MX887023A
LTE FDD
Downlink TX Measurement
Operation Manual

Second 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-W3703AE-2.0

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These indicate that the marked part should be recycled.

MX887023A
LTE FDD Downlink TX Measurement
Operation Manual

15 August 2014 (First Edition)
30 September 2014 (Second Edition)

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- 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.
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- 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.
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- Adding software
  Do not download or install software that has not been specifically recommended or licensed by Anritsu.
- Network connections
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1. Product Model

Software: MX887023A LTE FDD Downlink TX Measurement

2. Applied Directive and Standards

When MX887023A LTE FDD Downlink TX Measurement is installed in the MT8870A, the applied directive and standards of this software conform to those of the MT8870A main frame.

PS: About main frame
Please contact Anritsu for the latest information on the main frame types that MX887023A can be used with.

C-Tick Conformity Marking

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

C-Tick mark

1. Product Model

Software: MX887023A LTE FDD Downlink TX Measurement

2. Applied Directive and Standards

When MX887023A LTE FDD Downlink TX Measurement is installed in the MT8870A, the applied directive and standards of this software conform to those of the MT8870A main frame.

PS: About main frame
Please contact Anritsu for the latest information on the main frame types that MX887023A can be used with.

About This Manual

This manual mainly describes the use, panels, and specifications of the MX887023A LTE FDD Downlink TX Measurement .

Products related to the MT8870A Universal Wireless Test Set include:

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

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

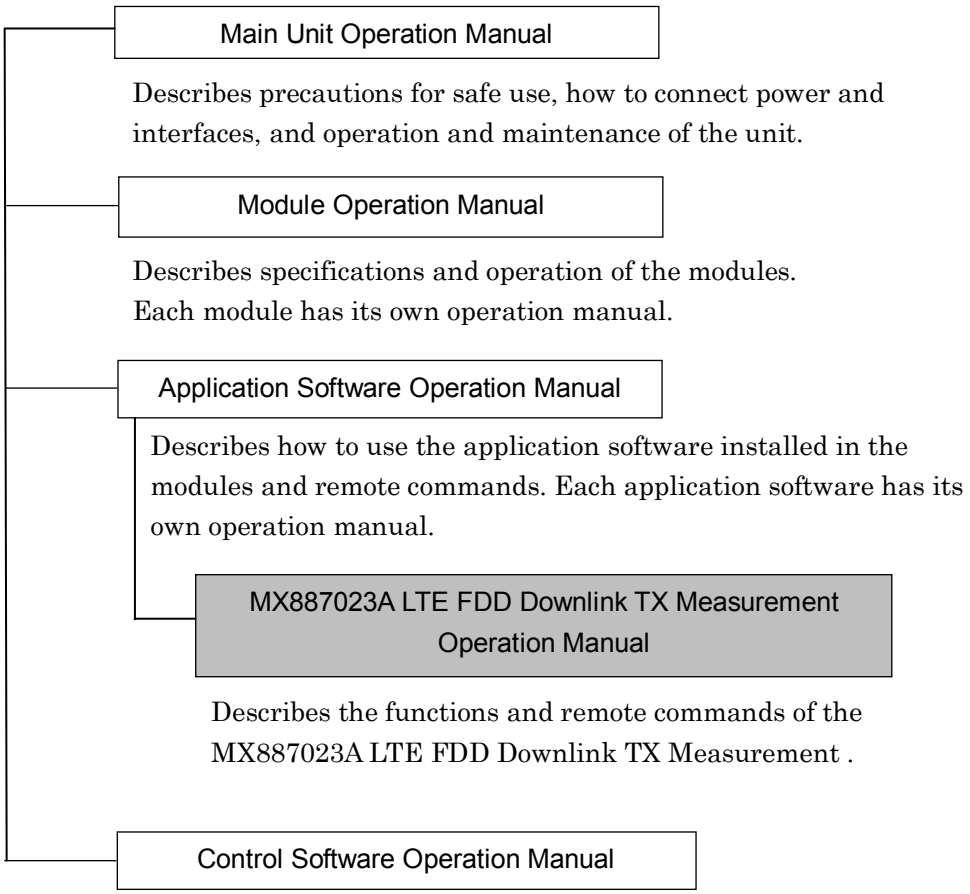

Table of Contents

IV.

Chapter 1 Outline

This chapter outlines the MX887023A LTE FDD Downlink TX Measurement. Refer to Appendix A Specifications for the software functions and performance.

1.1 Outline of LTE FDD Downlink TX Measurement

The MX887023A LTE FDD Downlink TX Measurement is application software for adding the radio performance measurement function for the LTE (Long Term Evolution) FDD system to the MU887000A TRX Test Module.

The transmissions from MU887000A to a base station are defined as Uplink, and those from a base station to MU887000A as Downlink.

1.2 Composition

The composition of the MX887023A is shown in Table 1.2-1, Table 1.2-2.

Table 1.2-1 MX887023A Composition

Item	Model/Code	Name	Qty	Remarks
Software		DVD-R	1	
	MX887023A	LTE FDD Downlink TX Measurement		License file included on DVD-R
	W3703AE	MX887023A LTE FDD Downlink TX Measurement Operation Manual		English, on DVD-R

1.3 License Registration

Before the MX887023A LTE FDD Downlink software can be used, the software license must be registered in the MT8870A.

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

1.4 Abbreviations

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

Table 1.4-1 Abbreviations

Abbreviation	Name
ACLR	Adjacent Channel Leakage Ratio
AWGN	Additive White Gaussian Noise
CQI	Channel Quality Indicator
DL	Downlink
E-TM	E-UTRA Test Model
E-UMTS	Evolved Universal Mobile Telecommunication System
E-UTRA	Evolved Universal Terrestrial Radio Access
EVM	Error Vector Magnitude
FDD	Frequency Division Duplex
LTE	Long Term Evolution
OBUE	Operating Band Unwanted Emissions
OBW	Occupied Bandwidth
OFDM	Orthogonal Frequency-Division Multiplexing
OSTP	OFDM Symbol Tx Power
PDCCH	Physical Downlink Control Channel
PDSCH	Physical Downlink Shared Channel
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase Shift Keying
RB	Resource Block
RMC	Reference Measurement Channel
RS	Reference Signal
RSTP	Reference Signal Transmit Power
SCPI	Standard Commands for Programmable Instruments
SEM	Spectrum Emission Mask
SG	Signal Generator
TS	Technical Specification
UTRA	UMTS Terrestrial Radio Access

Chapter 2 Fundamental Measurement

This chapter describes the fundamental functions and commands of the MX887023A. For details of the commands, refer to Chapter 3, "SCPI Command Reference".

2.1 Common Operations

This section describes operations that are common to the measurements. Both Native and SCPI commands are described in the introduction to commands.

2.1.1 Selecting application

Switch the MU887000A application software to small cell by setting the parameter to SMALLCELL using the following command:

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

2.1.2 Selecting measurement function

Select a measurement function of small-cell application software using the following command:
To measure LTE FDD Downlink Tx signals with MU887000A, set `3GLTE_DL,ACT` to the parameters. (=LTE FDD Downlink Tx measurement function)
To transmit LTE FDD Uplink signals or other signals, such as interfering signals, from MU887000A, set `SG,ACT` to the parameters. (=SG function)

```
:INSTrument:SYSTem
```

2.1.3 Setting ports

Set the MU887000A ports to be used. The following command sets both the port for transmitting and receiving the signals.

Transmitting ports are used by the SG function.
Receiving ports are used by the LTE FDD Downlink Tx measurement function.
Set Port1 to Port4 at the parameter

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

The loss of coaxial cables can be corrected for the output, input, and measured levels of the respective ports.
For the descriptions of the cable loss correction commands and loss correction data, refer to Chapter 3 “Fundamental Operation” in the *MU887000A TRX Test Module Operation Manual*.

2.2 Common Operations for SG Function

This section describes common operations in the case where the SG function is selected in 2.1.2 “Selecting measurement functions”.

2.2.1 Frequency and level

Frequency

Set the frequency of the transmission signal by the MU887000A using the following command:

```
[:SOURce]:FREQuency[:CW|:FIXed] <freq>
```

Level

Set the level of the transmission signal by the MU887000A using the following command:

```
[:SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude]
```

2.2.2 Setting transmission signal

To transmit the waveform pattern from MU887000A by using the Small Cell 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. Set the Modulation On/Off and Output On/Off.

Using the following commands, select a waveform file, and set modulation and output On and Off.

- Output On/Off
  `:OUTPut[:STATe]`
- Modulation On/Off
  `:OUTPut:MODulation[:STATe]`
- Waveform Pattern Select
  `[:SOURce]:RADio:ARB:WAVeform`

Load the waveform file into the waveform memory using the following commands:
Refer to Chapter 5 “SCPI Command Reference” in the MU887000A TRX Test Module Operation Manual.

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

2.2.3 Waveform patterns

To send an LTE waveform pattern for small cell, specify a file in the MV887023A LTE FDD Uplink Waveform files as the waveform file.

Refer to Chapter 3, “Waveform File Details” in the *Waveform File for Small Cell Application Operation Manual* for the descriptions of the MV887023A LTE FDD Uplink Waveform files.

2.3 Common Operations for LTE FDD Downlink Tx Measurement Function

This section describes common operations in the case where the LTE FDD Downlink Tx measurement function is selected in 2.1.2 “Selecting measurement functions”.

The LTE FDD Downlink Tx measurement function does not have any specific Native commands. In Native mode, only SCPI commands in short form can be received. For details on conversion rules, refer to Chapter 3, “SCPI Command Reference”.

2.3.1 Frequency and level

Frequency

Set the Rx frequency of MU887000A using the following command:

```
[:SENSe]:BATCh:BAND[0]:FREQuency:CENTer
```

Level

Set the level of the signal received by the MU887000A using the following command:

```
[:SENSe]:BATCh:BAND[0]:POWer[:RF]:RANGe:ILEVel
```

2.3.2 Setting LTE signals

Set the following items to configure the LTE signal.

Channel Bandwidth

An LTE system has a variable transmission bandwidth called the channel bandwidth. The specified channel bandwidth values are 1.4, 3, 5, 10, 15, and 20 MHz.
Set the channel bandwidth of the measurement target signal using the following command:

```
[:SENSe]:BATCh:CC[0]:RADio:CBANdwidth
```

Type of test model

The following six test model signals (E-UTRA Test Models) for radio performance tests on LTE base station are defined in the 3GPP TS 36.141, Section 6.1.1:
E-TM1.1, E-TM1.2, E-TM2, E-TM3.1, E-TM3.2, E-TM3.3
Using the following command, set the type of MX887023A's test model to Off (when not using any test model) or one of the above-mentioned six types:

```
[:SENSe]:BATCh:CC[0]:RADio:TMODel
```

When the type of test model is set to Off, the detailed signal parameters (for example, synchronization signal On/Off, boost level of physical channel) can be set. (When one of the test models is selected, these parameters are automatically set to the default values.)
Refer to Chapter 3, "SCPI Command Reference" for details.

2.3.3 Setting measurement

Set the following measurement items.

- On/Off of measurement in 2.4 "Modulation Analysis"measurement
  `[:SENSe]:BATCh:EVM[:STATe]`
- On/Off of measurement in 2.5 "Occupied BandWidth (OBW)"
  `[:SENSe]:BATCh:OBW[:STATe]`
- On/Off of measurement in 2.6 "Adjacent Channel Leakage power Ratio (ACLR)"
  `[:SENSe]:BATCh:ACLR[:STATe]`
- On/Off of measurement in 2.7 "Operating Band Unwanted Emissions (OBUE)"
  `[:SENSe]:BATCh:OBUE[:STATe]`

2.3.4 Starting measurement

Starting measurement

Start measurement using the following command:

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

```
:INITiate:MODE:SINGle
```

Checking measurement status

Query the measurement status and errors using the following command:

```
:STATus:ERRor?
```

Table 2.3.4-1 Bit Definition of Query Response

Response	Description
15 to 5	Not used and always set to 0
4	Set to 1 if the transfer measurement status is Timeout. No trigger is received during the measurement.
3	Not used and always set to 0.
2	Set to 1 if the status is Signal Abnormal.
1	Set to 1 if the status is Level Over.
0	Set to 1 if the status is Not-Yet-Measured.

2.4 Modulation Analysis

Modulation analysis measures:

- Frequency Error
- Error Vector Magnitude (EVM)
- Tx Power
- RS Power (RSTP)
- OFDM Symbol Tx Power (OSTP)

Using the following commands, set the subframes that are subject to modulation analysis, set whether or not to perform averaging, and set the storage count.
Modulation analysis of the specified subframes is performed each time measurement is performed.
Averaging is performed on consecutive frames, and its storage count can be set in the range of 2 to 100.

```
[:SENSe]:BATCh:CAPTure:TIME:STARt
[:SENSe]:BATCh:CAPTure:TIME:LENGth
[:SENSe]:BATCh:AVERage[:STATe]
[:SENSe]:BATCh:AVERage:COUNt
```

To query measurement results of modulation analysis, specify 1 to the parameter n in the following query commands:

```
:FETCh:BATCh[n]?
:READ:BATCh[n]?
:MEASure:BATCh[n]?
```

The respective measurement items are described in the following subsections.

2.4.1 Frequency Error

Frequency error measurement measures the downlink carrier frequency error.

Set the downlink frequency as the reference frequency for error measurement by referring to Section 2.3.1 “Frequency and level”.

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

2.4.2 Error Vector Magnitude (EVM)

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.

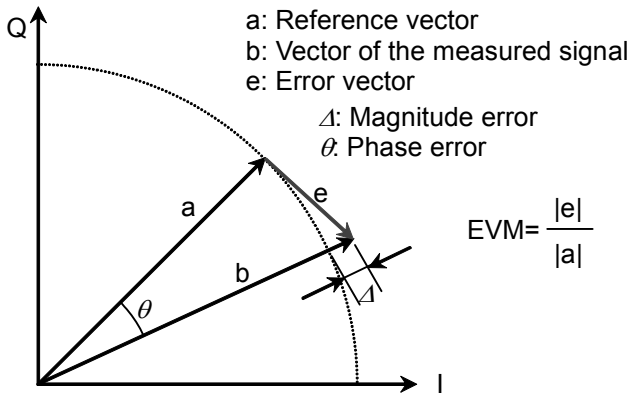

Figure 2.4.2-1 Definition of EVM

EVM of PDSCH is measured by Downlink Tx measurement. MX887023A supports measurement of EVM of the three modulation schemes (QPSK, 16QAM and 64QAM) defined in the 3GPP TS 36.141.

2.4.3 Output Power

Output Power is the average RF level including Cyclic Prefix.

By setting the frequency as described in 2.3.1 “Frequency and level,” the center frequency for power measurement is decided.

2.4.4 Tx Power

Tx Power is a power level filtered in a channel bandwidth and is equivalent to Mean Power defined in the 3GPP TS36.141.

The center frequency of the power measurement is determined by the frequency set in 2.3.1, “Frequency and level”.
The frequency range of the power measurement is determined by the channel bandwidth set in 2.3.2, “Setting LTE signals”.

2.4.5 RS Power (RSTP)

RS Power is the average power of all resource elements in Reference Signal, which is defined in 3GPP TS 36.141, Annex F.

2.4.6 OFDM Symbol Tx Power (OSTP)

OFDM Symbol Tx Power is the total power of all resource elements in the 4th symbol within a subframe and is defined in the 3GPP TS 36.141, Annex F.

2.5 Occupied Bandwidth (OBW)

OBW is the spectrum bandwidth that occupies a certain ratio (99% as defined in the 3GPP TS 36.141) of the total measured power.

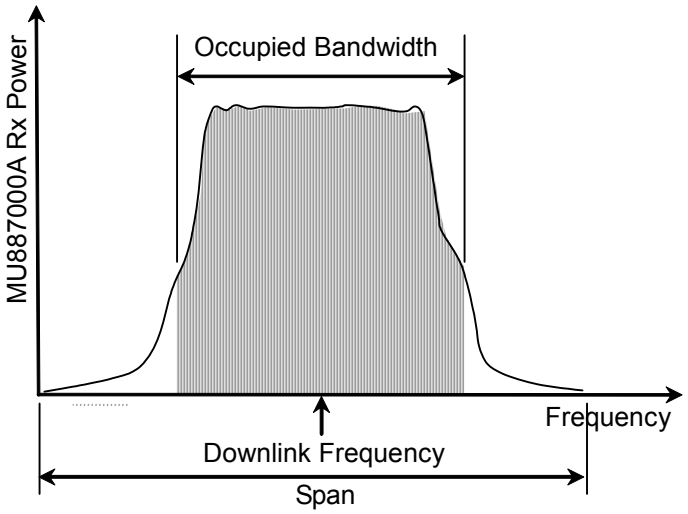

Figure 2.5-1 Occupied Bandwidth

The Occupied Bandwidth measurement settings are:

Downlink frequency

Specify the center frequency by referring to:

- Frequency described in Section 2.3.1 “Frequency and level”

Span

The frequency span is determined by the channel bandwidth setting, referring to Section 2.3.2 “Setting LTE signals”. The following shows the frequency span for occupied bandwidth measurements that is defined in the 3GPP TS 36.141, Table 6.6.1.4.2-1.

Table 2.5-1 Frequency Span for Occupied Bandwidth Measurements

Channel Bandwidth	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Span (MHz)	10	10	10	20	30	40

Measurement enable and measurement count

Using the following commands, set the section that is subject to OBW analysis, set whether or not to perform averaging, and set the storage count.

OBW measurement of the specified signal section is performed each time measurement is performed.

Averaging is performed on consecutive frames, and its storage count can be set in the range of 1 to 100.

```
[:SENSe]:BATCh:CAPTure:TIME:UWEMissions:STARt
[:SENSe]:BATCh:CAPTure:TIME:UWEMissions:LENGth
[:SENSe]:BATCh:AVERage:UWEMissions[:STATe]
[:SENSe]:BATCh:AVERage:UWEMissions:COUNt
```

To query results of OBW measurement, specify 2 to the parameter n in the following query commands:

```
:FETCh:BATCh[n]?
:READ:BATCh[n]?
:MEASure:BATCh[n]?
```

2.6 Adjacent Channel Leakage Power Ratio (ACLR)

ACLR is the ratio of in-band power to the power leaking to adjacent channels.

The E-UTRA (LTE) and UTRA (W-CDMA) bands are specified for adjacent channels. The measurement covers the power leaked to two adjacent channels on each side.

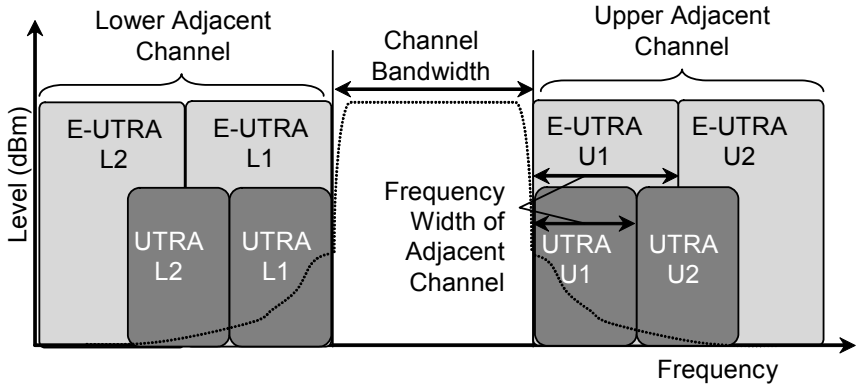

Figure 2.6-1 Adjacent Channels for ACLR Measurement

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

Table 2.6-1 Adjacent Channel Measurement Bandwidth (MHz)

Channel Bandwidth	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
UTRA	3.84	3.84	3.84	3.84	3.84	3.84
E-UTRA	1.08	2.7	4.5	9.0	13.5	18

The ACLR measurement settings are:

Measurement enable and measurement count

Using the following commands, set the section that is subject to ACLR analysis, set whether or not to perform averaging, and set the storage count.

ACLR measurement of the specified signal section is performed each time measurement is performed.

Averaging is performed on consecutive frames, and its storage count can be set in the range of 1 to 100.

```
[:SENSe]:BATCh:CAPTure:TIME:UWEMissions:STARt
[:SENSe]:BATCh:CAPTure:TIME:UWEMissions:LENGth
[:SENSe]:BATCh:AVERage:UWEMissions[:STATe]
```

```
[:SENSe]:BATCh:AVERage:UWEMissions:COUNt
```

To query results of ACLR measurement, specify 2 to the parameter n in the following query commands:

```
:FETCh:BATCh[n]?
:READ:BATCh[n]?
:MEASure:BATCh[n]?
```

2.7 Operating Band Unwanted Emissions (OBUE)

OBUE are obtained by measuring the following items of the spectrum within the frequency range defined in the 3GPP TS 36.141, Section 6.6.3 "Operating band unwanted emissions":

- Peak levels
- Frequency values
- Level margins with respect to the limit lines

The frequency range of each OBUE limit line will be referred to as "range", in documentation regarding MX887023A. From the edge of the channel bandwidth, numbers are assigned to ranges in order of 0, 1, 2... The number of ranges and frequency range vary depending on the setting of channel bandwidth and limit lines.

If the settings are made to measure the limit lines for additional requirements in certain regions or conditions, that is, if the [:SENSe]:BATCh:BAND[0]:OBUE:STANdard:ADDitional command is set to other than OFF, the Additional ranges described by blue limit lines in the following figure are added.

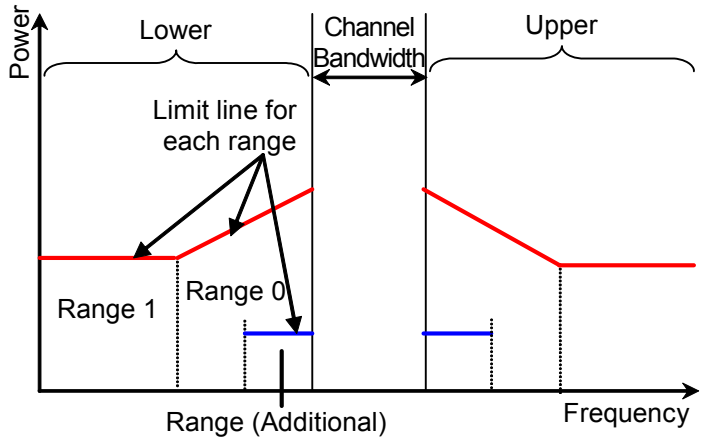

Figure 2.7-1 Frequency Range of the Respective OBUE Limit Lines

The OBUE measurement settings are:

Setting the limit lines

Limit lines are provided as templates consisting of frequency values and other specification values for the respective ranges defined in the 3GPP TS 36.141. Select a limit line template using the following command:

```
[:SENSe]:BATCh:BAND[0]:OBUE:STANdard
[:SENSe]:BATCh:BAND[0]:OBUE:STANdard:ADDitional
```

The definition of limit lines in the respective templates varies depending on the channel bandwidth as shown below.

Note:

The channel bandwidth edge on each side becomes a reference of each start frequency and end frequency.

The start and end levels are connected by a straight line on the dB scale.

Table 2.7-1 Definition of Limit Lines in the Respective Templates (1/6)

[Channel Bandwidth] Template Name	Parameter [Unit]	Range					
		0	1	2	3	4	5
[1.4 MHz] WIDE_A_U1G WIDE_A_O1G_U3G WIDE_B1_U1G WIDE_B1_O1G_U3G	Start Freq. [MHz]	0.05	1.45	None	None	None	None
	End Freq. [MHz]	1.45	2.85	None	None	None	None
	Start Level [dBm]	0.5	–9.5	None	None	None	None
	End Level [dBm]	–9.5	–9.5	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[3 MHz] WIDE_A_U1G WIDE_A_O1G_U3G WIDE_B1_U1G WIDE_B1_O1G_U3G	Start Freq. [MHz]	0.05	3.05	None	None	None	None
	End Freq. [MHz]	3.05	6.05	None	None	None	None
	Start Level [dBm]	–3.5	–13.5	None	None	None	None
	End Level [dBm]	–13.5	–13.5	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[≥ 5 MHz] WIDE_A_U1G WIDE_A_O1G_U3G WIDE_B1_U1G WIDE_B1_O1G_U3G	Start Freq. [MHz]	0.05	5.05	None	None	None	None
	End Freq. [MHz]	5.05	10.05	None	None	None	None
	Start Level [dBm]	–5.5	–12.5	None	None	None	None
	End Level [dBm]	–12.5	–12.5	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[1.4 MHz] WIDE_A_O3G WIDE_B1_O3G	Start Freq. [MHz]	0.05	1.45	None	None	None	None
	End Freq. [MHz]	1.45	2.85	None	None	None	None
	Start Level [dBm]	0.8	–9.2	None	None	None	None
	End Level [dBm]	–9.2	–9.2	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[3 MHz] WIDE_A_O3G WIDE_B1_O3G	Start Freq. [MHz]	0.05	3.05	None	None	None	None
	End Freq. [MHz]	3.05	6.05	None	None	None	None
	Start Level [dBm]	–3.2	–13.2	None	None	None	None
	End Level [dBm]	–13.2	–13.2	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[≥ 5 MHz] WIDE_A_O3G WIDE_B1_O3G	Start Freq. [MHz]	0.05	5.05	None	None	None	None
	End Freq. [MHz]	5.05	10.05	None	None	None	None
	Start Level [dBm]	–5.2	–12.2	None	None	None	None
	End Level [dBm]	–12.2	–12.2	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None

Table 2.7-1 Definition of Limit Lines in the Respective Templates (2/6)

[Channel Bandwidth] Template Name	Parameter [Unit]	Range					
		0	1	2	3	4	5
[≤ 3 MHz] WIDE_B2	Start Freq. [MHz]	0.015	0.065	0.165	0.215	1.015	1.5
	End Freq. [MHz]	0.065	0.165	0.215	1.015	1.5	6.5
	Start Level [dBm]	6.5	3.5	–12.5	–12.5	–24.5	–11.5
	End Level [dBm]	3.5	–12.5	–12.5	–24.5	–24.5	–11.5
	Meas. Bandwidth [kHz]	30	30	30	30	30	1000
[≥ 5 MHz] WIDE_B2	Start Freq. [MHz]	0.015	0.215	1.015	1.5	None	None
	End Freq. [MHz]	0.215	1.015	1.5	10.5	None	None
	Start Level [dBm]	–12.5	–12.5	–24.5	–11.5	None	None
	End Level [dBm]	–12.5	–24.5	–24.5	–11.5	None	None
	Meas. Bandwidth [kHz]	30	30	30	1000	None	None
[1.4 MHz] LOCAL_U3G	Start Freq. [MHz]	0.05	1.45	None	None	None	None
	End Freq. [MHz]	1.45	2.85	None	None	None	None
	Start Level [dBm]	–19.5	–29.5	None	None	None	None
	End Level [dBm]	–29.5	–29.5	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[1.4 MHz] LOCAL_O3G	Start Freq. [MHz]	0.05	1.45	None	None	None	None
	End Freq. [MHz]	1.45	2.85	None	None	None	None
	Start Level [dBm]	–19.2	–29.2	None	None	None	None
	End Level [dBm]	–29.2	–29.2	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[3 MHz] LOCAL_U3G	Start Freq. [MHz]	0.05	3.05	None	None	None	None
	End Freq. [MHz]	3.05	6.05	None	None	None	None
	Start Level [dBm]	–23.5	–33.5	None	None	None	None
	End Level [dBm]	–33.5	–33.5	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[3 MHz] LOCAL_O3G	Start Freq. [MHz]	0.05	3.05	None	None	None	None
	End Freq. [MHz]	3.05	6.05	None	None	None	None
	Start Level [dBm]	–23.2	–33.2	None	None	None	None
	End Level [dBm]	–33.2	–33.2	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None

Table 2.7-1 Definition of Limit Lines in the Respective Templates (3/6)

[Channel Bandwidth] Template Name	Parameter [Unit]	Range					
		0	1	2	3	4	5
[≥ 5 MHz] LOCAL_U3G	Start Freq. [MHz]	0.05	5.05	None	None	None	None
	End Freq. [MHz]	5.05	10.05	None	None	None	None
	Start Level [dBm]	–28.5	–35.5	None	None	None	None
	End Level [dBm]	–35.5	–35.5	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[≥ 5 MHz] LOCAL_O3G	Start Freq. [MHz]	0.05	5.05	None	None	None	None
	End Freq. [MHz]	5.05	10.05	None	None	None	None
	Start Level [dBm]	–28.2	–35.2	None	None	None	None
	End Level [dBm]	–35.2	–35.2	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[1.4 MHz] HOME_U3G	Start Freq. [MHz]	0.05	1.45	None	None	None	None
	End Freq. [MHz]	1.45	2.85	None	None	None	None
	Start Level [dBm]	–28.5	–34.5	None	None	None	None
	End Level [dBm]	–34.5	–34.5	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[1.4 MHz] HOME _O3G	Start Freq. [MHz]	0.05	1.45	None	None	None	None
	End Freq. [MHz]	1.45	2.85	None	None	None	None
	Start Level [dBm]	–28.2	–34.2	None	None	None	None
	End Level [dBm]	–34.2	–34.2	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[3 MHz] HOME_U3G	Start Freq. [MHz]	0.05	3.05	None	None	None	None
	End Freq. [MHz]	3.05	6.05	None	None	None	None
	Start Level [dBm]	–32.5	–38.5	None	None	None	None
	End Level [dBm]	–38.5	–38.5	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[3 MHz] HOME_O3G	Start Freq. [MHz]	0.05	3.05	None	None	None	None
	End Freq. [MHz]	3.05	6.05	None	None	None	None
	Start Level [dBm]	–32.2	–38.2	None	None	None	None
	End Level [dBm]	–38.2	–38.2	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None

Table 2.7-1 Definition of Limit Lines in the Respective Templates (4/6)

[Channel Bandwidth] Template Name	Parameter [Unit]	Range					
		0	1	2	3	4	5
[≥ 5 MHz] HOME_U3G	Start Freq. [MHz]	0.05	5.05	None	None	None	None
	End Freq. [MHz]	5.05	10.05	None	None	None	None
	Start Level [dBm]	–34.5	–40.5	None	None	None	None
	End Level [dBm]	–40.5	–40.5	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[≥ 5 MHz] HOME_O3G	Start Freq. [MHz]	0.05	5.05	None	None	None	None
	End Freq. [MHz]	5.05	10.05	None	None	None	None
	Start Level [dBm]	–34.2	–40.2	None	None	None	None
	End Level [dBm]	–40.2	–40.2	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[1.4 MHz] MEDIUM1_U3G	Start Freq. [MHz]	0.05	1.45	None	None	None	None
	End Freq. [MHz]	1.45	2.85	None	None	None	None
	Start Level [dBm]*	–43.5	–53.5	None	None	None	None
	End Level [dBm]*	–53.5	–53.5	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[1.4 MHz] MEDIUM1_O3G	Start Freq. [MHz]	0.05	1.45	None	None	None	None
	End Freq. [MHz]	1.45	2.85	None	None	None	None
	Start Level [dBm]*	–43.2	–53.2	None	None	None	None
	End Level [dBm]*	–53.2	–53.2	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[3 MHz] MEDIUM1_U3G	Start Freq. [MHz]	0.05	3.05	None	None	None	None
	End Freq. [MHz]	3.05	6.05	None	None	None	None
	Start Level [dBm]*	–47.5	–57.5	None	None	None	None
	End Level [dBm]*	–57.5	–57.5	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[3 MHz] MEDIUM1_O3G	Start Freq. [MHz]	0.05	3.05	None	None	None	None
	End Freq. [MHz]	3.05	6.05	None	None	None	None
	Start Level [dBm]*	–47.2	–57.2	None	None	None	None
	End Level [dBm]*	–57.2	–57.2	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None

*: Represents a limit line to be evaluated by the relative value to the carrier level.

Table 2.7-1 Definition of Limit Lines in the Respective Templates (5/6)

[Channel Bandwidth] Template Name	Parameter [Unit]	Range					
		0	1	2	3	4	5
[≥ 5 MHz] MEDIUM1_U3G	Start Freq. [MHz]	0.05	5.05	None	None	None	None
	End Freq. [MHz]	5.05	10.05	None	None	None	None
	Start Level [dBm]*	–51.5	–58.5	None	None	None	None
	End Level [dBm]*	–58.5	–58.5	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[≥ 5 MHz] MEDIUM1_O3G	Start Freq. [MHz]	0.05	5.05	None	None	None	None
	End Freq. [MHz]	5.05	10.05	None	None	None	None
	Start Level [dBm]*	–51.2	–58.2	None	None	None	None
	End Level [dBm]*	–58.2	–58.2	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[1.4 MHz] MEDIUM2_U3G	Start Freq. [MHz]	0.05	1.45	None	None	None	None
	End Freq. [MHz]	1.45	2.85	None	None	None	None
	Start Level [dBm]	–12.5	–22.5	None	None	None	None
	End Level [dBm]	–22.5	–22.5	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[1.4 MHz] MEDIUM2_O3G	Start Freq. [MHz]	0.05	1.45	None	None	None	None
	End Freq. [MHz]	1.45	2.85	None	None	None	None
	Start Level [dBm]	–12.2	–22.2	None	None	None	None
	End Level [dBm]	–22.2	–22.2	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[3 MHz] MEDIUM2_U3G	Start Freq. [MHz]	0.05	3.05	None	None	None	None
	End Freq. [MHz]	3.05	6.05	None	None	None	None
	Start Level [dBm]	–16.5	–26.5	None	None	None	None
	End Level [dBm]	–26.5	–26.5	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[3 MHz] MEDIUM2_O3G	Start Freq. [MHz]	0.05	3.05	None	None	None	None
	End Freq. [MHz]	3.05	6.05	None	None	None	None
	Start Level [dBm]	–16.2	–26.2	None	None	None	None
	End Level [dBm]	–26.2	–26.2	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None

*: Represents a limit line to be evaluated by the relative value to the carrier level.

Table 2.7-1 Definition of Limit Lines in the Respective Templates (6/6)

[Channel Bandwidth] Template Name	Parameter [Unit]	Range					
		0	1	2	3	4	5
[≥ 5 MHz] MEDIUM2_U3G	Start Freq. [MHz]	0.05	5.05	None	None	None	None
	End Freq. [MHz]	5.05	10.05	None	None	None	None
	Start Level [dBm]	–20.5	–27.5	None	None	None	None
	End Level [dBm]	–27.5	–27.5	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None
[≥ 5 MHz] MEDIUM2_O3G	Start Freq. [MHz]	0.05	5.05	None	None	None	None
	End Freq. [MHz]	5.05	10.05	None	None	None	None
	Start Level [dBm]	–20.2	–27.2	None	None	None	None
	End Level [dBm]	–27.2	–27.2	None	None	None	None
	Meas. Bandwidth [kHz]	100	100	None	None	None	None

Table 2.7-2 Definition of Limit Lines in the Respective Templates (For Additional Requirements)

[Channel Bandwidth] Template Name	Parameter [Unit]	Range
		Additional
[1.4 MHz] 1 2	Start Freq. [MHz]	0.005
	End Freq. [MHz]	0.995
	Start Level [dBm]	–14
	End Level [dBm]	–14
	Meas. Bandwidth [kHz]	10
[3 MHz] 1 2	Start Freq. [MHz]	0.015
	End Freq. [MHz]	0.985
	Start Level [dBm]	–13
	End Level [dBm]	–13
	Meas. Bandwidth [kHz]	30
[5 MHz] 1 2	Start Freq. [MHz]	0.015
	End Freq. [MHz]	0.985
	Start Level [dBm]	–15
	End Level [dBm]	–15
	Meas. Bandwidth [kHz]	30
[≥ 10 MHz] 1	Start Freq. [MHz]	0.05
	End Freq. [MHz]	0.95
	Start Level [dBm]	–13
	End Level [dBm]	–13
	Meas. Bandwidth [kHz]	100
[10 MHz] 2	Start Freq. [MHz]	0.05
	End Freq. [MHz]	0.95
	Start Level [dBm]	–13
	End Level [dBm]	–13
	Meas. Bandwidth [kHz]	100
[15 MHz] 2	Start Freq. [MHz]	0.05
	End Freq. [MHz]	0.95
	Start Level [dBm]	–15
	End Level [dBm]	–15
	Meas. Bandwidth [kHz]	100
[20 MHz] 2	Start Freq. [MHz]	0.05
	End Freq. [MHz]	0.95
	Start Level [dBm]	–16
	End Level [dBm]	–16
	Meas. Bandwidth [kHz]	100
[All bandwidths] 3	Start Freq. [MHz]	0.015
	End Freq. [MHz]	0.085
	Start Level [dBm]	–13
	End Level [dBm]	–13
	Meas. Bandwidth [kHz]	30

Measurement enable and measurement count

Using the following commands, set the section that is subject to OBUE analysis, set whether or not to perform averaging, and set the storage count.
OBUE measurement of the specified signal section is performed each time measurement is performed.
Averaging is performed on consecutive frames, and its storage count can be set in the range of 1 to 100.

```
[:SENSe]:BATCh:CAPTure:TIME:UWEMissions:STARt
[:SENSe]:BATCh:CAPTure:TIME:UWEMissions:LENGth
[:SENSe]:BATCh:AVERage:UWEMissions[:STATe]
[:SENSe]:BATCh:AVERage:UWEMissions:COUNt
```

To query results of OBUE measurement, specify 2, 6, or 7 to the parameter n in the following query commands. To query the worst value of all the ranges, specify 2. To query the worst value of each range, specify 6 or 7 (7: For additional requirements).

```
:FETCh:BATCh[n]?
:READ:BATCh[n]?
:MEASure:BATCh[n]?
```

2.8 Capturing Waveform Data

If at least one of the OBW and ACLR measurements is set to On in Section 2.3.3 “Setting measurement”, the OBW/ACLR spectrum waveform data can be captured using the following command:

```
:FETCh:BATCh[n]?
:READ:BATCh[n]?
:MEASure:BATCh[n]?
```

The following table shows the relationship between the spectrum waveform data items that can be captured and the query parameter n.

Table 2.8-1 Relationship Between Spectrum Waveform Data Items and Query Parameter n

Measurement Item	Query parameter	Description
The number of trace points	3	The number of points on a frequency axis in a Spectrum graph will be returned.
Absolute spectrum level	11	The number of data = The number of trace points
Spectrum frequency	12	The number of data = The number of trace points

2.9 Sample Commands

This section describes sample commands based on specific measurement examples.

2.9.1 Example of Operating Band Unwanted Emissions (OBUE)

An example of Operating Band Unwanted Emissions measurement using the Native command mode is described here.

Processing Flow

1. Initialize the communication interface.

   Refer to the documentation accompanying your interface for details.
2. Set the language mode.
3. Set the application software type to the MX887023A.
4. Initialize the MU887000A.
5. Set the following measurement conditions.

Test Port	Port 1
Input Level	–10 dBm
Downlink Frequency	2140 MHz
Channel Bandwidth	5 MHz
Test model	E-TM1.1
Occupied Bandwidth Measurement	OFF
Operating Band Unwanted Emissions (OBUE) Measurement	ON
Adjacent Channel Leakage Power Ratio Measurement	OFF
Modulation Analysis	OFF

6. Set the Operating Band Unwanted Emissions (OBUE).

Operating Band Unwanted Emissions (OBUE)	MEDIUM1_U3G

7. Start measurement.
8. Query measurement results after measurement is completed.

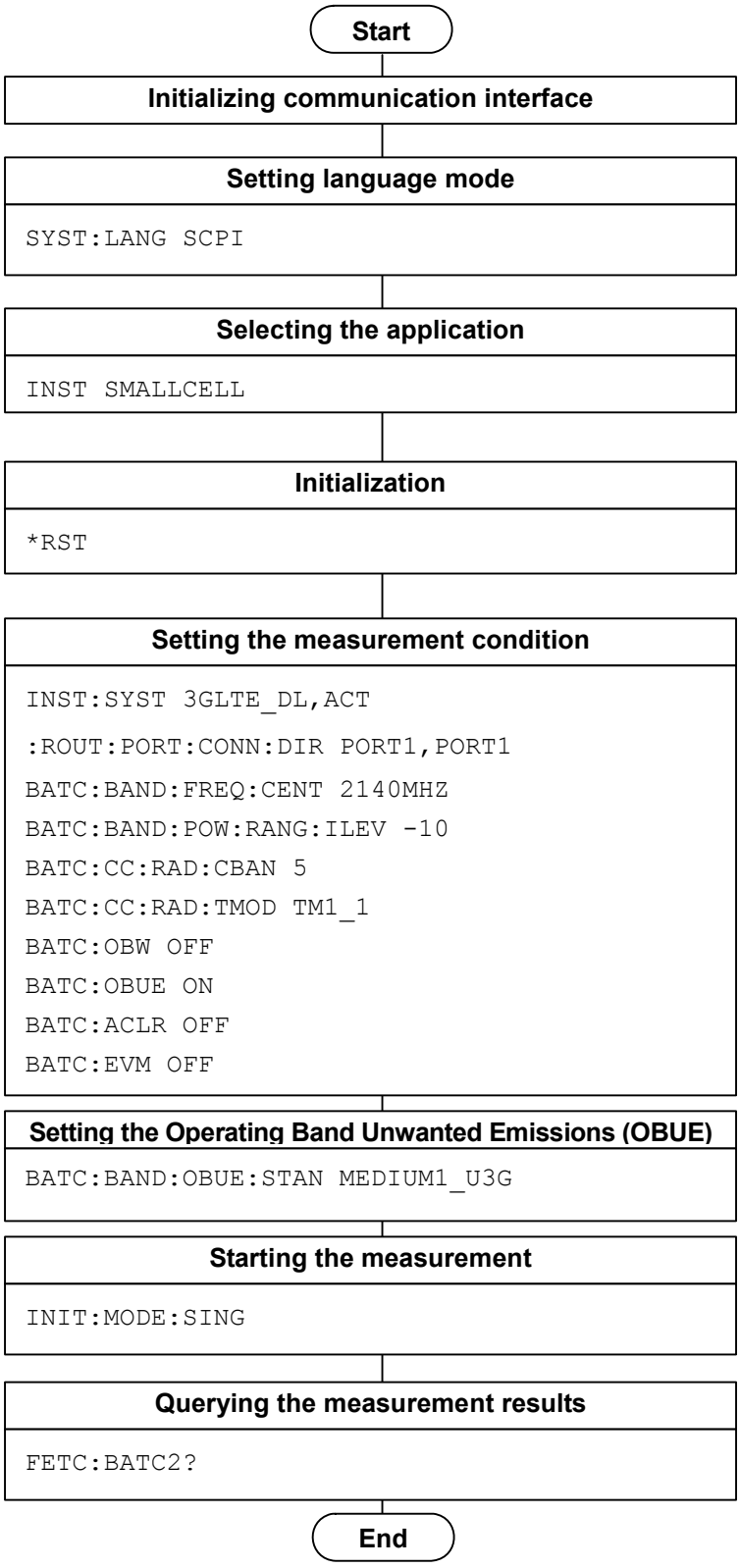

Figure 2.9.1-1 Example of Operating Band Unwanted Emissions measurement

2.9.2 Example of modulation analysis measurement

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

Processing Flow

1. Initialize the communication interface.

   Refer to the documentation accompanying your interface for details.
2. Set the language mode.
3. Set the application software type to the MX887023A.
4. Initialize the MU887000A.
5. Set the following measurement conditions.

Test Port	Port 1
Input Level	–20 dBm
Uplink Frequency	2140 MHz
Channel Bandwidth	5 MHz
Test model	E-TM3.1
Occupied Bandwidth Measurement	OFF
Operating Band Unwanted Emissions (OBUE) Measurement	OFF
Adjacent Channel Leakage Power Ratio Measurement	OFF
Modulation Analysis	ON

6. Start measurement.
7. Query the following measurement results when measurement is completed.

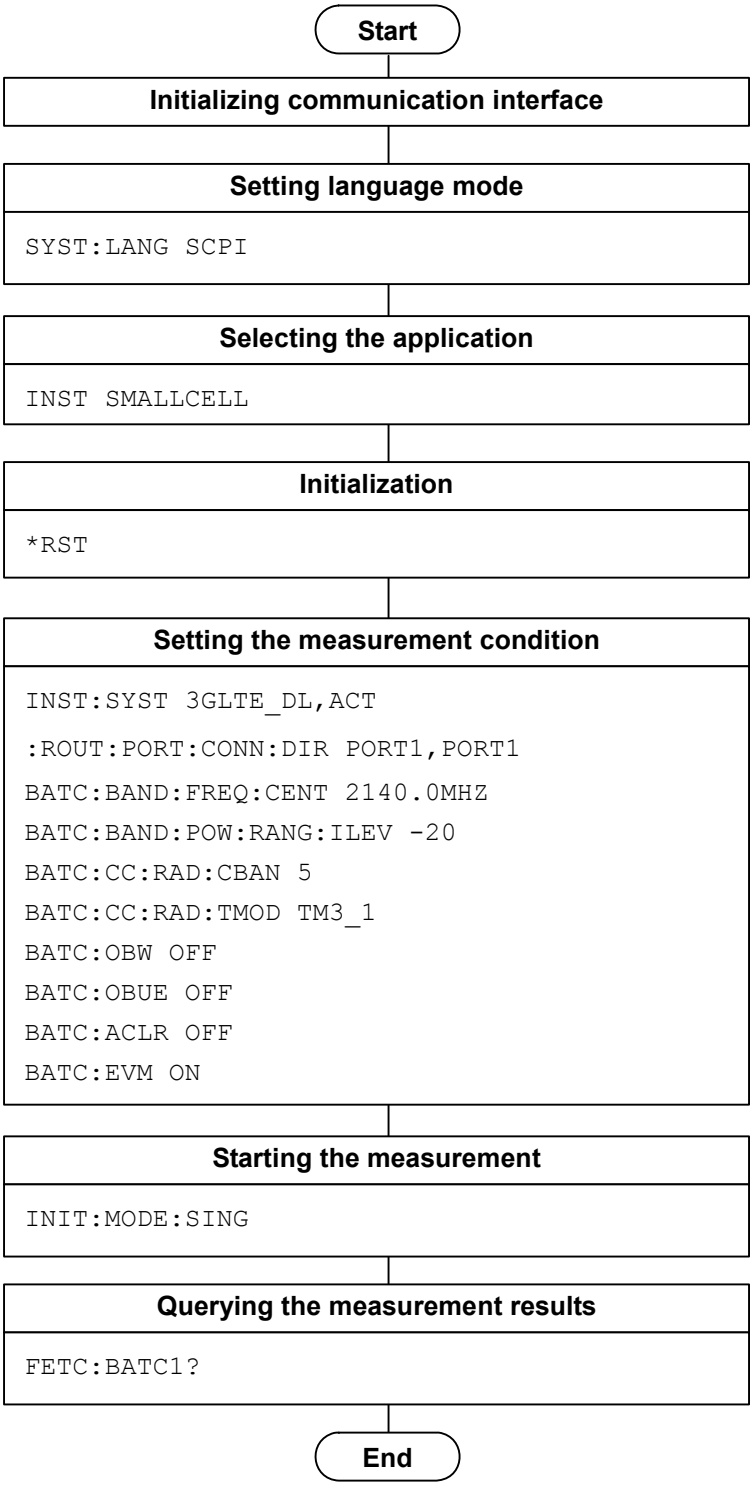

Figure 2.9.2-1 Example of Modulation Analysis measurement

Chapter 3 SCPI Command Reference

This chapter describes the details of SCPI commands.
To switch to the SCPI command mode, send the command SYST:LANG SCPI.

3.1 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).

Only the SCPI commands are defined in this application. To control the application in Native mode, convert the commands defined herein into Native mode in accordance with the conversion rule (1 to 4) below.

Conversion rule

1. Delete the numeric parameter in the program header of an SCPI mode, and describe the argument corresponding to the numeric parameter as the first argument. Once arguments that may be omitted are converted into Native mode, they can no longer be omitted.
2. Omit layers that may be omitted.
3. Change all keywords from long form to short form (abbreviated version).
4. Remove the leading colon ":".

Example 1

Converting the `:CALCulate:BATCh:CC[0]:PSS[:STATe] <switch>` command into the Native mode

1. Delete the numeric parameter in the program header, and describe the argument corresponding to the numeric parameter as the first argument.
   `:CALCulate:BATCh:CC[0]:PSS[:STATe] <switch>`
   ↓
   `:CALCulate:BATCh:CC:PSS[:STATe] <integer>,<switch>`
   (The argument `<integer>` represents an integer number.)
2. Omit layers that may be omitted.
   `:CALCulate:BATCh:CC:PSS[:STATe] <integer>,<switch>`
   ↓
   `:CALCulate:BATCh:CC:PSS <integer>,<switch>`
3. Change all keywords from long form to short form (abbreviated version).
   `:CALCulate:BATCh:CC:PSS <integer>,<switch>`

↓

```
:CALC:BATC:CC:PSS <integer>,<switch>
```

4. Remove the leading colon ":".

```
:CALC:BATC:CC:PSS <integer>,<switch>
```

↓

```
CALC:BATC:CC:PSS <integer>,<switch>
```

5. Specify values for the arguments.

```
CALC:BATC:CC:PSS <integer>,<switch>
```

↓

```
CALC:BATC:CC:PSS 0,ON
```

Example 2

Converting the `:FETCh:BATCh[n]?` command into the Native mode

1. Delete the numeric parameter in the program header , and describe the argument corresponding to the numeric parameter as the first argument.

```
:FETCh:BATCh[n]?
```

↓

```
:FETCh:BATCh? <integer>
```

(The argument <integer> represents an integer number.)

2. Change all keywords from long form to short form (abbreviated version).

```
:FETCh:BATCh? <integer>
```

↓

```
:FETC:BATC? <integer>
```

3. Remove the leading colon ":".

```
:FETC:BATC? <integer>
```

↓

```
FETC:BATC? <integer>
```

4. Specify a value for the argument.

```
FETC:BATC? <integer>
```

↓

```
FETC:BATC? 1
```

3.1.1 Selecting Application and Initialization

Table 3.1.1-1 Selecting Application

Function	Command	Query	Response
Application Switch And Window Status	:INSTrument:SYSTem <apl>,<window>	:INSTrument:SYSTem? <apl>	<status>,<window>
Preset (All Application)	*RST	---	---

Refer to Chapter 6 “Native Command Reference” in the MU870000A TRX Test Module Operation Manual for detailed for *RST command.

3.1.2 Setting Basic Parameters (Batch Measurement)

Table 3.1.2-1 Setting Basic Parameters (Batch Measurement)

Function	Command	Query	Response
Center Frequency	[:SENSe]:BATCh:BAND[0]:FREQuency:CENTer <freq>	[:SENSe]:BATCh:BAND[0]:FREQuency:CENTer?	<freq>
Frequency Span Query	-----	[:SENSe]:BATCh:BAND[0]:FREQuency:SPAN?	<freq>
Input Level	[:SENSe]:BATCh:BAND[0]:POWer[:RF]:RANGe:ILEVel <real>	[:SENSe]:BATCh:BAND[0]:POWer[:RF]:RANGe:ILEVel?	<real>

3.1.3 Setting System Parameters (Batch Measurement)

Table 3.1.3-1 Setting System Parameters (Batch Measurement)

Function	Command	Query	Response
Channel Bandwidth	[:SENSe]:BATCh:CC[0]:RADio:CBANdwidth <mode>	[:SENSe]:BATCh:CC[0]:RADio:CBANdwidth?	<mode>
Test Model	[:SENSe]:BATCh:CC[0]:RADio:TMODel <mode>	[:SENSe]:BATCh:CC[0]:RADio:TMODel?	<mode>
Synchronization Mode	[:SENSe]:BATCh:CC[0]:RADio:SYNChronization:MODE <mode>	[:SENSe]:BATCh:CC[0]:RADio:SYNChronization:MODE?	<mode>
Reference Signal Mode	:CALCulate:BATCh:CC[0]:RSIGnal:MODE <mode>	:CALCulate:BATCh:CC[0]:RSIGnal:MODE?	<mode>
Reference Signal Cell ID	:CALCulate:BATCh:CC[0]:RSIGnal:CELLid <integer>	:CALCulate:BATCh:CC[0]:RSIGnal:CELLid?	<integer>
Cell Specific Reference Signal Power Boosting	:CALCulate:BATCh:CC[0]:RSIGnal:POWer:BOOSting <rel_power>	:CALCulate:BATCh:CC[0]:RSIGnal:POWer:BOOSting?	<rel_power>
Number of Antenna Ports	:CALCulate:BATCh:CC[0]:ANTenna:NUMBer <mode>	:CALCulate:BATCh:CC[0]:ANTenna:NUMBer?	<mode>
Reference Signal Antenna Port	:CALCulate:BATCh:CC[0]:APORt <integer>	:CALCulate:BATCh:CC[0]:APORt?	<integer>

Table 3.1.3-1 Setting System Parameters (Batch Measurement)(Cont'd)

Function	Command	Query	Response
Analysis Time Starting Subframe Number	[:SENSe]:BATCh:CAPTure:TIME:STARt <integer>	[:SENSe]:BATCh:CAPTure:TIME:STARt?	<integer>
Analysis Time Measurement Interval	[:SENSe]:BATCh:CAPTure:TIME:LENGth <integer>	[:SENSe]:BATCh:CAPTure:TIME:LENGth?	<integer>
Analysis Time Starting OFDM Symbol Number	[:SENSe]:BATCh:CAPTure:TIME:UWEMissions:STARt <integer>	[:SENSe]:BATCh:CAPTure:TIME:UWEMissions:STARt?	<integer>
Analysis Time Measurement Interval for Unwanted Emissions	[:SENSe]:BATCh:CAPTure:TIME:UWEMissions:LENGth <integer>	[:SENSe]:BATCh:CAPTure:TIME:UWEMissions:LENGth?	<integer>
PDSCH Modulation Scheme	:CALCulate:BATCh:CC[0]:PDSCh:MODulation <mode>	:CALCulate:BATCh:CC[0]:PDSCh:MODulation?	<mode>
Batch Channel Estimation	:CALCulate:BATCh:CC[0]:CHANnel:ESTimation <switch>	:CALCulate:BATCh:CC[0]:CHANnel:ESTimation?	<switch>
PBCH On/Off	:CALCulate:BATCh:CC[0]:PBCH[:STATe] <switch>	:CALCulate:BATCh:CC[0]:PBCH[:STATe]?	<switch>
PBCH Power Auto	:CALCulate:BATCh:CC[0]:PBCH:POWer:AUTO <switch>	:CALCulate:BATCh:CC[0]:PBCH:POWer:AUTO?	<switch>
PBCH Power Boosting	:CALCulate:BATCh:CC[0]:PBCH:POWer:BOOSting <rel_power>	:CALCulate:BATCh:CC[0]:PBCH:POWer:BOOSting?	<rel_power>
P-SS On/Off	:CALCulate:BATCh:CC[0]:PSS[:STATe] <switch>	:CALCulate:BATCh:CC[0]:PSS[:STATe]?	<switch>
P-SS Power Auto	:CALCulate:BATCh:CC[0]:PSS:POWer:AUTO <switch>	:CALCulate:BATCh:CC[0]:PSS:POWer:AUTO?	<switch>
P-SS Power Boosting	:CALCulate:BATCh:CC[0]:PSS:POWer:BOOSting <rel_power>	:CALCulate:BATCh:CC[0]:PSS:POWer:BOOSting?	<rel_power>

Table 3.1.3-1 Setting System Parameters (Batch Measurement)(Cont'd)

Function	Command	Query	Response
S-SS On/Off	:CALCulate:BATCh:CC[0]:SSS[:STATe] <switch>	:CALCulate:BATCh:CC[0]:SSS[:STATe]?	<switch>
S-SS Power Auto	:CALCulate:BATCh:CC[0]:SSS:POWer:AUTO <switch>	:CALCulate:BATCh:CC[0]:SSS:POWer:AUTO?	<switch>
S-SS Power Boosting	:CALCulate:BATCh:CC[0]:SSS:POWer:BOOSting <rel_power>	:CALCulate:BATCh:CC[0]:SSS:POWer:BOOSting?	<rel_power>
PDCCH On/Off	:CALCulate:BATCh:CC[0]:PDCCh[:STATe] <switch>	:CALCulate:BATCh:CC[0]:PDCCh[:STATe]?	<switch>
PDCCH Power Auto	:CALCulate:BATCh:CC[0]:PDCCh:POWer:AUTO <switch>	:CALCulate:BATCh:CC[0]:PDCCh:POWer:AUTO?	<switch>
PDCCH Power Boosting	:CALCulate:BATCh:CC[0]:PDCCh:POWer:BOOSting <rel_power>	:CALCulate:BATCh:CC[0]:PDCCh:POWer:BOOSting?	<rel_power>
Number of PDCCH Symbol Auto	:CALCulate:BATCh:CC[0]:PDCCh:SYMBol:AUTO <switch>	:CALCulate:BATCh:CC[0]:PDCCh:SYMBol:AUTO?	<switch>
Number of PDCCH Symbol	:CALCulate:BATCh:CC[0]:PDCCh:SYMBol:NUMBer <mode>	:CALCulate:BATCh:CC[0]:PDCCh:SYMBol:NUMBer?	<mode>
PDCCH Mapping	:CALCulate:BATCh:CC[0]:PDCCh:MAPPing <mode>	:CALCulate:BATCh:CC[0]:PDCCh:MAPPing?	<mode>
PDCCH Format	:CALCulate:BATCh:CC[0]:PDCCh:MAPPing:EASY:FORMat <mode>	:CALCulate:BATCh:CC[0]:PDCCh:MAPPing:EASY:FORMat?	<mode>
Number of PDCCHs	:CALCulate:BATCh:CC[0]:PDCCh:MAPPing:EASY:NUMBer <integer>	:CALCulate:BATCh:CC[0]:PDCCh:MAPPing:EASY:NUMBer?	<integer>

Table 3.1.3-1 Setting System Parameters (Batch Measurement)(Cont'd)

Function	Command	Query	Response
PCFICH On/Off	:CALCulate:BATCh:CC[0]:PCFich[:STATe] <switch>	:CALCulate:BATCh:CC[0]:PCFich[:STATe]?	<switch>
PCFICH Power Auto	:CALCulate:BATCh:CC[0]:PCFich:POWer:AUTO <switch>	:CALCulate:BATCh:CC[0]:PCFich:POWer:AUTO?	<switch>
PCFICH Power Boosting	:CALCulate:BATCh:CC[0]:PCFich:POWer:BOOSting <rel_power>	:CALCulate:BATCh:CC[0]:PCFich:POWer:BOOSting?	<rel_power>
PHICH On/Off	:CALCulate:BATCh:CC[0]:PHICh[:STATe] <switch>	:CALCulate:BATCh:CC[0]:PHICh[:STATe]?	<switch>
PHICH Power Auto	:CALCulate:BATCh:CC[0]:PHICh:POWer:AUTO <switch>	:CALCulate:BATCh:CC[0]:PHICh:POWer:AUTO?	<switch>
PHICH Power Boosting	:CALCulate:BATCh:CC[0]:PHICh:POWer:BOOSting <rel_power>	:CALCulate:BATCh:CC[0]:PHICh:POWer:BOOSting?	<rel_power>
PHICH Ng	:CALCulate:BATCh:CC[0]:PHICh:NG <mode>	:CALCulate:BATCh:CC[0]:PHICh:NG?	<mode>
PHICH Duration	:CALCulate:BATCh:CC[0]:PHICh:DURation <mode>	:CALCulate:BATCh:CC[0]:PHICh:DURation?	<mode>
PDSCH Power Auto	:CALCulate:BATCh:CC[0]:PDSCh:POWer:AUTO <switch>	:CALCulate:BATCh:CC[0]:PDSCh:POWer:AUTO?	<switch>
PDSCH Power Boosting	:CALCulate:BATCh:CC[0]:PDSCh:POWer:BOOSting <rel_power>	:CALCulate:BATCh:CC[0]:PDSCh:POWer:BOOSting?	<rel_power>
Modulation Analysis	[:SENSe]:BATCh:EVM[:STATe] <switch>	[:SENSe]:BATCh:EVM[:STATe]?	<switch>
OBW	[:SENSe]:BATCh:OBW[:STATe] <switch>	[:SENSe]:BATCh:OBW[:STATe]?	<switch>

Table 3.1.3-1 Setting System Parameters (Batch Measurement)(Cont'd)

Function	Command	Query	Response
ACLR	[:SENSe]:BATCh:ACLR[:STATe] <switch>	[:SENSe]:BATCh:ACLR[:STATe]?	<switch>
OBUE	[:SENSe]:BATCh:OBUE[:STATe] <switch>	[:SENSe]:BATCh:OBUE[:STATe]?	<switch>
OBUE Standard	[:SENSe]:BATCh:BAND[0]:OBUE:STANdard <mode>	[:SENSe]:BATCh:BAND[0]:OBUE:STANdard?	<mode>
OBUE Standard Additional	[:SENSe]:BATCh:BAND[0]:OBUE:STANdard:ADDitional <mode>	[:SENSe]:BATCh:BAND[0]:OBUE:STANdard:ADDitional?	<mode>
Interfering Mode	[:SENSe]:BATCh:BAND[0]:INTerfering:MODE <switch>	[:SENSe]:BATCh:BAND[0]:INTerfering:MODE?	<switch>
Interfering Frequency Offset	[:SENSe]:BATCh:BAND[0]:INTerfering:FREQuency:OFFSet <freq>	[:SENSe]:BATCh:BAND[0]:INTerfering:FREQuency:OFFSet?	<freq>
Interfering Frequency Bandwidth	[:SENSe]:BATCh:BAND[0]:INTerfering:FREQuency:BANDwidth <freq>	[:SENSe]:BATCh:BAND[0]:INTerfering:FREQuency:BANDwidth?	<freq>

3.1.4 Common Measurement Function

Table 3.1.4-1 Common Measurement Function

Function	Command	Query	Response
Single Measurement	:INITiate:MODE:SINGle	-----	-----
Initiate	:INITiate[:IMMediate]	-----	-----
Trigger Switch	:TRIGger[:SEQuence][:STATe] <switch>	:TRIGger[:SEQuence][:STATe]?	<switch>
Trigger Source	:TRIGger[:SEQuence]:SOURce <mode>	:TRIGger[:SEQuence]:SOURce?	<mode>
Trigger Slope	:TRIGger[:SEQuence]:SLOPe <mode>	:TRIGger[:SEQuence]:SLOPe?	<mode>
Trigger Delay	:TRIGger[:SEQuence]:DELay <time>	:TRIGger[:SEQuence]:DELay?	<time>

3.1.5 Batch Measurement Function

Table 3.1.5-1 Batch Measurement Function

Function	Command	Query	Response
Batch Initiate	:INITiate:BATCh	-----	-----
Batch Query	-----	:FETCh:BATCh[n]?	See Table 3.2.5-1.
Batch Query	-----	:READ:BATCh[n]?	See Table 3.2.5-1.
Batch Query	-----	:MEASure:BATCh[n]?	See Table 3.2.5-1.

3.1.6 Setting Batch Measurement Parameters

Table 3.1.6-1 Setting Batch Measurement Parameters

Function	Command	Query	Response
Storage Mode	[:SENSe]:BATCh:AVERage[:STATe] <mode>	[:SENSe]:BATCh:AVERage[:STATe]?	<mode>
Storage Count	[:SENSe]:BATCh:AVERage:COUNt <integer>	[:SENSe]:BATCh:AVERage:COUNt?	<integer>
Storage Mode for Unwanted Emissions	[:SENSe]:BATCh:AVERage:UWEMissions[:STATe] <switch>	[:SENSe]:BATCh:AVERage:UWEMissions[:STATe]?	<switch>
Storage Count for Unwanted Emissions	[:SENSe]:BATCh:AVERage:UWEMissions:COUNt <integer>	[:SENSe]:BATCh:AVERage:UWEMissions:COUNt?	<integer>

3.1.7 Measurement Status Query

Table 3.1.7-1 Measurement Status Query

Function	Command	Query	Response
Measurement Status Query	-----	:STATus:ERRor?	<status>

3.1.8 Setting SG Frequency

Table 3.1.8-1 Setting SG Frequency

Function	Command	Query	Response
SG Frequency	[:SOURce]:FREQuency[:CW|:FIXed] <freq>	[:SOURce]:FREQuency[:CW|:FIXed]?	<freq>

3.1.9 Setting SG Level

Table 3.1.9-1 Setting SG Level

Function	Command	Query	Response
SG RF Output	:OUTPut[:STATe] <on_off>	:OUTPut[:STATe]?	<on_off>
SG Output Level	[:SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude] <level>	[:SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude]? <unit>	<level>

3.1.10 Playing/Selecting/Loading SG Waveform Pattern

Table 3.1.10-1 Playing/Selecting/Loading SG Waveform Pattern

Function	Command	Query	Response
SG Select Waveform File	[:SOURce]:RADio:ARB:WAVeform <file_name>,<group_number>	[:SOURce]:RADio:ARB:WAVeform?	<file_name>,<group_number>

3.1.11 Setting SG Modulation and AWGN

Table 3.1.11-1 Setting SG Modulation and AWGN

Function	Command	Query	Response
SG Modulation	:OUTPut:MODulation[:STATe] <on_off>	:OUTPut:MODulation[:STATe]?	<on_off>

3.1.12 Setting Parameters for MT8870

Table 3.1.12-1 Setting Parameters for MT8870

Function	Command	Query	Response
Application Select	:INSTrument[:SELect] <app>	:INSTrument[:SELect]?	<app>
Set Connect Port Direction	:ROUTe:PORT:CONNect:DIRection <input>,<output>	:ROUTe:PORT:CONNect:DIRection?	<input>,<output>
Language Selection of Remote Command	:SYSTem:LANGuage <mode>	:SYSTem:LANGuage?	<mode>

3.2 Details of Commands

This section describes the commands in functional order.

■ Terms in this command list

EX ..... Command name (header)

Example ..... Command function name

Function ..... Command function

Command..... Programming command syntax

Query ..... Query syntax

Response ..... Response syntax

Parameter..... Parameter definition

Details ..... Command restrictions and others

Example of Use ..... Command usage example

Related Commands ..... Introduction of related commands

■ Suffix Code list

Suffix Code	Unit	Suffix Code	Unit
DB	dB	MHZ	MHz
DBM	dBm	MS	ms
GHZ	GHz	MZ	MHz
GZ	GHz	NS	ns
HZ	Hz	S	s
KHZ	kHz	US	μs
KZ	kHz		

3.2.1 Selecting application

:INSTrument:SYSTem

Application Switch And Window Status

Function

This command switches the target application for operation/control. Also queries the status of the specified application.

Command

```
:INSTrument:SYSTem <apl>,<window>
```

Query

```
:INSTrument:SYSTem? <apl>
```

Response

```
<status>,<window>
```

Parameter

<apl>	Target application name
3GLTE_DL	LTE FDD Downlink Measurement Software
SG	SG

Any optional installed software other than those above can be specified. Refer to the operation manual (remote control) for each application for details.

<window>	Application status
ACTive	Operation enabled
When omitted	Same as ACT

<status>	Application status
CURR	Executed and targeted for operation
IDLE	Loaded but not executed

Details

This function is used to switch the operation/control target application.

Example of Use

To switch the operation target application to the LTE FDD Downlink Measurement Software.
INST:SYST 3GLTE_DL,ACT
INST:SYST? 3GLTE_DL
> CURR,ACT

3.2.2 Setting Basic Parameters (Batch Measurement)

[:SENSe]:BATCh:BAND[0]:FREQuency:CENTer

Center Frequency

Function

This command sets the center frequency of the signal to be measured.

Command

```
[:SENSe]:BATCh:BAND[0]:FREQuency:CENTer <freq>
```

Query

```
[:SENSe]:BATCh:BAND[0]:FREQuency:CENTer?
```

Response

```
<freq>
```

Parameter

<freq>		Center frequency
	Range	400.000000 to 3800.000000 MHz
	Resolution	1 Hz
	Suffix Code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ
		Hz is used when omitted.
	Default	2140 MHz

Example of Use

To set the center frequency to 2.000 GHz.

BATC:BAND:FREQ:CENT 2.000GHZ

BATC:BAND:FREQ:CENT?

> 2000000000

[:SENSe]:BATCh:BAND[0]:FREQuency:SPAN?

Frequency Span Query

Function

This command queries the frequency span.

Query

```
[:SENSe]:BATCh:BAND[0]:FREQuency:SPAN?
```

Response

```
<freq>
```

Parameter

<freq>		Frequency span
	Range	160 MHz
	Resolution	1 Hz
		Value is returned in Hz units.

Example of Use

To query the frequency span.

BATC:BAND:FREQ:SPAN?

> 160000000

[:SENSe]:BATCh:BAND[0]:POWer[:RF]:RANGe:ILEVel

Input Level

Function

This command sets the input level of RF signals.

Command

```
[:SENSe]:BATCh:BAND[0]:POWer[:RF]:RANGe:ILEVel <real>
```

Query

```
[:SENSe]:BATCh:BAND[0]:POWer[:RF]:RANGe:ILEVel?
```

Response

```
<real>
```

Parameter

<real>	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
Unit	dBm
Suffix Code	DBM
	dBm is used when omitted.
Default	+35.0 dBm (Port 1/Port 2)
	+25.0 dBm (Port 3/Port 4)

Details

The maximum value applies if the set value exceeds the range due to change of Set Connect Port Direction.

Example of Use

To set the input level to 0 dBm.

BATC:BAND:POW:RANG:ILEV 0

BATC:BAND:POW:RANG:ILEV?

> 0.0

3.2.3 Setting System Parameters (Batch Measurement)

[:SENSe]:BATCh:CC[0]:RADio:CBANdwidth

Channel Bandwidth

Function

This command sets the channel bandwidth.

Command

```
[:SENSe]:BATCh:CC[0]:RADio:CBANdwidth <mode>
```

Query

```
[:SENSe]:BATCh:CC[0]:RADio:CBANdwidth?
```

Response

```
<mode>
```

Parameter

<mode>	Channel bandwidth of signal to be measured
20	Sets a 20 MHz bandwidth signal for analysis.
15	Sets a 15 MHz bandwidth signal for analysis.
10	Sets a 10 MHz bandwidth signal for analysis.
5	Sets a 5 MHz bandwidth signal for analysis.(Default)
3	Sets a 3 MHz bandwidth signal for analysis.
1M4	Sets a 1.4 MHz bandwidth signal for analysis.

Example of Use

To set the channel bandwidth to 5 MHz.

BATC:CC:RAD:CBAN 5

BATC:CC:RAD:CBAN?

> 5

[:SENSe]:BATCh:CC[0]:RADio:TMODel

Test Model

Function

This command sets the type of a test model.

Command

```
[:SENSe]:BATCh:CC[0]:RADio:TMODel <mode>
```

Query

```
[:SENSe]:BATCh:CC[0]:RADio:TMODel?
```

Response

```
<mode>
```

Parameter

<mode>	Test model
OFF	None (Default)
TM1_1	E-TM 1.1
TM1_2	E-TM 1.2
TM2	E-TM 2
TM3_1	E-TM 3.1
TM3_2	E-TM 3.2
TM3_3	E-TM 3.3

Example of Use

To set E-TM1.1 as the test model.

BATC:CC:RAD:TMOD TM1_1

BATC:CC:RAD:TMOD?

> TM1_1

[:SENSe]:BATCh:CC[0]:RADio:SYNChronization:MODE

Synchronization Mode

Function

This command sets the synchronized signal.

Command

```
[:SENSe]:BATCh:CC[0]:RADio:SYNChronization:MODE <mode>
```

Query

```
[:SENSe]:BATCh:CC[0]:RADio:SYNChronization:MODE?
```

Response

```
<mode>
```

Parameter

<mode>		Synchronized signal
	RS	Sets Reference Signal for the synchronized signal.
	SS	Sets Synchronization Signal for the synchronized signal (Default)

Details

This command is available when Test Model is set to Off.

If Test Model is set to other than Off, this parameter is set to SS.

Example of Use

To set Reference Signal to the synchronized signal.

BATC:CC:RAD:SYNC:MODE RS

BATC:CC:RAD:SYNC:MODE?

> RS

:CALCulate:BATCh:CC[0]:RSIGnal:MODE

Reference Signal Mode

Function

This command sets the mode of the reference signal.

Command

```
:CALCulate:BATCh:CC[0]:RSIGnal:MODE <mode>
```

Query

```
:CALCulate:BATCh:CC[0]:RSIGnal:MODE?
```

Response

```
<mode>
```

Parameter

<mode>		Reference Signal
	CELL	Reference Signal is determined in accordance with the setting of the cell ID.
	AUTO	Reference Signal is determined through automatic judgment. (Default)

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to Auto.
The parameter can be set to Auto only if Synchronization Mode is Synchronization Signal.
However, regardless of the setting of Synchronization Mode, you can always set this command.

Example of Use

To set Auto for the mode of the reference signal.
CALC:BATC:CC:RSIG:MODE AUTO
CALC:BATC:CC:RSIG:MODE?
> AUTO

:CALCulate:BATCh:CC[0]:RSIGnal:CELLid

Reference Signal Cell ID

Function

This command sets the Cell ID. This parameter is valid when Reference Signal Mode is set to Using Cell ID.

Command

```
:CALCulate:BATCh:CC[0]:RSIGnal:CELLid <integer>
```

Query

```
:CALCulate:BATCh:CC[0]:RSIGnal:CELLid?
```

Response

```
<integer>
```

Parameter

<integer>	CELL ID
Range	0 to 503
Resolution	1
Suffix Code	None
Default	0

Details

This command will work only if Reference Signal Mode is set to CELL. However, regardless of the setting of Reference Signal Mode, you can always set this command.

Example of Use

To set the Cell ID to 2.
CALC:BATC:CC:RSIG:CELL 2
CALC:BATC:CC:RSIG:CELL?
> 2

:CALCulate:BATCh:CC[0]:RSIGnal:POWer:BOOSting

Cell Specific Reference Signal Power Boosting

Function

This command sets the boost level of the reference signal.

Command

```
:CALCulate:BATCh:CC[0]:RSIGnal:POWer:BOOSting <rel_power>
```

Query

```
:CALCulate:BATCh:CC[0]:RSIGnal:POWer:BOOSting?
```

Response

```
<rel_power>
```

Parameter

<rel_power>		Boost level of reference signal
	Range	–20.000 to +20.000 dB
	Resolution	0.001 dB
	Suffix Code	DB dB is used when omitted.
	Default	0 dB

Details

This command is available when Test Model is set to Off.

If Test Model is set to other than Off, this parameter is set to 0.000 dB.

Example of Use

To set the boost level of the reference signal to +10 dB.

CALC:BATC:CC:RSIG:POW:BOOS 10

CALC:BATC:CC:RSIG:POW:BOOS?

> 10.000

:CALCulate:BATCh:CC[0]:ANTenna:NUMBer

Number of Antenna Ports

Function

This command sets the number of antennas.

Command

```
:CALCulate:BATCh:CC[0]:ANTenna:NUMBer <mode>
```

Query

```
:CALCulate:BATCh:CC[0]:ANTenna:NUMBer?
```

Response

```
<mode>
```

Parameter

<mode>	Number of antennas
1	Uses 1 antenna for transmission. (Default)
2	Uses 2 antennas for transmission.
4	Uses 4 antennas for transmission.

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to 1.

Example of Use

To set 2 for the number of antennas.
CALC:BATC:CC:ANT:NUMB 2
CALC:BATC:CC:ANT:NUMB?
> 2

:CALCulate:BATCh:CC[0]:APORt

Reference Signal Antenna Port

Function

This command sets the antenna to be measured.

Command

```
:CALCulate:BATCh:CC[0]:APORt <integer>
```

Query

```
:CALCulate:BATCh:CC[0]:APORt?
```

Response

```
<integer>
```

Parameter

<integer>	Antenna to be measured
Range	0 to (Number of Antenna Ports – 1)
Resolution	1
Suffix Code	None
Default	0

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to 0.
The maximum value applies if the set value exceeds the range due to change of Number of Antenna Ports.

Example of Use

To set 2 to the antenna number to be measured.
CALC:BATC:CC:APOR 2
CALC:BATC:CC:APOR?
> 2

[:SENSe]:BATCh:CAPTure:TIME:STARt

Analysis Time Starting Subframe Number

Function

This command sets the analysis start position of Modulation Analysis.

Command

```
[:SENSe]:BATCh:CAPTure:TIME:STARt <integer>
```

Query

```
[:SENSe]:BATCh:CAPTure:TIME:STARt?
```

Response

```
<integer>
```

Parameter

<integer>	Subframe number
Range	0 to 9
Resolution	1
Suffix Code	None
Default	0

Example of Use

To set the analysis start position of Modulation Analysis to Subframe number 2.

BATC:CAPT:TIME:STAR 2

BATC:CAPT:TIME:STAR?

> 2

[:SENSe]:BATCh:CAPTure:TIME:LENGth

Analysis Time Measurement Interval

Function

This command sets the analysis subframe length of Modulation Analysis.

Command

```
[:SENSe]:BATCh:CAPTure:TIME:LENGth <integer>
```

Query

```
[:SENSe]:BATCh:CAPTure:TIME:LENGth?
```

Response

```
<integer>
```

Parameter

<integer>		Analysis subframe length
	Range	1 to (10 – Analysis Time Starting Subframe Number)
	Resolution	1
	Suffix Code	None
	Default	1

Details

The maximum value applies if the set value exceeds the range due to change of Analysis Time Starting Subframe Number.

Example of Use

To set the analysis subframe length of Modulation Analysis to 2.

BATC:CAPT:TIME:LENG 2

BATC:CAPT:TIME:LENG?

> 2

[:SENSe]:BATCh:CAPTure:TIME:UWEMissions:STARt

Analysis Time Starting OFDM Symbol Number

Function

This command sets the analysis start position of Unwanted Emissions.

Command

```
[:SENSe]:BATCh:CAPTure:TIME:UWEMissions:STARt <integer>
```

Query

```
[:SENSe]:BATCh:CAPTure:TIME:UWEMissions:STARt?
```

Response

```
<integer>
```

Parameter

<integer>	OFDM Symbol Number
Range	0 to 139
Resolution	1
Suffix Code	None
Default	3

Example of Use

To set the analysis start position of Unwanted Emissions to OFDM Symbol Number 2.

BATC:CAPT:TIME:UWEM:STAR 2

BATC:CAPT:TIME:UWEM:STAR?

> 2

[:SENSe]:BATCh:CAPTure:TIME:UWEMissions:LENGth

Analysis Time Measurement Interval for Unwanted Emissions

Function

This command sets the analysis OFDM Symbol length of Unwanted Emissions.

Command

```
[:SENSe]:BATCh:CAPTure:TIME:UWEMissions:LENGth <integer>
```

Query

```
[:SENSe]:BATCh:CAPTure:TIME:UWEMissions:LENGth?
```

Response

```
<integer>
```

Parameter

<integer>		Analysis OFDM Symbol length
	Range	1 to (140 – Analysis Time Starting OFDM Symbol Number)
	Resolution	1
	Suffix Code	None
	Default	1

Details

The maximum value applies if the set value exceeds the range due to change of Analysis Time Starting OFDM Symbol Number.

Example of Use

To set the analysis OFDM Symbol length of Unwanted Emissions to 2.

BATC:CAPT:TIME:UWEM:LENG 2

BATC:CAPT:TIME:UWEM:LENG?

> 2

:CALCulate:BATCh:CC[0]:PDSCh:MODulation

PDSCH Modulation Scheme

Function

This command sets the PDSCH modulation scheme.

Command

```
:CALCulate:BATCh:CC[0]:PDSCh:MODulation <mode>
```

Query

```
:CALCulate:BATCh:CC[0]:PDSCh:MODulation?
```

Response

```
<mode>
```

Parameter

<mode>	Modulation mode
QPSK	Sets QPSK modulation scheme for analysis.
16Qam	Sets 16QAM modulation scheme for analysis.
64Qam	Sets 64QAM modulation scheme for analysis.
AUTO	Automatically determines the modulation scheme for analysis (Default)

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to AUTO.
Select AUTO if the measurement target containing multiple modulation schemes.

Example of Use

To set the PDSCH modulation scheme to QPSK.
CALC:BATC:CC:PDSC:MOD QPSK
CALC:BATC:CC:PDSC:MOD?
> QPSK

:CALCulate:BATCh:CC[0]:CHANnel:ESTimation

Channel Estimation

Function

This command sets the Channel Estimation function to On/Off.

Command

```
:CALCulate:BATCh:CC[0]:CHANnel:ESTimation <switch>
```

Query

```
:CALCulate:BATCh:CC[0]:CHANnel:ESTimation?
```

Response

```
<switch>
```

Parameter

<switch>	On/Off
OFF|0	Off
ON|1	On (Default)

Example of Use

To set the Channel Estimation function to On.

CALC:BATC:CC:CHAN:EST ON

CALC:BATC:CC:CHAN:EST?

> 1

:CALCulate:BATCh:CC[0]:PBCH[:STATe]

PBCH On/Off

Function

This command sets whether to include (On) or exclude (Off) PBCH as the measurement target.

Command

```
:CALCulate:BATCh:CC[0]:PBCH[:STATe] <switch>
```

Query

```
:CALCulate:BATCh:CC[0]:PBCH[:STATe]?
```

Response

```
<switch>
```

Parameter

<switch>	PBCH On/Off
OFF|0	Off
ON|1	On (Default)

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to On.

Example of Use

To configure a setting to include PBCH.
CALC:BATC:CC:PBCH ON
CALC:BATC:CC:PBCH?
> 1

:CALCulate:BATCh:CC[0]:PBCH:POWer:AUTO

PBCH Power Auto

Function

This command enables or disables automatic detection of PBCH power.

Command

```
:CALCulate:BATCh:CC[0]:PBCH:POWer:AUTO <switch>
```

Query

```
:CALCulate:BATCh:CC[0]:PBCH:POWer:AUTO?
```

Response

```
<switch>
```

Parameter

<switch>	Automatic detection On/Off
OFF|0	Off
ON|1	On (Default)

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to Off.
This command will work only if PBCH is set to On. However, regardless of the setting of PBCH, you can always set this command.

Example of Use

To enable automatic detection of PBCH power.
CALC:BATC:CC:PBCH:POW:AUTO ON
CALC:BATC:CC:PBCH:POW:AUTO?
> 1

:CALCulate:BATCh:CC[0]:PBCH:POWer:BOOSting

PBCH Power Boosting

Function

This command sets the PBCH boosting level.

Command

```
:CALCulate:BATCh:CC[0]:PBCH:POWer:BOOSting <rel_power>
```

Query

```
:CALCulate:BATCh:CC[0]:PBCH:POWer:BOOSting?
```

Response

```
<rel_power>
```

Parameter

<rel_power>		PBCH boosting level
	Range	–20.000 to +20.000 dB
	Resolution	0.001 dB
	Suffix Code	DB dB is used when omitted.
	Default	0 dB

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is automatically set to the value that conforms to 3GPP TS 36.141, 6.1.1 E-UTRA Test Models.
This command will work only if PBCH is set to On and PBCH Power Auto is set to OFF.
However, regardless of the setting of each of PBCH and PBCH Power Auto, you can always set this command.

Example of Use

To set the PBCH boosting level to +10 dB.
CALC:BATC:CC:PBCH:POW:BOOS 10
CALC:BATC:CC:PBCH:POW:BOOS?
> 10.000

:CALCulate:BATCh:CC[0]:PSS[:STATe]

P-SS On/Off

Function

This command sets whether to include (On) or exclude (Off) Primary Synchronization Signal as the measurement target.

Command

```
:CALCulate:BATCh:CC[0]:PSS[:STATe] <switch>
```

Query

```
:CALCulate:BATCh:CC[0]:PSS[:STATe]?
```

Response

```
<switch>
```

Parameter

<switch>	Primary Synchronization Signal On/Off
OFF|0	Off
ON|1	On (Default)

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to On.
The parameter can be set to Off only if Synchronization Mode is Reference Signal. However, regardless of the setting of Synchronization Mode, you can always set this command.

Example of Use

To configure a setting to include Primary Synchronization Signal.
CALC:BATC:CC:PSS ON
CALC:BATC:CC:PSS?
> 1

:CALCulate:BATCh:CC[0]:PSS:POWer:AUTO

P-SS Power Auto

Function

This command enables or disables automatic detection of primary synchronization signal power.

Command

```
:CALCulate:BATCh:CC[0]:PSS:POWer:AUTO <switch>
```

Query

```
:CALCulate:BATCh:CC[0]:PSS:POWer:AUTO?
```

Response

```
<switch>
```

Parameter

<switch>	Automatic detection On/Off
OFF|0	Off
ON|1	On (Default)

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to Off.
This command will work only if P-SS is set to On. However, regardless of the setting of P-SS, you can always set this command.

Example of Use

To enable automatic detection of primary synchronization signal power.
CALC:BATC:CC:PSS:POW:AUTO ON
CALC:BATC:CC:PSS:POW:AUTO?
> 1

:CALCulate:BATCh:CC[0]:PSS:POWer:BOOSting

P-SS Power Boosting

Function

This command sets the primary synchronization signal boosting level.

Command

```
:CALCulate:BATCh:CC[0]:PSS:POWer:BOOSting <rel_power>
```

Query

```
:CALCulate:BATCh:CC[0]:PSS:POWer:BOOSting?
```

Response

```
<rel_power>
```

Parameter

<rel_power>		Primary synchronization signal boosting level
	Range	–20.000 to +20.000 dB
	Resolution	0.001 dB
	Suffix Code	DB dB is used when omitted.
	Default	0 dB

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is automatically set to the value that conforms to 3GPP TS 36.141, 6.1.1 E-UTRA Test Models.
This command will work only if P-SS is set to On and P-SS Power Auto is set to Off. However, regardless of the setting of each of P-SS and P-SS Power Auto, you can always set this command.

Example of Use

To set the primary synchronization signal boosting level to +10 dB.
CALC:BATC:CC:PSS:POW:BOOS 10
CALC:BATC:CC:PSS:POW:BOOS?
> 10.000

:CALCulate:BATCh:CC[0]:SSS[:STATe]

S-SS On/Off

Function

This command sets whether to include (On) or exclude (Off) Secondary Synchronization Signal as the measurement target.

Command

```
:CALCulate:BATCh:CC[0]:SSS[:STATe] <switch>
```

Query

```
:CALCulate:BATCh:CC[0]:SSS[:STATe]?
```

Response

```
<switch>
```

Parameter

<switch>	Secondary Synchronization Signal On/Off
OFF|0	Off
ON|1	On (Default)

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to On.
The parameter can be set to Off only if Synchronization Mode is Reference Signal. However, regardless of the setting of Synchronization Mode, you can always set this command.

Example of Use

To configure a setting to include Secondary Synchronization Signal as the measurement target.
CALC:BATC:CC:SSS ON
CALC:BATC:CC:SSS?
> 1

:CALCulate:BATCh:CC[0]:SSS:POWer:AUTO

S-SS Power Auto

Function

This command enables or disables automatic detection of secondary synchronization signal power.

Command

```
:CALCulate:BATCh:CC[0]:SSS:POWer:AUTO <switch>
```

Query

```
:CALCulate:BATCh:CC[0]:SSS:POWer:AUTO?
```

Response

```
<switch>
```

Parameter

<switch>	Automatic detection On/Off
OFF|0	Off
ON|1	On (Default)

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to Off.
This command will work only if S-SS is set to On. However, regardless of the setting of S-SS, you can always set this command.

Example of Use

To enable automatic detection of secondary synchronization signal power.
CALC:BATC:CC:SSS:POW:AUTO ON
CALC:BATC:CC:SSS:POW:AUTO?
> 1

:CALCulate:BATCh:CC[0]:SSS:POWer:BOOSting

S-SS Power Boosting

Function

This command sets the secondary synchronization signal boosting level.

Command

```
:CALCulate:BATCh:CC[0]:SSS:POWer:BOOSting <rel_power>
```

Query

```
:CALCulate:BATCh:CC[0]:SSS:POWer:BOOSting?
```

Response

```
<rel_power>
```

Parameter

<rel_power>		Secondary synchronization signal boosting level
	Range	–20.000 to +20.000 dB
	Resolution	0.001 dB
	Suffix Code	DB
		dB is used when omitted.
	Default	0 dB

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is automatically set to the value that conforms to 3GPP TS 36.141, 6.1.1 E-UTRA Test Models.
This command will work only if S-SS is set to On and S-SS Power Auto is set to Off. However, regardless of the setting of each of S-SS and S-SS Power Auto, you can always set this command.

Example of Use

To set the secondary synchronization signal boosting level to +10 dB.
CALC:BATC:CC:SSS:POW:BOOS 10
CALC:BATC:CC:SSS:POW:BOOS?
> 10.000

:CALCulate:BATCh:CC[0]:PDCCh[:STATe]

PDCCH On/Off

Function

This command sets whether to include (On) or exclude (Off) PDCCH for the measurement target.

Command

```
:CALCulate:BATCh:CC[0]:PDCCh[:STATe] <switch>
```

Query

```
:CALCulate:BATCh:CC[0]:PDCCh[:STATe]?
```

Response

```
<switch>
```

Parameter

<switch>	PDCCH On/Off
OFF|0	Off
ON|1	On (Default)

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to On.

Example of Use

To configure a setting to include PDCCH as the measurement target.
CALC:BATC:CC:PDCC ON
CALC:BATC:CC:PDCC?
> 1

:CALCulate:BATCh:CC[0]:PDCCh:POWer:AUTO

PDCCH Power Auto

Function

This command enables or disables automatic detection of PDCCH power.

Command

```
:CALCulate:BATCh:CC[0]:PDCCh:POWer:AUTO <switch>
```

Query

```
:CALCulate:BATCh:CC[0]:PDCCh:POWer:AUTO?
```

Response

```
<switch>
```

Parameter

<switch>	Automatic detection On/Off
OFF|0	Off
ON|1	On (Default)

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to Off.
This command will work only if PDCCH is set to On. However, regardless of the setting of PDCCH, you can always set this command.

Example of Use

To enable automatic detection of PDCCH power.
CALC:BATC:CC:PDCC:POW:AUTO ON
CALC:BATC:CC:PDCC:POW:AUTO?
> 1

:CALCulate:BATCh:CC[0]:PDCCh:POWer:BOOSting

PDCCH Power Boosting

Function

This command sets the PDCCH boosting level.

Command

```
:CALCulate:BATCh:CC[0]:PDCCh:POWer:BOOSting <rel_power>
```

Query

```
:CALCulate:BATCh:CC[0]:PDCCh:POWer:BOOSting?
```

Response

```
<rel_power>
```

Parameter

<rel_power>	PDCCH boosting level
Range	–20.000 to +20.000 dB
Resolution	0.001 dB
Suffix Code	DB dB is used when omitted.
Default	0 dB

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is automatically set to the value that conforms to 3GPP TS 36.141, 6.1.1 E-UTRA Test Models.
This command will work only if PDCCH is set to On and PDCCH Power Auto is set to Off. However, regardless of the setting of each of PDCCH and PDCCH Power Auto, you can always set this command.

Example of Use

To set the PDCCH boosting level to +10 dB.
CALC:BATC:CC:PDCC:POW:BOOS 10
CALC:BATC:CC:PDCC:POW:BOOS?
> 10.000

:CALCulate:BATCh:CC[0]:PDCCh:SYMBol:AUTO

Number of PDCCH Symbol Auto

Function

This command enables or disables automatic detection of PDCCH symbol count.

Command

```
:CALCulate:BATCh:CC[0]:PDCCh:SYMBol:AUTO <switch>
```

Query

```
:CALCulate:BATCh:CC[0]:PDCCh:SYMBol:AUTO?
```

Response

```
<switch>
```

Parameter

<switch>	Automatic detection On/Off
OFF|0	Off
ON|1	On (Default)

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to On.
This command will work only if PCFICH is set to On and PDCCH is set to On. However, regardless of the setting of each of PCFICH and PDCCH, you can always set this command.

Example of Use

To enable automatic detection of PDCCH symbol count.
CALC:BATC:CC:PDCC:SYMB:AUTO ON
CALC:BATC:CC:PDCC:SYMB:AUTO?
> 1

:CALCulate:BATCh:CC[0]:PDCCh:SYMBol:NUMBer

Number of PDCCH Symbol

Function

This command sets the number of symbols for PDCCH.

Command

```
:CALCulate:BATCh:CC[0]:PDCCh:SYMBol:NUMBer <mode>
```

Query

```
:CALCulate:BATCh:CC[0]:PDCCh:SYMBol:NUMBer?
```

Response

```
<mode>
```

Parameter

<mode>	Number of symbols
Range	When Channel Bandwidth is set to 1.4 MHz: 0 to 4 When Channel Bandwidth is set to other than 1.4 MHz: 0 to 3
Resolution	1
Suffix Code	None
Default	1

Details

This command will work if all of the following conditions are met: Test Model is set to Off, PDCCH is set to On, and PDCCH Number of PDCCH Symbol Auto is set to Off. However, regardless of the setting of each of Test Model, PDCCH and Number of PDCCH Symbol Auto, you can always set this command.
The maximum value applies if the set value exceeds the range due to change of Channel Bandwidth.

Example of Use

To set 1 as the number of symbols for PDCCH.
CALC:BATC:CC:PDCC:SYMB:NUMB 1
CALC:BATC:CC:PDCC:SYMB:NUMB?
> 1

:CALCulate:BATCh:CC[0]:PDCCh:MAPPing

PDCCH Mapping

Function

This command sets the PDCCH mapping specification method.

Command

`:CALCulate:BATCh:CC[0]:PDCCh:MAPPing <mode>`

Query

`:CALCulate:BATCh:CC[0]:PDCCh:MAPPing?`

Response

`<mode>`

Parameter

<mode>		PDCCH Mapping specification method
	AUTO	Auto detection (Default)
	FULL	Performs measurement assuming all resource elements as PDCCH.
	EASY	Performs measurement according to the specified PDCCH format and the number of PDCCHs.

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to EASY.
This command will work only if PDCCH is set to On. However, regardless of the setting of PDCCH, you can always set this command.

Example of Use

To perform `measurement` assuming all resource elements as PDCCH.
CALC:BATC:CC:PDCC:MAPP FULL
CALC:BATC:CC:PDCC:MAPP?
> FULL

:CALCulate:BATCh:CC[0]:PDCCh:MAPPing:EASY:FORMat

PDCCH Format

Function

This command sets the PDCCH format.

Command

```
:CALCulate:BATCh:CC[0]:PDCCh:MAPPing:EASY:FORMat <mode>
```

Query

```
:CALCulate:BATCh:CC[0]:PDCCh:MAPPing:EASY:FORMat?
```

Response

```
<mode>
```

Parameter

<mode>	PDCCH Format
Range	0, 1, 2, 3
Default	0

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is automatically set to the value that conforms to 3GPP TS 36.141, 6.1.1 E-UTRA Test Models. This command will work only if PDCCH is set to On and PDCCH Mapping is set to Easy. However, regardless of the setting of each of PDCCH and PDCCH Mapping, you can always set this command.

Example of Use

To set the PDCCH format to 1.
CALC:BATC:CC:PDCC:MAPP:EASY:FORM 1
CALC:BATC:CC:PDCC:MAPP:EASY:FORM?
> 1

:CALCulate:BATCh:CC[0]:PDCCh:MAPPing:EASY:NUMBer

Number of PDCCHs

Function

This command sets the number of PDCCHs.

Command

```
:CALCulate:BATCh:CC[0]:PDCCh:MAPPing:EASY:NUMBer <integer>
```

Query

```
:CALCulate:BATCh:CC[0]:PDCCh:MAPPing:EASY:NUMBer?
```

Response

<integer>	Number of PDCCHs
Range	1 to 88
Resolution	1

Parameter

<integer>	Number of PDCCHs
Range	1 to 88
Resolution	1
Suffix Code	None
Default	1

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is automatically set to the value that conforms to 3GPP TS 36.141, 6.1.1 E-UTRA Test Models.
This command will work only if PDCCH is set to On and PDCCH Mapping is set to Easy. However, regardless of the setting of each of PDCCH and PDCCH Mapping, you can always set this command.

Example of Use

To set 1 as the number of PDCCHs.
CALC:BATC:CC:PDCC:MAPP:EASY:NUMB 1
CALC:BATC:CC:PDCC:MAPP:EASY:NUMB?
> 1

:CALCulate:BATCh:CC[0]:PCFich[:STATe]

PCFICH On/Off

Function

This command sets whether to include (On) or exclude (Off) PCFICH for the measurement target.

Command

```
:CALCulate:BATCh:CC[0]:PCFich[:STATe] <switch>
```

Query

```
:CALCulate:BATCh:CC[0]:PCFich[:STATe]?
```

Response

```
<switch>
```

Parameter

<switch>	PCFICH On/Off
OFF|0	Off
ON|1	On (Default)

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to On.

Example of Use

To configure a setting to include PCFICH as the measurement target.
CALC:BATC:CC:PCF ON
CALC:BATC:CC:PCF?
> 1

:CALCulate:BATCh:CC[0]:PCFich:POWer:AUTO

PCFICH Power Auto

Function

This command enables or disables automatic detection of PCFICH power.

Command

```
:CALCulate:BATCh:CC[0]:PCFich:POWer:AUTO <switch>
```

Query

```
:CALCulate:BATCh:CC[0]:PCFich:POWer:AUTO?
```

Response

```
<switch>
```

Parameter

<switch>	Automatic detection On/Off
OFF|0	Off
ON|1	On (Default)

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to Off.
This command will work only if PCFICH is set to On. However, regardless of the setting of PCFICH, you can always set this command.

Example of Use

To enable automatic detection of PCFICH power.
CALC:BATC:CC:PCF:POW:AUTO ON
CALC:BATC:CC:PCF:POW:AUTO?
> 1

:CALCulate:BATCh:CC[0]:PCFich:POWer:BOOSting

PCFICH Power Boosting

Function

This command sets the PCFICH boosting level.

Command

```
:CALCulate:BATCh:CC[0]:PCFich:POWer:BOOSting <rel_power>
```

Query

```
:CALCulate:BATCh:CC[0]:PCFich:POWer:BOOSting?
```

Response

```
<rel_power>
```

Parameter

<rel_power>	PCFICH boosting level
Range	–20.000 to +20.000 dB
Resolution	0.001 dB
Suffix Code	DB dB is used when omitted.
Default	0 dB

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is automatically set to the value that conforms to 3GPP TS 36.141, 6.1.1 E-UTRA Test Models.
This command will work only if PCFICH is set to On and PCFICH Power Auto is set to Off. However, regardless of the setting of each of PCFICH and PCFICH Power Auto, you can always set this command.

Example of Use

To set the PCFICH boosting level to +10 dB.
CALC:BATC:CC:PCF:POW:BOOS 10
CALC:BATC:CC:PCF:POW:BOOS?
> 10.000

:CALCulate:BATCh:CC[0]:PHICh[:STATe]

PHICH On/Off

Function

This command sets whether to include (On) or exclude (Off) PHICH for the measurement target.

Command

```
:CALCulate:BATCh:CC[0]:PHICh[:STATe] <switch>
```

Query

```
:CALCulate:BATCh:CC[0]:PHICh[:STATe]?
```

Response

```
<switch>
```

Parameter

<switch>	PHICH On/Off
OFF|0	Off
ON|1	On (Default)

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to On.

Example of Use

To configure a setting to include PHICH as the measurement target.
CALC:BATC:CC:PHIC ON
CALC:BATC:CC:PHIC?
> 1

:CALCulate:BATCh:CC[0]:PHICh:POWer:AUTO

PHICH Power Auto

Function

This command enables or disables automatic detection of PHICH power.

Command

```
:CALCulate:BATCh:CC[0]:PHICh:POWer:AUTO <switch>
```

Query

```
:CALCulate:BATCh:CC[0]:PHICh:POWer:AUTO?
```

Response

```
<switch>
```

Parameter

<switch>	Automatic detection On/Off
OFF|0	Off
ON|1	On (Default)

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to Off.
This command will work only if PHICH is set to On. However, regardless of the setting of PHICH, you can always set this command.

Example of Use

To enable automatic detection of PHICH power.
CALC:BATC:CC:PHIC:POW:AUTO ON
CALC:BATC:CC:PHIC:POW:AUTO?
> 1

:CALCulate:BATCh:CC[0]:PHICh:POWer:BOOSting

PHICH Power Boosting

Function

This command sets the PHICH boosting level.

Command

```
:CALCulate:BATCh:CC[0]:PHICh:POWer:BOOSting <rel_power>
```

Query

```
:CALCulate:BATCh:CC[0]:PHICh:POWer:BOOSting?
```

Response

```
<rel_power>
```

Parameter

<rel_power>		PHICH boosting level
	Range	–20.000 to +20.000 dB
	Resolution	0.001 dB
	Suffix Code	DB dB is used when omitted.
	Default	0 dB

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is automatically set to the value that conforms to 3GPP TS 36.141, 6.1.1 E-UTRA Test Models.
This command will work only if PHICH is set to On and PHICH Power Auto is set to Off. However, regardless of the setting of each of PHICH and CC PHICH Power Auto, you can always set this command.

Example of Use

To set the PHICH boosting level to +10 dB.
CALC:BATC:CC:PHIC:POW:BOOS 10
CALC:BATC:CC:PHIC:POW:BOOS?
> 10.000

:CALCulate:BATCh:CC[0]:PHICh:NG

PHICH Ng

Function

This command sets Ng of PHICH.

Command

```
:CALCulate:BATCh:CC[0]:PHICh:NG <mode>
```

Query

```
:CALCulate:BATCh:CC[0]:PHICh:NG?
```

Response

```
<mode>
```

Parameter

<mode>	Ng of PHICH
R1BY6	Ng 1/6 (Default)
R1BY2	Ng 1/2
R1	Ng 1
R2	Ng 2

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to R1BY6.
This command will work only if PHICH is set to On. However, regardless of the setting of PHICH, you can always set this command.

Example of Use

To set Ng of PHICH to 1.
CALC:BATC:CC:PHIC:NG R1
CALC:BATC:CC:PHIC:NG?
> R1

:CALCulate:BATCh:CC[0]:PHICh:DURation

PHICH Duration

Function

This command sets the PHICH duration.

Command

```
:CALCulate:BATCh:CC[0]:PHICh:DURation <mode>
```

Query

```
:CALCulate:BATCh:CC[0]:PHICh:DURation?
```

Response

```
<mode>
```

Parameter

<mode>	PHICH Duration
NORMal	Normal (Default)
EXTended	Extended

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to NORMAL.
This command will work only if PHICH is set to On. However, regardless of the setting of PHICH, you can always set this command.

Example of Use

To set the PHICH duration to Normal.
CALC:BATC:CC:PHIC:DUR NORM
CALC:BATC:CC:PHIC:DUR?
> NORM

:CALCulate:BATCh:CC[0]:PDSCh:POWer:AUTO

PDSCH Power Auto

Function

This command enables or disables automatic detection of PDSCH power.

Command

```
:CALCulate:BATCh:CC[0]:PDSCh:POWer:AUTO <switch>
```

Query

```
:CALCulate:BATCh:CC[0]:PDSCh:POWer:AUTO?
```

Response

```
<switch>
```

Parameter

<switch>	Automatic detection On/Off
OFF|0	Off
ON|1	On (Default)

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is set to Off.
This command will work only if PDSCH Modulation Scheme is set to other than AUTO.
However, regardless of the setting of PDSCH Modulation Scheme, you can always set this command.

Example of Use

To enable automatic detection of PDSCH power.
CALC:BATC:CC:PDSC:POW:AUTO ON
CALC:BATC:CC:PDSC:POW:AUTO?
> 1

:CALCulate:BATCh:CC[0]:PDSCh:POWer:BOOSting

PDSCH Power Boosting

Function

This command sets the PDSCH boosting level.

Command

```
:CALCulate:BATCh:CC[0]:PDSCh:POWer:BOOSting <rel_power>
```

Query

```
:CALCulate:BATCh:CC[0]:PDSCh:POWer:BOOSting?
```

Response

```
<rel_power>
```

Parameter

<rel_power>		PDSCH boosting level
	Range	–20.000 to +20.000 dB
	Resolution	0.001 dB
	Suffix Code	DB dB is used when omitted.
	Default	0 dB

Details

This command is available when Test Model is set to Off.
If Test Model is set to other than Off, this parameter is automatically set to the value that conforms to 3GPP TS 36.141, 6.1.1 E-UTRA Test Models.
This command will work only if PDSCH Modulation Scheme is set to other than AUTO and PDSCH Power Auto is set to Off. However, regardless of the setting of each of PDSCH Modulation Scheme and PDSCH Power Auto, you can always set this command.

Example of Use

To set the PDSCH boosting level to +10 dB.
CALC:BATC:CC:PDSC:POW:BOOS 10
CALC:BATC:CC:PDSC:POW:BOOS?
> 10.000

[:SENSe]:BATCh:EVM[:STATe]

Modulation Analysis

Function

This command enables or disables the modulation analysis.

Command

```
[:SENSe]:BATCh:EVM[:STATe] <switch>
```

Query

```
[:SENSe]:BATCh:EVM[:STATe]?
```

Response

```
<switch>
```

Parameter

<switch>	Modulation Analysis On/Off
OFF|0	Off
ON|1	On (Default)

Example of Use

To configure a setting to include Batch Modulation Analysis.

BATC:EVM ON

BATC:EVM?

> 1

[:SENSe]:BATCh:OBW[:STATe]

OBW

Function

This command enables or disables the OBW measurement.

Command

```
[:SENSe]:BATCh:OBW[:STATe] <switch>
```

Query

```
[:SENSe]:BATCh:OBW[:STATe]?
```

Response

```
<switch>
```

Parameter

<switch>		OBW measurement On/Off
	OFF|0	Off
	ON|1	On (Default)

Example of Use

To set the OBW measurement to On.

BATC:OBW ON

BATC:OBW?

> 1

[:SENSe]:BATCh:ACLR[:STATe]

ACLR

Function

This command enables or disables the ACLR measurement.

Command

```
[:SENSe]:BATCh:ACLR[:STATe] <switch>
```

Query

```
[:SENSe]:BATCh:ACLR[:STATe]?
```

Response

```
<switch>
```

Parameter

<switch>	ACLR On/Off
OFF|0	Off
ON|1	On (Default)

Example of Use

To set the ACLR measurement to On.

BATC:ACLR ON

BATC:ACLR?

> 1

[:SENSe]:BATCh:OBUE[:STATe]

OBUE

Function

This command enables or disables the OBUE (Operating Band Unwanted Emissions) measurement.

Command

```
[:SENSe]:BATCh:OBUE[:STATe] <switch>
```

Query

```
[:SENSe]:BATCh:OBUE[:STATe]?
```

Response

```
<switch>
```

Parameter

<switch>	OBUE On/Off
OFF|0	Off
ON|1	On (Default)

Example of Use

To set the OBUE measurement to On.

BATC:OBUE ON

BATC:OBUE?

> 1

[:SENSe]:BATCh:BAND[0]:OBUE:STANdard

OBUE Standard

Function

This command sets the template of the OBUE measurement.

Command

```
[:SENSe]:BATCh:BAND[0]:OBUE:STANdard <mode>
```

Query

```
[:SENSe]:BATCh:BAND[0]:OBUE:STANdard?
```

Response

```
<mode>
```

Parameter

<mode>	Template of the OBUE measurement
WIDE_A_U1G	Wide Area BS Category A <1G (Default)
WIDE_A_O1G_U3G	Wide Area BS Category A 1-3G
WIDE_A_O3G	Wide Area BS Category A >3G
WIDE_B1_U1G	Wide Area BS Category B Option 1 <1G
WIDE_B1_O1G_U3G	Wide Area BS Category B Option 1 1-3G
WIDE_B1_O3G	Wide Area BS Category B Option 1 >3G
WIDE_B2	Wide Area BS Category B Option 2
LOCAL_U3G	Local Area BS ≤3G
LOCAL_O3G	Local Area BS >3G
HOME_U3G	Home BS ≤3G
HOME_O3G	Home BS >3G
MEDIUM1_U3G	Medium Range BS ≤3G , 31 < P ≤ 38 dBm
MEDIUM1_O3G	Medium Range BS >3G , 31 < P ≤ 38 dBm
MEDIUM2_U3G	Medium Range BS ≤3G , P ≤ 31 dBm
MEDIUM2_O3G	Medium Range BS >3G , P ≤ 31 dBm

Example of Use

To set the template of the OBUE measurement to Home BS ≤3G.

BATC:BAND:OBUE:STAN HOME_U3G

BATC:BAND:OBUE:STAN?

> HOME_U3G

[:SENSe]:BATCh:BAND[0]:OBUE:STANdard:ADDitional

OBUE Standard Additional

Function

This command sets the additional template of the OBUE measurement.

Command

```
[:SENSe]:BATCh:BAND[0]:OBUE:STANdard:ADDitional <mode>
```

Query

```
[:SENSe]:BATCh:BAND[0]:OBUE:STANdard:ADDitional?
```

Response

```
<mode>
```

Parameter

<mode>	Additional standard template for OBUE measurement
OFF	Not use the additional standard template (Default)
1	Band 5
2	Band 2, 4, 10, 23, 25, 35, 36, 41
3	Band 12, 13, 14, 17

Example of Use

To set the additional template of the OBUE measurement to Band 5.

BATC:BAND:OBUE:STAN:ADD 1

BATC:BAND:OBUE:STAN:ADD?

> 1

[:SENSe]:BATCh:BAND[0]:INTerfering:MODE

Interfering Mode

Function

This command sets whether or not to exclude the frequency, at which the interfering signal exists, from the target of the unwanted emissions measurement.

Command

```
[:SENSe]:BATCh:BAND[0]:INTerfering:MODE <switch>
```

Query

```
[:SENSe]:BATCh:BAND[0]:INTerfering:MODE?
```

Response

```
<switch>
```

Parameter

<switch>	Interfering Mode On/Off
OFF|0	Does not exclude. (Default)
ON|1	Excludes.

Example of Use

To set the Interfering Mode to On.

BATC:BAND:INT:MODE ON

BATC:BAND:INT:MODE?

> 1

[:SENSe]:BATCh:BAND[0]:INTerfering:FREQuency:OFFSet

Interfering Frequency Offset

Function

This command sets the center frequency of the interfering signal with the relative value from the center frequency of the measured channel.

Command

```
[:SENSe]:BATCh:BAND[0]:INTerfering:FREQuency:OFFSet <freq>
```

Query

```
[:SENSe]:BATCh:BAND[0]:INTerfering:FREQuency:OFFSet?
```

Response

```
<freq>
```

Parameter

<freq>	Center frequency of interfering signal (Relative value)
Range	±80 MHz
Resolution	1 Hz
Suffix Code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ Hz is used when omitted.
Default	0 Hz

Example of Use

To set the center frequency (relative value) of the interfering signal to 7.5 MHz.

BATC:BAND:INT:FREQ:OFFS 7.5MHZ

BATC:BAND:INT:FREQ:OFFS?

> 7500000

[:SENSe]:BATCh:BAND[0]:INTerfering:FREQuency:BANDwidth

Interfering Frequency Bandwidth

Function

This command sets the bandwidth of the interfering signal.

Command

```
[:SENSe]:BATCh:BAND[0]:INTerfering:FREQuency:BANDwidth <freq>
```

Query

```
[:SENSe]:BATCh:BAND[0]:INTerfering:FREQuency:BANDwidth?
```

Response

```
<freq>
```

Parameter

<freq>		Bandwidth of interfering signal
	Range	1 Hz to 20 MHz
	Resolution	1 Hz
	Suffix Code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ
		Hz is used when omitted.
	Default	5 MHz

Example of Use

To set the bandwidth of the interfering signal to 10 MHz.

BATC:BAND:INT:FREQ:BAND 10MHZ

BATC:BAND:INT:FREQ:BAND?

> 10000000

3.2.4 Common Measurement Function

:INITiate:MODE:SINGle

Single Measurement

Function

This command starts single measurement.

Command

```
:INITiate:MODE:SINGle
```

Example of Use

To start single measurement.

INIT:MODE:SING

:INITiate[:IMMediate]

Initiate

Function

This command starts measurement in the current measurement mode.

Command

```
:INITiate[:IMMediate]
```

Example of Use

To start measurement in the current measurement mode.

INIT

:TRIGger[:SEQuence][:STATe]

Trigger Switch

Function

This command sets the trigger wait state On/Off.

Command

```
:TRIGger[:SEQuence][:STATe] <switch>
```

Query

```
:TRIGger[:SEQuence][:STATe]?
```

Response

```
<switch>
```

Parameter

<switch>	Trigger wait On/Off
OFF|0	Off (Default)
ON|1	On

Example of Use

To set the trigger wait state On.

TRIG ON

TRIG?

> 1

:TRIGger[:SEQuence]:SOURce

Trigger Source

Function

This command selects the trigger signal source.

Command

```
:TRIGger[:SEQuence]:SOURce <mode>
```

Query

```
:TRIGger[:SEQuence]:SOURce?
```

Response

```
<mode>
```

Parameter

<mode>	Trigger signal source
EXTernal[1]	External input (Default)
IMMediate	Free run

Example of Use

To set the trigger signal source to external input.

TRIG:SOUR EXT

TRIG:SOUR?

> EXT

:TRIGger[:SEQuence]:SLOPe

Trigger Slope

Function

This command sets the trigger detection mode (rising or falling).

Command

```
:TRIGger[:SEQuence]:SLOPe <mode>
```

Query

```
:TRIGger[:SEQuence]:SLOPe?
```

Response

```
<mode>
```

Parameter

<mode>		Trigger detection mode
	POSitive	Triggers are detected at the rising edge (Default)
	NEGative	Triggers are detected at the falling edge.

Example of Use

To detect a trigger at the rising edge.

TRIG:SLOP POS

TRIG:SLOP?

> POS

:TRIGger[:SEQuence]:DELay

Trigger Delay

Function

This command sets the trigger delay time from generation of a trigger to start of a capture operation.

Command

```
:TRIGger[:SEQuence]:DELay <time>
```

Query

```
:TRIGger[:SEQuence]:DELay?
```

Response

```
<time>
```

Parameter

<time>		Trigger delay time
	Range	–0.5 to +0.5 s
	Resolution	1 us
	Suffix Code	NS, US, MS, S
		`S` is used when omitted.
	Default	0 s

Example of Use

To set the trigger delay time to 20 ms.

TRIG:DEL 20MS

TRIG:DEL?

> 0.020000

3.2.5 Batch Measurement Function

:INITiate:BATCh

Batch Initiate

Function

This command executes the measurement.

Command

```
:INITiate:BATCh
```

Example of Use

To execute the measurement.

INIT:BATC

:FETCh:BATCh[n]?

Batch Query

Function

This command queries the results of the measurement.

Query

```
:FETCh:BATCh[n]?
```

Response

See Table 3.2.5-1.

Details

An unmeasured value, for example 999.99, is returned if the measurement is not performed yet or its result is an error.
Unmeasured values are:
Measurement about Power [dB], [dBm]: 999.99
Frequency Error [Hz]: 99999999999.9
Frequency Error [ppm]: 9999999.999999
EVM: 999.99
Time Offset [s]: 9.999999999
OBW/ACLR/OBUE Frequency: 99999.999
Evaluation (Pass/Fail): - (hyphen)

Example of Use

To query the results of the measurement.
FETC:BATC?
> 0,1.23,4.56,1.002.00,...

Table 3.2.5-1 shows the responses to the parameter n.

Table 3.2.5-1 Responses to Measurement Results

n	Result Mode	Response
1 or omitted	A	Responses are returned with comma-separated value formats in the following order: 1. Measurement status (response to the :STATus:ERRor? query) 2. Frequency Error (Average) [Hz] (resolution 0.1 Hz) 3. Frequency Error (Maximum) [Hz] (resolution 0.1 Hz) 4. PDSCH EVM (Average) [%] (resolution 0.01 %) 5. PDSCH EVM (Maximum) [%] (resolution 0.01 %) 6. Output Power (Average) [dBm] (resolution 0.01 dB) 7. Output Power (Maximum) [dBm] (resolution 0.01 dB) 8. Output Power (Minimum) [dBm] (resolution 0.01 dB) 9. RS Power (Average) [dBm] (resolution 0.01 dB) 10. RS Power (Maximum) [dBm] (resolution 0.01 dB) 11. RS Power (Minimum) [dBm] (resolution 0.01 dB) 12. OSTP (Average) [dBm] (resolution 0.01 dB) 13. OSTP (Maximum) [dBm] (resolution 0.01 dB) 14. OSTP (Minimum) [dBm] (resolution 0.01 dB) 15. PDSCH QPSK EVM (Average) [%] (resolution 0.01 %) 16. PDSCH QPSK EVM (Maximum) [%] (resolution 0.01 %) 17. PDSCH 16QAM EVM (Average) [%] (resolution 0.01 %) 18. PDSCH 16QAM EVM (Maximum) [%] (resolution 0.01 %) 19. PDSCH 64QAM EVM (Average) [%] (resolution 0.01 %) 20. PDSCH 64QAM EVM (Maximum)[%] (resolution 0.01 %) 21. Frequency Error (Average) [ppm] (resolution 0.000001 ppm) 22. Frequency Error (Maximum) [ppm] (resolution 0.000001 ppm) 23. 999.99 24. 999.99 25. 999.99 26. 999.99 27. 999.99 28. 999.99 29. 999.99 30. 999.99

Table 3.2.5-1 Responses to Measurement Results (Cont'd)

n	Result Mode	Response
1 or omitted	A	31. 999.99 32. 999.99 33. 999.99 34. 999.99 35. 999.99 36. 999.99 37. 999.99 38. 999.99 39. 999.99 40. 999.99 41. 999.99 42. 999.99 43. 999.99 44. 999.99 45. 999.99 46. 999.99 47. 999.99 48. 999.99 49. 999.99 50. 999.99 51. 999.99 52. 999.99 53. 999.99 54. 999.99 55. 999.99 56. 999.99 57. 999.99 58. 999.99 59. 999.99 60. 999.99

Table 3.2.5-1 Responses to Measurement Results (Cont'd)

n	Result Mode	Response
1 or omitted	A	61 999.99 62. 999.99 63. 999.99 64. 999.99 65. 999.99 66. 999.99 67. 999.99 68. 999.99 69. 999.99 70. 999.99 71. 999.99 72. 999.99 73. 999.99 74. 999.99 75. 999.99 76. 999.99 77. 999.99 78. 999.99 79. 999.99 80. 999.99 81. 999.99 82. 999.99 83. 999.99 84. 999.99 85. 999.99 86. 999.99 87. 999.99 88. 999.99 89. 999.99 90. 999.99

Table 3.2.5-1 Responses to Measurement Results (Cont'd)

n	Result Mode	Response
1 or omitted	A	91. Frequency Error (Average) [Hz] (resolution 0.1 Hz) 92. Frequency Error (Maximum) [Hz] (resolution 0.1 Hz) 93. PDSCH EVM (Average) [%](resolution 0.01 %) 94. PDSCH EVM (Maximum)[%] (resolution 0.01 %) 95. Tx Power (Average) [dBm] (resolution 0.01 dB) 96. Tx Power (Maximum) [dBm] (resolution 0.01 dB) 97. Tx Power (Minimum) [dBm] (resolution 0.01 dB) 98. RS Power (Average) [dBm] (resolution 0.01 dB) 99. RS Power (Maximum) [dBm] (resolution 0.01 dB) 100. RS Power (Minimum) [dBm] (resolution 0.01 dB) 201. OSTP (Average) [dBm] (resolution 0.01 dB) 102. OSTP (Maximum) [dBm] (resolution 0.01 dB) 103. OSTP (Minimum) [dBm] (resolution 0.01 dB) 104. 999.99 105. 999.99 106. 999.99 107. 999.99 108. 999.99 109. 999.99 110. 999.99 111. 999.99 112. 999.99 113. 999.99 114. 999.99 115. 999.99 116. 999.99 117. 999.99 118. 999.99 119. 999.99 120. 999.99 121. 999.99 122. 999.99 123. 999.99 124. 999.99 125. 999.99 126. 999.99 127. 999.99 128. 999.99 129. 999.99

Table 3.2.5-1 Responses to Measurement Results (Cont'd)

n	Result Mode	Response
1 or omitted	A	130. 999.99 131. 999.99 132. 999.99 133. 999.99 134. 999.99 135. 999.99 136. 999.99 137. 999.99 138. 999.99 139. 999.99 140. 999.99 141. 999.99 142. 999.99 143. 999.99 144. 999.99 145. 999.99 146. 999.99 147. 999.99 148. 999.99 149. 999.99 150. 999.99 151. 999.99 152. 999.99 153. 999.99 154. 999.99 155. 999.99 156. Time Offset(Average) [s] (resolution 0.1 ns) 157. Time Offset(Maximum) [s] (resolution 0.1 ns) 158. 999.99 159. 999.99 160. 999.99 161. 999.99 162. 999.99 163. 999.99 164. 999.99 165. 999.99 166. PDSCH QPSK EVM (Average) [%] (resolution 0.01 %) 167. PDSCH QPSK EVM (Maximum) [%] (resolution 0.01 %) 168. PDSCH 16QAM EVM (Average) [%] (resolution 0.01 %) 169. PDSCH 16QAM EVM (Maximum) [%](resolution 0.01 %) 170. PDSCH 64QAM EVM (Average) [%](resolution 0.01 %) 171. PDSCH 64QAM EVM (Maximum) [%](resolution 0.01 %) 172. Frequency Error (Average) [ppm] (resolution 0.000001 ppm) 173. Frequency Error (Maximum) [ppm] (resolution 0.000001 ppm) 174. Tx Power (Unsync) (Current) [dBm] (resolution 0.01 dB)

Table 3.2.5-1 Responses to Measurement Results (Cont'd)

n	Result Mode	Response
2	A	Responses are returned with comma-separated value formats in the following order: 1. Measurement Status (response to the :STATus:ERRor? query) 2. OBW [MHz] (resolution 0.001 MHz) 3. ACLR E-UTRA L2 [dB] (resolution 0.01 dB) 4. ACLR E-UTRA L1 [dB] (resolution 0.01 dB) 5. ACLR E-UTRA U1 [dB] (resolution 0.01 dB) 6. ACLR E-UTRA U2 [dB] (resolution 0.01 dB) 7. ACLR UTRA L2 [dB] (resolution 0.01 dB) 8. ACLR UTRA L1 [dB] (resolution 0.01 dB) 9. ACLR UTRA U1 [dB] (resolution 0.01 dB) 10. ACLR UTRA U2 [dB] (resolution 0.01 dB) 11. OBUE Margin [dB] (resolution 0.01 dB) 12. OBUE Peak Absolute Level [dBm] (resolution 0.01 dB) 13. OBUE Peak Frequency [MHz] (resolution 0.0001 MHz) 14. 999.99 15. 999.99 16. 999.99 17. 999.99 18. 999.99 19. 999.99 20. 999.99 21. 999.99 22. 999.99 23. 999.99 24. 999.99 25. 999.99 26. 999.99 27. 999.99 28. 999.99 29. 999.99 30. 999.99 31. 999.99 32. 999.99 33. 999.99 34. 999.99 35. 999.99 36. 999.99 37. 999.99 38. 999.99 39. 999.99 40. OBW [MHz] (resolution 0.001 MHz) 41. 999.99 42. 999.99 43. 999.99 44. 999.99 45. OBUE Pass/Fail (PASS|FAIL)

Table 3.2.5-1 Responses to Measurement Results (Cont'd)

n	Result Mode	Response
3	A	Responses are returned with comma-separated value formats in the following order: 1. OBW/ACLR Spectrum trace point number 2. 999.99 3. 999.99
6	A/B	1. Range #0 Lower OBUE Margin (Normal) [dB] (resolution 0.01 dB 2. Range #0 Lower OBUE Peak Absolute Level (Normal) [dBm] (resolution 0.01 dB) 3. Range #0 Lower OBUE Peak Frequency (Normal) [MHz] (resolution 0.0001 MHz) 4. Range #0 Lower OBUE Pass/Fail (Normal) 5. Range #0 Upper OBUE Margin (Normal)[dB] (resolution 0.01 dB) 6. Range #0 Upper OBUE Peak Absolute Level (Normal) [dBm] (resolution 0.01 dB) 7. Range #0 Upper OBUE Peak Frequency (Normal) [MHz] (resolution 0.0001 MHz) 8. Range #0 Upper OBUE Pass/Fail (Normal) 9-16. Range #1 17-24. Range #2 25-32. Range #3 33-40. Range #4 41-48. Range #5
7	A/B	1. Range #0 Lower OBUE Margin (Additional) [dB] (resolution 0.01 dB) 2. Range #0 Lower OBUE Peak Absolute Level (Additional)[dBm] (resolution 0.01 dB) 3. Range #0 Lower OBUE Peak Frequency (Additional) [MHz] (resolution 0.0001 MHz) 4. Range #0 Lower OBUE Pass/Fail (Additional) 5. Range #0 Upper OBUE Margin (Additional) [dB] (resolution 0.01 dB) 6. Range #0 Upper OBUE Peak Absolute Level (Additional) [dBm] (resolution 0.01 dB) 7. Range #0 Upper OBUE Peak Frequency (Additional) [MHz] (resolution 0.0001 MHz) 8. Range #0 Upper OBUE Pass/Fail (Additional)

Table 3.2.5-1 Responses to Measurement Results (Cont'd)

n	Result Mode	Response
11	A	Responses are returned with comma-separated value formats in the following order: 1 to n OBW/ACLR Spectrum absolute level 1. 1st OBW/ACLR Spectrum absolute level 2. 2nd OBW/ACLR Spectrum absolute level … n. nth OBW/ACLR Spectrum absolute level ***Note:*** n is the OBW/ACLR Spectrum trace point number.
12	A	Responses are returned with comma-separated value formats in the following order: 1 to n OBW/ACLR Spectrum frequency 1. 1st OBW/ACLR Spectrum frequency 2. 2nd OBW/ACLR Spectrum frequency … n. nth OBW/ACLR Spectrum frequency ***Note:*** n is the OBW/ACLR Spectrum trace point number.

:READ:BATCh[n]?

Batch Query

Function

This command executes the single measurement with the current set values and queries the measurement results.

Query

```
:READ:BATCh[n]?
```

Response

See Table 3.2.5-1.

Example of Use

To execute the measurement and query the results.
READ:BATC?

Related Command

This command has the same function as the following command:
:MEASure:BATCh[n]?

:MEASure:BATCh[n]?

Batch Query

Function

This command executes the single measurement with the current set values and queries the measurement results.

Query

```
:MEASure:BATCh[n]?
```

Response

See Table 3.2.5-1.

Example of Use

To execute the measurement and query the results.
MEAS:BATC?

Related Command

This command has the same function as the following command:
READ:BATCh[n]?

3.2.6 Setting Batch Measurement Parameters

[:SENSe]:BATCh:AVERage[:STATe]

Storage Mode

Function

This command sets the storage mode.

Command

```
[:SENSe]:BATCh:AVERage[:STATe] <mode>
```

Query

```
[:SENSe]:BATCh:AVERage[:STATe]?
```

Response

```
<mode>
```

Parameter

<mode>	Storage Mode
OFF|0	Off (Default)
ON|1	Average
AMAXimum|2	Average & Maximum

Example of Use

To set the storage mode to Average.

BATC:AVER ON

BATC:AVER?

> 1

[:SENSe]:BATCh:AVERage:COUNt

Storage Count

Function

This command sets the storage count.

Command

```
[:SENSe]:BATCh:AVERage:COUNt <integer>
```

Query

```
[:SENSe]:BATCh:AVERage:COUNt?
```

Response

```
<integer>
```

Parameter

<integer>	Storage Count
Range	2 to 100
Resolution	1
Default	10

Example of Use

To set the storage count to 10.

BATC:AVER:COUN 10

BATC:AVER:COUN?

> 10

[:SENSe]:BATCh:AVERage:UWEMissions[:STATe]

Storage Mode for Unwanted Emissions

Function

This command sets the storage mode for Unwanted Emissions.

Command

```
[:SENSe]:BATCh:AVERage:UWEMissions[:STATe] <switch>
```

Query

```
[:SENSe]:BATCh:AVERage:UWEMissions[:STATe]?
```

Response

```
<switch>
```

Parameter

<switch>	Storage Mode for Unwanted Emissions
OFF|0	Off (Default)
ON|1	Average

Example of Use

To set the storage mode for Unwanted Emissions to Average.

BATC:AVER:UWEM ON

BATC:AVER:UWEM?

> 1

[:SENSe]:BATCh:AVERage:UWEMissions:COUNt

Storage Count for Unwanted Emissions

Function

This command sets the storage count for Unwanted Emissions.

Command

```
[:SENSe]:BATCh:AVERage:UWEMissions:COUNt <integer>
```

Query

```
[:SENSe]:BATCh:AVERage:UWEMissions:COUNt?
```

Response

```
<integer>
```

Parameter

<integer>	Unwanted Emissions Storage Count
Range	2 to 100
Resolution	1
Default	10

Example of Use

To set the storage count for Unwanted Emissions to 10.

BATC:AVER:UWEM:COUN 10

BATC:AVER:UWEM:COUN?

> 10

3.2.7 Measurement Status Query

:STATus:ERRor?

Measurement Status Query

Function

This command queries the measurement status.

Query

```
:STATus:ERRor?
```

Response

```
<status>
```

Parameter

<status>	Measurement status	
Value	= bit0 + bit1 + bit2 + bit3 + bit4 + bit5 + bit6	
	+ bit7 + bit8 + bit9 + bit10 + bit11 + bit12	
	+ bit13 + bit14 + bit15	
	bit0 : 2^0 = 1	Not measured
	bit1 : 2^1 = 2	Level over
	bit2 : 2^2 = 4	Signal abnormal
	bit3 : 2^3 = 8	(Reserved)
	bit4 : 2^4 = 16	Transfer measurement timeout
	bit5 : 2^5 = 32	(Reserved)
	bit6 : 2^6 = 64	(Reserved)
	bit7 : 2^7 = 128	(Reserved)
	bit8 : 2^8 = 256	(Reserved)
	bit9 : 2^9 = 512	(Reserved)
	bit10 : 2^{10} = 1024	(Reserved)
	bit11 : 2^{11} = 2048	(Reserved)
	bit12 : 2^{12} = 4096	(Reserved)
	bit13 : 2^{13} = 8192	(Reserved)
	bit14 : 2^{14} = 16384	(Reserved)
	bit15 : 2^{15} = 32768	(Reserved)
Range	0 to 65535	

Details

If the measurement ends normally, 0 is returned.

Example of Use

To query the measurement status.

```
STAT:ERR?
> 0
```

3.2.8 Setting SG Frequency

[:SOURce]:FREQuency[:CW|:FIXed]

SG Frequency

Function

This command sets the SG frequency.

Command

```
[:SOURce]:FREQuency[:CW|:FIXed] <freq>
```

Query

```
[:SOURce]:FREQuency[:CW|:FIXed]?
```

Response

```
<freq>
```

Parameter

<freq>		Frequency
	Range	400.000000 to 3800.000000 MHz
	Resolution	1 Hz
	Suffix Code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ
		Hz is used when omitted.
	Default	1 GHz

Example of Use

To set the SG frequency to 2 GHz.

FREQ 2GHZ

FREQ?

> 2000000000

3.2.9 Setting SG Level

:OUTPut[:STATe]

SG RF Output

Function

This command enables or disables RF output from the SG.

Command

```
:OUTPut[:STATe] <on_off>
```

Query

```
:OUTPut[:STATe]?
```

Response

```
<on_off>
```

Parameter

<on_off>	RF output On/Off
ON|1	On
OFF|0	Off (Default)

Example of Use

To enable the RF signal output from the SG.

OUTP ON

OUTP?

> 1

[:SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude]

SG Output Level

Function

This command sets the SG output level.

Command

```
[:SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude] <level>
```

Query

```
[:SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude]? <unit>
```

Response

```
<level>
```

Parameter

<level>		Output level
	Range	–130.0 to –10.0 dBm (Port1/Port2)
		–120.0 to 0.0 dBm (Port3/Port4)
	Resolution	0.1 dBm
	Default	–130.0 dBm (Port1/Port2)
		–120.0 dBm (Port3/Port4)
	Unit	dBm
	Suffix Code	DBM
<unit>		Unit of output level (This parameter can be omitted.)
	DBM	dBm
	When omitted	dBm

Example of Use

To set the SG output level to –10 dBm.

POW -10DBM

POW?

> –10.0

3.2.10 Playing/Selecting/Loading SG Waveform Pattern

[:SOURce]:RADio:ARB:WAVeform

SG Select Waveform File

Function

This command selects the waveform pattern file to be played from the waveform pattern files loaded to the waveform memory.

Command

```
[:SOURce]:RADio:ARB:WAVeform <file_name>,<group_number>
```

Query

```
[:SOURce]:RADio:ARB:WAVeform?
```

Response

```
<file_name>,<group_number>
```

Parameter

<file_name>	Waveform file name
<group_number>	Group No.

Example of Use

To set the waveform pattern of the group number 1 in the SG waveform file "MV887023A_LTEFDD_0001.xml" to the play pattern.

```
RAD:ARB:WAV "MV887023A_LTEFDD_0001",1
RAD:ARB:WAV?
> "MV887023A_LTEFDD_0001",1
```

3.2.11 Setting SG Modulation and AWGN

:OUTPut:MODulation[:STATe]

SG Modulation

Function

This command enables or disables the SG modulation function.

Command

```
:OUTPut:MODulation[:STATe] <on_off>
```

Query

```
:OUTPut:MODulation[:STATe]?
```

Response

```
<on_off>
```

Parameter

<on_off>	Modulation On/Off
ON|1	On
OFF|0	Off (Default)

Example of Use

To enable the SG modulation function.

OUTP:MOD ON

OUTP:MOD?

> 1

3.2.12 Setting Parameters for MT8870

:INSTrument[:SELect]

Application Select

Function

This command sets the type of application software executing on MU887000A

Command

```
:INSTrument[:SELect] <app>
```

Query

```
:INSTrument[:SELect]?
```

Response

```
<app>
```

Parameter

<app>		Type of application software
	SMALLCELL	Small Cell application MX887021A, MX887023A
	CELLULAR	Cellular application MX887010A, MX887011A, MX887012A, MX887013A, MX887014A, MX887015A, MX887016A, or MX887017A
	SRW	SRW application MX887030A, MX887031A, MX887040A, or MX887050A

Details

Set the parameter to SMALLCELL and send the command before using the MX887023A. Select SMALLCELL by INSTrument[:SELect] command, and then set 3GLTE_DL or SG by :INSTrument:SYSTem command.

Example of Use

To set the application software to SMALLCELL.

```
INST SMALLCELL
INST?
> SMALLCELL
```

: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

:SYSTem:LANGuage

Language Selection of Remote Command

Function

Switches language mode of remote control command.

Command

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

Query

```
:SYSTem:LANGuage?
```

Response

<mode>

Parameter

<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

Chapter 4 Performance Test

This chapter explains how to setup the measuring instruments required for the MX887023A LTE FDD Downlink performance tests as well as the test procedures.

4.1 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.

- Tx Power measurement accuracy (MOD)
- 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 the Anritsu Customer Service Center at the address listed in the back of this manual or in the separate file on the accessory DVD.

⚠ 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.

4.2 Instruments for Testing Performance

The following table lists the measuring instruments required for testing the MU887000A performance and the specifications for each instrument.

Table 4.2-1 Measuring Instruments for Performance Tests

Test Item	Required Specifications*	Recommended Instrument (Anritsu model)
Tx Power Measurements ● Measurement Accuracy	Signal Generator ● Frequency Range: 600 to 3800 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)
	Power Meter ● Main Frame Accuracy: ±0.02 dB ● Frequency Range: 600 to 3800 MHz ● Resolution: 0.01 dB	Power Meter (ML2437A)
	Power Sensor ● Frequency Range: 600 to 3800 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 In-Band Emissions	Signal generator supporting output of 3GPP LTE modulation signals Same as above	Same as above
	Power Meter Same as above	Same as above
	Power Sensor ● Frequency Range: 600 to 3800 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.

4.3 Performance Tests

Common test items

The following list shows the common settings for each measurement at the MU8870000A.

Application:	Small Cell
Standard:	LTE
Frame Structure:	FDD (MX887023A)
Channel Bandwidth:	20 MHz

4.3.1 Calibrating signal generator (MOD)

This section describes how to obtain calibration values for measurements that use modulated waveforms.

(1) Measuring instruments

- Vector signal generator: MG3700A
- Power meter: ML2437A
- Power sensor: MA24002A
- 3-dB Attenuator: AT-103 (2 sets)

(2) Setup

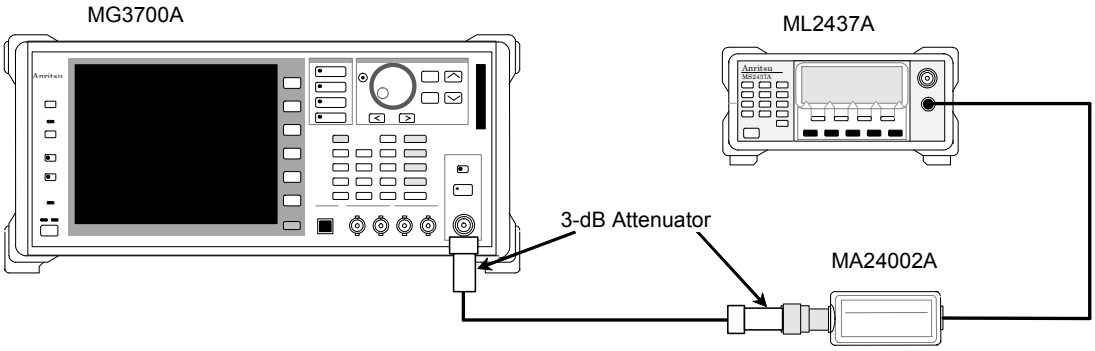

Figure 4.3.1-1 Signal Generator Calibration Setup (MOD)

(3) Procedure

1. Setup the instruments as shown in Figure 4.3.1-1.
2. Output a modulated 600 MHz signal from the Vector signal generator (SG) at a level of –4 dBm.

   Waveform Pattern: E-TM_3_1_20M_NF
   (for Frequency Error, EVM measurement)
   E-TM_1_1_20M_F
   (for TX power measurement, ACLR measurement)

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 4.3.1-1 “Measurement Point and Frequency” and perform the same measurements to obtain the calibration value.

Table 4.3.1-1 Measurement Point and Frequency

Meas. Point	Frequency (MHz)
1	600
2	940
3	1800
4	1900
5	2700
6	3400
7	3800

4.3.2 Tx power measurement accuracy (MOD)

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	–15 dBm ≤, ≤ +35 dBm	10 to 40°C

Test Port3/4

Measurement Accuracy	Input Level	Temperature
±0.7 dB	–15 dBm ≤, ≤ +25 dBm	10 to 40°C

(2) Measuring instruments

- Vector signal generator: MG3700A
- 3-dB Attenuator: AT-103 (2 sets)

(3) Setup

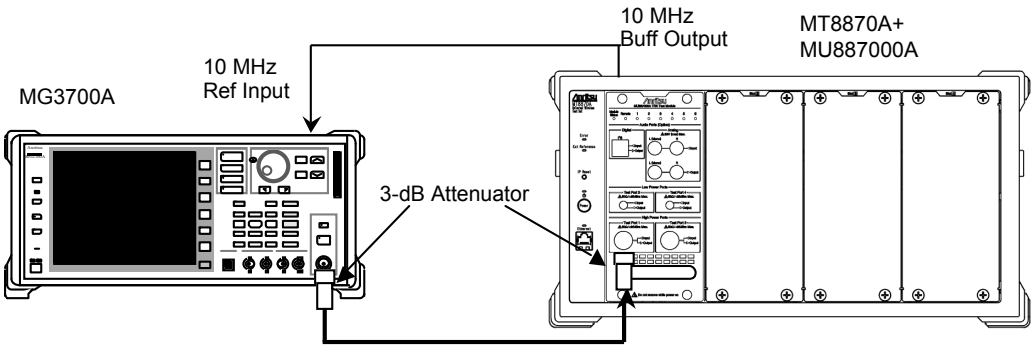

Figure 4.3.2-1 Setup for Measuring Amplitude Measurement Accuracy

(4) Test procedure

1 Setup the instruments as shown in Figure 4.3.4-1.

2. Set the MU887000A as follows:

Connect port:	Test Port1
Output level ON/OFF:	OFF (After setting the System to SG)
Input level:	–10 dBm
Downlink frequency:	600 MHz
Modulation Analysis Measurement:	ON, 1 time
Test Model:	E-TM 1.1
Starting Subframe Number:	0
Measurement Interval:	10

3. Set the Vector signal generator (SG) as follows:

Output:	ON
Modulation:	ON
Waveform pattern:	E-TM_1_1_20M_F
Output frequency:	600 MHz
Output level:	–10 dBm (This output level reflects the calibration value for item 4.3.1.)

4. Change the frequency of the MU887000A and SG according to Table 4.3.1-1 “Measurement Point and Frequency” and measure the Tx power.

Result of Tx Power Measurement: Average value

5. Change the Connect port setting for the connection with the MU887000A to Test Port2/3/4 successively, and repeat steps 2 to 4 over.

4.3.3 Frequency/modulation measurement

This test is related to the following modulation analyses:

- Carrier frequency accuracy
- Residual EVM

(1) Test specifications

Test Port1/2

	Measurement Accuracy
Carrier frequency accuracy	±(Set frequency × Reference oscillator accuracy + 10 Hz)
Residual EVM	≤1% (rms)

Input Frequency: 600 to 2700 MHz, 3400 to 3800 MHz

Input level: –15 dBm ≤, ≤+35 dBm

Test Port3/4

	Measurement Accuracy
Carrier frequency accuracy	±(Set frequency × Reference oscillator accuracy + 10 Hz)
Residual EVM	≤1% (rms)

Input Frequency: 600 to 2700 MHz, 3400 to 3800 MHz

Input level: –15 dBm ≤, ≤+25 dBm

(2) Measuring instruments

- Vector signal generator: MG3700A
- 3-dB Attenuator: AT-103 (2 sets)

(3) Setup

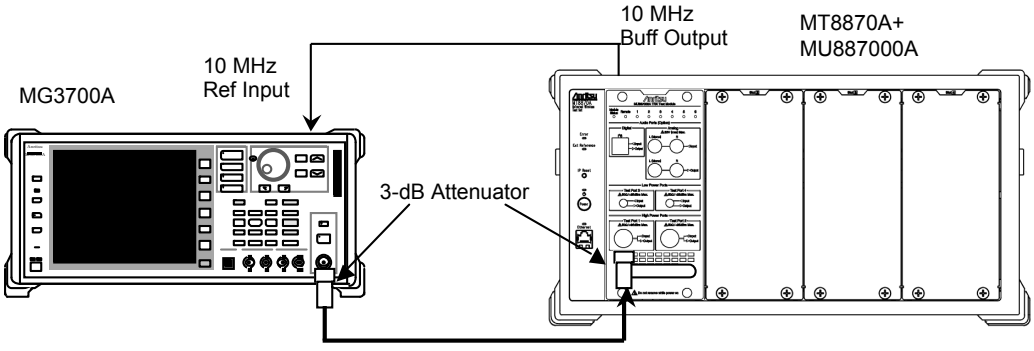

Figure 4.3.3-1 Setup for Measuring Frequency/Modulation

(4) Test procedure

1 Setup the instruments as shown in Figure 4.3.3-1

2. Set the MU887000A as follows:

Connect port:	Test Port1
Output level ON/OFF:	OFF (After setting the System to SG)
Input level:	–10 dBm
Downlink frequency:	600 MHz
Test Model:	E-TM 3.1
Modulation Analysis Measurement:	ON, 1 time
Starting Subframe Number:	0
Measurement Interval:	10

3. Set the Vector signal generator (SG) as follows:

Output:	ON
Modulation:	ON
Waveform pattern:	E-TM_3_1_20M_NF (for FDD)
Output frequency:	600 MHz
Output level:	–10 dBm (This output level reflects the calibration value for item 4.3.1.)

4. Measure the frequency error and EVM.

Carrier Frequency Error Result:	Worst value
EVM Result:	Average value

5. Change the MU887000A and SG frequencies according to Table 4.3.1-1 “Measurement Point and Frequency” and repeat steps 2 to 4 over.

6. Change the SG output level and the MU887000A input level to –15 dBm and measure by repeating steps 2 to 5 over. (–15 dBm is lower by 5 dB than the output level determined by the result measured in 4.3.1)

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.

4.3.4 Adjacent Channel Leakage Power Ratio

This test is related to Adjacent Channel Leakage Power Ratio measurements.

(1) Test specifications

Adjacent Channel Leakage Power Ratio	Measurement Point
≥50 dB	E-UTRA ALCR1, ACLR2
≥54 dB	UTRA ALCR1, ACLR2

Input Frequency: 600 to 2700 MHz, 3400 to 3800 MHz
Test Port1/2 Input level range: –10 dBm ≤, ≤+35 dBm
Test Port3/4 Input level range: –10 dBm ≤, ≤+25 dBm

(2) Measuring instruments

- Vector signal Generator: MG3700A
- 3-dB Attenuator: AT-103 (2 sets)

(3) Setup

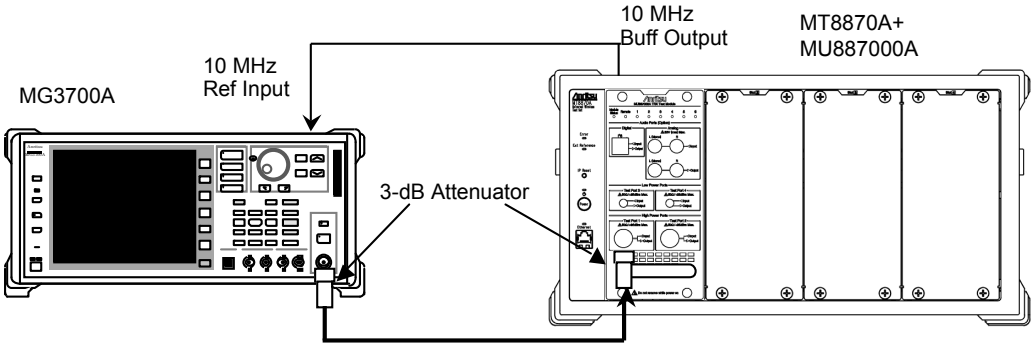

Figure 4.3.4-1 Setup for Measuring Adjacent Channel Leakage Power Ratio

(4) Test procedure

1. Setup the instruments as shown in Figure 4.3.4-1.
2. Set the MU887000A as follows:

   Connect port: Test Port1
   Output level ON/OFF: OFF (After setting the System to SG)
   Input level: –10 dBm
   Downlink frequency: 600 MHz
   Test Model: E-TM 1.1
   ACLR measurement: ON, 1 time

3. Set the Vector signal generator (SG) as follows:

   Output: ON
   Modulation: ON
   Waveform pattern: E-TM_1_1_20M_F
   Output frequency: 600 MHz
   Output level: –10 dBm (This output level reflects the calibration value for item 4.3.1.)

4. Measure the Adjacent Channel Leakage Power and read the following value:

   ACLR Result: Max value

5. Change the MU887000A and SG frequencies according to Table 4.3.1-1 “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.

4.3.5 About evaluation signals

The evaluation signals described in the performance test items 4.3.1, 4.3.2, 4.3.3, 4.3.4 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 Upper Frequency 6 GHz option is required to support Opt-015/016.

Summary of the evaluation signal

Refer to the parameter values for Channel bandwidth of 20 MHz that are specified in the following tables of 3GPP TS 36.141, Section 6.1.1.1:

- Table 6.1.1.1-1: Physical channel parameters of E-TM1.1
- Table 6.1.1.4-1: Physical channel parameters of E-TM3.1

When transmitting the evaluation signals from the SG, generate the following waveform pattern by using the Easy Setup function of the MX370108A LTE IQproducer™.

Table 4.3.5-1 LTE IQproducer Parameters

Parameter	Setting Values
System	LTE
Test Type	BS Test/E-UTRA Test Models
E-UTRA Test Models	E-TM3.1 (for frequency error, EVM measurement) E-TM1.1 (for TX power measurement, ACLR measurement)
Bandwidth	20 MHz
Cell ID	1
Roll Off Length	0
Filter Type	None (for frequency error, EVM measurement) Ideal (for TX power measurement, ACLR measurement)

4.3.6 Sample format for test result sheets

Use the following test result sheets when testing the MX887023A 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 (MOD)

SG Calibration Value (MOD)

MG3700A Modulation Wave

Frequency (MHz)	SG Setting (dBm)
	–10 dBm
600	
940	
1800	
1900	
2700	
3400	
3800	

Tx Power Measurement Accuracy (MOD)

Tx Power Measurement Accuracy Port1/2

MU887000A Input Level: –10 dBm (Item 4.3.1 Calibration Value)

Frequency (MHz)	MX887023A Measured Value (P) (dBm)	Measurement Accuracy (dB)			
		Lo Limit	Measurement Accuracy –10 – (P)	Hi Limit	Measurement uncertainty
600		–0.5		+0.5	±0.15
940					
1800					
1900					
2700					
3400					
3800					

Tx Power Measurement Accuracy Port3/4

MU887000A Input Level: –10 dBm (Item 4.3.1 Calibration Value)

Frequency (MHz)	MX887023A Measured Value (P) (dBm)	Measurement Accuracy (dB)(dB)			
		Lo Limit	Measurement Accuracy –10 – (P)	Hi Limit	Measurement uncertainty
600		–0.7		+0.7	±0.16
940					
1800					
1900					
2700					
3400					
3800					

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
600		≤1	±0. 03		±10.0	±2.4
940						
1800						
1900						
2700						
3400						
3800						

MU887000A Input Level: –15 dBm

Frequency (MHz)	Residual EVM (%)			Carrier Frequency Accuracy (Hz)		
	Measured Value	Spec.	Measurement uncertainty	Measured Value	Spec.	Measurement uncertainty
600		≤1	±0. 03		±10.0	±2.4
940						
1800						
1900						
2700						
3400						
3800						

Adjacent Channel Leakage Power Measurement

Adjacent Channel Leakage Power

MU887000A Input Level: –10 dBm

Frequency (MHz)	Adjacent Channel Leakage Power Ratio (dB)							
	Band							
	UTRA (–2)	UTRA (–1)	UTRA (+1)	UTRA (+2)	E-UTRA (–2)	E-UTRA (–1)	E-UTRA (+1)	E-UTRA (+2)
600								
940								
1800								
1900								
2700								
3400								
3800								
Spec. (dB)	≥54 dB	≥54 dB	≥54 dB	≥54 dB	≥50 dB	≥50 dB	≥50 dB	≥50 dB
Measurement uncertainty	1.04 dB				0.40 dB			

4.4 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 is listed on the last page of this manual, and in the separate file on the DVD 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 MX887023A LTE FDD Downlink TX Measurement. Refer to section 1.2 “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 MX887023A Specifications

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Common Items
Frequency
Measuring Object</td><td>
600 to 2700 MHz, 3400 to 3800 MHz
LTE FDD Downlink signal</td></tr>
<tr><td>RF Power
Input Level Range

Measurement Accuracy</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>–15 to +35 dBm</td><td>±0.3 dB (typ.)
±0.5 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>–15 to +25 dBm</td><td>±0.7 dB</td></tr>
</table></td></tr>
</table>

Table A-1 MX887023A Specifications (Cont'd)

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Modulation Analysis

Input Level Range

Carrier Frequency Accuracy
Modulation accuracy</td><td>

Port1, Port2: –15.0 to +35.0 dBm
Port3, Port4: –15.0 to +25.0 dBm
±(Set frequency × Reference oscillator accuracy + 10 Hz)
For Measurement Interval 10 Subframe, Test Model 3.1 signal
Residual Vector Error: ≤1%
For Measurement Interval 10 Subframe, Test Model 3.1signal, Channel Bandwidth = 3 / 5 / 10 / 15 /20 MHz</td></tr>
<tr><td>Adjacent Channel Leakage Power Ratio

Input Level Range

Measurement Range</td><td>

Port1, Port2: –10.0 to +35.0 dBm
Port3, Port4: –10.0 to +25.0 dBm
Channel Bandwidth = 1.4 / 3 / 5 MHz
<table>
<tr><th>Adjacent Channel</th><th>Measurement Range</th></tr>
<tr><td>E-UTRA ACLR1</td><td>≥54 dB</td></tr>
<tr><td>E-UTRA ACLR2</td><td>≥57 dB</td></tr>
</table>
Channel Bandwidth = 10 / 15 / 20 MHz
<table>
<tr><th>Adjacent Channel</th><th>Measurement Range</th></tr>
<tr><td>E-UTRA ACLR1
E-UTRA ACLR2</td><td>≥50 dB</td></tr>
</table>
Channel Bandwidth = 1.4 / 3 / 5 / 10 / 15 / 20 MHz
<table>
<tr><th>Adjacent Channel</th><th>Measurement Range</th></tr>
<tr><td>UTRA ACLR1
UTRA ACLR2</td><td>≥54 dB</td></tr>
</table></td></tr>
</table>

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