MX887012A
GSM/EDGE Uplink
TX Measurement
Operation Manual

Sixth Edition

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

ANRITSU CORPORATION

Document No.: M-W3609AE-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

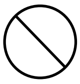
⚠ DANGER This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.

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

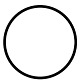
⚠ CAUTION This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

Safety Symbols Used on Equipment and in Manual

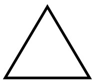
The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Ensure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.



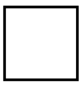
This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.



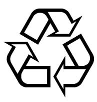
This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.

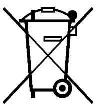


This indicates a warning or caution. The contents are indicated symbolically in or near the triangle.



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





These indicate that the marked part should be recycled.

MX887012A
GSM/EDGE Uplink TX Measurement
Operation Manual

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

Equipment Certificate

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

Anritsu Warranty

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

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

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

Anritsu Corporation Contact

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

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

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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.

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

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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: MX887012A GSM/EDGE Uplink TX Measurement

2. Applied Directive and Standards

When MX887012A GSM/EDGE Uplink 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 MX887012A 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: MX887012A GSM/EDGE Uplink TX Measurement

2. Applied Directive and Standards

When MX887012A GSM/EDGE Uplink TX Measurement is installed in the MT8870A, the applied directive and standards of this software is 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 MX887012A can be used with.

About This Manual

This manual mainly describes the use, panels, and specifications of the MX887012A GSM/EDGE Uplink TX Measurement software.

Products related to the MT8870A Universal Wireless Test Set include:

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

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

Main Unit Operation Manual

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

Module Operation Manual

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

Application Software Operation Manual

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

MX887012A GSM/EDGE Uplink TX Measurement Operation Manual

Describes the functions and remote commands of the GSM/EDGE Uplink Transmit Measurement software.

Control Software Operation Manual

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

Table of Contents

Chapter 1 Outline

This chapter outlines the MX887012A GSM/EDGE Uplink TX Measurement software option. Refer to Appendix A "Specifications" for the software functions and specifications.

1.1 Outline

The MX887012A GSM/EDGE Uplink Tx Measurement software (hereafter MX887012A) adds GSM/EDGE wireless measurement functions to the MU887000A TRX Test Module.

Any file pattern can be specified at the MX887012A to send as the downlink GSM signal waveform. The downlink signal is sent as a modulation signal pattern read from memory, irrespective of the uplink signal information (non-signalling).

The MX887012A software does not support signalling transmission methods in which the uplink signal information, such mobile call processing, is detected and the downlink signal modulation is changed.

1.2 Composition

The composition of the MX887012A is shown in Table 1.2-1.

Table 1.2-1 Composition

Item	Model/Code	Name	Qty	Remarks
Software		Storage media (DVD, etc.)	1	
	MX887012A	GSM/EDGE Uplink Tx Measurement		License file included on storage media (DVD, etc.)
	W3609AE	MX887012A GSM/EDGE Uplink Tx Measurement Operation Manual		English, on storage media (DVD, etc.)

1.3 License Registration

Before the MX887012A 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.

1.4 Abbreviations

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

Table 1.4-1 Abbreviations

Abbreviations	Name
ARFCN	Absolute Radio Frequency Channel Number
BER	Bit Error Rate
BTS	Base Transceiver Station
DL	Downlink
EDGE	Enhanced Data GSM Environment
EVM	Error Vector Magnitude
GSM	Global System for Mobile Communications
MS	Mobile Station
ORFS	Output RF Spectrum
PCL	Power Control Level
SRB	Switched Radio Block
TS	Training Sequence
TSC	Training Sequence Code
UL	Uplink

Chapter 2 Fundamental Measurement

This chapter describes the fundamental functions and commands of the MX887012A. 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 using the following command.

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

Switch the MX887012A measurement standard using the following command.
Set the parameter to GSM when a function described in sections 2.2 “Transmit Power” to 2.11 “Capturing Waveform Data” is to be used.
Set the parameter to SEQUENCE when a function described in Chapter 3 “Sequence Measurement” is to be used.

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

2.1.2 Setting ports

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

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

When setting the sequence table in sequence measurement, the sequence commands set only the output port to Port 1 to Port 4.
The above-mentioned command sets the receiving port.

2.1.3 Selecting measurement function

Select the measurement function using the following command.

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

2.1.4 Frequency and level

GSM System

GSM uses various frequency bands. The DCS1800 and PCS1900 bands have the same channel number (ARFCN). Use the following command to set the combination of frequency bands for measurement.

```
SYSCMB
:CONFigure:CELLular:GSM:RFSettings:SCOMbination
```

Frequency

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

- TCH Channel
  ```
  CHAN
  :CONFigure:CELLular:GSM:RFSettings:TCHannel
  ```
- TCH Downlink Frequency (mobile station Rx)
  ```
  DLFREQ
  RXFREQ
  :CONFigure:CELLular:GENerator:RFSettings:FREQuency
  ```
- TCH Uplink Frequency (mobile station Tx)
  ```
  ULFREQ
  TXFREQ
  :CONFigure:CELLular:MEASurement:RFSettings:FREQuency
  ```

Level

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

- Output Level
  `OLVL`
  `:CONFigure:CELLular:GENerator:RFSettings:LEVel`
- Input Level
  `ILVL`
  `:CONFigure:CELLular:MEASurement:RFSettings:LEVel`
- Input Level Control
  `ILVLCTRL`
  `:CONFigure:CELLular:GSM:FUNDamental:CONTrol: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.

2.1.5 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 Package Select
  `PACKAGE`
  `:CONFigure:CELLular:GENerator:ARB:PACKage:SELect`
- Waveform Pattern Select
  `DLPAT`
  `:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect`
  `DLPAT_SYNC`
  `:CONFigure:CELLular:GENerator:ARB:WAVeform:PATTern:SELect:SYNC`

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

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

2.1.6 Waveform patterns

To send a GSM/EDGE waveform pattern, specify a file of MV887012A GSM/EDGE Downlink waveform files as the waveform pattern file.

Refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual* for an explanation of the MV887012A GSM/EDGE Downlink Waveform files.

2.1.7 Setting GSM signals

Set the following items to configure the GSM signal.

Setting frequency band

GSM uses various frequency bands. The DCS1800 and PCS1900 bands have the same channel number (ARFCN).
Set the combination of frequency bands for measurement at the GSM system.

Setting traffic channel (TCH) frequency

The TCH channel and frequency have one-to-one relationship. Changing the traffic channel automatically changes the uplink frequency (TCH Uplink Frequency) and downlink frequency (TCH Downlink Frequency) as shown in table 2.1.7-1. However, changing a frequency does not change a channel.

Table 2.1.7-1 GSM Channels and Frequencies

System	Channel Number (n)	Uplink Frequency (Fl (n) MHz)	Downlink Frequency (Fu (n) MHz)
P-GSM900	$1 \leq n \leq 124$	890 + 0.2 * n	Fl (n) + 45
E-GSM900	$0 \leq n \leq 124$	890 + 0.2 * n	Fl (n) + 45
	$975 \leq n \leq 1023$	890 + 0.2 * (n–1024)	
R-GSM900	$0 \leq n \leq 124$	890 + 0.2 * n	Fl (n) + 45
	$955 \leq n \leq 1023$	890 + 0.2 * (n–1024)	
DCS1800	$512 \leq n \leq 885$	1710.2 + 0.2 * (n–512)	Fl (n) + 95
PCS1900	$512 \leq n \leq 810$	1850.2 + 0.2 * (n–512)	Fl (n) + 80
GSM450	$259 \leq n \leq 293$	450.6 + 0.2 * (n–259)	Fl (n) + 10
GSM480	$306 \leq n \leq 340$	479 + 0.2 * (n–306)	Fl (n) + 10
GSM850	$128 \leq n \leq 251$	824.2 + 0.2 * (n–128)	Fl (n) + 45

Frame configuration

The following figure shows the GSM frame configuration. Each 4.615-ms frame is composed of 8 slots (bursts) and one slot consists of 156.25 symbols.

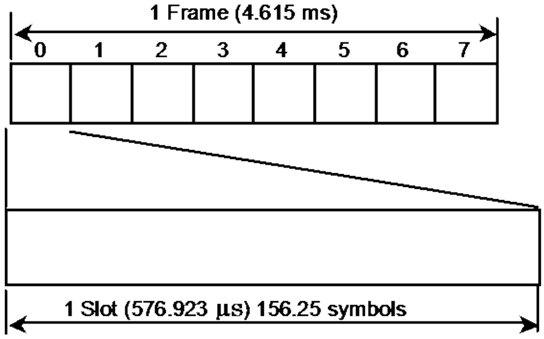

Figure 2.1.7-1 GSM Frame Configuration

Use the following commands to set the GSM signal.

- GSM System
  `SYSCMB`
  `:CONFigure:CELLular:GSM:RFSettings:SCOMbination`
- TCH Channel
  `CHAN`
  `:CONFigure:CELLular:GSM:RFSettings:TCHannel`

2.1.8 Setting measurement signals

Use the following commands to set the measurement signals.

- Training sequence code of Uplink
  TSC
  :CONFigure:CELLular:GSM:TSCode
- Measurement target signal
  MEASOBJ
  :CONFigure:CELLular:GSM:MOBJect
- Measurement band
  BAND
  :CONFigure:CELLular:GSM:FUNDamental:BAND
- Power control level of measurement signal
  PCL
  :CONFigure:CELLular:GSM:FUNDamental:PCLevel
- Setting measurement target signal, measurement band, and power control level of measurement signal at once
  RF
  :CONFigure:CELLular:GSM:FUNDamental:RFSet
- Number of slots to measure
  ASLOT
  :CONFigure:CELLular:GSM:FUNDamental:ASLot
- Number of slot that detected trigger
  TSLOT
  :CONFigure:CELLular:GSM:FUNDamental:TSLot

Table 2.1.8-1 PCL and Input Level

Band	GSM850 GSM900	DCS1800	PCS1900
PCL	**Input Level (dBm)**		
0	39	30	30
1	39	28	28
2	39	26	26
3	37	24	24
4	35	22	22
5	33	20	20
6	31	18	18
7	29	16	16
8	27	14	14
9	25	12	12
10	23	10	10
11	21	8	8
12	19	6	6
13	17	4	4
14	15	2	2
15	13	0	0
16	11	0	Reserved
17	9	0	Reserved
18	7	0	Reserved
19 to 28	5	0	Reserved
29	5	36	Reserved
30	5	34	33
31	5	32	32

2.1.9 Setting measurement

Set the following measurement items.

- Trigger level
  FMEAS_TRGLVL
  :TRIGger:CELLular:GSM:FUNDamental:LEVel
- Trigger timeout period
  TRGTOUT
  :TRIGger:CELLular:MEASurement:TOUT
- Measurement trigger
  MEASTRG
  :CONFigure:CELLular:GSM:MTRigger
- Setting waveform data output on/off
  GRAPHVIEW
  :CONFigure:CELLular:GSM:FUNDamental:GRAPh

Use the following command when not measuring.

- Setting all measurements to off
  ALLMEASITEMS_OFF
  :CONFigure:CELLular:GSM:FUNDamental:AMITems:OFF

2.1.10 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

The sent command and response depend on the measurement function. To query the overall measurement status and errors, send the following Fundamental Measurement command. To query the measurement status for measurements other than Fundamental Measurements, refer to the section for that measurement.

Fundamental Measurement

Overall measurement status

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

Table 2.1.10-1 Query Responses (Overall Status)

Response	Description
0	Measurement completed normally
2	Level exceeded The MU887000A receive level is higher than the set input level.
4	Measurement failed The input signal burst is too long or too short.
5	Synchronization word not detected No synchronization word was detected in the slot signal with measurement set to on.
9	Measurement in progress or not executed Measurement is progressing, or no measurement result was obtained.
12	Tx measurement timeout No trigger occurred before measurement timed out.
13	Rx measurement failed The following phenomena appear during the loopback BER measurement. • TCh is not contiguous for 12 frames. • No idle frame nor SACCH in 13 frames.

Measurement status of each slot

Determine the status of each slot by sending the following command.

```
FMEASSTAT
:FETCh:CELLular:GSM:FUNDamental:STATe
```

Table 2.1.10-2 Response (Each Slot)

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 measurement-On slot input signal burst is too long or too short.
5	No Training Sequence detected No Training Sequence was detected in the slot signal with measurement set to on.
9	Measurement in progress or not executed Measurement is progressing, or no measurement result was obtained.
13	Rx measurement failed The following phenomena appear during the loopback BER measurement. • TCh is not contiguous for 12 frames. • No idle frame nor SACCH in 13 frames.

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 MX887012A status registers are described in the following tables.

Native command mode:

Table 2.1.10-3 Bit Definitions of End Event Status Register (Signal Generator)

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

Table 2.1.10-4 Bit Definitions of End Event Status Register (Measurement)

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

Table 2.1.10-5 Bit Definitions of Error Event Status Register (Signal Generator)

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

Table 2.1.10-6 Bit Definitions of Error Event Status Register (Measurement)

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

SCPI command mode

Table 2.1.10-7 Bit Definitions of Signal Generator Status Register

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

Table 2.1.10-8 Bit Definitions of Measurement Status Register

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

Table 2.1.10-9 Bit Definitions of Signal Generator Questionable Register

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

Table 2.1.10-10 Bit Definitions of Measurement Questionable Register

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

2.2 Transmit Power

The Tx power of the mobile station is measured.

Setting parameters

The uplink Tx power measurement settings are:

Measurement function

Set the command parameter to Fundamental as described in section 2.1.3 “Selecting measurement function”.

Measurement target

Set the target signal type as described in section 2.1.8 “Setting measurement signals”.

Channel and frequency of input signals

Set the channel and frequency of the signal input to the MU887000A using the commands in section 2.1.4 “Frequency and level“ (TCH channel, TCH Uplink frequency:mobile station Tx frequency)

Input level

Set the level of the signal input to the MU887000A by referring to the commands in section 2.1.4 “Frequency and level”.

Other parameters

Set other parameters as described in section 2.1.6 “Waveform patterns” through to section 2.1.9 “Setting measurement”.

Starting measurement at specific count

Start measurement of uplink Tx power at a specific count within the range from 1 to 1000 using the following command.

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

Starting measurement

Start measurement as described in section 2.1.10 “Starting/stopping measurement”. Wait until the instruments are ready for measurement.

Signal output

Output the signal from the mobile station.

Stopping measurement

Wait until measurement is completed and then query the results using the following command.

- Wait for measurement completion
  `*WAI`

Checking measurement status

Check the measurement status as described in section 2.1.10 “Starting/stopping measurement”.

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

- Tx Power
  `TXPWR`
  `:FETCh:CELLular:GSM:FUNDamental:POWer:TXPower`
- Carrier Off Power (when measurement target signal is GMSK or 8PSK)
  `OFFPWR`
  `:FETCh:CELLular:GSM:FUNDamental:POWer:OFFPower`
- On/Off Ratio (when measurement target signal is GMSK or 8PSK)
  `RATIO`
  `:FETCh:CELLular:GSM:FUNDamental:POWer:RATio`
- Power Flatness Maximum Power
  `MAXPWR`
  `:FETCh:CELLular:GSM:FUNDamental:POWer:PFMaximum`
- Power Flatness Minimum Power
  `MINPWR`
  `:FETCh:CELLular:GSM:FUNDamental:POWer:PFMinimum`
- Estimated Power (when measurement target signal is 8PSK)
  `ESTPWR`
  `:FETCh:CELLular:GSM:FUNDamental:POWer:EPOWer`

2.3 Power vs Time

This measures the change in the level (Tx power) characteristics of the RF signal burst output from the mobile station over time. Only GMSK and 8PSK signals can be measured.

The following figures show the GMSK and 8PSK modulation time masks.
The numbers 0 to 9 and 0 to 15 in show the Judge Line Number.
The numbers (0) to (5) and (0) to (7) in show Template Level Number.

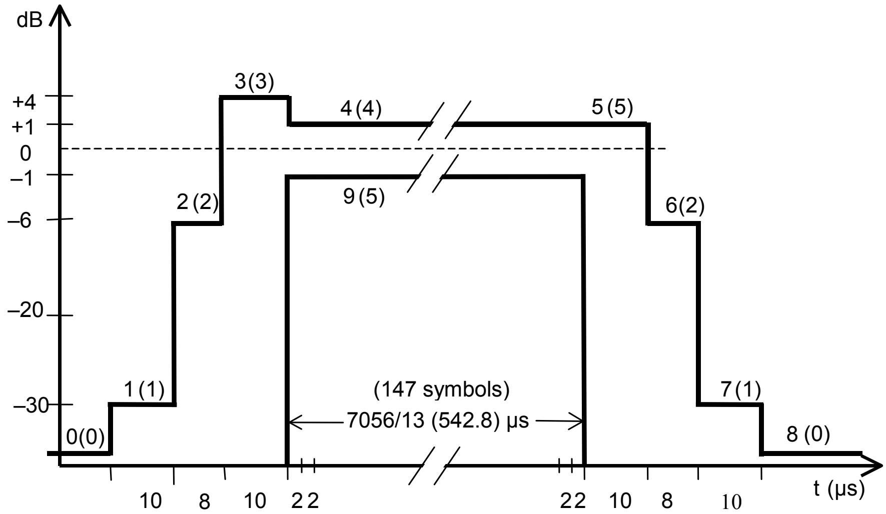

Figure 2.3-1 Time Mask for Normal Bursts at GMSK Modulation

The following table lists the Template Level for each Template Level Number in dB units.

Table 2.3-1 Template Level for Each Band (GMSK)

GSM850, GSM900

Template Level Number	(0)	(1)	(2)	(3)	(4)	(5)
PCL 0 to 15	–59.0	–30.0	–6.0	4.0	1.0	–1.0
PCL 16	–59.0	–30.0	–4.0	4.0	1.0	–1.0
PCL 17	–59.0	–30.0	–2.0	4.0	1.0	–1.0
PCL 18 to 31	–59.0	–30.0	–1.0	4.0	1.0	–1.0

DCS1800

Template Level Number	(0)	(1)	(2)	(3)	(4)	(5)
PCL 0 to 10, 29 to 31	–48.0	–30.0	–6.0	4.0	1.0	–1.0
PCL 11	–48.0	–30.0	–4.0	4.0	1.0	–1.0
PCL 12	–48.0	–30.0	–2.0	4.0	1.0	–1.0
PCL 13 to 28	–48.0	–30.0	–1.0	4.0	1.0	–1.0

PCS1900

Template Level Number	(0)	(1)	(2)	(3)	(4)	(5)
PCL 0 to 10, 30, 31	–48.0	–30.0	–6.0	4.0	1.0	–1.0
PCL 11	–48.0	–30.0	–4.0	4.0	1.0	–1.0
PCL 12	–48.0	–30.0	–2.0	4.0	1.0	–1.0
PCL 13 to 15	–48.0	–30.0	–1.0	4.0	1.0	–1.0

Also, the Additional Lowest Limit is applied to the Template Level of Judge Line Numbers 0, 1, 7, and 8.

Compared to the table above, a higher Template Level is applied.

The following table lists the Additional Lowest Limit for each band.

Table 2.3-2 Additional Lowest Limit Level for Each Band (GMSK)

GSM850, GSM900		Lowest Limit Level (dBm)
Judge Line Number 0	Leading	–36.0
Judge Line Number 1, 7	Second Lowest	–17.0
Judge Line Number 8	Trailing	–54.0

DCS1800, PCS1900		Lowest Limit Level (dBm)
Judge Line number 0	Leading	–48.0
Judge Line number 1, 7	Second Lowest	–20.0
Judge Line number 8	Trailing	–48.0

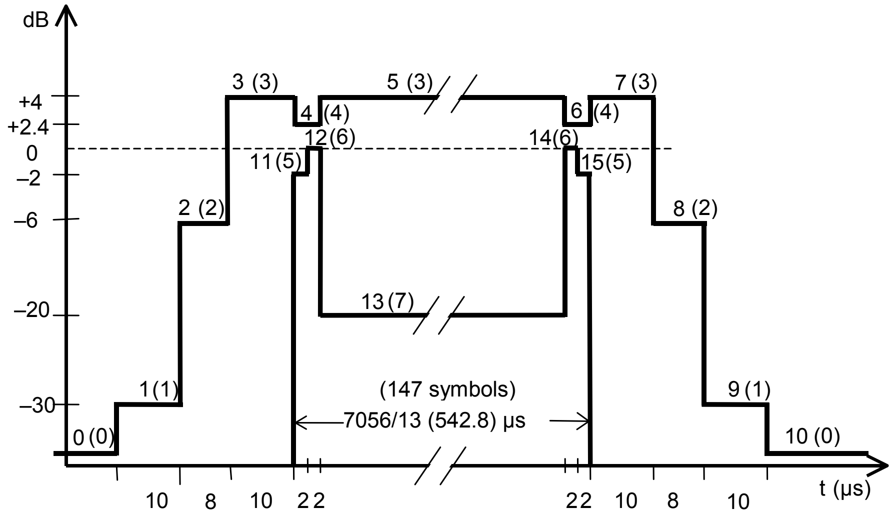

Figure 2.3-2 Time Mask for Normal Bursts at 8-PSK Modulation

The following table lists the Template Level for each Template Level Number in dB units.

Table 2.3-3 Template Level for Each Band (8PSK)

GSM850, GSM900

Template Level Number	(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PCL 0 to 15	–59.0	–30.0	–6.0	4.0	2.4	–2.0	0.0	–20.0
PCL 16	–59.0	–30.0	–4.0	4.0	2.4	–2.0	0.0	–20.0
PCL 17	–59.0	–30.0	–2.0	4.0	2.4	–2.0	0.0	–20.0
PCL 18 to 31	–59.0	–30.0	–1.0	4.0	2.4	–2.0	0.0	–20.0

DCS1800

Template Level Number	(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PCL 0 to 10, 29 to 31	–48.0	–30.0	–6.0	4.0	2.4	–2.0	0.0	–20.0
PCL 11	–48.0	–30.0	–4.0	4.0	2.4	–2.0	0.0	–20.0
PCL 12	–48.0	–30.0	–2.0	4.0	2.4	–2.0	0.0	–20.0
PCL 13 to 28	–48.0	–30.0	–1.0	4.0	2.4	–2.0	0.0	–20.0

PCS1900

Template Level Number	(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PCL 0 to 10, 30 to 31	–48.0	–30.0	–6.0	4.0	2.4	–2.0	0.0	–20.0
PCL 11	–48.0	–30.0	–4.0	4.0	2.4	–2.0	0.0	–20.0
PCL 12	–48.0	–30.0	–2.0	4.0	2.4	–2.0	0.0	–20.0
PCL 13 to 15	–48.0	–30.0	–1.0	4.0	2.4	–2.0	0.0	–20.0

Also, the Additional Lowest Limit is applied to the Template Level of Judge Line Numbers 0, 1, 9, and 10.
Compared to the table above, a higher Template Level is applied.
The following table lists the Additional Lowest Limit for each band.

Table 2.3-4 Additional Lowest Limit Level for Each Band (8PSK)

GSM850, GSM900		Lowest Limit Level (dBm)
Judge Line number 0	Leading	–36.0
Judge Line number 1, 9	Second Lowest	–17.0
Judge Line number 10	Trailing	–54.0

DCS1800,PCS1900		Lowest Limit Level (dBm)
Judge Line number 0	Leading	–48.0
Judge Line number 1, 9	Second Lowest	–20.0
Judge Line number 10	Trailing	–48.0

Setting parameters

The settings for Tx power vs time measurement are described below.

Set the measurement function, measurement target, channel and frequency of the input signal, input level, and other parameters, as described in section 2.2 "Transmit Power".

- Set the offset time for Tx power vs time measurement as follows:
  ```
  PVT_OFFSET
  :CONFigure:CELLular:GSM:FUNDamental:PVTime:TOFFset
  ```

Start measurement at a specified count as follows:
Start Tx Power measurement at the measurement count within the range from 1 to 1000.

```
PVT_SET
:CONFigure:CELLular:GSM:FUNDamental:PVTime:SET
```

Measurement

Confirm the measurement start, signal output, measurement stop, and measurement status, as described in section 2.2 "Transmit Power".

Use the following commands to query the measurement results.

- Power vs Time (GMSK or 8PSK modulation signals only)
  ```
  PVT
  :FETCh:CELLular:GSM:FUNDamental:PVTime:OTPower
  ```
- Power vs Time template (GMSK or 8PSK modulation signals only)
  ```
  PVT_TEMPLATE
  :FETCh:CELLular:GSM:FUNDamental:PVTime:TEMPlate
  ```
- Power vs Time template for each storage mode (GMSK or 8PSK modulation signals only.)
  ```
  PVT_TEMPLATE_STR
  :FETCh:CELLular:GSM:FUNDamental:PVTime:TEMPlate:STORage
  ```
- Power vs Time template Detail (GMSK or 8PSK modulation signals only)
  ```
  PVT_DETAIL
  :FETCh:CELLular:GSM:FUNDamental:PVTime:TEMPlate:DETail
  ```
- Power vs Time template for each storage mode (GMSK or 8PSK modulation signals only.)
  ```
  PVT_DETAIL_STR
  :FETCh:CELLular:GSM:FUNDamental:PVTime:TEMPlate:DETail
  :STORage
  ```
- Time Alignment (GSM downlink signal and GMSK or 8PSK modulation signals only)
  ```
  TERR
  :FETCh:CELLular:GSM:FUNDamental:PVTime:TERRor
  ```
- Time Alignment (worst) (GSM downlink signal and GMSK or 8PSK modulation signals only)
  ```
  TERR_WORST
  :FETCh:CELLular:GSM:FUNDamental:PVTime:TERRor:WORSt
  ```

2.4 Modulation Analysis

Modulation analysis measures:

- Frequency error
- EVM
- Phase Error
- Magnitude Error
- Origin Offset
- IQ Imbalance
- 95th Percentile

Setting parameters

Set the measurement function, measurement target, channel and frequency of the input signal, input level, and other parameters as described in section 2.2 “Transmit Power”.

Use the following command to set the measurement execution and measurement count for modulation analysis. The measurement execution count can be set within the range from 1 to 1000.

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

Measurement

Confirm the measurement start, signal output, measurement stop, and measurement status as described in section 2.2 “Transmit Power”.

2.4.1 Frequency error

Frequency error measurement measures the carrier frequency and frequency error of the uplink frequency.

Set the reference frequency for error measurement based on the uplink frequency referenced in section 2.1.4 “Frequency and level”.

Query the results of frequency error measurement using the following commands:

- Carrier Frequency (Hz)
  `CFREQ`
  `:FETCh:CELLular:GSM:FUNDamental:MODulation:CFREQuency`
- Frequency Error (ppm, Hz)
  `CFERR`
  `:FETCh:CELLular:GSM:FUNDamental:MODulation:FERRor`
- Worst Value of Frequency Error (ppm, Hz)
  `CFERR_WORST`
  `:FETCh:CELLular:GSM:FUNDamental:MODulation:FERRor:WORSt`

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

2.4.2 EVM

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

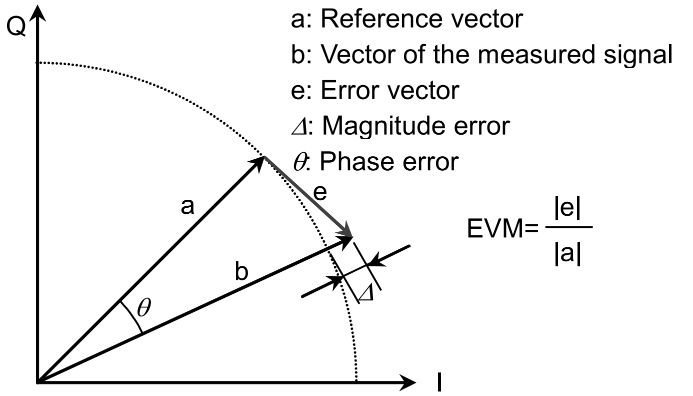

Figure 2.4.2-1 Definition of EVM

Query the EVM measurement results using the following commands:

- EVM (RMS) (only 8PSK modulation signal)
  EVM
  `:FETCh:CELLular:GSM:FUNDamental:MODulation:EVM`
- Peak EVM (only 8PSK modulation signal)
  `PEVM`
  `:FETCh:CELLular:GSM:FUNDamental:MODulation:PEVM`
- Phase Error
  `PHASEERR`
  `:FETCh:CELLular:GSM:FUNDamental:MODulation:PHERror`
- Peak Phase Error
  `PPHASEERR`
  `:FETCh:CELLular:GSM:FUNDamental:MODulation:PPHerror`
- Magnitude Error
  `MAGERR`
  `:FETCh:CELLular:GSM:FUNDamental:MODulation:MERRor`

2.4.3 Origin offset

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

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

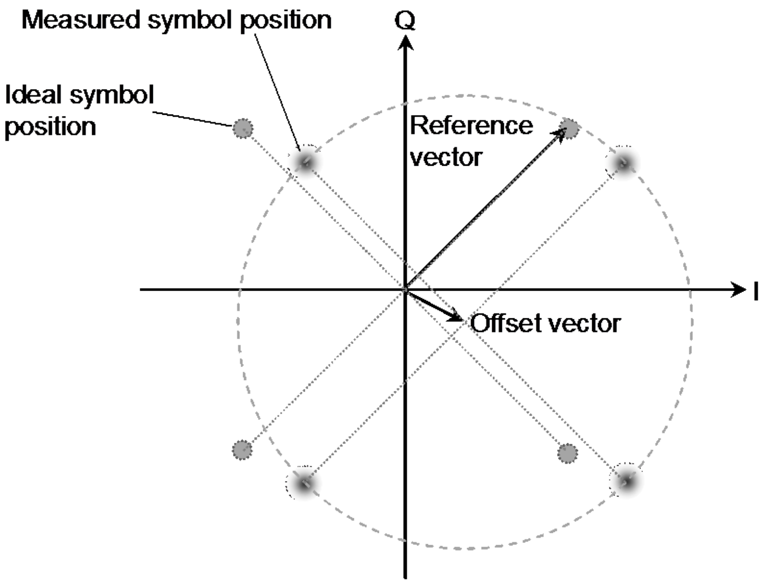

Figure 2.4.3-1 Definition of Origin Offset

Use the following command to query the Origin Offset measurement results.

- Origin Offset

  ORGNOFS

  :FETCh:CELLular:GSM:FUNDamental:MODulation:ORGNoffset

2.4.4 IQ Imbalance

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

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

When I ≈ Q, the IQ imbalance can be approximated as:

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

Use the following command to query the IQ imbalance measurement result:

- IQ imbalance
  `IQIMB`
  `:FETCh:CELLular:GSM:FUNDamental:MODulation:IQIMbalance`

2.4.5 95th percentile

The 95th percentile measures the EVM where the probability distribution becomes 95%.

Query the 95th percentile measurement result using the following command (8PSK modulation signal only):

- 95th percentile
  `EVM95PCT`
  `:FETCh:CELLular:GSM:FUNDamental:MODulation:EPERcentile`

2.5 Output RF Spectrum

The following items are measured to determine how much the output signal frequency spectrum interferes with adjacent channels.

Output RF Spectrum – Modulation

The power due to modulation at the frequency offset from the carrier frequency is displayed as a relative value (dB) to the carrier frequency level. The power of the carrier frequency and offset at 1600 kHz or less are measured at an RBW of 30 kHz. The power of the offset at 1800 kHz or more is measured at an RBW of either 30 kHz or 100 kHz.

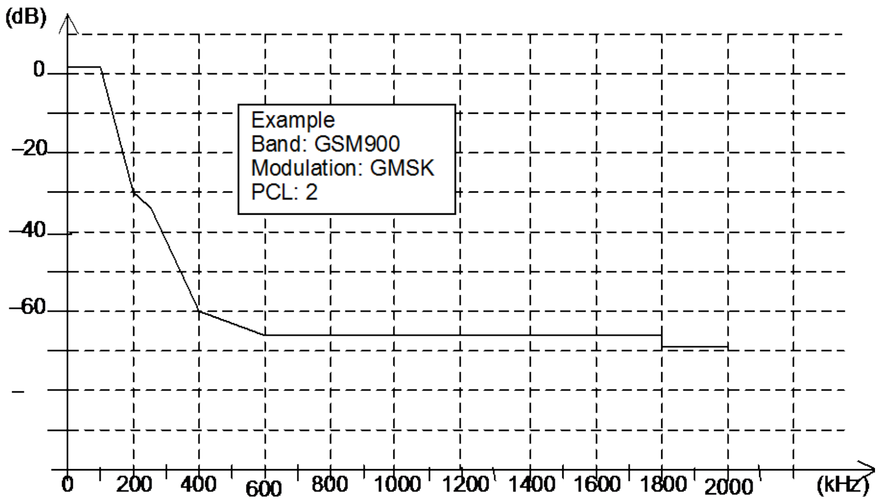

Figure 2.5-1 Template for Output RF Spectrum Modulation

The following tables list the specifications for each frequency at each PCL.

The higher of the two values for each frequency at each PCL and the absolute value is made the Template value.

Table 2.5-1 Output RF Spectrum due to Modulation Template

GSM850, GSM900 (unit: dB)

Offset Freq (kHz)	100	200	250	400	600	800	1000	1200	1400	1600	1800	2000
GMSK signal												
Absolute limit value (dBm)	–36.0	–36.0	–36.0	–36.0	–51.0	–51.0	–51.0	–51.0	–51.0	–51.0	–46.0	–46.0
PCL 0 to 31	0.5	–30.0	–33.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–63.0	–63.0
8PSK signal												
Absolute limit value (dBm)	–36.0	–36.0	–36.0	–36.0	–51.0	–51.0	–51.0	–51.0	–51.0	–51.0	–46.0	–46.0
PCL 0 to 2	0.5	–30.0	–33.0	–60.0	–66.0	–66.0	–66.0	–66.0	–66.0	–66.0	–69.0	–69.0
PCL 3	0.5	–30.0	–33.0	–60.0	–64.0	–64.0	–64.0	–64.0	–64.0	–64.0	–67.0	–67.0
PCL 4	0.5	–30.0	–33.0	–60.0	–62.0	–62.0	–62.0	–62.0	–62.0	–62.0	–65.0	–65.0
PCL 5 to 31	0.5	–30.0	–33.0	–54.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–63.0	–63.0

DCS1800 (unit: dB)

Offset Freq (kHz)	100	200	250	400	600	800	1000	1200	1400	1600	1800	2000
GMSK signal												
Absolute limit value (dBm)	–36.0	–36.0	–36.0	–36.0	–56.0	–56.0	–56.0	–56.0	–56.0	–56.0	–51.0	–51.0
PCL 0	0.5	–30.0	–33.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–65.0	–65.0
PCL 1	0.5	–30.0	–33.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–63.0	–63.0
PCL 2	0.5	–30.0	–33.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–61.0	–61.0
PCL 3 to 28	0.5	–30.0	–33.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–59.0	–59.0
PCL 29	0.5	–30.0	–33.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–71.0	–71.0
PCL 30	0.5	–30.0	–33.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–69.0	–69.0
PCL 31	0.5	–30.0	–33.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–67.0	–67.0
8PSK signal												
Absolute limit value (dBm)	–36.0	–36.0	–36.0	–36.0	–56.0	–56.0	–56.0	–56.0	–56.0	–56.0	–51.0	–51.0
PCL 29, 30, 31, 0	0.5	–30.0	–33.0	–54.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–65.0	–65.0
PCL 1	0.5	–30.0	–33.0	–54.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–63.0	–63.0
PCL 2	0.5	–30.0	–33.0	–54.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–61.0	–61.0
PCL 3 to 28	0.5	–30.0	–33.0	–54.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–59.0	–59.0

PCS1900 (unit: dB)

Offset Freq (kHz)	**100**	**200**	**250**	**400**	**600**	**800**	**1000**	**1200**	**1400**	**1600**	**1800**	**2000**
GMSK signal												
Absolute limit value (dBm)	–36.0	–36.0	–36.0	–36.0	–56.0	–56.0	–56.0	–56.0	–56.0	–56.0	–51.0	–51.0
PCL 0	0.5	–30.0	–33.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–65.0	–65.0
PCL 1	0.5	–30.0	–33.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–63.0	–63.0
PCL 2	0.5	–30.0	–33.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–61.0	–61.0
PCL 3 to 15	0.5	–30.0	–33.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–59.0	–59.0
PCL 30	0.5	–30.0	–33.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–68.0	–68.0
PCL 31	0.5	–30.0	–33.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–67.0	–67.0
8PSK signal												
Absolute limit value (dBm)	–36.0	–36.0	–36.0	–36.0	–56.0	–56.0	–56.0	–56.0	–56.0	–56.0	–51.0	–51.0
PCL 30, 31, 0	0.5	–30.0	–33.0	–54.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–65.0	–65.0
PCL 1	0.5	–30.0	–33.0	–54.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–63.0	–63.0
PCL 2	0.5	–30.0	–33.0	–54.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–61.0	–61.0
PCL 3 to 15	0.5	–30.0	–33.0	–54.0	–60.0	–60.0	–60.0	–60.0	–60.0	–60.0	–59.0	–59.0

Output RF Spectrum – Switching

The power due to the burst transient part at the offset from the carrier frequency is displayed in an absolute value (dBm). The carrier frequency and total offset power are measured at an RBW of 30 kHz.

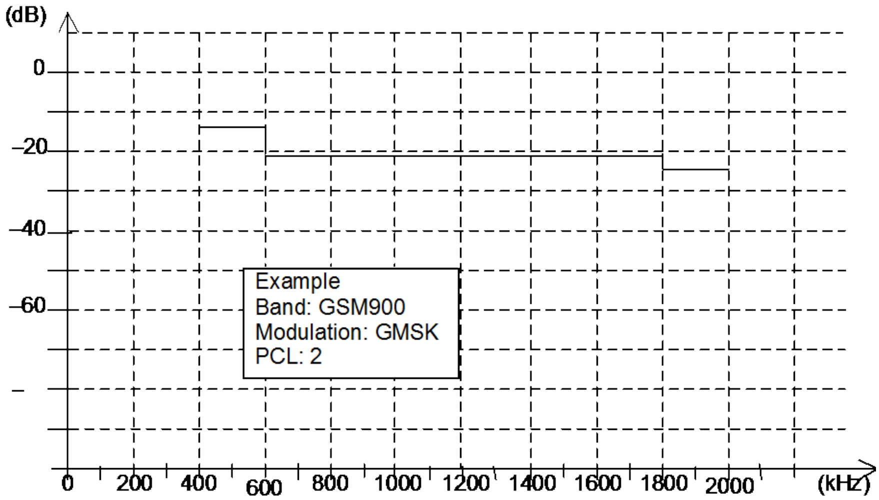

Figure 2.5-2 Template for Output RF Spectrum due to Switching

The following table lists the specifications for each frequency at each PCL.

Table 2.5-2 Output RF Spectrum due to Switching Template

GSM850, GSM900 (unit: dBm)

Offset Freq (kHz)	100	200	250	400	600	800	1000	1200	1400	1600	1800	2000
PCL 0 to 2	–	–	–	–13.0	–21.0	–21.0	–21.0	–21.0	–21.0	–21.0	–24.0	–24.0
PCL 3	–	–	–	–15.0	–21.0	–21.0	–21.0	–21.0	–21.0	–21.0	–24.0	–24.0
PCL 4	–	–	–	–17.0	–21.0	–21.0	–21.0	–21.0	–21.0	–21.0	–24.0	–24.0
PCL 5	–	–	–	–19.0	–21.0	–21.0	–21.0	–21.0	–21.0	–21.0	–24.0	–24.0
PCL 6	–	–	–	–21.0	–23.0	–23.0	–23.0	–23.0	–23.0	–23.0	–26.0	–26.0
PCL 7	–	–	–	–23.0	–25.0	–25.0	–25.0	–25.0	–25.0	–25.0	–28.0	–28.0
PCL 8	–	–	–	–23.0	–26.0	–26.0	–26.0	–27.0	–27.0	–27.0	–30.0	–30.0
PCL 9	–	–	–	–23.0	–26.0	–26.0	–26.0	–29.0	–29.0	–29.0	–32.0	–32.0
PCL 10	–	–	–	–23.0	–26.0	–26.0	–26.0	–31.0	–31.0	–31.0	–34.0	–34.0
PCL 11 to 31	–	–	–	–23.0	–26.0	–26.0	–26.0	–32.0	–32.0	–32.0	–36.0	–36.0

DCS1800 (unit: dBm)

Offset Freq (kHz)	**100**	**200**	**250**	**400**	**600**	**800**	**1000**	**1200**	**1400**	**1600**	**1800**	**2000**
PCL 0	–	–	–	–22.0	–24.0	–24.0	–24.0	–24.0	–24.0	–24.0	–27.0	–27.0
PCL 1	–	–	–	–23.0	–25.0	–25.0	–25.0	–26.0	–26.0	–26.0	–29.0	–29.0
PCL 2	–	–	–	–23.0	–26.0	–26.0	–26.0	–28.0	–28.0	–28.0	–31.0	–31.0
PCL 3	–	–	–	–23.0	–26.0	–26.0	–26.0	–30.0	–30.0	–30.0	–33.0	–33.0
PCL 4	–	–	–	–23.0	–26.0	–26.0	–26.0	–31.0	–31.0	–31.0	–35.0	–35.0
PCL 5 to 28	–	–	–	–23.0	–26.0	–26.0	–26.0	–32.0	–32.0	–32.0	–36.0	–36.0
PCL 29	–	–	–	–16.0	–21.0	–21.0	–21.0	–21.0	–21.0	–21.0	–24.0	–24.0
PCL 30	–	–	–	–18.0	–21.0	–21.0	–21.0	–21.0	–21.0	–21.0	–24.0	–24.0
PCL 31	–	–	–	–20.0	–22.0	–22.0	–22.0	–22.0	–22.0	–22.0	–25.0	–25.0

PCS1900 (unit: dBm)

Offset Freq (kHz)	**100**	**200**	**250**	**400**	**600**	**800**	**1000**	**1200**	**1400**	**1600**	**1800**	**2000**
PCL 0	–	–	–	–22.0	–24.0	–24.0	–24.0	–24.0	–24.0	–24.0	–27.0	–27.0
PCL 1	–	–	–	–23.0	–25.0	–25.0	–25.0	–26.0	–26.0	–26.0	–29.0	–29.0
PCL 2	–	–	–	–23.0	–26.0	–26.0	–26.0	–28.0	–28.0	–28.0	–31.0	–31.0
PCL 3	–	–	–	–23.0	–26.0	–26.0	–26.0	–30.0	–30.0	–30.0	–33.0	–33.0
PCL 4	–	–	–	–23.0	–26.0	–26.0	–26.0	–31.0	–31.0	–31.0	–35.0	–35.0
PCL 5 to 15	–	–	–	–23.0	–26.0	–26.0	–26.0	–32.0	–32.0	–32.0	–36.0	–36.0
PCL 30	–	–	–	–19.0	–22.0	–22.0	–22.0	–22.0	–22.0	–22.0	–25.0	–25.0
PCL 31	–	–	–	–20.0	–22.0	–22.0	–22.0	–22.0	–22.0	–22.0	–25.0	–25.0

Setting parameters

Set the measurement function, measurement target, channel and frequency of the input signal, input level, and other parameters as described in section 2.2 “Transmit Power”.

Measurement filter

Set the bandwidth of the filter that is used when the offset frequency for the Output RF Spectrum due to Modulation is 1800 kHz or more.

```
RBWFLT
:CONFigure:CELLular:GSM:FUNDamental:ORFSpectrum:FILTer
```

Set measurement execution at a specific measurement count

Start measurement at the output spectrum measurement count within the range from 1 to 1000.

```
ORFS_SET
:CONFigure:CELLular:GSM:FUNDamental:ORFSpectrum:SET
```

Measurement

Confirm the measurement start, signal output, measurement stop, and measurement status, as described in section 2.2 “Transmit Power”.

Query the output spectrum measurement results using the following commands:

Output RF Spectrum – Modulation

- Output RF Spectrum due to Modulation (Lower Side)
  ```
  ORFSMD_L
  :FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation
  :LOWer
  ```
- Output RF Spectrum due to Modulation (Lower Side) Fail Frequency Point
  ```
  ORFSMD_JUDGE_L
  :FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation
  :LOWer:FPOint
  ```
- Output RF Spectrum due to Modulation (Upper Side)
  ```
  ORFSMD_U
  :FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation
  :UPPer
  ```

- Output RF Spectrum due to Modulation (Upper Side) Fail Frequency Point
  ORFSMD_JUDGE_U
  :FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation:UPPer:FPOint
- Output RF Spectrum due to Modulation Judgement
  ORFSMD_JUDGE
  :FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation:JUDGement

Output RF Spectrum – Switching

- Output RF Spectrum due to Switching (Lower Side)
  ORFSSW_L
  :FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:LOWer
- Output RF Spectrum due to Switching (Lower Side) Fail Frequency Point
  ORFSSW_JUDGE_L
  :FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:LOWer:FPOint
- Output RF Spectrum due to Switching (Upper Side)
  ORFSSW_U
  :FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:UPPer
- Output RF spectrum due to Switching (Upper Side) Fail Frequency Point
  ORFSSW_JUDGE_U
  :FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:UPPer:FPOint
- Output RF Spectrum due to Switching Judgement
  ORFSSW_JUDGE
  :FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:JUDGement

2.6 Tx IQ Measurement

The power at 0 Hz, ±67.708 kHz, ±135.416 kHz, ±203.125 kHz, and ±270.833 kHz based on the measurement frequency is measured when the target signal is CW.

Setting parameters

Set the measurement function, measurement target, channel and frequency of the input signal, input level, and other parameters, as described in section 2.2 “Transmit Power”.

Start measurement at a specific spectrum measurement count set within the range from 1 to 1000 using the following command.

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

Measurement

Confirm the measurement start, signal output, measurement stop, and measurement status, as described in section 2.2 “Transmit Power”.

Query the Tx IQ measurement result using the following command:

- Power at Each Point
  `TXIQ` (Continuous signal only)
  `:FETCh:CELLular:GSM:FUNDamental:TXIQ:POWer`

2.7 Multi-Burst RF Power Measurement (Single Slot)

The Tx power during each burst of multiple bursts is measured as the following items:

Tx power of each slot
  Average power during burst
Maximum power of each slot
  Maximum Tx power during burst
Minimum power for each slot
  Minimum Tx power during burst

2.7.1 Measured signal conditions

The measured signal must meet the following conditions.

Trigger detection condition
The rise of the first burst signal is recognized as the trigger.
The trigger level is (Input level setting + Trigger level).

Burst interval
When the trigger mode is Once, a one-slot burst is output for each frame. Measurement is performed at one-frame intervals after the first burst is measured. Consequently, bursts are output with the same slot number. If the trigger mode is Re-trigger, setting the maximum interval for the next burst after slot detection allows measurement of the burst without a timeout if the burst is input within that period.

Number of bursts
The number of measured bursts can be set from 1 to 500.

Burst Tx power
The burst Tx power should be equal to or less than the input setting level.
If a burst significantly exceeds the input setting level, the measurement status exceeds the specified value and measurement stops.

Idle frame
This measurement does not support idle frames.

Signal type
Normal bursts are measured.

The following figure shows an example of a measured signal.

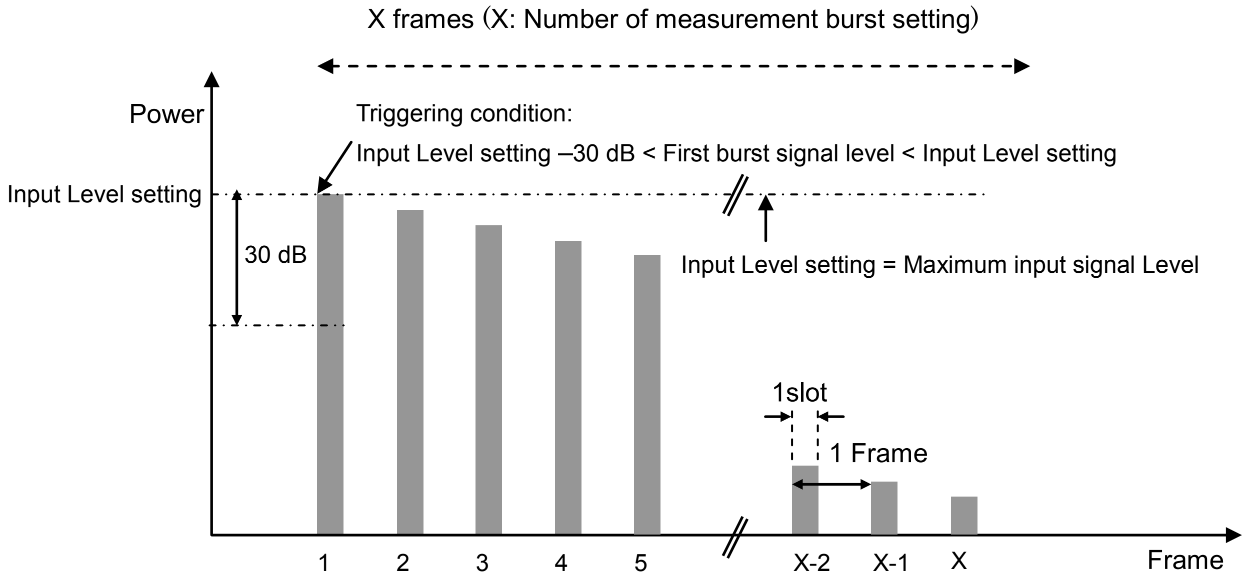

Figure 2.7.1-1 Example of Multi-Burst RF Power Measurement Signal

2.7.2 Measurement procedure

Setting parameters

The settings are listed below.

Measurement function

Set the command parameter to Multi Burst Power (single slot) as described in section 2.1.3 “Selecting measurement function”.

Channel and frequency of input signal

Set the channel and frequency of the signal input to the MU887000A using the commands in section 2.1.4 “Frequency and level” (TCH channel, TCH Uplink frequency : mobile station Tx frequency)

Input level

Set the level of the signal input to the MU887000A by referring to the commands in section 2.1.4 “Frequency and level”.
The expected level of the burst with maximum Tx power should be set.

Other parameters

Set other parameters as described in section 2.1.6 “Waveform patterns” through to section 2.1.9 “Setting measurement”.

Use the following commands to set the measurement items:

- Measurement Method
  `MRFPWR_METHOD`
  `:CONFigure:CELLular:GSM:MRFPower:METHod`
- Number of Measured Frames
  `MRFPWR_SET`
  `:CONFigure:CELLular:GSM:MRFPower:SSLot:FRAMe`
- Trigger Mode
  `MRFPWR_TRG`
  `:TRIGger:CELLular:GSM:MRFPower:SSLot:MODE`
- Trigger Level
  `MRFPWR_TLVL`
  `:TRIGger:CELLular:GSM:MRFPower:SSLot:LEVel`
- Maximum Interval between Bursts in Re-trigger Mode
  `MRFPWR_INTVAL`
  `:TRIGger:CELLular:GSM:MRFPower:SSLot:INTerval`

Start measurement as described in section 2.1.10 “Starting/stopping” measurement.

Wait until the instruments are ready for measurement.

Signal output

Output the signal from the mobile station.

Stopping measurement

Wait until measurement is completed and then query the results using the following command.

- Wait for measurement completion
  `*WAI`

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

- Measurement Status, Tx Power, Maximum and Minimum Tx power during Burst
  `MRFPWRALL`
  `:FETCh:CELLular:GSM:MRFPower:SSLot`
- Tx Power
  `MRFPWR`
  `:FETCh:CELLular:GSM:MRFPower:SSLot:TXPower`

Total measurement status

Check the total measurement status using the following command.
`MSTAT`
`:FETCh:CELLular:MEASurement:STATe`

Table 2.7.2-1 Response (Total)

Response	Description
0	Measurement completed normally
2	Level exceeded The MU887000A receive level is higher than the set input level.
4	Unable to measure A power flatness, short burst, or no training sequence detected error occurred.
9	Measurement in progress or not executed Measurement is in progress, or there is no measurement result.
12	Tx measurement timeout No trigger occurred before measurement timed out

Measurement status of each slot

Check the status of each slot using the following command.

```
MRFPWRSTAT
:FETCh:CELLular:GSM:MRFPower:SSLot:STATe
```

Table 2.7.2-2 Response (Each Slot)

Response	Description
0	Measurement completed normally
2	Level exceeded The MU887000A receive level is higher than the set input level.
4	Measurement failed A power flatness, short burst, or no training sequence detected error occurred.
5	Synchronization word not detected No synchronization word was detected in the slot signal with measurement set to on.
9	Measurement in progress or not executed Measurement is in progress, or there is no measurement result.
12	Tx measurement timeout No trigger occurred before measurement timed out. In the retrigger mode, it is output to the slot that did not detect a trigger.
14	Short burst The burst length is short.
15	Power flatness max/min fail The power flatness is incorrect.

2.7.3 Example of remote commands

An examples of measurement using remote commands is shown below.

Programming examples for remote control

---Sets measurement functions---

MEASSEL MRFPWRSNGL	/*Set measurement to Multi-Burst RF Power Measurement (single slot)*/

---Sets parameters---

MEASOBJ GMSK	/*Set the measurement target to a normal burst*/
MRFPWR_METHOD NORMAL	/*Set the measurement method to a normal*/
MRFPWR_SET 500	/*Set the number of measured frames to 500*/
MRFPWR_TRG RETRG	/*Set the trigger operation mode to Retrigger*/
MRFPWR_TLVL -30	/*Set the trigger level to -30 dB*/
MRFPWR_INTVAL 10	/*Set the interval to 10 ms*/

---Starts measurement---

SNGLS	/*Start measurement*/

---Waits until measuring instrument ready ---

---UE sends signal---

---Waits until measurement completed---

*WAI

---Queries measurement result---

MRFPWRALL?	/*Query all measurement results*/
MRFPWR?	/*Query Tx power*/

2.7.4 Power estimate function (8PSK)

Normally, multiple bursts of 8PSK modulation signals are averaged to prevent dispersion in measured values resulting from changing levels. The 8PSK power estimate function reduces the dispersion of measured values and does not require averaging for multiple bursts.
This function only supports 8PSK signals.

Set the measurement target signal to 8PSK using the following command.

```
MEASOBJ 8PSK
:CONFigure:CELLular:GSM:MOBJect 8PSK
```

Set the measurement method to the power estimate function using the following command.

```
MRFPWR_METHOD ESTIMATE
:CONFigure:CELLular:GSM:MRFPower:METHod ESTIMATE
```

2.8 Predistortion Measurement 1

The Tx power and phase during a specified measurement interval are measured for adjusting predistortion.

The following items are set.

Average Tx power during specified measurement interval

The average Tx power during each specified measurement interval is measured.

Phase during each specified measurement interval

The average phase during each specified measurement interval is measured.

2.8.1 Measured signal conditions

The measured signal must meet the following conditions.

Trigger detection condition
The rising signal is recognized as the trigger.
The trigger level is the input level setting – 30 dB.
The segment length is 100 to 4615 μs, and the ratio of valid measurement intervals is 0.1 to 1.0.

Tx Power
The Tx power should be equal to or less than the input setting level.
If a burst significantly exceeds the input setting level, the measurement status exceeds the specified value and measurement stops.

The following figure shows an example of a measured signal.

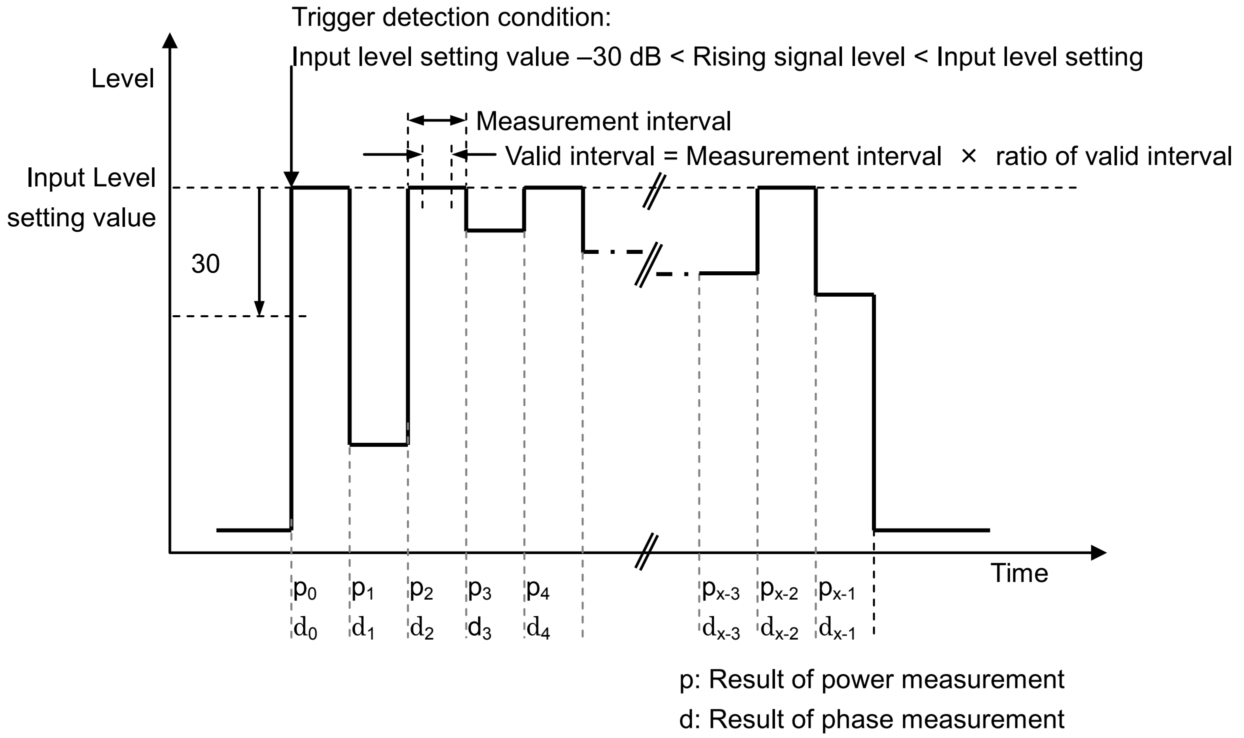

Figure 2.8.1-1 Example of Predistortion Measurement 1 Signal

2.8.2 Measurement procedure

Setting parameters

The settings are listed below.

Measurement function

Set the command parameter to Predistortion as described in section 2.1.3 “Selecting measurement function”.

Measurement target

Set a target signal type as described in section 2.1.8 “Setting measurement signals”.

Channel and frequency of input signal

Set the channel and frequency of the signal input to the MU887000A using the commands in section 2.1.4 “Frequency and level” (TCH channel, TCH Uplink frequency : mobile station Tx frequency)

Input level

Set the level of the signal input to the MU887000A by referring to the commands in section 2.1.4 “Frequency and level”
The expected level of the burst with maximum Tx power should be set.

Other parameters

Set other parameters as described in section 2.1.6 “Waveform patterns” through to section 2.1.9 “Setting measurement”.

Use the following commands to set the measurement items:

- Measurement Interval, Number of Measurement Intervals, and Ratio of Valid Measurement Intervals
  `PREDISTQ_SET`
  `:CONFigure:CELLular:GSM:QPDistortion:SET`
- Bandwidth of Filter used for Measurement
  `PREDISTQBW`
  `:CONFigure:CELLular:GSM:QPDistortion:FILTer`
- Measurement Central Time for Each Step (0 to 499) of Measurement (Time Since Level Trigger)
  `PREDISTQ_TCENTER1`
  `:CONFigure:CELLular:GSM:QPDistortion:TCENter1`
- Measurement Central Time for Each Step (125 to 249) of Measurement (Time Since Level Trigger)
  `PREDISTQ_TCENTER2`
  `:CONFigure:CELLular:GSM:QPDistortion:TCENter2`

- Measurement Central Time for Each Step (250 to 374) of Measurement (Time Since Level Trigger)
  `PREDISTQ_TCENTER3`
  `:CONFigure:CELLular:GSM:QPDistortion:TCENter3`
- Measurement Central Time for Each Step (375 to 499) of Measurement (Time Since Level Trigger)
  `PREDISTQ_TCENTER4`
  `:CONFigure:CELLular:GSM:QPDistortion:TCENter4`
- Length of Measurement Interval for Each Step (0 to 499)
  `PREDISTQ_TLENGTH1`
  `:CONFigure:CELLular:GSM:QPDistortion:TLENgth1`
- Length of Measurement Interval for Each Step (125 to 249)
  `PREDISTQ_TLENGTH2`
  `:CONFigure:CELLular:GSM:QPDistortion:TLENgth2`
- Length of Measurement Interval for Each Step (250 to 374)
  `PREDISTQ_TLENGTH3`
  `:CONFigure:CELLular:GSM:QPDistortion:TLENgth3`
- Length of Measurement Interval for Each Step (375 to 499)
  `PREDISTQ_TLENGTH4`
  `:CONFigure:CELLular:GSM:QPDistortion:TLENgth4`

Starting measurement

Start measurement as described in section 2.1.10 Starting/stopping measurement.

Wait until the instruments are ready for measurement.

Signal output

Output the signal from the mobile station.

Stopping measurement

Wait until measurement is completed and then query the results using the following command.

- Wait for measurement completion
  `*WAI`

Use the following commands to query the measurement results.

- Tx Power
  `PREDISTQ_POWER`
  `:FETCh:CELLular:GSM:QPDistortion:TXPower`
- Phase
  `PREDISTQ_PHASE`
  `:FETCh:CELLular:GSM:QPDistortion:PHASe`

- Tx Power and phase (binary output)
  `PREDISTQ_BIN`
  `:FETCh:CELLular:GSM:QPDistortion:BINary`

Total measurement status

Check the total measurement status using the following command.
`MSTAT`
`:FETCh:CELLular:MEASurement:STATe`

Table 2.8.2-1 Value of Response (Total)

Value of response	Description
0	Measurement completed normally
2	Level exceeded The MU887000A receive level is higher than the set input level.
9	Measurement in progress or not executed Measurement is in progress, or there is no measurement result.
12	Tx measurement timeout No trigger occurred before measurement timed out

2.8.3 Example of remote commands

An example of measurement using remote commands is shown below.

Programming examples for remote control

---Sets measurement functions---

`MEASSEL PREDISTQ` /*Sets measurement to Predistortion Measurement 1*/

---Sets parameters---

`PREDISTQ_SET 1000,200,0.5`

/*Measurement interval: 1000 μs, number of measurement intervals: 200, ratio of valid intervals: 0.5*/

`PREDISTQBW 30KHZ` /*Set the filter bandwidth to 30 kHz*/

---Starts measurement---

`SNGLS` /*Start measurement*/

---Waits until measuring instrument ready ---

---UE send signal---

---Waits until measurement completed---

`*WAI`

---Queries measurement result---

`PREDISTQ_POWER?` /*Query transmit power for each measurement interval*/

`PREDISTQ_PHASE?` /*Query phase for each measurement interval*/

2.9 Predistortion Measurement 2

The amplitude and phase of the signal at each sampling point is measured for predistortion adjustment.

The following items are set.

Burst power
The average burst power (dBm) is measured.

Power at each sampling point
The power at each sampling point is measured in mV units.

Phase at each sampling point
The phase at each sampling point is measured in degree units.

2.9.1 Measured signal conditions

The measured signal must meet the following conditions.

Signal configuration

The measured signal consists of a GMSK burst (corresponding to one slot) triggering the measurement start and a subsequent adjustment signal.

Trigger detection condition

The falling level of the burst is recognized as the trigger. The trigger detection point is where the burst level falls by the specified trigger level.

The sampling point where the specified delay value is added to the trigger detection point should be 0th sampling point.
Based on this sampling point, the amplitude and phase of the signal are measured for the –192 to 7999 sampling points.

The following figure shows an example of a measured signal.

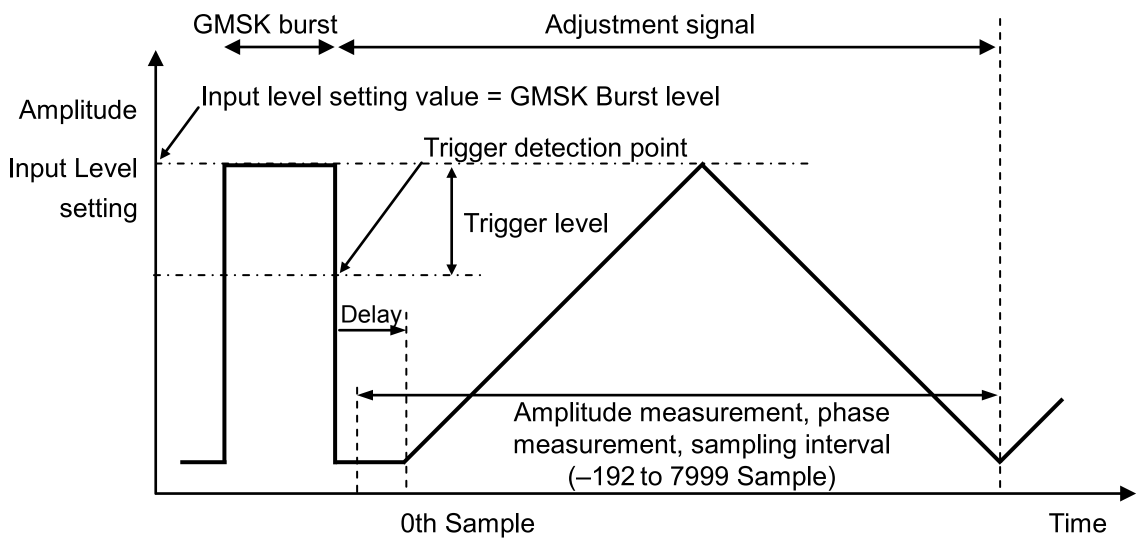

Figure 2.9.1-1 Example of Predistortion Measurement 2 Signal

2.9.2 Measurement procedure

Setting parameters

The settings are listed below.

Measurement function

Set the command parameter to Predistortion 2 as described in section 2.1.3 “Selecting measurement function”.

Measurement target

Set a target signal type as described in section 2.1.8 “Setting measurement signals”.

Channel and frequency of input signal

Set the channel and frequency of the signal input to the MU887000A using the commands in section 2.1.4 “Frequency and level” (TCH channel, TCH Uplink frequency : mobile station Tx frequency)

Input level

Set the level of the signal input to the MU887000A by referring to the commands in section 2.1.4 “Frequency and level”.
The expected level of the burst with maximum Tx power should be set.

Other parameters

Set other parameters as described in section 2.1.6 “Waveform patterns” through to section 2.1.9 “Setting measurement”.

Use the following commands to set the measurement items:

- Trigger level, trigger delay
  ```
  PREDISTE_SET
  :CONFigure:CELLular:GSM:EPDistortion:SET
  ```

Set the following parameters in the command.
Trigger level
Set the trigger level [dB] to detect the trigger point for starting measurement. In Predistortion Measurement 2, the falling level of the burst is the trigger detection point.
The trigger detection level is defined by the following equation:

(Trigger detection level [dBm])
= (Burst transmit power [dBm]) + (Trigger level [dB])

Trigger delay

Set the relative value from the sampling point detecting the trigger for starting measurement to the sampling point for actually starting measurement.

The relationship of measurement starting point, trigger detection point, and delay setting value is expressed by the following equation:

(Measurement starting point [sample])

= (Trigger detection point [sample]) + (Delay setting value [sample])

Starting measurement

Start measurement as described in section 2.1.10 “Starting/stopping measurement”.

Wait until the instruments are ready for measurement.

Signal output

Output the signal from the mobile station.

Stopping measurement

Wait until measurement is completed and then query the results using the following command.

- Wait for measurement completion
  `*WAI`

Use the following commands to query the measurement results.

- Tx Power for Trigger Burst and Amplitude at Each Sampling Point
  `PREDISTE_AMP`
  `:FETCh:CELLular:GSM:EPDistortion:AMPLitude`
- Phase at Each Sampling Point
  `PREDISTE_PHASE`
  `:FETCh:CELLular:GSM:EPDistortion:PHASe`
- Tx Power for Trigger Burst, Amplitude and Phase at Each Sampling Point (binary output)
  `PREDISTE_BIN`
  `:FETCh:CELLular:GSM:EPDistortion:BINary`

Total measurement status

Check the total measurement status using the following command.

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

Table 2.9.2-1 Response (Total)

Response	Description
0	Measurement completed normally
2	Level exceeded The MU887000A receive level is higher than the set input level.
3	Trigger burst level at least 30 dB smaller than input level
9	Measurement in progress or not executed Measurement is in progress, or there is no measurement result.
12	Tx measurement timeout No trigger occurred before measurement timed out

2.9.3 Example of remote commands

An example of measurement using remote commands is shown below.

Programming examples for remote control

---Sets measurement function---

`MEASSEL PREDISTE` /*Sets measurement to Predistortion Measurement 2*/

---Sets parameters---

`PREDISTE_SET -30,-1152`

/*Trigger level: -30 dB, delay: -1152 sample*/

---Starts measurement---

`SNGLS` /*Start the measurement*/

---Waits until measuring instrument ready ---

---UE sends signal---

---Waits until measurement completed---

`*WAI`

---Queries measurement result---

`PREDISTE_AMP? -192,8192`

/*Query transmit power and amplitude of the signal in each sampling point (8192 points from -192nd)*/

`PREDISTE_PHASE? -192,8192`

/*Query the phase in each point (8192 points from -192nd)*/

2.10 High-Speed Adjustment Measurement

This function measures the adjustment of the mobile station transceiver at high speed. It consists of the signal generator function Rx Sweep used to adjust the receiver and a Tx Sweep used to execute Tx measurement.

2.10.1 Procedure

The procedures for high-speed adjustment measurement are shown below.
The Rx Sweep parameters can be changed only while the Rs Sweep is stopped.

Rx Sweep procedures

Setting measurement function
Set the parameter to High Speed Adjustment as described in section 2.1.3 “Selecting measurement function”.

Setting parameters
Set the parameters as described in section 2.10.3 “Setting Rx Sweep parameters”.

Starting Rx Sweep
Start Rx Sweep using the following command.

```
RXSWP
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep[:EXECute]
```

Wait until mobile station measurement is completed.

Stopping Rx Sweep
Stop Rs Sweep Use the following command.

```
RXSWP
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep[:EXECute]
```

Tx Sweep procedures

Setting measurement function

Set the parameter to High Speed Adjustment as described in section 2.1.3 “Selecting measurement function”.

Setting parameters

Set the parameters as described in section 2.10.6 “Setting Tx Sweep parameters”.

Starting measurement

Start the measurement as described in section 2.1.10 “Starting/stopping measurement”.

Wait until the measuring instrument is ready.

Send signals from the mobile station.

Stopping measurement and querying results

Wait until measurement is completed.

```
*WAI
```

Querying measurement results

Query the results as described in section 2.10.7 “Tx Sweep measurement results”.

Procedure for executing Rx Sweep and Tx Sweep at same time (asynchronous)

Setting measurement function
Set the parameter to High Speed Adjustment as described in section 2.1.3 “Selecting measurement function”.

Setting parameters
Set the Rx parameters as described in section 2.10.3 “Setting Rx Sweep parameters”.
Set the Tx parameters as described in section 2.10.6 “Setting Tx Sweep parameters”.

Starting Rx Sweep
Start Rx Sweep using the following command.

```
RXSWP
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep[:EXECute]
```

Starting measurement
Start measurement as described in section 2.1.10 “Starting/stopping measurement”.

Wait until the measuring instrument is ready.

Signal output
Send signals from the mobile station.

Stopping measurement and querying results
Wait until measurement is completed.

```
*WAI
```

Querying measurement results
Query measurement results as described in section 2.10.7 “Tx Sweep measurement results”.

Wait until measurement of the mobile station is completed.

Stopping Rx Sweep
Stop Rx Sweep using the following command.

```
RXSWP
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep[:EXECute]
```

2.10.2 Rx Sweep output signal

Rx Sweep provides the signal generator function required for adjusting the mobile station receiver.

It outputs signals in a predefined sequence of up to 100 steps. The output frequency, burst type, output level pattern, and repeat count can be set at each step.
The minimum time unit for one step is 1 TDMA frame (4.615 ms). Seven out of eight slots can be used. The eighth slot (tuning slot) is allocated to the frequency change time and does not output signals.

Synchronizing the mobile station with the measuring instrument sequence using Rx Sweep saves significant time for controlling the signal generator and reduces the time for adjusting the mobile station receiver.

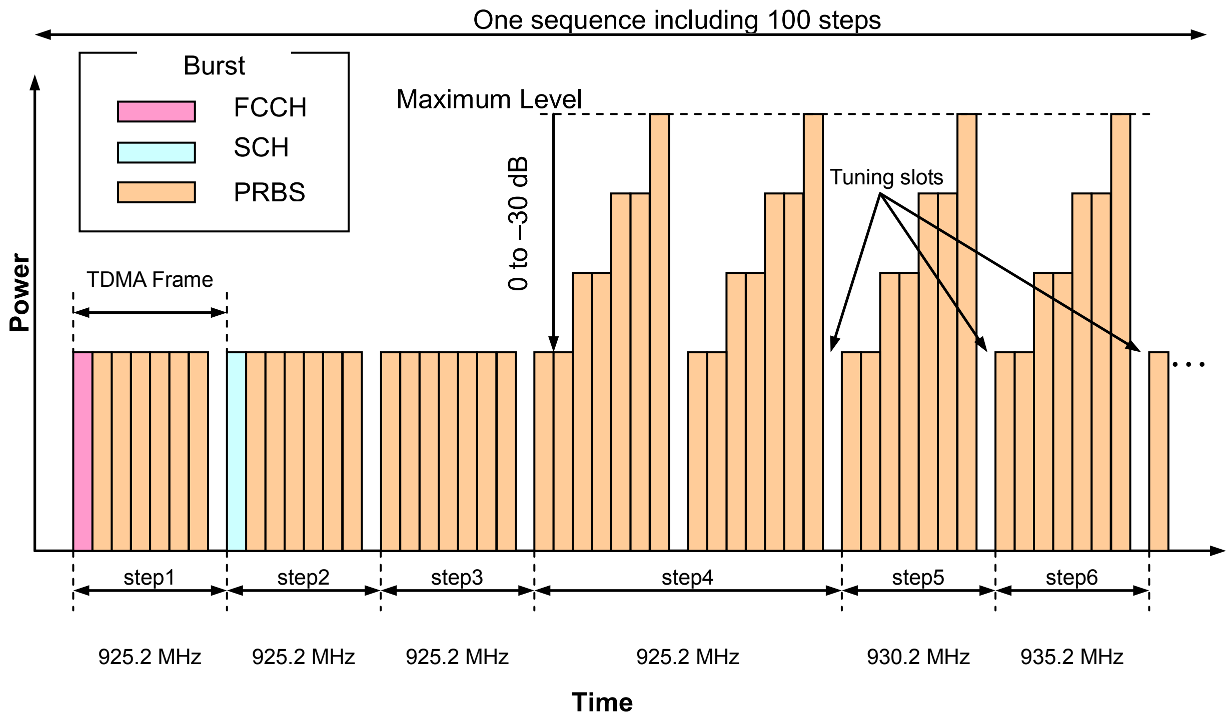

Figure 2.10.2-1 Example of Rx Sweep Output Sequence

The Rx Sweep output sequence setting should meet the following conditions.

Step

One sequence can be composed of up to 100 steps, and one step consists of one or more TDMA frames. The burst type and repeat count can be set at each step. This can repeat the same signal pattern across multiple frames. The following figure shows an example when the repeat count is set.

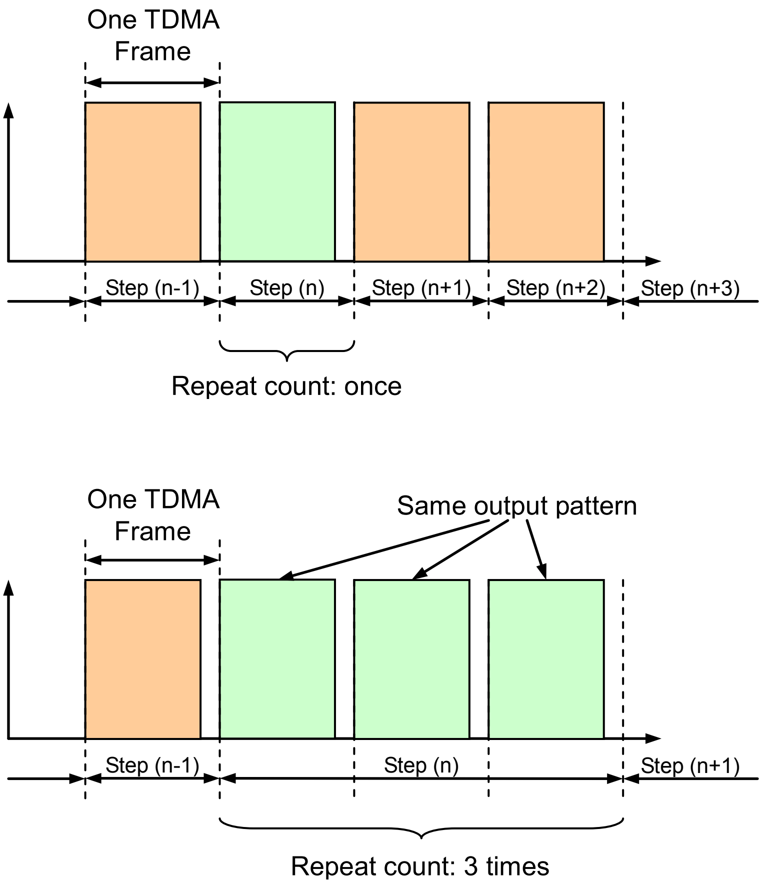

Figure 2.10.2-2 Example of Repeat Setting

Output frequency

The output frequency can be set at each step. The frequency range is between 400 and 3800 MHz. The resolution is 1 Hz.

Output level

The output level can be set at each step in dBm.

Two methods can be used.

When setting the same output level for all slots (Figure 2.10.1-3), set a numerical output level for target steps.

When setting different output levels each slot (Figure 2.10.1-4), set the output level list for each slot and set the desired list for the target steps. Up to eight output level lists can be registered. The output level can be set for Slot 0 through Slot 6.

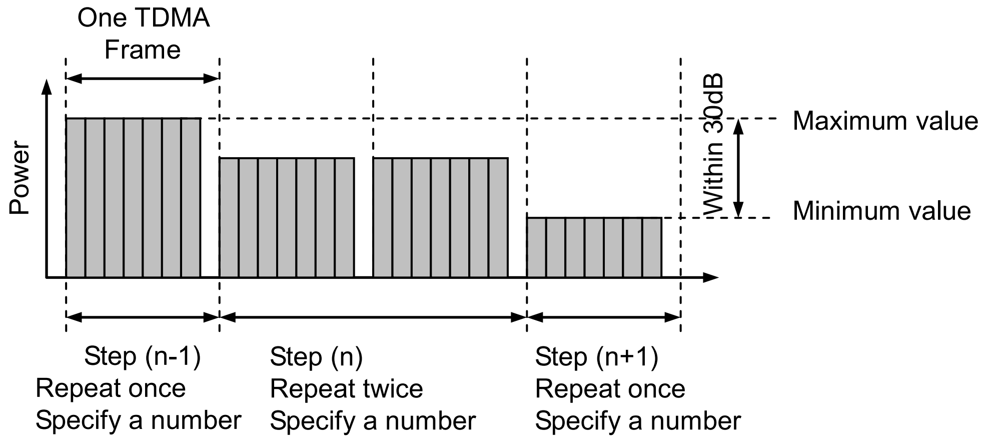

Figure 2.10.2-3 Same Output Level for All Slots

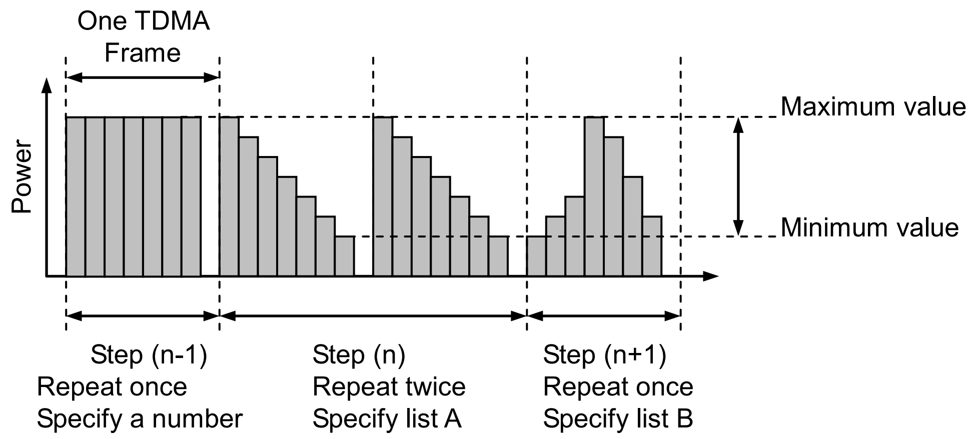

Figure 2.10.2-4 Different Output Levels for Each Slot

Burst type

The output burst type can be set at each step. The following nine burst types are supported: FCCH, SCH, PRBS, FCCH_SCH, DUMMY, FCCH_DUMMY, SCH_DUMMY, FCCH_SCH_DUMMY, and FCCH_DUMMY2.

FCCH	Frequency correction burst
SCH	Synchronization burst
PRBS	Pseudo-random Bit Stream
DUMMY	Dummy burst

The following table lists the burst type configuration. All symbol data should be PN9 for PRBS.

Table 2.10.2-1 Burst Type Configuration

Burst Type	Slot Configuration							
	Slot 0	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6	Slot 7
FCCH	FCCH	PRBS	PRBS	PRBS	PRBS	PRBS	PRBS	(Tuning)
SCH	SCH	PRBS	PRBS	PRBS	PRBS	PRBS	PRBS	(Tuning)
PRBS	PRBS	PRBS	PRBS	PRBS	PRBS	PRBS	PRBS	(Tuning)
FCCH_SCH	FCCH	SCH	PRBS	PRBS	PRBS	PRBS	PRBS	(Tuning)
DUMMY	DUMMY	DUMMY	DUMMY	DUMMY	DUMMY	DUMMY	DUMMY	(Tuning)
FCCH_DUMMY	FCCH	DUMMY	DUMMY	DUMMY	DUMMY	DUMMY	DUMMY	(Tuning)
SCH_DUMMY	SCH	DUMMY	DUMMY	DUMMY	DUMMY	DUMMY	DUMMY	(Tuning)
FCCH_SCH_DUMMY	FCCH	SCH	DUMMY	DUMMY	DUMMY	DUMMY	DUMMY	(Tuning)
FCCH_DUMMY2	DUMMY	FCCH	DUMMY	DUMMY	DUMMY	DUMMY	DUMMY	(Tuning)

2.10.3 Setting Rx Sweep parameters

Set the parameters to execute Rx Sweep using the following steps. For the details of each command, refer to Chapters 4 and 5.

The following commands can be set while Rx Sweep is stopped.

Number of executed Rx Sweep steps
Up to 100 steps can be set for one sequence.

```
RXSWPSTEPS
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:STEP
```

Output frequency setting
Set the output frequency for each step. Use the first command in the following list to set the output frequency for 100 steps, or use the subsequent four commands to set it for a total of 100 steps, each of 25 steps. Parameters for each command are set to the first step or all steps. Excluding the first step, other parameters can be omitted. Parameters at omitted locations remain unchanged from the previous setting.

- Frequency of Each Rx Sweep Step (0 to 99)
  ```
  REGMRXFREQ1
  :CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency1
  ```
- Frequency of Each Rx Sweep Step (25 to 49)
  ```
  REGMRXFREQ2
  :CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency2
  ```
- Frequency of Each Rx Sweep Step (50 to 74)
  ```
  REGMRXFREQ3
  :CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency3
  ```
- Frequency of Each Rx Sweep Step (75 to 99)
  ```
  REGMRXFREQ4
  :CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency4
  ```

Output level list setting
Use the REFMRXPWR remote command to set the output level for each slot in a frame as a list. One list consists of level settings from Slot 0 to Slot 6, and eight lists can be set.

- Output Level List for Each Slot of Rx Sweep
  REGMRXPWR
  :CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LLISt

Burst type setting
Set the burst type at each step of the output signal. Use the first command in the following list to set the output frequency for 100 steps, or use the subsequent four commands to set it for a total of 100 steps, each of 25 steps. Parameters for each command are set at the first step or all steps. Excluding the first step, other parameters can be omitted. Parameters at omitted locations remain unchanged from the previous setting.
The following eight burst types can be selected: FCCH, SCH, PRBS, FCCH_SCCH, DUMMY, FCCH_DUMMY, SCH_DUMMY, and FCCH_SCH_DUMMY.

- Burst Type for Each Rx Sweep Step (0 to 99)
  REGMRXBTYPE1
  :CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe1
- Burst Type for Each Rx Sweep Step (25 to 49)
  REGMRXBTYPE2
  :CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe2
- Burst Type for Each Rx Sweep Step (50 to 74)
  REGMRXBTYPE3
  :CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe3
- Burst Type for Each Rx Sweep Step (75 to 99)
  REGMRXBTYPE4
  :CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe4

Step output level setting
Set the output level at each step. Use the first command in the following list to set the output frequency for 100 steps, or use the subsequent four commands to set it for a total of 100 steps, each of 25 steps. Parameters for each command are set at the first step or all steps. Excluding the first step, other parameters can be omitted. Parameters at omitted locations remain unchanged from the previous setting.
When as a numerical value, the same level is used for all slots. When set as LIST1 through LIST8, the output level is based on the output level list setting. When set to OFF, that step does not output signals.

- Output Level Configuration for Each Rx Sweep Step (0 to 99)
  `REGMRXPCFG1`
  `:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel1`
- Output Level Configuration for Each Rx Sweep Step (25 to 49)
  `REGMRXPCFG2`
  `:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel2`
- Output Level Configuration for Each Rx Sweep Step (50 to 74)
  `REGMRXPCFG3`
  `:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel3`
- Output Level Configuration for Each Rx Sweep Step (75 to 99)
  `REGMRXPCFG4`
  `:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel4`

Frame repeat setting
Set the repeat frame count at each step. Use the first command in the following list to set the output frequency for 100 steps, or use the subsequent four commands to set it for a total of 100 steps, each of 25 steps. Parameters for each command are set at the first step or all steps. Excluding the first step, other parameters can be omitted. Parameters at omitted locations remain unchanged from the previous setting.

- Repeat Frame Count for Each Rx Sweep Step (0 to 99)
  `RXSWPREPEAT1`
  `:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat1`
- Repeat Frame Count for Each Rx Sweep Step (25 to 49)
  `RXSWPREPEAT2`
  `:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat2`
- Repeat Frame Count for Each Rx Sweep Step (50 to 74)
  `RXSWPREPEAT3`
  `:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat3`
- Repeat Frame Count for Each Rx Sweep Step (75 to 99)
  `RXSWPREPEAT4`
  `:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeatl4`

2.10.4 Example of Rx Sweep

An example of a Rx Sweep remote program is shown below.
It shows the signal generator control in Table 2.10.4-1.

Table 2.10.4-1 Example of Rx Sweep Output Signal

Band	Frequencies (MHz)	Power Level (dBm)	Repeat
FCCH, SCH	935.2	–40.0, –75.0	1 frame
Ignored frames	935.2	OFF	4 frames
PGSM900	935.2, 947.4, 959.8	–20.0, –30.0, –40.0, –50.0, –65.0, –75.0	1 frame
DCS1800	1805.2, 1842.8, 1879.8	–20.0, –30.0, –40.0, –50.0, –65.0, –75.0	1 frame

The output level reaches –20 to –75. Two output level lists should be set as shown in Figure 2.10.4-1.

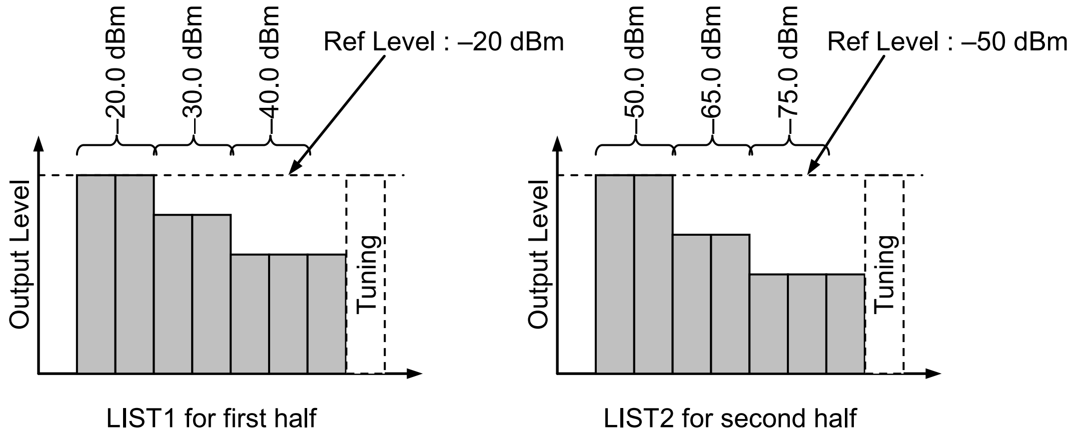

Figure 2.10.4-1 Output Level List

■ Remote control program example

--- Preparation ---

```
1: *RST                  /*Initialize all parameters*/
2: LOSSTBL 4             /*Set the loss calibration table index to 4*/
3: EXTLOSSW ON           /*Set the External Loss to on*/
4: STDSEL GSM            /*Set the standard to GSM*/
5: SOUR:GPRF:GEN:ARB:FILE:LOAD 'MV887012A_GSM_0003'
                         /*Load the waveform file*/
---Waits until loading waveform file completed---
*OPC?
---Enables high-speed adjustment function of measurement
                                                  function---
6: MEASSEL HSADJ         /*Enable the high speed adjustment function*/
7: REGMRXPWR LIST1,-20.0,-20.0,-30.0,-30.0,-40.0,-40.0,-40.0
                         /*Set the output level list LIST1*/
8: REGMRXPWR LIST2,-50.0,-50.0,-65.0,-65.0,-75.0,-75.0, -75.0
                         /*Set the output level list LIST2*/
9: REGMRXFRQ1 935.2,935.2, 935.2,935.2,947.4,959.8,1805.2,
 1842.8,1879.8           /*Set the output frequency for each step*/
10: REGMRXBTYPE1 FCCH,SCH,PRBS,PRBS,PRBS,PRBS,PRBS,PRBS,
 PRBS                    /*Set the burst type for each step*/
11: RXSWPREPEAT1 1,1,4,1,1,1,1,1,1
                         /*Set the repeat frame count for each step*/
12: RXSWPSTEPS 9         /*Set the Rx Sweep sequence step count*/
---First Rx Sweep execution (Ref. Level: –20 dBm) ---
13: REGMRXPCFG1 -40.0,-40.0,OFF,LIST1,LIST1,LIST1,LIST1,
 LIST1,LIST1             /*Set the output level for each step*/
14: OLVL -20.0dBm        /*Set Output Level to –20 dBm*/
---Waits until measuring instrument ready ---
*OPC?
15: RXSWP START          /*Start the Rx Sweep*/
---The mobile station receives call---
16: RXSWP STOP           /*Stop the Rx Sweep*/
---Second Rx Sweep execution (Ref. Level: –50 dBm) ---
17: REGMRXPCFG1 -75.0,-75.0,OFF,LIST2,LIST2,LIST2,LIST2,
 LIST2,LIST2             /*Set the output level for each step*/
18: OLVL -50.0dBm        /*Set Output Level to –50 dBm*/
---Waits until measuring instrument ready ---
*OPC?
19: RXSWP START          /*Start the Rx Sweep*/
---The mobile station receives call---
20: RXSWP STOP           /*Stop the Rx Sweep*/
```

2.10.5 Tx Sweep measured signal

Tx Sweep provides a measurement function to adjust the mobile station transmitter at high speed. It measure the power and controls the Rx frequency according to the predefined sequence.

The sequence is started by a level trigger. One sequence consists of up to 100 steps. The Tx power of seven out of eight slots in one frame is measured at each step. The remaining slot (tuning slot) is allocated to the frequency change time and power is not measured in this slot.
A repeat of two or more frames can be set at each step. When the repeat frame count is set, measurement results for this count are averaged in each slot without changing the frequency. One measurement (one sequence) can measure up to 700 slots.

The level trigger threshold value should be –30 dB from the input level. To ensure triggering, the first burst from the mobile station should be the maximum power in the burst sequence. Since the input level cannot be changed after the sequence starts, set the maximum power in the burst sequence before the sequence starts.

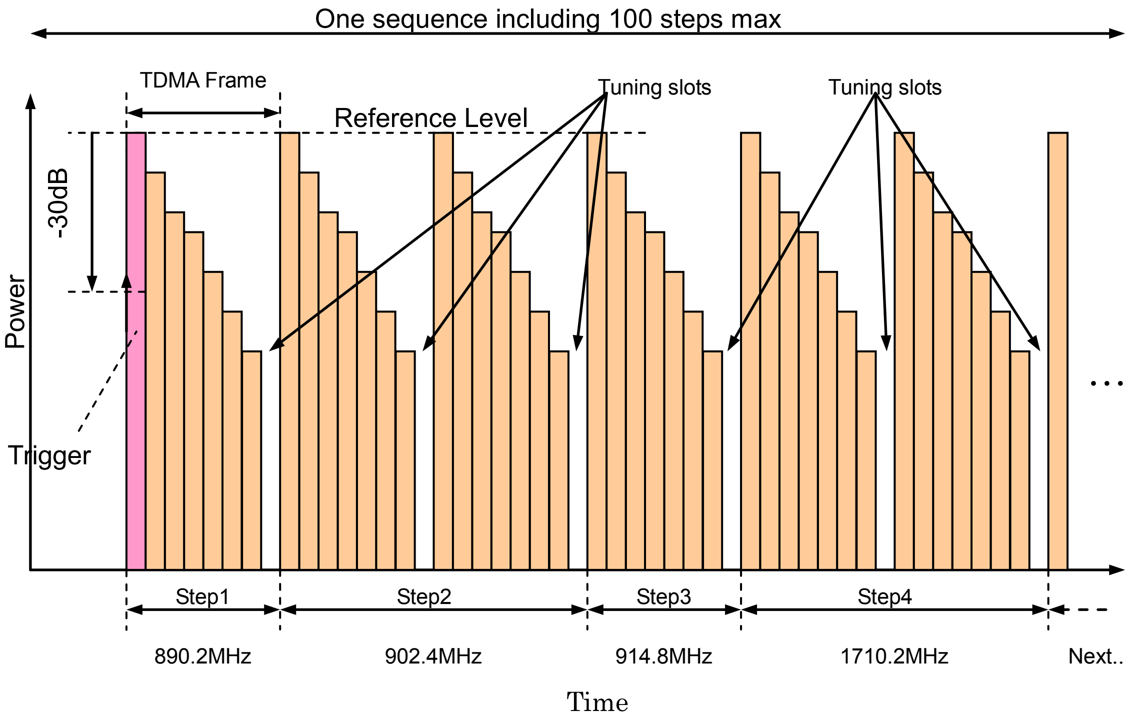

Figure 2.10.5-1 Example of Tx Sweep Sequence

2.10.6 Setting Tx Sweep parameters

Set the parameters to execute Tx Sweep using the following steps. For the details of each command, refer to Chapters 4 and 5.

Sequence step count setting

Up to 100 steps can be set for one sequence.

- Number of executed Tx Sweep steps
  `TXSWPSTEPS`
  `:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:STEP`

Input frequency setting

Set the input frequency for each step. Use the first command in the following list to set the output frequency for 100 steps, or use the subsequent four commands to set it for a total of 100 steps, each of 25 steps. Parameters for each command are set at the first step or all steps. Excluding the first step, other parameters can be omitted. Parameters at omitted locations remain unchanged from the previous setting.

- Frequency of Each Tx Sweep Step (0 to 99)
  `REGMTXFREQ1`
  `:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency1`
- Frequency of Each Tx Sweep Step (25 to 49)
  `REGMTXFREQ2`
  `:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency2`
- Frequency of Each Tx Sweep Step (50 to 74)
  `REGMTXFREQ3`
  `:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency3`
- Frequency of Each Tx Sweep Step (75 to 99)
  `REGMTXFREQ4`
  `:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency4`

Frame repeat setting
Set the repeat frame count at each step. Use the first command in the following list to set the output frequency for 100 steps, or use the subsequent four commands to set it for a total of 100 steps, each of 25 steps. Parameters for each command are set at the first step or all steps. Excluding the first step, other parameters can be omitted. Parameters at omitted locations remain unchanged from the previous setting.

- Repeat Count of Each Tx Sweep Step (0 to 99)
  `TXSWPREPEAT1`
  `:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat1`
- Repeat Count of Each Tx Sweep Step (25 to 49)
  `TXSWPREPEAT2`
  `:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat2`
- Repeat Count of Each Tx Sweep Step (50 to 74)
  `TXSWPREPEAT3`
  `:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat3`
- Repeat Count of Each Tx Sweep Step (75 to 99)
  `TXSWPREPEAT4`
  `:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat4`

Input level
Set the level of the signal input to the MX887012A.
For the setting procedure, refer to section 2.1.4 “Frequency and level”.
The expected level of the burst with maximum Tx power should be set.

Timeout period
Set the time before measurement is stopped when a burst without trigger is detected.
For the setting procedure, refer to the trigger timeout description in section 2.1.9 “ Setting measurement”.

2.10.7 Tx Sweep measurement results

Query the measurement result using the following commands.

- Measurement results for each slot when Tx Sweep used
  (The result for each slot is the average of the average count measurement results.)
  `TXSWP_AVG_TXPWR`
  `:FETCh:CELLular:GSM:HSADjustment:TXSWeep:TXPower`

Total measurement status

Check the total measurement status using the following command.
`MSTAT`
`:FETCh:CELLular:MEASurement:STATe`

Table 2.10.7-1 Response (Total)

Response	Description
0	Measurement completed normally
2	Level exceeded The MU887000A receive level is higher than the set input level.
9	Measurement in progress or not executed Measurement is in progress, or there is no measurement result.
12	Tx measurement timeout No trigger occurred before measurement timed out

Measurement status for each slot

Check the measurement status for each slot using the following command

```
TXSWP_STAT
:FETCh:CELLular:GSM:HSADjustment:TXSWeep:STATe
```

Table 2.10.7-2 Response (Each Slot)

Response	Description
0	Measurement completed normally
2	Level exceeded The MU887000A receive level is higher than the set input level.
9	Measurement in progress or not executed Measurement is in progress, or there is no measurement result.
12	Tx measurement timeout No trigger occurred before measurement timed out

2.10.8 Example of Tx Sweep

An example of a Tx Sweep remote program is shown below.
It shows the sequence for executing Tx Sweep measurement at the frequency conditions in Table 2.10.8-1.

Table 2.10.8-1　Example of Tx Sweep Measurement

Band	Frequencies (MHz)	Power Measurement Range	Averaging
PGSM900	890.2, 902.4, 914.8	+33 dBm to +7 dBm, 2 dB step	5
DCS1800	1710.2, 1747.8, 1784.8	+30 dBm to +4 dBm, 2 dB step	5

The difference between the maximum level and minimum level of the measured signal is 26 dB, and the step size is 2 dB.　Four input patterns are possible as shown in Figure 2.10.8-1.

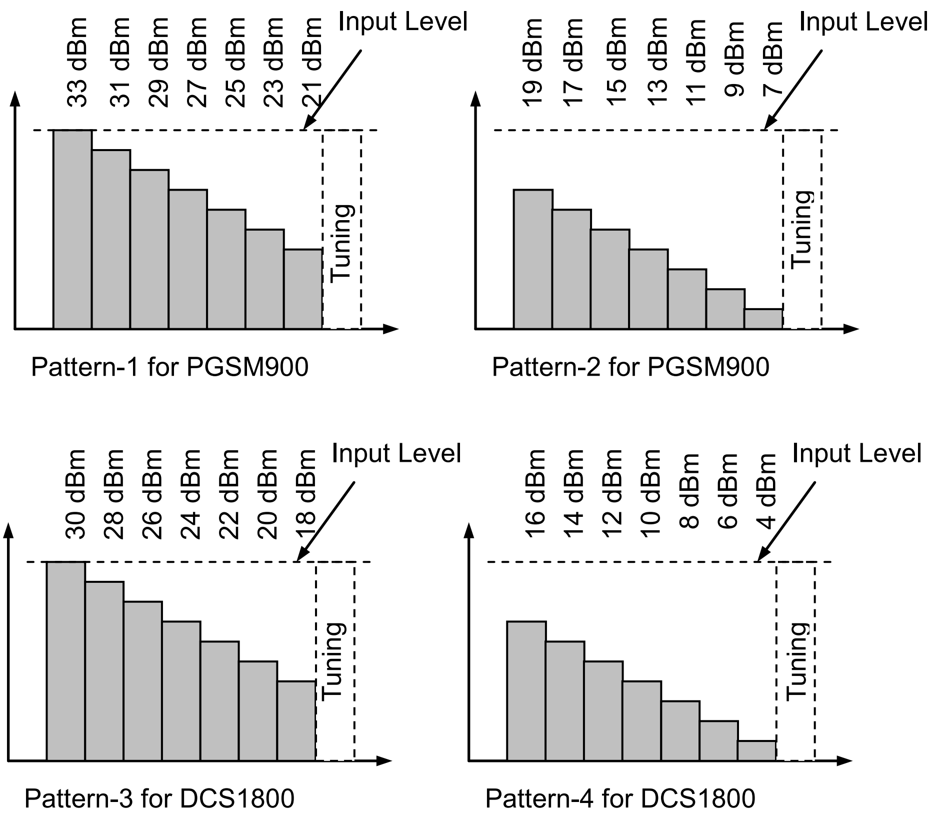

Figure 2.10.8-1　Example of Tx Sweep Input Pattern

Consequently, the Tx Sweep measurement sequence can be set as shown in the following figure.

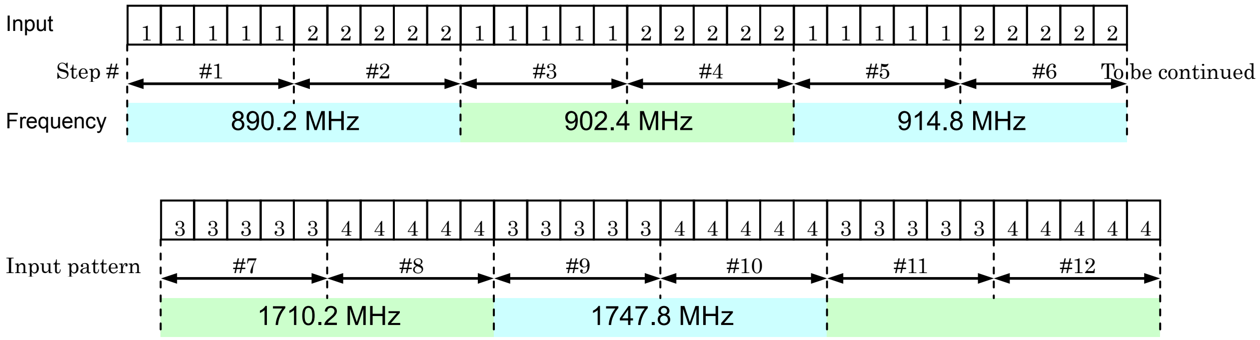

Table 2.10.8-2 Tx Sweep Measurement Sequence

■ Remote control program example

--- Preparation ---

1: `*RST` /*Initialize all parameters*/

2: `LOSSTBL 4` /*Set the loss calibration table index to 4*/

3: `EXTLOSSW ON` /*Set the External Loss to on*/

4: `STDSEL GSM` /*Set the standard to GSM*/

---Enables high-speed adjustment function of measurement function---

5: `MEASSEL HSADJ` /*Enable the high speed adjustment function*/

6: `REGMTXFREQ1 890.2,890.2,902.4,902.4,914.8,914.8,1710.2,1710.2,1747.8,1747.8,1784.8,1784.8`

/*Set the input frequency for each step*/

7: `TXSWPREPEAT1 5,5,5,5,5,5,5,5,5,5,5,5`

/*Set the repeat frame count for each step*/

8: `TXSWPSTEPS 12` /*Set the Tx Sweep sequence step count*/

9: `ILVL 33.0dBm` /*Set Input Level to 33 dBm*/

---Waits until measuring instrument ready ---

`*OPC?`

10: `SNGLS` /*Start the measurement*/

---UE send signal---

---Waits until measurement completed---

`*WAI`

---Queries measurement result---

11: `TXSWP_STAT?` /*Query the measurement status for each step*/

12: `TXSWP_AVG_TXPWR?`

/*Query the measurement result*/

2.11 Loopback BER Measurement

2.11.1 BER Measurement Types and Commands

The MX887012A performs the Bit Error Rate (BER) measurement of TCH (traffic channel) by loopback communication. In loopback communication, the object to be measured receives the downlink signal from the MU887000A and sends it back as uplink signal.

The Bit Error Rate measurement is performed to evaluate the reception performance of the object to be measured. Set the uplink signal to the level where the MU887000A does not have bit errors.

There are two types of BER measurements; high speed measurement and SRB (switched radio block) loopback measurement. In the SRB loopback measurement, BER is measured by loopback communication in EGRPS.

The setup for Bit Error Rate measurement is as follows:

Turning On/Off Bit Error Rate measurement

Sets execution of Bit Error Rate measurement

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

Sample bit number

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

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

Turning On/Off Bit Error Rate measurement in GPRS/EGPRS

Sets execution Bit Error Rate measurement in GPRS/EGPRS.

```
GPRSBER_MEAS
:CONFigure:CELLular:GSM:FUNDamental:BERate:GPRS:MEASurement
```

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

- Bit error rate
  ```
  BER
  :FETCh:CELLular:GSM:FUNDamental:BERate:ERATe
  ```
- Error bit number
  ```
  BERCNT
  :FETCh:CELLular:GSM:FUNDamental:BERate:ECOunt
  ```
- Received bit number

```
BERRECEIVE
:FETCh:CELLular:GSM:FUNDamental:BERate:RBIT
```

- Bit error rate, error bit number, received bit number, sample bit number

```
TTL_BER
:FETCh:CELLular:GSM:FUNDamental:BERate
```


2.11.2 Measurement procedure

Setting parameters

The settings are listed below.

Measurement function

Set the command parameter to FMEAS as described in section 2.1.3 “Selecting measurement function”.

Waveform pattern

The following waveform patterns are set according to Section 2.1.5 “Setting transmission signal”.
High speed measurement: PAT1 of MV887012A_GSM_0007
SRB loopback measurement: PAT2 of MV887012A_GSM_0007

Measurement target

Set the followings according to the measurement target signal in Section 2.1.8 “Setting measurement signals”.

High speed measurement: GMSK
SRB loopback measurement: 8PSK

Channel or frequency of input signal

Set the channel or frequency of the signal input to the MU887000A using the commands in section 2.1.4 “Frequency and level” (TCH channel, TCH Uplink frequency : mobile station Tx frequency)

Input level

Set the level of the signal input to the MU887000A by referring to the commands in section 2.1.4 “Frequency and level”.
Set to the level where the MU887000A does not have bit errors when receiving the signal.

Other parameters

Set other parameters as described in section 2.1.6 “Waveform pattern” through to section 2.1.9 “Setting measurement”.

BER measurement setup
Set Bit Error Rate measurement (BER_MEAS) to On for high speed measurement.
Set GPRS Bit Error Rate measurement (GPRSBER_MEAS) to On for SRB loopback measurement.
If the both are set to On, either high speed measurement or SRB loopback measurement is executed according to the measurement target signal setup.

2.11.3 Example of remote commands

An example of measurement using remote commands is shown below.

Programming example of high speed measurement:

```
---Set the transmission pattern ---
SYST:LANG SCPI                  /*Set Language mode to SCPI. */
:SOUR:GPRF:GEN:ARB:WAV:DEL:ALL      /*Clear waveform memory */
:SOUR:GPRF:GEN:ARB:FILE:LOAD "MV887012A_GSM_0007.xml"
     /*Load waveform file */
:CONF:CELL:GEN:ARB:PACK:SEL "MV887012A_GSM_0007"
     /*Set waveform pattern file */
:CONF:CELL:GEN:ARB:WAV:PATT:SEL PAT1
     /*Set waveform pattern to group number 1 */
---Sets measurement function---
:CONF:CELL:MEAS:SEL FMEAS/*Sets measurement to Tx Fundamental
                          Measurement*/
---Sets parameters---
:CONF:CELL:GSM:MOBJ GMSK   /*Set the measurement target to
GMSK burst. */
:CONF:CELL:GSM:FUND:BER:MEAS ON   /*Set BER measurement to
On. */
:CONF:CELL:GSM:FUND:BER:SAMP FAST,10000
     /*Set sample bit number to 10000. */
---Starts measurement---
:INIT:CELL:MEAS:SING                 /*Start the measurement*/
---Waits until measuring instrument ready ---
---UE sends signal---
---Waits until measurement completed---
*WAI
---Queries measurement result---
:FETC:CELL:GSM:FUND:BER? FAST
     /*Query all measurement results */
```

2

Fundamental Measurement

2.12 Capturing Waveform Data

Use the following command to obtain waveform data for measurement results after measurement is completed.

```
WAVEFMEAS
:FETCh:CELLular:GSM:FUNDamental:TRACe
```

The following table lists the measurement items, query parameters, and data interval for supported waveforms.

Table 2.12-1 Waveform Data Type and Data Interval

Measurement	Query Parameter	Data Count		Data Interval
		GMSK CONT	8PSK	
Tx Power (average)	1	10433	10433	1/8 symbol (0.462 μs)
Tx Power (max)	2			
Tx Power (min)	3			
Constellation of start frame (I)	4	883	148	1/6 symbol (0.615 μs)
Constellation of start frame (Q)	5			1 symbol (3.692 μs)
Phase error (average)	6	883	148	1/6 symbol (0.615 μs)
Phase error (max)	7			1 symbol (3.692 μs)
Phase Error (min)	8			
Magnitude error (average)	9	883	148	1 symbol (3.692 μs)
Magnitude error (max)	10			
Magnitude Error (min)	11			
EVM (average)	12	148	148	1 symbol (3.692 μs)
EVM (max)	13			
EVM (min)	14			
Demodulation data of start frame	15	148	148	1 symbol (3.692 μs)

2.13 Sample Program

2.13.1 Output RF spectrum measurement example

This section describes an example of modulation analysis using the Native command mode.

Sample programs can be executed as Tera Term macros. Refer to the Tera Term help for how to execute macros.

Processing flow

1. Set the application software type to CELLULAR.
2. Set the measurement standard to GSM.
3. Set the measurement function to Fundamental.
4. Set the following measurement conditions.

Test port	Port 1
Input level	–10 dBm
TCH Uplink frequency	890.2 MHz
Training sequence code of Uplink	TSC0
Measurement target signal	GMSK
Measurement band	GSM900
Power control level of measurement signal	5
Trigger level	–30 dB
Trigger timeout period	10 s
Measurement trigger	Video
Number of slots to measure	2
Number of slot for trigger detection	2
Tx Power measurement	OFF
Tx Power vs time measurement	OFF
Modulation analysis	OFF
Output RF spectrum measurement	ON, 100 times
Tx IQ measurement	OFF

5. Start measurement.
6. Query the status of measurements.
7. Query the measurement results when measurement is completed.

```
; Sample program for Output RF Spectrum
; 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 "GSM".
sendln 'STDSEL GSM'
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 "890.2 MHz".
sendln 'ULFREQ 890.2MHZ'
call check_error_code

; Set Uplink Training Sequence to "TSC0".
sendln 'TSC TSC0'
call check_error_code

; Set Measuring Object to "GMSK".
sendln 'MEASOBJ GMSK'
call check_error_code

; Set Measurement Band to "GSM900".
sendln 'BAND GSM900'
```

```
call check_error_code

; Set Expected Power Control Level to "5".
sendln 'PCL 5'
call check_error_code

; Set Trigger Level of Tx Fundamental Measurement to "-30".
sendln 'FMEAS_TRGLVL -30'
call check_error_code

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

; Set Measurement Trigger to "VIDEO".
sendln 'MEASTRG VIDEO'
call check_error_code

; Set Number of Active Slot "2".
sendln 'ASLOTS 2'
call check_error_code

; Set TCH slot to "2".
sendln 'TSLOT 2'
call check_error_code

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

; Set Measurement of Power vs Time to "OFF".
sendln 'PVT_SET OFF'
call check_error_code

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

; Set Measurement of Output RF Spectrum to "ON","100 times".
sendln 'ORFS_SET ON,100'
call check_error_code

; Set RBW Filter of Output RF Spectrum due to Modulation to "100 kHz".
sendln 'RBWFLT 100KHZ'
```

```
call check_error_code

; Start measurement
sendln 'SNGLS'
call check_error_code

; waiting measurement up to 10 second
for i 1 10

  sendln 'MSTATE?'
  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 Output RF Spectrum Due to Modulation Judgement
sendln 'ORFSMD_JUDGE? 0'
call check_error_code

; Query Output RF Spectrum Due to Modulation Judgement of Each Frequency Point
sendln 'ORFSMD_JUDGE_L? 0'
call check_error_code
sendln ' ORFSMD_JUDGE_U? 0'
call check_error_code

; Query Output RF Spectrum Due to Modulation
sendln 'ORFSMD_L? AVG,0'
call check_error_code
sendln ' ORFSMD_U? AVG,0'
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
```

2.13.2 Modulation analysis measurement example

This section describes an example of modulation analysis using the SCPI command mode.
Sample programs can be executed as Tera Term macros. Refer to the Tera Term help for how to execute macros.

Processing flow

1. Set the application software type to CELLULAR.
2. Set the measurement standard to GSM.
3. Set the measurement function to Fundamental.
4. Set the following measurement conditions.

Test port	Port 2
Input level	–20 dBm
TCH Uplink frequency	890.2 MHz
Training sequence code of Uplink	TSC0
Measurement target signal	8PSK
Measurement band	GSM900
Power control level of measurement signal	5
Trigger level	–30 dB
Trigger timeout period	10 s
Measurement trigger	Video
Number of slots to measure	2
Number of slot for trigger detection	2
Tx Power measurement	OFF
Tx Power vs time measurement	OFF
Modulation analysis	OFF, 200 times
Output RF spectrum measurement	OFF
Tx IQ measurement	OFF

5. Start measurement.
6. Query the status of measurements.
7. Query the following measurement results when measurement is completed.

   Carrier Frequency, Frequency Error, Worst Value of Frequency Error, EVM, Peak EVM, Phase Error, Peak Phase Error, Magnitude Error, Origin Offset, and IQ Imbalance

```
; 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 "GSM".
sendln 'CONF:CELL:MEAS:STAN GSM'
call check_error_code

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

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

; Set center frequency to "890.2 MHz".
sendln 'CONF:CELL:MEAS:RFS:FREQ 890.2MHZ'
call check_error_code

; Set Uplink Training Sequence to "TSC0".
sendln 'CONF:CELL:GSM:TSC TSC0'
call check_error_code

; Set Measuring Object to "8PSK".
sendln 'CONF:CELL:GSM:MOBJ 8PSK'
call check_error_code

; Set Measurement Band to "GSM900".
sendln 'CONF:CELL:GSM:FUND:BAND GSM900'
```

```
call check_error_code

; Set Expected Power Control Level to "5".
sendln 'CONF:CELL:GSM:FUND:PCL 5'
call check_error_code

; Set Trigger Level of Tx Fundamental Measurement to "-30".
sendln 'TRIG:CELL:GSM:FUND:LEV -30'
call check_error_code

; Set Trigger Timeout to "10 s".
sendln 'TRIG:CELL:MEAS:TOUT 10'
call check_error_code

; Set Measurement Trigger to "VIDEO".
sendln 'CONF:CELL:GSM:MTR VIDEO'
call check_error_code

; Set Number of Active Slot "2".
sendln 'CONF:CELL:GSM:FUND:ASL 2'
call check_error_code

; Set TCH slot to "2".
sendln 'CONF:CELL:GSM:FUND:TSL 2'
call check_error_code

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

; Set Measurement of Power vs Time to "OFF".
sendln 'CONF:CELL:GSM:FUND:PVT:SET OFF'
call check_error_code

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

; Set Measurement of Output RF Spectrum to "OFF".
sendln 'CONF:CELL:GSM:FUND:ORFS: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 Carrier Frequency
sendln 'FETC:CELL:GSM:FUND:MOD:CFR? 0'
call check_error_code

; Query Carrier Frequency Error
sendln 'FETC:CELL:GSM:FUND:MOD:FERR? TTL,0'
call check_error_code

; Query Carrier Frequency Error Worst Value
sendln 'FETC:CELL:GSM:FUND:MOD:FERR:WORS? 0'
call check_error_code

; Query EVM
sendln 'FETC:CELL:GSM:FUND:MOD:EVM? TTL,0'
call check_error_code

; Query Peak EVM
sendln 'FETC:CELL:GSM:FUND:MOD:PEVM? TTL,0'
call check_error_code

; Query Phase Error
sendln 'FETC:CELL:GSM:FUND:MOD:PHER? TTL,0'
call check_error_code
```

```
; Query Peak Phase Error
sendln 'FETC:CELL:GSM:FUND:MOD:PPH? TTL,0'
call check_error_code

; Query Magnitude Error
sendln 'FETC:CELL:GSM:FUND:MOD:MERR? TTL,0'
call check_error_code

; Query Origin Offset
sendln 'FETC:CELL:GSM:FUND:MOD:ORGN? TTL,0'
call check_error_code

; Query IQ Imbalance
sendln 'FETC:CELL:GSM:FUND:MOD:IQIM? TTL,0'
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 MX887012A 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 MX887012A GSM Measurement option adds the following GSM measurement items to the Sequence Measurement mode. Refer to Chapter 2 “Fundamental Measurement“ for details of each measurement.

- Tx Power
- Power vs. Time
- Modulation Analysis
  Frequency Error, EVM, Origin Offset, IQ Imbalance, 95th Percentile
- Output RF Spectrum

The Sequence Measurement mode does not support the following measurements.

- TXIQ Measurement
- Multi-Burst RF Power Measurement
- Predistortion Measurement 1
- Predistortion Measurement 2
- High-Speed Adjustment Measurement
- Waveform Data
- Bit Error Rate

GSM measurement can be allocated to any segment in the sequence table.
The segment duration depends on the measurement count. Each item of GSM measurement takes 4.615 ms.
When multiple measurements are specified in a segment, the largest measurement count determines the segment measurement duration.

Example:

Tx Power	50 times	50 × 4.615 ms = 230.75 ms
Power vs. Time	100 times	100 × 4.615 ms = 461.5 ms
Modulation Analysis	150 times	150 × 4.615 ms = 692.25 ms
Output Spectrum Measurement	50 times	50 × 4.615 ms = 230.75 ms

In this case, the measurement duration is 692.25 ms as determined by the Modulation Analysis measurement duration.

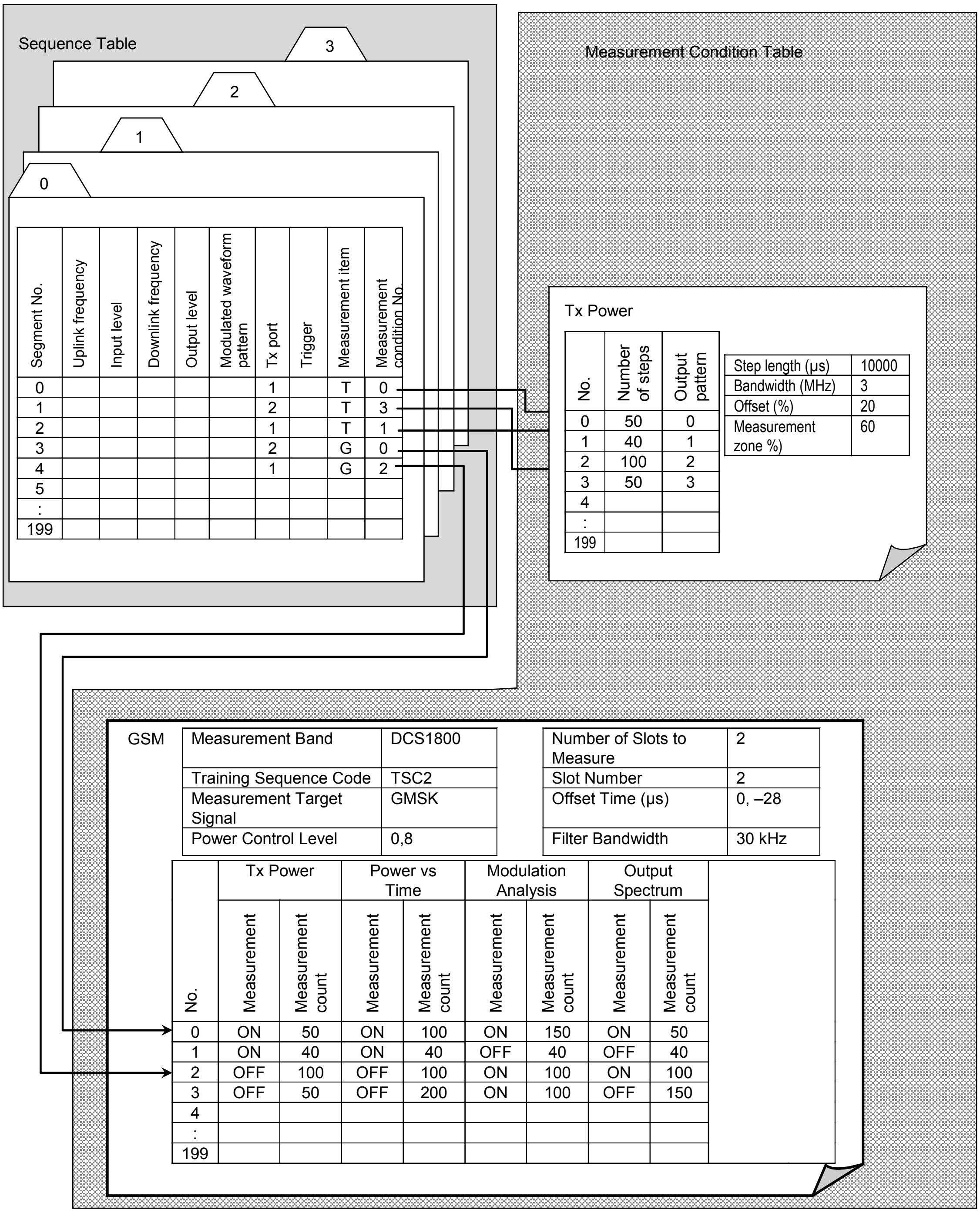

Figure 3.1-1 Data Composition of Sequence Measurement Condition When MX887012A Installed

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

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

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

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

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

- TCH Downlink Frequency (mobile station Rx)
  `DLFREQ`
  `RXFREQ`
  `:CONFigure:CELLular:GENerator:RFSettings:FREQuency`
- TCH Uplink Frequency (mobile station Tx)
  `ULFREQ`
  `TXFREQ`
- 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 Package
  `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
- Trigger timeout period
  TRGTOUT
  :TRIGger:CELLular:MEASurement:TOUT
- Ports
  PORT
  :ROUTe:PORT:CONNect:DIRection

3.2 Setting Sequence Table

3.2.1 Sequence table setting items

The sequence table setting items are:

- Table number
- Uplink frequency
- Input level
- Downlink frequency
- Output level
- Waveform pattern
- Output port
- Trigger conditions
- Measurement item
- Step count
- Measurement condition number

Table number

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

Uplink frequency, Input level, Downlink frequency, Output level, Waveform pattern

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

Frequency:	400.000000 to 3800.000000 MHz
Input level:	–65.0 to +35.0 dBm (Test Port 1, 2)
	–65.0 to +25.0 dBm (Test Port 3, 4)
Output level:	–130.0 to –10.0 dBm (Test Port 1, 2)
	–120.0 to 0.0 dBm (Test Port 3, 4)
Waveform pattern:	PAT1 to PATn (n: waveform information file group range)

For details of the modulated waveform patterns at GSM measurement, refer to Section 2.1.6 “Waveform patterns”.

Output port

This sets the number of the RF signal output port to 1 to 4 in each segment of the sequence table.

When selecting Port 3 or 4, make sure the port number is not the same as the input port.

Trigger conditions

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

The setting ranges are:

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

Measurement item, step count, and measurement mode

This sets the step count and measurement item for received signals in each segment of the sequence table.

To execute the GSM measurement described here, set GSM as the measurement mode.

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 GSM 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 GSM measurement condition table.

Without Idle Frame: Measurement count + 2

With Idle Frame: Measurement count + 2 + Idle Frame count

Table 3.2.1-1 Example of Step Count Setting

	Measurement	Example 1		Example 2	
		Measurement Execution	Measurement Count	Measurement Execution	Measurement Count
*1	Tx Power	On	50	On	100
	Power vs. Time	On	100	On	100
	Modulation Analysis	On	150	On	100
	Output Spectrum	On	50	On	100
*2	Step Count		152		102

*1: Setup item specified in GSM measurement condition table

*2: Setup item in sequence table

3.2.2 Sequence table commands

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

- Table number
  `SEQTBL`
  `:CONFigure:CELLular:SEQuence:TABLe`
- Uplink frequency, Input level, Downlink frequency, Output level, and Output signal pattern
  `SEQTRX`
  `:CONFigure:CELLular:SEQuence:RFSettings:TRX`
- Uplink frequency and Input level
  `SEQTX`
  `:CONFigure:CELLular:SEQuence:RFSettings:TX`
- Output port
  `SEQSGPORT`
  `:CONFigure:CELLular:SEQuence:RXPort`
- Trigger
  `SEQTRG`
  `:TRIGger:CELLular:SEQuence`
- Measurement mode, Step count, Measurement condition
  `SEQMEAS`
  `:CONFigure:CELLular:SEQuence:SETup`

3.2.3 Setting item error check

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

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

The following command is used to check for errors.

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

Capture memory is used to save the GSM measurement results.
One GSM measurement uses about 0.0172% of the memory, so 1.72% of the capture memory is required to execute 100 measurements for a specific segment.

The following table shows error causes.

Table 3.2.3-2 Error Cause

Parameter	Cause
Input level*1	Input level is out of range.
Output level*1	Output level is out of range.
Step count*2	Step count is shorter than frame length.
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.

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

*2: The error of step count does not occur in Tx Power measurement.

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

Sequence Measurement

3.3 Setting Measurement Conditions Table

3.3.1 Setting GSM measurement items

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

- Measurement band
- Uplink Training Sequence code
- Measurement target signal*1
- Measurement signal power control level*1
- Number of measured slots*1
- Number of slot where trigger detected*1
- Power vs. Time offset time
- Output RF spectrum due to modulation
- Tx Power measurement on/off and measurement count*1
- Power vs. Time measurement on/off and measurement count*1
- Modulation Analysis on/off and measurement count*1
- Output RF Spectrum measurement on/off and measurement count*1

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

3.3.2 GSM measurement condition commands

The following commands set and query the GSM measurement conditions.

Frequency

- Measurement band
  GSM_BAND
  :CONFigure:CELLular:SEQuence:GSM:BAND

GSM Signal

- Uplink Training Sequence code
  GSM_TSC
  :CONFigure:CELLular:SEQuence:GSM:TSCode
- Measurement target signal
  GSM_MOD
  :CONFigure:CELLular:SEQuence:GSM:MOBJect
- Measurement signal power control level
  GSM_PCL
  :CONFigure:CELLular:SEQuence:GSM:PCLevel
- Setting measurement target signal, measurement band, and power control level
  GSM_RF
  :CONFigure:CELLular:SEQuence:GSM:RFSet

Measurements

- Number of measured slots
  GSM_ASLOTS
  :CONFigure:CELLular:SEQuence:GSM:ASLot
- Number of slot where trigger detected
  GSM_TSLOT
  :CONFigure:CELLular:SEQuence:GSM:TSLot
- Power vs. time measurement offset time
  GSM_PVT_OFFSET
  :CONFigure:CELLular:SEQuence:GSM:PVTime:TOFFset
- Bandwidth of filter used at offset frequency of 1800 kHz or more for output spectrum measurement
  GSM_RBWFLT
  :CONFigure:CELLular:SEQuence:GSM:ORFSpectrum:FILTer

Measurement Items

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

- Power vs. Time measurement on/off and measurement count
  `GSM_PVT_SET`
  `:CONFigure:CELLular:SEQuence:GSM:PVTime:SET`

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

- Output Spectrum measurement on/off and measurement count
  `GSM_ORFS_SET`
  `:CONFigure:CELLular:SEQuence:GSM:ORFSpectrum:SET`

3.4 Controlling and Monitoring Sequence

3.4.1 Controlling and monitoring items

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

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

Start and stop segments

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

Initialization at end of sequence measurement

Select whether the following items are set to the values described in Section 2.1.4 "Frequency and level", when sequence measurement is completed.

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

Use the commands described in Section 2.1.10 "Starting/stopping measurement" to verify the sequence measurement start, end and status. In addition, the following items can be queried.

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

Number of measured segments and measurement status of each segment

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

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

Table 3.4.1-1 Segment Status

Value of response	Segment status
0	Measurement completed successfully
2	Over level
4	Measurement failed
5	Sync word not detected
9	Measuring or no measurement
10	Segment not measured
12	Tx measurement trigger timeout

Measurement status of specified segments

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

Progress of sequence measurement

The progress can be measured as a proportion of the total number of segments between the start and stop 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 segments
  `SEQSEGSTAT`
  `:FETCh:CELLular:SEQuence:SEG:STATe`
- Progress status of sequence measurement
  `SEQMSTAT`
  `:FETCh:CELLular:SEQuence:STATe`

3.5 Measurement Results

The GSM measurement results are queried using the following commands.

Tx Power

- Tx Power
  GSM_TXPWR
  :FETCh:CELLular:SEQuence:GSM:POWer:TXPower
- Estimated power (8PSK measurement signal)
  GSM_ESTPWR
  :FETCh:CELLular:SEQuence:GSM:POWer:EPOWer

Power vs. Time

- Power vs. time (GSM or 8PSK measurement signal)
  GSM_PVT
  :FETCh:CELLular:SEQuence:GSM:PVTime:OTPower
- Power vs. Time template (GSM or 8PSK measurement signal)
  GSM_PVT_TEMPLATE
  :FETCh:CELLular:SEQuence:GSM:PVTime:TEMPlate
- Power vs. Time template detail (GSM or 8PSK measurement signal)
  GSM_PVT_DETAIL
  :FETCh:CELLular:SEQuence:GSM:PVTime:TEMPlate:DETail
- Time Alignment (GSM or 8PSK measurement signal)
  GSM_TERR
  :FETCh:CELLular:SEQuence:GSM:PVTime:TERRor
- Time Alignment (Worst) (GSM or 8PSK measurement signal)
  GSM_TERR_WORST
  :FETCh:CELLular:SEQuence:GSM:PVTime:TERRor:WORSt

Modulation Analysis

- Frequency (Hz)
  `GSM_CFREQ`
  `:FETCh:CELLular:SEQuence:GSM:MODulation:CFRequency`
- Frequency Error (ppm, Hz)
  `GSM_CFERR`
  `:FETCh:CELLular:SEQuence:GSM:MODulation:FERRor`
- Frequency Error Worst value (ppm, Hz)
  `GSM_CFERR_WORST`
  `:FETCh:CELLular:SEQuence:GSM:MODulation:FERRor:WORSt`
- EVM (RMS) (8PSK measurement signal)
  `GSM_EVM`
  `:FETCh:CELLular:SEQuence:GSM:MODulation:EVM`
- Peak EVM (8PSK measurement signal)
  `GSM_PEVM`
  `:FETCh:CELLular:SEQuence:GSM:MODulation:PEVM`
- Phase Error
  `GSM_PHASEERR`
  `:FETCh:CELLular:SEQuence:GSM:MODulation:PHERror`
- Peak Phase Error
  `GSM_PPHASEERR`
  `:FETCh:CELLular:SEQuence:GSM:MODulation:PPHerror`
- Peak Phase Error (absolute value)
  `GSM_PPHASEERR_ABS`
  `:FETCh:CELLular:SEQuence:GSM:MODulation:PPHerror:ABSolute`
- Magnitude Error
  `GSM_MAGERR`
  `:FETCh:CELLular:SEQuence:GSM:MODulation:MERRor`
- Origin Offset
  `GSM_ORGNOFS`
  `:FETCh:CELLular:SEQuence:GSM:MODulation:ORGNoffset`
- IQ Imbalance
  `GSM_IQIMB`
  `:FETCh:CELLular:SEQuence:GSM:MODulation:IQIMbalance`
- 95th Percentile (8PSK measurement signal)
  `GSM_EVM95PCT`
  `:FETCh:CELLular:SEQuence:GSM:MODulation:EPERcentile`

Output Spectrum Measurement

Output RF Spectrum – Modulation

- Output RF Spectrum due to modulation (lower side)
  GSM_ORFSMD_L
  :FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:LOWer
- Output RF spectrum due to modulation (lower side) fail frequency point
  GSM_ORFSMD_JUDGE_L
  :FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:LOWer:FPOint
- Output RF Spectrum due to modulation (upper side)
  GSM_ORFSMD_U
  :FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:UPPer
- Output RF Spectrum due to modulation (upper side) fail frequency point
  GSM_ORFSMD_JUDGE_U
  :FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:UPPer:FPOint
- Output RF Spectrum due to modulation judgement
  GSM_ORFSMD_JUDGE
  :FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:JUDGement

Output RF Spectrum – Switching

- Output RF Spectrum due to switching (lower side)
  `GSM_ORFSSW_L`
  `:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:LOWer`
- Output RF Spectrum due to switching (lower side) fail frequency point
  `GSM_ORFSSW_JUDGE_L`
  `:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:LOWer:FPOint`
- Output RF Spectrum due to switching (upper side)
  `GSM_ORFSSW_U`
  `:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:UPPer`
- Output RF Spectrum due to switching (upper side) fail frequency point
  `GSM_ORFSSW_JUDGE_U`
  `:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:UPPer:FPOint`
- Output RF Spectrum due to switching judgement
  `GSM_ORFSSW_JUDGE`
  `:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:JUDGement`

3.6 Sample Program

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

Processing Flow

1. Set the application type to CELLULAR.
2. Set the measurement to sequence measurement.
3. Set the measurement conditions listed in Table 3.6-1 to Table 3.6-5.
4. Set the following items:

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

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

   Tx Power of segment 0
   Power vs. Time of segment 0
   Output RF Spectrum of segment 1
   Modulation analysis of segment 1

Table 3.6-1 Sequence Table Setting 1

Segment number	Frequency band	Uplink frequency (MHz)	Input level (dBm)	Downlink frequency (MHz)	Output level (dBm)	Output signal pattern	Output port
0	GSM900	890.2	0	935.2	–50	PAT1	1
1	DCS1800	1710.2	0	1805.2	–55	PAT2	2

Table 3.6-2 Sequence Table Setting 2

Segment number	Trigger source	Trigger slope	Trigger level	Trigger delay time (ms)	Measurement item	Number of steps	Measurement condition number
0	Free run	↑	–20	0	GSM	1000	0
1	Free run	↑	–25	0	GSM	1000	1

*↑: Rise

Table 3.6-3 GSM Measurement Condition Setting

Item	Set value			
Uplink Training Sequence	TSC2			
Measurement Target signal	GMSK			
Number of Active Slot	1			
RBW Filter of Output RF Spectrum due to modulation	100 kHz			
Power Control Level of measurement signal	5			
Measurement condition number	0	1	2	…
Tx Power measurement	ON	OFF		
Tx Power measurement count	100	10		
Power vs. Time measurement	ON	OFF		
Power vs. Time measurement count	50	5		
Output Spectrum measurement	OFF	ON		
Output Spectrum measurement count	100	10		
Modulation Analysis measurement	OFF	ON		
Modulation Analysis measurement count	100	10		

```
; Sample program for Tx/Rx vs Frequency
; 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 software 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 0,890.2,0,935.2,-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,GSM,1000,0'
call check_error_code

; Set Sequence Table Parameters of "segment 1".
sendln ' SEQTRX 1,1710.2,0,1805.2,-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 0,GSM,1000,1'
call check_error_code

; Set Measurement Condition of "GSM".
sendln 'GSM_RF 0,GSM900,5,GMSK'
call check_error_code

sendln 'GSM_ASLOTS 0,1'
call check_error_code

sendln 'GSM_TSC TSC2'
call check_error_code

sendln 'GSM_RBWFLT 100KHZ'
call check_error_code

sendln 'GSM_PWR_SET 0,ON,100'
call check_error_code

sendln 'GSM_PWR_SET 1,OFF,10'
call check_error_code

sendln 'GSM_PVT_SET 0,ON,50'
call check_error_code

sendln 'GSM_PVT_SET 1,OFF,5'
call check_error_code

sendln 'GSM_ORFS_SET 0,OFF,100'
call check_error_code

sendln 'GSM_ORFS_SET 1,ON,10'
call check_error_code

sendln 'GSM_MOD_SET 0,OFF,100'
call check_error_code

sendln 'GSM_MOD_SET 1,ON,10'
call check_error_code


; Set Output State to "On".
```

```
sendln 'LVL ON'
call check_error_code

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

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

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

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

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

```
; Query Power vs. time of "Segment 0"
sendln 'GSM_PVT? 0,AVG,0'
call check_error_code

; Query Power vs. time template of "Segment 0"
sendln 'GSM_PVT_TEMPLATE? 0,0'
call check_error_code
sendln 'GSM_PVT_DETAIL? 0,0'
call check_error_code

; Query Output RF Spectrum Due to Modulation data of "Segment 1"
sendln 'GSM_ORFSMD_JUDGE? 1,0'
call check_error_code
sendln 'GSM_ORFSMD_JUDGE_L? 1,0'
call check_error_code
sendln 'GSM_ORFSMD_L? 1,AVG,0'
call check_error_code
sendln 'GSM_ORFSMD_JUDGE_U? 1,0'
call check_error_code
sendln 'GSM_ORFSMD_U? 1,AVG,0'
call check_error_code

; Query Carrier Frequency data of "Segment 1"
sendln 'GSM_CFREQ? 1,0'
call check_error_code

; Query Carrier Frequency Error data of "Segment 1".
sendln 'GSM_CFERR? 1,AVG,0'
call check_error_code
sendln 'GSM_CFERR_WORST? 1,0'
call check_error_code

; Query EVM data of "Segment 1".
sendln 'GSM_EVM? 1,MAX,0'
call check_error_code
sendln 'GSM_PEVM? 1,MAX,0'
call check_error_code
sendln 'GSM_PHASEERR? 1,MAX,0'
call check_error_code
sendln 'GSM_PPHASEERR? 1,MAX,0'
call check_error_code
sendln 'GSM_MAGERR? 1,MAX,0'
call check_error_code
```

```
; Query IQ Imbalance of "Segment 1".
sendln 'GSM_IQIMB? 1,TTL,0'
call check_error_code

; Query 95:th Percentile data of "Segment 1".
sendln 'GSM_EVM95PCT? 1,0'
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

SCPI Command Reference

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 Parameters

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
Input Level	:CONFigure:CELLular:MEASurement:RFSettings:LEVel <level>	:CONFigure:CELLular:MEASurement:RFSettings:LEVel?	<level>
Input Level Control	:CONFigure:CELLular:GSM:FUNDamental:CONTrol:LEVel <type>	:CONFigure:CELLular:GSM:FUNDamental:CONTrol:LEVel?	<type>
Output Level	:CONFigure:CELLular:GENerator:RFSettings:LEVel <level>	:CONFigure:CELLular:GENerator:RFSettings:LEVel?	<level>
TCH Channel	:CONFigure:CELLular:GSM:RFSettings:TCHannel <ch>	:CONFigure:CELLular:GSM:RFSettings:TCHannel?	<ch>
TCH Uplink Frequency	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency <freq>	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency?	<freq>
TCH Downlink Frequency	:CONFigure:CELLular:GENerator:RFSettings:FREQuency <freq>	:CONFigure:CELLular:GENerator:RFSettings:FREQuency?	<freq>
Measurement Object	:CONFigure:CELLular:GSM:MOBJect <object>	:CONFigure:CELLular:GSM:MOBJect?	<object>
Measurement Select	:CONFigure:CELLular:MEASurement:SELect <meas>	:CONFigure:CELLular:MEASurement:SELect?	<meas>
Measurement Trigger	:CONFigure:CELLular:GSM:MTRigger <trigger>	:CONFigure:CELLular:GSM:MTRigger?	<trigger>
System Combination	:CONFigure:CELLular:GSM:RFSettings:SCOMbination <system>	:CONFigure:CELLular:GSM:RFSettings:SCOMbination?	<system>

Common Parameters (Cont'd)

Function	Command	Query	Response
Trigger Timeout	:TRIGger:CELLular:MEASurement:TOUT <time>	:TRIGger:CELLular:MEASurement:TOUT?	<time>
Uplink Training Sequence	:CONFigure:CELLular:GSM:TSCode <tsc>	:CONFigure:CELLular:GSM:TSCode?	<tsc>

Fundamental Measurement Parameters

Function	Command	Query	Response
Turn Off All Measurement Items	:CONFigure:CELLular:GSM:FUNDamental:AMITems:OFF	-----	-----
Measurement Band	:CONFigure:CELLular:GSM:FUNDamental:BAND <band>	:CONFigure:CELLular:GSM:FUNDamental:BAND?	<band>
GPRS Bit Error Rate On/Off (GPRS/EGPRS)	:CONFigure:CELLular:GSM:FUNDamental:BERate:GPRS:MEASurement <on_off>	:CONFigure:CELLular:GSM:FUNDamental:BERate:GPRS:MEASurement?	<on_off>
Bit Error Rate On/Off (GSM)	:CONFigure:CELLular:GSM:FUNDamental:BERate:MEASurement <on_off>	:CONFigure:CELLular:GSM:FUNDamental:BERate:MEASurement?	<on_off>
BER number of sample	:CONFigure:CELLular:GSM:FUNDamental:BERate:SAMPle <type>,<number>	:CONFigure:CELLular:GSM:FUNDamental:BERate:SAMPle? <type>	<type>,<number>
Expected Power Control Level	:CONFigure:CELLular:GSM:FUNDamental:PCLevel <pcl>	:CONFigure:CELLular:GSM:FUNDamental:PCLevel?	<pcl>
Number of Active Slot	:CONFigure:CELLular:GSM:FUNDamental:ASLot <a>	:CONFigure:CELLular:GSM:FUNDamental:ASLot?	<a>
TCH Test Pattern	:CONFigure:CELLular:GSM:FUNDamental:TCH:PATTern <pattern>	:CONFigure:CELLular:GSM:FUNDamental:TCH:PATTern?	<pattern>
TCH Slot	:CONFigure:CELLular:GSM:FUNDamental:TSLot <slot>	:CONFigure:CELLular:GSM:FUNDamental:TSLot?	<slot>

Fundamental Measurement Parameters (Cont'd)

Function	Command	Query	Response
Measurement Band, Expected Power Control Level and Measuring Object	:CONFigure:CELLular:GSM: FUNDamental:RFSet <band>,<pcl>,<object>	:CONFigure:CELLular:GSM: FUNDamental:RFSet?	<band>,<pcl>,<object>
Power Measurement On/Off and Average Count	:CONFigure:CELLular:GSM: FUNDamental:POWer:SET <on_off>[,<count>]	:CONFigure:CELLular:GSM: FUNDamental:POWer:SET?	<on_off>,<count>
Power vs. Time Measurement On/Off and Count	:CONFigure:CELLular:GSM: FUNDamental:PVTime:SET <on_off>[,<count>]	:CONFigure:CELLular:GSM: FUNDamental:PVTime:SET?	<on_off>,<count>
Power vs. Time, Time Offset	:CONFigure:CELLular:GSM: FUNDamental:PVTime:TOFFset <num>,<offset>	:CONFigure:CELLular:GSM: FUNDamental:PVTime:TOFFset? <num>	<offset>
Modulation Analysis On/Off and Count	:CONFigure:CELLular:GSM: FUNDamental:MODulation:SET <on_off>[,<count>]	:CONFigure:CELLular:GSM: FUNDamental:MODulation:SET?	<on_off>,<count>
Output RF Spectrum Measurement On/Off and Count	:CONFigure:CELLular:GSM: FUNDamental:ORFSpectrum: SET <on_off>[,<count>]	:CONFigure:CELLular:GSM: FUNDamental:ORFSpectrum: SET?	<on_off>,<count>
Trigger Level of Tx Fundamental Measurement	:TRIGger:CELLular:GSM:FUNDamental:LEVel <level>	:TRIGger:CELLular:GSM:FUNDamental:LEVel?	<level>
RBW Filter of Output RF Spectrum due to Modulation	:CONFigure:CELLular:GSM: FUNDamental:ORFSpectrum: FILTer <rbw>	:CONFigure:CELLular:GSM: FUNDamental:ORFSpectrum: FILTer?	<rbw>
Graph Data Output On/Off	:CONFigure:CELLular:GSM: FUNDamental:GRAPh <on_off>	:CONFigure:CELLular:GSM: FUNDamental:GRAPh?	<on_off>

Fundamental Measurement Results

Function	Command	Query	Response
Bit Error Rate - Total	-----	:FETCh:CELLular:GSM:FUNDamental:BERate? <type>	<judge>,<rate>,<n1>,<n2>,<n3>
Bit Error Rate - Error Counts	-----	:FETCh:CELLular:GSM:FUNDamental:BERate:ECOunt? <type>	<number>
Bit Error Rate	-----	:FETCh:CELLular:GSM:FUNDamental:BERate:ERATe? <type>	<rate>
Bit Error Rate - Received bits	-----	:FETCh:CELLular:GSM:FUNDamental:BERate:RBIT? <type>	<number>
Carrier Frequency	-----	:FETCh:CELLular:GSM:FUNDamental:MODulation:CFRequency? [<slot>]	<freq>
95:th Percentile	-----	:FETCh:CELLular:GSM:FUNDamental:MODulation:EPERcentile? [<slot>]	<percent>
EVM	-----	:FETCh:CELLular:GSM:FUNDamental:MODulation:EVM? <mode>[,<slot>]	{<avg>,<max>,<min>}|<percent>|{<n,<percent(0)>,<percent(1)>,...,<percent(n-1)>}
Carrier Frequency Error	-----	:FETCh:CELLular:GSM:FUNDamental:MODulation:FERRor? <mode>[,<slot>]	{<avg_ppm>,<avg_hz>,<max_ppm>,<max_hz>,<min_ppm>,<min_hz>}|{<freq_ppm>,<freq_hz>}
Carrier Frequency Error Worst Value	-----	:FETCh:CELLular:GSM:FUNDamental:MODulation:FERRor:WORSt? [<slot>]	<freq_ppm>,<freq_hz>

Fundamental Measurement Results (Cont'd)

Function	Command	Query	Response
IQ Imbalance	-----	:FETCh:CELLular:GSM:FUNDamental:MODulation:IQIMbalance? <mode>[,<slot>]	{<avg>,<max>,<min>}|<value>
Magnitude Error	-----	:FETCh:CELLular:GSM:FUNDamental:MODulation:MERRor? <mode>[,<slot>]	{<avg>,<max>,<min>}|<percent>
Origin Offset	-----	:FETCh:CELLular:GSM:FUNDamental:MODulation:ORGNoffset? <mode>[,<slot>]	{<avg>,<max>,<min>}|<value>
Peak EVM	-----	:FETCh:CELLular:GSM:FUNDamental:MODulation:PEVM? <mode>[,<slot>]	{<avg>,<max>,<min>}|<percent>
RMS Phase Error	-----	:FETCh:CELLular:GSM:FUNDamental:MODulation:PHERror? <mode>[,<slot>]	{<avg>,<max>,<min>}|<deg>
Peak Phase Error	-----	:FETCh:CELLular:GSM:FUNDamental:MODulation:PPHerror? <mode>[,<slot>]	{<avg>,<max>,<min>}|<deg>
Output RF Spectrum Due to Modulation Judgement	-----	:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation:JUDGement? [<slot>]	<judge>
Output RF Spectrum Due to Modulation (Lower Side)	-----	:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation:LOWer? <mode>[,<slot>]	{<avg(0)>,<avg(1)>,...,<avg(freq)>,<max(0)>,<max(1)>,...,<max(freq)>,<min(0)>,<min(1)>,...,<min(freq)>}|{<level(0)>,<level(1)>,...,<level(freq)>}

Fundamental Measurement Results (Cont'd)

Function	Command	Query	Response
Output RF Spectrum Due to Modulation Judgement of Each Frequency Point (Lower Side)	-----	:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation:LOWer:FPOint? [<slot>]	<judge>,<freq>
Output RF Spectrum Due to Modulation (Upper Side)	-----	:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation:UPPer? <mode>[,<slot>]	{<avg(0)>,<avg(1)>,...,<avg(freq)>,<max(0)>,<max(1),...,<max(freq)>,<min(0)>,<min(1)>,...,<min(freq)>}|{<level(0)>,<level(1)>,...,<level(freq)>}
Output RF Spectrum Due to Modulation Judgement of Each Frequency Point (Upper Side)	-----	:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation:UPPer:FPOint? [<slot>]	<judge(0)>,<judge(1)>,...,<judge(freq)>
Output RF Spectrum Due to Switching Judgement	-----	:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:JUDGement? [<slot>]	<judge>

Fundamental Measurement Results (Cont'd)

Function	Command	Query	Response
Output RF Spectrum Due to Switching (Lower Side)	-----	:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:LOWer? <mode>[,<slot>]	{<avg(0)>,<avg(1)>,...,<avg(freq)>,<max(0)>,<max(1)>,...,<max(freq)>,<min(0)>,<min(1)>,...,<min(freq)>}|{<level(0)>,<level(1)>,...,<level(freq)>}
Output RF Spectrum Due to Switching Judgement of Each Frequency Point (Lower Side)	-----	:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:LOWer:FPOint? [<slot>]	<judge(0)>,<judge(1)>,...,<judge(freq)>
Output RF Spectrum Due to Switching (Upper Side)	-----	:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:UPPer? <mode>[,<slot>]	{<avg(0)>,<avg(1)>,...,<avg(freq)>,<max(0)>,<max(1)>,...,<max(freq)>,<min(0)>,<min(1)>,...,<min(freq)>}|{<level(0)>,<level(1)>,...,<level(freq)>}

Fundamental Measurement Results (Cont'd)

<table>
<tr><th>Function</th><th>Command</th><th>Query</th><th>Response</th></tr>
<tr><td>Output RF Spectrum Due to Switching Judgement of Each Frequency Point (Upper Side)</td><td>-----</td><td>:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:UPPer:FPOint? [<slot>]</td><td><judge(0)>,<judge(1)>,...,<judge(freq)></td></tr>
<tr><td>Estimated Power</td><td>-----</td><td>:FETCh:CELLular:GSM:FUNDamental:POWer:EPOWer? <mode>[,<slot>]</td><td>{<avg>,<max>,<min>}|<level>|{<n>,<level(0)>,<level(1)>,...,<level(n-1)>}</td></tr>
<tr><td>Carrier Off Power</td><td>-----</td><td>:FETCh:CELLular:GSM:FUNDamental:POWer:OFFPower? <mode>[,<slot>]</td><td>{<avg>,<max>,<min>}|<level></td></tr>
<tr><td>Power Flatness Maximum Power</td><td>-----</td><td>:FETCh:CELLular:GSM:FUNDamental:POWer:PFMaximum? <mode>[,<slot>]</td><td>{<avg>,<max>,<min>}|<level></td></tr>
<tr><td>Power Flatness Minimum Power</td><td>-----</td><td>:FETCh:CELLular:GSM:FUNDamental:POWer:PFMinimum? <mode>[,<slot>]</td><td>{<avg>,<max>,<min>}|<level></td></tr>
<tr><td>On/Off Ratio</td><td>-----</td><td>:FETCh:CELLular:GSM:FUNDamental:POWer:RATio? <mode>[,<slot>]</td><td>{<avg>,<max>,<min>}|<level></td></tr>
<tr><td>Tx Power</td><td>-----</td><td>:FETCh:CELLular:GSM:FUNDamental:POWer:TXPower? <mode>[,<slot>]</td><td>{<avg>,<max>,<min>}|<level></td></tr>
<tr><td>Power vs. Time</td><td>-----</td><td>:FETCh:CELLular:GSM:FUNDamental:PVTime:OTPower? <mode>[,<slot>]</td><td>{<avg>,<max>,<min>}|<level></td></tr>
<tr><td>Power vs. Time Template Judgement</td><td>-----</td><td>:FETCh:CELLular:GSM:FUNDamental:PVTime:TEMPlate? [<slot>]</td><td><judge></td></tr>
</table>

Fundamental Measurement Results (Cont'd)

Function	Command	Query	Response
Power vs. Time Template storage Judgement	-----	:FETCh:CELLular:GSM:FUNDamental:PVTime:TEMPlate:STORage? <mode>[,<slot>]	{<judge_avg>,<judge_max>,<judge_min>}|<judge>
Power vs. Time Template Judgement Detail	-----	:FETCh:CELLular:GSM:FUNDamental:PVTime:TEMPlate:DETail? [<slot>]	<type>,<judge>,<n>
Power vs. Time Template storage Judgement Detail	-----	:FETCh:CELLular:GSM:FUNDamental:PVTime:TEMPlate:DETail:STORage? <mode>[,<slot>]	<judge>
Time Alignment	-----	:FETCh:CELLular:GSM:FUNDamental:PVTime:TERRor? <mode>[,<slot>]	{<avg>,<max>,<min>}|<value>
Time Alignment Worst Value	-----	:FETCh:CELLular:GSM:FUNDamental:PVTime:TERRor:WORSt? [<slot>]	<value>
Measurement Status of Each Slot	-----	:FETCh:CELLular:GSM:FUNDamental:STATe?	<status(0)>, <status(1)>,……, <status(s)>

Fundamental Measurement Results (Cont'd)

Function	Command	Query	Response
Graph Data	-----	:FETCh:CELLular:GSM:FUNDamental:TRACe? <format>,<start>,<n>[,<slot>]	data(0),data(1),...,data(n-1)
TX IQ	-----	:FETCh:CELLular:GSM:FUNDamental:TXIQ:POWer? <mode>[,<slot>]	<level(0)>,<level(1)>,...,<level(freq)>

High-Speed Adjustment Parameters

Function	Command	Query	Response
Rx Sweep Burst Type List 1 (0 to 99)	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe1 <type0>[,<type1>[,...[,<type99>]...]]	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe1?	<type(0)>,<type(1)>,……,<type(i)>
Rx Sweep Burst Type List 2 (25 to 49)	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe2 <type25>[,<type26>[,...[,<type49>]...]]	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe2?	<type(25)>,<type(26)>,……,<type(i)>
Rx Sweep Burst Type List 3 (50 to 74)	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe3 <type50>[,<type51>[,...[,<type74>]...]]	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe3?	<type(50)>,<type(51)>,……,<type(i)>
Rx Sweep Burst Type List 4 (75 to 99)	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe4 <type75>[,<type76>[,...[,<type99>]...]]	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe4?	<type(75)>,<type(76)>,……,<type(i)>

High-Speed Adjustment Parameters (Cont'd)

Function	Command	Query	Response
Rx Sweep Frequency List 1 (0 to 99)	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency1 <freq0>[,<freq1>[,...[,<freq99>]...]]	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency1?	<freq(0)>,<freq(1)>,……,<freq(i)>
Rx Sweep Frequency List 2 (25 to 49)	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency2 <freq25>[,<freq26>[,...[,<freq49>]...]]	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency2?	<freq(25)>,<freq(26)>,……,<freq(i)>
Rx Sweep Frequency List 3 (50 to 74)	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency3 <freq50>[,<freq51>[,...[,<freq74>]...]]	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency3?	<freq(50)>,<freq(51)>,……,<freq(i)>
Rx Sweep Frequency List 4 (75 to 99)	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency4 <freq75>[,<freq76>[,...[,<freq99>]...]]	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency4?	<freq(75)>,<freq(76)>,……,<freq(i)>

High-Speed Adjustment Parameters (Cont'd)

Function	Command	Query	Response
Rx Sweep Output Level List	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LLISt <list>,<level0>,<level1>,...,<level6>	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LLISt? <list>	<level(0)>,<level(1)>,<level(2)>,<level(3)>,<level(4)>,<level(5)>,<level(6)>
Rx Sweep Output Level Configuration List 1 (0 to 99)	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel1 <level0>[,<level1>[,...[,<level99>]...]]	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel1?	<level(0)>,<level(1)>,.......,<level(i)>
Rx Sweep Output Level Configuration List 2 (25 to 49)	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel2 <level25>[,<level26>[,...[,<level49>]...]]	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel2?	<level(25)>,<level(26)>,.......,<level(i)>
Rx Sweep Output Level Configuration List 3 (50 to 74)	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel3 <level50>[,<level51>[,...[,<level74>]...]]	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel3?	<level(50)>,<level(51)>,.......,<level(i)>
Rx Sweep Output Level Configuration List 4 (75 to 99)	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel4 <level75>[,<level76>[,...[,<level99>]...]]	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel4?	<level(75)>,<level(76)>,.......,<level(i)>

High-Speed Adjustment Parameters (Cont'd)

Function	Command	Query	Response
Tx Sweep Frequency List 1 (0 to 99)	:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency1 <freq0>[,<freq1>[,...[,<freq99>]...]]	:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency1?	<freq(0)>,<freq(1)>,……,<freq(i)>
Tx Sweep Frequency List 2 (25 to 49)	:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency2 <freq25>[,<freq26>[,...[,<freq49>]...]]	:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency2?	<freq(25)>,<freq(26)>,……,<freq(i)>
Tx Sweep Frequency List 3 (50 to 74)	:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency3 <freq50>[,<freq51>[,...[,<freq74>]...]]	:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency3?	<freq(50)>,<freq(51)>,……,<freq(i)>
Tx Sweep Frequency List 4 (75 to 99)	:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency4 <freq75>[,<freq76>[,...[,<freq99>]...]]	:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency4?	<freq(75)>,<freq(76)>,……,<freq(i)>
Rx Sweep Start/Stop	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep[:EXECute] <start_stop>	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep[:EXECute]?	<start_stop>

High-Speed Adjustment Parameters (Cont'd)

Function	Command	Query	Response
Rx Sweep Repeat Number List 1 (0 to 99)	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat1 <n0>[,<n1>[,...[,<n99>]...]]	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat1?	<n(0)>,<n(0)>,……,<n(i)>
Rx Sweep Repeat Number List 2 (25 to 49)	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat2 <n25>[,<n26>[,...[,<n49>]...]]	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat2?	<n(25)>,<n(26)>,……,<n(i)>
Rx Sweep Repeat Number List 3 (50 to 74)	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat3 <n50>[,<n51>[,...[,<n74>]...]]	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat3?	<n(50)>,<n(51)>,……,<n(i)>
Rx Sweep Repeat Number List 4 (75 to 99)	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat4 <n75>[,<n76>[,...[,<n99>]...]]	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat4?	<n(75)>,<n(76)>,……,<n(i)>

High-Speed Adjustment Parameters (Cont'd)

Function	Command	Query	Response
RX Sweep Number of Step	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:STEP <n>	:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:STEP?	<n>
Tx Sweep Repeat Number List 1 (0 to 99)	:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat1 <n0>[,<n1>[,...[,<n99>]...]]	:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat1?	<n(0)>,<n(0)>,……,<n(i)>
Tx Sweep Repeat Number List 2 (25 to 49)	:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat2 <n25>[,<n26>[,...[,<n49>]...]]	:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat2?	<n(25)>,<n(26)>,……,<n(i)>
Tx Sweep Repeat Number List 3 (50 to 74)	:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat3 <n50>[,<n51>[,...[,<n74>]...]]	:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat3?	<n(50)>,<n(51)>,……,<n(i)>
Tx Sweep Repeat Number List 4 (75 to 99)	:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat4 <n75>[,<n76>[,...[,<n99>]...]]	:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat4?	<n(75)>,<n(76)>,……,<n(i)>
TX Sweep Number of Step	:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:STEP <n>	:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:STEP?	<n>

High-Speed Adjustment Results

Function	Command	Query	Response
Tx Sweep Average Tx Power	-----	:FETCh:CELLular:GSM:HSADjustment:TXSWeep:TXPower?	<p(0)>,<p(1)>,……,<p(n×7-1)>
TX Sweep Measurement Status	-----	:FETCh:CELLular:GSM:HSADjustment:TXSWeep:STATe?	<s(0)>,<s(1)>,……,<s(n-1)>

Multiburst RF Power Parameters

Function	Command	Query	Response
Number of Multi Burst RF Power Measurement (single slot) Trigger Interval	TRIGger:CELLular:GSM:MRFPower:SSLot:INTerval <intval>	:TRIGger:CELLular:GSM:MRFPower:SSLot:INTerval?	<intval>
Multi Burst RF Power Method	:CONFigure:CELLular:GSM:MRFPower:METHod <method>	:CONFigure:CELLular:GSM:MRFPower:METHod?	<method>
Number of Multi Burst RF Power Measurement (single slot) Frames	:CONFigure:CELLular:GSM:MRFPower:SSLot:FRAMe <n>	:CONFigure:CELLular:GSM:MRFPower:SSLot:FRAMe?	<n>
Multi Burst RF Power Measurement (single slot) Trigger Level	:TRIGger:CELLular:GSM:MRFPower:SSLot:LEVel <level>	:TRIGger:CELLular:GSM:MRFPower:SSLot:LEVel?	<level>
Multi Burst RF Power Measurement (single slot) Trigger	:TRIGger:CELLular:GSM:MRFPower:SSLot:MODE <mode>	:TRIGger:CELLular:GSM:MRFPower:SSLot:MODE?	<mode>

Multiburst RF Power Results

Function	Command	Query	Response
Multi Burst RF Power Measurement (single slot) Tx Power Result	-----	:FETCh:CELLular:GSM:MRFPower:SSLot:TXPower?	<level(0)>,<level(1)>,...,<level(n-1)>
Multi Burst RF Power Measurement (single slot) Result All	-----	:FETCh:CELLular:GSM:MRFPower:SSLot?	<status(0)>,<level(0)>,<max(0)>,<min(0)>,<status(1)>,<level(1)>,<max(1)>,<min(1)>,...,<status(n-1)>,<level(n-1)>,<max(n-1)>,<min(n-1)>
Multiburst RF power measurement (single slot) status	-----	:FETCh:CELLular:GSM:MRFPower:SSLot:STATe?	<status(0)>,<status(1)>, ..., <status(n-1)>

Predistortion 1 Parameters

Function	Command	Query	Response
Predistortion Measurement 1 Setup	:CONFigure:CELLular:GSM:QPDistortion:SET <duration>,<n>,<ratio>	:CONFigure:CELLular:GSM:QPDistortion:SET?	<duration>,<n>,<ratio>
Predistortion Measurement 1 Center Time 1	:CONFigure:CELLular:GSM:QPDistortion:TCENter1 <t0>[,<t1>[,...[,<t499>]...]]	:CONFigure:CELLular:GSM:QPDistortion:TCENter1?	<t(0)>,<t(1)>,.......,<t(i)>
Predistortion Measurement 1 Center Time 2	:CONFigure:CELLular:GSM:QPDistortion:TCENter2 <t125>[,<t126>[,...[,<t249>]...]]	:CONFigure:CELLular:GSM:QPDistortion:TCENter2?	<t(125)>,<t(126)>,.......,<t(i)>
Predistortion Measurement 1 Center Time 3	:CONFigure:CELLular:GSM:QPDistortion:TCENter3 <t250>[,<t251>[,...[,<t374>]...]]	:CONFigure:CELLular:GSM:QPDistortion:TCENter3?	<t(250)>,<t(251)>,.......,<t(i)>
Predistortion Measurement 1 Center Time 4	:CONFigure:CELLular:GSM:QPDistortion:TCENter4 <t375>[,<t376>[,...[,<t499>]...]]	:CONFigure:CELLular:GSM:QPDistortion:TCENter4?	<t(375)>,<t(376)>,.......,<t(i)>
Predistortion Measurement 1 Length 1	:CONFigure:CELLular:GSM:QPDistortion:TLENgth1 <t0>[,<t1>[,...[,<t499>]...]]	:CONFigure:CELLular:GSM:QPDistortion:TLENgth1?	<t(0)>,<t(1)>,.......,<t(i)>
Predistortion Measurement 1 Length 2	:CONFigure:CELLular:GSM:QPDistortion:TLENgth2 <t125>[,<t126>[,...[,<t249>]...]]	:CONFigure:CELLular:GSM:QPDistortion:TLENgth2?	<t(125)>,<t(126)>,.......,<t(i)>

Predistortion 1 Parameters (Cont'd)

Function	Command	Query	Response
Predistortion Measurement 1 Length 3	:CONFigure:CELLular:GSM:QPDistortion:TLENgth3 <t250>[,<t251>[,...[,<t374>]...]]	:CONFigure:CELLular:GSM:QPDistortion:TLENgth3?	<t(250)>,<t(251)>,.......,<t(i)>
Predistortion Measurement 1 Length 4	:CONFigure:CELLular:GSM:QPDistortion:TLENgth4 <t375>[,<t376>[,...[,<t499>]...]]	:CONFigure:CELLular:GSM:QPDistortion:TLENgth4?	<t(375)>,<t(376)>,.......,<t(i)>
Predistortion Measurement 1 Filter Bandwidth	:CONFigure:CELLular:GSM:QPDistortion:FILTer <bw>	:CONFigure:CELLular:GSM:QPDistortion:FILTer?	<bw>

Predistortion 1 Results

Function	Command	Query	Response
Predistortion Measurement 1 Binary Transfer	-----	:FETCh:CELLular:GSM:QPDistortion:BINary? <n>	<p(0)>,<d(0)>,<p(1)>,<d(1)>,……,<p(n-1)>,<d(n-1)>
Predistortion Measurement 1 Phase	-----	:FETCh:CELLular:GSM:QPDistortion:PHASe?	<d(0)>,<d(1)>,……,<d(n-1)>
Predistortion Measurement 1 Tx Power	-----	:FETCh:CELLular:GSM:QPDistortion:TXPower?	<p(0)>,<p(1)>,……,<p(n-1)>

Predistortion 2 Parameter

Function	Command	Query	Response
Predistortion Measurement 2 Setup	:CONFigure:CELLular:GSM:EPDistortion:SET <level>,<delay>	:CONFigure:CELLular:GSM:EPDistortion:SET?	<level>,<delay>

Predistortion 2 Results

Function	Command	Query	Response
Predistortion Measurement 2 Amplitude	-----	:FETCh:CELLular:GSM:EPDistortion:AMPLitude? <start>,<n>	<p>,<e(0)>,<e(1)>,……,<e(n-1)>
Predistortion Measurement 2 Binary Transfer	-----	:FETCh:CELLular:GSM:EPDistortion:BINary? <start>,<n>	<p>,<e(0)>,<d(0)>,<e(1)>,<d(1)>,……,<e(n-1)>,<d(n-1)>
Predistortion Measurement 2 Phase	-----	:FETCh:CELLular:GSM:EPDistortion:PHASe? <start>,<n>	<d(0)>,<d(1)>,……,<d(n-1)>

4.1.3 Sequence measurement commands

Common Parameters

Function	Command	Query	Response
TCH Uplink Frequency	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency <freq>	CONFigure:CELLular:MEASurement:RFSettings:FREQuency?	<freq>
TCH Downlink Frequency	:CONFigure:CELLular:GENerator:RFSettings:FREQuency <freq>	CONFigure:CELLular:GENerator:RFSettings:FREQuency?	<freq>
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>

Sequence Measurements

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

Sequence Control Parameters

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

Sequence Parameter Information

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

Sequence Table Parameters

Function	Command	Query	Response
Sequence Table Parameter - Measurement	:CONFigure:CELLular:SEQuence:SETup <seg>,<mode>,<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>

Common Parameters

Function	Command	Query	Response
Uplink Training Sequence	:CONFigure:CELLular:SEQuence:GSM:TSCode <tsc>	:CONFigure:CELLular:SEQuence:GSM:TSCode?	<tsc>
Measured Object	:CONFigure:CELLular:SEQuence:GSM:MOBJect <mcond>,<object>	:CONFigure:CELLular:SEQuence:GSM:MOBJect? <mcond>	<object>

Measurement Parameters

Function	Command	Query	Response
Turn Off All Measurement Items	:CONFigure:CELLular:SEQuence:GSM:AMITems:OFF <mcond>	-----	-----
Measurement Band	:CONFigure:CELLular:SEQuence:GSM:BAND <mcond>,<band>	:CONFigure:CELLular:SEQuence:GSM:BAND? <mcond>	<band>
Expected Power Control Level	:CONFigure:CELLular:SEQuence:GSM:PCLevel <mcond>,<pcl>	:CONFigure:CELLular:SEQuence:GSM:PCLevel? <mcond>	<pcl>
Number of Active Slot	:CONFigure:CELLular:SEQuence:GSM:ASLot <mcond>,<a>	:CONFigure:CELLular:SEQuence:GSM:ASLot? <mcond>	<a>
TCH Slot	:CONFigure:CELLular:SEQuence:GSM:TSLot <mcond>,<slot>	:CONFigure:CELLular:SEQuence:GSM:TSLot? <mcond>	<slot>
Measurement Band, Expected Power Control Level and Measuring Object	:CONFigure:CELLular:SEQuence:GSM:RFSet <mcond>,<band>,<pcl>,<object>	:CONFigure:CELLular:SEQuence:GSM:RFSet? <mcond>	<band>,<pcl>,<object>
Power Measurement On/Off and Count	:CONFigure:CELLular:SEQuence:GSM:POWer:SET <mcond>,<on_off>,<count>	:CONFigure:CELLular:SEQuence:GSM:POWer:SET? <mcond>	<on_off>,<count>
Power vs. Time Measurement On/Off and Count	:CONFigure:CELLular:SEQuence:GSM:PVTime:SET <mcond>,<on_off>,<count>	:CONFigure:CELLular:SEQuence:GSM:PVTime:SET? <mcond>	<on_off>,<count>
Power vs. Time, Time Offset	:CONFigure:CELLular:SEQuence:GSM:PVTime:TOFFset <num>,<offset>	:CONFigure:CELLular:SEQuence:GSM:PVTime:TOFFset? <num>	<offset>
Modulation Analysis On/Off and Count	:CONFigure:CELLular:SEQuence:GSM:MODulation:SET <mcond>,<on_off>,<count>	:CONFigure:CELLular:SEQuence:GSM:MODulation:SET? <mcond>,	<on_off>,<count>

Measurement Parameters (Cont'd)

Function	Command	Query	Response
Output RF Spectrum Measurement On/Off and Count	:CONFigure:CELLular:SEQuence:GSM:ORFSpectrum:SET <on_off>,<count>	:CONFigure:CELLular:SEQuence:GSM:ORFSpectrum:SET?	<on_off>,<count>
RBW Filter of Output RF Spectrum Due to Modulation	:CONFigure:CELLular:SEQuence:GSM:ORFSpectrum:FILTer <rbw>	:CONFigure:CELLular:SEQuence:GSM:ORFSpectrum:FILTer?	<rbw>

Measurement Results

Function	Command	Query	Response
Tx Power	-----	:FETCh:CELLular:SEQuence :GSM:POWer:TXPower? <seg>,<mode>[,<slot>]	{<avg>,<max>,<min>}|<level>|{<n>,<level(0)>,<level(1)>,...,<level(n-1)>}
Estimated Power	-----	:FETCh:CELLular:SEQuence :GSM:POWer:EPOWer? <seg>,<mode>[,<slot>]	{<avg>,<max>,<min>}|<level>|{<n>,<level(0)>,<level(1)>,...,<level(n-1)>}
Power vs. Time	-----	:FETCh:CELLular:SEQuence :GSM:PVTime:OTPower? <seg>,<mode>[,<slot>]	{<avg(0)>,<avg(1)>,...,<avg(11)>,<max(0)>,<max(1)>,...,<max(11)>,<min(0)>,<min(1)>,...,<min(11)>}|{<level(0)>,<level(1)>,...,<level(11)>}
Power vs. Time Template Judgement	-----	:FETCh:CELLular:SEQuence :GSM:PVTime:TEMPlate? <seg>[,<slot>]	<judge>
Power vs. Time Template storage Judgement	-----	:FETCh:CELLular:SEQuence :GSM:PVTime:TEMPlate:STORage? <seg>,<mode>[,<slot>]	{<judge_avg>,<judge_max>,<judge_min>}|<judge>
Power vs. Time Template Judgement Detail	-----	:FETCh:CELLular:SEQuence :GSM:PVTime:TEMPlate:DETail? <seg>[,<slot>]	<type>,<judge(0)>,<judge(1)>,...,<judge(n-1)>
Power vs. Time Template storage Judgement Detail	-----	:FETCh:CELLular:SEQuence :GSM:PVTime:TEMPlate:DETail:STORage? <seg>,<mode>[,<slot>]	<type>,<judge(0)>,<judge(1)>,...,<judge(n-1)>

Measurement Results (Cont'd)

Function	Command	Query	Response
Time Alignment	-----	:FETCh:CELLular:SEQuence:GSM:PVTime:TERRor? <seg>,<mode>[,<slot>]	{<avg>,<max>,<min>}|<value>
Time Alignment Worst Value	-----	:FETCh:CELLular:SEQuence:GSM:PVTime:TERRor:WORSt? <seg>[,<slot>]	<value>
Carrier Frequency	-----	:FETCh:CELLular:SEQuence:GSM:MODulation:CFRequency? <seg>[,<slot>]	<freq>
Carrier Frequency Error	-----	:FETCh:CELLular:SEQuence:GSM:MODulation:FERRor? <seg>,<mode>[,<slot>]	{<avg_ppm>,<avg_hz>,<max_ppm>,<max_hz>,<min_ppm>,<min_hz>}|{<freq_ppm>,<freq_hz>}
Carrier Frequency Error Worst Value	-----	:FETCh:CELLular:SEQuence:GSM:MODulation:FERRor:WORSt? <seg>[,<slot>]	<freq_ppm>,<freq_hz>
EVM	-----	:FETCh:CELLular:SEQuence:GSM:MODulation:EVM? <seg>,<mode>[,<slot>]	{<avg>,<max>,<min>}|<percent>|{<n>,<percent(0)>,<percent(1)>,...,<percent(n-1)>}
Peak EVM	-----	:FETCh:CELLular:SEQuence:GSM:MODulation:PEVM? <seg>,<mode>[,<slot>]	{<avg>,<max>,<min>}|<percent>

Measurement Results (Cont'd)

Function	Command	Query	Response
RMS Phase Error	-----	:FETCh:CELLular:SEQuence:GSM:MODulation:PHERror? <seg>,<mode>[,<slot>]	{<avg>,<max>,<min>}|<deg>
Peak Phase Error	-----	:FETCh:CELLular:SEQuence:GSM:MODulation:PPHerror? <seg>,<mode>[,<slot>]	{<avg>,<max>,<min>}|<deg>
Magnitude Error	-----	:FETCh:CELLular:SEQuence:GSM:MODulation:MERRor? <seg>,<mode>[,<slot>]	{<avg>,<max>,<min>}|<percent>
Origin Offset	-----	:FETCh:CELLular:SEQuence:GSM:MODulation:ORGNoffset? <seg>,<mode>[,<slot>]	{<avg>,<max>,<min>}|<value>
IQ Imbalance	-----	:FETCh:CELLular:SEQuence:GSM:MODulation:IQIMbalance? <seg>,<mode>[,<slot>]	{<avg>,<max>,<min>}|<value>
95th Percentile	-----	:FETCh:CELLular:SEQuence:GSM:MODulation:EPERcentile? <seg>[,<slot>]	<percent>
Output RF Spectrum Due to Modulation Judgement	-----	:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:JUDGement? <seg>[,<slot>]	<judge>
Output RF Spectrum Due to Modulation Judgement of Each Frequency Point (Lower Side)	-----	:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:LOWer:FPOint? <seg>[,<slot>]	<judge(0)>,<judge(1)>,...,<judge(freq)>

Measurement Results (Cont'd)

Function	Command	Query	Response
Output RF Spectrum Due to Modulation (Lower Side)	-----	:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:LOWer? <seg>,<mode>[,<slot>]	{<avg(0)>,<avg(1)>,...,<avg(freq)>,<max(0)>,<max(1)>,...,<max(freq)>,<min(0)>,<min(1)>,...,<min(freq)>}|{<level(0)>,<level(1)>,...,<level(freq)>}
Output RF Spectrum Due to Modulation Judgement of Each Frequency Point (Upper Side)	-----	:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:UPPer:FPOint? <seg>[,<slot>]	<judge(0)>,<judge(1)>,...,<judge(freq)>
Output RF Spectrum Due to Modulation (Upper Side)	-----	:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:UPPer? <seg>,<mode>[,<slot>]	{<avg(0)>,<avg(1)>,...,<avg(freq)>,<max(0)>,<max(1)>,...,<max(freq)>,<min(0)>,<min(1)>,...,<min(freq)>}|{<level(0)>,<level(1)>,...,<level(freq)>}
Output RF Spectrum Due to Switching Judgement	-----	:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:JUDGement? <seg>[,<slot>]	<judge>

Measurement Results (Cont'd)

<table>
<tr><th>Function</th><th>Command</th><th>Query</th><th>Response</th></tr>
<tr><td>Output RF Spectrum Due to Switching Judgement of Each Frequency Point (Lower Side)</td><td>-----</td><td>:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:LOWer:FPOint? <seg>[,<slot>]</td><td><judge(0)>,<judge(1)>,...,<judge(freq)></td></tr>
<tr><td>Output RF Spectrum Due to Switching (Lower Side)</td><td>-----</td><td>:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:LOWer? <seg>,<mode>[,<slot>]</td><td>{<avg(0)>,<avg(1)>,...,<avg(freq)>,<max(0)>,<max(1)>,...,<max(freq)>,<min(0)>,<min(1)>,...,<min(freq)>}|{<level(0)>,<level(1)>,...,<level(freq)>}</td></tr>
<tr><td>Output RF Spectrum Due to Switching Judgement of Each Frequency Point (Upper Side)</td><td>-----</td><td>:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:UPPer:FPOint? <seg>[,<slot>]</td><td><judge(0)>,<judge(1)>,...,<judge(freq)></td></tr>
<tr><td>Output RF Spectrum Due to Switching (Upper Side)</td><td>-----</td><td>:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:UPPer? <seg>,<mode>[,<slot>]</td><td>{<avg(0)>,<avg(1)>,...,<avg(freq)>,<max(0)>,<max(1)>,...,<max(freq)>,<min(0)>,<min(1)>,...,<min(freq)>}|{<level(0)>,<level(1)>,...,<level(freq)>}</td></tr>
</table>

4.2 Details of Commands

This section describes commands in alphabetic order.

■ Terms in this command list

EX .... Command name (header)

Example .... Command function name

Function .... Command function

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

Query .... Query syntax

Response .... Response syntax

Parameter .... Parameter definition

Details .... Command restrictions and others

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

Related Commands ....Introduction of related commands

■ Suffix Code list

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

4.2.1 Common commands

:ABORt:CELLular:MEASurement

Measurement Stop

Function

Stops current measurement

Command

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

Example of Use

To stop measurement:

:ABOR:CELL:MEAS

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

Waveform File Select

Function

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

Command

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

Query

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

Response

<pac>

Parameter

<pac>	Waveform file

Details

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

Example of Use

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

:CONF:CELL:GEN:ARB:PACK:SEL “PAC0”

:CONF:CELL:GEN:ARB:PACK:SEL?

> PAC0

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:SEQuencer:RFSettings:TRX

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

Waveform Pattern Select

Function

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

Command

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

Query

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

Response

<pat>

Parameter

<pat>	Waveform pattern
PAT1 to PATn	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 1:
:CONF:CELL:GEN:ARB:WAV:PATT:SEL PAT1
:CONF:CELL:GEN:ARB:WAV:PATT:SEL?
> PAT1

Related Command

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

Remarks

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

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

Waveform Pattern Select (SYNC)

Function

Selects 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	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 1:

:CONF:CELL:GEN:ARB:WAV:PATT:SEL:SYNC PAT1

:CONF:CELL:GEN:ARB:WAV:PATT:SEL:SYNC?

> PAT1

Related Command

Waveform file for arbitrary waveform signal selection or query

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

Remarks

The group number depends on the selected waveform file.

For details of the waveform pattern, refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

:CONFigure:CELLular:GENerator:BBMode

Output Signal Modulation

Function

Sets or queries MU887000A RF signal output modulation

Command

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

Query

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

Response

<on_off>

Parameter

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

Example of Use

To modulate the RF signal:

:CONF:CELL:GEN:BBM ON

:CONF:CELL:GEN:BBM?

> ON

:CONFigure:CELLular:GENerator:RFSettings:STATe

Output Level On/Off

Function

Sets or queries RF signal output at MU887000A connector

Command

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

Query

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

Response

<on_off>

Parameter

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

Example of Use

To output of RF signals at MU887000A connector:
:CONF:CELL:GEN:RFSs: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

This parameter must be set to GSM to execute the commands described in Section 4.2.2 Fundamental measurement commands.

This parameter must be set to SEQUENCE to use the commands described in Section 4.2.3 Sequence measurement commands.

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

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

:FETCh:CELLular:MEASurement:STATe?

Measurement Status

Function

Queries measurement status

Query

`:FETCh:CELLular:MEASurement:STATe?`

Response

<m_status>

Parameter

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

Details

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

Example of Use

To query current measurement status:

:FETC:CELL:MEAS:STAT?

> 0

:INITiate:CELLular:MEASurement:SINGle

Measurement Start

Function

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

Command

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

Details

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

Example of Use

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

Related command

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

:INSTrument[:SELect]

Application Select

Function

Sets or queries type of application software executing on MU887000A

Command

`:INSTrument[:SELect] <app>`

Query

`:INSTrument[:SELect]?`

Response

<app>

Parameter

<app>	Type of the 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 MX887012A.

Example of Use

To set the applications software to CELLULAR:

:INST CELLULAR

:INST?

>CELLULAR

Remarks

When using the MX887012A, set the application to CELLULAR using

`:INSTrument[:SELect]`

and then set the standard to GSM 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
```

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

:STATus:QUEStionable:MEASure[:EVENt]?

Measurement Questionable Status Register Query

Function

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

Query

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

Response

<mqsr>

Value = bit0 + bit1 + ... + bit15

bit0 = 2^0 = 1	Over level
bit1 = 2^1 = 2	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 queries content of measurement questionable status register:
:STAT:QUES:MEAS?
> 1

: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:GENerator:RFSettings:FREQuency

TCH Downlink Frequency

Function

Sets or queries TCH Downlink frequency

Command

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

Query

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

Response

<freq>

Unit	Hz

Parameter

<freq>	TCH Downlink frequency
Range	400000000 to 3800000000 Hz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	935200000 Hz

Details

Changing the setting of the downlink frequency does not change the setting of the TCH channel.
When modulation is OFF, the frequency is output as the TCH Downlink Frequency.

Example of Use

To set the TCH Downlink frequency to 935.2 MHz:
:CONF:CELL:GEN:RFS:FREQ 935200000
:CONF:CELL:GEN:RFS:FREQ?
> 935200000

:CONFigure:CELLular:GENerator:RFSettings:LEVel

Output Level

Function

Sets or queries RF signal output level for all slots

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 (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 port 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 –55 dBm:
:CONF:CELL:GEN:RFS:LEV -55
:CONF:CELL:GEN:RFS:LEV?
> -55

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:GSM:EPDistortion:SET

Predistortion Measurement 2 Setup

Function

Sets or queries trigger level and trigger delay of Predistortion Measurement 2

Command

```
:CONFigure:CELLular:GSM:EPDistortion:SET <level>,<delay>
```

Query

```
:CONFigure:CELLular:GSM:EPDistortion:SET?
```

Response

<level>,<delay>

Parameters

<level>	Trigger level
Range	–30.0 to 0.0 dB
Resolution	0.1 dB
Suffix code	DB (uses dB when omitted)
Default	–30.0 dB
<delay>	Trigger delay (from trigger detection until 0th sample)
Range	–1152 to 96 samples
Resolution	1 sample
Default	0

Example of Use

To set the measurement trigger level and trigger delay to –10 dB and –100 samples, respectively:

:CONF:CELL:GSM:EPD:SET –10,–100
:CONF:CELL:GSM:EPD:SET?
> –10.0,–100

:CONFigure:CELLular:GSM:FUNDamental:AMITems:OFF

Turn Off All Measurement Items

Function

Turns off all measurement items

Command

```
:CONFigure:CELLular:GSM:FUNDamental:AMITems:OFF
```

Example of Use

To turn off all of measurement items:
:CONF:CELL:GSM:FUND:AMIT:OFF

:CONFigure:CELLular:GSM:FUNDamental:ASLot

Number of Active Slot

Function

Sets or queries number of measurement slots

Command

```
:CONFigure:CELLular:GSM:FUNDamental:ASLot <a>
```

Query

```
:CONFigure:CELLular:GSM:FUNDamental:ASLot?
```

Response

<a>

Parameter

<a>	Number of slots
Range	1 to 8
Resolution	1
Default	1

Details

Measurement is enabled for the specified slots, counting from Slot 0.

Example of Use

To enable measurement for three slots from Slot 0 to Slot 2:
:CONF:CELL:GSM:FUND:ASLot 3
:CONF:CELL:GSM:FUND:ASLot?
> 3

:CONFigure:CELLular:GSM:FUNDamental:BAND

Measurement Band

Function

Sets or queries measurement band

Command

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

Query

```
:CONFigure:CELLular:GSM:FUNDamental:BAND?
```

Response

<band>

Parameter

<band>	Measurement band
GSM850	GSM850 (GSM450, GSM480, GSM850)
GSM900	GSM900 (P-GSM900, E-GSM900, R-GSM900)
DCS1800	DCS1800
PCS1900	PCS1900
Default	GSM900

Details

This command sets the band to be measured. This value is used to determine the Power vs. Time measurement and Output RF Spectrum measurement judgement value.

Example of Use

To set the measurement band to GSM900:
:CONF:CELL:GSM:FUND:BAND GSM900
:CONF:CELL:GSM:FUND:BAND?
> GSM900

:CONFigure:CELLular:GSM:FUNDamental:BERate:GPRS:MEASurement

GPRS Bit Error Rate On/Off (GPRS/EGPRS)

Function

Enables Bit Error Rate measurement in GPRS/EGPRS or queries setting.

Command

```
:CONFigure:CELLular:GSM:FUNDamental:BERate:GPRS:MEASurement <on_off>
```

Query

```
:CONFigure:CELLular:GSM:FUNDamental:BERate:GPRS:MEASurement?
```

Response

<on_off>

Parameter

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

Example of Use

To set GPRS Bit Error Rate measurement to On.

:CONF:CELL:GSM:FUND:BER:GPRS:MEAS ON

:CONF:CELL:GSM:FUND:BER:GPRS:MEAS?

> ON

:CONFigure:CELLular:GSM:FUNDamental:BERate:MEASurement

Bit Error Rate On/Off (GSM)

Function

Enables Bit Error Rate measurement or queries setting.

Command

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

Query

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

Response

<on_off>

Parameter

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

Example of Use

To set BER measurement to On.

:CONF:CELL:GSM:FUND:BER:MEAS ON

:CONF:CELL:GSM:FUND:BER:MEAS?

> ON

:CONFigure:CELLular:GSM:FUNDamental:BERate:SAMPle

BER number of sample

Function

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

Command

```
:CONFigure:CELLular:GSM:FUNDamental:BERate:SAMPle <type>,<number>
```

Query

```
:CONFigure:CELLular:GSM:FUNDamental:BERate:SAMPle? <type>
```

Response

<type>,<number>

Parameter

<type>	Measurement type
FAST	High speed measurement
SRBLB	SRB loopback
Default	FAST
<number>	Number of samples
Range	1 to 114000 when <type> is set to FAST.
	1 to 306000 when <type> is set to SRBLB.
Resolution	1
Default	114000 when <type> is set to FAST.
	400000 when <type> is set to SRBLB.

Example of Use

To set the sample bit number at FAST measurement of Bit Error Rate measurement to 100.

:CONF:CELL:GSM:FUND:BER:SAMP FAST,100

:CONF:CELL:GSM:FUND:BER:SAMP? FAST

> 100

:CONFigure:CELLular:GSM:FUNDamental:CONTrol:LEVel

Input Level Control

Function

Sets or queries input level control.

Command

```
:CONFigure:CELLular:GSM:FUNDamental:CONTrol:LEVel <type>
```

Query

```
:CONFigure:CELLular:GSM:FUNDamental:CONTrol:LEVel?
```

Response

<type>

Parameter

<type>	Input level control
PCL	Input level changes according to the power control level.
MANUAL	Input level does not change according to the power control level.
Default	PCL

Details

When the input level control is set to PCL in fundamental measurement, the input level changes according to the power control level (PCL).
It is fixed to MANUAL in sequence measurement.

Example of Use

To set the input level control to PCL.
:CONF:CELL:GSM:FUND:CONT:LEV PCL
:CONF:CELL:GSM:FUND:CONT:LEV?
> PCL

:CONFigure:CELLular:GSM:FUNDamental:GRAPh

Graph Data Output On/Off

Function

Enables or queries output for each analysis waveform data item

Command

```
:CONFigure:CELLular:GSM:FUNDamental:GRAPh <on_off>
```

Query

```
:CONFigure:CELLular:GSM:FUNDamental:GRAPh?
```

Response

<on_off>

Parameter

<on_off>	Enables/disables analysis waveform data output
ON	Enables analysis waveform data output
OFF	Disables analysis waveform data output
Default	OFF

Details

Each analysis waveform data item can be read when the measurement is executed while the analysis waveform data output is enabled.

Example of Use

To output analysis waveform data:
:CONF:CELL:GSM:FUND:GRAP ON
:CONF:CELL:GSM:FUND:GRAP?
> ON

:CONFigure:CELLular:GSM:FUNDamental:MODulation:SET

Modulation Analysis On/Off and Count

Function

Enables Modulation Analysis and sets measurement count

Command

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

Query

```
:CONFigure:CELLular:GSM:FUNDamental:MODulation: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 1000
Resolution	1
Default	1

Example of Use

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

```
:CONF:CELL:GSM:FUND:MOD:SET ON,10
:CONF:CELL:GSM:FUND:MOD:SET?
> ON,10
```

:CONFigure:CELLular:GSM:FUNDamental:ORFSpectrum:FILTer

RBW Filter of Output RF Spectrum due to Modulation

Function

Sets or queries measurement filter bandwidth for offset frequency 1800 kHz and 2000 kHz at Output RF Spectrum (modulation part) measurement

Command

```
:CONFigure:CELLular:GSM:FUNDamental:ORFSpectrum:FILTer <rbw>
```

Query

```
:CONFigure:CELLular:GSM:FUNDamental:ORFSpectrum:FILTer?
```

Response

<rbw>

Parameter

<rbw>	Measurement filter bandwidth
30KHZ	30 kHz
100KHZ	100 kHz
Default	100KHZ

Example of Use

To set the measurement filter bandwidth at Output RF Spectrum (modulation part) measurement to 100 kHz:

:CONF:CELL:GSM:FUND:ORFS:FILT 100KHZ
:CONF:CELL:GSM:FUND:ORFS:FILT?
> 100KHZ

:CONFigure:CELLular:GSM:FUNDamental:ORFSpectrum:SET

Output RF Spectrum Measurement On/Off and Count

Function

Enables Output RF Spectrum measurement and sets measurement count

Command

```
:CONFigure:CELLular:GSM:FUNDamental:ORFSpectrum:SET <on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:GSM:FUNDamental:ORFSpectrum: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 1000
Resolution	1
Default	1

Example of Use

To enable Output RF Spectrum measurement and set the measurement count to 10:

:CONF:CELL:GSM:FUND:ORFS:SET ON,10

:CONF:CELL:GSM:FUND:ORFS:SET?

> ON,10

:CONFigure:CELLular:GSM:FUNDamental:PCLevel

Expected Power Control Level

Function

Sets or queries measurement signal Power Control Level

Command

```
:CONFigure:CELLular:GSM:FUNDamental:PCLevel <pcl>
```

Query

```
:CONFigure:CELLular:GSM:FUNDamental:PCLevel?
```

Response

<pcl>

Parameter

<pcl>	Power Control Level
Range	0 to 31
Resolution	1
Default	8

Details

This command sets the measurement signal Power Control Level. This value is used to determine the Power vs. Time measurement and Output RF Spectrum measurement judgement value.
The input level changes according to the power control level.
If the power control level is set to 16 to 29 when the system combination is PCS1900 and TCH channel is 512 to 810, an error occurs and the set value is not changed.

Example of Use

To set the input signal Power Control Level to 8:
:CONF:CELL:GSM:FUND:PCL 8
:CONF:CELL:GSM:FUND:PCL?
> 8

:CONFigure:CELLular:GSM:FUNDamental:POWer:SET

Power Measurement On/Off and Count

Function

Enables and queries power measurement and sets measurement count

Command

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

Query

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

Response

<on_off>,<count>

Parameters

<on_off>	Enables/disables measurement
ON	Executes measurement
OFF	Does not execute measurement
Default	ON
<count>	Measurement count
Range	1 to 1000
Resolution	1
Default	1

Example of Use

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

```
:CONF:CELL:GSM:FUND:POW:SET ON,10
:CONF:CELL:GSM:FUND:POW:SET?
> ON,10
```

:CONFigure:CELLular:GSM:FUNDamental:PVTime:SET

Power vs. Time Measurement On/Off and Count

Function

Enables Power vs. Time measurement and sets measurement count

Command

```
:CONFigure:CELLular:GSM:FUNDamental:PVTime:SET <on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:GSM:FUNDamental:PVTime: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 1000
Resolution	1
Default	1

Example of Use

To enable Power vs. Time measurement and set the measurement count to 10:

```
:CONF:CELL:GSM:FUND:PVT:SET ON,10
:CONF:CELL:GSM:FUND:PVT:SET?
> ON,10
```

:CONFigure:CELLular:GSM:FUNDamental:PVTime:TOFFset

Power vs. Time, Time Offset

Function

Sets or queries offset time to measure Power vs. Time

Command

```
:CONFigure:CELLular:GSM:FUNDamental:PVTime:TOFFset <num>,<offset>
```

Query

```
:CONFigure:CELLular:GSM:FUNDamental:PVTime:TOFFset? <num>
```

Response

<offset>

Unit	µs

Parameters

<num>	Offset number
Range	0 to 11
Resolution	1
<time>	Offset time
Range	–48.0 to 594.0 µs
Resolution	0.1 µs
Default	–28.0 µs (for num = 0)
	–23.0 µs (for num = 1)
	–18.0 µs (for num = 2)
	–10.0 µs (for num = 3)
	–5.0 µs (for num = 4)
	0.0 µs (for num = 5)
	542.8 µs (for num = 6)
	547.8 µs (for num = 7)
	552.8 µs (for num = 8)
	560.8 µs (for num = 9)
	565.8 µs (for num = 10)
	570.8 µs (for num = 11)

Example of Use

To set the offset number 0 for Power vs. Time measurement to –28.0 µs

:CONF:CELL:GSM:FUND:PVT:TOFF 0,-28.0

:CONF:CELL:GSM:FUND:PVT:TOFF? 0

> -28.0

:CONFigure:CELLular:GSM:FUNDamental:RFSet

Measurement Band, Expected Power Control Level and Measuring Object

Function

Sets or queries measurement signal band, Power Control Level, and measurement target signal

Command

```
:CONFigure:CELLular:GSM:FUNDamental:RFSet <band>,<pcl>,<object>
```

Query

```
:CONFigure:CELLular:GSM:FUNDamental:RFSet?
```

Response

<band>,<pcl>,<object>

Parameters

<band>	Measurement band
GSM850	GSM850 (GSM450, GSM480, GSM850)
GSM900	GSM900 (P-GSM900, E-GSM900, R-GSM900)
DCS1800	DCS1800
PCS1900	PCS1900
Default	GSM900
<pcl>	Power Control Level
Range	0 to 31
Resolution	1
Default	8
<object>	Measurement target signal
GMSK	Sets the GMSK burst signal as measurement target
8PSK	Sets the 8PSK burst signal as measurement target
Default	GMSK

Details

This command sets the measurement signal band, Power Control Level, and measurement target signal. The band and Power Control Level are used to determine the Power vs. Time measurement and Output RF Spectrum measurement judgement value.
The input level changes according to the power control level.
If the power control level is set to 16 to 29 when the system combination is PCS1900 and TCH channel is 512 to 810, an error occurs and all the set values are not changed.

Example of Use

To set the measurement signal band, Power Control Level, and measurement target signal to GSM900, 8, and GMSK, respectively:

:CONF:CELL:GSM:FUND:RFS GSM900,8,GMSK
:CONF:CELL:GSM:FUND:RFS?
> GSM900,8,GMSK

Related Commands

Measurement signal band setting
:CONFigure:CELLular:GSM:FUNDamental:BAND

Measurement signal Power Control Level setting
:CONFigure:CELLular:GSM:FUNDamental:PCLeve

Measurement target signal setting
:CONFigure:CELLular:GSM:MOBJect

:CONFigure:CELLular:GSM:FUNDamental:TCH:PATTern

TCH Test Pattern

Function

Sets or queries TCH test pattern.

Command

```
:CONFigure:CELLular:GSM:FUNDamental:TCH:PATTern <pattern>
```

Query

```
:CONFigure:CELLular:GSM:FUNDamental:TCH:PATTern?
```

Response

<pattern>

Parameter

<pattern>	Test Pattern
PAT1	PAT1

Example of Use

To query TCH test pattern.
:CONF:CELL:GSM:FUND:TCH:PATT?
> PAT1

Remarks

TCH test pattern setup is not required for the MX887012A.

:CONFigure:CELLular:GSM:FUNDamental:TSLot

TCH slot

Function

Sets or queries slot number of slot for trigger detection

This is the reference for Time Alignment measurement.

Command

```
:CONFigure:CELLular:GSM:FUNDamental:TSLot <slot>
```

Query

```
:CONFigure:CELLular:GSM:FUNDamental:TSLot?
```

Response

<slot>

Parameter

<slot>	Slot number
Range	0 to 7
Resolution	1
Default	2

Example of Use

To set the slot number for the trigger detection to 2:

:CONF:CELL:GSM:FUND:TSL 2

:CONF:CELL:GSM:FUND:TSL?

> 2

:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe1

Rx Sweep Burst Type List 1 (0 to 99)

Function

Sets or queries burst type of each step for Rx sweep

Command

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe1
type(0)[,type(1)[,…[,type(i)]…]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe1?
```

Response

<type(0)>,<type(1)>,……,<type(i)>

Parameter

<type(i)>	Burst type of step number i
FCCH	Frequency correction burs
SCH	Synchronization burst
PRBS	Pseudo Random Bit Stream
FCCH_SCH	Frequency correction Synchronization burst
DUMMY	Dummy burst
FCCH_DUMMY	Frequency correction Dummy burst
SCH_DUMMY	Synchronization Dummy burst
FCCH_SCH_DUMMY	Frequency correction Synchronization Dummy burst
FCCH_DUMMY2	Frequency correction Dummy burst2
Default	<type(0)> = FCCH
	<type(1)> = SCH
	<type(2)> and subsequent ones = PRBS
i	Step number
Range	0 to 99

Details

The burst type can be set while the Rx Sweep is stopped.
The <type(1)> and subsequent types can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the Rx sweep frequency to Step 0 = FCCH and Step 1 = SCH:
:CONF:CELL:GSM:HSAD:RXSW:BTYP1 FCCH,SCH
:CONF:CELL:GSM:HSAD:RXSW:BTYP1?
> FCCH,SCH,PRBS,…,PRBS,PRB*
*: 100 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe2

Rx Sweep Burst Type List 2 (25 to 49)

Function

Sets or queries burst type for each step of Rx sweep

Command

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe2
type(25)[,type(26)[,…[,type(i)]…]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe2?
```

Response

<type(25)>,<type(26)>,……,<type(i)>

Parameter

<type(i)>	Burst type of step number i
FCCH	Frequency correction burs
SCH	Synchronization burst
PRBS	Pseudo Random Bit Stream
FCCH_SCH	Frequency correction Synchronization burst
DUMMY	Dummy burst
FCCH_DUMMY	Frequency correction Dummy burst
SCH_DUMMY	Synchronization Dummy burst
FCCH_SCH_DUMMY	Frequency correction Synchronization Dummy burst
FCCH_DUMMY2	Frequency correction Dummy burst2
Default	<type(0)> = FCCH <type(1)>= SCH <type(2)> and subsequent ones = PRBS
i	Step number
Range	25 to 49

Details

The burst type can be set while the Rx Sweep is stopped.

The <type(26)> and subsequent types can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the Rx sweep frequency to Step 25 = FCCH and Step 26 = SCH:

```
:CONF:CELL:GSM:HSAD:RXSW:BTYP2 FCCH,SCH
:CONF:CELL:GSM:HSAD:RXSW:BTYP2?
> FCCH,SCH,PRBS,…,PRBS,PRB*
```

*: 25 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe3

Rx Sweep Burst Type List 3 (50 to 74)

Function

Sets or queries the burst type of each step for Rx sweep

Command

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe3
type(50)[,type(51)[,…[,type(i)]…]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe3?
```

Response

<type(50)>,<type(51)>,……,<type(i)>

Parameter

<type(i)>	Burst type of the step number i
FCCH	Frequency correction burs
SCH	Synchronization burst
PRBS	Pseudo Random Bit Stream
FCCH_SCH	Frequency correction Synchronization burst
DUMMY	Dummy burst
FCCH_DUMMY	Frequency correction Dummy burst
SCH_DUMMY	Synchronization Dummy burst
FCCH_SCH_DUMMY	Frequency correction Synchronization Dummy burst
FCCH_DUMMY2	Frequency correction Dummy burst2
Default	<type(0)> = FCCH
	<type(1)> = SCH
	<type(2)> and subsequent ones = PRBS
i	Step number
Range	50 to 74

Details

The burst type can be set while the Rx Sweep is stopped.
The <type(51)> and subsequent ones can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the Rx sweep frequency to Step 50 = FCCH and Step 51 = SCH:
:CONF:CELL:GSM:HSAD:RXSW:BTYP3 FCCH,SCH
:CONF:CELL:GSM:HSAD:RXSW:BTYP3?
> FCCH,SCH,PRBS,…,PRBS,PRB*
*: 25 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe4

Rx Sweep Burst Type List 4 (75 to 99)

Function

Sets or queries burst type of each step for Rx sweep

Command

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe4
type(75)[,type(76)[,…[,type(i)]…]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:BTYPe4?
```

Response

<type(75)>,<type(76)>,……,<type(i)>

Parameter

<type(i)>	Burst type of step number i
FCCH	Frequency correction burs
SCH	Synchronization burst
PRBS	Pseudo Random Bit Stream
FCCH_SCH	Frequency correction Synchronization burst
DUMMY	Dummy burst
FCCH_DUMMY	Frequency correction Dummy burst
SCH_DUMMY	Synchronization Dummy burst
FCCH_SCH_DUMMY	Frequency correction Synchronization Dummy burst
FCCH_DUMMY2	Frequency correction Dummy burst2
Default	<type(0)> = FCCH
	<type(1)> = SCH
	<type(1)> and subsequent ones = PRBS
i	Step number
Range	75 to 99

Details

The burst type can be set while the Rx Sweep is stopped.

The <type(76)> and subsequent types can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the Rx sweep frequency to Step 75 = FCCH and Step 76 = SCH:

:CONF:CELL:GSM:HSAD:RXSW:BTYP4 FCCH,SCH

:CONF:CELL:GSM:HSAD:RXSW:BTYP4?

> FCCH,SCH,PRBS,…,PRBS,PRB*

*: 25 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:RXSWeep[:EXECute]

RX Sweep Start/Stop

Function

Starts/stops Rx sweep at High-Speed Adjustment measurement

Command

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep[:EXECute] <start_stop>
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep[:EXECute]?
```

Response

<start_stop>

Parameter

<start_stop>	Start/stop Rx sweep
START	Starts Rx sweep
STOP	Stops Rx sweep
Default	STOP

Details

This command can be executed when Measurement select is set to High-Speed adjustment. The Rx sweep is stopped when Measurement select is changed from High-Speed Adjustment to another value.

Example of Use

To start the Rx sweep:
:CONF:CELL:GSM:HSAD:RXSW START
:CONF:CELL:GSM:HSAD:RXSW?
> START

:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency1

Rx Sweep Frequency List 1 (0 to 99)

Function

Sets or queries frequency of each step (0 to 99) for Rx sweep

Command

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency1
freq(0)[,freq(1)[,…[,freq(i)]…]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency1?
```

Response

<freq(0)>,<freq(1)>,……,<freq(i)>

Unit	MHz

Parameter

<freq(i)>	Frequency of step number i
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001 MHz
Suffix code	MHZ (uses MHz when omitted)
Default	935.200000 MHz
i	Step number
Range	0 to 99

Details

The frequency can be set while the Rx Sweep is stopped.
The <freq(1)> and subsequent frequencies can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the Rx sweep frequency to Step 0 = 935.2 MHz and Step 1 = 945.2 MHz:
:CONF:CELL:GSM:HSAD:RXSW:FREQ1 935.2,945.2
:CONF:CELL:GSM:HSAD:RXSW:FREQ1?
> 935.200000,945.200000,935.200000,…,935.200000,935.200000B*
*: 100 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency2

Rx Sweep Frequency List 2 (25 to 49)

Function

Sets or queries frequency of each step (25 to 49) for Rx sweep

Command

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency2
freq(25)[,freq(26)[,…[,freq(i)]…]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency2?
```

Response

<freq(25)>,<freq(26)>,……,<freq(i)>

Unit	MHz

Parameter

<freq(i)>	Frequency of step number i
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001 MHz
Suffix code	MHZ (uses MHz when omitted)
Default	935.200000 MHz
i	Step number
Range	25 to 49

Details

The frequency can be set while the Rx Sweep is stopped.
The <freq(26)> and subsequent frequencies can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the Rx sweep frequency to Step 25 = 935.2 MHz and Step 26 = 945.2 MHz:

:CONF:CELL:GSM:HSAD:RXSW:FREQ2 935.2,945.2

:CONF:CELL:GSM:HSAD:RXSW:FREQ2?

> 935.200000,945.200000,935.200000,…,935.200000,935.200000B*

*: 25 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency3

Rx Sweep Frequency List 3 (50 to 74)

Function

Sets or queries frequency of each step (50 to 74) for Rx sweep

Command

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency3
freq(50)[,freq(51)[,…[,freq(i)]…]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency3?
```

Response

<freq(50)>,<freq(51)>,……,<freq(i)>

Unit	MHz

Parameter

<freq(i)>	Frequency of step number i
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001 MHz
Suffix code	MHZ (uses MHz when omitted)
Default	935.200000 MHz
i	Step number
Range	50 to 74

Details

The frequency can be set while the Rx Sweep is stopped.

The <freq(51)> and subsequent frequencies can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the Rx sweep frequency to Step 50 = 935.2 MHz and Step 51 = 945.2 MHz:

:CONF:CELL:GSM:HSAD:RXSW:FREQ3 935.2,945.2

:CONF:CELL:GSM:HSAD:RXSW:FREQ3?

> 935.200000,945.200000,935.200000,…,935.200000,935.200000B*

*: 25 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency4

Rx Sweep Frequency List 4 (75 to 99)

Function

Sets or queries frequency of each step (75 to 99) for Rx sweep

Command

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency4
freq(75)[,freq(76)[,…[,freq(i)]…]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:FREQuency4?
```

Response

<freq(75)>,<freq(76)>,……,<freq(i)>

Unit	MHz

Parameter

<freq(i)>	Frequency of step number i
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001 MHz
Suffix code	MHZ (uses MHz when omitted)
Default	935.200000 MHz
i	Step number
Range	75 to 99

Details

The frequency can be set while the Rx Sweep is stopped.
The <freq(76)> and subsequent frequencies can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the Rx sweep frequency to Step 75 = 935.2 MHz and Step 76 = 945.2 MHz:
:CONF:CELL:GSM:HSAD:RXSW:FREQ4 935.2,945.2
:CONF:CELL:GSM:HSAD:RXSW:FREQ4?
> 935.200000,945.200000,935.200000,…,935.200000,935.200000B*
*: 25 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel1

RX Sweep Output Level Configuration list 1 (0 to 99)

Function

Sets or queries output level of each step for Rx sweep

Command

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel1
level(0)[,level(1)[,…[,level(i)]…]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel1?
```

Response

<level(0)>,< level(1)>,.......,<level (i)>

Unit	dBm

Parameter

<level(i)>	Output level of step number i
Range	OFF, LIST1, LIST2, LIST3, LIST4, LIST5, LIST6, LIST7, LIST8 –130.0 to –10.0 dBm (Port1/Port2), OFF, –120.0 to 0.0 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–55.0 dBm
i	Step number
Range	0 to 99

Details

The output level can be set while the Rx Sweep is stopped.
The <level(1)> and subsequent levels can be omitted. All omitted steps are set to OFF.
When Cable Loss Calibration is ON, the cable loss is subtracted from the output level setting range.
When the cable loss is 5 dB, the setting range is –135.0 to –15.0 dBm (Port1/Port2).
Even in this case, the output level can be set to −10.0 dBm. But a judgment to determine whether the setting level is within the parameter range or not is performed when sending the following command:
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep START
Therefore, this setting results in an error.

Example of Use

To set each step for Rx sweep with following output level:
step0 = -55 dBm, step 1 to step 5 = -45 dBm
:CONF:CELL:GSM:HSAD:RXSW:LEV1 -55,-45,-45,-45,-45,-45
:CONF:CELL:GSM:HSAD:RXSW:LEV1?
> -55.0,-45.0,-45.0,…,-45.0,-45.0*
*: 100 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel2

RX Sweep Output Level Configuration list 2 (25 to 49)

Function

Sets or queries output level of each step for Rx sweep

Command

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel2
level(25)[,level(26)[,…[,level(i)]…]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel2?
```

Response

<level(25)>,< level(26)>,.......,<level (i)>

Unit	dBm

Parameter

<level(i)>	Output level of step number i
Range	OFF, LIST1, LIST2, LIST3, LIST4, LIST5, LIST6, LIST7, LIST8 –130.0 to –10.0 dBm (Port1/Port2), OFF, –120.0 to 0.0 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–55.0 dBm
i	Step number
Range	25 to 49

Details

The output level can be set while the Rx Sweep is stopped.
The <level(26)> and subsequent levels can be omitted. All omitted steps are set to OFF.
When Cable Loss Calibration is ON, the cable loss is subtracted from the output level setting range.
When the cable loss is 5 dB, the setting range is –135.0 to –15.0 dBm (Port1/Port2).
Even in this case, the output level can be set to −10.0 dBm. But a judgment to determine whether the setting level is within the parameter range or not is performed when sending the following command:
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep START
Therefore, this setting results in an error.

Example of Use

To set each step for Rx sweep with the following output level:
step 25 = -55 dBm, step 26 to step 30 = -45 dBm
:CONF:CELL:GSM:HSAD:RXSW:LEV2 -55,-45,-45,-45,-45,-45
:CONF:CELL:GSM:HSAD:RXSW:LEV2?
> -55.0,-45.0,-45.0,…,-45.0,-45.0*
*: 25 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel3

RX Sweep Output Level Configuration list 3 (50 to 74)

Function

Sets or queries output level of each step for Rx sweep

Command

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel3
level(50)[,level(51)[,…[,level(i)]…]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel3?
```

Response

<level(50)>,< level(51)>,.......,<level (i)>

Unit	dBm

Parameter

<level(i)>	Output level of step number i
Range	OFF, LIST1, LIST2, LIST3, LIST4, LIST5, LIST6, LIST7, LIST8 –130.0 to –10.0 dBm (Port1/Port2), OFF, –120.0 to 0.0 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–55.0 dBm
i	Step number
Range	50 to 74

Details

The output level can be set while the Rx Sweep is stopped.
The <level(51)> and subsequent levels can be omitted. All omitted steps are set to OFF.
When Cable Loss Calibration is ON, the cable loss is subtracted from the output level setting range.
When the cable loss is 5 dB, the setting range is –135.0 to –15.0 dBm (Port1/Port2).
Even in this case, the output level can be set to −10.0 dBm. But a judgment to determine whether the setting level is within the parameter range or not is performed when sending the following command:
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep START
Therefore, this setting results in an error.

Example of Use

To set each step for Rx sweep with the following output level:
step50 = -55 dBm, step 51 to step 55 = -45 dBm
:CONF:CELL:GSM:HSAD:RXSW:LEV3 -55,-45,-45,-45,-45,-45
:CONF:CELL:GSM:HSAD:RXSW:LEV3?
> -55.0,-45.0,-45.0,…,-45.0,-45.0*
*: 25 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel4

RX Sweep Output Level Configuration list 4 (75 to 99)

Function

Sets or queries output level of each step for Rx sweep

Command

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel4
level(75)[,level(76)[,…[,level(i)]…]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LEVel4?
```

Response

<level(75)>,< level(76)>,.......,<level (i)>

Unit	dBm

Parameter

<level(i)>	Output level of step number i
Range	OFF, LIST1, LIST2, LIST3, LIST4, LIST5, LIST6, LIST7, LIST8 –130.0 to –10.0 dBm (Port1/Port2), OFF, –120.0 to 0.0 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–55.0 dBm
i	Step number
Range	75 to 99

Details

The output level can be set while the Rx Sweep is stopped.
The <level(76)> and subsequent level can be omitted. All omitted steps are set to OFF.
When Cable Loss Calibration is ON, the cable loss is subtracted from the output level setting range.
When the cable loss is 5 dB, the setting range is –135.0 to –15.0 dBm (Port1/Port2).
Even in this case, the output level can be set to −10.0 dBm. But a judgment to determine whether the setting level is within the parameter range or not is performed when sending the following command:
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep START
Therefore, this setting results in an error.

Example of Use

To set each step for Rx sweep with the following output level:
Step75 = -55 dBm, step 76 to step 80 = -45 dBm
:CONF:CELL:GSM:HSAD:RXSW:LEV4 -55,-45,-45,-45,-45,-45
:CONF:CELL:GSM:HSAD:RXSW:LEV4?
> -55.0,-45.0,-45.0,…,-45.0,-45.0*
*: 25 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LLISt

RX Sweep Output Level List

Function

Sets or queries output level list of each slot for Rx sweep

Command

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LLISt
<list>,<level0>,<level1>,...,<level6>
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:LLISt? <list>
```

Response

<level(0)>,<level(1)>,<level(2)>,<level(3)>,<level(4)>,<level(5)>,<level(6)>

Parameters

<list>	Output level list of each slot
Range	LIST1, LIST2, LIST3, LIST4, LIST5, LIST6, LIST7, LIST8
<level(i) >	
Range	OFF, –130.0 to –10.0 dBm, (Port1/Port2)
	OFF, –120.0 to 0.0 dBm, (Port3/Port4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–55.0 dBm
i	Slot number
Range	0 to 6
Resolution	1
Default	1

Details

The output level list can be set while the Rx Sweep is stopped.

Example of Use

To set LIST1 with the output level of each slot for Rx sweep:

To set slot0 = -55 dBm, slot1 to slot5 = -45 dBm, and slot6 = OFF

:CONF:CELL:GSM:HSAD:RXSW:LLIS LIST1 -55,-45,-45,-45,-45,-45,OFF

:CONF:CELL:GSM:HSAD:RXSW:LLIS? LIST1

> -55,-45,-45,-45,-45,-45,OFF

:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat1

Rx Sweep Repeat Number List 1 (0 to 99)

Function

Sets or queries number of repetition steps included in Rx sweep steps

Command

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat1
<n(0)>[,<n(1)>[,...[,<n(i)>]...]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat1?
```

Response

<n(0)>,<n(0)>,……,<n(i)>

Parameter

<n(i)>	Number of repetition frames of step number i
Range	1 to 26
Resolution	1
Default	1
i	Step number
Range	0 to 99

Details

The number can be set while the Rx Sweep is stopped.

The <n(1)> and subsequent numbers can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the number of repetition frames for Rx sweep to Step 2 = 5, Step 3 = 5, and other steps = 1:

:CONF:CELL:GSM:HSAD:RXSW:REP1 1,1,5,5,1

:CONF:CELL:GSM:HSAD:RXSW:REP1?

> 1,1,5,5,1,1,…,1,1,1,*

*: 25 items always returned without omitting

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SCPI Command Reference

:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat2

Rx Sweep Repeat Number List 2 (25 to 49)

Function

Sets or queries number of repetition steps included in Rx sweep steps

Command

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat2
<n(25)>[,<n(26)>[,...[,<n(i)>]...]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat2?
```

Response

<n(25)>,<n(26)>,……,<n(i)>

Parameter

<n(i)>	Number of repetition frames of step number i
Range	1 to 26
Resolution	1
Default	1
i	Step number
Range	25 to 49

Details

The number can be set while the Rx Sweep is stopped.
The <n(26)> and subsequent numbers can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the number of repetition frames for Rx sweep to Step 27 = 5, Step 28 = 5, and other steps = 1:

:CONF:CELL:GSM:HSAD:RXSW:REP2 1,1,5,5,1
:CONF:CELL:GSM:HSAD:RXSW:REP2?
> 1,1,5,5,1,1,…,1,1,1,*
*: 25 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat3

Rx Sweep Repeat Number List 3 (50 to 74)

Function

Sets or queries number of repetition steps included in Rx sweep steps

Command

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat3
<n(50)>[,<n(51)>[,...[,<n(i)>]...]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat3?
```

Response

<n(50)>,<n(51)>,……,<n(i)>

Parameter

<n(i)>	Number of repetition frames of step number i
Range	1 to 26
Resolution	1
Default	1
i	Step number
Range	50 to 74

Details

The number can be set while the Rx Sweep is stopped.
The <n(51)> and subsequent numbers can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the number of repetition frames for Rx sweep to Step 52 = 5, Step 53 = 5, and other steps = 1:

:CONF:CELL:GSM:HSAD:RXSW:REP3 1,1,5,5,1
:CONF:CELL:GSM:HSAD:RXSW:REP3?
> 1,1,5,5,1,1,...,1,1,1,*
*: 25 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat4

Rx Sweep Repeat Number List 4 (75 to 99)

Function

Sets or queries number of repetition steps included in Rx sweep steps

Command

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat4
<n(75)>[,<n(76)>[,...[,<n(i)>]...]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:REPeat4?
```

Response

<n(75)>,<n(76)>,……,<n(i)>

Parameter

<n(i)>	Number of repetition frames of step number i
Range	1 to 26
Resolution	1
Default	1
i	Step number
Range	75 to 99

Details

The number can be set while the Rx Sweep is stopped.

The <n(76)> and subsequent numbers can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the number of repetition frames for Rx sweep to Step 77 = 5, Step 78 = 5, and other steps = 1:

:CONF:CELL:GSM:HSAD:RXSW:REP4 1,1,5,5,1

:CONF:CELL:GSM:HSAD:RXSW:REP4?

> 1,1,5,5,1,1,…,1,1,1,*

*: 25 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:STEP

RX Sweep Number of Steps

Function

Sets or queries step count for Rx sweep execution at High-Speed Adjustment measurement

Command

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:STEP <n>
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:RXSWeep:STEP?
```

Response

<n>

Parameter

<n>	Number of execution steps
Range	1 to 100
Resolution	1
Default	1

Details

This command can be executed when Measurement Select is set to High-Speed Adjustment.
The number can be set while the Rx Sweep is stopped.

Example of Use

To set the number of execution steps for the Rx sweep to 10:
:CONF:CELL:GSM:HSAD:RXSW:STEP 10
:CONF:CELL:GSM:HSAD:RXSW:STEP?
> 10

:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency1

TX Sweep Frequency List 1 (0 to 99)

Function

Sets or queries input frequency of each step for Tx sweep measurement

Command

```
:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency1
<freq(0)>[,<freq(1)>[,...[,<freq(i)>]...]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency1?
```

Response

<freq(0)>,<freq(1)>,……,<freq(i)>

Unit	MHz

Parameter

<freq(i)>	Frequency of the step number i
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	890.200000
i	Step number
Range	0 to 99

Details

The <freq(1)> and subsequent frequencies can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the frequency of each step for Tx sweep to Step 0 = 890.2 MHz and Step 1 = 895.2 MHz:

:CONF:CELL:GSM:HSAD:TXSW:FREQ1 890.2,895.2

:CONF:CELL:GSM:HSAD:TXSW:FREQ1?

> 890.200000,895.200000,890.200000,…,890.200000,890.200000*

*: 100 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency2

TX Sweep Frequency List 2 (25 to 49)

Function

Sets or queries input frequency of each step for Tx sweep measurement

Command

```
:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency2
<freq(25)>[,<freq(26)>[,...[,<freq(i)>]...]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency2?
```

Response

<freq(25)>,<freq(26)>,……,<freq(i)>

Unit	MHz

Parameter

<freq(i)>	Frequency of step number i
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	890.200000
i	Step number
Range	25 to 49

Details

The <freq(26)> and subsequent frequency can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the frequency of each step for Tx sweep to Step 25 = 890.2 MHz and Step 26 = 895.2 MHz:

:CONF:CELL:GSM:HSAD:TXSW:FREQ2 890.2,895.2

:CONF:CELL:GSM:HSAD:TXSW:FREQ2?

> 890.200000,895.200000,890.200000,…,890.200000,890.200000*

*: 25 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency3

TX Sweep Frequency List 3 (50 to 74)

Function

Sets or queries input frequency of each step for Tx sweep measurement

Command

```
:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency3
<freq(50)>[,<freq(51)>[,...[,<freq(i)>]...]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency3?
```

Response

<freq(50)>,<freq(51)>,......,<freq(i)>

Unit	MHz

Parameter

<freq(i)>	Frequency of step number i
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	890.200000
i	Step number
Range	50 to 74

Details

The <freq(51)> and subsequent frequencies can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the frequency of each step for Tx sweep to Step 50 = 890.2 MHz and Step 51 = 895.2 MHz:

:CONF:CELL:GSM:HSAD:TXSW:FREQ3 890.2,895.2
:CONF:CELL:GSM:HSAD:TXSW:FREQ3?
> 890.200000,895.200000,890.200000,…,890.200000,890.200000*
*: 25 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency4

TX Sweep Frequency List 4 (75 to 99)

Function

Sets or queries input frequency of each step for Tx sweep measurement

Command

```
:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency4
<freq(75)>[,<freq(76)>[,...[,<freq(i)>]...]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:FREQuency4?
```

Response

<freq(75)>,<freq(76)>,……,<freq(i)>

Unit	MHz

Parameter

<freq(i)>	Frequency of the step number i
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	890.200000
i	Step number
Range	75 to 99

Details

The <freq(76)> and subsequent frequencies can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the frequency of each step for Tx sweep to Step 75 = 890.2 MHz and Step 76 = 895.2 MHz:

:CONF:CELL:GSM:HSAD:TXSW:FREQ4 890.2,895.2

:CONF:CELL:GSM:HSAD:TXSW:FREQ4?

> 890.200000,895.200000,890.200000,…,890.200000,890.200000*

*: 25 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat1

TX Sweep Repeat Number List 1 (0 to 99)

Function

Sets or queries frame measurement count at each step for Tx sweep measurement

Command

```
:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat1
<n(0)>[,<n(1)>[,...[,<n(i)>]...]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat1?
```

Response

<n(0)>,<n(0)>,……,<n(i)>

Parameter

<n(i)>	Number of repetition frames of step number i
Range	1 to 100
Resolution	1
Default	1
i	Step number
Range	0 to 99

Details

The <n(1)> and subsequent numbers can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement count for Tx sweep measurement to Step 2 = 5, Step 3 = 5, and other steps = 1:

:CONF:CELL:GSM:HSAD:TXSW:REP1 1,1,5,5,1

:CONF:CELL:GSM:HSAD:TXSW:REP1?

> 1,1,5,5,1,1,…,1,1,1,*

*: 100 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat2

TX Sweep Repeat Number List 2 (25 to 49)

Function

Sets or queries frame measurement count at each step for Tx sweep measurement

Command

```
:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat2
<n(25)>[,<n(26)>[,...[,<n(i)>]...]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat2?
```

Response

<n(25)>,<n(26)>,……,<n(i)>

Parameter

<n(i)>	Number of repetition frames of step number i
Range	1 to 100
Resolution	1
Default	1
i	Step number
Range	25 to 49

Details

The <n(26)> and subsequent numbers can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement count for Tx sweep measurement to Step 27 = 5, Step 28 = 5, and other steps = 1:

:CONF:CELL:GSM:HSAD:TXSW:REP2 1,1,5,5,1

:CONF:CELL:GSM:HSAD:TXSW:REP2?

> 1,1,5,5,1,1,…,1,1,1,*

*: 25 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat3

TX Sweep Repeat Number List 3 (50 to 74)

Function

Sets or queries frame measurement count at each step for Tx sweep measurement

Command

```
:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat3
<n(50)>[,<n(51)>[,...[,<n(i)>]...]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat3?
```

Response

<n(50)>,<n(51)>,……,<n(i)>

Parameter

<n(i)>	Number of repetition frames of step number i
Range	1 to 100
Resolution	1
Default	1
i	Step number
Range	50 to 74

Details

The <n(50)> and subsequent numbers can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement count for Tx sweep measurement to Step 52 = 5, Step 53 = 5, and other steps = 1:

:CONF:CELL:GSM:HSAD:TXSW:REP3 1,1,5,5,1

:CONF:CELL:GSM:HSAD:TXSW:REP3?

> 1,1,5,5,1,1,…,1,1,1,*

*: 25 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat4

TX Sweep Repeat Number List 4 (75 to 99)

Function

Sets or queries frame measurement count at each step for Tx sweep measurement

Command

```
:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat4
<n(75)>[,<n(76)>[,...[,<n(i)>]...]]
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:REPeat4?
```

Response

<n(75)>,<n(76)>,……,<n(i)>

Parameter

<n(i)>	Number of repetition frames of step number i
Range	1 to 100
Resolution	1
Default	1
i	Step number
Range	75 to 99

Details

The <n(76)> and subsequent numbers can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement count for Tx sweep measurement to Step 77 = 5, Step 78 = 5, and other steps = 1:

:CONF:CELL:GSM:HSAD:TXSW:REP4 1,1,5,5,1

:CONF:CELL:GSM:HSAD:TXSW:REP4?

> 1,1,5,5,1,1,…,1,1,1,*

*: 25 items always returned without omitting

:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:STEP

TX Sweep Number of Step

Function

Sets or queries number of execution steps for Tx sweep

Command

```
:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:STEP <n>
```

Query

```
:CONFigure:CELLular:GSM:HSADjustment:TXSWeep:STEP?
```

Response

<n>

Parameter

<n>	Number of execution steps
Range	1 to 100
Resolution	1
Default	1

Example of Use

To set the number of measurement sequence steps for Tx sweep to 10:

:CONF:CELL:GSM:HSAD:TXSW:STEP 10

:CONF:CELL:GSM:HSAD:TXSW:STEP?

> 10

:CONFigure:CELLular:GSM:MOBJect

Measuring Object

Function

Sets or queries measurement target signal

Command

```
:CONFigure:CELLular:GSM:MOBJect <object>
```

Query

```
:CONFigure:CELLular:GSM:MOBJect?
```

Response

<object>

Parameter

<object>	Measurement target signal
GMSK	Sets GMSK burst signal as measurement target
8PSK	Sets 8PSK burst signal as measurement target
CONT	Sets GMSK Continuous signal as measurement target
Default	GMSK

Example of Use

To set the measurement target to the GMSK burst signal:

:CONF:CELL:GSM:MOBJ GMSK

:CONF:CELL:GSM:MOBJ?

> GMSK

:CONFigure:CELLular:GSM:MRFPower:METHod

Multiburst RF Power Method

Function

Sets or queries Tx Power or Estimated Power for Multiburst RF Power measurement

Command

```
:CONFigure:CELLular:GSM:MRFPower:METHod <method>
```

Query

```
:CONFigure:CELLular:GSM:MRFPower:METHod?
```

Response

<method>

Parameter

<method>	Multiburst RF Power measurement method
NORMAL	Uses Tx Power
ESTIMATE	Uses Estimated Power
Default	NORMAL

Details

Estimated Power can be used only for 8PSK signals.

Example of Use

To use Tx Power for the Multiburst RF Power measurement:

:CONF:CELL:GSM:MRFP:METH NORMAL

:CONF:CELL:GSM:MRFP:METH?

> NORMAL

:CONFigure:CELLular:GSM:MRFPower:SSLot:FRAMe

Number of Multiburst RF Power Measurement (single slot) Frames

Function

Sets or queries number of frames measured at Multiburst RF power measurement (single slot)

Command

```
:CONFigure:CELLular:GSM:MRFPower:SSLot:FRAMe <n>
```

Query

```
:CONFigure:CELLular:GSM:MRFPower:SSLot:FRAMe?
```

Response

<n>

Parameter

<n>	Number of frames
Range	–500 to –1, 1 to 500
Resolution	1
Default	100

Details

When + is set for the number of frames, the burst that is 30 dB higher than the previous frame is found, and the result is output. Bursts before the peak burst are output continuously after the output.
When – is set for the number of frames, the burst that is 30 dB lower than the previous frame is found, and the result is output. Bursts before the peak burst are output continuously after the output.

Example of Use

To set the number of frames to be measured at Multiburst RF power measurement (single slot) to 100 frames:
:CONF:CELL:GSM:MRFP:SSL:FRAM 100
:CONF:CELL:GSM:MRFP:SSL:FRAM?
> 100

:CONFigure:CELLular:GSM:MTRigger

Measurement Trigger

Function

Sets or queries measurement trigger

Command

```
:CONFigure:CELLular:GSM:MTRigger <trigger>
```

Query

```
:CONFigure:CELLular:GSM:MTRigger?
```

Response

<trigger>

Parameter

<trigger>	Measurement trigger
TS	Training Sequence
VIDEO	Video
Default	TS

Details

The measurement trigger is selected from Training Sequence and Video.
Use Video for signal with no Training Sequence.

Example of Use

To set the measurement trigger to Training Sequence:

:CONF:CELL:GSM:MTR TS

:CONF:CELL:GSM:MTR?

> TS

:CONFigure:CELLular:GSM:QPDistortion:FILTer

Predistortion Measurement 1 Filter Bandwidth

Function

Sets or queries filter bandwidth for measurement

Command

```
:CONFigure:CELLular:GSM:QPDistortion:FILTer <bw>
```

Query

```
:CONFigure:CELLular:GSM:QPDistortion:FILTer?
```

Response

<bw>

Parameter

<bw>	Filter bandwidth
30KHZ	30 kHz
100KHZ	100 kHz
Default	100KHZ

Example of Use

To set the filter bandwidth for measurement to 100 kHz:

:CONF:CELL:GSM:QPD:FILT 100KHZ
:CONF:CELL:GSM:QPD:FILT?
>100KHZ

:CONFigure:CELLular:GSM:QPDistortion:SET

Predistortion Measurement 1 Setup

Function

Sets or queries measurement period, number of measurement periods, and valid measurement period ratio for Predistortion Measurement 1

Command

```
:CONFigure:CELLular:GSM:QPDistortion:SET <duration>,<n>,<ratio>
```

Query

```
:CONFigure:CELLular:GSM:QPDistortion:SET?
```

Response

<duration>,<n>,<ratio>

Parameters

<duration>	Measurement period
Range	0 or 100.000 to 4615.000 μs
Resolution	0.001
Suffix code	S, MS, US, NS (uses μs when omitted)
Default	200.000 μs
<n>	Number of measurement periods
Range	1 to 500
Resolution	1
Default	1
<ratio>	Valid measurement period ratio
Range	0.10 to 1.00
Resolution	0.01
Default	0.50

Example of Use

To set the measurement period, number of measurement periods, and valid measurement period ratio for Predistortion Measurement 1 to 200 μs, 100, and 0.5, respectively:

```
:CONF:CELL:GSM:QPD:SET 200,100,0.5
:CONF:CELL:GSM:QPD:SET?
> 200.000,100,0.50
```

:CONFigure:CELLular:GSM:QPDistortion:TCENter1

Predistortion Measurement 1 Center Time 1

Function

Sets or queries measurement center time for each step (0 to 499) for Predistortion Measurement 1 with time from level trigger

Command

```
:CONFigure:CELLular:GSM:QPDistortion:TCENter1
<t(0)>[,<t(1)>[,...[,<t(i)>]...]]
```

Query

```
:CONFigure:CELLular:GSM:QPDistortion:TCENter1?
```

Response

<t(0)>,<t(1)>,.......,<t(i)>

Unit	μs

Parameter

<t(i)>	Measurement center time of step number i
Range	50.000 to 400000.000 μs
Resolution	0.001
Suffix code	S, MS, US, NS (uses μs when omitted)
Default	50.000 μs
i	Step number
Range	0 to 499

Details

The <t(1)> and subsequent times can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement center time to Step 0 = 50 μs and Step 1 = 100 μs:

:CONF:CELL:GSM:QPD:TCEN1 50,100
:CONF:CELL:GSM:QPD:TCEN1?
> 50.000,100.000,50.000,…,50.000*
*: 500 items always returned without omitting

:CONFigure:CELLular:GSM:QPDistortion:TCENter2

Predistortion Measurement 1 Center Time 2

Function

Sets or queries measurement center time for each step (125 to 249) for Predistortion Measurement 1 with time from level trigger

Command

```
:CONFigure:CELLular:GSM:QPDistortion:TCENter2
<t(125)>[,<t(126)>[,...[,<t(i)>]...]]
```

Query

```
:CONFigure:CELLular:GSM:QPDistortion:TCENter2?
```

Response

<t(125)>,<t(126)>,.......,<t(i)>

Parameter

<t(i)>	Measurement center time of step number i
Range	50.000 to 400000.000 μs
Resolution	0.001
Suffix code	S, MS, US, NS (uses μs when omitted)
Default	50.000 μs
i	Step number
Range	125 to 249

Details

The <t(126)> and subsequent times can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement center time to Step 125 = 50 μs and Step 249 = 100 μs:

:CONF:CELL:GSM:QPD:TCEN2 50,100
:CONF:CELL:GSM:QPD:TCEN2?
> 50.000,100.000,50.000,…,50.000,50.000*
*: 125 items always returned without omitting

:CONFigure:CELLular:GSM:QPDistortion:TCENter3

Predistortion Measurement 1 Center Time 3

Function

Sets or queries measurement center time for each step (250 to 374) for Predistortion Measurement 1 with time from level trigger

Command

```
:CONFigure:CELLular:GSM:QPDistortion:TCENter3
<t(250)>[,<t(251)>[,...[,<t(i)>]...]]
```

Query

```
:CONFigure:CELLular:GSM:QPDistortion:TCENter3?
```

Response

<t(250)>,<t(251)>,.......,<t(i)>

Unit	μs

Parameter

<t(i)>	Measurement center time of step number i
Range	50.000 to 400000.000 μs
Resolution	0.001
Suffix code	S, MS, US, NS (uses μs when omitted)
Default	50.000 μs
i	Step number
Range	250 to 374

Details

The <t(251)> and subsequent times can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement center time to Step 250 = 50 μs and Step 251 = 100 μs:

:CONF:CELL:GSM:QPD:TCEN3 50,100

:CONF:CELL:GSM:QPD:TCEN3?

> 50.000,100.000,50.000,…,50.000,50.000*

*: 125 items always returned without omitting

:CONFigure:CELLular:GSM:QPDistortion:TCENter4

Predistortion Measurement 1 Center Time 4

Function

Sets or queries measurement center time for each step (375 to 499) for Predistortion Measurement 1 with time from level trigger

Command

```
:CONFigure:CELLular:GSM:QPDistortion:TCENter4
<t(375)>[,<t(376)>[,...[,<t(i)>]...]]
```

Query

```
:CONFigure:CELLular:GSM:QPDistortion:TCENter4?
```

Response

<t(375)>,<t(376)>,.......,<t(i)>

Unit	μs

Parameter

<t(i)>	Measurement center time of step number i
Range	50.000 to 400000.000 μs
Resolution	0.001
Suffix code	S, MS, US, NS (uses μs when omitted)
Default	50.000 μs
i	Step number
Range	375 to 499

Details

The <t(376)> and subsequent times can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement center time to Step 375 = 50 μs and Step 376 = 100 μs:

:CONF:CELL:GSM:QPD:TCEN4 50,100

:CONF:CELL:GSM:QPD:TCEN4?

> 50.000,100.000,50.000,…,50.000,50.000*

*: 125 items always returned without omitting

:CONFigure:CELLular:GSM:QPDistortion:TLENgth1

Predistortion Measurement 1 Length 1

Function

Sets or queries measurement period length for each step (0 to 499) for Predistortion Measurement 1

Command

```
:CONFigure:CELLular:GSM:QPDistortion:TLENgth1 t(0)[,t(1)[,…[,t(i)]…]]
```

Query

```
:CONFigure:CELLular:GSM:QPDistortion:TLENgth1?
```

Response

<t(0)>,<t(1)>,.......,<t(i)>

Unit	μs

Parameter

<t(i)>	Measuring period length of step number i
Range	100.000 to 4715.000 μs
Resolution	0.001
Suffix code	S, MS, US, NS (uses μs when omitted)
Default	100.000 μs
i	Step number
Range	0 to 499

Details

The <t(1)> and subsequent times can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement period length to Step 0 = 100 μs and Step 1 = 150 μs:

:CONF:CELL:GSM:QPD:TLEN1 100, 150

:CONF:CELL:GSM:QPD:TLEN1?

> 100.000,150.000, 100.000,..,100.000,100.00*

*: 500 items always returned without omitting

:CONFigure:CELLular:GSM:QPDistortion:TLENgth2

Predistortion Measurement 1 Length 2

Function

Sets or queries measurement period length for each step (125 to 249) for Predistortion Measurement 1

Command

```
:CONFigure:CELLular:GSM:QPDistortion:TLENgth2 t(125)[,t(126)[,…[t(i)]…]]
```

Query

```
:CONFigure:CELLular:GSM:QPDistortion:TLENgth2?
```

Response

<t(125)>,<t(126)>,.......,<t(i)>

Unit	μs

Parameter

<t(i)>	Measuring period length of the step number i
Range	100.000 to 4715.000 μs
Resolution	0.001
Suffix code	S, MS, US, NS (uses μs when omitted)
Default	100.000 μs
i	Step number
Range	125 to 249

Details

The <t(126)> and subsequent times can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement period length to Step 125 = 100 μs and Step 126 = 150 μs:

:CONF:CELL:GSM:QPD:TLEN2 100, 150

:CONF:CELL:GSM:QPD:TLEN2?

> 100.000,150.000, 100.000,..,100.000,100.00*

*: 125 items always returned without omitting

:CONFigure:CELLular:GSM:QPDistortion:TLENgth3

Predistortion Measurement 1 Length 3

Function

Sets or queries measurement period length of each step (250 to 374) for Predistortion Measurement 1

Command

```
:CONFigure:CELLular:GSM:QPDistortion:TLENgth3 t(250)[,t(251)[,…[,t(i)]…]]
```

Query

```
:CONFigure:CELLular:GSM:QPDistortion:TLENgth3?
```

Response

<t(250)>,<t(251)>,.......,<t(i)>

Unit	μs

Parameter

<t(i)>	Measuring period length of step number i
Range	100.000 to 4715.000 μs
Resolution	0.001
Suffix code	S, MS, US, NS (uses μs when omitted)
Default	100.000 μs
i	Step number
Range	250 to 374

Details

The <t(251)> and subsequent times can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measuring period length to Step 250 = 100 μs and Step 251 = 150 μs:

:CONF:CELL:GSM:QPD:TLEN3 100, 150

:CONF:CELL:GSM:QPD:TLEN3?

> 100.000,150.000, 100.000,..,100.000,100.00*

*: 125 items always returned without omitting

:CONFigure:CELLular:GSM:QPDistortion:TLENgth4

Predistortion Measurement 1 Length 4

Function

Sets or queries measurement period length of each step (375 to 499) for Predistortion Measurement 1

Command

```
:CONFigure:CELLular:GSM:QPDistortion:TLENgth4 t(375)[,t(376)[,…[,t(i)]…]]
```

Query

```
:CONFigure:CELLular:GSM:QPDistortion:TLENgth4?
```

Response

<t(375)>,<t(376)>,.......,<t(i)>

Unit	μs

Parameter

<t(i)>	Measuring period length of step number i
Range	100.000 to 4715.000 μs
Resolution	0.001
Suffix code	S, MS, US, NS (uses μs when omitted)
Default	100.000 μs
i	Step number
Range	375 to 499

Details

The <t(376)> and subsequent times can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measuring period length to Step 375 = 100 μs and Step 376 = 150 μs:

:CONF:CELL:GSM:QPD:TLEN4 100, 150

:CONF:CELL:GSM:QPD:TLEN4?

> 100.000,150.000,100.000,..,100.000,100.00*

*: 125 items always returned when omitted

:CONFigure:CELLular:GSM:RFSettings:SCOMbination

System Combination

Function

Sets or queries GSM system used for overlapping channel numbers (ARFCN)

Command

```
:CONFigure:CELLular:GSM:RFSettings:SCOMbination <system>
```

Query

```
:CONFigure:CELLular:GSM:RFSettings:SCOMbination?
```

Response

<system>

Parameter

<system>	System
DCS1800	DCS1800 (Measurement Band: DCS1800, GSM900)
PCS1900	PCS1900 (Measurement Band: PCS1900, GSM850)
Default	DCS1800

Details

When the CCH and TCH Channel is set, if the channel number (ARFCN) overlaps, the selected system determines the frequency of CCH Downlink, TCH Downlink, or TCH Uplink. The setting changes according to the system combination change as the table below.

System Combination Change	Setting		Setting Change			
	Channel	PCL	Channel	Band	PCL	ILVL
Change to DCS1800	512 to 885			DCS1800		
	Except 512 to 885			GSM900		
Change to PCS1900	811 to 885		810	PCS1900		Change*
	512 to 810			PCS1900		
	512 to 885	16 to 22		PCS1900	15	Change*
		23 to 29		PCS1900	30	Change*
	Except 512 to 885			GSM850		

*: When the input level control is set to PCL, the ILVL changes according to the PCL value.

For the relation of PCL value with ILVL, refer to Table 2.1.8-1 PCL and Input Level.

Example of Use

To set the GSM system to DCS1800:

```
:CONF:CELL:GSM:RFS:SCOM DCS1800
:CONF:CELL:GSM:RFS:SCOM?
> DCS1800
```

:CONFigure:CELLular:GSM:RFSettings:TCHannel

TCH Channel

Function

Sets or queries TCH Channel

Command

```
:CONFigure:CELLular:GSM:RFSettings:TCHannel <ch>
```

Query

```
:CONFigure:CELLular:GSM:RFSettings:TCHannel?
```

Response

<ch>

Parameter

<ch>	TCH Channel
Range	0 to 124
	128 to 251
	259 to 293
	306 to 340
	512 to 885 (DCS1800 System Combination)
	512 to 810 (PCS1900 System Combination)
	955 to 1023
Resolution	1
Default	1

Details

The setting range varies with the System Combination setting.
TCH Uplink Frequency and TCH Downlink Frequency are set for the TCH Channel.
Refer to Table 2.1.7-1 “Channel and Frequency of the GSM System” for the relationship between the parameter and frequency settings of channels.
If the System Combination is changed to PCS1900 when the TCH Channel is set within a range 811 to 885, then the TCH Channel is changed to 810.

The setting changes according to the TCH channel change as the table below.

TCH Channel Change	Setting			Setting Change		
	System Combination	Band	PCL	Band	PCL	ILVL
512 to 885	DCS1800	GSM900		DCS1800		Change*
		DCS1800				
Except 512 to 885		DCS1800		GSM900		Change*
		GSM900				
512 to 810	PCS1900	GSM850		PCS1900		Change*
		GSM850, PCS1900	16 to 22	PCS1900	15	Change*
			23 to 29	PCS1900	30	Change*
		PCS1900				
Except 512 to 810		PCS1900		GSM850		Change*
		GSM850				

*: When the input level control is set to PCL, the ILVL changes according to the PCL value.

For the relation of PCL value with ILVL, refer to Table 2.1.8-1 PCL and Input Level.

Example of Use

To set the TCH Channel to 1:

```
:CONF:CELL:GSM:RFS:TCH 1
:CONF:CELL:GSM:RFS:TCH?
> 1
```

:CONFigure:CELLular:GSM:TSCode

Uplink Training Sequence

Function

Sets or queries Uplink training sequence code

Command

```
:CONFigure:CELLular:GSM:TSCode <tsc>
```

Query

```
:CONFigure:CELLular:GSM:TSCode?
```

Response

<tsc>

Parameter

<tsc>	Uplink training sequence code
TSC0	TSC0 data pattern = 0x0970897
TSC1	TSC1 data pattern = 0x0B778B7
TSC2	TSC2 data pattern = 0x10EE90E
TSC3	TSC3 data pattern = 0x11ED11E
TSC4	TSC4 data pattern = 0x13AC13A
TSC5	TSC5 data pattern = 0x29F629F
TSC6	TSC6 data pattern = 0x29F629F
TSC7	TSC7 data pattern = 0x3BC4BBC
Default	TSC0

Example of Use

To set the Uplink training sequence code to TSC2:

:CONF:CELL:GSM:TSC TSC2

:CONF:CELL:GSM:TSC?

> TSC2

:CONFigure:CELLular:MEASurement:RFSettings:FREQuency

TCH Uplink Frequency

Function

Sets or queries TCH Uplink frequency

Command

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

Query

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

Response

<freq>

Unit	Hz

Parameter

<freq>	TCH Uplink Frequency
Range	400000000 to 3800000000 Hz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	890200000 Hz

Details

Changing the setting of the uplink frequency does not change the setting of the TCH channel.

Example of Use

To set the TCH Uplink frequency to 890.2 MHz:

:CONF:CELL:MEAS:RFS:FREQ 890200000

:CONF:CELL:MEAS:RFS:FREQ?

> 890200000

: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	–30.0 to +35.0 dBm (Port 1/Port 2)
	–30.0 to +25.0 dBm (Port 3/Port 4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	27.0

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 –25.0 to +40.0 dBm.

Example of Use

To set the input level to 27 dBm:
:CONF:CELL:MEASt:RFS:LEV 27
:CONF:CELL:MEASt:RFS:LEV?
> 27.0

Related Commands

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

:CONFigure:CELLular:MEASurement:SELect

Measurement Select

Function

Sets or queries measurement function

Command

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

Query

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

Response

<meas>

Parameter

<meas>	Selects measurement
FMEAS	Tx Fundamental Measurement
MRFPWRSNGL	Multiburst RF Power Measurement (single slot)
PREDISTQ	Predistortion Measurement 1
PREDISTE	Predistortion Measurement 2
HSADJ	High-Speed Adjustment
Default	FMEAS

Example of Use

To set the measurement function to Tx Fundamental Measurement:

:CONF:CELL:MEAS:SEL FMEAS

:CONF:CELL:MEAS:SEL?

> FMEAS

:FETCh:CELLular:GSM:EPDistortion:AMPLitude?

Predistortion Measurement 2 Amplitude

Function

Queries signal amplitude and Tx power of trigger burst at each sampling point measured at Predistortion Measurement 2

The response is in the exponent notation.

Query

```
:FETCh:CELLular:GSM:EPDistortion:AMPLitude? <start>,<n>
```

Response

<p>,<e(0)>,<e(1)>,……,<e(n-1)>

Unit	dBm (p) mV (e(0),e(1),……,e(n-1))

Parameters

<start>	Relative position from 0th sample
Range	–192 to 7999
Resolution	1
<n>	Number of samples
Range	1 to 8192 (Maximum n = 8192 – (start+192))
Resolution	1
<p>	Tx Power
Resolution	x.xxxE ±xx dBm
<e(n-1) >	Amplitude at each sampling point
Resolution	x.xxxE ±xx mV

Details

The Tx power response is –1.000E+01 (for –10 dBm) and 1.000E–02 (0.010 mV) for amplitude.

Example of Use

To query the signal amplitude and Tx power of the trigger burst for trigger at each sampling point measured at Predistortion Measurement 2 for 100 samples from the 0th sample:

:FETC:CELL:GSM:EPD:AMPL? 0,100

> -1.000E+01,1.234E-03,1.235E-03,…

:FETCh:CELLular:GSM:EPDistortion:BINary?

Predistortion Measurement 2 Binary Transfer

Function

Queries Tx power, amplitude and phase result at each sampling point measured at Predistortion Measurement 2 for number of samples in binary format
The data format is little-endian and 32-bit floating-point.

Query

```
:FETCh:CELLular:GSM:EPDistortion:BINary? <start>,<n>
```

Response

<p>,<d(0)>,<e(0)>,<d(1)>,<e(1)>,……,<d(n-1)>,<e(n-1)>

Unit	dBm (p)
	degree (d(0), d(1),……,d(n–1))
	dB (e(0), e(1),……,e(n–1))

Parameters

<start>	Relative position from 0th sample
Range	–192 to 7999
Resolution	1
<n>	Number of samples
Range	1 to 8192 (maximum n = 8192 – (start+192))
Resolution	1
<p>	Tx Power
Resolution	0.001 dB
<e(n-1)>	Amplitude at each sampling point
Resolution	0.001 mV
<d(n-1)>	Phase at each sampling point
Resolution	0.1 deg

Details

When the specified number of samples (n) is larger than the measured number, 0.0 is output for values exceed the measured number.

Example of Use

To query the transmit power and amplitude/phase at each sampling point measured at Predistortion Measurement 2 for 100 samples from the 0th sample in binary format:
:FETC:CELL:GSM:EPD:BIN? 0,100
> -20.001,0.020,0.1,0.021,0.1,...,0.1 (201 data items)

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SCPI Command Reference

:FETCh:CELLular:GSM:EPDistortion:PHASe?

Predistortion Measurement 2 Phase

Function

Queries phase at each sampling point measured at Predistortion Measurement 2

Query

```
:FETCh:CELLular:GSM:EPDistortion:PHASe? <start>,<n>
```

Response

<d(0)>,<d(1)>,……,<d(n-1)>

Unit	degree

Parameters

<start>	Relative position from 0th sample
Range	–192 to +7999
Resolution	1 sample
<n>	Number of samples
Range	1 to 8192 (maximum n = 8192 – (start+192))
Resolution	1 sample
<d(n-1) >	Phase at each sampling point
Resolution	0.1 deg

Example of Use

To query the phase at each sampling point measured at Predistortion Measurement 2 for 100 samples from the 0th sample:

:FETC:CELL:GSM:EPD:PHAS? 0,100

> 0.1,0.1,...,0.1 (100 data items)

:FETCh:CELLular:GSM:FUNDamental:BERate?

Bit Error Rate - Total

Function

Queries Pass/Fail judgment result, bit error rate, error bit number, received bit number, or sample bit number.

Query

```
:FETCh:CELLular:GSM:FUNDamental:BERate? <type>
```

Response

<judge>,<rate>,<n1>,<n2>,<n3>

Parameter

<type>	Measurement type
FAST	High speed measurement
SRBLB	SRB loopback
Default	FAST
<judge>	Pass/Fail judgment result
9	Reserved: Result is always 9.
<rate>	Bit Error Rate
<n1>	Error bit number
Resolution	1
<n2>	Received bit number
Resolution	1
<n3>	Sample bit number
Resolution	1

Example of Use

To query Pass/Fail judgment result, bit error rate, error bit number, received bit number, or sample bit number.

:FETC:CELL:GSM:FUND:BER? FAST

> 9,10.00,10,100,100

Remarks

When an error has occurred in the measurement (the response of :FETCh:CELLular:MEASurement:STATe? is 2, 4, 5, or 12) or before the measurement starts, the response is shown as below.

9,999.99,-1,-1,0

:FETCh:CELLular:GSM:FUNDamental:BERate:ECOunt?

Bit Error Rate - Error Counts

Function

Queries error bit number at Bit Error Rate measurement.

Query

```
:FETCh:CELLular:GSM:FUNDamental:BERate:ECOunt? <type>
```

Response

<number>

Unit	None

Parameter

<type>	Measurement type
FAST	High speed measurement
SRBLB	SRB loopback
Default	FAST
<number>	Error bit number
Resolution	1

Example of Use

To query error bit number at FAST measurement.

:FETC:CELL:GSM:FUND:BER:ECO? FAST

> 50

Remarks

When an error has occurred in the measurement (the response of :FETCh:CELLular:MEASurement:STATe? is 2, 4, 5, or 12) or before the measurement starts, the response is –1.

:FETCh:CELLular:GSM:FUNDamental:BERate:ERATe?

Bit Error Rate

Function

Queries results of Bit Error Rate measurement.

Query

```
:FETCh:CELLular:GSM:FUNDamental:BERate:ERATe? <type>
```

Response

<rate>

Unit	% (Resolution 0.01)

Parameter

<type>	Measurement type
FAST	High speed measurement
SRBLB	SRB loopback
Default	FAST
<rate>	Bit Error Rate

Example of Use

To query results of Bit Error Rate measurement.

:FETC:CELL:GSM:FUND:BER:ERAT? FAST

> 0.05

Remarks

When an error has occurred in the measurement (the response of :FETCh:CELLular:MEASurement:STATe? is 2, 4, 5, or 12) or before the measurement starts, the response is 999.99.

:FETCh:CELLular:GSM:FUNDamental:BERate:RBIT?

Bit Error Rate - Received bits

Function

Queries received bit number at Bit Error Rate measurement.

Query

```
:FETCh:CELLular:GSM:FUNDamental:BERate:RBIT? <type>
```

Response

<number>

Unit	None

Parameter

<type>	Measurement type
FAST	High speed measurement
SRBLB	SRB loopback
<number>	Received bit number
Resolution	1

Example of Use

To query received bit number at FAST measurement.

:FETC:CELL:GSM:FUND:BER:RBIT? FAST

> 50

Remarks

When an error has occurred in the measurement (the response of :FETCh:CELLular:MEASurement:STATe? is 2, 4, 5, or 12) or before the measurement starts, the response is –1.

:FETCh:CELLular:GSM:FUNDamental:MODulation:CFRequency?

Carrier Frequency

Function

Queries Carrier Frequency measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:MODulation:CFRequency? [<slot>]
```

Response

<freq>

Unit	Hz (1 Hz resolution)

Parameters

<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<freq>	Carrier Frequency

Example of Use

To query the Carrier Frequency measurement result for Slot 0:

:FETC:CELL:GSM:FUND:MOD:CFR? 0

> 890200000

:FETCh:CELLular:GSM:FUNDamental:MODulation:EVM?

EVM

Function

Queries EVM measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:MODulation:EVM? <mode>[,<slot>]
```

Response

When <mode> = TTL,

<avg>, <max>, <min>

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

<percent>

When <mode> = IND,

<n>,<percent(0)>,<percent(1)>,...,<percent(n–1)>

<n> = measurement count × measurement slot number when <slot> omitted

<n> = measurement count when <slot> not omitted

Unit	% (resolution 0.01 %)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	All measurement results (time-series display)
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<percent>	Measurement result in specified Storage mode

Details

Only 8PSK signals support this measurement.

When <mode> is set to IND, if the slot is omitted, the time-series measurement results are output for all slots.

Example of Use

To query the EVM measurement result average for Slot 0:
:FET:CELL:GSM:FUND:MOD:EVM? AVG,0
> 1.05

:FETCh:CELLular:GSM:FUNDamental:MODulation:EPERcentile?

95th Percentile

Function

Queries EVM measurement result with probability distribution of 95%

Query

```
:FETCh:CELLular:GSM:FUNDamental:MODulation:EPERcentile? [<slot>]
```

Response

<percent>

Unit	% (0.1% resolution)

Parameters

<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<percent>	EVM with probability distribution of 95%

Details

Only 8PSK signals support this measurement.

Example of Use

To query the 95th Percentile measurement result for Slot 0:
:FETC:CELL:GSM:FUND:MOD:EPER? 0
> 2.01

:FETCh:CELLular:GSM:FUNDamental:MODulation:FERRor?

Carrier Frequency Error

Function

Queries Carrier Frequency Error measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:MODulation:FERRor? <mode>[,<slot>]
```

Response

When <mode> = TTL,

<avg_ppm>,<avg_hz>,<max_ppm>, <max_hz>, <min_ppm>, <min_hz>

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

<freq_ppm>, <freq_hz>

Unit	ppm (0.01 ppm resolution), Hz (0.1 Hz resolution)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg_ppm>	Average in ppm
<avg_hz>	Average in Hz
<max_ppm>	Maximum in ppm
<max_hz>	Maximum in Hz
<min_ppm>	Minimum in ppm
<min_hz>	Maximum in Hz
<req_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 for Slot 0:

:FETC:CELL:GSM:FUND:MOD:FERR? AVG,0

> 0.12,1.5

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

Carrier Frequency Error Worst Value

Function

Queries worst value Carrier Frequency Error measurement results

Query

```
:FETCh:CELLular:GSM:FUNDamental:MODulation:FERRor:WORSt? [<slot>]
```

Response

<freq_ppm>,<freq_hz>

Unit	ppm (0.01 ppm resolution), Hz (0.1 Hz resolution)

Parameters

<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
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 results for Slot 0:

:FETC:CELL:GSM:FUND:MOD:FERR:WORS? 0

> 0.12,1.5

:FETCh:CELLular:GSM:FUNDamental:MODulation:IQIMbalance?

IQ Imbalance

Function

Queries IQ Imbalance measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:MODulation:IQIMbalance? <mode>[,<slot>]
```

Response

When <mode> = TTL,

<avg>, <max>, <min>

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

<value>

Unit	dB (0.01 dB resolution)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<value>	Measurement result in specified Storage mode

Example of Use

To query IQ Imbalance measurement result average for Slot 0:

:FETC:CELL:GSM:FUND:MOD:IQIM? AVG,0

> 1.05

:FETCh:CELLular:GSM:FUNDamental:MODulation:MERRor?

Magnitude Error

Function

Queries Magnitude Error measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:MODulation:MERRor? <mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg>, <max>, <min>
When <mode> = AVG, MAX, MIN or DVT,
<percent>

Unit	% (resolution 0.01 %)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<percent>	Measurement result in specified Storage mode

Example of Use

To query the Magnitude Error measurement result average for Slot 0:
:FETC:CELL:GSM:FUND:MOD:MERR? AVG,0
> 1.02

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SCPI Command Reference

:FETCh:CELLular:GSM:FUNDamental:MODulation:ORGNoffset?

Origin Offset

Function

Queries Origin Offset measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:MODulation:ORGNoffset? <mode>[,<slot>]
```

Response

When <mode> = TTL,

<avg>, <max>, <min>

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

<value>

Unit	dB (0.01 dB resolution)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<value>	Measurement result in specified Storage mode

Example of Use

To query the Origin Offset measurement result average for Slot 0:

:FETC:CELL:GSM:FUND:MOD:ORGN? AVG,0

> 0.25

:FETCh:CELLular:GSM:FUNDamental:MODulation:PEVM?

Peak EVM

Function

Queries Peak EVM measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:MODulation:PEVM? <mode>[,<slot>]
```

Response

When <mode> = TTL,

<avg>,<max>,<min>

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

<percent>

Unit	% (0.01% resolution)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<percent>	Measurement result in specified Storage mode

Details

Only 8PSK signals support this measurement.

Example of Use

To query the Peak EVM measurement result average for Slot 0:

:FETC:CELL:GSM:FUND:MOD:PEVM? AVG,0

> 3.01

:FETCh:CELLular:GSM:FUNDamental:MODulation:PHERror?

RMS Phase Error

Function

Queries RMS Phase Error measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:MODulation:PHERror? <mode>[,<slot>]
```

Response

When <mode> = TTL,

<avg>,<max>,<min>

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

<deg>

Unit	degree (0.01 deg resolution)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<deg>	Measurement result in specified Storage mode

Example of Use

To query the RMS Phase Error measurement result average for Slot 0:

:FETC:CELL:GSM:FUND:MOD:PHER? AVG,0

> 1.05

:FETCh:CELLular:GSM:FUNDamental:MODulation:PPHerror?

Peak Phase Error

Function

Queries Peak Phase Error measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:MODulation:PPHerror? <mode>[,<slot>]
```

Response

When <mode> = TTL,

<avg>,<max>,<min>

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

<deg>

Unit	degree (0.01 deg resolution)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<deg>	Measurement result in specified Storage mode

Example of Use

To query the Peak Phase Error measurement result average for Slot 0:

:FETC:CELL:GSM:FUND:MOD:PPH? AVG,0

> 1.03

:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation:JUDGement?

Output RF Spectrum Due to Modulation Judgement

Function

Queries Output RF Spectrum (modulation part) judgement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation:JUDGement?
[<slot>]
```

Response

<judge>

Parameters

<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<judge>	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement

Details

The judgement value is calculated using Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (modulation part) judgement result for Slot 0:

:FETC:CELL:GSM:FUND:ORFS:MOD:JUDG? 0

> PASS

:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation:LOWer?

Output RF Spectrum Due to Modulation (Lower Side)

Function

Queries Output RF Spectrum (modulation part, lower side) measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation:LOWer?
<mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg(0)>,<avg(1)>,...,<avg(freq)>,<max(0)>,<max(1)>,...,<max(freq)>,<min(0)>,<min(1)>,...,<min(freq)>
When <mode> = AVG, MAX, MIN or DVT,
<level(0)>,<level(1)>,...,<level(freq)>

Unit	dBm (mode = other than DVT and freq = 0), dB (other than left description), (resolution 0.01 dB)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<level>	Measurement result in specified Storage mode
<freq>	Offset frequency from center frequency
Range	0 to 12 0: Center frequency 1 to 12: Offset frequency (kHz) –100, –200, –250, –400, –600, –800, –1000, –1200, –1400, –1600, –1800, –2000
Resolution	1

Example of Use

To query the Output RF Spectrum (modulation part, lower side) measurement result average

for Slot 0:
:FETC:CELL:GSM:FUND:ORFS:MOD:LOW? AVG,0
> -20.00,-1.00,-2.00,-3.00,-4.00,-5.00,-6.00,-7.00,-8.00,-9.00,-10.00,-11.00,-12.00

:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation:LOWer:FPOint?

Output RF Spectrum Due to Modulation Judgement of Each Frequency Point (Lower Side)

Function

Queries Output RF Spectrum (modulation part, lower side) for each frequency point judgement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation:LOWer:FPOint?
[<slot>]
```

Response

<judge(1)>, <judge(2)>,..., <judge(freq)>

Parameters

<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<judge>	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
<freq>	Offset frequency from center frequency
Range	1 to 12
	1 to 12: Offset frequency (kHz) –100, –200, –250, –400, –600, –800, –1000, –1200, –1400, –1600, –1800, –2000
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (modulation part, lower side) of each frequency point judgement result for Slot 0:
:FETC:CELL:GSM:FUND:ORFS:MOD:LOW:FPO? 0
> PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation:UPPer?

Output RF Spectrum Due to Modulation (Upper Side)

Function

Queries Output RF Spectrum (modulation part, upper side) of measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation:UPPer?
<mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg(0)>,<avg(1)>,...,<avg(freq)>,<max(0)>,<max(1)>,...,<max(freq)>,<min(0)>,<min(1)>,...,
<min(freq)>
When <mode> = AVG, MAX, MIN or DVT,
<level(0)>,<level(1)>,...,<level(freq)>

Unit	dBm (mode = other than DVT and freq = 0), dB (other than left description), (resolution 0.01 dB)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<level>	Measurement result in specified Storage mode
freq	Offset frequency from center frequency
Range	0 to 12 0: Center frequency 1 to 12: Offset frequency (kHz) +100, +200, +250, +400, +600, +800, +1000, +1200, +1400, +1600, +1800, +2000
Resolution	1

Example of Use

To query the Output RF Spectrum (modulation part, upper side) of the measurement result average for Slot 0:

FETC:CELL:GSM:FUND:ORFS:MOD:UPP? AVG,0

> -20.00,-1.00,-2.00,-3.00,-4.00,-5.00,-6.00,-7.00,-8.00,-9.00,-10.00,-11.00,-12.00

:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation:UPPer:FPOint?

Output RF Spectrum Due to Modulation Judgement of Each Frequency Point (Upper Side)

Function

Queries Output RF Spectrum (modulation part, upper side) of each frequency point judgement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:MODulation:UPPer:FPOint?
[<slot>]
```

Response

<judge(1)>,<judge(2)>,...,<judge(freq)>

Parameters

<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<judge>	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
<freq>	Offset frequency from center frequency
Range	1 to 12 1 to 12: Offset frequency (kHz) +100, +200, +250, +400, +600, +800, +1000, +1200, +1400, +1600, +1800, +2000
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (modulation part, upper side) of each frequency point judgement result for Slot 0:

:FETC:CELL:GSM:FUND:ORFS:MOD:UPP:FPO? 0

> PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:JUDGement?

Output RF Spectrum Due to Switching Judgement

Function

Queries Output RF Spectrum (transient part) judgement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:JUDGement? [<slot>]
```

Response

<judge>

Parameters

slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (transient part) judgement result for Slot 0:

:FETC:CELL:GSM:FUND:ORFS:SWIT:JUDG? 0

> PASS

:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:LOWer?

Output RF Spectrum Due to Switching (Lower Side)

Function

Queries Output RF Spectrum (transient part, lower side) measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:LOWer?
<mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg(0)>,<avg(1)>,...,<avg(freq)>,<max(0)>,<max(1)>,...,<max(freq)>,<min(0)>,<min(1)>,...,
<min(freq)>
When <mode> = AVG, MAX, MIN or DVT,
<level(0)>,<level(1)>,...,<level(freq)>

Unit	dBm (mode = other than DVT), dB (other than left description), (resolution 0.01 dB)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<level>	Measurement result in specified Storage mode
freq	Offset frequency from center frequency
Range	0 to 12 0: Center frequency 1 to 12: Offset frequency (kHz) –100, –200, –250, –400, –600, –800, –1000, –1200, –1400, –1600, –1800, –2000
Resolution	1

Example of Use

To query the Output RF Spectrum (transient part, lower side) measurement result average for

Slot 0:
:FETC:CELL:GSM:FUND:ORFS:SWIT:LOW? AVG,0
> -20.00,-1.00,-2.00,-3.00,-4.00,-5.00,-6.00,-7.00,-8.00,-9.00,-10.00,-11.00,-12.00

:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:LOWer:FPOint?

Output RF Spectrum Due to Switching Judgement of Each Frequency Point (Lower Side)

Function

Queries Output RF Spectrum (transient part, lower side) of each frequency point judgement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:LOWer:FPOint?
[<slot>]
```

Response

<judge(1)>,<judge(2)>,...,<judge(freq)>

Parameters

slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
freq	Offset frequency from center frequency
Range	1 to 12
	1 to 12: Offset frequency (kHz) –100, –200, –250, –400, –600, –800, –1000, –1200, –1400, –1600, –1800, –2000
Resolution	1

Details

The judgement value is calculated using Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (transient part, lower side) of each frequency point judgement result for Slot 0:
:FETC:CELL:GSM:FUND:ORFS:SWIT:LOW:FPO? 0
> PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:UPPer?

Output RF Spectrum Due to Switching (Upper Side)

Function

Queries Output RF Spectrum (transient part, upper side) measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:UPPer?
<mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg(0)>,<avg(1)>,...,<avg(freq)>,<max(0)>,<max(1)>,...,<max(freq)>,<min(0)>,<min(1)>,...,
<min(freq)>
When <mode> = AVG, MAX, MIN or DVT,
<level(0)>,<level(1)>,...,<level(freq)>

Unit	dBm (mode = other than DVT and freq = 0), dB (other than left description), (resolution 0.01 dB)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<level>	Measurement result in specified Storage mode
freq	Offset frequency from center frequency
Range	0 to 12 0: Center frequency 1 to 12: Offset frequency (kHz) +100, +200, +250, +400, +600, +800, +1000, +1200, +1400, +1600, +1800, +2000
Resolution	1

Example of Use

To query the Output RF Spectrum (transient part, upper side) measurement result average for

Slot 0:
:FETC:CELL:GSM:FUND:ORFS:SWIT:UPP? AVG,0
> -20.00,-1.00,-2.00,-3.00,-4.00,-5.00,-6.00,-7.00,-8.00,-9.00,-10.00,-11.00,-12.00

:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:UPPer:FPOint?

Output RF Spectrum Due to Switching Judgement of Each Frequency Point (Upper Side)

Function

Queries Output RF Spectrum (transient part, upper side) of each frequency point judgement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum:SWITching:UPPer:FPOint?
[<slot>]
```

Response

<judge(1)>,<judge(2)>,...,<judge(freq)>

Parameters

slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
freq	Offset frequency from center frequency
Range	1 to 12
	1 to 12: Offset frequency (kHz) +100, +200, +250, +400, +600, +800, +1000, +1200, +1400, +1600, +1800, +2000
Resolution	1

Details

The judgement value is calculated using Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (transient part, upper side) of each frequency point judgement result for Slot 0:
:FETC:CELL:GSM:FUND:ORFS:SWIT:UPP:FPO? 0
> PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

:FETCh:CELLular:GSM:FUNDamental:POWer:EPOWer?

Estimated Power

Function

Queries 8PSK Estimated Power measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:POWer:EPOWer? <mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg>, <max>, <min>
When <mode> = AVG, MAX, MIN or DVT,
<level>
When <mode> = IND,
<n>,<level(0) >,<level(1) >,...<level(n–1) >

<n> = measurement count × measurement slot number when <slot> omitted
<n> = measurement count when <slot> not omitted

Unit	dBm (mode = other than DVT), dB (mode = DVT), (0.01 dBm resolution)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	All measurement results (time-series display)
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<level>	Measurement result in specified Storage mode

Details

When <mode> is set to IND, if the slot is omitted, the time-series measurement results are output for all slots.
Only 8PSK signals support this measurement.

Example of Use

To query the 8PSK Estimated Power measurement result average for Slot 0:
:FETC:CELL:GSM:FUND:POW:EPOW? AVG,0
> -20.00

:FETCh:CELLular:GSM:FUNDamental:POWer:OFFPower?

Carrier Off Power

Function

Queries Carrier Off Power measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:POWer:OFFPower? <mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg>, <max>, <min>
When <mode> = AVG, MAX, MIN or DVT,
<level>

Unit	dBm (mode = other than DVT), dB (mode = DVT), (0.01 dB resolution)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<level>	Measurement result in specified Storage mode

Example of Use

To query the Carrier Off Power measurement result average for Slot 0:
:FETC:CELL:GSM:FUND:POW:OFFP? AVG,0
> -120.00

:FETCh:CELLular:GSM:FUNDamental:POWer:PFMaximum?

Power Flatness Maximum Power

Function

Queries difference between Tx Power and Maximum Power within burst

Query

```
:FETCh:CELLular:GSM:FUNDamental:POWer:PFMaximum? <mode>[,<slot>]
```

Response

When <mode> = TTL,

<avg>, <max>, <min>

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

<level>

Unit	dB (0.01 dB resolution)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<level>	Measurement result in specified Storage mode

Example of Use

To query the Power Flatness Maximum Power measurement result average for Slot 0:

:FETC:CELL:GSM:FUND:POW:PFM? AVG,0

> 5.00

4

SCPI Command Reference

:FETCh:CELLular:GSM:FUNDamental:POWer:PFMinimum?

Power Flatness Minimum Power

Function

Queries difference between Tx Power and Minimum Power within burst

Query

```
:FETCh:CELLular:GSM:FUNDamental:POWer:PFMinimum? <mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg>, <max>, <min>
When <mode> = AVG, MAX, MIN or DVT,
<level>

Unit	dB (0.01 dB resolution)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<level>	Measurement result in specified Storage mode

Example of Use

To query the Power Flatness Minimum Power measurement result average for Slot 0:
:FETC:CELL:GSM:FUND:POW:PFM? AVG,0
> -5.00

:FETCh:CELLular:GSM:FUNDamental:POWer:RATio?

On/Off Ratio

Function

Queries ratio between burst-on and burst-off sections

Query

```
:FETCh:CELLular:GSM:FUNDamental:POWer:RATio? <mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg>,<max>,<min>
When <mode> = AVG, MAX, MIN or DVT,
<level>

Unit	dB, (0.01 dB resolution)

Parameters

<mode>	Mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<slot>	Slot Number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<level>	Measurement result in specified Storage mode

Example of Use

To query the on/off ratio measurement result average for Slot 0:
:FETC:CELL:GSM:FUND:POW:RAT? AVG,0
> 40.00

:FETCh:CELLular:GSM:FUNDamental:POWer:TXPower?

Tx Power

Function

Queries Tx Power measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:POWer:TXPower? <mode>[,<slot>]
```

Response

When <mode>= TTL,
<avg>,<max>,<min>
When <mode> = AVG, MAX, MIN or DVT,
<level>
When <mode> = IND,
<n>,<level(0)>,<level(1)>,...,<level(n–1)>

<n> = measurement count × measurement slot number when <slot> omitted
<n> = measurement count when <slot> not omitted

Unit	dBm (mode = other than DVT), dB (mode = DVT), (0.01 dB resolution)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	All measurement results (time-series display)
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<level>	Measurement result in specified Storage mode

Details

When <mode> is set to IND, if the slot is omitted, the time-series measurement results are output for all slots.

Example of Use

To query the Tx Power measurement result average for Slot 0:
:FETC:CELL:GSM:FUND:POW:TXP? AVG,0
> -10.00

:FETCh:CELLular:GSM:FUNDamental:PVTime:OTPower?

Power vs. Time

Function

Queries Power vs. Time measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:PVTime:OTPower? <mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg(0),<avg(1)>,...,<avg(11)>,<max(0)>,<max(1)>,...,<max(11)>,<min(0) >,<min(1)>,...,
<min(11)>
When <mode> = AVG, MAX, MIN or DVT,
<level(0)>,<level(1)>,...,<level(11)>

Unit	dBm (mode = other than DVT), dB (mode = DVT), (0.01 dBm resolution)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<level>	Measurement result in specified Storage mode

Example of Use

To query the Power vs. Time measurement result average:
:FETC:CELL:GSM:FUND:PVT:OTP AVG,0
> -10.00,-11.00-12.00,-13.00,-14.00,-15.00,-16.00,-17.00,-18.00,-19.00,-20.00,-21.00

:FETCh:CELLular:GSM:FUNDamental:PVTime:TEMPlate?

Power vs. Time Template Judgement

Function

Queries Power vs. Time Template judgement measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:PVTime:TEMPlate? [<slot>]
```

Response

<judge>

Parameters

<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<judge>	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Power vs. Time Template judgement measurement result for Slot 0:

:FETC:CELL:GSM:FUND:PVT:TEMP? 0

> PASS

:FETCh:CELLular:GSM:FUNDamental:PVTime:TEMPlate:DETail?

Power vs. Time Template Judgement Detail

Function

Queries Power vs. Time Template judgement for each measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:PVTime:TEMPlate:DETail? [<slot>]
```

Response

<type>,<judge(0)>,<judge(1)>,...,<judge(n-1)>

Parameters

<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<type>	Measurement target signal
GMSK	GMSK burst signal
8PSK	8PSK burst signal
NONE	Continuous signal
<judge>	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
n	Judgement line number
Range	10 (type = GMSK)
	16 (type = 8PSK)
	Omitted (type = NONE)
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

<judge> is omitted when <type> = NONE, because judgement is not executed.

Example of Use

To query the Power vs. Time Template judgement for measurement result for each line for Slot 0:

:FETC:CELL:GSM:FUND:PVT:TEMP:DET? 0

> GMSK,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

4

SCPI Command Reference

:FETCh:CELLular:GSM:FUNDamental:PVTime:TEMPlate:DETail:STORage?

Power vs time template storage Judgement Detail

Function

Queries measurement result at each judgment line of Power vs. Time Template judgment for each storage mode.

Query

```
:FETCh:CELLular:GSM:FUNDamental:PVTime:TEMPlate:DETail:STORage?
<mode>[,<slot>]
```

Response

<type>,<judge(0)>,<judge(1)>,...,<judge(n-1)>

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<type>	Measurement target signal
GMSK	GMSK burst signal
8PSK	8PSK burst signal
NONE	Continuous signal
<judge>	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
n	Judgement line number
Range	10 (type = GMSK)
	16 (type = 8PSK)
	Omitted (type = NONE)
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query measurement result (average) at each judgment line of Power vs. Time Template judgment for Slot 0.

```
:FETC:CELL:GSM:FUND:PVT:TEMP:DET:STOR? AVG,0
> GMSK,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS
```

:FETCh:CELLular:GSM:FUNDamental:PVTime:TEMPlate:STORage?

Power vs time template storage

Function

To query measurement result at judgment line of Power vs. Time Template judgment for each storage mode.

Query

```
:FETCh:CELLular:GSM:FUNDamental:PVTime:TEMPlate:STORage? <mode>[,<slot>]
```

Response

When <mode> = TTL,
<judge_ave>,<judge_max>,<judge_min>
When <mode> = AVG, MAX or MIN,
<judge>

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average･Maximum･Minimum
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<judge_ave>	Judgment result of average
<judge_max>	Judgment result of maximum
<judge_min>	Judgment result of minimum
<judge>	Judgement result in specified Storage mode
PASS	Pass
FAIL	Fail
–	No measurement

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query measurement result (maximum) of Power vs. Time Template judgment for Slot 0
:FETC:CELL:GSM:FUND:PVT:TEMP:STOR? MAX,0
> PASS

:FETCh:CELLular:GSM:FUNDamental:PVTime:TERRor?

Time Alignment

Function

Queries Time Alignment measurement result

Query

```
:FETCh:CELLular:GSM:FUNDamental:PVTime:TERRor? <mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg>,<max>,<min>
When <mode> = AVG, MAX, MIN or DVT,
<value>

Unit	bit (0.01 bit resolution)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<value>	Measurement result in specified Storage mode

Example of Use

To query the Time Alignment measurement result average for Slot 0:
:FETC:CELL:GSM:FUND:PVT:TERR? AVG,0
> 0.01

:FETCh:CELLular:GSM:FUNDamental:PVTime:TERRor:WORSt?

Time Alignment Worst Value

Function

Queries Time Alignment measurement result worst value

Query

```
:FETCh:CELLular:GSM:FUNDamental:PVTime:TERRor:WORSt? [<slot>]
```

Response

<value>

Unit	bit (0.01 bit resolution)

Parameters

<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<value>	Measurement result

Example of Use

To query the Time Alignment measurement result worst value for Slot 0:

:FETC:CELL:GSM:FUND:PVT:TERR:WORS? 0

> 0.10

:FETCh:CELLular:GSM:FUNDamental:STATe?

Measurement Status of Each Slot

Function

Queries measurement status of each slot

Query

```
:FETCh:CELLular:GSM:FUNDamental:STATe?
```

Response

<status(0)>, <status(1)>,……, <status(s)>

Parameters

s	Slot number
Range	0 to 7
Resolution	1
<status>	Measurement status
0	Ended normally
2	Over level
4	Measurement disabled, signal abnormal
5	Synchronization word not detected
9	Not measured

Example of Use

To query the measurement status of each slot:
FETC:CELL:GSM:FUND:STAT?
> 0,0,0,0,0,0,0,0

Related Command

Measurement status query
:FETCh:CELLular:MEASurement:STATe?

:FETCh:CELLular:GSM:FUNDamental:TRACe?

Graph Data

Function

Queries waveform data for graph display

Query

```
:FETCh:CELLular:GSM:FUNDamental:TRACe? <format>,<start>,<n>[,<slot>]
```

Response

<data(0)>,<data(1)>,...,<data(n–1)>

Unit	dBm (format 1,2,3)
Resolution	0.01 dB (format 1,2,3)
Unit	None (format 4,5)
Resolution	0.0001 (format 4,5)
Unit	degree (format 6,7,8)
Resolution	0.01 deg (format 6,7,8)
Unit	% (format 9 to 14)
Resolution	0.01 % (format 9 to 14)
Unit	None (format 15)
Resolution	1 (format 15)

Parameters

<format>	Output data Format
1	Tx Power Average
2	Tx Power Max. Hold
3	Tx Power Min. Hold
4	IQ Constellation I phase
5	IQ Constellation Q phase
6	Phase Error Average
7	Phase Error Max. Hold
8	Phase Error Min. Hold
9	Magnitude Error Average
10	Magnitude Error Max. Hold
11	Magnitude Error Min. Hold
12	EVM Average
13	EVM Max. Hold
14	EVM Min. Hold
15	Demodulation Data

<start>	Start point of waveform data
Range	–216 to 10216 (format 1,2,3)
	0 to 882 (format 4 to 11), when the measurement target is GMSK and CW
	0 to 147 (format 4 to 14), when the measurement target is 8PSK
	0 to 147 (format 15)
Resolution	1
<n>	Number of data to read
Range	1 to 10433 = (10216 – start), (format 1,2,3)
	1 to 883 = (883 – start), (format 4 to 11), when the measurement target is GMSK and CW
	1 to 148 = (148 – start), (format 4 to 14), when the measurement target is 8PSK
	1 to 148 = (148 – start), (format 15)
Resolution	1
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted, omitted for format 1,2,3)
Resolution	1
<data(n–1)>	Waveform data corresponding to Format

Details

The settable range and arguments vary according to the output data Format.

Example of Use

To query the Tx Power measurement result average for Slot 0:

:FETC:CELL:GSM:FUND:TRAC? 1,-216,10433,0

> -20.1,-20.2,-21.2,…,-22.2

To query the Peak Error (GMSK) measurement result average of Slot 0:

:FETC:CELL:GSM:FUND:TRAC? 6,0,883,0

> 1.25,1.22,1.23,…,1.35

:FETCh:CELLular:GSM:FUNDamental:TXIQ:POWer?

TX IQ

Function

Queries result of Power measurement at each point of 0 Hz, ±67.708 kHz, ±135.416 kHz, ±203.125 kHz, and ±270.833 kHz with reference to measurement frequency

Query

```
:FETCh:CELLular:GSM:FUNDamental:TXIQ:POWer? <mode>[,<slot>]
```

Response

<level(0)>,<level(1)>,...,<level(freq)>

Unit	dBm (0.01 dB resolution)

Parameters

<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<level>	Measurement result in specified Storage mode
<freq>	Offset frequency from center frequency
Range	0 to 8: Offset frequency (kHz) –270.833, –203.125, –135.416, –67.708, Center frequency, +67.708, +135.416, +203.125, +270.833
Resolution	1

Details

The measurement is executed only when the measurement target is CW.

Example of Use

To query the Tx IQ measurement result average for Slot 0:

:FETC:CELL:GSM:FUND:TXIQ:POW? AVG,0

> -20.00,-19.00,-18.00,-17.00,-10.00,-17.00,-18.00,-19.00,-20.00

4

SCPI Command Reference

:FETCh:CELLular:GSM:HSADjustment:TXSWeep:STATe?

TX Sweep Measurement Status

Function

Queries measurement status of each step in Tx Sweep measurement

Query

```
:FETCh:CELLular:GSM:HSADjustment:TXSWeep:STATe?
```

Response

<s(0)>,<s(1)>,……,<s(n–1)>

Parameter

<s(n–1)>	Measurement status of each step
0	Ended normally
2	Over level
9	Measurement in progress or not measured
12	Timeout
n	Number of measured steps

Example of Use

To query the measurement status of each step:

:FETC:CELL:GSM:HSAD:TXSW:STAT?

> 2

:FETCh:CELLular:GSM:HSADjustment:TXSWeep:TXPower?

TX Sweep Average Tx Power

Function

Queries average of measurement result for each slot at Tx sweep measurement

Query

`:FETCh:CELLular:GSM:HSADjustment:TXSWeep:TXPower?`

Response

<p(0)>,<p(1)>,……,<p(n×7–1)>

Unit	dBm

Parameter

<p(n×7–1)>	Transmit power of each slot
Resolution	0.01 dB
n	Number of measured steps

Details

When the frame measurement count is set to twice or more, the measured value of each slot in the frame is the average of the result measured for the measurement count.

Example of Use

To query the average of the measurement result for each slot at Tx sweep measurement:
:FETC:CELL:GSM:HSAD:TXSW:TXP?
>

:FETCh:CELLular:GSM:MRFPower:SSLot?

Multi Burst RF Power Measurement (single slot) Result All

Function

Queries Multiburst RF Power (single slot) measurement results for measurement status, Tx power, Power flatness max, and Power flatness min for each frame

Query

`:FETCh:CELLular:GSM:MRFPower:SSLot?`

Response

<status(0)>,<level(0)>,<max(0)>,<min(0)>,<status(1)>,<level(1)>,<max(1)>,<min(1)>,...,
<status(n–1)>,<level(n–1)>,<max(n–1)>,<min(n–1)>

n is the number of frames to be measured.

Unit	dBm(level), dB(max,min)

Parameters

<status(n–1)>	Measurement status
0	Ended normally
2	Over level
4	Measurement disabled
5	Synchronization word detection disabled
12	Timeout
14	Short burst length
15	Power flatness max/min fail
<level(n–1)>	Tx power
Resolution	0.01 dB
<max(n–1)>	Power flatness max
Resolution	0.01 dB
<min(n–1)>	Power flatness min
Resolution	0.01 dB

Example of Use

To query the Multiburst RF Power measurement (single slot) results:
:FETC:CELL:GSM:MRFP:SSL?
> 0,-20.00,2.00,-1.00,0,-20.00,2.00,......

Related Commands

Multiburst RF Power measurement (single slot) each frame transmit power query
:FETCh:CELLular:GSM:MRFPower:MSLot:TXPower?

Multiburst RF Power measurement (single slot) each frame status query
:FETCh:CELLular:GSM:MRFPower:MSLot:STATe?

:FETCh:CELLular:GSM:MRFPower:SSLot:STATe?

Multi Burst RF Power Measurement (Single Slot) Status

Function

Queries measurement status of each frame at Multiburst RF Power measurement (single slot)

Query

```
:FETCh:CELLular:GSM:MRFPower:SSLot:STATe?
```

Response

<status(0)>,<status(1)>,...,<status(n–1)>

n is the number of measured frames.

Parameter

<status(n–1)>	Measurement status of each frame
0	Ended normally
2	Over level
4	Measurement disabled
5	Synchronization word detection disabled
9	Measurement in progress or not measured
12	Timeout
14	Short burst length
15	Power flatness max/min fail

Example of Use

To query the measurement status at Multiburst RF Power measurement (single slot):
FETC:CELL:GSM:MRFP:SSL:STAT?
> 0,0,0,……

Related Commands

Multiburst RF power measurement (single slot) each frame transmit power query
:TRIGger:CELLular:GSM:MRFPower:SSLot:INTerval

Multiburst RF power measurement (single slot) each frame measurement status, Tx power, Power flatness max, and Power flatness min measurement results query
:FETCh:CELLular:GSM:MRFPower:SSLot?

:FETCh:CELLular:GSM:MRFPower:SSLot:TXPower?

Multi Burst RF Power Measurement (single slot) Tx Power Result

Function

Queries Tx power of each frame at Multiburst RF Power measurement (single slot)

Query

```
:FETCh:CELLular:GSM:MRFPower:SSLot:TXPower?
```

Response

<level(0)>,<level(1)>,...,<level(n–1)>

n is the number of measured frames.

Unit	dBm (level)

Parameter

<level(n–1)>	Tx Power measurement result
Resolution	0.01 dB

Example of Use

To query the Multiburst RF Power measurement (single slot) measurement results:
:FETC:CELL:GSM:MRFP:SSL:TXP?
> 0,-20.00,-20.00,……

Related Command

Multiburst RF power measurement (single slot) each frame measurement status, Tx power, Power flatness max, and Power flatness min measurement results query
:FETCh:CELLular:GSM:MRFPower:SSLot?

Multiburst RF power measurement (single slot) each frame status query
:FETCh:CELLular:GSM:MRFPower:SSLot:STATe?

:FETCh:CELLular:GSM:QPDistortion:BINary?

Predistortion Measurement 1 Binary Transfer

Function

Queries result of Tx power and phase measured at Predistortion Measurement 1 only for specified number of data items with binary format

The data format is little-endian and 32-bit floating-point.

Query

```
:FETCh:CELLular:GSM:QPDistortion:BINary? <n>
```

Response

```
<p(0)>,<d(0)>,<p(1)>,<d(1)>,……,<p(n-1)>,<d(n-1)>
```

Unit	dBm (p(0))
	dB (p(1),……,p(n–1))
	degree (d(n–1))

Parameters

<n>	Specified number of data items
Range	1 to 500
Resolution	1
Default	1
<p(n–1)>	Tx Power
Resolution	0.1 dB
<d(n–1)>	Phase
Resolution	0.1 deg

Details

When the specified number of samples (n) is larger than the measured number, 0.0 is output for values exceeding the measured number.

Example of Use

To query the result for Tx power and phase of the signal of each specified period measured at Predistortion Measurement 1 for 100 data items with binary format:

:FETC:CELL:GSM:QPD:BIN? 100

> -20.1,0.1,-0.5,0.2,0.5,0.1,……

:FETCh:CELLular:GSM:QPDistortion:PHASe?

Predistortion Measurement 1 Phase

Function

Queries phase of signal of each specified period measured at Predistortion Measurement 1

Query

`:FETCh:CELLular:GSM:QPDistortion:PHASe?`

Response

<d(0)>,<d(1)>,……,<d(n–1)>

n is the number of specified periods.

Unit	degree

Parameter

<d(n–1)>	phase
Resolution	0.1 deg

Example of Use

To query the phase of the signal of each specified period measured at Predistortion Measurement 1:

:FETC:CELL:GSM:QPD:PHAS?

> 0.1,0.2,0.1,……

:FETCh:CELLular:GSM:QPDistortion:TXPower?

Predistortion Measurement 1 Tx Power

Function

Queries Tx power of signal of each specified period measured at Predistortion Measurement 1

Query

```
:FETCh:CELLular:GSM:QPDistortion:TXPower?
```

Response

<p(0)>,<p(1)>,……,<p(n–1)>

n is the number of specified periods.

Unit	dBm (p(0))
	dB (p(1),……,p(n–1))

Parameter

<p(n–1)>	Tx Power
Resolution	0.1 dB

Example of Use

To query the Tx power of the signal of each specified period measured at Predistortion Measurement 1:

FETC:CELL:GSM:QPD:TXP?

> -20.1,-0.5,0.5,……

:TRIGger:CELLular:GSM:FUNDamental:LEVel

Trigger Level of Tx Fundamental Measurement

Function

Sets or queries measurement trigger level for Tx Fundamental Measurement

Command

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

Query

```
:TRIGger:CELLular:GSM:FUNDamental:LEVel?
```

Response

<level>

Unit	dB

Parameter

<level>	Measurement trigger level
Range	–45 to 0 dB
Resolution	1 dB
Suffix code	DB (uses dB when omitted)
Default	–30 dB

Example of Use

To set the measurement trigger level for Tx Fundamental Measurement to –30 dB:

:TRIG:CELL:GSM:FUND:LEV -30

:TRIG:CELL:GSM:FUND:LEV?

> -30

:TRIGger:CELLular:GSM:MRFPower:SSLot:INTerval

Number of Multi Burst RF Power Measurement (Single Slot) Trigger Interval

Function

Sets or queries Multiburst RF Power measurement (single slot) maximum trigger interval

Command

```
:TRIGger:CELLular:GSM:MRFPower:SSLot:INTerval <intval>
```

Query

```
:TRIGger:CELLular:GSM:MRFPower:SSLot:INTerval?
```

Response

<intval>

Unit	ms

Parameter

<intval>	Interval
Range	10 to 20 ms
Resolution	1
Suffix code	S, MS, US, NS (uses ms when omitted)
Default	20 ms

Details

This command sets the maximum trigger interval when the Multiburst RF Power measurement (single slot) trigger mode is Re-trigger.
If the trigger interval exceeds this time, a timeout occurs and subsequent measurement is not executed.

Example of Use

To set the Multiburst RF Power measurement (single slot) maximum trigger interval to 20 ms:
:TRIG:CELL:GSM:MRFP:SSL:INT 20
:TRIG:CELL:GSM:MRFP:SSL:INT?
> 20

Related Commands

Multiburst RF Power measurement (single slot) trigger operation mode setting
:TRIGger:CELLular:GSM:MRFPower:SSLot:MODE

Multiburst RF Power measurement (single slot) trigger level setting
:TRIGger:CELLular:GSM:MRFPower:SSLot:LEVel

:TRIGger:CELLular:GSM:MRFPower:SSLot:LEVel

Multi Burst RF Power Measurement (Single Slot) Trigger Level

Function

Sets or queries Multiburst RF Power measurement (single slot) trigger level

Command

```
:TRIGger:CELLular:GSM:MRFPower:SSLot:LEVel <level>
```

Query

```
:TRIGger:CELLular:GSM:MRFPower:SSLot:LEVel?
```

Response

<level>

Unit	dB

Parameter

<level>	Trigger level
Range	–40.0 to 0.0 dB
Resolution	0.1 dB
Suffix code	DB (uses dB when omitted)
Default	–30.0 dB

Details

Set as a relative value from the input level.

Example of Use

To set the Multiburst RF Power measurement (single slot) trigger level to –30.0 dB:

:TRIG:CELL:GSM:MRFP:SSL:LEV -30.0
:TRIG:CELL:GSM:MRFP:SSL:LEV?
> -30.0

Related Commands

Multiburst RF Power measurement (single slot) trigger operation mode setting
:TRIGger:CELLular:GSM:MRFPower:SSLot:MODE

Multiburst RF Power measurement (single slot) timeout time between triggers
:TRIGger:CELLular:GSM:MRFPower:SSLot:INTerval

:TRIGger:CELLular:GSM:MRFPower:SSLot:MODE

Multi Burst RF Power Measurement (Single Slot) Trigger

Function

Sets or queries Multiburst RF Power measurement (single slot) trigger operation mode

Command

```
MRFPWR_TRG mode
```

Query

```
MRFPWR_TRG?
```

Response

mode

Parameters

mode	Trigger operation mode
ONCE	Once
RETRG	Re-trigger
Default	ONCE

Details

When Once is set, measurement is executed with reference to the top frame trigger time.
When Re-trigger is set, trigger detection is executed for each measurement burst.

Example of Use

To set the Multiburst RF Power measurement (single slot) trigger operation mode to Once:
:TRIG:CELL:GSM:MRFP:SSL:MODE ONCE
:TRIG:CELL:GSM:MRFP:SSL:MODE?
> ONCE

Related Commands

Multiburst RF power measurement (single slot) trigger level setting
:TRIGger:CELLular:GSM:MRFPower:SSLot:LEVel

Multiburst RF power measurement (single slot) timeout time between triggers
:TRIGger:CELLular:GSM:MRFPower:SSLot:INTerval

:TRIGger:CELLular:MEASurement:TOUT

Trigger Timeout

Function

Sets or queries trigger timeout time

Command

```
:TRIGger:CELLular:MEASurement:TOUT <time>
```

Query

```
:TRIGger:CELLular:MEASurement:TOUT?
```

Response

<time>

Unit	s

Parameter

<time>	Timeout time
Range	1 to 10 s
Resolution	1 s
Suffix code	S, MS, US, NS (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

4.2.3 Sequence measurement commands

:CONFigure:CELLular:GENerator:RFSettings:FREQuency

TCH Downlink Frequency

Function

Sets or queries TCH Downlink frequency

Command

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

Query

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

Response

<freq>

Unit	Hz

Parameter

<freq>	TCH Downlink frequency
Range	400000000 to 3800000000 Hz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	935200000 Hz

Details

Changing the setting of the downlink frequency does not change the setting of the TCH channel.
When Modulation is OFF, the frequency is output as the TCH Downlink Frequency.

Example of Use

To set the TCH Downlink frequency to 935.2 MHz:
:CONF:CELL:GEN:RFS:FREQ 935200000
:CONF:CELL:GEN:RFS:FREQ?
> 935200000

:CONFigure:CELLular:GENerator:RFSettings:LEVel

Output Level

Function

Sets or queries output level for all slots

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 (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 port 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 –60 dBm:

:CONF:CELL:GEN:RFS:LEV -60

:CONF:CELL:GEN:RFS:LEV?

> -60

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

TCH Uplink Frequency

Function

Sets or queries TCH Uplink frequency

Command

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

Query

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

Response

<freq>

Unit	Hz

Parameter

<freq>	TCH Uplink Frequency
Range	400000000 to 3800000000 Hz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	890200000 Hz

Details

Changing the setting of the uplink frequency does not change the setting of the TCH channel.

Example of Use

To set the TCH Uplink frequency to 890.2 MHz:

:CONF:CELL:MEAS:RFS:FREQ 890200000

:CONF:CELL:MEAS:RFS:FREQ?

> 890200000

: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	–30.0 to +35.0 dBm (Port 1/Port 2)
	–30.0 to +25.0 dBm (Port 3/Port 4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	27.0

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 –25.0 to +40.0 dBm.

Example of Use

To set the input level to –10 dBm:
:CONF:CELL:MEAS:RFS:LEV -10
:CONF:CELL:MEAS:RFS:LEV?
> -10.0

Related Commands

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

:CONFigure:CELLular:SEQuence:CONTrol

Sequence Control Parameter - Sequence Control

Function

Sets or queries start and stop segments of Sequence Table

Sets the parameters for both measurement and signal transmission.

Command

```
:CONFigure:CELLular:SEQuence:CONTrol <start>,<end>
```

Query

```
:CONFigure:CELLular:SEQuence:CONTrol?
```

Response

<start>,<end>

Parameter

<start>	Start segment
Range	0 to 1999
Resolution	1
Default	0
<end>	Stop segment
Range	<start> to 1999
Resolution	1
Default	199

Details

<start> = 0 to 1999, <end> = 0 to 1999 where <end> ≥ <start>

Whether the set sequence table can be executed is evaluated.

Use the :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 20,52

:CONF:CELL:SEQ:CONT?

> 20,52

:CONFigure:CELLular:SEQuence:CONTrol:TX

Sequence Control Parameter - Sequence Control

Function

Sets or queries start and stop segments in sequence table.

Sets the measurement parameters only, without affecting the signal transmission parameters.

Command

```
:CONFigure:CELLular:SEQuence:CONTrol:TX <start>,<end>
```

Query

```
:CONFigure:CELLular:SEQuence:CONTrol:TX?
```

Response

```
<start>,<end>
```

Parameters

<start>	Start segment
Range	0 to 1999
Resolution	1
Default	0
<end>	Stop segment
Range	<start> to 1999
Resolution	1
Default	0

Details

<start> = 0 to 1999, <end> = 0 to 1999 where <end> ≥ <start>

Whether the set sequence table can be executed is evaluated.

Use the :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:GSM:AMITems:OFF

Turn Off All Measurement Items

Function

Sets all measurement items to Off collectively.

Command

```
:CONFigure:CELLular:SEQuence:GSM:AMITems:OFF <mcond>
```

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1

Examples of Use

To set all measurement items of number 0 to Off collectively.

:CONFigure:CELLular:SEQuence:GSM:AMITems:OFF 0

:CONFigure:CELLular:SEQuence:GSM:ASLot

Number of Active Slot

Function

Sets or queries number of slots to be measured

Command

```
:CONFigure:CELLular:SEQuence:GSM:ASLot <mcond>,<a>
```

Query

```
:CONFigure:CELLular:SEQuence:GSM:ASLot? <mcond>
```

Response

<a>

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<a>	Number of slots
Range	1 to 8
Resolution	1
Default	1

Details

Measurement is turned on for the specified number of counting from Slot 0.

Example of Use

To enable measurement for three slots from Slot 0 to Slot 2 with the Measurement Condition Number 0:

:CONF:CELL:SEQ:GSM:ASL 0,3

:CONF:CELL:SEQ:GSM:ASL? 0

> 3

:CONFigure:CELLular:SEQuence:GSM:BAND

Measurement Band

Function

Sets or queries band to measure

Command

```
:CONFigure:CELLular:SEQuence:GSM:BAND <mcond>,<band>
```

Query

```
:CONFigure:CELLular:SEQuence:GSM:BAND? <mcond>
```

Response

<band>

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<band>	Measurement band
GSM850	GSM850 (GSM450, GSM480, GSM850)
GSM900	GSM900 (P-GSM900, E-GSM900, R-GSM900)
DCS1800	DCS1800
PCS1900	PCS1900
Default	GSM900

Details

This command sets the band to be measured. This value is used to determine the Power vs. Time measurement and Output RF Spectrum measurement judgement value.

Example of Use

To set the band to be measured with the Measurement Condition Number 0 to GSM900:

:CONF:CELL:SEQ:GSM:BAND 0,GSM900

:CONF:CELL:SEQ:GSM:BAND? 0

> GSM900

:CONFigure:CELLular:SEQuence:GSM:MOBJect

Measuring Object

Function

Sets or queries measurement target signal

Command

```
:CONFigure:CELLular:SEQuence:GSM:MOBJect <mcond>,<object>
```

Query

```
:CONFigure:CELLular:SEQuence:GSM:MOBJect? <mcond>
```

Response

<object>

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<object>	Measurement target signal
GMSK	Sets GMSK burst signal as measurement target
8PSK	Sets 8PSK burst signal as measurement target
CONT	Sets GMSK Continuous signal as measurement target
Default	GMSK

Example of Use

To set the measurement target with the Measurement Condition Number 0 to GMSK:

:CONF:CELL:SEQ:GSM:MOBJ 0,GMSK

:CONF:CELL:SEQ:GSM:MOBJ? 0

> GMSK

:CONFigure:CELLular:SEQuence:GSM:MODulation:SET

Modulation Analysis On/Off and Count

Function

Enables Modulation Analysis and sets measurement count

Command

```
:CONFigure:CELLular:SEQuence:GSM:MODulation:SET
<mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:GSM: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	ON
<count>	Measurement count
Range	1 to 200
Resolution	1
Default	1

Example of Use

To enable Modulation Analysis for Measurement Condition Number 0 and set the measurement count to 10:

:CONF:CELL:SEQ:GSM:MOD:SET 0,ON,10
:CONF:CELL:SEQ:GSM:MOD:SET? 0
> ON,10

:CONFigure:CELLular:SEQuence:GSM:ORFSpectrum:FILTer

RBW Filter of Output RF Spectrum due to Modulation

Function

Sets or queries measurement filter bandwidth for offset frequency 1800 kHz and 2000 kHz at Output RF Spectrum (modulation part) measurement

Command

```
:CONFigure:CELLular:SEQuence:GSM:ORFSpectrum:FILTer <rbw>
```

Query

```
:CONFigure:CELLular:SEQuence:GSM:ORFSpectrum:FILTer?
```

Response

<rbw>

Parameter

<rbw>	Measurement filter bandwidth
30KHZ	30 kHz
100KHZ	100 kHz
Default	100KHZ

Example of Use

To set the RBW at Output RF Spectrum (modulation part) measurement to 100 kHz:

:CONF:CELL:SEQ:GSM:ORFS:FILT 100KHZ

:CONF:CELL:SEQ:GSM:ORFS:FILT?

> 100KHZ

:CONFigure:CELLular:SEQuence:GSM:ORFSpectrum:SET

Output RF Spectrum Measurement On/Off and Count

Function

Enables Output RF Spectrum measurement and sets measurement count

Command

```
:CONFigure:CELLular:SEQuence:GSM:ORFSpectrum:SET
<mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:GSM:ORFSpectrum:SET? <mcond>
```

Response

<on_off>,<count>

Parameters

<mcond>	Measurement Condition
Range	0 to 1999
Resolution	1
<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	ON
<count>	Measurement count
Range	1 to 200
Resolution	1
Default	1

Example of Use

To enable RF Spectrum measurement output for Measurement Condition 0 and set the measurement count to 10:

:CONF:CELL:SEQ:GSM:ORFS:SET 0,ON,10

:CONF:CELL:SEQ:GSM:ORFS:SET? 0

> ON,10

:CONFigure:CELLular:SEQuence:GSM:PCLevel

Expected Power Control Level

Function

Sets or queries measurement signal Power Control Level

Command

```
:CONFigure:CELLular:SEQuence:GSM:PCLevel <mcond>,<pcl>
```

Query

```
:CONFigure:CELLular:SEQuence:GSM:PCLevel? <mcond>
```

Response

<pcl>

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<pcl>	Power Control Level
Range	0 to 31
Resolution	1
Default	8

Details

This command sets the measurement signal Power Control Level. This value is used to determine the Power vs. Time measurement and Output RF Spectrum measurement judgement value.
Input level changes according to the power control level.
If the power control level is set to 16 to 29 when the system combination is PCS1900 and TCH channel is 512 to 810, an error occurs and the set value is not changed.

Example of Use

To set the Power Control Level of the input signal with the Measurement Condition Number 0 to 8:

```
:CONF:CELL:SEQ:GSM:PCL 0,8
:CONF:CELL:SEQ:GSM:PCL? 0
> 8
```

:CONFigure:CELLular:SEQuence:GSM:POWer:SET

Power Measurement On/Off and Count

Function

Enables Power measurement and sets measurement count

Command

```
:CONFigure:CELLular:SEQuence:GSM:POWer:SET <mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:GSM:POWer:SET? <mcond>
```

Response

<on_off>,<count>

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<on_off>	Power Measurement On/Off
ON	Enables measurement
OFF	Disables measurement
Default	ON
<count>	Measurement count
Range	1 to 200
Resolution	1
Default	1

Example of Use

To enable Power measurement for Measurement Condition Number 0 and set the measurement count to 10:

```
:CONF:CELL:SEQ:GSM:POW:SET 0,ON,10
:CONF:CELL:SEQ:GSM:POW:SET? 0
> ON,10
```

:CONFigure:CELLular:SEQuence:GSM:PVTime:SET

Power vs. Time Measurement On/Off and Count

Function

Enables Power vs. Time measurement and sets measurement count

Command

```
:CONFigure:CELLular:SEQuence:GSM:PVTime:SET <mcond>,<on_off>[,<count>]
```

Query

```
:CONFigure:CELLular:SEQuence:GSM:PVTime:SET? <mcond>
```

Response

<on_off>,<count>

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<on_off>	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	ON
<count>	Measurement count
Range	1 to 200
Resolution	1
Default	1

Example of Use

To enable Power vs. Time measurement for Measurement Condition Number 0 and set the measurement count to 10:

:CONF:CELL:SEQ:GSM:PVT:SET 0,ON,10

:CONF:CELL:SEQ:GSM:PVT:SET? 0

> ON,10

:CONFigure:CELLular:SEQuence:GSM:PVTime:TOFFset

Power vs. Time, Time Offset

Function

Sets or queries offset time to measure Power vs. Time

Command

```
:CONFigure:CELLular:SEQuence:GSM:PVTime:TOFFset <num>,<offset>
```

Query

```
:CONFigure:CELLular:SEQuence:GSM:PVTime:TOFFset? <num>
```

Response

<offset>

Unit	µs

Parameters

<num>	Offset number
Range	0 to 11
Resolution	1
<offset>	Offset time
Range	–48.0 to 594.0 µsec
Resolution	0.1
Default	–28.0 µs (for num = 0)
	–23.0 µs (for num = 1)
	–18.0 µs (for num = 2)
	–10.0 µs (for num = 3)
	–5.0 µs (for num = 4)
	0.0 µs (for num = 5)
	542.8 µs (for num = 6)
	547.8 µs (for num = 7)
	552.8 µs (for num = 8)
	560.8 µs (for num = 9)
	565.8 µs (for num = 10)
	570.8 µs (for num = 11)

Example of Use

To set the offset number 0 for Power vs. Time measurement to –28.0 µs:

:CONF:CELL:SEQ:GSM:PVT:TOFF 0,-28.0

:CONF:CELL:SEQ:GSM:PVT:TOFF? 0

> -28.0

:CONFigure:CELLular:SEQuence:GSM:RFSet

Measurement Band, Expected Power Control Level and Measuring Object

Function

Sets or queries measurement signal band, Power Control Level, and measurement target signal

Command

```
:CONFigure:CELLular:SEQuence:GSM:RFSet <mcond>,<band>,<pcl>,<object>
```

Query

```
:CONFigure:CELLular:SEQuence:GSM:RFSet? <mcond>
```

Response

<band>,<pcl>,<object>

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<band>	Measurement band
GSM850	GSM850 (GSM450, GSM480, GSM850)
GSM900	GSM900 (P-GSM900, E-GSM900, R-GSM900)
DCS1800	DCS1800
PCS1900	PCS1900
Default	GSM900
<pcl>	Power Control Level
Range	0 to 31
Resolution	1
Default	8
<object>	Measurement target signal
GMSK	Sets GMSK burst signal as measurement target
8PSK	Sets 8PSK burst signal as measurement target
Default	GMSK

Details

This command sets the measurement signal band, Power Control Level, and measurement target signal. The band and Power Control Level are used to determine the Power vs. Time measurement and Output RF Spectrum measurement judgement value.
The input level changes according to the power control level.
If the power control level is set to 16 to 29 when the system combination is PCS1900 and TCH channel is 512 to 810, an error occurs and all the set values are not changed.

Example of Use

To set the band, Power Control Level, and measurement target signal of the measurement signal with Measurement Condition Number 0 to GSM900, 8, and GMSK respectively:

:CONF:CELL:SEQ:GSM:RFS 0,GSM900,8,GMSK
:CONF:CELL:SEQ:GSM:RFS? 0
> GSM900,8,GMSK

Related Commands

Measurement signal band setting
:CONFigure:CELLular:SEQuence:GSM:BAND

Measurement signal Power Control Level setting
:CONFigure:CELLular:SEQuence:GSM:PCLevel

Measurement target signal setting
:CONFigure:CELLular:SEQuence:GSM:MOBJect

:CONFigure:CELLular:SEQuence:GSM:TSCode

Uplink Training Sequence

Function

Sets or queries Uplink Training Sequence code

Command

```
:CONFigure:CELLular:SEQuence:GSM:TSCode <tsc>
```

Query

```
:CONFigure:CELLular:SEQuence:GSM:TSCode?
```

Response

<tsc>

Parameter

<tsc>	Uplink training sequence code
TSC0	TSC0 data pattern = 0x0970897
TSC1	TSC1 data pattern = 0x0B778B7
TSC2	TSC2 data pattern = 0x10EE90E
TSC3	TSC3 data pattern = 0x11ED11E
TSC4	TSC4 data pattern = 0x13AC13A
TSC5	TSC5 data pattern = 0x29F629F
TSC6	TSC6 data pattern = 0x29F629F
TSC7	TSC7 data pattern = 0x3BC4BBC
Default	TSC0

Example of Use

To set the Uplink Training Sequence to 2:

:CONF:CELL:SEQ:GSM:TSC TSC2

:CONF:CELL:SEQ:GSM:TSC?

> TSC2

:CONFigure:CELLular:SEQuence:GSM:TSLot

TCH Slot

Function

Sets or queries number of slot where trigger detected
It is the reference for Time Alignment measurement.

Command

```
:CONFigure:CELLular:SEQuence:GSM:TSLot <mcond>,<slot>
```

Query

```
:CONFigure:CELLular:SEQuence:GSM:TSLot? <mcond>
```

Response

<slot>

Parameters

<mcond>	Measurement condition number
Range	0 to 1999
Resolution	1
<slot>	Slot number
Range	0 to 7
Resolution	1
Default	2

Example of Use

To set the number of the slot where the trigger is detected with the Measurement Condition Number 0 to 2:
:CONF:CELL:SEQ:GSM:TSL 0,2
:CONF:CELL:SEQ:GSM:TSL? 0
> 2

: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

- Downlink frequency
- Output level
- Output signal pattern
- Uplink frequency

- Input level

Command

```
:CONFigure:CELLular:SEQuence:RFSettings:REINit <sw>
```

Query

```
:CONFigure:CELLular:SEQuence:RFSettings:REINit?
```

Response

<sw>

Parameter

<sw>	Automatic initialization after sequence measurement completion
ON	On
OFF	Off
Default	ON

Details

If the parameter is set to ON, the settings are initialized to the values configured by the following commands after sequence measurement completion.

Downlink frequency	:CONFigure:CELLular:GENerator:RFSettings:FREQuency
Output level	:CONFigure:CELLular:GENerator:RFSettings:LEVel
Output signal pattern	:CONFigure:CELLular:GENerator:ARB:PACKage:SELect
Uplink 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 initialization after sequence measurement completion:
:CONF:CELL:SEQ:RFS:REINIT ON
:CONF:CELL:SEQ:RFS:REIN?
> ON

:CONFigure:CELLular:SEQuence:RFSettings:TRX

Sequence Table Parameter - TRX control

Function

Sets or queries following items in specific segment of sequence table

- Downlink frequency
- Output level
- Output signal pattern
- Uplink frequency
- Input level

Command

```
:CONFigure:CELLular:SEQuence:RFSettings:TRX
<seg>,<ul_freq>,<ref>,<dl_freq>,<level>,<pat>
```

Query

```
:CONFigure:CELLular:SEQuence:RFSettings:TRX? <seg>
```

Response

<ul_freq>,<ref>,<dl_freq>,<level>,<pat>

Parameter

<seg>	Segment number
Range	0 to 1999
Resolution	1
<ul_freq>	Uplink frequency
Range	400.000000 to 3,800.000000 MHz
Resolution	0.000001 MHz
Suffix Code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	1950.000000 MHz
<ref>	Input level
Range	–65.0 to +35 dBm (Port1/Port2) –65.0 to +25 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix Code	DBM (uses dBm when omitted)
Default	–10.0 dBm
<dl_freq>	Downlink frequency
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001 MHz
Suffix Code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	2140.000000 MHz
<level>	Output level
Range	–130.0 to –10.0 dBm (Port 1/Port 2)

		–120.0 to 0.0 dBm (Port 3/Port 4)
	Resolution	0.1 dB
	Suffix Code	DBM (used dBm when omitted)
	Default	–60.0 dBm
<pat>		Waveform pattern
	PAT1 to PATn	Pattern number (n: waveform information file group range)
	CW	Modulation turned OFF
	OFF	Output level turned OFF
	NC	Waveform pattern not configured in this segment (holds currently configured waveform pattern)
	Default	CW

Details

The setting range varies with the input/output port setting.

If Cable Loss Correction is ON, the cable loss is added to the range of the input level and subtracted from the range of output level.

If the cable loss is 5 dB, the input and output levels are as follows:

Input level –60.0 to +40 dBm

Output level –135.0 to –15.0 dBm

In this case, if the output level is set to –10.0 dBm, an out-of-parameter setting range error occurs. (The response to :SYSTem:ERRor? returns 220, Parameter error).

Whether an out-of-parameter setting range error has occurred is determined during execution of the following commands:

:CONFigure:CELLular:SEQuence:CONTrol, :INITiate:CELLular:MEASurement:SINGle, :INITiate:CELLular:SEQuence:EXECute:TX

A measurement execution error occurs when an out-of-range error occurs.

:FETCh:CELLular:SEQuence:ERRor? is used to query the details of errors.

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

Example of Use

To set segment 0 as follows.

Uplink frequency set to 1950.0 MHz, input level to –10.0 dBm, downlink frequency to 2140.0 MHz, output level to –60.0 dBm, and no modulation:

```
:CONF:CELL:SEQ:RFS:TRX 0,1950.000000,-10.0,2140.000000,-60.0,CW
:CONF:CELL:SEQ:RFS:TRX? 0
> 1950.000000,-10.0,2140.000000,-60.0,CW
```

Remarks

The group range is the selected waveform file.

For details of the waveform pattern, refer to Chapter 3, "Waveform File Details" in the *Waveform Files for Cellular Application Operation Manual*.

:CONFigure:CELLular:SEQuence:RFSettings:TX

Sequence Table Parameter - Uplink Frequency, Input Level

Function

Sets or queries uplink frequency and input level of segments in sequence table.

Command

```
:CONFigure:CELLular:SEQuence:RFSettings:TX <seg>,<ul_freq>,<ref>
```

Query

```
:CONFigure:CELLular:SEQuence:RFSettings:TX? <seg>
```

Response

```
<ul_freq>,<ref>
```

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

Command

```
:CONFigure:CELLular:SEQuence:RXPort <seg>,<port>
```

Query

```
:CONFigure:CELLular:SEQuence:RXPort? <seg>
```

Response

<port>

Parameter

<seg>	Segment number
Range	0 to 1999
<port>	Port number
PORT1	PORT 1
PORT 2	PORT 2
PORT3	PORT 3
PORT4	PORT 4
Default	PORT1

Details

PORT3 cannot be set when PORT3 is selected for RF signal input port.
PORT4 cannot be set when PORT4 is selected for RF signal input port.

Example of Use

To set the port number in segment 5 to 2:
:CONF:CELL:SEQ:RXP 5,PORT2
:CONF:CELL:SEQ:RXP? 5
>PORT2

:CONFigure:CELLular:SEQuence:SETup

Sequence Table Parameter - Measurement

Function

Sets or queries measurement conditions of specified segment

Command

```
:CONFigure:CELLular:SEQuence:SETup <seg>,<mode>,<step>,<mcond>
```

Query

```
:CONFigure:CELLular:SEQuence:SETup? <seg>
```

Response

<mode>,<step>,<mcond>

Parameters

<seg>	Segment number	
Range	0 to 1999	
Resolution	1	
<mode>	Measurement mode	Required software license
TXP	Tx Power measurement mode	MX887010A
WCDMA	W-CDMA measurement mode	MX887010A and MX887011A
GSM	GSM measurement mode	MX887010A and MX887012A
CDMA2K	CDMA2000 1x measurement mode	MX887010A and MX887015A
EVDO	CDMA2000 1xEVDO measurement mode	MX887010A and MX887016A
TDSCDMA	TD-SCDMA measurement mode	MX887010A and MX887017A
LTE	LTE measurement mode	MX887010A and MX887013A, or MX887010A and MX887014A
Default	TXP	
<step>	Step count	
Range	2 to 3000	
Resolution	1	
Default	2	
<mcond>	Measurement condition number	
Range	0 to 1999	
Resolution	1	
Default	0	

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Example of Use

To set settings for segment 2 as follows:
Measurement mode: GSM, Step count: 1000, Measurement condition number: 3
:CONF:CELL:SEQ:SET 2, GSM,10,3
:CONF:CELL:SEQ:SET? 2
> GSM,10,3

: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 setting information of sequence table

Query

```
:FETCh:CELLular:SEQuence:ERRor? [<item>]
```

Response

Query parameter	Response
None:	<n>,<err(0)>,...,<err(n–1)>
ILVL, OLVL, STEP,DLPAT, PORT:	<ns>,<seg(0)>,...,<seg(ns–1)>
LEN:	<e>,<mem>,<exe>,<set>
OLVLNUM,PATNUM,STDNUM:	<e>,<exe>,<set>

If no error is found in the sequence table, the response returns 0.

Parameters

<item>	Parameter 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>	Parameter with error	
ILVL	Input level	
OLVL	Output level	
STEP	Step count	
LEN	Capture memory length	
<ns>	Number of segments which contain errors	
Range	0 to 2000	
<seg>	Segment number with errors	
Range	0 to 1999	
<e>	Presence of errors	
Range	0	No error, executable
	1	Errors found, not executable
<mem>	Memory utilization	

Range	0.0 to 100.0%
Resolution	0.1%
<exe>	Number of segments capable of executing capture in number of configured segments
Range	0 to 2000
<set>	Number 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 :FETCh:CELLular:SEQuence:ERRor2? command.
Waveform pattern, port output level change count, waveform pattern change count, measurement mode change count.

To set parameters for sequence table using the following commands, errors are not checked.
:CONFigure:CELLular:SEQuence:RFSettings:TRX
:CONFigure:CELLular:SEQuence:RFSettings:TX
:CONFigure:CELLular:SEQuence:SETup

Examples of Use

To query 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

Sequence measurement cannot be started if there are errors.
However, the sequence can be started if segment numbers with errors are excluded from the execution range using the :CONFigure:CELLular:SEQuence:CONTrol command.

:FETCh:CELLular:SEQuence:ERRor2?

Sequence Parameter Information - Error Check

Function

Queries setting error information of sequence table

Query

```
:FETCh:CELLular:SEQuence:ERRor2? <format>
```

Response

<n>,<err(0)>,..,<err(n-1)>

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:GSM:MODulation:CFRequency?

Carrier Frequency

Function

Queries Carrier Frequency measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:MODulation:CFRequency? <seg>[,<slot>]
```

Response

<freq>	
Unit	Hz (1 Hz resolution)

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<freq>	Carrier frequency

Example of Use

To query the Carrier Frequency measurement result for Slot 0 in Segment 0:
:FETC:CELL:SEQ:GSM:MOD:CFR? 0,0
> 890200000

:FETCh:CELLular:SEQuence:GSM:MODulation:EPERcentile?

95th Percentile

Function

Queries EVM with probability distribution of 95% in measurement results

Query

```
:FETCh:CELLular:SEQuence:GSM:MODulation:EPERcentile? <seg>[,<slot>]
```

Response

<percent>	
Unit	% (0.01% resolution)

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<percent>	EVM with probability distribution of 95%

Details

Only 8PSK signals support this measurement.

Example of Use

To query the 95th Percentile measurement result for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:MOD:EPER? 0,0

> 2.01

:FETCh:CELLular:SEQuence:GSM:MODulation:EVM?

EVM

Function

Queries EVM measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:MODulation:EVM? <seg>,<mode>[,<slot>]
```

Response

When <mode> = TTL,

<avg>, <max>, <min>

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

<percent>

When <mode> = IND,

<n>,<percent(0)>,<percent(1)>,...,<percent(n–1)>

<n> = measurement count × measurement slot number when <slot> omitted

<n> = measurement count when <slot> not omitted

Unit	% (0.01% resolution)

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	All measurement results (time-series display)
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<percent>	Measurement result in specified Storage mode

Details

Only 8PSK signals support this measurement.

When <mode> is set to IND, if the slot is omitted, the time-series measurement results are output for all slots.

Example of Use

To query the EVM measurement result average for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:MOD:EVM? 0,AVG,0

> 1.05

:FETCh:CELLular:SEQuence:GSM:MODulation:FERRor?

Carrier Frequency Error

Function

Queries Carrier Frequency Error measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:MODulation:FERRor? <seg>,<mode>[,<slot>]
```

Response

When <mode> = TTL,

<avg_ppm>,<avg_hz>,<max_ppm>,<max_hz>,<min_ppm>,<min_hz>

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

<freq_ppm>,<freq_hz>

Unit	ppm (0.01 ppm resolution), Hz (0.1 Hz resolution)

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
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg_ppm>	Average in ppm
<avg_hz>	Average in Hz
<max_ppm>	Maximum in ppm
<max_hz>	Maximum in Hz
<min_ppm>	Minimum in ppm
<min_hz>	Maximum in Hz
<req_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 for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:MOD:FERR? 0,AVG,0

> 0.12,1.5

:FETCh:CELLular:SEQuence:GSM:MODulation:FERRor:WORSt?

Carrier Frequency Error Worst Value

Function

Queries worst value of Carrier Frequency Error measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:MODulation:FERRor:WORSt? <seg>[,<slot>]
```

Response

<freq_ppm>,<freq_hz>

Unit	ppm (0.01 ppm resolution), Hz (0.1 Hz resolution)

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<freq_ppm>	Worst value in Carrier Frequency Error measurement results in ppm
<freq_hz>	Worst value in Carrier Frequency Error measurement results in Hz

Example of Use

To query the worst value in the Carrier Frequency Error measurement results for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:MOD:FERR:WORS? 0,0

> 0.12,1.5

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:FETCh:CELLular:SEQuence:GSM:MODulation:IQIMbalance?

IQ Imbalance

Function

Queries IQ Imbalance measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:MODulation:IQIMbalance?
<seg>,<mode>[,<slot>]
```

Response

When <mode> = TTL,

<avg>,<max>,<min>

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

<value>

Unit	dB (0.01 dB resolution)

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
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<value>	Measurement result in specified Storage mode

Example of Use

To query the IQ Imbalance measurement result average for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:MOD:IQIM? 0,AVG,0

> 1.05

:FETCh:CELLular:SEQuence:GSM:MODulation:MERRor?

Magnitude Error

Function

Queries Magnitude Error measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:MODulation:MERRor? <seg>,<mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg>,<max>,<min>
When <mode> = AVG, MAX, MIN or DVT,
<percent>

Unit	% (0.01% resolution)

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
<percent>	
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<percent>	Measurement result in specified Storage mode

Example of Use

To query the Magnitude Error measurement result average for Slot 0 in Segment 0:
:FETC:CELL:SEQ:GSM:MOD:MERR? 0,AVG,0
> 1.02

:FETCh:CELLular:SEQuence:GSM:MODulation:ORGNoffset?

Origin Offset

Function

Queries Origin Offset measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:MODulation:ORGNoffset? <seg>,<mode>[,<slot>]
```

Response

When <mode> = TTL,

<avg>,<max>,<min>

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

<value>

Unit	dB (0.01 dB resolution)

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
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<value>	Measurement result in specified Storage mode

Example of Use

To query the Origin Offset measurement result average for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:MOD:ORGN? 0,AVG,0

> 0.25

:FETCh:CELLular:SEQuence:GSM:MODulation:PEVM?

Peak EVM

Function

Queries Peak EVM measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:MODulation:PEVM? <seg>,<mode>[,<slot>]
```

Response

When <mode> = TTL,

<avg>,<max>,<min>

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

<percent>

Unit	% (0.01% resolution)

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
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<percent>	Measurement result in specified Storage mode

Details

Only 8PSK signals support this measurement.

Example of Use

To query the Peak EVM measurement result average for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:MOD:PEVM? 0,AVG,0

> 3.01

4

SCPI Command Reference

:FETCh:CELLular:SEQuence:GSM:MODulation:PHERror?

RMS Phase Error

Function

Queries RMS Phase Error measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:MODulation:PHERror? <seg>,<mode>[,<slot>]
```

Response

When <mode> = TTL,

<avg>,<max>,<min>

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

<deg>

Unit	degree (0.01 deg resolution)

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
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<deg>	Measurement result in specified Storage mode

Example of Use

To query the RMS Phase Error measurement result average for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:MOD:PHER? 0,AVG,0

> 1.05

:FETCh:CELLular:SEQuence:GSM:MODulation:PPHerror?

Peak Phase Error

Function

Queries Peak Phase Error measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:MODulation:PPHerror? <seg>,<mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg>, <max>, <min>
When <mode> = AVG, MAX, MIN or DVT,
<deg>

Unit	degree (0.01 deg resolution)

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
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<deg>	Measurement result in specified Storage mode

Example of Use

To query the Peak Phase Error measurement result average for Slot 0 in Segment 0:
:FETC:CELL:SEQ:GSM:MOD:PPH? 0,AVG,0
> 1.03

4

SCPI Command Reference

:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:JUDGement?

Output RF Spectrum Due to Modulation Judgement

Function

Queries Output RF Spectrum (modulation part) judgement result

Query

```
:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:JUDGement?
<seg>[,<slot>]
```

Response

<judge>

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<judge>	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (modulation part) judgement result for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:ORFS:MOD:JUDG? 0,0

> PASS

:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:LOWer?

Output RF Spectrum Due to Modulation (Lower Side)

Function

Queries Output RF Spectrum (modulation part, lower side) measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:LOWer?
<seg>,<mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg(0)>,<avg(1)>,...,<avg(freq)>,<max(0)>,<max(1)>,...,<max(freq)>,<min(0)>,
<min(1)>,...,<min(freq)>
When <mode> = AVG, MAX, MIN or DVT,
<level(0)>,<level(1)>,...,<level(freq)>

Unit	dBm (mode = other than DVT and freq = 0), dB (other than left description), (0.01 dB resolution)

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
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<level>	Measurement result in specified Storage mode
freq	Offset frequency from center frequency
Range	0 to 12 0: Center frequency 1 to 12: Offset frequency (kHz) –100, –200, –250, –400, –600, –800, –1000, –1200, –1400, –1600, –1800, –2000
Resolution	1

Example of Use

To query the Output RF Spectrum (modulation part, lower side) measurement result average for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:ORFS:MOD:LOW? 0,AVG,0

> -20.00,-1.00,-2.00,-3.00,-4.00,-5.00,-6.00,-7.00,-8.00,-9.00,-10.00,-11.00,-12.00

:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:LOWer:FPOint?

Output RF Spectrum Due to Modulation Judgement of Each Frequency Point (Lower Side)

Function

Queries Output RF Spectrum (modulation part, lower side) each frequency point judgement result

Query

```
:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:LOWer:FPOint?
<seg>[,<slot>]
```

Response

<judge(1)>,<judge(2)>,...,<judge(freq)>

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<judge>	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
freq	Offset frequency from the center frequency
Range	1 to 12
	1 to 12: Offset frequency (kHz) –100, –200, –250, –400, –600, –800, –1000, –1200, –1400, –1600, –1800, –2000
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (modulation part, lower side) for each frequency point judgement result for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:ORFS:MOD:LOW:FPO? 0,0

> PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:UPPer?

Output RF Spectrum Due to Modulation (Upper Side)

Function

Queries Output RF Spectrum (modulation part, upper side) measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:UPPer?
<seg>,<mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg(0)>,<avg(1)>,...,<avg(freq)>,<max(0)>,<max(1)>,...,<max(freq)>,<min(0)>,<min(1)>,...,<min(freq)>
When <mode> = AVG, MAX, MIN or DVT,
<level(0)>,<level(1)>,...,<level(freq)>

Unit	dBm (mode = other than DVT and freq = 0), dB (other than left description), (0.01 dB resolution)

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
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<level>	Measurement result in specified Storage mode
freq	Offset frequency from the center frequency
Range	0 to 12 0: Center frequency 1 to 12: Offset frequency (kHz) +100, +200, +250, +400, +600, +800, +1000, +1200, +1400, +1600, +1800, +2000
Resolution	1

Example of Use

To query the Output RF Spectrum (modulation part, upper side) measurement result average for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:ORFS:MOD:UPP? 0,AVG,0

> -20.00,-1.00,-2.00,-3.00,-4.00,-5.00,-6.00,-7.00,-8.00,-9.00,-10.00,-11.00,-12.00

:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:UPPer:FPOint?

Output RF Spectrum Due to Modulation Judgement of Each Frequency Point (Upper Side)

Function

Queries Output RF Spectrum (modulation part, upper side) for each frequency point judgement result

Query

```
:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:MODulation:UPPer:FPOint?
<seg>[,<slot>]
```

Response

<judge(1)>,<judge(2)>,...,<judge(freq)>

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<judge>	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
freq	Offset frequency from center frequency
Range	1 to 12
	1 to 12: Offset frequency (kHz) +100, +200, +250, +400, +600, +800, +1000, +1200, +1400, +1600, +1800, +2000
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (modulation part, upper side) for each frequency point judgement result for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:ORFS:MOD:UPP:FPO? 0,0

> PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:JUDGement?

Output RF Spectrum Due to Switching Judgement

Function

Queries Output RF Spectrum (transient part) judgement result

Query

```
:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:JUDGement?
<seg>[,<slot>]
```

Response

<judge>

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<judge>	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (transient part) judgement result for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:ORFS:SWIT:JUDG? 0,0

> PASS

:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:LOWer?

Output RF Spectrum Due to Switching (Lower Side)

Function

Queries Output RF Spectrum (transient part, lower side) measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:LOWer?
<seg>,<mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg(0)>,<avg(1)>,...,<avg(freq)>,<max(0)>,<max(1)>,...,<max(freq)>,<min(0)>,
<min(1)>,...,<min(freq)>
When <mode> = AVG, MAX, MIN or DVT,
<level(0)>,<level(1)>,...,<level(freq)>

Unit	dBm (mode = other than DVT), dB (other than left description), (0.01 dB resolution)

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
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<level>	Measurement result in specified Storage mode
freq	Offset frequency from center frequency
Range	0 to 12 0: Center frequency 1 to 12: Offset frequency (kHz) –100, –200, –250, –400, –600, –800, –1000, –1200, –1400, –1600, –1800, –2000
Resolution	1

Example of Use

To query the Output RF Spectrum (transient part, lower side) measurement result average for Slot 0 in Segment 0:;

:FETC:CELL:SEQ:GSM:ORFS:SWIT:LOW? 0,AVG,0

> -20.00,-1.00,-2.00,-3.00,-4.00,-5.00,-6.00,-7.00,-8.00,-9.00,-10.00,-11.00,-12.00

:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:LOWer:FPOint?

Output RF Spectrum Due to Switching Judgement of Each Frequency Point (Lower Side)

Function

Queries Output RF Spectrum (transient part, lower side) of each frequency point judgement result

Query

```
:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:LOWer:FPOint?
<seg>[,<slot>]
```

Response

<judge(1)>,<judge(2)>,...,<judge(freq)>

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<judge>	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
freq	Offset frequency from the center frequency
Range	1 to 12 1 to 12: Offset frequency (kHz) –100, –200, –250, –400, –600, –800, –1000, –1200, –1400, –1600, –1800, –2000
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (transient part, lower side) of each frequency point judgement result for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:ORFS:SWIT:LOW:FPO? 0,0

> PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:UPPer?

Output RF Spectrum Due to Switching (Upper Side)

Function

Queries Output RF Spectrum (transient part, upper side) measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:UPPer?
<seg>,<mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg(0)>,<avg(1)>,...,<avg(freq)>,<max(0)>,<max(1)>,...,<max(freq)>,<min(0)>,<min(1)>,...,<min(freq)>
When <mode> = AVG, MAX, MIN or DVT,
<level(0)>,<level(1)>,...,<level(freq)>

Unit	dBm (mode = other than DVT and freq = 0), dB (other than the left description), (0.01 dB resolution)

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
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<level>	Measurement result in specified Storage mode
freq	Offset frequency from center frequency
Range	0 to 12 0: Center frequency 1 to 12: Offset frequency (kHz) +100, +200, +250, +400, +600, +800, +1000, +1200, +1400, +1600, +1800, +2000
Resolution	1

Example of Use

To query the Output RF Spectrum (transient part, upper side) measurement result average for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:ORFS:SWIT:UPP? 0,AVG,0

> -20.00,-1.00,-2.00,-3.00,-4.00,-5.00,-6.00,-7.00,-8.00,-9.00,-10.00,-11.00,-12.00

:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:UPPer:FPOint?

Output RF Spectrum Due to Switching Judgement of Each Frequency Point (Upper Side)

Function

Queries Output RF Spectrum (transient part, upper side) of each frequency point judgement result

Query

```
:FETCh:CELLular:SEQuence:GSM:ORFSpectrum:SWITching:UPPer:FPOint?
<seg>[,<slot>]
```

Response

<judge(1)>,<judge(2)>,...,<judge(freq)>

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<judge>	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
freq	Offset frequency from the center frequency
Range	1 to 12
	1 to 12: Offset frequency (kHz) +100, +200, +250, +400, +600, +800, +1000, +1200, +1400, +1600, +1800, +2000
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (transient part, upper side) of each frequency point judgement result for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:ORFS:SWIT:UPP:FPO? 0,0

> PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

:FETCh:CELLular:SEQuence:GSM:POWer:EPOWer?

Estimated Power

Function

Queries 8PSK Estimated Power measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:POWer:EPOWer? <seg>,<mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg>, <max>, <min>
When <mode> = AVG, MAX, MIN or DVT,
<level>
When <mode> = IND,
<n>,<level(0)>, <level(1)>,...,<level(n–1)>

<n> = measurement count × measurement slot number when <slot> omitted
<n> = measurement count when <slot> not omitted

Unit	dBm (mode = other than DVT), dB (mode = DVT), (0.01 dBm resolution)

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	All measurement results (time-series display)
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<level>	Measurement result in specified Storage mode

Details

When <mode> is set to IND, if the slot is omitted, the time-series measurement results are output for all slots.

Only 8PSK signals support this measurement.

Example of Use

To query the 8PSK Estimated Power measurement result average for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:POW:EPOW? 0,AVG,0

> -20.00

:FETCh:CELLular:SEQuence:GSM:POWer:TXPower?

Tx Power

Function

Queries Tx Power measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:POWer:TXPower? <seg>,<mode>[,<slot>]
```

Response

When <mode> = TTL,

<avg>,<max>,<min>

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

<level>

When <mode> = IND,

<n>,<level(0)>,<level(1)>,...,<level(n-1)>

<n> = measurement count × measurement slot number when <slot> omitted

<n> = measurement count when <slot> not omitted

Unit	dBm (mode = other than DVT), dB (mode = DVT), (0.01 dB resolution)

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	All measurement results (time-series display)
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<level>	Measurement result in specified Storage mode

Details

When <mode> is set to IND, if the slot is omitted, the time-series measurement results are output for all slots.

Example of Use

To query the Tx Power measurement result average for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:POW:TXP? 0,AVG,0

> -10.00

:FETCh:CELLular:SEQuence:GSM:PVTime:OTPower?

Power vs. Time

Function

Queries Power vs. Time measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:PVTime:OTPower? <seg>,<mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg(0)>,<avg(1)>,...,<avg(11)>,<max(0)>,<max(1)>,...,<max(11)>,<min(0) >,<min(1)>,...,
<min(11)>
When <mode> = AVG, MAX, MIN or DVT,
<level(0)>,<level(1)>,...,<level(11)>

Unit	dBm (mode = other than DVT), dB (mode = DVT), (0.01 dBm resolution)

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
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<level>	Measurement result in specified Storage mode

Example of Use

To query the Power vs. Time measurement result average for Slot 0 in Segment 0:
:FETC:CELL:SEQ:GSM:PVT:OTP? 0,AVG,0
> -10.00,-11.00-12.00,-13.00,-14.00,-15.00,-16.00,-17.00,-18.00,-19.00,-20.00,-21.00

:FETCh:CELLular:SEQuence:GSM:PVTime:TEMPlate?

Power vs. Time Template Judgement

Function

Queries Power vs. Time Template judgement measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:PVTime:TEMPlate? <seg>[,<slot>]
```

Response

<judge>

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<judge>	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Power vs. Time Template judgement measurement result for Slot 0 in Segment 0:
:FETC:CELL:SEQ:GSM:PVT:TEMP? 0,0
> PASS

4

SCPI Command Reference

:FETCh:CELLular:SEQuence:GSM:PVTime:TEMPlate:DETail?

Power vs. Time Template Judgement Detail

Function

Queries Power vs. Time Template judgement for each judgement line of measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:PVTime:TEMPlate:DETail? <seg>[,<slot>]
```

Response

<type>,<judge(0)>,<judge(1)>,...,<judge(n–1)>

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<type>	Measurement target signal
GMSK	GMSK burst signal
8PSK	8PSK burst signal
NONE	Continuous signal
<judge>	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
<n>	Judgement line number
Range	10 (type = GMSK) 16 (type = 8PSK) Omitted (type = NONE)
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

<judge> is omitted for <type> = NONE, because no judgement is executed.

Example of Use

To query the Power vs. Time Template judgement for each judgement line of the measurement result for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:PVT:TEMP:DET? 0,0

> GMSK,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

:FETCh:CELLular:SEQuence:GSM:PVTime:TEMPlate:DETail:STORage?

Power vs time template storage Judgement Detail

Function

Queries measurement result at each judgment line of Power vs. Time Template judgment for each storage mode.

Query

```
:FETCh:CELLular:SEQuence:GSM:PVTime:TEMPlate:DETail:STORage?
<seg>,<mode>[,<slot>]
```

Response

<type>,<judge(0)>,<judge(1)>,...,<judge(n-1)>

Parameter

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<type>	Measurement target signal
GMSK	GMSK burst signal
8PSK	8PSK burst signal
NONE	Continuous signal
<judge>	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
<n>	Judgement line number
Range	10 (type = GMSK)
	16 (type = 8PSK)
	Omitted (type = NONE)
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query measurement result (average) at each judgment line of Power vs. Time Template judgment for Slot 0 in Segment 1.

:FETCh:CELLular:SEQuence:GSM:PVTime:TEMPlate:DETail:STORage? 1,AVG,0

> GMSK,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,FAIL,PASS

:FETCh:CELLular:SEQuence:GSM:PVTime:TEMPlate:STORage?

Power vs time template storage Judgement

Function

To query measurement result at judgment line of Power vs. Time Template judgment for each storage mode.

Query

```
:FETCh:CELLular:SEQuence:GSM:PVTime:TEMPlate:STORage?
<seg>,<mode>[,<slot>]
```

Response

When <mode> = TTL,
<judge_ave>,<judge_max>,<judge_min>
When <mode> = AVG, MAX or MIN,
<judge>

Parameter

<seg>	Segment number
Range	0 to 1999
Resolution	1
<mode>	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<judge_ave>	Judgment result of average
<judge_max>	Judgment result of maximum
<judge_min>	Judgment result of minimum
<judge>	Judgement result in specified Storage mode
PASS	Pass
FAIL	Fail
–	No measurement

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

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SCPI Command Reference

Example of Use

To query measurement result (average) of Power vs. Time Template judgment for Slot 0 in Segment 2.

:FETCh:CELLular:SEQuence:GSM:PVTime:TEMPlate:STORage? 2,AVG,0

> PASS

:FETCh:CELLular:SEQuence:GSM:PVTime:TERRor?

Time Alignment

Function

Queries Time Alignment measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:PVTime:TERRor? <seg>,<mode>[,<slot>]
```

Response

When <mode> = TTL,
<avg>,<max>,<min>
When <mode> = AVG, MAX, MIN or DVT,
<value>

Unit	bit (0.01 bit resolution)

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
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<avg>	Average
<max>	Maximum
<min>	Minimum
<value>	Measurement result in specified Storage mode

Example of Use

To query the Time Alignment measurement result average for Slot 0 in Segment 0:
:FETC:CELL:SEQ:GSM:PVT:TERR? 0,AVG,0
> 0.01

4

SCPI Command Reference

:FETCh:CELLular:SEQuence:GSM:PVTime:TERRor:WORSt?

Time Alignment Worst Value

Function

Queries worst value of Time Alignment measurement result

Query

```
:FETCh:CELLular:SEQuence:GSM:PVTime:TERRor:WORSt? <seg>[,<slot>]
```

Response

<value>

Unit	bit (0.01 bit resolution)

Parameters

<seg>	Segment number
Range	0 to 1999
Resolution	1
<slot>	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
<value>	Measurement result

Example of Use

To query the worst value of the Time Alignment measurement result for Slot 0 in Segment 0:

:FETC:CELL:SEQ:GSM:PVT:TERR:WORS? 0,0

> 0.10

:FETCh:CELLular:SEQuence:PROGress?

Sequence Progress

Function

Queries progress ratio and executing sequence number at sequence measurement

Query

```
:FETCh:CELLular:SEQuence:PROGress?
```

Response

<p>,<cur>,<start>,<stop>

Parameter

<p>	Progress ratio at sequence measurement
Range	0 to 100%
<cur>	Currently executed segment number
Range	0 to 1999
<start>	First executed segment number
Range	0 to 1999
<end>	Last executed segment number
Range	0 to 1999

Example of Use

To query the progress ratio and executing sequence number at sequence measurement:
:FETC:CELL:SEQ:PROG?
>65,23,11,30

Remarks

The first and last executed segment numbers are the same as the start and stop segment numbers specified by the :CONFigure:CELLular:SEQuence:CONTrol command.

:FETCh:CELLular:SEQuence:SEG:STATe?

Specified Segment Status

Function

Queries measurement status of specified segment

Query

`:FETCh:CELLular:SEQuence:SEG:STATe? <seg>`

Response

<stat>

Parameter

<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 to be measured
12	Tx measurement timeout

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)>

Parameter

<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
<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 to be measured
12	Tx measurement timeout

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 the measured segments is 6 and an over-level error occurred at 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>

Parameter

<seg>	Segment number
Range	0 to 1999
<src>	Trigger source
FRAME	Waveform pattern frame trigger
FREERUN	Free run
PWR	Input signal power
Default	FREERUN
<slope>	Trigger slope
RISE	Rising edge trigger
Default	RISE
<level>	Trigger level
Range	–40 to 0 dB
Resolution	1 dB
Suffix Code	DB (uses dB when omitted)
Default	–30 dB
<delay>	Delay time
Range	0 to 1000.000 ms
Resolution	0.001 ms
Suffix Code	NS, US, MS, S (uses ms when omitted)
Default	0.000 ms

Details

The trigger slope and trigger level are enabled when the 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

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 SYST:LANG NAT command.

5

Native Command Reference

5.1 List of Commands

The following table shows the rules for describing messages.

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

5.1.1 Common commands

Common

Function	Command	Query	Response
Standard Select	STDSEL std	STDSEL?	std
Set Connect Port Direction	PORT input,output	PORT?	input,output

Measurement

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
Input Level	ILVL level	ILVL?	level
Input Level Control	ILVLCTRL type	ILVLCTRL?	type
Output Level	OLVL level	OLVL?	level
TCH Channel	CHAN ch	CHAN?	ch
TCH Uplink Frequency	TXFREQ freq	TXFREQ?	freq
	ULFREQ freq	ULFREQ?	freq
TCH Downlink Frequency	RXFREQ freq	RXFREQ?	freq
	DLFREQ freq	DLFREQ?	freq
Measuring Object	MEASOBJ object	MEASOBJ?	object
Measurement Select	MEASSEL meas	MEASSEL?	meas
Measurement Trigger	MEASTRG trigger	MEASTRG?	trigger
System Combination	SYSCMB system	SYSCMB?	system
Trigger Timeout	TRGTOUT time	TRGTOUT?	time
Uplink Training Sequence	TSC tsc	TSC?	tsc

Fundamental Measurement Parameters

Function	Command	Query	Response
Turn off All Measurement Items	ALLMEASITEMS_OFF	-----	-----
Number of Active Slot	ASLOTS a	ASLOTS?	a
Measurement Band	BAND band	BAND?	band
Bit Error Rate On/Off(GSM)	BER_MEAS on_off	BER_MEAS?	on_off
BER number of sample	BER_SAMPLE type,number	BER_SAMPLE? type	type,number
GPRS Bit Error Rate On/Off(GPRS/EGPRS)	GPRSBER_MEAS on_off	GPRSBER_MEAS?	on_off
Expected Power Control Level	PCL pcl	PCL?	pcl
TCH slot	TSLOT slot	TSLOT?	slot
Measurement Band, Expected Power Control Level and Measuring Object	RF band,pcl,object	RF?	band,pcl,object
Power Measurement On/Off and Count	PWR_SET on_off[,count]	PWR_SET?	on_off,count
Power vs. Time Measurement On/Off and Count	PVT_SET on_off[,count]	PVT_SET?	on_off,count
Power vs. Time, Time Offset	PVT_OFFSET num,offset	PVT_OFFSET? num	offset
Modulation Analysis On/Off and Count	MOD_SET on_off[,count]	MOD_SET?	on_off,count
Output RF Spectrum Measurement On/Off and Count	ORFS_SET on_off[,count]	ORFS_SET?	on_off,count
Trigger Level of Tx Fundamental Measurement	FMEAS_TRGLVL level	FMEAS_TRGLVL?	level
RBW Filter of Output RF Spectrum due to Modulation	RBWFLT rbw	RBWFLT?	rbw
Graph Data Output On/Off	GRAPHVIEW on_off	GRAPHVIEW?	on_off

Fundamental Measurement Results

Function	Command	Query	Response
Measurement Status of Each Slot	-----	FMEASSTAT?	status(0),status(1),……,status(s)
Bit Error Rate	-----	BER? type	rate
Bit Error Rate - Error Counts	-----	BERCNT? type	number
Bit Error Rate - Total	-----	TTL_BER? type	judge,rate,n1,n2,n3
Bit Error Rate - Received bits	-----	BERRECEIVE? type	number
Tx Power	-----	TXPWR? mode[,slot]	{avg,max,min}|level|{n,level(0),level(1),...,level(n-1)}
Carrier Off Power	-----	OFFPWR? mode[,slot]	{avg,max,min}|level
On/Off Ratio	-----	RATIO? mode[,slot]	{avg,max,min}|level
Power Flatness Maximum Power	-----	MAXPWR? mode[,slot]	{avg,max,min}|level
Power Flatness Minimum Power	-----	MINPWR? mode[,slot]	{avg,max,min}|level
Estimated Power	-----	ESTPWR? mode[,slot]	{avg,max,min}|level|{n,level(0),level(1),...,level(n-1)}
Power vs. Time	-----	PVT? mode[,slot]	{avg(0),avg(1),...,avg(11),max(0),max(1),...,max(11),min(0),min(1),...,min(11)}|{level(0),level(1),...,level(11)}
Power vs. Time Template Judgement	-----	PVT_TEMPLATE? [slot]	judge
Power vs time template storage	-----	PVT_TEMPLATE_STR? mode[,slot]	{judge_avg,judge_max,judge_min}|judge

Fundamental Measurement Results (Cont'd)

Function	Command	Query	Response
Power vs. Time Template Judgement Detail	-----	PVT_DETAIL? [slot]	type,judge(0),judge(1),...,judge(n-1)
Power vs time template storage Judgement Detail	-----	PVT_DETAIL_STR? mode[,slot]	type,judge(0),judge(1),...,judge(n-1)
Time Alignment	-----	TERR? mode[,slot]	{avg,max,min}|value
Time Alignment Worst Value	-----	TERR_WORST? [slot]	value
Carrier Frequency	-----	CFREQ? [slot]	freq
Carrier Frequency Error	-----	CFERR? mode[,slot]	{avg_ppm,avg_hz,max_ppm,max_hz,min_ppm,min_hz}|{freq_ppm,freq_hz}
Carrier Frequency Error Worst Value	-----	CFERR_WORST? [slot]	freq_ppm,freq_hz
EVM	-----	EVM? mode[,slot]	{avg,max,min}|percent|{n,percent(0),percent(1),...percent(n-1)}
Peak EVM	-----	PEVM? mode[,slot]	{avg,max,min}|percent
RMS Phase Error	-----	PHASEERR? mode[,slot]	{avg,max,min}|deg
Peak Phase Error	-----	PPHASEERR? mode[,slot]	{avg,max,min}|deg
Magnitude Error	-----	MAGERR? mode[,slot]	{avg,max,min}|percent

Fundamental Measurement Results (Cont'd)

Function	Command	Query	Response
Origin Offset	-----	ORGNOFS? mode[,slot]	{avg,max,min}|value
IQ Imbalance	-----	IQIMB? mode[,slot]	{avg,max,min}|value
95:th Percentile	-----	EVM95PCT? [slot]	percent
Output RF Spectrum Due to Modulation Judgement	-----	ORFSMD_JUDGE? [slot]	judge
Output RF Spectrum Due to Modulation Judgement of Each Frequency Point (Lower Side)	-----	ORFSMD_JUDGE_L? [slot]	judge(0),judge(1),...,judge(freq)
Output RF Spectrum Due to Modulation (Lower Side)	-----	ORFSMD_L? mode[,slot]	{avg(0),avg(1),...,avg(freq),max(0),max(1),...,max(freq),min(0),min(1),...,min(freq)}|{level(0),level(1),...,level(freq)}
Output RF Spectrum Due to Modulation Judgement of Each Frequency Point (Upper Side)	-----	ORFSMD_JUDGE_U? [slot]	judge(0),judge(1),...,judge(freq)
Output RF Spectrum Due to Modulation (Upper Side)	-----	ORFSMD_U? mode[,slot]	{avg(0),avg(1),...,avg(freq),max(0),max(1),...,max(freq),min(0),min(1),...,min(freq)}|{level(0),level(1),...,level(freq)}

Fundamental Measurement Results (Cont'd)

Function	Command	Query	Response
Output RF Spectrum Due to Switching Judgement	-----	ORFSSW_JUDGE? [slot]	judge
Output RF Spectrum Due to Switching Judgement of Each Frequency Point (Lower Side)	-----	ORFSSW_JUDGE_L? [slot]	judge(0),judge(1),...,judge(freq)
Output RF Spectrum Due to Switching (Lower Side)	-----	ORFSSW_L? mode[,slot]	{avg(0),avg(1),...,avg(freq),max(0),max(1),...,max(freq),min(0),min(1),...,min(freq)}|{level(0),level(1),...,level(freq)}
Output RF Spectrum Due to Switching Judgement of Each Frequency Point (Upper Side)	-----	ORFSSW_JUDGE_U? [slot]	judge(0),judge(1),...,judge(freq)
Output RF Spectrum Due to Switching (Upper Side)	-----	ORFSSW_U? mode[,slot]	{avg(0),avg(1),...,avg(freq),max(0),max(1),...,max(freq),min(0),min(1),...,min(freq)}|{level(0),level(1),...,level(freq)}
TX IQ	-----	TXIQ? mode[,slot]	level(0),level(1),...,level(freq)
Graph Data	-----	WAVEFMEAS? format,start,n[,slot]	data(0),data(1),...,data(n-1)

High-Speed Adjustment Parameters

Function	Command	Query	Response
Rx Sweep Burst Type List 1 (0 to 99)	`REGMRXBTYPE1 type(0)[,type(1)[,…[,…, type(i)]…]]`	`REGMRXBTYPE1?`	`type(0),type(1),……,type(i)`
Rx Sweep Burst Type List 2 (25 to 49)	`REGMRXBTYPE2 type(25)[,type(26)[,…[, …,type(i)]…]]`	`REGMRXBTYPE2?`	`type(25),type(26),……,type(i)`
Rx Sweep Burst Type List 3 (50 to 74)	`REGMRXBTYPE3 type(0)[,type(1)[,…[,…, type(i)]…]]`	`REGMRXBTYPE3?`	`type(50),type(51),……,type(i)`
Rx Sweep Burst Type List 4 (75 to 99)	`REGMRXBTYPE4 type(75)[,type(76)[,…[, …,type(i)]…]]`	`REGMRXBTYPE4?`	`type(75),type(76),……,type(i)`
Rx Sweep Frequency List 1 (0 to 99)	`REGMRXFREQ1 freq(0)[,freq(1)[,…[,…, freq(i)]…]]`	`REGMRXFREQ1?`	`freq(0),freq(1),……,freq(i)`
Rx Sweep Frequency List 2 (25 to 49)	`REGMRXFREQ2 freq(25)[,freq(26)[,…[, …,freq(i)]…]]`	`REGMRXFREQ2?`	`freq(25),freq(26),……,freq(i)`
Rx Sweep Frequency List 3 (50 to 74)	`REGMRXFREQ3 freq(50)[,freq(51)[,…[, …,freq(i)]…]]`	`REGMRXFREQ3?`	`freq(50),freq(51),……,freq(i)`
Rx Sweep Frequency List 4 (75 to 99)	`REGMRXFREQ4 freq(75)[,freq(76)[,…[, …,freq(i)]…]]`	`REGMRXFREQ4?`	`freq(75),freq(76),……,freq(i)`
RX Sweep Output Level List	`REGMRXPWR list,level(0),level(1), …,level(i)`	`REGMRXPWR? list`	`level(0),level(1),level(2),level(3),level(4),level(5),level(6)`
RX Sweep Output Level Configuration list 1 (0 to 99)	`REGMRXPCFG1 level(0)[,level(1)[,…[, …,level(i)]…]]`	`REGMRXPCFG1?`	`level(0), level(1),.......,level (i)`
RX Sweep Output Level Configuration list 2 (25 to 49)	`REGMRXPCFG2 level(25)[,level(26)[,… [,…,level(i)]…]]`	`REGMRXPCFG2?`	`level(25), level(26),.......,level (i)`

High-Speed Adjustment Parameters (Cont'd)

Function	Command	Query	Response
RX Sweep Output Level Configuration list 3 (50 to 74)	REGMRXPCFG3 level(50)[,level(51)[,…[,…,level(i)]…]]	REGMRXPCFG3?	level(50), level(51),.......,level (i)
RX Sweep Output Level Configuration list 4 (75 to 99)	REGMRXPCFG4 level(75)[,level(76)[,…[,…,level(i)]…]]	REGMRXPCFG4?	level(75), level(76),.......,level (i)
TX Sweep Frequency List 1 (0 to 99)	REGMTXFREQ1 freq(0)[,freq(1)[,…[,…,freq(i)]…]]	REGMTXFREQ1?	freq(0),freq(1),……,freq(i)
TX Sweep Frequency List 2 (25 to 49)	REGMTXFREQ2 freq(25)[,freq(26)[,…[,…,freq(i)]…]]	REGMTXFREQ2?	freq(25),freq(26),……,freq (i)
TX Sweep Frequency List 3 (50 to 74)	REGMTXFREQ3 freq(50)[,freq(51)[,…[,…,freq(i)]…]]	REGMTXFREQ3?	freq(50),freq(51),……,freq (i)
TX Sweep Frequency List 4 (75 to 99)	REGMTXFREQ4 freq(75)[,freq(76)[,…[,…,freq(i)]…]]	REGMTXFREQ4?	freq(75),freq(76),……,freq (i)
RX Sweep Start/Stop	RXSWP start_stop	RXSWP?	start_stop
Rx sweep repeat number list 1 (0 to 99)	RXSWPREPEAT1 n(0)[,n(1)[,…[,…,n(i)]…]]	RXSWPREPEAT1?	n(0),n(0),……,n(i)
Rx sweep repeat number list 2 (25 to 49)	RXSWPREPEAT2 n(25)[,n(26)[,…[,…,n(i)]…]]	RXSWPREPEAT2?	n(25),n(26),……,n(i)
Rx sweep repeat number list 3 (50 to 74)	RXSWPREPEAT3 n(50)[,n(51)[,…[,…,n(i)]…]]	RXSWPREPEAT3?	n(50),n(51),……,n(i)
Rx sweep repeat number list 4 (75 to 99)	RXSWPREPEAT4 n(75)[,n(76)[,…[,…,n(i)]…]]	RXSWPREPEAT4?	n(75),n(76),……,n(i)
RX Sweep Number of Step	RXSWPSTEPS n	RXSWPSTEPS?	n
TX Sweep Repeat Number List 1 (0 to 99)	TXSWPREPEAT1 n(0)[,n(1)[,…[,…,n(i)]…]]	TXSWPREPEAT1?	n(0),n(0),……,n(i)

High-Speed Adjustment Parameters (Cont'd)

Function	Command	Query	Response
TX Sweep Repeat Number List 2 (25 to 49)	TXSWPREPEAT2 n(25)[,n(26)[,…[,…,n(i)]…]]	TXSWPREPEAT2?	n(25),n(26),……,n(i)
TX Sweep Repeat Number List 3 (50 to 74)	TXSWPREPEAT3 n(50)[,n(51)[,…[,…,n(i)]…]]	TXSWPREPEAT3?	n(50),n(51),……,n(i)
TX Sweep Repeat Number List 4 (75 to 99)	TXSWPREPEAT4 n(75)[,n(76)[,…[,…,n(i)]…]]	TXSWPREPEAT4?	n(75),n(76),……,n(i)
TX Sweep Number of Step	TXSWPSTEPS n	TXSWPSTEPS?	n

High-Speed Adjustment Results

Function	Command	Query	Response
TX Sweep Average TX Power	-----	TXSWP_AVG_TXPWR?	p(0),p(1),……,p(n×7-1)
TX Sweep Measurement Status	-----	TXSWP_STAT?	s(0),s(1),……,s(n-1)

Multiburst RF Power Parameters

Function	Command	Query	Response
Number of Multi Burst RF Power Measurement (Single Slot) Trigger Interval	MRFPWR_INTVAL intval	MRFPWR_INTVAL?	intval
Multi Burst RF Power Method	MRFPWR_METHOD method	MRFPWR_METHOD?	method
Number of Multi Burst RF Power Measurement (Single Slot) Frames	MRFPWR_SET n	MRFPWR_SET?	n
Multi Burst RF Power Measurement (Single Slot) Trigger Level	MRFPWR_TLVL level	MRFPWR_TLVL?	level
Multi Burst RF Power Measurement (Single Slot) Trigger	MRFPWR_TRG mode	MRFPWR_TRG?	mode

Multiburst RF Power Results

Function	Command	Query	Response
Multi Burst RF Power Measurement (Single Slot) Tx Power Result	-----	MRFPWR?	level(0),level(1),...,level(n-1)
Multi Burst RF Power Measurement (Single Slot) Result All	-----	MRFPWRALL?	status(0),level(0),max(0),min(0),status(1),level(1),max(1),min(1),...,status(n-1),level(n-1),max(n-1),min(n-1)
Multi burst RF power measurement (Single Slot) status	-----	MRFPWRSTAT?	status(0),status(1),...,status(n-1)

Predistortion 1 Parameters

Function	Command	Query	Response
Predistortion Measurement 1 Setup	PREDISTQ_SET duration,n,ratio	PREDISTQ_SET?	duration,n,ratio
Predistortion Measurement 1 Center Time 1	PREDISTQ_TCENTER1 t(0)[,t(1)[,…[,…,t(i)]…]]	PREDISTQ_TCENTER1?	t(0),t(1),.......,t(i)
Predistortion Measurement 1 Center Time 2	PREDISTQ_TCENTER2 t(125)[,t(126)[,…[,…,t(i)]…]]	PREDISTQ_TCENTER2?	t(125),t(126),.......,t(i)
Predistortion Measurement 1 Center Time 3	PREDISTQ_TCENTER3 t(250)[,t(251)[,…[,…,t(i)]…]]	PREDISTQ_TCENTER3?	t(250),t(251),.......,t(i)
Predistortion Measurement 1 Center Time 4	PREDISTQ_TCENTER4 t(375)[,t(376)[,…[,…,t(i)]…]]	PREDISTQ_TCENTER4?	t(375),t(376),.......,t(i)
Predistortion Measurement 1 Length 1	PREDISTQ_TLENGTH1 t(0)[,t(1)[,…[,…,t(i)]…]]	PREDISTQ_TLENGTH1?	t(0),t(1),.......,t(i)
Predistortion Measurement 1 Length 2	PREDISTQ_TLENGTH2 t(125)[,t(126)[,…[,…,t(i)]…]]	PREDISTQ_TLENGTH2?	t(125),t(126),.......,t(i)
Predistortion Measurement 1 Length 3	PREDISTQ_TLENGTH3 t(250)[,t(251)[,…[,…,t(i)]…]]	PREDISTQ_TLENGTH3?	t(250),t(251),.......,t(i)
Predistortion Measurement 1 Length 4	PREDISTQ_TLENGTH4 t(375)[,t(376)[,…[,…,t(i)]…]]	PREDISTQ_TLENGTH4?	t(375),t(376),.......,t(i)
Predistortion Measurement 1 Filter Bandwidth	PREDISTQBW bw	PREDISTQBW?	bw

Predistortion 1 Results

Function	Command	Query	Response
Predistortion Measurement 1 Binary Transfer	-----	PREDISTQ_BIN? n	p(0),d(0),p(1),d(1),……,p(n-1),d(n-1)
Predistortion Measurement 1 Phase	-----	PREDISTQ_PHASE?	d(0),d(1),……,d(n-1)
Predistortion Measurement 1 Tx Power	-----	PREDISTQ_POWER?	p(0),p(1),……,p(n-1)

Predistortion 2 Parameters

Function	Command	Query	Response
Predistortion Measurement 2 Setup	PREDISTE_SET level,delay	PREDISTE_SET?	level,delay

Predistortion 2 Results

Function	Command	Query	Response
Predistortion Measurement 2 Amplitude	-----	PREDISTE_AMP? start,n	p,e(0),e(1),……,e(n-1)
Predistortion Measurement 2 Binary Transfer	-----	PREDISTE_BIN? start,n	p,e(0),d(0),e(1),d(1),……,e(n-1),d(n-1)
Predistortion Measurement 2 Phase	-----	PREDISTE_PHASE? start,n	d(0),d(1),……,d(n-1)

5.1.3 Sequence measurement commands

Common Parameters

Function	Command	Query	Response
Input Level	ILVL level	ILVL?	level
Output Level	OLVL level	OLVL?	level
TCH Uplink Frequency	TXFREQ freq	TXFREQ?	freq
	ULFREQ freq	ULFREQ?	freq
TCH Downlink Frequency	RXFREQ freq	RXFREQ?	freq
	DLFREQ freq	DLFREQ?	req

Sequence Measurements

Function	Command	Query	Response
Sequence Measurement Status	-----	SEQMSTAT?	m_status,n,s(0),s(1),…,s(n-1)
Sequence Progress	-----	SEQPROGRESS?	p,cur,start,end
Specified Segment Status	-----	SEQSEGSTAT? seg	stat
Trigger Timeout	TRGTOUT time	TRGTOUT?	time

Sequence Control Parameters

Function	Command	Query	Response
Sequence Control Parameter - Sequence Control	SEQCTRL start,end	SEQCTRL?	start,end
Sequence Control Parameter - Sequence Control	SEQCTRLTX start,end	SEQCTRLTX?	start,end
Start Signal Analyzer Measurement Only	SEQEXECTX	-----	-----
Sequence Control Parameter - Sequence End State Reinitialization	SEQREINIT sw	SEQREINIT?	sw
Sequence Control Parameter - Sequence Table	SEQTBL table	SEQTBL?	table

Sequence Parameter Information

Function	Command	Query	Response
Sequence Parameter Information - Error Check	-----	SEQERR? [item]	n,err(0),err(1),…,err(n-1) ns,seg(0),seg(1),…,seg(ns-1) e,mem,exe,set
Sequence Parameter Information - Error Check	-----	SEQERR2? format	n,err(n-1)

Sequence Table Parameters

Function	Command	Query	Response
Sequence Table Parameter - 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 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

Common Parameters

Function	Command	Query	Response
Uplink Training Sequence	GSM_TSC tsc	GSM_TSC?	tsc
Measuring Object	GSM_MOD mcond,object	GSM_MOD? mcond	object

Measurement Parameters

Function	Command	Query	Response
Turn Off All Measurement Items	GSM_MEAS_OFF mcond	-----	-----
Measurement Band	GSM_BAND mcond,band	GSM_BAND? mcond	band
Expected Power Control Level	GSM_PCL mcond,pcl	GSM_PCL? mcond	pcl
Number of Active Slot	GSM_ASLOTS mcond,a	GSM_ASLOTS? mcond	a
TCH slot	GSM_TSLOT mcond,slot	GSM_TSLOT? mcond	slot
Measurement Band, Expected Power Control Level and Measuring Object	GSM_RF mcond,band,pcl,object	GSM_RF? mcond	band,pcl,object
Power Measurement On/Off and Count	GSM_PWR_SET mcond,on_off,count	GSM_PWR_SET? mcond	on_off,count
Power vs. Time Measurement On/Off and Count	GSM_PVT_SET mcond,on_off,count	GSM_PVT_SET? mcond	on_off,count
Power vs. Time, Time Offset	GSM_PVT_OFFSET num,offset	GSM_PVT_OFFSET? num	offset
Modulation Analysis On/Off and Count	GSM_MOD_SET mcond,on_off,count	GSM_MOD_SET? mcond	on_off,count
Output RF Spectrum Measurement On/Off and Count	GSM_ORFS_SET mcond,on_off,count	GSM_ORFS_SET? mcond	on_off,count
RBW Filter of Output RF Spectrum due to Modulation	GSM_RBWFLT rbw	GSM_RBWFLT?	rbw

Measurement Results

Function	Command	Query	Response
Tx Power	-----	GSM_TXPWR? seg,mode[,slot]	{avg,max,min}|level|{n,level(0),level(1),...,level(n-1)}
Estimated Power	-----	GSM_ESTPWR? seg,mode[,slot]	{avg,max,min}|level|{n,level(0),level(1),...,level(n-1)}
Power vs. Time	-----	GSM_PVT? seg,mode[,slot]	{avg(0),avg(1),...,avg(11),max(0),max(1),...,max(11),min(0),min(1),...,min(11)}|{level(0),level(1),...,level(11)}
Power vs. Time Template Judgement	-----	GSM_PVT_TEMPLATE? seg[,slot]	judge
Power vs. Time Template storage Judgement	-----	GSM_PVT_TEMPLATE_STR? seg,mode[,slot]	{judge_avg,judge_max,judge_min}|judge
Power vs. Time Template Judgement Detail	-----	GSM_PVT_DETAIL? seg[,slot]	type,judge(0),judge(1),...,judge(n-1)
Power vs. Time Template storage Judgement Detail	-----	GSM_PVT_DETAIL_STR? seg,mode[,slot]	type,judge(0),judge(1),...,judge(n-1)
Time Alignment	-----	GSM_TERR? seg,mode[,slot]	{avg,max,min}|value
Time Alignment Worst Value	-----	GSM_TERR_WORST? seg[,slot]	value
Carrier Frequency	-----	GSM_CFREQ? seg[,slot]	freq

Measurement Results (Cont'd)

Function	Command	Query	Response
Carrier Frequency Error	-----	GSM_CFERR? seg,mode[,slot]	{avg_ppm,avg_hz,max_ppm,max_hz,min_ppm,min_hz}|{freq_ppm,freq_hz}
Carrier Frequency Error Worst Value	-----	GSM_CFERR_WORST? seg[,slot]	freq_ppm,freq_hz
EVM	-----	GSM_EVM? seg,mode[,slot]	{avg,max,min}|percent|{n, percent(0),percent(1),... percent(n-1)}
Peak EVM	-----	GSM_PEVM? seg,mode[,slot]	{avg,max,min}|percent
RMS Phase Error	-----	GSM_PHASEERR? seg,mode[,slot]	{avg,max,min}|deg
Peak Phase Error	-----	GSM_PPHASEERR? seg,mode[,slot]	{avg,max,min}|deg
Peak Phase Error Absolute Value	-----	GSM_PPHASEERR_ABS? seg,mode[,slot]	{avg,max,min}|deg
Magnitude Error	-----	GSM_MAGERR? seg,mode[,slot]	{avg,max,min}|percent
Origin Offset	-----	GSM_ORGNOFS? seg,mode[,slot]	{avg,max,min}|value
IQ Imbalance	-----	GSM_IQIMB? seg,mode[,slot]	{avg,max,min}|value
95:th Percentile	-----	GSM_EVM95PCT? seg[,slot]	percent

Measurement Results (Cont'd)

Function	Command	Query	Response
Output RF Spectrum Due to Modulation Judgement	-----	GSM_ORFSMD_JUDGE? seg[,slot]	judge
Output RF Spectrum Due to Modulation Judgement of Each Frequency Point (Lower Side)	-----	GSM_ORFSMD_JUDGE_L? seg[,slot]	judge(0),judge(1),...,judge(freq)
Output RF Spectrum Due to Modulation (Lower Side)	-----	GSM_ORFSMD_L? seg,mode[,slot]	{avg(0),avg(1),...,avg(freq),max(0),max(1),...,max(freq),min(0),min(1),...,min(freq)}|{level(0),level(1),...,level(freq)}
Output RF Spectrum Due to Modulation Judgement of Each Frequency Point (Upper Side)	-----	GSM_ORFSMD_JUDGE_U? seg[,slot]	judge(0),judge(1),...,judge(freq)
Output RF Spectrum Due to Modulation (Upper Side)	-----	GSM_ORFSMD_U? seg,mode[,slot]	{avg(0),avg(1),...,avg(freq),max(0),max(1),...,max(freq),min(0),min(1),...,min(freq)}|{level(0),level(1),...,level(freq)}
Output RF Spectrum Due to Switching Judgement	-----	GSM_ORFSSW_JUDGE? seg[,slot]	judge

Measurement Results (Cont'd)

Function	Command	Query	Response
Output RF Spectrum Due to Switching Judgement of Each Frequency Point (Lower Side)	-----	GSM_ORFSSW_JUDGE_L? seg[,slot]	judge(0),judge(1),...,judge(freq)
Output RF Spectrum Due to Switching (Lower Side)	-----	GSM_ORFSSW_L? seg,mode[,slot]	{avg(0),avg(1),...,avg(freq),max(0),max(1),...,max(freq),min(0),min(1),...,min(freq)}|{level(0),level(1),...,level(freq)}
Output RF Spectrum Due to Switching Judgement of Each Frequency Point (Upper Side)	-----	GSM_ORFSSW_JUDGE_U? seg[,slot]	judge(0),judge(1),...,judge(freq)
Output RF Spectrum Due to Switching (Upper Side)	-----	GSM_ORFSSW_U? seg,mode[,slot]	{avg(0),avg(1),...,avg(freq),max(0),max(1),...,max(freq),min(0),min(1),...,min(freq)}|{level(0),level(1),...,level(freq)}

5.2 Details of Commands

This section describes commands in alphabetic order.

■ Terms in this command list

EX .... Command name (header)

Example .... Command function name

Function .... Command function

Command... Programming command syntax

Query .... Query syntax

Response .... Response syntax

Parameter .... Parameter definition

Details .... Command restrictions and others

Example of Use... Command usage example

Related Commands ....Introduction of related commands

■ Suffix Code list

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

5.2.1 Common commands

DLPAT

Waveform Pattern Select

Function

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

Command

```
DLPAT pat
```

Query

```
DLPAT?
```

Response

pat

Parameter

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

Details

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

Example of Use

To set the waveformpattern to 1:
DLPAT PAT0
DLPAT?
> PAT0

Related Command

Waveform file for arbitrary waveform signal selection or query
PACKAGE

Remarks

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

DLPAT_SYNC

Waveform Pattern Select (SYNC)

Function

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

Command

```
DLPAT_SYNC pat
```

Query

```
DLPAT_SYNC?
```

Response

pat

Parameter

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

Details

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

Example of Use

To set the waveformpattern to 1:
DLPAT_SYNC PAT1
DLPAT_SYNC?
> PAT1

Related Command

Waveform file for arbitrary waveform signal selection or query
PACKAGE

Remarks

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

ESR2?

End Event Status (Measurement) Register Query

Function

Queries 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

LVL

Output Level On/Off

Function

Enables RF signal output, or queries setting

Command

```
LVL on_off
```

Query

```
LVL?
```

Response

on_off

Parameter

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

Example of Use

To output RF signals at MU887000A connector:

LVL ON

LVL?

> ON

MEASSTOP

Measurement Stop

Function

Stops current measurement

Command

```
MEASSTOP
```

Example of Use

To stop current measurement:

MEASSTOP

MOD

Output Signal Modulation

Function

Sets or queries MU887000A RF signal output modulation

Command

```
MOD on_off
```

Query

```
MOD?
```

Response

on_off

Parameter

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

Example of Use

To turn on the of output signal modulation:

MOD ON

MOD?

> ON

MSTAT?

Measure Status

Function

Queries status of current measurement

Query

`MSTAT?`

Response

m_status

Parameter

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

Details

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

Example of Use

To query current measurement status:

MSTAT?

> 0

PACKAGE

Waveform File Select

Function

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

Command

```
PACKAGE pac
```

Query

```
PACKAGE?
```

Response

pac

Parameter

pac	Waveform file

Details

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

Example of Use

To set the waveform file 0 from the waveform files loaded in memory:
PACKAGE “PAC0”
PACKAGE?
> PAC0

Related Command

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

Details

Sending this command executes one measurement execution.
Sending this command during measurement, aborts measurement once and restarts it.
ESR2 must be polled or sync processing via *WAI is required to determine the timing of measurement completion.

Example of Use

To start measurement:
SNGLS

Related command

ESR2
For the details of the event status register, refer to Chapter 3 “Fundamental Operation” in the *MU887000A TRX Test Module Operation Manual*.

STDSEL

Standard Select

Function

Sets or queries 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

This parameter must be set to GSM to execute the commands described in Section 5.2.2 “Fundamental measurement commands”.

This parameter must be set to SEQUENCE to use the commands described in Section 5.2.3 “Sequence measurement commands”.

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 specification.

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	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 MX887012A.

Example of Use

To set the applications software to CELLULAR:
SYSSEL CELLULAR
SYSSEL?
>CELLULAR

Remarks

When using the MX887012A, set the application to CELLULAR using the SYSSEL command, and then set the standard to GSM or SEQUENCE using 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

Turns off all measurement items

Command

```
ALLMEASITEMS_OFF
```

Example of Use

To turn off all of measurement items:
ALLMEASITEMS_OFF

ASLOTS

Number of Active Slot

Function

Sets or queries number of measurement slots

Command

```
ASLOTS a
```

Query

```
ASLOTS?
```

Response

a

Parameter

a	Number of slots
Range	1 to 8
Resolution	1
Default	1

Details

Measurement is enabled for the specified slots, counting from Slot 0.

Example of Use

To enable measurement for three slots from Slot 0 to Slot 2:

ASLOTS 3

ASLOTS?

> 3

BAND

Measurement Band

Function

Sets or queries measurement band

Command

```
BAND band
```

Query

```
BAND?
```

Response

band

Parameter

band	Measurement band
GSM850	GSM850 (GSM450, GSM480, GSM850)
GSM900	GSM900 (P-GSM900, E-GSM900, R-GSM900)
DCS1800	DCS1800
PCS1900	PCS1900
Default	GSM900

Details

This command sets the band to be measured. This value is used to determine the Power vs. Time measurement and Output RF Spectrum measurement judgement value.

Example of Use

To set the measurement band to GSM900:

BAND GSM900

BAND?

> GSM900

BER?

Bit Error Rate

Function

Queries results of Bit Error Rate measurement.

Query

```
BER? type
```

Response

rate

Unit	% (Resolution 0.01)

Parameters

type	Measurement type
FAST	High speed measurement
SRBLB	SRB loopback
Default	FAST
rate	Bit Error Rate

Example of Use

To query results of FAST measurement of Bit Error Rate measurement.

BER? FAST

> 0.05

Remarks

When an error has occurred in the measurement (the response of MSTAT? is 2, 4, 5, or 12) or before the measurement starts, the response is 999.99.

BERCNT?

Bit Error Rate - Error Counts

Function

Queries error bit number at Bit Error Rate measurement.

Query

```
BERCNT? type
```

Response

number

Unit	None

Parameters

type	Measurement type
FAST	High speed measurement
SRBLB	SRB loopback
Default	FAST
number	Error bit number
Resolution	1

Example of Use

To query error bit number at FAST measurement.

BERCNT? FAST

> 50

Remarks

When an error has occurred in the measurement (the response of MSTAT? is 2, 4, 5, or 12) or before the measurement starts, the response is –1.

BER_MEAS

Bit Error Rate On/Off (GSM)

Function

Enables Bit Error Rate measurement or queries setting.

Command

```
BER_MEAS on_off
```

Query

```
BER_MEAS?
```

Response

on_off

Parameter

on_off	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF

Example of Use

To set Bit Error Rate measurement to On.

BER_MEAS ON

BER_MEAS?

> ON

BERRECEIVE?

Bit Error Rate - Received bits

Function

Queries received bit number at Bit Error Rate measurement.

Query

```
BERRECEIVE? type
```

Response

number

Unit	None

Parameters

type	Measurement type
FAST	High speed measurement
SRBLB	SRB loopback
number	Received bit number
Resolution	1

Example of Use

To query received bit number at FAST measurement.

BERRECEIVE? FAST

> 50

Remarks

When an error has occurred in the measurement (the response of MSTAT? is 2, 4, 5, or 12) or before the measurement starts, the response is –1.

BER_SAMPLE

BER number of sample

Function

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

Command

```
BER_SAMPLE type,number
```

Query

```
BER_SAMPLE? type
```

Response

type,number

Parameters

type	Measurement type
FAST	High speed measurement
SRBLB	SRB loopback
Default	FAST
number	Number of samples
Range	1 to 114000 when type is set to FAST. 1 to 306000 when type is set to SRBLB.
Resolution	1
Default	114000 when type is set to FAST. 400000 when type is set to SRBLB.

Example of Use

To set the sample bit number at FAST measurement of Bit Error Rate measurement to 100.

BER_SAMPLE FAST,100

BER_SAMPLE? FAST

> 100

CFERR?

Carrier Frequency Error

Function

Queries Carrier Frequency Error measurement result

Query

```
CFERR? mode[,slot]
```

Response

When mode = TTL,
avg_ppm,avg_hz,max_ppm,max_hz,min_ppm,min_hz
When mode = AVG, MAX, MIN or DVT,
freq_ppm,freq_hz

Unit	ppm (0.01 ppm resolution), Hz (0.1 Hz resolution)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg_ppm	Average in ppm
avg_hz	Average in Hz
max_ppm	Maximum in ppm
max_hz	Maximum in Hz
min_ppm	Minimum in ppm
min_hz	Maximum in Hz
req_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 for Slot 0
CFERR? AVG,0
> 0.12,1.5

CFERR_WORST?

Carrier Frequency Error Worst Value

Function

Queries worst value of Carrier Frequency Error measurement result

Query

```
CFERR_WORST? [slot]
```

Response

freq_ppm,freq_hz

Unit	ppm (resolution 0.01 ppm), Hz (resolution 0.1 Hz)

Parameters

slot	Slot number
Range	0 to 7, (uses 0 when omitted)
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 results for Slot 0:

CFERR_WORST? 0

> 0.12,1.5

CFREQ?

Carrier Frequency

Function

Queries Carrier Frequency measurement result

Query

```
CFREQ? [slot]
```

Response

freq

Unit	Hz (1 Hz resolution)

Parameters

slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
freq	Carrier Frequency

Example of Use

To query the Carrier Frequency measurement result for Slot 0:

CFREQ? 0

> 890200000

CHAN

TCH Channel

Function

Sets or queries TCH Channel

Command

```
CHAN ch
```

Query

```
CHAN?
```

Response

ch

Parameter

ch		TCH Channel
	Range	0 to 124
		128 to 251
		259 to 293
		306 to 340
		512 to 885 (DCS1800System Combination)
		512 to 810 (PCS1900System Combination)
		955 to 1023
	Resolution	1
	Default	1

Details

The setting range varies with the System Combination setting.
TCH Uplink Frequency and TCH Downlink Frequency are set for the TCH Channel.
Refer to Table 2.1.7-1 “Channel and Frequency of the GSM System” for the relationship between the parameter and frequency settings of channels.
If the System Combination is changed to PCS1900 when the TCH Channel is set within a range 811 to 885, then the TCH Channel is changed to 810.

The setting changes according to the TCH channel change as the table below.

TCH Channel Change<	Setting			Setting Change		
	System Combination	Band	PCL	Band	PCL	ILVL
512 to 885	DCS1800	GSM900		DCS1800		Change*
		DCS1800				
Except 512 to 885		DCS1800		GSM900		Change*
		GSM900				
512 to 810	PCS1900	GSM850		PCS1900		Change*
		GSM850, PCS1900	16 to 22	PCS1900	15	Change*
			23 to 29	PCS1900	30	Change*
		PCS1900				
Except 512 to 810		PCS1900		GSM850		Change*
		GSM850				

*: When the input level control is PCL, the changes according to the PCL value.

For the relation of PCL value with ILVL, refer to Table 2.1.8-1 PCL and Input Level.

Example of Use

To set the TCH Channel to 1:

CHAN 1

CHAN?

> 1

DLFREQ

TCH Downlink Frequency

Function

Sets or queries TCH Downlink frequency

Command

```
DLFREQ freq
```

Query

```
DLFREQ?
```

Response

freq

Unit	Hz

Parameters

freq	TCH Downlink frequency
Range	400000000 to 3800000000 Hz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	935200000 Hz

Details

Changing the setting of the downlink frequency does not change the setting of the TCH channel.
When Modulation is OFF, the frequency is output as the TCH Downlink Frequency.

Example of Use

To set the TCH Downlink frequency to 935.2 MHz:
DLFREQ 935200000
DLFREQ?
> 935200000

ESTPWR?

Estimated Power

Function

Queries 8PSK Estimated Power measurement result

Query

```
ESTPWR? mode[,slot]
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT,
level
When mode = IND,
n,level(0),level(1),...level(n-1)

n = measurement count × measurement slot number when slot omitted
n = measurement count when slot not omitted

Unit	dBm (mode = other than DVT), dB (mode = DVT), (0.01 dBm resolution)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	All measurement results (time-series display)
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
level	Measurement result in specified Storage mode

Details

When <mode> is set to IND, if the slot is omitted, the time-series measurement results are output for all slots.
Only 8PSK signals support this measurement.

Example of Use

To query the 8PSK Estimated Power measurement result average for Slot 0 in Segment 0:

ESTPWR? AVG,0

> -20.00

EVM?

EVM

Function

Queries EVM measurement result

Query

```
EVM? mode[,slot]
```

Response

When mode = TTL,

avg,max,min

When mode = AVG, MAX, MIN or DVT,

percent

When mode = IND,

n,percent(0),percent(1),...,percent(n–1)

n = measurement count × measurement slot number when slot omitted

n = measurement count when slot not omitted

Unit	% (resolution 0.01 %)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	All measurement results (time-series display)
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
percent	Measurement result in specified Storage mode

Details

Only 8PSK signals support this measurement.
When <mode> is set to IND, if the slot is omitted, the time-series measurement results are output for all slots.

Example of Use

To query the EVM measurement result average for Slot 0
EVM? AVG,0
> 1.05

EVM95PCT?

95th Percentile

Function

Queries EVM measurement result with probability distribution of 95%

Query

```
EVM95PCT? [slot]
```

Response

percent	
Unit	% (0.01% resolution)

Parameters

slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
percent	EVM with probability distribution of 95%

Details

Only 8PSK signals support this measurement.

Example of Use

To query the 95th Percentile measurement result for Slot 0:
EVM95PCT? 0
> 2.01

FMEAS_TRGLVL

Trigger Level of Tx Fundamental Measurement

Function

Sets or queries measurement trigger level for Tx Fundamental Measurement

Command

```
FMEAS_TRGLVL level
```

Query

```
FMEAS_TRGLVL?
```

Response

level

Unit	dB

Parameter

level	Measurement trigger level
Range	–45 to 0 dB
Resolution	1 dB
Suffix code	DB (uses dB when omitted)
Default	–30 dB

Example of Use

To set the measurement trigger level for Tx Fundamental Measurement to –30 dB:

FMEAS_TRGLVL -30

FMEAS_TRGLVL?

> -30

FMEASSTAT?

Measurement Status of Each Slot

Function

Queries measurement status of each slot

Query

```
FMEASSTAT?
```

Response

status(0),status(1),……,status(s)

Parameters

s	Slot number
Range	0 to 7
Resolution	1
status	Measurement status
0	Ended normally
2	Over level
4	Measurement disabled, signal abnormal
5	Synchronization word not detected
9	Not measured

Example of Use

To query the measurement status of each slot:
FMEASSTAT?
> 0,0,0,0,0,0,0,0

Related Command

Measurement status query
MSTAT?

GPRSBER_MEAS

GPRS Bit Error Rate On/Off(GPRS/EGPRS)

Function

Enables Bit Error Rate measurement in GPRS/EGPRS or queries setting.

Command

```
GPRSBER_MEAS on_off
```

Query

```
GPRSBER_MEAS?
```

Response

on_off

Parameter

on_off	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	OFF

Example of Use

To set GPRSBER measurement to On.

GPRSBER_MEAS ON

GPRSBER_MEAS?

> ON

GRAPHVIEW

Graph Data Output On/Off

Function

Enables or queries output for each analysis waveform data item

Command

```
GRAPHVIEW on_off
```

Query

```
GRAPHVIEW?
```

Response

on_off

Parameter

on_off	Enables/disables analysis waveform data output
ON	Enables analysis waveform data output
OFF	Disables analysis waveform data output
Default	OFF

Details

Each analysis waveform data item can be read when the measurement is executed while the analysis waveform data output is enabled.

Example of Use

To output analysis waveform data:

GRAPHVIEW ON

GRAPHVIEW?

> ON

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	–30.0 to +35.0 dBm (Port 1/Port 2)
	–30.0 to +25.0 dBm (Port 3/Port 4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	27.0 dBm

Details

The setting range varies with the input port setting.
When the Cable Loss Calibration is ON, the cable loss is added to the input level setting range.
When the cable loss is 5 dB, the Port1/Port2 setting range is –25.0 to +40.0 dBm.

Example of Use

To set the input level to 27 dBm:
ILVL 27
ILVL?
> 27.0

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*.

ILVLCTRL

Input Level Control

Function

Sets or queries input level control.

Command

```
ILVLCTRL type
```

Query

```
ILVLCTRL?
```

Response

type

Parameter

type	Input level control
PCL	Input level changes according to the power control level.
MANUAL	Input level does not change according to the power control level.
Default	PCL

Details

While the input level control is set to PCL in fundamental measurement, the input level changes according to the power control level (PCL).
It is fixed to MANUAL in sequence measurement.

Example of Use

To set the input level control to PCL.
ILVLCTRL PCL
ILVLCTRL?
> PCL

Related Commands

EXTLOSSW
LOSSTBL
LOSSTBLVAL
For details of the commands, refer to Chapter 6 “Native Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

IQIMB?

IQ Imbalance

Function

Queries IQ Imbalance measurement result

Query

```
IQIMB? mode[,slot]
```

Response

When mode = TTL,

avg,max,min

When mode = AVG, MAX, MIN or DVT,

value

Unit	dB (0.01 dB resolution)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
value	Measurement result in specified Storage mode

Example of Use

To query the IQ Imbalance measurement result average for Slot 0:

IQIMB? AVG,0

> 1.05

MAGERR?

Magnitude Error

Function

Queries Magnitude Error measurement result

Query

```
MAGERR? mode[,slot]
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT,
percent

Unit	% (0.01% resolution)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
percent	Measurement result in specified Storage mode

Example of Use

To query the Magnitude Error measurement result average for Slot 0:
MAGERR? AVG,0
> 1.02

MAXPWR?

Power Flatness Maximum Power

Function

Queries difference between Tx Power and Maximum Power within burst

Query

```
MAXPWR? mode[,slot]
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT,
level

Unit	dB (0.01 dB resolution)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
level	Measurement result in specified Storage mode

Example of Use

To query the Power Flatness Maximum Power measurement result average for Slot 0:
MAXPWR? AVG,0
> 5.00

MEASOBJ

Measuring Object

Function

Sets or queries measurement target signal

Command

```
MEASOBJ object
```

Query

```
MEASOBJ?
```

Response

object

Parameter

object	Measurement target signal
GMSK	Sets GMSK burst signal as measurement target
8PSK	Sets 8PSK burst signal as measurement target
CONT	Sets GMSK Continuous signal as measurement target
Default	GMSK

Example of Use

To set the measurement target to the GMSK burst signal:

MEASOBJ GMSK

MEASOBJ?

> GMSK

MEASSEL

Measurement Select

Function

Sets or queries measurement function

Command

`MEASSEL meas`

Query

`MEASSEL?`

Response

meas

Parameter

meas	Measurement function
FMEAS	Tx Fundamental Measurement
MRFPWRSNGL	Multiburst RF Power Measurement (Single Slot)
PREDISTQ	Predistortion Measurement 1
PREDISTE	Predistortion Measurement 2
HSADJ	High-Speed Adjustment
Default	FMEAS

Example of Use

To set the measurement function to Tx Fundamental Measurement:

MEASSEL FMEAS

MEASSEL?

> FMEAS

MEASTRG

Measurement Trigger

Function

Sets or queries measurement trigger

Command

```
MEASTRG trigger
```

Query

```
MEASTRG?
```

Response

trigger

Parameter

trigger	Measurement trigger
TS	Training sequence
VIDEO	Video
Default	TS

Details

The measurement trigger is selected from Training Sequence and Video.
Use Video for signal with no Training Sequence.

Example of Use

To set the measurement trigger to the Training Sequence:
MEASTRG TS
MEASTRG?
> TS

MINPWR?

Power Flatness Minimum Power

Function

Queries difference between Tx Power and Minimum Power within burst

Query

```
MINPWR? mode[,slot]
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT,
level

Unit	dB (0.01 dB resolution)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
level	Measurement result in specified Storage mode

Example of Use

To query the Power Flatness Minimum Power measurement result average for Slot 0:
MINPWR? AVG,0
> -5.00

MOD_SET

Modulation Analysis On/Off and Count

Function

Enables Modulation Analysis and sets 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	ON
count	Measurement count
Range	1 to 1000
Resolution	1
Default	1

Details

The count can be omitted.

Example of Use

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

MOD_SET ON,10

MOD_SET?

> ON,10

MRFPWR?

Multi Burst RF Power Measurement (Single Slot) Tx Power Result

Function

Queries Tx power of each frame at Multiburst RF Power measurement (Single Slot)

Query

`MRFPWR?`

Response

level(0),level(1),...,level(n–1)

n is the number of measured frames.

Unit	dBm (level)

Parameter

level(n–1)	Tx Power measurement result
Resolution	0.01 dB

Example of Use

To query the Multiburst RF Power measurement (Single Slot) measurement results:
MRFPWR?
> 0,-20.00,-20.00,......

Related Commands

Multiburst RF power measurement (Single Slot) each frame measurement status, Tx power, Power flatness max, and Power flatness min measurement results query
MRFPWRALL?

Multiburst RF power measurement (Single Slot) each frame status query
MRFPWRSTAT?

MRFPWRALL?

Multi Burst RF Power Measurement (Single Slot) Result All

Function

Queries Multiburst RF Power (Single Slot) measurement results for measurement status, Tx power, Power flatness max, and Power flatness min for each frame

Query

```
MRFPWRALL?
```

Response

status(0),level(0),max(0),min(0),status(1),level(1),max(1),min(1),...,status(n–1),level(n–1),max(n–1),min(n–1)

n is the number of frames to be measured.

Unit	dBm(level),dB(max,min)

Parameters

status(n–1)	Measurement status
0	Ended normally
2	Over level
4	Measurement disabled
5	Synchronization word detection disabled
12	Timeout
14	Short burst length
15	Power flatness max/min fail
level(n–1)	Tx power
Resolution	0.01 dB
max(n–1)	Power flatness max
Resolution	0.01 dB
min(n–1)	Power flatness min
Resolution	0.01 dB

Example of Use

To query the Multiburst RF Power measurement (Single Slot) results:
MRFPWRALL?
> 0,-20.00,2.00,-1.00,0,-20.00,2.00,......

Related Commands

Multiburst RF Power measurement (Single Slot) each frame transmit power query
MRFPWR?

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Native Command Reference

Multiburst RF Power measurement (Single Slot) each frame status query
MRFPWRSTAT?

MRFPWR_INTVAL

Number of Multi Burst RF Power Measurement (Single Slot) Trigger Interval

Function

Sets or queries Multiburst RF Power measurement (Single Slot) maximum trigger interval

Command

```
MRFPWR_INTVAL intval
```

Query

```
MRFPWR_INTVAL?
```

Response

intval

Unit	ms

Parameter

intval	Interval
Range	10 to 20 ms
Resolution	1
Suffix code	S, MS, US, NS (uses ms when omitted)
Default	20 ms

Details

This command sets the maximum trigger interval when the Multiburst RF Power measurement (Single Slot) trigger mode is Re-trigger.
If the trigger interval exceeds this time, a timeout occurs and subsequent measurement is not executed.

Example of Use

To set the Multiburst RF Power measurement (Single Slot) maximum trigger interval to 20 ms:
MRFPWR_INTVAL 20
MRFPWR_INTVAL?
> 20

Related Commands

Multiburst RF Power measurement (Single Slot) trigger operation mode setting
MRFPWR_TRG

Multiburst RF Power measurement (Single Slot) trigger level setting
MRFPWR_TLVL

MRFPWR_METHOD

Multi Burst RF Power Method

Function

Sets or queries which of Tx Power or Estimated Power used for Multiburst RF power measurement

Command

```
MRFPWR_METHOD method
```

Query

```
MRFPWR_METHOD?
```

Response

method

Parameter

method	Multiburst RF Power measurement method
NORMAL	Uses Tx Power
ESTIMATE	Uses Estimated Power
Default	NORMAL

Details

Estimated Power can be used only when the measurement target is 8PSK.

Example of Use

To use Tx Power for Multiburst RF power measurement
MRFPWR_METHOD NORMAL
MRFPWR_METHOD?
> NORMAL

MRFPWRSTAT?

Multi Burst RF Power Measurement (Single Slot) Status

Function

Queries measurement status of each frame at Multiburst RF Power measurement (Single Slot)

Query

`MRFPWRSTAT?`

Response

status(0),status(1),...,status(n–1)

n is the number of measured frames.

Parameter

status(n–1)	Measurement status of each frame
0	Ended normally
2	Over level
4	Measurement disabled
5	Synchronization word detection disabled
9	Measurement in progress or not measured
12	Timeout
14	Short burst length
15	Power flatness max/min fail

Example of Use

To query the measurement status at Multiburst RF Power measurement (Single Slot):
MRFPWRSTAT?
> 0,0,0,……

Related Commands

Multiburst RF power measurement (Single Slot) each frame transmit power query
MRFPWR?

Multiburst RF power measurement (Single Slot) each frame measurement status, Tx power, Power flatness max, and Power flatness min measurement results query
MRFPWRALL?

MRFPWR_SET

Number of Multi Burst RF Power Measurement (Single Slot) Frames

Function

Sets or queries number of frames measured at Multiburst RF Power measurement (Single Slot)

Command

```
MRFPWR_SET n
```

Query

```
MRFPWR_SET?
```

Response

n

Parameter

n		Number of frames
	Range	–500 to –1, 1 to 500
	Resolution	1
	Default	100

Details

When + is set for the number of frames, the burst that is 30 dB higher than the previous frame is found, and the result is output. Bursts before the peak burst are output continuously after the output.
When – is set for the number of frames, the burst that is 30 dB lower than the previous frame is found, and the result is output. Bursts before the peak burst are output continuously after the output.

Example of Use

To set the number of frames to be measured at Multiburst RF power measurement (Single Slot) to 100 frames
MRFPWR_SET 100
MRFPWR_SET?
> 100

MRFPWR_TLVL

Multi Burst RF Power Measurement (Single Slot) Trigger Level

Function

Sets or queries Multiburst RF Power measurement (Single Slot) trigger level

Command

```
MRFPWR_TLVL level
```

Query

```
MRFPWR_TLVL?
```

Response

level

Unit	dB

Parameter

level	Trigger level
Range	–40.0 to 0.0 dB
Resolution	0.1 dB
Suffix code	DB (uses dB when omitted)
Default	–30.0 dB

Details

Set as a relative value from the input level.

Example of Use

To set the Multi burst RF power measurement (Single Slot) trigger level to –30.0 dB

MRFPWR_TLVL –30.0

MRFPWR_TLVL?

> -30.0

Related Commands

Multiburst RF Power measurement (Single Slot) trigger operation mode setting
MRFPWR_TRG

Multiburst RF Power measurement (Single Slot) timeout time between triggers
MRFPWR_INTVAL

MRFPWR_TRG

Multi Burst RF Power Measurement (Single Slot) Trigger

Function

Sets or queries Multiburst RF Power measurement (Single Slot) trigger operation mode

Command

```
MRFPWR_TRG mode
```

Query

```
MRFPWR_TRG?
```

Response

mode

Parameter

mode	Trigger operation mode
ONCE	Once
RETRG	Re-trigger
Default	ONCE

Details

When Once is set, measurement is executed with reference to the top frame trigger time.
When Re-trigger is set, trigger detection is executed for each measurement burst.

Example of Use

To set the Multiburst RF Power measurement (Single Slot) trigger operation mode to Once:
MRFPWR_TRG ONCE
MRFPWR_TRG?
> ONCE

Related Command

Multiburst RF power measurement (Single Slot) trigger level setting
MRFPWR_TLVL

Multiburst RF power measurement (Single Slot) timeout time between triggers
MRFPWR_INTVAL

OFFPWR?

Carrier Off Power

Function

Queries Carrier Off Power measurement result

Query

```
OFFPWR? mode[,slot]
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT,
level

Unit	dBm (mode = other than DVT), dB (mode = DVT), (0.01 dB resolution)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
level	Measurement result in specified Storage mode

Example of Use

To query the Carrier Off Power measurement result average for Slot 0:
OFFPWR? AVG,0
> -120.00

OLVL

Output Level

Function

Sets or queries RF signal output level for all slots

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 –55 dBm:
OLVL -55
OLVL?
> -55

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.*

ORFS_SET

Output RF Spectrum Measurement On/Off and Count

Function

Enables Output RF Spectrum measurement and sets or queries measurement count

Command

```
ORFS_SET on_off[,count]
```

Query

```
ORFS_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 1000
Resolution	1
Default	1

Example of Use

To enable RF Spectrum measurement output for Measurement Condition 0 and set the measurement count to 10:

ORFS_SET ON,10

ORFS_SET?

> ON,10

ORFSMD_JUDGE?

Output RF Spectrum Due to Modulation Judgement

Function

Queries Output RF Spectrum (modulation part) judgement result

Query

```
ORFSMD_JUDGE? [slot]
```

Response

judge

Parameters

slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (modulation part) judgement result for Slot 0:

ORFSMD_JUDGE? 0

> PASS

ORFSMD_JUDGE_L?

Output RF Spectrum Due to Modulation Judgement of Each Frequency Point (Lower Side)

Function

Queries Output RF Spectrum (modulation part, lower side) each frequency point judgement result

Query

```
ORFSMD_JUDGE_L? [slot]
```

Response

judge(1),judge(2),...,judge(freq)

Parameters

slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
freq	Offset frequency from center frequency
Range	1 to 12
	1 to 12: Offset frequency (kHz) –100, –200, –250, –400, –600, –800, –1000, –1200, –1400, –1600, –1800, –2000
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (modulation part, lower side) for each frequency point judgement result for Slot 0:

ORFSMD_JUDGE_L? 0

> PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

ORFSMD_JUDGE_U?

Output RF Spectrum Due to Modulation Judgement of Each Frequency Point (Upper Side)

Function

Queries Output RF Spectrum (modulation part, upper side) for each frequency point judgement result

Query

```
ORFSMD_JUDGE_U? [slot]
```

Response

judge(1),judge(2),...,judge(freq)

Parameters

slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
freq	Offset frequency from the center frequency
Range	1 to 12
	1 to 12: Offset frequency (kHz) +100, +200, +250, +400, +600, +800, +1000, +1200, +1400, +1600, +1800, +2000
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (modulation part, upper side) for each frequency point judgement result for Slot 0:

ORFSMD_JUDGE_U? 0

> PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

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Native Command Reference

ORFSMD_L?

Output RF Spectrum Due to Modulation (Lower Side)

Function

Queries Output RF Spectrum (modulation part, lower side) measurement result

Query

```
ORFSMD_L? mode[,slot]
```

Response

When mode = TTL,
avg(0),avg(1),...,avg(freq),max(0),max(1),...,max(freq),min(0),min(1),...,min(freq)
When mode = AVG, MAX, MIN or DVT,
level(0),level(1),...,level(freq)

Unit	dBm (mode = other than DVT and freq = 0), dB (other than left description), (0.01 dB resolution)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
level	Measurement result in specified Storage mode
freq	Offset frequency from the center frequency
Range	0 to 12 0: Center frequency 1 to 12: Offset frequency (kHz) –100, –200, –250, –400, –600, –800, –1000, –1200, –1400, –1600, –1800, –2000
Resolution	1

Example of Use

To query the Output RF Spectrum (modulation part, lower side) measurement result average for Slot 0:

ORFSMD_L? AVG,0

> -20.00,-1.00,-2.00,-3.00,-4.00,-5.00,-6.00,-7.00,-8.00,-9.00,-10.00,-11.00,-12.00

ORFSMD_U?

Output RF Spectrum Due to Modulation (Upper Side)

Function

Queries Output RF Spectrum (modulation part, upper side) of measurement result

Query

```
ORFSMD_U? mode[,slot]
```

Response

When mode = TTL,

avg(0),avg(1),...,avg(freq),max(0),max(1),...,max(freq),min(0),min(1),...,min(freq)

When mode = AVG, MAX, MIN or DVT,

level(0),level(1),...,level(freq)

Unit	dBm (mode = other than DVT and freq = 0), dB (other than the left description), (0.01 dB resolution)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
level	Measurement result in specified Storage mode
freq	Offset frequency from the center frequency
Range	0 to 12 0: Center frequency 1 to 12: Offset frequency (kHz) +100, +200, +250, +400, +600, +800,

	+1000, +1200, +1400, +1600, +1800, +2000
Resolution	1

Example of Use

To query the Output RF Spectrum (modulation part, upper side) of the measurement result average for Slot 0:

ORFSMD_U? AVG,0

> -20.00,-1.00,–2.00,-3.00,-4.00,-5.00,-6.00,-7.00,-8.00,-9.00,-10.00,-11.00,-12.00

ORFSSW_JUDGE?

Output RF Spectrum Due to Switching Judgement

Function

Queries Output RF Spectrum (transient part) judgement result

Query

```
ORFSSW_JUDGE? [slot]
```

Response

judge

Parameters

slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (transient part) judgement result for Slot 0:

ORFSSW_JUDGE? 0

> PASS

ORFSSW_JUDGE_L?

Output RF Spectrum Due to Switching Judgement of Each Frequency Point (Lower Side)

Function

Queries Output RF Spectrum (transient part, lower side) of each frequency point judgement result

Query

```
ORFSSW_JUDGE_L? [slot]
```

Response

judge(1),judge(2),...,judge(freq)

Parameters

slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
freq	Offset frequency from the center frequency
Range	1 to 12
	1 to 12: Offset frequency (kHz) –100, –200, –250, –400, –600, –800, –1000, –1200, –1400, –1600, –1800, –2000
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (transient part, lower side) of each frequency point judgement result for Slot 0:

ORFSSW_JUDGE_L? 0

> PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

ORFSSW_JUDGE_U?

Output RF Spectrum Due to Switching Judgement of Each Frequency Point (Upper Side)

Function

Queries Output RF Spectrum (transient part, upper side) of each frequency point judgement result

Query

```
ORFSSW_JUDGE_U? [slot]
```

Response

judge(1),judge(1),...,judge(freq)

Parameters

slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
freq	Offset frequency from center frequency
Range	1 to 12
	1 to 12: Offset frequency (kHz) +100, +200, +250, +400, +600, +800, +1000, +1200, +1400, +1600, +1800, +2000
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (transient part, upper side) of each frequency point judgement result for Slot 0:

ORFSSW_JUDGE_U? 0

> PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

ORFSSW_L?

Output RF Spectrum Due to Switching (Lower Side)

Function

Queries Output RF Spectrum (transient part, lower side) measurement result

Query

```
ORFSSW_L? mode[,slot]
```

Response

When mode = TTL,
avg(0),avg(1),...,avg(freq),max(0),max(1),...,max(freq),min(0),min(1),...,min(freq)
When mode = AVG, MAX, MIN or DVT,
level(0),level(1),...,level(freq)

Unit	dBm (mode = other than DVT), dB (other than left description), (0.01 dB resolution)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
level	Measurement result in specified Storage mode
freq	Offset frequency from center frequency
Range	0 to 12 0: Center frequency 1 to 12: Offset frequency (kHz) –100, –200, –250, –400, –600, –800, –1000, –1200, –1400, –1600, –1800, –2000
Resolution	1

Example of Use

To query the Output RF Spectrum (transient part, lower side) measurement result average for Slot 0:
ORFSSW_L? AVG,0

> -20.00,-1.00,-2.00,-3.00,-4.00,-5.00,-6.00,-7.00,-8.00,-9.00,-10.00,-11.00,-12.00

ORFSSW_U?

Output RF Spectrum Due to Switching (Upper Side)

Function

Queries Output RF Spectrum (transient part, upper side) measurement result

Query

```
ORFSSW_U? mode[,slot]
```

Response

When mode = TTL,
avg(0),avg(1),...,avg(freq),max(0),max(1),...,max(freq),min(0),min(1),...,min(freq)
When mode = AVG, MAX, MIN or DVT,
level(0),level(1),...,level(freq)

Unit	dBm (mode = other than DVT and freq = 0), dB (other than left description), (0.01 dB resolution)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
level	Measurement result in specified Storage mode
freq	Offset frequency from center frequency
Range	0 to 12 0: Center frequency 1 to 12: Offset frequency (kHz) +100, +200, +250, +400, +600, +800, +1000, +1200, +1400, +1600, +1800, +2000
Resolution	1

Example of Use

To query the Output RF Spectrum (transient part, upper side) measurement result average for Slot 0:

ORFSSW_U? AVG,0

> -20.00,-1.00,-2.00,-3.00,-4.00,-5.00,-6.00,-7.00,-8.00,-9.00,-10.00,-11.00,-12.00

ORGNOFS?

Origin Offset

Function

Queries Origin Offset measurement result

Query

```
ORGNOFS? mode[,slot]
```

Response

When mode = TTL,

avg,max,min

When mode = AVG, MAX, MIN or DVT,

value

Unit	dB (0.01 dB resolution)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
value	Measurement result in specified Storage mode

Example of Use

To query the Origin Offset measurement result average for Slot 0:

ORGNOFS? AVG,0

> 0.25

PCL

Expected Power Control Level

Function

Sets the measurement signal Power Control Level, or queries the set value

Command

```
PCL pcl
```

Query

```
PCL?
```

Response

pcl

Parameter

pcl	Power Control Level
Range	0 to 31
Resolution	1
Default	8

Details

This command sets the measurement signal Power Control Level. This value is used to determine the Power vs. Time measurement and Output RF Spectrum measurement judgement value.

Input level changes according to the power control level.

If the power control level is set to 16 to 29 when the system combination is PCS1900 and TCH channel is 512 to 810, an error occurs and the set value is not changed.

Example of Use

To set the input signal Power Control Level to 8:

PCL 8

PCL?

> 8

PEVM?

Peak EVM

Function

Queries the Peak EVM measurement result

Query

```
PEVM? mode[,slot]
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT,
percent

Unit	% (resolution 0.01 %)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
percent	Measurement result in specified Storage mode

Details

The measurement is executed only when the measurement target is 8PSK.

Example of Use

To query the Peak EVM measurement result average for Slot 0:
PEVM? AVG,0
> 3.01

PHASEERR?

RMS Phase Error

Function

Queries RMS Phase Error measurement result

Query

```
PHASEERR? mode[,slot]
```

Response

When mode = TTL,

avg,max,min

When mode = AVG, MAX, MIN or DVT,

deg

Unit	degree (0.01 deg resolution)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
deg	Measurement result in specified Storage mode

Example of Use

To query the RMS Phase Error measurement result average for Slot 0:

PHASEERR? AVG,0

> 1.05

PPHASEERR?

Peak Phase Error

Function

Queries Peak Phase Error measurement result

Query

```
PPHASEERR? mode[,slot]
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT,
deg

Unit	degree (0.01 deg resolution)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
deg	Measurement result in specified Storage mode

Example of Use

To query the Peak Phase Error measurement result average for Slot 0:
PHASEERR? AVG,0
> 1.03

PREDISTE_AMP?

Predistortion Measurement 2 Amplitude

Function

Queries signal amplitude and Tx power of trigger burst at each sampling point measured at Predistortion Measurement 2

The response is in the exponent notation.

Query

```
PREDISTE_AMP? start,n
```

Response

p,e(0),e(1),……,e(n–1)

Unit	dBm (p)
	mV (e(0),e(1),……,e(n–1))

Parameters

start	Relative position from 0th sample
Range	–192 to 7999
Resolution	1
n	Number of samples
Range	1 to 8192 (Maximum n = 8192 – (start+192))
Resolution	1
p	Tx Power
Resolution	x.xxxE ±xx dBm
e(n–1)	Amplitude at each sampling point
Resolution	x.xxxE ±xx mV

Details

The Tx power response is –1.000E+01 (for –10 dBm) and 1.000E–02 (0.010 mV) for amplitude.

Example of Use

To query the signal amplitude and Tx power of the trigger burst for trigger at each sampling point measured at Predistortion Measurement 2 for 100 samples from the 0th sample

PREDISTE_AMP? 0,100

> -1.000E+01,1.234E-03,1.235E-03,…

PREDISTE_BIN?

Predistortion Measurement 2 Binary Transfer

Function

Queries Tx power, amplitude and phase result at each sampling point measured at Predistortion Measurement 2 for number of samples in binary format
The data format is little-endian and 32-bit floating-point.

Query

```
PREDISTE_BIN? start,n
```

Response

p,d(0),e(0),d(1),e(1),……,d(n-1),e(n-1)

Unit	dBm (p)
	degree (d(0), d(1),……,d(n–1))
	dB (e(0), e(1),……,e(n–1))

Parameters

start	Relative position from 0th sample
Range	–192 to 7999
Resolution	1
n	Number of samples
Range	1 to 8192 (maximum n = 8192 – (start+192))
Resolution	1
p	Tx Power
Resolution	0.001 dB
d(n–1)	Phase at each sampling point
Resolution	0.1 deg
e(n–1)	Amplitude at each sampling point
Resolution	0.001 mV

Details

When the specified number of samples (n) is larger than the measured number, 0.0 is output for values exceed the measured number.

Example of Use

To query the Tx power and amplitude/phase at each sampling point measured at Predistortion Measurement 2 for 100 samples from the 0th sample in binary format:
PREDISTE_BIN? 0,100
> -20.001,0.020,0.1,0.021,0.1,･･･,0.1 (201 data items)

PREDISTE_PHASE?

Predistortion Measurement 2 Phase

Function

Queries phase at each sampling point measured at Predistortion Measurement 2

Query

```
PREDISTE_PHASE? start,n
```

Response

d(0),d(1),……,d(n–1)

Unit	degree

Parameters

start	Relative position from 0th sample
Range	–192 to +7999
Resolution	1 sample
n	Number of samples
Range	1 to 8192 (Maximum n = 8192 – (start+192))
Resolution	1 sample
d(n–1)	Phase at each sampling point
Resolution	0.1 deg

Example of Use

To query the phase at each sampling point measured at Predistortion Measurement 2 for 100 samples from the 0th sample:

PREDISTE_PHASE? 0,100

> 0.1,0.1,…,0.1 (100 data items)

PREDISTE_SET

Predistortion Measurement 2 Setup

Function

Sets or queries trigger level and trigger delay of Predistortion Measurement 2

Command

```
PREDISTE_SET level,delay
```

Query

```
PREDISTE_SET?
```

Response

level,delay

Parameters

level	Trigger level
Range	–30.0 to 0.0 dB
Resolution	0.1 dB
Suffix code	DB (uses dB when omitted)
Default	–30.0 dB
delay	Trigger delay (from trigger detection until 0th sample)
Range	–1152 to 96 samples
Resolution	1 sample
Default	0

Example of Use

To set the measurement trigger level and trigger delay to –10 dB and –100 samples, respectively:

PREDISTE_SET –10,–100

PREDISTE_SET?

> -10.0,-100

PREDISTQ_BIN?

Predistortion Measurement 1 Binary Transfer

Function

Queries result of Tx power and phase measured at Predistortion Measurement 1 only for specified number of data items with binary format
The data format is little-endian and 32-bit floating-point.

Query

```
PREDISTQ_BIN? n
```

Response

```
p(0),d(0),p(1),d(1),……,p(n-1),d(n-1)
```

Unit	dBm (p(0))
	dB (p(1),……,p(n–1))
	degree (d(n–1))

Parameters

n	Specified number of data items
Range	1 to 500
Resolution	1
Default	1
p(n–1)	Tx Power
Resolution	0.1 dB
d(n–1)	Phase
Resolution	0.1 deg

Details

When the specified number of samples (n) is larger than the measured number, 0.0 is output for values exceeding the measured number.

Example of Use

To query the result for Tx power and phase of the signal of each specified period measured at Predistortion Measurement 1 for 100 data items with binary format:
PREDISTQ_BIN? 100
> -20.1,0.1,-0.5,0.2,0.5,0.1,……

PREDISTQ_PHASE?

Predistortion Measurement 1 Phase

Function

Queries phase of signal of each specified period measured at Predistortion Measurement 1

Query

```
PREDISTQ_PHASE?
```

Response

d(0),d(1),……,d(n–1)

n is the number of specified periods.

Unit	degree

Parameters

d(n–1)	phase
Resolution	0.1 deg

Example of Use

To query the phase of the signal of each specified period measured at Predistortion Measurement 1:

PREDISTQ_PHASE?

> 0.1,0.2,0.1,……

PREDISTQ_POWER?

Predistortion Measurement 1 Tx Power

Function

Queries Tx power of signal of each specified period measured at Predistortion Measurement 1

Query

```
PREDISTQ_POWER?
```

Response

p(0),p(1),……,p(n–1)

n is the number of specified periods.

Unit	dBm (p(0))
	dB (p(1),……,p(n–1))

Parameter

p(n–1)	Transmit Power
Resolution	0.1 dB

Example of Use

To query the Tx power of the signal of each specified period measured at Predistortion Measurement 1:

PREDISTQ_POWER?

> -20.1,-0.5,0.5,……

PREDISTQ_SET

Predistortion Measurement 1 Setup

Function

Sets or queries measurement period, number of measurement periods, and valid measurement period ratio for Predistortion Measurement 1

Command

```
PREDISTQ_SET duration,n,ratio
```

Query

```
PREDISTQ_SET?
```

Response

duration,n,ratio

Parameters

duration	Measurement period
Range	0 or 100.000 to 4615.000 μs
Resolution	0.001
Suffix code	S, MS, US, NS (uses μs when omitted)
Default	200.000 μs
n	Number of measurement periods
Range	1 to 500
Resolution	1
Default	1
ratio	Valid measurement period ratio
Range	0.10 to 1.00
Resolution	0.01
Default	0.50

Example of Use

To set the measurement period, number of measurement periods, and valid measurement period ratio for Predistortion Measurement 1 to 200 μs, 100, and 0.5, respectively:

PREDISTQ_SET 200,100,0.5

PREDISTQ_SET?

> 200.000,100,0.50

PREDISTQ_TCENTER1

Predistortion Measurement 1 Center Time 1

Function

Sets or queries measurement center time for each step (0 to 499) for Predistortion Measurement 1 with time from level trigger

Command

```
PREDISTQ_TCENTER1 t(0)[,t(1)[,…[,…,t(i)]…]]
```

Query

```
PREDISTQ_TCENTER1?
```

Response

t(0),t(1),.......,t(i)

Unit	μs

Parameter

t(i)	Measurement center time of step number i
Range	50.000 to 400000.000 μs
Resolution	0.001
Suffix code	S, MS, US, NS (uses μs when omitted)
Default	50.000 μs
i	Step number
Range	0 to 499

Details

The t(1) and subsequent times can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement center time to Step 0 = 50 μs and Step 1 = 100 μs:

PREDISTQ_TLENGTH 50,100

PREDISTQ_TLENGTH1?

> 50.000,100.000,50.000,…,50.000*

*: 500 items always returned without omitting

PREDISTQ_TCENTER2

Predistortion Measurement 1 Center Time 2

Function

Sets or queries measurement center time for each step (125 to 249) for Predistortion Measurement 1 with time from level trigger

Command

```
PREDISTQ_TCENTER2 t(125)[,t(126)[,…[,…,t(i)]…]]
```

Query

```
PREDISTQ_TCENTER2?
```

Response

t(125),t(126),.......,t(i)

Unit	μs

Parameter

t(i)	Measurement center time of step number i
Range	50.000 to 400000.000 μs
Resolution	0.001
Suffix code	S, MS, US, NS (uses μs when omitted)
Default	50.000 μs
i	Step number
Range	125 to 249

Details

The t(126) and subsequent times can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement center time to Step 125 = 50 μs and Step 249 = 100 μs:
PREDISTQ_TLENGTH2 50,100
PREDISTQ_TLENGTH2?
> 50.000,100.000,50.000,…,50.000,50.000*
*: 125 items always returned without omitting

PREDISTQ_TCENTER3

Predistortion Measurement 1 Center Time 3

Function

Sets or queries measurement center time for each step (250 to 374) for Predistortion Measurement 1 with time from level trigger

Command

```
PREDISTQ_TCENTER3 t(250)[,t(251)[,…[,…,t(i)]…]]
```

Query

```
PREDISTQ_TCENTER3?
```

Response

t(250),t(251),.......,t(i)

Unit	µs

Parameter

t(i)		Measurement center time of step number i
	Range	50.000 to 400000.000 µs
	Resolution	0.001
	Suffix code	S, MS, US, NS (uses µs when omitted)
	Default	50.000 µs
i		Step number
	Range	250 to 374

Details

The <t(251)> and subsequent times can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement center time to Step 250 = 50 µs and Step 251 = 100 µs:

PREDISTQ_TLENGTH3 50,100

PREDISTQ_TLENGTH3?

> 50.000,100.000,50.000,…,50.000,50.000*

*: 125 items always returned without omitting

PREDISTQ_TCENTER4

Predistortion Measurement 1 Center Time 4

Function

Sets or queries measurement center time for each step (375 to 499) for Predistortion Measurement 1 with time from level trigger

Command

```
PREDISTQ_TCENTER1 t(375)[,t(376)[,…[,…,t(i)]…]]
```

Query

```
PREDISTQ_TCENTER4?
```

Response

t(375),t(376),.......,t(i)

Unit	µs

Parameter

t(i)	Measurement center time of step number i
Range	50.000 to 400000.000 µs
Resolution	0.001
Suffix code	S, MS, US, NS (uses µs when omitted)
Default	50.000 µs
i	Step number
Range	375 to 499

Details

The <t(376)> and subsequent times can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement center time to Step 375 = 50 µs and Step 376 = 100 µs:
PREDISTQ_TLENGTH4 50,100
PREDISTQ_TLENGTH4?
> 50.000,100.000,50.000,…,50.000,50.000*
*: 125 items always returned without omitting

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Native Command Reference

PREDISTQ_TLENGTH1

Predistortion Measurement 1 Length 1

Function

Sets or queries measurement period length for each step (0 to 499) for Predistortion Measurement 1

Command

```
PREDISTQ_TLENGTH1 t(0)[,t(1)[,…[,…,t(i)]…]]
```

Query

```
PREDISTQ_TLENGTH1?
```

Response

t(0),t(1),.......,t(i)

Unit	µs

Parameter

t(i)	Measuring period length of step number i
Range	100.000 to 4715.000 µs
Resolution	0.001
Suffix code	S, MS, US, NS (uses µs when omitted)
Default	100.000 µs
i	Step number
Range	0 to 499

Details

The <t(1)> and subsequent times can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement period length to Step 0 = 100 µs and Step 1 = 150 µs:

PREDISTQ_TCENTER1 100, 150

PREDISTQ_TCENTER1?

> 100.000,150.000, 100.000,..,100.000,100.00*

*: 500 items always returned without omitting

PREDISTQ_TLENGTH2

Predistortion Measurement 1 Length 2

Function

Sets or queries measurement period length for each step (125 to 249) for Predistortion Measurement 1

Command

```
PREDISTQ_TLENGTH1 t(125)[,t(126)[,…[,…,t(i)]…]]
```

Query

```
PREDISTQ_TLENGTH2?
```

Response

t(125),t(126),.......,t(i)

Unit	μs

Parameter

t(i)	Measuring period length of the step number i
Range	100.000 to 4715.000 μs
Resolution	0.001
Suffix code	S, MS, US, NS (uses μs when omitted)
Default	100.000 μs
i	Step number
Range	125 to 249

Details

The <t(126)> and subsequent times can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement period length to Step 125 = 100 μs and Step 126 = 150 μs:
PREDISTQ_TCENTER1 100, 150
PREDISTQ_TCENTER2?
> 100.000,150.000, 100.000,..,100.000,100.00*
*: 125 items always returned without omitting

PREDISTQ_TLENGTH3

Predistortion Measurement 1 Length 3

Function

Function

Sets or queries measurement period length of each step (250 to 374) for Predistortion Measurement 1

Command

```
PREDISTQ_TLENGTH1 t(250)[,t(251)[,…[,…,t(i)]…]]
```

Query

```
PREDISTQ_TLENGTH3?
```

Response

t(250),t(251),.......,t(i)

Unit	μs

Parameter

t(i)	Measuring period length of step number i
Range	100.000 to 4715.000 μs
Resolution	0.001
Suffix code	S, MS, US, NS (uses μs when omitted)
Default	100.000 μs
i	Step number
Range	250 to 374

Details

The <t(251)> and subsequent times can be omitted. The previously set value is held for omitted steps.

Example of Use

o set the measuring period length to Step 250 = 100 μs and Step 251 = 150 μs:

PREDISTQ_TCENTER3 100, 150

PREDISTQ_TCENTER3?

> 100.000,150.000, 100.000,..,100.000,100.00*

*: 125 items always returned without omitting

PREDISTQ_TLENGTH4

Predistortion Measurement 1 Length 4

Function

Sets or queries measurement period length of each step (375 to 499) for Predistortion Measurement 1

Command

```
PREDISTQ_TLENGTH1 t(375)[,t(376)[,…[,…,t(i)]…]]
```

Query

```
PREDISTQ_TLENGTH1?
```

Response

t(375),t(376),.......,t(i)

Unit	µs

Parameter

t(i)		Measuring period length of step number i
	Range	100.000 to 4715.000 µs
	Resolution	0.001
	Suffix code	S, MS, US, NS (uses µs when omitted)
	Default	100.000 µs
i		Step number
	Range	375 to 499

Details

The <t(376)> and subsequent times can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measuring period length to Step 375 = 100 µs and Step 376 = 150 µs:
PREDISTQ_TCENTER4 100, 150
PREDISTQ_TCENTER4?
> 100.000,150.000,100.000,..,100.000,100.00*
*: 125 items always returned without omitting

PREDISTQBW

Predistortion Measurement 1 Filter Bandwidth

Function

Sets or queries filter bandwidth for measurement

Command

```
PREDISTQBW bw
```

Query

```
PREDISTQBW?
```

Response

bw

Parameter

bw	Filter bandwidth
30KHZ	30 kHz
100KHZ	100 kHz
Default	30KHZ

Example of Use

To set the filter bandwidth for measurement to 100 kHz:

PREDISTQBW 100KHZ

PREDISTQBW?

>100KHZ

PVT?

Power vs. Time

Function

Queries Power vs. Time measurement result

Query

```
PVT? mode[,slot]
```

Response

When mode = TTL,

avg(0),avg(1),...,avg(11),max(0),max(1),...,max(11),min(0),min(1),...,min(11)

When mode = AVG, MAX, MIN or DVT,

level(0),level(1),...,level(11)

Unit	dBm (mode = other than DVT), dB (mode = DVT), (0.01 dBm resolution)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
level	Measurement result in specified Storage mode

Example of Use

To query the Power vs. Time measurement result average:

PVT? AVG,0

> -10.00,-11.00-12.00,-13.00,-14.00,-15.00,-16.00,-17.00,-18.00,-19.00,-20.00,-21.00

PVT_DETAIL?

Power vs. Time Template Judgement Detail

Function

Queries Power vs. Time Template judgement for each measurement result

Query

```
PVT_DETAIL? [slot]
```

Response

type,judge(0),judge(1),...,judge(n–1)

Parameters

slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
type	Measurement target signal
GMSK	GMSK burst signal
8PSK	8PSK burst signal
NONE	Continuous signal
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
n	Judgement line number
Range	10 (type = GMSK)
	16 (type = 8PSK)
	Omitted (type = NONE)
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

judge is omitted when type = NONE, because judgement is not executed.

Example of Use

To query the Power vs. Time Template judgement for the measurement result for each line for Slot 0:

PVT_DETAIL? 0

> GMSK,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

PVT_DETAIL_STR?

Power vs time template storage Judgement Detail

Function

Queries measurement result at each judgment line of Power vs. Time Template judgment for each storage mode.

Query

```
PVT_DETAIL_STR? mode[,slot]
```

Response

type,judge(0),judge(1),...,judge(n-1)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
slot	slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
type	Measurement target signal
GMSK	GMSK burst signal
8PSK	8PSK burst signal
NONE	Continuous signal
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
n	Judgement line number
Range	10 (type = GMSK)
	16 (type = 8PSK)
	Omitted (type = NONE)
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query measurement result at each AVG judgement line of Power vs. Time Template judgement for Slot 0.

PVT_DETAIL_STR? AVG,0

> GMSK,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

PVT_OFFSET

Power vs. Time, Time Offset

Function

Sets or queries offset time to measure Power vs. Time

Command

```
PVT_OFFSET num,offset
```

Query

```
PVT_OFFSET? num
```

Response

offset

Unit	µs

Parameters

num	Offset number
Range	0 to 11
Resolution	1
offset	Offset time
Range	–48.0 to 594.0 µs
Resolution	0.1 µs
Default	–28.0 µs (for num = 0)
	–23.0 µs (for num = 1)
	–18.0 µs (for num = 2)
	–10.0 µs (for num = 3)
	–5.0 µs (for num = 4)
	0.0 µs (for num = 5)
	542.8 µs (for num = 6)
	547.8 µs (for num = 7)
	552.8 µs (for num = 8)
	560.8 µs (for num = 9)
	565.8 µs (for num = 10)
	570.8 µs (for num = 11)

Example of Use

To set the offset number 0 for Power vs. Time measurement to –28.0 µs:

PVT_OFFSET 0,-28.0

PVT_OFFSET? 0

> -28.0

5

Native Command Reference

PVT_SET

Power vs. Time Measurement On/Off and Count

Function

Enables Power vs. Time measurement and sets measurement count

Command

```
PVT_SET on_off[,count]
```

Query

```
PVT_SET?
```

Response

on_off,count

Details

The count can be omitted.

Parameters

on_off	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	ON
count	Measurement count
Range	1 to 1000
Resolution	1
Default	1

Details

The count can be omitted.

Example of Use

To enable Power vs. Time measurement and set the measurement count to 10:

PVT_SET ON,10

PVT_SET?

> ON,10

PVT_TEMPLATE?

Power vs. Time Template Judgement

Function

Queries Power vs. Time Template judgement measurement result

Query

```
PVT_TEMPLATE? [slot]
```

Response

judge

Parameters

slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Power vs. Time Template judgement measurement result for Slot 0:
PVT_TEMPLATE? 0
> PASS

PVT_TEMPLATE_STR?

Power vs time template storage

Function

To query measurement result of Power vs. Time Template judgment for each storage mode.

Query

```
PVT_TEMPLATE_STR? mode[,slot]
```

Response

When mode = TTL,
judge_ave,judge_max,judge_min
When mode = AVG, MAX or MIN,
judge

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
<slot>	Slot number
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
judge_ave	Judgment result of average
judge_max	Judgment result of maximum
judge_min	Judgment result of minimum
judge	Judgement result in specified Storage mode
PASS	Pass
FAIL	Fail
–	No measurement

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query AVG measurement result of Power vs. Time Template judgment for Slot 0.
PVT_TEMPLATE_STR? AVG,0
> PASS

PWR_SET

Power Measurement On/Off and Count

Function

Enables and queries Power measurement and sets 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 1000
Resolution	1
Default	1

Details

The count can be omitted.

Example of Use

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

PWR_SET ON,10

PWR_SET?

> ON,10

RATIO?

On/Off Ratio

Function

Queries ratio between burst-on section and burst-off section

Query

```
RATIO? mode[,slot]
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT,
level

Unit	dB, (0.01 dB resolution)

Parameters

mode	Mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
slot	Slot Number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
level	Measurement result in specified Storage mode

Example of Use

To query the on/off ratio measurement result average for Slot 0:
RATIO? AVG,0
> 40.00

RBWFLT

RBW Filter of Output RF Spectrum due to Modulation

Function

Sets or queries measurement filter bandwidth for offset frequency 1800 kHz and 2000 kHz at Output RF Spectrum (modulation part) measurement

Command

```
RBWFLT rbw
```

Query

```
RBWFLT?
```

Response

rbw

Parameter

rbw	Measurement filter bandwidth
30KHZ	30 kHz
100KHZ	100 kHz
Default	100KHZ

Example of Use

To set the RBW at Output RF Spectrum (modulation part) measurement to 100 kHz:

RBWFLT 100KHZ

RBWFLT?

> 100KHZ

REGMRXBTYPE1

Rx Sweep Burst Type List 1 (0 to 99)

Function

Sets or queries burst type of each step for Rx sweep

Command

```
REGMRXBTYPE1 type(0)[,type(1)[,…[,…,type(i)]…]]
```

Query

```
REGMRXBTYPE1?
```

Response

type(0),type(1),……,type(i)

Parameter

type(i)	Burst type of step number i
FCCH	Frequency correction burs
SCH	Synchronization burst
PRBS	Pseudo Random Bit Stream
FCCH_SCH	Frequency correction Synchronization burst
DUMMY	Dummy burst
FCCH_DUMMY	Frequency correction Dummy burst
SCH_DUMMY	Synchronization Dummy burst
FCCH_SCH_DUMMY	Frequency correction Synchronization Dummy burst
FCCH_DUMMY2	Frequency correction Dummy burst2
Default	type(0) = FCCH type(1) = SCH type(2) and subsequent ones = PRBS
i	Step number
Range	0 to 99

Details

The burst type can be set while the Rx Sweep is stopped.
The type(1) and subsequent types can be omitted. The previously set value is held for omitted steps

Example of Use

To set the Rx sweep frequency to Step 0 = FCCH and Step 1 = SCH:
REGMRXBTYPE1 FCCH,SCH
REGMRXBTYPE1?
> FCCH,SCH,PRBS,…,PRBS,PRB*
*: 100 items always returned without omitting

REGMRXBTYPE2

Rx Sweep Burst Type List 2 (25 to 49)

Function

Sets or queries burst type for each step of Rx sweep

Command

```
REGMRXBTYPE2 type(25)[,type(26)[,…[,…,type(i)]…]]
```

Query

```
REGMRXBTYPE2?
```

Response

type(25),type(26),……,type(i)

Parameter

type(i)	Burst type of step number i
FCCH	Frequency correction burs
SCH	Synchronization burst
PRBS	Pseudo Random Bit Stream
FCCH_SCH	Frequency correction Synchronization burst
DUMMY	Dummy burst
FCCH_DUMMY	Frequency correction Dummy burst
SCH_DUMMY	Synchronization Dummy burst
FCCH_SCH_DUMMY	Frequency correction Synchronization Dummy burst
FCCH_DUMMY2	Frequency correction Dummy burst2
Default	type(0) = FCCH
	type(1) = SCH
	type(2) and subsequent ones = PRBS
i	Step number
Range	25 to 49

Details

The burst type can be set while the Rx Sweep is stopped.
The <type(26)> and subsequent types can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the Rx sweep frequency to Step 25 = FCCH and Step 26 = SCH:
REGMRXBTYPE2 FCCH,SCH
REGMRXBTYPE2?
> FCCH,SCH,PRBS,…,PRBS,PRB*
*: 25 items always returned without omitting

5

Native Command Reference

REGMRXBTYPE3

Rx Sweep Burst Type List 3 (50 to 74)

Function

Sets or queries the burst type of each step for Rx sweep

Command

```
REGMRXBTYPE3 type(0)[,type(1)[,…[,…,type(i)]…]]
```

Query

```
REGMRXBTYPE3?
```

Response

type(50),type(51),……,type(i)

Parameter

type(i)	Burst type of the step number i
FCCH	Frequency correction burs
SCH	Synchronization burst
PRBS	Pseudo Random Bit Stream
FCCH_SCH	Frequency correction Synchronization burst
DUMMY	Dummy burst
FCCH_DUMMY	Frequency correction Dummy burst
SCH_DUMMY	Synchronization Dummy burst
FCCH_SCH_DUMMY	Frequency correction Synchronization Dummy burst
FCCH_DUMMY2	Frequency correction Dummy burst2
Default	type(0) = FCCH type(1) = SCH type(2) and subsequent ones = PRBS
i	Step number
Range	50 to 74

Details

The burst type can be set while the Rx Sweep is stopped.
The type(51) and subsequent ones can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the Rx sweep frequency to Step 50 = FCCH and Step 51 = SCH:
REGMRXBTYPE3 FCCH,SCH
REGMRXBTYPE3?
> FCCH,SCH,PRBS,…,PRBS,PRB*
*: 25 items always returned without omitting

REGMRXBTYPE4

Rx Sweep Burst Type List 4 (75 to 99)

Function

Sets or queries burst type of each step for Rx sweep

Command

```
REGMRXBTYPE4 type(75)[,type(76)[,…[,…,type(i)]…]]
```

Query

```
REGMRXBTYPE4?
```

Response

type(75),type(76),……,type(i)

Parameter

type(i)	Burst type of step number i
FCCH	Frequency correction burs
SCH	Synchronization burst
PRBS	Pseudo Random Bit Stream
FCCH_SCH	Frequency correction Synchronization burst
DUMMY	Dummy burst
FCCH_DUMMY	Frequency correction Dummy burst
SCH_DUMMY	Synchronization Dummy burst
FCCH_SCH_DUMMY	Frequency correction Synchronization Dummy burst
FCCH_DUMMY2	Frequency correction Dummy burst2
Default	type(0) = FCCH
	type(1) = SCH
	type(2) and subsequent ones = PRBS
i	Step number
Range	75 to 99

Details

The burst type can be set while the Rx Sweep is stopped.
The type(76) and subsequent types can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the Rx sweep frequency to Step 75 = FCCH and Step 76 = SCH:
REGMRXBTYPE4 FCCH,SCH
REGMRXBTYPE4?
> FCCH,SCH,PRBS,…,PRBS,PRB*
*: 25 items always returned without omitting

REGMRXFREQ1

Rx Sweep Frequency List 1 (0 to 99)

Function

Sets or queries frequency of each step (0 to 99) for Rx sweep

Command

```
REGMRXFREQ1 freq(0)[,freq(1)[,…[,…,freq(i)]…]]
```

Query

```
REGMRXFREQ1?
```

Response

freq(0),freq(1),……,freq(i)

Unit	MHz

Parameter

freq(i)	Frequency of step number i
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001 MHz
Suffix code	MHZ (uses MHz when omitted)
Default	935.200000 MHz
i	Step number
Range	0 to 99

Details

The frequency can be set while the Rx Sweep is stopped.
The freq(1) and subsequent frequencies can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the Rx sweep frequency to Step 0 = 935.2 MHz and Step 1 = 945.2 MHz:
REGMRXFREQ1 935.2,945.2
REGMRXFREQ1?
> 935.200000,945.200000,935.200000,…,935.200000,935.200000B*
*: 100 items always returned without omitting

REGMRXFREQ2

Rx Sweep Frequency List 2 (25 to 49)

Function

Sets or queries frequency of each step (25 to 49) for Rx sweep

Command

```
REGMRXFREQ2 freq(25)[,freq(26)[,…[,…,freq(i)]…]]
```

Query

```
REGMRXFREQ2?
```

Response

freq(25),freq(26),……,freq(i)

Unit	MHz

Parameter

freq(i)	Frequency of step number i
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001 MHz
Suffix code	MHZ (uses MHz when omitted)
Default	935.200000 MHz
i	Step number
Range	25 to 49

Details

The frequency can be set while the Rx Sweep is stopped.
The freq(26) and subsequent frequencies can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the Rx sweep frequency to Step 25 = 935.2 MHz and Step 26 = 945.2 MHz:
REGMRXFREQ2 935.2,945.2
REGMRXFREQ2?
935.200000,935.200000B*
*: 25 items always returned without omitting

REGMRXFREQ3

Rx Sweep Frequency List 3 (50 to 74)

Function

Sets or queries frequency of each step (50 to 74) for Rx sweep

Command

```
REGMRXFREQ3 freq(50)[,freq(51)[,…[,…,freq(i)]…]]
```

Query

```
REGMRXFREQ3?
```

Response

freq(50),freq(51),……,freq(i)

Unit	MHz

Parameter

freq(i)	Frequency of step number i
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001 MHz
Suffix code	MHZ
	MHZ (uses MHz when omitted)
Default	935.200000 MHz
i	Step number
Range	50 to 74

Details

The frequency can be set while the Rx Sweep is stopped.
The freq(51) and subsequent frequencies can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the Rx sweep frequency to Step 50 = 935.2 MHz and Step 51 = 945.2 MHz:
REGMRXFREQ3 935.2,945.2
REGMRXFREQ3?
> 935.200000,945.200000,935.200000,…,935.200000,935.200000B*
*: 25 items always returned without omitting

REGMRXFREQ4

Rx Sweep Frequency List 4 (75 to 99)

Function

Sets or queries frequency of each step (75 to 99) for Rx sweep

Command

```
REGMRXFREQ4 freq(75)[,freq(76)[,…[,…,freq(i)]…]]
```

Query

```
REGMRXFREQ4?
```

Response

freq(75),freq(76),……,freq(i)

Unit	MHz

Parameter

freq(i)	Frequency of step number i
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001 MHz
Suffix code	MHZ (uses MHz when omitted)
Default	935.200000 MHz
i	Step number
Range	75 to 99

Details

The frequency can be set while the Rx Sweep is stopped.
The freq(76) and subsequent frequencies can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the Rx sweep frequency to Step 75 = 935.2 MHz and Step 76 = 945.2 MHz:
REGMRXFREQ4 935.2,945.2
REGMRXFREQ4?
> 935.200000,945.200000,935.200000,…,935.200000,935.200000B*
*: 25 items always returned without omitting

REGMRXPCFG1

RX Sweep Output Level Configuration list 1 (0 to 99)

Function

Sets or queries output level of each step for Rx sweep

Command

```
REGMRXPCFG1 level(0)[,level(1)[,…[,…,level(i)]…]]
```

Query

```
REGMRXPCFG1?
```

Response

level(0), level(1),.......,level (i)

Unit	dBm

Parameter

level(i)		Output level of step number i
	Range	OFF, LIST1, LIST2, LIST3, LIST4, LIST5, LIST6, LIST7, LIST8 –130.0 to –10.0 dBm (Port1/Port2), OFF, –120.0 to 0.0 dBm (Port3/Port4)
	Resolution	0.1 dB
	Suffix code	DBM (uses dBm when omitted)
	Default	–55.0 dBm
i		Step number
	Range	0 to 99

Details

The output level can be set while the Rx Sweep is stopped.
The level(1) and subsequent levels can be omitted. All omitted steps are set to OFF.

When Cable Loss Calibration is ON, the cable loss is subtracted from the output level setting range.
When the cable loss is 5 dB, the setting range is –135.0 to –15.0 dBm (Port1/Port2).
Even in this case, the output level can be set to −10.0 dBm. But a judgment to determine whether the setting level is within the parameter range or not is performed when sending the following command:
RXSWP START
Therefore, this setting results in an error.

Example of Use

To set each step for Rx sweep with the output level below:
step0 = –55 dBm, step 1 to step 5 = -45 dBm
REGMRXPCFG1 -55,-45,-45,-45,-45,-45
REGMRXPCFG1?
> -55.0, -45.0, -45.0,…, -45.0, -45.0*
*: 100 items always returned without omitting

REGMRXPCFG2

RX Sweep Output Level Configuration list 2 (25 to 49)

Function

Sets or queries output level of each step for Rx sweep

Command

```
REGMRXPCFG2 level(25)[,level(26)[,…[,…,level(i)]…]]
```

Query

```
REGMRXPCFG2?
```

Response

level(25), level(26),.......,level (i)

Unit	dBm

Parameter

level(i)	Output level of step number i
Range	OFF, LIST1, LIST2, LIST3, LIST4, LIST5, LIST6, LIST7, LIST8 –130.0 to –10.0 dBm (Port1/Port2), OFF, –120.0 to 0.0 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–55.0 dBm
i	Step number
Range	25 to 49

Details

The output level can be set while the Rx Sweep is stopped.
The level(26) and subsequent levels can be omitted. All omitted steps are set to OFF.

When Cable Loss Calibration is ON, the cable loss is subtracted from the output level setting range.
When the cable loss is 5 dB, the setting range is –135.0 to –15.0 dBm (Port1/Port2).
Even in this case, the output level can be set to −10.0 dBm. But a judgment to determine whether the setting level is within the parameter range or not is performed when sending the following command:
RXSWP START
Therefore, this setting results in an error.

Example of Use

To set each step for Rx sweep with the output level below:
step 25 = -55 dBm, step 26 to step 30 = -45 dBm
REGMRXPCFG2 -55,-45,-45,-45,-45,-45
REGMRXPCFG2?
> -55.0,-45.0,-45.0,-45.0,-45.0,-45.0*
*: 25 items always returned without omitting

REGMRXPCFG3

RX Sweep Output Level Configuration list 3 (50 to 74)

Function

RX Sweep Output Level Configuration list 3 (50 to 74)

Command

```
REGMRXPCFG3 level(50)[,level(51)[,…[,…,level(i)]…]]
```

Query

```
REGMRXPCFG3?
```

Response

level(50), level(51),.......,level (i)

Unit	dBm

Parameter

level(i)	Output level of step number i
Range	OFF, LIST1, LIST2, LIST3, LIST4, LIST5, LIST6, LIST7, LIST8 –130.0 to –10.0 dBm (Port1/Port2), OFF, –120.0 to 0.0 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–55.0 dBm
i	Step number
Range	50 to 74

Details

The output level can be set while the Rx Sweep is stopped.
The level(51) and subsequent levels can be omitted. All omitted steps are set to OFF.

When Cable Loss Calibration is ON, the cable loss is subtracted from the output level setting range.
When the cable loss is 5 dB, the setting range is –135.0 to –15.0 dBm (Port1/Port2).
Even in this case, the output level can be set to −10.0 dBm. But a judgment to determine whether the setting level is within the parameter range or not is performed when sending the following command:
RXSWP START
Therefore, this setting results in an error.

Example of Use

To set each step for Rx sweep with the output level below:
step50 = -55 dBm, step 51 to step 55 = -45 dBm
REGMRXPCFG3 -55,-45,-45,-45,-45,-45
REGMRXPCFG3?
> -55.0,-45.0,-45.0,-45.0,-45.0,-45.0

REGMRXPCFG4

RX Sweep Output Level Configuration list 4 (75 to 99)

Function

Sets or queries output level of each step for Rx sweep

Command

```
REGMRXPCFG4 level(75)[,level(76)[,…[,…,level(i)]…]]
```

Query

```
REGMRXPCFG4?
```

Response

level(75), level(76),.......,level (i)

Unit	dBm

Parameters

level(i)	Output level of step number i
Range	OFF, LIST1, LIST2, LIST3, LIST4, LIST5, LIST6, LIST7, LIST8 –130.0 to –10.00 dBm (Port1/Port2), OFF, –120.0 to 0.0 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–55.0 dBm
i	Step number
Range	75 to 99

Details

The output level can be set while the Rx Sweep is stopped.
The level(76) and subsequent levels can be omitted. All omitted steps are set to OFF.

When Cable Loss Calibration is ON, the cable loss is subtracted from the output level setting range.
When the cable loss is 5 dB, the setting range is –135.0 to –5.0 dBm (Port1/Port2).
Even in this case, the output level can be set to −10.0 dBm. But a judgment to determine whether the setting level is within the parameter range or not is performed when sending the following command:
RXSWP START
Therefore, this setting results in an error.

Example of Use

To set each step for Rx sweep with the output level below:
Step75 = -55 dBm, step 76 to step 80 = -45 dBm
REGMRXPCFG4 -55,-45,-45,-45,-45,-45
REGMRXPCFG4?
> -55.0,-45.0,-45.0,…,-45.0,-45.0*
*: 25 items always returned when omitted

REGMRXPWR

RX Sweep Output Level List

Function

Sets or queries output level list of each slot for Rx sweep

Command

```
REGMRXPWR list,level(0),level(1),…,level(i)
```

Query

```
REGMRXPWR? list
```

Response

```
level(0),level(1),level(2),level(3),level(4),level(5),level(6)
```

Parameters

list	Output level list of each slot
Range	LIST1, LIST2, LIST3, LIST4, LIST5, LIST6, LIST7, LIST8
level(i)	
Range	OFF, –130.0 to –10.0 dBm, (Port1/Port2) OFF, –120.0 to 0.0 dBm, (Port3/Port4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	–55.0 dBm
i	Slot number
Range	0 to 6
Resolution	1
Default	1

Details

The output level list can be set while the Rx Sweep is stopped.

Example of Use

To set LIST1 with the output level of each slot for Rx sweep:
To set slot0 = –55 dBm, slot1 to slot5 = -45 dBm, and slot6 = OFF
REGMRXPWR LIST1,-55,-45,-45,-45,-45,-45,OFF
REGMRXPWR? LIST1
> -55.0,-45.0,-45.0,-45.0,-45.0,-45.0,OFF

REGMTXFREQ1

TX Sweep Frequency List 1 (0 to 99)

Function

Sets or queries input frequency of each step for Tx sweep measurement

Command

```
REGMTXFREQ1 freq(0)[,freq(1)[,…[,…,freq(i)]…]]
```

Query

```
REGMTXFREQ1?
```

Response

freq(0),freq(1),……,freq(i)

Unit	MHz

Parameter

freq(i)	Frequency of the step number i
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	890.200000
i	Step number
Range	0 to 99

Details

The freq(1) and subsequent frequencies can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the frequency of each step for Tx sweep to Step 0 = 890.2 MHz and Step 1 = 895.2 MHz:

REGMTXFREQ1 890.2,895.2

REGMTXFREQ1?

> 890.200000,895.200000,890.200000,…,890.200000,890.200000*

*: 100 items always returned when omitted

REGMTXFREQ2

TX Sweep Frequency List 2 (25 to 49)

Function

Sets or queries input frequency of each step for Tx sweep measurement

Command

```
REGMTXFREQ2 freq(25)[,freq(26)[,…[,…,freq(i)]…]]
```

Query

```
REGMTXFREQ2?
```

Response

freq(25),freq(26),……,freq(i)

Unit	MHz

Parameter

freq(i)	Frequency of step number i
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	890.200000
i	Step number
Range	25 to 49

Details

The freq(26) and subsequent frequency can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the frequency of each step for Tx sweep to Step 25 = 890.2 MHz and Step 26 = 895.2 MHz:

REGMTXFREQ2 890.2,895.2

REGMTXFREQ2?

> 890.200000,895.200000,890.200000,…,890.200000,890.200000*

*: 25 items always returned when omitted

REGMTXFREQ3

TX Sweep Frequency List 3 (50 to 74)

Function

Sets or queries input frequency of each step for Tx sweep measurement

Command

```
REGMTXFREQ3 freq(50)[,freq(51)[,…[,…,freq(i)]…]]
```

Query

```
REGMTXFREQ3?
```

Response

freq(50),freq(51),……,freq(i)

Unit	MHz

Parameter

freq(i)	Frequency of step number i
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	890.200000
i	Step number
Range	50 to 74

Details

The freq(51) and subsequent frequencies can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the frequency of each step for Tx sweep to Step 50 = 890.2 MHz and Step 51 = 895.2 MHz

REGMTXFREQ3 890.2,895.2

REGMTXFREQ3?

> 890.200000,895.200000,890.200000,…,890.200000,890.200000*

*: 25 items always returned when omitted

5

Native Command Reference

REGMTXFREQ4

TX Sweep Frequency List 4 (75 to 99)

Function

Sets or queries input frequency of each step for Tx sweep measurement

Command

```
REGMTXFREQ4 freq(75)[,freq(76)[,…[,…,freq(i)]…]]
```

Query

```
REGMTXFREQ4?
```

Response

freq(75),freq(76),……,freq(i)

Unit	MHz

Parameter

freq(i)	Frequency of the step number i
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	890.200000
i	Step number
Range	75 to 99

Details

The freq(76) and subsequent frequencies can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the frequency of each step for Tx sweep to Step 75 = 890.2 MHz and Step 76 = 895.2 MHz:

REGMTXFREQ4 890.2,895.2

REGMTXFREQ4?

> 890.200000,895.200000,890.200000,…,890.200000,890.200000*

*: 25 items always returned when omitted

RF

Measurement Band, Expected Power Control Level and Measuring Object

Function

Sets or queries measurement signal band, Power Control Level, and measurement target signal

Command

```
RF band,pcl,object
```

Query

```
RF?
```

Response

band,pcl,object

Parameters

band	Measurement band
GSM850	GSM850 (GSM450, GSM480, GSM850)
GSM900	GSM900 (P-GSM900, E-GSM900, R-GSM900)
DCS1800	DCS1800
PCS1900	PCS1900
Default	GSM900
pcl	Power Control Level
Range	0 to 31
Resolution	1
Default	8
object	Measurement target signal
GMSK	Sets GMSK burst signal as measurement target
8PSK	Sets 8PSK burst signal as measurement target
Default	GMSK

Details

This command sets the measurement signal band, Power Control Level, and measurement target signal. The band and Power Control Level are used to determine the Power vs. Time measurement and Output RF Spectrum measurement judgement value.
The input level changes in conjunction with the power control level.
If the power control level is set to 16 to 29 when the system combination is PCS1900 and TCH channel is 512 to 810, an error occurs and all the set values are not changed.

Example of Use

To set the measurement signal band, Power Control Level, and measurement target signal to GSM900, 8, and GMSK, respectively:

RF GSM900,8,GMSK

RF?

> GSM900,8,GMSK

Related Commands

Measurement signal band setting

BAND

Measurement signal Power Control Level setting

PCL

Measurement target signal setting

MEASOBJ

RXFREQ

TCH Downlink Frequency

Function

Sets or queries TCH Downlink frequency

Command

```
RXFREQ freq
```

Query

```
RXFREQ?
```

Response

freq

Unit	Hz

Parameter

freq	TCH Downlink frequency
Range	400000000 to 3800000000 Hz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	935200000 Hz

Details

Changing the setting of the downlink frequency does not change the setting of the TCH channel.
When modulation is OFF, the frequency is output as the TCH Downlink Frequency.

Example of Use

To set the TCH Downlink frequency to 935.2 MHz:
RXFREQ 935200000
RXFREQ?
> 935200000

RXSWP

RX Sweep Start/Stop

Function

Starts/stops Rx sweep at High-Speed Adjustment measurement

Command

```
RXSWP start_stop
```

Query

```
RXSWP?
```

Response

start_stop

Parameter

start_stop	Starts/stops Rx sweep
START	Starts Rx sweep
STOP	Stops Rx sweep
Default	STOP

Details

This command can be executed when Measurement select is set to High-Speed adjustment. The Rx sweep is stopped when Measurement select is changed from High-Speed Adjustment to another value.

Example of Use

To start the Rx sweep:

RXSWP START

RXSWP?

> START

RXSWPREPEAT1

Rx Sweep Repeat Number List 1 (0 to 99)

Function

Sets or queries number of repetition steps included in Rx sweep steps

Command

```
RXSWPREPEAT1 n(0)[,n(1)[,…[,…,n(i)]…]]
```

Query

```
RXSWPREPEAT1?
```

Response

n(0),n(0),……,n(i)

Parameter

n(i)		Number of repetition frames of step number i
	Range	1 to 26
	Resolution	1
	Default	1
i		Step number
	Range	0 to 99

Details

The number can be set while the Rx Sweep is stopped.
The n(1) and subsequent numbers can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the number of repetition frames for Rx sweep to Step 2 = 5, Step 3 = 5, and other steps = 1:

RXSWPREPEAT1 1,1,5,5,1
RXSWPREPEAT1?
> 1,1,5,5,1,1,…,1,1,1, ,*
*: 100 items always returned when omitted

RXSWPREPEAT2

Rx Sweep Repeat Number List 2 (25 to 49)

Function

Sets or queries number of repetition steps included in Rx sweep steps

Command

```
RXSWPREPEAT2 n(25)[,n(26)[,…[,…,n(i)]…]]
```

Query

```
RXSWPREPEAT2?
```

Response

n(25),n(26),……,n(i)

Parameter

n(i)	Number of repetition frames of step number i
Range	1 to 26
Resolution	1
Default	1
i	Step number
Range	25 to 49

Details

The number can be set while the Rx Sweep is stopped.
The n(26) and subsequent numbers can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the number of repetition frames for Rx sweep to Step 27 = 5, Step 28 = 5, and other steps = 1

RXSWPREPEAT2 1,1,5,5,1

RXSWPREPEAT2?

> 1,1,5,5,1,1,…,1,1,1,*

*: 25 items always returned when omitted

RXSWPREPEAT3

Rx Sweep Repeat Number List 3 (50 to 74)

Function

Sets or queries number of repetition steps included in Rx sweep steps

Command

```
RXSWPREPEAT3 n(50)[,n(51)[,…[,…,n(i)]…]]
```

Query

```
RXSWPREPEAT3?
```

Response

n(50),n(51),……,n(i)

Parameter

n(i)	Number of repetition frames of step number i
Range	1 to 26
Resolution	1
Default	1
i	Step number
Range	50 to 74

Details

The number can be set while the Rx Sweep is stopped.
The n(51) and subsequent numbers can be omitted. The previously set value is held for omitted steps

Example of Use

To set the number of repetition frames for Rx sweep to Step 52 = 5, Step 53 = 5, and other steps = 1:
RXSWPREPEAT3 1,1,5,5,1
RXSWPREPEAT3?
> 1,1,5,5,1,1,…,1,1,1,*
*: 25 items always returned when omitted

RXSWPREPEAT4

Rx Sweep Repeat Number List 4 (75 to 99)

Function

Sets or queries number of repetition steps included in Rx sweep steps

Command

```
RXSWPREPEAT4 n(75)[,n(76)[,…[,…,n(i)]…]]
```

Query

```
RXSWPREPEAT4?
```

Response

n(75),n(76),……,n(i)

Parameter

n(i)	Number of repetition frames of step number i
Range	1 to 26
Resolution	1
Default	1
i	Step number
Range	75 to 99

Details

The number can be set while the Rx Sweep is stopped.
The n(76) and subsequent numbers can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the number of repetition frames for Rx sweep to Step 77 = 5, Step 78 = 5, and other steps = 1:
RXSWPREPEAT4 1,1,5,5,1
RXSWPREPEAT4?
> 1,1,5,5,1,1,…,1,1,1,*
*: 25 items always returned when omitted

RXSWPSTEPS

RX Sweep Number of Steps

Function

Sets or queries step count for Rx sweep execution at High-Speed Adjustment measurement

Command

```
RXSWPSTEPS n
```

Query

```
RXSWPSTEPS?
```

Response

n

Parameter

n		Number of execution steps
	Range	1 to 100
	Resolution	1
	Default	1

Details

This command can be executed when Measurement Select is set to High-Speed Adjustment.
The number can be set while the Rx Sweep is stopped.

Example of Use

To set the number of execution steps for the Rx sweep to 10
RXSWPSTEPS 10
RXSWPSTEPS?
> 10

SYSCMB

System Combination

Function

Sets or queries GSM system used for overlapping channel numbers (ARFCN)

Command

```
SYSCMB system
```

Query

```
SYSCMB?
```

Response

system

Parameter

system	System
DCS1800	DCS1800 (Measurement Band: DCS1800, GSM900)
PCS1900	PCS1900 (Measurement Band: PCS1900, GSM850)
Default	DCS1800

Details

When the CCH and TCH Channel is set, if the channel number (ARFCN) overlaps, the selected system determines the frequency of CCH Downlink, TCH Downlink, or TCH Uplink. The setting changes according to the system combination change as the table below.

<table>
<tr><th rowspan="2">System Combination Change</th><th colspan="2">Setting</th><th colspan="4">Setting Change</th></tr>
<tr><th>Channel</th><th>PCL</th><th>Channel</th><th>Band</th><th>PCL</th><th>ILVL</th></tr>
<tr><td rowspan="2">Change to DCS1800</td><td>512 to 885</td><td></td><td></td><td>DCS1800</td><td></td><td></td></tr>
<tr><td>Except 512 to 885</td><td></td><td></td><td>GSM900</td><td></td><td></td></tr>
<tr><td rowspan="5">Change to PCS1900</td><td>811 to 885</td><td></td><td>810</td><td>PCS1900</td><td></td><td>Change*</td></tr>
<tr><td>512 to 810</td><td></td><td></td><td>PCS1900</td><td></td><td></td></tr>
<tr><td rowspan="2">512 to 885</td><td>16 to 22</td><td></td><td>PCS1900</td><td>15</td><td>Change*</td></tr>
<tr><td>23 to 29</td><td></td><td>PCS1900</td><td>30</td><td>Change*</td></tr>
<tr><td>Except 512 to 885</td><td></td><td></td><td>GSM850</td><td></td><td></td></tr>
</table>

*: When the input level control is PCL, the ILVL is changed according to the PCL value.

For the relation of PCL value with ILVL, refer to Table 2.1.8-1 PCL and Input Level.

Example of Use

To set the GSM system to DCS1800:

SYSCMB DCS1800

SYSCMB?

> DCS1800

TERR?

Time Alignment

Function

Queries Time Alignment measurement result

Query

```
TERR? mode[,slot]
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT,
value

Unit	bit (0.01 bit resolution)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
value	Measurement result in specified Storage mode

Example of Use

To query the Time Alignment measurement result average for Slot 0:
TERR? AVG,0
> 0.01

TERR_WORST?

Time Alignment Worst Value

Function

Queries Time Alignment measurement result worst value

Query

```
TERR_WORST? [slot]
```

Response

value

Unit	bit (0.01 bit resolution)

Parameters

slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
value	Measurement result

Example of Use

To query the Time Alignment measurement result worst value for Slot 0:

TERR_WORST? 0

> 0.10

TESTPAT

TCH Test Pattern

Function

Sets or queries TCH test pattern.

Command

```
TESTPAT pattern
```

Query

```
TESTPAT?
```

Response

pattern

Parameter

pattern	Test Pattern
PAT1	PAT1

Example of Use

To query TCH test pattern.

TESTPAT?

> PAT1

Remarks

TCH test pattern setup is not required for the MX887012A.

This command is to keep compatibility with the existing model MT8820C.

TRGTOUT

Trigger Timeout

Function

Sets or queries trigger timeout time

Command

```
TRGTOUT time
```

Query

```
TRGTOUT?
```

Response

time

Unit	s

Parameter

time	Timeout time
Range	1 to 10 s
Resolution	1 s
Suffix code	S, MS, US, NS (uses s when omitted)
Default	10 s

Example of Use

To set the trigger timeout time to 10 seconds:

TRGTOUT 10

TRGTOUT?

> 10

TSC

Uplink Training Sequence

Function

Sets or queries Uplink Training Sequence code

Command

```
TSC tsc
```

Query

```
TSC?
```

Response

tsc

Parameter

tsc	Uplink training sequence code
TSC0	TSC0 data pattern = 0x0970897
TSC1	TSC1 data pattern = 0x0B778B7
TSC2	TSC2 data pattern = 0x10EE90E
TSC3	TSC3 data pattern = 0x11ED11E
TSC4	TSC4 data pattern = 0x13AC13A
TSC5	TSC5 data pattern = 0x29F629F
TSC6	TSC6 data pattern = 0x29F629F
TSC7	TSC7 data pattern = 0x3BC4BBC
Default	TSC0

Example of Use

To set the Uplink training sequence code to TSC2:

TSC TSC2

TSC?

> TSC2

TSLOT

TCH Slot

Function

Sets or queries number of slot where trigger detected

It is the reference for Time Alignment measurement.

Command

```
TSLOT slot
```

Query

```
TSLOT?
```

Response

slot

Parameter

slot	Slot number
Range	0 to 7
Resolution	1
Default	2

Example of Use

To set the slot number for the trigger detection to 2:

TSLOT 2

TSLOT?

> 2

TTL_BER?

Bit Error Rate - Total

Function

Queries Pass/Fail judgment result, bit error rate, error bit number, received bit number, or sample bit number.

Query

```
TTL_BER? type
```

Response

judge,rate,n1,n2,n3

Resolution 1

Parameters

type	Measurement type
FAST	High speed measurement
SRBLB	SRB loopback measurement
Default	FAST
judge	Pass/Fail judgment result
9	Reserved: Result is always 9.
rate	Bit error rate
n1	Error bit number
Resolution	1
n2	Received bit number
Resolution	1
n3	Sample bit number
Resolution	1

Example of Use

To query Pass/Fail judgment result, bit error rate, error bit number, received bit number, or sample bit number.

TTL_BER? FAST

> 9,10.00,10,100,100

Remarks

When an error has occurred in the measurement (the response of MSTAT? is 2, 4, 5, or 12) or before the measurement starts, the response is shown as below.

9,999.99,-1,-1,0

TXFREQ

TCH Uplink Frequency

Function

Sets or queries TCH Uplink frequency

Command

```
TXFREQ freq
```

Query

```
TXFREQ?
```

Response

freq

Unit	Hz

Parameter

freq	TCH Uplink Frequency
Range	400000000 to 3800000000 Hz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	890200000 Hz

Details

Changing the setting of the uplink frequency does not change the setting of the TCH channel.

Example of Use

To set the TCH Uplink frequency to 890.2 MHz:

TXFREQ 890200000

TXFREQ?

> 890200000

TXIQ?

TX IQ

Function

Queries result of Power measurement at each point of 0 Hz, ±67.708 kHz, ±135.416 kHz, ±203.125 kHz, and ±270.833 kHz with reference to measurement frequency

Query

```
TXIQ? mode[,slot]
```

Response

level(0),level(1),...,level(freq)

Unit	dBm (0.01 dB resolution)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
level	Measurement result in specified Storage mode
freq	Offset frequency from center frequency
Range	0 to 8: Offset frequency (kHz) –270.833, –203.125, –135.416, –67.708, Center frequency, +67.708, +135.416, +203.125, +270.833
Resolution	1

Details

The measurement is executed only when the measurement target is CW.

Example of Use

To query the TX IQ measurement result average for Slot 0:

EVM95PCT? 0

> -20.00,-19.00,-18.00,-17.00,-10.00,-17.00,-18.00,-19.00,-20.00

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Native Command Reference

TXPWR?

Tx Power

Function

Queries Tx Power measurement result

Query

```
TXPWR? mode[,slot]
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT,
level
When mode = IND,
n,level(0),level(1),...,level(n–1)

n = measurement count × measurement slot number when slot omitted
n = measurement count when slot not omitted

Unit	dBm (mode = other than DVT), dB (mode = DVT), (0.01 dB resolution)

Parameters

mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
DVT	Standard deviation
IND	All measurement results (time-series display)
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
level	Measurement result in specified Storage mode

Details

When <mode> is set to IND, if the slot is omitted, the time-series measurement results are output for all slots.

Example of Use

To query the Tx Power measurement result average for Slot 0:
TXPWR? AVG,0
> -10.00

TXSWP_AVG_TXPWR?

TX Sweep Average TX Power

Function

Queries average of measurement result for each slot at Tx sweep measurement

Query

```
TXSWP_AVG_TXPWR?
```

Response

p(0),p(1),……,p(n×7–1)

Unit dBm

Parameter

Transmit power of each slot
Resolution 0.01 dB
n Number of measured steps

Details

When the frame measurement count is set to twice or more, the measured value of each slot in the frame is the average of the result measured for the measurement count.

Example of Use

To query the average of measurement result of each slot in the Tx sweep measurement:
TXSWP_AVG_TXPWR?
>

TXSWP_STAT?

TX Sweep Measurement Status

Function

Queries measurement status of each step in Tx Sweep measurement

Query

```
TXSWP_STAT?
```

Response

s(0),s(1),……,s(n–1)

Parameter

s(n–1)	Measurement status of each step
0	Ended normally
2	Over level
9	Measurement in progress or not measured
12	Timeout
n	Number of measured steps

Example of Use

To query the measurement status of each step:

TXSWP_STAT?

> 2

TXSWPSTEPS

TX Sweep Number of Step

Function

Sets or queries number of execution steps for Tx sweep

Command

```
TXSWPSTEPS n
```

Query

```
TXSWPSTEPS?
```

Response

n

Parameter

n		Number of execution steps
	Range	1 to 100
	Resolution	1
	Default	1

Example of Use

To set the number of measurement sequence steps for Tx sweep to 10:

TXSWPSTEPS 10

TXSWPSTEPS?

> 10

TXSWPREPEAT1

TX Sweep Repeat Number List 1 (0 to 99)

Function

Sets or queries frame measurement count at each step for Tx sweep measurement

Command

```
TXSWPREPEAT1 n(0)[,n(1)[,…[,…,n(i)]…]]
```

Query

```
TXSWPREPEAT1?
```

Response

n(0),n(0),……,n(i)

Parameter

n(i)	Number of repetition frames of step number i
Range	1 to 100
Resolution	1
Default	1
i	Step number
Range	0 to 99

Details

The n(1) and subsequent numbers can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement count for Tx sweep measurement to Step 2 = 5, Step 3 = 5, and other steps = 1:

RXSWPREPEAT1 1,1,5,5,1

RXSWPREPEAT1?

> 1,1,5,5,1,1,…,1,1,1,*

*: 100 items always returned when omitted

TXSWPREPEAT2

TX Sweep Repeat Number List 2 (25 to 49)

Function

Sets or queries frame measurement count at each step for Tx sweep measurement

Command

```
TXSWPREPEAT2 n(25)[,n(26)[,…[,…,n(i)]…]]
```

Query

```
TXSWPREPEAT2?
```

Response

n(25),n(26),……,n(i)

Parameter

n(i)	Number of repetition frames of step number i
Range	1 to 100
Resolution	1
Default	1
i	Step number
Range	25 to 49

Details

The n(26) and subsequent numbers can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement count for Tx sweep measurement to Step 27 = 5, Step 28 = 5, and other steps = 1:

RXSWPREPEAT2 1,1,5,5,1

RXSWPREPEAT2?

> 1,1,5,5,1,1,…,1,1,1,*

*: 25 items always returned when omitted

TXSWPREPEAT3

TX Sweep Repeat Number List 3 (50 to 74)

Function

Sets or queries frame measurement count at each step for Tx sweep measurement

Command

```
TXSWPREPEAT3 n(50)[,n(51)[,…[,…,n(i)]…]]
```

Query

```
TXSWPREPEAT3?
```

Response

n(50),n(51),……,n(i)

Parameter

n(i)	Number of repetition frames of step number i
Range	1 to 100
Resolution	1
Default	1
i	Step number
Range	50 to 74

Details

The n(50) and subsequent numbers can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement count for Tx sweep measurement to Step 52 = 5, Step 53 = 5, and other steps = 1:

RXSWPREPEAT3 1,1,5,5,1

RXSWPREPEAT3?

> 1,1,5,5,1,1,…,1,1,1,*

*: 25 items always returned when omitted

TXSWPREPEAT4

TX Sweep Repeat Number List 4 (75 to 99)

Function

Sets or queries frame measurement count at each step for Tx sweep measurement

Command

```
TXSWPREPEAT4 n(75)[,n(76)[,…[,…,n(i)]…]]
```

Query

```
TXSWPREPEAT4?
```

Response

n(75),n(76),……,n(i)

Parameter

n(i)	Number of repetition frames of step number i
Range	1 to 100
Resolution	1
Default	1
i	Step number
Range	75 to 99

Details

The n(76) and subsequent numbers can be omitted. The previously set value is held for omitted steps.

Example of Use

To set the measurement count for Tx sweep measurement to Step 77 = 5, Step 78 = 5, and other steps = 1:

RXSWPREPEAT4 1,1,5,5,1

RXSWPREPEAT4?

> 1,1,5,5,1,1,…,1,1,1,*

*: 25 items always returned when omitted

ULFREQ

TCH Uplink Frequency

Function

Sets or queries TCH Uplink frequency

Command

```
ULFREQ freq
```

Query

```
ULFREQ?
```

Response

freq

Unit	Hz

Parameter

freq	TCH Uplink Frequency
Range	400000000 to 3800000000 Hz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	890200000 Hz

Details

Changing the setting of the uplink frequency does not change the setting of the TCH channel.

Example of Use

To set the TCH Uplink frequency to 890.2 MHz:

ULFREQ 890200000

ULFREQ?

> 890200000

WAVEFMEAS?

Graph Data

Function

Queries waveform data for graph display

Query

```
WAVEFMEAS? format,start,n[,slot]
```

Response

data(0),data(1),...,data(n–1)

Unit	dBm (format 1,2,3)
Resolution	0.01 dB (format 1,2,3)
Unit	None (format 4,5)
Resolution	0.0001 (format 4,5)
Unit	degree (format 6,7,8)
Resolution	0.01 deg (format 6,7,8)
Unit	% (format 9 to 14)
Resolution	0.01 % (format 9 to 14)
Unit	None (format 15)
Resolution	1 (format 15)

Parameters

format	Output data Format
1	Tx Power Average
2	Tx Power Max. Hold
3	Tx Power Min. Hold
4	IQ Constellation I phase
5	IQ Constellation Q phase
6	Phase Error Average
7	Phase Error Max. Hold
8	Phase Error Min. Hold
9	Magnitude Error Average
10	Magnitude Error Max. Hold
11	Magnitude Error Min. Hold
12	EVM Average
13	EVM Max. Hold
14	EVM Min. Hold
15	Demodulation Data

start		Start point of waveform data
	Range	–216 to 10216 (format 1,2,3)
		0 to 882 (format 4 to 11), when the measurement target is GMSK and CW
		0 to 147 (format 4 to 14), when the measurement target is 8PSK
		0 to 147 (format 15)
	Resolution	1
n		Number of data to read
	Range	1 to 10433 = (10216 – start), (format 1,2,3)
		1 to 883 = (883 – start), (format 4 to 11), when the measurement target is GMSK and CW
		1 to 148 = (148 – start), (format 4 to 14), when the measurement target is 8PSK
		1 to 148 = (148 – start), (format 15)
	Resolution	1
slot		Slot number
	Range	0 to 7, (uses 0 when omitted, omitted for format 1,2,3)
	Resolution	1
data		Waveform data corresponding to Format

Details

The settable range and arguments vary according to the output data Format.

Example of Use

To query the Tx Power measurement result average for Slot 0:
WAVEFMEAS? 1,-216,10433,0
> -20.1,-20.2,-21.2,…,-22.2

To query the Peak Error (GMSK) measurement result average for Slot 0
WAVEFMEAS? 6,0,883,0
> 1.25,1.22,1.23,…,1.35

5.2.3 Sequence measurement commands

DLFREQ

TCH Downlink Frequency

Function

Sets or queries TCH Downlink frequency

Command

```
DLFREQ freq
```

Query

```
DLFREQ?
```

Response

freq

Unit	Hz

Parameter

freq	TCH Downlink frequency
Range	400000000 to 3800000000 Hz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	935200000 Hz

Details

Changing the setting of the downlink frequency does not change the setting of the TCH channel.
When Modulation is OFF, the frequency is output as the TCH Downlink Frequency.

Example of Use

To set the TCH Downlink frequency to 935.2 MHz:
DLFREQ 935200000
DLFREQ?
> 935200000

GSM_ASLOTS

Number of Active Slot

Function

Sets or queries number of slots to be measured

Command

```
GSM_ASLOTS mcond,a
```

Query

```
GSM_ASLOTS? mcond
```

Response

a

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
a	Number of slots
Range	1 to 8
Resolution	1
Default	1

Details

Measurement is turned on for the specified number of slots counting from Slot 0.

Example of Use

To enable measurement for three slots from Slot 0 to Slot 2 with the Measurement Condition Number 0:

GSM_ASLOTS 0,3

GSM_ASLOTS? 0

> 3

GSM_BAND

Measurement Band

Function

Sets or queries band to measure

Command

```
GSM_BAND mcond,band
```

Query

```
GSM_BAND? mcond
```

Response

band

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
band	Measurement band
GSM850	GSM850 (GSM450, GSM480, GSM850)
GSM900	GSM900 (P-GSM900, E-GSM900, R-GSM900)
DCS1800	DCS1800
PCS1900	PCS1900
Default	GSM900

Details

This command sets the band to be measured. This value is used to determine the Power vs. Time measurement and Output RF Spectrum measurement judgement value.

Example of Use

To set the band to be measured with the Measurement Condition Number 0 to GSM900:

GSM_BAND 0,GSM900

GSM_BAND? 0

> GSM900

GSM_CFERR?

Carrier Frequency Error

Function

Queries Carrier Frequency Error measurement result

Query

```
GSM_CFERR? seg,mode[,slot]
```

Response

When mode = TTL,

avg_ppm,avg_hz,max_ppm,max_hz,min_ppm,min_hz

When mode = AVG, MAX, MIN or DVT,

freq_ppm,freq_hz

Unit	ppm (0.01 ppm resolution), Hz (0.1 Hz resolution)

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
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg_ppm	Average in ppm
avg_hz	Average in Hz
max_ppm	Maximum in ppm
max_hz	Maximum in Hz
min_ppm	Minimum in ppm
min_hz	Maximum in Hz
req_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 for Slot 0 in Segment 0:

GSM_CFERR? 0,AVG,0

> 0.12,1.5

GSM_CFERR_WORST?

Carrier Frequency Error Worst Value

Function

Queries worst value of Carrier Frequency Error measurement result

Query

```
GSM_CFERR_WORST? seg[,slot]
```

Response

freq_ppm,freq_hz

Unit	ppm (0.01 ppm resolution), Hz (0.1 Hz resolution)

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
freq_ppm	Worst value in Carrier Frequency Error measurement results in ppm
freq_hz	Worst value in Carrier Frequency Error measurement results in Hz

Example of Use

To query the worst value in the Carrier Frequency Error measurement results for Slot 0 in Segment 0:

GSM_CFERR_WORST? 0,0

> 0.12,1.5

GSM_CFREQ?

Carrier Frequency

Function

Queries Carrier Frequency measurement result

Query

```
GSM_CFREQ? seg[,slot]
```

Response

freq

Unit	Hz (1 Hz resolution)

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
freq	Carrier frequency

Example of Use

To query the Carrier Frequency measurement result for Slot 0 in Segment 0:

GSM_CFREQ? 0,0

> 890200000

GSM_ESTPWR?

Estimated Power

Function

Queries 8PSK Estimated Power measurement result

Query

```
GSM_ESTPWR? seg,mode[,slot]
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT,
level
When mode = IND,
n,level(0),level(1),...level(n–1)

n = measurement count × measurement slot number when slot omitted
n = measurement count when slot not omitted

Unit	dBm (mode = other than DVT), dB (mode = DVT), (0.01 dBm resolution)

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	All measurement results (time-series display)
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1

avg	Average
max	Maximum
min	Minimum
level	Measurement result in specified Storage mode

Details

When <mode> is set to IND, if the slot is omitted, the time-series measurement results are output for all slots.
Only 8PSK signals support this measurement.

Example of Use

To query the 8PSK Estimated Power measurement result average for Slot 0 in Segment 0:
GSM_ESTPWR? 0,AVG,0
> -20.00

GSM_EVM?

EVM

Function

Queries EVM measurement result

Query

```
GSM_EVM? seg,mode[,slot]
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT,
percent
When mode = IND,
n,percent(0),percent(1),...,percent(n–1)

n = measurement count × measurement slot number when slot omitted
n = measurement count when slot not omitted

Unit	% (0.01% resolution)

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	All measurement results (time-series display)
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
percent	Measurement result in specified Storage mode

Details

Only 8PSK signals support this measurement.
When <mode> is set to IND, if the slot is omitted, the time-series measurement results are output for all slots.

Example of Use

To query the EVM measurement result average for Slot 0 in Segment 0:
GSM_EVM? 0,AVG,0
> 1.05

GSM_EVM95PCT?

95th Percentile

Function

Queries EVM measurement result with probability distribution of 95%

Query

```
GSM_EVM95PCT? seg[,slot]
```

Response

percent	
Unit	% (0.01% resolution)

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
percent	EVM with probability distribution of 95%

Details

Only 8PSK signals support this measurement.

Example of Use

To query the 95th Percentile measurement result for Slot 0 in Segment 0:
GSM_EVM95PCT? 0,0
> 2.01

GSM_IQIMB?

IQ Imbalance

Function

Queries IQ Imbalance measurement result

Query

```
GSM_IQIMB? seg,mode[,slot]
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT,
value

Unit	dB (0.01 dB resolution)

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
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
value	Measurement result in specified Storage mode

Example of Use

To query the IQ Imbalance measurement result average for Slot 0 in Segment 0:
GSM_IQIMB? 0,AVG,0
> 1.05

GSM_MAGERR?

Magnitude Error

Function

Queries Magnitude Error measurement result

Query

```
GSM_MAGERR? seg,mode[,slot]
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT,
percent

Unit	% (0.01% resolution)

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
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
percent	Measurement result in specified Storage mode

Example of Use

To query the Magnitude Error measurement result average for Slot 0 in Segment 0:
GSM_MAGERR? 0,AVG,0
> 1.02

GSM_MEAS_OFF

Turn Off All Measurement Items

Function

Sets all measurement items to Off collectively.

Command

```
GSM_MEAS_OFF mcond
```

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1

Example of Use

To set all measurement items of number 0 to Off collectively.

GSM_MEAS_OFF 0

GSM_MOD

Measuring Object

Function

Sets or queries measurement target signal

Command

```
GSM_MOD mcond,object
```

Query

```
GSM_MOD? mcond
```

Response

```
object
```

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
object	Measurement target signal
GMSK	Sets GMSK burst signal as measurement target
8PSK	Sets 8PSK burst signal as measurement target
CONT	Sets GMSK Continuous signal as measurement target
Default	GMSK

Example of Use

To set the measurement target with the measurement condition number 0 to GMSK:

GSM_MOD 0,GMSK

GSM_MOD? 0

> GMSK

GSM_MOD_SET

Modulation Analysis On/Off and Count

Function

Enables Modulation Analysis and sets or queries measurement count

Command

```
GSM_MOD_SET mcond,on_off[,count]
```

Query

```
GSM_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	ON
count	Measurement count
Range	1 to 200
Resolution	1
Default	1

Example of Use

To enable Modulation Analysis for Measurement Condition Number 0 and set the measurement count to 10:

GSM_MOD_SET 0,ON,10

GSM_MOD_SET? 0

> ON,10

GSM_ORFS_SET

Output RF Spectrum Measurement On/Off and Count

Function

Enables Output RF Spectrum measurement and sets or queries measurement count

Command

```
GSM_ORFS_SET mcond,on_off[,count]
```

Query

```
GSM_ORFS_SET? mcond
```

Response

on_off,count

Parameters

mcond	Measurement Condition
Range	0 to 1999
Resolution	1
on_off	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	ON
count	Measurement count
Range	1 to 200
Resolution	1
Default	1

Example of Use

To enable RF Spectrum measurement output for Measurement Condition 0 and set the measurement count to 10:

GSM_ORFS_SET 0,ON,10

GSM_ORFS_SET? 0

> ON,10

GSM_ORFSMD_JUDGE?

Output RF Spectrum Due to Modulation Judgement

Function

Queries Output RF Spectrum (modulation part) judgement result

Query

```
GSM_ORFSMD_JUDGE? seg[,slot]
```

Response

judge

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (modulation part) judgement result for Slot 0 in Segment 0:

GSM_ORFSMD_JUDGE? 0,0

> PASS

GSM_ORFSMD_JUDGE_L?

Output RF Spectrum Due to Modulation Judgement of Each Frequency Point (Lower Side)

Function

Queries Output RF Spectrum (modulation part, lower side) for each frequency point judgement result

Query

```
GSM_ORFSMD_JUDGE_L? seg[,slot]
```

Response

judge(1),judge(2),...,judge(freq)

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
freq	Offset frequency from the center frequency
Range	1 to 12
	1 to 12: Offset frequency (kHz) –100, –200, –250, –400, –600, –800, –1000, –1200, –1400, –1600, –1800, –2000
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level

Example of Use

To query the Output RF Spectrum (modulation part, lower side) for each frequency point judgement result for Slot 0 in Segment 0:

GSM_ORFSMD_JUDGE_L? 0,0

> PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

GSM_ORFSMD_JUDGE_U?

Output RF Spectrum Due to Modulation Judgement of Each Frequency Point (Upper Side)

Function

Queries Output RF Spectrum (modulation part, upper side) for each frequency point judgement result

Query

```
GSM_ORFSMD_JUDGE_U? seg[,slot]
```

Response

judge(1),judge(2),...,judge(freq)

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
freq	Offset frequency from center frequency
Range	1 to 12 1 to 12: Offset frequency (kHz) +100, +200, +250, +400, +600, +800, +1000, +1200, +1400, +1600, +1800, +2000
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (modulation part, upper side) for each frequency point judgement result for Slot 0 in Segment 0:

GSM_ORFSMD_JUDGE_U? 0,0

> PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

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Native Command Reference

GSM_ORFSMD_L?

Output RF Spectrum Due to Modulation (Lower Side)

Function

Queries Output RF Spectrum (modulation part, lower side) measurement result

Query

```
GSM_ORFSMD_L? seg,mode[,slot]
```

Response

When mode = TTL,

avg(0),avg(1),...,avg(freq),max(0),max(1),...,max(freq),min(0),min(1),...,min(freq)

When mode = AVG, MAX, MIN or DVT,

level(0),level(1),...,level(freq)

Unit	dBm (mode = other than DVT and freq = 0), dB (other than left description), (0.01 dB resolution)

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
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
level	Measurement result in specified Storage mode
freq	Offset frequency from center frequency
Range	0 to 12 0: Center frequency 1 to 12: Offset frequency (kHz) –100, –200, –250, –400, –600, –800, –1000, –1200, –1400, –1600, –1800, –2000
Resolution	1

Example of Use

To query the Output RF Spectrum (modulation part, lower side) measurement result average for Slot 0:

GSM_ORFSMD_L? 0,AVG,0

> -20.00,-1.00,-2.00,-3.00,-4.00,-5.00,-6.00,-7.00,-8.00,-9.00,-10.00,-11.00,-12.00

GSM_ORFSMD_U?

Output RF Spectrum Due to Modulation (Upper Side)

Function

Queries Output RF Spectrum (modulation part, upper side) of measurement result

Query

```
GSM_ORFSMD_U? seg,mode[,slot]
```

Response

When mode = TTL,

avg(0),avg(1),...,avg(freq),max(0),max(1),...,max(freq),min(0),min(1),...,min(freq)

When mode = AVG, MAX, MIN or DVT,

level(0),level(1),...,level(freq)

Unit	dBm (mode = other than DVT and freq = 0), dB (other than the left description), (0.01 dB resolution)

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
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
level	Measurement result in specified Storage mode
freq	Offset frequency from center frequency
Range	0 to 12 0: Center frequency 1 to 12: Offset frequency (kHz) +100, +200, +250, +400, +600, +800, +1000, +1200, +1400, +1600, +1800, +2000
Resolution	1

Example of Use

To query the Output RF Spectrum (modulation part, upper side) measurement result average for Slot 0 in Segment 0:

GSM_ORFSMD_U? 0,AVG,0

> -20.00,-1.00,-2.00,-3.00,-4.00,-5.00,-6.00,-7.00,-8.00,-9.00,-10.00,-11.00,-12.00

GSM_ORFSSW_JUDGE?

Output RF Spectrum Due to Switching Judgement

Function

Queries Output RF Spectrum (transient part) judgement result

Query

```
GSM_ORFSSW_JUDGE? seg[,slot]
```

Response

judge

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (transient part) judgement result for Slot 0 in Segment 0:

GSM_ORFSSW_JUDGE? 0,0

> PASS

GSM_ORFSSW_JUDGE_L?

Output RF Spectrum Due to Switching Judgement of Each Frequency Point (Lower Side)

Function

Queries Output RF Spectrum (transient part, lower side) for each frequency point judgement result

Query

```
GSM_ORFSSW_JUDGE_L? seg[,slot]
```

Response

judge(1),judge(2),...,judge(freq)

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
freq	Offset frequency from center frequency
Range	1 to 12
	1 to 12: Offset frequency (kHz) –100, –200, –250, –400, –600, –800, –1000, –1200, –1400, –1600, –1800, –2000
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (transient part, lower side) each frequency point judgement result for Slot 0 in Segment 0:

GSM_ORFSSW_JUDGE_L? 0,0

> PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

GSM_ORFSSW_JUDGE_U?

Output RF Spectrum Due to Switching Judgement of Each Frequency Point (Upper Side)

Function

Queries Output RF Spectrum (transient part, upper side) for each frequency point judgement result

Query

```
GSM_ORFSSW_JUDGE_U? seg[,slot]
```

Response

judge(1),judge(2),...,judge(freq)

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
freq	Offset frequency from center frequency
Range	1 to 12 1 to 12: Offset frequency (kHz) +100, +200, +250, +400, +600, +800, +1000, +1200, +1400, +1600, +1800, +2000
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Output RF Spectrum (transient part, upper side) each frequency point judgement result for Slot 0 in Segment 0:

GSM_ORFSSW_JUDGE_U? 0,0

> PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

GSM_ORFSSW_L?

Output RF Spectrum Due to Switching (Lower Side)

Function

Queries Output RF Spectrum (transient part, lower side) measurement result

Query

```
GSM_ORFSSW_L? seg,mode[,slot]
```

Response

When mode = TTL,
avg(0),avg(1),...,avg(freq),max(0),max(1),...,max(freq),min(0),min(1),...,min(freq)
When mode = AVG, MAX, MIN or DVT,
level(0),level(1),...,level(freq)

Unit	dBm (mode = other than DVT), dB (other than left description), (0.01 dB resolution)

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
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
level	Measurement result in specified Storage mode
freq	Offset frequency from center frequency
Range	0 to 12 0: Center frequency 1 to 12: Offset frequency (kHz) –100, –200, –250, –400, –600, –800, –1000, –1200, –1400, –1600, –1800, –2000
Resolution	1

Example of Use

To query the Output RF Spectrum (transient part, lower side) measurement result average for Slot 0 in Segment 0:

GSM_ORFSSW_L? 0,AVG,0

> -20.00,-1.00,-2.00,-3.00,-4.00,-5.00,-6.00,-7.00,-8.00,-9.00,-10.00,-11.00,-12.00

GSM_ORFSSW_U?

Output RF Spectrum Due to Switching (Upper Side)

Function

Queries Output RF Spectrum (transient part, upper side) measurement result

Query

```
GSM_ORFSSW_U? seg,mode[,slot]
```

Response

When mode = TTL,

avg(0),avg(1),...,avg(freq),max(0),max(1),...,max(freq),min(0),min(1),...,min(freq)

When mode = AVG, MAX, MIN or DVT,

level(0),level(1),...,level(freq)

Unit	dBm (mode = other than DVT and freq = 0), dB (other than left description), (0.01 dB resolution)

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
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
level	Measurement result in specified Storage mode
freq	Offset frequency from center frequency

Range	0 to 12 0: Center frequency 1 to 12: Offset frequency (kHz) +100, +200, +250, +400, +600, +800, +1000, +1200, +1400, +1600, +1800, +2000
Resolution	1

Example of Use

To query the Output RF Spectrum (transient part, upper side) measurement result average for Slot 0 in Segment 0:

GSM_ORFSSW_U? 0,AVG,0

> -20.00,-1.00,-2.00,-3.00,-4.00,-5.00,-6.00,-7.00,-8.00,-9.00,-10.00,-11.00,-12.00

GSM_ORGNOFS?

Origin Offset

Function

Queries Origin Offset measurement result

Query

```
GSM_ORGNOFS? seg,mode[,slot]
```

Response

When mode = TTL,

avg,max,min

When mode = AVG, MAX, MIN or DVT,

value

Unit	dB (0.01 dB resolution)

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
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
value	Measurement result in specified Storage mode

Example of Use

To query the Origin Offset measurement result average for Slot 0 in Segment 0:

GSM_ORGNOFS? 0,AVG,0

> 0.25

GSM_PCL

Expected Power Control Level

Function

Sets or queries measurement signal Power Control Level

Command

```
GSM_PCL mcond,pcl
```

Query

```
GSM_PCL? mcond
```

Response

pcl

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
pcl	Power Control Level
Range	0 to 31
Resolution	1
Default	8

Details

This command sets the measurement signal Power Control Level. This value is used to determine the Power vs. Time measurement and Output RF Spectrum measurement judgement value.
Also, for the PCS1900Band setting, set 15 when the Power Control Level is set to 16 to 21, and set 30 when the Power Control Level is set to 22 to 29 to judge the Power vs. Time measurement and Output RF Spectrum measurement.

Example of Use

To set the Power Control Level of the input signal with the Measurement Condition Number 0 to 8:
GSM_PCL 0,8
GSM_PCL? 0
> 8

GSM_PEVM?

Peak EVM

Function

Queries Peak EVM measurement result

Query

```
GSM_PEVM? seg,mode[,slot]
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT,
percent

Unit	% (0.01% resolution)

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
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
percent	Measurement result in specified Storage mode

Details

Only 8PSK signals support this measurement.

Example of Use

To query the Peak EVM measurement result average for Slot 0 in Segment 0:
GSM_PEVM? 0,AVG,0
> 3.01

GSM_PHASEERR?

RMS Phase Error

Function

Queries RMS Phase Error measurement result

Query

```
GSM_PHASEERR? seg,mode[,slot]
```

Response

When mode = TTL,

avg,max,min

When mode = AVG, MAX, MIN or DVT,

deg

Unit	degree (0.01 deg resolution)

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
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
deg	Measurement result in specified Storage mode

Example of Use

To query the RMS Phase Error measurement result average for Slot 0 in Segment 0:

GSM_PHASEERR? 0,AVG,0

> 1.05

GSM_PPHASEERR?

Peak Phase Error

Function

Queries Peak Phase Error measurement result

Query

```
GSM_PPHASEERR? seg,mode[,slot]
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT,
deg

Unit	degree (0.01 deg resolution)

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
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
deg	Measurement result in specified Storage mode

Example of Use

To query the Peak Phase Error measurement result average for Slot 0 in Segment 0:
GSM_PPHASEERR? 0,AVG,0
> 1.03

GSM_PVT?

Power vs. Time

Function

Queries Power vs. Time measurement result

Query

```
GSM_PVT? seg,mode[,slot]
```

Response

When mode = TTL,
avg(0),avg(1),...,avg(11),max(0),max(1),...,max(11),min(0),min(1),...,min(11)
When mode = AVG, MAX, MIN or DVT,
level(0),level(1),...,level(11)

Unit	dBm (mode = other than DVT), dB (mode = DVT), (0.01 dBm resolution)

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
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
level	Measurement result in specified Storage mode

Example of Use

To query the Power vs. Time measurement result average for Slot 0 in Segment 0:
GSM_PVT? 0,AVG,0
> -10.00,-11.00-12.00,-13.00,-14.00,-15.00,-16.00,-17.00,-18.00,-19.00,-20.00,-21.00

GSM_PVT_DETAIL?

Power vs. Time Template Judgement Detail

Function

Queries Power vs. Time Template judgement each judgement line measurement result

Query

```
GSM_PVT_DETAIL? seg[,slot]
```

Response

type,judge(0),judge(1),...,judge(n–1)

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
type	Measurement target signal
GMSK	GMSK burst signal
8PSK	8PSK burst signal
NONE	Continuous signal
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
n	Judgement line number
Range	10 (type = GMSK)
	16 (type = 8PSK)
	Omitted (type = NONE)
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.
judge is omitted for type = NONE, because no judgement is executed.

Example of Use

To query the Power vs. Time Template judgement for each judgement line of the measurement result for Slot 0 in Segment 0:
GSM_PVT_DETAIL? 0,0
> GMSK,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS

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Native Command Reference

GSM_PVT_DETAIL_STR?

Power vs time template storage Judgement Detail

Function

Queries measurement result at each judgment line of Power vs. Time Template judgment for each storage mode.

Query

```
GSM_PVT_DETAIL_STR? seg,mode[,slot]
```

Response

type,judge(0),judge(1),...,judge(n-1)

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
type	Measurement target signal
GMSK	GMSK burst signal
8PSK	8PSK burst signal
NONE	Continuous signal
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement
n	Judgement line number
Range	10 (type = GMSK)
	16 (type = 8PSK)
	Omitted (type = NONE)
Resolution	1

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query measurement result (average) at each judgment line of Power vs. Time Template judgment for Slot 0 in Segment 1.

GSM_PVT_DETAIL_STR? 1,AVG,0

> GMSK,PASS,PASS,PASS,PASS,PASS,PASS,PASS,PASS,FAIL,PASS

GSM_PVT_OFFSET

Power vs. Time, Time Offset

Function

Sets or queries offset time to measure Power vs. Time

Command

```
GSM_PVT_OFFSET num,offset
```

Query

```
GSM_PVT_OFFSET? num
```

Response

offset

Unit	μs

Parameters

num	Offset number
Range	0 to 11
Resolution	1
offset	Offset time
Range	–48.0 to 594.0 μs
Resolution	0.1 μs
Default	–28.0 μs (for num = 0)
	–23.0 μs (for num = 1)
	–18.0 μs (for num = 2)
	–10.0 μsec (for num = 3)
	–5.0 μs (for num = 4)
	0.0 μs (for num = 5)
	542.8 μs (for num = 6)
	547.8 μs (for num = 7)
	552.8 μs (for num = 8)
	560.8 μs (for num = 9)
	565.8 μs (for num = 10)
	570.8 μs (for num = 11)

Example of Use

To set the offset number 0 for Power vs. Time measurement to –28.0 μs:

GSM_PVT_OFFSET 0,-28.0

GSM_PVT_OFFSET? 0

> -28.0

GSM_PVT_SET

Power vs. Time Measurement On/Off and Count

Function

Enables Power vs. Time measurement and sets or queries measurement count

Command

```
GSM_PVT_SET mcond,on_off[,count]
```

Query

```
GSM_PVT_SET? mcond
```

Response

on_off,count

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
on_off	Enables/disables measurement
ON	Enables measurement
OFF	Disables measurement
Default	ON
count	Measurement count
Range	1 to 200
Resolution	1
Default	1

Example of Use

To enable Power vs. Time measurement for Measurement Condition Number 0 and set the measurement count to 10:

GSM_PVT_SET 0,ON,10

GSM_PVT_SET? 0

> ON,10

GSM_PVT_TEMPLATE?

Power vs. Time Template Judgement

Function

Queries Power vs. Time Template judgement measurement result

Query

```
GSM_PVT_TEMPLATE? seg[,slot]
```

Response

judge

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
judge	Judgement result
PASS	Pass
FAIL	Fail
–	No measurement

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query the Power vs. Time Template judgement measurement result for Slot 0 in Segment 0:

GSM_PVT_TEMPLATE? 0,0

> PASS

GSM_PVT_TEMPLATE_STR?

Power vs time template storage Judgement

Function

Queries measurement result of Power vs. Time Template judgment for each storage mode.

Query

```
GSM_PVT_TEMPLATE_STR? seg,mode[,slot]
```

Response

When mode = TTL,
avg,max,min
judge_ave,judge_max,judge_min
When mode = AVG, MAX or MIN,
judge

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
mode	Storage mode
AVG	Average
MAX	Maximum
MIN	Minimum
TTL	Average・Maximum・Minimum
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
judge_ave	Judgment result of average
judge_max	Judgment result of maximum
judge_min	Judgment result of minimum
judge	Judgement result in specified Storage mode
PASS	Pass
FAIL	Fail
–	No measurement

Details

The judgement value is calculated using the Measurement Band and Expected Power Control Level.

Example of Use

To query measurement result (average) of Power vs. Time Template judgment for Slot 0 in Segment 2.

GSM_PVT_TEMPLATE_STR? 2,AVG,0
> PASS

GSM_PWR_SET

Power Measurement On/Off and Count

Function

Enables and queries power measurement and sets or queries measurement count

Command

```
GSM_PWR_SET mcond,on_off[,count]
```

Query

```
GSM_PWR_SET? mcond
```

Response

on_off,count

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
on_off	Enables/disables measurement
ON	Executes measurement
OFF	Does not execute measurement
Default	ON
count	Measurement count
Range	1 to 200
Resolution	1
Default	1

Example of Use

To enable Power measurement for Measurement Condition Number 0 and set the measurement count to 10:

GSM_PWR_SET 0,ON,10

GSM_PWR_SET? 0

> ON,10

GSM_RBWFLT

RBW Filter of Output RF Spectrum due to Modulation

Function

Sets or queries measurement filter bandwidth for offset frequency 1800 kHz and 2000 kHz at Output RF Spectrum (modulation part) measurement

Command

```
GSM_RBWFLT rbw
```

Query

```
GSM_RBWFLT?
```

Response

rbw

Parameter

rbw	Measurement filter bandwidth
30KHZ	30 kHz
100KHZ	100 kHz
Default	100KHZ

Example of Use

To set the RBW at Output RF Spectrum (modulation part) measurement to 100 kHz:

GSM_RBWFLT 100KHZ
GSM_RBWFLT?
> 100KHZ

GSM_RF

Measurement Band, Expected Power Control Level and Measuring Object

Function

Sets or queries measurement signal band, Power Control Level, and measurement target signal

Command

```
GSM_RF mcond,band,pcl,object
```

Query

```
GSM_RF? mcond
```

Response

band,pcl,object

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
band	Measurement band
GSM850	GSM850 (GSM450, GSM480, GSM850)
GSM900	GSM900 (P-GSM900, E-GSM900, R-GSM900)
DCS1800	DCS1800
PCS1900	PCS1900
Default	GSM900
pcl	Power Control Level
Range	0 to 31
Resolution	1
Default	8
object	Measurement target signal
GMSK	Sets GMSK burst signal as measurement target
8PSK	Sets 8PSK burst signal as measurement target
Default	GMSK

Details

This command sets the measurement signal band, Power Control Level, and measurement target signal. The band and Power Control Level are used to determine the Power vs. Time measurement and Output RF Spectrum measurement judgement value.
The input level changes in conjunction with the power control level.
If the power control level is set to 16 to 29 when the system combination is PCS1900 and TCH channel is 512 to 810, an error occurs and all the set values are not changed.

Example of Use

To set the band, Power Control Level, and measurement target signal of the measurement signal with Measurement Condition Number 0 to GSM900, 8, and GMSK, respectively:

GSM_RF 0,GSM900,8,GMSK
GSM_RF? 0
> GSM900,8,GMSK

Related Commands

Measurement signal band setting
GSM_BAND

Measurement signal Power Control Level setting
GSM_PCL

Measurement target signal setting
GSM_MOD

GSM_TERR?

Time Alignment

Function

Queries Time Alignment measurement result

Query

```
GSM_TERR? seg,mode[,slot]
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT,
value

Unit	bit (0.01 bit resolution)

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
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
value	Measurement result in specified Storage mode

Example of Use

To query the Time Alignment measurement result average for Slot 0 in Segment 0:
GSM_TERR? 0,AVG,0
> 0.01

GSM_TERR_WORST?

Time Alignment Worst Value

Function

Queries worst value of Time Alignment measurement result

Query

```
GSM_TERR_WORST? seg[,slot]
```

Response

value

Unit	bit (0.01 bit resolution)

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
value	Measurement result

Example of Use

To query the worst value of the Time Alignment measurement result for Slot 0 in Segment 0:

GSM_TERR_WORST? 0,0

> 0.10

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Native Command Reference

GSM_TSC

Uplink Training Sequence

Function

Sets or queries Uplink training sequence code

Command

```
GSM_TSC tsc
```

Query

```
GSM_TSC?
```

Response

tsc

Parameter

tsc	Uplink training sequence code
TSC0	TSC0 data pattern = 0x0970897
TSC1	TSC1 data pattern = 0x0B778B7
TSC2	TSC2 data pattern = 0x10EE90E
TSC3	TSC3 data pattern = 0x11ED11E
TSC4	TSC4 data pattern = 0x13AC13A
TSC5	TSC5 data pattern = 0x29F629F
TSC6	TSC6 data pattern = 0x29F629F
TSC7	TSC7 data pattern = 0x3BC4BBC
Default	TSC0

Example of Use

To set the Uplink training sequence to TSC2:

GSM_TSC TSC2

GSM_TSC?

> TSC2

GSM_TSLOT

TCH Slot

Function

Sets or queries number of slot where trigger detected
It is the reference for Time Alignment measurement.

Command

```
GSM_TSLOT mcond,slot
```

Query

```
GSM_TSLOT? mcond
```

Response

slot

Parameters

mcond	Measurement condition number
Range	0 to 1999
Resolution	1
slot	Slot number
Range	0 to 7
Resolution	1
Default	2

Example of Use

To set the number of the slot where the trigger is detected with the Measurement Condition Number 0 to 2:

GSM_TSLOT 0,2
GSM_TSLOT? 0
> 2

GSM_TXPWR?

Tx Power

Function

Queries Tx Power measurement result

Query

```
GSM_TXPWR? seg,mode[,slot]
```

Response

When mode = TTL,
avg,max,min
When mode = AVG, MAX, MIN or DVT,
level
When mode = IND,
n,level(0),level(1),...level(n-1)

n = measurement count × measurement slot number when slot omitted
n = measurement count when slot not omitted

Unit	dBm (mode = other than DVT), dB (mode = DVT), (0.01 dB resolution)

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	All measurement results (time-series display)
slot	Slot number
Range	0 to 7, (uses 0 when omitted)
Resolution	1
avg	Average
max	Maximum
min	Minimum
level	Measurement result in specified Storage mode

Details

When <mode> is set to IND, if the slot is omitted, the time-series measurement results are output for all slots.

Example of Use

To query the Tx Power measurement result average for Slot 0 in Segment 0:

GSM_TXPWR? 0,AVG,0

> -10.00

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	–30.0 to +35.0 dBm (Port 1/Port 2)
	–30.0 to +25.0 dBm (Port 3/Port 4)
Resolution	0.1 dB
Suffix code	DBM (uses dBm when omitted)
Default	27.0 dBm

Details

The setting range varies with the input port setting.

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

When the cable loss is 5 dB, the Port1/Port2 setting range is –25.0 to +40.0 dBm.

Example of Use

To set the input level to –10 dBm:

ILVL -10

ILVL?

> -10.0

Related Commands

EXTLOSSW

LOSSTBL

LOSSTBLVAL

For details of the commands, refer to Chapter 6 “Native Command Reference” in the *MU887000A TRX Test Module Operation Manual*.

OLVL

Output Level

Function

Sets or queries RF signal output level for all slots

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 –60 dBm:
OLVL -60
OLVL?
> -60

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*.

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Native Command Reference

RXFREQ

TCH Downlink Frequency

Function

Sets or queries TCH Downlink frequency

Command

```
RXFREQ freq
```

Query

```
RXFREQ?
```

Response

freq

Unit	Hz

Parameter

freq	TCH Downlink frequency
Range	400000000 to 3800000000 Hz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	935200000 Hz

Details

Changing the setting of the downlink frequency does not change the setting of the TCH channel.
When Modulation is OFF, the frequency is output as the TCH Downlink Frequency.

Example of Use

To set the TCH Downlink frequency to 935.2 MHz:
RXFREQ 935200000
RXFREQ?
> 935200000

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 20,52
SEQCTRL?
> 20,52

SEQCTRLTX

Sequence Control Parameter - Sequence Control

Function

Sets or queries start and stop segments in sequence table.

Sets the measurement parameters only, without affecting the signal transmission parameters.

Command

```
SEQCTRLTX start,end
```

Query

```
SEQCTRLTX?
```

Response

```
start,end
```

Parameters

start	Start segment
Range	0 to 1999
Resolution	1
Default	0
end	Stop segment
Range	start to 1999
Resolution	1
Default	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 setting information of sequence table

Query

`SEQERR? [item]`

Response

Query parameter	Response
None:	n,err(0),..,err(n–1)
ILVL, OLVL, STEP, DLPAT, PORT:	ns,seg(0),..,seg(ns–1)
LEN:	e,mem,exe,set
OLVLNUM, PATNUM, STDNUM:	e,exe,set

If no error is found in the sequence table, the response returns 0.

Parameters

item		Parameter in sequence table
	ILVL	Input level
	OLVL	Output level
	STEP	Number of Steps
	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 which contain errors
	Range	0 to 2000
Seg(n-1)		Segment number with errors
	Range	0 to 1999
e		Presence of errors
	Range	0 No error, executable
		1 Errors found, not executable
mem		Memory utilization
	Range	0.0% to 100.0%

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Native Command Reference

Resolution	0.1%
exe	Number of segments capable of executing capture in number of configured segments
Range	0 to 2000
set	Number 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

Examples of Use

To query the presence of errors:

SEQERR?

>1,ILVL

To query the input level setting error information

SEQERR? ILVL

>2,3,12

To query the capture memory error information:

SEQERR? LEN

>0,25.0,20,20

Here, the capture memory utilization is 25.0%, so all captures configured in 20 segments are executable.

Remarks

Sequence measurement cannot be started if there are errors.

However, the sequence can be started if segment numbers with errors are excluded from the execution range using the SEQCTRL command.

SEQERR2?

Sequence Parameter Information - Error Check

Function

Queries setting error information of sequence table

Query

```
SEQERR2? format
```

Response

n,err(0),..,err(n-1)
If no error is found in the sequence table, the response returns 0.

Parameters

format	Format
1	Error check 1
n	Number of errors
Range	0 to 7
err(n-1)	Parameter with errors
ILVL	Input level
OLVL	Output level
STEP	Step count
DLPAT	Waveform Pattern
PORT	Port
LEN	Capture memory length
OLVLNUM	Output level change count
PATNUM	Waveform pattern change count
STDNUM	Measurement mode change count

Details

Parameter setting errors can be checked up to seven types.
Only one of output level change count, waveform pattern change count, or measurement mode change count has an error.
Two or three of them cannot have an error simultaneously.

To set parameters for sequence table using the following commands, errors are not checked.
SEQTRX, SEQTX, SEQMEAS, SEQSGPORT
To query error details of each parameter, use SEQERR command.

Examples of Use

To query the presence of errors:
SEQERR2? 1
>2,ILVL,DLPAT

Remarks

Sequence measurement cannot be started if there are errors.
However, sequence measurement can be started if segment numbers with errors are excluded from the execution range using the SEQCTRL command.

SEQEXECTX

Start Signal Analyzer Measurement Only

Function

Sets only the parameters for the specified measurement and executes measurement, without affecting the signal transmission parameters.

Command

```
SEQEXECTX
```

SEQMEAS

Sequence Table Parameter - Measurement

Function

Sets or queries measurement conditions of specified segment

Command

```
SEQMEAS seg,mode,step,mcond
```

Query

```
SEQMEAS? seg
```

Response

mode,step,mcond

Parameters

seg	Segment Number	
Range	0 to 1999	
Resolution	1	
mode	Measurement mode	Required software license
TXP	Tx Power measurement mode	MX887010A
WCDMA	W-CDMA measurement mode	MX887010A and MX887011A
GSM	GSM measurement mode	MX887010A and MX887012A
CDMA2K	CDMA2000 1x measurement mode	MX887010A and MX887015A
EVDO	CDMA2000 1xEVDO measurement mode	MX887010A and MX887016A
TDSCDMA	TD-SCDMA measurement mode	MX887010A and MX887017A
LTE	LTE measurement mode	MX887010A and MX887013A, or MX887010A and MX887014A
Default	TXP	
step	Step count	
Range	2 to 3000	
Resolution	1	
Default	2	
mcond	Measurement Condition Number	
Range	0 to 1999	
Resolution	1	
Default	0	

Example of Use

To set settings for segment 2 as follows:
Measurement mode: GSM, Step count: 10, Measurement condition number: 3

```
SEQMEAS 2,GSM,10,3
SEQMEAS? 2
> GSM,10,3
```

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Native Command Reference

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
n	Number of measured segments
Range	0 to 2000
s(n-1)	Measurement status of specified segment
0	Measurement completed successfully
2	Over level
3	Under level
4	Measurement failed
5	Synchronization word not detected
9	Measurement in progress or not measured
10	Segment not measured
12	Tx measurement timeout

Example of Use

To query the status of 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 at the fifth segment.

Related Commands

MSTAT

SEQSEGSTAT

SEQPROGRESS?

Sequence Progress

Function

Queries progress ratio and executing sequence number at sequence measurement

Query

```
SEQPROGRESS?
```

Parameter

p,cur,start,end

Parameters

p	Progress ratio at sequence measurement
Range	0% to 100%
cur	Currently executed segment number
Range	0 to 1999
start	First executed segment number
Range	0 to 1999
end	Last executed segment number
Range	0 to 1999

Example of Use

To query the progress ratio and executing sequence number at sequence measurement:
SEQPROGRESS?
>65,23,11,30

Remarks

The first and last executed segment numbers are the same as the start and stop segment numbers specified by 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, queries setting

- Downlink frequency
- Output level
- Output signal pattern
- Uplink frequency
- Input level

Command

```
SEQREINIT sw
```

Query

```
SEQREINIT?
```

Response

sw

Parameter

sw	Automatic initialization after sequence measurement completion
ON	On
OFF	Off
Default	ON

Details

If the parameter is set to ON, the settings are initialized to the values configured by the following commands after sequence measurement completion.

Downlink frequency	DLFREQ
Output level	OLVL
Output signal pattern	DLPAT
Uplink frequency	ULFREQ
Input level	ILVL

If the parameter is set to OFF, the settings remain those of the sequence measurement stop segment.

Example of Use

To enable initialization after sequence measurement completion:

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
Resolution	1
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

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

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
Suffix Code	NS, US, MS, S (uses ms when omitted)
Default	0.000 ms

Details

The trigger slope and trigger level are enabled when the 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
SEQTRG 2,PWR,RISE,-30,0
SEQTRG? 2
> PWR,RISE,-30,0.000

Remarks

Trigger level is defined as the level difference from the input level specified by the following commands.
ILVL, SEQTRX

SEQTRX

Sequence Table Parameter - TRX Control

Function

Sets or queries following items in specific segment of sequence table

- Downlink frequency
- Output level
- Output signal pattern
- Uplink frequency
- Input level

Command

```
SEQTRX seg,ul_freq,ref,dl_freq,level,pat
```

Query

```
SEQTRX? seg
```

Response

ul_freq,ref,dl_freq,level,pat

Parameters

seg	Segment number
Range	0 to 1999
Resolution	1
ul_freq	Uplink frequency
Range	400.000000 to 3,800.000000 MHz
Resolution	0.000001 MHz
Suffix Code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	1950.000000 MHz
ref	Input level
Range	–65.0 to +35 dBm (Port1/Port2) –65.0 to +25 dBm (Port3/Port4)
Resolution	0.1 dB
Suffix Code	DBM (uses dBm when omitted)
Default	–10.0 dBm
dl_freq	Downlink frequency
Range	400.000000 to 3800.000000 MHz
Resolution	0.000001 MHz
Suffix Code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses MHz when omitted)
Default	2140.000000 MHz

level	Output level
Range	–130.0 to –10.0 dBm (Port 1/Port 2)
	–120.0 to 0.0 dBm (Port 3/Port 4)
Resolution	0.1 dB
Suffix Code	DBM (used dBm when omitted)
Default	–60.0 dBm
pat	Waveform pattern
PAT1 to PATn	Pattern number (n: waveform information file group range)
CW	Modulation turned OFF
OFF	Output level turned OFF
NC	Waveform pattern not configured in this segment (holds currently configured waveform pattern)
Default	CW

Details

The setting range varies with the input/output port setting.

If Cable Loss Correction is ON, the cable loss is added to the range of the input level and subtracted from the range of output level.

If the cable loss is 5 dB, the input and output levels are as follows:

Input level –60.0 to +40 dBm
Output level –135.0 to –15.0 dBm

In this case, if the output level is set to –10.0 dBm, an out-of-parameter setting range error occurs. (The response to SYSERR? returns 220, Parameter error).

Whether an out-of-parameter setting range error has occurred is determined during execution of the following commands:

SEQCTRL, SNGLS, SEQEXECTX

A measurement execution error occurs when an out-of-range error occurs.

SEQERR? is used to query the details of errors.

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

Example of Use

To set segment 0 as follows.

Uplink frequency set to 1950.0 MHz, input level to –10.0 dBm, downlink frequency to 2140.0 MHz, output level to –60.0 dBm, and no modulation:

```
SEQTRX 0,1950.000000, -10.0,2140.000000,-60.0,CW
SEQTRX? 0
> 1950.000000,-10.0,2140.000000,-60.0,CW
```

Remarks

The group range is the selected waveform file.

For details of the waveform pattern, refer to Chapter 3, “Waveform File Details” in the *Waveform Files for Cellular Application Operation Manual*.

SEQTX

Sequence Table Parameter - Uplink Frequency, Input Level

Function

Sets or queries uplink frequency and input level of segments in sequence table.

Command

```
SEQTX seg,ul_freq,ref
```

Query

```
SEQTX? seg
```

Response

```
ul_freq,ref
```

Parameter

seg	Segment number
Range	0 to 1999
Resolution	1
ul_freq	Rx frequency (uplink)
Range	400.000000 to 3800.000000 MHz
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)
Default	10 s

Example of Use

To set the Trigger timeout time to 10 seconds:
TRGTOUT 10
TRGTOUT?
> 10

TXFREQ

TCH Uplink Frequency

Function

Sets or queries TCH Uplink frequency

Command

```
TXFREQ freq
```

Query

```
TXFREQ?
```

Response

freq

Unit	Hz

Parameter

freq	TCH Uplink Frequency
Range	400000000 to 3800000000 Hz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	890200000 Hz

Details

Changing the setting of the uplink frequency does not change the setting of the TCH channel.

Example of Use

To set the TCH Uplink frequency to 890.2 MHz:

TXFREQ 890200000

TXFREQ?

> 890200000

ULFREQ

TCH Uplink Frequency

Function

Sets or queries TCH Uplink frequency

Command

```
ULFREQ freq
```

Query

```
ULFREQ?
```

Response

freq

Unit	Hz

Parameter

freq	TCH Uplink Frequency
Range	400000000 to 3800000000 Hz
Resolution	1 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ (uses Hz when omitted)
Default	890200000 Hz

Details

Changing the setting of the uplink frequency does not change the setting of the TCH channel.

Example of Use

To set the TCH Uplink frequency to 890.2 MHz:

ULFREQ 890200000

ULFREQ?

> 890200000

Chapter 6 Performance Test

This chapter explains how to setup the measuring instruments required for the MX887012A GSM/EDGE 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
- Carrier-off power measurement
- Frequency/modulation measurement: Carrier frequency accuracy
Phase error (GMSK)
Residual EVM (8PSK)
- Output RF spectrum measurement

We recommend testing the performance periodically once or twice a year. If the test results do not meet the specifications, contact an Anritsu Service and Sales office. Contact information can be found on the last page of the printed version of this manual, and is available in a separate file on the PDF version.

CAUTION

Warm-up the MU887000A and the required measuring instruments for at least 30 minutes (except when specified otherwise) to stabilize them. To achieve the highest accuracy, the test should be performed at room temperature using a power supply with as little voltage fluctuation as possible in an environment free from noise, vibration, dust and humidity.

6.2 Instruments for Testing Performance

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

Table 6.2-1 Measuring Instruments for Performance Tests

Performance Test Item	Required Specifications*[1]	Recommended Instrument (Anritsu model)
Output EVM	Signal Analyzer • Frequency Range: 400 to 2000 MHz • Resolution: 1 Hz • Measured Power Range: –140 to +20 dBm • Measurement Accuracy: ±0.05 dB • External Reference Input: (10 MHz)	Signal Analyzer (MS2690A or MS2830A) W-CDMA Measurement Software(MX269011A)
Tx Power Measurements • Measurement Accuracy • Linearity	Signal Generator • Frequency Range: 400 to 2000 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 2000 MHz • Resolution: 0.01 dB	Power Meter (ML2437A)
	Power Sensor • Frequency Range: 400 to 2000 MHz • Measured Power Range: –40 to +20 dBm • Input Connector: N type	Power Sensor (MA2442D)
Frequency/Modulation Measurements • Carrier Frequency Accuracy • Phase error • Residual EVM Output RF spectrum measurement Carrier-off power measurement	Signal generator supporting output of 3GPP W-CDMA modulation signals Same as above	Same as above
	Power Meter Same as above	Same as above
	Power Sensor • Frequency Range: 400 to 2000 MHz • Measured Power Range: –40 to +20 dBm • Input Connector: N type	Power Sensor (MA24002A)
Common	3-dB Attenuator	3-dB Attenuator (AT-103)

*1: 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 Select :	Cellular
Standard Select :	GSM
Measurement Select :	FMEAS
Trigger Level :	–30 dB
Number of Active Slot :	1
Uplink Training Sequence :	TSC0
RBW Filter :	100 kHz
Measurement Trigger :	TS
Graph Data Output :	OFF

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

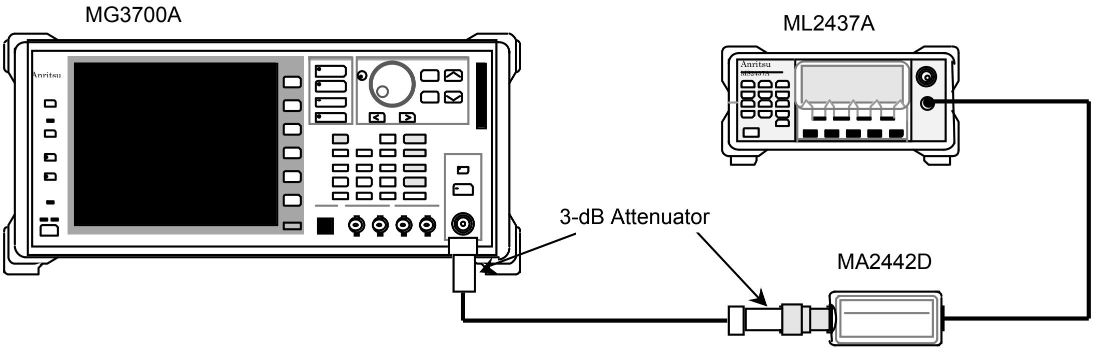

Figure 6.3.1-1 Signal Generator Calibration Setup (CW)

(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	2000
2	480		
3	880		
4	940		
5	1000		
6	1800		

Note:

Add an offset of −10 kHz to the frequency in the above table and set the frequency as SG output frequency, except for the measurement described in section 6.3.8, 6.3.9 and 6.3.10.

6.3.2 Calibrating signal generator (MOD)

This procedure captures the calibration value for measurement using a modulated waveform.

(1) Measuring instruments

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

(2) Setup

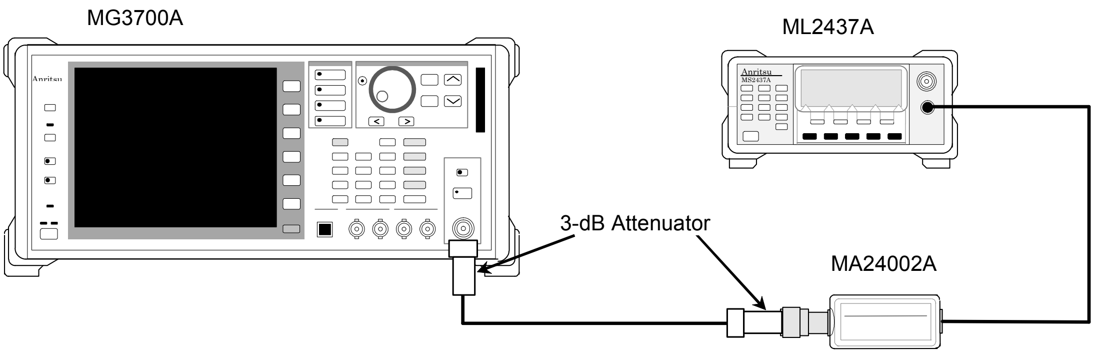

Figure 6.3.2-1　Signal Generator Calibration Setup (MOD)

(3) Procedure

1. Setup the instruments as shown in Figure 6.3.2-1.
2. Output a modulated 399.99 MHz signal from the Vector signal generator (SG) at a level of –4 dBm.
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

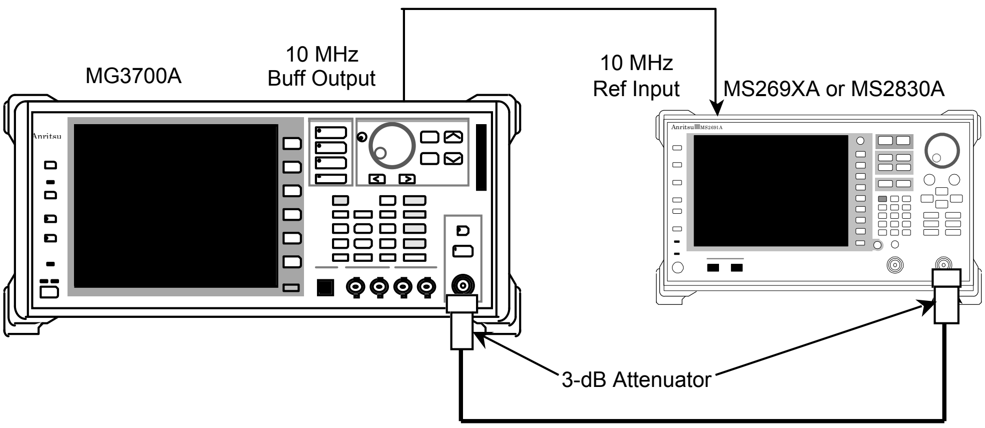

Figure 6.3.3-1 Linearity Calibration Setup

(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 +10 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 30 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”.

Table 6.3.3-1 Signal Analyzer Settings

	MS269xA or MS2830A						
	Application Switch	**RBW**	**Zone Width**	**Time Length**	**ATT**	**Preamp**	**Ref Level**
#1	Signal Analyzer	100 Hz	781.3 Hz	AUTO	20 dB	OFF	0 dBm
#2	Signal Analyzer	100 Hz	781.3 Hz	AUTO	0 dB	OFF	–20 dBm

6.3.4 Output Phase Error/EVM

This test measures the output signal EVM.

(1) Test specifications

	Specification	Remarks
Phase Error	1° rms(Average)	400 to 2700 MHz (GMSK)
EVM	≤1.8%rms	400 to 2700 MHz (8PSK)

(2) Measuring instruments

- Signal analyzer: MS269XA or MS2830A

(3) Setup

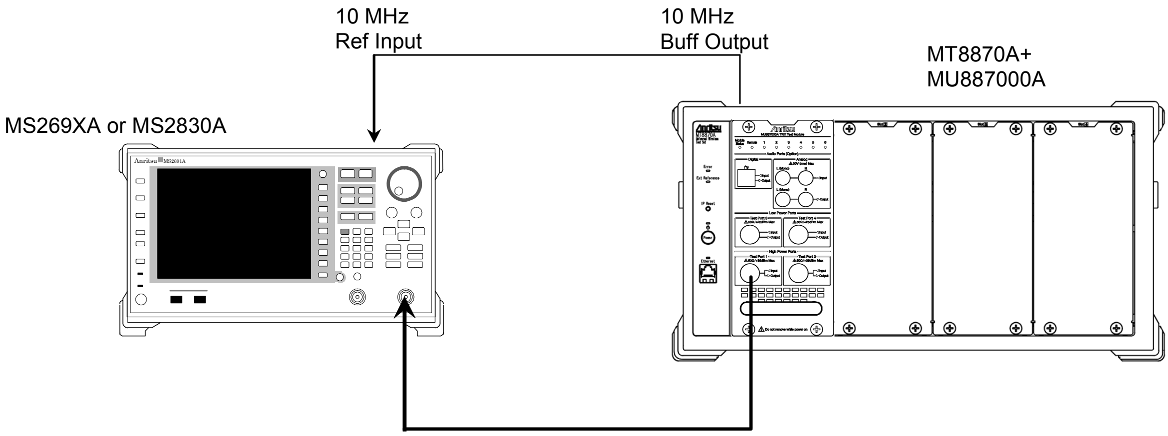

Figure 6.3.4-1 Output Phase Error/EVM Measurement Setup

(4) Procedure

1. Setup the instruments as shown in Figure 6.3.4-1.
2. Select the signal analyzer (SA) measurement software and set the following:

   Measurement software: MX269013A
   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:	MV887012A_GSM_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 Phase Error at the SA.
7. In the same manner, change the MU887000A output frequency 900, 2000 MHz and measure the Phase Error at each frequency.
8. Change the Test Port in steps 4 and 5 and repeat steps 4 to 7 over.
9. Change the MU887000A test pattern as follows:

   Downlink Pattern Name: Group No.3
10. Repeat steps 4 to 8 over and measure the EVM at the SA.

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	–30 dBm ≤, ≤+35 dBm	10 to 40°C

Test Port3/4

Measurement Accuracy	Input Level	Temperature
±0.7 dB	–30 dBm ≤, ≤+35 dBm	10 to 40°C

(2) Measuring instruments

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

(3) Setup

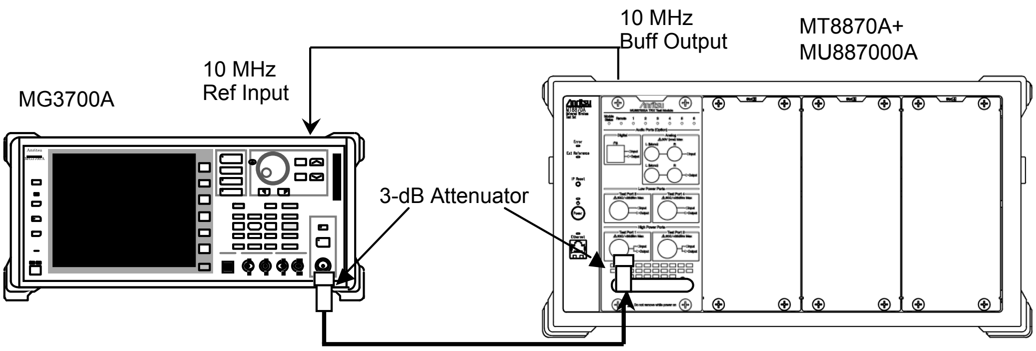

Figure 6.3.5-1 Setup for Measuring Amplitude Measurement Accuracy

(4) Procedure

1. Setup the instruments as shown in Figure 6.3.5-1.
2. Set the MU887000A as follows:

   Measuring Object : CONT
   Connect port: Test Port1
   Output level ON/OFF: OFF
   Input level: –10 dBm
   Uplink frequency: 400 MHz
   Turn Off All measurement: OFF
   Tx Power measurement: ON, 1 time

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

   Modulation: OFF
   Output frequency: 399.99 MHz
   Output level: –10 dBm (This output level reflects the calibration value for item 6.3.1.)

4. Change the frequency of the MU887000A and SG according to Table 6.3.1-1 “Measurement Point and Frequency” and measure the Tx power.

   Tx Power Measurement Results: Average value

5. Change the SG output level and MU887000A input level each to –30 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	–30 dBm ≤, –40 to 0 dB

(2) Measuring instruments

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

(3) Setup

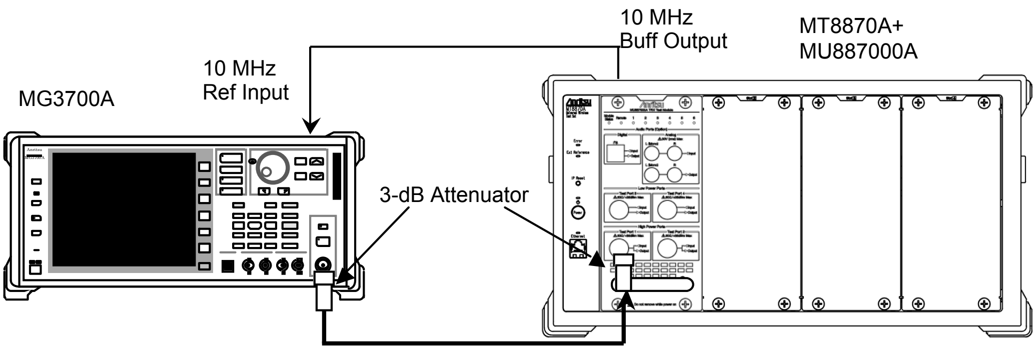

Figure 6.3.6-1 Setup for Measuring Tx Power Measurement Linearity

6

Performance Test

(4) Procedure

1. Setup the instruments as shown in Figure 6.3.6-1.
2. Set the MU887000A as follows:

Measuring Object :	CONT
Connect port:	Test Port1
Output level ON/OFF:	OFF
Input level:	0 dBm
Uplink frequency:	400 MHz
Trigger Level:	–40 dB
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 –30 dB in –10 dB steps and measure the Tx power. Calculate the linearity as described in step 6 and check that the results meet the specifications.
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 Connect port setting for the connection with the MU887000A to Test Port2/3/4 successively, and repeat steps 2 to 8 over.

6.3.7 Carrier-off power

This test is related to the carrier-off power measurement of amplitude measurements.

(1) Testing specifications

Measurement Range	Input Level	Temperature
≥65 dB	–10 dBm ≤	10 to 40°C
≥45 dB	–30 dBm ≤, <–10 dBm	10 to 40°C

(2) Measuring instruments

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

(3) Setup

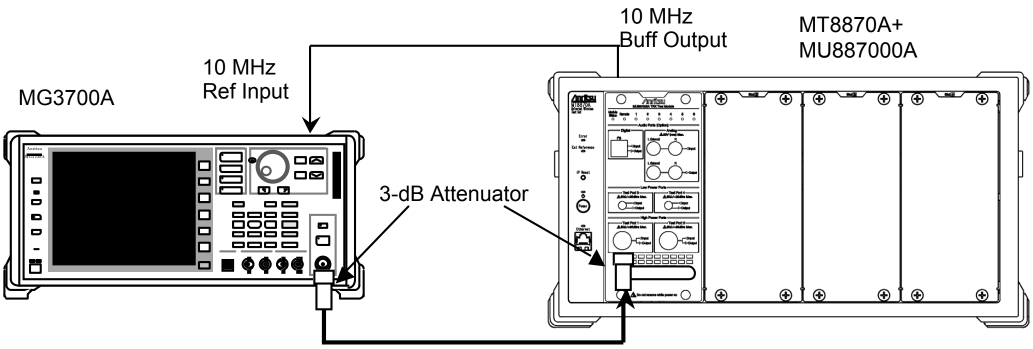

Figure 6.3.7-1 Setup for Measuring carrier-off power

(4) Test procedure

1. Setup the instruments as shown in Figure 6.3.7-1.
2. Set the MU887000A as follows:

Measurement target:	GMSK
Connect port:	Test Port1
Output level ON/OFF:	OFF
Input level:	–10 dBm
Uplink frequency:	400 MHz
Turn Off All measurement:	OFF
Tx Power measurement:	ON, 1 time

6 Performance Test

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

Modulation:	ON
Output frequency:	400 MHz
Output level:	–10 dBm (This output level reflects the calibration value for item 6.3.2.)

4. Measure the ON/OFF ratio.

   ON/OFF Ratio: Average value

5. Change the frequency of the MU887000A and SG according to Table 6.3.1-1 “Measurement Point and Frequency” and repeat steps 2 to 4 over.
6. Change the Output Level of the SG and the Input Level of the MU887000A 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 Frequency/Modulation measurement (GMSK)

This test is related to the following GMSK modulation analyses.

- Carrier Frequency Accuracy
- Phase Error

(1) Test specifications

Carrier frequency	±(Set frequency × Reference oscillator accuracy + 10 Hz)
Phase Error	≤0.5° rms (Frequency ≥500 MHz) ≤0.7° rms (Frequency <500 MHz) ≤2° (Peak)

Test Port1/2 input level: –30 dBm ≤, ≤+35 dBm

Test Port3/4 input level: –30 dBm ≤, ≤+25 dBm

(2) Measuring instruments

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

(3) Setup

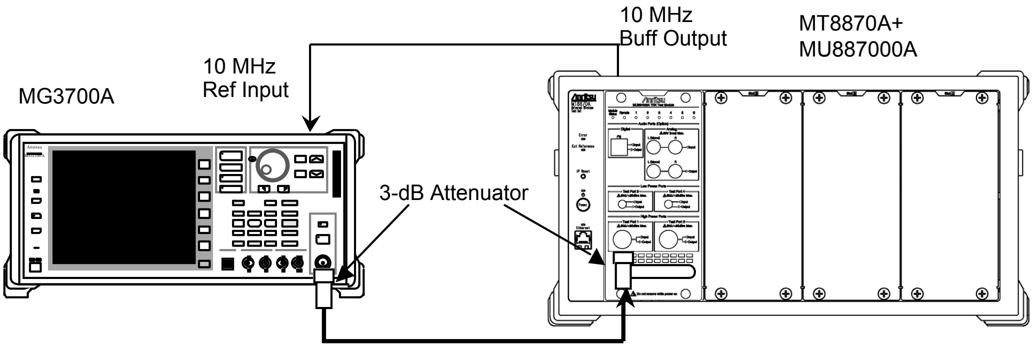

Figure 6.3.8-1 Setup for Measuring Frequency/Modulation measurement

(4) Procedure

1. Setup the instruments as shown in Figure 6.3.8-1.
2. Set the MU887000A as follows:

Measuring Object:	GMSK
Connect port:	Test Port1
Output Level On/Off:	OFF
Input level:	0 dBm
Uplink frequency:	400 MHz
Turn Off All measurement:	OFF
Modulation Analysis measurement:	ON, 1 time

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

Modulation:	ON
Waveform pattern:	TCH_FS
Output frequency:	400 MHz
Output level:	0 dBm (This output level reflects the calibration value for item 6.3.2.)

4. Measure the frequency error and phase error.

Carrier Frequency Error:	Average value, slot 0
RMS Phase Error:	Average value, slot 0
Peak Phase Error:	Average value, slot 0

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 repeat 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.

6.3.9 Frequency/Modulation measurement (8PSK)

This test is related to the following 8PSK modulation analyses.

- Carrier frequency accuracy
- Residual EVM

(1) Test specifications

Test Port1/2/3/4

Carrier frequency accuracy	±(Set frequency × Reference oscillator accuracy + 10 Hz)
EVM	≤1.5% rms

Test Port1/2 Input level: –30 dBm ≤, ≤+35 dBm

Test Port3/4 Input level: –30 dBm ≤, ≤+25 dBm

(2) Measuring instruments

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

(3) Setup

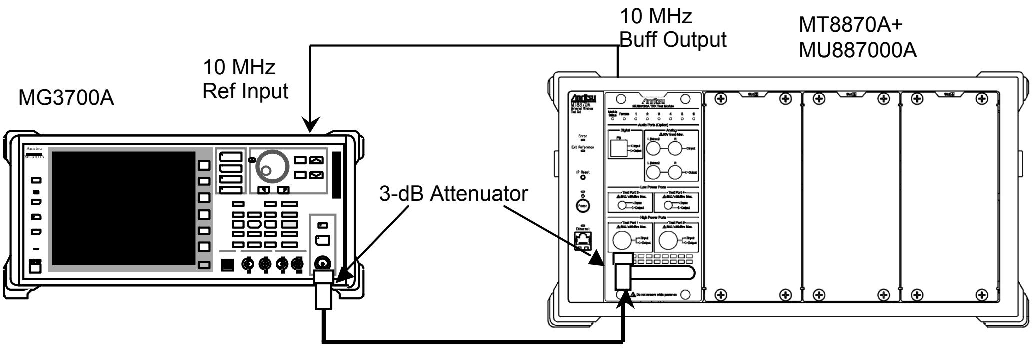

Figure 6.3.9-1 Setup for Measuring Frequency/Modulation measurement

(4) Procedure

1. Setup the instruments as shown in Figure 6.3.9-1.
2. Set the MU887000A as follows:

Measuring Object:	8PSK
Connect port:	Test Port1
Output Level On/Off :	OFF
Input level:	–10 dBm
Uplink frequency:	400 MHz
Turn Off All Measurement:	OFF
Modulation Analysis measurement:	ON, 1 time

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

Modulation:	ON
Waveform pattern:	NB_PSK
Output frequency:	400 MHz
Output level:	–10 dBm (This output level reflects the calibration value for item 6.3.2.)

4. Measure the frequency error and EVM.

Carrier Frequency Error:	Average value, Slot 0
EVM:	Average value, Slot 0

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 repeat 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.

6.3.10 Output spectrum measurement

This test is related to the output spectrum.

(1) Test specifications

Measurement Range of due to Modulation	≤–55dB (≤250 kHz detuning)
	≤–66dB (≥400 kHz detuning)
Measurement Range of switching Transient	≤–57 dB (≥400 kHz detuning)

Test Port1/2 input level: –10 dBm ≤, ≤+35 dBm

Test Port3/4 input level: –10 dBm ≤, ≤+25 dBm

(2) Measuring instruments

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

(3) Setup

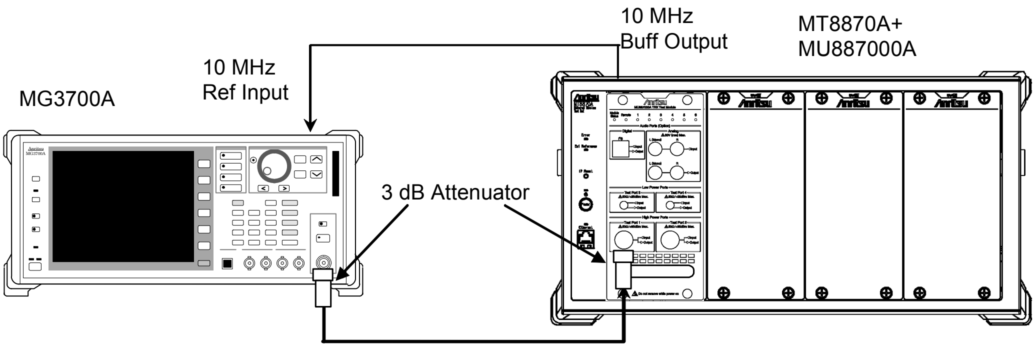

Figure 6.3.10-1 Setup for Measuring Output Spectrum measurement

(4) Procedure

1. Setup the instruments as shown in Figure 6.3.10-1.
2. Set the MU887000A as follows:

Measurement target:	CONT
Connect port:	Test Port1
Output level ON/OFF:	OFF
Input level:	–10 dBm
Uplink frequency:	400 MHz
Turn Off All Measurement:	OFF
Output RF Spectrum measurement:	ON, 10 times

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

Modulation:	OFF
Output frequency:	400 MHz
Output level:	–10 dBm (This output level reflects the calibration value for item 6.3.2.)

4. Measure the output spectrum and read the following values:

ORFS Due to Modulation (Lower Side):	Average value, Slot 0
ORFS Due to Modulation (Upper Side):	Average value, Slot 0
ORFS Due to Switching (Lower Side):	Average value, Slot 0
ORFS Due to Switching (Upper Side):	Average value, Slot 0

5. Change the MU887000A and SG frequencies according to Table 6.3.1-1 "Measurement Point and Frequency" and repeat steps 2 to 4 over.
6. Change the Connect Port setting for the connection with the MU887000A to Test Port2/3/4, successively and repeat steps 2 to 5 over.

6.3.11 About evaluation signals

The evaluation signals (Waveform pattern) described in the performance test items 6.3.2, 6.3.8, 6.3.9, 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.

6.3.12 Sample format for test result sheets

Use the following test result sheets when performing the MX887012A performance tests. Duplicate this sheet as necessary for tests.

Test location	______________	Report No.	______________
	______________	Date	______________
	______________	Person-in-charge	______________

Model:

Serial No.	______________	Ambient temperature	°C
Power source frequency	Hz	Relative humidity	%

Remarks ____

SG Calibration (CW)

SG Calibration Value (CW)

MG3700A Unmodulated Wave

Frequency (MHz)	**SG Setting (dBm)**		
	0 dBm	**–10 dBm**	**–25 dBm**
400			
480			
880			
940			
1000			
1800			
2000			

SG Calibration (MOD)

SG Calibration (MOD)

MG3700A Modulation Wave

Frequency (MHz)	**SG Setting (dBm)**
	–10 dBm
400	
480	
880	
940	
1000	
1800	
2000	

Linearity Calibration

Linearity Calibration

Frequency (MHz)	SG Level (dBm)	SA Measured Value (dBm)	Calibration Value (C) (B) – (A) (dB)
400	0	(A)	
	–10	(B)	
	–20	(B)	
	–30	(B)	
480	0	(A)	
	–10	(B)	
	–20	(B)	
	–30	(B)	
880	0	(A)	
	–10	(B)	
	–20	(B)	
	–30	(B)	
940	0	(A)	
	–10	(B)	
	–20	(B)	
	–30	(B)	
1000	0	(A)	
	–10	(B)	
	–20	(B)	
	–30	(B)	
1800	0	(A)	
	–10	(B)	
	–20	(B)	
	–30	(B)	
2000	0	(A)	
	–10	(B)	
	–20	(B)	
	–30	(B)	

Output Phase Error/EVM

Output Phase Error (Average)

Frequency (MHz)	Phase Error (degree): Test Port1 MU887000A Output Level: –10.9 dBm			Phase Error (degree): Test Port3 MU887000A Output Level: –0.9 dBm		
	Measured Value	Spec.	Measurement uncertainty	Measured Value	Spec.	Measurement uncertainty
400		≤1.0	0.1		≤1.0	0.1
900						
2000						

Output EVM

Frequency (MHz)	EVM (%rms): Test Port1 MU887000A Output Level: –10.9 dBm			EVM (%rms): Test Port3 MU887000A Output Level: –0.9 dBm		
	Measured Value	Spec.	Measurement uncertainty	Measured Value	Spec.	Measurement uncertainty
400		≤1.8	0.2		≤1.8	0.2
900						
2000						

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
480					
880					
940					
1000					
1800					
2000					

Tx Power Measurement Accuracy Port1/2

MU887000A Input Level: –30 dBm (Item 6.3.1 Calibration Value)

Frequency (MHz)	Measured Value (P) (dBm)	Measurement Accuracy (dB)			
		Lo Limit	Measurement Accuracy –30 – (P)	Hi Limit	Measurement uncertainty
400		–0.5		+0.5	±0.15
480					
880					
940					
1000					
1800					
2000					

Tx Power Measurement Accuracy (CW) (continued)

Tx Power Measurement Accuracy Port 3/4 (continued)

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	±0.27
480					
880					
940					
1000					
1800					
2000					

Tx Power Measurement Accuracy Port 3/4 (continued)

MU887000A Input Level: –30 dBm (Item 6.3.1 Calibration Value)

Frequency (MHz)	Measured Value (P) (dBm)	Measurement Accuracy (dB)			
		Lo Limit	Measurement Accuracy –30 – (P)	Hi Limit	Measurement uncertainty
400		–0.7		+0.7	±0.27
480					
880					
940					
1000					
1800					
2000					

Tx Power Measurement Linearity

Linearity (Reference Level 0 dBm)

Frequency (MHz)	SG Level (dBm)	Item 6.3.3 Calibration Value(dB)	MX887012A Measured Value(dBm)	Linearity (D) – (REF) – (C) (dB)	Spec. (dB)	Measurement uncertainty
400	0		(REF)			
	–10	(C)	(D)		±0.2	±0.05
	–20	(C)	(D)			
	–30	(C)	(D)			
480	0		(REF)			
	–10	(C)	(D)		±0.2	±0.05
	–20	(C)	(D)			
	–30	(C)	(D)			
880	0		(REF)			
	–10	(C)	(D)		±0.2	±0.05
	–20	(C)	(D)			
	–30	(C)	(D)			
940	0		(REF)			
	–10	(C)	(D)		±0.2	±0.05
	–20	(C)	(D)			
	–30	(C)	(D)			
1000	0		(REF)			
	–10	(C)	(D)		±0.2	±0.05
	–20	(C)	(D)			
	–30	(C)	(D)			
1800	0		(REF)			
	–10	(C)	(D)		±0.2	±0.05
	–20	(C)	(D)			
	–30	(C)	(D)			
2000	0		(REF)			
	–10	(C)	(D)		±0.2	±0.05
	–20	(C)	(D)			
	–30	(C)	(D)			

Amplitude Measurement Carrier-off Power Measurement

Carrier-off Power Measurement Range

Frequency (MHz)	On/Off ratio (dB) MU887000A Input Level: –10 dBm			On/Off ratio (dB) MU887000A Input Level: –30 dBm		
	Measured Value	Spec.	Measurement uncertainty	Measured Value	Spec.	Measurement uncertainty
400		≥65	1 dB		≥45	1 dB
480						
880						
940						
1000						
1800						
2000						

6

Performance Test

Frequency/Modulation Measurement (GMSK)

Phase Error/ Carrier Frequency Accuracy

MU887000A Input Level: –10 dBm

Frequency (MHz)	Carrier Frequency Accuracy (Hz)		
	Measured Value	Spec.	Measurement uncertainty
400		±10.0	±2.8
480			
880			
940			
1000			
1800			
2000			

Frequency (MHz)	Phase Error (Average)			Phase Error (Peak)		
	Measured Value	Spec.	Measurement uncertainty	Measured Value	Spec.	Measurement uncertainty
400		≤ 0.7°	±0.07°		≤ 2°	±0.0°
480						
880		≤ 0.5°	±0.02°			
940						
1000						
1800						
2000						

Frequency/Modulation Measurement (GMSK) (continued)

Phase Error/Carrier Frequency Accuracy

MU887000A Input Level: –30 dBm

<table>
<tr><th rowspan="2">Frequency (MHz)</th><th colspan="3">Carrier Frequency Accuracy (Hz)</th></tr>
<tr><th>Measured Value</th><th>Spec.</th><th>Measurement uncertainty</th></tr>
<tr><td>400</td><td></td><td rowspan="7">±10.0</td><td rowspan="7">±2.8</td></tr>
<tr><td>480</td><td></td></tr>
<tr><td>880</td><td></td></tr>
<tr><td>940</td><td></td></tr>
<tr><td>1000</td><td></td></tr>
<tr><td>1800</td><td></td></tr>
<tr><td>2000</td><td></td></tr>
</table>

<table>
<tr><th rowspan="2">Frequency (MHz)</th><th colspan="3">Phase Error (Average)</th><th colspan="3">Phase Error (Peak)</th></tr>
<tr><th>Measured Value</th><th>Spec.</th><th>Measurement uncertainty</th><th>Measured Value</th><th>Spec.</th><th>Measurement uncertainty</th></tr>
<tr><td>400</td><td></td><td rowspan="2">≤ 0.7°</td><td rowspan="2">±0.07°</td><td></td><td rowspan="7">≤ 2°</td><td rowspan="7">±0.0°</td></tr>
<tr><td>480</td><td></td><td></td></tr>
<tr><td>880</td><td></td><td rowspan="5">≤ 0.5°</td><td rowspan="5">±0.02°</td><td></td></tr>
<tr><td>940</td><td></td><td></td></tr>
<tr><td>1000</td><td></td><td></td></tr>
<tr><td>1800</td><td></td><td></td></tr>
<tr><td>2000</td><td></td><td></td></tr>
</table>

Frequency/Modulation Measurement (8PSK)

Residual Vector Error/Carrier Frequency Accuracy

MU887000A Input Level: –10 dBm

Frequency (MHz)	Residual Vector Error (%)			Carrier Frequency (Hz)		
	Measured Value	Spec.	Measurement uncertainty	Measured Value	Spec.	Measurement uncertainty
400		≤1.5	±0.1		±10.0	±2.8
480						
880						
940						
1000						
1800						
2000						

MU887000A Input Level: –30 dBm

Frequency (MHz)	Residual Vector Error (%)			Carrier Frequency (Hz)		
	Measured Value	Spec.	Measurement uncertainty	Measured Value	Spec.	Measurement uncertainty
400		≤1.5	±0.1		±10.0	±2.8
480						
880						
940						
1000						
1800						
2000						

Output Spectrum Measurement

Output Spectrum Due to Modulation Measurement Range

MU887000A Input Level: –10 dBm

Detuning Frequency (kHz)	Measured Value (Average of 10 times) (dB)					Spec. (dB)	Measurement uncertainty
	400 MHz	480 MHz	880 MHz	940 MHz	1000 MHz		
+100						≤–55	±1 dB
+200							
+250							
+400						≤–66	
+600							
+800							
+1000							
+1200							
+1400							
+1600							
+1800							
+2000							
–100						≤–55	
–200							
–250							
–400						≤–66	
–600							
–800							
–1000							
–1200							
–1400							
–1600							
–1800							
–2000							

Output Spectrum Measurement (continued)

Output Spectrum Due to Modulation Measurement Range

MU887000A Input Level: –10 dBm

Detuning Frequency (kHz)	Measured Value (Average of 10 times) (dB)					Spec. (dB)	Measurement uncertainty
	1800 MHz	2000 MHz					
+100						≤–55	±1 dB
+200							
+250							
+400						≤–66	
+600							
+800							
+1000							
+1200							
+1400							
+1600							
+1800							
+2000							
–100						≤–55	
–200							
–250							
–400						≤–66	
–600							
–800							
–1000							
–1200							
–1400							
–1600							
–1800							
–2000							

Output Spectrum Due to Switching Measurement Range

MU887000A Input Level: –10 dBm

Detuning Frequency (kHz)	Measured Value (Average of 10 times) (dB)					Spec. (dB)	Measurement uncertainty
	400 MHz	480 MHz	880 MHz	940 MHz	1000 MHz		
+400						≤–57	±1 dB
+600							
+800							
+1000							
+1200							
+1400							
+1600							
+1800							
+2000							
–400						≤–57	±1 dB
–600							
–800							
–1000							
–1200							
–1400							
–1600							
–1800							
–2000							

Output Spectrum Due to Switching Measurement Range (continued)

MU887000A Input Level: –10 dBm

Detuning Frequency (kHz)	Measured Value (Average of 10 times) (dB)					Spec. (dB)	Measurement uncertainty
	1800 MHz	2000 MHz					
+400						≤–57	±1 dB
+600							
+800							
+1000							
+1200							
+1400							
+1600							
+1800							
+2000							
–400						≤–57	±1 dB
–600							
–800							
–1000							
–1200							
–1400							
–1600							
–1800							
–2000							

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 MX887012A GSM/EDGE Uplink TX Measurement. Refer to section 1.2 “Composition” for details of the product configuration.

These specifications assume use of the system at a constant temperature after warming-up the instruments for 30 minutes. The abbreviation (typ.) indicates the reference data at 20 to 30°C and is not a guaranteed value.

Table A-1　MX887012A Specifications

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Common Items
Frequency Range
Measuring Objects</td><td>
400 to 2000 MHz
Normal burst (GMSK, 8PSK)</td></tr>
<tr><td>RF Power
Input Level Range</td><td>For average in-burst power
Port1, Port2: –30.0 to +35.0 dBm
Port3, Port4: –30.0 to +25.0 dBm</td></tr>
<tr><td>Measurement Accuracy</td><td>Port1, Port2: After calibration, 10 to 40°C
<table><tr><th>Input Level</th><th>Measurement Accuracy</th></tr><tr><td>–30 to +35 dBm</td><td>±0.3 dB (Typ.)
±0.5 dB</td></tr></table>
Port3, Port4: After calibration, 10 to 40°C
<table><tr><th>Input level</th><th>Measurement Accuracy</th></tr><tr><td>–30 to +25 dBm</td><td>±0.7 dB</td></tr></table></td></tr>
<tr><td>Linearity</td><td><table><tr><th>Input Level</th><th>Linearity</th></tr><tr><td>≥–30 dBm (0 to 40 dB)</td><td>±0.2 dB</td></tr></table></td></tr>
<tr><td>Carrier Off Power</td><td><table><tr><th>Input Level</th><th>Measurement Range</th></tr><tr><td>≥–10 dBm</td><td>≥65 dB</td></tr><tr><td>-30 to –10 dBm</td><td>≥45 dB</td></tr></table></td></tr>
</table>

Table A-1 MX887012A Specifications (continued)

Item	Specification
Modulation Analysis	
Input Level Range	Average in-burst power Port1,Port2: –30.0 to +35.0 dBm Port3,Port4: –30.0 to +25.0 dBm
Carrier Frequency Accuracy	±(Set frequency × Reference oscillator accuracy +10 Hz)
Modulation Accuracy	GMSK Modulation Residual Phase Error: ≤0.5° rms, ≤2° peak (Frequency ≥500 MHz) ≤0.7° rms, ≤2° peak (Frequency <500 MHz) 8PSK Modulation Residual EVM: ≤1.5%rms
Output RF Spectrum Measurement	
Input Level Range	Average in-burst power Port1, Port2: –10.0 to +35.0 dBm Port3, Port4: –10.0 to +25.0 dBm
Measurement Points	±100 kHz, ±200 kHz, ±250 kHz, ±400 kHz, ±600 kHz, ±800 kHz, ±1000 kHz, ±1200 kHz, ±1600 kHz, ±1800 kHz, ±2000 kHz
Measurement Range of due to modulation	Average of 10 measurements ≤–55 dB (≤250 kHz detuning) ≤–66 dB (≥400 kHz detuning)
Measurement Range of switching transient	≤–57 dB (≥400 kHz detuning)

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References are page numbers.

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