MX887016A
1xEV-DO Reverse Link
TX Measurement
Operation Manual

Sixth Edition

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

ANRITSU CORPORATION

Document No.: M-W3612AE-6.0

Safety Symbols

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

Symbols used in manual

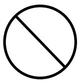
⚠ **DANGER** This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.

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

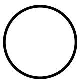
⚠ **CAUTION** This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

Safety Symbols Used on Equipment and in Manual

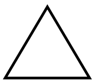
The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Ensure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.



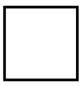
This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.



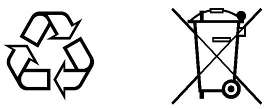
This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.



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



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



These indicate that the marked part should be recycled.

MX887016A
1xEV-DO Reverse Link TX Measurement
Operation Manual

20 August 2012 (First Edition)
20 January 2017 (Sixth Edition)

Equipment Certificate

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

Anritsu Warranty

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

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

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

Anritsu Corporation Contact

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

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   - ii) If this Software is used in conjunction with other non-Anritsu-approved software.
   - iii) Recovery of lost or damaged data.
   - iv) If this Software or the Equipment has been modified, repaired, or otherwise altered without Anritsu's prior approval.
   - v) For any other reasons out of Anritsu's direct control and responsibility, such as but not limited to, natural disasters, software virus infections, etc.

b. Expenses incurred for transport, hotel, daily allowance, etc., for on-site repairs by Anritsu engineers necessitated by the above faults shall be borne by you.

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

4. **Export Restrictions**

You may not use or otherwise export or re-export directly or indirectly this Software except as authorized by Japanese and United States law. In particular, this software may not be exported or re-exported (a) into any Japanese or US embargoed countries or (b) to anyone on the Japanese or US Treasury Department's list of Specially Designated Nationals or the US Department of Commerce Denied Persons List or Entity List. By using this Software, you warrant that you are not located in any such country or on any such list. You also agree that you will not use this Software for any purposes prohibited by Japanese and US law, including, without limitation, the development, design and manufacture or production of missiles or nuclear, chemical or biological weapons of mass destruction.

5. **Termination**

Anritsu shall deem this EULA terminated if you violate any conditions described herein. This EULA shall also be terminated if the conditions herein cannot be continued for any good reason, such as violation of copyrights, patents, or other laws and ordinances.

6. **Reparations**

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

7. **Responsibility after Termination**

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

8. **Dispute Resolution**

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

9. **Court of Jurisdiction**

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

Cautions against computer virus infection

- Copying files and data

  Only files that have been provided directly from Anritsu or generated using Anritsu equipment should be copied to the instrument.

  All other required files should be transferred by means of USB or CompactFlash media after undergoing a thorough virus check.
- Adding software

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

  Ensure that the network has sufficient anti-virus security protection in place.

CE Conformity Marking

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

CE marking

1. Product Model

Software: MX887016A 1xEV-DO Reverse Link TX Measurement

2. Applied Directive and Standards

When MX887016A 1xEV-DO Reverse Link TX Measurement is installed in the MT8870A, the applied directive and standards of this software conform to those of the MT8870A main frame.

PS: About main frame

Please contact Anritsu for the latest information on the main frame types that MX887016A can be used with.

RCM Conformity Marking

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

RCM marking

1. Product Model

Software: MX887016A 1xEV-DO Reverse Link TX Measurement

2. Applied Directive and Standards

When MX887016A 1xEV-DO Reverse Link TX Measurement is installed in the MT8870A, the applied directive and standards of this software conform to those of the MT8870A main frame.

PS: About main frame

Please contact Anritsu for the latest information on the main frame types that MX887016A can be used with.

About This Manual

This manual mainly describes the use, panels, and specifications of the MX887016A 1xEV-DO Reverse Link TX Measurement.

Products related to the MT8870A Universal Wireless Test Set include:

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

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

Main Unit Operation Manual

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

Module Operation Manual

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

Application software Operation Manual

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

MX887016A 1xEV-DO Reverse Link TX Measurement Option Operation Manual

Describes the functions and remote commands of the 1xEV-DO Reverse Link TX Measurement.

Control software Operation Manual

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

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Chapter 1 Outline

This chapter outlines the MX887016A 1xEV-DO Reverse Link Transmission Measurement. Refer to Appendix A Specifications for the software functions and performance.

1.1 Outline

The MX887016A 1xEV-DO Reverse Link Transmission Measurement software (hereafter MX887016A) adds the 3GPP2-specified CDMA2000 1xEV-DO measurement function to the MU887000A TRX Test Module.

Forward Link RF signals are output from the MU887000A to the RF connector of the mobile station, and Reverse Link signals are output from the mobile station to the MU887000A.

Note:

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

Reverse Link signals analyzed by the MX887016A are limited to patterns set to Long Code Mask = 0x00000000000.

The MX887016A supports setting of an arbitrary waveform file pattern for sending as the Forward Link signal. Regardless of the Reverse Link signal information, the modulated waveform pattern loaded from memory is sent as the Forward Link signal (Non-signalling method).

When performing RX measurement by the MX887015A, execute the FER measurement by the mobile station.

1.2 Features

The MX887016A software features:

(1) High-speed Measurement

The up-to-date processor and measurement algorithm support high-speed measurement.

(2) Sequence Measurement

Multiple measurements can be performed sequentially using preprogrammed measurement conditions. The Sequence Measurement mode helps cut mobile station test times.

1.3 Product Composition

The composition of MX887016A is shown in Table 1.3-1.

Table 1.3-1 Composition

Item	Model/Code	Name	Qty	Remarks
Software		Storage media (DVD, etc.)	1	
	MX887016A	1xEV-DO Reverse Link TX Measurement		On storage media (DVD, etc.)
	W3612AE	MX887016A 1xEV-DO Reverse Link TX Measurement Operation Manual		English, on storage media (DVD, etc.)

1.4 License Registration

Before the MX887016A software can be used, the software license must be registered in the MU887000A.

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

1.5 Abbreviations

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

Table 1.5-1 Abbreviations

Abbreviation	Name
3GPP2	Third Generation Partnership Project 2
ACK	Acknowledge
AVG	Average
CDP	Code Domain Power
DRC	Data Rate Channel
DSC	Data Source Channel
EV-DO	Evolution Data Only
FL	Forward Link
EVM	Error Vector Magnitude
IQ	In-phase and Quadrature-phase
NACK	Negative Acknowledge
OBW	Occupied Bandwidth
QPSK	Quadrature Phase Shift Keying
Rho	Waveform Quality Factor
RRI	Reverse Rate Indicator
SCPI	Standard Commands for Programmable Instruments
TTL	Total
RL	Reverse Link
WL	Walsh Code Length

Chapter 2 Fundamental Measurement

This chapter describes the fundamental functions and commands of the MX887016A. For details of the commands, refer to Chapter 4 “SCPI Command Reference” and Chapter 5 “Native Command Reference”.

2.1 Common Operations

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

2.1.1 Selecting application

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

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

Switch the MU887000A measurement standard using the following command.
Set the parameter to EVDO when a function described in section 2.2 “Transmit Power” to section 2.7 “Capturing Waveform Data” is to be used.
Set the parameter to SEQUENCE when using a function described in Chapter 3 “Sequence Measurement”.

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

2.1.2 Setting ports

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

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

When setting the sequence table in sequence measurement, the sequence commands set only the output port to Port1 to Port4.
The above-mentioned command sets the receiving port.

2.1.3 Frequency and level

Frequency

Use the following commands to set the frequency and channel of a signal to be measured.
The signal sent from the MU887000A to the mobile station is the Forward Link, and the signal sent from the mobile station to the MU887000A is the Reverse Link.

- Band Class
  `BANDCLASS`
  `:CONFigure:CELLular:MEASurement:RFSettings:BCLass`
- Channel
  `CHAN`
  `:CONFigure:CELLular:MEASurement:RFSettings:CHANnel`
- Reverse Link Frequency (mobile station Tx)
  `TXFREQ`
  `:CONFigure:CELLular:MEASurement:RFSettings:FREQuency`
- Forward Link Frequency (mobile station Rx)
  `RXFREQ`
  `:CONFigure:CELLular:GENerator:RFSettings:FREQuency`

Level

Set the level of the signal sent from and received by the MU887000A using the following commands.

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

Cable loss correction

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

2.1.4 Setting transmission signal

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

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

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

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

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

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

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

2.1.5 Waveform patterns

To send a 1xEV-DO waveform pattern, specify a file in the MV887016A EVDO Forward Link Waveform files as the waveform file.

Refer to Chapter 3, "Waveform File Details" in the *Waveform File for Cellular Application Operation Manual* for an explanation of the MV887016A EVDO Forward Link Waveform files.

2.1.6 Setting 1xEV-DO signals

Set the following items to configure the 1xEV-DO signal.

Channel Configuration
Select one of the Reverse Link signal channel configurations listed below. Measurement items vary with the Reverse Link signal channel configuration.

Table 2.1.6-1 Protocol Revision Setting and Measurement Items

Measurement Item	Protocol Revision	
	Rev. 0	Rev. A
Power		
Tx Power	✓	✓
Filtered Power	✓	✓
Occupied Bandwidth		
Occupied Bandwidth	✓	✓
Upper Frequency	✓	✓
Lower Frequency	✓	✓
Center (Upper+Lower)/2	✓	✓
OBW Wave Data	✓	✓
Spurious Emissions		
Level	✓	✓
Mask Margin	✓	✓
Frequency	✓	✓
Judge	✓	✓
Spurious Emissions Wave Data	✓	✓

Table 2.1.6-1 Protocol Revision Setting and Measurement Items (Cont'd)

Measurement item	Protocol Revision	
	Rev.0	Rev.A
Modulation Analysis		
Carrier Frequency	✓	✓
Carrier Frequency Error (Hz, ppm)	✓	✓
Worst Carrier Frequency Error (Hz, ppm)	✓	✓
Rho	✓	✓
EVM	✓	✓
Peak EVM	✓	✓
Phase Error	✓	✓
Magnitude Error	✓	✓
Origin Offset	✓	✓
Time Error	✓	✓
Code Domain Power		
Max Inactive Channel Power	✓	✓
Pilot Channel Power	✓	✓
RRI Channel Power	✓	✓
DSC Channel Power	–	✓
DRC Channel Power	✓	✓
ACK Channel Power	✓	✓
Data Channel Power	✓	✓
AUX Pilot Channel Power	–	✓
Code Domain Power Wave Data	✓	✓

✓ Measurement supported

– Measurement not supported

Long Span Code Search

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

Spurious Emission Limit Range

Set the band class to determine the Spurious Emission Limit range. Refer to Section 2.1.3 “Frequency and level” for the commands to set frequency.

Protocol Revision

Set Rev. 0 (IS-856-0) or Rev. A (IS-856-A) as the Protocol Revision for 1xEV-DO.

Data Channel Payload Size

When the Rev. A (IS-856-A) Protocol Revision is set, the amount of data carried on the data channel can be set.

Long Code Mask - I

Set Long Code Mask for I-phase. Q-phase is automatically calculated when I-phase is decided.

Channels

Set the frequency of the MU887000A Tx and Rx signals using the channel numbers specified in 3GPP2 C.S0057-E v1.0.

Changing the channel number changes the related Forward Link and Reverse Link frequencies. However, changing the frequencies does not change the channel number.
The following table shows the relationship between the channel number and Forward Link and Reverse Link frequencies.

Table 2.1.6-2 Channel Numbers and Center Frequency (Copied from 3GPP2 C.S0057-E v1.0, Table 2.1.1-2 and Others)

Band Class	Channel (N)	Step	Center Frequency for CDMA Channel (MHz)	
			Reverse Link	Forward Link
0	1 to 799	1	0.030 N + 825.000	0.030 N + 870.000
	991 to 1023	1	0.030 (N – 1023) + 825.000	0.030 (N – 1023) + 870.000
	1024 to 1323	1	0.030 (N – 1024) + 815.040	0.030 (N – 1024) + 860.040
1	0 to 1199	1	1850.000 + 0.050 N	1930.000 + 0.050 N
2	0 to 1000	1	0.025 N + 889.9875	0.025 N + 934.9875
	1329 to 2047	1	0.025 (N – 1328) + 871.9875	0.025 (N – 1328) + 916.9875
	2048 to 2108	1	0.025 (N – 2048) + 894.000	0.025 (N – 2048) + 849.000
3*	1 to 799	3	0.0125 N + 915.000	0.0125 N + 860.000
	801 to 1039	3	0.0125 (N – 800) + 898.000	0.0125 (N – 800) + 843.000
	1041 to 1199	3	0.0125 (N – 1040) + 887.000	0.0125 (N – 1040) + 832.000
	1201 to 1600	3	0.0125 (N – 1200) + 893.000	0.0125 (N – 1200) + 838.000
4	0 to 599	1	0.050 N + 1750.000	0.050 N + 1840.000
5	1 to 400	1	0.025 (N – 1) + 450.000	0.025 (N – 1) + 460.000
	472 to 871	1	0.025 (N – 472) + 410.000	0.025 (N – 472) + 420.000
	1039 to 1473	1	0.020 (N – 1024) + 451.010	0.020 (N – 1024) + 461.010
	1536 to 1715	1	0.025 (N – 1536) + 479.000	0.025 (N – 1536) + 489.000
	1792 to 2016	1	0.020 (N – 1792) + 479.000	0.020 (N – 1792) + 489.000
	2017	1	451.150	467.725
	2018	1	451.475	467.725
6	0 to 1199	1	1920.000 + 0.050 N	2110.000 + 0.050 N
7	0 to 240	1	776.000 + 0.050 N	746.000 + 0.050 N
8	0 to 1499	1	1710.000 + 0.050 N	1805.000 + 0.050 N
9	0 to 699	1	880.000 + 0.050 N	925.000 + 0.050 N
10	0 to 719	1	0.025 N + 806.000	0.025 N + 851.000
	720 to 919	1	0.025 (N – 720) + 896.000	0.025 (N – 720) + 935.000

*: N is valid only for even numbers in Band Class 3.

Table 2.1.6-2 Channel Numbers and Center Frequency (Copied from 3GPP2 C.S0057-E v1.0, Table 2.1.1-2 and Others) (Cont'd)

Band Class	Channel (N)	Step	Center Frequency for CDMA Channel (MHz)	
			Reverse Link	Forward Link
11	1 to 400	1	0.025 (N – 1) + 450.000	0.025 (N – 1) + 460.000
	472 to 871	1	0.025 (N – 472) + 410.000	0.025 (N – 472) + 420.000
	1039 to 1473	1	Reserved	Reserved
	1536 to 1715	1	0.025 (N – 1536) + 479.000	0.025 (N – 1536) + 489.000
	1792 to 2016	1	Reserved	Reserved
12	0 to 239	1	870.0125 + 0.025 N	915.0125 + 0.025 N
13	0 to 1399	1	2500.000 + 0.050 N	2620.000 + 0.050 N
14	0 to 1299	1	1850.000 + 0.050 N	1930.000 + 0.050 N
15	0 to 899	1	1710.000 + 0.050 N	2110.000 + 0.050 N
16	140 to 1459	1	2495.000 + 0.050 M	2617.000 + 0.050 N
18	0 to 240	1	787.000 + 0.050 N	757.000 + 0.050 N
19	0 to 360	1	698.000 + 0.050 N	728.000 + 0.050 N
20	0 to 680	1	1626.500 + 0.050 N	1525.000 + 0.050 N
21	0 to 200	1	2000.000 + 0.050 N	2190.000 + 0.050 N
	201 to 399	1	2010.000 + 0.050 (N – 200)	2180.000 + 0.050 (N – 200)

Use the following commands to set the 1xEV-DO signals:

- Band Class
  `BANDCLASS`
  `:CONFigure:CELLular:MEASurement:RFSettings:BCLass`
- Channel
  `CHAN`
  `:CONFigure:CELLular:MEASurement:RFSettings:CHANnel`
- Protocol Revision
  `PREV`
  `:CONFigure:CELLular:EVDO:PREVision`
- Long Span Code Search
  `LSCODESEARCH`
  `:CONFigure:CELLular:EVDO:FUNDamental:LSSearch`
- Data Channel Payload Size
  `PSIZE`
  `:CONFigure:CELLular:EVDO:PSIZe`
- Long Code Mask - I
  `RTCLCMI`
  `:CONFigure:CELLular:EVDO:LCMask:I`

2.1.7 Setting measurement conditions

Set the trigger conditions for starting measurement using the following commands.

- Trigger Source
  `FMEAS_TRGSRC`
  `:TRIGger:CELLular:EVDO:FUNDamental:SOURce`
- Trigger Level
  `FMEAS_TRGLVL`
  `:TRIGger:CELLular:EVDO:FUNDamental:LEVel`
- Trigger Delay
  `FMEAS_TRGDLY`
  `:TRIGger:CELLular:EVDO:FUNDamental:DELay`
- Trigger Timeout
  `FMEAS_TRGTOUT`
  `:TRIGger:CELLular:EVDO:FUNDamental:TOUT`

Use the following command when not measuring.

- All Measurement Items OFF
  `ALLMEASITEMS_OFF`
  `:CONFigure:CELLular:EVDO:FUNDamental:AMITems:OFF`

2.1.8 Starting/stopping measurement

Starting measurement

To start measurement, send the following command.

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

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

Stopping measurement

To stop measurement, send the following command.

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

Checking measurement status

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

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

Table 2.1.8-1 Query Response

Value of response	Description
0	Measurement completed normally
2	Level exceeded The MU887000A receive level is higher than the set input level.
4	Measurement failed The signal could not be analyzed.
5	The frame synchronization failed when the Long Span Code Search was Off, because the correct downlink signal was not output.
9	Measurement is in progress or not executed
12	Tx measurement timeout The signal could not be acquired within the measurement time.

The measurement status and errors can be queried using the status registers.

Refer to Chapter 3 "Fundamental Operation" in the "MU887000A TRX Test Module Operation Manual" for an explanation of the status registers.

The allocations of MX887016A status registers are described in the following tables.

Native command mode

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

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

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

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

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

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

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

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

SCPI command mode:

Table 2.1.8-6 Bit Definition of Signal Generator Status Register

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

Table 2.1.8-7 Bit Definition of Measurement Status Register

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

Table 2.1.8-8 Bit Definition of Signal Generator Questionable Register

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

Table 2.1.8-9 Bit Definition of Measurement Questionable Register

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

2.2 Transmit Power

The Tx power measurement measures the mobile station Tx power.

The Tx power measurement settings are:

Channel and frequency of input signals

Set the channel and frequency of RF signals input to the MU887000A using the commands in section 2.1.3 "Frequency and level".

Input level

Specify the level of RF signals input to the MU887000A using the commands in section 2.1.3 "Frequency and level".

Port

Set the input port for the MU887000A using the commands in section 2.1.2 "Setting ports".

Starting measurement and measurement count

Start Tx power measurement and specify the measurement count within the range from 1 to 200 using the following command.

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

Fast Power Measurement Mode

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

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

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

- Tx Power

```
TXPWR
:FETCh:CELLular:EVDO:FUNDamental:POWer:TXPower
```

- Filtered Power

```
FILTPWR
:FETCh:CELLular:EVDO:FUNDamental:POWer:FLTPower
```

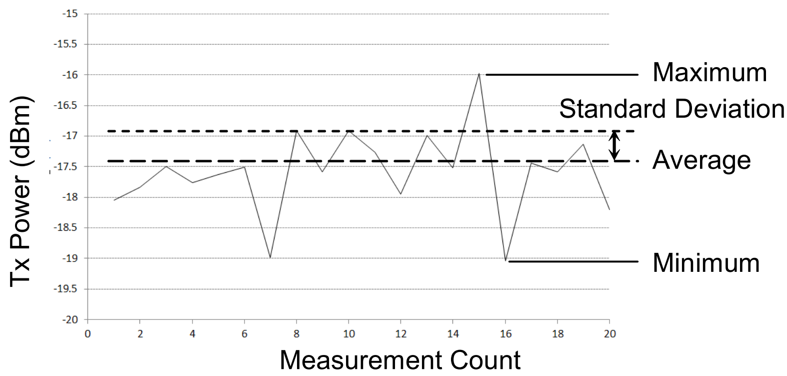

Figure 2.2-1 Type of Measurement Results

2.3 Occupied Bandwidth

The Occupied Bandwidth is the width of the measured spectrum with a specified proportion of the total power.
The following items are measured and displayed at Occupied Bandwidth measurement.

Occupied Bandwidth (OBW)

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

Upper frequency

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

Lower frequency

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

Center Frequency

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

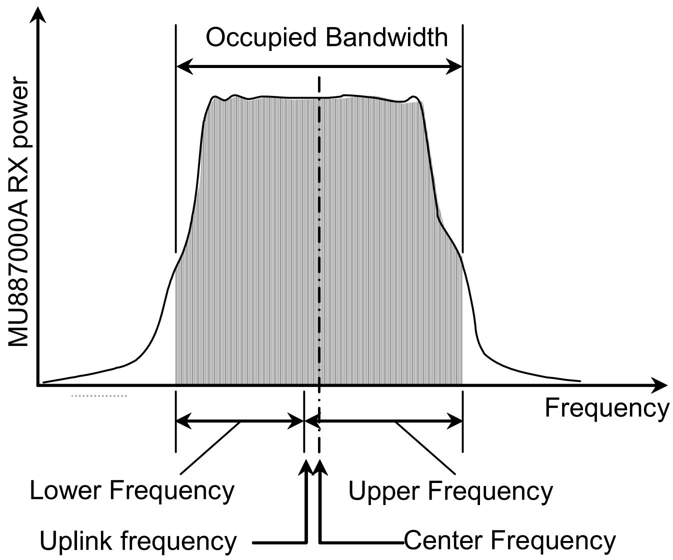

Figure 2.3-1 Occupied Bandwidth

The Occupied Bandwidth measurement settings are:

Channel and Frequency of input signals

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

Input level

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

Port

Set the input port for the MU887000A by referring to the command in section 2.1.4 “Setting transmission signal”.

Occupation Ratio

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

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

Measurement enable and measurement count

Use the following command to enable Occupied Bandwidth measurement and specify the measurement count from 1 to 200.

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

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

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

2.4 Spurious Emissions

Spurious Emissions measurement measures the peak level and margin at the conditions specified in C.S0033-B v1.0 4.4.1 Conducted Spurious Emissions.

Table 2.4-1 Spurious Emissions Specifications (1)

Band Class	Spurious Emission Template			
	k = 1	k = 2	k = 3	k = 4
0,2,3,5,7,9,10,11,12,18,19	885 kHz to 1.98 MHz –42 dBc/30 kHz	885 kHz to 1.98 MHz –54 dBm/1.23 MHz	1.98 to 4 MHz –54 dBc/30 kHz	1.98 to 4 MHz –54 dBm/1.23 MHz
1,4,6,8,13,14,15,16,20,21	1.25 to 1.98 MHz –42 dBc/30 kHz	1.25 to 1.98 MHz –54 dBm/1.23 MHz	1.98 to 4 MHz –50 dBc/30 kHz	1.98 to 4 MHz –54 dBm/1.23 MHz

k: Frequency division

Table 2.4-2 Spurious Emissions Specifications (2)

Band Class	Spurious Emission Template
	k = 5
6,8,13	2.25 to 4 MHz –{13+(Δf−2.25 MHz)} dBm/1 MHz
10	1.25 to 4 MHz –13 dBm/30 kHz
Other than the above	NONE

k: Frequency division

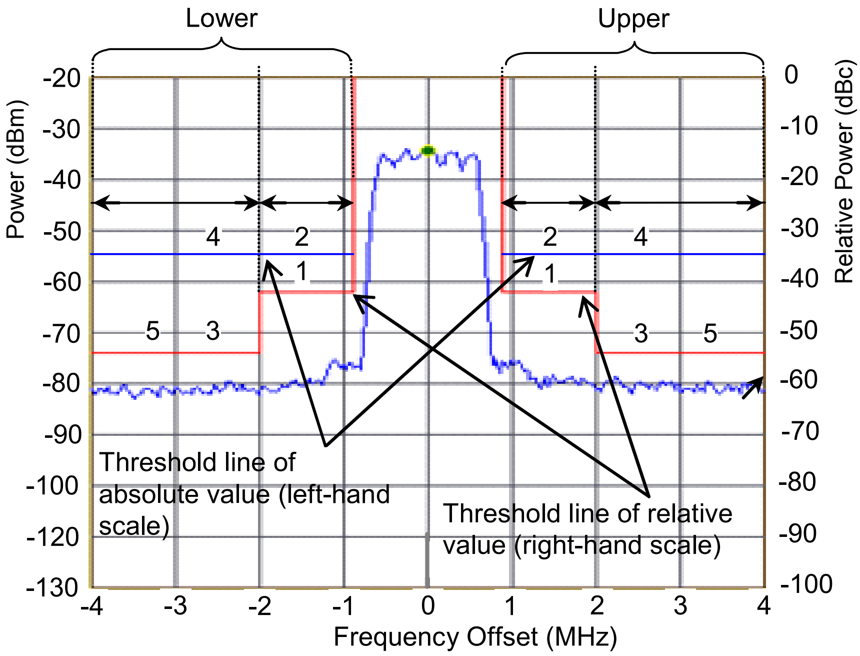

Figure 2.4-1 Spurious Emissions Threshold Line

The Spurious Emissions settings are as follows:

Channel and frequency of input signals

Specify the channel and frequency of RF signals applied to the MU887000A using the commands for setting frequency and level described in Section 2.1.3 “Frequency and level”.

Input level

Specify the level of RF signals applied to the MU887000A using the command for setting input level described in Section 2.1.3 “Frequency and Level”.

Port

Specify the input port for the MU887000A using the command for setting ports described in Section 2.1.4 “Setting transmission signal”.

Frequency Band

The Pass/Fail judgement standard depends on the frequency band specified in the 3GPP2 standard.

- Band Class (for Spurious Emission Limit)
  `BAND`
  `:CONFigure:CELLular:EVDO:FUNDamental:BAND`

Start measurement and measurement count

Start Spurious Emissions measurement and specify the measurement count from 1 to 200 using the following command.

- Measurement count
  `SPR_SET`
  `:CONFigure:CELLular:EVDO:FUNDamental:SPURious:SET`

The Spurious Emissions measurement results are:

- Evaluation result
  If the spurious is below the threshold, it is evaluated as PASS; if it above, it is evaluated as FAIL.
- Peak level and frequency in lower frequency range
- Peak level and frequency in upper frequency range
- Worst value level and frequency in each frequency range
  Each frequency range varies with the Band class.
- Margin and frequency in lower frequency range
- Margin and frequency in upper frequency range
- Minimum level difference from threshold line in frequency range
  Each frequency range varies with the band class.

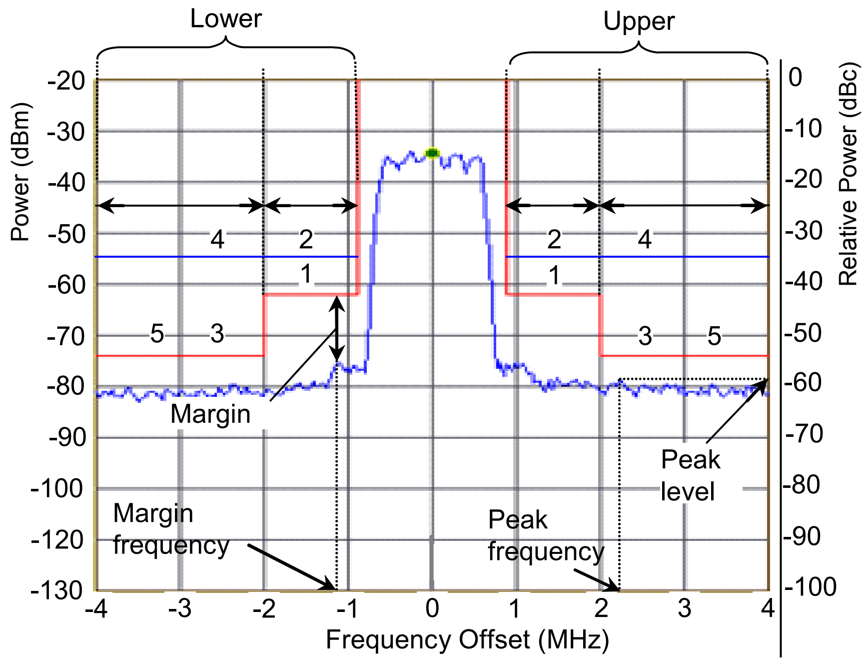

Figure 2.4-2 Spurious Emissions Measurement Result

Use the following commands to inquire results of the Spurious Emissions measurement:

- Judgement Result
  SEM
  :FETCh:CELLular:EVDO:FUNDamental:SPURious:JUDGement
- Peak Level and Frequency at Lower Side Frequency Range
  SEMLVL_LOWER
  :FETCh:CELLular:EVDO:FUNDamental:SPURious:LOWer

- Peak Level and Frequency at Upper Side Frequency Range
  `SEMLVL_UPPER`
  `:FETCh:CELLular:EVDO:FUNDamental:SPURious:UPPer`
- Margin and Related Point Frequency at Lower Side Frequency Range
  `SEMMARGIN_LOWER`
  `:FETCh:CELLular:EVDO:FUNDamental:SPURious:MARGin:LOWer`
- Margin and Related Point Frequency at Upper Side Frequency Range
  `SEMMARGIN_UPPER`
  `:FETCh:CELLular:EVDO:FUNDamental:SPURious:MARGin:UPPer`

2.5 Modulation Analysis

Modulation Analysis measures the following items:

- Carrier Frequency
- Carrier Frequency Error
- Worst Carrier Frequency Error
- Rho
- EVM
- Peak EVM
- Phase Error
- Magnitude Error
- Origin Offset
- Time Error

Use the following command to enable modulation analysis measurement and specify the measurement count from 1 to 200.

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

2.5.1 Frequency Error

Frequency Error measurement measures the carrier frequency and frequency error of the Reverse Link carrier frequency.

Set the reference frequency for error measurement based on the Channel and Reverse Link frequency described in Section 2.1.3 “Frequency and level”.

Use the following commands to query frequency error measurement results:

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

The types of frequency error measurement results are minimum, average, maximum, and standard deviation.
The worst value is either the maximum or minimum frequency error, whichever is the larger absolute value.

2.5.2 Rho

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

```
RHO
:FETCh:CELLular:EVDO:FUNDamental:MODulation:RHO
```

2.5.3 EVM

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

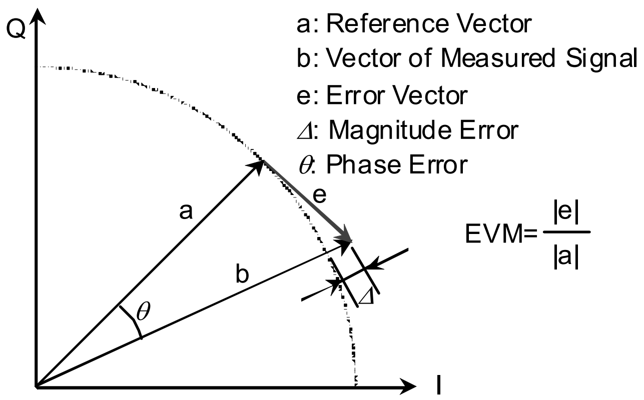

Figure 2.5.3-1 EVM Definition

EVM, phase error, and magnitude error are measured for each chip to obtain up to 2048 data. The rms of the data is regarded as one measurement result.
The peak EVM is the maximum value in the obtained EVM data.

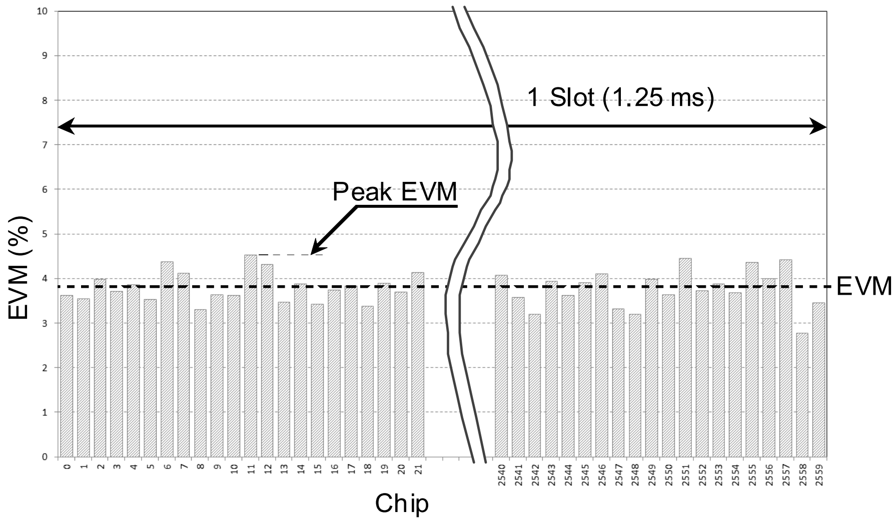

Figure 2.5.3-2 Difference between EVM and Peak EVM

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

- EVM
  `EVM`
  `:FETCh:CELLular:EVDO:FUNDamental:MODulation:EVM`
- Peak EVM
  `PEVM`
  `:FETCh:CELLular:EVDO:FUNDamental:MODulation:PEVM`
- Phase Error
  `PHASEERR`
  `:FETCh:CELLular:EVDO:FUNDamental:MODulation:PHERror`
- Magnitude Error
  `MAGERR`
  `:FETCh:CELLular:EVDO:FUNDamental:MODulation:MERRor`

2.5.4 Origin Offset

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

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

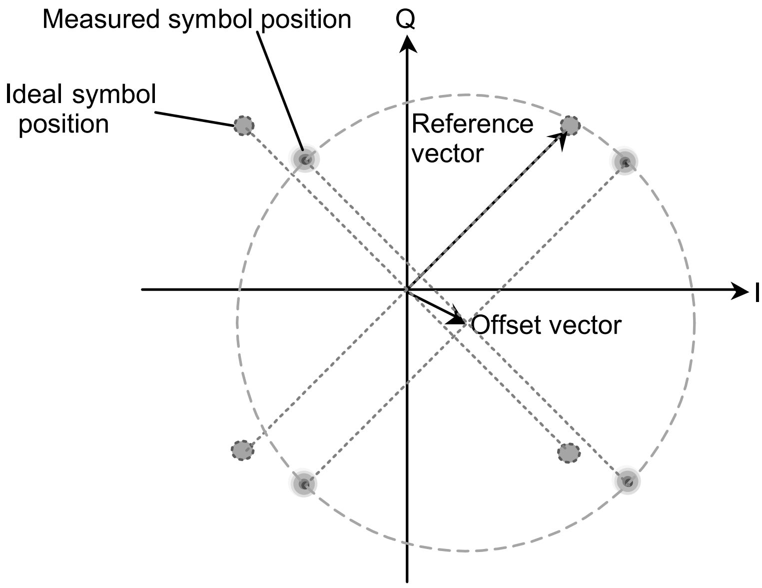

Figure 2.5.4-1 Origin Offset Definition

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

```
ORGNOFS
:FETCh:CELLular:EVDO:FUNDamental:MODulation:ORGNoffset
```

2.5.5 Time Error

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

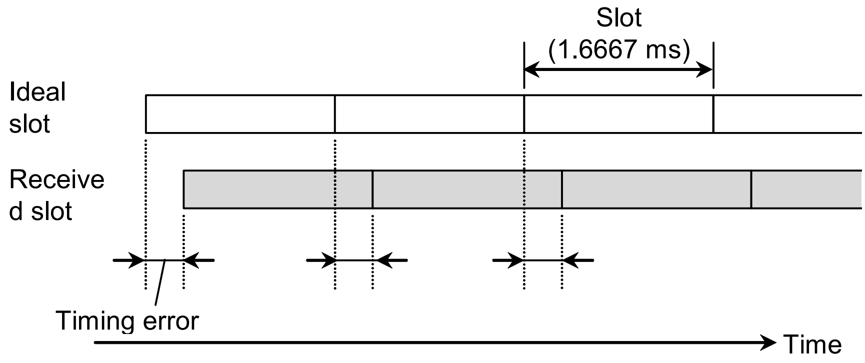

Figure 2.5.5-1 Time Error Definition

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

- Time Error
  `TAU`
  `:FETCh:CELLular:EVDO:FUNDamental:MODulation:TERRor`
- Time Error (Worst Value)
  `TAU_WORST`
  `:FETCh:CELLular:EVDO:FUNDamental:MODulation:TERRor:WORSt`

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

Note:

The MX887016A allows the Time Error measurement only when Long Span Code Search is Off.

2.6 Code Domain Power

Code Domain Power measurement measures the level of each code channel.

The Code Domain Power measurement settings are:

Start measurement and measurement count

Enable the Code Domain Power measurement and specify the measurement count from 1 to 200 using the following command.

```
CDP_SET
:CONFigure:CELLular:EVDO:FUNDamental:CDPower:SET
```

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

- Max Inactive Channel Power
  `MAXINACTCODE`
  `:FETCh:CELLular:EVDO:FUNDamental:CDPower:MICPower`
- Pilot Channel Power
  `CDP_PILOT`
  `:FETCh:CELLular:EVDO:FUNDamental:CDPower:PILot`
- RRI Channel Power (Reverse Rate Indicator)
  `CDP_RRI`
  `:FETCh:CELLular:EVDO:FUNDamental:CDPower:RRI`
- DSC Channel Power (Data Source Channel)
  `CDP_DSC`
  `:FETCh:CELLular:EVDO:FUNDamental:CDPower:DSC`
- DRC Channel Power (Data Rate Channel)
  `CDP_DRC`
  `:FETCh:CELLular:EVDO:FUNDamental:CDPower:DRC`
- ACK Channel Power
  `CDP_ACK`
  `:FETCh:CELLular:EVDO:FUNDamental:CDPower:ACK`
- DATA Channel Power
  `CDP_DATA`
  `:FETCh:CELLular:EVDO:FUNDamental:CDPower:DATA`
- Aux Pilot Channel Power
  `CDP_AUX`
  `:FETCh:CELLular:EVDO:FUNDamental:CDPower:APILot`

2.7 Capturing Waveform Data

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

```
WAVEFMEAS
:FETCh:CELLular:EVDO:FUNDamental:TRACe
```

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

Table 2.7-1 Waveform Data Type and Data Interval

Measurement	Query Parameter	Number of Data	Data Interval
Occupied Bandwidth	1	621	4.8828125 kHz
Spurious Emissions (RBW 30 kHz)	2	1893	4.8828125 kHz
Spurious Emissions (RBW 1 MHz)	3	1893	4.8828125 kHz
Spurious Emissions (RBW 1.23 MHz)	4	1893	4.8828125 kHz
Code Domain Power (I)	5	32	1 walsh code
Code Domain Power (Q)	6	32	1 walsh code

2.8 Sample Programs

2.8.1 Spurious Emissions

An example of Spectrum Spurious Emissions measurement using the Native command mode is described here.

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

Processing Flow

1. Set the application software type to the MX887016A.
2. Set the following measurement conditions.

Test Port	Port1
Input level	–10 dBm
Reverse Link frequency	1855 MHz
Frequency Band	1
Protocol Revision	Rev. A
Long Span Code Search	ON
Data Channel Payload Size	128 kbps
Trigger Source	Power
Trigger Level	–10
Trigger Delay	1 ms
Trigger Timeout	10 s
Tx Power Measurement	OFF
Occupied Bandwidth Measurement	OFF
Spurious Emissions Measurement	ON, 100 counts
Modulation Analysis	OFF
Code Domain Power	OFF

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

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

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

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

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

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

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

; Set center frequency to "1855 MHz".
sendln 'TXFREQ 1855MHZ'
call check_error_code

; Set Frequency Band to "1".
sendln 'BAND 1'
call check_error_code

; Set Protocol Revision to "Rev.A".
sendln 'PREV REVA'
call check_error_code
```

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

; Set Data Channel Payload Size to "128 kbps".
sendln 'PSIZE 128'
call check_error_code

; Set Trigger Source to "Power".
sendln 'FMEAS_TRGSRC PWR'
call check_error_code

; Set Trigger Level to "-10 dB".
sendln 'FMEAS_TRGLVL -10'
call check_error_code

; Set Trigger Delay to "1 ms".
sendln 'FMEAS_TRGDLY 1'
call check_error_code

; Set Trigger Timeout to "10 s".
sendln 'FMEAS_TRGTOUT 10'
call check_error_code

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

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

; Set Measurement of Spurious Emission to "ON","100 times".
sendln 'SPR_SET ON,100'
call check_error_code

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

; Set Measurement of Code Domain Power to "OFF".
sendln 'CDP_SET OFF'
call check_error_code
```

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

; waiting measurement up to 10 second
for i 1 10

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

; Query Judgement
sendln 'SEM?'
call check_error_code

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

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

; Query Spectrum data
sendln 'WAVEFMEAS? 2,0,1641'
call check_error_code

messagebox  'Macro end successfully' 'Finish'
```

```
End

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

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

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

  ; in case of no error

return

:check_response

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

  return

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

2.8.2 Modulation Analysis

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

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

Processing Flow

1. Set the application software type to the MX887016A.
2. Set the following measurement conditions.

Test Port	Port2
Input Level	–20 dBm
Reverse Link Frequency	1855 MHz
Frequency Band	1
Protocol Revision	Rev.A
Long Span Code Search	ON
Data Channel Payload Size	128 kbps
Trigger Source	Power
Trigger Level	–10
Trigger Delay	0 ms
Trigger Timeout	5 s
Tx Power Measurement	OFF
Occupied Bandwidth Measurement	OFF
Spurious Emissions Measurement	OFF
Modulation Analysis	ON, 200 counts
Code Domain Power	OFF

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

   Frequency, Frequency Error (Worst), EVM, Peak EVM, Phase Error, Magnitude Error, Origin Offset, Rho, and Time Error (Worst)

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

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

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

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

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

; Set Reverse Link Frequency to "1855 MHz".
sendln ':CONF:CELL:MEAS:RFS:FREQ 1855000000'
call check_error_code

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

; Set Frequency Band to "1".
sendln ':CONF:CELL:EVDO:FUND:BAND 1'
call check_error_code

; Set Protocol Revision to "Rev.A".
sendln ':CONF:CELL:EVDO:PREV REVA'
call check_error_code

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

```
; Set Data Channel Payload Size to "128 kbps".
sendln ':CONF:CELL:EVDO:PSIZ 128'
call check_error_code

; Set Trigger Source to "Power".
sendln ':TRIG:CELL:EVDO:FUND:SOUR PWR'
call check_error_code

; Set Trigger Level to "-10 dB".
sendln ':TRIG:CELL:EVDO:FUND:LEV -10'
call check_error_code

; Set Trigger Delay to "0 ms".
sendln ':TRIG:CELL:EVDO:FUND:DEL 0'
call check_error_code

; Set Trigger Timeout to "5 s".
sendln ':TRIG:CELL:EVDO:FUND:TOUT 5'
call check_error_code

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

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

; Set Measurement of Spurious Emission to "OFF".
sendln ':CONF:CELL:EVDO:FUND:SPUR:SET OFF'
call check_error_code

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

; Set Measurement of Code Domain Power to "OFF".
sendln ':CONF:CELL:EVDO:FUND:CDP:SET OFF'
call check_error_code

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

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

; waiting measurement up to 10 second
for i 1 10

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

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

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

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

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

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

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

; Query Origin Offset
```

```
sendln ':FETC:CELL:EVDO:FUND:MOD:ORGN? TTL'
call check_error_code

; Query Rho
sendln ':FETC:CELL:EVDO:FUND:MOD:RHO? TTL'
call check_error_code

; Query Time Error (Worst)
sendln ':FETC:CELL:EVDO:FUND:MOD:TERR:WORS?'
call check_error_code

messagebox  'Macro end successfully' 'Finish'

End

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

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

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

  ; in case of no error

return
```

```
:check_response

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

  return

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

Chapter 3 Sequence Measurement

This chapter explains the MX887016A Sequence Measurement function and commands. For a detailed description of the commands, refer to Chapter 4 “SCPI Command Reference” and Chapter 5 “Native Command Reference” in this manual.

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

3.1 Outline

The MX887016A 1xEV-DO Reverse Link transmission measurement option adds the following measurements to the Sequence Measurement mode. Refer to Chapter 2 "Fundamental Measurement" for details of each measurement.

- Tx Power
- Occupied Bandwidth
- Spurious Emissions
- Modulation Analysis
  Frequency Error, Rho, EVM, Origin Offset, Time Error
- Code Domain Power

The Sequence Measurement mode does not support the Waveform Data measurement.

1xEV-DO measurement can be allocated to any segment in the sequence table.
The segment duration depends on the measurement count. Each item of 1xEV-DO measurement takes 0.667 ms (≈10/15 ms).
When multiple measurements are specified in a segment, the largest measurement count determines the segment measurement duration.

Example:

Tx Power	50 times	50 × 10/15 ms = 33.3 ms
Occupied Bandwidth	100 times	100 × 10/15 ms = 66.7 ms
Spurious Emissions	150 times	150 × 10/15 ms = 100 ms
Modulation Analysis	50 times	50 × 10/15 ms = 33.3 ms
Code Domain Power	200 times	200 × 10/15 ms = 133.3 ms

In this case, the measurement duration is 133.3 ms as determined by the Code Domain Power measurement duration.

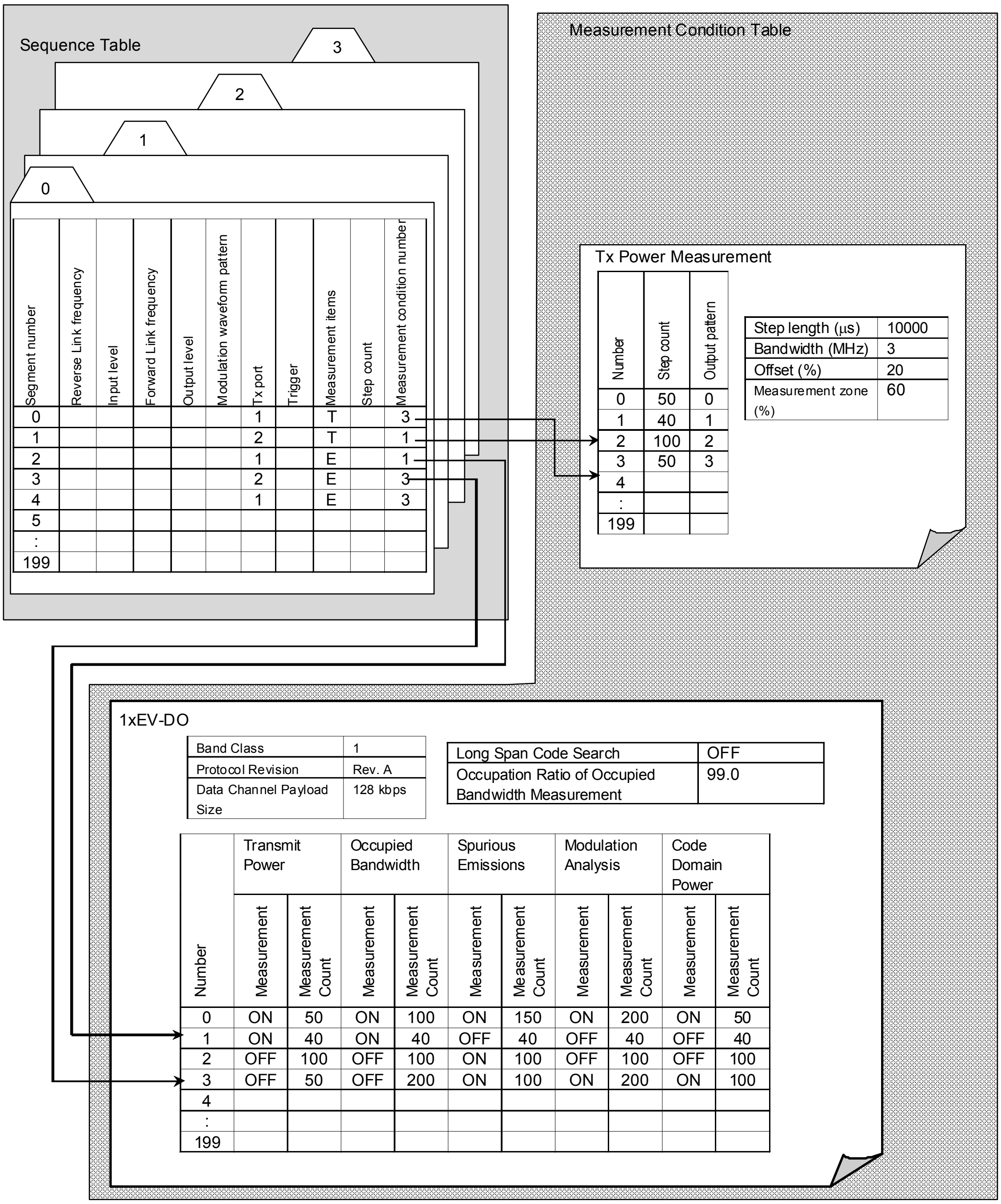

Figure 3.1-1 Data Composition of Sequence Measurement Conditions with MX887016A Installed

To switch to the Sequence Measurement mode, use the following command and specify SEQUENCE as the parameter.

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

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

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

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

- Input Frequency (Rev.) (mobile station Tx frequency)
  `TXFREQ`
  `:CONFigure:CELLular:MEASurement:RFSettings:FREQuency`
- Output Frequency (Fwd.) (mobile station Rx frequency)
  `RXFREQ`
  `:CONFigure:CELLular:GENerator:RFSettings:FREQuency`
- Output Level
  `OLVL`
  `:CONFigure:CELLular:GENerator:RFSettings:LEVel`
- Input Level
  `ILVL`
  `:CONFigure:CELLular:MEASurement:RFSettings:LEVel`
- Output On/Off
  `LVL`
  `:CONFigure:CELLular:GENerator:RFSettings:STATe`
- Modulation On/Off
  `MOD`
  `:CONFigure:CELLular:GENerator:BBMode`
- Waveform File
  `PACKAGE`
  `:CONFigure:CELLular:GENerator:ARB:PACKage:SELect`
- Waveform Pattern
  `DLPAT`
  `:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect`
  `DLPAT_SYNC`
  `:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect:SYNC`

- Ports

  PORT

  :ROUTe:PORT:CONNect:DIRection

3.2 Sequence Table Setup

3.2.1 Sequence table setting items

The sequence table setting items are:

- Table number
- Reverse Link frequency
- Input level
- Forward Link frequency
- Output level
- Modulated waveform pattern
- Output port
- Trigger conditions
- Measurement items
- Step count
- Measurement condition number

Table number

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

Reverse Link Frequency, Input level, Forward Link frequency, Output level, Modulated waveform pattern

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

Frequency:	400.000000 to 3,800.000000 MHz	
Input level:	–65.0 to +35.0 dBm	(Test Port 1, 2)
	–65.0 to +25.0 dBm	(Test Port 3, 4)
Output level:	–130.0 to –10.0 dBm	(Test Port 1, 2)
	–120.0 to 0.0 dBm	(Test Port 3, 4)
Modulation Waveform Pattern:	PAT1 to PATn (n: waveform information file group range)	

For details of the modulated waveform patterns at 1xEV-DO measurement, refer to Section 2.1.5 "Waveform patterns".

Output port

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

Trigger condition

This specifies the trigger condition at each segment of the sequence table. The setting ranges are:

Trigger Source:	Frame: When frame is detected
	Free run: When measurement start command received
	Power: When input level above (below) trigger level
Slope:	Rise: When input level exceeds trigger level
Trigger Level:	Level difference from input level
	Set a value in the range of –40.0 to 0 dB.
Trigger Delay:	Delay time
	Set a value in the range of 0 to 10.000 ms.

Measurement item, number of steps and measurement condition number

Measurement item, Step count and Measurement condition

This sets the step count and measurement item for received signals in each segment of the sequence table. To execute the 1xEV-DO measurement described here, set 1xEV-DO as the measurement item.

Note:

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

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

The 1xEV-DO measurement condition is specified in a separate table. A measurement item should be registered in a given segment with its measurement condition number specified in the related table.
Set the step count to the following values or more according to the contents of the 1xEV-DO measurement condition table.

- Measurement Count +2
- The step number of trigger segment* is 16 or above.

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

Step count setting examples are shown in the following table.

Table 3.2.1-1 Examples of Step Count Settings

	Measurement	Example 1		Example 2	
		Measurement	Measurement count	Measurement	Measurement count
*1	Tx Power	On	50	On	50
	Occupied Bandwidth	On	100	On	100
	Spurious Emissions	On	60	On	60
	Modulation Analysis	On	200	On	200
	Code Domain Power	On	100	Off	100
*2	Step Count		202		202

*1: Setup items specified in 1xEV-DO measurement condition table

*2: Setup items specified in sequence table

3.2.2 Sequence table commands

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

- Table Number
  `SEQTBL`
  `:CONFigure:CELLular:SEQuence:TABLe`
- Reverse Link frequency, Input Level, Forward Link frequency, Output Level, and Modulation Pattern
  `SEQTRX`
  `:CONFigure:CELLular:SEQuence:RFSettings:TRX`
- Reverse Link frequency and Input Level
  `SEQTX`
  `:CONFigure:CELLular:SEQuence:RFSettings:TX`
- Output port
  `SEQSGPORT`
  `:CONFigure:CELLular:SEQuence:RXPort`
- Trigger
  `SEQTRG`
  `:TRIGger:CELLular:SEQuence`
- Measurement mode, Step Count and Measurement Condition Number
  `SEQMEAS`
  `:CONFigure:CELLular:SEQuence:SETup`

3.2.3 Setting item error check

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

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

The following command is used to check for errors.

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

Capture memory is used to save the 1xEV-DO measurement results. One 1xEV-DO measurement uses about 0.017% of the memory, so 1.7% of the capture memory is required to execute 100 measurements for a specific segment.

The following table shows error causes.

Table 3.2.3-1 Error Cause

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

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

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

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

3.3 Setting Measurement Conditions Table

3.3.1 Setup 1xEV-DO measurement items

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

- Band Class*
- Protocol Revision
- Long Span Code Search
- Data Channel Payload Size
- Occupied Bandwidth Measurement Occupation Ratio
- Tx Power Measurement on/off and Count*
- Occupied Bandwidth measurement on/off and count*
- Spurious Emissions measurement on/off and count*
- Modulation Analysis measurement on/off and count*
- Code Domain Power measurement on/off and count*
- All measurement items Off*

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

3.3.2 1xEV-DO measurement condition setting commands

The following commands set and query the 1xEV-DO measurement conditions.

- Band Class
  EVDO_BAND
  :CONFigure:CELLular:SEQuence:EVDO:BAND

- Protocol Revision
  EVDO_PREV
  :CONFigure:CELLular:SEQuence:EVDO:PREVision

- Long Span Code Search
  EVDO_LSCODESEARCH
  :CONFigure:CELLular:SEQuence:EVDO:LSSearch

- Data Channel Payload Size
  EVDO_PSIZE
  :CONFigure:CELLular:SEQuence:EVDO:PSIZe

- Occupation Ratio
  `EVDO_OBW_RATIO`
  `:CONFigure:CELLular:SEQuence:EVDO:OBW:RATio`

- Tx Power measurement on/off and count
  `EVDO_PWR_SET`
  `:CONFigure:CELLular:SEQuence:EVDO:POWer:SET`

- Occupied Bandwidth measurement on/off and count
  `EVDO_OBW_SET`
  `:CONFigure:CELLular:SEQuence:EVDO:OBW:SET`

- Spurious Emissions measurement on/off and count
  `EVDO_SPR_SET`
  `:CONFigure:CELLular:SEQuence:EVDO:SPURious:SET`

- Modulation Analysis measurement on/off and count
  `EVDO_MOD_SET`
  `:CONFigure:CELLular:SEQuence:EVDO:MODulation:SET`

- Code Domain Power measurement on/off and count
  `EVDO_CDP_SET`
  `:CONFigure:CELLular:SEQuence:EVDO:CDPower:SET`

- All measurement items Off
  `EVDO_MEAS_OFF`
  `:CONFigure:CELLular:SEQuence:EVDO:AMITems:OFF`

3.4 Controlling and Monitoring Sequence

3.4.1 Controlling and monitoring items

The following items can be set to control sequence measurement.

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

Start and stop segments

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

Initialization after completion of sequence measurement

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

- Receive frequency (mobile station Tx frequency)
- Input level
- Transmit frequency (mobile station Rx frequency)
- Output level

To start or stop the Sequence Measurement or monitor the measurement status, use the commands described in Section 2.1.8 "Starting/stopping measurement".

In addition, the following items can be queried during sequence measurement.

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

Number of measured segments and measurement status of each segment

The number of completed segment measurements and the status of segments can be monitored during sequence measurement.

The following table lists the response values and status of segments.

Table 3.4.1-1 Segment Status

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

Measurement status of specified segments

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

Progress of sequence measurement

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

3.4.2 Sequence control and monitor commands

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

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

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

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

3.5 Measurement Results

The 1xEV-DO measurement results are queried using the following commands.

Tx Power

- Transmit Power
  EVDO_TXPWR
  :FETCh:CELLular:SEQuence:EVDO:POWer:TXPower
- Filter Power
  EVDO_FILTPWR
  :FETCh:CELLular:SEQuence:EVDO:POWer:FLTPower

Occupied Bandwidth

- Occupied Bandwidth
  EVDO_OBW
  :FETCh:CELLular:SEQuence:EVDO:OBW
- Occupied Bandwidth Frequency
  EVDO_OBWFREQ
  :FETCh:CELLular:SEQuence:EVDO:OBW:FREQuency

Spurious Emissions

- Judgement result
  EVDO_SEM
  :FETCh:CELLular:SEQuence:EVDO:SPURious:JUDGement
- Max. Level and Frequency in Each Range
  Lower Side of Channel Bandwidth
  EVDO_SEMLVL_LOWER
  :FETCh:CELLular:SEQuence:EVDO:SPURious:LOWer
  Upper Side of Channel Bandwidth
  EVDO_SEMLVL_UPPER
  :FETCh:CELLular:SEQuence:EVDO:SPURious:UPPer
- Margin in Each Range
  Lower Side of Channel Bandwidth
  EVDO_SEMMARGIN_LOWER
  :FETCh:CELLular:SEQuence:EVDO:SPURious:MARGin:LOWer
  Upper Side of Channel Bandwidth
  EVDO_SEMMARGIN_UPPER
  :FETCh:CELLular:SEQuence:EVDO:SPURious:MARGin:UPPer

Modulation Analysis

- Carrier Frequency
  EVDO_CFREQ
  :FETCh:CELLular:SEQuence:EVDO:MODulation:CFRequency
- Frequency Error (ppm, Hz)
  EVDO_CFERR
  :FETCh:CELLular:SEQuence:EVDO:MODulation:FERRor
- Frequency Error Worst Value (ppm, Hz)
  EVDO_CFERR_WORST
  :FETCh:CELLular:SEQuence:EVDO:MODulation:FERRor:WORSt
- Rho
  EVDO_RHO
  :FETCh:CELLular:SEQuence:EVDO:MODulation:RHO
- EVM
  EVDO_EVM
  :FETCh:CELLular:SEQuence:EVDO:MODulation:EVM
- Peak EVM
  EVDO_PEVM
  :FETCh:CELLular:SEQuence:EVDO:MODulation:PEVM
- Phase Error
  EVDO_PHASEERR
  :FETCh:CELLular:SEQuence:EVDO:MODulation:PHERror
- Magnitude Error
  EVDO_MAGERR
  :FETCh:CELLular:SEQuence:EVDO:MODulation:MERRor
- Origin Offset
  EVDO_ORGNOFS
  :FETCh:CELLular:SEQuence:EVDO:MODulation:ORGNoffset
- Time Error
  EVDO_TAU
  :FETCh:CELLular:SEQuence:EVDO:MODulation:TERRor
- Worst Value in Time Error Measurement Results
  EVDO_TAU_WORST
  :FETCh:CELLular:SEQuence:EVDO:MODulation:TERRor:WORSt

Code Domain Power

- Max Inactive Channel Power
  EVDO_MAXINACTCODE
  :FETCh:CELLular:SEQuence:EVDO:CDPower:MICPower
- Pilot Channel Power
  EVDO_CDP_PILOT
  :FETCh:CELLular:SEQuence:EVDO:CDPower:PILot
- RRI Channel Power (Reverse Rate Indicator)
  EVDO_CDP_RRI
  :FETCh:CELLular:SEQuence:EVDO:CDPower:RRI
- DSC Channel Power (Data Source Channel)
  EVDO_CDP_DSC
  :FETCh:CELLular:SEQuence:EVDO:CDPower:DSC
- DRC Channel Power (Data Rate Channel)
  EVDO_CDP_DRC
  :FETCh:CELLular:SEQuence:EVDO:CDPower:DRC
- ACK Channel Power
  EVDO_CDP_ACK
  :FETCh:CELLular:SEQuence:EVDO:CDPower:ACK
- DATA Channel Power
  EVDO_CDP_DATA
  FETCh:CELLular:SEQuence:EVDO:CDPower:DATA
- Aux Pilot Channel Power
  EVDO_CDP_AUX
  :FETCh:CELLular:SEQuence:EVDO:CDPower:APILot

3.6 Sample Program

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

Processing Flow

1. Set the application type to Cellular.
2. Set the MX887016A Sequence Measurement as measurement standard.
3. Set measurement conditions listed in Tables 3.6-1 and 3.6-2.
4. Query the sequence table for errors and abort if errors found.
5. Set the following items.

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

6. Start measurement.
7. Query the status of measurements.
8. When measurement is completed, query:
   Tx power and Occupied bandwidth at segment 0
   Spurious Emissions, Modulation Analysis, and Code Domain Power at segment 1

Table 3.6-1 Sequence Table Setting 1

Segment Number	0	1	2	....
Forward Link Frequency (MHz)	1935	1940		
Input Level (dBm)	0	0		
Reverse Link Frequency (MHz)	1855	1860		
Output Level (dBm)	–50	–55		
Downlink Signal Pattern	PAT1	PAT2		
Output Port	1	2		
Trigger Source	Free run	Free run		
Trigger Slope	Rise	Rise		
Trigger Level	–20	–25		
Trigger Delay Time (ms)	0	0		
Measurement Item	1xEV-DO	1xEV-DO		
Step Count	250	250		
Measurement Condition Number	0	1		

Table 3.6-2 1xEV-DO Measurement Condition Settings

Item	Setting			
Band Class	1			
Protocol Revision	Rev.0			
Long Span Code Search	ON			
Occupation Ratio (%)	99.5			
Measurement Condition Number	0	1	2	…
Tx Power Measurement	ON	OFF		
Tx Power Measurement Count	100	10		
Occupied Bandwidth Measurement	ON	OFF		
Occupied Bandwidth Measurement Count	50	5		
Spurious Emissions Measurement	OFF	ON		
Spurious Emissions Measurement Count	100	10		
Modulation Analysis Measurement	OFF	ON		
Modulation Analysis Measurement Count	200	20		
Code Domain Power Measurement	OFF	ON		
Code Domain Power Measurement Count	50	75		

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

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

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

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

; Set Sequence Table Parameters of "Segment 0".
sendln ' SEQTRX 0,1855,0,1935,-50,PAT1'
call check_error_code

sendln 'SEQSGPORT 0,PORT1'
call check_error_code

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

sendln 'SEQMEAS 0,EVDO,250,0'
call check_error_code

; Set Sequence Table Parameters of "Segment 1".
sendln ' SEQTRX 1,1860,0,1940,-55,PAT2'
call check_error_code

sendln 'SEQSGPORT 1,PORT2'
call check_error_code
```

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

sendln 'SEQMEAS 1,EVDO,250,1'
call check_error_code

; Set Measurement Condition of "1xEV-DO".
sendln 'EVDO_BAND 0,1'
call check_error_code

sendln 'EVDO_PREV REV0'
call check_error_code

sendln 'EVDO_LSCODESEARCH ON'
call check_error_code

sendln 'EVDO_OBW_RATIO 99.5'
call check_error_code

sendln 'EVDO_PWR_SET 0,ON,100'
call check_error_code

sendln 'EVDO_PWR_SET 1,OFF,10'
call check_error_code

sendln 'EVDO_OBW_SET 0,ON,50'
call check_error_code

sendln 'EVDO_OBW_SET 1,OFF,5'
call check_error_code

sendln 'EVDO_SPR_SET 0,OFF,100'
call check_error_code

sendln 'EVDO_SPR_SET 1,ON,10'
call check_error_code

sendln 'EVDO_MOD_SET 0,OFF,200'
call check_error_code

sendln 'EVDO_MOD_SET 1,ON,20'
call check_error_code
```

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

sendln 'EVDO_CDP_SET 1,ON,75'
call check_error_code

; SET VSG PARAMETERS
sendln 'SOUR:GPRF:GEN:MODE NORMAL'
call check_error_code
sendln 'SOUR:GPRF:GEN:ARB:FILE:LOAD "MV887015A_C2K_0002"'
call check_error_code
sendln '*WAI'
call check_error_code
sendln 'SOUR:GPRF:GEN:ARB:FILE:LOAD? "MV887015A_C2K_0002"'
call check_error_code
sendln 'SOUR:GPRF:GEN:MODE SEQUENCE"'
call check_error_code
sendln 'SYSERRALL?'
call check_error_code

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

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

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

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

; Start measurement
sendln 'SNGLS'
call check_error_code

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

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

next

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

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

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

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

; Query Spurious Emission data of "Segment 1"
sendln 'EVDO_SEM? 1'
call check_error_code
sendln 'EVDO_SEMLVL_LOWER? 1'
call check_error_code
sendln 'EVDO_SEMLVL_UPPER? 1'
call check_error_code
sendln 'EVDO_SEMMARGIN_LOWER? 1'
call check_error_code
sendln 'EVDO_SEMMARGIN_UPPER? 1'
```

```
call check_error_code

; Query Frequency Error data of "Segment 1".
sendln 'EVDO_CFREQ? 1'
call check_error_code
sendln 'EVDO_CFERR_WORST? 1'
call check_error_code

; Query EVM data of "Segment 1".
sendln 'EVDO_EVM? 1,MAX'
call check_error_code
sendln 'EVDO_PEVM? 1,MAX'
call check_error_code
sendln 'EVDO_PHASEERR? 1,MAX'
call check_error_code
sendln 'EVDO_MAGERR? 1,MAX'
call check_error_code

; Query Original Offset of "Segment 1".
sendln 'EVDO_ORGNOFS? 1,MAX'
call check_error_code

; Query Rho of "Segment 1".
sendln 'EVDO_RHO? 1,TTL'
call check_error_code

; Query Time Error data of "Segment 1".
sendln 'EVDO_TAU? 1,AVG'
call check_error_code
sendln 'EVDO_TAU_WORST? 1'
call check_error_code

; Query Code Domain Power of "Segment 1"
sendln 'EVDO_MAXINACTCODE? 1'
call check_error_code
sendln 'EVDO_CDP_PILOT? 1,AVG'
call check_error_code
sendln 'EVDO_CDP_RRI? 1,AVG'
call check_error_code
sendln 'EVDO_CDP_DSC? 1,AVG'
call check_error_code
sendln 'EVDO_CDP_DRC? 1,AVG'
call check_error_code
sendln 'EVDO_CDP_ACK? 1,AVG'
```

```
call check_error_code
sendln 'EVDO_CDP_DATA? 1,AVG'
call check_error_code
sendln 'EVDO_CDP_AUX? 1,AVG'
call check_error_code

messagebox  'Macro end successfully' 'Finish'

End

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

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

  ; in case of timeout
  if result=0 goto _timeout
  ; in case of error occurring
  if result=2 then

        e_message='Error code = '
        strconcat e_message inputstr
        messagebox  e_message 'Command Error occurred'
        end
  endif

  ; in case of no error

return

:check_seqerr_response

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

```
  return

:check_response

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

  return

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

Chapter 4 SCPI Command Reference

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

4.1 List of Commands

The following table shows the rules for describing messages.

[ ]	Messages or parameters in square brackets can be omitted.
|	Choose one of several choices. A|B|C|D indicates a choice of A, B, C, and D.
{}	Choose one of the groups in braces. A|B({C|D}) indicates a choice of A, B(C), or A, B(D).

4.1.1 Common commands

Operation Status Register

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

Questionable Register

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

Common

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

Measurements

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

Common Parameters

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

System

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

4.1.2 Fundamental measurement commands

Common Parameters

Function	Command	Query	Response
AWGN Level On/Off	:CONFigure:CELLular:GENerator:ARB:NOISe:STATe <on_off>	:CONFigure:CELLular:GENerator:ARB:NOISe:STATe?	<on_off>
AWGN Level	:CONFigure:CELLular:GENerator:ARB:NOISe:CN <level>	:CONFigure:CELLular:GENerator:ARB:NOISe:CN?	<level>
Input Level	:CONFigure:CELLular:MEASurement:RFSettings:LEVel <level>	:CONFigure:CELLular:MEASurement:RFSettings:LEVel?	<level>
Output Level	:CONFigure:CELLular:GENerator:RFSettings:LEVel <level>	:CONFigure:CELLular:GENerator:RFSettings:LEVel?	<level>
Output Frequency (Fwd.)	:CONFigure:CELLular:GENerator:RFSettings:FREQuency <freq>	:CONFigure:CELLular:GENerator:RFSettings:FREQuency?	<freq>
Input Frequency (Rev.)	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency <freq>	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency?	<freq>
Band Class	:CONFigure:CELLular:MEASurement:RFSettings:BCLass <band>	:CONFigure:CELLular:MEASurement:RFSettings:BCLass?	<band>
Channel	:CONFigure:CELLular:MEASurement:RFSettings:CHANnel <channel>	:CONFigure:CELLular:MEASurement:RFSettings:CHANnel?	<channel>

Fundamental Measurement Parameters

Function	Command	Query	Response
Turn Off All Measurement Items	:CONFigure:CELLular:EVDO :FUNDamental:AMITems:OFF	-----	-----
Band Class for Spurious Emissions Limit	:CONFigure:CELLular:EVDO :FUNDamental:BAND <band>	:CONFigure:CELLular:EVDO :FUNDamental:BAND?	<band>
Code Domain Power Enable and Count	:CONFigure:CELLular:EVDO :FUNDamental:CDPower:SET <on_off>[,<count>]	:CONFigure:CELLular:EVDO :FUNDamental:CDPower:SET ?	<on_off>,<count>
Trigger Delay	:TRIGger:CELLular:EVDO:FUNDamental:DELay <delay>	:TRIGger:CELLular:EVDO:FUNDamental:DELay?	<delay>
Trigger Level	:TRIGger:CELLular:EVDO:FUNDamental:LEVel <level>	:TRIGger:CELLular:EVDO:FUNDamental:LEVel?	<level>
Trigger Source	:TRIGger:CELLular:EVDO:FUNDamental:SOURce <source>	:TRIGger:CELLular:EVDO:FUNDamental:SOURce?	<source>
Trigger Timeout	:TRIGger:CELLular:EVDO:FUNDamental:TOUT <time>	:TRIGger:CELLular:EVDO:FUNDamental:TOUT?	<time>
Long Span Code search	:CONFigure:CELLular:EVDO :FUNDamental:LSSearch <on_off>	:CONFigure:CELLular:EVDO :FUNDamental:LSSearch?	<on_off>
Modulation Analysis Enable and Count	:CONFigure:CELLular:EVDO :FUNDamental:MODulation:SET <on_off>[,<count>]	:CONFigure:CELLular:EVDO :FUNDamental:MODulation:SET?	<on_off>,<count>

Fundamental Measurement Parameters (Cont'd)

Function	Command	Query	
Occupied Bandwidth Ratio	:CONFigure:CELLular:EVDO :FUNDamental:OBW:RATio <ratio>	:CONFigure:CELLular:EVDO :FUNDamental:OBW:RATio?	<ratio>
Occupied Bandwidth Enable and Count	:CONFigure:CELLular:EVDO :FUNDamental:OBW:SET <on_off>[,<count>]	:CONFigure:CELLular:EVDO :FUNDamental:OBW:SET?	<on_off>
Long Code Mask - I	:CONFigure:CELLular:EVDO :LCMask:I <lcm>	:CONFigure:CELLular:EVDO :LCMask:I?	<lcm>
Protocol Revision	:CONFigure:CELLular:EVDO :PREVision <rev>	:CONFigure:CELLular:EVDO :PREVision?	<rev>
Data Channel Payload Size	:CONFigure:CELLular:EVDO :PSIZe <size>	:CONFigure:CELLular:EVDO :PSIZe?	<size>
Fast Power Measurement Mode	:CONFigure:CELLular:EVDO :FUNDamental:POWer:FMODe <on_off>	:CONFigure:CELLular:EVDO :FUNDamental:POWer:FMODe ?	<on_off>
Tx Power Measurement Enable and Count	:CONFigure:CELLular:EVDO :FUNDamental:POWer:SET <on_off>[,<count>]	:CONFigure:CELLular:EVDO :FUNDamental:POWer:SET?	<on_off>
Spurious Emissions Enable and Count	:CONFigure:CELLular:EVDO :FUNDamental:SPURious:SE T <on_off>[,<count>]	:CONFigure:CELLular:EVDO :FUNDamental:SPURious:SE T?	<on_off>

Results

<table>
<tr><th>Function</th><th>Command</th><th>Query</th><th>Response</th></tr>
<tr><td>ACK Channel Power</td><td>-----</td><td>:FETCh:CELLular:EVDO:FUNDamental:CDPower:ACK? <mode>[,<unit>]</td><td>{<avg>,<max>,<min>}|<pwr></td></tr>
<tr><td>Auxiliary Pilot Channel Power</td><td>-----</td><td>:FETCh:CELLular:EVDO:FUNDamental:CDPower:APILot? <mode>[,<unit>]</td><td>{<avg>,<max>,<min>}|<pwr></td></tr>
<tr><td>DATA Channel Power</td><td>-----</td><td>:FETCh:CELLular:EVDO:FUNDamental:CDPower:DATA? <mode>[,<unit>]</td><td>{<avg>,<max>,<min>}|<pwr></td></tr>
<tr><td>DRC Channel Power</td><td>-----</td><td>:FETCh:CELLular:EVDO:FUNDamental:CDPower:DRC? <mode>[,<unit>]</td><td>{<avg>,<max>,<min>}|<pwr></td></tr>
<tr><td>DSC Channel Power</td><td>-----</td><td>:FETCh:CELLular:EVDO:FUNDamental:CDPower:DSC? <mode>[,<unit>]</td><td>{<avg>,<max>,<min>}|<pwr></td></tr>
<tr><td>R-PICH Power</td><td>-----</td><td>:FETCh:CELLular:EVDO:FUNDamental:CDPower:PILot? <mode></td><td>{<avg>,<max>,<min>}|<pwr></td></tr>
<tr><td>RRI Channel Power</td><td>-----</td><td>:FETCh:CELLular:EVDO:FUNDamental:CDPower:RRI? <mode>[,<unit>]</td><td>{<avg>,<max>,<min>}|<pwr></td></tr>
<tr><td>Carrier Frequency Error Result</td><td>-----</td><td>:FETCh:CELLular:EVDO:FUNDamental:MODulation:FERRor? <mode></td><td>{<avg_ppm>,<avg_Hz>,<max_ppm>,<max_Hz>,<min_ppm>,<min_Hz>}|{<freq_ppm>,<freq_Hz>}</td></tr>
<tr><td>Worst Carrier Frequency Error Result</td><td>-----</td><td>:FETCh:CELLular:EVDO:FUNDamental:MODulation:FERRor:WORSt?</td><td><freq_ppm>,<freq_Hz></td></tr>
</table>

Results (Cont'd)

Function	Command	Query	Response
Carrier Frequency Result	-----	:FETCh:CELLular:EVDO:FUNDamental:MODulation:CFRequency?	<freq>
EVM Result	-----	:FETCh:CELLular:EVDO:FUNDamental:MODulation:EVM? <mode>	{<avg>,<max>,<min>}|<evm>
Filtered Power Result	-----	:FETCh:CELLular:EVDO:FUNDamental:POWer:FLTPower? <mode>	{<avg>,<max>,<min>}|<pwr>|{<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>}
Magnitude Error Result	-----	:FETCh:CELLular:EVDO:FUNDamental:MODulation:MERRor? <mode>	{<avg>,<max>,<min>}|<merr>
Max Inactive Channel Power	-----	:FETCh:CELLular:EVDO:FUNDamental:CDPower:MICPower?	<pwr>,<ph>,<wn>,<wl>
OBW Result	-----	:FETCh:CELLular:EVDO:FUNDamental:OBW?	<bw>
OBW Frequency Result	-----	:FETCh:CELLular:EVDO:FUNDamental:OBW:FREQuency? <pos>	<freq>
Origin Offset Result	-----	:FETCh:CELLular:EVDO:FUNDamental:MODulation:ORGNoffset? <mode>	{<avg>,<max>,<min>}|<origin>
Peak EVM Result	-----	:FETCh:CELLular:EVDO:FUNDamental:MODulation:PEVM? <mode>	{<avg>,<max>,<min>}|<pevm>
Phase Error Result	-----	:FETCh:CELLular:EVDO:FUNDamental:MODulation:PHERror? <mode>	{<avg>,<max>,<min>}|<perr>

Results (Cont'd)

Function	Command	Query	Response
Rho Result	-----	:FETCh:CELLular:EVDO:FUNDamental:MODulation:RHO? <mode>	<avg>,<max>,<min>,<rho>
Spurious Emissions Judgement	-----	:FETCh:CELLular:EVDO:FUNDamental:SPURious:JUDGement?	<judgement>
Spurious Emissions Peak Value (Lower)	-----	:FETCh:CELLular:EVDO:FUNDamental:SPURious:LOWer?	<bc>,<f>,<l>
Spurious Emissions Peak Value (Upper)	-----	:FETCh:CELLular:EVDO:FUNDamental:SPURious:UPPer?	<bc>,<f>,<l>
Spurious Emissions Template Margin (Lower)	-----	:FETCh:CELLular:EVDO:FUNDamental:SPURious:MARGin:LOWer?	<bc>,<f>,<l>
Spurious Emissions Template Margin (Upper)	-----	:FETCh:CELLular:EVDO:FUNDamental:SPURious:MARGin:UPPer?	<bc>,<f>,<l>

Results (Cont'd)

Function	Command	Query	Response
Time Error Result	-----	:FETCh:CELLular:EVDO:FUNDamental:MODulation:TERRor? <mode>	{<avg>,<max>,<min>}|<time>
Worst Time Error Result	-----	:FETCh:CELLular:EVDO:FUNDamental:MODulation:TERRor:WORSt?	<time>
Tx Power Result	-----	:FETCh:CELLular:EVDO:FUNDamental:POWer:TXPower? <mode>	{<avg>,<max>,<min>}|<pwr>|{<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>}
Waveform	-----	:FETCh:CELLular:EVDO:FUNDamental:TRACe? <format>,<position>,<length>[,<wl>]	<data[n]>

4.1.3 Sequence measurement commands

Sequence Common Parameters

Function	Command	Query	Response
Input Level	:CONFigure:CELLular:MEASurement:RFSettings:LEVel <level>	:CONFigure:CELLular:MEASurement:RFSettings:LEVel?	<level>
Output Level	:CONFigure:CELLular:GENerator:RFSettings:LEVel <level>	:CONFigure:CELLular:GENerator:RFSettings:LEVel?	<level>
Output Frequency (Fwd.)	:CONFigure:CELLular:GENerator:RFSettings:FREQuency <freq>	:CONFigure:CELLular:GENerator:RFSettings:FREQuency?	<freq>
Sequence Measurement Status	-----	:FETCh:CELLular:SEQuence:STATe?	<m_status>,<n>,<s(n-1)>
Sequence Progress	-----	:FETCh:CELLular:SEQuence:PROGress?	<p>,<cur>,<start>,<stop>
Trigger Timeout	:TRIGger:CELLular:MEASurement:TOUT <time>	:TRIGger:CELLular:MEASurement:TOUT?	<time>
Specified Segment Status	-----	:FETCh:CELLular:SEQuence:SEG:STATe? <seg>	<stat>
Input Frequency (Rev.)	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency <freq>	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency?	<freq>

Sequence Control Parameters

Function	Command	Query	Response
Sequence Control Parameter - Sequence Control	:CONFigure:CELLular:SEQuence:CONTrol <start>,<end>	:CONFigure:CELLular:SEQuence:CONTrol?	<start>,<end>
Sequence Control Parameter - Sequence Control	:CONFigure:CELLular:SEQuence:CONTrol:TX <start>,<end>	:CONFigure:CELLular:SEQuence:CONTrol:TX?	<start>,<end>
Sequence Control Parameter - Sequence End State Reinitialization	:CONFigure:CELLular:SEQuence:RFSettings:REINit <sw>	:CONFigure:CELLular:SEQuence:RFSettings:REINit?	<sw>
Sequence Control Parameter - Sequence Table	:CONFigure:CELLular:SEQuence:TABLe <table>	:CONFigure:CELLular:SEQuence:TABLe?	<table>
Start Signal Analyzer Measurement Only	:INITiate:CELLular:SEQuence:EXECute:TX	-----	-----

Sequence Parameter Information

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

Sequence Table Parameters

Function	Command	Query	Response
Sequence Table Parameter - Measurement	:CONFigure:CELLular:SEQuence:SETup <seg>,<system>,<step>,<mcond>	:CONFigure:CELLular:SEQuence:SETup? <seg>	<mode>,<step>,<mcond>
Sequence Table Parameter - SG Output Port	:CONFigure:CELLular:SEQuence:RXPort <seg>,<port>	:CONFigure:CELLular:SEQuence:RXPort? <seg>	<port>
Sequence Table Parameter - Trigger	:TRIGger:CELLular:SEQuence <seg>,<src>,<slope>,<level>,<delay>	:TRIGger:CELLular:SEQuence? <seg>	<src>,<slope>,<level>,<delay>
Sequence Table Parameter - TRX Control	:CONFigure:CELLular:SEQuence:RFSettings:TRX <seg>,<ul_freq>,<ref,dl_freq>,<level>,<pat>	:CONFigure:CELLular:SEQuence:RFSettings:TRX? <seg>	<ul_freq>,<ref>,<dl_freq>,<level>,<pat>
Sequence Table Parameter - Uplink Frequency, Input Level	:CONFigure:CELLular:SEQuence:RFSettings:TX <seg>,<ul_freq>,<ref>	:CONFigure:CELLular:SEQuence:RFSettings:TX? <seg>	<ul_freq>,<ref>

Measurement Parameters

Function	Command	Query	Response
Turn Off All Measurement Items	:CONFigure:CELLular:SEQuence:EVDO:AMITems:OFF <mcond>	-----	-----
Band Class for Spurious Emissions Limit	:CONFigure:CELLular:SEQuence:EVDO:BAND <mcond>,<band>	:CONFigure:CELLular:SEQuence:EVDO:BAND? <mcond>	<band>

Measurement Parameters (Cont'd)

Function	Command	Query	Response
Code Domain Power Enable and Count	:CONFigure:CELLular:SEQuence:EVDO:CDPower:SET <mcond>,<on_off>[,<count>]	:CONFigure:CELLular:SEQuence:EVDO:CDPower:SET? <mcond>	<on_off>,<count>
Long Span Code Search	:CONFigure:CELLular:SEQuence:EVDO:LSSearch <on_off>	:CONFigure:CELLular:SEQuence:EVDO:LSSearch?	<on_off>
Modulation Analysis Enable and Count	:CONFigure:CELLular:SEQuence:EVDO:MODulation:SET <mcond>,<on_off>[,<count>]	:CONFigure:CELLular:SEQuence:EVDO:MODulation:SET? <mcond>	<on_off>,<count>
Occupied Bandwidth Ratio	:CONFigure:CELLular:SEQuence:EVDO:OBW:RATio <ratio>	:CONFigure:CELLular:SEQuence:EVDO:OBW:RATio?	<ratio>
Occupied Bandwidth Enable and Count	:CONFigure:CELLular:SEQuence:EVDO:OBW:SET <mcond>,<on_off>[,<count>]	:CONFigure:CELLular:SEQuence:EVDO:OBW:SET? <mcond>	<on_off>,<count>
Protocol Revision	:CONFigure:CELLular:SEQuence:EVDO:PREVision <rev>	:CONFigure:CELLular:SEQuence:EVDO:PREVision?	<rev>
Data Channel Payload Size	:CONFigure:CELLular:SEQuence:EVDO:PSIZe <size>	:CONFigure:CELLular:SEQuence:EVDO:PSIZe?	<size>
Tx Power Measurement Enable and Count	:CONFigure:CELLular:SEQuence:EVDO:POWer:SET <mcond>,<on_off>[,<count>]	:CONFigure:CELLular:SEQuence:EVDO:POWer:SET? <mcond>	<on_off>,<count>

Measurement Parameters (Cont'd)

Function	Command	Query	Response
Spurious Emissions Enable and Count	:CONFigure:CELLular:SEQuence:EVDO:SPURious:SET <mcond>,<on_off>[,<count>]	:CONFigure:CELLular:SEQuence:EVDO:SPURious:SET? <mcod>	<on_off>,<count>

Results

Function	Command	Query	Response
ACK Channel Power	-----	:FETCh:CELLular:SEQuence:EVDO:CDPower:ACK? <seg>,<mode>[,<unit>]	{<avg>,<max>,<min>}|<pwr>
Auxiliary Pilot Channel Power	-----	:FETCh:CELLular:SEQuence:EVDO:CDPower:APILot? <seg>,<mode>[,<unit>]	{<avg>,<max>,<min>}|<pwr>
DATA Channel Power	-----	:FETCh:CELLular:SEQuence:EVDO:CDPower:DATA? <seg>,<mode>[,<unit>]	{<avg>,<max>,<min>}|<pwr>
DRC Channel Power	-----	:FETCh:CELLular:SEQuence:EVDO:CDPower:DRC? <seg>,<mode>[,<unit>]	{<avg>,<max>,<min>}|<pwr>
DSC Channel Power	-----	:FETCh:CELLular:SEQuence:EVDO:CDPower:DSC? <seg>,<mode>[,<unit>]	{<avg>,<max>,<min>}|<pwr>
R-PICH Power	-----	:FETCh:CELLular:SEQuence:EVDO:CDPower:PILot? <seg>,<mode>	{<avg>,<max>,<min>}|<pwr>
RRI Channel Power	-----	:FETCh:CELLular:SEQuence:EVDO:CDPower:RRI? <seg>,<mode>[,<unit>]	{<avg>,<max>,<min>}|<pwr>

Results (Cont'd)

Function	Command	Query	Response
Carrier Frequency Error Result	-----	:FETCh:CELLular:SEQuence:EVDO:MODulation:FERRor? <seg>,<mode>	{<avg_ppm>,<avg_Hz>,<max_ppm>,<max_Hz>,<min_ppm>,<min_Hz>}|{<freq_ppm>,<freq_Hz>}
Worst Carrier Frequency Error Result	-----	:FETCh:CELLular:SEQuence:EVDO:MODulation:FERRor:WORSt? <seg>	<freq_ppm>,<freq_Hz>
Carrier Frequency Result	-----	:FETCh:CELLular:SEQuence:EVDO:MODulation:CFRequency? <seg>	<freq>
EVM Result	-----	:FETCh:CELLular:SEQuence:EVDO:MODulation:EVM? <seg>,<mode>	{<avg>,<max>,<min>}|<evm>
Filtered Power Result	-----	:FETCh:CELLular:SEQuence:EVDO:POWer:FLTPower? <seg>,<mode>	{<avg>,<max>,<min>}|<pwr>|{<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>}
Magnitude Error Result	-----	:FETCh:CELLular:SEQuence:EVDO:MODulation:MERRor? <seg>,<mode>	{<avg>,<max>,<min>}|<merr>
Max Inactive Channel Power	-----	:FETCh:CELLular:SEQuence:EVDO:CDPower:MICPower? <seg>	<pwr>,<ph>,<wn>,<wl>
OBW Result	-----	:FETCh:CELLular:SEQuence:EVDO:OBW? <seg>	<bw>
OBW Frequency Result	-----	:FETCh:CELLular:SEQuence:EVDO:OBW:FREQuency? <seg>,<pos>	<freq>

Results (Cont'd)

Function	Command	Query	Response
Origin Offset Result	-----	:FETCh:CELLular:SEQuence:EVDO:MODulation:ORGNoffset? <seg>,<mode>	{<avg>,<max>,<min>}|<origin>
Peak EVM Result	-----	:FETCh:CELLular:SEQuence:EVDO:MODulation:PEVM? <seg>,<mode>	{<avg>,<max>,<min>}|<pevm>
Phase Error Result	-----	:FETCh:CELLular:SEQuence:EVDO:MODulation:PHERror? <seg>,<mode>	{<avg>,<max>,<min>}|<perr>
Rho Result	-----	:FETCh:CELLular:SEQuence:EVDO:MODulation:RHO? <seg>,<mode>	{<avg>,<max>,<min>}|<rho>
Spurious Emissions Judgement	-----	:FETCh:CELLular:SEQuence:EVDO:SPURious:JUDGement? <seg>	<judgement>
Spurious Emissions Peak Value (Lower)	-----	:FETCh:CELLular:SEQuence:EVDO:SPURious:LOWer? <seg>	<bc>,<f>,<l>
Spurious Emissions Peak Value (Upper)	-----	:FETCh:CELLular:SEQuence:EVDO:SPURious:UPPer? <seg>	<bc>,<f>,<l>
Spurious Emissions Template Margin (Lower)	-----	:FETCh:CELLular:SEQuence:EVDO:SPURious:MARGin:LOWer? <seg>	<bc>,<f>,<l>
Spurious Emissions Template Margin (Upper)	-----	:FETCh:CELLular:SEQuence:EVDO:SPURious:MARGin:UPPer? <seg>	<bc>,<f>,<l>

Results (Cont'd)

Function	Command	Query	Response
Time Error Result	-----	:FETCh:CELLular:SEQuence :EVDO:MODulation:TERRor? <seg>,<mode>	{<avg>,<max>,<min>}|<time>
Worst Time Error Result	-----	:FETCh:CELLular:SEQuence :EVDO:MODulation:TERRor: WORSt? <seg>	<time>
Tx Power Result	-----	:FETCh:CELLular:SEQuence :EVDO:POWer:TXPower? <seg>,<mode>	{<avg>,<max>,<min>}|<pwr>|{<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>}

4.2 Details of Commands

This section describes the commands in alphabetical order.

■ Terms in this command list

EX .... Command name (header)

Example .... Command function name

Function .... Command function

Command.................................. Programming command syntax

Query .... Query syntax

Response ....Response syntax

Parameter .... Parameter definition

Details .... Command restrictions and others

Example of Use................................ Command usage example

Related Commands ....Introduction of related commands

■ Suffix code list

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

4.2.1 Common commands

:ABORt:CELLular:MEASurement

Measurement Stop

Function

Stops current measurement

Command

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

Example of Use

To stop current measurement:

:ABOR:CELL:MEAS

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

Waveform File Select

Function

Selects or queries waveform file for arbitrary waveform signal used at Forward Link signal.

Command

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

Query

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

Response

<pac>

Parameter

<pac>	Waveform file

Details

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

Example of Use

To set the waveform file 1 from the waveform files loaded in memory:
:CONF:CELL:GEN:ARB:PACK:SEL “PAC1”
:CONF:CELL:GEN:ARB:PACK:SEL?
> PAC1

Related Command

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

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

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

Waveform Pattern Select

Function

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

Command

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

Query

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

Response

<pat>

Parameter

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

Details

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

Example of Use

To set the waveform pattern to 1:
:CONF:CELL:GEN:ARB:WAV:PATT:SEL PAT1
:CONF:CELL:GEN:ARB:WAV:PATT:SEL?
>PAT1

Related Command

Waveform file for arbitrary waveform signal selection or query

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

Remarks

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

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

Waveform Pattern Select (SYNC)

Function

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

Command

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

Query

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

Response

<pat>

Parameter

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

Details

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

Example of Use

To set the waveform pattern to 1:
:CONF:CELL:GEN:ARB:WAV:PATT:SEL:SYNC PAT1
:CONF:CELL:GEN:ARB:WAV:PATT:SEL:SYNC?
>PAT1

Related Command

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

Remarks

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

:CONFigure:CELLular:GENerator:BBMode

Output Signal Modulation

Function

Sets or queries MU887000A RF signal output modulation

Command

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

Query

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

Response

<on_off>

Parameter

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

Example of Use

To modulate the RF signal:

:CONF:CELL:GEN:BBM ON

:CONF:CELL:GEN:BBM?

>ON

:CONFigure:CELLular:GENerator:RFSettings:STATe

Output Level On/Off

Function

Sets or queries RF signal output at MU887000A connector

Command

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

Query

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

Response

<on_off>

Parameter

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

Example of Use

To enable output of RF signals at MU887000A connector:

:CONF:CELL:GEN:RFS:STAT ON

:CONF:CELL:GEN:RFS:STAT?

ON

:CONFigure:CELLular:MEASurement:STANdard

Standard Select

Function

Sets or queries measurement standard

Command

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

Query

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

Response

<std>

Parameter

<std>	Measurement standard	
COMMON	Common Measurement	(requires MX887010A)
WCDMA	W-CDMA	(requires MX887011A)
GSM	GSM	(requires MX887012A)
LTE	LTE	(requires MX887013A or MX887014A)
CDMA2000	CDMA2000 1x	(requires MX887015A)
EVDO	CDMA2000 1xEVDO	(requires MX887016A)
TDSCDMA	TD-SCDMA	(requires MX887017A)
SEQUENCE	Sequence	(requires MX887010A)
SEQ	Sequence	(requires MX887010A)
Default	COMMON	

Example of Use

To switch the measurement standard to SEQUENCE:

:CONF:CELL:MEAS:STAN SEQUENCE

:CONF:CELL:MEAS:STAN?

> SEQUENCE

Remarks

To execute the measurements described in section 4.2.2 “Fundamental measurement commands”, set the parameter to EVDO.

To execute the measurements described in section 4.2.3 “Sequence measurement commands”, set the parameter to SEQUENCE.

If this command is sent during measurement, measurement stops to prepare for the new standard.

Common hardware settings, such as Downlink Frequency and Input Level, can be set for each measurement standard.

:FETCh:CELLular:MEASurement:STATe?

Measurement Status

Function

Queries measurement status

Query

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

Response

<m_status>

Parameter

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

Details

This command can be used while measurement is stopped or executing.
The value received from MX887016A is 0, 2, 4, 5, 9, or 12.

Example of Use

To query the measurement status:
:FETC:CELL:MEAS:STAT?
>0

:INITiate:CELLular:MEASurement:SINGle

Measurement Start

Function

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

Command

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

Example of Use

To start measurement:
:INIT:CELL:MEAS:SING

Related Command

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

:INSTrument[:SELect]

Application Select

Function

Sets or queries type of application software executing on MU887000A

Command

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

Query

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

Response

<app>

Parameter

<app>	Type of application software
CELLULAR	When using MX887010A, MX887011A, MX887012A, MX887013A, MX887014A, MX887015A, MX887016A or MX887017A
SRW	When using MX887030A, MX887031A, MX887040A, or MX887050A

Details

Set the parameter to CELLULAR and send the command before using the MX887016A.

Example of Use

To set the application software to CELLULAR:

:INST CELLULAR

:INST?

> CELLULAR

Remarks

When using the MX887016A, set the application to CELLULAR using `:INSTrument[:SELect]` and then set the standard to EVDO or SEQUENCE using `:CONFigure:CELLular:MEASurement:STANdard`.

:ROUTe:PORT:CONNect:DIRection

Set Connect Port Direction

Function

Sets or queries connectors for inputting and outputting RF signals

Command

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

Query

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

Response

<input>,<output>

Parameters

<input>	Test Port No.
PORT1	Test Port1
PORT2	Test Port2
PORT3	Test Port3
PORT4	Test Port4
Default	PORT1
<output>	Test Port No.
PORT1	Test Port1
PORT2	Test Port2
PORT3	Test Port3
PORT4	Test Port4
Default	PORT1

Details

Both Test Port1 and Test Port2 can be set to input and output simultaneously.
Test Port3 and Test Port4 can be set to either input or output at one time.

Example of Use

To set the RF signal input and output connectors to Test Port1 and Test Port2, respectively:
:ROUT:PORT:CONN:DIR PORT1,PORT2
:ROUT:PORT:CONN:DIR?
> PORT1,PORT2

4

SCPI Command Reference

:STATus:OPERation:MEASure[:EVENt]?

Measurement Operation Status Register Query

Function

Queries content of measurement operation status register
The event occurrence can be identified using the retrieved value.

Query

```
:STATus:OPERation:MEASure[:EVENt]?
```

Response

<mosr>

Value = bit0 + bit1 + ... + bit15

bit0 = 2^0 = 1	Measurement in progress
bit1 = 2^1 = 2	Preparing trigger
bit2 = 2^2 = 4	Unused
bit3 = 2^3 = 8	Unused
bit4 = 2^4 = 16	Unused
bit5 = 2^5 = 32	Unused
bit6 = 2^6 = 64	Unused
bit7 = 2^7 = 128	Unused
bit8 = 2^8 = 256	Unused
bit9 = 2^9 = 512	Unused
bit10 = 2^{10} = 1024	Unused
bit11 = 2^{11} = 2048	Unused
bit12 = 2^{12} = 4096	Unused
bit13 = 2^{13} = 8192	Unused
bit14 = 2^{14} = 16384	Unused
bit15 = 2^{15} = 32768	Unused

Parameter

<mosr>	Measurement operation status register
Range	0 to 65535

Details

The sum of the values for bits of the occurring event from the values $2^0 = 1$, $2^1 = 2$ to $2^{15} =$ 32768, that correspond to the measurement operation status register bits 0, 1 to 15 becomes the response.

Example of Use

To query content of measurement operation status register:
:STAT:OPER:MEAS?
> 1

:STATus:QUEStionable:MEASure[:EVENt]?

Measurement Questionable Status Register Query

Function

Queries content of measurement questionable status register
The event occurrence can be identified using the retrieved value.

Query

```
:STATus:QUEStionable:MEASure[:EVENt]?
```

Response

<mqsr>
Value = bit0 + bit1 + ... + bit15

bit0 = 2^0 = 1	Level over
bit1 = 2^1 = 2	Level under
bit2 = 2^2 = 4	Timeout
bit3 = 2^3 = 8	Unused
bit4 = 2^4 = 16	Unused
bit5 = 2^5 = 32	Unused
bit6 = 2^6 = 64	Unused
bit7 = 2^7 = 128	Unused
bit8 = 2^8 = 256	Unused
bit9 = 2^9 = 512	Unused
bit10 = 2^{10} = 1024	Unused
bit11 = 2^{11} = 2048	Unused
bit12 = 2^{12} = 4096	Unused
bit13 = 2^{13} = 8192	Unused
bit14 = 2^{14} = 16384	Unused
bit15 = 2^{15} = 32768	Unused

Parameter

<mqsr>	Measurement questionable status register
Range	0 to 65535

Details

The sum of the values for bits of the occurring event from the values $2^0 = 1$, $2^1 = 2$ to $2^{15} = 32768$, that correspond to the measurement questionable status register bits 0, 1 to 15 becomes the response.

Example of Use

To query content of measurement questionable status register:
:STAT:QUES:MEAS?
> 0

:SYSTem:LANGuage

Language Selection of Remote Command

Function

Switches language mode of remote control command

Command

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

Query

```
:SYSTem:LANGuage?
```

Response

<mode>

Parameter

<mode>	Language mode
NAT	Native
SCPI	SCPI
Default	NAT

Example of Use

To switch the remote control command language mode to Native:

:SYST:LANG NAT

:SYST:LANG?

>NAT

4.2.2 Fundamental measurement commands

:CONFigure:CELLular:EVDO:FUNDamental:AMITems:OFF

Turn Off All Measurement Items

Function

Disables all measurement items

Command

```
:CONFigure:CELLular:EVDO:FUNDamental:AMITems:OFF
```

Details

This command operation is similar to the following commands
:CONFigure:CELLular:EVDO:FUNDamental:POWer:SET,
:CONFigure:CELLular:EVDO:FUNDamental:OBW:SET,
:CONFigure:CELLular:EVDO:FUNDamental:SPURious:SET,
:CONFigure:CELLular:EVDO:FUNDamental:MODulation:SET,
:CONFigure:CELLular:EVDO:FUNDamental:CDPower:SET

Example of Use

To disable all measurement items:
:CONF:CELL:EVDO:FUND:AMIT:OFF

:CONFigure:CELLular:EVDO:FUNDamental:BAND

Band Class for Spurious Emissions Limit

Function

Sets or queries band class to determine Spurious Emissions Limit range

Command

```
:CONFigure:CELLular:EVDO:FUNDamental:BAND <band>
```

Query

```
:CONFigure:CELLular:EVDO:FUNDamental:BAND?
```

Response

<band>

Parameter

<band>	Band class
Range	0 to 16, 18 to 21
Resolution	1
Default	0

Details

This parameter sets the band class to determine the Spurious Emissions Limit range.

Example of Use

To set the band class to determine Spurious Emissions Limit range 10:

:CONF:CELL:EVDO:FUND:BAND 10

:CONF:CELL:EVDO:FUND:BAND?

>10

Remarks

Use the following command to set the band class to determine the frequency:

:CONFigure:CELLular:MEASurement:RFSettings:BClass

:CONFigure:CELLular:EVDO:FUNDamental:CDPower:SET

Code Domain Power Enable and Count

Function

Enables Code Domain Power measurement and sets measurement count, and queries settings

Command

```
:CONFigure:CELLular:EVDO:FUNDamental:CDPower:SET <on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:EVDO:FUNDamental:CDPower:SET?
```

Response

<on_off>,<count>

Parameters

<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
<count>	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable Code Domain Power measurement and set the measurement count to 10:

:CONF:CELL:EVDO:FUND:CDP:SET ON,10

:CONF:CELL:EVDO:FUND:CDP:SET?

>ON,10

:CONFigure:CELLular:EVDO:FUNDamental:LSSearch

Long Span Code Search

Function

Enables and queries Long Span Code Search function

Command

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

Query

```
:CONFigure:CELLular:EVDO:FUNDamental:LSSearch?
```

Response

<on_off>

Parameter

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

Details

Set this parameter to OFF when the Reverse Link and Forward Link signals are synchronized; set it to ON when they are not synchronized.

Example of Use

To enable Long Span Code Search:

:CONF:CELL:EVDO:FUND:LSS ON

:CONF:CELL:EVDO:FUND:LSS?

>ON

:CONFigure:CELLular:EVDO:FUNDamental:MODulation:SET

Modulation Analysis Enable and Count

Function

Enables Modulation Analysis Measurement and sets or queries measurement count

Command

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

Query

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

Response

<on_off>,<count>

Parameters

<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
<count>	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable Modulation Analysis measurement and set the measurement count to 10:

:CONF:CELL:EVDO:FUND:MOD:SET ON,10

:CONF:CELL:EVDO:FUND:MOD:SET?

>ON,10

:CONFigure:CELLular:EVDO:FUNDamental:OBW:RATio

Occupied Bandwidth Ratio

Function

Sets or queries Occupied Bandwidth measurement occupation ratio

Command

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

Query

```
:CONFigure:CELLular:EVDO:FUNDamental:OBW:RATio?
```

Response

<ratio>

Parameter

<ratio>	Occupation Ratio
Range	80.0% to 99.9%
Resolution	0.1%
Suffix code	% (uses % when omitted)
Default	99.0%

Example of Use

To set the Occupied Bandwidth occupation ratio to 99.0%:

```
:CONF:CELL:EVDO:FUND:OBW:RAT 99.0
:CONF:CELL:EVDO:FUND:OBW:RAT?
>99.0
```

:CONFigure:CELLular:EVDO:FUNDamental:OBW:SET

Occupied Bandwidth Enable and Count

Function

Enables Occupied Bandwidth measurement and sets or queries measurement count

Command

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

Query

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

Response

<on_off>,<count>

Parameters

<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
<count>	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable Occupied Bandwidth measurement and set the measurement count to 10:

```
:CONF:CELL:EVDO:FUND:OBW:SET ON,10
:CONF:CELL:EVDO:FUND:OBW:SET?
>ON,10
```

:CONFigure:CELLular:EVDO:FUNDamental:POWer:FMODe

Fast Power Measurement Mode

Function

Enables Fast Power Measurement mode or queries setting.

Command

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

Query

`:CONFigure:CELLular:EVDO:FUNDamental:POWer:FMODe?`

Response

<on_off>

Parameter

<on_off>	Fast Power Measurement Mode
ON	Executes Fast Power measurement.
OFF	Executes normal power measurement.
Default	OFF

Details

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

Example of Use

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

:CONFigure:CELLular:EVDO:FUNDamental:POWer:SET

Tx Power Measurement Enable and Count

Function

Enables Tx power measurement and sets or queries measurement count

Command

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

Query

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

Response

<on_off>,<count>

Parameters

<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	ON
<count>	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable Tx power measurement and set the measurement count to 10:

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

:CONF:CELL:EVDO:FUND:POW:SET?

>ON,10

:CONFigure:CELLular:EVDO:FUNDamental:SPURious:SET

Spurious Emissions Enable and Count

Function

Enables Spurious Emission measurement and sets or queries measurement count

Command

```
:CONFigure:CELLular:EVDO:FUNDamental:SPURious:SET <on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:EVDO:FUNDamental:SPURious:SET?
```

Response

<on_off>,<count>

Parameters

<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
<count>	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable Spurious Emission measurement and set measurement count to 10:

:CONF:CELL:EVDO:FUND:SPUR:SET ON,10

:CONF:CELL:EVDO:FUND:SPUR:SET?

>ON,10

:CONFigure:CELLular:EVDO:LCMask:I

Long Code Mask - I

Function

Sets or queries Long Code Mask for I-phase.

Command

```
:CONFigure:CELLular:EVDO:LCMask:I <lcm>
```

Query

```
:CONFigure:CELLular:EVDO:LCMask:I?
```

Response

<lcm>

Parameters

<lcm>	Long Code Mask - I
00000000000	0x00000000000
3FF00000000	0x3FF00000000
初期値	00000000000

Example of Use

To set Long Code Mask - I to 0x00000000000.

CONF:CELL:EVDO:LCM:I 00000000000

CONF:CELL:EVDO:LCM:I?

>00000000000

:CONFigure:CELLular:EVDO:PREVision

Protocol Revision

Function

Sets or queries Protocol Revision

Command

```
:CONFigure:CELLular:EVDO:PREVision <rev>
```

Query

```
:CONFigure:CELLular:EVDO:PREVision?
```

Response

<rev>

Parameter

<rev>	Protocol Revision
REV0	Rev .0
REVA	Rev. A
Default	REV0

Example of Use

To set Protocol Revision to Rev.0:

:CONF:CELL:EVDO:PREV REV0

:CONF:CELL:EVDO:PREV?

>REV0

:CONFigure:CELLular:EVDO:PSIZe

Data Channel Payload Size

Function

Sets or queries Data Channel Payload Size

Command

```
:CONFigure:CELLular:EVDO:PSIZe <size>
```

Query

```
:CONFigure:CELLular:EVDO:PSIZe?
```

Response

<size>

Unit	kbps

Parameter

<size>	Data channel payload size
Range	128,256,512,768,1024,1536,2048,3072,4096,6144,8192,12288
Suffix code	None
Default	128

Details

This is only enabled when the Protocol Revision is Rev. A.

Example of Use

To set Data Channel Payload Size to 128 kbps:

:CONF:CELL:EVDO:PSIZ 128

:CONF:CELL:EVDO:PSIZ?

>128

:CONFigure:CELLular:GENerator:ARB:NOISe:CN

AWGN Level

Function

Sets or queries AWGN (Additive White Gaussian Noise) output level ratio vs carrier

Command

```
:CONFigure:CELLular:GENerator:ARB:NOISe:CN <level>
```

Query

```
:CONFigure:CELLular:GENerator:ARB:NOISe:CN?
```

Response

<level>

Unit	dB

Parameter

<level>	AWGN output level
Range	–40 to +12 dB
Resolution	1 dB
Default	–20 dB

Example of Use

To set AWGN output level ratio vs the carrier to –40 dB

:CONF:CELL:GEN:ARB:NOIS:CN -40

:CONF:CELL:GEN:ARB:NOIS:CN?

> -40

:CONFigure:CELLular:GENerator:ARB:NOISe:STATe

AWGN Level On/Off

Function

Enables AWGN output, and queries setting

Command

```
:CONFigure:CELLular:GENerator:ARB:NOISe:STATe <on_off>
```

Query

```
:CONFigure:CELLular:GENerator:ARB:NOISe:STATe?
```

Response

<on_off>

Parameter

<on_off>	Enables/disables AWGN output
ON	Enables AWGN output
OFF	Disables AWGN output
Default	OFF

Example of Use

To enable the AWGN output:
:CONF:CELL:GEN:ARB:NOIS:STAT ON
:CONF:CELL:GEN:ARB:NOIS:STAT?
>ON

Related Command

To set and query AWGN output level ratio vs carrier:
:CONFigure:CELLular:GENerator:ARB:NOISe:CN

:CONFigure:CELLular:GENerator:RFSettings:FREQuency

Output Frequency (Fwd.)

Function

Sets or queries Forward Link center frequency

Command

```
:CONFigure:CELLular:GENerator:RFSettings:FREQuency <freq>
```

Query

```
:CONFigure:CELLular:GENerator:RFSettings:FREQuency?
```

Response

<freq>

Unit	Hz

Parameter

<freq>	Output Frequency (Fwd,)
Range	400.000000 to 3800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	873.600000 MHz

Detail

The input frequency is changed to a value determined by the combination of the Band Class and channel after the channel number is changed.
Changing the output frequency does not change the channel number.

Example of Use

To set the Forward Link frequency to 873.66 MHz:
:CONF:CELL:GEN:RFS:FREQ 873.66MHZ
:CONF:CELL:GEN:RFS:FREQ?
>873660000

:CONFigure:CELLular:GENerator:RFSettings:LEVel

Output Level

Function

Sets or queries RF output level

Command

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

Query

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

Response

<level>

Unit	dBm

Parameter

<level>	Output level
Range	–130.0 to –10.0 dBm (Port1/Port2)
	–120.0 to 0.0 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–55.0 dBm

Details

The setting range varies with the output port setting.
When the Cable Loss Calibration is ON, the cable loss is subtracted from the output level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –135.0 to –15.0 dBm.

Example of Use

To set the output level to –50.0 dBm:
:CONF:CELL:GEN:RFS:LEV -50.0
:CONF:CELL:GEN:RFS:LEV?
>-50.0

Related Commands

[:ROUTe]:EXTLoss:TABLe:SWITch
:CALCulate:EXTLoss:TABLe:SETTing
:CALCulate:EXTLoss:TABLe:VALue
For details of the commands, refer to Chapter 5 “SCPI Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

:CONFigure:CELLular:MEASurement:RFSettings:BCLass

Band Class

Function

Sets or queries band class

Command

```
:CONFigure:CELLular:MEASurement:RFSettings:BCLass <band>
```

Query

```
:CONFigure:CELLular:MEASurement:RFSettings:BCLass?
```

Response

<band>

Parameter

<band>	Band class
Range	0 to 16, 18 to 21
Resolution	1
Default	0

Example of Use

To set the band class to 10:
:CONF:CELL:MEAS:RFS:BCL 10
:CONF:CELL:MEAS:RFS:BCL?
>10

Remarks

Use the following command to set the band class to determine the Spurious Emission Limit range:
:CONFigure:CELLular:EVDO:FUNDamental:BAND

:CONFigure:CELLular:MEASurement:RFSettings:CHANnel

Channel

Function

Sets or queries channel

Command

```
:CONFigure:CELLular:MEASurement:RFSettings:CHANnel <channel>
```

Query

```
:CONFigure:CELLular:MEASurement:RFSettings:CHANnel?
```

Response

<channel>

Parameter

<channel>	Channel
Range	Band Class0: 1 to 799, 991 to 1323
	Band Class1: 0 to 1199
	Band Class2: 0 to 1000, 1329 to 2108
	Band Class3: 1 to 799, 801 to 1039, 1041 to 1199, 1201 to 1600
	Band Class4: 0 to 599
	Band Class5: 1 to 400, 472 to 871, 1039 to 1473, 1536 to 1715, 1792 to 2018
	Band Class6: 0 to 1199
	Band Class7: 0 to 240
	Band Class8: 0 to 1499
	Band Class9: 0 to 699
	Band Class10: 0 to 919
	Band Class11: 1 to 400, 472 to 871, 1039 to 1473, 1536 to 1715, 1792 to 2016
	Band Class12: 0 to 239
	Band Class13: 0 to 1399
	Band Class14: 0 to 1299
	Band Class15: 0 to 899
	Band Class16: 140 to 1459
	Band Class18: 0 to 240
	Band Class19: 0 to 360
	Band Class20: 0 to 680
	Band Class21: 0 to 399
Resolution	1 (other than Band Class3)
	2 (Band Class3)
Default	122

Details

The setting range of this parameter varies with the Band Class setting.
Changing the channel number changes the related output frequency (Forward Link frequency) and input frequency (Reverse Link frequency).

Example of Use

To set the channel to 100:
:CONF:CELL:MEAS:RFS:CHAN 100
:CONF:CELL:MEAS:RFS:CHAN?
>100

:CONFigure:CELLular:MEASurement:RFSettings:FREQuency

Input Frequency (Rev.)

Function

Sets or queries Reverse Link center frequency

Command

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

Query

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

Response

<freq>

Unit	Hz

Parameter

<freq>	Input Frequency (Rev.)
Range	400.000000 to 3800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (used Hz when omitted)
Default	828.660000 MHz

Details

The input frequency is changed to a value determined by the combination of the Band Class and channel after the channel number is changed.
Changing the input frequency does not change the channel number.

Example of Use

To set the Reverse Link center frequency to 828.66 MHz:
:CONF:CELL:MEAS:RFS:FREQ 828.66MHZ
:CONF:CELL:MEAS:RFS:FREQ?
>828660000

:CONFigure:CELLular:MEASurement:RFSettings:LEVel

Input Level

Function

Sets or queries input level of MU887000A connector

Command

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

Query

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

Response

<level>

Unit	dBm

Parameter

<level>	Input level
Range	–65.0 to +35.0 dBm (Port1/Port2)
	–65.0 to +25.0 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–23.7 dBm

Details

The setting range varies with the input port setting.

When the Cable Loss Calibration is ON, the cable loss is added to the input level setting range.

When the cable loss is 5 dB, the Port1/Port2 setting range is –60.0 to +40.0 dBm.

Example of Use

To set the input level to –10.0 dBm:

:CONF:CELL:MEAS:RFS:LEV -10.0

:CONF:CELL:MEAS:RFS:LEV?

>-10.0

Related Commands

[:ROUTe]:EXTLoss:TABLe:SWITch

:CALCulate:EXTLoss:TABLe:SETTing

:CALCulate:EXTLoss:TABLe:VALue

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

:FETCh:CELLular:EVDO:FUNDamental:CDPower:ACK?

ACK Channel Power

Function

Queries Reverse ACK Channel Power measurement result

Query

```
:FETCh:CELLular:EVDO:FUNDamental:CDPower:ACK? <mode>[,<unit>]
```

Response

When <mode> = TTL
<avg>,<max>,<min>
When <mode> is other than TTL
<pwr>

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<unit>	Query unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when <unit> omitted)
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pwr>	Measurement result in specified Storage mode

Example of Use

To query the ACK Channel Power measurement result average value:
:FETC:CELL:EVDO:FUND:CDP:ACK? AVG
>0.01

:FETCh:CELLular:EVDO:FUNDamental:CDPower:APILot?

Auxiliary Pilot Channel Power

Function

Queries Reverse Auxiliary Pilot Channel Power measurement result

Query

```
:FETCh:CELLular:EVDO:FUNDamental:CDPower:APILot? <mode>[,<unit>]
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<pwr>

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<unit>	Query unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when <unit> omitted)
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pwr>	Measurement result in specified Storage mode

Details

A valid data is acquired only when the Protocol Revision is Rev. A.

Example of Use

To query the Auxiliary Pilot Channel Power measurement result average value:

:FETC:CELL:EVDO:FUND:CDP:APIL? AVG

>0.01

:FETCh:CELLular:EVDO:FUNDamental:CDPower:DATA?

DATA Channel Power

Function

Queries Reverse DATA Channel Power measurement result

Query

```
:FETCh:CELLular:EVDO:FUNDamental:CDPower:DATA? <mode>[,<unit>]
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<pwr>

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<unit>	Query unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when <unit> omitted)
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pwr>	Measurement result in specified Storage mode

Example of Use

To query the average value of the DATA Channel Power measurement result

:FETC:CELL:EVDO:FUND:CDP:DATA? AVG

>0.01

:FETCh:CELLular:EVDO:FUNDamental:CDPower:DRC?

DRC Channel Power

Function

Queries Reverse DRC Channel (Data Rate Channel) Power measurement result

Query

```
:FETCh:CELLular:EVDO:FUNDamental:CDPower:DRC? <mode>[,<unit>]
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<pwr>

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<unit>	Query unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when <unit> omitted)
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pwr>	Measurement result in specified Storage mode

Example of Use

To query the DRC Channel Power measurement result average value

:FETC:CELL:EVDO:FUND:CDP:DRC? AVG

>0.01

:FETCh:CELLular:EVDO:FUNDamental:CDPower:DSC?

DSC Channel Power

Function

Queries Reverse DSC Channel (Data Source Channel) Power measurement result

Query

```
:FETCh:CELLular:EVDO:FUNDamental:CDPower:DSC? <mode>[,<unit>]
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<pwr>

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<unit>	Query unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when <unit> omitted)
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pwr>	Measurement result in specified Storage mode

Details

An valid data is acquired only when the Protocol Revision is Rev. A.

Example of Use

To query the DSC Channel Power measurement result average value

:FETC:CELL:EVDO:FUND:CDP:DSC? AVG

>0.01

:FETCh:CELLular:EVDO:FUNDamental:CDPower:MICPower?

Max Inactive Channel Power

Function

Queries channel outputting maximum power among inactive code channels, and power measurement result

Query

```
:FETCh:CELLular:EVDO:FUNDamental:CDPower:MICPower?
```

Response

<pwr>,<ph>,<wn>,<wl>

<pwr>	
Unit	dB
<wn>	
Unit	None
<wl>	
Unit	None

Parameters

<pwr>	Max Inactive Channel Power
Resolution	0.01 dB
<ph>	Phase (I/Q) of measured channel
I	I-phase
Q	Q-phase
<wn>	Walsh Code Number of measured channel
Resolution	1
<wl>	Walsh Code Length of measured channel
Resolution	1

Details

When executing more than two measurements using a single measurement start, the result of the last measurement is returned for (Meas. Count $\geq$ 2).

Example of Use

To query the channel outputting the maximum power among inactive code channels and the power measurement result:

:FETC:CELL:EVDO:FUND:CDP:MICP?

>3.00,Q,2,8

:FETCh:CELLular:EVDO:FUNDamental:CDPower:PILot?

R-PICH Power

Function

Queries R-PICH (Reverse Pilot Channel) power measurement result

Query

```
:FETCh:CELLular:EVDO:FUNDamental:CDPower:PILot? <mode>
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<pwr>

Unit	dB/Ior
Resolution	0.01 dB

Parameters

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

Example of Use

To query the R-PICH power measurement result average:

:FETC:CELL:EVDO:FUND:CDP:PIL? AVG

>0.01

:FETCh:CELLular:EVDO:FUNDamental:CDPower:RRI?

RRI Channel Power

Function

Queries Reverse RRI Channel (Reverse Rate Indicator Channel) Power measurement result

Query

```
:FETCh:CELLular:EVDO:FUNDamental:CDPower:RRI? <mode>[,<unit>]
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<pwr>

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<unit>	Query unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when <unit> omitted)
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pwr>	Measurement result in specified Storage mode

Example of Use

To query the RRI Channel Power measurement result average value:

:FETC:CELL:EVDO:FUND:CDP:RRI? AVG

>0.01

:FETCh:CELLular:EVDO:FUNDamental:MODulation:CFRequency?

Carrier Frequency Result

Function

Queries carrier frequency measurement result

Query

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

Response

<freq>

Unit	Hz
Resolution	1 Hz

Parameter

<freq>	Carrier Frequency

Example of Use

To query the carrier frequency measurement result:

:FETC:CELL:EVDO:FUND:MOD:CFR?

>862200000

:FETCh:CELLular:EVDO:FUNDamental:MODulation:EVM?

EVM Result

Function

Queries EVM measurement result

Query

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

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<evm>

Unit	%
Resolution	0.01%

Parameters

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

Example of Use

To query the EVM measurement result average:

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

>0.01

:FETCh:CELLular:EVDO:FUNDamental:MODulation:FERRor?

Carrier Frequency Error Result

Function

Queries Carrier Frequency Error measurement result

Query

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

Response

When <mode> = TTL

```
<avg_ppm>,<avg_Hz>,<max_ppm>,<max_Hz>,<min_ppm>,<min_Hz>
```

When <mode> is other than TTL

```
<freq_ppm>,<freq_Hz>
```

<xxx_ppm>

Unit	ppm
Resolution	0.01 ppm

<xxx_Hz>

Unit	Hz
Resolution	0.1 Hz

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg_ppm>	Measurement result in ppm (Average)
<avg_Hz>	Measurement result in Hz (Average)
<max_ppm>	Measurement result in ppm (Maximum)
<max_Hz>	Measurement result in Hz (Maximum)
<min_ppm>	Measurement result in ppm (Minimum)
<min_Hz>	Measurement result in Hz (Minimum)
<freq_ppm>	Measurement result in ppm in specified Storage mode
<freq_Hz>	Measurement result in Hz in specified Storage mode

Example of Use

To query the frequency error measurement result average value:

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

>0.50,431.1

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

Worst Carrier Frequency Error Result

Function

Queries worst value of Carrier Frequency Error measurement results

Query

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

Response

<freq_ppm>,<freq_Hz>

<freq_ppm>

Unit	ppm
Resolution	0.01 ppm

<freq_Hz>

Unit	Hz
Resolution	0.1 Hz

Parameters

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

Example of Use

To query the frequency error worst value measurement result:

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

>1.00,862.2

:FETCh:CELLular:EVDO:FUNDamental:MODulation:MERRor?

Magnitude Error Result

Function

Queries Magnitude Error measurement result

Query

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

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<merr>

Unit	%
Resolution	0.01%

Parameters

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

Example of Use

To query the Magnitude Error measurement result average:

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

>0.01

:FETCh:CELLular:EVDO:FUNDamental:MODulation:ORGNoffset?

Origin Offset Result

Function

Queries Origin Offset measurement result

Query

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

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<origin>

Unit	dB
Resolution	0.01 dB

Parameters

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

Example of Use

To query the Origin Offset measurement result average:

:FETC:CELL:EVDO:FUND:MOD:ORGN? AVG

>0.01

:FETCh:CELLular:EVDO:FUNDamental:MODulation:PEVM?

Peak EVM Result

Function

Queries Peak EVM measurement result

Query

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

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<pevm>

Unit	%
Resolution	0.01%

Parameters

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

Example of Use

To query the Peak EVM measurement result average:

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

>0.01

:FETCh:CELLular:EVDO:FUNDamental:MODulation:PHERror?

Phase Error Result

Function

Queries Phase Error measurement result

Query

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

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<perr>

Unit	degree
Resolution	0.01 degree

Parameters

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

Example of Use

To query the Phase Error measurement result average value

:FETC:CELL:EVDO:FUND:MOD:PHER? AVG

>0.01

:FETCh:CELLular:EVDO:FUNDamental:MODulation:RHO?

Rho Result

Function

Queries Rho (Waveform Quality) measurement result

Query

```
:FETCh:CELLular:EVDO:FUNDamental:MODulation:RHO? <mode>
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<rho>

Unit	None
Resolution	0.00001

Parameters

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

Example of Use

To query the Rho measurement result average:

:FETC:CELL:EVDO:FUND:MOD:RHO? AVG

>0.00100

:FETCh:CELLular:EVDO:FUNDamental:MODulation:TERRor?

Time Error Result

Function

Queries Time Error measurement result

Query

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

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<time>

Unit	μs
Resolution	0.01 μs

Parameters

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

Example of Use

To query the Time Error measurement result average:

:FETC:CELL:EVDO:FUND:MOD:TERR? AVG

>0.01

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

Worst Time Error Result

Function

Queries Time Error worst value measurement result

Query

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

Response

<time>

Unit	μs
Resolution	0.01 μs

Parameter

<time>	Time Error worst value

Example of Use

To query the Time Error measurement result worst value:

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

>0.01

:FETCh:CELLular:EVDO:FUNDamental:OBW?

OBW Result

Function

Queries Occupied Bandwidth measurement result

Query

```
:FETCh:CELLular:EVDO:FUNDamental:OBW?
```

Response

<bw>

Unit	MHz
Resolution	1 kHz

Parameter

<bw>	Occupied Bandwidth [MHz]

Example of Use

To query the Occupied Bandwidth measurement result:

:FETC:CELL:EVDO:FUND:OBW?

> 0.100

:FETCh:CELLular:EVDO:FUNDamental:OBW:FREQuency?

OBW Frequency Result

Function

Queries upper, lower and center frequency of Occupied Bandwidth measurement

Query

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

Response

<freq>

Unit	MHz
Resolution	1 kHz

Parameters

<pos>	Offset type
UPPER	Upper frequency
LOWER	Lower frequency
CENTER	Center frequency
<freq>	Offset frequency [MHz]

Example of Use

To query the center frequency measurement result:
:FETC:CELL:EVDO:FUND:OBW:FREQ? CENTER
>862.200

:FETCh:CELLular:EVDO:FUNDamental:POWer:FLTPower?

Filtered Power Result

Function

Queries Filtered Power measurement result

Query

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

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> = AVG,MAX,MIN or DVT,

<pwr>

When <mode> = IND,

<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>

Unit	dBm
Resolution	0.01 dB

Parameters

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

Example of Use

To query the Filtered Power measurement result average, maximum, and minimum:

:FETC:CELL:EVDO:FUND:POW:FLTP? TTL

>-10.05,-9.60,-10.50

:FETCh:CELLular:EVDO:FUNDamental:POWer:TXPower?

Tx Power Result

Function

Queries Tx power measurement result

Query

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

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> = AVG,MAX,MIN or DVT,

<pwr>

When <mode> = IND,

<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>

Unit	dBm
Resolution	0.01 dB

Parameters

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

Example of Use

To query the Tx power measurement result average, maximum, and minimum:

:FETC:CELL:EVDO:FUND:POW:TXP? TTL

>-10.05,-9.60,-10.50

:FETCh:CELLular:EVDO:FUNDamental:SPURious:JUDGement?

Spurious Emissions Judgement

Function

Queries judgement about whether or not Spurious Emissions within template

Query

```
:FETCh:CELLular:EVDO:FUNDamental:SPURious:JUDGement?
```

Response

<judgement>

Parameter

<judgement>	Judgement
PASS	Pass
FAIL	Fail

Example of Use

To query the Spurious Emissions judgement measurement result:

:FETC:CELL:EVDO:FUND:SPUR:JUDG?

>PASS

:FETCh:CELLular:EVDO:FUNDamental:SPURious:LOWer?

Spurious Emissions Peak Value (Lower)

Function

Queries worst level and frequency of spectrum in each lower frequency range

Query

```
:FETCh:CELLular:EVDO:FUNDamental:SPURious:LOWer?
```

Response

<bc>,<f_1>,<l_1,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>,<f_5>,<l_5>

<l_k>	
Unit	dBc or dBm
Resolution	0.01 dB
<f_k>	
Unit	MHz
Resolution	0.001 MHz

Parameters

<bc>	Band Class
Range	0 to 16, 18 to 21
<l_k>	Worst level at offset frequency section k 999.99 is returned for out of target.
<f_k>	Offset frequency for worst value acquired by l 99999.999 is returned for out of target.
k	Offset frequency section
Range	1, 2, 3, 4, 5

Details

For the offset frequency points, refer to Table 2.4-1 “Spurious Emissions Specifications (1)” and Table 2.4-2 “Specifications of Spurious Emissions (2)”.

Example of Use

To query the worst level and frequency of the spectrum in each lower frequency range in band class 6:

:FETC:CELL:EVDO:FUND:SPUR:LOW?

>6,1.000,-43.21,1.000,-54.32,2.000,-65.43,2.000,-76.54,3.000,-87.65

:FETCh:CELLular:EVDO:FUNDamental:SPURious:MARGin:LOWer?

Spurious Emissions Template Margin (Lower)

Function

Queries margin level from template for worst value and frequency of spectrum in each lower frequency range

Query

```
:FETCh:CELLular:EVDO:FUNDamental:SPURious:MARGin:LOWer?
```

Response

<bc>,<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>,<f_5>,<l_5>

<l_k>	
Unit	dB
Resolution	0.01 dB
<f_k>	
Unit	MHz
Resolution	0.001 MHz

Parameters

<bc>	Band Class
Range	0 to 16,18 to 21
<l_k>	Margin level for worst value at offset frequency section k 999.99 is returned for out of target.
<f_k>	Offset frequency of worst value acquired by l 99999.999 is returned for out of target.
k	Offset frequency section
Range	1, 2, 3, 4, 5

Details

For the offset frequency points, refer to Table 2.4-1 “Spurious Emissions Specifications (1)” and Table 2.4-2 “Spurious Emissions Specifications (2)”.

Example of Use

To query the margin level from the template for worst value and frequency of the spectrum in each lower frequency range in band class 6:

:FETC:CELL:EVDO:FUND:SPUR:MARG:LOW?

>6,1.000,20.00,1.000,21.00,2.000,22.00,2.000,23.00,3.000,24.00

:FETCh:CELLular:EVDO:FUNDamental:SPURious:MARGin:UPPer?

Spurious Emissions Template Margin (Upper)

Function

Queries margin level from template for worst value and frequency of spectrum in each upper frequency range

Query

```
:FETCh:CELLular:EVDO:FUNDamental:SPURious:MARGin:UPPer?
```

Response

<bc>,<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>,<f_5>,<l_5>

<l_k>	
Unit	dB
Resolution	0.01 dB
<f_k>	
Unit	MHz
Resolution	0.001 MHz

Parameters

<bc>	Band Class
Range	0 to 16, 18 to 21
<l_k>	Margin level for worst value at offset frequency section k 999.99 is returned for out of target.
<f_k>	Offset frequency of worst value acquired by l 99999.999 is returned for out of target.
k	Offset frequency section
Range	1, 2, 3, 4, 5

Details

For the offset frequency points, refer to Table 2.4-1 “Spurious Emissions Specifications (1)” and Table 2.4-2 “Spurious Emissions Specifications (2)”.

Example of Use

To query the margin level from the template for worst value and frequency of the spectrum in each upper frequency range in band class 6:

```
:FETC:CELL:EVDO:FUND:SPUR:MARG:UPP?
>6,1.000,20.00,1.000,21.00,2.000,22.00,2.000,23.00,3.000,24.00
```

:FETCh:CELLular:EVDO:FUNDamental:SPURious:UPPer?

Spurious Emissions Peak Value (Upper)

Function

Queries worst value level and frequency of spectrum in each upper frequency range

Query

```
:FETCh:CELLular:EVDO:FUNDamental:SPURious:UPPer?
```

Response

<bc>,<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>,<f_5>,<l_5>

<l_k>	
Unit	dBc or dBm
Resolution	0.01 dB
<f_k>	
Unit	MHz
Resolution	0.001 MHz

Parameters

<bc>	Band Class
Range	0 to 16, 18 to 21
<l_k>	Worst value level at offset frequency section k 999.99 is returned for out of target.
<f_k>	Offset frequency of worst value acquired by l 99999.999 is returned for out of target.
k	Offset frequency section
Range	1, 2, 3, 4, 5

Details

For the offset frequency points, refer to Table 2.4-1 “Spurious Emissions Specifications (1)” and Table 2.4-2 “Spurious Emissions Specifications (2)”.

Example of Use

To query the worst value level and frequency of the spectrum in each upper frequency range in band class 6:

:FETC:CELL:EVDO:FUND:SPUR:UPP?

>6,1.000,-43.21,1.000,-54.32,2.000,-65.43,2.000,-76.54,3.000,-87.65

:FETCh:CELLular:EVDO:FUNDamental:TRACe?

Waveform

Function

Queries waveform data for each measurement result

Query

```
:FETCh:CELLular:EVDO:FUNDamental:TRACe? <format>,
<position>,<length>[,<wl>]
```

Response

<data[0]>,<data[1]>,<data[2]>,...,<data[length–1]>

When <format> = 2, 3, or 4

Unit	dBm
Resolution	0.01 dB

When <format> = 1, 5 or 6

Unit	dB
Resolution	0.01 dB

Parameters

<format>	Format	
1	OBW Wave Data	
2	Spurious Emissions Wave Data (RB 30 kHz)	
3	Spurious Emissions Wave Data (RB 1 MHz)	
4	Spurious Emissions Wave Data (RB 1.23 MHz)	
5	Code Domain Power Wave Data (I)	
6	Code Domain Power Wave Data (Q)	
<position>	Starting point of waveform data	
Range	When format = 1	0 to 620 (–1.5 to 1.5 MHz)
	When format = 2, 3, or 4	0 to 1892 (–4.615 to 4.615 MHz)
	When format = 5 or 6	0 to (wl–1)
Resolution	1	
<length>	Number of data read	
Range	When format = 1	1 to (621–position)
	When format = 2, 3, or 4	1 to (1893–position)
	When format = 5 or 6	1 to (wl–position)
Resolution	1	
<wl>	Walsh Code Length	
Range	2, 4, 8, 16	
<data[length–1]>	Waveform Data	

Details

<wl> cannot be set when <format> is 1 to 4. (An error is returned at input.)
<wl> cannot be omitted when <format> is 5 or 6. (An error is returned if it is omitted.)

Example of Use

To query the Code Domain Power Q phase measurement result waveform data:
:FETC:CELL:EVDO:FUND:TRAC? 6,0,8,8
>0.10,0.11,0.12,0.13,0.14,0.15,0.16,0.17

:TRIGger:CELLular:EVDO:FUNDamental:DELay

Trigger Delay

Function

Sets or queries trigger delay

Command

```
:TRIGger:CELLular:EVDO:FUNDamental:DELay <delay>
```

Query

```
:TRIGger:CELLular:EVDO:FUNDamental:DELay?
```

Response

`<delay>`

Unit	ms

Parameter

`<delay>`	Trigger delay
Range	0 to 10.000 ms
Resolution	0.001 ms
Suffix code	S, MS, US (uses ms when omitted)
Default	0.000 ms

Details

The trigger delay setting is enabled when the trigger source is set to PWR.

Example of Use

To set trigger delay to 0.5 ms:
:TRIG:CELL:EVDO:FUND:DEL 0.5MS
:TRIG:CELL:EVDO:FUND:DEL?
>0.500

:TRIGger:CELLular:EVDO:FUNDamental:LEVel

Trigger Level

Function

Sets or queries trigger level

Command

```
:TRIGger:CELLular:EVDO:FUNDamental:LEVel <level>
```

Query

```
:TRIGger:CELLular:EVDO:FUNDamental:LEVel?
```

Response

<level>

Unit	dB

Parameter

<level>	Trigger level
Range	–40 to 0 dB
Resolution	1 dB
Suffix code	DB (uses dB when omitted)
Default	–40.0 dB

Details

The trigger level setting is enabled when the trigger source is set to PWR.

Example of Use

To set the trigger level to input signal –40 dB:

```
:TRIG:CELL:EVDO:FUND:LEV -40
:TRIG:CELL:EVDO:FUND:LEV?
> -40
```

:TRIGger:CELLular:EVDO:FUNDamental:SOURce

Trigger Source

Function

Sets or queries trigger source

Command

```
:TRIGger:CELLular:EVDO:FUNDamental:SOURce <source>
```

Query

```
:TRIGger:CELLular:EVDO:FUNDamental:SOURce?
```

Response

```
<source>
```

Parameter

`<source>`	Trigger source
FREERUN	Free run
PWR	Input signal power
Default	FREERUN

Example of Use

To set the input signal power as the trigger source:

:TRIG:CELL:EVDO:FUND:SOUR PWR

:TRIG:CELL:EVDO:FUND:SOUR?

> PWR

:TRIGger:CELLular:EVDO:FUNDamental:TOUT

Trigger Timeout

Function

Sets or queries trigger timeout

Command

```
:TRIGger:CELLular:EVDO:FUNDamental:TOUT <time>
```

Query

```
:TRIGger:CELLular:EVDO:FUNDamental:TOUT?
```

Response

<time>

Unit	s

Parameter

<time>	Timeout
Range	1 to 10 s
Resolution	1 s
Suffix code	S (uses s when omitted)
Default	10 s

Details

The trigger timeout setting is enabled when the trigger source is set to PWR.

Example of Use

To set the trigger timeout to 5 s:

```
:TRIG:CELL:EVDO:FUND:TOUT 5S
:TRIG:CELL:EVDO:FUND:TOUT?
>5
```

4.2.3 Sequence measurement commands

:CONFigure:CELLular:GENerator:RFSettings:FREQuency

Output Frequency (Fwd.)

Function

Sets or queries Forward Link center frequency

Command

```
:CONFigure:CELLular:GENerator:RFSettings:FREQuency <freq>
```

Query

```
:CONFigure:CELLular:GENerator:RFSettings:FREQuency?
```

Response

<freq>

Unit	Hz

Parameter

<freq>	Output Frequency (Fwd.)
Range	400.000000 to 3800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	873.660000 MHz

Detail

The input frequency is changed to a value determined by the combination of the Band Class and channel after the channel number is changed.
Changing the output frequency does not change the channel number.

Example of Use

To set the Forward Link Frequency to 873.66 MHz:
:CONF:CELL:GEN:RFS:FREQ 873.66MHZ
:CONF:CELL:GEN:RFS:FREQ?
>873660000

:CONFigure:CELLular:GENerator:RFSettings:LEVel
Output Level

Function
Sets or queries RF output level

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

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

Response
<level>

Unit	dBm

Parameter

<level>	Output level
Range	–130.0 to –10.0 dBm (Port1/Port2)
	–120.0 to 0.0 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix Code	DBM (uses dBm when omitted)
Default	–55.0 dBm

Details
The setting range depends on the output port settings.
When the Cable Loss Calibration is ON, the cable loss is subtracted from the output level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –135.0 to –15.0 dBm.

Example of Use
To set the output level to –50.0 dBm:
:CONF:CELL:GEN:RFS:LEV -50.0
:CONF:CELL:GEN:RFS:LEV?
>-50.0

Related Commands
[:ROUTe]:EXTLoss:TABLe:SWITch
:CALCulate:EXTLoss:TABLe:SETTing
:CALCulate:EXTLoss:TABLe:VALue
For details of the commands, refer to Chapter 5 “SCPI Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

:CONFigure:CELLular:MEASurement:RFSettings:FREQuency

Input Frequency (Rev.)

Function

Sets or queries Reverse Link center frequency

Command

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

Query

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

Response

<freq>

Unit	Hz

Parameter

<freq>	Input Frequency (Rev.)
Range	400.000000 to 3800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (used Hz when omitted)
Default	828.660000 MHz

Details

The input frequency is changed to a value determined by the combination of the Band Class and channel after the channel number is changed.
Changing the input frequency does not change the channel number.

Example of Use

To set the Reverse Link center frequency to 828.66 MHz:

```
:CONF:CELL:MEAS:RFS:FREQ 828.66MHZ
:CONF:CELL:MEAS:RFS:FREQ?
>828660000
```

:CONFigure:CELLular:MEASurement:RFSettings:LEVel

Input Level

Function

Sets or queries input level of MU887000A connector

Command

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

Query

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

Response

<level>

Unit	dBm

Parameter

<level>	Input level
Range	–65.0 to +35.0 dBm (Port1/Port2)
	–65.0 to +25.0 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–23.7 dBm

Details

The setting range varies with the input port setting.
When the Cable Loss Calibration is ON, the cable loss is added to the input level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –60.0 to +40.0 dBm.

Example of Use

To set the input level to –10.0 dBm:
:CONF:CELL:MEAS:RFS:LEV -10.0
:CONF:CELL:MEAS:RFS:LEV?
>-10.0

Related Commands

[:ROUTe]:EXTLoss:TABLe:SWITch
:CALCulate:EXTLoss:TABLe:SETTing
:CALCulate:EXTLoss:TABLe:VALue
For details of the commands, refer to Chapter 5 “SCPI Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

:CONFigure:CELLular:SEQuence:CONTrol

Sequence Control Parameter - Sequence Control

Function

Sets start and stop segments of Sequence Table, and queries set value in Sequence Measurement mode

Command

```
:CONFigure:CELLular:SEQuence:CONTrol <start>,<end>
```

Query

```
:CONFigure:CELLular:SEQuence:CONTrol?
```

Response

<start>,<end>

Parameters

<start>	Start segment
Range	0 to 1999
Resolution	1
Default	0
<end>	Stop segment
Range	<start> to 1999
Resolution	1
Default	199

Details

<start> = 0 to 1999, <end> = 0 to 1999 where <end> ≥ <start>
Whether the set sequence table can be executed is evaluated.
Use the :FETCh:CELLular:SEQuence:ERRor? command to query the error details.

Example of Use

To set the start segment to 20 and the stop segment to 55:
:CONF:CELL:SEQ:CONT 20,55
:CONF:CELL:SEQ:CONT?
> 20,55

:CONFigure:CELLular:SEQuence:CONTrol:TX

Sequence Control Parameter - Sequence Control

Function

Sets or queries start and stop segments in sequence table.

Sets the measurement parameters only, without affecting the signal transmission parameters.

Command

```
:CONFigure:CELLular:SEQuence:CONTrol:TX <start>,<end>
```

Query

```
:CONFigure:CELLular:SEQuence:CONTrol:TX?
```

Response

```
<start>,<end>
```

Parameters

<start>	Start segment
Range	0 to 1999
Resolution	1
Default	0
<end>	Stop segment
Range	<start> to 1999
Resolution	1
Default	199

Details

<start> = 0 to 1999, <end> = 0 to 1999 where <end> ≥ <start>

Whether the set sequence table can be executed is evaluated.

Use the :FETCh:CELLular:SEQuence:ERRor? command to query the error details.

Examples of Use

To set the start and stop segments to 20 and 55, respectively:

:CONF:CELL:SEQ:CONT 20,55

:CONF:CELL:SEQ:CONT?

> 20,55

:CONFigure:CELLular:SEQuence:EVDO:AMITems:OFF

Turn Off All Measurement Items

Function

Sets all measurement items to Off collectively.

Command

```
:CONFigure:CELLular:SEQuence:EVDO:AMITems:OFF <mcond>
```

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1

Examples of Use

To set all measurement items of condition number 0 in the sequence measurement to Off.

:CONF:CELL:SEQ:EVDO:AMIT:OFF 0

Remarks

This is equivalent to setting all the commands below to Off.

:CONFigure:CELLular:SEQuence:EVDO:POWer:SET,

:CONFigure:CELLular:SEQuence:EVDO:OBW:SET,

:CONFigure:CELLular:SEQuence:EVDO:SPURious:SET,

:CONFigure:CELLular:SEQuence:EVDO:MODulation:SET,

:CONFigure:CELLular:SEQuence:EVDO:CDPower:SET

:CONFigure:CELLular:SEQuence:EVDO:BAND

Band Class for Spurious Emissions Limit

Function

Sets or queries band class to determine Spurious Emissions Limit range

Command

```
:CONFigure:CELLular:SEQuence:EVDO:BAND <mcond>,<band>
```

Query

```
:CONFigure:CELLular:SEQuence:EVDO:BAND? <mcond>
```

Response

<band>

Parameters

<mcond>	Measurement Condition Number
Range	0 to 1999
Resolution	1
<band>	Band class
Range	0 to 16, 18 to 21
Resolution	1
Default	0

Details

This parameter sets the band class to determine the Spurious Emissions Limit range.

Example of Use

To set the band class to determine Spurious Emissions Limit range 10 for Measurement Condition Number 3 in the Sequence Measurement mode

:CONF:CELL:SEQ:EVDO:BAND 3,10
:CONF:CELL:SEQ:EVDO:BAND? 3
>10

Remarks

Use the following command to set the band class to determine the frequency:
:CONFigure:CELLular:MEASurement:RFSettings:BCLass

:CONFigure:CELLular:SEQuence:EVDO:CDPower:SET

Code Domain Power Enable and Count

Function

Enables Code Domain Power measurement and sets measurement count, and queries settings

Command

```
:CONFigure:CELLular:SEQuence:EVDO:CDPower:SET <mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:EVDO:CDPower:SET? <mcond>
```

Response

<on_off>,<count>

Parameters

<mcond>	Measurement Condition Number
Range	0 to 1999
Resolution	1
<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
<count>	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable Code Domain Power measurement for Measurement Condition Number 3 in the Sequence Measurement mode and set the measurement count to 10:

:CONF:CELL:SEQ:EVDO:CDP:SET 3,ON,10
:CONF:CELL:SEQ:EVDO:CDP:SET? 3
>ON,10

:CONFigure:CELLular:SEQuence:EVDO:LSSearch

Long Span Code Search

Function

Enables and queries Long Span Code Search function in Sequence Measurement mode

Command

```
:CONFigure:CELLular:SEQuence:EVDO:LSSearch <on_off>
```

Query

```
:CONFigure:CELLular:SEQuence:EVDO:LSSearch?
```

Response

<on_off>

Parameter

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

Details

Set this parameter to OFF when the Reverse Link and Forward Link signals are synchronized; set it to ON when they are not synchronized.

Example of Use

To enable the Long Span Code Search in the Sequence Measurement mode:

:CONF:CELL:SEQ:EVDO:LSS ON
:CONF:CELL:SEQ:EVDO:LSS?
>ON

:CONFigure:CELLular:SEQuence:EVDO:MODulation:SET

Modulation Analysis Enable and Count

Function

Enables Modulation Analysis Measurement and sets or queries measurement count in Sequence Measurement mode

Command

```
:CONFigure:CELLular:SEQuence:EVDO:MODulation:SET
<mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:EVDO:MODulation:SET? <mcond>
```

Response

<on_off>,<count>

Parameters

<mcond>	Measurement Condition Number
Range	0 to 1999
Resolution	1
<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
<count>	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable Modulation Analysis measurement in the Sequence Measurement mode with measurement condition number 3 and set the measurement count to 10:

:CONF:CELL:SEQ:EVDO:MOD:SET 3,ON,10
:CONF:CELL:SEQ:EVDO:MOD:SET? 3
>ON,10

:CONFigure:CELLular:SEQuence:EVDO:OBW:RATio

Occupied Bandwidth Ratio

Function

Sets or queries Occupied Bandwidth measurement occupation ratio in Sequence Measurement mode

Command

```
:CONFigure:CELLular:SEQuence:EVDO:OBW:RATio <ratio>
```

Query

```
:CONFigure:CELLular:SEQuence:EVDO:OBW:RATio?
```

Response

<ratio>

Parameter

<ratio>	Occupation Ratio
Range	80.0 to 99.9%
Resolution	0.1%
Suffix code	% (uses % when omitted)
Default	99.0%

Example of Use

To set the Occupied Bandwidth occupation ratio in the Sequence Measurement mode to 99.0%:

:CONF:CELL:SEQ:EVDO:OBW:RAT 99.0

:CONF:CELL:SEQ:EVDO:OBW:RAT?

>99.0

:CONFigure:CELLular:SEQuence:EVDO:OBW:SET

Occupied Bandwidth Enable and Count

Function

Enables Occupied Bandwidth measurement and sets or queries measurement count in Sequence Measurement mode

Command

```
:CONFigure:CELLular:SEQuence:EVDO:OBW:SET <mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:EVDO:OBW:SET? <mcond>
```

Response

<on_off>,<count>

Parameters

<mcond>	Measurement Condition Number
Range	0 to 1999
Resolution	1
<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
<count>	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable Occupied Bandwidth measurement and set the measurement count to 10 in the Sequence Measurement mode with the measurement condition number 3:

:CONF:CELL:SEQ:EVDO:OBW:SET 3,ON,10

:CONF:CELL:SEQ:EVDO:OBW:SET? 3

>ON,10

:CONFigure:CELLular:SEQuence:EVDO:POWer:SET

Tx Power Measurement Enable and Count

Function

Enables Tx power measurement and sets or queries measurement count in Sequence Measurement mode

Command

```
:CONFigure:CELLular:SEQuence:EVDO:POWer:SET <mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:EVDO:POWer:SET? <mcond>
```

Response

<on_off>,<count>

Parameters

<mcond>	Measurement Condition Number
Range	0 to 1999
Resolution	1
<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
<count>	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable the Tx power measurement and set the measurement count to 10 in the Sequence Measurement mode with the measurement condition number 3:

:CONF:CELL:SEQ:EVDO:POW:SET 3,ON,10
:CONF:CELL:SEQ:EVDO:POW:SET? 3
>ON,10

:CONFigure:CELLular:SEQuence:EVDO:PREVision

Protocol Revision

Function

Sets or queries Protocol Revision

Command

```
:CONFigure:CELLular:SEQuence:EVDO:PREVision <rev>
```

Query

```
:CONFigure:CELLular:SEQuence:EVDO:PREVision?
```

Response

<rev>

Parameter

<rev>	Protocol Revision
REV0	Rev. 0
REVA	Rev. A
Default	REV0

Example of Use

To set Protocol Revision to Rev. 0.

:CONF:CELL:SEQ:EVDO:PREV REV0

:CONF:CELL:SEQ:EVDO:PREV?

>REV0

:CONFigure:CELLular:SEQuence:EVDO:PSIZe

Data Channel Payload Size

Function

Sets or queries Data Channel Payload size

Command

```
:CONFigure:CELLular:SEQuence:EVDO:PSIZe <size>
```

Query

```
:CONFigure:CELLular:SEQuence:EVDO:PSIZe?
```

Response

<size>

Unit	kbps

Parameter

<size>	Data Channel Payload size
Range	128,256,512,768,1024,1536,2048,3072,4096,6144,8192,12288
Suffix code	None
Default	128

Details

This is supported only when the Protocol Revision is Rev. A.

Example of Use

To set Data Channel Payload size to 128 kbps:

```
:CONF:CELL:SEQ:EVDO:PSIZ 128
:CONF:CELL:SEQ:EVDO:PSIZ?
>128
```

:CONFigure:CELLular:SEQuence:EVDO:SPURious:SET

Spurious Emissions Enable and Count

Function

Enables Spurious Emission measurement and sets or queries measurement count in Sequence Measurement mode

Command

```
:CONFigure:CELLular:SEQuence:EVDO:SPURious:SET <mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:EVDO:SPURious:SET? <mcod>
```

Response

<on_off>,<count>

Parameters

<mcond>	Measurement Condition Number
Range	0 to 1999
Resolution	1
<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
<count>	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable the Spurious Emissions measurement and set the measurement count to 10 in the Sequence Measurement mode with the measurement condition number 3:

```
:CONF:CELL:SEQ:EVDO:SPUR:SET 3,ON,10
:CONF:CELL:SEQ:EVDO:SPUR:SET? 3
>ON,10
```

:CONFigure:CELLular:SEQuence:RFSettings:REINit

Sequence Control Parameter - Sequence End State Reinitialization

Function

Enables automatic initialization of following items at end of Sequence Measurement mode operation, and queries settings

- Forward Link frequency
- Output Level
- Output signal pattern
- Reverse Link frequency
- Input level

Command

```
:CONFigure:CELLular:SEQuence:RFSettings:REINit <sw>
```

Query

```
:CONFigure:CELLular:SEQuence:RFSettings:REINit?
```

Response

<sw>

Parameter

<sw>	Automatic initialization after sequence measurement completion
ON	Resets target parameters
OFF	Holds last segment setting
Default	ON

Details

If the parameter is set to ON, the settings are initialized to the values configured by the following commands after sequence measurement completion.

Forward Link frequency	:CONFigure:CELLular:GENerator:RFSettings:FREQuency
Output level	:CONFigure:CELLular:GENerator:RFSettings:LEVel
Output signal pattern	:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect
Reverse Link frequency	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency
Input level	:CONFigure:CELLular:MEASurement:RFSettings:LEVel

If the parameter is set to OFF, the settings remain those of the sequence measurement stop segment.

Example of Use

To enable automatic initialization after completion of the Sequence Measurement mode:

:CONF:CELL:SEQ:RFS:REINIT ON

:CONF:CELL:SEQ:RFS:REINIT?

> ON

:CONFigure:CELLular:SEQuence:RFSettings:TRX

Sequence Table Parameter - TRX Control

Function

Sets following items in specific segment of sequence table, and queries settings

- Forward Link frequency
- Output Level
- Output signal pattern
- Reverse Link frequency
- Input level

Command

```
:CONFigure:CELLular:SEQuence:RFSettings:TRX
<seg>,<ul_freq>,<ref>,<dl_freq>,<level>,<pat>
```

Query

```
:CONFigure:CELLular:SEQuence:RFSettings:TRX? <seg>
```

Response

<ul_freq>,<ref>,<dl_freq>,<level,pat>

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<ul_freq>	Reverse Link frequency
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001 MHz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	1950.000000 MHz
<ref>	Input level
Range	–65.0 to +35 dBm (Port1/Port2) –65.0 to +25 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–10.0 dBm
<dl_freq>	Forward Link Frequency
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001 MHz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	2140.000000 MHz
<level>	Output level
Range	–130.0 to –10.0 dBm (Port1/Port2)

	–120.0 to 0.0 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–60.0 dBm
<pat>	Waveform pattern
PAT1 to PATn	Pattern number(n: Waveform information file group range)
CW	Modulation disabled
OFF	Output level disabled
NC	Transmission signal pattern not configured in this segment (holds current transmission signal pattern)
Default	CW

Details

The setting range varies with the input/output port setting.

If Cable Loss Correction is ON, the cable loss is added to the range of the input level and subtracted from the range of output level.

If the cable loss is 5 dB, the input and output levels are as follows:

Input level –60.0 to +40 dBm
Output level –135.0 to –15.0 dBm

In this case, if the output level is set to –10.0 dBm, an out-of-parameter setting range error occurs. (The response to :SYSTem:ERRor? returns 220, Parameter error).

Whether an out-of-parameter setting range error has occurred is determined during execution of the following commands:

:CONFigure:CELLular:SEQuence:CONTrol,:INITiate:CELLular:MEASurement:SINGle, :INITiate:CELLular:SEQuence:EXECute:TX

A measurement execution error occurs when an out-of-range error occurs.
:FETCh:CELLular:SEQuence:ERRor? is used to query the error details.

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

Example of Use

To set segment 0 as follows:

Reverse Link frequency set to 1950.0 MHz, input level to –10.0 dBm, Forward Link to 2140.0 MHz, output level to –60.0 dBm, no modulation:

```
SEQTRX 0,1950.000000,-10.0,2140.000000,-60.0,CW
SEQTRX 0?
> 1950.000000,-10.0,2140.000000,-60.0,CW
```

Related Command

The group range depends on the selected waveform file.

For details of the waveform patterns, refer to Chapter 3, “Waveform File Details” in the *Waveform Files for Cellular Application Operation Manual*.

:CONFigure:CELLular:SEQuence:RFSettings:TX

Sequence Table Parameter - Uplink Frequency, Input Level

Function

Sets or queries uplink frequency and input level of segments in sequence table.

Command

```
:CONFigure:CELLular:SEQuence:RFSettings:TX <seg>,<ul_freq>,<ref>
```

Query

```
:CONFigure:CELLular:SEQuence:RFSettings:TX? <seg>
```

Response

```
<ul_freq>,<ref>
```

Parameter

<seg>	Segment number
Range	0 to 1999
Resolution	1
<ul_freq>	Rx frequency (uplink)
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001 MHz
Suffix code	HZ,KHZ,KZ,MHZ,MZ,GHZ,GZ (uses MHz when omitted)
Default	1950.000000 MHz
<ref>	Input level
Range	–65.0 to +35 dBm (Port1/Port2) –65.0 to +25 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–10.0 dBm

Details

This command sets only the uplink frequency and input level among the parameters that are set by :CONFigure:CELLular:SEQuence:RFSettings:TRX.
The setting range varies with the input port setting.
When the Cable Loss Calibration is ON, the cable loss is added to the input level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –60.0 to +40.0 dBm.
Whether an out-of-parameter setting range error has occurred is determined during execution of the following commands:
:CONFigure:CELLular:SEQuence:CONTrol,:INITiate:CELLular:MEASurement:SINGle,
:INITiate:CELLular:SEQuence:EXECute:TX

Example of Use

To set the parameters for segment 1 as follows:
Uplink frequency: 1950 MHz, Input level: -10.0 dBm
:CONF:CELL:SEQ:RFS:TX 1,1950,-10.0
:CONF:CELL:SEQ:RFS:TX? 1
> 1950.000000,-10.0

:CONFigure:CELLular:SEQuence:RXPort

Sequence Table Parameter - SG Output Port

Function

Sets or queries test port number to send RF signal in specified segment of sequence table

Command

```
:CONFigure:CELLular:SEQuence:RXPort <seg>,<port>
```

Query

```
:CONFigure:CELLular:SEQuence:RXPort? <seg>
```

Response

<port>

Parameters

<seg>	Segment number
Range	0 to 1999
<port>	Port number
PORT1	PORT 1
PORT2	PORT 2
PORT3	PORT 3
PORT4	PORT 4
Default	PORT 1

Details

PORT3 cannot be set when PORT3 is selected for RF signal input port.
PORT4 cannot be set when PORT4 is selected for RF signal input port.

Example of Use

To set the port number in segment 5 to 2:
:CONF:CELL:SEQ:RXP 5, PORT2
:CONF:CELL:SEQ:RXP? 5
>PORT2

:CONFigure:CELLular:SEQuence:SETup

Sequence Table Parameter - Measurement

Function

Sets or queries measurement conditions of specified segment

Command

```
:CONFigure:CELLular:SEQuence:SETup <seg>,<system>,<step>,<mcond>
```

Query

```
:CONFigure:CELLular:SEQuence:SETup? <seg>
```

Response

<mode>, <step>, <mcond>

Parameters

<seg>	Segment number	
Range	0 to 1999	
<mode>	Measurement mode	Required software license
TXP	Transmit power measurement mode	MX887010A
WCDMA	W-CDMA measurement mode	MX887010A and MX887011A
GSM	GSM measurement mode	MX887010A and MX887012A
CDMA2K	CDMA2000 1x measurement mode	MX887010A and MX887015A
EVDO	CDMA2000 1xEVDO measurement mode	MX887010A and MX887016A
TDSCDMA	TD-SCDMA measurement mode	MX887010A and MX887017A
LTE	LTE measurement mode	MX887010A and MX887013A, or MX887010A and MX887014A
Default	TXP	
<step>	Number of Steps	
Range	2 to 3000	
Resolution	1	
Default	2	
<mcond>	Measurement Condition Number	
Range	0 to 1999	
Resolution	1	
Default	0	

Details

To use the commands described in Chapter 3 Sequence Measurement, set the command parameter to EVDO

Example of Use

To set the measurement conditions for segment 1 as follows:

Measurement mode: EVDO,Step count: 100,Measurement condition number: 2

:CONF:CELL:SEQ:SET 1,EVDO,100,2

:CONF:CELL:SEQ:SET? 1

> EVDO,100,2

:CONFigure:CELLular:SEQuence:TABLe

Sequence Control Parameter - Sequence Table

Function

Sets or queries sequence table number to execute

Command

```
:CONFigure:CELLular:SEQuence:TABLe <table>
```

Query

```
:CONFigure:CELLular:SEQuence:TABLe?
```

Response

<table>

Parameter

<table>	Sequence table number
Range	0 to 3
Resolution	1
Default	0

Example of Use

To select sequence table 1:

:CONF:CELL:SEQ:TABL 1

:CONF:CELL:SEQ:TABL?

>1

:FETCh:CELLular:SEQuence:ERRor?

Sequence Parameter Information - Error Check

Function

Queries error status of sequence table

Query

```
:FETCh:CELLular:SEQuence:ERRor? [item]
```

Response

Query parameter	Response
None:	<n>,<err(0)>,..,<err(n–1)>
ILVL,OLVL,STEP, DLPAT, PORT:	<ns>,<seg(0)>,..,<seg(ns–1)>
LEN:	<e>,<mem>,<exe>,<set>
OLVLNUM,PATNUM,STDNUM:	<e>,<exe>,<set>

If no error is found in the sequence table, the response returns 0.

Parameters

<item>	Parameter in sequence table
ILVL	Input level
OLVL	Output level
STEP	Step count
DLPAT	Waveform pattern
PORT	Port
LEN	Capture memory length
OLVLNUM	Output level change count
PATNUM	Waveform pattern change count
STDNUM	Measurement mode change count
<n>	Number of errors
Range	0 to 4
<err(n–1)>	Parameter with error
ILVL	Input level
OLVL	Output level
STEP	Step count
LEN	Capture memory length
<ns>	Number of segments with errors
Range	0 to 2000
<seg(ns–1)>	Segment number with errors
Range	0 to 1999
<e>	Presence of errors
Range	0 No error, executable
	1 Errors found, not executable
<mem>	Memory occupation ratio

Range	0.0 to 100.0%
Resolution	0.1%
<exe>	Number of capture executable segments in number of configured segments
Range	0 to 2000
<set>	Number of segments with capture configured
Range	0 to 2000

Details

This command can check error presence of input level, output level, step count, and capture memory length
Waveform pattern, port, output level change count, waveform pattern change count, measurement mode change count.

To set parameters for sequence table using the following commands, errors are not checked.
:CONFigure:CELLular:SEQuence:RFSettings:TRX
:CONFigure:CELLular:SEQuence:RFSettings:TX
:CONFigure:CELLular:SEQuence:SETup

Example of Use

To query the presence of errors:
:FETC:CELL:SEQ:ERR?
>1,ILVL

To query the input level setting error information:
:FETC:CELL:SEQ:ERR? ILVL
>2,3,12

To query the capture memory error information:
:FETC:CELL:SEQ:ERR? LEN
>0,25.0,20,20
Here, the capture memory utilization is 25.0%, so all captures configured in 20 segments are executable.

Remarks

The Sequence Measurement mode cannot be started if there is an error.
However, the sequence can be started by using the :CONFigure:CELLular:SEQuence:CONTrol command to detect any segment with an error and exclude it from the executable range.

:FETCh:CELLular:SEQuence:ERRor2?

Sequence Parameter Information - Error Check

Function

Queries setting error information of sequence table

Query

```
:FETCh:CELLular:SEQuence:ERRor2? <format>
```

Response

<n>,<err(0)>,..,<err(n-1)>

If no error is found in the sequence table, the response returns 0.

Parameters

<format>	Format
1	Error Check 1
<n>	Number of errors
Range	0 to 7
<err(n-1)>	Parameter with errors
ILVL	Input level
OLVL	Output level
STEP	Step count
DLPAT	Waveform pattern
PORT	Port
LEN	Capture memory length
OLVLNUM	Output level change count
PATNUM	Waveform pattern change count
STDNUM	Measurement mode change count

Details

Parameter setting errors can be checked up to seven types.

Only one of output level change count, waveform pattern change count, or measurement mode change count has an error.

Two or three of them cannot have an error simultaneously.

To set parameters for sequence table using the following commands, errors are not checked.

:CONFigure:CELLular:SEQuence:RXPort
:CONFigure:CELLular:SEQuence:RFSettings:TRX
:CONFigure:CELLular:SEQuence:RFSettings:TX
:CONFigure:CELLular:SEQuence:SETup

To query error details per parameter, use :FETCh:CELLular:SEQuence:ERRor command.

Example of Use

To query the presence of errors:
:FETC:CELL:SEQ:ERR2? 1
>2,ILVL,DLPAT

Remarks

Sequence measurement cannot be started if there are errors.
However, sequence measurement can be started if segment numbers with errors are excluded from the execution range using the :CONFigure:CELLular:SEQuence:CONTrol command.

:FETCh:CELLular:SEQuence:EVDO:CDPower:ACK?

ACK Channel Power

Function

Queries Reverse ACK Channel Power measurement result in the Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:CDPower:ACK? <seg>,<mode>[,<unit>]
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<pwr>

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average･Maximum･Minimum
DVT	Standard deviation
<unit>	Query Unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when <unit> omitted)
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pwr>	Measurement result in specified Storage mode

Example of Use

To query the ACK Channel Power measurement result average value for segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:CDP:ACK? 3,AVG

>0.01

:FETCh:CELLular:SEQuence:EVDO:CDPower:APILot?

Auxiliary Pilot Channel Power

Function

Queries Reverse Auxiliary Pilot Channel Power measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:CDPower:APILot? <seg>,<mode>[,<unit>]
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<pwr>

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<unit>	Query Unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot) (uses Ior when <unit> omitted)
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pwr>	Measurement result in specified Storage mode

Details

A valid data is acquired only when the Protocol Revision is Rev. A.

Example of Use

To query the Auxiliary Pilot Channel Power measurement result average value for segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:CDP:APIL? 3,AVG

>0.01

:FETCh:CELLular:SEQuence:EVDO:CDPower:DATA?

DATA Channel Power

Function

Queries Reverse DATA Channel Power measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:CDPower:DATA? seg,mode[,unit]
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<pwr>

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<unit>	Query Unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when <unit> omitted)
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pwr>	Measurement result in specified Storage mode

Example of Use

To query the average value of the DATA Channel Power measurement result segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:CDP:DATA? 3,AVG

>0.01

:FETCh:CELLular:SEQuence:EVDO:CDPower:DRC?

DRC Channel Power

Function

Queries Reverse DRC Channel (Data Rate Channel) Power measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:CDPower:DRC? <seg>,<mode>[,<unit>]
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<pwr>

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<unit>	Query Unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when <unit> omitted)
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pwr>	Measurement result in specified Storage mode

Example of Use

To query the DRC Channel Power measurement result average value for segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:CDP:DRC? 3,AVG

>0.01

:FETCh:CELLular:SEQuence:EVDO:CDPower:DSC?

DSC Channel Power

Function

Queries Reverse DSC Channel (Data Source Channel) Power measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:CDPower:DSC? <seg>,<mode>[,<unit>]
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<pwr>

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<unit>	Query Unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when <unit> omitted)
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pwr>	Measurement result in specified Storage mode

Details

A valid data is acquired only when Protocol Revision is Rev. A.

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SCPI Command Reference

Example of Use

To query the DSC Channel Power measurement result average value for segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:CDP:DSC? 3,AVG

>0.01

:FETCh:CELLular:SEQuence:EVDO:CDPower:MICPower?

Max Inactive Channel Power

Function

Queries channel outputting maximum power among inactive code channels, and power measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:CDPower:MICPower? <seg>
```

Response

<pwr>,<ph>, <wn>, <wl>

<pwr>	
Unit	dB
<wn>	
Unit	None
<wl>	
Unit	None

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<pwr>	Max Inactive Channel Power
Resolution	0.01 dB
<ph>	Phase (I/Q) of measured channel
I	I-phase
Q	Q-phase
<wn>	Walsh Code Number of measured channel
Resolution	1
<wl>	Walsh Code Length of measured channel
Resolution	1

Details

When executing more than two measurements using a single measurement start, the result of the last measurement is returned for (Meas. Count $\geq$ 2).

Example of Use

To query the channel outputting the maximum power among inactive code channels and the power measurement result for segment number 3 in the Sequence Measurement mode:
:FETC:CELL:SEQ:EVDO:CDP:MICP? 3
>3.00,Q,2,8

:FETCh:CELLular:SEQuence:EVDO:CDPower:PILot?

R-PICH Power

Function

Queries R-PICH (Reverse Pilot Channel) Power measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:CDPower:PILot? <seg>,<mode>
```

Response

When <mode> = TTL
<avg>,<max>,<min>
When <mode> is other than TTL
<pwr>

Unit	dB/Ior
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pwr>	Measurement result in specified Storage mode

Example of Use

To query the R-PICH power measurement result average for segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:CDP:PIL? 3,AVG
>0.01

:FETCh:CELLular:SEQuence:EVDO:CDPower:RRI?

RRI Channel Power

Function

Queries Reverse RRI Channel (Reverse Rate Indicator Channel) Power measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:CDPower:RRI? <seg>,<mode>[,<unit>]
```

Response

When <mode> = TTL
<avg>,<max>,<min>
When <mode> is other than TTL
<pwr>

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<unit>	Query Unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot) (uses Ior when <unit> omitted)
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pwr>	Measurement result in specified Storage mode

Example of Use

To query the RRI Channel Power measurement result average value for segment number 3 in the Sequence Measurement mode:
:FETC:CELL:SEQ:EVDO:CDP:RRI? 3,AVG
>0.01

:FETCh:CELLular:SEQuence:EVDO:MODulation:CFRequency?

Carrier Frequency Result

Function

Queries Carrier Frequency measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:MODulation:CFRequency? <seg>
```

Response

<freq>

Unit	Hz
Resolution	1 Hz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<freq>	Carrier Frequency

Example of Use

To query the carrier frequency measurement result for segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:MOD:CFR? 3

>862200000

:FETCh:CELLular:SEQuence:EVDO:MODulation:EVM?

EVM Result

Function

Queries EVM measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:MODulation:EVM? <seg>,<mode>
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<evm>

Unit	%
Resolution	0.01%

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<evm>	Measurement result in specified Storage mode

Example of Use

To query the EVM measurement result average for segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:MOD:EVM? 3,AVG

>0.01

4 SCPI Command Reference

:FETCh:CELLular:SEQuence:EVDO:MODulation:FERRor?

Carrier Frequency Error Result

Function

Queries Carrier Frequency Error measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:MODulation:FERRor? <seg>,<mode>
```

Response

When <mode> = TTL

`<avg_ppm>,<avg_Hz>,<max_ppm>,<max_Hz>,<min_ppm>,<min_Hz>`

When <mode> is other than TTL

`<freq_ppm>,<freq_Hz>`

<xxx_ppm>	
Unit	ppm
Resolution	0.01 ppm
<xxx_Hz>	
Unit	Hz
Resolution	0.1 Hz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg_ppm>	Measurement result in ppm (Average)
<avg_Hz>	Measurement result in Hz (Average)
<max_ppm>	Measurement result in ppm (Maximum)
<max_Hz>	Measurement result in Hz (Maximum)
<min_ppm>	Measurement result in ppm (Minimum)
<min_Hz>	Measurement result in Hz (Minimum)
<freq_ppm>	Measurement result in ppm in specified Storage mode
<freq_Hz>	Measurement result in Hz in specified Storage mode

Example of Use

To query the frequency error measurement result average value for segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:MOD:FERR? 3,AVG

>0.50,431.1

:FETCh:CELLular:SEQuence:EVDO:MODulation:FERRor:WORSt?

Worst Carrier Frequency Error Result

Function

Queries worst value of Carrier Frequency Error measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:MODulation:FERRor:WORSt? <seg>
```

Response

<freq_ppm>, <freq_Hz>

<freq_ppm>

Unit	ppm
Resolution	0.01 ppm

<freq_Hz>

Unit	Hz
Resolution	0.1 Hz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<freq_ppm>	Worst value in Frequency Error measurement results in ppm
<freq_Hz>	Worst value in Frequency Error measurement results in Hz

Example of Use

To query the worst value of the frequency error measurement result for segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:MOD:FERR:WORS? 3

>1.00,862.2

:FETCh:CELLular:SEQuence:EVDO:MODulation:MERRor?

Magnitude Error Result

Function

Queries Magnitude Error measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:MODulation:MERRor? <seg>,<mode>
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<merr>

Unit	%
Resolution	0.01%

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<merr>	Measurement result in specified Storage mode

Example of Use

To query the Magnitude Error measurement result average value for segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:MOD:MERR? 3,AVG

>0.01

:FETCh:CELLular:SEQuence:EVDO:MODulation:ORGNoffset?

Origin Offset Result

Function

Queries Origin Offset measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:MODulation:ORGNoffset? <seg>,<mode>
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<origin>

Unit	dB
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<origin>	Measurement result in specified Storage mode

Example of Use

To query the Origin Offset measurement result average value for segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:MOD:ORGN? 3,AVG

>0.01

:FETCh:CELLular:SEQuence:EVDO:MODulation:PEVM?

Peak EVM Result

Function

Queries Peak EVM measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:MODulation:PEVM? <seg>,<mode>
```

Response

When <mode> = TTL
<avg>,<max>,<min>
When <mode> is other than TTL
<pevm>

Unit	%
Resolution	0.01%

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pevm>	Measurement result in specified Storage mode

Example of Use

To query the Peak EVM measurement result average value for segment number 3 in the Sequence Measurement mode:
:FETC:CELL:SEQ:EVDO:MOD:PEVM? 3,AVG
>0.01

:FETCh:CELLular:SEQuence:EVDO:MODulation:PHERror?

Phase Error Result

Function

Queries Phase Error measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:MODulation:PHERror? <seg>,<mode>
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<perr>

Unit	degree
Resolution	0.01 degree

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<perr>	Measurement result in specified Storage mode

Example of Use

To query the Phase Error measurement result average value for segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:MOD:PHER? 3,AVG

>0.01

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SCPI Command Reference

:FETCh:CELLular:SEQuence:EVDO:MODulation:RHO?

Rho Result

Function

Queries Rho (Waveform Quality) measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:MODulation:RHO? <seg>,<mode>
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<rho>

Unit	None
Resolution	0.00001

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<rho>	Measurement result in specified Storage mode

Example of Use

To query the Rho measurement result average for segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:MOD:RHO? 3,AVG

>0.00100

:FETCh:CELLular:SEQuence:EVDO:MODulation:TERRor?

Time Error Result

Function

Queries Time Error measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:MODulation:TERRor? <seg>,<mode>
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> is other than TTL

<time>

Unit	µs
Resolution	0.01 µs

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<time>	Measurement result in specified Storage mode

Example of Use

To query the Time Error measurement result average for segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:MOD:TERR? 3,AVG

>0.01

4

SCPI Command Reference

:FETCh:CELLular:SEQuence:EVDO:MODulation:TERRor:WORSt?

Worst Time Error Result

Function

Queries worst value of Time Error measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:MODulation:TERRor:WORSt? <seg>
```

Response

<time>

Unit	µs
Resolution	0.01 µs

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<time>	Worst value of Time Error

Example of Use

To query the worst value of the Time Error measurement result for segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:MOD:TERR:WORS? 3

>0.01

:FETCh:CELLular:SEQuence:EVDO:OBW?

OBW Result

Function

Queries Occupied Bandwidth measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:OBW? <seg>
```

Response

<bw>

Unit	MHz
Resolution	1 kHz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<bw>	Occupied Bandwidth [MHz]

Example of Use

To query the Occupied Bandwidth measurement result for segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:OBW? 3

> 0.100

:FETCh:CELLular:SEQuence:EVDO:OBW:FREQuency?

OBW Frequency Result

Function

Queries upper, lower and center frequency of Occupied Bandwidth measurement in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:OBW:FREQuency? <seg>,<pos>
```

Response

<freq>	
Unit	MHz
Resolution	1 kHz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<pos>	Offset type
UPPER	Upper frequency
LOWER	Lower frequency
CENTER	Center frequency
<freq>	Offset frequency [MHz]

Example of Use

To query Occupied Bandwidth center frequency measurement result for segment number 3 in the Sequence Measurement mode

:FETC:CELL:SEQ:EVDO:OBW:FREQ? 3,CENTER

>862.200

:FETCh:CELLular:SEQuence:EVDO:POWer:FLTPower?

Filtered Power Result

Function

Queries Filtered Power measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:POWer:FLTPower? <seg>,<mode>
```

Response

When <mode> = TTL

`<avg>,<max>,<min>`

When <mode> = AVG, MAX, MIN or DVT

`<pwr>`

When <mode> = IND,

<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>

Unit	dBm
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
Storage mode	
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	Value at each measurement
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pwr>	Measurement result in specified Storage mode
<pwr_s>	Power of sth
<pwr(s)>	Power of sth measurement
s	Measurement count
Range	1 to 200

Example of Use

To query the Filtered Power measurement result average, maximum, and minimum for segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:POW:FLTP? 3,TTL

>-10.05,-9.60,-10.50

:FETCh:CELLular:SEQuence:EVDO:POWer:TXPower?

Tx Power Result

Function

Queries Tx power measurement result in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:POWer:TXPower? <seg>,<mode>
```

Response

When <mode> = TTL

<avg>,<max>,<min>

When <mode> = AVG, MAX, MIN or DVT

<pwr>

When <mode> = IND,

<s>,<pwr(1)>,<pwr(2)>,…,<pwr(s)>

Unit	dBm
Resolution	0.01 dB

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	Value at measurement
<avg>	Measurement result (Average)
<max>	Measurement result (Maximum)
<min>	Measurement result (Minimum)
<pwr>	Measurement result in specified Storage mode
<pwr_s>	Power of sth
<pwr(s)>	Power of sth measurement
s	Measurement count
Range	1 to 200

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SCPI Command Reference

Example of Use

To query the Tx power measurement result average, maximum, and minimum for segment number 3 in the Sequence Measurement mode:
:FETC:CELL:SEQ:EVDO:POW:TXP? 3,TTL
>-10.05,-9.60,-10.50

:FETCh:CELLular:SEQuence:EVDO:SPURious:JUDGement?

Spurious Emissions Judgement

Function

Queries judgement about whether or not Spurious Emissions within template in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:SPURious:JUDGement? <seg>
```

Response

<judgement>

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<judgement>	Judgement
PASS	Pass
FAIL	Fail

Example of Use

To query the Spurious Emissions judgement measurement result for segment number 3 in the Sequence Measurement mode:
:FETC:CELL:SEQ:EVDO:SPUR:JUDG? 3
>PASS

:FETCh:CELLular:SEQuence:EVDO:SPURious:LOWer?

Spurious Emissions Peak Value (Lower)

Function

Queries worst level and frequency of spectrum in each lower frequency range in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:SPURious:LOWer? <seg>
```

Response

<bc>,<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>,<f_5>,<l_5>

<l_k>	
Unit	dBc or dBm
Resolution	0.01 dB
<f_k>	
Unit	MHz
Resolution	0.001 MHz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<bc>	Band Class
Range	0 to 16, 18 to 21
<l_k>	Worst level at offset frequency section k 999.99 is returned for out of target.
<f_k>	Offset frequency for worst value acquired by l 99999.999 is returned for out of target.
k	Offset frequency section
Range	1, 2, 3, 4, 5

Details

For the offset frequency points, refer to Table 2.4-1 “Spurious Emissions Specifications (1)” and Table 2.4-2 “Spurious Emissions Specifications (2)”.

Example of Use

To query the worst level and frequency of the spectrum in each lower frequency range in band class 6 for segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:SPUR:LOW? 3

>6,1.000,-43.21,1.000,-54.32,2.000,-65.43,2.000,-76.54,3.000,-87.65

:FETCh:CELLular:SEQuence:EVDO:SPURious:MARGin:LOWer?

Spurious Emissions Template Margin (Lower)

Function

Queries margin level from template for worst value and frequency of spectrum in each lower frequency range

Query

```
:FETCh:CELLular:SEQuence:EVDO:SPURious:MARGin:LOWer? <seg>
```

Response

<bc>,<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>,<f_5>,<l_5>

<l_k>	
Unit	dB
Resolution	0.01 dB
<f_k>	
Unit	MHz
Resolution	0.001 MHz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<bc>	Band Class
Range	0 to 16, 18 to 21
<l_k>	Margin level for worst value at offset frequency section k 999.99 is returned for out of target.
<f_k>	Offset frequency of worst value acquired by l 99999.999 is returned for out of target.
k	Offset frequency section
Range	1, 2, 3, 4, 5

Details

For the offset frequency points, refer to Table 2.4-1 "Spurious Emissions Specifications (1)" and Table 2.4-2 "Spurious Emissions Specifications (2)".

Example of Use

To query the margin level from the template for worst the value and frequency of the spectrum in each lower frequency range in band class 6 for segment number 3 in the Sequence Measurement mode:

:FETC:CELL:SEQ:EVDO:SPUR:MARG:LOW? 3

>6,1.000,20.00,1.000,21.00,2.000,22.00,2.000,23.00,3.000,24.00

:FETCh:CELLular:SEQuence:EVDO:SPURious:MARGin:UPPer?

Spurious Emissions Template Margin (Upper)

Function

Queries margin level from template for worst value and frequency of spectrum in each upper frequency range in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:SPURious:MARGin:UPPer? <seg>
```

Response

<bc>,<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>,<f_5>,<l_5>

<l_k>	
Unit	dB
Resolution	0.01 dB
<f_k>	
Unit	MHz
Resolution	0.001 MHz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<bc>	Band Class
Range	0 to 16, 18 to 21
<l_k>	Margin level for worst value at offset frequency section k 999.99 is returned for out of target.
<f_k>	Offset frequency of worst value acquired by l 99999.999 is returned for out of target.
k	Offset frequency section
Range	1, 2, 3, 4, 5

Details

For the offset frequency points, refer to Table 2.4-1 “Spurious Emissions Specifications (1)” and Table 2.4-2 “Spurious Emissions Specifications (2)”.

Example of Use

To query the margin level from the template for the worst value and frequency of the spectrum in each upper frequency range in band class 6 for segment number 3 in the Sequence Measurement mode:

```
:FETC:CELL:SEQ:EVDO:SPUR:MARG:UPP? 3
>6,1.000,20.00,1.000,21.00,2.000,22.00,2.000,23.00,3.000,24.00
```

:FETCh:CELLular:SEQuence:EVDO:SPURious:UPPer?

Spurious Emissions Peak Value (Upper)

Function

Queries worst value of level and frequency of spectrum in each upper frequency range in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:EVDO:SPURious:UPPer? <seg>
```

Response

<bc>,<f_1>,<l_1>,<f_2>,<l_2>,<f_3>,<l_3>,<f_4>,<l_4>,<f_5>,<l_5>

<l_k>	
Unit	dBc or dBm
Resolution	0.01 dB
<f_k>	
Unit	MHz
Resolution	0.001 MHz

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<bc>	Band Class
Range	0 to 16, 18 to 21
<l_k>	Margin level for worst value at offset frequency section k 999.99 is returned for out of target.
<f_k>	Offset frequency of worst value acquired by l 99999.999 is returned for out of target.
k	Offset frequency section
Range	1, 2, 3, 4, 5

Details

For the offset frequency points, refer to Table 2.4-1 "Spurious Emissions Specifications (1)" and Table 2.4-2 "Spurious Emissions Specifications (2)".

Example of Use

To query the margin level from the template for the worst value and frequency of the spectrum in each upper frequency range in band class 6 for segment number 3 in the Sequence Measurement mode:

```
:FETC:CELL:SEQ:EVDO:SPUR:UPP? 3
>6,1.000,-43.21,1.000,-54.32,2.000,-65.43,2.000,-76.54,3.000,-87.65
```

:FETCh:CELLular:SEQuence:PROGress?

Sequence Progress

Function

Queries progress ratio and executing sequence number in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:PROGress?
```

Response

<p>,<cur>,<start>,<end>

Parameters

<p>	Progress ratio in Sequence Measurement mode
Range	0 to 100%
<cur>	Current segment number being executed
Range	0 to 1999
<start>	First segment number
Range	0 to 1999
<stop>	Last segment number
Range	0 to 1999

Example of Use

To query the progress ratio and executing sequence number in the Sequence Measurement mode:

:FETC:CELL:SEQ:PROG?

>65,23,11,30

Remarks

The first and last segment numbers are the same as the start and end segment numbers specified using the:CONFigure:CELLular:SEQuence:CONTrol command.

:FETCh:CELLular:SEQuence:SEG:STATe?

Specified Segment Status

Function

Queries measurement status of specified segment in Sequence Measurement mode

Query

```
:FETCh:CELLular:SEQuence:SEG:STATe? <seg>
```

Response

<stat>

Parameters

<seg>	Segment number
Range	0 to 1999
<stat>	Segment status
0	Measurement completed successfully
2	Over level
3	Under level
4	Measurement failed
5	Failed to detect synchronization word
9	Measurement in progress or not measured
10	Segment not measured
12	Tx measurement timeout

The value received from MX887016A is 0, 2, 4, 5, 9, 10, or 12.

Example of Use

To query the measurement status of segment 16:

:FETC:CELL:SEQ:SEG:STAT? 16

> 0

:FETCh:CELLular:SEQuence:STATe?

Sequence Measurement Status

Function

Queries status of Sequence Measurement execution

Query

```
:FETCh:CELLular:SEQuence:STATe?
```

Response

<m_status>,<n>,<s(0)>,<s(1)>,..,<s(n–1)>

Parameters

<m_status>	Segment status
0	Measurement completed successfully
2	Over level
3	Under level
4	Measurement failed
5	Failed to detect synchronization word
9	Measurement in progress or not measured
12	Tx measurement timeout

The value received from MX887016A is 0, 2, 4, 5, 9, or 12.

<n>	Number of measured segments
Range	0 to 2000
<s>	Segment status
0	Measurement completed successfully
2	Over level
3	Under level
4	Measurement failed
5	Failed to detect synchronization word
9	Measurement in progress or not measured
10	Segment not measured
12	Tx measurement timeout

The value received from MX887016A is 0, 2, 4, 5, 9, 10, or 12.

Example of Use

To query the status of Sequence Measurement execution:

:FETC:CELL:SEQ:STAT?

>2,6,0,0,0,0,2,0

The number of measured segments is 6 and an over level error occurred in the fifth segment.

Related Command

:FETCh:CELLular:MEASurement:STATe

:FETCh:CELLular:SEQuence:SEG:STATe

:INITiate:CELLular:SEQuence:EXECute:TX

Start Signal Analyzer Measurement Only

Function

Sets only the parameters for the specified measurement and executes measurement, without affecting the signal transmission parameters.

Command

```
:INITiate:CELLular:SEQuence:EXECute:TX
```

:TRIGger:CELLular:MEASurement:TOUT

Trigger Timeout

Function

Sets or queries trigger timeout

Command

```
:TRIGger:CELLular:MEASurement:TOUT <time>
```

Query

```
:TRIGger:CELLular:MEASurement:TOUT?
```

Response

<time>

Unit	s

Parameters

<time>	Timeout time
Range	1 to 60 s
Resolution	1 s
Suffix code	NS,US,MS,S (uses s when omitted)
Default	10 s

Example of Use

To set the Trigger timeout to 10 seconds:

:TRIG:CELL:MEAS:TOUT 10

:TRIG:CELL:MEAS:TOUT?

> 10

:TRIGger:CELLular:SEQuence

Sequence Table Parameter - Trigger

Function

Sets or queries trigger condition for starting Sequence Measurement

Command

```
:TRIGger:CELLular:SEQuence <seg>,<src>,<slope>,<level>,<delay>
```

Query

```
:TRIGger:CELLular:SEQuence? <seg>
```

Response

<src>, <slope>, <level>, <delay>

Parameters

<seg>	Segment number
Range	0 to 1999
<src>	Trigger source
FRAME	Frame
FREERUN	Free run
PWR	Input signal power
Default	FREERUN
<slope>	Trigger slope
RISE	Rising edge trigger
Default	RISE
<level>	Trigger level
Range	–40 to 0 dB
Resolution	1 dB
Suffix Code	DB (uses dB when omitted)
Default	–30 dB
<delay>	Delay time
Range	0 to 1000.000 ms
Resolution	0.001 ms
Default	0.000 ms

Details

The trigger slope and trigger level are enabled when trigger source is set to PWR.

Example of Use

To set the trigger condition of segment 2 as follows:

Trigger source: PWR, Trigger slope: RISE, Trigger level: -30 dB, and Delay time: 0

:TRIG:CELL:SEQ 2,PWR,RISE,-30,0

:TRIG:CELL:SEQ? 2

> PWR,RISE,-30, 0.000

Remarks

The trigger level is defined as the level difference from the input level specified by the following commands:

:CONFigure:CELLular:MEASurement:RFSettings:LEVel,

:CONFigure:CELLular:SEQuence:RFSettings:TRX

Chapter 5 Native Command Reference

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

5.1 List of Commands

The following table shows the rules for describing messages.

[ ]	Messages or parameters in square brackets can be omitted.
|	Choose one of several choices. A|B|C|D indicates a choice of A, B, C, and D.
{}	Choose one of the groups in braces. A|B({C|D}) indicates a choice of A, B(C), or A, B(D).

5.1.1 Common commands

Common

Function	Command	Query	Response
Standard Select	STDSEL std	STDSEL?	std
Set Connect Port Direction	PORT input,output	PORT?	input,output

Measurements

Function	Command	Query	Response
Measurement Start	SNGLS	-----	-----
Measurement Stop	MEASSTOP	-----	-----
Measurement Status	-----	MSTAT?	m_status
End Event Status (Measurement) Register Query	-----	ESR2?	register
Error Event Status (Measurement) Register Query	-----	ESR3?	register

Common Parameters

Function	Command	Query	Response
Output Level On/Off	LVL on_off	LVL?	on_off
Output Signal Modulation	MOD on_off	MOD?	on_off
Waveform File Select	PACKAGE pac	PACKAGE?	pac
Waveform Pattern Select	DLPAT pat	DLPAT?	pat
Waveform Pattern Select (SYNC)	DLPAT_SYNC pat	DLPAT_SYNC?	pat

System

Function	Command	Query	Response
Application Select	`SYSSEL app`	`SYSSEL?`	`App`
Language Selection of Remote Command	`SYST:LANG mode`	`SYST:LANG?`	`Mode`

5.1.2 Fundamental measurement commands

Common Parameters

Function	Command	Query	Response
AWGN Level On/Off	`AWGNLVL on_off`	`AWGNLVL?`	`on_off`
AWGN Level	`AWGNPWR level`	`AWGNPWR?`	`Level`
Input Level	`ILVL level`	`ILVL?`	`Level`
Output Level	`OLVL level`	`OLVL?`	`Level`
Output Frequency (Fwd.)	`RXFREQ freq`	`RXFREQ?`	`Freq`
Input Frequency (Rev.)	`TXFREQ freq`	`TXFREQ?`	`Freq`
Band Class	`BANDCLASS band`	`BANDCLASS?`	`Band`
Channel	`CHAN channel`	`CHAN?`	`Channel`

Fundamental Measurement Parameters

Function	Command	Query	Response
Turn Off All Measurement Items	ALLMEASITEMS_OFF	-----	-----
Band Class for Spurious Emissions Limit	BAND band	BAND?	Band
Code Domain Power Enable and Count	CDP_SET on_off[,count]	CDP_SET?	on_off,count
Fast Power Measurement Mode	FASTPWRMODE on_off	FASTPWRMODE?	on_off
Trigger Delay	FMEAS_TRGDLY trgdelay	FMEAS_TRGDLY?	trgdelay
Trigger Level	FMEAS_TRGLVL trglevel	FMEAS_TRGLVL?	trglevel
Trigger Source	FMEAS_TRGSRC source	FMEAS_TRGSRC?	source
Trigger Timeout	FMEAS_TRGTOUT trgtime	FMEAS_TRGTOUT?	trgtime
Long Span Code search	LSCODESEARCH on_off	LSCODESEARCH?	on_off
Modulation Analysis Enable and Count	MOD_SET on_off[,count]	MOD_SET?	on_off,count
Occupied Bandwidth Ratio	OBW_RATIO ratio	OBW_RATIO?	Ratio
Occupied Bandwidth Enable and Count	OBW_SET on_off[,count]	OBW_SET?	on_off,count
Protocol Revision	PREV rev	PREV?	Rev
Data Channel Payload Size	PSIZE size	PSIZE?	Size
Tx Power Measurement Enable and Count	PWR_SET on_off[,count]	PWR_SET?	on_off,count
Long Code Mask - I	RTCLCMI lcm	RTCLCMI?	lcm
Spurious Emissions Enable and Count	SPR_SET on_off[,count]	SPR_SET?	on_off,count

Results

<table>
<tr><th>Function</th><th>Command</th><th>Query</th><th>Response</th></tr>
<tr><td>ACK Channel Power</td><td>-----</td><td>CDP_ACK? mode[,unit]</td><td>{avg,max,min}|pwr</td></tr>
<tr><td>Auxiliary Pilot Channel Power</td><td>-----</td><td>CDP_AUX? mode[,unit]</td><td>{avg,max,min}|pwr</td></tr>
<tr><td>DATA Channel Power</td><td>-----</td><td>CDP_DATA? mode[,unit]</td><td>{avg,max,min}|pwr</td></tr>
<tr><td>DRC Channel Power</td><td>-----</td><td>CDP_DRC? mode[,unit]</td><td>{avg,max,min}|pwr</td></tr>
<tr><td>DSC Channel Power</td><td>-----</td><td>CDP_DSC? mode[,unit]</td><td>{avg,max,min}|pwr</td></tr>
<tr><td>R-PICH Power</td><td>-----</td><td>CDP_PILOT? mode</td><td>{avg,max,min}|pwr</td></tr>
<tr><td>RRI Channel Power</td><td>-----</td><td>CDP_RRI? mode[,unit]</td><td>{avg,max,min}|pwr</td></tr>
<tr><td>Carrier Frequency Error Result</td><td>-----</td><td>CFERR? mode</td><td>{avg_ppm,avg_Hz,max_ppm,max_Hz,min_ppm,min_Hz}|{freq_ppm,freq_Hz}</td></tr>
<tr><td>Worst Carrier Frequency Error Result</td><td>-----</td><td>CFERR_WORST?</td><td>freq_ppm,freq_Hz</td></tr>
<tr><td>Carrier Frequency Result</td><td>-----</td><td>CFREQ?</td><td>freq</td></tr>
<tr><td>EVM Result</td><td>-----</td><td>EVM? mode</td><td>{avg,max,min}|evm</td></tr>
<tr><td>Filtered Power Result</td><td>-----</td><td>FILTPWR? mode</td><td>{avg,max,min}|pwr|{s,pwr(1),pwr(2),…,pwr(s)}</td></tr>
<tr><td>Magnitude Error Result</td><td>-----</td><td>MAGERR? mode</td><td>{avg,max,min}|merr</td></tr>
<tr><td>Max Inactive Channel Power</td><td>-----</td><td>MAXINACTCODE?</td><td>pwr,ph,wn,wl</td></tr>
<tr><td>OBW Result</td><td>-----</td><td>OBW?</td><td>Bw</td></tr>
<tr><td>OBW Frequency Result</td><td>-----</td><td>OBWFREQ? pos</td><td>freq</td></tr>
<tr><td>Origin Offset Result</td><td>-----</td><td>ORGNOFS? mode</td><td>{avg,max,min}|origin</td></tr>
<tr><td>Peak EVM Result</td><td>-----</td><td>PEVM? mode</td><td>{avg,max,min}|pevm</td></tr>
<tr><td>Phase Error Result</td><td>-----</td><td>PHASEERR? mode</td><td>{avg,max,min}|perr</td></tr>
<tr><td>Rho Result</td><td>-----</td><td>RHO? mode</td><td>{avg,max,min}|rho</td></tr>
<tr><td>Spurious Emissions Judgement</td><td>-----</td><td>SEM?</td><td>Judgement</td></tr>
<tr><td>Spurious Emissions Peak Value (Lower)</td><td>-----</td><td>SEMLVL_LOWER?</td><td>bc,l,f</td></tr>
</table>

Results (Cont'd)

Function	Command	Query	Response
Spurious Emissions Peak Value (Upper)	-----	SEMLVL_UPPER?	bc,l,f
Spurious Emissions Template Margin (Lower)	-----	SEMMARGIN_LOWER?	bc,l,f
Spurious Emissions Template Margin (Upper)	-----	SEMMARGIN_UPPER?	bc,l,f
Time Error Result	-----	TAU? mode	{avg,max,min}|time
Worst Time Error Result	-----	TAU_WORST?	Time
Tx Power Result	-----	TXPWR? mode	{avg,max,min}|pwr|{s,pwr(1),pwr(2),…,pwr(s)}
Waveform	-----	WAVEFMEAS? format,position,length[,wl]	data[n]

5.1.3 Sequence measurement commands

Sequence Common Parameters

Function	Command	Query	Response
Input Level	ILVL level	ILVL?	Level
Output Level	OLVL level	OLVL?	Level
Output Frequency (Fwd.)	RXFREQ freq	RXFREQ?	Freq
Downlink Frequency	DLFREQ dl_freq	DLFREQ?	dl_freq
Sequence Measurement Status	-----	SEQMSTAT?	m_status,n,s(n-1)
Sequence Progress	-----	SEQPROGRESS?	p,cur,start,end
Specified Segment Status	-----	SEQSEGSTAT? seg	Stat
Input Frequency (Rev.)	TXFREQ freq	TXFREQ?	Freq
Uplink Frequency	ULFREQ ul_freq	ULFREQ?	ul_freq
Trigger Timeout	TRGTOUT time	TRGTOUT?	time

Sequence Control Parameters

Function	Command	Query	Response
Sequence Control Parameter - Sequence Control	SEQCTRL start,end	SEQCTRL?	start,end
Sequence Control Parameter - Sequence Control	SEQCTRLTX start,end	SEQCTRLTX?	start,end
Start Signal Analyzer Measurement Only	SEQEXECTX	-----	-----
Sequence Control Parameter - Sequence End State Reinitialization	SEQREINIT sw	SEQREINIT?	sw
Sequence Control Parameter - Sequence Table	SEQTBL table	SEQTBL?	table

Sequence Parameter Information

Function	Command	Query	Response
Sequence Parameter Information - Error Check	-----	SEQERR? [item]	n,err(n-1),ns,seg(ns-1),e,mem,exe,set
Sequence Parameter Information - Error Check	-----	SEQERR2? format	n,err(n-1)

Sequence Table Parameters

Function	Command	Query	Response
Sequence Table Parameter - Measurement	SEQMEAS seg,mode,step,mcond	SEQMEAS? seg	mode,step,mcond
Sequence Table Parameter - SG Output Port	SEQSGPORT seg,port	SEQSGPORT? seg	port
Sequence Table Parameter - Trigger	SEQTRG seg,src,slope,level,delay	SEQTRG? seg	src,slope,level,delay

Sequence Table Parameters (Cont'd)

Function	Command	Query	Response
Sequence Table Parameter - TRX Control	SEQTRX seg,ul_freq,ref,dl_freq,level,pat	SEQTRX? seg	ul_freq,ref,dl_freq,level,pat
Sequence Table Parameter - Uplink Frequency, Input Level	SEQTX seg,ul_freq,ref	SEQTX? seg	ul_freq,ref

Measurement Parameters

Function	Command	Query	Response
Band Class for Spurious Emissions Limit	EVDO_BAND mcond,band	EVDO_BAND? mcond	Band
Code Domain Power Enable and Count	EVDO_CDP_SET mcond,on_off[,count]	EVDO_CDP_SET? mcond	on_off,count
Long Span Code Search	EVDO_LSCODESEARCH on_off	EVDO_LSCODESEARCH?	on_off
Turn Off All Measurement Items	EVDO_MEAS_OFF mcond	-----	-----
Modulation Analysis Enable and Count	EVDO_MOD_SET mcond,on_off[,count]	EVDO_MOD_SET? mcond	on_off,count
Occupied Bandwidth Ratio	EVDO_OBW_RATIO ratio	EVDO_OBW_RATIO?	ratio
Occupied Bandwidth Enable and Count	EVDO_OBW_SET mcond,on_off[,count]	EVDO_OBW_SET? mcond	on_off,count
Protocol Revision	EVDO_PREV rev	EVDO_PREV?	rev
Data Channel Payload Size	EVDO_PSIZE size	EVDO_PSIZE?	size
Tx Power Measurement Enable and Count	EVDO_PWR_SET mcond,on_off[,count]	EVDO_PWR_SET? mcond	on_off,count
Spurious Emissions Enable and Count	EVDO_SPR_SET mcond,on_off[,count]	EVDO_SPR_SET? mcond	on_off,count

Results

Function	Command	Query	Response
ACK Channel Power	-----	EVDO_CDP_ACK? seg,mode[,unit]	{avg,max,min}|pwr
Auxiliary Pilot Channel Power	-----	EVDO_CDP_AUX? seg,mode[,unit]	{avg,max,min}|pwr
DATA Channel Power	-----	EVDO_CDP_DATA? seg,mode[,unit]	{avg,max,min}|pwr
DRC Channel Power	-----	EVDO_CDP_DRC? seg,mode[,unit]	{avg,max,min}|pwr
DSC Channel Power	-----	EVDO_CDP_DSC? seg,mode[,unit]	{avg,max,min}|pwr
R-PICH Power	-----	EVDO_CDP_PILOT? seg,mode	{avg,max,min}|pwr
RRI Channel Power	-----	EVDO_CDP_RRI? seg,mode[,unit]	{avg,max,min}|pwr
Carrier Frequency Error Result	-----	EVDO_CFERR? seg,mode	{avg_ppm,avg_Hz,max_ppm, max_Hz,min_ppm,min_Hz}|{ freq_ppm,freq_Hz}
Worst Carrier Frequency Error Result	-----	EVDO_CFERR_WORST? seg	freq_ppm,freq_Hz
Carrier Frequency Result	-----	EVDO_CFREQ? seg	freq
EVM Result	-----	EVDO_EVM? seg,mode	{avg,max,min}|evm
Filtered Power Result	-----	EVDO_FILTPWR? seg,mode	{avg,max,min}|pwr|{s,pwr (1),pwr(2),…,pwr(s)}
Magnitude Error Result	-----	EVDO_MAGERR? seg,mode	{avg,max,min}|merr
Max Inactive Channel Power	-----	EVDO_MAXINACTCODE? seg	pwr,ph,wn,wl
OBW Result	-----	EVDO_OBW? seg	bw
OBW Frequency Result	-----	EVDO_OBWFREQ? seg, pos	freq
Origin Offset Result	-----	EVDO_ORGNOFS? seg,mode	{avg,max,min}|origin
Peak EVM Result	-----	EVDO_PEVM? seg,mode	{avg,max,min}|pevm
Phase Error Result	-----	EVDO_PHASEERR? seg,mode	{avg,max,min}|perr

Results (Cont'd)

Function	Command	Query	Response
Rho Result	-----	EVDO_RHO? seg,mode	{avg,max,min}|rho
Spurious Emissions Judgement	-----	EVDO_SEM? seg	judgement
Spurious Emissions Peak Value (Lower)	-----	EVDO_SEMLVL_LOWER? seg	bc,l,f
Spurious Emissions Peak Value (Upper)	-----	EVDO_SEMLVL_UPPER? seg	bc,l,f
Spurious Emissions Template Margin (Lower)	-----	EVDO_SEMMARGIN_LOWER? seg	bc,l,f
Spurious Emissions Template Margin (Upper)	-----	EVDO_SEMMARGIN_UPPER? seg	bc,l,f
Time Error Result	-----	EVDO_TAU? seg,mode	{avg,max,min}|time
Worst Time Error Result	-----	EVDO_TAU_WORST? seg	time
Tx Power Result	-----	EVDO_TXPWR? seg,mode	{avg,max,min}|pwr|{s,pwr (1),pwr(2),…,pwr(s)}

5.2 Details of Commands

This section describes the commands in alphabetical order.

■ Terms in this command list

EX ....Command name (header)

Example ....Command function name

Function ....Command function

Command.................................Programming command syntax

Query ....Query syntax

Response ....Response syntax

Parameter ....Parameter definition

Details ....Command restrictions and others

Example of Use...............................Command usage example

Related Commands ....Introduction of related commands

■ Suffix code list

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

5.2.1 Details of common commands

DLPAT

Waveform Pattern Select

Function

Selects waveform pattern to use from patterns included in waveform file

When the command received, the signal is immediately switched regardless of the frame cycle of signal, so the frame cycle is not continued.

This command is also used to query the currently selected waveform pattern.

Command

```
DLPAT pat
```

Query

```
DLPAT?
```

Response

pat

Parameter

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

Details

Select the waveform pattern for RF output signal in waveform file.

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

Example of Use

To set the waveform pattern to 1:

DLPAT PAT1

DLPAT?

>PAT1

Related Command

Waveform file for arbitrary waveform signal selection or query

```
PACKAGE
```

Remarks

The group range depends on the selected waveform file.

For details of the waveform pattern, refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

DLPAT_SYNC

Waveform Pattern Select (SYNC)

Function

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

Command

```
DLPAT_SYNC pat
```

Query

```
DLPAT_SYNC?
```

Response

pat

Parameter

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

Details

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

Example of Use

To set the waveform pattern to 1:
DLPAT_SYNC PAT1
DLPAT_SYNC?
>PAT1

Related Command

Waveform file for arbitrary waveform signal selection or query
PACKAGE

Remarks

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

ESR2?

End Event Status (Measurement) Register Query

Function

Queries end event status register (measurement)

The event occurrence can be identified using the retrieved value.

Query

```
ESR2?
```

Response

register Value = bit0 + bit1 + ... + bit7

bit0 = 2^0 = 1	End of measurement
bit1 = 2^1 = 2	Trigger preparation completed
bit2 = 2^2 = 4	Unused (reserved for application use)
bit3 = 2^3 = 8	Unused (reserved for application use)
bit4 = 2^4 = 16	Unused (reserved for application use)
bit5 = 2^5 = 32	Unused (reserved for application use)
bit6 = 2^6 = 64	Unused (reserved for application use)
bit7 = 2^7 = 128	Unused (reserved for application use)

Parameter

register	End event status register (measurement)
Range	0 to 255

Details

The sum of the values for bits of the occurring event from the values $2^0 = 1$, $2^1 = 2$, $2^2 = 4$, $2^3 = 8$, $2^4 = 16$, $2^5 = 32$, $2^6 = 64$, and $2^7 = 128$, that correspond to the end event status register (measurement) bits 0, 1, 2, 3, 4, 5, 6, and 7 becomes the response.

Example of Use

To query the end event status register (measurement) value:

ESR2?

> 0

ESR3?

Error Event Status (Measurement) Register Query

Function

Queries error event status register (measurement)

The event occurrence can be identified using the retrieved value.

Query

```
ESR3?
```

Response

register	Value = bit0 + bit1 + ... + bit7
bit0 = 2^0 = 1	Over level
bit1 = 2^1 = 2	Under level
bit2 = 2^2 = 4	Timeout
bit3 = 2^3 = 8	Unused (reserved for application use)
bit4 = 2^4 = 16	Unused (reserved for application use)
bit5 = 2^5 = 32	Unused (reserved for application use)
bit6 = 2^6 = 64	Unused (reserved for application use)
bit7 = 2^7 = 128	Unused (reserved for application use)

Parameter

register	Error event status register (measurement)
Range	0 to 255

Details

The sum of the values for bits of the occurring event from the values $2^0 = 1$, $2^1 = 2$, $2^2 = 4$, $2^3 = 8$, $2^4 = 16$, $2^5 = 32$, $2^6 = 64$, and $2^7 = 128$, that correspond to the error event status register (measurement) bits 0, 1, 2, 3, 4, 5, 6, and 7 becomes the response.

Example of Use

To query the error event status register (measurement) value:

ESR3?

> 4

5

Native Command Reference

LVL

Output Level On/Off

Function

Sets or queries RF signal output at MU887000A connector

Command

```
LVL on_off
```

Query

```
LVL?
```

Response

on_off

Parameter

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

Example of Use

To output the RF signal:

LVL ON

LVL?

ON

MEASSTOP

Measurement Stop

Function

Stops current measurement

Command

```
MEASSTOP
```

Example of Use

To stop current measurement:

MEASSTOP

MOD

Output Signal Modulation

Function

Sets or queries MU887000A RF signal output modulation

Command

```
MOD on_off
```

Query

```
MOD?
```

Response

on_off

Parameter

on_off	Enables/disables modulation
ON	Enables RF output signal modulation
OFF	Disables RF output signal modulation
Default	ON

Example of Use

To enable the modulation:

MOD ON

MOD?

>ON

MSTAT?

Measurement Status

Function

Queries status of current measurement

Query

```
MSTAT?
```

Response

m_status

Parameter

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

Details

This command can be used while measurement is stopped or executing.
The value received from MX887016A is 0, 2, 4, 5, 9, or 12.

Example of Use

To query the measurement status:
MSTAT?
>0

PACKAGE

Waveform File Select

Function

Selects or queries waveform file for arbitrary waveform signal used at Forward Link signal.

Command

`PACKAGE pac`

Query

`PACKAGE?`

Response

pac

Parameter

pac	Waveform file

Details

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

Example of Use

To set the waveform file 1 from the waveform files loaded in memory:
PACKAGE “PAC0”
PACKAGE?
> PAC1

Related Command

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

Use the following commands to select a waveform pattern to use from the waveform patterns included in the waveform file configured using the command described in this section.
DLPAT, DLPAT_SYNC, SEQTRX

PORT

Set Connect Port Direction

Function

Sets or queries connectors for inputting and outputting RF signals

Command

```
PORT input,output
```

Query

```
PORT?
```

Response

input, output

Parameters

input	Test Port No.
PORT1	Test Port1
PORT2	Test Port2
PORT3	Test Port3
PORT4	Test Port4
Default	PORT1
output	Test Port No.
PORT1	Test Port1
PORT2	Test Port2
PORT3	Test Port3
PORT4	Test Port4
Default	PORT1

Details

Both Test Port1 and Test Port2 can be set to input and output simultaneously.
Test Port3 and Test Port4 can be set to either input or output at one time.

Example of Use

To set the RF signal input and output connectors to Test Port1 and Test Port2, respectively:

PORT PORT1,PORT2

PORT?

> PORT1,PORT2

SNGLS

Measurement Start

Function

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

Command

```
SNGLS
```

Example of Use

To start measurement

SNGLS

Related command

ESR2

For the details of the event status register, refer to Chapter 3 “Fundamental Operation” in the *MU887000A TRX Test Module Operation Manual*.

STDSEL

Standard Select

Function

Sets or queries measurement standard

Command

```
STDSEL std
```

Query

```
STDSEL?
```

Response

std

Parameter

std	Measurement standard	
COMMON	Common Measurement	(requires MX887010A)
WCDMA	W-CDMA	(requires MX887011A)
GSM	GSM	(requires MX887012A)
LTE	LTE	(requires MX887013A or MX887014A)
CDMA2000	CDMA2000 1x	(requires MX887015A)
EVDO	CDMA2000 1xEVDO	(requires MX887016A)
TDSCDMA	TD-SCDMA	(requires MX887017A)
SEQUENCE	Sequence	(requires MX887010A)
SEQ	Sequence	(requires MX887010A)
Default	COMMON	

Example of Use

To switch the measurement standard to SEQUENCE:

STDSEL SEQUENCE

STDSEL?

> SEQUENCE

Remarks

To execute the measurements described in section 5.2.2 “Fundamental measurement commands”, set the parameter to EVDO.

To execute the measurements described in section 5.2.3 “Sequence measurement commands” , set the parameter to SEQUENCE.

If this command is sent during measurement, measurement stops to prepare for the new standard.

Common hardware settings, such as Downlink Frequency and Input Level, can be set for each measurement standard.

SYSSEL

Application Select

Function

Sets or queries type of application software executing on MU887000A

Command

`SYSSEL app`

Query

`SYSSEL?`

Response

app

Parameter

app	Type of application software
CELLULAR	Cellular Application
SRW	SRW Application

Details

Set the parameter to CELLULAR and send the command before using the MX887016A.

Example of Use

To set the applications software to be executed on the MU887000A to CELLULAR

SYSSEL CELLULAR

SYSSEL?

> CELLULAR

Remarks

Set the parameter to CELLULAR and send the command before using the MX887016A and then set the standard to EVDO or SEQUENCE using the STDSEL command.

SYST:LANG

Language Selection of Remote Command

Function

Switches language mode of remote control commands

Command

```
SYST:LANG mode
```

Query

```
SYST:LANG?
```

Response

mode

Parameter

mode	Language mode
NAT	Native
SCPI	SCPI
Default	NAT

Example of Use

To switch the remote control command language mode to Native:

SYST:LANG NAT

SYST:LANG?

>NAT

5.2.2 Fundamental measurement commands

ALLMEASITEMS_OFF

Turn Off All Measurement Items

Function

Disables all measurement items

Command

```
ALLMEASITEMS_OFF
```

Details

This command operation is similar to the following commands.
PWR_SET,OBW_SET,SPR_SET,MOD_SET,CDP_SET

Example of Use

To disable all measurement items:
ALLMEASITEMS_OFF

AWGNLVL

AWGN Level On/Off

Function

Enables AWGN output, and queries setting

Command

```
AWGNLVL on_off
```

Query

```
AWGNLVL?
```

Response

on_off

Parameter

on_off	Enables/disables AWGN output
ON	Enables AWGN output
OFF	Disables AWGN output
Default	OFF

Example of Use

To enable the AWGN output:

AWGNLVL ON

AWGNLVL?

>ON

Related Command

To set and query AWGN output level ratio vs carrier:

AWGNPWR

AWGNPWR

AWGN Level

Function

Sets or queries AWGN (Additive White Gaussian Noise) output level ratio vs carrier

Command

```
AWGNPWR level
```

Query

```
AWGNPWR?
```

Response

level

Unit	dB

Parameter

level	AWGN output level
Range	–40 to +12 dB
Resolution	1 dB
Default	–20 dB

Example of Use

To set AWGN output level ratio vs the carrier to –40 dB:

AWGNPWR -40

AWGNPWR?

> -40

BAND

Band Class for Spurious Emissions Limit

Function

Sets or queries band class to determine Spurious Emissions Limit range

Command

`BAND band`

Query

`BAND?`

Response

band

Parameter

band	Band class
Range	0 to 16, 18 to 21
Resolution	1
Default	0

Details

This parameter sets the band class determining the Spurious Emissions Limit range.

Example of Use

To set the band class determining the Spurious Emissions Limit range to 10:

BAND 10

BAND?

>10

Remarks

Use the following command to set the band class to determine the frequency:

`BANDCLASS`

BANDCLASS

Band Class

Function

Sets or queries band class

Command

```
BANDCLASS band
```

Query

```
BANDCLASS?
```

Response

band

Parameter

band	Band class
Range	0 to 16, 18 to 21
Resolution	1
Default	0

Example of Use

To set the band class to 10:

BANDCLASS 10

BANDCLASS?

>10

Remarks

Use the following command to set the band class to determine the Spurious Emission Limit range:

```
BAND
```

CDP_ACK?

ACK Channel Power

Function

Queries Reverse ACK Channel Power measurement result

Query

```
CDP_ACK? mode[,unit]
```

Response

When mode = TTL

avg,max,min

When mode = other than TTL

pwr

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
unit	Query unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when unit omitted)
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pwr	Measurement result in specified Storage mode

Example of Use

To query the ACK Channel Power measurement result average value:

CDP_ACK? AVG

>0.01

CDP_AUX?

Auxiliary Pilot Channel Power

Function

Queries Reverse Auxiliary Pilot Channel Power measurement result

Query

```
CDP_AUX? mode[,unit]
```

Response

When mode = TTL
avg,max,min
When mode = other than TTL
pwr

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
unit	Query unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot) (uses Ior when unit omitted)
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pwr	Measurement result in specified Storage mode

Details

A valid data is acquired only when the Protocol Revision is Rev. A.

Example of Use

To query the Auxiliary Pilot Channel Power measurement result average value:
CDP_AUX? AVG
>0.01

CDP_DATA?

DATA Channel Power

Function

Queries Reverse DATA Channel Power measurement result

Query

```
CDP_DATA? mode[,unit]
```

Response

When mode = TTL

avg,max,min

When mode = other than TTL

pwr

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
unit	Query unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when unit omitted)
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pwr	Measurement result in specified Storage mode

Example of Use

To query the average value of the DATA Channel Power measurement result:

CDP_DATA? AVG

>0.01

CDP_DRC?

DRC Channel Power

Function

Queries Reverse DRC Channel (Data Rate Channel) Power measurement result

Query

```
CDP_DRC? mode[,unit]
```

Response

When mode = TTL

avg,max,min

When mode = other than TTL

pwr

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
unit	Query unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when unit omitted)
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pwr	Measurement result in specified Storage mode

Example of Use

To query the DRC Channel Power measurement result average value:

CDP_DRC? AVG

>0.01

CDP_DSC?

DSC Channel Power

Function

Queries Reverse DSC Channel (Data Source Channel) Power measurement result

Query

```
CDP_DSC? mode[,unit]
```

Response

When mode = TTL
avg,max,min
When mode = other than TTL
pwr

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
unit	Query unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when unit omitted)
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pwr	Measurement result in specified Storage mode

Details

A valid data is acquired only when the Protocol Revision is Rev. A.

Example of Use

To query the DSC Channel Power measurement result average value:
CDP_DSC? AVG
>0.01

CDP_PILOT?

R-PICH Power

Function

Queries R-PICH (Reverse Pilot Channel) Power measurement results

Query

```
CDP_PILOT? mode
```

Response

When mode = TTL
avg,max,min
When mode = other than TTL
pwr

Unit	dB/Ior
Resolution	0.01 dB

Parameters

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

Example of Use

To query the R-PICH power measurement result average:
CDP_PILOT? AVG
>0.01

CDP_RRI?

RRI Channel Power

Function

Queries Reverse RRI Channel (Reverse Rate Indicator Channel) Power measurement result

Query

```
CDP_RRI? mode[,unit]
```

Response

When mode = TTL

avg,max,min

When mode = other than TTL

pwr

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
unit	Query unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when unit omitted)
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pwr	Measurement result in specified Storage mode

Example of Use

To query the RRI Channel Power measurement result average value:

CDP_RRI? AVG

>0.01

CDP_SET

Code Domain Power Enable and Count

Function

Enables Code Domain Power measurement and sets measurement count, and queries setting

Command

```
CDP_SET on_off[,count]
```

Query

```
CDP_SET?
```

Response

on_off,count

Parameters

on_off	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
count	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable the Code Domain Power measurement and set the measurement count to 10:

CDP_SET ON,10

CDP_SET?

>ON,10

CFERR?

Carrier Frequency Error Result

Function

Queries Carrier Frequency Error measurement result

Query

```
CFERR? mode
```

Response

When mode = TTL
avg_ppm,avg_Hz,max_ppm,max_Hz,min_ppm,min_Hz
When mode = other than TTL
freq_ppm,freq_Hz

xxx_ppm	
Unit	ppm
Resolution	0.01 ppm
xxx_Hz	
Unit	Hz
Resolution	0.1 Hz

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg_ppm	Measurement result in ppm (Average)
avg_Hz	Measurement result in Hz (Average)
max_ppm	Measurement result in ppm (Maximum)
max_Hz	Measurement result in Hz (Maximum)
min_ppm	Measurement result in ppm (Minimum)
min_Hz	Measurement result in Hz (Minimum)
freq_ppm	Measurement result in ppm in specified Storage mode
freq_Hz	Measurement result in Hz in specified Storage mode

Example of Use

To query the frequency error measurement result average;
CFERR? AVG
>0.50,431.1

CFERR_WORST?

Worst Carrier Frequency Error Result

Function

Queries worst value of Carrier Frequency Error measurement result

Query

```
CFERR_WORST?
```

Response

freq_ppm,freq_Hz

freq_ppm

Unit	ppm
Resolution	0.01 ppm

freq_Hz

Unit	Hz
Resolution	0.1 Hz

Parameters

freq_ppm	Worst value in frequency error measurement results in ppm
freq_Hz	Worst value in frequency error measurement results in Hz

Example of Use

To query the worst value of the frequency error measurement result:

CFERR_WORST?

>1.00,862.2

CFREQ?

Carrier Frequency Result

Function

Queries Carrier Frequency measurement result

Query

```
CFREQ?
```

Response

freq

Unit	Hz
Resolution	1 Hz

Parameter

freq	Carrier Frequency

Example of Use

To query the carrier frequency measurement result:

CFREQ?

>862200000

CHAN

Channel

Function

Sets the queries channel

Command

```
CHAN channel
```

Query

```
CHAN?
```

Response

channel

Parameter

channel	Channel
Range	Band Class0: 1 to 799, 991 to 1323
	Band Class1: 0 to 1199
	Band Class2: 0 to 1000, 1329 to 2108
	Band Class3: 1 to 799, 801 to 1039, 1041 to 1199, 1201 to 1600
	Band Class4: 0 to 599
	Band Class5: 1 to 400, 472 to 871, 1039 to 1473, 1536 to 1715, 1792 to 2018
	Band Class6: 0 to 1199
	Band Class7: 0 to 240
	Band Class8: 0 to 1499
	Band Class9: 0 to 699
	Band Class10: 0 to 919
	Band Class11: 1 to 400, 472 to 871, 1039 to 1473, 1536 to 1715, 1792 to 2016
	Band Class12: 0 to 239
	Band Class13: 0 to 1399
	Band Class14: 0 to 1299
	Band Class15: 0 to 899
	Band Class16: 140 to 1459
	Band Class18: 0 to 240
	Band Class19: 0 to 360
	Band Class20: 0 to 680
	Band Class21: 0 to 399
Resolution	1 (other than Band Class3)
	2 (Band Class3)
Default	122

Details

The setting range of this parameter varies with the Band Class setting.

Changing the channel number changes the related output frequency (Forward Link frequency) and input frequency (Reverse Link frequency).

Example of Use

To set the channel to 100:

CHAN 100

CHAN?

>100

EVM?

EVM Result

Function

Queries EVM result

Query

```
EVM? mode
```

Response

When mode = TTL

avg,max,min

When mode = other than TTL

evm

Unit	%
Resolution	0.01%

Parameters

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

Example of Use

To query the EVM measurement result average:

EVM? AVG

>0.01

FASTPWRMODE

Fast Power Measurement Mode

Function

Enables Fast Power Measurement mode or queries setting.

Command

```
FASTPWRMODE on_off
```

Query

```
FASTPWRMODE?
```

Response

on_off

Parameters

on_off	Fast Power Measurement Mode
ON	Executes Fast Power measurement.
OFF	Executes normal power measurement.
Default	OFF

Details

When Fast Power Measurement mode is set to On, only Tx Power is measured.
Use the following command to enable/disable power measurement and to set measuring times.
PWR_SET

Example of Use

To set Fast Power Measurement mode to On.
FASTPWRMODE ON
FASTPWRMODE?
> ON

FILTPWR?

Filtered Power Result

Function

Queries Filtered Power measurement result

Query

```
FILTPWR? mode
```

Response

When mode = TTL

avg,max,min

When mode = AVG, MAX, MIN or DVT,

pwr

When mode = IND,

s,pwr(1), pwr(2),…, pwr(s)

Unit	dBm
Resolution	0.01 dB

Parameters

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

Example of Use

To query the Filtered Power measurement result average, maximum, and minimum:

FILTPWR? TTL

>-10.05,-9.60,-10.50

FMEAS_TRGDLY

Trigger Delay

Function

Sets or queries trigger delay

Command

```
FMEAS_TRGDLY trgdelay
```

Query

```
FMEAS_TRGDLY?
```

Response

trgdelay

Unit	ms

Parameter

trgdelay	Trigger delay
Range	0 to 10.000 ms
Resolution	0.001 ms
Suffix code	S, MS, US (uses ms when omitted)
Default	0.000 ms

Details

The trigger delay setting is enabled when the trigger source is set to PWR.

Example of Use

To set trigger delay to 0.5 ms:

FMEAS_TRGDLY 0.5MS

FMEAS_TRGDLY?

>0.500

FMEAS_TRGLVL

Trigger Level

Function

Sets or queries trigger level

Command

```
FMEAS_TRGLVL trglevel
```

Query

```
FMEAS_TRGLVL?
```

Response

trglevel

Unit	dB

Parameter

trglevel	Trigger level
Range	–40 to 0 dB
Resolution	1 dB
Suffix code	DB (uses dB when omitted)
Default	–40.0 dB

Details

The trigger level setting is enabled when trigger source is set to PWR.

Example of Use

To set the input signal trigger level to –40 dB:

FMEAS_TRGLVL -40
FMEAS_TRGLVL?
> -40

FMEAS_TRGSRC

Trigger Source

Function

Sets or queries trigger source

Command

```
FMEAS_TRGSRC source
```

Query

```
FMEAS_TRGSRC?
```

Response

source

Parameter

source	Trigger source
FREERUN	Free run
PWR	Input signal power
Default	FREERUN

Example of Use

To set the input signal power as the trigger source:

FMEAS_TRGSRC PWR

FMEAS_TRGSRC?

> PWR

FMEAS_TRGTOUT

Trigger Timeout

Function

Sets or queries trigger timeout

Command

```
FMEAS_TRGTOUT trgtime
```

Query

```
FMEAS_TRGTOUT?
```

Response

trgtime

Unit	s

Parameter

trgtime	Timeout
Range	1 to 10 s
Resolution	1 s
Suffix code	S (uses s when omitted)
Default	10 s

Details

The trigger timeout setting is enabled when trigger source is set to PWR.

Example of Use

To set the trigger timeout to 5 s:

FMEAS_TRGTOUT 5S
FMEAS_TRGTOUT?
>5

ILVL

Input Level

Function

Sets or queries input level of MU887000A connector

Command

```
ILVL level
```

Query

```
ILVL?
```

Response

level

Unit	dBm

Parameter

level	Input Level
Range	–65.0 to +35.0 dBm (Port 1/Port 2)
	–65.0 to +25.0 dBm (Port 3/Port 4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–23.7 dBm

Details

The setting range varies with the input port setting.
When the Cable Loss Calibration is ON, the cable loss is added to the input level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –60.0 to +40.0 dBm.

Example of Use

To set the input level to –10.0 dBm:
ILVL -10.0
ILVL?
>-10.0

Related Commands

EXTLOSSW
LOSSTBL
LOSSTBLVAL
For details of the commands, refer to Chapter 6 “Native Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

LSCODESEARCH

Long Span Code Search

Function

Enables and queries Long Span Code Search function

Command

```
LSCODESEARCH on_off
```

Query

```
LSCODESEARCH?
```

Response

on_off

Parameter

on_off	Enables/disables Long Span Code Search
ON	Enables Long Span Code Search
OFF	Disables Long Span Search
Default	OFF

Details

Set this parameter to OFF when the Reverse Link and Forward Link signals are synchronized; set it to ON when they are not synchronized.

Example of Use

To enable the Long Span Code Search:

LSCODESEARCH ON

LSCODESEARCH?

>ON

MAGERR?

Magnitude Error Result

Function

Queries Magnitude Error measurement result

Query

`MAGERR? mode`

Response

When mode = TTL

avg,max,min

When mode = other than TTL

merr

Unit	%
Resolution	0.01%

Parameters

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

Example of Use

To query the Magnitude Error measurement result average:

MAGERR? AVG

>0.01

MAXINACTCODE?

Max Inactive Channel Power

Function

Queries channel outputting maximum power among inactive code channels, and power measurement result

Query

```
MAXINACTCODE?
```

Response

pwr,ph,wn,wl

pwr	
Unit	dB
wn	
Unit	None
wl	
Unit	None

Parameters

pwr	Max Inactive Channel Power
Resolution	0.01 dB
ph	Phase (I/Q) of target channel
I	I-phase
Q	Q-phase
wn	Walsh Code Number of target channel
Resolution	1
wl	Walsh Code Length of target channel
Resolution	1

Details

When executing more than two measurements using a single measurement start, the result of the last measurement is returned for (Meas. Count ≥ 2).

Example of Use

To query the channel outputting the maximum power among inactive code channels and the power measurement result:

MAXINACTCODE?

>3.00,Q,2,8

MOD_SET

Modulation Analysis Enable and Count

Function

Enables Modulation Analysis Measurement and sets or queries measurement count

Command

```
MOD_SET on_off[,count]
```

Query

```
MOD_SET?
```

Response

on_off,count

Parameters

on_off	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
count	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable Modulation Analysis measurement and set the measurement count to 10:

MOD_SET ON,10

MOD_SET?

>ON,10

OBW?

OBW Result

Function

Queries Occupied Bandwidth measurement result

Query

`OBW?`

Response

bw

Unit	MHz
Resolution	1 kHz

Parameter

bw	Occupied Bandwidth [MHz]

Example of Use

To query the Occupied Bandwidth measurement result:

OBW?

> 0.100

OBWFREQ?

OBW Frequency Result

Function

Queries upper, lower and center frequency of Occupied Bandwidth measurement

Query

`OBWFREQ? pos`

Response

freq

Unit	MHz
Resolution	1 kHz

Parameters

pos	Offset types
UPPER	Upper frequency
LOWER	Lower frequency
CENTER	Center frequency
freq	Offset frequency [MHz]

Example of Use

To query the Occupied Bandwidth measurement center frequency result:

OBWFREQ? CENTER

>862.200

OBW_RATIO

Occupied Bandwidth Ratio

Function

Sets or queries Occupied Bandwidth measurement occupation ratio

Command

```
OBW_RATIO ratio
```

Query

```
OBW_RATIO?
```

Response

ratio

Parameter

ratio	Occupied Bandwidth occupation ratio
Range	80.0 to 99.9%
Resolution	0.1%
Suffix code	% (uses % when omitted)
Default	99.0%

Example of Use

To set the Occupied Bandwidth occupation ratio to 99.0%:

OBW_RATIO 99.0
OBW_RATIO?
>99.0

OBW_SET

Occupied Bandwidth Enable and Count

Function

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

Command

```
OBW_SET on_off[,count]
```

Query

```
OBW_SET?
```

Response

on_off,count

Parameters

on_off	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
count	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable the Occupied Bandwidth measurement and set the measurement count to 10:

OBW_SET ON,10

OBW_SET?

>ON,10

OLVL

Output Level

Function

Sets or queries RF output level

Command

```
OLVL level
```

Query

```
OLVL?
```

Response

level

Unit	dBm

Parameter

level	Output level
Range	–130.0 to –10.0 dBm (Port 1/Port 2)
	–120.0 to 0.0 dBm (Port 3/Port 4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–55.0 dBm

Details

The setting range varies with the output port setting.
When the Cable Loss Calibration is ON, the cable loss is subtracted from the output level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –135.0 to –15.0 dBm.

Example of Use

To set the output level to –50.0 dBm:
OLVL -50.0
OLVL?
>-50.0

Related Commands

EXTLOSSW
LOSSTBL
LOSSTBLVAL
For details of the commands, refer to Chapter 6 “Native Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

ORGNOFS?

Origin Offset Result

Function

Queries Origin Offset measurement result

Query

`ORGNOFS? mode`

Response

When mode = TTL

avg,max,min

When mode = other than TTL

origin

Unit	dB
Resolution	0.01 dB

Parameters

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

Example of Use

To query the Origin Offset measurement result average:

ORGNOFS? AVG

>0.01

PEVM?

Peak EVM Result

Function

Queries Peak EVM measurement result

Query

```
PEVM? mode
```

Response

When mode = TTL

avg,max,min

When mode = other than TTL

pevm

Unit	%
Resolution	0.01%

Parameters

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

Example of Use

To query the Peak EVM measurement result average:

PEVM? AVG

>0.01

PHASEERR?

Phase Error Result

Function

Queries Phase Error measurement result

Query

`PHASEERR? mode`

Response

When mode = TTL

avg,max,min

When mode = other than TTL

perr

Unit	degree
Resolution	0.01 degree

Parameters

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

Example of Use

To query the Phase Error measurement result average:

PHASEERR? AVG

>0.01

PREV

Protocol Revision

Function

Sets or queries Protocol Revision

Command

```
PREV rev
```

Query

```
PREV?
```

Response

rev

Parameter

rev	Protocol Revision
REV0	Rev. 0
REVA	Rev. A
Default	REV0

Example of Use

To set Protocol Revision to Rev. 0.

PREV REV0

PREV?

>REV0

PSIZE

Data Channel Payload Size

Function

Sets or queries Data Channel Payload size

Command

```
PSIZE size
```

Query

```
PSIZE?
```

Response

size

Unit	kbps

Parameter

size	Data Channel Payload size
Range	128,256,512,768,1024,1536,2048,3072,4096,6144,8192,12288
Suffix code	None
Default	128

Details

This is supported only when the Protocol Revision is Rev. A.

Example of Use

To set Data Channel Payload size to 128 kbps:

PSIZE 128

PSIZE?

>128

PWR_SET

Tx Power Measurement Enable and Count

Function

Enables Tx power measurement and sets or queries measurement count

Command

```
PWR_SET on_off[,count]
```

Query

```
PWR_SET?
```

Response

on_off,count

Parameters

on_off	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	ON
count	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable the Tx power measurement and set the measurement count to 10:

PWR_SET ON,10

PWR_SET?

>ON,10

RHO?

Rho Result

Function

Queries Rho (Waveform Quality) measurement result

Query

`RHO? mode`

Response

When mode = TTL

avg,max,min

When mode = other than TTL

rho

Unit	None
Resolution	0.00001

Parameters

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

Example of Use

To query the Rho measurement result average:

RHO? AVG

>0.00100

RTCLCMI

Long Code Mask - I

Function

Sets or queries Long Code Mask for I-phase.

Command

```
RTCLCMI lcm
```

Query

```
RTCLCMI?
```

Response

lcm

Parameters

<lcm>	Long Code Mask - I
00000000000	0x00000000000
3FF00000000	0x3FF00000000
Default	00000000000

Example of Use

To set Long Code Mask - I to 0x00000000000.

RTCLCMI 00000000000

RTCLCMI?

>00000000000

RXFREQ

Output Frequency (Fwd.)

Function

Sets or queries Forward Link center frequency

Command

```
RXFREQ freq
```

Query

```
RXFREQ?
```

Response

freq

Unit	Hz

Parameter

freq	Output Frequency (Fwd.)
Range	400.000000 to 3,800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	873.660000 MHz

Detail

The input frequency is changed to a value determined by the combination of the Band Class and channel after the channel number is changed.
Changing the output frequency does not change the channel number.

Example of Use

To set the Forward Link frequency to 873.66 MHz:
RXFREQ 873.66MHZ
RXFREQ?
>873660000

SEM?

Spurious Emissions Judgement

Function

Queries judgement about whether or not Spurious Emissions within template

Query

```
SEM?
```

Response

judgement

Parameter

judgement	Judgement
PASS	Pass
FAIL	Fail

Example of Use

To query the Spurious Emissions judgement measurement result:

SEM?

>PASS

SEMLVL_LOWER?

Spurious Emissions Peak Value (Lower)

Function

Queries worst level and frequency of spectrum in each lower frequency range

Query

```
SEMLVL_LOWER?
```

Response

bc,f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4,f_5,l_5

l_k	
Unit	dBc or dBm
Resolution	0.01 dB
f_k	
Unit	MHz
Resolution	0.001 MHz

Parameters

bc	Band Class
Range	0 to 16, 18 to 21
l_k	Worst level at offset frequency section k 999.99 is returned for out of target.
f_k	Offset frequency for worst value acquired by l 99999.999 is returned for out of target.
k	Offset frequency section
Range	1, 2, 3, 4, 5

Details

For the offset frequency points, refer to Table 2.4-1 “Spurious Emissions Specifications (1)” and Table 2.4-2 “Spurious Emissions Specifications (2)”.

Example of Use

To query the worst value level and frequency of the spectrum in each lower frequency range in band class 6:

SEMLVL_LOWER?

>6,1.000,-43.21,1.000,-54.32,2.000,-65.43,2.000,-76.54,3.000,-87.65

SEMLVL_UPPER?

Spurious Emissions Peak Value (Upper)

Function

Queries worst level and frequency of spectrum in each upper frequency range

Query

```
SEMLVL_UPPER?
```

Response

bc,f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4,f_5,l_5

l_k	
Unit	dBc or dBm
Resolution	0.01 dB
f_k	
Unit	MHz
Resolution	0.001 MHz

Parameters

bc	Band Class
Range	0 to 16, 18 to 21
l_k	Worst level at offset frequency section k 999.99 is returned for out of target.
f_k	Offset frequency for worst value acquired by l 99999.999 is returned for out of target.
k	Offset frequency section
Range	1, 2, 3, 4, 5

Details

For the offset frequency points, refer to Table 2.4-1 “Spurious Emissions Specifications (1)” and Table 2.4-2 “Spurious Emissions Specifications (2)”.

Example of Use

To query the worst value level and frequency of the spectrum in each upper frequency range in band class 6:

SEMLVL_UPPER?

>6,1.000,-43.21,1.000,-54.32,2.000,-65.43,2.000,-76.54,3.000,-87.65

SEMMARGIN_LOWER?

Spurious Emissions Template Margin (Lower)

Function

Queries margin level from template for worst value and frequency of spectrum in each lower frequency range

Query

```
SEMMARGIN_LOWER?
```

Response

bc,f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4,f_5,l_5

l_k	
Unit	dB
Resolution	0.01 dB
f_k	
Unit	MHz
Resolution	0.001 MHz

Parameters

bc	Band Class
Range	0 to 16, 18 to 21
l_k	Margin level for worst value at offset frequency section k 999.99 is returned for out of target.
f_k	Offset frequency of worst value acquired by l 99999.999 is returned for out of target.
k	Offset frequency section
Range	1, 2, 3, 4, 5

Details

For the offset frequency points, refer to Table 2.4-1 “Spurious Emissions Specifications (1)” and Table 2.4-2 “Spurious Emissions Specifications (2)”.

Example of Use

To query the margin level from the template for the worst value and frequency of the spectrum in each lower frequency range in band class 6:

SEMMARGIN_LOWER?

>6,1.000,20.00,1.000,21.00,2.000,22.00,2.000,23.00,3.000,24.00

SEMMARGIN_UPPER?

Spurious Emissions Template Margin (Upper)

Function

Queries the margin level from the template and frequency for the worst value of the spectrum in each upper frequency range

Query

```
SEMMARGIN_UPPER?
```

Response

bc,f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4,f_5,l_5

l_k		
	Unit	dB
	Resolution	0.01 dB
f_k		
	Unit	MHz
	Resolution	0.001 MHz

Parameters

bc		Band Class
	Range	0 to 16, 18 to 21
l_k		Margin level for the worst value among offset frequency section k Returns 999.99 if it does not meet the condition.
f_k		The offset frequency of the worst value obtained with l Returns 99999.999 if it does not meet the condition.
k		Offset frequency section
	Range	1, 2, 3, 4, 5

Details

For the offset frequency points, refer to Table 2.4-1 “Spurious Emissions Specifications (1)” and Table 2.4-2 “Spurious Emissions Specifications (2)”.

Example of Use

To query the margin level from the template and frequency for the worst value of the spectrum in each upper frequency range of the band class 6

SEMMARGIN_UPPER?

>6,1.000,20.00,1.000,21.00,2.000,22.00,2.000,23.00,3.000,24.00

SPR_SET

Spurious Emissions Enable and Count

Function

Enables Spurious Emission measurement and sets or queries measurement count

Command

```
SPR_SET on_off[,count]
```

Query

```
SPR_SET?
```

Response

on_off,count

Parameters

on_off	Enables/disables
ON	Enables measurement
OFF	Disables measurement
Default	OFF
count	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable Spurious Emission measurement and set the measurement count to 10:

SPR_SET ON,10

SPR_SET?

>ON,10

TAU?

Time Error Result

Function

Queries Time Error measurement result

Query

```
TAU? mode
```

Response

When mode = TTL

avg,max,min

When mode = other than TTL

time

Unit	µs
Resolution	0.01 µs

Parameters

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

Example of Use

To query the Time Error measurement result average:

TAU? AVG

>0.01

TAU_WORST?

Worst Time Error Result

Function

Queries worst value of Time Error measurement result

Query

```
TAU_WORST?
```

Response

time

Unit	μs
Resolution	0.01 μs

Parameter

time	Worst value of Time Error

Example of Use

To query the worst value of the Time Error measurement result:

TAU_WORST?

>0.01

TXFREQ

Input Frequency (Rev.)

Function

Sets or queries Reverse Link center frequency

Command

```
TXFREQ freq
```

Query

```
TXFREQ?
```

Response

freq

Unit	Hz

Parameter

freq	Input Frequency (Rev.)
Range	400.000000 to 3800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (used Hz when omitted)
Default	828.660000 MHz

Details

The input frequency is changed to a value determined by the combination of the Band Class and channel after the channel number is changed.
Changing the input frequency does not change the channel number.

Example of Use

To set the Reverse Link center frequency to 828.66 MHz:
TXFREQ 828.66MHZ
TXFREQ?
>828660000

TXPWR?

Tx Power Result

Function

Queries Tx power measurement result

Query

```
TXPWR? mode
```

Response

When mode = TTL

avg,max,min

When mode = AVG,MAX,MIN or DVT

pwr

When mode = IND,

s,pwr(1), pwr(2),…, pwr(s)

Unit	dBm
Resolution	0.01 dB

Parameters

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

Example of Use

To query the Tx power measurement result average, maximum, and minimum:

TXPWR? TTL

>-10.05,-9.60,-10.50

WAVEFMEAS?

Waveform

Function

Queries waveform data for each measurement result

Query

```
WAVEFMEAS? format,position,length[,wl]
```

Response

data[0],data[1],data[2],…,data[length–1]

When format = 2, 3, or 4

Unit	dBm
Resolution	0.01 dB

When format = 1, 5 or 6

Unit	dB
Resolution	0.01 dB

Parameters

format	Format	
1	OBW Wave Data	
2	Spurious Emissions Wave Data (RB 30 kHz)	
3	Spurious Emissions Wave Data (RB 1 MHz)	
4	Spurious Emissions Wave Data (RB 1.23 MHz)	
5	Code Domain Power Wave Data (I)	
6	Code Domain Power Wave Data (Q)	
position	Starting point of waveform data	
Range	When format = 1,	0 to 620 (–1.5 to 1.5 MHz)
	When format = 2, 3, or 4,	0 to 1892 (–4.615 to 4.615 MHz)
	When format = 5 or 6,	0 to (wl–1)
Resolution	1	
length	Number data read	
Range	When format = 1,	1 to (621–position)
	When format = 2, 3, or 4,	1 to (1893–position)
	When format = 5 or 6,	1 to (wl–position)
Resolution	1	
wl	Walsh Code Length	
Range	2, 4, 8, 16	
data[length–1]	Waveform data	

Details

wl cannot be set when format is 1 to 4. (An error is returned at input.)

wl cannot be omitted when format is 5 or 6. (An error is returned if it is omitted.)

Example of Use

To query the Code Domain Power Q phase measurement result waveform data:

WAVEFMEAS? 6,0,8,8

>0.10,0.11,0.12,0.13,0.14,0.15,0.16,0.17

5.2.3 Sequence measurement commands

DLFREQ

Downlink Frequency

Function

Sets or queries downlink frequency of MU887000A

Command

```
DLFREQ dl_freq
```

Query

```
DLFREQ?
```

Response

dl_fleq

Unit	Hz

Parameter

dl_freq	Downlink frequency
Range	400.000000 to 3800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	2140.000000 MHz

Details

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

Example of Use

To set the Downlink Frequency to 2050 MHz:
DLFREQ 2050MHZ
DLFREQ?
> 2050000000

EVDO_BAND

Band Class for Spurious Emissions Limit

Function

Sets or queries band class to determine Spurious Emissions Limit range in the Sequence Measurement mode

Command

```
EVDO_BAND mcond,band
```

Query

```
EVDO_BAND? mcond
```

Response

band

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
band	Band class
Range	0 to 16, 18 to 21
Resolution	1
Default	0

Details

This parameter sets the band class determining the Spurious Emissions Limit range.

Example of Use

To set the band class determining the Spurious Emissions Limit range to 10 in the Sequence Measurement mode with measurement condition number 3:

EVDO_BAND 3,10

EVDO_BAND? 3

>10

Remarks

Use the following command to set the band class to determine the frequency.

```
BANDCLASS
```

EVDO_CDP_ACK?

ACK Channel Power

Function

Queries Reverse ACK Channel Power measurement result in the Sequence Measurement mode

Query

```
EVDO_CDP_ACK? seg,mode[,unit]
```

Response

When mode = TTL

avg,max,min

When mode = other than TTL

pwr

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
unit	Query Unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when unit omitted)
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pwr	Measurement result in specified Storage mode

Example of Use

To query the ACK Channel Power measurement result average value for segment number 3 in the Sequence Measurement mode:

EVDO_CDP_ACK? 3,AVG

>0.01

EVDO_CDP_AUX?

Auxiliary Pilot Channel Power

Function

Queries Reverse Auxiliary Pilot Channel Power measurement result in Sequence Measurement mode

Query

```
EVDO_CDP_AUX? seg,mode[,unit]
```

Response

When mode = TTL

avg,max,min

When mode = other than TTL

pwr

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
unit	Query Unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot) (uses Ior when unit omitted)
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pwr	Measurement result in specified Storage mode

Details

A valid data is acquired only when the Protocol Revision is Rev. A.

Example of Use

To query the Auxiliary Pilot Channel Power measurement result average value for segment

number 3 in the Sequence Measurement mode:
EVDO_CDP_AUX? 3,AVG
>0.01

EVDO_CDP_DATA?

DATA Channel Power

Function

Queries Reverse DATA Channel Power measurement result in Sequence Measurement mode

Query

```
EVDO_CDP_DATA? seg,mode[,unit]
```

Response

When mode = TTL

avg,max,min

When mode = other than TTL

pwr

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
unit	Query Unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when unit omitted)
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pwr	Measurement result in specified Storage mode

Example of Use

To query the average value of the DATA Channel Power measurement result segment number 3 in the Sequence Measurement mode:

EVDO_CDP_DATA? 3,AVG

>0.01

EVDO_CDP_DRC?

DRC Channel Power

Function

Queries Reverse DRC Channel (Data Rate Channel) Power measurement result in Sequence Measurement mode

Query

```
EVDO_CDP_DRC? seg,mode[,unit]
```

Response

When mode = TTL

avg,max,min

When mode = other than TTL

pwr

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
unit	Query Unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when unit omitted)
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pwr	Measurement result in specified Storage mode

Example of Use

To query the DRC Channel Power measurement result average value for segment number 3 in the Sequence Measurement mode:

EVDO_CDP_DRC? 3,AVG

>0.01

EVDO_CDP_DSC?

DSC Channel Power

Function

Queries Reverse DSC Channel (Data Source Channel) Power measurement result in Sequence Measurement mode

Query

```
EVDO_CDP_DSC? seg,mode[,unit]
```

Response

When mode = TTL

avg,max,min

When mode = other than TTL

pwr

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
unit	Query Unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when unit omitted)
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pwr	Measurement result in specified Storage mode

Details

A valid data is acquired only when the protocol Revision is Rev. A.

Example of Use

To query the DSC Channel Power measurement result average value for segment number 3 in the Sequence Measurement mode:

EVDO_CDP_DSC? 3,AVG

>0.01

EVDO_CDP_PILOT?

R-PICH Power

Function

Queries R-PICH (Reverse Pilot Channel) Power measurement result in Sequence Measurement mode

Query

```
EVDO_CDP_PILOT? seg,mode
```

Response

When mode = TTL
avg,max,min
When mode = other than TTL
pwr

Unit	dB/Ior
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average･Maximum･Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pwr	Measurement result in specified Storage mode

Example of Use

To query the R-PICH power measurement result average in segment number 3 in the Sequence Measurement mode:

EVDO_CDP_PILOT? 3,AVG
>0.01

EVDO_CDP_RRI?

RRI Channel Power

Function

Queries Reverse RRI Channel (Reverse Rate Indicator Channel) Power measurement result in Sequence Measurement mode

Query

```
EVDO_CDP_RRI? seg,mode[,unit]
```

Response

When mode = TTL

avg,max,min

When mode = other than TTL

pwr

Unit	Depends on parameter unit
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
unit	Query Unit
IOR	Ior (Total Power) reference value (dB/Ior)
PILOT	Pilot Channel reference value (dB/Pilot)
	(uses Ior when unit omitted)
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pwr	Measurement result in specified Storage mode

Example of Use

To query the RRI Channel Power measurement result average value for segment number 3 in the Sequence Measurement mode:

EVDO_CDP_RRI? 3,AVG

>0.01

EVDO_CDP_SET

Code Domain Power Enable and Count

Function

Enables Modulation Analysis Code Domain Power Measurement and sets or queries measurement count in Sequence Measurement mode

Command

```
EVDO_CDP_SET mcond,on_off[,count]
```

Query

```
EVDO_CDP_SET? mcond
```

Response

on_off,count

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
on_off	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
count	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable the Code Domain Power measurement and set the measurement count to 10 in the Sequence Measurement mode with measurement condition number 3:

EVDO_CDP_SET 3,ON,10
EVDO_CDP_SET? 3
>ON,10

EVDO_CFERR?

Carrier Frequency Error Result

Function

Queries Carrier Frequency Error measurement result in Sequence Measurement mode

Query

```
EVDO_CFERR? seg,mode
```

Response

When mode = TTL

avg_ppm,avg_Hz,max_ppm,max_Hz,min_ppm,min_Hz

When mode = other than TTL

freq_ppm,freq_Hz

xxx_ppm	
Unit	ppm
Resolution	0.01 ppm
xxx_Hz	
Unit	Hz
Resolution	0.1 Hz

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg_ppm	Measurement result in ppm (Average)
avg_Hz	Measurement result in Hz (Average)
max_ppm	Measurement result in ppm (Maximum)
max_Hz	Measurement result in Hz (Maximum)
min_ppm	Measurement result in ppm (Minimum)
min_Hz	Measurement result in Hz (Minimum)
freq_ppm	Measurement result in ppm in specified Storage mode
freq_Hz	Measurement result in Hz in specified Storage mode

Example of Use

To query the Carrier Frequency Error measurement result average in segment number 3 in

the Sequence Measurement mode:
EVDO_CFERR? 3,AVG
>0.50,431.1

EVDO_CFERR_WORST?

Worst Carrier Frequency Error Result

Function

Queries worst value of Carrier Frequency Error measurement result in the Sequence Measurement mode

Query

```
EVDO_CFERR_WORST? seg
```

Response

freq_ppm,freq_Hz

freq_ppm	
Unit	ppm
Resolution	0.01 ppm
freq_Hz	
Unit	Hz
Resolution	0.1 Hz

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
freq_ppm	Worst value in frequency error measurement results in ppm
freq_Hz	Worst value in frequency error measurement results in Hz

Example of Use

To query the worst value in the Carrier Frequency Error measurement result in segment number 3 in the Sequence Measurement mode:
EVDO_CFERR_WORST? 3
>1.00,862.2

EVDO_CFREQ?

Carrier Frequency Result

Function

Queries Carrier Frequency measurement result in Sequence Measurement mode

Query

```
EVDO_CFREQ? seg
```

Response

freq

Unit	Hz
Resolution	1 Hz

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
freq	Carrier frequency

Example of Use

To query the Carrier Frequency measurement result in segment number 3 in the Sequence Measurement mode:

EVDO_CFREQ? 3

>862200000

EVDO_EVM?

EVM Result

Function

Queries EVM measurement result in Sequence Measurement mode

Query

`EVDO_EVM? seg,mode`

Response

When mode = TTL

avg,max,min

When mode = other than TTL

evm

Unit	%
Resolution	0.01%

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
evm	Measurement result in specified Storage mode

Example of Use

To query the EVM measurement result average in segment number 3 in the Sequence Measurement mode:

EVDO_EVM? 3,AVG

>0.01

EVDO_FILTPWR?

Filtered Power Result

Function

Queries Filtered Power measurement result in Sequence Measurement mode

Query

```
EVDO_FILTPWR? seg,mode
```

Response

When mode = TTL

avg,max,min

When mode = AVG, MAX, MIN or DVT

pwr

When mode = IND,

s,pwr(1), pwr(2),..., pwr(s)

Unit	dBm
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	Value at each measurement
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pwr	Measurement result in specified Storage mode
pwr(s)	Power of sth measurement
s	Measurement count
Range	1 to 200

Example of Use

To query the Filtered Power measurement result average, maximum, and minimum in segment number 3 in the Sequence Measurement mode:

EVDO_FILTPWR? 3,TTL

>-10.05,-9.60,-10.50

EVDO_LSCODESEARCH

Long Span Code Search

Function

Enables and queries Long Span Code Search function in Sequence Measurement mode

Command

```
EVDO_LSCODESEARCH on_off
```

Query

```
EVDO_LSCODESEARCH?
```

Response

on_off

Parameter

on_off	Enables/disables Long Span Code Search
ON	Enables Long Span Code Search
OFF	Disables Long Span Search
Default	OFF

Details

Set this parameter to OFF when the Reverse Link and Forward Link signals are synchronized; set it to ON when they are not synchronized.

Example of Use

To enable the Long Span Code Search in the Sequence Measurement mode:

EVDO_LSCODESEARCH ON

EVDO_LSCODESEARCH?

>ON

EVDO_MAGERR?

Magnitude Error Result

Function

Queries Magnitude Error measurement result in Sequence Measurement mode

Query

```
EVDO_MAGERR? seg,mode
```

Response

When mode = TTL
avg,max,min
When mode = other than TTL
merr

Unit	%
Resolution	0.01%

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
merr	Measurement result in specified Storage mode

Example of Use

To query the Magnitude Error measurement result average in segment number 3 in the Sequence Measurement mode:
EVDO_MAGERR? 3,AVG
>0.01

EVDO_MAXINACTCODE?

Max Inactive Channel Power

Function

Queries channel outputting maximum power among inactive code channels, and power measurement result in Sequence Measurement mode

Query

```
EVDO_MAXINACTCODE? seg
```

Response

pwr,ph,wn,wl

pwr	
Unit	dB
wn	
Unit	None
wl	
Unit	None

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
pwr	Max Inactive Channel Power
Resolution	0.01 dB
ph	Phase (I/Q) of target channel
I	I-phase
Q	Q-phase
wn	Walsh Code Number of target channel
Resolution	1
wl	Walsh Code Length of target channel
Resolution	1

Details

When executing more than two measurements using a single measurement start, the result of the last measurement is returned for (Meas. Count $\geq$ 2).

Example of Use

To query the channel outputting the maximum power among inactive code channels and the power measurement result in segment number 3 in the Sequence Measurement mode:

EVDO_MAXINACTCODE? 3

>3.00,Q,2,8

EVDO_MEAS_OFF

Turn Off All Measurement Items

Function

Sets all measurement items to Off collectively.

Command

```
EVDO_MEAS_OFF mcond
```

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1

Example of Use

To set all measurement items of condition number 0 in the sequence measurement to Off.

EVDO_MEAS_OFF 0

Remarks

This is equivalent to setting all the commands below to Off.

EVDO_PWR_SET
EVDO_OBW_SET
EVDO_SPR_SET
EVDO_MOD_SET
EVDO_CDP_SET

EVDO_MOD_SET

Modulation Analysis Enable and Count

Function

Enables Modulation Analysis Measurement and sets or queries measurement count in Sequence Measurement mode

Command

```
EVDO_MOD_SET mcond,on_off[,count]
```

Query

```
EVDO_MOD_SET? mcond
```

Response

on_off,count

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
on_off	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
count	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable the Modulation Analysis measurement in the Sequence Measurement mode with the measurement condition number 3 and set the measurement count to 10:

EVDO_MOD_SET 3,ON,10

EVDO_MOD_SET? 3

>ON,10

EVDO_OBW?

OBW Result

Function

Queries Occupied Bandwidth measurement result in Sequence Measurement mode

Query

```
EVDO_OBW? seg
```

Response

bw

Unit	MHz
Resolution	1 kHz

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
bw	Occupied Bandwidth [MHz]

Example of Use

To query the Occupied Bandwidth measurement result in segment number 3 in the Sequence Measurement mode:

EVDO_OBW? 3

> 0.100

EVDO_OBWFREQ?

OBW Frequency Result

Function

Queries upper, lower, and center frequencies of Occupied Bandwidth measurement result in Sequence Measurement mode

Query

```
EVDO_OBWFREQ? seg,pos
```

Response

freq

Unit	MHz
Resolution	1 kHz

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
pos	Offset type
UPPER	Upper frequency
LOWER	Lower frequency
CENTER	Center frequency
freq	Offset frequency [MHz]

Example of Use

To query the Occupied Bandwidth measurement center frequency result in segment number 3 in the Sequence Measurement mode:

EVDO_OBWFREQ? 3,CENTER

>862.200

EVDO_OBW_RATIO

Occupied Bandwidth Ratio

Function

Sets or queries Occupied Bandwidth measurement occupation ratio in Sequence Measurement mode

Command

```
EVDO_OBW_RATIO ratio
```

Query

```
EVDO_OBW_RATIO?
```

Response

ratio

Parameter

ratio	Occupied Bandwidth occupation ratio
Range	80.0 to 99.9%
Resolution	0.1%
Suffix code	% (uses % when omitted)
Default	99.0%

Example of Use

To set the Occupied Bandwidth occupation ratio to 99.0% in the Sequence Measurement mode:

EVDO_OBW_RATIO 99.0

EVDO_OBW_RATIO?

>99.0

EVDO_OBW_SET

Occupied Bandwidth Enable and Count

Function

Enables Occupied Bandwidth measurement and sets or queries measurement count in Sequence Measurement mode

Command

```
EVDO_OBW_SET mcond,on_off[,count]
```

Query

```
EVDO_OBW_SET? mcond
```

Response

on_off,count

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
on_off	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF
count	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable the Occupied Bandwidth measurement and set the measurement count to 10 in the Sequence Measurement mode with measurement condition number 3:

EVDO_OBW_SET 3,ON,10

EVDO_OBW_SET? 3

>ON,10

EVDO_ORGNOFS?

Origin Offset Result

Function

Queries Origin Offset measurement result in the Sequence Measurement mode

Query

```
EVDO_ORGNOFS? seg,mode
```

Response

When mode = TTL

avg,max,min

When mode = other than TTL

origin

Unit	dB
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
origin	Measurement result in specified Storage mode

Example of Use

To query the Origin Offset measurement result average in segment number 3 in the Sequence Measurement mode:

EVDO_ORGNOFS? 3,AVG

>0.01

EVDO_PEVM?

Peak EVM Result

Function

Queries Peak EVM measurement result in Sequence Measurement mode

Query

```
EVDO_PEVM? seg,mode
```

Response

When mode = TTL
avg,max,min
When mode = other than TTL
pevm

Unit	%
Resolution	0.01%

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pevm	Measurement result in specified Storage mode

Example of Use

To query the Peak EVM measurement result average in segment number 3 in the Sequence Measurement mode:

EVDO_PEVM? 3,AVG
>0.01

EVDO_PHASEERR?

Phase Error Result

Function

Queries Phase Error measurement result in Sequence Measurement mode

Query

```
EVDO_PHASEERR? seg,mode
```

Response

When mode = TTL

avg,max,min

When mode = other than TTL

perr

Unit	degree
Resolution	0.01 degree

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
perr	Measurement result in specified Storage mode

Example of Use

To query the Phase Error measurement result average in segment number 3 in the Sequence Measurement mode:

EVDO_PHASEERR? 3,AVG

>0.01

EVDO_PREV

Protocol Revision

Function

Sets or queries Protocol Revision

Command

```
EVDO_PREV rev
```

Query

```
EVDO_PREV?
```

Response

rev

Parameter

rev	Protocol Revision
REV0	Rev.0
REVA	Rev.A
Default	REV0

Example of Use

To set Protocol Revision to Rev.0:

EVDO_PREV REV0

EVDO_PREV?

>REV0

EVDO_PSIZE

Data Channel Payload Size

Function

Sets or queries Data Channel Payload Size

Command

```
EVDO_PSIZE size
```

Query

```
EVDO_PSIZE?
```

Response

size

Unit	kbps

Parameter

size	Data channel payload size
Range	128,256,512,768,1024,1536,2048,3072,4096,6144,8192,12288
Suffix code	None
Default	128

Details

This is only enabled when the Protocol Revision is Rev. A.

Example of Use

To set Data Channel Payload Size to 128 kbps:

EVDO_PSIZE 128

EVDO_PSIZE?

>128

EVDO_PWR_SET

Tx Power Measurement Enable and Count

Function

Enables Tx power measurement and sets or queries measurement count in the Sequence Measurement mode

Command

```
EVDO_PWR_SET mcond,on_off[,count]
```

Query

```
EVDO_PWR_SET? mcond
```

Response

on_off,count

Parameters

mcond	Measurement Condition Number
Range	0 to 1999
Resolution	1
on_off	Turns on or off the measurement
ON	Executes the measurement
OFF	Does not execute the measurement
Default	ON
count	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable Tx power measurement and set the measurement count to 10 in the Sequence Measurement mode with measurement condition number 3:

EVDO_PWR_SET 3,ON,10

EVDO_PWR_SET? 3

>ON,10

EVDO_RHO?

Rho Result

Function

Queries Rho (waveform quality) measurement result in Sequence Measurement mode

Query

```
EVDO_RHO? seg,mode
```

Response

When mode = TTL

avg,max,min

When mode = other than TTL

rho

Unit	None
Resolution	0.00001

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
rho	Measurement result in specified Storage mode

Example of Use

To query the Rho measurement result average in segment number 3 in the Sequence Measurement mode:

EVDO_RHO? 3,AVG

>0.00100

EVDO_SEM?

Spurious Emissions Judgement

Function

Queries judgement whether or not Spurious Emissions within template in Sequence Measurement mode

Query

```
EVDO_SEM? seg
```

Response

judgement

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
judgement	Judgement
PASS	Pass
FAIL	Fail

Example of Use

To query the Spurious Emissions judgement result in segment number 3 in the Sequence Measurement mode:

EVDO_SEM? 3

>PASS

EVDO_SEMLVL_LOWER?

Spurious Emissions Peak Value (Lower)

Function

Queries worst level and frequency of spectrum in each lower frequency range in Sequence Measurement mode

Query

```
EVDO_SEMLVL_LOWER? seg
```

Response

bc,f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4,f_5,l_5

l_k	
Unit	dBc or dBm
Resolution	0.01 dB
f_k	
Unit	MHz
Resolution	0.001 MHz

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
bc	Band Class
Range	0 to 16, 18 to 21
l_k	Worst level at offset frequency section k 999.99 is returned for out of target.
f_k	Offset frequency for worst value acquired by l 99999.999 is returned for out of target.
k	Offset frequency section
Range	1, 2, 3, 4, 5

Details

For the offset frequency points, refer to Table 2.4-1 “Spurious Emissions Specifications (1)” and Table 2.4-2 “Spurious Emissions Specifications (2)”.

Example of Use

To query the worst value level and frequency of the spectrum in each lower frequency range in band class 6 and segment number 3 in the Sequence Measurement mode:

EVDO_SEMLVL_LOWER? 3

>6,1.000,-43.21,1.000,-54.32,2.000,-65.43,2.000,-76.54,3.000,-87.65

EVDO_SEMLVL_UPPER?

Spurious Emissions Peak Value (Upper)

Function

Queries worst level and frequency of spectrum in each upper frequency range in Sequence Measurement mode

Query

```
EVDO_SEMLVL_UPPER? seg
```

Response

bc,f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4,f_5,l_5

l_k	
Unit	dBc or dBm
Resolution	0.01 dB
f_k	
Unit	MHz
Resolution	0.001 MHz

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
bc	Band Class
Range	0 to 16, 18 to 21
l_k	Worst level at offset frequency section k 999.99 is returned for out of target.
f_k	Offset frequency for worst value acquired by l 99999.999 is returned for out of target.
k	Offset frequency section
Range	1, 2, 3, 4, 5

Details

For the offset frequency points, refer to Table 2.4-1 “Spurious Emissions Specifications (1)” and Table 2.4-2 “Spurious Emissions Specifications (2)”.

Example of Use

To query the worst value level and frequency of the spectrum in each upper frequency range in band class 6 and segment number 3 in the Sequence Measurement mode:

EVDO_SEMLVL_UPPER? 3

>6,1.000,-43.21,1.000,-54.32,2.000,-65.43,2.000,-76.54,3.000,-87.65

EVDO_SEMMARGIN_LOWER?

Spurious Emissions Template Margin (Lower)

Function

Queries margin level from template for worst value and frequency of spectrum in each lower frequency range in Sequence Measurement mode

Query

```
EVDO_SEMMARGIN_LOWER? seg
```

Response

bc,f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4,f_5,l_5

l_k	
Unit	dB
Resolution	0.01 dB
f_k	
Unit	MHz
Resolution	0.001 MHz

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
bc	Band Class
Range	0 to 16, 18 to 21
l_k	Margin level for worst value at offset frequency section k 999.99 is returned for out of target.
f_k	Offset frequency of worst value acquired by l 99999.999 is returned for out of target.
k	Offset frequency section
Range	1, 2, 3, 4, 5

Details

For the offset frequency points, refer to Table 2.4-1 “Spurious Emissions Specifications (1)” and Table 2.4-2 “Spurious Emissions Specifications (2)”.

Example of Use

To query the margin level from the template for worst value and frequency of the spectrum in each lower frequency range in band class 6 in the Sequence Measurement mode:

EVDO_SEMMARGIN_LOWER? 3

>6,1.000,20.00,1.000,21.00,2.000,22.00,2.000,23.00,3.000,24.00

EVDO_SEMMARGIN_UPPER?

Spurious Emissions Template Margin (Upper)

Function

Queries margin level from template for worst value and frequency of spectrum in each upper frequency range in Sequence Measurement mode

Query

```
EVDO_SEMMARGIN_UPPER? seg
```

Response

bc,f_1,l_1,f_2,l_2,f_3,l_3,f_4,l_4,f_5,l_5

l_k
- Unit: dB
- Resolution: 0.01 dB

f_k
- Unit: MHz
- Resolution: 0.001 MHz

Parameters

seg		Segment number
	Range	0 to 1999
	Resolution	1
bc		Band Class
	Range	0 to 16, 18 to 21
l_k		Margin level for worst value at offset frequency section k 999.99 is returned for out of target.
f_k		Offset frequency of worst value acquired by l 99999.999 is returned for out of target.
k		Offset frequency section
	Range	1, 2, 3, 4, 5

Details

For the offset frequency points, refer to Table 2.4-1 “Spurious Emissions Specifications (1)” and Table 2.4-2 “Spurious Emissions Specifications (2)”.

Example of Use

To query the margin level from the template for worst value and frequency of the spectrum in each lower frequency range in band class 6 in the Sequence Measurement mode:

EVDO_SEMMARGIN_UPPER? 3

>6,1.000,20.00,1.000,21.00,2.000,22.00,2.000,23.00,3.000,24.00

EVDO_SPR_SET

Spurious Emissions Enable and Count

Function

Enables Spurious Emission measurement and sets or queries measurement count in Sequence Measurement mode

Command

```
EVDO_SPR_SET mcond,on_off[,count]
```

Query

```
EVDO_SPR_SET? mcond
```

Response

on_off,count

Parameters

mcond	Measurement Condition Number
Range	0 to 1999
Resolution	1
on_off	Enables/disables
ON	Enables measurement
OFF	Disables measurement
Default	OFF
count	Measurement count
Range	1 to 200
Resolution	1
Suffix code	None
Default	1

Example of Use

To enable the Spurious Emissions measurement and set the measurement count to 10 in the Sequence Measurement mode with the measurement condition number 3:

EVDO_SPR_SET 3,ON,10

EVDO_SPR_SET? 3

>ON,10

EVDO_TAU?

Time Error Result

Function

Queries Time Error measurement result in Sequence Measurement mode

Query

```
EVDO_TAU? seg,mode
```

Response

When mode = TTL

avg,max,min

When mode = other than TTL

time

Unit	μs
Resolution	0.01 μs

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
time	Measurement result in specified Storage mode

Example of Use

To query the Time Error measurement result average for segment number 3 in the Sequence Measurement mode:

EVDO_TAU? 3,AVG

>0.01

EVDO_TAU_WORST?

Worst Time Error Result

Function

Queries worst value of Time Error measurement result in Sequence Measurement mode

Query

```
EVDO_TAU_WORST? seg
```

Response

time

Unit	µs
Resolution	0.01 µs

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
time	Worst value of Time Error

Example of Use

To query the worst value of the Time Error measurement result for segment number 3 in the Sequence Measurement mode:

EVDO_TAU_WORST? 3

>0.01

EVDO_TXPWR?

Tx Power Result

Function

Queries Tx power measurement result in Sequence Measurement mode

Query

```
EVDO_TXPWR? seg,mode
```

Response

When mode = TTL

avg,max,min

When mode = AVG, MAX, MIN or DVT

pwr

When mode = IND,

s,pwr(1), pwr(2),..., pwr(s)

Unit	dBm
Resolution	0.01 dB

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	The value in each measurement
avg	Measurement result (Average)
max	Measurement result (Maximum)
min	Measurement result (Minimum)
pwr	Measurement result in specified Storage mode
pwr(s)	Power of sth measurement
s	Measurement count
Range	1 to 200

Example of Use

To query the Tx power measurement result average, maximum, and minimum for segment number 3 in the Sequence Measurement mode:

EVDO_TXPWR? 3,TTL

>-10.05,-9.60,-10.50

ILVL

Input Level

Function

Sets or queries input level of MU887000A connector

Command

```
ILVL level
```

Query

```
ILVL?
```

Response

level

Unit	dBm

Parameter

level	Input level
Range	–65.0 to +35.0 dBm (Port 1/Port 2)
	–65.0 to +25.0 dBm (Port 3/Port 4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–23.7 dBm

Details

The setting range varies with input port setting.
When the Cable Loss Calibration is ON, the cable loss is added to the input level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –60.0 to +40.0 dBm.

Example of Use

To set the input level to –10.0 dBm:
ILVL -10.0
To query the set input level
ILVL?
>-10.0

Related Commands

EXTLOSSW
LOSSTBL
LOSSTBLVAL
For details of the commands, refer to Chapter 6 “Native Command Reference” in the *MU887000A TRX Test Module Operation Manual.*

OLVL

Output Level

Function

Sets or queries RF output level

Command

```
OLVL level
```

Query

```
OLVL?
```

Response

level

Unit	dBm

Parameter

level	Output level
Range	–130.0 to –10.0 dBm (Port 1/Port 2)
	–120.0 to 0.0 dBm (Port 3/Port 4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–55.0 dBm

Details

The setting range varies with the input port setting.
When the Cable Loss Calibration is ON, the cable loss is subtracted from the output level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –135.0 to –15.0 dBm.

Example of Use

To set the output level to –50.0 dBm:
OLVL -50.0
OLVL?
>-50.0

Related Commands

EXTLOSSW
LOSSTBL
LOSSTBLVAL
For details of the commands, refer to Chapter 6 “Native Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

RXFREQ

Output Frequency (Fwd)

Function

Sets or queries Forward Link center frequency

Command

```
RXFREQ freq
```

Query

```
RXFREQ?
```

Response

freq

Unit	Hz

Parameter

freq	Output Frequency (Fwd.)
Range	400.000000 to 3800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	873.660000 MHz

Detail

The input frequency is changed to a value determined by the combination of the Band Class and channel after the channel number is changed.
Changing the output frequency does not change the channel number.

Example of Use

To set the Forward Link Frequency to 873.66 MHz:
RXFREQ 873.66MHZ
RXFREQ?
>873660000

SEQCTRL

Sequence Control Parameter - Sequence Control

Function

Sets or queries start and stop segments in sequence table.
Sets the parameters for both measurement and signal transmission.

Command

```
SEQCTRL start,end
```

Query

```
SEQCTRL?
```

Response

start,end

Parameters

start	Start segment
Range	0 to 1999
Resolution	1
Default	0
end	Stop segment
Range	start to 1999
Resolution	1
Default	199

Details

Start = 0 to 1999, end = 0 to 1999 where end ≥ start
Whether the set sequence table can be executed is evaluated. Use the SEQERR? command to query the error details.

Example of Use

To set the start segment to 20 and the stop segment to 55:
SEQCTRL 20,55
SEQCTRL?
> 20,55

SEQCTRLTX

Sequence Control Parameter - Sequence Control

Function

Sets or queries start and stop segments in sequence table.
Sets the measurement parameters only, without affecting the signal transmission parameters.

Command

```
SEQCTRLTX start,end
```

Query

```
SEQCTRLTX?
```

Response

```
start,end
```

Parameters

start	Start segment
Range	0 to 1999
Resolution	1
Default	0
end	Stop segment
Range	start to 1999
Resolution	1
Default	0

Details

Start = to 1999, end = 0 to 1999 where end ≥ start
Whether the set sequence table can be executed is evaluated. Use the SEQERR? command to query the error details.

Examples of Use

To set the start and stop segments to 20 and 55, respectively:
SEQCTRLTX 20,55
SEQCTRLTX?
> 20,55

SEQERR?

Sequence Parameter Information - Error Check

Function

Queries error status of sequence table

Query

```
SEQERR? [item]
```

Response

Query parameter	Response
None:	n,err(0),..,err(n–1)
ILVL,OLVL,STEP, DLPAT, PORT:	ns,seg(0),..,seg(ns–1)
LEN:	e,mem,exe,set
OLVLNUM, PATNUM, STDNUM:	e,exe,set

In case of no error in the sequence table, the response is 0.

Parameters

item	Parameter in sequence table	
ILVL	Input level	
OLVL	Output level	
STEP	Step count	
DLPAT	Waveform Pattern	
PORT	Port	
LEN	Capture memory length	
OLVLNUM	Output level change count	
PATNUM	Waveform pattern change count	
STDNUM	Measurement mode change count	
n	Number of errors	
Range	0 to 4	
err(n–1)	Parameter with error	
ILVL	Input level	
OLVL	Output level	
STEP	Step count	
LEN	Capture memory length	
ns	Number of segments with errors	
Range	0 to 2000	
seg(ns–1)	Segment number with errors	
Range	0 to 1999	
e	Presence of errors	
Range	0	No error, executable
	1	Errors found, not executable
mem	Memory occupation ratio	

	Range	0.0 to 100.0%
	Resolution	0.1%
ex		Number of capture executable segments in number of configured segments
	Range	0 to 2000
set		Number of segments with capture configured
	Range	0 to 2000

Details

This command can check error presence of input level, output level, step count, and capture memory length.

To query error presence of the following parameters, use SEQERR2? command.

Waveform pattern, port, output level change count, waveform pattern change count, measurement mode change count.

To set parameters for sequence table using the following commands, errors are not checked.

SEQTRX, SEQTX, SEQMEAS

Example of Use

To query the presence of errors:

SEQERR?

>1,ILVL

To query the error information of input level

SEQERR? ILVL

>2,3,12

To query the input level setting error information:

SEQERR? LEN

>0,25.0,20,20

Here, the capture memory utilization is 25.0%, so all captures configured in 20 segments are executable.

Remarks

The Sequence Measurement mode cannot be started if there is an error.

However, the sequence can be started by using the SEQCTRL command to detect any segment with an error and exclude it from the executable range.

SEQERR2?

Sequence Parameter Information - Error Check

Function

Queries setting error information of sequence table

Query

```
SEQERR2? format
```

Response

n,err(0),..,err(n-1)

If no error is found in the sequence table, the response returns 0.

Parameters

format	Format
1	Error check 1
n	Number of errors
Range	0 to 7
err(n-1)	Parameter with errors
ILVL	Input level
OLVL	Output level
STEP	Step count
DLPAT	Waveform Pattern
PORT	Port
LEN	Capture memory length
OLVLNUM	Output level change count
PATNUM	Waveform pattern change count
STDNUM	Measurement mode change count

Details

Parameter setting errors can be checked up to seven types.

Only one of output level change count, waveform pattern change count, or measurement mode change count has an error.

Two or three of them cannot have an error simultaneously.

To set parameters for sequence table using the following commands, errors are not checked.

SEQTRX, SEQTX, SEQMEAS, SEQSGPORT

To query error details of each parameter, use SEQERR command.

Examples of Use

To query the presence of errors:

SEQERR2? 1

>2,ILVL,DLPAT

Remarks

Sequence measurement cannot be started if there are errors.
However, sequence measurement can be started if segment numbers with errors are excluded from the execution range using the SEQCTRL command.

SEQEXECTX

Start Signal Analyzer Measurement Only

Function

Sets only the parameters for the specified measurement and executes measurement, without affecting the signal transmission parameters.

Command

```
SEQEXECTX
```

SEQMEAS

Sequence Table Parameter - Measurement

Function

Sets or queries measurement conditions of specified segment

Command

```
SEQMEAS seg,mode,step,mcond
```

Query

```
SEQMEAS? seg
```

Response

mode,step,mcond

Parameters

seg	Segment number	
Range	0 to 1999	
mode	Measurement mode	Required software license
TXP	Transmit power measurement mode	MX887010A
WCDMA	W-CDMA measurement mode	MX887010A and MX887011A
GSM	GSM measurement mode	MX887010A and MX887012A
CDMA2K	CDMA2000 1x measurement mode	MX887010A and MX887015A
EVDO	CDMA2000 1xEVDO measurement mode	MX887010A and MX887016A
TDSCDMA	TD-SCDMA measurement mode	MX887010A and MX887017A
LTE	LTE measurement mode	MX887010A and MX887013A, or MX887010A and MX887014A
Default	TXP	
step	Step count	
Range	2 to 3000	
Resolution	1	
Default	2	
mcond	Measurement condition number	
Range	0 to 1999	
Resolution	1	
Default	0	

Details

To use the commands described in Chapter 3 Sequence Measurement, set the command parameter to EVDO.

Example of Use

To set measurement conditions for segment 1 as follows:

Measurement mode: EVDO, Step count: 100, Measurement condition number: 2

SEQMEAS 1,EVDO,100,2

SEQMEAS? 1

> EVDO,100,2

SEQMSTAT?

Sequence Measurement Status

Function

Queries status of Sequence Measurement execution

Query

```
SEQMSTAT?
```

Response

m_status,n,s(0),s(1),..,s(n−1)

Parameters

m_status	Measurement execution status
0	Measurement completed successfully
2	Over level
3	Under level
4	Measurement failed
5	Synchronization word not detected
9	Measurement in progress or not measured
12	Tx measurement timeout

The value received from MX887016A is 0, 2, 4, 5, 9, or 12.

n	Number of measured segments
Range	0 to 2000
s	Measurement status of specified segment
0	Measurement completed successfully
2	Over level
3	Under level
4	Measurement failed
5	Synchronization word not detected
9	Measurement in progress or not measured
10	Segment not measured
12	Tx measurement timeout

The value received from MX887016A is 0, 2, 4, 5, 9, 10, or 12.

Example of Use

To queries the status of the Sequence Measurement execution:

SEQMSTAT?

>2,6,0,0,0,0,2,0

The number of the measured segments is 6 and an over level error occurred in the fifth segment.

Related Command

MSTAT
SEQSEGSTAT

SEQPROGRESS?

Sequence Progress

Function

Queries progress ratio and executing sequence number in Sequence Measurement mode

Query

```
SEQPROGRESS?
```

Response

p,cur,start,end

Parameters

p	Progress ratio in Sequence Measurement mode
Range	0 to 100%
cur	Current segment number being executed
Range	0 to 1999
start	First segment number
Range	0 to 1999
stop	Last segment number
Range	0 to 1999

Example of Use

To query the progress ratio and executing sequence number in the Sequence Measurement mode:

SEQPROGRESS?
>65,23,11,30

Remarks

The first and last segment numbers are the same as the start and end segment numbers specified using the SEQCTRL command.

SEQREINIT

Sequence Control Parameter - Sequence End State Reinitialization

Function

Enables automatic initialization of following items at end of Sequence Measurement mode operation, and queries settings

- Forward Link frequency
- Output level
- Output signal pattern
- Reverse Link frequency
- Input level

Command

```
SEQREINIT sw
```

Query

```
SEQREINIT?
```

Response

sw

Parameter

sw	Automatic initialization after sequence measurement completion
ON	Resets target parameters
OFF	Holds last segment setting
Default	ON

Details

If the parameter is set to ON, the settings are initialized to the values configured by the following commands after sequence measurement completion.

Forward Link frequency	RXFREQ
Output level	OLVL
Output signal pattern	DLPAT
Reverse Link frequency	TXFREQ
Input level	ILVL

If the parameter is set to OFF, the settings remain those of the sequence measurement stop segment.

Example of Use

To set automatic initialization at the end of the Sequence Measurement mode operation:

SEQREINIT ON

SEQREINIT?

> ON

SEQSEGSTAT?

Specified Segment Status

Function

Queries measurement status of specified segment

Query

```
SEQSEGSTAT? seg
```

Response

stat

Parameters

seg	Segment number
Range	0 to 1999
stat	Segment status
0	Measurement completed successfully
2	Over level
3	Under level
4	Measurement failed
5	Synchronization word not detected
9	Measurement in progress or not measured
10	Segment not measured
12	Tx measurement timeout

The value received from MX887016A is 0, 2, 4, 5, 9, 10, or 12.

Example of Use

To query the measurement status of segment 16:

SEQSEGSTAT? 16

> 0

SEQSGPORT

Sequence Table Parameter - SG Output Port

Function

Sets or queries test port number to send RF signal in specified segment of sequence table

Command

```
SEQSGPORT seg,port
```

Query

```
SEQSGPORT? seg
```

Response

port

Parameters

seg	Segment number
Range	0 to 1999
port	Port number
PORT1	PORT 1
PORT2	PORT 2
PORT3	PORT 3
PORT4	PORT 4
Default	PORT1

Details

PORT3 cannot be set when PORT3 is selected for RF signal input port.

PORT4 cannot be set when PORT4 is selected for RF signal input port.

Example of Use

To set the port number in segment 5 to 2:

SEQSGPORT 5, PORT2

SEQSGPORT? 5

> PORT2

SEQTBL

Sequence Control Parameter - Sequence Table

Function

Sets or queries sequence table number to execute

Command

```
SEQTBL table
```

Query

```
SEQTBL?
```

Response

table

Parameter

table	Sequence table number
Range	0 to 3
Resolution	1
Default	0

Example of Use

To select sequence table 1:

SEQTBL 1

SEQTBL?

> 1

SEQTRG

Sequence Table Parameter - Trigger

Function

Sets or queries trigger condition for starting Sequence Measurement

Command

```
SEQTRG seg,src,slope,level,delay
```

Query

```
SEQTRG? seg
```

Response

src,slope,level,delay

Parameters

seg	Segment number
Range	0 to 1999
src	Trigger source
FRAME	Frame
FREERUN	Free run
PWR	Input signal power
Default	FREERUN
slope	Trigger slope
RISE	Rising edge trigger
Default	RISE
level	Trigger level
Range	–40 to 0 dB
Resolution	1 dB
Suffix code	DB (uses dB when omitted)
Default	–30 dB
delay	Delay time
Range	0 to 1000.000 ms
Resolution	0.001 ms
Default	0.000 ms

Details

The trigger slope and trigger level are enabled when trigger source is set to PWR.

Example of Use

To set the trigger condition of segment 2 as follows;

Trigger source: PWR, Trigger slope: RISE, Trigger level: –30 dB, Delay time: 0

SEQTRG 2,PWR,RISE,-30,0

SEQTRG? 2

> PWR,RISE,-30,0.000

Remarks

The trigger level is defined as the level difference from the input level specified by the following commands:

ILVL,SEQTRX

SEQTRX

Sequence Table Parameter - TRX Control

Function

Sets following items in specific segment of sequence table, and queries settings

- Forward Link frequency
- Output level
- Output signal pattern
- Reverse Link frequency
- Input level

Command

```
SEQTRX seg,ul_freq,ref,dl_freq,level,pat
```

Query

```
SEQTRX? seg
```

Response

ul_freq,ref,dl_freq,level,pat

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
ul_freq	Reverse Link frequency
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001 MHz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	1950.000000 MHz
ref	Input level
Range	–65.0 to +35 dBm (Port1/Port2) –65.0 to +25 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–10.0 dBm
dl_freq	Forward Link Frequency
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001 MHz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	2140.000000 MHz

level	Output level
Range	–130.0 to –10.0 dBm (Port 1/Port 2)
	–120.0 to 0.0 dBm (Port 3/Port 4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–60.0 dBm
pat	Waveform pattern
PAT1 to PATn	Pattern number (n: Waveform information file group range)
CW	Modulation disabled
OFF	Output level disabled
NC	Transmission signal pattern not configured in this segment (holds current transmission signal pattern)
Default	CW

Details

The setting range varies with the input/output port setting.

If Cable Loss Correction is ON, the cable loss is added to the range of the input level and subtracted from the range of output level.

If the cable loss is 5 dB, the input and output levels are as follows:

Input level –60.0 to +40 dBm

Output level –135.0 to –15.0 dBm

In this case, if the output level is set to –10.0 dBm, an out-of-parameter setting range error occurs. (The response to SYSERR? returns 220, Parameter error).

Whether an out-of-parameter setting range error has occurred is determined during execution of the following commands:

SEQCTRL, SNGLS, SEQEXECTX

A measurement execution error occurs at out-of-range errors.

SEQERR? is used to query the details of errors.

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

Example of Use

To set segment 0 as follows:

Reverse Link frequency: 1950.0 MHz, Input level: –10.0 dBm, Forward Link frequency: 2140.0 MHz, Output level: –60.0 dBm, and Modulation: Disabled

SEQTRX 0,1950.000000,-10.0,2140.000000,-60.0,CW

SEQTRX 0?

> 1950.000000,-10.0,2140.000000,-60.0,CW

Remark

The group range depends on the selected waveform file.

For details of the waveform patterns, refer to Chapter 3, “Waveform File Details” in the *Waveform Files for Cellular Application Operation Manual*.

SEQTX

Sequence Table Parameter - Uplink Frequency, Input Level

Function

Sets or queries uplink frequency and input level of segments in sequence table.

Command

```
SEQTX seg,ul_freq,ref
```

Query

```
SEQTX? seg
```

Response

```
ul_freq,ref
```

Parameter

seg	Segment number
Range	0 to 1999
Resolution	1
ul_freq	Rx frequency (uplink)
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001 MHz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	1950.000000 MHz
ref	Input level
Range	–65.0 to +35 dBm (Port1/Port2) –65.0 to +25 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–10.0 dBm

Details

This command sets only the uplink frequency and input level among the parameters that are set by SEQTRX.
The setting range varies with the input port setting.
When the Cable Loss Calibration is ON, the cable loss is added to the input level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –60.0 to +40.0 dBm.
Whether an out-of-parameter setting range error has occurred is determined during execution of the following commands:
SEQCTRL, SNGLS, SEQEXECTX

Example of Use

To set the parameters for segment 1 as follows:
Uplink frequency: 1950 MHz, Input level: –10.0 dBm
SEQTX 1,1950,-10.0
SEQTX? 1
> 1950.000000,-10.0

TRGTOUT

Trigger Timeout

Function

Sets or queries trigger timeout

Command

```
TRGTOUT time
```

Query

```
TRGTOUT?
```

Response

time

Unit	s

Parameter

time	Timeout time
Range	1 to 60 s
Resolution	1 s
Suffix code	NS, US, MS, S (uses s when omitted)
Initial Value	10 s

Example of Use

To set the Trigger timeout time to 10 seconds:
TRGTOUT 10
TRGTOUT?
> 10

TXFREQ

Input Frequency (Rev.)

Function

Sets or queries Reverse Link center frequency

Command

```
TXFREQ freq
```

Query

```
TXFREQ?
```

Response

freq

Unit	Hz

Parameter

freq	Input Frequency (Rev.)
Range	400.000000 to 3800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (used Hz when omitted)
Default	828.660000 MHz

Details

The input frequency is changed to a value determined by the combination of the Band Class and channel after the channel number is changed.

Changing the input frequency does not change the channel number.

Example of Use

To set the Reverse Link center frequency to 828.66 MHz:

TXFREQ 828.66MHZ

TXFREQ?

>828660000

ULFREQ

Uplink Frequency

Function

Sets or queries uplink (Rx) frequency of MU887000A

Command

```
ULFREQ ul_freq
```

Query

```
ULFREQ?
```

Response

ul_fleq

Unit	Hz

Parameter

ul_freq	Uplink Frequency
Range	400.000000 to 3800.000000 MHz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	1950.000000 MHz

Details

This setting corresponds to the mobile station Tx frequency.
Changing the uplink frequency setting does not change the uplink channel setting.

Example of Use

To set the uplink frequency to 1950 MHz:
ULFREQ 1950MHZ
ULFREQ?
>1950000000

Chapter 6 Performance Test

This chapter explains how to setup the measuring instruments required for the MX887016A 1xEV-DO performance tests as well as the test procedures.

6.1 Outline

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

- Output EVM
- Tx Power measurement accuracy (CW)
- Tx Power measurement linearity
- Frequency/modulation measurement Carrier frequency accuracy
  Rho

We recommend testing the performance periodically once or twice a year. If the test results do not meet the specifications, contact an Anritsu Service and Sales office. Contact information can be found on the last page of the printed version of this manual, and is available in a separate file on the PDF version.

CAUTION

Warm-up the MU887000A and the required measuring instruments for at least 30 minutes (except when specified otherwise) to stabilize them. To achieve the highest accuracy, the test should be performed at room temperature using a power supply with as little voltage fluctuation as possible in an environment free from noise, vibration, dust and humidity.

6.2 Instruments for Testing Performance

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

Table 6.2-1 Measuring Instruments for Performance Tests

Performance Test Item	Required Specifications*	Recommended Devices (Anritsu model name)
Output EVM	Signal Analyzer • Frequency Range: 400 to 2700 MHz • Resolution: 1 Hz • Measured Power Range: –140 to +20 dBm • Measurement Accuracy: ±0.05 dB • External Reference Input: (10 MHz)	Signal Analyzer (MS2690A or MS2830A) EVDO Measurement Software (MX269026A)
Tx Power Measurements • Measurement Accuracy • Linearity	Signal Generator • Frequency Range: 400 to 2700 MHz • Resolution: 1 Hz • Output Level Range Unmodulated: –143 to +13 dBm Resolution: 0.01 dB	Vector Signal Generator (MG3700A) Mechanical Attenuator (MG3700A-002) High Frequency 6 GHz (MG3700A-011)
	Signal Analyzer Same as above	Signal Analyzer (MS2690A or MS2830A)
	Power Meter • Main Frame Accuracy: ±0.02 dB • Frequency Range: 400 to 2700 MHz • Resolution: 0.01 dB	Power Meter (ML2437A)
	Power Sensor • Frequency Range: 400 to 2700 MHz • Measured Power Range: –40 to +20 dBm • Input Connector: N type	Power Sensor (MA2442D)
Frequency/Modulation Measurements • Carrier Frequency Accuracy • Rho	Signal generator supporting output of 3GPP 1xEV-DO modulation signals Same as above	Same as above
	Power Meter Same as above	Same as above
	Power Sensor • Frequency Range: 400 to 2700 MHz • Measured Power Range: –30 to +20 dBm • Input Connector: N type	Power Sensor (MA24002A)
Common	3-dB Attenuator	3-dB Attenuator (AT-103)

*: The performance covers the test item measurement range.

6

Performance Test

6.3 Performance Tests

Common test items

The following list shows the common settings for each measurement at the MU887000A.

Application:	Cellular
Standard:	CDMA2000 1xEVDO
Protocol Revision:	REV0
Trigger Source:	FREERUN
Trigger Level:	–10 dB
Trigger Delay:	0.00
Trigger Timeout:	1 s
OBW Ratio:	99.0%
Long Span Code Search:	ON

6.3.1 Calibrating signal generator (CW)

This procedure captures the calibration value for measurements using an unmodulated waveform (CW).

(1) Measuring instruments

- Vector signal generator: MG3700A
- Power meter: ML2437A
- Power sensor: MA2442D
- 3-dB Attenuator: AT-103 (2 sets)

(2) Setup

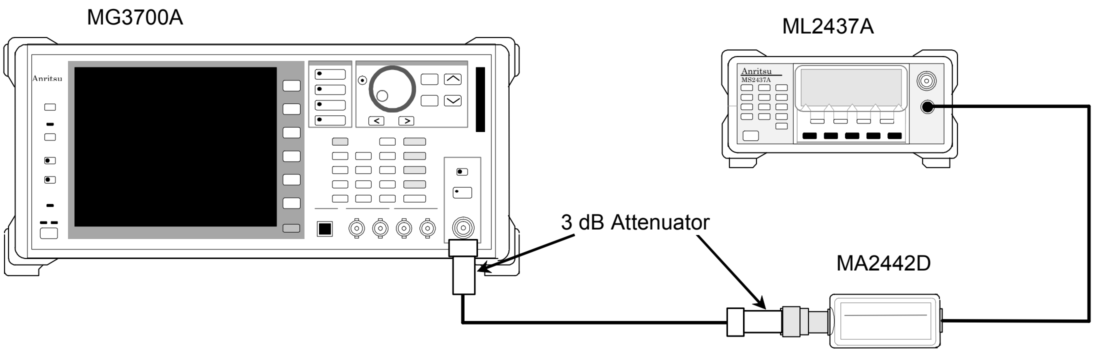

Figure 6.3.1-1 Signal Generator Calibration Setup (CW)

(3) Procedure

1. Setup the instruments as shown in Figure 6.3.1-1.
2. Output a CW 399.99 MHz signal from the Vector signal generator (SG) at a level of +6 dBm
3. Measure the level with the ML2437A power meter and adjust the SG so that the output level is 0 dBm.
4. Change the frequency as shown in Table 6.3.1-1 "Measurement Point and Frequency" and perform the same measurement to obtain the calibration value.
5. Repeat steps 3 and 4 over while changing the output level (value measured with power meter) to –10, –25 dBm, successively to measure and obtain the calibration value.

Table 6.3.1-1 Measurement Point and Frequency

Meas. Point	Frequency (MHz)	Meas. Point	Frequency (MHz)
1	400	7	1760
2	460	8	1900
3	780	9	2200
4	840	10	2500
5	1000	11	2700
6	1500		

Note:

Add an offset of −10 kHz to the frequency in the above table and set the frequency as SG output frequency, except for the measurement described in section 6.3.7.

6.3.2 Calibrating signal generator (MOD)

This procedure captures the calibration value for measurements using a modulated waveform.

(1) Measuring instruments

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

(2) Setup

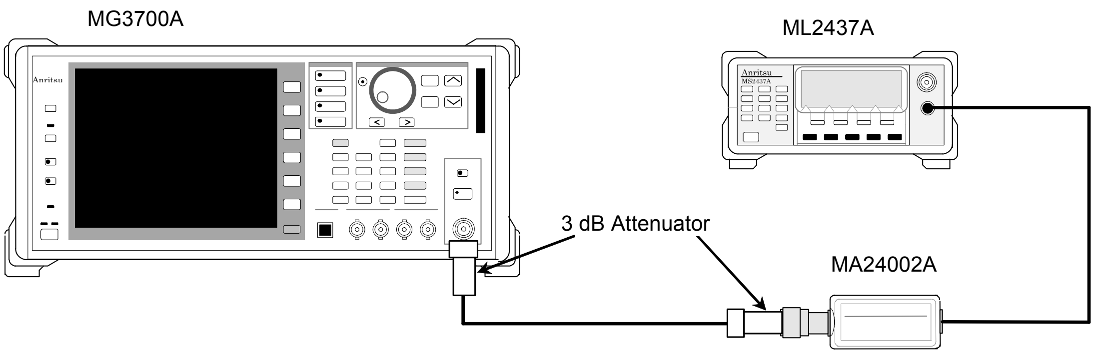

Figure 6.3.2-1 Signal Generator Calibration Setup (MOD)

(3) Procedure

1. Setup the instruments as shown in Figure 6.3.2-1.
2. Output a modulated 399.99 MHz signal from the Vector signal generator (SG) at a level of –4 dBm. with Waveform pattern name RVS_153_6_kbps_TX_LC0
3. Measure the level with the ML2437A Power Meter and adjust the SG so that the output level is –10 dBm.
4. Change the frequency as shown in Table 6.3.1-1 "Measurement Point and Frequency" and perform the same measurements to obtain the calibration value.

6.3.3 Calibrating linearity

This procedure captures the calibration value for measurements related to linearity.

(1) Measuring instruments

- Vector signal generator: MG3700A
- Signal analyzer: MS269XA or MS2830A
- 3-dB Attenuator: AT-103 (2 sets)

(2) Setup

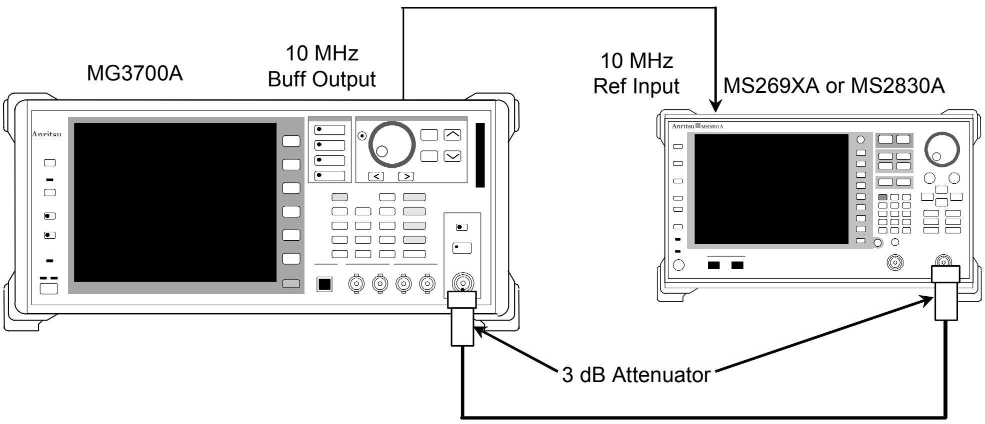

Figure 6.3.3-1 Linearity Calibration Setup

(3) Procedure

1. Setup the instruments as shown in Figure 6.3.3-1.
2. Set the signal analyzer (SA) as shown in #1 of Table 6.3.3-1 ”Signal Analyzer Settings”.
3. Output a 399.99 MHz signal from the Vector signal generator (SG) at a level of 0 dBm (output level reference). This output level reflects the calibration value for item 6.3.1.
4. Connect the output of the SG to the SA and measure the SG output level with the SA (A dBm)
5. Decrease the SG output level in 10-dB steps down to 40 dB and measure the level at each step (B dBm). (The calibration value is B – A.)
6. Change the frequency as shown in Table 6.3.1-1” Measurement Point and Frequency” and perform the same measurements to obtain the calibration value.
7. Set the SA as shown in #2 of Table 6.3.3-1 Signal Analyzer Settings.

8. Change the SG output reference level to –25 dBm and repeat the measurements over in the same way down to a level of –40 dBm. Use the same frequency range/steps. (This output level reflects the calibration value for item 6.3.1.)

Table 6.3.3-1 Signal Analyzer Settings

	MS269XA or MS2830A						
	Application Switch	**RBW**	**Zone Width**	**Time Length**	**ATT**	**Preamp**	**Ref Lev**
#1	Signal Analyzer	100 Hz	781.3 Hz	AUTO	20 dB	OFF	0 dBm
#2	Signal Analyzer	100 Hz	781.3 Hz	AUTO	0 dB	OFF	–20 dBm

6.3.4 Output Rho

This test measures the output signal Rho.

(1) Test specifications

Rho	Remarks
>0.990	400 to 2700 MHz

(2) Measuring instruments

- Signal Analyzer: MS269XA or MS2830A

(3) Setup

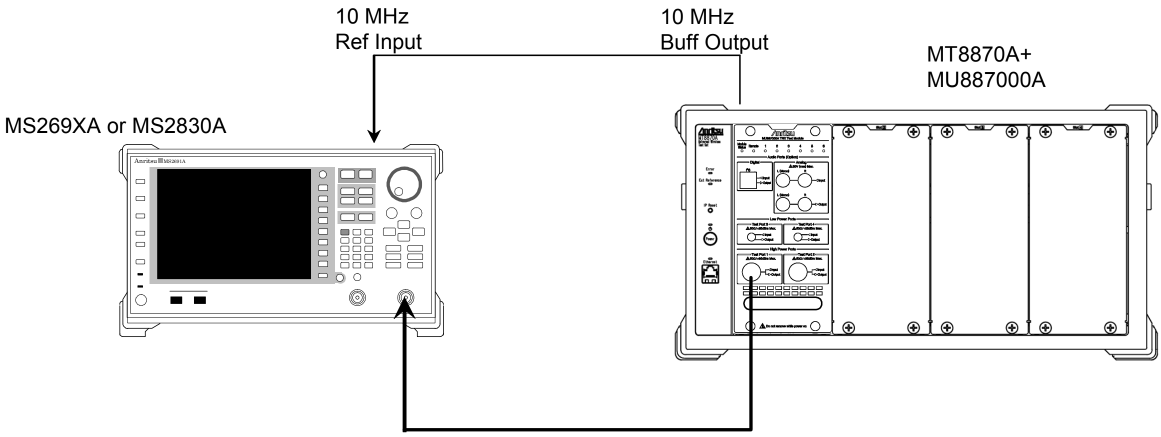

Figure 6.3.4-1 Output Rho Measurement Setup

(4) Procedure

1. Setup the instruments as shown in Figure 6.3.4-1.
2. Select the signal analyzer (SA) measurement software and set the following:

   Measurement software: MX269026A

   Input level: Output level of step 4
   Level offset: 0 dB
   Trigger: Free run
3. Select the MU887000A application software.
4. Set the MU887000A input and output levels.

Test Port1

Output level: –10.9 dBm
Input level: +35 dBm
Uplink frequency: 10 MHz

Test Port3

Output level:	–0.9 dBm
Input level:	+25 dBm
Uplink frequency:	10 MHz

5. Set the MU887000A output frequency to 400 MHz and output the test pattern.

Download package select:	MV887016A_EVDO_0002
Downlink pattern name:	Group No. 1
Connect port:	Test Port1 or Test Port3
Output level ON/OFF:	ON
Downlink frequency:	400 MHz

6. Measure the Rho at the SA.
7. In the same manner, change the MU887000A output frequency 900, 2000, 2700 MHz and measure the Rho at each frequency.
8. Change the Test Port in steps 4 and 5 and repeat steps 4 to 7 over.

6.3.5 Tx power measurement accuracy (CW)

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

(1) Test specifications

Test Port1/2

Measurement Accuracy	Input Level	Temperature
±0.5 dB	–25 dBm ≤, ≤+35 dBm	10° to 40°C
±0.7 dB	–55 dBm ≤, <–25 dBm	10° to 40°C
±0.9 dB	–65 dBm ≤, <–55 dBm	10° to 40°C

Test Port3/4

Measurement Accuracy	Input Level	Temperature
±0.7 dB	–25 dBm ≤, ≤+25 dBm	10° to 40°C
±0.9 dB	–55 dBm ≤, <–25 dBm	10° to 40°C
±1.1 dB	–65 dBm ≤, <–55 dBm	10° to 40°C

(2) Measuring instruments

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

(3) Setup

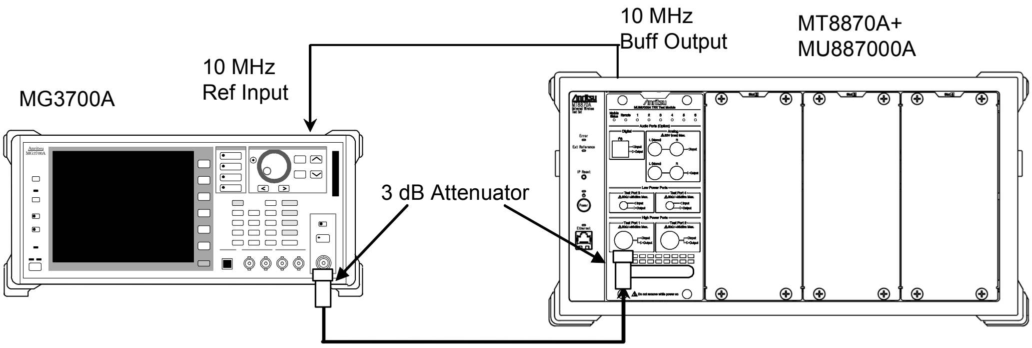

Figure 6.3.5-1 Setup for Measuring Amplitude Measurement Accuracy

(4) Procedure

1. Setup the instruments as shown in Figure 6.3.5-1.
2. Set the MU887000A as follows:

Connect port:	Test Port1
Output level ON/OFF:	OFF
Input level:	–10 dBm
Uplink frequency:	400 MHz
Turn Off All measurement:	OFF
Tx Power measurement:	ON, 10 times

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

Modulation:	OFF
Output frequency:	399.99 MHz
Output level:	–10 dBm (This output level reflects the calibration value for item 6.3.1.)

4. Change the frequency of the MU887000A and SG according to Table 6.3.1-1 "Measurement Point and Frequency" and measure the Tx power.

   Tx Power Measurement Results: Average value

5. Change the SG output level and MU887000A input level each to –55, and –65 dBm and repeat steps 2 to 4 over and measure the Tx power. (This output level reflects the calibration value for item 6.3.1.)
6. Change the Connect port setting for the connection with the MU887000A to Test Port2/3/4 successively, and repeat steps 2 to 5 over.

6.3.6 Tx power measurement linearity

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

(1) Test specifications

Linearity	Input Level, Range
±0.2 dB	–55 dBm ≤, –40 to 0 dB
±0.4 dB	–65 dBm ≤, –40 to 0 dB

(2) Measuring instruments

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

(3) Setup

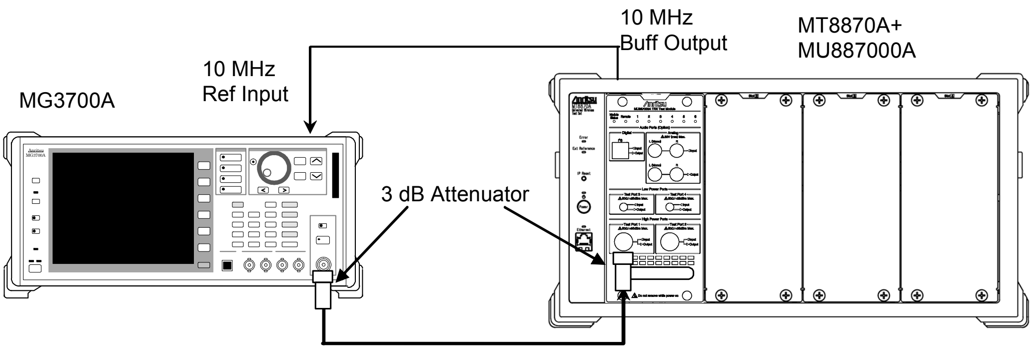

Figure 6.3.6-1 Setup for Measuring Tx Power Measurement Linearity

(4) Procedure

1. Setup the instruments as shown in Figure 6.3.6-1.
2. Set the MU887000A as follows:

Connect port:	Test Port1
Output level ON/OFF:	OFF
Input level:	0 dBm
Reverse Link frequency:	400 MHz
Turn Off All measurement:	OFF
Tx Power measurement:	ON, 1 time

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

Modulation:	OFF
Output frequency:	399.99 MHz
Output level:	0 dBm (This output level reflects the calibration value for item 6.3.1.)

4. Measure the Tx Power and make this value the reference level (REF dBm).

   Tx Power Measurement Results: Average value
5. Set the SG output level to –10 dB and measure the Tx power, making this value D dBm.
6. Calculate the difference between REF dBm and D dBm using the following equation.

   Linearity error = D – REF – (calibration value of section 6.3.3)
7. Similarly, change the SG output level successively from –20 dB to –40 dB in –10 dB steps and measure the Tx power. Calculate the linearity as described in step 6 and check that the results meet the specifications.
8. Change the MU887000A and SG frequencies according to Table 6.3.1-1 “Measurement Point and Frequency” and repeat steps 2 to 7 over.
9. Change the SG output level and the MU887000A input level to –25 dBm and repeat steps 2 to 8 over to measure the Tx Power. (This output level reflects the calibration value for item 6.3.1.)
10. Change the Connect port setting for the connection with the MU887000A to Test Port2/3/4 successively, and repeat steps 2 to 9 over.

6.3.7 Frequency/Modulation measurement

This test is related to the following modulation analyses.

- Carrier frequency accuracy
- Waveform quality

(1) Test specifications

Test Port1/2

Carrier frequency accuracy	±(Set frequency × Reference oscillator accuracy + 10 Hz)
Waveform quality (Rho)	>0.999

Input level: –30 dBm ≤, ≤+35 dBm

Test Port3/4

Carrier frequency accuracy	±(Set frequency × Reference oscillator accuracy + 10 Hz)
Waveform quality (Rho)	>0.999

Input level: –30 dBm ≤, ≤+25 dBm

(2) Measuring instruments

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

(3) Setup

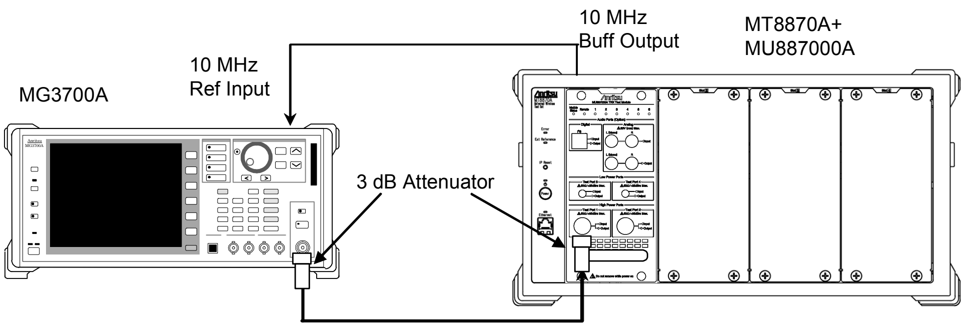

Figure 6.3.7-1 Setup for Measuring Frequency/Modulation

(4) Procedure

1. Setup the instruments as shown in Figure 6.3.7-1.
2. Set the MU887000A as follows:

Connect port:	Test Port1
Output level ON/OFF:	OFF
Input level:	–10 dBm
Reverse Link frequency:	400 MHz
Turn Off All measurement:	OFF
Modulation Analysis measurement:	ON, 20 times

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

Modulation:	ON
Waveform pattern:	RVS_153.6_kbps_TX
Output frequency:	400 MHz
Output level:	–10 dBm (This output level reflects the calibration value for item 6.3.2.)

4. Measure the frequency error, Rho, and EVM.

Carrier Frequency Error Result:	Average value
Rho Result:	Average value

5. Change the MU887000A and SG frequencies according to Table 6.3.1-1 "Measurement Point and Frequency" and repeat steps 2 to 4 over.

6. Change the SG output level and the MU887000A input level to –30 dBm and measure by repeating steps 2 to 5 over. (This output level reflects the calibration value for item 6.3.2.)

7. Change the Connect port setting for the connection with the MU887000A to Test Port2/3/4, successively and repeat steps 2 to 6 over.

6.3.8 About evaluation signals

The evaluation signals described in the performance test items 6.3.2 and 6.3.7 are set as follows. When the user is executing performance tests, set the SG actually used based on the following setting contents.

Install the MG3700A-002 Mechanical Attenuator option in the MG3700A. In addition, the MG3700A-011 High Frequency 6 GHz option is required to support Opt-015/016.

6.3.9 Sample format for test result sheets

Use the following test result sheets when testing the MX887016A performance. Duplicate these sheets as necessary for tests.

Test location ______________________
____
____

Report No. ______________________
Date ______________________
Person-in-charge ______________________

Model:

Serial No. ______________________

Ambient temperature ______________________ °C

Power source frequency ______________________ Hz

Relative humidity ______________________ %

Remarks ______________________
____
____

SG Calibration (CW)

SG Calibration Value (CW)

MG3700A Unmodulated Wave

Frequency (MHz)	SG Setting (dBm)		
	0 dBm	**–10 dBm**	**–25 dBm**
400			
460			
780			
840			
1000			
1500			
1760			
1900			
2200			
2500			
2700			

SG Calibration (MOD)

SG Calibration Value (MOD)

MG3700A Modulated Wave

Frequency (MHz)	SG Setting (dBm)
	–10 dBm
400	
460	
780	
840	
1000	
1500	
1760	
1900	
2200	
2500	
2700	

Linearity Calibration

Linearity Calibration

Frequency (MHz)	SG Level (dBm)	SA Measured Value (dBm)	Calibration Value (C) (B) – (A) (dB)	SG Level (dBm)	SA Measured Value (dBm)	Value (C) (B) – (A) (dB)
400	0	(A)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	
460	0	(A)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	
780	0	(A)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	
840	0	(A)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	
1000	0	(A)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	
1500	0	(A)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	

Linearity Calibration (continued)

Linearity Calibration (continued)

Frequency (MHz)	SG Level (dBm)	SA Measured Value (dBm)	Calibration Value (C) (B) – (A) (dB)	SG Level (dBm)	SA Measured Value (dBm)	Calibration Value (C) (B) – (A) (dB)
1760	0	(A)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	
1900	0	(A)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	
2200	0	(A)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	
2500	0	(A)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	
2700	0	(A)		–25	(A)	
	–10	(B)		–35	(B)	
	–20	(B)		–45	(B)	
	–30	(B)		–55	(B)	
	–40	(B)		–65	(B)	

Output Rho

Output Rho

Frequency (MHz)	Rho: Test Port1 MU887000A Output Level: –10.9 dBm			Rho: Test Port3 MU887000A Output Level: –0.9 dBm		
	Measured Value	Spec.	Measurement uncertainty	Measured Value	Spec.	Measurement uncertainty
400		>0.990	0.001		>0.990	0.001
900						
2000						
2700						

Tx Power Measurement Accuracy (CW)

Tx Power Measurement Accuracy Port1/2

MU887000A Input Level: –10 dBm (Item 6.3.1 Calibration Value)

Frequency (MHz)	Measured Value (P) (dBm)	Measurement Accuracy (dB)			
		Lo Limit	Measurement Accuracy –10 – (P)	Hi Limit	Measurement uncertainty
400		–0.5		+0.5	±0.15
460					
780					
840					
1000					
1500					
1760					
1900					
2200					
2500					
2700					

Tx Power Measurement Accuracy Port1/2

MU887000A Input Level: –55 dBm (Item 6.3.3 Calibration Value)

Frequency (MHz)	Item 6.3.3 –55 dBm Calibration Value (C) (dB)	Measured Value (P) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –25 + (C) – (P)	Hi Limit	Measurement uncertainty
400			–0.7		+0.7	±0.13
460						
780						
840						
1000						
1500						
1760						
1900						
2200						
2500						
2700						

Tx Power Measurement Accuracy (CW) (continued)

Tx Power Measurement Accuracy Port1/2 (continued)

MU887000A Input Level: –65 dBm (Item 6.3.3 Calibration Value)

Frequency (MHz)	Item 6.3.3 –65 dBm Calibration Value (C) (dB)	Measured Value (P) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –25 + (C) – (P)	Hi Limit	Measurement uncertainty
400			–0.9		+0.9	±0.13
460						
780						
840						
1000						
1500						
1760						
1900						
2200						
2500						
2700						

Tx Power Measurement Accuracy (CW) (continued)

Tx Power Measurement Accuracy Port3/4

MU887000A Input Level: –10 dBm (Item 6.3.1 Calibration Value)

Frequency (MHz)	Measured Value (P) (dBm)	Measurement Accuracy (dB)			
		Lo Limit	Measurement Accuracy –10 – (P)	Hi Limit	Measurement uncertainty
400		–0.7		+0.7	±0.17
460					
780					
840					
1000					
1500					
1760					
1900					
2200					
2500					
2700					

Tx Power Measurement Accuracy Port3/4

MU887000A Input Level: –55 dBm (Item 6.3.3 Calibration Value)

Frequency (MHz)	Item 6.3.3 –55 dBm Calibration Value (C) (dB)	Measured Value (P) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –25 + (C) – (P)	Hi Limit	Measurement uncertainty
400			–0.9		+0.9	±0.14
460						
780						
840						
1000						
1500						
1760						
1900						
2200						
2500						
2700						

Tx Power Measurement Accuracy (CW) (continued)

Tx Power Measurement Accuracy Port3/4

MU887000A Input Level: –65 dBm (Item 6.3.3 Calibration Value)

Frequency (MHz)	Item 6.3.3 –65 dBm Calibration Value (C) (dB)	Measured Value (P) (dBm)	Measurement Accuracy (dB)			
			Lo Limit	Measurement Accuracy –25 + (C) – (P)	Hi Limit	Measurement uncertainty
400			−1.1		+1.1	±0.14
460						
780						
840						
1000						
1500						
1760						
1900						
2200						
2500						
2700						

Tx Power Measurement Linearity

Linearity (Reference Level 0 dBm)

Frequency (MHz)	SG Level (dBm)	Item 6.3.3 Calibration Value (dB)	MX887016A Measured Value (dBm)	Linearity (D) – (REF) – (C) (dB)	Spec. (dB)	Measurement uncertainty
400	+10		(REF)			
	0	(C)	(D)		±0.2	±0.05
	–10	(C)	(D)			
	–20	(C)	(D)			
	–30	(C)	(D)			
460	+10		(REF)			
	0	(C)	(D)		±0.2	±0.05
	–10	(C)	(D)			
	–20	(C)	(D)			
	–30	(C)	(D)			
780	+10		(REF)			
	0	(C)	(D)		±0.2	±0.05
	–10	(C)	(D)			
	–20	(C)	(D)			
	–30	(C)	(D)			
840	+10		(REF)			
	0	(C)	(D)		±0.2	±0.05
	–10	(C)	(D)			
	–20	(C)	(D)			
	–30	(C)	(D)			
1000	+10		(REF)			
	0	(C)	(D)		±0.2	±0.05
	–10	(C)	(D)			
	–20	(C)	(D)			
	–30	(C)	(D)			
1500	+10		(REF)			
	0	(C)	(D)		±0.2	±0.05
	–10	(C)	(D)			
	–20	(C)	(D)			
	–30	(C)	(D)			

Tx Power Measurement Linearity (continued)

Linearity (Reference Level 0 dBm)

Frequency (MHz)	SG Level (dBm)	Item 6.3.3 Calibration Value (dB)	MX887016A Measured Value (dBm)	Linearity (D) – (REF) – (C) (dB)	Spec. (dB)	Measurement uncertainty
1760	+10		(REF)			
	0	(C)	(D)		±0.2	±0.05
	–10	(C)	(D)			
	–20	(C)	(D)			
	–30	(C)	(D)			
1900	+10		(REF)			
	0	(C)	(D)		±0.2	±0.05
	–10	(C)	(D)			
	–20	(C)	(D)			
	–30	(C)	(D)			
2200	+10		(REF)			
	0	(C)	(D)		±0.2	±0.05
	–10	(C)	(D)			
	–20	(C)	(D)			
	–30	(C)	(D)			
2500	+10		(REF)			
	0	(C)	(D)		±0.2	±0.05
	–10	(C)	(D)			
	–20	(C)	(D)			
	–30	(C)	(D)			
2700	+10		(REF)			
	0	(C)	(D)		±0.2	±0.05
	–10	(C)	(D)			
	–20	(C)	(D)			
	–30	(C)	(D)			

Tx Power Measurement Linearity (continued)

Linearity (Reference Level –25 dBm)

Frequency (MHz)	SG Level (dBm)	Item 6.3.3 Calibration Value (dB)	MX887016A Measured Value (dBm)	Linearity (D) – (REF) – (C) (dB)	Spec. (dB)	Measurement uncertainty
400	–25		(REF)			
	–35	(C)	(D)		±0.2	±0.05
	–45	(C)	(D)			
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05
460	–25		(REF)			
	–35	(C)	(D)		±0.2	±0.05
	–45	(C)	(D)			
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05
780	–25		(REF)			
	–35	(C)	(D)		±0.2	±0.05
	–45	(C)	(D)			
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05
840	–25		(REF)			
	–35	(C)	(D)		±0.2	±0.05
	–45	(C)	(D)			
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05
1000	–25		(REF)			
	–35	(C)	(D)		±0.2	±0.05
	–45	(C)	(D)			
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05
1500	–25		(REF)			
	–35	(C)	(D)		±0.2	±0.05
	–45	(C)	(D)			
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05

6 Performance Test

Tx Power Measurement Linearity (continued)

Linearity (Reference Level –25 dBm) (continued)

Frequency (MHz)	SG Level (dBm)	Item 6.3.3 Calibration Value (dB)	MX887016A Measured Value (dBm)	Linearity (D) – (REF) – (C) (dB)	Spec. (dB)	Measurement uncertainty
1760	–25		(REF)			
	–35	(C)	(D)		±0.2	±0.05
	–45	(C)	(D)			
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05
1900	–25		(REF)			
	–35	(C)	(D)		±0.2	±0.05
	–45	(C)	(D)			
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05
2200	–25		(REF)			
	–35	(C)	(D)		±0.2	±0.05
	–45	(C)	(D)			
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05
2500	–25		(REF)			
	–35	(C)	(D)		±0.2	±0.05
	–45	(C)	(D)			
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05
2700	–25		(REF)			
	–35	(C)	(D)		±0.2	±0.05
	–45	(C)	(D)			
	–55	(C)	(D)			
	–65	(C)	(D)		±0.4	±0.05

Frequency/Modulation Measurement

Carrier Frequency Accuracy/Waveform Quality

MU887000A Input Level: –10 dBm

Frequency (MHz)	Rho (Waveform Quality)			Carrier Frequency Accuracy (Hz)		
	Measured Value	Spec.	Measurement uncertainty	Measured Value	Spec.	Measurement uncertainty
400		>0.999	0.00001		±10.0	±0.6
460						
780						
840						
1000						
1500						
1760						
1900						
2200						
2500						
2700						

Carrier Frequency Accuracy/Waveform Quality

MU887000A Input Level: –30 dBm

Frequency (MHz)	Rho(Waveform Quality)			Carrier Frequency Accuracy (Hz)		
	Measured Value	Spec.	Measurement uncertainty	Measured Value	Spec.	Measurement uncertainty
400		>0.999	0.00001		±10.0	±0.6
460						
780						
840						
1000						
1500						
1760						
1900						
2200						
2500						
2700						

6.4 Servicing

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

When requesting repair, supply the following information:

(a) Model name and serial number marked on rear panel

(b) Failure symptoms

(c) Person to contact about nature of failure and repair completion notification

(d) Software version

Appendix A Specifications

This appendix lists the specifications of the MX887016A 1xEV-DO Reverse Link TX Measurement. Refer to section 1.3 “Product Composition” for details of the product configuration.

These specifications assume use of the system at a constant temperature after warming-up the instruments for 30 minutes. The abbreviation (typ.) indicates the reference data at 20 to 30°C and is not a guaranteed value.

Table A-1 MX887016A Specifications

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Common Items
Frequency
Measuring Object</td><td>
400 to 2700 MHz
1xEV-DO Rev. 0, Rev. A Reverse Link signals</td></tr>
<tr><td>RF Power
Input Level Range
Measurement Accuracy

Linearity</td><td>Port1, Port2: –65.0 to +35.0 dBm
Port3, Port4: –65.0 to +25.0 dBm

Port1, Port2: After calibration, 10 to 40°C
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–25 to +35 dBm</td><td>±0.3 dB (typ.)
±0.5 dB</td></tr>
<tr><td>–55 to –25 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–65 to –55 dBm</td><td>±0.9 dB</td></tr>
</table>
Port3, Port4: After calibration, 10 to 40°C
<table>
<tr><th>Input Level</th><th>Measurement Accuracy</th></tr>
<tr><td>–25 to +25 dBm</td><td>±0.7 dB</td></tr>
<tr><td>–55 to –25 dBm</td><td>±0.9 dB</td></tr>
<tr><td>–65 to –55 dBm</td><td>±1.1 dB</td></tr>
</table>

<table>
<tr><th>Input Level</th><th>Linearity</th></tr>
<tr><td>≥–55 dBm, 0 to 40 dB</td><td>±0.2 dB</td></tr>
<tr><td>≥–65 dBm, 0 to 40 dB</td><td>±0.4 dB</td></tr>
</table>
</td></tr>
</table>

Table A-1 MX887016A Specifications (continued)

Item	Specification
Modulation Analysis	
Input Level Range	Port1, Port2: –30.0 to +35.0 dBm Port3, Port4: –30.0 to +25.0 dBm
Carrier Frequency Accuracy	±(Set frequency × Reference oscillator accuracy + 10 Hz)
Waveform Quality	>0.999
Code Domain Power	
Input Level Range	Port1, Port2: –30.0 to +35.0 dBm Port3, Port4: –30.0 to +25.0 dBm
Measurement Accuracy	±0.2 dB (Code Power ≥–15.0 dBc) ±0.4 dB (Code Power ≥–23.0 dBc)
Occupied Bandwidth	
Input Level Range	Port1, Port2: –10.0 to +35.0 dBm Port3, Port4: –10.0 to +25.0 dBm
OBW Ratio	80.0 to 99.9%

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