

# **MX887023A LTE FDD Downlink TX Measurement Operation Manual**

**Fifth 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**

# Safety Symbols

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## Symbols used in manual



### **DANGER**

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



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



### **CAUTION**

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



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



These indicate that the marked part should be recycled.

MX887023A  
LTE FDD Downlink TX Measurement  
Operation Manual

15 August 2014 (First Edition)  
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#### **Revision History:**

February 29th, 2020  
December 17th, 2021

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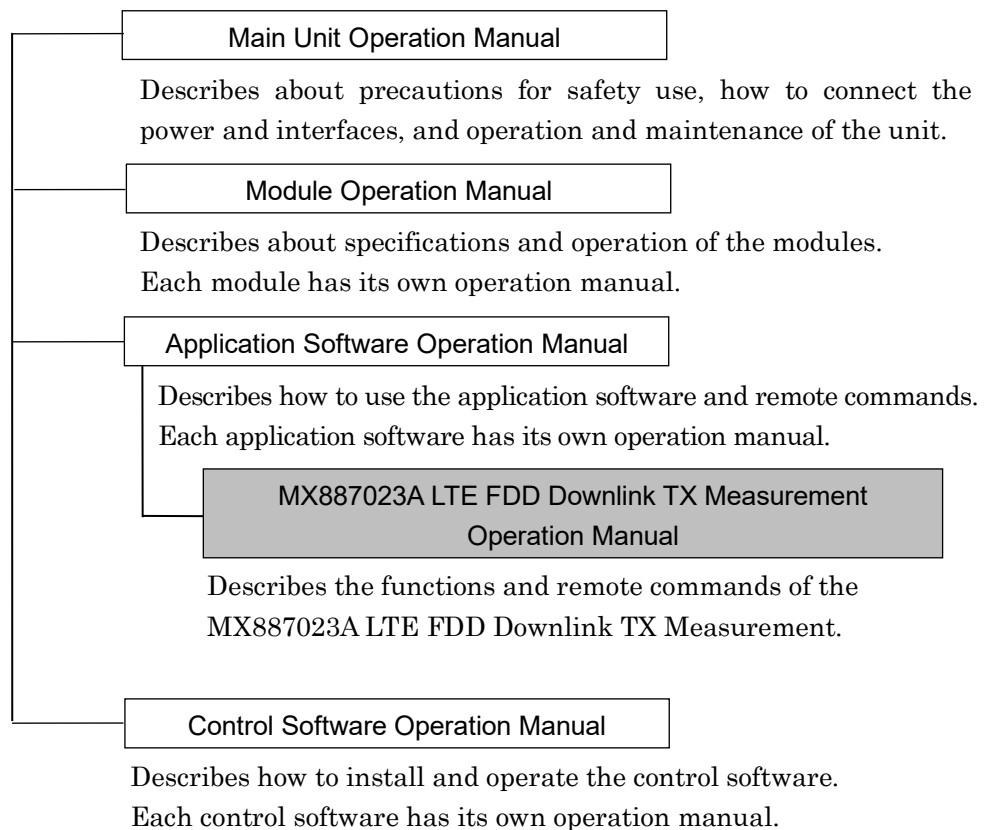
# About This Manual

This manual mainly describes the operation of the MX887023A LTE FDD Downlink TX Measurement.

Products related to the MT8870A Universal Wireless Test Set include:

- MT8870A Universal Wireless Test Set (main unit)
- Modules installed in the MT8870A
- Application software installed in the 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

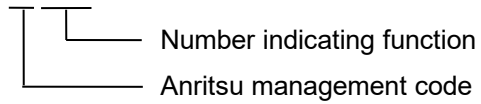
Except where there is a good reason to do otherwise, this manual assumes the use of MT8870A and MU887000A.

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.

MU88700XA- x x x



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# Chapter 1 Outline

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

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## 1.1 Outline of LTE FDD Downlink TX Measurement

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

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

## 1.2 Composition

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

**Table 1.2-1 MX887023A Composition**

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

## 1.3 License Registration

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

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

## 1.4 Abbreviations

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

**Table 1.4-1 Abbreviations**

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



## Chapter 2 Fundamental Measurement

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

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## 2.1 Common Operations

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

### 2.1.1 Selecting application

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

```
:INSTRument[:SElect]
```

### 2.1.2 Selecting measurement function

Select a measurement function of small-cell application software using the following command:

To measure LTE FDD Downlink Tx signals with MU887000A, set 3GLTE\_DL,ACT to the parameters. (=LTE FDD Downlink Tx measurement function)

To transmit LTE FDD Uplink signals or other signals, such as interfering signals, from MU887000A, set SG,ACT to the parameters. (=SG function)

```
:INSTRument:SYSTem
```

### 2.1.3 Setting ports

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

Outputting test ports are used by the SG function.

Inputting test ports are used by the LTE FDD Downlink Tx measurement function.

Set Port1 to Port4 at the parameter

```
:ROUTE:PORT:CONNection:DIRection
```

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

For the descriptions of the cable loss correction commands and loss correction data, refer to Chapter 3 “Fundamental Operation” in the *MU887000A TRX Test Module Operation Manual*.

## 2.2 Common Operations for SG Function

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

### 2.2.1 Frequency and level

#### Frequency

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

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

#### Level

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

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

## 2.2.2 Setting transmission signal

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

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

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

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

Load the waveform file into the waveform memory using the following commands:

Refer to Chapter 5 “SCPI Command Reference” in the MU887000A TRX Test Module Operation Manual.

- To load waveform file into the waveform memory  
:SOURce:GPRF:GENerator:ARB:FILE:LOAD
- To query the file name in the waveform memory  
:SOURce:GPRF:GENerator:ARB:WAVEform:NAME
- To optimize the waveform memory capacity  
:SOURce:GPRF:GENerator:ARB:WAVEform:DEFrag
- To delete waveform file in the waveform memory  
:SOURce:GPRF:GENerator:ARB:WAVEform:DELeTe
- To query the waveform memory free space  
:SOURce:GPRF:GENerator:ARB:WAVEform:FREE

### 2.2.3 Waveform patterns

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

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

## 2.3 Common Operations for LTE FDD Downlink Tx Measurement Function

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

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

### 2.3.1 Frequency and level

Frequency

Set the Rx frequency of MU887000A using the following command:

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

Level

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

```
[ :SENSe] :BATCh :BAND [ 0 ] :POWeR [ :RF ] :RANGe :ILEVeL
```

### 2.3.2 Setting LTE signals

Set the following items to configure the LTE signal.

#### Channel Bandwidth

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

Set the channel bandwidth of the measurement target signal using the following command:

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

#### Type of test model

The following six test model signals (E-UTRA Test Models) for radio performance tests on LTE base station are defined in the 3GPP TS 36.141, Section 6.1.1:

E-TM1.1, E-TM1.2, E-TM2, E-TM3.1, E-TM3.2, E-TM3.3

Using the following command, set the type of MX887023A's test model to Off (when not using any test model) or one of the above-mentioned six types:

```
[ :SENSe] :BATCh:CC[0] :RADio:TMODe1
```

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

Refer to Chapter 3, "SCPI Command Reference" for details.

### 2.3.3 Setting measurement

Set the following measurement items.

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

## 2.3.4 Starting measurement

Starting measurement

Start measurement using the following command:

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

```
:INITiate:MODE:SINGLE
```

Checking measurement status

Query the measurement status and errors using the following command:

```
:STATus:ERRor?
```

**Table 2.3.4-1 Bit Definition of Query Response**

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

## 2.4 Modulation Analysis

Modulation analysis measures:

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

Using the following commands, set the subframes that are subject to modulation analysis, set whether or not to perform averaging, and set the storage count.

Modulation analysis of the specified subframes is performed each time measurement is performed.

Averaging is performed on consecutive frames, and its storage count can be set in the range of 2 to 100.

```
[ :SENSe ] :BATCh:CAPTure:TIME:START
[ :SENSe ] :BATCh:CAPTure:TIME:LENGth
[ :SENSe ] :BATCh:AVEAge [ :STATe ]
[ :SENSe ] :BATCh:AVEAge:COUNT
```

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

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

The respective measurement items are described in the following subsections.

### 2.4.1 Frequency Error

Frequency error measurement measures the downlink carrier frequency error.

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

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

### 2.4.2 Error Vector Magnitude (EVM)

EVM is the magnitude ratio of the error vector to the reference vector. The error vector is the difference between the vector of the measured signal and the reference vector.

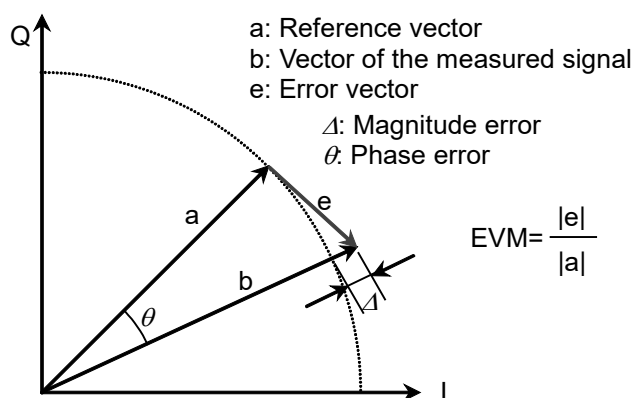


Figure 2.4.2-1 Definition of EVM

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

### 2.4.3 Output Power

Output Power is the average RF level including Cyclic Prefix.

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

#### 2.4.4 Tx Power

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

The center frequency of the power measurement is determined by the frequency set in 2.3.1, “Frequency and level”.

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

#### 2.4.5 RS Power (RSTP)

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

#### 2.4.6 OFDM Symbol Tx Power (OSTP)

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

## 2.5 Occupied Bandwidth (OBW)

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

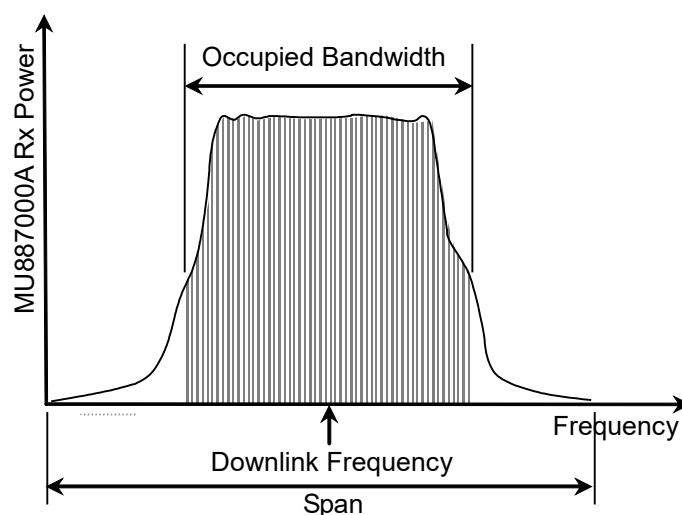


Figure 2.5-1 Occupied Bandwidth

The Occupied Bandwidth measurement settings are:

Downlink frequency

Specify the center frequency by referring to:

- Frequency described in Section 2.3.1 “Frequency and level”

Span

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

Table 2.5-1 Frequency Span for Occupied Bandwidth Measurements

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

### Measurement enable and measurement count

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

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

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

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

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

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

## 2.6 Adjacent Channel Leakage Power Ratio (ACLR)

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

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

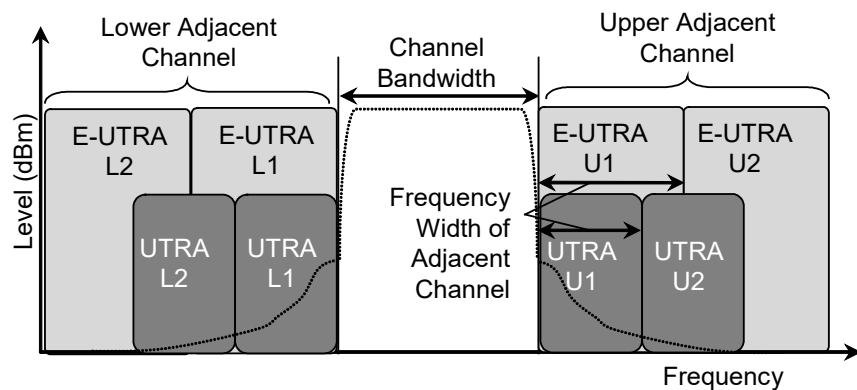


Figure 2.6-1 Adjacent Channels for ACLR Measurement

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

Table 2.6-1 Adjacent Channel Measurement Bandwidth (MHz)

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

The ACLR measurement settings are:

Measurement enable and measurement count

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

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

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

```
[ :SENSe]:BATCh:CAPTure:TIME:UWEMissions:START
[ :SENSe]:BATCh:CAPTure:TIME:UWEMissions:LENGTH
[ :SENSe]:BATCh:AVERage:UWEMissions[:STATE]
```

## 2.6 Adjacent Channel Leakage Power Ratio (ACLR)

---

[ :SENSe ] :BATCh :AVERAge :UWEMissions :COUNT

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

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

2

Fundamental Measurement

## 2.7 Operating Band Unwanted Emissions (OBUE)

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

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

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

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

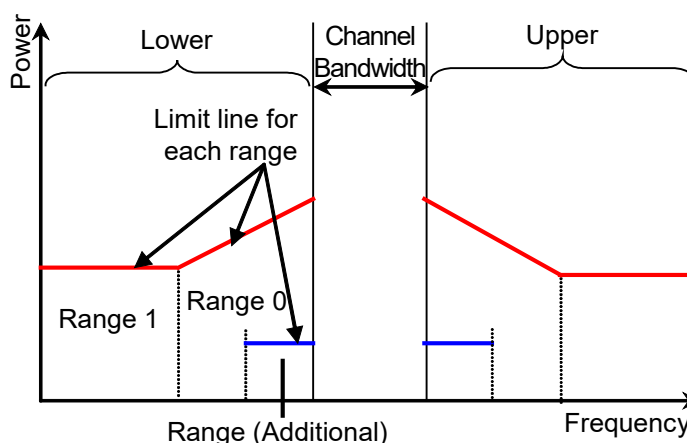


**Figure 2.7-1 Frequency Range of the Respective OBUE Limit Lines**

The OBUE measurement settings are:

### Setting the limit lines

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

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

## 2.7 Operating Band Unwanted Emissions (OBUE)

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

**Note:**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

#### Measurement enable and measurement count

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

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

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

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

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

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

## 2.8 Capturing Waveform Data

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

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

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

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

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

## 2.9 Sample Commands

This section describes sample commands based on specific measurement examples.

### 2.9.1 Example of Operating Band Unwanted Emissions (OBUE)

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

#### Processing Flow

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

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

|                                          |             |
|------------------------------------------|-------------|
| Operating Band Unwanted Emissions (OBUE) | MEDIUM1_U3G |
|------------------------------------------|-------------|
7. Start measurement.
8. Query measurement results after measurement is completed.

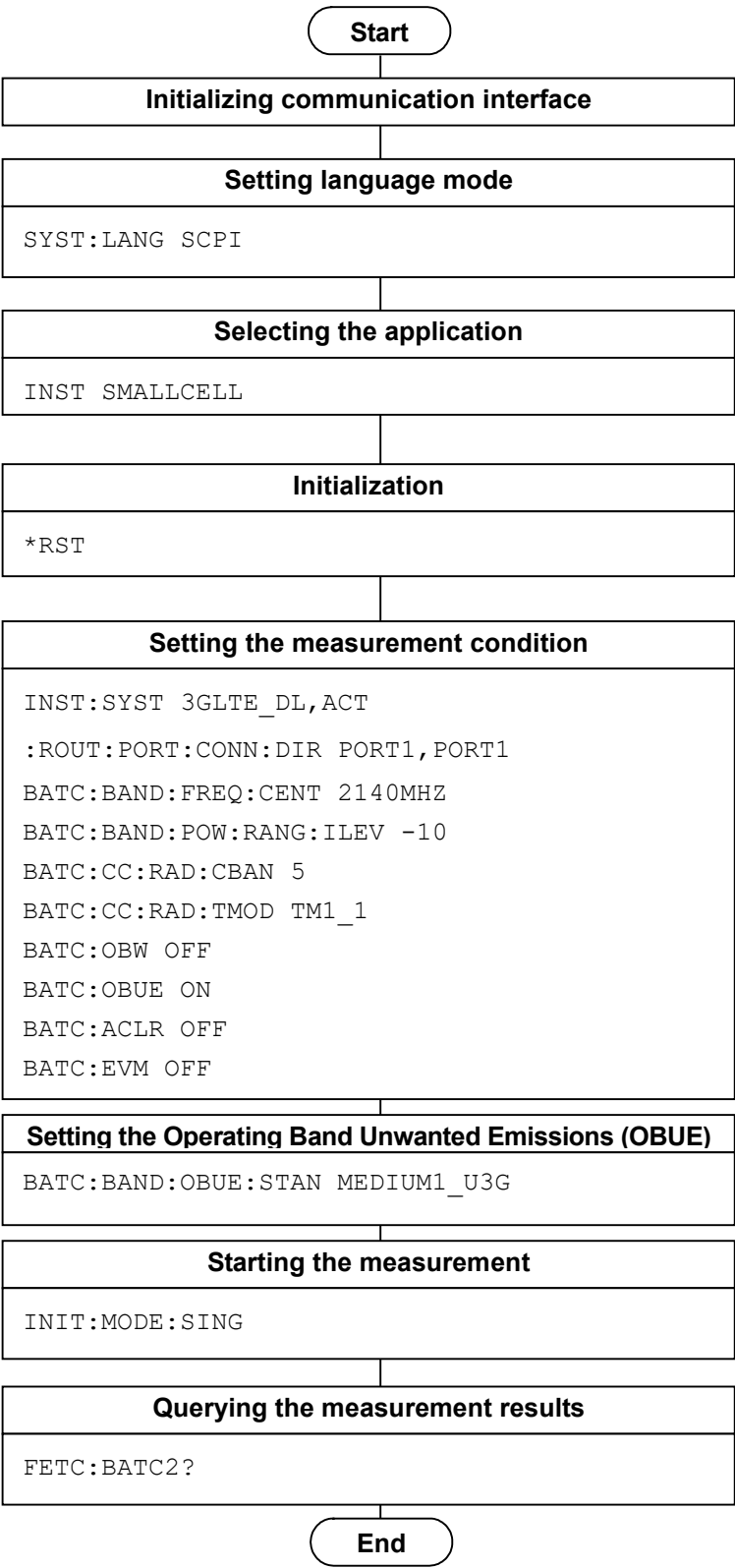


Figure 2.9.1-1 Example of Operating Band Unwanted Emissions measurement

## 2.9.2 Example of modulation analysis measurement

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

### Processing Flow

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

|                                |          |
|--------------------------------|----------|
| Test Port                      | Port 1   |
| Input Level                    | −20 dBm  |
| Uplink Frequency               | 2140 MHz |
| Channel Bandwidth              | 5 MHz    |
| Test model                     | E-TM3.1  |
| Occupied Bandwidth Measurement | OFF      |
| Operating Band Unwanted        | OFF      |
| Emissions (OBUE) Measurement   |          |
| Adjacent Channel Leakage Power | OFF      |
| Ratio Measurement              |          |
| Modulation Analysis            | ON       |
6. Start measurement.
7. Query the following measurement results when measurement is completed.

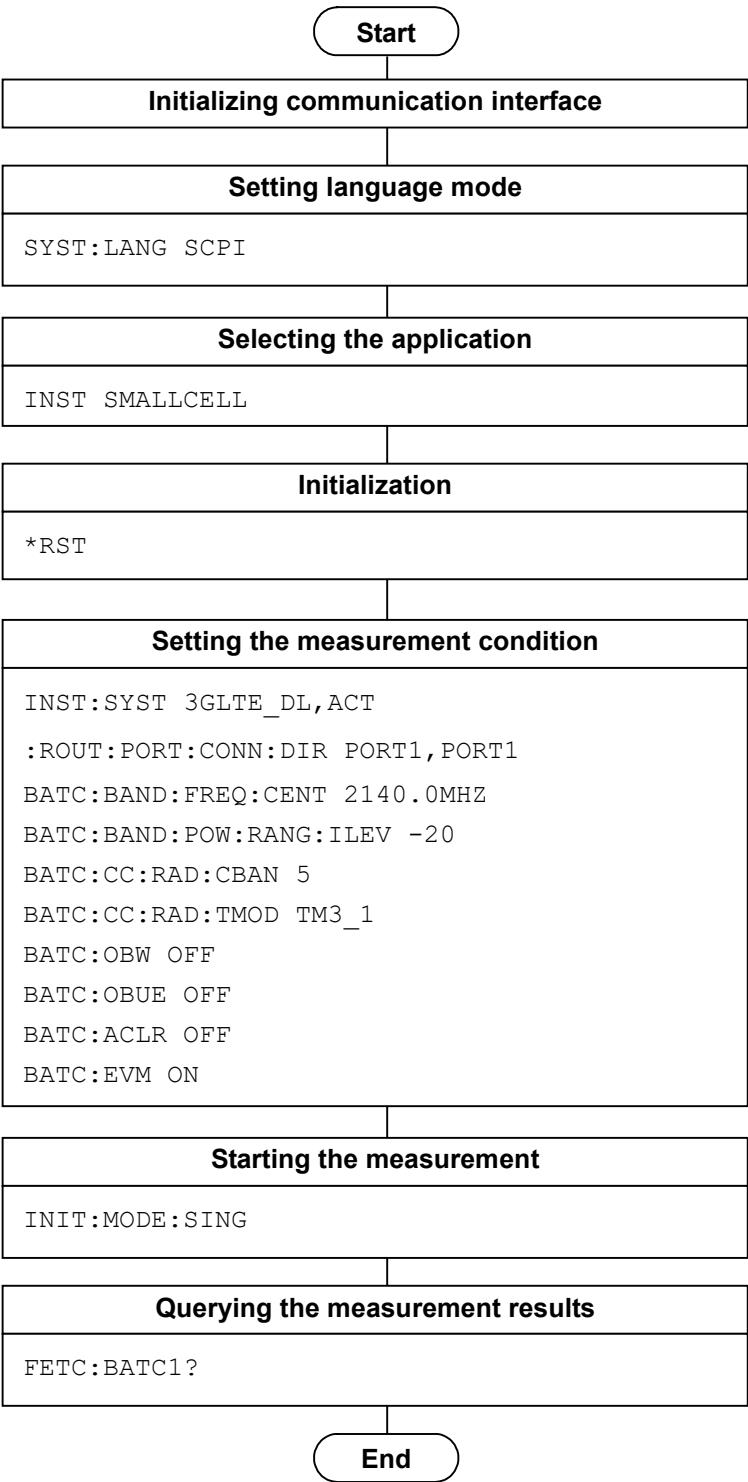


Figure 2.9.2-1 Example of Modulation Analysis measurement



## Chapter 3 SCPI Command Reference

This chapter describes the details of SCPI commands.

To switch to the SCPI command mode, send the command SYST:LANG SCPI.

|        |                                                        |      |
|--------|--------------------------------------------------------|------|
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| 3.2.11 | Setting SG Modulation and AWGN.....                    | 3-96 |
| 3.2.12 | Setting Parameters for MT8870.....                     | 3-97 |

## 3.1 List of Commands

The following table shows the rules for describing messages.

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

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

### Conversion rule

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

### Example 1

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

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

- ↓  
:CALC:BATC:CC:PSS <integer>,<switch>
4. Remove the leading colon “:”.  
:CALC:BATC:CC:PSS <integer>,<switch>
- ↓  
CALC:BATC:CC:PSS <integer>,<switch>
5. Specify values for the arguments.  
CALC:BATC:CC:PSS <integer>,<switch>
- ↓  
CALC:BATC:CC:PSS 0,ON

**Example 2**

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

1. Delete the numeric parameter in the program header , and describe the argument corresponding to the numeric parameter as the first argument.  
:FETCh:BATCh[n]?  
↓  
:FETCh:BATCh? <integer>  
(The argument <integer> represents an integer number.)
2. Change all keywords from long form to short form (abbreviated version).  
:FETCh:BATCh? <integer>  
↓  
:FETC:BATC? <integer>
3. Remove the leading colon “:”.  
:FETC:BATC? <integer>  
↓  
FETC:BATC? <integer>
4. Specify a value for the argument.  
FETC:BATC? <integer>  
↓  
FETC:BATC? 1

### 3.1.1 Selecting Application and Initialization

Table 3.1.1-1 Selecting Application

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

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

### 3.1.2 Setting Basic Parameters (Batch Measurement)

Table 3.1.2-1 Setting Basic Parameters (Batch Measurement)

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

### 3.1.3 Setting System Parameters (Batch Measurement)

Table 3.1.3-1 Setting System Parameters (Batch Measurement)

| Function                                         | Command                                                                               | Query                                                               | Response    |
|--------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------|
| Channel Bandwidth                                | <code>[[:SENSe]:BATCh:CC[0]:RADi<br/>o:CBANdwidth &lt;mode&gt;</code>                 | <code>[[:SENSe]:BATCh:CC[0]:RADi<br/>o:CBANdwidth?</code>           | <mode>      |
| Test Model                                       | <code>[[:SENSe]:BATCh:CC[0]:RADi<br/>o:TMODe1 &lt;mode&gt;</code>                     | <code>[[:SENSe]:BATCh:CC[0]:RADi<br/>o:TMODe1?</code>               | <mode>      |
| Synchronization Mode                             | <code>[[:SENSe]:BATCh:CC[0]:RADi<br/>o:SYNChronization:MODE<br/>&lt;mode&gt;</code>   | <code>[[:SENSe]:BATCh:CC[0]:RADi<br/>o:SYNChronization:MODE?</code> | <mode>      |
| Reference Signal Mode                            | <code>:CALCulate:BATCh:CC[0]:R<br/>SIGnal:MODE &lt;mode&gt;</code>                    | <code>:CALCulate:BATCh:CC[0]:RS<br/>IGnal:MODE?</code>              | <mode>      |
| Reference Signal Cell ID                         | <code>:CALCulate:BATCh:CC[0]:R<br/>SIGnal:CELLid &lt;integer&gt;</code>               | <code>:CALCulate:BATCh:CC[0]:RS<br/>IGnal:CELLid?</code>            | <integer>   |
| Cell Specific Reference Signal<br>Power Boosting | <code>:CALCulate:BATCh:CC[0]:R<br/>SIGnal:POWer:BOOSting<br/>&lt;rel_power&gt;</code> | <code>:CALCulate:BATCh:CC[0]:RS<br/>IGnal:POWer:BOOSting?</code>    | <rel_power> |
| Number of Antenna Ports                          | <code>:CALCulate:BATCh:CC[0]:A<br/>NTenna:NUMBer &lt;mode&gt;</code>                  | <code>:CALCulate:BATCh:CC[0]:AN<br/>Tenna:NUMBer?</code>            | <mode>      |
| Reference Signal Antenna Port                    | <code>:CALCulate:BATCh:CC[0]:A<br/>PORT &lt;integer&gt;</code>                        | <code>:CALCulate:BATCh:CC[0]:AP<br/>ORt?</code>                     | <integer>   |

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

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

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

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

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

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

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

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

### 3.1.4 Common Measurement Function

Table 3.1.4-1 Common Measurement Function

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

### 3.1.5 Batch Measurement Function

Table 3.1.5-1 Batch Measurement Function

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

### 3.1.6 Setting Batch Measurement Parameters

Table 3.1.6-1 Setting Batch Measurement Parameters

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

### 3.1.7 Measurement Status Query

Table 3.1.7-1 Measurement Status Query

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

### 3.1.8 Setting SG Frequency

Table 3.1.8-1 Setting SG Frequency

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

### 3.1.9 Setting SG Level

Table 3.1.9-1 Setting SG Level

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

### 3.1.10 Playing/Selecting/Loading SG Waveform Pattern

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

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

### 3.1.11 Setting SG Modulation and AWGN

Table 3.1.11-1 Setting SG Modulation and AWGN

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

3.1.12 Setting Parameters for MT8870

Table 3.1.12-1 Setting Parameters for MT8870

| Function                             | Command                                                                                | Query                          | Response                                              |
|--------------------------------------|----------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------|
| Application Select                   | :INSTrument[:SElect]<br><app>                                                          | :INSTrument[:SElect]?          | <app>                                                 |
| Set Connect Port Direction           | :ROUTe:PORT:CONNect:DIREction<br><input>,<output>[,<output>,<br><output>,...,<output>] | :ROUTe:PORT:CONNect:DIREction? | <input>,<output>[,<output>,<br><output>,...,<output>] |
| Language Selection of Remote Command | :SYSTem:LANGuage <mode>                                                                | :SYSTem:LANGuage?              | <mode>                                                |

## 3.2 Details of Commands

This section describes the commands in functional order.

### ■ Terms in this command list

|                        |                                  |
|------------------------|----------------------------------|
| EX .....               | Command name (header)            |
| Example .....          | Command function name            |
| Function .....         | Command function                 |
| Command .....          | Programming command syntax       |
| Query .....            | Query syntax                     |
| Response .....         | Response syntax                  |
| Parameter .....        | Parameter definition             |
| Details .....          | Command restrictions and others  |
| Example of Use .....   | Command usage example            |
| Related Commands ..... | Introduction of related commands |

### ■ Suffix Code list

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

### 3.2.1 Selecting application

#### :INSTrument:SYSTem

Application Switch And Window Status

##### Function

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

##### Command

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

##### Query

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

##### Response

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

##### Parameter

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

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

|              |                                     |
|--------------|-------------------------------------|
| <window>     | Application status                  |
| ACTive       | Operation enabled                   |
| When omitted | Same as ACT                         |
| <status>     | Application status                  |
| CURR         | Executed and targeted for operation |
| IDLE         | Loaded but not executed             |

##### Details

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

##### Example of Use

To switch the operation target application to the LTE FDD Downlink Measurement Software.

```
INST:SYST 3GLTE_DL,ACT
```

```
INST:SYST? 3GLTE_DL
```

```
> CURR,ACT
```

### 3.2.2 Setting Basic Parameters (Batch Measurement)

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

Center Frequency

#### Function

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

#### Command

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

#### Query

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

#### Response

`<freq>`

#### Parameter

|                           |                                                           |
|---------------------------|-----------------------------------------------------------|
| <code>&lt;freq&gt;</code> | Center frequency                                          |
| Range                     | 400.000000 to 3800.000000 MHz                             |
| Resolution                | 1 Hz                                                      |
| Suffix Code               | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ<br>Hz is used when omitted. |
| Default                   | 2140 MHz                                                  |

#### Example of Use

To set the center frequency to 2.000 GHz.

`BATC:BAND:FREQ:CENT 2.000GHZ`

`BATC:BAND:FREQ:CENT?`

`> 2000000000`

## `[[:SENSE]:BATCH:BAND[0]:FREQUENCY:SPAN?`

Frequency Span Query

### Function

This command queries the frequency span.

### Query

```
[[:SENSE]:BATCH:BAND[0]:FREQUENCY:SPAN?
```

### Response

```
<freq>
```

### Parameter

|            |                |
|------------|----------------|
| <freq>     | Frequency span |
| Range      | 160 MHz        |
| Resolution | 1 Hz           |

Value is returned in Hz units.

### Example of Use

```
To query the frequency span.  
BATC:BAND:FREQ:SPAN?  
> 160000000
```

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

Input Level

### Function

This command sets the input level of the input test port.

### Command

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

### Query

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

### Response

```
<real>
```

### Parameter

|             |                                                                          |
|-------------|--------------------------------------------------------------------------|
| <real>      | Input level                                                              |
| Range       |                                                                          |
| MU887000A   | –65.0 to +35.0 dBm (Port 1/Port 2)<br>–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 (TRX 1/2, Port 1 to Port 12)                          |
| Resolution  | 0.1                                                                      |
| Unit        | dBm                                                                      |
| Suffix Code | DBM                                                                      |
|             | dBm is used when omitted.                                                |
| Default     |                                                                          |
| MU887000A   | +35.0 dBm (Port 1/Port 2)<br>+25.0 dBm (Port 3/Port 4)                   |
| MU887001A   | +35.0 dBm (Port 1 to Port 4)                                             |
| MU887002A   | +35.0 dBm (TRX 1/2 Port 1 to Port 12)                                    |

### Details

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

### Example of Use

```
To set the input level to 0 dBm.  
BATC:BAND:POW:RANG:ILEV 0  
BATC:BAND:POW:RANG:ILEV?  
> 0.0
```

### 3.2.3 Setting System Parameters (Batch Measurement)

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

Channel Bandwidth

#### Function

This command sets the channel bandwidth.

#### Command

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

#### Query

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

#### Response

<mode>

#### Parameter

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

#### Example of Use

To set the channel bandwidth to 5 MHz.

BATC:CC:RAD:CBAN 5

BATC:CC:RAD:CBAN?

> 5

## `[[:SENSe]:BATCh:CC[0]:RADio:TMODEl`

Test Model

### Function

This command sets the type of a test model.

### Command

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

### Query

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

### Response

```
<mode>
```

### Parameter

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

### Example of Use

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

```
BATC:CC:RAD:TMOD TM1_1
```

```
BATC:CC:RAD:TMOD?
```

```
> TM1_1
```

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

Synchronization Mode

### Function

This command sets the synchronized signal.

### Command

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

### Query

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

### Response

```
<mode>
```

### Parameter

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

### Details

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

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

### Example of Use

To set Reference Signal to the synchronized signal.

```
BATC:CC:RAD:SYNC:MODE RS
```

```
BATC:CC:RAD:SYNC:MODE?
```

```
> RS
```

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

Reference Signal Mode

### Function

This command sets the mode of the reference signal.

### Command

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

### Query

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

### Response

```
<mode>
```

### Parameter

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

### Details

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

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

The parameter can be set to Auto only if Synchronization Mode is Synchronization Signal.

However, regardless of the setting of Synchronization Mode, you can always set this command.

### Example of Use

To set Auto for the mode of the reference signal.

```
CALC:BATC:CC:RSIG:MODE AUTO
```

```
CALC:BATC:CC:RSIG:MODE?
```

```
> AUTO
```

**:CALCulate:BATCH:CC[0]:RSIGnal:CELLid**

Reference Signal Cell ID

**Function**

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

**Command**

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

**Query**

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

**Response**

```
<integer>
```

**Parameter**

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

**Details**

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

**Example of Use**

To set the Cell ID to 2.

```
CALC:BATC:CC:RSIG:CELL 2
```

```
CALC:BATC:CC:RSIG:CELL?
```

```
> 2
```

## :CALCulate:BATCH:CC[0]:RSIGnal:POWer:BOOSting

Cell Specific Reference Signal Power Boosting

### Function

This command sets the boost level of the reference signal.

### Command

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

### Query

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

### Response

```
<rel_power>
```

### Parameter

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

### Details

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

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

### Example of Use

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

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

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

```
> 10.000
```

## :CALCulate:BATCH:CC[0]:ANTenna:NUMBer

Number of Antenna Ports

### Function

This command sets the number of antennas.

### Command

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

### Query

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

### Response

```
<mode>
```

### Parameter

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

### Details

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

If Test Model is set to other than Off, this parameter is set to 1.

### Example of Use

To set 2 for the number of antennas.

```
CALC:BATCH:CC:ANT:NUMB 2
```

```
CALC:BATCH:CC:ANT:NUMB?
```

```
> 2
```

## :CALCulate:BATCH:CC[0]:APORt

Reference Signal Antenna Port

### Function

This command sets the antenna to be measured.

### Command

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

### Query

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

### Response

```
<integer>
```

### Parameter

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

### Details

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

If Test Model is set to other than Off, this parameter is set to 0.

The maximum value applies if the set value exceeds the range due to change of Number of Antenna Ports.

### Example of Use

To set 2 to the antenna number to be measured.

```
CALC:BATCH:CC:APOR 2
```

```
CALC:BATCH:CC:APOR?
```

```
> 2
```

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

Analysis Time Starting Subframe Number

### Function

This command sets the analysis start position of Modulation Analysis.

### Command

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

### Query

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

### Response

```
<integer>
```

### Parameter

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

### Example of Use

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

```
BATC:CAPT:TIME:STAR 2
```

```
BATC:CAPT:TIME:STAR?
```

```
> 2
```

## [**:SENSe**]:**BATCh**:**CAPtUre**:**TIME**:**LENGth**

Analysis Time Measurement Interval

### Function

This command sets the analysis subframe length of Modulation Analysis.

### Command

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

### Query

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

### Response

```
<integer>
```

### Parameter

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

### Details

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

### Example of Use

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

```
BATC:CAPT:TIME:LENG 2
```

```
BATC:CAPT:TIME:LENG?
```

```
> 2
```

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

Analysis Time Starting OFDM Symbol Number

### Function

This command sets the analysis start position of Unwanted Emissions.

### Command

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

### Query

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

### Response

```
<integer>
```

### Parameter

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

### Example of Use

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

```
BATC:CAPT:TIME:UWEM:STAR 2
```

```
BATC:CAPT:TIME:UWEM:STAR?
```

```
> 2
```

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

Analysis Time Measurement Interval for Unwanted Emissions

### Function

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

### Command

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

### Query

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

### Response

```
<integer>
```

### Parameter

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

### Details

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

### Example of Use

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

```
BATC:CAPT:TIME:UWEM:LENG 2
```

```
BATC:CAPT:TIME:UWEM:LENG?
```

```
> 2
```

## :CALCulate:BATCH:CC[0]:PDSCh:MODulation

### PDSCH Modulation Scheme

#### Function

This command sets the PDSCH modulation scheme.

#### Command

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

#### Query

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

#### Response

```
<mode>
```

#### Parameter

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

#### Details

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

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

Select AUTO if the measurement target containing multiple modulation schemes.

#### Example of Use

To set the PDSCH modulation scheme to QPSK.

```
CALC:BATCH:CC:PDSC:MOD QPSK
```

```
CALC:BATCH:CC:PDSC:MOD?
```

```
> QPSK
```

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

Channel Estimation

### Function

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

### Command

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

### Query

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

### Response

```
<switch>
```

### Parameter

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

### Example of Use

To set the Channel Estimation function to On.

```
CALC:BATC:CC:CHAN:EST ON
```

```
CALC:BATC:CC:CHAN:EST?
```

```
> 1
```

:CALCulate:BATCH:CC[0]:PBCH[:STATe]  
PBCH On/Off

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

Command  
:CALCulate:BATCH:CC[0]:PBCH[:STATe] <switch>

Query  
:CALCulate:BATCH:CC[0]:PBCH[:STATe] ?

Response  
<switch>

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

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

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

## :CALCulate:BATCH:CC[0]:PBCH:POWer:AUTO

PBCH Power Auto

### Function

This command enables or disables automatic detection of PBCH power.

### Command

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

### Query

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

### Response

```
<switch>
```

### Parameter

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

### Details

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

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

This command will work only if PBCH is set to On. However, regardless of the setting of PBCH, you can always set this command.

### Example of Use

To enable automatic detection of PBCH power.

```
CALC:BATCH:CC:PBCH:POW:AUTO ON
```

```
CALC:BATCH:CC:PBCH:POW:AUTO?
```

```
> 1
```

## :CALCulate:BATCH:CC[0]:PBCH:POWer:BOOSting

### PBCH Power Boosting

#### Function

This command sets the PBCH boosting level.

#### Command

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

#### Query

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

#### Response

```
<rel_power>
```

#### Parameter

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

#### Details

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

If Test Model is set to other than Off, this parameter is automatically set to the value that conforms to 3GPP TS 36.141, 6.1.1 E-UTRA Test Models.

This command will work only if PBCH is set to On and PBCH Power Auto is set to OFF.

However, regardless of the setting of each of PBCH and PBCH Power Auto, you can always set this command.

#### Example of Use

To set the PBCH boosting level to +10 dB.

```
CALC:BATCH:CC:PBCH:POW:BOOS 10
```

```
CALC:BATCH:CC:PBCH:POW:BOOS?
```

```
> 10.000
```

## :CALCulate:BATCH:CC[0]:PSS[:STATe]

P-SS On/Off

### Function

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

### Command

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

### Query

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

### Response

```
<switch>
```

### Parameter

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

### Details

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

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

The parameter can be set to Off only if Synchronization Mode is Reference Signal. However, regardless of the setting of Synchronization Mode, you can always set this command.

### Example of Use

To configure a setting to include Primary Synchronization Signal.

```
CALC:BATCH:CC:PSS ON
```

```
CALC:BATCH:CC:PSS?
```

```
> 1
```

## :CALCulate:BATCH:CC[0]:PSS:POWer:AUTO

### P-SS Power Auto

#### Function

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

#### Command

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

#### Query

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

#### Response

```
<switch>
```

#### Parameter

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

#### Details

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

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

This command will work only if P-SS is set to On. However, regardless of the setting of P-SS, you can always set this command.

#### Example of Use

To enable automatic detection of primary synchronization signal power.

```
CALC:BATCH:CC:PSS:POW:AUTO ON
```

```
CALC:BATCH:CC:PSS:POW:AUTO?
```

```
> 1
```

## :CALCulate:BATCH:CC[0]:PSS:POWer:BOOSting

### P-SS Power Boosting

#### Function

This command sets the primary synchronization signal boosting level.

#### Command

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

#### Query

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

#### Response

```
<rel_power>
```

#### Parameter

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

#### Details

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

If Test Model is set to other than Off, this parameter is automatically set to the value that conforms to 3GPP TS 36.141, 6.1.1 E-UTRA Test Models.

This command will work only if P-SS is set to On and P-SS Power Auto is set to Off. However, regardless of the setting of each of P-SS and P-SS Power Auto, you can always set this command.

#### Example of Use

To set the primary synchronization signal boosting level to +10 dB.

```
CALC:BATCH:CC:PSS:POW:BOOS 10
```

```
CALC:BATCH:CC:PSS:POW:BOOS?
```

```
> 10.000
```

**:CALCulate:BATCH:CC[0]:SSS[:STATe]**

S-SS On/Off

**Function**

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

**Command**

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

**Query**

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

**Response**

```
<switch>
```

**Parameter**

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

**Details**

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

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

The parameter can be set to Off only if Synchronization Mode is Reference Signal. However, regardless of the setting of Synchronization Mode, you can always set this command.

**Example of Use**

To configure a setting to include Secondary Synchronization Signal as the measurement target.

```
CALC:BATCH:CC:SSS ON
```

```
CALC:BATCH:CC:SSS?
```

```
> 1
```

## :CALCulate:BATCH:CC[0]:SSS:POWer:AUTO

S-SS Power Auto

### Function

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

### Command

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

### Query

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

### Response

```
<switch>
```

### Parameter

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

### Details

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

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

This command will work only if S-SS is set to On. However, regardless of the setting of S-SS, you can always set this command.

### Example of Use

To enable automatic detection of secondary synchronization signal power.

```
CALC:BATCH:CC:SSS:POW:AUTO ON
```

```
CALC:BATCH:CC:SSS:POW:AUTO?
```

```
> 1
```

**:CALCulate:BATCH:CC[0]:SSS:POWer:BOOSting****S-SS Power Boosting****Function**

This command sets the secondary synchronization signal boosting level.

**Command**

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

**Query**

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

**Response**

```
<rel_power>
```

**Parameter**

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

**Details**

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

If Test Model is set to other than Off, this parameter is automatically set to the value that conforms to 3GPP TS 36.141, 6.1.1 E-UTRA Test Models.

This command will work only if S-SS is set to On and S-SS Power Auto is set to Off. However, regardless of the setting of each of S-SS and S-SS Power Auto, you can always set this command.

**Example of Use**

To set the secondary synchronization signal boosting level to +10 dB.

```
CALC:BATCH:CC:SSS:POW:BOOS 10
```

```
CALC:BATCH:CC:SSS:POW:BOOS?
```

```
> 10.000
```

## :CALCulate:BATCH:CC[0]:PDCCh[:STATe]

PDCCH On/Off

### Function

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

### Command

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

### Query

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

### Response

```
<switch>
```

### Parameter

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

### Details

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

### Example of Use

To configure a setting to include PDCCH as the measurement target.

```
CALC:BATCH:CC:PDCC ON
```

```
CALC:BATCH:CC:PDCC?
```

```
> 1
```

## :CALCulate:BATCH:CC[0]:PDCCh:POWer:AUTO

PDCCH Power Auto

### Function

This command enables or disables automatic detection of PDCCH power.

### Command

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

### Query

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

### Response

```
<switch>
```

### Parameter

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

### Details

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

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

This command will work only if PDCCH is set to On. However, regardless of the setting of PDCCH, you can always set this command.

### Example of Use

To enable automatic detection of PDCCH power.

```
CALC:BATC:CC:PDCC:POW:AUTO ON
```

```
CALC:BATC:CC:PDCC:POW:AUTO?
```

```
> 1
```

## :CALCulate:BATCH:CC[0]:PDCCh:POWer:BOOSting

### PDCCH Power Boosting

#### Function

This command sets the PDCCH boosting level.

#### Command

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

#### Query

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

#### Response

```
<rel_power>
```

#### Parameter

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

#### Details

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

If Test Model is set to other than Off, this parameter is automatically set to the value that conforms to 3GPP TS 36.141, 6.1.1 E-UTRA Test Models.

This command will work only if PDCCH is set to On and PDCCH Power Auto is set to Off.

However, regardless of the setting of each of PDCCH and PDCCH Power Auto, you can always set this command.

#### Example of Use

To set the PDCCH boosting level to +10 dB.

```
CALC:BATCH:CC:PDCC:POW:BOOS 10
```

```
CALC:BATCH:CC:PDCC:POW:BOOS?
```

```
> 10.000
```

**:CALCulate:BATCH:CC[0]:PDCCh:SYMBOL:AUTO**

Number of PDCCH Symbol Auto

**Function**

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

**Command**

```
:CALCulate:BATCH:CC[0]:PDCCh:SYMBOL:AUTO <switch>
```

**Query**

```
:CALCulate:BATCH:CC[0]:PDCCh:SYMBOL:AUTO?
```

**Response**

```
<switch>
```

**Parameter**

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

**Details**

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

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

This command will work only if PCFICH is set to On and PDCCH is set to On. However, regardless of the setting of each of PCFICH and PDCCH, you can always set this command.

**Example of Use**

To enable automatic detection of PDCCH symbol count.

```
CALC:BATCH:CC:PDCC:SYMBOL:AUTO ON
```

```
CALC:BATCH:CC:PDCC:SYMBOL:AUTO?
```

```
> 1
```

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

Number of PDCCH Symbol

### Function

This command sets the number of symbols for PDCCH.

### Command

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

### Query

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

### Response

```
<mode>
```

### Parameter

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

### Details

This command will work if all of the following conditions are met: Test Model is set to Off, PDCCH is set to On, and PDCCH Number of PDCCH Symbol Auto is set to Off. However, regardless of the setting of each of Test Model, PDCCH and Number of PDCCH Symbol Auto, you can always set this command.

The maximum value applies if the set value exceeds the range due to change of Channel Bandwidth.

### Example of Use

To set 1 as the number of symbols for PDCCH.

```
CALC:BATC:CC:PDCC:SYMB:NUMB 1
```

```
CALC:BATC:CC:PDCC:SYMB:NUMB?
```

```
> 1
```

## :CALCulate:BATCH:CC[0]:PDCCh:MAPPING

### PDCCH Mapping

#### Function

This command sets the PDCCH mapping specification method.

#### Command

```
:CALCulate:BATCH:CC[0]:PDCCh:MAPPING <mode>
```

#### Query

```
:CALCulate:BATCH:CC[0]:PDCCh:MAPPING?
```

#### Response

```
<mode>
```

#### Parameter

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

#### Details

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

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

This command will work only if PDCCH is set to On. However, regardless of the setting of PDCCH, you can always set this command.

#### Example of Use

To perform measurement assuming all resource elements as PDCCH.

```
CALC:BATCH:CC:PDCC:MAPP FULL
```

```
CALC:BATCH:CC:PDCC:MAPP?
```

```
> FULL
```

## :CALCulate:BATCH:CC[0]:PDCCh:MAPPING:EASY:FORMat

### PDCCH Format

#### Function

This command sets the PDCCH format.

#### Command

```
:CALCulate:BATCH:CC[0]:PDCCh:MAPPING:EASY:FORMat <mode>
```

#### Query

```
:CALCulate:BATCH:CC[0]:PDCCh:MAPPING:EASY:FORMat?
```

#### Response

```
<mode>
```

#### Parameter

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

#### Details

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

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

#### Example of Use

To set the PDCCH format to 1.

```
CALC:BATCH:CC:PDCC:MAPP:EASY:FORM 1
```

```
CALC:BATCH:CC:PDCC:MAPP:EASY:FORM?
```

```
> 1
```

**:CALCulate:BATCH:CC[0]:PDCCh:MAPPING:EASY:NUMBer**

Number of PDCCHs

**Function**

This command sets the number of PDCCHs.

**Command**

```
:CALCulate:BATCH:CC[0]:PDCCh:MAPPING:EASY:NUMBer <integer>
```

**Query**

```
:CALCulate:BATCH:CC[0]:PDCCh:MAPPING:EASY:NUMBer?
```

**Response**

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

**Parameter**

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

**Details**

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

If Test Model is set to other than Off, this parameter is automatically set to the value that conforms to 3GPP TS 36.141, 6.1.1 E-UTRA Test Models.

This command will work only if PDCCH is set to On and PDCCH Mapping is set to Easy.

However, regardless of the setting of each of PDCCH and PDCCH Mapping, you can always set this command.

**Example of Use**

To set 1 as the number of PDCCHs.

```
CALC:BATC:CC:PDCC:MAPP:EASY:NUMB 1
```

```
CALC:BATC:CC:PDCC:MAPP:EASY:NUMB?
```

```
> 1
```

## :CALCulate:BATCH:CC[0]:PCFich[:STATe]

PCFICH On/Off

### Function

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

### Command

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

### Query

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

### Response

```
<switch>
```

### Parameter

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

### Details

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

### Example of Use

To configure a setting to include PCFICH as the measurement target.

```
CALC:BATCH:CC:PCF ON
```

```
CALC:BATCH:CC:PCF?
```

```
> 1
```

:CALCulate:BATCH:CC[0]:PCFich:POWer:AUTO  
PCFICH Power Auto

Function  
This command enables or disables automatic detection of PCFICH power.

Command  
:CALCulate:BATCH:CC[0]:PCFich:POWer:AUTO <switch>

Query  
:CALCulate:BATCH:CC[0]:PCFich:POWer:AUTO?

Response  
<switch>

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

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

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

## :CALCulate:BATCH:CC[0]:PCFich:POWer:BOOSting

### PCFICH Power Boosting

#### Function

This command sets the PCFICH boosting level.

#### Command

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

#### Query

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

#### Response

```
<rel_power>
```

#### Parameter

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

#### Details

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

If Test Model is set to other than Off, this parameter is automatically set to the value that conforms to 3GPP TS 36.141, 6.1.1 E-UTRA Test Models.

This command will work only if PCFICH is set to On and PCFICH Power Auto is set to Off.

However, regardless of the setting of each of PCFICH and PCFICH Power Auto, you can always set this command.

#### Example of Use

To set the PCFICH boosting level to +10 dB.

```
CALC:BATC:CC:PCF:POW:BOOS 10
```

```
CALC:BATC:CC:PCF:POW:BOOS?
```

```
> 10.000
```

**:CALCulate:BATCH:CC[0]:PHICH[:STATe]**

PHICH On/Off

**Function**

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

**Command**`:CALCulate:BATCH:CC[0]:PHICH[:STATe] <switch>`**Query**`:CALCulate:BATCH:CC[0]:PHICH[:STATe] ?`**Response**`<switch>`**Parameter**

|                             |              |
|-----------------------------|--------------|
| <code>&lt;switch&gt;</code> | PHICH On/Off |
| <code>OFF 0</code>          | Off          |
| <code>ON 1</code>           | On (Default) |

**Details**

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

**Example of Use**

To configure a setting to include PHICH as the measurement target.

```
CALC:BATC:CC:PHIC ON
CALC:BATC:CC:PHIC?
> 1
```

## :CALCulate:BATCH:CC[0]:PHICH:POWer:AUTO

PHICH Power Auto

### Function

This command enables or disables automatic detection of PHICH power.

### Command

```
:CALCulate:BATCH:CC[0]:PHICH:POWer:AUTO <switch>
```

### Query

```
:CALCulate:BATCH:CC[0]:PHICH:POWer:AUTO?
```

### Response

```
<switch>
```

### Parameter

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

### Details

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

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

This command will work only if PHICH is set to On. However, regardless of the setting of PHICH, you can always set this command.

### Example of Use

To enable automatic detection of PHICH power.

```
CALC:BATC:CC:PHIC:POW:AUTO ON
```

```
CALC:BATC:CC:PHIC:POW:AUTO?
```

```
> 1
```

## :CALCulate:BATCH:CC[0]:PHICH:POWer:BOOSting

### PHICH Power Boosting

#### Function

This command sets the PHICH boosting level.

#### Command

```
:CALCulate:BATCH:CC[0]:PHICH:POWer:BOOSting <rel_power>
```

#### Query

```
:CALCulate:BATCH:CC[0]:PHICH:POWer:BOOSting?
```

#### Response

```
<rel_power>
```

#### Parameter

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

#### Details

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

If Test Model is set to other than Off, this parameter is automatically set to the value that conforms to 3GPP TS 36.141, 6.1.1 E-UTRA Test Models.

This command will work only if PHICH is set to On and PHICH Power Auto is set to Off.

However, regardless of the setting of each of PHICH and CC PHICH Power Auto, you can always set this command.

#### Example of Use

To set the PHICH boosting level to +10 dB.

```
CALC:BATC:CC:PHIC:POW:BOOS 10
```

```
CALC:BATC:CC:PHIC:POW:BOOS?
```

```
> 10.000
```

## :CALCulate:BATCH:CC[0]:PHICH:NG

PHICH Ng

### Function

This command sets Ng of PHICH.

### Command

```
:CALCulate:BATCH:CC[0]:PHICH:NG <mode>
```

### Query

```
:CALCulate:BATCH:CC[0]:PHICH:NG?
```

### Response

```
<mode>
```

### Parameter

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

### Details

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

If Test Model is set to other than Off, this parameter is set to R1BY6.

This command will work only if PHICH is set to On. However, regardless of the setting of PHICH, you can always set this command.

### Example of Use

To set Ng of PHICH to 1.

```
CALC:BATCH:CC:PHICH:NG R1
```

```
CALC:BATCH:CC:PHICH:NG?
```

```
> R1
```

## :CALCulate:BATCH:CC[0]:PHICH:DURation

PHICH Duration

### Function

This command sets the PHICH duration.

### Command

```
:CALCulate:BATCH:CC[0]:PHICH:DURation <mode>
```

### Query

```
:CALCulate:BATCH:CC[0]:PHICH:DURation?
```

### Response

```
<mode>
```

### Parameter

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

### Details

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

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

This command will work only if PHICH is set to On. However, regardless of the setting of PHICH, you can always set this command.

### Example of Use

To set the PHICH duration to Normal.

```
CALC:BATC:CC:PHIC:DUR NORM
```

```
CALC:BATC:CC:PHIC:DUR?
```

```
> NORM
```

## :CALCulate:BATCH:CC[0]:PDSCh:POWer:AUTO

PDSCH Power Auto

### Function

This command enables or disables automatic detection of PDSCH power.

### Command

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

### Query

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

### Response

```
<switch>
```

### Parameter

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

### Details

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

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

This command will work only if PDSCH Modulation Scheme is set to other than AUTO.

However, regardless of the setting of PDSCH Modulation Scheme, you can always set this command.

### Example of Use

To enable automatic detection of PDSCH power.

```
CALC:BATCH:CC:PDSC:POW:AUTO ON
```

```
CALC:BATCH:CC:PDSC:POW:AUTO?
```

```
> 1
```

## :CALCulate:BATCH:CC[0]:PDSCh:POWer:BOOSting

### PDSCH Power Boosting

#### Function

This command sets the PDSCH boosting level.

#### Command

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

#### Query

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

#### Response

```
<rel_power>
```

#### Parameter

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

#### Details

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

If Test Model is set to other than Off, this parameter is automatically set to the value that conforms to 3GPP TS 36.141, 6.1.1 E-UTRA Test Models.

This command will work only if PDSCH Modulation Scheme is set to other than AUTO and PDSCH Power Auto is set to Off. However, regardless of the setting of each of PDSCH Modulation Scheme and PDSCH Power Auto, you can always set this command.

#### Example of Use

To set the PDSCH boosting level to +10 dB.

```
CALC:BATC:CC:PDSC:POW:BOOS 10
```

```
CALC:BATC:CC:PDSC:POW:BOOS?
```

```
> 10.000
```

## **[[:SENSe]:BATCh:EVM[:STATe]**

Modulation Analysis

### Function

This command enables or disables the modulation analysis.

### Command

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

### Query

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

### Response

```
<switch>
```

### Parameter

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

### Example of Use

To configure a setting to include Batch Modulation Analysis.

```
BATC:EVM ON
```

```
BATC:EVM?
```

```
> 1
```

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

OBW

**Function**

This command enables or disables the OBW measurement.

**Command**

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

**Query**

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

**Response**

```
<switch>
```

**Parameter**

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

**Example of Use**

To set the OBW measurement to On.

```
BATC:OBW ON
```

```
BATC:OBW?
```

```
> 1
```

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

ACLR

### Function

This command enables or disables the ACLR measurement.

### Command

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

### Query

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

### Response

```
<switch>
```

### Parameter

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

### Example of Use

To set the ACLR measurement to On.

```
BATC:ACLR ON
```

```
BATC:ACLR?
```

```
> 1
```

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

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

**Command**  
[:SENSe]:BATCh:OBUE[:STATe] <switch>

**Query**  
[:SENSe]:BATCh:OBUE[:STATe]?

**Response**  
<switch>

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

**Example of Use**  
To set the OBUE measurement to On.  
BATC:OBUE ON  
BATC:OBUE?  
> 1

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

OBUE Standard

### Function

This command sets the template of the OBUE measurement.

### Command

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

### Query

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

### Response

```
<mode>
```

### Parameter

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

### Example of Use

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

```
BATC:BAND:OBUE:STAN HOME_U3G
```

```
BATC:BAND:OBUE:STAN?
```

```
> HOME_U3G
```

**[[:SENSe]:BATCh:BAND[0]:OBUE:STANdard:ADDitional**  
OBUE Standard Additional

**Function**  
This command sets the additional template of the OBUE measurement.

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

**Query**  
[:SENSe]:BATCh:BAND[0]:OBUE:STANdard:ADDitional?

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

**Example of Use**  
To set the additional template of the OBUE measurement to Band 5.  
BATC:BAND:OBUE:STAN:ADD 1  
BATC:BAND:OBUE:STAN:ADD?  
> 1

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

Interfering Mode

### Function

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

### Command

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

### Query

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

### Response

```
<switch>
```

### Parameter

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

### Example of Use

```
To set the Interfering Mode to On.  
BATC:BAND:INT:MODE ON  
BATC:BAND:INT:MODE?  
> 1
```

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

Interfering Frequency Offset

### Function

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

### Command

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

### Query

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

### Response

```
<freq>
```

### Parameter

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

### Example of Use

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

```
BATC:BAND:INT:FREQ:OFFS 7.5MHZ
```

```
BATC:BAND:INT:FREQ:OFFS?
```

```
> 7500000
```

## **[[:SENSE]:BATCh:BAND[0]:INTerfering:FREQuency:BANDwidth**

Interfering Frequency Bandwidth

### Function

This command sets the bandwidth of the interfering signal.

### Command

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

### Query

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

### Response

```
<freq>
```

### Parameter

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

### Example of Use

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

```
BATC:BAND:INT:FREQ:BAND 10MHZ
```

```
BATC:BAND:INT:FREQ:BAND?
```

```
> 10000000
```

### 3.2.4 Common Measurement Function

#### :INITiate:MODE:SINGle

Single Measurement

##### Function

This command starts single measurement.

##### Command

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

##### Example of Use

To start single measurement.

```
INIT:MODE:SING
```

## **:INITiate[:IMMediate]**

Initiate

### Function

This command starts measurement in the current measurement mode.

### Command

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

### Example of Use

To start measurement in the current measurement mode.

```
INIT
```

:TRIGger[:SEQuence][:STATe]

Trigger Switch

Function

This command sets the trigger wait state On/Off.

Command

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

Query

:TRIGger[:SEQuence][:STATe]?

Response

<switch>

Parameter

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

Example of Use

To set the trigger wait state On.  
TRIG ON  
TRIG?  
> 1

## :TRIGger[:SEQuence]:SOURce

Trigger Source

### Function

This command selects the trigger signal source.

### Command

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

### Query

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

### Response

```
<mode>
```

### Parameter

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

### Example of Use

To set the trigger signal source to external input.

```
TRIG:SOUR EXT
```

```
TRIG:SOUR?
```

```
> EXT
```

## :TRIGger[:SEQuence]:SLOPe

Trigger Slope

### Function

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

### Command

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

### Query

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

### Response

```
<mode>
```

### Parameter

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

### Example of Use

To detect a trigger at the rising edge.

```
TRIG:SLOP POS
```

```
TRIG:SLOP?
```

```
> POS
```

## :TRIGger[:SEQuence]:DELay

Trigger Delay

### Function

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

### Command

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

### Query

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

### Response

```
<time>
```

### Parameter

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

### Example of Use

To set the trigger delay time to 20 ms.

```
TRIG:DEL 20MS
```

```
TRIG:DEL?
```

```
> 0.020000
```

### 3.2.5 Batch Measurement Function

#### :INITiate:BATCh

Batch Initiate

#### Function

This command executes the measurement.

#### Command

:INITiate:BATCh

#### Example of Use

To execute the measurement.

INIT:BATC

## :FETCh:BATCh[n]?

Batch Query

### Function

This command queries the results of the measurement.

### Query

:FETCh:BATCh[n] ?

### Response

See Table 3.2.5-1.

### Details

An unmeasured value, for example 999.99, is returned if the measurement is not performed yet or its result is an error.

Unmeasured values are:

Measurement about Power [dB], [dBm]: 999.99

Frequency Error [Hz]: 9999999999.9

Frequency Error [ppm]: 9999999.999999

EVM: 999.99

Time Offset [s]: 9.999999999

OBW/ACLR/OBUE Frequency: 99999.999

Evaluation (Pass/Fail): - (hyphen)

### Example of Use

To query the results of the measurement.

FETC:BATC?

> 0,1.23,4.56,1.002.00,...

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

**Table 3.2.5-1 Responses to Measurement Results**

| n            | Result Mode | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 or omitted | A           | <p>Responses are returned with comma-separated value formats in the following order:</p> <ol style="list-style-type: none"> <li>1. Measurement status (response to the :STATus:ERRor? query)</li> <li>2. Frequency Error (Average) [Hz] (resolution 0.1 Hz)</li> <li>3. Frequency Error (Maximum) [Hz] (resolution 0.1 Hz)</li> <li>4. PDSCH EVM (Average) [%] (resolution 0.01 %)</li> <li>5. PDSCH EVM (Maximum) [%] (resolution 0.01 %)</li> <li>6. Output Power (Average) [dBm] (resolution 0.01 dB)</li> <li>7. Output Power (Maximum) [dBm] (resolution 0.01 dB)</li> <li>8. Output Power (Minimum) [dBm] (resolution 0.01 dB)</li> <li>9. RS Power (Average) [dBm] (resolution 0.01 dB)</li> <li>10. RS Power (Maximum) [dBm] (resolution 0.01 dB)</li> <li>11. RS Power (Minimum) [dBm] (resolution 0.01 dB)</li> <li>12. OSTP (Average) [dBm] (resolution 0.01 dB)</li> <li>13. OSTP (Maximum) [dBm] (resolution 0.01 dB)</li> <li>14. OSTP (Minimum) [dBm] (resolution 0.01 dB)</li> <li>15. PDSCH QPSK EVM (Average) [%] (resolution 0.01 %)</li> <li>16. PDSCH QPSK EVM (Maximum) [%] (resolution 0.01 %)</li> <li>17. PDSCH 16QAM EVM (Average) [%] (resolution 0.01 %)</li> <li>18. PDSCH 16QAM EVM (Maximum) [%] (resolution 0.01 %)</li> <li>19. PDSCH 64QAM EVM (Average) [%] (resolution 0.01 %)</li> <li>20. PDSCH 64QAM EVM (Maximum) [%] (resolution 0.01 %)</li> <li>21. Frequency Error (Average) [ppm] (resolution 0.000001 ppm)</li> <li>22. Frequency Error (Maximum) [ppm] (resolution 0.000001 ppm)</li> <li>23. 999.99</li> <li>24. 999.99</li> <li>25. 999.99</li> <li>26. 999.99</li> <li>27. 999.99</li> <li>28. 999.99</li> <li>29. 999.99</li> <li>30. 999.99</li> </ol> |

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

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

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

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

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

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

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

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

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

| n | Result Mode | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | A           | <p>Responses are returned with comma-separated value formats in the following order:</p> <ol style="list-style-type: none"> <li>1. Measurement Status (response to the :STATus:ERRor? query)</li> <li>2. OBW [MHz] (resolution 0.001 MHz)</li> <li>3. ACLR E-UTRA L2 [dB] (resolution 0.01 dB)</li> <li>4. ACLR E-UTRA L1 [dB] (resolution 0.01 dB)</li> <li>5. ACLR E-UTRA U1 [dB] (resolution 0.01 dB)</li> <li>6. ACLR E-UTRA U2 [dB] (resolution 0.01 dB)</li> <li>7. ACLR UTRA L2 [dB] (resolution 0.01 dB)</li> <li>8. ACLR UTRA L1 [dB] (resolution 0.01 dB)</li> <li>9. ACLR UTRA U1 [dB] (resolution 0.01 dB)</li> <li>10. ACLR UTRA U2 [dB] (resolution 0.01 dB)</li> <li>11. OBUE Margin [dB] (resolution 0.01 dB)</li> <li>12. OBUE Peak Absolute Level [dBm] (resolution 0.01 dB)</li> <li>13. OBUE Peak Frequency [MHz] (resolution 0.0001 MHz)</li> <li>14. 999.99</li> <li>15. 999.99</li> <li>16. 999.99</li> <li>17. 999.99</li> <li>18. 999.99</li> <li>19. 999.99</li> <li>20. 999.99</li> <li>21. 999.99</li> <li>22. 999.99</li> <li>23. 999.99</li> <li>24. 999.99</li> <li>25. 999.99</li> <li>26. 999.99</li> <li>27. 999.99</li> <li>28. 999.99</li> <li>29. 999.99</li> <li>30. 999.99</li> <li>31. 999.99</li> <li>32. 999.99</li> <li>33. 999.99</li> <li>34. 999.99</li> <li>35. 999.99</li> <li>36. 999.99</li> <li>37. 999.99</li> <li>38. 999.99</li> <li>39. 999.99</li> <li>40. OBW [MHz] (resolution 0.001 MHz)</li> <li>41. 999.99</li> <li>42. 999.99</li> <li>43. 999.99</li> <li>44. 999.99</li> <li>45. OBUE Pass/Fail (PASS FAIL)</li> </ol> |

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

| n | Result Mode | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | A           | <p>Responses are returned with comma-separated value formats in the following order:</p> <ol style="list-style-type: none"> <li>1. OBW/ACLR Spectrum trace point number</li> <li>2. 999.99</li> <li>3. 999.99</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 6 | A/B         | <ol style="list-style-type: none"> <li>1. Range #0 Lower OBUE Margin (Normal) [dB] (resolution 0.01 dB)</li> <li>2. Range #0 Lower OBUE Peak Absolute Level (Normal) [dBm] (resolution 0.01 dB)</li> <li>3. Range #0 Lower OBUE Peak Frequency (Normal) [MHz] (resolution 0.0001 MHz)</li> <li>4. Range #0 Lower OBUE Pass/Fail (Normal)</li> <li>5. Range #0 Upper OBUE Margin (Normal) [dB] (resolution 0.01 dB)</li> <li>6. Range #0 Upper OBUE Peak Absolute Level (Normal) [dBm] (resolution 0.01 dB)</li> <li>7. Range #0 Upper OBUE Peak Frequency (Normal) [MHz] (resolution 0.0001 MHz)</li> <li>8. Range #0 Upper OBUE Pass/Fail (Normal)</li> </ol> <p>9-16. Range #1<br/> 17-24. Range #2<br/> 25-32. Range #3<br/> 33-40. Range #4<br/> 41-48. Range #5</p> |
| 7 | A/B         | <ol style="list-style-type: none"> <li>1. Range #0 Lower OBUE Margin (Additional) [dB] (resolution 0.01 dB)</li> <li>2. Range #0 Lower OBUE Peak Absolute Level (Additional) [dBm] (resolution 0.01 dB)</li> <li>3. Range #0 Lower OBUE Peak Frequency (Additional) [MHz] (resolution 0.0001 MHz)</li> <li>4. Range #0 Lower OBUE Pass/Fail (Additional)</li> <li>5. Range #0 Upper OBUE Margin (Additional) [dB] (resolution 0.01 dB)</li> <li>6. Range #0 Upper OBUE Peak Absolute Level (Additional) [dBm] (resolution 0.01 dB)</li> <li>7. Range #0 Upper OBUE Peak Frequency (Additional) [MHz] (resolution 0.0001 MHz)</li> <li>8. Range #0 Upper OBUE Pass/Fail (Additional)</li> </ol>                                                                           |

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

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

## :READ:BATCH[n]?

Batch Query

### Function

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

### Query

:READ:BATCH[n] ?

### Response

See Table 3.2.5-1.

### Example of Use

To execute the measurement and query the results.

READ:BATCH?

### Related Command

This command has the same function as the following command:

:MEASure:BATCH[n]?

## :MEASure:BATCh[n]?

Batch Query

### Function

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

### Query

:MEASure:BATCh[n] ?

### Response

See Table 3.2.5-1.

### Example of Use

To execute the measurement and query the results.

MEAS:BATC?

### Related Command

This command has the same function as the following command:

READ:BATCh[n]?

### 3.2.6 Setting Batch Measurement Parameters

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

Storage Mode

Function

This command sets the storage mode.

Command

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

Query

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

Response

<mode>

Parameter

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

Example of Use

To set the storage mode to Average.  
BATC:AVER ON  
BATC:AVER?  
> 1

## [[:SENSe]:BATCh:AVERage:COUNT

Storage Count

### Function

This command sets the storage count.

### Command

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

### Query

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

### Response

```
<integer>
```

### Parameter

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

### Example of Use

To set the storage count to 10.

```
BATC:AVER:COUN 10
```

```
BATC:AVER:COUN?
```

```
> 10
```

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

Storage Mode for Unwanted Emissions

Function

This command sets the storage mode for Unwanted Emissions.

Command

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

Query

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

Response

<switch>

Parameter

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

Example of Use

To set the storage mode for Unwanted Emissions to Average.  
BATC:AVER:UWEM ON  
BATC:AVER:UWEM?  
> 1

## **[[:SENSe]:BATCh:AVERage:UWEMissions:COUNT**

Storage Count for Unwanted Emissions

### Function

This command sets the storage count for Unwanted Emissions.

### Command

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

### Query

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

### Response

```
<integer>
```

### Parameter

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

### Example of Use

To set the storage count for Unwanted Emissions to 10.

```
BATC:AVER:UWEM:COUN 10
```

```
BATC:AVER:UWEM:COUN?
```

```
> 10
```

### 3.2.7 Measurement Status Query

:STATus:ERRor?

Measurement Status Query

Function  
This command queries the measurement status.

Query  
:STATus:ERRor?

Response  
<status>

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

Details  
If the measurement ends normally, 0 is returned.

Example of Use  
To query the measurement status.  
STAT:ERR?  
> 0

### 3.2.8 Setting SG Frequency

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

SG Frequency

#### Function

This command sets the SG frequency.

#### Command

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

#### Query

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

#### Response

**<freq>**

#### Parameter

|                     |                                                           |
|---------------------|-----------------------------------------------------------|
| <b>&lt;freq&gt;</b> | Frequency                                                 |
| Range               | 400.000000 to 3800.000000 MHz                             |
| Resolution          | 1 Hz                                                      |
| Suffix Code         | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ<br>Hz is used when omitted. |
| Default             | 1 GHz                                                     |

#### Example of Use

To set the SG frequency to 2 GHz.

**FREQ 2GHZ**

**FREQ?**

**> 2000000000**

### 3.2.9 Setting SG Level

**:OUTPut[:STATe]**

SG RF Output

#### Function

This command enables or disables RF output from the SG.

#### Command

**:OUTPut[:STATe] <on\_off>**

#### Query

**:OUTPut[:STATe]?**

#### Response

**<on\_off>**

#### Parameter

|                       |                  |
|-----------------------|------------------|
| <b>&lt;on_off&gt;</b> | RF output On/Off |
| <b>ON 1</b>           | On               |
| <b>OFF 0</b>          | Off (Default)    |

#### Example of Use

To enable the RF signal output from the SG.

**OUTP ON**

**OUTP?**

**> 1**

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

SG Output Level

### Function

This command sets the SG output level.

### Command

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

### Query

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

### Response

```
<level>
```

### Parameter

|              |                                                       |                             |
|--------------|-------------------------------------------------------|-----------------------------|
| <level>      | Output level                                          |                             |
| Range        |                                                       |                             |
| MU887000A    | –130.0 to –10.0 dBm                                   | (Port1/Port2)               |
|              | –120.0 to 0.0 dBm                                     | (Port3/Port4)               |
| MU887001A    | –130.0 to –10.0 dBm                                   | (Port 1 to Port 4)          |
| MU887002A    | –130.0 to 0.0 dBm                                     | (TRX 1/2 Port 1 to Port 12) |
| Resolution   | 0.1 dBm                                               |                             |
| Default      |                                                       |                             |
| MU887000A    | –130.0 dBm                                            | (Port1/Port2)               |
|              | –120.0 dBm                                            | (Port3/Port4)               |
| MU887001A    | –130.0 dBm                                            | (Port 1 to Port 4)          |
| MU887002A    | –130.0 dBm                                            | (TRX 1/2 Port 1 to Port 12) |
| Unit         | dBm                                                   |                             |
| Suffix Code  | DBM                                                   |                             |
| <unit>       | Unit of output level (This parameter can be omitted.) |                             |
| DBM          | dBm                                                   |                             |
| When omitted | dBm                                                   |                             |

### Example of Use

To set the SG output level to –10 dBm.

```
POW -10DBM
```

```
POW?
```

```
> –10.0
```

### 3.2.10 Playing/Selecting/Loading SG Waveform Pattern

**[ :SOURce ] :RADio :ARB :WAVeform**

SG Select Waveform File

#### Function

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

#### Command

[ :SOURce ] :RADio :ARB :WAVeform <file\_name>,<group\_number>

#### Query

[ :SOURce ] :RADio :ARB :WAVeform?

#### Response

<file\_name>,<group\_number>

#### Parameter

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

#### Example of Use

To set the waveform pattern of the group number 1 in the SG waveform file "MV887023A\_LTEFDD\_0001.xml" to the play pattern.

RAD:ARB:WAV "MV887023A\_LTEFDD\_0001",1

RAD:ARB:WAV?

> "MV887023A\_LTEFDD\_0001",1

### 3.2.11 Setting SG Modulation and AWGN

#### :OUTPut:MODulation[:STATe]

SG Modulation

##### Function

This command enables or disables the SG modulation function.

##### Command

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

##### Query

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

##### Response

```
<on_off>
```

##### Parameter

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

##### Example of Use

To enable the SG modulation function.

```
OUTP:MOD ON
```

```
OUTP:MOD?
```

```
> 1
```

### 3.2.12 Setting Parameters for MT8870

#### :INSTrument[:SElect]

Application Select

##### Function

This command sets the type of application software to execute.

##### Command

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

##### Query

```
:INSTrument[:SElect]?
```

##### Response

```
<app>
```

##### Parameter

|           |                                                                                                                                                                                     |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <app>     | Type of application software                                                                                                                                                        |
| SMALLCELL | Small Cell application<br>When using MX887021A, or MX887023A                                                                                                                        |
| CELLULAR  | Cellular application<br>When using MX887010A, MX887011A, MX887012A, MX887013A, MX887014A, MX887015A, MX887016A, MX887017A, MX887018A, MX887019A, MX887065A, MX887067A, or MX887068A |
| SRW       | SRW application<br>When using MX887030A, MX887031A, MX887032A, MX887033A, MX887040A, or MX887050A                                                                                   |
| LRWPAN    | IEEE 802.15.4 application<br>When using MX887060A                                                                                                                                   |
| ZWAVE     | Z-Wave application<br>When using MX887061A                                                                                                                                          |
| FMAUDIO   | FM AUDIO application<br>When using MX887070A                                                                                                                                        |

##### Note:

MU887002A does not support MX887070A.

##### Details

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

##### Example of Use

```
To set the application software to SMALLCELL.
INST SMALLCELL
INST?
> SMALLCELL
```

## :ROUTe:PORT:CONNeCT:DIRectiOn

Set Connect Port Direction

### Function

Sets or queries 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
```

### Parameter

|          |                         |             |
|----------|-------------------------|-------------|
| <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 Port1 as RF signal input test port and Test Port2 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
```

## :SYSTem:LANGuage

Language Selection of Remote Command

### Function

Switches language mode of remote control command.

### Command

:SYSTem:LANGuage <mode>

### Query

:SYSTem:LANGuage?

### Response

<mode>

### Parameter

|         |               |
|---------|---------------|
| <mode>  | Language mode |
| NATive  | Native        |
| SCPI    | SCPI          |
| Default | NATive        |

### Example of Use

To switch the remote control command language mode to Native:

:SYST:LANG NAT

SYST:LANG?

> NAT

## Chapter 4 Performance Test

---

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

|       |                                           |      |
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## 4.1 Outline

The performance tests are performed to assure that the MU887000A performance does not deteriorate. Test the performance of the MU887000A at the initial acceptance inspection, at periodic inspections, and after repairs. Test important items periodically to assure the performance. This chapter explains the following test items.

- Tx Power measurement accuracy (MOD)
- Frequency/modulation measurement      Carrier frequency accuracy  
Residual EVM
- Adjacent Channel Leakage Power Ratio measurement

We recommend testing the performance periodically once or twice a year. If the test results do not meet the specifications, contact 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.**

---

## 4.2 Instruments for Testing Performance

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

**Table 4.2-1 Measuring Instruments for Performance Tests**

| Test Item                                                                                                                                        | Required Specifications*                                                                                                                                                                                           | Recommended Instrument (Anritsu model)                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| Tx Power Measurements<br>• Measurement Accuracy                                                                                                  | Signal Generator <ul style="list-style-type: none"> <li>Frequency Range: 600 to 3800 MHz</li> <li>Resolution: 1 Hz</li> <li>Output Level Range<br/>Unmodulated: -110 to +17 dBm<br/>Resolution: 0.01 dB</li> </ul> | Vector Signal Generator (MG3710E)<br>High Frequency 6 GHz (MG3710E-036) |
|                                                                                                                                                  | Power Meter <ul style="list-style-type: none"> <li>Main Frame Accuracy: <math>\pm 0.02</math> dB</li> <li>Frequency Range: 600 to 3800 MHz</li> <li>Resolution: 0.01 dB</li> </ul>                                 | Power Meter (ML2437A)                                                   |
|                                                                                                                                                  | Power Sensor <ul style="list-style-type: none"> <li>Frequency Range: 600 to 3800 MHz</li> <li>Measured Power Range: -40 to +20 dBm</li> <li>Input Connector: N type</li> </ul>                                     | Power Sensor (MA2442D)                                                  |
| Frequency/Modulation Measurements<br>• Carrier Frequency Accuracy<br>• Residual EVM<br>Adjacent Channel Leakage Power Ratio<br>In-Band Emissions | Signal generator supporting output of 3GPP LTE modulation signals<br>Same as above                                                                                                                                 | Same as above                                                           |
|                                                                                                                                                  | Power Meter<br>Same as above                                                                                                                                                                                       | Same as above                                                           |
|                                                                                                                                                  | Power Sensor <ul style="list-style-type: none"> <li>Frequency Range: 600 to 3800 MHz</li> <li>Measured Power Range: -30 to +20 dBm</li> <li>Input Connector: N type</li> </ul>                                     | Power Sensor (MA24002A)                                                 |
| Common                                                                                                                                           | 3-dB Attenuator                                                                                                                                                                                                    | 3-dB Attenuator (AT-103)                                                |

\*: The performance covers the test item measurement range.

## 4.3 Performance Tests

### Common test items

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

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

### 4.3.1 Calibrating signal generator (MOD)

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

#### (1) Measuring instruments

- Vector signal generator: MG3710E
- Power meter: ML2437A
- Power sensor: MA24002A
- 3-dB Attenuator: AT-103 (2 sets)

#### (2) Setup

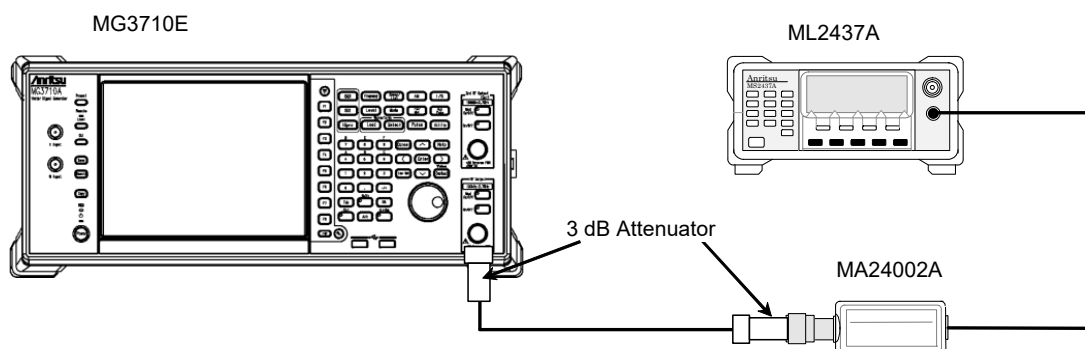


**Figure 4.3.1-1 Signal Generator Calibration Setup (MOD)**

#### (3) Procedure

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

Waveform Pattern: E-TM\_3\_1\_20M\_NF  
(for Frequency Error, EVM measurement)  
E-TM\_1\_1\_20M\_F  
(for TX power measurement, ACLR measurement)

- 3. Measure the level with the ML2437A Power Meter and adjust the SG so that the output level is –10 dBm.
- 4. Change the frequency as shown in Table 4.3.1-1 “Measurement Point and Frequency” and perform the same measurements to obtain the calibration value.

Table 4.3.1-1 Measurement Point and Frequency

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

4.3.2 Tx power measurement accuracy (MOD)

This test is related to the accuracy of Tx power measurements.

(1) Test specifications

MU887000A Test Port1/2

MU887001A Test Port 1 to 4

| Measurement Accuracy | Input Level          | Temperature |
|----------------------|----------------------|-------------|
| ±0.5 dB              | -15 dBm ≤, ≤ +35 dBm | 10 to 40°C  |

MU887000A Test Port3/4

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

(2) Measuring instruments

- Vector signal generator: MG3710E
- 3-dB Attenuator: AT-103 (2 sets)

(3) Setup

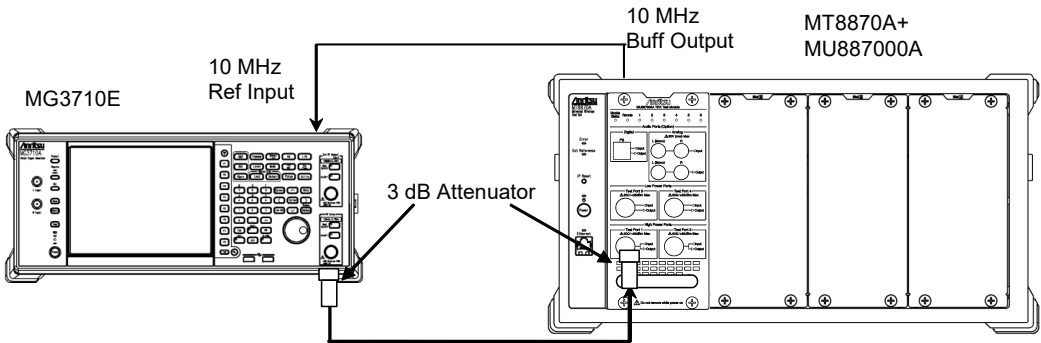


Figure 4.3.2-1 Setup for Measuring Amplitude Measurement Accuracy

## (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

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

2. Set the MU887000A as follows:

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

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

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

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

|                                 |               |
|---------------------------------|---------------|
| Result of Tx Power Measurement: | Average value |
|---------------------------------|---------------|

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

4.3.3 Frequency/modulation measurement

This test is related to the following modulation analyses:

- Carrier frequency accuracy
- Residual EVM

(1) Test specifications

MU887000A Test Port1/2

MU887001A Test Port 1 to 4

|                            | Measurement Accuracy                                                                    |
|----------------------------|-----------------------------------------------------------------------------------------|
| Carrier frequency accuracy | $\pm(\text{Set frequency} \times \text{Reference oscillator accuracy} + 10 \text{ Hz})$ |
| Residual EVM               | $\leq 1\% \text{ (rms)}$                                                                |

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

Input level:  $-15 \text{ dBm} \leq \leq +35 \text{ dBm}$

MU887000A Test Port3/4

|                            | Measurement Accuracy                                                                    |
|----------------------------|-----------------------------------------------------------------------------------------|
| Carrier frequency accuracy | $\pm(\text{Set frequency} \times \text{Reference oscillator accuracy} + 10 \text{ Hz})$ |
| Residual EVM               | $\leq 1\% \text{ (rms)}$                                                                |

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

Input level:  $-15 \text{ dBm} \leq \leq +25 \text{ dBm}$

(2) Measuring instruments

- Vector signal generator: MG3710E
- 3-dB Attenuator: AT-103 (2 sets)

(3) Setup

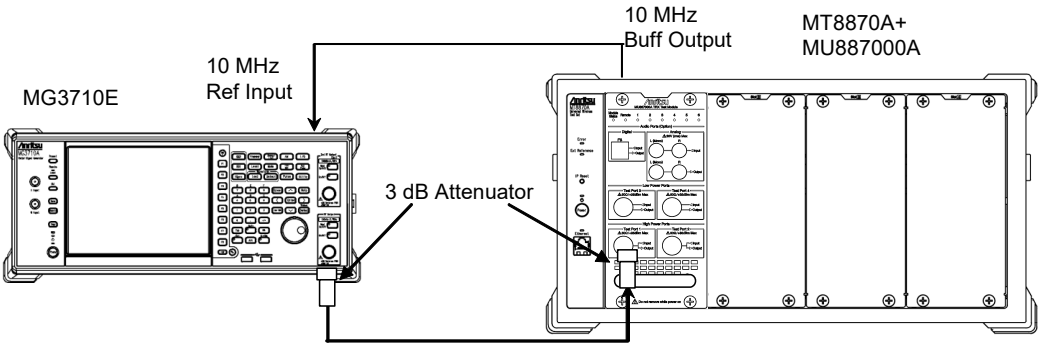


Figure 4.3.3-1 Setup for Measuring Frequency/Modulation

## (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

1 Setup the instruments as shown in Figure 4.3.3-1

2. Set the MU887000A as follows:

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

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

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

4. Measure the frequency error and EVM.

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

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

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

7. Change the Connect port setting for the connection with the MU887000A successively, and repeat steps 2 to 6 over.

4.3.4 Adjacent Channel Leakage Power Ratio

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

(1) Test specifications

| Adjacent Channel Leakage Power Ratio | Measurement Point   |
|--------------------------------------|---------------------|
| $\geq 50$ dB                         | E-UTRA ALCR1, ACLR2 |
| $\geq 54$ dB                         | UTRA ALCR1, ACLR2   |

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

MU887000A Test Port1/2

MU887001A Test Port 1 to 4 Input level range:  $-10\text{ dBm} \leq \leq +35\text{ dBm}$

MU887000A Test Port3/4 Input level range:  $-10\text{ dBm} \leq \leq +25\text{ dBm}$

(2) Measuring instruments

- Vector signal Generator: MG3710E
- 3-dB Attenuator: AT-103 (2 sets)

(3) Setup

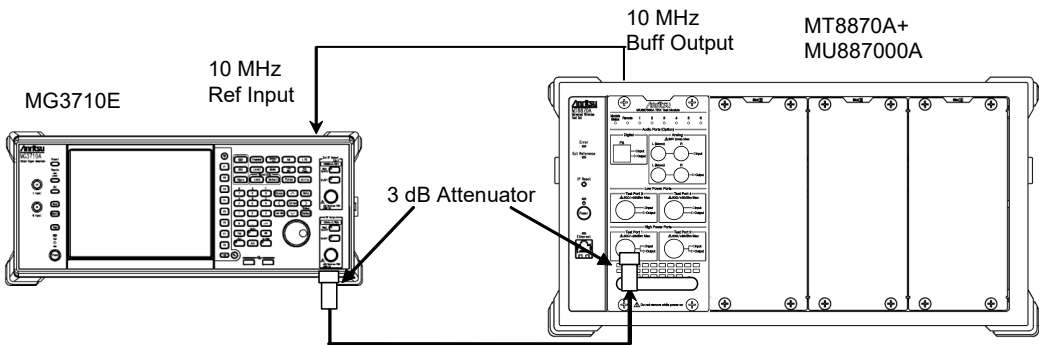


Figure 4.3.4-1 Setup for Measuring Adjacent Channel Leakage Power Ratio

(4) Test procedure

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

2. Set the MU887000A as follows:

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

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

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

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

ACLR Result: Max value

5. Change the MU887000A and SG frequencies according to Table 4.3.1-1 “Measurement Point and Frequency” and repeat steps 2 to 4 over.
6. Change the Connect port setting for the connection with the MU887000A successively, and repeat steps 2 to 5 over.

### 4.3.5 About evaluation signals

The evaluation signals described in the performance test items 4.3.1, 4.3.2, 4.3.3, 4.3.4 are set as follows. When the user is executing performance tests, set the SG actually used based on the following setting contents.

#### Summary of the evaluation signal

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

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

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

**Table 4.3.5-1 LTE IQproducer Parameters**

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

4.3.6 Sample format for test result sheets

Use the following test result sheets when testing the MX887023A performance. Duplicate these sheets as necessary for tests.

Test location

Report No.

Date

Person-in-charge

Model:

Serial No.

Ambient temperature

°C

Power source frequency

Hz

Relative humidity

%

Remarks

SG Calibration (MOD)

SG Calibration Value (MOD)

MG3710E Modulation Wave

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

Tx Power Measurement Accuracy (MOD)

**Tx Power Measurement Accuracy MU887000A Port1/2, MU887001A Port 1 to 4**

Input Level: -10 dBm (Item 4.3.1 Calibration Value)

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

**Tx Power Measurement Accuracy MU887000A Port3/4**

Input Level: -10 dBm (Item 4.3.1 Calibration Value)

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

Frequency/Modulation Measurement

Residual EVM/Carrier Frequency Accuracy

Input Level: –10 dBm

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

Input Level: –15 dBm

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

Adjacent Channel Leakage Power Measurement

Adjacent Channel Leakage Power

Input Level: –10 dBm

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

## 4.4 Servicing

If any unit is found to be broken or does not operate as described in the specifications, contact an Anritsu Service and Sales office. Contact information is listed on the last page of this manual, and in the separate file on the DVD version.

When requesting repair, supply the following information:

- (a) Model name and serial number marked on rear panel
- (b) Failure symptoms
- (c) Person to contact about nature of failure and repair completion notification
- (d) Software version



## Appendix A Specifications

This appendix lists the specifications of the MX887023A LTE FDD Downlink TX Measurement. Refer to section 1.2 “Composition” for details of the product configuration.

These specifications assume use of the system at a constant temperature after warming-up the instruments for 30 minutes.

The abbreviation (typ.) indicates the reference data at 20 to 30°C and is not a guaranteed value.

Nominal values (nom.) are not guaranteed.

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 MX887023A Specifications**

| Item                 | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |                      |                |                |             |                      |                |                |             |                      |                |         |             |                      |                |         |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------|----------------|----------------|-------------|----------------------|----------------|----------------|-------------|----------------------|----------------|---------|-------------|----------------------|----------------|---------|
| Common Items         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                      |                |                |             |                      |                |                |             |                      |                |         |             |                      |                |         |
| Frequency            | 600 to 2700 MHz, 3400 to 3800 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |                      |                |                |             |                      |                |                |             |                      |                |         |             |                      |                |         |
| Measuring Object     | LTE FDD Downlink signal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |                      |                |                |             |                      |                |                |             |                      |                |         |             |                      |                |         |
| RF Power             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                      |                |                |             |                      |                |                |             |                      |                |         |             |                      |                |         |
| Input Level Range    | MU887000A: Port1, Port2: –65.0 to +35.0 dBm<br>Port3, Port4: –65.0 to +25.0 dBm<br>MU887001A: Port1 to 4: –65.0 to +35.0 dBm<br>MU887002A: TRX 1/2 Port 1 to 12: –65.0 to +35.0 dBm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                      |                |                |             |                      |                |                |             |                      |                |         |             |                      |                |         |
| Measurement Accuracy | MU887000A: Port1, Port2: After calibration, 20 to 30°C<br>MU887001A: Port1 to 4: After calibration, 20 to 30°C<br><table border="1"> <tr> <th>Input Level</th><th>Measurement Accuracy</th></tr> <tr> <td>–15 to +35 dBm</td><td>±0.3 dB (typ.)</td></tr> </table> MU887002A-097: TRX 1/2 Port 1 to 12: After calibration, 20 to 30°C<br><table border="1"> <tr> <th>Input Level</th><th>Measurement Accuracy</th></tr> <tr> <td>–15 to +35 dBm</td><td>±0.3 dB (nom.)</td></tr> </table> MU887000A: Port1, Port2: After calibration, 10 to 40°C<br>MU887001A: Port1 to 4: After calibration, 10 to 40°C<br><table border="1"> <tr> <th>Input Level</th><th>Measurement Accuracy</th></tr> <tr> <td>–15 to +35 dBm</td><td>±0.5 dB</td></tr> </table> MU887000A: Port3, Port4: After calibration, 10 to 40°C<br><table border="1"> <tr> <th>Input Level</th><th>Measurement Accuracy</th></tr> <tr> <td>–15 to +25 dBm</td><td>±0.7 dB</td></tr> </table> | Input Level | Measurement Accuracy | –15 to +35 dBm | ±0.3 dB (typ.) | Input Level | Measurement Accuracy | –15 to +35 dBm | ±0.3 dB (nom.) | Input Level | Measurement Accuracy | –15 to +35 dBm | ±0.5 dB | Input Level | Measurement Accuracy | –15 to +25 dBm | ±0.7 dB |
| Input Level          | Measurement Accuracy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |                      |                |                |             |                      |                |                |             |                      |                |         |             |                      |                |         |
| –15 to +35 dBm       | ±0.3 dB (typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                      |                |                |             |                      |                |                |             |                      |                |         |             |                      |                |         |
| Input Level          | Measurement Accuracy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |                      |                |                |             |                      |                |                |             |                      |                |         |             |                      |                |         |
| –15 to +35 dBm       | ±0.3 dB (nom.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                      |                |                |             |                      |                |                |             |                      |                |         |             |                      |                |         |
| Input Level          | Measurement Accuracy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |                      |                |                |             |                      |                |                |             |                      |                |         |             |                      |                |         |
| –15 to +35 dBm       | ±0.5 dB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |                      |                |                |             |                      |                |                |             |                      |                |         |             |                      |                |         |
| Input Level          | Measurement Accuracy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |                      |                |                |             |                      |                |                |             |                      |                |         |             |                      |                |         |
| –15 to +25 dBm       | ±0.7 dB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |                      |                |                |             |                      |                |                |             |                      |                |         |             |                      |                |         |

**Table A-1 MX887023A Specifications (Cont'd)**

| Item                                 | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                             |         |       |                 |             |                      |             |                      |                  |                  |                      |                                |                |                      |                   |         |       |                 |             |                             |             |                             |                  |                  |                             |                                |                |                             |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|---------|-------|-----------------|-------------|----------------------|-------------|----------------------|------------------|------------------|----------------------|--------------------------------|----------------|----------------------|-------------------|---------|-------|-----------------|-------------|-----------------------------|-------------|-----------------------------|------------------|------------------|-----------------------------|--------------------------------|----------------|-----------------------------|
| Modulation Analysis                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                             |         |       |                 |             |                      |             |                      |                  |                  |                      |                                |                |                      |                   |         |       |                 |             |                             |             |                             |                  |                  |                             |                                |                |                             |
| Input Level Range                    | MU887000A: Port1, Port2: -15.0 to +35.0 dBm<br>Port3, Port4: -15.0 to +25.0 dBm<br>MU887001A: Port1 to 4: -15.0 to +35.0 dBm<br>MU887002A: TRX 1/2 Port 1 to 12: -15.0 to +35.0 dBm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                             |         |       |                 |             |                      |             |                      |                  |                  |                      |                                |                |                      |                   |         |       |                 |             |                             |             |                             |                  |                  |                             |                                |                |                             |
| Carrier Frequency Accuracy           | For Measurement Interval 10 Subframe, Test Model 3.1 signal<br>MU887000A, MU887001A: $\pm(\text{Set frequency} \times \text{Reference oscillator accuracy} + 10 \text{ Hz})$<br>MU887002A-097: $\pm(\text{Set frequency} \times \text{Reference oscillator accuracy} + 10 \text{ Hz}) \text{ (nom.)}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             |         |       |                 |             |                      |             |                      |                  |                  |                      |                                |                |                      |                   |         |       |                 |             |                             |             |                             |                  |                  |                             |                                |                |                             |
| Modulation accuracy                  | For Measurement Interval 10 Subframe, Test Model 3.1signal,<br>Channel Bandwidth = 3 / 5 / 10 / 15 /20 MHz<br>MU887000A, MU887001A: $\leq 1\%$<br>MU887002A-097: $\leq 1\% \text{ (nom.)}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                             |         |       |                 |             |                      |             |                      |                  |                  |                      |                                |                |                      |                   |         |       |                 |             |                             |             |                             |                  |                  |                             |                                |                |                             |
| Adjacent Channel Leakage Power Ratio |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                             |         |       |                 |             |                      |             |                      |                  |                  |                      |                                |                |                      |                   |         |       |                 |             |                             |             |                             |                  |                  |                             |                                |                |                             |
| Input Level Range                    | MU887000A: Port1, Port2: -10.0 to +35.0 dBm<br>Port3, Port4: -10.0 to +25.0 dBm<br>MU887001A: Port1 to 4: -10.0 to +35.0 dBm<br>MU887002A: TRX 1/2 Port 1 to 12: -10.0 to +35.0 dBm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                             |         |       |                 |             |                      |             |                      |                  |                  |                      |                                |                |                      |                   |         |       |                 |             |                             |             |                             |                  |                  |                             |                                |                |                             |
| Measurement Range                    | MU887000A, MU887001A: <table><tr><th>Channel Bandwidth</th><th>Channel</th><th>Range</th></tr><tr><td rowspan="2">1.4 / 3 / 5 MHz</td><td>E-UTRA Adj.</td><td><math>\geq 54 \text{ dB}</math></td></tr><tr><td>E-UTRA Alt.</td><td><math>\geq 57 \text{ dB}</math></td></tr><tr><td>10 / 15 / 20 MHz</td><td>E-UTRA Adj./Alt.</td><td><math>\geq 50 \text{ dB}</math></td></tr><tr><td>1.4 / 3 / 5 / 10 / 15 / 20 MHz</td><td>UTRA Adj./Alt.</td><td><math>\geq 54 \text{ dB}</math></td></tr></table><br>MU887002A-097: <table><tr><th>Channel Bandwidth</th><th>Channel</th><th>Range</th></tr><tr><td rowspan="2">1.4 / 3 / 5 MHz</td><td>E-UTRA Adj.</td><td><math>\geq 54 \text{ dB (nom.)}</math></td></tr><tr><td>E-UTRA Alt.</td><td><math>\geq 57 \text{ dB (nom.)}</math></td></tr><tr><td>10 / 15 / 20 MHz</td><td>E-UTRA Adj./Alt.</td><td><math>\geq 50 \text{ dB (nom.)}</math></td></tr><tr><td>1.4 / 3 / 5 / 10 / 15 / 20 MHz</td><td>UTRA Adj./Alt.</td><td><math>\geq 54 \text{ dB (nom.)}</math></td></tr></table><br>Adj. : Adjacent Channel Leakage Ratio<br>Alt. : Alternate Channel Leakage Ratio | Channel Bandwidth           | Channel | Range | 1.4 / 3 / 5 MHz | E-UTRA Adj. | $\geq 54 \text{ dB}$ | E-UTRA Alt. | $\geq 57 \text{ dB}$ | 10 / 15 / 20 MHz | E-UTRA Adj./Alt. | $\geq 50 \text{ dB}$ | 1.4 / 3 / 5 / 10 / 15 / 20 MHz | UTRA Adj./Alt. | $\geq 54 \text{ dB}$ | Channel Bandwidth | Channel | Range | 1.4 / 3 / 5 MHz | E-UTRA Adj. | $\geq 54 \text{ dB (nom.)}$ | E-UTRA Alt. | $\geq 57 \text{ dB (nom.)}$ | 10 / 15 / 20 MHz | E-UTRA Adj./Alt. | $\geq 50 \text{ dB (nom.)}$ | 1.4 / 3 / 5 / 10 / 15 / 20 MHz | UTRA Adj./Alt. | $\geq 54 \text{ dB (nom.)}$ |
| Channel Bandwidth                    | Channel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Range                       |         |       |                 |             |                      |             |                      |                  |                  |                      |                                |                |                      |                   |         |       |                 |             |                             |             |                             |                  |                  |                             |                                |                |                             |
| 1.4 / 3 / 5 MHz                      | E-UTRA Adj.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | $\geq 54 \text{ dB}$        |         |       |                 |             |                      |             |                      |                  |                  |                      |                                |                |                      |                   |         |       |                 |             |                             |             |                             |                  |                  |                             |                                |                |                             |
|                                      | E-UTRA Alt.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | $\geq 57 \text{ dB}$        |         |       |                 |             |                      |             |                      |                  |                  |                      |                                |                |                      |                   |         |       |                 |             |                             |             |                             |                  |                  |                             |                                |                |                             |
| 10 / 15 / 20 MHz                     | E-UTRA Adj./Alt.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | $\geq 50 \text{ dB}$        |         |       |                 |             |                      |             |                      |                  |                  |                      |                                |                |                      |                   |         |       |                 |             |                             |             |                             |                  |                  |                             |                                |                |                             |
| 1.4 / 3 / 5 / 10 / 15 / 20 MHz       | UTRA Adj./Alt.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | $\geq 54 \text{ dB}$        |         |       |                 |             |                      |             |                      |                  |                  |                      |                                |                |                      |                   |         |       |                 |             |                             |             |                             |                  |                  |                             |                                |                |                             |
| Channel Bandwidth                    | Channel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Range                       |         |       |                 |             |                      |             |                      |                  |                  |                      |                                |                |                      |                   |         |       |                 |             |                             |             |                             |                  |                  |                             |                                |                |                             |
| 1.4 / 3 / 5 MHz                      | E-UTRA Adj.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | $\geq 54 \text{ dB (nom.)}$ |         |       |                 |             |                      |             |                      |                  |                  |                      |                                |                |                      |                   |         |       |                 |             |                             |             |                             |                  |                  |                             |                                |                |                             |
|                                      | E-UTRA Alt.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | $\geq 57 \text{ dB (nom.)}$ |         |       |                 |             |                      |             |                      |                  |                  |                      |                                |                |                      |                   |         |       |                 |             |                             |             |                             |                  |                  |                             |                                |                |                             |
| 10 / 15 / 20 MHz                     | E-UTRA Adj./Alt.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | $\geq 50 \text{ dB (nom.)}$ |         |       |                 |             |                      |             |                      |                  |                  |                      |                                |                |                      |                   |         |       |                 |             |                             |             |                             |                  |                  |                             |                                |                |                             |
| 1.4 / 3 / 5 / 10 / 15 / 20 MHz       | UTRA Adj./Alt.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | $\geq 54 \text{ dB (nom.)}$ |         |       |                 |             |                      |             |                      |                  |                  |                      |                                |                |                      |                   |         |       |                 |             |                             |             |                             |                  |                  |                             |                                |                |                             |

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