MX887011A
W-CDMA/HSPA Uplink
TX Measurement
Operation Manual

Sixth 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-W3608AE-6.0

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

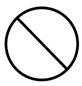
⚠ **DANGER** — This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.

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

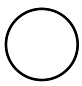
⚠ **CAUTION** — This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction if proper precautions are not taken.

Safety Symbols Used on Equipment and in Manual

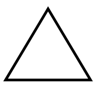
The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Ensure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.



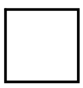
This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.



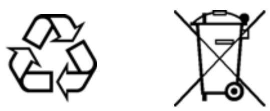
This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.



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.

MX887011A
W-CDMA/HSPA Uplink TX Measurement
Operation Manual

20 August 2012 (First Edition)
20 January 2017 (Sixth 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.
   - v) For any other reasons out of Anritsu's direct control and responsibility, such as but not limited to, natural disasters, software virus infections, etc.

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c. The warranty period for faults listed in article 3a above covered by this EULA shall be either 6 months from the date of purchase of this Software or 30 days after the date of repair, whichever is longer.

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If Anritsu suffers any loss, financial or otherwise, due to your violation of the terms of this EULA, Anritsu shall have the right to seek proportional damages from you.

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Upon termination of this EULA in accordance with item 5, you shall cease all use of this Software immediately and shall as directed by Anritsu either destroy or return this Software and any backup copies, full or partial, to Anritsu.

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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: MX887011A W-CDMA/HSPA Uplink TX Measurement

2. Applied Directive and Standards

When the MX887011A W-CDMA/HSPA Uplink TX Measurement is installed in the MT8870A, the applied directive and standards of this software conform to that of the MT8870A main frame.

PS: About main frame
Please contact Anritsu for the latest information on the main frame types that MX887011A 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: MX887011A W-CDMA/HSPA Uplink TX Measurement

2. Applied Directive and Standards

When the MX887011A W-CDMA/HSPA Uplink TX Measurement is installed in the MT8870A, the applied directive and standards of this software conform to that of the MT8870A main frame.

PS: About main frame

Please contact Anritsu for the latest information on the main frame types that MX887011A can be used with.

About This Manual

This manual mainly describes the use, panels, and specifications of the MX887011A W-CDMA/HSPA 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 of 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.

MX887011A W-CDMA/HSPA Uplink TX Measurement Operation Manual

Describes the functions and remote commands of the W-CDMA/HSPA Uplink Transmit Measurement software.

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.

Table of Contents

Chapter 1 Outline

This chapter outlines the MX887011A W-CDMA/HSPA Uplink Tx Measurement. Refer to Appendix A “Specifications” for the software function and specifications.

1.1 Outline

The MX887011A W-CDMA/HSPA Uplink TX Measurement. (hereafter MX887011A) measures the 3GPP-specified Tx characteristics of mobile stations.

The RF (downlink) signal output from the MU887000A is input to the RF connector of the mobile station and the signal output (uplink) from the mobile station is input to the MU887000A.
Any file pattern can be specified at the MX887011A to send as the downlink W-CDMA signal waveform. The downlink signal is sent as a modulation signal pattern read from memory, irrespective of the uplink signal information (non-signalling).

The MX887011A software does not support signalling transmission methods in which the uplink signal information, such mobile call processing, is detected and the downlink signal modulation is changed.

1.2 Features

The MX887011A software features:

(1) High-speed measurement

High-speed measurement is supported by the latest processor and measurement algorithm.

(2) Sequence measurement

Multiple measurements can be executed using pre-programmed sequences to save time and cost at standard mobile tests.

1.3 Composition

The composition of the MX887011A is shown in the Table 1.3-1.

Table 1.3-1 Composition

Item	Model/Code	Name	Qty	Remarks
Software		Storage media (DVD, etc.)	1	
	MX887011A	W-CDMA/HSPA Uplink TX Measurement		On storage media (DVD, etc.)
	W3608AE	MX887011A W-CDMA/HSPA Uplink TX Measurement Operation Manual		English, on storage media (DVD, etc.)

1.4 License Registration

Before the MX887011A software can be used, the software license must be registered in the MU887000A.

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

1.5 Abbreviations

The abbreviations used in this manual are listed in Table 1.5-1.

Table 1.5-1 Abbreviations

Abbreviations	Name
3GPP	Third Generation Partnership Project
ACK	Acknowledge
ACLR	Adjacent Channel Leakage Power Ratio
AVG	Average
BER	Bit Error Rate
BLER	Block Error Rate
CDE	Code Domain Error
CDP	Code Domain Power
CQI	Channel Quality Indicator
DCCH	Dedicated Control Channel
DTCH	Dedicated Traffic Channel
DL	Downlink
DPCCH	Dedicated Physical Control Channel
DPDCH	Dedicated Physical Data Channel
ECDP	Effective Code Domain Power
E-DPCCH	Enhanced Dedicated Physical Control Channel
E-DPDCH	Enhanced Dedicated Physical Data Channel
EVM	Error Vector Magnitude
HS-DPCCH	High Speed Dedicated Physical Control Channel
HS-DPDCH	High Speed Dedicated Physical Data Channel
HSPA	High Speed Packet Access
ILPC	Inner Loop Power Control
IQ	In-band and Quadrature-band
NACK	Negative Acknowledge
OBW	Occupied Bandwidth
PCDE	Peak Code Domain Error
PDISC	Phase Discontinuity
QPSK	Quadrature Phase Shift Keying
RCDE	Relative Code Domain Error
RRC	Root-Raised Cosine
SCPI	Standard Commands for Programmable Instruments

Table 1.5-1 Abbreviations (Cont'd)

Abbreviations	Name
SEM	Spectrum Emission Mask
TFCI	Transport Format Combination Indicator
TPC	Transmit Power Control
TTL	Total
UL	Uplink
W-CDMA	Wideband Code Division Multiple Access

Chapter 2 Fundamental Measurement

This chapter describes the fundamental functions and commands of the MX887011A. For details of the commands, refer to Chapter 4 “SCPI Command Reference” and Chapter 5 “Native Command Reference”.

2.1 Common Operations

This section explains 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 using the following command.

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

Switch the MU887000A measurement standard using the following command.
Set the parameter to WCDMA when a function described in sections 2.2 “Transmit Power” to 2.9 “Phase Discontinuity” is to be used.
Set the parameter to SEQUENCE when a function described in Chapter 3 “Sequence Measurement” is to be used.

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

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

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 frequency)
  `ULFREQ`
  `TXFREQ`
  `:CONFigure:CELLular:MEASurement:RFSettings:FREQuency`
- Downlink Channel
  `DLCHAN`
  `:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel`
- Downlink Frequency (mobile station Rx frequency)
  `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, respectively.

- 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 “Fundamental Operation” in the *MU887000A TRX Test Module Operation Manual* for an explanation of the commands and loss correction data.

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`

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* for detail descriptions of the commands.

- To load the 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 the 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 a WCDMA waveform pattern, specify a file of MV887011A W-CDMA/HSPA 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 MV887011A W-CDMA/HSPA Downlink Waveform files.

2.1.6 Setting WCDMA signal

Set the following items to configure the WCDMA signal.

Channel configuration

Select one of the uplink signal channel configurations listed below. The measurement items vary depending on the selected uplink signal channel configuration.

Table 2.1.6-1 Channel Configuration Settings and Measurement Items

Measurement Item	Channel Configuration					
	QPSK	WCDMA	WCDMA+ HSDPA	WCDMA+ HSUPA	WCDMA+ HSPA	WCDMA+ HSPA+
Tx Power	✓	✓	✓	✓	✓	✓
Occupied Bandwidth	✓	✓	✓	✓	✓	✓
Spectrum Emission Mask	✓	✓	✓	✓	✓	✓
Adjacent Channel Leakage Power Ratio	✓	✓	✓	✓	✓	✓
Modulation Analysis						
Carrier Frequency	✓	✓	✓	✓	✓	✓
EVM	✓	✓	✓	✓	✓	✓
Phase Error	✓	✓	✓	✓	✓	✓
Magnitude Error	✓	✓	✓	✓	✓	✓
IQ Imbalance	✓	✓	✓	✓	✓	✓
Timing Error	–	✓	✓	✓	✓	✓
DPCCH/DPDCH Power Ratio	–	✓	✓	✓	✓	✓
Peak Code Domain Error	–	✓	✓	✓	✓	✓
Relative Code Domain Error						
DPCCH	–	✓	✓	✓	✓	✓
DPDCH	–	✓	✓	✓	✓	✓
HS-DPCCH	–	–	✓	✓	✓	✓
E-DPCCH	–	–	–	✓	✓	✓
E-DPDCH1	–	–	–	✓	✓	✓
E-DPDCH2	–	–	–	✓	✓	✓
E-DPDCH3	–	–	–	–	–	✓
E-DPDCH4	–	–	–	–	–	✓

✓: Measurement supported

–: Measurement not supported

Scrambling code

The scrambling code assigned to each mobile station is a 24-bit spread code. Set the same value as the scrambling code set at the test mobile.

Long Span Code Search

The duration for detecting the uplink synchronization signal varies with the Long Span Code Search setting.
When Long Span Code Search is enabled, the uplink signal detection time becomes longer. If the uplink signal cannot be synchronized readily, the measurement time may be increased due to the time taken until synchronization is achieved.
When Long Span Code Search is disabled, the uplink signal detection time is shorter. If the Uplink and Downlink signals are already synchronized, turn off Long Span Code Search to shorten the measurement time.

Uplink and downlink channels

Set the frequency of the MU887000A TRx signals using the channel numbers specified in 3GPP TS 25.101 5.4 “Channel Arrangement”. Changing the channel number changes the related downlink and uplink frequencies. However, changing the frequencies does not change the channel number.

The relationships between the uplink channel number (N_{UL}) and the uplink frequencies (F_{UL}), and between the downlink channel number (N_{DL}) and downlink frequencies (F_{DL}) are shown as follows:

$N_{UL} = 5 \times (F_{UL} - F_{UL\_Offset})$ where $F_{UL\_low} \leq F_{UL} \leq F_{UL\_high}$

$N_{DL} = 5 \times (F_{DL} - F_{DL\_Offset})$ where $F_{DL\_low} \leq F_{DL} \leq F_{DL\_high}$

The subscripts used above are explained below. These values are specified for each frequency band.

	Uplink	Downlink
Offset frequency of frequency band	F_{UL_Offset}	F_{DL_Offset}
Lower limit frequency of frequency band	F_{DL_low}	F_{UL_low}
Higher limit frequency of frequency band	F_{UL_high}	F_{DL_high}

Table 2.1.6-2 E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation (Reprinted from Table 5.0A and Table 5.1 of 3GPP TS25.101)

Band	Frequency Separation (MHz)	Uplink			Downlink		
		UARFCN Formula Offset F_{UL_Offset} [MHz]	Carrier Frequency (F_{UL}) Range [MHz]		UARFCN Formula Offset F_{DL_Offset} [MHz]	Carrier Frequency (F_{DL}) Range [MHz]	
			F_{UL_low}	F_{UL_high}		F_{DL_low}	F_{DL_high}
I	190	0	1922.4	1977.6	0	2112.4	2167.6
II	80	0	1852.4	1907.6	0	1932.4	1987.6
III	95	1525	1712.4	1782.6	1575	1807.4	1877.6
IV	400	1450	1712.4	1752.6	1805	2112.4	2152.6
V	45	0	826.4	846.6	0	871.4	891.6
VI	45	0	832.4	837.6	0	877.4	882.6
VII	120	2100	2502.4	2567.6	2175	2622.4	2687.6
VIII	45	340	882.4	912.6	340	927.4	957.6
IX	95	0	1752.4	1782.4	0	1847.4	1877.4
X	400	1135	1712.4	1767.6	1490	2112.4	2167.6
XI	48	733	1430.4	1445.4	736	1478.4	1493.4
XII	30	–22	701.4	713.6	–37	731.4	743.6
XIII	31	21	779.4	784.6	–55	748.4	753.6
XIV	30	12	790.4	795.6	–63	760.4	765.6
XIX	45	770	832.4	842.6	735	877.4	887.6
XX	41	–23	834.4	859.6	–109	793.4	818.6
XXI	48	1358	1450.4	1460.4	1326	1498.4	1508.4
XXV	80	875	1852.4	1912.6	910	1932.4	1992.6
XXVI	45	–291	816.4	846.6	–291	861.4	891.6

The following commands are used to set the W-CDMA/HSPA signals.

- Channel Configuration
  `ULCONFIG`
  `:CONFigure:CELLular:WCDMa:ULConfig`
- Uplink Channel
  `ULCHAN`
  `:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel`
- Downlink Channel
  `DLCHAN`
  `:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel`
- Scrambling Code
  `SCRCODE`
  `:CONFigure:CELLular:WCDMa:SCODe`
- Long Span Code Search
  `LSCODESEARCH`
  `:CONFigure:CELLular:WCDMa:FUNDamental:LSSearch`

2.1.7 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:

There is no trigger for starting W-CDMA/HSPA fundamental measurement. Measurement starts as soon as the measurement start command is sent. Refer to the Section 3 "Sequence Measurement" for the trigger in Sequence Measurement.

Use the following command when not measuring.

Setting all measurements to off

```
ALLMEASITEMS_OFF
:CONFigure:CELLular:WCDMa:FUNDamental:AMITems:OFF
```

Stopping measurement

To stop measurement, send the following command.

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

Checking measurement status

To query the measurement status and errors, send the following command.

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

Table 2.1.7-1 Query Responses

Response	Meaning
0	Measurement completed normally
2	Level exceeded The MU887000A receive level is higher than the set input level.
5	Synchronization word not detected The frame synchronization failed when the Long Span Code Search was Off, because the correct downlink signal was not output.
9	Measurement in progress or not executed
12	Tx measurement timeout 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 MX887011A status registers are described in the following tables.

Native command mode:

Table 2.1.7-2 Bit Definitions 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 2.1.7-3 Bit Definitions 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 2.1.7-4 Bit Definitions 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 2.1.7-5 Bit Definitions 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 2.1.7-6 Bit Definitions 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 2.1.7-7 Bit Definitions 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 2.1.7-8 Bit Definitions 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 2.1.7-9 Bit Definitions 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 over

2.2 Transmit Power

Measurement of the Tx power measures the power of the uplink signal sent from the mobile stations as well as the power after passage through an RRC (Root Raised Cosine) filter.

The uplink Tx power measurement settings are:

Channel and frequency of input signals

Set the frequency of the RF signal input to the MU887000A by referring to the command in section 2.1.3 “Frequency and level”. Set the channel of the RF signal input to the MU887000A by referring to the command in section 2.1.6 “Setting WCDMA signal”.

Input level

Set the level of the RF signal input to the MU887000A by referring to the command in section 2.1.3 “Frequency and level”.

Port

Set the input port for the MU887000A by referring to the command in section 2.1.2 “Setting ports”.

Starting measurement and measurement count

Start Tx power measurement and specify the measurement count. The power for 1 slot (0.667 ms) is measured at single measurement. The measurement count can be set from 1 to 200.

```
PWR_SET
:CONFigure:CELLular:WCDMa: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, Peak Code Domain Error, Relative Code Domain Error, Phase Discontinuity, Bit Error Rate, and Block Error Rate cannot be measured.
In Fast Power Measurement Mode, measure either of Tx Power or Filter Power.

- Fast Power Measurement Mode
  ```
  FASTPWRMODE
  :CONFigure:CELLular:WCDMa:FUNDamental:POWer:FMODe
  ```
- Fast Power Measurement Mode - RRC filter
  ```
  FASTPWR_RRC
  ```

```
:CONFigure:CELLular:WCDMa:FUNDamental:POWer:FRRC
```

Use the following commands to query the Tx power measurement results. The minimum, average, maximum, standard deviation, and unique measurement values can be set as the measurement result type.

- Tx Power
  TXPWR
  :FETCh:CELLular:WCDMa:FUNDamental:POWer:TXPower
- Filter Power
  FILTPWR
  :FETCh:CELLular:WCDMa:FUNDamental:POWer:FLTPower

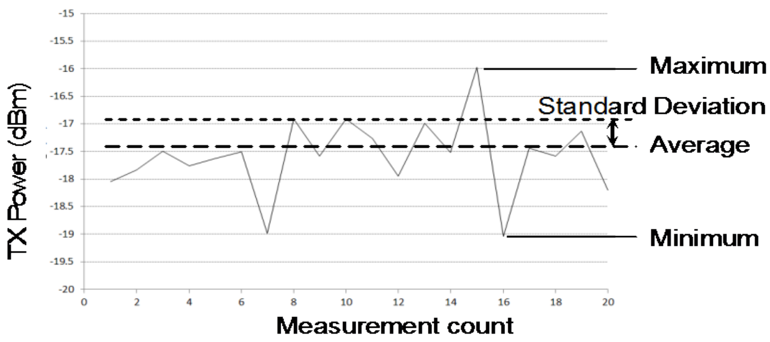


Figure 2.2-1 Types of Measurement Results

2.3 Occupied Bandwidth

The Occupied Bandwidth is the width of the measured spectrum with a specified proportion of the total power.

The following items are measured and displayed at Occupied Bandwidth measurement.

Occupied Bandwidth (OBW)

This is the bandwidth with a specific proportion of the total power of the signal input to the MU887000A.

Upper frequency

The frequency $f_{upper,}$ is found as the power of $\dfrac{100 - Occupation\_ratio}{2}\%$ within the total power from the measured waveform upper limit.
Upper frequency is the difference between this found frequency f_{upper} and the set uplink frequency.

Lower frequency

The frequency $f_{lower,}$ is found as the power of $\dfrac{100 - Occupation\_ratio}{2}\%$ within the total power from the measured waveform lower limit.
Lower frequency is the difference between this found frequency f_{lower} and the set uplink frequency.

Center frequency

The center frequency is found from $\dfrac{f_{upper} + f_{lower}}{2}$.

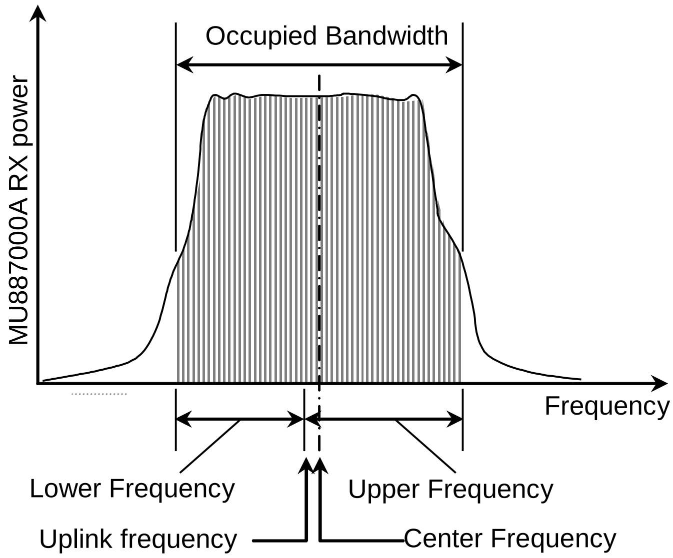


Figure 2.3-1 Occupied Bandwidth

The Occupied Bandwidth measurement settings are:

Channel and frequency of input signals

Specify the channel and frequency of the RF signal input to the MU887000A by referring to the commands in section 2.1.3 “Frequency and level” and section 2.1.6 “Setting WCDMA signal”.

Input level

Set the level of the RF signal input to the MU887000A by referring to the command in section 2.1.3 “Frequency and level”.

Port

Set the input port for the MU887000A by referring to the command in section 2.1.2 “Setting ports”.

Occupied 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:WCDMa: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 slot (0.667 ms) is measured at each measurement count. The measurement count can be set from 1 to 200.

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

Use the following commands to query Occupied Bandwidth measurement results.
To query a frequency, select one of upper frequency, lower frequency and center frequency.

- Occupied Bandwidth
  ```
  OBW
  :FETCh:CELLular:WCDMa:FUNDamental:OBW
  ```

- Occupied Bandwidth Frequency
  ```
  OBWFREQ
  :FETCh:CELLular:WCDMa:FUNDamental:OBW:FREQuency
  ```

2.4 Spectrum Emission Mask

Spectrum Emission Mask measurement measures the peak level and margin at the conditions specified in TS 34.121-1 5.9 Spectrum Emission Mask.

Table 2.4-1 Spectrum Emission Mask Requirement (reprinted from TS 34.121-1 Table 5.9.1)

Frequency Difference Δf MHz (Note 1)	Minimum Requirement (Note 2)		Measurement Bandwidth
	Relative Requirement	Absolute Requirement	
2.5 to 3.5	$\left\{-35-15\cdot\left(\frac{\Delta f}{MHz}-2.5\right)\right\}$dBc	–71.1 dBm	30 kHz (Note 3)
3.5 to 7.5	$\left\{-35-1\cdot\left(\frac{\Delta f}{MHz}-3.5\right)\right\}$dBc	–55.8 dBm	1 MHz (Note 4)
7.5 to 8.5	$\left\{-35-10\cdot\left(\frac{\Delta f}{MHz}-7.5\right)\right\}$dBc	–55.8 dBm	1 MHz (Note 4)
8.5 to 12.5	–49 dBc	–55.8 dBm	1 MHz (Note 4)

Note 1: Δf is the separation between the carrier frequency and the center of the measurement bandwidth.

Note 2: The minimum requirement is calculated from the relative requirement or the absolute requirement, whichever is the higher power.

Note 3: The first and last measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz and 3.485 MHz.

Note 4: The first and last measurement position with a 1 MHz filter is at Δf equals to 4 MHz and 12 MHz.

The absolute requirement is equal to the –50 dBm/3.84 MHz level.

There are additional requirements for the following frequency bands.

Table 2.4-2 Additional Requirements for Frequency Bands II, IV, and X (reprinted from TS 34.121-1 Table 5.9.1A)

Frequency Difference Δf MHz (Note 1)	Frequency Offset of Measurement Filter Center Frequency f_offset (MHz)	Additional Requirements for Frequency bands II, IV, and X	Measurement Bandwidth
2.5 ≤ Δf < 3.5	2.515 ≤ f_offset < 3.485	–15 dBm	30 kHz
3.5 ≤ Δf ≤ 12.5	4.0 ≤ f_offset < 12.0	–13 dBm	1 MHz
Note 1: Δf is the separation between the carrier frequency and the center of the measurement bandwidth.			

Table 2.4-3 Additional Requirements for Frequency Band V (reprinted from TS 34.121-1 Table 5.9.1B)

Frequency Difference Δf MHz (Note 1)	Frequency Offset of Measurement Filter Center Frequency f_offset (MHz)	Additional Requirements for Frequency band V	Measurement Bandwidth
2.5 ≤ Δf < 3.5	2.515 ≤ f_offset < 3.485	–15 dBm	30 kHz
3.5 ≤ Δf ≤ 12.5	3.55 ≤ f_offset < 12.45	–13 dBm	100 kHz
Note 1: Δf is the separation between the carrier frequency and the center of the measurement bandwidth.			

Table 2.4-4 Additional Requirements for Frequency Bands XII, XIII, and XIV (reprinted from TS 34.121-1 Table 5.9.1C)

Frequency Difference Δf MHz (Note 1)	Frequency Offset of Measurement filter Center Frequency f_offset (MHz)	Additional Requirements for Frequency Bands XII, XIII, and XIV	Measurement Bandwidth
2.5 ≤ Δf < 2.6	2.515 ≤ f_offset < 2.585	–13 dBm	30 kHz
2.6 ≤ Δf ≤ 12.45	2.65 ≤ f_offset < 12.45	–13 dBm	100 kHz
Note 1: Δf is the separation between the carrier frequency and the center of the measurement bandwidth.			

The thresholds are shown in the following diagram. The difference in the scale position between relative powers and absolute powers depends on the RF signal power.

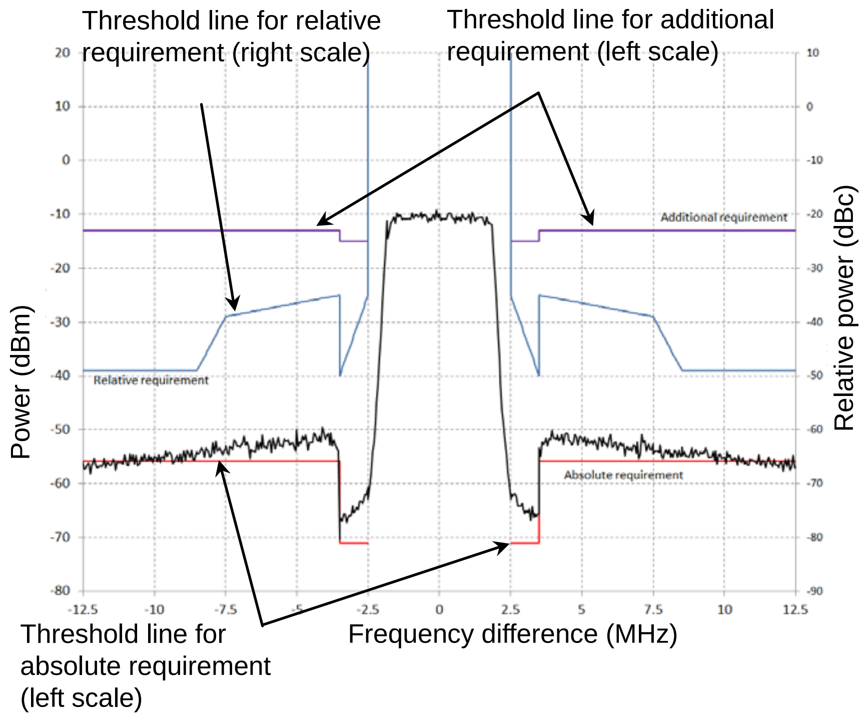


Figure 2.4-1 Thresholds for Spectrum Emission Mask

The Spectrum Emission Mask settings are:

Channel and frequency of input signals

Specify the uplink channel and uplink frequency of the RF signal input to the MU887000A by referring to the commands in section 2.1.3 “Frequency and level” and in section 2.1.6 “Setting WCDMA signal”.

Input level

Set the level of the RF signal input to the MU887000A by referring to the command in section 2.1.3 “Frequency and level”.

Port

Set the input port for the MU887000A by referring to the command in section 2.1.2 “Setting ports”.

Frequency band

The Pass/Fail evaluation standard depends on the frequency band specified in the 3GPP standard.

Template

The template is the threshold values for evaluating compliance with the relative standard values of the spectrum emission mask in Figure 2.4-1 “Thresholds for Spectrum Emission Mask”. The levels are set at the five locations shown by the specified numbers on the spectrum emission mask (Figure 2.4-2).

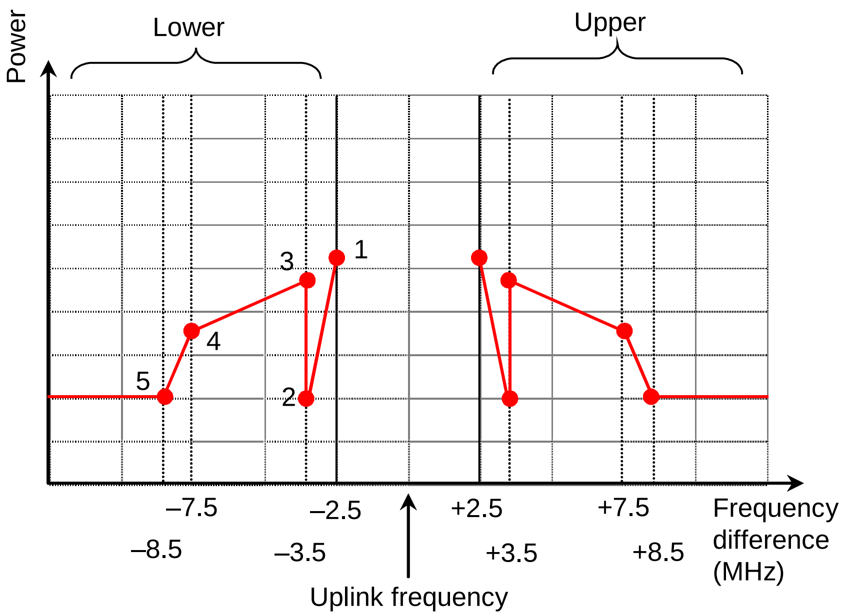


Figure 2.4-2 Setting Points and Levels of Spectrum Emission Mask

Minimum power threshold

The minimum power threshold is the threshold for evaluating compliance with the absolute standard line in Figure 2.4-1 Thresholds for Spectrum Emission Mask. The power per 3.84 MHz is set in dBm units. The value at 5.84 dB below the setting value becomes the evaluation level when the resolution is in the 1 MHz frequency range. The value at 21.07 dB below the setting value becomes the evaluation level when the resolution is in the 30 kHz frequency range.

Note:

The MX887011A does not support pass/fail evaluation for additional limit lines.

Measurement on/off and measurement count

Enable Spectrum Emission Mask measurement and specify the measurement count. The Spectrum Emission Mask measurement for 1 slot (0.667 ms) is measured at each measurement count. The measurement count can be set from 1 to 200.

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

- Template
  `SEM_TEMPLATE`
  `:CONFigure:CELLular:WCDMa:FUNDamental:SEMask:TEMPlate`
- Minimum power threshold
  `SEM_LLIMIT`
  `:CONFigure:CELLular:WCDMa:FUNDamental:SEMask:LIMit`
- Measurement Count
  `SEM_SET`
  `:CONFigure:CELLular:WCDMa:FUNDamental:SEMask:SET`

The results of the spectrum emission mask measurement are as follows:

- Evaluation result
  The larger value of either the template threshold or the minimum power threshold is the evaluation threshold value. If the spectrum is below the threshold, it is evaluated as PASS; if it above, it is evaluated as FAIL.
  If the spectrum is entirely within the white part shown in the following diagram, it is evaluated as PASS.

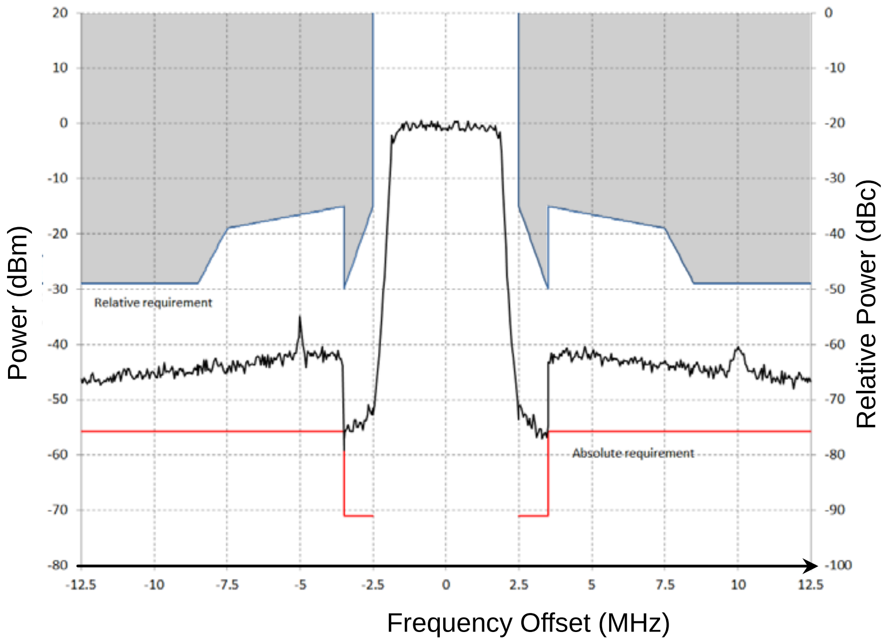


Figure 2.4-3 Spectrum Emission Mask Evaluation Range (at High Signal Level)

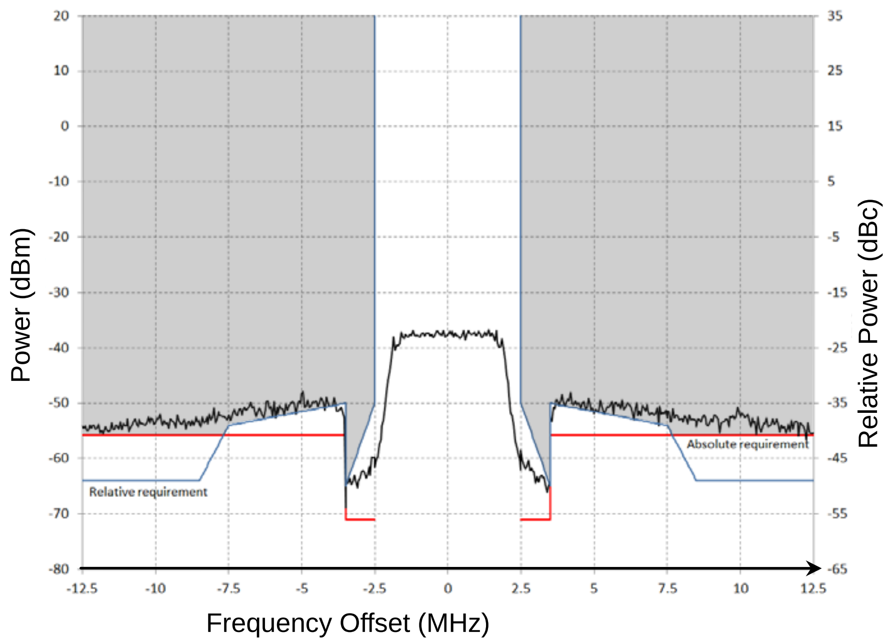


Figure 2.4-4 Spectrum Emission Mask Evaluation Range (at Low Signal Level)

- Peak level and frequency at each range
  Range numbers are shown in Figure 2.4-5 Spectrum Emission Mask Measurement Results.
- Margin
  This is the minimum level difference from the threshold. The applicable threshold depends on the signal level.

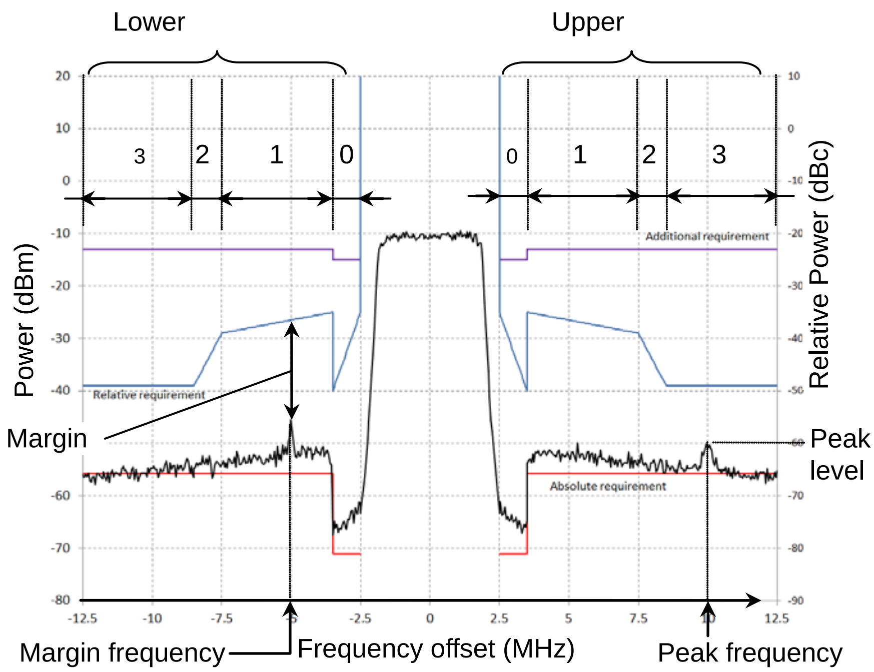


Figure 2.4-5 Spectrum Emission Mask Measurement Results

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

- Evaluation Result
  SEM
  :FETCh:CELLular:WCDMa:FUNDamental:SEMask:JUDGement
- Peak Level and Frequency at Lower Side Frequency Range
  SEMLVL_LOWER
  :FETCh:CELLular:WCDMa:FUNDamental:SEMask:LEVel:LOWer
- Peak Level and Frequency at Upper Side Frequency Range
  SEMLVL_UPPER
  :FETCh:CELLular:WCDMa:FUNDamental:SEMask:LEVel:UPPer
- Margin and Related Point Frequency at Lower Side Frequency Range
  SEMMARGIN_LOWER
  :FETCh:CELLular:WCDMa:FUNDamental:SEMask:MARGin:LOWer
- Margin and Related Point Frequency at Upper Side Frequency Range
  SEMMARGIN_UPPER
  :FETCh:CELLular:WCDMa:FUNDamental:SEMask:MARGin:UPPer

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.

The power leakage to adjacent channels is equivalent to the RRC filtered mean power centered around ±5 MHz and ±10 MHz from the uplink frequency.

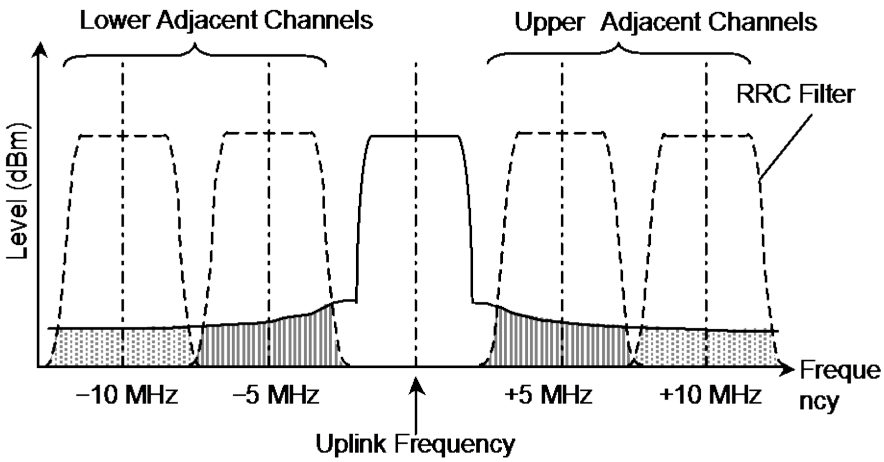


Figure 2.5-1 Measurement Range for Adjacent Channel Leakage Power Ratio

The Adjacent Channel Leakage Power Ratio measurement parameters are:

Measurement on/off and measurement count

Enable Adjacent Channel Leakage Power Ratio measurement and specify the measurement count. The Adjacent Channel Leakage Power Ratio measurement for 1 slot (0.667 ms) is measured at each measurement count. The measurement count can be set from 1 to 200.

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

Use the following command to query the results of the Adjacent Channel Leakage Power Ratio measurement (power ratio at offset frequency, –10 MHz, –5 MHz, +5 MHz, and +10 MHz).
Minimum, average, maximum, and standard deviation are available as the type of measurement results.

```
ACLR
:FETCh:CELLular:WCDMa:FUNDamental:ACLR
```

2.6 Modulation Analysis

Modulation analysis measures:

- Frequency Error
- EVM
- Origin Offset
- IQ Imbalance
- Timing Error
- DPCCH/DPDCH Power Ratio

Use the following command to enable modulation analysis measurement and specify the measurement count. Modulation analysis of 1 slot (0.667 ms) is performed at each measurement count. The measurement count can be set from 1 to 200.

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

Note:

The MX887011A supports only continuous wave signals in which ACK/NACK, CQI were transmitted continuously in Modulation Analysis measurement including HS-DPCCH.

2.6.1 Frequency error

Frequency error measurement measures the uplink carrier frequency and 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:WCDMa:FUNDamental:MODulation:CFRequency`
- Frequency Error
  `CFERR`
  `:FETCh:CELLular:WCDMa:FUNDamental:MODulation:FERRor`
- Worst Value of Frequency Error
  `CFERR_WORST`
  `:FETCh:CELLular:WCDMa:FUNDamental:MODulation:FERRor:WORSt`

The types of frequency error measurement results are minimum, average, maximum, and standard deviation.
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.

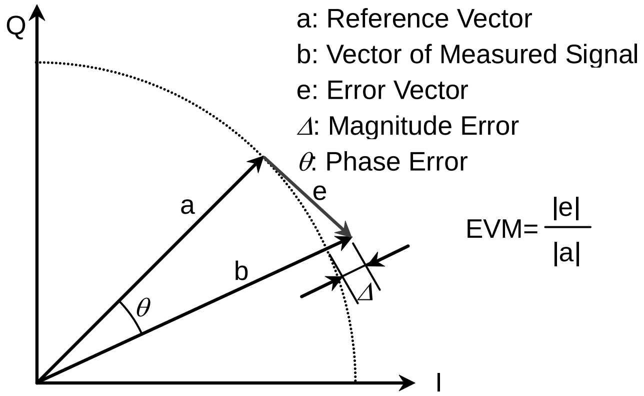


Figure 2.6.2-1 Definition of EVM

EVM, phase error, and magnitude error are measured for each chip for up to 2560 data. The rms of the data is regarded as one measurement result.
The peak EVM is the maximum value among the obtained EVM data.

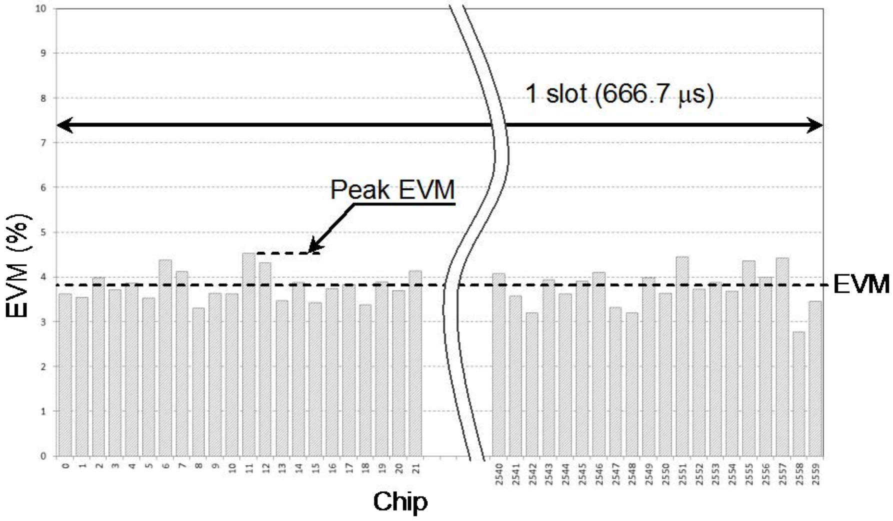


Figure 2.6.2-2 Difference between EVM and Peak EVM

Use the following commands to query the EVM measurement results:
The types of measurement results are minimum, average, maximum, and standard deviation.

- EVM
  EVM
  :FETCh:CELLular:WCDMa:FUNDamental:MODulation:EVM
- Peak EVM
  PEVM
  :FETCh:CELLular:WCDMa:FUNDamental:MODulation:PEVM
- Phase Error
  PHASEERR
  :FETCh:CELLular:WCDMa:FUNDamental:MODulation:PHERrror
- Magnitude Error
  MAGERR
  :FETCh:CELLular:WCDMa:FUNDamental:MODulation:MERRror

2.6.3 Origin offset

The origin offset is the offset of the IQ vector origin calculated as:

$$offset = 20\log_{10}\left(\frac{|\,offset\_vector\,|}{|\,Reference\_vector\,|}\right) \quad \text{(dB)}$$

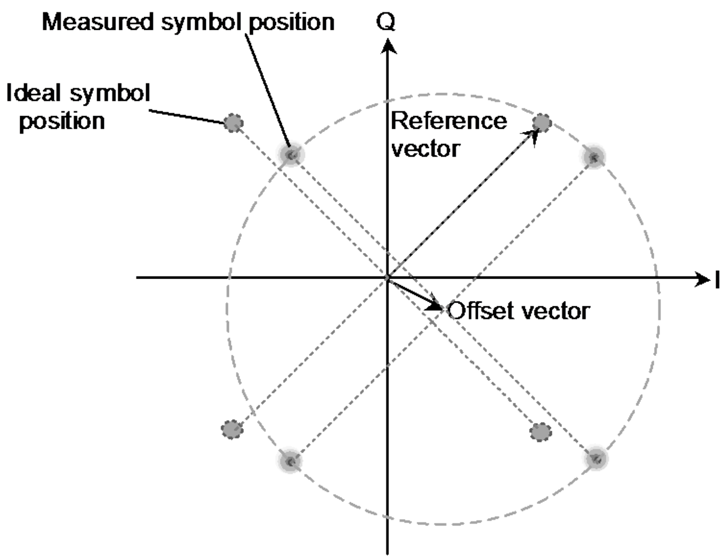


Figure 2.6.3-1 Definition of Origin Offset

Use the following command to query the Origin Offset measurement results.
The types of measurement results are minimum, average, maximum, and standard deviation.

ORGNOFS
:FETCh:CELLular:WCDMa:FUNDamental:MODulation:ORGNoffset

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:

$$IQ\_imbalance = \frac{I}{Q} \times 100 \quad (\%)$$

Use the following command to query the IQ imbalance measurement result:
The types of measurement results are minimum, average, maximum, and standard deviation.

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

2.6.5 Timing error

Timing error is measured as the time difference between arrival of the received slot and the ideal arrival.
If the slot is received later than the ideal arrival as shown below, the Timing Error is a positive value.

Note:

The MX887011A allows the Timing Error measurement only when the Long Span Code Search is OFF.

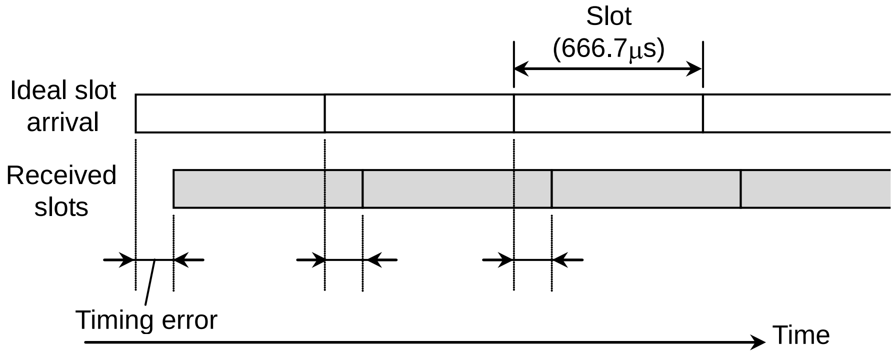


Figure 2.6.5-1 Definition of Timing Error

Use the following commands to query the Timing Error measurement results:

- Timing Error
  `TERR`
  `:FETCh:CELLular:WCDMa:FUNDamental:MODulation:TERRor`
- Timing Error (Worst Value)
  `TERR_WORST`
  `:FETCh:CELLular:WCDMa:FUNDamental:MODulation:TERRor:WORSt`

The types of Timing Error measurement results are minimum, average, maximum, and standard deviation.

2.6.6 DPCCH/DPDCH Power ratio

The DPCCH to DPDCH power ratio is calculated as:

$$Ratio = 10\log_{10}\left(\frac{P_{DPCCH}}{P_{DPDCH}}\right) \ \text{(dB)}$$

Use the following command to query the DPCCH/DPDCH Power Ratio measurement results.
The types of measurement results are minimum, average, maximum, and standard deviation.

```
PWRRATIO
:FETCh:CELLular:WCDMa:FUNDamental:MODulation:PRATio
```

2.7 Peak Code Domain Error

Peak Code Domain Error is the maximum value among code domain errors for channelization codes 0 to 255.

A code domain error is the ratio of an error vector to the reference vector for each channelization code.

$$CDE(code) = 20\log_{10}\left(\frac{|\,error\_vector(code)\,|}{|\,Reference\_vector\,|}\right)\ \text{(dB)}$$

code: 0 to 255

Note:

The MX887011A supports only RMC12.2kbps, Spreading Factor = 64.

The Peak Code Domain Error measurement setting items are:

Measurement execution on/off and measurement count

Turn on Peak Code Domain Error measurement and specify the measurement count. The Peak Code Domain Error of 1 slot (0.667 ms) is measured at each measurement count. The measurement count can be set within the range from 1 to 200.

```
PCDE_SET
:CONFigure:CELLular:WCDMa:FUNDamental:PCDE:SET
```

Use the following command to query the Peak Code Domain Error measurement results.
The types of measurement results are minimum, average, maximum, and standard deviation.

```
PCDE
:FETCh:CELLular:WCDMa:FUNDamental:PCDE
```

2.8 Relative Code Domain Error

Relative Code Domain Error is the ratio of an error vector to the code domain power for each channelization code.

$$RCDE(code) = 20\log_{10}\left(\frac{|error\_vector(code)|}{|CDP(code)|}\right) \quad \text{(dB)}$$

code: 0 to 255

Effective Code Domain Power is the measured code domain power ratio versus the total code domain power normalized by the spreading factor ratio of 256.

$$ECDP_k = 10\log_{10}\left(\frac{CDP_k}{\sum(CDP)}\right) + 10\log_{10}\left(\frac{SF_k}{256}\right) \quad \text{(dB)}$$

$ECDP_K$:	Effective Code Domain Power with Spreading factor k
CDP_K:	Code domain power with Spreading factor k
SF_K:	Spreading factor (k = 4, 8, 16, 32, 64, 128, 256)

The Relative Code Domain Error measurement settings are:

Measurement execution on/off and measurement count

Turn on Relative Code Domain Error measurement and specify the measurement count. The Relative Code Domain Error of 1 slot (0.667 ms) is measured at each measurement count. The measurement count can be set within the range from 1 to 200.

```
RCDE_SET
:CONFigure:CELLular:WCDMa:FUNDamental:RCDE:SET
```

Use the following commands to query the Relative Code Domain Error measurement results.

The types of measurement results are minimum, average, maximum, and standard deviation.

The channel number should be assigned at E-DPDCH.

- Relative Code Domain Error of DPCCH
  ```
  DPCCHRCDE
  :FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPCCh:RCDerror
  ```
- Code Domain Power of DPCCH
  ```
  DPCCHCDP
  :FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPCCh:CDPower
  ```

- Effective Code Domain Power of DPCCH
  DPCCHECDP
  :FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPCCh:ECDPower

- Relative Code Domain Error of DPDCH
  DPDCHRCDE
  :FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPDCh:RCDerror
- Code Domain Power of DPDCH
  DPDCHCDP
  :FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPDCh:CDPower
- Effective Code Domain Power of DPDCH
  DPDCHECDP
  :FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPDCh:ECDPower

- Relative Code Domain Error of HS-DPCCH
  HSDPCCHRCDE
  :FETCh:CELLular:WCDMa:FUNDamental:RCDE:HSDPcch:RCDerror
- Code Domain Power of HS-DPCCH
  HSDPCCHCDP
  :FETCh:CELLular:WCDMa:FUNDamental:RCDE:HSDPcch:CDPower
- Effective Code Domain Power of HS-DPCCH
  HSDPCCHECDP
  :FETCh:CELLular:WCDMa:FUNDamental:RCDE:HSDPcch:ECDPower

- Relative Code Domain Error of E-DPCCH
  EDPCCHRCDE
  :FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPCch:RCDerror
- Code Domain Power of E-DPCCH
  EDPCCHCDP
  :FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPCch:CDPower
- Effective Code Domain Power of E-DPCCH
  EDPCCHECDP
  :FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPCch:ECDPower

- Relative Code Domain Error of E-DPDCH
  EDPDCHRCDE
  :FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPDch:RCDerror
- Code Domain Power of E-DPDCH
  EDPDCHCDP
  :FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPDch:CDPower
- Effective Code Domain Power of E-DPDCH
  EDPDCHECDP
  :FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPDch:ECDPower

2.9 Phase Discontinuity

Phase Discontinuity is the phase difference between two consecutive slots. The phase and frequency providing the minimum EVM in each slot are analyzed to measure Phase Discontinuity. However, the start 25 μs and end 25 μs of the slot are excluded from measurement.

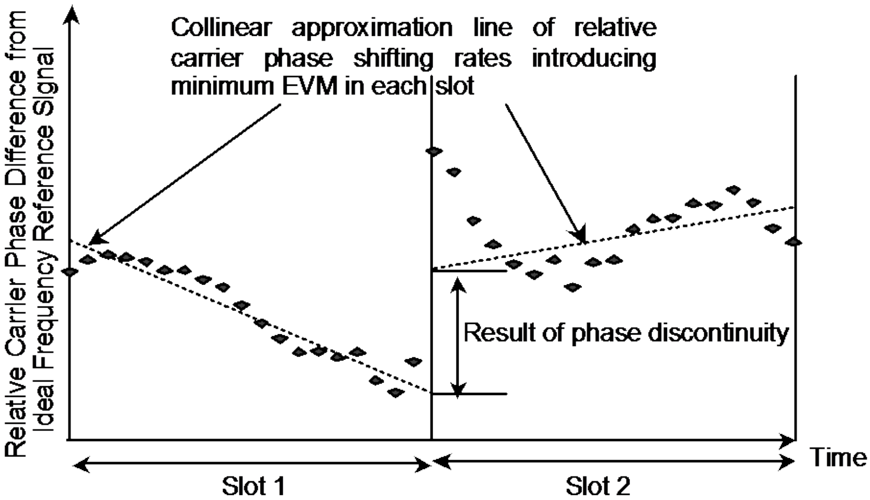


Figure 2.9-1 Concept of Phase Discontinuity (reprinted from TS34.121-1 Figure 5.13.3.1)

The Phase Discontinuity measurement settings are:

Measurement on/off and measurement count

Turn on Phase Discontinuity measurement and specify the measurement count. The Phase Discontinuity measurement between slots is measured at each measurement count. The measurement count can be set from 1 to 200.

```
PDISC_SET
:CONFigure:CELLular:WCDMa:FUNDamental:PDISc:SET
```

Use the following commands to query the Phase Discontinuity measurement results:

- Phase Discontinuity
  ```
  PDISC
  :FETCh:CELLular:WCDMa:FUNDamental:PDISc
  ```
- Frequency Error
  ```
  PDISC_CFERR
  :FETCh:CELLular:WCDMa:FUNDamental:PDISc:FERRor
  ```

- EVM

  PDISC_EVM

  :FETCh:CELLular:WCDMa:FUNDamental:PDISc:EVM

2.10 Bit Error Rate Measurement

The MX887011A performs the Bit Error Rate (BER) measurement of transport block by loop back communication. In loop back communication, the object to be measured receives the downlink signal from the MU887000A and sends it back as uplink signal.

The Bit Error Rate and Block Error Rate measurements are performed to evaluate the reception performance of the object to be measured. The uplink signal is set to the level where the MU887000A does not have bit errors.

Use the following waveform pattern for Bit Error Rate measurement.
File name : MV887011A_WCDMA_0004
Pattern number : 1

The setup for Bit Error Rate measurement is as follows:

Turning On/Off Bit Error Rate measurement

Sets execution of Bit Error Rate measurement

```
BER_MEAS
:CONFigure:CELLular:WCDMa:FUNDamental:BERate:MEASurement
```

Sample bit number

This command sets the bit to be measured. Bit Error Rate measurement ends when the bits specified by sample bit number are measured.

```
BER_SAMPLE
:CONFigure:CELLular:WCDMa:FUNDamental:BERate:SAMPle
```

Upper limit of bit error rate

Sets reference value for pass evaluation of bit error rate. If the measured bit error rate is below the reference, it is judged as pass.

```
BER_LIMIT
:CONFigure:CELLular:WCDMa:FUNDamental:BERate:LIMit
```

DTCH Data Pattern

Sets the data pattern of the signals to be measured. Sets the bit data composed of only 1s (ALL1).

```
DTCHPAT
:CONFigure:CELLular:WCDMa:FUNDamental:DTCH:PATTern
```

The commands to query the results of Bit Error Rate measurement are as follows.

- Bit error rate
  BER
  `:FETCh:CELLular:WCDMa:FUNDamental:BERate:ERATe`
- Error bit number
  BERCNT
  `:FETCh:CELLular:WCDMa:FUNDamental:BERate:ECOunt`
- Transmit bit number
  BERTRANSMIT
  `:FETCh:CELLular:WCDMa:FUNDamental:BERate:TBIT`
- Judgement results of Bit Error Rate measurement
  BERPASS
  `:FETCh:CELLular:WCDMa:FUNDamental:BERate:JUDGement`

2.11 Block Error Rate Measurement

The MX887011A performs Block Error Rate measurement by loop back communication. Block errors are checked by CRC (cyclic redundancy checksum) of transport block.

Use the following waveform pattern for Block Error Rate measurement.
File name : MV887011A_WCDMA_0004.xml
Pattern number : 1

The setup for Block Error Rate measurement is as follows:

Turning On/Off Block Error Rate measurement

Sets execution of Block Error Rate measurement.

```
BLER_MEAS
:CONFigure:CELLular:WCDMa:FUNDamental:BLERate:MEASurement
```

Sample block number

Sets the block number to be measured. Block Error Rate measurement ends when the blocks specified by sample block number are measured.

```
BLER_SAMPLE
:CONFigure:CELLular:WCDMa:FUNDamental:BLERate:SAMPle
```

Upper limit of block error rate

Sets reference value for pass evaluation of block error rate. If the measured block error rate is below the reference, it is judged as pass.

```
BLER_LIMIT
:CONFigure:CELLular:WCDMa:FUNDamental:BLERate:LIMit
```

TFCI Detection Mode

Sets TFCI detection to Auto or Manual (fixed value).

```
BER_TFCI
:CONFigure:CELLular:WCDMa:FUNDamental:BERate:TFCI
```

The commands to query the results of Block Error Rate measurement are as follows.

- Block error rate
  ```
  BLER
  :FETCh:CELLular:WCDMa:FUNDamental:BLERate:ERATe
  ```
- Error block number
  ```
  BLERCNT
  :FETCh:CELLular:WCDMa:FUNDamental:BLERate:ECOunt
  ```

- Transmit block number
  BLERTRANSMIT
  :FETCh:CELLular:WCDMa:FUNDamental:BLERate:TBIT
- Judgement results of Block Error Rate measurement
  BLERPASS
  :FETCh:CELLular:WCDMa:FUNDamental:BLERate:JUDGement

2.12 Inner Loop Power Control Measurement

MX887011A performs the Inner Loop Power Control measurement by measuring the Tx power of the mobile station while transmitting a downlink signal from MU887000A and controlling the Tx power of the mobile station with a power control bit included in the downlink signal.

Note:

The MX887011A supports only Step E/F.

Use the following waveform pattern for Inner Loop Power Control measurement.
File name: MV887011A_WCDMA_0004 or 0008*
Pattern number : 5
*: There is a difference in DPCH Channelization Code between file names 0004 and 0008. (0004: 9, 0008: 6)

The setup for Inner Loop Power Control (Auto) measurement is as follows:

Selecting Inner Loop Power Control (Auto) measurement
Use the following command and set the parameter to ILPC so that the Inner Loop Power Control (Auto) measurement is enabled.

```
MEASSEL
:CONFigure:CELLular:MEASurement:SELect
```

Inner Loop Power Control Parameter (Auto) - Method
Set the measurement method (Step) for the Inner Loop Power Control (Auto) measurement.
This measurement supports only the Step E-F section.

```
ILPC_MEAS
:CONFigure:CELLular:WCDMa:ILPC:MEASurement
```

The commands to query the results of Inner Loop Power Control (Auto) measurement are as follows.

- Slot Power
  Queries the measured result (level) of each slot in the step E or F specified by the Inner Loop Power Control (Auto) measurement.
  ```
  ILPC_PWR
  :FETCh:CELLular:WCDMa:ILPC:POWer
  ```
- Maximum Power
  Queries the maximum power in the Inner Loop Power Control (Auto) measurement.
  ```
  ILPC_MAXPWR
  :FETCh:CELLular:WCDMa:ILPC:MAXimum:POWer
  ```

- Minimum Power
  Queries the minimum power in the Inner Loop Power Control (Auto) measurement.
  ILPC_MINPWR
  :FETCh:CELLular:WCDMa:ILPC:MINimum:POWer
- Evaluation Result
  Queries judgement of the result for Inner Loop Power Control measurement.
  ILPC_PASS
  :FETCh:CELLular:WCDMa:ILPC:JUDGement

2.13 Capturing Waveform Data

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

```
WAVEFMEAS
:FETCh:CELLular:WCDMa:FUNDamental:TRACe
```

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

Table 2.13-1 Waveform Data Type and Data Interval

Measurement	Query Parameter	Number of Data	Data Interval
Occupied Bandwidth	1	1291	9.765625 kHz
Spectrum Emission Mask	2	2561	9.765625 kHz
Constellation (I)	3	2560	1 chip
Constellation (Q)	4		
EVM (Average)	5	2560	1 chip
EVM (Maximum)	6		
Phase Error (Average)	7	2560	1 chip
Phase Error (Maximum)	8		
Magnitude Error (Average)	9	2560	1 chip
Magnitude Error (Maximum)	10		

2.14 Sample Program

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

2.14.1 Example of Spectrum emission mask measurement

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 MX887011A.
2. Set the following measurement conditions:

Test Port	Port 1
Input Level	–10 dBm
Uplink Frequency	1940 MHz
Scrambling Code	000000
Signal Configuration	WCDMA+HSDPA
Long Span Code Search	ON
Tx Power Measurement	OFF
Occupied Bandwidth Measurement	OFF
Spectrum Emission Mask Measurement	ON, 100 counts
Adjacent Channel Leakage Power Ratio Measurement	OFF
Modulation Analysis	OFF
Peak Code Domain Power Measurement	OFF
Phase Discontinuity Measurement	OFF
Relative Code Domain Power Measurement	OFF

3. Set the Spectrum Emission Mask.

Frequency Band	BAND1
Offset 1	–36.0 dBc
Offset 2	–51.0 dBc
Offset 3	–36.0 dBc
Offset 4	–40.0 dBc
Offset 5	–50.0 dBc
Minimum Power	–51.0 dBm

4. Start measurement.
5. Read the measurement status.
6. Query measurement results after measurement is completed.
7. Query the spectrum waveform data.

```
; 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 "W-CDMA/HSPA".
sendln 'STDSEL WCDMA'
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 Scrambling Code to "000000".
sendln 'SCRCODE 000000'
call check_error_code

; Set Uplink Signal Configuration to "WCDMA+HSDPA".
sendln 'ULCONFIG WCDMA+HSDPA'
call check_error_code

; Set Long Span Code Search for Synchronization to "ON".
sendln ' LSCODESEARCH ON'
```

```
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 Measurement of Peak Code Domain Error to "OFF".
sendln 'PCDE_SET OFF'
call check_error_code

; Set Measurement of Phase Disconnection to "OFF".
sendln 'PDISC_SET OFF'
call check_error_code

; Set Measurement of Relative Code Domain Error to "OFF".
sendln 'RCDE_SET OFF'
call check_error_code

; Set Frequency Band to "BAND1".
sendln 'BAND BAND1'
call check_error_code

; Set Level Limit of Offset 1 to "-36.0 dBc".
sendln 'SEM_TEMPLATE 1,-36.0'
call check_error_code

; Set Level Limit of Offset 2 to "-51.0 dBc".
sendln 'SEM_TEMPLATE 2,-51.0'
```

```
call check_error_code

; Set Level Limit of Offset 3 to "-36.0 dBc".
sendln 'SEM_TEMPLATE 3,-36.0'
call check_error_code

; Set Level Limit of Offset 4 to "-40.0 dBc".
sendln 'SEM_TEMPLATE 4,-40.0'
call check_error_code

; Set Level Limit of Offset 5 to "-50.0 dBc".
sendln 'SEM_TEMPLATE 5,-50.0'
call check_error_code

; Set Lower Level Limit to "-51.0 dBm".
sendln 'SEM_LLIMIT -51.0'
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? 2,0,2561'
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
```

2.14.2 Example of modulation analysis measurement

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 MX887011A.
2. Set the following measurement conditions:

Test Port	Port 2
Input Level	–20 dBm
Uplink Frequency	1940 MHz
Scrambling Code	005555
Signal Configuration	WCDMA
Long Span Code Search	ON
Tx Power Measurement	OFF
Occupied Bandwidth Measurement	OFF
Spectrum Emission Mask Measurement	OFF
Adjacent Channel Leakage Power Ratio Measurement	OFF
Modulation Analysis	ON, 200 counts
Peak Code Domain Power Measurement	OFF
Phase Discontinuity Measurement	OFF
Relative Code Domain Power Measurement	OFF

3. Start measurement.
4. Read the measurement status
5. After measurement is completed, query the following measurement results:

   Frequency, Frequency Error (Worst), EVM, Peak EVM, Phase Error, Magnitude Error, Origin Offset, IQ Imbalance, Timing Error (Worst), and DPCCH/DCCH Power Ratio
6. Query the following waveform data:

   Constellation (I), Constellation (Q), EVM (Average), Phase Error (Average), and Magnitude Error (Average)

```
; 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 "W-CDMA".
sendln ':CONF:CELL:MEAS:STAN WCDMA'
call check_error_code

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

; Set Uplink Frequency to "1940 MHz".
sendln ':CONF:CELL:MEAS:RFS:FREQ 1940MHZ '
call check_error_code

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

; Set Scrambling Code  to "005555".
sendln ':CONF:CELL:WCDM:SCOD 005555'
call check_error_code

; Set Uplink Signal Configuration to "WCDMA".
sendln ':CONF:CELL:WCDM:ULC WCDMA'
call check_error_code

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

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

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

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

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

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

; Set Measurement of Peak Code Domain Error to "OFF".
sendln ':CONF:CELL:WCDM:FUND:PCDE:SET OFF'
call check_error_code

; Set Measurement of Phase Disconnection to "OFF".
sendln ':CONF:CELL:WCDM:FUND:PDISC:SET OFF'
call check_error_code

; Set Measurement of Relative Code Domain Error to "OFF".
sendln ':CONF:CELL:WCDM:FUND:RCDE:SET OFF'
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:WCDM:FUND:MOD:CFR?'
call check_error_code

; Query Frequency Error (Worst)
sendln ':FETC:CELL:WCDM:FUND:MOD:FERR:WORS?'
call check_error_code

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

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

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

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

; Query Origin Offset
sendln ':FETC:CELL:WCDM:FUND:MOD:ORGN? TTL'
call check_error_code

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

; Query Timing Error (Worst)
```

```
sendln ':FETC:CELL:WCDM:FUND:MOD:TERR:WORS?'
call check_error_code

; Query DPCCH/DPDCH Power Ratio
sendln ':FETC:CELL:WCDM:FUND:MOD:PRAT? TTL'
call check_error_code

; Query Waveform Data – Constellation (I)
sendln ':FETC:CELL:WCDM:FUND:TRAC? 3,0,2560'
call check_error_code

; Query Waveform Data – Constellation (Q)
sendln ':FETC:CELL:WCDM:FUND:TRAC? 4,0,2560'
call check_error_code

; Query Waveform Data – EVM (Average)
sendln ':FETC:CELL:WCDM:FUND:TRAC? 5,0,2560'
call check_error_code

; Query Waveform Data – Phase Error (Average)
sendln ':FETC:CELL:WCDM:FUND:TRAC? 7,0,2560'
call check_error_code

; Query Waveform Data – Magnitude Error (Average)
sendln ':FETC:CELL:WCDM:FUND:TRAC? 9,0,2560'
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 explains the MX887011A 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 MX887011A W-CDMA/HSPA Uplink Tx Measurement adds the following measurements 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, Origin Offset, IQ Imbalance, Timing Error
- Phase Discontinuity
- Peak Code Domain Error

The Sequence Measurement mode does not support the following measurements.

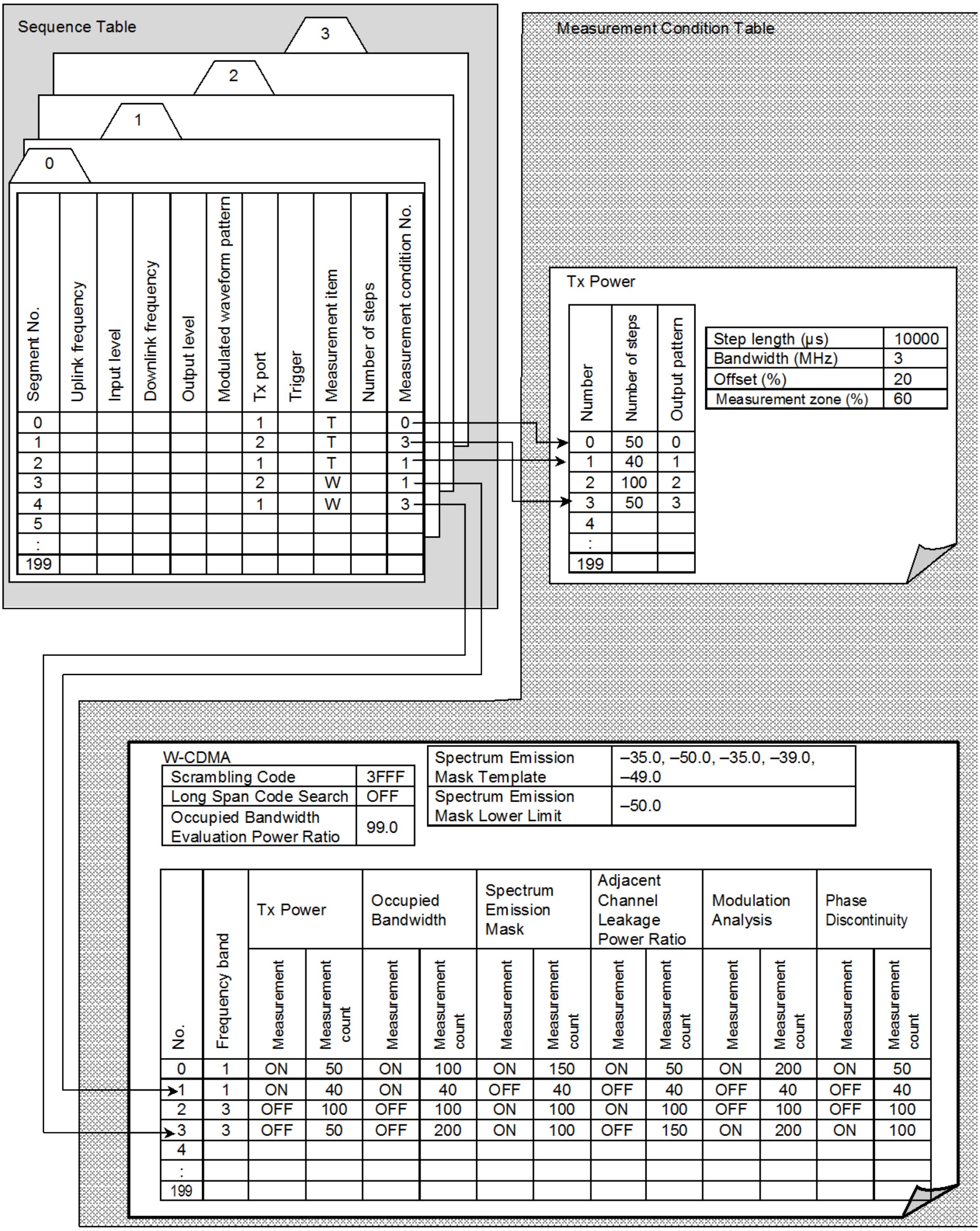
- Relative Code Domain Error
- Bit Error Rate
- Block Error Rate
- Waveform Data

W-CDMA measurement can be allocated to any segment in the sequence table.
The segment duration depends on the measurement count. Each item of W-CDMA measurement is measured once in one slot (10/15 ms ≈ 0.667 ms).
When multiple measurements are specified in a segment, the largest measurement count determines the segment measurement duration.

Example:

Transmission power	50 times	50 × 10/15 ms = 33.3 ms
Occupied Bandwidth	100 times	100 × 10/15 ms = 66.7 ms
Spectrum Emission Mask	150 times	150 × 10/15 ms = 100 ms
Adjacent Channel Leakage Power Ratio	50 times	50 × 10/15 ms = 33.3 ms
Modulation Analysis	200 times	200 × 10/15 ms = 133.3 ms

In this case, the WCDMA signal measurement duration is 133.3 ms as determined by the Modulation Analysis measurement duration.



Segment No.	Uplink frequency	Input level	Downlink frequency	Output level	Modulated waveform pattern	Tx port	Trigger	Measurement item	Number of steps	Measurement condition No.
0						1		T		0
1						2		T		3
2						1		T		1
3						2		W		1
4						1		W		3
5										
:										
199										

Tx Power

Number	Number of steps	Output pattern
0	50	0
1	40	1
2	100	2
3	50	3
4		
:		
199		

Step length (μs)	10000
Bandwidth (MHz)	3
Offset (%)	20
Measurement zone (%)	60

W-CDMA

Scrambling Code	3FFF
Long Span Code Search	OFF
Occupied Bandwidth Evaluation Power Ratio	99.0

Spectrum Emission Mask Template	–35.0, –50.0, –35.0, –39.0, –49.0
Spectrum Emission Mask Lower Limit	–50.0

No.	Frequency band	Tx Power		Occupied Bandwidth		Spectrum Emission Mask		Adjacent Channel Leakage Power Ratio		Modulation Analysis		Phase Discontinuity	
		Measurement	Measurement count	Measurement	Measurement count	Measurement	Measurement count	Measurement	Measurement count	Measurement	Measurement count	Measurement	Measurement count
0	1	ON	50	ON	100	ON	150	ON	50	ON	200	ON	50
1	1	ON	40	ON	40	OFF	40	OFF	40	OFF	40	OFF	40
2	3	OFF	100	OFF	100	ON	100	ON	100	OFF	100	OFF	100
3	3	OFF	50	OFF	200	ON	100	OFF	150	ON	200	ON	100
4													
:													
199													

Figure 3.1-1 Data Composition of Sequence Measurement Conditions with MX887011A Installed

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

```
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 detailed descriptions of commands, refer to Chapter 5 “SCPI Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

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

Set the initial sequence measurement conditions to the following items described in Section 2.1 “Common Operations”.
Individual values can be set for each of the following items described in Chapter 2 “Fundamental Measurement” and in this chapter.

- Uplink frequency (Tx frequency of mobile station)
  `ULFREQ`
  `TXFREQ`
  `:CONFigure:CELLular:MEASurement:RFSettings:FREQuency`
- Downlink frequency (Rx frequency of mobile station)
  `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 condition
- Measurement item
- 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 3800.000000 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 WCDMA measurement, refer to Section 2.1.4 “Waveform patterns”.

Output port

This sets the number of the RF signal output port to 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 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 W-CDMA measurement described here, set W-CDMA as the measurement item.

Note:

If the license of other cellular application software is installed, the measurement mode supported by the license can be set.

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

The W-CDMA measurement condition is 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.
Set the step count to the following values or more according to the contents of the W-CDMA measurement condition table.
Phase Discontinuity measurement OFF: Measurement Count + 2
Phase Discontinuity measurement ON: Measurement Count + 3
Additionally, the step number should be set to 15 or above for trigger segments.
Step count setting examples are shown in the following table.

Table 3.2.1-1 Example of Setting the Number of Steps

	Measurement	Example 1		Example 2	
		Measurement Execution	Measurement Count	Measurement Execution	Measurement Count
*1	Tx Power	On	50	On	50
	Occupied Bandwidth	On	100	On	100
	Spectrum Emission Mask	On	60	On	60
	Adjacent Channel Leakage Power Ratio	On	150	On	150
	Modulation Analysis	On	200	On	200
	Phase Discontinuity	On	100	Off	100
*2	Step Count		203		202

*1: Setup items specified in W-CDMA measurement condition table

*2: Setup items specified in sequence table

3.2.2 Sequence table commands

The following commands set and query items in the sequence table.

- 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 and 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
  SEQMEAS
  :CONFigure:CELLular:SEQuence:SETup

3.2.3 Setting item error check

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

- 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 check for errors.

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

Capture memory is used to save the W-CDMA measurement results. One W-CDMA measurement uses about 0.01% of the memory, so 1% 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

Parameters	Cause
Input level*	Input level is out of range.
Output level*	Output level is out of range.
Step count	Step count fails to satisfy the conditions in Section 3.2.1.
Waveform pattern	The specified waveform file is not loaded in the waveform memory. The specified waveform pattern does not exist in the waveform file.
Port	Port 3 is set for both input port and output port. Or Port 4 is set for both input port and output port.
Capture memory length	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 setting 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 W-CDMA measurement items

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

- Frequency band *2
- Scrambling Code
- Synchronization detection range
- Occupied Bandwidth Power Ratio
- Inner loop power control measurement On/Off *2
- Spectrum Emission Mask level*1
- Measurement target signal *2
- Tx Power Measurement on/off and count *2
- Occupied Bandwidth measurement on/off and count *2
- Inner Loop Power Control measurement on/off *2
- Spectrum Emission Mask measurement on/off and count *2
- Adjacent Channel Leakage Power Ratio measurement on/off and count*2
- Modulation Analysis measurement on/off and count*2
- Peak Code Domain Error measurement on/off and count*2
- Phase Discontinuity measurement on/off and count*2
- All measurement items off *2

*1: The relative (template) and absolute (minimum threshold power) are set for each frequency offset.

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

3.3.2 W-CDMA measurement condition setting commands

The following commands set and query the W-CDMA measurement conditions.

- Frequency band
  `WCDMA_BAND`
  `:CONFigure:CELLular:SEQuence:WCDMa:BAND`
- Scrambling Code
  `WCDMA_SCRCODE`
  `:CONFigure:CELLular:SEQuence:WCDMa:SCODe`
- Synchronization Detection range
  `WCDMA_LSCODESEARCH`
  `:CONFigure:CELLular:SEQuence:WCDMa:LSSearch`

- Occupied Bandwidth Power Ratio
  `WCDMA_OBW_RATIO`
  `:CONFigure:CELLular:SEQuence:WCDMa:OBW:RATio`
- Inner Loop Power Control measurement on/off
  `WCDMA_ILPC`
  `:CONFigure:CELLular:SEQuence:WCDMa:ILPC`
- Spectrum Emission Mask level
  Relative value (Template)
  `WCDMA_SEM_TEMPLATE`
  `:CONFigure:CELLular:SEQuence:WCDMa:SEMask:TEMPlate`
- Absolute value (minimum threshold power)
  `WCDMA_SEM_LLIMIT`
  `:CONFigure:CELLular:SEQuence:WCDMa:SEMask:LIMit`
- Measurement target signal
  `WCDMA_MA_MEASOBJ`
  `:CONFigure:CELLular:SEQuence:WCDMa:MOBJect`
- Tx Power measurement on/off and count
  `WCDMA_PWR_SET`
  `:CONFigure:CELLular:SEQuence:WCDMa:POWer:SET`
- Occupied Bandwidth measurement on/off and count
  `WCDMA_OBW_SET`
  `:CONFigure:CELLular:SEQuence:WCDMa:OBW:SET`
- Spectrum Emission Mask measurement on/off and count
  `WCDMA_SEM_SET`
  `:CONFigure:CELLular:SEQuence:WCDMa:SEMask:SET`
- Adjacent Channel Leakage Power Ratio measurement on/off and count
  `WCDMA_ACLR_SET`
  `:CONFigure:CELLular:SEQuence:WCDMa:ACLR:SET`
- Modulation Analysis measurement on/off and count
  `WCDMA_MOD_SET`
  `:CONFigure:CELLular:SEQuence:WCDMa:MODulation:SET`
- Peak Code Domain Error measurement on/off and count
  `WCDMA_PCDE_SET`
  `:CONFigure:CELLular:SEQuence:WCDMa:PCDE:SET`
- Phase Discontinuity measurement on/off and count
  `WCDMA_PDISC_SET`
  `:CONFigure:CELLular:SEQuence:WCDMa:PDISc:SET`
- All measurement items off
  `WCDMA_MEAS_OFF`
  `:CONFigure:CELLular:SEQuence:WCDMa:AMITems:OFF`

3.4 Controlling and Monitoring Sequence

3.4.1 Controlling and monitoring items

The following items can be set to control 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 they are not specified, 0 to 199 segments are measured.

Initialization after completion of sequence measurement

Select whether the following items are set to the values described in Section 2.1.2 “Frequency and level”, when sequence measurement is completed.

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

Use the commands described in Section 2.1.7 “Starting/stopping" measurement to verify the sequence measurement start, end and status . In addition, the following items can be queried during sequence measurement.

- 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	Status
0	Measurement completed successfully
2	Over level
5	Failed to detect synchronization word
9	Measuring or no measurement
10	Segment not measured
12	Tx measurement 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 numbers.

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 ratio of sequence measurement
  `SEQPROGRESS?`
  `:FETCh:CELLular:SEQuence:PROGress?`
- Measurement status of specified segment
  `SEQSEGSTAT?`
  `:FETCh:CELLular:SEQuence:SEG:STATe?`
- Progress status of sequence measurement
  `SEQMSTAT?`
  `:FETCh:CELLular:SEQuence:STATe?`

3.5 Measurement Results

The W-CDMA measurement results are queried using the following commands.

Tx Power

- Tx Power
  WCDMA_TXPWR?
  :FETCh:CELLular:SEQuence:WCDMa:POWer:TXPower?
- Filter power
  WCDMA_FILTPWR?
  :FETCh:CELLular:SEQuence:WCDMa:POWer:FLTPower?

Occupied Bandwidth

- Occupied Bandwidth
  WCDMA_OBW?
  :FETCh:CELLular:SEQuence:WCDMa:OBW?
- Occupied Bandwidth frequency
  WCDMA_OBWFREQ?
  :FETCh:CELLular:SEQuence:WCDMa:OBW:FREQuency?

Spectrum Emission Mask

- Evaluation result
  WCDMA_SEM?
  :FETCh:CELLular:SEQuence:WCDMa:SEMask:JUDGement?
- Max. level and frequency in each range
  Lower side of channel bandwidth
  WCDMA_SEMLVL_LOWER?
  :FETCh:CELLular:SEQuence:WCDMa:SEMask:LEVel:LOWer?
  Upper side of channel bandwidth
  WCDMA_SEMLVL_UPPER?
  :FETCh:CELLular:SEQuence:WCDMa:SEMask:LEVel:UPPer?
- Margin in each range
  Lower side of channel bandwidth
  WCDMA_SEMMARGIN_LOWER?
  :FETCh:CELLular:SEQuence:WCDMa:SEMask:MARGin:LOWer?
  Upper side of channel bandwidth
  WCDMA_SEMMARGIN_UPPER?
  :FETCh:CELLular:SEQuence:WCDMa:SEMask:MARGin:UPPer?

Adjacent Channel Leakage Power Ratio

WCDMA_ACLR?
:FETCh:CELLular:SEQuence:WCDMa:ACLR?

Modulation Analysis

- Carrier frequency
  `WCDMA_CFREQ?`
  `:FETCh:CELLular:SEQuence:WCDMa:MODulation:CFRequency?`
- Frequency error (ppm, Hz)
  `WCDMA_CFERR?`
  `:FETCh:CELLular:SEQuence:WCDMa:MODulation:FERRor?`
- Frequency error worst value (ppm, Hz)
  `WCDMA_CFERR_WORST?`
  `:FETCh:CELLular:SEQuence:WCDMa:MODulation:FERRor:WORSt?`
- EVM
  `WCDMA_EVM?`
  `:FETCh:CELLular:SEQuence:WCDMa:MODulation:EVM?`
- Peak EVM
  `WCDMA_PEVM?`
  `:FETCh:CELLular:SEQuence:WCDMa:MODulation:PEVM?`
- Phase Error
  `WCDMA_PHASEERR?`
  `:FETCh:CELLular:SEQuence:WCDMa:MODulation:PHERror?`
- Magnitude Error
  `WCDMA_MAGERR?`
  `:FETCh:CELLular:SEQuence:WCDMa:MODulation:MERRor?`
- Origin Offset
  `WCDMA_ORGNOFS?`
  `:FETCh:CELLular:SEQuence:WCDMa:MODulation:ORGNoffset?`
- IQ Imbalance
  `WCDMA_IQIMB?`
  `:FETCh:CELLular:SEQuence:WCDMa:MODulation:IQIMbalance?`
- Timing Error
  `WCDMA_TERR?`
  `:FETCh:CELLular:SEQuence:WCDMa:MODulation:TERRor?`
- Timing Error worst value
  `WCDMA_TERR_WORST?`
  `:FETCh:CELLular:SEQuence:WCDMa:MODulation:TERRor:WORSt?`

Peak Code Domain Error

`WCDMA_PCDE`
`:FETCh:CELLular:SEQuence:WCDMa:PCDE?`

Phase Discontinuity

- Phase Discontinuity
  WCDMA_PDISC?
  :FETCh:CELLular:SEQuence:WCDMa:PDISc?
- Frequency error
  WCDMA_PDISC_CFERR?
  :FETCh:CELLular:SEQuence:WCDMa:PDISc:FERRor?
- EVM
  WCDMA_PDISC_EVM?
  :FETCh:CELLular:SEQuence:WCDMa:PDISc:EVM?

3.6 Sample Program

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

Processing Flow

1. Set the vector signal generator mode to NORMAL.
2. Load the Tx signal pattern file (MV887011A_WCDMA_0002) into memory.
3. Set the application type to CELLULAR.
4. Set the measurement to sequence measurement.
5. Specify MV887011A_WCDMA_0002 as the pattern file to use for modulating the Tx signal.
6. Set measurement conditions listed in Table 3.6-1 and Table 3.6-2.
7. Set the following items:

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

8. Query the sequence table for errors and abort if errors found.
9. Set the vector signal generator mode to SEQUENCE.
10. Start measurement.
11. Query the status of measurements.
12. When measurement is completed, query:

    Tx Power and Occupied Bandwidth at segment 0
    Spectrum Emission Mask, Adjacent Channel Leakage Power Ratio, Modulation Analysis, and Phase Discontinuity at segment 1

Table 3.6-1 Sequence Table Settings 1

Segment number	0	1	2	....
Uplink frequency (MHz)	1920	1940		
Input level (dBm)	0	0		
Downlink frequency (MHz)	2110	2130		
Output level (dBm)	–50	–55		
Downlink signal pattern	PAT1	PAT2		
Output port	1	2		
Trigger source	Free run	Free run		
Trigger slope	Rise	Rise		
Trigger level	–20	–25		
Trigger delay time (ms)	0	0		

Table 3.6-2 Sequence Table Settings 2

Segment number	0	1	2	....
Measurement item	WCDMA	WCDMA		
Step count	250	250		
Measurement condition number	0	1		

Table 3.6-3 W-CDMA Measurement Condition Settings

Item		Setting			
Scrambling Code		0x000010			
Long Span Search		ON			
Occupied Ratio (%)		99.5			
Spectrum Emission Mask Level	Range 1	–35.0			
	Range 2	–50.0			
	Range 3	–35.0			
	Range 4	–39.0			
	Range 5	–50.0			
	Min. power	–50.0			
Measurement condition number		0	1	2	…
Frequency band		1	1		
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		
ACLR Measurement count		100	10		
Modulation Analysis measurement		OFF	ON		
Modulation Analysis measurement count		200	20		
Phase Discontinuity measurement		OFF	ON		
Phase Discontinuity measurement count		50	75		

```
; Sample program for WCDMA Sequence Measurement
; Anritsu Corporation March,2012
; Macro for Tera Term Version 4.69
;
; set local echo to on
setecho 1
flushrecv
; time out 10 second
timeout=10

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

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

; Load ARB File "MV887011A_WCDMA_0002".
sendln 'SOUR:GPRF:GEN:ARB:FILE:LOAD "MV887011A_WCDMA_0002"'
call check_error_code

; waiting load waveform file.
sendln '*WAI'
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

; Set download package to "MV887011A_WCDMA_0002".
sendln 'PACKAGE "MV887011A_WCDMA_0002"'
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,WCDMA,250,0'
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,WCDMA,250,1'
call check_error_code

; Set Measurement Condition of "WCDMA".
sendln 'WCDMA_SCRCODE 000010'
call check_error_code

sendln 'WCDMA_LSCODESEARCH ON'
call check_error_code

sendln 'WCDMA_OBW_RATIO 99.5'
call check_error_code

sendln 'WCDMA_SEM_TEMPLATE 1,-35.0'
call check_error_code

sendln 'WCDMA_SEM_TEMPLATE 2,-50.0'
call check_error_code

sendln 'WCDMA_SEM_TEMPLATE 3,-35.0'
call check_error_code

sendln 'WCDMA_SEM_TEMPLATE 4,-39.0'
call check_error_code

sendln 'WCDMA_SEM_TEMPLATE 5,-50.0'
```

```
call check_error_code

sendln 'WCDMA_SEM_LLIMIT -50.0'
call check_error_code

sendln 'WCDMA_BAND 0,BAND1'
call check_error_code

sendln 'WCDMA_BAND 1,BAND1'
call check_error_code

sendln 'WCDMA_PWR_SET 0,ON,100'
call check_error_code

sendln 'WCDMA_PWR_SET 1,OFF,10'
call check_error_code

sendln 'WCDMA_OBW_SET 0,ON,50'
call check_error_code

sendln 'WCDMA_OBW_SET 1,OFF,5'
call check_error_code

sendln 'WCDMA_SEM_SET 0,OFF,100'
call check_error_code

sendln 'WCDMA_SEM_SET 1,ON,10'
call check_error_code

sendln 'WCDMA_ACLR_SET 0,OFF,100'
call check_error_code

sendln 'WCDMA_ACLR_SET 1,ON,10'
call check_error_code

sendln 'WCDMA_MOD_SET 0,OFF,200'
call check_error_code

sendln 'WCDMA_MOD_SET 1,ON,20'
call check_error_code

sendln 'WCDMA_PDISC_SET 0,OFF,50'
call check_error_code
```

```
sendln 'WCDMA_PDISC_SET 1,ON,75'
call check_error_code

; 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

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

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

; Set VSG Mode to "Sequence".
sendln 'SOUR:GPRF:GEN:MODE SEQUENCE'
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 'WCDMA_TXPWR? 0,IND'
call check_error_code

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

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

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

; Query Spectrum Emission Mask data of "Segment 1"
sendln 'WCDMA_SEM? 1'
call check_error_code
sendln 'WCDMA_SEMLVL_LOWER? 1'
call check_error_code
sendln 'WCDMA_SEMLVL_UPPER? 1'
call check_error_code
sendln 'WCDMA_SEMMARGIN_LOWER? 1'
call check_error_code
sendln 'WCDMA_SEMMARGIN_UPPER? 1'
call check_error_code

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

; Query Frequency Error data of "Segment 1".
sendln 'WCDMA_CFREQ? 1'
call check_error_code
sendln 'WCDMA_CFERR_WORST? 1'
call check_error_code

; Query EVM data of "Segment 1".
```

```
sendln 'WCDMA_EVM? 1,MAX'
call check_error_code
sendln 'WCDMA_PEVM? 1,MAX'
call check_error_code
sendln 'WCDMA_PHASEERR? 1,MAX'
call check_error_code
sendln 'WCDMA_MAGERR? 1,MAX'
call check_error_code

; Query Orignal Offset of "Segment 1".
sendln 'WCDMA_ORGNOFS? 1,MAX'
call check_error_code

; Query IQ Imbalance of "Segment 1".
sendln 'WCDMA_IQIMB? 1,TTL'
call check_error_code

; Query Timing Error data of "Segment 1".
sendln 'WCDMA_TERR_WORST? 1'
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. A | B | C | D indicates a choice of A, B, C, and D.
{}	Choose one of the groups in braces. 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>

Measurements

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
Uplink Frequency	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency <ul_freq>	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency?	<ul_freq>
Uplink Channel	:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel <ul_ch>	:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel?	<ul_ch>
Input Level	:CONFigure:CELLular:MEASurement:RFSettings:LEVel <level>	:CONFigure:CELLular:MEASurement:RFSettings:LEVel?	<level>
Downlink Frequency	:CONFigure:CELLular:GENerator:RFSettings:FREQuency <dl_freq>	:CONFigure:CELLular:GENerator:RFSettings:FREQuency?	<dl_freq>
Downlink Channel	:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel <dl_ch>	:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel?	<dl_ch>
Output Level	:CONFigure:CELLular:GENerator:RFSettings:LEVel <level>	:CONFigure:CELLular:GENerator:RFSettings:LEVel?	<level>
Measurement Select	:CONFigure:CELLular:MEASurement:SELect <meassel>	:CONFigure:CELLular:MEASurement:SELect?	<meassel>

Fundamental Measurement Parameters

Function	Command	Query	Response
Turn Off All Measurement Items	:CONFigure:CELLular:WCDMa:FUNDamental:AMITems:OFF	-----	-----
Frequency Band	:CONFigure:CELLular:WCDMa:FUNDamental:BAND <FreqBand>	:CONFigure:CELLular:WCDMa:FUNDamental:BAND?	<FreqBand>
Long Span Code Search	:CONFigure:CELLular:WCDMa:FUNDamental:LSSearch <on_off>	:CONFigure:CELLular:WCDMa:FUNDamental:LSSearch?	<on_off>
Occupied Bandwidth Ratio	:CONFigure:CELLular:WCDMa:FUNDamental:OBW:RATio <ratio>	:CONFigure:CELLular:WCDMa:FUNDamental:OBW:RATio?	<ratio>
Fast Power Measurement Mode	:CONFigure:CELLular:WCDMa:FUNDamental:POWer:FMODe <on_off>	:CONFigure:CELLular:WCDMa:FUNDamental:POWer:FMODe?	<on_off>
Fast Power Measurement Mode - RRC filter	:CONFigure:CELLular:WCDMa:FUNDamental:POWer:FRRC <on_off>	:CONFigure:CELLular:WCDMa:FUNDamental:POWer:FRRC?	<on_off>
Spectrum Emission Mask - Mask Template Lower Limit	:CONFigure:CELLular:WCDMa:FUNDamental:SEMask:LIMit <level>	:CONFigure:CELLular:WCDMa:FUNDamental:SEMask:LIMit?	<level>
Spectrum Emission Mask - Mask Template	:CONFigure:CELLular:WCDMa:FUNDamental:SEMask:TEMPlate <offset>,<level>	:CONFigure:CELLular:WCDMa:FUNDamental:SEMask:TEMPlate? <offset>	<level>
Bit Error Rate - Upper Limit	:CONFigure:CELLular:WCDMa:FUNDamental:BERate:LIMit <ratio>	:CONFigure:CELLular:WCDMa:FUNDamental:BERate:LIMit?	<ratio>
Bit Error Rate	:CONFigure:CELLular:WCDMa:FUNDamental:BERate:MEASurement <on_off>	:CONFigure:CELLular:WCDMa:FUNDamental:BERate:MEASurement?	<on_off>

Fundamental Measurement Parameters (Cont'd)

Function	Command	Query	Response
Bit Error Rate - Number of Sample	:CONFigure:CELLular:WCDMa:FUNDamental:BERate:SAMPle <number>	:CONFigure:CELLular:WCDMa:FUNDamental:BERate:SAMPle?	<number>
TFCI Detection Mode	:CONFigure:CELLular:WCDMa:FUNDamental:BERate:TFCI <mode>	:CONFigure:CELLular:WCDMa:FUNDamental:BERate:TFCI ?	<mode>
Block Error Rate - Upper Limit	:CONFigure:CELLular:WCDMa:FUNDamental:BLERate:LIMit <ratio>	:CONFigure:CELLular:WCDMa:FUNDamental:BLERate:LIMit?	<ratio>
Block Error Rate	:CONFigure:CELLular:WCDMa:FUNDamental:BLERate:MEASurement <on_off>	:CONFigure:CELLular:WCDMa:FUNDamental:BLERate:MEASurement?	<on_off>
Block Error Rate - Number of Sample	:CONFigure:CELLular:WCDMa:FUNDamental:BLERate:SAMPle <number>	:CONFigure:CELLular:WCDMa:FUNDamental:BLERate:SAMPle?	<number>
DTCH Data Pattern	:CONFigure:CELLular:WCDMa:FUNDamental:DTCH:PATTern <pattern>	:CONFigure:CELLular:WCDMa:FUNDamental:DTCH:PATTern?	<pattern>
Scrambling Code Number	:CONFigure:CELLular:WCDMa:SCODe <code>	:CONFigure:CELLular:WCDMa:SCODe?	<code>
Uplink Configuration	:CONFigure:CELLular:WCDMa:ULConfig <object>	:CONFigure:CELLular:WCDMa:ULConfig?	<object>
Inner Loop Power Control Parameter (Auto) - Method	:CONFigure:CELLular:WCDMa:ILPC:MEASurement <auto>	:CONFigure:CELLular:WCDMa:ILPC:MEASurement?	<auto>

Measurement Parameters

Function	Command	Query	Response
ACLR Measurement Enable and Count	:CONFigure:CELLular:WCDMa:FUNDamental:ACLR:SET <on_off>[,<count>]	:CONFigure:CELLular:WCDMa:FUNDamental:ACLR:SET?	<on_off>,<count>
Modulation Analysis Measurement Enable and Count	:CONFigure:CELLular:WCDMa:FUNDamental:MODulation:SET <on_off>[,<count>]	:CONFigure:CELLular:WCDMa:FUNDamental:MODulation:SET?	<on_off>,<count>
OBW Measurement Enable and Count	:CONFigure:CELLular:WCDMa:FUNDamental:OBW:SET <on_off>[,<count>]	:CONFigure:CELLular:WCDMa:FUNDamental:OBW:SET?	<on_off>,<count>
Peak Code Domain Error Measurement Enable and Count	:CONFigure:CELLular:WCDMa:FUNDamental:PCDE:SET <on_off>[,<count>]	:CONFigure:CELLular:WCDMa:FUNDamental:PCDE:SET?	<on_off>,<count>
Phase Discontinuity Measurement Enable and Count	:CONFigure:CELLular:WCDMa:FUNDamental:PDISc:SET <on_off>[,<count>]	:CONFigure:CELLular:WCDMa:FUNDamental:PDISc:SET?	<on_off>,<count>
Tx Power Measurement Enable and Count	:CONFigure:CELLular:WCDMa:FUNDamental:POWer:SET <on_off>[,<count>]	:CONFigure:CELLular:WCDMa:FUNDamental:POWer:SET?	<on_off>,<count>
Relative Code Domain Error Measurement Enable and Count	:CONFigure:CELLular:WCDMa:FUNDamental:RCDE:SET <on_off>[,<count>]	:CONFigure:CELLular:WCDMa:FUNDamental:RCDE:SET?	<on_off>,<count>
SEM Measurement Enable and Count	:CONFigure:CELLular:WCDMa:FUNDamental:SEMask:SET <on_off>[,<count>]	:CONFigure:CELLular:WCDMa:FUNDamental:SEMask:SET?	<on_off>,<count>

Peak Code Domain Error Measurement

Function	Command	Query	Response
Result of Peak Code Domain Error of Tx Fundamental Measurement	-----	:FETCh:CELLular:WCDMa:FUNDamental:PCDE? <mode>	{<avg>,<max>,<min>}|<pcde>

Phase Discontinuity Measurements

Function	Command	Query	Response
Result of Phase Discontinuity	-----	:FETCh:CELLular:WCDMa:FUNDamental:PDISc?	<count>,<data(0)>,<data(1)>,…,<data(count-1)>
EVM Result of Phase Discontinuity	-----	:FETCh:CELLular:WCDMa:FUNDamental:PDISc:EVM?	<count>,<evm(0)>,<evm(1)>,…,<evm(count-1)>
Carrier Frequency Error Result of Phase Discontinuity	-----	:FETCh:CELLular:WCDMa:FUNDamental:PDISc:FERRor? <mode>	<count>,<fppm(0)>,<fHz(0)>,<fppm(1)>,<fHz(1)>,…,<fppm(count-1)>,<fHz(count-1)>

Relative Code Domain Error Measurement Commands

Function	Command	Query	Response
Result of Code Domain Power of DPCCH	-----	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPCCh:CDPower? <mode>	<cdp>
Result of Effective Code Domain Power of DPCCH	-----	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPCCh:ECDPower? <mode>	<ecdp>
Result of Relative Code Domain Error of DPCCH	-----	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPCCh:RCDerror? <mode>	{<avg>,<max>,<min>}|<rcde>
Result of Code Domain Power of DPDCH	-----	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPDCh:CDPower? <mode>	<cdp>
Result of Effective Code Domain Power of DPDCH	-----	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPDCh:ECDPower? <mode>	<ecdp>
Result of Relative Code Domain Error of DPDCH	-----	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPDCh:RCDerror? <mode>	{<avg>,<max>,<min>}|<rcde>
Result of Code Domain Power of E-DPCCH	-----	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPCch:CDPower? <mode>	<cdp>
Result of Effective Code Domain Power of E-DPCCH	-----	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPCch:ECDPower? <mode>	<ecdp>
Result of Relative Code Domain Error of E-DPCCH	-----	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPCch:RCDerror? <mode>	{<avg>,<max>,<min>}|<rcde>

Relative Code Domain Error Measurement Commands (Cont'd)

Function	Command	Query	Response
Result of Code Domain Power of E-DPDCH	-----	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPDch:CDPower? <no>,<mode>	<cdp>
Result of Effective Code Domain Power of E-DPDCH	-----	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPDch:ECDPower? <no>,<mode>	<ecdp>
Result of Relative Code Domain Error of E-DPDCH	-----	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPDch:RCDerror? <no>,<mode>	{<avg>,<max>,<min>}|<rcde>
Result of Code Domain Power of HS-DPCCH	-----	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:HSDPcch:CDPower? <mode>	<cdp>
Result of Effective Code Domain Power of HS-DPCCH	-----	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:HSDPcch:ECDPower? <mode>	<ecdp>
Result of Relative Code Domain Error of HS-DPCCH	-----	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:HSDPcch:RCDerror? <mode>	{<avg>,<max>,<min>}|<rcde>

Results

Function	Command	Query	Response
Result of Adjacent Channel Leakage Power Ratio	-----	:FETCh:CELLular:WCDMa:FUNDamental:ACLR? <mode>	{<avg0>,<avg1>,<avg2>,<avg3>,<max0>,<max1>,<max2>,<max3>,<min0>,<min1>,<min2>,<min3>}|{<aclr0>,<aclr1>,<aclr2>,<aclr3>}
Bit Error Rate - Error Counts	-----	:FETCh:CELLular:WCDMa:FUNDamental:BERate:ECOunt?	<number>
Bit Error Rate	-----	:FETCh:CELLular:WCDMa:FUNDamental:BERate:ERATe? [<format>]	<rate>
Bit Error Rate - Judgement	-----	:FETCh:CELLular:WCDMa:FUNDamental:BERate:JUDGement?	<Judgement>
Bit Error Rate - Transmitted bits	-----	:FETCh:CELLular:WCDMa:FUNDamental:BERate:TBIT?	<number>
Block Error Rate - Error Counts	-----	:FETCh:CELLular:WCDMa:FUNDamental:BLERate:ECOunt?	<number>
Block Error Rate	-----	:FETCh:CELLular:WCDMa:FUNDamental:BLERate:ERATe? [<format>]	<rate>
Block Error Rate - Judgement	-----	:FETCh:CELLular:WCDMa:FUNDamental:BLERate:JUDGement?	<Judgement>
Block Error Rate - Transmitted bits	-----	:FETCh:CELLular:WCDMa:FUNDamental:BLERate:TBIT?	<number>
Result of Occupied Bandwidth	-----	:FETCh:CELLular:WCDMa:FUNDamental:OBW?	<bw>

Results (Cont'd)

Function	Command	Query	Response
Result of Occupied Bandwidth Frequency	-----	:FETCh:CELLular:WCDMa:FUNDamental:OBW:FREQuency? <pos>	<freq>
Result of Filtered Power Measurement	-----	:FETCh:CELLular:WCDMa:FUNDamental:POWer:FLTPower? <mode>	{<avg>,<max>,<min>}|<pwr>|{<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>}
Result of Tx Power Measurement	-----	:FETCh:CELLular:WCDMa:FUNDamental:POWer:TXPower? <mode>	{<avg>,<max>,<min>}|<pwr>|{<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>}
Judgement of Spectrum Emission Mask	-----	:FETCh:CELLular:WCDMa:FUNDamental:SEMask:JUDGement?	<judgement>
Result of Spectrum Emission Mask (Lower)	-----	:FETCh:CELLular:WCDMa:FUNDamental:SEMask:LEVel:LOWer?	<band>,<freq(0)>,<peak(0)>,<freq(1)>,<peak(1)>,<freq(2)>,<peak(2)>,<freq(3)>,<peak(3)>
Result of Spectrum Emission Mask (Upper)	-----	:FETCh:CELLular:WCDMa:FUNDamental:SEMask:LEVel:UPPer?	<band>,<freq(0)>,<peak(0)>,<freq(1)>,<peak(1)>,<freq(2)>,<peak(2)>,<freq(3)>,<peak(3)>
Margin of Spectrum Emission Mask (Lower)	-----	:FETCh:CELLular:WCDMa:FUNDamental:SEMask:MARGin:LOWer?	<band>,<freq(0)>,<peak(0)>,<freq(1)>,<peak(1)>,<freq(2)>,<peak(2)>,<freq(3)>,<peak(3)>
Margin of Spectrum Emission Mask (Upper)	-----	:FETCh:CELLular:WCDMa:FUNDamental:SEMask:MARGin:UPPer?	<band>,<freq(0)>,<peak(0)>,<freq(1)>,<peak(1)>,<freq(2)>,<peak(2)>,<freq(3)>,<peak(3)>

Results (Cont'd)

Function	Command	Query	Response
Waveform Data	-----	:FETCh:CELLular:WCDMa:FUNDamental:TRACe? <format>,<position>,<length>	<data(0)>,<data(1)>,…,<data(length-1)>
Inner Loop Power Control (Auto) - Judgement	-----	:FETCh:CELLular:WCDMa:ILPC:JUDGement? <step>	<judgement>
Slot Power List - Slot Level	-----	:FETCh:CELLular:WCDMa:ILPC:POWer? <step>[,<slot>]	<l[0]>,<l[1]>,…,<l[max_slot_number]>
Inner Loop Power Control (Auto) maximum power	-----	:FETCh:CELLular:WCDMa:ILPC:MAXimum:POWer?	<power>
Inner Loop Power Control (Auto) minimum power	-----	:FETCh:CELLular:WCDMa:ILPC:MINimum:POWer?	<power>

Result of Modulation Analysis Measurements

Function	Command	Query	Response
Carrier Frequency Result of Modulation Analysis	-----	:FETCh:CELLular:WCDMa:FUNDamental:MODulation:CFRequency?	<freq>
EVM Result of Modulation Analysis	-----	:FETCh:CELLular:WCDMa:FUNDamental:MODulation:EVM? <mode>	{<avg>,<max>,<min>}|<evm>
Carrier Frequency Error Result of Modulation Analysis	-----	:FETCh:CELLular:WCDMa:FUNDamental:MODulation:FERRor? <mode>	{<avg_ppm>,<avg_Hz>,<max_ppm>,<max_Hz>,<min_ppm>,<min_Hz>}|{<freq_ppm>,<freq_Hz>}
Carrier Frequency Error Result of Modulation Analysis (Worst)	-----	:FETCh:CELLular:WCDMa:FUNDamental:MODulation:FERRor:WORSt?	<freq_ppm>,<freq_Hz>
IQ Imbalance Result of Modulation Analysis	-----	:FETCh:CELLular:WCDMa:FUNDamental:MODulation:IQIMbalance? <mode>	{<avg>,<max>,<min>}|<iqimb>
Magnitude Error Result of Modulation Analysis	-----	:FETCh:CELLular:WCDMa:FUNDamental:MODulation:MERRor? <mode>	{<avg>,<max>,<min>}|<merr>
Origin Offset Result of Modulation Analysis	-----	:FETCh:CELLular:WCDMa:FUNDamental:MODulation:ORGNoffset? <mode>	{<avg>,<max>,<min>}|<orgnoffs>
Peak EVM Result of Modulation Analysis	-----	:FETCh:CELLular:WCDMa:FUNDamental:MODulation:PEVM? <mode>	{<avg>,<max>,<min>}|<pevm>
Phase Error Result of Modulation Analysis	-----	:FETCh:CELLular:WCDMa:FUNDamental:MODulation:PHERror? <mode>	{<avg>,<max>,<min>}|<perr>

Result of Modulation Analysis Measurements (Cont’d)

Function	Command	Query	Response
Power Ratio Result of Modulation Analysis	-----	:FETCh:CELLular:WCDMa:FUNDamental:MODulation:PRATio? <mode>	{<avg>,<max>,<min>}|<powerratio>
Timing Error Result of Modulation Analysis	-----	:FETCh:CELLular:WCDMa:FUNDamental:MODulation:TERRor? <mode>	{<avg>,<max>,<min>}|<terror>
Timing Error Result of Modulation Analysis (Worst)	-----	:FETCh:CELLular:WCDMa:FUNDamental:MODulation:TERRor:WORSt?	<terror>

4.1.3 Sequence measurement commands

Common Parameters

Function	Command	Query	Response
Uplink Frequency	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency <ul_freq>	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency?	<ul_freq>
Input Level	:CONFigure:CELLular:MEASurement:RFSettings:LEVel <level>	:CONFigure:CELLular:MEASurement:RFSettings:LEVel?	<level>
Downlink Frequency	:CONFigure:CELLular:GENerator:RFSettings:FREQuency <dl_freq>	:CONFigure:CELLular:GENerator:RFSettings:FREQuency?	<dl_freq>
Output Level	:CONFigure:CELLular:GENerator:RFSettings:LEVel <level>	:CONFigure:CELLular:GENerator:RFSettings:LEVel?	<level>

Sequence Measurements

Function	Command	Query	Response
Sequence Measurement Status	-----	:FETCh:CELLular:SEQuence:STATe?	<m_status>,<n>,<s(n-1)>
Sequence Progress	-----	:FETCh:CELLular:SEQuence:PROGress?	<p>,<cur>,<start>,<stop>
Specified Segment Status	-----	:FETCh:CELLular:SEQuence:SEG:STATe? <seg>	<stat>
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	-----	-----

Sequence Parameter Information

Function	Command	Query	Response
Sequence Parameter Information - Error Check	-----	:FETCh:CELLular:SEQuence:ERRor? [<item>]	<n>,<err(n-1)>,<ns>,<seg(ns-1)>,<e>,<mem>,<exe>,<set>
Sequence Parameter Information - Error Check	-----	:FETCh:CELLular:SEQuence:ERRor2? <format>	<n>,<err(n-1)>

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 - 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 Table Parameter - Uplink Frequency, Input Level	:CONFigure:CELLular:SEQuence:RFSettings:TX <seg>,<ul_freq>,<ref>	:CONFigure:CELLular:SEQuence:RFSettings:TX? <seg>	<ul_freq>,<ref>

Measurement Parameters

Function	Command	Query	Response
ACLR Measurement Enable and Count	:CONFigure:CELLular:SEQuence:WCDMa:ACLR:SET <mcond>,<on_off>[,<count>]	:CONFigure:CELLular:SEQuence:WCDMa:ACLR:SET? <mcond>	<on_off>,<count>
Turn Off All Measurement Items	:CONFigure:CELLular:SEQuence:WCDMa:AMITems:OFF <mcond>	-----	-----
Frequency Band	:CONFigure:CELLular:SEQuence:WCDMa:BAND <mcond>,<FreqBand>	:CONFigure:CELLular:SEQuence:WCDMa:BAND? <mcond>	<FreqBand>
ILPC Measurement Enable	CONFigure:CELLular:SEQuence:WCDMa:ILPC <mcond>,<on_off>	:CONFigure:CELLular:SEQuence:WCDMa:ILPC? <mcond>	<on_off>

Measurement Parameters (Cont'd)

Function	Command	Query	Response
Long Span Code Search	:CONFigure:CELLular:SEQuence:WCDMa:LSSearch <on_off>	:CONFigure:CELLular:SEQuence:WCDMa:LSSearch?	<on_off>
Modulation Analysis Measuring object	:CONFigure:CELLular:SEQuence:WCDMa:MOBJect <mcond>,<mobj>	:CONFigure:CELLular:SEQuence:WCDMa:MOBJect? <mcond>	<mobj>
Modulation Analysis Measurement Enable and Count	:CONFigure:CELLular:SEQuence:WCDMa:MODulation:SET <mcond>,<on_off>[,<count>]	:CONFigure:CELLular:SEQuence:WCDMa:MODulation:SET? <mcond>	<on_off>,<count>
Occupied Bandwidth Ratio	:CONFigure:CELLular:SEQuence:WCDMa:OBW:RATio <ratio>	:CONFigure:CELLular:SEQuence:WCDMa:OBW:RATio?	<ratio>
OBW Measurement Enable and Count	:CONFigure:CELLular:SEQuence:WCDMa:OBW:SET <mcond>,<on_off>[,<count>]	:CONFigure:CELLular:SEQuence:WCDMa:OBW:SET? <mcond>	<on_off>,<count>
Peak Code Domain Error Measurement Enable and Count	:CONFigure:CELLular:SEQuence:WCDMa:PCDE:SET <mcond>,<on_off>[,<count>]	:CONFigure:CELLular:SEQuence:WCDMa:PCDE:SET? <mcond>	<on_off>,<count>
Phase Discontinuity Measurement Enable and Count	:CONFigure:CELLular:SEQuence:WCDMa:PDISc:SET <mcond>,<on_off>[,<count>]	:CONFigure:CELLular:SEQuence:WCDMa:PDISc:SET? <mcond>	<on_off>,<count>
Tx Power Measurement Enable and Count	:CONFigure:CELLular:SEQuence:WCDMa:POWer:SET <mcond>,<on_off>[,<count>]	:CONFigure:CELLular:SEQuence:WCDMa:POWer:SET? <mcond>	<on_off>,<count>

Measurement Parameters (Cont'd)

Function	Command	Query	Response
Scrambling Code Number	:CONFigure:CELLular:SEQuence:WCDMa:SCODe <code>	:CONFigure:CELLular:SEQuence:WCDMa:SCODe?	<code>
Spectrum Emission Mask - Mask Template Lower Limit	:CONFigure:CELLular:SEQuence:WCDMa:SEMask:LIMit <level>	:CONFigure:CELLular:SEQuence:WCDMa:SEMask:LIMit?	<level>
SEM Measurement Enable and Count	:CONFigure:CELLular:SEQuence:WCDMa:SEMask:SET <mcond>,<on_off>[,<count>]	:CONFigure:CELLular:SEQuence:WCDMa:SEMask:SET? <mcond>	<on_off>,<count>
Spectrum Emission Mask - Mask Template	:CONFigure:CELLular:SEQuence:WCDMa:SEMask:TEMPlate <offset>,<level>	:CONFigure:CELLular:SEQuence:WCDMa:SEMask:TEMPlate? <offset>	<level>

Modulation Analysis Measurement Results

<table>
<tr><th>Function</th><th>Command</th><th>Query</th><th>Response</th></tr>
<tr><td>Carrier Frequency Result of Modulation Analysis</td><td>-----</td><td>:FETCh:CELLular:SEQuence:WCDMa:MODulation:CFRequency? <seg></td><td><freq></td></tr>
<tr><td>EVM Result of Modulation Analysis</td><td>-----</td><td>:FETCh:CELLular:SEQuence:WCDMa:MODulation:EVM? <seg>,<mode></td><td>{<avg>,<max>,<min>}|<evm></td></tr>
<tr><td>Carrier Frequency Error Result of Modulation Analysis</td><td>-----</td><td>:FETCh:CELLular:SEQuence:WCDMa:MODulation:FERRor? <seg>,<mode></td><td>{<avg_ppm>,<avg_Hz>,<max_ppm>,<max_Hz>,<min_ppm>,<min_Hz>}|{<freq_ppm>,<freq_Hz>}</td></tr>
<tr><td>Carrier Frequency Error Result of Modulation Analysis (Worst)</td><td>-----</td><td>:FETCh:CELLular:SEQuence:WCDMa:MODulation:FERRor:WORSt? <seg></td><td><freq_ppm>,<freq_Hz></td></tr>
<tr><td>IQ Imbalance Result of Modulation Analysis</td><td>-----</td><td>:FETCh:CELLular:SEQuence:WCDMa:MODulation:IQIMbalance? <seg>,<mode></td><td>{<avg>,<max>,<min>}|<iqimb></td></tr>
<tr><td>Magnitude Error Result of Modulation Analysis</td><td>-----</td><td>:FETCh:CELLular:SEQuence:WCDMa:MODulation:MERRor? <seg>,<mode></td><td>{<avg>,<max>,<min>}|<merr></td></tr>
</table>

Modulation Analysis Measurement Results (Cont'd)

Function	Command	Query	Response
Origin Offset Result of Modulation Analysis	-----	:FETCh:CELLular:SEQuence:WCDMa:MODulation:ORGNoffset? <seg>,<mode>	{<avg>,<max>,<min>}|<orgnoffs>
Peak EVM Result of Modulation Analysis	-----	:FETCh:CELLular:SEQuence:WCDMa:MODulation:PEVM? <seg>,<mode>	{<avg>,<max>,<min>}|<pevm>
Phase Error Result of Modulation Analysis	-----	:FETCh:CELLular:SEQuence:WCDMa:MODulation:PHERror? <seg>,<mode>	{<avg>,<max>,<min>}|<perr>
Timing Error Result of Modulation Analysis	-----	:FETCh:CELLular:SEQuence:WCDMa:MODulation:TERRor? <seg>,<mode>	{<avg>,<max>,<min>}|<terror>
Timing Error Result of Modulation Analysis (Worst)	-----	:FETCh:CELLular:SEQuence:WCDMa:MODulation:TERRor:WORSt? <seg>	<terror>

Phase Discontinuity Results

Function	Command	Query	Response
Result of Phase Discontinuity	-----	:FETCh:CELLular:SEQuence:WCDMa:PDISc? <seg>	<count>,<data(0)>,<data(1)>,…,<data(count-1)>
EVM Result of Phase Discontinuity	-----	:FETCh:CELLular:SEQuence:WCDMa:PDISc:EVM? <seg>	<count>,<evm(0)>,<evm(1)>,…,<evm(count-1)>
Carrier Frequency Error Result of Phase Discontinuity	-----	:FETCh:CELLular:SEQuence:WCDMa:PDISc:FERRor? <seg>	<count>,<fppm(0)>,<fHz(0)>,<fppm(1)>,<fHz(1)>,…,<fppm(count-1)>,<fHz(count-1)>

Results

Function	Command	Query	Response
Result of Adjacent Channel Leakage Power	-----	:FETCh:CELLular:SEQuence:WCDMa:ACLR? <seg>,<mode>	{<avg0>,<avg1>,<avg2>,<avg3>,<max0>,<max1>,<max2>,<max3>,<min0>,<min1>,<min2>,<min3>}|{<aclr0>,<aclr1>,<aclr2>,<aclr3>}
Result of Occupied Bandwidth	-----	:FETCh:CELLular:SEQuence:WCDMa:OBW? <seg>	<bw>
Result of Occupied Bandwidth Frequency	-----	:FETCh:CELLular:SEQuence:WCDMa:OBW:FREQuency? <seg>,<pos>	<freq>

Results (Cont'd)

Function	Command	Query	Response
Result of Filtered Power Measurement	-----	:FETCh:CELLular:SEQuence:WCDMa:POWer:FLTPower? <seg>,<mode>	{<avg>,<max>,<min>}|<pwr>|{<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>}
Result of Tx Power Measurement	-----	:FETCh:CELLular:SEQuence:WCDMa:POWer:TXPower? <seg>,<mode>	{<avg>,<max>,<min>}|<pwr>|{<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>}
Judgement of Spectrum Emission Mask	-----	:FETCh:CELLular:SEQuence:WCDMa:SEMask:JUDGement? <seg>	<judgement>
Result of Spectrum Emission Mask (Lower)	-----	:FETCh:CELLular:SEQuence:WCDMa:SEMask:LEVel:LOWer? <seg>	<band>,<freq(0)>,<peak(0)>,<freq(1)>,<peak(1)>,<freq(2)>,<peak(2)>,<freq(3)>,<peak(3)>
Result of Spectrum Emission Mask (Upper)	-----	:FETCh:CELLular:SEQuence:WCDMa:SEMask:LEVel:UPPer? <seg>	<band>,<freq(0)>,<peak(0)>,<freq(1)>,<peak(1)>,<freq(2)>,<peak(2)>,<freq(3)>,<peak(3)>
Margin of Spectrum Emission Mask (Lower)	-----	:FETCh:CELLular:SEQuence:WCDMa:SEMask:MARGin:LOWer? <seg>	<band>,<freq(0)>,<peak(0)>,<freq(1)>,<peak(1)>,<freq(2)>,<peak(2)>,<freq(3)>,<peak(3)>
Margin of Spectrum Emission Mask (Upper)	-----	:FETCh:CELLular:SEQuence:WCDMa:SEMask:MARGin:UPPer? <seg>	<band>,<freq(0)>,<peak(0)>,<freq(1)>,<peak(1)>,<freq(2)>,<peak(2)>,<freq(3)>,<peak(3)>
Result of Peak Code Domain Error	-----	:CONFigure:CELLular:SEQuence:WCDMa:PCDE? <seg>,<mode>	{<avg>,<max>,<min>}|<pcde>

4.2 Details of Commands

This section describes commands in alphabetic 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
%	%	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 current measurement

Command

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

Example of Use

To stop measurement:

:ABOR:CELL:MEAS

:CONFigure:CELLular:GENerator:ARB:PACKage:SELect

Waveform File Select

Function

Selects or queries 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 1 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 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 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 output waveform 1 signal:
: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 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 output waveform 1 signal:
: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/disables 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

: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 output 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 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	

Example of Use

To switch the measurement standard to SEQUENCE:
:CONF:CELLMEAS:STAN SEQUENCE
:CONF:CELL:MEAS:STAN?
> SEQUENCE

Remarks

To execute the measurement described here, set the parameter to WCDMA or SEQUENCE.
If this command is sent during measurement, measurement stops to prepare for the new standard.
Common hardware settings, such as Downlink Frequency and Input Level, can be set for each measurement standard.

:FETCh:CELLular:MEASurement:STATe?

Measurement Status

Function

Queries measurement status

Query

```
:FETCh:CELLular:MEASurement:STATe?
```

Response

m_status

Parameter

<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 MX887011A 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 execution.
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 the questionable register, refer to Chapter 3 “Fundamental Operation” in the *MU887000A TRX Test Module Operation Manual*.

:INSTrument[:SELect]

Application Select

Function

Sets or queries 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 MX887011A.

Example of Use

To set the application software to CELLULAR:
:INST CELLULAR
:INST?
> CELLULAR

Remarks

When using the MX887011A, set the application to CELLULAR using `:INSTrument[:SELect]` and then set the standard to WCDMA 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>

Parameter

<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.

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
```

4

SCPI Command Reference

: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>

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

Parameter

<mosr>	Measurement operation status register
Range	0 to 65535

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 operation status 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>

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

Parameter

<mqsr>	Measurement questionable status register
Range	0 to 65535

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 language mode of remote control command

Command

```
:SYSTem:LANGuage <mode>
```

Query

```
:SYSTem:LANGuage?
```

Response

<mode>

Parameters

<mode>	Language mode
NATive	Native
SCPI	SCPI
Default	NATive

Example of Use

To switch the remote control command language mode to Native:

:SYST:LANG NAT

:SYST:LANG?

>NAT

4.2.2 Fundamental measurement commands

:CONFigure:CELLular:GENerator:RFSettings:FREQuency

Downlink Frequency

Function

Sets or queries 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
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	2137.600000 MHz

Example of Use

To set the downlink frequency to 2050 MHz:
:CONF:CELL:GEN:RFS:FREQ 2050MHZ
:CONF:CELL:GEN:RFS:FREQ?
>2050000000

Remarks

The Rx frequency for the mobile station is set.
Changing the setting of downlink frequency does not change the setting of the downlink channel.

:CONFigure:CELLular:GENerator:RFSettings:LEVel

Output Level

Function

Sets or queries RF signal total output level for all channels

Command

```
:CONFigure:CELLular:GENerator:RFSettings:LEVel <level>
```

Query

```
:CONFigure:CELLular:GENerator:RFSettings:LEVel?
```

Response

<level>

Unit	dBm

Parameter

<level>	Output level
Range	–130.0 to –10.0 dBm (Port1/Port2)
	–120.0 to 0.0 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix Code	DBM (uses dBm when omitted)
Default	–65.7 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:MEASurement:RFSettings:DLCHannel

Downlink Channel

Function

Sets or queries EARFCN (E-UTRA Absolute Radio Frequency Channel Number) to 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	412, 437, 462, 487, 512, 537, 562, 587, 612, 637, 662, 687, 712 to 763, 787, 812, 837, 862 to 912, 1007, 1012, 1032, 1037, 1062, 1087, 1100 to 13500
Resolution	1
Default	10688

Details

Changing the Downlink Channel parameter, also changes the related Uplink Channel, Downlink Frequency and Uplink Frequency parameters.
For the relationship between the parameter and channel frequency settings, refer to “Uplink Channel, Downlink Channel” in section 2.1.6 “W-CDMA signal setting” and Table 2.1.6-2 “E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation”.

Example of Use

To set the downlink channel 1100:
:CONF:CELL:MEAS:RFS:DLCH 1100
:CONF:CELL:MEAS:RFS:DLCH?
> 1100

:CONFigure:CELLular:MEASurement:RFSettings:FREQuency

Uplink Frequency

Function

Sets or queries uplink frequency of MU887000A

Command

```
:CONFigure:CELLular:MEASurement:RFSettings:FREQuency <ul_freq>
```

Query

```
:CONFigure:CELLular:MEASurement:RFSettings:FREQuency?
```

Response

<ul_freq>

Unit	Hz

Parameter

<ul_freq>	Uplink frequency
Range	400.000000 to 3800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	1947.600000 MHz

Details

The Tx frequency is set for the mobile station.
Changing the setting of the Uplink Frequency parameter does not change the Uplink Channel setting.

Example of Use

To set the uplink frequency to 1950 MHz:
:CONF:CELL:MEAS:RFS:FREQ 1950MHZ
:CONF:CELL:MEAS:RFS:FREQ?
>1950000000

:CONFigure:CELLular:MEASurement:RFSettings:LEVel

Input Level

Function

Sets or queries input level of MU887000A connector

Command

```
:CONFigure:CELLular:MEASurement:RFSettings:LEVel <level>
```

Query

```
:CONFigure:CELLular:MEASurement:RFSettings:LEVel?
```

Response

<level>

Unit	dBm

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 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.

Example of Use

To set the input level to 27.0 dBm

```
:CONF:CELL:MEAS:RFS:LEV 27.0
:CONF:CELL:MEAS:RFS:LEV?
> 27.0
```

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 EARFCN (E-UTRA Absolute Radio Frequency Channel Number) Uplink Channel

Command

```
:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel <ul_ch>
```

Query

```
:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel?
```

Response

<ul_ch>

Parameter

<ul_ch>	Uplink Channel
Range	12, 37, 62, 87, 112, 137, 150 to 12550
Resolution	1
Default	9738

Details

Changing the Uplink Channel parameter also changes the related Downlink Channel, Uplink Frequency and Downlink Frequency parameters.
For the relationship between the parameter and channel frequency settings, refer to “Uplink Channel, Downlink Channel” in section 2.1.6 “W-CDMA signal setting” and Table 2.1.6-2 “E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation”

Example of Use

To set uplink channel 12000:
:CONF:CELL:MEAS:RFS:ULCH 12000
:CONF:CELL:MEAS:RFS:ULCH?
> 12000

:CONFigure:CELLular:MEASurement:SELect

Measurement Select

Function

Sets or queries measurement functions

Command

```
:CONFigure:CELLular:MEASurement:SELect <meassel>
```

Query

```
:CONFigure:CELLular:MEASurement:SELect?
```

Response

<meassel>

Parameters

<meassel>	Measurement function
FMEAS	Fundamental Measurement
ILPC	Inner Loop Power Control
Default	FMEAS

Example of Use

To set the measurement function to Fundamental Measurement:

:CONF:CELL:MEAS:SEL FMEAS

:CONF:CELL:MEAS:SEL?

> FMEAS

:CONFigure:CELLular:WCDMa:FUNDamental:ACLR:SET

ACLR Measurement Enable and Count

Function

Enables Adjacent Channel Leakage Power Ratio measurement and sets or queries measurement count

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:ACLR:SET <on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:ACLR:SET?
```

Response

<on_off>,<count>

Parameters

<on_off>	Executes measurement
ON	Enables measurement
OFF	Disables measurement
<count>	Measurement count
Range	1 to 200
Resolution	1
Default	1

Example of Use

To enable Adjacent Channel Leakage Power Ratio measurement and set the measurement count to 50:

:CONF:CELL:WCDM:FUND:ACLR:SET ON,50

:CONF:CELL:WCDM:FUND:ACLR:SET?

> ON,50

:CONFigure:CELLular:WCDMa:FUNDamental:AMITems:OFF

Turn Off All Measurement Items

Function

Turns off all fundamental measurement items

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:AMITems:OFF
```

Example of Use

To set all measurements to off at one time:
:CONF:CELL:WCDM:FUND:AMIT:OFF

Remarks

The operation of this command is similar to turning off all the following command settings.
:CONFigure:CELLular:WCDMa:FUNDamental:POWer:SET
:CONFigure:CELLular:WCDMa:FUNDamental:OBW:SET
:CONFigure:CELLular:WCDMa:FUNDamental:SEMask:SET
:CONFigure:CELLular:WCDMa:FUNDamental:ACLR:SET
:CONFigure:CELLular:WCDMa:FUNDamental:MODulation:SET
:CONFigure:CELLular:WCDMa:FUNDamental:PCDE:SET
:CONFigure:CELLular:WCDMa:FUNDamental:PDISc:SET
:CONFigure:CELLular:WCDMa:FUNDamental:RCDE:SET

:CONFigure:CELLular:WCDMa:FUNDamental:BAND

Frequency Band

Function

Sets or queries frequency band

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:BAND <FreqBand>
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:BAND?
```

Response

<FreqBand>

Parameter

<FreqBand>	Frequency Band	
NONE	NONE	
BAND1	Band1	1920 to 1980/2110 to 2170 MHz
BAND2	Band2	1850 to 1910/1930 to 1990 MHz
BAND3	Band3	1710 to 1785/1805 to 1880 MHz
BAND4	Band4	1710 to 1755/2110 to 2155 MHz
BAND5	Band5	824 to 849/869 to 894 MHz
BAND6	Band6	830 to 840/875 to 885 MHz
BAND7	Band7	2500 to 2570/2620 to 2690 MHz
BAND8	Band8	880 to 915/925 to 960 MHz
BAND9	Band9	1749.9 to 1784.9/1844.9 to 1879.9 MHz
BAND10	Band10	1710 to 1770/2110 to 2170 MHz
BAND11	Band11	1427.9 to 1447.9/1475.9 to 1495.9 MHz
BAND12	Band12	698 to 716/728 to 746 MHz
BAND13	Band13	777 to 787/746 to 756 MHz
BAND14	Band14	788 to 798/758 to 768 MHz
BAND19	Band19	830 to 845/875 to 890 MHz
BAND20	Band20	832 to 862/791 to 821 MHz
BAND21	Band21	1447.9 to 1462.9/1495.9 to 1510.9 MHz
BAND25	Band25	1850 to 1915 / 1930 to 1995 MHz
BAND26	Band26	814 to 849 / 859 to 894 MHz
Default	NONE	

Details

This command sets additional spectrum emission limits per frequency band as described in Section 5.9 of 3GPP TS34.121-1.

No additional requirement:
NONE, BAND1, BAND3, BAND6 to BAND9, BAND11, BAND19 to BAND21
Additional requirement specified in Table 5.9.1A:
BAND2, BAND4, BAND10, BAND25
Additional requirement specified in Table 5.9.1B: BAND5, BAND26
Additional requirement specified in Table 5.9.1C: BAND12 to BAND14

For the contents of Table 5.9.1A, 5.9.1B and 5.9.1C, refer to Table 2.4-2 Additional Requirements for Frequency Bands II, IV, X and XXV, Table 2.4-3 Additional Requirements for Frequency Band V and XXVI, and Table 2.4-4 Additional Requirements for Frequency Bands XII, XIII, and XIV.

Example of Use

To set the frequency band to BAND1:
:CONF:CELL:WCDM:FUND:BAND BAND1
:CONF:CELL:WCDM:FUND:BAND BAND1
> BAND1

:CONFigure:CELLular:WCDMa:FUNDamental:BERate:LIMit

Bit Error Rate - Upper Limit

Function

Sets or queries upper limit (%) at Bit Error Rate measurement.

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:BERate:LIMit <ratio>
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:BERate:LIMit?
```

Response

<ratio>

Unit	%

Parameter

<ratio>	Upper Limit
Range	0.0 to 100.0
Resolution	0.1
Default	10.0

Example of Use

To set upper limit of Bit Error Rate measurement to 10.0%.

:CONF:CELL:WCDM:FUND:BER:LIM 10

:CONF:CELL:WCDM:FUND:BER:LIM?

> 10.0

:CONFigure:CELLular:WCDMa:FUNDamental:BERate:MEASurement

Bit Error Rate

Function

Enables Bit Error Rate measurement or queries setting.

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:BERate:MEASurement <on_off>
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:BERate:MEASurement?
```

Response

on_off

Parameter

<on_off>	Enables/disables measurement.
ON	Enables measurement.
OFF	Disables measurement.
Default	OFF

Example of Use

To set Bit Error Rate measurement to On.

:CONF:CELL:WCDM:FUND:BER:MEAS ON

:CONF:CELL:WCDM:FUND:BER:MEAS?

> ON

:CONFigure:CELLular:WCDMa:FUNDamental:BERate:SAMPle

Bit Error Rate - Number of Sample

Function

Sets or queries sample bit number at Bit Error Rate measurement.

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:BERate:SAMPle <number>
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:BERate:SAMPle?
```

Response

<number>

Parameter

<number>	Sample bit number
Range	1 to 73200
Resolution	1
Default	10000

Example of Use

To set sample bit number of Bit Error Rate measurement to 1000.

:CONF:CELL:WCDM:FUND:BER:SAMP 1000

:CONF:CELL:WCDM:FUND:BER:SAMP?

> 1000

:CONFigure:CELLular:WCDMa:FUNDamental:BERate:TFCI

TFCI Detection Mode

Function

Sets TFCI detection to Auto or Manual (fixed value) or queries setting

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:BERate:TFCI <mode>
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:BERate:TFCI?
```

Response

<mode>

Parameter

<mode>	Detection mode
AUTO	TFCI = 2 or 3 Auto detect
FIX2	TFCI = 2 fixed
FIX3	TFCI = 3 fixed
Default	AUTO

Example of Use

To set TFCI detection to Auto

:CONF:CELL:WCDM:FUND:BER:TFCI AUTO

:CONF:CELL:WCDM:FUND:BER:TFCI?

> AUTO

:CONFigure:CELLular:WCDMa:FUNDamental:BLERate:LIMit

Block Error Rate - Upper Limit

Function

Sets or queries upper limit (%) at Block Error Rate measurement.

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:BLERate:LIMit <ratio>
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:BLERate:LIMit?
```

Response

<ratio>

Parameter

<ratio>	Upper Limit
Range	0.0 to 100.0
Resolution	0.1
Default	10.0

Example of Use

To set upper limit of Block Error Rate measurement to 10.0%.

:CONF:CELL:WCDM:FUND:BLER:LIM 10

:CONF:CELL:WCDM:FUND:BLER:LIM?

> 10.0

:CONFigure:CELLular:WCDMa:FUNDamental:BLERate:MEASurement

Block Error Rate

Function

Enables Block Error Rate measurement or queries setting.

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:BLERate:MEASurement <on_off>
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:BLERate:MEASurement?
```

Response

on_off

Parameter

<on_off>	Enables/disables measurement.
ON	Enables measurement.
OFF	Disables measurement.
Default	OFF

Example of Use

To set Block Error Rate measurement to On.
:CONF:CELL:WCDM:FUND:BLER:MEAS ON
:CONF:CELL:WCDM:FUND:BLER:MEAS?
> ON

:CONFigure:CELLular:WCDMa:FUNDamental:BLERate:SAMPle

Block Error Rate - Number of Sample

Function

Sets or queries sample block number at Block Error Rate measurement.

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:BLERate:SAMPle <number>
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:BLERate:SAMPle?
```

Response

number

Parameter

<number>	Sample block number
Range	1 to 300
Resolution	1
Default	50

Example of Use

To set sample block number of Block Error Rate measurement to 50.

:CONF:CELL:WCDM:FUND:BLER:SAMP 50

:CONF:CELL:WCDM:FUND:BLER:SAMP?

> 50

:CONFigure:CELLular:WCDMa:FUNDamental:DTCH:PATTern

DTCH Data Pattern

Function

Sets or queries DTCH data pattern.

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:DTCH:PATTern <pattern>
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:DTCH:PATTern?
```

Response

<pattern>

Parameter

<pattern>	Data Pattern
ALL1	All "1"s

Example of Use

To set DTCH data pattern to ALL1.
:CONF:CELL:WCDM:FUND:DTCH:PATT ALL1
:CONF:CELL:WCDM:FUND:DTCH:PATT?
> ALL1

:CONFigure:CELLular:WCDMa:FUNDamental:LSSearch

Long Span Code Search

Function

Enables Long Span Search or queries setting

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:LSSearch <on_off>
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:LSSearch?
```

Response

<on_off>

Parameter

<on_off>	Enable Long Span Search
ON	Enables Long Span Code Search
OFF	Disables Long Span Search
Default	OFF

Details

Measurement takes more time when the Long Span Search function is on.
Set this parameter to Off when the uplink and downlink signals are synchronized; set it to On when they are not synchronized.

Example of Use

To enable Long Span Search:
:CONF:CELL:WCDM:FUND:LSS ON
:CONF:CELL:WCDM:FUND:LSS?
> ON

:CONFigure:CELLular:WCDMa:FUNDamental:MODulation:SET

Modulation Analysis Measurement Enable and Count

Function

Enables Modulation Analysis measurement and sets measurement count, or queries settings

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:MODulation:SET <on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:MODulation:SET?
```

Response

<on_off>,<count>

Parameters

<on_off>	Enables/disables measurement
ON	Enables Modulation Analysis measurement
OFF	Disables Modulation Analysis measurement
Default	OFF
<count>	Measurement count
Range	1 to 200
Resolution	1
Default	1

Example of Use

To enable Modulation Analysis measurement and set the measurement count to 120:

:CONF:CELL:WCDM:FUND:MOD:SET ON,120

:CONF:CELL:WCDM:FUND:MOD:SET?

> ON,120

:CONFigure:CELLular:WCDMa:FUNDamental:OBW:RATio

Occupied Bandwidth Ratio

Function

Sets or queries Occupied Bandwidth measurement occupation ratio

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:OBW:RATio <ratio>
```

Query

```
:CONFigure:CELLular:WCDMa: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 95.0%:

:CONF:CELL:WCDM:FUND:OBW:RAT 95.0

:CONF:CELL:WCDM:FUND:OBW:RAT?

> 95.0

:CONFigure:CELLular:WCDMa:FUNDamental:OBW:SET

OBW Measurement Enable and Count

Function

Enables Occupied Bandwidth measurement and sets measurement count, or queries settings

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:OBW:SET <on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:OBW:SET?
```

Response

<on_off>,<count>

Parameters

<on_off>	Enables measurement
ON	Sets measurement on
OFF	Sets measurement off
Default	OFF
<count>	Measurement count
Range	1 to 200
Resolution	1
Default	1

Example of Use

To turn Occupied Bandwidth measurement on and set the measurement count to 100:

:CONF:CELL:WCDM:FUND:OBW:SET ON,100

:CONF:CELL:WCDM:FUND:OBW:SET?

> ON,100

:CONFigure:CELLular:WCDMa:FUNDamental:PCDE:SET

Peak Code Domain Error Measurement Enable and Count

Function

Enables Peak Code Domain Error measurement and sets measurement count, or queries settings

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:PCDE:SET <on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:PCDE: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
Default	1

Example of Use

To turn the Peak Code Domain Error measurement on and set the measurement count to 150:

:CONF:CELL:WCDM:FUND:PCDE:SET ON,150

:CONF:CELL:WCDM:FUND:PCDE:SET?

> ON,150

:CONFigure:CELLular:WCDMa:FUNDamental:PDISc:SET

Phase Discontinuity Measurement Enable and Count

Function

Enables Phase Discontinuity measurement and sets measurement count, or queries settings

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:PDISc:SET <on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:PDISc:SET?
```

Response

<on_off>,<count>

Parameters

<on_off>	Enables/disables measurement
ON	Enable measurement
OFF	Disables measurement
Default	OFF
<count>	Measurement count
Range	1 to 100
Resolution	1
Default	1

Example of Use

To enable Phase Discontinuity measurement and set the measurement count to 50:

:CONF:CELL:WCDM:FUND:PDIS:SET ON,50

:CONF:CELL:WCDM:FUND:PDIS:SET?

> ON,10

:CONFigure:CELLular:WCDMa:FUNDamental:POWer:FMODe

Fast Power Measurement Mode

Function

Enables Fast Power Measurement mode or queries setting.

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:POWer:FMODe <on_off>
```

Query

```
:CONFigure:CELLular:WCDMa: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

When Fast Power Measurement mode is On, either Tx power or RRC filter power is measured. Use the following command to enable/disable power measurement and to set measuring times.
:CONFigure:CELLular:WCDMa:FUNDamental:POWer:SET

Use the following command to select either Tx power or RRC filter power for measurement.
:CONFigure:CELLular:WCDMa:FUNDamental:POWer:FRRC

Example of Use

To set Fast Power Measurement mode to On.
:CONF:CELL:WCDM:FUND:POW:FMOD ON
:CONF:CELL:WCDM:FUND:POW:FMOD?
> ON

:CONFigure:CELLular:WCDMa:FUNDamental:POWer:FRRC

Fast Power Measurement Mode - RRC filter

Function

Sets either RRC filter power or Tx power to measure in Fast Power Measurement mode or queries setting.

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:POWer:FRRC <on_off>
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:POWer:FRRC?
```

Response

<on_off>

Parameter

<on_off>	Enables/disables RRC filter power measurement.
ON	Enables RRC filter power measurement.
OFF	Enables Tx power measurement.
Default	OFF

Example of Use

To set RRC filter power measurement in Fast Power Measurement mode.

:CONF:CELL:WCDM:FUND:POW:FRRC ON

:CONF:CELL:WCDM:FUND:POW:FRRC?

> ON

:CONFigure:CELLular:WCDMa:FUNDamental:POWer:SET

Tx Power Measurement Enable and Count

Function

Enables Tx Power measurement and sets measurement count, or queries settings

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:POWer:SET <on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:POWer:SET?
```

Response

<on_off>,<count>

Parameter

<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	ON
<count>	Measurement count
Range	1 to 200
Resolution	1
Default	1

Example of Use

To Transmit Power measurement on and set the measurement count to 10:

:CONF:CELL:WCDM:FUND:POW:SET ON,10

:CONF:CELL:WCDM:FUND:RCDE:SET?

> ON,10

:CONFigure:CELLular:WCDMa:FUNDamental:RCDE:SET

Relative Code Domain Error Measurement Enable and Count

Function

Enables Relative Code Domain Error measurement and sets measurement count, or queries settings

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:RCDE:SET <on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:RCDE: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
Default	1

Example of Use

To enable Relative Code Domain Error measurement and set the measurement count to 200:

:CONF:CELL:WCDM:FUND:RCDE:SET ON,200

:CONF:CELL:WCDM:FUND:RCDE:SET?

> ON,200

:CONFigure:CELLular:WCDMa:FUNDamental:SEMask:LIMit

Spectrum Emission Mask - Mask Template Lower Limit

Function

Sets absolute lower level threshold (minimum threshold power) for Spectrum Emission Mask and queries settings

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:SEMask:LIMit <level>
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:SEMask:LIMit?
```

Response

<level>

Unit	dBm

Parameter

<level>	Template threshold
Range	–100.0 to 0.0 /3.84 MHz
Resolution	0.1 dBm
Default	–50.0 dBm

Example of Use

To set the absolute lower level threshold (minimum threshold power) for Spectrum Emission Mask measurement to –55.0 dBm:

:CONF:CELL:WCDM:FUND:SEM:LIM -55.0

:CONF:CELL:WCDM:FUND:SEM:LIM?

> -55.0

:CONFigure:CELLular:WCDMa:FUNDamental:SEMask:SET

SEM Measurement Enable and Count

Function

Enables Spectrum Emission Mask measurement and sets measurement count, or queries settings

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:SEMask:SET <on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:SEMask: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
Default	1

Example of Use

To enable Spectrum Emission Mask measurement and set the measurement count to 20:

:CONF:CELL:WCDM:FUND:SEM:SET ON,20

:CONF:CELL:WCDM:FUND:SEM:SET?

> ON,20

:CONFigure:CELLular:WCDMa:FUNDamental:SEMask:TEMPlate

Spectrum Emission Mask - Mask Template

Function

Sets relative level threshold (template) for Spectrum Emission Mask and queries settings

Command

```
:CONFigure:CELLular:WCDMa:FUNDamental:SEMask:TEMPlate <offset>,<level>
```

Query

```
:CONFigure:CELLular:WCDMa:FUNDamental:SEMask:TEMPlate? <offset>
```

Response

<level>

Unit	dBm

Parameters

<offset>	Offset frequency point		
Range	1 to 5		
Resolution	1		
<level>	Level at each offset frequency point		
Point	Offset	Level	(Default)
1	(2.5 MHz)	–100.0 to 0.0	(–35.0 dBc)
2	(3.5 MHz)	–100.0 to 0.0	(–50.0 dBc)
3	(3.5 MHz)	–100.0 to 0.0	(–35.0 dBc)
4	(7.5 MHz)	–100.0 to 0.0	(–39.0 dBc)
5	(8.5 MHz)	–100.0 to 0.0	(–49.0 dBc)
Resolution	0.1 dBc		
Default	0.1		

Example of Use

To set template value at 2.5 MHz frequency offset to –80.0 dBc:

```
:CONF:CELL:WCDM:FUND:SEM:TEMP 1,-80.0
:CONF:CELL:WCDM:FUND:SEM:TEMP?
> 1,-80.0
```

:CONFigure:CELLular:WCDMa:ILPC:MEASurement

Inner Loop Power Control Parameter (Auto) - Method

Function

Sets the measurement method (Step) for the Inner Loop Power Control (Auto) measurement.

Command

```
:CONFigure:CELLular:WCDMa:ILPC:MEASurement <auto>
```

Query

```
:CONFigure:CELLular:WCDMa:ILPC:MEASurement?
```

Response

<auto>

Parameter

<auto>	Measurement method (Step)
AUTO_EF	Auto (Step E to F)
Default	AUTO_EF

Example of Use

To set the measurement method for the Inner Loop Power Control measurement to Auto (Step E to F):

:CONF:CELL:WCDM:ILPC:MEAS AUTO_EF

:CONF:CELL:WCDM:ILPC:MEAS?

>AUTO_EF

:CONFigure:CELLular:WCDMa:SCODe

Scrambling Code Number

Function

Sets Scrambling Code Number or queries setting

Command

```
:CONFigure:CELLular:WCDMa:SCODe <code>
```

Query

```
:CONFigure:CELLular:WCDMa:SCODe?
```

Response

<code>

Parameter

<code>	Scrambling Code Number
Range	0 to FFFFFF (Hexadecimal)
Resolution	1
Default	0

Example of Use

To set Scrambling Code Number to 271F:

:CONF:CELL:WCDM:SCOD 271F

:CONF:CELL:WCDM:SCOD?

> 00271F

:CONFigure:CELLular:WCDMa:ULConfig

Uplink Configuration

Function

Sets uplink signal channel configuration or queries setting

Command

```
:CONFigure:CELLular:WCDMa:ULConfig <object>
```

Query

```
:CONFigure:CELLular:WCDMa:ULConfig?
```

Response

<object>

Parameter

<object>	Uplink signal configuration
QPSK	QPSK signal consists of single DPCCH and single DPDCH
WCDMA	WCDMA signal
WCDMA+HSDPA	HSDPA channel (HS-DPCCH) signal
WCDMA+HSUPA	HSUPA channel (E-DPCH) signal
WCDMA+HSPA	HSPA channel signal
WCDMA+HSPA+	HSPA+ channel signal (16QAM)
Default	WCDMA

Details

Supported measurements depend on the uplink signal channel configuration. Refer to Table 2.1.6-1 “Channel Configuration Settings and Measurement Items”.

Example of Use

To set the uplink signal channel configuration to WCDMA:

:CONF:CELL:WCDM:ULC WCDMA

:CONF:CELL:WCDM:ULC?

> WCDMA

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SCPI Command Reference

:FETCh:CELLular:WCDMa:FUNDamental:ACLR?

Result of Adjacent Channel Leakage Power Ratio

Function

Queries result of Adjacent Channel Leakage Power Ratio measurement

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:ACLR? <mode>
```

Response

When <mode> = TTL,

<avg(0)>,<avg(1)>,<avg(2)>,<avg3>,<max(0)>,<max(1)>,<max(2)>,<max(3)>,<min(0)>,<min(1)>,<min(2)>,<min(3)>

When <mode> ≠ TTL,

<aclr(0)>,<aclr(1)>,<aclr(2)>,<aclr(3)>

Unit	dB
Resolution	0.01

Parameter number	Frequency offset
0	–10 MHz
1	–5 MHz
2	+5 MHz
3	+10 MHz

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<aclr>	Measurement result in specified Storage mode

Example of Use

To query average of ACLR measurement result:

:FETC:CELL:WCDM:FUND:ACLR? AVG

> -20.00,-21.00,-22.00,-23.00

:FETCh:CELLular:WCDMa:FUNDamental:BERate:ECOunt?

Bit Error Rate - Error Counts

Function

Queries error bit count.

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:BERate:ECOunt?
```

Response

<number>

Parameter

<number>	Error Counts

Example of Use

To query error bit count:
:FETC:CELL:WCDM:FUND:BER:ECO?
> 25

Remarks

When an error has occurred in the measurement (the response of :FETCh:CELLular:MEASurement:STATe? is 5, 9, or 12) or before the measurement starts, the response is –1.

:FETCh:CELLular:WCDMa:FUNDamental:BERate:ERATe?

Bit Error Rate

Function

Queries bit error rate.

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:BERate:ERATe? [<format>]
```

Response

<rate>

When <format> is omitted:	(Error bit number /Transmitted bit number)
When <format> is PER:	(Error bit number/Transmitted bit number×100) [%]
When <format> is EXP:	Exponential of (Error bit number/Transmitted bit number)

Parameters

<format>	Format
PER	Percent
EXP	Exponential
<rate>	Bit error rate

Example of Use

To query bit error rate:

:FETC:CELL:WCDM:FUND:BER:ERAT?

> 0.0050

:FETC:CELL:WCDM:FUND:BER:ERAT? PER

> 0.50

:FETC:CELL:WCDM:FUND:BER:ERAT? EXP

> 5.00E-3

Remarks

When an error has occurred in the measurement (the response of :FETCh:CELLular:MEASurement:STATe? is 5, 9, or 12) or before the measurement starts, the response is shown as below.

:FETC:CELL:WCDM:FUND:BER:ERAT?	9.9999
:FETC:CELL:WCDM:FUND:BER:ERAT? PER	999.99
:FETC:CELL:WCDM:FUND:BER:ERAT? EXP	9.99E-10

:FETCh:CELLular:WCDMa:FUNDamental:BERate:JUDGement?

Bit Error Rate - Judgement

Function

Queries judgement results of bit error rate measurement.

Query

`:FETCh:CELLular:WCDMa:FUNDamental:BERate:JUDGement?`

Response

<Judgement>

Parameter

<Judgement>	Judgement results
PASS	Passed
FAIL	Failed
–	Not measured

Example of Use

To query judgement results of bit error rate measurement:

:FETC:CELL:WCDM:FUND:BER:JUDG?

> PASS

Remarks

When an error has occurred in the measurement (the response of :FETCh:CELLular:MEASurement:STATe? is 5, 9, or 12) or before the measurement starts, the response is '–'.

:FETCh:CELLular:WCDMa:FUNDamental:BERate:TBIT?

Bit Error Rate - Transmitted bits

Function

Queries transmitted bit number.

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:BERate:TBIT?
```

Response

<number>

Parameter

<number>	Transmitted bit number

Example of Use

To query transmitted bit number:

:FETC:CELL:WCDM:FUND:BER:TBIT?

> 6000

Remarks

When an error has occurred in the measurement (the response of :FETCh:CELLular:MEASurement:STATe? is 5, 9, or 12) or before the measurement starts, the response is –1.

:FETCh:CELLular:WCDMa:FUNDamental:BLERate:ECOunt?

Block Error Rate - Error Counts

Function

Queries error block number.

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:BLERate:ECOunt?
```

Response

<number>

Parameter

<number>	Error block number

Example of Use

To query error block number:
:FETC:CELL:WCDM:FUND:BLER:ECO?
> 12

Remarks

When an error has occurred in the measurement (the response of :FETCh:CELLular:MEASurement:STATe? is 5, 9, or 12) or before the measurement starts, the response is –1.

:FETCh:CELLular:WCDMa:FUNDamental:BLERate:ERATe?

Block Error Rate

Function

Queries block error rate.

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:BLERate:ERATe? [<format>]
```

Response

<rate>

When <format> is omitted:	(Error block number /Transmitted block number)
When <format> is PER:	(Error block number/Transmitted block number×100) [%]
When <format> is EXP:	Exponential of (Error block number/Transmitted block number)

Parameters

<format>	Format
PER	Percent
EXP	Exponential
<rate>	Block Error Rate

Example of Use

To query block error rate:

:FETC:CELL:WCDM:FUND:BLER:ERAT?

> 0.06

:FETC:CELL:WCDM:FUND:BLER:ERAT? PER

> 6.00

:FETC:CELL:WCDM:FUND:BLER:ERAT? EXP

> 6.00E-2

Remarks

When an error has occurred in the measurement (the response of :FETCh:CELLular:MEASurement:STATe? is 5, 9, or 12) or before the measurement starts, the response is shown as below.

:FETC:CELL:WCDM:FUND:BLER:ERAT?	9.9999
:FETC:CELL:WCDM:FUND:BLER:ERAT? PER	999.99
:FETC:CELL:WCDM:FUND:BLER:ERAT? EXP	9.99E-10

:FETCh:CELLular:WCDMa:FUNDamental:BLERate:JUDGement?

Block Error Rate - Judgement

Function

Queries judgement results of block error rate measurement.

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:BLERate:JUDGement?
```

Response

<Judgement>

Parameter

<Judgement>	Judgement results
PASS	Passed
FAIL	Failed
–	Not measured

Example of Use

To query judgement results of block error rate measurement:

:FETC:CELL:WCDM:FUND:BLER:JUDG?

> PASS

Remarks

When an error has occurred in the measurement (the response of :FETCh:CELLular:MEASurement:STATe? is 5, 9, or 12) or before the measurement starts, the response is '–'.

:FETCh:CELLular:WCDMa:FUNDamental:BLERate:TBIT?

Block Error Rate - Transmitted bits

Function

Queries transmitted block number.

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:BLERate:TBIT?
```

Response

<number>

Parameter

<number>	Transmitted block number

Example of Use

To query transmitted block number:
:FETC:CELL:WCDM:FUND:BLER:TBIT?
> 300

Remarks

When an error has occurred in the measurement (the response of :FETCh:CELLular:MEASurement:STATe? is 5, 9, or 12) or before the measurement starts, the response is –1.

:FETCh:CELLular:WCDMa:FUNDamental:MODulation:CFRequency?

Carrier Frequency Result of Modulation Analysis

Function

Queries Carrier Frequency measurement result

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:MODulation:CFRequency?
```

Response

<freq>

Unit	Hz
Resolution	1

Parameters

<freq>	Carrier frequency
Resolution	1

Example of Use

To query Carrier Frequency measurement result:
:FETC:CELL:WCDM:FUND:MOD:CFR?
> 1951000000

:FETCh:CELLular:WCDMa:FUNDamental:MODulation:EVM?

EVM Result of Modulation Analysis

Function

Queries EVM measurement result

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:MODulation:EVM? <mode>
```

Response

When <mode> = TTL,
<avg>,<max>,<min>
When <mode> ≠ TTL,
<evm>

Unit	%
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<evm>	Measurement result in the specified Storage mode

Example of Use

To query average of EVM measurement result:

:FETC:CELL:WCDM:FUND:MOD:EVM? AVG

> 1.50

:FETCh:CELLular:WCDMa:FUNDamental:MODulation:FERRor?

Carrier Frequency Error Result of Modulation Analysis

Function

Queries frequency error measurement result

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:MODulation:FERRor? <mode>
```

Response

When <mode> = TTL,

avg_ppm,avg_Hz,max_ppm,max_Hz,min_ppm,min_Hz

When <mode> ≠ TTL,

freq_ppm,freq_Hz

Unit	ppm, Hz
Resolution	0.01, 0.1

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation

<avg_ppm>	Average of Frequency Error measurement results in ppm
Resolution	0.01
<avg_Hz>	Average of Frequency Error measurement results in Hz
Resolution	0.1
<max_ppm>	Maximum value in Frequency Error measurement results in ppm
Resolution	0.01
<max_Hz>	Maximum value in Frequency Error measurement results in Hz
Resolution	0.1
<min_ppm>	Minimum value in Frequency Error measurement results in ppm
Resolution	0.01
<min_Hz>	Minimum value in Frequency Error measurement results in Hz
Resolution	0.1
<freq_ppm>	Frequency Error measurement results in specified Storage mode in ppm
Resolution	0.01
<freq_Hz>	Frequency Error measurement results in specified Storage mode of Hz
Resolution	0.1

Example of Use

To query average of Frequency Error measurement results for segment 1 in Sequence Measurement mode:

:FETC:CELL:WCDM:FUND:MOD:FERR? AVG

> 0.03,60.0

:FETCh:CELLular:WCDMa:FUNDamental:MODulation:FERRor:WORSt?

Carrier Frequency Error Result of Modulation Analysis (Worst)

Function

Queries worst value in Frequency Error measurement results

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:MODulation:FERRor:WORSt?
```

Response

<freq_ppm>,<freq_Hz>

Unit	ppm, Hz
Resolution	0.01, 0.1

Parameter

<freq_ppm>	Worst value in Frequency Error measurement results in ppm
Resolution	0.01
<freq_Hz>	Worst value in Frequency Error measurement results in Hz
Resolution	0.1

Example of Use

To query worst value in Frequency Error measurement results:

:FETC:CELL:WCDM:FUND:MOD:FERR:WORS?

> 0.03,60.0

:FETCh:CELLular:WCDMa:FUNDamental:MODulation:IQIMbalance?

IQ Imbalance Result of Modulation Analysis

Function

Queries IQ Imbalance measurement results

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:MODulation:IQIMbalance? <mode>
```

Response

When <mode> = TTL,
<avg>,<max>,<min>
When <mode> ≠ TTL,
<iqimb>

Units	%
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<iqimb>	Measurement result in specified Storage mode

Example of Use

To query average of IQ Imbalance measurement result:
:FETC:CELL:WCDM:FUND:MOD:IQIM? AVG
> 0.04

Remarks

When the measurement target is QPSK, the results are returned with either I or Q value, whichever has a bigger gain, as Q axis.

:FETCh:CELLular:WCDMa:FUNDamental:MODulation:MERRor?

Magnitude Error Result of Modulation Analysis

Function

Queries Magnitude Error measurement result

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:MODulation:MERRor? <mode>
```

Response

When <mode> = TTL,

<avg>,<max>,<min>

When <mode> ≠ TTL,

<merr>

Unit	%
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<merr>	Measurement result in specified Storage mode

Example of Use

To query average of Magnitude Error measurement result:

:FETC:CELL:WCDM:FUND:MOD:MERR? AVG

> 1.05

:FETCh:CELLular:WCDMa:FUNDamental:MODulation:ORGNoffset?

Origin Offset Result of Modulation Analysis

Function

Queries Origin Offset measurement result

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:MODulation:ORGNoffset? <mode>
```

Response

When <mode> = TTL,
<avg>,<max>,<min>
When <mode> ≠ TTL,
<orgnoffs>

Unit	dB
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<orgnoffs>	Measurement result in specified Storage mode

Example of Use

To query average of Origin Offset measurement result:
:FETC:CELL:WCDM:FUND:MOD:ORGN? AVG
> 0.04

:FETCh:CELLular:WCDMa:FUNDamental:MODulation:PEVM?

Peak EVM Result of Modulation Analysis

Function

Queries EVM Peak measurement result

Query

`:FETCh:CELLular:WCDMa:FUNDamental:MODulation:PEVM? <mode>`

Response

When <mode> = TTL,

<avg>,<max>,<min>

When <mode> ≠ TTL,

<pevm>

Unit	%
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pevm>	Measurement result in specified Storage mode

Example of Use

To query average of EVM Peak measurement result

:FETC:CELL:WCDM:FUND:MOD:PEVM? AVG

> 1.75

:FETCh:CELLular:WCDMa:FUNDamental:MODulation:PHERror?

Phase Error Result of Modulation Analysis

Function

Queries Phase Error measurement result

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:MODulation:PHERror? <mode>
```

Response

When <mode> = TTL,
<avg>,<max>,<min>
When <mode> ≠ TTL,
<perr>

Unit	degree
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Min. value
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<perr>	Measurement result in the specified Storage mode

Example of Use

To query average of Phase Error measurement result:
:FETC:CELL:WCDM:FUND:MOD:PHER? AVG
> 1.55

4 SCPI Command Reference

:FETCh:CELLular:WCDMa:FUNDamental:MODulation:PRATio?

Power Ratio Result of Modulation Analysis

Function

Queries DPCCH/DPDCH Power Ratio measurement result

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:MODulation:PRATio? <mode>
```

Response

When <mode> = TTL,

<avg>,<max>,<min>

When <mode> ≠ TTL,

<powerratio>

Unit	dB
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<powerratio>	Measurement result in specified Storage mode

Example of Use

To query average of DPCCH/DPDCH Power Ratio measurement result:

:FETC:CELL:WCDM:FUND:MOD:PRAT? AVG

> 0.08

:FETCh:CELLular:WCDMa:FUNDamental:MODulation:TERRor?

Timing Error Result of Modulation Analysis

Function

Queries Timing Error measurement result

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:MODulation:TERRor? <mode>
```

Response

When <mode> = TTL,
<avg>,<max>,<min>
When <mode> ≠ TTL,
<terror>

Units	chip
Resolution	0.1

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<terror>	Measurement result in specified Storage mode

Example of Use

To query average of Timing Error measurement result:
:FETC:CELL:WCDM:FUND:MOD:TERR? AVG
> 0.7

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SCPI Command Reference

:FETCh:CELLular:WCDMa:FUNDamental:MODulation:TERRor:WORSt?

Timing Error Result of Modulation Analysis (Worst)

Function

Queries worst value in Timing Error measurement results

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:MODulation:TERRor:WORSt?
```

Response

<terror>

Units	chip
Resolution	0.1

Parameter

<terror>	Worst value in Timing Error measurement results

Example of Use

To query worst value in Timing Error measurement results:

:FETC:CELL:WCDM:FUND:MOD:TERR:WORS?

> 1.1

:FETCh:CELLular:WCDMa:FUNDamental:OBW?

Result of Occupied Bandwidth

Function

Queries Occupied Bandwidth measurement result

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:OBW?
```

Response

<bw>

Unit	MHz
Resolution	0.001

Parameter

<bw>	Occupied Bandwidth [MHz]

Example of Use

To query Occupied Bandwidth measurement result:

:FETC:CELL:WCDM:FUND:OBW?

> 3.840

:FETCh:CELLular:WCDMa:FUNDamental:OBW:FREQuency?

Result of Occupied Bandwidth Frequency

Function

Queries upper, lower and center frequency of Occupied Bandwidth measurement

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:OBW:FREQuency? <pos>
```

Response

<freq>

Unit	MHz
Resolution	0.001

Parameter

<pos>	Frequency position
UPPER	Upper frequency
LOWER	Lower frequency
CENTER	Center frequency
<freq>	Frequency [MHz]

Example of Use

To query upper frequency of Occupied Bandwidth:

:FETC:CELL:WCDM:FUND:OBW:FREQ? UPPER

> 1951.920

:FETCh:CELLular:WCDMa:FUNDamental:PCDE?

Result of Peak Code Domain Error of Tx Fundamental Measurement

Function

Queries Peak Code Domain Error measurement result

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:PCDE? <mode>
```

Response

When <mode> = TTL,
<avg>,<max>,<min>
When <mode> ≠ TTL,
<pcde>

Unit	dB
Resolution	0.01

Parameter

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pcde>	Measurement result in the specified Storage mode

Example of Use

To query average of Peak Code Domain Error measurement result
:FETC:CELL:WCDM:FUND:PCDE? AVG
> 0.08

:FETCh:CELLular:WCDMa:FUNDamental:PDISc?

Result of Phase Discontinuity

Function

Queries Phase Discontinuity measurement result

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:PDISc?
```

Response

count,<data(0)>,<data(1)>,<data(2)>,…,<data(count–1)>

Unit	degree
Resolution	0.01

Parameters

<count>	Measurement count
<data(0)> to <data(count–1)>	Phase difference from previous time slot

Example of Use

To query Phase Discontinuity measurement result

:FETC:CELL:WCDM:FUND:PDIS?

> 2,1.51,1.53

:FETCh:CELLular:WCDMa:FUNDamental:PDISc:EVM?

EVM Result of Phase Discontinuity

Function

Queries EVM measurement result at Phase Discontinuity measurement

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:PDISc:EVM?
```

Response

<count>,<evm(0)>,<evm(1)>,...,<evm(count–1)>

Unit	%
Resolution	0.01

Parameters

<count>	Measurement count
Range	1 to 100
<evm(0)> to <evm(count–1)>	EVM

Example of Use

To query EVM measurement at Phase Discontinuity measurement result:

:FETC:CELL:WCDM:FUND:PDIS:EVM?

> 2,1.51,1.53

:FETCh:CELLular:WCDMa:FUNDamental:PDISc:FERRor?

Carrier Frequency Error Result of Phase Discontinuity

Function

Queries Carrier Frequency Error measurement result for Phase Discontinuity

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:PDISc:FERRor?
```

Response

<count>,<fppm(0)>,<fHz(0)>,<fppm(1)>,<fHz(1>,…,<fppm(count–1)>,<fHz(count–1)>

Unit	ppm, Hz
Resolution	0.01, 0.1

Parameters

<count>	Measurement count
Range	1 to 100
<fppm(0)>	Frequency error in ppm
Resolution	0.1
<fHz(0)>	Frequency error in Hz
Resolution	0.01
<fppm(1)>	Frequency error in ppm
Resolution	0.1
<fHz(1)>	Frequency error in Hz
Resolution	0.01
<fppm(count-1)>	Frequency error in ppm
Resolution	0.1
<fHz(count-1)>	Frequency error in Hz
Resolution	0.01

Example of Use

To query Carrier Frequency Error measurement result for Phase Discontinuity

:FETC:CELL:WCDM:FUND:PDIS:FERR?

> 2,0.08,0.2,0.09,0.4

:FETCh:CELLular:WCDMa:FUNDamental:POWer:FLTPower?

Result of Filtered Power Measurement

Function

Queries result of RRC Filtered Power measurement

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:POWer:FLTPower? <mode>
```

Response

When <mode> = TTL,
<avg>,<max>,<min>
When <mode> = AVG, MAX, MIN or DVT
<pwr>
When <mode> = IND,
<s>,<pwr(1)>,<pwr(2)>,...,<pwr(s)>

Unit	dBm
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	Individual measurement result
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pwr>	Measurement result in specified Storage mode
<pwr(s)>	Measurement result at sth slot
s	Measurement count
Range	1 to 200

Example of Use

To query average of RRC Filtered Power measurement result:
:FETC:CELL:WCDM:FUND:POW:FLTP? AVG
> -20.00

:FETCh:CELLular:WCDMa:FUNDamental:POWer:TXPower?

Result of Tx Power Measurement

Function

Queries Tx Power measurement result

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:POWer:TXPower? <mode>
```

Response

When <mode> = TTL,
<avg>,<max>,<min>
When <mode> = AVG, MAX, MIN or DVT
<pwr>
When <mode> = IND,
<s>,<pwr(1)>,<pwr(2)>,...,<pwr(s)>

Unit	dBm
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	Individual measurement result
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pwr>	Measurement result in specified Storage mode
<pwr(s)>	Tx Power of sth measurement
s	Measurement count
Range	1 to 200

Example of Use

To query average of Tx Power measurement results:
:FETC:CELL:WCDM:FUND:POW:TXP? AVG
> -20.00

:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPCCh:CDPower?

Result of Code Domain Power of DPCCH

Function

Queries Code Domain Power measurement results for DPCCH

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPCCh:CDPower? <mode>
```

Response

<cdp>

Unit	dB
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
<cdp>	Code Domain Power

Example of Use

To query average of Code Domain Power measurement result for DPCCH:

:FETC:CELL:WCDM:FUND:RCDE:DPCC:CDP? AVG

> 1.55

:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPCCh:ECDPower?

Result of Effective Code Domain Power of DPCCH

Function

Queries Effective Code Domain Power measurement result for DPCCH

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPCCh:ECDPower? <mode>
```

Response

<ecdp>

Unit	dB
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
<ecdp>	Effective Code Domain Power

Example of Use

To query average of Effective Code Domain Power measurement result for DPCCH:

:FETC:CELL:WCDM:FUND:RCDE:DPCC:ECDP? AVG

> 1.55

:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPCCh:RCDerror?

Result of Relative Code Domain Error of DPCCH

Function

Queries Relative Code Domain Error measurement result for DPCCH

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPCCh:RCDerror? <mode>
```

Response

When <mode> = TTL,
<avg>,<max>,<min>
When <mode> ≠ TTL,
<rcde>

Unit	dB
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<rcde>	Measurement result in specified Storage mode

Example of Use

To query average of Relative Code Domain Error measurement result for DPCCH:
:FETC:CELL:WCDM:FUND:RCDE:DPCC:RCD? AVG
> 1.50

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SCPI Command Reference

:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPDCh:CDPower?

Result of Code Domain Power of DPDCH

Function

Queries DPDCH Code Domain Power measurement result

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPDCh:CDPower? <mode>
```

Response

<cdp>

Unit	dB
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
<cdp>	Code Domain Power

Example of Use

To query average of DPDCH Code Domain Power measurement result

:FETC:CELL:WCDM:FUND:RCDE:DPDC:CDP? AVG

> 1.50

:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPDCh:ECDPower?

Result of Effective Code Domain Power of DPDCH

Function

Queries Effective Code Domain Power measurement result for DPDCH

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPDCh:ECDPower? <mode>
```

Response

<ecdp>

Unit	dB
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
<ecdp>	Effective Code Domain Power

Example of Use

To query average of Effective Code Domain Power measurement result for DPDCH:

:FETC:CELL:WCDM:FUND:RCDE:DPDC:ECDP? AVG

> 1.50

:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPDCh:RCDerror?

Result of Relative Code Domain Error of DPDCH

Function

Queries Relative Code Domain Error measurement result for DPDCH

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPDCh:RCDerror? <mode>
```

Response

When <mode> = TTL,

<avg>,<max>,<min>

When <mode> ≠ TTL,

<rcde>

Unit	dB
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<rcde>	Measurement result in specified Storage mode

Example of Use

To query average of Relative Code Domain Error measurement result for DPDCH:

:FETC:CELL:WCDM:FUND:RCDE:DPDC:RCD? AVG

> 1.50

:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPCch:CDPower?

Result of Code Domain Power of E-DPCCH

Function

Queries E-DPCCH Code Domain Power measurement result

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPCch:CDPower? <mode>
```

Response

<cdp>

Unit	dB
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
<cdp>	Code Domain Power

Example of Use

To query average of E-DPCCH Code Domain Power measurement result:

:FETC:CELL:WCDM:FUND:RCDE:EDPC:CDP? AVG

> 1.50

:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPCch:ECDPower?

Result of Effective Code Domain Power of E-DPCCH

Function

Queries Effective Code Domain Power measurement result for E-DPCCH

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPCch:ECDPower? <mode>
```

Response

<ecdp>

Unit	dB
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
<ecdp>	Effective Code Domain Power

Example of Use

To query average of Effective Code Domain Power measurement result for E-DPCCH:

:FETC:CELL:WCDM:FUND:RCDE:EDPC:ECDP? AVG

> 1.50

:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPCch:RCDerror?

Result of Relative Code Domain Error of E-DPCCH

Function

Queries Relative Code Domain Error measurement result for E-DPCCH

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPCch:RCDerror? <mode>
```

Response

When <mode> = TTL,
<avg>,<max>,<min>
When <mode> ≠ TTL,
<rcde>

Unit	dB
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<rcde>	Measurement result in the specified Storage mode

Example of Use

To query average of Relative Code Domain Error measurement result for E-DPCCH:
:FETC:CELL:WCDM:FUND:RCDE:EDPC:RCD? AVG
> 1.50

:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPDch:CDPower?

Result of Code Domain Power of E-DPDCH

Function

Queries E-DPDCH Code Domain Power measurement result

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPDch:CDPower? <no>,<mode>
```

Response

<cdp>

Unit	dB
Resolution	0.01

Parameters

<no>	E-DPDCH channel number
Range	1 to 4
Resolution	1
<mode>	Storage mode
AVG	Average
<cdp>	Code Domain Power

Example of Use

To query average of E-DPDCH Code Domain Power measurement result for E-DPDCH channel number 1:

:FETC:CELL:WCDM:FUND:RCDE:EDPD:CDP? 1,AVG

> 1.50

:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPDch:ECDPower?

Result of Effective Code Domain Power of E-DPDCH

Function

Queries Effective Code Domain Power measurement result for E-DPDCH

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPDch:ECDPower? <no>,<mode>
```

Response

<ecdp>

Unit	dB
Resolution	0.01

Parameters

<no>	E-DPDCH channel number
Range	1 to 4
Resolution	1
<mode>	Storage mode
AVG	Average
<ecdp>	Effective Code Domain Power

Example of Use

To query average of Effective Code Domain Power measurement result for E-DPDCH channel number 1:

:FETC:CELL:WCDM:FUND:RCDE:EDPD:ECDP? 1,AVG

> 1.50

:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPDch:RCDerror?

Result of Relative Code Domain Error of E-DPDCH

Function

Queries Relative Code Domain Error measurement result for E-DPDCH

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPDch:RCDerror? <no>,<mode>
```

Response

When <mode> = TTL,

<avg>,<max>,<min>

When <mode> ≠ TTL,

<rcde>

Unit	dB
Resolution	0.01

Parameters

<no>	E-DPDCH channel number
Range	1 to 4
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<rcde>	Measurement result in specified Storage mode

Example of Use

To query average of Relative Code Domain Error measurement result for E-DPDCH: channel number 1:

:FETC:CELL:WCDM:FUND:RCDE:EDPD:RCD? 1,AVG

> 1.50

:FETCh:CELLular:WCDMa:FUNDamental:RCDE:HSDPcch:CDPower?

Result of Code Domain Power of HS-DPCCH

Function

Queries HS-DPCCH Code Domain Power measurement result

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:RCDE:HSDPcch:CDPower? <mode>
```

Response

<cdp>

Unit	dB
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
<cdp>	Code Domain Power

Example of Use

To query average of HS-DPCCH Code Domain Power measurement result:

:FETC:CELL:WCDM:FUND:RCDE:HSDP:CDP? AVG

> 1.50

:FETCh:CELLular:WCDMa:FUNDamental:RCDE:HSDPcch:ECDPower?

Result of Effective Code Domain Power of HS-DPCCH

Function

Queries Effective Code Domain Power measurement result for HS-DPCCH

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:RCDE:HSDPcch:ECDPower? <mode>
```

Response

<ecdp>

Unit	dB
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
<ecdp>	Effective Code Domain Power

Example of Use

To query average of Effective Code Domain Power measurement result for HS-DPCCH:

:FETC:CELL:WCDM:FUND:RCDE:HSDP:ECDP? AVG

> 1.50

:FETCh:CELLular:WCDMa:FUNDamental:RCDE:HSDPcch:RCDerror?

Result of Relative Code Domain Error of HS-DPCCH

Function

Queries Relative Code Domain Error measurement result for HS-DPCCH

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:RCDE:HSDPcch:RCDerror? <mode>
```

Response

When <mode> = TTL,
<avg>,<max>,<min>
When <mode> ≠ TTL,
<rcde>

Unit	dB
Resolution	0.01

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<rcde>	Measurement result in specified Storage mode

Example of Use

To query average of Relative Code Domain Error measurement result for HS-DPCCH:
:FETC:CELL:WCDM:FUND:RCDE:HSDP:RCD? AVG
> 1.50

:FETCh:CELLular:WCDMa:FUNDamental:SEMask:JUDGement?

Judgement of Spectrum Emission Mask

Function

Queries whether spectrum threshold set at spectrum measurement exceeded or not

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:SEMask:JUDGement?
```

Response

<judgement>

Parameter

<judgement>	Judgement result
PASS	Passed (below threshold)
FAIL	Failed (above threshold)
–	No measurement

Example of Use

To query whether spectrum threshold set at spectrum measurement exceeded or not:

:FETC:CELL:WCDM:FUND:SEM:JUDG?

> PASS

:FETCh:CELLular:WCDMa:FUNDamental:SEMask:LEVel:LOWer?

Result of Spectrum Emission Mask (Lower)

Function

Queries peak level and frequency of spectrum in each lower frequency range of Spectrum Emission Mask

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:SEMask:LEVel:LOWer?
```

Response

<band>,<freq(0)>,<peak(0)>,<freq(1)>,<peak(1)>,<freq(2)>,<peak(2)>,<freq(3)>,<peak(3)>

<band>:	Target band
<freq(n)>:	Offset frequency of spectrum peak
Resolution	0.001 MHz
<peak(n)>:	Peak level of spectrum
Resolution	0.01 dB

Parameters

<band>	Target band
Range	0 to 14, 19 to 21
<freq(0)>	Offset frequency of spectrum peak in offset frequency range from –2.5 to –3.5 MHz
<peak(0)>	Peak level of spectrum in offset frequency range from –2.5 to –3.5 MHz
<freq(1)>	Offset frequency of spectrum peak in offset frequency range from –3.5 to –7.5 MHz
<peak(1)>	Peak level of spectrum in offset frequency range from –3.5 to –7.5 MHz
<freq(2)>	Offset frequency of spectrum peak in offset frequency range from –7.5 to –8.5 MHz
<peak(2)>	Peak level of spectrum in offset frequency range from –7.5 to –8.5 MHz
<freq(3)>	Offset frequency of spectrum peak in offset frequency range below –8.5 MHz
<peak(3)>	Peak level of spectrum in offset frequency range below –8.5 MHz

Example of Use

To query spectrum peak level and frequency at lower side of each frequency range:

:FETC:CELL:WCDM:FUND:SEM:LEV:LOW?

> 1,-3.000,-20.00,-5.000,-30.00,-8.000,-40.00,-9.500,-50.00

:FETCh:CELLular:WCDMa:FUNDamental:SEMask:LEVel:UPPer?

Result of Spectrum Emission Mask (Upper)

Function

Queries peak level and frequency of spectrum in each upper frequency range of Spectrum Emission Mask

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:SEMask:LEVel:UPPer?
```

Response

<band>,<freq(0)>,<peak(0)>,<freq(1)>,<peak(1)>,<freq(2)>,<peak(2)>,<freq(3)>,<peak(3)>

<band>:	Target band
<freq(n)>:	Offset frequency of spectrum peak
Resolution	0.001 MHz
<peak(n)>:	Peak level of spectrum
Resolution	0.01 dB

Parameters

<band>	Target band
Range	0 to 14, 19 to 21
<freq(0)>	Offset frequency of spectrum peak in offset frequency range from +2.5 to +3.5 MHz
<peak(0)>	Peak level of spectrum in offset frequency range from +2.5 to +3.5 MHz
<freq(1)>	Offset frequency of spectrum peak in offset frequency range from +3.5 to +7.5 MHz
<peak(1)>	Peak level of spectrum in offset frequency range from +3.5 to +7.5 MHz
<freq(2)>	Offset frequency of the spectrum peak in the offset frequency range from +7.5 to +8.5 MHz
<peak(2)>	Peak level of spectrum in offset frequency range from +7.5 to +8.5 MHz
<freq(3)>	Offset frequency of spectrum peak in offset frequency range above +8.5 MHz
<peak(3)>	Peak level of spectrum in offset frequency range above +8.5 MHz

Example of Use

To query spectrum peak level and frequency at upper side of each frequency range:

:FETC:CELL:WCDM:FUND:SEM:LEV:UPP?

> 1,3.000,-20.00,5.000,-30.00,8.000,-40.00,9.500,-50.00

:FETCh:CELLular:WCDMa:FUNDamental:SEMask:MARGin:LOWer?

Margin of Spectrum Emission Mask (Lower)

Function

Queries spectrum margin and offset frequency in each lower frequency range of Spectrum Emission Mask

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:SEMask:MARGin:LOWer?
```

Response

<band>,<freq(0)>,<peak(0)>,<freq(1)>,<peak(1)>,<freq(2)>,<peak(2)>,<freq(3)>,<peak(3)>

<band>:	Target band
<freq(n)>:	Offset frequency at point where margin determined
Resolution	0.001 MHz
<peak(n)>:	Margin from template
Resolution	0.01 dB

Parameters

<band>	Target band
Range	0 to 14, 19 to 21
<freq(0)>	Offset frequency at point where margin determined in offset frequency range from –2.5 to –3.5 MHz
<peak(0)>	Margin in offset frequency range from –2.5 to –3.5 MHz
<freq(1)>	Offset frequency at point where margin determined offset frequency range from –3.5 to –7.5 MHz
<peak(1)>	Margin in offset frequency range from –3.5 to –7.5 MHz
<freq(2)>	Offset frequency at point margin determined in offset frequency range from –7.5 to –8.5 MHz
<peak(2)>	Margin in offset frequency range from –7.5 to –8.5 MHz
<freq(3)>	Offset frequency at point where margin determined in offset frequency range below –8.5 MHz
<peak(3)>	Margin in offset frequency range below –8.5 MHz

Example of Use

To query margin from Spectrum Emission Mask template and frequency at lower side of each frequency range:

:FETC:CELL:WCDM:FUND:SEM:MARG:LOW?

> 1,-3.000,3.00,-5.000,3.00,-8.000,3.00,-9.500,3.00

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SCPI Command Reference

:FETCh:CELLular:WCDMa:FUNDamental:SEMask:MARGin:UPPer?

Margin of Spectrum Emission Mask (Upper)

Function

Queries spectrum margin and offset frequency in each upper frequency range of Spectrum Emission Mask

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:SEMask:MARGin:UPPer?
```

Response

<band>,<freq(0)>,<peak(0)>,<freq(1)>,<peak(1)>,<freq(2)>,<peak(2)>,<freq(3)>,<peak(3)>

<band>:	Target band
<freq(n)>:	Offset frequency at point where margin determined
Resolution	0.001 MHz
<peak(n)>:	Margin from template
Resolution	0.01 dB

Parameters

<band>	Target band
Range	0 to 14, 19 to 21
<freq(0)>	Offset frequency at point where margin determined in offset frequency range from +2.5 to +3.5 MHz
<peak(0)>	Margin in offset frequency range from +2.5 to +3.5 MHz
<freq(1)>	Offset frequency at point where margin determined in offset frequency range from +3.5 to +7.5 MHz
<peak(1)>	Margin in offset frequency range from +3.5 to +7.5 MHz
<freq(2)>	Offset frequency at point where margin determined in offset frequency range from +7.5 to +8.5 MHz
<peak(2)>	Margin in offset frequency range from +7.5 to +8.5 MHz
<freq(3)>	Offset frequency at point where margin determined in offset frequency range above +8.5 MHz
<peak(3)>	Margin in offset frequency range above +8.5 MHz

Example of Use

To query margin from Spectrum Emission Mask template and frequency at upper side of each frequency range:

:FETC:CELL:WCDM:FUND:SEM:MARG:UPP?

> 1,3.000,3.00,5.000,3.00,8.000,3.00,9.500,3.00

:FETCh:CELLular:WCDMa:FUNDamental:TRACe?

Waveform Data

Function

Queries waveform data for each measurement result

Query

```
:FETCh:CELLular:WCDMa:FUNDamental:TRACe? <format>,<position>,<length>
```

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

Parameters

<format>	Format
1	Measured spectrum for Occupied Bandwidth
2	Measured spectrum for Spectrum Emission Mask
3	Measured waveform for Constellation (I)
4	Measured waveform for Constellation (Q)
5	Measured waveform for EVM (Average)
6	Measured waveform for EVM (Maximum)
7	Measured waveform for Phase Error (Average)
8	Measured waveform for Phase Error (Maximum)
9	Measured waveform for Magnitude Error (Average)
10	Measured waveform for Magnitude Error (Maximum)
<position>	Starting point of waveform data
Range	format1: 0 to 1290
	format2: 0 to 2560
	format3 to format10: 0 to 2559
Resolution	1
<length>	Number of data to be read out
Range	format1: 1 to 1291
	format2: 1 to 2561
	format3 to format10: 1 to 2560
<data(0)>	Waveform data(0)
<data(1)>	Waveform data(1)
<data(length–1)>	Waveform data(length–1)

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SCPI Command Reference

Details

Data in the average format are equivalent to results in the Average storage mode.

Data in the maximum format are equivalent to results in the Peak-hold storage mode.

Example of Use

To query 1024 points of the measured waveform data for EVM (Average) from 257th point:

:FETC:CELL:WCDM:FUND:TRAC? 5,256,1024

> 2.00,2.01,2.00,…,2.10

:FETCh:CELLular:WCDMa:ILPC:JUDGement?

Inner Loop Power Control (Auto) - Judgement

Function

Queries judgment of the result for Inner Loop Power Control (Auto) measurement.

Query

```
:FETCh:CELLular:WCDMa:ILPC:JUDGement? <step>
```

Response

<judgement>

Parameter

<step>	Step
ALL	Step E and Step F
E	Step E
F	Step F
<judgement>	Judgement result
PASS	Passed
FAIL	Failed
–	Not measured

Example of Use

To query the all judgement results of the Inner Loop Power Control (Auto) measurement:

:FETC:CELL:WCDM:ILPC:JUDG? ALL

> PASS,PASS

:FETCh:CELLular:WCDMa:ILPC:MAXimum:POWer?

Inner Loop Power Control (Auto) maximum power

Function

Queries the maximum power in the Inner Loop Power Control (Auto) measurement.

Query

```
:FETCh:CELLular:WCDMa:ILPC:MAXimum:POWer?
```

Response

<power>

Unit	dBm

Parameter

<power>	Maximum power
Resolution	0.01 dB

Example of Use

To query the maximum power in the Inner Loop Power Control (Auto) measurement:

:FETC:CELL:WCDM:ILPC:MAX:POW?

> -10.00

:FETCh:CELLular:WCDMa:ILPC:MINimum:POWer?

Inner Loop Power Controln (Auto) minimum power

Function

Queries the minimum power in the Inner Loop Power Control (Auto) measurement.

Query

```
:FETCh:CELLular:WCDMa:ILPC:MINimum:POWer?
```

Response

<power>

Unit	dBm

Parameter

<power>	Minimum power
Resolution	0.01 dB

Example of Use

To query the minimum power in the Inner Loop Power Control (Auto) measurement:

:FETC:CELL:WCDM:ILPC:MIN:POW?

> -10.0

:FETCh:CELLular:WCDMa:ILPC:POWer?

Slot Power List - Slot Level

Function

Queries the measured result (level) of each slot in the step E or F specified by the Inner Loop Power Control (Auto) measurement.

Query

```
:FETCh:CELLular:WCDMa:ILPC:POWer? <step>[,<slot>]
```

Response

<l[0]>,<l[1]>,...,<l[max_slot_number]>

Unit	dBm

Parameter

<step>	Target step
E	Step E
F	Step F
<slot>	Registered slot number
ALL	ALL
<l[max_slot_number]>	Power
Resolution	0.01 dB

Example of Use

To query the level at the step E and All slot in Inner Loop Power Control (Auto) measurement:

:FETC:CELL:WCDM:ILPC:POW? E,ALL

> -10.24,-10.25,-10.26,-10.26,-10.25...

4.2.3 Sequence measurement commands

:CONFigure:CELLular:GENerator:RFSettings:FREQuency

Downlink Frequency

Function

Sets or queries MU887000A downlink frequency

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
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz omitted)
Default	2137.600000 MHz

Example of Use

To set the downlink frequency to 2050 MHz:
:CONF:CELL:GEN:RFS:FREQ 2050MHZ
:CONF:CELL:GEN:RFS:FREQ?
>2050000000

Remarks

The Rx frequency is set for the mobile station.
Changing the setting of the downlink frequency does not change the setting of the downlink channel.

:CONFigure:CELLular:GENerator:RFSettings:LEVel

Output Level

Function

Sets or queries RF signal total output level for all channels

Command

```
:CONFigure:CELLular:GENerator:RFSettings:LEVel <level>
```

Query

```
:CONFigure:CELLular:GENerator:RFSettings:LEVel?
```

Response

<level>

Unit	dBm

Parameter

<level>	Output level
Range	–130.0 to –10.0 dBm (Port1/Port2)
	–120.0 to 0.0 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–65.7 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.

Examples 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 MU887000A Rx frequency (uplink frequency)

Command

```
:CONFigure:CELLular:MEASurement:RFSettings:FREQuency <ul_freq>
```

Query

```
:CONFigure:CELLular:MEASurement:RFSettings:FREQuency?
```

Response

<ul_freq>

Unit	Hz

Parameter

<ul_freq>	Uplink frequency
Range	400.000000 to 3800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	1947.600000 MHz

Details

This sets the Tx frequency for the mobile station.
Changing the setting of the Uplink Frequency parameter does not change the Uplink Channel setting.

Example of Use

To set the uplink frequency to 1950 MHz:
:CONF:CELL:MEAS:RFS:FREQ 1950MHZ
:CONF:CELL:MEAS:RFS:FREQ?
>1950000000

:CONFigure:CELLular:MEASurement:RFSettings:LEVel

Input Level

Function

Sets or queries input level of MU887000A connector

Command

```
:CONFigure:CELLular:MEASurement:RFSettings:LEVel <level>
```

Query

```
:CONFigure:CELLular:MEASurement:RFSettings:LEVel?
```

Response

<level>

Unit	dBm

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
Default	–1.0 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.

Example of Use

To set input level of MU887000A connector –10 dBm
:CONF:CELL:MEAS:RFS:LEV -10
: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 start and stop segments in 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 and stop segments to 20 and 52, respectively:
:CONF:CELL:SEQ:CONT 20,52
:CONF:CELL:SEQ:CONT?
> 20,52

: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:RFSettings:REINit

Sequence Control Parameter - Sequence End State Reinitialization

Function

Enables automatic initialization of following items after completion of sequence measurement mode operation, queries setting

- 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 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 following items in specific segment of 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>

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<ul_freq>	Receive frequency (Uplink)
Range	400.000000 to 3800.000000 MHz
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)
	–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
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 :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

Remarks

The group range is the selected waveform file.

For details of the waveform pattern, refer to the 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>
```

Parameter

<seg>	Segment number
Range	0 to 1999
Resolution	1
<ul_freq>	Rx frequency (uplink)
Range	400.000000 to 3800.000000 MHz
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) –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:RXPort

Sequence Table Parameter - SG Output Port

Function

Sets or queries test port to send RF signal in specified segment of 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 measurement conditions of 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	Tx 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 settings for segment 2 as follows:

Measurement mode: WCDMA, Step count: 1000, Measurement condition number: 3

:CONF:CELL:SEQ:SET 2, WCDMA,1000,3

:CONF:CELL:SEQ:SET? 2

> WCDMA,1000,3

:CONFigure:CELLular:SEQuence:TABLe

Sequence Control Parameter - Sequence Table

Function

Sets or queries number of sequence table to execute

Command

```
:CONFigure:CELLular:SEQuence:TABLe <table>
```

Query

```
:CONFigure:CELLular:SEQuence:TABLe?
```

Response

<table>

Parameters

<table>	Sequence table number
Range	0 to 3
Resolution	1
Default	0

Example of Use

To select sequence table 1:

:CONF:CELL:SEQ:TABL 1

:CONF:CELL:SEQ:TABL?

> 1

:CONFigure:CELLular:SEQuence:WCDMa:ACLR:SET

ACLR Measurement Enable and Count

Function

Enables Adjacent Channel Leakage Power Ratio measurement and sets measurement count in Sequence Measurement mode, or queries settings

Command

```
:CONFigure:CELLular:SEQuence:WCDMa:ACLR:SET <mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:WCDMa: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
Resolution	1
Default	1

Example of Use

To enable Adjacent Channel Leakage Power Ratio measurement and set the measurement count to 80 at measurement condition number 3:

:CONF:CELL:SEQ:WCDM:ACLR:SET 3,ON,80
:CONF:CELL:SEQ:WCDM:ACLR:SET? 3
> ON,80

:CONFigure:CELLular:SEQuence:WCDMa:AMITems:OFF

Turn Off All Measurement Items

Function

Turns off all fundamental measurement items

Command

```
:CONFigure:CELLular:SEQuence:WCDMa:AMITems:OFF <mcond>
```

Parameter

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1

Example of use

Sets all measurement items of number 0 in the WCDMA measurement condition table to Off collectively.

:CONF:CELL:SEQ:WCDM:AMIT:OFF 0

Remarks

The operation of this command is similar to turning off all the following command settings.

:CONFigure:CELLular:SEQuence:WCDMa:POWer:SET
:CONFigure:CELLular:SEQuence:WCDMa:OBW:SET
:CONFigure:CELLular:SEQuence:WCDMa:SEMask:SET
:CONFigure:CELLular:SEQuence:WCDMa:ACLR:SET
:CONFigure:CELLular:SEQuence:WCDMa:MODulation:SET
:CONFigure:CELLular:SEQuence:WCDMa:PCDE:SET
:CONFigure:CELLular:SEQuence:WCDMa:PDISc:SET

:CONFigure:CELLular:SEQuence:WCDMa:BAND

Frequency Band

Function

Sets or queries frequency band in Sequence Measurement mode

Command

```
:CONFigure:CELLular:SEQuence:WCDMa:BAND <mcond>,<FreqBand>
```

Query

```
:CONFigure:CELLular:SEQuence:WCDMa:BAND? <mcond>
```

Response

<FreqBand>

Parameters

<mcond>	Measurement condition number	
Range	0 to 1999	
Resolution	1	
<FreqBand>	Frequency Band	
NONE	NONE	
BAND1	Band1	1920 to 1980/2110 to 2170 MHz
BAND2	Band2	1850 to 1910/1930 to 1990 MHz
BAND3	Band3	1710 to 1785/1805 to 1880 MHz
BAND4	Band4	1710 to 1755/2110 to 2155 MHz
BAND5	Band5	824 to 849/869 to 894 MHz
BAND6	Band6	830 to 840/875 to 885 MHz
BAND7	Band7	2500 to 2570/2620 to 2690 MHz
BAND8	Band8	880 to 915/925 to 960 MHz
BAND9	Band9	1749.9 to 1784.9/1844.9 to 1879.9 MHz
BAND10	Band10	1710 to 1770/2110 to 2170 MHz
BAND11	Band11	1427.9 to 1447.9/1475.9 to 1495.9 MHz
BAND12	Band12	698 to 716/728 to 746 MHz
BAND13	Band13	777 to 787/746 to 756 MHz
BAND14	Band14	788 to 798/758 to 768 MHz
BAND19	Band19	830 to 845/875 to 890 MHz
BAND20	Band20	832 to 862/791 to 821 MHz
BAND21	Band21	1447.9 to 1462.9/1495.9 to 1510.9 MHz
BAND25	Band25	1850 to 1915 / 1930 to 1995 MHz
BAND26	Band26	814 to 849 / 859 to 894 MHz
Default	NONE	

Details

The additional requirement of the Spectrum Emission Mask specified in Section 5.9 of 3GPP TS34.121-1 is provided according to the set frequency band

No additional requirement:

NONE, BAND1, BAND3, BAND6 to BAND11, BAND19 to BAND21

Additional requirement specified in Table 5.9.1A: BAND2, BAND4, BAND10, BAND25

Additional requirement specified in Table 5.9.1B: BAND5, BAND26

Additional requirement specified in Table 5.9.1C: BAND12 to BAND14

For details of Table 5.9.1A, 5.9.1B and 5.9.1C, refer to Table 2.4-2 "Additional Requirements for Frequency Bands II, IV, X and XXV", Table 2.4-3 "Additional Requirements for Frequency Band V and XXVI", and Table 2.4-4 "Additional Requirements for Frequency Bands XII, XIII, and XIV".

Example of Use

To set the frequency band to 2 for Measurement condition number 2 in the Sequence Measurement mode

```
:CONF:CELL:SEQ:WCDM:BAND 2, BAND2
:CONF:CELL:SEQ:WCDM:BAND? 2
> BAND2
```

:CONFigure:CELLular:SEQuence:WCDMa:ILPC

ILPC Measurement Enable

Function

Enables Inner Loop Power Control measurement in Sequence Measurement mode, or queries settings

Command

```
:CONFigure:CELLular:SEQuence:WCDMa:ILPC <mcond>,<on_off>
```

Query

```
:CONFigure:CELLular:SEQuence:WCDMa:ILPC? <mcond>
```

Response

<on_off>

Parameter

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF

Example of Use

To enable Inner Loop Power Control measurement for the measurement condition number 3 in Sequence Measurement mode:

:CONF:CELL:SEQ:WCDM:ILPC 3,ON

:CONF:CELL:SEQ:WCDM:ILPC? 3

> ON

:CONFigure:CELLular:SEQuence:WCDMa:LSSearch

Long Span Code Search

Function

Enables or queries Long Span Code Search function in Sequence Measurement mode

Command

```
:CONFigure:CELLular:SEQuence:WCDMa:LSSearch <on_off>
```

Query

```
:CONFigure:CELLular:SEQuence:WCDMa:LSSearch?
```

Response

<on_off>

Parameter

<on_off>	Enables Long Span Code Search
ON	Turns Long Span Code Search on
OFF	Turns Long Span Search off
Default	OFF

Details

Measurement takes more time when Long Span Search is on.
Set this parameter to OFF when the uplink and downlink signals are synchronized; set it to ON when they are not synchronized.

Example of Use

To enable Long Span Search in the Sequence Measurement mode:
:CONF:CELL:SEQ:WCDM:LSS ON
:CONF:CELL:SEQ:WCDM:LSS?
> ON

:CONFigure:CELLular:SEQuence:WCDMa:MOBJect

Modulation Analysis Measuring object

Function

Sets the target signal of modulation analysis.

Command

```
:CONFigure:CELLularSEQuence:WCDMa:MOBJect <mcond>,<mobj>
```

Query

```
:CONFigure:CELLular:SEQuence:WCDMa:MOBJect? <mcond>
```

Response

<mobj>

Parameter

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<mobj>	Measurement target signal
QPSK	QPSK signal (One DPCCH and one DPDCH)
WCDMA	WCDMA signal

Example of Use

To set the target signal for modulation analysis of the measurement condition number 0 to WCDMA.

:CONF:CELL:SEQ:WCDM:MOBJ 0,WCDMA

:CONFigure:CELLular:SEQuence:WCDMa:MODulation:SET

Modulation Analysis Measurement Enable and Count

Function

Enables Modulation Analysis Measurement and sets measurement count in Sequence Measurement mode, or queries set values

Command

```
:CONFigure:CELLular:SEQuence:WCDMa:MODulation:SET
<mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:WCDMa: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
Resolution	1
Default	1

Example of Use

To enable Modulation Analysis measurement and set the measurement count to 120 for measurement condition number 25:

:CONF:CELL:SEQ:WCDM:MOD:SET 25,ON,120
:CONF:CELL:SEQ:WCDM:MOD:SET? 25
> ON,120

:CONFigure:CELLular:SEQuence:WCDMa:OBW:RATio

Occupied Bandwidth Ratio

Function

Sets Occupied Bandwidth measurement occupation ratio in Sequence Measurement mode, or queries setting

Command

```
:CONFigure:CELLular:SEQuence:WCDMa:OBW:RATio <ratio>
```

Query

```
:CONFigure:CELLular:SEQuence:WCDMa: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 95.0% in Sequence Measurement mode:

:CONF:CELL:SEQ:WCDM:OBW:RAT 95.0

:CONF:CELL:SEQ:WCDM:OBW:RAT?

> 95.0

:CONFigure:CELLular:SEQuence:WCDMa:OBW:SET

OBW Measurement Enable and Count

Function

Enables Occupied Bandwidth measurement and sets measurement count in Sequence Measurement mode, or queries settings

Command

```
:CONFigure:CELLular:SEQuence:WCDMa:OBW:SET <mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:WCDMa: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
Resolution	1
Default	1

Example of Use

To enable Occupied Bandwidth measurement and set the measurement count to 100 for the measurement condition number 2 in Sequence Measurement mode:

:CONF:CELL:SEQ:WCDM:OBW:SET 2,ON,100
:CONF:CELL:SEQ:WCDM:OBW:SET? 2
> ON,100

:CONFigure:CELLular:SEQuence:WCDMa:PCDE:SET

Peak Code Domain Error Measurement Enable and Count

Function

Enables Peak Code Domain Error measurement and sets measurement count, or queries settings

Command

```
:CONFigure:CELLular:SEQuence:WCDMa:PCDE:SET <mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:WCDMa:PCDE:SET? <mcond>
```

Response

<on_off>,<count>

Parameter

<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
Resolution	1
Default	1

Example of Use

To enable Peak Code Domain Error measurement and set the measurement count to 150 for the measurement condition number 2 in Sequence Measurement mode:

:CONF:CELL:SEQ:WCDM:PCDE:SET 2,ON,150
:CONF:CELL:SEQ:WCDM:PCDE:SET? 2
> ON,150

:CONFigure:CELLular:SEQuence:WCDMa:PDISc:SET

Phase Discontinuity Measurement Enable and Count

Function

Enables Phase Discontinuity measurement and sets measurement count in Sequence Measurement mode, or queries settings

Command

```
:CONFigure:CELLular:SEQuence:WCDMa:PDISc:SET <mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:WCDMa:PDISc: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 100
Resolution	1
Default	1

Example of Use

To enable Phase Discontinuity measurement and set the measurement count to 30 for the measurement condition number 40 in Sequence Measurement mode:

```
:CONF:CELL:SEQ:WCDM:PDIS:SET 40,ON,30
:CONF:CELL:SEQ:WCDM:PDIS:SET? 40
> ON,30
```

:CONFigure:CELLular:SEQuence:WCDMa:POWer:SET

Tx Power Measurement Enable and Count

Function

Enables Tx Power measurement and sets measurement count in Sequence Measurement mode, or queries settings

Command

```
:CONFigure:CELLular:SEQuence:WCDMa:POWer:SET <mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:WCDMa: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
Resolution	1
Default	1

Example of Use

To enable Transmit Power measurement and set the measurement count to 10 for measurement condition number 5 in Sequence Measurement mode:

:CONF:CELL:SEQ:WCDM:POW:SET 5,ON,10

:CONF:CELL:SEQ:WCDM:POW:SET? 5

> ON,10

:CONFigure:CELLular:SEQuence:WCDMa:SCODe

Scrambling Code Number

Function

Sets Scrambling Code Number in Sequence Measurement mode or queries setting

Command

```
:CONFigure:CELLular:SEQuence:WCDMa:SCODe <code>
```

Query

```
:CONFigure:CELLular:SEQuence:WCDMa:SCODe?
```

Response

<code>

Parameter

<code>	Scrambling Code Number
Range	0 to FFFFFF (Hexadecimal)
Resolution	1
Default	0

Example of Use

To set Scrambling Code Number to 271F in Sequence Measurement mode:

```
:CONF:CELL:SEQ:WCDM:SCOD 271F
:CONF:CELL:SEQ:WCDM:SCOD?
> 271F
```

:CONFigure:CELLular:SEQuence:WCDMa:SEMask:LIMit

Spectrum Emission Mask - Mask Template Lower Limit

Function

Sets absolute lower level threshold (minimum threshold power) for Spectrum Emission Mask measurement in Sequence Measurement mode, queries setting

Command

```
:CONFigure:CELLular:SEQuence:WCDMa:SEMask:LIMit <level>
```

Query

```
:CONFigure:CELLular:SEQuence:WCDMa:SEMask:LIMit?
```

Response

<level>

Unit	dBm

Parameter

<level>	Template threshold
Range	–100.0 to 0.0/3.84 MHz
Resolution	0.1 dBm
Default	–50.0 dBm

Example of Use

To set the absolute lower level threshold (minimum threshold power) for the Spectrum Emission Mask measurement to –100.0 dBm:

:CONF:CELL:SEQ:WCDM:SEM:LIM -100.0
:CONF:CELL:SEQ:WCDM:SEM:LIM?
> -100.0

:CONFigure:CELLular:SEQuence:WCDMa:SEMask:SET

SEM Measurement Enable and Count

Function

Enables Spectrum Emission Mask Measurement and sets measurement count in Sequence Measurement mode, and queries settings

Command

```
:CONFigure:CELLular:SEQuence:WCDMa:SEMask:SET <mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:WCDMa:SEMask: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
Resolution	1
Default	1

Example of Use

To enable Spectrum Emission Mask measurement and set the measurement count to 20 for the measurement condition number 8 in Sequence Measurement mode:

:CONF:CELL:SEQ:WCDM:SEM:SET 8,ON,20

:CONF:CELL:SEQ:WCDM:SEM:SET? 8

> ON,20

:CONFigure:CELLular:SEQuence:WCDMa:SEMask:TEMPlate

Spectrum Emission Mask - Mask Template

Function

Sets relative threshold for the Spectrum Emission Mask measurement in Sequence Measurement mode, and queries setting

Command

```
:CONFigure:CELLular:SEQuence:WCDMa:SEMask:TEMPlate <offset>,<level>
```

Query

```
:CONFigure:CELLular:SEQuence:WCDMa:SEMask:TEMPlate? <offset>
```

Response

<level>

Parameters

<offset>	Offset frequency point		
Range	1 to 5		
Resolution	1		
<level>	Level at each offset frequency point		
Point	offset	Level	(Default)
1	(2.5 MHz)	–100.0 to 0.0	(–35.0 dBc)
2	(3.5 MHz)	–100.0 to 0.0	(–50.0 dBc)
3	(3.5 MHz)	–100.0 to 0.0	(–35.0 dBc)
4	(7.5 MHz)	–100.0 to 0.0	(–39.0 dBc)
5	(8.5 MHz)	–100.0 to 0.0	(–49.0 dBc)
Resolution	0.1 dBc		
Default	0.1		

Example of Use

To set the relative threshold at Point3 (3.5 MHz frequency offset) for the Spectrum Emission Mask measurement to –60.0 dBc in Sequence Measurement mode:

:CONF:CELL:SEQ:WCDM:SEM:TEMP 3,-60.0
:CONF:CELL:SEQ:WCDM:SEM:TEMP? 3
> -60.0

:FETCh:CELLular:SEQuence:ERRor?

Sequence Parameter Information - Error Check

Function

Queries setting error information of sequence table

Query

```
:FETCh:CELLular:SEQuence:ERRor? [<item>]
```

Response

Query parameter	Response
None:	<n>,<err(0)>,...,<err(n–1)>
ILVL, OLVL, STEP,DLPAT,PORT:	<ns>,<seg(0)>,...,<seg(ns–1)>
LEN:	<e>,<mem>,<exe>,<set>
OLVLNUM,PATNUM,STDNUM:	<e>,<exe>,<set>

If no error is found in the sequence table, the response returns 0.

Parameters

<item>	Parameter of 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	
<n>	Number of errors	
Range	0 to 4	
<err(n–1)>	Parameter with error	
ILVL	Input level	
OLVL	Output level	
STEP	Number of steps	
LEN	Capture memory length	
<ns>	Number of segments with errors	
Range	0 to 200	
<seg(ns–1)>	Segment number with errors	
Range	0 to 1999	
<e>	Presence of errors	
Range	0	No error, executable
	1	Errors found, not executable
<mem>	Memory utilization	

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SCPI Command Reference

Range	0.0 to 100.0%
Resolution	0.1%
<exe>	Number of capture capable of executing capture out of number of configured segments
Range	0 to 200
<set>	Number of segments with capture configured
Range	0 to 200

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

Examples of Use

To query presence of error:
:CONF:CELL:SEQ:ERR?
>1,ILVL

To query the input level setting error information:
:CONF:CELL:SEQ:ERR? ILVL
>2,3,12

To query 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, 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: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)>
If no error is found in the sequence table, the response returns 0.

Parameters

<format>	Format
1	Error Check 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

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:PROGress?

Sequence progress

Function

Queries progress rate of sequence measurement and currently operating sequence number

Query

```
:FETCh:CELLular:SEQuence:PROGress?
```

Response

<p>,<cur>,<start>,<stop>

Parameters

<p>	Progress rate of sequence measurement
Range	0% to 100 %
<cur>	Segment number currently executing
Range	0 to 1999
<start>	Segment number executed first
Range	0 to 1999
<stop>	Segment number executed last
Range	0 to 1999

Example of Use

To query sequence measurement progress and currently executing sequence number:
:FETC:CELL:SEQ:PROG?
>65,23,11,30

Remarks

The segment number where measurement is executed first and the segment number where measurement is executed last are same as the start and stop segment numbers configured using the :CONFigure:CELLular:SEQuence:CONTrol command.

:FETCh:CELLular:SEQuence:SEG:STATe?

Specified Segment Status

Function

Queries measurement status of specified segment

Query

```
:FETCh:CELLular:SEQuence:SEG:STATe? <seg>
```

Response

<stat>

Parameters

<seg>	Segment number
Range	0 to 1999
<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 MX887011A is 0, 2, 5, 9, 10, or 12.

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 status of sequence measurement

Query

```
:FETCh:CELLular:SEQuence:STATe?
```

Response

<m_status>,<n>,<s(0)>,<s(1)>,…,<s(n–1)>

Parameters

<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 MX887011A is 0, 2, 5, 9, or 12.

<n>	Number of measured segments
Range	0 to 200
<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 MX887011A is 0, 2, 5, 9, 10, or 12.

Example of Use

To query 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
```

:FETCh:CELLular:SEQuence:WCDMa:ACLR?

Result of Adjacent Channel Leakage Power Ratio

Function

Queries Adjacent Channel Leakage Power Ratio measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:ACLR? <seg>,<mode>
```

Response

When <mode> = TTL,
<avg(0)>,<avg(1)>,<avg(2)>,<avg(3)>,<max(0)>,<max(1)>,<max(2)>,<max(3)>,<min(0)>,<min(1)>,<min(2)>,<min(3)>
When <mode> ≠ TTL,
<aclr(0)>,<aclr(1)>,<aclr(2)>,<aclr(3)>

Unit	dB
Resolution	0.01

Parameter number	Frequency offset
0	–10 MHz
1	–5 MHz
2	+5 MHz
3	+10 MHz

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
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<aclr>	Measurement result in specified Storage mode

Example of Use

To query average value of ACLR measurement results for segment 1 in the Sequence Measurement mode:

:FETC:CELL:SEQ:WCDM:ACLR? 1,AVG

> -20.00,-21.00,-22.00,-23.00

:FETCh:CELLular:SEQuence:WCDMa:MODulation:CFRequency?

Carrier Frequency Result of Modulation Analysis

Function

Queries Carrier Frequency measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:MODulation:CFRequency? <seg>
```

Response

<freq>

Unit	Hz
Resolution	1

Parameter

<seg>	Segment number
Range	0 to 1999
Resolution	1
<freq>	Carrier frequency

Example of Use

To query the carrier frequency measurement result for segment 1 in the Sequence Measurement mode:

:FETC:CELL:SEQ:WCDM:MOD:CFR? 1

> 1951000000

:FETCh:CELLular:SEQuence:WCDMa:MODulation:EVM?

EVM Result of Modulation Analysis

Function

Queries EVM measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:MODulation:EVM? <seg>,<mode>
```

Response

When <mode> = TTL,

<avg>,<max>,<min>

When <mode> ≠ TTL,

<evm>

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
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<evm>	Measurement result in specified Storage mode

Example of Use

To query average of EVM Measurement results for segment 1 in Sequence Measurement mode:

:FETC:CELL:SEQ:WCDM:MOD:EVM? 1,AVG

> 1.50

:FETCh:CELLular:SEQuence:WCDMa:MODulation:FERRor?

Carrier Frequency Error Result of Modulation Analysis

Function

Queries Carrier Frequency Error measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:MODulation:FERRor? <seg>,<mode>
```

Response

When <mode> = TTL,
<avg_ppm>,<avg_Hz>,<max_ppm>,<max_Hz>,<min_ppm>,<min_Hz>
When <mode> ≠ TTL,
<freq_ppm>,<freq_Hz>

Unit	ppm, Hz
Resolution	0.01,0.1

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
<avg_ppm>	Average of Frequency Error measurement results in ppm
<avg_Hz>	Average of Frequency Error measurement results in Hz
<max_ppm>	Maximum value in Frequency Error measurement results in ppm
<max_Hz>	Maximum value in Frequency Error measurement results in Hz
<min_ppm>	Minimum value in Frequency Error measurement results in ppm
<min_Hz>	Minimum value in Frequency Error measurement results in Hz
<freq_ppm>	Frequency Error measurement results in specified Storage mode in ppm
<freq_Hz>	Frequency Error measurement results in specified Storage mode in Hz

Example of Use

To query average of Frequency Error measurement results for segment 1 in Sequence Measurement mode:

```
:FETC:CELL:SEQ:WCDM:MOD:FERR? 1,AVG
> 0.03,60.0
```

:FETCh:CELLular:SEQuence:WCDMa:MODulation:FERRor:WORSt?

Carrier Frequency Error Result of Modulation Analysis (Worst)

Function

Queries worst value in Carrier Frequency Error measurement results in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:MODulation:FERRor:WORSt? <seg>
```

Response

<freq_ppm>,<freq_Hz>

Unit	ppm, Hz
Resolution	0.01,0.1

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<freq_ppm>	Worst value in Frequency Error measurement results in ppm
<freq_Hz>	Worst value in Frequency Error measurement results in Hz

Example of Use

To query worst value in Frequency Error measurement results for segment 1 in Sequence Measurement mode:

:FETC:CELL:SEQ:WCDM:MOD:FERR:WORS? 1

> 0.03,60.0

:FETCh:CELLular:SEQuence:WCDMa:MODulation:IQIMbalance?

IQ Imbalance Result of Modulation Analysis

Function

Queries IQ Imbalance measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:MODulation:IQIMbalance? <seg>,<mode>
```

Response

When <mode> = TTL,
<avg>,<max>,<min>
When <mode> ≠ TTL,
<iqimb>

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
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<iqimb>	Measurement result in specified Storage mode

Example of Use

To query average of IQ Imbalance Measurement results for segment 1 in Sequence Measurement mode:
:FETC:CELL:SEQ:WCDM:MOD:IQIM? 1,AVG
> 0.04

Remarks

When the measurement target is QPSK, the results are returned with either I or Q value, whichever has a bigger gain, as Q axis.

:FETCh:CELLular:SEQuence:WCDMa:MODulation:MERRor?

Magnitude Error Result of Modulation Analysis

Function

Queries Magnitude Error measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:MODulation:MERRor? <seg>,<mode>
```

Response

When <mode> = TTL,
<avg>,<max>,<min>
When <mode> ≠ TTL,
<merr>

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
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<merr>	Measurement result in specified Storage mode

Example of Use

To query average of Magnitude Error measurement result for segment 1 in Sequence Measurement mode:

:FETC:CELL:SEQ:WCDM:MOD:MERR? 1,AVG
> 1.05

:FETCh:CELLular:SEQuence:WCDMa:MODulation:ORGNoffset?

Origin Offset Result of Modulation Analysis

Function

Queries Origin Offset measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:MODulation:ORGNoffset? <seg>,<mode>
```

Response

When <mode> = TTL,
<avg>,<max>,<min>
When <mode> ≠ TTL,
<orgnoffs>

Unit	dB
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
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<orgnoffs>	Measurement result in specified Storage mode

Example of Use

To query average of Origin Offset measurement result for segment 1 in Sequence Measurement mode

:FETC:CELL:SEQ:WCDM:MOD:ORGN? 1,AVG

> 0.04

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SCPI Command Reference

:FETCh:CELLular:SEQuence:WCDMa:MODulation:PEVM?

Peak EVM Result of Modulation Analysis

Function

Queries Peak EVM measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:MODulation:PEVM? <seg>,<mode>
```

Response

When <mode> = TTL,

<avg>,<max>,<min>

When <mode> ≠ TTL,

<pevm>

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
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pevm>	Measurement result in specified Storage mode

Example of Use

To query average of peak EVM measurement results for segment 1 in Sequence Measurement mode:

:FETC:CELL:SEQ:WCDM:MOD:PEVM? 1,AVG

> 1.75

:FETCh:CELLular:SEQuence:WCDMa:MODulation:PHERror?

Phase Error Result of Modulation Analysis

Function

Queries Phase Error measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:MODulation:PHERror? <seg>,<mode>
```

Response

When <mode> = TTL,
<avg>,<max>,<min>
When <mode> ≠ TTL,
<perr>

Unit	degree
Resolution	0.01

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
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<perr>	Measurement result in specified Storage mode

Example of Use

To query average of Phase Error measurement results for segment 1 in Sequence Measurement mode:
:FETC:CELL:SEQ:WCDM:MOD:PHER? 1,AVG
> 1.55

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SCPI Command Reference

:FETCh:CELLular:SEQuence:WCDMa:MODulation:TERRor?

Timing Error Result of Modulation Analysis

Function

Queries Timing Error measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:MODulation:TERRor? <seg>,<mode>
```

Response

When <mode> = TTL,

<avg>,<max>,<min>

When <mode> ≠ TTL,

<terror>

Unit	chip
Resolution	0.1

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
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<terror>	Measurement result in specified Storage mode

Example of Use

To query average of Timing Error measurement results for segment 1 in Sequence Measurement mode

:FETC:CELL:SEQ:WCDM:MOD:TERR? 1,AVG

> 0.7

:FETCh:CELLular:SEQuence:WCDMa:MODulation:TERRor:WORSt?

Timing Error Result of Modulation Analysis (Worst)

Function

Queries worst value in Timing Error measurement results in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:MODulation:TERRor:WORSt? <seg>
```

Response

<terror>

Unit	chip
Resolution	0.1

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<terror>	Worst value in Timing Error measurement results

Example of Use

To query worst value in Timing Error measurement for Segment number 1 in Sequence Measurement mode

:FETC:CELL:SEQ:WCDM:MOD:TERR:WORS? 1

> 1.1

:FETCh:CELLular:SEQuence:WCDMa:OBW?

Result of Occupied Bandwidth

Function

Queries Occupied Bandwidth measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:OBW? <seg>
```

Response

<bw>

Unit	MHz
Resolution	0.001

Parameter

<seg>	Segment number
Range	0 to 1999
Resolution	1

Example of Use

To query Occupied Bandwidth measurement result for segment 0 in Sequence Measurement mode:

:FETC:CELL:SEQ:WCDM:OBW? 0

> 3.840

:FETCh:CELLular:SEQuence:WCDMa:OBW:FREQuency?

Result of Occupied Bandwidth Frequency

Function

Queries upper, lower and center frequency of Occupied Bandwidth measurement in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:OBW:FREQuency? <seg>,<pos>
```

Response

<freq>

Unit	MHz
Resolution	0.001

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<pos>	Frequency position
UPPER	Upper frequency
LOWER	Lower frequency
CENTER	Center frequency
<freq>	Frequency [MHz]

Example of Use

To query the upper frequency of the Occupied Bandwidth for segment 1 in the Sequence Measurement mode:

:FETC:CELL:SEQ:WCDM:OBW:FREQ? 1,UPPER

> 1951.920

:FETCh:CELLular:SEQuence:WCDMa:PCDE?

Result of Peak Code Domain Error

Function

Queries Peak Code Domain Error measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:PCDE? <seg>,<mode>
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> ≠ TTL,

<pcde>

Unit:	dB
Resolution:	0.01

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
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pcde>	Measurement result in specified Storage mode

Example of Use

To query average of Peak Code Domain Error measurement results for segment 2 in Sequence Measurement mode:

:FETC:CELL:SEQ:WCDM:PCDE? 2,AVG

> 0.08

:FETCh:CELLular:SEQuence:WCDMa:PDISc?

Result of Phase Discontinuity

Function

Queries Phase Discontinuity measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:PDISc? <seg>
```

Response

<count>,<data(0)>,<data(1)>,<data(2)>,…,<data(count–1)>

Unit	degree
Resolution	0.01

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<count>	Measurement count
<data(0)> to <data(count–1)>	Phase difference from previous time slot

Example of Use

To query Phase Discontinuity measurement result for segment 1 in Sequence Measurement mode:

:FETC:CELL:SEQ:WCDM:PDIS? 1

> 0.08

:FETCh:CELLular:SEQuence:WCDMa:PDISc:EVM?

EVM Result of Phase Discontinuity

Function

Queries EVM measurement result at Phase Discontinuity measurement in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:PDISc:EVM? <seg>
```

Response

<count>,<evm(0)>,<evm(1)>,…,<evm(count–1)>

Unit	%
Resolution	0.01

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<count>	Measurement count
Range	1 to 100
<evm(0)> to <evm(count–1)>	EVM

Example of Use

To query EVM measurement result at Phase Discontinuity measurement for segment 1 in Sequence Measurement mode:

:FETC:CELL:SEQ:WCDM:PDIS:EVM? 1

> 2,1.51,1.53

:FETCh:CELLular:SEQuence:WCDMa:PDISc:FERRor?

Carrier Frequency Error Result of Phase Discontinuity

Function

Queries Carrier frequency error of Phase Discontinuity measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:PDISc:FERRor? <seg>
```

Response

<count>,<fppm(0)>,<fHz(0)>,<fppm(1)>,<fHz(1)>,…,<fppm(count–1)>,<fHz(count–1)>

Unit	ppm, Hz
Resolution	0.01,0.1

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<count>	Measurement count
Range	1 to 100
<fppm(0)>	Frequency error in ppm
<fHz(0)>	Frequency error in Hz
<fppm(1)>	Frequency error in ppm
<fHz(1)>	Frequency error in Hz
<fppm(count–1)>	Frequency error in ppm
<fHz(count–1)>	Frequency error in Hz

Example of Use

To query Phase Discontinuity Frequency Error measurement result for segment 1 in Sequence Measurement mode:

:FETC:CELL:SEQ:WCDM:PDIS:FERR? 1

> 2,0.08,0.2,0.09,0.4

:FETCh:CELLular:SEQuence:WCDMa:POWer:FLTPower?

Result of Filtered Power Measurement

Function

Queries Filtered Power measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:POWer:FLTPower? <seg>,<mode>
```

Response

When <mode> = TTL,

<avg>,<max>,<min>

When <mode> = AVG, MAX, MIN or DVT

<pwr>

When <mode> = IND,

<s>,<pwr(1)>,<pwr(2)>,...,<pwr(s)>

Unit	dB
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
IND	Individual measurement result
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pwr>	Measurement result in specified Storage mode
<pwr(s)>	Measurement result at sth slot

s	Measurement count
Range	1 to 200

Example of Use

To query average of RRC Filtered Power Measurement result for segment 0 in Sequence Measurement mode:

:FETC:CELL:SEQ:WCDM:POW:FLTP? 0,AVG

> -20.00

:FETCh:CELLular:SEQuence:WCDMa:POWer:TXPower?

Result of Tx Power Measurement

Function

Queries Tx Power measurement results in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:POWer:TXPower? <seg>,<mode>
```

Response

When <mode> = TTL,

<avg>,<max>,<min>

When <mode> = AVG, MAX, MIN or DVT

<pwr>

When <mode> = IND,

<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>

Unit	dBm
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
IND	Individual measurement result
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)

<min>	Measurement result (Minimum)
<pwr>	Measurement result in specified Storage mode
<pwr(s)>	Tx Power of sth measurement
s	Measurement count
Range	1 to 200

Example of Use

To query average of Tx Power measurement result for segment 0 in Sequence Measurement mode:

:FETC:CELL:SEQ:WCDM:POW:TXP? 0,AVG

> -20.00

:FETCh:CELLular:SEQuence:WCDMa:SEMask:JUDGement?

Judgement of Spectrum Emission Mask

Function

Queries whether spectrum threshold set at spectrum measurement exceeded or not

Query

```
:FETCh:CELLular:SEQuence:WCDMa:SEMask:JUDGement? <seg>
```

Response

<judgement>

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<judgement>	Judgement result
PASS	Passed (below threshold)
FAIL	Failed (above threshold)
–	No measurement

Example of Use

To query whether spectrum threshold set for segment 1 in Sequence Measurement mode exceeded or not:

:FETC:CELL:SEQ:WCDM:SEM:JUDG? 1

> PASS

:FETCh:CELLular:SEQuence:WCDMa:SEMask:LEVel:LOWer?

Result of Spectrum Emission Mask (Lower)

Function

Queries peak level and frequency of spectrum in each lower frequency range of Spectrum Emission Mask in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:SEMask:LEVel:LOWer? <seg>
```

Response

<band>,<freq(0)>,<peak(0)>,<freq(1)>,<peak(1)>,<freq(2)>,<peak(2)>,<freq(3)>,<peak(3)>

<band>:	Target band
<freq(n)>:	Offset frequency of spectrum peak
Resolution	0.001 MHz
<peak(n)>:	Peak level of spectrum
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<band>	Target band
Range	0 to 14, 19 to 21
<freq(0)>	Offset frequency of spectrum peak in offset frequency range from –2.5 to –3.5 MHz
<peak(0)>	Peak level of spectrum in offset frequency range from –2.5 to –3.5 MHz
<freq(1)>	Offset frequency of spectrum peak in offset frequency range from –3.5 to –7.5 MHz
<peak(1)>	Peak level of spectrum in offset frequency range from –3.5 to –7.5 MHz
<freq(2)>	Offset frequency of spectrum peak in offset frequency range from –7.5 to –8.5 MHz
<peak(2)>	Peak level of spectrum in offset frequency range from –7.5 to –8.5 MHz
<freq(3)>	Offset frequency of spectrum peak in offset frequency range below –8.5 MHz
<peak(3)>	Peak level of spectrum in offset frequency range below –8.5 MHz

Example of Use

To query peak level and frequency of spectrum in each lower frequency range for segment 1 in Sequence Measurement mode:

:FETC:CELL:SEQ:WCDM:SEM:LEV:LOW? 1

> 1,-3.000,-20.00,-5.000,-30.00,-8.000,-40.00,-9.500,-50.00

:FETCh:CELLular:SEQuence:WCDMa:SEMask:LEVel:UPPer?

Result of Spectrum Emission Mask (Upper)

Function

Queries peak level and frequency of spectrum in each upper frequency range of Spectrum Emission Mask in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:SEMask:LEVel:UPPer? <seg>
```

Response

<band>,<freq(0)>,<peak(0)>,<freq(1)>,<peak(1)>,<freq(2)>,<peak(2)>,<freq(3)>,<peak(3)>

<band>:	Target band
<freq(n)>:	Offset frequency of spectrum peak
Resolution	0.001 MHz
<peak(n)>:	Peak level of spectrum
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<band>	Target band
Range	0 to 14, 19 to 21
<freq(0)>	Offset frequency of spectrum peak in offset frequency range from +2.5 to +3.5 MHz
<peak(0)>	Peak level of spectrum in offset frequency range from +2.5 to +3.5 MHz
<freq(1)>	Offset frequency of spectrum peak in offset frequency range from +3.5 to +7.5 MHz
<peak(1)>	Peak level of the spectrum in the offset frequency range from +3.5 to +7.5 MHz
<freq(2)>	Offset frequency of spectrum peak in offset frequency range from +7.5 to +8.5 MHz
<peak(2)>	Peak level of spectrum in offset frequency range from +7.5 to +8.5 MHz
<freq(3)>	Offset frequency of spectrum peak in offset frequency range above +8.5 MHz
<peak(3)>	Peak level of spectrum in offset frequency range above +8.5 MHz

Example of Use

To query peak level and frequency of spectrum in each upper frequency range for segment 1 in Sequence Measurement mode:

:FETC:CELL:SEQ:WCDM:SEM:LEV:UPP? 1

> 1,3.000,-20.00,5.000,-30.00,8.000,-40.00,9.500,-50.00

:FETCh:CELLular:SEQuence:WCDMa:SEMask:MARGin:LOWer?

Margin of Spectrum Emission Mask (Lower)

Function

Queries spectrum margin and offset frequency in each lower frequency range of Spectrum Emission Mask in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:SEMask:MARGin:LOWer? <seg>
```

Response

<band>,<freq(0)>,<peak(0)>,<freq(1)>,<peak(1)>,<freq(2)>,<peak(2)>,<freq(3)>,<peak(3)>

<band>:	Target band
<freq(n)>:	Offset frequency at point where margin determined
Resolution	0.001 MHz
<peak(n)>:	Margin from template
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<band>	Target band
Range	0 to 14, 19 to 21
<freq(0)>	Offset frequency at point where margin determined in offset frequency range from –2.5 to –3.5 MHz
<peak(0)>	Margin in offset frequency range from –2.5 to –3.5 MHz
<freq(1)>	Offset frequency at point where margin determined in offset frequency range from –3.5 to –7.5 MHz
<peak(1)>	Margin in offset frequency range from –3.5 to –7.5 MHz
<freq(2)>	Offset frequency at point where margin determined in offset frequency range from –7.5 to –8.5 MHz
<peak(2)>	Margin in offset frequency range from –7.5 to –8.5 MHz
<freq(3)>	Offset frequency at point where margin determined in offset frequency range below –8.5 MHz
<peak(3)>	Margin in offset frequency range below –8.5 MHz

Example of Use

To query margin and frequency from Spectrum Emission Mask template spectrum in each lower frequency range for segment 1 in Sequence Measurement mode:

:FETC:CELL:SEQ:WCDM:SEM:MARG:LOW? 1

> 1,-3.000,3.00,-5.000,3.00,-8.000,3.00,-9.500,3.00

:FETCh:CELLular:SEQuence:WCDMa:SEMask:MARGin:UPPer?

Margin of Spectrum Emission Mask (Upper)

Function

Queries spectrum margin and offset frequency in each upper frequency range of Spectrum Emission Mask in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:WCDMa:SEMask:MARGin:UPPer? <seg>
```

Response

<band>,<freq(0)>,<peak(0)>,<freq(1)>,<peak(1)>,<freq(2)>,<peak(2)>,<freq(3)>,<peak(3)>

<band>:	Target band
<freq(n)>:	Offset frequency at point where margin determined
Resolution	0.001 MHz
<peak(n)>:	Margin from template
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<band>	Target band
Range	0 to 14, 19 to 21
<freq(0)>	Offset frequency at point where margin determined in offset frequency range from +2.5 to +3.5 MHz
<peak(0)>	Margin in offset frequency range from +2.5 to +3.5 MHz
<freq(1)>	Offset frequency at point where margin determined in offset frequency range from +3.5 to +7.5 MHz
<peak(1)>	Margin in offset frequency range from +3.5 to +7.5 MHz
<freq(2)>	Offset frequency at point where margin determined in offset frequency range from +7.5 to +8.5 MHz
<peak(2)>	Margin in the offset frequency range from +7.5 to +8.5 MHz
<freq(3)>	Offset frequency at point where margin determined in offset frequency range above +8.5 MHz
<peak(3)>	Margin in offset frequency range above +8.5 MHz

Example of Use

To query margin and frequency from Spectrum Emission Mask template spectrum in each upper frequency range for segment 1 in Sequence Measurement mode:

:FETC:CELL:SEQ:WCDM:SEM:MARG:UPP? 1

> 1,3.000,3.00,5.000,3.00,8.000,3.00,9.500,3.00

: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 trigger timeout

Command

```
:TRIGger:CELLular:MEASurement:TOUT <time>
```

Query

```
:TRIGger:CELLular:MEASurement:TOUT?
```

Response

<time>

Unit	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 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 s 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

Native Command Reference

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. A | B | C | D indicates a choice of A, B, C, and D.
{}	Choose one of the groups in braces. 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

Measurements

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`	`ILVL?`	`level`
Output Level	`OLVL level`	`OLVL?`	`level`
Downlink Channel	`DLCHAN dl_ch`	`DLCHAN?`	`dl_ch`
Downlink Frequency	`RXFREQ dl_freq`	`RXFREQ?`	`dl_freq`
	`DLFREQ dl_freq`	`DLFREQ?`	`dl_freq`
Uplink Channel	`ULCHAN ul_ch`	`ULCHAN?`	`ul_ch`
Uplink Frequency	`TXFREQ ul_freq`	`TXFREQ?`	`ul_freq`
	`ULFREQ ul_freq`	`ULFREQ?`	`ul_freq`
Measurement Select	`MEASSEL meassel`	`MEASSEL?`	`meassel`

Fundamental Measurement Parameters

Function	Command	Query	Response
Turn Off All Measurement Items	ALLMEASITEMS_OFF	-----	-----
Frequency Band	BAND FreqBand	BAND?	FreqBand
Fast Power Measurement Mode - RRC filter	FASTPWR_RRC on_off	FASTPWR_RRC?	on_off
Fast Power Measurement Mode	FASTPWRMODE on_off	FASTPWRMODE?	on_off
Long Span Code Search	LSCODESEARCH on_off	LSCODESEARCH?	on_off
Occupied Bandwidth Ratio	OBW_RATIO ratio	OBW_RATIO?	ratio
Spectrum Emission Mask - Mask Template Lower Limit	SEM_LLIMIT level	SEM_LLIMIT?	level
Spectrum Emission Mask - Mask Template	SEM_TEMPLATE offset,level	SEM_TEMPLATE? offset	level
Bit Error Rate - Upper Limit	BER_LIMIT ratio	BER_LIMIT?	ratio
Bit Error Rate	BER_MEAS on_off	BER_MEAS?	on_off
Bit Error Rate - Number of Sample	BER_SAMPLE number	BER_SAMPLE?	number
TFCI Detection Mode	BER_TFCI mode	BER_TFCI?	mode
Block Error Rate - Upper Limit	BLER_LIMIT ratio	BLER_LIMIT?	ratio
Block Error Rate	BLER_MEAS on_off	BLER_MEAS?	on_off
Block Error Rate - Number of Sample	BLER_SAMPLE number	BLER_SAMPLE?	number
DTCH Data Pattern	DTCHPAT pattern	DTCHPAT?	pattern
Scrambling Code Number	SCRCODE code	SCRCODE?	code
Uplink Configuration	ULCONFIG object	ULCONFIG?	object
Inner Loop Power Control Parameter (Auto) - Method	ILPC_MEAS auto	ILPC_MEAS?	auto

Measurement Parameters

Function	Command	Query	Response
ACLR Measurement Enable and Count	ACLR_SET on_off[,count]	ACLR_SET?	on_off,count
Modulation Analysis Measurement Enable and Count	MOD_SET on_off[,count]	MOD_SET?	on_off,count
OBW Measurement Enable and Count	OBW_SET on_off[,count]	OBW_SET?	on_off,count
Peak Code Domain Error Measurement Enable and Count	PCDE_SET on_off[,count]	PCDE_SET?	on_off,count
Phase Discontinuity Measurement Enable and Count	PDISC_SET on_off[,count]	PDISC_SET?	on_off,count
Tx Power Measurement Enable and Count	PWR_SET on_off[,count]	PWR_SET?	on_off,count
Relative Code Domain Error Measurement Enable and Count	RCDE_SET on_off[,count]	RCDE_SET?	on_off,count
SEM Measurement Enable and Count	SEM_SET on_off[,count]	SEM_SET?	on_off,count

Peak Code Domain Error Measurement

Function	Command	Query	Response
Result of Peak Code Domain Error	-----	PCDE? mode	{avg,max,min}|pcde

Phase Discontinuity Measurements

Function	Command	Query	Response
Result of Phase Discontinuity	-----	PDISC?	count,data(0),data(1),…,data(count-1)
Carrier Frequency Error Result of Phase Discontinuity	-----	PDISC_CFERR? mode	count,fppm(0),fHz(0),fppm(1),fHz(1),…,fppm(count-1),fHz(count-1)
EVM Result of Phase Discontinuity	-----	PDISC_EVM?	count,evm(0),evm(1),…,evm(count-1)

Relative Code Domain Error Measurements

Function	Command	Query	Response
Result of Code Domain Power of DPCCH	-----	DPCCHCDP? mode	cdp
Result of Effective Code Domain Power of DPCCH	-----	DPCCHECDP? mode	ecdp
Result of Relative Code Domain Error of DPCCH	-----	DPCCHRCDE? mode	{avg,max,min}|rcde
Result of Code Domain Power of DPDCH	-----	DPDCHCDP? mode	cdp
Result of Effective Code Domain Power of DPDCH	-----	DPDCHECDP? mode	ecdp
Result of Relative Code Domain Error of DPDCH	-----	DPDCHRCDE? mode	{avg,max,min}|rcde
Result of Code Domain Power of E-DPCCH	-----	EDPCCHCDP? mode	cdp
Result of Effective Code Domain Power of E-DPCCH	-----	EDPCCHECDP? mode	ecdp
Result of Relative Code Domain Error of E-DPCCH	-----	EDPCCHRCDE? mode	{avg,max,min}|rcde
Result of Code Domain Power of E-DPDCH	-----	EDPDCHCDP? no,mode	cdp
Result of Effective Code Domain Power of E-DPDCH	-----	EDPDCHECDP? no,mode	ecdp
Result of Relative Code Domain Error of E-DPDCH	-----	EDPDCHRCDE? no,mode	{avg,max,min}|rcde
Result of Code Domain Power of HS-DPCCH	-----	HSDPCCHCDP? mode	cdp
Result of Effective Code Domain Power of HS-DPCCH	-----	HSDPCCHECDP? mode	ecdp
Result of Relative Code Domain Error of HS-DPCCH	-----	HSDPCCHRCDE? mode	{avg,max,min}|rcde

Results

Function	Command	Query	Response
Result of Adjacent Channel Leakage Power Ratio	-----	ACLR? mode	{avg(0),avg(1),avg(2),avg(3),max(0),max(1),max(2),max(3),min(0),min(1),min(2),min(3)}|{ aclr(0),aclr(1),aclr(2),aclr(3)}
Bit Error Rate	-----	BER? [format]	rate
Bit Error Rate - Error Counts	-----	BERCNT?	number
Bit Error Rate - Judgement	-----	BERPASS?	judgement
Bit Error Rate - Transmitted bits	-----	BERTRANSMIT?	number
Block Error Rate	-----	BLER? [format]	rate
Block Error Rate - Error Counts	-----	BLERCNT?	number
Block Error Rate - Judgement	-----	BLERPASS?	Judgement
Block Error Rate - Transmitted bits	-----	BLERTRANSMIT?	number
Result of Filtered Power Measurement	-----	FILTPWR? mode	{avg,max,min}|pwr|{s,pwr(1),pwr(2),…,pwr(s)}
Result of Occupied Bandwidth	-----	OBW?	bw
Result of Occupied Bandwidth Frequency	-----	OBWFREQ? pos	freq
Judgement of Spectrum Emission Mask	-----	SEM?	judgement
Result of Spectrum Emission Mask (Lower)	-----	SEMLVL_LOWER?	band,freq(0),peak(0),freq(1),peak(1),freq(2),peak(2),freq(3),peak(3)
Result of Spectrum Emission Mask (Upper)	-----	SEMLVL_UPPER?	band,freq(0),peak(0),freq(1),peak(1),freq(2),peak(2),freq(3),peak(3)

Results (Cont'd)

Function	Command	Query	Response
Margin of Spectrum Emission Mask (Lower)	-----	`SEMMARGIN_LOWER?`	`band,freq(0),peak(0),freq(1),peak(1),freq(2),peak(2),freq(3),peak(3)`
Margin of Spectrum Emission Mask (Upper)	-----	`SEMMARGIN_UPPER?`	`band,freq(0),peak(0),freq(1),peak(1),freq(2),peak(2),freq(3),peak(3)`
Result of Tx Power Measurement	-----	`TXPWR? mode`	`{avg,max,min}|pwr|{s,pwr(1),pwr(2),…,pwr(s)}`
Waveform Data	-----	`WAVEFMEAS? format,position,length`	`data(0),data(1),…,data(length-1)`
Inner Loop Power Control (Auto) - Judgement	-----	`ILPC_PASS? <step>`	`judgement`
Slot Power List - Slot Level	-----	`ILPC_PWR? <step>[,<slot>]`	`l[0],l[1],...,l[max_slot_number]`
Inner Loop Power Control (Auto) maximum power	-----	`ILPC_MAXPWR?`	`power`
Inner Loop Power Control (Auto) minimum power	-----	`ILPC_MINPWR?`	`power`

Results of Modulation Analysis Measurements

Function	Command	Query	Response
Carrier Frequency Error Result of Modulation Analysis	-----	CFERR? mode	{avg_ppm,avg_Hz,max_ppm,max_Hz,min_ppm,min_Hz}|{freq_ppm,freq_Hz}
Carrier Frequency Error Result of Modulation Analysis (Worst)	-----	CFERR_WORST?	freq_ppm,freq_Hz
Carrier Frequency Result of Modulation Analysis	-----	CFREQ?	freq
EVM Result of Modulation Analysis	-----	EVM? mode	{avg,max,min}|evm
IQ Imbalance Result of Modulation Analysis	-----	IQIMB? mode	{avg,max,min}|iqimb
Magnitude Error Result of Modulation Analysis	-----	MAGERR? mode	{avg,max,min}|merr
Origin Offset Result of Modulation Analysis	-----	ORGNOFS? mode	{avg,max,min}|orgnoffs
Peak EVM Result of Modulation Analysis	-----	PEVM? mode	{avg,max,min}|pevm
Phase Error Result of Modulation Analysis	-----	PHASEERR? mode	{avg,max,min}|perr
Power Ratio Result of Modulation Analysis	-----	PWRRATIO? mode	{avg,max,min}|powerratio
Timing Error Result of Modulation Analysis	-----	TERR? mode	{avg,max,min}|terror
Timing Error Result of Modulation Analysis (Worst)	-----	TERR_WORST?	terror

5.1.3 Sequence measurement commands

Common Parameters

Function	Command	Query	Response
Input Level	`ILVL level`	`ILVL?`	`level`
Output Level	`OLVL level`	`OLVL?`	`level`
Downlink Frequency	`RXFREQ dl_freq`	`RXFREQ?`	`dl_freq`
	`DLFREQ dl_freq`	`DLFREQ?`	`dl_freq`
Uplink Frequency	`TXFREQ ul_freq`	`TXFREQ?`	`ul_freq`
	`ULFREQ ul_freq`	`ULFREQ?`	`ul_freq`

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

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

Measurement Parameters

Function	Command	Query	Response
ACLR Measurement Enable and Count	WCDMA_ACLR_SET mcond,on_off[,count]	WCDMA_ACLR_SET? mcond	on_off,count
Frequency Band	WCDMA_BAND mcond,FreqBand	WCDMA_BAND? mcond	FreqBand
ILPC Measurement Enable	WCDMA_ILPC mcond,on_off	WCDMA_ILPC? mcond	on_off
Long Span Code Search	WCDMA_LSCODESEARCH on_off	WCDMA_LSCODESEARCH?	on_off
Modulation Analysis Measuring object	WCDMA_MA_MEASOBJ mcond,mobj	WCDMA_MA_MEASOBJ? mcond	mobj
Turn Off All Measurement Items	WCDMA_MEAS_OFF mcond	-----	-----
Modulation Analysis Measurement Enable and Count	WCDMA_MOD_SET mcond,on_off[,count]	WCDMA_MOD_SET? mcond	on_off,count
Occupied Bandwidth Ratio	WCDMA_OBW_RATIO ratio	WCDMA_OBW_RATIO?	ratio
OBW Measurement Enable and Count	WCDMA_OBW_SET mcond,on_off[,count]	WCDMA_OBW_SET? mcond	on_off,count
Peak Code Domain Error Measurement Enable and Count	WCDMA_PCDE_SET mcond,on_off[,count]	WCDMA_PCDE_SET? mcond	on_off,count
Phase Discontinuity Measurement Enable and Count	WCDMA_PDISC_SET mcond,on_off[,count]	WCDMA_PDISC_SET? mcond	on_off,count
Tx Power Measurement Enable and Count	WCDMA_PWR_SET mcond,on_off[,count]	WCDMA_PWR_SET? mcond	on_off,count
Scrambling Code Number	WCDMA_SCRCODE code	WCDMA_SCRCODE?	code
Spectrum Emission Mask - Mask Template Lower Limit	WCDMA_SEM_LLIMIT level	WCDMA_SEM_LLIMIT?	level
SEM Measurement Enable and Count	WCDMA_SEM_SET mcond,on_off[,count]	WCDMA_SEM_SET? mcond	on_off,count
Spectrum Emission Mask - Mask Template	WCDMA_SEM_TEMPLATE offset,level	WCDMA_SEM_TEMPLATE? offset	level

Modulation Analysis Measurement Results

Function	Command	Query	Response
Carrier Frequency Error Result of Modulation Analysis	-----	WCDMA_CFERR? seg,mode	{avg_ppm,avg_Hz,max_ppm,max_Hz,min_ppm,min_Hz}|{freq_ppm,freq_Hz}
Carrier Frequency Error Result of Modulation Analysis (Worst)	-----	WCDMA_CFERR_WORST? seg	freq_ppm,freq_Hz
Carrier Frequency Result of Modulation Analysis	-----	WCDMA_CFREQ? seg	freq
EVM Result of Modulation Analysis	-----	WCDMA_EVM? seg,mode	{avg,max,min}|evm
IQ Imbalance Result of Modulation Analysis	-----	WCDMA_IQIMB? seg,mode	{avg,max,min}|iqimb
Magnitude Error Result of Modulation Analysis	-----	WCDMA_MAGERR? seg,mode	{avg,max,min}|merr
Origin Offset Result of Modulation Analysis	-----	WCDMA_ORGNOFS? seg,mode	{avg,max,min}|orgnoffs
Peak EVM Result of Modulation Analysis	-----	WCDMA_PEVM? seg,mode	{avg,max,min}|pevm
Phase Error Result of Modulation Analysis	-----	WCDMA_PHASEERR? seg,mode	{avg,max,min}|perr
Timing Error Result of Modulation Analysis	-----	WCDMA_TERR? seg,mode	{avg,max,min}|terror
Timing Error Result of Modulation Analysis (Worst)	-----	WCDMA_TERR_WORST? seg	terror

Phase Discontinuity Results

Function	Command	Query	Response
Result of Phase Discontinuity	-----	WCDMA_PDISC? seg	count,data(0),data(1),…,data(count-1)
Carrier Frequency Error Result of Phase Discontinuity	-----	WCDMA_PDISC_CFERR? seg	count,fppm(0),fHz(0),fppm(1),fHz(1),…,fppm(count-1),fHz(count-1)
EVM Result of Phase Discontinuity	-----	WCDMA_PDISC_EVM? seg	count,evm(0),evm(1),…,evm(count-1)

Results

Function	Command	Query	Response
Result of Adjacent Channel Leakage Power Ratio	-----	WCDMA_ACLR? seg,mode	{avg(0),avg(1),avg(2),avg(3),max(0),max(1),max(2),max(3),min(0),min(1),min(2),min(3)}|{ aclr(0),aclr(1),aclr(2),aclr(3)}
Result of Filtered Power Measurement	-----	WCDMA_FILTPWR? seg,mode	{avg,max,min}|pwr|{s,pwr(1),pwr(2),…,pwr(s)}
Result of Occupied Bandwidth	-----	WCDMA_OBW? seg	bw
Result of Occupied Bandwidth Frequency	-----	WCDMA_OBWFREQ? seg,pos	freq
Judgement of Spectrum Emission Mask	-----	WCDMA_SEM? seg	judgement
Result of Spectrum Emission Mask (Lower)	-----	WCDMA_SEMLVL_LOWER? seg	band,freq(0),peak(0),freq(1),peak(1),freq(2),peak(2),freq(3),peak(3)
Result of Spectrum Emission Mask (Upper)	-----	WCDMA_SEMLVL_UPPER? seg	band,freq(0),peak(0),freq(1),peak(1),freq(2),peak(2),freq(3),peak(3)

Results (Cont'd)

Function	Command	Query	Response
Margin of Spectrum Emission Mask (Lower)	-----	WCDMA_SEMMARGIN_LOWER? seg	band,freq(0),peak(0),freq(1),peak(1),freq(2),peak(2),freq(3),peak(3)
Margin of Spectrum Emission Mask (Upper)	-----	WCDMA_SEMMARGIN_UPPER? seg	band,freq(0),peak(0),freq(1),peak(1),freq(2),peak(2),freq(3),peak(3)
Result of Tx Power Measurement	-----	WCDMA_TXPWR? seg,mode	{avg,max,min}|pwr|{s,pwr(1),pwr(2),…,pwr(s)}
Result of Peak Code Domain Error	-----	WCDMA_PCDE? seg,mode	{avg,max,min}|pcde

5.2 Details of Commands

Commands are detailed below in alphabetic 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
%	%	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 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	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 waveform pattern 10:

DLPAT PAT10

DLPAT?

> PAT10

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 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	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 waveform pattern 10:
DLPAT_SYNC PAT10
DLPAT_SYNC?
> PAT10

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 end event status register (measurement)
The event occurrence can be identified using the retrieved value.

Query

ESR2?

Response

register	Value = bit0 + bit1 + ... + bit7
bit0 = 2^0 = 1	End of measurement
bit1 = 2^1 = 2	Trigger prepartion 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)

Parameter

register	End event status register (measurement)
Range	0 to 255

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

ESR3?

Error Event Status (Measurement) Register Query

Function

Queries error event status register (measurement)
The event occurrence can be identified using the retrieved value.

Query

ESR3?

Response

register	Value = bit0 + bit1 + ... + bit7
bit0 = 2^0 = 1	Level over
bit1 = 2^1 = 2	Level under
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)

Parameter

register	Error event status register (measurement)
Range	0 to 255

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

Enables the MU887000A RF signal output or queries the set status

Command

`LVL on_off`

Query

`LVL?`

Response

on_off

Parameter

on_off	Enabled the RF signal output
ON	Outputs the RF signal
OFF	Does not output the RF signal
Default	ON

Example of Use

To output RF signal at MU887000A connector:

LVL ON

LVL?

> ON

MEASSTOP

Measurement Stop

Function

Stops current measurement

Command

```
MEASSTOP
```

Example of Use

To stop current measurement:

MEASSTOP

MOD

Output Signal Modulation

Function

Enables modulation of MU887000A RF signal output or queries set status

Command

```
MOD on_off
```

Query

```
MOD?
```

Response

on_off

Parameter

on_off	Enables RF signal modulation
ON	Turns modulation off
OFF	Turns modulation on
Default	ON

Example of Use

To turn modulation on:

MOD ON

MOD?

> ON

MSTAT?

Measurement Status

Function

Queries status of current measurement

Query

```
MSTAT?
```

Response

m_status

Parameter

m_status	Measurement status
0	Measurement completed normally
2	Over level
3	Under level
4	Measurement failed
5	Synchronization word not detected
9	Measurement in progress or not executed
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 MX887011A is 0, 2, 5, 9, or 12.

Example of Use

To query current measurement status:
MSTAT?
> 0

PACKAGE

Waveform File Select

Function

Selects or queries 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 file1 from the waveform file 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 the 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 the 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 connector settings 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.

Example of Use

To set Test Port1 as RF signal input connector and Test Port2 as RF signal output connector:
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 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 measurement standard

Command

```
STDSEL std
```

Query

```
STDSEL?
```

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	

Example of Use

To switch the measurement standard to SEQUENCE:

STDSEL SEQUENCE

STDSEL?

> SEQUENCE

Remarks

To execute the measurement described here, set the parameter to WCDMA or SEQUENCE.

If this command is sent during measurement, measurement stops to prepare for the new standard.

Common hardware settings, such as Downlink Frequency and Input Level, can be set for each measurement standard.

SYSSEL

Application Select

Function

Sets or queries type of application software executing on MU887000A

Command

```
SYSSEL app
```

Query

```
SYSSEL?
```

Response

app

Parameter

app	Application software
CELLULAR	Cellular Application
SRW	SRW Application

Details

Set the parameter to CELLULAR and send the command before using the MX887011A.

Example of Use

To set the application software to CELLULAR:

SYSSEL CELLULAR
SYSSEL?
> CELLULAR

Remarks

When using the MX887011A, set the application to CELLULAR using the SYSSEL command, and then set the standard to measure using the STDSEL command.

SYST:LANG

Language Selection of Remote Command

Function

Switches language mode of remote control command

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 remote control command language mode to Native:

SYST:LANG NAT

SYST:LANG?

>NAT

5.2.2 Fundamental measurement commands

ACLR?

Result of Adjacent Channel Leakage Power Ratio

Function

Queries Adjacent Channel Leakage Power Ratio measurement result

Query

```
ACLR? mode
```

Response

When mode = TTL,
avg(0),avg(1),avg(2),avg(3),max(0),max(1),max(2),max(3),min(0),min(1),min(2),min(3)
When mode ≠ TTL,
aclr(0),aclr(1),aclr(2),aclr(3)

Unit	dB
Resolution	0.01

Parameter number	Frequency offset
0	–10 MHz
1	–5 MHz
2	+5 MHz
3	+10 MHz

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
aclr	Measurement result in specified Storage mode

Example of Use

To query average of ACLR measurement result:
ACLR? AVG
> -20.00,-21.00,-22.00,-23.00

ACLR_SET

ACLR Measurement Enable and Count

Function

Enables Adjacent Channel Leakage Power Ratio measurement and sets average number, or queries settings

Command

```
ACLR_SET on_off[,count]
```

Query

```
ACLR_SET?
```

Response

on_off, count

Parameters

on_off	Enables/disables measurement
ON	Executes the measurement
OFF	Does not execute the measurement
Default	OFF
count	Number of measurement
Range	1 to 200
Resolution	1
Default	1

Example of Use

To enable Adjacent Channel Leakage Power Ratio measurement and set the average number of average to 50:

ACLR_SET ON,50

ACLR_SET?

> ON,50

ALLMEASITEMS_OFF

Turn Off All Measurement Items

Function

Turns off all of fundamental measurement items

Command

```
ALLMEASITEMS_OFF
```

Details

The operation of this command is similar to turning off all the following command settings.
PWR_SET, OBW_SET, SEM_SET, ACLR_SET, MOD_SET, PCDE_SET, PDISC_SET, RCDE_SET

Example of Use

To set all measurements to off at one time:
ALLMEASITEMS_OFF

BAND

Frequency Band

Function

Sets or queries frequency band

Command

```
BAND FreqBand
```

Query

```
BAND?
```

Response

FreqBand

Parameter

FreqBand	Frequency Band	
NONE	NONE	
BAND1	Band1	1920 to 1980/2110 to 2170 MHz
BAND2	Band2	1850 to 1910/1930 to 1990 MHz
BAND3	Band3	1710 to 1785/1805 to 1880 MHz
BAND4	Band4	1710 to 1755/2110 to 2155 MHz
BAND5	Band5	824 to 849/869 to 894 MHz
BAND6	Band6	830 to 840/875 to 885 MHz
BAND7	Band7	2500 to 2570/2620 to 2690 MHz
BAND8	Band8	880 to 915/925 to 960 MHz
BAND9	Band9	1749.9 to 1784.9/1844.9 to 1879.9 MHz
BAND10	Band10	1710 to 1770/2110 to 2170 MHz
BAND11	Band11	1427.9 to 1447.9/1475.9 to 1495.9 MHz
BAND12	Band12	698 to 716/728 to 746 MHz
BAND13	Band13	777 to 787/746 to 756 MHz
BAND14	Band14	788 to 798/758 to 768 MHz
BAND19	Band19	830 to 845/875 to 890 MHz
BAND20	Band20	832 to 862/791 to 821 MHz
BAND21	Band21	1447.9 to 1462.9/1495.9 to 1510.9 MHz
BAND25	Band25	1850 to 1915 / 1930 to 1995 MHz
BAND26	Band26	814 to 849 / 859 to 894 MHz
Default	NONE	

Details

This command sets additional spectrum emission limits per frequency band as described in Section 5.9 of 3GPP TS34.121-1.

No additional requirement:

NONE, BAND1, BAND3, BAND6 to BAND9, BAND11, BAND19 to BAND21
Additional requirement specified in Table 5.9.1A:
BAND2, BAND4, BAND10, BAND25
Additional requirement specified in Table 5.9.1B:
BAND5, BAND26
Additional requirement specified in Table 5.9.1C:
BAND12 to BAND14
For the contents of Table 5.9.1A, 5.9.1B and 5.9.1C, refer to Table 2.4-2 “Additional Requirements for Frequency Bands II, IV, X and XXV”, Table 2.4-3 “Additional Requirements for Frequency Band V and XXVI”, and Table 2.4-4 “Additional Requirements for Frequency Bands XII, XIII, and XIV”.

Example of Use

To set the frequency band to BAND1:
BAND BAND1
BAND?
> BAND1

BER?

Bit Error Rate

Function

Queries bit error rate.

Query

```
BER? [format]
```

Response

rate

When <format> is omitted: (Error bit number/transmitted bit number)
When <format> is PER: (Error bit number/transmitted bit number ×100) [%]
When <format> is EXP: Exponential of (Error bit number/transmitted bit number)

Parameter

format	Format
PER	Percent
EXP	Exponential
rate	Bit Error Rate

Example of Use

Queries bit error rate.
BER?
> 0.0050
BER? PER
> 0.50
BER? EXP
> 5.00E-3

Remarks

When an error has occurred in the measurement (the response of MSTAT? is 5, 9, or 12) or before the measurement starts, the response is shown as below.

BER?	9.9999
BER? PER	999.99
BER? EXP	9.99E-10

BERCNT?

Bit Error Rate - Error Counts

Function

Queries error bit count.

Query

```
BERCNT?
```

Response

number

Parameter

number	Error bit number

Example of Use

To query error bit count.
BERCNT?
> 25

Remarks

When an error has occurred in the measurement (the response of MSTAT? is 5, 9, or 12) or before the measurement starts, the response is –1.

BER_LIMIT

Bit Error Rate - Upper Limit

Function

Sets or queries upper limit (%) at Bit Error Rate measurement.

Command

```
BER_LIMIT ratio
```

Query

```
BER_LIMIT?
```

Response

ratio

Unit	%

Parameter

ratio	Upper Limit
Range	0.0 to 100.0
Resolution	0.1
Default	10.0

Example of Use

To set upper limit of Bit Error Rate measurement to 10.0%.

BER_LIMIT 10

BER_LIMIT?

> 10.0

BER_MEAS

Bit Error Rate

Function

Enables Bit Error Rate measurement or queries setting.

Command

```
BER_MEAS on_off
```

Query

```
BER_MEAS?
```

Response

on_off

Parameter

on_off		Enables/disables measurement.
	ON	Enables measurement.
	OFF	Disables measurement.
	Default	OFF

Example of Use

To set Bit Error Rate measurement to On.

BER_MEAS ON

BER_MEAS?

> ON

BERPASS?

Bit Error Rate - Judgement

Function

Queries judgement results of bit error rate measurement.

Query

BERPASS?

Response

judgement

Parameter

judgement	Judgement results
PASS	Passed
FAIL	Failed
–	Not measured

Example of Use

Queries judgement results of bit error rate measurement.

BERPASS?

> PASS

Remarks

When an error has occurred in the measurement (the response of MSTAT? is 5, 9, or 12) or before the measurement starts, the response is '–'

BER_SAMPLE

Bit Error Rate - Number of Sample

Function

Sets or queries sample bit number at Bit Error Rate measurement.

Command

```
BER_SAMPLE number
```

Query

```
BER_SAMPLE?
```

Response

number

Parameter

number	Sample bit number
Range	1 to 73200
Resolution	1
Default	10000

Example of Use

To set sample bit number at Bit Error Rate measurement to 1000.

BER_SAMPLE 1000

BER_SAMPLE?

> 1000

BER_TFCI

TFCI Detection Mode

Function

Sets TFCI detection to Auto or Manual (fixed value) or queries setting.

Command

```
BER_TFCI mode
```

Query

```
BER_TFCI?
```

Response

mode

Parameter

mode	Detection mode
AUTO	TFCI = 2 or 3 Auto detect
FIX2	TFCI = 2 fixed
FIX3	TFCI = 3 fixed
Default	AUTO

Example of Use

To set TFCI detection to Auto.

BER_TFCI AUTO

BER_TFCI?

> AUTO

BERTRANSMIT?

Bit Error Rate - Transmitted bits

Function

Queries transmitted bit number.

Query

```
BERTRANSMIT?
```

Response

number

Parameter

number	Transmitted bit number

Example of Use

To query transmitted bit number.
BERTRANSMIT?
> 6000

Remarks

When an error has occurred in the measurement (the response of MSTAT? is 5, 9, or 12) or before the measurement starts, the response is –1.

BLER?

Block Error Rate

Function

Queries block error rate.

Query

```
BLER? [format]
```

Response

rate

When <format> is omitted: (Error block number/transmitted block number)

When <format> is PER: (Error block number/transmitted block number ×100) [%]

When <format> is EXP: Exponential of (Error block number/transmitted block number)

Parameter

format	Format
PER	Percent
EXP	Exponential
rate	Block Error Rate

Example of Use

To query block error rate.

BLER?

> 0.0600

BLER? PER

> 6.00

BLER? EXP

> 6.00E-2

Remarks

When an error has occurred in the measurement (the response of MSTAT? is 5, 9, or 12) or before the measurement starts, the response is shown as below.

BLER?	9.9999
BLER? PER	999.99
BLER? EXP	9.99E-10

BLERCNT?

Block Error Rate - Error Counts

Function

Queries error block number.

Query

```
BLERCNT?
```

Response

number

Parameter

number	Error block number

Example of Use

To query error block number.
BLERCNT?
> 12

Remarks

When an error has occurred in the measurement (the response of MSTAT? is 5, 9, or 12) or before the measurement starts, the response is –1.

BLER_LIMIT

Block Error Rate - Upper Limit

Function

Sets or queries upper limit (%) at Block Error Rate measurement.

Command

```
BLER_LIMIT ratio
```

Query

```
BLER_LIMIT?
```

Response

ratio

Parameter

ratio	Upper Limit
Range	0.0 to 100.0
Resolution	0.1
Default	10.0

Example of Use

To set upper limit of Block Error Rate measurement to 10.0%.

BLER_LIMIT 10

BLER_LIMIT?

> 10.0

BLER_MEAS

Block Error Rate

Function

Enables Block Error Rate measurement or queries setting.

Command

```
BLER_MEAS on_off
```

Query

```
BLER_MEAS?
```

Response

on_off

Parameter

on_off	Enables/disables measurement.
ON	Enables measurement.
OFF	Disables measurement.
Default	OFF

Example of Use

To set Block Error Rate measurement to On.

BLER_MEAS ON

BLER_MEAS?

> ON

BLERPASS?

Block Error Rate - Judgement

Function

Queries judgement results of Block Error Rate measurement.

Query

BLERPASS?

Response

judgment

Parameter

judgement	Judgement results
PASS	Passed
FAIL	Failed
–	Not measured

Example of Use

To query judgement results of Block Error Rate measurement.

BLERPASS?

> PASS

Remarks

When an error has occurred in the measurement (the response of MSTAT? is 5, 9, or 12) or before the measurement starts, the response is '–'.

BLER_SAMPLE

Block Error Rate - Number of Sample

Function

Sets or queries sample block number at Block Error Rate measurement.

Command

```
BLER_SAMPLE number
```

Query

```
BLER_SAMPLE?
```

Response

number

Parameter

number	Sample block number
Range	1 to 300
Resolution	1
Default	50

Example of Use

To set sample block number of Block Error Rate measurement to 50.

BLER_SAMPLE 50

BLER_SAMPLE?

> 50

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Native Command Reference

BLERTRANSMIT?

Block Error Rate - Transmitted bits

Function

Queries transmitted block number.

Query

`BLERTRANSMIT?`

Response

number

Parameter

number	Transmitted block number

Example of Use

To query transmitted block number.

BLERTRANSMIT?

> 300

Remarks

When an error has occurred in the measurement (the response of MSTAT? is 5, 9, or 12) or before the measurement starts, the response is –1.

CFERR?

Carrier Frequency Error Result of Modulation Analysis

Function

Queries Carrier Frequency Error measurement result

Query

```
CFERR? mode
```

Response

When mode = TTL,
avg_ppm,avg_Hz,max_ppm,max_Hz,min_ppm,min_Hz
When mode ≠ TTL,
freq_ppm,freq_Hz

Unit	ppm, Hz
Resolution	0.01, 0.1

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg_ppm	Average of Frequency Error measurement results ppm
Resolution	0.01
avg_Hz	Average of Frequency Error measurement results Hz
Resolution	0.1
max_ppm	Maximum value in Frequency Error measurement result in ppm
Resolution	0.01
max_Hz	Maximum value in Frequency Error measurement results in Hz
Resolution	0.1
min_ppm	Minimum value in Frequency Error measurement results in ppm
Resolution	0.01
min_Hz	Minimum value in Frequency Error measurement results in Hz
Resolution	0.1
freq_ppm	Frequency Error measurement results in specified Storage mode in ppm
Resolution	0.01
freq_Hz	Frequency Error measurement results in specified Storage mode in Hz
Resolution	0.1

Example of Use

To query average of Frequency Error measurement results:

CFERR? AVG

> 0.03,60.0

CFERR_WORST?

Carrier Frequency Error Result of Modulation Analysis (Worst)

Function

Queries worst value in Carrier Frequency Error measurement results

Query

```
CFERR_WORST?
```

Response

freq_ppm,freq_Hz

Unit	ppm, Hz
Resolution	0.01, 0.1

Parameters

freq_ppm	Worst value in Frequency Error measurement results in ppm
Resolution	0.01
freq_Hz	Worst value in Frequency Error measurement results in Hz
Resolution	0.1

Example of Use

To query worst value in Frequency Error measurement results:

CFERR_WORST?

> 0.03,60.0

CFREQ?

Carrier Frequency Result of Modulation Analysis

Function

Queries Carrier Frequency measurement result

Query

```
CFREQ?
```

Response

freq

Unit	Hz
Resolution	1

Parameter

freq	Carrier frequency
Resolution	1

Example of Use

To query Carrier Frequency measurement result:

CFREQ?

> 1951000000

DLCHAN

Downlink Channel

Function

Sets or queries EARFCN (E-UTRA Absolute Radio Frequency Channel Number) to Downlink Channel

Command

```
DLCHAN dl_ch
```

Query

```
DLCHAN?
```

Response

dl_ch

Parameter

dl_ch	Downlink Channel
Range	412, 437, 462, 487, 512, 537, 562, 587, 612, 637, 662, 687, 712 to 763, 787, 812, 837, 862 to 912, 1007, 1012, 1032, 1037, 1062, 1087, 1100 to 13500
Default	10688

Details

Changing the Downlink Channel parameter, also changes the related Uplink Channel, Downlink Frequency and Uplink Frequency parameters.
For the relationship between the parameter and channel frequency settings, refer to "Uplink Channel, Downlink Channel" in section 2.1.6 "W-CDMA signal setting" and Table 2.1.6-2 "E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation".

Example of Use

To set the downlink channel 1100:
DLCHAN 1100
DLCHAN?
> 1100

DLFREQ

Downlink Frequency

Function

Sets or queries MU887000A downlink frequency

Command

```
DLFREQ dl_freq
```

Query

```
DLFREQ?
```

Response

dl_freq

Unit	Hz

Parameter

dl_freq	Downlink frequency
Range	400.000000 to 3800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz omitted)
Default	2137.600000 MHz

Details

The Rx frequency is set for the mobile station.

Changing the setting of the 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

DPCCHCDP?

Result of Code Domain Power of DPCCH

Function

Queries Code Domain Power measurement result for DPCCH

Query

```
DPCCHCDP? mode
```

Response

cdp

Unit	dB
Resolution	0.01

Parameter

mode	Storage mode
AVG	Average
cdp	Code Domain Power

Example of Use

To query average of Code Domain Power measurement result for DPCCH:

DPCCHCDP? AVG

> 1.55

DPCCHECDP?

Result of Effective Code Domain Power of DPCCH

Function

Queries Effective Code Domain Power measurement result for DPCCH

Query

```
DPCCHECDP? mode
```

Response

ecdp

Unit	dB
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
ecdp	Effective Code Domain Power

Example of Use

To query average of Effective Code Domain Power measurement result for DPCCH:

DPCCHECDP? AVG

> 1.55

DPCCHRCDE?

Result of Relative Code Domain Error of DPCCH

Function

Queries Relative Code Domain Error measurement result for DPCCH

Query

```
DPCCHRCDE? mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
rcde

Unit	dB
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation DVTStandard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
rcde	Measurement result in specified Storage mode

Example of Use

To query average of Relative Code Domain Error measurement result for DPCCH:
DPCCHRCDE? AVG
> 1.50

DPDCHCDP?

Result of Code Domain Power of DPDCH

Function

Queries DPDCH Code Domain Power measurement result

Query

```
DPDCHCDP? mode
```

Response

cdp

Unit	dB
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
cdp	Code Domain Power

Example of Use

To query average of DPDCH Code Domain Power measurement result

DPDCHCDP? AVG

> 1.50

DPDCHECDP?

Result of Effective Code Domain Power of DPDCH

Function

Queries Effective Code Domain Power measurement result for DPDCH

Query

```
DPDCHECDP? mode
```

Response

ecdp

Unit	dB
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
ecdp	Effective Code Domain Power

Example of Use

To query average of Effective Code Domain Power measurement result for DPDCH:

DPDCHECDP? AVG

> 1.50

DPDCHRCDE?

Result of Relative Code Domain Error of DPDCH

Function

Queries Relative Code Domain Error measurement result for DPDCH

Query

```
DPDCHRCDE? mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
rcde

Unit	dB
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
rcde	Measurement result in specified Storage mode

Example of Use

To query average of Relative Code Domain Error measurement result for DPDCH:
DPDCHRCDE? AVG
> 1.50

DTCHPAT

DTCH Data Pattern

Function

Sets or queries DTCH data pattern.

Command

```
DTCHPAT pattern
```

Query

```
DTCHPAT?
```

Response

pattern

Parameter

pattern	Data Pattern
ALL1	All "1"s

Example of Use

To set DTCH data pattern to ALL1.

DTCHPAT ALL1

DTCHPAT?

> ALL1

EDPCCHCDP?

Result of Code Domain Power of E-DPCCH

Function

Queries E-DPCCH Code Domain Power measurement result

Query

```
EDPCCHCDP? mode
```

Response

cdp

Unit	dB
Resolution	0.01

Parameter

mode	Storage mode
AVG	Average
cdp	Code Domain Power
Resolution	0.01

Example of Use

To query average of E-DPCCH Code Domain Power measurement result:

EDPCCHCDP? AVG

> 1.50

EDPCCHECDP?

Result of Effective Code Domain Power of E-DPCCH

Function

Queries Effective Code Domain Power measurement result for E-DPCCH

Query

```
EDPCCHECDP? mode
```

Response

ecdp

Unit	dB
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
ecdp	Effective Code Domain Power

Example of Use

To query average of Effective Code Domain Power measurement result for E-DPCCH:

EDPCCHECDP? AVG

> 1.50

EDPCCHRCDE?

Result of Relative Code Domain Error of E-DPCCH

Function

Queries Relative Code Domain Error measurement result for E-DPCCH

Query

```
EDPCCHRCDE? mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
rcde

Unit	dB
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
rcde	Measurement result in specified Storage mode

Example of Use

To query average of Relative Code Domain Error measurement result for E-DPCCH:
EDPCCHRCDE? AVG
> 1.50

EDPDCHCDP?

Result of Code Domain Power of E-DPDCH

Function

Queries E-DPDCH Code Domain Power measurement result

Query

```
EDPDCHCDP? no,mode
```

Response

cdp

Unit	dB
Resolution	0.01

Parameters

no	E-DPDCH channel number
Range	1 to 4
Resolution	1
mode	Storage mode
AVG	Average
cdp	Code Domain Power

Example of Use

To query average of E-DPDCH Code Domain Power measurement result for E-DPDCH channel number 1:

EDPDCHCDP? 1,AVG

> 1.50

EDPDCHECDP?

Result of Effective Code Domain Power of E-DPDCH

Function

Queries Effective Code Domain Power measurement result for E-DPDCH

Query

`EDPDCHECDP? no,mode`

Response

ecdp

Unit	dB
Resolution	0.01

Parameters

no	E-DPDCH channel number
Range	1 to 4
Resolution	1
mode	Storage mode
AVG	Average
ecdp	Effective Code Domain Power

Example of Use

To query average of Effective Code Domain Power measurement result for E-DPDCH channel number 1:

EDPDCHECDP? 1,AVG

> 1.50

EDPDCHRCDE?

Result of Relative Code Domain Error of E-DPDCH

Function

Queries Relative Code Domain Error measurement result for E-DPDCH

Query

```
EDPDCHRCDE? no,mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
rcde

Unit	dB
Resolution	0.01

Parameters

no	E-DPDCH channel number
Range	1 to 4
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
rcde	Measurement result in specified Storage mode

Example of Use

To query average of Relative Code Domain Error measurement result for E-DPDCH:
EDPDCHRCDE? 1,AVG
> 1.50

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Native Command Reference

EVM?

EVM Result of Modulation Analysis

Function

Queries EVM measurement result

Query

`EVM? mode`

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
evm

Unit	%
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
evm	Measurement result in specified Storage mode

Example of Use

To query average of EVM measurement result:
EVM? AVG
> 1.50

FASTPWRMODE

Fast Power Measurement Mode

Function

Enables Fast Power Measurement mode or queries setting.

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

When Fast Power Measurement mode is On, measurement of other than Tx power or RRC filtered power is not available.
Use the following command to enable/disable power measurement and to set measuring times.
PWR_SET

Use the following command to set either Tx power or filtered power for measurement.
FASTPWR_RRC

Example of Use

To set Fast Power Measurement mode to On.
FASTPWRMODE ON
FASTPWRMODE?
> ON

FASTPWR_RRC

Fast Power Measurement Mode - RRC filter

Function

Sets either RRC filter power or Tx power to measure in Fast Power Measurement mode or queries setting.

Command

```
FASTPWR_RRC on_off
```

Query

```
FASTPWR_RRC?
```

Response

on_off

Parameter

on_off	Enables/disables measurement of RRC filter power.
ON	Enables measurement of RRC filter power.
OFF	Enables Tx Power measurement.
Default	OFF

Example of Use

To set RRC filter power measurement in Fast Power Measurement mode.

FASTPWR_RRC ON

FASTPWR_RRC?

> ON

FILTPWR?

Result of Filtered Power Measurement

Function

Queries RRC Filtered Power measurement result

Query

```
FILTPWR? mode
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT
pwr
When mode = IND,
s,pwr(1),pwr(2),...,pwr(s)

Unit	dBm
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	Individual measurement result
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pwr	Measurement result in specified Storage mode
pwr(s)	Measurement result at sth slot
s	Measurement count
Range	1 to 200

Example of Use

To query average of RRC Filtered Power measurement result:
FILTPWR? AVG
> -20.00

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Native Command Reference

HSDPCCHCDP?

Result of Code Domain Power of HS-DPCCH

Function

Queries HS-DPCCH Code Domain Power measurement result

Query

```
HSDPCCHCDP? mode
```

Response

cdp

Unit	dB
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
cdp	Code Domain Power

Example of Use

To query average of HS-DPCCH Code Domain Power measurement result:

HSDPCCHCDP? AVG

> 1.50

HSDPCCHECDP?

Result of Effective Code Domain Power of HS-DPCCH

Function

Queries Effective Code Domain Power measurement result for HS-DPCCH

Query

```
HSDPCCHECDP? mode
```

Response

ecdp

Unit	dB
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
ecdp	Effective Code Domain Power

Example of Use

To query average of Effective Code Domain Power measurement result for HS-DPCCH:

HSDPCCHECDP? AVG

> 1.50

HSDPCCHRCDE?

Result of Relative Code Domain Error of HS-DPCCH

Function

Queries Relative Code Domain Error measurement result for HS-DPCCH

Query

```
HSDPCCHRCDE? mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
rcde

Unit	dB
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
rcde	Measurement result in specified Storage mode

Example of Use

To query average of Relative Code Domain Error measurement result for HS-DPCCH:
HSDPCCHRCDE? AVG
> 1.50

ILPC_MEAS

Inner Loop Power Control Parameter (Auto) - Method

Function

Sets the measurement method (Step) for the Inner Loop Power Control (Auto) measurement.

Command

```
ILPC_MEAS auto
```

Query

```
ILPC_MEAS?
```

Response

auto

Parameter

auto	Measurement method (Step)
AUTO_EF	Auto (Step E to F)
Default	AUTO_EF

Example of Use

To set the measurement method for the Inner Loop Power Control measurement to Auto (Step E to F):

ILPC_MEAS AUTO_EF
ILPC_MEAS?
>AUTO_EF

ILPC_MAXPWR?

Inner Loop Power Control (Auto) maximum power

Function

Queries the maximum power in the Inner Loop Power Control (Auto) measurement.

Query

```
ILPC_MAXPWR?
```

Response

power

Unit	dBm

Parameter

power	Maximum power
Resolution	0.01 dB

Example of Use

To query the maximum power in the Inner Loop Power Control (Auto) measurement:

ILPC_MAXPWR?

> -10.00

ILPC_MINPWR?

Inner Loop Power Control (Auto) minimum power

Function

Queries the minimum power in the Inner Loop Power Control (Auto) measurement.

Query

```
ILPC_MINPWR?
```

Response

power

Unit	dBm

Parameter

power	Minimum power
Resolution	0.01 dB

Example of Use

To query the minimum power in the Inner Loop Power Control (Auto) measurement:

ILPC_MINPWR?

> -10.0

ILPC_PASS?

Inner Loop Power Control (Auto) - Judgement

Function

Queries judgement of the result for Inner Loop Power Control measurement.

Query

```
ILPC_PASS? step
```

Response

judgement

Parameter

step	Step
ALL	Step E, Step F
E	Step E
F	Step F
judgement	Judgement result
PASS	Passed
FAIL	Failed
–	Not measured

Example of Use

To query all the judgement results of the Inner Loop Power Control (Auto) measurement:

ILPC_PASS? ALL

> PASS,PASS

ILPC_PWR?

Slot Power List - Slot Level

Function

Queries the measured result (level) of each slot in the step E or F specified by the Inner Loop Power Control (Auto) measurement.

Query

```
ILPC_PWR? step[,<slot>]
```

Response

l[0],l[1],..,l[max_slot_number]

Unit	dBm

Parameter

step	Target step
E	Step E
F	Step F
slot	Registered slot number
ALL	ALL
l[max_slot_number]	Power
Resolution	0.01 dB

Example of Use

To query the level at the step E and All slot in Inner Loop Power Control (Auto) measurement:

ILPC_PWR? E,ALL

> -10.24,-10.25,-10.26,-10.26,-10.25,,,,

ILVL

Input Level

Function

Sets or queries input level of MU887000A connector

Command

`ILVL level`

Query

`ILVL?`

Response

level

Unit	dBm

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	–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.

Example of Use

To set the output level 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*.

IQIMB?

IQ Imbalance Result of Modulation Analysis

Function

Queries IQ Imbalance measurement result

Query

```
IQIMB? mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
iqimb

Unit	%
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
iqimb	Measurement result in specified Storage mode

Example of Use

To query average of IQ Imbalance measurement result:
IQIMB? AVG
> 0.04

Remarks

When the measurement target is QPSK, the results are returned with either I or Q value, whichever has a bigger gain, as Q axis.

LSCODESEARCH

Long Span Code Search

Function

Enables Long Span Search or queries setting

Command

```
LSCODESEARCH on_off
```

Query

```
LSCODESEARCH?
```

Response

on_off

Parameter

on_off	EnablesLong Span Code Search
ON	Enables Long Span Code Search
OFF	Disables Long Span Search
Default	OFF

Details

Measurement takes more time when the Long Span Search function is on.
Set this parameter to OFF when the uplink and downlink signals are synchronized; set it to ON when they are not synchronized.

Example of Use

To enable Long Span Search:
LSCODESEARCH ON
LSCODESEARCH?
> ON

MAGERR?

Magnitude Error Result of Modulation Analysis

Function

Queries Magnitude Error measurement result

Query

```
MAGERR? mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
mevm

Unit	%
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
merr	Measurement result in specified Storage mode

Example of Use

To query average of Magnitude Error measurement result:
MAGERR? AVG
> 1.05

MEASSEL

Measurement Select

Function

Sets or queries measurement functions.

Command

```
MEASSEL meassel
```

Query

```
MEASSEL?
```

Response

meassel

Parameter

meassel	Measurement function
FMEAS	Fundamental Measurement
ILPC	Inner Loop Power Control
Default	FMEAS

Example of Use

To set the measurement function to Fundamental Measurement:

MEASSEL FMEAS

MEASSEL?

> FMEAS

MOD_SET

Modulation Analysis Measurement Enable and Count

Function

Enables Modulation Analysis measurement and sets measurement count, or queries settings

Command

```
MOD_SET on_off[,count]
```

Query

```
MOD_SET?
```

Response

on_off, count

Parameters

on_off	Enables/disables measurement
ON	Enables Modulation Analysis measurement
OFF	Disables Modulation Analysis measurement
Default	OFF
count	Measurement count
Range	1 to 200
Resolution	1
Default	1

Example of Use

To enable Modulation Analysis measurement and set average number to 120:

MOD_SET ON,120

MOD_SET?

> ON,120

OBW?

Result of Occupied Bandwidth

Function

Queries Occupied Bandwidth measurement result

Query

`OBW?`

Response

bw

Unit	MHz
Resolution	0.001

Parameter

bw	Occupied Bandwidth [MHz]

Example of Use

To query Occupied Bandwidth measurement result:

OBW?

> 3.840

OBWFREQ?

Result of Occupied Bandwidth Frequency

Function

Queries upper, lower and center frequency of Occupied Bandwidth measurement

Query

```
OBWFREQ? pos
```

Response

freq

Unit	MHz
Resolution	0.001

Parameters

pos	Frequency position
UPPER	Upper frequency
LOWER	Lower frequency
CENTER	Center frequency
freq	Frequency [MHz]

Example of Use

To query upper frequency of Occupied Bandwidth:

OBWFREQ? UPPER

> 1951.920

OBW_RATIO

Occupied Bandwidth Ratio

Function

Sets Occupied Bandwidth measurement occupation ratio in Sequence Measurement mode, or queries 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	%
Default	99.0

Example of Use

To set the Occupied Bandwidth occupation ratio to 95.0%:

OBW_RATIO 95.0

OBW_RATIO?

> 95.0

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
Resolution	1
Default	1

Example of Use

To enable Occupied Bandwidth measurement and set the measurement count to 100:

OBW_SET ON,100

OBW_SET?

> ON,100

OLVL

Output Level

Function

Sets or queries RF signal total output level for all channels

Command

```
OLVL level
```

Query

```
OLVL?
```

Response

level

Unit	dBm

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
Suffix code	DBM (uses dBm when omitted)
Default	–65.7 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*.

ORGNOFS?

Origin Offset Result of Modulation Analysis

Function

Queries Origin Offset measurement result

Query

```
ORGNOFS? mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
orgnoffs

Unit	dB
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
orgnoffs	Measurement result in specified Storage mode

Example of Use

To query average of Origin Offset measurement result:
ORGNOFS? AVG
> 0.04

PCDE?

Result of Peak Code Domain Error

Function

Queries Peak Code Domain Error measurement result

Query

```
PCDE? mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
pcde

Unit	dB
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Min. value
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pcde	Measurement result in specified Storage mode

Example of Use

To query average of Peak Code Domain Error measurement result:
PCDE? AVG
> 0.08

PCDE_SET

Peak Code Domain Error Measurement Enable and Count

Function

Enables Peak Code Domain Error measurement and sets measurement count, or queries settings

Command

```
PCDE_SET on_off[,count]
```

Query

```
PCDE_SET?
```

Response

on_off, count

Parameters

on_off	Enables/disables measurement
ON	Turns measurement on
OFF	Turns measurement off
count	Measurement count
Range	1 to 200
Resolution	1
Default	1

Example of Use

To turn the Peak Code Domain Error measurement on and set the measurement count to 150:

PCDE_SET ON,150

PCDE_SET?

> ON,150

PDISC?

Result of Phase Discontinuity

Function

Queries Phase Discontinuity measurement result

Query

```
PDISC?
```

Response

count,data(0),data(1),data(2),…,data(count–1)

Unit	degree
Resolution	0.01

Parameters

count	Measurement count
data(count–1)	Phase difference from previous time slot

Example of Use

To query Phase Discontinuity measurement result:

PDISC?

> 2,1.51,1.53

PDISC_CFERR?

Carrier Frequency Error Result of Phase Discontinuity

Function

Queries Carrier Frequency Error measurement result for Phase Discontinuity

Query

```
PDISC_CFERR?
```

Response

count,fppm(0),fHz(0),fppm(1),fHz(1),…,fppm(count–1),fHz(count–1)

Unit	ppm, Hz
Resolution	0.01, 0.1

Parameters

count	Measurement count
Range	1 to 100
fppm(0) to fppm(count–1)	Frequency error in ppm
Resolution	0.01
fHz(0) to fHz(count–1)	Frequency error in Hz
Resolution	0.1

Example of Use

To query Carrier Frequency Error measurement result for Phase Discontinuity:
PDISC_CFERR?
> 2,0.08,0.2,0.09,0.4

PDISC_EVM?

EVM Result of Phase Discontinuity

Function

Queries EVM measurement result at Phase Discontinuity measurement result

Query

```
PDISC_EVM?
```

Response

count,evm(0),evm(1),…,evm(count–1)

Unit	%
Resolution	0.01

Parameters

count	Measurement count
Range	1 to 100
evm(0) to evm(count–1)	EVM

Example of Use

To query EVM of Phase Discontinuity measurement result:

PDISC_EVM?

> 2,1.51,1.53

PDISC_SET

Phase Discontinuity Measurement Enable and Count

Function

Enables Phase Discontinuity measurement and sets measurement count, or queries settings

Command

```
PDISC_SET on_off[,count]
```

Query

```
PDISC_SET?
```

Response

on_off, count

Parameters

on_off	Enables/disables measurement
ON	Enable measurement
OFF	Disables measurement
Default	OFF
count	Measurement count
Range	1 to 100
Resolution	1
Default	1

Example of Use

To enable Phase Discontinuity measurement and set the measurement count to 50:

PDISC_SET ON,50

PDISC_SET?

> ON,50

PEVM?

Peak EVM Result of Modulation Analysis

Function

Queries EVM Peak measurement result

Query

```
PEVM? mode
```

Response

When mode = TTL,

avg,max,min

When mode ≠ TTL,

pevm

Unit	%
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pevm	Measurement result in specified Storage mode

Example of Use

To query average of EVM Peak measurement result:

PEVM? AVG

> 1.75

PHASEERR?

Phase Error Result of Modulation Analysis

Function

Queries Phase Error measurement result

Query

```
PHASEERR? mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
perr

Unit	degree
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Min. value
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
perr	Measurement result in specified Storage mode

Example of Use

To query average of Phase Error measurement result:
PHASEERR? AVG
> 1.55

PWRRATIO?

Power Ratio Result of Modulation Analysis

Function

Queries DPCCH/DPDCH Power Ratio measurement result

Query

```
PWRRATIO? mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
powerratio

Unit	dB
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
powerratio	Measurement result in specified Storage mode

Example of Use

To query average of DPCCH/DPDCH Power Ratio measurement result:
PWRRATIO? AVG
> 0.08

PWR_SET

Tx Power Measurement Enable and Count

Function

Enables Tx Power measurement and sets measurement count, or queries settings

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
Resolution	1
Default	1

Example of Use

To enable Transmit Power measurement and set the average number to 10:

PWR_SET ON,10

PWR_SET?

> ON,10

RCDE_SET

Relative Code Domain Error Measurement Enable and Count

Function

Enables Relative Code Domain Error measurement and sets measurement count, or queries settings

Command

```
RCDE_SET on_off[,count]
```

Query

```
RCDE_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
Default	1

Example of Use

To enable Relative Code Domain Error measurement and set the measurement count to 200:

RCDE_SET ON,200

RCDE_SET?

> ON,200

RXFREQ

Downlink Frequency

Function

Sets or queries MU887000A downlink frequency

Command

```
RXFREQ dl_freq
```

Query

```
RXFREQ?
```

Response

dl_freq

Parameter

dl_freq	Downlink frequency
Range	400.000000 to 3800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz omitted)
Default	2137.600000 MHz

Details

The Rx frequency is set for the mobile station.
Changing the setting of the 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

SCRCODE

Scrambling Code Number

Function

Sets Scrambling Code Number or queries setting

Command

```
SCRCODE code
```

Query

```
SCRCODE?
```

Response

code

Parameter

code	Scrambling Code Number
Range	000000 to FFFFFF (Hexadecimal)
Resolution	1
Default	000000

Example of Use

To set Scrambling Code Number to 271F:

SCRCODE 271F

SCRCODE?

> 271F

SEM?

Judgement of Spectrum Emission Mask

Function

Queries whether spectrum threshold set at spectrum measurement exceeded or not

Query

```
SEM?
```

Response

judgement

Parameter

judgement	Judgement result
PASS	Passed (below threshold)
FAIL	Failed (above threshold)
–	No measurement

Example of Use

To query whether spectrum threshold set at spectrum measurement exceeded or not:

SEM?

> PASS

SEM_LLIMIT

Spectrum Emission Mask - Mask Template Lower Limit

Function

Sets absolute level threshold (minimum threshold power) for Spectrum Emission Mask and queries settings

Command

```
SEM_LLIMIT level
```

Query

```
SEM_LLIMIT?
```

Response

level

Unit	dBm

Parameter

level	Template threshold
Range	–100.0 to 0.0 /3.84 MHz
Resolution	0.1 dBm
Default	–50.0 dBm

Example of Use

To set the absolute level threshold (minimum threshold power) for Spectrum Emission Mask measurement to –55.0 dBm:

SEM_LLIMIT -55.0
SEM_LLIMIT?
> -55.0

SEMLVL_LOWER?

Result of Spectrum Emission Mask (Lower)

Function

Queries peak level and frequency of spectrum in each lower frequency range of Spectrum Emission Mask

Query

```
SEMLVL_LOWER?
```

Response

band,freq(0),peak(0),freq(1),peak(1),freq(2),peak(2),freq(3),peak(3)

band:	Target band
freq(n):	Offset frequency of spectrum peak
Resolution	0.001 MHz
peak(n):	Peak level of spectrum
Resolution	0.01 dB

Parameters

band	Target band
Range	0 to 14, 19 to 21
freq(0)	Offset frequency of spectrum peak in offset frequency range from –2.5 to –3.5 MHz
peak(0)	Peak level of spectrum in offset frequency range from –2.5 to –3.5 MHz
freq(1)	Offset frequency of spectrum peak in offset frequency range from –3.5 to –7.5 MHz
peak(1)	Peak level of spectrum in offset frequency range from –3.5 to –7.5 MHz
freq(2)	Offset frequency of spectrum peak in offset frequency range from –7.5 to –8.5 MHz
peak(2)	Peak level of spectrum in offset frequency range from –7.5 to –8.5 MHz
freq(3)	Offset frequency of spectrum peak in offset frequency range below –8.5 MHz
peak(3)	Peak level of spectrum in offset frequency range below –8.5 MHz

Example of Use

To query spectrum peak level and frequency at lower side of each frequency range:

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

SEMLVL_UPPER?

Result of Spectrum Emission Mask (Upper)

Function

Queries peak level and frequency of spectrum in each upper frequency range of Spectrum Emission Mask

Query

```
SEMLVL_UPPER?
```

Response

band,freq(0),peak(0),freq(1),peak(1),freq(2),peak(2),freq(3),peak(3)

band:	Target band
freq(n):	Offset frequency of spectrum peak
Resolution	0.001 MHz
peak(n):	Peak level of spectrum
Resolution	0.01 dB

Parameters

band	Target band
Range	0 to 14, 19 to 21
freq(0)	Offset frequency of spectrum peak in offset frequency range from +2.5 to +3.5 MHz
peak(0)	Peak level of spectrum in offset frequency range from +2.5 to +3.5 MHz
freq(1)	Offset frequency of spectrum peak in offset frequency range from +3.5 to +7.5 MHz
peak(1)	Peak level of spectrum in offset frequency range from +3.5 to +7.5 MHz
freq(2)	Offset frequency of the spectrum peak in the offset frequency range from +7.5 to +8.5 MHz
peak(2)	Peak level of spectrum in offset frequency range from +7.5 to +8.5 MHz
freq(3)	Offset frequency of spectrum peak in offset frequency range above +8.5 MHz
peak(3)	Peak level of spectrum in offset frequency range above +8.5 MHz

Example of Use

To query spectrum peak level and frequency at upper side of each frequency range:
SEMLVL_UPPER?
> 1,3.000,-20.00,5.000,-30.00,8.000,-40.00,9.500,-50.00

SEMMARGIN_LOWER?

Margin of Spectrum Emission Mask (Lower)

Function

Queries spectrum margin and offset frequency in each lower frequency range of Spectrum Emission Mask

Query

```
SEMMARGIN_LOWER?
```

Response

band, freq(0), peak(0), freq(1), peak(1), freq(2), peak(2), freq(3), peak(3)

band:	Target band
freq(n):	Offset frequency at point where margin determined
Resolution	0.001 MHz
peak(n):	Margin from template
Resolution	0.01 dB

Parameters

band	Target band
Range	0 to 14, 19 to 21
freq(0)	Offset frequency at point where margin determined in offset frequency range from –2.5 to –3.5 MHz
peak(0)	Margin in offset frequency range from –2.5 to –3.5 MHz
freq(1)	Offset frequency at point where margin determined offset frequency range from –3.5 to –7.5 MHz
peak(1)	Margin in offset frequency range from –3.5 to –7.5 MHz
freq(2)	Offset frequency at point margin determined in offset frequency range from –7.5 to –8.5 MHz
peak(2)	Margin in offset frequency range from –7.5 to –8.5 MHz
freq(3)	Offset frequency at point where margin determined in offset frequency range below –8.5 MHz
peak(3)	Margin in offset frequency range below –8.5 MHz

Example of Use

To query margin from Spectrum Emission Mask template and frequency at lower side of each frequency range:

SEMMARGIN_LOWER?

> 1,-3.000,3.00,-5.000,3.00,-8.000,3.00,-9.500,3.00

SEMMARGIN_UPPER?

Margin of Spectrum Emission Mask (Upper)

Function

Queries spectrum margin and offset frequency in each upper frequency range of Spectrum Emission Mask

Query

```
SEMMARGIN_UPPER?
```

Response

band, freq(0), peak(0), freq(1), peak(1), freq(2), peak(2), freq(3), peak(3)

band:	Target band
freq(n):	Offset frequency at the point on which the margin is determined
Resolution	0.001 MHz
peak(n):	Margin from the template
Resolution	0.01 dB

Parameter

band	Target band
Range	0 to 14, 19 to 21
<freq(0)>	Offset frequency at point where margin determined in offset frequency range from +2.5 to +3.5 MHz
<peak(0)>	Margin in offset frequency range from +2.5 to +3.5 MHz
<freq(1)>	Offset frequency at point where margin determined in offset frequency range from +3.5 to +7.5 MHz
<peak(1)>	Margin in offset frequency range from +3.5 to +7.5 MHz
<freq(2)>	Offset frequency at point where margin determined in offset frequency range from +7.5 to +8.5 MHz
<peak(2)>	Margin in offset frequency range from +7.5 to +8.5 MHz
<freq(3)>	Offset frequency at point where margin determined in offset frequency range above +8.5 MHz
<peak(3)>	Margin in offset frequency range above +8.5 MHz

Example of Use

To query margin from Spectrum Emission Mask template and frequency at upper side of each frequency range:

SEMMARGIN_UPPER?

> 1,3.000,3.00,5.000,3.00,8.000,3.00,9.500,3.00

SEM_SET

SEM Measurement Enable and Count

Function

Enables Spectrum Emission Mask Measurement and sets measurement count, and queries settings

Command

```
SEM_SET on_off[,count]
```

Query

```
SEM_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
Default	1

Example of Use

To enable Spectrum Emission Mask measurement and set the measurement count to 20:

SEM_SET ON,20

SEM_SET?

> ON,20

SEM_TEMPLATE

Spectrum Emission Mask - Mask Template

Function

Sets relative threshold for the Spectrum Emission Mask measurement, and queries setting

Command

```
SEM_TEMPLATE offset,level
```

Query

```
SEM_TEMPLATE? offset
```

Response

level

Unit	dBm

Parameters

offset	Offset frequency point		
Range	1 to 5		
Resolution	1		

level	Level at each offset frequency point		
Range	offset point	Level	Default
1	(2.5 MHz, RBW=30 kHz)	–100.0 to 0.0	–35.0 dBc
2	(3.5 MHz, RBW=30 kHz)	–100.0 to 0.0	–50.0 dBc
3	(3.5 MHz, RBW=1 MHz)	–100.0 to 0.0	–35.0 dBc
4	(7.5 MHz, RBW=1 MHz)	–100.0 to 0.0	–39.0 dBc
5	(8.5 MHz, RBW=1 MHz)	–100.0 to 0.0	–49.0 dBc
Resolution	0.1 dBc		
Default	0.1		

Example of Use

To set template at Point1 (2.5 MHz frequency offset) to –80.0 dBc:

SEM_TEMPLATE 1,-80.0

SEM_TEMPLATE? 1

> -80.0

TERR?

Timing Error Result of Modulation Analysis

Function

Queries Timing Error measurement result

Query

```
TERR? mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
terror

Unit	chip
Resolution	0.1

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
terror	Measurement result in specified Storage mode

Example of Use

To query average of Timing Error measurement result:
TERR? AVG
> 0.7

TERR_WORST?

Timing Error Result of Modulation Analysis (Worst)

Function

Queries worst value in Timing Error measurement results

Query

```
TERR_WORST?
```

Response

terror

Unit	chip
Resolution	0.1

Parameter

terror	Worst value in Timing Error measurement results

Example of Use

To query worst value in Timing Error measurement results:

TERR_WORST?

> 1.1

TXFREQ

Uplink Frequency

Function

Sets or queries MU887000A Rx frequency (uplink frequency)

Command

```
TXFREQ ul_freq
```

Query

```
TXFREQ?
```

Response

ul_freq

Parameter

ul_freq	Uplink frequency
Range	400.000000 to 3800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	1947.600000 MHz

Details

This sets the Tx frequency for the mobile station.
Changing the setting of the uplink frequency does not change the setting of the uplink channel.

Example of Use

To set the Uplink frequency to 1950 MHz:

TXFREQ 1950MHZ

TXFREQ?

>1950000000

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Native Command Reference

TXPWR?

Result of Tx Power Measurement

Function

Queries Tx Power measurement results

Query

```
TXPWR? mode
```

Response

When mode = TTL,

avg,max,min

When mode = AVG, MAX, MIN or DVT

pwr

When mode = IND,

s,pwr(1),pwr(2),…,pwr(s)

Unit	dBm
Resolution	0.01

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	Individual measurement result
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pwr	Measurement result in specified Storage mode
pwr(s)	Tx Power of sth measurement
s	Measurement count
Range	1 to 200

Example of Use

To query average of Tx Power measurement results:

TXPWR? AVG

> -20.00

ULCHAN

Uplink Channel

Function

Sets or queries EARFCN (E-UTRA Absolute Radio Frequency Channel Number) Uplink Channel

Command

```
ULCHAN ul_ch
```

Query

```
ULCHAN?
```

Response

ul_ch

Parameter

ul_ch	Uplink Channel
Range	12, 37, 62, 87, 112, 137, 150 to 12550
Resolution	1
Default	9738

Details

Changing the Uplink Channel parameter also changes the related Downlink Channel, Uplink Frequency and Downlink Frequency parameters.
For the relationship between the parameter and channel frequency settings, refer to "Uplink and downlink channels" in section 2.1.6 "Setting WCDMA signal" and Table 2.1.6-2 "E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation".

Example of Use

To set uplink channel 12000:
ULCHAN 12000
ULCHAN?
> 12000

ULCONFIG

Uplink Configuration

Function

Sets uplink signal channel configuration or queries setting

Command

```
ULCONFIG object
```

Query

```
ULCONFIG?
```

Response

object

Parameter

object	Uplink signal channel configuration
QPSK	QPSK signal consists of single DPCCH and single DPDCH
WCDMA	WCDMA signal
WCDMA+HSDPA	HSDPA channel (HS-DPCCH) signal
WCDMA+HSUPA	HSUPA channel (E-DPCH) signal
WCDMA+HSPA	HSPA channel signal
WCDMA+HSPA+	HSPA+ channel signal (16QAM)
Default	WCDMA

Details

Supported measurements depend on the uplink signal channel configuration. Refer to Table 2.1.6-1 “Channel Configuration Settings and Measurement Items”.

Example of Use

To set the uplink signal channel configuration to WCDMA:
ULCONFIG WCDMA
ULCONFIG?
> WCDMA

ULFREQ

Uplink Frequency

Function

Sets or queries MU887000A Rx frequency (uplink frequency)

Command

```
ULFREQ ul_freq
```

Query

```
ULFREQ?
```

Response

ul_freq

Unit	Hz

Parameter

ul_freq	Uplink frequency
Range	400.000000 to 3800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	1947.600000 MHz

Details

This sets the Tx frequency for the mobile station.
Changing the setting of the Uplink Frequency parameter does not change the Uplink Channel setting.

Example of Use

To set the uplink frequency to 1950 MHz:
ULFREQ 1950MHZ
ULFREQ?
>1950000000

WAVEFMEAS?

Waveform Data

Function

Queries waveform data for each measurement result

Query

```
WAVEFMEAS? format,position,length
```

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

Parameters

format	Format
1	Measured spectrum for Occupied Bandwidth
2	Measured spectrum for Spectrum Emission Mask
3	Measured waveform for Constellation (I)
4	Measured waveform for Constellation (Q)
5	Measured waveform for EVM (Average)
6	Measured waveform for EVM (Maximum)
7	Measured waveform for Phase Error (Average)
8	Measured waveform for Phase Error (Maximum)
9	Measured waveform for Magnitude Error (Average)
10	Measured waveform for Magnitude Error (Maximum)
position	Starting point of the waveform data
Range	format1: 0 to 1290
	format2: 0 to 2560
	format3 to format10: 0 to 2559
Resolution	1
length	Number of data to be read out
Range	format1:1 to 1291
	format2:1 to 2561
	format3 to format10:1 to 2560
data(0)	Waveform data(0)
data(1)	Waveform data(1)
:	:
data(length–1)	Waveform data(length–1)

Details

Data in the average format are equivalent to results in the Average storage mode.
Data in the maximum format are equivalent to results in the Peak-hold storage mode.

Example of Use

To query 1024 points of the measured waveform data for EVM (Average) from 257th point:
WAVEFMEAS? 5,256,1024
> 2.00,2.01,2.00,…,2.10

5.2.3 Sequence measurement commands

DLFREQ

Downlink Frequency

Function

Sets or queries downlink frequency of MU887000A

Command

```
DLFREQ dl_freq
```

Query

```
DLFREQ?
```

Response

dl_freq

Unit	Hz

Parameter

dl_freq	Downlink frequency
Range	400.000000 to 3800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	2137.600000 MHz

Details

The Rx frequency is set for the mobile station.
Updating the downlink frequency values does not affect the downlink channel setting.

Example of Use

To set the downlink frequency to 2050 MHz:
DLFREQ 2050MHZ
DLFREQ?
> 2050000000

ILVL

Input Level

Function

Sets or queries input level at MU887000A connector

Command

```
ILVL level
```

Query

```
ILVL?
```

Response

level

Unit	dBm

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	–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.

Example of Use

To set the output level 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*.

OLVL

Output Level

Function

Sets or queries RF signal total output level for all channels.

Command

```
OLVL level
```

Query

```
OLVL?
```

Response

level

Unit	dBm

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
Suffix code	DBM (uses dBm when omitted)
Default	–65.7 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*.

RXFREQ

Downlink Frequency

Function

Sets or queries MU887000A downlink frequency

Command

```
RXFREQ dl_freq
```

Query

```
RXFREQ?
```

Response

dl_freq

Parameter

dl_freq	Downlink frequency
Range	400.000000 to 3800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz omitted)
Default	2137.600000 MHz

Details

This Rx frequency is set for the mobile station.
Changing the setting of the 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 start and stop segments in 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	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 SEQERR? command to query the error details.

Example of Use

To set the start and stop segments to 20 and 52, respectively.
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
```

Parameter

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 SEQERR? command to query the error details.

Example 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 setting error information of sequence table

Query

```
SEQERR? [item]
```

Response

Query parameter	Response
None:	n,err(0),..,err(n–1)
ILVL, OLVL, STEP, DLPAT, PORT:	ns,seg(0),..,seg(ns–1)
LEN:	e,mem,exe,set
OLVLNUM, PATNUM, STDNUM:	e,exe,set

If no error is found in the sequence table, the response returns 0.

Parameters

item	Parameter of 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	
n	Number of errors	
Range	0 to 4	
err	Parameter with error	
ILVL	Input level	
OLVL	Output level	
STEP	Number of steps	
LEN	Capture memory length	
ns	Number of segments that contain errors	
Range	0 to 200	
seg	Segment number that contains errors	
Range	0 to 1999	
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 capture capable of executing capture out of number of configured segments
	Range	0 to 200
set		Number of segments with capture configured
	Range	0 to 200

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

Examples of Use

To query presence or error:
SEQERR?
>1,ILVL

To query the input level setting error information:
SEQERR? ILVL
>2,3,12

To query 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)

If no error is found in the sequence table, the response returns 0.

Parameters

format	Format
1	Error check 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

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 measurement conditions of 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 settings for segment 2 as follows:

Measurement mode: WCDMA, Step count: 1000, Measurement condition number: 3

```
SEQMEAS 2,WCDMA,1000,3
SEQMEAS? 2
> WCDMA,1000,3
```

SEQMSTAT?

Sequence Measurement Status

Function

Queries status of sequence measurement

Query

```
SEQMSTAT?
```

Response

m_status,n,s(0),s(1),..,s(n–1)

Parameters

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 MX887011A is 0, 2, 5, 9, or 12.

n	Number of measured segments
Range	0 to 200
s	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 MX887011A is 0, 2, 5, 9, 10, or 12.

Example of Use

To query sequence measurement execution status:

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 command

MSTAT

SEQSEGSTAT

SEQPROGRESS?

Sequence Progress

Function

Queries progress rate of sequence measurement and currently operating sequence number

Query

SEQPROGRESS?

Response

p,cur,start,end

Parameters

p	Progress rate of sequence measurement
Range	0% to 100 %
cur	Segment number currently executing
Range	0 to 1999
start	Segment number executed first
Range	0 to 1999
end	Segment number executed last
Range	0 to 1999

Example of Use

To query sequence measurement progress and currently executing sequence number:

SEQPROGRESS?

>65,23,11,30

Remarks

The segment number where measurement is executed first and the segment number where measurement is executed last are same as the start and stop segment numbers configured using the SEQCTRL command.

SEQREINIT

Sequence Control Parameter - Sequence End State Reinitialization

Function

Enables automatic initialization of following items after completion of sequence measurement mode operation, queries setting

- 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	DLPAT
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 target parameters:

SEQREINIT ON

SEQREINIT?

> ON

SEQSEGSTAT?

Specified Segment Status

Function

Queries measurement status of specified segment

Query

```
SEQSEGSTAT? seg
```

Response

```
stat
```

Parameters

seg	Segment number
Range	0 to 1999
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 MX887011A is 0, 2, 5, 9, 10, or 12.

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 test port to send RF signal in specified segment of 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 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 sequence table 1:

SEQTBL 1

SEQTBL?

> 1

SEQTRG

Sequence Table Parameter - Trigger

Function

Sets and queries trigger condition for starting Sequence Measurement mode

Command

```
SEQTRG seg,src,slope,level,delay
```

Query

```
SEQTRG? 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 0)
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 command:
ILVL, SEQTRX

SEQTRX

Sequence Table Parameter - TRX Control

Function

Sets or queries following items in specific segment of 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

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
ul_freq	Uplink frequency
Range	400.000000 to 3800.000000 MHz
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) –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
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*.

Examples 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
```

Parameter

seg		Segment number
	Range	0 to 1999
	Resolution	1
ul_freq		Uplink frequency
	Range	400.000000 to 3800.000000 MHz
	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) –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

TRGTOUT

Trigger Timeout

Function

Sets and queries trigger timeout

Command

```
TRGTOUT time
```

Query

```
TRGTOUT?
```

Response

time

Unit	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 uplink frequency of MU887000A

Command

`TXFREQ ul_freq`

Query

`TXFREQ?`

Response

ul_freq

Parameter

ul_freq	Uplink frequency
Range	400.000000 to 3800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	1947.600000 MHz

Details

The Tx frequency is set for the mobile station.
Changing the setting of the Uplink Frequency parameter does not change the Uplink Channel setting.

Example of Use

To set the uplink frequency to 1950 MHz:
TXFREQ 1950MHZ
TXFREQ?
>1950000000

ULFREQ

Uplink Frequency

Function

Sets or queries MU887000A Rx frequency (uplink frequency)

Command

```
ULFREQ ul_freq
```

Query

```
ULFREQ?
```

Response

ul_freq

Unit	Hz

Parameter

ul_freq	Uplink frequency
Range	400.000000 to 3800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	1947.600000 MHz

Details

This sets the Tx frequency for the mobile station.
Changing the setting of the Uplink Frequency parameter does not change the Uplink Channel setting.

Example of Use

To set the uplink frequency to 1950 MHz:
ULFREQ 1950MHZ
ULFREQ?
>1950000000

WCDMA_ACLR?

Result of Adjacent Channel Leakage Power Ratio

Function

Queries Adjacent Channel Leakage Power Ratio measurement result in Sequence Measurement mode

Query

```
WCDMA_ACLR? seg,mode
```

Response

When mode = TTL,
avg(0),avg(1),avg(2),avg(3),max(0),max(1),max(2),max(3),min(0),min(1),min(2),min(3)
When mode ≠ TTL,
aclr(0),aclr(1),aclr(2),aclr(3)

Unit	dB
Resolution	0.01

Parameter number	Frequency offset
0	–10 MHz
1	–5 MHz
2	+5 MHz
3	+10 MHz

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
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
aclr	Measurement result in specified Storage mode

Example of Use

To query average value of ACLR measurement results for segment 20 in the Sequence Measurement mode:

WCDMA_ACLR? 20 AVG
> -20.00,-21.00,-22.00,-23.00

WCDMA_ACLR_SET

ACLR Measurement Enable and Count

Function

Enables Adjacent Channel Leakage Power Ratio measurement and sets or queries measurement count

Command

```
WCDMA_ACLR_SET mcond,on_off[,count]
```

Query

```
WCDMA_ACLR_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
count	Measurement count
Range	1 to 200
Resolution	1
Default	1

Example of Use

To enable Adjacent Channel Leakage Power Ratio measurement and set the measurement count to 80 in measurement condition number 3:
WCDMA_ACLR_SET 3,ON,80
WCDMA_ACLR_SET? 3
> ON,80

WCDMA_BAND

Frequency Band

Function

Sets or queries frequency band in Sequence Measurement mode

Command

```
WCDMA_BAND mcond,FreqBand
```

Query

```
WCDMA_BAND? mcond
```

Response

FreqBand

Parameter

mcond	Measurement condition number	
Range	0 to 1999	
Resolution	1	
FreqBand	Frequency Band	
NONE	NONE	
BAND1	Band1	1920 to 1980/2110 to 2170 MHz
BAND2	Band2	1850 to 1910/1930 to 1990 MHz
BAND3	Band3	1710 to 1785/1805 to 1880 MHz
BAND4	Band4	1710 to 1755/2110 to 2155 MHz
BAND5	Band5	824 to 849/869 to 894 MHz
BAND6	Band6	830 to 840/875 to 885 MHz
BAND7	Band7	2500 to 2570/2620 to 2690 MHz
BAND8	Band8	880 to 915/925 to 960 MHz
BAND9	Band9	1749.9 to 1784.9/1844.9 to 1879.9 MHz
BAND10	Band10	1710 to 1770/2110 to 2170 MHz
BAND11	Band11	1427.9 to 1447.9/1475.9 to 1495.9 MHz
BAND12	Band12	698 to 716/728 to 746 MHz
BAND13	Band13	777 to 787/746 to 756 MHz
BAND14	Band14	788 to 798/758 to 768 MHz
BAND19	Band19	830 to 845/875 to 890 MHz
BAND20	Band20	832 to 862/791 to 821 MHz
BAND21	Band21	1447.9 to 1462.9/1495.9 to 1510.9 MHz
BAND25	Band25	1850 to 1915 / 1930 to 1995 MHz
BAND26	Band26	814 to 849 / 859 to 894 MHz
Default	NONE	

Details

This command sets additional spectrum emission limits per frequency band as described in Section 5.9 of 3GPP TS34.121-1.

No additional requirement:

NONE, BAND1, BAND3, BAND6 to BAND9, BAND11, BAND19 to BAND21

Additional requirement specified in Table 5.9.1A:

BAND2, BAND4, BAND10, BAND25

Additional requirement specified in Table 5.9.1B:

BAND5, BAND26

Additional requirement specified in Table 5.9.1C:

BAND12 to BAND14

For the contents of Table 5.9.1A, 5.9.1B and 5.9.1C, refer to Table 2.4-2 “Additional Requirements for Frequency Bands II, IV, X and, XXV”, Table 2.4-3 “Additional Requirements for Frequency Band V and XXVI”, and Table 2.4-4 “Additional Requirements for Frequency Bands XII, XIII, and XIV” in this manual.

Example of Use

To set the frequency band to BAND2 for the measurement condition number 2 in the Sequence Measurement mode:

WCDMA_BAND 2,BAND2

WCDMA_BAND? 2

> BAND2

WCDMA_CFREQ?

Carrier Frequency Result of Modulation Analysis

Function

Queries Carrier Frequency measurement result

Query

```
WCDMA_CFREQ? seg
```

Response

freq

Unit	Hz
Resolution	1

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
freq	Carrier frequency

Example of Use

To query the carrier frequency measurement result for segment 1 in the Sequence Measurement mode:

WCDMA_CFREQ? 1

> 1951000000

WCDMA_CFERR?

Carrier Frequency Error Result of Modulation Analysis

Function

Queries Carrier Frequency measurement result in Sequence Measurement mode

Query

```
WCDMA_CFERR? seg,mode
```

Response

When mode = TTL,

avg_ppm,avg_Hz,max_ppm,max_Hz,min_ppm,min_Hz

When mode ≠ TTL,

freq_ppm,freq_Hz

Unit	ppm, Hz
Resolution	0.01, 0.1

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
avg_ppm	Average of Frequency Error measurement results in ppm
avg_Hz	Average of Frequency Error measurement results in Hz
max_ppm	Maximum value in Frequency Error measurement results in ppm
max_Hz	Maximum value in Frequency Error measurement results in Hz
min_ppm	Minimum value in Frequency Error measurement results in ppm
min_Hz	Minimum value in Frequency Error measurement results in Hz
freq_ppm	Frequency Error measurement results in specified Storage mode in ppm
freq_Hz	Frequency Error measurement results in specified Storage mode in Hz

Example of Use

To query average of Frequency Error measurement results for segment 1 in Sequence Measurement mode:

WCDMA_CFERR? 1,AVG

> 0.03,60.0

WCDMA_CFERR_WORST?

Carrier Frequency Error Result of Modulation Analysis (Worst)

Function

Queries worst value in Carrier Frequency Error measurement results in Sequence Measurement mode

Query

```
WCDMA_CFERR_WORST? seg
```

Response

freq_ppm,freq_Hz

Unit	ppm, Hz
Resolution	0.01, 0.1

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
freq_ppm	Worst value in Frequency Error measurement results in ppm
freq_Hz	Worst value in Frequency Error measurement results in Hz

Example of Use

To query worst value in Frequency Error measurement results for segment 1 in Sequence Measurement mode:

WCDMA_CFERR_WORST? 1

> 0.03,60.0

WCDMA_EVM?

EVM Result of Modulation Analysis

Function

Queries EVM measurement in Sequence Measurement mode

Query

```
WCDMA_EVM? seg,mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
evm

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
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
evm	Measurement result in specified Storage mode

Example of Use

To query average of EVM Measurement results for segment 1 in Sequence Measurement mode:

WCDMA_EVM? 1,AVG
> 1.50

WCDMA_FILTPWR?

Result of Filtered Power Measurement

Function

Queries result of RRC Filtered Power measurement in Sequence Measurement mode

Query

```
WCDMA_FILTPWR? seg,mode
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT
pwr
When mode = IND,
s,pwr(1),pwr(2),..,pwr(s)

Unit	dBm
Resolution	0.01

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
IND	Individual measurement result
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pwr	Measurement result in specified Storage mode
pwr(s)	Filtered Power of sth measurement
s	Measurement count
Range	1 to 200

Example of Use

To query average of RRC Filtered Power Measurement result for segment 0 in Sequence Measurement mode:
WCDMA_FILTPWR? 0,AVG
> -20.00

5

Native Command Reference

WCDMA_ILPC

ILPC Measurement Enable

Function

Enables Inner Loop Power Control measurement in Sequence Measurement mode, or queries settings

Command

```
WCDMA_ILPC mcond,on_off
```

Query

```
WCDMA_ILPC? mcond
```

Response

on_off

Parameter

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
on_off	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF

Example of Use

To enable Inner Loop Power Control measurement for the measurement condition number 3 in Sequence Measurement mode:

WCDMA_ILPC 3,ON

WCDMA_ILPC? 3

> ON

WCDMA_IQIMB?

IQ Imbalance Result of Modulation Analysis

Function

Queries IQ Imbalance measurement result in Sequence Measurement mode

Query

```
WCDMA_IQIMB? seg,mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
iqimb

Unit	dB
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
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
iqimb	Measurement result in specified Storage mode

Example of Use

To query average of IQ Imbalance Measurement results for segment 1 in Sequence Measurement mode:

WCDMA_IQIMB? 1,AVG
> 0.04

Remarks

When the measurement target is QPSK, the results are returned with either I or Q value, whichever has a bigger gain, as Q axis.

WCDMA_LSCODESEARCH

Long Span Code Search

Function

Enables Long Span Search in Sequence Measurement mode, or queries setting

Command

```
WCDMA_LSCODESEARCH on_off
```

Query

```
WCDMA_LSCODESEARCH?
```

Response

on_off

Parameter

on_off	Enables/Disables Long Span Code Search
ON	Enables Long Span Code Search
OFF	Disables Long Span Search
Default	OFF

Details

Measurement takes more time when the Long Span Search function is on.
Set this parameter to Off when the uplink and downlink signals are synchronized; set it to On when they are not synchronized.

Example of Use

To enable Long Span Search in the Sequence Measurement mode:
WCDMA_LSCODESEARCH ON
WCDMA_LSCODESEARCH?
> ON

WCDMA_MA_MEASOBJ

Modulation Analysis Measuring object

Function

Sets the target signal of modulation analysis.

Command

```
WCDMA_MA_MEASOBJ mcond,mobj
```

Query

```
WCDMA_MA_MEASOBJ? mcond
```

Response

mobj

Parameter

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
mobj	Measurement target signal
QPSK	QPSK signal (One DPCCH and one DPDCH)
WCDMA	WCDMA signal

Example of Use

To set the target signal for modulation analysis of the measurement condition number 0 to WCDMA.

WCDMA_MA_MEASOBJ 0,WCDMA
WCDMA_MA_MEASOBJ? 0
> WCDMA

WCDMA_MAGERR?

Magnitude Error Result of Modulation Analysis

Function

Queries result of Magnitude Error measurement in Sequence Measurement mode

Query

```
WCDMA_MAGERR? seg,mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
merr

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
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
merr	Measurement result in specified Storage mode

Example of Use

To query average of Magnitude Error measurement result for segment 1 in Sequence Measurement mode:

WCDMA_MAGERR? 1,AVG
> 1.05

WCDMA_MEAS_OFF

Turn Off All Measurement Items

Function

Sets all measurement items to Off collectively.

Command

```
WCDMA_MEAS_OFF mcond
```

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1

Example of use

Sets all measurement items of number 0 in the WCDMA measurement condition table to Off collectively.

WCDMA_MEAS_OFF 0

Remarks

The operation of this command is similar to turning off all the following command settings.

WCDMA_PWR_SET
WCDMA_OBW_SET
WCDMA_SEM_SET
WCDMA_ACLR_SET
WCDMA_MOD_SET
WCDMA_PCDE_SET
WCDMA_PDISC_SET

WCDMA_MOD_SET

Modulation Analysis Measurement Enable and Count

Function

Enables Modulation Analysis measurement and sets measurement count, or queries settings

Command

```
WCDMA_MOD_SET mcond,on_off[,count]
```

Query

```
WCDMA_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 Modulation Analysis measurement
OFF	Disables Modulation Analysis measurement
Default	OFF
count	Measurement count
Range	1 to 200
Resolution	1
Default	1

Example of Use

To enable Modulation Analysis measurement and set the measurement count to 120 in measurement condition number 25:

WCDMA_MOD_SET 25,ON,120
WCDMA_MOD_SET? 25
> ON,120

WCDMA_OBW?

Result of Occupied Bandwidth

Function

Queries Occupied Bandwidth measurement result in Sequence Measurement mode

Query

```
WCDMA_OBW? seg
```

Response

bw

Unit	MHz
Resolution	0.001

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
bw	Occupied Bandwidth [MHz]

Example of Use

To query Occupied Bandwidth measurement result for segment 0 in Sequence Measurement mode:

WCDMA_OBW? 0

> 3.840

WCDMA_OBWFREQ?

Result of Occupied Bandwidth Frequency

Function

Queries upper, lower and center frequency of Occupied Bandwidth measurement in Sequence Measurement mode

Query

```
WCDMA_OBWFREQ? seg,pos
```

Response

freq

Unit	MHz
Resolution	0.001

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
pos	Frequency position
UPPER	Upper frequency
LOWER	Lower frequency
CENTER	Center frequency
freq	Frequency [MHz]

Example of Use

To query the upper frequency of the Occupied Bandwidth for segment 1 in the Sequence Measurement mode:

WCDMA_OBWFREQ? 1,UPPER

> 1951.920

WCDMA_OBW_RATIO

Occupied Bandwidth Ratio

Function

Sets Occupied Bandwidth measurement occupation ratio in Sequence Measurement mode, or queries setting

Command

```
WCDMA_OBW_RATIO ratio
```

Query

```
WCDMA_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 occupation ratio for Occupied Bandwidth to 95.0% in Sequence Measurement mode:

WCDMA_OBW_RATIO 95.0
WCDMA_OBW_RATIO?
> 95.0

WCDMA_OBW_SET

OBW Measurement Enable and Count

Function

Enables Occupied Bandwidth measurement and sets measurement count in Sequence Measurement mode, or queries settings

Command

```
WCDMA_OBW_SET mcond,on_off[,count]
```

Query

```
WCDMA_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
Resolution	1
Default	1

Example of Use

To enable Occupied Bandwidth measurement and set the measurement count to 100 for the measurement condition number 2 in Sequence Measurement mode:

WCDMA_OBW_SET 2,ON,100

WCDMA_OBW_SET? 2

> ON,100

WCDMA_ORGNOFS?

Origin Offset Result of Modulation Analysis

Function

Queries Origin Offset measurement result in Sequence Measurement mode

Query

```
WCDMA_ORGNOFS? seg,mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
orgnoffs

Unit	dB
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
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
orgnoffs	Measurement result in the specified Storage mode

Example of Use

To query average of Origin Offset measurement result for segment 1 in Sequence Measurement mode
WCDMA_ORGNOFS? 1,AVG
> 0.04

WCDMA_PCDE?

Result of Peak Code Domain Error

Function

Queries Peak Code Domain Error measurement result in Sequence Measurement mode

Query

```
WCDMA_PCDE? seg,mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
pcde

Unit:	dB
Resolution:	0.01

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
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pcde	Measurement result in specified Storage mode

Example of Use

To query average of Peak Code Domain Error measurement results for segment 2 in Sequence Measurement mode:

WCDMA_PCDE? 2,AVG
> 0.08

WCDMA_PCDE_SET

Peak Code Domain Error Measurement Enable and Count

Function

Enables Peak Code Domain Error measurement and sets measurement count, or queries settings

Command

```
WCDMA_PCDE_SET mcond,on_off[,count]
```

Query

```
WCDMA_PCDE_SET? mcond
```

Response

on_off, count

Parameter

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
Resolution	1
Default	1

Example of Use

To enable Peak Code Domain Error measurement and set the measurement count to 150 for the measurement condition number 2 in Sequence Measurement mode:

WCDMA_PCDE_SET 2,ON,150
WCDMA_PCDE_SET? 2
> ON,150

WCDMA_PDISC?

Result of Phase Discontinuity

Function

Queries Phase Discontinuity measurement result in Sequence Measurement mode

Query

```
WCDMA_PDISC? seg
```

Response

count,data(0),data(1),data(2),…,data(count–1)

Unit	degree
Resolution	0.01

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
count	Measurement count
data(0) to data(count–1)	Phase difference from previous time slot

Example of Use

To query Phase Discontinuity measurement result for segment 1 in Sequence Measurement mode:

WCDMA_PDISC? 1

> 0.08

WCDMA_PDISC_CFERR?

Carrier Frequency Error Result of Phase Discontinuity

Function

Queries Carrier frequency error of Phase Discontinuity measurement result in Sequence Measurement mode

Query

```
WCDMA_PDISC_CFERR? seg
```

Response

count,fppm(0),fHz(0),fppm(1),fHz(1),…,fppm(count–1),fHz(count–1)

Unit	ppm, Hz
Resolution	0.01, 0.1

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
count	Measurement count
Range	1 to 100
fppm(0) to fppm(count–1)	Frequency error in ppm
Resolution	0.01
fHz(0) to fHz(count–1)	Frequency error in Hz
Resolution	0.1

Example of Use

To query Phase Discontinuity Frequency Error measurement result for segment 1 in Sequence Measurement mode:

WCDMA_PDISC_CFERR? 1

> 2,0.08,0.2,0.09,0.4

WCDMA_PDISC_EVM?

EVM Result of Phase Discontinuity

Function

Queries EVM measurement result at Phase Discontinuity measurement in Sequence Measurement mode

Query

```
WCDMA_PDISC_EVM? seg
```

Response

count,evm(0),evm(1),…,evm(count–1)

Unit	%
Resolution	0.01

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
count	Number of measurement
Range	1 to 100
evm(0) to evm(count–1)	EVM

Example of Use

To query EVM measurement result at Phase Discontinuity measurement for segment 1 in Sequence Measurement mode:

WCDMA_PDISC_EVM? 1

> 2,1.51,1.53

WCDMA_PDISC_SET

Phase Discontinuity Measurement Enable and Count

Function

Enables Phase Discontinuity measurement in Sequence Measurement mode and sets measurement count, or queries settings

Command

```
WCDMA_PDISC_SET mcond,on_off[,count]
```

Query

```
WCDMA_PDISC_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	Number of measurement
Range	1 to 100
Resolution	1
Default	1

Example of Use

To enable Phase Discontinuity measurement and set measurement count to 30 for the measurement condition number 40 in Sequence Measurement mode:

WCDMA_PDISC_SET 40,ON,30
PDISC_SET? 40
> ON,30

WCDMA_PEVM?

Peak EVM Result of Modulation Analysis

Function

Queries EVM Peak measurement result in Sequence Measurement mode

Query

```
WCDMA_PEVM? seg,mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
pevm

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
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pevm	Measurement result in specified Storage mode

Example of Use

To query average of peak EVM measurement results for segment 1 in Sequence Measurement mode:

WCDMA_PEVM? 1,AVG
> 1.75

WCDMA_PHASEERR?

Phase Error Result of Modulation Analysis

Function

Queries result of Phase Error measurement in Sequence Measurement mode

Query

```
WCDMA_PHASEERR? seg,mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
perr

Unit	degree
Resolution	0.01

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
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
perr	Measurement result in the specified Storage mode

Example of Use

To query average of Phase Error measurement results for segment 1 in Sequence Measurement mode:

WCDMA_PHASEERR? 1,AVG
> 1.55

WCDMA_PWR_SET

Tx Power Measurement Enable and Count

Function

Enables Tx Power measurement and sets measurement count in Sequence Measurement mode, or queries settings

Command

```
WCDMA_PWR_SET mcond,on_off[,count]
```

Query

```
WCDMA_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
Resolution	1
Default	1

Example of Use

To enable Transmit Power measurement and set the measurement count to 10 for the measurement condition number 5 in Sequence Measurement mode:

WCDMA_PWR_SET 5,ON,10

WCDMA_PWR_SET? 5

> ON,10

WCDMA_SCRCODE

Scrambling Code Number

Function

Sets Scrambling Code Number in Sequence Measurement mode or queries setting

Command

```
WCDMA_SCRCODE code
```

Query

```
WCDMA_SCRCODE?
```

Response

code

Parameter

code	Scrambling Code Number
Range	000000 to FFFFFF (Hexadecimal)
Resolution	1
Default	000000

Example of Use

To set Scrambling Code Number to 271F in Sequence Measurement mode:

WCDMA_SCRCODE 271F

WCDMA_SCRCODE?

> 271F

WCDMA_SEM?

Judgement of Spectrum Emission Mask

Function

Queries whether spectrum threshold set at Spectrum measurement in Sequence Measurement mode exceeded or not

Query

```
WCDMA_SEM? seg
```

Response

judgement

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
judgement	Judgement result
PASS	Pass (below threshold)
FAIL	Failed (above threshold)
–	No measurement

Example of Use

To query whether spectrum threshold set for segment 1 in Sequence Measurement mode exceeded or not:

WCDMA_SEM? 1

> PASS

WCDMA_SEM_LLIMIT

Spectrum Emission Mask - Mask Template Lower Limit

Function

Sets absolute lower level threshold (minimum threshold power) for Spectrum Emission Mask in Sequence Measurement mode and queries settings

Command

```
WCDMA_SEM_LLIMIT level
```

Query

```
WCDMA_SEM_LLIMIT?
```

Response

level

Unit	dBm

Parameter

level	Template threshold
Range	–100.0 to 0.0 /3.84 MHz
Resolution	0.1 dBm
Default	–50.0 dBm

Example of Use

To set the absolute level threshold (minimum threshold power) for Spectrum Emission Mask measurement to –100.0 dBm:

WCDMA_SEM_LLIMIT -100.0
WCDMA_SEM_LLIMIT?
> -100.0

WCDMA_SEMLVL_LOWER?

Result of Spectrum Emission Mask (Lower)

Function

Queries peak level and frequency of spectrum in each lower frequency range of Spectrum Emission Mask in Sequence Measurement mode

Query

```
WCDMA_SEMLVL_LOWER? seg
```

Response

band, freq(0), peak(0), freq(1), peak(1), freq(2), peak(2), freq(3), peak(3)

band:	Target band
freq(n):	Offset frequency of spectrum peak
Resolution	0.001 MHz
peak(n):	Peak level of spectrum
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
band	Target band
Range	0 to 14, 19 to 21
freq(0)	Offset frequency of spectrum peak in offset frequency range from –2.5 to –3.5 MHz
peak(0)	Peak level of spectrum in offset frequency range from –2.5 to –3.5 MHz
freq(1)	Offset frequency of spectrum peak in offset frequency range from –3.5 to –7.5 MHz
peak(1)	Peak level of spectrum in offset frequency range from –3.5 to –7.5 MHz
freq(2)	Offset frequency of spectrum peak in offset frequency range from –7.5 to –8.5 MHz
peak(2)	Peak level of spectrum in offset frequency range from –7.5 to –8.5 MHz
freq(3)	Offset frequency of spectrum peak in offset frequency range below –8.5 MHz
peak(3)	Peak level of spectrum in offset frequency range below –8.5 MHz

Example of Use

To query peak level and frequency of spectrum in each lower frequency range for segment 1 in Sequence Measurement mode:

WCDMA_SEMLVL_LOWER? 1

> 1,-3.000,-20.00,-5.000,-30.00,-8.000,-40.00,-9.500,-50.00

WCDMA_SEMLVL_UPPER?

Result of Spectrum Emission Mask (Upper)

Function

Queries peak level and frequency of spectrum in each upper frequency range of Spectrum Emission Mask in Sequence Measurement mode

Query

```
WCDMA_SEMLVL_UPPER? seg
```

Response

band, freq(0), peak(0), freq(1), peak(1), freq(2), peak(2), freq(3), peak(3)

band:	Target band
freq(n):	Offset frequency of spectrum peak
Resolution	0.001 MHz
peak(n):	Peak level of spectrum
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
band	Target band
Range	0 to 14, 19 to 21
freq(0)	Offset frequency of spectrum peak in offset frequency range from +2.5 to +3.5 MHz
peak(0)	Peak level of spectrum in offset frequency range from +2.5 to +3.5 MHz
freq(1)	Offset frequency of spectrum peak in offset frequency range from +3.5 to +7.5 MHz
peak(1)	Peak level of spectrum in offset frequency range from +3.5 to +7.5 MHz
freq(2)	Offset frequency of the spectrum peak in offset frequency range from +7.5 to +8.5 MHz
peak(2)	Peak level of spectrum in offset frequency range from +7.5 to +8.5 MHz
freq(3)	Offset frequency of spectrum peak in offset frequency range above +8.5 MHz
peak(3)	Peak level of spectrum in offset frequency range above +8.5 MHz

Example of Use

To query peak level and frequency of spectrum in each upper frequency range for segment 1 in Sequence Measurement mode:

WCDMA_SEMLVL_UPPER? 1

> 1,3.000,-20.00,5.000,-30.00,8.000,-40.00,9.500,-50.00

WCDMA_SEMMARGIN_LOWER?

Margin of Spectrum Emission Mask (Lower)

Function

Queries spectrum margin and offset frequency in each lower frequency range of Spectrum Emission Mask in Sequence Measurement mode

Query

```
WCDMA_SEMMARGIN_LOWER? seg
```

Response

band, freq(0), peak(0), freq(1), peak(1), freq(2), peak(2), freq(3), peak(3)

band:	Target band
freq(n):	Offset frequency at point where margin determined
Resolution	0.001 MHz
peak(n):	Margin from template
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
band	Target band
Range	0 to 14, 19 to 21
freq(0)	Offset frequency at point where margin determined in offset frequency range from –2.5 to –3.5 MHz
peak(0)	Margin in offset frequency range from –2.5 to –3.5 MHz
freq(1)	Offset frequency at point where margin determined in offset frequency range from –3.5 to –7.5 MHz
peak(1)	Margin in offset frequency range from –3.5 to –7.5 MHz
freq(2)	Offset frequency at point where margin determined in offset frequency range from –7.5 to –8.5 MHz
peak(2)	Margin in offset frequency range from –7.5 to –8.5 MHz
freq(3)	Offset frequency at point where margin determined in offset frequency range below –8.5 MHz
peak(3)	Margin in offset frequency range below –8.5 MHz

Example of Use

To query margin and frequency from Spectrum Emission Mask template spectrum in each lower frequency range for segment 1 in Sequence Measurement mode:

WCDMA_SEMMARGIN_LOWER? 1

> 1,-3.000,3.00,-5.000,3.00,-8.000,3.00,-9.500,3.00

WCDMA_SEMMARGIN_UPPER?

Margin of Spectrum Emission Mask (Upper)

Function

Queries spectrum margin and offset frequency in each upper frequency range of Spectrum Emission Mask in Sequence Measurement mode

Query

```
WCDMA_SEMMARGIN_UPPER? seg
```

Response

band, freq(0), peak(0), freq(1), peak(1), freq(2), peak(2), freq(3), peak(3)

band:	Target band
freq(n):	Offset frequency at point where margin determined
Resolution	0.001 MHz
peak(n):	Margin from template
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
band	Target band
Range	0 to 14, 19 to 21
freq(0)	Offset frequency at point where margin determined in offset frequency range from +2.5 to +3.5 MHz
peak(0)	Margin in offset frequency range from +2.5 to +3.5 MHz
freq(1)	Offset frequency at point where margin determined in offset frequency range from +3.5 to +7.5 MHz
peak(1)	Margin in offset frequency range from +3.5 to +7.5 MHz
freq(2)	Offset frequency at point where margin determined in offset frequency range from +7.5 to +8.5 MHz
peak(2)	Margin in the offset frequency range from +7.5 to +8.5 MHz
freq(3)	Offset frequency at point where margin determined in offset frequency range above +8.5 MHz
peak(3)	Margin in offset frequency range above +8.5 MHz

Example of Use

To query margin and frequency from Spectrum Emission Mask template spectrum in each upper frequency range for segment 1 in Sequence Measurement mode:

WCDMA_SEMMARGIN_UPPER? 1

> 1,3.000,3.00,5.000,3.00,8.000,3.00,9.500,3.00

WCDMA_SEM_SET

SEM Measurement Enable and Count

Function

Enables Spectrum Emission Mask measurement and sets measurement count, or queries settings

Command

```
WCDMA_SEM_SET mcond,on_off[,count]
```

Query

```
WCDMA_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
Resolution	1
Default	1

Example of Use

To enable Spectrum Emission Mask measurement and set the measurement count to 20 for the measurement condition number 8

WCDMA_SEM_SET 8,ON,20

WCDMA_SEM_SET? 8

> ON,20

WCDMA_SEM_TEMPLATE

Spectrum Emission Mask - Mask Template

Function

Sets relative level threshold (template) for Spectrum Emission Mask in Sequence Measurement mode and queries settings

Command

```
WCDMA_SEM_TEMPLATE offset,level
```

Query

```
WCDMA_SEM_TEMPLATE? offset
```

Response

level

Parameters

offset	Offset frequency point		
Range	1 to 5		
Resolution	1		
level	Level at each offset frequency point		
Point	Offset	Level	(Default)
1	(2.5 MHz)	–100.0 to 0.0	(–35.0 dBc)
2	(3.5 MHz)	–100.0 to 0.0	(–50.0 dBc)
3	(3.5 MHz)	–100.0 to 0.0	(–35.0 dBc)
4	(7.5 MHz)	–100.0 to 0.0	(–39.0 dBc)
5	(8.5 MHz)	–100.0 to 0.0	(–49.0 dBc)
Resolution	0.1 dBc		
Default	0.1		

Example of Use

To set the template at Point3 (3.5 MHz frequency offset) for the Spectrum Emission Mask measurement to –60.0 dBc in Sequence Measurement mode:

WCDMA_SEM_TEMPLATE 3,-60.0

WCDMA_SEM_TEMPLATE? 3

> -60.0

WCDMA_TERR?

Timing Error Result of Modulation Analysis

Function

Queries Timing Error measurement result in Sequence Measurement mode

Query

```
WCDMA_TERR? seg,mode
```

Response

When mode = TTL,
avg,max,min
When mode ≠ TTL,
terror

Unit	chip
Resolution	0.1

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
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
terror	Measurement result in specified Storage mode

Example of Use

To query average of Timing Error measurement results for segment 1 in Sequence Measurement mode

WCDMA_TERR? 1,AVG
> 0.7

WCDMA_TERR_WORST?

Timing Error Result of Modulation Analysis (Worst)

Function

Queries worst value of Timing Error measurement results in Sequence Measurement mode

Query

```
WCDMA_TERR_WORST? seg
```

Response

terror

Unit	chip
Resolution	0.1

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
terror	Worst value in Timing Error measurement results

Example of Use

To query worst value in Timing Error measurement result for segment 1 in Sequence Measurement mode:

WCDMA_TERR_WORST? 1

> 1.1

WCDMA_TXPWR?

Result of Tx Power Measurement

Function

Queries Tx Power measurement result in Sequence Measurement mode

Query

```
WCDMA_TXPWR? seg,mode
```

Response

When mode = TTL,

avg,max,min

When mode = AVG, MAX, MIN or DVT

pwr

When mode = IND,

s,pwr(1),pwr(2),…,pwr(s)

Unit	dBm
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
IND	Individual measurement result
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pwr	Measurement result in specified Storage mode
pwr(s)	Tx Power of sth measurement
s	Measurement count
Range	1 to 200

Example of Use

To query average of Tx Power measurement result for segment 0 in Sequence Measurement mode:

WCDMA_TXPWR? 0,AVG

> -20.00

Chapter 6 Performance Test

This chapter explains how to setup the measuring instruments required for the MX887011A W-CDMA 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
- Adjacent Channel Leakage Power Ratio measurement

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 Test

Performance Test Item	Instrument Required Specifications*	Recommended Instrument (Anritsu Model)
Output EVM	Signal Analyzer • Frequency Range: 400 to 2700 MHz • Resolution: 1 Hz • Measured Power Range: –140 to +20 dBm • Measurement Accuracy: ±0.05 dB • External Reference Input: (10 MHz)	Signal Analyzer (MS2690A or MS2830A) W-CDMA Measurement Software(MX269011A)
Tx Power Measurements • Measurement Accuracy • Linearity	Signal Generator • Frequency Range: 400 to 2700 MHz • Resolution: 1 Hz • Output Level Range Unmodulated: –143 to +13 dBm Resolution: 0.01 dB	Vector Signal Generator (MG3700A) Mechanical Attenuator (MG3700A-002) High Frequency 6 GHz (MG3700A-011)
	Signal Analyzer Same as above	Signal Analyzer (MS2690A or MS2830A)
	Power Meter • Main Frame Accuracy: ±0.02 dB • Frequency Range: 400 to 2700 MHz • Resolution: 0.01 dB	Power Meter (ML2437A)
	Power sensor • Frequency Range: 400 to 2700 MHz • Measured Power Range: –40 to +20 dBm • Input Connector: N type	Power Sensor (MA2442D)
Frequency/Modulation Measurements • Carrier Frequency Accuracy • Residual EVM • Adjacent Channel Leakage Power Ratio	Signal generator supporting output of 3GPP W-CDMA modulation signals Same as above	Same as above
	Power Meter Same as above	Same as above
	Power sensor • Frequency Range: 400 to 2700 MHz • Measured Power Range: –30 to +20 dBm • Input Connector: N type	Power Sensor (MA24002A)
Common	3-dB Attenuator	3-dB Attenuator (AT-103)

*: The performance covers the test item measurement range.

6.3 Performance Test for Each Measurement

Common test items

The following list shows the common settings for each measurement at the MU887000A.

Application:	Cellular
Standard:	W-CDMA
Uplink Configuration:	WCDMA
Scrambling Code:	0x000000
OBW-Ratio :	99.0%
Frequency Band :	NONE
Long Span Code Search:	ON
HS-DPCCH Measurement:	Period3

6.3.1 Calibrating signal generator (CW)

This procedure captures the calibration value for measurements using an unmodulated waveform (CW).

(1) Measuring instruments

- Vector signal generator: MG3700A
- Power meter: ML2437A
- Power sensor: MA2442D
- 3-dB Attenuator: AT-103 (2 sets)

(2) Setup

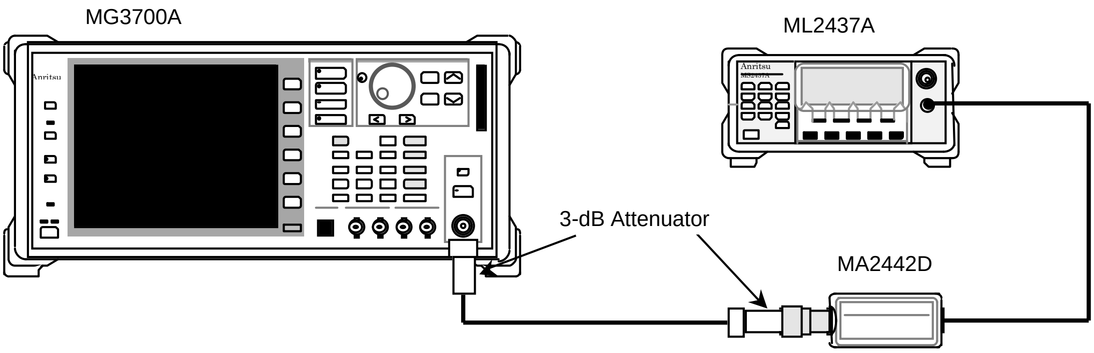

Figure 6.3.1-1 Signal Generator Calibration Setup (CW)

(3) Procedure

1. Setup the instruments as shown in Figure 6.3.1-1.
2. Output a CW 399.99 MHz signals from the Vector signal generator (SG) at a level of +6 dBm
3. Measure the level with the ML2437A power meter and adjust the SG so that the output level is 0 dBm.
4. Change the frequency as shown in Table 6.3.1-1 "Measurement Points and Frequency" and perform the same measurement to obtain the calibration value.
5. Repeat steps 3 and 4 over while changing the output level (value measured with power meter) to –10, –25 dBm, successively to measure and obtain the calibration value.

Table 6.3.1-1 Measurement Point and Frequency

Meas. Point	Frequency (MHz)	Meas. Point	Frequency (MHz)
1	400	7	2000
2	480	8	2200
3	880	9	2700
4	940		
5	1000		
6	1800		

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 6.3.7 and 6.3.8.

6.3.2 Calibrating signal generator (MOD)

This procedure captures the calibration value for measurement using a modulated waveform.

(1) Measuring instruments

- Vector signal generator: MG3700A
- Power meter: ML2437A
- Power sensor: MA24002A
- 3-dB Attenuator: AT-103 (2 sets)

(2) Setup

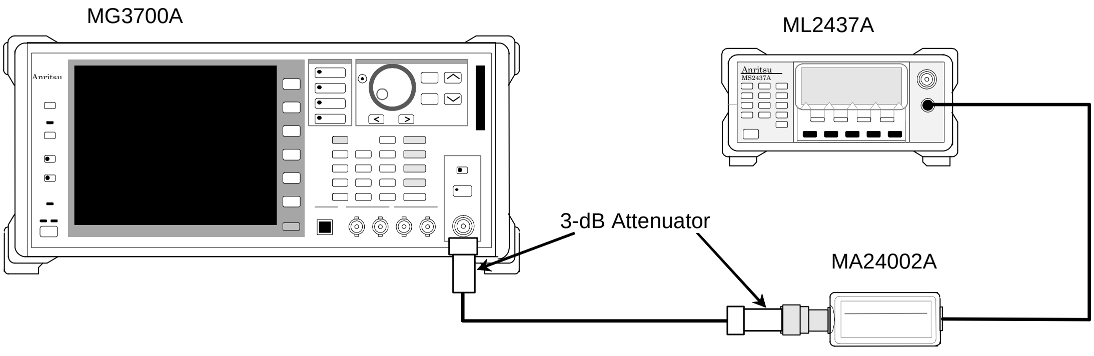

Figure 6.3.2-1 Signal Generator Calibration Setup (MOD)

(3) Procedure

1. Setup the instruments as shown in Figure 6.3.2-1.
2. Output a modulated 399.99 MHz signal from the Vector signal generator (SG) at a level of –4 dBm with Waveform pattern UL–RMC_12_2kbps.
3. Measure the level with the ML2437A Power Meter and adjust the SG so that the output level is –10 dBm.
4. Change the frequency as shown in Table 6.3.1-1 “Measurement Points and Frequency” and perform the same measurements to obtain the calibration value.

6.3.3 Calibrating linearity

This procedure captures the calibration value for measurements related to linearity.

(1) Measuring instruments

- Vector Signal Generator: MG3700A
- Signal Analyzer: MS269XA or MS2830A
- 3-dB Attenuator: AT-103 (2 sets)

(2) Setup

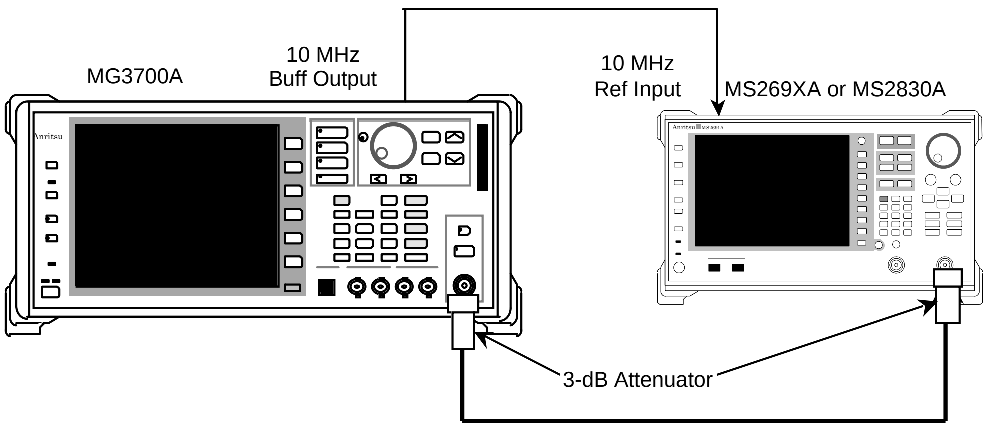

Figure 6.3.3-1 Linearity Calibration Setup

(3) 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. Output a 399.99 MHz signal from the Vector signal generator (SG) at a level of 0 dBm (output level reference). This output level reflects the calibration value for item 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. Change the frequency as shown in Table 6.3.1-1 “Measurement Points and Frequency” and perform the same measurements to obtain the calibration value.
7. Set the SA as shown in #2 of Table 6.3.3-1 “Signal Analyzer Settings”.

8. Change the SG output reference level to –25 dBm and repeat the measurements over in the same way down to a level of –40 dBm. Use the same frequency range/steps. (This output level reflects the calibration value for item 6.3.1.)

Table 6.3.3-1 Signal Analyzer Settings

	MS269xA or MS2830A						
	Application Switch	**RBW**	**Zone Width**	**Time Length**	**ATT**	**Preamp**	**Ref Level**
#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 Output EVM

This test measures the output signal EVM.

(1) Test specifications

EVM	Remarks
≤3%rms	400 to 2700 MHz (W-CDMA)

(2) Measuring instruments

- Signal Analyzer: MS269XA or MS2830A

(3) Setup

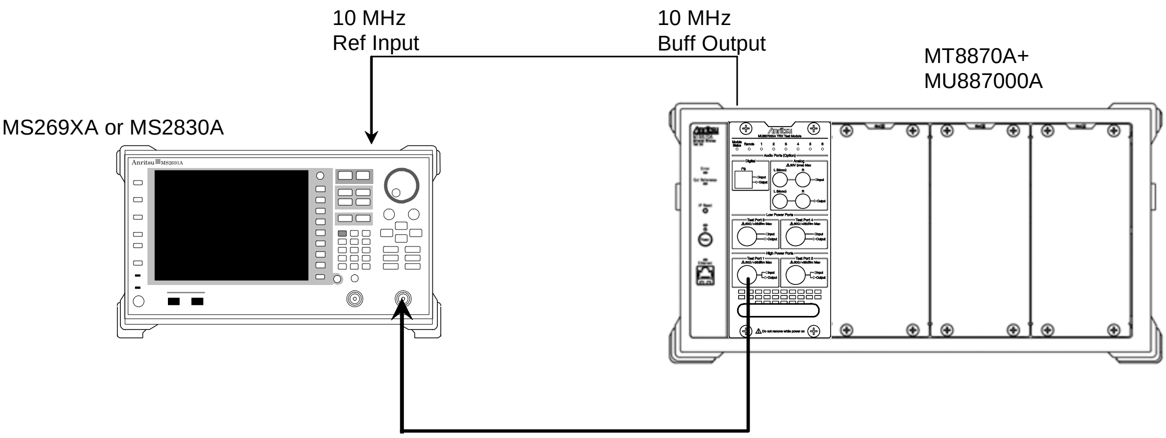

Figure 6.3.4-1 Output EVM Measurement Setup

(4) Procedure

1. Setup the instruments as shown in Figure 6.3.4-1.
2. Select the signal analyzer (SA) measurement software and set the following:

   Measurement software: MX269011A
   Input level: Output level of step 4
   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: –10.9 dBm
Input level: +35 dBm
Uplink frequency: 10 MHz

Test Port3

Output level: –0.9 dBm

Input level:	+25 dBm
Uplink frequency:	10 MHz

5. Set the MU887000A output frequency to 400 MHz and output the test pattern.

Download Package Select:	MV887011A_WCDMA_0002
Downlink pattern name:	Group No. 1
Connect port:	Test Port1 or Test Port3
Output level ON/OFF:	ON
Downlink frequency:	400 MHz

6. Measure the EVM at the SA.
7. In the same manner, change the MU887000A output frequency sequentially from 900, 2000, 2700 MHz and measure the EVM at each frequency.
8. Change the Test Port in steps 4 and 5 and repeat steps 4 to 7 over.

6.3.5 Tx Power measurement accuracy (CW)

This test is related to the accuracy of Tx power measurements.

(1) Test specifications

Test Port1/2

Measurement Accuracy	Input Level	Temperature
±0.5 dB	–25 dBm ≤, ≤+35 dBm	10 to 40°C
±0.7 dB	–55 dBm ≤, <–25 dBm	10 to 40°C
±0.9 dB	–65 dBm ≤, <–55 dBm	10 to 40°C

Test Port3/4

Measurement Accuracy	Input Level	Temperature
±0.7 dB	–25 dBm ≤, ≤+25 dBm	10 to 40°C
±0.9 dB	–55 dBm ≤, <–25 dBm	10 to 40°C
±1.1 dB	–65 dBm ≤, <–55 dBm	10 to 40°C

(2) Measuring instruments

- Vector signal generator: MG3700A
- 3-dB Attenuator: AT-103 (2 sets)

(3) Setup

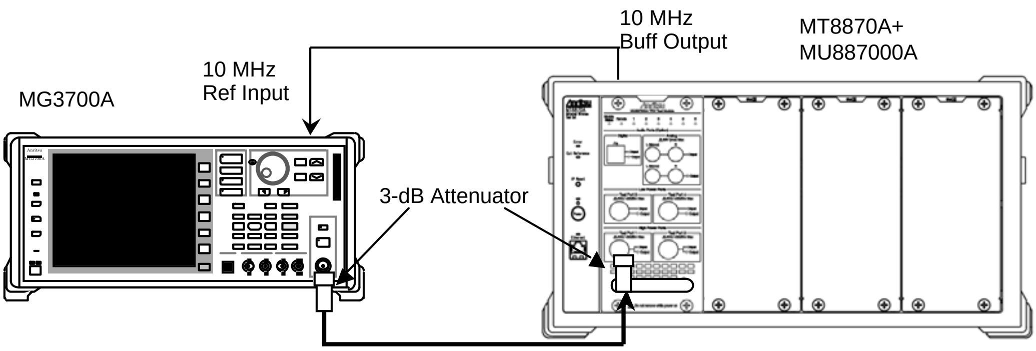

Figure 6.3.5-1 Setup for Measuring Amplitude Measurement Accuracy

6

Performance Test

(4) Test procedure

1. Setup the instruments as shown in Figure 6.3.5-1.
2. Set the MU887000A as follows:

Connect port:	Test Port1
Output level ON/OFF :	OFF
Input level:	–10 dBm
Uplink frequency:	400 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:	399.99 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 6.3.1-1 “Measurement Point and Frequency” and measure the Tx power.

   Result of Tx Power Measurement: Average value
5. Change the SG output level and MU887000A input level each to –55, and –65 dBm and repeat steps 2 to 4 over and measure the Tx power. (This output level reflects the calibration value for item 6.3.1.)
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.

6.3.6 Tx power measurement linearity

This test is related to the linearity of Tx power measurements.

(1) Test specifications

Linearity	Input Level, Range
±0.2 dB	–55 dBm ≤, –40 to 0 dB
±0.4 dB	–65 dBm ≤, –40 to 0 dB

(2) Measuring instruments

- Vector signal generator: MG3700A
- 3-dB Attenuator: AT-103 (2 sets)

(3) Setup

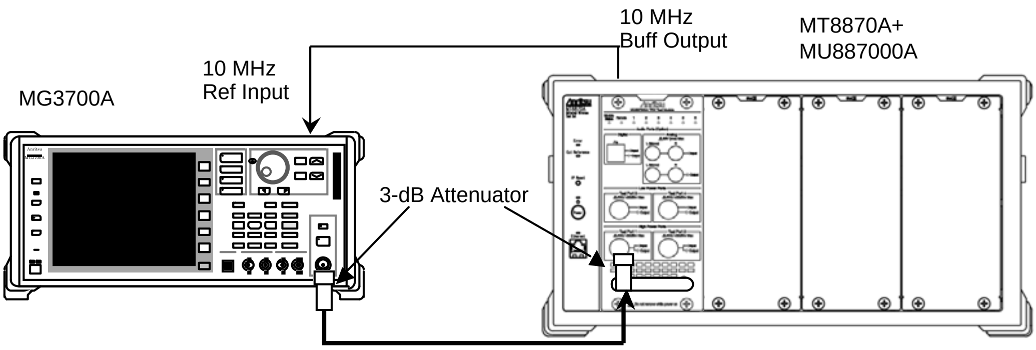

Figure 6.3.6-1 Setup for Measuring Tx Power Measurement Linearity

(4) Procedure

1. Setup the instruments as shown in Figure 6.3.6-1.
2. Set the MU887000A as follows:

Connect port:	Test Port1
Output level ON/OFF:	OFF
Input level:	0 dBm
Uplink frequency:	400 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:	399.99 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 6.3.1-1 “Measurement Point and Frequency” and repeat steps 2 to 7 over.
9. Change the SG output level and the MU887000A input level to –25 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.

6.3.7 Frequency/Modulation measurement

This test is related to the following modulation analyses.

- Carrier frequency accuracy
- Residual EVM

(1) Test specifications

Test Port1/2

Carrier frequency accuracy	±(Set frequency × Reference oscillator accuracy + 10 Hz)
Residual EVM	≤2.5% (rms)

Input level: –30 dBm ≤, ≤+35 dBm

Test Port3/4

Carrier frequency accuracy	±(Set frequency × Reference oscillator accuracy + 10 Hz)
Residual EVM	≤2.5% (rms)

Input level: –30 dBm ≤, ≤+25 dBm

(2) Measuring instruments

- Vector signal generator: MG3700A
- 3-dB Attenuator: AT-103 (2 sets)

(3) Setup

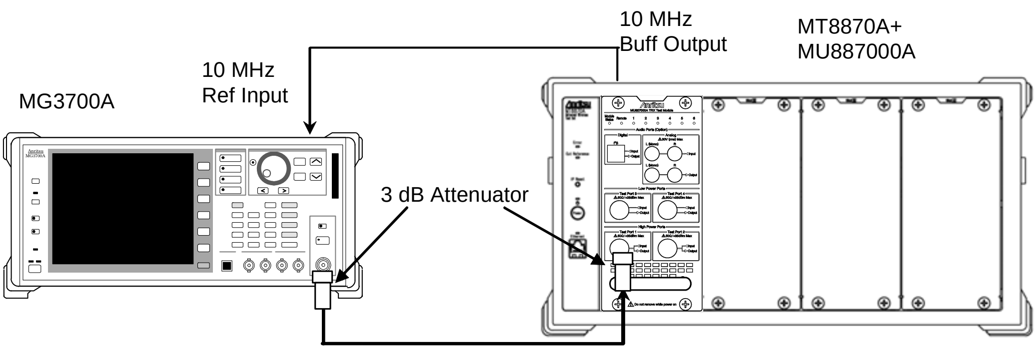

Figure 6.3.7-1 Setup for Measuring Frequency/Modulation

6 Performance Test

(4) Test procedure

1. Setup the instruments as shown in Figure 6.3.7-1.
2. Set the MU887000A as follows:

Connect port:	Test Port1
Output level ON/OFF:	OFF
Input level:	–10 dBm
Uplink frequency:	400 MHz
Turn Off All measurement:	OFF
Modulation Analysis measurement:	ON, 1 time

3. Set the Vector signal generator (SG) as follows:

Modulation:	ON
Waveform pattern:	UL_RMC_12_2kbp
Output frequency:	400 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 Table 6.3.1-1 "Measurement Point and Frequency" and repeat steps 2 to 4 over.
6. Change the SG output level and the MU887000A input level to –30 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.

6.3.8 Adjacent Channel Leakage Power Ratio

This test is related to Adjacent Channel Leakage Power Ratio measurements.

(1) Testing specifications

Test Port1/2

Adjacent Channel Leakage Power Ratio	Measurement Point
≥50 dB	5 MHz detuning
≥55 dB	10 MHz detuning

Input level range: –10 dBm ≤, ≤+35 dBm

Test Port3/4

Adjacent Channel Leakage Power Ratio	Measurement Point
≥50 dB	5 MHz detuning
≥55 dB	10 MHz detuning

Input level range: –10 dBm ≤, ≤+25 dBm

(2) Measuring instruments

- Vector signal Generator: MG3700A
- 3-dB Attenuator: AT-103 (2 sets)

(3) Setup

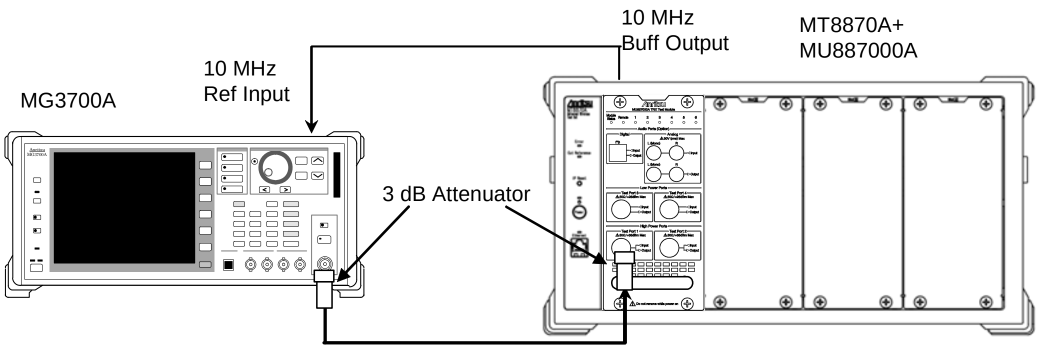

Figure 6.3.8-1 Setup for Measuring Adjacent Channel Leakage Power Ratio

(4) Test procedure

1. Setup the instruments as shown in Figure 6.3.8-1.
2. Set the MU887000A as follows:

Connect port:	Test Port1
Output level ON/OFF:	OFF
Input level:	–10 dBm
Uplink frequency:	400 MHz

Turn Off All measurement: OFF
ACLR measurement: ON, 1 time

3. Set the Vector signal generator (SG) as follows:

   Modulation: ON
   Waveform pattern: UL_RMC_12_2kbp
   Output frequency: 400 MHz
   Output level: –10 dBm (This output level reflects the calibration value for item 6.3.2.)

4. Measure the Adjacent Channel Leakage Power Ratio for ±5 MHz and ±10 MHz.

   ACLR result: Average value

5. Change the MU887000A and SG frequencies according to Table 6.3.1-1 "Measurement Point and Frequency" 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.

6.3.9 About evaluation signals

The evaluation signals (Waveform pattern) described in the performance test items 6.3.2, 6.3.7, 6.3.8 are set as follows. When the user is executing performance tests, set the SG actually used based on the following setting contents.

Install the MG3700A-002 Mechanical Attenuator option in the MG3700A. In addition, the MG3700A-011 High Frequency 6 GHz option is required to support Opt-015/016.

Outline of Evaluation Signals

3GPP2 TS 34.121 Annex C.2.1 describes the UL reference measurement channel (12.2 kbps).

Select ULRMC12k at Pattern Select at the MG3700A Digital Modulation Signal Generator for sending the UL reference measurement channel (12.2 kbps).

6.3.10 Sample format for performance test result sheets

Use the following test result sheets when testing the MX887011A 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	–25 dBm
400			
480			
880			
940			
1000			
1800			
2000			
2200			
2700			

SG Calibration (MOD)

SG Calibration (MOD)

MG3700A Modulation Wave

Frequency (MHz)	**SG Setting (dBm)**
	–10 dBm
400	
480	
880	
940	
1000	
1800	
2000	
2200	
2700	

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)
400	0	(A)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	
480	0	(A)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	
880	0	(A)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	
940	0	(A)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	
1000	0	(A)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	
1800	0	(A)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	

Linearity Calibration (continued)

Linearity Calibration (continued)

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)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	
2200	0	(A)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	
2700	0	(A)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	

Output EVM

Output EVM

Frequency (MHz)	EVM (%) Test Port1 MU887000A Output Level: –10.9 dBm			EVM (%) Test Port3 MU887000A Output Level: –0.9 dBm		
	Measured Value	Spec.	Measurement uncertainty	Measured Value	Spec.	Measurement uncertainty
400		≤ 3.0	0.2		≤ 3.0	0.2
900						
2000						
2700						

Tx Power Measurement Accuracy (CW)

Tx Power Measurement Accuracy Port1/2

MU887000A Input Level: –10 dBm (Item 6.3.1 Calibration Value)

Frequency (MHz)	MX887011A Measured Value (P) (dBm)	Measurement Accuracy (dB)			
		Lo Limit	Measurement Accuracy –10 – (P)	Hi Limit	Measurement uncertainty
400					
480					
880					
940					
1000		–0.5		+0.5	±0.15
1800					
2000					
2200					
2700					

Tx Power Measurement Accuracy Port1/2

MU887000A Input Level: –55 dBm (Item 6.3.3 Calibration Value)

Frequency (MHz)	Item 6.3.3 –55 dBm Calibration Value (C) (dB)	MX887011A Measured Value (P) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –25 + (C) – (P)	Hi Limit	Measurement uncertainty
400						
480						
880						
940						
1000			–0.7		+0.7	±0.13
1800						
2000						
2200						
2700						

Tx Power Measurement Accuracy (CW) (continued)

Tx Power Measurement Accuracy Port1/2

MU887000A Input Level: –65 dBm (Item 6.3.3 Calibration Value)

Frequency (MHz)	Item 6.3.3 –65 dBm Calibration Value (C) (dB)	MX887011A Measured Value (P) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –25 + (C) – (P)	Hi Limit	Measurement uncertainty
400			–0.9		+0.9	±0.13
480						
880						
940						
1000						
1800						
2000						
2200						
2700						

Tx Power Measurement Accuracy (CW) (continued)

Tx Power Measurement Accuracy Port3/4

MU887000A Input Level: –10 dBm (Item 6.3.1 Calibration Value)

Frequency (MHz)	MX887011A Measured Value (P) (dBm)	Measurement Accuracy (dB)			
		Lo Limit	Measurement Accuracy –10 – (P)	Hi Limit	Measurement uncertainty
400		–0.7		+0.7	±0.17
480					
880					
940					
1000					
1800					
2000					
2200					
2700					

Tx Power Measurement Accuracy Port3/4

MU887000A Input Level: –55 dBm (Item 6.3.3 Calibration Value)

Frequency (MHz)	Item 6.3.3 –55 dBm Calibration Value (C) (dB)	MX887011A Measured Value (P) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –25 + (C) – (P)	Hi Limit	Measurement uncertainty
400			–0.9		+0.9	±0.14
480						
880						
940						
1000						
1800						
2000						
2200						
2700						

Tx Power Measurement Accuracy (CW) (continued)

Tx Power Measurement Accuracy Port3/4

MU887000A Input Level: –65 dBm (Item 6.3.3 Calibration Value)

Frequency (MHz)	Item 6.3.3 –65 dBm Calibration Value (C) (dB)	MX887011A Measured Value (P) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –25 + (C) – (P)	Hi Limit	Measurement uncertainty
400			–1.1		+1.1	±0.14
480						
880						
940						
1000						
1800						
2000						
2200						
2700						

Tx Power Measurement Linearity

Linearity (Reference Level 0 dBm)

Frequency (MHz)	SG Level (dBm)	Item 6.3.3 Calibration Value (dB)	MX887011A Measured Value (dBm)	Linearity (D) – (REF) – (C) (dB)	Spec. (dB)	Measurement uncertainty
400	0		(REF)			
	–10	(C)	(D)		±0.2	±0.05
	–20	(C)	(D)			
	–30	(C)	(D)			
	–40	(C)	(D)			
480	0		(REF)			
	–10	(C)	(D)		±0.2	±0.05
	–20	(C)	(D)			
	–30	(C)	(D)			
	–40	(C)	(D)			
880	0		(REF)			
	–10	(C)	(D)		±0.2	±0.05
	–20	(C)	(D)			
	–30	(C)	(D)			
	–40	(C)	(D)			
940	0		(REF)			
	–10	(C)	(D)		±0.2	±0.05
	–20	(C)	(D)			
	–30	(C)	(D)			
	–40	(C)	(D)			
1000	0		(REF)			
	–10	(C)	(D)		±0.2	±0.05
	–20	(C)	(D)			
	–30	(C)	(D)			
	–40	(C)	(D)			
1800	0		(REF)			
	–10	(C)	(D)		±0.2	±0.05
	–20	(C)	(D)			
	–30	(C)	(D)			
	–40	(C)	(D)			

Tx Power Measurement Linearity (continued)

Linearity (Reference Level 0 dBm)

Frequency (MHz)	SG Level (dBm)	Item 6.3.3 Calibration Value (dB)	MX887011A Measured Value (dBm)	Linearity (D) – (REF) – (C) (dB)	Spec. (dB)	Measurement uncertainty
2000	0		(REF)			
	–10	(C)	(D)		±0.2	±0.05
	–20	(C)	(D)			
	–30	(C)	(D)			
	–40	(C)	(D)			
2200	0		(REF)			
	–10	(C)	(D)		±0.2	±0.05
	–20	(C)	(D)			
	–30	(C)	(D)			
	–40	(C)	(D)			
2700	0		(REF)			
	–10	(C)	(D)		±0.2	±0.05
	–20	(C)	(D)			
	–30	(C)	(D)			
	–40	(C)	(D)			

Tx Power Measurement Linearity (continued)

Linearity (Reference Level – 25 dBm)

Frequency (MHz)	SG Level (dBm)	Item 6.3.3 Calibration Value (dB)	MX887011A Measured Value (dBm)	Linearity (D) – (REF) – (C) (dB)	Spec. (dB)	Measurement uncertainty
400	–25		(REF)			
	–35	(C)	(D)			
	–45	(C)	(D)		±0.2	±0.05
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05
480	–25		(REF)			
	–35	(C)	(D)			
	–45	(C)	(D)		±0.2	±0.05
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05
880	–25		(REF)			
	–35	(C)	(D)			
	–45	(C)	(D)		±0.2	±0.05
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05
940	–25		(REF)			
	–35	(C)	(D)			
	–45	(C)	(D)		±0.2	±0.05
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05
1000	–25		(REF)			
	–35	(C)	(D)			
	–45	(C)	(D)		±0.2	±0.05
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05
1800	–25		(REF)			
	–35	(C)	(D)			
	–45	(C)	(D)		±0.2	±0.05
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05

Tx Power Measurement Linearity (continued)

Linearity (Reference Level – 25 dBm) (continued)

Frequency (MHz)	SG Level (dBm)	Item 6.3.3 Calibration Value (dB)	MX887011A Measured Value (dBm)	Linearity (D) – (REF) – (C) (dB)	Spec. (dB)	Measurement uncertainty
2000	–25		(REF)			
	–35	(C)	(D)		±0.2	±0.05
	–45	(C)	(D)			
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05
2200	–25		(REF)			
	–35	(C)	(D)		±0.2	±0.05
	–45	(C)	(D)			
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05
2700	–25		(REF)			
	–35	(C)	(D)		±0.2	±0.05
	–45	(C)	(D)			
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05

Frequency/Modulation Measurement

Residual EVM/Carrier Frequency Accuracy

MU887000A Input Level: –10 dBm

Frequency (MHz)	Residual EVM (%)			Carrier Frequency Accuracy (Hz)		
	Measured Value	Spec.	Measurement uncertainty	Measured Value	Spec.	Measurement uncertainty
400		≤2.5	±0.1		±10.0	±2.0
480						
880						
940						
1000						
1800						
2000						
2200						
2700						

MU887000A Input Level: –30 dBm

Frequency (MHz)	Residual EVM (%)			Carrier Frequency Accuracy (Hz)		
	Measured Value	Spec.	Measurement uncertainty	Measured Value	Spec.	Measurement uncertainty
400		≤2.5	±0.1		±10.0	±2.0
480						
880						
940						
1000						
1800						
2000						
2200						
2700						

Adjacent Channel Leakage Power Ratio Measurement

Adjacent Channel Leakage Power Ratio

	Adjacent Channel Leakage Power Ratio (dB)			
	MU887000A Input Level: –10 dBm			
Frequency (MHz)	Detuning Frequency (MHz)			
	–10	–5	+5	+10
400				
480				
880				
940				
1000				
1800				
2000				
2200				
2700				
Spec. (dB)	≥55	≥50	≥50	≥55
Measurement uncertainty	1 dB			

6.4 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 MX887011A W-CDMA/HSPA Uplink TX Measurement. Refer to section 1.3 “Composition” for details of the product configuration.

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　MX887011A Specifications

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Common Items
Frequency
Measurement Target</td><td>
400 to 2700 MHz
W-CDMA Uplink signals</td></tr>
<tr><td>Tx Power Measurement
Input Level Range

Measurement Accuracy

Linearity

Relative Measurement Error</td><td>
Port1, Port2: –65.0 to +35.0 dBm
Port3, Port4: –65.0 to +25.0 dBm

Port1, Port2: After calibration, 10° to 40°C
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–25 to +35 dBm</td><td>±0.3 dB (typ.)
±0.5 dB</td></tr>
<tr><td>–55 to –25 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–65 to –55 dBm</td><td>±0.9 dB</td></tr>
</table>
Port3, Port4: After calibration, 10° to 40°C
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–25 to +25 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–55 to –25 dBm</td><td>±0.9 dB</td></tr>
<tr><td>–65 to –55 dBm</td><td>±1.1 dB</td></tr>
</table>
<table>
<tr><th>Input Level</th><th>Linearity</th></tr>
<tr><td>≥–55 dBm (0 to 40 dB)</td><td>±0.2 dB</td></tr>
<tr><td>≥–65 dBm (0 to 40 dB)</td><td>±0.4 dB</td></tr>
</table>
For range <2 dB
<table>
<tr><th>Input Level</th><th>Relative Measurement Error</th></tr>
<tr><td>≥–55 dBm (0 to 40 dB)</td><td>±0.1 dB (typ.)</td></tr>
</table>
</td></tr>
</table>

Table A-1 MX887011A Specifications (Cont'd)

Item	Specification
Modulation Analysis	
Input Level Range	Port1, Port2: –30.0 to +35.0 dBm Port3, Port4: –30.0 to +25.0 dBm
Carrier Frequency Accuracy	±(Set frequency × Reference oscillator accuracy + 10 Hz)
Modulation Accuracy	Residual Vector Error: ≤2.5% (At single DPCCH and single DPDCH input)
Occupied Bandwidth	
Input Level Range	Port1, Port2: –10.0 to +35.0 dBm Port3, Port4: –10.0 to +25.0 dBm
Occupation Ratio	80.0% to 99.9 %
Adjacent Channel Leakage Power Ratio	
Input Level Range	Port1, Port2: –10.0 to +35.0 dBm Port3, Port4: –10.0 to +25.0 dBm
Measurement Point	±5 MHz, ±10 MHz
Measurement Range	See table below

Measurement Point	Measurement Range
±5 MHz	≥ 50 dB
±10 MHz	≥ 55 dB

References are page numbers.

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W