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

13th 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 it before using the equipment.**
- **Keep this manual with the equipment.**

ANRITSU CORPORATION

Document No.: M-W3610AE-13.0

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These indicate that the marked part should be recycled.

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

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Revision History:

February 29th, 2020
December 17th, 2021

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

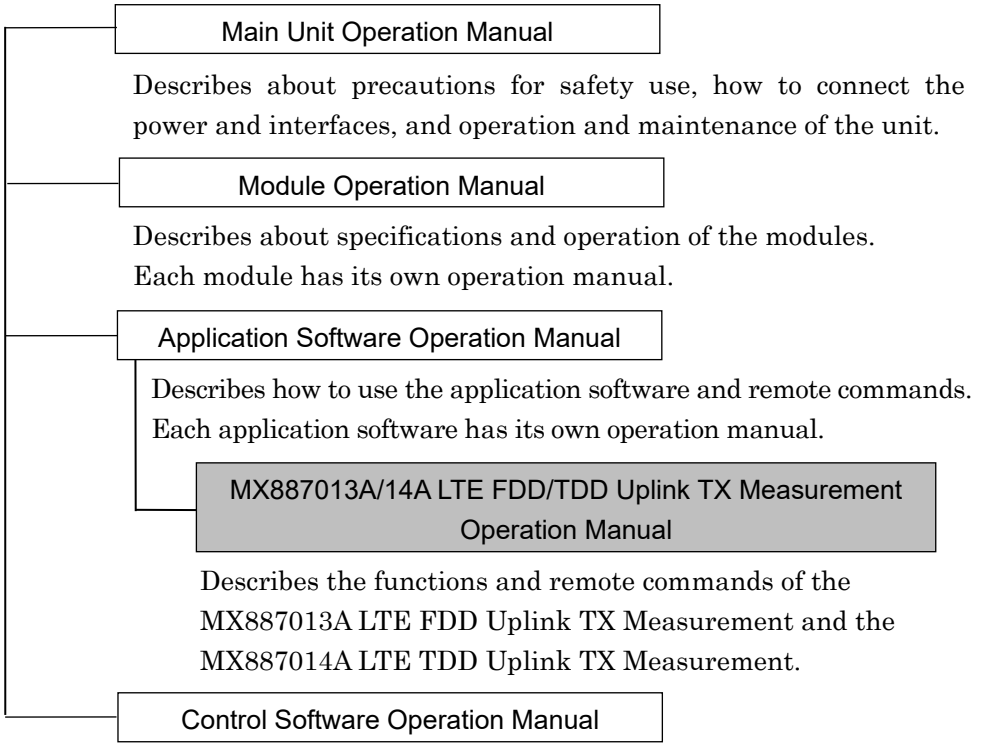
About This Manual

This manual mainly describes the operation of the MX887013A LTE FDD Uplink TX Measurement and MX887014A LTE TDD Uplink TX Measurement.

Products related to the MT8870A Universal Wireless Test Set include:

- MT8870A Universal Wireless Test Set (main unit)
- Modules installed in the MT8870A
- Application software installed in the MT8870A
- Control software installed in a PC to control the MT8870A remotely

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.



Convention Used in This Manual

Except where there is a good reason to do otherwise, this manual assumes the use of MT8870A and MU887000A.
Note that the descriptions in this manual also apply to MT8872A, MU887001A, or MU887002A. MU887000A/01A means the MU887000A or MU887001A.

Additionally, the Anritsu management code of the options described in this manual is "0" unless there is a reason.

The option number: The option number is indicated by three digits.

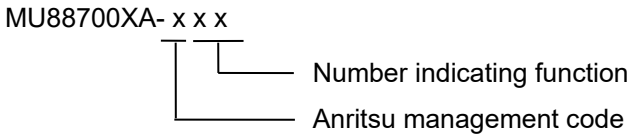


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Chapter 1 Outline

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

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1.1 Outline

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

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

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

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

When RX measurement is conducted by the MX887013A/14A, a waveform pattern is sent by the MU887000A and throughput measurement is executed with the mobile station.

1.2 Composition

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

Table 1.2-1 MX887013A Composition

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

Table 1.2-2 MX887014A Composition

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

1.3 License Registration

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

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

1.4 Abbreviations

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

Table 1.4-1 Abbreviations

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

Chapter 2 Fundamental Measurement

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

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2.1 Common Operations

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

2.1.1 Selecting application

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

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

Switch the MX887013A/14A measurement standard using the following command. Set the Setting Measurement Mode parameter to LTE when a function described in Section 2.2, “Transmit Power” to Section 2.6, “Modulation Analysis” is to be used.

- Setting Measurement Mode

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

Set the Sequence Measurement Mode parameter to SEQUENCE when using a function described in Chapter 3, “Sequence Measurement” at LTE measurement and set LTE as the sequence measurement configuration.

- Sequence Measurement Configuration

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

2.1.2 Setting ports

Set the MU887000A test ports to be used. The following command sets both the test port for outputting the downlink signal and the test port for inputting the uplink signals.

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

When setting the sequence table in sequence measurement, the sequence commands set the input and output test port.
The above-mentioned command sets the inputting test port.

2.1.3 Frequency and level

2.1.3.1 non CA

Frequency

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

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

Level

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

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

Cable loss correction

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

2.1.3.2 UL CA (MX887013A/14A-001)

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

Frequency

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

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

Level

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

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

Cable loss correction

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

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

2.1.4 Setting transmission signal

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

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

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

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

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

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

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

2.1.5 Waveform patterns

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

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

2.1.6 Setting LTE signals

Set the following items to configure the LTE signal.

Frame Structure

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

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

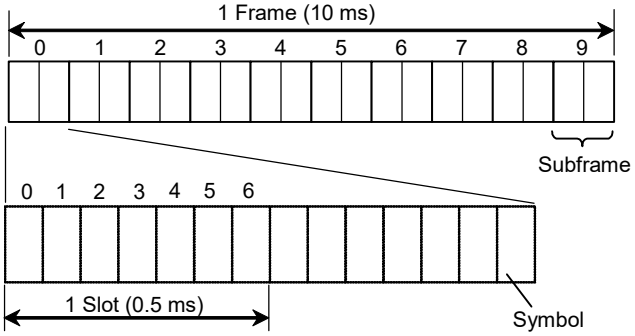


Figure 2.1.6-1 FDD Frame Structure

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

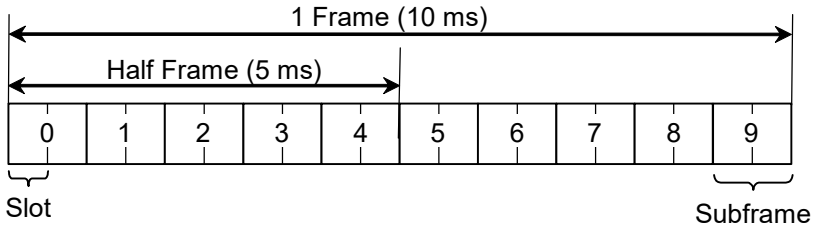


Figure 2.1.6-2 TDD Frame Structure

Uplink-Downlink configuration

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

Table 2.1.6-1 Uplink-Downlink configuration

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

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

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

Channel Bandwidth

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

Set the channel bandwidth of the measurement target signal.

Channel configuration

Select the target physical channel from the following:

PUSCH Physical Uplink Shared Channel

PSCCH Physical Uplink Control Channel

Reference measurement signal modulation

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

RMC Start RB Number

RMC Number of RBs

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

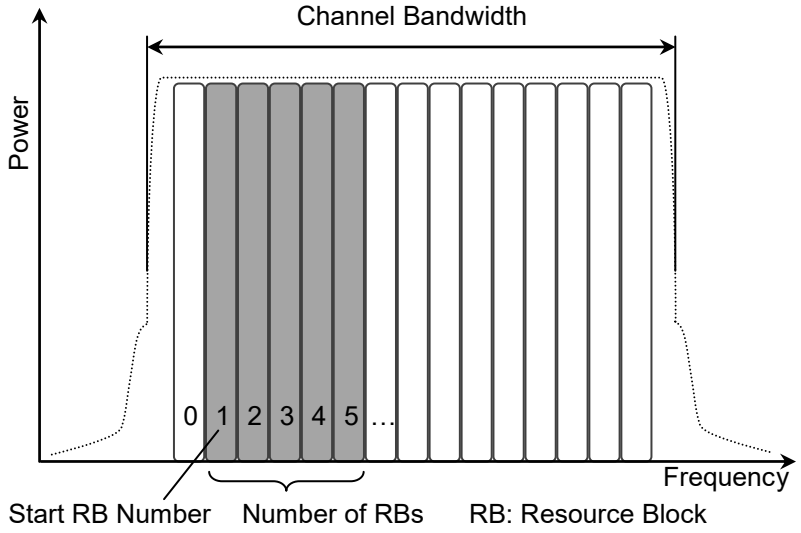


Figure 2.1.6-3 Target Resource Blocks

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

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

Long Span Code Search

The duration of Uplink synchronization signal detection varies with the Long Span Code Search setting.
Turning on Long Span Code Search lengthens the duration of the Uplink Reference Signal detection. It assures signal synchronization but lengthens the synchronization duration.
Turning off Long Span Code Search shortens the duration of the Uplink Reference Signal detection. If the Uplink and Downlink signals are already synchronized, turn off Long Span Code Search to shorten the measurement time.

Frequency Error Range

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

Channel Quality Indicator RB Number

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

Uplink and Downlink Channels

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

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

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

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

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

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

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

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

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

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

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

   Downlink lower limit frequency (F_{DL_low}), Downlink offset number ($N_{Offs\text{-}DL}$)
2. Calculates Downlink frequency (F_{DL}) from following equation:

   $F_{DL} = F_{DL\_low} + 0.1(N_{DL} - N_{Offs\text{-}DL})$
3. Sets Downlink frequency at MU887000A
4. Determines Uplink Channel Number (N_{UL}) based on Downlink Channel Number (N_{DL}) and Table 2.1.6-3
5. Determines values of following parameters based Uplink Channel Number (N_{UL}) and Table 2.1.6-4

   Uplink lower limit frequency (F_{UL_low}), Uplink offset number ($N_{Offs\text{-}UL}$)
6. Calculates Uplink Frequency (F_{UL}) from following equation:

   $F_{UL} = F_{UL\_low} + 0.1(N_{UL} - N_{Offs\text{-}UL})$
7. Sets Uplink frequency (F_{UL}) at MU887000A

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

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

   Uplink lower limit frequency (F_{UL_low}), Uplink offset number ($N_{Offs\text{-}UL}$)
2. Calculates Uplink frequency (F_{UL}) from following equation:

   $F_{UL} = F_{UL\_low} + 0.1(N_{UL} - N_{Offs\text{-}UL})$
3. Sets Uplink frequency at MU887000A
4. Determines Downlink Channel Number (N_{DL}) based on Uplink Channel Number (N_{UL}) and Table 2.1.6-3
5. Determines values of following parameters based on Downlink Channel Number (N_{DL}) and Table 2.1.6-4:

   Downlink lower limit frequency (F_{DL_low}), Downlink offset number ($N_{Offs\text{-}DL}$)
6. Calculates Downlink frequency (F_{DL}) from following equation:

   $F_{DL} = F_{DL\_low} + 0.1(N_{DL} - N_{Offs\text{-}DL})$
7. Sets Downlink frequency at MU887000A

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

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

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

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

*: This can be used only when MU887000A/01A-001 is installed, or MU887002A.

Table 2.1.6-5 Band and Frame Structure

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

2.1.6.1 non CA

Use the following commands to set the LTE signals

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

:CONFigure:CELLular:LTE:CID

- Cyclic Shift
  CSHIFT
  :CONFigure:CELLular:LTE:CSHift
- Delta SS
  DELTASS
  CONFigure:CELLular:LTE:DSS

2.1.6.2 UL CA (MX887013A/14A-001)

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

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

2.1.7 Setting measurement

Set the following measurement items.

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

Use the following command when not measuring.

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

2.1.8 Starting/stopping measurement

Starting measurement

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

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

Note:

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

Stopping measurement

To stop measurement, send the following command.

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

Checking measurement status

Query the measurement status and errors using the following commands.

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

Table 2.1.8-1 Query Response

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

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

Native command mode

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

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

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

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

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

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

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

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

SCPI Command mode

Table 2.1.8-6 Bit Definition of Signal Generator Status Register

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

Table 2.1.8-7 Bit Definition of Measurement Status Register

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

Table 2.1.8-8 Bit Definition of Signal Generator Questionable Register

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

Table 2.1.8-9 Bit Definition of Measurement Questionable Register

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

2.2 Transmit Power

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

Table 2.2-1 Tx Power Bandwidth (MHz)

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

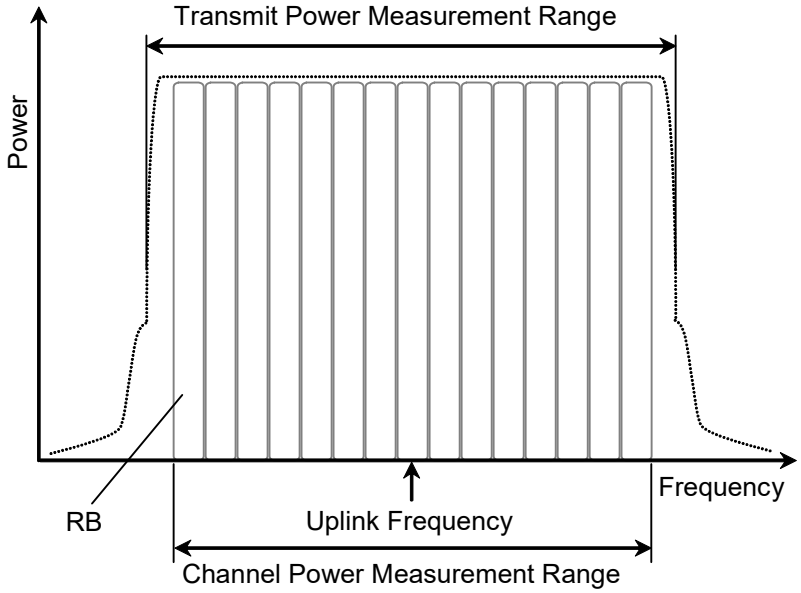


Figure 2.2-1 Tx Power Measurement Range

2.2.1 non CA

Set the following parameter to measure the Uplink Tx Power.

Center frequency

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

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

Bandwidth

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

Measurement enable and measurement count

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

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

Fast Power Measurement Mode

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

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

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

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

2.2.2 UL CA (MX887013A/14A-001)

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

Table 2.2.2-1 Measurement Items of Tx Power

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

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

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

*2: The power of PCC is measured.

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

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

2.3 Occupied Bandwidth

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

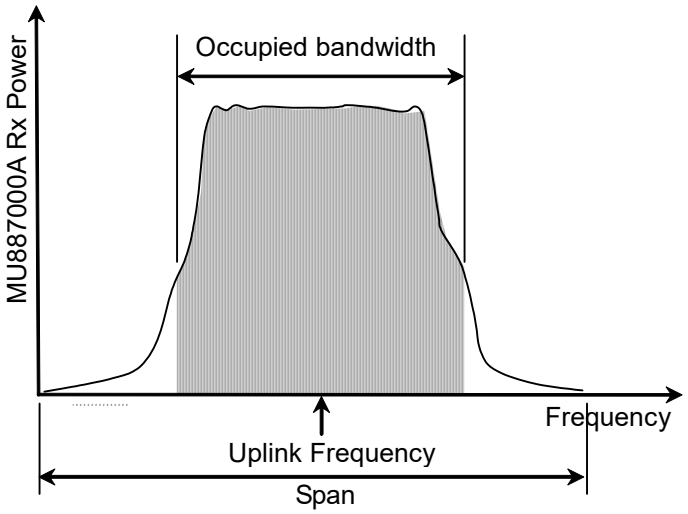


Figure 2.3-1 Occupied Bandwidth

2.3.1 non CA

The Occupied Bandwidth measurement settings are:

Center frequency

Specify the center frequency by referring to:

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

Span

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

Table 2.3.1-1 Occupied Bandwidth Measurement Frequency Range

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

Occupied Bandwidth power ratio

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

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

Measurement enable and measurement count

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

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

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

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

2.3.2 UL CA (MX887013A/14A-001)

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

Table 2.3.2-1 Measurement Items of OBW

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

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

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

2.4 Spectrum Emission Mask

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

2.4.1 non CA

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

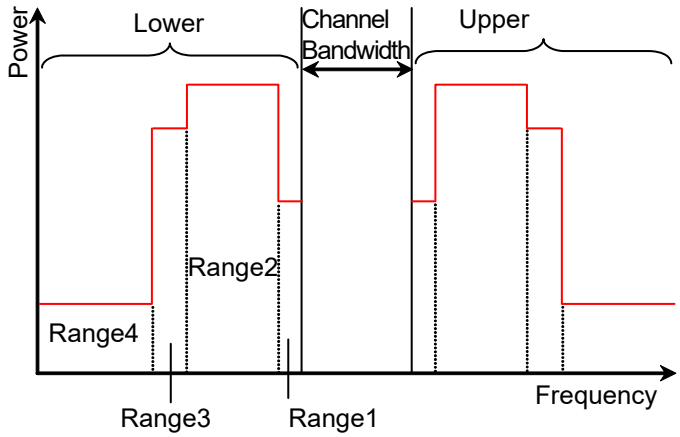


Figure 2.4.1-1 Mask Range of Spectrum Emission Mask

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

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

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

The Spectrum Emission Mask settings are:

Additional Spectrum Emission

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

Level

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

Measurement enable and measurement count

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

The results of the spectrum emission mask measurement are:

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

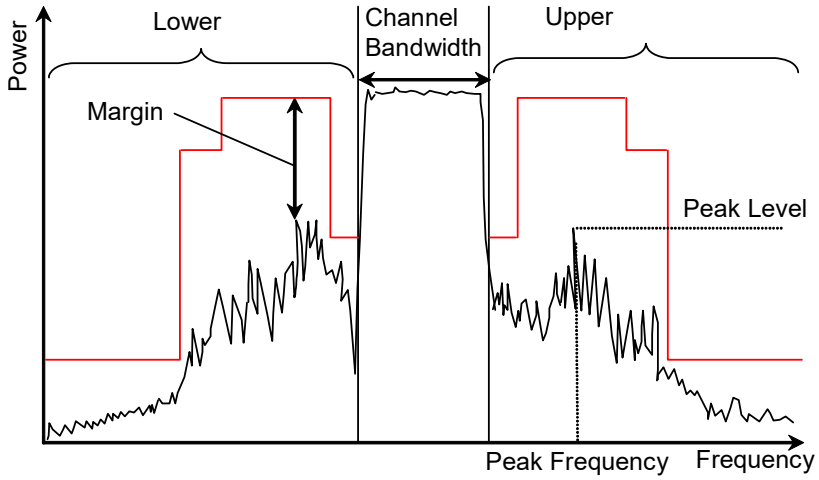


Figure 2.4.1-2 Spectrum Emission Mask Measurement Result

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

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

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

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

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

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

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

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

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

2.4.2 UL CA (MX887013A/14A-001)

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

Table 2.4.2-1 Measurement Items of Spectrum Emission Mask

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

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

• At Contiguous UL CA

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

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

• At Inter-band

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

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

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

• At Contiguous UL CA

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

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

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

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

• At Inter-band

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

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

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

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

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

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

c:RB75:RB75

75RB+100RB (34.85 MHz)

SEM_TEMPLATE_CONTCC_75RB_100RB

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

100RB+100RB (39.8 MHz)

SEM_TEMPLATE_CONTCC_100RB_100RB

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

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

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

2.5 Adjacent Channel Leakage Power Ratio

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

2.5.1 non CA

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

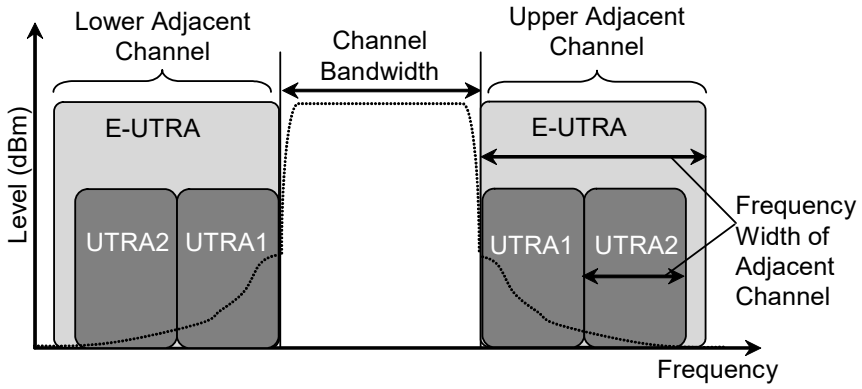


Figure 2.5.1-1 Adjacent Channels for Adjacent Channel Leakage Power Ratio Measurement

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

Table 2.5.1-1 Adjacent Channel Measurement Bandwidth (MHz)

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

The Adjacent Channel Leakage Power Ratio measurement parameters are:

Measurement enable and measurement count

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

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

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

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

2.5.2 UL CA (MX887013A/14A-001)

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

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

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

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

- At Contiguous UL CA

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

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

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

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

- At Inter-band

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

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

- ACLR Result
  `ACLR`
  `:FETCh:CELLular:LTE:FUNDamental:ACLR`

2.6 Modulation Analysis

Modulation analysis measures:

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

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

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


2.6.1 Frequency Error

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

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

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

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

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

2.6.2 EVM

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

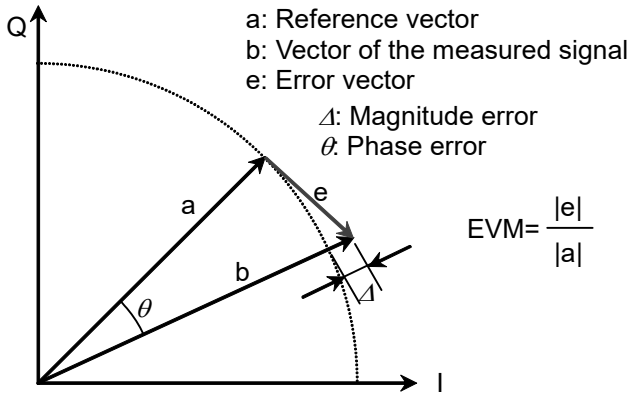


Figure 2.6.2-1 Definition of EVM

Query the EVM measurement result using the following commands:

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

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

2.6.3 Carrier leakage

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

- Carrier Leakage Result
  `CARRLEAK`
  `:FETCh:CELLular:LTE:FUNDamental:MODulation:CARLeakage`

2.6.4 IQ Imbalance

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

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

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

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

Note:

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

Query the IQ Imbalance measurement result using the following command:

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

2.6.5 Rho

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

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

Query the Rho measurement results using the following command:

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

2.6.6 In-band emissions for non-allocated RB

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

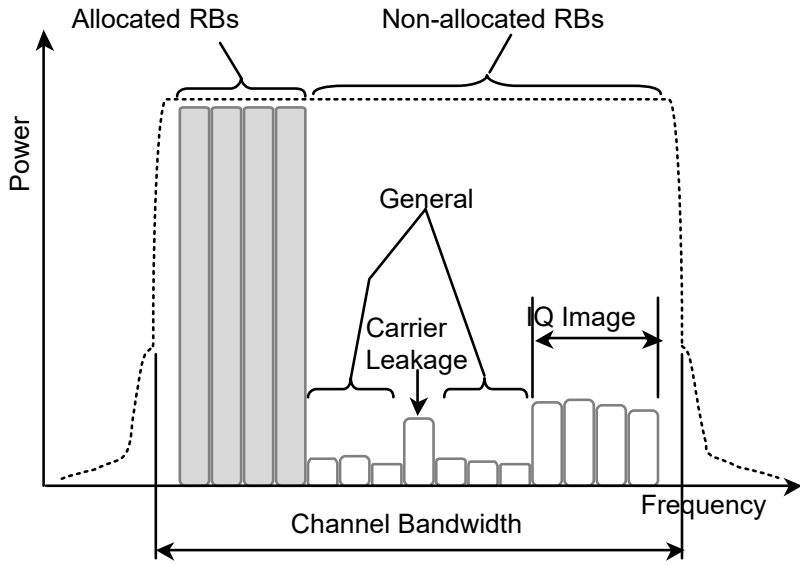


Figure 2.6.6-1 In-band Emission Measurement Range

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

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

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

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

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

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

2.6.7 Spectrum Flatness

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

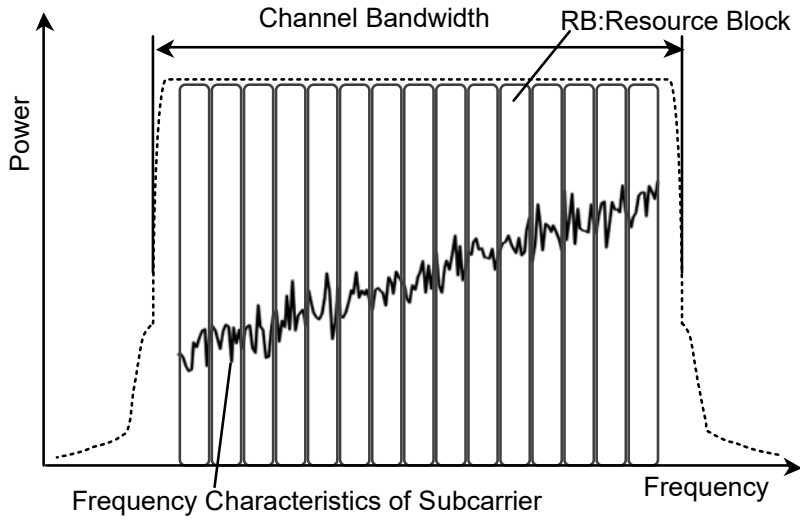


Figure 2.6.7-1 Measurement Range of Spectrum Flatness

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

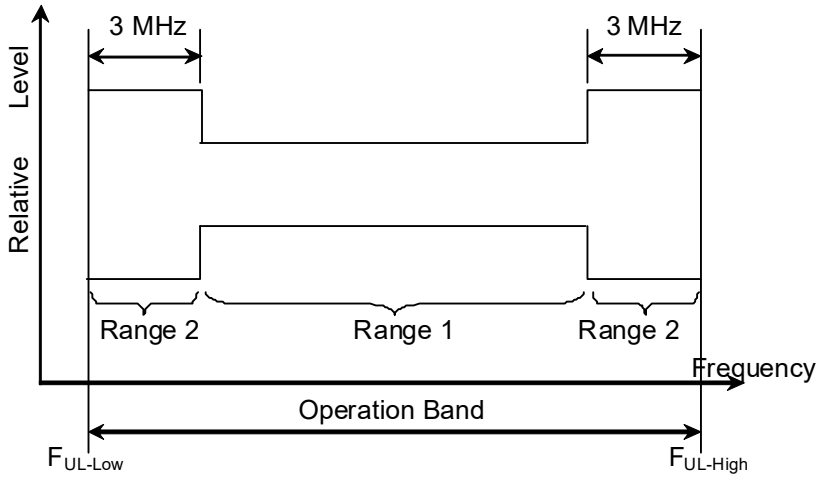


Figure 2.6.7-2 Standard Range of Spectrum Flatness

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

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

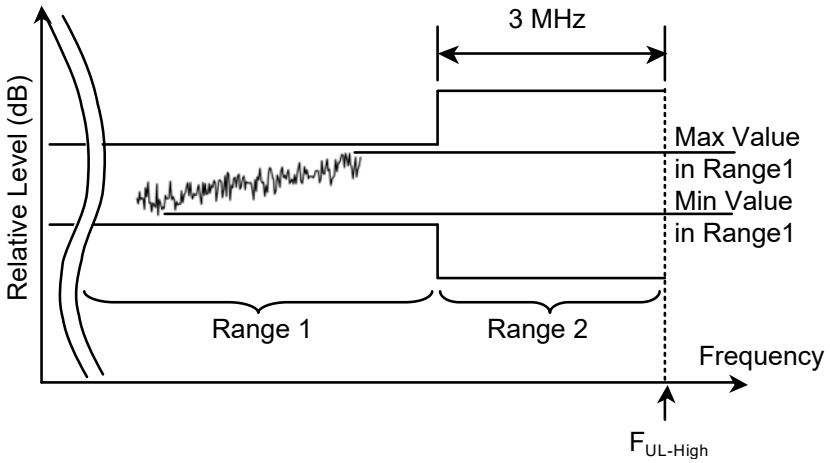


Figure 2.6.7-3 Channel Bandwidth in Range 1

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

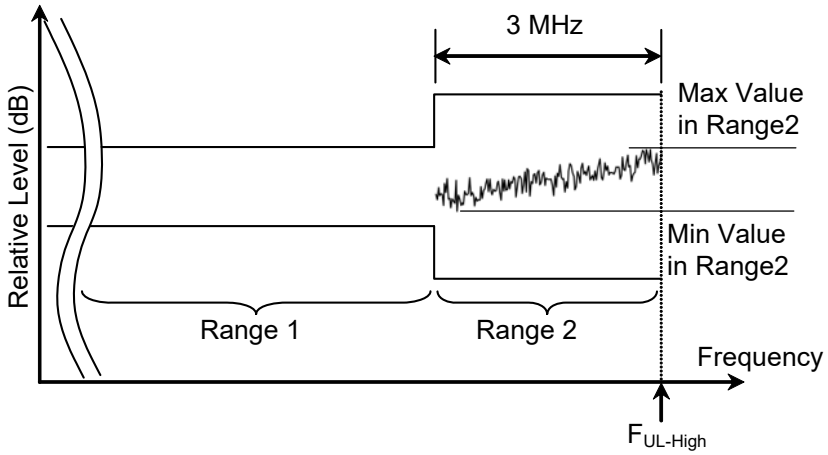


Figure 2.6.7-4 Channel Bandwidth in Range 2

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

Maximum value, minimum value, and ripple (maximum value – minimum value) of Range 2
Difference between maximum value of Range 1 and minimum value of Range 2
Difference between maximum value of Range 2 and minimum value of Range 1

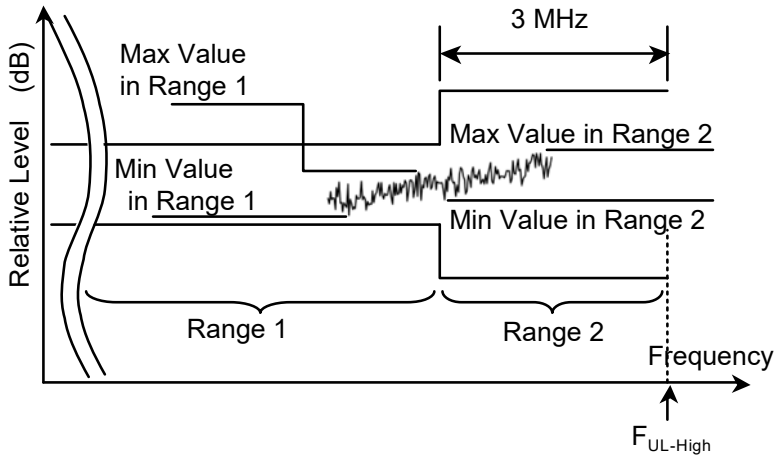


Figure 2.6.7-5 Channel Bandwidth Crossing Range 1 and Range 2

The MX887013A measures the frequency characteristics of the subcarrier for the number of times specified for modulation analysis.
The maximum and minimum values of the level are recorded for each subcarrier, like peak hold and minimum hold for a spectrum analyzer.

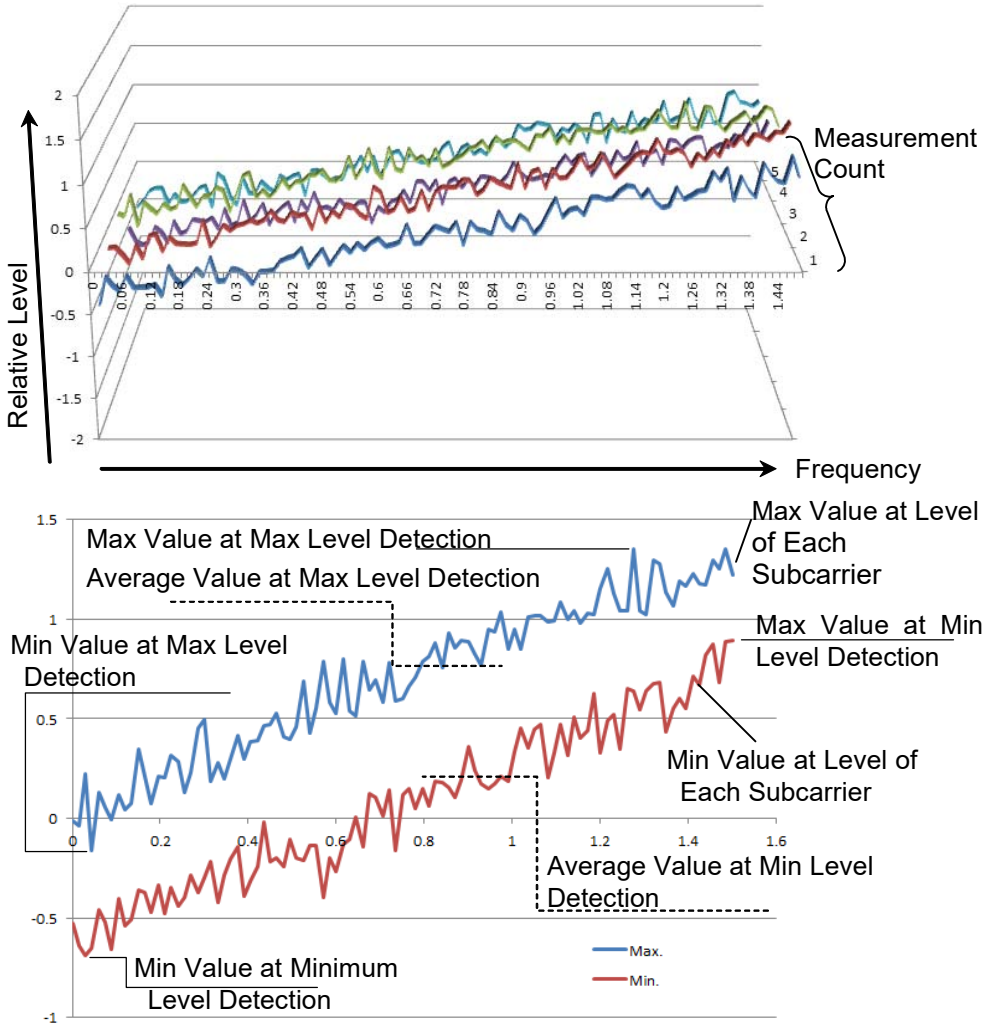


Figure 2.6.7-6 Types of Spectrum Flatness Measurement Results

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

Query the spectrum flatness measurement results using the following commands:

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

2.6.8 UL CA (MX887013A/14A-001)

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

Table 2.6.8-1 Measurement Items of Modulation Analysis

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- Frequency Error
- Carrier Frequency Result

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

- Carrier Frequency Error Result
  CFERR
  :FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor
- Worst Carrier Frequency Error Result
  CFERR_WORST
  :FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor:WORSt

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

- Carrier Leakage
- Carrier Leakage Result
  CARRLEAK
  :FETCh:CELLular:LTE:FUNDamental:MODulation:CARLeakage

- IQ Imbalance
- IQ Imbalance Result
  IQIMB
  :FETCh:CELLular:LTE:FUNDamental:MODulation:IQIMbalance

- RHO
- Rho Result
  RHO
  :FETCh:CELLular:LTE:FUNDamental:MODulation:RHO

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

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

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

- Spectrum Flatness
- Operation band for SCC-1

Sets an operation band listed in Table 2.1.6-4, and determines the limit line of Spectrum Flatness.
BAND_SCC1
:CONFigure:CELLular:LTE:FUNDamental:BAND:SCC1

- Test Environment
  Sets the test environment defined in 3GPP TS36.521-1, and determines the limit line of Spectrum Flatness.
  TESTENV
  :CONFigure:CELLular:LTE:FUNDamental:TENVironment
- Spectrum Flatness (≥ 3 MHz (R1 +)) Result
  SPECFLAT1_P
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1P
- Spectrum Flatness (≥ 3 MHz (R1 –)) Result
  SPECFLAT1_M
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1M
- Spectrum Flatness (≥ 3 MHz) Result
  SPECFLAT1
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1
- Spectrum Flatness (≥ 3 MHz (RP1)) Result
  SPECFLAT_RP1
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP1
- Spectrum Flatness (<3 MHz (R2 +)) Result
  SPECFLAT2_P
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2P
- Spectrum Flatness (<3 MHz (R2 –)) Result
  SPECFLAT2_M
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2M
- Spectrum Flatness (<3 MHz) Result
  SPECFLAT2
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2
- Spectrum Flatness (<3 MHz (RP2)) Result
  SPECFLAT_RP2
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP2
- Spectrum Flatness (RP21) Result
  SPECFLAT_RP21
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP21
- Spectrum Flatness (RP12) Result
  SPECFLAT_RP12
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP12
- Spectrum Flatness Measured Item
  SPECFLATITEM
  :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:ITEM

2.7 Power Template

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

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

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

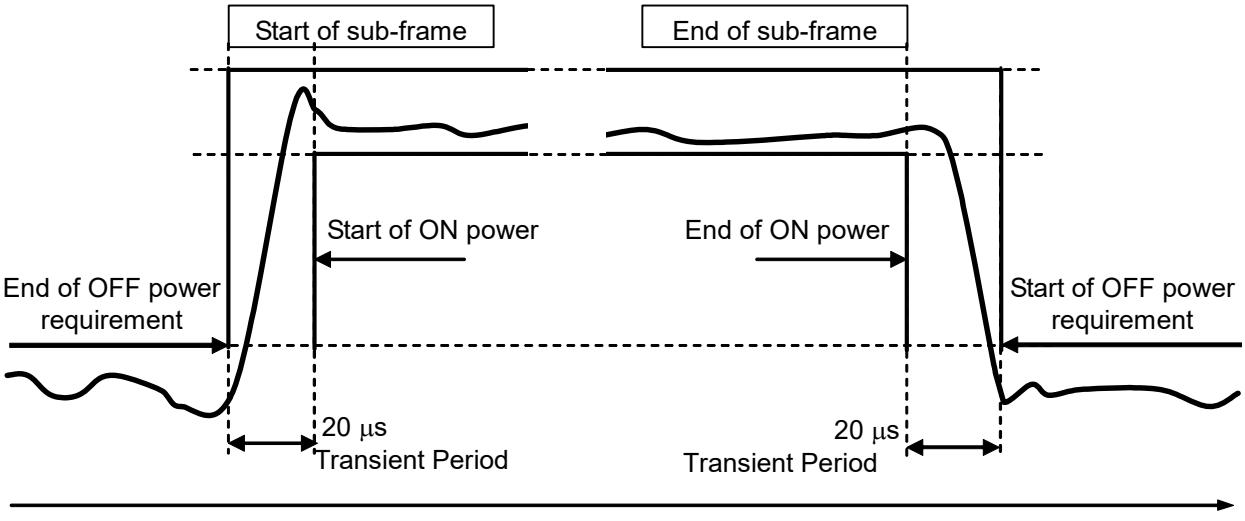


Figure 2.7-1 Power Template Measurement Range

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

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

Details of Subframe#1(Special subframe)

DwPTS	GP	UpPTS

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

The Power Template measurement setting items are as described below:

Center Frequency

Specify the center frequency for Power Template measurement using the following parameters:

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

Input Level

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

Port

- Set ports as described in Section 2.1.2 “Setting ports”.

Bandwidth

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

Measurement Item

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

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

Note:

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

Measurement enable and measurement count

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

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

Use the following commands to set the Power Template measurement.

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

The commands for querying the Power Template measurement results are:

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

2.8 Capturing Waveform Data

2.8.1 non CA

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

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

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

Table 2.8.1-1 Waveform Data Type and Data Interval

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

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

Table 2.8.1-2 Channel Bandwidth and Number of Data

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

2.8.2 UL CA (MX887013A/14A-001)

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

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

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

Table 2.8.2-1 Waveform Data Type and Data Interval

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

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

- At Inter-band UL CA

Table 2.8.2-2 Channel Bandwidth and Number of Data

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

- At Contiguous UL CA

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

  OBW

Table 2.8.2-3 Channel Bandwidth and Number of Data

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

  Spectrum Emission Mask

Table 2.8.2-4 Channel Bandwidth and Number of Data

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

Table 2.8.2-5 Measurement Items of Waveform Data

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

*1: This is the PCC measurement result.

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

2.9 Sample Programs

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

2.9.1 non CA

2.9.1.1 Spectrum Emission Mask

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

Processing Flow

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

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

3. Set the Spectrum Emission Mask.

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

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

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

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

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

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

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

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

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

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

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

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

```
call check_error_code

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

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

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

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

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

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

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

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

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

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

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

```
call check_error_code

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

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

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

; Start measurement
sendln 'SNGLS'
call check_error_code

; waiting measurement up to 10 second
for i 1 10

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

; Query Judgement
sendln 'SEM?'
call check_error_code

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

; Query Margin in each range
```

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

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

messagebox  'Macro end successfully' 'Finish'

End

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

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

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

  ; in case of no error

return

:check_response

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

  return

:_timeout
```

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

2.9.1.2 Modulation Analysis

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

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

Processing Flow

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

; waiting measurement up to 10 second
```

```
for i 1 10

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

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

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

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

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

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

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

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

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

```
call check_error_code

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

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

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

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

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

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

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

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

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

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

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

```
call check_error_code

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

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

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

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

messagebox  'Macro end successfully' 'Finish'

End

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

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

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

  ; in case of no error

return

:check_response
```

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

  return

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

2.9.2 UL CA (MX887013A/14A-001)

2.9.2.1 Spectrum Emission Mask

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

Processing Flow

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

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

3. Set the Spectrum Emission Mask.

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

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

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

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

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

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

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

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

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

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

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

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

```
call check_error_code

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

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

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

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

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

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

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

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

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

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

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

```
call check_error_code

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

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

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

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

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

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

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

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

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

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

; Start measurement
sendln 'SNGLS'
```

```
call check_error_code

; waiting measurement up to 10 second
for i 1 10

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

; Query Judgement
sendln 'SEM?'
call check_error_code

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

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

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

messagebox  'Macro end successfully' 'Finish'

End

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

:check_error_code
```

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

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

  ; in case of no error

return

:check_response

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

  return

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

2.9.2.2 Modulation Analysis

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

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

Processing Flow

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

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

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

   Frequency
   Frequency Error
   EVM
   Peak EVM

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

; waiting measurement up to 10 second
for i 1 10

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

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

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

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

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

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

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

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

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

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

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

```
call check_error_code

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

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

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

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

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

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

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

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

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

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

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

```
call check_error_code

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

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

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

messagebox  'Macro end successfully' 'Finish'

End

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

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

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

  ; in case of no error

return

:check_response

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

```
  messagebox result_str 'debug2'

  return

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

Chapter 3 Sequence Measurement

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

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

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3.1 Outline

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

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

The Sequence Measurement mode does not support the following measurements.

- Modulation Analysis
  Rho
- Power Template
- Waveform Data

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

Note:

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

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

Example:

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

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

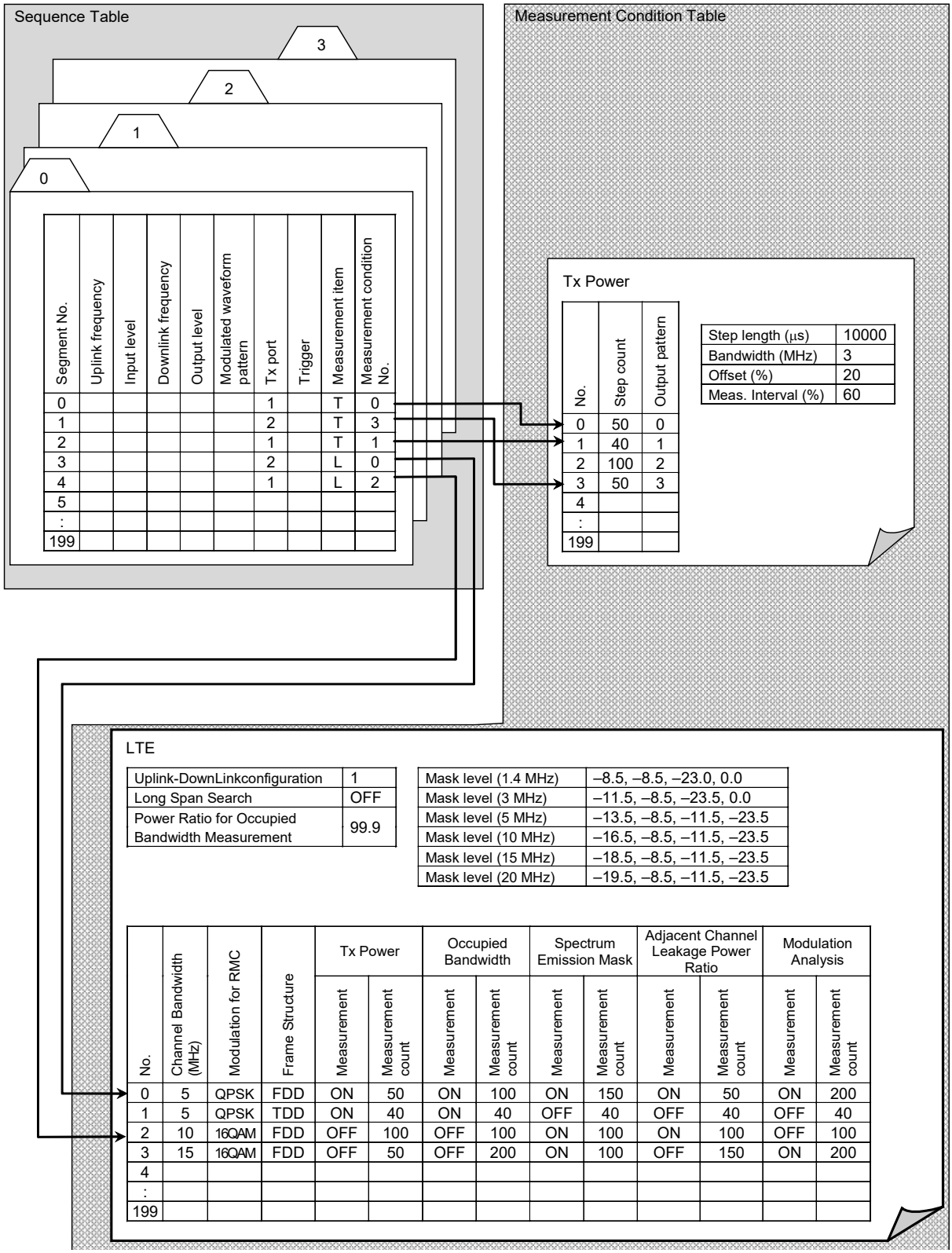


Figure 3.1-1 Data Composition of Sequence Measurement Condition when MX887013A Installed

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

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

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

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

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

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

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

3.2 Setting Sequence Table

3.2.1 Sequence table setting items

The sequence table setting items are:

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

Table number

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

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

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

Frequency: 400.000000 to 3800.000000 MHz (MU887000A/01A)
400.000000 to 6000.000000 MHz (With MU887000A/01A-001)
400.000000 to 6000.000000 MHz (MU887002A)

Input level:

MU887000A	–65.0 to +35.0 dBm	(Test Port 1, 2)
	–65.0 to +25.0 dBm	(Test Port 3, 4)
MU887001A	–65.0 to +35.0 dBm	(Test Port 1 to 4)
MU887002A	–65.0 to +35.0 dBm	(TRX 1/2 Test Port 1 to 12)

Output level:

400 MHz ≤ frequency ≤ 3800 MHz

MU887000A	–130.0 to –10.0 dBm	(Test Port 1, 2)
	–120.0 to 0.0 dBm	(Test Port 3, 4)
MU887001A	–130.0 to –10.0 dBm	(Test Port 1 to 4)

3800 MHz < frequency ≤ 6000 MHz

MU887000A	–130.0 to –18.0 dBm	(Test Port 1, 2)
	–120.0 to –8.0 dBm	(Test Port 3, 4)
MU887001A	–130.0 to –18.0 dBm	(Test Port 1 to 4)

400 MHz ≤ frequency ≤ 6000 MHz

MU887002A –130.0 to 0.0 dBm (TRX 1/2 Test Port 1 to 12)
Modulated waveform pattern: PAT1 to PATn
(n: waveform information file group range)

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

Output test port

This sets the RF signal output test port in each segment of the sequence table.

MU887000A: Test port 1 to 4 (When selecting test port 3 or 4, make sure the port number is not the same as the input port.)
MU887001A: Test port 1 to 4
MU887002A: Test port 1 to 12

Input test port

Specifies the segment number and sets the test port for inputting RF signals.

Trigger conditions

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

The setting ranges are:

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

Measurement item, step count, and measurement condition number

This sets the step count and measurement item for received signals in each segment of the sequence table. To execute the LTE measurement described here, set LTE as the measurement item.
The LTE measurement conditions are specified in a separate table. A measurement item should be registered in a given segment with its measurement condition number specified in the related table.

Note:

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

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

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

- When LTE_LONGSEARCH is set to OFF, the step count of trigger segment* is 10 or above.
  *: A start segment of sequence measurement or a segment whose trigger source is not set to Freerun.
- Frame structure is FDD
  - When the Inter-band UL CA measurement is not performed:
    or
    When the Inter-band UL CA measurement is performed and the number of RBs for CC not specified at LTE_MCARRIER is set to 0:
    max_average_count+2
    (max_average_count: Maximum measurement count in the measurement of the concerned segment)
  - When the Inter-band UL CA measurement is performed and the number of RBs for CC not specified at LTE_MCARRIER is set to other than 0:
    (max_average_count+2)×2
    (max_average_count: Maximum measurement count in the measurement of the concerned segment)

- Frame structure is TDD

  It is as the table below.

Table 3.2.1-1 Minimum Value of Step Count

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

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

mod_count: Measurement count for modulation analysis of the concerned segment.
When measurement is Off: 0

pwr_count: Maximum count among the Power, OBW, ACLR, and SEM measurements of the concerned segment.
When measurement is Off: 0

floor(x): Maximum integer equal to the actual number x or below.

(x) mod (y): Surplus when the integer x is divided by integer y.

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

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

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

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

3.2.2 Sequence table commands

3.2.2.1 non CA

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

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

3.2.2.2 UL CA (MX887013A/14A-001)

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

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

3.2.3 Setting item error check

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

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

The following command is used to query for errors.

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

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

The following table shows error causes.

Table 3.2.3-1 Error Cause

Parameter	Cause
Input level*	Input level is out of range.
Output level*	Output level is out of range.
Step count	Fail to satisfy the step count conditions in Section 3.2.1.
Waveform pattern	The specified waveform file is not loaded in the waveform memory. The specified waveform pattern does not exist in the waveform file.
Port	For MU887000A: Port 3 is set for both input port and output port. Or Port 4 is set for both input port and output port.
Amount of capture memory	Memory use rate is 100% or above
Output level change count	Output level change count is 3001 or above.
Waveform pattern change count	Waveform pattern change count is 101 or above.
Measurement mode change count	Measurement mode change count is 16 or above.

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

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

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

3.3 Setting Measurement Conditions Table

3.3.1 Setting LTE measurement items

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

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

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

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

*3: Set measurement conditions for each channel bandwidth.

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

Table 3.3.1-1 Measurement Conditions for Sequence Measurement

Item	Setting
RMC Composition	PUSCH
additional Spectrum Emission	NS_01

3.3.2 LTE Measurement condition commands

The following commands set and query the LTE measurement conditions.

3.3.2.1 non CA

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

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

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

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

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

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

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

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

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

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

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

LTE_BAND
:CONFigure:CELLular:SEQuence:LTE:BAND

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3.3.2.2 UL CA (MX887013A/14A-001)

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

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

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

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

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

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

- Modulation Method for Uplink Reference Measurement Channel for SCC-1
  LTE_ULRMC_MOD_SCC1
  :CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme:SCC1

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

- In-band emissions carrier leakage template for SCC-1
  LTE_TP_INBANDE_LEAK_SCC1
  :CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak:SCC1

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

B25:RB100

50RB+100RB (29.9 MHz)

LTE_SEM_TEMPLATE_CONTCC_50RB_100RB

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

75RB+75RB (30 MHz)

LTE_SEM_TEMPLATE_CONTCC_75RB_75RB

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

75RB+100RB (34.85 MHz)

LTE_SEM_TEMPLATE_CONTCC_75RB_100RB

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

100RB+100RB (39.8 MHz)

LTE_SEM_TEMPLATE_CONTCC_100RB_100RB

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

3.4 Controlling and Monitoring Sequence

3.4.1 Controlling and monitoring items

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

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

Start and stop segments

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

Initialization at end of sequence measurement

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

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

Use the commands described in Section 2.1.8 “Starting/stopping measurement” to start and stop the sequence measurement and verify the sequence measurement status.
In addition, the following items can be queried.

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

Number of measured segments and measurement status of each segment

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

Table 3.4.1-1 Segment Status

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

Measurement status of specified segments

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

Progress of sequence measurement

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

3.4.2 Sequence control and monitor commands

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

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

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

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

3.5 Measurement Results

The LTE measurement results are queried using the following commands.

Tx Power

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

Occupied Bandwidth

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

Spectrum Emission Mask

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

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

Adjacent Channel Leakage Power Ratio

`LTE_ACLR`
`:FETCh:CELLularr:SEQuence:LTE:ACLR`

Modulation Analysis

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

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

In-band emission measurement results

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

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

Spectrum Flatness measurement results

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

3.6 Sample Program

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

Processing Flow

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

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

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

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

Table 3.6-1 Sequence Table 1

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

Table 3.6-2 Sequence Table 2

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

↑: Rise

Table 3.6-3 LTE Measurement Conditions

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

```
; Sample program for MX887013A Sequence Measurement
; Anritsu Corporation March,2012
; Macro for Tera Term Version 4.69
;
; set local echo to on
setecho 1
flushrecv
; time out 10 second
timeout=10

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

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

; Load ARB File "MV887013A_LTEFDD_0002".
sendln 'SOUR:GPRF:GEN:ARB:FILE:LOAD "MV887013A_LTEFDD_0002"'
call check_error_code

; waiting load waveform file.
sendln '*WAI'
call check_error_code

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

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

; Set download package to "MV887013A_LTEFDD_0002".
sendln 'PACKAGE "MV887013A_LTEFDD_0002"'
call check_error_code

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

sendln 'SEQSGPORT 0,PORT1'
call check_error_code
```

```
sendln 'SEQSAPORT 0,PORT1'
call check_error_code

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

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

; Set Sequence Table Parameters of "segment 1".
sendln ' SEQTRX 1,1940,0,2130,-55,PAT2'
call check_error_code

sendln 'SEQSGPORT 1,PORT2'
call check_error_code

sendln 'SEQSAPORT 1,PORT2'
call check_error_code

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

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

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

sendln 'LTE_LONGSEARCH OFF'
call check_error_code

sendln 'LTE_GROUPHOP ON'
call check_error_code

sendln 'LTE_OBW_RATIO 99.9'
call check_error_code

sendln 'LTE_CELLID 0'
call check_error_code

sendln 'LTE_CSHIFT ON'
call check_error_code
```

```
sendln 'LTE_DELTASS 0'
call check_error_code

sendln 'LTE_SEM_TEMPLATE_5MHZ 1,-13.5'
call check_error_code

sendln 'LTE_SEM_TEMPLATE_5MHZ 2,-8.5'
call check_error_code

sendln 'LTE_SEM_TEMPLATE_5MHZ 3,-11.5'
call check_error_code

sendln 'LTE_SEM_TEMPLATE_5MHZ 4,-23.5'
call check_error_code

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

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

sendln 'LTE_ULRMC_MOD 0,QPSK'
call check_error_code

sendln 'LTE_ULRMC_MOD 1,QPSK'
call check_error_code

sendln 'LTE_FRAMETYPE 0,FDD'
call check_error_code

sendln 'LTE_FRAMETYPE 1,TDD'
call check_error_code

sendln 'LTE_BAND 0,1'
call check_error_code

sendln 'LTE_BAND 1,43'
call check_error_code

sendln 'LTE_TESTENV 0,NORMAL'
call check_error_code

sendln 'LTE_TESTENV 1,EXTREME'
```

```
call check_error_code

sendln 'LTE_TP_INBANDE_LEAK 0,0DBM'
call check_error_code

sendln 'LTE_TP_INBANDE_LEAK 1,30DBM'
call check_error_code

sendln 'LTE_PWR_SET 0,ON,100'
call check_error_code

sendln 'LTE_PWR_SET 1,OFF,10'
call check_error_code

sendln 'LTE_OBW_SET 0,ON,50'
call check_error_code

sendln 'LTE_OBW_SET 1,OFF,5'
call check_error_code

sendln 'LTE_SEM_SET 0,OFF,100'
call check_error_code

sendln 'LTE_SEM_SET 1,ON,10'
call check_error_code

sendln 'LTE_ACLR_SET 0,OFF,100'
call check_error_code

sendln 'LTE_ACLR_SET 1,ON,10'
call check_error_code

sendln 'LTE_MOD_SET 0,OFF,200'
call check_error_code

sendln 'LTE_MOD_SET 1,ON,20'
call check_error_code

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

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

```
call check_error_code

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

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

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

; Start measurement
sendln 'SNGLS'
call check_error_code

; waiting measurement up to 10 second
for i 1 10

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

next

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

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

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

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

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

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

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

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

```
call check_error_code

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

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

End

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

:check_error_code
  ; query error
  sendln 'SYSERR?'

  waitln 'No error'

  ; in case of timeout

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

  ; in case of no error

return

:check_seqerr_response

  ;for debug
  strsplit inputstr ','
  err_num=str2int groupmatchstr1
  if err_num then
         ; when error count is not 0.
         messagebox inputstr 'Sequence Table Error'
```

```
        End
  endif

  return

:check_response

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

  return

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

Chapter 4 SCPI Command Reference

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

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4.1 List of Commands

The following table shows the rules for describing messages.

[ ]	Messages or parameters in square brackets can be omitted.
|	Choose one of several choices. A | B | C | D indicates a choice of A, B, C, and D.
{ }	Curly brackets are used to group options. For A | B({C | D}), choose A, B(C), or B(D).

4.1.1 Common commands

Operation Status Register

Function	Command	Query	Response
Measurement Operation Status Register Query	-----	:STATus:OPERation:MEASure[:EVENt]?	<mosr>

Questionable Register

Function	Command	Query	Response
Measurement Questionable Status Register Query	-----	:STATus:QUEStionable:MEASure[:EVENt]?	<mqsr>

Common

Function	Command	Query	Response
Standard Select	:CONFigure:CELLular:MEASurement:STANdard <std>	:CONFigure:CELLular:MEASurement:STANdard?	<std>
Set Connect Port Direction	:ROUTe:PORT:CONNect:DIRection <input>,<output>[,<output>,…,<output>]	:ROUTe:PORT:CONNect:DIRection?	<input>,<output>[,<output>,…,<output>]

Measurement

Function	Command	Query	Response
Measurement Stop	:ABORt:CELLular:MEASurement	-----	-----
Measurement Status	-----	:FETCh:CELLular:MEASurement:STATe?	<m_status>
Measurement Start	:INITiate:CELLular:MEASurement:SINGle	-----	-----

Common Parameters

Function	Command	Query	Response
Output Level On/Off	:CONFigure:CELLular:GENerator:RFSettings:STATe <on_off>	:CONFigure:CELLular:GENerator:RFSettings:STATe?	<on_off>
Output Signal Modulation	:CONFigure:CELLular:GENerator:BBMode <on_off>	:CONFigure:CELLular:GENerator:BBMode?	<on_off>
Waveform File Select	:CONFigure:CELLular:GENerator:ARB:PACKage:SELect <pac>	:CONFigure:CELLular:GENerator:ARB:PACKage:SELect?	<pac>
Waveform Pattern Select	:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect <pat>	:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect?	<pat>
Waveform Pattern Select (SYNC)	:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect:SYNC <pat>	:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect:SYNC?	<pat>

System

Function	Command	Query	Response
Application Select	:INSTrument[:SELect] <app>	:INSTrument[:SELect]?	<app>
Language Selection of Remote Command	:SYSTem:LANGuage <mode>	:SYSTem:LANGuage?	<mode>

4.1.2 Fundamental measurement commands

Common Parameters

Function	Command	Query	Response
Input Level	:CONFigure:CELLular:MEASurement:RFSettings:LEVel <level>[,<level_scc1>]	:CONFigure:CELLular:MEASurement:RFSettings:LEVel? [<ALL>]	<level>[,<level_scc1>]
Input Level for SCC-1	:CONFigure:CELLular:MEASurement:RFSettings:LEVel:SCC1 <level>	:CONFigure:CELLular:MEASurement:RFSettings:LEVel:SCC1?	<level>
Output Level	:CONFigure:CELLular:GENerator:RFSettings:LEVel <level>	:CONFigure:CELLular:GENerator:RFSettings:LEVel?	<level>
External Loss Table Index for SCC-1	:CONFigure:CELLular:LTE:EXTLoss:INDex:SCC1 <index>	:CONFigure:CELLular:LTE:EXTLoss:INDex:SCC1?	<index>
Measurement Carrier	:CONFigure:CELLular:LTE:MCARrier <carrier>	:CONFigure:CELLular:LTE:MCARrier?	<carrier>
Downlink Channel	:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel <dl_ch>	:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel?	<dl_ch>
Downlink Channel for SCC-1	:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel:SCC1 <dl_ch>	:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel:SCC1?	<dl_ch>
Downlink Frequency	:CONFigure:CELLular:GENerator:RFSettings:FREQuency <dl_freq>	:CONFigure:CELLular:GENerator:RFSettings:FREQuency?	<dl_freq>
Downlink Frequency for SCC-1	:CONFigure:CELLular:GENerator:RFSettings:FREQuency:SCC1 <dl_freq>	:CONFigure:CELLular:GENerator:RFSettings:FREQuency:SCC1?	<dl_freq>
Uplink Channel	:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel <ul_ch>[,<ul_ch_scc1>]	:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel? [<ALL>]	<ul_ch>[,<ul_ch_scc1>]

Common Parameters (Cont'd)

Function	Command	Query	Response
Uplink Channel for SCC-1	:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel:SCC1 <ul_ch>[,<ul_ch_scc1>]	:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel:SCC1? [<ALL>]	<ul_ch>
Uplink Frequency	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency <ul_freq>[,<freq_scc1>]	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency? [<ALL>]	<ul_fleq>,<freq_scc1>
Uplink Frequency for SCC-1	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency:SCC1 <ul_freq>	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency:SCC1?	<ul_fleq>
AWGN Level On/Off	:CONFigure:CELLular:GENerator:ARB:NOISe:STATe <on_off>	:CONFigure:CELLular:GENerator:ARB:NOISe:STATe?	<on_off>
AWGN Level	:CONFigure:CELLular:GENerator:ARB:NOISe:CN <level>	:CONFigure:CELLular:GENerator:ARB:NOISe:CN?	<level>

LTE Settings

Function	Command	Query	Response
Channel Bandwidth	:CONFigure:CELLular:LTE:CBANdwidth <ch_bw>[,<ch_bw_scc1>]	:CONFigure:CELLular:LTE:CBANdwidth? [<ALL>]	<ch_bw>,<ch_bw_scc1>
Channel Bandwidth for SCC-1	:CONFigure:CELLular:LTE:CBANdwidth:SCC1 <ch_bw>	:CONFigure:CELLular:LTE:CBANdwidth:SCC1?	<ch_bw>
Channel Bandwidth, RB	:CONFigure:CELLular:LTE:BWRB <ch_bw>[,<rb>[,<start>]]	:CONFigure:CELLular:LTE:BWRB?	ch_bw,rb,start
Channel Bandwidth, RB for SCC-1	:CONFigure:CELLular:LTE:BWRB:SCC1 <ch_bw>[,<rb>[,<start>]]	:CONFigure:CELLular:LTE:BWRB:SCC1?	<ch_bw>,<rb>,<start>
Channel Coding	:CONFigure:CELLular:LTE:CHCoding <object>	:CONFigure:CELLular:LTE:CHCoding?	<object>
RMC Configuration	:CONFigure:CELLular:LTE:CTYPe <val>	:CONFigure:CELLular:LTE:CTYPe?	<val>

LTE Settings (Cont'd)

Function	Command	Query	Response
Frame Structure	:CONFigure:CELLular:LTE:FSTRucture <mode>	:CONFigure:CELLular:LTE:FSTRucture?	<mode>
Frame Structure for SCC-1	:CONFigure:CELLular:LTE:FSTRucture:SCC1 <mode>	:CONFigure:CELLular:LTE:FSTRucture:SCC1?	<mode>
nRB-CQI	:CONFigure:CELLular:LTE:RBCQi <value>	:CONFigure:CELLular:LTE:RBCQi?	<value>
UL RMC Number of RB	:CONFigure:CELLular:LTE:RBALlocation:NRB <ul_rmc_rb>	:CONFigure:CELLular:LTE:RBALlocation:NRB?	<ul_rmc_rb>
UL RMC Number of RB for SCC-1	:CONFigure:CELLular:LTE:RBALlocation:NRB:SCC1 <ul_rmc_rb>	:CONFigure:CELLular:LTE:RBALlocation:NRB:SCC1?	<ul_rmc_rb>
UL RMC Modulation	:CONFigure:CELLular:LTE:MODulation:MSCHeme <ul_rmc_mod>	:CONFigure:CELLular:LTE:MODulation:MSCHeme?	<ul_rmc_mod>
UL RMC Modulation for SCC-1	:CONFigure:CELLular:LTE:MODulation:MSCHeme:SCC1 <ul_rmc_mod>	:CONFigure:CELLular:LTE:MODulation:MSCHeme:SCC1?	<ul_rmc_mod>
UL RMC Starting RB	:CONFigure:CELLular:LTE:RBALlocation:ORB <ulrb>	:CONFigure:CELLular:LTE:RBALlocation:ORB?	<ulrb>
UL RMC Starting RB for SCC-1	:CONFigure:CELLular:LTE:RBALlocation:ORB:SCC1 <ulrb>	:CONFigure:CELLular:LTE:RBALlocation:ORB:SCC1?	<ulrb>
Trigger Delay	:TRIGger:CELLular:LTE:FUNDamental:DELay <trgdly>	:TRIGger:CELLular:LTE:FUNDamental:DELay?	<trgdly>
Trigger Level	:TRIGger:CELLular:LTE:FUNDamental:LEVel <trglevel>	:TRIGger:CELLular:LTE:FUNDamental:LEVel?	<trglevel>
Trigger Source	:TRIGger:CELLular:LTE:FUNDamental:SOURce <trgsrc>	:TRIGger:CELLular:LTE:FUNDamental:SOURce?	<trgsrc>
Trigger Timeout	:TRIGger:CELLular:LTE:FUNDamental:TOUT <trgtime>	:TRIGger:CELLular:LTE:FUNDamental:TOUT?	<trgtime>

LTE Settings (Cont'd)

Function	Command	Query	Response
Cell ID	:CONFigure:CELLular:LTE:CID <id>	:CONFigure:CELLular:LTE:CID?	<id>
Cell ID for SCC-1	:CONFigure:CELLular:LTE:CID:SCC1 <id>	:CONFigure:CELLular:LTE:CID:SCC1?	<id>
Cyclic Shift	:CONFigure:CELLular:LTE:CSHift <on_off>	:CONFigure:CELLular:LTE:CSHift?	<on_off>
Group hopping	:CONFigure:CELLular:LTE:GHOPping <on_off>	:CONFigure:CELLular:LTE:GHOPping?	<on_off>
Delta SS	:CONFigure:CELLular:LTE:DSS <val>	:CONFigure:CELLular:LTE:DSS?	<val>
Operation band	:CONFigure:CELLular:LTE:FUNDamental:BAND <band>	:CONFigure:CELLular:LTE:FUNDamental:BAND?	<band>
Operation band for SCC-1	:CONFigure:CELLular:LTE:FUNDamental:BAND:SCC1 <band>	:CONFigure:CELLular:LTE:FUNDamental:BAND:SCC1?	<band>
Test Environment	:CONFigure:CELLular:LTE:FUNDamental:TENVironment <env>	:CONFigure:CELLular:LTE:FUNDamental:TENVironment?	<env>
In-band Emission Carrier Leakage Frequency	:CONFigure:CELLular:LTE:FUNDamental:IEMissions:CLFRequency <clf>	:CONFigure:CELLular:LTE:FUNDamental:IEMissions:CLFRequency?	<clf>
In-band emissions carrier leakage template	:CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak <tp>	:CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak?	<tp>
In-band Emissions Carrier Leakage Template for SCC-1	:CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak:SCC1 <tp>	:CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak:SCC1?	<tp>
Uplink Downlink Configuration	:CONFigure:CELLular:LTE:ULDL <conf>	:CONFigure:CELLular:LTE:ULDL?	<conf>
Frequency Error Range	:CONFigure:CELLular:LTE:FUNDamental:FERange <value>	:CONFigure:CELLular:LTE:FUNDamental:FERange?	<value>

Fundamental Measurement Parameters

Function	Command	Query	Response
Adjacent Channel Leakage Power Ratio Enable and Count	:CONFigure:CELLular:LTE:FUNDamental:ACLR:SET <on_off>[,<count>]	:CONFigure:CELLular:LTE:FUNDamental:ACLR:SET?	<on_off>,<count>
Turn Off All Measurement Items	:CONFigure:CELLular:LTE:FUNDamental:AMITems:OFF	-----	-----
Measurement Item	:CONFigure:CELLular:LTE:FUNDamental:MITem <item>	:CONFigure:CELLular:LTE:FUNDamental:MITem?	<item>
Power Template - ON power tolerance Limit	:CONFigure:CELLular:LTE:FUNDamental:TMASk:GENeral:TOL <limit>	:CONFigure:CELLular:LTE:FUNDamental:TMASk:GENeral:TOL?	<limit>
Power Template - Transmit OFF power Limit	:CONFigure:CELLular:LTE:FUNDamental:OFFPwr:UL <limit>	:CONFigure:CELLular:LTE:FUNDamental:OFFPwr:UL?	<limit>
Long Span Search	:CONFigure:CELLular:LTE:FUNDamental:LSSearch <on_off>	:CONFigure:CELLular:LTE:FUNDamental:LSSearch?	<on_off>
Modulation Analysis Measurement Enable and Count	:CONFigure:CELLular:LTE:FUNDamental:MODulation:SET <on_off>[,<count>]	:CONFigure:CELLular:LTE:FUNDamental:MODulation:SET?	<on_off>,<count>
Occupied Bandwidth Ratio	:CONFigure:CELLular:LTE:FUNDamental:OBW:RATio <ratio>	:CONFigure:CELLular:LTE:FUNDamental:OBW:RATio?	<ratio>
OBW Measurement Enable and Count	:CONFigure:CELLular:LTE:FUNDamental:OBW:SET <on_off>[,<count>]	:CONFigure:CELLular:LTE:FUNDamental:OBW:SET?	<on_off>,<count>
Fast Power Measurement Mode	:CONFigure:CELLular:LTE:FUNDamental:POWer:FMODe <on_off>	:CONFigure:CELLular:WCDMa:FUNDamental:POWer:FMODe?	<on_off>
Tx Power Measurement Enable and Count	:CONFigure:CELLular:LTE:FUNDamental:POWer:SET <on_off>[,<count>]	:CONFigure:CELLular:LTE:FUNDamental:POWer:SET?	<on_off>,<count>



Fundamental Measurement Parameters (Cont'd)

Function	Command	Query	Response
AdditionalSpectrumEmission	:CONFigure:CELLular:LTE:FUNDamental:SEMask:ASEMission <sib2_ns>	:CONFigure:CELLular:LTE:FUNDamental:SEMask:ASEMission?	<sib2_ns>
Spectrum Emission Mask Template (10 MHz)	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B10M <range>,<limit>	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B10M? <range>	<limit>
Spectrum Emission Mask Template (15 MHz)	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B15M <range>,<limit>	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B15M? <range>	<limit>
Spectrum Emission Mask Template (1.4 MHz)	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B1M4 <range>,<limit>	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B1M4? <range>	<limit>
Spectrum Emission Mask Template (20 MHz)	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B20M <range>,<limit>	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B20M? <range>	<limit>
Spectrum Emission Mask Template (3 MHz)	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B3M <range>,<limit>	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B3M? <range>	<limit>
Spectrum Emission Mask Template (5 MHz)	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B5M <range>,<limit>	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B5M? <range>	<limit>
Spectrum Emission Mask Enable and Count	:CONFigure:CELLular:LTE:FUNDamental:SEMask:SET <on_off>[,<count>]	:CONFigure:CELLular:LTE:FUNDamental:SEMask:SET?	<on_off>,<count>

Fundamental Measurement Parameters (Cont'd)

Function	Command	Query	Response
Spectrum Emission Mask Template for Contiguous UL CA(100RB+100RB)	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB100:RB100 <range>,<limit>	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB100:RB100? <range>	<limit>
Spectrum Emission Mask Template for Contiguous UL CA(25RB+100RB)	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB25:RB100 <range>,<limit>	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB25:RB100? <range>	<limit>
Spectrum Emission Mask Template for Contiguous UL CA(50RB+100RB)	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB50:RB100 <range>,<limit>	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB50:RB100? <range>	<limit>
Spectrum Emission Mask Template for Contiguous UL CA(75RB+100RB)	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB75:RB100 <range>,<limit>	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB75:RB100? <range>	<limit>
Spectrum Emission Mask Template for Contiguous UL CA(75RB+75RB)	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB75:RB75 <range>,<limit>	:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB75:RB75? <range>	<limit>
Power Template - Wide Dynamic Range	:CONFigure:CELLular:LTE:FUNDamental:TEMPlate:WDRange <on_off>	:CONFigure:CELLular:LTE:FUNDamental:TEMPlate:WDRange?	<on_off>
Power Template measurement Enable and Count	:CONFigure:CELLular:LTE:FUNDamental:TEMPlate:SET <on_off>[,<count>]	:CONFigure:CELLular:LTE:FUNDamental:TEMPlate:SET?	<on_off>,<count>

Results

Function	Command	Query	Response
ACLR Result	-----	:FETCh:CELLular:LTE:FUNDamental:ACLR? <mode>[,<cc>]	{<avg0>,<avg1>,<avg2>,<avg3>,<avg4>,<avg5>,<max0>,<max1>,<max2>,<max3>,<max4>,<max5>,<min0>,<min1>,<min2>,<min3>,<min4>,<min5>}|{<aclr0>,<aclr1>,<aclr2>,<aclr3>,<aclr4>,<aclr5>}
Carrier Leakage Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:CARLeakage? <mode>[,<cc>]	{<avg>,<max>,<min>}|<cleakage>
Carrier Frequency Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:CFRequency? [<cc>]	<freq>
Spectrum Flatness Measured Item	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:ITEM? [<cc>]	<flag>
Spectrum Flatness Judgement	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:JUDGement? [<cc>]	<judgement>
Spectrum Flatness (≥3 MHz) Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1? [<cc>]	<worst>
Spectrum Flatness (≥3 MHz (R1-)) Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1M? <mode>[,<cc>]	{<avg>,<max>,<min>}|<sflatness>
Spectrum Flatness (≥3 MHz (R1+)) Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1P? <mode>[,<cc>]	{<avg>,<max>,<min>}|<sflatness>
Spectrum Flatness (<3 MHz) Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2? [<cc>]	<worst>

Results (Cont'd)

Function	Command	Query	Response
Spectrum Flatness (<3 MHz (R2–)) Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2M? <mode>[,<cc>]	{<avg>,<max>,<min>}|<sflatness>
Spectrum Flatness (<3 MHz (R2+)) Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2P? <mode>[,<cc>]	{<avg>,<max>,<min>}|<sflatness>
Spectrum Flatness (≥3 MHz (RP1)) Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP1? <mode>[,<cc>]	{<avg>,<max>,<min>}|<sflatness>
Spectrum Flatness (RP12) Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP12? <mode>[,<cc>]	{<avg>,<max>,<min>}|<sflatness>
Spectrum Flatness (<3 MHz (RP2)) Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP2? <mode>[,<cc>]	{<avg>,<max>,<min>}|<sflatness>
Spectrum Flatness (RP21) Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP21? <mode>[,<cc>]	{<avg>,<max>,<min>}|<sflatness>
EVM Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:EVM? <mode>[,<cc>]	{<avg>,<max>,<min>}|<evm>
Carrier Frequency Error Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor? <mode>[,<cc>]	{<avg_ppm>,<avg_Hz>,<max_ppm>,<max_Hz>,<min_ppm>,<min_Hz>}|{<freq_ppm>,<freq_Hz>}
Worst Carrier Frequency Error Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor:WORSt? [<cc>]	<freq_ppm>,<freq_Hz>

Results (Cont'd)

Function	Command	Query	Response
In-Band Emissions Measured Item	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:ITEM? [<cc>]	<flag>
In-Band Emissions Judgement	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:JUDGement? [<cc>]	<judgement>
In-Band Emissions (Carrier Leakage) Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:CARLeakage? <mode>[,<cc>]	{<avg>,<max>,<min>}|<ibe>
In-Band Emissions limit (Carrier Leakage)	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:CARLeakage? [<cc>]	<level>
In-Band Emissions (General) Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:GENeral? <mode>[,<cc>]	{<avg>,<max>,<min>}|<ibe>
In-Band Emissions limit (General)	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:GENeral? [<cc>]	<level>
In-Band Emissions (IQ Image) Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:IQIMage? <mode>[,<cc>]	{<avg>,<max>,<min>}|<ibe>
In-Band Emissions limit (IQ Image)	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:IQIMage? [<cc>]	<level>
In-Band Emissions Margin	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:MARGin? [<cc>]	<margin>

Results (Cont'd)

Function	Command	Query	Response
IQ Imbalance Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:IQIMbalance? <mode>[,<cc>]	{<avg>,<max>,<min>}|<iqimb>
Magnitude Error Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:MERRor? <mode>[,<cc>]	{<avg>,<max>,<min>}|<merr>
Peak EVM Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:PEVM? <mode>[,<cc>]	{<avg>,<max>,<min>}|<pevm>
Phase Error Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:PHERror? <mode>[,<cc>]	{<avg>,<max>,<min>}|<perr>
Rho Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:RHO? <mode>[,<cc>]	{<avg>,<max>,<min>}|<rho>
Reference Signal EVM Result	-----	:FETCh:CELLular:LTE:FUNDamental:MODulation:RSEVm? <mode>[,<cc>]	{<avg>,<max>,<min>}|<rsevm>
OBW Result	-----	:FETCh:CELLular:LTE:FUNDamental:OBW?	<bw>
OBW Frequency Result	-----	:FETCh:CELLular:LTE:FUNDamental:OBW:FREQuency? <pos>	<freq>

Results (Cont'd)

Function	Command	Query	Response
SEM Judgement	-----	:FETCh:CELLular:LTE:FUNDamental:SEMask:JUDGement? [<cc>]	<judgement>
SEM Peak Value (Lower)	-----	:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer? [<cc>]	<l_M1>,<l_M2>,<l_M3>,<l_M4>,<f_M1>,<f_M2>,<f_M3>,<f_M4>
SEM Peak Value (Detail) (Lower)	-----	:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer:DETail? [<cc>]	<l_M1>,<l_M2>,<l_M3>,<l_M4>,<l_M5>,<l_M6>,<l_M7>,<l_M8>,<l_M9>,<f_M1>,<f_M2>,<f_M3>,<f_M4>,<f_M5>,<f_M6>,<f_M7>,<f_M8>,<f_M9>
SEM Peak Value (Upper)	-----	:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer? [<cc>]	<l_1>,<l_2>,<l_3>,<l_4>,<f_1>,<f_2>,<f_3>,<f_4>
SEM Peak Value (Detail) (Upper)	-----	:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer:DETail? [<cc>]	<l_1>,<l_2>,<l_3>,<l_4>,<l_5>,<l_6>,<l_7>,<l_8>,<l_9>,<f_1>,<f_2>,<f_3>,<f_4>,<f_5>,<f_6>,<f_7>,<f_8>,<f_9>
SEM Template Margin (Lower)	-----	:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:LOWer? [<cc>]	<l_M1>,<l_M2>,<l_M3>,<l_M4>,<f_M1>,<f_M2>,<f_M3>,<f_M4>
SEM Template Margin (Detail) (Lower)	-----	:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:LOWer:DETail? [<cc>]	<l_M1>,<l_M2>,<l_M3>,<l_M4>,<l_M5>,<l_M6>,<l_M7>,<l_M8>,<l_M9>,<f_M1>,<f_M2>,<f_M3>,<f_M4>,<f_M5>,<f_M6>,<f_M7>,<f_M8>,<f_M9>
SEM Template Margin (Upper)	-----	:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer? [<cc>]	<l_1>,<l_2>,<l_3>,<l_4>,<f_1>,<f_2>,<f_3>,<f_4>

Results (Cont'd)

Function	Command	Query	Response
SEM Template Margin (Detail) (Upper)	-----	:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer:DETail? [<cc>]	<l_1>,<l_2>,<l_3>,<l_4>,<l_5>,<l_6>,<l_7>,<l_8>,<l_9>,<f_1>,<f_2>,<f_3>,<f_4>,<f_5>,<f_6>,<f_7>,<f_8>,<f_9>
Waveform	-----	:FETCh:CELLular:LTE:FUNDamental:TRACe? <format>,<position>,<length>[,<symbol>][,<cc>]	<data(n)>
Channel Power Result	-----	:FETCh:CELLular:LTE:FUNDamental:POWer:CHPower? <mode>[,<cc>]	{<avg>,<max>,<min>}|<pwr>|{<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>}
Tx Power Result	-----	:FETCh:CELLular:LTE:FUNDamental:POWer:TXPower? <mode>[,<cc>]	{<avg>,<max>,<min>}|<pwr>|{<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>}
On Power	-----	:FETCh:CELLular:LTE:FUNDamental:TEMPlate:ONPower? mode	{<avg>,<max>,<min>}|<level>
Off Power (Before)	-----	:FETCh:CELLular:LTE:FUNDamental:TEMPlate:OFFPower:BEFore? mode	{<avg>,<max>,<min>}|<level>
Off Power (After)	-----	:FETCh:CELLular:LTE:FUNDamental:TEMPlate:OFFPower:AFTer? mode	{<avg>,<max>,<min>}|<level>
On Power Judgement	-----	:FETCh:CELLular:LTE:FUNDamental:TEMPlate:JUDGement:ONPower?	<judgement>
Off Power Judgement	-----	:FETCh:CELLular:LTE:FUNDamental:TEMPlate:JUDGement:OFFPower?	<judgement>

4.1.3 Sequence measurement commands

Common Parameters

Function	Command	Query	Response
Input Level	:CONFigure:CELLular:MEASurement:RFSettings:LEVel <level>	:CONFigure:CELLular:MEASurement:RFSettings:LEVel?	<level>
Output Level	:CONFigure:CELLular:GENerator:RFSettings:LEVel <level>	:CONFigure:CELLular:GENerator:RFSettings:LEVel?	<level>
External Loss Table Index for SCC-1	:CONFigure:CELLular:SEQuence:LTE:EXTLoss:INDex:SCC1 <index>	:CONFigure:CELLular:SEQuence:LTE:EXTLoss:INDex:SCC1?	<index>
Downlink Frequency	:CONFigure:CELLular:GENerator:RFSettings:FREQuency <dl_freq>	:CONFigure:CELLular:GENerator:RFSettings:FREQuency?	<dl_freq>
Uplink Frequency	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency <ul_freq>	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency?	<ul_freq>
Channel Bandwidth, RB	:CONFigure:CELLular:SEQuence:LTE:BWRB <mcond>,<ch_bw>[,<rb>[,<start>]]	:CONFigure:CELLular:SEQuence:LTE:BWRB? <mcond>	<ch_bw>,<rb>,<start>
Channel Bandwidth, RB for SCC-1	:CONFigure:CELLular:LTE:BWRB:SCC1 <ch_bw>[,<rb>[,<start>]]	:CONFigure:CELLular:LTE:BWRB:SCC1?	<ch_bw>,<rb>,<start>

Sequence Measurements

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

Sequence Control Parameters

Function	Command	Query	Response
Sequence Control Parameter - Sequence Control	:CONFigure:CELLular:SEQuence:CONTrol <start>,<end>	:CONFigure:CELLular:SEQuence:CONTrol?	<start>,<end>
Sequence Control Parameter - Sequence Control	:CONFigure:CELLular:SEQuence:CONTrol:TX <start>,<end>	:CONFigure:CELLular:SEQuence:CONTrol:TX?	<start>,<end>
Sequence Control Parameter - Sequence End State Reinitialization	:CONFigure:CELLular:SEQuence:RFSettings:REINit <sw>	:CONFigure:CELLular:SEQuence:RFSettings:REINit?	<sw>
Sequence Control Parameter - Sequence Table	:CONFigure:CELLular:SEQuence:TABLe <table>	:CONFigure:CELLular:SEQuence:TABLe?	<table>
Start Signal Analyzer Measurement Only	:INITiate:CELLular:SEQuence:EXECute:TX	-----	-----
Measurement Offset	:CONFigure:CELLular:SEQuence:LTE:MOFFset <mcond>,<on_off>[,<time>]	:CONFigure:CELLular:SEQuence:LTE:MOFFset? <mcond>	<on_off>,<time>
RS Search Range for FDD mode	CONFigure:CELLular:SEQuence:LTE:RSRange:FDD <time>	CONFigure:CELLular:SEQuence:LTE:RSRange:FDD?	<time>
RS Search Range for TDD mode	CONFigure:CELLular:SEQuence:LTE:RSRange:TDD <time>	CONFigure:CELLular:SEQuence:LTE:RSRange:TDD?	<time>
Channel Coding	:CONFigure:CELLular:SEQuence:LTE:CHCoding <mcond>,<object>	:CONFigure:CELLular:SEQuence:LTE:CHCoding? <mcond>	<object>



Sequence Parameter Information

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

Sequence Table Parameters

Function	Command	Query	Response
Sequence Table Parameter - TRX Control	:CONFigure:CELLular:SEQuence:RFSettings:TRX <seg>,<ul_freq>,<ref>,<dl_freq>,<level>,<pat>	:CONFigure:CELLular:SEQuence:RFSettings:TRX? <seg>	<ul_freq>,<ref>,<dl_freq>,<level>,<pat>
Sequence Table Parameter - Uplink Frequency, Input Level	:CONFigure:CELLular:SEQuence:RFSettings:TX <seg>,<ul_freq>,<ref>	:CONFigure:CELLular:SEQuence:RFSettings:TX? <seg>	<ul_freq>,<ref>
Sequence Table Parameter - Uplink Frequency, Input Level for SCC-1	:CONFigure:CELLular:SEQuence:RFSettings:TX:SCC1 <seg>,<ul_freq>,<ref>	:CONFigure:CELLular:SEQuence:RFSettings:TX:SCC1? <seg>	<ul_freq>,<ref>
Sequence Table Parameter - SG Output Port	:CONFigure:CELLular:SEQuence:RXPort <seg>,<port>[,<port>,…,<port>]	:CONFigure:CELLular:SEQuence:RXPort? <seg>	<port>[,<port>,…,<port>]
	:CONFigure:CELLular:SEQuence:PORT:RX <seg>,<port>[,<port>,…,<port>]	:CONFigure:CELLular:SEQuence:PORT:RX? <seg>	<port>[,<port>,…,<port>]
Sequence Table Parameter - SA Input Port	:CONFigure:CELLular:SEQuence:PORT:TX <seg>,<port>	:CONFigure:CELLular:SEQuence:PORT:TX? <seg>	<port>

Sequence Table Parameters (Cont'd)

Function	Command	Query	Response
Sequence Table Parameter - Measurement	:CONFigure:CELLular:SEQuence:SETup <seg>,<mode>,<step>,<mcond>	:CONFigure:CELLular:SEQuence:SETup? <seg>	<mode>,<step>,<mcond>
Sequence Table Parameter - Trigger	:TRIGger:CELLular:SEQuence <seg>,<src>,<slope>,<level>,<delay>	:TRIGger:CELLular:SEQuence? <seg>	<src>,<slope>,<level>,<delay>
Sequence UL RMC Modulation	:CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme <mcond>,<ul_rmc_mod>	:CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme? <mcond>	<ul_rmc_mod>
Sequence UL RMC Modulation for SCC-1	:CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme:SCC1 <mcond>,<ul_rmc_mod>	:CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme:SCC1? <mcond>	<ul_rmc_mod>
Frame Structure	:CONFigure:CELLular:SEQuence:LTE:FSTRucture <mcond>,<mode>	:CONFigure:CELLular:SEQuence:LTE:FSTRucture? <mcond>	<mode>
Frame Structure for SCC-1	:CONFigure:CELLular:SEQuence:LTE:FSTRucture:SCC1 <mcond>,<mode>	:CONFigure:CELLular:SEQuence:LTE:FSTRucture:SCC1?	<mode>
Cell ID	:CONFigure:CELLular:SEQuence:LTE:CID <id>	:CONFigure:CELLular:SEQuence:LTE:CID?	<id>
Cell ID for SCC-1	:CONFigure:CELLular:SEQuence:LTE:CID:SCC1 <id>	:CONFigure:CELLular:SEQuence:LTE:CID:SCC1?	<id>
Cyclic Shift	:CONFigure:CELLular:SEQuence:LTE:CSHift <on_off>	:CONFigure:CELLular:SEQuence:LTE:CSHift?	<on_off>
Group hopping	:CONFigure:CELLular:SEQuence:LTE:GHOPping <on_off>	:CONFigure:CELLular:SEQuence:LTE:GHOPping?	<on_off>
Delta SS	:CONFigure:CELLular:SEQuence:LTE:DSS <val>	:CONFigure:CELLular:SEQuence:LTE:DSS?	<val>

Sequence Table Parameters (Cont'd)

Function	Command	Query	Response
Operation band	:CONFigure:CELLular:SEQuence:LTE:BAND <mcond>,<band>	:CONFigure:CELLular:SEQuence:LTE:BAND? <mcond>	<band>
Operation band for SCC-1	:CONFigure:CELLular:SEQuence:LTE:BAND:SCC1 <mcond>,<band>	:CONFigure:CELLular:SEQuence:LTE:BAND:SCC1? <mcond>	<band>
Test Environment	:CONFigure:CELLular:SEQuence:LTE:TENVironment <mcond>,<env>	:CONFigure:CELLular:SEQuence:LTE:TENVironment? <mcond>	<env>
In-band Emission Carrier Leakage Frequency	:CONFigure:CELLular:SEQuence:LTE:IEMissions:CLFRequency <clf>	:CONFigure:CELLular:SEQuence:LTE:IEMissions:CLFRequency?	<clf>
Measurement Carrier	:CONFigure:CELLular:SEQuence:LTE:MCARrier <mcond>,<carrier>	LTE_MCARRIER? <mcond>	<carrier>
In-band Emissions Carrier Leakage Template	:CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak <mcond>,<tp>	:CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak? <mcond>	<tp>
In-band Emissions Carrier Leakage Template for SCC-1	:CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak:SCC1 <mcond>,<tp>	:CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak:SCC1? <mcond>	<tp>
Uplink Downlink Configuration	:CONFigure:CELLular:SEQuence:LTE:ULDL <conf>	:CONFigure:CELLular:SEQuence:LTE:ULDL?	<conf>
Frequency Error Range	:CONFigure:CELLular:SEQuence:LTE:FERange <value>	:CONFigure:CELLular:SEQuence:LTE:FERange?	<value>

Fundamental Measurement Parameters

Function	Command	Query	Response
Adjacent channel leakage power ratio Enable and Count	:CONFigure:CELLular:SEQuence:LTE:ACLR:SET <mcond>,<on_off>[,<count>]	:CONFigure:CELLular:SEQuence:LTE:ACLR:SET? <mcond>	<on_off>,<count>
Turn Off All Measurement Items	:CONFigure:CELLular:SEQuence:LTE:AMITems:OFF <mcond>	-----	-----
Long Span Search	:CONFigure:CELLular:SEQuence:LTE:LSSearch <on_off>	:CONFigure:CELLular:SEQuence:LTE:LSSearch?	<on_off>
Modulation Analysis Measurement Enable and Count	:CONFigure:CELLular:SEQuence:LTE:MODulation:SET <mcond>,<on_off>[,<count>]	:CONFigure:CELLular:SEQuence:LTE:MODulation:SET? <mcond>	<on_off>,<count>

Fundamental Measurement Parameters (Cont'd)

Function	Command	Query	Response
Occupied Bandwidth Ratio	:CONFigure:CELLular:SEQuence:LTE:OBW:RATio <ratio>	:CONFigure:CELLular:SEQuence:LTE:OBW:RATio?	<ratio>
OBW Measurement Enable and Count	:CONFigure:CELLular:SEQuence:LTE:OBW:SET <mcond>,<on_off>[,<count>]	:CONFigure:CELLular:SEQuence:LTE:OBW:SET? <mcond>	<on_off>,<count>
Tx Power Measurement Enable and Count	:CONFigure:CELLular:SEQuence:LTE:POWer:SET <mcond>,<on_off>[,<count>]	:CONFigure:CELLular:SEQuence:LTE:POWer:SET? <mcond>	<on_off>,<count>
Spectrum Emission Mask Template (10 MHz)	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B10M <range>,<limit>	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B10M? <range>	<limit>
Spectrum Emission Mask Template (15 MHz)	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B15M <range>,<limit>	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B15M? <range>	<limit>
Spectrum Emission Mask Template (1.4 MHz)	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B1M4 <range>,<limit>	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B1M4? <range>	<limit>
Spectrum Emission Mask Template (20 MHz)	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B20M <range>,<limit>	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B20M? <range>	<limit>
Spectrum Emission Mask Template (3 MHz)	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B3M <range>,<limit>	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B3M? <range>	<limit>
Spectrum Emission Mask Template (5 MHz)	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B5M <range>,<limit>	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B5M? <range>	<limit>
Spectrum Emission Mask Enable and Count	:CONFigure:CELLular:SEQuence:LTE:SEMask:SET <mcond>,<on_off>[,<count>]	:CONFigure:CELLular:SEQuence:LTE:SEMask:SET? <mcond>	<on_off>,<count>

Fundamental Measurement Parameters (Cont'd)

Function	Command	Query	Response
Spectrum Emission Mask Template for Contiguous UL CA (100RB+100RB)	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB100:RB100 <range>,<limit>	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB100:RB100? <range>	<limit>
Spectrum Emission Mask Template for Contiguous UL CA (25RB+100RB)	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB25:RB100 <range>,<limit>	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB25:RB100? <range>	<limit>
Spectrum Emission Mask Template for Contiguous UL CA (50RB+100RB)	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB50:RB100 <range>,<limit>	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB50:RB100? <range>	<limit>
Spectrum Emission Mask Template for Contiguous UL CA (75RB+100RB)	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB100 <range>,<limit>	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB100? <range>	<limit>
Spectrum Emission Mask Template for Contiguous UL CA (75RB+75RB)	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB75 <range>,<limit>	:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB75? <range>	<limit>

Results

Function	Command	Query	Response
ACLR Result	-----	:FETCh:CELLular:SEQuence:LTE:ACLR? <seg>,<mode>[,<cc>]	{<avg0>,<avg1>,<avg2>,<avg3>,<avg4>,<avg5>,<max0>,<max1>,<max2>,<max3>,<max4>,<max5>,<min0>,<min1>,<min2>,<min3>,<min4>,<min5>}|{<aclr0>,<aclr1>,<aclr2>,<aclr3>,<aclr4>,<aclr5>}
Carrier Leakage Result	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:CARLeakage? <seg>,<mode>[,<cc>]	{<avg>,<max>,<min>}|<cleakage>
Carrier Frequency Result	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:CFRequency? <seg>[,<cc>]	<freq>
EVM Result	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:EVM? <seg>,<mode>[,<cc>]	{<avg>,<max>,<min>}|<evm>
Carrier Frequency Error Result	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:FERRor? <seg>,<mode>[,<cc>]	{<avg_ppm>,<avg_Hz>,<max_ppm>,<max_Hz>,<min_ppm>,<min_Hz>}|{<freq_ppm>,<freq_Hz>}
Worst Carrier Frequency Error Result	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:FERRor:WORSt? <seg>[,<cc>]	<freq_ppm>,<freq_Hz>
IQ Imbalance Result	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:IQIMbalance? <seg>,<mode>[,<cc>]	{<avg>,<max>,<min>}|<iqimb>
Magnitude Error Result	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:MERRor? <seg>,<mode>[,<cc>]	{<avg>,<max>,<min>}|<merr>
Peak EVM Result	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:PEVM? <seg>,<mode>[,<cc>]	{<avg>,<max>,<min>}|<pevm>

Results (Cont'd)

Function	Command	Query	Response
Phase Error Result	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:PHERror? <seg>,<mode>[,<cc>]	{<avg>,<max>,<min>}|<perr>
Reference Signal EVM Result	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:RSEVm? <seg>,<mode>[,<cc>]	{<avg>,<max>,<min>}|<rsevm>
OBW Result	-----	:FETCh:CELLular:SEQuence:LTE:OBW? <seg>	<bw>
OBW Frequency Result	-----	:FETCh:CELLular:SEQuence:LTE:OBW:FREQuency? <seg>,<pos>	<freq>
Channel Power Result	-----	:FETCh:CELLular:SEQuence:LTE:POWer:CHPower? <seg>,<mode>[,<cc>]	{<avg>,<max>,<min>}|<pwr>|{<s>,<pwr(1)>,<pwr(2)>,<pwr(3)>,...,<pwr(s)>}
Tx Power Result	-----	:FETCh:CELLular:SEQuence:LTE:POWer:TXPower? <seg>,<mode>[,<cc>]	{<avg>,<max>,<min>}|<pwr>|{<s>,<pwr(1)>,<pwr(2)>,<pwr(3)>,...,<pwr(s)>}
In-Band Emissions Measured Item	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:ITEM? <seg>[,<cc>]	<flag>
In-Band Emissions Judgement	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:JUDGement? <seg>[,<cc>]	<judgement>
In-Band Emissions limit (General)	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:GENeral? <seg>[,<cc>]	<level>
In-Band Emissions (General) Result	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:GENeral? <seg>,<mode>[,<cc>]	{<avg>,<max>,<min>}|<ibe>

Results (Cont'd)

Function	Command	Query	Response
In-Band Emissions limit (IQ Image)	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:IQIMage? <seg>[,<cc>]	<level>
In-Band Emissions (IQ Image) Result	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:IQIMage? <seg>,<mode>[,<cc>]	{<avg>,<max>,<min>}|<ibe>
In-Band Emissions limit (Carrier Leakage)	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:CARLeakage? <seg>[,<cc>]	<level>
In-Band Emissions (Carrier Leakage) Result	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:CARLeakage? <seg>,<mode>[,<cc>]	{<avg>,<max>,<min>}|<ibe>
In-Band Emissions Margin	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:MARGin? <seg>[,<cc>]	<margin>
SEM Judgement	-----	:FETCh:CELLular:SEQuence:LTE:SEMask:JUDGement? <seg>[,<cc>]	<judgement>
SEM Peak Value (Lower)	-----	:FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:LOWer? <seg>[,<cc>]	<l_M1>,<l_M2>,<l_M3>,<l_M4>,<f_M1>,<f_M2>,<f_M3>,<f_M4>
SEM Peak Value (Detail) (Lower)	-----	:FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:LOWer:DETail? <seg>[,<cc>]	<l_M1>,<l_M2>,<l_M3>,<l_M4>,<l_M5>,<l_M6>,<l_M7>,<l_M8>,<l_M9>,<f_M1>,<f_M2>,<f_M3>,<f_M4>,<f_M5>,<f_M6>,<f_M7>,<f_M8>,<f_M9>

Results (Cont'd)

Function	Command	Query	Response
SEM Peak Value (Upper)	-----	:FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:UPPer? <seg>[,<cc>]	<l_1>,<l_2>,<l_3>,<l_4>,<f_1>,<f_2>,<f_3>,<f_4>
SEM Peak Value (Detail) (Upper)	-----	:FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:UPPer:DETail? <seg>[,<cc>]	<l_1>,<l_2>,<l_3>,<l_4>,<l_5>,<l_6>,<l_7>,<l_8>,<l_9>,<f_1>,<f_2>,<f_3>,<f_4>,<f_5>,<f_6>,<f_7>,<f_8>,<f_9>
SEM Template Margin (Lower)	-----	:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:LOWer? <seg>[,<cc>]	<l_M1>,<l_M2>,<l_M3>,<l_M4>,<f_M1>,<f_M2>,<f_M3>,<f_M4>
SEM Template Margin (Detail) (Lower)	-----	:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:LOWer:DETail? <seg>[,<cc>]	<l_M1>,<l_M2>,<l_M3>,<l_M4>,<l_M5>,<l_M6>,<l_M7>,<l_M8>,<l_M9>,<f_M1>,<f_M2>,<f_M3>,<f_M4>,<f_M5>,<f_M6>,<f_M7>,<f_M8>,<f_M9>
SEM Template Margin (Upper)	-----	:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:UPPer? <seg>[,<cc>]	<l_1>,<l_2>,<l_3>,<l_4>,<f_1>,<f_2>,<f_3>,<f_4>
SEM Template Margin (Detail) (Upper)	-----	:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:UPPer:DETail? <seg>[,<cc>]	<l_1>,<l_2>,<l_3>,<l_4>,<l_5>,<l_6>,<l_7>,<l_8>,<l_9>,<f_1>,<f_2>,<f_3>,<f_4>,<f_5>,<f_6>,<f_7>,<f_8>,<f_9>

Results (Cont'd)

Function	Command	Query	Response
Spectrum Flatness Measured Item	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:ITEM? <seg>[,<cc>]	<flag>
Spectrum Flatness Judgement	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:JUDGement? <seg>[,<cc>]	<judgement>
Spectrum Flatness (≥3 MHz (RP1)) Result	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP1? <seg>,<mode>[,<cc>]	{<avg>,<max>,<min>}|<sflatness>
Spectrum Flatness (RP12) Result	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP12?<seg>,<mode>[,<cc>]	{<avg>,<max>,<min>}|<sflatness>
Spectrum Flatness (<3 MHz (RP2)) Result	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP2? <seg>,<mode>[,<cc>]	{<avg>,<max>,<min>}|<sflatness>
Spectrum Flatness (RP21) Result	-----	:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP21?<seg>,<mode>[,<cc>]	{<avg>,<max>,<min>}|<sflatness>

4.2 Details of Commands

This section describes the commands in alphabetical order.

■ Terms in this command list

EX ..... Command name (header)

Example ..... Command function name

Function ..... Command function

Command..... Programming command syntax

Query ..... Query syntax

Response .....Response syntax

Parameter ..... Parameter definition

Details ..... Command restrictions and others

Example of Use..... Command usage example

Related Commands .....Introduction of related commands

■ Suffix Code list

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

4.2.1 Common commands

:ABORt:CELLular:MEASurement

Measurement Stop

Function

Stops measurement.

Command

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

Example of Use

To stop the measurement:

```
:ABOR:CELL:MEAS
```

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

Waveform File Select

Function

Selects or queries the waveform file for arbitrary waveform signal used at Downlink signal.

Command

```
:CONFigure:CELLular:GENerator:ARB:PACKage:SELect <pac>
```

Query

```
:CONFigure:CELLular:GENerator:ARB:PACKage:SELect?
```

Response

```
<pac>
```

Parameter

<pac> Waveform file

Details

The name of the file used from the waveform files loaded into waveform memory is set by this command.

Example of Use

To set the waveform file 0 from the waveform files loaded in memory:

```
:CONF:CELL:GEN:ARB:PACK:SEL "PAC1"
:CONF:CELL:GEN:ARB:PACK:SEL?
> PAC1
```

Related command

Use the following command to load the waveform file into waveform memory.
:SOURce:GPRF:GENerator:ARB:FILE:LOAD
For details of the command, refer to Chapter 5 "SCPI Command Reference" in the *MU887000A TRX Test Module Operation Manual*.
The following command can be used to query the names of the waveform files that have been loaded into waveform memory.
:SOURce:GPRF:GENerator:ARB:WAVeform:NAME?
For details of the command, refer to Chapter 5 "SCPI Command Reference" in the *MU887000A TRX Test Module Operation Manual*.

Use the following commands to select a waveform pattern to use from the waveform patterns included in the waveform file configured using the command described in this section.
:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect
:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect:SYNC
:CONFigure:CELLular:SEQuencer:RFSettings:TRX

:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect

Waveform Pattern Select

Function

Selects a waveform pattern to use from patterns included in waveform file
When the command received, the signal is immediately switched regardless of the frame cycle of signal, so the frame cycle is not continued.
This command is also used to query the currently selected waveform pattern.

Command

```
:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect <pat>
```

Query

```
:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect?
```

Response

```
<pat>
```

Parameter

<pat>		Waveform pattern
	PAT1 to PATn	Waveform pattern number (n: waveform information file group range)
	Default	PAT1

Details

Select the waveform pattern for RF output signal in waveform file.
The pattern number is the same as the group number. Refer to Chapter 3, “Waveform File Details” in the *Waveform Files for Cellular Application Operation Manual*.

Example of Use

To set the waveform pattern to 1:

```
:CONF:CELL:GEN:ARB:WAV:PATT:SEL PAT1
:CONF:CELL:GEN:ARB:WAV:PATT:SEL?
> PAT1
```

Related Command

Waveform file for arbitrary waveform signal selection or query
:CONFigure:CELLular:GENerator:ARB:PACKage:SELect

Remarks

The group number depends on the selected waveform file.
For details of the waveform pattern, refer to Chapter 3, “Waveform File Details” in the *Waveform Files for Cellular Application Operation Manual*.

:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect:SYNC

Waveform Pattern Select (SYNC)

Function

Selects a waveform pattern to use from patterns included in waveform file.
When the command received, the signal is switched according to the frame cycle of signal so that the frame cycle is continued.
This command is also used to query the currently selected waveform pattern.

Command

```
:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect:SYNC <pat>
```

Query

```
:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect:SYNC?
```

Response

```
<pat>
```

Parameter

<pat>		Waveform pattern
	PAT1 to PATn	Waveform pattern number (n: waveform information file group range)
	Default	PAT1

Details

Select the waveform pattern for RF output signal in waveform file.
The pattern number is the same as the group number. Refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

Example of Use

To set the waveform pattern to 1:

```
:CONF:CELL:GEN:ARB:WAV:PATT:SEL:SYNC PAT1
:CONF:CELL:GEN:ARB:WAV:PATT:SEL:SYNC?
> PAT1
```

Related Command

Waveform file for arbitrary waveform signal selection or query
:CONFigure:CELLular:GENerator:ARB:PACKage:SELect

Remarks

The group number depends on the selected waveform file.
For details of the waveform pattern, refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

:CONFigure:CELLular:GENerator:BBMode

Output Signal Modulation

Function

Sets or queries RF signal output modulation.

Command

```
:CONFigure:CELLular:GENerator:BBMode <on_off>
```

Query

```
:CONFigure:CELLular:GENerator:BBMode?
```

Response

```
<on_off>
```

Parameter

<on_off>	Enables/disable modulation
ON	Enables RF output signal modulation
OFF	Disables RF output signal modulation
Default	ON

Example of Use

To modulate the RF signal:

```
:CONF:CELL:GEN:BBM ON
:CONF:CELL:GEN:BBM?
> ON
```

:CONFigure:CELLular:GENerator:RFSettings:STATe

Output Level On/Off

Function

Sets or queries RF signal output ON/OFF.

Command

```
:CONFigure:CELLular:GENerator:RFSettings:STATe <on_off>
```

Query

```
:CONFigure:CELLular:GENerator:RFSettings:STATe?
```

Response

```
<on_off>
```

Parameter

<on_off>	Enables/disables RF signal output
ON	Enables RF signal output
OFF	Disables RF signal output
Default	ON

Example of Use

To enable RF signal output at Test port:

```
:CONF:CELL:GEN:RFS:STAT ON
:CONF:CELL:GEN:RFS:STAT?
> ON
```

:CONFigure:CELLular:MEASurement:STANdard

Standard Select

Function

Sets or queries the measurement standard.

Command

```
:CONFigure:CELLular:MEASurement:STANdard <std>
```

Query

```
:CONFigure:CELLular:MEASurement:STANdard?
```

Response

```
<std>
```

Parameter

<std>	Measurement standard	
COMMON	Common Measurement	(requires MX887010A)
WCDMA	W-CDMA	(requires MX887011A)
GSM	GSM	(requires MX887012A)
LTE	LTE	(requires MX887013A or MX887014A)
CDMA2000	CDMA2000 1x	(requires MX887015A)
EVDO	CDMA2000 1xEVDO	(requires MX887016A)
TDSCDMA	TD-SCDMA	(requires MX887017A)
NR	NR sub-6GHz	(requires MX887018A or MX887019A)
CATM	Category M	(requires MX887065A)
NBIOT	NB-IoT	(requires MX887067A)
LTEV2X	LTE-V2X	(requires MX887068A)
SEQUENCE	Sequence	(requires MX887010A)
SEQ	Sequence	(requires MX887010A)
Default	COMMON	

Details

Switch the measurement standard and sequence measurement according to the application software.
If this command is sent during measurement, measurement stops to prepare for the new standard.
The old measurement results are cleared.
Common hardware settings, such as Downlink Frequency and Input Level, can be set for each measurement standard.
LTE FDD (MX887013A) and LTE TDD (MX887014A) are switched depending on the Frame Structure command.

Example of Use

To switch the measurement standard to SEQUENCE:

```
:CONF:CELL:MEAS:STAN SEQUENCE
:CONF:CELL:MEAS:STAN?
> SEQUENCE
```

Remarks

This parameter must be set to LTE to execute the commands described in Section 4.2.2 “Fundamental measurement commands”.
This parameter must be set to SEQUENCE to use the commands described in Section 4.2.3 “Sequence measurement commands”.

:FETCh:CELLular:MEASurement:STATe?

Measurement Status

Function

Queries the measurement status.

Query

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

Response

```
<m_status>
```

<m_status>	Measurement status
0	Completed measurement
2	Over level
3	Under level
4	Measurement failed
5	Synchronization word not detected
9	Measurement in progress or not measured
12	Tx measurement timeout
13	Rx measurement failed

Details

This can be used either during measurement or while measurement is stopped.

The value received from MX887013A or MX887014A is 0, 2, 5, 9, or 12.

Example of Use

To query the current measurement status:

```
:FETC:CELL:MEAS:STAT?
> 0
```

:INITiate:CELLular:MEASurement:SINGle

Measurement Start

Function

Sets the parameters for both specified measurement and signal transmission and executes measurement.

Command

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

Details

Sending this command executes one measurement.
Sending this command during measurement, aborts measurement once and restarts it.
The measurement questionable register must be polled or sync processing via *WAI is required to determine the timing of measurement completion.

Example of Use

To start measurement:

```
INIT:CELL:MEAS:SING
```

Related Command

:STATus:QUEStionable:MEASure[:EVENt]
For the details of questionable register, refer to Chapter 3 “Fundamental Operation” in the *MU887000A TRX Test Module Operation Manual*.

:INSTrument[:SELect]

Application Select

Function

Sets or queries the type of application software to execute.

Command

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

Query

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

Response

```
<app>
```

Parameter

<app>		Type of application software
	CELLULAR	Cellular application When using MX887010A, MX887011A, MX887012A, MX887013A, MX887014A, MX887015A, MX887016A, MX887017A, MX887018A, MX887019A, MX887065A, MX887067A, or MX887068A
	SRW	Short Range Wireless application When using MX887030A, MX887031A, MX887032A, MX887033A, MX887040A, or MX887050A
	LRWPAN	IEEE 802.15.4 application When using MX887060A
	ZWAVE	Z-Wave application When using MX887061A
	FMAUDIO	FM AUDIO application When using MX887070A

Note: MU887002A does not support MX887070A.

Details

Set the parameter to CELLULAR and send the command before using the MX887013A.

Example of Use

To set the application software to CELLULAR:

```
:INST CELLULAR
:INST?
> CELLULAR
```

Remarks

When using the MX887013A, set the application to CELLULAR using:INSTrument[:SELect], and then set the standard to LTE or SEQUENCE using :CONFigure:CELLular:MEASurement:STANdard.

:ROUTe:PORT:CONNect:DIRection

Set Connect Port Direction

Function

Sets or queries the test ports for inputting and outputting RF signals.
Multiple output test port can be set for MU887002A.

Command

`:ROUTe:PORT:CONNect:DIRection <input>,<output>` MU887000A, MU887001A

`:ROUTe:PORT:CONNect:DIRection <input>,<output>[,<output>,…,<output>]` MU887002A

Query

`:ROUTe:PORT:CONNect:DIRection?`

Response

<input>,<output>	MU887000A, MU887001A
<input>,<output>[,<output>,…,<output>]	MU887002A

Parameters

<input>	Input Test Port No.	
Range	Test Port 1 to 4	(MU887000A)
	Test Port 1 to 4	(MU887001A)
	OFF, Test Port 1 to 12	(MU887002A)
PORT1	Test Port 1	
…	…	
PORT12	Test Port 12	
OFF	No any Input Test Ports	(MU887002A)
Default	PORT1	
<output>	Output Test Port No.	
Range	Test Port 1 to 4	(MU887000A)
	Test Port 1 to 4	(MU887001A)
	Test Port 1 to 12	(MU887002A)
PORT1	Test Port 1	
…	…	
PORT12	Test Port 12	
Default	PORT1	

Details

For MU887000A,
Test Port 1 and Test Port 2 can be set for both input and output.
Test Port 3 and Test Port 4 can be set for either input or output.
For MU887001A, Test Port 1 to Test Port 4 can be set for both input and output.
For MU887002A, Test Port 1 to Test Port 12 can be set for both input and output.

Example of Use

To set Test Port 1 as RF signal input test port and Test Port 2 as RF signal output test port:

```
:ROUT:PORT:CONN:DIR PORT1,PORT2
:ROUT:PORT:CONN:DIR?
> PORT1,PORT2
```

To set No any Input Test Ports and Test Port 4, Test Port 6, Test Port 10 as RF signal output test ports:

```
:ROUT:PORT:CONN:DIR OFF,PORT10,PORT4,PORT6
:ROUT:PORT:CONN:DIR?
> OFF,PORT4,PORT6,PORT10
```

:STATus:OPERation:MEASure[:EVENt]?

Measurement Operation Status Register Query

Function

Queries content of measurement operation status register.
The event occurrence can be identified using the retrieved value.

Query

```
:STATus:OPERation:MEASure[:EVENt]?
```

Response

<mosr>

<mosr> Measurement operation status register

Range 0 to 65535

Value = bit0 + bit1 + ... + bit15

bit0 = 2^0 = 1	Measurement in progress
bit1 = 2^1 = 2	Preparing trigger
bit2 = 2^2 = 4	Unused
bit3 = 2^3 = 8	Unused
bit4 = 2^4 = 16	Unused
bit5 = 2^5 = 32	Unused
bit6 = 2^6 = 64	Unused
bit7 = 2^7 = 128	Unused
bit8 = 2^8 = 256	Unused
bit9 = 2^9 = 512	Unused
bit10 = 2^{10} = 1024	Unused
bit11 = 2^{11} = 2048	Unused
bit12 = 2^{12} = 4096	Unused
bit13 = 2^{13} = 8192	Unused
bit14 = 2^{14} = 16384	Unused
bit15 = 2^{15} = 32768	Unused

Details

The sum of the values for bits of the occurring event from the values 2^0 = 1, 2^1 = 2 to 2^{15} = 32768, that correspond to the measurement operation status register bits 0, 1 to 15 becomes the response.

Example of Use

To query content of measurement status event register:

```
:STAT:OPER:MEAS?
> 1
```

:STATus:QUEStionable:MEASure[:EVENt]?

Measurement Questionable Status Register Query

Function

Queries content of measurement questionable status register.
The event occurrence can be identified using the retrieved value.

Query

```
:STATus:QUEStionable:MEASure[:EVENt]?
```

Response

<mqsr>

<mqsr> Measurement questionable status register

Range 0 to 65535

Value = bit0 + bit1 + ... + bit15

bit0 = 2^0 = 1	Over level
bit1 = 2^1 = 2	Under level
bit2 = 2^2 = 4	Timeout
bit3 = 2^3 = 8	Unused
bit4 = 2^4 = 16	Unused
bit5 = 2^5 = 32	Unused
bit6 = 2^6 = 64	Unused
bit7 = 2^7 = 128	Unused
bit8 = 2^8 = 256	Unused
bit9 = 2^9 = 512	Unused
bit10 = 2^{10} = 1024	Unused
bit11 = 2^{11} = 2048	Unused
bit12 = 2^{12} = 4096	Unused
bit13 = 2^{13} = 8192	Unused
bit14 = 2^{14} = 16384	Unused
bit15 = 2^{15} = 32768	Unused

Details

The sum of the values for bits of the occurring event from the values 2^0 = 1, 2^1 = 2 to 2^{15} = 32768, that correspond to the measurement questionable status register bits 0, 1 to 15 becomes the response.

Example of Use

To query content of measurement questionable status register:

```
:STAT:QUES:MEAS?
> 0
```

:SYSTem:LANGuage

Language Selection of Remote Command

Function

Switches the language mode of remote control command.

Command

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

Query

```
:SYSTem:LANGuage?
```

Response

```
<mode>
```

Parameter

<mode>	Language mode
NATive	Native
SCPI	SCPI
Default	NAT

Example of Use

To switch the language mode of remote control commands to Native.

```
:SYST:LANG NAT
:SYST:LANG?
>NAT
```

4.2.2 Fundamental Measurement Commands

:CONFigure:CELLular:GENerator:ARB:NOISe:CN

AWGN Level

Function

Sets or queries AWGN (Additive White Gaussian Noise) output level ratio vs carrier.

Command

```
:CONFigure:CELLular:GENerator:ARB:NOISe:CN <level>
```

Query

```
:CONFigure:CELLular:GENerator:ARB:NOISe:CN?
```

Response

<level>

Unit	dB
Resolution	1 dB

Parameter

<level>	AWGN Output level
Range	–40 to +12 dB
Resolution	1 dB
Default	–40 dB

Example of Use

To set AWGN output level ratio vs the carrier to –14 dB:

```
:SOUR:GPRF:GEN:ARB:NOIS:CN -14
:SOUR:GPRF:GEN:ARB:NOIS:CN?
> -14
```

:CONFigure:CELLular:GENerator:ARB:NOISe:STATe

AWGN Level On/Off

Function

Enables AWGN output, and queries setting.

Command

```
:CONFigure:CELLular:GENerator:ARB:NOISe:STATe <on_off>
```

Query

```
:CONFigure:CELLular:GENerator:ARB:NOISe:STATe?
```

Response

```
<on_off>
```

Parameter

<on_off>	Enables/disables AWGN output
ON	Enables AWGN output
OFF	Disables AWGN output
Default	OFF

Example of Use

To enable AWGN output:

```
:SOUR:GPRF:GEN:ARB:NOIS:STAT ON
:SOUR:GPRF:GEN:ARB:NOIS:STAT?
> ON
```

Related Command

:SOURce:GPRF:GENerator:ARB:NOISe:CN

:CONFigure:CELLular:GENerator:RFSettings:FREQuency

Downlink Frequency

Function

Sets or queries the downlink frequency.

Command

```
:CONFigure:CELLular:GENerator:RFSettings:FREQuency <dl_freq>
```

Query

```
:CONFigure:CELLular:GENerator:RFSettings:FREQuency?
```

Response

```
<dl_freq>
```

Parameter

<dl_freq>		Downlink frequency
	Range	400 000 000 to 3800 000 000 Hz (MU887000A/01A) 400 000 000 to 6000 000 000 Hz (With MU887000A/01A-001) 400 000 000 to 6000 000 000 Hz (MU887002A)
	Resolution	1 Hz
	Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
	Default	2140 000 000 Hz

Details

This sets the Rx frequency for the mobile station.
Changing the setting of downlink frequency does not change the setting of the downlink channel.

Example of Use

To set the downlink frequency to 2050 MHz:

```
:CONF:CELL:GEN:RFS:FREQ 2050MHZ
:CONF:CELL:GEN:RFS:FREQ?
>2050000000
```

:CONFigure:CELLular:GENerator:RFSettings:FREQuency:SCC1

Downlink Frequency for SCC-1

Function

Sets or queries the Downlink Frequency for SCC-1.

Command

```
:CONFigure:CELLular:GENerator:RFSettings:FREQuency:SCC1 <dl_freq>
```

Query

```
:CONFigure:CELLular:GENerator:RFSettings:FREQuency:SCC1?
```

Response

<dl_freq>

Unit	Hz
Resolution	1 Hz

Parameter

<dl_freq>	Downlink Frequency for SCC-1
Range	400 000 000 to 3800 000 000 Hz (MU887000A/01A) 400 000 000 to 6000 000 000 Hz (With MU887000A/01A-001) 400 000 000 to 6000 000 000 Hz (MU887002A)
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	2140 000 000 Hz

Details

This sets the Rx frequency for the mobile station.
Updating the setting of the Downlink frequency for SCC-1 does not affect the setting of the Downlink Channel for SCC-1.

Example of Use

To set the Downlink frequency for SCC-1 to 2050 MHz:

```
:CONF:CELL:GEN:RFS:FREQ:SCC1 2050MHZ
:CONF:CELL:GEN:RFS:FREQ:SCC1?
>2050000000
```

:CONFigure:CELLular:GENerator:RFSettings:LEVel

Output Level

Function

Sets or queries the RF signal total output level of all channels.

Command

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

Query

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

Response

<level>

Unit	dBm
Resolution	0.1 dB

Parameter

<level> Output level

Range

MU887000A	400 MHz ≤ frequency ≤ 3800 MHz	
	–130.0 to –10.0 dBm	(Port 1/Port 2)
	–120.0 to 0.0 dBm	(Port 3/Port 4)
	3800 MHz < frequency ≤ 6000 MHz	
	–130.0 to –18.0 dBm	(Port 1/Port 2)
	–120.0 to –8.0 dBm	(Port 3/Port 4)
MU887001A	400 MHz ≤ frequency ≤ 3800 MHz	
	–130.0 to –10.0 dBm	(Port 1 to Port 4)
	3800 MHz < frequency ≤ 6000 MHz	
	–130.0 to –18.0 dBm	(Port 1 to Port 4)
MU887002A	400 MHz < frequency ≤ 6000 MHz	
	–130.0 to 0.0 dBm	(Port 1 to Port 12)

Resolution	0.1 dB
Suffix Code	DBM (uses dBm when omitted)
Default	–60.2 dBm

Details

For MU887000A, the setting range varies with the output test port setting.
If cable loss correction is set to ON, the setting range of the output level is the range of values with subtracted cable loss.
If the cable loss is 5 dB and frequency ≤ 3800 MHz,
the MU887000A Port 1/Port 2 setting range is –135.0 to –15.0 dBm.

Example of Use

To set the output level to –50.0 dBm:

```
:CONF:CELL:GEN:RFS:LEV -50.0
:CONF:CELL:GEN:RFS:LEV?
> -50.0
```

Related Commands

[:ROUTe]:EXTLoss:TABLe:SWITch

:CALCulate:EXTLoss:TABLe:SETTing

:CALCulate:EXTLoss:TABLe:VALue

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

:CONFigure:CELLular:LTE:BWRB

Channel Bandwidth, RB

Function

Sets or queries the Uplink Channel bandwidth and Resource Blocks (RB).

Command

```
:CONFigure:CELLular:LTE:BWRB <ch_bw>[,<rb>[,<start>]]
```

Query

```
:CONFigure:CELLular:LTE:BWRB?
```

Response

```
<ch_bw>,<rb>,<start>
```

Parameters

<ch_bw>	Channel bandwidth
1.4MHZ	1.4 MHz
3MHZ	3 MHz
5MHZ	5 MHz
10MHZ	10 MHz
15MHZ	15 MHz
20MHZ	20 MHz
Default	5MHZ
<rb>	RB count
Range	Same as :CONFigure:CELLular:LTE:RBALlocation:NRB
Default	25
<start>	Start RB number
Range	Same as :CONFigure:CELLular:LTE:RBALlocation:ORB
Default	0

Details

The <rb> and <start> settings can be omitted. If omitted, the settings are Full RB (<rb> is the maximum for the channel bandwidth and <start> is 0).

Example of Use

To set as follows:

Channel Bandwidth: 1.4 MHz, UL RMC Number of RB: 6, UL RMC Starting RB: 0

```
:CONF:CELL:LTE:BWRB 1.4MHZ,6,0
:CONF:CELL:LTE:BWRB?
>1.4MHZ,6,0
```

Related Commands

Channel Bandwidth	:CONFigure:CELLular:LTE:CBANdwidth
UL RMC Number of RB	:CONFigure:CELLular:LTE:RBALlocation:NRB
UL RMC Starting RB	:CONFigure:CELLular:LTE:RBALlocation:ORB

:CONFigure:CELLular:LTE:BWRB:SCC1

Channel Bandwidth, RB for SCC-1

Function

Sets or queries the Uplink Channel bandwidth and Resource Blocks (RB) for SCC-1.

Command

```
:CONFigure:CELLular:LTE:BWRB:SCC1 <ch_bw>[,<rb>[,<start>]]
```

Query

```
:CONFigure:CELLular:LTE:BWRB:SCC1?
```

Response

```
<ch_bw>,<rb>,<start>
```

Parameters

<ch_bw>	Channel bandwidth for SCC-1
1.4MHZ	1.4 MHz
3MHZ	3 MHz
5MHZ	5 MHz
10MHZ	10 MHz
15MHZ	15 MHz
20MHZ	20 MHz
Default	5MHZ
<rb>	RB count for SCC-1
Range	Same as :CONFigure:CELLular:LTE:RBALlocation:NRB
Default	25
<start>	Start RB number for SCC-1
Range	Same as :CONFigure:CELLular:LTE:RBALlocation:ORB
Default	0

Details

The <rb> and <start> settings can be omitted. If omitted, the settings are Full RB (<rb> is the maximum for the channel bandwidth and <start> is 0).

Example of Use

To set the items for SCC-1 as follows:
UL Channel Bandwidth: 1.4 MHz, UL RMC Number of RB: 6, UL RMC Starting RB: 0

```
:CONF:CELL:LTE:BWRB:SCC1 1.4MHZ,6,0
:CONF:CELL:LTE:BWRB:SCC1?
>1.4MHZ,6,0
```

Related Commands

Channel Bandwidth for SCC-1	:CONFigure:CELLular:LTE:CBANdwidth:SCC1
UL RMC Number of RB for SCC-1	:CONFigure:CELLular:LTE:RBALlocation:NRB:SCC1
UL RMC Starting RB for SCC-1	:CONFigure:CELLular:LTE:RBALlocation:ORB:SCC1

:CONFigure:CELLular:LTE:CBANdwidth

Channel Bandwidth

Function

Sets or queries the channel bandwidth.

Command

```
:CONFigure:CELLular:LTE:CBANdwidth <ch_bw>[,<ch_bw_scc1>]
```

Query

```
:CONFigure:CELLular:LTE:CBANdwidth? [<ALL>]
```

Response

```
<ch_bw>,<ch_bw_scc1>
```

Parameter

<ch_bw>	Channel bandwidth for PCC
<ch_bw_scc1>	Channel bandwidth for SCC-1
1.4MHZ	1.4 MHz
3MHZ	3 MHz
5MHZ	5 MHz
10MHZ	10 MHz
15MHZ	15 MHz
20MHZ	20 MHz
Default	5 MHz

Details

When the channel bandwidth for PCC is updated, the start RB number setting value at Uplink RMC for PCC is reset to 0. The RBs allocated to RMC of the PCC uplink signal is changed to the maximum value.
When the channel bandwidth for SCC-1 is updated, the start RB number setting value at Uplink RMC for SCC-1 is reset to 0. The RBs allocated to RMC of the SCC-1 uplink signal is changed to the maximum value.
When the command argument <ALL> is omitted, the response is <ch_bw> only.

Example of Use

To set the channel bandwidth as follows:
For PCC: 1.4 MHz, For SCC-1: 3 MHz

```
:CONF:CELL:LTE:CBAN 1.4MHZ,3MHZ
:CONF:CELL:LTE:CBAN? ALL
> 1.4MHZ,3MHZ
```

:CONFigure:CELLular:LTE:CBANdwidth:SCC1

Channel Bandwidth for SCC-1

Function

Sets or queries the channel bandwidth for SCC-1.

Command

```
:CONFigure:CELLular:LTE:CBANdwidth:SCC1 <ch_bw>
```

Query

```
:CONFigure:CELLular:LTE:CBANdwidth:SCC1?
```

Response

```
<ch_bw>
```

Parameter

<ch_bw>	Channel bandwidth for SCC-1
1.4MHZ	1.4 MHz
3MHZ	3 MHz
5MHZ	5 MHz
10MHZ	10 MHz
15MHZ	15 MHz
20MHZ	20 MHz
Default	5 MHz

Details

When the channel bandwidth for SCC-1 is updated, the start RB number setting value at Uplink RMC for SCC-1 is reset to 0. The RBs allocated to RMC of the SCC-1 uplink signal is changed to the maximum value.

Example of Use

To set the channel bandwidth for SCC-1 to 1.4 MHz:

```
:CONF:CELL:LTE:CBAN:SCC1 1.4MHZ,3MHZ
:CONF:CELL:LTE:CBAN:SCC1? ALL
> 1.4MHZ
```

:CONFigure:CELLular:LTE:CHCoding

Channel Coding

Function

Sets or queries the channel coding.

Command

```
:CONFigure:CELLular:LTE:CHCoding <object>
```

Query

```
:CONFigure:CELLular:LTE:CHCoding?
```

Response

```
<object>
```

Parameter

<object>	Target for channel coding
RMC	Reference Measurement Channel
RMC_UL_CA	RMC at UL CA
Default	RMC

Details

When FRAMETYPE is FDD and RMC_UL_CA is set, MX887013A-001 is required.
When FRAMETYPE is TDD and RMC_UL_CA is set, MX887014A-001 is required.

Example of Use

To set the channel coding to RMC:

```
:CONF:CELL:LTE:CHC RMC
:CONF:CELL:LTE:CHC?
> RMC
```

:CONFigure:CELLular:LTE:CID

Cell ID

Function

Sets or queries the Cell ID.

Command

```
:CONFigure:CELLular:LTE:CID <id>
```

Query

```
:CONFigure:CELLular:LTE:CID?
```

Response

```
<id>
```

Parameter

<id>	Cell ID
Range	0 to 503
Resolution	1
Default	0

Example of Use

To set the Cell ID to 121:

```
:CONF:CELL:LTE:CID 121
:CONF:CELL:LTE:CID?
> 121
```

:CONFigure:CELLular:LTE:CID:SCC1

Cell ID for SCC-1

Function

Sets or queries the Cell ID. for SCC-1.

Command

```
:CONFigure:CELLular:LTE:CID:SCC1 <id>
```

Query

```
:CONFigure:CELLular:LTE:CID:SCC1?
```

Response

```
<id>
```

Parameter

<id>	Cell ID for SCC-1
Range	0 to 503
Resolution	1
Default	0

Example of Use

To set the Cell ID for SCC-1 to 121:

```
:CONF:CELL:LTE:CID:SCC1 121
:CONF:CELL:LTE:CID:SCC1?
> 121
```

:CONFigure:CELLular:LTE:CSHift

Cyclic Shift

Function

Enables Cyclic Shift or queries setting.

Command

```
:CONFigure:CELLular:LTE:CSHift <on_off>
```

Query

```
:CONFigure:CELLular:LTE:CSHift?
```

Response

```
<on_off>
```

Parameter

<on_off>	Cyclic Shift
ON	Enables Cyclic Shift.
OFF	Disables Cyclic Shift.
FIX1	The fixed value is set.
Default	ON

Example of Use

To enable Cyclic Shift.

```
:CONF:CELL:LTE:CSH ON
:CONF:CELL:LTE:CSH?
> ON
```

:CONFigure:CELLular:LTE:CTYPe

RMC Configuration

Function

Sets or queries the Uplink Channel configuration when Channel Coding set to RMC.

Command

```
:CONFigure:CELLular:LTE:CTYPe <val>
```

Query

```
:CONFigure:CELLular:LTE:CTYPe?
```

Response

```
<val>
```

Parameter

<val>	RMC Channel configuration
PUSCH	PUSCH
PUCCH	PUCCH
Default	PUSCH

Examples of Use

To sets the Uplink Channel configuration to PUSCH:

```
:CONF:CELL:LTE:CTYP PUSCH
:CONF:CELL:LTE:CTYP?
> PUSCH
```

:CONFigure:CELLular:LTE:DSS

Delta SS

Function

Sets or queries the Delta SS (Group Assignment PUSCH).

Command

```
:CONFigure:CELLular:LTE:DSS <val>
```

Query

```
:CONFigure:CELLular:LTE:DSS?
```

Response

```
<val>
```

Parameter

<val>	Delta SS
Range	0 to 29
Resolution	1
Default	0

Example of Use

To set the Delta SS to 12:

```
:CONF:CELL:LTE:DSS 12
:CONF:CELL:LTE:DSS?
> 12
```

:CONFigure:CELLular:LTE:EXTLoss:INDex:SCC1

External Loss Table Index for SCC-1

Function

Sets and queries the loss correction table index for SCC-1.

Command

```
:CONFigure:CELLular:LTE:EXTLoss:INDex:SCC1 <index>
```

Query

```
:CONFigure:CELLular:LTE:EXTLoss:INDex:SCC1?
```

Response

```
<index>
```

Parameter

<index>	Loss correction table index
Range	0 to 16
Resolution	1
Default	0

Details

When the loss correction table index is set to 0, the setting value of the common command ":CALCulate:EXTLoss:TABLe:SETTing" is used.
Refer to Chapter 5 "SCPI Command Reference" in the *MU887000A TRX Test Module Operation Manual* for details of the CALCulate:EXTLoss:TABLe:SETTing command.

Example of Use

To set the loss correction table index for SCC-1 to 1:

```
:CONF:CELL:LTE:EXTL:IND:SCC1 1
:CONF:CELL:LTE:EXTL:IND:SCC1?
>1
```

:CONFigure:CELLular:LTE:FSTRucture

Frame Structure

Function

Sets or queries the LTE frame structure.
This setting determines the duplex mode.

Command

```
:CONFigure:CELLular:LTE:FSTRucture <mode>
```

Query

```
:CONFigure:CELLular:LTE:FSTRucture?
```

Response

```
<mode>
```

Parameter

<mode>		Frame type (Duplex mode)
	FDD	Frequency Division Multiplexing
	TDD	Time Division Multiplexing
	Default	FDD

Details

When only MX887013A is installed, only FDD can be set.
When only MX887014A is installed, only TDD can be set and the default is TDD.

Example of Use

To set the duplex mode to FDD:

```
:CONF:CELL:LTE:FSTR FDD
:CONF:CELL:LTE:FSTR?
> FDD
```

:CONFigure:CELLular:LTE:FSTRucture:SCC1

Frame Structure for SCC-1

Function

Sets or queries the LTE frame structure for SCC-1.

Command

```
:CONFigure:CELLular:LTE:FSTRucture:SCC1 <mode>
```

Query

```
:CONFigure:CELLular:LTE:FSTRucture:SCC1?
```

Response

```
<mode>
```

Parameter

<mode>		Frame type (Duplex mode) for SCC-1
	FDD	Frequency Division Multiplexing
	TDD	Time Division Multiplexing
	Default	FDD

Details

When only MX887013A is installed, only FDD can be set.
When only MX887014A is installed, only TDD can be set and the default is TDD.
When the settings in this command and :CONFigure:CELLular:LTE:FSTRucture are different, the measurement is performed using the settings in :CONFigure:CELLular:LTE:FSTRucture.

Example of Use

To set the duplex mode for SCC-1 to FDD:

```
:CONF:CELL:LTE:FSTR:SCC1 FDD
:CONF:CELL:LTE:FSTR:SCC1?
> FDD
```

:CONFigure:CELLular:LTE:FUNDamental:ACLR:SET

Adjacent Channel Leakage Power Ratio Enable and Count

Function

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

Command

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

Query

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

Response

```
<on_off>,<count>
```

Parameters

<on_off>	Enables/disables measurement
ON	Executes the measurement
OFF	Disables measurement
Default	OFF
<count>	Measurement count
Range	1 to 200
	1 to 100 (at UL CA)
Resolution	1
Suffix code	None
Default	1

Examples of Use

To sets the Adjacent Channel Leakage Power Ratio measurement to OFF:

```
:CONF:CELL:LTE:FUND:ACLR:SET OFF
:CONF:CELL:LTE:FUND:ACLR:SET?
> OFF
```

Remarks

The Adjacent Channel Leakage Power Ratio of 1 subframe (1 ms) is measured at each measurement count.

:CONFigure:CELLular:LTE:FUNDamental:AMITems:OFF

Turn Off All Measurement Items

Function

Disables all measurement items.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:AMITems:OFF
```

Remarks

The operation of this command is similar to turning off all the following command settings.

:CONFigure:CELLular:LTE:FUNDamental:POWer:SET
:CONFigure:CELLular:LTE:FUNDamental:OBW:SET
:CONFigure:CELLular:LTE:FUNDamental:SEMask:SET
:CONFigure:CELLular:LTE:FUNDamental:ACLR:SET
:CONFigure:CELLular:LTE:FUNDamental:MODulation:SET

Example of Use

To set all measurements to off at one time:

```
:CONF:CELL:LTE:FUND:AMIT:OFF
```

:CONFigure:CELLular:LTE:FUNDamental:BAND

Operation band

Function

Sets or queries the operation band.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:BAND <band>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:BAND?
```

Response

```
<band>
```

Parameter

<band>	Operation band
Range	1 to 256
Resolution	1
Default	1

Details

This is the parameter for determining the following items:

- Limit line of Spectrum Flatness measurement
- Intra-band/Inter-band (at UL CA)

Example of Use

To set the operation band to 10:

```
:CONF:CELL:LTE:FUND:BAND 10
:CONF:CELL:LTE:FUND:BAND?
> 10
```

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

Operation band for SCC-1

Function

Sets or queries the operation band for SCC-1.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:BAND:SCC1 <band>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:BAND:SCC1?
```

Response

```
<band>
```

Parameter

<band>		Operation band for SCC-1
	Range	1 to 256
	Resolution	1
	Default	1

Details

This is the parameter for determining the following items:

- Limit line of Spectrum Flatness measurement
- Intra-band/Inter-band (at UL CA)

Example of Use

To set the operation band for SCC-1 to 10:

```
:CONF:CELL:LTE:FUND:BAND:SCC1 10
:CONF:CELL:LTE:FUND:BAND:SCC1?
> 10
```

:CONFigure:CELLular:LTE:FUNDamental:IEMissions:CLFRequency

In-band Emission Carrier Leakage Frequency

Function

Sets and queries the position of Carrier Leakage Frequency of the UE in the In-band Emission/EVM measurement at Contiguous UL CA.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:IEMissions:CLFRequency <clf>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:IEMissions:CLFRequency?
```

Response

```
<clf>
```

Parameter

<clf>		Position of Carrier Leakage Frequency
	CFR	Center frequency of Aggregated Channel Bandwidth
	CCC	Center frequency of each CC
	Default	CFR

Details

When the In-band Emission measurement at Contiguous UL CA is performed, “UL Number of RB” for PCC or SCC-1 must be set to 0.
For CFR, the resource block located at the center frequency of Aggregated Channel Bandwidth is treated as the carrier leak frequency and the In-band Emission/EVM measurement is performed.
For CCC, the center frequencies of each CC are treated as the carrier leak frequency and the In-band Emission/EVM measurement is performed.

Example of Use

To set the position of Carrier Leakage Frequency to CFR:

```
:CONF:CELL:LTE:FUND:IEM:CLFR CFR
:CONF:CELL:LTE:FUND:IEM:CLFR?
> CFR
```

:CONFigure:CELLular:LTE:FUNDamental:FERange

Frequency Error Range

Function

Sets and queries the frequency error detection method in the modulation analysis measurement.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:FERange <value>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:FERange?
```

Response

```
<value>
```

Parameter

<value>	Frequency Error Range
NORMAL	Normal
NARROW	Narrow Range
Default	NORMAL

Example of Use

To set Frequency Error Range to Narrow Range:

```
:CONF:CELL:LTE:FUND:FER NARROW
:CONF:CELL:LTE:FUND:FER?
>NARROW
```

:CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak

In-band Emissions Carrier Leakage Template

Function

Set and queries the In-band Emissions Carrier Leakage Template.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak <tp>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak?
```

Response

```
<tp>
```

Parameter

<tp>	In-band Emissions Carrier Leakage Template
0DBM	–24.2 dBc (UE output level 0 dBm)
30DBM	–19.2 dBc (UE output level –30 dBm)
40DBM	–9.2 dBc (UE output level –40 dBm)
Default	0DBM

Details

The upper limit for the Carrier Leakage defined in 3GPP TS36.521 6.5.2.3 is selected according to this parameter setting.

Example of Use

To set the In-band Emissions Carrier Leakage Template to 0DBM:

```
:CONF:CELL:LTE:FUND:IEM:TPL 0DBM
:CONF:CELL:LTE:FUND:IEM:TPL?
> 0DBM
```

:CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak:SCC1

In-band Emissions Carrier Leakage Template for SCC-1

Function

Set and queries the In-band Emissions Carrier Leakage Template for SCC-1.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak:SCC1 <tp>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:IEMissions:TPLeak:SCC1?
```

Response

```
<tp>
```

Parameter

<tp>	In-band Emissions Carrier Leakage Template
0DBM	–24.2 dBc (UE output level 0 dBm)
30DBM	–19.2 dBc (UE output level –30 dBm)
40DBM	–9.2 dBc (UE output level –40 dBm)
Default	0DBM

Details

The upper limit for the Carrier Leakage defined in 3GPP TS36.521 6.5.2.3 is selected according to this parameter setting.

Example of Use

To set the In-band Emissions Carrier Leakage Template for SCC-1 to 0DBM:

```
:CONF:CELL:LTE:FUND:IEM:TPL:SCC1 0DBM
:CONF:CELL:LTE:FUND:IEM:TPL:SCC1?
> 0DBM
```

:CONFigure:CELLular:LTE:FUNDamental:LSSearch

Long Span Search

Function

Enables and queries the Long Span Search.

Command

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

Query

```
:CONFigure:CELLular:LTE:FUNDamental:LSSearch?
```

Response

```
<on_off>
```

Parameter

<on_off>	Enables/disables Long Span Search
ON	Enables Long Span Search
OFF	Disables Long Span Search
Default	ON

Details

Set this parameter to OFF when the Uplink and Downlink signals are synchronized; set it to ON when they are not synchronized.
The response to the :FETCh:CELular:LTE:MEASurement:STATe query is 5 (Synchronization word not detected), if this parameter to OFF when the Uplink and Downlink signals are not synchronized.
Measurement takes more time when the Long Span Search function is on.

Example of Use

To enable the Long Span Search:

```
:CONF:CELL:LTE:FUND:LSS ON
:CONF:CELL:LTE:FUND:LSS?
> ON
```

:CONFigure:CELLular:LTE:FUNDamental:MITem

Measurement Item

Function

Sets or queries the Measurement Item in Fundamental Measurement.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:MITem <item>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:MITem?
```

Response

```
<item>
```

Parameters

<item>	Measurement Item in Fundamental Measurement
NORMAL	Normal
PWRTEMP	Power Template
Default	NORMAL

Details

PWRTEMP is valid only when CHCODING is set to RMC.

Note this parameter can be edited even if CHCODING is set to RMC_UL_CA.

Example of Use

To set the Measurement Item in Fundamental Measurement to Power Template:

```
:CONF:CELL:LTE:FUND:MIT PWRTEMP
:CONF:CELL:LTE:FUND:MIT?
> PWRTEMP
```

:CONFigure:CELLular:LTE:FUNDamental:MODulation:SET

Modulation Analysis Measurement Enable and Count

Function

Enables the Modulation Analysis Measurement and sets the measurement count, and queries the settings.

Command

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

Query

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

Response

```
<on_off>,<count>
```

Parameters

<on_off>		Enables/disables measurement
	ON	Enables measurement
	OFF	Disables measurement
	Default	OFF
<count>		Measurement count
	Range	1 to 200
		1 to 100 (at UL CA)
	Resolution	1
	Suffix code	None
	Default	1

Example of Use

To enable the Modulation Analysis measurement and set the measurement count to 200:

```
:CONF:CELL:LTE:FUND:MOD:SET ON,200
:CONF:CELL:LTE:FUND:MOD:SET?
> ON,200
```

Remarks

Modulation analysis is executed for 1 slot (0.5 ms) at each measurement count.

:CONFigure:CELLular:LTE:FUNDamental:OBW:RATio

Occupied Bandwidth Ratio

Function

Sets the Occupied Bandwidth measurement occupation ratio, and queries the setting.

Command

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

Query

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

Response

```
<ratio>
```

Parameter

<ratio>	Occupied Bandwidth occupation ratio
Range	80.0% to 99.9%
Resolution	0.1
Suffix code	%
Default	99.0

Example of Use

To set the Occupied Bandwidth occupation ratio to 99.0%:

```
:CONF:CELL:LTE:FUND:OBW:RAT 99.0
:CONF:CELL:LTE:FUND:OBW:RAT?
> 99.0
```

:CONFigure:CELLular:LTE:FUNDamental:OBW:SET

OBW Measurement Enable and Count

Function

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

Command

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

Query

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

Response

```
<on_off>,<count>
```

Parameters

<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
<count>	Measurement count
Range	1 to 200
	1 to 100 (at UL CA)
Resolution	1
Suffix code	None
Default	1

Example of Use

To turn Occupied Bandwidth measurement on and set the measurement count to 50:

```
:CONF:CELL:LTE:FUND:OBW:SET ON,50
:CONF:CELL:LTE:FUND:OBW:SET?
> ON,100
```

Remarks

The Occupied Bandwidth is measured for 1 subframe (1 ms) at each measurement count.

:CONFigure:CELLular:LTE:FUNDamental:OFFPwr:UL

Power Template - Transmit OFF power Limit

Function

Sets the Pass/Fail evaluation limits for Transmit Off Power, and queries the settings.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:OFFPwr:UL <limit>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:OFFPwr:UL?
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<limit>	Evaluation limits
Range	–99.9 to 99.9 dBm
Resolution	0.1 dB
Default	–48.5 dBm

Example of Use

To set the Pass/Fail evaluation limits to –10.0 dBm:

```
:CONF:CELL:LTE:FUND:OFFP:UL -10.0
:CONF:CELL:LTE:FUND:OFFP:UL?
> -10.0
```

:CONFigure:CELLular:LTE:FUNDamental:POWer:FMODe

Fast Power Measurement Mode

Function

Enables Fast Power Measurement mode or queries setting when Channel Coding set to RMC.

Command

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

Query

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

Response

```
<on_off>
```

Parameters

<on_off>	Fast Power Measurement Mode
ON	Executes Fast Power measurement.
OFF	Executes general power measurement.
Default	OFF

Details

This command is available for FDD. The setup of this command is ignored if set to TDD.
When Fast Power Measurement mode is set to On, only Tx power is measured.
Use the following command to enable/disable power measurement and to set measuring times.
:CONFigure:CELLular:LTE:FUNDamental:POWer:SET

Example of Use

To set Fast Power Measurement mode to On.

```
:CONF:CELL:LTE:FUND:POW:FMOD ON
:CONF:CELL:LTE:FUND:POW:FMOD?
> ON
```

:CONFigure:CELLular:LTE:FUNDamental:POWer:SET

Tx Power Measurement Enable and Count

Function

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

Command

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

Query

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

Response

```
<on_off>,<count>
```

Parameters

<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
<count>	Measurement count
Range	1 to 200 1 to 100 (at UL CA)
Resolution	1
Suffix code	None
Default	1

Example of Use

To turn Transmit Power measurement ON and set the measurement count to 200:

```
:CONF:CELL:LTE:FUND:POW:SET ON,200
:CONF:CELL:LTE:FUND:POW:SET?
> ON,200
```

Remarks

The Tx power is measured for 1 subframe (1 ms) at each measurement count.

:CONFigure:CELLular:LTE:FUNDamental:SEMask:ASEMission

AdditionalSpectrumEmission

Function

Sets or queries the network signalled value for additionalSpectrumEmission in SIB2.
This setting determines the Spectrum Emission Mask frequency range.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:ASEMission <sib2_ns>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:ASEMission?
```

Response

```
<sib2_ns>
```

Parameter

<sib2_ns>	Network signalled value for AdditionalSpectrumEmission
NS_01	NS_01
NS_02	NS_02
NS_03	NS_03
:	:
NS_30	NS_30
NS_31	NS_31
NS_32	NS_32
Default	NS_01

Example of Use

To set the additionalSpectrumEmission in SIB2 to NS_02:

```
:CONF:CELL:LTE:FUND:SEM:ASEM NS_02
:CONF:CELL:LTE:FUND:SEM:ASEM?
> NS_02
```

:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B10M

Spectrum Emission Mask Template (10 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 10 MHz channel bandwidth.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B10M <range>,<limit>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B10M? <range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range
Range	1 to 4
Resolution	1
Suffix code	None
Default	1
<limit>	Limit level
Range	–99.9 to 99.9 dBm
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	Range 1: –16.5 dBm Range 2: –8.5 dBm Range 3: –11.5 dBm Range 4: –23.5 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 10 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:LTE:FUND:SEM:LIM:B10M 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:B10M? 2
> -10.0
```

:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B15M

Spectrum Emission Mask Template (15 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 15 MHz channel bandwidth.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B15M <range>,<limit>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B15M? <range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range
Range	1 to 4
Resolution	1
Suffix code	None
Default	1
<limit>	Limit level
Range	–99.9 to 99.9 dBm
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	Range 1: –18.5 dBm Range 2: –8.5 dBm Range 3: –11.5 dBm Range 4: –23.5 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 15 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:LTE:FUND:SEM:LIM:B15M 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:B15M? 2
> -10.0
```

:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B1M4

Spectrum Emission Mask Template (1.4 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 1.4 MHz channel bandwidth.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B1M4 <range>,<limit>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B1M4? <range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range
Range	1 to 4
Resolution	1
Suffix code	None
Default	1
<limit>	Limit level
Range	–99.9 to 99.9 dBm
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	Range 1: –8.5 dBm Range 2: –8.5 dBm Range 3: –23.5 dBm Range 4: 0.0 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 1.4 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:LTE:FUND:SEM:LIM:B1M4 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:B1M4? 2
> -10.0
```

:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B20M

Spectrum Emission Mask Template (20 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 20 MHz channel bandwidth.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B20M <range>,<limit>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B20M? <range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range
Range	1 to 4
Resolution	1
Suffix code	None
Default	1
<limit>	Limit level
Range	–99.9 to 99.9 dBm
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	Range 1: –19.5 dBm Range 2: –8.5 dBm Range 3: –11.5 dBm Range 4: –23.5 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 20 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:LTE:FUND:SEM:LIM:B20M 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:B20M? 2
> -10.0
```

:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B3M

Spectrum Emission Mask Template (3 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 3 MHz channel bandwidth.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B3M <range>,<limit>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B3M? <range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range
Range	1 to 4
Resolution	1
Suffix code	None
Default	1
<limit>	Limit level
Range	–99.9 to 99.9 dBm
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	Range 1: –11.5 dBm Range 2: –8.5 dBm Range 3: –23.5 dBm Range 4: 0.0 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 3 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:LTE:FUND:SEM:LIM:B3M 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:B3M? 2
> -10.0
```

:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B5M

Spectrum Emission Mask Template (5 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 5 MHz channel bandwidth.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B5M <range>,<limit>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:B5M? <range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range
Range	1 to 4
Resolution	1
Suffix code	None
Default	1
<limit>	Limit level
Range	–99.9 to 99.9 dBm
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	Range 1: –13.5 dBm Range 2: –8.5 dBm Range 3: –11.5 dBm Range 4: –23.5 dBm

Example of Use

To set the limit value of Range 2of Spectrum Emission Mask for 5 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:LTE:FUND:SEM:LIM:B5M 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:B5M? 2
> -10.0
```

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

Spectrum Emission Mask Template for Contiguous UL CA (100RB+100RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 100RB+100RB.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB100:RB100
<range>,<limit>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB100:RB100?
<range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range
Range	1 to 6
Resolution	1
Default	1
<limit>	Limit level
Range	–99.9 to 99.9 dBm
Resolution	0.1 dB
Default	Range 1: –22.5 dBm Range 2: –8.5 dBm Range 3: –11.5 dBm Range 4: –23.5 dBm Range 5: –23.5 dBm Range 6: –23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 100RB+100RB:

```
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB100:RB100 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB100:RB100? 2
>-10.0
```

:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB25:RB100

Spectrum Emission Mask Template for Contiguous UL CA (25RB+100RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 25RB+100RB.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB25:RB100
<range>,<limit>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB25:RB100?
<range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range
Range	1 to 6
Resolution	1
Default	1
<limit>	Limit level
Range	–99.9 to 99.9 dBm
Resolution	0.1 dB
Default	Range 1: –20.5 dBm Range 2: –8.5 dBm Range 3: –11.5 dBm Range 4: –23.5 dBm Range 5: –23.5 dBm Range 6: –23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 25RB+100RB:

```
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB25:RB100 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB25:RB100? 2
>-10.0
```

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

Spectrum Emission Mask Template for Contiguous UL CA (50RB+100RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 50RB+100RB.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB50:RB100
<range>,<limit>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB50:RB100?
<range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range
Range	1 to 6
Resolution	1
Default	1
<limit>	Limit level
Range	–99.9 to 99.9 dBm
Resolution	0.1 dB
Default	Range 1: –21.0 dBm Range 2: –8.5 dBm Range 3: –11.5 dBm Range 4: –23.5 dBm Range 5: –23.5 dBm Range 6: –23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 50RB+100RB:

```
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB100:RB50 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB100:RB50? 2
>-10.0
```

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

Spectrum Emission Mask Template for Contiguous UL CA (75RB+100RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 75RB+100RB.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB75:RB100
<range>,<limit>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB75:RB100?
<range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range
Range	1 to 6
Resolution	1
Default	1
<limit>	Limit level
Range	–99.9 to 99.9 dBm
Resolution	0.1 dB
Default	Range 1: –22.0 dBm Range 2: –8.5 dBm Range 3: –11.5 dBm Range 4: –23.5 dBm Range 5: –23.5 dBm Range 6: –23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 75RB+100RB:

```
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB75:RB100 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB75:RB100? 2
>-10.0
```

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

Spectrum Emission Mask Template for Contiguous UL CA (75RB+75RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 75RB+75RB.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB75:RB75
<range>,<limit>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:LIMit:CONTcc:RB75:RB75?
<range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range
Range	1 to 6
Resolution	1
Default	1
<limit>	Limit level
Range	–99.9 to 99.9 dBm
Resolution	0.1 dB
Default	Range 1: –21.0 dBm Range 2: –8.5 dBm Range 3: –11.5 dBm Range 4: –23.5 dBm Range 5: –23.5 dBm Range 6: –23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 75RB+75RB:

```
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB75:RB75 2,-10.0
:CONF:CELL:LTE:FUND:SEM:LIM:CONT:RB75:RB75? 2
>-10.0
```

:CONFigure:CELLular:LTE:FUNDamental:SEMask:SET

Spectrum Emission Mask Enable and Count

Function

Enables the Spectrum Emission Mask Measurement and sets or queries measurement count.

Command

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

Query

```
:CONFigure:CELLular:LTE:FUNDamental:SEMask:SET?
```

Response

```
<on_off>,<count>
```

Parameters

<on_off>	Enables/disables the measurement
ON	Enables the measurement
OFF	Disables the measurement
Default	OFF
<count>	Measurement count
Range	1 to 200 1 to 100 (at UL CA)
Resolution	1
Suffix code	None
Default	1

Example of Use

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

```
:CONF:CELL:LTE:FUND:SEM:SET ON,100
:CONF:CELL:LTE:FUND:SEM:SET?
> ON,100
```

Remarks

The Spectrum Emission Mask is measured for 1 subframe (1 ms) at each measurement count.

:CONFigure:CELLular:LTE:FUNDamental:TEMPlate:SET

Power Template measurement Enable and Count

Function

Enables the Power Template Measurement and sets the measurement count, and queries the settings. When setting Measurement Item to PWRTEMP, it is turned On automatically.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:TEMPlate:SET <on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:TEMPlate:SET?
```

Response

```
<on_off>,<count>
```

Parameters

<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
<count>	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable Power template measurement and set the measurement count to 100:

```
:CONF:CELL:LTE:FUND:TEMP:SET ON,100
:CONF:CELL:LTE:FUND:TEMP:SET?
> ON,100
```

:CONFigure:CELLular:LTE:FUNDamental:TEMPlate:WDRange

Power Template - Wide Dynamic Range

Function

Enables the wide dynamic range function for the Power Template measurement, and queries the settings.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:TEMPlate:WDRange <on_off>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:TEMPlate:WDRange?
```

Response

```
<on_off>
```

Parameters

<on_off>	Enables/disables the wide dynamic range function
ON	Enables the wide dynamic range function
OFF	Disables the wide dynamic range function
Default	ON

Example of Use

To enable the wide dynamic range function:

```
:CONF:CELL:LTE:FUND:TEMP:WDR ON
:CONF:CELL:LTE:FUND:TEMP:WDR?
> ON
```

:CONFigure:CELLular:LTE:FUNDamental:TENVironment

Test Environment

Function

Sets or queries the test environment.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:TENVironment <env>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:TENVironment?
```

Response

```
<env>
```

Parameters

<env>	Test Environment
NORMAL	Normal
EXTREME	Extreme
Default	NORMAL

Details

This is a parameter that determines the threshold line for Spectrum Flatness measurement. The test environment is defined in 3GPP TS36.521-1. The following values depend on the test environment settings.

・When the test environment is NORMAL

Border of Range1/Range2	3 MHz
RP1 limit level	5.4 dB
RP2 limit level	9.4 dB
RP12 limit level	6.4 dB
RP21 limit level	8.4 dB

・When the test environment is EXTREME

Border of Range1/Range2	5 MHz
RP1 limit level	5.4 dB
RP2 limit level	13.4 dB
RP12 limit level	7.4 dB
RP21 limit level	11.4 dB

Example of Use

To set the test environment to EXTREME:

```
:CONF:CELL:LTE:FUND:TENV EXTREME
:CONF:CELL:LTE:FUND:TENV?
> EXTREME
```

:CONFigure:CELLular:LTE:FUNDamental:TMASk:GENeral:TOL

Power Template - ON power tolerance Limit

Function

Sets the Pass/Fail evaluation limits for On Power tolerance, and queries the settings.

Command

```
:CONFigure:CELLular:LTE:FUNDamental:TMASk:GENeral:TOL <limit>
```

Query

```
:CONFigure:CELLular:LTE:FUNDamental:TMASk:GENeral:TOL?
```

Response

<limit>

Unit	dB
Resolution	0.1 dB

Parameters

<limit>	Evaluation limits
Range	0.0 to 99.9 dBm
Resolution	0.1 dB
Default	7.5 dB

Example of Use

To set the Pass/Fail evaluation limits to 10.0 dBm:

```
:CONF:CELL:LTE:FUND:TMASk:GEN:TOL 10.0
:CONF:CELL:LTE:FUND:TMASk:GEN:TOL?
> 10.0
```

:CONFigure:CELLular:LTE:GHOPping

Group Hopping

Function

Enables and queries the Group hopping.

Command

```
:CONFigure:CELLular:LTE:GHOPping <on_off>
```

Query

```
:CONFigure:CELLular:LTE:GHOPping?
```

Response

```
<on_off>
```

Parameter

<on_off>	Enables/disables Group hopping
ON	Enables Group hopping
OFF	Disables Group hopping
Default	ON

Example of Use

To enable Group hopping:

```
:CONF:CELL:LTE:GHOP ON
:CONF:CELL:LTE:GHOP?
> ON
```

:CONFigure:CELLular:LTE:MCARrier

Measurement Carrier

Function

Sets and queries the Component Carrier for measurement at Inter-band UL CA.

Command

```
:CONFigure:CELLular:LTE:MCARrier <carrier>
```

Query

```
:CONFigure:CELLular:LTE:MCARrier?
```

Response

```
<carrier>
```

Parameter

<carrier>	Component Carrier for measurement
PCC	PCC
SCC1	SCC-1
Default	PCC

Example of Use

To set the Component Carrier for measurement to PCC:

```
:CONF:CELL:LTE:MCAR PCC
:CONF:CELL:LTE:MCAR?
>PCC
```

:CONFigure:CELLular:LTE:MODulation:MSCHeme

UL RMC Modulation

Function

Sets or queries the Uplink RMC modulation method.

Command

```
:CONFigure:CELLular:LTE:MODulation:MSCHeme <ul_rmc_mod>
```

Query

```
:CONFigure:CELLular:LTE:MODulation:MSCHeme?
```

Response

```
<ul_rmc_mod>
```

Parameter

<ul_rmc_mod>	Uplink RMC modulation mode
QPSK	QPSK mode
16QAM	16QAM mode
64QAM	64QAM mode
256QAM	256QAM mode
Default	QPSK

Example of Use

To set the Uplink RMC modulation method to 16QAM:

```
:CONF:CELL:LTE:MOD:MSCH 16QAM
:CONF:CELL:LTE:MOD:MSCH?
> 16QAM
```

:CONFigure:CELLular:LTE:MODulation:MSCHeme:SCC1

UL RMC Modulation for SCC-1

Function

Sets and queries the modulation method used for RMC of the uplink signal for SCC-1.

Command

```
:CONFigure:CELLular:LTE:MODulation:MSCHeme:SCC1 <ul_rmc_mod>
```

Query

```
:CONFigure:CELLular:LTE:MODulation:MSCHeme:SCC1?
```

Response

```
<ul_rmc_mod>
```

Parameter

<ul_rmc_mod>	Uplink RMC modulation mode for SCC-1
QPSK	QPSK mode
16QAM	16QAM mode
64QAM	64QAM mode
256QAM	256QAM mode
Default	QPSK

Example of Use

To set the Uplink RMC modulation method for SCC-1 to 16QAM:

```
:CONF:CELL:LTE:MOD:MSCH:SCC1 16QAM
:CONF:CELL:LTE:MOD:MSCH:SCC1?
> 16QAM
```

:CONFigure:CELLular:LTE:RBALlocation:NRB

UL RMC Number of RB

Function

Sets or queries the number of assigned RBs (Resource Blocks) at Uplink RMC.

Command

```
:CONFigure:CELLular:LTE:RBALlocation:NRB <ul_rmc_rb>
```

Query

```
:CONFigure:CELLular:LTE:RBALlocation:NRB?
```

Response

```
<ul_rmc_rb>
```

Parameter

<ul_rmc_rb>	Number of RBs		
Range	Number defined by equation of (2^X) × (3^Y) × (5^Z) and falling within following range where (X, Y, Z ≥ 0, integer)		
	0 to 6	When channel bandwidth is 1.4 MHz	
	0 to 15	When channel bandwidth is 3 MHz	
	0 to 25	When channel bandwidth is 5 MHz	
	0 to 50	When channel bandwidth is 10 MHz	
	0 to 75	When channel bandwidth is 15 MHz	
	0 to 100	When channel bandwidth is 20 MHz	
Resolution	1		
Default	25		

Details

When the In-band Emission measurement at Contiguous UL CA is performed, set 0 to the number of RBs for CC where the signal is not output.
Even when Modulation Analysis is set to ON, the measurement is not performed under the following conditions.
- Contiguous UL CA
- At Carrier Frequency is not specified at Carrier Leakage Frequency.
- The number of RBs is set to 0.

Example of Use

To set the number of assigned RBs at Uplink RMC to 6

```
:CONF:CELL:LTE:RBAL:NRB 6
:CONF:CELL:LTE:RBAL:NRB?
> 6
```

:CONFigure:CELLular:LTE:RBALlocation:NRB:SCC1

UL RMC Number of RB for SCC-1

Function

Sets or queries the number of assigned RBs (Resource Blocks) at Uplink RMC for SCC-1.

Command

```
:CONFigure:CELLular:LTE:RBALlocation:NRB:SCC1 <ul_rmc_rb>
```

Query

```
:CONFigure:CELLular:LTE:RBALlocation:NRB:SCC1?
```

Response

```
<ul_rmc_rb>
```

Parameter

<ul_rmc_rb>	Number of RBs for SCC-1	
Range	Number defined by equation of (2^X) × (3^Y) × (5^Z) and falling within following range where (X, Y, Z ≥ 0, integer)	
	0 to 6	When channel bandwidth is 1.4 MHz
	0 to 15	When channel bandwidth is 3 MHz
	0 to 25	When channel bandwidth is 5 MHz
	0 to 50	When channel bandwidth is 10 MHz
	0 to 75	When channel bandwidth is 15 MHz
	0 to 100	When channel bandwidth is 20 MHz
Resolution	1	
Default	25	

Details

When the In-band Emission measurement at Contiguous UL CA is performed, set 0 to the number of RBs for CC where the signal is not output.
Even when Modulation Analysis is set to ON, the measurement is not performed under the following conditions.
- Contiguous UL CA
- At Carrier Frequency is not specified at Carrier Leakage Frequency.
- The number of RBs is set to 0.

Example of Use

To set the number of assigned RBs at Uplink RMC to 6

```
:CONF:CELL:LTE:RBAL:NRB:SCC1 6
:CONF:CELL:LTE:RBAL:NRB:SCC1?
> 6
```

:CONFigure:CELLular:LTE:RBALlocation:ORB

UL RMC Starting RB

Function

Sets or queries the RB start number for Uplink RMC.

Command

```
:CONFigure:CELLular:LTE:RBALlocation:ORB <ulrb>
```

Query

```
:CONFigure:CELLular:LTE:RBALlocation:ORB?
```

Response

```
<ulrb>
```

Parameter

<ulrb>	RB start number	
Range	0 to (RBmax – RBn)	
	RBmax = 6	When channel bandwidth is 1.4 MHz
	RBmax = 15	When channel bandwidth is 3 MHz
	RBmax = 25	When channel bandwidth is 5 MHz
	RBmax = 50	When channel bandwidth is 10 MHz
	RBmax = 75	When channel bandwidth is 15 MHz
	RBmax = 100	When channel bandwidth is 20 MHz
	RBn is set using the :CONFigure:CELLular:LTE:RBALlocation:NRB command.	
Resolution	1	
Default	0	

Details

The RB start number for the Uplink signal is reset to 0 when the channel bandwidth is updated.
Also when the RB start number for the Uplink signal is updated, the RB start number for the Uplink RMC is changed to 0.

Example of Use

To set the RB start number for Uplink RMC to 6:

```
:CONF:CELL:LTE:RBAL:ORB 6
:CONF:CELL:LTE:RBAL:ORB?
> 6
```

:CONFigure:CELLular:LTE:RBALlocation:ORB:SCC1

UL RMC Starting RB for SCC-1

Function

Sets or queries the RB start number for Uplink RMC for SCC-1.

Command

```
:CONFigure:CELLular:LTE:RBALlocation:ORB:SCC1 <ulrb>
```

Query

```
:CONFigure:CELLular:LTE:RBALlocation:ORB:SCC1?
```

Response

```
<ulrb>
```

Parameter

<ulrb>	RB start number for SCC-1	
Range	0 to (RBmax – RBn)	
	RBmax = 6	When channel bandwidth is 1.4 MHz
	RBmax = 15	When channel bandwidth is 3 MHz
	RBmax = 25	When channel bandwidth is 5 MHz
	RBmax = 50	When channel bandwidth is 10 MHz
	RBmax = 75	When channel bandwidth is 15 MHz
	RBmax = 100	When channel bandwidth is 20 MHz
	RBn is set using the :CONFigure:CELLular:LTE:RBALlocation:NRB:SCC1 command.	
Resolution	1	
Default	0	

Details

When the channel bandwidth for SCC-1 is updated, the start RB number for SCC-1 is reset to 0. Also when the RB number setting value at Uplink RMC is updated, the start RB number is reset to 0.

Example of Use

To set the RB start number for Uplink RMC to 6:

```
:CONF:CELL:LTE:RBAL:ORB:SCC1 6
:CONF:CELL:LTE:RBAL:ORB:SCC1?
> 6
```

:CONFigure:CELLular:LTE:RBCQi

nRB-CQI

Function

Sets or queries nRB-CQI setting.

Command

```
:CONFigure:CELLular:LTE:RBCQi <value>
```

Query

```
:CONFigure:CELLular:LTE:RBCQi?
```

Response

```
<value>
```

Parameter

<value>		nRB-CQI
	Range	0 to 98
	Resolution	1
	Default	2

Details

The RB number for the send Uplink PUCCH signal is set.

Example of Use

To set nRB-CQI to 3

```
:CONF:CELL:LTE:RBCQ 3
:CONF:CELL:LTE:RBCQ?
> 3
```

:CONFigure:CELLular:LTE:ULDL

Uplink Downlink Configuration

Function

Sets or queries the Uplink/Downlink signal configuration of TDD.

Command

```
:CONFigure:CELLular:LTE:ULDL <conf>
```

Query

```
:CONFigure:CELLular:LTE:ULDL?
```

Response

```
<conf>
```

Parameter

<conf>	Uplink Downlink Signal Configuration
Range	0 to 6
Resolution	1
Default	1

Example of Use

To set the Uplink/Downlink signal configuration to 1:

```
:CONF:CELL:LTE:ULDL 1
:CONF:CELL:LTE:ULDL?
> 1
```

:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel

Downlink Channel

Function

Sets or queries the EARFCN (E-UTRA Absolute Radio Frequency Channel Number) Downlink Channel.

Command

```
:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel <dl_ch>
```

Query

```
:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel?
```

Response

```
<dl_ch>
```

Parameter

<dl_ch>	Downlink Channel
Range	0 to 262143
Resolution	1
Default	300

Details

When the Downlink Channel parameter is updated, the related Uplink Channel parameter and Downlink Frequency and frame structure are changed accordingly.
For the relationship between the parameter and frequency settings of channels refer to Table 2.1.6-3 “Relationship between Uplink Channel Number and Downlink Channel Number” and to Table 2.1.6-4 “E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation”.

Example of Use

To set the Downlink Channel to 1100:

```
:CONF:CELL:MEAS:RFS:DLCH 1100
:CONF:CELL:MEAS:RFS:DLCH?
> 1100
```

:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel:SCC1

Downlink Channel for SCC-1

Function

Sets or queries the Downlink Channel for SCC-1.

Command

```
:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel:SCC1 <dl_ch>
```

Query

```
:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel:SCC1?
```

Response

```
<dl_ch>
```

Parameter

<dl_ch>		Downlink Channel for SCC-1
	Range	0 to 262143
	Resolution	1
	Default	300

Details

When the Downlink Channel is updated, the related Uplink Channel, Downlink Frequency, Uplink Frequency and Frame structure parameter are changed accordingly.
For the relationship between the parameter and frequency settings of channels refer to Table 2.1.6-3 “Relationship between Uplink Channel Number and Downlink Channel Number” and to Table 2.1.6-4 “E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation”.

Example of Use

To set the Downlink Channel for SCC-1 to 1100:

```
:CONF:CELL:MEAS:RFS:DLCH:SCC1 1100
:CONF:CELL:MEAS:RFS:DLCH:SCC1?
> 1100
```

:CONFigure:CELLular:MEASurement:RFSettings:FREQuency

Uplink Frequency

Function

Sets or queries the Uplink frequency.

Command

```
:CONFigure:CELLular:MEASurement:RFSettings:FREQuency.
<ul_freq>[,<ul_freq_scc1>]
```

Query

```
:CONFigure:CELLular:MEASurement:RFSettings:FREQuency? [<ALL>]
```

Response

<ul_fleq>,<ul_freq_scc1>

Unit	Hz
Resolution	1 Hz

Parameter

<ul_freq>	Uplink frequency for PCC
<freq_scc1>	Uplink frequency for SCC-1
Range	400 000 000 to 3800 000 000 Hz (MU887000A/01A) 400 000 000 to 6000 000 000 Hz (With MU887000A/01A-001) 400 000 000 to 6000 000 000 Hz (MU887002A)
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	1950 000 000 Hz (<ul_freq>) 1969 800 000 Hz (<freq_scc1>)

Details

This sets the Tx frequency for the mobile station.
Updating the setting of the Uplink frequency for PCC does not affect the setting of the Uplink Channel for PCC.
Updating the setting of the Uplink frequency for SCC-1 does not affect the setting of the Uplink Channel for SCC-1.
When the query argument <ALL> is omitted, the response is <ul_freq> only.

Example of Use

To set the Uplink frequency for PCC to 1950 MHz and the Uplink frequency for SCC-1 to 1969.8 MHz:

```
:CONF:CELL:MEAS:RFS:FREQ 1950MHZ,1969.8MHZ
:CONF:CELL:MEAS:RFS:FREQ? ALL
>1950000000,1969800000
```

:CONFigure:CELLular:MEASurement:RFSettings:FREQuency:SCC1

Uplink Frequency for SCC-1

Function

Sets or queries the Uplink frequency for SCC-1.

Command

```
:CONFigure:CELLular:MEASurement:RFSettings:FREQuency:SCC1 <ul_freq>
```

Query

```
:CONFigure:CELLular:MEASurement:RFSettings:FREQuency:SCC1?
```

Response

<ul_fleq>

Unit	Hz
Resolution	1 Hz

Parameter

<ul_freq>	Uplink frequency for SCC-1
Range	400 000 000 to 3800 000 000 Hz (MU887000A/01A) 400 000 000 to 6000 000 000 Hz (With MU887000A/01A-001) 400 000 000 to 6000 000 000 Hz (MU887002A)
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	1969 800 000 Hz

Details

This sets the Tx frequency for the mobile station.
Updating the setting of the Uplink frequency for SCC-1 does not affect the setting of the Uplink Channel for SCC-1.

Example of Use

To set the Uplink frequency for SCC-1 to 1969.8 MHz:

```
:CONF:CELL:MEAS:RFS:FREQ:SCC1 1969.8MHZ
:CONF:CELL:MEAS:RFS:FREQ:SCC1?
>1969800000
```

:CONFigure:CELLular:MEASurement:RFSettings:LEVel

Input Level

Function

Sets or queries the input level of the input test port.

Command

```
:CONFigure:CELLular:MEASurement:RFSettings:LEVel <level>[,<level_scc1>]
```

Query

```
:CONFigure:CELLular:MEASurement:RFSettings:LEVel? [<ALL>]
```

Response

```
<level>,<level_scc1>
```

Unit	dBm
Resolution	0.1 dB

Parameter

<level>	Input level for PCC
<level_scc1>	Input level for SCC-1
Range	
MU887000A	–65.0 to +35.0 dBm (Port 1/Port 2)
	–65.0 to +25.0 dBm (Port 3/Port 4)
MU887001A	–65.0 to +35.0 dBm (Port 1 to Port 4)
MU887002A	–65.0 to +35.0 dBm (Port 1 to Port 12)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–1.0 dBm

Details

For MU887000A, the setting range varies with the input test port setting.
If cable loss correction is set to ON, the setting range of the input level is the range of values with added cable loss.
If the cable loss is 5 dB, the MU887000A Port 1/Port 2 setting range is –60.0 to +40.0 dBm.
When the query argument <ALL> is omitted, the response is <level> only.

Example of Use

To set the input level for PCC to –10.0 dBm and the input level for SCC-1 to –15.0 dBm:

```
:CONF:CELL:MEAS:RFS:LEV -10.0,-15.0
:CONF:CELL:MEAS:RFS:LEV? ALL
>-10.0,-15.0
```

Related Commands

[:ROUTe]:EXTLoss:TABLe:SWITch
:CALCulate:EXTLoss:TABLe:SETTing
:CALCulate:EXTLoss:TABLe:VALue
For details of the commands, refer to Chapter 5 “SCPI Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

:CONFigure:CELLular:MEASurement:RFSettings:LEVel:SCC1

Input Level for SCC-1

Function

Sets or queries the input level of the input test port for SCC-1.

Command

```
:CONFigure:CELLular:MEASurement:RFSettings:LEVel:SCC1 <level>
```

Query

```
:CONFigure:CELLular:MEASurement:RFSettings:LEVel:SCC1?
```

Response

<level>

Unit	dBm
Resolution	0.1 dB

Parameter

<level>	Input level for SCC-1
Range	
MU887000A	–65.0 to +35.0 dBm (Port 1/Port 2)
	–65.0 to +25.0 dBm (Port 3/Port 4)
MU887001A	–65.0 to +35.0 dBm (Port 1 to Port 4)
MU887002A	–65.0 to +35.0 dBm (Port 1 to Port 12)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–1.0 dBm

Details

For MU887000A, the setting range varies with the input test port setting.
If cable loss correction is set to ON, the setting range of the input level is the range of values with added cable loss.
If the cable loss is 5 dB, the MU887000A Port 1/Port 2 setting range is –60.0 to +40.0 dBm.

Example of Use

To set the input level for SCC-1 to –10.0 dBm.

```
:CONF:CELL:MEAS:RFS:LEV:SCC1 -10.0
:CONF:CELL:MEAS:RFS:LEV:SCC1?
>-10.0
```

Related Commands

[:ROUTe]:EXTLoss:TABLe:SWITch
:CALCulate:EXTLoss:TABLe:SETTing
:CALCulate:EXTLoss:TABLe:VALue
For details of the commands, refer to Chapter 5 “SCPI Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel

Uplink Channel

Function

Sets or queries the Uplink Channel.

Command

```
:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel
<ul_ch>[,<ul_ch_scc1>]
```

Query

```
:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel? [<ALL>]
```

Response

```
<ul_ch>,<ul_ch_scc1>
```

Parameter

<ul_ch>	Uplink Channel for PCC
<ul_ch_scc1>	Uplink Channel for SCC-1
Range	0 to 262143
Resolution	1
Default	18300

Details

Changing the setting of the Uplink Channel for PCC changes the settings of the Downlink Channel, Uplink frequency for PCC, Downlink frequency, and frame structure.

Changing the setting of the Uplink Channel for SCC-1 changes the Uplink frequency for SCC-1.

When the query argument <ALL> is omitted, the response is <ul_ch> only.

For the relationship between the parameter and frequency settings of channels refer to Table 2.1.6-3 “Relationship between Uplink Channel Number and Downlink Channel Number” and to Table 2.1.6-4 “E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation”.

Example of Use

To set the Uplink Channel for PCC to 39750 and the Uplink Channel for SCC-1 to 39948:

```
:CONF:CELL:MEAS:RFS:ULCH 39750,39948
:CONF:CELL:MEAS:RFS:ULCH? ALL
> 39750,39948
```

:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel:SCC1

Uplink Channel for SCC-1

Function

Sets or queries the Uplink Channel for SCC-1.

Command

```
:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel:SCC1 <ul_ch>
```

Query

```
:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel:SCC1?
```

Response

```
<ul_ch>
```

Parameter

<ul_ch>		Uplink Channel for SCC-1
	Range	0 to 262143
	Resolution	1
	Default	18300

Details

Changing the setting of the Uplink Channel for SCC-1 changes the Uplink frequency for SCC-1.
For the relationship between the parameter and frequency settings of channels refer to Table 2.1.6-3 “Relationship between Uplink Channel Number and Downlink Channel Number” and to Table 2.1.6-4 “E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation”.

Example of Use

To set the Uplink Channel for SCC-1 to 39948:

```
:CONF:CELL:MEAS:RFS:ULCH:SCC1 39948
:CONF:CELL:MEAS:RFS:ULCH:SCC1?
> 39948
```

:FETCh:CELLular:LTE:FUNDamental:ACLR?

ACLR Result

Function

Queries the result of Adjacent Channel Leakage Power Ratio measurement.

Query

```
:FETCh:CELLular:LTE:FUNDamental:ACLR? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg0>,<avg1>,<avg2>,<avg3>,<avg4>,<avg5>,<max0>,<max1>,<max2>,<max3>,<
max4>,<max5>,<min0>,<min1>,<min2>,<min3>,<min4>,<min5>
```

<avg>		Adjacent Channel Leakage Power Ratio (Average)
<max>		Adjacent Channel Leakage Power Ratio (Maximum)
<min>		Adjacent Channel Leakage Power Ratio (Minimum)
	Unit	dB
	Resolution	0.01 dB

When <mode> ≠ TTL,

```
<aclr0>,<aclr1>,<aclr2>,<aclr3>,<aclr4>,<aclr5>
```

<aclr>		Measurement result of Adjacent Channel Leakage Power Ratio corresponding to storage mode
	Unit	dB
	Resolution	0.01 dB

The responses are sent in the following order.
E-UTRA ACLR LOW,
E-UTRA ACLR UP,
UTRA ACLR2 LOW,
UTRA ACLR1 LOW,
UTRA ACLR1 UP,
UTRA ACLR2 UP

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.5.2-1 Measurement Items of Adjacent Channel Leakage Power Ratio” for details.
PCC	PCC

SCC1	SCC-1
Omitted	Total

Details

The measurement bandwidth of the target adjacent channel varies with the channel bandwidth setting.
Refer to Table 2.5.1-1 “Adjacent Channel Measurement Bandwidth (MHz)” for details.

Example of Use

To the query average of ACLR measurement result:

```
:FETC:CELL:LTE:FUND:ACLR? AVG
> 3.00,3.01,3.02,3.03,3.04,3.05
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:CARLeakage?

Carrier Leakage Result

Function

Queries the Carrier Leak measurement result at Modulation Analysis.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:CARLeakage? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg> Measurement result (Average)
<max> Measurement result (Maximum)
<min> Measurement result (Minimum)
Unit dBc
Resolution 0.01 dB

When <mode> ≠ TTL,

```
<cleakage>
```

<cleakage> Measurement result corresponding to storage mode
Unit dBc
Resolution 0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Carrier Leakage measurement result:

```
:FETC:CELL:LTE:FUND:MOD:CARL? AVG
> 1.05
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:CFRequency?

Carrier Frequency Result

Function

Queries the result of Carrier Frequency measurement in Modulation Analysis.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:CFRequency? [<cc>]
```

Response

```
<freq>
```

<freq>	Carrier frequency
Unit	Hz
Resolution	1 Hz

Parameter

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the result of Carrier Frequency measurement:

```
:FETC:CELL:LTE:FUND:MOD:CFR?
> 1951000000
```

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

Spectrum Flatness Measured Item

Function

Queries whether each spectrum flatness measurement items is measured or not.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:ITEM? [<cc>]
```

Response

```
<flag>
```

<flag> Measured/Not measured flag (0 to 3)

Returns the sum of the following measurement items.

0 Not measured

1 ≥ 3 MHz area (When Test Environment is Normal)
≥ 5 MHz area (When Test Environment is Extreme)

2 < 3 MHz area (When Test Environment is Normal)
< 5 MHz area (When Test Environment is Extreme)

Parameter

<cc> Component Carrier

Used at UL CA and omitted at non CA.

Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.

PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query whether each spectrum flatness measurement items is measured or not.

```
:FETC:CELL:LTE:FUND:MOD:ESFL:ITEM?
> 2
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:JUDGement?

Spectrum Flatness Judgement

Function

Queries the judgement of Spectrum Flatness measurement result.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:JUDGement? [<cc>]
```

Response

<judgement>

<judgement>	Judgement
PASS	Pass
FAIL	Fail
–	Not measured

Parameter

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the judgement of Spectrum Flatness measurement result:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:JUDG?
> PASS
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1?

Spectrum Flatness (≥3 MHz) Result

Function

Queries the worst value in Spectrum Flatness measurement result in Range 1.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1? [<cc>]
```

Response

<worst>

<worst>	Measurement result
Unit	dB
Resolution	0.01 dB

Parameter

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The worst value should be either the maximum or minimum of the Flatness measurement results in Range 1, whichever is the larger absolute value.

Example of Use

To query the worst value in Spectrum Flatness measurement result in Range 1:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:R1?
```

> 0.04

:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1M?

Spectrum Flatness (≥3 MHz (R1 –)) Result

Function

Queries the minimum value in Spectrum Flatness measurement result in Range 1.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1M? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<sflatness>
```

<sflatness>	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of minimum value in Spectrum Flatness measurement result in Range 1:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:R1M? AVG
> 0.04
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1P?

Spectrum Flatness (≥3 MHz (R1 +)) Result

Function

Queries the maximum value in Spectrum Flatness measurement result in Range 1.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1P? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<sflatness>
```

<sflatness>	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of maximum value in Spectrum Flatness measurement result in Range 1:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:R1P? AVG
> 0.04
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2?

Spectrum Flatness (<3 MHz) Result

Function

Queries the worst value in Spectrum Flatness measurement result in Range 2.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2? [<cc>]
```

Response

```
<worst>
```

<worst>	Measurement result
Unit	dB
Resolution	0.01 dB

Parameter

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The worst value should be either the maximum or minimum of the Flatness measurement results in Range 2, whichever is the larger absolute value.

Example of Use

To query the worst value in Spectrum Flatness measurement result in Range 2:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:R2?
> 0.04
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2M?

Spectrum Flatness (<3 MHz (R2 –)) Result

Function

Queries the minimum value in Spectrum Flatness measurement result in Range 2.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2M? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<sflatness>
```

<sflatness>	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of the minimum value in Spectrum Flatness measurement result in Range 2:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:R2M? AVG
> 0.04
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2P?

Spectrum Flatness (<3 MHz (R2 +)) Result

Function

Queries the maximum value in the result of Spectrum Flatness measurement in Range 2.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2P? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<sflatness>
```

<sflatness>	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of the maximum value in Spectrum Flatness measurement result in Range 2:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:R2P? AVG
> 0.04
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP1?

Spectrum Flatness (≥3 MHz (RP1)) Result

Function

Queries the ripple value in Spectrum Flatness measurement result in Range 1.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP1? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<sflatness>
```

<sflatness>	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of ripple value in Spectrum Flatness measurement result in Range 1:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:RP1? AVG
> 0.04
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP12?

Spectrum Flatness (RP12) Result

Function

Queries the difference between maximum value in Range 1 and minimum value in Range 2 of Spectrum Flatness measurement result.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP12? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<sflatness>
```

<sflatness>	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of difference between maximum value in Range 1 and minimum value in Range 2:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:RP12? AVG
> 0.04
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP2?

Spectrum Flatness (<3 MHz (RP2)) Result

Function

Queries the ripple value in Spectrum Flatness measurement result in Range 2.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP2? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<sflatness>
```

<sflatness>	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of ripple value in Spectrum Flatness measurement result in Range 2:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:RP2? AVG
> 0.04
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP21?

Spectrum Flatness (RP21) Result

Function

Queries the difference between maximum value in Range 2 and minimum value in Range 1 of Spectrum Flatness measurement result.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP21? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<sflatness>
```

<sflatness>	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of difference between maximum value in Range 2 and minimum value in Range 12:

```
:FETC:CELL:LTE:FUND:MOD:ESFL:RP21? AVG
> 0.04
```

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

EVM Result

Function

Queries the EVM measurement result of Modulation Analysis.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:EVM? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	%
Resolution	0.01%

When <mode> ≠ TTL,

```
<evm>
```

<evm>	Measurement result in specified Storage mode
Unit	%
Resolution	0.01%

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of EVM measurement result:

```
:FETC:CELL:LTE:FUND:MOD:EVM? AVG
> 1.50
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor?

Carrier Frequency Error Result

Function

Queries the Frequency Error measurement result.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg_ppm>,<avg_Hz>,<max_ppm>,<max_Hz>,<min_ppm>,<min_Hz>
```

<avg_ppm>	Measurement result in ppm (Average)
<max_ppm>	Measurement result in ppm (Maximum)
<min_ppm>	Measurement result in ppm (Minimum)
Unit	ppm
Resolution	0.01 ppm
<avg_Hz>	Measurement result in Hz (Average)
<max_Hz>	Measurement result in Hz (Maximum)
<min_Hz>	Measurement result in Hz (Minimum)
Unit	ppm
Resolution	0.01 ppm

When <mode> ≠ TTL,

```
<freq_ppm>,<freq_Hz>
```

<freq_ppm>	Measurement result in ppm in specified Storage mode
Unit	ppm
Resolution	0.01 ppm
<freq_Hz>	Measurement result in Hz in specified Storage mode
Unit	Hz
Resolution	0.1 Hz

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Frequency Error measurement result:

```
:FETC:CELL:LTE:FUND:MOD:FERR? AVG
> 0.03,60.0
```

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

Worst Carrier Frequency Error Result

Function

Queries the worst value in Frequency Error measurement results.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor:WORSt? [<cc>]
```

Response

<freq_ppm>,<freq_Hz>

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

Parameters

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The worst value should be either the maximum or minimum of the Frequency Error measurement results, whichever is the larger absolute value.

Example of Use

To query the worst value in Frequency Error measurement results:

```
:FETC:CELL:LTE:FUND:MOD:FERR:WORS?
> 0.03,60.0
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:CARLeakage?

In-Band Emissions (Carrier Leakage) Result

Function

Queries in-band emissions (Carrier Leakage) measurement result of Modulation Analysis.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:CARLeakage?
<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dBc
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<ibe>
```

<ibe>	Measurement result in specified Storage mode
Unit	dBc
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of in-band emissions (Carrier Leakage) measurement result:

```
:FETC:CELL:LTE:FUND:MOD:IEM:CARL? AVG
> 0.04
```

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

In-Band Emissions (General) Result

Function

Queries in-band emissions (General) measurement result of Modulation Analysis.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:GENeral?
<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<ibe>
```

<ibe>	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of in-band emissions (General) measurement result:

```
:FETC:CELL:LTE:FUND:MOD:IEM:GEN? AVG
> 0.04
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:IQIMage?

In-Band Emissions (IQ Image) Result

Function

Queries in-band emissions (IQ Image) measurement result of Modulation Analysis.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:IQIMage?
<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<ibe>
```

<ibe>	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of in-band emissions (IQ Image) measurement result:

```
:FETC:CELL:LTE:FUND:MOD:IEM:IQIM? AVG
> 0.04
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:ITEM?

In-Band Emissions Measured Item

Function

Queries whether each in-band emission measurement item for modulation analysis is measured or not.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:ITEM? [<cc>]
```

Response

```
<flag>
```

<flag> Measured/Not measured flag (0 to 7)
Returns the sum of the following measurement items.

0	Not measured
1	Measure General
2	Measure IQ Image
4	Measure Carrier Leakage

Parameter

<cc> Component Carrier
Used at UL CA and omitted at non CA.
Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.

PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query whether each in-band emission measurement item for modulation analysis is measured or not.:

```
:FETC:CELL:LTE:FUND:MOD:IEM:ITEM?
> 4
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:JUDGement?

In-Band Emissions Judgement

Function

Queries the judgement on the in-band emission measurement result for modulation analysis.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:JUDGement? [<cc>]
```

Response

<judgement>

<judgement>	Judgement result
PASS	Pass
FAIL	Fail
–	Not measured

Parameter

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the judgement on the in-band emission measurement result for modulation analysis.

```
:FETC:CELL:LTE:FUND:MOD:IEM:JUDG?
> PASS
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:CARLeakage?

In-Band Emissions limit (Carrier Leakage)

Function

Queries the limit of in-band emission measurement (Carrier Leakage) for modulation analysis.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:CARLeakage?
[<cc>]
```

Response

```
<level>
```

<level>	Limit
Unit	dBc
Resolution	0.01 dB

Parameter

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the limit of in-band emission measurement result (Carrier Leakage) for modulation analysis.

```
:FETC:CELL:LTE:FUND:MOD:IEM:LIM:CARL?
> 1.05
```

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

In-Band Emissions limit (General)

Function

Queries the limit of the in-band emission measurement result (General) for modulation analysis.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:GENeral?
[<cc>]
```

Response

<level>

<level>	Limit
Unit	dB
Resolution	0.01 dB

Parameter

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the limit of the in-band emission measurement result (General) for modulation analysis.

```
:FETC:CELL:LTE:FUND:MOD:IEM:LIM:GEN?
> 2.05
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:IQIMage?

In-Band Emissions limit (IQ Image)

Function

Queries the limit of in-band emission measurement (IQ Image) for modulation analysis.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:LIMit:IQIMage?
[<cc>]
```

Response

```
<level>
```

<level>	Limit
Unit	dB
Resolution	0.01 dB

Parameter

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the limit of in-band emission measurement result (IQ Image) for modulation analysis.

```
:FETC:CELL:LTE:FUND:MOD:IEM:LIM:IQIM
> 1.05
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:MARGin?

In-Band Emissions Margin

Function

Queries the worst margin in the entire bandwidth for in-band emission measurement.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IEMissions:MARGin? [<cc>]
```

Response

<margin>

<margin>	Worst margin in the entire bandwidth
Unit	dB
Resolution	0.01 dB

Parameter

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

Queries the worst margin in the entire bandwidth of in-band emission measurement for modulation analysis.

```
:FETC:CELL:LTE:FUND:MOD:IEM:MARG?
> 1.05
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:IQIMbalance?

IQ Imbalance Result

Function

Queries the IQ Imbalance measurement result of Modulation Analysis.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:IQIMbalance? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Average
<max>	Maximum
<min>	Minimum
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<iqimb>
```

<iqimb>	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

IQ Imbalance can be measured when the number of RBs is set to the maximum value for the channel bandwidth shown in Table 2.1.6-2 Number of Allocatable Resource Blocks in Channel Bandwidth.

If the number of RBs is not the maximum allocatable value in the channel bandwidth, the response is 999.99.

Example of Use

To query the average of IQ Imbalance measurement result:

```
:FETC:CELL:LTE:FUND:MOD:IQIM? AVG
> 0.04
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:MERRor?

Magnitude Error Result

Function

Queries the Magnitude Error measurement result of Modulation Analysis.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:MERRor? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	%
Resolution	0.01%

When <mode> ≠ TTL,

```
<merr>
```

<merr>	Measurement result in specified Storage mode
Unit	%
Resolution	0.01%

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Magnitude Error measurement result:

```
:FETC:CELL:LTE:FUND:MOD:MERR? AVG
> 1.05
```

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

Peak EVM Result

Function

Queries the EVM Peak measurement result.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:PEVM? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	%
Resolution	0.01%

When <mode> ≠ TTL,

```
<pevm>
```

<pevm>	Measurement result in specified Storage mode
Unit	%
Resolution	0.01%

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of EVM Peak measurement result:

```
:FETC:CELL:LTE:FUND:MOD:PEVM? AVG
> 1.75
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:PHERror?

Phase Error Result

Function

Queries the Phase Error measurement result of Modulation Analysis.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:PHERror? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	degree
Resolution	0.01 degree

When <mode> ≠ TTL,

```
<perr>
```

<perr>	Measurement result in specified Storage mode
Unit	degree
Resolution	0.01 degree

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Phase Error measurement result:

```
:FETC:CELL:LTE:FUND:MOD:PHER? AVG
> 1.55
```

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

Rho Result

Function

Queries the Signal Quality measurement (Rho) result of Modulation Analysis.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:RHO? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Resolution	0.00001

When <mode> ≠ TTL,

```
<rho>
```

<rho>	Measurement result in specified Storage mode
Resolution	0.00001

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Signal Quality measurement (Rho) result:

```
:FETC:CELL:LTE:FUND:MOD:RHO? AVG
> 0.04
```

:FETCh:CELLular:LTE:FUNDamental:MODulation:RSEVm?

Reference Signal EVM Result

Function

Queries the EVM measurement result of Reference Signal.

Query

```
:FETCh:CELLular:LTE:FUNDamental:MODulation:RSEVm? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	%
Resolution	0.01%

When <mode> ≠ TTL,

```
<rsevm>
```

<rsevm>	Measurement result in specified Storage mode
Unit	%
Resolution	0.01%

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The EVM measurement of the Reference Signal is supported when PUSCH is assigned using the :CONFig:CELLular:LTE:CTYPe command.

Example of Use

To query the average of EVM measurement result of Reference Signal:

```
:FETC:CELL:LTE:FUND:MOD:RSEV? AVG
> 1.51
```

:FETCh:CELLular:LTE:FUNDamental:OBW?

OBW Result

Function

Queries the Occupied Bandwidth measurement result.

Query

```
:FETCh:CELLular:LTE:FUNDamental:OBW? [<cc>]
```

Response

```
<bw>
```

<bw>	Occupied Bandwidth
Unit	MHz
Resolution	1 kHz

Parameter

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.3.2-1 Measurement Items of OBW” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of in-band emissions (Carrier Leakage) measurement result:

```
:FETC:CELL:LTE:FUND:OBW?
> 3.840
```

:FETCh:CELLular:LTE:FUNDamental:OBW:FREQuency?

OBW Frequency Result

Function

Queries the upper, lower and center frequency of Occupied Bandwidth measurement.

Query

```
:FETCh:CELLular:LTE:FUNDamental:OBW:FREQuency? <pos>[,<cc>]
```

Response

```
<freq>
```

<freq>	Offset frequency
Unit	MHz
Resolution	1 kHz

Parameters

<pos>	Offset type
UPPER	Upper frequency
LOWER	Lower frequency
CENTER	Center frequency
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.3.2-1 Measurement Items of OBW” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the upper frequency of Occupied Bandwidth measurement result:

```
:FETC:CELL:LTE:FUND:OBW:FREQ? UPPER
> 1951.920
```

:FETCh:CELLular:LTE:FUNDamental:POWer:CHPower?

Channel Power Result

Function

Queries the Channel Power measurement result.

Query

```
:FETCh:CELLular:LTE:FUNDamental:POWer:CHPower? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dBm
Resolution	0.01 dB

When <mode> = AVG, MAX, MIN or DVT,

```
<pwr>
```

<pwr>	Measurement result in specified Storage mode
Unit	dBm
Resolution	0.01 dB

When <mode> = IND,

```
<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>
```

<s>	Measurement count
Range	1 to 200
<pwr(s)>	Channel Power of sth measurement
Unit	dBm
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	Individual measurement result
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.2.2-1 Measurement Items of Tx Power” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Channel Power measurement result:

```
:FETC:CELL:LTE:FUND:POW:CHP? AVG
> -20.00
```

:FETCh:CELLular:LTE:FUNDamental:POWer:TXPower?

Tx Power Result

Function

Queries the Tx power measurement result.

Query

```
:FETCh:CELLular:LTE:FUNDamental:POWer:TXPower? <mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dBm
Resolution	0.01 dB

When <mode> = AVG, MAX, MIN or DVT,

```
<pwr>
```

<pwr>	Measurement result in specified Storage mode
Unit	dBm
Resolution	0.01 dB

When <mode> = IND,

```
<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>
```

<s>	Measurement count
Range	1 to 200
<pwr(s)>	Tx Power of sth measurement
Unit	dBm
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	Individual measurement result
<cc>	Component Carrier

	Used at UL CA and omitted at non CA. Refer to "Table 2.2.2-1 Measurement Items of Tx Power" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Tx Power measurement results:

```
:FETC:CELL:LTE:FUND:POW:TXP? AVG
> -20.00
```

:FETCh:CELLular:LTE:FUNDamental:SEMask:JUDGement?

SEM Judgement

Function

Queries the judgement result of Spectrum Emission Mask measurement.
Fail when any part of spectrum exceeds limit, otherwise Pass.

Query

```
:FETCh:CELLular:LTE:FUNDamental:SEMask:JUDGement? [<cc>]
```

Response

<judgement>

<judgement>	Result
PASS	Pass
FAIL	Fail
–	Not measured

Parameter

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the judgement result whether the spectrum is within the specified threshold:

```
:FETC:CELL:LTE:FUND:SEM:JUDG?
> PASS
```

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

SEM Peak Value (Lower)

Function

Queries the peak level with offset frequency at each of lower side ranges of Spectrum Emission Mask measurement.

Query

```
:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer? [<cc>]
```

Response

```
<f_M1>,<l_M1>,<f_M2>,<l_M2>,<f_M3>,<l_M3>,<f_M4>,<l_M4>
```

<l_M1> to <l_M4>	Peak level at each of lower side Range 1 to Range 4
Unit	dBm
Resolution	0.01 dB
<f_M1> to <f_M4>	Offset frequency of peak level at each of lower side Range 1 to Range 4
Unit	MHz
Resolution	1 kHz

Parameters

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

Refer to Table 2.4.1-1 "Frequency Ranges of Range 1 to Range 4" for the frequency range for the measurement.

Example of Use

To the query peak level with offset frequency at each of lower side ranges of Spectrum Emission Mask measurement:

```
:FETC:CELL:LTE:FUND:SEM:LEV:LOW?
> -3.000,-20.00,-5.000,-30.00,-8.000,-40.00,-9.500,-50.00
```

:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer:DETail?

SEM Peak Value (Detail) (Lower)

Function

Queries the peak level with offset frequency at each of lower side 9 ranges of Spectrum Emission Mask measurement.

Query

```
:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer:DETail? [<cc>]
```

Response

```
<f_M1>,<l_M1>,<f_M2>,<l_M2>,<f_M3>,<l_M3>,<f_M4>,<l_M4>,<f_M5>,<l_M5>,<f_M6>,<l_M6>,<f_M7>,<l_M7>,<f_M8>,<l_M8>,<f_M9>,<l_M9>
```

<l_M1> to <l_M9>	Peak level at each of lower side range of Range 1 to Range 9
Unit	dBm
Resolution	0.01 dB
<f_M1> to <f_M9>	Offset frequency of peak level at each of lower side range of Range 1 to Range 9
Unit	MHz
Resolution	1 kHz

Parameters

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The number of target ranges varies with the combination of channel bandwidth and network signalled value for AdditionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the peak level with offset frequency at each of lower side of 9 ranges of Spectrum Emission Mask measurement:

```
:FETC:CELL:LTE:FUND:SEM:LEV:LOW:DET?
>
-0.500,3.00,-1.500,3.00,-2.600,3.00,-3.500,3.00,-5.500,3.00,-8.000,3.00,-12.500,3.00,-17.500,3.00,-22.500,3.00
```

:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer?

SEM Peak Value (Upper)

Function

Queries the peak level with offset frequency at each of upper side ranges of Spectrum Emission Mask measurement.

Query

```
:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer? [<cc>]
```

Response

```
<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>
```

<l_1> to <l_4>	Peak level in each of upper Range 1 to Range 4
Unit	dBm
Resolution	0.01 dB
<f_1> to <f_4>	Offset frequency of peak level in each of upper Range 1 to Range 4
Unit	MHz
Resolution	1 kHz

Parameters

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

Refer to Table 2.4.1-1 "Frequency Ranges of Range 1 to Range 4" for the frequency range for the measurement.

Example of Use

To query the peak level with offset frequency at each of upper side ranges of Spectrum Emission Mask measurement:

```
:FETC:CELL:LTE:FUND:SEM:LEV:UPP?
> 3.000,-20.00,5.000,-30.00,8.000,-40.00,9.500,-50.00
```

:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer:DETail?

SEM Peak Value (Detail) (Upper)

Function

Queries the peak level with offset frequency at each of upper side of nine ranges of Spectrum Emission Mask measurement.

Query

```
:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer:DETail? [<cc>]
```

Response

```
<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>,<f_5>,<l_5>,<f_6>,<l_6>,<
f_7>,<l_7>,<f_8>,<l_8>,<f_9>,<l_9>
```

<l_1> to <l_9>	Peak level in each of upper Range 1 to Range 9
Unit	dB
Resolution	0.01 dB
<f_1> to <f_9>	Offset frequency of peak level in each of upper Range 1 to Range 9
Unit	MHz
Resolution	1 kHz

Parameters

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The number of target ranges varies with the combination of channel bandwidth and network signalled value for AdditionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the peak level with offset frequency at each of upper side of nine ranges of Spectrum Emission Mask measurement:

```
:FETC:CELL:LTE:FUND:SEM:LEV:UPP:DET?
>
0.500,3.00,1.500,3.00,2.600,3.00,3.500,3.00,5.500,3.00,8.000,3.00,12.500,
3.00,17.500,3.00,22.500,3.00
```

:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:LOWer?

SEM Template Margin (Lower)

Function

Queries the level margin at each of lower side ranges in Spectrum Emission Mask measurement.

Query

```
:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:LOWer? [<cc>]
```

Response

```
<f_M1>,<l_M1>,<f_M2>,<l_M2>,<f_M3>,<l_M3>,<f_M4>,<l_M4>
```

<l_M1> to <l_M4>	Level margin in each of lower Range 1 to Range 4
Unit	dB
Resolution	0.01 dB
<f_M1> to <f_M4>	Offset frequency where level margin in each of lower Range 1 to Range 4 measured
Unit	MHz
Resolution	1 kHz

Parameters

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

Refer to Table 2.4.1-1 Frequency Ranges of Range 1 to Range 4 for the frequency range for the measurement.

Example of Use

To query the level margin with frequency where margin measured at each of lower side ranges of Spectrum Emission Mask measurement:

```
:FETC:CELL:LTE:FUND:SEM:MARG:LOW?
> -3.000,3.00,-5.000,3.00,-8.000,3.00,-9.500,3.00
```

:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:LOWer:DETail?

SEM Template Margin (Detail) (Lower)

Function

Queries the level margin with frequency where margin measured at each of lower side of 9 ranges of Spectrum Emission Mask measurement.

Query

```
:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:LOWer:DETail? [<cc>]
```

Response

```
<f_M1>,<l_M1>,<f_M2>,<l_M2>,<f_M3>,<l_M3>,<f_M4>,<l_M4>,<f_M5>,<l_M5>,<f_M6>,<l_M6>,<f_M7>,<l_M7>,<f_M8>,<l_M8>,<f_M9>,<l_M9>
```

<l_M1> to <l_M9>	Level margin in each of lower side range of Range 1 to Range 9
Unit	dB
Resolution	0.01 dB
<f_M1> to <f_M9>	Offset frequency where level margin measured in each of lower side range of Range 1 to Range 9
Unit	MHz
Resolution	1 kHz

Parameters

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

The number of target ranges varies with the combination of channel bandwidth and network signalled value for AdditionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the level margin with frequency where margin measured at each of lower side of 9 ranges of Spectrum Emission Mask measurement:

```
:FETC:CELL:LTE:FUND:SEM:MARG:LOW:DET?
>
-0.500,3.00,-1.500,3.00,-2.600,3.00,-3.500,3.00,-5.500,3.00,-8.000,3.00,-12.500,3.00,-17.500,3.00,-22.500,3.00
```

:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer?

SEM Template Margin (Upper)

Function

Queries the level margin with frequency where margin measured at each of upper side ranges of Spectrum Emission Mask measurement.

Query

```
:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer? [<cc>]
```

Response

```
<f_M1>,<l_M1>,<f_M2>,<l_M2>,<f_M3>,<l_M3>,<f_M4>,<l_M4>
```

<l_1> to <l_4>	Level margin in each of upper Range 1 to Range 4
Unit	dB
Resolution	0.01 dB
<f_1> to <f_4>	Offset frequency where level margin in each of upper Range 1 to Range 4 measured
Unit	MHz
Resolution	1 kHz

Parameters

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

Refer to Table 2.4.1-1 "Frequency Ranges of Range 1 to Range 4" for the frequency range for the measurement.

Example of Use

To query the level margin with frequency where margin measured at each of upper side ranges of Spectrum Emission Mask measurement:

```
:FETC:CELL:LTE:FUND:SEM:MARG:UPP?
> 3.000,3.00,5.000,3.00,8.000,3.00,9.500,3.00
```

:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer:DETail?

SEM Template Margin (Detail) (Upper)

Function

Queries the level margin with frequency where margin measured at each of upper side of 9 ranges of Spectrum Emission Mask measurement.

Query

```
:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer:DETail? [<cc>]
```

Response

```
<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>,<f_5>,<l_5>,<f_6>,<l_6>,<f_7>,<l_7>,<f_8>,<l_8>,<f_9>,<l_9>
```

<l_1> to <l_9>	Level margin in each of upper side range of Range 1 to Range 9
Unit	dB
Resolution	0.01 dB
<f_1> to <f_9>	Offset frequency where level margin measured in each of upper side range of Range 1 to Range 9
Unit	MHz
Resolution	1 kHz

Parameters

<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

The number of target ranges varies with the combination of channel bandwidth and network signalled value for AdditionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the level margin with frequency where margin measured at each of upper side of 9 ranges of Spectrum Emission Mask measurement:

```
:FETC:CELL:LTE:FUND:SEM:MARG:UPP:DET?
> 0.500,3.00,1.500,3.00,2.600,3.00,3.500,3.00,5.500,3.00,8.000,3.00,
12.500,3.00,17.500,3.00,22.500,3.00
```

:FETCh:CELLular:LTE:FUNDamental:TEMPlate:JUDGement:OFFPower?

Off Power Judgement

Function

Queries the judgement result of Off Power measurement.
The result is Fail when any part of spectrum exceeds limit, otherwise Pass.

Query

```
:FETCh:CELLular:LTE:FUNDamental:TEMPlate:JUDGement:OFFPower?
```

Response

```
<judgement>
```

<judgement>	Judgement result
PASS	Pass
FAIL	Fail
–	Not measured

Example of Use

To query the judgement result of Off Power measurement:

```
:FETC:CELL:LTE:FUND:TEMP:JUDG:OFFP?
> PASS
```

:FETCh:CELLular:LTE:FUNDamental:TEMPlate:JUDGement:ONPower?

On Power Judgement

Function

Queries the judgement result of On Power measurement.
The result is Fail when any part of spectrum exceeds limit, otherwise Pass.

Query

```
:FETCh:CELLular:LTE:FUNDamental:TEMPlate:JUDGement:ONPower?
```

Response

```
<judgement>
```

<judgement>	Judgement result
PASS	Pass
FAIL	Fail
–	Not measured

Example of Use

To query the judgement result of Off Power measurement.

```
:FETC:CELL:LTE:FUND:TEMP:JUDG:ONP?
> PASS
```

:FETCh:CELLular:LTE:FUNDamental:TEMPlate:OFFPower:AFTer?

Off Power (After)

Function

Queries the Off Power (After) measurement result.

Query

```
:FETCh:CELLular:LTE:FUNDamental:TEMPlate:OFFPower:AFTer? <mode>
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<level>
```

<level>	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

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

Example of Use

To query the average of Off Power (After) measurement result:

```
:FETC:CELL:LTE:FUND:TEMP:OFFP:AFT? AVG
> 1.75
```

:FETCh:CELLular:LTE:FUNDamental:TEMPlate:OFFPower:BEFore?

Off Power (Before)

Function

Queries the Off Power (Before) measurement result.

Query

```
:FETCh:CELLular:LTE:FUNDamental:TEMPlate:OFFPower:BEFore? <mode>
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<level>
```

<level>	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

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

Example of Use

To query the average of Off Power (Before) measurement result:

```
:FETC:CELL:LTE:FUND:TEMP:OFFP:BEF? AVG
> 1.75
```

:FETCh:CELLular:LTE:FUNDamental:TEMPlate:ONPower?

On Power

Function

Queries the On Power measurement result.

Query

```
:FETCh:CELLular:LTE:FUNDamental:TEMPlate:ONPower? <mode>
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dBm
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<level>
```

<level>	Measurement result in specified Storage mode
Unit	dBm
Resolution	0.01 dB

Parameters

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

Example of Use

To query the average of On Power measurement result:

```
:FETC:CELL:LTE:FUND:TEMP:ONP? AVG
> 1.75
```

:FETCh:CELLular:LTE:FUNDamental:TRACe?

Waveform

Function

Queries the spectrum waveform data of each measurement result.

Query

```
:FETCh:CELLular:LTE:FUNDamental:TRACe?
<format>,<position>,<length>[,<symbol>][,<cc>]]
```

Response

```
<data(0)>,<data(1)>,<data(2)>,…,<data(length-1)>
```

<format>	Unit	Resolution
1, 2	dBm	0.01 dB
3, 4	None	0.0001
5, 6, 9, 10	%	0.01%
7, 8	degree	0.01 degree
11, 12, 15, 16, 17, 18	dB	0.01 dB
13, 14	dBc	0.01 dB

Parameter

<format>	Format
1	Occupied Bandwidth
2	Spectrum Emission Mask (SEM)
3	Constellation (I)
4	Constellation (Q)
5	EVM (Average)
6	EVM (Maximum)
7	Phase Error (Average)
8	Phase Error (Maximum)
9	Magnitude Error (Average)
10	Magnitude Error (Maximum)
11	In-band Emissions (Average)
12	In-band Emissions (Maximum)
13	In-band Emissions (Average)
14	In-band Emissions (Maximum)
15	Spectrum Flatness (Average)
16	Spectrum Flatness (Maximum)
17	Spectrum Flatness (Minimum)
18	Power Template

<position> Start point of waveform data

Range

	Channel Bandwidth					
Format	**1.4 MHz**	**3 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
1	0 to 594	0 to 1238	0 to 2064	0 to 4136	0 to 6194	0 to 8266
2	0 to 1214	0 to 2474	0 to 4124	0 to 6554	0 to 9014	0 to 11474
3 to 10, 15 to 17	0 to 71	0 to 179	0 to 299	0 to 599	0 to 899	0 to 1199
11 to 14	0 to 5	0 to 14	0 to 24	0 to 49	0 to 74	0 to 99
18	0 to 9374	0 to 18749	0 to 37499	0 to 74999	0 to 149999	0 to 149999

Refer to 2.8 “Capturing Waveform Data” for details of the ranges under the following conditions.

- Contiguous UL CA
- The format is 1 or 2.

<length> Number of read data

Range

	Channel Bandwidth					
Format	**1.4 MHz**	**3 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
1	1 to 595	1 to 1239	1 to 2065	1 to 4137	1 to 6195	1 to 8267
2	1 to 1215	1 to 2475	1 to 4125	1 to 6555	1 to 9015	1 to 11475
3 to 10, 15 to 17	1 to 72	1 to 180	1 to 300	1 to 600	1 to 900	1 to 1200
11 to 14	1 to 6	1 to 15	1 to 25	1 to 50	1 to 75	1 to 100
18	1 to 9375	1 to 18750	1 to 37500	1 to 75000	1 to 150000	1 to 150000

Refer to 2.8 “Capturing Waveform Data” for details of the ranges under the following conditions.

- Contiguous UL CA
- The format is 1 or 2.

<symbol> Position of SC-FDMA symbol

Range When format is 3 to 10

0 to 6

<data(n)> Waveform data

<cc> Component Carrier

Used at UL CA and omitted at non CA.

Refer to “Table 2.8.2-5 Measurement Items of Waveform Data” for details.

PCC PCC

SCC1 SCC-1

Omitted Total

Details

Average in the above formats is equivalent to the average waveform of a spectrum analyzer. Maximum in the above formats is equivalent to the peak-hold waveform of a spectrum analyzer.

Example of Use

To query the EVM (Average) of 768 spectrum waveform data from 257 of each measurement result:

```
:FETC:CELL:LTE:FUND:TRAC? 5,256,768,0
> 2.00,2.01,2.00,…,2.10
```

:TRIGger:CELLular:LTE:FUNDamental:DELay

Trigger Delay

Function

Sets or queries the Trigger Delay.

Command

```
:TRIGger:CELLular:LTE:FUNDamental:DELay <trgdly>
```

Query

```
:TRIGger:CELLular:LTE:FUNDamental:DELay?
```

Response

<trgdly>

Unit	ms
Resolution	0.001 ms

Parameter

<trgdly>	Trigger Delay
Range	0 to 10.000 ms
Resolution	0.001 ms
Suffix code	MS
Default	0.000 ms

Details

This parameter is valid only when FRAMETYPE is set to TDD. Note this parameter can be edited even if FRAMETYPE is set to FDD.
This parameter is valid when MEASITEM is set to NORMAL.

Example of Use

To set the trigger delay to 0.001 ms:

```
:TRIG:CELL:LTE:FUND:DEL 0.001
:TRIG:CELL:LTE:FUND:DEL?
>0.001
```

:TRIGger:CELLular:LTE:FUNDamental:LEVel

Trigger Level

Function

Sets or queries the Trigger Level.

Command

```
:TRIGger:CELLular:LTE:FUNDamental:LEVel <trglevel>
```

Query

```
:TRIGger:CELLular:LTE:FUNDamental:LEVel?
```

Response

<trglevel>

Unit	dB
Resolution	1 dB

Parameter

<trglevel>	Trigger Level
Range	–40 to 0 dB
Resolution	1 dB
Suffix code	DB
Default	–30 dB

Details

This parameter is valid only when FRAMETYPE is set to TDD. Note this parameter can be edited even if FRAMETYPE is set to FDD.

Example of Use

To set the trigger level to –30 dB:

```
:TRIG:CELL:LTE:FUND:LEV -30
:TRIG:CELL:LTE:FUND:LEV?
> -30
```

:TRIGger:CELLular:LTE:FUNDamental:SOURce

Trigger Source

Function

Sets or queries the Trigger Source.

Command

```
:TRIGger:CELLular:LTE:FUNDamental:SOURce <trgsrc>
```

Query

```
:TRIGger:CELLular:LTE:FUNDamental:SOURce?
```

Response

```
<trgsrc>
```

Parameter

<trgsrc>	Trigger Source
PWR	Power of input signal
FRAME	frame
FREERUN	Free run
Default	PWR

Details

This parameter is valid only when FRAMETYPE is set to TDD. Note this parameter can be edited even if FRAMETYPE is set to FDD.
This parameter is valid when MEASITEM is set to NORMAL. When PWRTEMP is set, the value is fixed to PWR.

Example of Use

To set the trigger source to PWR:

```
:TRIG:CELL:LTE:FUND:SOUR PWR
:TRIG:CELL:LTE:FUND:SOUR?
>PWR
```

:TRIGger:CELLular:LTE:FUNDamental:TOUT

Trigger Timeout

Function

Sets or queries the trigger timeout.

Command

```
:TRIGger:CELLular:LTE:FUNDamental:TOUT <trgtime>
```

Query

```
:TRIGger:CELLular:LTE:FUNDamental:TOUT?
```

Response

<trgtime>

Unit	s
Resolution	1 s

Parameter

<trgtime>	Trigger Timeout
Range	1 to 10 s
Resolution	1 s
Suffix code	S
Default	10 s

Details

This parameter is valid only when FRAMETYPE is set to TDD. Note this parameter can be edited even if FRAMETYPE is set to FDD.

Example of Use

To set the Trigger timeout time to 5 seconds:

```
:TRIG:CELL:LTE:FUND:TOUT 5
:TRIG:CELL:LTE:FUND:TOUT?
> 5
```

4.2.3 Sequence measurement commands

:CONFigure:CELLular:GENerator:RFSettings:FREQuency

Downlink Frequency

Function

Sets or queries the downlink frequency

Command

```
:CONFigure:CELLular:GENerator:RFSettings:FREQuency <dl_freq>
```

Query

```
:CONFigure:CELLular:GENerator:RFSettings:FREQuency?
```

Response

<dl_freq>

Unit	Hz
Resolution	1 Hz

Parameter

<dl_freq>	Downlink frequency
Range	400 000 000 to 3800 000 000 Hz (MU887000A/01A) 400 000 000 to 6000 000 000 Hz (With MU887000A/01A-001) 400 000 000 to 6000 000 000 Hz (MU887002A)
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	2140 000 000 Hz

Details

This sets the Rx frequency for the mobile station.
Changing the setting of downlink frequency does not change the setting of the downlink channel.

Example of Use

To set the downlink frequency to 2050 MHz:

```
:CONF:CELL:GEN:RFS:FREQ 2050MHZ
:CONF:CELL:GEN:RFS:FREQ?
>2050000000
```

:CONFigure:CELLular:GENerator:RFSettings:LEVel

Output Level

Function

Sets or queries the total output level of all channels.

Command

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

Query

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

Response

<level>

Unit	dBm
Resolution	0.1 dB

Parameter

<level> Output level

Range

MU887000A	400 MHz ≤ frequency ≤ 3800 MHz	
	–130.0 to –10.0 dBm	(Port 1/Port 2)
	–120.0 to 0.0 dBm	(Port 3/Port 4)
	3800 MHz < frequency ≤ 6000 MHz	
	–130.0 to –18.0 dBm	(Port 1/Port 2)
	–120.0 to –8.0 dBm	(Port 3/Port 4)
MU887001A	400 MHz ≤ frequency ≤ 3800 MHz	
	–130.0 to –10.0 dBm	(Port 1 to Port 4)
	3800 MHz < frequency ≤ 6000 MHz	
	–130.0 to –18.0 dBm	(Port 1 to Port 4)
MU887002A	400 MHz < frequency ≤ 6000 MHz	
	–130.0 to 0.0 dBm	(Port 1 to Port 12)

Resolution	0.1 dB
Suffix Code	DBM (uses dBm when omitted)
Default	–60.2 dBm

Details

For MU887000A, the setting range varies with the output test port setting.
If cable loss correction is set to ON, the setting range of the output level is the range of values with subtracted cable loss.
If the cable loss is 5 dB and frequency ≤ 3800 MHz,
the MU887000A Port 1/Port 2 setting range is –135.0 to –15.0 dBm.

Example of Use

To set the output level to –50.0 dBm:

```
:CONF:CELL:GEN:RFS:LEV -50.0
:CONF:CELL:GEN:RFS:LEV?
> -50.0
```

Related Commands

[:ROUTe]:EXTLoss:TABLe:SWITch

:CALCulate:EXTLoss:TABLe:SETTing

:CALCulate:EXTLoss:TABLe:VALue

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

:CONFigure:CELLular:MEASurement:RFSettings:FREQuency

Uplink Frequency

Function

Sets or queries the uplink frequency

Command

```
:CONFigure:CELLular:MEASurement:RFSettings:FREQuency
<ul_freq>[,<ul_freq_scc1>]
```

Query

```
:CONFigure:CELLular:MEASurement:RFSettings:FREQuency? [<ALL>]
```

Response

<ul_fleq>,<ul_freq_scc1>

Unit	Hz
Resolution	1 Hz

Parameter

<ul_freq>	Uplink frequency for PCC
Range	400 000 000 to 3800 000 000 Hz (MU887000A/01A)
	400 000 000 to 6000 000 000 Hz (With MU887000A/01A-001)
	400 000 000 to 6000 000 000 Hz (MU887002A)
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	1950 000 000 Hz
<ul_freq_scc1>	Uplink frequency for SCC-1
Range	400 000 000 to 3800 000 000 Hz (MU887000A/01A)
	400 000 000 to 6000 000 000 Hz (With MU887000A/01A-001)
	400 000 000 to 6000 000 000 Hz (MU887002A)
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	1969 800 000 Hz (<freq_scc1>)

Details

This sets the Tx frequency for the mobile station

Changing the uplink frequency setting does not change the uplink channel setting.

The command argument ul_freq_scc1 and the query argument ALL can be omitted. When All is omitted, only ul_freq is returned.

Example of Use

To set the uplink frequency to 1950 MHz:

```
:CONF:CELL:MEAS:RFS:FREQ 1950MHZ,1969.8MHZ
:CONF:CELL:MEAS:RFS:FREQ? ALL
>1950000000,1969800000
```

:CONFigure:CELLular:MEASurement:RFSettings:LEVel

Input Level

Function

Sets or queries the input level of the input test port.

Command

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

Query

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

Response

<level>

Unit	dBm
Resolution	0.1 dB

Parameter

<level>	Input level
Range	
MU887000A	–65.0 to +35.0 dBm (Port 1/Port 2)
	–65.0 to +25.0 dBm (Port 3/Port 4)
MU887001A	–65.0 to +35.0 dBm (Port 1 to Port 4)
MU887002A	–65.0 to +35.0 dBm (Port 1 to Port 12)
Resolution	0.1 dB
Suffix Code	DBM (uses dBm when omitted)
Default	–1.0 dBm

Details

For MU887000A, the setting range varies with the input test port setting.
If cable loss correction is set to ON, the setting range of the input level is the range of values with added cable loss.
If the cable loss is 5 dB, the MU887000A Port 1/Port 2 setting range is –60.0 to +40.0 dBm.

Example of Use

To set the input level to –10.0 dBm

```
:CONF:CELL:MEAS:RFS:LEV -10.0
:CONF:CELL:MEAS:RFS:LEV?
>-10.0
```

Related Commands

[:ROUTe]:EXTLoss:TABLe:SWITch
:CALCulate:EXTLoss:TABLe:SETTing
:CALCulate:EXTLoss:TABLe:VALue
For details of the commands, refer to Chapter 5 “SCPI Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

:CONFigure:CELLular:SEQuence:CONTrol

Sequence Control Parameter - Sequence Control

Function

Sets or queries the start and stop segments of Sequence Table

Sets the parameters for both measurement and signal transmission.

Command

```
:CONFigure:CELLular:SEQuence:CONTrol <start>,<end>
```

Query

```
:CONFigure:CELLular:SEQuence:CONTrol?
```

Response

```
<start>,<end>
```

Parameters

<start>	Start segment
Range	0 to 1999
Resolution	1
Default	0
<end>	Stop segment
Range	<start> to 1999
Resolution	1
Default	199

Details

<start> = 0 to 1999, <end> = 0 to 1999 where <end> ≥ <start>

Whether the set sequence table can be executed is evaluated.

Use the :FETCh:CELLular:SEQuence:ERRor? command to query the error details.

Example of Use

To set the start segment to 20 and the stop segment to 52:

```
:CONF:CELL:SEQ:CONT 20,52
:CONF:CELL:SEQ:CONT?
> 20,52
```

:CONFigure:CELLular:SEQuence:CONTrol:TX

Sequence Control Parameter - Sequence Control

Function

Sets or queries start and stop segments in sequence table.

Sets the measurement parameters only, without affecting the signal transmission parameters.

Command

```
:CONFigure:CELLular:SEQuence:CONTrol:TX <start>,<end>
```

Query

```
:CONFigure:CELLular:SEQuence:CONTrol:TX?
```

Response

```
<start>,<end>
```

Parameters

<start>	Start segment
Range	0 to 1999
Resolution	1
Default	0
<end>	Stop segment
Range	<start> to 1999
Resolution	1
Default	199

Details

<start> = 0 to 1999, <end> = 0 to 1999 where <end> ≥ <start>

Whether the set sequence table can be executed is evaluated.

Use the :FETCh:CELLular:SEQuence:ERRor? command to query the error details.

Examples of Use

To set the start and stop segments to 20 and 55, respectively:

```
:CONF:CELL:SEQ:CONT 20,55
:CONF:CELL:SEQ:CONT?
> 20,55
```

:CONFigure:CELLular:SEQuence:LTE:ACLR:SET

Adjacent Channel Leakage Power Ratio Enable and Count

Function

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

Command

```
:CONFigure:CELLular:SEQuence:LTE:ACLR:SET <mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:ACLR:SET? <mcond>
```

Response

```
<on_off>,<count>
```

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<on_off>	Enables/disables measurement
ON	Turns measurement on
OFF	Disables measurement
Default	OFF
<count>	Measurement count
Range	1 to 200 1 to 100 (at UL CA)
Resolution	1
Suffix Code	None
Default	1

Example of Use

To disable Adjacent Channel Leakage Power Ratio measurement at measurement condition number 0 in LTE measurement condition table:

```
:CONF:CELL:SEQ:LTE:ACLR:SET 0,OFF
:CONF:CELL:SEQ:LTE:ACLR:SET? 0
> OFF
```

Remarks

The Adjacent Channel Leakage Power Ratio of 1 subframe (1 ms) is measured at each measurement count.

:CONFigure:CELLular:SEQuence:LTE:AMITems:OFF

Turn Off All Measurement Items

Function

Sets all measurement items to Off collectively.

Command

```
:CONFigure:CELLular:SEQuence:LTE:AMITems:OFF <mcond>
```

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1

Example of use

To set all measurement items of number 0 in the LTE measurement condition table to Off collectively.

```
:CONF:CELL:SEQ:LTE:AMIT:OFF 0
```

Remarks

This command is equivalent to setting all the commands below to Off.

:CONFigure:CELLular:SEQuence:LTE:POWer:SET
:CONFigure:CELLular:SEQuence:LTE:OBW:SET
:CONFigure:CELLular:SEQuence:LTE:SEMask:SET
:CONFigure:CELLular:SEQuence:LTE:ACLR:SET
:CONFigure:CELLular:SEQuence:LTE:MODulation:SET

:CONFigure:CELLular:SEQuence:LTE:BAND

Operation band

Function

Sets or queries the operation band.

Command

```
:CONFigure:CELLular:SEQuence:LTE:BAND <mcond>,<band>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:BAND? <mcond>
```

Response

```
<band>
```

Parameter

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<band>	Operation band
Range	1 to 256
Resolution	1
Default	1

Details

This is the parameter for determining the following items:

- Limit line of Spectrum Flatness measurement
- Intra-band/Inter-band (at UL CA)

Example of Use

To set the operation band to 10 for the measurement condition number 2:

```
:CONF:CELL:SEQ:LTE:BAND 2,10
:CONF:CELL:SEQ:LTE:BAND? 2
> 10
```

:CONFigure:CELLular:SEQuence:LTE:BAND:SCC1

Operation band for SCC-1

Function

Sets or queries the operation band for SCC-1.

Command

```
:CONFigure:CELLular:SEQuence:LTE:BAND:SCC1 <mcond>,<band>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:BAND:SCC1? <mcond>
```

Response

```
<band>
```

Parameter

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<band>	Operation band
Range	1 to 256
Resolution	1
Default	1

Details

This is the parameter for determining the following items:

- Limit line of Spectrum Flatness measurement
- Intra-band/Inter-band (at UL CA)

Example of Use

To set the operation band for SCC-1 to 10 for the measurement condition number 2:

```
:CONFigure:CELLular:SEQuence:LTE:BAND:SCC1 2,10
:CONFigure:CELLular:SEQuence:LTE:BAND:SCC1? 2
> 10
```

:CONFigure:CELLular:SEQuence:LTE:BWRB

Channel Bandwidth, RB

Function

Sets or queries the Uplink Channel bandwidth and RB (Resource Block)

Command

```
:CONFigure:CELLular:SEQuence:LTE:BWRB <mcond>,<ch_bw>[,<rb>[,<start>]]
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:BWRB? <mcond>
```

Response

```
<ch_bw>,<rb>,<start>
```

Parameters

<mcond>	Measurement condition number	
Range	0 to 1999	
Resolution	1	
<ch_bw>	Channel bandwidth	
1.4MHZ	1.4 MHz	
3MHZ	3 MHz	
5MHZ	5 MHz	
10MHZ	10 MHz	
15MHZ	15 MHz	
20MHZ	20 MHz	
Default	5MHZ	
<rb>	Number of RBs	
Range	Number defined by equation of (2^X) × (3^Y) × (5^Z) and falling within following range where (X, Y, Z ≥ 0, integer)	
	0 to 6	When channel bandwidth is 1.4 MHz
	0 to 15	When channel bandwidth is 3 MHz
	0 to 25	When channel bandwidth is 5 MHz
	0 to 50	When channel bandwidth is 10 MHz
	0 to 75	When channel bandwidth is 15 MHz
	0 to 100	When channel bandwidth is 20 MHz
Resolution	1	
Default	25	
<start>	Start RB number	
Range	0 to (RBmax – RBn)	
	RBmax = 6	(When channel bandwidth is 1.4 MHz)
	RBmax = 15	(When channel bandwidth is 3 MHz)
	RBmax = 25	(When channel bandwidth is 5 MHz)

	RBmax = 50 (When channel bandwidth is 10 MHz) RBmax = 75 (When channel bandwidth is 15 MHz) RBmax = 100 (When channel bandwidth is 20 MHz) RBn is value set by ULRMC_RB command.
Resolution	1
Default	0

Details

The <rb> and <start> settings can be omitted. If omitted, the settings are Full RB (<rb> is the maximum for the channel bandwidth and <start> is 0).

When the In-band Emission measurement at Contiguous UL CA is performed, set 0 to the number of RBs for CC where the signal is not output.

Even when Modulation Analysis is set to ON, the measurement is not performed under the following conditions.

- Contiguous UL CA
- At Carrier Frequency is not specified at Carrier Leakage Frequency.
- The number of RBs is set to 0.

Example of Use

To set as follows: Measurement condition number: 1,
Channel Bandwidth: 1.4 MHz, Number of RB: 6, Start RB number: 0

```
:CONF:CELL:SEQ:LTE:BWRB 1,1.4MHZ,6,0
:CONF:CELL:SEQ:LTE:BWRB? 1
>1.4MHZ,6,0
```

:CONFigure:CELLular:SEQuence:LTE:BWRB:SCC1

Channel Bandwidth, RB for SCC-1

Function

Sets or queries the Uplink Channel bandwidth and RB (Resource Block) for SCC-1.

Command

```
:CONFigure:CELLular:SEQuence:LTE:BWRB:SCC1
<mcond>,<ch_bw>[,<rb>[,<start>]]
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:BWRB:SCC1? <mcond>
```

Response

```
<ch_bw>,<rb>,<start>
```

Parameters

<mcond>	Measurement condition number	
Range	0 to 1999	
Resolution	1	
<ch_bw>	Channel bandwidth for SCC-1	
1.4MHZ	1.4 MHz	
3MHZ	3 MHz	
5MHZ	5 MHz	
10MHZ	10 MHz	
15MHZ	15 MHz	
20MHZ	20 MHz	
Default	5MHZ	
<rb>	Number of RBs for SCC-1	
Range	Number defined by equation of (2^X) × (3^Y) × (5^Z) and falling within following range where (X, Y, Z ≥ 0, integer)	
	0 to 6	When channel bandwidth is 1.4 MHz
	0 to 15	When channel bandwidth is 3 MHz
	0 to 25	When channel bandwidth is 5 MHz
	0 to 50	When channel bandwidth is 10 MHz
	0 to 75	When channel bandwidth is 15 MHz
	0 to 100	When channel bandwidth is 20 MHz
Resolution	1	
Default	25	
<start>	Start RB number for SCC-1	
Range	0 to (RBmax – RBn)	
	RBmax = 6	(When channel bandwidth is 1.4 MHz)
	RBmax = 15	(When channel bandwidth is 3 MHz)
	RBmax = 25	(When channel bandwidth is 5 MHz)
	RBmax = 50	(When channel bandwidth is 10 MHz)
	RBmax = 75	(When channel bandwidth is 15 MHz)

	RBmax = 100 (When channel bandwidth is 20 MHz) RBn is value set by ULRMC_RB command.
Resolution	1
Default	0

Details

The <rb> and <start> settings can be omitted. If omitted, the settings are Full RB (<rb> is the maximum for the channel bandwidth and <start> is 0).

When the In-band Emission measurement at Contiguous UL CA is performed, set 0 to the number of RBs for CC where the signal is not output.

Even when Modulation Analysis is set to ON, the measurement is not performed under the following conditions.

- Contiguous UL CA
- At Carrier Frequency is not specified at Carrier Leakage Frequency.
- The number of RBs is set to 0.

Example of Use

To set the items for SCC-1 as follows at the measurement condition number 1:

UL Channel Bandwidth: 1.4 MHz, Number of RB: 6, Start RB number: 0

```
:CONF:CELL:SEQ:LTE:BWRB:SCC1 1,1.4MHZ,6,0
:CONF:CELL:SEQ:LTE:BWRB:SCC1? 1
>1.4MHZ,6,0
```

:CONFigure:CELLular:SEQuence:LTE:CHCoding

Channel Coding

Function

Sets or queries the channel coding.

Command

```
:CONFigure:CELLular:SEQuence:LTE:CHCoding <mcond>,<object>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:CHCoding? <mcond>
```

Response

```
<object>
```

Parameter

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<object>	Target for channel coding
RMC	Reference Measurement Channel
RMC_UL_CA	RMC at UL CA
Default	RMC

Details

When FRAMETYPE is FDD and RMC_UL_CA is set, MX887013A-001 is required.
When FRAMETYPE is TDD and RMC_UL_CA is set, MX887014A-001 is required.

Example of Use

To set the channel coding to RMC:

```
:CONF:CELL:SEQ:LTE:CHC 1,RMC
:CONF:CELL:SEQ:LTE:CHC? 1
> RMC
```

:CONFigure:CELLular:SEQuence:LTE:CID

Cell ID

Function

Sets or queries the Cell ID.

Command

```
:CONFigure:CELLular:SEQuence:LTE:CID <id>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:CID?
```

Response

```
<id>
```

Parameter

<id>	Cell ID
Range	0 to 503
Resolution	1
Default	0

Example of Use

To set the Cell ID to 121:

```
:CONF:CELL:SEQ:LTE:CID 121
:CONF:CELL:SEQ:LTE:CID?
> 121
```

:CONFigure:CELLular:SEQuence:LTE:CID:SCC1

Cell ID for SCC-1

Function

Sets or queries the Cell ID for SCC-1.

Command

```
:CONFigure:CELLular:SEQuence:LTE:CID:SCC1 <id>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:CID:SCC1?
```

Response

```
<id>
```

Parameter

<id>		Cell ID for SCC-1
	Range	0 to 503
	Resolution	1
	Default	0

Example of Use

To set the Cell ID for SCC-1 to 121:

```
:CONF:CELL:SEQ:LTE:CID:SCC1 121
:CONF:CELL:SEQ:LTE:CID:SCC1?
> 121
```

:CONFigure:CELLular:SEQuence:LTE:CSHift

Cyclic Shift

Function

Sets or queries the Cyclic Shift On/Off.

Command

```
:CONFigure:CELLular:SEQuence:LTE:CSHift <on_off>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:CSHift?
```

Response

```
<on_off>
```

Parameter

<on_off>	Cyclic Shift
ON	Enables Cyclic Shift
OFF	Disables Cyclic Shift
FIX1	The fixed value is set.
Default	ON

Example of Use

To enable the Cyclic Shift:

```
:CONF:CELL:SEQ:LTE:CSH ON
:CONF:CELL:SEQ:LTE:CSH?
> ON
```

:CONFigure:CELLular:SEQuence:LTE:DSS

Delta SS

Function

Sets or queries the Delta SS (Group Assignment PUSCH).

Command

```
:CONFigure:CELLular:SEQuence:LTE:DSS <val>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:DSS?
```

Response

```
<val>
```

Parameter

<val>		Delta SS
	Range	0 to 29
	Resolution	1
	Default	0

Example of Use

To set the Delta SS to 12:

```
:CONF:CELL:SEQ:LTE:DSS 12
:CONF:CELL:SEQ:LTE:DSS?
> 12
```

:CONFigure:CELLular:SEQuence:LTE:EXTLoss:INDex:SCC1

External Loss Table Index for SCC-1

Function

Sets and queries the loss correction table index for SCC-1.

Command

```
:CONFigure:CELLular:SEQuence:LTE:EXTLoss:INDex:SCC1 <index>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:EXTLoss:INDex:SCC1?
```

Response

```
<index>
```

Parameter

<index>	Loss correction table index
Range	0 to 16
Resolution	1
Default	0

Details

When the loss correction table index is set to 0, the setting value of the common command ":CALCulate:EXTLoss:TABLe:SETTing" is used.
Refer to Chapter 5 "SCPI Command Reference" in the *MU887000A TRX Test Module Operation Manual* for details of the CALCulate:EXTLoss:TABLe:SETTing command.

Example of Use

To set the loss correction table index for SCC-1 to 1:

```
:CONF:CELL:SEQ:LTE:EXTL:IND:SCC1 1
:CONF:CELL:SEQ:LTE:EXTL:IND:SCC1?
>1
```

:CONFigure:CELLular:SEQuence:LTE:FERange

Frequency Error Range

Function

Sets and queries the frequency error detection method in the modulation analysis measurement.

Command

```
:CONFigure:CELLular:SEQuence:LTE:FERange <value>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:FERange?
```

Response

```
<value>
```

Parameter

<value>		Frequency Error Range
	NORMAL	Normal
	NARROW	Narrow Range
	Default	NORMAL

Example of Use

To set Frequency Error Range to Narrow Range:

```
:CONF:CELL:SEQ:LTE:FER NARROW
:CONF:CELL:SEQ:LTE:FER?
>NARROW
```

:CONFigure:CELLular:SEQuence:LTE:FSTRucture

Frame Structure

Function

Sets or queries the LTE frame structure.
This setting determines the duplex mode.

Command

```
:CONFigure:CELLular:SEQuence:LTE:FSTRucture <mcond>,<mode>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:FSTRucture? <mcond>
```

Response

```
<mode>
```

Parameter

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<mode>	Frame type (Duplex mode)
FDD	Frequency Division Multiplexing
TDD	Time Division Multiplexing
Default	FDD

Details

When only MX887013A is installed, only FDD can be set.
When only MX887014A is installed, only TDD can be set and the default is TDD.

Example of Use

To set the duplex mode to FDD for the measurement condition number 2:

```
:CONF:CELL:SEQ:LTE:FSTR 2,FDD
:CONF:CELL:SEQ:LTE:FSTR? 2
> FDD
```

:CONFigure:CELLular:SEQuence:LTE:FSTRucture:SCC1

Frame Structure for SCC-1

Function

Sets or queries the LTE frame structure for SCC-1.

Command

```
:CONFigure:CELLular:SEQuence:LTE:FSTRucture:SCC1 <mcond>,<mode>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:FSTRucture:SCC1?
```

Response

```
<mode>
```

Parameter

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<mode>	Frame type for SCC-1 (Duplex mode)
FDD	Frequency Division Multiplexing
TDD	Time Division Multiplexing
Default	FDD

Details

When only MX887013A is installed, only FDD can be set.
When only MX887014A is installed, only TDD can be set and the default is TDD.
When the settings in this command and :CONFigure:CELLular:SEQuence:LTE:FSTRucture are different, the measurement is performed using the settings in :CONFigure:CELLular:SEQuence:LTE:FSTRucture.

Example of Use

To set the duplex mode for SCC-1 to FDD for the measurement condition number 2:

```
:CONF:CELL:SEQ:LTE:FSTR:SCC1 2,FDD
:CONF:CELL:SEQ:LTE:FSTR:SCC1? 2
> FDD
```

:CONFigure:CELLular:SEQuence:LTE:GHOPping

Group hopping

Function

Enables and queries the Group hopping.

Command

```
:CONFigure:CELLular:SEQuence:LTE:GHOPping <on_off>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:GHOPping?
```

Response

```
<on_off>
```

Parameter

<on_off>	Enables/disables Group hopping
ON	Enables Group hopping
OFF	Disables Group hopping
Default	ON

Example of Use

To enable the Group hopping:

```
:CONF:CELL:SEQ:LTE:GHOP ON
:CONF:CELL:SEQ:LTE:GHOP?
> ON
```

:CONFigure:CELLular:SEQuence:LTE:IEMissions:CLFRequency

In-band Emission Carrier Leakage Frequency

Function

Sets and queries the position of Carrier Leakage Frequency of the UE in the In-band Emission/EVM measurement at Contiguous UL CA.

Command

```
:CONFigure:CELLular:SEQuence:LTE:IEMissions:CLFRequency <clf>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:IEMissions:CLFRequency?
```

Response

```
<clf>
```

Parameter

<clf>	Position of Carrier Leakage Frequency
CFR	Center frequency of Aggregated Channel Bandwidth
CCC	Center frequency of each CC
Default	CFR

Details

When the In-band Emission measurement at Contiguous UL CA is performed, “UL Number of RB” for PCC or SCC-1 must be set to 0.
For CFR, the resource block located at the center frequency of Aggregated Channel Bandwidth is treated as the carrier leak frequency and the In-band Emission/EVM measurement is performed.
For CCC, the center frequencies of each CC are treated as the carrier leak frequency and the In-band Emission/EVM measurement is performed.

Example of Use

To set the position of Carrier Leakage Frequency to CFR:

```
:CONF:CELL:SEQ:LTE:IEM:CLFR CFR
:CONF:CELL:SEQ:LTE:IEM:CLFR?
> CFR
```

:CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak

In-band Emissions Carrier Leakage Template

Function

Set and queries In-band Emissions Carrier Leakage Template.

Command

```
:CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak <mcond>,<tp>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak? <mcond>
```

Response

```
<tp>
```

Parameter

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<tp>	In-band Emissions Carrier Leakage Template
0DBM	–24.2 dBc (UE output level 0 dBm)
30DBM	–19.2 dBc (UE output level –30 dBm)
40DBM	–9.2 dBc (UE output level –40 dBm)
Default	0DBM

Details

The upper limit for the Carrier Leakage defined in 3GPP TS36.521 6.5.2.3 is selected according to this parameter setting.

Example of Use

To set the In-band Emissions Carrier Leakage Template to 0DBM for the measurement condition number 2:

```
:CONF:CELL:SEQ:LTE:IEM:TPL 2,0DBM
:CONF:CELL:SEQ:LTE:IEM:TPL? 2
> 0DBM
```

:CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak:SCC1

In-band Emissions Carrier Leakage Template for SCC-1

Function

Set and queries In-band Emissions Carrier Leakage Template for SCC-1.

Command

```
:CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak:SCC1 <mcond>,<tp>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:IEMissions:TPLeak:SCC1? <mcond>
```

Response

```
<tp>
```

Parameter

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<tp>	In-band Emissions Carrier Leakage Template
0DBM	–24.2 dBc (UE output level 0 dBm)
30DBM	–19.2 dBc (UE output level –30 dBm)
40DBM	–9.2 dBc (UE output level –40 dBm)
Default	0DBM

Details

The upper limit for the Carrier Leakage defined in 3GPP TS36.521 6.5.2.3 is selected according to this parameter setting.

Example of Use

To set the In-band Emissions Carrier Leakage Template for SCC-1 to 0DBM for the measurement condition number 2:

```
:CONF:CELL:SEQ:LTE:IEM:TPL:SCC1 2,0DBM
:CONF:CELL:SEQ:LTE:IEM:TPL:SCC1? 2
> 0DBM
```

:CONFigure:CELLular:SEQuence:LTE:LSSearch

Long Span Search

Function

Enables and queries the Long Span Search.

Command

```
:CONFigure:CELLular:SEQuence:LTE:LSSearch <on_off>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:LSSearch?
```

Response

```
<on_off>
```

Parameter

<on_off>	Enables/disables Long Span Search
ON	Enables Long Span Search
OFF	Disables Long Span Search
Default	OFF

Details

Set this parameter to OFF when the Uplink and Downlink signals are synchronized; set it to ON when they are not synchronized.
The response to the MSTAT will be 5 (Synchronization word not detected), if this parameter to OFF when the Uplink and Downlink signals are not synchronized.

Measurement takes more time when the Long Span Search function is on.

Example of Use

To enables the Long Span Search:

```
:CONF:CELL:SEQ:LTE:LSS ON
:CONF:CELL:SEQ:LTE:LSS?
> ON
```

:CONFigure:CELLular:SEQuence:LTE:MCARrier

Measurement Carrier

Function

Sets and queries the Component Carrier for measurement at Inter-band UL CA.

Command

```
:CONFigure:CELLular:SEQuence:LTE:MCARrier <mcond>,<carrier>
```

Query

```
LTE_MCARRIER? <mcond>
```

Response

```
<carrier>
```

Parameter

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<carrier>	Component Carrier for measurement
PCC	PCC
SCC1	SCC-1
Default	PCC

Example of Use

To set the Component Carrier for measurement to PCC at the measurement condition number 2:

```
:CONF:CELL:SEQ:LTE:MCAR 2,PCC
:CONF:CELL:SEQ:LTE:MCAR? 2
>PCC
```

:CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme

Sequence UL RMC Modulation

Function

Sets or queries the modulation method used by Uplink signal RMC at sequence measurement.

Command

```
:CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme <mcond>,<ul_rmc_mod>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme? <mcond>
```

Response

```
<ul_rmc_mod>
```

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<ul_rmc_mod>	Uplink RMC modulation method
QPSK	QPSK modulation
16QAM	16QAM modulation
64QAM	64QAM modulation
256QAM	256QAM modulation
Default	QPSK

Example of Use

To set the modulation method of condition number 1 in the LTE measurement condition table to 16QAM:

```
:CONF:CELL:SEQ:LTE:MOD:MSCH 1,16QAM
:CONF:CELL:SEQ:LTE:MOD:MSCH? 1
> 16QAM
```

:CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme:SCC1

Sequence UL RMC Modulation for SCC-1

Function

Sets or queries the modulation method for SCC-1 used by Uplink signal RMC at sequence measurement.

Command

```
:CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme:SCC1
<mcond>,<ul_rmc_mod>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:MODulation:MSCHeme:SCC1? <mcond>
```

Response

```
<ul_rmc_mod>
```

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<ul_rmc_mod>	Uplink RMC modulation method
QPSK	QPSK modulation
16QAM	16QAM modulation
64QAM	64QAM modulation
256QAM	256QAM modulation
Default	QPSK

Example of Use

To set the modulation method for SCC-1 at the measurement condition number 1 in the LTE measurement condition table to 16QAM:

```
:CONF:CELL:SEQ:LTE:MOD:MSCH:SCC1 1,16QAM
:CONF:CELL:SEQ:LTE:MOD:MSCH:SCC1? 1
> 16QAM
```

:CONFigure:CELLular:SEQuence:LTE:MODulation:SET

Modulation Analysis Measurement Enable and Count

Function

Enables the Modulation Analysis Measurement and sets the measurement count, or queries the setting values.

Command

```
:CONFigure:CELLular:SEQuence:LTE:MODulation:SET
<mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:MODulation:SET? <mcond>
```

Response

```
<on_off>,<count>
```

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
<count>	Measurement count
Range	1 to 200 1 to 100 (at UL CA)
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable the Modulation Analysis measurement and set the measurement count to 200 for measurement condition number 2 in the LTE measurement condition table:

```
:CONF:CELL:SEQ:LTE:MOD:SET 2,ON,200
:CONF:CELL:SEQ:LTE:MOD:SET? 2
> ON,200
```

Remarks

Modulation analysis is executed for 1 slot (0.5 ms) at each measurement count.

:CONFigure:CELLular:SEQuence:LTE:MOFFset

Measurement Offset

Function

Sets and queries the shift amount of the analysis start time at the sequence measurement.

Command

```
:CONFigure:CELLular:SEQuence:LTE:MOFFset <mcond>,<on_off>[,<time>]
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:MOFFset? <mcond>
```

Response

```
<on_off>,<time>
```

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<on_off>	Analysis start time shift ON/OFF
ON	Shifts the analysis start time.
OFF	Does not shift the analysis start time.
Default	OFF
<time>	Shift amount of analysis start time
Range	0 to 10.00000 ms
Resolution	0.00001 ms
Default	0.00000 ms

Details

This setting is enabled only when :CONFigure:CELLular:SEQuence:LTE:LSSearch is set to ON and the measurement count is 1.

Example of Use

To set the shift amount of the analysis start time to 10 ms at the measurement condition number 1 in the LTE measurement condition table:

```
:CONFigure:CELLular:SEQuence:LTE:MOFFset 1,ON,10
:CONFigure:CELLular:SEQuence:LTE:MOFFset? 1
>ON,10.00000
```

:CONFigure:CELLular:SEQuence:LTE:OBW:RATio

Occupied Bandwidth Ratio

Function

Sets the Occupied Bandwidth measurement occupation ratio in Sequence Measurement mode, and queries the setting.

Command

```
:CONFigure:CELLular:SEQuence:LTE:OBW:RATio <ratio>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:OBW:RATio?
```

Response

```
<ratio>
```

Parameter

<ratio>	Occupied Bandwidth occupation ratio
Range	80.0% to 99.9%
Resolution	0.1%
Suffix code	None
Default	99.0%

Example of Usage

To set the Occupied Bandwidth occupation ratio to 99.0% at sequence measurement:

```
:CONF:CELL:SEQ:LTE:OBW:RAT 99.0
:CONF:CELL:SEQ:LTE:OBW:RAT?
> 99.0
```

:CONFigure:CELLular:SEQuence:LTE:OBW:SET

OBW Measurement Enable and Count

Function

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

Command

```
:CONFigure:CELLular:SEQuence:LTE:OBW:SET <mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:OBW:SET? <mcond>
```

Response

```
<on_off>,<count>
```

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
<count>	Measurement count
Range	1 to 200
	1 to 100 (at UL CA)
Resolution	1
Suffix code	None
Default	1

Example of Use

To disable Occupied Bandwidth measurement for measurement condition number 3 in the LTE measurement condition table:

```
:CONF:CELL:SEQ:LTE:OBW:SET 3,OFF
:CONF:CELL:SEQ:LTE:OBW:SET? 3
> OFF
```

Remarks

Occupied Bandwidth is measured for 1 subframe (1 ms) at each measurement count.

:CONFigure:CELLular:SEQuence:LTE:POWer:SET

Tx Power Measurement Enable and Count

Function

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

Command

```
:CONFigure:CELLular:SEQuence:LTE:POWer:SET <mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:POWer:SET? <mcond>
```

Response

```
<on_off>,<count>
```

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	ON
<count>	Measurement count
Range	1 to 200 1 to 100 (at UL CA)
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable the Tx Power measurement and set the measurement count to 50 for the measurement condition number 5 in the LTE measurement condition table:

```
:CONF:CELL:SEQ:LTE:POW:SET 5,ON,50
:CONF:CELL:SEQ:LTE:POW:SET? 5
> ON,50
```

Remarks

The Tx power is measured for 1 subframe (1 ms) at each measurement count.

:CONFigure:CELLular:SEQuence:LTE:RSRange:FDD

RS Search Range for FDD mode

Function

Sets and queries the range of Reference Signal detection at the sequence measurement.

Command

```
CONFigure:CELLular:SEQuence:LTE:RSRange:FDD <time>
```

Query

```
CONFigure:CELLular:SEQuence:LTE:RSRange:FDD?
```

Response

<time>

Unit	us
Resolution	0.1 us

Parameters

<time>	Range of Reference Signal detection
Range	0.8 to 100.0 us
Resolution	0.1 us
Default	0.8 us

Details

This setting is enabled only when LTE_MEASOFFSET is set to ON.

Example of Use

To set the range of Reference Signal detection to 10 us in the FDD mode:

```
CONFigure:CELLular:SEQuence:LTE:RSRange:FDD 10
CONFigure:CELLular:SEQuence:LTE:RSRange:FDD?
>10.0
```

:CONFigure:CELLular:SEQuence:LTE:RSRange:TDD

RS Search Range for TDD mode

Function

Sets and queries the range of Reference Signal detection at the sequence measurement.

Command

```
CONFigure:CELLular:SEQuence:LTE:RSRange:TDD <time>
```

Query

```
CONFigure:CELLular:SEQuence:LTE:RSRange:TDD?
```

Response

<time>

Unit	us
Resolution	0.1 us

Parameters

<time>	Range of Reference Signal detection
Range	0.8 to 100.0 us
Resolution	0.1 us
Default	17.8 us

Details

This setting is enabled only when LTE_MEASOFFSET is set to ON.

Example of Use

To set the range of Reference Signal detection to 10 us in the TDD mode:

```
CONFigure:CELLular:SEQuence:LTE:RSRange:TDD 10
CONFigure:CELLular:SEQuence:LTE:RSRange:TDD?
>10.0
```

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

Spectrum Emission Mask Template for Contiguous UL CA (100RB+100RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 100RB+100RB.

Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB100:RB100
<range>,<limit>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB100:RB100? <range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range	
Range	1 to 6	
Resolution	1	
Default	1	
<limit>	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Default	Range 1:	–22.5 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm
	Range 5:	–23.5 dBm
	Range 6:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 100RB+100RB:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB100:RB100 2,-10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB100:RB100? 2
>-10.0
```

:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB25:RB100

Spectrum Emission Mask Template for Contiguous UL CA (25RB+100RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 25RB+100RB.

Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB25:RB100
<range>,<limit>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB25:RB100? <range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range	
Range	1 to 6	
Resolution	1	
Default	1	
<limit>	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Default	Range 1:	–20.5 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm
	Range 5:	–23.5 dBm
	Range 6:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 25RB+100RB:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB25:RB100 2,-10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB25:RB100? 2
>-10.0
```

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

Spectrum Emission Mask Template for Contiguous UL CA (50RB+100RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 50RB+100RB.

Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB50:RB100
<range>,<limit>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB50:RB100? <range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range	
Range	1 to 6	
Resolution	1	
Default	1	
<limit>	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Default	Range 1:	–21.0 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm
	Range 5:	–23.5 dBm
	Range 6:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 50RB+100RB:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB50:RB100 2,-10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB50:RB100? 2
>-10.0
```

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

Spectrum Emission Mask Template for Contiguous UL CA (75RB+100RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 75RB+100RB.

Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB100
<range>,<limit>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB100? <range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range	
Range	1 to 6	
Resolution	1	
Default	1	
<limit>	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Default	Range 1:	–22.0 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm
	Range 5:	–23.5 dBm
	Range 6:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 75RB+100RB:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB75:RB100 2,-10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB75:RB100? 2
>-10.0
```

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

Spectrum Emission Mask Template for Contiguous UL CA (75RB+75RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 75RB+75RB.

Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB75
<range>,<limit>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:CONTcc:RB75:RB75? <range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range	
Range	1 to 6	
Resolution	1	
Default	1	
<limit>	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Default	Range 1:	–21.0 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm
	Range 5:	–23.5 dBm
	Range 6:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 75RB+75RB:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB75:RB75 2,-10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:CONT:RB75:RB75? 2
>-10.0
```

:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B10M

Spectrum Emission Mask Template (10 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 10 MHz channel bandwidth in Sequence Measurement mode.

Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B10M <range>,<limit>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B10M? <range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range	
Range	1 to 4	
Resolution	1	
Suffix code	None	
Default	1	
<limit>	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Suffix code	DBM (uses dBm when omitted)	
Default	Range 1:	–16.5 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 10 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:B10M 2, -10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:B10M? 2
> -10.0
```

:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B15M

Spectrum Emission Mask Template (15 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 15 MHz channel bandwidth in Sequence Measurement mode.

Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B15M <range>,<limit>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B15M? <range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range	
Range	1 to 4	
Resolution	1	
Suffix code	None	
Default	1	
<limit>	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Suffix code	DBM (uses dBm when omitted)	
Default	Range 1:	–16.5 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 15 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:B15M 2, -10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:B15M? 2
> -10.0
```

:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B1M4

Spectrum Emission Mask Template (1.4 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 1.4 MHz channel bandwidth in Sequence Measurement mode.

Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B1M4 <range>,<limit>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B1M4? <range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range	
Range	1 to 4	
Resolution	1	
Suffix code	None	
Default	1	
<limit>	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Suffix code	DBM (uses dBm when omitted)	
Default	Range 1:	–8.5 dBm
	Range 2:	–8.5 dBm
	Range 3:	–23.5 dBm
	Range 4:	0.0 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 1.4 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:B1M4 2, -10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:B1M4? 2
> -10.0
```

:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B20M

Spectrum Emission Mask Template (20 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 20 MHz channel bandwidth in Sequence Measurement mode.

Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B20M <range>,<limit>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B20M? <range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range	
Range	1 to 4	
Resolution	1	
Suffix code	None	
Default	1	
<limit>	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Suffix code	DBM (uses dBm when omitted)	
Default	Range 1:	–19.5 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 20 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:B20M 2,-10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:B20M? 2
> -10.0
```

:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B3M

Spectrum Emission Mask Template (3 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 3 MHz channel bandwidth in Sequence Measurement mode.

Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B3M <range>,<limit>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B3M? <range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range	
Range	1 to 4	
Resolution	1	
Suffix code	None	
<limit>	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Suffix code	DBM (uses dBm when omitted)	
Default	Range 1:	–11.5 dBm
	Range 2:	–8.5 dBm
	Range 3:	–23.5 dBm
	Range 4:	0.0 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 3 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:B3M 2,-10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:B3M? 2
> -10.0
```

:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B5M

Spectrum Emission Mask Template (5 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 5 MHz channel bandwidth in Sequence Measurement mode.

Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B5M <range>,<limit>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:LIMit:B5M? <range>
```

Response

<limit>

Unit	dBm
Resolution	0.1 dB

Parameters

<range>	Range	
Range	1 to 4	
Resolution	1	
Suffix code	None	
Default	1	
<limit>	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Suffix code	DBM (uses dBm when omitted)	
Default	Range 1:	–13.5 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 5 MHz channel bandwidth to –10.0 dBm:

```
:CONF:CELL:SEQ:LTE:SEM:LIM:B5M 2,-10.0
:CONF:CELL:SEQ:LTE:SEM:LIM:B5M? 2
> -10.0
```

:CONFigure:CELLular:SEQuence:LTE:SEMask:SET

Spectrum Emission Mask Enable and Count

Function

Enables the Spectrum Emission Mask Measurement and sets or queries measurement count.

Command

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:SET <mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:SEMask:SET? <mcond>
```

Response

```
<on_off>,<count>
```

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<on_off>	Enables/disables the measurement
ON	Enables the measurement
OFF	Disables the measurement
Default	OFF
<count>	Measurement count
Range	1 to 200 1 to 100 (at UL CA)
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable the Spectrum Emission measurement and set the measurement count to 100 for measurement condition number 1 in the LTE measurement condition table:

```
:CONF:CELL:SEQ:LTE:SEM:SET 1,ON,100
:CONF:CELL:SEQ:LTE:SEM:SET? 1
> ON,100
```

Remarks

The Spectrum Emission Mask is measured for 1 subframe (1 ms) at each measurement count.

:CONFigure:CELLular:SEQuence:LTE:TENVironment

Test Environment

Function

Sets or queries the test environment.

Command

```
:CONFigure:CELLular:SEQuence:LTE:TENVironment <mcond>,<env>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:TENVironment? <mcond>
```

Response

```
<env>
```

Parameter

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<env>	Test Environment
NORMAL	Normal
EXTREME	Extreme
Default	NORMAL

Details

This is the parameter that determines the threshold line for Spectrum Flatness measurement. The test environment is defined in 3GPP TS36.521-1. The following values depend on the test environment settings.

・When the test environment is NORMAL

Border of Range1/Range2	3 MHz
RP1 limit level	5.4 dB
RP2 limit level	9.4 dB
RP12 limit level	6.4 dB
RP21 limit level	8.4 dB

・When the test environment is EXTREME

Border of Range1/Range2	5 MHz
RP1 limit level	5.4 dB
RP2 limit level	13.4 dB
RP12 limit level	7.4 dB
RP21 limit level	11.4 dB

Example of Use

To set the test environment to EXTREME for the measurement condition number 2 in the LTE measurement condition table:

```
:CONF:CELL:SEQ:LTE:TENV 2,EXTREME
:CONF:CELL:SEQ:LTE:TENV? 2
> EXTREME
```

:CONFigure:CELLular:SEQuence:LTE:ULDL

Uplink Downlink Configuration

Function

Sets or queries Uplink/Downlink signal configuration of TDD.

Command

```
:CONFigure:CELLular:SEQuence:LTE:ULDL <conf>
```

Query

```
:CONFigure:CELLular:SEQuence:LTE:ULDL?
```

Response

```
<conf>
```

Parameter

<conf>	Uplink Downlink Signal Configuration
Range	0 to 6
Resolution	1
Default	1

Example of Use

To set the Uplink/Downlink signal configuration to 1:

```
:CONF:CELL:SEQ:LTE:ULDL 1
:CONF:CELL:SEQ:LTE:ULDL?
> 1
```

:CONFigure:CELLular:SEQuence:PORT:RX

Sequence Table Parameter - SG Output Port

Function

Specifies the segment number and sets or queries the test port number for transmitting RFsignals.

Command

`:CONFigure:CELLular:SEQuence:PORT:RX <seg>,<port>` MU887000A, MU887001A

`:CONFigure:CELLular:SEQuence:PORT:RX <seg>,<port>[,<port>,…,<port>]` MU887002A

Query

`:CONFigure:CELLular:SEQuence:PORT:RX? <seg>`

Response

<port>	MU887000A, MU887001A
<port>[,<port>,…,<port>]	MU887002A

Parameters

<seg>	Segment number	
Range	0 to 1999	
<port>	Output test port number	
Range	Test Port 1 to 4	(MU887000A)
	Test Port 1 to 4	(MU887001A)
	Test Port 1 to 12	(MU887002A)
PORT1	Test Port 1	
…	…	
PORT12	Test Port 12	
Default	PORT1	

Details

For MU887000A

Test Port 3 cannot be set when Test Port 3 is selected for RF signal input test port.

Test Port 4 cannot be set when Test Port 4 is selected for RF signal input test port.

For MU887001A and MU887002A, there are no restrictions as above.

Examples of Use

To set the test port number of segment 5 to Test Port 2:

```
:CONF:CELL:SEQ:PORT:RX 5,PORT2
:CONF:CELL:SEQ:PORT:RX? 5
> PORT2
```

To set the test port number of segment 5 to Test Port 2, Test Port 11, and Test Port 5:

```
:CONF:CELL:SEQ:PORT:RX 5,PORT2,PORT11,PORT5
:CONF:CELL:SEQ:PORT:RX? 5
> PORT2,PORT5,PORT11
```

:CONFigure:CELLular:SEQuence:PORT:TX

Sequence Table Parameter - SA Input Port

Function

Specifies the segment number and sets or queries the test port number for inputting RF signals.

Command

```
:CONFigure:CELLular:SEQuence:PORT:TX <seg>,<port>
```

Query

```
:CONFigure:CELLular:SEQuence:PORT:TX? <seg>
```

Response

```
<port>
```

Parameters

<seg>	Segment number	
Range	0 to 1999	
<port>	Input test port number	
Range	COMMON, Test Port 1 to 4	(MU887000A)
	COMMON, Test Port 1 to 4	(MU887001A)
	OFF, COMMON, Test Port 1 to 12	(MU887002A)
PORT1	Test Port 1	
…	…	
PORT12	Test Port 12	
OFF	No any Input Test Ports	(MU887002A)
COMMON	Input test port specified by :ROUTe:PORT:CONNect:DIRection command.	
Default	COMMON	

Details

For MU887000A,
Test Port 3 cannot be set when Test Port 3 is selected for RF signal output test port.
Test Port 4 cannot be set when Test Port 4 is selected for RF signal output test port.

For MU887001A and MU887002A, there are no restrictions as above.

Examples of Use

To set the test port number of segment 5 to Test Port 2:

```
:CONF:CELL:SEQ:PORT:TX 5,PORT2
:CONF:CELL:SEQ:PORT:TX? 5
> PORT2
```

:CONFigure:CELLular:SEQuence:RFSettings:REINit

Sequence Control Parameter - Sequence End State Reinitialization

Function

Enables and queries the automatic initialization of following items after sequence measurement completion.

- Downlink frequency
- Output level
- Output signal pattern
- Uplink frequency
- Input level

Command

```
:CONFigure:CELLular:SEQuence:RFSettings:REINit <sw>
```

Query

```
:CONFigure:CELLular:SEQuence:RFSettings:REINit?
```

Response

```
<sw>
```

Parameter

<sw>	Automatic initialization after sequence measurement completion
ON	Enables automatic initialization
OFF	Disables automatic initialization
Default	ON

Details

If the parameter is set to ON, the settings are initialized to the values configured by the following commands after sequence measurement completion.

Downlink frequency	:CONFigure:CELLular:GENerator:RFSettings:FREQuency
Output level	:CONFigure:CELLular:GENerator:RFSettings:LEVel
Output signal pattern	:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect
Uplink frequency	:CONFigure:CELLular:MEASurementRFSettings:FREQuency
Input level	:CONFigure:CELLular:MEASurement:RFSettings:LEVel

If the parameter is set to OFF, the settings remain those of the sequence measurement stop segment.

Example of Use

To reset the target parameters:

```
:CONF:CELL:SEQ:RFS:REIN ON
:CONF:CELL:SEQ:RFS:REIN?
> ON
```

:CONFigure:CELLular:SEQuence:RFSettings:TRX

Sequence Table Parameter - TRX Control

Function

Sets or queries the following items in the specific segment of the sequence table.

- Downlink frequency
- Output Level
- Output signal pattern
- Uplink frequency
- Input level

Command

```
:CONFigure:CELLular:SEQuence:RFSettings:TRX
<seg>,<ul_freq>,<ref>,<dl_freq>,<level>,<pat>
```

Query

```
:CONFigure:CELLular:SEQuence:RFSettings:TRX? <seg>
```

Response

```
<ul_freq>,<ref>,<dl_freq>,<level>,<pat>
```

<ul_freq>, <dl_freq>

Unit	MHz
Resolution	0.000001 MHz

<ref>, <level>

Unit	dBm
Resolution	0.1 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<ul_freq>	Uplink frequency
Range	400.000000 to 3800.000000 MHz (MU887000A/01A)
	400.000000 to 6000.000000 MHz (With MU887000A/01A-001)
	400.000000 to 6000.000000 MHz (MU887002A)
Resolution	0.000001 MHz
Suffix Code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	1950.000000 MHz
<ref>	Input level
Range	
MU887000A	–65.0 to +35.0 dBm (Port 1/Port 2)
	–65.0 to +25.0 dBm (Port 3/Port 4)
MU887001A	–65.0 to +35.0 dBm (Port 1 to Port 4)
MU887002A	–65.0 to +35.0 dBm (Port 1 to Port 12)
Resolution	0.1 dB
Suffix Code	DBM (uses dBm when omitted)
Default	–10.0 dBm
<dl_freq>	Downlink frequency

Range	400.000000 to 3800.000000 MHz (MU887000A/01A) 400.000000 to 6000.000000 MHz (With MU887000A/01A-001) 400.000000 to 6000.000000 MHz (MU887002A)
Resolution	0.000001 MHz
Suffix Code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	2140.000000 MHz
<level>	Output level
Range	
MU887000A	400 MHz ≤ frequency ≤ 3800 MHz –130.0 to –10.0 dBm (Port 1/Port 2) –120.0 to 0.0 dBm (Port 3/Port 4) 3800 MHz < frequency ≤ 6000 MHz –130.0 to –18.0 dBm (Port 1/Port 2) –120.0 to –8.0 dBm (Port 3/Port 4)
MU887001A	400 MHz ≤ frequency ≤ 3800 MHz –130.0 to –10.0 dBm (Port 1 to Port 4) 3800 MHz < frequency ≤ 6000 MHz –130.0 to –18.0 dBm (Port 1 to Port 4)
MU887002A	400 MHz < frequency ≤ 6000 MHz –130.0 to 0.0 dBm (Port 1 to Port 12)
Resolution	0.1 dB
Suffix Code	DBM (used dBm when omitted)
Default	–60.0 dBm
<pat>	Waveform pattern
PAT1 to PATn	Pattern number (n: waveform information file group range)
CW	Modulation turned OFF
OFF	Output level turned OFF
NC	Waveform pattern not configured in this segment (holds currently configured waveform pattern)
Default	CW

Details

For MU887000A, the setting range varies with the input/output test port setting.
If cable loss correction is set to ON, the setting range of the input level is the range of values with added cable loss and the setting range of the output level is the range of values with subtracted cable loss.
If the cable loss is 5 dB and frequency ≤ 3800 MHz, the input and output levels are as follows:
MU887000A Port 1/Port 2 Input level –60.0 to +40.0 dBm
MU887000A Port 1/Port 2 Output level –135.0 to –15.0 dBm
In this case, if the output level is set to –10.0 dBm, an out-of-parameter setting range error occurs. (The response to :SYSTem:ERRor? returns 220, Parameter error).
Whether an out-of-parameter setting range error has occurred is determined during execution of the following commands:
:CONFigure:CELLular:SEQuence:CONTrol,:INITiate:CELLular:MEASurement:SINGle,
:INITiate:CELLular:SEQuence:EXECute:TX

A measurement execution error occurs when an out-of-range error occurs.
:FETCh:CELLular:SEQuence:ERRor? is used to query the error details.

The pattern number is the same as the group number. Refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

Example of Use

To set segment 0 as follows.
Uplink frequency set to 1950.0 MHz, input level to –10.0 dBm, downlink frequency to 2140.0 MHz, output level to –60.0 dBm, and no modulation:

```
:CONF:CELL:SEQ:RFS:TRX 0,1950.000000,-10.0,2140.000000,-60.0,CW
:CONF:CELL:SEQ:RFS:TRX? 0
> 1950.000000,-10.0,2140.000000,-60.0,CW
```

Remarks

The group range is the selected waveform file.
For details of the waveform pattern, refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

:CONFigure:CELLular:SEQuence:RFSettings:TX

Sequence Table Parameter - Uplink Frequency, Input Level

Function

Sets or queries uplink frequency and input level of segments in sequence table.

Command

```
:CONFigure:CELLular:SEQuence:RFSettings:TX <seg>,<ul_freq>,<ref>
```

Query

```
:CONFigure:CELLular:SEQuence:RFSettings:TX? <seg>
```

Response

<ul_freq>,<ref>

<ul_freq>

Unit	MHz
Resolution	0.000001 MHz

<ref>

Unit	dBm
Resolution	0.1 dB

Parameter

<seg>	Segment number
Range	0 to 1999
Resolution	1
<ul_freq>	Rx frequency (uplink)
Range	400.000000 to 3800.000000 MHz (MU887000A/01A)
	400.000000 to 6000.000000 MHz (With MU887000A/01A-001)
	400.000000 to 6000.000000 MHz (MU887002A)
Resolution	0.000001 MHz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	1950.000000 MHz
<ref>	Input level
Range	
MU887000A	–65.0 to +35.0 dBm (Port 1/Port 2)
	–65.0 to +25.0 dBm (Port 3/Port 4)
MU887001A	–65.0 to +35.0 dBm (Port 1 to Port 4)
MU887002A	–65.0 to +35.0 dBm (Port 1 to Port 12)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–10.0 dBm

Details

This command sets only the uplink frequency and input level among the parameters that are set by :CONFigure:CELLular:SEQuence:RFSettings:TRX.
For MU887000A, the setting range varies with the input test port setting.
If cable loss correction is set to ON, the setting range of the input level is the range of values with added cable loss.
If the cable loss is 5 dB, the MU887000A Port 1/Port 2 setting range is –60.0 to +40.0 dBm.
Whether an out-of-parameter setting range error has occurred is determined during execution of the following commands:
:CONFigure:CELLular:SEQuence:CONTrol,:INITiate:CELLular:MEASurement:SINGle,
:INITiate:CELLular:SEQuence:EXECute:TX

Example of Use

To set the parameters for segment 1 as follows:
Uplink frequency: 1950 MHz, Input level: -10.0 dBm

```
:CONF:CELL:SEQ:RFS:TX 1,1950,-10.0
:CONF:CELL:SEQ:RFS:TX? 1
> 1950.000000,-10.0
```

:CONFigure:CELLular:SEQuence:RFSettings:TX:SCC1

Sequence Table Parameter - Uplink Frequency, Input Level for SCC-1

Function

Sets and queries the uplink signal frequency and input level for SCC-1 in the segment of the sequence table.

Command

```
:CONFigure:CELLular:SEQuence:RFSettings:TX:SCC1 <seg>,<ul_freq>,<ref>
```

Query

```
:CONFigure:CELLular:SEQuence:RFSettings:TX:SCC1? <seg>
```

Response

<ul_freq>,<ref>

<ul_freq>

Unit	MHz
Resolution	0.000001 MHz

<ref>

Unit	dBm
Resolution	0.1 dB

Parameter

<seg>	Segment number
Range	0 to 1999
Resolution	1
<ul_freq>	Rx frequency (uplink) for SCC-1
Range	400.000000 to 3800.000000 MHz 400.000000 to 6000.000000 MHz (With MU887000A/01A-001) 400.000000 to 6000.000000 MHz (With MU887002A)
Resolution	0.000001 MHz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	1950.000000 MHz
<ref>	Input level
Range	
MU887000A	–65.0 to +35.0 dBm (Port 1/Port 2) –65.0 to +25.0 dBm (Port 3/Port 4)
MU887001A	–65.0 to +35.0 dBm (Port 1 to Port 4)
MU887002A	–65.0 to +35.0 dBm (Port 1 to Port 12)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–10.0 dBm

Details

For MU887000A, the setting range varies with the input test port setting.
If cable loss correction is set to ON, the setting range of the input level is the range of values with added cable loss.
If the cable loss is 5 dB, the MU887000A Port 1/Port 2 setting range is –60.0 to +40.0 dBm.
Whether an out-of-parameter setting range error has occurred is determined during execution of the following commands:
:CONFigure:CELLular:SEQuence:CONTrol,:INITiate:CELLular:MEASurement:SINGle,
:INITiate:CELLular:SEQuence:EXECute:TX

Example of Use

To set the parameters for SCC-1 for segment 1 as follows:
Uplink frequency: 1950 MHz, Input level: –10.0 dBm

```
:CONF:CELL:SEQ:RFS:TX:SCC1 1,1950,-10.0
:CONF:CELL:SEQ:RFS:TX:SCC1? 1
> 1950.000000,-10.0
```

:CONFigure:CELLular:SEQuence:RXPort

Sequence Table Parameter - SG Output Port

Function

Specifies the segment number and sets or queries the test port number for outputting RF signals.

Command

```
:CONFigure:CELLular:SEQuence:RXPort <seg>,<port>
```
MU887000A, MU887001A

```
:CONFigure:CELLular:SEQuence:RXPort <seg>,<port>[,<port>,…,<port>]
```
MU887002A

Query

```
:CONFigure:CELLular:SEQuence:RXPort? <seg>
```

Response

<port>	MU887000A, MU887001A
<port>[,<port>,…,<port>]	MU887002A

Parameters

<seg>	Segment number	
Range	0 to 1999	
<port>	Output test port number	
Range	Test Port 1 to 4	(MU887000A)
	Test Port 1 to 4	(MU887001A)
	Test Port 1 to 12	(MU887002A)
PORT1	Test Port 1	
…	…	
PORT12	Test Port 12	
Default	PORT1	

Details

For MU887000A,
Test Port 3 cannot be set when Test Port 3 is selected for RF signal input test port.
Test Port 4 cannot be set when Test Port 4 is selected for RF signal input test port.

For MU887001A and MU887002A, there are no restrictions as above.

Example of Use

To set the test port number in segment 5 to Test Port 2:

```
:CONF:CELL:SEQ:RXP 5,PORT2
:CONF:CELL:SEQ:RXP? 5
> PORT2
```

To set the test port number of segment 5 to Test Port 4, Test Port 6, and Test Port 10:

```
:CONF:CELL:SEQ:RXP 5,PORT10,PORT4,PORT6
:CONF:CELL:SEQ:RXP? 5
> PORT4,PORT6,PORT10
```

:CONFigure:CELLular:SEQuence:SETup

Sequence Table Parameter - Measurement

Function

Sets or queries the measurement conditions of the specified segment.

Command

```
:CONFigure:CELLular:SEQuence:SETup <seg>,<mode>,<step>,<mcond>
```

Query

```
:CONFigure:CELLular:SEQuence:SETup? <seg>
```

Response

```
<mode>,<step>,<mcond>
```

Parameters

<seg>	Segment number	
Range	0 to 1999	
Resolution	1	
<mode>	Measurement mode	Required software license
TXP	Transmit power measurement mode	MX887010A
WCDMA	W-CDMA measurement mode	MX887010A and MX887011A
GSM	GSM measurement mode	MX887010A and MX887012A
CDMA2K	CDMA2000 1x measurement mode	MX887010A and MX887015A
EVDO	CDMA2000 1xEVDO measurement mode	MX887010A and MX887016A
TDSCDMA	TD-SCDMA measurement mode	MX887010A and MX887017A
LTE	LTE measurement mode	MX887010A and MX887013A, or MX887010A and MX887014A
NR	NR sub-6GHz measurement mode	MX887010A and MX887018A or MX887010A and MX887019A
Default	TXP	
<step>	Step count	
Range	2 to 3000	
Resolution	1	
Default	2	
<mcond>	Measurement condition number	
Range	0 to 1999	
Resolution	1	
Default	0	

Example of Use

To set the settings for segment 2 as follows:

Measurement mode: LTE, Step count: 10, Measurement condition number: 3

```
:CONF:CELL:SEQ:SET 2,LTE,10,3
:CONF:CELL:SEQ:SET? 2
> LTE,10,3
```

:CONFigure:CELLular:SEQuence:TABLe

Sequence Control Parameter - Sequence Table

Function

Sets or queries the number of sequence table to execute.

Command

```
:CONFigure:CELLular:SEQuence:TABLe <table>
```

Query

```
:CONFigure:CELLular:SEQuence:TABLe?
```

Response

```
<table>
```

Parameter

<table>	Sequence table number
Range	0 to 3
Resolution	1
Default	0

Example of Use

To select the sequence table 1:

```
:CONF:CELL:SEQ:TABL 1
:CONF:CELL:SEQ:TABL?
> 1
```

:FETCh:CELLular:SEQuence:ERRor?

Sequence Parameter Information - Error check

Function

Queries the setting error information of sequence table.

Query

```
:FETCh:CELLular:SEQuence:ERRor? [<item>]
```

Response

When nothing is set to <item>:

```
<n>,<err(0)>,..,<err(n-1)>
```

<n>		Number of errors
	Range	0 to 4
<err(n–1)>		Parameter with error
	ILVL	Input level
	OLVL	Output level
	STEP	Step count
	LEN	Capture memory length

When <item> is ILVL, OLVL, STEP, DLPAT, or PORT:

```
<ns>,<seg(0)>,..,<seg(ns-1)>
```

<ns>		Number of segments with errors
	Range	0 to 2000
<seg(ns–1)>		Segment number with errors
	Range	0 to 1999

When <item> is LEN:

```
<e>,<mem>,<exe>,<set>
```

<e>		Presence of errors
	Range	0 No error, executable
		1 Errors found, not executable
<mem>		Memory utilization
	Range	0.0% to 100.0%
	Resolution	0.1%
<exe>		Number of segments capable of executing capture in number of configured segments
	Range	0 to 2000
<set>		Number of segments with capture configured
	Range	0 to 2000

When <item> is OLVLNUM, PATNUM, or STDNUM:

```
<e>,<exe>,<set>
```

<e>		Presence of errors
	Range	0 No error, executable
		1 Errors found, not executable
<exe>		Number of segments capable of executing capture in number of configured segments

Range 0 to 2000

<set> Number of segments with capture configured

Range 0 to 2000

If no error is found in the sequence table, the response returns 0.

Parameters

<item>	Parameter in sequence table
ILVL	Input level
OLVL	Output level
STEP	Step count
DLPAT	Waveform pattern
PORT	Test port
LEN	Capture memory length
OLVLNUM	Output level change count
PATNUM	Waveform pattern change count
STDNUM	Measurement mode change count

Details

This command can check error presence of input level, output level, step count, and capture memory length.
To query error presence of the following parameters,
use :FETCh:CELLular:SEQuence:ERRor2? command.
Waveform pattern, test port, output level change count, waveform pattern change count, measurement mode change count.

To set parameters for sequence table using the following commands, errors are not checked.
:CONFigure:CELLular:SEQuence:RFSettings:TRX
:CONFigure:CELLular:SEQuence:RFSettings:TX
:CONFigure:CELLular:SEQuence:SETup

Example of Use

To query the presence of errors:

```
:CONF:CELL:SEQ:ERR?
>1,ILVL
```

To query the input level setting error information:

```
:CONF:CELL:SEQ:ERR? ILVL
>2,3,12
```

To query the capture memory error information:

```
:CONF:CELL:SEQ:ERR? LEN
>0,25.0,20,20
```

Here, the capture memory utilization is 25.0%, so all captures configured in 20 segments are executable.

Remarks

Sequence measurement cannot be started if there are errors.
However, the sequence can be started if segment numbers with errors are excluded from the execution range using the :CONFigure:CELLular:SEQuence:CONTrol command.

:FETCh:CELLular:SEQuence:ERRor2?

Sequence Parameter Information - Error Check

Function

Queries setting error information of sequence table

Query

```
:FETCh:CELLular:SEQuence:ERRor2? <format>
```

Response

```
<n>,<err(0)>,..,<err(n-1)>
```

<n>	Number of errors
Range	0 to 7
<err(n-1)>	Parameter with errors
ILVL	Input level
OLVL	Output level
STEP	Step count
DLPAT	Waveform pattern
PORT	Test port
LEN	Capture memory length
OLVLNUM	Output level change count
PATNUM	Waveform pattern change count
STDNUM	Measurement mode change count

If no error is found in the sequence table, the response returns 0.

Parameters

<format>	Format
1	Error Check 1

Details

Parameter setting errors can be checked up to seven types.
Only one of output level change count, waveform pattern change count, or measurement mode change count has an error.
Two or three of them cannot have an error simultaneously.

To set parameters for sequence table using the following commands, errors are not checked.
:CONFigure:CELLular:SEQuence:RXPort
:CONFigure:CELLular:SEQuence:RFSettings:TRX
:CONFigure:CELLular:SEQuence:RFSettings:TX
:CONFigure:CELLular:SEQuence:SETup
To query error details per parameter, use :FETCh:CELLular:SEQuence:ERRor command.

Example of Use

To query the presence of errors:

```
:FETC:CELL:SEQ:ERR2? 1
>2,ILVL,DLPAT
```

Remarks

Sequence measurement cannot be started if there are errors.
However, sequence measurement can be started if segment numbers with errors are excluded from the execution range using the :CONFigure:CELLular:SEQuence:CONTrol command.

:FETCh:CELLular:SEQuence:LTE:ACLR?

ACLR Result

Function

Queries the Adjacent Channel Leakage Power Ratio measurement result

Query

```
:FETCh:CELLular:SEQuence:LTE:ACLR? <seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg0>,<avg1>,<avg2>,<avg3>,<avg4>,<avg5>,<max0>,<max1>,<max2>,<max3>,<
max4>,<max5>,<min0>,<min1>,<min2>,<min3>,<min4>,<min5>
```

<avg>	Measurement results in order of offset frequencies (Average)
<max>	Measurement results in order of offset frequencies (Maximum)
<min>	Measurement results in order of offset frequencies (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<aclr0>,<aclr1>,<aclr2>,<aclr3>,<aclr4>,<aclr5>
```

<aclr>	Measurement results in order of offset frequencies in specified Storage mode
Unit	dB
Resolution	0.01 dB

The responses are sent in the following order.
E-UTRA ACLR LOW,
E-UTRA ACLR UP,
UTRA ACLR2 LOW,
UTRA ACLR1 LOW,
UTRA ACLR1 UP,
UTRA ACLR2 UP

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.5.2-1 Measurement Items of Adjacent Channel Leakage

	Power Ratio" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The measurement bandwidth of the target adjacent channel varies with the channel bandwidth setting.
Refer to Table 2.5.1-1 "Adjacent Channel Measurement Bandwidth (MHz)" for details.

Example of Use

To query the average of ACLR measurement result for segment 0:

```
:FETC:CELL:SEQ:LTE:ACLR? 0,AVG
> 3.00,3.01,3.02,3.03,3.04,3.05
```

:FETCh:CELLular:SEQuence:LTE:MODulation:CARLeakage?

Carrier Leakage Result

Function

Queries the Carrier Leakage (Modulation Analysis) measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:CARLeakage? <seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dBc
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<cleakage>
```

<cleakage>	Measurement result in specified Storage mode
Unit	dBc
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of the Carrier Leakage measurement result for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:CARL? 1,AVG
> 1.05
```

:FETCh:CELLular:SEQuence:LTE:MODulation:CFRequency?

Carrier Frequency Result

Function

Queries the Carrier Frequency measurement result

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:CFRequency? <seg>[,<cc>]
```

Response

<freq>

<freq>	Carrier frequency
Unit	Hz
Resolution	1 Hz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the result of Carrier Frequency measurement for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:CFR? 1
> 1951000000
```

:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:ITEM?

Spectrum Flatness Measured Item

Function

Queries whether each spectrum flatness measurement items is measured or not.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:ITEM? <seg>[,<cc>]
```

Response

```
<flag>
```

<flag> Measured/Not measured flag (0 to 3)

Returns the sum of the following measurement items.

0 Not measured

1 ≥ 3 MHz area (When Test Environment is Normal)
≥ 5 MHz area (When Test Environment is Extreme)

2 < 3 MHz area (When Test Environment is Normal)
< 5 MHz area (When Test Environment is Extreme)

Parameters

<seg> Segment number

Range 0 to 1999

Resolution 1

<cc> Component Carrier

Used at UL CA and omitted at non CA.

Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.

PCC PCC

SCC1 SCC-1

Omitted Total

Example of Use

To query whether each spectrum flatness measurement items of Segment 1 is measured or not in the sequence measurement:

```
:FETC:CELL:SEQ:LTE:MOD:ESFL:ITEM? 1
> 2
```

:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:JUDGement?

Spectrum Flatness Judgement

Function

Queries the judgement of Spectrum Flatness measurement result

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:JUDGement?
<seg>[,<cc>]
```

Response

```
<judgement>
```

<judgement>	Judgement result
PASS	Pass
FAIL	Fail
–	Not measured

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the judgement of Spectrum Flatness measurement result for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:ESFL:JUDG? 1
> PASS
```

:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP1?

Spectrum Flatness (≥3 MHz (RP1)) Result

Function

Queries the ripple value in Spectrum Flatness measurement result in Range 1.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP1?
<seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<sflatness>
```

<sflatness>	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameter

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Range 1 ripple value in Spectrum Flatness measurement result of Segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:ESFL:RP1? 1,AVG
> 0.04
```

:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP12?

Spectrum Flatness (RP12) Result

Function

Queries the difference between maximum value in Range 1 and minimum value in Range 2 of Spectrum Flatness measurement result.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP12?
<seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<sflatness>
```

<sflatness>	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of difference between maximum value in Range 1 and minimum value in Range 2 of Spectrum Flatness measurement result of Segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:ESFL:RP12? 1,AVG
> 0.04
```

:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP2?

Spectrum Flatness (<3 MHz (RP2)) Result

Function

Queries the ripple value in Spectrum Flatness measurement result in Range 2.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP2?
<seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<sflatness>
```

<sflatness>	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Range 2 ripple value in Spectrum Flatness measurement result of Segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:ESFL:RP2? 1,AVG
> 0.04
```

:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP21?

Spectrum Flatness (RP21) Result

Function

Queries the difference between maximum value in Range 2 and minimum value in Range 1 of Spectrum Flatness measurement result.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:ESFLatness:RP21?
<seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<sflatness>
```

<sflatness>	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of difference between maximum value in Range 2 and minimum value in Range 1 of Spectrum Flatness measurement result of Segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:ESFL:RP21? 1,AVG
> 0.04
```

:FETCh:CELLular:SEQuence:LTE:MODulation:EVM?

EVM Result

Function

Queries the EVM measurement result in Sequence Measurement mode.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:EVM? <seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	%
Resolution	0.01%

When <mode> ≠ TTL,

```
<evm>
```

<evm>	Measurement result in specified Storage mode
Unit	%
Resolution	0.01%

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of the EVM measurement result for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:EVM? 1,AVG
> 1.50
```

:FETCh:CELLular:SEQuence:LTE:MODulation:FERRor?

Carrier Frequency Error Result

Function

Queries the Frequency Error measurement result.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:FERRor? <seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg_ppm>,<avg_Hz>,<max_ppm>,<max_Hz>,<min_ppm>,<min_Hz>
```

<avg_ppm>	Measurement result in ppm (Average)
<max_ppm>	Measurement result in ppm (Maximum)
<min_ppm>	Measurement result in ppm (Minimum)
Unit	ppm
Resolution	0.01 ppm
<avg_Hz>	Measurement result in Hz (Average)
<max_Hz>	Measurement result in Hz (Maximum)
<min_Hz>	Measurement result in Hz (Minimum)
Unit	Hz
Resolution	0.1 Hz

When <mode> ≠ TTL,

```
<freq_ppm>,<freq_Hz>
```

<freq_ppm>	Measurement result in ppm in specified Storage mode
Unit	ppm
Resolution	0.01 ppm
<freq_Hz>	Measurement result in Hz in specified Storage mode
Unit	Hz
Resolution	0.1 Hz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation

<cc>	Component Carrier	
		Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
	PCC	PCC
	SCC1	SCC-1
	Omitted	Total

Example of Use

To query the average of the carrier frequency error measurement results for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:FERR? 1,AVG
> 0.03,60.0
```

:FETCh:CELLular:SEQuence:LTE:MODulation:FERRor:WORSt?

Worst Carrier Frequency Error Result

Function

Queries the worst value in Frequency Error measurement results.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:FERRor:WORSt? <seg>[,<cc>]
```

Response

```
<freq_ppm>,<freq_Hz>
```

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

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The worst value should be either the maximum or minimum of the Frequency Error measurement results, whichever is the larger absolute value.

Example of Use

To query the worst value in Frequency Error measurement results for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:FERR:WORS? 1
> 0.03,60.0
```

:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:CARLeakage?

In-Band Emissions (Carrier Leakage) Result

Function

Queries the in-band emission measurement result (Carrier Leakage) for modulation analysis.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:CARLeakage?
<seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dBc
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<ibe>
```

<ibe>	Measurement result in specified Storage mode
Unit	dBc
Resolution	0.01 dB

Parameter

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of in-band emission measurement result (Carrier Leakage) of Segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:IEM:CARL? 1,AVG
> 0.04
```

:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:GENeral?

In-Band Emissions (General) Result

Function

Queries the in-band emission measurement result (General) for modulation analysis.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:GENeral?
<seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL

```
<avg>,<max>,<min>
```

<avg>	Measurement results (Average)
<max>	Measurement results (Maximum)
<min>	Measurement results (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL

```
<ibe>
```

<ibe>	Measurement results in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameter

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of in-band emission measurement result (General) of Segment 1 in the sequence measurement:

```
:FETC:CELL:SEQ:LTE:MOD:IEM:GEN? 1,AVG
> 0.04
```

:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:IQIMage?

In-Band Emissions (IQ Image) Result

Function

Queries the in-band emission measurement result (IQ Image) for modulation analysis.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:IQIMage?
<seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<ibe>
```

<ibe>	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameter

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of in-band emission measurement result (IQ Image) of Segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:IEM:IQIM? 1,AVG
> 0.04
```

:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:ITEM?

In-Band Emissions Measured Item

Function

Queries whether each in-band emission measurement item for modulation analysis is measured or not.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:ITEM? <seg>[,<cc>]
```

Response

```
<flag>
```

<flag> Measured / Not measured flag (0 to 7)

Returns the sum of the following measurement items.

0 Not measured
1 Measure General
2 Measure IQ Image
4 Measure Carrier Leakage

Parameter

<seg> Segment number

Range 0 to 1999
Resolution 1

<cc> Component Carrier

Used at UL CA and omitted at non CA.
Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.

PCC PCC
SCC1 SCC-1
Omitted Total

Example of Use

To query whether each in-band emission measurement item for modulation analysis of Segment 1 is measured or not:

```
:FETC:CELL:SEQ:LTE:MOD:IEM:ITEM? 1
> 4
```

:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:JUDGement?

In-Band Emissions Judgement

Function

Queries the judgement of in-band emission measurement result for modulation analysis.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:JUDGement?
<seg>[,<cc>]
```

Response

```
<judgement>
```

<judgement>	Judgement result
PASS	Pass
FAIL	Fail
–	Not measured

Parameter

<seg>	Segment number
Range	0 to 1999
Resolution	1
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the judgement of in-band emission measurement result for modulation analysis of Segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:IEM:JUDG? 1
> PASS
```

:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:CARLeakage?

In-Band Emissions limit (Carrier Leakage)

Function

Queries the limit for in-band emission measurement (Carrier Leakage) for modulation analysis.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:CARLeakage?
<seg>[,<cc>]
```

Response

```
<level>
```

<level>	Limit
Unit	dBc
Resolution	0.01 dB

Parameter

<seg>	Segment number
Range	0 to 1999
Resolution	1
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the limit for in-band emission measurement result (Carrier Leakage) for modulation analysis of Segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:IEM:LIM:CARL? 1
> 1.05
```

:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:GENeral?

In-Band Emissions limit (General)

Function

Queries the limit for in-band emission measurement result (General) for modulation analysis.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:GENeral?
<seg>[,<cc>]
```

Response

```
<level>
```

<level>	Limit
Unit	dB
Resolution	0.01 dB

Parameter

<seg>	Segment number
Range	0 to 1999
Resolution	1
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the limit for in-band emission measurement result (General) for modulation analysis of Segment 1.

```
:FETC:CELL:SEQ:LTE:MOD:IEM:LIMit:GEN? 1
> 2.05
```

:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:IQIMage?

In-Band Emissions limit (IQ Image)

Function

Queries the limit for in-band emission measurement (IQ Image) for modulation analysis.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:LIMit:IQIMage?
<seg>[,<cc>]
```

Response

```
<level>
```

<level>	Limit
Unit	dB
Resolution	0.01 dB

Parameter

<seg>	Segment number
Range	0 to 1999
Resolution	1
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the limit for in-band emission measurement result (IQ Image) for modulation analysis of Segment 1.

```
:FETC:CELL:SEQ:LTE:MOD:IEM:LIM:IQIM? 1
> 1.05
```

:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:MARGin?

In-Band Emissions Margin

Function

Queries the worst margin in the entire bandwidth for in-band emission measurement.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IEMissions:MARGin? <seg>[,<cc>]
```

Response

```
<margin>
```

<margin>	Worst margin in the entire bandwidth
Unit	dB
Resolution	0.01 dB

Parameter

<seg>	Segment number
Range	0 to 1999
Resolution	1
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the worst margin in the entire bandwidth for in-band emission measurement for modulation analysis of Segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:IEM:MARG? 1
> 1.05
```

:FETCh:CELLular:SEQuence:LTE:MODulation:IQIMbalance?

IQ Imbalance Result

Function

Queries the IQ Imbalance measurement results.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:IQIMbalance? <seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When <mode> ≠ TTL,

```
<iqimb>
```

<iqimb>	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

IQ Imbalance can be measured when the number of RBs is set to the maximum value for the channel bandwidth shown in Table 2.1.6-2 "Number of Allocatable Resource Blocks in Channel Bandwidth".

If the number of RBs is not the maximum allocatable value in the channel bandwidth, the response is 999.99.

Example of Use

To query the average of IQ Imbalance measurement result for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:IQIM? 1,AVG
> 0.04
```

:FETCh:CELLular:SEQuence:LTE:MODulation:MERRor?

Magnitude Error Result

Function

Queries the Magnitude Error measurement result.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:MERRor? <seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	%
Resolution	0.01%

When <mode> ≠ TTL,

```
<merr>
```

<merr>	Measurement result in specified Storage mode
Unit	%
Resolution	0.01%

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of the Magnitude Error measurement result for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:MERR? 1,AVG
> 1.05
```

:FETCh:CELLular:SEQuence:LTE:MODulation:PEVM?

Peak EVM Result

Function

Queries the EVM Peak measurement result.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:PEVM? <seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	%
Resolution	0.01%

When <mode> ≠ TTL,

```
<pevm>
```

<pevm>	Measurement result in specified Storage mode
Unit	%
Resolution	0.01%

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of EVM Peak measurement result for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:PEVM? 1,AVG
> 1.75
```

:FETCh:CELLular:SEQuence:LTE:MODulation:PHERror?

Phase Error Result

Function

Queries the Phase Error measurement result.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:PHERror? <seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	degree
Resolution	0.01 degree

When <mode> ≠ TTL,

```
<perr>
```

<perr>	Measurement result in specified Storage mode
Unit	degree
Resolution	0.01 degree

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Phase Error measurement result for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:PHER? 1,AVG
> 1.55
```

:FETCh:CELLular:SEQuence:LTE:MODulation:RSEVm?

Reference Signal EVM Result

Function

Queries the EVM measurement result of Demodulation Reference Signal.

Query

```
:FETCh:CELLular:SEQuence:LTE:MODulation:RSEVm? <seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	%
Resolution	0.01%

When <mode> ≠ TTL,

```
<rsevm>
```

<rsevm>	Measurement result in specified Storage mode
Unit	%
Resolution	0.01%

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<cc>	Component Carrier
	Used at UL CA and omitted at non CA.
	Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The EVM measurement of the Reference Signal is supported when PUSCH is assigned using the :CONFig:CELLular:LTE:CTYPe command.

Example of Use

To query the average of EVM measurement result of Reference Signal for segment 1:

```
:FETC:CELL:SEQ:LTE:MOD:RSEV? 1,AVG
> 1.51
```

:FETCh:CELLular:SEQuence:LTE:OBW?

OBW Result

Function

Queries the Occupied Bandwidth measurement result.

Query

```
:FETCh:CELLular:SEQuence:LTE:OBW? <seg>[,<cc>]
```

Response

<bw>

<bw>	Occupied Bandwidth
Unit	MHz
Resolution	1 kHz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.3.2-1 Measurement Items of OBW” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of the in-band emissions (Carrier Leakage) measurement result for segment 0:

```
:FETC:CELL:SEQ:LTE:OBW? 0
> 3.840
```

:FETCh:CELLular:SEQuence:LTE:OBW:FREQuency?

OBW Frequency Result

Function

Queries the upper, lower or center frequency of Occupied Bandwidth in Sequence Measurement mode.

Query

```
:FETCh:CELLular:SEQuence:LTE:OBW:FREQuency? <seg>,<pos>[,<cc>]
```

Response

```
<freq>
```

<freq>	Offset frequency
Unit	MHz
Resolution	1 kHz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<pos>	Offset type
UPPER	Upper frequency
LOWER	Lower frequency
CENTER	Center frequency
<cc>	Component Carrier
	Used at UL CA and omitted at non CA.
	Refer to “Table 2.3.2-1 Measurement Items of OBW” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the upper frequency of the Occupied Bandwidth measurement result for segment 1:

```
:FETC:CELL:SEQ:LTE:OBW:FREQ? 1,UPPER
> 1951.920
```

:FETCh:CELLular:SEQuence:LTE:POWer:CHPower?

Channel Power Result

Function

Queries the Channel Power measurement result.

Query

```
:FETCh:CELLular:SEQuence:LTE:POWer:CHPower? <seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dBm
Resolution	0.01 dB

When <mode> = AVG, MAX, MIN or DVT,

```
<pwr>
```

<pwr>	Measurement result in specified Storage mode
Unit	dBm
Resolution	0.01 dB

When <mode> = IND,

```
<s>,<pwr(1)>,<pwr(2)>,<pwr(3)>,...,<pwr(s)>
```

<s>	Measurement count
Range	1 to 200
<pwr(s)>	Channel Power of sth measurement
Unit	dBm
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	Individual measurement result
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.2.2-1 Measurement Items of Tx Power” for details.
PCC	PCC

SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of the Channel Power measurement result for segment 0:

```
:FETC:CELL:SEQ:LTE:POW:CHP? 0,AVG
> -20.00
```

:FETCh:CELLular:SEQuence:LTE:POWer:TXPower?

Tx Power Result

Function

Queries the Tx power measurement result.

Query

```
:FETCh:CELLular:SEQuence:LTE:POWer:TXPower? <seg>,<mode>[,<cc>]
```

Response

When <mode> = TTL,

```
<avg>,<max>,<min>
```

<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
Unit	dBm
Resolution	0.01 dB

When <mode> = AVG, MAX, MIN or DVT,

```
<pwr>
```

<pwr>	Measurement result in specified Storage mode
Unit	dBm
Resolution	0.01 dB

When <mode> = IND,

```
<s>,<pwr(1)>,<pwr(2)>,...,<pwr(s)>
```

<s>	Measurement count
Range	1 to 200
<pwr(s)>	Channel Power of sth measurement
Unit	dBm
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum

MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	Individual measurement result
<cc>	Component Carrier
	Used at UL CA and omitted at non CA.
	Refer to “Table 2.2.2-1 Measurement Items of Tx Power” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Tx Power measurement results for segment 1:

```
:FETC:CELL:SEQ:LTE:POW:TXP? 1,AVG
> -20.00
```

:FETCh:CELLular:SEQuence:LTE:SEMask:JUDGement?

SEM Judgement

Function

Queries the judgement of the Spectrum Emission Mask measurement result.
Fail when any part of spectrum exceeds limit, otherwise Pass.

Query

```
:FETCh:CELLular:SEQuence:LTE:SEMask:JUDGement? <seg>[,<cc>]
```

Response

```
<judgement>
```

<judgement>	Judgement
PASS	Pass
FAIL	Fail
–	Not measured

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the judgement of the Spectrum Emission Mask measurement result for segment 1:

```
:FETC:CELL:SEQ:LTE:SEM:JUDG? 1
> PASS
```

:FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:LOWer?

SEM Peak Value (Lower)

Function

Queries the peak level with offset frequency at each of lower side ranges of Spectrum Emission Mask measurement.

Query

```
:FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:LOWer? <seg>[<cc>]
```

Response

```
<f_M1>,<l_M1>,<f_M2>,<l_M2>,<f_M3>,<l_M3>,<f_M4>,<l_M4>
```

<l_M1> to <l_M4>	Peak level in each of lower Range 1 to Range 4
Unit	dBm
Resolution	0.01 dB
<f_M1> to <f_M4>	Offset frequency of peak level in each of lower Range 1 to Range 4
Unit	MHz
Resolution	1 kHz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the peak level with offset frequency at each of lower side ranges of Spectrum Emission Mask measurement for segment 1:

```
:FETC:CELL:SEQ:LTE:SEM:LEV:LOW? 1
> -3.000,-20.00,-5.000,-30.00,-8.000,-40.00,-9.500,-50.00
```

:FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:LOWer:DETail?

SEM Peak Value (Detail) (Lower)

Function

Queries the peak level with offset frequency at each of lower side of 9 ranges of Spectrum Emission Mask measurement.

Refer to Table 2.4.1-2 Available Frequency Ranges for Spectrum Emission Mask Measurements (1/2) and Table 2.4.1-3 Available Frequency Ranges for Spectrum Emission Mask Measurements (2/2) for details.

Query

```
:FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:LOWer:DETail? <seg>[,<cc>]
```

Response

```
<f_M1>,<l_M1>,<f_M2>,<l_M2>,<f_M3>,<l_M3>,<f_M4>,<l_M4>,<f_M5>,<l_M5>,<f_
M6>,<l_M6>,<f_M7>,<l_M7>,<f_M8>,<l_M8>,<f_M9>,<l_M9>
```

<l_M1> to <l_M9>	Peak level in each of lower Range 1 to Range 9
Unit	dBm
Resolution	0.01 dB
<f_M1> to <f_M9>	Offset frequency of peak level in each of lower Range 1 to Range 9
Unit	MHz
Resolution	1 kHz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The number of target ranges varies with the combination of channel bandwidth and network signalled value for AdditionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the peak level with offset frequency at each of lower side of 9 ranges of Spectrum Emission Mask measurement for segment 0:

```
:FETC:CELL:SEQ:LTE:SEM:LEV:LOW:DET? 0
>
-0.500,3.00,-1.500,3.00,-2.600,3.00,-3.500,3.00,-5.500,3.00,-8.000,3.00,-
12.500,3.00,-17.500,3.00,-22.500,3.00
```

:FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:UPPer?

SEM Peak Value (Upper)

Function

Queries the peak level with offset frequency at each of upper side ranges of Spectrum Emission Mask measurement.

Query

```
:FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:UPPer? <seg>[,<cc>]
```

Response

```
<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>
```

<l_1> to <l_4>	Peak level in each of upper Range 1 to Range 4
Unit	dBm
Resolution	0.01 dB
<f_1> to <f_4>	Offset frequency of peak level in each of upper Range 1 to Range 4
Unit	MHz
Resolution	1 kHz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

Refer to Table 2.4.1-1 "Frequency Ranges of Range 1 to Range 4" for the frequency range for the measurement.

Example of Use

To query the peak level with offset frequency at each of upper side ranges of Spectrum Emission Mask measurement for segment 1:

```
:FETC:CELL:SEQ:LTE:SEM:LEV:UPP? 1
> 3.000,-20.00,5.000,-30.00,8.000,-40.00,9.500,-50.00
```

:FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:UPPer:DETail?

SEM Peak Value (Detail) (Upper)

Function

Queries the peak level with offset frequency at each of upper side of 9 measurement ranges of Spectrum Emission Mask measurement

Refer to Table 2.4.1-2 Available Frequency Ranges for Spectrum Emission Mask Measurements (1/2) and Table 2.4.1-3 Available Frequency Ranges for Spectrum Emission Mask Measurements (2/2) for details.

Query

```
:FETCh:CELLular:SEQuence:LTE:SEMask:LEVel:UPPer:DETail? <seg>[,<cc>]
```

Response

```
<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>,<f_5>,<l_5>,<f_6>,<l_6>,<f_7>,<l_7>,<f_8>,<l_8>,<f_9>,<l_9>
```

<l_1> to <l_9>	Peak level in each of upper Range 1 to Range 9
Unit	dBm
Resolution	0.01 dB
<f_1> to <f_9>	Offset frequency of peak level in each of upper Range 1 to Range 9
Unit	MHz
Resolution	1 kHz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The number of target ranges varies with the combination of channel bandwidth and network signalled value for AdditionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the peak level with offset frequency at each of upper side of nine ranges of Spectrum Emission Mask measurement for segment 0:

```
:FETC:CELL:SEQ:LTE:SEM:LEV:UPP:DET? 0
>
0.500,3.00,1.500,3.00,2.600,3.00,3.500,3.00,5.500,3.00,8.000,3.00,12.500,
3.00,17.500,3.00,22.500,3.00
```

:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:LOWer?

SEM Template Margin (Lower)

Function

Queries the level margin at each of lower side ranges in Spectrum Emission Mask measurement.

Query

```
:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:LOWer? <seg>[,<cc>]
```

Response

```
<f_M1>,<l_M1>,<f_M2>,<l_M2>,<f_M3>,<l_M3>,<f_M4>,<l_M4>
```

<l_M1> to <l_M4>	Level margin in each of lower Range 1 to Range 4
Unit	dBm
Resolution	0.01 dB
<f_M1> to <f_M4>	Offset frequency where level margin in each of lower Range 1 to Range 4 measured
Unit	MHz
Resolution	1 kHz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

Level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

Refer to Table 2.4.1-1 Frequency Ranges of Range 1 to Range 4 for the frequency range for the measurement.

Example of Use

To query the level margin with frequency where margin measured at each of lower side ranges of Spectrum Emission Mask measurement for segment 1:

```
:FETC:CELL:SEQ:LTE:SEM:MARG:LOW? 1
> -3.000,3.00,-5.000,3.00,-8.000,3.00,-9.500,3.00
```

:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:LOWer:DETail?

SEM Template Margin (Detail) (Lower)

Function

Queries the level margin with frequency where margin was measured at each of lower side 9 measurement ranges in Spectrum Emission Mask measurement.

Refer to Table 2.4.1-2 Available Frequency Ranges for Spectrum Emission Mask Measurements (1/2) and Table 2.4.1-3 Available Frequency Ranges for Spectrum Emission Mask Measurements (2/2) for details.

Query

```
:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:LOWer:DETail? <seg>[,<cc>]
```

Response

```
<f_M1>,<l_M1>,<f_M2>,<l_M2>,<f_M3>,<l_M3>,<f_M4>,<l_M4>,<f_M5>,<l_M5>,<f_M6>,<l_M6>,<f_M7>,<l_M7>,<f_M8>,<l_M8>,<f_M9>,<l_M9>
```

<l_M1> to <l_M9>	Level margin in each of lower Range 1 to Range 9
Unit	dBm
Resolution	0.01 dB
<f_M1> to <f_M9>	Offset frequency where level margin in each of lower Range 1 to Range 9 measured
Unit	MHz
Resolution	1 kHz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

The number of target ranges varies with the combination of channel bandwidth and network signalled value for AdditionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the level margin with frequency where margin measured at each of lower side of 9 ranges of Spectrum Emission Mask measurement for segment 0:

```
:FETC:CELL:SEQ:LTE:SEM:MARG:LOW:DET? 0
>
-0.500,3.00,-1.500,3.00,-2.600,3.00,-3.500,3.00,-5.500,3.00,-8.000,3.00,-12.500,3.00,-17.500,3.00,-22.500,3.00
```

:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:UPPer?

SEM Template Margin (Upper)

Function

Queries the level margin at each of upper side range in Spectrum Emission Mask measurement.

Query

```
:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:UPPer? <seg>[,<cc>]
```

Response

```
<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>
```

<l_1> to <l_4>	Level margin in each of upper Range 1 to Range 4
Unit	dBm
Resolution	0.01 dB
<f_1> to <f_4>	Offset frequency where level margin in each of upper Range 1 to Range 4 measured
Unit	MHz
Resolution	1 kHz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

Level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

Refer to Table 2.4.1-1 Frequency Ranges of Range 1 to Range 4 for the frequency range for the measurement.

Example of Use

To query the level margin with frequency where margin measured at each of upper side ranges of Spectrum Emission Mask measurement for segment 1:

```
:FETC:CELL:SEQ:LTE:SEM:MARG:UPP? 1
> 3.000,3.00,5.000,3.00,8.000,3.00,9.500,3.00
```

:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:UPPer:DETail?

SEM Template Margin (Detail) (Upper)

Function

Queries the level margin with frequency where margin was measured at each of upper side 9 measurement ranges in Spectrum Emission Mask measurement.

Refer to Table 2.4.1-2 Available Frequency Ranges for Spectrum Emission Mask Measurements (1/2) and Table 2.4.1-3 Available Frequency Ranges for Spectrum Emission Mask Measurements (2/2) for details.

Query

```
:FETCh:CELLular:SEQuence:LTE:SEMask:MARGin:UPPer:DETail? <seg>[,<cc>]
```

Response

```
<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>,<f_5>,<l_5>,<f_6>,<l_6>,<f_7>,<l_7>,<f_8>,<l_8>,<f_9>,<l_9>
```

<l_1> to <l_9>	Level margin in each of upper Range 1 to Range 9
Unit	dBm
Resolution	0.01 dB
<f_1> to <f_9>	Offset frequency where level margin in each of upper Range 1 to Range 9 measured
Unit	MHz
Resolution	1 kHz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<cc>	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

The number of target ranges varies with the combination of channel bandwidth and network signalled value for AdditionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the level margin with frequency where margin measured at each of upper side of 9 ranges of Spectrum Emission Mask measurement for segment 0:

```
:FETC:CELL:SEQ:LTE:SEM:MARG:UPP:DET? 0
>
0.500,3.00,1.500,3.00,2.600,3.00,3.500,3.00,5.500,3.00,8.000,3.00,12.500,
3.00,17.500,3.00,22.500,3.00
```

:FETCh:CELLular:SEQuence:PROGress?

Sequence Progress

Function

Queries the progress ratio and the executing sequence number.

Query

```
:FETCh:CELLular:SEQuence:PROGress?
```

Response

```
<p>,<cur>,<start>,<stop>
```

<p>	Progress ratio in Sequence Measurement mode
Range	0 to 100%
<cur>	Current segment number being executed
Range	0 to 1999
<start>	First segment number
Range	0 to 1999
<stop>	Last segment number
Range	0 to 1999

Example of Use

To query the progress ratio and the executing sequence number in Sequence Measurement mode:

```
:FETC:CELL:SEQ:PROG?
>65,23,11,30
```

Remarks

The first and last segment numbers are the same as the start and end segment numbers specified using the :CONFigure:CELLular:SEQuence:CONTrol command.

:FETCh:CELLular:SEQuence:SEG:STATe?

Specified Segment Status

Function

Queries the measurement status of the specified segment.

Query

```
:FETCh:CELLular:SEQuence:SEG:STATe? <seg>
```

Response

<stat>

<stat>	Segment status
0	Measurement completed successfully
2	Over level
3	Under level
4	Measurement failed
5	Synchronization word not detected
9	Measurement in progress or not measured
10	Segment not measured
12	Tx measurement timeout

The value received from MX887013A or MX887014A is 0, 2, 5, 9, 10, or 12.

Parameters

<seg>	Segment number
Range	0 to 1999

Example of Use

To query the measurement status of segment 16:

```
:FETC:CELL:SEQ:SEG:STAT 16
> 0
```

:FETCh:CELLular:SEQuence:STATe?

Sequence Measurement Status

Function

Queries the status of sequence measurement.

Query

```
:FETCh:CELLular:SEQuence:STATe?
```

Response

```
<m_status>,<n>,<s(0)>,<s(1)>,..,<s(n-1)>
```

<m_status>		Measurement execution status
	0	Measurement completed successfully
	2	Over level
	3	Under level
	4	Measurement failed
	5	Synchronization word not detected
	9	Measurement in progress or not measured
	12	Tx measurement timeout
	The value received from MX887013A or MX887014A is 0, 2, 5, 9, or 12.	
<n>		Number of measured segments
	Range	0 to 2000
<s(n–1)>		Measurement status of specified segment
	0	Measurement completed successfully
	2	Over level
	3	Under level
	4	Measurement failed
	5	Synchronization word not detected
	9	Measurement in progress or not measured
	10	Segment not measured
	12	Tx measurement timeout
	The value received from MX887013A or MX887014A is 0, 2, 5, 9, 10, or 12.	

Example of Use

To query the status of sequence measurement:

```
:FETC:CELL:SEQ:STAT?
>2,6,0,0,0,0,2,0
```

The results shows that six segments are measured segments and the fifth segment is over level.

Related commands

:FETCh:CELLular:MEASurement:STATe

:FETCh:CELLular:SEQuence:SEG:STATe

:INITiate:CELLular:SEQuence:EXECute:TX

Start Signal Analyzer Measurement Only

Function

Sets only the parameters for the specified measurement and executes measurement, without affecting the signal transmission parameters.

Command

```
:INITiate:CELLular:SEQuence:EXECute:TX
```

:TRIGger:CELLular:MEASurement:TOUT

Trigger Timeout

Function

Sets or queries the trigger timeout.

Command

```
:TRIGger:CELLular:MEASurement:TOUT <time>
```

Query

```
:TRIGger:CELLular:MEASurement:TOUT?
```

Response

<time>

Unit	s
Resolution	1 s

Parameters

<time>	Timeout time
Range	1 to 60 s
Resolution	1 s
Suffix code	NS, US, MS, S (uses s when omitted)
Default	10 s

Example of Use

To set the Trigger timeout to 10 seconds:

```
:TRIG:CELL:MEAS:TOUT 10
:TRIG:CELL:MEAS:TOUT?
> 10
```

:TRIGger:CELLular:SEQuence

Sequence Table Parameter - Trigger

Function

Sets or queries the trigger condition for starting Sequence Measurement.

Command

```
:TRIGger:CELLular:SEQuence <seg>,<src>,<slope>,<level>,<delay>
```

Query

```
:TRIGger:CELLular:SEQuence? <seg>
```

Response

```
<src>,<slope>,<level>,<delay>
```

Parameters

<seg>	Segment number
Range	0 to 1999
<src>	Trigger source
FRAME	Frame
FREERUN	Free run
PWR	Input signal power
Default	FREERUN
<slope>	Trigger slope
RISE	Rising edge trigger
Default	RISE
<level>	Trigger level
Range	–40 to 0 dB
Resolution	1 dB
Suffix Code	DB (uses dB when omitted)
Default	–30 dB
<delay>	Delay time
Range	0 to 1000.000 ms
Resolution	0.001 ms
Suffix Code	NS, US, MS, S (uses ms when omitted)
Default	0.000 ms

Details

The trigger slope and trigger level are enabled when trigger source is set to PWR.

Example of Use

To set the trigger condition of segment 2 as follows:

Trigger source:PWR, Trigger slope: RISE, Trigger level: -30 dB, Delay time: 0

```
:TRIG:CELL:SEQ 2,PWR,RISE,-30,0
:TRIG:CELL:SEQ? 2
> PWR,RISE,-30,0.000
```

Remarks

Trigger level is defined as the level difference from the input level specified by the following commands:
:CONFigure:CELLular:MEASurement:RFSettings:LEVel
:CONFigure:CELLular:SEQuence:RFSettings:TRX

Chapter 5 Native Command Reference

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

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5.1 List of Commands

The following table shows the rules for describing messages.

[ ]	Messages or parameters in square brackets can be omitted.
|	Choose one of several choices. A | B | C | D indicates a choice of A, B, C, and D.
{ }	Curly brackets are used to group options. For A | B({C | D}), choose A, B(C), or B(D).

5.1.1 Common commands

Common

Function	Command	Query	Response
Standard Select	STDSEL std	STDSEL?	std
Set Connect Port Direction	PORT input,output[,output,…,output]	PORT?	input,output[,output,…,output]

Measurement

Function	Command	Query	Response
Measurement Stop	MEASSTOP	-----	-----
Measurement Status	-----	MSTAT	m_status
Measurement Start	SNGLS	-----	-----
End Event Status (Measurement) Register Query	-----	ESR2?	register
Error Event Status (Measurement) Register Query	-----	ESR3?	register

Common Parameters

Function	Command	Query	Response
Output Level On/Off	LVL on_off	LVL?	on_off
Output Signal Modulation	MOD on_off	MOD?	on_off
Waveform File Select	PACKAGE pac	PACKAGE?	pac
Waveform Pattern Select	DLPAT pat	DLPAT?	pat
Waveform Pattern Select (SYNC)	DLPAT_SYNC pat	DLPAT_SYNC?	pat

System

Function	Command	Query	Response
Application Select	SYSSEL app	SYSSEL?	App
Language Selection of Remote Command	SYST:LANG mode	SYST:LANG?	mode

5.1.2 Fundamental measurement commands

Common Parameters

Function	Command	Query	Response
Input Level	ILVL level[,level_scc1]	ILVL? [ALL]	level,level_scc1
Input Level for SCC-1	ILVL_SCC1 level	ILVL_SCC1?	level
External Loss Table Index for SCC-1	EXTLOSSINDEX_SCC1 index	EXTLOSSINDEX_SCC1?	index
Output Level	OLVL level	OLVL?	level
Downlink Channel	DLCHAN dl_ch	DLCHAN?	dl_ch
Downlink Channel for SCC-1	DLCHAN_SCC1 dl_ch	DLCHAN_SCC1?	dl_ch
Downlink Frequency	RXFREQ dl_freq DLFREQ dl_freq	RXFREQ? DLFREQ?	dl_freq
Downlink Frequency for SCC-1	DLFREQ_SCC1 dl_freq	DLFREQ_SCC1?	dl_freq
Uplink Channel	ULCHAN ul_ch[,ul_ch_scc1]	ULCHAN? [ALL]	ul_ch,ul_ch_scc1
Uplink Channel for SCC-1	ULCHAN_SCC1 ul_ch	ULCHAN_SCC1?	ul_ch
Uplink Frequency	TXFREQ ul_freq[,ul_freq_scc1] ULFREQ ul_freq[,ul_freq_scc1]	TXFREQ? [ALL] ULFREQ? [ALL]	ul_freq,ul_freq_scc1
Uplink Frequency for SCC-1	ULFREQ_SCC1 ul_freq	ULFREQ_SCC1?	ul_freq
AWGN Level On/Off	AWGNLVL on_off	AWGNLVL?	on_off
AWGN Level	AWGNPWR level	AWGNPWR?	level

LTE Setting

Function	Command	Query	Response
Channel Bandwidth	BANDWIDTH ch_bw[,ch_bw_scc1]	BANDWIDTH? [ALL]	ch_bw,ch_bw_scc1
Channel Bandwidth for SCC-1	BANDWIDTH_SCC1 ch_bw	BANDWIDTH_SCC1?	ch_bw
Channel Bandwidth, RB	BW_RB ch_bw[,rb[,start]]	BW_RB?	ch_bw,rb,start
Channel Bandwidth, RB for SCC-1	BW_RB_SCC1 ch_bw[,rb[,start]]	BW_RB_SCC1?	ch_bw,rb,start
RMC Configuration	CHCONFIG val	CHCONFIG?	val
Channel Coding	CHCODING object	CHCODING?	object
Frame Structure	FRAMETYPE mode	FRAMETYPE?	mode
Frame Structure for SCC-1	FRAMETYPE_SCC1 mode	FRAMETYPE_SCC1?	mode
nRB-CQI	NRBCQI value	NRBCQI?	value
UL RMC Starting RB	ULRB_START ulrb	ULRB_START?	ulrb
UL RMC Starting RB for SCC-1	ULRB_START_SCC1 ulrb	ULRB_START_SCC1?	ulrb
UL RMC Modulation	ULRMC_MOD ul_rmc_mod	ULRMC_MOD?	ul_rmc_mod
UL RMC Modulation for SCC-1	ULRMC_MOD_SCC1 ul_rmc_mod	ULRMC_MOD_SCC1?	ul_rmc_mod
UL RMC Number of RB	ULRMC_RB ul_rmc_rb	ULRMC_RB?	ul_rmc_rb
UL RMC Number of RB for SCC-1	ULRMC_RB_SCC1 ul_rmc_rb	ULRMC_RB_SCC1?	ul_rmc_rb
Trigger Delay	FMEAS_TRGDLY trgdly	FMEAS_TRGDLY?	trgdly
Trigger Level	FMEAS_TRGLVL trglevel	FMEAS_TRGLVL?	trglevel
Trigger Source	FMEAS_TRGSRC trgsrc	FMEAS_TRGSRC?	trgsrc
Trigger Timeout	FMEAS_TRGTOUT trgtime	FMEAS_TRGTOUT?	trgtime
Cell ID	CELLID id	CELLID?	id
Cell ID for SCC-1	CELLID_SCC1 id	CELLID_SCC1?	id
Cyclic Shift	CSHIFT on_off	CSHIFT?	on_off

LTE Setting (Cont'd)

Function	Command	Query	Response
Group hopping	GROUPHOP on_off	GROUPHOP?	on_off
Delta SS	DELTASS val	DELTASS?	val
Operation band	BAND band	BAND?	band
Operation band for SCC-1	BAND_SCC1 band	BAND_SCC1?	band
Test Environment	TESTENV env	TESTENV?	env
In-band Emission Carrier Leakage Frequency	IBEM_CLFR clf	IBEM_CLFR?	clf
Measurement Carrier	MCARRIER carrier	MCARRIER?	carrier
In-band emissions carrier leakage template	TP_INBANDE_LEAK tp	TP_INBANDE_LEAK?	tp
In-band Emissions Carrier Leakage Template for SCC-1	TP_INBANDE_LEAK_SCC1 tp	TP_INBANDE_LEAK_SCC1?	tp
Uplink Downlink Configuration	TDDULDLCONF conf	TDDULDLCONF?	conf
Frequency Error Range	FREQERRRNG value	FREQERRRNG?	value

Fundamental Measurement Parameters

Function	Command	Query	Response
Adjacent Channel Leakage Power Ratio Enable and Count	ACLR_SET on_off[,count]	ACLR_SET?	on_off,count
Turn Off All Measurement Items	ALLMEASITEMS_OFF	-----	-----
Fast Power Measurement Mode	FASTPWRMODE on_off	FASTPWRMODE?	on_off
Measurement Item	MEASITEM item	MEASITEM?	item
Power Template - Wide Dynamic Range	PT_WDR on_off	PT_WDR?	on_off
Power Template - ON power tolerance Limit	TP_TMASK_GEN_TOL limit	TP_TMASK_GEN_TOL?	limit
Power Template - Transmit OFF power Limit	TP_OFFPWR_UL limit	TP_OFFPWR_UL?	limit
Long Span Search	LONGSEARCH on_off	LONGSEARCH?	on_off
Modulation Analysis Measurement Enable and Count	MOD_SET on_off[,count]	MOD_SET?	on_off,count
Occupied Bandwidth Ratio	OBW_RATIO ratio	OBW_RATIO?	ratio
OBW Measurement Enable and Count	OBW_SET on_off[,count]	OBW_SET?	on_off,count
Tx Power Measurement Enable and Count	PWR_SET on_off[,count]	PWR_SET?	on_off,count

Fundamental Measurement Parameters (Cont'd)

Function	Command	Query	Response
Spectrum Emission Mask Enable and Count	SEM_SET on_off[,count]	SEM_SET?	on_off,count
Spectrum Emission Mask Template (1.4MHz)	SEM_TEMPLATE_1.4MHZ range,limit	SEM_TEMPLATE_1.4MHZ? range	limit
Spectrum Emission Mask Template (10 MHz)	SEM_TEMPLATE_10MHZ range,limit	SEM_TEMPLATE_10MHZ? range	limit
Spectrum Emission Mask Template (15 MHz)	SEM_TEMPLATE_15MHZ range,limit	SEM_TEMPLATE_15MHZ? range	limit
Spectrum Emission Mask Template (20 MHz)	SEM_TEMPLATE_20MHZ range,limit	SEM_TEMPLATE_20MHZ? range	limit
Spectrum Emission Mask Template (3 MHz)	SEM_TEMPLATE_3MHZ range,limit	SEM_TEMPLATE_3MHZ? range	limit
Spectrum Emission Mask Template (5 MHz)	SEM_TEMPLATE_5MHZ range,limit	SEM_TEMPLATE_5MHZ? range	limit
Spectrum Emission Mask Template for Contiguous UL CA (100RB+100RB)	SEM_TEMPLATE_CONTCC_100RB _100RB range,limit	SEM_TEMPLATE_CONTCC_100RB _100RB? range	limit
Spectrum Emission Mask Template for Contiguous UL CA (25RB+100RB)	SEM_TEMPLATE_CONTCC_25RB_ 100RB range,limit	SEM_TEMPLATE_CONTCC_25RB_ 100RB? range	limit
Spectrum Emission Mask Template for Contiguous UL CA (50RB+100RB)	SEM_TEMPLATE_CONTCC_50RB_ 100RB range,limit	SEM_TEMPLATE_CONTCC_50RB_ 100RB? range	limit
Spectrum Emission Mask Template for Contiguous UL CA (75RB+100RB)	SEM_TEMPLATE_CONTCC_75RB_ 100RB range,limit	SEM_TEMPLATE_CONTCC_75RB_ 100RB? range	limit
Spectrum Emission Mask Template for Contiguous UL CA (75RB+75RB)	SEM_TEMPLATE_CONTCC_75RB_ 75RB range,limit	SEM_TEMPLATE_CONTCC_75RB_ 75RB? range	limit
additionalSpectrumEmission	SIB2_NS sib2_ns	SIB2_NS?	sib2_ns
Power Template measurement Enable and Count	TEMPLATE_SET on_off[,count]	TEMPLATE_SET?	on_off,count

Results

Function	Command	Query	Response
ACLR Result	-----	ACLR? mode[,cc]	{avg,max,min}|aclr
Carrier Leakage Result	-----	CARRLEAK? mode[,cc]	{avg,max,min}|cleakage
Carrier Frequency Error Result	-----	CFERR? mode[,cc]	{avg_ppm,avg_Hz,max_ppm,max_Hz,min_ppm,min_Hz}|{freq_ppm,freq_Hz}
Worst Carrier Frequency Error Result	-----	CFERR_WORST? [cc]	freq_ppm,freq_Hz
Carrier Frequency Result	-----	CFREQ? [cc]	freq
Channel Power Result	-----	CHPWR? mode[,cc]	{avg,max,min}|pwr|{s,pwr(1),pwr(2),...,pwr(s)}
EVM Result	-----	EVM? mode[,cc]	{avg,max,min}|evm
In-Band Emissions Measured Item	-----	INBANDEITEM? [cc]	flag
In-Band Emissions Judgement	-----	INBANDEPASS? [cc]	judgement
In-Band Emissions (General) Result	-----	INBANDE_GEN? mode[,cc]	{avg,max,min}|ibe
In-Band Emissions limit (General)	-----	INBANDE_GENUL? [cc]	level
In-Band Emissions (IQ Image) Result	-----	INBANDE_IMG? mode[,cc]	{avg,max,min}|ibe
In-Band Emissions limit (IQ Image)	-----	INBANDE_IMGUL? [cc]	level
In-Band Emissions (Carrier Leakage) Result	-----	INBANDE_LEAK? mode[,cc]	{avg,max,min}|ibe
In-Band Emissions limit (Carrier Leakage)	-----	INBANDE_LEAKUL? [cc]	level
In-Band Emissions Margin	-----	INBANDE_MARG? [cc]	margin
IQ Imbalance Result	-----	IQIMB? mode[,cc]	{avg,max,min}|iqimb
Magnitude Error Result	-----	MAGERR? mode[,cc]	{avg,max,min}|merr
OBW Result	-----	OBW?	bw

Results (Cont'd)

Function	Command	Query	Response
OBW Frequency Result	-----	OBWFREQ? pos	freq
Peak EVM Result	-----	PEVM? mode[,cc]	{avg,max,min}|pevm
Phase Error Result	-----	PHASEERR? mode[,cc]	{avg,max,min}|perr
Rho Result	-----	RHO? mode[,cc]	{avg,max,min}|rho
Reference Signal EVM Result	-----	RSEVM? mode[,cc]	{avg,max,min}|rsevm
SEM Judgement	-----	SEM? [cc]	judgement
SEM Peak Value (Detail) (Lower)	-----	SEMLVL_DET_LOWER? [cc]	l_M1,l_M2,l_M3,l_M4,l_M5,l_M6,l_M7,l_M8,l_M9,f_M1,f_M2,f_M3,f_M4,f_M5,f_M6,f_M7,f_M8,f_M9
SEM Peak Value (Detail) (Upper)	-----	SEMLVL_DET_UPPER? [cc]	l_1,l_2,l_3,l_4,l_5,l_6,l_7,l_8,l_9,f_1,f_2,f_3,f_4,f_5,f_6,f_7,f_8,f_9
SEM Peak Value (Lower)	-----	SEMLVL_LOWER? [cc]	l_M1,l_M2,l_M3,l_M4,f_M1,f_M2,f_M3,f_M4
SEM Peak Value (Upper)	-----	SEMLVL_UPPER? [cc]	l_1,l_2,l_3,l_4,f_1,f_2,f_3,f_4
SEM Template Margin (Detail) (Lower)	-----	SEMMARGIN_DET_LOWER? [cc]	l_M1,l_M2,l_M3,l_M4,l_M5,l_M6,l_M7,l_M8,l_M9,f_M1,f_M2,f_M3,f_M4,f_M5,f_M6,f_M7,f_M8,f_M9
SEM Template Margin (Detail) (Upper)	-----	SEMMARGIN_DET_UPPER? [cc]	l_1,l_2,l_3,l_4,l_5,l_6,l_7,l_8,l_9,f_1,f_2,f_3,f_4,f_5,f_6,f_7,f_8,f_9
SEM Template Margin (Lower)	-----	SEMMARGIN_LOWER? [cc]	l_M1,l_M2,l_M3,l_M4,f_M1,f_M2,f_M3,f_M4
SEM Template Margin (Upper)	-----	SEMMARGIN_UPPER? [cc]	l_1,l_2,l_3,l_4,f_1,f_2,f_3,f_4

Results (Cont'd)

Function	Command	Query	Response
Spectrum Flatness Measured Item	-----	SPECFLATITEM? [cc]	flag
Spectrum Flatness Judgement	-----	SPECFLATPPPASS? [cc]	judgement
Spectrum Flatness (≥3 MHz (RP1)) Result	-----	SPECFLAT_RP1? mode[,cc]	{avg,max,min}|sflatness
Spectrum Flatness (RP12) Result	-----	SPECFLAT_RP12? mode[,cc]	{avg,max,min}|sflatness
Spectrum Flatness (<3 MHz (RP2)) Result	-----	SPECFLAT_RP2? mode[,cc]	{avg,max,min}|sflatness
Spectrum Flatness (RP21) Result	-----	SPECFLAT_RP21? mode[,cc]	{avg,max,min}|sflatness
Spectrum Flatness (≥3 MHz) Result	-----	SPECFLAT1? [cc]	worst
Spectrum Flatness (≥3 MHz (R1 –)) Result	-----	SPECFLAT1_M? mode[,cc]	{avg,max,min}|sflatness
Spectrum Flatness (≥3 MHz (R1 +)) Result	-----	SPECFLAT1_P? mode[,cc]	{avg,max,min}|sflatness
Spectrum Flatness (<3 MHz) Result	-----	SPECFLAT2? [cc]	worst
Spectrum Flatness (<3 MHz (R2 –)) Result	-----	SPECFLAT2_M? mode[,cc]	{avg,max,min}|sflatness
Spectrum Flatness (<3 MHz (R2 +)) Result	-----	SPECFLAT2_P? mode[,cc]	{avg,max,min}|sflatness
Tx Power Result -----	-----	TXPWR? mode[,cc]	{avg,max,min}|pwr|{s,pwr(1),pwr(2),...,pwr(s)}
On Power	-----	ONPWR? mode	{avg,max,min}|level
Off Power (Before)	-----	OFFPWR_BEFORE? mode	{avg,max,min}|level
Off Power (After)	-----	OFFPWR_AFTER? mode	{avg,max,min}|level
On Power Judgement	-----	ONPWRPASS?	judgement
Off Power Judgement	-----	OFFPWRPASS?	judgement
Waveform	-----	WAVEFMEAS? format,position,length[,symbol[,cc]]	data(n)

5.1.3 Sequence measurement commands

Common Parameters

Function	Command	Query	Response
Input Level	ILVL level	ILVL?	level
Output Level	OLVL level	OLVL?	level
External Loss Table Index for SCC-1	LTE_EXTLOSSINDEX_SCC1 index	LTE_EXTLOSSINDEX_SCC1?	index
Downlink Frequency	RXFREQ dl_freq DLFREQ dl_freq	RXFREQ? DLFREQ?	dl_freq
Uplink Frequency	TXFREQ ul_freq ULFREQ ul_freq	TXFREQ? ULFREQ?	ul_freq
Channel Bandwidth, RB	LTE_BW_RB mcond,ch_bw[,rb[,start]]	LTE_BW_RB? mcond	ch_bw,rb,start
Channel Bandwidth, RB for SCC-1	LTE_BW_RB_SCC1 mcond,ch_bw[,rb[,start]]	LTE_BW_RB_SCC1? mcond	ch_bw,rb,start

Sequence Measurements

Function	Command	Query	Response
Sequence Measurement Status	-----	SEQMSTAT?	m_status,n,s(0),s(1),…,s(n-1)
Sequence Progress	-----	SEQPROGRESS?	p,cur,start,end
Specified Segment Status	-----	SEQSEGSTAT? seg	stat
Trigger Timeout	TRGTOUT time	TRGTOUT?	time

Sequence Control Parameters

Function	Command	Query	Response
Sequence Control Parameter - Sequence Control	SEQCTRL start,end	SEQCTRL?	start,end
Sequence Control Parameter - Sequence Control	SEQCTRLTX start,end	SEQCTRLTX?	start,end
Start Signal Analyzer Measurement Only	SEQEXECTX	-----	-----
Sequence Control Parameter - Sequence End State Reinitialization	SEQREINIT sw	SEQREINIT?	sw
Sequence Control Parameter - Sequence Table	SEQTBL table	SEQTBL?	table
Measurement Offset	LTE_MEASOFFSET mcond,on_off[,time]	LTE_MEASOFFSET? mcond	on_off,time
RS Search Range for FDD mode	LTE_RSRANGE_FDD time	LTE_RSRANGE_FDD?	time
RS Search Range for TDD mode	LTE_RSRANGE_TDD time	LTE_RSRANGE_TDD?	time
Channel Coding	LTE_CHCODING mcond,object	LTE_CHCODING? mcond	object

Sequence Parameter Information

Function	Command	Query	Response
Sequence Parameter Information - Error check	-----	SEQERR? [item]	{n,err(0),err(1),…,err(n-1)}|{ns,seg(0),seg(1),…,seg(ns-1)}|{e,mem,exe,set}
Sequence Parameter Information - Error Check	-----	SEQERR2? format	n,err(n-1)

Sequence Table Parameters

Function	Command	Query	Response
Sequence Table Parameter - SG Output Port	SEQSGPORT seg,port[,port,…,port]	SEQSGPORT? seg	port[,port,…,port]
Sequence Table Parameter - SA Input Port	SEQSAPORT seg,port	SEQSAPORT? seg	port
Sequence Table Parameter - Measurement	SEQMEAS seg,mode,step,mcond	SEQMEAS? seg	mode,step,mcond
Sequence Table Parameter - Trigger	SEQTRG seg,src,slope,level,delay	SEQTRG? seg	src,slope,level,delay
Sequence Table Parameter - TRX Control	SEQTRX seg,ul_freq,ref,dl_freq,level,pat	SEQTRX? seg	ul_freq,ref,dl_freq,level,pat
Sequence Table Parameter - Uplink Frequency, Input Level	SEQTX seg,ul_freq,ref	SEQTX? seg	ul_freq,ref
Sequence Table Parameter - Uplink Frequency, Input Level for SCC-1	SEQTX_SCC1 seg,ul_freq,ref	SEQTX_SCC1? seg	ul_freq,ref
Sequence UL RMC Modulation	LTE_ULRMC_MOD mcond,ul_rmc_mod	LTE_ULRMC_MOD? mcond	ul_rmc_mod
Sequence UL RMC Modulation for SCC-1	LTE_ULRMC_MOD_SCC1 mcond,ul_rmc_mod	LTE_ULRMC_MOD_SCC1? mcond	ul_rmc_mod
Frame Structure	LTE_FRAMETYPE mcond,mode	LTE_FRAMETYPE? mcond	mcond
Frame Structure for SCC-1	LTE_FRAMETYPE_SCC1 mcond,mode	LTE_FRAMETYPE_SCC1? mcond	mode
Cell ID	LTE_CELLID id	LTE_CELLID?	id
Cell ID for SCC-1	LTE_CELLID_SCC1 id	LTE_CELLID_SCC1?	id
Cyclic Shift	LTE_CSHIFT on_off	LTE_CSHIFT?	on_off
Group hopping	LTE_GROUPHOP on_off	LTE_GROUPHOP?	on_off
Delta SS	LTE_DELTASS val	LTE_DELTASS?	val
Operation band	LTE_BAND mcond,band	LTE_BAND? mcond	mcond,band
Operation band for SCC-1	LTE_BAND_SCC1 mcond,band	LTE_BAND_SCC1? mcond	band
Test Environment	LTE_TESTENV mcond,env	LTE_TESTENV? mcond	mcond,env

Sequence Table Parameters (Cont'd)

Function	Command	Query	Response
In-band Emission Carrier Leakage Frequency	LTE_IBEM_CLFR clf	LTE_IBEM_CLFR?	clf
Measurement Carrier	LTE_MCARRIER mcond,carrier	LTE_MCARRIER? mcond	carrier
In-band Emissions Carrier Leakage Template	LTE_TP_INBANDE_LEAK mcond,tp	LTE_TP_INBANDE_LEAK? mcond	tp
In-band Emissions Carrier Leakage Template for SCC-1	LTE_TP_INBANDE_LEAK_SCC1 mcond,tp	LTE_TP_INBANDE_LEAK_SCC1? mcond	tp
Uplink Downlink Configuration	LTE_TDDULDLCONF conf	LTE_TDDULDLCONF?	conf
Frequency Error Range	LTE_FREQERRRNG value	LTE_FREQERRRNG?	value

Measurement Parameters

Function	Command	Query	Response
Adjacent Channel Leakage Power Ratio Enable and Count	LTE_ACLR_SET mcond,on_off[,count]	LTE_ACLR_SET? mcond	on_off,count
Long Span Search	LTE_LONGSEARCH on_off	LTE_LONGSEARCH?	on_off
Turn Off All Measurement Items	LTE_MEAS_OFF mcond	-----	-----
Modulation Analysis Measurement Enable and Count	LTE_MOD_SET mcond,on_off[,count]	LTE_MOD_SET? mcond	on_off,count
Occupied Bandwidth Ratio	LTE_OBW_RATIO ratio	LTE_OBW_RATIO?	ratio
OBW Measurement Enable and Count	LTE_OBW_SET mcond,on_off[,count]	LTE_OBW_SET? mcond	on_off,count
Tx Power Measurement Enable and Count	LTE_PWR_SET mcond,on_off[,count]	LTE_PWR_SET? mcond	on_off,count
Spectrum Emission Mask Enable and Count	LTE_SEM_SET mcond,on_off[,count]	LTE_SEM_SET? mcond	on_off,count

Measurement Parameters (Cont'd)

Function	Command	Query	Response
Spectrum Emission Mask Template (1.4 MHz)	LTE_SEM_TEMPLATE_1.4MHZ range,limit	LTE_SEM_TEMPLATE_1.4MHZ? range	limit
Spectrum Emission Mask Template (10 MHz)	LTE_SEM_TEMPLATE_10MHZ range,limit	LTE_SEM_TEMPLATE_10MHZ? range	limit
Spectrum Emission Mask Template (15 MHz)	LTE_SEM_TEMPLATE_15MHZ range,limit	LTE_SEM_TEMPLATE_15MHZ? range	limit
Spectrum Emission Mask Template (20 MHz)	LTE_SEM_TEMPLATE_20MHZ range,limit	LTE_SEM_TEMPLATE_20MHZ? range	limit
Spectrum Emission Mask Template (3 MHz)	LTE_SEM_TEMPLATE_3MHZ range,limit	LTE_SEM_TEMPLATE_3MHZ? range	limit
Spectrum Emission Mask Template (5 MHz)	LTE_SEM_TEMPLATE_5MHZ range,limit	LTE_SEM_TEMPLATE_5MHZ? range	limit
Spectrum Emission Mask Template for Contiguous UL CA (100RB+100RB)	LTE_SEM_TEMPLATE_CONTCC_100RB_100RB range,limit	LTE_SEM_TEMPLATE_CONTCC_100RB_100RB? range	limit
Spectrum Emission Mask Template for Contiguous UL CA (25RB+100RB)	LTE_SEM_TEMPLATE_CONTCC_25RB_100RB range,limit	LTE_SEM_TEMPLATE_CONTCC_25RB_100RB? range	limit
Spectrum Emission Mask Template for Contiguous UL CA (50RB+100RB)	LTE_SEM_TEMPLATE_CONTCC_50RB_100RB range,limit	LTE_SEM_TEMPLATE_CONTCC_50RB_100RB? range	limit
Spectrum Emission Mask Template for Contiguous UL CA (75RB+100RB)	LTE_SEM_TEMPLATE_CONTCC_75RB_100RB range,limit	LTE_SEM_TEMPLATE_CONTCC_75RB_100RB? range	limit
Spectrum Emission Mask Template for Contiguous UL CA (75RB+75RB)	LTE_SEM_TEMPLATE_CONTCC_75RB_75RB range,limit	LTE_SEM_TEMPLATE_CONTCC_75RB_75RB? range	limit

Results

Function	Command	Query	Response
ACLR Result	-----	LTE_ACLR? seg,mode[,cc]	{avg,max,min}|aclr
Carrier Leakage Result	-----	LTE_CARRLEAK? seg,mode[,cc]	{avg,max,min}|cleakage
Carrier Frequency Error Result	-----	LTE_CFERR? seg,mode[,cc]	{avg_ppm,avg_Hz,max_ppm,max_Hz,min_ppm,min_Hz}|{freq_ppm,freq_Hz}
Worst Carrier Frequency Error Result	-----	LTE_CFERR_WORST? seg[,cc]	freq_ppm,freq_Hz
Carrier Frequency Result	-----	LTE_CFREQ? seg[,cc]	freq
Channel Power Result	-----	LTE_CHPWR? seg,mode[,cc]	{avg,max,min}|pwr|{s,pwr(1),pwr(2),...,pwr(s)}
EVM Result	-----	LTE_EVM? seg,mode[,cc]	{avg,max,min}|evm
IQ Imbalance Result	-----	LTE_IQIMB? seg,mode[,cc]	{avg,max,min}|iqimb
Magnitude Error Result	-----	LTE_MAGERR? seg,mode[,cc]	{avg,max,min}|merr
OBW Result	-----	LTE_OBW? seg	bw
OBW Frequency Result	-----	LTE_OBWFREQ? seg,pos	freq
Peak EVM Result	-----	LTE_PEVM? seg,mode[,cc]	{avg,max,min}|pevm
Phase Error Result	-----	LTE_PHASEERR? seg,mode[,cc]	{avg,max,min}|perr
Reference Signal EVM Result	-----	LTE_RSEVM? seg,mode[,cc]	{avg,max,min}|rsevm
In-Band Emissions Measured Item	-----	LTE_INBANDEITEM? seg[,cc]	flag
In-Band Emissions Judgement	-----	LTE_INBANDEPASS? seg[,cc]	judgement
In-Band Emissions limit (General)	-----	LTE_INBANDE_GENUL? seg[,cc]	level
In-Band Emissions (General) Result	-----	LTE_INBANDE_GEN? seg,mode[,cc]	{avg,max,min}|ibe
In-Band Emissions limit (IQ Image)	-----	LTE_INBANDE_IMGUL? seg[,cc]	level
In-Band Emissions (IQ Image) Result	-----	LTE_INBANDE_IMG? seg,mode[,cc]	{avg,max,min}|ibe

Results (Cont'd)

Function	Command	Query	Response
In-Band Emissions limit (Carrier Leakage)	-----	LTE_INBANDE_LEAKUL? seg[,cc]	level
In-Band Emissions (Carrier Leakage) Result	-----	LTE_INBANDE_LEAK? seg,mode[,cc]	{avg,max,min}|ibe
In-Band Emissions Margin	-----	LTE_INBANDE_MARG? seg[,cc]	margin
SEM Judgement	-----	LTE_SEM? seg[,cc]	judgement
SEM Peak Value (Detail) (Lower)	-----	LTE_SEMLVL_DET_LOWER? seg[,cc]	l_M1,l_M2,l_M3,l_M4,l_M5,l_M6,l_M7,l_M8,l_M9,f_M1,f_M2,f_M3,f_M4,f_M5,f_M6,f_M7,f_M8,f_M9
SEM Peak Value (Detail) (Upper)	-----	LTE_SEMLVL_DET_UPPER? seg[,cc]	l_1,l_2,l_3,l_4,l_5,l_6,l_7,l_8,l_9,f_1,f_2,f_3,f_4,f_5,f_6,f_7,f_8,f_9
SEM Peak Value (Lower)	-----	LTE_SEMLVL_LOWER? seg[,cc]	l_M1,l_M2,l_M3,l_M4,f_M1,f_M2,f_M3,f_M4
SEM Peak Value (Upper)	-----	LTE_SEMLVL_UPPER? seg[,cc]	l_1,l_2,l_3,l_4,f_1,f_2,f_3,f_4
SEM Template Margin (Detail) (Lower)	-----	LTE_SEMMARGIN_DET_LOWER? seg[,cc]	l_M1,l_M2,l_M3,l_M4,l_M5,l_M6,l_M7,l_M8,l_M9,f_M1,f_M2,f_M3,f_M4,f_M5,f_M6,f_M7,f_M8,f_M9
SEM Template Margin (Detail) (Upper)	-----	LTE_SEMMARGIN_DET_UPPER? seg[,cc]	l_1,l_2,l_3,l_4,l_5,l_6,l_7,l_8,l_9,f_1,f_2,f_3,f_4,f_5,f_6,f_7,f_8,f_9
SEM Template Margin (Lower)	-----	LTE_SEMMARGIN_LOWER? seg[,cc]	l_M1,l_M2,l_M3,l_M4,f_M1,f_M2,f_M3,f_M4
SEM Template Margin (Upper)	-----	LTE_SEMMARGIN_UPPER? seg[,cc]	l_1,l_2,l_3,l_4,f_1,f_2,f_3,f_4

Results (Cont'd)

Function	Command	Query	Response
Spectrum Flatness Measured Item	-----	LTE_SPECFLATITEM? seg[,cc]	flag
Spectrum Flatness Judgement	-----	LTE_SPECFLATPPPASS? seg[,cc]	judgement
Spectrum Flatness (≥3 MHz (RP1)) Result	-----	LTE_SPECFLAT_RP1? seg,mode[,cc]	{avg,max,min}|sflatness
Spectrum Flatness (RP12) Result	-----	LTE_SPECFLAT_RP12? seg,mode[,cc]	{avg,max,min}|sflatness
Spectrum Flatness (<3 MHz (RP2)) Result	-----	LTE_SPECFLAT_RP2? seg,mode[,cc]	{avg,max,min}|sflatness
Spectrum Flatness (RP21) Result	-----	LTE_SPECFLAT_RP21? seg,mode[,cc]	{avg,max,min}|sflatness
Tx Power Result	-----	LTE_TXPWR? seg,mode[,cc]	{avg,max,min}|pwr|{s,pwr(1),pwr(2),...,pwr(s)}

5.2 Details of Commands

This section describes the commands in alphabetical order.

■ Terms in this command list

EX ..... Command name (header)

Example ..... Command function name

Function ..... Command function

Command..... Programming command syntax

Query ..... Query syntax

Response .....Response syntax

Parameter ..... Parameter definition

Details ..... Command restrictions and others

Example of Use..... Command usage example

Related Commands .....Introduction of related commands

■ Suffix Code list

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

5.2.1 Common commands

DLPAT

Waveform Pattern Select

Function

Selects a waveform pattern to use from patterns included in waveform file.
When the command received, the signal is immediately switched regardless of the frame cycle of signal, so the frame cycle is not continued.
This command is also used to query the currently selected waveform pattern.

Command

```
DLPAT pat
```

Query

```
DLPAT?
```

Response

```
pat
```

Parameter

pat		Waveform pattern
	PAT1 to PATn	Waveform pattern number (n: waveform information file group range)
	Default	PAT1

Details

Select the waveform pattern for RF output signal in waveform file.
The pattern number is the same as the group number. Refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

Example of Use

To output the waveform pattern to 1:

```
DLPAT PAT1
DLPAT?
> PAT1
```

Related command

Waveform file for arbitrary waveform signal selection or query
PACKAGE

Remarks

The group number depends on the selected waveform file.
For details of the waveform pattern, refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

DLPAT_SYNC

Waveform Pattern Select (SYNC)

Function

Selects a waveform pattern to use from patterns included in waveform file.
When the command received, the signal is switched according to the frame cycle of signal so that the frame cycle is continued.
This command is also used to query the currently selected waveform pattern.

Command

```
DLPAT_SYNC pat
```

Query

```
DLPAT_SYNC?
```

Response

```
pat
```

Parameter

pat	Waveform pattern
PAT1 to PATn	Waveform pattern number (n: waveform information file group range)
Default	PAT1

Details

Select the waveform pattern for RF output signal in waveform file.
The pattern number is the same as the group number. Refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

Example of Use

To output the waveform pattern to 1:

```
DLPAT_SYNC PAT1
DLPAT_SYNC?
> PAT1
```

Related command

Waveform file for arbitrary waveform signal selection or query
PACKAGE

Remarks

The group number depends on the selected waveform file.
For details of the waveform pattern, refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

ESR2?

End Event Status (Measurement) Register Query

Function

Queries the end event status register (measurement).
The event occurrence can be identified using the retrieved value.

Query

```
ESR2?
```

Response

```
register
```

register	End event status register (measurement)
Range	0 to 255
register	Value = bit0 + bit1 + ... + bit7
bit0 = 2^0 = 1	End of measurement
bit1 = 2^1 = 2	Trigger preparation completed
bit2 = 2^2 = 4	Unused (reserved for application use)
bit3 = 2^3 = 8	Unused (reserved for application use)
bit4 = 2^4 = 16	Unused (reserved for application use)
bit5 = 2^5 = 32	Unused (reserved for application use)
bit6 = 2^6 = 64	Unused (reserved for application use)
bit7 = 2^7 = 128	Unused (reserved for application use)

Details

The sum of the values for bits of the occurring event from the values 2^0 = 1, 2^1 = 2, 2^2 = 4, 2^3 = 8, 2^4 = 16, 2^5 = 32, 2^6 = 64, and 2^7 = 128, that correspond to the end event status register (measurement) bits 0, 1, 2, 3, 4, 5, 6, and 7 becomes the response.

Example of Use

To query the end event status register (measurement) value:

```
ESR2?
> 0
```

ESR3?

Error Event Status (Measurement) Register Query

Function

Queries the error event status register (measurement).
The event occurrence can be identified using the retrieved value.

Query

```
ESR3?
```

Response

```
register
```

register	Error event status register (measurement)
Range	0 to 255
register	Value = bit0 + bit1 + ... + bit7
bit0 = 2^0 = 1	Over level
bit1 = 2^1 = 2	Under level
bit2 = 2^2 = 4	Timeout
bit3 = 2^3 = 8	Unused (reserved for application use)
bit4 = 2^4 = 16	Unused (reserved for application use)
bit5 = 2^5 = 32	Unused (reserved for application use)
bit6 = 2^6 = 64	Unused (reserved for application use)
bit7 = 2^7 = 128	Unused (reserved for application use)

Details

The sum of the values for bits of the occurring event from the values 2^0 = 1, 2^1 = 2, 2^2 = 4, 2^3 = 8, 2^4 = 16, 2^5 = 32, 2^6 = 64, and 2^7 = 128, that correspond to the error event status register (measurement) bits 0, 1, 2, 3, 4, 5, 6, and 7 becomes the response.

Example of Use

To query the error event status register (measurement) value:

```
ESR3?
> 4
```

LVL

Output Level On/Off

Function

Sets or queries RF signal output ON/OFF.

Command

```
LVL on_off
```

Query

```
LVL?
```

Response

```
on_off
```

Parameter

on_off	Enables/disables RF signal output.
ON	Enables RF signal output.
OFF	Disables RF signal output.
Default	ON

Example of Use

To output RF signals at Test port:

```
LVL ON
LVL?
> ON
```

MEASSTOP

Measurement Stop

Function

Stops the current measurement.

Command

```
MEASSTOP
```

Example of Use

To stop the current measurement:

```
MEASSTOP
```

MOD

Output Signal Modulation

Function

Sets or queries RF signal output modulation.

Command

```
MOD on_off
```

Query

```
MOD?
```

Response

```
on_off
```

Parameter

on_off		Enables/disables modulation.
	ON	Enables RF output signal modulation.
	OFF	Disables RF output signal modulation.
	Default	ON

Example of Use

To turn on the modulation.

```
MOD ON
MOD?
> ON
```

MSTAT?

Measurement Status

Function

Queries the measurement status.

Query

```
MSTAT?
```

Response

```
m_status
```

m_status	Measurement status
0	Completed measurement
2	Over level
3	Under level
4	Measurement failed
5	Synchronization word not detected
9	Measurement in progress or not measured
12	Tx measurement timeout
13	Rx measurement failed

Details

This command can be used while measurement is in progress or suspended.
The value received from MX887013A or MX887014A is 0, 2, 5, 9, or 12.

Example of Use

To query current measurement status:

```
MSTAT?
> 0
```

PACKAGE

Waveform File Select

Function

Selects and queries the waveform file for arbitrary waveform signal used at Downlink signal.

Command

```
PACKAGE pac
```

Query

```
PACKAGE?
```

Response

```
pac
```

Parameter

pac	Waveform file

Details

The name of the file used from the waveform files loaded into waveform memory is set by this command.

Example of Use

To set the waveform file 1 from waveform files loaded in waveform memory:

```
PACKAGE "PAC1"
PACKAGE?
> PAC1
```

Related command

Use the following command to load the waveform file into waveform memory.
SOUR:GPRF:GEN:ARB:FILE:LOAD
For details of the command, refer to Chapter 5 "SCPI Command Reference" in the *MU887000A TRX Test Module Operation Manual*.
:SOURce:GPRF:GENerator:ARB:FILE:LOAD
The following command can be used to query the names of waveform files that have been loaded into waveform memory.
SOUR:GPRF:GEN:ARB:WAV:NAME?
For details of the command, refer to Chapter 5 "SCPI Command Reference" in the *MU887000A TRX Test Module Operation Manual*.
:SOURce:GPRF:GENerator:ARB:WAVeform:NAME?

Use the following commands to select a waveform pattern to use from the waveform patterns included in the waveform file configured using the command described in this section.
DLPAT, DLPAT_SYNC, SEQTRX

PORT

Set Connect Port Direction

Function

Sets or queries the test ports for inputting and outputting RF signals.
Multiple output test port can be set for MU887002A.

Command

`PORT input,output`	MU887000A, MU887001A
`PORT input,output[,output,…,output]`	MU887002A

Query

`PORT?`

Response

input,output	MU887000A, MU887001A
input,output[,output,...,output]	MU887002A

Parameters

input	Input Test Port No.	
Range	Test Port 1 to 4	(MU887000A)
	Test Port 1 to 4	(MU887001A)
	OFF, Test Port 1 to 12	(MU887002A)
PORT1	Test Port 1	
…	…	
PORT12	Test Port 12	
OFF	No any Input Test Ports	(MU887002A)
Default	PORT1	
output	Output Test Port No.	
Range	Test Port 1 to 4	(MU887000A)
	Test Port 1 to 4	(MU887001A)
	Test Port 1 to 12	(MU887002A)
PORT1	Test Port 1	
…	…	
PORT12	Test Port 12	
Default	PORT1	

Details

For MU887000A,
Test Port 1 and Test Port 2 can be set for both input and output.
Test Port 3 and Test Port 4 can be set for either input or output.
For MU887001A, Test Port 1 to Test Port 4 can be set for both input and output.
For MU887002A, Test Port 1 to Test Port 12 can be set for both input and output.

Example of Use

To set Test Port 1 as RF signal input test port and Test Port 2 as RF signal output test port:

```
PORT PORT1,PORT2
PORT?
> PORT1,PORT2
```

To set No any Input Test Ports and Test Port 4, Test Port 6, Test Port 10 as RF signal output test ports:

```
PORT OFF,PORT10,PORT4,PORT6
PORT?
> OFF,PORT4,PORT6,PORT10
```

SNGLS

Measurement Start

Function

Sets the parameters for both specified measurement and signal transmission and executes measurement.

Command

```
SNGLS
```

Details

Sending this command executes one measurement execution.
Sending this command during measurement, aborts measurement once and restarts it.
ESR2 must be polled or sync processing via *WAI is required to determine the timing of measurement completion.

Example of Use

To start measurement:

```
SNGLS
```

Related command

ESR2
For the details of the event status register, refer to Chapter 3 “Fundamental Operation” in the *MU887000A TRX Test Module Operation Manual*.

STDSEL

Standard Select

Function

Sets or queries the measurement standard.

Command

```
STDSEL std
```

Query

```
STDSEL?
```

Response

```
std
```

Parameter

std	Measurement standard	
COMMON	Common Measurement	(requires MX887010)A
WCDMA	W-CDMA	(requires MX887011A)
GSM	GSM	(requires MX887012A)
LTE	LTE	(requires MX887013A or MX887014A)
CDMA2000	CDMA2000 1x	(requires MX887015A)
EVDO	CDMA2000 1xEVDO	(requires MX887016A)
TDSCDMA	TD-SCDMA	(requires MX887017A)
NR	NR sub-6GHz	(requires MX887018A or MX887019A)
CATM	Category M	(requires MX887065A)
NBIOT	NB-IoT	(requires MX887067A)
LTEV2X	LTE-V2X	(requires MX887068A)
SEQUENCE	Sequence	(requires MX887010A)
SEQ	Sequence	(requires MX887010A)
Default	COMMON	

Details

Switch the measurement standard and sequence measurement according to the application software.
If this command is sent during measurement, measurement stops to prepare for the new standard.
The old measurement results are cleared.
Common hardware settings, such as Downlink Frequency and Input Level, can be set for each measurement standard.
LTE FDD(MX887013A) and LTE TDD(MX887014A) are switched depending on the Frame Structure command.

Example of Use

To switch the measurement standard to SEQUENCE:

```
STDSEL SEQUENCE
STDSEL?
> SEQUENCE
```

Remarks

This parameter must be set to LTE to execute the commands described in Section 5.2.2 “Fundamental measurement commands”.

This parameter must be set to SEQUENCE to use the commands described in Section 5.2.3 “Sequence measurement commands”.

SYSSEL

Application Select

Function

Sets or queries the type of application software to execute.

Command

```
SYSSEL app
```

Query

```
SYSSEL?
```

Response

```
app
```

Parameter

app		Type of application software
	CELLULAR	Cellular Application When using MX887010A, MX887011A, MX887012A, MX887013A, MX887014A, MX887015A, MX887016A, MX887017A, MX887018A, MX887019A, MX887065A, MX887067A, or MX887068A
	SRW	Short Range Wireless application When using MX887030A, MX887031A, MX887032A, MX887033A, MX887040A, or MX887050A
	LRWPAN	IEEE 802.15.4 application When using MX887060A
	ZWAVE	Z-Wave application When using MX887061A
	FMAUDIO	FM AUDIO application When using MX887070A

Note: MU887002A does not support MX887070A.

Details

Set the parameter to CELLULAR and send the command before using the MX887013A.

Example of Use

To set the application software to CELLULAR:

```
SYSSEL CELLULAR
SYSSEL?
> CELLULAR
```

Remarks

When using the MX887013A, set the application to CELLULAR using the SYSSEL command, and then set the standard to LTE or SEQUENCE using the STDSEL command.

SYST:LANG

Language Selection of Remote Command

Function

Switches the language mode of remote control commands.

Command

```
SYST:LANG mode
```

Query

```
SYST:LANG?
```

Response

```
mode
```

Parameter

mode	Language mode
NAT	Native
SCPI	SCPI
Default	NAT

Example of Use

To switch the language mode of remote control commands to Native.

```
SYST:LANG NAT
SYST:LANG?
>NAT
```

5.2.2 Fundamental measurement commands

ACLR?

ACLR Result

Function

Queries the result of Adjacent Channel Leakage Power Ratio measurement.

Query

```
ACLR? mode[,cc]
```

Response

When mode = TTL,

```
avg0,avg1,avg2,avg3,avg4,avg5,max0,max1,max2,max3,max4,max5,min0,min1,min2,min3,min4,min5
```

avg	Adjacent Channel Leakage Power Ratio (Average)
max	Adjacent Channel Leakage Power Ratio (Maximum)
min	Adjacent Channel Leakage Power Ratio (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
aclr0,aclr1,aclr2,aclr3,aclr4,aclr5
```

aclr	Result of Adjacent Channel Leakage Power Ratio measurement in specified Storage mode
Unit	dB
Resolution	0.01 dB

The responses are sent in the following order.
E-UTRA ACLR LOW,
E-UTRA ACLR UP,
UTRA ACLR2 LOW,
UTRA ACLR1 LOW,
UTRA ACLR1 UP,
UTRA ACLR2 UP

Parameters

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

cc		Component Carrier Used at UL CA and omitted at non CA. Refer to Table 2.5.2-1 “Measurement Items of Adjacent Channel Leakage Power Ratio” for details.
	PCC	PCC
	SCC1	SCC-1
	Omitted	Total

Details

The measurement bandwidth of the target adjacent channel varies with the channel bandwidth setting.
Refer to Table 2.5.1-1 “Adjacent Channel Measurement Bandwidth (MHz)” for details.

Example of Use

To query the average of ACLR measurement result:

```
ACLR? AVG
> 3.00,3.01,3.02,3.03,3.04,3.05
```

ACLR_SET

Adjacent Channel Leakage Power Ratio Enable and Count

Function

Enables Adjacent Channel Leakage Power Ratio measurement and sets measurement count in Sequence Measurement mode, or queries settings.

Command

```
ACLR_SET on_off[,count]
```

Query

```
ACLR_SET?
```

Response

```
on_off,count
```

Parameters

on_off		Enables/disables measurement.
	ON	Turns measurement on.
	OFF	Disables measurement.
	Default	OFF
count		Measurement count
	Range	1 to 200 1 to 100 (at UL CA)
	Resolution	1
	Suffix code	None
	Default	1

Examples of Use

To set the Adjacent Channel Leakage Power Ratio measurement to OFF.

```
ACLR_SET OFF
ACLR_SET?
> OFF
```

Remarks

This Adjacent Channel Leakage Power Ratio of 1 subframe (1 ms) is measured at each measurement count.

ALLMEASITEMS_OFF

Turn Off All Measurement Items

Function

Disables all measurement items.

Command

```
ALLMEASITEMS_OFF
```

Remarks

This command operates similarly to the following commands.

PWR_SET

OBW_SET

SEM_SET

ACLR_SET

MOD_SET

Example of Use

To set all measurements to off at one time:

```
ALLMEASITEMS_OFF
```

AWGNPWR

AWGN Level

Function

Sets or queries AWGN (Additive White Gaussian Noise) output level ratio relative to carrier.

Command

```
AWGNPWR level
```

Query

```
AWGNPWR?
```

Response

```
level
```

Unit	dB
Resolution	1 dB

Parameter

level	AWGN output level
Range	–40 to +12 dB
Resolution	1 dB
Default	–40 dB

Example of Use

To set AWGN output level ratio vs. the carrier to –14 dB:

```
AWGNPWR -14
AWGNPWR?
> -14
```

AWGNLVL

AWGN Level On/Off

Function

Enables AWGN output, or queries setting.

Command

```
AWGNLVL on_off
```

Query

```
AWGNLVL?
```

Response

```
on_off
```

Parameter

on_off		Enables/disables AWGN output.
	ON	Enables AWGN output.
	OFF	Disables AWGN output.
	Default	OFF

Example of Use

To enable AWGN output:

```
AWGNLVL ON
```

To query the status of AWGN output:

```
AWGNLVL?
> ON
```

Related command

AWGNPWR

BAND

Operation band

Function

Sets or queries the operation band.

Command

```
BAND band
```

Query

```
BAND?
```

Response

```
band
```

Parameter

band	Operation band
Range	1 to 256
Resolution	1
Default	1

Details

This is the parameter for determining the following items:

- Limit line of Spectrum Flatness measurement
- Intra-band/Inter-band (at UL CA)

Example of Use

To set the operation band to 10:

```
BAND 10
BAND?
> 10
```

BAND_SCC1

Operation band for SCC-1

Function

Sets or queries the operation band for SCC-1.

Command

```
BAND_SCC1 band
```

Query

```
BAND_SCC1?
```

Response

```
band
```

Parameter

band	Operation band
Range	1 to 256
Resolution	1
Default	1

Details

This is the parameter for determining the following items:

- Limit line of Spectrum Flatness measurement
- Intra-band/Inter-band (at UL CA)

Example of Use

To set the operation band of SCC-1 to 10:

```
BAND_SCC1 10
BAND_SCC1?
> 10
```

BANDWIDTH

Channel Bandwidth

Function

Sets or queries the channel bandwidth.

Command

```
BANDWIDTH ch_bw[,ch_bw_scc1]
```

Query

```
BANDWIDTH? [ALL]
```

Response

```
ch_bw,ch_bw_scc1
```

Parameter

ch_bw	Channel bandwidth of PCC
ch_bw_scc1	Channel bandwidth of SCC-1
1.4MHZ	1.4 MHz
3MHZ	3 MHz
5MHZ	5 MHz
10MHZ	10 MHz
15MHZ	15 MHz
20MHZ	20 MHz
Default	5 MHz

Details

When the channel bandwidth for PCC is updated, the start RB number setting value at Uplink RMC for PCC is reset to 0. The RBs allocated to RMC of the PCC uplink signal is changed to the maximum value.
When the channel bandwidth for SCC-1 is updated, the start RB number setting value at Uplink RMC for SCC-1 is reset to 0. The RBs allocated to RMC of the SCC-1 uplink signal is changed to the maximum value.
When the command argument ALL is omitted, the response is ch_bw only.

Example of Use

To set the channel bandwidth as follows:
For PCC: 1.4 MHz, For SCC-1: 3 MHz

```
BANDWIDTH 1.4MHZ,3MHZ
BANDWIDTH? ALL
> 1.4MHZ,3MHZ
```

BANDWIDTH_SCC1

Channel Bandwidth for SCC-1

Function

Sets or queries the channel bandwidth of SCC-1.

Command

```
BANDWIDTH_SCC1 ch_bw
```

Query

```
BANDWIDTH_SCC1?
```

Response

```
ch_bw
```

Parameters

ch_bw	Channel bandwidth of SCC-1
1.4MHZ	1.4 MHz
3MHZ	3 MHz
5MHZ	5 MHz
10MHZ	10 MHz
15MHZ	15 MHz
20MHZ	20 MHz
Default	5 MHZ

Details

When the channel bandwidth for SCC-1 is updated, the start RB number setting value at Uplink RMC for SCC-1 is reset to 0. The RBs allocated to RMC of the SCC-1 uplink signal is changed to the maximum value.

Example of Use

To set the channel bandwidth of SCC-1 to 1.4 MHz.

```
BANDWIDTH_SCC1 1.4MHZ
BANDWIDTH_SCC1?
> 1.4MHZ
```

BW_RB

Channel Bandwidth, RB

Function

Sets or queries the uplink channel bandwidth and RB (Resource Block).

Command

```
BW_RB ch_bw[,rb[,start]]
```

Query

```
BW_RB?
```

Response

```
ch_bw,rb,start
```

Parameters

ch_bw		Channel bandwidth
	1.4MHZ	1.4 MHz
	3MHZ	3 MHz
	5MHZ	5 MHz
	10MHZ	10 MHz
	15MHZ	15 MHz
	20MHZ	20 MHz
	Default	5MHZ
rb		Number of RBs
	Range	Same as ULRMC_RB
	Default	25
start		Start RB number
	Range	Same as ULRB_START
	Default	0

Details

The rb and start settings can be omitted. If omitted, the settings are Full RB (rb is the maximum for the channel bandwidth and start is 0).

Example of Use

To set as follows:

Channel Bandwidth: 1.4 MHz, Number of RB: 6, Start RB number: 0

```
BW_RB 1.4MHZ,6,0
BW_RB?
>1.4MHZ,6,0
```

Related Commands

Channel Bandwidth	BANDWIDTH
UL RMC Number of RB	ULRMC_RB
UL RMC Starting RB	ULRB_START

BW_RB_SCC1

Channel Bandwidth, RB for SCC-1

Function

Sets or queries the uplink channel bandwidth and RB (Resource Block) of SCC-1.

Command

```
BW_RB_SCC1 ch_bw[,rb[,start]]
```

Query

```
BW_RB_SCC1?
```

Response

```
ch_bw,rb,start
```

Parameters

ch_bw		Channel bandwidth of SCC-1.
	1.4MHZ	1.4 MHz
	3MHZ	3 MHz
	5MHZ	5 MHz
	10MHZ	10 MHz
	15MHZ	15 MHz
	20MHZ	20 MHz
	Default	5 MHZ
rb		Number of RBs for SCC-1
	Range	Same as ULRMC_RB
	Default	25
start		Start RB number of SCC-1
	Range	Same as ULRB_START
	Default	0

Details

The rb and start settings can be omitted. If omitted, the settings are Full RB (rb is the maximum for the channel bandwidth and start is 0).

Example of Use

To set as follows:

Channel Bandwidth of SCC-1: 1.4 MHz, Number of RB: 6, Start RB number: 0

```
BW_RB_SCC1 1.4MHZ,6,0
BW_RB_SCC1?
>1.4MHZ,6,0
```

Related Commands

Channel Bandwidth of SCC-1	BANDWIDTH_SCC1
UL RMC Number of RB for SCC-1	ULRMC_RB_SCC1
UL RMC Starting RB of SCC-1	ULRB_START_SCC1

CARRLEAK?

Carrier Leakage Result

Function

Queries the Carrier Leak measurement result at Modulation Analysis.

Query

```
CARRLEAK? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dBc
Resolution	0.01 dB

When mode ≠ TTL,

```
cleakage
```

cleakage	Measurement result in specified Storage mode
Unit	dBc
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Carrier Leakage measurement result:

```
CARRLEAK? AVG
> 1.05
```

CELLID

Cell ID

Function

Sets or queries the Cell ID.

Command

```
CELLID id
```

Query

```
CELLID?
```

Response

```
id
```

Parameter

id		Cell ID
	Range	0 to 503
	Resolution	1
	Default	0

Example of Use

To set the Cell ID to 121:

```
CELLID 121
CELLID?
> 121
```

CELLID_SCC1

Cell ID for SCC-1

Function

Sets or queries the Cell ID of SCC-1.

Command

```
CELLID_SCC1 id
```

Query

```
CELLID_SCC1?
```

Response

```
id
```

Parameter

id	Cell ID of SCC-1
Range	0 to 503
Resolution	1
Default	0

Example of Use

To set the Cell ID of SCC-1 to 121:

```
CELLID_SCC1 121
CELLID_SCC1?
> 121
```

CFERR?

Carrier Frequency Error Result

Function

Queries the Frequency Error measurement result.

Query

```
CFERR? mode[,cc]
```

Response

When mode = TTL,

```
avg_ppm,avg_Hz,max_ppm,max_Hz,min_ppm,min_Hz
```

avg_ppm	Measurement result in ppm (Average)
max_ppm	Measurement result in ppm (Maximum)
min_ppm	Measurement result in ppm (Minimum)
Unit	ppm
Resolution	0.01 ppm
avg_Hz	Measurement result in Hz (Average)
max_Hz	Measurement result in Hz (Maximum)
min_Hz	Measurement result in units of Hz (Minimum)
Unit	Hz
Resolution	0.1 Hz

When mode ≠ TTL,

```
freq_ppm,freq_Hz
```

freq_ppm	Measurement result in ppm in specified Storage mode
Unit	ppm
Resolution	0.01 ppm
freq_Hz	Measurement results in Hz in specified Storage mode
Unit	Hz
Resolution	0.1 Hz

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Frequency Error measurement result:

```
CFERR? AVG
> 0.03,60.0
```

CFERR_WORST?

Worst Carrier Frequency Error Result

Function

Queries the worst value in Frequency Error measurement results.

Query

```
CFERR_WORST? [cc]
```

Response

```
freq_ppm,freq_Hz
```

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

Parameters

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The worst value should be either the maximum or minimum of the Frequency Error measurement results, whichever is the larger absolute value.

Example of Use

To query the worst value in Frequency Error measurement results:

```
CFERR_WORST?
> 0.03,60.0
```

CFREQ?

Carrier Frequency Result

Function

Queries the Carrier Frequency measurement result at Modulation Analysis.

Query

```
CFREQ? [cc]
```

Response

```
freq
```

freq	Carrier frequency
Unit	Hz
Resolution	1 Hz

Parameter

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the result of Carrier Frequency measurement:

```
CFREQ?
> 1951000000
```

CHCODING

Channel Coding

Function

Sets or queries the channel coding.

Command

```
CHCODING object
```

Query

```
CHCODING?
```

Response

```
object
```

Parameter

object		Target for channel coding
	RMC	Reference Measurement Channel
	RMC_UL_CA	RMC at UL CA
	Default	RMC

Details

When FRAMETYPE is FDD and RMC_UL_CA is set, MX887013A-001 is required.
When FRAMETYPE is TDD and RMC_UL_CA is set, MX887014A-001 is required.

Examples of Use

To set the channel coding to RMC:

```
CHCODING RMC
CHCODING?
> RMC
```

CHCONFIG

RMC Configuration

Function

Sets or queries the Uplink Channel configuration when Channel Coding set to RMC.

Command

```
CHCONFIG val
```

Query

```
CHCONFIG?
```

Response

```
val
```

Parameter

val	RMC Channel configuration
PUSCH	PUSCH
PUCCH	PUCCH
Default	PUSCH

Examples of Use

To set the Uplink Channel configuration to PUSCH.

```
CHCONFIG PUSCH
CHCONFIG?
> PUSCH
```

CHPWR?

Channel Power Result

Function

Queries the Channel Power measurement result.

Query

```
CHPWR? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dBm
Resolution	0.01 dB

When mode = AVG, MAX, MIN or DVT,

```
pwr
```

pwr	Measurement result in specified Storage mode
Unit	dBm
Resolution	0.01 dB

When mode = IND,

```
s,pwr(1),pwr(2),pwr(3),…,pwr(s)
```

pwr(s)	Channel Power of sth measurement
Unit	dBm
Resolution	0.01 dB
s	Measurement count
Range	1 to 200

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	Individual measurement result
cc	Component Carrier
	Used at UL CA and omitted at non CA.
	Refer to “Table 2.2.2-1 Measurement Items of Tx Power” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of PCC Channel Power measurement result:

```
CHPWR? AVG,PCC
> -20.00
```

CSHIFT

Cyclic Shift

Function

Sets or queries the Cyclic Shift.

Command

```
CSHIFT on_off
```

Query

```
CSHIFT?
```

Response

```
on_off
```

Parameter

on_off	Cyclic Shift
ON	Enables Cyclic Shift
OFF	Disables Cyclic Shift
FIX1	The fixed value is set.
Default	ON

Example of Use

To enable the Cyclic Shift:

```
CSHIFT ON
CSHIFT?
> ON
```

DELTASS

Delta SS

Function

Sets or queries the Delta SS (Group Assignment PUSCH).

Command

```
DELTASS val
```

Query

```
DELTASS?
```

Response

```
val
```

Parameter

val	Delta SS
Range	0 to 29
Resolution	1
Default	0

Example of Use

To set the Delta SS to 12:

```
DELTASS 12
DELTASS?
> 12
```

DLCHAN

Downlink Channel

Function

Sets or queries the EARFCN (E-UTRA Absolute Radio Frequency Channel Number) Downlink Channel.

Command

```
DLCHAN dl_ch
```

Query

```
DLCHAN?
```

Response

```
dl_ch
```

Parameter

dl_ch	Downlink Channel
Range	0 to 262143
Resolution	1
Default	300

Details

When the Downlink Channel is updated, the related Uplink Channel, Downlink Frequency, Uplink Frequency, and Flame structure parameter are changed accordingly.
For the relationship between the parameter and frequency settings of channels refer to Table 2.1.6-3 “Relationship between Uplink Channel Number and Downlink Channel Number” and Table 2.1.6-4 “E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation”.

Example of Use

To set the Downlink Channel to 1100:

```
DLCHAN 1100
DLCHAN?
> 1100
```

DLCHAN_SCC1

Downlink Channel for SCC-1

Function

Sets or queries the Downlink Channel for SCC-1.

Command

```
DLCHAN_SCC1 dl_ch
```

Query

```
DLCHAN_SCC1?
```

Response

```
dl_ch
```

Parameter

dl_ch		Downlink Channel for SCC-1
	Range	0 to 262143
	Resolution	1
	Default	300

Details

When the Downlink Channel is updated, the related Uplink Channel, Downlink Frequency, Uplink Frequency and Frame structure parameter are changed accordingly.
For the relationship between the parameter and frequency settings of channels refer to Table 2.1.6-3 “Relationship between Uplink Channel Number and Downlink Channel Number” and to Table 2.1.6-4 “E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation”.

Example of Use

To set the Downlink Channel for SCC-1 to 1100:

```
DLCHAN_SCC1 1100
DLCHAN_SCC1?
> 1100
```

DLFREQ

Downlink Frequency

Function

Sets or queries the downlink frequency.

Command

```
DLFREQ dl_freq
```

Query

```
DLFREQ?
```

Response

```
dl_fleq
```

Unit	Hz
Resolution	1 Hz

Parameter

dl_freq	Downlink frequency
Range	400 000 000 to 3800 000 000 Hz (MU887000A/01A) 400 000 000 to 6000 000 000 Hz (With MU887000A/01A-001) 400 000 000 to 6000 000 000 Hz (MU887002A)
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	2140 000 000 Hz

Details

This sets the Rx frequency for the mobile station.

Updating the Downlink Frequency setting does not affect the Downlink Channel setting.

Example of Use

To set the downlink frequency to 2050 MHz:

```
DLFREQ 2050MHZ
DLFREQ?
>2050000000
```

DLFREQ_SCC1

Downlink Frequency for SCC-1

Function

Sets or queries the Downlink Frequency for SCC-1.

Command

```
DLFREQ_SCC1 dl_freq
```

Query

```
DLFREQ_SCC1?
```

Response

```
dl_fleq
```

Unit	Hz
Resolution	1 Hz

Parameter

dl_freq	Downlink Frequency for SCC-1
Range	400.000000 to 3800.000000 MHz (MU887000A/01A) 400.000000 to 6000.000000 MHz (with MU887000A/01A-001) 400 000 000 to 6000 000 000 Hz (MU887002A)
Resolution	1 Hz
Suffix code	H, KH, K, MH, M, GH, GZ (uses Hz when omitted)
Default	2140 000 000 Hz

Details

This sets the Rx frequency for the mobile station.
Updating the setting of the Downlink frequency for SCC-1 does not affect the setting of the Downlink Channel for SCC-1.

Example of Use

To set the Downlink frequency for SCC-1 to 2050 MHz:

```
DLFREQ_SCC1 2050MHZ
DLFREQ_SCC1?
> 2050000000
```

EVM?

EVM Result

Function

Queries the EVM measurement result of Modulation Analysis.

Query

```
EVM? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	%
Resolution	0.01%

When mode ≠ TTL,

```
evm
```

evm	Measurement result in specified Storage mode
Unit	%
Resolution	0.01%

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of EVM measurement result:

```
EVM? AVG
> 1.50
```

EXTLOSSINDEX_SCC1

External Loss Table Index for SCC-1

Function

Sets and queries the loss correction table index for SCC-1.

Command

```
EXTLOSSINDEX_SCC1 index
```

Query

```
EXTLOSSINDEX_SCC1?
```

Response

```
index
```

Parameters

index	Loss correction table index
Range	0 to 16
Resolution	1
Default	0

Details

When the loss correction table index is set to 0, the setting value of the common command "LOSSTBL" is used.

Refer to Chapter 6 "Native Command Reference" in the *MU887000A TRX Test Module Operation Manual* for details of the LOSSTBL command.

Examples of Use

To set the loss correction table index for SCC-1 to 1:

```
EXTLOSSINDEX_SCC1 1
EXTLOSSINDEX_SCC1?
>1
```

FASTPWRMODE

Fast Power Measurement Mode

Function

Enables Fast Power Measurement mode or queries setting when Channel Coding set to RMC.

Command

```
FASTPWRMODE on_off
```

Query

```
FASTPWRMODE?
```

Response

```
on_off
```

Parameter

on_off		Fast Power Measurement Mode
	ON	Executes Fast Power measurement.
	OFF	Executes general power measurement.
	Default	OFF

Details

This command is available for FDD.

The setup of this command is ignored if set to TDD.

When Fast Power Measurement mode is set to On, only Tx power is measured.

Use the following command to enable/disable power measurement and to set measuring times.

PWR_SET

Example of Use

To set Fast Power Measurement mode to On.

```
FASTPWRMODE ON
FASTPWRMODE?
> ON
```

FMEAS_TRGDLY

Trigger Delay

Function

Sets or queries the Trigger Delay.

Command

```
FMEAS_TRGDLY trgdly
```

Query

```
FMEAS_TRGDLY?
```

Response

```
trgdly
```

Unit	ms
Resolution	0.001 ms

Parameters

trgdly	Trigger Delay
Range	0 to 10.000 ms
Resolution	0.001 ms
Suffix code	MS
Default	0.000 ms

Details

This parameter is valid only when FRAMETYPE is set to TDD. Note this parameter can be edited even if FRAMETYPE is set to FDD.
This parameter is valid when MEASITEM is set to NORMAL.

Examples of Use

To set the trigger delay to 0.001 ms:

```
FMEAS_TRGDLY 0.001
FMEAS_TRGDLY?
>0.001
```

FMEAS_TRGLVL

Trigger Level

Function

Sets or queries the Trigger Level.

Command

```
FMEAS_TRGLVL trglevel
```

Query

```
FMEAS_TRGLVL?
```

Response

```
trglevel
```

Unit	dB
Resolution	1 dB

Parameter

trglevel	Trigger Level
Range	–40 to 0 dB
Resolution	1 dB
Suffix code	DB
Default	–30 dB

Details

This parameter is valid only when FRAMETYPE is set to TDD. Note this parameter can be edited even if FRAMETYPE is set to FDD.

Example of Use

To set the trigger level to –30 dB:

```
FMEAS_TRGLVL -30
FMEAS_TRGLVL?
> -30
```

FMEAS_TRGSRC

Trigger Source

Function

Sets or queries the Trigger Source.

Command

```
FMEAS_TRGSRC trgsrc
```

Query

```
FMEAS_TRGSRC?
```

Response

```
trgsrc
```

Parameters

trgsrc	Trigger Source
PWR	Power of input signal
FRAME	frame
FREERUN	Free run
Default	PWR

Details

This parameter is valid only when FRAMETYPE is set to TDD. Note this parameter can be edited even if FRAMETYPE is set to FDD.
This parameter is valid when MEASITEM is set to NORMAL. When PWRTEMP is set, the value is fixed to PWR.

Examples of Use

To set the trigger source to PWR:

```
FMEAS_TRGSRC PWR
FMEAS_TRGSRC?
>PWR
```

FMEAS_TRGTOUT

Trigger Timeout

Function

Sets or queries the trigger timeout.

Command

```
FMEAS_TRGTOUT trgtime
```

Query

```
FMEAS_TRGTOUT?
```

Response

`trgtime`

Unit	s
Resolution	1 s

Parameter

trgtime	Trigger Timeout
Range	1 to 10 s
Resolution	1 s
Suffix code	S
Default	10 s

Details

This parameter is valid only when FRAMETYPE is set to TDD. Note this parameter can be edited even if FRAMETYPE is set to FDD.

Example of Use

To set the Trigger timeout time to 5 seconds:

```
FMEAS_TRGTOUT 5
FMEAS_TRGTOUT?
> 5
```

FRAMETYPE

Frame Structure

Function

Sets or queries the LTE frame structure.
This setting determines the duplex mode.

Command

```
FRAMETYPE mode
```

Query

```
FRAMETYPE?
```

Response

```
mode
```

Parameter

mode		Frame type (Duplex mode)
	FDD	Frequency Division Multiplexing
	TDD	Time Division Multiplexing
	Default	FDD

Details

When only MX887013A is installed, only FDD can be set.
When only MX887014A is installed, only TDD can be set and the default is TDD.

Example of Use

To set the duplex mode to FDD:

```
FRAMETYPE FDD
FRAMETYPE?
> FDD
```

FRAMETYPE_SCC1

Frame Structure for SCC-1

Function

Sets or queries the LTE frame structure for SCC-1.

Command

```
FRAMETYPE_SCC1 mode
```

Query

```
FRAMETYPE_SCC1?
```

Response

```
mode
```

Parameters

mode	Frame type (Duplex mode)
FDD	Frequency Division Multiplexing
TDD	Time Division Multiplexing
Default	FDD

Details

When only MX887013A is installed, only FDD can be set.
When only MX887014A is installed, only TDD can be set and the default is TDD.
When the settings in this command and FRAMETYPE are different, the measurement is performed using the settings in FRAMETYPE.

Examples of Use

To set the duplex mode for SCC-1 to FDD:

```
FRAMETYPE_SCC1 FDD
FRAMETYPE_SCC1?
> FDD
```

FREQERRRNG

Frequency Error Range

Function

Sets and queries the frequency error detection method in the modulation analysis measurement.

Command

```
FREQERRRNG value
```

Query

```
FREQERRRNG?
```

Response

```
value
```

Parameters

value		Frequency Error Range
	NORMAL	Normal
	NARROW	Narrow Range
	Default	NORMAL

Examples of Use

To set Frequency Error Range to Narrow Range:

```
FREQERRRNG NARROW
FREQERRRNG?
>NARROW
```

GROUPHOP

Group Hopping

Function

Enables and queries the Group hopping.

Command

```
GROUPHOP on_off
```

Query

```
GROUPHOP?
```

Response

```
on_off
```

Parameter

on_off	Enables/disables Group hopping.
ON	Enables Group hopping.
OFF	Disables Group hopping.
Default	ON

Example of Use

To enable Group hopping:

```
GROUPHOP  ON
GROUPHOP?
> ON
```

IBEM_CLFR

In-band Emission Carrier Leakage Frequency

Function

Sets and queries the position of Carrier Leakage Frequency of the UE in the In-band Emission/EVM measurement at Contiguous UL CA.

Command

```
IBEM_CLFR clf
```

Query

```
IBEM_CLFR?
```

Response

```
clf
```

Parameters

clf		Position of Carrier Leakage Frequency
	CFR	at Carrier Frequency Center frequency of Aggregated Channel Bandwidth
	CCC	at each CC Center Center frequency of each CC
	Default	CFR

Details

When the In-band Emission measurement at Contiguous UL CA is performed, “UL Number of RB” for PCC or SCC-1 must be set to 0.

For CFR, the resource block located at the center frequency of Aggregated Channel Bandwidth is treated as the carrier leak frequency and the In-band Emission/EVM measurement is performed.

For CCC, the center frequencies of each CC are treated as the carrier leak frequency and the In-band Emission/EVM measurement is performed.

Example of Use

To set the position of Carrier Leakage Frequency to CFR:

```
IBEM_CLFR CFR
IBEM_CLFR?
> CFR
```

ILVL

Input Level

Function

Sets or queries the input level of the input test port.

Command

```
ILVL level[,level_scc1]
```

Query

```
ILVL? [ALL]
```

Response

```
level,level_scc1
```

Unit	dBm
Resolution	0.1 dB

Parameter

level	Input level of PCC
level_scc1	Input level of SCC-1
Range	
MU887000A	–65.0 to +35.0 dBm (Port 1/Port 2)
	–65.0 to +25.0 dBm (Port 3/Port 4)
MU887001A	–65.0 to +35.0 dBm (Port 1 to Port 4)
MU887002A	–65.0 to +35.0 dBm (Port 1 to Port 12)
Resolution	0.1 dB
Suffix Code	DBM (uses dBm when omitted)
Default	–1.0 dBm

Details

For MU887000A, the setting range varies with the input test port setting.
If cable loss correction is set to ON, the setting range of the input level is the range of values with added cable loss.
If the cable loss is 5 dB, the MU887000A Port 1/Port 2 setting range is –60.0 to +40.0 dBm.
When the query argument ALL is omitted, the response is level only.

Example of Use

To set the input level for PCC to –10.0 dBm and the input level for SCC-1 to –15.0 dBm:

```
ILVL -10.0,-15.0
ILVL? ALL
>-10.0,-15.0
```

Related Commands

EXTLOSSW, LOSSTBL, LOSSTBLVAL
For details of the commands, refer to Chapter 6 “Native Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

ILVL_SCC1

Input Level for SCC-1

Function

Sets or queries the input level of the input test port.

Command

```
ILVL_SCC1 level
```

Query

```
ILVL_SCC1?
```

Response

level

Unit	dBm
Resolution	0.1 dB

Parameters

level — Input level for SCC-1

Range	
MU887000A	–65.0 to +35.0 dBm (Port 1/Port 2)
	–65.0 to +25.0 dBm (Port 3/Port 4)
MU887001A	–65.0 to +35.0 dBm (Port 1 to Port 4)
MU887002A	–65.0 to +35.0 dBm (Port 1 to Port 12)
Resolution	0.1 dB
Suffix Code	DBM (uses dBm when omitted)
Default	–1.0 dBm

Details

For MU887000A, the setting range varies with the input test port setting.
If cable loss correction is set to ON, the setting range of the input level is the range of values with added cable loss.
If the cable loss is 5 dB, the MU887000A Port 1/Port 2 setting range is –60.0 to +40.0 dB.

Examples of Use

To set the input level for SCC-1 to –10.0 dBm.

```
ILVL_SCC1 -10.0
ILVL_SCC1?
>-10.0
```

Related Commands

EXTLOSSW, LOSSTBL, LOSSTBLVAL
For details of the commands, refer to Chapter 6 “Native Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

INBANDEITEM?

In-Band Emissions Measured Item

Function

Queries whether each in-band emission measurement item for modulation analysis is measured or not.

Query

```
INBANDEITEM? [cc]
```

Response

```
flag
```

flag Measured/Not measured flag (0 to 7)
Returns the sum of the following measurement items.

0 Not measured
1 Measure General
2 Measure IQ Image
4 Measure Carrier Leakage

Parameter

cc Component Carrier
Used at UL CA and omitted at non CA.
Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.

PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query whether each in-band emission measurement item for modulation analysis is measured or not.

```
INBANDEITEM?
> 4
```

INBANDEPASS?

In-Band Emissions Judgement

Function

Queries the judgement on the in-band emission measurement result for modulation analysis.

Query

```
INBANDEPASS? [cc]
```

Response

```
judgement
```

judgement	Judgement
PASS	Pass
FAIL	Fail
–	Not measured

Parameter

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the judgement on the in-band emission measurement result for modulation analysis.

```
INBANDEPASS?
> PASS
```

INBANDE_GEN?

In-Band Emissions (General) Result

Function

Queries in-band emissions (General) for non-allocated RB measurement result of Modulation Analysis.

Query

```
INBANDE_GEN? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
ibe
```

ibe	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of in-band emissions (General) measurement result:

```
INBANDE_GEN? AVG
> 0.04
```

INBANDE_GENUL?

In-Band Emissions limit (General)

Function

Queries the limit of the in-band emission measurement result (General) for modulation analysis.

Query

```
INBANDE_GENUL? [cc]
```

Response

```
level
```

level	Limit
Unit	dB
Resolution	0.01 dB

Parameter

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the limit of the in-band emission measurement result (General) for modulation analysis.

```
INBANDE_GENUL?
> 2.05
```

INBANDE_IMG?

In-Band Emissions (IQ Image) Result

Function

Queries in-band emissions (IQ Image) for non-allocated RB measurement result of Modulation Analysis.

Query

```
INBANDE_IMG? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
ibe
```

ibe	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of in-band emissions (IQ Image) measurement result:

```
INBANDE_IMG? AVG
> 0.04
```

INBANDE_IMGUL?

In-Band Emissions limit (IQ Image)

Function

Queries the limit of in-band emission measurement (IQ Image) for modulation analysis.

Query

```
INBANDE_IMGUL? [cc]
```

Response

```
level
```

level	Limit
Unit	dB
Resolution	0.01 dB

Parameter

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the limit of in-band emission measurement result (IQ Image) for modulation analysis.

```
INBANDE_IMGUL?
> 1.05
```

INBANDE_LEAK?

In-Band Emissions (Carrier Leakage) Result

Function

Queries the In-band emissions (Carrier Leakage) for non-allocated RB measurement result of Modulation Analysis.

Query

```
INBANDE_LEAK? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dBc
Resolution	0.01 dB

When mode ≠ TTL,

```
ibe
```

ibe	Measurement result in specified Storage mode
Unit	dBc
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of in-band emissions (Carrier Leakage) measurement result:

```
INBANDE_LEAK? AVG
> 0.04
```

INBANDE_LEAKUL?

In-Band Emissions limit (Carrier Leakage)

Function

Queries the limit of in-band emission measurement (Carrier Leakage) for modulation analysis.

Query

```
INBANDE_LEAKUL? [cc]
```

Response

```
level
```

level	Limit
Unit	dBc
Resolution	0.01 dB

Parameter

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the limit of in-band emission measurement result (Carrier Leakage) for modulation analysis.

```
INBANDE_LEAKUL?
> 1.05
```

INBANDE_MARG?

In-Band Emissions Margin

Function

Queries the worst margin in the entire bandwidth for in-band emission measurement.

Query

```
INBANDE_MARG? [cc]
```

Response

```
margin
```

margin	Worst margin in the entire bandwidth
Unit	dB
Resolution	0.01 dB

Parameter

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

Queries the worst margin in the entire bandwidth of in-band emission measurement for modulation analysis.

```
INBANDE_MARG?
> 1.05
```

IQIMB?

IQ Imbalance Result

Function

Queries the IQ Imbalance measurement result of Modulation Analysis.

Query

```
IQIMB? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
iqimb
```

iqimb	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

IQ Imbalance can be measured when the number of RBs is set to the maximum value for the channel bandwidth shown in Table 2.1.6-2 "Number of Allocatable Resource Blocks in Channel Bandwidth".
If the number of RBs is not the maximum allocatable value in the channel bandwidth, the response is 999.99.

Example of Use

To query the average of IQ Imbalance measurement result:

```
IQIMB? AVG
> 0.04
```

LONGSEARCH

Long Span Search

Function

Enables and queries the Long Span Search.

Command

```
LONGSEARCH on_off
```

Query

```
LONGSEARCH?
```

Response

```
on_off
```

Parameter

on_off		Enables/disables Long Span Search.
	ON	Enables Long Span Search.
	OFF	Disables Long Span Search.
	Default	OFF

Details

Set this parameter to OFF when the Uplink and Downlink signals are synchronized; set it to ON when they are not synchronized.
The response to the MSTAT will be 5 (Synchronization word not detected), if this parameter to OFF when the Uplink and Downlink signals are not synchronized.

Measurement takes more time when the Long Span Search function is on.

Example of Use

To enable the Long Span Search:

```
LONGSEARCH ON
LONGSEARCH?
> ON
```

MAGERR?

Magnitude Error Result

Function

Queries the Magnitude Error measurement result of Modulation Analysis.

Query

```
MAGERR? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	%
Resolution	0.01%

When mode ≠ TTL,

```
merr
```

merr	Measurement result in specified Storage mode
Unit	%
Resolution	0.01%

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Magnitude Error measurement result:

```
MAGERR? AVG
> 1.05
```

MCARRIER

Measurement Carrier

Function

Sets and queries the Component Carrier for measurement at Inter-band UL CA.

Command

```
MCARRIER carrier
```

Query

```
MCARRIER?
```

Response

```
carrier
```

Parameters

carrier	Component Carrier for measurement
PCC	PCC
SCC1	SCC-1
Default	PCC

Examples of Use

To set the Component Carrier for measurement to PCC:

```
MCARRIER PCC
MCARRIER?
>PCC
```

MEASITEM

Measurement Item

Function

Sets or queries the Measurement Item in Fundamental Measurement.

Command

```
MEASITEM item
```

Query

```
MEASITEM?
```

Response

```
item
```

Parameters

item		Measurement Item in Fundamental Measurement
	NORMAL	Normal
	PWRTEMP	Power Template
	Default	NORMAL

Details

PWRTEMP is valid only when CHCODING is set to RMC.

Note this parameter can be edited even if CHCODING is set to RMC_UL_CA.

Example of Use

To set the Measurement Item in Fundamental Measurement to Power Template:.

```
MEASITEM PWRTEMP
MEASITEM ?
> PWRTEMP
```

MOD_SET

Modulation Analysis Measurement Enable and Count

Function

Enables Modulation Analysis Measurement and sets measurement count, and queries settings.

Command

```
MOD_SET on_off[,count]
```

Query

```
MOD_SET?
```

Response

```
on_off,count
```

Parameters

on_off	Enables/disables measurement.
ON	Enables measurement.
OFF	Disables measurement.
Default	OFF
count	Measurement count
Range	1 to 200 1 to 100 (at UL CA)
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable Modulation Analysis measurement and set measurement count to 200:

```
MOD_SET ON,200
MOD_SET?
> ON,200
```

Remarks

Modulation analysis is executed for 1 slot (0.5 ms) at each measurement count.

NRBCQI

nRB-CQI

Function

Sets or queries nRB-CQI.

Command

```
NRBCQI value
```

Query

```
NRBCQI?
```

Response

```
value
```

Parameter

value	nRB-CQI
Range	0 to 98
Resolution	1
Default	2

Details

The number of RBs to send the Uplink PUCCH signal is set.

Example of Use

To set nRB-CQI to 3.

```
NRBCQI 3
NRBCQI?
> 3
```

OBW?

OBW Result

Function

Queries the Occupied Bandwidth measurement result.

Query

```
OBW? [cc]
```

Response

```
bw
```

bw	Occupied Bandwidth
Unit	MHz
Resolution	1 kHz

Parameter

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.3.2-1 Measurement Items of OBW" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of in-band emissions (Carrier Leakage) measurement result:

```
OBW?
> 3.840
```

OBWFREQ?

OBW Frequency Result

Function

Queries the upper, lower and center frequency of Occupied Bandwidth measurement.

Query

```
OBWFREQ? pos[,cc]
```

Response

```
freq
```

freq	Offset frequency
Unit	MHz
Resolution	1 kHz

Parameters

pos	Offset type
UPPER	Upper frequency
LOWER	Lower frequency
CENTER	Center frequency
cc	Component Carrier
	Used at UL CA and omitted at non CA.
	Refer to “Table 2.3.2-1 Measurement Items of OBW” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the upper frequency of Occupied Bandwidth measurement result:

```
OBWFREQ? UPPER
> 1951.920
```

OBW_RATIO

Occupied Bandwidth Ratio

Function

Sets Occupied Bandwidth measurement occupation ratio in Sequence Measurement mode, and queries the setting.

Command

```
OBW_RATIO ratio
```

Query

```
OBW_RATIO?
```

Response

```
ratio
```

Parameter

ratio	Occupied Bandwidth occupation ratio
Range	80.0% to 99.9%
Resolution	0.1%
Suffix code	None
Default	99.0%

Example of Use

To set the Occupied Bandwidth occupation ratio to 99.0%:

```
OBW_RATIO 99.0
OBW_RATIO?
> 99.0
```

OBW_SET

OBW Measurement Enable and Count

Function

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

Command

```
OBW_SET on_off[,count]
```

Query

```
OBW_SET?
```

Response

```
on_off,count
```

Parameters

on_off		Enables/disables measurement.
	ON	Enables measurement.
	OFF	Disables measurement.
	Default	OFF
count		Measurement count
	Range	1 to 200 1 to 100 (at UL CA)
	Resolution	1
	Suffix code	None
	Default	1

Example of Use

To turn Occupied Bandwidth measurement on and set the measurement count to 50:

```
OBW_SET ON,50
OBW_SET?
> ON,50
```

Remarks

Occupied Bandwidth is measured for 1 subframe (1 ms) at each measurement count.

OFFPWR_AFTER?

Off Power (After)

Function

Queries the Off Power (After) measurement result.

Query

```
OFFPWR_AFTER? mode
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
level
```

level	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameter

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

Example of Use

To query the average of Off Power (After) measurement result:

```
OFFPWR_AFTER? AVG
> 1.75
```

OFFPWR_BEFORE?

Off Power (Before)

Function

Queries the Off Power (Before) measurement result.

Query

```
OFFPWR_BEFORE? mode
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
level
```

level	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameter

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

Example of Use

To query the average of Off Power (Before) measurement result:

```
OFFPWR_BEFORE? AVG
> 1.75
```

OFFPWRPASS?

Off Power Judgement

Function

Queries the judgement result of Off Power measurement.
The result is Fail when any part of spectrum exceeds limit, otherwise Pass.

Query

```
OFFPWRPASS?
```

Response

```
judgement
```

judgement	Judgement result
PASS	Pass
FAIL	Fail
–	Not measured

Example of Use

To query the judgement result of Off Power measurement:

```
OFFPWRPASS?
> PASS
```

OLVL

Output Level

Function

Sets or queries the total output level of all channels.

Command

```
OLVL level
```

Query

```
OLVL?
```

Response

```
level
```

Unit	dBm
Resolution	0.1 dB

Parameter

level Output level

Range

MU887000A	400 MHz ≤ frequency ≤ 3800 MHz
	–130.0 to –10.0 dBm (Port 1/Port 2)
	–120.0 to 0.0 dBm (Port 3/Port 4)
	3800 MHz < frequency ≤ 6000 MHz
	–130.0 to –18.0 dBm (Port 1/Port 2)
	–120.0 to –8.0 dBm (Port 3/Port 4)
MU887001A	400 MHz ≤ frequency ≤ 3800 MHz
	–130.0 to –10.0 dBm (Port 1 to Port 4)
	3800 MHz < frequency ≤ 6000 MHz
	–130.0 to –18.0 dBm (Port 1 to Port 4)
MU887002A	400 MHz < frequency ≤ 6000 MHz
	–130.0 to 0.0 dBm (Port 1 to Port 12)
Resolution	0.1 dB
Suffix Code	DBM (uses dBm when omitted)
Default	–60.2 dBm

Details

For MU887000A, the setting range varies with the output test port setting.
If cable loss correction is set to ON, the setting range of the output level is the range of values with subtracted cable loss.
If the cable loss is 5 dB and frequency ≤ 3800 MHz,
the MU887000A Port 1/Port 2 setting range is –135.0 to –15.0 dBm.

Example of Use

To set the output level to –50.0 dBm:

```
OLVL -50.0
OLVL?
> -50.0
```

Related Commands

EXTLOSSW

LOSSTBL

LOSSTBLVAL

For details of the commands, refer to Chapter 6 “Native Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

ONPWR?

On Power

Function

Queries the On Power measurement result.

Query

```
ONPWR? mode
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dBm
Resolution	0.01 dB

When mode ≠ TTL,

```
level
```

level	Measurement result in specified Storage mode
Unit	dBm
Resolution	0.01 dB

Parameter

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

Example of Use

To query the average of On Power measurement result:

```
ONPWR? AVG
> 1.75
```

ONPWRPASS?

On Power Judgement

Function

Queries the judgement result of On Power measurement.
The result is Fail when any part of spectrum exceeds limit, otherwise Pass.

Query

```
ONPWRPASS?
```

Response

```
judgement
```

judgement	Judgement result
PASS	Pass
FAIL	Fail
–	Not measured

Example of Use

To query the judgement result of Off Power measurement.

```
ONPWRPASS?
> PASS
```

PEVM?

Peak EVM Result

Function

Queries the EVM Peak measurement result.

Query

```
PEVM? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	%
Resolution	0.01%

When mode ≠ TTL,

```
pevm
```

pevm	Measurement result in specified Storage mode
Unit	%
Resolution	0.01%

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of EVM Peak measurement result:

```
PEVM? AVG
> 1.75
```

PHASEERR?

Phase Error Result

Function

Queries the Phase Error measurement result of Modulation Analysis.

Query

```
PHASEERR? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	degree
Resolution	0.01 degree

When mode ≠ TTL,

```
perr
```

perr	Measurement result in specified Storage mode
Unit	degree
Resolution	0.01 degree

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Phase Error measurement result:

```
PHASEERR? AVG
> 1.55
```

PT_WDR

Power Template - Wide Dynamic Range

Function

Enables the wide dynamic range function for the Power Template measurement, and queries the settings.

Command

```
PT_WDR on_off
```

Query

```
PT_WDR?
```

Response

```
on_off
```

Parameter

on_off		Enables/disables the wide dynamic range function
	ON	Enables the wide dynamic range function
	OFF	Disables the wide dynamic range function
	Default	ON

Example of Use

To enable the wide dynamic range function:

```
PT_WDR ON
PT_WDR?
> ON
```

PWR_SET

Tx Power Measurement Enable and Count

Function

Enables Tx power measurement and sets or queries measurement count in Sequence Measurement mode.

Command

```
PWR_SET on_off[,count]
```

Query

```
PWR_SET?
```

Response

```
on_off,count
```

Parameters

on_off		Enables/disables measurement.
	ON	Enables measurement.
	OFF	Disables measurement.
	Default	ON
count		Measurement count
	Range	1 to 200 1 to 100 (at UL CA)
	Resolution	1
	Suffix code	None
	Default	1

Example of Use

To turn Transmit Power measurement ON and set the measurement count to 200:

```
PWR_SET ON,200
PWR_SET?
> ON,200
```

Remarks

Tx Power is measured for 1 subframe (1 ms) at each measurement count.

RHO?

Rho Result

Function

Queries the Rho (waveform quality) measurement result of Modulation Analysis.

Query

```
RHO? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Resolution	0.00001

When mode ≠ TTL,

```
rho
```

rho	Measurement result in specified Storage mode
Resolution	0.00001

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Signal Quality measurement (Rho) result:

```
RHO? AVG
> 0.04
```

RSEVM?

Reference Signal EVM Result

Function

Queries the EVM measurement result of Reference Signal.

Query

```
RSEVM? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	%
Resolution	0.01%

When mode ≠ TTL,

```
rsevm
```

rsevm	Measurement result in specified Storage mode
Unit	%
Resolution	0.01%

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The EVM measurement of the Reference Signal is supported when PUSCH is assigned using the CHCONFIG command.

Example of Use

To query the EVM measurement result of Reference Signal:

```
RSEVM?
> 1.51
```

RXFREQ

Downlink Frequency

Function

Sets or queries the downlink frequency.

This command has the same function as DLFREQ.

Command

```
RXFREQ dl_freq
```

Query

```
RXFREQ?
```

Response

```
dl_freq
```

Parameter

dl_freq		Downlink frequency
	Range	400 000 000 to 3800 000 000 Hz (MU887000A/01A) 400 000 000 to 6000 000 000 Hz (With MU887000A/01A-001) 400 000 000 to 6000 000 000 Hz (MU887002A)
	Resolution	1 Hz
	Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
	Default	2140 000 000 Hz

Details

This sets the Rx frequency for the mobile station.

Updating the Downlink Frequency setting does not affect the Downlink Channel setting.

Example of Use

To set the downlink frequency to 2120 MHz:

```
RXFREQ 2120MHZ
RXFREQ?
>2120000000
```

SEM?

SEM Judgement

Function

Queries the judgement result of Spectrum Emission Mask measurement.
Fail when any part of spectrum exceeds limit, otherwise Pass.

Query

```
SEM? [cc]
```

Response

```
judgement
```

judgement	Judgement result
PASS	Pass
FAIL	Fail
–	Not measured

Parameter

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the judgement result whether the spectrum is within the specified threshold:

```
SEM?
> PASS
```

SEMLVL_DET_LOWER?

SEM Peak Value (Detail) (Lower)

Function

Queries the peak level with offset frequency at each of lower side 9 ranges of Spectrum Emission Mask measurement.

Query

```
SEMLVL_DET_LOWER? [cc]
```

Response

```
f_M1,l_M1,f_M2,l_M2,f_M3,l_M3,f_M4,l_M4,f_M5,l_M5,f_M6,l_M6,f_M7,l_M7,f_M
8,l_M8,f_M9,l_M9
```

l_M1 to l_M9	Peak level at each of lower side range of Range 1 to Range 9
Unit	dBm
Resolution	0.01 dB
f_M1 to f_M9	Offset frequency of peak level at each of lower side range of Range 1 to Range 9
Unit	MHz
Resolution	1 kHz

Parameters

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The number of target ranges varies with the combination of channel bandwidth and network signalled value for additionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the peak level with offset frequency at each of lower side of 9 ranges of Spectrum Emission Mask measurement:

```
SEMLVL_DET_LOWER?
>
-0.500,3.00,-1.500,3.00,-2.600,3.00,-3.500,3.00,-5.500,3.00,-8.000,3.00,-
12.500,3.00,-17.500,3.00,-22.500,3.00
```

SEMLVL_DET_UPPER?

SEM Peak Value (Detail) (Upper)

Function

Queries the peak level with offset frequency at each of upper side 9 ranges of Spectrum Emission Mask measurement.

Query

```
SEMLVL_DET_UPPER? [cc]
```

Response

```
f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4,f_5,l_5,f_6,l_6,f_7,l_7,f_8,l_8,f_9,l_9
```

l_1 to l_9	Peak level in each of upper Range 1 to Range 9
Unit	dBm
Resolution	0.01 dB
f_1 to f_9	Offset frequency of peak level in each of upper Range 1 to Range 9
Unit	MHz
Resolution	1 kHz

Parameters

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The number of target ranges varies with the combination of channel bandwidth and network signalled value for additionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the peak level with offset frequency at each of upper side of 9 ranges of Spectrum Emission Mask measurement:

```
SEMLVL_DET_UPPER?
>
0.500,3.00,1.500,3.00,2.600,3.00,3.500,3.00,5.500,3.00,8.000,3.00,12.500,
3.00,17.500,3.00,22.500,3.00
```

SEMLVL_LOWER?

SEM Peak Value (Lower)

Function

Queries the peak level with offset frequency at each of lower side ranges of Spectrum Emission Mask measurement.

Query

```
SEMLVL_LOWER? [cc]
```

Response

```
f_M1,l_M1,f_M2,l_M2,f_M3,l_M3,f_M4,l_M4
```

l_M1 to l_M4	Peak level in each of lower Range 1 to Range 4
Unit	dBm
Resolution	0.01 dB
f_M1 to f_M4	Offset frequency of peak level in each of lower Range 1 to Range 4
Unit	MHz
Resolution	1 kHz

Parameters

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

Refer to Table 2.4.1-1 “Frequency Ranges of Range 1 to Range 4” for the frequency range for the measurement.

Example of Use

To query the peak level with offset frequency at each of lower side ranges of Spectrum Emission Mask measurement:

```
SEMLVL_LOWER?
> -3.000,-20.00,-5.000,-30.00,-8.000,-40.00,-9.500,-50.00
```

SEMLVL_UPPER?

SEM Peak Value (Upper)

Function

Queries the peak level with offset frequency at each of upper side ranges of Spectrum Emission Mask measurement.

Query

```
SEMLVL_UPPER? [cc]
```

Response

```
f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4
```

l_1 to l_4	Peak level in each of upper Range 1 to Range 4
Unit	dBm
Resolution	0.01 dB
f_1 to f_4	Offset frequency of peak level in each of upper Range 1 to Range 4
Unit	MHz
Resolution	1 kHz

Parameters

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

Refer to Table 2.4.1-1 "Frequency Ranges of Range 1 to Range 4" for the frequency range for the measurement.

Example of Use

To query the peak level with offset frequency at each of upper side ranges of Spectrum Emission Mask measurement:

```
SEMLVL_UPPER?
> 3.000,-20.00,5.000,-30.00,8.000,-40.00,9.500,-50.00
```

SEMMARGIN_DET_LOWER?

SEM Template Margin (Detail) (Lower)

Function

Queries the level margin with frequency where margin measured at each of lower side of 9 ranges of Spectrum Emission Mask measurement.

Query

```
SEMMARGIN_DET_LOWER? [cc]
```

Response

```
f_M1,l_M1,f_M2,l_M2,f_M3,l_M3,f_M4,l_M4,f_M5,l_M5,f_M6,l_M6,f_M7,l_M7,f_M8,l_M8,f_M9,l_M9
```

l_M1 to l_M9	Level margin in each of lower Range 1 to Range 9
Unit	dB
Resolution	0.01 dB
f_M1 to f_M9	Offset frequency where level margin in each of lower Range 1 to Range 9 measured
Unit	MHz
Resolution	1 kHz

Parameters

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

The number of target ranges varies with the combination of channel bandwidth and network signalled value for additionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the level margin with frequency where margin measured at each of lower side of 9 ranges of Spectrum Emission Mask measurement:

```
SEMMARGIN_DET_LOWER?
>
-0.500,3.00,-1.500,3.00,-2.600,3.00,-3.500,3.00,-5.500,3.00,-8.000,3.00,-12.500,3.00,-17.500,3.00,-22.500,3.00
```

SEMMARGIN_DET_UPPER?

SEM Template Margin (Detail) (Upper)

Function

Queries the level margin with frequency where margin measured at each of upper side of 9 ranges of Spectrum Emission Mask measurement.

Query

```
SEMMARGIN_DET_UPPER? [cc]
```

Response

```
f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4,f_5,l_5,f_6,l_6,f_7,l_7,f_8,l_8,f_9,l_9
```

l_1 to l_9	Level margin in each of upper side range of Range 1 to Range 9
Unit	dB
Resolution	0.01 dB
f_1 to f_9	Offset frequency where level margin measured in each of upper side range of Range 1 to Range 9
Unit	MHz
Resolution	1 kHz

Parameters

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

The number of target ranges varies with the combination of channel bandwidth and network signalled value for additionalSpectrumEmission. Refer to Table 2.4.1-2 "Frequency Ranges for Measurement Results (1/2)" and Table 2.4.1-3 "Frequency Ranges for Measurement Results (2/2)" for details.

Example of Use

To query the level margin with frequency where margin measured at each of upper side of 9 ranges of Spectrum Emission Mask measurement:

```
SEMLVL_DET_UPPER?
>
0.500,3.00,1.500,3.00,2.600,3.00,3.500,3.00,5.500,3.00,8.000,3.00,12.500,
3.00,17.500,3.00,22.500,3.00
```

SEMMARGIN_LOWER?

SEM Template Margin (Lower)

Function

Queries the level margin at each of lower side ranges in Spectrum Emission Mask measurement.

Query

```
SEMMARGIN_LOWER? [cc]
```

Response

```
f_M1,l_M1,f_M2,l_M2,f_M3,l_M3,f_M4,l_M4
```

l_M1 to l_M4	Level margin in each of lower Range 1 to Range 4
Unit	dB
Resolution	0.01 dB
f_M1 to f_M4	Offset frequency where level margin in each of lower Range 1 to Range 4 measured
Unit	MHz
Resolution	1 kHz

Parameters

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

Level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

Refer to Table 2.4.1-1 Frequency Ranges of Range 1 to Range 4 for the frequency range for the measurement.

Example of Use

To query the level margin with frequency where margin measured at each of lower side ranges of Spectrum Emission Mask measurement:

```
SEMMARGIN_LOWER?
> -3.000,3.00,-5.000,3.00,-8.000,3.00,-9.500,3.00
```

SEMMARGIN_UPPER?

SEM Template Margin (Upper)

Function

Queries the level margin at each of upper side range in Spectrum Emission Mask measurement in Sequence Measurement mode.

Query

```
SEMMARGIN_UPPER? [cc]
```

Response

```
f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4
```

l_1 to l_4	Level margin in each of upper Range 1 to Range 4
Unit	dB
Resolution	0.01 dB
f_1 to f_4	Offset frequency where level margin in each of upper Range 1 to Range 4 measured
Unit	MHz
Resolution	1 kHz

Parameters

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

Level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

Refer to Table 2.4.1-1 "Frequency Ranges of Range 1 to Range 4" for the frequency range for the measurement.

Example of Use

To query the level margin with frequency where margin measured at each of upper side ranges of Spectrum Emission Mask measurement:

```
SEMMARGIN_UPPER?
> 3.000,3.00,5.000,3.00,8.000,3.00,9.500,3.00
```

SEM_SET

Spectrum Emission Mask Enable and Count

Function

Enables the Spectrum Emission Mask Measurement and sets or queries the measurement count.

Command

```
SEM_SET on_off[,count]
```

Query

```
SEM_SET?
```

Response

```
on_off,count
```

Parameters

on_off		Enables/disables the measurement.
	ON	Enables the measurement.
	OFF	Disables the measurement.
	Default	OFF
count		Measurement count
	Range	1 to 200 1 to 100 (at UL CA)
	Resolution	1
	Suffix code	None
	Default	1

Example of Use

To enable the Spectrum Emission Mask measurement and set the measurement count to 100:

```
SEM_SET ON,100
SEM_SET?
> ON,100
```

Remarks

The Spectrum Emission Mask is measured for 1 subframe (1 ms) at each measurement count.

SEM_TEMPLATE_1.4MHZ

Spectrum Emission Mask Template (1.4 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 1.4 MHz channel bandwidth.

Command

```
SEM_TEMPLATE_1.4MHZ range,limit
```

Query

```
SEM_TEMPLATE_1.4MHZ? range
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 4	
Resolution	1	
Suffix code	None	
Default	1	
limit	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Suffix code	DBM (uses dBm when omitted)	
Default	Range 1:	–8.5 dBm
	Range 2:	–8.5 dBm
	Range 3:	–23.5 dBm
	Range 4:	0.0 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 1.4 MHz channel bandwidth to –10.0 dBm:

```
SEM_TEMPLATE_1.4MHZ 2,-10.0
SEM_TEMPLATE_1.4MHZ? 2
> -10.0
```

SEM_TEMPLATE_10MHZ

Spectrum Emission Mask Template (10 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 10 MHz channel bandwidth.

Command

```
SEM_TEMPLATE_10MHZ range,limit
```

Query

```
SEM_TEMPLATE_10MHZ? range
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 4	
Resolution	1	
Suffix code	None	
Default	1	
limit	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Suffix code	DBM (uses dBm when omitted)	
Default	Range 1:	–16.5 dBm
	Range2:	–8.5 dBm
	Range3:	–11.5 dBm
	Range4:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 10 MHz channel bandwidth to –10.0 dBm:

```
SEM_TEMPLATE_10MHZ 2,-10.0
SEM_TEMPLATE_10MHZ? 2
> -10.0
```

SEM_TEMPLATE_15MHZ

Spectrum Emission Mask Template (15 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 15 MHz channel bandwidth.

Command

```
SEM_TEMPLATE_15MHZ range,limit
```

Query

```
SEM_TEMPLATE_15MHZ? range
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 4	
Resolution	1	
Suffix code	None	
Default	1	
limit	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Suffix code	DBM (uses dBm when omitted)	
Default	Range 1:	–18.5 dBm
	Range2:	–8.5 dBm
	Range3:	–11.5 dBm
	Range4:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 15 MHz channel bandwidth to –10.0 dBm:

```
SEM_TEMPLATE_15MHZ 2,-10.0
SEM_TEMPLATE_15MHZ? 2
> -10.0
```

SEM_TEMPLATE_20MHZ

Spectrum Emission Mask Template (20 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 20 MHz channel bandwidth.

Command

```
SEM_TEMPLATE_20MHZ range,limit
```

Query

```
SEM_TEMPLATE_20MHZ? range
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 4	
Resolution	1	
Suffix code	None	
Default	1	
limit	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Suffix code	DBM (uses dBm when omitted)	
Default	Range 1:	–19.5 dBm
	Range2:	–8.5 dBm
	Range3:	–11.5 dBm
	Range4:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 20 MHz channel bandwidth to –10.0 dBm:

```
SEM_TEMPLATE_20MHZ 2,-10.0
SEM_TEMPLATE_20MHZ? 2
> -10.0
```

SEM_TEMPLATE_3MHZ

Spectrum Emission Mask Template (3 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 3 MHz channel bandwidth.

Command

```
SEM_TEMPLATE_3MHZ range,limit
```

Query

```
SEM_TEMPLATE_3MHZ? range
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 4	
Resolution	1	
Suffix code	None	
Default	1	
limit	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Suffix code	DBM (uses dBm when omitted)	
Default	Range 1:	–11.5 dBm
	Range2:	–8.5 dBm
	Range3:	–23.5 dBm
	Range4:	0.0 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 3 MHz channel bandwidth to –10.0 dBm:

```
SEM_TEMPLATE_3MHZ 2,-10.0
SEM_TEMPLATE_3MHZ? 2
> -10.0
```

SEM_TEMPLATE_5MHZ

Spectrum Emission Mask Template (5 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 5 MHz channel bandwidth.

Command

```
SEM_TEMPLATE_5MHZ range,limit
```

Query

```
SEM_TEMPLATE_5MHZ? range
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 4	
Resolution	1	
Suffix code	None	
Default	1	
limit	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Suffix code	DBM (uses dBm when omitted)	
Default	Range 1:	–13.5 dBm
	Range2:	–8.5 dBm
	Range3:	–11.5 dBm
	Range4:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 5 MHz channel bandwidth to –10.0 dBm:

```
SEM_TEMPLATE_5MHZ 2,-10.0
SEM_TEMPLATE_5MHZ? 2
> -10.0
```

SEM_TEMPLATE_CONTCC_100RB_100RB

Spectrum Emission Mask Template for Contiguous UL CA (100RB+100RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 100RB+100RB.

Command

```
SEM_TEMPLATE_CONTCC_100RB_100RB range,limit
```

Query

```
SEM_TEMPLATE_CONTCC_100RB_100RB? range
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 6	
Resolution	1	
Default	1	
limit	Limit	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Default	Range 1:	–22.5 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm
	Range 5:	–23.5 dBm
	Range 6:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 100RB+100RB.

```
SEM_TEMPLATE_CONTCC_100RB_100RB 2,-10.0
SEM_TEMPLATE_CONTCC_100RB_100RB? 2
>-10.0
```

SEM_TEMPLATE_CONTCC_25RB_100RB

Spectrum Emission Mask Template for Contiguous UL CA (25RB+100RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 25RB+100RB.

Command

```
SEM_TEMPLATE_CONTCC_25RB_100RB range,limit
```

Query

```
SEM_TEMPLATE_CONTCC_25RB_100RB? range
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 6	
Resolution	1	
Default	1	
limit	Limit	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Default	Range 1:	–20.5 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm
	Range 5:	–23.5 dBm
	Range 6:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 25RB+100RB.

```
SEM_TEMPLATE_CONTCC_25RB_100RB 2,-10.0
SEM_TEMPLATE_CONTCC_25RB_100RB? 2
>-10.0
```

SEM_TEMPLATE_CONTCC_50RB_100RB

Spectrum Emission Mask Template for Contiguous UL CA (50RB+100RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 50RB+100RB.

Command

```
SEM_TEMPLATE_CONTCC_50RB_100RB range,limit
```

Query

```
SEM_TEMPLATE_CONTCC_50RB_100RB? range
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 6	
Resolution	1	
Default	1	
limit	Limit	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Default	Range 1:	–21.0 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm
	Range 5:	–23.5 dBm
	Range 6:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 50RB+100RB.

```
SEM_TEMPLATE_CONTCC_50RB_100RB 2,-10.0
SEM_TEMPLATE_CONTCC_50RB_100RB? 2
>-10.0
```

SEM_TEMPLATE_CONTCC_75RB_100RB

Spectrum Emission Mask Template for Contiguous UL CA (75RB+100RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 75RB+100RB.

Command

```
SEM_TEMPLATE_CONTCC_75RB_100RB range,limit
```

Query

```
SEM_TEMPLATE_CONTCC_75RB_100RB? range
```

Response

`limit`

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 6	
Resolution	1	
Default	1	
limit	Limit	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Default	Range 1:	–22.0 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm
	Range 5:	–23.5 dBm
	Range 6:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 75RB+100RB.

```
SEM_TEMPLATE_CONTCC_75RB_100RB 2,-10.0
SEM_TEMPLATE_CONTCC_75RB_100RB? 2
>-10.0
```

SEM_TEMPLATE_CONTCC_75RB_75RB

Spectrum Emission Mask Template for Contiguous UL CA (75RB+75RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 75RB+75RB.

Command

```
SEM_TEMPLATE_CONTCC_75RB_75RB range,limit
```

Query

```
SEM_TEMPLATE_CONTCC_75RB_75RB? range
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 6	
Resolution	1	
Default	1	
limit	Limit	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Default	Range 1:	–21.0 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm
	Range 5:	–23.5 dBm
	Range 6:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 75RB+75RB.

```
SEM_TEMPLATE_CONTCC_75RB_75RB 2,-10.0
SEM_TEMPLATE_CONTCC_75RB_75RB? 2
>-10.0
```

SIB2_NS

additionalSpectrumEmission

Function

Sets or queries the network signalled value for additionalSpectrumEmission in SIB2. This setting determines the Spectrum Emission Mask frequency range.

Command

```
SIB2_NS sib2_ns
```

Query

```
SIB2_NS?
```

Response

```
sib2_ns
```

Parameter

sib2_ns	Network signalled value for additionalSpectrumEmission
NS_01	NS_01
NS_02	NS_02
NS_03	NS_03
:	:
NS_30	NS_30
NS_31	NS_31
NS_32	NS_32
Default	NS_01

Example of Use

To set the additionalSpectrumEmission in SIB2 to NS_02:

```
SIB2_NS NS_02
SIB2_NS?
> NS_02
```

SPECFLAT1?

Spectrum Flatness (≥3 MHz) Result

Function

Queries the worst value in Spectrum Flatness measurement result in Range 1.

Query

```
SPECFLAT1? [cc]
```

Response

```
worst
```

worst	Measurement result
Unit	dB
Resolution	0.01 dB

Parameter

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The worst value should be either the maximum or minimum of the Flatness measurement results in Range 1, whichever is the larger absolute value.

Example of Use

To query the worst value in Spectrum Flatness measurement result in Range 1:

```
SPECFLAT1?
> 0.04
```

SPECFLAT1_M?

Spectrum Flatness (≥3 MHz (R1 −)) Result

Function

Queries the minimum value in Spectrum Flatness measurement result in Range 1.

Query

```
SPECFLAT1_M? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
sflatness
```

sflatness	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of minimum value in Spectrum Flatness measurement result in Range 1:

```
SPECFLAT1_M? AVG
> 0.04
```

SPECFLAT1_P?

Spectrum Flatness (≥3 MHz (R1 +)) Result

Function

Queries the maximum value in Spectrum Flatness measurement result in Range 1.

Query

```
SPECFLAT1_P? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

sflatness	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of maximum value in Spectrum Flatness measurement result in Range 1:

```
SPECFLAT1_P? AVG
> 0.04
```

SPECFLAT2?

Spectrum Flatness (<3 MHz) Result

Function

Queries the worst value in Spectrum Flatness measurement result in Range 2.

Query

```
SPECFLAT2? [cc]
```

Response

```
worst
```

worst	Measurement result
Unit	dB
Resolution	0.01 dB

Parameter

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The worst value should be either the maximum or minimum of the Flatness measurement results in Range 2, whichever is the larger absolute value.

Example of Use

To query the worst value in Spectrum Flatness measurement result in Range 2:

```
SPECFLAT2?
> 0.04
```

SPECFLAT2_M?

Spectrum Flatness (<3 MHz (R2 –)) Result

Function

Queries the minimum value in Spectrum Flatness measurement result in Range 2.

Query

```
SPECFLAT2_M? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
sflatness
```

sflatness	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of the minimum value in Spectrum Flatness measurement result in Range 2:

```
SPECFLAT2_M? AVG
> 0.04
```

SPECFLAT2_P?

Spectrum Flatness (<3 MHz (R2 +)) Result

Function

Queries the maximum value in Spectrum Flatness measurement result in Range 2.

Query

```
SPECFLAT2_P? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
sflatness
```

sflatness	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of the maximum value in Spectrum Flatness measurement result in Range 2:

```
SPECFLAT2_P? AVG
> 0.04
```

SPECFLATITEM?

Spectrum Flatness Measured Item

Function

Queries whether each spectrum flatness measurement items is measured or not.

Query

```
SPECFLATITEM? [cc]
```

Response

```
flag
```

flag — Measured/Not measured flag (0 to 3)

Returns the sum of the following measurement items.

0 Not measured

1 ≥ 3 MHz area (When Test Environment is Normal)
≥ 5 MHz area (When Test Environment is Extreme)

2 < 3 MHz area (When Test Environment is Normal)
< 5 MHz area (When Test Environment is Extreme)

Parameter

cc — Component Carrier

Used at UL CA and omitted at non CA.

Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.

PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query whether each spectrum flatness measurement items is measured or not.

```
SPECFLATITEM?
> 2
```

SPECFLATPPPASS?

Spectrum Flatness Judgement

Function

Queries the judgement of Spectrum Flatness measurement result.

Query

```
SPECFLATPPPASS? [cc]
```

Response

```
judgement
```

judgement	Judgement
PASS	Pass
FAIL	Fail
–	Not measured

Parameter

cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the judgement of Spectrum Flatness measurement result:

```
SPECFLATPPPASS?
> PASS
```

SPECFLAT_RP1?

Spectrum Flatness (≥3 MHz (RP1)) Result

Function

Queries the ripple value in Spectrum Flatness measurement result in Range 1.

Query

```
SPECFLAT_RP1? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
sflatness
```

sflatness	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of ripple value in Spectrum Flatness measurement result in Range 1:

```
SPECFLAT_RP1? AVG
> 0.04
```

SPECFLAT_RP12?

Spectrum Flatness (RP12) Result

Function

Queries the difference between maximum value in Range 1 and minimum value in Range 2 of Spectrum Flatness measurement result.

Query

```
SPECFLAT_RP12? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
sflatness
```

sflatness	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of difference between maximum value in Range 1 and minimum value in Range 2:

```
SPECFLAT_RP12? AVG
> 0.04
```

SPECFLAT_RP2?

Spectrum Flatness (<3 MHz (RP2)) Result

Function

Queries the ripple value in Spectrum Flatness measurement result in Range 2.

Query

```
SPECFLAT_RP2? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
sflatness
```

sflatness	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of ripple value in Spectrum Flatness measurement result in Range 2:

```
SPECFLAT_RP2? AVG
> 0.04
```

SPECFLAT_RP21?

Spectrum Flatness (RP21) Result

Function

Queries the difference between maximum value in Range 2 and minimum value in Range 1 of Spectrum Flatness measurement result.

Query

```
SPECFLAT_RP21? mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
sflatness
```

sflatness	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of difference between maximum value in Range 2 and minimum value in Range 12:

```
SPECFLAT_RP21? AVG
> 0.04
```

TDDULDLCONF

Uplink Downlink Configuration

Function

Sets or queries the Uplink/Downlink signal configuration of TDD.

Command

```
TDDULDLCONF conf
```

Query

```
TDDULDLCONF?
```

Response

```
conf
```

Parameter

conf	Uplink Downlink Signal Configuration
Range	0 to 6
Resolution	1
Default	1

Example of Use

To set the Uplink/Downlink signal configuration to 1:

```
TDDULDLCONF 1
TDDULDLCONF?
> 1
```

TEMPLATE_SET

Power Template measurement Enable and Count

Function

Enables the Power Template Measurement and sets the measurement count, and queries the settings. When setting Measurement Item to PWRTEMP, it is turned On automatically.

Command

```
TEMPLATE_SET on_off[,count]
```

Query

```
TEMPLATE_SET?
```

Response

```
on_off,count
```

Parameters

on_off	Enables/disables measurement.
ON	Enables measurement.
OFF	Disables measurement.
Default	OFF
count	Measurement count
Range	1 to 200
Resolution	1
Suffix Code	None
Default	1

Example of Use

To enable Power template measurement and set the measurement count to 100:

```
TEMPLATE_SET ON,100
TEMPLATE_SET?
> ON,100
```

TESTENV

Test Environment

Function

Sets or queries the test environment.

Command

```
TESTENV env
```

Query

```
TESTENV?
```

Response

```
env
```

Parameter

env	Test Environment
NORMAL	Normal
EXTREME	Extreme
Default	NORMAL

Details

This is a parameter that determines the threshold line for Spectrum Flatness measurement. The test environment is defined in 3GPP TS36.521-1. The following values depend on the test environment settings.

・When the test environment is NORMAL

Border of Range1/Range2	3 MHz
RP1 limit level	5.4 dB
RP2 limit level	9.4 dB
RP12 limit level	6.4 dB
RP21 limit level	8.4 dB

・When the test environment is EXTREME

Border of Range1/Range2	5 MHz
RP1 limit level	5.4 dB
RP2 limit level	13.4 dB
RP12 limit level	7.4 dB
RP21 limit level	11.4 dB

Example of Use

To set the test environment to EXTREME:

```
TESTENV EXTREME
TESTENV?
> EXTREME
```

TP_INBANDE_LEAK

In-band Emissions Carrier Leakage Template

Function

Set and queries the In-band Emissions Carrier Leakage Template.

Command

```
TP_INBANDE_LEAK tp
```

Query

```
TP_INBANDE_LEAK?
```

Response

```
Tp
```

Parameter

tp	In-band Emissions Carrier Leakage Template
0DBM	–24.2 dBc (UE output level 0 dBm)
30DBM	–19.2 dBc (UE output level –30 dBm)
40DBM	–9.2 dBc (UE output level –40 dBm)
Default	0DBM

Details

The upper limit for the Carrier Leakage defined in 3GPP TS36.521 6.5.2.3 is selected according to this parameter setting.

Example of Use

To set the In-band Emissions Carrier Leakage Template to 0DBM:

```
TP_INBANDE_LEAK 0DBM
TP_INBANDE_LEAK?
> 0DBM
```

TP_INBANDE_LEAK_SCC1

In-band Emissions Carrier Leakage Template for SCC-1

Function

Set and queries the In-band Emissions Carrier Leakage Template of SCC-1.

Command

```
TP_INBANDE_LEAK_SCC1 tp
```

Query

```
TP_INBANDE_LEAK_SCC1?
```

Response

```
tp
```

Parameters

tp	In-band Emissions Carrier Leakage Template of SCC-1
0DBM	–24.2 dBc (UE output level 0 dBm)
30DBM	–19.2 dBc (UE output level –30 dBm)
40DBM	–9.2 dBc (UE output level –40 dBm)
Default	0DBM

Details

The upper limit for the Carrier Leakage defined in 3GPP TS36.521 6.5.2.3 is selected according to this parameter setting.

Examples of Use

To set the In-band Emissions Carrier Leakage Template of SCC-1 to 0DBM:

```
TP_INBANDE_LEAK_SCC1 0DBM
TP_INBANDE_LEAK_SCC1?
> 0DBM
```

TP_OFFPWR_UL

Power Template - Transmit OFF power Limit

Function

Sets the Pass/Fail evaluation limits for Transmit Off Power, and queries the settings.

Command

```
TP_OFFPWR_UL limit
```

Query

```
TP_OFFPWR_UL?
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameter

limit	Evaluation limits
Range	–99.9 to 99.9 dBm
Resolution	0.1 dB
Default	–48.5 dBm

Example of Use

To set the Pass/Fail evaluation limits to –10.0 dBm:

```
TP_OFFPWR_UL -10.0
TP_OFFPWR_UL?
> -10.0
```

TP_TMASK_GEN_TOL

Power Template - ON power tolerance Limit

Function

Sets the Pass/Fail evaluation limits for On Power tolerance, and queries the settings.

Command

```
TP_TMASK_GEN_TOL limit
```

Query

```
TP_TMASK_GEN_TOL?
```

Response

```
limit
```

Unit	dB
Resolution	0.1 dB

Parameter

limit	Evaluation limits
Range	0.0 to 99.9 dBm
Resolution	0.1 dB
Default	7.5 dB

Example of Use

To set the Pass/Fail evaluation limits to 10.0 dBm:

```
TP_TMASK_GEN_TOL 10.0
TP_TMASK_GEN_TOL?
> 10.0
```

TXFREQ

Uplink Frequency

Function

Sets or queries the uplink frequency.
This command has the same function as ULFREQ.

Command

```
TXFREQ ul_freq[,ul_freq_scc1]
```

Query

```
TXFREQ? [ALL]
```

Response

```
ul_freq,ul_freq_scc1
```

Unit	Hz
Resolution	1 Hz

Parameter

ul_freq	Uplink frequency of PCC
ul_freq_scc1	Uplink frequency of SCC-1
Range	400 000 000 to 3800 000 000 Hz (MU887000A/01A) 400 000 000 to 6000 000 000 Hz (With MU887000A/01A-001) 400 000 000 to 6000 000 000 Hz (MU887002A)
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	1950 000 000 Hz (ul_freq) 1969 800 000 Hz (ul_freq_scc1)

Details

This sets the Tx frequency for the mobile station.
Updating this Uplink frequency of PCC does not affect the Uplink Channel parameters of PCC.
Updating this Uplink frequency of SCC-1 does not affect the Uplink Channel parameters of SCC-1. When the query argument ALL is omitted, the response is ul_freq only.

Example of Use

To set the Uplink frequency for PCC to 1950 MHz and the Uplink frequency for SCC-1 to 1969.8 MHz:

```
TXFREQ 1950MHZ,1969.8MHZ
TXFREQ? ALL
>1950000000,1969800000
```

TXPWR?

Tx Power Result

Function

Queries the Tx power measurement result.

Query

```
TXPWR? mode[,cc]
```

Response

When mode = TTL

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dBm
Resolution	0.01 dB

When mode = AVG, MAX, MIN or DVT,

```
pwr
```

pwr	Measurement result in specified Storage mode
Unit	dBm
Resolution	0.01 dB

When mode = IND,

```
s,pwr(1),pwr(2),…,pwr(s)
```

s	Measurement count
Range	1 to 200
pwr(s)	Tx Power of sth measurement
Unit	dBm
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	Individual measurement result
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.2.2-1 Measurement Items of Tx Power” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Tx Power measurement results:

```
TXPWR? AVG
> -20.00
```

ULCHAN

Uplink Channel

Function

Sets or queries the Uplink Channel.

Command

```
ULCHAN ul_ch[,ul_ch_scc1]
```

Query

```
ULCHAN? [ALL]
```

Response

```
ul_ch,ul_ch_scc1
```

Parameter

ul_ch	Uplink Channel of PCC
ul_ch_scc1	Uplink Channel of SCC-1
Range	0 to 262143
Default	18300 (ul_ch) 18498 (ul_ch_scc1)

Details

When the Uplink Channel parameter of PCC is updated, the related Downlink Channel parameter, Uplink Frequency of PCC, Downlink Frequency and Flame structure parameter are changed accordingly.
When the Uplink Channel parameter of SCC-1 is updated, the related Uplink Frequency of SCC-1 are changed accordingly.
When the query argument ALL is omitted, the response is ul_ch only.
For the relationship between the parameter and frequency settings of channels refer to Table 2.1.6-3 “Relationship between Uplink Channel Number and Downlink Channel Number” and to Table 2.1.6-4 “E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation”.

Example of Use

To set the Uplink Channel for PCC to 39750 and the Uplink Channel for SCC-1 to 39948:

```
ULCHAN 39750,39948
ULCHAN? ALL
>39750,39948
```

ULCHAN_SCC1

Uplink Channel for SCC-1

Function

Sets or queries the Uplink Channel of SCC-1.

Command

```
ULCHAN SCC1 ul_ch
```

Query

```
ULCHAN SCC1?
```

Response

```
ul_ch
```

Parameters

ul_ch		Uplink Channel of SCC-1
	Range	0 to 262143
	Resolution	1
	Default	18300

Details

When the Uplink Channel parameter of SCC-1 is updated, the related Uplink Frequency of SCC-1 are changed accordingly.
For the relationship between the parameter and frequency settings of channels refer to Table 2.1.6-3 “Relationship between Uplink Channel Number and Downlink Channel Number” and to Table 2.1.6-4 “E-UTRA Channel Numbers and Default UE TX-RX Frequency Separation”.

Examples of Use

To set the uplink channel of SCC-1 to 39948.

```
ULCHAN_SCC1 39948
ULCHAN_SCC1?
>39948
```

ULFREQ

Uplink Frequency

Function

Sets or queries the uplink frequency.

Command

```
ULFREQ ul_freq[,ul_freq_scc1]
```

Query

```
ULFREQ? [ALL]
```

Response

```
ul_fleq,ul_freq_scc1
```

Unit	Hz
Resolution	1 Hz

Parameter

ul_freq	Uplink frequency of PCC
ul_freq_scc1	Uplink frequency of SCC-1
Range	400 000 000 to 3800 000 000 Hz (MU887000A/01A) 400 000 000 to 6000 000 000 Hz (With MU887000A/01A-001) 400 000 000 to 6000 000 000 Hz (MU887002A)
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	1950 000 000 Hz (ul_freq) 1969 800 000 Hz (ul_freq_scc1)

Details

This sets the Tx frequency for the mobile station.
Updating this Uplink frequency of PCC does not affect the Uplink Channel parameters of PCC.
Updating this Uplink frequency of SCC-1 does not affect the Uplink Channel parameters of SCC-1. When the query argument ALL is omitted, the response is ul_freq only.

Example of Use

To set the Uplink frequency for PCC to 1950 MHz and the Uplink frequency for SCC-1 to 1969.8 MHz:

```
ULFREQ 1950MHZ,1969.8MHZ
ULFREQ? ALL
>1950000000,1969800000
```

ULFREQ_SCC1

Uplink Frequency for SCC-1

Function

Sets or queries the uplink frequency of SCC-1.

Command

```
ULFREQ_SCC1 ul_freq
```

Query

```
ULFREQ_SCC1?
```

Response

```
ul_fleq
```

Unit	Hz
Resolution	1 Hz

Parameters

ul_freq	Uplink frequency of SCC-1
Range	400 000 000 to 3800 000 000 Hz (MU887000A/01A) 400 000 000 to 6000 000 000 Hz (With MU887000A/01A-001) 400 000 000 to 6000 000 000 Hz (MU887002A)
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	1969 800 000 Hz

Details

This sets the Tx frequency for the mobile station.
Updating this Uplink frequency of SCC-1 does not affect the Uplink Channel parameters of SCC-1.

Examples of Use

To set the uplink frequency of SCC-1 to 1969.8 MHz.

```
ULFREQ_SCC1 1969.8MHZ
ULFREQ_SCC1?
>1969800000
```

ULRB_START

UL RMC Starting RB

Function

Sets or queries the start number for Uplink signal RB.

Command

```
ULRB_START ulrb
```

Query

```
ULRB_START?
```

Response

```
ulrb
```

Parameter

ulrb		RB start number
	Range	0 to (RBmax – RBn)
		RBmax = 6 When channel bandwidth is 1.4 MHz
		RBmax = 15 When channel bandwidth is 3 MHz
		RBmax = 25 When channel bandwidth is 5 MHz
		RBmax = 50 When channel bandwidth is 10 MHz
		RBmax = 75 When channel bandwidth is 15 MHz
		RBmax = 100 When channel bandwidth is 20 MHz
		RBn is set using the ULRMC_RB command.
	Resolution	1
	Default	0

Details

The RB start number for the Uplink signal is reset to 0 when the channel bandwidth is updated.
Also when the RB start number for the Uplink signal is updated, the RB start number for the Uplink RMC is changed to 0.

Example of Use

To set the RB start number for Uplink RMC to 6:

```
ULRB_START 6
ULRB_START?
> 6
```

ULRB_START_SCC1

UL RMC Starting RB for SCC-1

Function

Sets or queries the start number for Uplink signal RB of SCC-1.

Command

```
ULRB_START_SCC1 ulrb
```

Query

```
ULRB_START_SCC1?
```

Response

```
ulrb
```

Parameters

ulrb		RB start number of SCC-1
	Range	0 to (RBmax – RBn)
		RBmax = 6 When channel bandwidth is 1.4 MHz
		RBmax = 15 When channel bandwidth is 3 MHz
		RBmax = 25 When channel bandwidth is 5 MHz
		RBmax = 50 When channel bandwidth is 10 MHz
		RBmax = 75 When channel bandwidth is 15 MHz
		RBmax = 100 When channel bandwidth is 20 MHz
		RBn is set using the ULRMC_RB_SCC1 command.
	Resolution	1
	Default	0

Details

The RB start number for the Uplink signal of SCC-1 is reset to 0 when the channel bandwidth of SCC-1 is updated.
Also when the RB start number for the Uplink signal of SCC-1 is updated, the RB start number for the Uplink RMC is changed to 0.

Examples of Use

To set the RB start number for Uplink RMC of SCC-1 to 6:

```
ULRB_START_SCC1 6
ULRB_START_SCC1?
>6
```

ULRMC_MOD

UL RMC Modulation

Function

Sets or queries the modulation method used by Uplink signal RMC.

Command

```
ULRMC_MOD ul_rmc_mod
```

Query

```
ULRMC_MOD?
```

Response

```
ul_rmc_mod
```

Parameter

ul_rmc_mod	Uplink RMC modulation method
QPSK	QPSK modulation
16QAM	16QAM modulation
64QAM	64QAM modulation
256QAM	256QAM modulation
Default	QPSK

Example of Use

To set the Uplink RMC modulation method to 16QAM:

```
ULRMC_MOD 16QAM
ULRMC_MOD?
> 16QAM
```

ULRMC_MOD_SCC1

UL RMC Modulation for SCC-1

Function

Sets or queries the modulation method used by Uplink signal RMC of SCC-1.

Command

```
ULRMC_MOD_SCC1 ul_rmc_mod
```

Query

```
ULRMC_MOD_SCC1?
```

Response

```
ul_rmc_mod
```

Parameter

ul_rmc_mod	Uplink RMC modulation method of SCC-1
QPSK	QPSK modulation
16QAM	16QAM modulation
64QAM	64QAM modulation
256QAM	256QAM modulation
Default	QPSK

Example of Use

To set the Uplink RMC modulation method for SCC-1 to 16QAM:

```
ULRMC_MOD_SCC1 16QAM
ULRMC_MOD_SCC1?
>16QAM
```

ULRMC_RB

UL RMC Number of RB

Function

Sets or queries the number of assigned RBs (Resource Blocks) at Uplink RMC.

Command

```
ULRMC_RB ul_rmc_rb
```

Query

```
ULRMC_RB?
```

Response

```
ul_rmc_rb
```

Parameter

ul_rmc_rb	Number of RBs	
Range	Number defined by equation of (2^X) × (3^Y) × (5^Z) and falling within following range where (X, Y, Z ≥ 0, integer)	
	0 to 6	When channel bandwidth is 1.4 MHz
	0 to 15	When channel bandwidth is 3 MHz
	0 to 25	When channel bandwidth is 5 MHz
	0 to 50	When channel bandwidth is 10 MHz
	0 to 75	When channel bandwidth is 15 MHz
	0 to 100	When channel bandwidth is 20 MHz
Resolution	1	
Default	25	

Details

When the In-band Emission measurement at Contiguous UL CA is performed, set 0 to the number of RBs for CC where the signal is not output.
Even when Modulation Analysis is set to ON, the measurement is not performed under the following conditions.
- Contiguous UL CA
- At Carrier Frequency is not specified at Carrier Leakage Frequency.
- The number of RBs is set to 0.

Example of Use

To set the number of assigned RBs at Uplink RMC to 6.

```
ULRMC_RB 6
ULRMC_RB?
> 6
```

ULRMC_RB_SCC1

UL RMC Number of RB for SCC-1

Function

Sets or queries the number of assigned RBs (Resource Blocks) at Uplink RMC of SCC-1.

Command

```
ULRMC_RB_SCC1 ul_rmc_rb
```

Query

```
ULRMC_RB_SCC1?
```

Response

```
ul_rmc_rb
```

Parameter

ul_rmc_rb	Number of RBs for SCC-1	
Range	Number defined by equation of (2^X) × (3^Y) × (5^Z) and falling within following range where (X, Y, Z ≥ 0, integer)	
	0 to 6	When channel bandwidth is 1.4 MHz
	0 to 15	When channel bandwidth is 3 MHz
	0 to 25	When channel bandwidth is 5 MHz
	0 to 50	When channel bandwidth is 10 MHz
	0 to 75	When channel bandwidth is 15 MHz
	0 to 100	When channel bandwidth is 20 MHz
Resolution	1	
Default	25	

Details

When the In-band Emission measurement at Contiguous UL CA is performed, set 0 to the number of RBs for CC where the signal is not output.
Even when Modulation Analysis is set to ON, the measurement is not performed under the following conditions.
- Contiguous UL CA
- At Carrier Frequency is not specified at Carrier Leakage Frequency.
- The number of RBs is set to 0.

Example of Use

To set the number of assigned RBs at Uplink RMC to 6.

```
ULRMC_RB_SCC1 6
ULRMC_RB_SCC1?
> 6
```

WAVEFMEAS?

Waveform

Function

Queries the spectrum waveform data of each measurement result.

Query

```
WAVEFMEAS? format,position,length[,symbol[,cc]]
```

Response

```
data(0),data(1),data(2),…,data(length-1)
```

format	Unit	Resolution
1, 2	dBm	0.01 dB
3, 4	None	0.0001
5, 6, 9, 10	%	0.01%
7, 8	degree	0.01 degree
11, 12, 15, 16, 17, 18	dB	0.01 dB
13, 14	dBc	0.01 dB

Parameter

format	Format
1	Occupied Bandwidth
2	Spectrum Emission Mask (SEM)
3	Constellation (I)
4	Constellation (Q)
5	EVM (Average)
6	EVM (Maximum)
7	Phase Error (Average)
8	Phase Error (Maximum)
9	Magnitude Error (Average)
10	Magnitude Error (Maximum)
11	In-band Emissions (Average)
12	In-band Emissions (Maximum)
13	In-band Emissions (Average)
14	In-band Emissions (Maximum)
15	Spectrum Flatness (Average)
16	Spectrum Flatness (Maximum)
17	Spectrum Flatness (Minimum)
18	Power Template

position Start point of waveform data

Range

	Channel Bandwidth					
Format	**1.4 MHz**	**3 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
1	0 to 594	0 to 1238	0 to 2064	0 to 4136	0 to 6194	0 to 8266
2	0 to 1214	0 to 2474	0 to 4124	0 to 6554	0 to 9014	0 to 11474
3 to 10, 15 to 17	0 to 71	0 to 179	0 to 299	0 to 599	0 to 899	0 to 1199
11 to 14	0 to 5	0 to 14	0 to 24	0 to 49	0 to 74	0 to 99
18	0 to 9374	0 to 18749	0 to 37499	0 to 74999	0 to 149999	0 to 149999

Refer to 2.8 “Capturing Waveform Data” for details of the ranges under the following conditions.

- Contiguous UL CA
- The format is 1 or 2.

length Number of read data

Range

	Channel Bandwidth					
Format	**1.4 MHz**	**3 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
1	1 to 595	1 to 1239	1 to 2065	1 to 4137	1 to 6195	1 to 8267
2	1 to 1215	1 to 2475	1 to 4125	1 to 6555	1 to 9015	1 to 11475
3 to 10, 15 to 17	1 to 72	1 to 180	1 to 300	1 to 600	1 to 900	1 to 1200
11 to 14	1 to 6	1 to 15	1 to 25	1 to 50	1 to 75	1 to 100
18	1 to 9375	1 to 18750	1 to 37500	1 to 75000	1 to 150000	1 to 150000

Refer to 2.8 “Capturing Waveform Data” for details of the ranges under the following conditions.

- Contiguous UL CA
- The format is 1 or 2.

symbol Position of SC-FDMA symbol

Range When format is 3 to 10

0 to 6

data(n) Waveform data

cc Component Carrier

Used at UL CA and omitted at non CA.

Refer to “Table 2.8.2-5 Measurement Items of Waveform Data” for details.

PCC PCC

SCC1 SCC-1

Omitted Total

Details

Average in the above formats is equivalent to the average waveform of a spectrum analyzer. Maximum in the above formats is equivalent to the peak-hold waveform of a spectrum analyzer.

Example of Use

To query the EVM (Average) of 768 spectrum waveform data from 257 of each measurement result:

```
WAVEFMEAS? 5,256,768,0
> 2.00,2.01,2.00,…,2.10
```

5.2.3 Sequence measurement commands

DLFREQ

Downlink Frequency

Function

Sets or queries the downlink frequency.

Command

```
DLFREQ dl_freq
```

Query

```
DLFREQ?
```

Response

```
dl_fleq
```

Unit	Hz
Resolution	1 Hz

Parameter

dl_freq	Downlink frequency
Range	400 000 000 to 3800 000 000 Hz (MU887000A/01A) 400 000 000 to 6000 000 000 Hz (With MU887000A/01A-001) 400 000 000 to 6000 000 000 Hz (MU887002A)
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	2140 000 000 Hz

Details

This sets the Rx frequency for the mobile station.
Changing the setting of downlink frequency does not change the setting of the downlink channel.

Example of Use

To set the Downlink Frequency to 2050 MHz:

```
DLFREQ 2050MHZ
DLFREQ?
> 2050000000
```

ILVL

Input Level

Function

Sets or queries the input level of the input test port.

Command

```
ILVL level
```

Query

```
ILVL?
```

Response

```
level
```

Unit	dBm
Resolution	0.1 dB

Parameter

Level	Input level
Range	
MU887000A	–65.0 to +35.0 dBm (Port 1/Port 2)
	–65.0 to +25.0 dBm (Port 3/Port 4)
MU887001A	–65.0 to +35.0 dBm (Port 1 to Port 4)
MU887002A	–65.0 to +35.0 dBm (Port 1 to Port 12)
Resolution	0.1 dB
Suffix Code	DBM (uses dBm when omitted)
Default	–1.0 dBm

Details

For MU887000A, the setting range varies with the input test port setting.
If cable loss correction is set to ON, the setting range of the input level is the range of values with added cable loss.
If the cable loss is 5 dB, the MU887000A Port 1/Port 2 setting range is –60.0 to +40.0 dBm.

Example of Use

To set the input level of the MU887000A connector to –10.0 dBm.

```
ILVL-10.0
ILVL?
> -10.0
```

Related Commands

EXTLOSSW
LOSSTBL
LOSSTBLVAL
For details of the commands, refer to Chapter 6 “Native Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

LTE_ACLR?

ACLR Result

Function

Queries the Adjacent Channel Leakage Power Ratio measurement result.

Query

```
LTE_ACLR? seg,mode[,cc]
```

Response

When mode = TTL,

```
avg0,avg1,avg2,avg3,avg4,avg5,max0,max1,max2,max3,max4,max5,min0,min1,min2,min3,min4,min5
```

avg	Measurement results in order of offset frequencies (Average)
max	Measurement results in order of offset frequencies (Maximum)
min	Measurement results in order of offset frequencies (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
aclr0,aclr1,aclr2,aclr3,aclr4,aclr5
```

aclr	Measurement results in order of offset frequencies in specified Storage mode
Unit	dB
Resolution	0.01 dB

The responses are sent in the following order.
E-UTRA ACLR LOW,
E-UTRA ACLR UP,
UTRA ACLR2 LOW,
UTRA ACLR1 LOW,
UTRA ACLR1 UP,
UTRA ACLR2 UP

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.5.2-1 Measurement Items of Adjacent Channel Leakage

	Power Ratio" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The measurement bandwidth of the target adjacent channel varies with the channel bandwidth setting.
Refer to Table 2.5.1-1 "Adjacent Channel Measurement Bandwidth (MHz)" for details.

Example of Use

To query the average of ACLR measurement result for segment 0:

```
LTE_ACLR? 0,AVG
> 3.00,3.01,3.02,3.03,3.04,3.05
```

LTE_ACLR_SET

Adjacent Channel Leakage Power Ratio Enable and Count

Function

Enables the Adjacent Channel Leakage Power Ratio measurement and sets the measurement count, or queries the settings.

Command

```
LTE_ACLR_SET mcond,on_off[,count]
```

Query

```
LTE_ACLR_SET? mcond
```

Response

```
on_off,count
```

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
on_off	Enables/disables measurement.
ON	Executes the measurement.
OFF	Disables measurement.
Default	OFF
count	Measurement count
Range	1 to 200 1 to 100 (at UL CA)
Resolution	1
Suffix code	None
Default	1

Example of Use

To turn off the Adjacent Channel Leakage Power Ratio measurement for the condition number 0 in the LTE measurement condition table:

```
LTE_ACLR_SET 0,OFF
LTE_ACLR_SET? 0
> OFF
```

Remarks

The Adjacent Channel Leakage Power Ratio of 1 subframe (1 ms) is measured at each measurement count.

LTE_BAND

Operation band

Function

Sets or queries the operation band.

Command

```
LTE_BAND mcond,band
```

Query

```
LTE_BAND? mcond
```

Response

```
band
```

Parameter

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
band	Operation band
Range	1 to 256
Resolution	1
Default	1

Details

This is the parameter for determining the following items:

- Limit line of Spectrum Flatness measurement
- Intra-band/Inter-band (at UL CA)

Example of Use

To set the operation band to 10 for the measurement condition number 2:

```
LTE_BAND 2,10
LTE_BAND? 2
> 10
```

LTE_BAND_SCC1

Operation band for SCC-1

Function

Sets or queries the operation band for SCC-1.

Command

```
LTE_BAND_SCC1 mcond,band
```

Query

```
LTE_BAND_SCC1? mcond
```

Response

```
band
```

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
band	Operation band
Range	1 to 256
Resolution	1
Default	1

Details

This is the parameter for determining the following items:

- Limit line of Spectrum Flatness measurement
- Intra-band/Inter-band (at UL CA)

Examples of Use

To set the operation band of SCC-1 to 10 for the measurement condition number 2:

```
LTE_BAND_SCC1 2,10
LTE_BAND_SCC1? 2
> 10
```

LTE_BW_RB

Channel Bandwidth, RB

Function

Sets the uplink channel bandwidth and RB (Resource Block).

Command

```
LTE_BW_RB mcond,ch_bw[,rb[,start]]
```

Query

```
LTE_BW_RB? mcond
```

Response

```
ch_bw,rb,start
```

Parameters

mcond		Measurement condition number
	Range	0 to 1999
	Resolution	1
ch_bw		Channel bandwidth
	1.4MHZ	1.4 MHz
	3MHZ	3 MHz
	5MHZ	5 MHz
	10MHZ	10 MHz
	15MHZ	15 MHz
	20MHZ	20 MHz
	Default	5MHZ
rb		Number of RBs
	Range	Number defined by equation of (2^X) × (3^Y) × (5^Z) and falling within following range where (X, Y, Z ≥ 0, integer)
		0 to 6 When channel bandwidth is 1.4 MHz
		0 to 15 When channel bandwidth is 3 MHz
		0 to 25 When channel bandwidth is 5 MHz
		0 to 50 When channel bandwidth is 10 MHz
		0 to 75 When channel bandwidth is 15 MHz
		0 to 100 When channel bandwidth is 20 MHz
	Resolution	1
	Default	25

start	Start RB number	
Range	0 to (RBmax – RBn)	
	RBmax = 6	When channel bandwidth is 1.4 MHz
	RBmax = 15	When channel bandwidth is 3 MHz
	RBmax = 25	When channel bandwidth is 5 MHz
	RBmax = 50	When channel bandwidth is 10 MHz
	RBmax = 75	When channel bandwidth is 15 MHz
	RBmax = 100	When channel bandwidth is 20 MHz
	RBn is set using the ULRMC_RB command.	
Resolution	1	
Default	0	

Remarks

The rb and start settings can be omitted. If omitted, the settings are Full RB (rb is the maximum for the channel bandwidth and start is 0).
When the In-band Emission measurement at Contiguous UL CA is performed, set 0 to the number of RBs for CC where the signal is not output.
Even when Modulation Analysis is set to ON, the measurement is not performed under the following conditions.
- Contiguous UL CA
- At Carrier Frequency is not specified at Carrier Leakage Frequency.
- The number of RBs is set to 0.

Example of Use

To set as follows:
Measurement condition number: 1, Channel Bandwidth: 1.4 MHz, Number of RB: 6, Start RB number: 0

```
LTE_BW_RB 1,1.4MHZ,6,0
LTE_BW_RB? 1
>1.4MHZ,6,0
```

LTE_BW_RB_SCC1

Channel Bandwidth, RB for SCC-1

Function

Sets or queries the Uplink Channel bandwidth and Resource Blocks (RB) for SCC-1.

Command

```
LTE_BW_RB_SCC1 mcond,ch_bw[,rb[,start]]
```

Query

```
LTE_BW_RB_SCC1? mcond
```

Response

```
ch_bw,rb,start
```

Parameters

mcond	Measurement condition number	
Range	0 to 1999	
Resolution	1	
ch_bw	Channel bandwidth	
1.4MHZ	1.4 MHz	
3MHZ	3 MHz	
5MHZ	5 MHz	
10MHZ	10 MHz	
15MHZ	15 MHz	
20MHZ	20 MHz	
Default	5MHZ	
rb	Number of RBs	
Range	Number defined by equation of (2^X) × (3^Y) × (5^Z) and falling within following range where (X, Y, Z ≥ 0, integer)	
	0 to 6	When channel bandwidth is 1.4 MHz
	0 to 15	When channel bandwidth is 3 MHz
	0 to 25	When channel bandwidth is 5 MHz
	0 to 50	When channel bandwidth is 10 MHz
	0 to 75	When channel bandwidth is 15 MHz
	0 to 100	When channel bandwidth is 20 MHz
Resolution	1	
Default	25	

start	Start RB number	
Range	0 to (RBmax – RBn)	
	RBmax = 6	When channel bandwidth is 1.4 MHz
	RBmax = 15	When channel bandwidth is 3 MHz
	RBmax = 25	When channel bandwidth is 5 MHz
	RBmax = 50	When channel bandwidth is 10 MHz
	RBmax = 75	When channel bandwidth is 15 MHz
	RBmax = 100	When channel bandwidth is 20 MHz
	RBn is set using the ULRMC_RB command.	
Resolution	1	
Default	0	

Details

The rb and start settings can be omitted. If omitted, the settings are Full RB (rb is the maximum for the channel bandwidth and start is 0).
When the In-band Emission measurement at Contiguous UL CA is performed, set 0 to the number of RBs for CC where the signal is not output.
Even when Modulation Analysis is set to ON, the measurement is not performed under the following conditions.
- Contiguous UL CA
- At Carrier Frequency is not specified at Carrier Leakage Frequency.
- The number of RBs is set to 0.

Examples of Use

To set the items for SCC-1 as follows at the measurement condition number 1:
UL Channel Bandwidth: 1.4 MHz, Number of RB: 6, Start RB number: 0

```
LTE_BW_RB_SCC1 1,1.4MHZ,6,0
LTE_BW_RB_SCC1? 1
>1.4MHZ,6,0
```

LTE_CARRLEAK?

Carrier Leakage Result

Function

Queries the Carrier Leak measurement result at Modulation Analysis.

Query

```
LTE_CARRLEAK? seg,mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dBc
Resolution	0.01 dB

When mode ≠ TTL,

```
cleakage
```

cleakage	Measurement result in specified Storage mode
Unit	dBc
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average·Maximum·Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of the Carrier Leakage measurement result for segment 1:

```
LTE_CARRLEAK? 1,AVG
> 1.05
```

LTE_CELLID

Cell ID

Function

Sets or queries the Cell ID.

Command

```
LTE_CELLID id
```

Query

```
LTE_CELLID?
```

Response

```
id
```

Parameter

id		Cell ID
	Range	0 to 503
	Resolution	1
	Default	0

Example of Use

To set the Cell ID to 121:

```
LTE_CELLID 121
LTE_CELLID?
> 121
```

LTE_CELLID_SCC1

Cell ID for SCC-1

Function

Sets or queries the Cell ID. for SCC-1.

Command

```
LTE_CELLID_SCC1 id
```

Query

```
LTE_CELLID_SCC1?
```

Response

```
id
```

Parameter

id		Cell ID for SCC-1
	Range	0 to 503
	Resolution	1
	Default	0

Example of Use

To set the Cell ID for SCC-1 to 121:

```
LTE_CELLID_SCC1 121
LTE_CELLID_SCC1?
> 121
```

LTE_CFERR?

Carrier Frequency Error Result

Function

Queries the Frequency Error measurement result.

Query

```
LTE_CFERR? seg,mode[,cc]
```

Response

When mode = TTL,

```
avg_ppm,avg_Hz,max_ppm,max_Hz,min_ppm,min_Hz
```

avg_ppm	Measurement result in ppm (Average)
max_ppm	Measurement result in ppm (Maximum)
min_ppm	Measurement result in ppm (Minimum)
Unit	ppm
Resolution	0.01 ppm
avg_Hz	Measurement result in Hz (Average)
max_Hz	Measurement result in Hz (Maximum)
min_Hz	Measurement result in Hz (Minimum)
Unit	Hz
Resolution	0.1 Hz

When mode ≠ TTL,

```
freq_ppm,freq_Hz
```

freq_ppm	Measurement result in ppm in specified Storage mode
Unit	ppm
Resolution	0.01 ppm
freq_Hz	Measurement results in Hz in specified Storage mode
Unit	Hz
Resolution	0.1 Hz

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	mode Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation

cc		Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
	PCC	PCC
	SCC1	SCC-1
	Omitted	Total

Example of Use

To query the average of the carrier frequency error measurement results for segment 1:

```
LTE_CFERR? 1,AVG
> 0.03,60.0
```

LTE_CFERR_WORST?

Worst Carrier Frequency Error Result

Function

Queries the worst value in Frequency Error measurement results in Sequence Measurement mode.

Query

```
LTE_CFERR_WORST? seg[,cc]
```

Response

```
freq_ppm,freq_Hz
```

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

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The worst value should be either the maximum or minimum of the Frequency Error measurement results, whichever is the larger absolute value.

Example of Use

To query the worst value in Frequency Error measurement results for segment 1:

```
LTE_CFERR_WORST? 1
> 0.03,60.0
```

LTE_CFREQ?

Carrier Frequency Result

Function

Queries the Carrier Frequency measurement result.

Query

```
LTE_CFREQ? seg[,cc]
```

Response

```
freq
```

freq	Carrier frequency
Unit	Hz
Resolution	1 Hz

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the result of Carrier Frequency measurement for segment 1:

```
LTE_CFREQ? 1
> 1951000000
```

LTE_CHCODING

Channel Coding

Function

Sets or queries the channel coding.

Command

```
LTE_CHCODING mcond,object
```

Query

```
LTE_CHCODING? mcond
```

Response

```
object
```

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
object	Target for channel coding
RMC	Reference Measurement Channel
RMC_UL_CA	RMC at UL CA
Default	RMC

Details

When FRAMETYPE is FDD and RMC_UL_CA is set, MX887013A-001 is required.
When FRAMETYPE is TDD and RMC_UL_CA is set, MX887014A-001 is required.

Example of Use

To set the channel coding to RMC for the condition number 1:

```
LTE_CHCODING 1,RMC
LTE_CHCODING? 1
> RMC
```

LTE_CHPWR?

Channel Power Result

Function

Queries the Channel Power measurement result.

Query

```
LTE_CHPWR? seg,mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dBm
Resolution	0.01 dB

When mode = AVG, MAX, MIN or DVT,

```
pwr
```

pwr	Measurement result in specified Storage mode
Unit	dBm
Resolution	0.01 dB

When mode = IND,

```
s,pwr(1),pwr(2),pwr(3),…,pwr(s)
```

s	Measurement count
Range	1 to 200
pwr(s)	Channel Power of sth measurement
Unit	dBm
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	Individual measurement result
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.2.2-1 Measurement Items of Tx Power” for details.
PCC	PCC

SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of the Channel Power measurement result for segment 0:

```
LTE_CHPWR? 0,AVG
> -20.00
```

LTE_CSHIFT

Cyclic Shift

Function

Sets or queries the Cyclic Shift On/Off.

Command

```
LTE_CSHIFT on_off
```

Query

```
LTE_CSHIFT?
```

Response

on_off

Parameter

on_off	Cyclic Shift
ON	Enables Cyclic Shift.
OFF	Disables Cyclic Shift.
FIX1	The fixed value is set.
Default	ON

Example of Use

To enable the Cyclic Shift:

```
LTE_CSHIFT ON
LTE_CSHIFT?
> ON
```

LTE_DELTASS

Delta SS

Function

Sets or queries the Delta SS (Group Assignment PUSCH).

Command

```
LTE_DELTASS val
```

Query

```
LTE_DELTASS?
```

Response

```
val
```

Parameter

val	Delta SS
Range	0 to 29
Resolution	1
Default	0

Example of Use

To set the Delta SS to 12:

```
LTE_DELTASS 12
LTE_DELTASS?
> 12
```

LTE_EVM?

EVM Result

Function

Queries the EVM measurement result.

Query

```
LTE_EVM? seg,mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	%
Resolution	0.01%

When mode ≠ TTL,

```
evm
```

evm	Measurement result in specified Storage mode
Unit	%
Resolution	0.01%

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of the EVM measurement result for segment 1:

```
LTE_EVM? 1,AVG
> 1.50
```

LTE_EXTLOSSINDEX_SCC1

External Loss Table Index for SCC-1

Function

Sets and queries the loss correction table index for SCC-1.

Command

```
LTE_EXTLOSSINDEX_SCC1 index
```

Query

```
LTE_EXTLOSSINDEX_SCC1?
```

Response

```
index
```

Parameters

index	Loss correction table index
Range	0 to 16
Resolution	1
Default	0

Details

When the loss correction table index is set to 0, the setting value of the common command "LOSSTBL" is used.

Refer to Chapter 6 "Native Command Reference" in the *MU887000A TRX Test Module Operation Manual* for details of the LOSSTBL command.

Examples of Use

To set the loss correction table index for SCC-1 to 1:

```
LTE_EXTLOSSINDEX_SCC1 1
LTE_EXTLOSSINDEX_SCC1?
>1
```

LTE_FRAMETYPE

Frame Structure

Function

Sets or queries the LTE frame structure.
This setting determines the duplex mode.

Command

```
LTE_FRAMETYPE mcond,mode
```

Query

```
LTE_FRAMETYPE? mcond
```

Response

```
mode
```

Parameter

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
mode	Frame type (Duplex mode)
FDD	Frequency Division Multiplexing
TDD	Time Division Multiplexing
Default	FDD

Details

When only MX887013A is installed, only FDD can be set.
When only MX887014A is installed, only TDD can be set and the default is TDD.

Example of Use

To set the duplex mode to FDD for the measurement condition number 2:

```
LTE_FRAMETYPE 2,FDD
LTE_FRAMETYPE? 2
> FDD
```

LTE_FRAMETYPE_SCC1

Frame Structure for SCC-1

Function

Sets or queries the LTE frame structure for SCC-1.

Command

```
LTE_FRAMETYPE_SCC1 mcond,mode
```

Query

```
LTE_FRAMETYPE_SCC1? mcond
```

Response

```
mode
```

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
mode	Frame type for SCC-1 (Duplex mode)
FDD	Frequency Division Multiplexing
TDD	Time Division Multiplexing
Default	FDD

Details

When only MX887013A is installed, only FDD can be set.
When only MX887014A is installed, only TDD can be set and the default is TDD.
When the settings in this command and LTE_FRAMETYPE are different, the measurement is performed using the settings in LTE_FRAMETYPE.

Example of Use

To set the duplex mode for SCC-1 to FDD for the measurement condition number 2:

```
LTE_FRAMETYPE_SCC1 2,FDD
LTE_FRAMETYPE_SCC1? 2
>FDD
```

LTE_FREQERRRNG

Frequency Error Range

Function

Sets and queries the frequency error detection method in the modulation analysis measurement.

Command

```
LTE_FREQERRRNG value
```

Query

```
LTE_FREQERRRNG?
```

Response

```
value
```

Parameters

value	Frequency Error Range
NORMAL	Normal
NARROW	Narrow Range
Default	NORMAL

Examples of Use

To set Frequency Error Range to Narrow Range:

```
LTE_FREQERRRNG NARROW
LTE_FREQERRRNG?
>NARROW
```

LTE_GROUPHOP

Group Hopping

Function

Enables and queries the Group hopping.

Command

```
LTE_GROUPHOP on_off
```

Query

```
LTE_GROUPHOP?
```

Response

```
on_off
```

Parameter

on_off	Enables/disables Group hopping.
ON	Enables Group hopping.
OFF	Disables Group hopping.
Default	ON

Example of Use

To enable the Group hopping:

```
LTE_GROUPHOP ON
LTE_GROUPHOP?
> ON
```

LTE_IBEM_CLFR

In-band Emission Carrier Leakage Frequency

Function

Sets and queries the position of Carrier Leakage Frequency of the UE in the In-band Emission/EVM measurement at Contiguous UL CA.

Command

```
LTE_IBEM_CLFR clf
```

Query

```
LTE_IBEM_CLFR?
```

Response

```
clf
```

Parameters

clf		Position of Carrier Leakage Frequency
	CFR	at Carrier Frequency Center frequency of Aggregated Channel Bandwidth
	CCC	at each CC Center Center frequency of each CC
	Default	CFR

Details

When the In-band Emission measurement at Contiguous UL CA is performed, “UL Number of RB” for PCC or SCC-1 must be set to 0.
For CFR, the resource block located at the center frequency of Aggregated Channel Bandwidth is treated as the carrier leak frequency and the In-band Emission/EVM measurement is performed.
For CCC, the center frequencies of each CC are treated as the carrier leak frequency and the In-band Emission/EVM measurement is performed.

Example of Use

To set the position of Carrier Leakage Frequency to CFR:

```
LTE_IBEM_CLFR CFR
LTE_IBEM_CLFR?
> CFR
```

LTE_INBANDEITEM?

In-Band Emissions Measured Item

Function

Queries whether each in-band emission measurement item for modulation analysis is measured or not.

Query

```
LTE_INBANDEITEM? seg[,cc]
```

Response

```
flag
```

flag	Measured / Not measured flag (0 to 7) Returns the sum of the following measurement items. 0 Not measured 1 Measure General 2 Measure IQ Image 4 Measure Carrier Leakage

Parameter

seg	Segment number
Range	0 to 1999
Resolution	1
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query whether each in-band emission measurement item for modulation analysis of Segment 1 is measured or not in the sequence measurement.

```
LTE_INBANDEITEM? 1
> 4
```

LTE_INBANDEPASS?

In-Band Emissions Judgement

Function

Queries the judgement of in-band emission measurement result for modulation analysis.

Query

```
LTE_INBANDEPASS? seg[,cc]
```

Response

```
judgement
```

judgement	Judgement
PASS	Pass
FAIL	Fail
–	Not measured

Parameter

seg	Segment number
Range	0 to 1999
Resolution	1
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the judgement of in-band emission measurement result for modulation analysis of Segment 1 in the sequence measurement.

```
LTE_INBANDEPASS? 1
> PASS
```

LTE_INBANDE_GEN?

In-Band Emissions (General) Result

Function

Queries the in-band emission measurement result (General) for modulation analysis.

Query

```
LTE_INBANDE_GEN? seg,mode[,cc]
```

Response

When mode = TTL

```
avg,max,min
```

avg	Measurement results (Average)
max	Measurement results (Maximum)
min	Measurement results (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL

```
ibe
```

ibe	Measurement results in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameter

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of in-band emission measurement result (General) of Segment 1.

```
LTE_INBANDE_GEN? 1,AVG
> 0.04
```

LTE_INBANDE_GENUL?

In-Band Emissions limit (General)

Function

Queries the limit for in-band emission measurement result (General) for modulation analysis.

Query

```
LTE_INBANDE_GENUL? seg[,cc]
```

Response

```
level
```

level	Limit
Unit	dB
Resolution	0.01 dB

Parameter

seg	Segment number
Range	0 to 1999
Resolution	1
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the limit for in-band emission measurement result (General) for modulation analysis of Segment 1.

```
LTE_INBANDE_GENUL?
> 2.05
```

LTE_INBANDE_IMG?

In-Band Emissions (IQ Image) Result

Function

Queries the in-band emission measurement result (IQ Image) for modulation analysis.

Query

```
LTE_INBANDE_IMG? seg,mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
ibe
```

ibe	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameter

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of in-band emission measurement result (IQ Image) of Segment 1 in the sequence measurement.

```
LTE_INBANDE_IMG? 1,AVG
> 0.04
```

LTE_INBANDE_IMGUL?

In-Band Emissions limit (IQ Image)

Function

Queries the limit for in-band emission measurement (IQ Image) for modulation analysis.

Query

```
LTE_INBANDE_IMGUL? seg[,cc]
```

Response

```
level
```

level	Limit
Unit	dB
Resolution	0.01 dB

Parameter

seg	Segment number
Range	0 to 1999
Resolution	1
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the limit for in-band emission measurement result (IQ Image) for modulation analysis of Segment 1.

```
LTE_INBANDE_IMGUL? 1
> 1.05
```

LTE_INBANDE_LEAK?

In-Band Emissions (Carrier Leakage) Result

Function

Queries the in-band emission measurement result (Carrier Leakage) for modulation analysis.

Query

```
LTE_INBANDE_LEAK? seg,mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dBc
Resolution	0.01 dB

When mode ≠ TTL,

```
ibe
```

ibe	Measurement result in specified Storage mode
Unit	dBc
Resolution	0.01 dB

Parameter

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of in-band emission measurement result (Carrier Leakage) of Segment 1 in the sequence measurement.

```
LTE_INBANDE_LEAK? 1,AVG
> 0.04
```

LTE_INBANDE_LEAKUL?

In-Band Emissions limit (Carrier Leakage)

Function

Queries the limit for in-band emission measurement (Carrier Leakage) for modulation analysis.

Query

```
LTE_INBANDE_LEAKUL? seg[,cc]
```

Response

```
level
```

level	Limit
Unit	dBc
Resolution	0.01 dB

Parameter

seg	Segment number
Range	0 to 1999
Resolution	1
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the limit for in-band emission measurement result (Carrier Leakage) for modulation analysis of Segment 1.

```
LTE_INBANDE_LEAKUL? 1
> 1.05
```

LTE_INBANDE_MARG?

In-Band Emissions Margin

Function

Queries the worst margin in the entire bandwidth for in-band emission measurement.

Query

```
LTE_INBANDE_MARG? seg[,cc]
```

Response

```
margin
```

margin	Worst margin in the entire bandwidth
Unit	dB
Resolution	0.01 dB

Parameter

seg	Segment number
Range	0 to 1999
Resolution	1
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the worst margin in the entire bandwidth for in-band emission measurement for modulation analysis of Segment 1.

```
LTE_INBANDE_MARG? 1
> 1.05
```

LTE_IQIMB?

IQ Imbalance Result

Function

Queries the IQ Imbalance measurement result.

Query

```
LTE_IQIMB? seg,mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
iqimb
```

iqimb	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	mode Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

IQ Imbalance can be measured when the number of RBs is set to the maximum value for the channel bandwidth shown in Table 2.1.6-2 "Number of Allocatable Resource Blocks in Channel Bandwidth".

If the number of RBs is not the maximum allocatable value in the channel bandwidth, the response is 999.99.

Example of Use

To query the average of IQ Imbalance measurement result for segment 1:

```
LTE_IQIMB? 1,AVG
> 0.04
```

LTE_LONGSEARCH

Long Span Search

Function

Enables and queries the Long Span Search.

Command

```
LTE_LONGSEARCH on_off
```

Query

```
LTE_LONGSEARCH?
```

Response

```
on_off
```

Parameter

on_off		Enables/disables Long Span Search.
	ON	Enables Long Span Search.
	OFF	Disables Long Span Search.
	Default	OFF

Details

Set this parameter to OFF when the Uplink and Downlink signals are synchronized; set it to ON when they are not synchronized.

The response to the MSTAT will be 5 (Synchronization word not detected), if this parameter to OFF when the Uplink and Downlink signals are not synchronized.

Measurement takes more time when the Long Span Search function is on.

Example of Use

To enable the Long Span Search:

```
LTE_LONGSEARCH ON
LTE_LONGSEARCH?
> ON
```

LTE_MAGERR?

Magnitude Error Result

Function

Queries the Magnitude Error measurement result in Sequence Measurement mode.

Query

```
LTE_MAGERR? seg,mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	%
Resolution	0.01%

When mode ≠ TTL,

```
merr
```

merr	Measurement result in specified Storage mode
Unit	%
Resolution	0.01%

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of the Magnitude Error measurement result for segment 1:

```
LTE_MAGERR? 1,AVG
> 1.05
```

LTE_MCARRIER

Measurement Carrier

Function

Sets and queries the Component Carrier for measurement at Inter-band UL CA.

Command

```
LTE_MCARRIER mcond,carrier
```

Query

```
LTE_MCARRIER? mcond
```

Response

```
carrier
```

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
carrier	Component Carrier for measurement
PCC	PCC
SCC1	SCC-1
Default	PCC

Example of Use

To set the Component Carrier for measurement to PCC at the measurement condition number 2:

```
LTE_MCARRIER 2,PCC
LTE_MCARRIER? 2
>PCC
```

LTE_MEAS_OFF

Turn Off All Measurement Items

Function

Sets all measurement items to Off collectively.

Command

```
LTE_MEAS_OFF mcond
```

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1

Example of use

To set all measurement items of number 0 in the LTE measurement condition table to Off collectively.

```
LTE_MEAS_OFF 0
```

Remarks

This command is equivalent to setting all the commands below to Off.

LTE_PWR_SET
LTE_OBW_SET
LTE_SEM_SET
LTE_ACLR_SET
LTE_MOD_SET

LTE_MEASOFFSET

Measurement Offset

Function

Sets and queries the shift amount of the analysis start time at the sequence measurement.

Command

```
LTE_MEASOFFSET mcond,on_off[,time]
```

Query

```
LTE_MEASOFFSET? mcond
```

Response

```
on_off,time
```

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
on_of	Analysis start time shift ON/OFF
ON	Shifts the analysis start time.
OFF	Does not shift the analysis start time.
Default	OFF
time	Shift amount of analysis start time
Range	0 to 10.00000 ms
Resolution	0.00001 ms
Default	0.00000 ms

Details

This setting is enabled only when LTE_LONGSEARCH is set to ON and the measurement count is 1.

Example of Use

To set the shift amount of the analysis start time to 10 ms at the measurement condition number 1 in the LTE measurement condition table:

```
LTE_MEASOFFSET 1,ON,10
LTE_MEASOFFSET? 1
>ON,10.00000
```

LTE_MOD_SET

Modulation Analysis Measurement Enable and Count

Function

Enables the Modulation Analysis Measurement and sets the measurement count, and queries the settings.

Command

```
LTE_MOD_SET mcond,on_off[,count]
```

Query

```
LTE_MOD_SET? mcond
```

Response

```
on_off,count
```

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
on_off	Enables/disables measurement.
ON	Enables measurement.
OFF	Disables measurement.
Default	OFF
count	Measurement count
Range	1 to 200 1 to 100 (at UL CA)
Resolution	1
Suffix code	None
Default	1

Example of Use

To turn on the Modulation Analysis measurement and set the number of measurement to 200 for the measurement condition number 2 in the LTE measurement condition table:

```
LTE_MOD_SET 2,ON,200
LTE_MOD_SET? 2
> ON,200
```

Remarks

Modulation analysis is executed for 1 slot (0.5 ms) at each measurement count.

LTE_OBW?

OBW Result

Function

Queries the Occupied Bandwidth measurement result.

Query

```
LTE_OBW? seg[,cc]
```

Response

```
bw
```

bw	Occupied Bandwidth (MHz)
Unit	MHz
Resolution	1 kHz

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.3.2-1 Measurement Items of OBW” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of the in-band emissions (Carrier Leakage) measurement result for segment 0:

```
LTE_OBW? 0
> 3.840
```

LTE_OBWFREQ?

OBW Frequency Result

Function

Queries the upper, lower or center frequency of Occupied Bandwidth measurement in Sequence Measurement mode.

Query

```
LTE_OBWFREQ? seg,pos[,cc]
```

Response

```
freq
```

freq	Offset frequency
Unit	MHz
Resolution	1 kHz

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
pos	Offset type
UPPER	Upper frequency
LOWER	Lower frequency
CENTER	Center frequency
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.3.2-1 Measurement Items of OBW” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the upper frequency of the Occupied Bandwidth measurement result for segment 1:

```
LTE_OBWFREQ? 1,UPPER
> 1951.920
```

LTE_OBW_RATIO

Occupied Bandwidth Ratio

Function

Sets the Occupied Bandwidth measurement occupation ratio in Sequence Measurement mode, and queries the setting.

Command

```
LTE_OBW_RATIO ratio
```

Query

```
LTE_OBW_RATIO?
```

Response

```
ratio
```

Parameter

ratio	Occupied Bandwidth occupation ratio
Range	80.0% to 99.9%
Resolution	0.1%
Suffix code	None
Default	99.0%

Example of Use

To set the Occupied Bandwidth occupation ratio to 99.0% at sequence measurement:

```
LTE_OBW_RATIO 99.0
LTE_OBW_RATIO?
> 99.0
```

LTE_OBW_SET

OBW Measurement Enable and Count

Function

Enables the Occupied Bandwidth measurement and sets the measurement count, or queries the settings in Sequence Measurement mode.

Command

```
LTE_OBW_SET mcond,on_off[,count]
```

Query

```
LTE_OBW_SET? mcond
```

Response

```
on_off,count
```

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
on_off	Enables/disables measurement.
ON	Enables measurement.
OFF	Disables measurement.
Default	OFF
count	Measurement count
Range	1 to 200 1 to 100 (at UL CA)
Resolution	1
Suffix code	None
Default	1

Example of Use

To turn off the Occupied Bandwidth measurement for the measurement condition number 3 in the LTE measurement condition table:

```
LTE_OBW_SET 3,OFF
LTE_OBW_SET? 3
> OFF
```

Remarks

The Occupied Bandwidth is measured for 1 subframe (1 ms) at each measurement count.

LTE_PEVM?

Peak EVM Result

Function

Queries the EVM Peak measurement result.

Query

```
LTE_PEVM? seg,mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	%
Resolution	0.01%

When mode ≠ TTL,

```
pevm
```

pevm	Measurement result in specified Storage mode
Unit	%
Resolution	0.01%

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of EVM Peak measurement result for segment 1:

```
LTE_PEVM? 1,AVG
> 1.75
```

LTE_PHASEERR?

Phase Error Result

Function

Queries the Phase Error measurement result in Sequence Measurement mode.

Query

```
LTE_PHASEERR? seg,mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	degree
Resolution	0.01 degree

When mode ≠ TTL,

```
perr
```

perr	Measurement result in specified Storage mode
Unit	degree
Resolution	0.01 degree

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Phase Error measurement result for segment 1:

```
LTE_PHASEERR? 1,AVG
> 1.55
```

LTE_PWR_SET

Tx Power Measurement Enable and Count

Function

Enables the Tx Power measurement and sets the measurement count, and queries the settings.

Command

```
LTE_PWR_SET mcond,on_off[,count]
```

Query

```
LTE_PWR_SET? mcond
```

Response

```
on_off,count
```

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
on_off	Enables/disables measurement.
ON	Enables measurement.
OFF	Disables measurement.
Default	ON
count	Measurement count
Range	1 to 200 1 to 100 (at UL CA)
Resolution	1
Suffix code	None
Default	1

Example of Use

To turn on the Tx power measurement and set the measurement count to 50 for the measurement condition number 5 in the LTE measurement condition table:

```
LTE_PWR_SET 5,ON,50
LTE_PWR_SET? 5
> ON,50
```

Remarks

Tx Power is measured for 1 subframe (1 ms) at each measurement count.

LTE_RSEVM?

Reference Signal EVM Result

Function

Queries the EVM measurement result of Demodulation Reference Signal.

Query

```
LTE_RSEVM? seg,mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	%
Resolution	0.01%

When mode ≠ TTL,

```
rsevm
```

rsevm	Measurement result in specified Storage mode
Unit	%
Resolution	0.01%

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The EVM measurement of the Reference Signal is supported when PUSCH is assigned using the CHCONFIG command.

Example of Use

To query the average of EVM measurement result of Reference Signal for segment 1:

```
LTE_RSEVM? 1,AVG
> 1.51
```

LTE_RSRANGE_FDD

RS Search Range for FDD mode

Function

Sets and queries the range of Reference Signal detection at the sequence measurement.

Command

```
LTE_RSRANGE_FDD time
```

Query

```
LTE_RSRANGE_FDD?
```

Response

`time`

Unit	us
Resolution	0.1 us

Parameters

time	Range of Reference Signal detection
Range	0.8 to 100.0 us
Resolution	0.1 us
Default	0.8 us

Details

This setting is enabled only when LTE_MEASOFFSET is set to ON.

Example of Use

To set the range of Reference Signal detection to 10 us in the FDD mode:

```
LTE_RSRANGE_FDD 10
LTE_RSRANGE_FDD?
>10.0
```

LTE_RSRANGE_TDD

RS Search Range for TDD mode

Function

Sets and queries the range of Reference Signal detection at the sequence measurement.

Command

```
LTE_RSRANGE_TDD time
```

Query

```
LTE_RSRANGE_TDD?
```

Response

```
time
```

Unit	us
Resolution	0.1 us

Parameters

time	Range of Reference Signal detection
Range	0.8 to 100.0 us
Resolution	0.1 us
Default	17.8 us

Details

This setting is enabled only when LTE_MEASOFFSET is set to ON.

Example of Use

To set the range of Reference Signal detection to 10 us in the TDD mode:

```
LTE_RSRANGE_TDD 10
LTE_RSRANGE_TDD?
>10.0
```

LTE_SEM?

SEM Judgement

Function

Queries the judgement of the Spectrum Emission Mask measurement result.
Fail when any part of spectrum exceeds limit, otherwise Pass.

Query

```
LTE_SEM? seg[,cc]
```

Response

```
judgement
```

judgement	Judgement
PASS	Pass
FAIL	Fail
–	Not measured

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the judgement of the Spectrum Emission Mask measurement result for segment 1:

```
LTE_SEM? 1
> PASS
```

LTE_SEMLVL_DET_LOWER?

SEM Peak Value (Detail) (Lower)

Function

Queries the peak level with offset frequency at each of lower side of 9 ranges of Spectrum Emission Mask measurement.

Refer to Table 2.4.1-2 Available Frequency Ranges for Spectrum Emission Mask Measurements (1/2) and Table 2.4.1-3 Available Frequency Ranges for Spectrum Emission Mask Measurements (2/2) for details.

Query

```
LTE_SEMLVL_DET_LOWER? seg[,cc]
```

Response

```
f_M1,l_M1,f_M2,l_M2,f_M3,l_M3,f_M4,l_M4,f_M5,l_M5,f_M6,l_M6,f_M7,l_M7,f_M8,l_M8,f_M9,l_M9
```

l_M1 to l_M9	Peak level at each of lower side range of Range 1 to Range 9
Units	dBm
Resolution	0.01 dB
f_M1 to f_M9	Offset frequency of peak level at each of lower side range of Range 1 to Range 9
Units	MHz
Resolution	1 kHz

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The number of target ranges varies with the combination of channel bandwidth and network signalled value for additionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the peak level with offset frequency at each of lower side of 9 ranges of Spectrum Emission Mask measurement for segment 0:

```
LTE_SEMLVL_DET_LOWER? 0
>
-0.500,3.00,-1.500,3.00,-2.600,3.00,-3.500,3.00,-5.500,3.00,-8.000,3.00,-12.500,3.00,-17.500,3.00, -22.500,3.00
```

LTE_SEMLVL_DET_UPPER?

SEM Peak Value (Detail) (Upper)

Function

Queries the peak level with offset frequency at each of upper side ranges of Spectrum Emission Mask measurement.

Refer to Table 2.4.1-2 Available Frequency Ranges for Spectrum Emission Mask Measurements (1/2) and Table 2.4.1-3 Available Frequency Ranges for Spectrum Emission Mask Measurements (2/2) for details.

Query

```
LTE_SEMLVL_DET_UPPER? seg[,cc]
```

Response

```
f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4,f_5,l_5,f_6,l_6,f_7,l_7,f_8,l_8,f_9,l_9
```

l_1 to l_9		Peak level in each of upper Range 1 to Range 9
	Unit	dB
	Resolution	0.01 dB
f_1 to f_9		Offset frequency of peak level in each of upper Range 1 to Range 9
	Unit	MHz
	Resolution	1 kHz

Parameters

seg		Segment number
	Range	0 to 1999
	Resolution	1
cc		Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
	PCC	PCC
	SCC1	SCC-1
	Omitted	Total

Details

The number of target ranges varies with the combination of channel bandwidth and network signalled value for additionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the peak level with offset frequency at each of upper side of nine ranges of Spectrum Emission Mask measurement for segment 0:

```
LTE_SEMLVL_DET_UPPER? 0
>
0.500,3.00,1.500,3.00,2.600,3.00,3.500,3.00,5.500,3.00,8.000,3.00,12.500,
3.00,17.500,3.00,22.500,3.00
```

LTE_SEMLVL_LOWER?

SEM Peak Value (Lower)

Function

Queries the peak level with offset frequency at each of lower side ranges of Spectrum Emission Mask measurement in Sequence Measurement mode.

Query

```
LTE_SEMLVL_LOWER? seg[,cc]
```

Response

```
f_M1,l_M1,f_M2,l_M2,f_M3,l_M3,f_M4,l_M4
```

l_M1 to l_M4	Peak level in each of lower Range 1 to Range 4
Unit	dB
Resolution	0.01 dB
f_M1 to f_M4	Offset frequency of peak level in each of lower Range 1 to Range 4
Unit	MHz
Resolution	1 kHz

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

Refer to Table 2.4.1-1 “Frequency Ranges of Range 1 to Range 4” for the frequency range for the measurement.

Example of Use

To query the peak level with offset frequency at each of lower side ranges of Spectrum Emission Mask measurement for segment 1:

```
LTE_SEMLVL_LOWER? 1
> -3.000,-20.00,-5.000,-30.00,-8.000,-40.00,-9.500,-50.00
```

LTE_SEMLVL_UPPER?

SEM Peak Value (Upper)

Function

Queries the peak level with offset frequency at each of upper side ranges of Spectrum Emission Mask measurement in Sequence Measurement mode.

Query

```
LTE_SEMLVL_UPPER? seg[,cc]
```

Response

```
f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4
```

l_1 to l_4	Peak level in each of upper Range 1 to Range 4
Unit	dB
Resolution	0.01 dB
f_1 to f_4	Offset frequency of peak level in each of upper Range 1 to Range 4
Unit	MHz
Resolution	1 kHz

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.4.2-1 Measurement Items of Spectrum Emission Mask" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

Refer to Table 2.4.1-1 "Frequency Ranges of Range 1 to Range 4" for the frequency range for the measurement.

Example of Use

To query the peak level with offset frequency at each of upper side ranges of Spectrum Emission Mask measurement for segment 1:

```
LTE_SEMLVL_UPPER? 1
> 3.000,-20.00,5.000,-30.00,8.000,-40.00,9.500,-50.00
```

LTE_SEMMARGIN_DET_LOWER?

SEM Template Margin (Detail) (Lower)

Function

Queries the level margin with frequency where margin was measured at each of lower side 9 measurement ranges in Spectrum Emission Mask measurement.

Refer to Table 2.4.1-2 Available Frequency Ranges for Spectrum Emission Mask Measurements (1/2) and Table 2.4.1-3 Available Frequency Ranges for Spectrum Emission Mask Measurements (2/2) for details.

Query

```
LTE_SEMMARGIN_DET_LOWER? seg[,cc]
```

Response

```
f_M1,l_M1,f_M2,l_M2,f_M3,l_M3,f_M4,l_M4,f_M5,l_M5,f_M6,l_M6,f_M7,l_M7,f_M
8,l_M8,f_M9,l_M9
```

l_M1 to l_M9	Level margin in each of lower Range 1 to Range 9
Unit	dB
Resolution	0.01 dB
f_M1 to f_M9	Offset frequency where level margin in each of lower Range 1 to Range 9 measured
Unit	MHz
Resolution	1 kHz

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

The number of target ranges varies with the combination of channel bandwidth and network signalled value for additionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the level margin with frequency where margin measured at each of lower side of 9 ranges of Spectrum Emission Mask measurement for segment 0:

```
LTE_SEMLVL_DET_LOWER? 0
>
-0.500,3.00,-1.500,3.00,-2.600,3.00,-3.500,3.00,-5.500,3.00,-8.000,3.00,-12.500,3.00,-17.500,3.00,-22.500,3.00
```

LTE_SEMMARGIN_DET_UPPER?

SEM Template Margin (Detail) (Upper)

Function

Queries the level margin with frequency where margin measured at each of upper side of 9 ranges of Spectrum Emission Mask measurement in Sequence Measurement mode.

Refer to Table 2.4.1-2 Available Frequency Ranges for Spectrum Emission Mask Measurements (1/2) and Table 2.4.1-3 Available Frequency Ranges for Spectrum Emission Mask Measurements (2/2) for details.

Query

```
LTE_SEMMARGIN_DET_UPPER? seg[,cc]
```

Response

```
f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4,f_5,l_5,f_6,l_6,f_7,l_7,f_8,l_8,f_9,l_9
```

l_1 to l_9	Level margin in each of upper side range of Range 1 to Range 9
Unit	dB
Resolution	0.01 dB
f_1 to f_9	Offset frequency where level margin measured in each of upper side range of Range 1 to Range 9
Unit	MHz
Resolution	1 kHz

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

The level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

The number of target ranges varies with the combination of channel bandwidth and network signalled value for additionalSpectrumEmission. Refer to Table 2.4.1-2 “Frequency Ranges for Measurement Results (1/2)” and Table 2.4.1-3 “Frequency Ranges for Measurement Results (2/2)” for details.

Example of Use

To query the level margin with frequency where margin measured at each of upper side of 9 ranges of Spectrum Emission Mask measurement for segment 0:

```
LTE_SEMLVL_DET_UPPER? 0
>
0.500,3.00,1.500,3.00,2.600,3.00,3.500,3.00,5.500,3.00,8.000,3.00,12.500,
3.00,17.500,3.00,22.500,3.00
```

LTE_SEMMARGIN_LOWER?

SEM Template Margin (Lower)

Function

Queries the level margin at each of lower side ranges in Spectrum Emission Mask measurement.

Query

```
LTE_SEMMARGIN_LOWER? seg[,cc]
```

Response

```
f_M1,l_M1,f_M2,l_M2,f_M3,l_M3,f_M4,l_M4
```

l_M1 to l_M4	Level margin in each of lower Range 1 to Range 4
Unit	dB
Resolution	0.01 dB
f_M1 to f_M4	Offset frequency where level margin in each of lower Range 1 to Range 4 measured
Unit	MHz
Resolution	1 kHz

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

Level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

Refer to Table 2.4.1-1 Frequency Ranges of Range 1 to Range 4 for the frequency range for the measurement.

Example of Use

To query the level margin with frequency where margin measured at each of lower side ranges of Spectrum Emission Mask measurement for segment 1:

```
LTE_SEMMARGIN_LOWER? 1
> -3.000,3.00,-5.000,3.00,-8.000,3.00,-9.500,3.00
```

LTE_SEMMARGIN_UPPER?

SEM Template Margin (Upper)

Function

Queries the level margin at each of upper side range in Spectrum Emission Mask measurement in Sequence Measurement mode.

Query

```
LTE_SEMMARGIN_UPPER? seg[,cc]
```

Response

```
f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4
```

l_ 1to l_4	Level margin in each of upper Range 1 to Range 4
Unit	dB
Resolution	0.01 dB
f_1 to f_4	Offset frequency where level margin in each of upper Range 1 to Range 4 measured
Unit	MHz
Resolution	1 kHz

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.4.2-1 Measurement Items of Spectrum Emission Mask” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Details

Level margin is calculated as (limit value – measured value).
If the measured value exceeds the limit value, the level margin becomes negative.

Refer to Table 2.4.1-1 “Frequency Ranges of Range 1 to Range 4” for the frequency range for the measurement.

Example of Use

To query the level margin with frequency where margin measured at each of upper side ranges of Spectrum Emission Mask measurement for segment 1:

```
LTE_SEMMARGIN_UPPER? 1
> 3.000,3.00,5.000,3.00,8.000,3.00,9.500,3.00
```

LTE_SEM_SET

Spectrum Emission Mask Enable and Count

Function

Enables the Spectrum Emission Mask Measurement and sets or queries the measurement count.

Command

```
LTE_SEM_SET mcond,on_off[,count]
```

Query

```
LTE_SEM_SET? mcond
```

Response

```
on_off,count
```

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
on_off	Enables/disables measurement.
ON	Enables measurement.
OFF	Disables measurement.
Default	OFF
count	Measurement count
Range	1 to 200 1 to 100 (at UL CA)
Resolution	1
Suffix code	None
Default	1

Example of Use

To turn on the Spectrum Emission measurement and set the measurement count to 100 for the measurement condition number 1 in the LTE measurement condition table:

```
LTE_SEM_SET 1,ON,100
LTE_SEM_SET? 1
> ON,100
```

Remarks

The Spectrum Emission Mask is measured for 1 subframe (1 ms) at each measurement count.

LTE_SEM_TEMPLATE_1.4MHZ

Spectrum Emission Mask Template (1.4 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 1.4 MHz channel bandwidth in Sequence Measurement mode.

Command

```
LTE_SEM_TEMPLATE_1.4MHZ range,limit
```

Query

```
LTE_SEM_TEMPLATE_1.4MHZ? range
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 4	
Resolution	1	
Suffix code	None	
Default	1	
limit	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Suffix code	DBM (uses dBm when omitted)	
Default	Range 1:	–8.5 dBm
	Range 2:	–8.5 dBm
	Range 3:	–23.5 dBm
	Range 4:	0.0 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 1.4 MHz channel bandwidth to –10.0 dBm:

```
LTE_SEM_TEMPLATE_1.4MHZ 2,-10.0
LTE_SEM_TEMPLATE_1.4MHZ? 2
> -10.0
```

LTE_SEM_TEMPLATE_10MHZ

Spectrum Emission Mask Template (10 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 10 MHz channel bandwidth in Sequence Measurement mode.

Command

```
LTE_SEM_TEMPLATE_10MHZ range,limit
```

Query

```
LTE_SEM_TEMPLATE_10MHZ? range
```

Response

`limit`

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 4	
Resolution	1	
Suffix code	None	
Default	1	
limit	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Suffix code	DBM (uses dBm when omitted)	
Default	Range 1:	–16.5 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 10 MHz channel bandwidth to –10.0 dBm:

```
LTE_SEM_TEMPLATE_10MHZ 2,-10.0
LTE_SEM_TEMPLATE_10MHZ? 2
> -10.0
```

LTE_SEM_TEMPLATE_15MHZ

Spectrum Emission Mask Template (15 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 15 MHz channel bandwidth in Sequence Measurement mode.

Command

```
LTE_SEM_TEMPLATE_15MHZ range,limit
```

Query

```
LTE_SEM_TEMPLATE_15MHZ? range
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 4	
Resolution	1	
Suffix code	None	
Default	1	
limit	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Suffix code	DBM (uses dBm when omitted)	
Default	Range 1:	–18.5 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 15 MHz channel bandwidth to 10.0 dBm:

```
LTE_SEM_TEMPLATE_15MHZ 2,-10.0
LTE_SEM_TEMPLATE_15MHZ? 2
> -10.0
```

LTE_SEM_TEMPLATE_20MHZ

Spectrum Emission Mask Template (20 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 20 MHz channel bandwidth in Sequence Measurement mode.

Command

```
LTE_SEM_TEMPLATE_20MHZ range,limit
```

Query

```
LTE_SEM_TEMPLATE_20MHZ? range
```

Response

`limit`

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 4	
Resolution	1	
Suffix code	None	
Default	1	
limit	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Suffix code	DBM (uses dBm when omitted)	
Default	Range 1:	–19.5 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 10 MHz channel bandwidth to –10.0 dBm:

```
LTE_SEM_TEMPLATE_20MHZ 2,-10.0
LTE_SEM_TEMPLATE_20MHZ? 2
> -10.0
```

LTE_SEM_TEMPLATE_3MHZ

Spectrum Emission Mask Template (3 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 3 MHz channel bandwidth in Sequence Measurement mode.

Command

```
LTE_SEM_TEMPLATE_3MHZ range,limit
```

Query

```
LTE_SEM_TEMPLATE_3MHZ? range
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 4	
Resolution	1	
Suffix code	None	
Default	1	
limit	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Suffix code	DBM (uses dBm when omitted)	
Default	Range 1:	–11.5 dBm
	Range 2:	–8.5 dBm
	Range 3:	–23.5 dBm
	Range 4:	0.0 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 3 MHz channel bandwidth to –10.0 dBm:

```
LTE_SEM_TEMPLATE_3MHZ 2,-10.0
LTE_SEM_TEMPLATE_3MHZ? 2
> -10.0
```

LTE_SEM_TEMPLATE_5MHZ

Spectrum Emission Mask Template (5 MHz)

Function

Sets or queries the limit of Spectrum Emission Mask for 5 MHz channel bandwidth in Sequence Measurement mode.

Command

```
LTE_SEM_TEMPLATE_5MHZ range,limit
```

Query

```
LTE_SEM_TEMPLATE_5MHZ? range
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 4	
Resolution	1	
Suffix code	None	
Default	1	
limit	Limit level	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Suffix code	DBM (uses dBm when omitted)	
Default	Range 1:	–13.5 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of Spectrum Emission Mask for 5 MHz channel bandwidth to –10.0 dBm:

```
LTE_SEM_TEMPLATE_5MHZ 2,-10.0
LTE_SEM_TEMPLATE_5MHZ? 2
> -10.0
```

LTE_SEM_TEMPLATE_CONTCC_100RB_100RB

Spectrum Emission Mask Template for Contiguous UL CA (100RB+100RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 100RB+100RB.

Command

```
LTE_SEM_TEMPLATE_CONTCC_100RB_100RB range,limit
```

Query

```
LTE_SEM_TEMPLATE_CONTCC_100RB_100RB? range
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 6	
Resolution	1	
Default	1	
limit	Limit	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Default	Range 1:	–22.5 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm
	Range 5:	–23.5 dBm
	Range 6:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 100RB+100RB.

```
LTE_SEM_TEMPLATE_CONTCC_100RB_100RB 2,-10.0
LTE_SEM_TEMPLATE_CONTCC_100RB_100RB? 2
>-10.0
```

LTE_SEM_TEMPLATE_CONTCC_25RB_100RB

Spectrum Emission Mask Template for Contiguous UL CA (25RB+100RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 25RB+100RB.

Command

```
LTE_SEM_TEMPLATE_CONTCC_25RB_100RB range,limit
```

Query

```
LTE_SEM_TEMPLATE_CONTCC_25RB_100RB? range
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 6	
Resolution	1	
Default	1	
limit	Limit	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Default	Range 1:	–20.5 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm
	Range 5:	–23.5 dBm
	Range 6:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 25RB+100RB.

```
LTE_SEM_TEMPLATE_CONTCC_25RB_100RB 2,-10.0
LTE_SEM_TEMPLATE_CONTCC_25RB_100RB? 2
>-10.0
```

LTE_SEM_TEMPLATE_CONTCC_50RB_100RB

Spectrum Emission Mask Template for Contiguous UL CA (50RB+100RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 50RB+100RB.

Command

```
LTE_SEM_TEMPLATE_CONTCC_50RB_100RB range,limit
```

Query

```
LTE_SEM_TEMPLATE_CONTCC_50RB_100RB? range
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 6	
Resolution	1	
Default	1	
limit	Limit	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Default	Range 1:	–21.0 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm
	Range 5:	–23.5 dBm
	Range 6:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 50RB+100RB.

```
LTE_SEM_TEMPLATE_CONTCC_50RB_100RB 2,-10.0
LTE_SEM_TEMPLATE_CONTCC_50RB_100RB? 2
>-10.0
```

LTE_SEM_TEMPLATE_CONTCC_75RB_100RB

Spectrum Emission Mask Template for Contiguous UL CA (75RB+100RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 75RB+100RB.

Command

```
LTE_SEM_TEMPLATE_CONTCC_75RB_100RB range,limit
```

Query

```
LTE_SEM_TEMPLATE_CONTCC_75RB_100RB? range
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 6	
Resolution	1	
Default	1	
limit	Limit	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Default	Range 1:	–22.0 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm
	Range 5:	–23.5 dBm
	Range 6:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 75RB+100RB.

```
LTE_SEM_TEMPLATE_CONTCC_75RB_100RB 2,-10.0
LTE_SEM_TEMPLATE_CONTCC_75RB_100RB? 2
>-10.0
```

LTE_SEM_TEMPLATE_CONTCC_75RB_75RB

Spectrum Emission Mask Template for Contiguous UL CA (75RB+75RB)

Function

Sets and queries the limit value of the spectrum emission mask when the number of RBs at Contiguous UL CA is 75RB+75RB.

Command

```
LTE_SEM_TEMPLATE_CONTCC_75RB_75RB range,limit
```

Query

```
LTE_SEM_TEMPLATE_CONTCC_75RB_75RB? range
```

Response

```
limit
```

Unit	dBm
Resolution	0.1 dB

Parameters

range	Range	
Range	1 to 6	
Resolution	1	
Default	1	
limit	Limit	
Range	–99.9 to 99.9 dBm	
Resolution	0.1 dB	
Default	Range 1:	–21.0 dBm
	Range 2:	–8.5 dBm
	Range 3:	–11.5 dBm
	Range 4:	–23.5 dBm
	Range 5:	–23.5 dBm
	Range 6:	–23.5 dBm

Example of Use

To set the limit value of Range 2 of the spectrum emission mask to –10.0 dBm when the number of RBs is 75RB+75RB.

```
LTE_SEM_TEMPLATE_CONTCC_75RB_75RB 2,-10.0
LTE_SEM_TEMPLATE_CONTCC_75RB_75RB? 2
>-10.0
```

LTE_SPECFLATITEM?

Spectrum Flatness Measured Item

Function

Queries whether each spectrum flatness measurement items is measured or not.

Query

```
LTE_SPECFLATITEM? seg[,cc]
```

Response

```
flag
```

flag — Measured/Not measured flag (0 to 3)

Returns the sum of the following measurement items.

0 Not measured

1 ≥ 3 MHz area (When Test Environment is Normal)
≥ 5 MHz area (When Test Environment is Extreme)

2 < 3 MHz area (When Test Environment is Normal)
< 5 MHz area (When Test Environment is Extreme)

Parameters

seg — Segment number

- Range: 0 to 1999
- Resolution: 1

cc — Component Carrier

Used at UL CA and omitted at non CA.

Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.

- PCC: PCC
- SCC1: SCC-1
- Omitted: Total

Example of Use

To query whether each spectrum flatness measurement items of Segment 1 is measured or not.

```
LTE_SPECFLATITEM? 1
> 2
```

LTE_SPECFLATPPPASS?

Spectrum Flatness Judgement

Function

Queries the judgement of Spectrum Flatness measurement result.

Query

```
LTE_SPECFLATPPPASS? seg[,cc]
```

Response

```
judgement
```

judgement	Judgement result
PASS	Pass
FAIL	Fail
–	Not measured

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the judgement of Spectrum Flatness measurement result for segment 1

```
LTE_SPECFLATPPPASS? 1
> PASS
```

LTE_SPECFLAT_RP1?

Spectrum Flatness (≥3 MHz (RP1)) Result

Function

Queries the ripple value in Spectrum Flatness measurement result in Range 1.

Query

```
LTE_SPECFLAT_RP1? seg,mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
sflatness
```

sflatness	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameter

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Range 1 ripple value in Spectrum Flatness measurement result of Segment 1 in the sequence measurement.

```
LTE_SPECFLAT_RP1? 1,AVG
> 0.04
```

LTE_SPECFLAT_RP12?

Spectrum Flatness (RP12) Result

Function

Queries the difference between maximum value in Range 1 and minimum value in Range 2 of Spectrum Flatness measurement result.

Query

```
LTE_SPECFLAT_RP12? seg,mode
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
sflatness
```

sflatness	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of difference between maximum value in Range 1 and minimum value in Range 2 of Spectrum Flatness measurement result of Segment 1 in the sequence measurement.

```
LTE_SPECFLAT_RP12? 1,AVG
> 0.04
```

LTE_SPECFLAT_RP2?

Spectrum Flatness (<3 MHz (RP2)) Result

Function

Queries the ripple value in Spectrum Flatness measurement result in Range 2.

Query

```
LTE_SPECFLAT_RP2? seg,mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
sflatness
```

sflatness	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.6.8-1 Measurement Items of Modulation Analysis” for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Range 2 ripple value in Spectrum Flatness measurement result of Segment 1 in the sequence measurement.

```
LTE_SPECFLAT_RP2? 1,AVG
> 0.04
```

LTE_SPECFLAT_RP21?

Spectrum Flatness (RP21) Result

Function

Queries the difference between maximum value in Range 2 and minimum value in Range 1 of Spectrum Flatness measurement result.

Query

```
LTE_SPECFLAT_RP21? seg,mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dB
Resolution	0.01 dB

When mode ≠ TTL,

```
sflatness
```

sflatness	Measurement result in specified Storage mode
Unit	dB
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to "Table 2.6.8-1 Measurement Items of Modulation Analysis" for details.
PCC	PCC
SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of difference between maximum value in Range 2 and minimum value in Range 1 of Spectrum Flatness measurement result of Segment 1 in the sequence measurement.

```
LTE_SPECFLAT_RP21? 1,AVG
> 0.04
```

LTE_TDDULDLCONF

Uplink Downlink Configuration

Function

Sets or queries Uplink/Downlink signal configuration of TDD.

Command

```
LTE_TDDULDLCONF conf
```

Query

```
LTE_TDDULDLCONF?
```

Response

```
conf
```

Parameter

conf	Uplink Downlink Signal Configuration
Range	0 to 6
Resolution	1
Default	1

Example of Use

To set the Uplink/Downlink signal configuration to 1:

```
LTE_TDDULDLCONF 1
LTE_TDDULDLCONF?
> 1
```

LTE_TESTENV

Test Environment

Function

Sets or queries the test environment.

Command

```
LTE_TESTENV mcond,env
```

Query

```
LTE_TESTENV? mcond
```

Response

```
env
```

Parameter

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
env	Test Environment
NORMAL	Normal
EXTREME	Extreme
Default	NORMAL

Details

This is the parameter that determines the threshold line for Spectrum Flatness measurement. The test environment is defined in 3GPP TS36.521-1. The following values depend on the test environment settings.

・When the test environment is NORMAL

Border of Range1/Range2	3 MHz
RP1 limit level	5.4 dB
RP2 limit level	9.4 dB
RP12 limit level	6.4 dB
RP21 limit level	8.4 dB

・When the test environment is EXTREME

Border of Range1/Range2	5 MHz
RP1 limit level	5.4 dB
RP2 limit level	13.4 dB
RP12 limit level	7.4 dB
RP21 limit level	11.4 dB

Example of Use

To set the test environment to EXTREME for the measurement condition number 2 in the LTE measurement condition table:

```
LTE_TESTENV 2,EXTREME
LTE_TESTENV? 2
> EXTREME
```

LTE_TP_INBANDE_LEAK

In-band Emissions Carrier Leakage Template

Function

Set and queries In-band Emissions Carrier Leakage Template.

Command

```
LTE_TP_INBANDE_LEAK mcond,tp
```

Query

```
LTE_TP_INBANDE_LEAK? mcond
```

Response

```
tp
```

Parameter

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
tp	In-band Emissions Carrier Leakage Template
0DBM	–24.2 dBc (UE output level 0 dBm)
30DBM	–19.2 dBc (UE output level –30 dBm)
40DBM	–9.2 dBc (UE output level –40 dBm)
Default	0DBM

Details

The upper limit for the Carrier Leakage defined in 3GPP TS36.521 6.5.2.3 is selected according to this parameter setting.

Example of Use

To set the In-band Emissions Carrier Leakage Template to 0DBM for the measurement condition number 2:

```
LTE_TP_INBANDE_LEAK 2,0DBM
LTE_TP_INBANDE_LEAK? 2
> 0DBM
```

LTE_TP_INBANDE_LEAK_SCC1

In-band Emissions Carrier Leakage Template for SCC-1

Function

Set and queries the In-band Emissions Carrier Leakage Template of SCC-1.

Command

```
LTE_TP_INBANDE_LEAK_SCC1 mcond,tp
```

Query

```
LTE_TP_INBANDE_LEAK_SCC1? mcond
```

Response

```
tp
```

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
tp	In-band Emissions Carrier Leakage Template of SCC-1
0DBM	–24.2 dBc (UE output level 0 dBm)
30DBM	–19.2 dBc (UE output level –30 dBm)
40DBM	–9.2 dBc (UE output level –40 dBm)
Default	0DBM

Details

The upper limit for the Carrier Leakage defined in 3GPP TS36.521 6.5.2.3 is selected according to this parameter setting.

Examples of Use

To set the In-band Emissions Carrier Leakage Template for SCC-1 to 0DBM for the measurement condition number 2:

```
LTE_TP_INBANDE_LEAK_SCC1 2,0DBM
LTE_TP_INBANDE_LEAK_SCC1? 2
> 0DBM
```

LTE_TXPWR?

Tx Power Result

Function

Queries the Tx power measurement result.

Query

```
LTE_TXPWR? seg,mode[,cc]
```

Response

When mode = TTL,

```
avg,max,min
```

avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
Unit	dBm
Resolution	0.01 dB

When mode = AVG, MAX, MIN or DVT,

```
pwr
```

pwr	Measurement result in specified Storage mode
Unit	dBm
Resolution	0.01 dB

When mode = IND,

```
s,pwr(1),pwr(2),pwr(3),…,pwr(s)
```

s	Measurement count
Range	1 to 200
pwr(s)	Tx Power of sth measurement
Unit	dBm
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	Individual measurement result
cc	Component Carrier Used at UL CA and omitted at non CA. Refer to “Table 2.2.2-1 Measurement Items of Tx Power” for details.
PCC	PCC

SCC1	SCC-1
Omitted	Total

Example of Use

To query the average of Tx Power measurement results for segment 1:

```
LTE_TXPWR? 1,AVG
> -20.00
```

LTE_ULRMC_MOD

Sequence UL RMC Modulation

Function

Sets or queries the modulation method used by Uplink signal RMC.

Command

```
LTE_ULRMC_MOD mcond,ul_rmc_mod
```

Query

```
LTE_ULRMC_MOD? mcond
```

Response

```
ul_rmc_mod
```

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
ul_rmc_mod	Uplink RMC modulation method
QPSK	QPSK method
16QAM	16QAM method
64QAM	64QAM modulation
256QAM	256QAM modulation
Default	QPSK

Example of Use

To set the modulation method of condition number 1 in the LTE measurement condition table to 16QAM:

```
LTE_ULRMC_MOD 1,16QAM
LTE_ULRMC_MOD? 1
> 16QAM
```

LTE_ULRMC_MOD_SCC1

Sequence UL RMC Modulation for SCC-1

Function

Sets or queries the modulation method used by Uplink signal RMC of SCC-1.

Command

```
LTE_ULRMC_MOD_SCC1 mcond,ul_rmc_mod
```

Query

```
LTE_ULRMC_MOD_SCC1? mcond
```

Response

```
ul_rmc_mod
```

Parameter

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
ul_rmc_mod	Uplink RMC modulation method of SCC-1
QPSK	QPSK modulation
16QAM	16QAM modulation
64QAM	64QAM modulation
256QAM	256QAM modulation
Default	QPSK

Example of Use

To set the modulation method for SCC-1 at the measurement condition number 1 in the LTE measurement condition table to 16QAM:

```
LTE_ULRMC_MOD_SCC1 1,16QAM
LTE_ULRMC_MOD_SCC1? 1
> 16QAM
```

OLVL

Output Level

Function

Sets or queries the total output level of all channels.

Command

```
OLVL level
```

Query

```
OLVL?
```

Response

```
level
```

Unit	dBm
Resolution	0.1 dB

Parameter

level Output level

Range

MU887000A	400 MHz ≤ frequency ≤ 3800 MHz
	–130.0 to –10.0 dBm (Port 1/Port 2)
	–120.0 to 0.0 dBm (Port 3/Port 4)
	3800 MHz < frequency ≤ 6000 MHz
	–130.0 to –18.0 dBm (Port 1/Port 2)
	–120.0 to –8.0 dBm (Port 3/Port 4)
MU887001A	400 MHz ≤ frequency ≤ 3800 MHz
	–130.0 to –10.0 dBm (Port 1 to Port 4)
	3800 MHz < frequency ≤ 6000 MHz
	–130.0 to –18.0 dBm (Port 1 to Port 4)
MU887002A	400 MHz < frequency ≤ 6000 MHz
	–130.0 to 0.0 dBm (Port 1 to Port 12)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–60.2 dBm

Details

For MU887000A, the setting range varies with the output test port setting.
If cable loss correction is set to ON, the setting range of the output level is the range of values with subtracted cable loss.
When the cable loss is 5 dB and frequency ≤ 3800 MHz,
the MU887000A Port 1/Port 2 setting range is –135.0 to –15.0 dBm.

Example of Use

To set the output level to –50.0 dBm:

```
OLVL -50.0
OLVL?
> -50.0
```

Related Commands

EXTLOSSW

LOSSTBL

LOSSTBLVAL

For details of the commands, refer to Chapter 6 “Native Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

RXFREQ

Downlink Frequency

Function

Sets or queries the downlink frequency.
This command has the same function as DLFREQ.

Command

```
RXFREQ dl_freq
```

Query

```
RXFREQ?
```

Unit	Hz
Resolution	1 Hz

Response

```
dl_freq
```

Parameter

dl_freq	Downlink frequency
Range	400 000 000 to 3800 000 000 Hz (MU887000A/01A) 400 000 000 to 6000 000 000 Hz (With MU887000A/01A-001) 400 000 000 to 6000 000 000 Hz (MU887002A)
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	2140 000 000 Hz

Details

This sets the Rx frequency for the mobile station.
Changing the setting of downlink frequency does not change the setting of the downlink channel.

Example of Use

To set the downlink frequency to 2120 MHz:

```
RXFREQ 2120MHZ
RXFREQ?
>2120000000
```

SEQCTRL

Sequence Control Parameter - Sequence Control

Function

Sets or queries the start and stop segments of Sequence Table.
Sets the parameters for both measurement and signal transmission.

Command

```
SEQCTRL start,end
```

Query

```
SEQCTRL?
```

Response

```
start,end
```

Parameters

start	Start segment
Range	0 to 1999
Resolution	1
Default	0
end	Stop segment
Range	start to 1999
Resolution	1
Default	0

Details

start = 0 to 1999, end = 0 to 1999 where end ≥ start
Whether the set sequence table can be executed is evaluated. Use the SEQERR? command to query the error details.

Example of Use

To set the start segment to 20 and the stop segment to 52:

```
SEQCTRL 20,52
SEQCTRL?
> 20,52
```

SEQCTRLTX

Sequence Control Parameter - Sequence Control

Function

Sets or queries start and stop segments in sequence table.

Sets the measurement parameters only, without affecting the signal transmission parameters.

Command

```
SEQCTRLTX start,end
```

Query

```
SEQCTRLTX?
```

Response

```
start,end
```

Parameters

start	Start segment
Range	0 to 1999
Resolution	1
Default	0
end	Stop segment
Range	start to 1999
Resolution	1
Default	199

Details

start = to 1999, end = 0 to 1999 where end ≥ start

Whether the set sequence table can be executed is evaluated. Use the SEQERR? command to query the error details.

Examples of Use

To set the start and stop segments to 20 and 55, respectively:

```
SEQCTRLTX 20,55
SEQCTRLTX?
> 20,55
```

SEQERR?

Sequence Parameter Information - Error check

Function

Queries the setting error information of sequence table.

Query

```
SEQERR? [item]
```

Response

When nothing is set to item:

```
n,err(0),..,err(n-1)
```

n		Number of errors
	Range	0 to 4
err(n–1)		Parameter with error
	ILVL	Input level
	OLVL	Output level
	STEP	Step count
	LEN	Capture memory length

When item is ILVL, OLVL, STEP, DLPAT, or PORT:

```
ns,seg(0),..,seg(ns-1)
```

ns		Number of segments with errors
	Range	0 to 2000
seg(ns–1)		Segment number with errors
	Range	0 to 1999

When item is LEN:

```
e,mem,exe,set
```

e		Presence of errors
	Range	0 No error, executable
		1 Errors found, not executable
mem		Memory utilization
	Range	0.0% to 100.0%
	Resolution	0.1%
exe		Number of segments capable of executing capture in number of configured segments
	Range	0 to 2000
set		Number of segments with capture configured
	Range	0 to 2000

When item is OLVLNUM, PATNUM, or STDNUM:

```
e,exe,set
```

e		Presence of errors
	Range	0 No error, executable
		1 Errors found, not executable
exe		Number of segments capable of executing capture in number of

configured segments
Range 0 to 2000
set Number of segments with capture configured
Range 0 to 2000

If no error is found in the sequence table, the response returns 0.

Parameters

item	Parameter in sequence table
ILVL	Input level
OLVL	Output level
STEP	Step count
DLPAT	Waveform Pattern
PORT	Test Port
LEN	Capture memory length
OLVLNUM	Output level change count
PATNUM	Waveform pattern change count
STDNUM	Measurement mode change count

Details

This command can check error presence of input level, output level, step count, and capture memory length.

To query error presence of the following parameters, use SEQERR2? command.

Waveform pattern, test port, output level change count, waveform pattern change count, measurement mode change count.

To set parameters for sequence table using the following commands, errors are not checked.

SEQTRX, SEQTX, SEQMEAS

Example of Use

To query the presence of errors:

```
SEQERR?
>1,ILVL
```

To query the input level setting error information:

```
SEQERR? ILVL
>2,3,12
```

To query the capture memory error information

```
SEQERR? LEN
>0,25.0,20,20
```

Here, the capture memory utilization is 25.0%, so all captures configured in 20 segments are executable.

Remarks

Sequence measurement cannot be started if there are errors.

However, sequence measurement can be started if segment numbers with errors are excluded from the execution range using the SEQCTRL command.

SEQERR2?

Sequence Parameter Information - Error Check

Function

Queries setting error information of sequence table.

Query

```
SEQERR2? format
```

Response

```
n,err(0),..,err(n-1)
```

n	Number of errors
Range	0 to 7
err(n-1)	Parameter with errors
ILVL	Input level
OLVL	Output level
STEP	Step count
DLPAT	Waveform pattern
PORT	Test Port
LEN	Capture memory length
OLVLNUM	Output level change count
PATNUM	Waveform pattern change count
STDNUM	Measurement mode change count

If no error is found in the sequence table, the response returns 0.

Parameters

format	Format
1	Error check 1

Details

Parameter setting errors can be checked up to seven types.
Only one of output level change count, waveform pattern change count, or measurement mode change count has an error.
Two or three of them cannot have an error simultaneously.

To set parameters for sequence table using the following commands, errors are not checked.
SEQTRX, SEQTX, SEQMEAS, SEQSGPORT
To query error details of each parameter, use SEQERR command.

Examples of Use

To query the presence of errors:

```
SEQERR2? 1
>2,ILVL,DLPAT
```

Remarks

Sequence measurement cannot be started if there are errors.
However, sequence measurement can be started if segment numbers with errors are excluded from the execution range using the SEQCTRL command.

SEQEXECTX

Start Signal Analyzer Measurement Only

Function

Sets only the parameters for the specified measurement and executes measurement, without affecting the signal transmission parameters.

Command

```
SEQEXECTX
```

SEQMEAS

Sequence Table Parameter - Measurement

Function

Sets or queries the measurement conditions of the specified segment.

Command

```
SEQMEAS seg,mode,step,mcond
```

Query

```
SEQMEAS? seg
```

Response

```
mode,step,mcond
```

Parameters

seg	Segment number	
Range	0 to 1999	
Resolution	1	
mode	Measurement mode	Required software license
TXP	Transmit power measurement mode	MX887010A
WCDMA	W-CDMA measurement mode	MX887010A and MX887011A
GSM	GSM measurement mode	MX887010A and MX887012A
CDMA2K	CDMA2000 1x measurement mode	MX887010A and MX887015A
EVDO	CDMA2000 1xEVDO measurement mode	MX887010A and MX887016A
TDSCDMA	TD-SCDMA measurement mode	MX887010A and MX887017A
LTE	LTE measurement mode	MX887010A and MX887013A, or MX887010A and MX887014A
NR	NR sub-6GHz measurement mode	MX887010A and MX887018A or MX887010A and MX887019A
Default	TXP	
step	Step count	
Range	2 to 3000	
Resolution	1	
Default	2	
mcond	Measurement condition number	
Range	0 to 1999	
Resolution	1	
Default	0	

Example of Use

To set the settings for segment 2 as follows:
Measurement mode: LTE, Step count: 10, Measurement condition number: 3

```
SEQMEAS 2, LTE,10,3
SEQMEAS? 2
> LTE,10,3
```

SEQMSTAT?

Sequence Measurement Status

Function

Queries the status of sequence measurement.

Query

```
SEQMSTAT?
```

Response

```
m_status,n,s(0),s(1),..,s(n-1)
```

m_status		Measurement execution status
	0	Measurement completed successfully
	2	Over level
	3	Under level
	4	Measurement failed
	5	Synchronization word not detected
	9	Measurement in progress or not measured
	12	Tx measurement timeout
	The value received from MX887013A or MX887014A is 0, 2, 5, 9, or 12.	
n		Number of measured segments
	Range	0 to 2000
s(n–1)		Measurement status of specified segment
	0	Measurement completed successfully
	2	Over level
	3	Under level
	4	Measurement failed
	5	Synchronization word not detected
	9	Measurement in progress or not measured
	10	Segment not measured
	12	Tx measurement timeout
	The value received from MX887013A or MX887014A is 0, 2, 5, 9, 10, or 12.	

Example of Use

To query the status of sequence measurement:

```
SEQMSTAT?
>2,6,0,0,0,0,2,0
```

The results shows that six segments are measured segments and the fifth segment is over level.

Related commands

MSTAT

SEQSEGSTAT

SEQPROGRESS?

Sequence Progress

Function

Queries the progress ratio and the executing sequence number in Sequence Measurement mode.

Query

```
SEQPROGRESS?
```

Response

```
p,cur,start,end
```

p	Progress ratio in Sequence Measurement mode
Range	0 to 100%
cur	Current segment number being executed
Range	0 to 1999
start	First segment number
Range	0 to 1999
stop	Last segment number
Range	0 to 1999

Example of Use

To query the progress ratio and the executing sequence number in Sequence Measurement mode:

```
SEQPROGRESS?
>65,23,11,30
```

Remarks

The first and last segment numbers are the same as the start and end segment numbers specified using the SEQCTRL command.

SEQREINIT

Sequence Control Parameter - Sequence End State Reinitialization

Function

Enables and queries the automatic initialization of following items after sequence measurement completion.

- Downlink frequency
- Output level
- Output signal pattern
- Uplink frequency
- Input level

Command

```
SEQREINIT sw
```

Query

```
SEQREINIT?
```

Response

```
sw
```

Parameter

sw		Automatic initialization after sequence measurement completion
	ON	Enables automatic initialization.
	OFF	Disables automatic initialization.
	Default	ON

Details

If the parameter is set to ON, the settings are initialized to the values configured by the following commands after sequence measurement completion.

Downlink frequency	DLFREQ
Output level	OLVL
Output signal pattern	PACKAGE
Uplink frequency	ULFREQ
Input level	ILVL

If the parameter is set to OFF, the settings remain those of the sequence measurement stop segment.

Example of Use

To reset the target parameters:

```
SEQREINIT ON
SEQREINIT?
> ON
```

SEQSAPORT

Sequence Table Parameter - SA Input Port

Function

Specifies the segment number and sets or queries the test port number for inputting RF signals.

Command

```
SEQSAPORT seg,port
```

Query

```
SEQSAPORT? seg
```

Response

port

Parameter

seg	Segment number	
Range	0 to 1999	
port	Input test port number	
Range	COMMON, Test Port 1 to 4	(MU887000A)
	COMMON, Test Port 1 to 4	(MU887001A)
	OFF, COMMON, Test Port 1 to 12	(MU887002A)
PORT1	Test Port 1	
…	…	
PORT12	Test Port 12	
OFF	No any Input Test Ports	(MU887002A)
COMMON	Input test port specified by PORT command.	
Default	COMMON	

Details

For MU887000A,
Test Port 3 cannot be set when Test Port 3 is selected for RF signal output test port.
Test Port 4 cannot be set when Test Port 4 is selected for RF signal output test port.

For MU887001A and MU887002A, there are no restrictions as above.

Example of Use

To set the test port number of segment 5 to Test Port 2
SEQSAPORT 5, PORT2
SEQSAPORT? 5
> PORT2

SEQSEGSTAT?

Specified Segment Status

Function

Queries the measurement status of the specified segment.

Query

```
SEQSEGSTAT? seg
```

Response

```
stat
```

stat	Segment status
0	Measurement completed successfully
2	Over level
3	Under level
4	Measurement failed
5	Synchronization word not detected
9	Measurement in progress or not measured
10	Segment not measured
12	Tx measurement timeout

The value received from MX887013A or MX887014A is 0, 2, 5, 9, 10, or 12.

Parameters

seg	Segment number
Range	0 to 1999

Example of Use

To query the measurement status of segment 16:

```
SEQSEGSTAT 16
> 0
```

SEQSGPORT

Sequence Table Parameter - SG Output Port

Function

Specifies the segment number and sets or queries the test port number for outputting RF signals.

Command

`SEQSGPORT seg,port`	MU887000A, MU887001A
`SEQSGPORT seg,port[,port,…,port]`	MU887002A

Query

`SEQSGPORT? seg`

Response

port	MU887000A, MU887001A
port[,port,…,port]	MU887002A

Parameters

seg	Segment number	
Range	0 to 1999	
port	Output test port number	
Range	Test Port 1 to 4	(MU887000A)
	Test Port 1 to 4	(MU887001A)
	Test Port 1 to 12	(MU887002A)
PORT1	Test Port 1	
…	…	
PORT12	Test Port 12	
Default	PORT1	

Details

For MU887000A,
Test Port 3 cannot be set when Test Port 3 is selected for RF signal input test port.
Test Port 4 cannot be set when Test Port 4 is selected for RF signal input test port.

For MU887001A and MU887002A, there are no restrictions as above.

Example of Use

To set the test port number of segment 5 to Test Port 2:

```
SEQSGPORT 5,PORT2
SEQSGPORT? 5
> PORT2
```

To set the test port number of segment 5 to Test Port 4, Test Port 6, and Test Port 10:

```
SEQSGPORT 5,PORT10,PORT4,PORT6
SEQSGPORT? 5
> PORT4,PORT6,PORT10
```

SEQTBL

Sequence Control Parameter - Sequence Table

Function

Sets or queries the number of sequence table to execute.

Command

```
SEQTBL table
```

Query

```
SEQTBL?
```

Response

```
table
```

Parameter

table	Sequence table number
Range	0 to 3
Resolution	1
Default	0

Example of Use

To select the sequence table 1:

```
SEQTBL 1
SEQTBL?
> 1
```

SEQTRG

Sequence Table Parameter - Trigger

Function

Sets or queries the trigger condition for starting Sequence Measurement Mode.

Command

```
SEQTRG seg,src,slope,level,delay
```

Query

```
SEQTRG? seg
```

Response

```
src,slope,level,delay
```

level

Unit	dB
Resolution	1 dB

delay

Unit	ms
Resolution	0.001 ms

Parameters

seg	Segment number
Range	0 to 1999
src	Trigger source
FRAME	Frame
FREERUN	Free run
PWR	Input signal power
Default	FREERUN
slope	Trigger slope
RISE	Rising edge trigger
Default	RISE
level	Trigger level
Range	–40 to 0 dB
Resolution	1 dB
Suffix Code	DB (uses dB when omitted)
Default	–30 dB
delay	Delay time
Range	0 to 1000.000 ms
Resolution	0.001 ms
Suffix Code	NS, US, MS, S (uses ms when omitted)
Default	0.000 ms

Details

The trigger slope and trigger level are enabled when trigger source is set to PWR.

Example of Use

To set the trigger condition of segment 2 as follows:
Trigger source: PWR, Trigger slope: RISE, Trigger level: -30 dB, Delay time: 0

```
SEQTRG 2,PWR,RISE,-30,0
SEQTRG? 2
> PWR,RISE,-30,0.000
```

Remarks

Trigger level is defined as the level difference from the input level specified by the following commands: ILVL, SEQTRX

SEQTRX

Sequence Table Parameter - TRX Control

Function

Sets or queries the following items in the specific segment of the sequence table.

- Downlink frequency
- Output Level
- Output signal pattern
- Uplink frequency
- Input level

Command

```
SEQTRX seg,ul_freq,ref,dl_freq,level,pat
```

Query

```
SEQTRX? seg
```

Response

```
ul_freq,ref,dl_freq,level,pat
```

ul_freq, dl_freq

Unit	MHz
Resolution	0.000001 MHz

ref, level

Unit	dBm
Resolution	0.1 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
ul_freq	Uplink frequency
Range	400.000000 to 3800.000000 MHz (MU887000A/01A)
	400.000000 to 6000.000000 MHz (With MU887000A/01A-001)
	400.000000 to 6000.000000 MHz (MU887002A)
Resolution	0.000001 MHz
Suffix Code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	1950.000000 MHz
ref	Input level
Range	
MU887000A	–65.0 to +35.0 dBm (Port 1/Port 2)
	–65.0 to +25.0 dBm (Port 3/Port 4)
MU887001A	–65.0 to +35.0 dBm (Port 1 to Port 4)
MU887002A	–65.0 to +35.0 dBm (Port 1 to Port 12)
Resolution	0.1 dB
Suffix Code	DBM (uses dBm when omitted)
Default	–10.0 dBm

dl_freq	Downlink frequency
Range	400.000000 to 3800.000000 MHz (MU887000A/01A) 400.000000 to 6000.000000 MHz (With MU887000A/01A-001) 400.000000 to 6000.000000 MHz (MU887002A)
Resolution	0.000001 MHz
Suffix Code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	2140 000 000 MHz
level	Output level
Range	
MU887000A	400 MHz ≤ frequency ≤ 3800 MHz –130.0 to –10.0 dBm (Port 1/Port 2) –120.0 to 0.0 dBm (Port 3/Port 4) 3800 MHz < frequency ≤ 6000 MHz –130.0 to –18.0 dBm (Port 1/Port 2) –120.0 to –8.0 dBm (Port 3/Port 4)
MU887001A	400 MHz ≤ frequency ≤ 3800 MHz –130.0 to –10.0 dBm (Port 1 to Port 4) 3800 MHz < frequency ≤ 6000 MHz –130.0 to –18.0 dBm (Port 1 to Port 4)
MU887002A	400 MHz < frequency ≤ 6000 MHz –130.0 to 0.0 dBm (Port 1 to Port 12)
Resolution	0.1 dB
Suffix Code	DBM (used dBm when omitted)
Default	–60.0 dBm
pat	Waveform pattern
PAT1 to PATn	Pattern number (n: waveform information file group range)
CW	Modulation turned OFF
OFF	Output level turned OFF
NC	Waveform pattern not configured in this segment (holds currently configured waveform pattern)
Default	CW

Details

For MU887000A, the setting range varies with the input/output test port setting.
If cable loss correction is set to ON, the setting range of the input level is the range of values with added cable loss and the setting range of the output level is the range of values with subtracted cable loss.
If the cable loss is 5 dB and frequency ≤ 3800 MHz, the input and output levels are as follows:

MU887000A Port 1/Port 2 Input level	–60.0 to +40 dBm
MU887000A Port 1/Port 2 Output level	–135.0 to –15.0 dBm

In this case, if the output level is set to –10.0 dBm, an out-of-parameter setting range error occurs. (The response to SYSERR? returns 220, Parameter error).
Whether an out-of-parameter setting range error has occurred is determined during execution of the following commands:

SEQCTRL, SNGLS, SEQEXECTX

A measurement execution error occurs when an out-of-range error occurs.

SEQERR? is used to query the details of errors.

The pattern number is the same as the group number. Refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

Example of Use

To set segment 0 as follows.

Uplink frequency set to 1950.0 MHz, input level to –10.0 dBm, downlink frequency to 2140.0 MHz, output level to –60.0 dBm, and no modulation:

```
SEQTRX 0,1950.000000, -10.0,2140.000000,-60.0,CW
SEQTRX? 0
> 1950.000000,-10.0,2140.000000,-60.0,CW
```

Remarks

The group range is the selected waveform file.

For details of the waveform pattern, refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

SEQTX

Sequence Table Parameter - Uplink Frequency, Input Level

Function

Sets or queries uplink frequency and input level of segments in sequence table.

Command

```
SEQTX seg,ul_freq,ref
```

Query

```
SEQTX? seg
```

Response

```
ul_freq,ref
```

Parameter

seg	Segment number
Range	0 to 1999
Resolution	1
ul_freq	Rx frequency (uplink)
Range	
	400.000000 to 3800.000000 MHz (MU887000A/01A)
	400.000000 to 6000.000000 MHz (With MU887000A/01A-001)
	400.000000 to 6000.000000 MHz (MU887002A)
Resolution	0.000001 MHz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	1950.000000 MHz
ref	Input level
Range	
MU887000A	–65.0 to +35.0 dBm (Port 1/Port 2)
	–65.0 to +25.0 dBm (Port 3/Port 4)
MU887001A	–65.0 to +35.0 dBm (Port 1 to Port 4)
MU887002A	–65.0 to +35.0 dBm (Port 1 to Port 12)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–10.0 dBm

Details

This command sets only the uplink frequency and input level among the parameters that are set by SEQTRX.
For MU887000A, the setting range varies with the input test port setting.
If cable loss correction is set to ON, the setting range of the input level is the range of values with added cable loss.
If the cable loss is 5 dB, the MU887000A Port 1/Port 2 setting range is –60.0 to +40.0 dBm.
Whether an out-of-parameter setting range error has occurred is determined during execution of the following commands:
SEQCTRL, SNGLS, SEQEXECTX

Example of Use

To set the parameters for segment 1 as follows:
Uplink frequency: 1950 MHz, Input level: -10.0 dBm

```
SEQTX 1,1950,-10.0
SEQTX? 1
> 1950.000000,-10.0
```

SEQTX_SCC1

Sequence Table Parameter - Uplink Frequency, Input Level for SCC-1

Function

Sets and queries the uplink signal frequency and input level for SCC-1 in the segment of the sequence table.

Command

```
SEQTX_SCC1 seg,ul_freq,ref
```

Query

```
SEQTX_SCC1? seg
```

Response

```
ul_freq,ref
```

ul_freq

Unit	MHz
Resolution	0.000001 MHz

ref

Unit	dBm
Resolution	0.1 dB

Parameter

seg	Segment number
Range	0 to 1999
Resolution	1
ul_freq	Rx frequency (uplink) for SCC-1
Range	400.000000 to 3800.000000 MHz (MU887000A/01A) 400.000000 to 6000.000000 MHz (With MU887000A/01A-001) 400.000000 to 6000.000000 MHz (MU887002A)
Resolution	0.000001 MHz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	1950.000000 MHz
ref	Input level
Range	
MU887000A	–65.0 to +35.0 dBm (Port 1/Port 2) –65.0 to +25.0 dBm (Port 3/Port 4)
MU887001A	–65.0 to +35.0 dBm (Port 1 to Port 4)
MU887002A	–65.0 to +35.0 dBm (Port 1 to Port 12)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–10.0 dBm

Details

For MU887000A, the setting range varies with the input test port setting.
If cable loss correction is set to ON, the setting range of the input level is the range of values

with added cable loss.
If the cable loss is 5 dB, the MU887000A Port 1/Port 2 setting range is –60.0 to +40.0 dBm.
Whether an out-of-parameter setting range error has occurred is determined during execution of the following commands:
SEQCTRL, SNGLS, SEQEXECTX

Example of Use

To set the parameters for SCC-1 for segment 1 as follows:
Uplink frequency: 1950 MHz, Input level: -10.0 dBm

```
SEQTX_SCC1 1,1950,-10.0
SEQTX_SCC1? 1
> 1950.000000,-10.0
```

TRGTOUT

Trigger Timeout

Function

Sets or queries the trigger timeout.

Command

```
TRGTOUT time
```

Query

```
TRGTOUT?
```

Response

`time`

Unit	s
Resolution	1 s

Parameter

time	Timeout time
Range	1 to 60 s
Resolution	1 s
Suffix code	NS, US, MS, S (uses s when omitted)
Initial Value	10 s

Example of Use

To set the Trigger timeout time to 10 seconds:

```
TRGTOUT 10
TRGTOUT?
> 10
```

TXFREQ

Uplink Frequency

Function

Sets or queries the uplink frequency.

This command has the same function as ULFREQ.

Command

```
TXFREQ ul_freq
```

Query

```
TXFREQ?
```

Response

```
ul_freq
```

Unit	Hz
Resolution	1 Hz

Parameter

ul_freq	Uplink frequency
Range	400 000 000 to 3800 000 000 Hz (MU887000A/01A) 400 000 000 to 6000 000 000 Hz (With MU887000A/01A-001) 400 000 000 to 6000 000 000 Hz (MU887002A)
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	1950 000 000 Hz

Details

This sets the Tx frequency for the mobile station.

Updating this Uplink frequency does not affect the Uplink Channel parameters.

Example of Use

To set the uplink frequency to 1950 MHz:

```
TXFREQ 1950MHZ
TXFREQ?
>1950000000
```

ULFREQ

Uplink Frequency

Function

Sets or queries the uplink frequency.

Command

```
ULFREQ ul_freq
```

Query

```
ULFREQ?
```

Response

```
ul_fleq
```

Unit	Hz
Resolution	1 Hz

Parameter

ul_freq	Uplink Frequency
Range	400 000 000 to 3800 000 000 Hz (MU887000A/01A) 400 000 000 to 6000 000 000 Hz (With MU887000A/01A-001) 400 000 000 to 6000 000 000 Hz (MU887002A)
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	1950 000 000 Hz

Details

This sets the Tx frequency for the mobile station.

Changing the uplink frequency setting does not change the uplink channel setting.

Example of Use

To set the uplink frequency to 1950 MHz:

```
ULFREQ 1950MHZ
ULFREQ?
>1950000000
```

Chapter 6 Performance Test

This chapter explains how to setup the measuring instruments required for the MX887013A LTE FDD and MX887014A LTE TDD performance tests as well as the test procedures.

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6.1 Outline

The performance tests are performed to assure that the MU887000A performance does not deteriorate. Test the performance of the MU887000A at the initial acceptance inspection, at periodic inspections, and after repairs. Test important items periodically to assure the performance. This chapter explains the following test items.

- Output EVM
- Tx Power measurement accuracy (CW)
- Tx Power measurement linearity
- Frequency/modulation measurement — Carrier frequency accuracy, Residual EVM
- In-Band Emission measurement
- Adjacent Channel Leakage Power Ratio measurement (ACLR)

We recommend testing the performance periodically once or twice a year.

If the test results do not meet the specifications, contact an Anritsu Service and Sales office. Contact information can be found on the last page of the printed version of this manual, and is available in a separate file on the PDF version.

⚠ CAUTION

Warm-up the MU887000A and the required measuring instruments for at least 30 minutes (except when specified otherwise) to stabilize them. To achieve the highest accuracy, the test should be performed at room temperature using a power supply with as little voltage fluctuation as possible in an environment free from noise, vibration, dust and humidity.

6.2 Instruments for Testing Performance

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

Table 6.2-1 Measuring Instruments for Performance Tests

Test Item	Required Specifications*	Recommendation
Output EVM	Signal Analyzer ● Frequency Range: MU887000A/01A: 400 to 3800 MHz With MU887000A/01A-001: 400 to 6000 MHz MU887002A: 400 to 6000 MHz ● Frequency Resolution: 1 Hz ● Level Range: –130 to +30 dBm ● Level Accuracy: ±0.05 dB ● External Reference Input: (10 MHz)	Signal Analyzer (MS269xA or MS2830A) Upper Frequency 6 GHz (MS2830A-041) Preamplifier (MS269xA-008 or MS2830A-008) LTE FDD Measurement Software (MX269020A) LTE TDD Measurement Software (MX269022A)
Tx Power Measurements ● Measurement Accuracy (CW) ● Linearity	Signal Generator ● Frequency Range: MU887000A/01A: 600 to 3800 MHz With MU887000A/01A-001: 600 to 4200 MHz MU887002A: 600 to 4200 MHz ● Frequency Resolution: 1 Hz ● Output Level Range Unmodulated: –110 to +17 dBm Resolution: 0.01 dB	Vector Signal Generator (MG3710E) Upper Frequency 6 GHz (MG3710E-036)
	Signal Analyzer Same as above	Same as above
	Power Meter ● Frequency Range: MU887000A/01A: 600 to 3800 MHz With MU887000A/01A-001: 600 to 4200 MHz MU887002A: 600 to 4200 MHz ● Level Accuracy: ±0.02 dB ● Level Resolution: 0.01 dB	Power Meter (ML2437A)
	Power Sensor ● Frequency Range: MU887000A/01A: 600 to 3800 MHz With MU887000A/01A-001: 600 to 4200 MHz MU887002A: 600 to 4200 MHz ● Level Range: –40 to +20 dBm ● Input Connector: N type	Power Sensor (MA2442D)

*: The performance covers the test item measurement range.

Table 6.2-1 Measuring Instruments for Performance Tests (Cont'd)

Test Item	Required Specifications*	Recommendation
Frequency/Modulation Measurements ● 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: MU887000A/01A: 600 to 3800 MHz With MU887000A/01A-001: 600 to 4200 MHz MU887002A: 600 to 4200 MHz ● Level Range: –30 to +20 dBm ● Input Connector: N type	Power Sensor (MA24002A)
Common	Attenuator (for MU887000A/01A)	3-dB Attenuator (AT-103)
	Attenuator (for MU887002A)	3-dB Attenuator (BW-N3W5+) 6-dB Attenuator (BW-N6W5+)

6.3 Calibration (MX887013A/14A)

This section explains how to obtain the calibration values of the instrument used for the performance tests.

6.3.1 SG Calibration (CW)

This section explains how to obtain the calibration values of the CW (unmodulated) signal source.

(1) Measuring instruments

- Vector signal generator: MG3710E
- Power Meter: ML2437A
- Power Sensor: MA2442D
- Attenuator:

For MU887000A/01A	3 dB:	AT-103	2 sets
For MU887002A	3 dB:	BW-N3W5+	
	6 dB:	BW-N6W5+	

(2) Setup

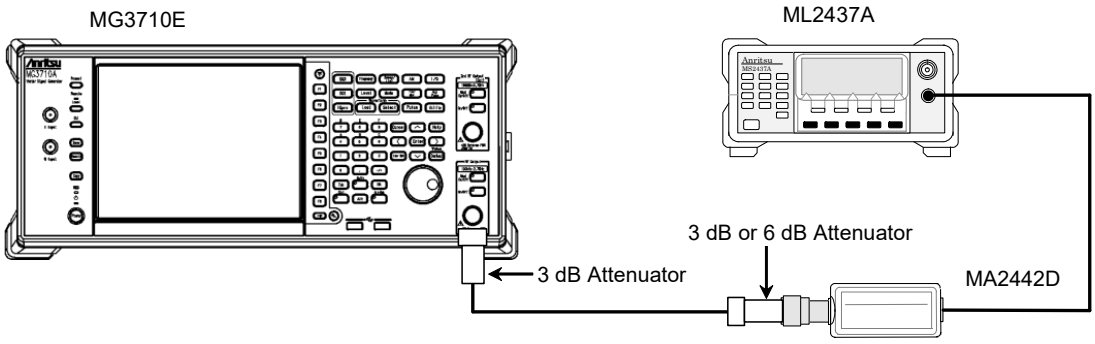


Figure 6.3.1-1 SG Calibration (CW)

(3) Test Procedure

1. Setup the instruments as shown in Figure 6.3.1-1.
2. Set the vector signal generator (SG) as follows:

   Modulation: OFF
   Output frequency: 599.99 MHz (600 MHz –10 kHz)
   Output level: MU887000A/01A: 6 dBm (0 dBm + 6 dB)
   MU887002A: 9 dBm (0 dBm + 9 dB)
3. Adjust the SG output level so that the level measurement value of the power meter is 0 dBm, and obtain the calibration values for the setting frequency and setting level.
4. Set frequencies in accordance with the table in 6.3.4, “Measurement Frequencies”, and obtain the calibration values of each frequency.
5. Replace 0 dBm with –10 dBm and –20 dBm at step 2, repeat steps 2 to 4 respectively, and obtain the calibration values.

6.3.2 SG Calibration (MOD)

This section explains how to obtain the calibration values of the modulation wave signal source.

(1) Measuring instruments

- Vector signal generator: MG3710E
- Power Meter: ML2437A
- Power sensor: MA24002A
- Attenuator:

For MU887000A/01A	3 dB:	AT-103	2 sets
For MU887002A	3 dB:	BW-N3W5+	
	6 dB:	BW-N6W5+	

(2) Setup

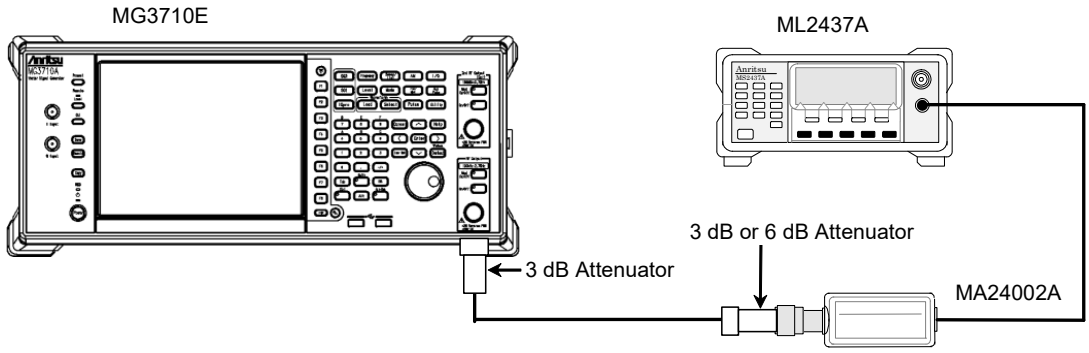


Figure 6.3.2-1 SG Calibration (MOD)

(3) Test procedure

1. Setup the instruments as shown in Figure 6.3.2-1.
2. Set the vector signal generator (SG) as follows:

Modulation:	ON
Modulation wave:	Waveform pattern based on the settings in 6.3.5, "Evaluation Signals"
Output frequency:	599.99 MHz (600 MHz –10 kHz)
Output level:	MU887000A/01A: –4 dBm (–10 dBm + 6 dB)
	MU887002A: –1 dBm (–10 dBm + 9 dB)

3. Adjust the SG output level so that the level measurement value of the power meter is –10 dBm, and obtain the calibration values for the setting frequency and setting level.
4. Set frequencies in accordance with the table in 6.3.4, "Measurement Frequencies", and obtain the calibration values of each frequency.

6.3.3 Linearity Calibration

This section explains how to obtain the calibration values for linearity.

(1) Measuring instruments

- Vector signal generator: MG3710E
- Signal Analyzer: MS269xA or MS2830A
- Attenuator:

For MU887000A/01A	3 dB:	AT-103	2 sets
For MU887002A	3 dB:	BW-N3W5+	
	6 dB:	BW-N6W5+	

(2) Setup

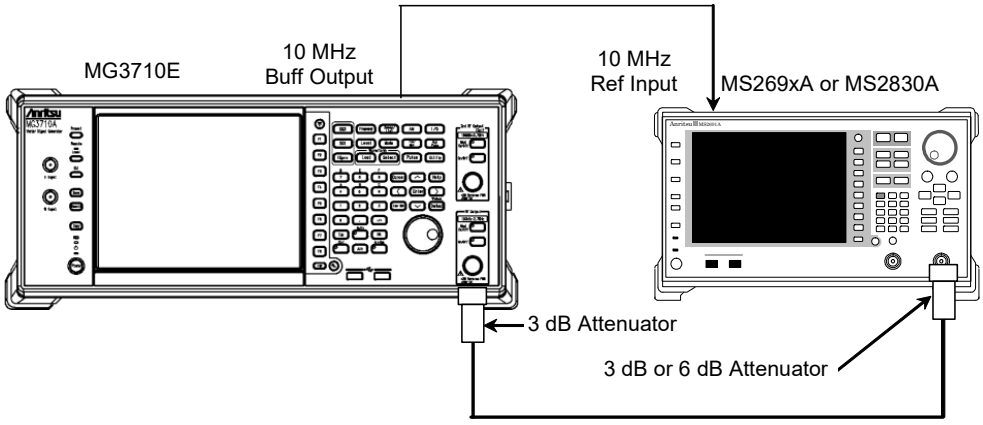


Figure 6.3.3-1 Linearity Calibration

(3) Test procedure

1. Setup the instruments as shown in Figure 6.3.3-1.
2. Set the signal analyzer (SA) as shown in #1 of Table 6.3.3-1 “Signal Analyzer Settings”.
3. Set the vector signal generator (SG) as follows:

   Modulation: OFF

   Output frequency: 599.99 MHz (600 MHz –10 kHz)

   Output level: Setting level when the level measurement value of the power meter is 0 dBm in the SG calibration (Section 6.3.1)
4. Connect the output of the SG to the SA and measure the SG output level with the SA (A dBm).
5. Decrease the SG output level in 10-dB steps down to 40 dB and measure the level at each step (B dBm). (The calibration value is B – A.)

6. Set frequencies in accordance with the table in 6.3.4, "Measurement Frequencies", and obtain the calibration values of each frequency.
7. Set the SA as shown in #2 of Table 6.3.3-1 "Signal Analyzer Settings".
8. Replace 0 dBm with –20 dBm at step 3, and repeat steps 3 to 6.

Table 6.3.3-1 Signal Analyzer Settings

	MS269xA or MS2830A						
	Application Switch	RBW	Zone Width	Time Length	ATT	Preamp	Ref Lev
#1	Signal Analyzer	100 Hz	781.3 Hz	AUTO	20 dB	OFF	0 dBm
#2	Signal Analyzer	100 Hz	781.3 Hz	AUTO	0 dB	OFF	–20 dBm

6.3.4 Measurement Frequencies

Table 6.3.4-1 lists the frequencies set in the performance tests for the calibration and calibrated test system. The 4000 MHz and more frequency is measured only when MU887000A/01A-001 is installed or MU887002A.

Table 6.3.4-1 Measurement Point and Frequency

Meas. Point	Frequency (MHz)	Meas. Point	Frequency (MHz)
1	600	8	2200
2	700	9	2700
3	880	10	3400
4	940	11	3600
5	1000	12	3800
6	1800	13	4000
7	2000	14	4200

Note:

Add an offset of –10 kHz to the frequency in the above table and set the frequency as SG output frequency, except for the measurement described in section 6.4.4, 6.4.5 and 6.4.6.

6.3.5 Evaluation Signals

This section explains the modulation wave signal used for the performance test. Set the vector signal generator based on the following contents when performing the performance test.

When MU887000A/01A-001 is installed or MU887002A, the option for MG3710E-036 upper limit frequency 6 GHz is required.

Summary of the evaluation signal

The following tables listed in 3GPP TS 36.521-1 are referenced.

FDD:

A.2.2 Reference measurement channels for FDD

Table A.2.2.1.1-1: Reference Channels for QPSK with full RB allocation

Channel bandwidth: 20 MHz

Table A.2.2.2.1-1: Reference Channels for QPSK with partial RB allocation

Channel bandwidth: 20 MHz

Allocated RBs: 18

TDD:

A.2.3 Reference measurement channels for TDD

Table A.2.3.1.1-1: Reference Channels for QPSK with full RB allocation

Channel bandwidth: 20 MHz

Table A.2.3.2.1-1: Reference Channels for QPSK with partial RB allocation

Channel bandwidth: 20 MHz

Allocated RBs: 18

To send the evaluation signal with the SG, generate the following waveform pattern with LTE IQproducer™ MX370108A.

Table 6.3.5-1 LTE IQproducer Parameter (FDD)

Parameter	Setting Values
Cell ID	0
Bandwidth	20 MHz
DL/UL	Uplink
Cyclic Prefix	Normal
Roll Off Length	70 (ACLR) 4 (Others)
Filter Type	Ideal (ACLR) None (Others)
Data Transmission / Random Access	Data Transmission
Subframe #0 to 9	–
Number of PUCCHs	0
Number of PUSCHs	1
PUSCH #0 Data Status	Enable
PUSCH #0 Modulation Scheme	QPSK
PUSCH #0 Data Type	PN9
PUSCH #0 Start Number of RB	0
PUSCH #0 Number of RBs	18 (In-Band Emission) 100 (Others)
PUSCH #0 Power Boosting	0 dB
Demodulation RS for PUSCH	–
Data Type	Base Sequence
Group Hopping	Enable
Delta SS	0
Base Sequence Number v	0
Cyclic Shift for 1st	In the order of number starting from Subframe #0; 4,2,10,9,0,2,2,4,8,2
Cyclic Shift for 2nd	In the order of number starting from Subframe #0; 10,0,2,8,2,2,2,10,2,2

Table 6.3.5-2 LTE IQproducer Parameter (TDD)

Parameter	Setting Values
Cell ID	0
Bandwidth	20 MHz
DL/UL	Uplink
Uplink-downlink Configuration	1
Cyclic Prefix	Normal
Roll Off Length	70 (ACLR) 0 (Others)
Filter Type	Ideal (ACLR) None (Others)
Subframe #1, #6	–
Number of PUCCHs	0
Number of PUSCHs	0
Subframe #2, #3, #7, #8	–
Number of PUCCHs	0
Number of PUSCHs	1
PUSCH #0 Data Status	Enable
PUSCH #0 Modulation Scheme	QPSK
PUSCH #0 Data Type	PN9
PUSCH #0 Start Number of RB	0
PUSCH #0 Number of RBs	18 (In-Band Emission) 100 (Others)
PUSCH #0 Power Boosting	0 dB
Demodulation RS for PUSCH	–
Group Hopping	Enable
Delta SS	0
Base Sequence Number v	0
Cyclic Shift for 1st	In order of Subframe #2, #3, #7, and #8 10,9,4,8
Cyclic Shift for 2nd	In order of Subframe #2, #3, #7, and #8 2,8,10,2

6.4 Performance Tests (MX887013A/14A)

Common test items

The following list shows the common settings for each measurement at the MU887000A.

Application:	Cellular
Standard:	LTE
Frame Structure:	FDD (MX887013A)
	TDD (MX887014A)
Channel Coding:	RMC
Channel Bandwidth:	20 MHz
RMC Configuration:	PUSCH
Uplink RMC Modulation:	QPSK
Uplink RMC RB Number:	100
Uplink RMC Start RB:	0
OBW Ratio:	99.0%
Long Span Code Search:	ON

6.4.1 Measuring Output EVM

This test measures the output signal EVM.

(1) Test specifications

The specifications to be tested are explained in the Waveform File for Cellular Application Operation Manual

EVM	Remarks	
2%rms	400 MHz ≤ f_0 ≤ 2700 MHz	(MU887000A/01A)
	400 MHz ≤ f_0 – BW/2, f_0 ≤ 2700 MHz	(MU887002A)
3%rms	3400 MHz ≤ f_0 ≤ 3800 MHz	
4%rms	3800 MHz < f_0 ≤ 6000 MHz	(MU887000A/01A)
	3800 MHz < f_0, f_0 + BW/2 ≤ 6000 MHz	(MU887002A)

BW: Signal bandwidth, f_0: Center frequency

(2) Measuring instruments

- Signal analyzer: MS269xA or MS2830A

(3) Setup

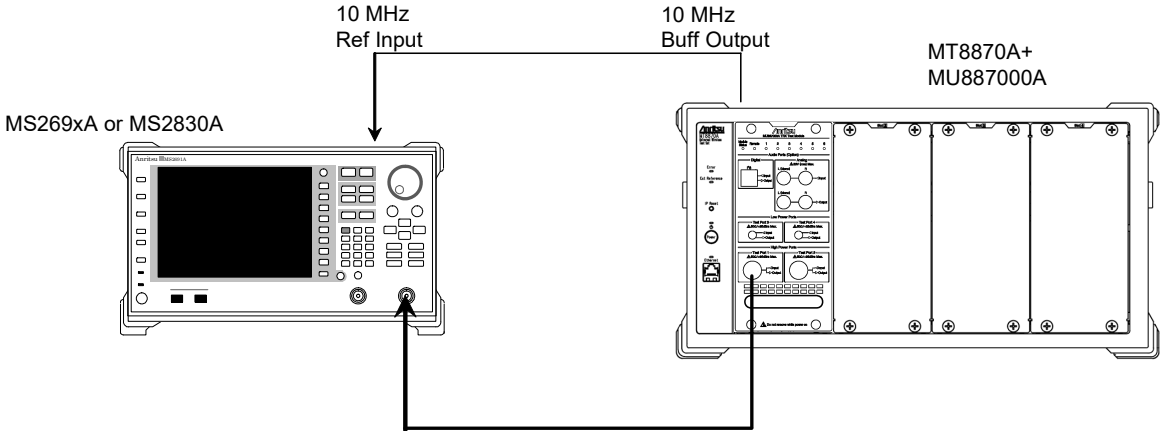


Figure 6.4.1-1 Test System for Output EVM

(4) Test procedure

This test is measured at the following Test Ports.
When testing other than Test Port 1, read "Test Port 1" in the following procedure as the port to be tested.

MU887000A: Test Port 1, 3
MU887001A: Test Port 1, 3
MU887002A: TRX 1: Test Port 1, 2, TRX 2: Test Port 1, 2

1. Setup the instruments as shown in Figure 6.4.1-1.
2. Select the signal analyzer (SA) measurement software and set the following:

   Measurement software: MX269020A (LTE FDD)
   MX269022A (LTE TDD)
   Input level: –15 dBm
   Level offset: 0 dB
   Trigger: Free run

3. Select the MU887000A application software.
4. Set the MU887000A input and output levels.

   MU887000A
   Test Port 1 Output Level: –12.9 dBm (Freq. ≤ 3800 MHz)
   Output Level: –20.9 dBm (3800 MHz < Freq.)
   Input Level: +35 dBm
   Test Port 3 Output Level: –2.9 dBm (Freq. ≤ 3800 MHz)
   Output Level: –10.9 dBm (3800 MHz < Freq.)
   Input Level: +25 dBm
   MU887001A
   Test Port 1/3 Output Level: –12.9 dBm (Freq. ≤ 3800 MHz)
   Output Level: –20.9 dBm (3800 MHz < Freq.)
   Input Level: +35 dBm
   MU887002A
   TRX 1/2 Test Port 1/2
   Output Level: –7.0 dBm (Freq. ≤ 3800 MHz)
   Output Level: –10.0 dBm (3800 MHz < Freq.)
   Input Level: +35 dBm

5. Set the MU887000A output frequency and output the test pattern.

   Download Package Select: MV887013A_LTEFDD_0003
   MV887014A_LTETDD_0005

   Downlink Pattern Name: Group No.1

   Connect Port: MU887000A Test Port 1 or 3
   MU887001A Test Port 1 or 3
   MU887002A TRX 1/2 Test Port 1 or 2

   Output level ON/OFF: ON

   Downlink frequency: MU887000A/01A 400 MHz
   MU887002A 410 MHz

6. Set the same SA frequency as the frequency set at step 5, and measure EVM.

7. Change the MU887000A frequency to 900, 2000, 2700, 3400, and 3800 MHz, and repeat steps 5 to 6 respectively.
   When MU887000A/01A-001 is installed, also repeat the steps for the frequencies 4000, 4500, 5000, 5500, and 6000 MHz.
   When MU887002A, also repeat the steps for the frequencies 4000, 4500, 5000, 5500, and 5990 MHz.

8. Change the Test Port, and repeat steps 4 to 7 respectively.

6.4.2 Tx Power Measurement Accuracy (CW)

This test is related to the accuracy of Tx power measurements.

(1) Test specifications

MU887000A Test Port 1/2
MU887001A Test Port 1 to 4
(600 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 3800 MHz)

Measurement Accuracy	Input Level	Temperature
±0.5 dB	–20 dBm ≤, ≤ +35 dBm	10 to 40°C
±0.7 dB	–50 dBm ≤, < –20 dBm	10 to 40°C
±0.9 dB	–60 dBm ≤, < –50 dBm	10 to 40°C

MU887002A TRX 1/2 Test Port 1 to 12
(600 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 3800 MHz)

Measurement Accuracy	Input Level	Temperature
±0.5 dB	–20 dBm ≤, ≤ +35 dBm	20 to 30°C
±0.7 dB	–50 dBm ≤, < –20 dBm	20 to 30°C
±0.9 dB	–60 dBm ≤, < –50 dBm	20 to 30°C

MU887000A Test Port 1/2
MU887001A Test Port 1 to 4
MU887002A TRX 1/2 Test Port 1 to 12
(3800 MHz < Frequency ≤ 4200 MHz)

Measurement Accuracy	Input Level	Temperature
±0.7 dB	–20 dBm ≤, ≤ +35 dBm	20 to 30°C
±0.9 dB	–50 dBm ≤, < –20 dBm	20 to 30°C
±1.1 dB	–60 dBm ≤, < –50 dBm	20 to 30°C

MU887000A Test Port 3/4
(600 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 3800 MHz)

Measurement Accuracy	Input Level	Temperature
±0.7 dB	–20 dBm ≤, ≤ +25 dBm	10 to 40°C
±0.9 dB	–50 dBm ≤, < –20 dBm	10 to 40°C
±1.1 dB	–60 dBm ≤, < –50 dBm	10 to 40°C

MU887000A Test Port 3/4 (3800 MHz < Frequency ≤ 4200 MHz)

Measurement Accuracy	Input Level	Temperature
±0.7 dB	–20 dBm ≤, ≤ +25 dBm	20 to 30°C
±0.9 dB	–50 dBm ≤, < –20 dBm	20 to 30°C
±1.1 dB	–60 dBm ≤, < –50 dBm	20 to 30°C

(2) Measuring instruments

- Vector signal generator: MG3710E
- Attenuator:

For MU887000A/01A	3 dB:	AT-103	2 sets
For MU887002A	3 dB:	BW-N3W5+	
	6 dB:	BW-N6W5+	

(3) Setup

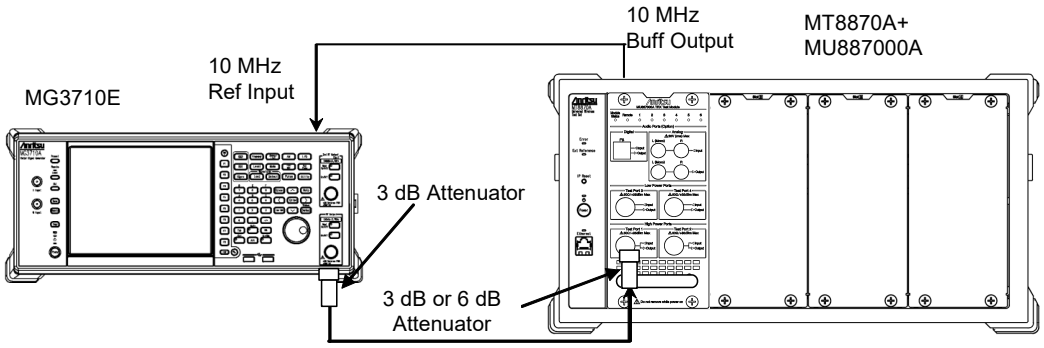


Figure 6.4.2-1 Setup for Measuring Amplitude Measurement Accuracy

(4) Test procedure

This test is measured at the following Test Ports.
When testing other than Test Port 1, read "Test Port 1" in the following procedure as the port to be tested.
MU887000A: Test Port 1, 2, 3, 4
MU887001A: Test Port 1, 2, 3, 4
MU887002A: TRX 1: Test Port 1, 2, TRX 2: Test Port 1, 2

1. Setup the instruments as shown in Figure 6.4.2-1.
2. Set the MU887000A as follows:

Connect port:	Test Port 1
Output level ON/OFF:	OFF
Input level:	–10 dBm
Uplink frequency:	600 MHz
Turn Off All measurement:	OFF
Tx Power measurement:	ON, 1 time

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

Modulation:	OFF
Output frequency:	599.99 MHz
Output level:	–10 dBm (This output level reflects the calibration value for item 6.3.1.)

4. Change the frequency of the MU887000A and SG according to Table 6.3.4 “Measurement Frequencies” and measure the Tx power.

   Tx Power Measurement Results: Average value

5. Change the SG output level and MU887000A input level each to –50, and –60 dBm and repeat steps 2 to 4 over and measure the Tx power. (This output level reflects the calibration value for item 6.3.3.)

6. Change the Connect port setting for the connection with the MU887000A successively, and repeat steps 2 to 5 over.

6.4.3 Tx Power Measurement Linearity

This test is related to the linearity of Tx power measurements.

(1) Test specifications

(600 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 4200 MHz)

Linearity	Input Level, Range
±0.2 dB	–50 dBm ≤, –40 to 0 dB
±0.4 dB	–60 dBm ≤, –40 to 0 dB

(2) Measuring instruments

- Vector signal generator: MG3710E
- Attenuator:

For MU887000A/01A	3 dB:	AT-103	2 sets
For MU887002A	3 dB:	BW-N3W5+	
	6 dB:	BW-N6W5+	

(3) Setup

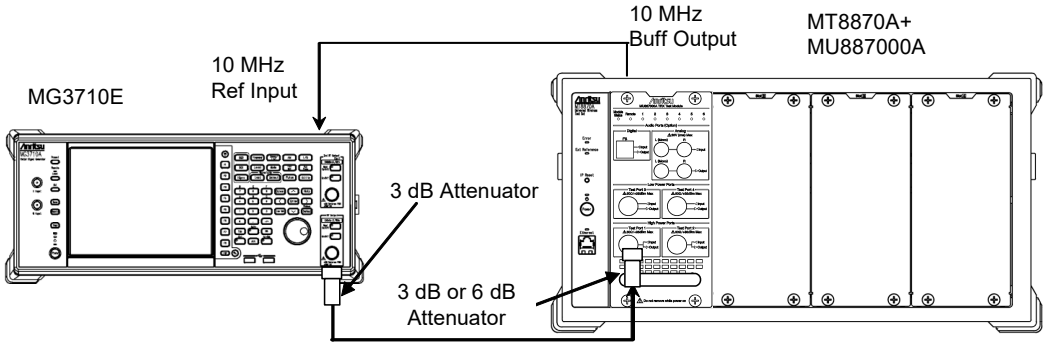


Figure 6.4.3-1 Setup for Measuring Tx Power Measurement Linearity

(4) Test procedure

This test is measured at the following Test Ports.
When testing other than Test Port 1, read "Test Port 1" in the following procedure as the port to be tested.
MU887000A: Test Port 1, 2, 3, 4
MU887001A: Test Port 1, 2, 3, 4
MU887002A: TRX 1: Test Port 1, 2, TRX 2: Test Port 1, 2

1. Setup the instruments as shown in Figure 6.4.3-1.
2. Set the MU887000A as follows:

Connect port:	Test Port 1
Output level ON/OFF:	OFF
Input level:	0 dBm
Uplink frequency:	600 MHz
Turn Off All measurement:	OFF
Tx Power measurement:	ON, 1 time

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

Modulation:	OFF
Output frequency:	599.99 MHz
Output level:	0 dBm (This output level reflects the calibration value for item 6.3.1.)

4. Measure the Tx Power and make this value the reference level (REF dBm).

   Tx Power Measurement Results: Average value

5. Set the SG output level to –10 dB and measure the Tx power, making this value D dBm.
6. Calculate the difference between REF dBm and D dBm using the following equation.

   Linearity error = D – REF – (calibration value of section 6.3.3)

7. Similarly, change the SG output level successively from –20 dB to –40 dB in –10 dB steps and measure the Tx power. Calculate the linearity as described in step 6 and check that the results meet the specifications.
8. Change the MU887000A and SG frequencies according to Table 6.3.4 "Measurement Frequencies" and repeat steps 2 to 7 over.
9. Change the SG output level and the MU887000A input level to –20 dBm and repeat steps 2 to 8 over to measure the Tx Power. (This output level reflects the calibration value for item 6.3.1.)
10. Change the Connect port setting for the connection with the MU887000A successively, and repeat steps 2 to 9 over.

6.4.4 Frequency/Modulation

This test is related to the following modulation analyses.

- Carrier frequency accuracy
- Residual EVM

(1) Test specifications

	Measurement Accuracy
Carrier frequency accuracy	±(Set frequency × Reference oscillator accuracy + 15 Hz)
Residual EVM	≤ 2.5% (rms)

MU887000A Test Port 1/2,
MU887001A Test Port 1 to 4
MU887002A TRX 1/2 Test Port 1 to 12
Input Level range: –40 dBm ≤, ≤ +35 dBm
MU887000A Test Port 3/4
Input Level range: –40 dBm ≤, ≤ +25 dBm

(2) Measuring instruments

- Vector signal generator: MG3710E
- Attenuator:

For MU887000A/01A	3 dB:	AT-103	2 sets
For MU887002A	3 dB:	BW-N3W5+	
	6 dB:	BW-N6W5+	

(3) Setup

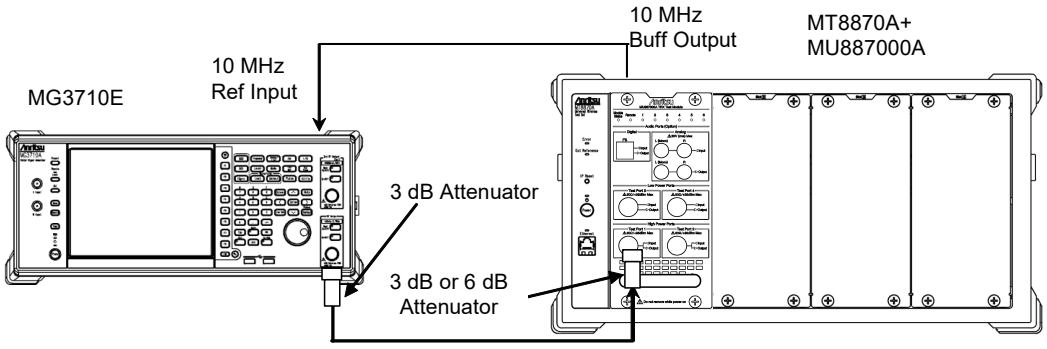


Figure 6.4.4-1 Setup for Measuring Frequency/Modulation

(4) Test procedure

This test is measured at the following Test Ports.
When testing other than Test Port 1, read "Test Port 1" in the following procedure as the port to be tested.
MU887000A: Test Port 1, 2, 3, 4
MU887001A: Test Port 1, 2, 3, 4
MU887002A: TRX 1: Test Port 1, 2, TRX 2: Test Port 1, 2

1 Setup the instruments as shown in Figure 6.4.4-1.

2. Set the MU887000A as follows:

Connect port:	Test Port 1
Output level ON/OFF:	OFF
Input level:	–30 dBm
Uplink frequency:	600 MHz
Turn Off All measurement:	OFF
Modulation Analysis measurement:	ON, 20 times

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

Modulation:	ON
Modulation wave:	Waveform pattern based on the settings in 6.3.5, "Evaluation Signals"
Output frequency:	600 MHz
Output level:	–30 dBm (This output level reflects the calibration value for item 6.3.2.)

4. Measure the frequency error and EVM.

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

5. Change the MU887000A and SG frequencies according to 6.3.4 "Measurement Frequencies" and repeat steps 2 to 4 over.

6. Change the SG output level and the MU887000A input level to –40 dBm and measure by repeating steps 2 to 5 over. (This output level reflects the calibration value for item 6.3.2.)

7. Change the Connect port setting for the connection with the MU887000A successively, and repeat steps 2 to 6 over.

6.4.5 In-band Emissions

This test is related to in-band emissions.

(1) Test specifications

(600 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 4200 MHz)

In-Band Emissions	≤ –40 dBc

Input level: ≥ –10 dBm

Allocated RB ≤ 18

(2) Measuring instruments

- Vector signal generator: MG3710E
- Attenuator:

For MU887000A/01A 3 dB: AT-103 2 sets

For MU887002A 3 dB: BW-N3W5+

6 dB: BW-N6W5+

(3) Setup

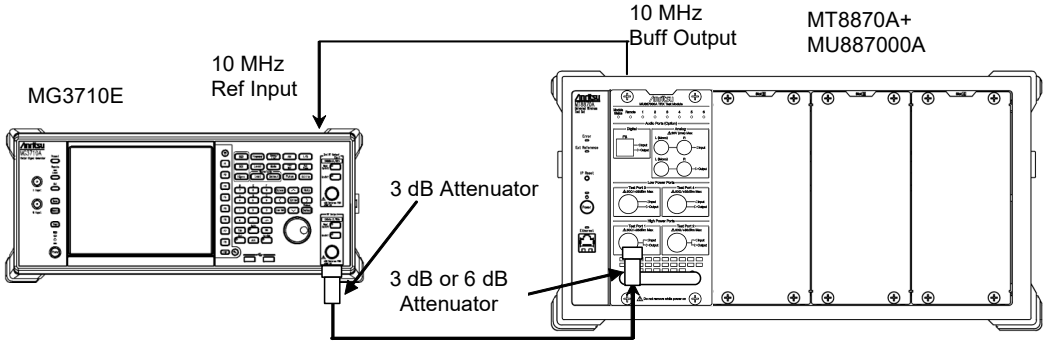


Figure 6.4.5-1 In-Band Emissions Measurement Setup

(4) Test procedure

This test is measured at the following Test Ports.
When testing other than Test Port 1, read "Test Port 1" in the following procedure as the port to be tested.
MU887000A: Test Port 1, 2, 3, 4
MU887001A: Test Port 1, 2, 3, 4
MU887002A: TRX 1: Test Port 1, 2, TRX 2: Test Port 1, 2

1. Setup the instruments as shown in Figure 6.4.5-1.
2. Set the MU887000A as follows:

Connect port:	Test Port 1
Output level ON/OFF:	OFF
Input level:	–10 dBm
Uplink frequency:	600 MHz
UL RMC RB number:	18
Turn Off All measurement:	OFF
Modulation Analysis measurement:	ON, 20 times

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

Modulation:	ON
Modulation wave:	Waveform pattern based on the settings in 6.3.5, "Evaluation Signals"
Output frequency:	600 MHz
Output level:	–10 dBm (This output level reflects the calibration value for item 6.3.2.)

4. Measure the in-band emissions and read the following value:

   In-band emissions (General) Result: Max value

5. Change the MU887000A and SG frequencies according to 6.3.4 "Measurement Frequencies" and repeat steps 2 to 4 over.
6. Change the Connect port setting for the connection with the MU887000A successively, and repeat steps 2 to 5 over.

6.4.6 Adjacent Channel Leakage Power Ratio (ACLR)

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

(1) Test specifications

(600 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 4200 MHz)

Adjacent Channel Leakage Power Ratio	Measurement Point
≥ 45 dB	E-UTRA ALCR1
≥ 50 dB	UTRA ALCR1
≥ 55 dB	UTRA ALCR2

MU887000A Test Port 1/2,
MU887001A Test Port 1 to 4
Input Level range: –10 dBm ≤, ≤ +35 dBm
MU887002A TRX 1/2 Test Port 1 to 12
600 MHz ≤ frequency ≤ 2700 MHz
Input Level range: –10 dBm ≤, ≤ +35 dBm
3400 MHz ≤ frequency ≤ 4200 MHz
Input Level range: –14 dBm ≤, ≤ +35 dBm
MU887000A Test Port 3/4
Input Level range: –10 dBm ≤, ≤ +25 dBm

(2) Measuring instruments

- Vector signal Generator: MG3710E
- Attenuator:
  For MU887000A/01A 3 dB: AT-103 2 sets
  For MU887002A 3 dB: BW-N3W5+
  6 dB: BW-N6W5+

(3) Setup

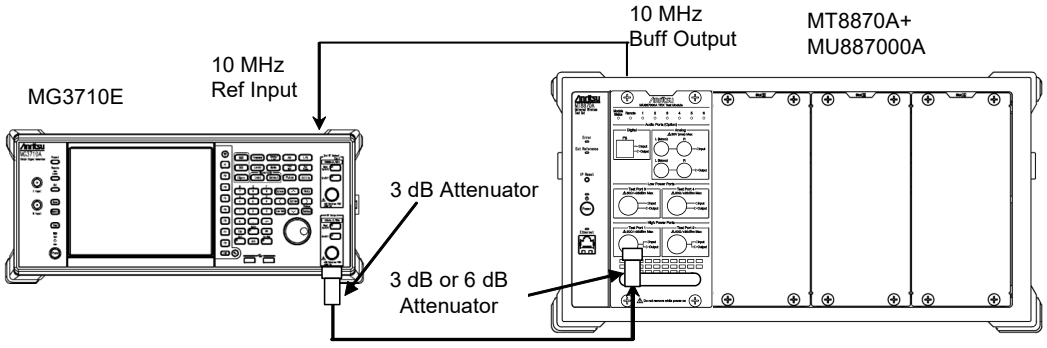


Figure 6.4.6-1 Setup for Measuring Adjacent Channel Leakage Power Ratio

(4) Test procedure

This test is measured at the following Test Ports.
When testing other than Test Port 1, read "Test Port 1" in the following procedure as the port to be tested.
MU887000A: Test Port 1, 2, 3, 4
MU887001A: Test Port 1, 2, 3, 4
MU887002A: TRX 1: Test Port 1, 2, TRX 2: Test Port 1, 2

1. Setup the instruments as shown in Figure 6.4.6-1.
2. Set the MU887000A as follows:

   Connect port: Test Port 1
   Output level ON/OFF: OFF
   Input level: –10 dBm
   For MU887002A, 3400 MHz ≤ frequency: –14 dBm
   Uplink frequency: 600 MHz
   Turn Off All measurement: OFF
   ACLR measurement: ON, 20 times

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

   Modulation: ON
   Modulation wave: Waveform pattern based on the settings in 6.3.5, "Evaluation Signals"
   Output frequency: 600 MHz
   Output level: –10 dBm
   (This output level reflects the calibration value for item 6.3.2.)
   For MU887002A, 3400 MHz ≤ frequency: –14 dBm
   (Obtained by subtracting 4 dB from the output level where the correction value in 6.3.2 is reflected)

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

   ACLR Result: Max value

5. Change the MU887000A and SG frequencies according to 6.3.4 "Measurement Frequencies" and repeat steps 2 to 4 over.
6. Change the Connect port setting for the connection with the MU887000A successively, and repeat steps 2 to 5 over.

6.4.7 Sample Format for Test Result Sheets

Use the following test result sheets when testing the MX887013A or MX887014A performance. Duplicate these sheets as necessary for tests.

Test location		Report No.	
		Date	
		Person-in-charge	

Model:

Serial No.		Ambient temperature	°C
Power source frequency	Hz	Relative humidity	%

Remarks

SG Calibration (CW)

SG Calibration Value (CW)

MG3710E Unmodulated Wave

Frequency (MHz)	SG Setting (dBm)		
	0 dBm	–10 dBm	–20 dBm
600			
700			
880			
940			
1000			
1800			
2000			
2200			
2700			
3400			
3600			
3800			
4000			
4200			

SG Calibration (MOD)

SG Calibration Value (MOD)

MG3710E Modulation Wave

Frequency (MHz)	SG Setting (dBm)
	–10 dBm
600	
700	
880	
940	
1000	
1800	
2000	
2200	
2700	
3400	
3600	
3800	
4000	
4200	

Linearity Calibration

Linearity Calibration

Frequency (MHz)	SG Level (dBm)	SA Measured Value (dBm)	Calibration Value (C) (B) – (A) (dB)	SG Level (dBm)	SA Measured Value (dBm)	Calibration Value (C) (B) – (A) (dB)
600	0	(A)		–20	(A)	
	–10	(B)		–30	(B)	
	–20	(B)		–40	(B)	
	–30	(B)		–50	(B)	
	–40	(B)		–60	(B)	
700	0	(A)		–20	(A)	
	–10	(B)		–30	(B)	
	–20	(B)		–40	(B)	
	–30	(B)		–50	(B)	
	–40	(B)		–60	(B)	
880	0	(A)		–20	(A)	
	–10	(B)		–30	(B)	
	–20	(B)		–40	(B)	
	–30	(B)		–50	(B)	
	–40	(B)		–60	(B)	
940	0	(A)		–20	(A)	
	–10	(B)		–30	(B)	
	–20	(B)		–40	(B)	
	–30	(B)		–50	(B)	
	–40	(B)		–60	(B)	
1000	0	(A)		–20	(A)	
	–10	(B)		–30	(B)	
	–20	(B)		–40	(B)	
	–30	(B)		–50	(B)	
	–40	(B)		–60	(B)	
1800	0	(A)		–20	(A)	
	–10	(B)		–30	(B)	
	–20	(B)		–40	(B)	
	–30	(B)		–50	(B)	
	–40	(B)		–60	(B)	

Linearity Calibration (Cont'd)

Linearity Calibration (Cont'd)

Frequency (MHz)	SG Level (dBm)	SA Measured Value (dBm)	Calibration Value (C) (B) – (A) (dB)	SG Level (dBm)	SA Measured Value (dBm)	Calibration Value (C) (B) – (A) (dB)
2000	0	(A)		–20	(A)	
	–10	(B)		–30	(B)	
	–20	(B)		–40	(B)	
	–30	(B)		–50	(B)	
	–40	(B)		–60	(B)	
2200	0	(A)		–20	(A)	
	–10	(B)		–30	(B)	
	–20	(B)		–40	(B)	
	–30	(B)		–50	(B)	
	–40	(B)		–60	(B)	
2700	0	(A)		–20	(A)	
	–10	(B)		–30	(B)	
	–20	(B)		–40	(B)	
	–30	(B)		–50	(B)	
	–40	(B)		–60	(B)	
3400	0	(A)		–20	(A)	
	–10	(B)		–30	(B)	
	–20	(B)		–40	(B)	
	–30	(B)		–50	(B)	
	–40	(B)		–60	(B)	
3600	0	(A)		–20	(A)	
	–10	(B)		–30	(B)	
	–20	(B)		–40	(B)	
	–30	(B)		–50	(B)	
	–40	(B)		–60	(B)	
3800	0	(A)		–20	(A)	
	–10	(B)		–30	(B)	
	–20	(B)		–40	(B)	
	–30	(B)		–50	(B)	
	–40	(B)		–60	(B)	

Linearity Calibration (Cont'd)

Linearity Calibration (Cont'd)

Frequency (MHz)	SG Level (dBm)	SA Measured Value (dBm)	Calibration Value (C) (B) – (A) (dB)	SG Level (dBm)	SA Measured Value (dBm)	Calibration Value (C) (B) – (A) (dB)
4000	0	(A)		–20	(A)	
	–10	(B)		–30	(B)	
	–20	(B)		–40	(B)	
	–30	(B)		–50	(B)	
	–40	(B)		–60	(B)	
4200	0	(A)		–20	(A)	
	–10	(B)		–30	(B)	
	–20	(B)		–40	(B)	
	–30	(B)		–50	(B)	
	–40	(B)		–60	(B)	

Output EVM

Output EVM

Frequency (MHz)	EVM (%rms)			EVM (%rms)		
	Test Port		Output Level	Test Port		Output Level
	MU887000A Test Port 1		–12.9 dBm	MU887000A Test Port 3		–2.9 dBm
	MU887001A Test Port 1		–12.9 dBm	MU887001A Test Port 3		–12.9 dBm
	MU887002A TRX 1/2 Test Port 1		–7.0 dBm	MU887002A TRX 1/2 Test Port 2		–7.0 dBm
	Measured Value	Spec.	Measurement uncertainty	Measured Value	Spec.	Measurement uncertainty
400 / 410		≤ 2.0	0.1		≤ 2.0	0.1
900						
2000						
2700						
3400		≤ 3.0	0.1		≤ 3.0	0.1
3800						

Frequency (MHz)	EVM (%rms)			EVM (%rms)		
	Test Port		Output Level	Test Port		Output Level
	MU887000A Test Port 1		–20.9 dBm	MU887000A Test Port 3		–10.9 dBm
	MU887001A Test Port 1		–20.9 dBm	MU887001A Test Port 3		–20.9 dBm
	MU887002A TRX 1/2 Test Port 1		–10.0 dBm	MU887002A TRX 1/2 Test Port 2		–10.0 dBm
	Measured Value	Spec.	Measurement uncertainty	Measured Value	Spec.	Measurement uncertainty
4000		≤ 4.0	0.1		≤ 4.0	0.1
4500						
5000						
5500						
6000 / 5990						

Tx Power Measurement Accuracy (CW)

Tx Power Measurement Accuracy

MU887000A Port 1/2, MU887001A Port 1/2/3/4, MU887002A TRX 1/2 Port 1/2

Input Level: –10 dBm (Item 6.3.1 Calibration Value)

Frequency (MHz)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
		Lo Limit	Measurement Accuracy –10 – (Pow)	Hi Limit	Measurement uncertainty
600		–0.5		+0.5	±0.15
700					
880					
940					
1000					
1800					
2000					
2200					
2700					
3400					
3600					
3800					
4000		–0.7		+0.7	±0.33
4200					

Tx Power Measurement Accuracy

MU887000A Port 1/2, MU887001A Port 1/2/3/4, MU887002A TRX 1/2 Port 1/2

Input Level: –50 dBm (Item 6.3.3 Calibration Value)

Frequency (MHz)	Item 6.3.3 –50 dBm Calibration Value (C) (dB)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –20 + (C) – (Pow)	Hi Limit	Measurement uncertainty
600			–0.7		+0.7	±0.14
700						
880						
940						
1000						
1800						
2000						
2200						
2700						
3400						
3600						
3800						
4000			–0.9		+0.9	±0.33
4200						

Tx Power Measurement Accuracy (CW) (Cont'd)

Tx Power Measurement Accuracy

MU887000A Port 1/2, MU887001A Port 1/2/3/4, MU887002A TRX 1/2 Port 1/2

Input Level :–60 dBm (Item 6.3.3 Calibration Value)

Frequency (MHz)	Item 6.3.3 –60 dBm Calibration Value (C) (dB)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –20 + (C) – (Pow)	Hi Limit	Measurement uncertainty
600			–0.9		+0.9	±0.14
700						
880						
940						
1000						
1800						
2000						
2200						
2700						
3400						
3600						
3800						
4000			–1.1		+1.1	±0.33
4200						

Tx Power Measurement Accuracy (CW) (Cont'd)

Tx Power Measurement Accuracy MU887000A Port 3/4

Input Level: –10 dBm (Item 6.3.1 Calibration Value)

Frequency (MHz)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
		Lo Limit	Measurement Accuracy –10 – (Pow)	Hi Limit	Measurement uncertainty
600		–0.7		+0.7	±0.17
700					
880					
940					
1000					
1800					
2000					
2200					
2700					
3400					
3600					
3800					
4000		–0.7		+0.7	±0.28
4200					

Tx Power Measurement Accuracy MU887000A Port 3/4

Input Level: –50 dBm (Item 6.3.3 Calibration Value)

Frequency (MHz)	6 Item 6.3.3 –50 dBm Calibration Value (C) (dB)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –20 + (C) – (Pow)	Hi Limit	Measurement uncertainty
600			–0.9		+0.9	±0.14
700						
880						
940						
1000						
1800						
2000						
2200						
2700						
3400						
3600						
3800						
4000			–0.9		+0.9	±0.20
4200						

Tx Power Measurement Accuracy (CW) (Cont'd)

Tx Power Measurement Accuracy MU887000A Port 3/4

Input Level :–60 dBm (Item 6.3.3 Calibration Value)

Frequency (MHz)	Item 6.3.3 –60 dBm Calibration Value (C) (dB)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –20 + (C) – (Pow)	Hi Limit	Measurement uncertainty
600			–1.1		+1.1	±0.14
700						
880						
940						
1000						
1800						
2000						
2200						
2700						
3400						
3600						
3800						
4000			–1.1		+1.1	±0.21
4200						

Tx Power Measurement Linearity

Linearity (±0.2 dB: 0 to –40 dB, ≥ –50 dBm, Reference Level 0 dBm)

Frequency (MHz)	SG Level (dBm)	Item 6.3.3 Calibration Value (dB)	MX887013A/14A Measured Value (dBm)	Linearity (D) – (REF) – (C) (dB)	Spec. (dB)	Measurement uncertainty
600	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
	–40		(D)			
700	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
	–40		(D)			
880	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
	–40		(D)			
940	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
	–40		(D)			
1000	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
	–40		(D)			
1800	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
	–40		(D)			

Tx Power Measurement Linearity (Cont'd)

Linearity (±0.2 dB: 0 to –40 dB, ≥ –50 dBm, Reference Level 0 dBm) (Cont'd)

Frequency (MHz)	SG Level (dBm)	Item 6.3.3 Calibration Value (dB)	MX887013A/14A Measured Value (dBm)	Linearity (D) – (REF) – (C) (dB)	Spec. (dB)	Measurement uncertainty
2000	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
	–40		(D)			
2200	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
	–40		(D)			
2700	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
	–40		(D)			
3400	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
	–40		(D)			
3600	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
	–40		(D)			
3800	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
	–40		(D)			

Tx Power Measurement Linearity(Cont'd)

Linearity (±0.2 dB: 0 to –40 dB, ≥ –50 dBm, Reference Level 0 dBm) (Cont'd)

Frequency (MHz)	SG Level (dBm)	Item 6.3.3 Calibration Value (dB)	MX887013A/14A Measured Value (dBm)	Linearity (D) – (REF) – (C) (dB)	Spec. (dB)	Measurement uncertainty
4000	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
	–40		(D)			
4200	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
	–40		(D)			

Tx Power Measurement Linearity (Cont'd)

Linearity (±0.2 dB: 0 to –40 dB, ≥ –60 dBm, Reference Level –20 dBm)

Frequency (MHz)	SG Level (dBm)	Item 6.3.3 Calibration Value (dB)	MX887013A/14A Measured Value (dBm)	Linearity (D) – (REF) – (C) (dB)	Spec. (dB)	Measurement uncertainty
600	–20		(REF)			
	–30		(D)		±0.2	±0.05
	–40		(D)			
	–50		(D)			
	–60		(D)		±0.4	±0.05
700	–20		(REF)			
	–30		(D)		±0.2	±0.05
	–40		(D)			
	–50		(D)			
	–60		(D)		±0.4	±0.05
880	–20		(REF)			
	–30		(D)		±0.2	±0.05
	–40		(D)			
	–50		(D)			
	–60		(D)		±0.4	±0.05
940	–20		(REF)			
	–30		(D)		±0.2	±0.05
	–40		(D)			
	–50		(D)			
	–60		(D)		±0.4	±0.05
1000	–20		(REF)			
	–30		(D)		±0.2	±0.05
	–40		(D)			
	–50		(D)			
	–60		(D)		±0.4	±0.05
1800	–20		(REF)			
	–30		(D)		±0.2	±0.05
	–40		(D)			
	–50		(D)			
	–60		(D)		±0.4	±0.05

Tx Power Measurement Linearity (Cont'd)

Linearity (±0.2 dB: 0 to –40 dB, ≥ –60 dBm, Reference Level –20 dBm) (Cont'd)

Frequency (MHz)	SG Level (dBm)	Item 6.3.3 Calibration Value (dB)	MX887013A/14A Measured Value (dBm)	Linearity (D) – (REF) – (C) (dB)	Spec. (dB)	Measurement uncertainty
2000	–20		(REF)			
	–30		(D)		±0.2	±0.05
	–40		(D)			
	–50		(D)			
	–60		(D)		±0.4	±0.05
2200	–20		(REF)			
	–30		(D)		±0.2	±0.05
	–40		(D)			
	–50		(D)			
	–60		(D)		±0.4	±0.05
2700	–20		(REF)			
	–30		(D)		±0.2	±0.05
	–40		(D)			
	–50		(D)			
	–60		(D)		±0.4	±0.05
3400	–20		(REF)			
	–30		(D)		±0.2	±0.05
	–40		(D)			
	–50		(D)			
	–60		(D)		±0.4	±0.05
3600	–20		(REF)			
	–30		(D)		±0.2	±0.05
	–40		(D)			
	–50		(D)			
	–60		(D)		±0.4	±0.05
3800	–20		(REF)			
	–30		(D)		±0.2	±0.05
	–40		(D)			
	–50		(D)			
	–60		(D)		±0.4	±0.05

Tx Power Measurement Linearity (Cont'd)

Linearity (±0.2 dB: 0 to –40 dB, ≥ –60 dBm, Reference Level –20 dBm) (Cont'd)

Frequency (MHz)	SG Level (dBm)	Item 6.3.3 Calibration Value (dB)	MX887013A/14A Measured Value (dBm)	Linearity (D) – (REF) – (C) (dB)	Spec. (dB)	Measurement uncertainty
4000	–20		(REF)			
	–30		(D)		±0.2	±0.05
	–40		(D)			
	–50		(D)			
	–60		(D)		±0.4	±0.05
4200	–20		(REF)			
	–30		(D)		±0.2	±0.05
	–40		(D)			
	–50		(D)			
	–60		(D)		±0.4	±0.05

Frequency/Modulation Measurement

Residual EVM/Carrier Frequency Accuracy

Input Level: –30 dBm/–40 dBm

Frequency (MHz)	Residual EVM (%)			Carrier Frequency Accuracy (Hz)		
	Measured Value	Spec.	Measurement uncertainty	Measured Value	Spec.	Measurement uncertainty
600		≤ 2.5	±0.1		±15.0	±2.6
700						
880						
940						
1000						
1800						
2000						
2200						
2700						
3400						
3600						
3800						
4000		≤ 2.5	±0.1		±15.0	±3.8
4200						

In-Band Emission Measurement

In-Band Emission

Frequency (MHz)	Input Level: –10 dBm	
	Measured Value (dB)	Spec.
600		≤ –40 dBc
700		
880		
940		
1000		
1800		
2000		
2200		
2700		
3400		
3600		
3800		
4000		≤ –40 dBc
4200		

Adjacent Channel Leakage Power Measurement (ACLR)

Adjacent Channel Leakage Power (Cont'd)

Input Level: –10 dBm / –14 dBm

Frequency (MHz)	Adjacent Channel Leakage Power Ratio (dB)					
	Band					
	UTRA (–2)	UTRA (–1)	UTRA (+1)	UTRA (+2)	E-UTRA (–1)	E-UTRA (+1)
600						
700						
880						
940						
1000						
1800						
2000						
2200						
2700						
3400						
3600						
3800						
4000						
4200						
Spec. (dB)	≥ 55 dB	≥ 50 dB	≥ 50 dB	≥ 55 dB	≥ 45 dB	≥ 45 dB
Measurement uncertainty	1 dB					

6.5 Calibration (MX887013A-001/14A-001)

This section explains how to obtain the calibration values of the instrument used for the performance tests.

6.5.1 SG Calibration (CW)

This section explains how to obtain the calibration values of the CW (unmodulated) signal source.

(1) Measuring instruments

- Vector signal Generator: MG3710E
- Power meter: ML2437A
- Power sensor: MA2442D
- Attenuator:

For MU887000A/01A	3 dB:	AT-103	2 sets
For MU887002A	3 dB:	BW-N3W5+	
	6 dB:	BW-N6W5+	

(2) Setup

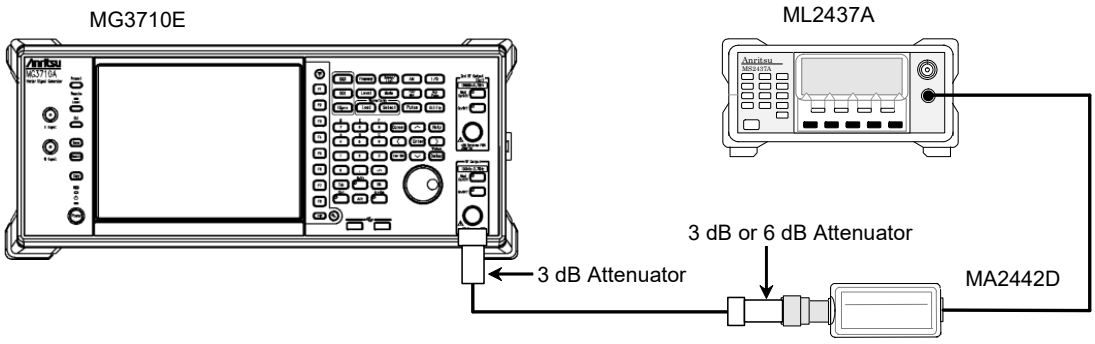


Figure 6.5.1-1 SG Calibration (CW)

(3) Test procedure

1. Setup the instruments as shown in Figure 6.5.1-1.
2. Set the Vector signal generator (SG) as follows:

   Modulation: OFF
   Output frequency: 717.79 MHz (717.8 MHz –10 kHz)
   Output level: MU887000A/01A: 6 dBm (0 dBm + 6 dB)
   MU887002A: 9 dBm (0 dBm + 9 dB)
3. Adjust the SG output level so that the level measurement value of the power meter is 0 dBm, and obtain the calibration values for the setting frequency and setting level.
4. Set frequencies in accordance with the table in 6.5.4, “Measurement Frequencies”, and obtain the calibration values of each frequency.
5. Replace 0 dBm with –10 and –20 dBm at step 2, repeat steps 2 to 4 respectively, and obtain the calibration values.

6.5.2 SG Calibration (MOD)

This section explains how to obtain the calibration values of the modulation wave signal source.

(1) Measuring instruments

- Vector signal Generator: MG3710E
- Power meter: ML2437A
- Power sensor: MA24002A
- Attenuator:

For MU887000A/01A	3 dB:	AT-103	2 sets
For MU887002A	3 dB:	BW-N3W5+	
	6 dB:	BW-N6W5+	

(2) Setup

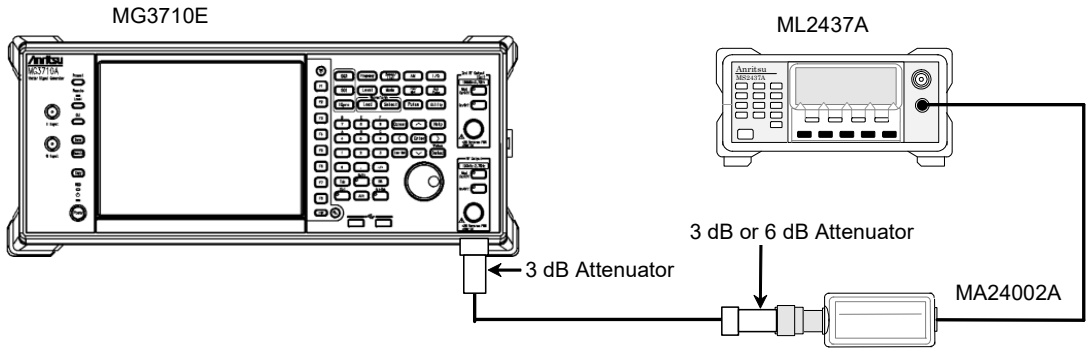


Figure 6.5.2-1 SG Calibration (MOD)

(3) Test procedure

1. Setup the instruments as shown in Figure 6.5.2-1.
2. Set the Vector signal generator (SG) as follows:

   Modulation: ON
   Modulation wave: Waveform pattern based on the settings in 6.5.5, "Evaluation Signals"
   Output frequency: 717.79 MHz (717.8 MHz –10 kHz)
   Output level: MU887000A/01A: –4 dBm (–10 dBm + 6 dB)
   MU887002A: –1 dBm (–10 dBm + 9 dB)
3. Adjust the SG output level so that the level measurement value of the power meter is –10 dBm, and obtain the calibration values for the setting frequency and setting level.
4. Set frequencies in accordance with the table in 6.5.4, "Measurement Frequencies", and obtain the calibration values of each frequency.

6.5.3 Linearity Calibration

This section explains how to obtain the calibration values for linearity.

(1) Measuring instruments

- Vector signal Generator: MG3710E
- Signal analyzer: MS269xA or MS2830A
- Attenuator:

For MU887000A/01A	3 dB:	AT-103	2 sets
For MU887002A	3 dB:	BW-N3W5+	
	6 dB:	BW-N6W5+	

(2) Setup

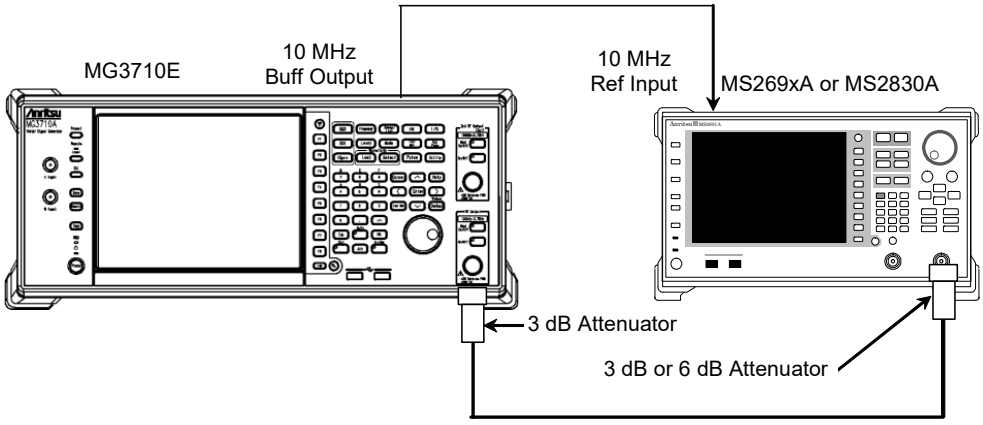


Figure 6.5.3-1 Linearity Calibration

(3) Test procedure

1. Setup the instruments as shown in Figure 6.5.3-1.
2. Set the signal analyzer (SA) as shown in #1 of Table 6.5.3-1 “Signal Analyzer Settings”.
3. Set the Vector signal generator (SG) as follows:

   Modulation: OFF
   Output frequency: 717.79 MHz (717.8 MHz –10 kHz)
   Output level: Setting level when the level measurement value of the power meter is 0 dBm in the SG calibration (Section 6.5.1)
4. Connect the output of the SG to the SA and measure the SG output level with the SA (A dBm).
5. Decrease the SG output level in 10-dB steps down to 30 dB and measure the level at each step (B dBm). (The calibration value is B – A.)

6. Set frequencies in accordance with the table in 6.5.4, “Measurement Frequencies”, and obtain the calibration values of each frequency.
7. Set the SA as shown in #2 of Table 6.5.3-1 “Signal Analyzer Settings”.
8. Replace 0 dBm with –20 dBm at step 3, and repeat steps 3 to 6.

Table 6.5.3-1 Signal Analyzer Settings

	MS269xA or MS2830A						
	Application Switch	RBW	Zone Width	Time Length	ATT	Preamp	Ref Lev
#1	Signal Analyzer	100 Hz	781.3 Hz	AUTO	20 dB	OFF	0 dBm
#2	Signal Analyzer	100 Hz	781.3 Hz	AUTO	0 dB	OFF	–20 dBm

6.5.4 Measurement Frequencies

The following tables list the frequencies set in the performance tests for the calibration and calibrated test system. The 4000 MHz and more frequency is measured only when MU887000A/01A-001 is installed or MU887002A.

For the calibrations and performance tests described in the following sections:

- 6.5.1 SG Calibration (CW)
- 6.5.2 SG Calibration (MOD)
- 6.5.3 Linearity Calibration
- 6.6.1 Tx Power Measurement Accuracy (CW)
- 6.6.2 Tx Power Measurement Linearity
- 6.6.3 Frequency/Modulation

Meas. Point	PCC (MHz)	SCC: PCC–19.8 (MHz)	SCC: PCC+19.8 (MHz)
1	717.8	698.0	737.6
2	2719.8	2700.0	2739.6
3	3400.0	3380.2	3419.8
4	3780.2	3760.4	3800.0
5	4180.2	4160.4	4200.0

For the performance test described in 6.6.4 In-Band Emissions:

Meas. Point	PCC (MHz)	SCC: PCC+19.8 (MHz)
1	698.0	717.8
2	2700.0	2719.8
3	3400.0	3419.8
4	3800.0	3819.8
5	4180.2	4200.0

For the performance test described in 6.6.5 Adjacent Channel Leakage Power Ratio (ACLR):

Meas. Point	PCC (MHz)	SCC: PCC–19.8 (MHz)	SCC: PCC+19.8 (MHz)
1	698.0	-	717.8
2	2700.0	2680.2	2719.8
3	3400.0	3380.2	3419.8
4	3800.0	3780.2	3819.8
5	4180.2	4160.4	4200.0

Note:

Add an offset of –10 kHz to the frequency in the above table and set the frequency as SG output frequency, except for the measurement described in section 6.6.3, 6.6.4 and 6.6.5.

6.5.5 Evaluation Signals

This section explains the modulation wave signal used for the performance test. Set the vector signal generator based on the following contents when performing the performance test.

When MU887000A/01A-001 is installed or MU887002A, the option for MG3710E-036 upper limit frequency 6 GHz is required.

Summary of the evaluation signal

The following tables listed in 3GPP TS 36.521-1 are referenced.

FDD:

A.2.2 Reference measurement channels for FDD

Table A.2.2.1.1-1: Reference Channels for QPSK with full RB allocation

PCC Channel bandwidth: 20 MHz

SCC Channel bandwidth: 20 MHz

Table A.2.2.2.1-1: Reference Channels for QPSK with partial RB allocation

PCC:

Channel bandwidth: 20 MHz

Allocated RBs: 18

Starting RB 0

SCC:

Channel bandwidth: 20 MHz

Allocated RBs: 0

TDD:

A.2.3 Reference measurement channels for TDD

Table A.2.3.1.1-1: Reference Channels for QPSK with full RB allocation

PCC Channel bandwidth: 20 MHz

SCC Channel bandwidth: 20 MHz

Table A.2.3.2.1-1: Reference Channels for QPSK with partial RB allocation

PCC:

Channel bandwidth: 20 MHz

Allocated RBs: 18

Starting RB 0

SCC:

Channel bandwidth: 20 MHz

Allocated RBs: 0

To send the evaluation signal with the SG, generate the following waveform pattern with LTE IQproducer™ MX370108A.

Table 6.5.5-1 LTE IQproducer Parameter (FDD PCC 20 MHz, SCC 20 MHz)

Parameter	Setting Values
Common	
System	LTE-Advanced
Carrier Aggregation Mode	Intra-band
Downlink/Uplink	Uplink
Component Carrier #0	–
Freq Offset(MHz)	–9.9
Cell ID	0
Bandwidth	20 MHz
Cyclic Prefix	Normal
Roll Off Length	70
Filter Type	Ideal
DMRS Parameters	Auto
Subframe #0 to 9	–
Number of PUCCHs	0
Number of PUSCHs	1
PUSCH #0 Data Status	Enable
PUSCH #0 Modulation Scheme	QPSK
PUSCH #0 Data Type	PN9
PUSCH #0 Start Number of RB	0
PUSCH #0 Number of RBs	18 (for In-Band Emission evaluation signal) 100 (Others)
PUSCH #0 Power Boosting	0 dB
Demodulation RS for PUSCH	–
Data Type	Base Sequence
Group Hopping	Enable
Delta SS	0
n_cs_Setting	Auto
n(1)_DMRS	0
n(2)_DMRS	0

Table 6.5.5-1 LTE IQproducer Parameter (FDD PCC 20 MHz, SCC 20 MHz) (Cont'd)

Parameter	Setting Values
Component Carrier #1	–
Freq Offset(MHz)	+9.9
Cell ID	0
Bandwidth	20 MHz
Cyclic Prefix	Normal
Roll Off Length	70
Filter Type	Ideal
Data Transmission / Random Access	Data Transmission
DMRS Parameters	Auto
Subframe #0 to 9	–
Number of PUCCHs	0
Number of PUSCHs	0 (for In-Band Emission evaluation signal) 1 (Others)
The subsequence settings are the same as the settings of Component Carrier #0 when Number of PUSCH is 1.	

Table 6.5.5-2 LTE IQproducer Parameter (TDD PCC 20 MHz, SCC 20 MHz)

Parameter	Setting Values
Common	
System	LTE-Advanced
Carrier Aggregation Mode	Intra-band
Downlink/Uplink	Uplink
Component Carrier #0	
Freq Offset(MHz)	–9.9
Cell ID	0
Bandwidth	20 MHz
Uplink Downlink Configuration	1
Cyclic Prefix	Normal
Roll Off Length	70
Filter Type	Ideal
Data Transmission / Random Access	Data Transmission
DMRS Parameters	Auto
Subframe #0 to 9	–
Number of PUCCHs	0
Number of PUSCHs	1
PUSCH #0 Data Status	Enable
PUSCH #0 Modulation Scheme	QPSK
PUSCH #0 Data Type	PN9
PUSCH #0 Start Number of RB	0
PUSCH #0 Number of RBs	18 (for In-Band Emission evaluation signal) 100 (Others)
PUSCH #0 Power Boosting	0 dB
Demodulation RS for PUSCH	–
Data Type	Base Sequence
Group Hopping	Enable
Delta SS	0
n_cs_Setting	Auto
n(1)_DMRS	0
n(2)_DMRS	0

Table 6.5.5-3 LTE IQproducer Parameter (TDD PCC 20 MHz, SCC 20 MHz) (Cont'd)

Parameter	Setting Values
Component Carrier #1	
Freq Offset(MHz)	+9.9
Cell ID	0
Bandwidth	20 MHz
Cyclic Prefix	Normal
Roll Off Length	70
Filter Type	Ideal
Data Transmission / Random Access	Data Transmission
DMRS Parameters	Auto
Subframe #0 to 9	–
Number of PUCCHs	0
Number of PUSCHs	0 (for In-Band Emission evaluation signal) 1 (Others)
The subsequence settings are the same as the settings of Component Carrier #0 when Number of PUSCH is 1.	

6.6 Performance Tests (MX887013A-001/14A-001)

Common test items

The following list shows the common settings for each measurement at the MU887000A.

Application Select:	Cellular
Standard Select:	LTE
Frame Structure(PCC):	FDD (MX887013A)
	TDD (MX887014A)
Frame Structure(SCC-1):	FDD (MX887013A)
	TDD (MX887014A)
Channel Coding:	RMC_UL_CA
Channel Bandwidth(PCC):	20 MHz
Channel Bandwidth(SCC-1):	20 MHz
RMC Configuration:	PUSCH
UL RMC Modulation(PCC):	QPSK
UL RMC Number of RB(PCC):	100
UL RMC Starting RB(PCC):	0
UL RMC Modulation(SCC-1):	QPSK
UL RMC Number of RB(SCC-1):	0
UL RMC Starting RB(SCC-1):	0
OBW Ratio:	99.0%
Long Span Search:	ON

6.6.1 Tx Power Measurement Accuracy (CW)

This test is related to the accuracy of Tx power measurements.

(1) Test specifications

MU887000A Test Port 1/2,
MU887001A Test Port 1 to 4,
(Excluding when measuring Intraband Contiguous CA SCC and PCC + SCC)
(698 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 3800 MHz)

Measurement Accuracy	Input Level	Temperature
±0.5 dB	–20 dBm ≤, ≤ +35 dBm	10 to 40°C
±0.7 dB	–50 dBm ≤, < –20 dBm	10 to 40°C
±0.9 dB	–60 dBm ≤, < –50 dBm	10 to 40°C

MU887002A TRX 1/2 Test Port 1 to 12
(Excluding when measuring Intraband Contiguous CA SCC and PCC + SCC)
(698 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 3800 MHz)

Measurement Accuracy	Input Level	Temperature
±0.5 dB	–20 dBm ≤, ≤ +35 dBm	20 to 30°C
±0.7 dB	–50 dBm ≤, < –20 dBm	20 to 30°C
±0.9 dB	–60 dBm ≤, < –50 dBm	20 to 30°C

MU887000A Test Port 1/2
MU887001A Test Port 1 to 4
MU887002A TRX 1/2 Test Port 1 to 12
(Excluding when measuring Intraband Contiguous CA SCC and PCC + SCC)
(3800 MHz < Frequency ≤ 4200 MHz)

Measurement Accuracy	Input Level	Temperature
±0.7 dB	–20 dBm ≤, ≤ +35 dBm	20 to 30°C
±0.9 dB	–50 dBm ≤, < –20 dBm	20 to 30°C
±1.1 dB	–60 dBm ≤, < –50 dBm	20 to 30°C

MU887000A Test Port 1/2,
MU887001A Test Port 1 to 4
(When measuring Intraband Contiguous CA SCC and PCC + SCC)
(698 MHz ≤ Frequency ≤ 2700 MHz)

Measurement Accuracy	Input Level	Temperature
±0.7 dB	–50 dBm ≤, ≤ +35 dBm	10 to 40°C
±0.9 dB	–60 dBm ≤, < –50 dBm	10 to 40°C

MU887002A TRX 1/2 Test Port 1 to 12
(When measuring Intraband Contiguous CA SCC and PCC + SCC)
(698 MHz ≤ Frequency ≤ 2700 MHz)

Measurement Accuracy	Input Level	Temperature
±0.7 dB	–50 dBm ≤, ≤ +35 dBm	20 to 30°C
±0.9 dB	–60 dBm ≤, < –50 dBm	20 to 30°C

MU887000A Test Port 1/2,
MU887001A Test Port 1 to 4
(When measuring Intraband Contiguous CA SCC and PCC + SCC)
(3400 MHz < Frequency ≤ 3800 MHz)

Measurement Accuracy	Input Level	Temperature
±1.0 dB	–50 dBm ≤, ≤ +35 dBm	10 to 40°C
±1.3 dB	–60 dBm ≤, < –50 dBm	10 to 40°C

MU887002A TRX 1/2 Test Port 1 to 12
(When measuring Intraband Contiguous CA SCC and PCC + SCC)
(3400 MHz < Frequency ≤ 3800 MHz)

Measurement Accuracy	Input Level	Temperature
±1.0 dB	–50 dBm ≤, ≤ +35 dBm	20 to 30°C
±1.3 dB	–60 dBm ≤, < –50 dBm	20 to 30°C

MU887000A Test Port 1/2
MU887001A Test Port 1 to 4
MU887002A TRX 1/2 Test Port 1 to 12
(When measuring Intraband Contiguous CA SCC and PCC + SCC)
(3800 MHz < Frequency ≤ 4200 MHz)

Measurement Accuracy	Input Level	Temperature
±1.0 dB	–50 dBm ≤, ≤ +35 dBm	20 to 30 °C
±1.3 dB	–60 dBm ≤,< –50 dBm	20 to 30 °C

MU887000A Test Port 3/4
(Excluding when measuring Intraband Contiguous CA SCC and PCC + SCC)
(698 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 3800 MHz)

Measurement Accuracy	Input Level	Temperature
±0.7 dB	–20 dBm ≤, ≤ +25 dBm	10 to 40 °C
±0.9 dB	–50 dBm ≤, < –20 dBm	10 to 40 °C
±1.1 dB	–60 dBm ≤, < –50 dBm	10 to 40 °C

(3800 MHz < Frequency ≤ 4200 MHz)

Measurement Accuracy	Input Level	Temperature
±0.7 dB	–20 dBm ≤, ≤ +25 dBm	20 to 30 °C
±0.9 dB	–50 dBm ≤, < –20 dBm	20 to 30 °C
±1.1 dB	–60 dBm ≤, < –50 dBm	20 to 30 °C

MU887000A Test Port 3/4
(When measuring Intraband Contiguous CA SCC and PCC + SCC)
(698 MHz ≤ Frequency ≤ 2700 MHz)

Measurement Accuracy	Input Level	Temperature
±0.7 dB	–20 dBm ≤, ≤ +25 dBm	10 to 40 °C
±0.9 dB	–50 dBm ≤, < –20 dBm	10 to 40 °C
±1.1 dB	–60 dBm ≤, < –50 dBm	10 to 40 °C

(3400 MHz < Frequency ≤ 3800 MHz)

Measurement Accuracy	Input Level	Temperature
±1.0 dB	–50 dBm ≤, ≤ +25 dBm	10 to 40 °C
±1.3 dB	–60 dBm ≤, < –50 dBm	10 to 40 °C

(3800 MHz < Frequency ≤ 4200 MHz)

Measurement Accuracy	Input Level	Temperature
±1.0 dB	–50 dBm ≤, ≤ +25 dBm	20 to 30 °C
±1.3 dB	–60 dBm ≤, < –50 dBm	20 to 30 °C

(2) Measuring instruments

- Vector signal Generator: MG3710E
- Attenuator:
  For MU887000A/01A 3 dB: AT-103 2 sets
  For MU887002A 3 dB: BW-N3W5+
  6 dB: BW-N6W5+

(3) Setup

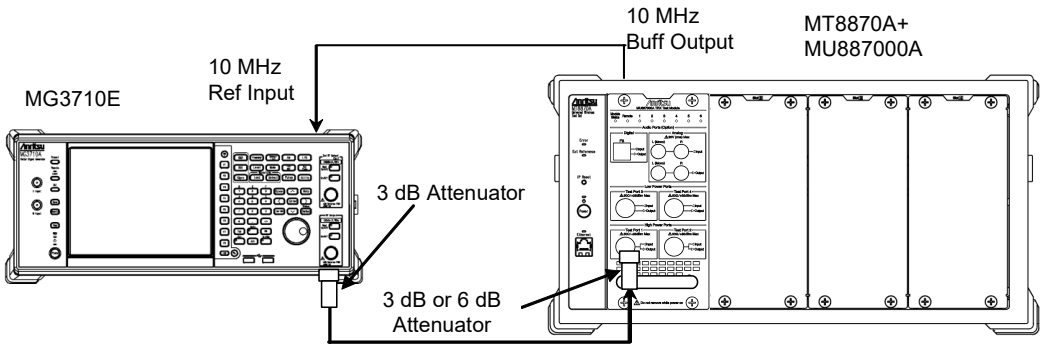


Figure 6.6.1-1 Setup for Measuring Amplitude Measurement Accuracy

(4) Test procedure

This test is measured at the following Test Ports.
When testing other than Test Port 1, read "Test Port 1" in the following procedure as the port to be tested.
MU887000A: Test Port 1, 2, 3, 4
MU887001A: Test Port 1, 2, 3, 4
MU887002A: TRX 1: Test Port 1, 2, TRX 2: Test Port 1, 2

1. Setup the instruments as shown in Figure 6.6.1-1.
2. Set the MU887000A as follows:

   Connect Port: Test Port 1
   Output Level On/Off: OFF
   Input Level: –10 dBm
   Uplink Frequency :
   PCC: 717.8 MHz
   SCC: 698.0 MHz (PCC – 19.8 MHz)
   Turn Off All Measurement: OFF
   Tx Power Measurement: ON, 1 time

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

   Modulation: OFF
   Output frequency: 717.79 MHz (PCC)
   Output level: –10 dBm
   (This output level reflects the calibration value for item 6.5.1.)

4. Measure Tx Power of PCC.

   Result of Tx Power Measurement: Average value

5. Change the SG settings as follows.

   Output frequency: 697.99 MHz (PCC – 19.8 MHz)
   Output level: –10 dBm
   (This output level reflects the calibration value for item 6.5.1.)

6. Measure Tx Power of SCC (PCC – 19.8 MHz).

   Result of Tx Power Measurement: Average value

7. Change the SCC frequency in MU887000A as follows.

   Uplink Frequency:
   SCC: 737.6 MHz (PCC + 19.8 MHz)

8. Change the SG settings as follows.

   Output frequency: 737.59 MHz (PCC + 19.8 MHz)
   Output level: –10 dBm
   (This output level reflects the calibration value for item 6.5.1.)

9. Measure Tx Power of SCC (PCC + 19.8 MHz).

   Result of Tx Power Measurement: Average value

10. Change the MU887000A and SG frequencies according to 6.5.4 “Measurement Frequencies” and repeat steps 2 to 9 over.
11. Change the SG output level and MU887000A input level each to –50, and –60 dBm and repeat steps 2 to 10 over and measure the Tx power. (This output level reflects the calibration value for item 6.5.3.)
12. Change the Connect port setting for the connection with the MU887000A successively, and repeat steps 2 to 11 over.

6.6.2 Tx Power Measurement Linearity

This test is related to the linearity of Tx power measurements.

(1) Test specifications

(698 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 4200 MHz)

Linearity	Input Level, Range
±0.2 dB	–50 dBm ≤, –30 to 0 dB
±0.4 dB	–60 dBm ≤, –30 to 0 dB

(2) Measuring instruments

- Vector signal Generator: MG3710E
- Attenuator:

  For MU887000A/01A 3 dB: AT-103 2 sets

  For MU887002A 3 dB: BW-N3W5+

  6 dB: BW-N6W5+

(3) Setup

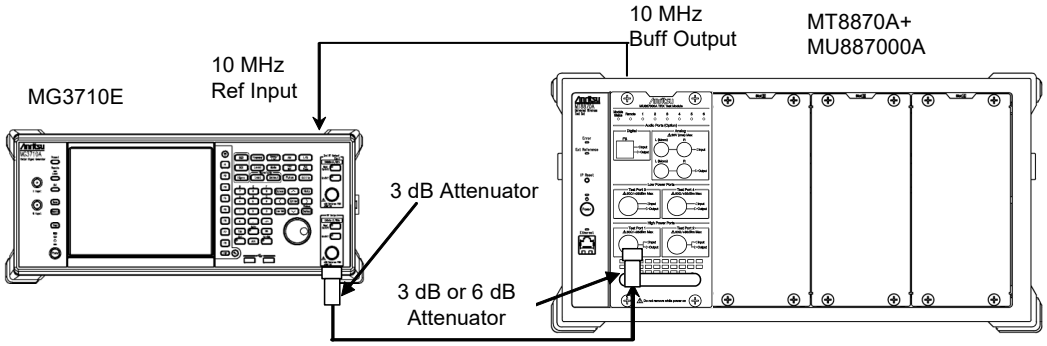


Figure 6.6.2-1 Setup for Measuring Tx Power Measurement Linearity

(4) Test procedure

This test is measured at the following Test Ports.
When testing other than Test Port 1, read "Test Port 1" in the following procedure as the port to be tested.
MU887000A: Test Port 1, 2, 3, 4
MU887001A: Test Port 1, 2, 3, 4
MU887002A: TRX 1: Test Port 1, 2, TRX 2: Test Port 1, 2

1. Setup the instruments as shown in Figure 6.6.2-1.
2. Set the MU887000A as follows:

   Connect Port: Test Port 1

   Output Level On/Off: OFF

   Input Level: 0 dBm

   Uplink Frequency:

   PCC: 717.8 MHz

   SCC: 698.0 MHz (PCC – 19.8 MHz)

   Turn Off All Measurement: OFF

   Tx Power Measurement: ON, 1 time
3. Set the Vector signal generator (SG) as follows:

   Modulation: OFF

   Output frequency: 717.79 MHz (PCC)

   Output level: 0 dBm
   (This output level reflects the calibration value for item 6.5.1.)
4. Measure Tx Power of PCC and the measured value is the reference level (REF dBm).

   Result of Tx Power Measurement: Average value
5. Set the SG output level to –10 dB and measure the Tx power, making this value D dBm.
6. Calculate the difference between REF dBm and D dBm using the following equation.

   Linearity error = D – REF – (calibration value of section 6.5.3)
7. Similarly, change the SG output level successively from –20 dB to –30 dB in –10 dB steps and measure the Tx power. Calculate the linearity as described in step 6 and check that the results meet the specifications.

Note:

Measure the Tx power five times when the following conditions are met.
- The frequency is 3400 MHz and more.
- The SG output level is –30 dB.

And calculate the frequency using the average value.

8. Change the vector signal generator (SG) settings as follows.
   Output frequency: 697.99 MHz (PCC – 19.8 MHz)
   Output level: 0 dBm
   (This output level reflects the calibration value for item 6.5.1.)
9. Change the measurement target to SCC (PCC – 19.8 MHz), and repeat steps 4 to 7.
10. Change the SCC frequency in MU887000A as follows.
    Uplink Frequency:
    SCC: 737.6 MHz (PCC + 19.8 MHz)
11. Change the SG settings as follows.
    Output frequency: 737.59 MHz (PCC + 19.8 MHz)
    Output level: 0 dBm
    (This output level reflects the calibration value for item 6.5.1.)
12. Change the measurement target to SCC (PCC + 19.8 MHz), and repeat steps 4 to 7.
13. Change the MU887000A and SG frequencies according to 6.5.4 “Measurement Frequencies” and repeat steps 2 to 12 over.
14. Change the SG output level and the MU887000A input level to –30 dBm and repeat steps 2 to 13 over to measure the Tx Power. (This output level reflects the calibration value for item 6.5.1.)

6.6.3 Frequency/Modulation

This test is related to the following modulation analyses.

- Carrier frequency accuracy
- Residual EVM

(1) Test specifications

	Measurement Accuracy
Carrier frequency accuracy	±(Set frequency × Reference oscillator accuracy + 15 Hz)
Residual EVM	≤ 2.5% (rms)

MU887000A Test Port 1/2,
MU887001A Port 1 to 4
MU887002A TRX 1/2 Test Port 1 to 12
Input Level range: –40 dBm ≤, ≤ +35 dBm
MU887000A Test Port 3/4
Input Level range: –40 dBm ≤, ≤ +25 dBm

(2) Measuring instruments

- Vector signal Generator: MG3710E
- Attenuator:

For MU887000A/01A	3 dB:	AT-103	2 sets
For MU887002A	3 dB:	BW-N3W5+	
	6 dB:	BW-N6W5+	

(3) Setup

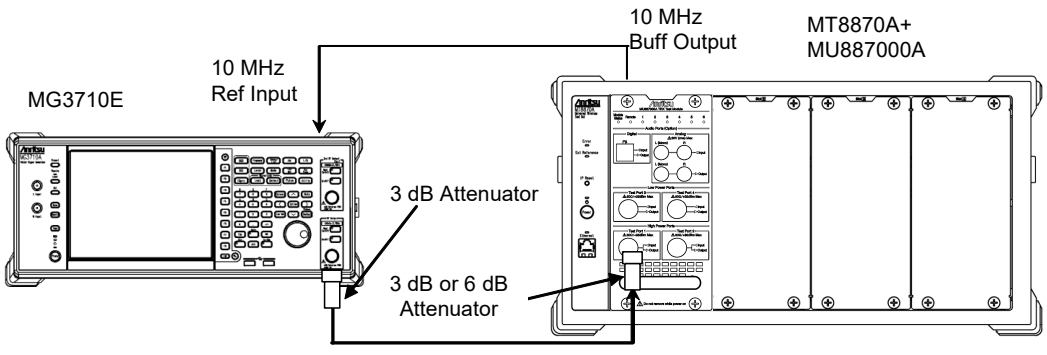


Figure 6.6.3-1 Setup for Measuring Frequency/Modulation

(4) Test procedure

This test is measured at the following Test Ports.
When testing other than Test Port 1, read "Test Port 1" in the following procedure as the port to be tested.
MU887000A: Test Port 1, 2, 3, 4
MU887001A: Test Port 1, 2, 3, 4
MU887002A: TRX 1: Test Port 1, 2, TRX 2: Test Port 1, 2

1 Setup the instruments as shown in Figure 6.6.3-1.

2. Set the MU887000A as follows:

Connect Port:	Test Port 1
Output Level On/Off:	OFF
Input Level:	–40 dBm
Uplink Frequency:	
PCC:	717.8 MHz
SCC:	698.0 MHz (PCC – 19.8 MHz)
Turn Off All Measurement:	OFF
Tx Power Measurement:	ON, 1 time

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

Modulation:	ON
Modulation wave:	Waveform pattern based on the settings in 6.5.5, "Evaluation Signals"
Output frequency:	717.8 MHz
Output level:	–40 dBm (This output level reflects the calibration value for item 6.5.2.)

4. Measure the PCC frequency error and EVM.

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

5. Change the vector signal generator (SG) settings as follows.

Output frequency:	698.0 MHz (PCC – 19.8 MHz)
Output level:	–40 dBm (This output level reflects the calibration value for item 6.5.2.)

6. Measure the SCC (PCC – 19.8 MHz) frequency error and EVM.

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

7. Change the SCC frequency in MU887000A as follows.

Uplink Frequency:	
SCC:	737.6 MHz (PCC + 19.8 MHz)

8. Change the SG settings as follows.

   Output frequency: 737.6 MHz (PCC + 19.8 MHz)

   Output level: –40 dBm
   (This output level reflects the calibration value for item 6.5.2.)

9. Measure the SCC (PCC + 19.8 MHz) frequency error and EVM.

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

10. Change the MU887000A and SG frequencies according to 6.5.4 “Measurement Frequencies” and repeat steps 2 to 9 over.

6.6.4 In-band Emissions

This test is related to in-band emissions.

- In-Band Emission

(1) Test specifications

(698 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 4200 MHz)

In-Band Emission	≤ –40 dBc

Input level: ≥ –10 dBm

Allocated RB ≤ 18

(2) Measuring instruments

- Vector signal Generator: MG3710E
- Attenuator:

For MU887000A/01A 3 dB: AT-103 2 sets

For MU887002A 3 dB: BW-N3W5+

6 dB: BW-N6W5+

(3) Setup

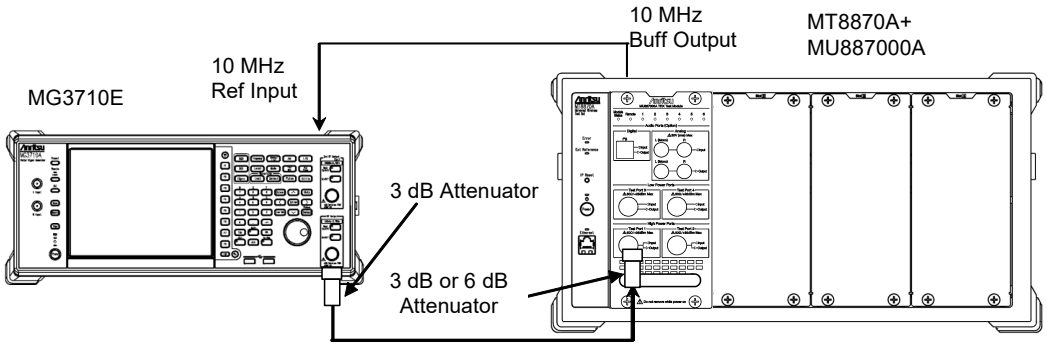


Figure 6.6.4-1 Test System for Frequency/Modulation Measurement

(4) Test procedure

This test is measured at the following Test Ports.
When testing other than Test Port 1, read "Test Port 1" in the following procedure as the port to be tested.
MU887000A: Test Port 1, 2, 3, 4
MU887001A: Test Port 1, 2, 3, 4
MU887002A: TRX 1: Test Port 1, 2, TRX 2: Test Port 1, 2

1. Setup the instruments as shown in Figure 6.6.4-1.
2. Set the MU887000A as follows:

Connect Port:	Test Port 1
Output Level On/Off:	OFF
Input Level:	–10 dBm
Uplink Frequency:	
PCC:	698.0 MHz
SCC:	717.8 MHz (PCC + 19.8 MHz)
Turn Off All Measurement:	OFF
Tx Power Measurement:	ON, 1 time

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

Modulation:	ON
Modulation wave:	Waveform pattern based on the settings in 6.5.5, "Evaluation Signals"
Output frequency:	707.9 MHz (PCC + 9.9 MHz)
Output level:	–10 dBm (This output level reflects the calibration value for item 6.5.2.)

4. Measure the In-Band Emission of PCC and SCC, and read the following value.

   In-Band Emissions (General) Result: Max value

5. Change the MU887000A and SG frequencies according to 6.5.4 "Measurement Frequencies" and repeat steps 2 to 4 over.

6.6.5 Adjacent Channel Leakage Power Ratio (ACLR)

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

(1) Test specifications

(698 MHz ≤ Frequency ≤ 2700 MHz, 3400 MHz ≤ Frequency ≤ 4200 MHz)

Adjacent Channel Leakage Power Ratio	Measurement Point
≥ 45 dB	E-UTRA ALCR1
≥ 50 dB	UTRA ALCR1
≥ 55 dB	UTRA ALCR2

MU887000A Test Port 1/2,
MU887001A Port 1 to 4
Input Level range: –10 dBm ≤, ≤ +35 dBm
MU887002A TRX 1/2 Test Port 1 to 12
698 MHz ≤ frequency ≤ 2700 MHz
Input Level range: –10 dBm ≤, ≤ +35 dBm
3400 MHz ≤ frequency ≤ 4200 MHz
Input Level range: –14 dBm ≤, ≤ +35 dBm
MU887000A Test Port 3/4
Input Level range: –10 dBm ≤, ≤ +25 dBm

(2) Measuring instruments

- Vector signal Generator: MG3710E
- Attenuator:
  For MU887000A/01A 3 dB: AT-103 2 sets
  For MU887002A 3 dB: BW-N3W5+
  6 dB: BW-N6W5+

(3) Setup

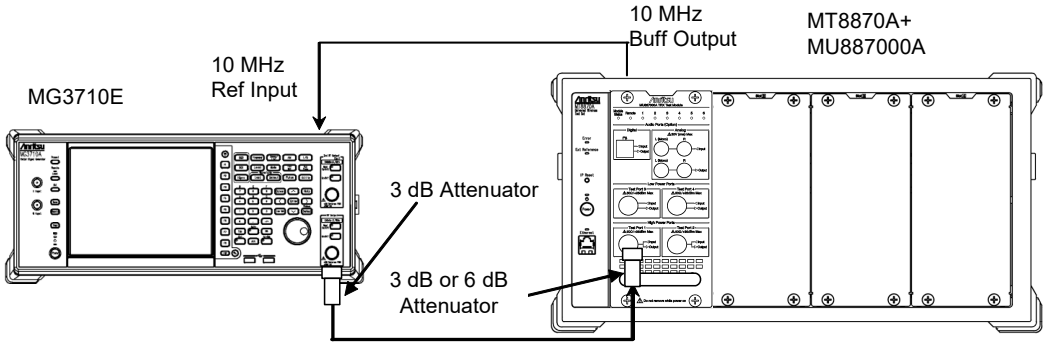


Figure 6.6.5-1 Setup for Measuring Adjacent Channel Leakage Power Ratio

(4) Test procedure

This test is measured at the following Test Ports.
When testing other than Test Port 1, read "Test Port 1" in the following procedure as the port to be tested.
MU887000A: Test Port 1, 2, 3, 4
MU887001A: Test Port 1, 2, 3, 4
MU887002A: TRX 1: Test Port 1, 2, TRX 2: Test Port 1, 2

Note:

When the frequency for PCC is 698 MHz, steps 2 to 4 are not performed.

1. Setup the instruments as shown in Figure 6.6.5-1.
2. Set the MU887000A as follows:

   Connect Port: Test Port 1
   Output Level On/Off: OFF
   Input Level: –10 dBm
   For MU887002A, 3400 MHz ≤ frequency: –14 dBm
   Uplink Frequency:
   PCC: 698.0 MHz
   SCC: 678.2 MHz (PCC – 19.8 MHz)
   Turn Off All Measurement: OFF
   ACLR Measurement: ON, 20 times
3. Set the Vector signal generator (SG) as follows:

   Modulation: ON
   Modulation wave: Waveform pattern based on the settings in 6.5.5, "Evaluation Signals"
   Output frequency: 688.1 MHz (PCC – 9.9 MHz)
   Output level: –10 dBm
   (Output level where the correction value at the PCC frequency in 6.5.2 is reflected)
   For MU887002A, 3400 MHz ≤ frequency: –14 dBm
   (Obtained by subtracting 4 dB from the output level where the correction value at the PCC frequency in 6.5.2 is reflected)

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

   E-UTRA_ACLR_LOW: (MAX)
   E-UTRA_ACLR_UP: (MAX)
   UTRA_ACLR2_LOW: (MAX)
   UTRA_ACLR1_LOW: (MAX)
   UTRA_ACLR1_UP: (MAX)
   UTRA_ACLR2_UP: (MAX)

5. Change the SCC frequency in MU887000A as follows.

   Uplink Frequency:
   SCC: 717.8 MHz (PCC + 19.8 MHz)

6. Change the vector signal generator (SG) settings as follows.

   Output frequency: 707.9 MHz (PCC + 9.9 MHz)

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

   E-UTRA_ACLR_LOW: (MAX)
   E-UTRA_ACLR_UP: (MAX)
   UTRA_ACLR2_LOW: (MAX)
   UTRA_ACLR1_LOW: (MAX)
   UTRA_ACLR1_UP: (MAX)
   UTRA_ACLR2_UP: (MAX)

8. Change the MU887000A and SG frequencies according to 6.5.4 “Measurement Frequencies” and repeat steps 2 to 7 over.

6.6.6 Sample Format for Test Result Sheets

Use the following test result sheets when testing the MX887013A-001 or MX887014A-001 performance. Duplicate these sheets as necessary for tests.

Test location		Report No.	
		Date	
		Person-in-charge	

Model:

Serial No.		Ambient temperature	°C
Power source frequency	Hz	Relative humidity	%

Remarks

SG Calibration (CW)

SG Calibration Value (CW)

0 dBm

PCC (MHz)	SG Setting (dBm)	SCC: PCC – 19.8 (MHz)	SG Setting (dBm)	SCC: PCC + 19.8 (MHz)	SG Setting (dBm)
717.8		698.0		737.6	
2719.8		2700.0		2739.6	
3400.0		3380.2		3419.8	
3780.2		3760.4		3800.0	
4180.2		4160.4		4200.0	

–10 dBm

PCC (MHz)	SG Setting (dBm)	SCC: PCC – 19.8 (MHz)	SG Setting (dBm)	SCC: PCC + 19.8 (MHz)	SG Setting (dBm)
717.8		698.0		737.6	
2719.8		2700.0		2739.6	
3400.0		3380.2		3419.8	
3780.2		3760.4		3800.0	
4180.2		4160.4		4200.0	

–20 dBm

PCC (MHz)	SG Setting (dBm)	SCC: PCC – 19.8 (MHz)	SG Setting (dBm)	SCC: PCC + 19.8 (MHz)	SG Setting (dBm)
717.8		698.0		737.6	
2719.8		2700.0		2739.6	
3400.0		3380.2		3419.8	
3780.2		3760.4		3800.0	
4180.2		4160.4		4200.0	

SG Calibration (MOD)

SG Calibration Value (MOD)

–10 dBm

PCC (MHz)	SG Setting (dBm)	SCC: PCC – 19.8 (MHz)	SG Setting (dBm)	SCC: PCC + 19.8 (MHz)	SG Setting (dBm)
717.8		698.0		737.6	
2719.8		2700.0		2739.6	
3400.0		3380.2		3419.8	
3780.2		3760.4		3800.0	
4180.2		4160.4		4200.0	

Linearity Calibration

Linearity Calibration

Frequency (MHz)	SG Level (dBm)	SA Measured Value (dBm)	Calibration Value (C) (B) – (A) (dB)	SG Level (dBm)	SA Measured Value (dBm)	Calibration Value (C) (B) – (A) (dB)
698.0	0	(A)		–30	(A)	
	–10	(B)		–40	(B)	
	–20	(B)		–50	(B)	
	–30	(B)		–60	(B)	
717.8	0	(A)		–30	(A)	
	–10	(B)		–40	(B)	
	–20	(B)		–50	(B)	
	–30	(B)		–60	(B)	
737.6	0	(A)		–30	(A)	
	–10	(B)		–40	(B)	
	–20	(B)		–50	(B)	
	–30	(B)		–60	(B)	
2700.0	0	(A)		–30	(A)	
	–10	(B)		–40	(B)	
	–20	(B)		–50	(B)	
	–30	(B)		–60	(B)	
2719.8	0	(A)		–30	(A)	
	–10	(B)		–40	(B)	
	–20	(B)		–50	(B)	
	–30	(B)		–60	(B)	
2739.6	0	(A)		–30	(A)	
	–10	(B)		–40	(B)	
	–20	(B)		–50	(B)	
	–30	(B)		–60	(B)	
3380.2	0	(A)		–30	(A)	
	–10	(B)		–40	(B)	
	–20	(B)		–50	(B)	
	–30	(B)		–60	(B)	
3400.0	0	(A)		–30	(A)	
	–10	(B)		–40	(B)	
	–20	(B)		–50	(B)	
	–30	(B)		–60	(B)	
3419.8	0	(A)		–30	(A)	
	–10	(B)		–40	(B)	
	–20	(B)		–50	(B)	
	–30	(B)		–60	(B)	

Linearity Calibration (Cont'd)

Linearity Calibration (Cont'd)

Frequency (MHz)	SG Level (dBm)	SA Measured Value (dBm)	Calibration Value (C) (B) – (A) (dB)	SG Level (dBm)	SA Measured Value (dBm)	Calibration Value (C) (B) – (A) (dB)
3760.4	0	(A)		–30	(A)	
	–10	(B)		–40	(B)	
	–20	(B)		–50	(B)	
	–30	(B)		–60	(B)	
3780.2	0	(A)		–30	(A)	
	–10	(B)		–40	(B)	
	–20	(B)		–50	(B)	
	–30	(B)		–60	(B)	
3800.0	0	(A)		–30	(A)	
	–10	(B)		–40	(B)	
	–20	(B)		–50	(B)	
	–30	(B)		–60	(B)	
4160.4	0	(A)		–30	(A)	
	–10	(B)		–40	(B)	
	–20	(B)		–50	(B)	
	–30	(B)		–60	(B)	
4180.2	0	(A)		–30	(A)	
	–10	(B)		–40	(B)	
	–20	(B)		–50	(B)	
	–30	(B)		–60	(B)	
4200.0	0	(A)		–30	(A)	
	–10	(B)		–40	(B)	
	–20	(B)		–50	(B)	
	–30	(B)		–60	(B)	

Tx Power Measurement Accuracy (CW)

Tx Power Measurement Accuracy

MU887000A Port 1/2, MU887001A Port 1/2/3/4, MU887002A TRX 1/2 Port 1/2

Input Level: –10 dBm (Item 6.5.1 Calibration Value)

PCC (MHz)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
		Lo Limit	Measurement Accuracy –10 – (Pow)	Hi Limit	Measurement uncertainty
717.8		–0.5		+0.5	±0.15
2719.8					
3400.0					
3780.2					
4180.2		–0.7		+0.7	±0.33

Input Level: –10 dBm (Item 6.5.1 Calibration Value)

SCC: PCC – 19.8 (MHz)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
		Lo Limit	Measurement Accuracy –10 – (Pow)	Hi Limit	Measurement uncertainty
698.0		–0.7		+0.7	±0.15
2700.0					
3380.2		–1.0		+1.0	±0.14
3760.4					
4160.4		–1.0		+1.0	±0.33

Input Level: –10 dBm (Item 6.5.1 Calibration Value)

SCC: PCC + 19.8 (MHz)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
		Lo Limit	Measurement Accuracy –10 – (Pow)	Hi Limit	Measurement uncertainty
737.6		–0.7		+0.7	±0.15
2739.6					
3419.8		–1.0		+1.0	±0.14
3800.0					
4200.0		–1.0		+1.0	±0.33

Tx Power Measurement Accuracy (CW) (Cont'd)

Tx Power Measurement Accuracy

MU887000A Port 1/2, MU887001A Port 1/2/3/4, MU887002A TRX 1/2 Port 1/2

Input Level: –50 dBm (Item 6.5.3 Calibration Value)

PCC (MHz)	Item 6.5.3 –50 dBm Calibration Value (C) (dB)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –10 – (Pow)	Hi Limit	Measurement uncertainty
717.8			–0.7		+0.7	±0.14
2719.8						
3400.0						
3780.2						
4180.2			–0.9		+0.9	±0.33

Input Level: –50 dBm (Item 6.5.3 Calibration Value)

SCC: PCC – 19.8 (MHz)	Item 6.5.3 –50 dBm Calibration Value (C) (dB)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –10 – (Pow)	Hi Limit	Measurement uncertainty
698.0			–0.7		+0.7	±0.14
2700.0						
3380.2			–1.0		+1.0	±0.14
3760.4						
4160.4			–1.0		+1.0	±0.33

Input Level: –50 dBm (Item 6.5.3 Calibration Value)

SCC: PCC + 19.8 (MHz)	Item 6.5.3 –50 dBm Calibration Value (C) (dB)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –10 – (Pow)	Hi Limit	Measurement uncertainty
737.6			–0.7		+0.7	±0.14
2739.6						
3419.8			–1.0		+1.0	±0.14
3800.0						
4200.0			–1.0		+1.0	±0.33

Tx Power Measurement Accuracy (CW) (Cont'd)

Tx Power Measurement Accuracy

MU887000A Port 1/2, MU887001A Port 1/2/3/4, MU887002A TRX 1/2 Port 1/2

Input Level: –60 dBm (Item 6.5.3 Calibration Value)

PCC (MHz)	Item 6.5.3 –60 dBm Calibration Value (C) (dB)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –20 – (Pow)	Hi Limit	Measurement uncertainty
717.8			–0.9		+0.9	±0.33
2719.8						
3400.0						
3780.2						
4180.2			–1.1		+1.1	±0.33

Input Level: –60 dBm (Item 6.5.3 Calibration Value)

SCC: PCC–19.8 (MHz)	Item 6.5.3 –50 dBm Calibration Value (C) (dB)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –20 – (Pow)	Hi Limit	Measurement uncertainty
698.0			–0.9		+0.9	±0.34
2700.0						
3380.2			–1.3		+1.3	±0.14
3760.4						
4160.4			–1.3		+1.3	±0.33

Input Level: –60 dBm (Item 6.5.3 Calibration Value)

SCC: PCC+19.8 (MHz)	Item 6.5.3 –50 dBm Calibration Value (C) (dB)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –20 – (Pow)	Hi Limit	Measurement uncertainty
737.6			–0.9		+0.9	±0.34
2739.6						
3419.8			–1.3		+1.3	±0.14
3800.0						
4200.0			–1.3		+1.3	±0.33

Tx Power Measurement Accuracy (CW) (Cont'd)

Tx Power Measurement Accuracy MU887000A Port 3/4

Input Level: –10 dBm (Item 6.5.1 Calibration Value)

PCC (MHz)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
		Lo Limit	Measurement Accuracy –10 – (Pow)	Hi Limit	Measurement uncertainty
717.8		–0.7		+0.7	±0.17
2719.8					
3400.0					
3780.2					
4180.2		–0.7		+0.7	±0.28

Input Level: –10 dBm (Item 6.5.1 Calibration Value)

SCC: PCC – 19.8 (MHz)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
		Lo Limit	Measurement Accuracy –10 – (Pow)	Hi Limit	Measurement uncertainty
698.0		–0.7		+0.7	±0.17
2700.0					
3380.2		–1.0		+1.0	±0.14
3760.4					
4160.4		–1.0		+1.0	±0.20

Input Level: –10 dBm (Item 6.5.1 Calibration Value)

SCC: PCC + 19.8 (MHz)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
		Lo Limit	Measurement Accuracy –10 – (Pow)	Hi Limit	Measurement uncertainty
737.6		–0.7		+0.7	±0.17
2739.6					
3419.8		–1.0		+1.0	±0.14
3800.0					
4200.0		–1.0		+1.0	±0.20

Tx Power Measurement Accuracy (CW) (Cont'd)

Tx Power Measurement Accuracy MU887000A Port 3/4

Input Level: –50 dBm (Item 6.5.3 Calibration Value)

PCC (MHz)	Item 6.5.3 –50 dBm Calibration Value (C) (dB)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –10 – (Pow)	Hi Limit	Measurement uncertainty
717.8			–0.9		+0.9	±0.14
2719.8						
3400.0						
3780.2						
4180.2			–0.9		+0.9	±0.20

Input Level: –50 dBm (Item 6.5.3 Calibration Value)

SCC: PCC – 19.8 (MHz)	Item 6.5.3 –50 dBm Calibration Value (C) (dB)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –10 – (Pow)	Hi Limit	Measurement uncertainty
698.0			–0.9		+0.9	±0.24
2700.0						
3380.2			–1.0		+1.0	±0.24
3760.4						
4160.4			–1.0		+1.0	±0.20

Input Level: –50 dBm (Item 6.5.3 Calibration Value)

SCC: PCC + 19.8 (MHz)	Item 6.5.3 –50 dBm Calibration Value (C) (dB)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –10 – (Pow)	Hi Limit	Measurement uncertainty
737.6			–0.9		+0.9	±0.24
2739.6						
3419.8			–1.0		+1.0	±0.24
3800.0						
4200.0			–1.0		+1.0	±0.20

Tx Power Measurement Accuracy (CW) (Cont'd)

Tx Power Measurement Accuracy MU887000A Port 3/4

Input Level: –60 dBm (Item 6.5.3 Calibration Value)

PCC (MHz)	Item 6.5.3 –60 dBm Calibration Value (C) (dB)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –20 – (Pow)	Hi Limit	Measurement uncertainty
717.8			–1.1		+1.1	±0.14
2719.8						
3400.0						
3780.2						
4180.2			–1.1		+1.1	±0.20

Input Level: –60 dBm (Item 6.5.3 Calibration Value)

SCC: PCC – 19.8 (MHz)	Item 6.5.3 –60 dBm Calibration Value (C) (dB)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –20 – (Pow)	Hi Limit	Measurement uncertainty
698.0			–1.1		+1.1	±0.14
2700.0						
3380.2			–1.3		+1.3	±0.14
3760.4						
4160.4			–1.3		+1.3	±0.20

Input Level: –60 dBm (Item 6.5.3 Calibration Value)

SCC: PCC+19.8 (MHz)	Item 6.5.3 –60 dBm Calibration Value (C) (dB)	MX887013A/14A Measured Value (Pow) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –20 – (Pow)	Hi Limit	Measurement uncertainty
737.6			–1.1		+1.1	±0.14
2739.6						
3419.8			–1.3		+1.3	±0.14
3800.0						
4200.0			–1.3		+1.3	±0.20

Tx Power Measurement Linearity

Linearity (±0.2 dB: 0 to –30 dB, ≥ –50 dBm, Reference Level 0 dBm)

Frequency (MHz)	SG LEVEL (dBm)	Item 6.5.3 Calibration Value (C) (dB)	MX887013A/14A Measured Value (dBm)	Linearity (D) – (REF) – (C) (dB)	Spec. (dB)	Measurement uncertainty
698.0	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
717.8	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
737.6	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
2700.0	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
2719.8	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
2739.6	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
3380.2	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
3400.0	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
3419.8	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			

Tx Power Measurement Linearity (Cont'd)

Linearity (±0.2 dB: 0 to –30 dB, ≥ –50 dBm, Reference Level 0 dBm) (Cont'd)

Frequency (MHz)	SG LEVEL (dBm)	Item 6.5.3 Calibration Value (C) (dB)	MX887013A/14A Measured Value (dBm)	Linearity (D) – (REF) – (C) (dB)	Spec. (dB)	Measurement uncertainty
3760.4	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
3780.2	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
3800.0	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
4160.4	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
4180.2	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			
4200.0	0		(REF)			
	–10		(D)		±0.2	±0.05
	–20		(D)			
	–30		(D)			

Tx Power Measurement Linearity (Cont'd)

Linearity (±0.2 dB: 0 to –30 dB, ≥ –60 dBm, Reference Level –30 dBm)

Frequency (MHz)	SG LEVEL (dBm)	Item 6.5.3 Calibration Value (C) (dB)	MX887013A/14A Measured Value (dBm)	Linearity (D) – (REF) – (C) (dB)	Spec. (dB)	Measurement uncertainty
698.0	–30		(REF)			
	–40		(D)		±0.2	±0.05
	–50		(D)			
	–60		(D)		±0.4	
717.8	–30		(REF)			
	–40		(D)		±0.2	±0.05
	–50		(D)			
	–60		(D)		±0.4	
737.6	–30		(REF)			
	–40		(D)		±0.2	±0.05
	–50		(D)			
	–60		(D)		±0.4	
2700.0	–30		(REF)			
	–40		(D)		±0.2	±0.05
	–50		(D)			
	–60		(D)		±0.4	
2719.8	–30		(REF)			
	–40		(D)		±0.2	±0.05
	–50		(D)			
	–60		(D)		±0.4	
2739.6	–30		(REF)			
	–40		(D)		±0.2	±0.05
	–50		(D)			
	–60		(D)		±0.4	
3380.2	–30		(REF)			
	–40		(D)		±0.2	±0.05
	–50		(D)			
	–60		(D)		±0.4	
3400.0	–30		(REF)			
	–40		(D)		±0.2	±0.05
	–50		(D)			
	–60		(D)		±0.4	
3419.8	–30		(REF)			
	–40		(D)		±0.2	±0.05
	–50		(D)			
	–60		(D)		±0.4	

Tx Power Measurement Linearity (Cont'd)

Linearity (±0.2 dB: 0 to –30 dB, ≥ –60 dBm, Reference Level –30 dBm) (Cont'd)

Frequency (MHz)	SG LEVEL (dBm)	Item 6.5.3 Calibration Value (C) (dB)	MX887013A/14A Measured Value (dBm)	Linearity (D) – (REF) – (C) (dB)	Spec. (dB)	Measurement uncertainty
3760.4	–30		(REF)			
	–40		(D)		±0.2	±0.05
	–50		(D)			
	–60		(D)		±0.4	
3780.2	–30		(REF)			
	–40		(D)		±0.2	±0.05
	–50		(D)			
	–60		(D)		±0.4	
3800.0	–30		(REF)			
	–40		(D)		±0.2	±0.05
	–50		(D)			
	–60		(D)		±0.4	
4160.4	–30		(REF)			
	–40		(D)		±0.2	±0.05
	–50		(D)			
	–60		(D)		±0.4	
4180.2	–30		(REF)			
	–40		(D)		±0.2	±0.05
	–50		(D)			
	–60		(D)		±0.4	
4200.0	–30		(REF)			
	–40		(D)		±0.2	±0.05
	–50		(D)			
	–60		(D)		±0.4	

Frequency/Modulation Measurement

Residual EVM/Carrier Frequency Accuracy

Input Level: –40 dBm

Frequency (MHz)	Residual EVM (%)			Carrier Frequency Accuracy (Hz)		
	Measured Value	Spec.	Measurement uncertainty	Measured Value	Spec.	Measurement uncertainty
698.0		≤ 2.5	±0.1		±15.0	±3.0
717.8						
737.6						
2700.0						
2719.8						
2739.6						
3380.2						
3400.0						
3419.8						
3760.4						
3780.2						
3800.0						
4160.4		≤ 2.5	±0.1		±15.0	±3.0
4180.2						
4200.0						

In-Band Emission Measurement

In-Band Emission

Input Level: –10 dBm

SG Frequency (PCC + 9.9) (MHz)	PCC (dB)	SCC (dB)	Spec.
707.9			≤ –40 dBc
2709.9			
3409.9			
3809.9			
4190.1			≤ –40 dBc

Adjacent Channel Leakage Power Ratio Measurement

Adjacent Channel Leakage Power Ratio

Input Level: –10 dBm / –14 dBm

SG Frequency (MHz)		Adjacent Channel Leakage Power Ratio (dB)					
PCC Frequency (MHz)	PCC ± 9.9 (MHz)	Band					
		UTRA (–2)	UTRA (–1)	UTRA (+1)	UTRA (+2)	E-UTRA (–1)	E-UTRA (+1)
698.0	+9.9						
2700.0	–9.9						
	+9.9						
3400.0	–9.9						
	+9.9						
3800.0	–9.9						
	+9.9						
4180.2	–9.9						
	+9.9						
Spec. (dB)		≥ 55 dB	≥ 50 dB	≥ 50 dB	≥ 55 dB	≥ 45 dB	≥ 45 dB
Measurement uncertainty		1 dB					

6.7 Servicing

If any unit is found to be broken or does not operate as described in the specifications, contact an Anritsu Service and Sales office. Contact information can be found on the last page of the printed version of this manual, and is available in a separate file on the PDF version.

When requesting repair, supply the following information:

(a) Model name and serial number marked on rear panel

(b) Failure symptoms

(c) Person to contact about nature of failure and repair completion notification

(d) Software version

Appendix A Specifications

This appendix lists the specifications of the MX887013A LTE FDD Uplink TX Measurement and MX887014A LTE TDD Uplink TX Measurement. Refer to section 1.2 “Composition” for details of the product configuration.

A.1 MX887013A/MX887014A A-2
A.2 MX887013A-001/MX887014A-001 ..... A-6

A.1 MX887013A/MX887014A

This section explains the specifications of MX887013A LTE FDD Uplink and MX887014A LTE TDD Uplink where the software options are not installed.

These specifications assume use of the system at a constant temperature after warming-up the instruments for 30 minutes. The abbreviation (typ.) indicates the reference data at 20 to 30°C and is not a guaranteed value.

For MU887002A, when the ports 1 and 2 of TRX 1 or TRX 2 satisfy the specifications, the specifications of the ports 3 to 12 of the same TRX are guaranteed by design.

Table A.1-1 MX887013A/MX887014A Specifications

Item	Specification		
Common Items			
Frequency Range	600 to 2700 MHz, 3400 to 3800 MHz		(MU887000A/01A)
	600 to 2700 MHz, 3400 to 4200 MHz		(With MU887000A/01A-001)
	600 to 2700 MHz, 3400 to 4200 MHz		(MU887002A)
Measuring Object	PUSCH, PUCCH		
RF Power			
Input Level Range	MU887000A	Port 1, Port 2:	–65.0 to +35.0 dBm
		Port 3, Port 4:	–65.0 to +25.0 dBm
	MU887001A	Port 1 to 4:	–65.0 to +35.0 dBm
	MU887002A	TRX 1/2, Port 1 to 12:	–65.0 to +35.0 dBm

Table A.1-1 MX887013A/MX887014A Specifications (Cont'd)

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Measurement Accuracy</td><td>
MU887000A Port 1, Port 2: After calibration, 20 to 30°C
MU887001A Port 1 to 4: After calibration, 20 to 30°C
MU887002A TRX 1/2, Port 1 to 12: After calibration, 20 to 30°C
Frequency: 600 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 3800 MHz
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +35 dBm</td><td>±0.3 dB (typ.)</td></tr>
</table>
MU887000A Port 1, Port 2: After calibration, 10 to 40°C
MU887001A Port 1 to 4: After calibration, 10 to 40°C
MU887002A TRX 1/2, Port 1 to 12: After calibration, 20 to 30°C
Frequency: 600 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 3800 MHz
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +35 dBm</td><td>±0.5 dB</td></tr>
<tr><td>–50 to –20 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±0.9 dB</td></tr>
</table>
MU887000A Port 1, Port 2: After calibration, 20 to 30°C
MU887001A Port 1 to 4: After calibration, 20 to 30°C
MU887002A TRX 1/2, Port 1 to 12: After calibration, 20 to 30°C
Frequency: 3800 MHz < f ≤ 4200 MHz
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +35 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–50 to –20 dBm</td><td>±0.9 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.1 dB</td></tr>
</table>
MU887000A Port 3, Port 4: After calibration, 10 to 40°C
Frequency: 600 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 3800 MHz
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +25 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–50 to –20 dBm</td><td>±0.9 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.1 dB</td></tr>
</table>
MU887000A Port 3, Port 4: After calibration, 20 to 30°C
Frequency: 3800 MHz < f ≤ 4200 MHz
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +25 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–50 to –20 dBm</td><td>±0.9 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.1 dB</td></tr>
</table>
</td></tr>
</table>

Table A.1-1 MX887013A/MX887014A Specifications (Cont'd)

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Linearity</td><td>Frequency: 600 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 4200 MHz
<table>
<tr><th>Input Level</th><th>Linearity</th></tr>
<tr><td>≥ –50 dBm (0 to 40 dB)</td><td>±0.2 dB</td></tr>
<tr><td>≥ –60 dBm (0 to 40 dB)</td><td>±0.4 dB</td></tr>
</table></td></tr>
<tr><td>Relative Level Accuracy</td><td>For range < 2 dB
Frequency: 600 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 4200 MHz
<table>
<tr><th>Input Level</th><th>Relative Measurement Accuracy</th></tr>
<tr><td>≥ –50 dBm (0 to 40 dB)</td><td>±0.1 dB (typ.)</td></tr>
</table></td></tr>
</table>

Table A.1-1 MX887013A/MX887014A Specifications (Cont'd)

Item	Specification
Modulation Analysis	
Input Level Range	MU887000A Port 1, Port 2: –40.0 to +35.0 dBm Port 3, Port 4: –40.0 to +25.0 dBm MU887001A Port 1 to 4: –40.0 to +35.0 dBm MU887002A TRX 1/2, Port 1 to 12: –40.0 to +35.0 dBm
Carrier Frequency Accuracy	±(Set frequency × Reference oscillator accuracy + 15 Hz) Frequency: 600 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 4200 MHz
Modulation accuracy	Residual Vector Error: ≤2.5% Frequency: 600 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 4200 MHz (20 averaging times)
In-Band Emissions	≤ –40 dBc (Input Level ≥–10 dBm and Allocated RBs ≤18)
Occupied Bandwidth	
Input Level Range	MU887000A Port 1, Port 2: –10.0 to +35.0 dBm Port 3, Port 4: –10.0 to +25.0 dBm MU887001A Port 1 to 4: –10.0 to +35.0 dBm MU887002A TRX 1/2, Port 1 to 12: –10.0 to +35.0 dBm
OBW Ratio	80.0 to 99.9%
Adjacent Channel Leakage Power Ratio	
Input Level Range	MU887000A Port 1, Port 2: –10.0 to +35.0 dBm Port 3, Port 4: –10.0 to +25.0 dBm MU887001A Port 1 to 4: –10.0 to +35.0 dBm MU887002A TRX 1/2, Port 1 to 12: 600 MHz ≤ frequency ≤ 2700 MHz –10.0 to +35.0 dBm 3400 MHz ≤ frequency ≤ 4200 MHz –14.0 to +35.0 dBm
Measurement Range	Frequency: 600 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 4200 MHz
Spectrum Emission Mask (SEM)	
Input Level Range	MU887000A Port 1, Port 2: –10.0 to +35.0 dBm Port 3, Port 4: –10.0 to +25.0 dBm MU887001A Port 1 to 4: –10.0 to +35.0 dBm MU887002A TRX 1/2, Port 1 to 12: –10.0 to +35.0 dBm

Adjacent Channel	Measurement Range
E-UTRA ACLR1	≥ 45 dB
UTRA ACLR1	≥ 50 dB
UTRA ACLR2	≥ 55 dB

A.2 MX887013A-001/MX887014A-001

This section explains the specifications of MX887013A-001 LTE-Advanced FDD Uplink CA TX Measurement and MX887014A-001 LTE-Advanced TDD Uplink CA TX Measurement.
These specifications assume use of the system at a constant temperature after warming-up the instruments for 30 minutes. The abbreviation (typ.) indicates the reference data at 20 to 30°C and is not a guaranteed value.
For MU887002A, when the ports 1 and 2 of TRX 1 or TRX 2 satisfy the specifications, the specifications of the ports 3 to 12 of the same TRX are guaranteed by design.

Table A.2-1 MX887013A-001/MX887014A-001 Specifications

Item	Specification		
Common Items			
Frequency	698 to 2700 MHz, 3400 to 3800 MHz		(MU887000A/01A)
	698 to 2700 MHz, 3400 to 4200 MHz		(With MU887000A/01A-001)
	698 to 2700 MHz, 3400 to 4200 MHz		(MU887002A)
Measuring Object	PUSCH		
RF Power			
Input Level Range	MU887000A	Port 1, Port 2:	–65.0 to +35.0 dBm
		Port 3, Port 4:	–65.0 to +25.0 dBm
	MU887001A	Port 1 to 4:	–65.0 to +35.0 dBm
	MU887002A	TRX 1/2, Port 1 to 12:	–65.0 to +35.0 dBm

Table A.2-1 MX887013A-001/MX887014A-001 Specifications (Cont'd)

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Measurement Accuracy</td><td>
Excluding when measuring Intraband Contiguous CA SCC and PCC + SCC
MU887000A Port 1, Port 2: After calibration, 20 to 30°C
MU887001A Port 1 to 4: After calibration, 20 to 30°C
MU887002A TRX 1/2, Port 1 to 12: After calibration, 20 to 30°C
Frequency: 698 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 3800 MHz
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +35 dBm</td><td>±0.3 dB (typ.)</td></tr>
</table>
MU887000A Port 1, Port 2: After calibration, 10 to 40°C
MU887001A Port 1 to 4: After calibration, 10 to 40°C
MU887002A TRX 1/2, Port 1 to 12: After calibration, 20 to 30°C
Frequency: 698 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 3800 MHz
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +35 dBm</td><td>±0.5 dB</td></tr>
<tr><td>–50 to –20 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±0.9 dB</td></tr>
</table>
MU887000A Port 1, Port 2: After calibration, 20 to 30°C
MU887001A Port 1 to 4: After calibration, 20 to 30°C
MU887002A TRX 1/2, Port 1 to 12: After calibration, 20 to 30°C
Frequency: 3800 MHz < f ≤ 4200 MHz
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +35 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–50 to –20 dBm</td><td>±0.9 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.1 dB</td></tr>
</table>
</td></tr>
</table>

Table A.2-1 MX887013A-001/MX887014A-001 Specifications (Cont'd)

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Measurement Accuracy (Cont'd)</td><td>
When measuring Intraband Contiguous CA SCC and PCC + SCC
MU887000A Port 1, Port 2: After calibration, 20 to 30°C
MU887001A Port 1 to 4: After calibration, 20 to 30°C
MU887002A TRX 1/2, Port 1 to 12: After calibration, 20 to 30°C
Frequency: 698 MHz ≤ f ≤ 2700 MHz
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +35 dBm</td><td>±0.5 dB (typ.)</td></tr>
</table>
MU887000A Port 1, Port 2: After calibration, 10 to 40°C
MU887001A Port 1 to 4: After calibration, 10 to 40°C
MU887002A TRX 1/2, Port 1 to 12: After calibration, 20 to 30°C
Frequency: 698 MHz ≤ f ≤ 2700 MHz
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +35 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–50 to +20 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±0.9 dB</td></tr>
</table>
MU887000A Port 1, Port 2: After calibration, 10 to 40°C
MU887001A Port 1 to 4: After calibration, 10 to 40°C
MU887002A TRX 1/2, Port 1 to 12: After calibration, 20 to 30°C
Frequency: 3400 MHz ≤ f ≤ 3800 MHz
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–50 to +35 dBm</td><td>±1.0 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.3 dB</td></tr>
</table>
MU887000A Port 1, Port 2: After calibration, 20 to 30°C
MU887001A Port 1 to 4: After calibration, 20 to 30°C
MU887002A TRX 1/2, Port 1 to 12: After calibration, 20 to 30°C
Frequency: 3800 MHz < f ≤ 4200 MHz
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–50 to +35 dBm</td><td>±1.0 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.3 dB</td></tr>
</table>
</td></tr>
</table>

Table A.2-1 MX887013A-001/MX887014A-001 Specifications (Cont'd)

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Measurement Accuracy (Cont'd)</td><td>
Excluding when measuring Intraband Contiguous CA SCC and PCC + SCC
MU887000A Port 3, Port 4: After calibration, 10 to 40°C
Frequency: 698 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 3800 MHz
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +25 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–50 to –20 dBm</td><td>±0.9 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.1 dB</td></tr>
</table>
MU887000A Port 3, Port 4: After calibration, 20 to 30°C
Frequency: 3800 MHz < f ≤ 4200 MHz
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +25 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–50 to –20 dBm</td><td>±0.9 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.1 dB</td></tr>
</table>
When measuring Intraband Contiguous CA SCC and PCC + SCC
MU887000A Port 3, Port 4: After calibration, 10 to 40°C
Frequency: 698 MHz ≤ f ≤ 2700 MHz
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–20 to +25 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–50 to –20 dBm</td><td>±0.9 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.1 dB</td></tr>
</table>
MU887000A Port 3, Port 4: After calibration, 10 to 40°C
Frequency: 3400 MHz ≤ f ≤ 3800 MHz
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–50 to +25 dBm</td><td>±1.0 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.3 dB</td></tr>
</table>
MU887000A Port 3, Port 4: After calibration, 20 to 30°C
Frequency: 3800 MHz < f ≤ 4200 MHz
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–50 to +25 dBm</td><td>±1.0 dB</td></tr>
<tr><td>–60 to –50 dBm</td><td>±1.3 dB</td></tr>
</table>
</td></tr>
<tr><td>Linearity</td><td>
Frequency: 698 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 4200 MHz (20 to 30°C)
<table>
<tr><th>Input Level</th><th>Linearity</th></tr>
<tr><td>≥ –50 dBm (0 to 30 dB)</td><td>±0.2 dB</td></tr>
<tr><td>≥ –60 dBm (0 to 30 dB)</td><td>±0.4 dB</td></tr>
</table>
</td></tr>
</table>

Table A.2-1 MX887013A-001/MX887014A-001 Specifications (Cont'd)

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Modulation Analysis
Input Level Range</td><td>MU887000A Port 1, Port 2: –40.0 to +35.0 dBm
Port 3, Port 4: –40.0 to +25.0 dBm
MU887001A Port 1 to 4: –40.0 to +35.0 dBm
MU887002A TRX 1/2, Port 1 to 12: –40.0 to +35.0 dBm</td></tr>
<tr><td>Carrier Frequency Accuracy</td><td>±(Set frequency × Reference oscillator accuracy + 15 Hz)
Frequency: 698 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 4200 MHz</td></tr>
<tr><td>Modulation accuracy</td><td>Residual Vector Error: ≤ 2.5%
Frequency: 698 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 4200 MHz
(20 averaging times)</td></tr>
<tr><td>In-Band Emissions</td><td>≤ –40 dBc (Input Level ≥ –10 dBm and Allocated RBs ≤ 18)</td></tr>
<tr><td>Occupied Bandwidth
Input Level Range</td><td>MU887000A Port 1, Port 2: –10.0 to +35.0 dBm
Port 3, Port 4: –10.0 to +25.0 dBm
MU887001A Port 1 to 4: –10.0 to +35.0 dBm
MU887002A TRX 1/2, Port 1 to 12: –10.0 to +35.0 dBm</td></tr>
<tr><td>OBW Ratio</td><td>80.0 to 99.9%</td></tr>
<tr><td>Adjacent Channel Leakage Power Ratio
Input Level Range</td><td>MU887000A Port 1, Port 2: –10.0 to +35.0 dBm
Port 3, Port 4: –10.0 to +25.0 dBm
MU887001A Port 1 to 4: –10.0 to +35.0 dBm
MU887002A TRX 1/2, Port 1 to 12:
698MHz ≤ frequency ≤ 2700 MHz –10.0 to +35.0 dBm
3400 MHz ≤ frequency ≤ 4200 MHz –14.0 to +35.0 dBm</td></tr>
<tr><td>Measurement Range</td><td>Frequency: 698 MHz ≤ f ≤ 2700 MHz, 3400 MHz ≤ f ≤ 4200 MHz
<table>
<tr><th>Adjacent Channel</th><th>Measurement Range</th></tr>
<tr><td>E-UTRA ACLR1</td><td>≥ 45 dB</td></tr>
<tr><td>UTRA ACLR1</td><td>≥ 50 dB</td></tr>
<tr><td>UTRA ACLR2</td><td>≥ 55 dB</td></tr>
</table></td></tr>
<tr><td>Spectrum Emission Mask (SEM)
Input Level Range</td><td>MU887000A Port 1, Port 2: –10.0 to +35.0 dBm
Port 3, Port 4: –10.0 to +25.0 dBm
MU887001A Port 1 to 4: –10.0 to +35.0 dBm
MU887002A TRX 1/2, Port 1 to 12: –10.0 to +35.0 dBm</td></tr>
</table>

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