# MX887013A/14A
# LTE FDD/TDD
# Uplink TX Measurement
# Operation Manual

**Seventh Edition**

- **For safety and warning information, please read this manual before attempting to use the equipment.**
- **Additional safety and warning information is provided in the MT8870A Universal Wireless Test Set Operation Manual. Please also refer to this document before using the equipment.**
- **Keep this manual with the equipment.**

## ANRITSU CORPORATION

Document No.: M-W3610AE-7.0

# Safety Symbols

To prevent the risk of personal injury or loss related to equipment malfunction, Anritsu Corporation uses the following safety symbols to indicate safety-related information. Ensure that you clearly understand the meanings of the symbols BEFORE using the equipment. Some or all of the following symbols may be used on all Anritsu equipment. In addition, there may be other labels attached to products that are not shown in the diagrams in this manual.

## Symbols used in manual

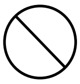
**DANGER** This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.

**WARNING** This indicates a hazardous procedure that could result in serious injury or death if not performed properly.

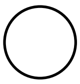
**CAUTION** This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

## Safety Symbols Used on Equipment and in Manual

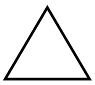
The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Ensure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.



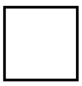
This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.



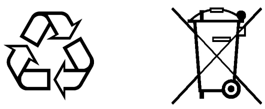
This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.



This indicates a warning or caution. The contents are indicated symbolically in or near the triangle.



This indicates a note. The contents are described in the box.



These indicate that the marked part should be recycled.

MX887013A/14A
LTE FDD/TDD Uplink TX Measurement
Operation Manual

20 August 2012 (First Edition)
17 November 2017 (Seventh Edition)

# Equipment Certificate

Anritsu Corporation guarantees that this equipment was inspected at shipment and meets the published specifications.

# Anritsu Warranty

- During the warranty period, Anritsu Corporation will repair or exchange this software free-of-charge if it proves defective when used as described in the operation manual.
- The warranty period is 6 months from the purchase date.
- The warranty period after repair or exchange will remain 6 months from the original purchase date, or 30 days from the date of repair or exchange, depending on whichever is longer.
- This warranty does not cover damage to this software caused by Acts of God, natural disasters, and misuse or mishandling by the customer.

In addition, this warranty is valid only for the original equipment purchaser. It is not transferable if the equipment is resold.

Anritsu Corporation shall assume no liability for injury or financial loss of the customer due to the use of or a failure to be able to use this equipment.

# Anritsu Corporation Contact

In the event of this equipment malfunctions, contact an Anritsu Service and Sales office. Contact information can be found on the last page of the printed version of this manual, and is available in a separate file on the PDF version.

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   - ii) If this Software is used in conjunction with other non-Anritsu-approved software.
   - iii) Recovery of lost or damaged data.
   - iv) If this Software or the Equipment has been modified, repaired, or otherwise altered without Anritsu's prior approval.
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## 8. Dispute Resolution

If matters of dispute or items not covered by this EULA arise, they shall be resolved by negotiations in good faith between you and Anritsu.

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This EULA shall be interpreted in accordance with Japanese law and any disputes that cannot be resolved by negotiation described in Article 8 shall be settled by the Japanese courts.

## Cautions against computer virus infection

- Copying files and data
  Only files that have been provided directly from Anritsu or generated using Anritsu equipment should be copied to the instrument.
  All other required files should be transferred by means of USB or CompactFlash media after undergoing a thorough virus check.
- Adding software
  Do not download or install software that has not been specifically recommended or licensed by Anritsu.
- Network connections
  Ensure that the network has sufficient anti-virus security protection in place.

# CE Conformity Marking

Anritsu affixes the CE conformity marking on the following product(s) in accordance with the Decision 768/2008/EC to indicate that they conform to the EMC and LVD directive of the European Union (EU).

**CE marking**

## 1. Product Model

| | |
|---|---|
| Software: | MX887013A LTE FDD Uplink TX Measurement |
| Software: | MX887014A LTE TDD Uplink TX Measurement |

## 2. Applied Directive and Standards

When MX887013A LTE FDD Uplink TX Measurement or MX887014A LTE TDD Uplink TX Measurement is installed in the MT8870A, the applied directive and standards of this software conform to those of the MT8870A main frame.

PS: About main frame

Please contact Anritsu for the latest information on the main frame types that MX887013A or MX887014A can be used with.

# RCM Conformity Marking

Anritsu affixes the RCM mark on the following product(s) in accordance with the regulation to indicate that they conform to the EMC framework of Australia/New Zealand.

**RCM marking**

## 1. Product Model

| | |
|---|---|
| Software: | MX887013A LTE FDD Uplink TX Measurement |
| Software: | MX887014A LTE TDD Uplink TX Measurement |

## 2. Applied Directive and Standards

When MX887013A LTE FDD Uplink TX Measurement or MX887014A LTE TDD Uplink TX Measurement is installed in the MT8870A, the applied directive and standards of this software conform to those of the MT8870A main frame.

PS: About main frame

Please contact Anritsu for the latest information on the main frame types that MX887013A or MX887014A can be used with.

# About This Manual

This manual mainly describes the use, panels, and specifications of the MX887013A LTE FDD Uplink TX Measurement and MX887014A LTE TDD Uplink TX Measurement.

Products related to the MT8870A Universal Wireless Test Set include:
- MT8870A Universal Wireless Test Set (main unit)
- Modules installed in the MT8870A
- Application software installed in the modules
- Control software installed in a PC controller

These products are referred to as the "Universal Wireless Test Set Series". The operation manuals for the Universal Wireless Test Set Series consist of separate documents for the main unit, module(s), application software, and control software, as shown below. ▭ represents this manual.

**Main Unit Operation Manual**

Describes precautions for safe use, how to connect power and interfaces, and operation and maintenance of the unit.

**Module Operation Manual**

Describes specifications and operation of the modules. Each module has its own operation manual.

**Application Software Operation Manual**

Describes how to use the application software installed in the modules and remote commands. Each application software has its own operation manual.

**MX887013A/14A LTE FDD/TDD Uplink TX Measurement Operation Manual**

Describes the functions and remote commands of the MX887013A LTE FDD Uplink TX Measurement and the MX887014A LTE TDD Uplink TX Measurement.

**Control Software Operation Manual**

Describes how to install and operate the software for controlling the MT8870A system via a PC. Each control software has its own operation manual.

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# Chapter 1 Outline



This chapter outlines the MX887013A/14A LTE FDD/TDD Uplink TX Measurement. Refer to Appendix A Specifications for the software functions and performance.

## 1.1 Outline

The MX887013A/14A LTE FDD/TDD Uplink TX Measurement (hereafter MX887013A/14A) adds the LTE (Long Term Evolution) wireless measurement function to the MU887000A TRX Test Module.

The MX887013A/14A supports setting of an arbitrary waveform pattern for sending as the LTE downlink signal. Regardless of the uplink signal information, the modulated waveform pattern loaded from memory is sent as the downlink signal (Non-signalling method).

The Signalling method, which detects the Uplink signal information, such as call processing with the mobile station, and changes the Downlink signal modulation, is not supported.

The signal sent from the MU887000A to the mobile station is the downlink signal and the signal sent from the mobile station to the MU887000A is the uplink signal.

When conducting the RX measurement by the MX887013A/14A, execute throughput measurement by the mobile station.

# 1.2 Composition

The composition of the MX887013A/14A is shown in Table 1.2-1, Table 1.2-2.

**Table 1.2-1 MX887013A Composition**

| Item | Model/Code | Name | Qty | Remarks |
|---|---|---|---|---|
| Software | | Storage media (DVD, etc.) | 1 | |
| | MX887013A | LTE FDD Uplink TX Measurement | | License file included on storage media (DVD, etc.) |
| | W3610AE | MX887013A/14A LTE FDD/TDD Uplink TX Measurement Operation Manual | | English, on storage media (DVD, etc.) |
| Option | MX887013A-001 | LTE-Advanced FDD Uplink CA TX Measurement | | License file included on storage media (DVD, etc.) |

**Table 1.2-2 MX887014A Composition**

| Item | Model/Code | Name | Qty | Remarks |
|---|---|---|---|---|
| Software | | Storage media (DVD, etc.) | 1 | |
| | MX887014A | LTE TDD Uplink TX Measurement | | License file included on storage media (DVD, etc.) |
| | W3610AE | MX887013A/14A LTE FDD/TDD Uplink TX Measurement Operation Manual | | English, on storage media (DVD, etc.) |
| Option | MX887014A-001 | LTE-Advanced TDD Uplink CA TX Measurement | | License file included on storage media (DVD, etc.) |

# 1.3 License Registration

Before the MX887013A or MX887014A software can be used, the software license must be registered in the MT8870A.

Refer to Chapter 8 “Utility Tool” in *the MU887000A TRX Test Module Operation Manual* for the license registration procedure.

# 1.4 Abbreviations

The abbreviations used in this manual are listed in Table 1.4-1.

**Table 1.4-1 Abbreviations**

| Abbreviation | Name |
|---|---|
| ACLR | Adjacent Channel Leakage Ratio |
| AWGN | Additive White Gaussian Noise |
| CA | Carrier Aggregation |
| CQI | Channel Quality Indicator |
| DL | Downlink |
| E-UMTS | Evolved UMTS Terrestrial Radio Access |
| EVM | Error Vector Magnitude |
| FDD | Frequency Division Duplex |
| LTE | Long Term Evolution |
| NS | Network Signalling value |
| OBW | Occupied Bandwidth |
| PDCCH | Physical Downlink Control Channel |
| PDSCH | Physical Downlink Shared Channel |
| PUCCH | Physical Uplink Control Channel |
| PUSCH | Physical Uplink Shared Channel |
| RB | Resource Block |
| RMC | Reference Measurement Channel |
| RS | Reference Signal |
| SEM | Spectrum Emission Mask |
| SIB | System Information Block |
| TDD | Time Division Duplex |
| TPC | Total Power Control |
| TS | Technical Specification |
| UL | Uplink |
| UMTS | Universal Mobile Telecommunication System |

# Chapter 2 Fundamental Measurement

This chapter describes the fundamental functions and commands of the MX887013A/14A. For details of the commands, refer to Chapter 4 “SCPI Command Reference” and Chapter 5 “Native Command Reference”.

# 2.1 Common Operations

This section describes operations that are common to the measurements in Chapter 3 “Sequence Measurement”.
Both Native and SCPI commands are described in the introduction to commands.

## 2.1.1 Selecting application

Switch the MU887000A application software to cellular by setting the parameter to CELLULAR using the following command.

```
SYSSEL
:INSTrument[:SELect]
```

Switch the MX887013A/14A measurement standard using the following command. Set the parameter to LTE when a function described in Section 2.2, “Transmit Power” to Section 2.6, “Modulation Analysis” is to be used.
Set the parameter to SEQUENCE when using a function described in Chapter 3, “Sequence Measurement” at LTE measurement and set LTE as the sequence measurement configuration.

- Setting Measurement Mode

```
STDSEL
:CONFigure:CELLular:MEASurement:STANdard
```

- Sequence Measurement Configuration

```
SEQMEAS
:CONFigure:CELLular:SEQuence:SETup
```

## 2.1.2 Setting ports

Set the MU887000A ports to be used. The following command sets both the port for outputting the downlink signal and the port for receiving the uplink signals.
Set Port1 to Port4 at the parameter

```
PORT
:ROUTe:PORT:CONNect:DIRection
```

When setting the sequence table in sequence measurement, the sequence commands set only the output port to Port 1 to Port 4.
The above-mentioned command sets the receiving port.

## 2.1.3 Frequency and level

### 2.1.3.1 non CA

Frequency

Set the frequency and channel of the measured signal using the following commands.
The signal sent from the MU887000A to the mobile station is the downlink signal and the signal sent from the mobile station to the MU887000A is the uplink signal.

- Uplink Channel
  `ULCHAN`
  `:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel`
- Uplink Frequency (mobile station Tx)
  `ULFREQ`
  `TXFREQ`
  `:CONFigure:CELLular:MEASurement:RFSettings:FREQuency`
- Downlink Channel
  `DLCHAN`
  `:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel`
- Downlink Frequency (mobile station Rx)
  `DLFREQ`
  `RXFREQ`
  `:CONFigure:CELLular:GENerator:RFSettings:FREQuency`

Level

Set the level of the signal sent (Tx) from and received (Rx) by the MU887000A using the following commands.

- Output Level
  `OLVL`
  `:CONFigure:CELLular:GENerator:RFSettings:LEVel`
- Input Level
  `ILVL`
  `:CONFigure:CELLular:MEASurement:RFSettings:LEVel`

Cable loss correction

The loss of coaxial cables can be corrected for the output, input, and measured levels.
Refer to Chapter 3 Basic Operation in the *MU887000A TRX Test Module Operation Manual* for an explanation of the commands and loss correction data.

### 2.1.3.2 UL CA (MX887013A/14A-001)

The commands that can be used in UL CA are shown below.
The commands for PCC are the same as the non CA commands.

#### Frequency

Set the frequency and channel of the measured signal using the following commands.

- Uplink Channel for SCC-1
  `ULCHAN_SCC1`
  `:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel:SCC1`
- Uplink Frequency for SCC-1
  `ULFREQ_SCC1`
  `:CONFigure:CELLular:MEASurement:RFSettings:FREQuency:SCC1`
- Downlink Channel for SCC-1
  `DLCHAN_SCC1`
  `:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel:SCC1`
- Downlink Frequency for SCC-1
  `DLFREQ_SCC1`
  `:CONFigure:CELLular:GENErator:RFSettings:FREQuency:SCC1`
- Operation band
  Sets an operation band listed in Table 2.1.6-4.
  `BAND`
  `:CONFigure:CELLular:LTE:FUNDamental:BAND`
- Operation band for SCC-1
  Sets an operation band listed in Table 2.1.6-4.
  `BAND_SCC1`
  `:CONFigure:CELLular:LTE:FUNDamental:BAND:SCC1`

#### Level

Set the level of the signal received (Rx) by the MU887000A using the following commands:

- Input Level for SCC-1
  `ILVL_SCC1`
  `:CONFigure:CELLular:MEASurement:RFSettings:LEVel:SCC1`

#### Cable loss correction

The loss of coaxial cables can be corrected for the output, input, and measured levels.

- External Loss Table Index for SCC-1
  `EXTLOSSINDEX_SCC1`
  `:CONFigure:CELLular:LTE:EXTLoss:INDex:SCC1`

### 2.1.4 Setting transmission signal

To transmit the waveform pattern from MU887000A by using the Cellular application software, load the waveform file into the waveform memory, and then follow the procedure below:

1. Select the waveform file in the waveform memory.
2. Select the waveform pattern in the waveform file selected in step 1.
3. Set the Modulation On/Off and Output On/Off.

Use the following commands to select waveform file and waveform pattern and to set modulation and output On and Off.

- Output On/Off
  `LVL`
  `:CONFigure:CELLular:GENerator:RFSettings:STATe`
- Modulation On/Off
  `MOD`
  `:CONFigure:CELLular:GENerator:BBMode`
- Waveform File Select
  `PACKAGE`
  `:CONFigure:CELLular:GENerator:ARB:PACKage:SELect`
- Waveform Pattern Select
  `DLPAT`
  `:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect`
  `DLPAT_SYNC`
  `:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect:SYNC`
- Adding Noise
  `AWGNLVL`
  `:CONFigure:CELLular:GENerator:ARB:NOISE:STATe`
- Noise Level
  `AWGNPWR`
  `:CONFigure:CELLular:GENerator:ARB:NOISE:CN`

Use the following commands to load the waveform file into the waveform memory.
Refer to Chapter 5 SCPI Command Reference in the *MU887000A TRX Test Module Operation Manual*.

- To load waveform file into the waveform memory
  `:SOURce:GPRF:GENerator:ARB:FILE:LOAD`
- To query the file name in the waveform memory
  `:SOURce:GPRF:GENerator:ARB:WAVeform:NAME`
- To optimize the waveform memory capacity
  `:SOURce:GPRF:GENerator:ARB:WAVeform:DEFRag`

- To delete waveform file in the waveform memory
  `:SOURce:GPRF:GENerator:ARB:WAVeform:DELete`
- To query the waveform memory free space
  `:SOURce:GPRF:GENerator:ARB:WAVeform:FREE`

## 2.1.5 Waveform patterns

To send an LTE waveform pattern, specify a file in the MV887013A LTE FDD Downlink Waveform files or the MV887014A LTE TDD Downlink Waveform files as the waveform file.

Refer to Chapter 3, "Waveform File Details" in the *Waveform File for Cellular Application Operation Manual* for an explanation of the MV887013A LTE FDD Downlink Waveform files and the MV887014A LTE TDD Downlink Waveform files.

## 2.1.6 Setting LTE signals

Set the following items to configure the LTE signal.

Frame Structure

The LTE standard specifies two types of wireless frames: FDD (Frequency Division Duplex), and TDD (Time Division Duplex). Select one for the target signal. Set FDD when using the MX887013A, or Set TDD when using the MX887014A.

The following figure shows the FDD frame structure. Each 10-ms frame contains 10 subframes, each consisting of two slots. Each slot consists of seven symbols.

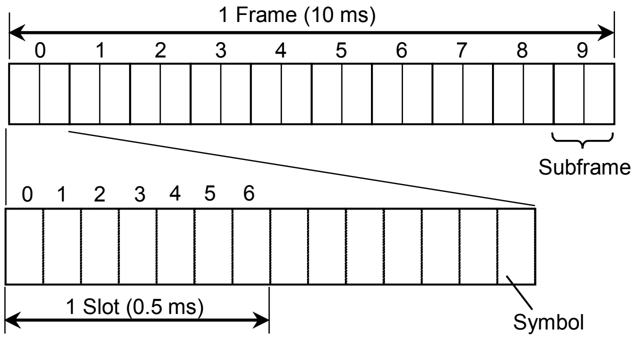


**Figure 2.1.6-1 FDD Frame Structure**

The following figure shows the TDD frame structure. Each 10-ms frame contains 10 subframes, each consisting of two slots.

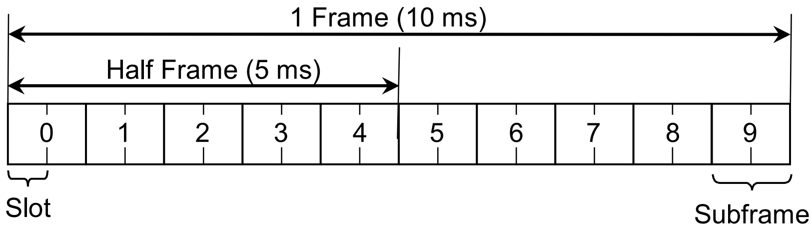


**Figure 2.1.6-2 TDD Frame Structure**

Uplink-Downlink configuration

Uplink-Downlink signal configuration of TDD is set as follows.

**Table 2.1.6-1 Uplink-Downlink configuration**

**(Reproduction of a part of 3GPP TS36.211, Table 4.2-2)**

| Uplink-downlink configuration | Downlink-to-Uplink Switch-point periodicity | Subframe number | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0 | 5 ms | D | S | U | U | U | D | S | U | U | U |
| 1 | 5 ms | D | S | U | U | D | D | S | U | U | D |
| 2 | 5 ms | D | S | U | D | D | D | S | U | D | D |
| 3 | 10 ms | D | S | U | U | U | D | D | D | D | D |
| 4 | 10 ms | D | S | U | U | D | D | D | D | D | D |
| 5 | 10 ms | D | S | U | D | D | D | D | D | D | D |
| 6 | 5 ms | D | S | U | U | U | D | S | U | U | D |

U: Uplink, D: Downlink, S: Special subframe

Channel Bandwidth

An LTE system has a variable transmission bandwidth called the channel bandwidth. The specified channel bandwidth values are 1.4, 3, 5, 10, 15, and 20 MHz.

Set the channel bandwidth of the measurement target signal.

Channel configuration

Select the target physical channel from the following:

PUSCH Physical Uplink Shared Channel

PSCCH Physical Uplink Control Channel

Reference measurement signal modulation

The Reference Measurement Channel (RMC) signal for measuring the wireless performance of LTE mobiles is specified in TS 36.521-1 Annex A. One of the QPSK, 16QAM, or 64QAM modulation scheme can be specified as the measurement target signal at the FDD/TDD frame Uplink RMC.

RMC Start RB Number

RMC Number of RBs

The LTE system has subcarrier signals at 15-kHz intervals and a set of 12 subcarriers is called a Resource Block (RB).
The number of allocated RBs is specified for each channel bandwidth.
The target RB is specified using the start RB number and the number of RBs as shown in Figure 2.1.6-3.

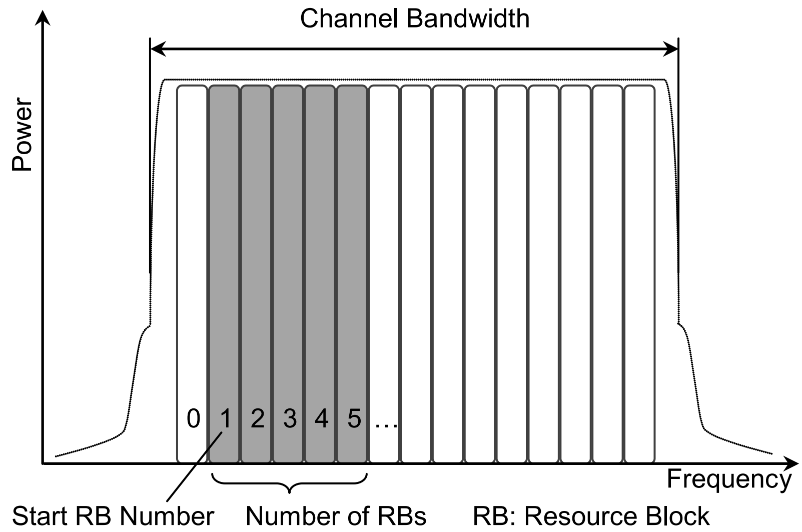


**Figure 2.1.6-3 Target Resource Blocks**

**Table 2.1.6-2 Number of Allocated Resource Blocks in Channel Bandwidth**

| Channel Bandwidth | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
|---|---|---|---|---|---|---|
| Number of Resource Blocks | 6 | 15 | 25 | 50 | 75 | 100 |

Long Span Code Search

The duration of Uplink synchronization signal detection varies with the Long Span Code Search setting.

Turning on Long Span Code Search lengthens the duration of the Uplink Reference Signal detection. It assures signal synchronization but lengthens the synchronization duration.

Turning off Long Span Code Search shortens the duration of the Uplink Reference Signal detection. If the Uplink and Downlink signals are already synchronized, turn off Long Span Code Search to shorten the measurement time.

Frequency Error Range

Select the frequency error detection method in the modulation analysis measurement.

When Narrow Range is set, the measurement time takes longer, but the high accuracy measurement is performed.

Channel Quality Indicator RB Number

Set the RB number for the mobile station to transmit the Downlink signal Channel Quality Indicator (CQI). The CQI is transmitted in the PUSCH, so the RB number determines the PUCCH position.

### Uplink and Downlink Channels

The frequency of the signals sent and received by the MU887000A is set by the channel numbers as specified in TS 36.101 5.7.3 Carrier frequency and EARFCN.

If the Uplink Channel Number setting is changed, the Downlink Channel Number and Uplink Frequency, Downlink Frequency and frame structure settings are changed as well. Changing Downlink Channel Number setting changes the Uplink Channel Number and Uplink Frequency, Downlink Frequency and frame structure settings.

However, the Uplink Frequency and channel number are not changed interlocking with the Downlink Frequency change and vice versa.

The following table below shows the relationship between the Downlink Channel Number and Uplink Channel Number settings.

**Table 2.1.6-3 Relationship between Uplink Channel Number and Downlink Channel Number**

| Downlink Channel Number ($N_{DL}$) | Uplink Channel Number ($N_{UL}$) |
|---|---|
| dl_ch | ul_ch |
| 0 to 4949 | ul_ch = dl_ch + 18000 |
| 5010 to 5379 | ul_ch = dl_ch + 18000 |
| 5730 to 7399 | ul_ch = dl_ch + 18000 |
| 7500 to 9659 | ul_ch = dl_ch + 18000 |
| 9770 to 9919 | ul_ch = dl_ch + 17890 |
| 36000 to 54539 | ul_ch = dl_ch |
| 55240 to 56739 | ul_ch = dl_ch |
| 65536 to 67135 | ul_ch = dl_ch + 65536 |
| 67536 to 67835 | ul_ch = dl_ch + 65136 |
| 68336 to 68485 | ul_ch = dl_ch + 64636 |
| 68586 to 68935 | ul_ch = dl_ch + 64536 |
| 253644 to 255143 | ul_ch = dl_ch |

The operating bandwidth (Band) and the following values are determined referring to Table 2.1.6-4, based on the Uplink Channel Number ($N_{UL}$) and the Downlink Channel Number ($N_{DL}$).

Downlink lower limit frequency ($F_{DL\_low}$), Downlink offset number ($N_{Offs\text{-}DL}$), Uplink lower limit frequency ($F_{UL\_low}$), Uplink offset number ($N_{Offs\text{-}UL}$)

The frame structure is decided by the operating band as in Table 2.1.6-5.

When Downlink Channel Number is changed, the MX887013A/14A executes the following processes:

1. Determines values of following parameters based on Downlink Channel Number ($N_{DL}$) and Table 2.1.6-4

   Downlink lower limit frequency ($F_{DL\_low}$), Downlink offset number ($N_{Offs\text{-}DL}$)

2. Calculates Downlink frequency ($F_{DL}$) from following equation:

   $F_{DL} = F_{DL\_low} + 0.1(N_{DL} - N_{Offs\text{-}DL})$

3. Sets Downlink frequency at MU887000A
4. Determines Uplink Channel Number ($N_{UL}$) based on Downlink Channel Number ($N_{DL}$) and Table 2.1.6-3
5. Determines values of following parameters based Uplink Channel Number ($N_{UL}$) and Table 2.1.6-4

   Uplink lower limit frequency ($F_{UL\_low}$), Uplink offset number ($N_{Offs\text{-}UL}$)

6. Calculates Uplink Frequency ($F_{UL}$) from following equation:

   $F_{UL} = F_{UL\_low} + 0.1(N_{UL} - N_{Offs\text{-}UL})$

7. Sets Uplink frequency ($F_{UL}$) at MU887000A

When Uplink Channel is changed, the MX887013A/14A executes the following processing:

1. Determines values of following parameters based on Uplink Channel Number ($N_{UL}$) and Table 2.1.6-4.

   Uplink lower limit frequency ($F_{UL\_low}$), Uplink offset number ($N_{Offs\text{-}UL}$)

2. Calculates Uplink frequency ($F_{UL}$) from following equation:

   $F_{UL} = F_{UL\_low} + 0.1(N_{UL} - N_{Offs\text{-}UL})$

3. Sets Uplink frequency at MU887000A
4. Determines Downlink Channel Number ($N_{DL}$) based on Uplink Channel Number ($N_{UL}$) and Table 2.1.6-3
5. Determines values of following parameters based on Downlink Channel Number ($N_{DL}$) and Table 2.1.6-4:

   Downlink lower limit frequency ($F_{DL\_low}$), Downlink offset number ($N_{Offs\text{-}DL}$)

6. Calculates Downlink frequency ($F_{DL}$) from following equation:

   $F_{DL} = F_{DL\_low} + 0.1(N_{DL} - N_{Offs\text{-}DL})$

7. Sets Downlink frequency at MU887000A

Table 2.1.6-4 E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation (Reprinted from Table 5.7.3-1 and Table 5.7.4-1 of 3GPP TS36.101)

| Band | Freq Separation (MHz) | Downlink | | | Uplink | | |
|---|---|---|---|---|---|---|---|
| | | $F_{DL\_low}$ (MHz) | $N_{Offs\text{-}DL}$ | Range of $N_{DL}$ | $F_{UL\_low}$ (MHz) | $N_{Offs\text{-}UL}$ | Range of $N_{UL}$ |
| 1 | 190 | 2110 | 0 | 0 to 599 | 1920 | 18000 | 18000 to 18599 |
| 2 | 80 | 1930 | 600 | 600 to 1199 | 1850 | 18600 | 18600 to 19199 |
| 3 | 95 | 1805 | 1200 | 1200 to 1949 | 1710 | 19200 | 19200 to 19949 |
| 4 | 400 | 2110 | 1950 | 1950 to 2399 | 1710 | 19950 | 19950 to 20399 |
| 5 | 45 | 869 | 2400 | 2400 to 2649 | 824 | 20400 | 20400 to 20649 |
| 6 | 45 | 875 | 2650 | 2650 to 2749 | 830 | 20650 | 20650 to 20749 |
| 7 | 120 | 2620 | 2750 | 2750 to 3449 | 2500 | 20750 | 20750 to 21449 |
| 8 | 45 | 925 | 3450 | 3450 to 3799 | 880 | 21450 | 21450 to 21799 |
| 9 | 95 | 1844.9 | 3800 | 3800 to 4149 | 1749.9 | 21800 | 21800 to 22149 |
| 10 | 400 | 2110 | 4150 | 4150 to 4749 | 1710 | 22150 | 22150 to 22749 |
| 11 | 48 | 1475.9 | 4750 | 4750 to 4949 | 1427.9 | 22750 | 22750 to 22949 |
| 12 | 30 | 729 | 5010 | 5010 to 5179 | 699 | 23010 | 23010 to 23179 |
| 13 | –31 | 746 | 5180 | 5180 to 5279 | 777 | 23180 | 23180 to 23279 |
| 14 | –30 | 758 | 5280 | 5280 to 5379 | 788 | 23280 | 23280 to 23379 |
| … | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| 17 | 30 | 734 | 5730 | 5730 to 5849 | 704 | 23730 | 23730 to 23849 |
| 18 | 45 | 860 | 5850 | 5850 to 5999 | 815 | 23850 | 23850 to 23999 |
| 19 | 45 | 875 | 6000 | 6000 to 6149 | 830 | 24000 | 24000 to 24149 |
| 20 | –41 | 791 | 6150 | 6150 to 6449 | 832 | 24150 | 24150 to 24449 |
| 21 | 48 | 1495.9 | 6450 | 6450 to 6599 | 1447.9 | 24450 | 24450 to 24599 |
| 22 | 48 | 3510 | 6600 | 6600 to 7399 | 3410 | 24600 | 24600 to 25399 |
| 23 | 100 | 2180 | 7500 | 7500 to 7699 | 2000 | 25500 | 25500 to 25699 |
| 24 | 180 | 1525 | 7700 | 7700 to 8039 | 1626.5 | 25700 | 25700 to 26039 |
| 25 | –101.5 | 1930 | 8040 | 8040 to 8689 | 1850 | 26040 | 26040 to 26689 |
| 26 | 45 | 859 | 8690 | 8690 to 9039 | 814 | 26690 | 26690 to 27039 |
| 27 | 45 | 852 | 9040 | 9040 to 9209 | 807 | 27040 | 27040 to 27209 |
| 28 | 55 | 758 | 9210 | 9210 to 9659 | 703 | 27210 | 27210 to 27659 |
| 29 | N/A | 717 | 9660 | 9660 to 9769 | N/A | N/A | N/A |
| 30 | 45 | 2350 | 9770 | 9770 to 9869 | 2305 | 27660 | 27660 to 27759 |
| 31 | 10 | 462.5 | 9870 | 9870 to 9919 | 452.5 | 27760 | 27760 to 27809 |
| 32 | N/A | 1452 | 9920 | 9920 to 10359 | N/A | N/A | N/A |
| 33 | 0 | 1900 | 36000 | 36000 to 36199 | 1900 | 36000 | 36000 to 36199 |
| 34 | 0 | 2010 | 36200 | 36200 to 36349 | 2010 | 36200 | 36200 to 36349 |
| 35 | 0 | 1850 | 36350 | 36350 to 36949 | 1850 | 36350 | 36350 to 36949 |
| 36 | 0 | 1930 | 36950 | 36950 to 37549 | 1930 | 36950 | 36950 to 37549 |
| 37 | 0 | 1910 | 37550 | 37550 to 37749 | 1910 | 37550 | 37550 to 37749 |
| 38 | 0 | 2570 | 37750 | 37750 to 38249 | 2570 | 37750 | 37750 to 38249 |
| 39 | 0 | 1880 | 38250 | 38250 to 38649 | 1880 | 38250 | 38250 to 38649 |

Table 2.1.6-4 E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation (Reprinted from Table 5.7.3-1 and Table 5.7.4-1 of 3GPP TS36.101) (Cont'd)

| Band | Freq Separation (MHz) | Downlink | | | Uplink | | |
|---|---|---|---|---|---|---|---|
| | | $F_{DL\_low}$ (MHz) | $N_{Offs\text{-}DL}$ | Range of $N_{DL}$ | $F_{UL\_low}$ (MHz) | $N_{Offs\text{-}UL}$ | Range of $N_{UL}$ |
| 40 | 0 | 2300 | 38650 | 38650 to 39649 | 2300 | 38650 | 38650 to 39649 |
| 41 | 0 | 2496 | 39650 | 39650 to 41589 | 2496 | 39650 | 39650 to 41589 |
| 42 | 0 | 3400 | 41590 | 41590 to 43589 | 3400 | 41590 | 41590 to 43589 |
| 43 | 0 | 3600 | 43590 | 43590 to 45589 | 3600 | 43590 | 43590 to 45589 |
| 44 | 0 | 703 | 45590 | 45590 to 46589 | 703 | 45590 | 45590 to 46589 |
| 45 | 0 | 1447 | 46590 | 46590 to 46789 | 1447 | 46590 | 46590 to 46789 |
| 46 | 0 | 5150 | 46790 | 46790 to 54539 | 5150 | 46790 | 46790 to 54539 |
| … | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| 48 | 0 | 3550 | 55240 | 55240 to 56739 | 3550 | 55240 | 55240 to 56739 |
| … | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| 65 | 190 | 2110 | 65536 | 65536 to 66435 | 1920 | 131072 | 131072 to 131971 |
| 66 | 400 | 2110 | 66436 | 66436 to 67335 | 1710 | 131972 | 131972 to 132671 |
| 67 | N/A | 738 | 67336 | 67336 to 67535 | N/A | N/A | N/A |
| 68 | 55 | 753 | 67536 | 67536 to 67835 | 698 | 132672 | 132672 to 132971 |
| 69 | N/A | 2570 | 67836 | 67836 to 68335 | N/A | N/A | N/A |
| 70 | 300 | 1995 | 68336 | 68336 to 68585 | 1695 | 132972 | 132972 to 133121 |
| 71 | –46 | 617 | 68586 | 68586 to 68935 | 663 | 133122 | 133122 to 133471 |
| … | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| 250 | 0 | 3550 | 253644 | 253644 to 255143 | 3550 | 253644 | 253644 to 255143 |
| 252*1 | N/A | 5150 | 255144 | 255144 to 256143 | N/A | N/A | N/A |
| 255*1 | N/A | 5725 | 260894 | 260894 to 262143 | N/A | N/A | N/A |

*1: This can be used only when MU887000A-001/101 is installed.

Table 2.1.6-5 Band and Frame Structure

| Band | Frame Structure |
|---|---|
| 1 to 14 | FDD |
| 17 to 32 | FDD |
| 33 to 46 | TDD |
| 48 | TDD |
| 65 to 71 | FDD |
| 250 | TDD |
| 252, 255 | FDD |

### 2.1.6.1 non CA

Use the following commands to set the LTE signals

- Frame Structure
  FRAMETYPE
  :CONFigure:CELLular:LTE:FSTRucture
- Uplink DownlinkConfiguration
  TDDULDLCONF
  :CONFigure:CELLular:LTE:ULDL
- Channel Bandwidth
  BANDWIDTH
  :CONFigure:CELLular:LTE:CBANdwidth
- Channel Bandwidth and Resource Block
  BW_RB
  :CONFigure:CELLular:LTE:BWRB
- Channel Coding
  CHCODING
  :CONFigure:CELLular:LTE:CHCoding
- Channel Configuration
  CHCONFIG
  :CONFigure:CELLular:LTE:CTYPe
- Modulation Method for Reference Measurement Channel
  ULRMC_MOD
  :CONFigure:CELLular:LTE:MODulation:MSCHeme
- Number of Resource Blocks of Reference Measurement Channel
  ULRMC_RB
  :CONFigure:CELLular:LTE:RBALlocation:NRB
- Start Position of Resource Block of Reference Measurement Channel
  ULRB_START
  :CONFigure:CELLular:LTE:RBALlocation:ORB
- Position of Resource Block of Channel Quality Indicator
  NRBCQI
  :CONFigure:CELLular:LTE:RBCQi
- Long Span Code Search
  LONGSEARCH
  :CONFigure:CELLular:LTE:FUNDamental:LSSearch
- Frequency Error Range
  FREQERRRNG
  :CONFigure:CELLular:LTE:FUNDamental:FERange
- Group Hopping On/Off
  GROUPHOP
  :CONFigure:CELLular:LTE:GHOPping
- Cell ID
  CELLID

:CONFigure:CELLular:LTE:CID

- Cyclic Shift

  CSHIFT

  :CONFigure:CELLular:LTE:CSHift

- Delta SS

  DELTASS

  CONFigure:CELLular:LTE:DSS

### 2.1.6.2 UL CA (MX887013A/14A-001)

The commands that can be used in UL CA are shown below.
The commands for PCC are the same as the non CA commands.

- Measurement Carrier
  MCARRIER
  :CONFigure:CELLular:LTE:MCARrier
- Frame Structure for SCC-1
  FRAMETYPE_SCC1
  :CONFigure:CELLular:LTE:FSTRucture:SCC1
- Channel Bandwidth for SCC-1
  BANDWIDTH_SCC1
  :CONFigure:CELLular:LTE:CBANdwidth:SCC1
- Channel Bandwidth and Resource Block for SCC-1
  BW_RB_SCC1
  :CONFigure:CELLular:LTE:BWRB:SCC1
- Cell ID for SCC-1
  CELLID_SCC1
  :CONFigure:CELLular:LTE:CID
- Modulation Method for Reference Measurement Channel of SCC-1
  ULRMC_MOD_SCC1
  :CONFigure:CELLular:LTE:MODulation:MSCHeme:SCC1
- Number of Resource Blocks of Reference Measurement Channel for SCC-1
  ULRMC_RB_SCC1
  :CONFigure:CELLular:LTE:RBALlocation:NRB:SCC1
- UL RMC Starting RB for SCC-1
  ULRB_START_SCC1
  :CONFigure:CELLular:LTE:RBALlocation:ORB:SCC1
- In-band Emission Carrier Leakage Frequency
  Sets the position of Carrier Leakage Frequency of the UE in the In-Band Emissions/EVM measurement at Contiguous UL CA.
  When At Carrier Frequency is specified, the resource block located at the center frequency of Aggregated Channel Bandwidth is treated as the carrier leak frequency and the In-Band Emission/EVM measurement is performed. The UL Number of RB of either PCC or SCC-1 must be set to 0.
  When At Each CC Center is specified, the center frequencies of each CC are treated as the carrier leak frequency and the In-Band Emission/EVM measurement is performed.
  IBEM_CLFR
  :CONFigure:CELLular:LTE:FUNDamental:IEMissions:CLFRequency

### 2.1.7 Setting measurement

Set the following measurement items.

- Trigger level (Only valid for TDD.)
  FMEAS_TRGLVL
  :TRIGger:CELLular:LTE:FUNDamental:LEVel
- Trigger Timeout (Only valid for TDD.)
  FMEAS_TRGTOUT
  :TRIGger:CELLular:LTE:FUNDamental:TOUT
- Trigger Delay (Only valid for TDD.)
  FMEAS_TRGDLY
  :TRIGger:CELLular:LTE:FUNDamental:DELay
- Trigger Source (Only valid for TDD.)
  FMEAS_TRGSRC
  :TRIGger:CELLular:LTE:FUNDamental:SOURce

Use the following command when not measuring.

- Setting all measurement items to off
  ALLMEASITEMS_OFF
  :CONFigure:CELLular:LTE:FUNDamental:AMITems:OFF

## 2.1.8 Starting/stopping measurement

### Starting measurement

To start measurement, send the following command.

The status indication lamp 3 of MU887000A is on during the execution of measurement or analysis. For the explanation of the status lamp, refer to Appendix D “Status Indication of lamps” in *the MU887000A TRX Test Module Operation Manual*.

```
SNGLS
:INITiate:CELLular:MEASurement:SINGle
```

***Note:***

When set to FDD, LTE fundamental measurement does not support a start trigger. Measurement starts as soon as the measurement start command is sent. When set to TDD, the measurement always starts with Trigger source set to Power or Frame. Refer to Chapter 3 “Sequence Measurement” for the trigger in Sequence Measurement.

### Stopping measurement

To stop measurement, send the following command.

```
MEASSTOP
:ABORt:CELLular:MEASurement
```

### Checking measurement status

Query the measurement status and errors using the following commands.

```
MSTAT
:FETCh:CELLular:MEASurement:STATe
```

**Table 2.1.8-1 Query Response**

| Response | Description |
|---|---|
| 0 | Measurement completed normally |
| 2 | Level exceeded<br>The MU887000A receive level is higher than the set input level. |
| 5 | Synchronization word not detected<br>Because the output Downlink signal was incorrect, the frames were not synchronized when Long Span Code Search is Off.<br>Or no reference signal was detected for Uplink frame synchronization. |
| 9 | Measurement in progress or not executed |
| 12 | Tx measurement timeout<br>No trigger occurred before measurement timed out. |

The measurement status and errors can be queried using the status registers.
Refer to Chapter 3 "Fundamental Operation" in the *MU887000A TRX Test Module Operation Manual* for an explanation of the status registers.
The allocations of MX887013A/14A status registers are described in the following tables.

Native command mode

**Table 2.1.8-2 Bit Definition of End Event Status Register (Signal Generator)**

| Bit | Description |
|---|---|
| 7 to 1 | Not used and always set to 0. |
| 0 | Changed to 1 at end of reading waveform file |

**Table 2.1.8-3 Bit Definition of End Event Status Register (Measurement)**

| Bit | Description |
|---|---|
| 7 to 2 | Not used and always set to 0. |
| 1 | Changed to 1 after trigger prepared |
| 0 | Changed to 1 when measurement preparation completed |

**Table 2.1.8-4 Bit Definition of Error Event Status Register (Signal Generator)**

| Bit | Description |
|---|---|
| 7 to 1 | Not used and always set to 0. |
| 0 | Changed to 1 at error in read waveform file |

**Table 2.1.8-5 Bit Definition of Error Event Status Register (Measurement)**

| Bit | Description |
|---|---|
| 7 to 3 | Not used and always set to 0. |
| 2 | Changed to 1 at measurement timeout |
| 1 | Changed to 1 when measurement result under level |
| 0 | Changed to 1 when measurement result over level |

SCPI Command mode

**Table 2.1.8-6 Bit Definition of Signal Generator Status Register**

| Bit | Description |
|---|---|
| 16 to 1 | Not used and always set to 0. |
| 0 | Changed to 1 while reading file |

**Table 2.1.8-7 Bit Definition of Measurement Status Register**

| Bit | Description |
|---|---|
| 16 to 2 | Not used and always set to 0. |
| 1 | Changed to 1 while preparing trigger |
| 0 | Changed to 1 during measurement |

**Table 2.1.8-8 Bit Definition of Signal Generator Questionable Register**

| Bit | Description |
|---|---|
| 16 to 1 | Not used and always set to 0. |
| 0 | Changed to 1 at error in read file |

**Table 2.1.8-9 Bit Definition of Measurement Questionable Register**

| Bit | Description |
|---|---|
| 16 to 3 | Not used and always set to 0. |
| 2 | Changed to 1 at measurement timeout |
| 1 | Changed to 1 when measurement result under level |
| 0 | Changed to 1 when measurement result over level |

# 2.2 Transmit Power

The Tx Power measurement measures the power in the bandwidth specified in Table 6.3.2.3-1 of 3GPP TS36.521-1.

**Table 2.2-1 Tx Power Bandwidth (MHz)**

| Channel Bandwidth | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
|---|---|---|---|---|---|---|
| Tx Power | 1.4 | 3 | 5 | 10 | 15 | 20 |
| Channel Power | 1.08 | 2.7 | 4.5 | 9.0 | 13.5 | 18 |

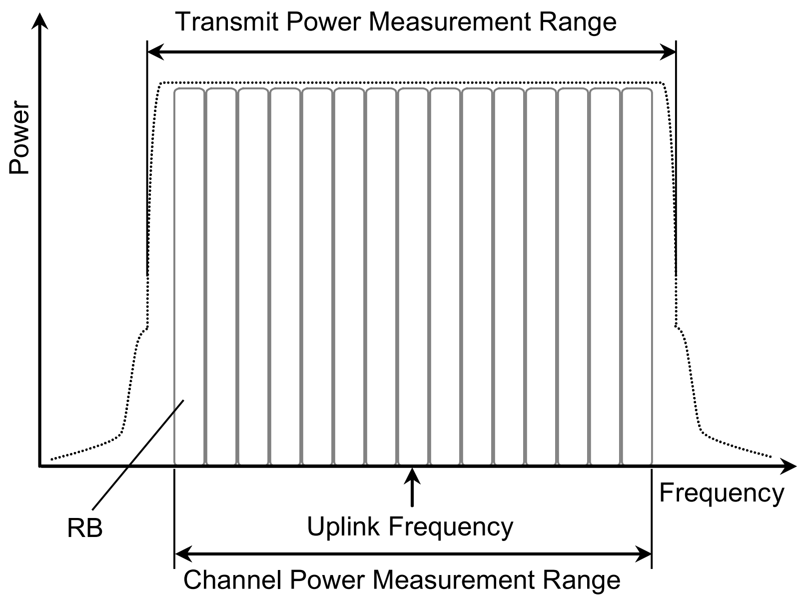


**Figure 2.2-1 Tx Power Measurement Range**

## 2.2.1 non CA

Set the following parameter to measure the Uplink Tx Power.

Center frequency

Specify the center frequency for power measurement using the following parameters:

- Uplink Frequency as described in Section 2.1.3 "Frequency and level"
- Uplink Channel as described in Section 2.1.6 "Setting LTE signals"

Bandwidth

Determine the channel bandwidth for power measurement by referring to Section 2.1.6 "Setting LTE signals".

Measurement enable and measurement count

Enable measurement of the Tx power and specify the measurement count. The power of 1 subframe (1 ms) is measured at each measurement count. The measurement count can be set from 1 to 200.

```
PWR_SET
:CONFigure:CELLular:LTE:FUNDamental:POWer:SET
```

Fast Power Measurement Mode

If Fast Power Measurement Mode is turned On, the Tx power measurement time can be shortened by changing the hardware process. However, Occupied Bandwidth, Spectrum Emission Mask, Adjacent Channel Leakage Power Ratio, Modulation analysis cannot be measured.

```
FASTPWRMODE
:CONFigure:CELLular:LTE:FUNDamental:POWer:FMODe
```

Use the following commands to query the Tx power measurement results.

- Tx Power
  ```
  TXPWR
  :FETCh:CELLular:LTE:FUNDamental:POWer:TXPower
  ```
- Channel Power
  ```
  CHPWR
  :FETCh:CELLular:LTE:FUNDamental:POWer:CHPower
  ```

## 2.2.2 UL CA (MX887013A/14A-001)

The following items are measured for Total, PCC, and SCC-1.

**Table 2.2.2-1 Measurement Items of Tx Power**

| Measurement Item | | Contiguous UL CA | Inter-band UL CA | Fast Power Measurement = ON |
|---|---|---|---|---|
| Total | Tx Power | ✓*1 | | ✓*2 |
| | Channel Power | | | |
| PCC | Tx Power | ✓ | ✓ | |
| | Channel Power | ✓ | ✓ | |
| SCC-1 | Tx Power | ✓ | ✓ | |
| | Channel Power | ✓ | ✓ | |

*1: The Total Tx Power measurement bandwidth is determined using the following formula described in 3GPP TS36.521-1 5.4.2A.

$$BW_{Channel\_CA} = F_{edge,high} - F_{edge,low}\ [MHz]$$

*2: The power of PCC is measured.

Use the following commands to query the Tx power measurement results.

- Tx Power
  `TXPWR`
  `:FETCh:CELLular:LTE:FUNDamental:POWer:TXPower`
- Channel Power
  `CHPWR`
  `:FETCh:CELLular:LTE:FUNDamental:POWer:CHPower`

# 2.3 Occupied Bandwidth

Occupied Bandwidth is the bandwidth with a specific proportion of the total measured power.

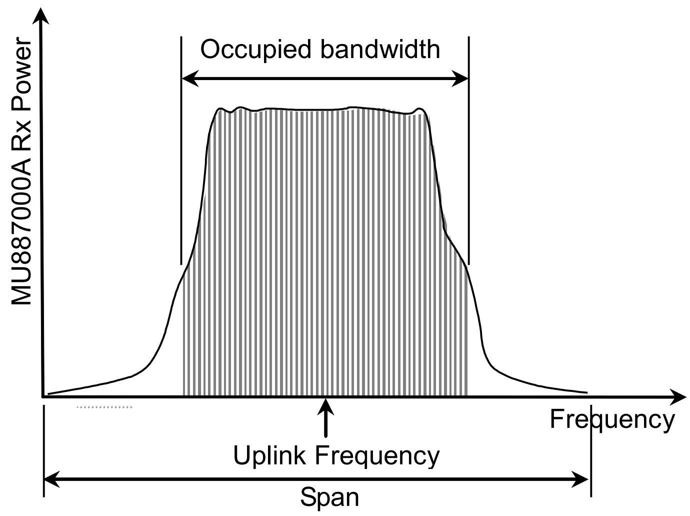


**Figure 2.3-1 Occupied Bandwidth**

## 2.3.1 non CA

The Occupied Bandwidth measurement settings are:

Center frequency

Specify the center frequency by referring to:

- Uplink Frequency described in Section 2.1.3 "Frequency and level"
- Uplink Channel described in Section 2.1.6 "Setting LTE signals"

Span

The frequency span is determined by the channel bandwidth setting, referring to Section 2.1.6 "Setting LTE signals".

**Table 2.3.1-1 Occupied Bandwidth Measurement Frequency Range**

| Channel Bandwidth | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
|---|---|---|---|---|---|---|
| Span (MHz) | 3.632 | 7.562 | 12.603 | 25.250 | 37.811 | 50.458 |

Occupied Bandwidth power ratio

Set the power ratio (occupied ratio) for determining the Occupied Bandwidth within the range from 80.0 to 99.9%.

```
OBW_RATIO
:CONFigure:CELLular:LTE:FUNDamental:OBW:RATio
```

Measurement enable and measurement count

Use the following command to enable Occupied Bandwidth measurement and specify the measurement count. The Occupied Bandwidth for 1 subframe (1 ms) is measured at each measurement count. The measurement count can be set from 1 to 200.

```
OBW_SET
:CONFigure:CELLular:LTE:FUNDamental:OBW:SET
```

Use the following command to query the results of Occupied Bandwidth measurement.

- OBW Result
  ```
  OBW
  :FETCh:CELLular:LTE:FUNDamental:OBW
  ```
- OBW Frequency Result
  ```
  OBWFREQ
  :FETCh:CELLular:LTE:FUNDamental:OBW:FREQuency
  ```

### 2.3.2 UL CA (MX887013A/14A-001)

The following items are measured for Total, PCC, and SCC-1.

**Table 2.3.2-1 Measurement Items of OBW**

| Measurement Item | | Contiguous UL CA | Inter-band UL CA |
|---|---|---|---|
| Total | OBW | ✓ | |
| | Upper Frequency | ✓ | |
| | Lower Frequency | ✓ | |
| | Center (Upper+Lower) /2 | ✓ | |
| | Wave Data | ✓ | |
| PCC | OBW | | ✓ |
| | Upper Frequency | | ✓ |
| | Lower Frequency | | ✓ |
| | Center (Upper+Lower) /2 | | ✓ |
| | Wave Data | | ✓ |
| SCC-1 | OBW | | ✓ |
| | Upper Frequency | | ✓ |
| | Lower Frequency | | ✓ |
| | Center (Upper+Lower) /2 | | ✓ |
| | Wave Data | | ✓ |

Use the following command to query the results of Occupied Bandwidth measurement.

- OBW Result
  `OBW`
  `:FETCh:CELLular:LTE:FUNDamental:OBW`
- OBW Frequency Result
  `OBWFREQ`
  `:FETCh:CELLular:LTE:FUNDamental:OBW:FREQuency`

# 2.4 Spectrum Emission Mask

Spectrum Emission Mask measurement measures the peak level and margin at the conditions specified in TS 36.521-1 6.6.2.1 Spectrum Emission Mask.

## 2.4.1 non CA

When using the MX887013A, the spectrum emission mask frequency ranges are called Range 1, Range 2, Range 3, and Range 4, starting sequentially from the end of the channel bandwidth.

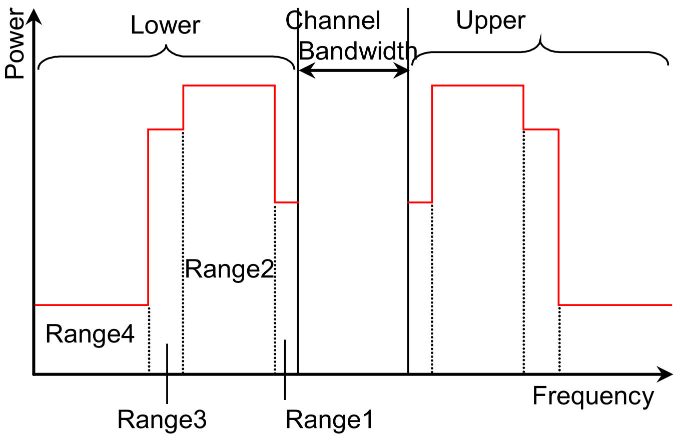


**Figure 2.4.1-1 Mask Range of Spectrum Emission Mask**

The Range 1 to Range 4 varies with the Channel Bandwidth and the Network Signal Value (NS_01 to NS_07) for the Additional Spectrum Emission.

**Table 2.4.1-1 Frequency ranges of Range 1 to Range 4**

| | | Frequency range | | | |
|---|---|---|---|---|---|
| **Additional Spectrum Emission** | **Channel Bandwidth (MHz)** | **Range 1** | **Range 2** | **Range 3** | **Range 4** |
| NS_01<br>NS_02<br>NS_03<br>NS_04<br>NS_05 | 1.4 | 0 to 1 MHz | 1 to 2.5 MHz | 2.5 to 2.8 MHz | ----- |
| | 3.0 | 0 to 1 MHz | 1 to 5 MHz | 5 to 6 MHz | ----- |
| | 5 | 0 to 1 MHz | 1 to 5 MHz | 5 to 6 MHz | 6 to 1.0 MHz |
| | 10 | 0 to 1 MHz | 1 to 5 MHz | 5 to 10 MHz | 10 to 15 MHz |
| NS_01 to NS_07 | 15 | 0 to 1 MHz | 1 to 5 MHz | 5 to 15 MHz | 15 to 20 MHz |
| | 20 | 0 to 1 MHz | 1 to 5 MHz | 5 to 20 MHz | 20 to 25 MHz |
| Measurement Bandwidth | | 30 kHz | 1 MHz | 1 MHz | 1 MHz |
| NS_06<br>NS_07 | 1.4 | 0 to 0.1 MHz | 0.1 to 1 MHz | 1 to 2.5 MHz | 2.5 to 2.8 MHz |
| | 3.0 | 0 to 0.1 MHz | 0.1 to 1 MHz | 1 to 5 MHz | 5 to 6 MHz |
| | 5 | 0 to 0.1 MHz | 0.1 to 1 MHz | 1 to 6 MHz | 6 to 10 MHz |
| | 10 | 0 to 0.1 MHz | 0.1 to 1 MHz | 1 to 10 MHz | 10 to 15 MHz |
| Measurement Bandwidth | | 30 kHz | 100 kHz | 1 MHz | 1 MHz |

The Spectrum Emission Mask settings are:

Additional Spectrum Emission
Set the Network Signal Value (NS_01 to NS_07) for Additional Spectrum Emission. The frequency range changes to the values shown in Table 2.4.1-1, depending on the NS_01 to NS_07 setting.

Level
Set the level for pass/fail evaluation of the spectrum emission mask for each channel bandwidth.

Measurement enable and measurement count
Enable spectrum emission mask measurement and specify the measurement count. The spectrum emission mask is measured for 1 subframe (1 ms) at each measurement count. The measurement count can be set from 1 to 200.

The results of the spectrum emission mask measurement are:

- Pass/fail result
  If the spectrum is at the mask level or below, the result is PASS. If it exceeds the mask level, the result is FAIL.
- Peak level and frequency at each level
- Margin
  This is the minimum level difference from the threshold. The applicable threshold depends on the signal level.

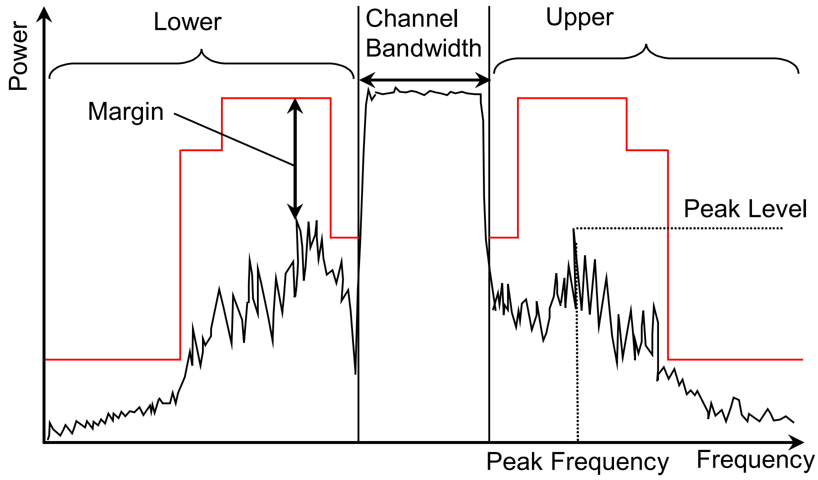


**Figure 2.4.1-2 Spectrum Emission Mask Measurement Result**

The peak level and frequency can be read in the following frequency ranges.

**Table 2.4.1-2 Frequency Ranges for Measurement Results (1/2)**

| | | Frequency Difference from Channel Bandwidth $\Delta f_{OOB}$ (MHz) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Additional Spectrum Emission** | **Channel Bandwidth (MHz)** | **0 - 1** | **1 - 2.5** | **2.5 - 2.8** | **2.8 - 5** | **5 - 6** | **6 - 10** | **10 - 15** | **15 - 20** | **20 - 25** |
| NS_01<br>NS_02<br>NS_03<br>NS_04<br>NS_05 | 1.4 | ✓ | ✓ | ✓ | | | | | | |
| | 3.0 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | |
| | 5 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 10 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| NS_01 to NS_07 | 15 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | 20 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Measurement Bandwidth | | 30 kHz | 1 MHz | 1 MHz | 1 MHz | 1 MHz | 1 MHz | 1 MHz | 1 MHz | 1 MHz |
| Frequency Range (freq_range) | | 1, –1 | 2, –2 | 3, –3 | 4, –4 | 5, –5 | 6, –6 | 7, –7 | 8, –8 | 9, –9 |

**Table 2.4.1-3 Frequency Ranges for Measurement Results (2/2)**

| | | Frequency Difference from Channel Bandwidth $\Delta f_{OOB}$ (MHz) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Additional Spectrum Emission** | **Channel Bandwidth (MHz)** | **0 - 0.1** | **0.1 - 1** | **1 - 2.5** | **2.5 - 2.8** | **2.8 - 5** | **5 - 6** | **6 - 10** | **10 - 15** |
| NS_06<br>NS_07 | 1.4 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 3.0 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| | 5 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | 10 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Measurement Bandwidth | | 30 kHz | 100 kHz | 1 MHz | 1 MHz | 1 MHz | 1 MHz | 1 MHz | 1 MHz |
| Frequency Range (freq_range) | | 1, –1 | 2, –2 | 3, –3 | 4, –4 | 5, –5 | 6, –6 | 7, –7 | 8, –8 |

Use the following commands to set the spectrum emission mask measurement.

- Measurement Count
  `SEM_SET`
  `:CONFigure:CELLular:LTE:FUNDamental:SEMask:SET`
- Additional Spectrum Emission
  `SIB2_NS`
  `:CONFigure:CELLular:LTE:FUNDamental:SEMask:ASEMission`
- Template
  Channel Bandwidth 1.4 MHz
  `SEM_TEMPLATE_1.4MHZ`
  `:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B1M4`
  Channel Bandwidth 3 MHz
  `SEM_TEMPLATE_3MHZ`
  `:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B3M`
  Channel Bandwidth 5 MHz
  `SEM_TEMPLATE_5MHZ`
  `:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B5M`
  Channel Bandwidth 10 MHz
  `SEM_TEMPLATE_10MHZ`
  `:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B10M`
  Channel Bandwidth 15 MHz
  `SEM_TEMPLATE_15MHZ`
  `:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B15M`
  Channel Bandwidth 20 MHz
  `SEM_TEMPLATE_20MHZ`
  `:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B20M`

The commands for querying the spectrum emission mask measurement results are:

- Evaluation Result
  SEM
  :FETCh:CELLular:LTE:FUNDamental:SEMask:JUDGement
- Lower Peak Level and Frequency
  SEMLVL_LOWER
  :FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer
- Upper Peak Level and Frequency
  SEMLVL_UPPER
  :FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer
- Lower Peak Level and Frequency (Detail)
  SEMLVL_DET_LOWER
  :FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer:DETail
- Upper Peak Level and Frequency (Detail)
  SEMLVL_DET_UPPER
  :FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer:DETail
- Lower Margin
  SEMMARGIN_LOWER
  :FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:LOWer
- Upper Margin
  SEMMARGIN_UPPER
  :FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer
- Lower Margin (Detail)
  SEMMARGIN_DET_LOWER
  :FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:LOWer:DETail
- Upper Margin (Detail)
  SEMMARGIN_DET_UPPER
  :FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer:DETail

## 2.4.2 UL CA (MX887013A/14A-001)

The following items are measured for Total, PCC, and SCC-1.

**Table 2.4.2-1 Measurement Items of Spectrum Emission Mask**

| Measurement Item | | Contiguous UL CA | Inter-band UL CA |
|---|---|---|---|
| Total | Level | ✓*1 | |
| | Mask Margin | ✓*1 | |
| | Worst Point Level | ✓*2 | |
| | Worst Power Margin | ✓*2 | |
| | Judge | ✓ | |
| | Wave Data | ✓ | |
| PCC | Level | | ✓*1 |
| | Mask Margin | | ✓*1 |
| | Worst Point Level | | ✓*2 |
| | Worst Power Margin | | ✓*2 |
| | Judge | | ✓ |
| | Wave Data | | ✓ |
| SCC-1 | Level | | ✓*1 |
| | Mask Margin | | ✓*1 |
| | Worst Point Level | | ✓*2 |
| | Worst Power Margin | | ✓*2 |
| | Judge | | ✓ |
| | Wave Data | | ✓ |

*1: The frequency ranges are defined in the following table.

• At Contiguous UL CA

**Table 2.4.2-2 Values in Frequency Ranges Corresponding to Ranges (Frequency Range 1 to Frequency Range 6)**

| Additional Spectrum Emission | Channel Bandwidth | Frequency Range1 (MHz) | Frequency Range2 (MHz) | Frequency Range3 (MHz) | Frequency Range4 (MHz) | Frequency Range5 (MHz) | Frequency Range6 (MHz) |
|---|---|---|---|---|---|---|---|
| CA_NS_01<br>CA_NS_02<br>CA_NS_03<br>CA_NS_05<br>CA_NS_06<br>CA_NS_07<br>CA_NS_08 | 25RB+100RB (24.95MHz) | 0 to 1 | 1 to 5 | 5 to 24.95 | 24.95 to 29.95 | ----- | ----- |
| | 50RB+100RB (29.9MHz) | 0 to 1 | 1 to 5 | 5 to 29.9 | 29.9 to 34.9 | ----- | ----- |
| | 75RB+75RB (30MHz) | 0 to 1 | 1 to 5 | 5 to 30 | 30 to 35 | ----- | ----- |
| | 75RB+100RB (34.85MHz) | 0 to 1 | 1 to 5 | 5 to 34.85 | 34.85 to 39.85 | ----- | ----- |
| | 100RB+100RB (39.8MHz) | 0 to 1 | 1 to 5 | 5 to 39.8 | 39.8 to 44.8 | ----- | ----- |
| Measurement Bandwidth | | 30 kHz | 1 MHz | 1 MHz | 1 MHz | ----- | ----- |
| CA_NS_04 | 50RB+100RB (29.9MHz) | 0 to 1 | 1 to 5.5 | ----- | ----- | ----- | ----- |
| | 75RB+75RB (30MHz) | 0 to 1 | 1 to 5.5 | 5 to 34.9 | ----- | ----- | ----- |
| | 75RB+100RB (34.85MHz) | 0 to 1 | 1 to 5.5 | 5 to 34.9 | 34.9 to 35 | 35 to 39.85 | ----- |
| | 100RB+100RB (39.8MHz) | 0 to 1 | 1 to 5.5 | 5 to 34.9 | 34.9 to 35 | 35 to 39.85 | 39.85 to 44.8 |
| Measurement Bandwidth | | 30 kHz | 1 MHz | 1 MHz | 1 MHz | 1 MHz | 1 MHz |

• At Inter-band

**Table 2.4.2-3 Values in Frequency Ranges Corresponding to Ranges (Frequency Range 1 to Frequency Range 4)**

| | | Frequency Range | | | |
|---|---|---|---|---|---|
| **Additional Spectrum Emission** | **Channel Bandwidth (MHz)** | **Frequency Range 1** | **Frequency Range 2** | **Frequency Range 3** | **Frequency Range 4** |
| NS_01<br>NS_02<br>NS_03<br>NS_04<br>NS_05<br>NS_11<br>NS_20<br>NS_21 | 1.4 | 0 to 1 MHz | 1 to 2.5 MHz | 2.5 to 2.8 MHz | ----- |
| | 3.0 | 0 to 1 MHz | 1 to 5 MHz | 5 to 6 MHz | ----- |
| | 5 | 0 to 1 MHz | 1 to 5 MHz | 5 to 6 MHz | 6 to 10 MHz |
| | 10 | 0 to 1 MHz | 1 to 5 MHz | 5 to 10 MHz | 10 to 15 MHz |
| NS_01 to NS_07 | 15 | 0 to 1 MHz | 1 to 5 MHz | 5 to 15 MHz | 15 to 20 MHz |
| | 20 | 0 to 1 MHz | 1 to 5 MHz | 5 to 20 MHz | 20 to 25 MHz |
| Measurement Bandwidth | | 30 kHz | 1 MHz | 1 MHz | 1 MHz |
| NS_06<br>NS_07 | 1.4 | 0 to 0.1 MHz | 0.1 to 1 MHz | 1 to 2.5 MHz | 2.5 to 2.8 MHz |
| | 3.0 | 0 to 0.1 MHz | 0.1 to 1 MHz | 1 to 5 MHz | 5 to 6 MHz |
| | 5 | 0 to 0.1 MHz | 0.1 to 1 MHz | 1 to 6 MHz | 6 to 10 MHz |
| | 10 | 0 to 0.1 MHz | 0.1 to 1 MHz | 1 to 10 MHz | 10 to 15 MHz |
| Measurement Bandwidth | | 30 kHz | 100 kHz | 1 MHz | 1 MHz |

*2: The frequency ranges are defined in the following table.

• At Contiguous UL CA

**Table 2.4.2-4 Frequency Range 1 Where Results are Obtained (Without CA_NS_04) (Contiguous UL CA)**

| $\Delta f_{OOB}$ (MHz) | 25+100RB (24.95MHz) | 50+100RB (29.9MHz) | 75+75RB (30MHz) | 75+100RB (34.85MHz) | 100+100RB (39.8MHz) | Measurement Bandwidth | Frequency Range (freq_range) |
|---|---|---|---|---|---|---|---|
| 0 to 1 | ✓ | ✓ | ✓ | ✓ | ✓ | 30kHz | 1, –1 |
| 1 to 5 | ✓ | ✓ | ✓ | ✓ | ✓ | 1MHz | 2, –2 |
| 5 to 24.95 | ✓ | ✓ | ✓ | ✓ | ✓ | 1MHz | 3, –3 |
| 24.95 to 29.9 | ✓ | ✓ | ✓ | ✓ | ✓ | 1MHz | 4, –4 |
| 29.9 to 29.95 | ✓ | ✓ | ✓ | ✓ | ✓ | 1MHz | 5, –5 |
| 29.95 to 30 | | ✓ | ✓ | ✓ | ✓ | 1MHz | 6, –6 |
| 30 to 34.85 | | ✓ | ✓ | ✓ | ✓ | 1MHz | 7, –7 |
| 34.85 to 34.9 | | ✓ | ✓ | ✓ | ✓ | 1MHz | 8, –8 |
| 34.9 to 35 | | | ✓ | ✓ | ✓ | 1MHz | 9, –9 |
| 35 to 39.8 | | | | ✓ | ✓ | 1MHz | 10, –10 |
| 39.8 to 39.85 | | | | ✓ | ✓ | 1MHz | 11, –11 |
| 39.85 to 44.8 | | | | | ✓ | 1MHz | 12, –12 |

**Table 2.4.2-5 Frequency Range 2 Where Results are Obtained (With CA_NS_04) (Contiguous UL CA)**

| $\Delta f_{OOB}$ (MHz) | 50+100RB (29.9MHz) | 75+75RB (30MHz) | 75+100RB (34.85MHz) | 100+100RB (39.8MHz) | Measurement Bandwidth | Frequency Range (freq_range) |
|---|---|---|---|---|---|---|
| 0 to 1 | ✓ | ✓ | ✓ | ✓ | 30kHz | 1, –1 |
| 1 to 5.5 | ✓ | ✓ | ✓ | ✓ | 1MHz | 2, –2 |
| 5.5 to 34.9 | ✓ | ✓ | ✓ | ✓ | 1MHz | 3, –3 |
| 34 to 9-35 | | ✓ | ✓ | ✓ | 1MHz | 4, –4 |
| 35 to 39.85 | | | ✓ | ✓ | 1MHz | 5, –5 |
| 39.85 to 44.8 | | | | ✓ | 1MHz | 6, –6 |

2

Fundamental Measurement

- At Inter-band

**Table 2.4.2-6 Frequency Range 1 Where Results are Obtained (Inter-band UL CA)**

| | | $\Delta f_{OOB}$ (MHz) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Additional Spectrum Emission** | **Channel Bandwidth (MHz)** | **0 to 1** | **1 to 2.5** | **2.5 to 2.8** | **2.8 to 5** | **5 to 6** | **6 to 10** | **10 to 15** | **15 to 20** | **20 to 25** |
| NS_01 to NS_05, NS_11,NS_20, NS_21 | 1.4 | ✓ | ✓ | ✓ | | | | | | |
| | 3.0 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | |
| | 5 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 10 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| NS_01 to NS_07, NS_11,NS_20, NS_21 | 15 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | 20 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Measurement Bandwidth | | 30 kHz | 1 MHz | 1 MHz | 1 MHz | 1 MHz | 1 MHz | 1 MHz | 1 MHz | 1 MHz |
| FrequencyRange (freq_range) | | 1, –1 | 2, –2 | 3, –3 | 4, –4 | 5, –5 | 6, –6 | 7, –7 | 8, –8 | 9, –9 |

**Table 2.4.2-7 Frequency Range 2 Where Results are Obtained (Inter-band UL CA)**

| | | $\Delta f_{OOB}$ (MHz) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Additional Spectrum Emission** | **Channel Bandwidth (MHz)** | **0 to 0.1** | **0.1 to 1** | **1 to 2.5** | **2.5 to 2.8** | **2.8 to 5** | **5 to 6** | **6 to 10** | **10 to 15** |
| NS_06 NS_07 | 1.4 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 3.0 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| | 5 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | 10 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Measurement Bandwidth | | 30 kHz | 100 kHz | 1 MHz | 1 MHz | 1 MHz | 1 MHz | 1 MHz | 1 MHz |
| FrequencyRange (freq_range) | | 1, –1 | 2, –2 | 3, –3 | 4, –4 | 5, –5 | 6, –6 | 7, –7 | 8, –8 |

Use the following commands to set the spectrum emission mask measurement.

- Level of Spectrum Emission Mask (At Contiguous UL CA)
  25RB+100RB(24.95 MHz)
  `SEM_TEMPLATE_CONTCC_25RB_100RB`
  `:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB25:RB100`
  50RB+100RB (29.9 MHz)
  `SEM_TEMPLATE_CONTCC_50RB_100RB`
  `:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB50:RB100`
  75RB+75RB (30 MHz)
  `SEM_TEMPLATE_CONTCC_75RB_75RB`
  `:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTc`

c:RB75:RB75

75RB+100RB (34.85 MHz)

SEM_TEMPLATE_CONTCC_75RB_100RB

:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTc c:RB75:RB100

100RB+100RB (39.8 MHz)

SEM_TEMPLATE_CONTCC_100RB_100RB

:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTc c:RB100:RB100

Use the following commands to query the results of the spectrum emission mask measurement.

- SEM Judgement
  SEM
  :FETCh:CELLular:LTE:FUNDamental:SEMask:JUDGement
- SEM Peak Value (Lower)
  SEMLVL_LOWER
  :FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer
- SEM Peak Value (Upper)
  SEMLVL_UPPER
  :FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer
- SEM Peak Value (Detail) (Lower)
  SEMLVL_DET_LOWER
  :FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer:DETail
- SEM Peak Value (Detail) (Upper)
  SEMLVL_DET_UPPER
  :FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer:DETail
- SEM Template Margin (Lower)
  SEMMARGIN_LOWER
  :FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:LOWer
- SEM Template Margin (Upper)
  SEMMARGIN_UPPER
  :FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer
- SEM Template Margin (Detail) (Lower)
  SEMMARGIN_DET_LOWER
  :FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:LOWer:DE Tail
- SEM Template Margin (Detail) (Upper)
  SEMMARGIN_DET_UPPER
  :FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer:DE Tail

# 2.5 Adjacent Channel Leakage Power Ratio

Adjacent Channel Leakage Power Ratio is the ratio of in-band power to the power leaking to adjacent channels.

## 2.5.1 non CA

The E-UTRA (LTE) and UTRA (W-CDMA) bands are specified for adjacent channels. The power leaking to the two adjacent channels is measured for UTRA.

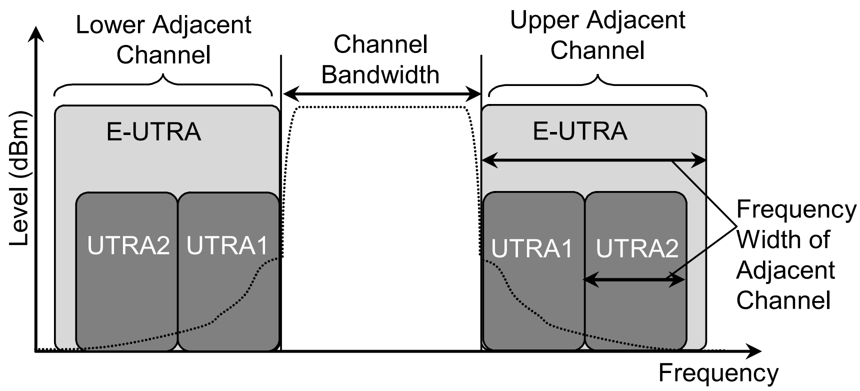


**Figure 2.5.1-1 Adjacent Channels for Adjacent Channel Leakage Power Ratio Measurement**

The frequency range of the adjacent channels varies with the channel bandwidth.

**Table 2.5.1-1 Adjacent Channel Measurement Bandwidth (MHz)**

| Channel Bandwidth | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
|---|---|---|---|---|---|---|
| UTRA (FDD) | 3.84 | 3.84 | 3.84 | 3.84 | 3.84 | 3.84 |
| UTRA (TDD) | 1.28 | 1.28 | 1.28 | 1.28 | 1.28 | 1.28 |
| E-UTRA | 1.08 | 2.7 | 4.5 | 9.0 | 13.5 | 18 |

The Adjacent Channel Leakage Power Ratio measurement parameters are:

Measurement enable and measurement count

Enable Adjacent Channel Leakage Power measurement and specify the measurement count. The Adjacent Channel Leakage Power is measured for 1 subframe (1 ms) at each measurement count. The measurement count can be set from 1 to 200.

```
ACLR_SET
:CONFigure:CELLular:LTE:FUNDamental:ACLR:SET
```

Use the following command to query the results of the Adjacent Channel Leakage Power Ratio measurement.

```
ACLR
:FETCh:CELLular:LTE:FUNDamental:ACLR
```

### 2.5.2 UL CA (MX887013A/14A-001)

The following items are measured for Total, PCC, and SCC-1.

**Table 2.5.2-1 Measurement Items of Adjacent Channel Leakage Power Ratio**

| Measurement Item | | Contiguous UL CA | Inter-band UL CA |
|---|---|---|---|
| Total | E-UTRA ACLR | ✓ | |
| | UTRA ACLR1 | ✓ | |
| | UTRA ACLR2 | ✓ | |
| PCC | E-UTRA ACLR | | ✓ |
| | UTRA ACLR1 | | ✓ |
| | UTRA ACLR2 | | ✓ |
| SCC-1 | E-UTRA ACLR | | ✓ |
| | UTRA ACLR1 | | ✓ |
| | UTRA ACLR2 | | ✓ |

The offset frequencies for E-UTRA and UTRA are listed below.

• At Contiguous UL CA

| Channel Bandwidth | | 1.4MHz | 3MHz | 5MHz | 10MHz | 15MHz | 20MHz |
|---|---|---|---|---|---|---|---|
| E-UTRA ACLR (MHz) | | $\pm BW_{CA}$ *1 | | | | | |
| FDD | UTRA ACLR1 (MHz) | $\pm BW_{CA}/2 + BW_{UTRA}/2$ *2 | | | | | |
| | UTRA ACLR2 (MHz) | $\pm BW_{CA}/2 + 3*BW_{UTRA}/2$ *3 | | | | | |
| TDD | UTRA ACLR1 (MHz) | $\pm BW_{CA}/2 + BW_{UTRA}/2$ | | | | | |
| | UTRA ACLR2 (MHz) | $\pm BW_{CA}/2 + 3*BW_{UTRA}/2$ *3 | | | | | |

*1: Refer to 3GPP TS36.521-1 5.4.2A for calculating $BW_{CA}$.

*2: The frequency of $BW_{UTRA}$ is as follows:
FDD: 5 MHz, TDD: 1.6 MHz

*3: When $BW_{CA}$ is smaller than $BW_{UTRA}$ ($BW_{CA} < BW_{UTRA}$), UTRA ACLR2 is not measured.

• At Inter-band

| Channel Bandwidth | | 1.4MHz | 3MHz | 5MHz | 10MHz | 15MHz | 20MHz |
|---|---|---|---|---|---|---|---|
| E-UTRA ACLR (MHz) | | ±1.4 | ±3 | ±5 | ±10 | ±15 | ±20 |
| FDD | UTRA ACLR1 (MHz) | ±3.2 | ±4 | ±5 | ±7.5 | ±10 | ±12.5 |
| | UTRA ACLR2 (MHz) | | | ±10 | ±12.5 | ±15 | ±17.5 |
| TDD | UTRA ACLR1 (MHz) | ±1.5 | ±2.3 | ±3.3 | ±5.8 | ±8.3 | ±10.8 |
| | UTRA ACLR2 (MHz) | | | ±4.9 | ±7.4 | ±9.9 | ±12.4 |

Use the following command to query the results of the Adjacent Channel Leakage Power Ratio measurement.

- ACLR Result

```
ACLR
:FETCh:CELLular:LTE:FUNDamental:ACLR
```

# 2.6 Modulation Analysis

Modulation analysis measures:

- Frequency Error
- EVM
- Carrier Leakage
- IQ Imbalance
- Waveform Quality (Rho)
- In-band Emissions for Non-Allocated RB
- Spectrum Flatness

Use the following command to enable modulation analysis measurement and specify the measurement count. Modulation analysis of 1 slot (0.5 ms) is performed at each measurement count. The measurement count can be set from 1 to 200.

```
MOD_SET
:CONFigure:CELLular:LTE:FUNDamental:MODulation:SET
```

## 2.6.1 Frequency Error

Frequency error measurement measures the carrier frequency and Uplink frequency error.

Set the uplink frequency as the reference frequency for error measurement by referring to Section 2.1.3 “Frequency and level”.

Use the following commands to query the frequency error measurement results:

- Carrier Frequency
  ```
  CFREQ
  :FETCh:CELLular:LTE:FUNDamental:MODulation:CFRequency
  ```
- Frequency Error
  ```
  CFERR
  :FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor
  ```
- Worst Value of Frequency Error
  ```
  CFERR_WORST
  :FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor:WORSt
  ```

The worst value is either the maximum or minimum frequency error, whichever is the larger absolute value.

## 2.6.2 EVM

Error Vector Magnitude (EVM) is the magnitude ratio of the error vector to the reference vector. The error vector is the difference between the vector of the measured signal and the reference vector.
The difference in phase between the vector of the measured signal and the reference vector is called the phase error while the difference in magnitude is called the magnitude error.

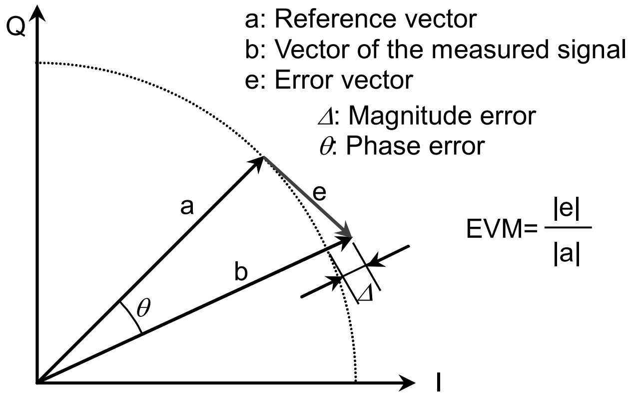


**Figure 2.6.2-1 Definition of EVM**

Query the EVM measurement result using the following commands:

- EVM
  `EVM`
  `:FETCh:CELLular:LTE:FUNDamental:MODulation:EVM`
- Peak EVM
  `PEVM`
  `:FETCh:CELLular:LTE:FUNDamental:MODulation:PEVM`
- EVM of the Reference Signal
  `RSEVM`
  `:FETCh:CELLular:LTE:FUNDamental:MODulation:RSEVm`
- Phase Error
  `PHASEERR`
  `:FETCh:CELLular:LTE:FUNDamental:MODulation:PHERror`
- Magnitude Error
  `MAGERR`
  `:FETCh:CELLular:LTE:FUNDamental:MODulation:MERRor`

The reference signal is defined in TS 36.211 5.5.2.1 “Demodulation Reference Signal for PUSCH”.
The target symbol for EVM measurement differs with the channel configuration as described in Section 2.1.6 “Setting LTE signals”. (PUSCH and PUCCH measurements are available, but PRACH measurement is not.)
PUSCH: Measures reference signal of EVM. Symbols other than the reference signal are the target for EVM and peak EVM measurement.
PUCCH: All symbols are the target for EVM and peak EVM. The EVM of the reference signal cannot be measured.





### 2.6.3 Carrier leakage

Query the mobile station carrier leakage measurement result using the following command:

- Carrier Leakage Result

```
CARRLEAK
:FETCh:CELLular:LTE:FUNDamental:MODulation:CARLeakage
```

### 2.6.4 IQ Imbalance

IQ Imbalance is the magnitude ratio of the I component to Q component of the measured signal vector calculated as:

$$IQ\_imbalance = 20\log_{10}\left(\frac{|I-Q|}{|I+Q|}\right) \quad \text{(dB)}$$

When I ≈ Q, the IQ imbalance can be calculated using the following approximation:

$$IQ\_imbalance = 20\log_{10}\left(\frac{|I-Q|}{2}\right) \quad \text{(dB)}$$

***Note:***

The IQ imbalance can be measured when the number of RBs is set to the upper limit of the channel bandwidth shown in Table 2.1.6-1.

Query the IQ Imbalance measurement result using the following command:

```
IQIMB
:FETCh:CELLular:LTE:FUNDamental:MODulation:IQIMbalance
```

## 2.6.5 Rho

Waveform quality (ρ: Rho) shows the correlation between an ideal noiseless waveform and the measured signal. It is 1 when both signals match each other.
The approximate relationship between Rho and EVM is:

$$\rho \approx \frac{1}{1 + EVM^2}$$

Query the Rho measurement results using the following command:

```
RHO
:FETCh:CELLular:LTE:FUNDamental:MODulation:RHO
```

## 2.6.6 In-band emissions for non-allocated RB

The In-band Emission for Non-Allocated RB is the ratio between the signal power of the allocated RBs and the signal power in the non-allocated RBs.
TS 36.521-1 6.5.2.3 “In-band Emission for non-allocated RBs” specifies three measurement ranges: Carrier Leakage, General, and IQ Image.



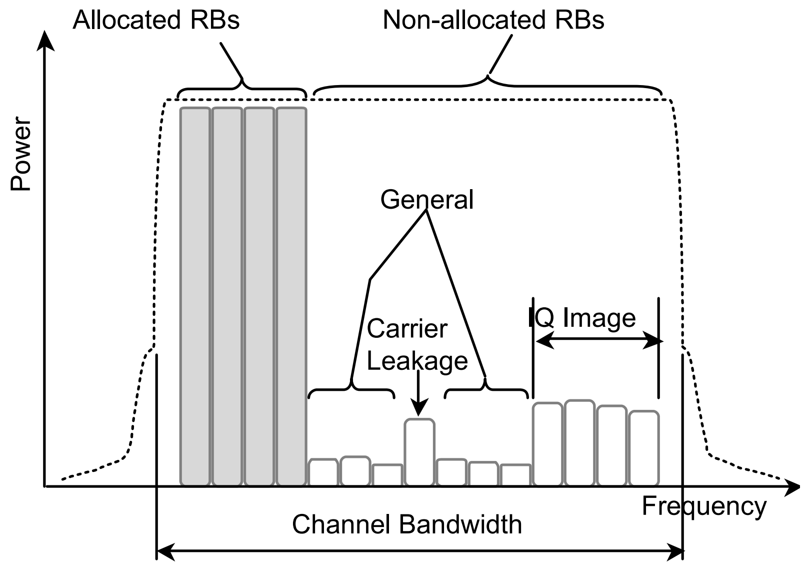


**Figure 2.6.6-1 In-band Emission Measurement Range**

Set the allocated RB using the start RB number and number of RBs of the reference target signal as described in Section 2.1.6 “Setting LTE signals”.
The number of RBs varies with the channel bandwidth.

- In-band emissions carrier leakage template
  Select a template for in-band emission measurement (Carrier Leakage).
  `TP_INBANDE_LEAK`
  `CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak`

Query the In-band Emissions for Non-Allocated RB measurement results using the following commands:

- Carrier Leakage
  `INBANDE_LEAK`
  `:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:CARLeakage`
- General
  `INBANDE_GEN`

:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:GENeral

- IQ Image
  INBANDE_IMG
  :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:IQIMage
- In-Band Emissions limit - General
  INBANDE_GENUL
  :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:GENeral
- In-Band Emissions limit - IQ Image
  INBANDE_IMGUL
  FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:IQIMage
- In-Band Emissions limit - Carrier Leakage
  INBANDE_LEAKUL
  FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:CARLeakage
- In-Band Emissions margin
  INBANDE_MARG
  FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:MARGin
- In-Band Emissions Measured Item
  INBANDEITEM
  FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:ITEM
- In-Band Emissions Judgement
  INBANDEPASS
  FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:JUDGement

### 2.6.7 Spectrum Flatness

Spectrum Flatness measurement measures the maximum and minimum values of the relative level of the subcarriers.

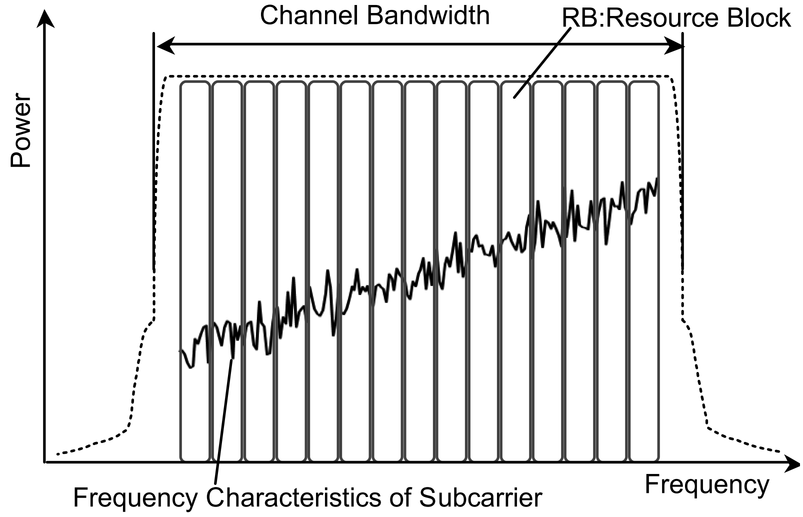


**Figure 2.6.7-1 Measurement Range of Spectrum Flatness**

TS 36.521-1 6.5.2.4 EVM Equalizer Spectrum Flatness specifies two separate frequency ranges (Range 1 and Range 2) in the operation band with individual limit values.
Range 1 covers the range of 3 MHz or higher, and Range 2 covers the range lower than 3 MHz from both ends of the operation band.

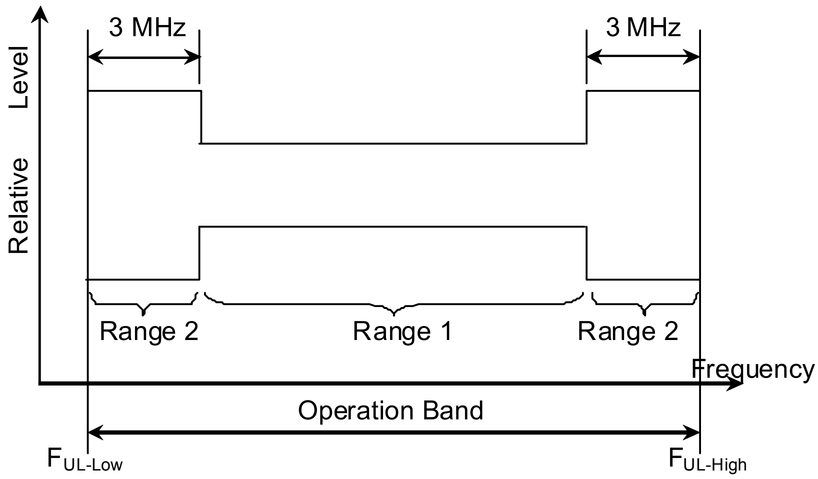


**Figure 2.6.7-2 Standard Range of Spectrum Flatness**

The measured data varies depending on where the target channel bandwidth is located in the operation band.

When the measurement range is within Range 1, the maximum value, minimum value, and ripple (maximum value – minimum value) of Range 1 are measured.

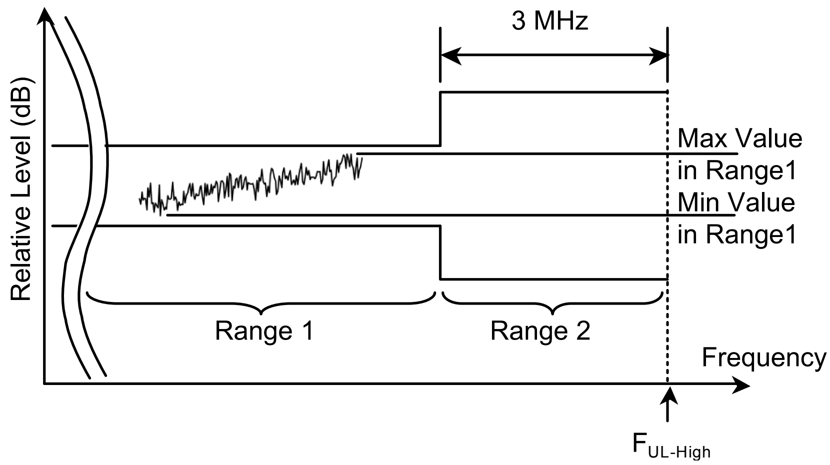


**Figure 2.6.7-3 Channel Bandwidth in Range 1**

When the measurement range is within Range 2, the maximum value, minimum value, and ripple (maximum value – minimum value) of Range 2 are measured.

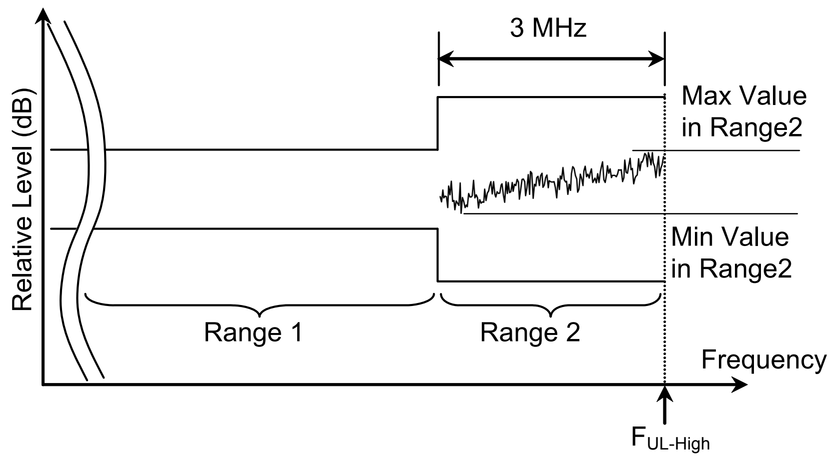


**Figure 2.6.7-4 Channel Bandwidth in Range 2**

When the measurement range crosses both Range 1 and Range 2, the following values are measured:
Maximum value, minimum value, and ripple (maximum value – minimum value) of Range 1

Maximum value, minimum value, and ripple (maximum value – minimum value) of Range 2

Difference between maximum value of Range 1 and minimum value of Range 2

Difference between maximum value of Range 2 and minimum value of Range 1

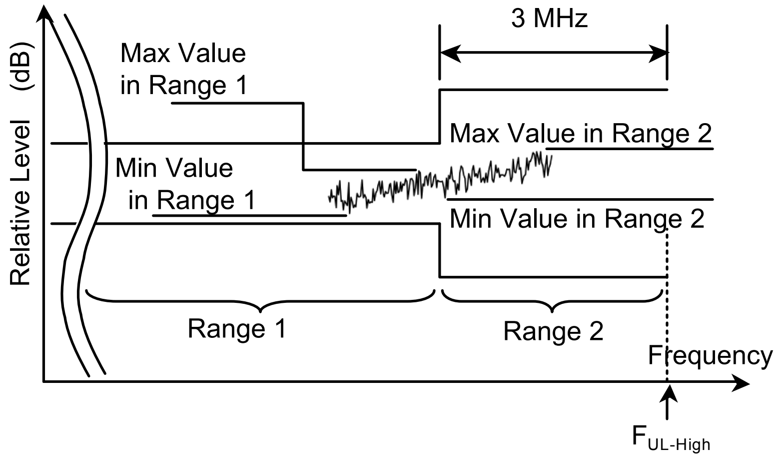


**Figure 2.6.7-5 Channel Bandwidth Crossing Range 1 and Range 2**

The MX887013A measures the frequency characteristics of the subcarrier for the number of times specified for modulation analysis.

The maximum and minimum values of the level are recorded for each subcarrier, like peak hold and minimum hold for a spectrum analyzer.

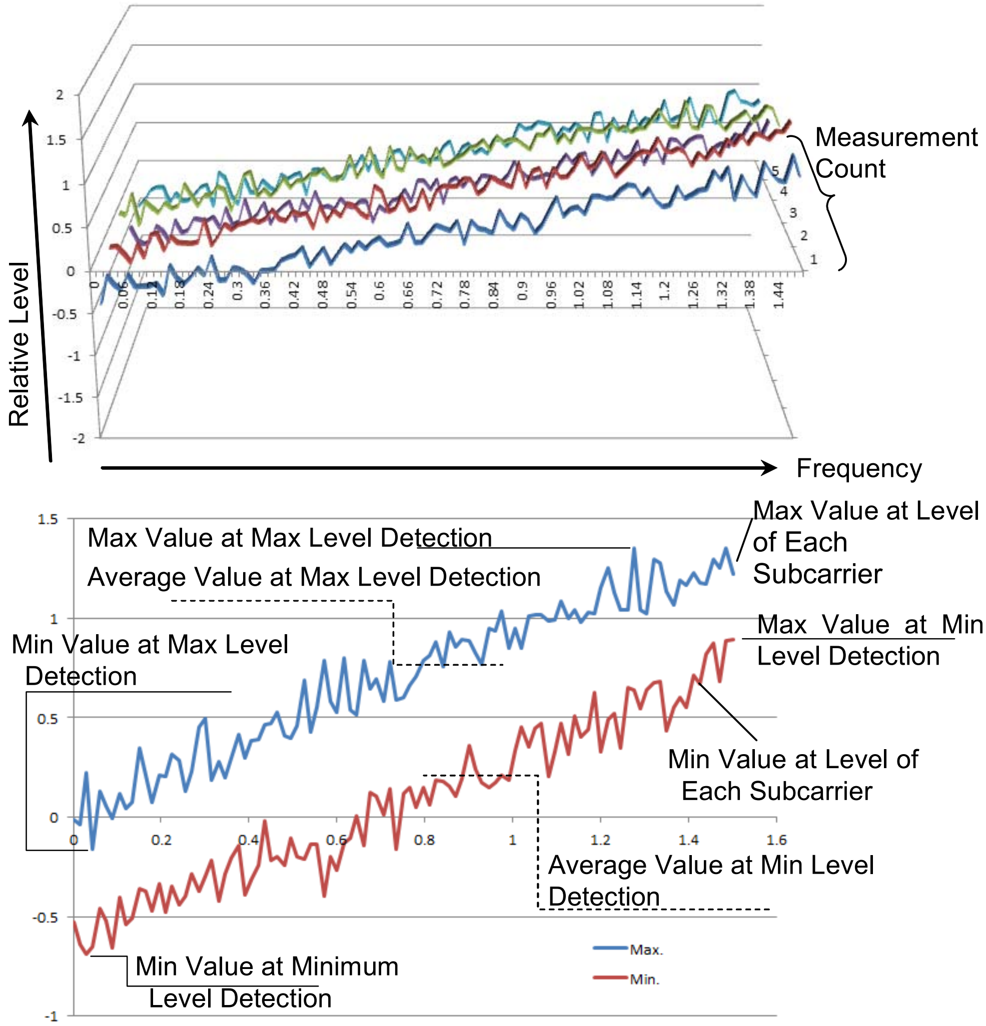


**Figure 2.6.7-6 Types of Spectrum Flatness Measurement Results**

- Operation band
  The threshold line for spectrum flatness is determined by setting the operation band in Table 2.1.6-4.
  BAND
  CONFigure:CELLular:LTE:FUNDamental:BAND
- Test Environment
  The threshold line for spectrum flatness is determined by setting the test environment defined in 3GPP TS36.521-1.
  TESTENV
  CONFigure:CELLular:LTE:FUNDamental:TENVironment

Query the spectrum flatness measurement results using the following commands:

- Range 1 Maximum Value
  SPECFLAT1_P
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1P
- Range 1 Minimum Value
  SPECFLAT1_M
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1M
- Range 1 Worst Value
  SPECFLAT1
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1
- Range 1 Ripple
  SPECFLAT_RP1
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP1
- Range 2 Maximum Value
  SPECFLAT2_P
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2P
- Range 2 Minimum Value
  SPECFLAT2_M
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2M
- Range 2 Worst Value
  SPECFLAT2
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2
- Range 2 Ripple
  SPECFLAT_RP2
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP2
- Range 2 Maximum Value – Range 1 Minimum Value
  SPECFLAT_RP21
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP21
- Range 1 Maximum Value – Range 2 Minimum Value
  SPECFLAT_RP12
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP12
- Spectrum Flatness Measured Item
  SPECFLATITEM
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:ITEM
- Spectrum Flatness Judgement
  SPECFLATPPPASS
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:JUDGement

## 2.6.8 UL CA (MX887013A/14A-001)

The following items are measured for Total, PCC, and SCC-1.

**Table 2.6.8-1 Measurement Items of Modulation Analysis**

| Measurement Item | | Contiguous UL CA | | Inter-band UL CA |
|---|---|---|---|---|
| | | PCC | SCC-1 | |
| Total | Carrier Frequency | ✓*1 | | ✓*1*4 |
| | Carrier Frequency Error (Hz, ppm) | ✓*1 | | ✓*1*4 |
| | Worst Carrier Frequency Error (Hz, ppm) | ✓*1 | | ✓*1*4 |
| | EVM | ✓*1 | | ✓*1*4 |
| | EVM (High) | ✓*1 | | ✓*1*4 |
| | EVM (Low) | ✓*1 | | ✓*1*4 |
| | Reference Signal EVM | ✓*1 | | ✓*1*4 |
| | Peak Vector Error | ✓*1 | | ✓*1*4 |
| | Phase Error | ✓*1 | | ✓*1*4 |
| | Magnitude Error | ✓*1 | | ✓*1*4 |
| | Rho | ✓*1 | | ✓*1*4 |
| | Carrier Leakage | ✓*3 | | ✓*1*4 |
| | IQ Imbalance | ✓*2 | | ✓*2*4 |
| | In-Band Emissions | ✓*3 | | ✓*1*4 |
| | In-Band Emissions limit | ✓*3 | | ✓*1*4 |
| | In-Band Emissions margin | ✓*3 | | ✓*1*4 |
| | In-Band Emissions Measure Item | ✓*3 | | ✓*1*4 |
| | In-Band Emissions Judgement | ✓*3 | | ✓*1*4 |
| | EVM equalizer spectrum flatness | | | ✓*1*4 |
| | EVM equalizer spectrum flatness Measure Item | | | ✓*1*4 |
| | EVM equalizer spectrum flatness Judgement | | | ✓*1*4 |
| | Constellation | ✓*1 | | ✓*1*4 |
| | EVM Wave Data | ✓*1 | | ✓*1*4 |
| | Phase Error Wave Data | ✓*1 | | ✓*1*4 |
| | Magnitude Error Wave Data | ✓*1 | | ✓*1*4 |
| | In-band Emissions Wave Data | ✓*3 | | ✓*1*4 |
| | EVM equalizer spectrum flatness Wave Data | | | ✓*1*4 |

Table 2.6.8-1 Measurement Items of Modulation Analysis (Cont'd)

| Measurement Item | | Contiguous UL CA | | Inter-band UL CA | |
|---|---|---|---|---|---|
| | | PCC | SCC-1 | PCC | SCC-1 |
| PCC/SCC-1 | Carrier Frequency | ✓*1 | ✓*1 | ✓*1 | ✓*1 |
| | Carrier Frequency Error (Hz, ppm) | ✓*1 | ✓*1 | ✓*1 | ✓*1 |
| | Worst Carrier Frequency Error (Hz, ppm) | ✓*1 | ✓*1 | ✓*1 | ✓*1 |
| | EVM | ✓*1 | ✓*1 | ✓*1 | ✓*1 |
| | EVM (High) | ✓*1 | ✓*1 | ✓*1 | ✓*1 |
| | EVM (Low) | ✓*1 | ✓*1 | ✓*1 | ✓*1 |
| | Reference Signal EVM | ✓*1 | ✓*1 | ✓*1 | ✓*1 |
| | Peak Vector Error | ✓*1 | ✓*1 | ✓*1 | ✓*1 |
| | Phase Error | ✓*1 | ✓*1 | ✓*1 | ✓*1 |
| | Magnitude Error | ✓*1 | ✓*1 | ✓*1 | ✓*1 |
| | Rho | ✓*1 | ✓*1 | ✓*1 | ✓*1 |
| | Carrier Leakage | ✓*3 | ✓*3 | ✓*1 | ✓*1 |
| | IQ Imbalance | ✓*2 | ✓*2 | ✓*2 | ✓*2 |
| | In-Band Emissions | ✓*3 | ✓*3 | ✓*1 | ✓*1 |
| | In-Band Emissions limit | ✓*3 | ✓*3 | ✓*1 | ✓*1 |
| | In-Band Emissions margin | ✓*3 | ✓*3 | ✓*1 | ✓*1 |
| | In-Band Emissions Measure Item | ✓*3 | ✓*3 | ✓*1 | ✓*1 |
| | In-Band Emissions Judgement | ✓*3 | ✓*3 | ✓*1 | ✓*1 |
| | EVM equalizer spectrum flatness | | | ✓*1 | ✓*1 |
| | EVM equalizer spectrum flatness Measure Item | | | ✓*1 | ✓*1 |
| | EVM equalizer spectrum flatness Judgement | | | ✓*1 | ✓*1 |
| | Constellation | ✓*1 | ✓*1 | ✓*1 | ✓*1 |
| | EVM Wave Data | ✓*1 | ✓*1 | ✓*1 | ✓*1 |
| | Phase Error Wave Data | ✓*1 | ✓*1 | ✓*1 | ✓*1 |
| | Magnitude Error Wave Data | ✓*1 | ✓*1 | ✓*1 | ✓*1 |
| | In-band Emissions Wave Data | ✓*3 | ✓*3 | ✓*1 | ✓*1 |
| | EVM equalizer spectrum flatness Wave Data | | | ✓*1 | ✓*1 |

*1: When UL Number of RB for the measurement target CC is 0, this is not measured.

*2: When UL Number of RB for the measurement target CC is not FULL, this is not measured.

*3: The measurement conditions of In-Band Emissions vary depending on the setting values of Carrier Leakage Frequency. The measurement conditions are shown below.

- When At Each CC Center is specified at Carrier Leakage Frequency:

  The center frequencies of each CC are treated as the carrier leak frequency and the measurement is performed.
  The measurement conditions are listed below.

**Table 2.6.8-2 Measurement Conditions of In-Band Emissions (at Each CC Center)**

| PCC UL Number of RB (NRB) | PCC Measurement Result Display of In-Band Emissions |
|---|---|
| NRB = 0 | |
| 0 < NRB < Full RB | ✓ |
| NRB = Full RB | |
| **SCC-1 UL Number of RB (NRB)** | **SCC-1 Measurement Result Display of In-Band Emissions** |
| NRB = 0 | |
| 0 < NRB < Full RB | ✓ |
| NRB = Full RB | |

- When At Carrier Frequency Center is specified at Carrier Leakage Frequency:

  The resource block located at the center frequency of Aggregated Channel Bandwidth is treated as the carrier leak frequency and the measurement is performed.
  The measurement conditions are listed below.

**Table 2.6.8-3 Measurement Conditions of In-Band Emissions (at Carrier Frequency)**

| PCC UL Number of RB (P-NRB) | SCC-1 UL Number of RB (S-NRB) | Measurement Result Display of In-Band Emissions | |
|---|---|---|---|
| | | PCC | SCC-1 |
| P-NRB = 0 | S-NRB = 0 | | |
| 0 < P-NRB | 0 < S-NRB | | |
| 0 < P-NRB | S-NRB = 0 | ✓ | ✓ |
| P-NRB = 0 | 0 < S-NRB | ✓ | ✓ |

*4: This is the result of CC set at Measurement Carrier.

Use the following command to query the results of the measurement items.

- Frequency Error
- Carrier Frequency Result

CFREQ
:FETCh:CELLular:LTE:FUNDamental:MODulation:CFRequency

- Carrier Frequency Error Result

CFERR
:FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor

- Worst Carrier Frequency Error Result

CFERR_WORST
:FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor:WORS
t

- EVM
- EVM Result

EVM
:FETCh:CELLular:LTE:FUNDamental:MODulation:EVM

- Peak EVM Result

PEVM
:FETCh:CELLular:LTE:FUNDamental:MODulation:PEVM

- Reference Signal EVM Result

RSEVM
:FETCh:CELLular:LTE:FUNDamental:MODulation:RSEVm

- Phase Error Result

PHASEERR
:FETCh:CELLular:LTE:FUNDamental:MODulation:PHERror

- Magnitude Error Result

MAGERR
:FETCh:CELLular:LTE:FUNDamental:MODulation:MERRor

- Carrier Leakage
- Carrier Leakage Result

CARRLEAK
:FETCh:CELLular:LTE:FUNDamental:MODulation:CARLeakage

- IQ Imbalance
- IQ Imbalance Result

IQIMB
:FETCh:CELLular:LTE:FUNDamental:MODulation:IQIMbalance

- RHO
- Rho Result

RHO
:FETCh:CELLular:LTE:FUNDamental:MODulation:RHO

- In-band emissions
- In-band emissions carrier leakage template for SCC-1

Selects the template of the In-band emissions measurement (Carrier Leakage).
TP_INBANDE_LEAK_SCC1
:CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak:SCC1

- In-Band Emissions (Carrier Leakage) Result
  INBANDE_LEAK
  :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:CARLeakage
- In-Band Emissions (General) Result
  INBANDE_GEN
  :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:GENeral
- In-Band Emissions (IQ Image) Result
  INBANDE_IMG
  :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:IQIMage
- In-Band Emissions limit - General
  INBANDE_GENUL
  :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:GENeral
- In-Band Emissions limit - IQ Image
  INBANDE_IMGUL
  FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:IQIMage
- In-Band Emissions limit - Carrier Leakage
  INBANDE_LEAKUL
  FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:CARLeakage
- In-Band Emissions margin
  INBANDE_MARG
  FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:MARGin
- In-Band Emissions Measured Item
  INBANDEITEM
  FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:ITEM
- In-Band Emissions Judgement
  INBANDEPASS
  FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:JUDGement

- Spectrum Flatness
- Operation band for SCC-1

Sets an operation band listed in Table 2.1.6-4, and determines the limit line of Spectrum Flatness.

BAND_SCC1

:CONFigure:CELLular:LTE:FUNDamental:BAND:SCC1

- Test Environment

  Sets the test environment defined in 3GPP TS36.521-1, and determines the limit line of Spectrum Flatness.

  TESTENV

  :CONFigure:CELLular:LTE:FUNDamental:TENVironment
- Spectrum Flatness (≥ 3 MHz (R1 +)) Result

  SPECFLAT1_P

  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1P
- Spectrum Flatness (≥ 3 MHz (R1 –)) Result

  SPECFLAT1_M

  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1M
- Spectrum Flatness (≥ 3 MHz) Result

  SPECFLAT1

  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1
- Spectrum Flatness (≥ 3 MHz (RP1)) Result

  SPECFLAT_RP1

  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP1
- Spectrum Flatness (<3 MHz (R2 +)) Result

  SPECFLAT2_P

  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2P
- Spectrum Flatness (<3 MHz (R2 –)) Result

  SPECFLAT2_M

  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2M
- Spectrum Flatness (<3 MHz) Result

  SPECFLAT2

  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2
- Spectrum Flatness (<3 MHz (RP2)) Result

  SPECFLAT_RP2

  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP2
- Spectrum Flatness (RP21) Result

  SPECFLAT_RP21

  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP21
- Spectrum Flatness (RP12) Result

  SPECFLAT_RP12

  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP12
- Spectrum Flatness Measured Item

  SPECFLATITEM

  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:ITEM

## 2.7 Power Template

The Power Template measurement measures the power in the transmit On period / Off period specified in 6.3.3 and 6.3.4.1 of 3GPP TS36.521-1. The measurement range of transmission On period / Off period is decided based on DMRS of uplink signals.

**Table 2.7-1 Power Template Measurement Standard**
**(Reprinted from Table 6.3.4.1.5-1: General ON/OFF time mask of 3GPP TS36.521-1)**

| | Channel bandwidth / minimum output power / measurement bandwidth | | | | | |
|---|---|---|---|---|---|---|
| | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
| Transmit OFF power | For carrier frequency f ≤ 3.0 GHz: ≤ –48.5 dBm<br>For carrier frequency 3.0 GHz < f ≤ 4.2 GHz: ≤ –48.2 dBm | | | | | |
| Transmission OFF Measurement bandwidth | 1.08 MHz | 2.7 MHz | 4.5 MHz | 9.0 MHz | 13.5 MHz | 18 MHz |
| Expected Transmission ON Measured power | –14.8 dBm | –10.8 dBm | –8.6 dBm | –5.6 dBm | –3.9 dBm | –2.6 dBm |
| ON power tolerance<br>f ≤ 3.0 GHz<br>3.0 GHz < f ≤ 4.2 GHz | ± 7.5 dB<br>± 7.8 dB | ± 7.5 dB<br>± 7.8 dB | ± 7.5 dB<br>± 7.8 dB | ± 7.5 dB<br>± 7.8 dB | ± 7.5 dB<br>± 7.8 dB | ± 7.5 dB<br>± 7.8 dB |

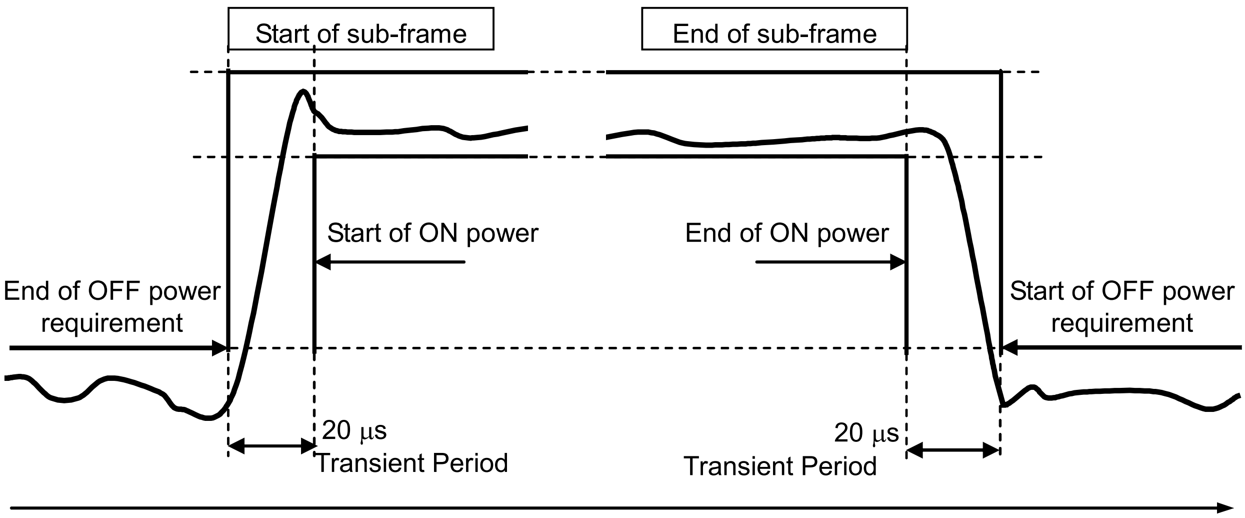


**Figure 2.7-1 Power Template Measurement Range**

Measurement signal
Subframe2 signal is measured in LTE-TDD.
Frame configuration
(Uplink-downlink configuration = 1, Special subframe configuration = 4)

| Subframe number | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| **D** | **S** | **U** | **U** | **D** | **D** | **S** | **U** | **U** | **D** |

Details of Subframe#1(Special subframe)

| DwPTS | GP | UpPTS |
|---|---|---|

DwPTS = 6592Ts(3 symbol), GP = 19744Ts(9 symbol),
UpPTS = 4384Ts(2 symbol)

The Power Template measurement setting items are as described below:

Center Frequency
Specify the center frequency for Power Template measurement using the following parameters:
- Uplink Frequency as described in Section 2.1.3 "Frequency and level"
- Uplink Channel as described in Section 2.1.6 "Setting LTE signals"

Input Level
- Set Input Level as described in Section 2.1.3 "Frequency and level"

Port
- Set ports as described in Section 2.1.2 "Setting ports".

Bandwidth
Determine the channel bandwidth for Power Template measurement by referring to Section 2.1.6 "Setting LTE signals".

Measurement Item
Set the parameter to PWRTEMP to enable Power Template measurement by using the following command.

```
MEASITEM
:CONFigure:CELLular:LTE:FUNDamental:MITem
```

***Note:***

The Power Template measurement and other measurement cannot be executed simultaneously.

Measurement enable and measurement count

Enable/Disable the Power Template measurement and specify the measurement count. The power of 1 subframe is measured at each measurement count. The measurement count can be set from 1 to 200.

- Measurement Enable and Count
  `TEMPLATE_SET`
  `:CONFigure:CELLular:LTE:FUNDamental:TEMPlate:SET`

Use the following commands to set the Power Template measurement.

- Wide Dynamic Range
  `PT_WDR`
  `:CONFigure:CELLular:LTE:FUNDamental:TEMPlate:WDRange`
- ON power tolerance Limit
  `TP_TMASK_GEN_TOL`
  `:CONFigure:CELLular:LTE:FUNDamental:TMASk:GENeral:TOL`
- Transmit OFF power Limit
  `TP_OFFPWR_UL`
  `:CONFigure:CELLular:LTE:FUNDamental:OFFPwr:UL`

The commands for querying the Power Template measurement results are:

- On Power
  `ONPWR`
  `:FETCh:CELLular:LTE:FUNDamental:TEMPlate:ONPower`
- Off Power (Before)
  `OFFPWR_BEFORE`
  `:FETCh:CELLular:LTE:FUNDamental:TEMPlate:OFFPower:BEFore`
- Off Power (After)
  `OFFPWR_AFTER`
  `:FETCh:CELLular:LTE:FUNDamental:TEMPlate:OFFPower:AFTer`
- On Power Judgement
  `ONPWRPASS`
  `:FETCh:CELLular:LTE:FUNDamental:TEMPlate:JUDGement:ONP`
  `ower`
- Off Power Judgement
  `OFFPWRPASS?`
  `:FETCh:CELLular:LTE:FUNDamental:TEMPlate:JUDGement:OFF`
  `Power`

# 2.8 Capturing Waveform Data

## 2.8.1 non CA

The following command is used to capture the waveform data after measurement has been completed.

- Waveform

  ```
  WAVEFMEAS
  :FETCh:CELLular:LTE:FUNDamental:TRACe
  ```

The query parameter and data interval for capturing the waveform data for each measurement item are listed in the following table.

**Table 2.8.1-1 Waveform Data Type and Data Interval**

| Measurement Item | Query Parameter | Data Interval |
|---|---|---|
| Occupied Bandwidth | 1 | 6.103515625 kHz |
| Spectrum Emission Mask | 2 | 6.103515625 kHz |
| Constellation (I) | 3 | Subcarrier (15 kHz) |
| Constellation (Q) | 4 | |
| EVM (Average) | 5 | Subcarrier (15 kHz) |
| EVM (Maximum) | 6 | |
| Phase Error (Average) | 7 | Subcarrier (15 kHz) |
| Phase Error (Maximum) | 8 | |
| Magnitude Error (Average) | 9 | Subcarrier (15 kHz) |
| Magnitude Error (Maximum) | 10 | |
| In-band Emissions<br>dB (Average) | 11 | Resource block (180 kHz) |
| dB (Maximum) | 12 | |
| dBc (Average) | 13 | |
| dB (Maximum) | 14 | |
| Spectrum Flatness<br>(Average) | 15 | Subcarrier (15 kHz) |
| (Maximum) | 16 | |
| (Minimum) | 17 | |
| Power Template | 18 | The data interval varies depending on the channel bandwidth setting.<br>20MHz: 20 ns<br>15MHz: 20 ns<br>10MHz: 40 ns<br>5MHz: 80 ns<br>3MHz: 160 ns<br>1.4MHz: 320 ns |

The number of waveform data varies depending on the channel bandwidth setting.

**Table 2.8.1-2 Channel Bandwidth and Number of Data**

| | Channel Bandwidth (MHz) | | | | | |
|---|---|---|---|---|---|---|
| **Measurement Item** | **1.4** | **3** | **5** | **10** | **15** | **20** |
| Occupied Bandwidth | 595 | 1239 | 2065 | 4137 | 6195 | 8267 |
| Spectrum Emission Mask | 1215 | 2475 | 4125 | 6555 | 9015 | 11475 |
| Constellation | 72 | 180 | 300 | 600 | 900 | 1200 |
| EVM | 72 | 180 | 300 | 600 | 900 | 1200 |
| Phase Error | 72 | 180 | 300 | 600 | 900 | 1200 |
| Magnitude Error | 72 | 180 | 300 | 600 | 900 | 1200 |
| In-band Emissions | 6 | 15 | 25 | 50 | 75 | 100 |
| Spectrum Flatness | 72 | 180 | 300 | 600 | 900 | 1200 |
| Power Template | 9375 | 18750 | 37500 | 75000 | 150000 | 150000 |

## 2.8.2 UL CA (MX887013A/14A-001)

The following command is used to capture the waveform data after measurement has been completed.

- Waveform

  `WAVEFMEAS`
  `:FETCh:CELLular:LTE:FUNDamental:TRACe`

The query parameter and data interval for capturing the waveform data for each measurement item are listed in the following table.

**Table 2.8.2-1 Waveform Data Type and Data Interval**

| Measurement Item | Query Parameter | Data Interval |
|---|---|---|
| Occupied Bandwidth | 1 | 6.103515625 kHz |
| Spectrum Emission Mask | 2 | 6.103515625 kHz |
| Constellation (I) | 3 | Subcarrier (15 kHz) |
| Constellation (Q) | 4 | |
| EVM (Average) | 5 | Subcarrier (15 kHz) |
| EVM (Maximum) | 6 | |
| Phase Error (Average) | 7 | Subcarrier (15 kHz) |
| Phase Error (Maximum) | 8 | |
| Magnitude Error (Average) | 9 | Subcarrier (15 kHz) |
| Magnitude Error (Maximum) | 10 | |
| In-band Emissions<br>dB (Average) | 11 | Resource block (180 kHz) |
| dB (Maximum) | 12 | |
| dBc (Average) | 13 | |
| dB (Maximum) | 14 | |
| Spectrum Flatness<br>(Average) | 15 | Subcarrier (15 kHz) |
| (Maximum) | 16 | |
| (Minimum) | 17 | |

The number of waveform data varies depending on the channel bandwidth setting.

- At Inter-band UL CA

**Table 2.8.2-2 Channel Bandwidth and Number of Data**

| | Channel Bandwidth (MHz) | | | | | |
|---|---|---|---|---|---|---|
| **Measurement Item** | **1.4** | **3** | **5** | **10** | **15** | **20** |
| Occupied Bandwidth | 595 | 1239 | 2065 | 4137 | 6195 | 8267 |
| Spectrum Emission Mask | 1215 | 2475 | 4125 | 6555 | 9015 | 11475 |
| Constellation | 72 | 180 | 300 | 600 | 900 | 1200 |
| EVM | 72 | 180 | 300 | 600 | 900 | 1200 |
| Phase Error | 72 | 180 | 300 | 600 | 900 | 1200 |
| Magnitude Error | 72 | 180 | 300 | 600 | 900 | 1200 |
| In-band Emissions | 6 | 15 | 25 | 50 | 75 | 100 |
| Spectrum Flatness | 72 | 180 | 300 | 600 | 900 | 1200 |

- At Contiguous UL CA

  Other than following measurement items are the same as the measurement items at Inter-band UL CA.

  OBW

**Table 2.8.2-3 Channel Bandwidth and Number of Data**

| | | Channel Bandwidth of SCC-1(MHz) | | | | | |
|---|---|---|---|---|---|---|---|
| | | **1.4** | **3** | **5** | **10** | **15** | **20** |
| **Channel Bandwidth of PCC (MHz)** | **1.4** | 1169 | 1827 | 2653 | 4711 | 6783 | 8841 |
| | **3** | 1827 | 2485 | 3311 | 5369 | 7441 | 9499 |
| | **5** | 2653 | 3311 | 4137 | 6195 | 8267 | 10325 |
| | **10** | 4711 | 5369 | 6195 | 8267 | 10325 | 12397 |
| | **15** | 6783 | 7441 | 8267 | 10325 | 12397 | 14455 |
| | **20** | 8841 | 9499 | 10325 | 12397 | 14455 | 16527 |

Spectrum Emission Mask

**Table 2.8.2-4 Channel Bandwidth and Number of Data**

| | | Channel Bandwidth of SCC-1(MHz) | | | | | |
|---|---|---|---|---|---|---|---|
| | | **1.4** | **3** | **5** | **10** | **15** | **20** |
| **Channel Bandwidth of PCC (MHz)** | **1.4** | 2829 | 3749 | 4733 | 7115 | 9647 | 12031 |
| | **3** | 3749 | 4589 | 5573 | 7957 | 10487 | 12871 |
| | **5** | 4733 | 5573 | 6457 | 8989 | 11373 | 13903 |
| | **10** | 7115 | 7957 | 8989 | 11421 | 13805 | 16337 |
| | **15** | 9647 | 10487 | 11373 | 13805 | 16387 | 18769 |
| | **20** | 12031 | 12871 | 13903 | 16337 | 18769 | 21203 |

**Table 2.8.2-5 Measurement Items of Waveform Data**

| Measurement Item | | Contiguous UL CA | Inter-band UL CA |
|---|---|---|---|
| Total | Occupied Bandwidth | ✓ | |
| | Spectrum Emission Mask | ✓ | |
| | Constellation (I)<br>Constellation (Q) | ✓*1 | ✓*2 |
| | EVM (Average)<br>EVM (Maximum) | ✓*1 | ✓*2 |
| | Phase Error (Average)<br>Phase Error (Maximum) | ✓*1 | ✓*2 |
| | Magnitude Error (Average)<br>Magnitude Error (Maximum) | ✓*1 | ✓*2 |
| | In-band Emissions<br>dB (Average)<br>dB (Maximum)<br>dBc (Average)<br>dBc (Maximum) | ✓*1 | ✓*2 |
| | Spectrum Flatness<br>(Average)<br>(Maximum)<br>(Minimum) | | ✓*2 |
| PCC/SCC-1 | Occupied Bandwidth | | ✓ |
| | Spectrum Emission Mask | | ✓ |
| | Constellation (I)<br>Constellation (Q) | ✓ | ✓ |
| | EVM (Average)<br>EVM (Maximum) | ✓ | ✓ |
| | Phase Error (Average)<br>Phase Error (Maximum) | ✓ | ✓ |
| | Magnitude Error (Average)<br>Magnitude Error (Maximum) | ✓ | ✓ |
| | In-band Emissions<br>dB (Average)<br>dB (Maximum)<br>dBc (Average)<br>dBc (Maximum) | ✓ | ✓ |
| | Spectrum Flatness<br>(Average)<br>(Maximum)<br>(Minimum) | | ✓ |

*1: This is the PCC measurement result.

*2: This is the result of CC set at Measurement Carrier.

# 2.9 Sample Programs

This section describes sample programs using the free Tera Term software.
For the Tera Term communication settings of, refer to Section 2.3.1 "Ethernet" in the *MU887000A TRX Test Module Operation Manual*.

## 2.9.1 non CA

### 2.9.1.1 Spectrum Emission Mask

An example of Spectrum Emission Mask measurement using the Native command mode is described here.
The sample program on the following pages can be executed as a Tera Term macro. Refer to the Tera Term Help file for how to execute the macro.

Processing Flow

1. Set the application software type to the MX887013A.
2. Set the following measurement conditions.

| | |
|---|---|
| Test Port | Port 1 |
| Input Level | –10 dBm |
| Uplink Frequency | 1940 MHz |
| Frame Configuration | FDD |
| Channel Bandwidth | 5 MHz |
| RMC Configuration | PUSCH |
| RMC Modulation Method | QPSK |
| Start RB Number | 0 |
| Number of RBs | 25 |
| Tx Power Measurement | OFF |
| Occupied Bandwidth Measurement | OFF |
| Spectrum Emission Mask Measurement | ON, 100 times |
| Adjacent Channel Leakage Power Ratio Measurement | OFF |
| Modulation Analysis | OFF |

3. Set the Spectrum Emission Mask.

| | |
|---|---|
| Additional Spectrum Emission | NS_03 |
| Range 1 | –13.5 dBm |
| Range 2 | –8.5 dBm |
| Range 3 | –11.5 dBm |
| Range 4 | –23.5 dBm |

4. Start measurement.
5. Read the measurement status.
6. Query measurement results after measurement is completed.

```
; Sample program for Spectrum Emission Mask
; Anritsu Corporation March,2012
; Macro for Tera Term Version 4.69
;
; set local echo to on
setecho 1
flushrecv
; time out 3 second
timeout=3

; Set language to "Native".
sendln 'SYST:LANG NAT'
call check_error_code

; Set application type to "Cellular".
sendln 'SYSSEL CELLULAR'
call check_error_code

; Set standard to "LTE".
sendln 'STDSEL LTE'
call check_error_code

; Set test port to "Port1".
sendln 'PORT PORT1,PORT1'
call check_error_code

; Set Input Range to "-10 dBm".
sendln 'ILVL -10'
call check_error_code

; Set center frequency to "1940 MHz".
sendln 'ULFREQ 1940MHZ'
call check_error_code

; Set Frame Structure to "FDD".
sendln 'FRAMETYPE FDD'
call check_error_code

; Set Channel Bandwidth to "5 MHz".
sendln 'BANDWIDTH 5MHZ'
call check_error_code

; Set RMC Configuration to "PUSCH".
sendln 'CHCONFIG PUSCH'
```

```
call check_error_code

; Set RMC Modulation to "QPSK".
sendln 'ULRMC_MOD QPSK'
call check_error_code

; Set Starting RB Number to "0".
sendln 'ULRB_START 0'
call check_error_code

; Set Count of RB to "25".
sendln 'ULRMC_RB 25'
call check_error_code

; Set Long Span Code Search for Synchronization to "Off".
sendln 'LONGSEARCH OFF'
call check_error_code

; Set Measurement of Tx Power to "OFF".
sendln 'PWR_SET OFF'
call check_error_code

; Set Measurement of Occupied Bandwidth to "OFF".
sendln 'OBW_SET OFF'
call check_error_code

; Set Measurement of Spectrum Emission Mask to "ON","100 times".
sendln 'SEM_SET ON,100'
call check_error_code

; Set Measurement of Adjacent Channel Leakage power Ratio to "OFF".
sendln 'ACLR_SET OFF'
call check_error_code

; Set Measurement of Modulation Analysis to "OFF".
sendln 'MOD_SET OFF'
call check_error_code

; Set AddtionalSpectrumEmission to "NS_03".
sendln 'SIB2_NS NS_03'
call check_error_code

; Set Level Limit of Range 1 to "-13.5 dBm".
sendln 'SEM_TEMPLATE_5MHZ 1,-13.5'
```

```
call check_error_code

; Set Level Limit of Range 2 to "-8.5 dBm".
sendln 'SEM_TEMPLATE_5MHZ 2,-8.5'
call check_error_code

; Set Level Limit of Range 3 to "-11.5 dBm".
sendln 'SEM_TEMPLATE_5MHZ 3,-11.5'
call check_error_code

; Set Level Limit of Range 4 to "-23.5 dBm".
sendln 'SEM_TEMPLATE_5MHZ 4,-23.5'
call check_error_code

; Start measurement
sendln 'SNGLS'
call check_error_code

; waiting measurement up to 10 second
for i 1 10

  sendln 'MSTAT?'
  pause 1; wait 1 second
  recvln
  recvln
  ;call check_response ; debug
  if result=0 goto _timeout
  if result=1 then
         break
  endif
  call check_error_code
next

; Query Judgement
sendln 'SEM?'
call check_error_code

; Query Peak level and frequency in each range
sendln 'SEMLVL_LOWER?'
call check_error_code
sendln 'SEMLVL_UPPER?'
call check_error_code

; Query Margin in each range
```

```
sendln 'SEMMARGIN_LOWER?'
call check_error_code
sendln 'SEMMARGIN_UPPER?'
call check_error_code

; Query Spectrum data
sendln 'WAVEFMEAS? 2,0,4125'
call check_error_code

messagebox  'Macro end successfully' 'Finish'

End

;       ------------ subroutines -----------

:check_error_code
  ; query error
  sendln 'SYSERR?'
  waitln 'No error'

  ; in case of timeout
  if result=0 goto _timeout
  ; in case of error occurring
  if result=2 then
         e_message='Error code = '
         strconcat e_message inputstr
         messagebox  e_message 'Command Error occurred'
         end
  endif

  ; in case of no error

return

:check_response

  ;for debug
  messagebox inputstr 'debug1'
  int2str result_str result
  messagebox result_str 'debug2'

  return

:_timeout
```

```
messagebox  'No response from MT8870A.' 'Time out!'
call check_error_code
End
```

### 2.9.1.2 Modulation Analysis

An example of modulation analysis using the SCPI command mode is described here.

The sample program on the following pages can be executed as a Tera Term macro. Refer to the Tera Term Help file for how to execute the macro.

#### Processing Flow

1. Set the application software type to the MX887013A.
2. Set the following measurement conditions.

| | |
|---|---|
| Test Port | Port 2 |
| Input Level | –20 dBm |
| Uplink Frequency | 1940 MHz |
| Frame Structure | FDD |
| Channel Bandwidth | 5 MHz |
| RMC Configuration | PUSCH |
| RMC Modulation | QPSK |
| Start RB Number | 0 |
| Number of RBs | 8 |
| Tx Power | OFF |
| Occupied Bandwidth Measurement | OFF |
| Spectrum Emission Mask Measurement | OFF |
| Adjacent Channel Leakage Power Ratio Measurement | OFF |
| Modulation Analysis | ON, 200 times |

3. Start measurement.
4. Read the measurement status.
5. Query the following measurement results when measurement is completed.

| | |
|---|---|
| Frequency | |
| Frequency Error | |
| EVM | |
| Peak EVM | |
| Reference Signal EVM | |
| Phase Error | |
| Magnitude Error | |
| Carrier Leakage | |
| IQ Imbalance | |
| Waveform Quality | |
| In-band Emissions | General, IQ Image, Carrier Leakage |
| Spectrum Flatness | Max value, min value, worst value, and ripple of Range 1 |
| | Max value, min value, worst value, and ripple of Range 2 |
| | Difference between max value of Range 2 and min value of Range 1 |
| | Difference between max value of Range 1 and min value of Range 2 |

```
; Sample program for Modulation Analysis
; Anritsu Corporation March,2012
; Macro for Tera Term Version 4.69
;
; set local echo to on
setecho 1
flushrecv
; time out 3 second
timeout=3

; Set language to "SCPI".
sendln 'SYST:LANG SCPI'
call check_error_code

; Set application type to "Cellular".
sendln ':INST CELLULAR'
call check_error_code

; Set standard to "LTE".
sendln ':CONF:CELL:MEAS:STAN LTE'
call check_error_code

; Set test port to "Port2".
sendln ':ROUT:PORT:CONN:DIR PORT2,PORT2'
call check_error_code

; Set channel to "9750".
sendln ':CONF:CELL:MEAS:RFS:ULCH 9750'
call check_error_code

; Set Input Level to "-20 dBm".
sendln ':CONF:CELL:MEAS:RFS:LEV -20'

; Set Frame Structure to "FDD".
sendln ':CONF:CELL:LTE:FSTR FDD'
call check_error_code

; Set Channel Bandwidth to "5 MHz".
sendln ':CONF:CELL:LTE:CBAN 5MHZ'
call check_error_code

; Set RMC Configuration to "PUSCH"
sendln ':CONF:CELL:LTE:CTYP PUSCH'
call check_error_code
```

```
; Set RMC Modulation to "QPSK".
sendln ':CONF:CELL:LTE:MOD:MSCH QPSK'
call check_error_code

; Set Starting RB Number to "0".
sendln ':CONF:CELL:LTE:RBAL:ORB 0'
call check_error_code

; Set Count of RB to "8".
sendln ':CONF:CELL:LTE:RBAL:NRB 8'
call check_error_code

; Set Long Span Code Search for Synchronization to "Off".
sendln ':CONF:CELL:LTE:FUND:LSS OFF'
call check_error_code

; Set Measurement of Tx Power to "OFF".
sendln ':CONF:CELL:LTE:FUND:POW:SET OFF'
call check_error_code

; Set Measurement of Occupied Bandwidth to "OFF".
sendln ':CONF:CELL:LTE:FUND:OBW:SET OFF'
call check_error_code

; Set Measurement of Spectrum Emission Mask to "OFF".
sendln ':CONF:CELL:LTE:FUND:SEM:SET OFF'
call check_error_code

; Set Measurement of Adjacent Channel Leakage power Ratio to "OFF".
sendln ':CONF:CELL:LTE:FUND:ACLR:SET OFF'
call check_error_code

; Set Measurement of Modulation Analysis to "ON","200 times".
sendln ':CONF:CELL:LTE:FUND:MOD:SET ON,200'
call check_error_code

; ! Note !
; Output the RF power of Device under test.

; Start measurement
sendln ':INIT:CELL:MEAS:SING'
call check_error_code

; waiting measurement up to 10 second
```

```
for i 1 10

  sendln ':FETC:CELL:MEAS:STAT?'
  pause 1; wait 1 second
  recvln
  recvln
  ;call check_response ; debug
  if result=0 goto _timeout
  if result=1 then
         break
  endif
  call check_error_code
next

; Query Frequency
sendln ':FETC:CELL:LTE:FUND:MOD:CFR?'
call check_error_code

; Query Frequency Error
sendln ':FETC:CELL:LTE:FUND:MOD:FERR? TTL'
call check_error_code

; Query EVM
sendln ':FETC:CELL:LTE:FUND:MOD:EVM? TTL'
call check_error_code

; Query Peak EVM
sendln ':FETC:CELL:LTE:FUND:MOD:PEVM? TTL'
call check_error_code

; Query Demodulation Reference Signal EVM
sendln ':FETC:CELL:LTE:FUND:MOD:RSEV? TTL'
call check_error_code

; Query Phase Error
sendln ':FETC:CELL:LTE:FUND:MOD:PHER? TTL'
call check_error_code

; Query Magnitude Error
sendln ':FETC:CELL:LTE:FUND:MOD:MERR? TTL'
call check_error_code

; Query Carrier Leakage
sendln ':FETC:CELL:LTE:FUND:MOD:CARL? TTL'
```

```
call check_error_code

; Query IQ Imbalance
sendln ':FETC:CELL:LTE:FUND:MOD:IQIM? TTL'
call check_error_code

; Query Waveform Quality
sendln ':FETC:CELL:LTE:FUND:MOD:RHO? TTL'
call check_error_code

; Query Inband Emission - General
sendln ':FETC:CELL:LTE:FUND:MOD:IEM:GEN? TTL'
call check_error_code

; Query Inband Emission – IQ Image
sendln ':FETC:CELL:LTE:FUND:MOD:IEM:IQIM? TTL'
call check_error_code

; Query Inband Emission – Carrier Leakage
sendln ':FETC:CELL:LTE:FUND:MOD:IEM:CARL? TTL'
call check_error_code

; Query Spectrum Flatness – Range 1 Maximum
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:R1P? TTL'
call check_error_code

; Query Spectrum Flatness – Range 1 Minimum
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:R1M? TTL'
call check_error_code

; Query Spectrum Flatness – Range 1 Worst
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:R1? TTL'
call check_error_code

; Query Spectrum Flatness – Range 1 Ripple
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:RP1? TTL'
call check_error_code

; Query Spectrum Flatness – Range 2 Maximum
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:R2P? TTL'
call check_error_code

; Query Spectrum Flatness – Range 2 Minimum
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:R2M? TTL'
```

```
call check_error_code

; Query Spectrum Flatness - Range 2 Worst
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:R2? TTL'
call check_error_code

; Query Spectrum Flatness - Range 2 Ripple
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:RP2? TTL'
call check_error_code

; Query Spectrum Flatness - Range 2 Max to Range 1 Min
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:RP21? TTL'
call check_error_code

; Query Spectrum Flatness - Range 1 Max to Range 2 Min
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:RP12? TTL'
call check_error_code

messagebox  'Macro end successfully' 'Finish'

End

;       ------------ subroutines -----------

:check_error_code
  ; query error
  sendln ':SYSTem:ERRor?'
  waitln 'No error'

  ; in case of timeout
  if result=0 goto _timeout
  ; in case of error occurring
  if result=2 then
         e_message='Error code = '
         strconcat e_message inputstr
         messagebox  e_message 'Command Error occurred'
         end
  endif

  ; in case of no error

return

:check_response
```

```
;for debug
messagebox inputstr 'debug1'
int2str result_str result
messagebox result_str 'debug2'

return

:_timeout
messagebox  'No response from MT8870A.' 'Time out!'
call check_error_code
End
```

## 2.9.2 UL CA (MX887013A/14A-001)

### 2.9.2.1 Spectrum Emission Mask

An example of Spectrum Emission Mask measurement using the Native command mode is described here.
The sample program on the following pages can be executed as a Tera Term macro. Refer to the Tera Term Help file for how to execute the macro.

#### Processing Flow

1. Set the application software type to the MX887013A.
2. Set the following measurement conditions.

| | |
|---|---|
| Test Port | Port 1 |
| Input Level | –10 dBm |
| Uplink Frequency for PCC | 1940 MHz |
| Uplink Frequency for SCC-1 | 1959.8 MHz |
| Channel Coding | RMC_UL_CA |
| Frame Configuration for PCC | FDD |
| Frame Configuration for SCC-1 | FDD |
| Channel Bandwidth for PCC | 20 MHz |
| Channel Bandwidth for SCC-1 | 20 MHz |
| RMC Configuration | PUSCH |
| RMC Modulation Method for PCC | QPSK |
| RMC Modulation Method for SCC-1 | QPSK |
| Start RB Number for PCC | 0 |
| Start RB Number for SCC-1 | 0 |
| Number of RBs for PCC | 100 |
| Number of RBs for SCC-1 | 100 |
| Tx Power Measurement | OFF |
| Occupied Bandwidth Measurement | OFF |
| Spectrum Emission Mask Measurement | ON, 100 times |
| Adjacent Channel Leakage Power Ratio Measurement | OFF |
| Modulation Analysis | OFF |

3. Set the Spectrum Emission Mask.

| | |
|---|---|
| AddtionalSpectrumEmission | NS_03 |
| Range 1 | –13.5 dBm |
| Range 2 | –8.5 dBm |
| Range 3 | –11.5 dBm |
| Range 4 | –23.5 dBm |

4. Start measurement.
5. Read the measurement status.
6. Query measurement results after measurement is completed.

```
; Sample program for Spectrum Emission Mask
; Anritsu Corporation March,2012
; Macro for Tera Term Version 4.69
;
; set local echo to on
setecho 1
flushrecv
; time out 3 second
timeout=3

; Set language to "Native".
sendln 'SYST:LANG NAT'
call check_error_code

; Set application type to "Cellular".
sendln 'SYSSEL CELLULAR'
call check_error_code

; Set standard to "LTE".
sendln 'STDSEL LTE'
call check_error_code

; Set test port to "Port1".
sendln 'PORT PORT1,PORT1'
call check_error_code

; Set Input Range to "-10 dBm".
sendln 'ILVL -10'
call check_error_code

; Set uplink frequency for PCC to "1940 MHz".
sendln 'ULFREQ 1940MHZ'
call check_error_code

; Set uplink frequency for SCC-1 to "1959.8 MHz".
sendln 'ULFREQ_SCC1 1959.8MHZ'
call check_error_code

; Set Channel Cording to "RMC_UL_CA".
sendln 'CHCODING RMC_UL_CA'
call check_error_code

; Set Frame Structure for PCC to "FDD".
sendln 'FRAMETYPE FDD'
```

```
call check_error_code

; Set Frame Structure for SCC-1 to "FDD".
sendln 'FRAMETYPE_SCC1 FDD'
call check_error_code

; Set Channel Bandwidth for PCC to "20 MHz".
sendln 'BANDWIDTH 20MHZ'
call check_error_code

; Set Channel Bandwidth for SCC-1 to "20 MHz".
sendln 'BANDWIDTH_SCC1 20MHZ'
call check_error_code

; Set RMC Configuration to "PUSCH".
sendln 'CHCONFIG PUSCH'
call check_error_code

; Set RMC Modulation for PCC to "QPSK".
sendln 'ULRMC_MOD QPSK'
call check_error_code

; Set RMC Modulation for SCC-1 to "QPSK".
sendln 'ULRMC_MOD_SCC1 QPSK'
call check_error_code

; Set Starting RB Number for PCC to "0".
sendln 'ULRB_START 0'
call check_error_code

; Set Starting RB Number for SCC-1 to "0".
sendln 'ULRB_START_SCC1 0'
call check_error_code

; Set Count of RB for PCC to "100".
sendln 'ULRMC_RB 100'
call check_error_code

; Set Count of RB for SCC-1 to "100".
sendln 'ULRMC_RB_SCC1 100'
call check_error_code

; Set Long Span Code Search for Synchronization to "Off".
sendln 'LONGSEARCH OFF'
```

```
call check_error_code

; Set Measurement of Tx Power to "OFF".
sendln 'PWR_SET OFF'
call check_error_code

; Set Measurement of Occupied Bandwidth to "OFF".
sendln 'OBW_SET OFF'
call check_error_code

; Set Measurement of Spectrum Emission Mask to "ON","100 times".
sendln 'SEM_SET ON,100'
call check_error_code

; Set Measurement of Adjacent Channel Leakage power Ratio to "OFF".
sendln 'ACLR_SET OFF'
call check_error_code

; Set Measurement of Modulation Analysis to "OFF".
sendln 'MOD_SET OFF'
call check_error_code

; Set AddtionalSpectrumEmission to "NS_03".
sendln 'SIB2_NS NS_03'
call check_error_code

; Set Level Limit of Range 1 to "-13.5 dBm".
sendln 'SEM_TEMPLATE_CONTCC_100RB_100RB 1,-13.5'
call check_error_code

; Set Level Limit of Range 2 to "-8.5 dBm".
sendln 'SEM_TEMPLATE_CONTCC_100RB_100RB 2,-8.5'
call check_error_code

; Set Level Limit of Range 3 to "-11.5 dBm".
sendln 'SEM_TEMPLATE_CONTCC_100RB_100RB 3,-11.5'
call check_error_code

; Set Level Limit of Range 4 to "-23.5 dBm".
sendln 'SEM_TEMPLATE_CONTCC_100RB_100RB 4,-23.5'
call check_error_code

; Start measurement
sendln 'SNGLS'
```

2

Fundamental Measurement

```
call check_error_code

; waiting measurement up to 10 second
for i 1 10

  sendln 'MSTAT?'
  pause 1; wait 1 second
  recvln
  recvln
  ;call check_response ; debug
  if result=0 goto _timeout
  if result=1 then
         break
  endif
  call check_error_code
next

; Query Judgement
sendln 'SEM?'
call check_error_code

; Query Peak level and frequency in each range
sendln 'SEMLVL_LOWER?'
call check_error_code
sendln 'SEMLVL_UPPER?'
call check_error_code

; Query Margin in each range
sendln 'SEMMARGIN_LOWER?'
call check_error_code
sendln 'SEMMARGIN_UPPER?'
call check_error_code

; Query Spectrum data
sendln 'WAVEFMEAS? 2,0,21203'
call check_error_code

messagebox  'Macro end successfully' 'Finish'

End

;       ------------ subroutines -----------

:check_error_code
```

```
  ; query error
  sendln 'SYSERR?'
  waitln 'No error'

  ; in case of timeout
  if result=0 goto _timeout
  ; in case of error occurring
  if result=2 then
         e_message='Error code = '
         strconcat e_message inputstr
         messagebox  e_message 'Command Error occurred'
         end
  endif

  ; in case of no error

return

:check_response

  ;for debug
  messagebox inputstr 'debug1'
  int2str result_str result
  messagebox result_str 'debug2'

  return

:_timeout
  messagebox  'No response from MT8870A.' 'Time out!'
  call check_error_code
  End
```

### 2.9.2.2 Modulation Analysis

An example of modulation analysis using the SCPI command mode is described here.

The sample program on the following pages can be executed as a Tera Term macro. Refer to the Tera Term Help file for how to execute the macro.

#### Processing Flow

1. Set the application software type to the MX887013A.
2. Set the following measurement conditions.

| | |
|---|---|
| Test Port | Port 2 |
| Input Level | –20 dBm |
| Uplink Frequency for PCC | 18000 |
| Uplink Frequency for SCC-1 | 18198 |
| Channel Coding | RMC_UL_CA |
| Frame Configuration for PCC | FDD |
| Frame Configuration for SCC-1 | FDD |
| Channel Bandwidth for PCC | 20 MHz |
| Channel Bandwidth for SCC-1 | 20 MHz |
| RMC Configuration | PUSCH |
| RMC Modulation Method for PCC | QPSK |
| RMC Modulation Method for SCC-1 | QPSK |
| Start RB Number for PCC | 0 |
| Start RB Number for SCC-1 | 0 |
| Number of RBs for PCC | 18 |
| Number of RBs for SCC-1 | 0 |
| Operation band for PCC | 1 |
| Operation band for SCC-1 | 1 |
| In-band Emission Carrier Leakage Frequency | CFR |
| Tx Power Measurement | OFF |
| Occupied Bandwidth Measurement | OFF |
| Spectrum Emission Mask Measurement | OFF |
| Adjacent Channel Leakage Power Ratio Measurement | OFF |
| Modulation Analysis | ON, 100 times |

3. Start measurement.
4. Read the measurement status.
5. Query measurement results after measurement is completed.

   Frequency
   Frequency Error
   EVM
   Peak EVM

| | |
|---|---|
| Reference Signal EVM | |
| Phase Error | |
| Magnitude Error | |
| Carrier Leakage | |
| IQ Imbalance | |
| Waveform Quality | |
| In-band Emissions | General, IQ Image, Carrier Leakage |
| Spectrum Flatness | Max value, min value, worst value, and ripple of Range 1 |
| | Max value, min value, worst value, and ripple of Range 2 |
| | Difference between max value of Range 2 and min value of Range 1 |
| | Difference between max value of Range 1 and min value of Range 2 |

```
; Sample program for Modulation Analysis
; Anritsu Corporation March,2012
; Macro for Tera Term Version 4.69
;
; set local echo to on
setecho 1
flushrecv
; time out 3 second
timeout=3

; Set language to "SCPI".
sendln 'SYST:LANG SCPI'
call check_error_code

; Set application type to "Cellular".
sendln ':INST CELLULAR'
call check_error_code

; Set standard to "LTE".
sendln ':CONF:CELL:MEAS:STAN LTE'
call check_error_code

; Set test port to "Port2".
sendln ':ROUT:PORT:CONN:DIR PORT2,PORT2'
call check_error_code

; Set uplink channel for PCC to "18000".
sendln ':CONF:CELL:MEAS:RFS:ULCH 18000
call check_error_code

; Set uplink channel for SCC-1 to "18198".
sendln ':CONF:CELL:MEAS:RFS:ULCH:SCC1 18198
call check_error_code

; Set Input Level to "-20 dBm".
sendln ':CONF:CELL:MEAS:RFS:LEV -20'

; Set Channel Coding to "RMC_UL_CA".
sendln ':CONF:CELL:LTE:CHC RMC_UL_CA'

; Set Frame Structure for PCC to "FDD".
sendln ':CONF:CELL:LTE:FSTR FDD'
call check_error_code
```

```
; Set Frame Structure for SCC-1 to "FDD".
sendln ':CONF:CELL:LTE:FSTR:SCC1 FDD'
call check_error_code

; Set Channel Bandwidth for PCC to "20 MHz".
sendln ':CONF:CELL:LTE:CBAN 20MHZ'
call check_error_code

; Set Channel Bandwidth for SCC-1 to "20 MHz".
sendln ':CONF:CELL:LTE:CBAN:SCC1 20MHZ'
call check_error_code

; Set RMC Configuration to "PUSCH"
sendln ':CONF:CELL:LTE:CTYP PUSCH'
call check_error_code

; Set RMC Modulation for PCC to "QPSK".
sendln ':CONF:CELL:LTE:MOD:MSCH QPSK'
call check_error_code

; Set RMC Modulation for SCC-1 to "QPSK".
sendln ':CONF:CELL:LTE:MOD:MSCH:SCC1 QPSK'
call check_error_code

; Set Starting RB Number for PCC to "0".
sendln ':CONF:CELL:LTE:RBAL:ORB 0'
call check_error_code

; Set Starting RB Number for SCC1 to "0".
sendln ':CONF:CELL:LTE:RBAL:ORB:SCC1 0'
call check_error_code

; Set Count of RB for PCC to "18".
sendln ':CONF:CELL:LTE:RBAL:NRB 18'
call check_error_code

; Set Count of RB for SCC-1 to "0".
sendln ':CONF:CELL:LTE:RBAL:NRB:SCC1 0'
call check_error_code

; Set Long Span Code Search for Synchronization to "Off".
sendln ':CONF:CELL:LTE:FUND:LSS OFF'
call check_error_code
```

```
; Set operation band for PCC to "1".
sendln ':CONF:CELL:LTE:FUND:BAND 1'
call check_error_code

; Set operation band for SCC-1 to "1".
sendln ':CONF:CELL:LTE:FUND:BAND:SCC1 1'
call check_error_code

; Set In-band Emission Carrier Leakage Frequency to "CFR".
sendln ':CONF:CELL:LTE:FUND:IEM:CLFR CFR'
call check_error_code

; Set Measurement of Transmit Power to "OFF".
sendln ':CONF:CELL:LTE:FUND:POW:SET OFF'
call check_error_code

; Set Measurement of Occupied Bandwidth to "OFF".
sendln ':CONF:CELL:LTE:FUND:OBW:SET OFF'
call check_error_code

; Set Measurement of Spectrum Emission Mask to "OFF".
sendln ':CONF:CELL:LTE:FUND:SEM:SET OFF'
call check_error_code

; Set Measurement of Adjacent Channel Leakage power Ratio to "OFF".
sendln ':CONF:CELL:LTE:FUND:ACLR:SET OFF'
call check_error_code

; Set Measurement of Modulation Analysis to "ON","100 times".
sendln ':CONF:CELL:LTE:FUND:MOD:SET ON,100'
call check_error_code

; ! Note !
; Output the RF power of Device under test.

; Start measurement
sendln ':INIT:CELL:MEAS:SING'
call check_error_code

; waiting measurement up to 10 second
for i 1 10

  sendln ':FETC:CELL:MEAS:STAT?'
  pause 1; wait 1 second
```

```
  recvln
  recvln
  ;call check_response ; debug
  if result=0 goto _timeout
  if result=1 then
         break
  endif
  call check_error_code
next

; Query Frequency
sendln ':FETC:CELL:LTE:FUND:MOD:CFR?'
call check_error_code

; Query Frequency Error
sendln ':FETC:CELL:LTE:FUND:MOD:FERR? TTL'
call check_error_code

; Query EVM
sendln ':FETC:CELL:LTE:FUND:MOD:EVM? TTL'
call check_error_code

; Query Peak EVM
sendln ':FETC:CELL:LTE:FUND:MOD:PEVM? TTL'
call check_error_code

; Query Demodulation Reference Signal EVM
sendln ':FETC:CELL:LTE:FUND:MOD:RSEV? TTL'
call check_error_code

; Query Phase Error
sendln ':FETC:CELL:LTE:FUND:MOD:PHER? TTL'
call check_error_code

; Query Magnitude Error
sendln ':FETC:CELL:LTE:FUND:MOD:MERR? TTL'
call check_error_code

; Query Carrier Leakage
sendln ':FETC:CELL:LTE:FUND:MOD:CARL? TTL'
call check_error_code

; Query IQ Imbalance
sendln ':FETC:CELL:LTE:FUND:MOD:IQIM? TTL'
```

```
call check_error_code

; Query Waveform Quality
sendln ':FETC:CELL:LTE:FUND:MOD:RHO? TTL'
call check_error_code

; Query Inband Emission - General
sendln ':FETC:CELL:LTE:FUND:MOD:IEM:GEN? TTL'
call check_error_code

; Query Inband Emission - IQ Image
sendln ':FETC:CELL:LTE:FUND:MOD:IEM:IQIM? TTL'
call check_error_code

; Query Inband Emission - Carrier Leakage
sendln ':FETC:CELL:LTE:FUND:MOD:IEM:CARL? TTL'
call check_error_code

; Query Spectrum Flatness - Range 1 Maximum
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:R1P? TTL'
call check_error_code

; Query Spectrum Flatness - Range 1 Minimum
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:R1M? TTL'
call check_error_code

; Query Spectrum Flatness - Range 1 Worst
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:R1?'
call check_error_code

; Query Spectrum Flatness - Range 1 Ripple
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:RP1? TTL'
call check_error_code

; Query Spectrum Flatness - Range 2 Maximum
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:R2P? TTL'
call check_error_code

; Query Spectrum Flatness - Range 2 Minimum
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:R2M? TTL'
call check_error_code

; Query Spectrum Flatness - Range 2 Worst
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:R2?'
```

```
call check_error_code

; Query Spectrum Flatness - Range 2 Ripple
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:RP2? TTL'
call check_error_code

; Query Spectrum Flatness - Range 2 Max to Range 1 Min
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:RP21? TTL'
call check_error_code

; Query Spectrum Flatness - Range 1 Max to Range 2 Min
sendln ':FETC:CELL:LTE:FUND:MOD:ESFL:RP12? TTL'
call check_error_code

messagebox  'Macro end successfully' 'Finish'

End

;       ------------ subroutines -----------

:check_error_code
  ; query error
  sendln ':SYSTem:ERRor?'
  waitln 'No error'

  ; in case of timeout
  if result=0 goto _timeout
  ; in case of error occurring
  if result=2 then
         e_message='Error code = '
         strconcat e_message inputstr
         messagebox  e_message 'Command Error occurred'
         end
  endif

  ; in case of no error

return

:check_response

  ;for debug
  messagebox inputstr 'debug1'
  int2str result_str result
```

```
  messagebox result_str 'debug2'

  return

:_timeout
  messagebox  'No response from MT8870A.' 'Time out!'
  call check_error_code
  End
```

# Chapter 3 Sequence Measurement

This chapter describes the MX887013A/14A Sequence Measurement function and commands. For a detailed description of the commands, refer to Chapter 4 “SCPI Command Reference” and Chapter 5 “Native Command Reference” in this manual.

A license for the MX887010A Cellular Standards Sequence Measurement is required to execute sequence measurement.

# 3.1 Outline

The MX887013A LTE FDD Uplink TX Measurement and MX887014A LTE TDD Uplink TX Measurement add the following LTE measurement items to the Sequence Measurement mode. Refer to Chapter 2 “Fundamental Measurement” for details of each measurement.

- Tx Power
- Occupied Bandwidth
- Spectrum Emission Mask
- Adjacent Channel Leakage Power Ratio
- Modulation Analysis
  Frequency Error, EVM, Carrier Leakage, IQ Imbalance, In-band Emission, and Spectrum Flatness

The Sequence Measurement mode does not support the following measurements.

- Modulation Analysis
  Rho
- Power Template
- Waveform Data

LTE measurement can be allocated to any segment in the sequence table. The segment duration depends on the measurement count. Each item of LTE measurement is measured once in one subframe (1 ms).

***Note:***

Modulation Analysis is measured only at one slot (0.5 ms) in one subframe.

When multiple measurement items are specified in a segment, the largest measurement count among them determines the measurement duration of the segment.

Example:

| | | |
|---|---|---|
| Tx Power | 50 times | 50 × 1 ms = 50 ms |
| Occupied Bandwidth | 100 times | 100 × 1 ms = 100 ms |
| Spectrum Emission Mask | 150 times | 150 × 1 ms = 150 ms |
| Adjacent Channel Leakage Power Ratio | 50 times | 50 × 1 ms = 50 ms |
| Modulation Analysis | 200 times | 200 × 1 ms = 200 ms |

In this case, the LTE measurement duration is 200 ms as determined by the Spectrum Emission Mask measurement duration.

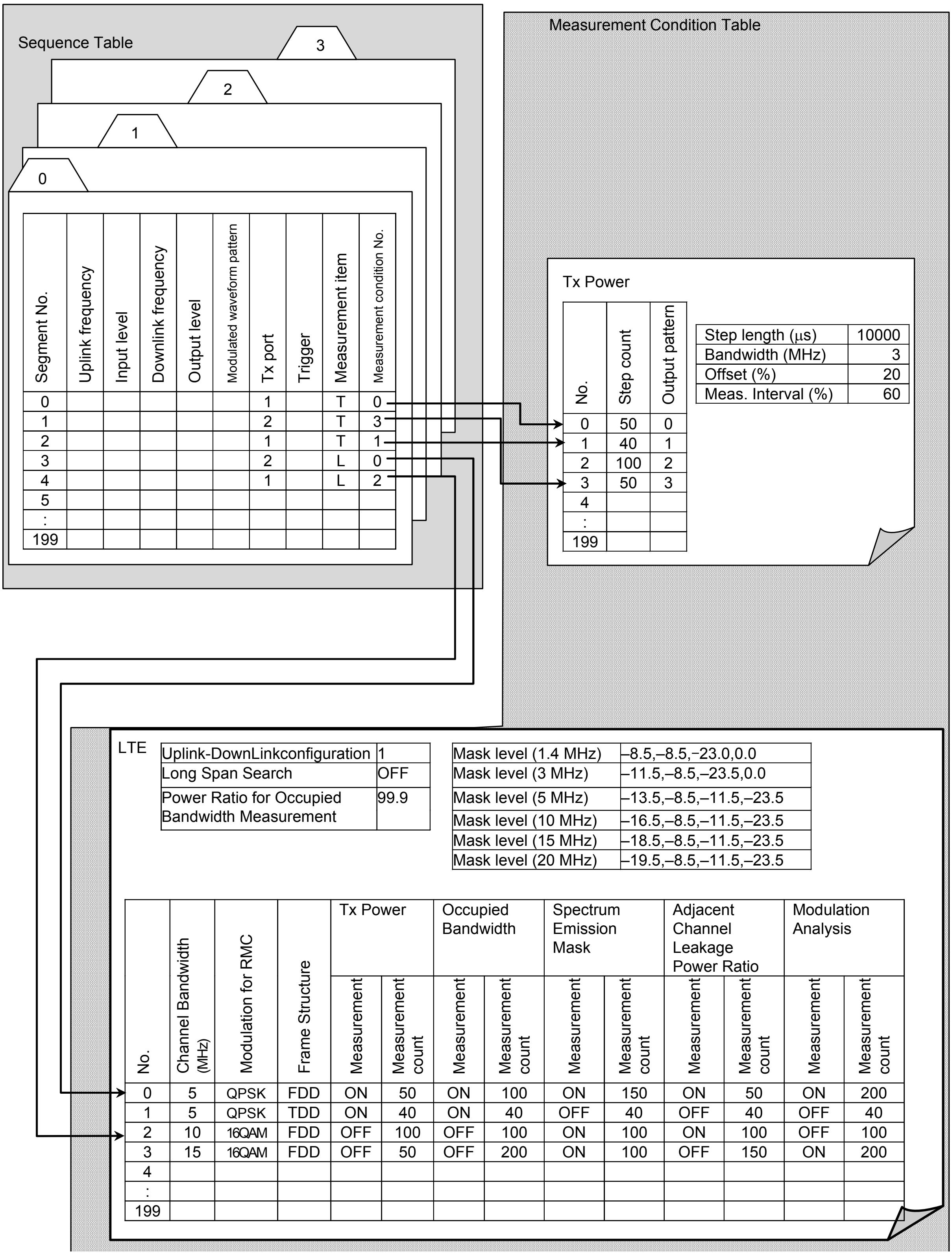


**Figure 3.1-1 Data Composition of Sequence Measurement Condition when MX887013A Installed**

To change measurement to the Sequence Measurement mode, set the parameter to SEQUENCE using the following command.

```
STDSEL
:CONFigure:CELLular:MEASurement:STANdard
```

To modify the frequency, level or waveform pattern of a Downlink signal at sequence measurement, set the MU887000A vector signal generator to the Sequence Measurement mode. Set the parameter to SEQUENCE using the following command. For a detailed description, refer to Chapter 5 "SCPI Command Reference" in the *MU887000A TRX Test Module Operation Manual*.

```
:SOURce:GPRF:GENerator:MODE
```

Set the initial conditions of the Sequence Measurement mode to the following four items from the items described in Section 2.1 "Common Operations".
Individual values can be set as described in Chapter 2 "Fundamental Measurements" and Chapter 3 "Sequence Measurement".

- Uplink Frequency (mobile station Tx frequency)
  `ULFREQ`
  `TXFREQ`
  `:CONFigure:CELLular:MEASurement:RFSettings:FREQuency`
- Downlink Frequency (mobile station Rx frequency)
  `DLFREQ`
  `RXFREQ`
  `:CONFigure:CELLular:GENerator:RFSettings:FREQuency`
- Output Level
  `OLVL`
  `:CONFigure:CELLular:GENerator:RFSettings:LEVel`
- Input Level
  `ILVL`
  `:CONFigure:CELLular:MEASurement:RFSettings:LEVel`
- Output On/Off
  `LVL`
  `:CONFigure:CELLular:GENerator:RFSettings:STATe`
- Modulation On/Off
  `MOD`
  `:CONFigure:CELLular:GENerator:BBMode`
- Waveform File
  `PACKAGE`
  `:CONFigure:CELLular:GENerator:ARB:PACKage:SELect`

- Waveform Pattern
  DLPAT
  :CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect
  DLPAT_SYNC
  :CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect:SYNC
- Ports
  PORT
  :ROUTe:PORT:CONNect:DIRection

# 3.2 Setting Sequence Table

## 3.2.1 Sequence table setting items

The sequence table setting items are:

- Table number
- Uplink (Rx) frequency
- Input level
- Downlink (Tx) frequency
- Output level
- Modulated waveform pattern
- Output port
- Trigger conditions
- Measurement items
- Step count
- Measurement condition number

Table number

This is the number allocated to the edited sequence table. Four sequence tables are used and each table has a number between 0 and 3.

Rx Frequency, Input level, Tx frequency, Output level, Modulated waveform pattern

Each segment of the sequence table is configured with frequencies (MHz) and levels (dBm) and modulated waveform pattern number. The setting ranges are:

| | |
|---|---|
| Frequency: | 400.000000 to 6000.000000 MHz |
| Input level: | –65.0 to +35.0 dBm (Test Port 1, 2) |
| | –65.0 to +25.0 dBm (Test Port 3, 4) |
| Output level: | –130.0 to –10.0 dBm (Test Port 1, 2) |
| | –120.0 to 0.0 dBm (Test Port 3, 4) |
| Modulated waveform pattern: | PAT1 to PATn (n: waveform information file group range) |

For details of the modulated waveform patterns at LTE measurement, refer to Section 2.1.5 “Waveform patterns”.

Output port

This sets the number of the RF signal output port to one of 1 to 4 in each segment of the sequence table. When selecting Port 3 or 4, make sure the port number is not the same as the input port.

### Trigger conditions

This specifies the trigger condition at each segment of the sequence table.

The setting ranges are:

| | | |
|---|---|---|
| Trigger Source: | Frame | When frame is detected |
| | Free run: | When measurement start command received |
| | Power: | When input level above (below) trigger level |
| Slope: | Rise: When input level exceeds trigger level | |
| Trigger Level: | Level difference from input level<br>Set a value in the range of –40.0 to 0 dB. | |

### Measurement item, step count, and measurement condition

This sets the step count and measurement item for received signals in each segment of the sequence table. To execute the LTE measurement described here, set LTE as the measurement item.

The LTE measurement conditions are specified in a separate table. A measurement item should be registered in a given segment with its measurement condition number specified in the related table.

***Note:***

If other cellular application software is installed, the measurement mode that corresponds to the license can be set.

In this case, the measurement mode can be switched up to 15 times during the sequence.

Set the following values or greater for the step count according to the measurement condition table.

- When LTE_LONGSEARCH is set to OFF, the step count of trigger segment* is 10 or above.

  *: A start segment of sequence measurement or a segment whose trigger source is not set to Freerun.

- Frame structure is FDD
  - When the Inter-band UL CA measurement is not performed:
    or
    When the Inter-band UL CA measurement is performed and the number of RBs for CC not specified at LTE_MCARRIER is set to 0:

    <u>max_average_count+1</u>
    (max_average_count: Maximum measurement count in the measurement of the concerned segment)

    NARROW is specified in the FREQERRRNG command only when the following condition is met:

3

Sequence Measurement

Step count > max_average_count+1
If not, NORMAL is specified.

- When the Inter-band UL CA measurement is performed and the number of RBs for CC not specified at LTE_MCARRIER is set to other than 0:

  <u>(max_average_count+1)×2</u>
  (max_average_count: Maximum measurement count in the measurement of the concerned segment)

  NARROW is specified in the FREQERRRNG command only when the following condition is met:
  Step count > (max_average_count+2)×2
  If not, NORMAL is specified.

- Frame structure is TDD

  It is as the table below.

**Table 3.2.1-1 Minimum Value of Step Count**

| Uplink-downlink configuration | Minimum Value of Step Count |
|---|---|
| 0 | A=floor((mod_count–1)/5)×5+floor((((mod_count–1) mod 5)+1)/2)+2<br>When mod_count=0, A=0, B= pwr_count×5–2<br>When pwr_count=0, B=0<br>A or B, whichever is bigger, is the minimum value of the step count.<br>It is rounded up to a multiple of 5. |
| 1 | floor((max_average_count+1)/2)×5–2<br>It is rounded up to a multiple of 5. |
| 2 | A=(mod_count-1)×5+2<br>When mod_count=0, A=0, B=(pwr_count-1)×5+2<br>When pwr_count=0, B=0<br>A or B, whichever is bigger, is the minimum value of the step count.<br>It is rounded up to a multiple of 5. |
| 3 | A=floor((mod_count–1)/5)×10+floor((((mod_count–1) mod 5)+1)/2)+2<br>When mod_count=0, A=0, B=pwr_count×10–7<br>When pwr_count=0, B=0<br>A or B, whichever is bigger, is the minimum value of the step count.<br>It is rounded up to a multiple of 10. |
| 4 | A=floor((mod_count–1)/3)×10+floor((((mod_count–1) mod 3)+1)/2)+2<br>When mod_count=0, A=0, B= (pwr_count × 10)–7<br>When pwr_count=0, B=0<br>A or B, whichever is bigger, is the minimum value of the step count.<br>It is rounded up to a multiple of 10. |
| 5 | A= (mod_count–1)×10+2<br>When mod_count=0, A=0, B= (pwr_count–1)×10+2<br>When pwr_count=0, B=0<br>A or B, whichever is bigger, is the minimum value of the step count.<br>It is rounded up to a multiple of 10. |
| 6 | A=floor((mod_count–1)/3)×5+floor((((mod_count–1) mod 3)+1)/2)+1<br>+floor(mod_count/8)+1<br>When mod_count=0, A=0, B= pwr_count×5–2<br>When pwr_count=0, B=0<br>A or B, whichever is bigger, is the minimum value of the step count.<br>It is rounded up to a multiple of 5. |

max_average_count: Maximum measurement count among the measurements when the concerned segment is On.

| | |
|---|---|
| mod_count: | Measurement count for modulation analysis of the concerned segment.<br>When measurement is Off: 0 |
| pwr_count: | Maximum count among the Power, OBW, ACLR, and SEM measurements of the concerned segment.<br>When measurement is Off: 0 |
| floor(x): | Maximum integer equal to the actual number x or below. |
| (x) mod (y): | Surplus when the integer x is divided by integer y. |

- When the Inter-band UL CA measurement is not performed:
  or
  When the Inter-band UL CA measurement is performed and the number of RBs for CC not specified at LTE_MCARRIER is set to 0:
  Step count calculated in the above table

- When the Inter-band UL CA measurement is performed and the number of RBs for CC not specified at LTE_MCARRIER is set to other than 0:
  Step count calculated in the above table × 2

- When Measurement Offset is set to On:
  When Measurement Offset is set to On, the step count for the measurement offset time is required. Therefore, the minimum values of the step count when setting On and Off are different.
  - Frame structure is FDD
    <u>max_average_count+offset_step+1</u>
    max_average_count: Maximum measurement count in the measurement of the target segment
    offset_step: Value rounded the measurement offset time to the nearest 1 ms above

  - Frame structure is TDD
    <u>measurement_step+offset_step</u>
    The value is rounded to a multiple of 5.
    measurement_step: Larger value of A or B
    A = floor(mod_count/2)+2
    When mod_count is 0, A is 0.
    B = pwr_count+1
    When pwr_count is 0, B is 0.
    offset_step: Value rounded the measurement offset time to the nearest 1 ms above

## 3.2.2 Sequence table commands

### 3.2.2.1 non CA

The commands that can be used in non CA are shown below.

- Table Number
  `SEQTBL`
  `:CONFigure:CELLular:SEQuence:TABLe`
- Uplink Frequency, Input Level, Downlink Frequency, Output Level, and Modulation Pattern
  `SEQTRX`
  `:CONFigure:CELLular:SEQuence:RFSettings:TRX`
- Uplink Frequency, Input Level
  `SEQTX`
  `:CONFigure:CELLular:SEQuence:RFSettings:TX`
- Output Port
  `SEQSGPORT`
  `:CONFigure:CELLular:SEQuence:RXPort`
- Trigger
  `SEQTRG`
  `:TRIGger:CELLular:SEQuence`
- Measurement mode, Step Count, Measurement Condition Number
  `SEQMEAS`
  `:CONFigure:CELLular:SEQuence:SETup`

### 3.2.2.2 UL CA (MX887013A/14A-001)

The commands that can be used in UL CA are shown below.
The commands for PCC are the same as the non CA commands.

- Uplink Frequency and Input Level for SCC-1
  `SEQTX_SCC1`
  `:CONFigure:CELLular:SEQuence:RFSettings:TX:SCC1`
- External Loss Table Index for SCC-1
  `LTE_EXTLOSSINDEX_SCC1`
  `:CONFigure:CELLular:SEQuence:LTE:EXTLoss:INDex:SCC1`

### 3.2.3 Setting item error check

Setting errors in the following items in the sequence table can be queried.

- Input level
- Output level
- Step count
- Waveform pattern
- Port
- Amount of capture memory
- Output level change count
- Waveform pattern change count
- Measurement mode change count

The following command is used to query for errors.

```
SEQERR
:FETCh:CELLular:SEQuence:ERRor
SEQERR2
:FETCh:CELLular:SEQuence:ERRor2
```

Capture memory is used to save the LTE measurement results.
One LTE measurement uses about 0.03% of the memory, so 3% of the capture memory is required to execute 100 measurements for a specific segment.

The following table shows error causes.

**Table 3.2.3-1 Error Cause**

| Parameter | Cause |
|---|---|
| Input level* | Input level is out of range. |
| Output level* | Output level is out of range. |
| Step count | Fail to satisfy the step count conditions in Section 3.2.1. |
| Waveform pattern | The specified waveform file is not loaded in the waveform memory.<br>The specified waveform pattern does not exist in the waveform file. |
| Port | Port 3 is set for both input port and output port.<br>Or Port 4 is set for both input port and output port. |
| Amount of capture memory | Memory use rate is 100% or above |
| Output level change count | Output level change count is 3001 or above. |
| Waveform pattern change count | Waveform pattern change count is 101 or above. |
| Measurement mode change count | Measurement mode change count is 16 or above. |

*: The available level depends on the settings of port number and external loss.

Changing the waveform pattern to CW or NC is not counted as waveform pattern change. Some examples of how to count waveform pattern change are shown below.

| Parameter Setting Command | Waveform Pattern Change Count |
|---|---|
| `SEQTRX 0,1950.00,-10.00,869.20,-60.00,PAT1` | 1 |
| `SEQTRX 1,1950.00,-10.00,869.20,-60.00,CW` | 1 |
| `SEQTRX 2,1950.00,-10.00,869.20,-60.00,PAT2` | 2 |
| `SEQTRX 3,1950.00,-10.00,869.20,-60.00,NC` | 2 |
| `SEQTRX 4,1950.00,-10.00,869.20,-60.00,PAT3` | 3 |
| `SEQTRX 5,1950.00,-10.00,869.20,-60.00,PAT1` | 4 |

# 3.3 Setting Measurement Conditions Table

## 3.3.1 Setting LTE measurement items

The items in the LTE measurement condition table supporting sequence measurement are listed below. Refer to Figure 3.1-1.

- Channel Coding*[1]
- Measurement Carrier*[1]
- External Loss Table Index for SCC-1*[2]
- Uplink Downlink Configuration*[1]
- Measurement Offset*[1]
- RS Search Range*[2]
- Long Span Code Search*[2]
- Group hopping On/Off*[2]
- Occupied Bandwidth power ratio*[2]
- Cell ID*[2]
- Cyclic Shift *[2]
- Delta SS*[2]
- Operation band*[1]
- Test Environment*[1]
- In-band emissions carrier leakage template*[1]
- Channel Bandwidth and Resource Block*[1]
- Modulation Method for Uplink Reference Measurement Channel*[1]
- Frequency Error Range*[2]
- Frame Structure*[1]
- Spectrum Emission Mask level*[2] *[3]
- In-band Emission Carrier Leakage Frequency*[2]
- Tx Power Measurement on/off and measurement count*[1]
- Occupied Bandwidth measurement on/off and measurement count*[1]
- Spectrum Emission Mask measurement on/off and measurement count*[1]
- Adjacent Channel Leakage Power Ratio measurement on/off and measurement count*[1]
- Modulation Analysis measurement on/off and measurement count*[1]
- All measurement items off*[1]

*1: Up to 2000 measurement conditions numbered 0 to 1999 can be set.

*2: This is common to all segments in the LTE measurement mode.

*3: Set measurement conditions for each channel bandwidth.

The following table lists the presettings for the sequence measurement LTE measurement conditions.

**Table 3.3.1-1 Measurement Conditions for Sequence Measurement**

| Item | Setting |
|---|---|
| RMC Composition | PUSCH |
| additional Spectrum Emission | NS_01 |

## 3.3.2 LTE Measurement condition commands

The following commands set and query the LTE measurement conditions.

### 3.3.2.1 non CA

The commands that can be used in non CA are shown below.

- Channel Coding
  `LTE_CHCODING`
  `:CONFigure:CELLular:SEQuence:LTE:CHCoding`

- Frame Structure
  `LTE_FRAMETYPE`
  `:CONFigure:CELLular:SEQuence:LTE:FSTRucture`

- Measurement Offset
  `LTE_MEASOFFSET`
  `:CONFigure:CELLular:SEQuence:LTE:MOFFset`

- RS Search Range for FDD
  `LTE_RSRANGE_FDD`
  `:CONFigure:CELLular:SEQuence:LTE:RSRange:FDD`

- RS Search Range for TDD
  `LTE_RSRANGE_TDD`
  `:CONFigure:CELLular:SEQuence:LTE:RSRange:TDD`

- Cell ID
  `LTE_CELLID`
  `:CONFigure:CELLular:SEQuence:LTE:CID`

- Cyclic Shift
  `LTE_CSHIFT`
  `:CONFigure:CELLular:SEQuence:LTE:CSHift`

- Group hopping on and off
  `LTE_GROUPHOP`
  `:CONFigure:CELLular:SEQuence:LTE:GHOPping`

- Delta SS
  `LTE_DELTASS`
  `:CONFigure:CELLular:SEQuence:LTE:DSS`

- Operation band
  Sets an operation band listed in Table 2.1.6-4.

LTE_BAND
:CONFigure:CELLular:SEQuence:LTE:BAND

- Modulation Method for Uplink Reference Measurement Channel
  LTE_ULRMC_MOD
  :CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme

- Channel Bandwidth and Resource Block
  LTE_BW_RB
  :CONFigure:CELLular:SEQuence:LTE:BWRB

- Test Environment
  The threshold line for Spectrum Flatness is determined by setting the test environment defined in 3GPP TS36.521-1.
  LTE_TESTENV
  :CONFigure:CELLular:SEQuence:LTE:TENVironment

- In-band emissions carrier leakage template
  Select a template for in-band emission measurement (Carrier Leakage).
  LTE_TP_INBANDE_LEAK
  :CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak

- Long Span Code Search
  LTE_LONGSEARCH
  :CONFigure:CELLular:SEQuence:LTE:LSSearch

- Occupied Bandwidth power ratio
  LTE_OBW_RATIO
  :CONFigure:CELLular:SEQuence:LTE:OBW:RATio

- Frequency Error Range
  LTE_FREQERRRNG
  :CONFigure:CELLular:SEQuence:LTE:FERange

- Uplink Downlink Configuration
  LTE_TDDULDLCONF
  :CONFigure:CELLular:SEQuence:LTE:ULDL

- Spectrum Emission Mask level
  Channel bandwidth of 1.4 MHz
  LTE_SEM_TEMPLATE_1.4MHZ
  :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B1M4
  Channel bandwidth of 3 MHz

LTE_SEM_TEMPLATE_3MHZ
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B3M
Channel bandwidth of 5 MHz
LTE_SEM_TEMPLATE_5MHZ
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B5M
Channel bandwidth of 10 MHz
LTE_SEM_TEMPLATE_10MHZ
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B10M
Channel bandwidth of 15 MHz
LTE_SEM_TEMPLATE_15MHZ
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B15M
Channel bandwidth of 20 MHz
LTE_SEM_TEMPLATE_20MHZ
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B20M

- Tx Power measurement on/off and measurement count
  LTE_PWR_SET
  :CONFigure:CELLular:SEQuence:LTE:POWer:SET

- Occupied Bandwidth measurement on/off and measurement count
  LTE_OBW_SET
  :CONFigure:CELLular:SEQuence:LTE:OBW:SET

- Spectrum Emission Mask measurement on/off and measurement count
  LTE_SEM_SET
  :CONFigure:CELLular:SEQuence:LTE:SEMask:SET

- Adjacent Channel Leakage Power Ratio measurement on/off and measurement count
  LTE_ACLR_SET
  :CONFigure:CELLular:SEQuence:LTE:ACLR:SET

- Modulation Analysis measurement on/off and measurement count
  LTE_MOD_SET
  :CONFigure:CELLular:SEQuence:LTE:MODulation:SET

- All measurement items off
  LTE_MEAS_OFF
  :CONFigure:CELLular:SEQuence:LTE:AMITems:OFF

### 3.3.2.2 UL CA (MX887013A/14A-001)

The commands that can be used in UL CA are shown below.
The commands for PCC are the same as the non CA commands.

- Measurement Carrier
  LTE_MCARRIER
  :CONFigure:CELLular:SEQuence:LTE:MCARrier

- External Loss Table Index for SCC-1
  LTE_EXTLOSSINDEX_SCC1
  :CONFigure:CELLular:SEQuence:LTE:EXTLoss:INDex:SCC1

- Frame Structure for SCC-1
  LTE_FRAMETYPE_SCC1
  :CONFigure:CELLular:SEQuence:LTE:FSTRucture:SCC1

- Cell ID for SCC-1
  LTE_CELLID_SCC1
  :CONFigure:CELLular:SEQuence:LTE:CID:SCC1

- Operation band for SCC-1
  Sets an operation band listed in Table 2.1.6-4.
  LTE_BAND_SCC1
  :CONFigure:CELLular:SEQuence:LTE:BAND:SCC1

- Modulation Method for Uplink Reference Measurement Channel for SCC-1
  LTE_ULRMC_MOD_SCC1
  :CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme:SC
  C1

- Channel Bandwidth and Resource Block for SCC-1
  LTE_BW_RB_SCC1
  :CONFigure:CELLular:SEQuence:LTE:BWRB:SCC1

- In-band emissions carrier leakage template for SCC-1
  LTE_TP_INBANDE_LEAK_SCC1
  :CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak:SCC
  1

- Spectrum Emission Mask level (At Contiguous UL CA)
  25RB+100RB (24.95 MHz)
  LTE_SEM_TEMPLATE_CONTCC_25RB_100RB
  :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:R

B25:RB100

50RB+100RB (29.9 MHz)

LTE_SEM_TEMPLATE_CONTCC_50RB_100RB

:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB50:RB100

75RB+75RB (30 MHz)

LTE_SEM_TEMPLATE_CONTCC_75RB_75RB

:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB75

75RB+100RB (34.85 MHz)

LTE_SEM_TEMPLATE_CONTCC_75RB_100RB

:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB100

100RB+100RB (39.8 MHz)

LTE_SEM_TEMPLATE_CONTCC_100RB_100RB

:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB100:RB100

# 3.4 Controlling and Monitoring Sequence

## 3.4.1 Controlling and monitoring items

The following items can be set to control the sequence measurement.

- Start and stop segments
- Initialization after completion of sequence measurement

### Start and stop segments

Segment numbers from 0 to 1999 can be set in the sequence table. The start and stop segments must be specified if part of a sequence table is executed. If start and stop segments are not specified, 0 to 199 segments (default) are measured.

### Initialization at end of sequence measurement

Select whether the following items are set to the values described in Section 2.1.3, "Frequency and level", when sequence measurement is completed.

- Uplink frequency (Tx frequency of mobile station)
- Input level
- Downlink frequency (Rx frequency of mobile station)
- Output level

Use the commands described in Section 2.1.8 "Starting/stopping measurement" to start and stop the sequence measurement and verify the sequence measurement status.

In addition, the following items can be queried.

- Number of measured segments
- Measurement status of each segment
- Measurement status of specified segments
- Progress of sequence measurement

Number of measured segments and measurement status of each segment

The number of completed segment measurements and the status of segments can be monitored during sequence measurement.
The following table lists the response values and status of segments.

**Table 3.4.1-1 Segment Status**

| Response | Segment Status |
|---|---|
| 0 | Measurement completed successfully |
| 2 | Over level |
| 5 | Sync word not detected |
| 9 | Measuring or no measurement |
| 10 | Segment not measured |
| 12 | Tx measurement trigger timeout |

Measurement status of specified segments

Monitor the status of segments by specifying segment numbers from 0 to 1999.

Progress of sequence measurement

The progress can be measured as a proportion of the total number of segments between the start and stop number.

### 3.4.2 Sequence control and monitor commands

The sequence measurement can be controlled and monitored using the following commands.
The status indication lamp 3 of MU887000A is on during the execution of measurement or analysis. For the explanation of the status lamp, refer to Appendix D "Status Indication of lamps" in *the MU887000A TRX Test Module Operation Manual*.

- Starting measurement and signal output
  This command sets the parameters for both specified measurement and signal transmission and executes measurement.
  `SNGLS`
  `:INITiate:CELLular:MEASurement:SINGle`
- Start segment and stop segment for measurement and signal transmission
  This command sets both start segment and end segment for sequence measurement and sets both measurement and signal transmission parameters.
  `SEQCTRL`
  `:CONFigure:CELLular:SEQuence:CONTrol`
- Start segment and stop segment for measurement
  This command sets both start segment and end segment for sequence measurement and sets the measurement parameters only, without affecting the signal transmission parameters.
  `SEQCTRLTX`
  `:CONFigure:CELLular:SEQuence:CONTrol:TX`
- Starting measurement
  This command sets only the parameters for the specified measurement and executes measurement, without affecting the signal transmission parameters.
  `SEQEXECTX`
  `:INITiate:CELLular:SEQuence:EXECute:TX`
- Stopping measurement
  `MEASSTOP`
  `:ABORt:CELLular:MEASurement`
- Initialization after completion of sequence measurement
  `SEQREINIT`
  `:CONFigure:CELLular:SEQuence:RFSettings:REINit`

The status of sequence measurement can be queried using the following commands.

- Progress of sequence measurement
  `SEQPROGRESS`
  `:FETCh:CELLular:SEQuence:PROGress`
- Measurement status of specified segments
  `SEQSEGSTAT`
  `:FETCh:CELLular:SEQuence:SEG:STATe`
- Number of measured segments and status of each segment
  `SEQMSTAT`
  `:FETCh:CELLular:SEQuence:STATe`

# 3.5 Measurement Results

The LTE measurement results are queried using the following commands.

Tx Power

- Tx Power
  LTE_TXPWR
  :FETCh:CELLular:SEQuence:LTE:POWer:TXPower
- Channel Power
  LTE_CHPWR
  :FETCh:CELLular:SEQuence:LTE:POWer:CHPower

Occupied Bandwidth

- Occupied Bandwidth
  LTE_OBW
  :FETCh:CELLular:SEQuence:LTE:OBW
- Frequency of Occupied Bandwidth
  LTE_OBWFREQ
  :FETCh:CELLular:SEQuence:LTE:OBW:FREQuency

Spectrum Emission Mask

- Pass/Fail Result
  LTE_SEM
  :FETCh:CELLular:SEQuence:LTE:SEMask:JUDGement
- Maximum Level and Frequency for Each Range Query
  Below Channel Bandwidth
  LTE_SEMLVL_LOWER
  :FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:LOWer
  Above Channel Bandwidth
  LTE_SEMLVL_UPPER
  :FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:UPPer
- Maximum Level and Frequency for Each Range (Detail) Query
  Below Channel Bandwidth
  LTE_SEMLVL_DET_LOWER
  :FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:LOWer:DETail
  Above Channel Bandwidth
  LTE_SEMLVL_DET_UPPER
  :FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:UPPer:DETail

- Margin for Each Range Query
  Below Channel Bandwidth
  `LTE_SEMMARGIN_LOWER`
  `:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:LOWer`
  Above Channel Bandwidth
  `LTE_SEMMARGIN_UPPER`
  `:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:UPPer`
- Margin for Each Range (Detail) Query
  Below Channel Bandwidth
  `LTE_SEMMARGIN_DET_LOWER`
  `:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:LOWer:DETail`
  Above Channel Bandwidth
  `LTE_SEMMARGIN_DET_UPPER`
  `:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:UPPer:DETail`

Adjacent Channel Leakage Power Ratio
`LTE_ACLR`
`:FETCh:CELLularr:SEQuence:LTE:ACLR`

Modulation Analysis

- Frequency (Hz)
  `LTE_CFREQ`
  `:FETCh:CELLular:SEQuence:LTE:MODulation:CFRequency`
- Frequency Error (ppm, Hz)
  `LTE_CFERR`
  `:FETCh:CELLular:SEQuence:LTE:MODulation:FERRor`
- Worst Value of Frequency Error (ppm, Hz)
  `LTE_CFERR_WORST`
  `:FETCh:CELLular:SEQuence:LTE:MODulation:FERRor:WORSt`
- EVM
  `LTE_EVM`
  `:FETCh:CELLular:SEQuence:LTE:MODulation:EVM`
- Peak EVM
  `LTE_PEVM`
  `:FETCh:CELLular:SEQuence:LTE:MODulation:PEVM`
- Reference Signal EVM
  `LTE_RSEVM`
  `:FETCh:CELLular:SEQuence:LTE:MODulation:RSEVm`
- Phase Error
  `LTE_PHASEERR`
  `:FETCh:CELLular:SEQuence:LTE:MODulation:PHERror`
- Magnitude Error
  `LTE_MAGERR`
  `:FETCh:CELLular:SEQuence:LTE:MODulation:MERRor`

- Carrier Leakage
  LTE_CARRLEAK
  :FETCh:CELLular:SEQuence:LTE:MODulation:CARLeakage
- IQ Imbalance
  LTE_IQIMB
  :FETCh:CELLula:SEQuence:LTE:MODulation:IQIMbalance

In-band emission measurement results

- In-band emissions - Carrier Leakage
  LTE_INBANDE_LEAK
  :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:CARLeakage
- In-band emissions - General
  LTE_INBANDE_GEN
  :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:GENeral
- In-band emissions - IQ Image
  LTE_INBANDE_IMG
  :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:IQIMage
- In-Band Emissions limit - General
  Queries the limit for in-band emission measurement (General).
  LTE_INBANDE_GENUL
  :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:GENeral
- In-Band Emissions limit - IQ Image
  Queries the limit for in-band emission measurement (IQ Image).
  LTE_INBANDE_IMGUL
  :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:IQIMage
- In-Band Emissions limit - Carrier Leakage
  Queries the limit for in-band emission measurement (Carrier Leakage).
  LTE_INBANDE_LEAKUL
  :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:CARLeakage
- In-Band Emissions margin
  Queries the worst margin in the entire bandwidth for in-band emission measurement.
  LTE_INBANDE_MARG
  :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:MARGin

- In-Band Emissions Measured Item
  Queries whether each in-band emission measurement item is measured or not.
  `LTE_INBANDEITEM`
  `:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:ITEM`
- In-Band Emissions Judgement
  Queries the judgement of in-band emission measurement.
  `LTE_INBANDEPASS`
  `:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:JUDGement`

Spectrum Flatness measurement results

- Ripple in Range 1
  `LTE_SPECFLAT_RP1`
  `:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP1`
- Ripple in Range 2
  `LTE_SPECFLAT_RP2`
  `:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP2`
- Maximum value in Range 2–Minimum value in Range 1
  `LTE_SPECFLAT_RP21`
  `:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP21`
- Maximum value in Range 1–Minimum value in Range 2
  `LTE_SPECFLAT_RP12`
  `:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP12`
- Spectrum Flatness Measured Item
  `LTE_SPECFLATITEM`
  `:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:ITEM`
- Spectrum Flatness Judgement
  `LTE_SPECFLATPPPASS`
  `:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:JUDGement`

# 3.6 Sample Program

This section describes an example of sequence measurement using the Native command mode.

### Processing Flow

1. Set the application type to CELLULAR.
2. Load the Tx signal pattern file DL_FILE.xml into memory.
3. Set the vector signal generator mode to Sequence mode.
4. Set the measurement standard to Sequence measurement
5. Set the measurement conditions listed in Table 3.6-1 to Table 3.6-3.
6. Set the following items:

| | |
|---|---|
| RF Signal output | On |
| Start segment number | 0 |
| Stop segment number | 1 |
| Initialization after sequence measurement | On |

7. Query the sequence table for errors and abort if errors found.
8. Start measurement.
9. Query the status of measurement.
10. When measurement is completed, query:

    Tx Power of segment 0
    Occupied Bandwidth of segment 0
    Spectrum Emission Mask of segment 1
    Adjacent Channel Leakage Power Ratio of segment 1
    Modulation Analysis of segment 1

**Table 3.6-1 Sequence Table 1**

| Segment number | Uplink frequency (MHz) | Input level (dBm) | Downlink frequency (MHz) | Output level (dBm) | Transmit signal pattern | Output port |
|---|---|---|---|---|---|---|
| 0 | 1920 | 0 | 2110 | –50 | PAT1 | 1 |
| 1 | 1940 | 0 | 2130 | –55 | PAT2 | 2 |

**Table 3.6-2 Sequence Table 2**

| Segment number | Trigger source | Trigger slope* | Trigger level | Trigger delay time (ms) | Measurement item | Step count | Measurement condition number |
|---|---|---|---|---|---|---|---|
| 0 | Free run | ↑ | –20 | 0 | LTE | 1000 | 0 |
| 1 | Free run | ↑ | –25 | 0 | LTE | 1000 | 1 |

↑: Rise

**Table 3.6-3 LTE Measurement Conditions**

| Item | | Setting | | | |
|---|---|---|---|---|---|
| Uplink-Downlink Configuration | | 1 | | | |
| Long Span Code Search | | OFF | | | |
| Group hopping | | ON | | | |
| Occupied Bandwidth power ratio | | 99.9 | | | |
| Cell ID | | 0 | | | |
| Cyclic Shift On/Off | | ON | | | |
| Delta SS | | 0 | | | |
| Level of Spectrum Emission Mask | Range 1 | –13.5 | | | |
| | Range 2 | –8.5 | | | |
| | Range 3 | –11.5 | | | |
| | Range 4 | –23.5 | | | |
| Measurement Condition Number | | 0 | 1 | 2 | … |
| Channel Bandwidth and Resource Block | | 5MHZ,25,0 | 5MHZ,25,0 | | |
| Modulation Method for Uplink Reference Measurement Channel | | QPSK | QPSK | | |
| Frame Structure | | FDD | TDD | | |
| Operation band | | 1 | 43 | | |
| Test Environment | | NORMAL | EXTREME | | |
| In-band emissions carrier leakage template | | 0DBM | 30DBM | | |
| Tx Power Measurement | | ON | OFF | | |
| Tx Power Measurement Count | | 100 | 10 | | |
| Occupied Bandwidth Measurement | | ON | OFF | | |
| Occupied Bandwidth Measurement Count | | 50 | 5 | | |
| SEM Measurement | | OFF | ON | | |
| SEM Measurement Count | | 100 | 10 | | |
| ACLR Measurement | | OFF | ON | | |
| ACR Measurement Count | | 100 | 10 | | |
| Modulation Analysis Measurement | | OFF | ON | | |
| Modulation Analysis Measurement Count | | 200 | 20 | | |

```
; Sample program for MX887013A Sequence Measurement
; Anritsu Corporation March,2012
; Macro for Tera Term Version 4.69
;
; set local echo to on
setecho 1
flushrecv
; time out 3 second
timeout=3

; Set language to "Native".
sendln 'SYST:LANG NAT'
call check_error_code

; Set application type to "Cellular".
sendln 'SYSSEL CELLULAR'
call check_error_code

; Set standard to "Sequence".
sendln 'STDSEL SEQUENCE'
call check_error_code

; Load ARB File "DL_FILE".
sendln 'SOUR:GPRF:GEN:ARB:FILE:LOAD DL_FILE.xml'
call check_error_code

; Set VSG Mode to "Sequence".
sendln 'SOUR:GPRF:GEN:MODE SEQUENCE'
call check_error_code

; Set Sequence Table Parameters of "segment 0".
sendln 'SEQTRX 0,1920,0,2110,-50,PAT1'
call check_error_code

sendln 'SEQSGPORT 0,PORT1'
call check_error_code

sendln 'SEQTRG 0,FREERUN,RISE,-20,0'
call check_error_code

sendln 'SEQMEAS 0,LTE,1000,0'
call check_error_code

; Set Sequence Table Parameters of "segment 1".
```

```
sendln ' SEQTRX 1,1940,0,2130,-55,PAT2'
call check_error_code

sendln 'SEQSGPORT 1,PORT2'
call check_error_code

sendln 'SEQTRG 1,FREERUN,RISE,-25,0'
call check_error_code

sendln 'SEQMEAS 1,LTE,1000,1'
call check_error_code

; Set Measurement Condition of "LTE".
sendln 'LTE_TDDULDLCONF 1'
call check_error_code

sendln 'LTE_LONGSEARCH OFF'
call check_error_code

sendln 'LTE_GROUPHOP ON'
call check_error_code

sendln 'LTE_OBW_RATIO 99.9'
call check_error_code

sendln 'LTE_CELLID 0'
call check_error_code

sendln 'LTE_CSHIFT ON'
call check_error_code

sendln 'LTE_DELTASS 0'
call check_error_code

sendln 'LTE_SEM_TEMPLATE_5MHZ 1,-13.5'
call check_error_code

sendln 'LTE_SEM_TEMPLATE_5MHZ 2,-8.5'
call check_error_code

sendln 'LTE_SEM_TEMPLATE_5MHZ 3,-11.5'
call check_error_code

sendln 'LTE_SEM_TEMPLATE_5MHZ 4,-23.5'
```

```
call check_error_code

sendln 'LTE_BW_RB 0,5MHZ,25,0'
call check_error_code

sendln 'LTE_BW_RB 1,5MHZ,25,0'
call check_error_code

sendln 'LTE_ULRMC_MOD 0,QPSK'
call check_error_code

sendln 'LTE_ULRMC_MOD 1,QPSK'
call check_error_code

sendln 'LTE_FRAMETYPE 0,FDD'
call check_error_code

sendln 'LTE_FRAMETYPE 1,TDD'
call check_error_code

sendln 'LTE_BAND 0,1'
call check_error_code

sendln 'LTE_BAND 1,43'
call check_error_code

sendln 'LTE_TESTENV 0,NORMAL'
call check_error_code

sendln 'LTE_TESTENV 1,EXTREME'
call check_error_code

sendln 'LTE_TP_INBANDE_LEAK 0,0DBM'
call check_error_code

sendln 'LTE_TP_INBANDE_LEAK 1,30DBM'
call check_error_code

sendln 'LTE_PWR_SET 0,ON,100'
call check_error_code

sendln 'LTE_PWR_SET 1,OFF,10'
call check_error_code
```

```
sendln 'LTE_OBW_SET 0,ON,50'
call check_error_code

sendln 'LTE_OBW_SET 1,OFF,5'
call check_error_code

sendln 'LTE_SEM_SET 0,OFF,100'
call check_error_code

sendln 'LTE_SEM_SET 1,ON,10'
call check_error_code

sendln 'LTE_ACLR_SET 0,OFF,100'
call check_error_code

sendln 'LTE_ACLR_SET 1,ON,10'
call check_error_code

sendln 'LTE_MOD_SET 0,OFF,200'
call check_error_code

sendln 'LTE_MOD_SET 1,ON,20'
call check_error_code

; Query error of Sequence table settings.
sendln 'SEQERR?'
waitln '0,' '1,' '2,' '3,' '4,'
call check_seqerr_response

; Set Output State to "On".
sendln 'LVL ON'
call check_error_code

; Set Start Segment Number to "0",Stop Segment Number to "1".
sendln 'SEQCTRL 0,1'
call check_error_code

; Set Initialization to "On" when sequence finished.
sendln 'SEQREINIT ON'
call check_error_code

; Start measurement
sendln 'SNGLS'
call check_error_code
```

```
; waiting measurement up to 10 second
for i 1 10

  sendln 'MSTAT?'
  pause 1; wait 1 second
  recvln
  recvln
  ;call check_response ; debug
  if result=0 goto _timeout
  if result=1 then
         str2int m_code inputstr
         if m_code=0 break    ;Sequence finish normally.
         call check_error_code
  endif

next

; Query Tx power data of "Segment 0".
sendln 'LTE_TXPWR? 0,IND'
call check_error_code

; Query Channel power data of "Segment 0".
sendln 'LTE_CHPWR? 0,IND'
call check_error_code

; Query Occupied Bandwidth of "Segment 0"
sendln 'LTE_OBW? 0'
call check_error_code

; Query Occupied Bandwidth Frequency of "Segment 0"
sendln 'LTE_OBWFREQ? 0,UPPER'
call check_error_code
sendln 'LTE_OBWFREQ? 0,LOWER'
call check_error_code
sendln 'LTE_OBWFREQ? 0,CENTER'
call check_error_code

; Query Spectrum Emission Mask data of "Segment 1"
sendln 'LTE_SEM? 1'
call check_error_code
sendln 'LTE_SEMLVL_LOWER? 1'
call check_error_code
sendln 'LTE_SEMLVL_UPPER? 1'
call check_error_code
```

```
sendln 'LTE_SEMMARGIN_LOWER? 1'
call check_error_code
sendln 'LTE_SEMMARGIN_UPPER? 1'
call check_error_code

; Query ACLR data of "Segment 1"
sendln 'LTE_ACLR? 1,TTL'
call check_error_code

; Query Frequency Error data of "Segment 1".
sendln 'LTE_CFREQ? 1'
call check_error_code
sendln 'LTE_CFERR_WORST? 1'
call check_error_code

; Query EVM data of "Segment 1".
sendln 'LTE_EVM? 1,MAX'
call check_error_code
sendln 'LTE_PEVM? 1,MAX'
call check_error_code
sendln 'LTE_RSEVM? 1,MAX'
call check_error_code
sendln 'LTE_PHASEERR? 1,MAX'
call check_error_code
sendln 'LTE_MAGERR? 1,MAX'
call check_error_code

; Query Carrier Leak of "Segment 1".
sendln 'LTE_CARRLEAK? 1,MAX'
call check_error_code

; Query EVM data of "Segment 1".
sendln 'LTE_IQIMB? 1,TTL'
call check_error_code
messagebox  'Macro end successfully' 'Finish'

End

;       ------------ subroutines -----------

:check_error_code
  ; query error
  sendln 'SYSERR?'
  waitln 'No error'
```

```
  ; in case of timeout
  if result=0 goto _timeout
  ; in case of error occurring
  if result=2 then
         e_message='Error code = '
         strconcat e_message inputstr
         messagebox  e_message 'Command Error occurred'
         end
  endif

  ; in case of no error

return

:check_seqerr_response

  ;for debug
  strsplit inputstr ','
  err_num=str2int groupmatchstr1
  if err_num then
         ; when error count is not 0.
         messagebox inputstr 'Sequence Table Error'
         End
  endif

  return

:check_response

  ;for debug
  messagebox inputstr 'debug1'
  int2str result_str result
  messagebox result_str 'debug2'

  return

:_timeout
  messagebox  'No response from MT8870A.' 'Time out!'
  call check_error_code
  End
```

# Chapter 4 SCPI Command Reference

This chapter describes the details of SCPI commands.
To switch to the SCPI command mode, send the command SYST:LANG SCPI.

# 4.1 List of Commands

The following table shows the rules for describing messages.

| | |
|---|---|
| [ ] | Messages or parameters in square brackets can be omitted. |
| \| | Choose one of several choices.<br>A\|B\|C\|D indicates a choice of A, B, C, and D. |
| {} | Choose one of the groups in braces.<br>A\|B({C\|D}) indicates a choice of A, B(C), or A, B(D). |

## 4.1.1 Common commands

Operation Status Register

| Function | Command | Query | Response |
|---|---|---|---|
| Measurement Operation Status Register Query | ----- | :STATus:OPERation:MEASure[:EVENt]? | <mosr> |

Questionable Register

| Function | Command | Query | Response |
|---|---|---|---|
| Measurement Questionable Status Register Query | ----- | :STATus:QUEStionable:MEASure[:EVENt]? | <mqsr> |

Common

| Function | Command | Query | Response |
|---|---|---|---|
| Standard Select | :CONFigure:CELLular:MEASurement:STANdard <std> | :CONFigure:CELLular:MEASurement:STANdard? | <std> |
| Set Connect Port Direction | :ROUTe:PORT:CONNect:DIRection <input>,<output> | :ROUTe:PORT:CONNect:DIRection? | <input>,<output> |

Measurement

| Function | Command | Query | Response |
|---|---|---|---|
| Measurement Stop | :ABORt:CELLular:MEASurement | ----- | ----- |
| Measurement Status | ----- | :FETCh:CELLular:MEASurement:STATe? | <m_status> |
| Measurement Start | :INITiate:CELLular:MEASurement:SINGle | ----- | ----- |

Common Parameters

| Function | Command | Query | Response |
|---|---|---|---|
| Output Level On/Off | :CONFigure:CELLular:GENerator:RFSettings:STATe <on_off> | :CONFigure:CELLular:GENerator:RFSettings:STATe? | <on_off> |
| Output Signal Modulation | :CONFigure:CELLular:GENerator:BBMode <on_off> | :CONFigure:CELLular:GENerator:BBMode? | <on_off> |
| Waveform File Select | :CONFigure:CELLular:GENerator:ARB:PACKage:SELect <pac> | :CONFigure:CELLular:GENerator:ARB:PACKage:SELect? | <pac> |
| Waveform Pattern Select | :CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect <pat> | :CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect? | <pat> |
| Waveform Pattern Select (SYNC) | :CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect:SYNC <pat> | :CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect:SYNC? | <pat> |

System

| Function | Command | Query | Response |
|---|---|---|---|
| Application Select | :INSTrument[:SELect] <app> | :INSTrument[:SELect]? | <app> |
| Language Selection of Remote Command | :SYSTem:LANGuage <mode> | :SYSTem:LANGuage? | <mode> |

## 4.1.2 Fundamental measurement commands

Common Parameters

| Function | Command | Query | Response |
|---|---|---|---|
| Input Level | :CONFigure:CELLular:MEASurement:RFSettings:LEVel <level>[,<level_scc1>] | :CONFigure:CELLular:MEASurement:RFSettings:LEVel? [<ALL>] | <level>[,<level_scc1>] |
| Input Level for SCC-1 | :CONFigure:CELLular:MEASurement:RFSettings:LEVel:SCC1 <level> | :CONFigure:CELLular:MEASurement:RFSettings:LEVel:SCC1? | <level> |
| Output Level | :CONFigure:CELLular:GENerator:RFSettings:LEVel <level> | :CONFigure:CELLular:GENerator:RFSettings:LEVel? | <level> |
| External Loss Table Index for SCC-1 | :CONFigure:CELLular:LTE:EXTLoss:INDex:SCC1 <index> | :CONFigure:CELLular:LTE:EXTLoss:INDex:SCC1? | <index> |
| Measurement Carrier | :CONFigure:CELLular:LTE:MCARrier <carrier> | :CONFigure:CELLular:LTE:MCARrier? | <carrier> |
| Downlink Channel | :CONFigure:CELLular:MEASurement:RFSettings:DLCHannel <dl_ch> | :CONFigure:CELLular:MEASurement:RFSettings:DLCHannel? | <dl_ch> |
| Downlink Channel for SCC-1 | :CONFigure:CELLular:MEASurement:RFSettings:DLCHannel:SCC1 <dl_ch> | :CONFigure:CELLular:MEASurement:RFSettings:DLCHannel:SCC1? | <dl_ch> |
| Downlink Frequency | :CONFigure:CELLular:GENerator:RFSettings:FREQuency <dl_freq> | :CONFigure:CELLular:GENerator:RFSettings:FREQuency? | <dl_freq> |
| Downlink Frequency for SCC-1 | :CONFigure:CELLular:GENerator:RFSettings:FREQuency:SCC1 <dl_freq> | :CONFigure:CELLular:GENerator:RFSettings:FREQuency:SCC1? | <dl_freq> |
| Uplink Channel | :CONFigure:CELLular:MEASurement:RFSettings:ULCHannel <ul_ch>[,<ul_ch_scc1>] | :CONFigure:CELLular:MEASurement:RFSettings:ULCHannel? [<ALL>] | <ul_ch>[,<ul_ch_scc1>] |

Common Parameters (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| Uplink Channel for SCC-1 | :CONFigure:CELLular:MEASurement:RFSettings:ULCHannel:SCC1 <ul_ch>[,<ul_ch_scc1>] | :CONFigure:CELLular:MEASurement:RFSettings:ULCHannel:SCC1? [<ALL>] | <ul_ch> |
| Uplink Frequency | :CONFigure:CELLular:MEASurement:RFSettings:FREQuency <ul_freq>[,<freq_scc1>] | :CONFigure:CELLular:MEASurement:RFSettings:FREQuency? [<ALL>] | <ul_fleq>,<freq_scc1> |
| Uplink Frequency for SCC-1 | :CONFigure:CELLular:MEASurement:RFSettings:FREQuency:SCC1 <ul_freq> | :CONFigure:CELLular:MEASurement:RFSettings:FREQuency:SCC1? | <ul_fleq> |
| AWGN Level On/Off | :CONFigure:CELLular:GENerator:ARB:NOISe:STATe <on_off> | :CONFigure:CELLular:GENerator:ARB:NOISe:STATe? | <on_off> |
| AWGN Level | :CONFigure:CELLular:GENerator:ARB:NOISe:CN <level> | :CONFigure:CELLular:GENerator:ARB:NOISe:CN? | <level> |

LTE Settings

| Function | Command | Query | Response |
|---|---|---|---|
| Channel Bandwidth | :CONFigure:CELLular:LTE:CBANdwidth <ch_bw>[,<ch_bw_scc1>] | :CONFigure:CELLular:LTE:CBANdwidth? [<ALL>] | <ch_bw>,<ch_bw_scc1> |
| Channel Bandwidth for SCC-1 | :CONFigure:CELLular:LTE:CBANdwidth:SCC1 <ch_bw> | :CONFigure:CELLular:LTE:CBANdwidth:SCC1? | <ch_bw> |
| Channel Bandwidth, RB | :CONFigure:CELLular:LTE:BWRB <ch_bw>[,<rb>[,<start>]] | :CONFigure:CELLular:LTE:BWRB? | ch_bw,rb,start |
| Channel Bandwidth, RB for SCC-1 | :CONFigure:CELLular:LTE:BWRB:SCC1 <ch_bw>[,<rb>[,<start>]] | :CONFigure:CELLular:LTE:BWRB:SCC1? | <ch_bw>,<rb>,<start> |
| Channel Coding | :CONFigure:CELLular:LTE:CHCoding <object> | :CONFigure:CELLular:LTE:CHCoding? | <object> |
| RMC Configuration | :CONFigure:CELLular:LTE:CTYPe <val> | :CONFigure:CELLular:LTE:CTYPe? | <val> |

LTE Settings (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| Frame Structure | :CONFigure:CELLular:LTE:FSTRucture <mode> | :CONFigure:CELLular:LTE:FSTRucture? | <mode> |
| Frame Structure for SCC-1 | :CONFigure:CELLular:LTE:FSTRucture:SCC1 <mode> | :CONFigure:CELLular:LTE:FSTRucture:SCC1? | <mode> |
| nRB-CQI | :CONFigure:CELLular:LTE:RBCQi <value> | :CONFigure:CELLular:LTE:RBCQi? | <value> |
| UL RMC Number of RB | :CONFigure:CELLular:LTE:RBALlocation:NRB <ul_rmc_rb> | :CONFigure:CELLular:LTE:RBALlocation:NRB? | <ul_rmc_rb> |
| UL RMC Number of RB for SCC-1 | :CONFigure:CELLular:LTE:RBALlocation:NRB:SCC1 <ul_rmc_rb> | :CONFigure:CELLular:LTE:RBALlocation:NRB:SCC1? | <ul_rmc_rb> |
| UL RMC Modulation | :CONFigure:CELLular:LTE:MODulation:MSCHeme <ul_rmc_mod> | :CONFigure:CELLular:LTE:MODulation:MSCHeme? | <ul_rmc_mod> |
| UL RMC Modulation for SCC-1 | :CONFigure:CELLular:LTE:MODulation:MSCHeme:SCC1 <ul_rmc_mod> | :CONFigure:CELLular:LTE:MODulation:MSCHeme:SCC1? | <ul_rmc_mod> |
| UL RMC Starting RB | :CONFigure:CELLular:LTE:RBALlocation:ORB <ulrb> | :CONFigure:CELLular:LTE:RBALlocation:ORB? | <ulrb> |
| UL RMC Starting RB for SCC-1 | :CONFigure:CELLular:LTE:RBALlocation:ORB:SCC1 <ulrb> | :CONFigure:CELLular:LTE:RBALlocation:ORB:SCC1? | <ulrb> |
| Trigger Delay | :TRIGger:CELLular:LTE:FUNDamental:DELay <trgdly> | :TRIGger:CELLular:LTE:FUNDamental:DELay? | <trgdly> |
| Trigger Level | :TRIGger:CELLular:LTE:FUNDamental:LEVel <trglevel> | :TRIGger:CELLular:LTE:FUNDamental:LEVel? | <trglevel> |
| Trigger Source | :TRIGger:CELLular:LTE:FUNDamental:SOURce <trgsrc> | :TRIGger:CELLular:LTE:FUNDamental:SOURce? | <trgsrc> |
| Trigger Timeout | :TRIGger:CELLular:LTE:FUNDamental:TOUT <trgtime> | :TRIGger:CELLular:LTE:FUNDamental:TOUT? | <trgtime> |

LTE Settings (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| Cell ID | :CONFigure:CELLular:LTE:CID <id> | :CONFigure:CELLular:LTE:CID? | <id> |
| Cell ID for SCC-1 | :CONFigure:CELLular:LTE:CID:SCC1 <id> | :CONFigure:CELLular:LTE:CID:SCC1? | <id> |
| Cyclic Shift | :CONFigure:CELLular:LTE:CSHift <on_off> | :CONFigure:CELLular:LTE:CSHift? | <on_off> |
| Group hopping | :CONFigure:CELLular:LTE:GHOPping <on_off> | :CONFigure:CELLular:LTE:GHOPping? | <on_off> |
| Delta SS | :CONFigure:CELLular:LTE:DSS <val> | :CONFigure:CELLular:LTE:DSS? | <val> |
| Operation band | :CONFigure:CELLular:LTE:FUNDamental:BAND <band> | :CONFigure:CELLular:LTE:FUNDamental:BAND? | <band> |
| Operation band for SCC-1 | :CONFigure:CELLular:LTE:FUNDamental:BAND:SCC1 <band> | :CONFigure:CELLular:LTE:FUNDamental:BAND:SCC1? | <band> |
| Test Environment | :CONFigure:CELLular:LTE:FUNDamental:TENVironment <env> | :CONFigure:CELLular:LTE:FUNDamental:TENVironment? | <env> |
| In-band Emission Carrier Leakage Frequency | :CONFigure:CELLular:LTE:FUNDamental:IEMissions:CLFRequency <clf> | :CONFigure:CELLular:LTE:FUNDamental:IEMissions:CLFRequency? | <clf> |
| In-band emissions carrier leakage template | :CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak <tp> | :CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak? | <tp> |
| In-band Emissions Carrier Leakage Template for SCC-1 | :CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak:SCC1 <tp> | :CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak:SCC1? | <tp> |
| Uplink Downlink Configuration | :CONFigure:CELLular:LTE:ULDL <conf> | :CONFigure:CELLular:LTE:ULDL? | <conf> |
| Frequency Error Range | :CONFigure:CELLular:LTE:FUNDamental:FERange <value> | :CONFigure:CELLular:LTE:FUNDamental:FERange? | <value> |

Fundamental Measurement Parameters

| Function | Command | Query | Response |
|---|---|---|---|
| Adjacent Channel Leakage Power Ratio Enable and Count | :CONFigure:CELLular:LTE:FUNDamental:ACLR:SET <on_off>[,<count>] | :CONFigure:CELLular:LTE:FUNDamental:ACLR:SET? | <on_off>,<count> |
| Turn Off All Measurement Items | :CONFigure:CELLular:LTE:FUNDamental:AMITems:OFF | ----- | ----- |
| Measurement Item | :CONFigure:CELLular:LTE:FUNDamental:MITem <item> | :CONFigure:CELLular:LTE:FUNDamental:MITem? | <item> |
| Power Template - ON power tolerance Limit | :CONFigure:CELLular:LTE:FUNDamental:TMASk:GENeral:TOL <limit> | :CONFigure:CELLular:LTE:FUNDamental:TMASk:GENeral:TOL? | <limit> |
| Power Template - Transmit OFF power Limit | :CONFigure:CELLular:LTE:FUNDamental:OFFPwr:UL <limit> | :CONFigure:CELLular:LTE:FUNDamental:OFFPwr:UL? | <limit> |
| Long Span Search | :CONFigure:CELLular:LTE:FUNDamental:LSSearch <on_off> | :CONFigure:CELLular:LTE:FUNDamental:LSSearch? | <on_off> |
| Modulation Analysis Measurement Enable and Count | :CONFigure:CELLular:LTE:FUNDamental:MODulation:SET <on_off>[,<count>] | :CONFigure:CELLular:LTE:FUNDamental:MODulation:SET? | <on_off>,<count> |
| Occupied Bandwidth Ratio | :CONFigure:CELLular:LTE:FUNDamental:OBW:RATio <ratio> | :CONFigure:CELLular:LTE:FUNDamental:OBW:RATio? | <ratio> |
| OBW Measurement Enable and Count | :CONFigure:CELLular:LTE:FUNDamental:OBW:SET <on_off>[,<count>] | :CONFigure:CELLular:LTE:FUNDamental:OBW:SET? | <on_off>,<count> |
| Fast Power Measurement Mode | :CONFigure:CELLular:LTE:FUNDamental:POWer:FMODe <on_off> | :CONFigure:CELLular:WCDMa:FUNDamental:POWer:FMODe? | <on_off> |
| Tx Power Measurement Enable and Count | :CONFigure:CELLular:LTE:FUNDamental:POWer:SET <on_off>[,<count>] | :CONFigure:CELLular:LTE:FUNDamental:POWer:SET? | <on_off>,<count> |

Fundamental Measurement Parameters (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| AdditionalSpectrumEmission | :CONFigure:CELLular:LTE:FUNDamental:SEMask:ASEMission <sib2_ns> | :CONFigure:CELLular:LTE:FUNDamental:SEMask:ASEMission? | <sib2_ns> |
| Spectrum Emission Mask Template (10 MHz) | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B10M <range>,<limit> | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B10M? <range> | <limit> |
| Spectrum Emission Mask Template (15 MHz) | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B15M <range>,<limit> | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B15M? <range> | <limit> |
| Spectrum Emission Mask Template (1.4 MHz) | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B1M4 <range>,<limit> | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B1M4? <range> | <limit> |
| Spectrum Emission Mask Template (20 MHz) | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B20M <range>,<limit> | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B20M? <range> | <limit> |
| Spectrum Emission Mask Template (3 MHz) | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B3M <range>,<limit> | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B3M? <range> | <limit> |
| Spectrum Emission Mask Template (5 MHz) | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B5M <range>,<limit> | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B5M? <range> | <limit> |
| Spectrum Emission Mask Enable and Count | :CONFigure:CELLular:LTE:FUNDamental:SEMask:SET <on_off>[,<count>] | :CONFigure:CELLular:LTE:FUNDamental:SEMask:SET? | <on_off>,<count> |

Fundamental Measurement Parameters (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| Spectrum Emission Mask Template for Contiguous UL CA(100RB+100RB) | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB100:RB100 <range>,<limit> | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB100:RB100? <range> | <limit> |
| Spectrum Emission Mask Template for Contiguous UL CA(25RB+100RB) | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB25:RB100 <range>,<limit> | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB25:RB100? <range> | <limit> |
| Spectrum Emission Mask Template for Contiguous UL CA(50RB+100RB) | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB50:RB100 <range>,<limit> | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB50:RB100? <range> | <limit> |
| Spectrum Emission Mask Template for Contiguous UL CA(75RB+100RB) | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB75:RB100 <range>,<limit> | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB75:RB100? <range> | <limit> |
| Spectrum Emission Mask Template for Contiguous UL CA(75RB+75RB) | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB75:RB75 <range>,<limit> | :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB75:RB75? <range> | <limit> |
| Power Template - Wide Dynamic Range | :CONFigure:CELLular:LTE:FUNDamental:TEMPlate:WDRange <on_off> | :CONFigure:CELLular:LTE:FUNDamental:TEMPlate:WDRange? | <on_off> |
| Power Template measurement Enable and Count | :CONFigure:CELLular:LTE:FUNDamental:TEMPlate:SET <on_off>[,<count>] | :CONFigure:CELLular:LTE:FUNDamental:TEMPlate:SET? | <on_off>,<count> |

Results

<table>
<tr><th>Function</th><th>Command</th><th>Query</th><th>Response</th></tr>
<tr><td>ACLR Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:ACLR? <mode>[,<cc>]</td><td>{<avg0>,<avg1>,<avg2>,<avg3>,<avg4>,<avg5>,<max0>,<max1>,<max2>,<max3>,<max4>,<max5>,<min0>,<min1>,<min2>,<min3>,<min4>,<min5>}|{<aclr0>,<aclr1>,<aclr2>,<aclr3>,<aclr4>,<aclr5>}</td></tr>
<tr><td>Carrier Leakage Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:CARLeakage? <mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<cleakage></td></tr>
<tr><td>Carrier Frequency Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:CFRequency? [<cc>]</td><td><freq></td></tr>
<tr><td>Spectrum Flatness Measured Item</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:ITEM? [<cc>]</td><td><flag></td></tr>
<tr><td>Spectrum Flatness Judgement</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:JUDGement? [<cc>]</td><td><judgement></td></tr>
<tr><td>Spectrum Flatness (≥3 MHz) Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1? [<cc>]</td><td><worst></td></tr>
<tr><td>Spectrum Flatness (≥3 MHz (R1-)) Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1M? <mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<sflatness></td></tr>
<tr><td>Spectrum Flatness (≥3 MHz (R1+)) Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1P? <mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<sflatness></td></tr>
<tr><td>Spectrum Flatness (<3 MHz) Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2? [<cc>]</td><td><worst></td></tr>
</table>

Results (Cont'd)

<table>
<tr><th>Function</th><th>Command</th><th>Query</th><th>Response</th></tr>
<tr><td>Spectrum Flatness (<3 MHz (R2 –)) Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2M? <mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<sflatness></td></tr>
<tr><td>Spectrum Flatness (<3 MHz (R2 +)) Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2P? <mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<sflatness></td></tr>
<tr><td>Spectrum Flatness (≥3 MHz (RP1)) Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP1? <mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<sflatness></td></tr>
<tr><td>Spectrum Flatness (RP12) Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP12? <mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<sflatness></td></tr>
<tr><td>Spectrum Flatness (<3 MHz (RP2)) Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP2? <mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<sflatness></td></tr>
<tr><td>Spectrum Flatness (RP21) Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP21? <mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<sflatness></td></tr>
<tr><td>EVM Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:EVM? <mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<evm></td></tr>
<tr><td>Carrier Frequency Error Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor? <mode>[,<cc>]</td><td>{<avg_ppm>,<avg_Hz>,<max_ppm>,<max_Hz>,<min_ppm>,<min_Hz>}|{<freq_ppm>,<freq_Hz>}</td></tr>
<tr><td>Worst Carrier Frequency Error Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor:WORSt? [<cc>]</td><td><freq_ppm>,<freq_Hz></td></tr>
</table>

Results (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| In-Band Emissions Measured Item | ----- | :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:ITEM? [<cc>] | <flag> |
| In-Band Emissions Judgement | ----- | :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:JUDGement? [<cc>] | <judgement> |
| In-Band Emissions (Carrier Leakage) Result | ----- | :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:CARLeakage? <mode>[,<cc>] | {<avg>,<max>,<min>}\|<ibe> |
| In-Band Emissions limit (Carrier Leakage) | ----- | :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:CARLeakage? [<cc>] | <level> |
| In-Band Emissions (General) Result | ----- | :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:GENeral? <mode>[,<cc>] | {<avg>,<max>,<min>}\|<ibe> |
| In-Band Emissions limit (General) | ----- | :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:GENeral? [<cc>] | <level> |
| In-Band Emissions (IQ Image) Result | ----- | :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:IQIMage? <mode>[,<cc>] | {<avg>,<max>,<min>}\|<ibe> |
| In-Band Emissions limit (IQ Image) | ----- | :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:IQIMage? [<cc>] | <level> |
| In-Band Emissions Margin | ----- | :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:MARGin? [<cc>] | <margin> |

Results (Cont'd)

<table>
<tr><th>Function</th><th>Command</th><th>Query</th><th>Response</th></tr>
<tr><td>IQ Imbalance Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:IQIMbalance? <mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<iqimb></td></tr>
<tr><td>Magnitude Error Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:MERRor? <mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<merr></td></tr>
<tr><td>Peak EVM Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:PEVM? <mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<pevm></td></tr>
<tr><td>Phase Error Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:PHERror? <mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<perr></td></tr>
<tr><td>Rho Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:RHO? <mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<rho></td></tr>
<tr><td>Reference Signal EVM Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:MODulation:RSEVm? <mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<rsevm></td></tr>
<tr><td>OBW Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:OBW?</td><td><bw></td></tr>
<tr><td>OBW Frequency Result</td><td>-----</td><td>:FETCh:CELLular:LTE:FUNDamental:OBW:FREQuency? <pos></td><td><freq></td></tr>
</table>

Results (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| SEM Judgement | ----- | :FETCh:CELLular:LTE:FUNDamental:SEMask:JUDGement? [<cc>] | <judgement> |
| SEM Peak Value (Lower) | ----- | :FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer? [<cc>] | <l_M1>,<l_M2>,<l_M3>,<l_M4>,<f_M1>,<f_M2>,<f_M3>,<f_M4> |
| SEM Peak Value (Detail) (Lower) | ----- | :FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer:DETail? [<cc>] | <l_M1>,<l_M2>,<l_M3>,<l_M4>,<l_M5>,<l_M6>,<l_M7>,<l_M8>,<l_M9>,<f_M1>,<f_M2>,<f_M3>,<f_M4>,<f_M5>,<f_M6>,<f_M7>,<f_M8>,<f_M9> |
| SEM Peak Value (Upper) | ----- | :FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer? [<cc>] | <l_1>,<l_2>,<l_3>,<l_4>,<f_1>,<f_2>,<f_3>,<f_4> |
| SEM Peak Value (Detail) (Upper) | ----- | :FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer:DETail? [<cc>] | <l_1>,<l_2>,<l_3>,<l_4>,<l_5>,<l_6>,<l_7>,<l_8>,<l_9>,<f_1>,<f_2>,<f_3>,<f_4>,<f_5>,<f_6>,<f_7>,<f_8>,<f_9> |
| SEM Template Margin (Lower) | ----- | :FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:LOWer? [<cc>] | <l_M1>,<l_M2>,<l_M3>,<l_M4>,<f_M1>,<f_M2>,<f_M3>,<f_M4> |
| SEM Template Margin (Detail) (Lower) | ----- | :FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:LOWer:DETail? [<cc>] | <l_M1>,<l_M2>,<l_M3>,<l_M4>,<l_M5>,<l_M6>,<l_M7>,<l_M8>,<l_M9>,<f_M1>,<f_M2>,<f_M3>,<f_M4>,<f_M5>,<f_M6>,<f_M7>,<f_M8>,<f_M9> |
| SEM Template Margin (Upper) | ----- | :FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer? [<cc>] | <l_1>,<l_2>,<l_3>,<l_4>,<f_1>,<f_2>,<f_3>,<f_4> |

Results (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| SEM Template Margin (Detail) (Upper) | ----- | :FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer:DETail? [<cc>] | <l_1>,<l_2>,<l_3>,<l_4>,<l_5>,<l_6>,<l_7>,<l_8>,<l_9>,<f_1>,<f_2>,<f_3>,<f_4>,<f_5>,<f_6>,<f_7>,<f_8>,<f_9> |
| Waveform | ----- | :FETCh:CELLular:LTE:FUNDamental:TRACe? <format>,<position>,<length>[,<symbol>][,<cc>] | <data(n)> |
| Channel Power Result | ----- | :FETCh:CELLular:LTE:FUNDamental:POWer:CHPower? <mode>[,<cc>] | {<avg>,<max>,<min>}\|<pwr>\|{<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>} |
| Tx Power Result | ----- | :FETCh:CELLular:LTE:FUNDamental:POWer:TXPower? <mode>[,<cc>] | {<avg>,<max>,<min>}\|<pwr>\|{<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>} |
| On Power | ----- | :FETCh:CELLular:LTE:FUNDamental:TEMPlate:ONPower? mode | {<avg>,<max>,<min>}\|<level> |
| Off Power (Before) | ----- | :FETCh:CELLular:LTE:FUNDamental:TEMPlate:OFFPower:BEFore? mode | {<avg>,<max>,<min>}\|<level> |
| Off Power (After) | ----- | :FETCh:CELLular:LTE:FUNDamental:TEMPlate:OFFPower:AFTer? mode | {<avg>,<max>,<min>}\|<level> |
| On Power Judgement | ----- | :FETCh:CELLular:LTE:FUNDamental:TEMPlate:JUDGement:ONPower? | <judgement> |
| Off Power Judgement | ----- | :FETCh:CELLular:LTE:FUNDamental:TEMPlate:JUDGement:OFFPower? | <judgement> |

### 4.1.3 Sequence measurement commands

Common Parameters

| Function | Command | Query | Response |
|---|---|---|---|
| Input Level | :CONFigure:CELLular:MEASurement:RFSettings:LEVel <level> | :CONFigure:CELLular:MEASurement:RFSettings:LEVel? | <level> |
| Output Level | :CONFigure:CELLular:GENerator:RFSettings:LEVel <level> | :CONFigure:CELLular:GENerator:RFSettings:LEVel? | <level> |
| External Loss Table Index for SCC-1 | :CONFigure:CELLular:SEQuence:LTE:EXTLoss:INDex:SCC1 <index> | :CONFigure:CELLular:SEQuence:LTE:EXTLoss:INDex:SCC1? | <index> |
| Downlink Frequency | :CONFigure:CELLular:GENerator:RFSettings:FREQuency <dl_freq> | :CONFigure:CELLular:GENerator:RFSettings:FREQuency? | <dl_freq> |
| Uplink Frequency | :CONFigure:CELLular:MEASurement:RFSettings:FREQuency <ul_freq> | :CONFigure:CELLular:MEASurement:RFSettings:FREQuency? | <ul_freq> |
| Channel Bandwidth, RB | :CONFigure:CELLular:SEQuence:LTE:BWRB <mcond>,<ch_bw>[,<rb>[,<start>]] | :CONFigure:CELLular:SEQuence:LTE:BWRB? <mcond> | <ch_bw>,<rb>,<start> |
| Channel Bandwidth, RB for SCC-1 | :CONFigure:CELLular:LTE:BWRB:SCC1 <ch_bw>[,<rb>[,<start>]] | :CONFigure:CELLular:LTE:BWRB:SCC1? | <ch_bw>,<rb>,<start> |

Sequence Measurements

| Function | Command | Query | Response |
|---|---|---|---|
| Sequence Progress | ----- | :FETCh:CELLular:SEQuence:PROGress? | <p>,<cur>,<start>,<stop> |
| Specified Segment Status | ----- | :FETCh:CELLular:SEQuence:SEG:STATe? <seg> | <stat> |
| Sequence Measurement Status | ----- | :FETCh:CELLular:SEQuence:STATe? | <m_status>,<n>,<s(n-1)> |
| Trigger Timeout | :TRIGger:CELLular:MEASurement:TOUT <time> | :TRIGger:CELLular:MEASurement:TOUT? | <time> |

Sequence Control Parameters

| Function | Command | Query | Response |
|---|---|---|---|
| Sequence Control Parameter - Sequence Control | :CONFigure:CELLular:SEQuence:CONTrol <start>,<end> | :CONFigure:CELLular:SEQuence:CONTrol? | <start>,<end> |
| Sequence Control Parameter - Sequence Control | :CONFigure:CELLular:SEQuence:CONTrol:TX <start>,<end> | :CONFigure:CELLular:SEQuence:CONTrol:TX? | <start>,<end> |
| Sequence Control Parameter - Sequence End State Reinitialization | :CONFigure:CELLular:SEQuence:RFSettings:REINit <sw> | :CONFigure:CELLular:SEQuence:RFSettings:REINit? | <sw> |
| Sequence Control Parameter - Sequence Table | :CONFigure:CELLular:SEQuence:TABLe <table> | :CONFigure:CELLular:SEQuence:TABLe? | <table> |
| Start Signal Analyzer Measurement Only | :INITiate:CELLular:SEQuence:EXECute:TX | ----- | ----- |
| Measurement Offset | :CONFigure:CELLular:SEQuence:LTE:MOFFset <mcond>,<on_off>[,<time>] | :CONFigure:CELLular:SEQuence:LTE:MOFFset? <mcond> | <on_off>,<time> |
| RS Search Range for FDD mode | CONFigure:CELLular:SEQuence:LTE:RSRange:FDD <time> | CONFigure:CELLular:SEQuence:LTE:RSRange:FDD? | <time> |
| RS Search Range for TDD mode | CONFigure:CELLular:SEQuence:LTE:RSRange:TDD <time> | CONFigure:CELLular:SEQuence:LTE:RSRange:TDD? | <time> |
| Channel Coding | :CONFigure:CELLular:SEQuence:LTE:CHCoding <mcond>,<object> | :CONFigure:CELLular:SEQuence:LTE:CHCoding? <mcond> | <object> |

Sequence Parameter Information

<table>
<tr><th>Function</th><th>Command</th><th>Query</th><th>Response</th></tr>
<tr><td>Sequence Parameter Information - Error check</td><td>-----</td><td>:FETCh:CELLular:SEQuence:ERRor? [<item>]</td><td>{<n>,<err(n-1)>}|{<ns>,<seg(ns-1)>}|{<e>,<mem>,<exe>,<set>}|{<e>,<exe>,<set>}</td></tr>
<tr><td>Sequence Parameter Information - Error Check</td><td>-----</td><td>:FETCh:CELLular:SEQuence:ERRor2? <format></td><td><n>,<err(n-1)></td></tr>
</table>

Sequence Table Parameters

| Function | Command | Query | Response |
|---|---|---|---|
| Sequence Table Parameter - TRX Control | :CONFigure:CELLular:SEQuence:RFSettings:TRX <seg>,<ul_freq>,<ref>,<dl_freq>,<level>,<pat> | :CONFigure:CELLular:SEQuence:RFSettings:TRX? <seg> | <ul_freq>,<ref>,<dl_freq>,<level>,<pat> |
| Sequence Table Parameter - Uplink Frequency, Input Level | :CONFigure:CELLular:SEQuence:RFSettings:TX <seg>,<ul_freq>,<ref> | :CONFigure:CELLular:SEQuence:RFSettings:TX? <seg> | <ul_freq>,<ref> |
| Sequence Table Parameter - Uplink Frequency, Input Level for SCC-1 | :CONFigure:CELLular:SEQuence:RFSettings:TX:SCC1 <seg>,<ul_freq>,<ref> | :CONFigure:CELLular:SEQuence:RFSettings:TX:SCC1? <seg> | <ul_freq>,<ref> |
| Sequence Table Parameter - SG Output Port | :CONFigure:CELLular:SEQuence:RXPort <seg>,<port> | :CONFigure:CELLular:SEQuence:RXPort? <seg> | <port> |
| Sequence Table Parameter - Measurement | :CONFigure:CELLular:SEQuence:SETup <seg>,<mode>,<step>,<mcond> | :CONFigure:CELLular:SEQuence:SETup? <seg> | <mode>,<step>,<mcond> |
| Sequence Table Parameter - Trigger | :TRIGger:CELLular:SEQuence <seg>,<src>,<slope>,<level>,<delay> | :TRIGger:CELLular:SEQuence? <seg> | <src>,<slope>,<level>,<delay> |
| Sequence UL RMC Modulation | :CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme <mcond>,<ul_rmc_mod> | :CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme? <mcond> | <ul_rmc_mod> |

Sequence Table Parameters (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| Sequence UL RMC Modulation for SCC-1 | :CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme:SCC1 <mcond>,<ul_rmc_mod> | :CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme:SCC1? <mcond> | <ul_rmc_mod> |
| Frame Structure | :CONFigure:CELLular:SEQuence:LTE:FSTRucture <mcond>,<mode> | :CONFigure:CELLular:SEQuence:LTE:FSTRucture? <mcond> | <mode> |
| Frame Structure for SCC-1 | :CONFigure:CELLular:SEQuence:LTE:FSTRucture:SCC1 <mcond>,<mode> | :CONFigure:CELLular:SEQuence:LTE:FSTRucture:SCC1? | <mode> |
| Cell ID | :CONFigure:CELLular:SEQuence:LTE:CID <id> | :CONFigure:CELLular:SEQuence:LTE:CID? | <id> |
| Cell ID for SCC-1 | :CONFigure:CELLular:SEQuence:LTE:CID:SCC1 <id> | :CONFigure:CELLular:SEQuence:LTE:CID:SCC1? | <id> |
| Cyclic Shift | :CONFigure:CELLular:SEQuence:LTE:CSHift <on_off> | :CONFigure:CELLular:SEQuence:LTE:CSHift? | <on_off> |
| Group hopping | :CONFigure:CELLular:SEQuence:LTE:GHOPping <on_off> | :CONFigure:CELLular:SEQuence:LTE:GHOPping? | <on_off> |
| Delta SS | :CONFigure:CELLular:SEQuence:LTE:DSS <val> | :CONFigure:CELLular:SEQuence:LTE:DSS? | <val> |
| Operation band | :CONFigure:CELLular:SEQuence:LTE:BAND <mcond>,<band> | :CONFigure:CELLular:SEQuence:LTE:BAND? <mcond> | <band> |
| Operation band for SCC-1 | :CONFigure:CELLular:SEQuence:LTE:BAND:SCC1 <mcond>,<band> | :CONFigure:CELLular:SEQuence:LTE:BAND:SCC1? <mcond> | <band> |
| Test Environment | :CONFigure:CELLular:SEQuence:LTE:TENVironment <mcond>,<env> | :CONFigure:CELLular:SEQuence:LTE:TENVironment? <mcond> | <env> |

Sequence Table Parameters (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| In-band Emission Carrier Leakage Frequency | :CONFigure:CELLular:SEQuence:LTE:IEMissions:CLFRequency <clf> | :CONFigure:CELLular:SEQuence:LTE:IEMissions:CLFRequency? | <clf> |
| Measurement Carrier | :CONFigure:CELLular:SEQuence:LTE:MCARrier <mcond>,<carrier> | LTE_MCARRIER? <mcond> | <carrier> |
| In-band Emissions Carrier Leakage Template | :CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak <mcond>,<tp> | :CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak? <mcond> | <tp> |
| In-band Emissions Carrier Leakage Template for SCC-1 | :CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak:SCC1 <mcond>,<tp> | :CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak:SCC1? <mcond> | <tp> |
| Uplink Downlink Configuration | :CONFigure:CELLular:SEQuence:LTE:ULDL <conf> | :CONFigure:CELLular:SEQuence:LTE:ULDL? | <conf> |
| Frequency Error Range | :CONFigure:CELLular:SEQuence:LTE:FERange <value> | :CONFigure:CELLular:SEQuence:LTE:FERange? | <value> |

Fundamental Measurement Parameters

| Function | Command | Query | Response |
|---|---|---|---|
| Adjacent channel leakage power ratio Enable and Count | :CONFigure:CELLular:SEQuence:LTE:ACLR:SET <mcond>,<on_off>[,<count>] | :CONFigure:CELLular:SEQuence:LTE:ACLR:SET? <mcond> | <on_off>,<count> |
| Turn Off All Measurement Items | :CONFigure:CELLular:SEQuence:LTE:AMITems:OFF <mcond> | ----- | ----- |
| Long Span Search | :CONFigure:CELLular:SEQuence:LTE:LSSearch <on_off> | :CONFigure:CELLular:SEQuence:LTE:LSSearch? | <on_off> |
| Modulation Analysis Measurement Enable and Count | :CONFigure:CELLular:SEQuence:LTE:MODulation:SET <mcond>,<on_off>[,<count>] | :CONFigure:CELLular:SEQuence:LTE:MODulation:SET? <mcond> | <on_off>,<count> |

Fundamental Measurement Parameters (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| Occupied Bandwidth Ratio | :CONFigure:CELLular:SEQuence:LTE:OBW:RATio <ratio> | :CONFigure:CELLular:SEQuence:LTE:OBW:RATio? | <ratio> |
| OBW Measurement Enable and Count | :CONFigure:CELLular:SEQuence:LTE:OBW:SET <mcond>,<on_off>[,<count>] | :CONFigure:CELLular:SEQuence:LTE:OBW:SET? <mcond> | <on_off>,<count> |
| Tx Power Measurement Enable and Count | :CONFigure:CELLular:SEQuence:LTE:POWer:SET <mcond>,<on_off>[,<count>] | :CONFigure:CELLular:SEQuence:LTE:POWer:SET? <mcond> | <on_off>,<count> |
| Spectrum Emission Mask Template (10 MHz) | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B10M <range>,<limit> | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B10M? <range> | <limit> |
| Spectrum Emission Mask Template (15 MHz) | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B15M <range>,<limit> | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B15M? <range> | <limit> |
| Spectrum Emission Mask Template (1.4 MHz) | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B1M4 <range>,<limit> | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B1M4? <range> | <limit> |
| Spectrum Emission Mask Template (20 MHz) | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B20M <range>,<limit> | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B20M? <range> | <limit> |
| Spectrum Emission Mask Template (3 MHz) | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B3M <range>,<limit> | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B3M? <range> | <limit> |
| Spectrum Emission Mask Template (5 MHz) | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B5M <range>,<limit> | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B5M? <range> | <limit> |
| Spectrum Emission Mask Enable and Count | :CONFigure:CELLular:SEQuence:LTE:SEMask:SET <mcond>,<on_off>[,<count>] | :CONFigure:CELLular:SEQuence:LTE:SEMask:SET? <mcond> | <on_off>,<count> |

Fundamental Measurement Parameters (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| Spectrum Emission Mask Template for Contiguous UL CA (100RB+100RB) | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB100:RB100 <range>,<limit> | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB100:RB100? <range> | <limit> |
| Spectrum Emission Mask Template for Contiguous UL CA (25RB+100RB) | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB25:RB100 <range>,<limit> | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB25:RB100? <range> | <limit> |
| Spectrum Emission Mask Template for Contiguous UL CA (50RB+100RB) | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB50:RB100 <range>,<limit> | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB50:RB100? <range> | <limit> |
| Spectrum Emission Mask Template for Contiguous UL CA (75RB+100RB) | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB100 <range>,<limit> | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB100? <range> | <limit> |
| Spectrum Emission Mask Template for Contiguous UL CA (75RB+75RB) | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB75 <range>,<limit> | :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB75? <range> | <limit> |

Results

<table>
<tr><th>Function</th><th>Command</th><th>Query</th><th>Response</th></tr>
<tr><td>ACLR Result</td><td>-----</td><td>:FETCh:CELLular:SEQuence:LTE:ACLR? <seg>,<mode>[,<cc>]</td><td>{<avg0>,<avg1>,<avg2>,<avg3>,<avg4>,<avg5>,<max0>,<max1>,<max2>,<max3>,<max4>,<max5>,<min0>,<min1>,<min2>,<min3>,<min4>,<min5>}|{<aclr0>,<aclr1>,<aclr2>,<aclr3>,<aclr4>,<aclr5>}</td></tr>
<tr><td>Carrier Leakage Result</td><td>-----</td><td>:FETCh:CELLular:SEQuence:LTE:MODulation:CARLeakage? <seg>,<mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<cleakage></td></tr>
<tr><td>Carrier Frequency Result</td><td>-----</td><td>:FETCh:CELLular:SEQuence:LTE:MODulation:CFRequency? <seg>[,<cc>]</td><td><freq></td></tr>
<tr><td>EVM Result</td><td>-----</td><td>:FETCh:CELLular:SEQuence:LTE:MODulation:EVM? <seg>,<mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<evm></td></tr>
<tr><td>Carrier Frequency Error Result</td><td>-----</td><td>:FETCh:CELLular:SEQuence:LTE:MODulation:FERRor? <seg>,<mode>[,<cc>]</td><td>{<avg_ppm>,<avg_Hz>,<max_ppm>,<max_Hz>,<min_ppm>,<min_Hz>}|{<freq_ppm>,<freq_Hz>}</td></tr>
<tr><td>Worst Carrier Frequency Error Result</td><td>-----</td><td>:FETCh:CELLular:SEQuence:LTE:MODulation:FERRor:WORSt? <seg>[,<cc>]</td><td><freq_ppm>,<freq_Hz></td></tr>
<tr><td>IQ Imbalance Result</td><td>-----</td><td>:FETCh:CELLular:SEQuence:LTE:MODulation:IQIMbalance? <seg>,<mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<iqimb></td></tr>
<tr><td>Magnitude Error Result</td><td>-----</td><td>:FETCh:CELLular:SEQuence:LTE:MODulation:MERRor? <seg>,<mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<merr></td></tr>
<tr><td>Peak EVM Result</td><td>-----</td><td>:FETCh:CELLular:SEQuence:LTE:MODulation:PEVM? <seg>,<mode>[,<cc>]</td><td>{<avg>,<max>,<min>}|<pevm></td></tr>
</table>

Results (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| Phase Error Result | ----- | :FETCh:CELLular:SEQuence:LTE:MODulation:PHERror? <seg>,<mode>[,<cc>] | {<avg>,<max>,<min>}\|<perr> |
| Reference Signal EVM Result | ----- | :FETCh:CELLular:SEQuence:LTE:MODulation:RSEVm? <seg>,<mode>[,<cc>] | {<avg>,<max>,<min>}\|<rsevm> |
| OBW Result | ----- | :FETCh:CELLular:SEQuence:LTE:OBW? <seg> | <bw> |
| OBW Frequency Result | ----- | :FETCh:CELLular:SEQuence:LTE:OBW:FREQuency? <seg>,<pos> | <freq> |
| Channel Power Result | ----- | :FETCh:CELLular:SEQuence:LTE:POWer:CHPower? <seg>,<mode>[,<cc>] | {<avg>,<max>,<min>}\|<pwr>\|{<s>,<pwr(1)>,<pwr(2)>,<pwr(3)>,...,<pwr(s)>} |
| Tx Power Result | ----- | :FETCh:CELLular:SEQuence:LTE:POWer:TXPower? <seg>,<mode>[,<cc>] | {<avg>,<max>,<min>}\|<pwr>\|{<s>,<pwr(1)>,<pwr(2)>,<pwr(3)>,...,<pwr(s)>} |
| In-Band Emissions Measured Item | ----- | :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:ITEM? <seg>[,<cc>] | <flag> |
| In-Band Emissions Judgement | ----- | :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:JUDGement? <seg>[,<cc>] | <judgement> |
| In-Band Emissions limit (General) | ----- | :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:GENeral? <seg>[,<cc>] | <level> |
| In-Band Emissions (General) Result | ----- | :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:GENeral? <seg>,<mode>[,<cc>] | {<avg>,<max>,<min>}\|<ibe> |

Results (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| In-Band Emissions limit (IQ Image) | ----- | :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:IQIMage? <seg>[,<cc>] | <level> |
| In-Band Emissions (IQ Image) Result | ----- | :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:IQIMage? <seg>,<mode>[,<cc>] | {<avg>,<max>,<min>}\|<ibe> |
| In-Band Emissions limit (Carrier Leakage) | ----- | :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:CARLeakage? <seg>[,<cc>] | <level> |
| In-Band Emissions (Carrier Leakage) Result | ----- | :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:CARLeakage? <seg>,<mode>[,<cc>] | {<avg>,<max>,<min>}\|<ibe> |
| In-Band Emissions Margin | ----- | :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:MARGin? <seg>[,<cc>] | <margin> |
| SEM Judgement | ----- | :FETCh:CELLular:SEQuence:LTE:SEMask:JUDGement? <seg>[,<cc>] | <judgement> |
| SEM Peak Value (Lower) | ----- | :FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:LOWer? <seg>[,<cc>] | <l_M1>,<l_M2>,<l_M3>,<l_M4>,<f_M1>,<f_M2>,<f_M3>,<f_M4> |
| SEM Peak Value (Detail) (Lower) | ----- | :FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:LOWer:DETail? <seg>[,<cc>] | <l_M1>,<l_M2>,<l_M3>,<l_M4>,<l_M5>,<l_M6>,<l_M7>,<l_M8>,<l_M9>,<f_M1>,<f_M2>,<f_M3>,<f_M4>,<f_M5>,<f_M6>,<f_M7>,<f_M8>,<f_M9> |

Results (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| SEM Peak Value (Upper) | ----- | :FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:UPPer? <seg>[,<cc>] | <l_1>,<l_2>,<l_3>,<l_4>,<f_1>,<f_2>,<f_3>,<f_4> |
| SEM Peak Value (Detail) (Upper) | ----- | :FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:UPPer:DETail? <seg>[,<cc>] | <l_1>,<l_2>,<l_3>,<l_4>,<l_5>,<l_6>,<l_7>,<l_8>,<l_9>,<f_1>,<f_2>,<f_3>,<f_4>,<f_5>,<f_6>,<f_7>,<f_8>,<f_9> |
| SEM Template Margin (Lower) | ----- | :FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:LOWer? <seg>[,<cc>] | <l_M1>,<l_M2>,<l_M3>,<l_M4>,<f_M1>,<f_M2>,<f_M3>,<f_M4> |
| SEM Template Margin (Detail) (Lower) | ----- | :FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:LOWer:DETail? <seg>[,<cc>] | <l_M1>,<l_M2>,<l_M3>,<l_M4>,<l_M5>,<l_M6>,<l_M7>,<l_M8>,<l_M9>,<f_M1>,<f_M2>,<f_M3>,<f_M4>,<f_M5>,<f_M6>,<f_M7>,<f_M8>,<f_M9> |
| SEM Template Margin (Upper) | ----- | :FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:UPPer? <seg>[,<cc>] | <l_1>,<l_2>,<l_3>,<l_4>,<f_1>,<f_2>,<f_3>,<f_4> |
| SEM Template Margin (Detail) (Upper) | ----- | :FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:UPPer:DETail? <seg>[,<cc>] | <l_1>,<l_2>,<l_3>,<l_4>,<l_5>,<l_6>,<l_7>,<l_8>,<l_9>,<f_1>,<f_2>,<f_3>,<f_4>,<f_5>,<f_6>,<f_7>,<f_8>,<f_9> |

Results (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| Spectrum Flatness Measured Item | ----- | :FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:ITEM? <seg>[,<cc>] | <flag> |
| Spectrum Flatness Judgement | ----- | :FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:JUDGement? <seg>[,<cc>] | <judgement> |
| Spectrum Flatness (≥3 MHz (RP1)) Result | ----- | :FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP1? <seg>,<mode>[,<cc>] | {<avg>,<max>,<min>}\|<sflatness> |
| Spectrum Flatness (RP12) Result | ----- | :FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP12? <seg>,<mode>[,<cc>] | {<avg>,<max>,<min>}\|<sflatness> |
| Spectrum Flatness (<3 MHz (RP2)) Result | ----- | :FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP2? <seg>,<mode>[,<cc>] | {<avg>,<max>,<min>}\|<sflatness> |
| Spectrum Flatness (RP21) Result | ----- | :FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP21? <seg>,<mode>[,<cc>] | {<avg>,<max>,<min>}\|<sflatness> |

# 4.2 Details of Commands

This section describes the commands in alphabetical order.

■ Terms in this command list

EX ............................................. Command name (header)

Example ........................................... Command function name

Function ..................................................... Command function

Command................................. Programming command syntax

Query ........................................................... Query syntax

Response ..................................................... Response syntax

Parameter................................................. Parameter definition

Details .................................. Command restrictions and others

Example of Use ............................... Command usage example

Related Commands ............... Introduction of related commands

■ Suffix Code list

| Suffix Code | Unit | Suffix Code | Unit |
|---|---|---|---|
| DB | dB | MHZ | MHz |
| DBM | dBm | MS | ms |
| GHZ | GHz | MZ | MHz |
| GZ | GHz | NS | ns |
| HZ | Hz | S | s |
| KHZ | kHz | US | μs |
| KZ | kHz | | |

## 4.2.1 Common commands

### :ABORt:CELLular:MEASurement

Measurement Stop

Function

Stops measurement

Command

```
:ABORt:CELLular:MEASurement
```

Example of Use

To stop the measurement:

```
:ABOR:CELL:MEAS
```

## :CONFigure:CELLular:GENerator:ARB:PACKage:SELect

Waveform File Select

### Function

Selects or queries the waveform file for arbitrary waveform signal used at Downlink signal

### Command

```
:CONFigure:CELLular:GENerator:ARB:PACKage:SELect <pac>
```

### Query

```
:CONFigure:CELLular:GENerator:ARB:PACKage:SELect?
```

### Response

```
<pac>
```

### Parameter

| | |
|---|---|
| <pac> | Waveform file |

### Details

The name of the file used from the waveform files loaded into waveform memory is set by this command.

### Example of Use

To set the waveform file 0 from the waveform files loaded in memory:

```
:CONF:CELL:GEN:ARB:PACK:SEL "PAC1"
:CONF:CELL:GEN:ARB:PACK:SEL?
> PAC1
```

### Related command

Use the following command to load the waveform file into waveform memory.

:SOURce:GPRF:GENerator:ARB:FILE:LOAD

For details of the command, refer to Chapter 5 "SCPI Command Reference" in the *MU887000A TRX Test Module Operation Manual*.

The following command can be used to query the names of the waveform files that have been loaded into waveform memory.

:SOURce:GPRF:GENerator:ARB:WAVeform:NAME?

For details of the command, refer to Chapter 5 "SCPI Command Reference" in the *MU887000A TRX Test Module Operation Manual*.

Use the following commands to select a waveform pattern to use from the waveform patterns included in the waveform file configured using the command described in this section.

:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect

:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect:SYNC

:CONFigure:CELLular:SEQuencer:RFSettings:TRX

## :CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect

Waveform Pattern Select

### Function

Selects a waveform pattern to use from patterns included in waveform file
When the command received, the signal is immediately switched regardless of the frame cycle of signal, so the frame cycle is not continued.
This command is also used to query the currently selected waveform pattern.

### Command

```
:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect <pat>
```

### Query

```
:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect?
```

### Response

```
<pat>
```

### Parameter

| | |
|---|---|
| <pat> | Waveform pattern |
| PAT1 to PATn | Waveform pattern number (n: waveform information file group range) |
| Default | PAT1 |

### Details

Select the waveform pattern for RF output signal in waveform file.
The pattern number is the same as the group number. Refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

### Example of Use

To set the waveform pattern to 1:

```
:CONF:CELL:GEN:ARB:WAV:PATT:SEL PAT1
:CONF:CELL:GEN:ARB:WAV:PATT:SEL?
> PAT1
```

### Related Command

Waveform file for arbitrary waveform signal selection or query
:CONFigure:CELLular:GENerator:ARB:PACKage:SELect

### Remarks

The group number depends on the selected waveform file.
For details of the waveform pattern, refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

## :CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect:SYNC

Waveform Pattern Select (SYNC)

### Function

Selects a waveform pattern to use from patterns included in waveform file

When the command received, the signal is switched according to the frame cycle of signal so that the frame cycle is continued.

This command is also used to query the currently selected waveform pattern.

### Command

```
:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect:SYNC <pat>
```

### Query

```
:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect:SYNC?
```

### Response

```
<pat>
```

### Parameter

| | |
|---|---|
| <pat> | Waveform pattern |
| PAT1 to PATn | Waveform pattern number (n: waveform information file group range) |
| Default | PAT1 |

### Details

Select the waveform pattern for RF output signal in waveform file.

The pattern number is the same as the group number. Refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

### Example of Use

To set the waveform pattern to 1:

```
:CONF:CELL:GEN:ARB:WAV:PATT:SEL:SYNC PAT1
:CONF:CELL:GEN:ARB:WAV:PATT:SEL:SYNC?
> PAT1
```

### Related Command

Waveform file for arbitrary waveform signal selection or query

:CONFigure:CELLular:GENerator:ARB:PACKage:SELect

### Remarks

The group number depends on the selected waveform file.

For details of the waveform pattern, refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

## :CONFigure:CELLular:GENerator:BBMode

Output Signal Modulation

### Function

Sets or queries MU887000A RF signal output modulation

### Command

```
:CONFigure:CELLular:GENerator:BBMode <on_off>
```

### Query

```
:CONFigure:CELLular:GENerator:BBMode?
```

### Response

```
<on_off>
```

### Parameter

| | |
|---|---|
| <on_off> | Enables/disable modulation |
| ON | Enables RF output signal modulation |
| OFF | Disables RF output signal modulation |
| Default | ON |

### Example of Use

To modulate the RF signal:

```
:CONF:CELL:GEN:BBM ON
:CONF:CELL:GEN:BBM?
> ON
```

4 SCPI Command Reference

## :CONFigure:CELLular:GENerator:RFSettings:STATe

Output Level On/Off

### Function

Sets or queries RF signal output at MU887000A connector

### Command

```
:CONFigure:CELLular:GENerator:RFSettings:STATe <on_off>
```

### Query

```
:CONFigure:CELLular:GENerator:RFSettings:STATe?
```

### Response

```
<on_off>
```

### Parameter

| | |
|---|---|
| <on_off> | Enables/disables RF signal output |
| ON | Enables RF signal output |
| OFF | Disables RF signal output |
| Default | ON |

### Example of Use

To enable output of RF signals at MU887000A connector:

```
:CONF:CELL:GEN:RFS:STAT ON
:CONF:CELL:GEN:RFS:STAT?
> ON
```

## :CONFigure:CELLular:MEASurement:STANdard

Standard Select

### Function

Sets or queries the measurement standard

### Command

```
:CONFigure:CELLular:MEASurement:STANdard <std>
```

### Query

```
:CONFigure:CELLular:MEASurement:STANdard?
```

### Response

```
<std>
```

### Parameter

| | | |
|---|---|---|
| <std> | Measurement standard | |
| COMMON | Common Measurement | (requires MX887010A) |
| WCDMA | W-CDMA | (requires MX887011A) |
| GSM | GSM | (requires MX887012A) |
| LTE | LTE | (requires MX887013A or MX887014A) |
| CDMA2000 | CDMA2000 1x | (requires MX887015A) |
| EVDO | CDMA2000 1xEVDO | (requires MX887016A) |
| TDSCDMA | TD-SCDMA | (requires MX887017A) |
| SEQUENCE | Sequence | (requires MX887010A) |
| SEQ | Sequence | (requires MX887010A) |
| Default | COMMON | |

### Details

Switch the measurement standard and sequence measurement according to the application software.

If this command is sent during measurement, measurement stops to prepare for the new standard.

The old measurement results are cleared.

Common hardware settings, such as Downlink Frequency and Input Level, can be set for each measurement standard.

LTE FDD (MX887013A) and LTE TDD (MX887014A) are switched depending on the Frame Structure command.

Example of Use

To switch the measurement standard to SEQUENCE:

```
:CONF:CELL:MEAS:STAN SEQUENCE
:CONF:CELL:MEAS:STAN?
> SEQUENCE
```

Remarks

This parameter must be set to LTE to execute the commands described in Section 4.2.2 “Fundamental measurement commands”.

This parameter must be set to SEQUENCE to use the commands described in Section 4.2.3 “Sequence measurement commands”.

## :FETCh:CELLular:MEASurement:STATe?

Measurement Status

### Function

Queries the measurement status

### Query

```
:FETCh:CELLular:MEASurement:STATe?
```

### Response

```
<m_status>
```

| | |
|---|---|
| <m_status> | Measurement status |
| 0 | Completed measurement |
| 2 | Over level |
| 3 | Under level |
| 4 | Measurement failed |
| 5 | Synchronization word not detected |
| 9 | Measurement in progress or not measured |
| 12 | Tx measurement timeout |
| 13 | Rx measurement failed |

### Details

This can be used either during measurement or while measurement is stopped.
The value received from MX887013A or MX887014A is 0, 2, 5, 9, or 12.

### Example of Use

To query the current measurement status:

```
:FETC:CELL:MEAS:STAT?
> 0
```

## :INITiate:CELLular:MEASurement:SINGle

Measurement Start

### Function

Sets the parameters for both specified measurement and signal transmission and executes measurement.

### Command

`:INITiate:CELLular:MEASurement:SINGle`

### Details

Sending this command executes one measurement.
Sending this command during measurement, aborts measurement once and restarts it.
The measurement questionable register must be polled or sync processing via *WAI is required to determine the timing of measurement completion.

### Example of Use

To start measurement:
`INIT:CELL:MEAS:SING`

### Related Command

:STATus:QUEStionable:MEASure[:EVENt]
For the details of questionable register, refer to Chapter 3 “Fundamental Operation” in the *MU887000A TRX Test Module Operation Manual*.

## :INSTrument[:SELect]

Application Select

### Function

Sets or queries the type of application software executing on MU887000A

### Command

```
:INSTrument[:SELect] <app>
```

### Query

```
:INSTrument[:SELect]?
```

### Response

```
<app>
```

### Parameter

| | |
|---|---|
| <app> | Type of application software |
| CELLULAR | When using MX887010A, MX887011A, MX887012A, MX887013A, MX887014A, MX887015A, MX887016A or MX887017A |
| SRW | When using MX887030A, MX887031A, MX887040A, or MX887050A |

### Details

Set the parameter to CELLULAR and send the command before using the MX887013A.

### Example of Use

To set the application software to CELLULAR:

```
:INST CELLULAR
:INST?
> CELLULAR
```

### Remarks

When using the MX887013A, set the application to CELLULAR using:INSTrument[:SELect], and then set the standard to LTE or SEQUENCE using :CONFigure:CELLular:MEASurement:STANdard.

## :ROUTe:PORT:CONNect:DIRection

Set Connect Port Direction

### Function

Sets or queries connectors for inputting and outputting RF signals

### Command

```
:ROUTe:PORT:CONNect:DIRection <input>,<output>
```

### Query

```
:ROUTe:PORT:CONNect:DIRection?
```

### Response

```
<input>,<output>
```

### Parameters

| | |
|---|---|
| <input> | Test Port No. |
| <output> | Test Port No. |
| PORT1 | Test Port1 |
| PORT2 | Test Port2 |
| PORT3 | Test Port3 |
| PORT4 | Test Port4 |
| Default | PORT1 |

### Details

Both Test Port1 and Test Port2 can be set to input and output simultaneously.
Test Port3 and Test Port4 can be set to either input or output at one time.
Only Port1 and Port2 are used by the MX887013A.

### Example of Use

To set Test Port1 as RF signal input connector and Test Port2 as RF signal output connector:

```
:ROUT:PORT:CONN:DIR PORT1,PORT2
:ROUT:PORT:CONN:DIR?
> PORT1,PORT2
```

## :STATus:OPERation:MEASure[:EVENt]?

Measurement Operation Status Register Query

### Function

Queries content of measurement operation status register
The event occurrence can be identified using the retrieved value.

### Query

```
:STATus:OPERation:MEASure[:EVENt]?
```

### Response

<mosr>

<mosr> Measurement operation status register

Range 0 to 65535

Value = bit0 + bit1 + ... + bit15

| | |
|---|---|
| bit0 = $2^0$ = 1 | Measurement in progress |
| bit1 = $2^1$ = 2 | Preparing trigger |
| bit2 = $2^2$ = 4 | Unused |
| bit3 = $2^3$ = 8 | Unused |
| bit4 = $2^4$ = 16 | Unused |
| bit5 = $2^5$ = 32 | Unused |
| bit6 = $2^6$ = 64 | Unused |
| bit7 = $2^7$ = 128 | Unused |
| bit8 = $2^8$ = 256 | Unused |
| bit9 = $2^9$ = 512 | Unused |
| bit10 = $2^{10}$ = 1024 | Unused |
| bit11 = $2^{11}$ = 2048 | Unused |
| bit12 = $2^{12}$ = 4096 | Unused |
| bit13 = $2^{13}$ = 8192 | Unused |
| bit14 = $2^{14}$ = 16384 | Unused |
| bit15 = $2^{15}$ = 32768 | Unused |

### Details

The sum of the values for bits of the occurring event from the values $2^0 = 1$, $2^1 = 2$ to $2^{15} = 32768$, that correspond to the measurement operation status register bits 0, 1 to 15 becomes the response.

### Example of Use

To query content of measurement status event register:

```
:STAT:OPER:MEAS?
> 1
```

## :STATus:QUEStionable:MEASure[:EVENt]?

Measurement Questionable Status Register Query

### Function

Queries content of measurement questionable status register
The event occurrence can be identified using the retrieved value.

### Query

```
:STATus:QUEStionable:MEASure[:EVENt]?
```

### Response

```
<mqsr>
```

<mqsr> Measurement questionable status register

Range 0 to 65535

Value = bit0 + bit1 + ... + bit15

| | |
|---|---|
| bit0 = $2^0$ = 1 | Over level |
| bit1 = $2^1$ = 2 | Under level |
| bit2 = $2^2$ = 4 | Timeout |
| bit3 = $2^3$ = 8 | Unused |
| bit4 = $2^4$ = 16 | Unused |
| bit5 = $2^5$ = 32 | Unused |
| bit6 = $2^6$ = 64 | Unused |
| bit7 = $2^7$ = 128 | Unused |
| bit8 = $2^8$ = 256 | Unused |
| bit9 = $2^9$ = 512 | Unused |
| bit10 = $2^{10}$ = 1024 | Unused |
| bit11 = $2^{11}$ = 2048 | Unused |
| bit12 = $2^{12}$ = 4096 | Unused |
| bit13 = $2^{13}$ = 8192 | Unused |
| bit14 = $2^{14}$ = 16384 | Unused |
| bit15 = $2^{15}$ = 32768 | Unused |

### Details

The sum of the values for bits of the occurring event from the values $2^0 = 1$, $2^1 = 2$ to $2^{15} = 32768$, that correspond to the measurement questionable status register bits 0, 1 to 15 becomes the response.

### Example of Use

To query content of measurement questionable status register:

```
:STAT:QUES:MEAS?
> 0
```

## :SYSTem:LANGuage

Language Selection of Remote Command

### Function

Switches the language mode of remote control command

### Command

```
:SYSTem:LANGuage <mode>
```

### Query

```
:SYSTem:LANGuage?
```

### Response

```
<mode>
```

### Parameter

| | |
|---|---|
| <mode> | Language mode |
| NATive | Native |
| SCPI | SCPI |
| Default | NAT |

### Example of Use

To switch the language mode of remote control commands to Native.

```
:SYST:LANG NAT
:SYST:LANG?
>NAT
```

## 4.2.2 Fundamental Measurement Commands

### :CONFigure:CELLular:GENerator:ARB:NOISe:CN

AWGN Level

#### Function

Sets or queries AWGN (Additive White Gaussian Noise) output level ratio vs carrier

#### Command

```
:CONFigure:CELLular:GENerator:ARB:NOISe:CN <level>
```

#### Query

```
:CONFigure:CELLular:GENerator:ARB:NOISe:CN?
```

#### Response

`<level>`

| | |
|---|---|
| Unit | dB |
| Resolution | 1 dB |

#### Parameter

| | |
|---|---|
| <level> | AWGN Output level |
| Range | –40 to +12 dB |
| Resolution | 1 dB |
| Default | –40 dB |

#### Example of Use

To set AWGN output level ratio vs the carrier to –14 dB:

```
:SOUR:GPRF:GEN:ARB:NOIS:CN -14
:SOUR:GPRF:GEN:ARB:NOIS:CN?
> -14
```

## :CONFigure:CELLular:GENerator:ARB:NOISe:STATe

AWGN Level On/Off

### Function

Enables AWGN output, and queries setting

### Command

```
:CONFigure:CELLular:GENerator:ARB:NOISe:STATe <on_off>
```

### Query

```
:CONFigure:CELLular:GENerator:ARB:NOISe:STATe?
```

### Response

```
<on_off>
```

### Parameter

| | |
|---|---|
| <on_off> | Enables/disables AWGN output |
| ON | Enables AWGN output |
| OFF | Disables AWGN output |
| Default | OFF |

### Example of Use

To enable AWGN output:

```
:SOUR:GPRF:GEN:ARB:NOIS:STAT ON
:SOUR:GPRF:GEN:ARB:NOIS:STAT?
> ON
```

### Related Command

:SOURce:GPRF:GENerator:ARB:NOISe:CN

## :CONFigure:CELLular:GENerator:RFSettings:FREQuency

Downlink Frequency

### Function

Sets or queries the downlink frequency of MU887000A

### Command

```
:CONFigure:CELLular:GENerator:RFSettings:FREQuency <dl_freq>
```

### Query

```
:CONFigure:CELLular:GENerator:RFSettings:FREQuency?
```

### Response

```
<dl_freq>
```

### Parameter

| | |
|---|---|
| <dl_freq> | Downlink frequency |
| Range | 400.000000 to 3800.000000 MHz |
| | 400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 1 Hz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted) |
| Default | 2140.000000 MHz |

### Details

The Rx frequency for the UE is set.
Changing the setting of downlink frequency does not change the setting of the downlink channel.

### Example of Use

To set the downlink frequency to 2050 MHz:

```
:CONF:CELL:GEN:RFS:FREQ 2050MHZ
:CONF:CELL:GEN:RFS:FREQ?
>2050000000
```

## :CONFigure:CELLular:GENerator:RFSettings:FREQuency:SCC1

Downlink Frequency for SCC-1

### Function

Sets or queries the Downlink Frequency for SCC-1.

### Command

```
:CONFigure:CELLular:GENerator:RFSettings:FREQuency:SCC1 <dl_freq>
```

### Query

```
:CONFigure:CELLular:GENerator:RFSettings:FREQuency:SCC1?
```

### Response

<dl_freq>

| | |
|---|---|
| Unit | Hz |
| Resolution | 1 Hz |

### Parameter

| | |
|---|---|
| <dl_freq> | Downlink Frequency for SCC-1 |
| Range | 400.000000 to 3800.000000 MHz<br>400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 1 Hz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted) |
| Default | 2140.000000 MHz |

### Details

This setting corresponds to theUE Tx frequency setting.
Updating the setting of the Downlink frequency for SCC-1 does not affect the setting of the Downlink Channel for SCC-1.

### Example of Use

To set the Downlink frequency for SCC-1 to 2050 MHz:

```
:CONF:CELL:GEN:RFS:FREQ:SCC1 2050MHZ
:CONF:CELL:GEN:RFS:FREQ:SCC1?
>2050000000
```

## :CONFigure:CELLular:GENerator:RFSettings:LEVel

Output Level

### Function

Sets or queries the RF signal total output level of all channels

### Command

```
:CONFigure:CELLular:GENerator:RFSettings:LEVel <level>
```

### Query

```
:CONFigure:CELLular:GENerator:RFSettings:LEVel?
```

### Response

```
<level>
```

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameter

| | | |
|---|---|---|
| <level> | | Output level |
| | Range | –130.0 to –10.0 dBm (Port1/Port2)<br>–120.0 to 0.0 dBm (Port3/Port4) |
| | Resolution | 0.1 dB |
| | Suffix Code | DBM (uses dBm when omitted) |
| | Default | –60.2 dBm |

### Details

The setting range varies with the output port setting.
When the Cable Loss Calibration is ON, the cable loss is subtracted from the output level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –135.0 to –15.0 dBm.

### Example of Use

To set the output level to –50.0 dBm:

```
:CONF:CELL:GEN:RFS:LEV -50.0
:CONF:CELL:GEN:RFS:LEV?
> -50.0
```

### Related Commands

[:ROUTe]:EXTLoss:TABLe:SWITch
:CALCulate:EXTLoss:TABLe:SETTing
:CALCulate:EXTLoss:TABLe:VALue
For details of the commands, refer to Chapter 5 “SCPI Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

## :CONFigure:CELLular:LTE:BWRB

Channel Bandwidth, RB

### Function

Sets or queries the Uplink Channel bandwidth and Resource Blocks (RB)

### Command

```
:CONFigure:CELLular:LTE:BWRB <ch_bw>[,<rb>[,<start>]]
```

### Query

```
:CONFigure:CELLular:LTE:BWRB?
```

### Response

```
<ch_bw>,<rb>,<start>
```

### Parameters

| | |
|---|---|
| <ch_bw> | Channel bandwidth |
| 1.4MHZ | 1.4 MHz |
| 3MHZ | 3 MHz |
| 5MHZ | 5 MHz |
| 10MHZ | 10 MHz |
| 15MHZ | 15 MHz |
| 20MHZ | 20 MHz |
| Default | 5MHZ |
| <rb> | RB count |
| Range | Same as :CONFigure:CELLular:LTE:RBALlocation:NRB |
| Default | 25 |
| <start> | Start RB number |
| Range | Same as :CONFigure:CELLular:LTE:RBALlocation:ORB |
| Default | 0 |

### Details

The <rb> and <start> settings can be omitted. If omitted, the settings are Full RB (<rb> is the maximum for the channel bandwidth and <start> is 0).

### Example of Use

To set as follows:

Channel Bandwidth: 1.4 MHz, UL RMC Number of RB: 6, UL RMC Starting RB: 0

```
:CONF:CELL:LTE:BWRB 1.4MHZ,6,0
:CONF:CELL:LTE:BWRB?
>1.4MHZ,6,0
```

### Related Commands

| | |
|---|---|
| Channel Bandwidth | :CONFigure:CELLular:LTE:CBANdwidth |
| UL RMC Number of RB | :CONFigure:CELLular:LTE:RBALlocation:NRB |
| UL RMC Starting RB | :CONFigure:CELLular:LTE:RBALlocation:ORB |

## :CONFigure:CELLular:LTE:BWRB:SCC1

Channel Bandwidth, RB for SCC-1

### Function

Sets or queries the Uplink Channel bandwidth and Resource Blocks (RB) for SCC-1

### Command

```
:CONFigure:CELLular:LTE:BWRB:SCC1 <ch_bw>[,<rb>[,<start>]]
```

### Query

```
:CONFigure:CELLular:LTE:BWRB:SCC1?
```

### Response

```
<ch_bw>,<rb>,<start>
```

### Parameters

| | |
|---|---|
| <ch_bw> | Channel bandwidth for SCC-1 |
| 1.4MHZ | 1.4 MHz |
| 3MHZ | 3 MHz |
| 5MHZ | 5 MHz |
| 10MHZ | 10 MHz |
| 15MHZ | 15 MHz |
| 20MHZ | 20 MHz |
| Default | 5MHZ |
| <rb> | RB count for SCC-1 |
| Range | Same as :CONFigure:CELLular:LTE:RBALlocation:NRB |
| Default | 25 |
| <start> | Start RB number for SCC-1 |
| Range | Same as :CONFigure:CELLular:LTE:RBALlocation:ORB |
| Default | 0 |

### Details

The <rb> and <start> settings can be omitted. If omitted, the settings are Full RB (<rb> is the maximum for the channel bandwidth and <start> is 0).

### Example of Use

To set the items for SCC-1 as follows:

UL Channel Bandwidth: 1.4 MHz, UL RMC Number of RB: 6, UL RMC Starting RB: 0

```
:CONF:CELL:LTE:BWRB:SCC1 1.4MHZ,6,0
:CONF:CELL:LTE:BWRB:SCC1?
>1.4MHZ,6,0
```

### Related Commands

| | |
|---|---|
| Channel Bandwidth for SCC-1 | :CONFigure:CELLular:LTE:CBANdwidth:SCC1 |
| UL RMC Number of RB for SCC-1 | :CONFigure:CELLular:LTE:RBALlocation:NRB:SCC1 |
| UL RMC Starting RB for SCC-1 | :CONFigure:CELLular:LTE:RBALlocation:ORB:SCC1 |

## :CONFigure:CELLular:LTE:CBANdwidth

Channel Bandwidth

### Function

Sets or queries the channel bandwidth

### Command

```
:CONFigure:CELLular:LTE:CBANdwidth <ch_bw>[,<ch_bw_scc1>]
```

### Query

```
:CONFigure:CELLular:LTE:CBANdwidth? [<ALL>]
```

### Response

```
<ch_bw>,<ch_bw_scc1>
```

### Parameter

| | |
|---|---|
| <ch_bw> | Channel bandwidth for PCC |
| <ch_bw_scc1> | Channel bandwidth for SCC-1 |
| 1.4MHZ | 1.4 MHz |
| 3MHZ | 3 MHz |
| 5MHZ | 5 MHz |
| 10MHZ | 10 MHz |
| 15MHZ | 15 MHz |
| 20MHZ | 20 MHz |
| Default | 5 MHz |

### Details

When the channel bandwidth for PCC is updated, the start RB number setting value at Uplink RMC for PCC is reset to 0. The RBs allocated to RMC of the PCC uplink signal is changed to the maximum value.
When the channel bandwidth for SCC-1 is updated, the start RB number setting value at Uplink RMC for SCC-1 is reset to 0. The RBs allocated to RMC of the SCC-1 uplink signal is changed to the maximum value.
When the command argument <ALL> is omitted, the response is <ch_bw> only.

### Example of Use

To set the channel bandwidth as follows:
For PCC: 1.4 MHz, For SCC-1: 3 MHz

```
:CONF:CELL:LTE:CBAN 1.4MHZ,3MHZ
:CONF:CELL:LTE:CBAN? ALL
> 1.4MHZ,3MHZ
```

## :CONFigure:CELLular:LTE:CBANdwidth:SCC1

Channel Bandwidth for SCC-1

### Function

Sets or queries the channel bandwidth for SCC-1

### Command

```
:CONFigure:CELLular:LTE:CBANdwidth:SCC1 <ch_bw>
```

### Query

```
:CONFigure:CELLular:LTE:CBANdwidth:SCC1?
```

### Response

```
<ch_bw>
```

### Parameter

| | |
|---|---|
| <ch_bw> | Channel bandwidth for SCC-1 |
| 1.4MHZ | 1.4 MHz |
| 3MHZ | 3 MHz |
| 5MHZ | 5 MHz |
| 10MHZ | 10 MHz |
| 15MHZ | 15 MHz |
| 20MHZ | 20 MHz |
| Default | 5 MHz |

### Details

When the channel bandwidth for SCC-1 is updated, the start RB number setting value at Uplink RMC for SCC-1 is reset to 0. The RBs allocated to RMC of the SCC-1 uplink signal is changed to the maximum value.

### Example of Use

To set the channel bandwidth for SCC-1 to 1.4 MHz:

```
:CONF:CELL:LTE:CBAN:SCC1 1.4MHZ,3MHZ
:CONF:CELL:LTE:CBAN:SCC1? ALL
> 1.4MHZ
```

## :CONFigure:CELLular:LTE:CHCoding

Channel Coding

### Function

Sets or queries the channel coding.

### Command

```
:CONFigure:CELLular:LTE:CHCoding <object>
```

### Query

```
:CONFigure:CELLular:LTE:CHCoding?
```

### Response

```
<object>
```

### Parameter

| | |
|---|---|
| <object> | Target for channel coding |
| RMC | Reference Measurement Channel |
| RMC_UL_CA | RMC at UL CA |
| Default | RMC |

### Details

When FRAMETYPE is FDD and RMC_UL_CA is set, MX887013A-001 is required.
When FRAMETYPE is TDD and RMC_UL_CA is set, MX887014A-001 is required.

### Example of Use

To set the channel coding to RMC:

```
:CONF:CELL:LTE:CHC RMC
:CONF:CELL:LTE:CHC?
> RMC
```

## :CONFigure:CELLular:LTE:CID

Cell ID

### Function

Sets or queries the Cell ID.

### Command

```
:CONFigure:CELLular:LTE:CID <id>
```

### Query

```
:CONFigure:CELLular:LTE:CID?
```

### Response

```
<id>
```

### Parameter

| | |
|---|---|
| <id> | Cell ID |
| Range | 0 to 503 |
| Resolution | 1 |
| Default | 0 |

### Example of Use

To set the Cell ID to 121:

```
:CONF:CELL:LTE:CID 121
:CONF:CELL:LTE:CID?
> 121
```

## :CONFigure:CELLular:LTE:CID:SCC1

Cell ID for SCC-1

### Function

Sets or queries the Cell ID. for SCC-1

### Command

```
:CONFigure:CELLular:LTE:CID:SCC1 <id>
```

### Query

```
:CONFigure:CELLular:LTE:CID:SCC1?
```

### Response

```
<id>
```

### Parameter

| | |
|---|---|
| <id> | Cell ID for SCC-1 |
| Range | 0 to 503 |
| Resolution | 1 |
| Default | 0 |

### Example of Use

To set the Cell ID for SCC-1 to 121:

```
:CONF:CELL:LTE:CID:SCC1 121
:CONF:CELL:LTE:CID:SCC1?
> 121
```

## :CONFigure:CELLular:LTE:CSHift

Cyclic Shift

### Function

Enables Cyclic Shift or queries setting.

### Command

```
:CONFigure:CELLular:LTE:CSHift <on_off>
```

### Query

```
:CONFigure:CELLular:LTE:CSHift?
```

### Response

```
<on_off>
```

### Parameter

| | |
|---|---|
| <on_off> | Cyclic Shift |
| ON | Enables Cyclic Shift. |
| OFF | Disables Cyclic Shift. |
| FIX1 | The fixed value is set. |
| Default | ON |

### Example of Use

To enable Cyclic Shift.

```
:CONF:CELL:LTE:CSH ON
:CONF:CELL:LTE:CSH?
> ON
```

## :CONFigure:CELLular:LTE:CTYPe

RMC Configuration

### Function

Sets or queries the Uplink Channel configuration when Channel Coding set to RMC

### Command

```
:CONFigure:CELLular:LTE:CTYPe <val>
```

### Query

```
:CONFigure:CELLular:LTE:CTYPe?
```

### Response

```
<val>
```

### Parameter

| | |
|---|---|
| <val> | RMC Channel configuration |
| PUSCH | PUSCH |
| PUCCH | PUCCH |
| Default | PUSCH |

### Examples of Use

To sets the Uplink Channel configuration to PUSCH

```
:CONF:CELL:LTE:CTYP PUSCH
:CONF:CELL:LTE:CTYP?
> PUSCH
```

## :CONFigure:CELLular:LTE:DSS

Delta SS

### Function

Sets or queries the Delta SS (Group Assignment PUSCH).

### Command

```
:CONFigure:CELLular:LTE:DSS <val>
```

### Query

```
:CONFigure:CELLular:LTE:DSS?
```

### Response

```
<val>
```

### Parameter

| | |
|---|---|
| <val> | Delta SS |
| Range | 0 to 29 |
| Resolution | 1 |
| Default | 0 |

### Example of Use

To set the Delta SS to 12:

```
:CONF:CELL:LTE:DSS 12
:CONF:CELL:LTE:DSS?
> 12
```

## :CONFigure:CELLular:LTE:EXTLoss:INDex:SCC1

External Loss Table Index for SCC-1

### Function

Sets and queries the loss correction table index for SCC-1.

### Command

```
:CONFigure:CELLular:LTE:EXTLoss:INDex:SCC1 <index>
```

### Query

```
:CONFigure:CELLular:LTE:EXTLoss:INDex:SCC1?
```

### Response

```
<index>
```

### Parameter

| | |
|---|---|
| <index> | Loss correction table index |
| Range | 0 to 16 |
| Resolution | 1 |
| Default | 0 |

### Details

When the loss correction table index is set to 0, the setting value of the common command ":CALCulate:EXTLoss:TABLe:SETTing" is used.
Refer to Chapter 5 "SCPI Command Reference" in the *MU887000A Transmitter and Receiver Module Operation Manual* for details of the CALCulate:EXTLoss:TABLe:SETTing command.

### Example of Use

To set the loss correction table index for SCC-1 to 1:

```
:CONF:CELL:LTE:EXTL:IND:SCC1 1
:CONF:CELL:LTE:EXTL:IND:SCC1?
>1
```

## :CONFigure:CELLular:LTE:FSTRucture

Frame Structure

### Function

Sets or queries the LTE frame structure

This setting determines the duplex mode.

### Command

```
:CONFigure:CELLular:LTE:FSTRucture <mode>
```

### Query

```
:CONFigure:CELLular:LTE:FSTRucture?
```

### Response

```
<mode>
```

### Parameter

| | |
|---|---|
| <mode> | Frame type (Duplex mode) |
| FDD | Frequency Division Multiplexing |
| TDD | Time Division Multiplexing |
| Default | FDD |

### Details

When only MX887013A is installed, only FDD can be set.

When only MX887014A is installed, only TDD can be set and the default is TDD.

### Example of Use

To set the duplex mode to FDD:

```
:CONF:CELL:LTE:FSTR FDD
:CONF:CELL:LTE:FSTR?
> FDD
```

## :CONFigure:CELLular:LTE:FSTRucture:SCC1

Frame Structure for SCC-1

### Function

Sets or queries the LTE frame structure for SCC-1.

### Command

```
:CONFigure:CELLular:LTE:FSTRucture:SCC1 <mode>
```

### Query

```
:CONFigure:CELLular:LTE:FSTRucture:SCC1?
```

### Response

```
<mode>
```

### Parameter

| | |
|---|---|
| <mode> | Frame type (Duplex mode) for SCC-1 |
| FDD | Frequency Division Multiplexing |
| TDD | Time Division Multiplexing |
| Default | FDD |

### Details

When only MX887013A is installed, only FDD can be set.
When only MX887014A is installed, only TDD can be set and the default is TDD.
When the settings in this command and :CONFigure:CELLular:LTE:FSTRucture are different, the measurement is performed using the settings in :CONFigure:CELLular:LTE:FSTRucture.

### Example of Use

To set the duplex mode for SCC-1 to FDD:

```
:CONF:CELL:LTE:FSTR:SCC1 FDD
:CONF:CELL:LTE:FSTR:SCC1?
> FDD
```

## :CONFigure:CELLular:LTE:FUNDamental:ACLR:SET

Adjacent Channel Leakage Power Ratio Enable and Count

### Function

Enables Adjacent Channel Leakage Power Ratio measurement and sets or queries the measurement count

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:ACLR:SET <on_off>[,<count>]
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:ACLR:SET?
```

### Response

```
<on_off>,<count>
```

### Parameters

| | |
|---|---|
| <on_off> | Enables/disables measurement |
| ON | Executes the measurement |
| OFF | Disables measurement |
| Default | OFF |
| <count> | Measurement count |
| Range | 1 to 200 |
| | 1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

### Examples of Use

To sets the Adjacent Channel Leakage Power Ratio measurement to OFF

```
:CONF:CELL:LTE:FUND:ACLR:SET OFF
:CONF:CELL:LTE:FUND:ACLR:SET?
> OFF
```

### Remarks

The Adjacent Channel Leakage Power Ratio of 1 subframe (1 ms) is measured at each measurement count.

## :CONFigure:CELLular:LTE:FUNDamental:AMITems:OFF

Turn Off All Measurement Items

### Function

Disables all measurement items

### Command

`:CONFigure:CELLular:LTE:FUNDamental:AMITems:OFF`

### Remarks

The operation of this command is similar to turning off all the following command settings.

:CONFigure:CELLular:LTE:FUNDamental:POWer:SET
:CONFigure:CELLular:LTE:FUNDamental:OBW:SET
:CONFigure:CELLular:LTE:FUNDamental:SEMask:SET
:CONFigure:CELLular:LTE:FUNDamental:ACLR:SET
:CONFigure:CELLular:LTE:FUNDamental:MODulation:SET

### Example of Use

To set all measurements to off at one time:
`:CONF:CELL:LTE:FUND:AMIT:OFF`

## :CONFigure:CELLular:LTE:FUNDamental:BAND

Operation band

### Function

Sets or queries the operation band.

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:BAND <band>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:BAND?
```

### Response

```
<band>
```

### Parameter

| | |
|---|---|
| <band> | Operation band |
| Range | 1 to 256 |
| Resolution | 1 |
| Default | 1 |

### Details

This is the parameter for determining the following items:

- Limit line of Spectrum Flatness measurement
- Intra-band/Inter-band (at UL CA)

### Example of Use

To set the operation band to 10:

```
:CONF:CELL:LTE:FUND:BAND 10
:CONF:CELL:LTE:FUND:BAND?
> 10
```

## :CONFigure:CELLular:LTE:FUNDamental:BAND:SCC1

Operation band for SCC-1

### Function

Sets or queries the operation band for SCC-1.

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:BAND:SCC1 <band>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:BAND:SCC1?
```

### Response

```
<band>
```

### Parameter

| | |
|---|---|
| <band> | Operation band for SCC-1 |
| Range | 1 to 256 |
| Resolution | 1 |
| Default | 1 |

### Details

This is the parameter for determining the following items:

- Limit line of Spectrum Flatness measurement
- Intra-band/Inter-band (at UL CA)

### Example of Use

To set the operation band for SCC-1 to 10:

```
:CONF:CELL:LTE:FUND:BAND:SCC1 10
:CONF:CELL:LTE:FUND:BAND:SCC1?
> 10
```

## :CONFigure:CELLular:LTE:FUNDamental:IEMissions:CLFRequency

In-band Emission Carrier Leakage Frequency

### Function

Sets and queries the position of Carrier Leakage Frequency of the UE in the In-band Emission/EVM measurement at Contiguous UL CA.

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:IEMissions:CLFRequency <clf>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:IEMissions:CLFRequency?
```

### Response

```
<clf>
```

### Parameter

| | |
|---|---|
| <clf> | Position of Carrier Leakage Frequency |
| CFR | Center frequency of Aggregated Channel Bandwidth |
| CCC | Center frequency of each CC |
| Default | CFR |

### Details

When the In-band Emission measurement at Contiguous UL CA is performed, “UL Number of RB” for PCC or SCC-1 must be set to 0.
For CFR, the resource block located at the center frequency of Aggregated Channel Bandwidth is treated as the carrier leak frequency and the In-band Emission/EVM measurement is performed.
For CCC, the center frequencies of each CC are treated as the carrier leak frequency and the In-band Emission/EVM measurement is performed.

### Example of Use

To set the position of Carrier Leakage Frequency to CFR:

```
:CONF:CELL:LTE:FUND:IEM:CLFR CFR
:CONF:CELL:LTE:FUND:IEM:CLFR?
> CFR
```

## :CONFigure:CELLular:LTE:FUNDamental:FERange

Frequency Error Range

### Function

Sets and queries the frequency error detection method in the modulation analysis measurement.

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:FERange <value>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:FERange?
```

### Response

```
<value>
```

### Parameter

| | |
|---|---|
| <value> | Frequency Error Range |
| NORMAL | Normal |
| NARROW | Narrow Range |
| Default | NORMAL |

### Details

When Narrow Range is set, the measurement time takes longer, but the high accuracy measurement is performed.

### Example of Use

To set Frequency Error Range to Narrow Range:

```
:CONF:CELL:LTE:FUND:FER NARROW
:CONF:CELL:LTE:FUND:FER?
>NARROW
```

## :CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak

In-band Emissions Carrier Leakage Template

### Function

Set and queries the In-band Emissions Carrier Leakage Template.

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak <tp>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak?
```

### Response

```
<tp>
```

### Parameter

| | |
|---|---|
| <tp> | In-band Emissions Carrier Leakage Template |
| 0DBM | –24.2 dBc (UE output level 0 dBm) |
| 30DBM | –19.2 dBc (UE output level –30 dBm) |
| 40DBM | –9.2 dBc (UE output level –40 dBm) |
| Default | 0DBM |

### Details

The upper limit for the Carrier Leakage defined in 3GPP TS36.521 6.5.2.3 is selected according to this parameter setting.

### Example of Use

To set the In-band Emissions Carrier Leakage Template to 0DBM:

```
:CONF:CELL:LTE:FUND:IEM:TPL 0DBM
:CONF:CELL:LTE:FUND:IEM:TPL?
> 0DBM
```

## :CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak:SCC1

In-band Emissions Carrier Leakage Template for SCC-1

### Function

Set and queries the In-band Emissions Carrier Leakage Template for SCC-1.

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak:SCC1 <tp>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak:SCC1?
```

### Response

```
<tp>
```

### Parameter

| | |
|---|---|
| <tp> | In-band Emissions Carrier Leakage Template |
| 0DBM | –24.2 dBc (UE output level 0 dBm) |
| 30DBM | –19.2 dBc (UE output level –30 dBm) |
| 40DBM | –9.2 dBc (UE output level –40 dBm) |
| Default | 0DBM |

### Details

The upper limit for the Carrier Leakage defined in 3GPP TS36.521 6.5.2.3 is selected according to this parameter setting.

### Example of Use

To set the In-band Emissions Carrier Leakage Template for SCC-1 to 0DBM:

```
:CONF:CELL:LTE:FUND:IEM:TPL:SCC1 0DBM
:CONF:CELL:LTE:FUND:IEM:TPL:SCC1?
> 0DBM
```

## :CONFigure:CELLular:LTE:FUNDamental:LSSearch

Long Span Search

### Function

Enables and queries the Long Span Search

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:LSSearch <on_off>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:LSSearch?
```

### Response

```
<on_off>
```

### Parameter

| | |
|---|---|
| <on_off> | Enables/disables Long Span Search |
| ON | Enables Long Span Search |
| OFF | Disables Long Span Search |
| Default | ON |

### Details

Set this parameter to OFF when the Uplink and Downlink signals are synchronized; set it to ON when they are not synchronized.
The response to the :FETCh:CELular:LTE:MEASurement:STATe query is 5 (Synchronization word not detected), if this parameter to OFF when the Uplink and Downlink signals are not synchronized.
Measurement takes more time when the Long Span Search function is on.

### Example of Use

To enable the Long Span Search:

```
:CONF:CELL:LTE:FUND:LSS ON
:CONF:CELL:LTE:FUND:LSS?
> ON
```

# :CONFigure:CELLular:LTE:FUNDamental:MITem

Measurement Item

## Function

Sets or queries the Measurement Item in Fundamental Measurement.

## Command

```
:CONFigure:CELLular:LTE:FUNDamental:MITem <item>
```

## Query

```
:CONFigure:CELLular:LTE:FUNDamental:MITem?
```

## Response

```
<item>
```

## Parameters

| | |
|---|---|
| <item> | Measurement Item in Fundamental Measurement |
| NORMAL | Normal |
| PWRTEMP | Power Template |
| Default | NORMAL |

## Details

PWRTEMP is valid only when CHCODING is set to RMC.
Note this parameter can be edited even if CHCODING is set to RMC_UL_CA.

## Example of Use

To set the Measurement Item in Fundamental Measurement to Power Template:

```
:CONF:CELL:LTE:FUND:MIT PWRTEMP
:CONF:CELL:LTE:FUND:MIT?
> PWRTEMP
```

4

SCPI Command Reference

## :CONFigure:CELLular:LTE:FUNDamental:MODulation:SET

Modulation Analysis Measurement Enable and Count

### Function

Enables the Modulation Analysis Measurement and sets the measurement count, and queries the settings

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:MODulation:SET <on_off>[,<count>]
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:MODulation:SET?
```

### Response

```
<on_off>,<count>
```

### Parameters

| | |
|---|---|
| <on_off> | Enables/disables measurement |
| ON | Enables measurement |
| OFF | Disables measurement |
| Default | OFF |
| <count> | Measurement count |
| Range | 1 to 200<br>1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

### Example of Use

To enable the Modulation Analysis measurement and set the measurement count to 200:

```
:CONF:CELL:LTE:FUND:MOD:SET ON,200
:CONF:CELL:LTE:FUND:MOD:SET?
> ON,200
```

### Remarks

Modulation analysis is executed for 1 slot (0.5 ms) at each measurement count.

## :CONFigure:CELLular:LTE:FUNDamental:OBW:RATio

Occupied Bandwidth Ratio

### Function

Sets the Occupied Bandwidth measurement occupation ratio, and queries the setting

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:OBW:RATio <ratio>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:OBW:RATio?
```

### Response

```
<ratio>
```

### Parameter

| | |
|---|---|
| <ratio> | Occupied Bandwidth occupation ratio |
| Range | 80.0% to 99.9% |
| Resolution | 0.1 |
| Suffix code | % |
| Default | 99.0 |

### Example of Use

To set the Occupied Bandwidth occupation ratio to 99.0%:

```
:CONF:CELL:LTE:FUND:OBW:RAT 99.0
:CONF:CELL:LTE:FUND:OBW:RAT?
> 99.0
```

## :CONFigure:CELLular:LTE:FUNDamental:OBW:SET

OBW Measurement Enable and Count

### Function

Enables the Occupied Bandwidth measurement and sets the measurement count, or queries the settings

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:OBW:SET <on_off>[,<count>]
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:OBW:SET?
```

### Response

```
<on_off>,<count>
```

### Parameters

| | |
|---|---|
| <on_off> | Enables/disables measurement |
| ON | Enables measurement |
| OFF | Disables measurement |
| Default | OFF |
| <count> | Measurement count |
| Range | 1 to 200 |
| | 1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

### Example of Use

To turn Occupied Bandwidth measurement on and set the measurement count to 50:

```
:CONF:CELL:LTE:FUND:OBW:SET ON,50
:CONF:CELL:LTE:FUND:OBW:SET?
> ON,100
```

### Remarks

The Occupied Bandwidth is measured for 1 subframe (1 ms) at each measurement count.

## :CONFigure:CELLular:LTE:FUNDamental:OFFPwr:UL

Power Template - Transmit OFF power Limit

### Function

Sets the Pass/Fail evaluation limits for Transmit Off Power, and queries the settings.

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:OFFPwr:UL <limit>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:OFFPwr:UL?
```

### Response

<limit>

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | |
|---|---|
| <limit> | Evaluation limits |
| Range | –99.9 to 99.9 dBm |
| Resolution | 0.1 dB |
| Default | –48.5 dBm |

### Example of Use

To set the Pass/Fail evaluation limits to –10.0 dBm:

```
:CONF:CELL:LTE:FUND:OFFP:UL -10.0
:CONF:CELL:LTE:FUND:OFFP:UL?
> -10.0
```

## :CONFigure:CELLular:LTE:FUNDamental:POWer:FMODe

Fast Power Measurement Mode

### Function

Enables Fast Power Measurement mode or queries setting when Channel Coding set to RMC.

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:POWer:FMODe <on_off>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:POWer:FMODe?
```

### Response

```
<on_off>
```

### Parameters

| | |
|---|---|
| <on_off> | Fast Power Measurement Mode |
| ON | Executes Fast Power measurement. |
| OFF | Executes general power measurement. |
| Default | OFF |

### Details

This command is available for FDD. The setup of this command is ignored if set to TDD.
When Fast Power Measurement mode is set to On, only Tx power is measured.
Use the following command to enable/disable power measurement and to set measuring times.
:CONFigure:CELLular:LTE:FUNDamental:POWer:SET

### Example of Use

To set Fast Power Measurement mode to On.

```
:CONF:CELL:LTE:FUND:POW:FMOD ON
:CONF:CELL:LTE:FUND:POW:FMOD?
> ON
```

## :CONFigure:CELLular:LTE:FUNDamental:POWer:SET

Tx Power Measurement Enable and Count

### Function

Enables the Tx Power measurement and sets the measurement count, or queries the settings.

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:POWer:SET <on_off>[,<count>]
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:POWer:SET?
```

### Response

```
<on_off>,<count>
```

### Parameters

| | |
|---|---|
| <on_off> | Enables/disables measurement |
| ON | Enables measurement |
| OFF | Disables measurement |
| Default | OFF |
| <count> | Measurement count |
| Range | 1 to 200<br>1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

### Example of Use

To turn Transmit Power measurement ON and set the measurement count to 200:

```
:CONF:CELL:LTE:FUND:POW:SET ON,200
:CONF:CELL:LTE:FUND:POW:SET?
> ON,200
```

### Remarks

The Tx power is measured for 1 subframe (1 ms) at each measurement count.

## :CONFigure:CELLular:LTE:FUNDamental:SEMask:ASEMission

AdditionalSpectrumEmission

### Function

Sets or queries the network signalled value for additionalSpectrumEmission in SIB2
This setting determines the Spectrum Emission Mask frequency range.

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:ASEMission <sib2_ns>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:ASEMission?
```

### Response

```
<sib2_ns>
```

### Parameter

| | |
|---|---|
| <sib2_ns> | Network signalled value for AdditionalSpectrumEmission |
| NS_01 | NS_01 |
| NS_02 | NS_02 |
| NS_03 | NS_03 |
| : | : |
| NS_30 | NS_30 |
| NS_31 | NS_31 |
| NS_32 | NS_32 |
| Default | NS_01 |

### Example of Use

To set the additionalSpectrumEmission in SIB2 to NS_02:

```
:CONF:CELL:LTE:FUND:SEM:ASEM NS_02
:CONF:CELL:LTE:FUND:SEM:ASEM?
> NS_02
```

## :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B10M

Spectrum Emission Mask Template (10 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 10 MHz channel bandwidth

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B10M <range>,<limit>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B10M? <range>
```

### Response

<limit>

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | |
|---|---|
| <range> | Range |
| Range | 1 to 4 |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |
| <limit> | Limit level |
| Range | –99.9 to 99.9 dBm |
| Resolution | 0.1 dB |
| Suffix code | DBM (uses dBm when omitted) |
| Default | Range 1: –16.5 dBm<br>Range 2: –8.5 dBm<br>Range 3: –11.5 dBm<br>Range 4: –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 10 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:LTE:FUND:SEM:LIM:B10M 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:B10M? 2
> -10.0
```

## :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B15M

Spectrum Emission Mask Template (15 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 15 MHz channel bandwidth

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B15M <range>,<limit>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B15M? <range>
```

### Response

`<limit>`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | |
|---|---|
| <range> | Range |
| Range | 1 to 4 |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |
| <limit> | Limit level |
| Range | –99.9 to 99.9 dBm |
| Resolution | 0.1 dB |
| Suffix code | DBM (uses dBm when omitted) |
| Default | Range 1: –18.5 dBm |
| | Range 2: –8.5 dBm |
| | Range 3: –11.5 dBm |
| | Range 4: –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 15 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:LTE:FUND:SEM:LIM:B15M 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:B15M? 2
> -10.0
```

## :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B1M4

Spectrum Emission Mask Template (1.4 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 1.4 MHz channel bandwidth

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B1M4 <range>,<limit>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B1M4? <range>
```

### Response

<limit>

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | |
|---|---|
| <range> | Range |
| Range | 1 to 4 |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |
| <limit> | Limit level |
| Range | –99.9 to 99.9 dBm |
| Resolution | 0.1 dB |
| Suffix code | DBM (uses dBm when omitted) |
| Default | Range 1: –8.5 dBm<br>Range 2: –8.5 dBm<br>Range 3: –23.5 dBm<br>Range 4: 0.0 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 1.4 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:LTE:FUND:SEM:LIM:B1M4 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:B1M4? 2
> -10.0
```

## :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B20M

Spectrum Emission Mask Template (20 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 20 MHz channel bandwidth

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B20M <range>,<limit>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B20M? <range>
```

### Response

`<limit>`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | |
|---|---|
| <range> | Range |
| Range | 1 to 4 |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |
| <limit> | Limit level |
| Range | –99.9 to 99.9 dBm |
| Resolution | 0.1 dB |
| Suffix code | DBM (uses dBm when omitted) |
| Default | Range 1: –19.5 dBm |
| | Range 2: –8.5 dBm |
| | Range 3: –11.5 dBm |
| | Range 4: –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 20 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:LTE:FUND:SEM:LIM:B20M 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:B20M? 2
> -10.0
```

## :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B3M

Spectrum Emission Mask Template (3 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 3 MHz channel bandwidth

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B3M <range>,<limit>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B3M? <range>
```

### Response

`<limit>`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | |
|---|---|
| <range> | Range |
| Range | 1 to 4 |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |
| <limit> | Limit level |
| Range | –99.9 to 99.9 dBm |
| Resolution | 0.1 dB |
| Suffix code | DBM (uses dBm when omitted) |
| Default | Range 1: –11.5 dBm<br>Range 2: –8.5 dBm<br>Range 3: –23.5 dBm<br>Range 4: 0.0 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 3 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:LTE:FUND:SEM:LIM:B3M 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:B3M? 2
> -10.0
```

## :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B5M

Spectrum Emission Mask Template (5 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 5 MHz channel bandwidth

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B5M <range>,<limit>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B5M? <range>
```

### Response

`<limit>`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | |
|---|---|
| <range> | Range |
| Range | 1 to 4 |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |
| <limit> | Limit level |
| Range | –99.9 to 99.9 dBm |
| Resolution | 0.1 dB |
| Suffix code | DBM (uses dBm when omitted) |
| Default | Range 1: –13.5 dBm<br>Range 2: –8.5 dBm<br>Range 3: –11.5 dBm<br>Range 4: –23.5 dBm |

### Example of Use

To set the limit value of Range 2of Spectrum Emission Mask for 5 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:LTE:FUND:SEM:LIM:B5M 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:B5M? 2
> -10.0
```

## :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB100:RB100

Spectrum Emission Mask Template for Contiguous UL CA (100RB+100RB)

### Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 100RB+100RB.

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB100:RB100
<range>,<limit>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB100:RB100?
<range>
```

### Response

<limit>

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | |
|---|---|
| <range> | Range |
| Range | 1 to 6 |
| Resolution | 1 |
| Default | 1 |
| <limit> | Limit level |
| Range | –99.9 to 99.9 dBm |
| Resolution | 0.1 dB |
| Default | Range 1: –22.5 dBm<br>Range 2: –8.5 dBm<br>Range 3: –11.5 dBm<br>Range 4: –23.5 dBm<br>Range 5: –23.5 dBm<br>Range 6: –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 100RB+100RB:

```
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB100:RB100 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB100:RB100? 2
>-10.0
```

## :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB25:RB100

Spectrum Emission Mask Template for Contiguous UL CA (25RB+100RB)

### Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 25RB+100RB.

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB25:RB100
<range>,<limit>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB25:RB100?
<range>
```

### Response

`<limit>`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | |
|---|---|
| <range> | Range |
| Range | 1 to 6 |
| Resolution | 1 |
| Default | 1 |
| <limit> | Limit level |
| Range | –99.9 to 99.9 dBm |
| Resolution | 0.1 dB |
| Default | Range 1: –20.5 dBm<br>Range 2: –8.5 dBm<br>Range 3: –11.5 dBm<br>Range 4: –23.5 dBm<br>Range 5: –23.5 dBm<br>Range 6: –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 25RB+100RB:

```
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB25:RB100 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB25:RB100? 2
>-10.0
```

## :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB50:RB100

Spectrum Emission Mask Template for Contiguous UL CA (50RB+100RB)

### Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 50RB+100RB.

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB50:RB100
<range>,<limit>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB50:RB100?
<range>
```

### Response

```
<limit>
```

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | |
|---|---|
| <range> | Range |
| Range | 1 to 6 |
| Resolution | 1 |
| Default | 1 |
| <limit> | Limit level |
| Range | –99.9 to 99.9 dBm |
| Resolution | 0.1 dB |
| Default | Range 1: –21.0 dBm<br>Range 2: –8.5 dBm<br>Range 3: –11.5 dBm<br>Range 4: –23.5 dBm<br>Range 5: –23.5 dBm<br>Range 6: –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 50RB+100RB:

```
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB100:RB50 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB100:RB50? 2
>-10.0
```

## :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB75:RB100

Spectrum Emission Mask Template for Contiguous UL CA (75RB+100RB)

### Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 75RB+100RB.

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB75:RB100
<range>,<limit>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB75:RB100?
<range>
```

### Response

```
<limit>
```

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | |
|---|---|
| <range> | Range |
| Range | 1 to 6 |
| Resolution | 1 |
| Default | 1 |
| <limit> | Limit level |
| Range | –99.9 to 99.9 dBm |
| Resolution | 0.1 dB |
| Default | Range 1: –22.0 dBm<br>Range 2: –8.5 dBm<br>Range 3: –11.5 dBm<br>Range 4: –23.5 dBm<br>Range 5: –23.5 dBm<br>Range 6: –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 75RB+100RB:

```
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB75:RB100 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB75:RB100? 2
>-10.0
```

## :CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB75:RB75

Spectrum Emission Mask Template for Contiguous UL CA (75RB+75RB)

### Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 75RB+75RB.

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB75:RB75
<range>,<limit>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB75:RB75?
<range>
```

### Response

```
<limit>
```

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | |
|---|---|
| <range> | Range |
| Range | 1 to 6 |
| Resolution | 1 |
| Default | 1 |
| <limit> | Limit level |
| Range | –99.9 to 99.9 dBm |
| Resolution | 0.1 dB |
| Default | Range 1: –21.0 dBm<br>Range 2: –8.5 dBm<br>Range 3: –11.5 dBm<br>Range 4: –23.5 dBm<br>Range 5: –23.5 dBm<br>Range 6: –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 75RB+75RB:

```
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB75:RB75 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB75:RB75? 2
>-10.0
```

## :CONFigure:CELLular:LTE:FUNDamental:SEMask:SET

Spectrum Emission Mask Enable and Count

### Function

Enables the Spectrum Emission Mask Measurement and sets or queries measurement count

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:SET <on_off>[,<count>]
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:SET?
```

### Response

```
<on_off>,<count>
```

### Parameters

| | |
|---|---|
| <on_off> | Enables/disables the measurement |
| ON | Enables the measurement |
| OFF | Disables the measurement |
| Default | OFF |
| <count> | Measurement count |
| Range | 1 to 200 |
| | 1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

### Example of Use

To enable the Spectrum Emission Mask measurement and set the measurement count to

```
:CONF:CELL:LTE:FUND:SEM:SET ON,100
:CONF:CELL:LTE:FUND:SEM:SET?
> ON,100
```

### Remarks

The Spectrum Emission Mask is measured for 1 subframe (1 ms) at each measurement count.

## :CONFigure:CELLular:LTE:FUNDamental:TEMPlate:SET

Power Template measurement Enable and Count

### Function

Enables the Power Template Measurement and sets the measurement count, and queries the settings. When setting Measurement Item to PWRTEMP, it is turned On automatically.

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:TEMPlate:SET <on_off>[,<count>]
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:TEMPlate:SET?
```

### Response

```
<on_off>,<count>
```

### Parameters

| | |
|---|---|
| <on_off> | Enables/disables measurement |
| ON | Enables measurement |
| OFF | Disables measurement |
| Default | OFF |
| <count> | Measurement count |
| Range | 1 to 200 |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

### Example of Use

To enable Power template measurement and set the measurement count to 100:

```
:CONF:CELL:LTE:FUND:TEMP:SET ON,100
:CONF:CELL:LTE:FUND:TEMP:SET?
> ON,100
```

## :CONFigure:CELLular:LTE:FUNDamental:TEMPlate:WDRange

Power Template - Wide Dynamic Range

### Function

Enables the wide dynamic range function for the Power Template measurement, and queries the settings.

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:TEMPlate:WDRange <on_off>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:TEMPlate:WDRange?
```

### Response

```
<on_off>
```

### Parameters

| | |
|---|---|
| <on_off> | Enables/disables the wide dynamic range function |
| ON | Enables the wide dynamic range function |
| OFF | Disables the wide dynamic range function |
| Default | ON |

### Example of Use

To enable the wide dynamic range function:

```
:CONF:CELL:LTE:FUND:TEMP:WDR ON
:CONF:CELL:LTE:FUND:TEMP:WDR?
> ON
```

## :CONFigure:CELLular:LTE:FUNDamental:TENVironment

Test Environment

### Function

Sets or queries the test environment.

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:TENVironment <env>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:TENVironment?
```

### Response

```
<env>
```

### Parameters

| | |
|---|---|
| <env> | Test Environment |
| NORMAL | Normal |
| EXTREME | Extreme |
| Default | NORMAL |

### Details

This is a parameter that determines the threshold line for Spectrum Flatness measurement. The test environment is defined in 3GPP TS36.521-1. The following values depend on the test environment settings.

• When the test environment is NORMAL

| | |
|---|---|
| Border of Range1/Range2 | 3 MHz |
| RP1 limit level | 5.4 dB |
| RP2 limit level | 9.4 dB |
| RP12 limit level | 6.4 dB |
| RP21 limit level | 8.4 dB |

• When the test environment is EXTREME

| | |
|---|---|
| Border of Range1/Range2 | 5 MHz |
| RP1 limit level | 5.4 dB |
| RP2 limit level | 13.4 dB |
| RP12 limit level | 7.4 dB |
| RP21 limit level | 11.4 dB |

### Example of Use

To set the test environment to EXTREME:

```
:CONF:CELL:LTE:FUND:TENV EXTREME
:CONF:CELL:LTE:FUND:TENV?
> EXTREME
```

## :CONFigure:CELLular:LTE:FUNDamental:TMASk:GENeral:TOL

Power Template - ON power tolerance Limit

### Function

Sets the Pass/Fail evaluation limits for On Power tolerance, and queries the settings.

### Command

```
:CONFigure:CELLular:LTE:FUNDamental:TMASk:GENeral:TOL <limit>
```

### Query

```
:CONFigure:CELLular:LTE:FUNDamental:TMASk:GENeral:TOL?
```

### Response

```
<limit>
```

| | |
|---|---|
| Unit | dB |
| Resolution | 0.1 dB |

### Parameters

| | |
|---|---|
| <limit> | Evaluation limits |
| Range | 0.0 to 99.9 dBm |
| Resolution | 0.1 dB |
| Default | 7.5 dB |

### Example of Use

To set the Pass/Fail evaluation limits to 10.0 dBm:

```
:CONF:CELL:LTE:FUND:TMASk:GEN:TOL 10.0
:CONF:CELL:LTE:FUND:TMASk:GEN:TOL?
> 10.0
```

## :CONFigure:CELLular:LTE:GHOPping

Group Hopping

### Function

Enables and queries the Group hopping.

### Command

```
:CONFigure:CELLular:LTE:GHOPping <on_off>
```

### Query

```
:CONFigure:CELLular:LTE:GHOPping?
```

### Response

```
<on_off>
```

### Parameter

| | |
|---|---|
| <on_off> | Enables/disables Group hopping |
| ON | Enables Group hopping |
| OFF | Disables Group hopping |
| Default | ON |

### Example of Use

To enable Group hopping:

```
:CONF:CELL:LTE:GHOP ON
:CONF:CELL:LTE:GHOP?
> ON
```

## :CONFigure:CELLular:LTE:MCARrier

Measurement Carrier

### Function

Sets and queries the Component Carrier for measurement at Inter-band UL CA.

### Command

`:CONFigure:CELLular:LTE:MCARrier <carrier>`

### Query

`:CONFigure:CELLular:LTE:MCARrier?`

### Response

`<carrier>`

### Parameter

| | |
|---|---|
| <carrier> | Component Carrier for measurement |
| PCC | PCC |
| SCC1 | SCC-1 |
| Default | PCC |

### Example of Use

To set the Component Carrier for measurement to PCC:

```
:CONF:CELL:LTE:MCAR PCC
:CONF:CELL:LTE:MCAR?
>PCC
```

## :CONFigure:CELLular:LTE:MODulation:MSCHeme

UL RMC Modulation

### Function

Sets or queries the Uplink RMC modulation method

### Command

```
:CONFigure:CELLular:LTE:MODulation:MSCHeme <ul_rmc_mod>
```

### Query

```
:CONFigure:CELLular:LTE:MODulation:MSCHeme?
```

### Response

```
<ul_rmc_mod>
```

### Parameter

| | |
|---|---|
| <ul_rmc_mod> | Uplink RMC modulation mode |
| QPSK | QPSK mode |
| 16QAM | 16QAM mode |
| 64QAM | 64QAM mode |
| Default | QPSK |

### Example of Use

To set the Uplink RMC modulation method to 16QAM:

```
:CONF:CELL:LTE:MOD:MSCH 16QAM
:CONF:CELL:LTE:MOD:MSCH?
> 16QAM
```

## :CONFigure:CELLular:LTE:MODulation:MSCHeme:SCC1

UL RMC Modulation for SCC-1

### Function

Sets and queries the modulation method used for RMC of the uplink signal for SCC-1.

### Command

```
:CONFigure:CELLular:LTE:MODulation:MSCHeme:SCC1 <ul_rmc_mod>
```

### Query

```
:CONFigure:CELLular:LTE:MODulation:MSCHeme:SCC1?
```

### Response

```
<ul_rmc_mod>
```

### Parameter

| | |
|---|---|
| <ul_rmc_mod> | Uplink RMC modulation mode for SCC-1 |
| QPSK | QPSK mode |
| 16QAM | 16QAM mode |
| 64QAM | 64QAM mode |
| Default | QPSK |

### Example of Use

To set the Uplink RMC modulation method for SCC-1 to 16QAM:

```
:CONF:CELL:LTE:MOD:MSCH:SCC1 16QAM
:CONF:CELL:LTE:MOD:MSCH:SCC1?
> 16QAM
```

## :CONFigure:CELLular:LTE:RBALlocation:NRB

UL RMC Number of RB

### Function

Sets or queries the number of assigned RBs (Resource Blocks) at Uplink RMC

### Command

```
:CONFigure:CELLular:LTE:RBALlocation:NRB <ul_rmc_rb>
```

### Query

```
:CONFigure:CELLular:LTE:RBALlocation:NRB?
```

### Response

```
<ul_rmc_rb>
```

### Parameter

| | | |
|---|---|---|
| <ul_rmc_rb> | Number of RBs | |
| Range | Number defined by equation of (2^X) × (3^Y) × (5^Z) and falling within following range where (X, Y, Z ≥ 0, integer) | |
| | 0 to 6 | When channel bandwidth is 1.4 MHz |
| | 0 to 15 | When channel bandwidth is 3 MHz |
| | 0 to 25 | When channel bandwidth is 5 MHz |
| | 0 to 50 | When channel bandwidth is 10 MHz |
| | 0 to 75 | When channel bandwidth is 15 MHz |
| | 0 to 100 | When channel bandwidth is 20 MHz |
| Resolution | 1 | |
| Default | 25 | |

### Details

When the In-band Emission measurement at Contiguous UL CA is performed, set 0 to the number of RBs for CC where the signal is not output.

Even when Modulation Analysis is set to ON, the measurement is not performed under the following conditions.

- Contiguous UL CA
- At Carrier Frequency is not specified at Carrier Leakage Frequency.
- The number of RBs is set to 0.

### Example of Use

To set the number of assigned RBs at Uplink RMC to 6

```
:CONF:CELL:LTE:RBAL:NRB 6
:CONF:CELL:LTE:RBAL:NRB?
> 6
```

## :CONFigure:CELLular:LTE:RBALlocation:NRB:SCC1

UL RMC Number of RB for SCC-1

### Function

Sets or queries the number of assigned RBs (Resource Blocks) at Uplink RMC for SCC-1.

### Command

```
:CONFigure:CELLular:LTE:RBALlocation:NRB:SCC1 <ul_rmc_rb>
```

### Query

```
:CONFigure:CELLular:LTE:RBALlocation:NRB:SCC1?
```

### Response

```
<ul_rmc_rb>
```

### Parameter

| | | |
|---|---|---|
| <ul_rmc_rb> | Number of RBs for SCC-1 | |
| Range | Number defined by equation of (2^X) × (3^Y) × (5^Z) and falling within following range where (X, Y, Z ≥ 0, integer) | |
| | 0 to 6 | When channel bandwidth is 1.4 MHz |
| | 0 to 15 | When channel bandwidth is 3 MHz |
| | 0 to 25 | When channel bandwidth is 5 MHz |
| | 0 to 50 | When channel bandwidth is 10 MHz |
| | 0 to 75 | When channel bandwidth is 15 MHz |
| | 0 to 100 | When channel bandwidth is 20 MHz |
| Resolution | 1 | |
| Default | 25 | |

### Details

When the In-band Emission measurement at Contiguous UL CA is performed, set 0 to the number of RBs for CC where the signal is not output.

Even when Modulation Analysis is set to ON, the measurement is not performed under the following conditions.

- Contiguous UL CA
- At Carrier Frequency is not specified at Carrier Leakage Frequency.
- The number of RBs is set to 0.

### Example of Use

To set the number of assigned RBs at Uplink RMC to 6

```
:CONF:CELL:LTE:RBAL:NRB:SCC1 6
:CONF:CELL:LTE:RBAL:NRB:SCC1?
> 6
```

## :CONFigure:CELLular:LTE:RBALlocation:ORB

UL RMC Starting RB

### Function

Sets or queries the RB start number for Uplink RMC

### Command

```
:CONFigure:CELLular:LTE:RBALlocation:ORB <ulrb>
```

### Query

```
:CONFigure:CELLular:LTE:RBALlocation:ORB?
```

### Response

```
<ulrb>
```

### Parameter

<ulrb> RB start number

Range 0 to (RBmax – RBn)

| | |
|---|---|
| RBmax = 6 | When channel bandwidth is 1.4 MHz |
| RBmax = 15 | When channel bandwidth is 3 MHz |
| RBmax = 25 | When channel bandwidth is 5 MHz |
| RBmax = 50 | When channel bandwidth is 10 MHz |
| RBmax = 75 | When channel bandwidth is 15 MHz |
| RBmax = 100 | When channel bandwidth is 20 MHz |

RBn is set using the :CONFigure:CELLular:LTE:RBALlocation:NRB command.

Resolution 1

Default 0

### Details

The RB start number for the Uplink signal is reset to 0 when the channel bandwidth is updated.

Also when the RB start number for the Uplink signal is updated, the RB start number for the Uplink RMC is changed to 0.

### Example of Use

To set the RB start number for Uplink RMC to 6:

```
:CONF:CELL:LTE:RBAL:ORB 6
:CONF:CELL:LTE:RBAL:ORB?
> 6
```

## :CONFigure:CELLular:LTE:RBALlocation:ORB:SCC1

UL RMC Starting RB for SCC-1

### Function

Sets or queries the RB start number for Uplink RMC for SCC-1

### Command

```
:CONFigure:CELLular:LTE:RBALlocation:ORB:SCC1 <ulrb>
```

### Query

```
:CONFigure:CELLular:LTE:RBALlocation:ORB:SCC1?
```

### Response

```
<ulrb>
```

### Parameter

| | | |
|---|---|---|
| <ulrb> | RB start number for SCC-1 | |
| Range | 0 to (RBmax – RBn) | |
| | RBmax = 6 | When channel bandwidth is 1.4 MHz |
| | RBmax = 15 | When channel bandwidth is 3 MHz |
| | RBmax = 25 | When channel bandwidth is 5 MHz |
| | RBmax = 50 | When channel bandwidth is 10 MHz |
| | RBmax = 75 | When channel bandwidth is 15 MHz |
| | RBmax = 100 | When channel bandwidth is 20 MHz |
| | RBn is set using the :CONFigure:CELLular:LTE:RBALlocation:NRB:SCC1 command. | |
| Resolution | 1 | |
| Default | 0 | |

### Details

When the channel bandwidth for SCC-1 is updated, the start RB number for SCC-1 is reset to 0. Also when the RB number setting value at Uplink RMC is updated, the start RB number is reset to 0.

### Example of Use

To set the RB start number for Uplink RMC to 6:

```
:CONF:CELL:LTE:RBAL:ORB:SCC1 6
:CONF:CELL:LTE:RBAL:ORB:SCC1?
> 6
```

## :CONFigure:CELLular:LTE:RBCQi

nRB-CQI

### Function

Sets or queries nRB-CQI setting

### Command

```
:CONFigure:CELLular:LTE:RBCQi <value>
```

### Query

```
:CONFigure:CELLular:LTE:RBCQi?
```

### Response

```
<value>
```

### Parameter

| | |
|---|---|
| <value> | nRB-CQI |
| Range | 0 to 98 |
| Resolution | 1 |
| Default | 2 |

### Details

The RB number for the send Uplink PUCCH signal is set.

### Example of Use

To set nRB-CQI to 3

```
:CONF:CELL:LTE:RBCQ 3
:CONF:CELL:LTE:RBCQ?
> 3
```

## :CONFigure:CELLular:LTE:ULDL

Uplink Downlink Configuration

### Function

Sets or queries the Uplink/Downlink signal configuration of TDD.

### Command

```
:CONFigure:CELLular:LTE:ULDL <conf>
```

### Query

```
:CONFigure:CELLular:LTE:ULDL?
```

### Response

```
<conf>
```

### Parameter

| | |
|---|---|
| <conf> | Uplink Downlink Signal Configuration |
| Range | 0 to 6 |
| Resolution | 1 |
| Default | 1 |

### Example of Use

To set the Uplink/Downlink signal configuration to 1:

```
:CONF:CELL:LTE:ULDL 1
:CONF:CELL:LTE:ULDL?
> 1
```

## :CONFigure:CELLular:MEASurement:RFSettings:DLCHannel

Downlink Channel

### Function

Sets or queries the EARFCN (E-UTRA Absolute Radio Frequency Channel Number) Downlink Channel.

### Command

```
:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel <dl_ch>
```

### Query

```
:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel?
```

### Response

```
<dl_ch>
```

### Parameter

| | |
|---|---|
| <dl_ch> | Downlink Channel |
| Range | 0 to 262143 |
| Resolution | 1 |
| Default | 300 |

### Details

When the Downlink Channel parameter is updated, the related Uplink Channel parameter and Downlink Frequency and frame structure are changed accordingly.
For the relationship between the parameter and frequency settings of channels refer to Table 2.1.6-3 "Relationship between Uplink Channel Number and Downlink Channel Number" and to Table 2.1.6-4 "E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation".

### Example of Use

To set the Downlink Channel to 1100:

```
:CONF:CELL:MEAS:RFS:DLCH 1100
:CONF:CELL:MEAS:RFS:DLCH?
> 1100
```

## :CONFigure:CELLular:MEASurement:RFSettings:DLCHannel:SCC1

Downlink Channel for SCC-1

### Function

Sets or queries the Downlink Channel for SCC-1.

### Command

```
:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel:SCC1 <dl_ch>
```

### Query

```
:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel:SCC1?
```

### Response

```
<dl_ch>
```

### Parameter

| | |
|---|---|
| <dl_ch> | Downlink Channel for SCC-1 |
| Range | 0 to 262143 |
| Resolution | 1 |
| Default | 300 |

### Details

When the Downlink Channel is updated, the related Uplink Channel, Downlink Frequency, Uplink Frequency and Frame structure parameter are changed accordingly.
For the relationship between the parameter and frequency settings of channels refer to Table 2.1.6-3 “Relationship between Uplink Channel Number and Downlink Channel Number” and to Table 2.1.6-4 “E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation”.

### Example of Use

To set the Downlink Channel for SCC-1 to 1100:

```
:CONF:CELL:MEAS:RFS:DLCH:SCC1 1100
:CONF:CELL:MEAS:RFS:DLCH:SCC1?
> 1100
```

## :CONFigure:CELLular:MEASurement:RFSettings:FREQuency

Uplink Frequency

### Function

Sets or queries the Uplink frequency

### Command

```
:CONFigure:CELLular:MEASurement:RFSettings:FREQuency
<ul_freq>[,<ul_freq_scc1>]
```

### Query

```
:CONFigure:CELLular:MEASurement:RFSettings:FREQuency? [<ALL>]
```

### Response

```
<ul_fleq>,<ul_freq_scc1>
```

| | |
|---|---|
| Unit | Hz |
| Resolution | 1 Hz |

### Parameter

| | |
|---|---|
| <ul_freq> | Uplink frequency |
| <freq_scc1> | Uplink frequency for SCC-1 |
| Range | 400.000000 to 3800.000000 MHz |
| | 400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 1 Hz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted) |
| Default | 1950.000000 MHz (<ul_freq>) |
| | 1969.800000 MHz (<freq_scc1>) |

### Details

This setting corresponds to the UE Tx frequency setting.
Updating the setting of the Uplink frequency for PCC does not affect the setting of the Uplink Channel for PCC.
Updating the setting of the Uplink frequency for SCC-1 does not affect the setting of the Uplink Channel for SCC-1.
When the query argument <ALL> is omitted, the response is <ul_freq> only.

### Example of Use

To set the Uplink frequency for PCC to 1950 MHz and the Uplink frequency for SCC-1 to 1969.8 MHz:

```
:CONF:CELL:MEAS:RFS:FREQ 1950MHZ,1969.8MHZ
:CONF:CELL:MEAS:RFS:FREQ? ALL
>1950000000,1969800000
```

## :CONFigure:CELLular:MEASurement:RFSettings:FREQuency:SCC1

Uplink Frequency for SCC-1

### Function

Sets or queries the Uplink frequency for SCC-1

### Command

```
:CONFigure:CELLular:MEASurement:RFSettings:FREQuency:SCC1 <ul_freq>
```

### Query

```
:CONFigure:CELLular:MEASurement:RFSettings:FREQuency:SCC1?
```

### Response

```
<ul_fleq>
```

| | |
|---|---|
| Unit | Hz |
| Resolution | 1 Hz |

### Parameter

| | |
|---|---|
| <ul_freq> | Uplink frequency for SCC-1 |
| Range | 400.000000 to 3800.000000 MHz<br>400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 1 Hz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted) |
| Default | 1969.800000 MHz |

### Details

This setting corresponds to the UE Tx frequency setting.
Updating the setting of the Uplink frequency for SCC-1 does not affect the setting of the Uplink Channel for SCC-1.

### Example of Use

To set the Uplink frequency for SCC-1 to 1969.8 MHz:

```
:CONF:CELL:MEAS:RFS:FREQ:SCC1 1969.8MHZ
:CONF:CELL:MEAS:RFS:FREQ:SCC1?
>1969800000
```

## :CONFigure:CELLular:MEASurement:RFSettings:LEVel

Input Level

### Function

Sets or queries the input level of the MU887000A connector

### Command

```
:CONFigure:CELLular:MEASurement:RFSettings:LEVel <level>[,<level_scc1>]
```

### Query

```
:CONFigure:CELLular:MEASurement:RFSettings:LEVel? [<ALL>]
```

### Response

```
<level>,<level_scc1>
```

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameter

| | |
|---|---|
| <level> | Input level for PCC |
| <level_scc1> | Input level for SCC-1 |
| Range | –65.0 to +35.0 dBm (Port 1/Port 2) |
| | –65.0 to +25.0 dBm (Port 3/Port 4) |
| Resolution | 0.1 dB |
| Suffix code | DBM (uses dBm when omitted) |
| Default | –1.0 dBm |

### Details

The setting range varies according to the input port setting.
When the Cable Loss Correction is ON, the cable loss is added to the input level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –60.0 to +40.0 dBm.
When the query argument <ALL> is omitted, the response is <level> only.

### Example of Use

To set the input level for PCC to –10.0 dBm and the input level for SCC-1 to –15.0 dBm:

```
:CONF:CELL:MEAS:RFS:LEV -10.0,-15.0
:CONF:CELL:MEAS:RFS:LEV? ALL
>-10.0,-15.0
```

### Related Commands

[:ROUTe]:EXTLoss:TABLe:SWITch
:CALCulate:EXTLoss:TABLe:SETTing
:CALCulate:EXTLoss:TABLe:VALue
For details of the commands, refer to Chapter 5 “SCPI Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

## :CONFigure:CELLular:MEASurement:RFSettings:LEVel:SCC1

Input Level for SCC-1

### Function

Sets or queries the input level of the MU887000A connector for SCC-1

### Command

```
:CONFigure:CELLular:MEASurement:RFSettings:LEVel:SCC1 <level>
```

### Query

```
:CONFigure:CELLular:MEASurement:RFSettings:LEVel:SCC1?
```

### Response

```
<level>
```

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameter

| | |
|---|---|
| <level> | Input level for SCC-1 |
| Range | –65.0 to +35.0 dBm (Port 1/Port 2) |
| | –65.0 to +25.0 dBm (Port 3/Port 4) |
| Resolution | 0.1 dB |
| Suffix code | DBM (uses dBm when omitted) |
| Default | –1.0 dBm |

### Details

The setting range varies according to the input port setting.
When the Cable Loss Correction is ON, the cable loss is added to the input level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –60.0 to +40.0 dBm.

### Example of Use

To set the input level for SCC-1 to –10.0 dBm.

```
:CONF:CELL:MEAS:RFS:LEV:SCC1 -10.0
:CONF:CELL:MEAS:RFS:LEV:SCC1?
>-10.0
```

### Related Commands

[:ROUTe]:EXTLoss:TABLe:SWITch
:CALCulate:EXTLoss:TABLe:SETTing
:CALCulate:EXTLoss:TABLe:VALue
For details of the commands, refer to Chapter 5 "SCPI Command Reference" in the *MU887000A TRX Test Module Operation Manual*.

## :CONFigure:CELLular:MEASurement:RFSettings:ULCHannel

Uplink Channel

### Function

Sets or queries the Uplink Channel

### Command

```
:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel
<ul_ch>[,<ul_ch_scc1>]
```

### Query

```
:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel? [<ALL>]
```

### Response

```
<ul_ch>,<ul_ch_scc1>
```

### Parameter

| | |
|---|---|
| <ul_ch> | Uplink Channel for PCC |
| <ul_ch_scc1> | Uplink Channel for SCC-1 |
| Range | 0 to 262143 |
| Resolution | 1 |
| Default | 18300 |

### Details

Changing the setting of the Uplink Channel for PCC changes the settings of the Downlink Channel, Uplink frequency for PCC, Downlink frequency, and frame structure.
Changing the setting of the Uplink Channel for SCC-1 changes the Uplink frequency for SCC-1.
When the query argument <ALL> is omitted, the response is <ul_ch> only.
For the relationship between the parameter and frequency settings of channels refer to Table 2.1.6-3 “Relationship between Uplink Channel Number and Downlink Channel Number” and to Table 2.1.6-4 “E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation”.

### Example of Use

To set the Uplink Channel for PCC to 39750 and the Uplink Channel for SCC-1 to 39948:

```
:CONF:CELL:MEAS:RFS:ULCH 39750,39948
:CONF:CELL:MEAS:RFS:ULCH? ALL
> 39750,39948
```

## :CONFigure:CELLular:MEASurement:RFSettings:ULCHannel:SCC1

Uplink Channel for SCC-1

### Function

Sets or queries the Uplink Channel for SCC-1

### Command

```
:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel:SCC1 <ul_ch>
```

### Query

```
:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel:SCC1?
```

### Response

```
<ul_ch>
```

### Parameter

| | |
|---|---|
| <ul_ch> | Uplink Channel for SCC-1 |
| Range | 0 to 262143 |
| Resolution | 1 |
| Default | 18300 |

### Details

Changing the setting of the Uplink Channel for SCC-1 changes the Uplink frequency for SCC-1.

For the relationship between the parameter and frequency settings of channels refer to Table 2.1.6-3 “Relationship between Uplink Channel Number and Downlink Channel Number” and to Table 2.1.6-4 “E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation”.

### Example of Use

To set the Uplink Channel for SCC-1 to 39948:

```
:CONF:CELL:MEAS:RFS:ULCH:SCC1 39948
:CONF:CELL:MEAS:RFS:ULCH:SCC1?
> 39948
```

## :FETCh:CELLular:LTE:FUNDamental:ACLR?

ACLR Result

### Function

Queries the result of Adjacent Channel Leakage Power Ratio measurement

### Query

```
:FETCh:CELLular:LTE:FUNDamental:ACLR? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg0>,<avg1>,<avg2>,<avg3>,<avg4>,<avg5>,<max0>,<max1>,<max2>,<max3>,<max4>,<max5>,<min0>,<min1>,<min2>,<min3>,<min4>,<min5>
```

| | |
|---|---|
| <avg> | Adjacent Channel Leakage Power Ratio (Average) |
| <max> | Adjacent Channel Leakage Power Ratio (Maximum) |
| <min> | Adjacent Channel Leakage Power Ratio (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

```
<aclr0>,<aclr1>,<aclr2>,<aclr3>,<aclr4>,<aclr5>
```

| | |
|---|---|
| <aclr> | Measurement result of Adjacent Channel Leakage Power Ratio corresponding to storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

The responses are sent in the following order.
E-UTRA ACLR LOW,
E-UTRA ACLR UP,
UTRA ACLR2 LOW,
UTRA ACLR1 LOW,
UTRA ACLR1 UP,
UTRA ACLR2 UP

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.5.2-1 Measurement Items of Adjacent Channel Leakage Power Ratio" for details. |

| | |
|---|---|
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Details

The measurement bandwidth of the target adjacent channel varies with the channel bandwidth setting.
Refer to Table 2.5.1-1 “Adjacent Channel Measurement Bandwidth (MHz)” for details.

Example of Use

To the query average of ACLR measurement result:

```
:FETC:CELL:LTE:FUND:ACLR? AVG
> 3.00,3.01,3.02,3.03,3.04,3.05
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:CARLeakage?

Carrier Leakage Result

### Function

Queries the Carrier Leak measurement result at Modulation Analysis

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:CARLeakage? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | | |
|---|---|---|
| <avg> | | Measurement result (Average) |
| <max> | | Measurement result (Maximum) |
| <min> | | Measurement result (Minimum) |
| | Unit | dBc |
| | Resolution | 0.01 dB |

When <mode> ≠ TTL,

```
<cleakage>
```

| | | |
|---|---|---|
| <cleakage> | | Measurement result corresponding to storage mode |
| | Unit | dBc |
| | Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of Carrier Leakage measurement result:

```
:FETC:CELL:LTE:FUND:MOD:CARL? AVG
> 1.05
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:CFRequency?

Carrier Frequency Result

### Function

Queries the result of Carrier Frequency measurement in Modulation Analysis

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:CFRequency? [<cc>]
```

### Response

```
<freq>
```

| | |
|---|---|
| <freq> | Carrier frequency |
| Unit | Hz |
| Resolution | 1 Hz |

### Parameter

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the result of Carrier Frequency measurement:

```
:FETC:CELL:LTE:FUND:MOD:CFR?
> 1951000000
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:ITEM?

Spectrum Flatness Measured Item

### Function

Queries whether each spectrum flatness measurement items is measured or not.

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:ITEM? [<cc>]
```

### Response

```
<flag>
```

<flag> Measured/Not measured flag (0 to 3)

Returns the sum of the following measurement items.

| | |
|---|---|
| 0 | Not measured |
| 1 | ≥ 3 MHz area (When Test Environment is Normal)<br>≥ 5 MHz area (When Test Environment is Extreme) |
| 2 | < 3 MHz area (When Test Environment is Normal)<br>< 5 MHz area (When Test Environment is Extreme) |

### Parameter

<cc> Component Carrier

Used at UL CA and omitted at non CA.

Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.

| | |
|---|---|
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query whether each spectrum flatness measurement items is measured or not.

```
:FETC:CELL:LTE:FUND:MOD:ESFL:ITEM?
> 2
```

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SCPI Command Reference

## :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:JUDGement?

Spectrum Flatness Judgement

### Function

Queries the judgement of Spectrum Flatness measurement result.

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:JUDGement? [<cc>]
```

### Response

```
<judgement>
```

| | |
|---|---|
| <judgement> | Judgement |
| PASS | Pass |
| FAIL | Fail |
| – | Not measured |

### Parameter

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the judgement of Spectrum Flatness measurement result:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:JUDG?
> PASS
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1?

Spectrum Flatness (≥3 MHz) Result

### Function

Queries the worst value in Spectrum Flatness measurement result in Range 1

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1? [<cc>]
```

### Response

```
<worst>
```

| | |
|---|---|
| <worst> | Measurement result |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The worst value should be either the maximum or minimum of the Flatness measurement results in Range 1, whichever is the larger absolute value.

### Example of Use

To query the worst value in Spectrum Flatness measurement result in Range 1:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:R1?
```

> 0.04

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SCPI Command Reference

## :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1M?

Spectrum Flatness (≥3 MHz (R1 –)) Result

### Function

Queries the minimum value in Spectrum Flatness measurement result in Range 1

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1M? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

`<avg>,<max>,<min>`

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

`<sflatness>`

| | |
|---|---|
| <sflatness> | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of minimum value in Spectrum Flatness measurement result in Range 1:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:R1M? AVG
> 0.04
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1P?

Spectrum Flatness (≥3 MHz (R1 +)) Result

### Function

Queries the maximum value in Spectrum Flatness measurement result in Range 1

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1P? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

```
<sflatness>
```

| | |
|---|---|
| <sflatness> | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of maximum value in Spectrum Flatness measurement result in Range 1:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:R1P? AVG
> 0.04
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2?

Spectrum Flatness (<3 MHz) Result

### Function

Queries the worst value in Spectrum Flatness measurement result in Range 2

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2? [<cc>]
```

### Response

```
<worst>
```

| | |
|---|---|
| <worst> | Measurement result |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The worst value should be either the maximum or minimum of the Flatness measurement results in Range 2, whichever is the larger absolute value.

### Example of Use

To query the worst value in Spectrum Flatness measurement result in Range 2:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:R2?
> 0.04
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2M?

Spectrum Flatness (<3 MHz (R2 –)) Result

### Function

Queries the minimum value in Spectrum Flatness measurement result in Range 2

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2M? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

```
<sflatness>
```

| | |
|---|---|
| <sflatness> | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of the minimum value in Spectrum Flatness measurement result in Range 2:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:R2M? AVG
> 0.04
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2P?

Spectrum Flatness (<3 MHz (R2 +)) Result

### Function

Queries the maximum value in the result of Spectrum Flatness measurement in Range 2

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2P? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

```
<sflatness>
```

| | |
|---|---|
| <sflatness> | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of the maximum value in Spectrum Flatness measurement result in Range 2:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:R2P? AVG
> 0.04
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP1?

Spectrum Flatness (≥3 MHz (RP1)) Result

### Function

Queries the ripple value in Spectrum Flatness measurement result in Range 1

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP1? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

```
<sflatness>
```

| | |
|---|---|
| <sflatness> | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of ripple value in Spectrum Flatness measurement result in Range 1:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:RP1? AVG
> 0.04
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP12?

Spectrum Flatness (RP12) Result

### Function

Queries the difference between maximum value in Range 1 and minimum value in Range 2 of Spectrum Flatness measurement result

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP12? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

```
<sflatness>
```

| | |
|---|---|
| <sflatness> | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of difference between maximum value in Range 1 and minimum value in Range 2:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:RP12? AVG
> 0.04
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP2?

Spectrum Flatness (<3 MHz (RP2)) Result

### Function

Queries the ripple value in Spectrum Flatness measurement result in Range 2

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP2? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

```
<sflatness>
```

| | |
|---|---|
| <sflatness> | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of ripple value in Spectrum Flatness measurement result in Range 2:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:RP2? AVG
> 0.04
```

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SCPI Command Reference

## :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP21?

Spectrum Flatness (RP21) Result

### Function

Queries the difference between maximum value in Range 2 and minimum value in Range 1 of Spectrum Flatness measurement result

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP21? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

```
<sflatness>
```

| | |
|---|---|
| <sflatness> | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of difference between maximum value in Range 2 and minimum value in Range 12:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:RP21? AVG
> 0.04
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:EVM?

EVM Result

### Function

Queries the EVM measurement result of Modulation Analysis

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:EVM? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | % |
| Resolution | 0.01% |

When <mode> ≠ TTL,

```
<evm>
```

| | |
|---|---|
| <evm> | Measurement result in specified Storage mode |
| Unit | % |
| Resolution | 0.01% |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of EVM measurement result:

```
:FETC:CELL:LTE:FUND:MOD:EVM? AVG
> 1.50
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor?

Carrier Frequency Error Result

### Function

Queries the Frequency Error measurement result

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg_ppm>,<avg_Hz>,<max_ppm>,<max_Hz>,<min_ppm>,<min_Hz>
```

| | |
|---|---|
| <avg_ppm> | Measurement result in ppm (Average) |
| <max_ppm> | Measurement result in ppm (Maximum) |
| <min_ppm> | Measurement result in ppm (Minimum) |
| Unit | ppm |
| Resolution | 0.01 ppm |
| <avg_Hz> | Measurement result in Hz (Average) |
| <max_Hz> | Measurement result in Hz (Maximum) |
| <min_Hz> | Measurement result in Hz (Minimum) |
| Unit | ppm |
| Resolution | 0.01 ppm |

When <mode> ≠ TTL,

```
<freq_ppm>,<freq_Hz>
```

| | |
|---|---|
| <freq_ppm> | Measurement result in ppm in specified Storage mode |
| Unit | ppm |
| Resolution | 0.01 ppm |
| <freq_Hz> | Measurement result in Hz in specified Storage mode |
| Unit | Hz |
| Resolution | 0.1 Hz |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average･Maximum･Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Example of Use

To query the average of Frequency Error measurement result:

```
:FETC:CELL:LTE:FUND:MOD:FERR? AVG
> 0.03,60.0
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor:WORSt?

Worst Carrier Frequency Error Result

Function

Queries the worst value in Frequency Error measurement results

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor:WORSt? [<cc>]
```

Response

```
<freq_ppm>,<freq_Hz>
```

| | |
|---|---|
| <freq_ppm> | Worst value in Frequency Error measurement results in ppm |
| Unit | ppm |
| Resolution | 0.01 ppm |
| <freq_Hz> | Worst value in Frequency Error measurement results in Hz |
| Unit | Hz |
| Resolution | 0.1 Hz |

Parameters

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Details

The worst value should be either the maximum or minimum of the Frequency Error measurement results, whichever is the larger absolute value.

Example of Use

To query the worst value in Frequency Error measurement results:

```
:FETC:CELL:LTE:FUND:MOD:FERR:WORS?
> 0.03,60.0
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:CARLeakage?

In-Band Emissions (Carrier Leakage) Result

### Function

Queries in-band emissions (Carrier Leakage) measurement result of Modulation Analysis

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:CARLeakage?
<mode>[,<cc>]
```

### Response

When <mode> = TTL,

`<avg>,<max>,<min>`

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dBc |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

`<ibe>`

| | |
|---|---|
| <ibe> | Measurement result in specified Storage mode |
| Unit | dBc |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of in-band emissions (Carrier Leakage) measurement result:

```
:FETC:CELL:LTE:FUND:MOD:IEM:CARL? AVG
> 0.04
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:GENeral?

In-Band Emissions (General) Result

### Function

Queries in-band emissions (General) measurement result of Modulation Analysis

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:GENeral?
<mode>[,<cc>]
```

### Response

When <mode> = TTL,

`<avg>,<max>,<min>`

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

`<ibe>`

| | |
|---|---|
| <ibe> | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of in-band emissions (General) measurement result:

```
:FETC:CELL:LTE:FUND:MOD:IEM:GEN? AVG
> 0.04
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:IQIMage?

In-Band Emissions (IQ Image) Result

### Function

Queries in-band emissions (IQ Image) measurement result of Modulation Analysis

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:IQIMage?
<mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

```
<ibe>
```

| | |
|---|---|
| <ibe> | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of in-band emissions (IQ Image) measurement result:

```
:FETC:CELL:LTE:FUND:MOD:IEM:IQIM? AVG
> 0.04
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:ITEM?

In-Band Emissions Measured Item

### Function

Queries whether each in-band emission measurement item for modulation analysis is measured or not.

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:ITEM? [<cc>]
```

### Response

```
<flag>
```

| | | |
|---|---|---|
| <flag> | Measured/Not measured flag (0 to 7)<br>Returns the sum of the following measurement items. | |
| | 0 | Not measured |
| | 1 | Measure General |
| | 2 | Measure IQ Image |
| | 4 | Measure Carrier Leakage |

### Parameter

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query whether each in-band emission measurement item for modulation analysis is measured or not.:

```
:FETC:CELL:LTE:FUND:MOD:IEM:ITEM?
> 4
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:JUDGement?

In-Band Emissions Judgement

### Function

Queries the judgement on the in-band emission measurement result for modulation analysis.

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:JUDGement? [<cc>]
```

### Response

```
<judgement>
```

| | |
|---|---|
| <judgement> | Judgement result |
| PASS | Pass |
| FAIL | Fail |
| – | Not measured |

### Parameter

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the judgement on the in-band emission measurement result for modulation analysis.

```
:FETC:CELL:LTE:FUND:MOD:IEM:JUDG?
> PASS
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:CARLeakage?

In-Band Emissions limit (Carrier Leakage)

### Function

Queries the limit of in-band emission measurement (Carrier Leakage) for modulation analysis.

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:CARLeakage?
[<cc>]
```

### Response

```
<level>
```

| | |
|---|---|
| <level> | Limit |
| Unit | dBc |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the limit of in-band emission measurement result (Carrier Leakage) for modulation analysis.

```
:FETC:CELL:LTE:FUND:MOD:IEM:LIM:CARL?
> 1.05
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:GENeral?

In-Band Emissions limit (General)

### Function

Queries the limit of the in-band emission measurement result (General) for modulation analysis.

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:GENeral?
[<cc>]
```

### Response

```
<level>
```

| | |
|---|---|
| <level> | Limit |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the limit of the in-band emission measurement result (General) for modulation analysis.

```
:FETC:CELL:LTE:FUND:MOD:IEM:LIM:GEN?
> 2.05
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:IQIMage?

In-Band Emissions limit (IQ Image)

### Function

Queries the limit of in-band emission measurement (IQ Image) for modulation analysis.

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:IQIMage?
[<cc>]
```

### Response

```
<level>
```

| | |
|---|---|
| <level> | Limit |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the limit of in-band emission measurement result (IQ Image) for modulation analysis.

```
:FETC:CELL:LTE:FUND:MOD:IEM:LIM:IQIM
> 1.05
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:MARGin?

In-Band Emissions Margin

### Function

Queries the worst margin in the entire bandwidth for in-band emission measurement.

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:MARGin? [<cc>]
```

### Response

```
<margin>
```

| | |
|---|---|
| <margin> | Worst margin in the entire bandwidth |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

Queries the worst margin in the entire bandwidth of in-band emission measurement for modulation analysis.

```
:FETC:CELL:LTE:FUND:MOD:IEM:MARG?
> 1.05
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:IQIMbalance?

IQ Imbalance Result

### Function

Queries the IQ Imbalance measurement result of Modulation Analysis

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IQIMbalance? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Average |
| <max> | Maximum |
| <min> | Minimum |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

```
<iqimb>
```

| | |
|---|---|
| <iqimb> | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

IQ Imbalance can be measured when the number of RBs is set to the maximum value for the channel bandwidth shown in Table 2.1.6-2 Number of Allocatable Resource Blocks in Channel Bandwidth.
If the number of RBs is not the maximum allocatable value in the channel bandwidth, the response is 999.99.

### Example of Use

To query the average of IQ Imbalance measurement result:

```
:FETC:CELL:LTE:FUND:MOD:IQIM? AVG
> 0.04
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:MERRor?

Magnitude Error Result

### Function

Queries the Magnitude Error measurement result of Modulation Analysis

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:MERRor? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | % |
| Resolution | 0.01% |

When <mode> ≠ TTL,

```
<merr>
```

| | |
|---|---|
| <merr> | Measurement result in specified Storage mode |
| Unit | % |
| Resolution | 0.01% |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of Magnitude Error measurement result:

```
:FETC:CELL:LTE:FUND:MOD:MERR? AVG
> 1.05
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:PEVM?

Peak EVM Result

### Function

Queries the EVM Peak measurement result

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:PEVM? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | % |
| Resolution | 0.01% |

When <mode> ≠ TTL,

```
<pevm>
```

| | |
|---|---|
| <pevm> | Measurement result in specified Storage mode |
| Unit | % |
| Resolution | 0.01% |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of EVM Peak measurement result:

```
:FETC:CELL:LTE:FUND:MOD:PEVM? AVG
> 1.75
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:PHERror?

Phase Error Result

### Function

Queries the Phase Error measurement result of Modulation Analysis

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:PHERror? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

`<avg>,<max>,<min>`

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | degree |
| Resolution | 0.01 degree |

When <mode> ≠ TTL,

`<perr>`

| | |
|---|---|
| <perr> | Measurement result in specified Storage mode |
| Unit | degree |
| Resolution | 0.01 degree |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of Phase Error measurement result:

```
:FETC:CELL:LTE:FUND:MOD:PHER? AVG
> 1.55
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:RHO?

Rho Result

### Function

Queries the Signal Quality measurement (Rho) result of Modulation Analysis

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:RHO? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Resolution | 0.00001 |

When <mode> ≠ TTL,

```
<rho>
```

| | |
|---|---|
| <rho> | Measurement result in specified Storage mode |
| Resolution | 0.00001 |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of Signal Quality measurement (Rho) result:

```
:FETC:CELL:LTE:FUND:MOD:RHO? AVG
> 0.04
```

## :FETCh:CELLular:LTE:FUNDamental:MODulation:RSEVm?

Reference Signal EVM Result

### Function

Queries the EVM measurement result of Reference Signal

### Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:RSEVm? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | % |
| Resolution | 0.01% |

When <mode> ≠ TTL,

```
<rsevm>
```

| | |
|---|---|
| <rsevm> | Measurement result in specified Storage mode |
| Unit | % |
| Resolution | 0.01% |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The EVM measurement of the Reference Signal is supported when PUSCH is assigned using the :CONFig:CELLular:LTE:CTYPe command.

### Example of Use

To query the average of EVM measurement result of Reference Signal:

```
:FETC:CELL:LTE:FUND:MOD:RSEV? AVG
> 1.51
```

## :FETCh:CELLular:LTE:FUNDamental:OBW?

OBW Result

### Function

Queries the Occupied Bandwidth measurement result

### Query

```
:FETCh:CELLular:LTE:FUNDamental:OBW? [<cc>]
```

### Response

```
<bw>
```

| | |
|---|---|
| <bw> | Occupied Bandwidth |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameter

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.3.2-1 Measurement Items of OBW” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of in-band emissions (Carrier Leakage) measurement result:

```
:FETC:CELL:LTE:FUND:OBW?
> 3.840
```

## :FETCh:CELLular:LTE:FUNDamental:OBW:FREQuency?

OBW Frequency Result

### Function

Queries the upper, lower and center frequency of Occupied Bandwidth measurement

### Query

```
:FETCh:CELLular:LTE:FUNDamental:OBW:FREQuency? <pos>[,<cc>]
```

### Response

```
<freq>
```

| | |
|---|---|
| <freq> | Offset frequency |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| <pos> | Offset type |
| UPPER | Upper frequency |
| LOWER | Lower frequency |
| CENTER | Center frequency |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.3.2-1 Measurement Items of OBW” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the upper frequency of Occupied Bandwidth measurement result:

```
:FETC:CELL:LTE:FUND:OBW:FREQ? UPPER
> 1951.920
```

## :FETCh:CELLular:LTE:FUNDamental:POWer:CHPower?

Channel Power Result

### Function

Queries the Channel Power measurement result

### Query

```
:FETCh:CELLular:LTE:FUNDamental:POWer:CHPower? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

`<avg>,<max>,<min>`

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dBm |
| Resolution | 0.01 dB |

When <mode> = AVG, MAX, MIN or DVT,

`<pwr>`

| | |
|---|---|
| <pwr> | Measurement result in specified Storage mode |
| Unit | dBm |
| Resolution | 0.01 dB |

When <mode> = IND,

`<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>`

| | |
|---|---|
| <s> | Measurement count |
| Range | 1 to 200 |
| <pwr(s)> | Channel Power of sth measurement |
| Unit | dBm |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| IND | Individual measurement result |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.2.2-1 Measurement Items of Tx Power” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of Channel Power measurement result:

```
:FETC:CELL:LTE:FUND:POW:CHP? AVG
> -20.00
```

## :FETCh:CELLular:LTE:FUNDamental:POWer:TXPower?

Tx Power Result

### Function

Queries the Tx power measurement result

### Query

```
:FETCh:CELLular:LTE:FUNDamental:POWer:TXPower? <mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dBm |
| Resolution | 0.01 dB |

When <mode> = AVG, MAX, MIN or DVT,

```
<pwr>
```

| | |
|---|---|
| <pwr> | Measurement result in specified Storage mode |
| Unit | dBm |
| Resolution | 0.01 dB |

When <mode> = IND,

```
<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>
```

| | |
|---|---|
| <s> | Measurement count |
| Range | 1 to 200 |
| <pwr(s)> | Tx Power of sth measurement |
| Unit | dBm |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| IND | Individual measurement result |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA. |

| | |
|---|---|
| | Refer to “Table 2.2.2-1 Measurement Items of Tx Power” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Example of Use

To query the average of Tx Power measurement results:

```
:FETC:CELL:LTE:FUND:POW:TXP? AVG
> -20.00
```

## :FETCh:CELLular:LTE:FUNDamental:SEMask:JUDGement?

SEM Judgement

Function

Queries the judgement result of Spectrum Emission Mask measurement.
Fail when any part of spectrum exceeds limit, otherwise Pass

Query

```
:FETCh:CELLular:LTE:FUNDamental:SEMask:JUDGement? [<cc>]
```

Response

```
<judgement>
```

| <judgement> | Result |
|---|---|
| PASS | Pass |
| FAIL | Fail |
| – | Not measured |

Parameter

| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
|---|---|
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Example of Use

To query the judgement result whether the spectrum is within the specified threshold:

```
:FETC:CELL:LTE:FUND:SEM:JUDG?
> PASS
```

## :FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer?

SEM Peak Value (Lower)

### Function

Queries the peak level with offset frequency at each of lower side ranges of Spectrum Emission Mask measurement

### Query

```
:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer? [<cc>]
```

### Response

```
<f_M1>,<l_M1>,<f_M2>,<l_M2>,<f_M3>,<l_M3>,<f_M4>,<l_M4>
```

| | |
|---|---|
| <l_M1> to <l_M4> | Peak level at each of lower side Range 1 to Range 4 |
| Unit | dBm |
| Resolution | 0.01 dB |
| <f_M1> to <f_M4> | Offset frequency of peak level at each of lower side Range 1 to Range 4 |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

Refer to Table 2.4.1-1 "Frequency Ranges of Range 1 to Range 4" for the frequency range for the measurement.

### Example of Use

To the query peak level with offset frequency at each of lower side ranges of Spectrum Emission Mask measurement:

```
:FETC:CELL:LTE:FUND:SEM:LEV:LOW?
> -3.000,-20.00,-5.000,-30.00,-8.000,-40.00,-9.500,-50.00
```

## :FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer:DETail?

SEM Peak Value (Detail) (Lower)

### Function

Queries the peak level with offset frequency at each of lower side 9 ranges of Spectrum Emission Mask measurement

### Query

```
:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer:DETail? [<cc>]
```

### Response

```
<f_M1>,<l_M1>,<f_M2>,<l_M2>,<f_M3>,<l_M3>,<f_M4>,<l_M4>,<f_M5>,<l_M5>,<f_M6>,<l_M6>,<f_M7>,<l_M7>,<f_M8>,<l_M8>,<f_M9>,<l_M9>
```

| | |
|---|---|
| <l_M1> to <l_M9> | Peak level at each of lower side range of Range 1 to Range 9 |
| Unit | dBm |
| Resolution | 0.01 dB |
| <f_M1> to <f_M9> | Offset frequency of peak level at each of lower side range of Range 1 to Range 9 |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The number of target ranges varies with the combination of channel bandwidth and network signalled value for AdditionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

### Example of Use

To query the peak level with offset frequency at each of lower side of 9 ranges of Spectrum Emission Mask measurement:

```
:FETC:CELL:LTE:FUND:SEM:LEV:LOW:DET?
>
-0.500,3.00,-1.500,3.00,-2.600,3.00,-3.500,3.00,-5.500,3.00,-8.000,3.00,-12.500,3.00,-17.500,3.00,-22.500,3.00
```

## :FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer?

SEM Peak Value (Upper)

### Function

Queries the peak level with offset frequency at each of upper side ranges of Spectrum Emission Mask measurement

### Query

`:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer? [<cc>]`

### Response

`<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>`

| | |
|---|---|
| <l_1> to <l_4> | Peak level in each of upper Range 1 to Range 4 |
| Unit | dBm |
| Resolution | 0.01 dB |
| <f_1> to <f_4> | Offset frequency of peak level in each of upper Range 1 to Range 4 |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

Refer to Table 2.4.1-1 "Frequency Ranges of Range 1 to Range 4" for the frequency range for the measurement.

### Example of Use

To query the peak level with offset frequency at each of upper side ranges of Spectrum Emission Mask measurement:

```
:FETC:CELL:LTE:FUND:SEM:LEV:UPP?
> 3.000,-20.00,5.000,-30.00,8.000,-40.00,9.500,-50.00
```

## :FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer:DETail?

SEM Peak Value (Detail) (Upper)

### Function

Queries the peak level with offset frequency at each of upper side of nine ranges of Spectrum Emission Mask measurement

### Query

```
:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer:DETail? [<cc>]
```

### Response

```
<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>,<f_5>,<l_5>,<f_6>,<l_6>,<
f_7>,<l_7>,<f_8>,<l_8>,<f_9>,<l_9>
```

| | |
|---|---|
| <l_1> to <l_9> | Peak level in each of upper Range 1 to Range 9 |
| Unit | dB |
| Resolution | 0.01 dB |
| <f_1> to <f_9> | Offset frequency of peak level in each of upper Range 1 to Range 9 |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The number of target ranges varies with the combination of channel bandwidth and network signalled value for AdditionalSpectrumEmission. Refer to Table 2.4.1-2 "Frequency Ranges for Measurement Results (1/2)" and Table 2.4.1-3 "Frequency Ranges for Measurement Results (2/2)" for details.

### Example of Use

To query the peak level with offset frequency at each of upper side of nine ranges of Spectrum Emission Mask measurement:

```
:FETC:CELL:LTE:FUND:SEM:LEV:UPP:DET?
>
0.500,3.00,1.500,3.00,2.600,3.00,3.500,3.00,5.500,3.00,8.000,3.00,12.500,
3.00,17.500,3.00,22.500,3.00
```

4 SCPI Command Reference

## :FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:LOWer?

SEM Template Margin (Lower)

### Function

Queries the level margin with frequency where margin measured at each of lower side ranges of Spectrum Emission Mask measurement

### Query

```
:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:LOWer? [<cc>]
```

### Response

```
<f_M1>,<l_M1>,<f_M2>,<l_M2>,<f_M3>,<l_M3>,<f_M4>,<l_M4>
```

| | |
|---|---|
| <l_M1> to <l_M4> | Level margin in each of lower Range 1 to Range 4 |
| Unit | dB |
| Resolution | 0.01 dB |
| <f_M1> to <f_M4> | Offset frequency where level margin in each of lower Range 1 to Range 4 measured |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

Refer to Table 2.4.1-1 Frequency Ranges of Range 1 to Range 4 for the frequency range for the measurement.

### Example of Use

To query the level margin with frequency where margin measured at each of lower side ranges of Spectrum Emission Mask measurement:

```
:FETC:CELL:LTE:FUND:SEM:MARG:LOW?
> -3.000,3.00,-5.000,3.00,-8.000,3.00,-9.500,3.00
```

## :FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:LOWer:DETail?

SEM Template Margin (Detail) (Lower)

### Function

Queries the level margin with frequency where margin measured at each of lower side of 9 ranges of Spectrum Emission Mask measurement

### Query

```
:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:LOWer:DETail? [<cc>]
```

### Response

```
<f_M1>,<l_M1>,<f_M2>,<l_M2>,<f_M3>,<l_M3>,<f_M4>,<l_M4>,<f_M5>,<l_M5>,<f_
M6>,<l_M6>,<f_M7>,<l_M7>,<f_M8>,<l_M8>,<f_M9>,<l_M9>
```

| | |
|---|---|
| <l_M1> to <l_M9> | Level margin in each of lower side range of Range 1 to Range 9 |
| Unit | dB |
| Resolution | 0.01 dB |
| <f_M1> to <f_M9> | Offset frequency where level margin measured in each of lower side range of Range 1 to Range 9 |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

The number of target ranges varies with the combination of channel bandwidth and network signalled value for AdditionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

### Example of Use

To query the level margin with frequency where margin measured at each of lower side of 9 ranges of Spectrum Emission Mask measurement:

```
:FETC:CELL:LTE:FUND:SEM:MARG:LOW:DET?
>
-0.500,3.00,-1.500,3.00,-2.600,3.00,-3.500,3.00,-5.500,3.00,-8.000,3.00,-
12.500,3.00,-17.500,3.00,-22.500,3.00
```

## :FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer?

SEM Template Margin (Upper)

### Function

Queries the level margin with frequency where margin measured at each of upper side ranges of Spectrum Emission Mask measurement

### Query

```
:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer? [<cc>]
```

### Response

```
<f_M1>,<l_M1>,<f_M2>,<l_M2>,<f_M3>,<l_M3>,<f_M4>,<l_M4>
```

| | |
|---|---|
| <l_1> to <l_4> | Level margin in each of upper Range 1 to Range 4 |
| Unit | dB |
| Resolution | 0.01 dB |
| <f_1> to <f_4> | Offset frequency where level margin in each of upper Range 1 to Range 4 measured |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

Refer to Table 2.4.1-1 “Frequency Ranges of Range 1 to Range 4” for the frequency range for the measurement.

### Example of Use

To query the level margin with frequency where margin measured at each of upper side ranges of Spectrum Emission Mask measurement:

```
:FETC:CELL:LTE:FUND:SEM:MARG:UPP?
> 3.000,3.00,5.000,3.00,8.000,3.00,9.500,3.00
```

## :FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer:DETail?

SEM Template Margin (Detail) (Upper)

### Function

Queries the level margin with frequency where margin measured at each of upper side of 9 ranges of Spectrum Emission Mask measurement

### Query

```
:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer:DETail? [<cc>]
```

### Response

```
<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>,<f_5>,<l_5>,<f_6>,<l_6>,<
f_7>,<l_7>,<f_8>,<l_8>,<f_9>,<l_9>
```

| | |
|---|---|
| <l_1> to <l_9> | Level margin in each of upper side range of Range 1 to Range 9 |
| Unit | dB |
| Resolution | 0.01 dB |
| <f_1> to <f_9> | Offset frequency where level margin measured in each of upper side range of Range 1 to Range 9 |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

The number of target ranges varies with the combination of channel bandwidth and network signalled value for AdditionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

### Example of Use

To query the level margin with frequency where margin measured at each of upper side of 9 ranges of Spectrum Emission Mask measurement:

```
:FETC:CELL:LTE:FUND:SEM:MARG:UPP:DET?
> 0.500,3.00,1.500,3.00,2.600,3.00,3.500,3.00,5.500,3.00,8.000,3.00,
12.500,3.00,17.500,3.00,22.500,3.00
```

## :FETCh:CELLular:LTE:FUNDamental:TEMPlate:JUDGement:OFFPower?

Off Power Judgement

### Function

Queries the judgement result of Off Power measurement.

The result is Fail when any part of spectrum exceeds limit, otherwise Pass.

### Query

```
:FETCh:CELLular:LTE:FUNDamental:TEMPlate:JUDGement:OFFPower?
```

### Response

```
<judgement>
```

| | |
|---|---|
| <judgement> | Judgement result |
| PASS | Pass |
| FAIL | Fail |
| – | Not measured |

### Example of Use

To query the judgement result of Off Power measurement:

```
:FETC:CELL:LTE:FUND:TEMP:JUDG:OFFP?
> PASS
```

## :FETCh:CELLular:LTE:FUNDamental:TEMPlate:JUDGement:ONPower?

On Power Judgement

### Function

Queries the judgement result of On Power measurement.

The result is Fail when any part of spectrum exceeds limit, otherwise Pass.

### Query

```
:FETCh:CELLular:LTE:FUNDamental:TEMPlate:JUDGement:ONPower?
```

### Response

```
<judgement>
```

| | |
|---|---|
| <judgement> | Judgement result |
| PASS | Pass |
| FAIL | Fail |
| – | Not measured |

### Example of Use

To query the judgement result of Off Power measurement.

```
:FETC:CELL:LTE:FUND:TEMP:JUDG:ONP?
> PASS
```

## :FETCh:CELLular:LTE:FUNDamental:TEMPlate:OFFPower:AFTer?

Off Power (After)

### Function

Queries the Off Power (After) measurement result.

### Query

```
:FETCh:CELLular:LTE:FUNDamental:TEMPlate:OFFPower:AFTer? <mode>
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

```
<level>
```

| | |
|---|---|
| <level> | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |

### Example of Use

To query the average of Off Power (After) measurement result:

```
:FETC:CELL:LTE:FUND:TEMP:OFFP:AFT? AVG
> 1.75
```

## :FETCh:CELLular:LTE:FUNDamental:TEMPlate:OFFPower:BEFore?

Off Power (Before)

### Function

Queries the Off Power (Before) measurement result.

### Query

```
:FETCh:CELLular:LTE:FUNDamental:TEMPlate:OFFPower:BEFore? <mode>
```

### Response

When <mode> = TTL,

`<avg>,<max>,<min>`

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

`<level>`

| | |
|---|---|
| <level> | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |

### Example of Use

To query the average of Off Power (Before) measurement result:

```
:FETC:CELL:LTE:FUND:TEMP:OFFP:BEF? AVG
> 1.75
```

## :FETCh:CELLular:LTE:FUNDamental:TEMPlate:ONPower?

On Power

### Function

Queries the On Power measurement result.

### Query

```
:FETCh:CELLular:LTE:FUNDamental:TEMPlate:ONPower? <mode>
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dBm |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

```
<level>
```

| | |
|---|---|
| <level> | Measurement result in specified Storage mode |
| Unit | dBm |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |

### Example of Use

To query the average of On Power measurement result:

```
:FETC:CELL:LTE:FUND:TEMP:ONP? AVG
> 1.75
```

## :FETCh:CELLular:LTE:FUNDamental:TRACe?

Waveform

### Function

Queries the spectrum waveform data of each measurement result

### Query

```
:FETCh:CELLular:LTE:FUNDamental:TRACe?
<format>,<position>,<length>[,<symbol>][,<cc>]]
```

### Response

```
<data(0)>,<data(1)>,<data(2)>,…,<data(length-1)>
```

| <format> | Unit | Resolution |
|---|---|---|
| 1, 2 | dBm | 0.01 dB |
| 3, 4 | None | 0.0001 |
| 5, 6, 9, 10 | % | 0.01% |
| 7, 8 | degree | 0.01 degree |
| 11, 12, 15, 16, 17, 18 | dB | 0.01 dB |
| 13, 14 | dBc | 0.01 dB |

### Parameter

| <format> | Format |
|---|---|
| 1 | Occupied Bandwidth |
| 2 | Spectrum Emission Mask (SEM) |
| 3 | Constellation (I) |
| 4 | Constellation (Q) |
| 5 | EVM (Average) |
| 6 | EVM (Maximum) |
| 7 | Phase Error (Average) |
| 8 | Phase Error (Maximum) |
| 9 | Magnitude Error (Average) |
| 10 | Magnitude Error (Maximum) |
| 11 | In-band Emissions (Average) |
| 12 | In-band Emissions (Maximum) |
| 13 | In-band Emissions (Average) |
| 14 | In-band Emissions (Maximum) |
| 15 | Spectrum Flatness (Average) |
| 16 | Spectrum Flatness (Maximum) |
| 17 | Spectrum Flatness (Minimum) |
| 18 | Power Template |

<position> Start point of waveform data

Range

| | Channel Bandwidth | | | | | |
|---|---|---|---|---|---|---|
| **Format** | **1.4 MHz** | **3 MHz** | **5 MHz** | **10 MHz** | **15 MHz** | **20 MHz** |
| 1 | 0 to 594 | 0 to 1238 | 0 to 2064 | 0 to 4136 | 0 to 6194 | 0 to 8266 |
| 2 | 0 to 1214 | 0 to 2474 | 0 to 4124 | 0 to 6554 | 0 to 9014 | 0 to 11474 |
| 3 to 10, 15 to 17 | 0 to 71 | 0 to 179 | 0 to 299 | 0 to 599 | 0 to 899 | 0 to 1199 |
| 11 to 14 | 0 to 5 | 0 to 14 | 0 to 24 | 0 to 49 | 0 to 74 | 0 to 99 |
| 18 | 0 to 9374 | 0 to 18749 | 0 to 37499 | 0 to 74999 | 0 to 149999 | 0 to 149999 |

Refer to 2.8 “Capturing Waveform Data” for details of the ranges under the following conditions.

- Contiguous UL CA
- The format is 1 or 2.

<length> Number of read data

Range

| | Channel Bandwidth | | | | | |
|---|---|---|---|---|---|---|
| **Format** | **1.4 MHz** | **3 MHz** | **5 MHz** | **10 MHz** | **15 MHz** | **20 MHz** |
| 1 | 1 to 595 | 1 to 1239 | 1 to 2065 | 1 to 4137 | 1 to 6195 | 1 to 8267 |
| 2 | 1 to 1215 | 1 to 2475 | 1 to 4125 | 1 to 6555 | 1 to 9015 | 1 to 11475 |
| 3 to 10, 15 to 17 | 1 to 72 | 1 to 180 | 1 to 300 | 1 to 600 | 1 to 900 | 1 to 1200 |
| 11 to 14 | 1 to 6 | 1 to 15 | 1 to 25 | 1 to 50 | 1 to 75 | 1 to 100 |
| 18 | 1 to 9375 | 1 to 18750 | 1 to 37500 | 1 to 75000 | 1 to 150000 | 1 to 150000 |

Refer to 2.8 “Capturing Waveform Data” for details of the ranges under the following conditions.

- Contiguous UL CA
- The format is 1 or 2.

<symbol> Position of SC-FDMA symbol

Range When format is 3 to 10

0 to 6

<data(n)> Waveform data

<cc> Component Carrier

Used at UL CA and omitted at non CA.

Refer to “Table 2.8.2-5 Measurement Items of Waveform Data” for details.

PCC PCC

SCC1 SCC-1

Omitted Total

Details

Average in the above formats is equivalent to the average waveform of a spectrum analyzer. Maximum in the above formats is equivalent to the peak-hold waveform of a spectrum analyzer.

Example of Use

To query the EVM (Average) of 768 spectrum waveform data from 257 of each measurement result:

```
:FETC:CELL:LTE:FUND:TRAC? 5,256,768,0
> 2.00,2.01,2.00,…,2.10
```

## :TRIGger:CELLular:LTE:FUNDamental:DELay

Trigger Delay

Function

Sets or queries the Trigger Delay.

Command

```
:TRIGger:CELLular:LTE:FUNDamental:DELay <trgdly>
```

Query

```
:TRIGger:CELLular:LTE:FUNDamental:DELay?
```

Response

<trgdly>

| | |
|---|---|
| Unit | ms |
| Resolution | 0.001 ms |

Parameter

| | |
|---|---|
| <trgdly> | Trigger Delay |
| Range | 0 to 10.000 ms |
| Resolution | 0.001 ms |
| Suffix code | MS |
| Default | 0.000 ms |

Details

This parameter is valid only when FRAMETYPE is set to TDD. Note this parameter can be edited even if FRAMETYPE is set to FDD.
This parameter is valid when MEASITEM is set to NORMAL.

Example of Use

To set the trigger delay to 0.001 ms:

```
:TRIG:CELL:LTE:FUND:DEL 0.001
:TRIG:CELL:LTE:FUND:DEL?
>0.001
```

## :TRIGger:CELLular:LTE:FUNDamental:LEVel

Trigger Level

### Function

Sets or queries the Trigger Level.

### Command

```
:TRIGger:CELLular:LTE:FUNDamental:LEVel <trglevel>
```

### Query

```
:TRIGger:CELLular:LTE:FUNDamental:LEVel?
```

### Response

`<trglevel>`

| | |
|---|---|
| Unit | dB |
| Resolution | 1 dB |

### Parameter

| | |
|---|---|
| <trglevel> | Trigger Level |
| Range | –40 to 0 dB |
| Resolution | 1 dB |
| Suffix code | DB |
| Default | –30 dB |

### Details

This parameter is valid only when FRAMETYPE is set to TDD. Note this parameter can be edited even if FRAMETYPE is set to FDD.

### Example of Use

To set the trigger level to –30 dB:

```
:TRIG:CELL:LTE:FUND:LEV -30
:TRIG:CELL:LTE:FUND:LEV?
> -30
```

## :TRIGger:CELLular:LTE:FUNDamental:SOURce

Trigger Source

### Function

Sets or queries the Trigger Source.

### Command

```
:TRIGger:CELLular:LTE:FUNDamental:SOURce <trgsrc>
```

### Query

```
:TRIGger:CELLular:LTE:FUNDamental:SOURce?
```

### Response

```
<trgsrc>
```

### Parameter

| | |
|---|---|
| <trgsrc> | Trigger Source |
| PWR | Power of input signal |
| FRAME | frame |
| Default | PWR |

### Details

This parameter is valid only when FRAMETYPE is set to TDD. Note this parameter can be edited even if FRAMETYPE is set to FDD.
This parameter is valid when MEASITEM is set to NORMAL. When PWRTEMP is set, the value is fixed to PWR.

### Example of Use

To set the trigger source to PWR:

```
:TRIG:CELL:LTE:FUND:SOUR PWR
:TRIG:CELL:LTE:FUND:SOUR?
>PWR
```

## :TRIGger:CELLular:LTE:FUNDamental:TOUT

Trigger Timeout

### Function

Sets or queries the trigger timeout.

### Command

```
:TRIGger:CELLular:LTE:FUNDamental:TOUT <trgtime>
```

### Query

```
:TRIGger:CELLular:LTE:FUNDamental:TOUT?
```

### Response

```
<trgtime>
```

| | |
|---|---|
| Unit | s |
| Resolution | 1 s |

### Parameter

| | |
|---|---|
| <trgtime> | Trigger Timeout |
| Range | 1 to 10 s |
| Resolution | 1 s |
| Suffix code | S |
| Default | 10 s |

### Details

This parameter is valid only when FRAMETYPE is set to TDD. Note this parameter can be edited even if FRAMETYPE is set to FDD.

### Example of Use

To set the Trigger timeout time to 5 seconds:

```
:TRIG:CELL:LTE:FUND:TOUT 5
:TRIG:CELL:LTE:FUND:TOUT?
> 5
```

## 4.2.3 Sequence measurement commands

### :CONFigure:CELLular:GENerator:RFSettings:FREQuency

Downlink Frequency

Function

Sets or queries the downlink frequency of MU887000A

Command

```
:CONFigure:CELLular:GENerator:RFSettings:FREQuency <dl_freq>
```

Query

```
:CONFigure:CELLular:GENerator:RFSettings:FREQuency?
```

Response

```
<dl_freq>
```

| | |
|---|---|
| Unit | Hz |
| Resolution | 1 Hz |

Parameter

| | |
|---|---|
| <dl_freq> | Downlink frequency |
| Range | 400.000000 to 3800.000000 MHz<br>400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 1 Hz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted) |
| Default | 2140.000000 MHz |

Details

The Rx frequency for the UE is set.
Changing the setting of downlink frequency does not change the setting of the downlink channel.

Example of Use

To set the downlink frequency to 2050 MHz:

```
:CONF:CELL:GEN:RFS:FREQ 2050MHZ
:CONF:CELL:GEN:RFS:FREQ?
>2050000000
```

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## :CONFigure:CELLular:GENerator:RFSettings:LEVel

Output Level

### Function

Sets or queries the total output level of all channels.

### Command

```
:CONFigure:CELLular:GENerator:RFSettings:LEVel <level>
```

### Query

```
:CONFigure:CELLular:GENerator:RFSettings:LEVel?
```

### Response

`<level>`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameter

| | |
|---|---|
| <level> | Output level |
| Range | –130.0 to –10.00 dBm (Port1/Port2) |
| | –120.0 to 0.0 dBm (Port3/Port4) |
| Resolution | 0.1 dB |
| Suffix Code | DBM (uses dBm when omitted) |
| Default | –60.2 dBm |

### Details

The setting range varies with the output port setting.
When Cable Loss Calibration is ON, the cable loss is subtracted from the output level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –135.0 to –15.0 dBm.

### Example of Use

To set the output level to –50.0 dBm:

```
:CONF:CELL:GEN:RFS:LEV -50.0
:CONF:CELL:GEN:RFS:LEV?
> -50.0
```

### Related Commands

[:ROUTe]:EXTLoss:TABLe:SWITch
:CALCulate:EXTLoss:TABLe:SETTing
:CALCulate:EXTLoss:TABLe:VALue
For details of the commands, refer to Chapter 5 “SCPI Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

## :CONFigure:CELLular:MEASurement:RFSettings:FREQuency

Uplink Frequency

### Function

Sets or queries the uplink (Rx) frequency of MU887000A

### Command

```
:CONFigure:CELLular:MEASurement:RFSettings:FREQuency
<ul_freq>[,<ul_freq_scc1>]
```

### Query

```
:CONFigure:CELLular:MEASurement:RFSettings:FREQuency? [<ALL>]
```

### Response

```
<ul_fleq>,<ul_freq_scc1>
```

| | |
|---|---|
| Unit | Hz |
| Resolution | 1 Hz |

### Parameter

| | |
|---|---|
| <ul_freq> | Uplink frequency |
| Range | 400.000000 to 3800.000000 MHz |
| | 400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 1 Hz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted) |
| Default | 1950.000000 MHz |
| <ul_freq_scc1> | Uplink frequency for SCC-1 |
| Range | 400.000000 to 3800.000000 MHz |
| | 400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 1 Hz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted) |
| Default | 1969.800000 MHz (<freq_scc1>) |

### Details

This setting corresponds to the UE Tx frequency.
Changing the uplink frequency setting does not change the uplink channel setting.
The command argument ul_freq_scc1 and the query argument ALL can be omitted. When All is omitted, only ul_freq is returned.

### Example of Use

To set the uplink frequency to 1950 MHz:

```
:CONF:CELL:MEAS:RFS:FREQ 1950MHZ,1969.8MHZ
:CONF:CELL:MEAS:RFS:FREQ? ALL
>1950000000,1969800000
```

## :CONFigure:CELLular:MEASurement:RFSettings:LEVel

Input Level

### Function

Sets or queries the input level of the MU887000A connector

### Command

```
:CONFigure:CELLular:MEASurement:RFSettings:LEVel <level>
```

### Query

```
:CONFigure:CELLular:MEASurement:RFSettings:LEVel?
```

### Response

```
<level>
```

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameter

| | |
|---|---|
| <level> | Input level |
| Range | –65.0 to +35.0 dBm (Port 1/Port 2) |
| | –65.0 to +25.0 dBm (Port 3/Port 4) |
| Resolution | 0.1 dB |
| Suffix Code | DBM (uses dBm when omitted) |
| Default | –1.0 dBm |

### Details

The setting range varies according to the input port setting.
When the Cable Loss Correction is ON, the cable loss is added to the input level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –60.0 to +40.0 dBm.

### Example of Use

To set the input level of the MU887000A connector to –10.0 dBm

```
:CONF:CELL:MEAS:RFS:LEV -10.0
:CONF:CELL:MEAS:RFS:LEV?
>-10.0
```

### Related Commands

[:ROUTe]:EXTLoss:TABLe:SWITch
:CALCulate:EXTLoss:TABLe:SETTing
:CALCulate:EXTLoss:TABLe:VALue
For details of the commands, refer to Chapter 5 "SCPI Command Reference" in the *MU887000A TRX Test Module Operation Manual*.

## :CONFigure:CELLular:SEQuence:CONTrol

Sequence Control Parameter - Sequence Control

### Function

Sets or queries the start and stop segments of Sequence Table

Sets the parameters for both measurement and signal transmission.

### Command

```
:CONFigure:CELLular:SEQuence:CONTrol <start>,<end>
```

### Query

```
:CONFigure:CELLular:SEQuence:CONTrol?
```

### Response

```
<start>,<end>
```

### Parameters

| | |
|---|---|
| <start> | Start segment |
| Range | 0 to 1999 |
| Resolution | 1 |
| Default | 0 |
| <end> | Stop segment |
| Range | <start> to 1999 |
| Resolution | 1 |
| Default | 199 |

### Details

<start> = 0 to 1999, <end> = 0 to 1999 where <end> ≥ <start>

Whether the set sequence table can be executed is evaluated.

Use the :FETCh:CELLular:SEQuence:ERRor? command to query the error details.

### Example of Use

To set the start segment to 20 and the stop segment to 52:

```
:CONF:CELL:SEQ:CONT 20,52
:CONF:CELL:SEQ:CONT?
> 20,52
```

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SCPI Command Reference

## :CONFigure:CELLular:SEQuence:CONTrol:TX

Sequence Control Parameter - Sequence Control

### Function

Sets or queries start and stop segments in sequence table.

Sets the measurement parameters only, without affecting the signal transmission parameters.

### Command

```
:CONFigure:CELLular:SEQuence:CONTrol:TX <start>,<end>
```

### Query

```
:CONFigure:CELLular:SEQuence:CONTrol:TX?
```

### Response

```
<start>,<end>
```

### Parameters

| | |
|---|---|
| <start> | Start segment |
| Range | 0 to 1999 |
| Resolution | 1 |
| Default | 0 |
| <end> | Stop segment |
| Range | <start> to 1999 |
| Resolution | 1 |
| Default | 199 |

### Details

<start> = 0 to 1999, <end> = 0 to 1999  where <end> ≥ <start>

Whether the set sequence table can be executed is evaluated.

Use the :FETCh:CELLular:SEQuence:ERRor? command to query the error details.

### Examples of Use

To set the start and stop segments to 20 and 55, respectively:

```
:CONF:CELL:SEQ:CONT 20,55
:CONF:CELL:SEQ:CONT?
> 20,55
```

## :CONFigure:CELLular:SEQuence:LTE:ACLR:SET

Adjacent Channel Leakage Power Ratio Enable and Count

### Function

Enables the Adjacent Channel Leakage Power Ratio measurement and sets the measurement count, or queries the settings

### Command

```
:CONFigure:CELLular:SEQuence:LTE:ACLR:SET <mcond>,<on_off>[,<count>]
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:ACLR:SET? <mcond>
```

### Response

```
<on_off>,<count>
```

### Parameters

| | |
|---|---|
| <mcond> | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <on_off> | Enables/disables measurement |
| ON | Turns measurement on |
| OFF | Disables measurement |
| Default | OFF |
| <count> | Measurement count |
| Range | 1 to 200<br>1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix Code | None |
| Default | 1 |

### Example of Use

To disable Adjacent Channel Leakage Power Ratio measurement at measurement condition number 0 in LTE measurement condition table:

```
:CONF:CELL:SEQ:LTE:ACLR:SET 0,OFF
:CONF:CELL:SEQ:LTE:ACLR:SET? 0
> OFF
```

### Remarks

The Adjacent Channel Leakage Power Ratio of 1 subframe (1 ms) is measured at each measurement count.

## :CONFigure:CELLular:SEQuence:LTE:AMITems:OFF

Turn Off All Measurement Items

### Function

Sets all measurement items to Off collectively.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:AMITems:OFF <mcond>
```

### Parameters

| | |
|---|---|
| <mcond> | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |

### Example of use

To set all measurement items of number 0 in the LTE measurement condition table to Off collectively.

```
:CONF:CELL:SEQ:LTE:AMIT:OFF 0
```

### Remarks

This command is equivalent to setting all the commands below to Off.

:CONFigure:CELLular:SEQuence:LTE:POWer:SET
:CONFigure:CELLular:SEQuence:LTE:OBW:SET
:CONFigure:CELLular:SEQuence:LTE:SEMask:SET
:CONFigure:CELLular:SEQuence:LTE:ACLR:SET
:CONFigure:CELLular:SEQuence:LTE:MODulation:SET

## :CONFigure:CELLular:SEQuence:LTE:BAND

Operation band

### Function

Sets or queries the operation band.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:BAND <mcond>,<band>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:BAND? <mcond>
```

### Response

```
<band>
```

### Parameter

| | |
|---|---|
| <mcond> | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <band> | Operation band |
| Range | 1 to 256 |
| Resolution | 1 |
| Default | 1 |

### Details

This is the parameter for determining the following items:

- Limit line of Spectrum Flatness measurement
- Intra-band/Inter-band (at UL CA)

### Example of Use

To set the operation band to 10 for the measurement condition number 2:

```
:CONF:CELL:SEQ:LTE:BAND 2,10
:CONF:CELL:SEQ:LTE:BAND? 2
> 10
```

## :CONFigure:CELLular:SEQuence:LTE:BAND:SCC1

Operation band for SCC-1

### Function

Sets or queries the operation band for SCC-1.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:BAND:SCC1 <mcond>,<band>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:BAND:SCC1? <mcond>
```

### Response

```
<band>
```

### Parameter

| | |
|---|---|
| <mcond> | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <band> | Operation band |
| Range | 1 to 256 |
| Resolution | 1 |
| Default | 1 |

### Details

This is the parameter for determining the following items:

- Limit line of Spectrum Flatness measurement
- Intra-band/Inter-band (at UL CA)

### Example of Use

To set the operation band for SCC-1 to 10 for the measurement condition number 2:

```
:CONFigure:CELLular:SEQuence:LTE:BAND:SCC1 2,10
:CONFigure:CELLular:SEQuence:LTE:BAND:SCC1? 2
> 10
```

## :CONFigure:CELLular:SEQuence:LTE:BWRB

Channel Bandwidth, RB

### Function

Sets or queries the Uplink Channel bandwidth and RB (Resource Block)

### Command

```
:CONFigure:CELLular:SEQuence:LTE:BWRB <mcond>,<ch_bw>[,<rb>[,<start>]]
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:BWRB? <mcond>
```

### Response

```
<ch_bw>,<rb>,<start>
```

### Parameters

| | | |
|---|---|---|
| <mcond> | Measurement condition number | |
| Range | 0 to 1999 | |
| Resolution | 1 | |
| <ch_bw> | Channel bandwidth | |
| 1.4MHZ | 1.4 MHz | |
| 3MHZ | 3 MHz | |
| 5MHZ | 5 MHz | |
| 10MHZ | 10 MHz | |
| 15MHZ | 15 MHz | |
| 20MHZ | 20 MHz | |
| Default | 5MHZ | |
| <rb> | Number of RBs | |
| Range | Number defined by equation of (2^X) × (3^Y) × (5^Z) and falling within following range where (X, Y, Z ≥ 0, integer) | |
| | 0 to 6 | When channel bandwidth is 1.4 MHz |
| | 0 to 15 | When channel bandwidth is 3 MHz |
| | 0 to 25 | When channel bandwidth is 5 MHz |
| | 0 to 50 | When channel bandwidth is 10 MHz |
| | 0 to 75 | When channel bandwidth is 15 MHz |
| | 0 to 100 | When channel bandwidth is 20 MHz |
| Resolution | 1 | |
| Default | 25 | |
| <start> | Start RB number | |
| Range | 0 to (RBmax – RBn) | |
| | RBmax = 6 | (When channel bandwidth is 1.4 MHz) |
| | RBmax = 15 | (When channel bandwidth is 3 MHz) |
| | RBmax = 25 | (When channel bandwidth is 5 MHz) |

RBmax = 50 (When channel bandwidth is 10 MHz)
RBmax = 75 (When channel bandwidth is 15 MHz)
RBmax = 100 (When channel bandwidth is 20 MHz)

RBn is value set by ULRMC_RB command.

| | |
|---|---|
| Resolution | 1 |
| Default | 0 |

Details

The <rb> and <start> settings can be omitted. If omitted, the settings are Full RB (<rb> is the maximum for the channel bandwidth and <start> is 0).
When the In-band Emission measurement at Contiguous UL CA is performed, set 0 to the number of RBs for CC where the signal is not output.
Even when Modulation Analysis is set to ON, the measurement is not performed under the following conditions.
- Contiguous UL CA
- At Carrier Frequency is not specified at Carrier Leakage Frequency.
- The number of RBs is set to 0.

Example of Use

To set as follows: Measurement condition number: 1,
Channel Bandwidth: 1.4 MHz, Number of RB: 6, Start RB number: 0

```
:CONF:CELL:SEQ:LTE:BWRB 1,1.4MHZ,6,0
:CONF:CELL:SEQ:LTE:BWRB? 1
>1.4MHZ,6,0
```

## :CONFigure:CELLular:SEQuence:LTE:BWRB:SCC1

Channel Bandwidth, RB for SCC-1

### Function

Sets or queries the Uplink Channel bandwidth and RB (Resource Block) for SCC-1.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:BWRB:SCC1
<mcond>,<ch_bw>[,<rb>[,<start>]]
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:BWRB:SCC1? <mcond>
```

### Response

```
<ch_bw>,<rb>,<start>
```

### Parameters

| | |
|---|---|
| <mcond> | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <ch_bw> | Channel bandwidth for SCC-1 |
| 1.4MHZ | 1.4 MHz |
| 3MHZ | 3 MHz |
| 5MHZ | 5 MHz |
| 10MHZ | 10 MHz |
| 15MHZ | 15 MHz |
| 20MHZ | 20 MHz |
| Default | 5MHZ |
| <rb> | Number of RBs for SCC-1 |
| Range | Number defined by equation of (2^X) × (3^Y) × (5^Z) and falling within following range where (X, Y, Z ≥ 0, integer)<br>0 to 6 When channel bandwidth is 1.4 MHz<br>0 to 15 When channel bandwidth is 3 MHz<br>0 to 25 When channel bandwidth is 5 MHz<br>0 to 50 When channel bandwidth is 10 MHz<br>0 to 75 When channel bandwidth is 15 MHz<br>0 to 100 When channel bandwidth is 20 MHz |
| Resolution | 1 |
| Default | 25 |
| <start> | Start RB number for SCC-1 |
| Range | 0 to (RBmax – RBn)<br>RBmax = 6 (When channel bandwidth is 1.4 MHz)<br>RBmax = 15 (When channel bandwidth is 3 MHz)<br>RBmax = 25 (When channel bandwidth is 5 MHz)<br>RBmax = 50 (When channel bandwidth is 10 MHz)<br>RBmax = 75 (When channel bandwidth is 15 MHz) |

| | |
|---|---|
| | RBmax = 100 (When channel bandwidth is 20 MHz) |
| | RBn is value set by ULRMC_RB command. |
| Resolution | 1 |
| Default | 0 |

Details

The <rb> and <start> settings can be omitted. If omitted, the settings are Full RB (<rb> is the maximum for the channel bandwidth and <start> is 0).

When the In-band Emission measurement at Contiguous UL CA is performed, set 0 to the number of RBs for CC where the signal is not output.

Even when Modulation Analysis is set to ON, the measurement is not performed under the following conditions.

- Contiguous UL CA
- At Carrier Frequency is not specified at Carrier Leakage Frequency.
- The number of RBs is set to 0.

Example of Use

To set the items for SCC-1 as follows at the measurement condition number 1:

UL Channel Bandwidth: 1.4 MHz, Number of RB: 6, Start RB number: 0

```
:CONF:CELL:SEQ:LTE:BWRB:SCC1 1,1.4MHZ,6,0
:CONF:CELL:SEQ:LTE:BWRB:SCC1? 1
>1.4MHZ,6,0
```

## :CONFigure:CELLular:SEQuence:LTE:CHCoding

Channel Coding

### Function

Sets or queries the channel coding.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:CHCoding <mcond>,<object>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:CHCoding? <mcond>
```

### Response

```
<object>
```

### Parameter

| | |
|---|---|
| <mcond> | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <object> | Target for channel coding |
| RMC | Reference Measurement Channel |
| RMC_UL_CA | RMC at UL CA |
| Default | RMC |

### Details

When FRAMETYPE is FDD and RMC_UL_CA is set, MX887013A-001 is required.
When FRAMETYPE is TDD and RMC_UL_CA is set, MX887014A-001 is required.

### Example of Use

To set the channel coding to RMC:

```
:CONF:CELL:SEQ:LTE:CHC 1,RMC
:CONF:CELL:SEQ:LTE:CHC? 1
> RMC
```

## :CONFigure:CELLular:SEQuence:LTE:CID

Cell ID

### Function

Sets or queries the Cell ID.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:CID <id>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:CID?
```

### Response

```
<id>
```

### Parameter

| | |
|---|---|
| <id> | Cell ID |
| Range | 0 to 503 |
| Resolution | 1 |
| Default | 0 |

### Example of Use

To set the Cell ID to 121:

```
:CONF:CELL:SEQ:LTE:CID 121
:CONF:CELL:SEQ:LTE:CID?
> 121
```

## :CONFigure:CELLular:SEQuence:LTE:CID:SCC1

Cell ID for SCC-1

### Function

Sets or queries the Cell ID for SCC-1.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:CID:SCC1 <id>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:CID:SCC1?
```

### Response

```
<id>
```

### Parameter

| | |
|---|---|
| <id> | Cell ID for SCC-1 |
| Range | 0 to 503 |
| Resolution | 1 |
| Default | 0 |

### Example of Use

To set the Cell ID for SCC-1 to 121:

```
:CONF:CELL:SEQ:LTE:CID:SCC1 121
:CONF:CELL:SEQ:LTE:CID:SCC1?
> 121
```

# :CONFigure:CELLular:SEQuence:LTE:CSHift

Cyclic Shift

## Function

Sets or queries the Cyclic Shift On/Off.

## Command

```
:CONFigure:CELLular:SEQuence:LTE:CSHift <on_off>
```

## Query

```
:CONFigure:CELLular:SEQuence:LTE:CSHift?
```

## Response

```
<on_off>
```

## Parameter

| | |
|---|---|
| <on_off> | Cyclic Shift |
| ON | Enables Cyclic Shift |
| OFF | Disables Cyclic Shift |
| FIX1 | The fixed value is set. |
| Default | ON |

## Example of Use

To enable the Cyclic Shift:

```
:CONF:CELL:SEQ:LTE:CSH ON
:CONF:CELL:SEQ:LTE:CSH?
> ON
```

## :CONFigure:CELLular:SEQuence:LTE:DSS

Delta SS

### Function

Sets or queries the Delta SS (Group Assignment PUSCH).

### Command

```
:CONFigure:CELLular:SEQuence:LTE:DSS <val>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:DSS?
```

### Response

```
<val>
```

### Parameter

| | |
|---|---|
| <val> | Delta SS |
| Range | 0 to 29 |
| Resolution | 1 |
| Default | 0 |

### Example of Use

To set the Delta SS to 12:

```
:CONF:CELL:SEQ:LTE:DSS 12
:CONF:CELL:SEQ:LTE:DSS?
> 12
```

## :CONFigure:CELLular:SEQuence:LTE:EXTLoss:INDex:SCC1

External Loss Table Index for SCC-1

### Function

Sets and queries the loss correction table index for SCC-1.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:EXTLoss:INDex:SCC1 <index>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:EXTLoss:INDex:SCC1?
```

### Response

```
<index>
```

### Parameter

| | |
|---|---|
| <index> | Loss correction table index |
| Range | 0 to 16 |
| Resolution | 1 |
| Default | 0 |

### Details

When the loss correction table index is set to 0, the setting value of the common command ":CALCulate:EXTLoss:TABLe:SETTing" is used.

Refer to Chapter 5 "SCPI Command Reference" in the *MU887000A Transmitter and Receiver Module Operation Manual* for details of the CALCulate:EXTLoss:TABLe:SETTing command.

### Example of Use

To set the loss correction table index for SCC-1 to 1:

```
:CONF:CELL:SEQ:LTE:EXTL:IND:SCC1 1
:CONF:CELL:SEQ:LTE:EXTL:IND:SCC1?
>1
```

## :CONFigure:CELLular:SEQuence:LTE:FERange

Frequency Error Range

### Function

Sets and queries the frequency error detection method in the modulation analysis measurement.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:FERange <value>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:FERange?
```

### Response

```
<value>
```

### Parameter

| | |
|---|---|
| <value> | Frequency Error Range |
| NORMAL | Normal |
| NARROW | Narrow Range |
| Default | NORMAL |

### Details

When Narrow Range is set, the measurement time takes longer and the range of permissible frequency errors is narrower, but the high accuracy measurement is performed.

### Example of Use

To set Frequency Error Range to Narrow Range:

```
:CONF:CELL:SEQ:LTE:FER NARROW
:CONF:CELL:SEQ:LTE:FER?
>NARROW
```

## :CONFigure:CELLular:SEQuence:LTE:FSTRucture

Frame Structure

### Function

Sets or queries the LTE frame structure.
This setting determines the duplex mode.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:FSTRucture <mcond>,<mode>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:FSTRucture? <mcond>
```

### Response

```
<mode>
```

### Parameter

| | |
|---|---|
| <mcond> | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Frame type (Duplex mode) |
| FDD | Frequency Division Multiplexing |
| TDD | Time Division Multiplexing |
| Default | FDD |

### Details

When only MX887013A is installed, only FDD can be set.
When only MX887014A is installed, only TDD can be set and the default is TDD.

### Example of Use

To set the duplex mode to FDD for the measurement condition number 2:

```
:CONF:CELL:SEQ:LTE:FSTR 2,FDD
:CONF:CELL:SEQ:LTE:FSTR? 2
> FDD
```

## :CONFigure:CELLular:SEQuence:LTE:FSTRucture:SCC1

Frame Structure for SCC-1

### Function

Sets or queries the LTE frame structure for SCC-1.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:FSTRucture:SCC1 <mcond>,<mode>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:FSTRucture:SCC1?
```

### Response

```
<mode>
```

### Parameter

| | |
|---|---|
| <mcond> | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Frame type for SCC-1 (Duplex mode) |
| FDD | Frequency Division Multiplexing |
| TDD | Time Division Multiplexing |
| Default | FDD |

### Details

When only MX887013A is installed, only FDD can be set.
When only MX887014A is installed, only TDD can be set and the default is TDD.
When the settings in this command and :CONFigure:CELLular:SEQuence:LTE:FSTRucture are different, the measurement is performed using the settings in :CONFigure:CELLular:SEQuence:LTE:FSTRucture.

### Example of Use

To set the duplex mode for SCC-1 to FDD for the measurement condition number 2:

```
:CONF:CELL:SEQ:LTE:FSTR:SCC1 2,FDD
:CONF:CELL:SEQ:LTE:FSTR:SCC1? 2
> FDD
```

## :CONFigure:CELLular:SEQuence:LTE:GHOPping

Group hopping

### Function

Enables and queries the Group hopping.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:GHOPping <on_off>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:GHOPping?
```

### Response

```
<on_off>
```

### Parameter

| | |
|---|---|
| <on_off> | Enables/disables Group hopping |
| ON | Enables Group hopping |
| OFF | Disables Group hopping |
| Default | ON |

### Example of Use

To enable the Group hopping:

```
:CONF:CELL:SEQ:LTE:GHOP ON
:CONF:CELL:SEQ:LTE:GHOP?
> ON
```

## :CONFigure:CELLular:SEQuence:LTE:IEMissions:CLFRequency

In-band Emission Carrier Leakage Frequency

### Function

Sets and queries the position of Carrier Leakage Frequency of the UE in the In-band Emission/EVM measurement at Contiguous UL CA.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:IEMissions:CLFRequency <clf>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:IEMissions:CLFRequency?
```

### Response

```
<clf>
```

### Parameter

| | |
|---|---|
| <clf> | Position of Carrier Leakage Frequency |
| CFR | Center frequency of Aggregated Channel Bandwidth |
| CCC | Center frequency of each CC |
| Default | CFR |

### Details

When the In-band Emission measurement at Contiguous UL CA is performed, “UL Number of RB” for PCC or SCC-1 must be set to 0.
For CFR, the resource block located at the center frequency of Aggregated Channel Bandwidth is treated as the carrier leak frequency and the In-band Emission/EVM measurement is performed.
For CCC, the center frequencies of each CC are treated as the carrier leak frequency and the In-band Emission/EVM measurement is performed.

### Example of Use

To set the position of Carrier Leakage Frequency to CFR:

```
:CONF:CELL:SEQ:LTE:IEM:CLFR CFR
:CONF:CELL:SEQ:LTE:IEM:CLFR?
> CFR
```

## :CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak

In-band Emissions Carrier Leakage Template

### Function

Set and queries In-band Emissions Carrier Leakage Template.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak <mcond>,<tp>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak? <mcond>
```

### Response

```
<tp>
```

### Parameter

| | |
|---|---|
| <mcond> | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <tp> | In-band Emissions Carrier Leakage Template |
| 0DBM | –24.2 dBc (UE output level 0 dBm) |
| 30DBM | –19.2 dBc (UE output level –30 dBm) |
| 40DBM | –9.2 dBc (UE output level –40 dBm) |
| Default | 0DBM |

### Details

The upper limit for the Carrier Leakage defined in 3GPP TS36.521 6.5.2.3 is selected according to this parameter setting.

### Example of Use

To set the In-band Emissions Carrier Leakage Template to 0DBM for the measurement condition number 2:

```
:CONF:CELL:SEQ:LTE:IEM:TPL 2,0DBM
:CONF:CELL:SEQ:LTE:IEM:TPL? 2
> 0DBM
```

## :CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak:SCC1

In-band Emissions Carrier Leakage Template for SCC-1

### Function

Set and queries In-band Emissions Carrier Leakage Template for SCC-1.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak:SCC1 <mcond>,<tp>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak:SCC1? <mcond>
```

### Response

```
<tp>
```

### Parameter

| | |
|---|---|
| <mcond> | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <tp> | In-band Emissions Carrier Leakage Template |
| 0DBM | –24.2 dBc (UE output level 0 dBm) |
| 30DBM | –19.2 dBc (UE output level –30 dBm) |
| 40DBM | –9.2 dBc (UE output level –40 dBm) |
| Default | 0DBM |

### Details

The upper limit for the Carrier Leakage defined in 3GPP TS36.521 6.5.2.3 is selected according to this parameter setting.

### Example of Use

To set the In-band Emissions Carrier Leakage Template for SCC-1 to 0DBM for the measurement condition number 2:

```
:CONF:CELL:SEQ:LTE:IEM:TPL:SCC1 2,0DBM
:CONF:CELL:SEQ:LTE:IEM:TPL:SCC1? 2
> 0DBM
```

## :CONFigure:CELLular:SEQuence:LTE:LSSearch

Long Span Search

### Function

Enables and queries the Long Span Search

### Command

```
:CONFigure:CELLular:SEQuence:LTE:LSSearch <on_off>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:LSSearch?
```

### Response

```
<on_off>
```

### Parameter

| | |
|---|---|
| <on_off> | Enables/disables Long Span Search |
| ON | Enables Long Span Search |
| OFF | Disables Long Span Search |
| Default | OFF |

### Details

Set this parameter to OFF when the Uplink and Downlink signals are synchronized; set it to ON when they are not synchronized.
The response to the MSTAT will be 5 (Synchronization word not detected), if this parameter to OFF when the Uplink and Downlink signals are not synchronized.

Measurement takes more time when the Long Span Search function is on.

### Example of Use

To enables the Long Span Search:

```
:CONF:CELL:SEQ:LTE:LSS ON
:CONF:CELL:SEQ:LTE:LSS?
> ON
```

## :CONFigure:CELLular:SEQuence:LTE:MCARrier

Measurement Carrier

### Function

Sets and queries the Component Carrier for measurement at Inter-band UL CA.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:MCARrier <mcond>,<carrier>
```

### Query

```
LTE_MCARRIER? <mcond>
```

### Response

```
<carrier>
```

### Parameter

| | |
|---|---|
| <mcond> | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <carrier> | Component Carrier for measurement |
| PCC | PCC |
| SCC1 | SCC-1 |
| Default | PCC |

### Example of Use

To set the Component Carrier for measurement to PCC at the measurement condition number 2:

```
:CONF:CELL:SEQ:LTE:MCAR 2,PCC
:CONF:CELL:SEQ:LTE:MCAR? 2
>PCC
```

## :CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme

Sequence UL RMC Modulation

### Function

Sets or queries the modulation method used by Uplink signal RMC at sequence measurement

### Command

```
:CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme <mcond>,<ul_rmc_mod>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme? <mcond>
```

### Response

```
<ul_rmc_mod>
```

### Parameters

| | |
|---|---|
| <mcond> | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <ul_rmc_mod> | Uplink RMC modulation method |
| QPSK | QPSK modulation |
| 16QAM | 16QAM modulation |
| 64QAM | 64QAM modulation |
| Default | QPSK |

### Example of Use

To set the modulation method of condition number 1 in the LTE measurement condition table to 16QAM:

```
:CONF:CELL:SEQ:LTE:MOD:MSCH 1,16QAM
:CONF:CELL:SEQ:LTE:MOD:MSCH? 1
> 16QAM
```

## :CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme:SCC1

Sequence UL RMC Modulation for SCC-1

### Function

Sets or queries the modulation method for SCC-1 used by Uplink signal RMC at sequence measurement

### Command

```
:CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme:SCC1
<mcond>,<ul_rmc_mod>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme:SCC1? <mcond>
```

### Response

```
<ul_rmc_mod>
```

### Parameters

| | |
|---|---|
| <mcond> | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <ul_rmc_mod> | Uplink RMC modulation method |
| QPSK | QPSK modulation |
| 16QAM | 16QAM modulation |
| 64QAM | 64QAM modulation |
| Default | QPSK |

### Example of Use

To set the modulation method for SCC-1 at the measurement condition number 1 in the LTE measurement condition table to 16QAM:

```
:CONF:CELL:SEQ:LTE:MOD:MSCH:SCC1 1,16QAM
:CONF:CELL:SEQ:LTE:MOD:MSCH:SCC1? 1
> 16QAM
```

## :CONFigure:CELLular:SEQuence:LTE:MODulation:SET

Modulation Analysis Measurement Enable and Count

### Function

Enables the Modulation Analysis Measurement and sets the measurement count, or queries the setting values

### Command

```
:CONFigure:CELLular:SEQuence:LTE:MODulation:SET
<mcond>,<on_off>[,<count>]
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:MODulation:SET? <mcond>
```

### Response

```
<on_off>,<count>
```

### Parameters

| | |
|---|---|
| <mcond> | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <on_off> | Enables/disables measurement |
| ON | Enables measurement |
| OFF | Disables measurement |
| Default | OFF |
| <count> | Measurement count |
| Range | 1 to 200<br>1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

### Example of Use

To enable the Modulation Analysis measurement and set the measurement count to 200 for measurement condition number 2 in the LTE measurement condition table:

```
:CONF:CELL:SEQ:LTE:MOD:SET 2,ON,200
:CONF:CELL:SEQ:LTE:MOD:SET? 2
> ON,200
```

### Remarks

Modulation analysis is executed for 1 slot (0.5 ms) at each measurement count.

## :CONFigure:CELLular:SEQuence:LTE:MOFFset

Measurement Offset

### Function

Sets and queries the shift amount of the analysis start time at the sequence measurement.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:MOFFset <mcond>,<on_off>[,<time>]
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:MOFFset? <mcond>
```

### Response

```
<on_off>,<time>
```

### Parameters

| | |
|---|---|
| <mcond> | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <on_off> | Analysis start time shift ON/OFF |
| ON | Shifts the analysis start time. |
| OFF | Does not shift the analysis start time. |
| Default | OFF |
| <time> | Shift amount of analysis start time |
| Range | 0 to 10.00000 ms |
| Resolution | 0.00001 ms |
| Default | 0.00000 ms |

### Details

This setting is enabled only when :CONFigure:CELLular:SEQuence:LTE:LSSearch is set to ON and the measurement count is 1.

### Example of Use

To set the shift amount of the analysis start time to 10 ms at the measurement condition number 1 in the LTE measurement condition table:

```
:CONFigure:CELLular:SEQuence:LTE:MOFFset 1,ON,10
:CONFigure:CELLular:SEQuence:LTE:MOFFset? 1
>ON,10.00000
```

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SCPI Command Reference

## :CONFigure:CELLular:SEQuence:LTE:OBW:RATio

Occupied Bandwidth Ratio

### Function

Sets the Occupied Bandwidth measurement occupation ratio in Sequence Measurement mode, and queries the setting

### Command

```
:CONFigure:CELLular:SEQuence:LTE:OBW:RATio <ratio>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:OBW:RATio?
```

### Response

```
<ratio>
```

### Parameter

| | |
|---|---|
| <ratio> | Occupied Bandwidth occupation ratio |
| Range | 80.0% to 99.9% |
| Resolution | 0.1% |
| Suffix code | None |
| Default | 99.0% |

### Example of Usage

To set the Occupied Bandwidth occupation ratio to 99.0% at sequence measurement:

```
:CONF:CELL:SEQ:LTE:OBW:RAT 99.0
:CONF:CELL:SEQ:LTE:OBW:RAT?
> 99.0
```

## :CONFigure:CELLular:SEQuence:LTE:OBW:SET

OBW Measurement Enable and Count

### Function

Enables Occupied Bandwidth measurement and sets measurement count, or queries settings

### Command

```
:CONFigure:CELLular:SEQuence:LTE:OBW:SET <mcond>,<on_off>[,<count>]
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:OBW:SET? <mcond>
```

### Response

```
<on_off>,<count>
```

### Parameters

| | |
|---|---|
| <mcond> | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <on_off> | Enables/disables measurement |
| ON | Enables measurement |
| OFF | Disables measurement |
| Default | OFF |
| <count> | Measurement count |
| Range | 1 to 200<br>1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

### Example of Use

To disable Occupied Bandwidth measurement for measurement condition number 3 in the LTE measurement condition table:

```
:CONF:CELL:SEQ:LTE:OBW:SET 3,OFF
:CONF:CELL:SEQ:LTE:OBW:SET? 3
> OFF
```

### Remarks

Occupied Bandwidth is measured for 1 subframe (1 ms) at each measurement count.

## :CONFigure:CELLular:SEQuence:LTE:POWer:SET

Tx Power Measurement Enable and Count

### Function

Enables the Tx Power measurement and sets the measurement count, or queries the settings.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:POWer:SET <mcond>,<on_off>[,<count>]
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:POWer:SET? <mcond>
```

### Response

```
<on_off>,<count>
```

### Parameters

| | |
|---|---|
| <mcond> | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <on_off> | Enables/disables measurement |
| ON | Enables measurement |
| OFF | Disables measurement |
| Default | ON |
| <count> | Measurement count |
| Range | 1 to 200<br>1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

### Example of Use

To enable the Tx Power measurement and set the measurement count to 50 for the measurement condition number 5 in the LTE measurement condition table:

```
:CONF:CELL:SEQ:LTE:POW:SET 5,ON,50
:CONF:CELL:SEQ:LTE:POW:SET? 5
> ON,50
```

### Remarks

The Tx power is measured for 1 subframe (1 ms) at each measurement count.

## :CONFigure:CELLular:SEQuence:LTE:RSRange:FDD

RS Search Range for FDD mode

### Function

Sets and queries the range of Reference Signal detection at the sequence measurement.

### Command

```
CONFigure:CELLular:SEQuence:LTE:RSRange:FDD <time>
```

### Query

```
CONFigure:CELLular:SEQuence:LTE:RSRange:FDD?
```

### Response

<time>

| | |
|---|---|
| Unit | us |
| Resolution | 0.1 us |

### Parameters

| | |
|---|---|
| <time> | Range of Reference Signal detection |
| Range | 0.8 to 100.0 us |
| Resolution | 0.1 us |
| Default | 0.8 us |

### Details

This setting is enabled only when LTE_MEASOFFSET is set to ON.

### Example of Use

To set the range of Reference Signal detection to 10 us in the FDD mode:

```
CONFigure:CELLular:SEQuence:LTE:RSRange:FDD 10
CONFigure:CELLular:SEQuence:LTE:RSRange:FDD?
>10.0
```

## :CONFigure:CELLular:SEQuence:LTE:RSRange:TDD

RS Search Range for TDD mode

### Function

Sets and queries the range of Reference Signal detection at the sequence measurement.

### Command

```
CONFigure:CELLular:SEQuence:LTE:RSRange:TDD <time>
```

### Query

```
CONFigure:CELLular:SEQuence:LTE:RSRange:TDD?
```

### Response

`<time>`

| | |
|---|---|
| Unit | us |
| Resolution | 0.1 us |

### Parameters

| | |
|---|---|
| <time> | Range of Reference Signal detection |
| Range | 0.8 to 100.0 us |
| Resolution | 0.1 us |
| Default | 17.8 us |

### Details

This setting is enabled only when LTE_MEASOFFSET is set to ON.

### Example of Use

To set the range of Reference Signal detection to 10 us in the TDD mode:

```
CONFigure:CELLular:SEQuence:LTE:RSRange:TDD 10
CONFigure:CELLular:SEQuence:LTE:RSRange:TDD?
>10.0
```

## :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB100:RB100

Spectrum Emission Mask Template for Contiguous UL CA (100RB+100RB)

### Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 100RB+100RB.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB100:RB100
<range>,<limit>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB100:RB100? <range>
```

### Response

<limit>

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| <range> | Range | |
| Range | 1 to 6 | |
| Resolution | 1 | |
| Default | 1 | |
| <limit> | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Default | Range 1: | –22.5 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |
| | Range 5: | –23.5 dBm |
| | Range 6: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 100RB+100RB:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB100:RB100 2,-10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB100:RB100? 2
>-10.0
```

## :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB25:RB100

Spectrum Emission Mask Template for Contiguous UL CA (25RB+100RB)

### Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 25RB+100RB.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB25:RB100
<range>,<limit>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB25:RB100? <range>
```

### Response

```
<limit>
```

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| <range> | Range | |
| Range | 1 to 6 | |
| Resolution | 1 | |
| Default | 1 | |
| <limit> | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Default | Range 1: | –20.5 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |
| | Range 5: | –23.5 dBm |
| | Range 6: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 25RB+100RB:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB25:RB100 2,-10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB25:RB100? 2
>-10.0
```

## :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB50:RB100

Spectrum Emission Mask Template for Contiguous UL CA (50RB+100RB)

### Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 50RB+100RB.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB50:RB100
<range>,<limit>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB50:RB100? <range>
```

### Response

<limit>

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| <range> | Range | |
| Range | 1 to 6 | |
| Resolution | 1 | |
| Default | 1 | |
| <limit> | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Default | Range 1: | –21.0 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |
| | Range 5: | –23.5 dBm |
| | Range 6: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 50RB+100RB:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB50:RB100 2,-10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB50:RB100? 2
>-10.0
```

4

SCPI Command Reference

## :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB100

Spectrum Emission Mask Template for Contiguous UL CA (75RB+100RB)

### Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 75RB+100RB.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB100
<range>,<limit>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB100? <range>
```

### Response

`<limit>`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| <range> | Range | |
| Range | 1 to 6 | |
| Resolution | 1 | |
| Default | 1 | |
| <limit> | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Default | Range 1: | –22.0 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |
| | Range 5: | –23.5 dBm |
| | Range 6: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 75RB+100RB:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB75:RB100 2,-10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB75:RB100? 2
>-10.0
```

## :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB75

Spectrum Emission Mask Template for Contiguous UL CA (75RB+75RB)

### Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 75RB+75RB.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB75
<range>,<limit>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB75? <range>
```

### Response

```
<limit>
```

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| <range> | Range | |
| Range | 1 to 6 | |
| Resolution | 1 | |
| Default | 1 | |
| <limit> | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Default | Range 1: | –21.0 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |
| | Range 5: | –23.5 dBm |
| | Range 6: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 75RB+75RB:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB75:RB75 2,-10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB75:RB75? 2
>-10.0
```

## :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B10M

Spectrum Emission Mask Template (10 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 10 MHz channel bandwidth in Sequence Measurement mode.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B10M <range>,<limit>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B10M? <range>
```

### Response

`<limit>`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| <range> | Range | |
| Range | 1 to 4 | |
| Resolution | 1 | |
| Suffix code | None | |
| Default | 1 | |
| <limit> | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Suffix code | DBM (uses dBm when omitted) | |
| Default | Range 1: | –16.5 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 10 MHz channel bandwidth to –10.0 dBm :

```
:CONF:CELL:SEQ:LTE:SEM:LIM:B10M 2, -10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:B10M? 2
> -10.0
```

## :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B15M

Spectrum Emission Mask Template (15 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 15 MHz channel bandwidth in Sequence Measurement mode

### Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B15M <range>,<limit>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B15M? <range>
```

### Response

<limit>

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| <range> | Range | |
| Range | 1 to 4 | |
| Resolution | 1 | |
| Suffix code | None | |
| Default | 1 | |
| <limit> | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Suffix code | DBM (uses dBm when omitted) | |
| Default | Range 1: | –16.5 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 15 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:B15M 2, -10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:B15M? 2
> -10.0
```

## :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B1M4

Spectrum Emission Mask Template (1.4 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 1.4 MHz channel bandwidth in Sequence Measurement mode

### Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B1M4 <range>,<limit>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B1M4? <range>
```

### Response

`<limit>`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| <range> | Range | |
| Range | 1 to 4 | |
| Resolution | 1 | |
| Suffix code | None | |
| Default | 1 | |
| <limit> | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Suffix code | DBM (uses dBm when omitted) | |
| Default | Range 1: | –8.5 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –23.5 dBm |
| | Range 4: | 0.0 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 1.4 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:B1M4 2, -10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:B1M4? 2
> -10.0
```

## :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B20M

Spectrum Emission Mask Template (20 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 20 MHz channel bandwidth in Sequence Measurement mode

### Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B20M <range>,<limit>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B20M? <range>
```

### Response

`<limit>`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| <range> | Range | |
| Range | 1 to 4 | |
| Resolution | 1 | |
| Suffix code | None | |
| Default | 1 | |
| <limit> | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Suffix code | DBM (uses dBm when omitted) | |
| Default | Range 1: | –19.5 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 20 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:B20M 2,-10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:B20M? 2
> -10.0
```

## :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B3M

Spectrum Emission Mask Template (3 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 3 MHz channel bandwidth in Sequence Measurement mode

### Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B3M <range>,<limit>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B3M? <range>
```

### Response

`<limit>`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| <range> | Range | |
| Range | 1 to 4 | |
| Resolution | 1 | |
| Suffix code | None | |
| <limit> | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Suffix code | DBM (uses dBm when omitted) | |
| Default | Range 1: | –11.5 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –23.5 dBm |
| | Range 4: | 0.0 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 3 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:B3M 2,-10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:B3M? 2
> -10.0
```

## :CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B5M

Spectrum Emission Mask Template (5 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 5 MHz channel bandwidth in Sequence Measurement mode

### Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B5M <range>,<limit>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B5M? <range>
```

### Response

```
<limit>
```

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| <range> | Range | |
| Range | 1 to 4 | |
| Resolution | 1 | |
| Suffix code | None | |
| Default | 1 | |
| <limit> | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Suffix code | DBM (uses dBm when omitted) | |
| Default | Range 1: | –13.5 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 5 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:B5M 2,-10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:B5M? 2
> -10.0
```

## :CONFigure:CELLular:SEQuence:LTE:SEMask:SET

Spectrum Emission Mask Enable and Count

### Function

Enables the Spectrum Emission Mask Measurement and sets or queries measurement count

### Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:SET <mcond>,<on_off>[,<count>]
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:SET? <mcond>
```

### Response

```
<on_off>,<count>
```

### Parameters

| | |
|---|---|
| <mcond> | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <on_off> | Enables/disables the measurement |
| ON | Enables the measurement |
| OFF | Disables the measurement |
| Default | OFF |
| <count> | Measurement count |
| Range | 1 to 200<br>1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

### Example of Use

To enable the Spectrum Emission measurement and set the measurement count to 100 for measurement condition number 1 in the LTE measurement condition table:

```
:CONF:CELL:SEQ:LTE:SEM:SET 1,ON,100
:CONF:CELL:SEQ:LTE:SEM:SET? 1
> ON,100
```

### Remarks

The Spectrum Emission Mask is measured for 1 subframe (1 ms) at each measurement count.

## :CONFigure:CELLular:SEQuence:LTE:TENVironment

Test Environment

### Function

Sets or queries the test environment.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:TENVironment <mcond>,<env>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:TENVironment? <mcond>
```

### Response

```
<env>
```

### Parameter

| | |
|---|---|
| <mcond> | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <env> | Test Environment |
| NORMAL | Normal |
| EXTREME | Extreme |
| Default | NORMAL |

### Details

This is the parameter that determines the threshold line for Spectrum Flatness measurement. The test environment is defined in 3GPP TS36.521-1. The following values depend on the test environment settings.

- When the test environment is NORMAL

| | |
|---|---|
| Border of Range1/Range2 | 3 MHz |
| RP1 limit level | 5.4 dB |
| RP2 limit level | 9.4 dB |
| RP12 limit level | 6.4 dB |
| RP21 limit level | 8.4 dB |

- When the test environment is EXTREME

| | |
|---|---|
| Border of Range1/Range2 | 5 MHz |
| RP1 limit level | 5.4 dB |
| RP2 limit level | 13.4 dB |
| RP12 limit level | 7.4 dB |
| RP21 limit level | 11.4 dB |

### Example of Use

To set the test environment to EXTREME for the measurement condition number 2 in the LTE measurement condition table:

```
:CONF:CELL:SEQ:LTE:TENV 2,EXTREME
:CONF:CELL:SEQ:LTE:TENV? 2
> EXTREME
```

## :CONFigure:CELLular:SEQuence:LTE:ULDL

Uplink Downlink Configuration

### Function

Sets or queries Uplink/Downlink signal configuration of TDD.

### Command

```
:CONFigure:CELLular:SEQuence:LTE:ULDL <conf>
```

### Query

```
:CONFigure:CELLular:SEQuence:LTE:ULDL?
```

### Response

```
<conf>
```

### Parameter

| | |
|---|---|
| <conf> | Uplink Downlink Signal Configuration |
| Range | 0 to 6 |
| Resolution | 1 |
| Default | 1 |

### Example of Use

To set the Uplink/Downlink signal configuration to 1:

```
:CONF:CELL:SEQ:LTE:ULDL 1
:CONF:CELL:SEQ:LTE:ULDL?
> 1
```

## :CONFigure:CELLular:SEQuence:RFSettings:REINit

Sequence Control Parameter - Sequence End State Reinitialization

### Function

Enables and queries the automatic initialization of following items after sequence measurement completion

- Downlink frequency
- Output level
- Output signal pattern
- Uplink frequency
- Input level

### Command

```
:CONFigure:CELLular:SEQuence:RFSettings:REINit <sw>
```

### Query

```
:CONFigure:CELLular:SEQuence:RFSettings:REINit?
```

### Response

```
<sw>
```

### Parameter

| | |
|---|---|
| <sw> | Automatic initialization after sequence measurement completion |
| ON | Enables automatic initialization |
| OFF | Disables automatic initialization |
| Default | ON |

### Details

If the parameter is set to ON, the settings are initialized to the values configured by the following commands after sequence measurement completion.

| | |
|---|---|
| Downlink frequency | :CONFigure:CELLular:GENerator:RFSettings:FREQuency |
| Output level | :CONFigure:CELLular:GENerator:RFSettings:LEVel |
| Output signal pattern | :CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect |
| Uplink frequency | :CONFigure:CELLular:MEASurementRFSettings:FREQuency |
| Input level | :CONFigure:CELLular:MEASurement:RFSettings:LEVel |

If the parameter is set to OFF, the settings remain those of the sequence measurement stop segment.

### Example of Use

To reset the target parameters:

```
:CONF:CELL:SEQ:RFS:REIN ON
:CONF:CELL:SEQ:RFS:REIN?
> ON
```

## :CONFigure:CELLular:SEQuence:RFSettings:TRX

Sequence Table Parameter - TRX Control

### Function

Sets or queries the following items in the specific segment of the sequence table

- Downlink frequency
- Output Level
- Output signal pattern
- Uplink frequency
- Input level

### Command

```
:CONFigure:CELLular:SEQuence:RFSettings:TRX
<seg>,<ul_freq>,<ref>,<dl_freq>,<level>,<pat>
```

### Query

```
:CONFigure:CELLular:SEQuence:RFSettings:TRX? <seg>
```

### Response

```
<ul_freq>,<ref>,<dl_freq>,<level>,<pat>
```

<ul_freq>, <dl_freq>

| | |
|---|---|
| Unit | MHz |
| Resolution | 0.000001 MHz |

<ref>, <level>

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <ul_freq> | Uplink frequency |
| Range | 400.000000 to 3800.000000 MHz<br>400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 0.000001 MHz |
| Suffix Code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted) |
| Default | 1950.000000 MHz |
| <ref> | Input level |
| Range | –65.0 to +35 dBm (Port1/Port2)<br>–65.0 to +25 dBm (Port3/Port4) |
| Resolution | 0.1 dB |
| Suffix Code | DBM (uses dBm when omitted) |
| Default | –10.0 dBm |
| <dl_freq> | Downlink frequency |
| Range | 400.000000 to 3800.000000 MHz<br>400.000000 to 6000.000000 MHz (with MU887000A-001/101) |

| | |
|---|---|
| Resolution | 0.000001 MHz |
| Suffix Code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted) |
| Default | 2140.000000 MHz |
| <level> | Output level |
| Range | –130.0 to –10.00 dBm (Port1/Port2) |
| | –120.0 to 0.0 dBm (Port3/Port4) |
| Resolution | 0.1 dB |
| Suffix Code | DBM (used dBm when omitted) |
| Default | –60.0 dBm |
| <pat> | Waveform pattern |
| PAT1 to PATn | Pattern number (n: waveform information file group range) |
| CW | Modulation turned OFF |
| OFF | Output level turned OFF |
| NC | Waveform pattern not configured in this segment (holds currently configured waveform pattern) |
| Default | CW |

Details

The setting range varies with the input/output port setting.
If Cable Loss Correction is ON, the cable loss is added to the range of the input level and subtracted from the range of output level.
If the cable loss is 5 dB, the input and output levels are as follows:

| | |
|---|---|
| Input level | –60.0 to +40 dBm |
| Output level | –135.0 to –15.0 dBm |

In this case, if the output level is set to –10.0 dBm, an out-of-parameter setting range error occurs. (The response to :SYSTem:ERRor? returns 220, Parameter error).
Whether an out-of-parameter setting range error has occurred is determined during execution of the following commands:
:CONFigure:CELLular:SEQuence:CONTrol,:INITiate:CELLular:MEASurement:SINGle,
:INITiate:CELLular:SEQuence:EXECute:TX
A measurement execution error occurs when an out-of-range error occurs.
:FETCh:CELLular:SEQuence:ERRor? is used to query the error details.

The pattern number is the same as the group number. Refer to Chapter 3, “Waveform File Details” in the *Waveform Files for Cellular Application Operation Manual*.

Example of Use

To set segment 0 as follows.
Uplink frequency set to 1950.0 MHz, input level to –10.0 dBm, downlink frequency to 2140.0 MHz, output level to –60.0 dBm, and no modulation:

```
:CONF:CELL:SEQ:RFS:TRX 0,1950.000000,-10.0,2140.000000,-60.0,CW
:CONF:CELL:SEQ:RFS:TRX? 0
> 1950.000000,-10.0,2140.000000,-60.0,CW
```

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Remarks

The group range is the selected waveform file.
For details of the waveform pattern, refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

## :CONFigure:CELLular:SEQuence:RFSettings:TX

Sequence Table Parameter - Uplink Frequency, Input Level

Function

Sets or queries uplink frequency and input level of segments in sequence table.

Command

```
:CONFigure:CELLular:SEQuence:RFSettings:TX <seg>,<ul_freq>,<ref>
```

Query

```
:CONFigure:CELLular:SEQuence:RFSettings:TX? <seg>
```

Response

```
<ul_freq>,<ref>
```

<ul_freq>

| | |
|---|---|
| Unit | MHz |
| Resolution | 0.000001 MHz |

<ref>

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

Parameter

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <ul_freq> | Rx frequency (uplink) |
| Range | 400.000000 to 3800.000000 MHz<br>400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 0.000001 MHz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted) |
| Default | 1950.000000 MHz |
| <ref> | Input level |
| Range | –65.0 to +35 dBm (Port1/Port2)<br>–65.0 to +25 dBm (Port3/Port4) |
| Resolution | 0.1 dB |
| Suffix code | DBM (uses dBm when omitted) |
| Default | –10.0 dBm |

Details

This command sets only the uplink frequency and input level among the parameters that are set by :CONFigure:CELLular:SEQuence:RFSettings:TRX.
The setting range varies with the input port setting.
When the Cable Loss Calibration is ON, the cable loss is added to the input level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –60.0 to +40.0 dBm.
Whether an out-of-parameter setting range error has occurred is determined during execution of the following commands:
:CONFigure:CELLular:SEQuence:CONTrol,:INITiate:CELLular:MEASurement:SINGle, :INITiate:CELLular:SEQuence:EXECute:TX

Example of Use

To set the parameters for segment 1 as follows:
Uplink frequency: 1950 MHz, Input level: -10.0 dBm

```
:CONF:CELL:SEQ:RFS:TX 1,1950,-10.0
:CONF:CELL:SEQ:RFS:TX? 1
> 1950.000000,-10.0
```

## :CONFigure:CELLular:SEQuence:RFSettings:TX:SCC1

Sequence Table Parameter - Uplink Frequency, Input Level for SCC-1

Function

Sets and queries the uplink signal frequency and input level for SCC-1 in the segment of the sequence table.

Command

```
:CONFigure:CELLular:SEQuence:RFSettings:TX:SCC1 <seg>,<ul_freq>,<ref>
```

Query

```
:CONFigure:CELLular:SEQuence:RFSettings:TX:SCC1? <seg>
```

Response

```
<ul_freq>,<ref>
```

<ul_freq>

| | |
|---|---|
| Unit | MHz |
| Resolution | 0.000001 MHz |

<ref>

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

Parameter

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <ul_freq> | Rx frequency (uplink) for SCC-1 |

| | | |
|---|---|---|
| | Range | 400.000000 to 3800.000000 MHz<br>400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| | Resolution | 0.000001 MHz |
| | Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted) |
| | Default | 1950.000000 MHz |
| <ref> | | Input level |
| | Range | –65.0 to +35 dBm (Port1/Port2)<br>–65.0 to +25 dBm (Port3/Port4) |
| | Resolution | 0.1 dB |
| | Suffix code | DBM (uses dBm when omitted) |
| | Default | –10.0 dBm |

Details

The setting range varies with the input port setting.
When the Cable Loss Calibration is ON, the cable loss is added to the input level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –60.0 to +40.0 dBm.
Whether an out-of-parameter setting range error has occurred is determined during execution of the following commands:
:CONFigure:CELLular:SEQuence:CONTrol,:INITiate:CELLular:MEASurement:SINGle, :INITiate:CELLular:SEQuence:EXECute:TX

Example of Use

To set the parameters for SCC-1 for segment 1 as follows:
Uplink frequency: 1950 MHz, Input level: –10.0 dBm

```
:CONF:CELL:SEQ:RFS:TX:SCC1 1,1950,-10.0
:CONF:CELL:SEQ:RFS:TX:SCC1? 1
> 1950.000000,-10.0
```

# :CONFigure:CELLular:SEQuence:RXPort

Sequence Table Parameter - SG Output Port

## Function

Sets or queries the test port to send RF signal in the specified segment of the sequence table

## Command

```
:CONFigure:CELLular:SEQuence:RXPort <seg>,<port>
```

## Query

```
:CONFigure:CELLular:SEQuence:RXPort? <seg>
```

## Response

```
<port>
```

## Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| <port> | Port number |
| PORT1 | PORT 1 |
| PORT2 | PORT 2 |
| PORT3 | PORT 3 |
| PORT4 | PORT 4 |
| Default | PORT1 |

## Details

PORT3 cannot be set when PORT3 is selected for RF signal input port.
PORT4 cannot be set when PORT4 is selected for RF signal input port.

## Example of Use

To set the port number in segment 5 to 2:

```
:CONF:CELL:SEQ:RXP 5,PORT2
:CONF:CELL:SEQ:RXP? 5
> PORT2
```

# :CONFigure:CELLular:SEQuence:SETup

Sequence Table Parameter - Measurement

## Function

Sets or queries the measurement conditions of the specified segment

## Command

```
:CONFigure:CELLular:SEQuence:SETup <seg>,<mode>,<step>,<mcond>
```

## Query

```
:CONFigure:CELLular:SEQuence:SETup? <seg>
```

## Response

```
<mode>,<step>,<mcond>
```

## Parameters

| | | |
|---|---|---|
| <seg> | Segment number | |
| Range | 0 to 1999 | |
| Resolution | 1 | |
| <mode> | Measurement mode | Required software license |
| TXP | Transmit power measurement mode | MX887010A |
| WCDMA | W-CDMA measurement mode | MX887010A and MX887011A |
| GSM | GSM measurement mode | MX887010A and MX887012A |
| CDMA2K | CDMA2000 1x measurement mode | MX887010A and MX887015A |
| EVDO | CDMA2000 1xEVDO measurement mode | MX887010A and MX887016A |
| TDSCDMA | TD-SCDMA measurement mode | MX887010A and MX887017A |
| LTE | LTE measurement mode | MX887010A and MX887013A, or MX887010A and MX887014A |
| Default | TXP | |
| <step> | Step count | |
| Range | 2 to 3000 | |
| Resolution | 1 | |
| Default | 2 | |
| <mcond> | Measurement condition number | |
| Range | 0 to 1999 | |
| Resolution | 1 | |
| Default | 0 | |

## Example of Use

To set the settings for segment 2 as follows:

Measurement mode: LTE, Step count: 10, Measurement condition number: 3

```
:CONF:CELL:SEQ:SET 2,LTE,10,3
:CONF:CELL:SEQ:SET? 2
> LTE,10,3
```

## :CONFigure:CELLular:SEQuence:TABLe

Sequence Control Parameter - Sequence Table

### Function

Sets or queries the number of sequence table to execute

### Command

```
:CONFigure:CELLular:SEQuence:TABLe <table>
```

### Query

```
:CONFigure:CELLular:SEQuence:TABLe?
```

### Response

```
<table>
```

### Parameter

| | |
|---|---|
| <table> | Sequence table number |
| Range | 0 to 3 |
| Resolution | 1 |
| Default | 0 |

### Example of Use

To select the sequence table 1:

```
:CONF:CELL:SEQ:TABL 1
:CONF:CELL:SEQ:TABL?
> 1
```

## :FETCh:CELLular:SEQuence:ERRor?

Sequence Parameter Information - Error check

### Function

Queries the setting error information of sequence table

### Query

```
:FETCh:CELLular:SEQuence:ERRor? [<item>]
```

### Response

When nothing is set to <item>:

```
<n>,<err(0)>,..,<err(n-1)>
```

| | | |
|---|---|---|
| <n> | | Number of errors |
| | Range | 0 to 4 |
| <err(n–1)> | | Parameter with error |
| | ILVL | Input level |
| | OLVL | Output level |
| | STEP | Step count |
| | LEN | Capture memory length |

When <item> is ILVL, OLVL, STEP, DLPAT, or PORT:

```
<ns>,<seg(0)>,..,<seg(ns-1)>
```

| | | |
|---|---|---|
| <ns> | | Number of segments with errors |
| | Range | 0 to 2000 |
| <seg(ns–1)> | | Segment number with errors |
| | Range | 0 to 1999 |

When <item> is LEN:

```
<e>,<mem>,<exe>,<set>
```

| | | |
|---|---|---|
| <e> | | Presence of errors |
| | Range | 0 No error, executable |
| | | 1 Errors found, not executable |
| <mem> | | Memory utilization |
| | Range | 0.0% to 100.0% |
| | Resolution | 0.1% |
| <exe> | | Number of segments capable of executing capture in number of configured segments |
| | Range | 0 to 2000 |
| <set> | | Number of segments with capture configured |
| | Range | 0 to 2000 |

When <item> is OLVLNUM, PATNUM, or STDNUM:

```
<e>,<exe>,<set>
```

| | | |
|---|---|---|
| <e> | | Presence of errors |
| | Range | 0 No error, executable |
| | | 1 Errors found, not executable |
| <exe> | | Number of segments capable of executing capture in number of |

| | |
|---|---|
| | configured segments |
| Range | 0 to 2000 |
| <set> | Number of segments with capture configured |
| Range | 0 to 2000 |

If no error is found in the sequence table, the response returns 0.

Parameters

| | |
|---|---|
| <item> | Parameter in sequence table |
| ILVL | Input level |
| OLVL | Output level |
| STEP | Step count |
| DLPAT | Waveform pattern |
| PORT | Port |
| LEN | Capture memory length |
| OLVLNUM | Output level change count |
| PATNUM | Waveform pattern change count |
| STDNUM | Measurement mode change count |

Details

This command can check error presence of input level, output level, step count, and capture memory length.
To query error presence of the following parameters,
use :FETCh:CELLular:SEQuence:ERRor2? command.
Waveform pattern, port, output level change count, waveform pattern change count, measurement mode change count.

To set parameters for sequence table using the following commands, errors are not checked.
:CONFigure:CELLular:SEQuence:RFSettings:TRX
:CONFigure:CELLular:SEQuence:RFSettings:TX
:CONFigure:CELLular:SEQuence:SETup

Example of Use

To query the presence of errors:
```
:CONF:CELL:SEQ:ERR?
>1,ILVL
```

To query the input level setting error information:
```
:CONF:CELL:SEQ:ERR? ILVL
>2,3,12
```

To query the capture memory error information:
```
:CONF:CELL:SEQ:ERR? LEN
>0,25.0,20,20
```
Here, the capture memory utilization is 25.0%, so all captures configured in 20 segments are

executable.

Remarks

Sequence measurement cannot be started if there are errors.
However, the sequence can be started if segment numbers with errors are excluded from the execution range using the :CONFigure:CELLular:SEQuence:CONTrol command.

## :FETCh:CELLular:SEQuence:ERRor2?

Sequence Parameter Information - Error Check

### Function

Queries setting error information of sequence table

### Query

```
:FETCh:CELLular:SEQuence:ERRor2? <format>
```

### Response

```
<n>,<err(0)>,..,<err(n-1)>
```

| | |
|---|---|
| <n> | Number of errors |
| Range | 0 to 7 |
| <err(n-1)> | Parameter with errors |
| ILVL | Input level |
| OLVL | Output level |
| STEP | Step count |
| DLPAT | Waveform pattern |
| PORT | Port |
| LEN | Capture memory length |
| OLVLNUM | Output level change count |
| PATNUM | Waveform pattern change count |
| STDNUM | Measurement mode change count |

If no error is found in the sequence table, the response returns 0.

### Parameters

| | |
|---|---|
| <format> | Format |
| 1 | Error Check 1 |

### Details

Parameter setting errors can be checked up to seven types.
Only one of output level change count, waveform pattern change count, or measurement mode change count has an error.
Two or three of them cannot have an error simultaneously.

To set parameters for sequence table using the following commands, errors are not checked.

:CONFigure:CELLular:SEQuence:RXPort
:CONFigure:CELLular:SEQuence:RFSettings:TRX
:CONFigure:CELLular:SEQuence:RFSettings:TX
:CONFigure:CELLular:SEQuence:SETup

To query error details per parameter, use :FETCh:CELLular:SEQuence:ERRor command.

Example of Use

To query the presence of errors:

```
:FETC:CELL:SEQ:ERR2? 1
>2,ILVL,DLPAT
```

Remarks

Sequence measurement cannot be started if there are errors.
However, sequence measurement can be started if segment numbers with errors are excluded from the execution range using the :CONFigure:CELLular:SEQuence:CONTrol command.

## :FETCh:CELLular:SEQuence:LTE:ACLR?

ACLR Result

### Function

Queries the Adjacent Channel Leakage Power Ratio measurement result

### Query

```
:FETCh:CELLular:SEQuence:LTE:ACLR? <seg>,<mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg0>,<avg1>,<avg2>,<avg3>,<avg4>,<avg5>,<max0>,<max1>,<max2>,<max3>,<
max4>,<max5>,<min0>,<min1>,<min2>,<min3>,<min4>,<min5>
```

| | |
|---|---|
| <avg> | Measurement results in order of offset frequencies (Average) |
| <max> | Measurement results in order of offset frequencies (Maximum) |
| <min> | Measurement results in order of offset frequencies (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

```
<aclr0>,<aclr1>,<aclr2>,<aclr3>,<aclr4>,<aclr5>
```

| | |
|---|---|
| <aclr> | Measurement results in order of offset frequencies in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

The responses are sent in the following order.
E-UTRA ACLR LOW,
E-UTRA ACLR UP,
UTRA ACLR2 LOW,
UTRA ACLR1 LOW,
UTRA ACLR1 UP,
UTRA ACLR2 UP

### Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA. |

| | |
|---|---|
| | Refer to “Table 2.5.2-1 Measurement Items of Adjacent Channel Leakage Power Ratio” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Details

The measurement bandwidth of the target adjacent channel varies with the channel bandwidth setting.
Refer to Table 2.5.1-1 “Adjacent Channel Measurement Bandwidth (MHz)” for details.

Example of Use

To query the average of ACLR measurement result for segment 0:

```
:FETC:CELL:SEQ:LTE:ACLR? 0,AVG
> 3.00,3.01,3.02,3.03,3.04,3.05
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:CARLeakage?

Carrier Leakage Result

### Function

Queries the Carrier Leakage (Modulation Analysis) measurement result in Sequence Measurement mode

### Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:CARLeakage? <seg>,<mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dBc |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

```
<cleakage>
```

| | |
|---|---|
| <cleakage> | Measurement result in specified Storage mode |
| Unit | dBc |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Example of Use

To query the average of the Carrier Leakage measurement result for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:CARL? 1,AVG
> 1.05
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:CFRequency?

Carrier Frequency Result

Function

Queries the Carrier Frequency measurement result

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:CFRequency? <seg>[,<cc>]
```

Response

```
<freq>
```

| | |
|---|---|
| <freq> | Carrier frequency |
| Unit | Hz |
| Resolution | 1 Hz |

Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Example of Use

To query the result of Carrier Frequency measurement for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:CFR? 1
> 1951000000
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:ITEM?

Spectrum Flatness Measured Item

### Function

Queries whether each spectrum flatness measurement items is measured or not.

### Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:ITEM? <seg>[,<cc>]
```

### Response

```
<flag>
```

| | | |
|---|---|---|
| <flag> | Measured/Not measured flag (0 to 3)<br>Returns the sum of the following measurement items. | |
| | 0 | Not measured |
| | 1 | ≥ 3 MHz area (When Test Environment is Normal)<br>≥ 5 MHz area (When Test Environment is Extreme) |
| | 2 | < 3 MHz area (When Test Environment is Normal)<br>< 5 MHz area (When Test Environment is Extreme) |

### Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query whether each spectrum flatness measurement items of Segment 1 is measured or not in the sequence measurement.

```
:FETC:CELL:SEQ:LTE:MOD:ESFL:ITEM? 1
> 2
```

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## :FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:JUDGement?

Spectrum Flatness Judgement

### Function

Queries the judgement of Spectrum Flatness measurement result

### Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:JUDGement?
<seg>[,<cc>]
```

### Response

```
<judgement>
```

| | |
|---|---|
| <judgement> | Judgement result |
| PASS | Pass |
| FAIL | Fail |
| – | Not measured |

### Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the judgement of Spectrum Flatness measurement result for segment 1

```
:FETC:CELL:SEQ:LTE:MOD:ESFL:JUDG? 1
> PASS
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP1?

Spectrum Flatness (≥3 MHz (RP1)) Result

### Function

Queries the ripple value in Spectrum Flatness measurement result in Range 1.

### Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP1?
<seg>,<mode>[,<cc>]
```

### Response

When <mode> = TTL,

`<avg>,<max>,<min>`

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

`<sflatness>`

| | |
|---|---|
| <sflatness> | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of Range 1 ripple value in Spectrum Flatness measurement result of Segment 1.

```
:FETC:CELL:SEQ:LTE:MOD:ESFL:RP1? 1,AVG
> 0.04
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP12?

Spectrum Flatness (RP12) Result

### Function

Queries the difference between maximum value in Range 1 and minimum value in Range 2 of Spectrum Flatness measurement result.

### Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP12?
<seg>,<mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

```
<sflatness>
```

| | |
|---|---|
| <sflatness> | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Example of Use

To query the average of difference between maximum value in Range 1 and minimum value in Range 2 of Spectrum Flatness measurement result of Segment 1.

```
:FETC:CELL:SEQ:LTE:MOD:ESFL:RP12? 1,AVG
> 0.04
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP2?

Spectrum Flatness (<3 MHz (RP2)) Result

Function

Queries the ripple value in Spectrum Flatness measurement result in Range 2.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP2?
<seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

```
<sflatness>
```

| | |
|---|---|
| <sflatness> | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |

| | |
|---|---|
| SCC1 | SCC-1 |
| Omitted | Total |

Example of Use

To query the average of Range 2 ripple value in Spectrum Flatness measurement result of Segment 1.

```
:FETC:CELL:SEQ:LTE:MOD:ESFL:RP2? 1,AVG
> 0.04
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP21?

Spectrum Flatness (RP21) Result

Function

Queries the difference between maximum value in Range 2 and minimum value in Range 1 of Spectrum Flatness measurement result.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP21?
<seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

```
<sflatness>
```

| | |
|---|---|
| <sflatness> | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average･Maximum･Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA. |

| | |
|---|---|
| | Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Example of Use

To query the average of difference between maximum value in Range 2 and minimum value in Range 1 of Spectrum Flatness measurement result of Segment 1.

```
:FETC:CELL:SEQ:LTE:MOD:ESFL:RP21? 1,AVG
> 0.04
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:EVM?

EVM Result

### Function

Queries the EVM measurement result in Sequence Measurement mode

### Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:EVM? <seg>,<mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | % |
| Resolution | 0.01% |

When <mode> ≠ TTL,

```
<evm>
```

| | |
|---|---|
| <evm> | Measurement result in specified Storage mode |
| Unit | % |
| Resolution | 0.01% |

### Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of the EVM measurement result for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:EVM? 1,AVG
> 1.50
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:FERRor?

Carrier Frequency Error Result

### Function

Queries the Frequency Error measurement result

### Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:FERRor? <seg>,<mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg_ppm>,<avg_Hz>,<max_ppm>,<max_Hz>,<min_ppm>,<min_Hz>
```

| | |
|---|---|
| <avg_ppm> | Measurement result in ppm (Average) |
| <max_ppm> | Measurement result in ppm (Maximum) |
| <min_ppm> | Measurement result in ppm (Minimum) |
| Unit | ppm |
| Resolution | 0.01 ppm |
| <avg_Hz> | Measurement result in Hz (Average) |
| <max_Hz> | Measurement result in Hz (Maximum) |
| <min_Hz> | Measurement result in Hz (Minimum) |
| Unit | Hz |
| Resolution | 0.1 Hz |

When <mode> ≠ TTL,

```
<freq_ppm>,<freq_Hz>
```

| | |
|---|---|
| <freq_ppm> | Measurement result in ppm in specified Storage mode |
| Unit | ppm |
| Resolution | 0.01 ppm |
| <freq_Hz> | Measurement result in Hz in specified Storage mode |
| Unit | Hz |
| Resolution | 0.1 Hz |

### Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |

| | |
|---|---|
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Example of Use

To query the average of the carrier frequency error measurement results for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:FERR? 1,AVG
> 0.03,60.0
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:FERRor:WORSt?

Worst Carrier Frequency Error Result

### Function

Queries the worst value in Frequency Error measurement results

### Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:FERRor:WORSt? <seg>[,<cc>]
```

### Response

```
<freq_ppm>,<freq_Hz>
```

| | |
|---|---|
| <freq_ppm> | Worst value in Frequency Error measurement results in ppm |
| Unit | ppm |
| Resolution | 0.01 ppm |
| <freq_Hz> | Worst value in Frequency Error measurement results in Hz |
| Unit | Hz |
| Resolution | 0.1 Hz |

### Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The worst value should be either the maximum or minimum of the Frequency Error measurement results, whichever is the larger absolute value.

### Example of Use

To query the worst value in Frequency Error measurement results for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:FERR:WORS? 1
> 0.03,60.0
```

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SCPI Command Reference

## :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:CARLeakage?

In-Band Emissions (Carrier Leakage) Result

### Function

Queries the in-band emission measurement result (Carrier Leakage) for modulation analysis.

### Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:CARLeakage?
<seg>,<mode>[,<cc>]
```

### Response

When <mode> = TTL,

`<avg>,<max>,<min>`

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dBc |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

`<ibe>`

| | |
|---|---|
| <ibe> | Measurement result in specified Storage mode |
| Unit | dBc |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Example of Use

To query the average of in-band emission measurement result (Carrier Leakage) of Segment 1.

```
:FETC:CELL:SEQ:LTE:MOD:IEM:CARL? 1,AVG
> 0.04
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:GENeral?

In-Band Emissions (General) Result

Function

Queries the in-band emission measurement result (General) for modulation analysis.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:GENeral?
<seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement results (Average) |
| <max> | Measurement results (Maximum) |
| <min> | Measurement results (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL

```
<ibe>
```

| | |
|---|---|
| <ibe> | Measurement results in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

Parameter

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average･Maximum･Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |

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SCPI Command Reference

| | |
|---|---|
| Omitted | Total |

Example of Use

To query the average of in-band emission measurement result (General) of Segment 1 in the sequence measurement.

```
:FETC:CELL:SEQ:LTE:MOD:IEM:GEN? 1,AVG
> 0.04
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:IQIMage?

In-Band Emissions (IQ Image) Result

Function

Queries the in-band emission measurement result (IQ Image) for modulation analysis.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:IQIMage?
<seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

```
<ibe>
```

| | |
|---|---|
| <ibe> | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

Parameter

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |

| | |
|---|---|
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Example of Use

To query the average of in-band emission measurement result (IQ Image) of Segment 1.

```
:FETC:CELL:SEQ:LTE:MOD:IEM:IQIM? 1,AVG
> 0.04
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:ITEM?

In-Band Emissions Measured Item

Function

Queries whether each in-band emission measurement item for modulation analysis is measured or not.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:ITEM? <seg>[,<cc>]
```

Response

```
<flag>
```

<flag> Measured / Not measured flag (0 to 7)

Returns the sum of the following measurement items.

| | |
|---|---|
| 0 | Not measured |
| 1 | Measure General |
| 2 | Measure IQ Image |
| 4 | Measure Carrier Leakage |

Parameter

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Example of Use

To query whether each in-band emission measurement item for modulation analysis of Segment 1 is measured or not.

```
:FETC:CELL:SEQ:LTE:MOD:IEM:ITEM? 1
> 4
```

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SCPI Command Reference

## :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:JUDGement?

In-Band Emissions Judgement

### Function

Queries the judgement of in-band emission measurement result for modulation analysis.

### Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:JUDGement?
<seg>[,<cc>]
```

### Response

```
<judgement>
```

| | |
|---|---|
| <judgement> | Judgement result |
| PASS | Pass |
| FAIL | Fail |
| – | Not measured |

### Parameter

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the judgement of in-band emission measurement result for modulation analysis of Segment 1.

```
:FETC:CELL:SEQ:LTE:MOD:IEM:JUDG? 1
> PASS
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:CARLeakage?

In-Band Emissions limit (Carrier Leakage)

### Function

Queries the limit for in-band emission measurement (Carrier Leakage) for modulation analysis.

### Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:CARLeakage?
<seg>[,<cc>]
```

### Response

```
<level>
```

| | |
|---|---|
| <level> | Limit |
| Unit | dBc |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the limit for in-band emission measurement result (Carrier Leakage) for modulation analysis of Segment 1.

```
:FETC:CELL:SEQ:LTE:MOD:IEM:LIM:CARL? 1
> 1.05
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:GENeral?

In-Band Emissions limit (General)

### Function

Queries the limit for in-band emission measurement result (General) for modulation analysis.

### Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:GENeral?
<seg>[,<cc>]
```

### Response

```
<level>
```

| | |
|---|---|
| <level> | Limit |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the limit for in-band emission measurement result (General) for modulation analysis of Segment 1.

```
:FETC:CELL:SEQ:LTE:MOD:IEM:LIMit:GEN? 1
> 2.05
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:IQIMage?

In-Band Emissions limit (IQ Image)

### Function

Queries the limit for in-band emission measurement (IQ Image) for modulation analysis.

### Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:IQIMage?
<seg>[,<cc>]
```

### Response

```
<level>
```

| | |
|---|---|
| <level> | Limit |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the limit for in-band emission measurement result (IQ Image) for modulation analysis of Segment 1.

```
:FETC:CELL:SEQ:LTE:MOD:IEM:LIM:IQIM? 1
> 1.05
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:MARGin?

In-Band Emissions Margin

### Function

Queries the worst margin in the entire bandwidth for in-band emission measurement.

### Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:MARGin? <seg>[,<cc>]
```

### Response

```
<margin>
```

| | |
|---|---|
| <margin> | Worst margin in the entire bandwidth |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the worst margin in the entire bandwidth for in-band emission measurement for modulation analysis of Segment 1.

```
:FETC:CELL:SEQ:LTE:MOD:IEM:MARG? 1
> 1.05
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:IQIMbalance?

IQ Imbalance Result

### Function

Queries the IQ Imbalance measurement results

### Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IQIMbalance? <seg>,<mode>[,<cc>]
```

### Response

When <mode> = TTL,

`<avg>,<max>,<min>`

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When <mode> ≠ TTL,

`<iqimb>`

| | |
|---|---|
| <iqimb> | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

IQ Imbalance can be measured when the number of RBs is set to the maximum value for the channel bandwidth shown in Table 2.1.6-2 "Number of Allocatable Resource Blocks in Channel Bandwidth".

If the number of RBs is not the maximum allocatable value in the channel bandwidth, the response is 999.99.

Example of Use

To query the average of IQ Imbalance measurement result for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:IQIM? 1,AVG
> 0.04
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:MERRor?

Magnitude Error Result

Function

Queries the Magnitude Error measurement result

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:MERRor? <seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | % |
| Resolution | 0.01% |

When <mode> ≠ TTL,

```
<merr>
```

| | |
|---|---|
| <merr> | Measurement result in specified Storage mode |
| Unit | % |
| Resolution | 0.01% |

Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |

Omitted Total

Example of Use

To query the average of the Magnitude Error measurement result for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:MERR? 1,AVG
> 1.05
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:PEVM?

Peak EVM Result

Function

Queries the EVM Peak measurement result.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:PEVM? <seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | % |
| Resolution | 0.01% |

When <mode> ≠ TTL,

```
<pevm>
```

| | |
|---|---|
| <pevm> | Measurement result in specified Storage mode |
| Unit | % |
| Resolution | 0.01% |

Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |

| | |
|---|---|
| Omitted | Total |

Example of Use

To query the average of EVM Peak measurement result for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:PEVM? 1,AVG
> 1.75
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:PHERror?

Phase Error Result

Function

Queries the Phase Error measurement result

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:PHERror? <seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | degree |
| Resolution | 0.01 degree |

When <mode> ≠ TTL,

```
<perr>
```

| | |
|---|---|
| <perr> | Measurement result in specified Storage mode |
| Unit | degree |
| Resolution | 0.01 degree |

Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |

Omitted Total

Example of Use

To query the average of Phase Error measurement result for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:PHER? 1,AVG
> 1.55
```

## :FETCh:CELLular:SEQuence:LTE:MODulation:RSEVm?

Reference Signal EVM Result

Function

Queries the EVM measurement result of Demodulation Reference Signal

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:RSEVm? <seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | % |
| Resolution | 0.01% |

When <mode> ≠ TTL,

```
<rsevm>
```

| | |
|---|---|
| <rsevm> | Measurement result in specified Storage mode |
| Unit | % |
| Resolution | 0.01% |

Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |

| | |
|---|---|
| Omitted | Total |

Details

The EVM measurement of the Reference Signal is supported when PUSCH is assigned using the :CONFig:CELLular:LTE:CTYPe command.

Example of Use

To query the average of EVM measurement result of Reference Signal for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:RSEV? 1,AVG
> 1.51
```

## :FETCh:CELLular:SEQuence:LTE:OBW?

OBW Result

Function

Queries the Occupied Bandwidth measurement result.

Query

```
:FETCh:CELLular:SEQuence:LTE:OBW? <seg>[,<cc>]
```

Response

```
<bw>
```

| | |
|---|---|
| <bw> | Occupied Bandwidth |
| Unit | MHz |
| Resolution | 1 kHz |

Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.3.2-1 Measurement Items of OBW” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Example of Use

To query the average of the in-band emissions (Carrier Leakage) measurement result for segment 0:

```
:FETC:CELL:SEQ:LTE:OBW? 0
> 3.840
```

## :FETCh:CELLular:SEQuence:LTE:OBW:FREQuency?

OBW Frequency Result

### Function

Queries the upper, lower or center frequency of Occupied Bandwidth in Sequence Measurement mode

### Query

```
:FETCh:CELLular:SEQuence:LTE:OBW:FREQuency? <seg>,<pos>[,<cc>]
```

### Response

```
<freq>
```

| | |
|---|---|
| <freq> | Offset frequency |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <pos> | Offset type |
| UPPER | Upper frequency |
| LOWER | Lower frequency |
| CENTER | Center frequency |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.3.2-1 Measurement Items of OBW” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the upper frequency of the Occupied Bandwidth measurement result for segment 1:

```
:FETC:CELL:SEQ:LTE:OBW:FREQ? 1,UPPER
> 1951.920
```

## :FETCh:CELLular:SEQuence:LTE:POWer:CHPower?

Channel Power Result

### Function

Queries the Channel Power measurement result.

### Query

```
:FETCh:CELLular:SEQuence:LTE:POWer:CHPower? <seg>,<mode>[,<cc>]
```

### Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dBm |
| Resolution | 0.01 dB |

When <mode> = AVG, MAX, MIN or DVT,

```
<pwr>
```

| | |
|---|---|
| <pwr> | Measurement result in specified Storage mode |
| Unit | dBm |
| Resolution | 0.01 dB |

When <mode> = IND,

```
<s>,<pwr(1)>,<pwr(2)>,<pwr(3)>,...,<pwr(s)>
```

| | |
|---|---|
| <s> | Measurement count |
| Range | 1 to 200 |
| <pwr(s)> | Channel Power of sth measurement |
| Unit | dBm |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| IND | Individual measurement result |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.2.2-1 Measurement Items of Tx Power" for details. |
| PCC | PCC |

| | |
|---|---|
| SCC1 | SCC-1 |
| Omitted | Total |

Example of Use

To query the average of the Channel Power measurement result for segment 0:

```
:FETC:CELL:SEQ:LTE:POW:CHP? 0,AVG
> -20.00
```

## :FETCh:CELLular:SEQuence:LTE:POWer:TXPower?

Tx Power Result

Function

Queries the Tx power measurement result.

Query

```
:FETCh:CELLular:SEQuence:LTE:POWer:TXPower? <seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

| | |
|---|---|
| <avg> | Measurement result (Average) |
| <max> | Measurement result (Maximum) |
| <min> | Measurement result (Minimum) |
| Unit | dBm |
| Resolution | 0.01 dB |

When <mode> = AVG, MAX, MIN or DVT,

```
<pwr>
```

| | |
|---|---|
| <pwr> | Measurement result in specified Storage mode |
| Unit | dBm |
| Resolution | 0.01 dB |

When <mode> = IND,

```
<s>,<pwr(1)>,<pwr(2)>,...,<pwr(s)>
```

| | |
|---|---|
| <s> | Measurement count |
| Range | 1 to 200 |
| <pwr(s)> | Channel Power of sth measurement |
| Unit | dBm |
| Resolution | 0.01 dB |

Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <mode> | Storage mode |
| AVG | Average |
| MAX | Maximum |

| | |
|---|---|
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| IND | Individual measurement result |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.2.2-1 Measurement Items of Tx Power” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Example of Use

To query the average of Tx Power measurement results for segment 1:

```
:FETC:CELL:SEQ:LTE:POW:TXP? 1,AVG
> -20.00
```

## :FETCh:CELLular:SEQuence:LTE:SEMask:JUDGement?

SEM Judgement

Function

Queries the judgement of the Spectrum Emission Mask measurement result.
Fail when any part of spectrum exceeds limit, otherwise Pass

Query

```
:FETCh:CELLular:SEQuence:LTE:SEMask:JUDGement? <seg>[,<cc>]
```

Response

```
<judgement>
```

| | |
|---|---|
| <judgement> | Judgement |
| PASS | Pass |
| FAIL | Fail |
| – | Not measured |

Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Example of Use

To query the judgement of the Spectrum Emission Mask measurement result for segment 1:

```
:FETC:CELL:SEQ:LTE:SEM:JUDG? 1
> PASS
```

## :FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:LOWer?

SEM Peak Value (Lower)

Function

Queries the peak level with offset frequency at each of lower side ranges of Spectrum Emission Mask measurement

Query

```
:FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:LOWer? <seg>[<cc>]
```

Response

```
<f_M1>,<l_M1>,<f_M2>,<l_M2>,<f_M3>,<l_M3>,<f_M4>,<l_M4>
```

| | |
|---|---|
| <l_M1> to <l_M4> | Peak level in each of lower Range 1 to Range 4 |
| Unit | dBm |
| Resolution | 0.01 dB |
| <f_M1> to <f_M4> | Offset frequency of peak level in each of lower Range 1 to Range 4 |
| Unit | MHz |
| Resolution | 1 kHz |

Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Example of Use

To query the peak level with offset frequency at each of lower side ranges of Spectrum Emission Mask measurement for segment 1:

```
:FETC:CELL:SEQ:LTE:SEM:LEV:LOW? 1
> -3.000,-20.00,-5.000,-30.00,-8.000,-40.00,-9.500,-50.00
```

## :FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:LOWer:DETail?

SEM Peak Value (Detail) (Lower)

### Function

Queries the peak level with offset frequency at each of lower side of 9 ranges of Spectrum Emission Mask measurement

Refer to Table 2.4.1-2 Available Frequency Ranges for Spectrum Emission Mask Measurements (1/2) and Table 2.4.1-3 Available Frequency Ranges for Spectrum Emission Mask Measurements (2/2) for details.

### Query

```
:FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:LOWer:DETail? <seg>[,<cc>]
```

### Response

```
<f_M1>,<l_M1>,<f_M2>,<l_M2>,<f_M3>,<l_M3>,<f_M4>,<l_M4>,<f_M5>,<l_M5>,<f_
M6>,<l_M6>,<f_M7>,<l_M7>,<f_M8>,<l_M8>,<f_M9>,<l_M9>
```

| | |
|---|---|
| <l_M1> to <l_M9> | Peak level in each of lower Range 1 to Range 9 |
| Unit | dBm |
| Resolution | 0.01 dB |
| <f_M1> to <f_M9> | Offset frequency of peak level in each of lower Range 1 to Range 9 |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The number of target ranges varies with the combination of channel bandwidth and network signalled value for AdditionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the peak level with offset frequency at each of lower side of 9 ranges of Spectrum Emission Mask measurement for segment 0:

```
:FETC:CELL:SEQ:LTE:SEM:LEV:LOW:DET? 0
>
-0.500,3.00,-1.500,3.00,-2.600,3.00,-3.500,3.00,-5.500,3.00,-8.000,3.00,-
12.500,3.00,-17.500,3.00,-22.500,3.00
```

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SCPI Command Reference

## :FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:UPPer?

SEM Peak Value (Upper)

### Function

Queries the peak level with offset frequency at each of upper side ranges of Spectrum Emission Mask measurement

### Query

```
:FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:UPPer? <seg>[,<cc>]
```

### Response

```
<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>
```

| | |
|---|---|
| <l_1> to <l_4> | Peak level in each of upper Range 1 to Range 4 |
| Unit | dBm |
| Resolution | 0.01 dB |
| <f_1> to <f_4> | Offset frequency of peak level in each of upper Range 1 to Range 4 |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

Refer to Table 2.4.1-1 “Frequency Ranges of Range 1 to Range 4” for the frequency range for the measurement.

### Example of Use

To query the peak level with offset frequency at each of upper side ranges of Spectrum Emission Mask measurement for segment 1:

```
:FETC:CELL:SEQ:LTE:SEM:LEV:UPP? 1
> 3.000,-20.00,5.000,-30.00,8.000,-40.00,9.500,-50.00
```

## :FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:UPPer:DETail?

SEM Peak Value (Detail) (Upper)

### Function

Queries the peak level with offset frequency at each of upper side of 9 measurement ranges of Spectrum Emission Mask measurement

Refer to Table 2.4.1-2 Available Frequency Ranges for Spectrum Emission Mask Measurements (1/2) and Table 2.4.1-3 Available Frequency Ranges for Spectrum Emission Mask Measurements (2/2) for details.

### Query

```
:FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:UPPer:DETail? <seg>[,<cc>]
```

### Response

```
<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>,<f_5>,<l_5>,<f_6>,<l_6>,<f_7>,<l_7>,<f_8>,<l_8>,<f_9>,<l_9>
```

| | |
|---|---|
| <l_1> to <l_9> | Peak level in each of upper Range 1 to Range 9 |
| Unit | dBm |
| Resolution | 0.01 dB |
| <f_1> to <f_9> | Offset frequency of peak level in each of upper Range 1 to Range 9 |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The number of target ranges varies with the combination of channel bandwidth and network signalled value for AdditionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the peak level with offset frequency at each of upper side of nine ranges of Spectrum Emission Mask measurement for segment 0:

```
:FETC:CELL:SEQ:LTE:SEM:LEV:UPP:DET? 0
>
0.500,3.00,1.500,3.00,2.600,3.00,3.500,3.00,5.500,3.00,8.000,3.00,12.500,
3.00,17.500,3.00,22.500,3.00
```

## :FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:LOWer?

SEM Template Margin (Lower)

### Function

Queries the level margin at each of lower side ranges in Spectrum Emission Mask measurement.

### Query

```
:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:LOWer? <seg>[,<cc>]
```

### Response

```
<f_M1>,<l_M1>,<f_M2>,<l_M2>,<f_M3>,<l_M3>,<f_M4>,<l_M4>
```

| | |
|---|---|
| <l_M1> to <l_M4> | Level margin in each of lower Range 1 to Range 4 |
| Unit | dBm |
| Resolution | 0.01 dB |
| <f_M1> to <f_M4> | Offset frequency where level margin in each of lower Range 1 to Range 4 measured |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

Level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

Refer to Table 2.4.1-1 Frequency Ranges of Range 1 to Range 4 for the frequency range for the measurement.

### Example of Use

To query the level margin with frequency where margin measured at each of lower side ranges of Spectrum Emission Mask measurement for segment 1:

```
:FETC:CELL:SEQ:LTE:SEM:MARG:LOW? 1
> -3.000,3.00,-5.000,3.00,-8.000,3.00,-9.500,3.00
```

## :FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:LOWer:DETail?

SEM Template Margin (Detail) (Lower)

### Function

Queries the level margin with frequency where margin was measured at each of lower side 9 measurement ranges in Spectrum Emission Mask measurement

Refer to Table 2.4.1-2 Available Frequency Ranges for Spectrum Emission Mask Measurements (1/2) and Table 2.4.1-3 Available Frequency Ranges for Spectrum Emission Mask Measurements (2/2) for details.

### Query

```
:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:LOWer:DETail? <seg>[,<cc>]
```

### Response

```
<f_M1>,<l_M1>,<f_M2>,<l_M2>,<f_M3>,<l_M3>,<f_M4>,<l_M4>,<f_M5>,<l_M5>,<f_M6>,<l_M6>,<f_M7>,<l_M7>,<f_M8>,<l_M8>,<f_M9>,<l_M9>
```

| | |
|---|---|
| <l_M1> to <l_M9> | Level margin in each of lower Range 1 to Range 9 |
| Unit | dBm |
| Resolution | 0.01 dB |
| <f_M1> to <f_M9> | Offset frequency where level margin in each of lower Range 1 to Range 9 measured |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

The number of target ranges varies with the combination of channel bandwidth and network signalled value for AdditionalSpectrumEmission. Refer to Table 2.4.1-2 "Frequency Ranges for Measurement Results (1/2)" and Table 2.4.1-3 "Frequency Ranges for Measurement Results (2/2)" for details.

Example of Use

To query the level margin with frequency where margin measured at each of lower side of 9 ranges of Spectrum Emission Mask measurement for segment 0:

```
:FETC:CELL:SEQ:LTE:SEM:MARG:LOW:DET? 0
>
-0.500,3.00,-1.500,3.00,-2.600,3.00,-3.500,3.00,-5.500,3.00,-8.000,3.00,-
12.500,3.00,-17.500,3.00,-22.500,3.00
```

## :FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:UPPer?

SEM Template Margin (Upper)

Function

Queries the level margin at each of upper side range in Spectrum Emission Mask measurement

Query

```
:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:UPPer? <seg>[,<cc>]
```

Response

```
<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>
```

| | |
|---|---|
| <l_1> to <l_4> | Level margin in each of upper Range 1 to Range 4 |
| Unit | dBm |
| Resolution | 0.01 dB |
| <f_1> to <f_4> | Offset frequency where level margin in each of upper Range 1 to Range 4 measured |
| Unit | MHz |
| Resolution | 1 kHz |

Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Details

Level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

Refer to Table 2.4.1-1 Frequency Ranges of Range 1 to Range 4 for the frequency range for the measurement.

Example of Use

To query the level margin with frequency where margin measured at each of upper side ranges of Spectrum Emission Mask measurement for segment 1:

```
:FETC:CELL:SEQ:LTE:SEM:MARG:UPP? 1
> 3.000,3.00,5.000,3.00,8.000,3.00,9.500,3.00
```

## :FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:UPPer:DETail?

SEM Template Margin (Detail) (Upper)

Function

Queries the level margin with frequency where margin was measured at each of upper side 9 measurement ranges in Spectrum Emission Mask measurement

Refer to Table 2.4.1-2 Available Frequency Ranges for Spectrum Emission Mask Measurements (1/2) and Table 2.4.1-3 Available Frequency Ranges for Spectrum Emission Mask Measurements (2/2) for details.

Query

```
:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:UPPer:DETail? <seg>[,<cc>]
```

Response

```
<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>,<f_5>,<l_5>,<f_6>,<l_6>,<
f_7>,<l_7>,<f_8>,<l_8>,<f_9>,<l_9>
```

| | |
|---|---|
| <l_1> to <l_9> | Level margin in each of upper Range 1 to Range 9 |
| Unit | dBm |
| Resolution | 0.01 dB |
| <f_1> to <f_9> | Offset frequency where level margin in each of upper Range 1 to Range 9 measured |
| Unit | MHz |
| Resolution | 1 kHz |

Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| <cc> | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” |

| | |
|---|---|
| | for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

The number of target ranges varies with the combination of channel bandwidth and network signalled value for AdditionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the level margin with frequency where margin measured at each of upper side of 9 ranges of Spectrum Emission Mask measurement for segment 0:

```
:FETC:CELL:SEQ:LTE:SEM:MARG:UPP:DET? 0
>
0.500,3.00,1.500,3.00,2.600,3.00,3.500,3.00,5.500,3.00,8.000,3.00,12.500,
3.00,17.500,3.00,22.500,3.00
```

## :FETCh:CELLular:SEQuence:PROGress?

Sequence Progress

Function

Queries the progress ratio and the executing sequence number

Query

```
:FETCh:CELLular:SEQuence:PROGress?
```

Response

```
<p>,<cur>,<start>,<stop>
```

| | |
|---|---|
| <p> | Progress ratio in Sequence Measurement mode |
| Range | 0 to 100% |
| <cur> | Current segment number being executed |
| Range | 0 to 1999 |
| <start> | First segment number |
| Range | 0 to 1999 |
| <stop> | Last segment number |
| Range | 0 to 1999 |

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### Example of Use

To query the progress ratio and the executing sequence number in Sequence Measurement mode:

```
:FETC:CELL:SEQ:PROG?
>65,23,11,30
```

### Remarks

The first and last segment numbers are the same as the start and end segment numbers specified using the :CONFigure:CELLular:SEQuence:CONTrol command.

## :FETCh:CELLular:SEQuence:SEG:STATe?

Specified Segment Status

### Function

Queries the measurement status of the specified segment

### Query

```
:FETCh:CELLular:SEQuence:SEG:STATe? <seg>
```

### Response

```
<stat>
```

| | |
|---|---|
| <stat> | Segment status |
| 0 | Measurement completed successfully |
| 2 | Over level |
| 3 | Under level |
| 4 | Measurement failed |
| 5 | Synchronization word not detected |
| 9 | Measurement in progress or not measured |
| 10 | Segment not measured |
| 12 | Tx measurement timeout |

The value received from MX887013A or MX887014A is 0, 2, 5, 9, 10, or 12.

### Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |

### Example of Use

To query the measurement status of segment 16:

```
:FETC:CELL:SEQ:SEG:STAT 16
> 0
```

## :FETCh:CELLular:SEQuence:STATe?

Sequence Measurement Status

### Function

Queries the status of sequence measurement

### Query

```
:FETCh:CELLular:SEQuence:STATe?
```

### Response

```
<m_status>,<n>,<s(0)>,<s(1)>,..,<s(n-1)>
```

| | |
|---|---|
| <m_status> | Measurement execution status |
| 0 | Measurement completed successfully |
| 2 | Over level |
| 3 | Under level |
| 4 | Measurement failed |
| 5 | Synchronization word not detected |
| 9 | Measurement in progress or not measured |
| 12 | Tx measurement timeout |

The value received from MX887013A or MX887014A is 0, 2, 5, 9, or 12.

| | |
|---|---|
| <n> | Number of measured segments |
| Range | 0 to 2000 |
| <s(n–1)> | Measurement status of specified segment |
| 0 | Measurement completed successfully |
| 2 | Over level |
| 3 | Under level |
| 4 | Measurement failed |
| 5 | Synchronization word not detected |
| 9 | Measurement in progress or not measured |
| 10 | Segment not measured |
| 12 | Tx measurement timeout |

The value received from MX887013A or MX887014A is 0, 2, 5, 9, 10, or 12.

### Example of Use

To query the status of sequence measurement:

```
:FETC:CELL:SEQ:STAT?
>2,6,0,0,0,0,2,0
```

The results shows that six segments are measured segments and the fifth segment is over level.

### Related commands

:FETCh:CELLular:MEASurement:STATe

:FETCh:CELLular:SEQuence:SEG:STATe

4

SCPI Command Reference

## :INITiate:CELLular:SEQuence:EXECute:TX

Start Signal Analyzer Measurement Only

Function

Sets only the parameters for the specified measurement and executes measurement, without affecting the signal transmission parameters.

Command

```
:INITiate:CELLular:SEQuence:EXECute:TX
```

## :TRIGger:CELLular:MEASurement:TOUT

Trigger Timeout

Function

Sets or queries the trigger timeout

Command

```
:TRIGger:CELLular:MEASurement:TOUT <time>
```

Query

```
:TRIGger:CELLular:MEASurement:TOUT?
```

Response

<time>

| | |
|---|---|
| Unit | s |
| Resolution | 1 s |

Parameters

| | |
|---|---|
| <time> | Timeout time |
| Range | 1 to 60 s |
| Resolution | 1 s |
| Suffix code | NS, US, MS, S (uses s when omitted) |
| Default | 10 s |

Example of Use

To set the Trigger timeout to 10 seconds:

```
:TRIG:CELL:MEAS:TOUT 10
:TRIG:CELL:MEAS:TOUT?
> 10
```

## :TRIGger:CELLular:SEQuence

Sequence Table Parameter - Trigger

### Function

Sets or queries the trigger condition for starting Sequence Measurement

### Command

```
:TRIGger:CELLular:SEQuence <seg>,<src>,<slope>,<level>,<delay>
```

### Query

```
:TRIGger:CELLular:SEQuence? <seg>
```

### Response

```
<src>,<slope>,<level>,<delay>
```

### Parameters

| | |
|---|---|
| <seg> | Segment number |
| Range | 0 to 1999 |
| <src> | Trigger source |
| FRAME | Frame |
| FREERUN | Free run |
| PWR | Input signal power |
| Default | FREERUN |
| <slope> | Trigger slope |
| RISE | Rising edge trigger |
| Default | RISE |
| <level> | Trigger level |
| Range | –40 to 0 dB |
| Resolution | 1 dB |
| Suffix Code | DB (uses dB when omitted) |
| Default | –30 dB |
| <delay> | Delay time |
| Range | 0 to 1000.000 ms |
| Resolution | 0.001 ms |
| Suffix Code | NS, US, MS, S (uses ms when omitted) |
| Default | 0.000 ms |

### Details

The trigger slope and trigger level are enabled when trigger source is set to PWR.

### Example of Use

To set the trigger condition of segment 2 as follows:

Trigger source:PWR, Trigger slope: RISE, Trigger level: -30 dB, Delay time: 0

```
:TRIG:CELL:SEQ 2,PWR,RISE,-30,0
:TRIG:CELL:SEQ? 2
> PWR,RISE,-30,0.000
```

Remarks

Trigger level is defined as the level difference from the input level specified by the following commands:

:CONFigure:CELLular:MEASurement:RFSettings:LEVel

:CONFigure:CELLular:SEQuence:RFSettings:TRX

# Chapter 5 Native Command Reference

This chapter describes the details of Native commands.
To switch to the Native command mode, send the command SYST:LANG NAT.

# 5.1 List of Commands

The following table shows the rules for describing messages.

| | |
|---|---|
| [ ] | Messages or parameters in square brackets can be omitted. |
| \| | Choose one of several choices.<br>A \| B \| C \| D indicates a choice of A, B, C, and D. |
| {} | Choose one of the groups in braces.<br>A \| B({C \| D}) indicates a choice of A, B(C), or A, B(D). |

## 5.1.1 Common commands

Common

| Function | Command | Query | Response |
|---|---|---|---|
| Standard Select | STDSEL std | STDSEL? | std |
| Set Connect Port Direction | PORT input,output | PORT? | input,output |

Measurement

| Function | Command | Query | Response |
|---|---|---|---|
| Measurement Stop | MEASSTOP | ----- | ----- |
| Measurement Status | ----- | MSTAT | m_status |
| Measurement Start | SNGLS | ----- | ----- |
| End Event Status (Measurement) Register Query | ----- | ESR2? | register |
| Error Event Status (Measurement) Register Query | ----- | ESR3? | register |

Common Parameters

| Function | Command | Query | Response |
|---|---|---|---|
| Output Level On/Off | LVL on_off | LVL? | on_off |
| Output Signal Modulation | MOD on_off | MOD? | on_off |
| Waveform File Select | PACKAGE pac | PACKAGE? | pac |
| Waveform Pattern Select | DLPAT pat | DLPAT? | pat |
| Waveform Pattern Select (SYNC) | DLPAT_SYNC pat | DLPAT_SYNC? | pat |

System

| Function | Command | Query | Response |
|---|---|---|---|
| Application Select | SYSSEL app | SYSSEL? | App |
| Language Selection of Remote Command | SYST:LANG mode | SYST:LANG? | mode |

## 5.1.2 Fundamental measurement commands

Common Parameters

| Function | Command | Query | Response |
|---|---|---|---|
| Input Level | ILVL level[,level_scc1] | ILVL? [ALL] | level,level_scc1 |
| Input Level for SCC-1 | ILVL_SCC1 level | ILVL_SCC1? | level |
| External Loss Table Index for SCC-1 | EXTLOSSINDEX_SCC1 index | EXTLOSSINDEX_SCC1? | index |
| Output Level | OLVL level | OLVL? | level |
| Downlink Channel | DLCHAN dl_ch | DLCHAN? | dl_ch |
| Downlink Channel for SCC-1 | DLCHAN_SCC1 dl_ch | DLCHAN_SCC1? | dl_ch |
| Downlink Frequency | RXFREQ dl_freq<br>DLFREQ dl_freq | RXFREQ?<br>DLFREQ? | dl_freq |
| Downlink Frequency for SCC-1 | DLFREQ_SCC1 dl_freq | DLFREQ_SCC1? | dl_freq |
| Uplink Channel | ULCHAN ul_ch[,ul_ch_scc1] | ULCHAN? [ALL] | ul_ch,ul_ch_scc1 |
| Uplink Channel for SCC-1 | ULCHAN_SCC1 ul_ch | ULCHAN_SCC1? | ul_ch |
| Uplink Frequency | TXFREQ ul_freq[,ul_freq_scc1]<br>ULFREQ ul_freq[,ul_freq_scc1] | TXFREQ? [ALL]<br>ULFREQ? [ALL] | ul_freq,ul_freq_scc1 |
| Uplink Frequency for SCC-1 | ULFREQ_SCC1 ul_freq | ULFREQ_SCC1? | ul_freq |
| AWGN Level On/Off | AWGNLVL on_off | AWGNLVL? | on_off |
| AWGN Level | AWGNPWR level | AWGNPWR? | level |

LTE Setting

| Function | Command | Query | Response |
|---|---|---|---|
| Channel Bandwidth | BANDWIDTH ch_bw[,ch_bw_scc1] | BANDWIDTH? [ALL] | ch_bw,ch_bw_scc1 |
| Channel Bandwidth for SCC-1 | BANDWIDTH_SCC1 ch_bw | BANDWIDTH_SCC1? | ch_bw |
| Channel Bandwidth, RB | BW_RB ch_bw[,rb[,start]] | BW_RB? | ch_bw,rb,start |
| Channel Bandwidth, RB for SCC-1 | BW_RB_SCC1 ch_bw[,rb[,start]] | BW_RB_SCC1? | ch_bw,rb,start |
| RMC Configuration | CHCONFIG val | CHCONFIG? | val |
| Channel Coding | CHCODING object | CHCODING? | object |
| Frame Structure | FRAMETYPE mode | FRAMETYPE? | mode |
| Frame Structure for SCC-1 | FRAMETYPE_SCC1 mode | FRAMETYPE_SCC1? | mode |
| nRB-CQI | NRBCQI value | NRBCQI? | value |
| UL RMC Starting RB | ULRB_START ulrb | ULRB_START? | ulrb |
| UL RMC Starting RB for SCC-1 | ULRB_START_SCC1 ulrb | ULRB_START_SCC1? | ulrb |
| UL RMC Modulation | ULRMC_MOD ul_rmc_mod | ULRMC_MOD? | ul_rmc_mod |
| UL RMC Modulation for SCC-1 | ULRMC_MOD_SCC1 ul_rmc_mod | ULRMC_MOD_SCC1? | ul_rmc_mod |
| UL RMC Number of RB | ULRMC_RB ul_rmc_rb | ULRMC_RB? | ul_rmc_rb |
| UL RMC Number of RB for SCC-1 | ULRMC_RB_SCC1 ul_rmc_rb | ULRMC_RB_SCC1? | ul_rmc_rb |
| Trigger Delay | FMEAS_TRGDLY trgdly | FMEAS_TRGDLY? | trgdly |
| Trigger Level | FMEAS_TRGLVL trglevel | FMEAS_TRGLVL? | trglevel |
| Trigger Source | FMEAS_TRGSRC trgsrc | FMEAS_TRGSRC? | trgsrc |
| Trigger Timeout | FMEAS_TRGTOUT trgtime | FMEAS_TRGTOUT? | trgtime |
| Cell ID | CELLID id | CELLID? | id |
| Cell ID for SCC-1 | CELLID_SCC1 id | CELLID_SCC1? | id |
| Cyclic Shift | CSHIFT on_off | CSHIFT? | on_off |

LTE Setting (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| Group hopping | GROUPHOP on_off | GROUPHOP? | on_off |
| Delta SS | DELTASS val | DELTASS? | val |
| Operation band | BAND band | BAND? | band |
| Operation band for SCC-1 | BAND_SCC1 band | BAND_SCC1? | band |
| Test Environment | TESTENV env | TESTENV? | env |
| In-band Emission Carrier Leakage Frequency | IBEM_CLFR clf | IBEM_CLFR? | clf |
| Measurement Carrier | MCARRIER carrier | MCARRIER? | carrier |
| In-band emissions carrier leakage template | TP_INBANDE_LEAK tp | TP_INBANDE_LEAK? | tp |
| In-band Emissions Carrier Leakage Template for SCC-1 | TP_INBANDE_LEAK_SCC1 tp | TP_INBANDE_LEAK_SCC1? | tp |
| Uplink Downlink Configuration | TDDULDLCONF conf | TDDULDLCONF? | conf |
| Frequency Error Range | FREQERRRNG value | FREQERRRNG? | value |

Fundamental Measurement Parameters

| Function | Command | Query | Response |
|---|---|---|---|
| Adjacent Channel Leakage Power Ratio Enable and Count | ACLR_SET on_off[,count] | ACLR_SET? | on_off,count |
| Turn Off All Measurement Items | ALLMEASITEMS_OFF | ----- | ----- |
| Fast Power Measurement Mode | FASTPWRMODE on_off | FASTPWRMODE? | on_off |
| Measurement Item | MEASITEM item | MEASITEM? | item |
| Power Template - Wide Dynamic Range | PT_WDR on_off | PT_WDR? | on_off |
| Power Template - ON power tolerance Limit | TP_TMASK_GEN_TOL limit | TP_TMASK_GEN_TOL? | limit |
| Power Template - Transmit OFF power Limit | TP_OFFPWR_UL limit | TP_OFFPWR_UL? | limit |
| Long Span Search | LONGSEARCH on_off | LONGSEARCH? | on_off |
| Modulation Analysis Measurement Enable and Count | MOD_SET on_off[,count] | MOD_SET? | on_off,count |
| Occupied Bandwidth Ratio | OBW_RATIO ratio | OBW_RATIO? | ratio |
| OBW Measurement Enable and Count | OBW_SET on_off[,count] | OBW_SET? | on_off,count |
| Tx Power Measurement Enable and Count | PWR_SET on_off[,count] | PWR_SET? | on_off,count |

Fundamental Measurement Parameters (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| Spectrum Emission Mask Enable and Count | SEM_SET on_off[,count] | SEM_SET? | on_off,count |
| Spectrum Emission Mask Template (1.4MHz) | SEM_TEMPLATE_1.4MHZ range,limit | SEM_TEMPLATE_1.4MHZ? range | limit |
| Spectrum Emission Mask Template (10 MHz) | SEM_TEMPLATE_10MHZ range,limit | SEM_TEMPLATE_10MHZ? range | limit |
| Spectrum Emission Mask Template (15 MHz) | SEM_TEMPLATE_15MHZ range,limit | SEM_TEMPLATE_15MHZ? range | limit |
| Spectrum Emission Mask Template (20 MHz) | SEM_TEMPLATE_20MHZ range,limit | SEM_TEMPLATE_20MHZ? range | limit |
| Spectrum Emission Mask Template (3 MHz) | SEM_TEMPLATE_3MHZ range,limit | SEM_TEMPLATE_3MHZ? range | limit |
| Spectrum Emission Mask Template (5 MHz) | SEM_TEMPLATE_5MHZ range,limit | SEM_TEMPLATE_5MHZ? range | limit |
| Spectrum Emission Mask Template for Contiguous UL CA (100RB+100RB) | SEM_TEMPLATE_CONTCC_100RB_100RB range,limit | SEM_TEMPLATE_CONTCC_100RB_100RB? range | limit |
| Spectrum Emission Mask Template for Contiguous UL CA (25RB+100RB) | SEM_TEMPLATE_CONTCC_25RB_100RB range,limit | SEM_TEMPLATE_CONTCC_25RB_100RB? range | limit |
| Spectrum Emission Mask Template for Contiguous UL CA (50RB+100RB) | SEM_TEMPLATE_CONTCC_50RB_100RB range,limit | SEM_TEMPLATE_CONTCC_50RB_100RB? range | limit |
| Spectrum Emission Mask Template for Contiguous UL CA (75RB+100RB) | SEM_TEMPLATE_CONTCC_75RB_100RB range,limit | SEM_TEMPLATE_CONTCC_75RB_100RB? range | limit |
| Spectrum Emission Mask Template for Contiguous UL CA (75RB+75RB) | SEM_TEMPLATE_CONTCC_75RB_75RB range,limit | SEM_TEMPLATE_CONTCC_75RB_75RB? range | limit |
| additionalSpectrumEmission | SIB2_NS sib2_ns | SIB2_NS? | sib2_ns |
| Power Template measurement Enable and Count | TEMPLATE_SET on_off[,count] | TEMPLATE_SET? | on_off,count |

Results

| Function | Command | Query | Response |
|---|---|---|---|
| ACLR Result | ----- | ACLR? mode[,cc] | {avg,max,min}\|aclr |
| Carrier Leakage Result | ----- | CARRLEAK? mode[,cc] | {avg,max,min}\|cleakage |
| Carrier Frequency Error Result | ----- | CFERR? mode[,cc] | {avg_ppm,avg_Hz,max_ppm,max_Hz,min_ppm,min_Hz}\|{freq_ppm,freq_Hz} |
| Worst Carrier Frequency Error Result | ----- | CFERR_WORST? [cc] | freq_ppm,freq_Hz |
| Carrier Frequency Result | ----- | CFREQ? [cc] | freq |
| Channel Power Result | ----- | CHPWR? mode[,cc] | {avg,max,min}\|pwr\|{s,pwr(1),pwr(2),...,pwr(s)} |
| EVM Result | ----- | EVM? mode[,cc] | {avg,max,min}\|evm |
| In-Band Emissions Measured Item | ----- | INBANDEITEM? [cc] | flag |
| In-Band Emissions Judgement | ----- | INBANDEPASS? [cc] | judgement |
| In-Band Emissions (General) Result | ----- | INBANDE_GEN? mode[,cc] | {avg,max,min}\|ibe |
| In-Band Emissions limit (General) | ----- | INBANDE_GENUL? [cc] | level |
| In-Band Emissions (IQ Image) Result | ----- | INBANDE_IMG? mode[,cc] | {avg,max,min}\|ibe |
| In-Band Emissions limit (IQ Image) | ----- | INBANDE_IMGUL? [cc] | level |
| In-Band Emissions (Carrier Leakage) Result | ----- | INBANDE_LEAK? mode[,cc] | {avg,max,min}\|ibe |
| In-Band Emissions limit (Carrier Leakage) | ----- | INBANDE_LEAKUL? [cc] | level |
| In-Band Emissions Margin | ----- | INBANDE_MARG? [cc] | margin |
| IQ Imbalance Result | ----- | IQIMB? mode[,cc] | {avg,max,min}\|iqimb |
| Magnitude Error Result | ----- | MAGERR? mode[,cc] | {avg,max,min}\|merr |
| OBW Result | ----- | OBW? | bw |

Results (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| OBW Frequency Result | ----- | OBWFREQ? pos | freq |
| Peak EVM Result | ----- | PEVM? mode[,cc] | {avg,max,min}\|pevm |
| Phase Error Result | ----- | PHASEERR? mode[,cc] | {avg,max,min}\|perr |
| Rho Result | ----- | RHO? mode[,cc] | {avg,max,min}\|rho |
| Reference Signal EVM Result | ----- | RSEVM? mode[,cc] | {avg,max,min}\|rsevm |
| SEM Judgement | ----- | SEM? [cc] | judgement |
| SEM Peak Value (Detail) (Lower) | ----- | SEMLVL_DET_LOWER? [cc] | l_M1,l_M2,l_M3,l_M4,l_M5,l_M6,l_M7,l_M8,l_M9,f_M1,f_M2,f_M3,f_M4,f_M5,f_M6,f_M7,f_M8,f_M9 |
| SEM Peak Value (Detail) (Upper) | ----- | SEMLVL_DET_UPPER? [cc] | l_1,l_2,l_3,l_4,l_5,l_6,l_7,l_8,l_9,f_1,f_2,f_3,f_4,f_5,f_6,f_7,f_8,f_9 |
| SEM Peak Value (Lower) | ----- | SEMLVL_LOWER? [cc] | l_M1,l_M2,l_M3,l_M4,f_M1,f_M2,f_M3,f_M4 |
| SEM Peak Value (Upper) | ----- | SEMLVL_UPPER? [cc] | l_1,l_2,l_3,l_4,f_1,f_2,f_3,f_4 |
| SEM Template Margin (Detail) (Lower) | ----- | SEMMARGIN_DET_LOWER? [cc] | l_M1,l_M2,l_M3,l_M4,l_M5,l_M6,l_M7,l_M8,l_M9,f_M1,f_M2,f_M3,f_M4,f_M5,f_M6,f_M7,f_M8,f_M9 |
| SEM Template Margin (Detail) (Upper) | ----- | SEMMARGIN_DET_UPPER? [cc] | l_1,l_2,l_3,l_4,l_5,l_6,l_7,l_8,l_9,f_1,f_2,f_3,f_4,f_5,f_6,f_7,f_8,f_9 |
| SEM Template Margin (Lower) | ----- | SEMMARGIN_LOWER? [cc] | l_M1,l_M2,l_M3,l_M4,f_M1,f_M2,f_M3,f_M4 |
| SEM Template Margin (Upper) | ----- | SEMMARGIN_UPPER? [cc] | l_1,l_2,l_3,l_4,f_1,f_2,f_3,f_4 |

Results (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| Spectrum Flatness Measured Item | ----- | SPECFLATITEM? [cc] | flag |
| Spectrum Flatness Judgement | ----- | SPECFLATPPPASS? [cc] | judgement |
| Spectrum Flatness (≥3 MHz (RP1)) Result | ----- | SPECFLAT_RP1? mode[,cc] | {avg,max,min}\|sflatness |
| Spectrum Flatness (RP12) Result | ----- | SPECFLAT_RP12? mode[,cc] | {avg,max,min}\|sflatness |
| Spectrum Flatness (<3 MHz (RP2)) Result | ----- | SPECFLAT_RP2? mode[,cc] | {avg,max,min}\|sflatness |
| Spectrum Flatness (RP21) Result | ----- | SPECFLAT_RP21? mode[,cc] | {avg,max,min}\|sflatness |
| Spectrum Flatness (≥3 MHz) Result | ----- | SPECFLAT1? [cc] | worst |
| Spectrum Flatness (≥3 MHz (R1 –)) Result | ----- | SPECFLAT1_M? mode[,cc] | {avg,max,min}\|sflatness |
| Spectrum Flatness (≥3 MHz (R1 +)) Result | ----- | SPECFLAT1_P? mode[,cc] | {avg,max,min}\|sflatness |
| Spectrum Flatness (<3 MHz) Result | ----- | SPECFLAT2? [cc] | worst |
| Spectrum Flatness (<3 MHz (R2 –)) Result | ----- | SPECFLAT2_M? mode[,cc] | {avg,max,min}\|sflatness |
| Spectrum Flatness (<3 MHz (R2 +)) Result | ----- | SPECFLAT2_P? mode[,cc] | {avg,max,min}\|sflatness |
| Tx Power Result<br>----- | ----- | TXPWR? mode[,cc] | {avg,max,min}\|pwr\|{s,pwr(1),pwr(2),...,pwr(s)} |
| On Power | ----- | ONPWR? mode | {avg,max,min}\|level |
| Off Power (Before) | ----- | OFFPWR_BEFORE? mode | {avg,max,min}\|level |
| Off Power (After) | ----- | OFFPWR_AFTER? mode | {avg,max,min}\|level |
| On Power Judgement | ----- | ONPWRPASS? | judgement |
| Off Power Judgement | ----- | OFFPWRPASS? | judgement |
| Waveform | ----- | WAVEFMEAS? format,position,length[,symbol[,cc]] | data(n) |

## 5.1.3 Sequence measurement commands

Common Parameters

| Function | Command | Query | Response |
|---|---|---|---|
| Input Level | `ILVL level` | `ILVL?` | `level` |
| Output Level | `OLVL level` | `OLVL?` | `level` |
| External Loss Table Index for SCC-1 | `LTE_EXTLOSSINDEX_SCC1 index` | `LTE_EXTLOSSINDEX_SCC1?` | `index` |
| Downlink Frequency | `RXFREQ dl_freq`<br>`DLFREQ dl_freq` | `RXFREQ?`<br>`DLFREQ?` | `dl_freq` |
| Uplink Frequency | `TXFREQ ul_freq`<br>`ULFREQ ul_freq` | `TXFREQ?`<br>`ULFREQ?` | `ul_freq` |
| Channel Bandwidth, RB | `LTE_BW_RB mcond,ch_bw[,rb[,start]]` | `LTE_BW_RB? mcond` | `ch_bw,rb,start` |
| Channel Bandwidth, RB for SCC-1 | `LTE_BW_RB_SCC1 mcond,ch_bw[,rb[,start]]` | `LTE_BW_RB_SCC1? mcond` | `ch_bw,rb,start` |

Sequence Measurements

| Function | Command | Query | Response |
|---|---|---|---|
| Sequence Measurement Status | ----- | `SEQMSTAT?` | `m_status,n,s(0),s(1),…,s(n-1)` |
| Sequence Progress | ----- | `SEQPROGRESS?` | `p,cur,start,end` |
| Specified Segment Status | ----- | `SEQSEGSTAT? seg` | `stat` |
| Trigger Timeout | `TRGTOUT time` | `TRGTOUT?` | `time` |

Sequence Control Parameters

| Function | Command | Query | Response |
|---|---|---|---|
| Sequence Control Parameter - Sequence Control | SEQCTRL start,end | SEQCTRL? | start,end |
| Sequence Control Parameter - Sequence Control | SEQCTRLTX start,end | SEQCTRLTX? | start,end |
| Start Signal Analyzer Measurement Only | SEQEXECTX | ----- | ----- |
| Sequence Control Parameter - Sequence End State Reinitialization | SEQREINIT sw | SEQREINIT? | sw |
| Sequence Control Parameter - Sequence Table | SEQTBL table | SEQTBL? | table |
| Measurement Offset | LTE_MEASOFFSET mcond,on_off[,time] | LTE_MEASOFFSET? mcond | on_off,time |
| RS Search Range for FDD mode | LTE_RSRANGE_FDD time | LTE_RSRANGE_FDD? | time |
| RS Search Range for TDD mode | LTE_RSRANGE_TDD time | LTE_RSRANGE_TDD? | time |
| Channel Coding | LTE_CHCODING mcond,object | LTE_CHCODING? mcond | object |

Sequence Parameter Information

| Function | Command | Query | Response |
|---|---|---|---|
| Sequence Parameter Information - Error check | ----- | SEQERR? [item] | {n,err(0),err(1),…,err(n-1)}\|{ns,seg(0),seg(1),…,seg(ns-1)}\|{e,mem,exe,set} |
| Sequence Parameter Information - Error Check | ----- | SEQERR2? format | n,err(n-1) |

Sequence Table Parameters

| Function | Command | Query | Response |
|---|---|---|---|
| Sequence Table Parameter - SG Output Port | SEQSGPORT seg,port | SEQSGPORT? seg | port |
| Sequence Table Parameter - Measurement | SEQMEAS seg,mode,step,mcond | SEQMEAS? seg | mode,step,mcond |
| Sequence Table Parameter - Trigger | SEQTRG seg,src,slope,level,delay | SEQTRG? seg | src,slope,level,delay |
| Sequence Table Parameter - TRX Control | SEQTRX seg,ul_freq,ref,dl_freq,level,pat | SEQTRX? seg | ul_freq,ref,dl_freq,level,pat |
| Sequence Table Parameter - Uplink Frequency, Input Level | SEQTX seg,ul_freq,ref | SEQTX? seg | ul_freq,ref |
| Sequence Table Parameter - Uplink Frequency, Input Level for SCC-1 | SEQTX_SCC1 seg,ul_freq,ref | SEQTX_SCC1? seg | ul_freq,ref |
| Sequence UL RMC Modulation | LTE_ULRMC_MOD mcond,ul_rmc_mod | LTE_ULRMC_MOD? mcond | ul_rmc_mod |
| Sequence UL RMC Modulation for SCC-1 | LTE_ULRMC_MOD_SCC1 mcond,ul_rmc_mod | LTE_ULRMC_MOD_SCC1? mcond | ul_rmc_mod |
| Frame Structure | LTE_FRAMETYPE mcond,mode | LTE_FRAMETYPE? mcond | mcond |
| Frame Structure for SCC-1 | LTE_FRAMETYPE_SCC1 mcond,mode | LTE_FRAMETYPE_SCC1? mcond | mode |
| Cell ID | LTE_CELLID id | LTE_CELLID? | id |
| Cell ID for SCC-1 | LTE_CELLID_SCC1 id | LTE_CELLID_SCC1? | id |
| Cyclic Shift | LTE_CSHIFT on_off | LTE_CSHIFT? | on_off |
| Group hopping | LTE_GROUPHOP on_off | LTE_GROUPHOP? | on_off |
| Delta SS | LTE_DELTASS val | LTE_DELTASS? | val |
| Operation band | LTE_BAND mcond,band | LTE_BAND? mcond | mcond,band |
| Operation band for SCC-1 | LTE_BAND_SCC1 mcond,band | LTE_BAND_SCC1? mcond | band |
| Test Environment | LTE_TESTENV mcond,env | LTE_TESTENV? mcond | mcond,env |

Sequence Table Parameters (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| In-band Emission Carrier Leakage Frequency | LTE_IBEM_CLFR clf | LTE_IBEM_CLFR? | clf |
| Measurement Carrier | LTE_MCARRIER mcond,carrier | LTE_MCARRIER? mcond | carrier |
| In-band Emissions Carrier Leakage Template | LTE_TP_INBANDE_LEAK mcond,tp | LTE_TP_INBANDE_LEAK? mcond | tp |
| In-band Emissions Carrier Leakage Template for SCC-1 | LTE_TP_INBANDE_LEAK_SCC1 mcond,tp | LTE_TP_INBANDE_LEAK_SCC1? mcond | tp |
| Uplink Downlink Configuration | LTE_TDDULDLCONF conf | LTE_TDDULDLCONF? | conf |
| Frequency Error Range | LTE_FREQERRRNG value | LTE_FREQERRRNG? | value |

Measurement Parameters

| Function | Command | Query | Response |
|---|---|---|---|
| Adjacent Channel Leakage Power Ratio Enable and Count | LTE_ACLR_SET mcond,on_off[,count] | LTE_ACLR_SET? mcond | on_off,count |
| Long Span Search | LTE_LONGSEARCH on_off | LTE_LONGSEARCH? | on_off |
| Turn Off All Measurement Items | LTE_MEAS_OFF mcond | ----- | ----- |
| Modulation Analysis Measurement Enable and Count | LTE_MOD_SET mcond,on_off[,count] | LTE_MOD_SET? mcond | on_off,count |
| Occupied Bandwidth Ratio | LTE_OBW_RATIO ratio | LTE_OBW_RATIO? | ratio |
| OBW Measurement Enable and Count | LTE_OBW_SET mcond,on_off[,count] | LTE_OBW_SET? mcond | on_off,count |
| Tx Power Measurement Enable and Count | LTE_PWR_SET mcond,on_off[,count] | LTE_PWR_SET? mcond | on_off,count |
| Spectrum Emission Mask Enable and Count | LTE_SEM_SET mcond,on_off[,count] | LTE_SEM_SET? mcond | on_off,count |

Measurement Parameters (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| Spectrum Emission Mask Template (1.4 MHz) | LTE_SEM_TEMPLATE_1.4MHZ range,limit | LTE_SEM_TEMPLATE_1.4MHZ? range | limit |
| Spectrum Emission Mask Template (10 MHz) | LTE_SEM_TEMPLATE_10MHZ range,limit | LTE_SEM_TEMPLATE_10MHZ? range | limit |
| Spectrum Emission Mask Template (15 MHz) | LTE_SEM_TEMPLATE_15MHZ range,limit | LTE_SEM_TEMPLATE_15MHZ? range | limit |
| Spectrum Emission Mask Template (20 MHz) | LTE_SEM_TEMPLATE_20MHZ range,limit | LTE_SEM_TEMPLATE_20MHZ? range | limit |
| Spectrum Emission Mask Template (3 MHz) | LTE_SEM_TEMPLATE_3MHZ range,limit | LTE_SEM_TEMPLATE_3MHZ? range | limit |
| Spectrum Emission Mask Template (5 MHz) | LTE_SEM_TEMPLATE_5MHZ range,limit | LTE_SEM_TEMPLATE_5MHZ? range | limit |
| Spectrum Emission Mask Template for Contiguous UL CA (100RB+100RB) | LTE_SEM_TEMPLATE_CONTCC_100RB_100RB range,limit | LTE_SEM_TEMPLATE_CONTCC_100RB_100RB? range | limit |
| Spectrum Emission Mask Template for Contiguous UL CA (25RB+100RB) | LTE_SEM_TEMPLATE_CONTCC_25RB_100RB range,limit | LTE_SEM_TEMPLATE_CONTCC_25RB_100RB? range | limit |
| Spectrum Emission Mask Template for Contiguous UL CA (50RB+100RB) | LTE_SEM_TEMPLATE_CONTCC_50RB_100RB range,limit | LTE_SEM_TEMPLATE_CONTCC_50RB_100RB? range | limit |
| Spectrum Emission Mask Template for Contiguous UL CA (75RB+100RB) | LTE_SEM_TEMPLATE_CONTCC_75RB_100RB range,limit | LTE_SEM_TEMPLATE_CONTCC_75RB_100RB? range | limit |
| Spectrum Emission Mask Template for Contiguous UL CA (75RB+75RB) | LTE_SEM_TEMPLATE_CONTCC_75RB_75RB range,limit | LTE_SEM_TEMPLATE_CONTCC_75RB_75RB? range | limit |

Results

| Function | Command | Query | Response |
|---|---|---|---|
| ACLR Result | ----- | LTE_ACLR? seg,mode[,cc] | {avg,max,min}\|aclr |
| Carrier Leakage Result | ----- | LTE_CARRLEAK? seg,mode[,cc] | {avg,max,min}\|cleakage |
| Carrier Frequency Error Result | ----- | LTE_CFERR? seg,mode[,cc] | {avg_ppm,avg_Hz,max_ppm,max_Hz,min_ppm,min_Hz}\|{freq_ppm,freq_Hz} |
| Worst Carrier Frequency Error Result | ----- | LTE_CFERR_WORST? seg[,cc] | freq_ppm,freq_Hz |
| Carrier Frequency Result | ----- | LTE_CFREQ? seg[,cc] | freq |
| Channel Power Result | ----- | LTE_CHPWR? seg,mode[,cc] | {avg,max,min}\|pwr\|{s,pwr(1),pwr(2),...,pwr(s)} |
| EVM Result | ----- | LTE_EVM? seg,mode[,cc] | {avg,max,min}\|evm |
| IQ Imbalance Result | ----- | LTE_IQIMB? seg,mode[,cc] | {avg,max,min}\|iqimb |
| Magnitude Error Result | ----- | LTE_MAGERR? seg,mode[,cc] | {avg,max,min}\|merr |
| OBW Result | ----- | LTE_OBW? seg | bw |
| OBW Frequency Result | ----- | LTE_OBWFREQ? seg,pos | freq |
| Peak EVM Result | ----- | LTE_PEVM? seg,mode[,cc] | {avg,max,min}\|pevm |
| Phase Error Result | ----- | LTE_PHASEERR? seg,mode[,cc] | {avg,max,min}\|perr |
| Reference Signal EVM Result | ----- | LTE_RSEVM? seg,mode[,cc] | {avg,max,min}\|rsevm |
| In-Band Emissions Measured Item | ----- | LTE_INBANDEITEM? seg[,cc] | flag |
| In-Band Emissions Judgement | ----- | LTE_INBANDEPASS? seg[,cc] | judgement |
| In-Band Emissions limit (General) | ----- | LTE_INBANDE_GENUL? seg[,cc] | level |
| In-Band Emissions (General) Result | ----- | LTE_INBANDE_GEN? seg,mode[,cc] | {avg,max,min}\|ibe |
| In-Band Emissions limit (IQ Image) | ----- | LTE_INBANDE_IMGUL? seg[,cc] | level |
| In-Band Emissions (IQ Image) Result | ----- | LTE_INBANDE_IMG? seg,mode[,cc] | {avg,max,min}\|ibe |

Results (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| In-Band Emissions limit (Carrier Leakage) | ----- | LTE_INBANDE_LEAKUL? seg[,cc] | level |
| In-Band Emissions (Carrier Leakage) Result | ----- | LTE_INBANDE_LEAK? seg,mode[,cc] | {avg,max,min}\|ibe |
| In-Band Emissions Margin | ----- | LTE_INBANDE_MARG? seg[,cc] | margin |
| SEM Judgement | ----- | LTE_SEM? seg[,cc] | judgement |
| SEM Peak Value (Detail) (Lower) | ----- | LTE_SEMLVL_DET_LOWER? seg[,cc] | l_M1,l_M2,l_M3,l_M4,l_M5, l_M6,l_M7,l_M8,l_M9,f_M1, f_M2,f_M3,f_M4,f_M5,f_M6, f_M7,f_M8,f_M9 |
| SEM Peak Value (Detail) (Upper) | ----- | LTE_SEMLVL_DET_UPPER? seg[,cc] | l_1,l_2,l_3,l_4,l_5,l_6,l_7,l_8,l_9,f_1,f_2,f_3,f_4,f_5,f_6,f_7,f_8,f_9 |
| SEM Peak Value (Lower) | ----- | LTE_SEMLVL_LOWER? seg[,cc] | l_M1,l_M2,l_M3,l_M4,f_M1, f_M2,f_M3,f_M4 |
| SEM Peak Value (Upper) | ----- | LTE_SEMLVL_UPPER? seg[,cc] | l_1,l_2,l_3,l_4,f_1,f_2,f_3,f_4 |
| SEM Template Margin (Detail) (Lower) | ----- | LTE_SEMMARGIN_DET_LOWER? seg[,cc] | l_M1,l_M2,l_M3,l_M4,l_M5, l_M6,l_M7,l_M8,l_M9,f_M1, f_M2,f_M3,f_M4,f_M5,f_M6, f_M7,f_M8,f_M9 |
| SEM Template Margin (Detail) (Upper) | ----- | LTE_SEMMARGIN_DET_UPPER? seg[,cc] | l_1,l_2,l_3,l_4,l_5,l_6,l_7,l_8,l_9,f_1,f_2,f_3,f_4,f_5,f_6,f_7,f_8,f_9 |
| SEM Template Margin (Lower) | ----- | LTE_SEMMARGIN_LOWER? seg[,cc] | l_M1,l_M2,l_M3,l_M4,f_M1, f_M2,f_M3,f_M4 |
| SEM Template Margin (Upper) | ----- | LTE_SEMMARGIN_UPPER? seg[,cc] | l_1,l_2,l_3,l_4,f_1,f_2,f_3,f_4 |

Results (Cont'd)

| Function | Command | Query | Response |
|---|---|---|---|
| Spectrum Flatness Measured Item | ----- | LTE_SPECFLATITEM? seg[,cc] | flag |
| Spectrum Flatness Judgement | ----- | LTE_SPECFLATPPPASS? seg[,cc] | judgement |
| Spectrum Flatness (≥3 MHz (RP1)) Result | ----- | LTE_SPECFLAT_RP1? seg,mode[,cc] | {avg,max,min}\|sflatness |
| Spectrum Flatness (RP12) Result | ----- | LTE_SPECFLAT_RP12? seg,mode[,cc] | {avg,max,min}\|sflatness |
| Spectrum Flatness (<3 MHz (RP2)) Result | ----- | LTE_SPECFLAT_RP2? seg,mode[,cc] | {avg,max,min}\|sflatness |
| Spectrum Flatness (RP21) Result | ----- | LTE_SPECFLAT_RP21? seg,mode[,cc] | {avg,max,min}\|sflatness |
| Tx Power Result | ----- | LTE_TXPWR? seg,mode[,cc] | {avg,max,min}\|pwr\|{s,pwr(1),pwr(2),...,pwr(s)} |

# 5.2 Details of Commands

This section describes the commands in alphabetical order.

■ Terms in this command list

EX ................................................ Command name (header)

Example ............................................ Command function name

Function ........................................................ Command function

Command.................................. Programming command syntax

Query ........................................................... Query syntax

Response ........................................................ Response syntax

Parameter .................................................. Parameter definition

Details .................................... Command restrictions and others

Example of Use................................. Command usage example

Related Commands ................Introduction of related commands

■ Suffix Code list

| Suffix Code | Unit | Suffix Code | Unit |
|---|---|---|---|
| DB | dB | MHZ | MHz |
| DBM | dBm | MS | ms |
| GHZ | GHz | MZ | MHz |
| GZ | GHz | NS | ns |
| HZ | Hz | S | s |
| KHZ | kHz | US | μs |
| KZ | kHz | | |

## 5.2.1 Common commands

### DLPAT

Waveform Pattern Select

#### Function

Selects a waveform pattern to use from patterns included in waveform file.
When the command received, the signal is immediately switched regardless of the frame cycle of signal, so the frame cycle is not continued.
This command is also used to query the currently selected waveform pattern.

#### Command

```
DLPAT pat
```

#### Query

```
DLPAT?
```

#### Response

```
pat
```

#### Parameter

| | |
|---|---|
| pat | Waveform pattern |
| PAT1 to PATn | Waveform pattern number (n: waveform information file group range) |
| Default | PAT1 |

#### Details

Select the waveform pattern for RF output signal in waveform file.
The pattern number is the same as the group number. Refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

#### Example of Use

To output the waveform pattern to 1:

```
DLPAT PAT1
DLPAT?
> PAT1
```

#### Related command

Waveform file for arbitrary waveform signal selection or query
PACKAGE

#### Remarks

The group number depends on the selected waveform file.
For details of the waveform pattern, refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

# DLPAT_SYNC

Waveform Pattern Select (SYNC)

### Function

Selects a waveform pattern to use from patterns included in waveform file.
When the command received, the signal is switched according to the frame cycle of signal so that the frame cycle is continued.
This command is also used to query the currently selected waveform pattern.

### Command

```
DLPAT_SYNC pat
```

### Query

```
DLPAT_SYNC?
```

### Response

```
pat
```

### Parameter

| | |
|---|---|
| pat | Waveform pattern |
| PAT1 to PATn | Waveform pattern number (n: waveform information file group range) |
| Default | PAT1 |

### Details

Select the waveform pattern for RF output signal in waveform file.
The pattern number is the same as the group number. Refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

### Example of Use

To output the waveform pattern to 1:

```
DLPAT_SYNC PAT1
DLPAT_SYNC?
> PAT1
```

### Related command

Waveform file for arbitrary waveform signal selection or query
PACKAGE

### Remarks

The group number depends on the selected waveform file.
For details of the waveform pattern, refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

# ESR2?

End Event Status (Measurement) Register Query

### Function

Queries the end event status register (measurement).
The event occurrence can be identified using the retrieved value.

### Query

```
ESR2?
```

### Response

```
register
```

| | |
|---|---|
| register | End event status register (measurement) |
| Range | 0 to 255 |

| | |
|---|---|
| register | Value = bit0 + bit1 + ... + bit7 |
| bit0 = $2^0$ = 1 | End of measurement |
| bit1 = $2^1$ = 2 | Trigger preparation completed |
| bit2 = $2^2$ = 4 | Unused (reserved for application use) |
| bit3 = $2^3$ = 8 | Unused (reserved for application use) |
| bit4 = $2^4$ = 16 | Unused (reserved for application use) |
| bit5 = $2^5$ = 32 | Unused (reserved for application use) |
| bit6 = $2^6$ = 64 | Unused (reserved for application use) |
| bit7 = $2^7$ = 128 | Unused (reserved for application use) |

### Details

The sum of the values for bits of the occurring event from the values $2^0 = 1$, $2^1 = 2$, $2^2 = 4$, $2^3 = 8$, $2^4 = 16$, $2^5 = 32$, $2^6 = 64$, and $2^7 = 128$, that correspond to the end event status register (measurement) bits 0, 1, 2, 3, 4, 5, 6, and 7 becomes the response.

### Example of Use

To query the end event status register (measurement) value:

```
ESR2?
> 0
```

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Native Command Reference

## ESR3?

Error Event Status (Measurement) Register Query

### Function

Queries the error event status register (measurement).

The event occurrence can be identified using the retrieved value.

### Query

```
ESR3?
```

### Response

```
register
```

| | |
|---|---|
| register | Error event status register (measurement) |
| Range | 0 to 255 |
| | |
| register | Value = bit0 + bit1 + ... + bit7 |
| bit0 = $2^0$ = 1 | Over level |
| bit1 = $2^1$ = 2 | Under level |
| bit2 = $2^2$ = 4 | Timeout |
| bit3 = $2^3$ = 8 | Unused (reserved for application use) |
| bit4 = $2^4$ = 16 | Unused (reserved for application use) |
| bit5 = $2^5$ = 32 | Unused (reserved for application use) |
| bit6 = $2^6$ = 64 | Unused (reserved for application use) |
| bit7 = $2^7$ = 128 | Unused (reserved for application use) |

### Details

The sum of the values for bits of the occurring event from the values $2^0 = 1$, $2^1 = 2$, $2^2 = 4$, $2^3 = 8$, $2^4 = 16$, $2^5 = 32$, $2^6 = 64$, and $2^7 = 128$, that correspond to the error event status register (measurement) bits 0, 1, 2, 3, 4, 5, 6, and 7 becomes the response.

### Example of Use

To query the error event status register (measurement) value:

```
ESR3?
> 4
```

## LVL

Output Level On/Off

### Function

Sets or queries RF signal output at MU887000A connector.

### Command

```
LVL on_off
```

### Query

```
LVL?
```

### Response

```
on_off
```

### Parameter

| | |
|---|---|
| on_off | Enables/disables RF signal output. |
| ON | Enables RF signal output. |
| OFF | Disables RF signal output. |
| Default | ON |

### Example of Use

To turn on the RF signal transmitted from the MU887000A connector:

```
LVL ON
LVL?
> ON
```

## MEASSTOP

Measurement Stop

### Function

Stops the current measurement.

### Command

```
MEASSTOP
```

### Example of Use

To stop the current measurement:

```
MEASSTOP
```

# MOD

Output Signal Modulation

### Function

Sets or queries MU887000A RF signal output modulation.

### Command

```
MOD on_off
```

### Query

```
MOD?
```

### Response

```
on_off
```

### Parameter

| | |
|---|---|
| on_off | Enables/disables modulation. |
| ON | Enables RF output signal modulation. |
| OFF | Disables RF output signal modulation. |
| Default | ON |

### Example of Use

To turn on the modulation.

```
MOD ON
MOD?
> ON
```

# MSTAT?

Measurement Status

## Function

Queries the measurement status.

## Query

```
MSTAT?
```

## Response

```
m_status
```

| | |
|---|---|
| m_status | Measurement status |
| 0 | Completed measurement |
| 2 | Over level |
| 3 | Under level |
| 4 | Measurement failed |
| 5 | Synchronization word not detected |
| 9 | Measurement in progress or not measured |
| 12 | Tx measurement timeout |
| 13 | Rx measurement failed |

## Details

This command can be used while measurement is in progress or suspended.
The value received from MX887013A or MX887014A is 0, 2, 5, 9, or 12.

## Example of Use

To query current measurement status:

```
MSTAT?
> 0
```

# PACKAGE

Waveform File Select

### Function

Selects and queries the waveform file for arbitrary waveform signal used at Downlink signal.

### Command

```
PACKAGE pac
```

### Query

```
PACKAGE?
```

### Response

```
pac
```

### Parameter

| | |
|---|---|
| pac | Waveform file |

### Details

The name of the file used from the waveform files loaded into waveform memory is set by this command.

### Example of Use

To set the waveform file 1 from waveform files loaded in waveform memory:

```
PACKAGE "PAC1"
PACKAGE?
> PAC1
```

### Related command

Use the following command to load the waveform file into waveform memory.
SOUR:GPRF:GEN:ARB:FILE:LOAD
For details of the command, refer to Chapter 5 "SCPI Command Reference" in the *MU887000A TRX Test Module Operation Manual*.
:SOURce:GPRF:GENerator:ARB:FILE:LOAD
The following command can be used to query the names of waveform files that have been loaded into waveform memory.
SOUR:GPRF:GEN:ARB:WAV:NAME?
For details of the command, refer to Chapter 5 "SCPI Command Reference" in the *MU887000A TRX Test Module Operation Manual*.
:SOURce:GPRF:GENerator:ARB:WAVeform:NAME?

Use the following commands to select a waveform pattern to use from the waveform patterns included in the waveform file configured using the command described in this section.
DLPAT, DLPAT_SYNC, SEQTRX

# PORT

Set Connect Port Direction

## Function

Sets or queries connectors for inputting and outputting RF signals.

## Command

```
PORT input,output
```

## Query

```
PORT?
```

## Response

```
input,output
```

## Parameters

| | |
|---|---|
| input | Test Port No. |
| PORT1 | Test Port1 |
| PORT2 | Test Port2 |
| PORT3 | Test Port3 |
| PORT4 | Test Port4 |
| Default | PORT1 |
| output | Test Port No. |
| PORT1 | Test Port1 |
| PORT2 | Test Port2 |
| PORT3 | Test Port3 |
| PORT4 | Test Port4 |
| Default | PORT1 |

## Details

Both Test Port1 and Test Port2 can be set to input and output simultaneously.
Test Port3 and Test Port4 can be set to either input or output at one time.
Only Port1 and Port2 are used by the MX887013A.

## Example of Use

To set the RF signal input and output connectors to Test Port1 and Test Port2, respectively:

```
PORT PORT1,PORT2
PORT?
> PORT1,PORT2
```

# SNGLS

Measurement Start

## Function

Sets the parameters for both specified measurement and signal transmission and executes measurement.

## Command

```
SNGLS
```

## Details

Sending this command executes one measurement execution.
Sending this command during measurement, aborts measurement once and restarts it.
ESR2 must be polled or sync processing via *WAI is required to determine the timing of measurement completion.

## Example of Use

To start measurement:

```
SNGLS
```

## Related command

ESR2

For the details of the event status register, refer to Chapter 3 “Fundamental Operation” in the *MU887000A TRX Test Module Operation Manual*.

## STDSEL

Standard Select

### Function

Sets or queries the measurement standard.

### Command

```
STDSEL std
```

### Query

```
STDSEL?
```

### Response

```
std
```

### Parameter

| | | |
|---|---|---|
| std | Measurement standard | |
| COMMON | Common Measurement (requires MX887010)A | |
| WCDMA | W-CDMA | (requires MX887011A) |
| GSM | GSM | (requires MX887012A) |
| LTE | LTE | (requires MX887013A or MX887014A) |
| CDMA2000 | CDMA2000 1x | (requires MX887015A) |
| EVDO | CDMA2000 1xEVDO | (requires MX887016A) |
| TDSCDMA | TD-SCDMA | (requires MX887017A) |
| SEQUENCE | Sequence | (requires MX887010A) |
| SEQ | Sequence | (requires MX887010A) |
| Default | COMMON | |

### Details

Switch the measurement standard and sequence measurement according to the application software.
If this command is sent during measurement, measurement stops to prepare for the new standard.
The old measurement results are cleared.
Common hardware settings, such as Downlink Frequency and Input Level, can be set for each measurement standard.
LTE FDD(MX887013A) and LTE TDD(MX887014A) are switched depending on the Frame Structure command.

5 Native Command Reference

Example of Use

To switch the measurement standard to SEQUENCE:

```
STDSEL SEQUENCE
STDSEL?
> SEQUENCE
```

Remarks

This parameter must be set to LTE to execute the commands described in Section 5.2.2 “Fundamental measurement commands”.
This parameter must be set to SEQUENCE to use the commands described in Section 5.2.3 “Sequence measurement commands”.

## SYSSEL

Application Select

Function

Sets or queries the type of application software executing on MU887000A.

Command

```
SYSSEL app
```

Query

```
SYSSEL?
```

Response

```
app
```

Parameter

| | |
|---|---|
| app | Type of application software |
| CELLULAR | Cellular Application |
| SRW | SRW Application |

Details

Set the parameter to CELLULAR and send the command before using the MX887013A.

Example of Use

To set the application software to CELLULAR:

```
SYSSEL CELLULAR
SYSSEL?
> CELLULAR
```

Remarks

When using the MX887013A, set the application to CELLULAR using the SYSSEL command, and then set the standard to LTE or SEQUENCE using the STDSEL command.

## SYST:LANG

Language Selection of Remote Command

### Function

Switches the language mode of remote control commands.

### Command

```
SYST:LANG mode
```

### Query

```
SYST:LANG?
```

### Response

```
mode
```

### Parameter

| | |
|---|---|
| mode | Language mode |
| NAT | Native |
| SCPI | SCPI |
| Default | NAT |

### Example of Use

To switch the language mode of remote control commands to Native.

```
SYST:LANG NAT
SYST:LANG?
>NAT
```

## 5.2.2 Fundamental measurement commands

### ACLR?

ACLR Result

#### Function

Queries the result of Adjacent Channel Leakage Power Ratio measurement.

#### Query

```
ACLR? mode[,cc]
```

#### Response

When mode = TTL,

```
avg0,avg1,avg2,avg3,avg4,avg5,max0,max1,max2,max3,max4,max5,min0,min1,min2,min3,min4,min5
```

| | |
|---|---|
| avg | Adjacent Channel Leakage Power Ratio (Average) |
| max | Adjacent Channel Leakage Power Ratio (Maximum) |
| min | Adjacent Channel Leakage Power Ratio (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

```
aclr0,aclr1,aclr2,aclr3,aclr4,aclr5
```

| | |
|---|---|
| aclr | Result of Adjacent Channel Leakage Power Ratio measurement in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

The responses are sent in the following order.
E-UTRA ACLR LOW,
E-UTRA ACLR UP,
UTRA ACLR2 LOW,
UTRA ACLR1 LOW,
UTRA ACLR1 UP,
UTRA ACLR2 UP

#### Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to Table 2.5.2-1 “Measurement Items of Adjacent Channel Leakage Power Ratio” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Details

The measurement bandwidth of the target adjacent channel varies with the channel bandwidth setting.
Refer to Table 2.5.1-1 “Adjacent Channel Measurement Bandwidth (MHz)” for details.

Example of Use

To query the average of ACLR measurement result:

```
ACLR? AVG
> 3.00,3.01,3.02,3.03,3.04,3.05
```

# ACLR_SET

Adjacent Channel Leakage Power Ratio Enable and Count

### Function

Enables Adjacent Channel Leakage Power Ratio measurement and sets measurement count in Sequence Measurement mode, or queries settings.

### Command

```
ACLR_SET on_off[,count]
```

### Query

```
ACLR_SET?
```

### Response

```
on_off,count
```

### Parameters

| | |
|---|---|
| on_off | Enables/disables measurement. |
| ON | Turns measurement on. |
| OFF | Disables measurement. |
| Default | OFF |
| count | Measurement count |
| Range | 1 to 200<br>1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

### Examples of Use

To set the Adjacent Channel Leakage Power Ratio measurement to OFF.

```
ACLR_SET OFF
ACLR_SET?
> OFF
```

### Remarks

This Adjacent Channel Leakage Power Ratio of 1 subframe (1 ms) is measured at each measurement count.

## ALLMEASITEMS_OFF

Turn Off All Measurement Items

### Function

Disables all measurement items.

### Command

```
ALLMEASITEMS_OFF
```

### Remarks

This command operates similarly to the following commands.

PWR_SET
OBW_SET
SEM_SET
ACLR_SET
MOD_SET

### Example of Use

To set all measurements to off at one time:

```
ALLMEASITEMS_OFF
```

# AWGNPWR

AWGN Level

### Function

Sets or queries AWGN (Additive White Gaussian Noise) output level ratio relative to carrier.

### Command

`AWGNPWR level`

### Query

`AWGNPWR?`

### Response

`level`

| | |
|---|---|
| Unit | dB |
| Resolution | 1 dB |

### Parameter

| | |
|---|---|
| level | AWGN output level |
| Range | –40 to +12 dB |
| Resolution | 1 dB |
| Default | –40 dB |

### Example of Use

To set AWGN output level ratio vs. the carrier to –14 dB:

```
AWGNPWR -14
AWGNPWR?
> -14
```

## AWGNLVL

AWGN Level On/Off

### Function

Enables AWGN output, or queries setting.

### Command

```
AWGNLVL on_off
```

### Query

```
AWGNLVL?
```

### Response

```
on_off
```

### Parameter

| | |
|---|---|
| on_off | Enables/disables AWGN output. |
| ON | Enables AWGN output. |
| OFF | Disables AWGN output. |
| Default | OFF |

### Example of Use

To enable AWGN output:

```
AWGNLVL ON
```

To query the status of AWGN output:

```
AWGNLVL?
> ON
```

### Related command

AWGNPWR

# BAND

Operation band

### Function

Sets or queries the operation band.

### Command

`BAND band`

### Query

`BAND?`

### Response

`band`

### Parameter

| | |
|---|---|
| band | Operation band |
| Range | 1 to 256 |
| Resolution | 1 |
| Default | 1 |

### Details

This is the parameter for determining the following items:

- Limit line of Spectrum Flatness measurement
- Intra-band/Inter-band (at UL CA)

### Example of Use

To set the operation band to 10:

```
BAND 10
BAND?
> 10
```

## BAND_SCC1

Operation band for SCC-1

### Function

Sets or queries the operation band for SCC-1.

### Command

```
BAND_SCC1 band
```

### Query

```
BAND_SCC1?
```

### Response

```
band
```

### Parameter

| | |
|---|---|
| band | Operation band |
| Range | 1 to 256 |
| Resolution | 1 |
| Default | 1 |

### Details

This is the parameter for determining the following items:

- Limit line of Spectrum Flatness measurement
- Intra-band/Inter-band (at UL CA)

### Example of Use

To set the operation band of SCC-1 to 10:

```
BAND_SCC1 10
BAND_SCC1?
> 10
```

# BANDWIDTH

Channel Bandwidth

### Function

Sets or queries the channel bandwidth.

### Command

```
BANDWIDTH ch_bw[,ch_bw_scc1]
```

### Query

```
BANDWIDTH? [ALL]
```

### Response

```
ch_bw,ch_bw_scc1
```

### Parameter

| | |
|---|---|
| ch_bw | Channel bandwidth of PCC |
| ch_bw_scc1 | Channel bandwidth of SCC-1 |
| 1.4MHZ | 1.4 MHz |
| 3MHZ | 3 MHz |
| 5MHZ | 5 MHz |
| 10MHZ | 10 MHz |
| 15MHZ | 15 MHz |
| 20MHZ | 20 MHz |
| Default | 5 MHz |

### Details

When the channel bandwidth for PCC is updated, the start RB number setting value at Uplink RMC for PCC is reset to 0. The RBs allocated to RMC of the PCC uplink signal is changed to the maximum value.

When the channel bandwidth for SCC-1 is updated, the start RB number setting value at Uplink RMC for SCC-1 is reset to 0. The RBs allocated to RMC of the SCC-1 uplink signal is changed to the maximum value.

When the command argument ALL is omitted, the response is ch_bw only.

### Example of Use

To set the channel bandwidth as follows:

For PCC: 1.4 MHz, For SCC-1: 3 MHz

```
BANDWIDTH 1.4MHZ,3MHZ
BANDWIDTH? ALL
> 1.4MHZ,3MHZ
```

## BANDWIDTH_SCC1

Channel Bandwidth for SCC-1

### Function

Sets or queries the channel bandwidth of SCC-1.

### Command

```
BANDWIDTH_SCC1 ch_bw
```

### Query

```
BANDWIDTH_SCC1?
```

### Response

```
ch_bw
```

### Parameters

| | |
|---|---|
| ch_bw | Channel bandwidth of SCC-1 |
| 1.4MHZ | 1.4 MHz |
| 3MHZ | 3 MHz |
| 5MHZ | 5 MHz |
| 10MHZ | 10 MHz |
| 15MHZ | 15 MHz |
| 20MHZ | 20 MHz |
| Default | 5 MHZ |

### Details

When the channel bandwidth for SCC-1 is updated, the start RB number setting value at Uplink RMC for SCC-1 is reset to 0. The RBs allocated to RMC of the SCC-1 uplink signal is changed to the maximum value.

### Example of Use

To set the channel bandwidth of SCC-1 to 1.4 MHz.

```
BANDWIDTH_SCC1 1.4MHZ
BANDWIDTH_SCC1?
> 1.4MHZ
```

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Native Command Reference

# BW_RB

Channel Bandwidth, RB

### Function

Sets or queries the uplink channel bandwidth and RB (Resource Block).

### Command

```
BW_RB ch_bw[,rb[,start]]
```

### Query

```
BW_RB?
```

### Response

```
ch_bw,rb,start
```

### Parameters

| | |
|---|---|
| ch_bw | Channel bandwidth |
| 1.4MHZ | 1.4 MHz |
| 3MHZ | 3 MHz |
| 5MHZ | 5 MHz |
| 10MHZ | 10 MHz |
| 15MHZ | 15 MHz |
| 20MHZ | 20 MHz |
| Default | 5MHZ |
| rb | Number of RBs |
| Range | Same as ULRMC_RB |
| Default | 25 |
| start | Start RB number |
| Range | Same as ULRB_START |
| Default | 0 |

### Details

The rb and start settings can be omitted. If omitted, the settings are Full RB (rb is the maximum for the channel bandwidth and start is 0).

### Example of Use

To set as follows:
Channel Bandwidth: 1.4 MHz, Number of RB: 6, Start RB number: 0

```
BW_RB 1.4MHZ,6,0
BW_RB?
>1.4MHZ,6,0
```

Related Commands

| | |
|---|---|
| Channel Bandwidth | BANDWIDTH |
| UL RMC Number of RB | ULRMC_RB |
| UL RMC Starting RB | ULRB_START |

# BW_RB_SCC1

Channel Bandwidth, RB for SCC-1

### Function

Sets or queries the uplink channel bandwidth and RB (Resource Block) of SCC-1.

### Command

```
BW_RB_SCC1 ch_bw[,rb[,start]]
```

### Query

```
BW_RB_SCC1?
```

### Response

```
ch_bw,rb,start
```

### Parameters

| | |
|---|---|
| ch_bw | Channel bandwidth of SCC-1. |
| 1.4MHZ | 1.4 MHz |
| 3MHZ | 3 MHz |
| 5MHZ | 5 MHz |
| 10MHZ | 10 MHz |
| 15MHZ | 15 MHz |
| 20MHZ | 20 MHz |
| Default | 5 MHZ |
| rb | Number of RBs for SCC-1 |
| Range | Same as ULRMC_RB |
| Default | 25 |
| start | Start RB number of SCC-1 |
| Range | Same as ULRB_START |
| Default | 0 |

### Details

The rb and start settings can be omitted. If omitted, the settings are Full RB (rb is the maximum for the channel bandwidth and start is 0).

### Example of Use

To set as follows:

Channel Bandwidth of SCC-1: 1.4 MHz, Number of RB: 6, Start RB number: 0

```
BW_RB_SCC1 1.4MHZ,6,0
BW_RB_SCC1?
>1.4MHZ,6,0
```

### Related Commands

| | |
|---|---|
| Channel Bandwidth of SCC-1 | BANDWIDTH_SCC1 |
| UL RMC Number of RB for SCC-1 | ULRMC_RB_SCC1 |
| UL RMC Starting RB of SCC-1 | ULRB_START_SCC1 |

# CARRLEAK?

Carrier Leakage Result

## Function

Queries the Carrier Leak measurement result at Modulation Analysis.

## Query

```
CARRLEAK? mode[,cc]
```

## Response

When mode = TTL,

```
avg,max,min
```

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dBc |
| Resolution | 0.01 dB |

When mode ≠ TTL,

```
cleakage
```

| | |
|---|---|
| cleakage | Measurement result in specified Storage mode |
| Unit | dBc |
| Resolution | 0.01 dB |

## Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

## Example of Use

To query the average of Carrier Leakage measurement result:

```
CARRLEAK? AVG
> 1.05
```

# CELLID

Cell ID

### Function

Sets or queries the Cell ID.

### Command

```
CELLID id
```

### Query

```
CELLID?
```

### Response

```
id
```

### Parameter

| | | |
|---|---|---|
| id | | Cell ID |
| | Range | 0 to 503 |
| | Resolution | 1 |
| | Default | 0 |

### Example of Use

To set the Cell ID to 121:

```
CELLID 121
CELLID?
> 121
```

## CELLID_SCC1

Cell ID for SCC-1

### Function

Sets or queries the Cell ID of SCC-1.

### Command

```
CELLID_SCC1 id
```

### Query

```
CELLID_SCC1?
```

### Response

```
id
```

### Parameter

| | | |
|---|---|---|
| id | | Cell ID of SCC-1 |
| | Range | 0 to 503 |
| | Resolution | 1 |
| | Default | 0 |

### Example of Use

To set the Cell ID of SCC-1 to 121:

```
CELLID_SCC1 121
CELLID_SCC1?
> 121
```

# CFERR?

Carrier Frequency Error Result

## Function

Queries the Frequency Error measurement result.

## Query

```
CFERR? mode[,cc]
```

## Response

When mode = TTL,

`avg_ppm,avg_Hz,max_ppm,max_Hz,min_ppm,min_Hz`

| | |
|---|---|
| avg_ppm | Measurement result in ppm (Average) |
| max_ppm | Measurement result in ppm (Maximum) |
| min_ppm | Measurement result in ppm (Minimum) |
| Unit | ppm |
| Resolution | 0.01 ppm |
| avg_Hz | Measurement result in Hz (Average) |
| max_Hz | Measurement result in Hz (Maximum) |
| min_Hz | Measurement result in units of Hz (Minimum) |
| Unit | Hz |
| Resolution | 0.1 Hz |

When mode ≠ TTL,

`freq_ppm,freq_Hz`

| | |
|---|---|
| freq_ppm | Measurement result in ppm in specified Storage mode |
| Unit | ppm |
| Resolution | 0.01 ppm |
| freq_Hz | Measurement results in Hz in specified Storage mode |
| Unit | Hz |
| Resolution | 0.1 Hz |

## Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of Frequency Error measurement result:

```
CFERR? AVG
> 0.03,60.0
```

## CFERR_WORST?

Worst Carrier Frequency Error Result

### Function

Queries the worst value in Frequency Error measurement results.

### Query

```
CFERR_WORST? [cc]
```

### Response

```
freq_ppm,freq_Hz
```

| | |
|---|---|
| freq_ppm | Worst value in Frequency Error measurement results in ppm |
| Unit | ppm |
| Resolution | 0.01 ppm |
| freq_Hz | Worst value in Frequency Error measurement results in Hz |
| Unit | Hz |
| Resolution | 0.1 Hz |

### Parameters

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The worst value should be either the maximum or minimum of the Frequency Error measurement results, whichever is the larger absolute value.

### Example of Use

To query the worst value in Frequency Error measurement results:

```
CFERR_WORST?
> 0.03,60.0
```

# CFREQ?

Carrier Frequency Result

## Function

Queries the Carrier Frequency measurement result at Modulation Analysis.

## Query

```
CFREQ? [cc]
```

## Response

```
freq
```

| | |
|---|---|
| freq | Carrier frequency |
| Unit | Hz |
| Resolution | 1 Hz |

## Parameter

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

## Example of Use

To query the result of Carrier Frequency measurement:

```
CFREQ?
> 1951000000
```

## CHCODING

Channel Coding

### Function

Sets or queries the channel coding.

### Command

```
CHCODING object
```

### Query

```
CHCODING?
```

### Response

```
object
```

### Parameter

| | |
|---|---|
| object | Target for channel coding |
| RMC | Reference Measurement Channel |
| RMC_UL_CA | RMC at UL CA |
| Default | RMC |

### Details

When FRAMETYPE is FDD and RMC_UL_CA is set, MX887013A-001 is required.
When FRAMETYPE is TDD and RMC_UL_CA is set, MX887014A-001 is required.

### Examples of Use

To set the channel coding to RMC:

```
CHCODING RMC
CHCODING?
> RMC
```

# CHCONFIG

RMC Configuration

### Function

Sets or queries the Uplink Channel configuration when Channel Coding set to RMC.

### Command

```
CHCONFIG val
```

### Query

```
CHCONFIG?
```

### Response

```
val
```

### Parameter

| | |
|---|---|
| val | RMC Channel configuration |
| PUSCH | PUSCH |
| PUCCH | PUCCH |
| Default | PUSCH |

### Examples of Use

To set the Uplink Channel configuration to PUSCH.

```
CHCONFIG PUSCH
CHCONFIG?
> PUSCH
```

# CHPWR?

Channel Power Result

## Function

Queries the Channel Power measurement result.

## Query

```
CHPWR? mode[,cc]
```

## Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dBm |
| Resolution | 0.01 dB |

When mode = AVG, MAX, MIN or DVT,

`pwr`

| | |
|---|---|
| pwr | Measurement result in specified Storage mode |
| Unit | dBm |
| Resolution | 0.01 dB |

When mode = IND,

`s,pwr(1),pwr(2),pwr(3),…,pwr(s)`

| | |
|---|---|
| pwr(s) | Channel Power of sth measurement |
| Unit | dBm |
| Resolution | 0.01 dB |
| s | Measurement count |
| Range | 1 to 200 |

## Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| IND | Individual measurement result |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.2.2-1 Measurement Items of Tx Power" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Example of Use

To query the average of PCC Channel Power measurement result:

```
CHPWR? AVG,PCC
> -20.00
```

## CSHIFT

Cyclic Shift

Function

Sets or queries the Cyclic Shift.

Command

```
CSHIFT on_off
```

Query

```
CSHIFT?
```

Response

```
on_off
```

Parameter

| | |
|---|---|
| on_off | Cyclic Shift |
| ON | Enables Cyclic Shift |
| OFF | Disables Cyclic Shift |
| FIX1 | The fixed value is set. |
| Default | ON |

Example of Use

To enable the Cyclic Shift:

```
CSHIFT ON
CSHIFT?
> ON
```

# DELTASS

Delta SS

## Function

Sets or queries the Delta SS (Group Assignment PUSCH).

## Command

```
DELTASS val
```

## Query

```
DELTASS?
```

## Response

```
val
```

## Parameter

| | |
|---|---|
| val | Delta SS |
| Range | 0 to 29 |
| Resolution | 1 |
| Default | 0 |

## Example of Use

To set the Delta SS to 12:

```
DELTASS 12
DELTASS?
> 12
```

# DLCHAN

Downlink Channel

### Function

Sets or queries the EARFCN (E-UTRA Absolute Radio Frequency Channel Number) Downlink Channel.

### Command

```
DLCHAN dl_ch
```

### Query

```
DLCHAN?
```

### Response

```
dl_ch
```

### Parameter

| | |
|---|---|
| dl_ch | Downlink Channel |
| Range | 0 to 262143 |
| Resolution | 1 |
| Default | 300 |

### Details

When the Downlink Channel is updated, the related Uplink Channel, Downlink Frequency, Uplink Frequency, and Flame structure parameter are changed accordingly.
For the relationship between the parameter and frequency settings of channels refer to Table 2.1.6-3 “Relationship between Uplink Channel Number and Downlink Channel Number” and Table 2.1.6-4 “E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation”.

### Example of Use

To set the Downlink Channel to 1100:

```
DLCHAN 1100
DLCHAN?
> 1100
```

## DLCHAN_SCC1

Downlink Channel for SCC-1

### Function

Sets or queries the Downlink Channel for SCC-1.

### Command

```
DLCHAN_SCC1 dl_ch
```

### Query

```
DLCHAN_SCC1?
```

### Response

```
dl_ch
```

### Parameter

| | |
|---|---|
| dl_ch | Downlink Channel for SCC-1 |
| Range | 0 to 262143 |
| Resolution | 1 |
| Default | 300 |

### Details

When the Downlink Channel is updated, the related Uplink Channel, Downlink Frequency, Uplink Frequency and Frame structure parameter are changed accordingly.
For the relationship between the parameter and frequency settings of channels refer to Table 2.1.6-3 “Relationship between Uplink Channel Number and Downlink Channel Number” and to Table 2.1.6-4 “E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation”.

### Example of Use

To set the Downlink Channel for SCC-1 to 1100:

```
DLCHAN_SCC1 1100
DLCHAN_SCC1?
> 1100
```

# DLFREQ

Downlink Frequency

### Function

Sets or queries the downlink frequency of MU887000A.

### Command

```
DLFREQ dl_freq
```

### Query

```
DLFREQ?
```

### Response

```
dl_fleq
```

| | |
|---|---|
| Unit | Hz |
| Resolution | 1 Hz |

### Parameter

| | |
|---|---|
| dl_freq | Downlink frequency |
| Range | 400.000000 to 3800.000000 MHz |
| | 400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 1 Hz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted) |
| Default | 2140.000000 MHz |

### Details

The Rx frequency for the UE is set.

Updating the Downlink Frequency setting does not affect the Downlink Channel setting.

### Example of Use

To set the downlink frequency to 2050 MHz:

```
DLFREQ 2050MHZ
DLFREQ?
>2050000000
```

## DLFREQ_SCC1

Downlink Frequency for SCC-1

### Function

Sets or queries the Downlink Frequency for SCC-1.

### Command

```
DLFREQ_SCC1 dl_freq
```

### Query

```
DLFREQ_SCC1?
```

### Response

```
dl_fleq
```

| | |
|---|---|
| Unit | Hz |
| Resolution | 1 Hz |

### Parameter

| | |
|---|---|
| dl_freq | Downlink Frequency for SCC-1 |
| Range | 400.000000 to 3800.000000 MHz |
| | 400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 1 Hz |
| Suffix code | H, KH, K, MH, M, GH, GZ (uses Hz when omitted) |
| Default | 2140.000000 MHz |

### Details

This setting corresponds to the UE Tx frequency setting.

Updating the setting of the Downlink frequency for SCC-1 does not affect the setting of the Downlink Channel for SCC-1.

### Example of Use

To set the Downlink frequency for SCC-1 to 2050 MHz:

```
DLFREQ_SCC1 2050MHZ
DLFREQ_SCC1?
> 2050000000
```

# EVM?

EVM Result

## Function

Queries the EVM measurement result of Modulation Analysis.

## Query

```
EVM? mode[,cc]
```

## Response

When mode = TTL,

```
avg,max,min
```

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | % |
| Resolution | 0.01% |

When mode ≠ TTL,

```
evm
```

| | |
|---|---|
| evm | Measurement result in specified Storage mode |
| Unit | % |
| Resolution | 0.01% |

## Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

## Example of Use

To query the average of EVM measurement result:

```
EVM? AVG
> 1.50
```

## EXTLOSSINDEX_SCC1

External Loss Table Index for SCC-1

### Function

Sets and queries the loss correction table index for SCC-1.

### Command

```
EXTLOSSINDEX_SCC1 index
```

### Query

```
EXTLOSSINDEX_SCC1?
```

### Response

```
index
```

### Parameters

| | |
|---|---|
| index | Loss correction table index |
| Range | 0 to 16 |
| Resolution | 1 |
| Default | 0 |

### Details

When the loss correction table index is set to 0, the setting value of the common command "LOSSTBL" is used.
Refer to Chapter 6 "Native Command Reference" in the *MU887000A Transmitter and Receiver Module Operation Manual* for details of the LOSSTBL command.

### Examples of Use

To set the loss correction table index for SCC-1 to 1:

```
EXTLOSSINDEX_SCC1 1
EXTLOSSINDEX_SCC1?
>1
```

# FASTPWRMODE

Fast Power Measurement Mode

## Function

Enables Fast Power Measurement mode or queries setting when Channel Coding set to RMC.

## Command

```
FASTPWRMODE on_off
```

## Query

```
FASTPWRMODE?
```

## Response

```
on_off
```

## Parameter

| | |
|---|---|
| on_off | Fast Power Measurement Mode |
| ON | Executes Fast Power measurement. |
| OFF | Executes general power measurement. |
| Default | OFF |

## Details

This command is available for FDD.

The setup of this command is ignored if set to TDD.

When Fast Power Measurement mode is set to On, only Tx power is measured.

Use the following command to enable/disable power measurement and to set measuring times.

PWR_SET

## Example of Use

To set Fast Power Measurement mode to On.

```
FASTPWRMODE ON
FASTPWRMODE?
> ON
```

# FMEAS_TRGDLY

Trigger Delay

### Function

Sets or queries the Trigger Delay.

### Command

```
FMEAS_TRGDLY trgdly
```

### Query

```
FMEAS_TRGDLY?
```

### Response

```
trgdly
```

| | |
|---|---|
| Unit | ms |
| Resolution | 0.001 ms |

### Parameters

| | |
|---|---|
| trgdly | Trigger Delay |
| Range | 0 to 10.000 ms |
| Resolution | 0.001 ms |
| Suffix code | MS |
| Default | 0.000 ms |

### Details

This parameter is valid only when FRAMETYPE is set to TDD. Note this parameter can be edited even if FRAMETYPE is set to FDD.
This parameter is valid when MEASITEM is set to NORMAL.

### Examples of Use

To set the trigger delay to 0.001 ms:

```
FMEAS_TRGDLY 0.001
FMEAS_TRGDLY?
>0.001
```

## FMEAS_TRGLVL

Trigger Level

### Function

Sets or queries the Trigger Level.

### Command

```
FMEAS_TRGLVL trglevel
```

### Query

```
FMEAS_TRGLVL?
```

### Response

`trglevel`

| | |
|---|---|
| Unit | dB |
| Resolution | 1 dB |

### Parameter

| | |
|---|---|
| trglevel | Trigger Level |
| Range | –40 to 0 dB |
| Resolution | 1 dB |
| Suffix code | DB |
| Default | –30 dB |

### Details

This parameter is valid only when FRAMETYPE is set to TDD. Note this parameter can be edited even if FRAMETYPE is set to FDD.

### Example of Use

To set the trigger level to –30 dB:

```
FMEAS_TRGLVL -30
FMEAS_TRGLVL?
> -30
```

## FMEAS_TRGSRC

Trigger Source

### Function

Sets or queries the Trigger Source.

### Command

```
FMEAS_TRGSRC trgsrc
```

### Query

```
FMEAS_TRGSRC?
```

### Response

```
trgsrc
```

### Parameters

| | |
|---|---|
| trgsrc | Trigger Source |
| PWR | Power of input signal |
| FRAME | frame |
| Default | PWR |

### Details

This parameter is valid only when FRAMETYPE is set to TDD. Note this parameter can be edited even if FRAMETYPE is set to FDD.
This parameter is valid when MEASITEM is set to NORMAL. When PWRTEMP is set, the value is fixed to PWR.

### Examples of Use

To set the trigger source to PWR:

```
FMEAS_TRGSRC PWR
FMEAS_TRGSRC?
>PWR
```

## FMEAS_TRGTOUT

Trigger Timeout

### Function

Sets or queries the trigger timeout.

### Command

```
FMEAS_TRGTOUT trgtime
```

### Query

```
FMEAS_TRGTOUT?
```

### Response

`trgtime`

| | |
|---|---|
| Unit | s |
| Resolution | 1 s |

### Parameter

| | |
|---|---|
| trgtime | Trigger Timeout |
| Range | 1 to 10 s |
| Resolution | 1 s |
| Suffix code | S |
| Default | 10 s |

### Details

This parameter is valid only when FRAMETYPE is set to TDD. Note this parameter can be edited even if FRAMETYPE is set to FDD.

### Example of Use

To set the Trigger timeout time to 5 seconds:

```
FMEAS_TRGTOUT 5
FMEAS_TRGTOUT?
> 5
```

## FRAMETYPE

Frame Structure

### Function

Sets or queries the LTE frame structure.
This setting determines the duplex mode.

### Command

```
FRAMETYPE mode
```

### Query

```
FRAMETYPE?
```

### Response

```
mode
```

### Parameter

| | |
|---|---|
| mode | Frame type (Duplex mode) |
| FDD | Frequency Division Multiplexing |
| TDD | Time Division Multiplexing |
| Default | FDD |

### Details

When only MX887013A is installed, only FDD can be set.
When only MX887014A is installed, only TDD can be set and the default is TDD.

### Example of Use

To set the duplex mode to FDD:

```
FRAMETYPE FDD
FRAMETYPE?
> FDD
```

# FRAMETYPE_SCC1

Frame Structure for SCC-1

### Function

Sets or queries the LTE frame structure for SCC-1.

### Command

```
FRAMETYPE_SCC1 mode
```

### Query

```
FRAMETYPE_SCC1?
```

### Response

```
mode
```

### Parameters

| | |
|---|---|
| mode | Frame type (Duplex mode) |
| FDD | Frequency Division Multiplexing |
| TDD | Time Division Multiplexing |
| Default | FDD |

### Details

When only MX887013A is installed, only FDD can be set.
When only MX887014A is installed, only TDD can be set and the default is TDD.
When the settings in this command and FRAMETYPE are different, the measurement is performed using the settings in FRAMETYPE.

### Examples of Use

To set the duplex mode for SCC-1 to FDD:

```
FRAMETYPE_SCC1 FDD
FRAMETYPE_SCC1?
> FDD
```

## FREQERRRNG

Frequency Error Range

### Function

Sets and queries the frequency error detection method in the modulation analysis measurement.

### Command

```
FREQERRRNG value
```

### Query

```
FREQERRRNG?
```

### Response

```
value
```

### Parameters

| | |
|---|---|
| value | Frequency Error Range |
| NORMAL | Normal |
| NARROW | Narrow Range |
| Default | NORMAL |

### Details

When Narrow Range is set, the measurement time takes longer, but the high accuracy measurement is performed.

### Examples of Use

To set Frequency Error Range to Narrow Range:

```
FREQERRRNG NARROW
FREQERRRNG?
>NARROW
```

# GROUPHOP

Group Hopping

### Function

Enables and queries the Group hopping.

### Command

```
GROUPHOP on_off
```

### Query

```
GROUPHOP?
```

### Response

```
on_off
```

### Parameter

| | |
|---|---|
| on_off | Enables/disables Group hopping. |
| ON | Enables Group hopping. |
| OFF | Disables Group hopping. |
| Default | ON |

### Example of Use

To enable Group hopping:

```
GROUPHOP  ON
GROUPHOP?
> ON
```

## IBEM_CLFR

In-band Emission Carrier Leakage Frequency

### Function

Sets and queries the position of Carrier Leakage Frequency of the UE in the In-band Emission/EVM measurement at Contiguous UL CA.

### Command

```
IBEM_CLFR clf
```

### Query

```
IBEM_CLFR?
```

### Response

```
clf
```

### Parameters

| | |
|---|---|
| clf | Position of Carrier Leakage Frequency |
| CFR | at Carrier Frequency<br>Center frequency of Aggregated Channel Bandwidth |
| CCC | at each CC Center<br>Center frequency of each CC |
| Default | CFR |

### Details

When the In-band Emission measurement at Contiguous UL CA is performed, “UL Number of RB” for PCC or SCC-1 must be set to 0.
For CFR, the resource block located at the center frequency of Aggregated Channel Bandwidth is treated as the carrier leak frequency and the In-band Emission/EVM measurement is performed.
For CCC, the center frequencies of each CC are treated as the carrier leak frequency and the In-band Emission/EVM measurement is performed.

### Example of Use

To set the position of Carrier Leakage Frequency to CFR:

```
IBEM_CLFR CFR
IBEM_CLFR?
> CFR
```

# ILVL

Input Level

### Function

Sets or queries the input level of the MU887000A connector.

### Command

```
ILVL level[,level_scc1]
```

### Query

```
ILVL? [ALL]
```

### Response

```
level,level_scc1
```

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameter

| | |
|---|---|
| level | Input level of PCC |
| level_scc1 | Input level of SCC-1 |
| Range | –65.0 to +35.0 dBm (Port 1/Port 2) |
| | –65.0 to +25.0 dBm (Port 3/Port 4) |
| Resolution | 0.1 dB |
| Suffix Code | DBM (uses dBm when omitted) |
| Default | –1.0 dBm |

### Details

The setting range varies according to the External Loss setting.
When Cable Loss Correction is ON, the cable loss is added to the input level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –60.0 to +40.0 dBm.
When the query argument ALL is omitted, the response is level only.

### Example of Use

To set the input level for PCC to –10.0 dBm and the input level for SCC-1 to –15.0 dBm:

```
ILVL -10.0,-15.0
ILVL? ALL
>-10.0,-15.0
```

### Related Commands

EXTLOSSW
LOSSTBL
LOSSTBLVAL
For details of the commands, refer to Chapter 6 “Native Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

## ILVL_SCC1

Input Level for SCC-1

### Function

Sets or queries the input level of the MU887000A connector for SCC-1

### Command

```
ILVL_SCC1 level
```

### Query

```
ILVL_SCC1?
```

### Response

level

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | |
|---|---|
| level | Input level for SCC-1 |
| Range | –65.0 to +35.0 dBm (Port 1/Port 2) |
| | –65.0 to +25.0 dBm (Port 3/Port 4) |
| Resolution | 0.1 dB |
| Suffix Code | DBM (uses dBm when omitted) |
| Default | –1.0 dBm |

### Details

The setting range varies according to the External Loss setting.
When Cable Loss Correction is ON, the cable loss is added to the input level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –60.0 to +40.0 dBm.

### Examples of Use

To set the input level for SCC-1 to –10.0 dBm.

```
ILVL_SCC1 -10.0
ILVL_SCC1?
>-10.0
```

### Related Commands

EXTLOSSW
LOSSTBL
LOSSTBLVAL
For details of the commands, refer to Chapter 6 “Native Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

## INBANDEITEM?

In-Band Emissions Measured Item

### Function

Queries whether each in-band emission measurement item for modulation analysis is measured or not.

### Query

`INBANDEITEM? [cc]`

### Response

`flag`

| | | |
|---|---|---|
| flag | Measured/Not measured flag (0 to 7)<br>Returns the sum of the following measurement items. | |
| | 0 | Not measured |
| | 1 | Measure General |
| | 2 | Measure IQ Image |
| | 4 | Measure Carrier Leakage |

### Parameter

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query whether each in-band emission measurement item for modulation analysis is measured or not.

```
INBANDEITEM?
> 4
```

## INBANDEPASS?

In-Band Emissions Judgement

### Function

Queries the judgement on the in-band emission measurement result for modulation analysis.

### Query

```
INBANDEPASS? [cc]
```

### Response

```
judgement
```

| | |
|---|---|
| judgement | Judgement |
| PASS | Pass |
| FAIL | Fail |
| – | Not measured |

### Parameter

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the judgement on the in-band emission measurement result for modulation analysis.

```
INBANDEPASS?
> PASS
```

## INBANDE_GEN?

In-Band Emissions (General) Result

### Function

Queries in-band emissions (General) for non-allocated RB measurement result of Modulation Analysis.

### Query

```
INBANDE_GEN? mode[,cc]
```

### Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

`ibe`

| | |
|---|---|
| ibe | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of in-band emissions (General) measurement result:

```
INBANDE_GEN? AVG
> 0.04
```

## INBANDE_GENUL?

In-Band Emissions limit (General)

### Function

Queries the limit of the in-band emission measurement result (General) for modulation analysis.

### Query

```
INBANDE_GENUL? [cc]
```

### Response

```
level
```

| | |
|---|---|
| level | Limit |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the limit of the in-band emission measurement result (General) for modulation analysis.

```
INBANDE_GENUL?
> 2.05
```

# INBANDE_IMG?

In-Band Emissions (IQ Image) Result

### Function

Queries in-band emissions (IQ Image) for non-allocated RB measurement result of Modulation Analysis.

### Query

`INBANDE_IMG? mode[,cc]`

### Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

`ibe`

| | |
|---|---|
| ibe | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of in-band emissions (IQ Image) measurement result:

```
INBANDE_IMG? AVG
> 0.04
```

## INBANDE_IMGUL?

In-Band Emissions limit (IQ Image)

### Function

Queries the limit of in-band emission measurement (IQ Image) for modulation analysis.

### Query

```
INBANDE_IMGUL? [cc]
```

### Response

```
level
```

| | |
|---|---|
| level | Limit |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the limit of in-band emission measurement result (IQ Image) for modulation analysis.

```
INBANDE_IMGUL?
> 1.05
```

# INBANDE_LEAK?

In-Band Emissions (Carrier Leakage) Result

## Function

Queries the In-band emissions (Carrier Leakage) for non-allocated RB measurement result of Modulation Analysis.

## Query

```
INBANDE_LEAK? mode[,cc]
```

## Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dBc |
| Resolution | 0.01 dB |

When mode ≠ TTL,

`ibe`

| | |
|---|---|
| ibe | Measurement result in specified Storage mode |
| Unit | dBc |
| Resolution | 0.01 dB |

## Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

## Example of Use

To query the average of in-band emissions (Carrier Leakage) measurement result:

```
INBANDE_LEAK? AVG
> 0.04
```

## INBANDE_LEAKUL?

In-Band Emissions limit (Carrier Leakage)

### Function

Queries the limit of in-band emission measurement (Carrier Leakage) for modulation analysis.

### Query

```
INBANDE_LEAKUL? [cc]
```

### Response

```
level
```

| | |
|---|---|
| level | Limit |
| Unit | dBc |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the limit of in-band emission measurement result (Carrier Leakage) for modulation analysis.

```
INBANDE_LEAKUL?
> 1.05
```

# INBANDE_MARG?

In-Band Emissions Margin

### Function

Queries the worst margin in the entire bandwidth for in-band emission measurement.

### Query

```
INBANDE_MARG? [cc]
```

### Response

```
margin
```

| | |
|---|---|
| margin | Worst margin in the entire bandwidth |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

Queries the worst margin in the entire bandwidth of in-band emission measurement for modulation analysis.

```
INBANDE_MARG?
> 1.05
```

## IQIMB?

IQ Imbalance Result

### Function

Queries the IQ Imbalance measurement result of Modulation Analysis.

### Query

```
IQIMB? mode[,cc]
```

### Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

`iqimb`

| | |
|---|---|
| iqimb | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

IQ Imbalance can be measured when the number of RBs is set to the maximum value for the channel bandwidth shown in Table 2.1.6-2 “Number of Allocatable Resource Blocks in Channel Bandwidth”.
If the number of RBs is not the maximum allocatable value in the channel bandwidth, the response is 999.99.

### Example of Use

To query the average of IQ Imbalance measurement result:

```
IQIMB? AVG
> 0.04
```

## LONGSEARCH

Long Span Search

### Function

Enables and queries the Long Span Search.

### Command

```
LONGSEARCH on_off
```

### Query

```
LONGSEARCH?
```

### Response

```
on_off
```

### Parameter

| | |
|---|---|
| on_off | Enables/disables Long Span Search. |
| ON | Enables Long Span Search. |
| OFF | Disables Long Span Search. |
| Default | OFF |

### Details

Set this parameter to OFF when the Uplink and Downlink signals are synchronized; set it to ON when they are not synchronized.
The response to the MSTAT will be 5 (Synchronization word not detected), if this parameter to OFF when the Uplink and Downlink signals are not synchronized.

Measurement takes more time when the Long Span Search function is on.

### Example of Use

To enable the Long Span Search:

```
LONGSEARCH ON
LONGSEARCH?
> ON
```

## MAGERR?

Magnitude Error Result

### Function

Queries the Magnitude Error measurement result of Modulation Analysis.

### Query

```
MAGERR? mode[,cc]
```

### Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | % |
| Resolution | 0.01% |

When mode ≠ TTL,

`merr`

| | |
|---|---|
| merr | Measurement result in specified Storage mode |
| Unit | % |
| Resolution | 0.01% |

### Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of Magnitude Error measurement result:

```
MAGERR? AVG
> 1.05
```

5

Native Command Reference

# MCARRIER

Measurement Carrier

### Function

Sets and queries the Component Carrier for measurement at Inter-band UL CA.

### Command

```
MCARRIER carrier
```

### Query

```
MCARRIER?
```

### Response

```
carrier
```

### Parameters

| | |
|---|---|
| carrier | Component Carrier for measurement |
| PCC | PCC |
| SCC1 | SCC-1 |
| Default | PCC |

### Examples of Use

To set the Component Carrier for measurement to PCC:

```
MCARRIER PCC
MCARRIER?
>PCC
```

# MEASITEM

Measurement Item

## Function

Sets or queries the Measurement Item in Fundamental Measurement.

## Command

```
MEASITEM item
```

## Query

```
MEASITEM?
```

## Response

```
item
```

## Parameters

| | |
|---|---|
| item | Measurement Item in Fundamental Measurement |
| NORMAL | Normal |
| PWRTEMP | Power Template |
| Default | NORMAL |

## Details

PWRTEMP is valid only when CHCODING is set to RMC.
Note this parameter can be edited even if CHCODING is set to RMC_UL_CA.

## Example of Use

To set the Measurement Item in Fundamental Measurement to Power Template:.

```
MEASITEM PWRTEMP
MEASITEM ?
> PWRTEMP
```

# MOD_SET

Modulation Analysis Measurement Enable and Count

## Function

Enables Modulation Analysis Measurement and sets measurement count, and queries settings.

## Command

```
MOD_SET on_off[,count]
```

## Query

```
MOD_SET?
```

## Response

```
on_off,count
```

## Parameters

| | |
|---|---|
| on_off | Enables/disables measurement. |
| ON | Enables measurement. |
| OFF | Disables measurement. |
| Default | OFF |
| count | Measurement count |
| Range | 1 to 200 |
| | 1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

## Example of Use

To enable Modulation Analysis measurement and set measurement count to 200:

```
MOD_SET ON,200
MOD_SET?
> ON,200
```

## Remarks

Modulation analysis is executed for 1 slot (0.5 ms) at each measurement count.

## NRBCQI

nRB-CQI

### Function

Sets or queries nRB-CQI.

### Command

```
NRBCQI value
```

### Query

```
NRBCQI?
```

### Response

```
value
```

### Parameter

| | |
|---|---|
| value | nRB-CQI |
| Range | 0 to 98 |
| Resolution | 1 |
| Default | 2 |

### Details

The number of RBs to send the Uplink PUCCH signal is set.

### Example of Use

To set nRB-CQI to 3.

```
NRBCQI 3
NRBCQI?
> 3
```

# OBW?

OBW Result

### Function

Queries the Occupied Bandwidth measurement result.

### Query

```
OBW? [cc]
```

### Response

```
bw
```

| | |
|---|---|
| bw | Occupied Bandwidth |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameter

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.3.2-1 Measurement Items of OBW” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of in-band emissions (Carrier Leakage) measurement result:

```
OBW?
> 3.840
```

## OBWFREQ?

OBW Frequency Result

### Function

Queries the upper, lower and center frequency of Occupied Bandwidth measurement.

### Query

```
OBWFREQ? pos[,cc]
```

### Response

```
freq
```

| | |
|---|---|
| freq | Offset frequency |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| pos | Offset type |
| UPPER | Upper frequency |
| LOWER | Lower frequency |
| CENTER | Center frequency |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.3.2-1 Measurement Items of OBW” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the upper frequency of Occupied Bandwidth measurement result:

```
OBWFREQ? UPPER
> 1951.920
```

# OBW_RATIO

Occupied Bandwidth Ratio

### Function

Sets Occupied Bandwidth measurement occupation ratio in Sequence Measurement mode, and queries the setting.

### Command

```
OBW_RATIO ratio
```

### Query

```
OBW_RATIO?
```

### Response

```
ratio
```

### Parameter

| | |
|---|---|
| ratio | Occupied Bandwidth occupation ratio |
| Range | 80.0% to 99.9% |
| Resolution | 0.1% |
| Suffix code | None |
| Default | 99.0% |

### Example of Use

To set the Occupied Bandwidth occupation ratio to 99.0%:

```
OBW_RATIO 99.0
OBW_RATIO?
> 99.0
```

## OBW_SET

OBW Measurement Enable and Count

### Function

Enables Occupied Bandwidth measurement and sets measurement count, or queries settings.

### Command

```
OBW_SET on_off[,count]
```

### Query

```
OBW_SET?
```

### Response

```
on_off,count
```

### Parameters

| | |
|---|---|
| on_off | Enables/disables measurement. |
| ON | Enables measurement. |
| OFF | Disables measurement. |
| Default | OFF |
| count | Measurement count |
| Range | 1 to 200<br>1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

### Example of Use

To turn Occupied Bandwidth measurement on and set the measurement count to 50:

```
OBW_SET ON,50
OBW_SET?
> ON,50
```

### Remarks

Occupied Bandwidth is measured for 1 subframe (1 ms) at each measurement count.

# OFFPWR_AFTER?

Off Power (After)

### Function

Queries the Off Power (After) measurement result.

### Query

`OFFPWR_AFTER? mode`

### Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

`level`

| | |
|---|---|
| level | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |

### Example of Use

To query the average of Off Power (After) measurement result:

```
OFFPWR_AFTER? AVG
> 1.75
```

## OFFPWR_BEFORE?

Off Power (Before)

### Function

Queries the Off Power (Before) measurement result.

### Query

`OFFPWR_BEFORE? mode`

### Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

`level`

| | |
|---|---|
| level | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |

### Example of Use

To query the average of Off Power (Before) measurement result:

```
OFFPWR_BEFORE? AVG
> 1.75
```

5 Native Command Reference

# OFFPWRPASS?

Off Power Judgement

### Function

Queries the judgement result of Off Power measurement.

The result is Fail when any part of spectrum exceeds limit, otherwise Pass.

### Query

`OFFPWRPASS?`

### Response

`judgement`

| | |
|---|---|
| judgement | Judgement result |
| PASS | Pass |
| FAIL | Fail |
| – | Not measured |

### Example of Use

To query the judgement result of Off Power measurement:

```
OFFPWRPASS?
> PASS
```

# OLVL

Output Level

### Function

Sets or queries the total output level of all channels.

### Command

```
OLVL level
```

### Query

```
OLVL?
```

### Response

```
level
```

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameter

| | |
|---|---|
| level | Output level |
| Range | –130.0 to –10.0 dBm (Port 1/Port 2) |
| | –120.0 to 0.0 dBm (Port 3/Port 4) |
| Resolution | 0.1 dB |
| Suffix Code | DBM (uses dBm when omitted) |
| Default | –60.2 dBm |

### Details

The setting range varies with the output port setting.
When the Cable Loss Calibration is ON, the cable loss is subtracted from the output level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –135.0 to –15.0 dBm.

### Example of Use

To set the output level to –50.0 dBm:

```
OLVL -50.0
OLVL?
> -50.0
```

### Related Commands

EXTLOSSW
LOSSTBL
LOSSTBLVAL
For details of the commands, refer to Chapter 6 “Native Command Reference” in the *MU887000A TRX Test Module Operation Manual.*

# ONPWR?

On Power

### Function

Queries the On Power measurement result.

### Query

```
ONPWR? mode
```

### Response

When mode = TTL,

```
avg,max,min
```

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dBm |
| Resolution | 0.01 dB |

When mode ≠ TTL,

```
level
```

| | |
|---|---|
| level | Measurement result in specified Storage mode |
| Unit | dBm |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |

### Example of Use

To query the average of On Power measurement result:

```
ONPWR? AVG
> 1.75
```

## ONPWRPASS?

On Power Judgement

### Function

Queries the judgement result of On Power measurement.

The result is Fail when any part of spectrum exceeds limit, otherwise Pass.

### Query

```
ONPWRPASS?
```

### Response

```
judgement
```

| | |
|---|---|
| judgement | Judgement result |
| PASS | Pass |
| FAIL | Fail |
| – | Not measured |

### Example of Use

To query the judgement result of Off Power measurement.

```
ONPWRPASS?
> PASS
```

# PEVM?

Peak EVM Result

### Function

Queries the EVM Peak measurement result.

### Query

```
PEVM? mode[,cc]
```

### Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | % |
| Resolution | 0.01% |

When mode ≠ TTL,

`pevm`

| | |
|---|---|
| pevm | Measurement result in specified Storage mode |
| Unit | % |
| Resolution | 0.01% |

### Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of EVM Peak measurement result:

```
PEVM? AVG
> 1.75
```

# PHASEERR?

Phase Error Result

## Function

Queries the Phase Error measurement result of Modulation Analysis.

## Query

```
PHASEERR? mode[,cc]
```

## Response

When mode = TTL,

```
avg,max,min
```

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | degree |
| Resolution | 0.01 degree |

When mode ≠ TTL,

```
perr
```

| | |
|---|---|
| perr | Measurement result in specified Storage mode |
| Unit | degree |
| Resolution | 0.01 degree |

## Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

## Example of Use

To query the average of Phase Error measurement result:

```
PHASEERR? AVG
> 1.55
```

# PT_WDR

Power Template - Wide Dynamic Range

## Function

Enables the wide dynamic range function for the Power Template measurement, and queries the settings.

## Command

```
PT_WDR on_off
```

## Query

```
PT_WDR?
```

## Response

```
on_off
```

## Parameter

| | |
|---|---|
| on_off | Enables/disables the wide dynamic range function |
| ON | Enables the wide dynamic range function |
| OFF | Disables the wide dynamic range function |
| Default | ON |

## Example of Use

To enable the wide dynamic range function:

```
PT_WDR ON
PT_WDR?
> ON
```

## PWR_SET

Tx Power Measurement Enable and Count

### Function

Enables Tx power measurement and sets or queries measurement count in Sequence Measurement mode.

### Command

```
PWR_SET on_off[,count]
```

### Query

```
PWR_SET?
```

### Response

```
on_off,count
```

### Parameters

| | |
|---|---|
| on_off | Enables/disables measurement. |
| ON | Enables measurement. |
| OFF | Disables measurement. |
| Default | ON |
| count | Measurement count |
| Range | 1 to 200<br>1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

### Example of Use

To turn Transmit Power measurement ON and set the measurement count to 200:

```
PWR_SET ON,200
PWR_SET?
> ON,200
```

### Remarks

Tx Power is measured for 1 subframe (1 ms) at each measurement count.

# RHO?

Rho Result

### Function

Queries the Rho (waveform quality) measurement result of Modulation Analysis.

### Query

`RHO? mode[,cc]`

### Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Resolution | 0.00001 |

When mode ≠ TTL,

`rho`

| | |
|---|---|
| rho | Measurement result in specified Storage mode |
| Resolution | 0.00001 |

### Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of Signal Quality measurement (Rho) result:

```
RHO? AVG
> 0.04
```

# RSEVM?

Reference Signal EVM Result

## Function

Queries the EVM measurement result of Reference Signal.

## Query

```
RSEVM? mode[,cc]
```

## Response

When mode = TTL,

```
avg,max,min
```

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | % |
| Resolution | 0.01% |

When mode ≠ TTL,

```
rsevm
```

| | |
|---|---|
| rsevm | Measurement result in specified Storage mode |
| Unit | % |
| Resolution | 0.01% |

## Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

## Details

The EVM measurement of the Reference Signal is supported when PUSCH is assigned using the CHCONFIG command.

#### Example of Use

To query the EVM measurement result of Reference Signal:

```
RSEVM?
> 1.51
```

## RXFREQ

Downlink Frequency

#### Function

Sets or queries the downlink frequency.

#### Command

```
RXFREQ dl_freq
```

#### Query

```
RXFREQ?
```

#### Response

```
dl_freq
```

#### Parameter

| | |
|---|---|
| dl_freq | Downlink frequency |
| Range | 400.000000 to 3800.000000 MHz |
| | 400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 1 Hz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted) |
| Default | 2140.000000 MHz |

#### Details

The Rx frequency for the UE is set.

Updating the Downlink Frequency setting does not affect the Downlink Channel setting.

#### Example of Use

To set the downlink frequency to 2120 MHz:

```
RXFREQ 2120MHZ
RXFREQ?
>2120000000
```

# SEM?

SEM Judgement

## Function

Queries the judgement result of Spectrum Emission Mask measurement.
Fail when any part of spectrum exceeds limit, otherwise Pass.

## Query

```
SEM? [cc]
```

## Response

```
judgement
```

| | |
|---|---|
| judgement | Judgement result |
| PASS | Pass |
| FAIL | Fail |
| – | Not measured |

## Parameter

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

## Example of Use

To query the judgement result whether the spectrum is within the specified threshold:

```
SEM?
> PASS
```

## SEMLVL_DET_LOWER?

SEM Peak Value (Detail) (Lower)

### Function

Queries the peak level with offset frequency at each of lower side 9 ranges of Spectrum Emission Mask measurement.

### Query

```
SEMLVL_DET_LOWER? [cc]
```

### Response

```
f_M1,l_M1,f_M2,l_M2,f_M3,l_M3,f_M4,l_M4,f_M5,l_M5,f_M6,l_M6,f_M7,l_M7,f_M8,l_M8,f_M9,l_M9
```

| | |
|---|---|
| l_M1 to l_M9 | Peak level at each of lower side range of Range 1 to Range 9 |
| Unit | dBm |
| Resolution | 0.01 dB |
| f_M1 to f_M9 | Offset frequency of peak level at each of lower side range of Range 1 to Range 9 |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The number of target ranges varies with the combination of channel bandwidth and network signalled value for additionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

### Example of Use

To query the peak level with offset frequency at each of lower side of 9 ranges of Spectrum Emission Mask measurement:

```
SEMLVL_DET_LOWER?
>
-0.500,3.00,-1.500,3.00,-2.600,3.00,-3.500,3.00,-5.500,3.00,-8.000,3.00,-12.500,3.00,-17.500,3.00,-22.500,3.00
```

## SEMLVL_DET_UPPER?

SEM Peak Value (Detail) (Upper)

### Function

Queries the peak level with offset frequency at each of upper side 9 ranges of Spectrum Emission Mask measurement.

### Query

```
SEMLVL_DET_UPPER? [cc]
```

### Response

```
f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4,f_5,l_5,f_6,l_6,f_7,l_7,f_8,l_8,f_9,l_9
```

| | |
|---|---|
| l_1 to l_9 | Peak level in each of upper Range 1 to Range 9 |
| Unit | dBm |
| Resolution | 0.01 dB |
| f_1 to f_9 | Offset frequency of peak level in each of upper Range 1 to Range 9 |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The number of target ranges varies with the combination of channel bandwidth and network signalled value for additionalSpectrumEmission. Refer to Table 2.4.1-2 "Frequency Ranges for Measurement Results (1/2)" and Table 2.4.1-3 "Frequency Ranges for Measurement Results (2/2)" for details.

### Example of Use

To query the peak level with offset frequency at each of upper side of 9 ranges of Spectrum Emission Mask measurement:

```
SEMLVL_DET_UPPER?
>
0.500,3.00,1.500,3.00,2.600,3.00,3.500,3.00,5.500,3.00,8.000,3.00,12.500,
3.00,17.500,3.00,22.500,3.00
```

# SEMLVL_LOWER?

SEM Peak Value (Lower)

### Function

Queries the peak level with offset frequency at each of lower side ranges of Spectrum Emission Mask measurement.

### Query

```
SEMLVL_LOWER? [cc]
```

### Response

```
f_M1,l_M1,f_M2,l_M2,f_M3,l_M3,f_M4,l_M4
```

| | |
|---|---|
| l_M1 to l_M4 | Peak level in each of lower Range 1 to Range 4 |
| Unit | dBm |
| Resolution | 0.01 dB |
| f_M1 to f_M4 | Offset frequency of peak level in each of lower Range 1 to Range 4 |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

Refer to Table 2.4.1-1 "Frequency Ranges of Range 1 to Range 4" for the frequency range for the measurement.

### Example of Use

To query the peak level with offset frequency at each of lower side ranges of Spectrum Emission Mask measurement:

```
SEMLVL_LOWER?
> -3.000,-20.00,-5.000,-30.00,-8.000,-40.00,-9.500,-50.00
```

# SEMLVL_UPPER?

SEM Peak Value (Upper)

## Function

Queries the peak level with offset frequency at each of upper side ranges of Spectrum Emission Mask measurement.

## Query

```
SEMLVL_UPPER? [cc]
```

## Response

```
f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4
```

| | |
|---|---|
| l_1 to l_4 | Peak level in each of upper Range 1 to Range 4 |
| Unit | dBm |
| Resolution | 0.01 dB |
| f_1 to f_4 | Offset frequency of peak level in each of upper Range 1 to Range 4 |
| Unit | MHz |
| Resolution | 1 kHz |

## Parameters

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

## Details

Refer to Table 2.4.1-1 “Frequency Ranges of Range 1 to Range 4” for the frequency range for the measurement.

## Example of Use

To query the peak level with offset frequency at each of upper side ranges of Spectrum Emission Mask measurement:

```
SEMLVL_UPPER?
> 3.000,-20.00,5.000,-30.00,8.000,-40.00,9.500,-50.00
```

# SEMMARGIN_DET_LOWER?

SEM Template Margin (Detail) (Lower)

### Function

Queries the level margin with frequency where margin measured at each of lower side of 9 ranges of Spectrum Emission Mask measurement.

### Query

```
SEMMARGIN_DET_LOWER? [cc]
```

### Response

```
f_M1,l_M1,f_M2,l_M2,f_M3,l_M3,f_M4,l_M4,f_M5,l_M5,f_M6,l_M6,f_M7,l_M7,f_M
8,l_M8,f_M9,l_M9
```

| | |
|---|---|
| l_M1 to l_M9 | Level margin in each of lower Range 1 to Range 9 |
| Unit | dB |
| Resolution | 0.01 dB |
| f_M1 to f_M9 | Offset frequency where level margin in each of lower Range 1 to Range 9 measured |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

The number of target ranges varies with the combination of channel bandwidth and network signalled value for additionalSpectrumEmission. Refer to Table 2.4.1-2 "Frequency Ranges for Measurement Results (1/2)" and Table 2.4.1-3 "Frequency Ranges for Measurement Results (2/2)" for details.

### Example of Use

To query the level margin with frequency where margin measured at each of lower side of 9 ranges of Spectrum Emission Mask measurement:

```
SEMMARGIN_DET_LOWER?
>
-0.500,3.00,-1.500,3.00,-2.600,3.00,-3.500,3.00,-5.500,3.00,-8.000,3.00,-
12.500,3.00,-17.500,3.00,-22.500,3.00
```

# SEMMARGIN_DET_UPPER?

SEM Template Margin (Detail) (Upper)

## Function

Queries the level margin with frequency where margin measured at each of upper side of 9 ranges of Spectrum Emission Mask measurement.

## Query

```
SEMMARGIN_DET_UPPER? [cc]
```

## Response

```
f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4,f_5,l_5,f_6,l_6,f_7,l_7,f_8,l_8,f_9,l_9
```

| | |
|---|---|
| l_1 to l_9 | Level margin in each of upper side range of Range 1 to Range 9 |
| Unit | dB |
| Resolution | 0.01 dB |
| f_1 to f_9 | Offset frequency where level margin measured in each of upper side range of Range 1 to Range 9 |
| Unit | MHz |
| Resolution | 1 kHz |

## Parameters

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

## Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

The number of target ranges varies with the combination of channel bandwidth and network signalled value for additionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the level margin with frequency where margin measured at each of upper side of 9 ranges of Spectrum Emission Mask measurement:

```
SEMLVL_DET_UPPER?
>
0.500,3.00,1.500,3.00,2.600,3.00,3.500,3.00,5.500,3.00,8.000,3.00,12.500,
3.00,17.500,3.00,22.500,3.00
```

## SEMMARGIN_LOWER?

SEM Template Margin (Lower)

### Function

Queries the level margin at each of lower side ranges in Spectrum Emission Mask measurement in Sequence Measurement mode.

### Query

```
SEMMARGIN_LOWER? [cc]
```

### Response

```
f_M1,l_M1,f_M2,l_M2,f_M3,l_M3,f_M4,l_M4
```

| | |
|---|---|
| l_M1 to l_M4 | Level margin in each of lower Range 1 to Range 4 |
| Unit | dB |
| Resolution | 0.01 dB |
| f_M1 to f_M4 | Offset frequency where level margin in each of lower Range 1 to Range 4 measured |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

Level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

Refer to Table 2.4.1-1 Frequency Ranges of Range 1 to Range 4 for the frequency range for the measurement.

### Example of Use

To query the level margin with frequency where margin measured at each of lower side ranges of Spectrum Emission Mask measurement:

```
SEMMARGIN_LOWER?
> -3.000,3.00,-5.000,3.00,-8.000,3.00,-9.500,3.00
```

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Native Command Reference

# SEMMARGIN_UPPER?

SEM Template Margin (Upper)

## Function

Queries the level margin at each of upper side range in Spectrum Emission Mask measurement in Sequence Measurement mode.

## Query

```
SEMMARGIN_UPPER? [cc]
```

## Response

```
f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4
```

| | |
|---|---|
| l_1 to l_4 | Level margin in each of upper Range 1 to Range 4 |
| Unit | dB |
| Resolution | 0.01 dB |
| f_1 to f_4 | Offset frequency where level margin in each of upper Range 1 to Range 4 measured |
| Unit | MHz |
| Resolution | 1 kHz |

## Parameters

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

## Details

Level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

Refer to Table 2.4.1-1 “Frequency Ranges of Range 1 to Range 4” for the frequency range for the measurement.

## Example of Use

To query the level margin with frequency where margin measured at each of upper side ranges of Spectrum Emission Mask measurement:

```
SEMMARGIN_UPPER?
> 3.000,3.00,5.000,3.00,8.000,3.00,9.500,3.00
```

## SEM_SET

Spectrum Emission Mask Enable and Count

### Function

Enables the Spectrum Emission Mask Measurement and sets or queries the measurement count.

### Command

```
SEM_SET on_off[,count]
```

### Query

```
SEM_SET?
```

### Response

```
on_off,count
```

### Parameters

| | |
|---|---|
| on_off | Enables/disables the measurement. |
| ON | Enables the measurement. |
| OFF | Disables the measurement. |
| Default | OFF |
| count | Measurement count |
| Range | 1 to 200<br>1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

### Example of Use

To enable the Spectrum Emission Mask measurement and set the measurement count to 100:

```
SEM_SET ON,100
SEM_SET?
> ON,100
```

### Remarks

The Spectrum Emission Mask is measured for 1 subframe (1 ms) at each measurement count.

## SEM_TEMPLATE_1.4MHZ

Spectrum Emission Mask Template (1.4 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 1.4 MHz channel bandwidth.

### Command

```
SEM_TEMPLATE_1.4MHZ range,limit
```

### Query

```
SEM_TEMPLATE_1.4MHZ? range
```

### Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 4 | |
| Resolution | 1 | |
| Suffix code | None | |
| Default | 1 | |
| limit | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Suffix code | DBM (uses dBm when omitted) | |
| Default | Range 1: | –8.5 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –23.5 dBm |
| | Range 4: | 0.0 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 1.4 MHz channel bandwidth to –10.0 dBm:

```
SEM_TEMPLATE_1.4MHZ 2,-10.0
SEM_TEMPLATE_1.4MHZ? 2
> -10.0
```

## SEM_TEMPLATE_10MHZ

Spectrum Emission Mask Template (10 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 10 MHz channel bandwidth.

### Command

```
SEM_TEMPLATE_10MHZ range,limit
```

### Query

```
SEM_TEMPLATE_10MHZ? range
```

### Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 4 | |
| Resolution | 1 | |
| Suffix code | None | |
| Default | 1 | |
| limit | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Suffix code | DBM (uses dBm when omitted) | |
| Default | Range 1: | –16.5 dBm |
| | Range2: | –8.5 dBm |
| | Range3: | –11.5 dBm |
| | Range4: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 10 MHz channel bandwidth to –10.0 dBm:

```
SEM_TEMPLATE_10MHZ 2,-10.0
SEM_TEMPLATE_10MHZ? 2
> -10.0
```

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Native Command Reference

## SEM_TEMPLATE_15MHZ

Spectrum Emission Mask Template (15 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 15 MHz channel bandwidth.

### Command

```
SEM_TEMPLATE_15MHZ range,limit
```

### Query

```
SEM_TEMPLATE_15MHZ? range
```

### Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 4 | |
| Resolution | 1 | |
| Suffix code | None | |
| Default | 1 | |
| limit | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Suffix code | DBM (uses dBm when omitted) | |
| Default | Range 1: | –18.5 dBm |
| | Range2: | –8.5 dBm |
| | Range3: | –11.5 dBm |
| | Range4: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 15 MHz channel bandwidth to –10.0 dBm:

```
SEM_TEMPLATE_15MHZ 2,-10.0
SEM_TEMPLATE_15MHZ? 2
> -10.0
```

## SEM_TEMPLATE_20MHZ

Spectrum Emission Mask Template (20 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 20 MHz channel bandwidth.

### Command

```
SEM_TEMPLATE_20MHZ range,limit
```

### Query

```
SEM_TEMPLATE_20MHZ? range
```

### Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 4 | |
| Resolution | 1 | |
| Suffix code | None | |
| Default | 1 | |
| limit | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Suffix code | DBM (uses dBm when omitted) | |
| Default | Range 1: | –19.5 dBm |
| | Range2: | –8.5 dBm |
| | Range3: | –11.5 dBm |
| | Range4: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 20 MHz channel bandwidth to –10.0 dBm:

```
SEM_TEMPLATE_20MHZ 2,-10.0
SEM_TEMPLATE_20MHZ? 2
> -10.0
```

## SEM_TEMPLATE_3MHZ

Spectrum Emission Mask Template (3 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 3 MHz channel bandwidth.

### Command

```
SEM_TEMPLATE_3MHZ range,limit
```

### Query

```
SEM_TEMPLATE_3MHZ? range
```

### Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 4 | |
| Resolution | 1 | |
| Suffix code | None | |
| Default | 1 | |
| limit | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Suffix code | DBM (uses dBm when omitted) | |
| Default | Range 1: | –11.5 dBm |
| | Range2: | –8.5 dBm |
| | Range3: | –23.5 dBm |
| | Range4: | 0.0 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 3 MHz channel bandwidth to –10.0 dBm:

```
SEM_TEMPLATE_3MHZ 2,-10.0
SEM_TEMPLATE_3MHZ? 2
> -10.0
```

## SEM_TEMPLATE_5MHZ

Spectrum Emission Mask Template (5 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 5 MHz channel bandwidth.

### Command

```
SEM_TEMPLATE_5MHZ range,limit
```

### Query

```
SEM_TEMPLATE_5MHZ? range
```

### Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 4 | |
| Resolution | 1 | |
| Suffix code | None | |
| Default | 1 | |
| limit | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Suffix code | DBM (uses dBm when omitted) | |
| Default | Range 1: | –13.5 dBm |
| | Range2: | –8.5 dBm |
| | Range3: | –11.5 dBm |
| | Range4: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 5 MHz channel bandwidth to –10.0 dBm:

```
SEM_TEMPLATE_5MHZ 2,-10.0
SEM_TEMPLATE_5MHZ? 2
> -10.0
```

## SEM_TEMPLATE_CONTCC_100RB_100RB

Spectrum Emission Mask Template for Contiguous UL CA (100RB+100RB)

### Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 100RB+100RB.

### Command

```
SEM_TEMPLATE_CONTCC_100RB_100RB range,limit
```

### Query

```
SEM_TEMPLATE_CONTCC_100RB_100RB? range
```

### Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 6 | |
| Resolution | 1 | |
| Default | 1 | |
| limit | Limit | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Default | Range 1: | –22.5 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |
| | Range 5: | –23.5 dBm |
| | Range 6: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 100RB+100RB.

```
SEM_TEMPLATE_CONTCC_100RB_100RB 2,-10.0
SEM_TEMPLATE_CONTCC_100RB_100RB? 2
>-10.0
```

## SEM_TEMPLATE_CONTCC_25RB_100RB

Spectrum Emission Mask Template for Contiguous UL CA (25RB+100RB)

### Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 25RB+100RB.

### Command

```
SEM_TEMPLATE_CONTCC_25RB_100RB range,limit
```

### Query

```
SEM_TEMPLATE_CONTCC_25RB_100RB? range
```

### Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 6 | |
| Resolution | 1 | |
| Default | 1 | |
| limit | Limit | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Default | Range 1: | –20.5 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |
| | Range 5: | –23.5 dBm |
| | Range 6: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 25RB+100RB.

```
SEM_TEMPLATE_CONTCC_25RB_100RB 2,-10.0
SEM_TEMPLATE_CONTCC_25RB_100RB? 2
>-10.0
```

## SEM_TEMPLATE_CONTCC_50RB_100RB

Spectrum Emission Mask Template for Contiguous UL CA (50RB+100RB)

### Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 50RB+100RB.

### Command

```
SEM_TEMPLATE_CONTCC_50RB_100RB range,limit
```

### Query

```
SEM_TEMPLATE_CONTCC_50RB_100RB? range
```

### Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 6 | |
| Resolution | 1 | |
| Default | 1 | |
| limit | Limit | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Default | Range 1: | –21.0 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |
| | Range 5: | –23.5 dBm |
| | Range 6: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 50RB+100RB.

```
SEM_TEMPLATE_CONTCC_50RB_100RB 2,-10.0
SEM_TEMPLATE_CONTCC_50RB_100RB? 2
>-10.0
```

## SEM_TEMPLATE_CONTCC_75RB_100RB

Spectrum Emission Mask Template for Contiguous UL CA (75RB+100RB)

### Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 75RB+100RB.

### Command

```
SEM_TEMPLATE_CONTCC_75RB_100RB range,limit
```

### Query

```
SEM_TEMPLATE_CONTCC_75RB_100RB? range
```

### Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 6 | |
| Resolution | 1 | |
| Default | 1 | |
| limit | Limit | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Default | Range 1: | –22.0 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |
| | Range 5: | –23.5 dBm |
| | Range 6: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 75RB+100RB.

```
SEM_TEMPLATE_CONTCC_75RB_100RB 2,-10.0
SEM_TEMPLATE_CONTCC_75RB_100RB? 2
>-10.0
```

# SEM_TEMPLATE_CONTCC_75RB_75RB

Spectrum Emission Mask Template for Contiguous UL CA (75RB+75RB)

## Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 75RB+75RB.

## Command

```
SEM_TEMPLATE_CONTCC_75RB_75RB range,limit
```

## Query

```
SEM_TEMPLATE_CONTCC_75RB_75RB? range
```

## Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

## Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 6 | |
| Resolution | 1 | |
| Default | 1 | |
| limit | Limit | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Default | Range 1: | –21.0 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |
| | Range 5: | –23.5 dBm |
| | Range 6: | –23.5 dBm |

## Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 75RB+75RB.

```
SEM_TEMPLATE_CONTCC_75RB_75RB 2,-10.0
SEM_TEMPLATE_CONTCC_75RB_75RB? 2
>-10.0
```

## SIB2_NS

additionalSpectrumEmission

### Function

Sets or queries the network signalled value for additionalSpectrumEmission in SIB2.
This setting determines the Spectrum Emission Mask frequency range.

### Command

```
SIB2_NS sib2_ns
```

### Query

```
SIB2_NS?
```

### Response

```
sib2_ns
```

### Parameter

| | |
|---|---|
| sib2_ns | Network signalled value for additionalSpectrumEmission |
| NS_01 | NS_01 |
| NS_02 | NS_02 |
| NS_03 | NS_03 |
| : | : |
| NS_30 | NS_30 |
| NS_31 | NS_31 |
| NS_32 | NS_32 |
| Default | NS_01 |

### Example of Use

To set the additionalSpectrumEmission in SIB2 to NS_02:

```
SIB2_NS NS_02
SIB2_NS?
> NS_02
```

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Native Command Reference

# SPECFLAT1?

Spectrum Flatness (≥3 MHz) Result

### Function

Queries the worst value in Spectrum Flatness measurement result in Range 1.

### Query

```
SPECFLAT1? [cc]
```

### Response

```
worst
```

| | |
|---|---|
| worst | Measurement result |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The worst value should be either the maximum or minimum of the Flatness measurement results in Range 1, whichever is the larger absolute value.

### Example of Use

To query the worst value in Spectrum Flatness measurement result in Range 1:

```
SPECFLAT1?
> 0.04
```

## SPECFLAT1_M?

Spectrum Flatness (≥3 MHz (R1 −)) Result

### Function

Queries the minimum value in Spectrum Flatness measurement result in Range 1.

### Query

```
SPECFLAT1_M? mode[,cc]
```

### Response

When mode = TTL,

```
avg,max,min
```

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

```
sflatness
```

| | |
|---|---|
| sflatness | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of minimum value in Spectrum Flatness measurement result in Range 1:

```
SPECFLAT1_M? AVG
> 0.04
```

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Native Command Reference

## SPECFLAT1_P?

Spectrum Flatness (≥3 MHz (R1 +)) Result

### Function

Queries the maximum value in Spectrum Flatness measurement result in Range 1.

### Query

```
SPECFLAT1_P? mode[,cc]
```

### Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

| | |
|---|---|
| sflatness | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of maximum value in Spectrum Flatness measurement result in Range 1:

```
SPECFLAT1_P? AVG
> 0.04
```

## SPECFLAT2?

Spectrum Flatness (<3 MHz) Result

### Function

Queries the worst value in Spectrum Flatness measurement result in Range 2.

### Query

```
SPECFLAT2? [cc]
```

### Response

```
worst
```

| | |
|---|---|
| worst | Measurement result |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The worst value should be either the maximum or minimum of the Flatness measurement results in Range 2, whichever is the larger absolute value.

### Example of Use

To query the worst value in Spectrum Flatness measurement result in Range 2:

```
SPECFLAT2?
> 0.04
```

## SPECFLAT2_M?

Spectrum Flatness (<3 MHz (R2 –)) Result

### Function

Queries the minimum value in Spectrum Flatness measurement result in Range 2.

### Query

```
SPECFLAT2_M? mode[,cc]
```

### Response

When mode = TTL,

```
avg,max,min
```

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

```
sflatness
```

| | |
|---|---|
| sflatness | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average･Maximum･Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of the minimum value in Spectrum Flatness measurement result in Range 2:

```
SPECFLAT2_M? AVG
> 0.04
```

## SPECFLAT2_P?

Spectrum Flatness (<3 MHz (R2 +)) Result

### Function

Queries the maximum value in Spectrum Flatness measurement result in Range 2.

### Query

```
SPECFLAT2_P? mode[,cc]
```

### Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

`sflatness`

| | |
|---|---|
| sflatness | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of the maximum value in Spectrum Flatness measurement result in Range 2:

```
SPECFLAT2_P? AVG
> 0.04
```

## SPECFLATITEM?

Spectrum Flatness Measured Item

### Function

Queries whether each spectrum flatness measurement items is measured or not.

### Query

```
SPECFLATITEM? [cc]
```

### Response

```
flag
```

| | |
|---|---|
| flag | Measured/Not measured flag (0 to 3)<br>Returns the sum of the following measurement items.<br>0 Not measured<br>1 ≥ 3 MHz area (When Test Environment is Normal)<br>≥ 5 MHz area (When Test Environment is Extreme)<br>2 < 3 MHz area (When Test Environment is Normal)<br>< 5 MHz area (When Test Environment is Extreme) |

### Parameter

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query whether each spectrum flatness measurement items is measured or not.

```
SPECFLATITEM?
> 2
```

## SPECFLATPPPASS?

Spectrum Flatness Judgement

### Function

Queries the judgement of Spectrum Flatness measurement result.

### Query

```
SPECFLATPPPASS? [cc]
```

### Response

```
judgement
```

| | |
|---|---|
| judgement | Judgement |
| PASS | Pass |
| FAIL | Fail |
| – | Not measured |

### Parameter

| | |
|---|---|
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the judgement of Spectrum Flatness measurement result:

```
SPECFLATPPPASS?
> PASS
```

## SPECFLAT_RP1?

Spectrum Flatness (≥3 MHz (RP1)) Result

### Function

Queries the ripple value in Spectrum Flatness measurement result in Range 1.

### Query

```
SPECFLAT_RP1? mode[,cc]
```

### Response

When mode = TTL,

```
avg,max,min
```

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

```
sflatness
```

| | |
|---|---|
| sflatness | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of ripple value in Spectrum Flatness measurement result in Range 1:

```
SPECFLAT_RP1? AVG
> 0.04
```

## SPECFLAT_RP12?

Spectrum Flatness (RP12) Result

### Function

Queries the difference between maximum value in Range 1 and minimum value in Range 2 of Spectrum Flatness measurement result.

### Query

```
SPECFLAT_RP12? mode[,cc]
```

### Response

When mode = TTL,

```
avg,max,min
```

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

```
sflatness
```

| | |
|---|---|
| sflatness | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of difference between maximum value in Range 1 and minimum value in Range 2:

```
SPECFLAT_RP12? AVG
> 0.04
```

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Native Command Reference

## SPECFLAT_RP2?

Spectrum Flatness (<3 MHz (RP2)) Result

### Function

Queries the ripple value in Spectrum Flatness measurement result in Range 2.

### Query

```
SPECFLAT_RP2? mode[,cc]
```

### Response

When mode = TTL,

```
avg,max,min
```

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

```
sflatness
```

| | |
|---|---|
| sflatness | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of ripple value in Spectrum Flatness measurement result in Range 2:

```
SPECFLAT_RP2? AVG
> 0.04
```

## SPECFLAT_RP21?

Spectrum Flatness (RP21) Result

### Function

Queries the difference between maximum value in Range 2 and minimum value in Range 1 of Spectrum Flatness measurement result.

### Query

```
SPECFLAT_RP21? mode[,cc]
```

### Response

When mode = TTL,

```
avg,max,min
```

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

```
sflatness
```

| | |
|---|---|
| sflatness | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of difference between maximum value in Range 2 and minimum value in Range 12:

```
SPECFLAT_RP21? AVG
> 0.04
```

## TDDULDLCONF

Uplink Downlink Configuration

### Function

Sets or queries the Uplink/Downlink signal configuration of TDD.

### Command

```
TDDULDLCONF conf
```

### Query

```
TDDULDLCONF?
```

### Response

```
conf
```

### Parameter

| | |
|---|---|
| conf | Uplink Downlink Signal Configuration |
| Range | 0 to 6 |
| Resolution | 1 |
| Default | 1 |

### Example of Use

To set the Uplink/Downlink signal configuration to 1:

```
TDDULDLCONF 1
TDDULDLCONF?
> 1
```

## TEMPLATE_SET

Power Template measurement Enable and Count

### Function

Enables the Power Template Measurement and sets the measurement count, and queries the settings. When setting Measurement Item to PWRTEMP, it is turned On automatically.

### Command

```
TEMPLATE_SET on_off[,count]
```

### Query

```
TEMPLATE_SET?
```

### Response

```
on_off,count
```

### Parameters

| | |
|---|---|
| on_off | Enables/disables measurement. |
| ON | Enables measurement. |
| OFF | Disables measurement. |
| Default | OFF |
| count | Measurement count |
| Range | 1 to 200 |
| Resolution | 1 |
| Suffix Code | None |
| Default | 1 |

### Example of Use

To enable Power template measurement and set the measurement count to 100:

```
TEMPLATE_SET ON,100
TEMPLATE_SET?
> ON,100
```

# TESTENV

Test Environment

### Function

Sets or queries the test environment.

### Command

```
TESTENV env
```

### Query

```
TESTENV?
```

### Response

```
env
```

### Parameter

| | |
|---|---|
| env | Test Environment |
| NORMAL | Normal |
| EXTREME | Extreme |
| Default | NORMAL |

### Details

This is a parameter that determines the threshold line for Spectrum Flatness measurement. The test environment is defined in 3GPP TS36.521-1. The following values depend on the test environment settings.

・When the test environment is NORMAL

| | |
|---|---|
| Border of Range1/Range2 | 3 MHz |
| RP1 limit level | 5.4 dB |
| RP2 limit level | 9.4 dB |
| RP12 limit level | 6.4 dB |
| RP21 limit level | 8.4 dB |

・When the test environment is EXTREME

| | |
|---|---|
| Border of Range1/Range2 | 5 MHz |
| RP1 limit level | 5.4 dB |
| RP2 limit level | 13.4 dB |
| RP12 limit level | 7.4 dB |
| RP21 limit level | 11.4 dB |

### Example of Use

To set the test environment to EXTREME:

```
TESTENV EXTREME
TESTENV?
> EXTREME
```

## TP_INBANDE_LEAK

In-band Emissions Carrier Leakage Template

### Function

Set and queries the In-band Emissions Carrier Leakage Template.

### Command

```
TP_INBANDE_LEAK tp
```

### Query

```
TP_INBANDE_LEAK?
```

### Response

```
Tp
```

### Parameter

| | |
|---|---|
| tp | In-band Emissions Carrier Leakage Template |
| 0DBM | –24.2 dBc (UE output level 0 dBm) |
| 30DBM | –19.2 dBc (UE output level –30 dBm) |
| 40DBM | –9.2 dBc (UE output level –40 dBm) |
| Default | 0DBM |

### Details

The upper limit for the Carrier Leakage defined in 3GPP TS36.521 6.5.2.3 is selected according to this parameter setting.

### Example of Use

To set the In-band Emissions Carrier Leakage Template to 0DBM:

```
TP_INBANDE_LEAK 0DBM
TP_INBANDE_LEAK?
> 0DBM
```

## TP_INBANDE_LEAK_SCC1

In-band Emissions Carrier Leakage Template for SCC-1

### Function

Set and queries the In-band Emissions Carrier Leakage Template of SCC-1.

### Command

```
TP_INBANDE_LEAK_SCC1 tp
```

### Query

```
TP_INBANDE_LEAK_SCC1?
```

### Response

```
tp
```

### Parameters

| | |
|---|---|
| tp | In-band Emissions Carrier Leakage Template of SCC-1 |
| 0DBM | –24.2 dBc (UE output level 0 dBm) |
| 30DBM | –19.2 dBc (UE output level –30 dBm) |
| 40DBM | –9.2 dBc (UE output level –40 dBm) |
| Default | 0DBM |

### Details

The upper limit for the Carrier Leakage defined in 3GPP TS36.521 6.5.2.3 is selected according to this parameter setting.

### Examples of Use

To set the In-band Emissions Carrier Leakage Template of SCC-1 to 0DBM:

```
TP_INBANDE_LEAK_SCC1 0DBM
TP_INBANDE_LEAK_SCC1?
> 0DBM
```

# TP_OFFPWR_UL

Power Template - Transmit OFF power Limit

## Function

Sets the Pass/Fail evaluation limits for Transmit Off Power, and queries the settings.

## Command

```
TP_OFFPWR_UL limit
```

## Query

```
TP_OFFPWR_UL?
```

## Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

## Parameter

| | |
|---|---|
| limit | Evaluation limits |
| Range | –99.9 to 99.9 dBm |
| Resolution | 0.1 dB |
| Default | –48.5 dBm |

## Example of Use

To set the Pass/Fail evaluation limits to –10.0 dBm:

```
TP_OFFPWR_UL -10.0
TP_OFFPWR_UL?
> -10.0
```

# TP_TMASK_GEN_TOL

Power Template - ON power tolerance Limit

## Function

Sets the Pass/Fail evaluation limits for On Power tolerance, and queries the settings.

## Command

```
TP_TMASK_GEN_TOL limit
```

## Query

```
TP_TMASK_GEN_TOL?
```

## Response

`limit`

| | |
|---|---|
| Unit | dB |
| Resolution | 0.1 dB |

## Parameter

| | |
|---|---|
| limit | Evaluation limits |
| Range | 0.0 to 99.9 dBm |
| Resolution | 0.1 dB |
| Default | 7.5 dB |

## Example of Use

To set the Pass/Fail evaluation limits to 10.0 dBm:

```
TP_TMASK_GEN_TOL 10.0
TP_TMASK_GEN_TOL?
> 10.0
```

## TXFREQ

Uplink Frequency

### Function

Sets or queries the uplink frequency.

### Command

```
TXFREQ ul_freq[,ul_freq_scc1]
```

### Query

```
TXFREQ? [ALL]
```

### Response

```
ul_freq,ul_freq_scc1
```

| | |
|---|---|
| Unit | Hz |
| Resolution | 1 Hz |

### Parameter

| | |
|---|---|
| ul_freq | Uplink frequency of PCC |
| ul_freq_scc1 | Uplink frequency of SCC-1 |
| ul_freq | Uplink frequency |
| Range | 400.000000 to 3800.000000 MHz |
| | 400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 1 Hz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted) |
| Default | 1950.000000 MHz (ul_freq) |
| | 1969.800000 MHz (ul_freq_scc1) |

### Details

This setting corresponds to the UE Tx frequency setting.
Updating this Uplink frequency of PCC does not affect the Uplink Channel parameters of PCC.
Updating this Uplink frequency of SCC-1 does not affect the Uplink Channel parameters of SCC-1. When the query argument ALL is omitted, the response is ul_freq only.

### Example of Use

To set the Uplink frequency for PCC to 1950 MHz and the Uplink frequency for SCC-1 to 1969.8 MHz:

```
TXFREQ 1950MHZ,1969.8MHZ
TXFREQ? ALL
>1950000000,1969800000
```

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Native Command Reference

# TXPWR?

Tx Power Result

## Function

Queries the Tx power measurement result.

## Query

```
TXPWR? mode[,cc]
```

## Response

When mode = TTL

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dBm |
| Resolution | 0.01 dB |

When mode = AVG, MAX, MIN or DVT,

`pwr`

| | |
|---|---|
| pwr | Measurement result in specified Storage mode |
| Unit | dBm |
| Resolution | 0.01 dB |

When mode = IND,

`s,pwr(1),pwr(2),…,pwr(s)`

| | |
|---|---|
| s | Measurement count |
| Range | 1 to 200 |
| pwr(s) | Tx Power of sth measurement |
| Unit | dBm |
| Resolution | 0.01 dB |

## Parameters

| | |
|---|---|
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| IND | Individual measurement result |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.2.2-1 Measurement Items of Tx Power” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Example of Use

To query the average of Tx Power measurement results:

```
TXPWR? AVG
> -20.00
```

## ULCHAN

Uplink Channel

Function

Sets or queries the Uplink Channel.

Command

```
ULCHAN ul_ch[,ul_ch_scc1]
```

Query

```
ULCHAN? [ALL]
```

Response

```
ul_ch,ul_ch_scc1
```

Parameter

| | |
|---|---|
| ul_ch | Uplink Channel of PCC |
| ul_ch_scc1 | Uplink Channel of SCC-1 |
| Range | 0 to 262143 |
| Default | 18300 (ul_ch) |
| | 18498 (ul_ch_scc1) |

Details

When the Uplink Channel parameter of PCC is updated, the related Downlink Channel parameter, Uplink Frequency of PCC, Downlink Frequency and Flame structure parameter are changed accordingly.
When the Uplink Channel parameter of SCC-1 is updated, the related Uplink Frequency of SCC-1 are changed accordingly.
When the query argument ALL is omitted, the response is ul_ch only.
For the relationship between the parameter and frequency settings of channels refer to Table 2.1.6-3 “Relationship between Uplink Channel Number and Downlink Channel Number” and to Table 2.1.6-4 “E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation”.

Example of Use

To set the Uplink Channel for PCC to 39750 and the Uplink Channel for SCC-1 to 39948:

```
ULCHAN 39750,39948
ULCHAN? ALL
>39750,39948
```

# ULCHAN_SCC1

Uplink Channel for SCC-1

### Function

Sets or queries the Uplink Channel of SCC-1.

### Command

```
ULCHAN SCC1 ul_ch
```

### Query

```
ULCHAN SCC1?
```

### Response

```
ul_ch
```

### Parameters

| | |
|---|---|
| ul_ch | Uplink Channel of SCC-1 |
| Range | 0 to 262143 |
| Resolution | 1 |
| Default | 18300 |

### Details

When the Uplink Channel parameter of SCC-1 is updated, the related Uplink Frequency of SCC-1 are changed accordingly.

For the relationship between the parameter and frequency settings of channels refer to Table 2.1.6-3 “Relationship between Uplink Channel Number and Downlink Channel Number” and to Table 2.1.6-4 “E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation”.

### Examples of Use

To set the uplink channel of SCC-1 to 39948.

```
ULCHAN_SCC1 39948
ULCHAN_SCC1?
>39948
```

# ULFREQ

Uplink Frequency

### Function

Sets or queries the Rx frequency (uplink frequency) of MU887000A.

### Command

```
ULFREQ ul_freq[,ul_freq_scc1]
```

### Query

```
ULFREQ? [ALL]
```

### Response

```
ul_fleq,ul_freq_scc1
```

| | |
|---|---|
| Unit | Hz |
| Resolution | 1 Hz |

### Parameter

| | |
|---|---|
| ul_freq | Uplink frequency of PCC |
| ul_freq_scc1 | Uplink frequency of SCC-1 |
| Range | 400.000000 to 3800.000000 MHz |
| | 400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 1 Hz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted) |
| Default | 1950.000000 MHz (ul_freq) |
| | 1969.800000 MHz (ul_freq_scc1) |

### Details

This setting corresponds to the UE Tx frequency setting.
Updating this Uplink frequency of PCC does not affect the Uplink Channel parameters of PCC.
Updating this Uplink frequency of SCC-1 does not affect the Uplink Channel parameters of SCC-1. When the query argument ALL is omitted, the response is ul_freq only.

### Example of Use

To set the Uplink frequency for PCC to 1950 MHz and the Uplink frequency for SCC-1 to 1969.8 MHz:

```
ULFREQ 1950MHZ,1969.8MHZ
ULFREQ? ALL
>1950000000,1969800000
```

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Native Command Reference

## ULFREQ_SCC1

Uplink Frequency for SCC-1

### Function

Sets or queries the uplink  frequency of SCC-1.

### Command

```
ULFREQ_SCC1 ul_freq
```

### Query

```
ULFREQ_SCC1?
```

### Response

```
ul_fleq
```

| | |
|---|---|
| Unit | Hz |
| Resolution | 1 Hz |

### Parameters

| | |
|---|---|
| ul_freq | Uplink  frequency of SCC-1 |
| Range | 400.000000 to 3800.000000 MHz<br>400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 1 Hz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted) |
| Default | 1969.800000 MHz |

### Details

This setting corresponds to the UE Tx frequency setting.
Updating this Uplink frequency of SCC-1 does not affect the Uplink Channel parameters of SCC-1.

### Examples of Use

To set the uplink frequency of SCC-1 to 1969.8 MHz.

```
ULFREQ_SCC1 1969.8MHZ
ULFREQ_SCC1?
>1969800000
```

## ULRB_START

UL RMC Starting RB

### Function

Sets or queries the start number for Uplink signal RB.

### Command

```
ULRB_START ulrb
```

### Query

```
ULRB_START?
```

### Response

```
ulrb
```

### Parameter

| | | |
|---|---|---|
| ulrb | RB start number | |
| Range | 0 to (RBmax – RBn) | |
| | RBmax = 6 | When channel bandwidth is 1.4 MHz |
| | RBmax = 15 | When channel bandwidth is 3 MHz |
| | RBmax = 25 | When channel bandwidth is 5 MHz |
| | RBmax = 50 | When channel bandwidth is 10 MHz |
| | RBmax = 75 | When channel bandwidth is 15 MHz |
| | RBmax = 100 | When channel bandwidth is 20 MHz |
| | RBn is set using the ULRMC_RB command. | |
| Resolution | 1 | |
| Default | 0 | |

### Details

The RB start number for the Uplink signal is reset to 0 when the channel bandwidth is updated.
Also when the RB start number for the Uplink signal is updated, the RB start number for the Uplink RMC is changed to 0.

### Example of Use

To set the RB start number for Uplink RMC to 6:

```
ULRB_START 6
ULRB_START?
> 6
```

## ULRB_START_SCC1

UL RMC Starting RB for SCC-1

### Function

Sets or queries the start number for Uplink signal RB of SCC-1.

### Command

```
ULRB_START_SCC1 ulrb
```

### Query

```
ULRB_START_SCC1?
```

### Response

```
ulrb
```

### Parameters

| | | |
|---|---|---|
| ulrb | RB start number of SCC-1 | |
| Range | 0 to (RBmax – RBn) | |
| | RBmax = 6 | When channel bandwidth is 1.4 MHz |
| | RBmax = 15 | When channel bandwidth is 3 MHz |
| | RBmax = 25 | When channel bandwidth is 5 MHz |
| | RBmax = 50 | When channel bandwidth is 10 MHz |
| | RBmax = 75 | When channel bandwidth is 15 MHz |
| | RBmax = 100 | When channel bandwidth is 20 MHz |
| | RBn is set using the ULRMC_RB_SCC1 command. | |
| Resolution | 1 | |
| Default | 0 | |

### Details

The RB start number for the Uplink signal of SCC-1 is reset to 0 when the channel bandwidth of SCC-1 is updated.
Also when the RB start number for the Uplink signal of SCC-1 is updated, the RB start number for the Uplink RMC is changed to 0.

### Examples of Use

To set the RB start number for Uplink RMC of SCC-1 to 6:

```
ULRB_START_SCC1 6
ULRB_START_SCC1?
>6
```

# ULRMC_MOD

UL RMC Modulation

## Function

Sets or queries the modulation method used by Uplink signal RMC.

## Command

```
ULRMC_MOD ul_rmc_mod
```

## Query

```
ULRMC_MOD?
```

## Response

```
ul_rmc_mod
```

## Parameter

| | |
|---|---|
| ul_rmc_mod | Uplink RMC modulation method |
| QPSK | QPSK modulation |
| 16QAM | 16QAM modulation |
| 64QAM | 64QAM modulation |
| Default | QPSK |

## Example of Use

To set the Uplink RMC modulation method to 16QAM:

```
ULRMC_MOD 16QAM
ULRMC_MOD?
> 16QAM
```

# ULRMC_MOD_SCC1

UL RMC Modulation for SCC-1

### Function

Sets or queries the modulation method used by Uplink signal RMC of SCC-1.

### Command

```
ULRMC_MOD_SCC1 ul_rmc_mod
```

### Query

```
ULRMC_MOD_SCC1?
```

### Response

```
ul_rmc_mod
```

### Parameter

| | |
|---|---|
| ul_rmc_mod | Uplink RMC modulation method of SCC-1 |
| QPSK | QPSK modulation |
| 16QAM | 16QAM modulation |
| 64QAM | 64QAM modulation |
| Default | QPSK |

### Example of Use

To set the Uplink RMC modulation method for SCC-1 to 16QAM:

```
ULRMC_MOD_SCC1 16QAM
ULRMC_MOD_SCC1?
>16QAM
```

# ULRMC_RB

UL RMC Number of RB

## Function

Sets or queries the number of assigned RBs (Resource Blocks) at Uplink RMC.

## Command

```
ULRMC_RB ul_rmc_rb
```

## Query

```
ULRMC_RB?
```

## Response

```
ul_rmc_rb
```

## Parameter

| | | |
|---|---|---|
| ul_rmc_rb | Number of RBs | |
| Range | Number defined by equation of (2^X) × (3^Y) × (5^Z) and falling within following range where (X, Y, Z ≥ 0, integer) | |
| | 0 to 6 | When channel bandwidth is 1.4 MHz |
| | 0 to 15 | When channel bandwidth is 3 MHz |
| | 0 to 25 | When channel bandwidth is 5 MHz |
| | 0 to 50 | When channel bandwidth is 10 MHz |
| | 0 to 75 | When channel bandwidth is 15 MHz |
| | 0 to 100 | When channel bandwidth is 20 MHz |
| Resolution | 1 | |
| Default | 25 | |

## Details

When the In-band Emission measurement at Contiguous UL CA is performed, set 0 to the number of RBs for CC where the signal is not output.

Even when Modulation Analysis is set to ON, the measurement is not performed under the following conditions.

- Contiguous UL CA
- At Carrier Frequency is not specified at Carrier Leakage Frequency.
- The number of RBs is set to 0.

## Example of Use

To set the number of assigned RBs at Uplink RMC to 6.

```
ULRMC_RB 6
ULRMC_RB?
> 6
```

# ULRMC_RB_SCC1

UL RMC Number of RB for SCC-1

### Function

Sets or queries the number of assigned RBs (Resource Blocks) at Uplink RMC of SCC-1.

### Command

```
ULRMC_RB_SCC1 ul_rmc_rb
```

### Query

```
ULRMC_RB_SCC1?
```

### Response

```
ul_rmc_rb
```

### Parameter

ul_rmc_rb — Number of RBs for SCC-1

Range — Number defined by equation of (2^X) × (3^Y) × (5^Z) and falling within following range where (X, Y, Z ≥ 0, integer)

| | |
|---|---|
| 0 to 6 | When channel bandwidth is 1.4 MHz |
| 0 to 15 | When channel bandwidth is 3 MHz |
| 0 to 25 | When channel bandwidth is 5 MHz |
| 0 to 50 | When channel bandwidth is 10 MHz |
| 0 to 75 | When channel bandwidth is 15 MHz |
| 0 to 100 | When channel bandwidth is 20 MHz |

Resolution — 1

Default — 25

### Details

When the In-band Emission measurement at Contiguous UL CA is performed, set 0 to the number of RBs for CC where the signal is not output.

Even when Modulation Analysis is set to ON, the measurement is not performed under the following conditions.

- Contiguous UL CA
- At Carrier Frequency is not specified at Carrier Leakage Frequency.
- The number of RBs is set to 0.

### Example of Use

To set the number of assigned RBs at Uplink RMC to 6.

```
ULRMC_RB_SCC1 6
ULRMC_RB_SCC1?
> 6
```

## WAVEFMEAS?

Waveform

### Function

Queries the spectrum waveform data of each measurement result.

### Query

```
WAVEFMEAS? format,position,length[,symbol[,cc]]
```

### Response

```
data(0),data(1),data(2),…,data(length-1)
```

| format | Unit | Resolution |
|---|---|---|
| 1, 2 | dBm | 0.01 dB |
| 3, 4 | None | 0.0001 |
| 5, 6, 9, 10 | % | 0.01% |
| 7, 8 | degree | 0.01 degree |
| 11, 12, 15, 16, 17, 18 | dB | 0.01 dB |
| 13, 14 | dBc | 0.01 dB |

### Parameter

| format | Format |
|---|---|
| 1 | Occupied Bandwidth |
| 2 | Spectrum Emission Mask (SEM) |
| 3 | Constellation (I) |
| 4 | Constellation (Q) |
| 5 | EVM (Average) |
| 6 | EVM (Maximum) |
| 7 | Phase Error (Average) |
| 8 | Phase Error (Maximum) |
| 9 | Magnitude Error (Average) |
| 10 | Magnitude Error (Maximum) |
| 11 | In-band Emissions (Average) |
| 12 | In-band Emissions (Maximum) |
| 13 | In-band Emissions (Average) |
| 14 | In-band Emissions (Maximum) |
| 15 | Spectrum Flatness (Average) |
| 16 | Spectrum Flatness (Maximum) |
| 17 | Spectrum Flatness (Minimum) |
| 18 | Power Template |

position Start point of waveform data

Range

| | Channel Bandwidth | | | | | |
|---|---|---|---|---|---|---|
| Format | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
| 1 | 0 to 594 | 0 to 1238 | 0 to 2064 | 0 to 4136 | 0 to 6194 | 0 to 8266 |
| 2 | 0 to 1214 | 0 to 2474 | 0 to 4124 | 0 to 6554 | 0 to 9014 | 0 to 11474 |
| 3 to 10, 15 to 17 | 0 to 71 | 0 to 179 | 0 to 299 | 0 to 599 | 0 to 899 | 0 to 1199 |
| 11 to 14 | 0 to 5 | 0 to 14 | 0 to 24 | 0 to 49 | 0 to 74 | 0 to 99 |
| 18 | 0 to 9374 | 0 to 18749 | 0 to 37499 | 0 to 74999 | 0 to 149999 | 0 to 149999 |

Refer to 2.8 “Capturing Waveform Data” for details of the ranges under the following conditions.

- Contiguous UL CA
- The format is 1 or 2.

length Number of read data

Range

| | Channel Bandwidth | | | | | |
|---|---|---|---|---|---|---|
| Format | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
| 1 | 1 to 595 | 1 to 1239 | 1 to 2065 | 1 to 4137 | 1 to 6195 | 1 to 8267 |
| 2 | 1 to 1215 | 1 to 2475 | 1 to 4125 | 1 to 6555 | 1 to 9015 | 1 to 11475 |
| 3 to 10, 15 to 17 | 1 to 72 | 1 to 180 | 1 to 300 | 1 to 600 | 1 to 900 | 1 to 1200 |
| 11 to 14 | 1 to 6 | 1 to 15 | 1 to 25 | 1 to 50 | 1 to 75 | 1 to 100 |
| 18 | 1 to 9375 | 1 to 18750 | 1 to 37500 | 1 to 75000 | 1 to 150000 | 1 to 150000 |

Refer to 2.8 “Capturing Waveform Data” for details of the ranges under the following conditions.

- Contiguous UL CA
- The format is 1 or 2.

symbol Position of SC-FDMA symbol

Range When format is 3 to 10

0 to 6

data(n) Waveform data

cc Component Carrier

Used at UL CA and omitted at non CA.

Refer to “Table 2.8.2-5 Measurement Items of Waveform Data” for details.

PCC PCC

SCC1 SCC-1

Omitted Total

Details

Average in the above formats is equivalent to the average waveform of a spectrum analyzer. Maximum in the above formats is equivalent to the peak-hold waveform of a spectrum analyzer.

Example of Use

To query the EVM (Average) of 768 spectrum waveform data from 257 of each measurement result:

```
WAVEFMEAS? 5,256,768,0
> 2.00,2.01,2.00,…,2.10
```

## 5.2.3 Sequence measurement commands

### DLFREQ

Downlink Frequency

#### Function

Sets or queries the downlink frequency.

#### Command

```
DLFREQ dl_freq
```

#### Query

```
DLFREQ?
```

#### Response

```
dl_fleq
```

| | |
|---|---|
| Unit | Hz |
| Resolution | 1 Hz |

#### Parameter

| | |
|---|---|
| dl_freq | Downlink frequency |
| Range | 400.000000 to 3800.000000 MHz |
| | 400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 1 Hz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted) |
| Default | 2140.000000 MHz |

#### Details

The Rx frequency for the UE is set.
Changing the setting of downlink frequency does not change the setting of the downlink channel.

#### Example of Use

To set the Downlink Frequency to 2050 MHz:

```
DLFREQ 2050MHZ
DLFREQ?
> 2050000000
```

## ILVL

Input Level

### Function

Sets or queries the input level of the MU887000A connector.

### Command

```
ILVL level
```

### Query

```
ILVL?
```

### Response

```
level
```

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameter

| | |
|---|---|
| Level | Input level |
| Range | –65.0 to +35.0 dBm (Port 1/Port 2) |
| | –65.0 to +25.0 dBm (Port 3/Port 4) |
| Resolution | 0.1 dB |
| Suffix Code | DBM (uses dBm when omitted) |
| Default | –1.0 dBm |

### Details

The setting range varies according to the External Loss setting.
When Cable Loss Correction is ON, the cable loss is added to the input level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –60.0 to +40.0 dBm.

### Example of Use

To set the input level of the MU887000A connector to –10.0 dBm.

```
ILVL-10.0
ILVL?
> -10.0
```

### Related Commands

EXTLOSSW
LOSSTBL
LOSSTBLVAL
For details of the commands, refer to Chapter 6 “Native Command Reference” in the *MU887000A TRX Test Module Operation Manual.*

# LTE_ACLR?

ACLR Result

## Function

Queries the Adjacent Channel Leakage Power Ratio measurement result.

## Query

```
LTE_ACLR? seg,mode[,cc]
```

## Response

When mode = TTL,

```
avg0,avg1,avg2,avg3,avg4,avg5,max0,max1,max2,max3,max4,max5,min0,min1,min2,min3,min4,min5
```

| | |
|---|---|
| avg | Measurement results in order of offset frequencies (Average) |
| max | Measurement results in order of offset frequencies (Maximum) |
| min | Measurement results in order of offset frequencies (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

```
aclr0,aclr1,aclr2,aclr3,aclr4,aclr5
```

| | |
|---|---|
| aclr | Measurement results in order of offset frequencies in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

The responses are sent in the following order.
E-UTRA ACLR LOW,
E-UTRA ACLR UP,
UTRA ACLR2 LOW,
UTRA ACLR1 LOW,
UTRA ACLR1 UP,
UTRA ACLR2 UP

## Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA. |

Refer to "Table 2.5.2-1 Measurement Items of Adjacent Channel Leakage Power Ratio" for details.

| | |
|---|---|
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Details

The measurement bandwidth of the target adjacent channel varies with the channel bandwidth setting.
Refer to Table 2.5.1-1 "Adjacent Channel Measurement Bandwidth (MHz)" for details.

Example of Use

To query the average of ACLR measurement result for segment 0:

```
LTE_ACLR? 0,AVG
> 3.00,3.01,3.02,3.03,3.04,3.05
```

# LTE_ACLR_SET

Adjacent Channel Leakage Power Ratio Enable and Count

## Function

Enables the Adjacent Channel Leakage Power Ratio measurement and sets the measurement count, or queries the settings

## Command

```
LTE_ACLR_SET mcond,on_off[,count]
```

## Query

```
LTE_ACLR_SET? mcond
```

## Response

```
on_off,count
```

## Parameters

| | |
|---|---|
| mcond | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| on_off | Enables/disables measurement. |
| ON | Executes the measurement. |
| OFF | Disables measurement. |
| Default | OFF |
| count | Measurement count |
| Range | 1 to 200 |
| | 1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

## Example of Use

To turn off the Adjacent Channel Leakage Power Ratio measurement for the condition number 0 in the LTE measurement condition table:

```
LTE_ACLR_SET 0,OFF
LTE_ACLR_SET? 0
> OFF
```

## Remarks

The Adjacent Channel Leakage Power Ratio of 1 subframe (1 ms) is measured at each measurement count.

# LTE_BAND

Operation band

## Function

Sets or queries the operation band.

## Command

```
LTE_BAND mcond,band
```

## Query

```
LTE_BAND? mcond
```

## Response

```
band
```

## Parameter

| | |
|---|---|
| mcond | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| band | Operation band |
| Range | 1 to 256 |
| Resolution | 1 |
| Default | 1 |

## Details

This is the parameter for determining the following items:

- Limit line of Spectrum Flatness measurement
- Intra-band/Inter-band (at UL CA)

## Example of Use

To set the operation band to 10 for the measurement condition number 2:

```
LTE_BAND 2,10
LTE_BAND? 2
> 10
```

# LTE_BAND_SCC1

Operation band for SCC-1

### Function

Sets or queries the operation band for SCC-1.

### Command

```
LTE_BAND_SCC1 mcond,band
```

### Query

```
LTE_BAND_SCC1? mcond
```

### Response

```
band
```

### Parameters

| | |
|---|---|
| mcond | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| band | Operation band |
| Range | 1 to 256 |
| Resolution | 1 |
| Default | 1 |

### Details

This is the parameter for determining the following items:

- Limit line of Spectrum Flatness measurement
- Intra-band/Inter-band (at UL CA)

### Examples of Use

To set the operation band of SCC-1 to 10 for the measurement condition number 2:

```
LTE_BAND_SCC1 2,10
LTE_BAND_SCC1? 2
> 10
```

# LTE_BW_RB

Channel Bandwidth, RB

## Function

Sets the uplink channel bandwidth and RB (Resource Block).

## Command

```
LTE_BW_RB mcond,ch_bw[,rb[,start]]
```

## Query

```
LTE_BW_RB? mcond
```

## Response

```
ch_bw,rb,start
```

## Parameters

| | | |
|---|---|---|
| mcond | Measurement condition number | |
| Range | 0 to 1999 | |
| Resolution | 1 | |
| ch_bw | Channel bandwidth | |
| 1.4MHZ | 1.4 MHz | |
| 3MHZ | 3 MHz | |
| 5MHZ | 5 MHz | |
| 10MHZ | 10 MHz | |
| 15MHZ | 15 MHz | |
| 20MHZ | 20 MHz | |
| Default | 5MHZ | |
| rb | Number of RBs | |
| Range | Number defined by equation of (2^X) × (3^Y) × (5^Z) and falling within following range where (X, Y, Z ≥ 0, integer) | |
| | 0 to 6 | When channel bandwidth is 1.4 MHz |
| | 0 to 15 | When channel bandwidth is 3 MHz |
| | 0 to 25 | When channel bandwidth is 5 MHz |
| | 0 to 50 | When channel bandwidth is 10 MHz |
| | 0 to 75 | When channel bandwidth is 15 MHz |
| | 0 to 100 | When channel bandwidth is 20 MHz |
| Resolution | 1 | |
| Default | 25 | |

| | | |
|---|---|---|
| start | Start RB number | |
| Range | 0 to (RBmax – RBn) | |
| | RBmax = 6 | When channel bandwidth is 1.4 MHz |
| | RBmax = 15 | When channel bandwidth is 3 MHz |
| | RBmax = 25 | When channel bandwidth is 5 MHz |
| | RBmax = 50 | When channel bandwidth is 10 MHz |
| | RBmax = 75 | When channel bandwidth is 15 MHz |
| | RBmax = 100 | When channel bandwidth is 20 MHz |
| | RBn is set using the ULRMC_RB command. | |
| Resolution | 1 | |
| Default | 0 | |

### Remarks

The rb and start settings can be omitted. If omitted, the settings are Full RB (rb is the maximum for the channel bandwidth and start is 0).
When the In-band Emission measurement at Contiguous UL CA is performed, set 0 to the number of RBs for CC where the signal is not output.
Even when Modulation Analysis is set to ON, the measurement is not performed under the following conditions.
- Contiguous UL CA
- At Carrier Frequency is not specified at Carrier Leakage Frequency.
- The number of RBs is set to 0.

### Example of Use

To set as follows:
Measurement condition number: 1, Channel Bandwidth: 1.4 MHz, Number of RB: 6, Start RB number: 0

```
LTE_BW_RB 1,1.4MHZ,6,0
LTE_BW_RB? 1
>1.4MHZ,6,0
```

## LTE_BW_RB_SCC1

Channel Bandwidth, RB for SCC-1

### Function

Sets or queries the Uplink Channel bandwidth and Resource Blocks (RB) for SCC-1

### Command

```
LTE_BW_RB_SCC1 mcond,ch_bw[,rb[,start]]
```

### Query

```
LTE_BW_RB_SCC1? mcond
```

### Response

```
ch_bw,rb,start
```

### Parameters

| | |
|---|---|
| mcond | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| ch_bw | Channel bandwidth |
| 1.4MHZ | 1.4 MHz |
| 3MHZ | 3 MHz |
| 5MHZ | 5 MHz |
| 10MHZ | 10 MHz |
| 15MHZ | 15 MHz |
| 20MHZ | 20 MHz |
| Default | 5MHZ |
| rb | Number of RBs |
| Range | Number defined by equation of (2^X) × (3^Y) × (5^Z) and falling within following range where (X, Y, Z ≥ 0, integer) |

| | |
|---|---|
| 0 to 6 | When channel bandwidth is 1.4 MHz |
| 0 to 15 | When channel bandwidth is 3 MHz |
| 0 to 25 | When channel bandwidth is 5 MHz |
| 0 to 50 | When channel bandwidth is 10 MHz |
| 0 to 75 | When channel bandwidth is 15 MHz |
| 0 to 100 | When channel bandwidth is 20 MHz |

| | |
|---|---|
| Resolution | 1 |
| Default | 25 |

| | | |
|---|---|---|
| start | Start RB number | |
| Range | 0 to (RBmax – RBn) | |
| | RBmax = 6 | When channel bandwidth is 1.4 MHz |
| | RBmax = 15 | When channel bandwidth is 3 MHz |
| | RBmax = 25 | When channel bandwidth is 5 MHz |
| | RBmax = 50 | When channel bandwidth is 10 MHz |
| | RBmax = 75 | When channel bandwidth is 15 MHz |
| | RBmax = 100 | When channel bandwidth is 20 MHz |
| | RBn is set using the ULRMC_RB command. | |
| Resolution | 1 | |
| Default | 0 | |

### Details

The rb and start settings can be omitted. If omitted, the settings are Full RB (rb is the maximum for the channel bandwidth and start is 0).
When the In-band Emission measurement at Contiguous UL CA is performed, set 0 to the number of RBs for CC where the signal is not output.
Even when Modulation Analysis is set to ON, the measurement is not performed under the following conditions.

- Contiguous UL CA
- At Carrier Frequency is not specified at Carrier Leakage Frequency.
- The number of RBs is set to 0.

### Examples of Use

To set the items for SCC-1 as follows at the measurement condition number 1:
UL Channel Bandwidth: 1.4 MHz, Number of RB: 6, Start RB number: 0

```
LTE_BW_RB_SCC1 1,1.4MHZ,6,0
LTE_BW_RB_SCC1? 1
>1.4MHZ,6,0
```

## LTE_CARRLEAK?

Carrier Leakage Result

### Function

Queries the Carrier Leak measurement result at Modulation Analysis.

### Query

```
LTE_CARRLEAK? seg,mode[,cc]
```

### Response

When mode = TTL,

```
avg,max,min
```

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dBc |
| Resolution | 0.01 dB |

When mode ≠ TTL,

```
cleakage
```

| | |
|---|---|
| cleakage | Measurement result in specified Storage mode |
| Unit | dBc |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average·Maximum·Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of the Carrier Leakage measurement result for segment 1:

```
LTE_CARRLEAK? 1,AVG
> 1.05
```

# LTE_CELLID

Cell ID

## Function

Sets or queries the Cell ID.

## Command

```
LTE_CELLID id
```

## Query

```
LTE_CELLID?
```

## Response

```
id
```

## Parameter

| | |
|---|---|
| id | Cell ID |
| Range | 0 to 503 |
| Resolution | 1 |
| Default | 0 |

## Example of Use

To set the Cell ID to 121:

```
LTE_CELLID 121
LTE_CELLID?
> 121
```

## LTE_CELLID_SCC1

Cell ID for SCC-1

### Function

Sets or queries the Cell ID. for SCC-1

### Command

```
LTE_CELLID_SCC1 id
```

### Query

```
LTE_CELLID_SCC1?
```

### Response

```
id
```

### Parameter

| | |
|---|---|
| id | Cell ID for SCC-1 |
| Range | 0 to 503 |
| Resolution | 1 |
| Default | 0 |

### Example of Use

To set the Cell ID for SCC-1 to 121:

```
LTE_CELLID_SCC1 121
LTE_CELLID_SCC1?
> 121
```

# LTE_CFERR?

Carrier Frequency Error Result

## Function

Queries the Frequency Error measurement result.

## Query

```
LTE_CFERR? seg,mode[,cc]
```

## Response

When mode = TTL,

`avg_ppm,avg_Hz,max_ppm,max_Hz,min_ppm,min_Hz`

| | |
|---|---|
| avg_ppm | Measurement result in ppm (Average) |
| max_ppm | Measurement result in ppm (Maximum) |
| min_ppm | Measurement result in ppm (Minimum) |
| Unit | ppm |
| Resolution | 0.01 ppm |
| avg_Hz | Measurement result in Hz (Average) |
| max_Hz | Measurement result in Hz (Maximum) |
| min_Hz | Measurement result in Hz (Minimum) |
| Unit | Hz |
| Resolution | 0.1 Hz |

When mode ≠ TTL,

`freq_ppm,freq_Hz`

| | |
|---|---|
| freq_ppm | Measurement result in ppm in specified Storage mode |
| Unit | ppm |
| Resolution | 0.01 ppm |
| freq_Hz | Measurement results in Hz in specified Storage mode |
| Unit | Hz |
| Resolution | 0.1 Hz |

## Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| mode | mode Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |

| | | |
|---|---|---|
| cc | | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| | PCC | PCC |
| | SCC1 | SCC-1 |
| | Omitted | Total |

Example of Use

To query the average of the carrier frequency error measurement results for segment 1:

```
LTE_CFERR? 1,AVG
> 0.03,60.0
```

# LTE_CFERR_WORST?

Worst Carrier Frequency Error Result

## Function

Queries the worst value in Frequency Error measurement results in Sequence Measurement mode.

## Query

```
LTE_CFERR_WORST? seg[,cc]
```

## Response

```
freq_ppm,freq_Hz
```

| | |
|---|---|
| freq_ppm | Worst value in Frequency Error measurement results in ppm |
| Unit | ppm |
| Resolution | 0.01 ppm |
| freq_Hz | Worst value in Frequency Error measurement results in Hz |
| Unit | Hz |
| Resolution | 0.1 Hz |

## Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

## Details

The worst value should be either the maximum or minimum of the Frequency Error measurement results, whichever is the larger absolute value.

## Example of Use

To query the worst value in Frequency Error measurement results for segment 1:

```
LTE_CFERR_WORST? 1
> 0.03,60.0
```

## LTE_CFREQ?

Carrier Frequency Result

### Function

Queries the Carrier Frequency measurement result.

### Query

```
LTE_CFREQ? seg[,cc]
```

### Response

```
freq
```

| | |
|---|---|
| freq | Carrier frequency |
| Unit | Hz |
| Resolution | 1 Hz |

### Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the result of Carrier Frequency measurement for segment 1:

```
LTE_CFREQ? 1
> 1951000000
```

# LTE_CHCODING

Channel Coding

### Function

Sets or queries the channel coding.

### Command

```
LTE_CHCODING mcond,object
```

### Query

```
LTE_CHCODING? mcond
```

### Response

```
object
```

### Parameters

| | |
|---|---|
| mcond | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| object | Target for channel coding |
| RMC | Reference Measurement Channel |
| RMC_UL_CA | RMC at UL CA |
| Default | RMC |

### Details

When FRAMETYPE is FDD and RMC_UL_CA is set, MX887013A-001 is required.
When FRAMETYPE is TDD and RMC_UL_CA is set, MX887014A-001 is required.

### Example of Use

To set the channel coding to RMC for the condition number 1:

```
LTE_CHCODING 1,RMC
LTE_CHCODING? 1
> RMC
```

## LTE_CHPWR?

Channel Power Result

### Function

Queries the Channel Power measurement result .

### Query

```
LTE_CHPWR? seg,mode[,cc]
```

### Response

When mode = TTL,

`avg,max,min`

| | | |
|---|---|---|
| avg | | Measurement result (Average) |
| max | | Measurement result (Maximum) |
| min | | Measurement result (Minimum) |
| | Unit | dBm |
| | Resolution | 0.01 dB |

When mode = AVG, MAX, MIN or DVT,

`pwr`

| | | |
|---|---|---|
| pwr | | Measurement result in specified Storage mode |
| | Unit | dBm |
| | Resolution | 0.01 dB |

When mode = IND,

`s,pwr(1),pwr(2),pwr(3),…,pwr(s)`

| | | |
|---|---|---|
| s | | Measurement count |
| | Range | 1 to 200 |
| pwr(s) | | Channel Power of sth measurement |
| | Unit | dBm |
| | Resolution | 0.01 dB |

### Parameters

| | | |
|---|---|---|
| seg | | Segment number |
| | Range | 0 to 1999 |
| | Resolution | 1 |
| mode | | Storage mode |
| | AVG | Average |
| | MAX | Maximum |
| | MIN | Minimum |
| | TTL | Average・Maximum・Minimum |
| | DVT | Standard deviation |
| | IND | Individual measurement result |
| cc | | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.2.2-1 Measurement Items of Tx Power" for details. |
| | PCC | PCC |

| | |
|---|---|
| SCC1 | SCC-1 |
| Omitted | Total |

#### Example of Use

To query the average of the Channel Power measurement result for segment 0:

```
LTE_CHPWR? 0,AVG
> -20.00
```

## LTE_CSHIFT

### Cyclic Shift

#### Function

Sets or queries the Cyclic Shift On/Off.

#### Command

```
LTE_CSHIFT on_off
```

#### Query

```
LTE_CSHIFT?
```

#### Response

on_off

#### Parameter

| | |
|---|---|
| on_off | Cyclic Shift |
| ON | Enables Cyclic Shift. |
| OFF | Disables Cyclic Shift. |
| FIX1 | The fixed value is set. |
| Default | ON |

#### Example of Use

To enable the Cyclic Shift:

```
LTE_CSHIFT ON
LTE_CSHIFT?
> ON
```

## LTE_DELTASS

Delta SS

### Function

Sets or queries the Delta SS (Group Assignment PUSCH).

### Command

```
LTE_DELTASS val
```

### Query

```
LTE_DELTASS?
```

### Response

```
val
```

### Parameter

| | |
|---|---|
| val | Delta SS |
| Range | 0 to 29 |
| Resolution | 1 |
| Default | 0 |

### Example of Use

To set the Delta SS to 12:

```
LTE_DELTASS 12
LTE_DELTASS?
> 12
```

# LTE_EVM?

EVM Result

## Function

Queries the EVM measurement result.

## Query

```
LTE_EVM? seg,mode[,cc]
```

## Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | % |
| Resolution | 0.01% |

When mode ≠ TTL,

`evm`

| | |
|---|---|
| evm | Measurement result in specified Storage mode |
| Unit | % |
| Resolution | 0.01% |

## Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

## Example of Use

To query the average of the EVM measurement result for segment 1:

```
LTE_EVM? 1,AVG
> 1.50
```

# LTE_EXTLOSSINDEX_SCC1

External Loss Table Index for SCC-1

## Function

Sets and queries the loss correction table index for SCC-1.

## Command

```
LTE_EXTLOSSINDEX_SCC1 index
```

## Query

```
LTE_EXTLOSSINDEX_SCC1?
```

## Response

```
index
```

## Parameters

| | |
|---|---|
| index | Loss correction table index |
| Range | 0 to 16 |
| Resolution | 1 |
| Default | 0 |

## Details

When the loss correction table index is set to 0, the setting value of the common command "LOSSTBL" is used.

Refer to Chapter 6 "Native Command Reference" in the *MU887000A Transmitter and Receiver Module Operation Manual* for details of the LOSSTBL command.

## Examples of Use

To set the loss correction table index for SCC-1 to 1:

```
LTE_EXTLOSSINDEX_SCC1 1
LTE_EXTLOSSINDEX_SCC1?
>1
```

## LTE_FRAMETYPE

Frame Structure

### Function

Sets or queries the LTE frame structure.

This setting determines the duplex mode.

### Command

```
LTE_FRAMETYPE mcond,mode
```

### Query

```
LTE_FRAMETYPE? mcond
```

### Response

```
mode
```

### Parameter

| | |
|---|---|
| mcond | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| mode | Frame type (Duplex mode) |
| FDD | Frequency Division Multiplexing |
| TDD | Time Division Multiplexing |
| Default | FDD |

### Details

When only MX887013A is installed, only FDD can be set.

When only MX887014A is installed, only TDD can be set and the default is TDD.

### Example of Use

To set the duplex mode to FDD for the measurement condition number 2:

```
LTE_FRAMETYPE 2,FDD
LTE_FRAMETYPE? 2
> FDD
```

## LTE_FRAMETYPE_SCC1

Frame Structure for SCC-1

### Function

Sets or queries the LTE frame structure for SCC-1.

### Command

```
LTE_FRAMETYPE_SCC1 mcond,mode
```

### Query

```
LTE_FRAMETYPE_SCC1? mcond
```

### Response

```
mode
```

### Parameters

| | |
|---|---|
| mcond | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| mode | Frame type for SCC-1 (Duplex mode) |
| FDD | Frequency Division Multiplexing |
| TDD | Time Division Multiplexing |
| Default | FDD |

### Details

When only MX887013A is installed, only FDD can be set.
When only MX887014A is installed, only TDD can be set and the default is TDD.
When the settings in this command and LTE_FRAMETYPE are different, the measurement is performed using the settings in LTE_FRAMETYPE.

### Example of Use

To set the duplex mode for SCC-1 to FDD for the measurement condition number 2:

```
LTE_FRAMETYPE_SCC1 2,FDD
LTE_FRAMETYPE_SCC1? 2
>FDD
```

# LTE_FREQERRRNG

Frequency Error Range

### Function

Sets and queries the frequency error detection method in the modulation analysis measurement.

### Command

`LTE_FREQERRRNG value`

### Query

`LTE_FREQERRRNG?`

### Response

`value`

### Parameters

| | |
|---|---|
| value | Frequency Error Range |
| NORMAL | Normal |
| NARROW | Narrow Range |
| Default | NORMAL |

### Details

When Narrow Range is set, the measurement time takes longer, but the high accuracy measurement is performed.

### Examples of Use

To set Frequency Error Range to Narrow Range:

```
LTE_FREQERRRNG NARROW
LTE_FREQERRRNG?
>NARROW
```

## LTE_GROUPHOP

Group Hopping

### Function

Enables and queries the Group hopping.

### Command

```
LTE_GROUPHOP on_off
```

### Query

```
LTE_GROUPHOP?
```

### Response

```
on_off
```

### Parameter

| | |
|---|---|
| on_off | Enables/disables Group hopping. |
| ON | Enables Group hopping. |
| OFF | Disables Group hopping. |
| Default | ON |

### Example of Use

To enable the Group hopping:

```
LTE_GROUPHOP ON
LTE_GROUPHOP?
> ON
```

# LTE_IBEM_CLFR

In-band Emission Carrier Leakage Frequency

## Function

Sets and queries the position of Carrier Leakage Frequency of the UE in the In-band Emission/EVM measurement at Contiguous UL CA.

## Command

```
LTE_IBEM_CLFR clf
```

## Query

```
LTE_IBEM_CLFR?
```

## Response

```
clf
```

## Parameters

| | |
|---|---|
| clf | Position of Carrier Leakage Frequency |
| CFR | at Carrier Frequency |
| | Center frequency of Aggregated Channel Bandwidth |
| CCC | at each CC Center |
| | Center frequency of each CC |
| Default | CFR |

## Details

When the In-band Emission measurement at Contiguous UL CA is performed, “UL Number of RB” for PCC or SCC-1 must be set to 0.
For CFR, the resource block located at the center frequency of Aggregated Channel Bandwidth is treated as the carrier leak frequency and the In-band Emission/EVM measurement is performed.
For CCC, the center frequencies of each CC are treated as the carrier leak frequency and the In-band Emission/EVM measurement is performed.

## Example of Use

To set the position of Carrier Leakage Frequency to CFR:

```
LTE_IBEM_CLFR CFR
LTE_IBEM_CLFR?
> CFR
```

## LTE_INBANDEITEM?

In-Band Emissions Measured Item

### Function

Queries whether each in-band emission measurement item for modulation analysis is measured or not.

### Query

```
LTE_INBANDEITEM? seg[,cc]
```

### Response

```
flag
```

| | | |
|---|---|---|
| flag | Measured / Not measured flag (0 to 7)<br>Returns the sum of the following measurement items. | |
| | 0 | Not measured |
| | 1 | Measure General |
| | 2 | Measure IQ Image |
| | 4 | Measure Carrier Leakage |

### Parameter

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query whether each in-band emission measurement item for modulation analysis of Segment 1 is measured or not in the sequence measurement.

```
LTE_INBANDEITEM? 1
> 4
```

# LTE_INBANDEPASS?

In-Band Emissions Judgement

### Function

Queries the judgement of in-band emission measurement result for modulation analysis.

### Query

```
LTE_INBANDEPASS? seg[,cc]
```

### Response

```
judgement
```

| | |
|---|---|
| judgement | Judgement |
| PASS | Pass |
| FAIL | Fail |
| – | Not measured |

### Parameter

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the judgement of in-band emission measurement result for modulation analysis of Segment 1 in the sequence measurement.

```
LTE_INBANDEPASS? 1
> PASS
```

## LTE_INBANDE_GEN?

In-Band Emissions (General) Result

### Function

Queries the in-band emission measurement result (General) for modulation analysis.

### Query

```
LTE_INBANDE_GEN? seg,mode[,cc]
```

### Response

When mode = TTL

`avg,max,min`

| | |
|---|---|
| avg | Measurement results (Average) |
| max | Measurement results (Maximum) |
| min | Measurement results (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL

`ibe`

| | |
|---|---|
| ibe | Measurement results in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of in-band emission measurement result (General) of Segment 1.

```
LTE_INBANDE_GEN? 1,AVG
> 0.04
```

## LTE_INBANDE_GENUL?

In-Band Emissions limit (General)

### Function

Queries the limit for in-band emission measurement result (General) for modulation analysis.

### Query

```
LTE_INBANDE_GENUL? seg[,cc]
```

### Response

```
level
```

| | |
|---|---|
| level | Limit |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the limit for in-band emission measurement result (General) for modulation analysis of Segment 1.

```
LTE_INBANDE_GENUL?
> 2.05
```

## LTE_INBANDE_IMG?

In-Band Emissions (IQ Image) Result

### Function

Queries the in-band emission measurement result (IQ Image) for modulation analysis.

### Query

```
LTE_INBANDE_IMG? seg,mode[,cc]
```

### Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

`ibe`

| | |
|---|---|
| ibe | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of in-band emission measurement result (IQ Image) of Segment 1 in the sequence measurement.

```
LTE_INBANDE_IMG? 1,AVG
> 0.04
```

# LTE_INBANDE_IMGUL?

In-Band Emissions limit (IQ Image)

## Function

Queries the limit for in-band emission measurement (IQ Image) for modulation analysis.

## Query

```
LTE_INBANDE_IMGUL? seg[,cc]
```

## Response

```
level
```

| | |
|---|---|
| level | Limit |
| Unit | dB |
| Resolution | 0.01 dB |

## Parameter

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

## Example of Use

To query the limit for in-band emission measurement result (IQ Image) for modulation analysis of Segment 1.

```
LTE_INBANDE_IMGUL? 1
> 1.05
```

## LTE_INBANDE_LEAK?

In-Band Emissions (Carrier Leakage) Result

### Function

Queries the in-band emission measurement result (Carrier Leakage) for modulation analysis.

### Query

```
LTE_INBANDE_LEAK? seg,mode[,cc]
```

### Response

When mode = TTL,

```
avg,max,min
```

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dBc |
| Resolution | 0.01 dB |

When mode ≠ TTL,

```
ibe
```

| | |
|---|---|
| ibe | Measurement result in specified Storage mode |
| Unit | dBc |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of in-band emission measurement result (Carrier Leakage) of Segment 1 in the sequence measurement.

```
LTE_INBANDE_LEAK? 1,AVG
> 0.04
```

# LTE_INBANDE_LEAKUL?

In-Band Emissions limit (Carrier Leakage)

### Function

Queries the limit for in-band emission measurement (Carrier Leakage) for modulation analysis.

### Query

```
LTE_INBANDE_LEAKUL? seg[,cc]
```

### Response

```
level
```

| | |
|---|---|
| level | Limit |
| Unit | dBc |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the limit for in-band emission measurement result (Carrier Leakage) for modulation analysis of Segment 1.

```
LTE_INBANDE_LEAKUL? 1
> 1.05
```

## LTE_INBANDE_MARG?

In-Band Emissions Margin

### Function

Queries the worst margin in the entire bandwidth for in-band emission measurement.

### Query

```
LTE_INBANDE_MARG? seg[,cc]
```

### Response

```
margin
```

| | |
|---|---|
| margin | Worst margin in the entire bandwidth |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the worst margin in the entire bandwidth for in-band emission measurement for modulation analysis of Segment 1.

```
LTE_INBANDE_MARG? 1
> 1.05
```

## LTE_IQIMB?

IQ Imbalance Result

### Function

Queries the IQ Imbalance measurement result.

### Query

```
LTE_IQIMB? seg,mode[,cc]
```

### Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

`iqimb`

| | |
|---|---|
| iqimb | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| mode | mode Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

IQ Imbalance can be measured when the number of RBs is set to the maximum value for the channel bandwidth shown in Table 2.1.6-2 "Number of Allocatable Resource Blocks in Channel Bandwidth".

If the number of RBs is not the maximum allocatable value in the channel bandwidth, the response is 999.99.

Example of Use

To query the average of IQ Imbalance measurement result for segment 1:

```
LTE_IQIMB? 1,AVG
> 0.04
```

## LTE_LONGSEARCH

Long Span Search

Function

Enables and queries the Long Span Search.

Command

```
LTE_LONGSEARCH on_off
```

Query

```
LTE_LONGSEARCH?
```

Response

```
on_off
```

Parameter

| | |
|---|---|
| on_off | Enables/disables Long Span Search. |
| ON | Enables Long Span Search. |
| OFF | Disables Long Span Search. |
| Default | OFF |

Details

Set this parameter to OFF when the Uplink and Downlink signals are synchronized; set it to ON when they are not synchronized.

The response to the MSTAT will be 5 (Synchronization word not detected), if this parameter to OFF when the Uplink and Downlink signals are not synchronized.

Measurement takes more time when the Long Span Search function is on.

Example of Use

To enable the Long Span Search:

```
LTE_LONGSEARCH ON
LTE_LONGSEARCH?
> ON
```

## LTE_MAGERR?

Magnitude Error Result

### Function

Queries the Magnitude Error measurement result in Sequence Measurement mode.

### Query

```
LTE_MAGERR? seg,mode[,cc]
```

### Response

When mode = TTL,

```
avg,max,min
```

| | | |
|---|---|---|
| avg | | Measurement result (Average) |
| max | | Measurement result (Maximum) |
| min | | Measurement result (Minimum) |
| | Unit | % |
| | Resolution | 0.01% |

When mode ≠ TTL,

```
merr
```

| | | |
|---|---|---|
| merr | | Measurement result in specified Storage mode |
| | Unit | % |
| | Resolution | 0.01% |

### Parameters

| | | |
|---|---|---|
| seg | | Segment number |
| | Range | 0 to 1999 |
| | Resolution | 1 |
| mode | | Storage mode |
| | AVG | Average |
| | MAX | Maximum |
| | MIN | Minimum |
| | TTL | Average・Maximum・Minimum |
| | DVT | Standard deviation |
| cc | | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| | PCC | PCC |
| | SCC1 | SCC-1 |
| | Omitted | Total |

### Example of Use

To query the average of the Magnitude Error measurement result for segment 1:

```
LTE_MAGERR? 1,AVG
> 1.05
```

## LTE_MCARRIER

Measurement Carrier

### Function

Sets and queries the Component Carrier for measurement at Inter-band UL CA.

### Command

```
LTE_MCARRIER mcond,carrier
```

### Query

```
LTE_MCARRIER? mcond
```

### Response

```
carrier
```

### Parameters

| | |
|---|---|
| mcond | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| carrier | Component Carrier for measurement |
| PCC | PCC |
| SCC1 | SCC-1 |
| Default | PCC |

### Example of Use

To set the Component Carrier for measurement to PCC at the measurement condition number 2:

```
LTE_MCARRIER 2,PCC
LTE_MCARRIER? 2
>PCC
```

# LTE_MEAS_OFF

Turn Off All Measurement Items

## Function

Sets all measurement items to Off collectively.

## Command

```
LTE_MEAS_OFF mcond
```

## Parameters

| | |
|---|---|
| mcond | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |

## Example of use

To set all measurement items of number 0 in the LTE measurement condition table to Off collectively.

```
LTE_MEAS_OFF 0
```

## Remarks

This command is equivalent to setting all the commands below to Off.

LTE_PWR_SET
LTE_OBW_SET
LTE_SEM_SET
LTE_ACLR_SET
LTE_MOD_SET

# LTE_MEASOFFSET

Measurement Offset

## Function

Sets and queries the shift amount of the analysis start time at the sequence measurement.

## Command

```
LTE_MEASOFFSET mcond,on_off[,time]
```

## Query

```
LTE_MEASOFFSET? mcond
```

## Response

```
on_off,time
```

## Parameters

| | |
|---|---|
| mcond | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| on_of | Analysis start time shift ON/OFF |
| ON | Shifts the analysis start time. |
| OFF | Does not shift the analysis start time. |
| Default | OFF |
| time | Shift amount of analysis start time |
| Range | 0 to 10.00000 ms |
| Resolution | 0.00001 ms |
| Default | 0.00000 ms |

## Details

This setting is enabled only when LTE_LONGSEARCH is set to ON and the measurement count is 1.

## Example of Use

To set the shift amount of the analysis start time to 10 ms at the measurement condition number 1 in the LTE measurement condition table:

```
LTE_MEASOFFSET 1,ON,10
LTE_MEASOFFSET? 1
>ON,10.00000
```

# LTE_MOD_SET

Modulation Analysis Measurement Enable and Count

### Function

Enables the Modulation Analysis Measurement and sets the measurement count, and queries the settings.

### Command

```
LTE_MOD_SET mcond,on_off[,count]
```

### Query

```
LTE_MOD_SET? mcond
```

### Response

```
on_off,count
```

### Parameters

| | |
|---|---|
| mcond | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| on_off | Enables/disables measurement. |
| ON | Enables measurement. |
| OFF | Disables measurement. |
| Default | OFF |
| count | Measurement count |
| Range | 1 to 200<br>1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

### Example of Use

To turn on the Modulation Analysis measurement and set the number of measurement to 200 for the measurement condition number 2 in the LTE measurement condition table:

```
LTE_MOD_SET 2,ON,200
LTE_MOD_SET? 2
> ON,200
```

### Remarks

Modulation analysis is executed for 1 slot (0.5 ms) at each measurement count.

## LTE_OBW?

OBW Result

### Function

Queries the Occupied Bandwidth measurement result.

### Query

```
LTE_OBW? seg[,cc]
```

### Response

```
bw
```

| | |
|---|---|
| bw | Occupied Bandwidth (MHz) |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.3.2-1 Measurement Items of OBW” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of the in-band emissions (Carrier Leakage) measurement result for segment 0:

```
LTE_OBW? 0
> 3.840
```

# LTE_OBWFREQ?

OBW Frequency Result

### Function

Queries the upper, lower or center frequency of Occupied Bandwidth measurement in Sequence Measurement mode.

### Query

```
LTE_OBWFREQ? seg,pos[,cc]
```

### Response

```
freq
```

| | |
|---|---|
| freq | Offset frequency |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| pos | Offset type |
| UPPER | Upper frequency |
| LOWER | Lower frequency |
| CENTER | Center frequency |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.3.2-1 Measurement Items of OBW” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the upper frequency of the Occupied Bandwidth measurement result for segment 1:

```
LTE_OBWFREQ? 1,UPPER
> 1951.920
```

# LTE_OBW_RATIO

Occupied Bandwidth Ratio

### Function

Sets the Occupied Bandwidth measurement occupation ratio in Sequence Measurement mode, and queries the setting.

### Command

```
LTE_OBW_RATIO ratio
```

### Query

```
LTE_OBW_RATIO?
```

### Response

```
ratio
```

### Parameter

| | |
|---|---|
| ratio | Occupied Bandwidth occupation ratio |
| Range | 80.0% to 99.9% |
| Resolution | 0.1% |
| Suffix code | None |
| Default | 99.0% |

### Example of Use

To set the Occupied Bandwidth occupation ratio to 99.0% at sequence measurement:

```
LTE_OBW_RATIO 99.0
LTE_OBW_RATIO?
> 99.0
```

# LTE_OBW_SET

OBW Measurement Enable and Count

### Function

Enables the Occupied Bandwidth measurement and sets the measurement count, or queries the settings in Sequence Measurement mode.

### Command

```
LTE_OBW_SET mcond,on_off[,count]
```

### Query

```
LTE_OBW_SET? mcond
```

### Response

```
on_off,count
```

### Parameters

| | |
|---|---|
| mcond | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| on_off | Enables/disables measurement. |
| ON | Enables measurement. |
| OFF | Disables measurement. |
| Default | OFF |
| count | Measurement count |
| Range | 1 to 200<br>1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

### Example of Use

To turn off the Occupied Bandwidth measurement for the measurement condition number 3 in the LTE measurement condition table:

```
LTE_OBW_SET 3,OFF
LTE_OBW_SET? 3
> OFF
```

### Remarks

The Occupied Bandwidth is measured for 1 subframe (1 ms) at each measurement count.

## LTE_PEVM?

Peak EVM Result

### Function

Queries the EVM Peak measurement result.

### Query

```
LTE_PEVM? seg,mode[,cc]
```

### Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | % |
| Resolution | 0.01% |

When mode ≠ TTL,

`pevm`

| | |
|---|---|
| pevm | Measurement result in specified Storage mode |
| Unit | % |
| Resolution | 0.01% |

### Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of EVM Peak measurement result for segment 1:

```
LTE_PEVM? 1,AVG
> 1.75
```

# LTE_PHASEERR?

Phase Error Result

## Function

Queries the Phase Error measurement result in Sequence Measurement mode.

## Query

```
LTE_PHASEERR? seg,mode[,cc]
```

## Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | degree |
| Resolution | 0.01 degree |

When mode ≠ TTL,

`perr`

| | |
|---|---|
| perr | Measurement result in specified Storage mode |
| Unit | degree |
| Resolution | 0.01 degree |

## Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

## Example of Use

To query the average of Phase Error measurement result for segment 1:

```
LTE_PHASEERR? 1,AVG
> 1.55
```

## LTE_PWR_SET

Tx Power Measurement Enable and Count

### Function

Enables the Tx Power measurement and sets the measurement count, and queries the settings.

### Command

```
LTE_PWR_SET mcond,on_off[,count]
```

### Query

```
LTE_PWR_SET? mcond
```

### Response

```
on_off,count
```

### Parameters

| | |
|---|---|
| mcond | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| on_off | Enables/disables measurement. |
| ON | Enables measurement. |
| OFF | Disables measurement. |
| Default | ON |
| count | Measurement count |
| Range | 1 to 200<br>1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

### Example of Use

To turn on the Tx power measurement and set the measurement count to 50 for the measurement condition number 5 in the LTE measurement condition table:

```
LTE_PWR_SET 5,ON,50
LTE_PWR_SET? 5
> ON,50
```

### Remarks

Tx Power is measured for 1 subframe (1 ms) at each measurement count.

# LTE_RSEVM?

Reference Signal EVM Result

## Function

Queries the EVM measurement result of Demodulation Reference Signal.

## Query

```
LTE_RSEVM? seg,mode[,cc]
```

## Response

When mode = TTL,

```
avg,max,min
```

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | % |
| Resolution | 0.01% |

When mode ≠ TTL,

```
rsevm
```

| | |
|---|---|
| rsevm | Measurement result in specified Storage mode |
| Unit | % |
| Resolution | 0.01% |

## Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

## Details

The EVM measurement of the Reference Signal is supported when PUSCH is assigned using the CHCONFIG command.

## Example of Use

To query the average of EVM measurement result of Reference Signal for segment 1:

```
LTE_RSEVM? 1,AVG
> 1.51
```

## LTE_RSRANGE_FDD

RS Search Range for FDD mode

### Function

Sets and queries the range of Reference Signal detection at the sequence measurement.

### Command

```
LTE_RSRANGE_FDD time
```

### Query

```
LTE_RSRANGE_FDD?
```

### Response

```
time
```

| | |
|---|---|
| Unit | us |
| Resolution | 0.1 us |

### Parameters

| | |
|---|---|
| time | Range of Reference Signal detection |
| Range | 0.8 to 100.0 us |
| Resolution | 0.1 us |
| Default | 0.8 us |

### Details

This setting is enabled only when LTE_MEASOFFSET is set to ON.

### Example of Use

To set the range of Reference Signal detection to 10 us in the FDD mode:

```
LTE_RSRANGE_FDD 10
LTE_RSRANGE_FDD?
>10.0
```

# LTE_RSRANGE_TDD

RS Search Range for TDD mode

### Function

Sets and queries the range of Reference Signal detection at the sequence measurement.

### Command

```
LTE_RSRANGE_TDD time
```

### Query

```
LTE_RSRANGE_TDD?
```

### Response

`time`

| | |
|---|---|
| Unit | us |
| Resolution | 0.1 us |

### Parameters

| | |
|---|---|
| time | Range of Reference Signal detection |
| Range | 0.8 to 100.0 us |
| Resolution | 0.1 us |
| Default | 17.8 us |

### Details

This setting is enabled only when LTE_MEASOFFSET is set to ON.

### Example of Use

To set the range of Reference Signal detection to 10 us in the TDD mode:

```
LTE_RSRANGE_TDD 10
LTE_RSRANGE_TDD?
>10.0
```

# LTE_SEM?

SEM Judgement

## Function

Queries the judgement of the Spectrum Emission Mask measurement result.
Fail when any part of spectrum exceeds limit, otherwise Pass.

## Query

```
LTE_SEM? seg[,cc]
```

## Response

```
judgement
```

| | |
|---|---|
| judgement | Judgement |
| PASS | Pass |
| FAIL | Fail |
| – | Not measured |

## Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

## Example of Use

To query the judgement of the Spectrum Emission Mask measurement result for segment 1:

```
LTE_SEM? 1
> PASS
```

## LTE_SEMLVL_DET_LOWER?

SEM Peak Value (Detail) (Lower)

### Function

Queries the peak level with offset frequency at each of lower side of 9 ranges of Spectrum Emission Mask measurement.

Refer to Table 2.4.1-2 Available Frequency Ranges for Spectrum Emission Mask Measurements (1/2) and Table 2.4.1-3 Available Frequency Ranges for Spectrum Emission Mask Measurements (2/2) for details.

### Query

```
LTE_SEMLVL_DET_LOWER? seg[,cc]
```

### Response

```
f_M1,l_M1,f_M2,l_M2,f_M3,l_M3,f_M4,l_M4,f_M5,l_M5,f_M6,l_M6,f_M7,l_M7,f_M8,l_M8,f_M9,l_M9
```

| | |
|---|---|
| l_M1 to l_M9 | Peak level at each of lower side range of Range 1 to Range 9 |
| Units | dBm |
| Resolution | 0.01 dB |
| f_M1 to f_M9 | Offset frequency of peak level at each of lower side range of Range 1 to Range 9 |
| Units | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The number of target ranges varies with the combination of channel bandwidth and network signalled value for additionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the peak level with offset frequency at each of lower side of 9 ranges of Spectrum Emission Mask measurement for segment 0:

```
LTE_SEMLVL_DET_LOWER? 0
>
-0.500,3.00,-1.500,3.00,-2.600,3.00,-3.500,3.00,-5.500,3.00,-8.000,3.00,-
12.500,3.00,-17.500,3.00, -22.500,3.00
```

## LTE_SEMLVL_DET_UPPER?

SEM Peak Value (Detail) (Upper)

Function

Queries the peak level with offset frequency at each of upper side ranges of Spectrum Emission Mask measurement.

Refer to Table 2.4.1-2 Available Frequency Ranges for Spectrum Emission Mask Measurements (1/2) and Table 2.4.1-3 Available Frequency Ranges for Spectrum Emission Mask Measurements (2/2) for details.

Query

```
LTE_SEMLVL_DET_UPPER? seg[,cc]
```

Response

```
f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4,f_5,l_5,f_6,l_6,f_7,l_7,f_8,l_8,f_9,l_9
```

| | |
|---|---|
| l_1 to l_9 | Peak level in each of upper Range 1 to Range 9 |
| Unit | dB |
| Resolution | 0.01 dB |
| f_1 to f_9 | Offset frequency of peak level in each of upper Range 1 to Range 9 |
| Unit | MHz |
| Resolution | 1 kHz |

Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

Details

The number of target ranges varies with the combination of channel bandwidth and network signalled value for additionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the peak level with offset frequency at each of upper side of nine ranges of Spectrum Emission Mask measurement for segment 0:

```
LTE_SEMLVL_DET_UPPER? 0
>
0.500,3.00,1.500,3.00,2.600,3.00,3.500,3.00,5.500,3.00,8.000,3.00,12.500,
3.00,17.500,3.00,22.500,3.00
```

## LTE_SEMLVL_LOWER?

SEM Peak Value (Lower)

### Function

Queries the peak level with offset frequency at each of lower side ranges of Spectrum Emission Mask measurement in Sequence Measurement mode.

### Query

```
LTE_SEMLVL_LOWER? seg[,cc]
```

### Response

```
f_M1,l_M1,f_M2,l_M2,f_M3,l_M3,f_M4,l_M4
```

| | |
|---|---|
| l_M1 to l_M4 | Peak level in each of lower Range 1 to Range 4 |
| Unit | dB |
| Resolution | 0.01 dB |
| f_M1 to f_M4 | Offset frequency of peak level in each of lower Range 1 to Range 4 |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

Refer to Table 2.4.1-1 "Frequency Ranges of Range 1 to Range 4" for the frequency range for the measurement.

### Example of Use

To query the peak level with offset frequency at each of lower side ranges of Spectrum Emission Mask measurement for segment 1:

```
LTE_SEMLVL_LOWER? 1
> -3.000,-20.00,-5.000,-30.00,-8.000,-40.00,-9.500,-50.00
```

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Native Command Reference

# LTE_SEMLVL_UPPER?

SEM Peak Value (Upper)

## Function

Queries the peak level with offset frequency at each of upper side ranges of Spectrum Emission Mask measurement in Sequence Measurement mode.

## Query

```
LTE_SEMLVL_UPPER? seg[,cc]
```

## Response

```
f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4
```

| | |
|---|---|
| l_1 to l_4 | Peak level in each of upper Range 1 to Range 4 |
| Unit | dB |
| Resolution | 0.01 dB |
| f_1 to f_4 | Offset frequency of peak level in each of upper Range 1 to Range 4 |
| Unit | MHz |
| Resolution | 1 kHz |

## Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

## Details

Refer to Table 2.4.1-1 "Frequency Ranges of Range 1 to Range 4" for the frequency range for the measurement.

## Example of Use

To query the peak level with offset frequency at each of upper side ranges of Spectrum Emission Mask measurement for segment 1:

```
LTE_SEMLVL_UPPER? 1
> 3.000,-20.00,5.000,-30.00,8.000,-40.00,9.500,-50.00
```

## LTE_SEMMARGIN_DET_LOWER?

SEM Template Margin (Detail) (Lower)

### Function

Queries the level margin with frequency where margin was measured at each of lower side 9 measurement ranges in Spectrum Emission Mask measurement.

Refer to Table 2.4.1-2 Available Frequency Ranges for Spectrum Emission Mask Measurements (1/2) and Table 2.4.1-3 Available Frequency Ranges for Spectrum Emission Mask Measurements (2/2) for details.

### Query

```
LTE_SEMMARGIN_DET_LOWER? seg[,cc]
```

### Response

```
f_M1,l_M1,f_M2,l_M2,f_M3,l_M3,f_M4,l_M4,f_M5,l_M5,f_M6,l_M6,f_M7,l_M7,f_M8,l_M8,f_M9,l_M9
```

| | |
|---|---|
| l_M1 to l_M9 | Level margin in each of lower Range 1 to Range 9 |
| Unit | dB |
| Resolution | 0.01 dB |
| f_M1 to f_M9 | Offset frequency where level margin in each of lower Range 1 to Range 9 measured |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

The number of target ranges varies with the combination of channel bandwidth and network signalled value for additionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the level margin with frequency where margin measured at each of lower side of 9 ranges of Spectrum Emission Mask measurement for segment 0:

```
LTE_SEMLVL_DET_LOWER? 0
>
-0.500,3.00,-1.500,3.00,-2.600,3.00,-3.500,3.00,-5.500,3.00,-8.000,3.00,-
12.500,3.00,-17.500,3.00,-22.500,3.00
```

## LTE_SEMMARGIN_DET_UPPER?

SEM Template Margin (Detail) (Upper)

### Function

Queries the level margin with frequency where margin measured at each of upper side of 9 ranges of Spectrum Emission Mask measurement in Sequence Measurement mode.

Refer to Table 2.4.1-2 Available Frequency Ranges for Spectrum Emission Mask Measurements (1/2) and Table 2.4.1-3 Available Frequency Ranges for Spectrum Emission Mask Measurements (2/2) for details.

### Query

```
LTE_SEMMARGIN_DET_UPPER? seg[,cc]
```

### Response

```
f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4,f_5,l_5,f_6,l_6,f_7,l_7,f_8,l_8,f_9,l_9
```

| | |
|---|---|
| l_1 to l_9 | Level margin in each of upper side range of Range 1 to Range 9 |
| Unit | dB |
| Resolution | 0.01 dB |
| f_1 to f_9 | Offset frequency where level margin measured in each of upper side range of Range 1 to Range 9 |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

The number of target ranges varies with the combination of channel bandwidth and network signalled value for additionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

### Example of Use

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To query the level margin with frequency where margin measured at each of upper side of 9 ranges of Spectrum Emission Mask measurement for segment 0:

```
LTE_SEMLVL_DET_UPPER? 0
>
0.500,3.00,1.500,3.00,2.600,3.00,3.500,3.00,5.500,3.00,8.000,3.00,12.500,
3.00,17.500,3.00,22.500,3.00
```

## LTE_SEMMARGIN_LOWER?

SEM Template Margin (Lower)

### Function

Queries the level margin at each of lower side ranges in Spectrum Emission Mask measurement.

### Query

```
LTE_SEMMARGIN_LOWER? seg[,cc]
```

### Response

```
f_M1,l_M1,f_M2,l_M2,f_M3,l_M3,f_M4,l_M4
```

| | |
|---|---|
| l_M1 to l_M4 | Level margin in each of lower Range 1 to Range 4 |
| Unit | dB |
| Resolution | 0.01 dB |
| f_M1 to f_M4 | Offset frequency where level margin in each of lower Range 1 to Range 4 measured |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

Level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

Refer to Table 2.4.1-1 Frequency Ranges of Range 1 to Range 4 for the frequency range for the measurement.

### Example of Use

To query the level margin with frequency where margin measured at each of lower side ranges of Spectrum Emission Mask measurement for segment 1:

```
LTE_SEMMARGIN_LOWER? 1
> -3.000,3.00,-5.000,3.00,-8.000,3.00,-9.500,3.00
```

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Native Command Reference

# LTE_SEMMARGIN_UPPER?

SEM Template Margin (Upper)

### Function

Queries the level margin at each of upper side range in Spectrum Emission Mask measurement in Sequence Measurement mode.

### Query

```
LTE_SEMMARGIN_UPPER? seg[,cc]
```

### Response

```
f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4
```

| | |
|---|---|
| l_ 1to l_4 | Level margin in each of upper Range 1 to Range 4 |
| Unit | dB |
| Resolution | 0.01 dB |
| f_1 to f_4 | Offset frequency where level margin in each of upper Range 1 to Range 4 measured |
| Unit | MHz |
| Resolution | 1 kHz |

### Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Details

Level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

Refer to Table 2.4.1-1 “Frequency Ranges of Range 1 to Range 4” for the frequency range for the measurement.

### Example of Use

To query the level margin with frequency where margin measured at each of upper side ranges of Spectrum Emission Mask measurement for segment 1:

```
LTE_SEMMARGIN_UPPER? 1
> 3.000,3.00,5.000,3.00,8.000,3.00,9.500,3.00
```

## LTE_SEM_SET

Spectrum Emission Mask Enable and Count

### Function

Enables the Spectrum Emission Mask Measurement and sets or queries the measurement count.

### Command

```
LTE_SEM_SET mcond,on_off[,count]
```

### Query

```
LTE_SEM_SET? mcond
```

### Response

```
on_off,count
```

### Parameters

| | |
|---|---|
| mcond | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| on_off | Enables/disables measurement. |
| ON | Enables measurement. |
| OFF | Disables measurement. |
| Default | OFF |
| count | Measurement count |
| Range | 1 to 200<br>1 to 100 (at UL CA) |
| Resolution | 1 |
| Suffix code | None |
| Default | 1 |

### Example of Use

To turn on the Spectrum Emission measurement and set the measurement count to 100 for the measurement condition number 1 in the LTE measurement condition table:

```
LTE_SEM_SET 1,ON,100
LTE_SEM_SET? 1
> ON,100
```

### Remarks

The Spectrum Emission Mask is measured for 1 subframe (1 ms) at each measurement count.

## LTE_SEM_TEMPLATE_1.4MHZ

Spectrum Emission Mask Template (1.4 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 1.4 MHz channel bandwidth in Sequence Measurement mode.

### Command

```
LTE_SEM_TEMPLATE_1.4MHZ range,limit
```

### Query

```
LTE_SEM_TEMPLATE_1.4MHZ? range
```

### Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 4 | |
| Resolution | 1 | |
| Suffix code | None | |
| Default | 1 | |
| limit | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Suffix code | DBM (uses dBm when omitted) | |
| Default | Range 1: | –8.5 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –23.5 dBm |
| | Range 4: | 0.0 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 1.4 MHz channel bandwidth to –10.0 dBm:

```
LTE_SEM_TEMPLATE_1.4MHZ 2,-10.0
LTE_SEM_TEMPLATE_1.4MHZ? 2
> -10.0
```

# LTE_SEM_TEMPLATE_10MHZ

Spectrum Emission Mask Template (10 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 10 MHz channel bandwidth in Sequence Measurement mode.

### Command

```
LTE_SEM_TEMPLATE_10MHZ range,limit
```

### Query

```
LTE_SEM_TEMPLATE_10MHZ? range
```

### Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 4 | |
| Resolution | 1 | |
| Suffix code | None | |
| Default | 1 | |
| limit | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Suffix code | DBM (uses dBm when omitted) | |
| Default | Range 1: | –16.5 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 10 MHz channel bandwidth to –10.0 dBm:

```
LTE_SEM_TEMPLATE_10MHZ 2,-10.0
LTE_SEM_TEMPLATE_10MHZ? 2
> -10.0
```

## LTE_SEM_TEMPLATE_15MHZ

Spectrum Emission Mask Template (15 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 15 MHz channel bandwidth in Sequence Measurement mode.

### Command

```
LTE_SEM_TEMPLATE_15MHZ range,limit
```

### Query

```
LTE_SEM_TEMPLATE_15MHZ? range
```

### Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 4 | |
| Resolution | 1 | |
| Suffix code | None | |
| Default | 1 | |
| limit | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Suffix code | DBM (uses dBm when omitted) | |
| Default | Range 1: | –18.5 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 15 MHz channel bandwidth to 10.0 dBm:

```
LTE_SEM_TEMPLATE_15MHZ 2,-10.0
LTE_SEM_TEMPLATE_15MHZ? 2
> -10.0
```

## LTE_SEM_TEMPLATE_20MHZ

Spectrum Emission Mask Template (20 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 20 MHz channel bandwidth in Sequence Measurement mode.

### Command

```
LTE_SEM_TEMPLATE_20MHZ range,limit
```

### Query

```
LTE_SEM_TEMPLATE_20MHZ? range
```

### Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 4 | |
| Resolution | 1 | |
| Suffix code | None | |
| Default | 1 | |
| limit | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Suffix code | DBM (uses dBm when omitted) | |
| Default | Range 1: | –19.5 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 10 MHz channel bandwidth to –10.0 dBm:

```
LTE_SEM_TEMPLATE_20MHZ 2,-10.0
LTE_SEM_TEMPLATE_20MHZ? 2
> -10.0
```

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Native Command Reference

## LTE_SEM_TEMPLATE_3MHZ

Spectrum Emission Mask Template (3 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 3 MHz channel bandwidth in Sequence Measurement mode.

### Command

```
LTE_SEM_TEMPLATE_3MHZ range,limit
```

### Query

```
LTE_SEM_TEMPLATE_3MHZ? range
```

### Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 4 | |
| Resolution | 1 | |
| Suffix code | None | |
| Default | 1 | |
| limit | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Suffix code | DBM (uses dBm when omitted) | |
| Default | Range 1: | –11.5 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –23.5 dBm |
| | Range 4: | 0.0 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 3 MHz channel bandwidth to –10.0 dBm:

```
LTE_SEM_TEMPLATE_3MHZ 2,-10.0
LTE_SEM_TEMPLATE_3MHZ? 2
> -10.0
```

## LTE_SEM_TEMPLATE_5MHZ

Spectrum Emission Mask Template (5 MHz)

### Function

Sets or queries the limit of Spectrum Emission Mask for 5 MHz channel bandwidth in Sequence Measurement mode.

### Command

```
LTE_SEM_TEMPLATE_5MHZ range,limit
```

### Query

```
LTE_SEM_TEMPLATE_5MHZ? range
```

### Response

limit

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 4 | |
| Resolution | 1 | |
| Suffix code | None | |
| Default | 1 | |
| limit | Limit level | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Suffix code | DBM (uses dBm when omitted) | |
| Default | Range 1: | –13.5 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 5 MHz channel bandwidth to –10.0 dBm:

```
LTE_SEM_TEMPLATE_5MHZ 2,-10.0
LTE_SEM_TEMPLATE_5MHZ? 2
> -10.0
```

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# LTE_SEM_TEMPLATE_CONTCC_100RB_100RB

Spectrum Emission Mask Template for Contiguous UL CA (100RB+100RB)

## Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 100RB+100RB.

## Command

```
LTE_SEM_TEMPLATE_CONTCC_100RB_100RB range,limit
```

## Query

```
LTE_SEM_TEMPLATE_CONTCC_100RB_100RB? range
```

## Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

## Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 6 | |
| Resolution | 1 | |
| Default | 1 | |
| limit | Limit | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Default | Range 1: | –22.5 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |
| | Range 5: | –23.5 dBm |
| | Range 6: | –23.5 dBm |

## Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 100RB+100RB.

```
LTE_SEM_TEMPLATE_CONTCC_100RB_100RB 2,-10.0
LTE_SEM_TEMPLATE_CONTCC_100RB_100RB? 2
>-10.0
```

## LTE_SEM_TEMPLATE_CONTCC_25RB_100RB

Spectrum Emission Mask Template for Contiguous UL CA (25RB+100RB)

### Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 25RB+100RB.

### Command

```
LTE_SEM_TEMPLATE_CONTCC_25RB_100RB range,limit
```

### Query

```
LTE_SEM_TEMPLATE_CONTCC_25RB_100RB? range
```

### Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 6 | |
| Resolution | 1 | |
| Default | 1 | |
| limit | Limit | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Default | Range 1: | –20.5 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |
| | Range 5: | –23.5 dBm |
| | Range 6: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 25RB+100RB.

```
LTE_SEM_TEMPLATE_CONTCC_25RB_100RB 2,-10.0
LTE_SEM_TEMPLATE_CONTCC_25RB_100RB? 2
>-10.0
```

## LTE_SEM_TEMPLATE_CONTCC_50RB_100RB

Spectrum Emission Mask Template for Contiguous UL CA (50RB+100RB)

### Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 50RB+100RB.

### Command

```
LTE_SEM_TEMPLATE_CONTCC_50RB_100RB range,limit
```

### Query

```
LTE_SEM_TEMPLATE_CONTCC_50RB_100RB? range
```

### Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 6 | |
| Resolution | 1 | |
| Default | 1 | |
| limit | Limit | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Default | Range 1: | –21.0 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |
| | Range 5: | –23.5 dBm |
| | Range 6: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 50RB+100RB.

```
LTE_SEM_TEMPLATE_CONTCC_50RB_100RB 2,-10.0
LTE_SEM_TEMPLATE_CONTCC_50RB_100RB? 2
>-10.0
```

## LTE_SEM_TEMPLATE_CONTCC_75RB_100RB

Spectrum Emission Mask Template for Contiguous UL CA (75RB+100RB)

### Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 75RB+100RB.

### Command

```
LTE_SEM_TEMPLATE_CONTCC_75RB_100RB range,limit
```

### Query

```
LTE_SEM_TEMPLATE_CONTCC_75RB_100RB? range
```

### Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 6 | |
| Resolution | 1 | |
| Default | 1 | |
| limit | Limit | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Default | Range 1: | –22.0 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |
| | Range 5: | –23.5 dBm |
| | Range 6: | –23.5 dBm |

### Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 75RB+100RB.

```
LTE_SEM_TEMPLATE_CONTCC_75RB_100RB 2,-10.0
LTE_SEM_TEMPLATE_CONTCC_75RB_100RB? 2
>-10.0
```

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Native Command Reference

# LTE_SEM_TEMPLATE_CONTCC_75RB_75RB

Spectrum Emission Mask Template for Contiguous UL CA (75RB+75RB)

## Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 75RB+75RB.

## Command

```
LTE_SEM_TEMPLATE_CONTCC_75RB_75RB range,limit
```

## Query

```
LTE_SEM_TEMPLATE_CONTCC_75RB_75RB? range
```

## Response

`limit`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

## Parameters

| | | |
|---|---|---|
| range | Range | |
| Range | 1 to 6 | |
| Resolution | 1 | |
| Default | 1 | |
| limit | Limit | |
| Range | –99.9 to 99.9 dBm | |
| Resolution | 0.1 dB | |
| Default | Range 1: | –21.0 dBm |
| | Range 2: | –8.5 dBm |
| | Range 3: | –11.5 dBm |
| | Range 4: | –23.5 dBm |
| | Range 5: | –23.5 dBm |
| | Range 6: | –23.5 dBm |

## Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 75RB+75RB.

```
LTE_SEM_TEMPLATE_CONTCC_75RB_75RB 2,-10.0
LTE_SEM_TEMPLATE_CONTCC_75RB_75RB? 2
>-10.0
```

## LTE_SPECFLATITEM?

Spectrum Flatness Measured Item

### Function

Queries whether each spectrum flatness measurement items is measured or not.

### Query

```
LTE_SPECFLATITEM? seg[,cc]
```

### Response

```
flag
```

| | |
|---|---|
| flag | Measured/Not measured flag (0 to 3) |
| | Returns the sum of the following measurement items. |
| | 0 Not measured |
| | 1 ≥ 3 MHz area (When Test Environment is Normal) |
| | ≥ 5 MHz area (When Test Environment is Extreme) |
| | 2 < 3 MHz area (When Test Environment is Normal) |
| | < 5 MHz area (When Test Environment is Extreme) |

### Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier |
| | Used at UL CA and omitted at non CA. |
| | Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query whether each spectrum flatness measurement items of Segment 1 is measured or not.

```
LTE_SPECFLATITEM? 1
> 2
```

# LTE_SPECFLATPPPASS?

Spectrum Flatness Judgement

## Function

Queries the judgement of Spectrum Flatness measurement result.

## Query

```
LTE_SPECFLATPPPASS? seg[,cc]
```

## Response

```
judgement
```

| | |
|---|---|
| judgement | Judgement result |
| PASS | Pass |
| FAIL | Fail |
| – | Not measured |

## Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

## Example of Use

To query the judgement of Spectrum Flatness measurement result for segment 1

```
LTE_SPECFLATPPPASS? 1
> PASS
```

## LTE_SPECFLAT_RP1?

Spectrum Flatness (≥3 MHz (RP1)) Result

### Function

Queries the ripple value in Spectrum Flatness measurement result in Range 1.

### Query

```
LTE_SPECFLAT_RP1? seg,mode[,cc]
```

### Response

When mode = TTL,

```
avg,max,min
```

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

```
sflatness
```

| | |
|---|---|
| sflatness | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameter

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of Range 1 ripple value in Spectrum Flatness measurement result of Segment 1 in the sequence measurement.

```
LTE_SPECFLAT_RP1? 1,AVG
> 0.04
```

## LTE_SPECFLAT_RP12?

Spectrum Flatness (RP12) Result

### Function

Queries the difference between maximum value in Range 1 and minimum value in Range 2 of Spectrum Flatness measurement result.

### Query

`LTE_SPECFLAT_RP12? seg,mode`

### Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

`sflatness`

| | |
|---|---|
| sflatness | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of difference between maximum value in Range 1 and minimum value in Range 2 of Spectrum Flatness measurement result of Segment 1 in the sequence measurement.

```
LTE_SPECFLAT_RP12? 1,AVG
> 0.04
```

## LTE_SPECFLAT_RP2?

Spectrum Flatness (<3 MHz (RP2)) Result

### Function

Queries the ripple value in Spectrum Flatness measurement result in Range 2.

### Query

```
LTE_SPECFLAT_RP2? seg,mode[,cc]
```

### Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

`sflatness`

| | |
|---|---|
| sflatness | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of Range 2 ripple value in Spectrum Flatness measurement result of Segment 1 in the sequence measurement.

```
LTE_SPECFLAT_RP2? 1,AVG
> 0.04
```

## LTE_SPECFLAT_RP21?

Spectrum Flatness (RP21) Result

### Function

Queries the difference between maximum value in Range 2 and minimum value in Range 1 of Spectrum Flatness measurement result.

### Query

```
LTE_SPECFLAT_RP21? seg,mode[,cc]
```

### Response

When mode = TTL,

```
avg,max,min
```

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dB |
| Resolution | 0.01 dB |

When mode ≠ TTL,

```
sflatness
```

| | |
|---|---|
| sflatness | Measurement result in specified Storage mode |
| Unit | dB |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details. |
| PCC | PCC |
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of difference between maximum value in Range 2 and minimum value in Range 1 of Spectrum Flatness measurement result of Segment 1 in the sequence measurement.

```
LTE_SPECFLAT_RP21? 1,AVG
> 0.04
```

## LTE_TDDULDLCONF

Uplink Downlink Configuration

### Function

Sets or queries Uplink/Downlink signal configuration of TDD.

### Command

```
LTE_TDDULDLCONF conf
```

### Query

```
LTE_TDDULDLCONF?
```

### Response

```
conf
```

### Parameter

| | |
|---|---|
| conf | Uplink Downlink Signal Configuration |
| Range | 0 to 6 |
| Resolution | 1 |
| Default | 1 |

### Example of Use

To set the Uplink/Downlink signal configuration to 1:

```
LTE_TDDULDLCONF 1
LTE_TDDULDLCONF?
> 1
```

# LTE_TESTENV

Test Environment

## Function

Sets or queries the test environment.

## Command

```
LTE_TESTENV mcond,env
```

## Query

```
LTE_TESTENV? mcond
```

## Response

```
env
```

## Parameter

| | |
|---|---|
| mcond | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| env | Test Environment |
| NORMAL | Normal |
| EXTREME | Extreme |
| Default | NORMAL |

## Details

This is the parameter that determines the threshold line for Spectrum Flatness measurement. The test environment is defined in 3GPP TS36.521-1. The following values depend on the test environment settings.

- When the test environment is NORMAL

| | |
|---|---|
| Border of Range1/Range2 | 3 MHz |
| RP1 limit level | 5.4 dB |
| RP2 limit level | 9.4 dB |
| RP12 limit level | 6.4 dB |
| RP21 limit level | 8.4 dB |

- When the test environment is EXTREME

| | |
|---|---|
| Border of Range1/Range2 | 5 MHz |
| RP1 limit level | 5.4 dB |
| RP2 limit level | 13.4 dB |
| RP12 limit level | 7.4 dB |
| RP21 limit level | 11.4 dB |

#### Example of Use

To set the test environment to EXTREME for the measurement condition number 2 in the LTE measurement condition table:

```
LTE_TESTENV 2,EXTREME
LTE_TESTENV? 2
> EXTREME
```

## LTE_TP_INBANDE_LEAK

### In-band Emissions Carrier Leakage Template

#### Function

Set and queries In-band Emissions Carrier Leakage Template.

#### Command

```
LTE_TP_INBANDE_LEAK mcond,tp
```

#### Query

```
LTE_TP_INBANDE_LEAK? mcond
```

#### Response

```
tp
```

#### Parameter

| | |
|---|---|
| mcond | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| tp | In-band Emissions Carrier Leakage Template |
| 0DBM | –24.2 dBc (UE output level 0 dBm) |
| 30DBM | –19.2 dBc (UE output level –30 dBm) |
| 40DBM | –9.2 dBc (UE output level –40 dBm) |
| Default | 0DBM |

#### Details

The upper limit for the Carrier Leakage defined in 3GPP TS36.521 6.5.2.3 is selected according to this parameter setting.

#### Example of Use

To set the In-band Emissions Carrier Leakage Template to 0DBM for the measurement condition number 2:

```
LTE_TP_INBANDE_LEAK 2,0DBM
LTE_TP_INBANDE_LEAK? 2
> 0DBM
```

## LTE_TP_INBANDE_LEAK_SCC1

In-band Emissions Carrier Leakage Template for SCC-1

### Function

Set and queries the In-band Emissions Carrier Leakage Template of SCC-1.

### Command

```
LTE_TP_INBANDE_LEAK_SCC1 mcond,tp
```

### Query

```
LTE_TP_INBANDE_LEAK_SCC1? mcond
```

### Response

```
tp
```

### Parameters

| | |
|---|---|
| mcond | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| tp | In-band Emissions Carrier Leakage Template of SCC-1 |
| 0DBM | –24.2 dBc (UE output level 0 dBm) |
| 30DBM | –19.2 dBc (UE output level –30 dBm) |
| 40DBM | –9.2 dBc (UE output level –40 dBm) |
| Default | 0DBM |

### Details

The upper limit for the Carrier Leakage defined in 3GPP TS36.521 6.5.2.3 is selected according to this parameter setting.

### Examples of Use

To set the In-band Emissions Carrier Leakage Template for SCC-1 to 0DBM for the measurement condition number 2:

```
LTE_TP_INBANDE_LEAK_SCC1 2,0DBM
LTE_TP_INBANDE_LEAK_SCC1? 2
> 0DBM
```

## LTE_TXPWR?

Tx Power Result

### Function

Queries the Tx power measurement result.

### Query

```
LTE_TXPWR? seg,mode[,cc]
```

### Response

When mode = TTL,

`avg,max,min`

| | |
|---|---|
| avg | Measurement result (Average) |
| max | Measurement result (Maximum) |
| min | Measurement result (Minimum) |
| Unit | dBm |
| Resolution | 0.01 dB |

When mode = AVG, MAX, MIN or DVT,

`pwr`

| | |
|---|---|
| pwr | Measurement result in specified Storage mode |
| Unit | dBm |
| Resolution | 0.01 dB |

When mode = IND,

`s,pwr(1),pwr(2),pwr(3),…,pwr(s)`

| | |
|---|---|
| s | Measurement count |
| Range | 1 to 200 |
| pwr(s) | Tx Power of sth measurement |
| Unit | dBm |
| Resolution | 0.01 dB |

### Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| mode | Storage mode |
| AVG | Average |
| MAX | Maximum |
| MIN | Minimum |
| TTL | Average・Maximum・Minimum |
| DVT | Standard deviation |
| IND | Individual measurement result |
| cc | Component Carrier<br>Used at UL CA and omitted at non CA.<br>Refer to “Table 2.2.2-1 Measurement Items of Tx Power” for details. |
| PCC | PCC |

| | |
|---|---|
| SCC1 | SCC-1 |
| Omitted | Total |

### Example of Use

To query the average of Tx Power measurement results for segment 1:

```
LTE_TXPWR? 1,AVG
> -20.00
```

## LTE_ULRMC_MOD

Sequence UL RMC Modulation

### Function

Sets or queries the modulation method used by Uplink signal RMC.

### Command

```
LTE_ULRMC_MOD mcond,ul_rmc_mod
```

### Query

```
LTE_ULRMC_MOD? mcond
```

### Response

```
ul_rmc_mod
```

### Parameters

| | |
|---|---|
| mcond | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| ul_rmc_mod | Uplink RMC modulation method |
| QPSK | QPSK method |
| 16QAM | 16QAM method |
| 64QAM | 64QAM modulation |
| Default | QPSK |

### Example of Use

To set the modulation method of condition number 1 in the LTE measurement condition table to 16QAM:

```
LTE_ULRMC_MOD 1,16QAM
LTE_ULRMC_MOD? 1
> 16QAM
```

## LTE_ULRMC_MOD_SCC1

Sequence UL RMC Modulation for SCC-1

### Function

Sets or queries the modulation method used by Uplink signal RMC of SCC-1.

### Command

```
LTE_ULRMC_MOD_SCC1 mcond,ul_rmc_mod
```

### Query

```
LTE_ULRMC_MOD_SCC1? mcond
```

### Response

```
ul_rmc_mod
```

### Parameter

| | |
|---|---|
| mcond | Measurement condition number |
| Range | 0 to 1999 |
| Resolution | 1 |
| ul_rmc_mod | Uplink RMC modulation method of SCC-1 |
| QPSK | QPSK modulation |
| 16QAM | 16QAM modulation |
| 64QAM | 64QAM modulation |
| Default | QPSK |

### Example of Use

To set the modulation method for SCC-1 at the measurement condition number 1 in the LTE measurement condition table to 16QAM:

```
LTE_ULRMC_MOD_SCC1 1,16QAM
LTE_ULRMC_MOD_SCC1? 1
> 16QAM
```

# OLVL

Output Level

## Function

Sets or queries the total output level of all channels.

## Command

```
OLVL level
```

## Query

```
OLVL?
```

## Response

`level`

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

## Parameter

| | |
|---|---|
| level | Output level |
| Range | –130.0 to –10.0 dBm (Port 1/Port 2) |
| | –120.0 to 0.0 dBm (Port 3/Port 4) |
| Resolution | 0.1 dB |
| Suffix code | DBM (uses dBm when omitted) |
| Default | –60.2 dBm |

## Details

The setting range varies with the output port setting.
When the Cable Loss Calibration is ON, the cable loss is subtracted from the output setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –135.0 to –15.0 dBm.

## Example of Use

To set the output level to –50.0 dBm:

```
OLVL -50.0
OLVL?
> -50.0
```

## Related Commands

EXTLOSSW
LOSSTBL
LOSSTBLVAL
For details of the commands, refer to Chapter 6 “Native Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

# RXFREQ

Downlink Frequency

### Function

Sets or queries the downlink frequency.

### Command

```
RXFREQ dl_freq
```

### Query

```
RXFREQ?
```

### Response

```
dl_freq
```

### Parameter

| | |
|---|---|
| dl_freq | Downlink frequency |
| Range | 400.000000 to 3800.000000 MHz |
| | 400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 1 Hz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted) |
| Default | 2140.000000 MHz |

### Details

The Rx frequency for the UE is set.
Changing the setting of downlink frequency does not change the setting of the downlink channel.

### Example of Use

To set the downlink frequency to 2120 MHz:

```
RXFREQ 2120MHZ
RXFREQ?
>2120000000
```

# SEQCTRL

Sequence Control Parameter - Sequence Control

## Function

Sets or queries the start and stop segments of Sequence Table.
Sets the parameters for both measurement and signal transmission.

## Command

```
SEQCTRL start,end
```

## Query

```
SEQCTRL?
```

## Response

```
start,end
```

## Parameters

| | |
|---|---|
| start | Start segment |
| Range | 0 to 1999 |
| Resolution | 1 |
| Default | 0 |
| end | Stop segment |
| Range | start to 1999 |
| Resolution | 1 |
| Default | 0 |

## Details

start = 0 to 1999, end = 0 to 1999 where end ≥ start
Whether the set sequence table can be executed is evaluated. Use the SEQERR? command to query the error details.

## Example of Use

To set the start segment to 20 and the stop segment to 52:

```
SEQCTRL 20,52
SEQCTRL?
> 20,52
```

# SEQCTRLTX

Sequence Control Parameter - Sequence Control

## Function

Sets or queries start and stop segments in sequence table.
Sets the measurement parameters only, without affecting the signal transmission parameters.

## Command

```
SEQCTRLTX start,end
```

## Query

```
SEQCTRLTX?
```

## Response

```
start,end
```

## Parameters

| | |
|---|---|
| start | Start segment |
| Range | 0 to 1999 |
| Resolution | 1 |
| Default | 0 |
| end | Stop segment |
| Range | start to 1999 |
| Resolution | 1 |
| Default | 199 |

## Details

start = to 1999, end = 0 to 1999 where end ≥ start
Whether the set sequence table can be executed is evaluated. Use the SEQERR? command to query the error details.

## Examples of Use

To set the start and stop segments to 20 and 55, respectively:

```
SEQCTRLTX 20,55
SEQCTRLTX?
> 20,55
```

## SEQERR?

Sequence Parameter Information - Error check

### Function

Queries the setting error information of sequence table.

### Query

```
SEQERR? [item]
```

### Response

When nothing is set to item:

```
n,err(0),..,err(n-1)
```

| | | |
|---|---|---|
| n | | Number of errors |
| | Range | 0 to 4 |
| err(n–1) | | Parameter with error |
| | ILVL | Input level |
| | OLVL | Output level |
| | STEP | Step count |
| | LEN | Capture memory length |

When item is ILVL, OLVL, STEP, DLPAT, or PORT:

```
ns,seg(0),..,seg(ns-1)
```

| | | |
|---|---|---|
| ns | | Number of segments with errors |
| | Range | 0 to 2000 |
| seg(ns–1) | | Segment number with errors |
| | Range | 0 to 1999 |

When item is LEN:

```
e,mem,exe,set
```

| | | |
|---|---|---|
| e | | Presence of errors |
| | Range | 0 No error, executable |
| | | 1 Errors found, not executable |
| mem | | Memory utilization |
| | Range | 0.0% to 100.0% |
| | Resolution | 0.1% |
| exe | | Number of segments capable of executing capture in number of configured segments |
| | Range | 0 to 2000 |
| set | | Number of segments with capture configured |
| | Range | 0 to 2000 |

When item is OLVLNUM, PATNUM, or STDNUM:

```
e,exe,set
```

| | | |
|---|---|---|
| e | | Presence of errors |
| | Range | 0 No error, executable |
| | | 1 Errors found, not executable |
| exe | | Number of segments capable of executing capture in number of |

configured segments

| | |
|---|---|
| Range | 0 to 2000 |
| set | Number of segments with capture configured |
| Range | 0 to 2000 |

If no error is found in the sequence table, the response returns 0.

### Parameters

| | |
|---|---|
| item | Parameter in sequence table |
| ILVL | Input level |
| OLVL | Output level |
| STEP | Step count |
| DLPAT | Waveform Pattern |
| PORT | Port |
| LEN | Capture memory length |
| OLVLNUM | Output level change count |
| PATNUM | Waveform pattern change count |
| STDNUM | Measurement mode change count |

### Details

This command can check error presence of input level, output level, step count, and capture memory length.

To query error presence of the following parameters, use SEQERR2? command.

Waveform pattern, port, output level change count, waveform pattern change count, measurement mode change count.

To set parameters for sequence table using the following commands, errors are not checked.

SEQTRX, SEQTX, SEQMEAS

### Example of Use

To query the presence of errors:

```
SEQERR?
>1,ILVL
```

To query the input level setting error information:

```
SEQERR? ILVL
>2,3,12
```

To query the capture memory error information

```
SEQERR? LEN
>0,25.0,20,20
```

Here, the capture memory utilization is 25.0%, so all captures configured in 20 segments are executable.

### Remarks

Sequence measurement cannot be started if there are errors.

However, sequence measurement can be started if segment numbers with errors are excluded from the execution range using the SEQCTRL command.

## SEQERR2?

Sequence Parameter Information - Error Check

### Function

Queries setting error information of sequence table

### Query

```
SEQERR2? format
```

### Response

```
n,err(0),..,err(n-1)
```

| | |
|---|---|
| n | Number of errors |
| Range | 0 to 7 |
| err(n-1) | Parameter with errors |
| ILVL | Input level |
| OLVL | Output level |
| STEP | Step count |
| DLPAT | Waveform pattern |
| PORT | Port |
| LEN | Capture memory length |
| OLVLNUM | Output level change count |
| PATNUM | Waveform pattern change count |
| STDNUM | Measurement mode change count |

If no error is found in the sequence table, the response returns 0.

### Parameters

| | |
|---|---|
| format | Format |
| 1 | Error check 1 |

### Details

Parameter setting errors can be checked up to seven types.
Only one of output level change count, waveform pattern change count, or measurement mode change count has an error.
Two or three of them cannot have an error simultaneously.

To set parameters for sequence table using the following commands, errors are not checked.
SEQTRX, SEQTX, SEQMEAS, SEQSGPORT
To query error details of each parameter, use SEQERR command.

### Examples of Use

To query the presence of errors:

```
SEQERR2? 1
>2,ILVL,DLPAT
```

Remarks

Sequence measurement cannot be started if there are errors.
However, sequence measurement can be started if segment numbers with errors are excluded from the execution range using the SEQCTRL command.

## SEQEXECTX

Start Signal Analyzer Measurement Only

Function

Sets only the parameters for the specified measurement and executes measurement, without affecting the signal transmission parameters.

Command

```
SEQEXECTX
```

## SEQMEAS

Sequence Table Parameter - Measurement

### Function

Sets or queries the measurement conditions of the specified segment.

### Command

```
SEQMEAS seg,mode,step,mcond
```

### Query

```
SEQMEAS? seg
```

### Response

```
mode,step,mcond
```

### Parameters

| | | |
|---|---|---|
| seg | Segment number | |
| Range | 0 to 1999 | |
| Resolution | 1 | |
| mode | Measurement mode | Required software license |
| TXP | Transmit power measurement mode | MX887010A |
| WCDMA | W-CDMA measurement mode | MX887010A and MX887011A |
| GSM | GSM measurement mode | MX887010A and MX887012A |
| CDMA2K | CDMA2000 1x measurement mode | MX887010A and MX887015A |
| EVDO | CDMA2000 1xEVDO measurement mode | MX887010A and MX887016A |
| TDSCDMA | TD-SCDMA measurement mode | MX887010A and MX887017A |
| LTE | LTE measurement mode | MX887010A and MX887013A, or MX887010A and MX887014A |
| Default | TXP | |
| step | Step count | |
| Range | 2 to 3000 | |
| Resolution | 1 | |
| Default | 2 | |
| mcond | Measurement condition number | |
| Range | 0 to 1999 | |
| Resolution | 1 | |
| Default | 0 | |

### Example of Use

To set the settings for segment 2 as follows:

Measurement mode: LTE, Step count: 10, Measurement condition number: 3

```
SEQMEAS 2, LTE,10,3
SEQMEAS? 2
> LTE,10,3
```

# SEQMSTAT?

Sequence Measurement Status

## Function

Queries the status of sequence measurement.

## Query

```
SEQMSTAT?
```

## Response

```
m_status,n,s(0),s(1),..,s(n-1)
```

| | |
|---|---|
| m_status | Measurement execution status |
| 0 | Measurement completed successfully |
| 2 | Over level |
| 3 | Under level |
| 4 | Measurement failed |
| 5 | Synchronization word not detected |
| 9 | Measurement in progress or not measured |
| 12 | Tx measurement timeout |

The value received from MX887013A or MX887014A is 0, 2, 5, 9, or 12.

| | |
|---|---|
| n | Number of measured segments |
| Range | 0 to 2000 |
| s(n–1) | Measurement status of specified segment |
| 0 | Measurement completed successfully |
| 2 | Over level |
| 3 | Under level |
| 4 | Measurement failed |
| 5 | Synchronization word not detected |
| 9 | Measurement in progress or not measured |
| 10 | Segment not measured |
| 12 | Tx measurement timeout |

The value received from MX887013A or MX887014A is 0, 2, 5, 9, 10, or 12.

## Example of Use

To query the status of sequence measurement:

```
SEQMSTAT?
>2,6,0,0,0,0,2,0
```

The results shows that six segments are measured segments and the fifth segment is over level.

## Related commands

MSTAT
SEQSEGSTAT

5

Native Command Reference

# SEQPROGRESS?

Sequence Progress

## Function

Queries the progress ratio and the executing sequence number in Sequence Measurement mode.

## Query

`SEQPROGRESS?`

## Response

`p,cur,start,end`

| | |
|---|---|
| p | Progress ratio in Sequence Measurement mode |
| Range | 0 to 100% |
| cur | Current segment number being executed |
| Range | 0 to 1999 |
| start | First segment number |
| Range | 0 to 1999 |
| stop | Last segment number |
| Range | 0 to 1999 |

## Example of Use

To query the progress ratio and the executing sequence number in Sequence Measurement mode:

```
SEQPROGRESS?
>65,23,11,30
```

## Remarks

The first and last segment numbers are the same as the start and end segment numbers specified using the SEQCTRL command.

## SEQREINIT

Sequence Control Parameter - Sequence End State Reinitialization

### Function

Enables and queries the automatic initialization of following items after sequence measurement completion

- Downlink frequency
- Output level
- Output signal pattern
- Uplink frequency
- Input level

### Command

```
SEQREINIT sw
```

### Query

```
SEQREINIT?
```

### Response

```
sw
```

### Parameter

| | |
|---|---|
| sw | Automatic initialization after sequence measurement completion |
| ON | Enables automatic initialization. |
| OFF | Disables automatic initialization. |
| Default | ON |

### Details

If the parameter is set to ON, the settings are initialized to the values configured by the following commands after sequence measurement completion.

| | |
|---|---|
| Downlink frequency | DLFREQ |
| Output level | OLVL |
| Output signal pattern | PACKAGE |
| Uplink frequency | ULFREQ |
| Input level | ILVL |

If the parameter is set to OFF, the settings remain those of the sequence measurement stop segment.

### Example of Use

To reset the target parameters:

```
SEQREINIT ON
SEQREINIT?
> ON
```

# SEQSEGSTAT?

Specified Segment Status

### Function

Queries the measurement status of the specified segment.

### Query

```
SEQSEGSTAT? seg
```

### Response

```
stat
```

| | |
|---|---|
| stat | Segment status |
| 0 | Measurement completed successfully |
| 2 | Over level |
| 3 | Under level |
| 4 | Measurement failed |
| 5 | Synchronization word not detected |
| 9 | Measurement in progress or not measured |
| 10 | Segment not measured |
| 12 | Tx measurement timeout |

The value received from MX887013A or MX887014A is 0, 2, 5, 9, 10, or 12.

### Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |

### Example of Use

To query the measurement status of segment 16:

```
SEQSEGSTAT 16
> 0
```

# SEQSGPORT

Sequence Table Parameter - SG Output Port

## Function

Sets or queries the test port to send RF signal in the specified segment of the sequence table.

## Command

```
SEQSGPORT seg,port
```

## Query

```
SEQSGPORT? seg
```

## Response

```
port
```

## Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| port | Port number |
| PORT1 | PORT 1 |
| PORT2 | PORT 2 |
| PORT3 | PORT 3 |
| PORT4 | PORT 4 |
| Default | PORT1 |

## Details

PORT3 cannot be set when PORT3 is selected for RF signal input port.

PORT4 cannot be set when PORT4 is selected for RF signal input port.

## Example of Use

To set the port number in segment 5 to 2:

```
SEQSGPORT 5,PORT2
SEQSGPORT? 5
> PORT2
```

# SEQTBL

Sequence Control Parameter - Sequence Table

### Function

Sets or queries the number of sequence table to execute.

### Command

```
SEQTBL table
```

### Query

```
SEQTBL?
```

### Response

```
table
```

### Parameter

| | |
|---|---|
| table | Sequence table number |
| Range | 0 to 3 |
| Resolution | 1 |
| Default | 0 |

### Example of Use

To select the sequence table 1:

```
SEQTBL 1
SEQTBL?
> 1
```

## SEQTRG

Sequence Table Parameter - Trigger

### Function

Sets or queries the trigger condition for starting Sequence Measurement Mode.

### Command

```
SEQTRG seg,src,slope,level,delay
```

### Query

```
SEQTRG? seg
```

### Response

```
src,slope,level,delay
```

| | |
|---|---|
| level | |
| Unit | dB |
| Resolution | 1 dB |
| delay | |
| Unit | ms |
| Resolution | 0.001 ms |

### Parameters

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| src | Trigger source |
| FRAME | Frame |
| FREERUN | Free run |
| PWR | Input signal power |
| Default | FREERUN |
| slope | Trigger slope |
| RISE | Rising edge trigger |
| Default | RISE |
| level | Trigger level |
| Range | –40 to 0 dB |
| Resolution | 1 dB |
| Suffix Code | DB (uses dB when omitted) |
| Default | –30 dB |
| delay | Delay time |
| Range | 0 to 1000.000 ms |
| Resolution | 0.001 ms |
| Suffix Code | NS, US, MS, S (uses ms when omitted) |
| Default | 0.000 ms |

### Details

The trigger slope and trigger level are enabled when trigger source is set to PWR.

### Example of Use

To set the trigger condition of segment 2 as follows:

Trigger source: PWR, Trigger slope: RISE, Trigger level: -30 dB, Delay time: 0

```
SEQTRG 2,PWR,RISE,-30,0
SEQTRG? 2
> PWR,RISE,-30,0.000
```

### Remarks

Trigger level is defined as the level difference from the input level specified by the following commands: ILVL, SEQTRX

## SEQTRX

Sequence Table Parameter - TRX Control

### Function

Sets or queries the following items in the specific segment of the sequence table.

- Downlink frequency
- Output Level
- Output signal pattern
- Uplink frequency
- Input level

### Command

```
SEQTRX seg,ul_freq,ref,dl_freq,level,pat
```

### Query

```
SEQTRX? seg
```

### Response

```
ul_freq,ref,dl_freq,level,pat
```

ul_freq, dl_freq

| | |
|---|---|
| Unit | MHz |
| Resolution | 0.000001 MHz |

ref, level

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameters

| | | |
|---|---|---|
| seg | | Segment number |
| | Range | 0 to 1999 |
| | Resolution | 1 |
| ul_freq | | Uplink frequency |
| | Range | 400.000000 to 3800.000000 MHz<br>400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| | Resolution | 0.000001 MHz |
| | Suffix Code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted) |
| | Default | 1950.000000 MHz |
| ref | | Input level |
| | Range | –65.0 to +35 dBm (Port1/Port2)<br>–65.0 to +25 dBm (Port3/Port4) |
| | Resolution | 0.1 dB |
| | Suffix Code | DBM (uses dBm when omitted) |
| | Default | –10.0 dBm |
| dl_freq | | Downlink frequency |
| | Range | 400.000000 to 3800.000000 MHz<br>400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| | Resolution | 0.000001 MHz |

| | | |
|---|---|---|
| | Suffix Code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted) |
| | Default | 2140.000000 MHz |
| level | | Output level |
| | Range | –130.0 to –10.0 dBm (Port 1/Port 2) |
| | | –120.0 to 0.0 dBm (Port 3/Port 4) |
| | Resolution | 0.1 dB |
| | Suffix Code | DBM (used dBm when omitted) |
| | Default | –60.0 dBm |
| pat | | Waveform pattern |
| | PAT1 to PATn | Pattern number (n: waveform information file group range) |
| | CW | Modulation turned OFF |
| | OFF | Output level turned OFF |
| | NC | Waveform pattern not configured in this segment (holds currently configured waveform pattern) |
| | Default | CW |

Details

The setting range varies with the input/output port setting.
If Cable Loss Correction is ON, the cable loss is added to the range of the input level and subtracted from the range of output level.
If the cable loss is 5 dB, the input and output levels are as follows:

| | |
|---|---|
| Input level | –60.0 to +40 dBm |
| Output level | –135.0 to –15.0 dBm |

In this case, if the output level is set to –10.0 dBm, an out-of-parameter setting range error occurs. (The response to SYSERR? returns 220, Parameter error).
Whether an out-of-parameter setting range error has occurred is determined during execution of the following commands:
SEQCTRL, SNGLS, SEQEXECTX
A measurement execution error occurs when an out-of-range error occurs.
SEQERR? is used to query the details of errors.
The pattern number is the same as the group number. Refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

Example of Use

To set segment 0 as follows.
Uplink frequency set to 1950.0 MHz, input level to –10.0 dBm, downlink frequency to 2140.0 MHz, output level to –60.0 dBm, and no modulation:

```
SEQTRX 0,1950.000000, -10.0,2140.000000,-60.0,CW
SEQTRX? 0
> 1950.000000,-10.0,2140.000000,-60.0,CW
```

Remarks

The group range is the selected waveform file.
For details of the waveform pattern, refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

## SEQTX

Sequence Table Parameter - Uplink Frequency, Input Level

### Function

Sets or queries uplink frequency and input level of segments in sequence table.

### Command

```
SEQTX seg,ul_freq,ref
```

### Query

```
SEQTX? seg
```

### Response

```
ul_freq,ref
```

ul_freq

| | |
|---|---|
| Unit | MHz |
| Resolution | 0.000001 MHz |

ref

| | |
|---|---|
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameter

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| ul_freq | Rx frequency (uplink) |
| Range | 400.000000 to 3800.000000 MHz<br>400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 0.000001 MHz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted) |
| Default | 1950.000000 MHz |
| ref | Input level |
| Range | –65.0 to +35 dBm (Port1/Port2)<br>–65.0 to +25 dBm (Port3/Port4) |
| Resolution | 0.1 dB |
| Suffix code | DBM (uses dBm when omitted) |
| Default | –10.0 dBm |

### Details

This command sets only the uplink frequency and input level among the parameters that are set by SEQTRX.
The setting range varies with the input port setting.
When the Cable Loss Calibration is ON, the cable loss is added to the input level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –60.0 to +40.0 dBm.
Whether an out-of-parameter setting range error has occurred is determined during execution of the following commands:

SEQCTRL, SNGLS, SEQEXECTX

### Example of Use

To set the parameters for segment 1 as follows:
Uplink frequency: 1950 MHz, Input level: -10.0 dBm

```
SEQTX 1,1950,-10.0
SEQTX? 1
> 1950.000000,-10.0
```

## SEQTX_SCC1

Sequence Table Parameter - Uplink Frequency, Input Level for SCC-1

### Function

Sets and queries the uplink signal frequency and input level for SCC-1 in the segment of the sequence table.

### Command

```
SEQTX_SCC1 seg,ul_freq,ref
```

### Query

```
SEQTX_SCC1? seg
```

### Response

```
ul_freq,ref
```

| | |
|---|---|
| ul_freq | |
| Unit | MHz |
| Resolution | 0.000001 MHz |
| ref | |
| Unit | dBm |
| Resolution | 0.1 dB |

### Parameter

| | |
|---|---|
| seg | Segment number |
| Range | 0 to 1999 |
| Resolution | 1 |
| ul_freq | Rx frequency (uplink) for SCC-1 |
| Range | 400.000000 to 3800.000000 MHz<br>400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 0.000001 MHz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted) |
| Default | 1950.000000 MHz |
| ref | Input level |
| Range | –65.0 to +35 dBm (Port1/Port2)<br>–65.0 to +25 dBm (Port3/Port4) |
| Resolution | 0.1 dB |
| Suffix code | DBM (uses dBm when omitted) |

Default –10.0 dBm

Details

The setting range varies with the input port setting.
When the Cable Loss Calibration is ON, the cable loss is added to the input level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –60.0 to +40.0 dBm.
Whether an out-of-parameter setting range error has occurred is determined during execution of the following commands:
SEQCTRL, SNGLS, SEQEXECTX

Example of Use

To set the parameters for SCC-1 for segment 1 as follows:
Uplink frequency: 1950 MHz, Input level: -10.0 dBm

```
SEQTX_SCC1 1,1950,-10.0
SEQTX_SCC1? 1
> 1950.000000,-10.0
```

## TRGTOUT

Trigger Timeout

Function

Sets or queries the trigger timeout.

Command

```
TRGTOUT time
```

Query

```
TRGTOUT?
```

Response

`time`

| | |
|---|---|
| Unit | s |
| Resolution | 1 s |

Parameter

| | |
|---|---|
| time | Timeout time |
| Range | 1 to 60 s |
| Resolution | 1 s |
| Suffix code | NS, US, MS, S (uses s when omitted) |
| Initial Value | 10 s |

Example of Use

To set the Trigger timeout time to 10 seconds:

```
TRGTOUT 10
TRGTOUT?
> 10
```

## TXFREQ

Uplink Frequency

### Function

Sets or queries the Rx frequency (uplink frequency) of MU887000A.

### Command

```
TXFREQ ul_freq
```

### Query

```
TXFREQ?
```

### Response

`ul_freq`

| | |
|---|---|
| Unit | Hz |
| Resolution | 1 Hz |

### Parameter

| | |
|---|---|
| ul_freq | Uplink frequency |
| Range | 400.000000 to 3800.000000 MHz |
| | 400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 1 Hz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted) |
| Default | 1950.000000 MHz |

### Details

This setting corresponds to the UE Tx frequency setting.
Updating this Uplink frequency does not affect the Uplink Channel parameters.

### Example of Use

To set the uplink frequency to 1950 MHz:

```
TXFREQ 1950MHZ
TXFREQ?
>1950000000
```

# ULFREQ

Uplink Frequency

### Function

Sets or queries the uplink (Rx) frequency of MU887000A.

### Command

```
ULFREQ ul_freq
```

### Query

```
ULFREQ?
```

### Response

```
ul_fleq
```

| | |
|---|---|
| Unit | Hz |
| Resolution | 1 Hz |

### Parameter

| | |
|---|---|
| ul_freq | Uplink Frequency |
| Range | 400.000000 to 3800.000000 MHz<br>400.000000 to 6000.000000 MHz (with MU887000A-001/101) |
| Resolution | 1 Hz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted) |
| Default | 1950.000000 MHz |

### Details

This setting corresponds to the UE Tx frequency.
Changing the uplink frequency setting does not change the uplink channel setting.

### Example of Use

To set the uplink frequency to 1950 MHz:

```
ULFREQ 1950MHZ
ULFREQ?
>1950000000
```

# Chapter 6 Performance Test

This chapter explains how to setup the measuring instruments required for the MX887013A LTE FDD and MX887014A LTE TDD performance tests as well as the test procedures.

# 6.1 Outline

The performance tests are performed to assure that the MU887000A performance does not deteriorate. Test the performance of the MU887000A at the initial acceptance inspection, at periodic inspections, and after repairs. Test important items periodically to assure the performance. This chapter explains the following test items.

- Output EVM
- Tx Power measurement accuracy (CW)
- Tx Power measurement linearity
- Frequency/modulation measurement Carrier frequency accuracy
  Residual EVM
- In-Band Emission measurement
- Adjacent Channel Leakage Power Ratio measurement (ACLR)

We recommend testing the performance periodically once or twice a year. If the test results do not meet the specifications, contact an Anritsu Service and Sales office. Contact information can be found on the last page of the printed version of this manual, and is available in a separate file on the PDF version.

## ⚠ CAUTION

**Warm-up the MU887000A and the required measuring instruments for at least 30 minutes (except when specified otherwise) to stabilize them. To achieve the highest accuracy, the test should be performed at room temperature using a power supply with as little voltage fluctuation as possible in an environment free from noise, vibration, dust and humidity.**

# 6.2 Instruments for Testing Performance

The following table lists the measuring instruments required for testing the MU887000A performance and the specifications for each instrument.

**Table 6.2-1 Measuring Instruments for Performance Tests**

| Test Item | Required Specifications* | Recommendation |
|---|---|---|
| Output EVM | Signal Analyzer<br>• Frequency Range: 400 to 3800 MHz<br>With MU887000A-001/101:<br>3800 to 6000 MHz<br>• Frequency Resolution: 1 Hz<br>• Level Range: –140 to +20 dBm<br>• Level Accuracy: ±0.05 dB<br>• External Reference Input:<br>(10 MHz) | Signal Analyzer<br>(MS2690A or MS2830A)<br>LTE FDD Measurement Software (MX269020A)<br>LTE TDD Measurement Software (MX269022A) |
| Tx Power Measurements<br>• Measurement Accuracy (CW)<br>• Linearity | Signal Generator<br>• Frequency Range: 600 to 3800 MHz<br>With MU887000A-001/101:<br>3800 to 4200 MHz<br>• Frequency Resolution: 1 Hz<br>• Output Level Range<br>Unmodulated: –143 to +13 dBm<br>Resolution: 0.01 dB | Vector Signal Generator<br>(MG3700A)<br>Mechanical Attenuator<br>(MG3700A-002)<br>High Frequency<br>6 GHz (MG3700A-011) |
| | Signal Analyzer<br>Same as above | Signal Analyzer<br>(MS2690A or MS2830A) |
| | Power Meter<br>• Frequency Range: 600 to 3800 MHz<br>With MU887000A-001/101:<br>3800 to 4200 MHz<br>• Level Accuracy: ±0.02 dB<br>• Level Resolution: 0.01 dB | Power Meter (ML2437A) |
| | Power Sensor<br>• Frequency Range: 600 to 3800 MHz<br>With MU887000A-001/101:<br>3800 to 4200 MHz<br>• Level Range: –40 to +20 dBm<br>• Input Connector: N type | Power Sensor (MA2442D) |

*: The performance covers the test item measurement range.

**Table 6.2-1 Measuring Instruments for Performance Tests (Cont'd)**

| Test Item | Required Specifications* | Recommendation |
|---|---|---|
| Frequency/Modulation Measurements<br>● Carrier Frequency Accuracy<br>● Residual EVM<br>Adjacent Channel Leakage Power Ratio<br>In-Band Emissions | Signal generator supporting output of 3GPP LTE modulation signals<br>Same as above | Same as above |
| | Power Meter<br>Same as above | Same as above |
| | Power Sensor<br>● Frequency Range: 600 to 3800 MHz<br>With MU887000A-001/101: 3800 to 4200 MHz<br>● Level Range: –30 to +20 dBm<br>● Input Connector: N type | Power Sensor (MA24002A) |
| Common | 3-dB Attenuator | 3-dB Attenuator (AT-103) |

# 6.3 Calibration (MX887013A/14A)

This section explains how to obtain the calibration values of the instrument used for the performance tests.

## 6.3.1 SG Calibration (CW)

This section explains how to obtain the calibration values of the CW (unmodulated) signal source.

(1) Measuring instruments

- Vector signal generator: MG3700A
- Power Meter: ML2437A
- Power Sensor: MA2442D
- 3-dB Attenuator: AT-103 (2 sets)

(2) Setup

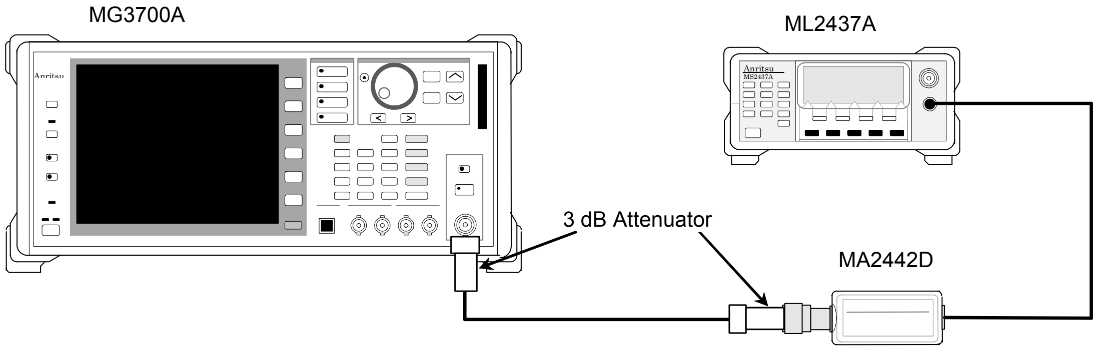


**Figure 6.3.1-1 SG Calibration (CW)**

(3) Test Procedure

1. Setup the instruments as shown in Figure 6.3.1-1.
2. Set the vector signal generator (SG) as follows:

   Modulation: OFF

   Output frequency: 599.99 MHz (600 MHz –10 kHz)

   Output level: 6 dBm (0 dBm + 6 dB)
3. Adjust the SG output level so that the level measurement value of the power meter is 0 dBm, and obtain the calibration values for the setting frequency and setting level.
4. Set frequencies in accordance with the table in 6.3.4, “Measurement Frequencies”, and obtain the calibration values of each frequency.
5. Replace 0 dBm with –10 dBm and –20 dBm at step 2, repeat steps 2 to 4 respectively, and obtain the calibration values.

## 6.3.2 SG Calibration (MOD)

This section explains how to obtain the calibration values of the modulation wave signal source.

(1) Measuring instruments

- Vector signal generator: MG3700A
- Power Meter: ML2437A
- Power sensor: MA24002A
- 3-dB Attenuator: AT-103 (2 sets)

(2) Setup

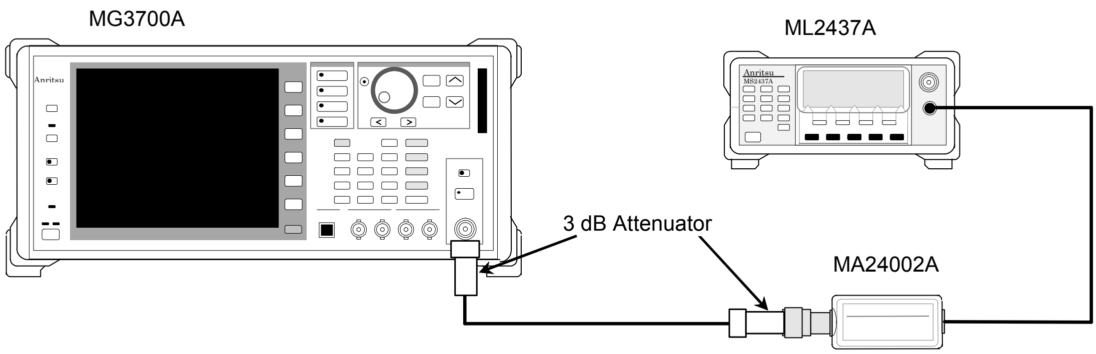


**Figure 6.3.2-1 SG Calibration (MOD)**

(3) Test procedure

1. Setup the instruments as shown in Figure 6.3.2-1.
2. Set the vector signal generator (SG) as follows:

   Modulation: ON

   Modulation wave: Waveform pattern based on the settings in 6.3.5, “Evaluation Signals”

   Output frequency: 599.99 MHz (600 MHz –10 kHz)

   Output level: –4 dBm (–10 dBm + 6 dB)
3. Adjust the SG output level so that the level measurement value of the power meter is –10 dBm, and obtain the calibration values for the setting frequency and setting level.
4. Set frequencies in accordance with the table in 6.3.4, “Measurement Frequencies”, and obtain the calibration values of each frequency.

### 6.3.3 Linearity Calibration

This section explains how to obtain the calibration values for linearity.

(1) Measuring instruments

- Vector signal generator: MG3700A
- Signal Analyzer: MS269XA or MS2830A
- 3-dB Attenuator: AT-103 (2 sets)

(2) Setup

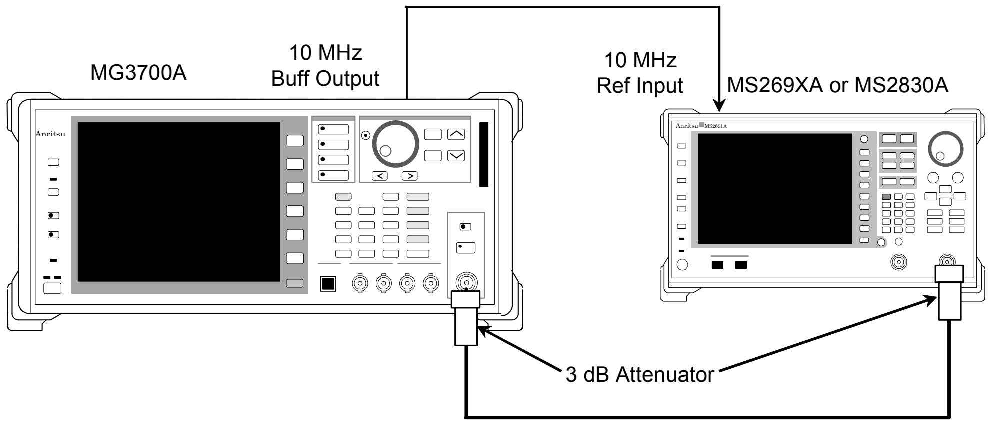


**Figure 6.3.3-1 Linearity Calibration**

(3) Test procedure

1. Setup the instruments as shown in Figure 6.3.3-1.
2. Set the signal analyzer (SA) as shown in #1 of Table 6.3.3-1 "Signal Analyzer Settings".
3. Set the vector signal generator (SG) as follows:

   Modulation: OFF

   Output frequency: 599.99 MHz (600 MHz –10 kHz)

   Output level: Setting level when the level measurement value of the power meter is 0 dBm in the SG calibration (Section 6.3.1)
4. Connect the output of the SG to the SA and measure the SG output level with the SA (A dBm).
5. Decrease the SG output level in 10-dB steps down to 40 dB and measure the level at each step (B dBm). (The calibration value is B – A.)
6. Set frequencies in accordance with the table in 6.3.4, "Measurement Frequencies", and obtain the calibration values of each frequency.

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7. Set the SA as shown in #2 of Table 6.3.3-1 “Signal Analyzer Settings”.

8. Replace 0 dBm with –20 dBm at step 3, and repeat steps 3 to 6.

**Table 6.3.3-1 Signal Analyzer Settings**

| | MS269XA or MS2830A | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Application Switch** | **RBW** | **Zone Width** | **Time Length** | **ATT** | **Preamp** | **Ref Lev** |
| #1 | Signal Analyzer | 100 Hz | 781.3 Hz | AUTO | 20 dB | OFF | 0 dBm |
| #2 | Signal Analyzer | 100 Hz | 781.3 Hz | AUTO | 0 dB | OFF | –20 dBm |

## 6.3.4 Measurement Frequencies

Table 6.3.4-1 lists the frequencies set in the performance tests for the calibration and calibrated test system. The 4000 MHz and more frequency is measured only when MU887000A-001/101 is installed.

**Table 6.3.4-1 Measurement Point and Frequency**

| Meas. Point | Frequency (MHz) | Meas. Point | Frequency (MHz) |
|---|---|---|---|
| 1 | 600 | 8 | 2200 |
| 2 | 700 | 9 | 2700 |
| 3 | 880 | 10 | 3400 |
| 4 | 940 | 11 | 3600 |
| 5 | 1000 | 12 | 3800 |
| 6 | 1800 | 13 | 4000 |
| 7 | 2000 | 14 | 4200 |

***Note:***

Add an offset of –10 kHz to the frequency in the above table and set the frequency as SG output frequency, except for the measurement described in section 6.4.4, 6.4.5 and 6.4.6.

## 6.3.5 Evaluation Signals

This section explains the modulation wave signal used for the performance test. Set the vector signal generator based on the following contents when performing the performance test.

Use the MG3700A vector signal generator where the MG3700A-002 Mechanical Attenuator option is installed to perform the test. When MU887000A-001/101 is installed, the option for MG3700A-011 upper limit frequency 6 GHz is required.

Summary of the evaluation signal

The following tables listed in 3GPP TS 36.521-1 are referenced.

FDD:

A.2.2 Reference measurement channels for FDD

Table A.2.2.1.1-1: Reference Channels for QPSK with full RB allocation

Channel bandwidth: 20 MHz

Table A.2.2.2.1-1: Reference Channels for QPSK with partial RB allocation

Channel bandwidth: 20 MHz

Allocated RBs: 18

TDD:

A.2.3 Reference measurement channels for TDD

Table A.2.3.1.1-1: Reference Channels for QPSK with full RB allocation

Channel bandwidth: 20 MHz

Table A.2.3.2.1-1: Reference Channels for QPSK with partial RB allocation

Channel bandwidth: 20 MHz

Allocated RBs: 18

To send the evaluation signal with the SG, generate the following waveform pattern with LTE IQproducer™ MX370108A.

**Table 6.3.5-1 LTE IQproducer Parameter (FDD)**

| Parameter | Setting Values |
|---|---|
| Cell ID | 0 |
| Bandwidth | 20 MHz |
| DL/UL | Uplink |
| Cyclic Prefix | Normal |
| Roll Off Length | 70 (ACLR)<br>4 (Others) |
| Filter Type | Ideal (ACLR)<br>None (Others) |
| Data Transmission / Random Access | Data Transmission |
| Subframe #0 to 9 | – |
| Number of PUCCHs | 0 |
| Number of PUSCHs | 1 |
| PUSCH #0 Data Status | Enable |
| PUSCH #0 Modulation Scheme | QPSK |
| PUSCH #0 Data Type | PN9 |
| PUSCH #0 Start Number of RB | 0 |
| PUSCH #0 Number of RBs | 18 (In-Band Emission)<br>100 (Others) |
| PUSCH #0 Power Boosting | 0 dB |
| Demodulation RS for PUSCH | – |
| Data Type | Base Sequence |
| Group Hopping | Enable |
| Delta SS | 0 |
| Base Sequence Number v | 0 |
| Cyclic Shift for 1st | In the order of number starting from Subframe #0;<br>4,2,10,9,0,2,2,4,8,2 |
| Cyclic Shift for 2nd | In the order of number starting from Subframe #0;<br>10,0,2,8,2,2,2,10,2,2 |

**Table 6.3.5-2 LTE IQproducer Parameter (TDD)**

| Parameter | Setting Values |
|---|---|
| Cell ID | 0 |
| Bandwidth | 20 MHz |
| DL/UL | Uplink |
| Uplink-downlink Configuration | 1 |
| Cyclic Prefix | Normal |
| Roll Off Length | 70 (ACLR)<br>0 (Others) |
| Filter Type | Ideal (ACLR)<br>None (Others) |
| Subframe #1, #6 | – |
| Number of PUCCHs | 0 |
| Number of PUSCHs | 0 |
| Subframe #2, #3, #7, #8 | – |
| Number of PUCCHs | 0 |
| Number of PUSCHs | 1 |
| PUSCH #0 Data Status | Enable |
| PUSCH #0 Modulation Scheme | QPSK |
| PUSCH #0 Data Type | PN9 |
| PUSCH #0 Start Number of RB | 0 |
| PUSCH #0 Number of RBs | 18 (In-Band Emission)<br>100 (Others) |
| PUSCH #0 Power Boosting | 0 dB |
| Demodulation RS for PUSCH | – |
| Group Hopping | Enable |
| Delta SS | 0 |
| Base Sequence Number v | 0 |
| Cyclic Shift for 1st | In order of Subframe #2, #3, #7, and #8<br>10,9,4,8 |
| Cyclic Shift for 2nd | In order of Subframe #2, #3, #7, and #8<br>2,8,10,2 |

# 6.4 Performance Tests (MX887013A/14A)

### Common test items

The following list shows the common settings for each measurement at the MU887000A.

| | |
|---|---|
| Application: | Cellular |
| Standard: | LTE |
| Frame Structure: | FDD (MX887013A) |
| | TDD (MX887014A) |
| Channel Coding: | RMC |
| Channel Bandwidth: | 20 MHz |
| RMC Configuration: | PUSCH |
| Uplink RMC Modulation: | QPSK |
| Uplink RMC RB Number: | 100 |
| Uplink RMC Start RB: | 0 |
| OBW Ratio: | 99.0% |
| Long Span Code Search: | ON |

## 6.4.1 Measuring Output EVM

This test measures the output signal EVM.

(1) Test specifications

The specifications to be tested are explained in the Waveform File for Cellular Application Operation Manual

| EVM | Remarks |
|---|---|
| 2%rms | 400 to 2700 MHz |
| 3%rms | 3400 to 3800 MHz |
| 4%rms | 3800 to 6000 MHz (with MU887000A-001/101) |

(2) Measuring instruments

- Signal analyzer: MS269XA or MS2830A

(3) Setup

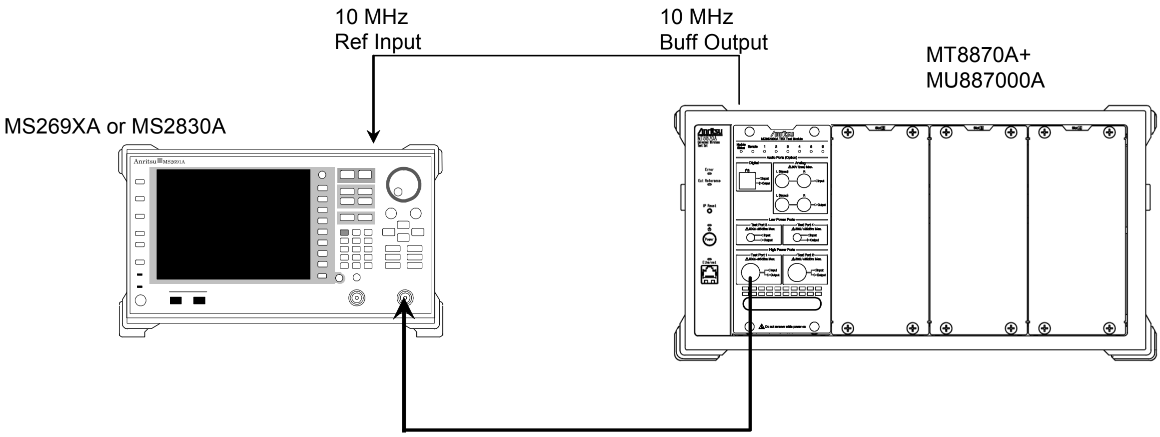


**Figure 6.4.1-1 Test System for Output EVM**

(4) Test procedure

1. Setup the instruments as shown in Figure 6.4.1-1.
2. Select the signal analyzer (SA) measurement software and set the following:

   | | |
   |---|---|
   | Measurement software: | MX269020A (LTE FDD)<br>MX269022A (LTE TDD) |
   | Input level: | –15 dBm |
   | Level offset: | 0 dB |
   | Trigger: | Free run |

3. Select the MU887000A application software.
4. Set the MU887000A input and output levels.

   Test Port1

   | | |
   |---|---|
   | Output level: | –12.9 dBm |
   | Input level: | +35 dBm |
   | Uplink frequency: | 10 MHz |

   Test Port3

   | | |
   |---|---|
   | Output level: | –2.9 dBm |
   | Input level: | +25 dBm |
   | Uplink frequency: | 10 MHz |

5. Set the MU887000A frequency to 400 MHz and output the test pattern.

   | | |
   |---|---|
   | Download Package Select: | MV887013A_LTEFDD_0003<br>MV887014A_LTETDD_0005 |
   | Downlink Pattern Name: | Group No.1 |
   | Connect Port: | Test Port1 or Test Port3 |
   | Output level ON/OFF: | ON |
   | Downlink frequency: | 400 MHz |

6. Set the same SA frequency as the frequency set at step 5, and measure EVM.
7. Change the MU887000A frequency to 900, 2000, 2700, 3400, and 3800 MHz, and repeat steps 5 to 6 respectively. When MU887000A-001/101 is installed, also repeat the steps for the frequencies 4000, 4500, 5000, 5500, and 6000 MHz.
8. Change the Test Port, and repeat steps 4 to 7 respectively.

## 6.4.2 Tx Power Measurement Accuracy (CW)

This test is related to the accuracy of Tx power measurements.

(1) Test specifications

Test Port1/2
(600 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 3800 MHz)

| Measurement Accuracy | Input Level | Temperature |
|---|---|---|
| ±0.5 dB | –20 dBm ≤, ≤+35 dBm | 10 to 40°C |
| ±0.7 dB | –50 dBm ≤, <–20 dBm | 10 to 40°C |
| ±0.9 dB | –60 dBm ≤, <–50 dBm | 10 to 40°C |

Test Port1/2 (3800 MHz < Frequency ≤ 4200 MHz)

| Measurement Accuracy | Input Level | Temperature |
|---|---|---|
| ±0.7 dB | –20 dBm ≤, ≤+35 dBm | 20 to 30°C |
| ±0.9 dB | –50 dBm ≤, <–20 dBm | 20 to 30°C |
| ±1.1 dB | –60 dBm ≤, <–50 dBm | 20 to 30°C |

Test Port3/4
(600 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 3800 MHz)

| Measurement Accuracy | Input Level | Temperature |
|---|---|---|
| ±0.7 dB | –20 dBm ≤, ≤+25 dBm | 10 to 40°C |
| ±0.9 dB | –50 dBm ≤, <–20 dBm | 10 to 40°C |
| ±1.1 dB | –60 dBm ≤, <–50 dBm | 10 to 40°C |

Test Port3/4 (3800 MHz < Frequency ≤ 4200 MHz)

| Measurement Accuracy | Input Level | Temperature |
|---|---|---|
| ±0.7 dB | –20 dBm ≤, ≤+25 dBm | 20 to 30°C |
| ±0.9 dB | –50 dBm ≤, <–20 dBm | 20 to 30°C |
| ±1.1 dB | –60 dBm ≤, <–50 dBm | 20 to 30°C |

(2) Measuring instruments

- Vector signal generator: MG3700A
- 3-dB Attenuator: AT-103 (2 sets)

(3) Setup

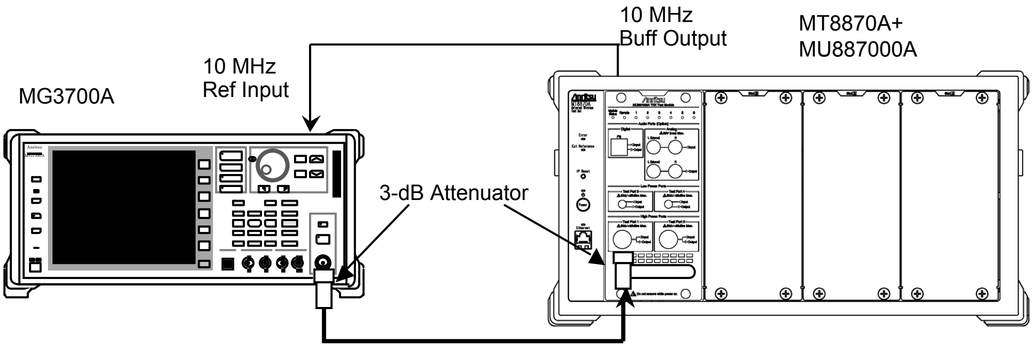


**Figure 6.4.2-1 Setup for Measuring Amplitude Measurement Accuracy**

(4) Test procedure

1. Setup the instruments as shown in Figure 6.4.2-1.
2. Set the MU887000A as follows:

   | | |
   |---|---|
   | Connect port: | Test Port1 |
   | Output level ON/OFF: | OFF |
   | Input level: | –10 dBm |
   | Uplink frequency: | 600 MHz |
   | Turn Off All measurement: | OFF |
   | Tx Power measurement: | ON, 1 time |

3. Set the Vector signal generator (SG) as follows:

   | | |
   |---|---|
   | Modulation: | OFF |
   | Output frequency: | 599.99 MHz |
   | Output level: | –10 dBm (This output level reflects the calibration value for item 6.3.1.) |

4. Change the frequency of the MU887000A and SG according to Table 6.3.4 "Measurement Frequencies" and measure the Tx power.

   Tx Power Measurement Results: Average value

5. Change the SG output level and MU887000A input level each to –50, and –60 dBm and repeat steps 2 to 4 over and measure the Tx power. (This output level reflects the calibration value for item 6.3.3.)
6. Change the Connect port setting for the connection with the MU887000A to Test Port2/3/4 successively, and repeat steps 2 to 5 over.

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## 6.4.3 Tx Power Measurement Linearity

This test is related to the linearity of Tx power measurements.

(1) Test specifications

(600 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 4200 MHz)

| Linearity | Input Level, Range |
|---|---|
| ±0.2 dB | –50 dBm ≤, –40 to 0 dB |
| ±0.4 dB | –60 dBm ≤, –40 to 0 dB |

(2) Measuring instruments

- Vector signal generator: MG3700A
- 3-dB Attenuator: AT-103 (2 sets)

(3) Setup

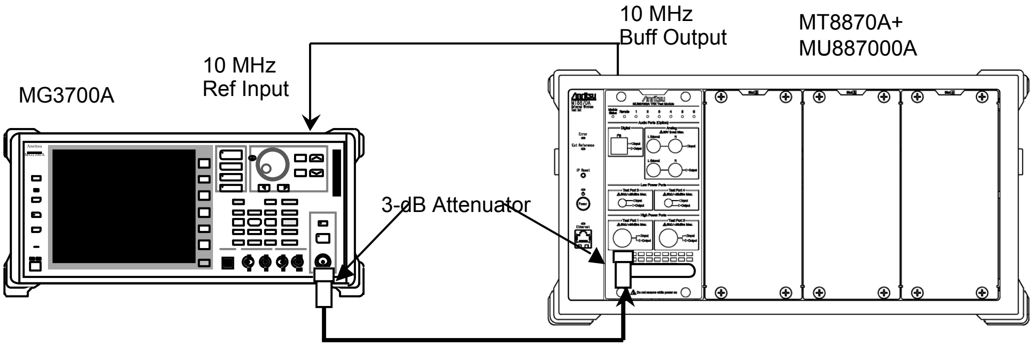


**Figure 6.4.3-1 Setup for Measuring Tx Power Measurement Linearity**

(4) Test procedure

1. Setup the instruments as shown in Figure 6.4.3-1.
2. Set the MU887000A as follows:

   | | |
   |---|---|
   | Connect port: | Test Port1 |
   | Output level ON/OFF: | OFF |
   | Input level: | 0 dBm |
   | Uplink frequency: | 600 MHz |
   | Turn Off All measurement: | OFF |
   | Tx Power measurement: | ON, 1 time |

3. Set the Vector signal generator (SG) as follows:

   | | |
   |---|---|
   | Modulation: | OFF |
   | Output frequency: | 599.99 MHz |
   | Output level: | 0 dBm (This output level reflects the calibration value for item 6.3.1.) |

4. Measure the Tx Power and make this value the reference level (REF dBm).

   Tx Power Measurement Results: Average value
5. Set the SG output level to –10 dB and measure the Tx power, making this value D dBm.
6. Calculate the difference between REF dBm and D dBm using the following equation.

   Linearity error = D – REF – (calibration value of section 6.3.3)
7. Similarly, change the SG output level successively from –20 dB to –40 dB in –10 dB steps and measure the Tx power. Calculate the linearity as described in step 6 and check that the results meet the specifications.
8. Change the MU887000A and SG frequencies according to Table 6.3.4 “Measurement Frequencies” and repeat steps 2 to 7 over.
9. Change the SG output level and the MU887000A input level to –20 dBm and repeat steps 2 to 8 over to measure the Tx Power. (This output level reflects the calibration value for item 6.3.1.)
10. Change the Connect port setting for the connection with the MU887000A to Test Port2/3/4 successively, and repeat steps 2 to 9 over.

## 6.4.4 Frequency/Modulation

This test is related to the following modulation analyses.

- Carrier frequency accuracy
- Residual EVM

(1) Test specifications

| | Measurement Accuracy |
|---|---|
| Carrier frequency accuracy | ±(Set frequency × Reference oscillator accuracy + 15 Hz) |
| Residual EVM | ≤ 2.5% (rms) |

Test Port1/2 Input Level range: –40 dBm ≤, ≤ +35 dBm
Test Port3/4 Input Level range: –40 dBm ≤, ≤ +25 dBm

(2) Measuring instruments

- Vector signal generator: MG3700A
- 3-dB Attenuator: AT-103 (2 sets)

(3) Setup

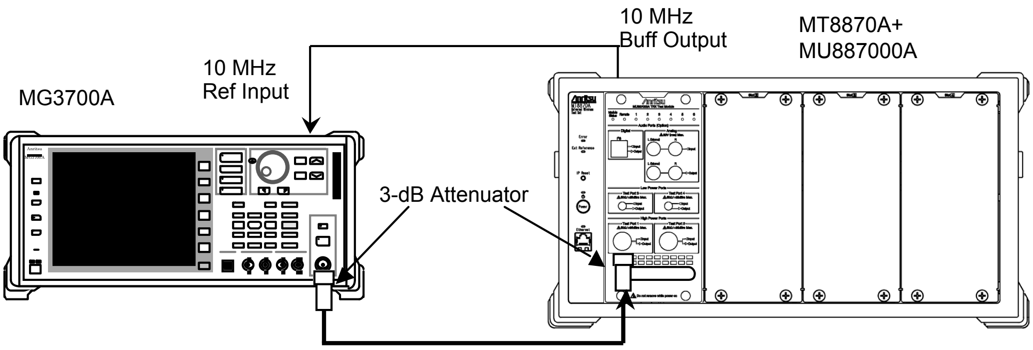


**Figure 6.4.4-1 Setup for Measuring Frequency/Modulation**

(4) Test procedure

1 Setup the instruments as shown in Figure 6.4.4-1.

2. Set the MU887000A as follows:

| | |
|---|---|
| Connect port: | Test Port1 |
| Output level ON/OFF: | OFF |
| Input level: | –10 dBm |
| Uplink frequency: | 600 MHz |
| Turn Off All measurement: | OFF |
| Modulation Analysis measurement: | ON, 20 times |

3. Set the Vector signal generator (SG) as follows:

| | |
|---|---|
| Modulation: | ON |
| Modulation wave: | Waveform pattern based on the settings in 6.3.5, “Evaluation Signals” |
| Output frequency: | 600 MHz |
| Output level: | –10 dBm (This output level reflects the calibration value for item 6.3.2.) |

4. Measure the frequency error and EVM.

| | |
|---|---|
| Carrier Frequency Error Result: | Average value |
| EVM Result: | Average value |

5. Change the MU887000A and SG frequencies according to 6.3.4 “Measurement Frequencies” and repeat steps 2 to 4 over.

6. Change the SG output level and the MU887000A input level to –40 dBm and measure by repeating steps 2 to 5 over. (This output level reflects the calibration value for item 6.3.2.)

7. Change the Connect port setting for the connection with the MU887000A to Test Port2/3/4 successively, and repeat steps 2 to 6 over.

## 6.4.5 In-band Emissions

This test is related to in-band emissions.

(1) Test specifications

(600 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 4200 MHz)

| | |
|---|---|
| In-Band Emissions | ≤–40 dBc |

Input level: ≥–10 dBm

Allocated RB ≤18

(2) Measuring instruments

- Vector signal generator: MG3700A
- 3-dB Attenuator: AT-103 (2 sets)

(3) Setup

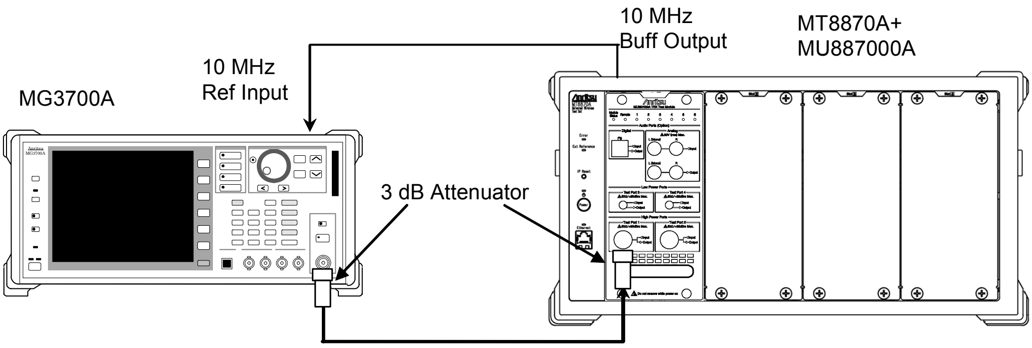


**Figure 6.4.5-1 In-Band Emissions Measurement Setup**

(4) Test procedure

1. Setup the instruments as shown in Figure 6.4.5-1.
2. Set the MU887000A as follows:

| | |
|---|---|
| Connect port: | Test Port1 |
| Output level ON/OFF: | OFF |
| Input level: | –10 dBm |
| Uplink frequency: | 600 MHz |
| UL RMC RB number: | 18 |
| Turn Off All measurement: | OFF |
| Modulation Analysis measurement: | ON, 20 times |

3. Set the Vector signal generator (SG) as follows:

| | |
|---|---|
| Modulation: | ON |
| Modulation wave: | Waveform pattern based on the settings in 6.3.5, “Evaluation Signals” |
| Output frequency: | 600 MHz |
| Output level: | –10 dBm (This output level reflects the calibration value for item 6.3.2.) |

4. Measure the in-band emissions and read the following value:

   In-band emissions (General) Result: Max value

5. Change the MU887000A and SG frequencies according to 6.3.4 “Measurement Frequencies” and repeat steps 2 to 4 over.
6. Change the Connect port setting for the connection with the MU887000A to Test Port2/3/4 successively, and repeat steps 2 to 5 over.

## 6.4.6 Adjacent Channel Leakage Power Ratio (ACLR)

This test is related to Adjacent Channel Leakage Power Ratio measurements.

(1) Test specifications

(600 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 4200 MHz)

| Adjacent Channel Leakage Power Ratio | Measurement Point |
|---|---|
| ≥45 dB | E-UTRA ALCR1 |
| ≥50 dB | UTRA ALCR1 |
| ≥55 dB | UTRA ALCR2 |

Test Port1/2 Input Level range: –10 dBm ≤, ≤+35 dBm

Test Port3/4 Input Level range: –10 dBm ≤, ≤+25 dBm

(2) Measuring instruments

- Vector signal Generator: MG3700A
- 3 dB Attenuator: AT-103 (2 sets)

(3) Setup

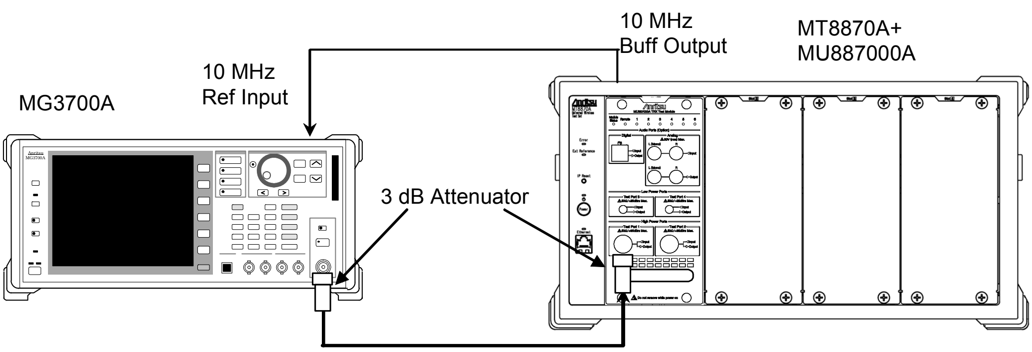


**Figure 6.4.6-1 Setup for Measuring Adjacent Channel Leakage Power Ratio**

(4) Test procedure

1. Setup the instruments as shown in Figure 6.4.6-1.
2. Set the MU887000A as follows:

   | | |
   |---|---|
   | Connect port: | Test Port1 |
   | Output level ON/OFF: | OFF |
   | Input level: | –10 dBm |
   | Uplink frequency: | 600 MHz |
   | Turn Off All measurement: | OFF |
   | ACLR measurement: | ON, 20 times |

3. Set the Vector signal generator (SG) as follows:

   | | |
   |---|---|
   | Modulation: | ON |
   | Modulation wave: | Waveform pattern based on the settings in 6.3.5, “Evaluation Signals” |
   | Output frequency: | 600 MHz |
   | Output level: | –10 dBm (This output level reflects the calibration value for item 6.3.2.) |

4. Measure the Adjacent Channel Leakage Power and read the following value:

   ACLR Result: Max value

5. Change the MU887000A and SG frequencies according to 6.3.4 “Measurement Frequencies” and repeat steps 2 to 4 over.
6. Change the Connect port setting for the connection with the MU887000A to Test Port2/3/4 successively, and repeat steps 2 to 5 over.

## 6.4.7 Sample Format for Test Result Sheets

Use the following test result sheets when testing the MX887013A or MX887014A performance. Duplicate these sheets as necessary for tests.

| | | | |
|---|---|---|---|
| Test location | | Report No. | |
| | | Date | |
| | | Person-in-charge | |

Model:

| | | | |
|---|---|---|---|
| Serial No. | | Ambient temperature | °C |
| Power source frequency | Hz | Relative humidity | % |

Remarks

SG Calibration (CW)

**SG Calibration Value (CW)**

MG3700A Unmodulated Wave

| Frequency (MHz) | SG Setting (dBm) | | |
|---|---|---|---|
| | 0 dBm | –10 dBm | –20 dBm |
| 600 | | | |
| 700 | | | |
| 880 | | | |
| 940 | | | |
| 1000 | | | |
| 1800 | | | |
| 2000 | | | |
| 2200 | | | |
| 2700 | | | |
| 3400 | | | |
| 3600 | | | |
| 3800 | | | |
| 4000 | | | |
| 4200 | | | |

SG Calibration (MOD)

**SG Calibration Value (MOD)**

MG3700A Modulation Wave

| Frequency (MHz) | SG Setting (dBm) |
|---|---|
| | –10 dBm |
| 600 | |
| 700 | |
| 880 | |
| 940 | |
| 1000 | |
| 1800 | |
| 2000 | |
| 2200 | |
| 2700 | |
| 3400 | |
| 3600 | |
| 3800 | |
| 4000 | |
| 4200 | |

Linearity Calibration

**Linearity Calibration**

| Frequency (MHz) | SG Level (dBm) | SA Measured Value (dBm) | Calibration Value (C) (B) – (A) (dB) | SG Level (dBm) | SA Measured Value (dBm) | Calibration Value (C) (B) – (A) (dB) |
|---|---|---|---|---|---|---|
| 600 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| | –40 | (B) | | –60 | (B) | |
| 700 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| | –40 | (B) | | –60 | (B) | |
| 880 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| | –40 | (B) | | –60 | (B) | |
| 940 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| | –40 | (B) | | –60 | (B) | |
| 1000 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| | –40 | (B) | | –60 | (B) | |
| 1800 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| | –40 | (B) | | –60 | (B) | |

Linearity Calibration (Cont'd)

**Linearity Calibration (Cont'd)**

| Frequency (MHz) | SG Level (dBm) | SA Measured Value (dBm) | Calibration Value (C) (B) – (A) (dB) | SG Level (dBm) | SA Measured Value (dBm) | Calibration Value (C) (B) – (A) (dB) |
|---|---|---|---|---|---|---|
| 2000 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| | –40 | (B) | | –60 | (B) | |
| 2200 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| | –40 | (B) | | –60 | (B) | |
| 2700 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| | –40 | (B) | | –60 | (B) | |
| 3400 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| | –40 | (B) | | –60 | (B) | |
| 3600 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| | –40 | (B) | | –60 | (B) | |
| 3800 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| | –40 | (B) | | –60 | (B) | |

Linearity Calibration (Cont'd)

**Linearity Calibration (Cont'd)**

| Frequency (MHz) | SG Level (dBm) | SA Measured Value (dBm) | Calibration Value (C) (B) – (A) (dB) | SG Level (dBm) | SA Measured Value (dBm) | Calibration Value (C) (B) – (A) (dB) |
|---|---|---|---|---|---|---|
| 4000 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| | –40 | (B) | | –60 | (B) | |
| 4200 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| | –40 | (B) | | –60 | (B) | |

6

Performance Test

Output EVM

**Output EVM**

| Frequency (MHz) | EVM (%rms) Test Port1 MU887000A Output Level: –12.9 dBm | | | EVM (%rms) Test Port3 MU887000A Output Level: –2.9 dBm | | |
|---|---|---|---|---|---|---|
| | Measured Value | Spec. | Measurement uncertainty | Measured Value | Spec. | Measurement uncertainty |
| 400 | | ≤2.0 | 0.1 | | ≤2.0 | 0.1 |
| 900 | | | | | | |
| 2000 | | | | | | |
| 2700 | | | | | | |
| 3400 | | ≤3.0 | 0.1 | | ≤3.0 | 0.1 |
| 3800 | | | | | | |
| 4000 | | ≤3.0 | 0.1 | | ≤3.0 | 0.1 |
| 4500 | | | | | | |
| 5000 | | | | | | |
| 5500 | | | | | | |
| 6000 | | | | | | |

Tx Power Measurement Accuracy (CW)

**Tx Power Measurement Accuracy Port1/2**

MU887000A Input Level: –10 dBm (Item 6.3.1 Calibration Value)

| Frequency (MHz) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) | | | |
|---|---|---|---|---|---|
| | | Lo Limit | Measurement Accuracy –10 – (Pow) | Hi Limit | Measurement uncertainty |
| 600 | | –0.5 | | +0.5 | ±0.15 |
| 700 | | | | | |
| 880 | | | | | |
| 940 | | | | | |
| 1000 | | | | | |
| 1800 | | | | | |
| 2000 | | | | | |
| 2200 | | | | | |
| 2700 | | | | | |
| 3400 | | | | | |
| 3600 | | | | | |
| 3800 | | | | | |
| 4000 | | –0.7 | | +0.7 | 0.33 |
| 4200 | | | | | |

**Tx Power Measurement Accuracy Port1/2**

MU887000A Input Level: –50 dBm (Item 6.3.3 Calibration Value)

| Frequency (MHz) | Item 6.3.3 –50 dBm Calibration Value (C) (dB) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) | | | |
|---|---|---|---|---|---|---|
| | | | Lo Limit | Measurement Accuracy –20 + (C) – (Pow) | Hi Limit | Measurement uncertainty |
| 600 | | | –0.7 | | +0.7 | ±0.14 |
| 700 | | | | | | |
| 880 | | | | | | |
| 940 | | | | | | |
| 1000 | | | | | | |
| 1800 | | | | | | |
| 2000 | | | | | | |
| 2200 | | | | | | |
| 2700 | | | | | | |
| 3400 | | | | | | |
| 3600 | | | | | | |
| 3800 | | | | | | |
| 4000 | | | –0.9 | | +0.9 | ±0.33 |
| 4200 | | | | | | |

Tx Power Measurement Accuracy (CW) (Cont'd)

**Tx Power Measurement Accuracy Port1/2**

MU887000A Input Level :–60 dBm (Item 6.3.3 Calibration Value)

| Frequency (MHz) | Item 6.3.3 –60 dBm Calibration Value (C) (dB) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) | | | | |
|---|---|---|---|---|---|---|---|
| | | | Lo Limit | Measurement Accuracy –20 + (C) – (Pow) | Hi Limit | Measurement uncertainty |
| 600 | | | –0.9 | | +0.9 | ±0.14 |
| 700 | | | | | | |
| 880 | | | | | | |
| 940 | | | | | | |
| 1000 | | | | | | |
| 1800 | | | | | | |
| 2000 | | | | | | |
| 2200 | | | | | | |
| 2700 | | | | | | |
| 3400 | | | | | | |
| 3600 | | | | | | |
| 3800 | | | | | | |
| 4000 | | | –1.1 | | +1.1 | ±0.33 |
| 4200 | | | | | | |

Tx Power Measurement Accuracy (CW) (Cont'd)

**Tx Power Measurement Accuracy　Port3/4**

MU887000A Input Level: –10 dBm (Item 6.3.1 Calibration Value)

| Frequency (MHz) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) Lo Limit | Measurement Accuracy –10 – (Pow) | Hi Limit | Measurement uncertainty |
|---|---|---|---|---|---|
| 600 | | –0.7 | | +0.7 | ±0.17 |
| 700 | | | | | |
| 880 | | | | | |
| 940 | | | | | |
| 1000 | | | | | |
| 1800 | | | | | |
| 2000 | | | | | |
| 2200 | | | | | |
| 2700 | | | | | |
| 3400 | | | | | |
| 3600 | | | | | |
| 3800 | | | | | |
| 4000 | | –0.7 | | +0.7 | ±0.28 |
| 4200 | | | | | |

**Tx Power Measurement Accuracy　Port3/4**

MU887000A Input Level: –50 dBm (Item 6.3.3 Calibration Value)

| Frequency (MHz) | 6 Item 6.3.3 –50 dBm Calibration Value (C) (dB) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) Lo Limit | Measurement Accuracy –20 + (C) – (Pow) | Hi Limit | Measurement uncertainty |
|---|---|---|---|---|---|---|
| 600 | | | –0.9 | | +0.9 | ±0.14 |
| 700 | | | | | | |
| 880 | | | | | | |
| 940 | | | | | | |
| 1000 | | | | | | |
| 1800 | | | | | | |
| 2000 | | | | | | |
| 2200 | | | | | | |
| 2700 | | | | | | |
| 3400 | | | | | | |
| 3600 | | | | | | |
| 3800 | | | | | | |
| 4000 | | | –0.9 | | +0.9 | ±0.20 |
| 4200 | | | | | | |

Tx Power Measurement Accuracy (CW) (Cont’d)

**Tx Power Measurement Accuracy Port3/4**

MU887000A Input Level :–60 dBm (Item 6.3.3 Calibration Value)

| Frequency (MHz) | Item 6.3.3 –60 dBm Calibration Value (C) (dB) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) | | | |
|---|---|---|---|---|---|---|
| | | | Lo Limit | Measurement Accuracy –20 + (C) – (Pow) | Hi Limit | Measurement uncertainty |
| 600 | | | –1.1 | | +1.1 | ±0.14 |
| 700 | | | | | | |
| 880 | | | | | | |
| 940 | | | | | | |
| 1000 | | | | | | |
| 1800 | | | | | | |
| 2000 | | | | | | |
| 2200 | | | | | | |
| 2700 | | | | | | |
| 3400 | | | | | | |
| 3600 | | | | | | |
| 3800 | | | | | | |
| 4000 | | | –1.1 | | +1.1 | ±0.21 |
| 4200 | | | | | | |

Tx Power Measurement Linearity

**Linearity (±0.2 dB: 0 to –40 dB, ≥–50 dBm, Reference Level 0 dBm)**

| Frequency (MHz) | SG Level (dBm) | Item 6.3.3 Calibration Value (dB) | MX887013A/14A Measured Value (dBm) | Linearity (D) – (REF) – (C) (dB) | Spec. (dB) | Measurement uncertainty |
|---|---|---|---|---|---|---|
| 600 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| | –40 | | (D) | | | |
| 700 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| | –40 | | (D) | | | |
| 880 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| | –40 | | (D) | | | |
| 940 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| | –40 | | (D) | | | |
| 1000 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| | –40 | | (D) | | | |
| 1800 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| | –40 | | (D) | | | |

Tx Power Measurement Linearity (Cont'd)

**Linearity (±0.2 dB: 0 to –40 dB, ≥–50 dBm, Reference Level 0 dBm) (Cont'd)**

| Frequency (MHz) | SG Level (dBm) | Item 6.3.3 Calibration Value (dB) | MX887013A/14A Measured Value (dBm) | Linearity (D) – (REF) – (C) (dB) | Spec. (dB) | Measurement uncertainty |
|---|---|---|---|---|---|---|
| 2000 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| | –40 | | (D) | | | |
| 2200 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| | –40 | | (D) | | | |
| 2700 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| | –40 | | (D) | | | |
| 3400 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| | –40 | | (D) | | | |
| 3600 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| | –40 | | (D) | | | |
| 3800 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| | –40 | | (D) | | | |

Tx Power Measurement Linearity(Cont'd)

**Linearity (±0.2 dB: 0 to –40 dB, ≥–50 dBm, Reference Level 0 dBm) (Cont'd)**

| Frequency (MHz) | SG Level (dBm) | Item 6.3.3 Calibration Value (dB) | MX887013A/14A Measured Value (dBm) | Linearity (D) – (REF) – (C) (dB) | Spec. (dB) | Measurement uncertainty |
|---|---|---|---|---|---|---|
| 4000 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| | –40 | | (D) | | | |
| 4200 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| | –40 | | (D) | | | |

Tx Power Measurement Linearity (Cont'd)

**Linearity (±0.2 dB: 0 to –40 dB, ≥–60 dBm, Reference Level –20 dBm)**

| Frequency (MHz) | SG Level (dBm) | Item 6.3.3 Calibration Value (dB) | MX887013A/14A Measured Value (dBm) | Linearity (D) – (REF) – (C) (dB) | Spec. (dB) | Measurement uncertainty |
|---|---|---|---|---|---|---|
| 600 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| | –60 | | (D) | | ±0.4 | ±0.05 |
| 700 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| | –60 | | (D) | | ±0.4 | ±0.05 |
| 880 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| | –60 | | (D) | | ±0.4 | ±0.05 |
| 940 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| | –60 | | (D) | | ±0.4 | ±0.05 |
| 1000 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| | –60 | | (D) | | ±0.4 | ±0.05 |
| 1800 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| | –60 | | (D) | | ±0.4 | ±0.05 |

Tx Power Measurement Linearity (Cont'd)

**Linearity (±0.2 dB: 0 to –40 dB, ≥–60 dBm, Reference Level –20 dBm) (Cont'd)**

| Frequency (MHz) | SG Level (dBm) | Item 6.3.3 Calibration Value (dB) | MX887013A/14A Measured Value (dBm) | Linearity (D) – (REF) – (C) (dB) | Spec. (dB) | Measurement uncertainty |
|---|---|---|---|---|---|---|
| 2000 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| | –60 | | (D) | | ±0.4 | ±0.05 |
| 2200 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| | –60 | | (D) | | ±0.4 | ±0.05 |
| 2700 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| | –60 | | (D) | | ±0.4 | ±0.05 |
| 3400 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| | –60 | | (D) | | ±0.4 | ±0.05 |
| 3600 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| | –60 | | (D) | | ±0.4 | ±0.05 |
| 3800 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| | –60 | | (D) | | ±0.4 | ±0.05 |

Tx Power Measurement Linearity (Cont'd)

**Linearity (±0.2 dB: 0 to –40 dB, ≥–60 dBm, Reference Level –20 dBm) (Cont'd)**

| Frequency (MHz) | SG Level (dBm) | Item 6.3.3 Calibration Value (dB) | MX887013A/14A Measured Value (dBm) | Linearity (D) – (REF) – (C) (dB) | Spec. (dB) | Measurement uncertainty |
|---|---|---|---|---|---|---|
| 4000 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| | –60 | | (D) | | ±0.4 | ±0.05 |
| 4200 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| | –60 | | (D) | | ±0.4 | ±0.05 |

Frequency/Modulation Measurement

**Residual EVM/Carrier Frequency Accuracy**

MU887000A Input Level: –10 dBm/–40 dBm

<table>
<tr><th rowspan="2">Frequency (MHz)</th><th colspan="3">Residual EVM (%)</th><th colspan="3">Carrier Frequency Accuracy (Hz)</th></tr>
<tr><th>Measured Value</th><th>Spec.</th><th>Measurement uncertainty</th><th>Measured Value</th><th>Spec.</th><th>Measurement uncertainty</th></tr>
<tr><td>600</td><td></td><td rowspan="12">≤2.5</td><td rowspan="12">±0.1</td><td></td><td rowspan="12">±15.0</td><td rowspan="12">±2.6</td></tr>
<tr><td>700</td><td></td><td></td></tr>
<tr><td>880</td><td></td><td></td></tr>
<tr><td>940</td><td></td><td></td></tr>
<tr><td>1000</td><td></td><td></td></tr>
<tr><td>1800</td><td></td><td></td></tr>
<tr><td>2000</td><td></td><td></td></tr>
<tr><td>2200</td><td></td><td></td></tr>
<tr><td>2700</td><td></td><td></td></tr>
<tr><td>3400</td><td></td><td></td></tr>
<tr><td>3600</td><td></td><td></td></tr>
<tr><td>3800</td><td></td><td></td></tr>
<tr><td>4000</td><td></td><td rowspan="2">≤2.5</td><td rowspan="2">±0.1</td><td></td><td rowspan="2">±15.0</td><td rowspan="2">±3.8</td></tr>
<tr><td>4200</td><td></td><td></td></tr>
</table>

In-Band Emission Measurement

**In-Band Emission**

| Frequency (MHz) | Input Level: –10 dBm | |
|---|---|---|
| | Measured Value (dB) | Spec. |
| 600 | | ≤–40 dBc |
| 700 | | |
| 880 | | |
| 940 | | |
| 1000 | | |
| 1800 | | |
| 2000 | | |
| 2200 | | |
| 2700 | | |
| 3400 | | |
| 3600 | | |
| 3800 | | |
| 4000 | | ≤–40 dBc |
| 4200 | | |

Adjacent Channel Leakage Power Measurement (ACLR)

**Adjacent Channel Leakage Power (Cont'd)**

MU887000A Input Level: –10 dBm

| Frequency (MHz) | Adjacent Channel Leakage Power Ratio (dB) | | | | | |
|---|---|---|---|---|---|---|
| | Band | | | | | |
| | UTRA (–2) | UTRA (–1) | UTRA (+1) | UTRA (+2) | E-UTRA (–1) | E-UTRA (+1) |
| 600 | | | | | | |
| 700 | | | | | | |
| 880 | | | | | | |
| 940 | | | | | | |
| 1000 | | | | | | |
| 1800 | | | | | | |
| 2000 | | | | | | |
| 2200 | | | | | | |
| 2700 | | | | | | |
| 3400 | | | | | | |
| 3600 | | | | | | |
| 3800 | | | | | | |
| 4000 | | | | | | |
| 4200 | | | | | | |
| Spec. (dB) | ≥55 dB | ≥50 dB | ≥50 dB | ≥55 dB | ≥45 dB | ≥45 dB |
| Measurement uncertainty | 1 dB | | | | | |

# 6.5 Calibration (MX887013A-001/14A-001)

This section explains how to obtain the calibration values of the instrument used for the performance tests.

## 6.5.1 SG Calibration (CW)

This section explains how to obtain the calibration values of the CW (unmodulated) signal source.

(1) Measuring instruments

- Vector signal Generator: MG3700A
- Power meter: ML2437A
- Power sensor: MA2442D
- 3-dB Attenuator: AT-103 (2 sets)

(2) Setup

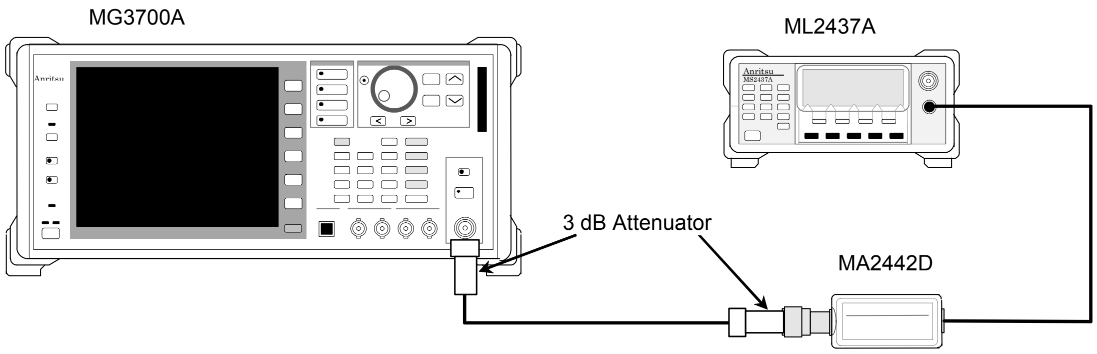


**Figure 6.5.1-1 SG Calibration (CW)**

(3) Test procedure

1. Setup the instruments as shown in Figure 6.5.1-1.
2. Set the Vector signal generator (SG) as follows:

   Modulation: OFF

   Output frequency: 717.79 MHz (717.8 MHz –10 kHz)

   Output level: 6 dBm (0 dBm + 6 dB)
3. Adjust the SG output level so that the level measurement value of the power meter is 0 dBm, and obtain the calibration values for the setting frequency and setting level.
4. Set frequencies in accordance with the table in 6.5.4, “Measurement Frequencies”, and obtain the calibration values of each frequency.
5. Replace 0 dBm with –10 and –20 dBm at step 2, repeat steps 2 to 4 respectively, and obtain the calibration values.

## 6.5.2 SG Calibration (MOD)

This section explains how to obtain the calibration values of the modulation wave signal source.

(1) Measuring instruments

- Vector signal Generator: MG3700A
- Power meter: ML2437A
- Power sensor: MA24002A
- 3-dB Attenuator: AT-103 (2 sets)

(2) Setup

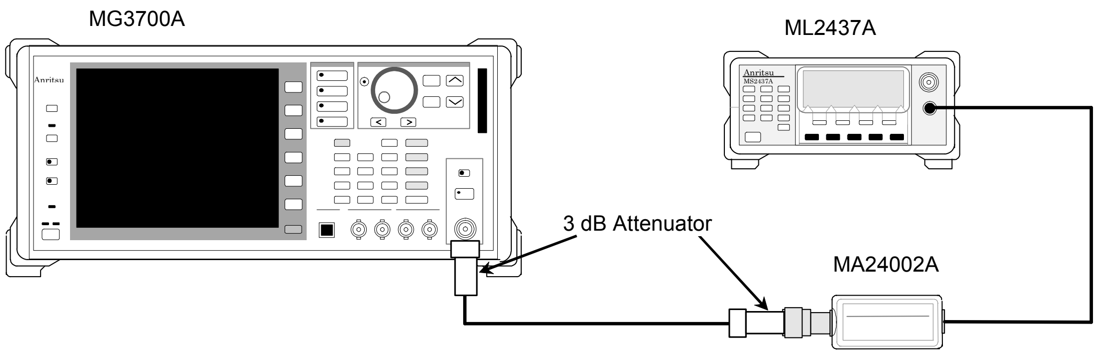


**Figure 6.5.2-1 SG Calibration (MOD)**

(3) Test procedure

1. Setup the instruments as shown in Figure 6.5.2-1.
2. Set the Vector signal generator (SG) as follows:

   | | |
   |---|---|
   | Modulation: | ON |
   | Modulation wave: | Waveform pattern based on the settings in 6.5.5, "Evaluation Signals" |
   | Output frequency: | 717.79 MHz (717.8 MHz –10 kHz) |
   | Output level: | –4 dBm (–10 dBm + 6 dB) |

3. Adjust the SG output level so that the level measurement value of the power meter is –10 dBm, and obtain the calibration values for the setting frequency and setting level.
4. Set frequencies in accordance with the table in 6.5.4, "Measurement Frequencies", and obtain the calibration values of each frequency.

## 6.5.3 Linearity Calibration

This section explains how to obtain the calibration values for linearity.

(1) Measuring instruments

- Vector signal Generator: MG3700A
- Signal analyzer: MS269XA or MS2830A
- 3-dB Attenuator: AT-103 ((2 sets)

(2) Setup

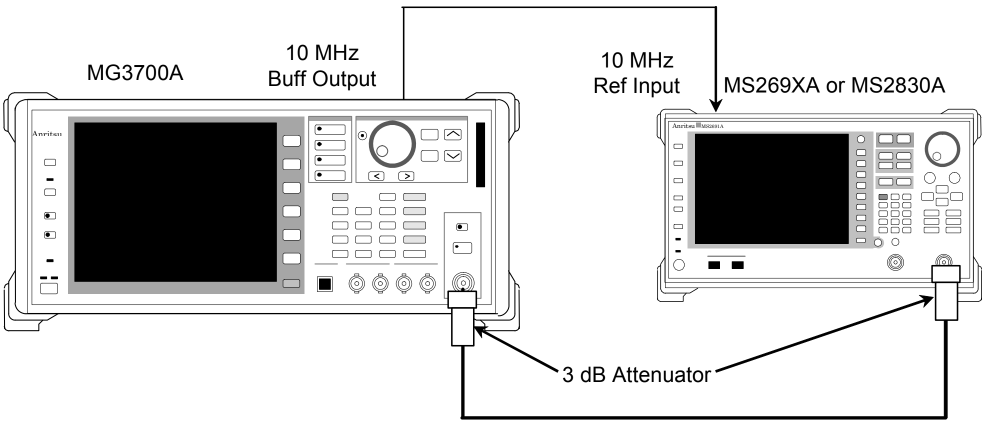


**Figure 6.5.3-1 Linearity Calibration**

(3) Test procedure

1. Setup the instruments as shown in Figure 6.5.3-1.
2. Set the signal analyzer (SA) as shown in #1 of Table 6.5.3-1 "Signal Analyzer Settings".
3. Set the Vector signal generator (SG) as follows:

   Modulation: OFF

   Output frequency: 717.79 MHz (717.8 MHz –10 kHz)

   Output level: Setting level when the level measurement value of the power meter is 0 dBm in the SG calibration (Section 6.5.1)
4. Connect the output of the SG to the SA and measure the SG output level with the SA (A dBm).
5. Decrease the SG output level in 10-dB steps down to 30 dB and measure the level at each step (B dBm). (The calibration value is B – A.)
6. Set frequencies in accordance with the table in 6.5.4, "Measurement Frequencies", and obtain the calibration values of each frequency.

7. Set the SA as shown in #2 of Table 6.5.3-1 "Signal Analyzer Settings".
8. Replace 0 dBm with –20 dBm at step 3, and repeat steps 3 to 6.

**Table 6.5.3-1 Signal Analyzer Settings**

| | MS269XA or MS2830A | | | | | | |
|---|---|---|---|---|---|---|---|
| | Application Switch | RBW | Zone Width | Time Length | ATT | Preamp | Ref Lev |
| #1 | Signal Analyzer | 100 Hz | 781.3 Hz | AUTO | 20 dB | OFF | 0 dBm |
| #2 | Signal Analyzer | 100 Hz | 781.3 Hz | AUTO | 0 dB | OFF | –20 dBm |

## 6.5.4 Measurement Frequencies

The following tables list the frequencies set in the performance tests for the calibration and calibrated test system. The 4000 MHz and more frequency is measured only when MU887000A-001/101 is installed.

For the calibrations and performance tests described in the following sections:

- 6.5.1 SG Calibration (CW)
- 6.5.2 SG Calibration (MOD)
- 6.5.3 Linearity Calibration
- 6.6.1 Tx Power Measurement Accuracy (CW)
- 6.6.2 Tx Power Measurement Linearity
- 6.6.3 Frequency/Modulation

| Meas. Point | PCC (MHz) | SCC: PCC–19.8 (MHz) | SCC: PCC+19.8 (MHz) |
|---|---|---|---|
| 1 | 717.8 | 698.0 | 737.6 |
| 2 | 2719.8 | 2700.0 | 2739.6 |
| 3 | 3400.0 | 3380.2 | 3419.8 |
| 4 | 3780.2 | 3760.4 | 3800.0 |
| 5 | 4180.2 | 4160.4 | 4200.0 |

For the performance test described in 6.6.4 In-Band Emissions:

| Meas. Point | PCC (MHz) | SCC: PCC+19.8 (MHz) |
|---|---|---|
| 1 | 698.0 | 717.8 |
| 2 | 2700.0 | 2719.8 |
| 3 | 3400.0 | 3419.8 |
| 4 | 3800.0 | 3819.8 |
| 5 | 4180.2 | 4200.0 |

For the performance test described in 6.6.5 Adjacent Channel Leakage Power Ratio (ACLR):

| Meas. Point | PCC (MHz) | SCC: PCC–19.8 (MHz) | SCC: PCC+19.8 (MHz) |
|---|---|---|---|
| 1 | 698.0 | - | 717.8 |
| 2 | 2700.0 | 2680.2 | 2719.8 |
| 3 | 3400.0 | 3380.2 | 3419.8 |
| 4 | 3800.0 | 3780.2 | 3819.8 |
| 5 | 4180.2 | 4160.4 | 4200.0 |

***Note:***

Add an offset of –10 kHz to the frequency in the above table and set the frequency as SG output frequency, except for the measurement described in section 6.6.3, 6.6.4 and 6.6.5.

### 6.5.5 Evaluation Signals

This section explains the modulation wave signal used for the performance test. Set the vector signal generator based on the following contents when performing the performance test.

Use the MG3700A vector signal generator where the MG3700A-002 Mechanical Attenuator option is installed to perform the test. When MU887000A-001/101 is installed, the option for MG3700A-011 upper limit frequency 6 GHz is required.

Summary of the evaluation signal

The following tables listed in 3GPP TS 36.521-1 are referenced.

FDD:

A.2.2 Reference measurement channels for FDD

- Table A.2.2.1.1-1: Reference Channels for QPSK with full RB allocation
  - PCC Channel bandwidth: 20 MHz
  - SCC Channel bandwidth: 20 MHz
- Table A.2.2.2.1-1: Reference Channels for QPSK with partial RB allocation
  - PCC:
    - Channel bandwidth: 20 MHz
    - Allocated RBs: 18
    - Starting RB 0
  - SCC:
    - Channel bandwidth: 20 MHz
    - Allocated RBs: 0

TDD:

A.2.3 Reference measurement channels for TDD

- Table A.2.3.1.1-1: Reference Channels for QPSK with full RB allocation
  - PCC Channel bandwidth: 20 MHz
  - SCC Channel bandwidth: 20 MHz
- Table A.2.3.2.1-1: Reference Channels for QPSK with partial RB allocation
  - PCC:
    - Channel bandwidth: 20 MHz
    - Allocated RBs: 18
    - Starting RB 0
  - SCC:
    - Channel bandwidth: 20 MHz
    - Allocated RBs: 0

To send the evaluation signal with the SG, generate the following waveform pattern with LTE IQproducer™ MX370108A.

Table 6.5.5-1 LTE IQproducer Parameter (FDD PCC 20 MHz, SCC 20 MHz)

| Parameter | Setting Values |
|---|---|
| Common | |
| System | LTE-Advanced |
| Carrier Aggregation Mode | Intra-band |
| Downlink/Uplink | Uplink |
| Component Carrier #0 | – |
| Freq Offset(MHz) | –9.9 |
| Cell ID | 0 |
| Bandwidth | 20 MHz |
| Cyclic Prefix | Normal |
| Roll Off Length | 70 |
| Filter Type | Ideal |
| DMRS Parameters | Auto |
| Subframe #0 to 9 | – |
| Number of PUCCHs | 0 |
| Number of PUSCHs | 1 |
| PUSCH #0 Data Status | Enable |
| PUSCH #0 Modulation Scheme | QPSK |
| PUSCH #0 Data Type | PN9 |
| PUSCH #0 Start Number of RB | 0 |
| PUSCH #0 Number of RBs | 18 (for In-Band Emission evaluation signal)<br>100 (Others) |
| PUSCH #0 Power Boosting | 0 dB |
| Demodulation RS for PUSCH | – |
| Data Type | Base Sequence |
| Group Hopping | Enable |
| Delta SS | 0 |
| n_cs_Setting | Auto |
| n(1)_DMRS | 0 |
| n(2)_DMRS | 0 |

**Table 6.5.5-1 LTE IQproducer Parameter (FDD PCC 20 MHz, SCC 20 MHz) (Cont'd)**

| Parameter | Setting Values |
|---|---|
| Component Carrier #1 | – |
| Freq Offset(MHz) | +9.9 |
| Cell ID | 0 |
| Bandwidth | 20 MHz |
| Cyclic Prefix | Normal |
| Roll Off Length | 70 |
| Filter Type | Ideal |
| Data Transmission / Random Access | Data Transmission |
| DMRS Parameters | Auto |
| Subframe #0 to 9 | – |
| Number of PUCCHs | 0 |
| Number of PUSCHs | 0 (for In-Band Emission evaluation signal)<br>1 (Others) |
| The subsequence settings are the same as the settings of Component Carrier #0 when Number of PUSCH is 1. | |

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Performance Test

**Table 6.5.5-2 LTE IQproducer Parameter (TDD PCC 20 MHz, SCC 20 MHz)**

| Parameter | Setting Values |
|---|---|
| Common | |
| System | LTE-Advanced |
| Carrier Aggregation Mode | Intra-band |
| Downlink/Uplink | Uplink |
| Component Carrier #0 | |
| Freq Offset(MHz) | –9.9 |
| Cell ID | 0 |
| Bandwidth | 20 MHz |
| Uplink Downlink Configuration | 1 |
| Cyclic Prefix | Normal |
| Roll Off Length | 70 |
| Filter Type | Ideal |
| Data Transmission / Random Access | Data Transmission |
| DMRS Parameters | Auto |
| Subframe #0 to 9 | – |
| Number of PUCCHs | 0 |
| Number of PUSCHs | 1 |
| PUSCH #0 Data Status | Enable |
| PUSCH #0 Modulation Scheme | QPSK |
| PUSCH #0 Data Type | PN9 |
| PUSCH #0 Start Number of RB | 0 |
| PUSCH #0 Number of RBs | 18 (for In-Band Emission evaluation signal)<br>100 (Others) |
| PUSCH #0 Power Boosting | 0 dB |
| Demodulation RS for PUSCH | – |
| Data Type | Base Sequence |
| Group Hopping | Enable |
| Delta SS | 0 |
| n_cs_Setting | Auto |
| n(1)_DMRS | 0 |
| n(2)_DMRS | 0 |

**Table 6.5.5-3 LTE IQproducer Parameter (TDD PCC 20 MHz, SCC 20 MHz) (Cont'd)**

| Parameter | Setting Values |
|---|---|
| Component Carrier #1 | |
| Freq Offset(MHz) | +9.9 |
| Cell ID | 0 |
| Bandwidth | 20 MHz |
| Cyclic Prefix | Normal |
| Roll Off Length | 70 |
| Filter Type | Ideal |
| Data Transmission / Random Access | Data Transmission |
| DMRS Parameters | Auto |
| Subframe #0 to 9 | – |
| Number of PUCCHs | 0 |
| Number of PUSCHs | 0 (for In-Band Emission evaluation signal)<br>1 (Others) |
| The subsequence settings are the same as the settings of Component Carrier #0 when Number of PUSCH is 1. | |

6

Performance Test

# 6.6 Performance Tests (MX887013A-001/14A-001)

Common test items

The following list shows the common settings for each measurement at the MU887000A.

| | |
|---|---|
| Application Select: | Cellular |
| Standard Select: | LTE |
| Frame Structure(PCC): | FDD (MX887013A)<br>TDD (MX887014A) |
| Frame Structure(SCC-1): | FDD (MX887013A)<br>TDD (MX887014A) |
| Channel Coding: | RMC_UL_CA |
| Channel Bandwidth(PCC): | 20 MHz |
| Channel Bandwidth(SCC-1): | 20 MHz |
| RMC Configuration: | PUSCH |
| UL RMC Modulation(PCC): | QPSK |
| UL RMC Number of RB(PCC): | 100 |
| UL RMC Starting RB(PCC): | 0 |
| UL RMC Modulation(SCC-1): | QPSK |
| UL RMC Number of RB(SCC-1): | 0 |
| UL RMC Starting RB(SCC-1): | 0 |
| OBW Ratio: | 99.0% |
| Long Span Search: | ON |

### 6.6.1 Tx Power Measurement Accuracy (CW)

This test is related to the accuracy of Tx power measurements.

(1) Test specifications

Test Port1/2

(Excluding when measuring Intraband Contiguous CA SCC and PCC + SCC)

(698 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 3800 MHz)

| Measurement Accuracy | Input Level | Temperature |
|---|---|---|
| ±0.5 dB | –20 dBm ≤, ≤ +35 dBm | 10 to 40 °C |
| ±0.7 dB | –50 dBm ≤,< –20 dBm | 10 to 40 °C |
| ±0.9 dB | –60 dBm ≤,< –50 dBm | 10 to 40 °C |

(3800 MHz < Frequency ≤ 4200 MHz)

| Measurement Accuracy | Input Level | Temperature |
|---|---|---|
| ±0.7 dB | –20 dBm ≤, ≤ +35 dBm | 20 to 30 °C |
| ±0.9 dB | –50 dBm ≤,< –20 dBm | 20 to 30 °C |
| ±1.1 dB | –60 dBm ≤,< –50 dBm | 20 to 30 °C |

Test Port1/2

(When measuring Intraband Contiguous CA SCC and PCC + SCC)

(698 MHz ≤ Frequency ≤ 2700 MHz)

| Measurement Accuracy | Input Level | Temperature |
|---|---|---|
| ±0.7 dB | –50 dBm ≤, ≤ +35 dBm | 10 to 40 °C |
| ±0.9 dB | –60 dBm ≤,< –50 dBm | 10 to 40 °C |

(3400 MHz < Frequency ≤ 3800 MHz)

| Measurement Accuracy | Input Level | Temperature |
|---|---|---|
| ±1.0 dB | –50 dBm ≤, ≤ +35 dBm | 10 to 40 °C |
| ±1.3 dB | –60 dBm ≤,< –50 dBm | 10 to 40 °C |

(3800 MHz < Frequency ≤ 4200 MHz)

| Measurement Accuracy | Input Level | Temperature |
|---|---|---|
| ±1.0 dB | –50 dBm ≤, ≤ +35 dBm | 20 to 30 °C |
| ±1.3 dB | –60 dBm ≤,< –50 dBm | 20 to 30 °C |

Test Port3/4
(Excluding when measuring Intraband Contiguous CA SCC and PCC + SCC)

(698 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 3800 MHz)

| Measurement Accuracy | Input Level | Temperature |
|---|---|---|
| ±0.7 dB | –20 dBm ≤, ≤ +25 dBm | 10 to 40 °C |
| ±0.9 dB | –50 dBm ≤,< –20 dBm | 10 to 40 °C |
| ±1.1 dB | –60 dBm ≤,< –50 dBm | 10 to 40 °C |

(3800 MHz < Frequency ≤ 4200 MHz)

| Measurement Accuracy | Input Level | Temperature |
|---|---|---|
| ±0.7 dB | –20 dBm ≤, ≤ +25 dBm | 20 to 30 °C |
| ±0.9 dB | –50 dBm ≤,< –20 dBm | 20 to 30 °C |
| ±1.1 dB | –60 dBm ≤,< –50 dBm | 20 to 30 °C |

Test Port3/4
(When measuring Intraband Contiguous CA SCC and PCC + SCC)

(698 MHz ≤ Frequency ≤ 2700 MHz)

| Measurement Accuracy | Input Level | Temperature |
|---|---|---|
| ±0.7 dB | –20 dBm ≤, ≤ +25 dBm | 10 to 40 °C |
| ±0.9 dB | –50 dBm ≤,< –20 dBm | 10 to 40 °C |
| ±1.1 dB | –60 dBm ≤,< –50 dBm | 10 to 40 °C |

(3400 MHz < Frequency ≤ 3800 MHz)

| Measurement Accuracy | Input Level | Temperature |
|---|---|---|
| ±1.0 dB | –50 dBm ≤, ≤ +25 dBm | 10 to 40 °C |
| ±1.3 dB | –60 dBm ≤,< –50 dBm | 10 to 40 °C |

(3800 MHz < Frequency ≤ 4200 MHz)

| Measurement Accuracy | Input Level | Temperature |
|---|---|---|
| ±1.0 dB | –50 dBm ≤, ≤ +25 dBm | 20 to 30 °C |
| ±1.3 dB | –60 dBm ≤,< –50 dBm | 20 to 30 °C |

(2) Measuring instruments

- Vector signal Generator: MG3700A
- 3 dB Attenuator: AT-103 (2 sets)

(3) Setup

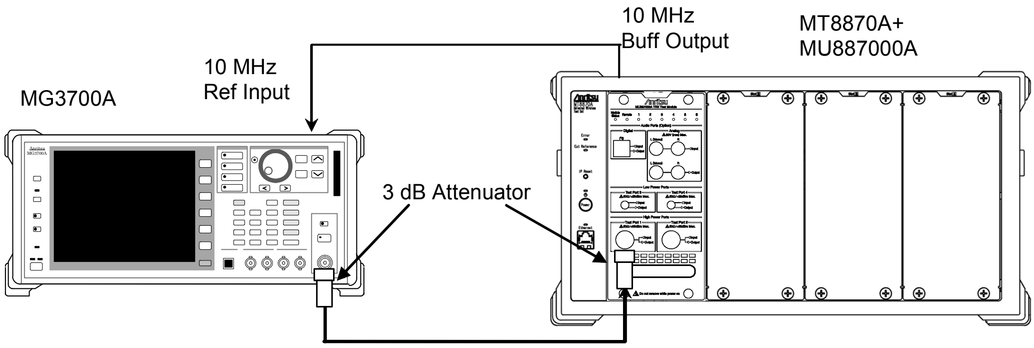


**Figure 6.6.1-1 Setup for Measuring Amplitude Measurement Accuracy**

(4) Test procedure

1. Setup the instruments as shown in Figure 6.6.1-1.
2. Set the MU887000A as follows:

| | |
|---|---|
| Connect Port: | Test Port1 |
| Output Level On/Off: | OFF |
| Input Level: | –10 dBm |
| Uplink Frequency : | |
| PCC: | 717.8 MHz |
| SCC: | 698.0 MHz (PCC–19.8MHz) |
| Turn Off All Measurement: | OFF |
| Tx Power Measurement: | ON, 1 time |

3. Set the Vector signal generator (SG) as follows:

| | |
|---|---|
| Modulation: | OFF |
| Output frequency: | 717.79 MHz (PCC) |
| Output level: | –10 dBm<br>(This output level reflects the calibration value for item 6.5.1.) |

4. Measure Tx Power of PCC.

   Result of Tx Power Measurement: Average value
5. Change the SG settings as follows.

| | |
|---|---|
| Output frequency: | 697.99 MHz (PCC–19.8MHz) |
| Output level: | –10 dBm<br>(This output level reflects the calibration value for item 6.5.1.) |

6. Measure Tx Power of SCC (PCC–19.8MHz).

   Result of Tx Power Measurement: Average value

6

Performance Test

7. Change the SCC frequency in MU887000A as follows.

   Uplink Frequency:

   SCC: 737.6 MHz (PCC+19.8MHz)

8. Change the SG settings as follows.

   Output frequency: 737.59 MHz (PCC+19.8MHz)

   Output level: –10 dBm (This output level reflects the calibration value for item 6.5.1.)

9. Measure Tx Power of SCC (PCC+19.8MHz).

   Result of Tx Power Measurement: Average value

10. Change the MU887000A and SG frequencies according to 6.5.4 "Measurement Frequencies" and repeat steps 2 to 9 over.

11. Change the SG output level and MU887000A input level each to –50, and –60 dBm and repeat steps 2 to 10 over and measure the Tx power. (This output level reflects the calibration value for item 6.5.3.)

12. Change the Connect port setting for the connection with the MU887000A to Test Port2/3/4 successively, and repeat steps 2 to 11 over.

## 6.6.2 Tx Power Measurement Linearity

This test is related to the linearity of Tx power measurements.

(1) Test specifications

(698 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 4200 MHz)

| Linearity | Input Level, Range |
|---|---|
| ±0.2 dB | –50 dBm ≤, –30 to 0 dB |
| ±0.4 dB | –60 dBm ≤, –30 to 0 dB |

(2) Measuring instruments

- Vector signal Generator: MG3700A
- 3 dB Attenuator: AT-103 (2 sets)

(3) Setup

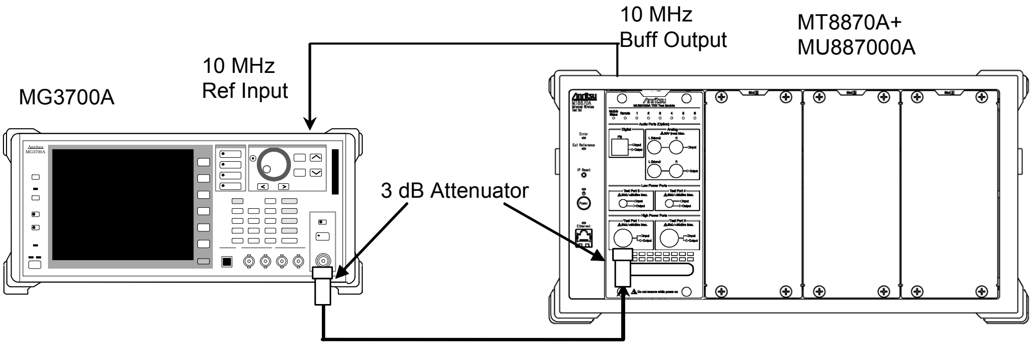


**Figure 6.6.2-1 Setup for Measuring Tx Power Measurement Linearity**

(4) Test procedure

1. Setup the instruments as shown in Figure 6.6.2-1.
2. Set the MU887000A as follows:

   Connect Port: Test Port1

   Output Level On/Off: OFF

   Input Level: 0 dBm

   Uplink Frequency:
   PCC: 717.8 MHz
   SCC: 698.0 MHz (PCC–19.8MHz)
   Turn Off All Measurement: OFF
   Tx Power Measurement: ON, 1 time
3. Set the Vector signal generator (SG) as follows:

   Modulation: OFF

   Output frequency: 717.79 MHz (PCC)

   Output level: 0 dBm
   (This output level reflects the calibration value for item 6.5.1.)
4. Measure Tx Power of PCC and the measured value is the reference level (REF dBm).

   Result of Tx Power Measurement: Average value
5. Set the SG output level to –10 dB and measure the Tx power, making this value D dBm.
6. Calculate the difference between REF dBm and D dBm using the following equation.

   Linearity error = D – REF – (calibration value of section 6.5.3)
7. Similarly, change the SG output level successively from –20 dB to –30 dB in –10 dB steps and measure the Tx power. Calculate the linearity as described in step 6 and check that the results meet the specifications.

   ***Note:***

   Measure the Tx power five times when the following conditions are met.
   - The frequency is 3400 MHz and more.
   - The SG output level is –40 dB.
   And calculate the frequency using the average value.

8. Change the vector signal generator (SG) settings as follows.

   Output frequency: 697.99 MHz (PCC–19.8MHz)

   Output level: –10 dBm
   (This output level reflects the calibration value for item 6.5.1.)

9. Change the measurement target to SCC (PCC–19.8MHz), and repeat steps 4 to 7.
10. Change the SCC frequency in MU887000A as follows.

    Uplink Frequency:

    SCC: 737.6 MHz (PCC+19.8MHz)
11. Change the SG settings as follows.

    Output frequency: 737.59 MHz (PCC+19.8MHz)

    Output level: –20 dBm
    (This output level reflects the calibration value for item 6.5.1.)
12. Change the measurement target to SCC (PCC+19.8MHz), and repeat steps 4 to 7.
13. Change the MU887000A and SG frequencies according to 6.5.4 "Measurement Frequencies" and repeat steps 2 to 12 over.
14. Change the SG output level and the MU887000A input level to –20 dBm and repeat steps 2 to 13 over to measure the Tx Power. (This output level reflects the calibration value for item 6.5.1.)

## 6.6.3 Frequency/Modulation

This test is related to the following modulation analyses.

- Carrier frequency accuracy
- Residual EVM

(1) Test specifications

| | Measurement Accuracy |
|---|---|
| Carrier frequency accuracy | ±(Set frequency × Reference oscillator accuracy + 15 Hz) |
| Residual EVM | ≤ 2.5% (rms) |

Test Port1/2 Input Level range: –40 dBm ≤, ≤ +35 dBm

Test Port3/4 Input Level range: –40 dBm ≤, ≤ +25 dBm

(2) Measuring instruments

- Vector signal Generator: MG3700A
- 3 dB Attenuator: AT-103 (2 sets)

(3) Setup

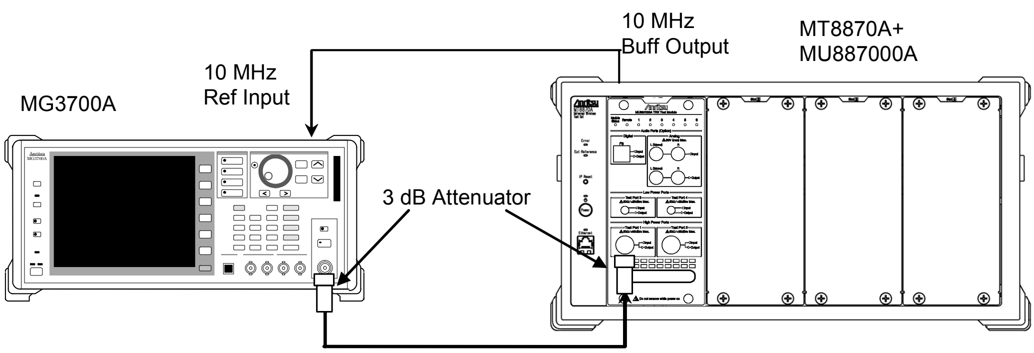


**Figure 6.6.3-1 Setup for Measuring Frequency/Modulation**

(4) Test procedure

1 Setup the instruments as shown in Figure 6.6.3-1.

2. Set the MU887000A as follows:

| | |
|---|---|
| Connect Port: | Test Port1 |
| Output Level On/Off: | OFF |
| Input Level: | –10 dBm |
| Uplink Frequency: | |
| PCC: | 717.8 MHz |
| SCC: | 698.0 MHz (PCC–19.8MHz) |
| Turn Off All Measurement: | OFF |
| Tx Power Measurement: | ON, 1 time |

3. Set the Vector signal generator (SG) as follows:

| | |
|---|---|
| Modulation: | ON |
| Modulation wave: | Waveform pattern based on the settings in 6.5.5, “Evaluation Signals” |
| Output frequency: | 717.8 MHz |
| Output level: | –10 dBm (This output level reflects the calibration value for item 6.5.2.) |

4. Measure the PCC frequency error and EVM.

| | |
|---|---|
| Carrier Frequency Error Result: | Average value |
| EVM Result: | Average value |

5. Change the vector signal generator (SG) settings as follows.

| | |
|---|---|
| Output frequency: | 698.0 MHz (PCC–19.8MHz) |
| Output level: | –10 dBm<br>(This output level reflects the calibration value for item 6.5.1.) |

6. Measure the SCC (PCC – 19.8 MHz) frequency error and EVM.

| | |
|---|---|
| Carrier Frequency Error Result: | Average value |
| EVM Result: | Average value |

7. Change the SCC frequency in MU887000A as follows.

| | |
|---|---|
| Uplink Frequency: | |
| SCC: | 737.6 MHz (PCC+19.8MHz) |

8. Change the SG settings as follows.

| | |
|---|---|
| Output frequency: | 737.6 MHz (PCC+19.8MHz) |
| Output level: | –10 dBm<br>(This output level reflects the calibration value for item 6.5.1.) |

9. Measure the SCC (PCC + 19.8 MHz) frequency error and EVM.

| | |
|---|---|
| Carrier Frequency Error Result: | Average value |
| EVM Result: | Average value |

10. Change the MU887000A and SG frequencies according to 6.5.4 “Measurement Frequencies” and repeat steps 2 to 9 over.
11. Change the SG output level and the MU887000A input level to –40 dBm and measure by repeating steps 2 to 10 over. (This output level reflects the calibration value for item 6.5.2.)

## 6.6.4 In-band Emissions

This test is related to in-band emissions.

- In-Band Emission

(1) Test specifications

(698 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 4200 MHz)

| | |
|---|---|
| In-Band Emission | ≤ –40 dBc |

Input level: ≥ –10 dBm

Allocated RB ≤ 18

(2) Measuring instruments

- Vector signal Generator: MG3700A
- 3 dB Attenuator: AT-103 (2 sets)

(3) Setup

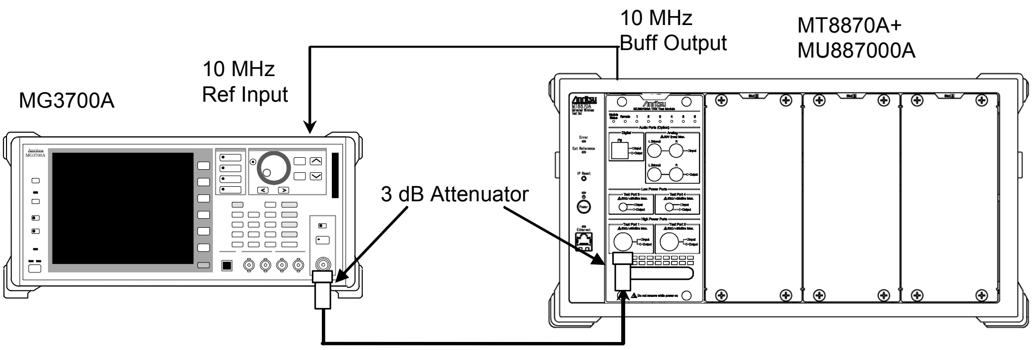


**Figure 6.6.4-1 Test System for Frequency/Modulation Measurement**

6

Performance Test

(4) Test procedure

1. Setup the instruments as shown in Figure 6.6.4-1.
2. Set the MU887000A as follows:

| | |
|---|---|
| Connect Port: | Test Port1 |
| Output Level On/Off: | OFF |
| Input Level: | –10 dBm |
| Uplink Frequency: | |
| PCC: | 698.0 MHz |
| SCC: | 717.8 MHz (PCC+19.8MHz) |
| Turn Off All Measurement: | OFF |
| Tx Power Measurement: | ON, 1 time |

3. Set the Vector signal generator (SG) as follows:

| | |
|---|---|
| Modulation: | ON |
| Modulation wave: | Waveform pattern based on the settings in 6.5.5, “Evaluation Signals” |
| Output frequency: | 707.9 MHz (PCC+9.9MHz) |
| Output level: | –10 dBm (This output level reflects the calibration value for item 6.5.2.) |

4. Measure the In-Band Emission of PCC and SCC, and read the following value.

   In-Band Emissions (General) Result: Max value

5. Change the MU887000A and SG frequencies according to 6.5.4 “Measurement Frequencies” and repeat steps 2 to 4 over.
6. Change the SG output level and the MU887000A input level to –40 dBm and repeat steps 2 to 5 over to measure the Tx Power.

   (This output level reflects the calibration value for item 6.5.2.)

## 6.6.5 Adjacent Channel Leakage Power Ratio (ACLR)

This test is related to Adjacent Channel Leakage Power Ratio measurements.

(1) Test specifications

(698 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 4200 MHz)

| Adjacent Channel Leakage Power Ratio | Measurement Point |
|---|---|
| ≥ 45 dB | E-UTRA ALCR1 |
| ≥ 50 dB | UTRA ALCR1 |
| ≥ 55 dB | UTRA ALCR2 |

Test Port1/2 Input Level range: –10 dBm ≤, ≤ +35 dBm
Test Port3/4 Input Level range: –10 dBm ≤, ≤ +25 dBm

(2) Measuring instruments

- Vector signal Generator: MG3700A
- 3 dB Attenuator: AT-103 (2 sets)

(3) Setup

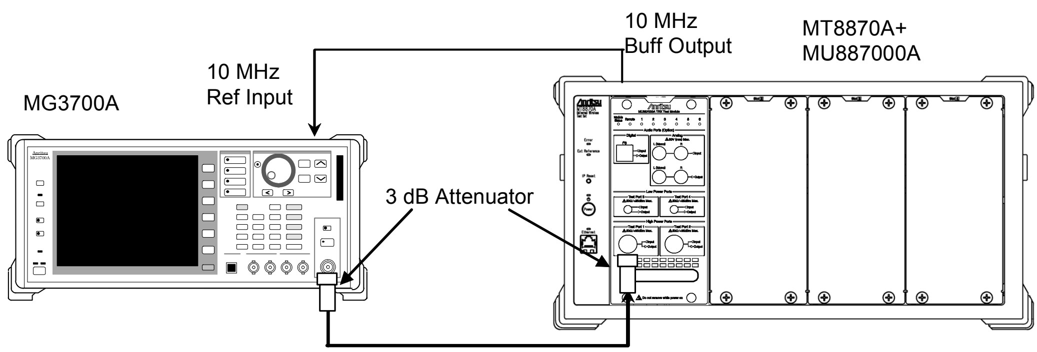


**Figure 6.6.5-1 Setup for Measuring Adjacent Channel Leakage Power Ratio**

(4) Test procedure

***Note:***

When the frequency for PCC is 698 MHz, steps 2 to 4 are not performed.

1. Setup the instruments as shown in Figure 6.6.5-1.
2. Set the MU887000A as follows:

| | |
|---|---|
| Connect Port: | Test Port1 |
| Output Level On/Off: | OFF |
| Input Level: | –10 dBm |
| Uplink Frequency: | |
| PCC: | 698.0 MHz |

SCC: 678.2 MHz (PCC–19.8MHz)
Turn Off All Measurement: OFF
ACLR Measurement: ON, 20 times

3. Set the Vector signal generator (SG) as follows:

| | |
|---|---|
| Modulation: | ON |
| Modulation wave: | Waveform pattern based on the settings in 6.5.5, "Evaluation Signals" |
| Output frequency: | 688.1 MHz (PCC–9.9MHz) |
| Output level: | –10 dBm<br>(Output level where the calibration value for the PCC frequency in the SG calibration (Section 6.5.2) is reflected) |

4. Measure the Adjacent Channel Leakage Power and read the following value:

| | |
|---|---|
| E-UTRA_ACLR_LOW: | (MAX) |
| E-UTRA_ACLR_UP: | (MAX) |
| UTRA_ACLR2_LOW: | (MAX) |
| UTRA_ACLR1_LOW: | (MAX) |
| UTRA_ACLR1_UP: | (MAX) |
| UTRA_ACLR2_UP: | (MAX) |

5. Change the SCC frequency in MU887000A as follows.

Uplink Frequency:
SCC: 717.8 MHz (PCC+19.8MHz)

6. Change the vector signal generator (SG) settings as follows.

Output frequency: 707.9 MHz (PCC+9.9MHz)

7. Measure the Adjacent Channel Leakage Power and read the following value:

| | |
|---|---|
| E-UTRA_ACLR_LOW: | (MAX) |
| E-UTRA_ACLR_UP: | (MAX) |
| UTRA_ACLR2_LOW: | (MAX) |
| UTRA_ACLR1_LOW: | (MAX) |
| UTRA_ACLR1_UP: | (MAX) |
| UTRA_ACLR2_UP: | (MAX) |

8. Change the MU887000A and SG frequencies according to 6.5.4 "Measurement Frequencies" and repeat steps 2 to 7 over.

### 6.6.6 Sample Format for Test Result Sheets

Use the following test result sheets when testing the MX887013A-001 or MX887014A-001 performance. Duplicate these sheets as necessary for tests.

| | | | |
|---|---|---|---|
| Test location | | Report No. | |
| | | Date | |
| | | Person-in-charge | |

Model:

| | | | |
|---|---|---|---|
| Serial No. | | Ambient temperature | °C |
| Power source frequency | Hz | Relative humidity | % |

Remarks

SG Calibration (CW)

**SG Calibration Value (CW)**

0 dBm

| PCC (MHz) | SG Setting (dBm) | SCC: PCC–19.8 (MHz) | SG Setting (dBm) | SCC: PCC+19.8 (MHz) | SG Setting (dBm) |
|---|---|---|---|---|---|
| 717.8 | | 698.0 | | 737.6 | |
| 2719.8 | | 2700.0 | | 2739.6 | |
| 3400.0 | | 3380.2 | | 3419.8 | |
| 3780.2 | | 3760.4 | | 3800.0 | |
| 4180.2 | | 4160.4 | | 4200.0 | |

–10 dBm

| PCC (MHz) | SG Setting (dBm) | SCC: PCC–19.8 (MHz) | SG Setting (dBm) | SCC: PCC+19.8 (MHz) | SG Setting (dBm) |
|---|---|---|---|---|---|
| 717.8 | | 698.0 | | 737.6 | |
| 2719.8 | | 2700.0 | | 2739.6 | |
| 3400.0 | | 3380.2 | | 3419.8 | |
| 3780.2 | | 3760.4 | | 3800.0 | |
| 4180.2 | | 4160.4 | | 4200.0 | |

–20 dBm

| PCC (MHz) | SG Setting (dBm) | SCC: PCC–19.8 (MHz) | SG Setting (dBm) | SCC: PCC+19.8 (MHz) | SG Setting (dBm) |
|---|---|---|---|---|---|
| 717.8 | | 698.0 | | 737.6 | |
| 2719.8 | | 2700.0 | | 2739.6 | |
| 3400.0 | | 3380.2 | | 3419.8 | |
| 3780.2 | | 3760.4 | | 3800.0 | |
| 4180.2 | | 4160.4 | | 4200.0 | |

SG Calibration (MOD)

**SG Calibration Value (MOD)**

–10 dBm

| PCC (MHz) | SG Setting (dBm) | SCC: PCC–19.8 (MHz) | SG Setting (dBm) | SCC: PCC+19.8 (MHz) | SG Setting (dBm) |
|---|---|---|---|---|---|
| 717.8 | | 698.0 | | 737.6 | |
| 2719.8 | | 2700.0 | | 2739.6 | |
| 3400.0 | | 3380.2 | | 3419.8 | |
| 3780.2 | | 3760.4 | | 3800.0 | |
| 4180.2 | | 4160.4 | | 4200.0 | |

Linearity Calibration

**Linearity Calibration**

| Frequency (MHz) | SG Level (dBm) | SA Measured Value (dBm) | Calibration Value (C) (B) – (A) (dB) | SG Level (dBm) | SA Measured Value (dBm) | Calibration Value (C) (B) – (A) (dB) |
|---|---|---|---|---|---|---|
| 698.0 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| 717.8 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| 737.6 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| 2700.0 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| 2719.8 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| 2739.6 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| 3380.2 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| 3400.0 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| 3419.8 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |

Linearity Calibration (Cont'd)

**Linearity Calibration (Cont'd)**

| Frequency (MHz) | SG Level (dBm) | SA Measured Value (dBm) | Calibration Value (C) (B) – (A) (dB) | SG Level (dBm) | SA Measured Value (dBm) | Calibration Value (C) (B) – (A) (dB) |
|---|---|---|---|---|---|---|
| 3760.4 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| 3780.2 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| 3800.0 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| 4160.4 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| 4180.2 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |
| 4200.0 | 0 | (A) | | –20 | (A) | |
| | –10 | (B) | | –30 | (B) | |
| | –20 | (B) | | –40 | (B) | |
| | –30 | (B) | | –50 | (B) | |

Tx Power Measurement Accuracy (CW)

**Tx Power Measurement Accuracy Port1/2**

MU887000A Input Level: –10 dBm (Item 6.5.1 Calibration Value)

| PCC (MHz) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) | | | |
|---|---|---|---|---|---|
| | | Lo Limit | Measurement Accuracy –10 – (Pow) | Hi Limit | Measurement uncertainty |
| 717.8 | | –0.5 | | +0.5 | ±0.15 |
| 2719.8 | | | | | |
| 3400.0 | | | | | |
| 3780.2 | | | | | |
| 4180.2 | | –0.7 | | +0.7 | ±0.33 |

MU887000A Input Level: –10 dBm (Item 6.5.1 Calibration Value)

| SCC: PCC–19.8 (MHz) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) | | | |
|---|---|---|---|---|---|
| | | Lo Limit | Measurement Accuracy –10 – (Pow) | Hi Limit | Measurement uncertainty |
| 698.0 | | –0.7 | | +0.7 | ±0.15 |
| 2700.0 | | | | | |
| 3380.2 | | –1.0 | | +1.0 | ±0.14 |
| 3760.4 | | | | | |
| 4160.4 | | –1.0 | | +1.0 | ±0.33 |

MU887000A Input Level: –10 dBm (Item 6.5.1 Calibration Value)

| SCC: PCC+19.8 (MHz) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) | | | |
|---|---|---|---|---|---|
| | | Lo Limit | Measurement Accuracy –10 – (Pow) | Hi Limit | Measurement uncertainty |
| 737.6 | | –0.7 | | +0.7 | ±0.15 |
| 2739.6 | | | | | |
| 3419.8 | | –1.0 | | +1.0 | ±0.14 |
| 3800.0 | | | | | |
| 4200.0 | | –1.0 | | +1.0 | ±0.33 |

Tx Power Measurement Accuracy (CW) (Cont'd)

**Tx Power Measurement Accuracy Port1/2**

MU887000A Input Level: –50 dBm (Item 6.5.1 Calibration Value)

| PCC (MHz) | Item 6.5.3 –50 dBm Calibration Value (C) (dB) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) Lo Limit | Measurement Accuracy –10 – (Pow) | Hi Limit | Measurement uncertainty |
|---|---|---|---|---|---|---|
| 717.8 | | | –0.7 | | +0.7 | ±0.14 |
| 2719.8 | | | | | | |
| 3400.0 | | | | | | |
| 3780.2 | | | | | | |
| 4180.2 | | | –0.9 | | +0.9 | ±0.33 |

MU887000A Input Level: –50 dBm (Item 6.5.1 Calibration Value)

| SCC: PCC–19.8 (MHz) | Item 6.5.3 –50 dBm Calibration Value (C) (dB) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) Lo Limit | Measurement Accuracy –10 – (Pow) | Hi Limit | Measurement uncertainty |
|---|---|---|---|---|---|---|
| 698.0 | | | –0.7 | | +0.7 | ±0.14 |
| 2700.0 | | | | | | |
| 3380.2 | | | –1.0 | | +1.0 | ±0.14 |
| 3760.4 | | | | | | |
| 4160.4 | | | –1.0 | | +1.0 | ±0.33 |

MU887000A Input Level: –50 dBm (Item 6.5.1 Calibration Value)

| SCC: PCC+19.8 (MHz) | Item 6.5.3 –50 dBm Calibration Value (C) (dB) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) Lo Limit | Measurement Accuracy –10 – (Pow) | Hi Limit | Measurement uncertainty |
|---|---|---|---|---|---|---|
| 737.6 | | | –0.7 | | +0.7 | ±0.14 |
| 2739.6 | | | | | | |
| 3419.8 | | | –1.0 | | +1.0 | ±0.14 |
| 3800.0 | | | | | | |
| 4200.0 | | | –1.0 | | +1.0 | ±0.33 |

Tx Power Measurement Accuracy (CW) (Cont'd)

**Tx Power Measurement Accuracy Port1/2**

MU887000A Input Level: –60 dBm (Item 6.5.1 Calibration Value)

| PCC (MHz) | Item 6.5.3 –60 dBm Calibration Value (C) (dB) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) | | | |
|---|---|---|---|---|---|---|
| | | | Lo Limit | Measurement Accuracy –20 – (Pow) | Hi Limit | Measurement uncertainty |
| 717.8 | | | –0.9 | | +0.9 | ±0.33 |
| 2719.8 | | | | | | |
| 3400.0 | | | | | | |
| 3780.2 | | | | | | |
| 4180.2 | | | –1.1 | | +1.1 | ±0.33 |

MU887000A Input Level: –60 dBm (Item 6.5.1 Calibration Value)

| SCC: PCC–19.8 (MHz) | Item 6.5.3 –50 dBm Calibration Value (C) (dB) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) | | | |
|---|---|---|---|---|---|---|
| | | | Lo Limit | Measurement Accuracy –20 – (Pow) | Hi Limit | Measurement uncertainty |
| 698.0 | | | –0.9 | | +0.9 | ±0.34 |
| 2700.0 | | | | | | |
| 3380.2 | | | –1.3 | | +1.3 | ±0.14 |
| 3760.4 | | | | | | |
| 4160.4 | | | –1.3 | | +1.3 | ±0.33 |

MU887000A Input Level: –60 dBm (Item 6.5.1 Calibration Value)

| SCC: PCC+19.8 (MHz) | Item 6.5.3 –50 dBm Calibration Value (C) (dB) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) | | | |
|---|---|---|---|---|---|---|
| | | | Lo Limit | Measurement Accuracy –20 – (Pow) | Hi Limit | Measurement uncertainty |
| 737.6 | | | –0.9 | | +0.9 | ±0.34 |
| 2739.6 | | | | | | |
| 3419.8 | | | –1.3 | | +1.3 | ±0.14 |
| 3800.0 | | | | | | |
| 4200.0 | | | –1.3 | | +1.3 | ±0.33 |

Tx Power Measurement Accuracy (CW) (Cont'd)

**Tx Power Measurement Accuracy Port3/4**

MU887000A Input Level: –10 dBm (Item 6.5.1 Calibration Value)

<table>
<tr><th rowspan="2">PCC<br>(MHz)</th><th rowspan="2">MX887013A/14A<br>Measured<br>Value (Pow)<br>(dBm)</th><th colspan="4">Measurement Accuracy (dB)</th></tr>
<tr><th>Lo<br>Limit</th><th>Measurement<br>Accuracy<br>–10 – (Pow)</th><th>Hi<br>Limit</th><th>Measurement<br>uncertainty</th></tr>
<tr><td>717.8</td><td></td><td rowspan="4">–0.7</td><td></td><td rowspan="4">+0.7</td><td rowspan="4">±0.17</td></tr>
<tr><td>2719.8</td><td></td><td></td></tr>
<tr><td>3400.0</td><td></td><td></td></tr>
<tr><td>3780.2</td><td></td><td></td></tr>
<tr><td>4180.2</td><td></td><td>–0.7</td><td></td><td>+0.7</td><td>±0.28</td></tr>
</table>

MU887000A Input Level: –10 dBm (Item 6.5.1 Calibration Value)

<table>
<tr><th rowspan="2">SCC: PCC–19.8<br>(MHz)</th><th rowspan="2">MX887013A/14A<br>Measured<br>Value (Pow)<br>(dBm)</th><th colspan="4">Measurement Accuracy (dB)</th></tr>
<tr><th>Lo<br>Limit</th><th>Measurement<br>Accuracy<br>–10 – (Pow)</th><th>Hi<br>Limit</th><th>Measurement<br>uncertainty</th></tr>
<tr><td>698.0</td><td></td><td rowspan="2">–0.7</td><td></td><td rowspan="2">+0.7</td><td rowspan="2">±0.17</td></tr>
<tr><td>2700.0</td><td></td><td></td></tr>
<tr><td>3380.2</td><td></td><td rowspan="2">–1.0</td><td></td><td rowspan="2">+1.0</td><td rowspan="2">±0.14</td></tr>
<tr><td>3760.4</td><td></td><td></td></tr>
<tr><td>4160.4</td><td></td><td>–1.0</td><td></td><td>+1.0</td><td>±0.20</td></tr>
</table>

MU887000A Input Level: –10 dBm (Item 6.5.1 Calibration Value)

<table>
<tr><th rowspan="2">SCC: PCC+19.8<br>(MHz)</th><th rowspan="2">MX887013A/14A<br>Measured<br>Value (Pow)<br>(dBm)</th><th colspan="4">Measurement Accuracy (dB)</th></tr>
<tr><th>Lo<br>Limit</th><th>Measurement<br>Accuracy<br>–10 – (Pow)</th><th>Hi<br>Limit</th><th>Measurement<br>uncertainty</th></tr>
<tr><td>737.6</td><td></td><td rowspan="2">–0.7</td><td></td><td rowspan="2">+0.7</td><td rowspan="2">±0.17</td></tr>
<tr><td>2739.6</td><td></td><td></td></tr>
<tr><td>3419.8</td><td></td><td rowspan="2">–1.0</td><td></td><td rowspan="2">+1.0</td><td rowspan="2">±0.14</td></tr>
<tr><td>3800.0</td><td></td><td></td></tr>
<tr><td>4200.0</td><td></td><td>–1.0</td><td></td><td>+1.0</td><td>±0.20</td></tr>
</table>

Tx Power Measurement Accuracy (CW) (Cont'd)

**Tx Power Measurement Accuracy Port3/4**

MU887000A Input Level: –50 dBm (Item 6.5.1 Calibration Value)

| PCC (MHz) | Item 6.5.3 –50 dBm Calibration Value (C) (dB) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) | | | |
|---|---|---|---|---|---|---|
| | | | Lo Limit | Measurement Accuracy –10 – (Pow) | Hi Limit | Measurement uncertainty |
| 717.8 | | | –0.9 | | +0.9 | ±0.14 |
| 2719.8 | | | | | | |
| 3400.0 | | | | | | |
| 3780.2 | | | | | | |
| 4180.2 | | | –0.9 | | +0.9 | ±0.20 |

MU887000A Input Level: –50 dBm (Item 6.5.1 Calibration Value)

| SCC: PCC–19.8 (MHz) | Item 6.5.3 –50 dBm Calibration Value (C) (dB) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) | | | |
|---|---|---|---|---|---|---|
| | | | Lo Limit | Measurement Accuracy –10 – (Pow) | Hi Limit | Measurement uncertainty |
| 698.0 | | | –0.9 | | +0.9 | ±0.24 |
| 2700.0 | | | | | | |
| 3380.2 | | | –1.0 | | +1.0 | ±0.24 |
| 3760.4 | | | | | | |
| 4160.4 | | | –1.0 | | +1.0 | ±0.20 |

MU887000A Input Level: –50 dBm (Item 6.5.1 Calibration Value)

| SCC: PCC+19.8 (MHz) | Item 6.5.3 –50 dBm Calibration Value (C) (dB) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) | | | |
|---|---|---|---|---|---|---|
| | | | Lo Limit | Measurement Accuracy –10 – (Pow) | Hi Limit | Measurement uncertainty |
| 737.6 | | | –0.9 | | +0.9 | ±0.24 |
| 2739.6 | | | | | | |
| 3419.8 | | | –1.0 | | +1.0 | ±0.24 |
| 3800.0 | | | | | | |
| 4200.0 | | | –1.0 | | +1.0 | ±0.20 |

Tx Power Measurement Accuracy (CW) (Cont'd)

**Tx Power Measurement Accuracy Port3/4**

MU887000A Input Level: –60 dBm (Item 6.5.1 Calibration Value)

| PCC (MHz) | Item 6.5.3 –60 dBm Calibration Value (C) (dB) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) | | | |
|---|---|---|---|---|---|---|
| | | | Lo Limit | Measurement Accuracy –20 – (Pow) | Hi Limit | Measurement uncertainty |
| 717.8 | | | –1.1 | | +1.1 | ±0.14 |
| 2719.8 | | | | | | |
| 3400.0 | | | | | | |
| 3780.2 | | | | | | |
| 4180.2 | | | –1.1 | | +1.1 | ±0.20 |

MU887000A Input Level: –60 dBm (Item 6.5.1 Calibration Value)

| SCC: PCC–19.8 (MHz) | Item 6.5.3 –60 dBm Calibration Value (C) (dB) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) | | | |
|---|---|---|---|---|---|---|
| | | | Lo Limit | Measurement Accuracy –20 – (Pow) | Hi Limit | Measurement uncertainty |
| 698.0 | | | –1.1 | | +1.1 | ±0.14 |
| 2700.0 | | | | | | |
| 3380.2 | | | –1.3 | | +1.3 | ±0.14 |
| 3760.4 | | | | | | |
| 4160.4 | | | –1.3 | | +1.3 | ±0.20 |

MU887000A Input Level: –60 dBm (Item 6.5.1 Calibration Value)

| SCC: PCC+19.8 (MHz) | Item 6.5.3 –60 dBm Calibration Value (C) (dB) | MX887013A/14A Measured Value (Pow) (dBm) | Measurement Accuracy (dB) | | | |
|---|---|---|---|---|---|---|
| | | | Lo Limit | Measurement Accuracy –20 – (Pow) | Hi Limit | Measurement uncertainty |
| 737.6 | | | –1.1 | | +1.1 | ±0.14 |
| 2739.6 | | | | | | |
| 3419.8 | | | –1.3 | | +1.3 | ±0.14 |
| 3800.0 | | | | | | |
| 4200.0 | | | –1.3 | | +1.3 | ±0.20 |

Tx Power Measurement Linearity

**Linearity (±0.2 dB: 0 to –30 dB, ≥ –50 dBm, Reference Level 0 dBm)**

| Frequency (MHz) | SG LEVEL (dBm) | Item 6.5.3 Calibration Value (C) (dB) | MX887013A/14A Measured Value (dBm) | Linearity (D) – (REF) – (C) (dB) | Spec. (dB) | Measurement uncertainty |
|---|---|---|---|---|---|---|
| 698.0 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| 717.8 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| 737.6 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| 2700.0 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| 2719.8 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| 2739.6 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| 3380.2 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| 3400.0 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| 3419.8 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |

Tx Power Measurement Linearity (Cont'd)

**Linearity (±0.2 dB: 0 to –30 dB, ≥ –50 dBm, Reference Level 0 dBm) (Cont'd)**

| Frequency (MHz) | SG LEVEL (dBm) | Item 6.5.3 Calibration Value (C) (dB) | MX887013A/14A Measured Value (dBm) | Linearity (D) – (REF) – (C) (dB) | Spec. (dB) | Measurement uncertainty |
|---|---|---|---|---|---|---|
| 3760.4 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| 3780.2 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| 3800.0 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| 4160.4 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| 4180.2 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |
| 4200.0 | 0 | | (REF) | | | |
| | –10 | | (D) | | ±0.2 | ±0.05 |
| | –20 | | (D) | | | |
| | –30 | | (D) | | | |

Tx Power Measurement Linearity (Cont'd)

**Linearity (±0.2 dB: 0 to –30 dB, ≥ –60 dBm, Reference Level –20 dBm)**

| Frequency (MHz) | SG LEVEL (dBm) | Item 6.5.3 Calibration Value (C) (dB) | MX887013A/14A Measured Value (dBm) | Linearity (D) – (REF) – (C) (dB) | Spec. (dB) | Measurement uncertainty |
|---|---|---|---|---|---|---|
| 698.0 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| 717.8 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| 737.6 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| 2700.0 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| 2719.8 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| 2739.6 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| 3380.2 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| 3400.0 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| 3419.8 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |

Tx Power Measurement Linearity (Cont'd)

**Linearity (±0.2 dB: 0 to –30 dB, ≥ –60 dBm, Reference Level –20 dBm) (Cont'd)**

| Frequency (MHz) | SG LEVEL (dBm) | Item 6.5.3 Calibration Value (C) (dB) | MX887013A/14A Measured Value (dBm) | Linearity (D) – (REF) – (C) (dB) | Spec. (dB) | Measurement uncertainty |
|---|---|---|---|---|---|---|
| 3760.4 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| 3780.2 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| 3800.0 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| 4160.4 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| 4180.2 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |
| 4200.0 | –20 | | (REF) | | | |
| | –30 | | (D) | | ±0.2 | ±0.05 |
| | –40 | | (D) | | | |
| | –50 | | (D) | | | |

Frequency/Modulation Measurement

**Residual EVM/Carrier Frequency Accuracy**

MU887000A Input Level: –10 dBm/–40 dBm

| Frequency (MHz) | Residual EVM (%) | | | Carrier Frequency Accuracy (Hz) | | |
|---|---|---|---|---|---|---|
| | Measured Value | Spec. | Measurement uncertainty | Measured Value | Spec. | Measurement uncertainty |
| 698.0 | | $\leq 2.5$ | ±0.1 | | ±15.0 | ±3.0 |
| 717.8 | | | | | | |
| 737.6 | | | | | | |
| 2700.0 | | | | | | |
| 2719.8 | | | | | | |
| 2739.6 | | | | | | |
| 3380.2 | | | | | | |
| 3400.0 | | | | | | |
| 3419.8 | | | | | | |
| 3760.4 | | | | | | |
| 3780.2 | | | | | | |
| 3800.0 | | | | | | |
| 4160.4 | | $\leq 2.5$ | ±0.1 | | ±15.0 | ±3.0 |
| 4180.2 | | | | | | |
| 4200.0 | | | | | | |

In-Band Emission Measurement

**In-Band Emission**

MU887000A Input Level: –10 dBm

| SG Frequency (PCC+9.9) (MHz) | PCC (dB) | SCC (dB) | Spec. |
|---|---|---|---|
| 707.9 | | | ≤ –40 dBc |
| 2709.9 | | | |
| 3409.9 | | | |
| 3809.9 | | | |
| 4190.1 | | | ≤ –40 dBc |

Adjacent Channel Leakage Power Ratio Measurement

**Adjacent Channel Leakage Power Ratio**

MU887000A Input Level: –10 dBm

| SG Frequency (MHz) | | Adjacent Channel Leakage Power Ratio (dB) | | | | | |
|---|---|---|---|---|---|---|---|
| PCC Frequency (MHz) | PCC±9.9 (MHz) | Band | | | | | |
| | | UTRA (–2) | UTRA (–1) | UTRA (+1) | UTRA (+2) | E-UTRA (–1) | E-UTRA (+1) |
| 698.0 | +9.9 | | | | | | |
| 2700.0 | –9.9 | | | | | | |
| | +9.9 | | | | | | |
| 3400.0 | –9.9 | | | | | | |
| | +9.9 | | | | | | |
| 3800.0 | –9.9 | | | | | | |
| | +9.9 | | | | | | |
| 4180.2 | –9.9 | | | | | | |
| | +9.9 | | | | | | |
| Spec. (dB) | | ≥ 55 dB | ≥ 50 dB | ≥ 50 dB | ≥ 55 dB | ≥ 45 dB | ≥ 45 dB |
| Measurement uncertainty | | 1 dB | | | | | |

# 6.7 Servicing

If any unit is found to be broken or does not operate as described in the specifications, contact an Anritsu Service and Sales office. Contact information can be found on the last page of the printed version of this manual, and is available in a separate file on the PDF version.

When requesting repair, supply the following information:

(a) Model name and serial number marked on rear panel

(b) Failure symptoms

(c) Person to contact about nature of failure and repair completion notification

(d) Software version

# Appendix A Specifications

This appendix lists the specifications of the MX887013A LTE FDD Uplink TX Measurement and MX887014A LTE TDD Uplink TX Measurement. Refer to section 1.2 “Composition” for details of the product configuration.

# A.1 MX887013A/MX887014A

This section explains the specifications of MX887013A LTE FDD Uplink and MX887014A LTE TDD Uplink where the software options are not installed.

These specifications assume use of the system at a constant temperature after warming-up the instruments for 30 minutes. The abbreviation (typ.) indicates the reference data at 20 to 30°C and is not a guaranteed value.

**Table A.1-1　MX887013A/MX887014A Specifications**

| Item | Specification |
|---|---|
| Common Items | |
| Frequency | 600 to 2700 MHz, 3400 to 3800 MHz<br>600 to 2700 MHz, 3400 to 4200 MHz (with MU887000A-001/101) |
| Measuring Object | PUSCH, PUCCH |

**Table A.1-1 MX887013A/MX887014A Specifications (Cont'd)**

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>RF Power</td><td></td></tr>
<tr><td>Input Level Range</td><td>Port1, Port2: –65.0 to +35.0 dBm<br>Port3, Port4: –65.0 to +25.0 dBm</td></tr>
<tr><td>Measurement Accuracy</td><td>Port1, Port2:<br>Frequency: 600 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 3800 MHz<br>(After calibration, 20 to 30°C)
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +35 dBm</td><td>±0.3 dB (typ.)</td></tr>
</table>
Frequency: 600 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 3800 MHz<br>(After calibration, 10 to 40°C)
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +35 dBm</td><td>±0.5 dB</td></tr>
<tr><td>–50 to –20 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±0.9 dB</td></tr>
</table>
Frequency: 3800 MHz < f ≤ 4200 MHz (After calibration, 20 to 30°C)
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +35 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–50 to –20 dBm</td><td>±0.9 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.1 dB</td></tr>
</table>
Port3, Port4:<br>Frequency: 600 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 3800 MHz<br>(After calibration, 10 to 40°C)
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +25 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–50 to –20 dBm</td><td>±0.9 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.1 dB</td></tr>
</table>
Frequency: 3800 MHz < f ≤ 4200 MHz (After calibration, 20 to 30°C)
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +25 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–50 to –20 dBm</td><td>±0.9 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.1 dB</td></tr>
</table></td></tr>
<tr><td>Linearity</td><td>Frequency: 600 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 4200 MHz
<table>
<tr><th>Input Level</th><th>Linearity</th></tr>
<tr><td>≥–50 dBm (0 to 40 dB)</td><td>±0.2 dB</td></tr>
<tr><td>≥–60 dBm (0 to 40 dB)</td><td>±0.4 dB</td></tr>
</table></td></tr>
<tr><td>Relative Level Accuracy</td><td>For range <2 dB<br>Frequency: 600 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 4200 MHz
<table>
<tr><th>Input Level</th><th>Relative Measurement Accuracy</th></tr>
<tr><td>≥–50 dBm (0 to 40 dB)</td><td>±0.1 dB (typ.)</td></tr>
</table></td></tr>
</table>

**Table A.1-1 MX887013A/MX887014A Specifications (Cont'd)**

| Item | Specification |
|---|---|
| Modulation Analysis | |
| Input Level Range | Port1, Port2: –40.0 to +35.0 dBm<br>Port3, Port4: –40.0 to +25.0 dBm |
| Carrier Frequency Accuracy | ±(Set frequency × Reference oscillator accuracy + 15 Hz)<br>Frequency: 600 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 4200 MHz |
| Modulation accuracy | Residual Vector Error: ≤2.5%<br>Frequency: 600 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 4200 MHz<br>(20 averaging times) |
| In-Band Emissions | ≤–40 dBc (Input Level ≥–10 dBm and Allocated RBs ≤18) |
| Occupied Bandwidth | |
| Input Level Range | Port1, Port2: –10.0 to +35.0 dBm<br>Port3, Port4: –10.0 to +25.0 dBm |
| OBW Ratio | 80.0 to 99.9% |
| Adjacent Channel Leakage Power Ratio | |
| Input Level Range | Port1, Port2: –10.0 to +35.0 dBm<br>Port3, Port4: –10.0 to +25.0 dBm |
| Measurement Range | Frequency: 600 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 4200 MHz<br>Adjacent Channel: Measurement Range<br>E-UTRA ACLR1: ≥ 45 dB<br>UTRA ACLR1: ≥ 50 dB<br>UTRA ACLR2: ≥ 55 dB |
| Spectrum Emission Mask (SEM) | |
| Input Level Range | Port1, Port2: –10.0 to +35.0 dBm<br>Port3, Port4: –10.0 to +25.0 dBm |

# A.2 MX887013A-001/MX887014A-001

This section explains the specifications of MX887013A-001 LTE-Advanced FDD Uplink CA TX Measurement and MX887014A-001 LTE-Advanced TDD Uplink CA TX Measurement.
These specifications assume use of the system at a constant temperature after warming-up the instruments for 30 minutes. The abbreviation (typ.) indicates the reference data at 20 to 30°C and is not a guaranteed value.

**Table A.2-1 MX887013A-001/MX887014A-001 Specifications**

| Item | Specification |
|---|---|
| Common Items | |
| Frequency | 698 to 2700 MHz, 3400 to 3800 MHz<br>698 to 2700 MHz, 3400 to 4200 MHz<br>(with MU887000A-001/101) |
| Measuring Object | PUSCH |

**Table A.2-1 MX887013A-001/MX887014A-001 Specifications (Cont'd)**

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>RF Power</td><td></td></tr>
<tr><td>Input Level Range</td><td>Port1, Port2: –65.0 to +35.0 dBm<br>Port3, Port4: –65.0 to +25.0 dBm</td></tr>
<tr><td>Measurement Accuracy</td><td>Port1, Port2:<br>(Excluding when measuring Intraband Contiguous CA SCC and PCC + SCC)<br>Frequency: 698 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 3800 MHz<br>(After calibration, 20 to 30°C)
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +35 dBm</td><td>±0.3 dB (typ.)</td></tr>
</table>
Frequency: 698 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 3800 MHz<br>(After calibration, 10 to 40°C)
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +35 dBm</td><td>±0.5 dB</td></tr>
<tr><td>–50 to –20 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±0.9 dB</td></tr>
</table>
Frequency: 3800 MHz < f ≤ 4200 MHz (After calibration, 20 to 30°C)
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +35 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–50 to –20 dBm</td><td>±0.9 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.1 dB</td></tr>
</table>
Port1, Port2:<br>(When measuring Intraband Contiguous CA SCC and PCC + SCC)<br>Frequency: 698 MHz ≤ f ≤ 2700 MHz (After calibration, 20 to 30°C)
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +35 dBm</td><td>±0.5 dB (typ.)</td></tr>
</table>
Frequency: 698 MHz ≤ f ≤ 2700 MHz (After calibration, 10 to 40°C)
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–50 to +35 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±0.9 dB</td></tr>
</table>
Frequency: 3400 MHz ≤ f ≤ 3800 MHz (After calibration, 10 to 40°C)
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–50 to +35 dBm</td><td>±1.0 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.3 dB</td></tr>
</table>
Frequency: 3800 MHz < f ≤ 4200 MHz (After calibration, 20 to 30°C)
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–50 to +35 dBm</td><td>±1.0 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.3 dB</td></tr>
</table>
</td></tr>
</table>

**Table A.2-1 MX887013A-001/MX887014A-001 Specifications (Cont'd)**

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Measurement Accuracy</td><td>Port3, Port4:<br>(Excluding when measuring Intraband Contiguous CA SCC and PCC + SCC)<br>Frequency: 698 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 3800 MHz<br>(After calibration, 10 to 40°C)
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +25 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–50 to –20 dBm</td><td>±0.9 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.1 dB</td></tr>
</table>
Frequency: 3800 MHz < f ≤ 4200 MHz (After calibration, 20 to 30°C)
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +25 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–50 to –20 dBm</td><td>±0.9 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.1 dB</td></tr>
</table>
Port3, Port4:<br>(When measuring Intraband Contiguous CA SCC and PCC + SCC)<br>Frequency: 698 MHz ≤ f ≤ 2700 MHz (After calibration, 10 to 40°C)
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +25 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–50 to –20 dBm</td><td>±0.9 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.1 dB</td></tr>
</table>
Frequency: 3400 MHz ≤ f ≤ 3800 MHz (After calibration, 10 to 40°C)
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–50 to +25 dBm</td><td>±1.0 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.3 dB</td></tr>
</table>
Frequency: 3800 MHz < f ≤ 4200 MHz (After calibration, 20 to 30°C)
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–50 to +25 dBm</td><td>±1.0 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.3 dB</td></tr>
</table>
</td></tr>
<tr><td>Linearity</td><td>Frequency: 698 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 4200 MHz<br>(20 to 30°C)
<table>
<tr><th>Input Level</th><th>Linearity</th></tr>
<tr><td>≥–50 dBm (0 to 30 dB)</td><td>±0.2 dB</td></tr>
<tr><td>≥–60 dBm (0 to 30 dB)</td><td>±0.4 dB</td></tr>
</table>
</td></tr>
</table>

Appendix

Appendix A

**Table A.2-1 MX887013A-001/MX887014A-001 Specifications (Cont'd)**

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Modulation Analysis</td><td></td></tr>
<tr><td>Input Level Range</td><td>Port1, Port2: –40.0 to +35.0 dBm<br>Port3, Port4: –40.0 to +25.0 dBm</td></tr>
<tr><td>Carrier Frequency Accuracy</td><td>±(Set frequency × Reference oscillator accuracy + 15 Hz)<br>Frequency: 698 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 4200 MHz</td></tr>
<tr><td>Modulation accuracy</td><td>Residual Vector Error: ≤ 2.5%<br>Frequency: 698 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 4200 MHz<br>(20 averaging times)</td></tr>
<tr><td>In-Band Emissions</td><td>≤–40 dBc (Input Level ≥ –10 dBm and Allocated RBs ≤ 18)</td></tr>
<tr><td>Occupied Bandwidth</td><td></td></tr>
<tr><td>Input Level Range</td><td>Port1, Port2: –10.0 to +35.0 dBm<br>Port3, Port4: –10.0 to +25.0 dBm</td></tr>
<tr><td>OBW Ratio</td><td>80.0 to 99.9%</td></tr>
<tr><td>Adjacent Channel Leakage Power Ratio</td><td></td></tr>
<tr><td>Input Level Range</td><td>Port1, Port2: –10.0 to +35.0 dBm<br>Port3, Port4: –10.0 to +25.0 dBm</td></tr>
<tr><td>Measurement Range</td><td>Frequency: 698 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 4200 MHz<table><tr><td>Adjacent Channel</td><td>Measurement Range</td></tr><tr><td>E-UTRA ACLR1</td><td>≥ 45 dB</td></tr><tr><td>UTRA ACLR1</td><td>≥ 50 dB</td></tr><tr><td>UTRA ACLR2</td><td>≥ 55 dB</td></tr></table></td></tr>
<tr><td>Spectrum Emission Mask (SEM)</td><td></td></tr>
<tr><td>Input Level Range</td><td>Port1, Port2: –10.0 to +35.0 dBm<br>Port3, Port4: –10.0 to +25.0 dBm</td></tr>
</table>

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