MX269023A
LTE TDD Uplink Measurement
Software
Operation Manual
Remote Control

Seventh Edition

- **For safety and warning information, please read this manual before attempting to use the equipment.**
- **Additional safety and warning information is provided within the MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe Operation), MS2830A Signal Analyzer Operation Manual (Mainframe Operation), MS2850A Signal Analyzer Operation Manual (Mainframe Operation), and MX269023A LTE TDD Uplink Measurement Software Operation Manual (Operation). Please also refer to these documents before using the equipment.**
- **Keep this manual with the equipment.**

ANRITSU CORPORATION

Document No.: M-W3522AE-7.0

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

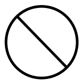
⚠ DANGER This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.

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

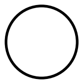
⚠ CAUTION This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

Safety Symbols Used on Equipment and in Manual

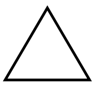
The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Ensure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.



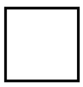
This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.



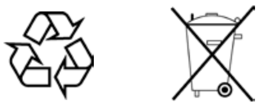
This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.



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.

MX269023A
LTE TDD Uplink Measurement Software
Operation Manual Remote Control

24 June 2011 (First Edition)
19 July 2017 (Seventh Edition)

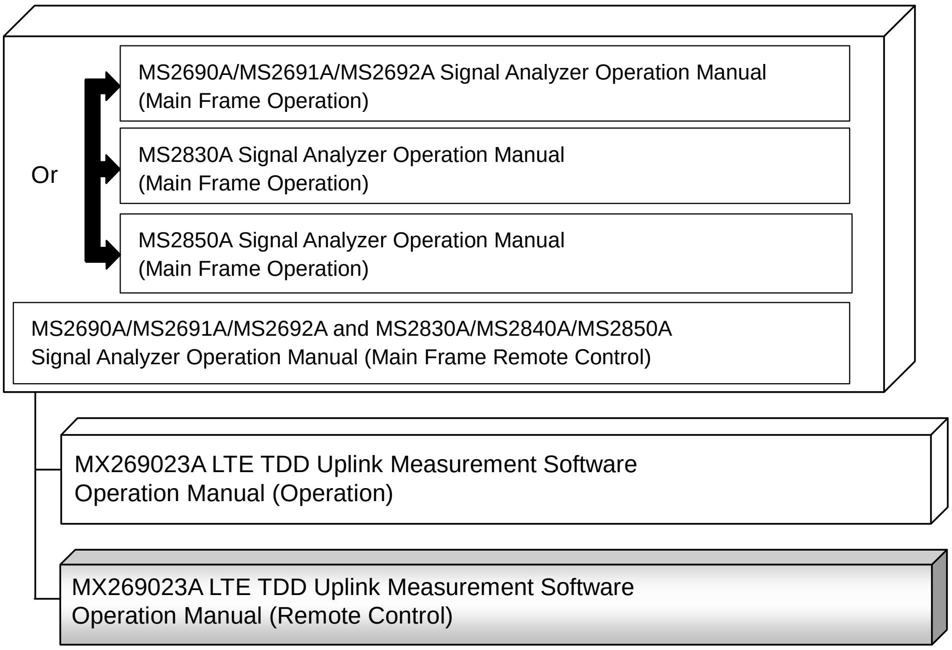
Notes On Export Management

This product and its manuals may require an Export License/Approval by the Government of the product's country of origin for re-export from your country.
Before re-exporting the product or manuals, please contact us to confirm whether they are export-controlled items or not.
When you dispose of export-controlled items, the products/manuals need to be broken/shredded so as not to be unlawfully used for military purpose.

About This Manual

■Composition of Operation Manuals

The operation manuals for MX269023A LTE TDD Uplink Measurement Software are comprised as shown in the figure below.



- Signal Analyzer Operation Manual (Mainframe Operation)
- Signal Analyzer Operation Manual (Mainframe Remote Control)

These manuals describe basic operating methods, maintenance procedures, common functions, and common remote control of the signal analyzer mainframe.

- MX269023A LTE TDD Uplink Measurement Software Operation Manual (Operation)

This manual describes operating methods of the MX269023A LTE TDD Uplink Measurement Software.

- MX269023A LTE TDD Uplink Measurement Software Operation Manual (Remote Control) <This document>

This manual describes remote control of the MX269023A LTE TDD Uplink Measurement Software.

Table of Contents

1
2
3

Chapter 1 Outline

This chapter outlines the remote control operation of the MX269023A LTE TDD Uplink Measurement Software (hereinafter referred to as "MX269023A").

1.1 Outline

The MX269023A can be controlled from an external controller (PC) by remote control commands using the MS2690/MS2691/MS2692A, MS2830A or MS2850A Signal Analyzer (hereafter referred to as "this instrument"). The remote control commands are defined by the SCPI format.

1.1.1 Interface

This instrument has GPIB, Ethernet, and USB interfaces for remote control. Only one of these can be used at once.

The interface is automatically determined when a command is received at the start of communication. This instrument enters the remote state after the interface has been determined. At remote-interface operation, the front panel Remote lamp lights; the lamp is off at local-interface operation.

Refer to the *MS2690A/MS2691A/MS2692A and MS2830A/MS2840A/MS2850A Signal Analyzer manual (Mainframe, Remote Control)* for more details of the basic operations for remote control, such as interface setting.

1.1.2 Controlled Application

Two types of the remote control commands can be used with this instrument: commands that are commonly applied to this instrument itself or all the applications (hereinafter, referred to as, "Common commands"), and the other commands unique to the applications. Common commands can be executed at any time, regardless of the currently controlled application. However, commands unique to an application can be executed at the controlled application. If it is executed at another application, the command is not executed or an error occurs.

In this instrument, multiple applications can be loaded at the same time. Only one application resource can be executed per piece of hardware at one time. The MX269023A measures an input signal by using the resource of RF Input. Thus, the MX269023A cannot be executed at the same time with another application using the same resource such as the signal analyzer function. In order to execute a function unique to the application by using the remote control, you need to select this application while it has been running. Furthermore, this application can be executed at the same time as another application that uses by itself a resource not used by this application, such as the Vector Signal Generator (hereinafter referred to as "Option 020").

1.2 Basic Flow of Control

This section describes the basic remote control command programming operations for measuring LTE TDD Uplink signals.

Figure 1.2-1 shows the flow of the basic control process. The order in which the measurement functions are executed can be rearranged, but the parameter settings and measurement function type that are applied to the measurement, and the measurement execution order cannot be changed.

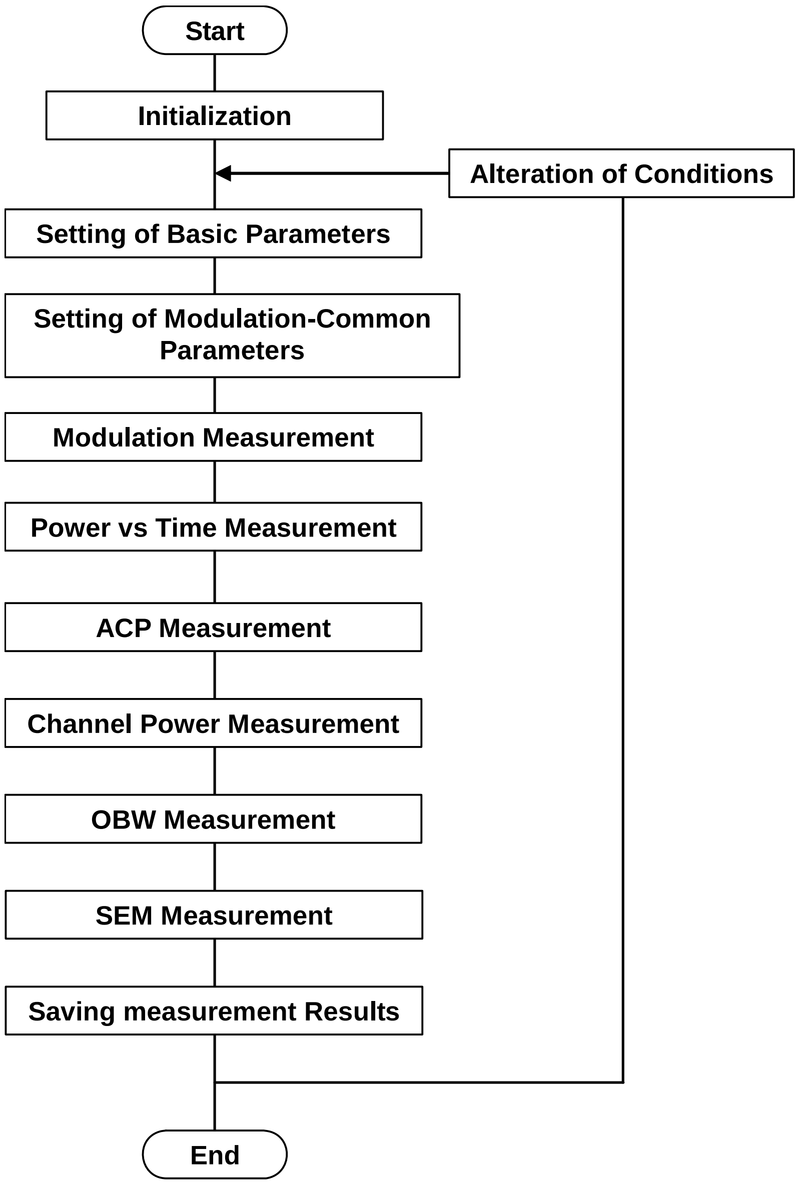


Figure 1.2-1 Flow of Basic Test

(1) Initial Setting
Initialize the communication interface and the parameters, set the communication mode, load applications, and select applications.

☞ 1.2.1 Initialization

(2) Setting Basic Parameters
Set the parameters applied in common to all measurements, such as carrier frequency and input level.

☞ 1.2.2 Setting of Basic Parameters

(3) Setting of Modulation-Common Parameters
The parameters used in common by the modulation measurement function to be executed in this application are set. These parameters are used to set a trigger, modulation mode, bandwidth, and other items.

☞ 1.2.3 Setting of Modulation-Common Parameters

(4) Modulation Measurement
The measurement functions to be executed in this application are executed. First, select the measurement functions to be executed. Next, set the trace mode and storage mode for each measurement function. Finally perform the measurement and read out the measurement results.

☞ 1.2.4 Modulation Measurement

(5) Power vs Time Measurement
The measurement functions to be executed in this application are executed. First, select the measurement functions to be executed. Next, set the trace mode and storage mode for each measurement function. Finally perform the measurement and read out the measurement results.

☞ 1.2.5 Power vs Time Measurement

(6) ACP/Channel Power/OBW/SEM Measurement
The measurement functions to be executed in the Signal Analyzer or Spectrum Analyzer are executed. First, set the parameters applied in common to the measurement functions. Next, set the applications used for each measurement, select the measurement functions, configure settings required for the measurement, such as the trigger mode, storage mode, BW, analysis time, sweep time, and trace point, then execute measurement, and read out the measurement results.

☞ 1.2.6 ACP (Adjacent Channel Power) Measurement
☞ 1.2.7 Channel Power Measurement
☞ 1.2.8 OBW (Occupied Bandwidth) Measurement
☞ 1.2.9 SEM (Spectrum Emission Mask) Measurement

1.2.1 Initialization

As part of the initial settings, perform the preparations for using the measuring instrument and the application. The following actions are included in the initial settings:

(1) Initializing Communication Interface
The remote control interface to be used is initialized so sending and receiving of commands can start. For details, refer to *MS2690A/MS2691A/MS2692A and MS2830A/MS2840A/MS2850A Signal Analyzer manual (Mainframe Remote Control)*.

(2) Setting Language Mode and Response Format
The language mode and the response format used to communicate are set. For details, refer to *MS2690A/MS2691A/MS2692A and MS2830A/MS2840A/MS2850A Signal Analyzer manual (Mainframe Remote Control)*.

(3) Starting the application
The application is loaded. In addition to this application, the Signal Analyzer and Spectrum Analyzer applications are also started.

(4) Selecting Application
The target application is selected.

(5) Initialization
All parameters and statuses are reset at initialization.

(6) Setting Measurement Mode
After initialization, the measurement mode is at continuous measurement mode. To select single measurement mode, switch to the single measurement mode.

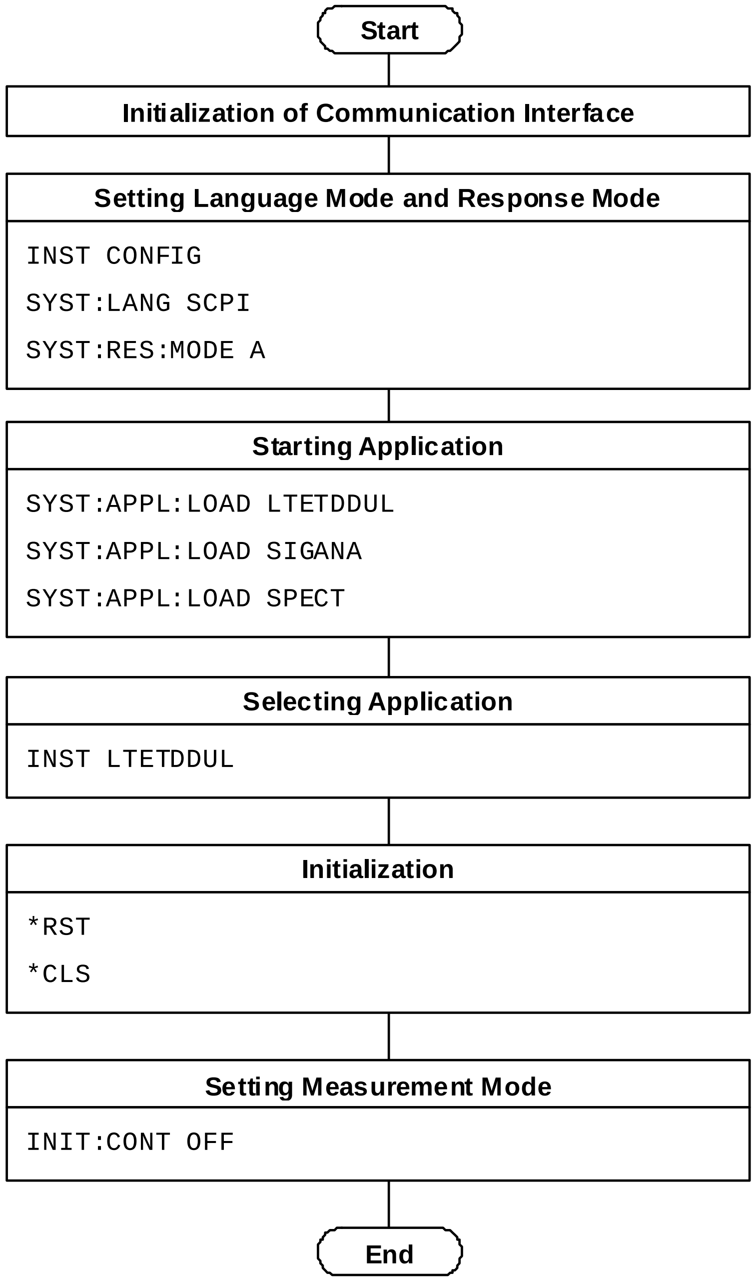


Figure 1.2.1-1 Initialization Flow and Command Example

1.2.2 Setting of Basic Parameters

Set the parameters used in common for to all measurements using this application, the Signal Analyzer, and the Spectrum Analyzer. The basic parameters include the following:

(1) Carrier Frequency

(2) Input Level (Reference Level/Attenuator)

(3) Level Offset

(4) Pre-Amp (Option)

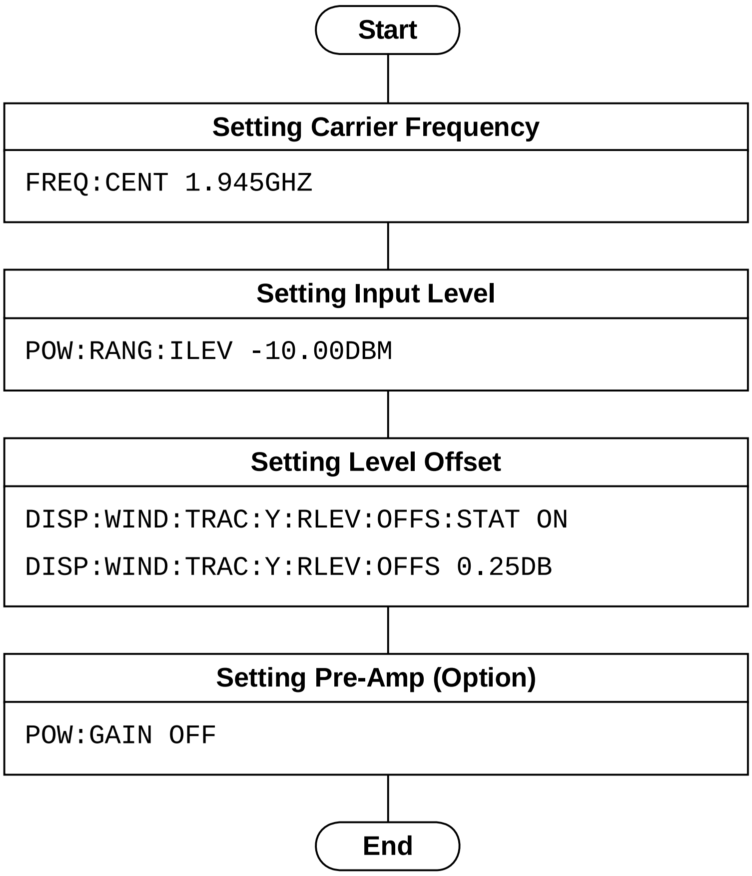


Figure 1.2.2-1 Flow of Basic Parameter Setting and Command Example

1.2.3 Setting of Modulation-Common Parameters

Set the parameters used in common for the Modulation measurement functions executed in this application. The parameters can be set in any order, unless otherwise specified.

(1) Trigger

(a) Trigger Switch

(b) Trigger Source

(c) Trigger Slope

(d) Trigger Delay

(2) Channel Bandwidth

(3) Uplink-downlink Configuration

(4) Special Subframe Configuration

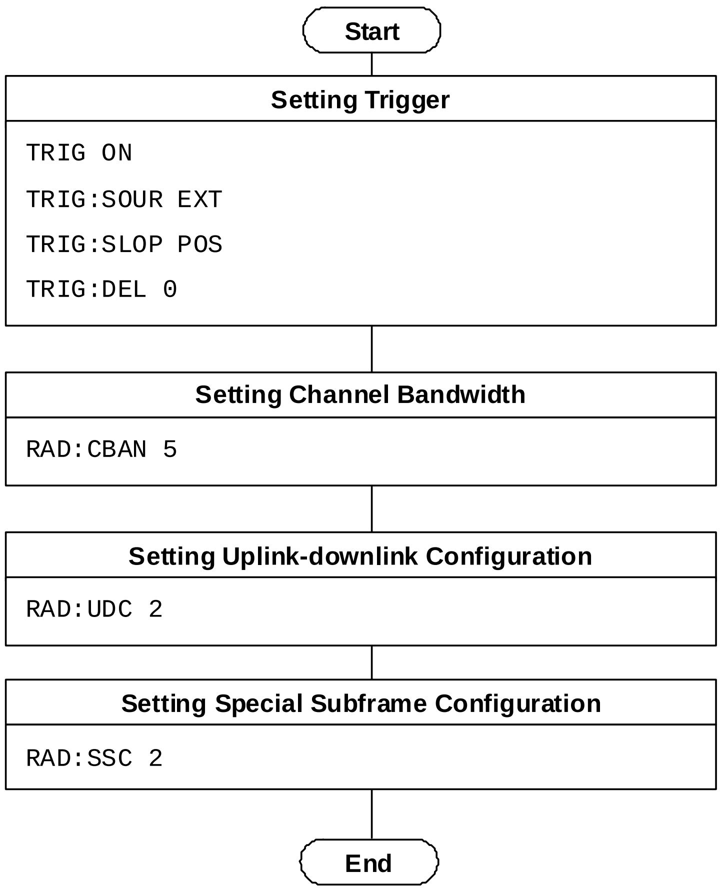


Figure 1.2.3-1 Flow of Common Settings for Modulation and Command Example

1.2.4 Modulation Measurement

Modulation measurement is executed in the following order:

(1) Selecting the measurement function.

(2) Setting measurement parameters
The following parameters are only applied to Modulation measurement:

(a) Measurement Interval Resolution

(b) Starting Subframe/Slot Number

(c) Measurement Interval

(d) Storage

(3) Executing measurement and querying the result

(4) Setting contents to be displayed
This control is not required when simply reading out the measurement results by using the remote control, but is used to display the measurement results on the screen in the same way as during manual operation.

(a) Trace Mode

(b) Scale

(c) Target Number

(d) Marker

Start

Selecting Measurement Function

```
CONF:EVM
```

Setting Measurement Parameters

```
EVM:CAPT:TIME:RES SUBF
EVM:CAPT:TIME:STAR 2
EVM:CAPT:TIME:LENG 2
EVM:AVER ON
EVM:AVER:COUN 10
```

Performing Measurement and Reading Out Measured Results

```
READ:EVM?
STAT:ERR?
```

Setting Contents to Be Displayed (as required)

```
DISP:EVM:SEL EVS
DISP:EVM:WIND2:TRAC:Y:SPAC DB
DISP:EVM:WIND2:TRAC:Y:RLEV 0
CALC:EVM:WIND2:SYMB:NUMB 110
CALC:EVM:MARK ON
CALC:EVM:MARK:ACT CONS
CALC:EVM:MARK:SUBC 100
CALC:EVM:MARK:X?
CALC:EVM:MARK:Y?
```

End

Figure 1.2.4-1 Flow of Common Settings for Modulation and Command Example

1.2.5 Power vs Time Measurement

Power vs Time measurement is executed in the following order:

(1) Selecting the measurement function.

(2) Setting measurement parameters
The following parameters are only applied to Power vs Time measurement:

(a) Storage

(3) Executing measurement and querying the result

(4) Setting contents to be displayed
This control is not required when simply reading out the measurement results by using the remote control, but is used to display the measurement results on the screen in the same way as during manual operation.

(a) Trace Mode

(b) Scale

(c) Marker

Start

Selecting Measurement Function

```
CONF:PVT
```

Setting Measurement Parameters

```
PVT:AVER ON
PVT:AVER:COUN 10
```

Performing Measurement and Reading Out Measured Results

```
READ:PVT3?
STAT:ERR?
```

Setting Contents to Be Displayed (as required)

```
DISP:PVT:SEL BURS
DISP:PVT:WIND1:TRAC:Y:UPP 20
DISP:PVT:WIND1:TRAC:Y:RLEV LOW -80
CALC:PVT:MARK ON
CALC:EVM:MARK:TS 61440
```

End

Figure 1.2.5-1 Flow of Common Settings for Modulation and Command Example

1.2.6 ACP (Adjacent Channel Power) Measurement

The ACP measurement is executed in the following order:

(1) Selecting application and the measurement function
Select either Signal Analyzer or Spectrum Analyzer as the application to execute the ACP measurement function. The application will be switched to the selected one if the ACP measurement function is selected. The values of the basic parameters are applied to the selected application. After this, only the commands and queries available to the selected application are available.

Note:

The ACP measurement function of the Signal Analyzer is enabled in this application only when Channel Bandwidth is set to 1.4, 3, or 5 MHz.

(2) Setting measurement parameters
The following parameters apply only to the specific application selected.

(a) Trigger

(b) Time Length/Filter Type/Storage, etc. (in Signal Analyzer)

(c) Sweep Time/Filter Type/Storage, etc. (in Spectrum Analyzer)

(3) Executing measurement and querying the result

(4) Setting Contents to be Displayed
This control is not required when simply reading out the measurement results by using the remote control, but is used to display the measurement results on the screen in the same way as during manual operation.

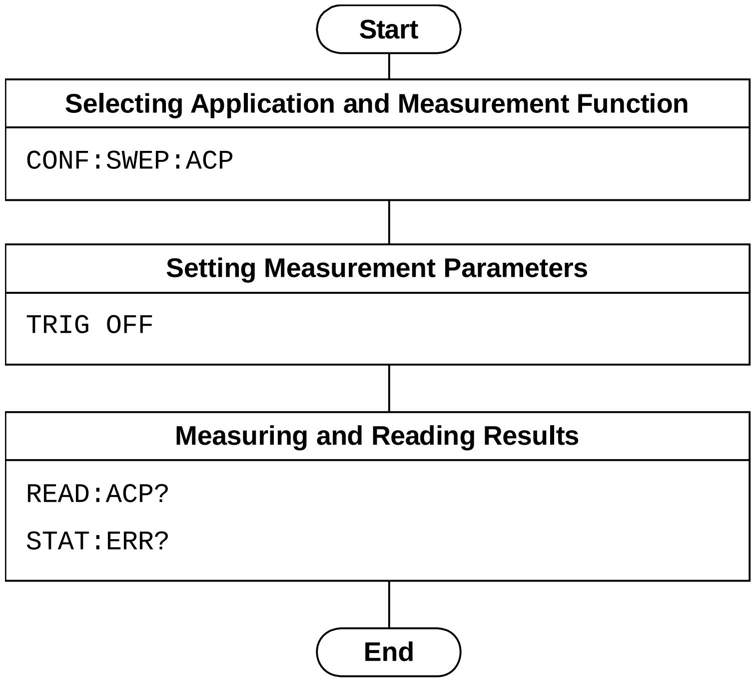


Figure 1.2.6-1 Flow of ACP Measurement using Spectrum Analyzer and Command Example

1.2.7 Channel Power Measurement

The Channel Power measurement is executed in the following order:

(1) Selecting application and the measurement function
Select either Signal Analyzer or Spectrum Analyzer as the application to execute the Channel Power measurement function. The application will be switched to the selected one if the Channel Power measurement function is selected. The values of the basic parameters are applied to the selected application. After this, only the commands and queries available to the selected application are available.

(2) Setting measurement parameters
The following parameters apply only to the specific application selected.

(a) Trigger

(b) Time Length/Filter Type/Storage, etc. (in Signal Analyzer)

(c) Sweep Time/Filter Type/Storage, etc. (in Spectrum Analyzer)

(3) Executing measurement and querying the result

(4) Setting Contents to be Displayed
This control is not required when simply reading out the measurement results by using the remote control, but is used to display the measurement results on the screen in the same way as during manual operation.

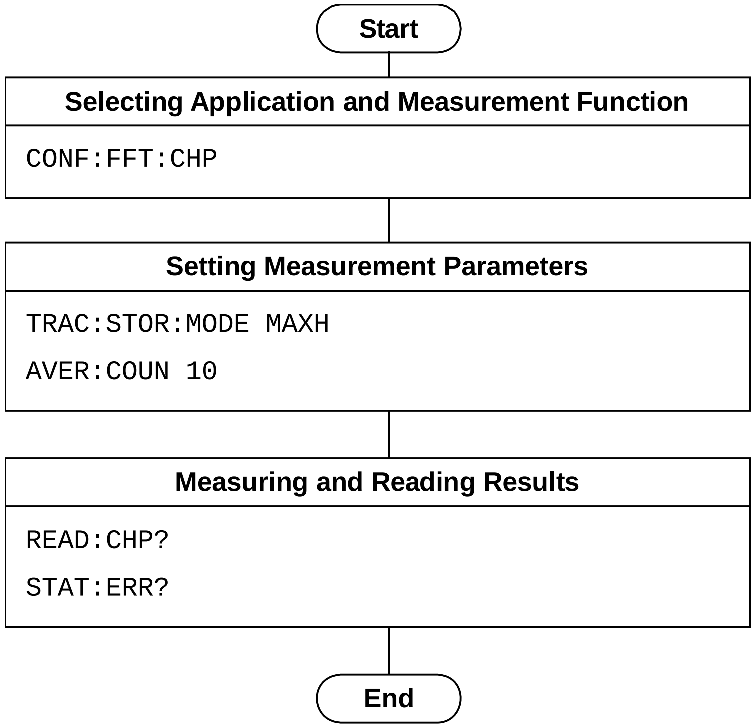


Figure 1.2.7-1 Flow of Channel Power Measurement using Signal Analyzer and Command Examples

1.2.8 OBW (Occupied Bandwidth) Measurement

OBW measurement is executed in the following order:

(1) Selecting application and the measurement function
Select either Signal Analyzer or Spectrum Analyzer as the application to execute the OBW measurement function. The application will be switched to the selected one if the OBW measurement function is selected. The values of the basic parameters are applied to the selected application. After this, only the commands and queries available to the selected application are available.

(2) Setting measurement parameters
The following parameters apply only to the specific application selected.

(a) Trigger

(b) Method, N% Ratio, and XdB Value

(3) Executing measurement and querying the result

(4) Setting Contents to be Displayed
This control is not required when simply reading out the measurement results by using the remote control, but is used to display the measurement results on the screen in the same way as during manual operation.

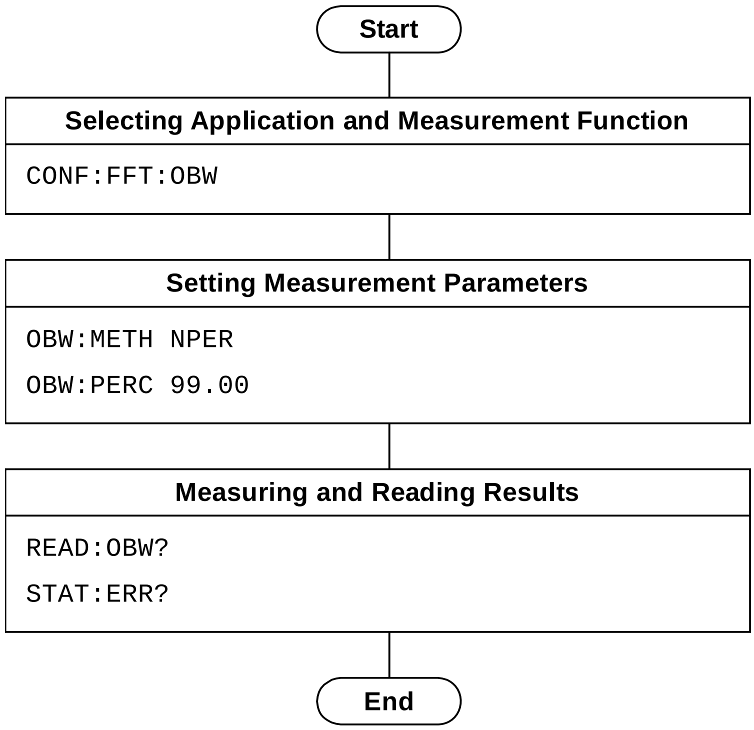


Figure 1.2.8-1 Flow of OBW Measurement using Signal Analyzer and Command Example

1.2.9 SEM (Spectrum Emission Mask) Measurement

SEM measurement is executed in the following order:

(1) Selecting the measurement function Selecting the SEM measurement function makes the application switch to Spectrum Analyzer. The values of the basic parameters are applied to the Spectrum Analyzer. Subsequently, only the commands/queries available in the Spectrum Analyzer can be used.

Note:

The SEM measurement function is enabled only for the Spectrum Analyzer.

(2) Setting measurement parameters The following parameters apply only to the Spectrum Analyzer.

  (a) Trigger

  (b) Limit Side/Filter Type/Storage

(3) Executing measurement and querying the result

(4) Setting Contents to be Displayed
This control is not required when simply reading out the measurement results by using the remote control, but is used to display the measurement results on the screen in the same way as during manual operation.

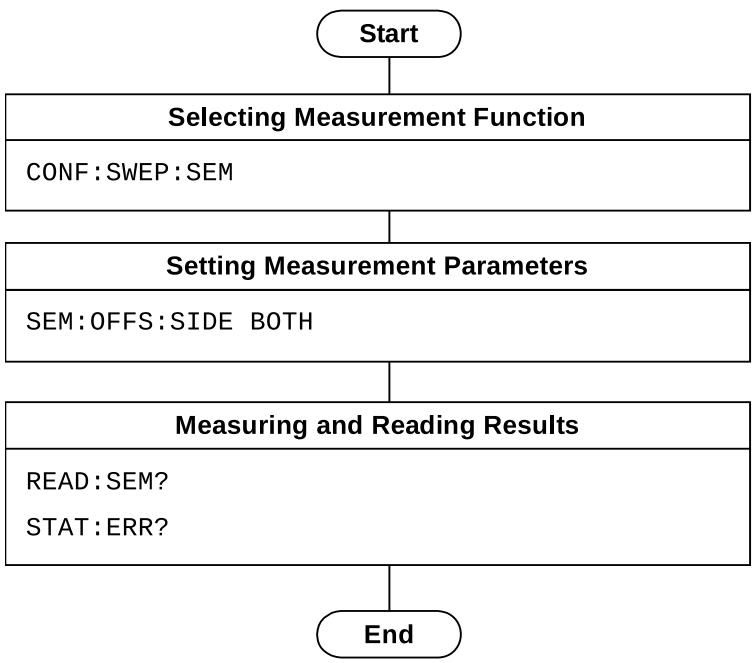


Figure 1.2.9-1 Flow of SEM Measurement using Spectrum Analyzer and Command Example

1.2.10 Signal Analyzer/Spectrum Analyzer Switching

There are the following two methods for switching from this application to Signal Analyzer/Spectrum Analyzer during remote control.

(1) Execute `CONFigureure[:FFT|SWEPt]:<measure>`

The basic parameters such as the carrier frequency/input level (reference level) are reflected to the selected application. A template is automatically set according to the state of this application. There is no limitation on control of the selected application.

Note:

This may be impossible depending on the application used and the selected measurement function.

Also, you can switch between Signal Analyzer and Spectrum Analyzer by using `CONFigure:FFT|SWEPt:<measure>`.The basic parameters such as carrier frequency and input level (reference level) and the templates are also applied in this case.

When switching back to measurement application control using `CONFigure:<measure>`, the basic parameters such as carrier frequency and input level (reference level) that are modified with the Signal Analyzer or Spectrum Analyzer are applied.

Compared with method (2), you can shorten the execution time of the program, since you do not need to reset the basic parameter per a measurement function.

(2) :Execute `:INSTrument[:SELect] SIGANA|SPECT`

No parameter and template are reflected in this method.

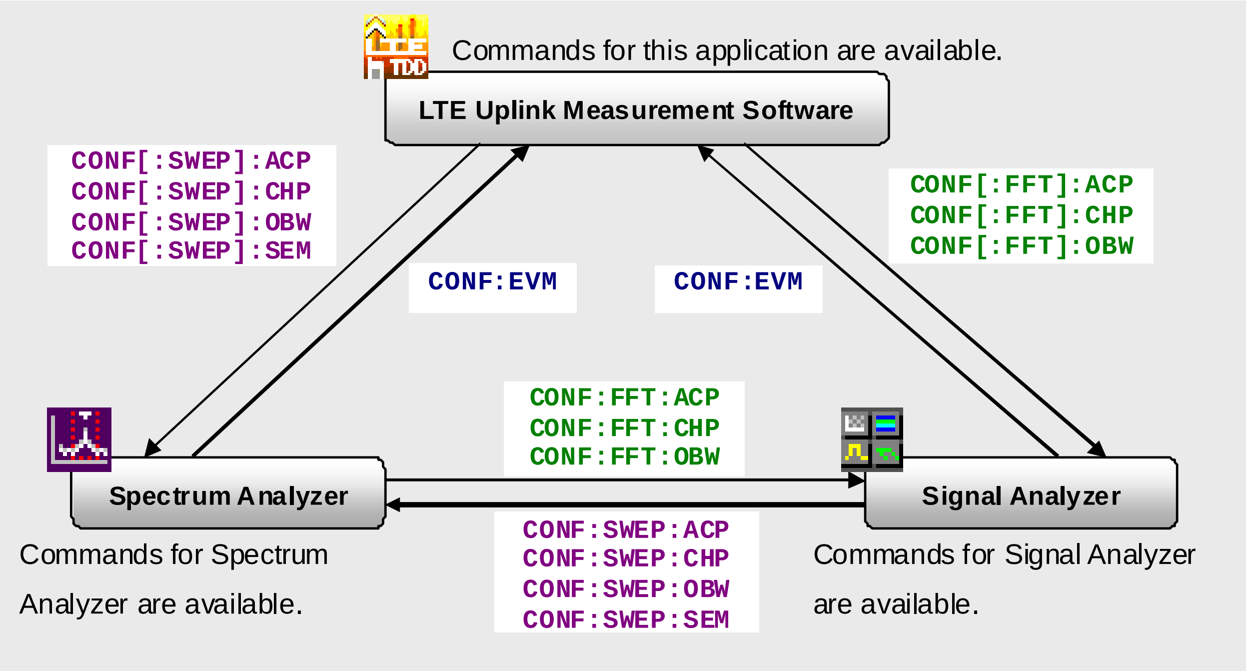


Figure 1.2.10-1 Switching of Measurement Functions among Applications

Figure 1.2.10-1 shows the measurement functions and offered by each application and the switching commands. For example, you need to program `CONF:SWEP:ACP`, in order to invoke the ACP measurement function of Spectrum Analyzer from this application. You can write `CONF:ACP` without writing `SWEP` since it is set to use Spectrum Analyzer for the ACP measurement function if `ACP:INST SWEP` is transmitted in advance. `CONF[:SWEP]:<measure>` in Figure 1.2.10-1 means that `SWEP` can be omitted if `<measure>:INST SWEP` is transmitted in advance.

If you switch the measurement function from Spectrum Analyzer to Signal Analyzer, or in the opposite way, you need to program `CONF:FFT:<measure>` or `CONF:SWEP:<measure>`. If `FFT` or `SWEP` is omitted, the measurement function will be selected by the presently selected application.

1.3 How to use the Native Mode

This instrument defines the syntax/format types of the remote control commands as “Language mode”. The language mode has two modes: SCPI and Native.

(1) SCPI mode

The SCPI mode processes commands conforming to the syntax/format defined in SCPI (ver1999.0). For programming, you can use the character string in long/short form format and can omit angled bracket ([ ]) definition character strings.

On the Configuration screen, the SCPI mode is automatically set after transmitting `SYST:LANG SCPI`.

(2) Native mode

The Native mode processes commands that are in this instrument's own definition type. Unless otherwise specified, the character string of a command header is fixed. If application commands are defined only by the SCPI mode, character strings converted according to the conversion rules are the commands in the Native mode. For programming, you cannot use the grammar of SCPI mode, such as character string in long/short form format and cannot omit any angled bracket ([ ]) definition character strings.

Note:

The `STATus:QUEStionable` register command and `STATus:OPERation` command cannot be used in the Native mode, even if they are converted following the conversion rule described below.

On the Configuration screen, the Native mode is automatically set after transmitting `SYST:LANG NAT`.

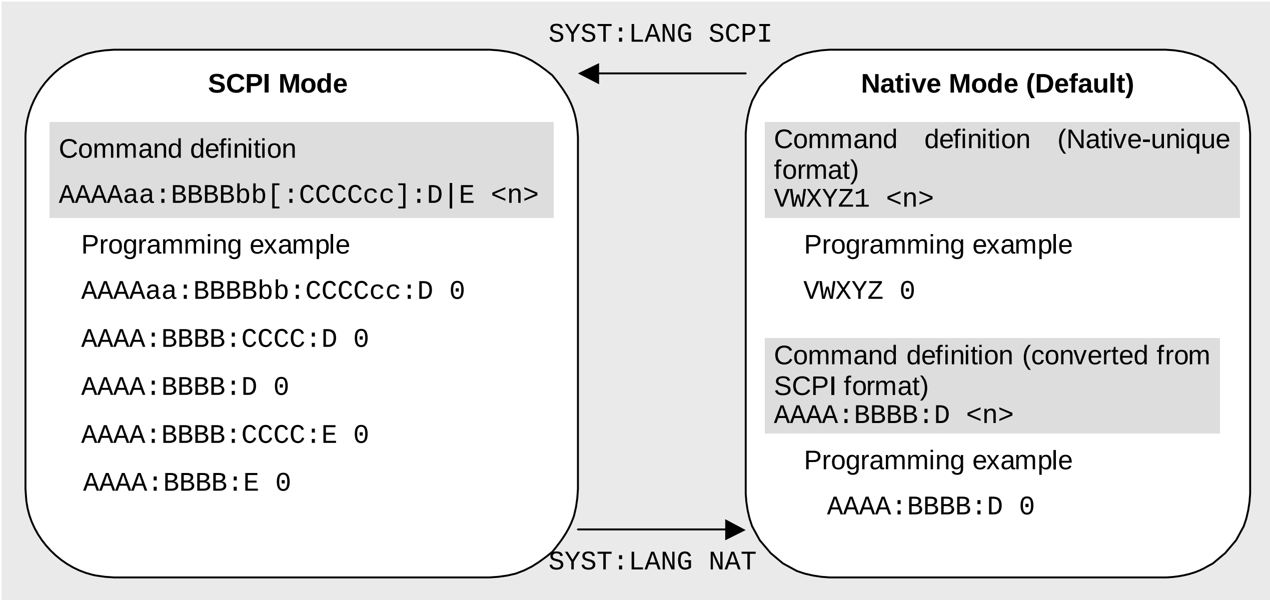


Figure 1.3-1 SCP Mode and Native Mode

This application is only defined as the commands of the SCPI mode. You need to follow the conversion rule below in order to control this application by using the Native mode.

Conversion Rule

1. Move the numeric parameters in the SCPI mode program header to the head of the arguments. Omit parameters that represent only one type of value and can be omitted. Leave parameters that represent only one type of value but cannot be omitted.
2. Use the first node if multiple ones can be selected.
3. Delete layers that can be deleted.
4. Alter all the long forms into the short ones.
5. Omit the colon (":") at the head of the command.

Example 1

Convert `:CALCulate:MARKer[1]|2[:SET]:CENTer`
into a Native mode.

1. Put a numeric parameter of the program header at the head of the argument.
   `:CALCulate:MARKer`**`[1]|2`**`[:SET]:CENTer`
   ↓
   `:CALCulate:MARKer[:SET]:CENTer` **`<integer>`**
   (the argument `<integer>` represents the numeric value 1 or 2)
2. Delete the layers that can be deleted.
   `:CALCulate:MARKer`**`[:SET]`**`:CENTer <integer>`

↓

:CALCulate:MARKer:CENTer <integer>

3. Alter all long forms into short forms.

   :**CALCulate**:**MARKer**:**CENTer** <integer>

   ↓

   :**CALC**:**MARK**:**CENT** <integer>

4. Delete the colon mark (":") at the head.

   :CALC:MARK:CENT <integer>

   ↓

   CALC:MARK:CENT <integer>

Example 2

Convert [:SENSe]:BPOWer|:TXPower[:STATe]?
into a Native mode.

1. Use the leading one if multiple nodes can be selected.

   [:SENSe]**:BPOWer|:TXPower**[:STATe]?

   ↓

   [:SENSe]**:BPOWer**[:STATe]?

2. Delete the layers that can be deleted.

   [:SENSe]:BPOWer**[:STATe]**?

   ↓

   :BPOWer?

3. Alter all long forms into short forms.

   :**BPOWer**?

   ↓

   :**BPOW**?

4. Delete the colon mark (":") at the head.

   :BPOW?

   ↓

   BPOW?

Chapter 2 SCPI Device Message Details

This chapter describes the detailed specifications of SCPI remote control commands for executing the functions of this application. The device messages are listed according to function. Refer to the *MS2690A/MS2691A/MS2692A and MS2830A/MS2840A/MS2850A Signal Analyzer Operation Manual (Mainframe Remote Control)* for detailed specifications of the IEEE488.2 common device messages and application common device messages.

2.1 Selecting Application

Table 2.1-1 lists the device messages for setup operations such as loading/selecting/initializing an application.

Table 2.1-1 Device Messages for Selecting Application

Function	Device Messages
Load Application	:SYSTem:APPLication:LOAD LTETDDUL
Unload Application	:SYSTem:APPLication:UNLoad LTETDDUL
Application Switch	:INSTrument[:SELect] LTETDDUL
	:INSTrument[:SELect]?
Application Switch and Window Status	:INSTrument:SYSTem LTETDDUL,[ACTive]|INACtive|MINimum
	:INSTrument:SYSTem? LTETDDUL

2.1.1 Loading application

:SYSTem:APPLication:LOAD LTETDDUL

Load Application

Function

This command loads this application.

Command

`:SYSTem:APPLication:LOAD LTETDDUL`

Details

This function loads an installed application and registers it to the Application Switch menu.

Example of Use

To load this application.

`SYST:APPL:LOAD LTETDDUL`

:SYSTem:APPLication:UNLoad LTETDDUL

Unload Application

Function

This command exits this application.

Command

`:SYSTem:APPLication:UNLoad LTETDDUL`

Details

This function exits an activated application and deletes it from the Application Switch menu.

Example of Use

To exit this application.

`SYST:APPL:UNL LTETDDUL`

2.1.2 Selecting application

:INSTrument[:SELect] LTETDDUL

Application Switch

Function

This command selects the controlled application.

Command

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

Parameter

<apl_name>	Application
LTETDDDL	This application
CONFIG	Config

Details

To select a measurement function of Signal Analyzer or Spectrum Analyzer from this application, use the following:

```
:CONFigure[:FFT|SWEPt]:ACP
:CONFigure[:FFT|SWEPt]:CHPower
:CONFigure[:FFT|SWEPt]:OBWidth
:CONFigure[:SWEPt]:SEMask
```

Example of Use

To switch the control target to this application.

```
INST LTETDDUL
```

:INSTrument[:SELect]?

Application Switch Query

Function

This command queries the controlled application.

Query

`:INSTrument[:SELect]?`

Response

<apl_name>

Parameter

<apl_name>	Application
`LTETDDDL`	This application
`CONFIG`	Config

Details

`LTETDDUL` is returned when a measurement function of this application is selected.

SIGANA or SPECT is returned when a measurement function of Signal Analyzer or Spectrum Analyzer such as ACP, Channel Power, OBW, and SEM is selected.

Example of Use

To query the controlled application.

```
INST?
> LTETDDUL
```

:INSTrument:SYSTem LTETDDUL,[ACTive]|INACtive|MINimum

Application Switch and Window Status

Function

This command selects the window status of this application.

Command

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

Parameter

`<window>`	Window status
`ACTive`	Active
`INACtive`	Inactive
`MINimum`	Minimized
When omitted	Active

Example of Use

To set the window status of this application to the active state.

```
INST:SYST LTETDDUL,ACT
```

:INSTrument:SYSTem? LTETDDUL

Application Switch and Window Status Query

Function

This command queries the window status of this application.

Query

```
:INSTrument:SYSTem? LTETDDUL
```

Response

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

Parameter

<status>	Status of this application
CURR	Executed and targeted for control
RUN	Executed but not targeted for control
IDLE	Loaded but not executed
UNL	Not loaded
<window>	Window status
ACT	Active
INAC	Inactive
MIN	Minimized
NON	Window not displayed

Example of Use

To query the window status of this application.

```
INST:SYST? LTETDDUL
> CURR,ACT
```

2.2 Setting of Basic Parameters

Table 2.2-1 lists the parameters applied in common to this application, such as frequency and level.

Table 2.2-1 Device Messages for Setting Basic Parameters

Parameter	Device Messages
Carrier Frequency	[:SENSe]:FREQuency:CENTer <freq>
	[:SENSe]:FREQuency:CENTer?
Frequency Span	[:SENSe]:FREQuency:SPAN AUTO|<freq>
	[:SENSe]:FREQuency:SPAN?
Operating Band Setting	:CALCulation:OBANd:FREQuency:SETTing STANdard|USER
	:CALCulation:OBANd:FREQuency:SETTing?
Operating Band Number	:CALCulation:OBANd <integer>
	:CALCulation:OBANd?
Operating Band Lowest Frequency	:CALCulation:OBANd:FREQuency:LOWest <freq>
	:CALCulation:OBANd:FREQuency:LOWest?
Operating Band Highest Frequency	:CALCulation:OBANd:FREQuency:HIGHest <freq>
	:CALCulation:OBANd:FREQuency:HIGHest?
Input Level	[:SENSe]:POWer[:RF]:RANGe:ILEVel <real>
	[:SENSe]:POWer[:RF]:RANGe:ILEVel?
Reference Level (Remote only)	:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>
	:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
Level Offset Value	:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet <rel_power>
	:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet?
Level Offset State	:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet:STATe OFF|ON|0|1
	:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet:STATe?
Pre-Amp	[:SENSe]:POWer[:RF]:GAIN[:STATe] OFF|ON|0|1
	[:SENSe]:POWer[:RF]:GAIN[:STATe]?
Lowest ATT Setting	[:SENSe]:POWer[:RF]:ATTenuation:LOWest:SETTing 0dB|4dB
	[:SENSe]:POWer[:RF]:ATTenuation:LOWest:SETTing?

2.2.1 Carrier Frequency

[:SENSe]:FREQuency:CENTer <freq>

Carrier Frequency

Function

This command sets the carrier frequency of the measured signal.

Command

```
[:SENSe]:FREQuency:CENTer <freq>
```

Parameter

`<freq>`	Carrier frequency
Range	300 MHz to the upper limit of the main unit (When MS2830A-077/177/078/178 is installed, or MS2850A.) 100 MHz to the upper limit of the main unit (MS269xA, MS2830A other than above.)
Resolution	1 Hz
Suffix code	`HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ` Hz is used when omitted.
Default	1920 MHz

Details

This command is not available when the Replay function is executed.

Example of Use

To set the carrier frequency to 1.920 GHz.

```
FREQ:CENT 1.920GHZ
```

[:SENSe]:FREQuency:CENTer?

Carrier Frequency Query

Function

This command queries the carrier frequency of the measured signal.

Query

```
[:SENSe]:FREQuency:CENTer?
```

Response

```
<freq>
```

Parameter

`<freq>`	Carrier frequency
Range	300 MHz to the upper limit of the main unit (When MS2830A-077/177/078/178 is installed, MS2850A.) 100 MHz to the upper limit of the main unit (MS269xA, MS2830A other than above.)
Resolution	1 Hz Value is returned in Hz units.

Example of Use

To query the carrier frequency.

```
FREQ:CENT?
> 1920000000
```

2.2.2 Frequency Span

[:SENSe]:FREQuency:SPAN AUTO|<freq>

Frequency Span

Function

This command sets the Frequency Span.

Command

```
[:SENSe]:FREQuency:SPAN AUTO|<freq>
```

Parameter

`AUTO|<freq>`	Frequency Span
`AUTO`	Auto (Default)
`31.25MHZ`	31.25 MHz
`62.5MHZ`	62.5 MHz (When MS269xA-004/104/077/177/078/178 or MS2830A-004/104/077/177/078/178 is installed, or MS2850A)
`125MHZ`	125 MHz (When MS269xA-004/104/078/178 or MS2830A-004/104/078/178 is installed, or MS2850A.)
Suffix code	`HZ,KHZ,KZ,MHZ,MZ,GHZ,GZ` Hz is used when omitted.

Details

This can be set when MX269023A-001 is installed and Standard is LTE-A.
This is fixed to 31.25 MHz and cannot be set when Standard is LTE.
This is fixed to the span of digitized data when Replay function is executed.
The maximum span is defined as below.

31.25MHz	When neither MS269xA-004/104/077/177/078/178 nor MS2830A-004/104/077/177/078/178 is installed.
62.5MHz	When neither MS269xA-004/104/078/178 nor MS2830A-004/104/078/178 is installed and when MS269xA-077/177 or MS2830A-077/177 is installed.
125MHz	When MS269xA-004/104/078/178, MS2830A-004/104/078/178 is installed, or MS2850A.

Example of Use

To set Frequency Span to 31.25 MHz.

```
FREQ:SPAN 31.25MHZ
```

[:SENSe]:FREQuency:SPAN?

Frequency Span Query

Function

This command queries the Frequency Span.

Query

`[:SENSe]:FREQuency:SPAN?`

Response

`<freq>`

Parameter

`<freq>`	Frequency Span
`31250000`	31.25 MHz
`62500000`	62.5 MHz
`125000000`	125 MHz

Example of Use

To query the Frequency Span.

```
FREQ:SPAN?
> 31250000
```

2.2.3 Operating Band Setting

:CALCulation:OBANd:FREQuency:SETTing STANdard|USER

Operating Band Setting

Function

This command sets the Setting Mode of Operating Band (Standard or User).

Command

`:CALCulation:OBANd:FREQuency:SETTing <mode>`

Parameter

`<mode>`	Setting Mode of Operating Band
`STANdard`	Standard (Default)
`USER`	User

Details

When the mode is Standard, Operating Band is set by the band number. When the mode is User, Operating Band is set with the highest and lowest frequencies specified by the user.

Example of Use

To set Operating Band to Standard.

```
CALC:OBAN:FREQ:SETT STAN
```

:CALCulation:OBANd:FREQuency:SETTing?

Operating Band Setting Query

Function

This command queries the Setting Mode of Operating Band (Standard or User).

Query

`:CALCulation:OBANd:FREQuency:SETTing?`

Response

`<mode>`

Parameter

`<mode>`	Setting Mode of Operating Band
`STAN`	Standard (Default)
`USER`	User

Example of Use

To query the Operating Band Setting.

```
CALC:OBAN:FREQ:SETT?
> STAN
```

2.2.4 Operating Band Number

:CALCulation:OBANd <integer>

Operating Band Number

Function

This command sets the Operating Band Number.

Command

```
:CALCulation:OBANd <integer>
```

Parameter

`<integer>`	Operating Band Number
Range	0, 33 to 46
Resolution	1
Default	0

Details

This can be set only when Operating Band Setting is Standard.
When set to 1 to 32, the value is rounded up to 33.
The Operating Band setting is used for calculating the Spectral Flatness measurement Inside and Outside measurement results in Summary.
When the setting is 0, it is handled as all inside the Tx band.
Inside and Outside correspond to Range 1 and Range 2 respectively that are defined in 3GPP TS 36.521-1.

Example of Use

To set Operating Band Number to 33.

```
:CALC:OBAND 33
```

:CALCulation:OBANd?

Operating Band Number Query

Function

This command queries the Operating Band Number.

Query

```
:CALCulation:OBANd?
```

Response

```
<integer>
```

Parameter

`<integer>`	Operating Band Number
Range	0, 33 to 46
Resolution	1

Example of Use

To query the Operating Band Number.

```
CALC:OBAN?
> 33
```

2.2.5 Operating Band Lowest Frequency

:CALCulation:OBANd:FREQuency:LOWest <freq>

Operating Band Lowest Frequency

Function

This command sets the Operating Band Lowest Frequency.

Command

```
:CALCulation:OBANd:FREQuency:LOWest <freq>
```

Parameter

`<freq>`	Operating Band Lowest Frequency
Range	(Minimum Carrier Frequency–Maximum Span / 2) to (Maximum Carrier Frequency+Maximum Span / 2)
Resolution	1 Hz
Suffix code	`HZ,KHZ,KZ,MHZ,MZ,GHZ,GZ` Hz when omitted.
Default	(Minimum Carrier Frequency–Maximum Span / 2)

Details

This can be set only when Operating Band Setting is User.
Make sure not to set a value higher than Operating Band Highest Frequency.

Example of Use

To set the Operating Band Lowest Frequency to 84.375 MHz.

```
CALC:OBAN:FREQ:LOW 84.375MHZ
```

:CALCulation:OBANd:FREQuency:LOWest?

Operating Band Lowest Frequency Query

Function

This command queries the Operating Band Lowest Frequency.

Query

```
:CALCulation:OBANd:FREQuency:LOWest?
```

Response

```
<freq>
```

Parameter

`<freq>`	Operating Band Lowest Frequency
Range	(Minimum Carrier Frequency–Maximum Span / 2) to (Maximum Carrier Frequency+Maximum Span / 2)
Resolution	1 Hz Value is returned in Hz units.

Example of Use

To query the Operating Band Lowest Frequency.

```
CALC:OBAN:FREQ:LOW?
> 84375000
```

2.2.6 Operating Band Highest Frequency

:CALCulation:OBANd:FREQuency:HIGHest <freq>

Operating Band Highest Frequency

Function

This command sets the Operating Band Highest Frequency.

Command

```
:CALCulation:OBANd:FREQuency:HIGHest <freq>
```

Parameter

`<freq>`	Operating Band Highest Frequency
Range	(Minimum Carrier Frequency–Maximum Span / 2) to (Maximum Carrier Frequency+Maximum Span / 2)
Resolution	1 Hz
Suffix code	HZ,KHZ,KZ,MHZ,MZ,GHZ,GZ Hz is used when omitted.
Default	(Maximum Carrier Frequency–Maximum Span / 2)

Details

This can be set only when Operating Band Setting is User.
Make sure not to set a value lower than Operating Band Lowest Frequency.

Example of Use

To set Operating Band Highest Frequency to 31.25 MHz.

```
CALC:OBAN:FREQ:HIGH 6.015625GHZ
```

:CALCulation:OBANd:FREQuency:HIGHest?

Operating Band Highest Frequency Query

Function

This command queries the Operating Band Highest Frequency.

Query

```
:CALCulation:OBANd:FREQuency:HIGHest?
```

Response

```
<freq>
```

Parameter

`<freq>`	Operating Band Highest Frequency
Range	(Minimum Carrier Frequency–Maximum Span / 2) to (Maximum Carrier Frequency+Maximum Span / 2)
Resolution	1 Hz Value is returned in Hz units.

Example of Use

To query the Operating Band Highest Frequency.

```
CALC:OBAN:FREQ:HIGH?
> 6015625000
```

2.2.7 Input Level

[:SENSe]:POWer[:RF]:RANGe:ILEVel <real>

Input Level

Function

This command sets the input level of RF signals.

Command

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

Parameter

<real>	Input level
Range	(–60.00+Level Offset) to (30.00+Level Offset) dBm When Pre-Amp is Off: (–80.00+Level Offset) to (10.00+Level Offset) dBm When Pre-Amp is On:
Resolution	0.01 dB
Unit	1 dBm
Suffix code	DBM dBm is used when omitted.
Default	–10.00 dBm

Details

The setting range when Pre Amp is Off is applied if the MS2690A/MS2691A/MS2692A-008 6 GHz Preamplifier, MS2830A-008 Preamplifier, or MS2850A-068 Preamplifier (hereinafter referred to as "Option 008") is not installed.

This command is not available when the Replay function is executed.

Example of Use

To set the input level to –10 dBm.

```
POW:RANG:ILEV -10
```

[:SENSe]:POWer[:RF]:RANGe:ILEVel?

Input Level Query

Function

This command queries the input level of RF signals.

Query

```
[:SENSe]:POWer[:RF]:RANGe:ILEVel?
```

Response

```
<real>
```

Parameter

<real>	Input level
Range	(–60.00+Level Offset) to (30.00+Level Offset) dBm When Pre-Amp is Off: (–80.00+Level Offset) to (10.00+Level Offset) dBm When Pre-Amp is On:
Resolution	0.01 dB Value is returned in dBm units.

Example of Use

To query the input level.

```
POW:RANG:ILEV?
> -10.00
```

2.2.8 Reference Level

:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>

Reference Level (Remote only)

Function

This command sets the reference level for ACP/Channel Power/OBW/SEM measurements.

Command

```
:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>
```

Parameter

`<real>`	Reference level
Range	(Minimum input level + 14) to (Maximum input level + 14) dBm
Resolution	0.01 dB
Suffix code	DBM dBm is used when omitted.
Default	4.00 dBm

Details

Reference Level indicates the peak level of the input signal by using the internal parameter which is automatically calculated to Input Level and is not shown on the screen. This Reference level value is applied to the measurement function when fetching ACP/Channel Power/OBW/SEM measurement functions. The Input Level value is also changed when the Reference Level is changed.

This command is not available when the Replay function is executed.

Example of Use

To set the reference level to 0.00 dBm

```
DISP:WIND:TRAC:Y:RLEV 0.00DBM
```

:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?

Reference Level Query (Remote only)

Function

This command queries the reference level for ACP/Channel Power/OBW/SEM measurements.

Query

```
:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
```

Response

```
<real>
```

Parameter

<real>	Reference level
Range	(Minimum input level + 14) to (Maximum input level + 14) dBm
Resolution	0.01 dB
	Value is returned in dBm units.

Example of Use

To query the reference level.

```
DISP:WIND:TRAC:Y:RLEV?
> 0.00
```

2.2.9 Level Offset

:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet <rel_power>

Level Offset Value

Function

This command sets the input level offset value.

Command

```
:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet
<rel_power>
```

Parameter

`<rel_power>`	Offset value
Range	–99.99 to +99.99 dB
Resolution	0.01 dB
Suffix code	DB dB is used when omitted.
Default	0 dB

Example of Use

To set the input level offset value to +10 dB.

```
DISP:WIND:TRAC:Y:RLEV:OFFS 10
```

:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet?

Level Offset Value Query

Function

This command queries the input level offset value.

Query

```
:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet?
```

Response

```
<rel_power>
```

Parameter

`<rel_power>`	Offset value
Range	–99.99 to +99.99 dB
Resolution	0.01 dB

Example of Use

To query the input level offset value.

```
DISP:WIND:TRAC:Y:RLEV:OFFS?
> 10.00
```

2.2.10 Level Offset State

:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet:STATe OFF|ON|0|1

Level Offset State

Function

This command enables/disables the offset function of the input level.

Command

`:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet:STATe <switch>`

Parameter

`<switch>`	Enable/disable input level offset function
`OFF|0`	Disabled (default)
`ON|1`	Enabled

Example of Use

To enable the input level offset function.

```
DISP:WIND:TRAC:Y:RLEV:OFFS:STAT ON
```

:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet:STATe?

Level Offset State Query

Function

This command queries the state of the input level offset function.

Query

`:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet:STATe?`

Response

`<switch>`

Parameter

`<switch>`	Enable/disable input level offset function
`0`	Disabled
`1`	Enabled

Example of Use

To query the state of the input level offset function.

```
DISP:WIND:TRAC:Y:RLEV:OFFS:STAT?
> 1
```

2.2.11 Pre Amp

[:SENSe]:POWer[:RF]:GAIN[:STATe] OFF|ON|0|1

Pre Amp

Function

This command sets Pre-Amp to On/Off.

Command

`[:SENSe]:POWer[:RF]:GAIN[:STATe] <switch>`

Parameter

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

Details

This command is invalid when the Option 008 is not installed.

This command is not available when the Replay function is executed.

Example of Use

To set Pre-Amp to On.

```
POW:GAIN ON
```

[:SENSe]:POWer[:RF]:GAIN[:STATe]?

Pre Amp Query

Function

This command queries the state of Pre-Amp.

Query

`[:SENSe]:POWer[:RF]:GAIN[:STATe]?`

Response

`<switch>`

Parameter

`<switch>`	Pre-Amp On/Off
`0`	Off
`1`	On

Details

Off is returned when the Option 008 is not installed.

Example of Use

To query the state of Pre-Amp.

```
POW:GAIN?
> 1
```

2.2.12 Lowest ATT Setting

[:SENSe]:POWer[:RF]:ATTenuation:LOWest:SETTing 0dB|4dB

Lowest ATT Setting

Function

This command switches the lower limit of the internal attenuator among 0, 4, 10 dB.

Command

```
[:SENSe]:POWer[:RF]:ATTenuation:LOWest:SETTing <mode>
```

Parameter

<mode>	Lowest ATT setting
0DB	0 dB
4DB	4 dB (Default)
10DB	10 dB

Details

This command switches the lower limit setting of the attenuator among 0, 4, 10 dB.

Example of Use

To set the lowest ATT setting to 0 dB.

```
POW:ATT:LOW:SETT 0DB
```

[:SENSe]:POWer[:RF]:ATTenuation:LOWest:SETTing?

Lowest ATT Setting Query

Function

This command queries the lower limit of the internal attenuator.

Query

```
[:SENSe]:POWer[:RF]:ATTenuation:LOWest:SETTing?
```

Response

<mode>

Parameter

<mode>	Lowest ATT setting
0DB	0 dB
4DB	4 dB
10DB	10 dB

Example of Use

To query the lowest ATT setting.

```
POW:ATT:LOW:SETT?
> 0DB
```

2.3 Setting System Parameters

Table 2.3-1 lists the device messages for the communication system of the measurement target.

Table 2.3-1 Device Messages for Setting System Parameters

Parameter	Device Messages
Standard	[:SENSe]:RADio:STANdard LTE|LTEA
	[:SENSe]:RADio:STANdard?
Contiguous Mode	[:SENSe]:RADio:CONTiguous OFF|ON|0|1
	[:SENSe]:RADio:CONTiguous?
Number of CCs	[:SENSe]:RADio:CC:NUMBer <integer>
	[:SENSe]:RADio:CC:NUMBer?
Synchronization CC#	[:SENSe]:RADio:SYNChronization:CC 0|1|EACH
	[:SENSe]:RADio:SYNChronization:CC?
Setting/Result Target CC#	[:SENSe]:RADio:TCC 0|1
	[:SENSe]:RADio:TCC?
In-Band Emission Carrier Leakage Frequency	[:SENSe]:RADio:CLFRequency:IBEMission CFRequency|CCCenter
	[:SENSe]:RADio:CLFRequency:IBEMission?
Carrier Leak Rejection	[:SENSe]:RADio:CLEak:REJection:CFRequency OFF|ON|0|1
	[:SENSe]:RADio:CLEak:REJection:CFRequency?
	[:SENSe]:RADio:CLEak:REJection:CCCenter OFF|ON|0|1
	[:SENSe]:RADio:CLEak:REJection:CCCenter?
CC Status	[:SENSe]:RADio:CC[:STATe] OFF|ON|0|1
	[:SENSe]:RADio:CC[:STATe]?
CC Frequency Offset	[:SENSe]:RADio:CC:FREQunecy:OFFSet <freq_0>,<freq_1>
	[:SENSe]:RADio:CC:FREQunecy:OFFSet?
Channel Bandwidth	[:SENSe]:RADio:CBANdwidth 20|15|10|5|3|1M4
	[:SENSe]:RADio:CBANdwidth?
Uplink-downlink Configuration	[:SENSe]:RADio:UDConfiguration <integer>
	[:SENSe]:RADio:UDConfiguration?
Special Subframe Configuration	[:SENSe]:RADio:SSConfiguration <integer>
	[:SENSe]:RADio:SSConfiguration?
Target Channel	[:SENSe]:RADio:TCHannel:PUSCh INCLude|EXCLude
	[:SENSe]:RADio:TCHannel:PUSCh?
	[:SENSe]:RADio:TCHannel:PUCCh INCLude|EXCLude
	[:SENSe]:RADio:TCHannel:PUCCh?
	[:SENSe]:RADio:TCHannel:PRACh INCLude|EXCLude
	[:SENSe]:RADio:TCHannel:PRACh?

Table 2.3-1 Device Messages for Setting System Parameters (Cont'd)

Parameter	Device Messages
PUSCH Reference Signal - Cell ID	:CALCulate:EVM:PUSCh:RSIGnal:CELLid <integer>
	:CALCulate:EVM:PUSCh:RSIGnal:CELLid?
PUSCH Reference Signal - nDMRS1,nDMRS2	:CALCulate:EVM:PUSCh:RSIGnal:DMRS1|DMRS2 <integer>
	:CALCulate:EVM:PUSCh:RSIGnal:DMRS1|DMRS2?
PUSCH Reference Signal - delta SS	:CALCulate:EVM:PUSCh:RSIGnal:DSS <integer>
	:CALCulate:EVM:PUSCh:RSIGnal:DSS?
PUSCH Reference Signal - Group Hopping	:CALCulate:EVM:PUSCh:RSIGnal:SGRoup:HOPPing OFF|ON|0|1
	:CALCulate:EVM:PUSCh:RSIGnal:SGRoup:HOPPing?
PUSCH Reference Signal - Sequence Hopping	:CALCulate:EVM:PUSCh:RSIGnal:BSEQuence:HOPPing OFF|ON|0|1
	:CALCulate:EVM:PUSCh:RSIGnal:BSEQuence:HOPPing?
PUSCH DMRS Parameters - Subframe0-9 Assignment	[:SENSe]:RADio:PUSCh:ASSignment:SUBFrame [0]|1|2|3|4|5|6|7|8|9 OFF|ON|0|1
	[:SENSe]:RADio:PUSCh:ASSignment:SUBFrame [0]|1|2|3|4|5|6|7|8|9?
PUSCH DMRS Parameters - Subframe All Assignment	[:SENSe]:RADio:PUSCh:ASSignment OFF|ON|0|1
	[:SENSe]:RADio:PUSCh:ASSignment?
PUCCH Reference Signal - Cell ID	:CALCulate:EVM:PUCCh:RSIGnal:CELLid <integer>
	:CALCulate:EVM:PUCCh:RSIGnal:CELLid?
PUCCH Reference Signal - N_cs_1	:CALCulate:EVM:PUCCh:RSIGnal:NCS1 <integer>
	:CALCulate:EVM:PUCCh:RSIGnal:NCS1?
PUCCH Reference Signal - N_RB_2	:CALCulate:EVM:PUCCh:RSIGnal:NRB2 <integer>
	:CALCulate:EVM:PUCCh:RSIGnal:NRB2?
PUCCH Reference Signal - nPUCCH1	:CALCulate:EVM:PUCCh:RSIGnal:NPUCch1:SUBFrame [0]|1|2|3|4|5|6|7|8|9 <integer>
	:CALCulate:EVM:PUCCh:RSIGnal:NPUCch1:SUBFrame [0]|1|2|3|4|5|6|7|8|9?
PUCCH Reference Signal - nPUCCH2	:CALCulate:EVM:PUCCh:RSIGnal:NPUCch2 <integer>
	:CALCulate:EVM:PUCCh:RSIGnal:NPUCch2?
PUCCH Auto Calculate Params n_PUCCH3	:CALCulate:EVM:PUCCh:RSIGnal:NPUCch3:SUBFrame[0]|1|2|3|4|5|6|7|8|9 <integer>
	:CALCulate:EVM:PUCCh:RSIGnal:NPUCch3:SUBFrame[0]|1|2|3|4|5|6|7|8|9?
PUCCH Reference Signal - delta Shift PUCCH	:CALCulate:EVM:PUCCh:RSIGnal:DSHift <integer>
	:CALCulate:EVM:PUCCh:RSIGnal:DSHift?
PUCCH Reference Signal - Group Hopping	:CALCulate:EVM:PUCCh:RSIGnal:SGRoup:HOPPing OFF|ON|0|1
	:CALCulate:EVM:PUCCh:RSIGnal:SGRoup:HOPPing?

Table 2.3-1 Device Messages for Setting System Parameters (Cont'd)

Parameter	Device Messages
PUCCH DMRS Parameters - Subframe0-9 Assignment	[:SENSe]:RADio:PUCCh:ASSignment:SUBFrame [0]|1|2|3|4|5|6|7|8|9 OFF|ON|0|1
	[:SENSe]:RADio:PUCCh:ASSignment:SUBFrame [0]|1|2|3|4|5|6|7|8|9?
PUCCH DMRS Parameters - Subframe All Assignment	[:SENSe]:RADio:PUCCh:ASSignment OFF|ON|0|1
	[:SENSe]:RADio:PUCCh:ASSignment?
PRACH - Configuration	:CALCulate:EVM:PRACh:CONFiguration <integer>
	:CALCulate:EVM:PRACh:CONFiguration?
PRACH - Physical Root Sequence Number	:CALCulate:EVM:PRACh:PRSequence:NUMBer <integer>
	:CALCulate:EVM:PRACh:PRSequence:NUMBer?
PRACH - Cyclic Shift Value	:CALCulate:EVM:PRACh:CSHift <integer>
	:CALCulate:EVM:PRACh:CSHift?
Measurement Interval Resolution	[:SENSe]:EVM:CAPTure:TIME:RESolution SUBFrame|SLOT
	[:SENSe]:EVM:CAPTure:TIME:RESolution?
Starting Subframe Number	[:SENSe]:EVM:CAPTure:TIME:STARt <integer>
	[:SENSe]:EVM:CAPTure:TIME:STARt?
Measurement Interval (Subframe)	[:SENSe]:EVM:CAPTure:TIME:LENGth <integer>
	[:SENSe]:EVM:CAPTure:TIME:LENGth?
Starting Slot Number	[:SENSe]:EVM:CAPTure:TIME:STARt:SLOT <integer>
	[:SENSe]:EVM:CAPTure:TIME:STARt:SLOT?
Measurement Interval (Slot)	[:SENSe]:EVM:CAPTure:TIME:LENGth:SLOT <integer>
	[:SENSe]:EVM:CAPTure:TIME:LENGth:SLOT?
Analysis Frame Position	[:SENSe]:EVM:CAPTure:TIME:FPOSition <integer>
	[:SENSe]:EVM:CAPTure:TIME:FPOSition?
PUSCH Modulation Scheme	:CALCulate:EVM:PUSCh:MODulation QPSK|16Qam|64Qam|AUTO
	:CALCulate:EVM:PUSCh:MODulation?
PUCCH Format	:CALCulate:EVM:PUCCh:FORMat 1|1a|1b|2|2a|2b|3
	:CALCulate:EVM:PUCCh:FORMat?
Window Length (Ts unit)	:CALCulate:EVM:WLENgth <integer>
	:CALCulate:EVM:WLENgth?
Window Length (W unit)	:CALCulate:EVM:WLENgth:W <integer>
	:CALCulate:EVM:WLENgth:W?
Window Length Unit	:CALCulate:EVM:WLENgth:TYPE TS|W
	:CALCulate:EVM:WLENgth:TYPE?
Channel Bandwidth Selective Filter	[:SENSe]:RADio:CBANdwidth:FILTer OFF|ON|0|1
	[:SENSe]:RADio:CBANdwidth:FILTer?
RB Type of In-Band Emission Query	:CALCulate:EVM:WINDow11:RBLock:TYPE?
Delta RB of In-Band Emission Query	:CALCulate:EVM:WINDow11:RBLock:DELTa?

Table 2.3-1 Device Messages for Setting System Parameters (Cont'd)

Parameter	Device Messages
Exclusion Period Subframe0-9	:CALCulate:EVM:EPERiod:SUBFrame[0]|1|2|3|4|5|6|7|8|9 OFF|ON|0|1
	:CALCulate:EVM:EPERiod:SUBFrame[0]|1|2|3|4|5|6|7|8|9?
Leading Exclusion Period Subframe0-9	:CALCulate:EVM:EPERiod:LEADing:SUBFrame[0]|1|2|3|4|5|6|7|8|9 <time>
	:CALCulate:EVM:EPERiod:LEADing:SUBFrame[0]|1|2|3|4|5|6|7|8|9?
Lagging Exclusion Period Subframe0-9	:CALCulate:EVM:EPERiod:LAGGing:SUBFrame[0]|1|2|3|4|5|6|7|8|9 <time>
	:CALCulate:EVM:EPERiod:LAGGing:SUBFrame[0]|1|2|3|4|5|6|7|8|9?
PUSCH - First RB all Subframe	:CALCulate:EVM:PUSCh:RBLock:FIRSt <integer>
	:CALCulate:EVM:PUSCh:RBLock:FIRSt?
PUSCH - First RB Subframe0-9	:CALCulate:EVM:PUSCh:RBLock:FIRSt:SUBFrame[0]|1|2|3|4|5|6|7|8|9 <integer>
	:CALCulate:EVM:PUSCh:RBLock:FIRSt:SUBFrame[0]|1|2|3|4|5|6|7|8|9?
PUSCH - Number of RBs all Subframe	:CALCulate:EVM:PUSCh:RBLock:NUMBer <integer>
	:CALCulate:EVM:PUSCh:RBLock:NUMBer?
PUSCH - Number of RBs Subframe0-9	:CALCulate:EVM:PUSCh:RBLock:NUMBer:SUBFrame[0]|1|2|3|4|5|6|7|8|9 <integer>
	:CALCulate:EVM:PUSCh:RBLock:NUMBer:SUBFrame[0]|1|2|3|4|5|6|7|8|9?
PRACH - Frequency Offset	:CALCulate:EVM:PRACh:FREQuency:OFFSet <integer>
	:CALCulate:EVM:PRACh:FREQuency:OFFSet?

2.3.1 Standard

[:SENSe]:RADio:STANdard LTE|LTEA

Standard

Function

This command sets the Standard (LTE / LTE-Advanced).

Command

`[:SENSe]:RADio:STANdard <mode>`

Parameter

<mode>	Standard	
LTE	LTE	(Default)
LTEA	LTE-A:	LTE-Advanced

Details

The software option MX269023A-001 is required to select LTE-A.

Example of Use

To set Standard to LTE.

```
RAD:STAN LTE
```

[:SENSe]:RADio:STANdard?

Standard Query

Function

This command queries the Standard.

Query

`[:SENSe]:RADio:STANdard?`

Response

<mode>

Parameter

<mode>	Standard	
LTE	LTE	
LTEA	LTE-A:	LTE-Advanced

Example of Use

To query the Standard.

```
RAD:STAN?
> LTE
```

2.3.2 Contiguous Mode

[:SENSe]:RADio:CONTiguous OFF|ON|0|1

Contiguous Mode

Function

This command sets the Contiguous Mode.

Command

```
[:SENSe]:RADio:CONTiguous <switch>
```

Parameter

<switch>	Contiguous Mode
OFF|0	Intra-band non-contiguous CA
ON|1	Intra-band contiguous CA (Default)

Details

This can be set when MX269023A-001 is installed and Standard is LTE-A.

Example of Use

To set the Contiguous Mode to On.

```
RAD:CONT 1
```

[:SENSe]:RADio:CONTiguous?

Contiguous Mode Query

Function

This command queries the Contiguous Mode.

Query

```
[:SENSe]:RADio:CONTiguous?
```

Response

```
<switch>
```

Parameter

<switch>	Contiguous Mode
0	OFF
1	ON

Example of Use

To query the Contiguous Mode.

```
RAD:CONT?
> 1
```

2.3.3 Number of CCs

[:SENSe]:RADio:CC:NUMBer <integer>

Number of CCs

Function

This command sets the number of target CCs to measure.

Command

```
[:SENSe]:RADio:CC:NUMBer <integer>
```

Parameter

`<integer>`	Number of CCs to measure
Range	1 to 2
Resolution	1
Suffix code	None
Default	2

Details

This can be set when MX269023A-001 is installed and Standard is LTE-A.

Example of Use

To set the number of target CCs to 1.

```
RAD:CC:NUMB 1
```

[:SENSe]:RADio:CC:NUMBer?

Number of CCs Query

Function

This command queries the number of target CCs to measure.

Query

```
[:SENSe]:RADio:CC:NUMBer?
```

Response

```
<integer>
```

Parameter

`<integer>`	Number of CCs to measure
Range	1 to 2
Resolution	1

Example of Use

To query the number of target CCs to measure.

```
RAD:CC:NUMB?
> 1
```

2.3.4 Synchronization CC#

[:SENSe]:RADio:SYNChronization:CC 0|1|EACH

Synchronization CC#

Function

This command sets CC# to use in frame synchronization.

Command

```
[:SENSe]:RADio:SYNChronization:CC <mode>
```

Parameter

<mode>	Synchronization CC#
0	CC#0 (Default)
1	CC#1 (When Number of CCs is 2.)
EACH	Each CC (When Contiguous Mode is Off.)

Details

This is available when MX269023A-001 is installed, and Standard is LTE-A.

Example of Use

To set CC# to use in frame synchronization to 0.

```
RAD:SYNC:CC 0
```

[:SENSe]:RADio:SYNChronization:CC?

Synchronization CC# Query

Function

This command queries CC# to use in frame synchronization.

Query

```
[:SENSe]:RADio:SYNChronization:CC?
```

Response

```
<mode>
```

Parameter

<mode>	Synchronization CC#
0	CC#0
1	CC#1
EACH	EACH CC

Example of Use

To query CC# to use in frame synchronization.

```
RAD:SYNC:CC?
> 0
```

2.3.5 Setting/Result Target CC#

[:SENSe]:RADio:TCC 0|1

Setting/Result Target CC#

Function

This command selects target CC# for parameter setting and measurement result display (both screen and remote) for the items to measure in each CC individually.

Command

`[:SENSe]:RADio:TCC <mode>`

Parameter

`<mode>`	Setting/Result Target CC#
0	CC#0 (Default)
1	CC#1 (Only when Number of CCs is 2)

Details

This is available when MX269023A-001 is installed, and Standard is LTE-A.

Example of Use

To set the target for parameter setting and measurement result display to CC#0.

```
RAD:TCC 0
```

[:SENSe]:RADio:TCC?

Setting/Result Target CC# Query

Function

This command queries target CC# for parameter setting and measurement result display (both screen and remote) for the items to measure in each CC individually.

Query

`[:SENSe]:RADio:TCC?`

Response

`<mode>`

Parameter

`<mode>`	Setting/Result Target CC#
0	CC#0
1	CC#1

Example of Use

To query the target CC# for parameter setting and measurement result display.

```
RAD:TCC?
> 0
```

2.3.6 In-Band Emission Carrier Leakage Frequency

[:SENSe]:RADio:CLFRequency:IBEMission CFRequency|CCCenter

In-Band Emission Carrier Leakage Frequency

Function

This command sets Position of Carrier Leakage Frequency (depends on DUT) in LTE-Advanced In-band emission measurement.

Command

```
[:SENSe]:RADio:CLFRequency:IBEMission <mode>
```

Parameter

<mode>	Position of Carrier Leakage Frequency
CFRequency	At Carrier Frequency (Default)
CCCenter	At Each CC Center

Details

This is available when MX269023A-001 is installed, and Standard is LTE-A.
It is unavailable when CC#0 Status and CC#1 Status are both On.

Example of Use

To set Position of Carrier Leakage Frequency in In-band emission measurement to At Carrier Frequency.

```
RAD:CLFR:IBEM CFR
```

[:SENSe]:RADio:CLFRequency:IBEMission?

In-Band Emission Carrier Leakage Frequency Query

Function

This command queries Position of Carrier Leakage Frequency (depends on DUT) in LTE-Advanced In-band emission measurement.

Query

```
[:SENSe]:RADio:CLFRequency:IBEMission?
```

Response

```
<mode>
```

Parameter

<mode>	Position of Carrier Leakage Frequency
CFR	At Carrier Frequency
CCC	At Each CC Center

Example of Use

To query Position of Carrier Leakage Frequency in In-band emission measurement.

```
RAD:CLFR:IBEM?
> CFR
```

2

SCPI Device Message Details

2.3.7 Carrier Leak Rejection

[:SENSe]:RADio:CLEak:REJection:CFRequency OFF|ON|0|1

Carrier Leak Rejection (At Carrier Frequency)

Function

Sets whether to remove carrier leak at the center of CA bandwidth (frequency set for Carrier Frequency) in LTE-Advanced CA measurement.

Command

```
[:SENSe]:RADio:CLEak:REJection:CFRequency <switch>
```

Parameter

`<switch>`	Removes carrier leak at the center of CA bandwidth or not.
`OFF|0`	Does not remove carrier leak. (Default)
`ON|1`	Removes carrier leak

Details

The setting is available when the MX269023A-001 is installed and Standard is LTE-A.

Note:

The measurement results of Origin Offset are always carrier leak elements at the center of CC#0 and CC#1, regardless of On/Off status of this function.

Example of Use

To set removal of carrier leak at the center of CA bandwidth.

```
RAD:CLE:REJ:CFR ON
```

[:SENSe]:RADio:CLEak:REJection:CFRequency?

Carrier Leak Rejection (At Carrier Frequency) Query

Function

Queries whether carrier leak is removed at the center of CA bandwidth in LTE Advanced CA measurement.

Query

`[:SENSe]:RADio:CLEak:REJection:CFRequency?`

Response

`<switch>`

Parameter

`<switch>`	Removes carrier leak at the center of CA bandwidth or not.
`0`	Does not remove carrier leak.
`1`	Removes carrier leak.

Example of Use

To query whether carrier leak is removed at the center of CA bandwidth in LTE Advanced CA measurement.

```
RAD:CLE:REJ:CFR?
> 1
```

[:SENSe]:RADio:CLEak:REJection:CCCenter OFF|ON|0|1

Carrier Leak Rejection (At CC Center)

Function

Sets whether to remove carrier leak at the CC center (frequency set for CC Frequency Offset) in LTE-Advanced CA measurement.

Command

`[:SENSe]:RADio:CLEak:REJection:CCCenter <switch>`

Parameter

`<switch>` Removes carrier leak at the center of CC bandwidth or not.

`OFF|0`	Does not remove carrier leak. (Default)
`ON|1`	Removes carrier leak.

Details

The setting is available when the MX269023A-001 is installed and Standard is LTE-A.
The same setting can be performed for CC#0 and CC#1 individually. To change the CC to set, edit Setting/Result Target CC#.

Note:

The measurement results of Origin Offset are always carrier leak elements at the center of CC#0 and CC#1, regardless of On/Off status of this function.

Example of Use

To set removal of carrier leak at the center of CC bandwidth.
`RAD:CLE:REJ:CCC ON`

[:SENSe]:RADio:CLEak:REJection:CCCenter?

Carrier Leak Rejection (At CC Center) Query

Function

Sets whether to remove carrier leak at the center of CC bandwidth in LTE Advanced CA measurement.

Query

```
[:SENSe]:RADio:CLEak:REJection:CCCenter?
```

Response

```
<switch>
```

Parameter

`<switch>`	Removes carrier leak at the center of CC bandwidth or not.
`0`	Does not remove carrier leak.
`1`	Removes carrier leak.

Example of Use

To query whether carrier leak is removed at the center of CC bandwidth or not.

```
RAD:CLE:REJ:CCC?
> 1
```

2.3.8 CC Status

[:SENSe]:RADio:CC[:STATe] OFF|ON|0|1

CC Status

Function

This command sets the CC Status. When the status is On, the measurement is performed on the assumption that a signal is allocated to the CC (Allocated).When it is Off, the measurement is performed on the assumption that a signal is not allocated to the CC (Non-allocated).

Command

```
[:SENSe]:RADio:CC[:STATe] <switch>
```

Parameter

`<switch>`	CC Status
`OFF|0`	OFF
`ON|1`	ON (Default)

Details

This is available when MX269023A-001 is installed, and Standard is LTE-A.
It can be set for each CC individually. To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set the CC Status to On.

```
RAD:CC ON
```

[:SENSe]:RADio:CC[:STATe]?

CC Status Query

Function

This command queries the setting of CC Status.

Query

```
[:SENSe]:RADio:CC[:STATe]?
```

Response

```
<switch>
```

Parameter

<switch>	CC Status
0	OFF
1	ON

Details

This is set for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the setting of CC Status.

```
RAD:CC?
> 1
```

2.3.9 CC Frequency Offset

[:SENSe]:RADio:CC:FREQunecy:OFFSet <freq_0>,<freq_1>

CC Frequency Offset

Function

This command sets Frequency Offset against Carrier Frequency of each CC collectively.

Command

```
[:SENSe]:RADio:CC:FREQunecy:OFFSet <freq_0>,<freq_1>
```

Parameter

<freq 0>,<freq 1>	CC#0, CC#1 Frequency Offset
Range	± (Valid Span – Channel Bandwidth) / 2
Resolution	1 Hz
Suffix code	HZ,KHZ,KZ,MHZ,MZ,GHZ,GZ Hz is used when omitted.
Default	CC#0 = –2.4 MHz CC#1 = 2.4 MHz

Details

This is available when MX269023A-001 is installed, and Standard is LT-Adv.

When Frequency Span is Auto, the above setting range is set according to the maximum span.
When Contiguous Mode is On, the Freq. Offset between CC#0 and CC#1 is limited to the multiples of 300 kHz.
When Frequency Span is Auto, the span is automatically set as below.

31.25 MHz	The case where absolute value of each CC edge is 15.625 MHz or below.
62.5 MHz	The case where the absolute value of each CC edge is 31.25 MHz and that does not correspond to the above.
125 MHz	The case that does not correspond to the above.

Note:

When Contiguous Mode is changed to On from Off, CC#1 value is rounded up or down automatically so that it becomes the closest multiple of 300 kHz.

Example of Use

To set frequency offset of CC#0 and CC#1 to –2.4 MHz and 2.4 MHz respectively.

```
RAD:CC:FREQ:OFFS -2400000,2400000
```

[:SENSe]:RADio:CC:FREQunecy:OFFSet?

CC Frequency Offset Query

Function

This command queries frequency offset of each CC against Carrier Frequency.

Query

```
[:SENSe]:RADio:CC:FREQunecy:OFFSet?
```

Response

```
<freq 0>,<freq 1>
```

Parameter

`<freq 0>,<freq 1>`	CC#0, CC#1 Frequency Offset
Range	±(Valid Span – Channel Bandwidth) / 2
Resolution	1 Hz

Example of Use

To query the frequency offset settings of CC#0 and CC#1.

```
RAD:CC:FREQ:OFFS?
> -2400000,2400000
```

2.3.10 Channel Bandwidth

[:SENSe]:RADio:CBANdwidth 20|15|10|5|3|1M4

Channel Bandwidth

Function

This command sets the band of the measured signal.

Command

`[:SENSe]:RADio:CBANdwidth <mode>`

Parameter

`<mode>`	Bandwidth for signal to be measured
`20`	Sets 20 MHz band signal for analysis.
`15`	Sets 15 MHz band signal for analysis.
`10`	Sets 10 MHz band signal for analysis.
`5`	Sets 5 MHz band signal for analysis. (Default)
`3`	Sets 3 MHz band signal for analysis.
`1M4`	Sets 1.4 MHz band signal for analysis.

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set the bandwidth of the signal to be measured to 5 MHz.

```
RAD:CBAN 5
```

[:SENSe]:RADio:CBANdwidth?

Channel Bandwidth Query

Function

This command queries the setting of the band.

Query

```
[:SENSe]:RADio:CBANdwidth?
```

Response

```
<mode>
```

Parameter

<mode>	Bandwidth for signal to be measured
20	Sets 20 MHz band signal for analysis.
15	Sets 15 MHz band signal for analysis.
10	Sets 10 MHz band signal for analysis.
5	Sets 5 MHz band signal for analysis.
3	Sets 3 MHz band signal for analysis.
1M4	Sets 1.4 MHz band signal for analysis.

Details

When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To set the bandwidth of the signal to be measured to 5 MHz.

```
RAD:CBAN?
> 5
```

2.3.11 Uplink-downlink Configuration

[:SENSe]:RADio:UDConfiguration <integer>

Uplink-downlink Configuration

Function

This command sets the Uplink-downlink Configuration.

Command

```
[:SENSe]:RADio:UDConfiguration <integer>
```

Parameter

`<integer>`	Uplink-downlink Configuration
Range	0 to 6
Default	1

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set Uplink-downlink Configuration to 2.

```
RAD:UDC 2
```

[:SENSe]:RADio:UDConfiguration?

Uplink-downlink Configuration Query

Function

This command queries the Uplink-downlink Configuration.

Query

```
[:SENSe]:RADio:UDConfiguration?
```

Response

```
<integer>
```

Parameter

`<integer>`	Uplink-downlink Configuration
Range	0 to 6

Details

When Standard is LTE-A, this can be queried for each CC individually.
To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the Uplink-downlink Configuration.

```
RAD:UDC?
> 2
```

2.3.12 Special Subframe Configuration

[:SENSe]:RADio:SSConfiguration <integer>

Special Subframe Configuration

Function

This command sets the Special Subframe Configuration.

Command

`[:SENSe]:RADio:SSConfiguration <integer>`

Parameter

`<integer>`	Special Subframe Configuration
Range	0 to 8
Default	4

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set Special Subframe Configuration to 2.

```
RAD:SSC 2
```

[:SENSe]:RADio:SSConfiguration?

Special Subframe Configuration Query

Function

This command queries the Special Subframe Configuration.

Query

`[:SENSe]:RADio:SSConfiguration?`

Response

`<integer>`

Parameter

`<integer>`	Special Subframe Configuration
Range	0 to 8

Details

When Standard is LTE-A, this can be queried for each CC individually.
To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query Special Subframe Configuration.

```
RAD:SSC?
> 2
```

2.3.13 Target Channel

[:SENSe]:RADio:TCHannel:PUSCh INCLude|EXCLude

Target Channel PUSCH

Function

This command sets the status of PUSCH target channel.

Command

`[:SENSe]:RADio:TCHannel:PUSCh <mode>`

Parameter

`<mode>`	PUSCH measurement	
`INCLude`	Include	Measures. (Default)
`EXCLude`	Exclude	Does not measure.

Details

Include and Exclude of each Target Channel are mutually exclusive.

Example of Use

To set the status of PUSCH target channel to Include.

`RAD:TCH:PUSC INCL`

[:SENSe]:RADio:TCHannel:PUSCh?

Target Channel PUSCH Query

Function

This command queries the status of PUSCH target channel.

Query

`[:SENSe]:RADio:TCHannel:PUSCh?`

Response

`<mode>`

Parameter

`<mode>`	PUSCH measurement	
`INCL`	Include	Measures.
`EXCL`	Exclude	Does not measure.

Example of Use

To query the status of PUSCH target channel.

```
RAD:TCH:PUSC?
> INCL
```

[:SENSe]:RADio:TCHannel:PUCCh INCLude|EXCLude

Target Channel PUCCH

Function

This command sets the status of PUCCH target channel.

Command

```
[:SENSe]:RADio:TCHannel:PUCCh <mode>
```

Parameter

`<mode>`	PUCCH measurement	
`INCLude`	Include	Measures.
`EXCLude`	Exclude	Does not measure. (Default)

Details

Include and Exclude of each Target Channel are mutually exclusive.

Example of Use

To set the status of PUCCH target channel to Include.

```
RAD:TCH:PUCC INCL
```

[:SENSe]:RADio:TCHannel:PUCCh?

Target Channel PUCCH Query

Function

This command queries the status of PUCCH target channel.

Query

```
[:SENSe]:RADio:TCHannel:PUCCh?
```

Response

```
<mode>
```

Parameter

`<mode>`	PUCCH measurement	
`INCL`	Include	Measures.
`EXCL`	Exclude	Does not measure.

Example of Use

To query the status of PUCCH target channel.

```
RAD:TCH:PUCC?
> INCL
```

[:SENSe]:RADio:TCHannel:PRACh INCLude|EXCLude

Target Channel PRACH

Function

This command sets the status of PRACH target channel.

Command

`[:SENSe]:RADio:TCHannel:PRACh <mode>`

Parameter

`<mode>`	PRACH measurement	
`INCLude`	Include	Measures.
`EXCLude`	Exclude	Does not measure. (Default)

Details

This is available when Standard is LTE.
Include and Exclude of each Target Channel are mutually exclusive.

Example of Use

To set the status of PRACH target channel to Include.

```
RAD:TCH:PRAC INCL
```

[:SENSe]:RADio:TCHannel:PRACh?

Target Channel PRACH Query

Function

This command queries the status of PRACH target channel.

Query

`[:SENSe]:RADio:TCHannel:PRACh?`

Response

`<mode>`

Parameter

`<mode>`	PRACH measurement	
`INCL`	Include	Measures.
`EXCL`	Exclude	Does not measure.

Example of Use

To query the status of PRACH target channel.

```
RAD:TCH:PRAC?
> INCL
```

2.3.14 Reference Signal PUSCH

:CALCulate:EVM:PUSCh:RSIGnal:CELLid <integer>

PUSCH Reference Signal - Cell ID

Function

This command sets the Cell ID for PUSCH measurement.

Command

```
:CALCulate:EVM:PUSCh:RSIGnal:CELLid <integer>
```

Parameter

`<integer>`	Cell ID for PUSCH measurement
Range	0 to 503
Resolution	1
Suffix code	None
Default	0

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set the Cell ID to 10 for PUSCH measurement.

```
CALC:EVM:PUSC:RSIG:CELL 0
```

:CALCulate:EVM:PUSCh:RSIGnal:CELLid?

PUSCH Reference Signal - Cell ID Query

Function

This command queries the Cell ID for PUSCH measurement.

Query

```
:CALCulate:EVM:PUSCh:RSIGnal:CELLid?
```

Response

```
<integer>
```

Parameter

`<integer>`	Cell ID for PUSCH measurement
Range	0 to 503
Resolution	1

Details

When Standard is LTE-A, this can be queried for each CC individually.
To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To set the Cell ID for PUSCH measurement.

```
CALC:EVM:PUSC:RSIG:CELL?
> 0
```

:CALCulate:EVM:PUSCh:RSIGnal:DMRS1|DMRS2 <integer>

PUSCH Reference Signal - nDMRS1, nDMRS2

Function

Sets the n_DMRS_1 and n_DMRS_2 value for PUSCH measurement.

Command

```
:CALCulate:EVM:PUSCh:RSIGnal:DMRS1|DMRS2 <integer>
```

Parameter

`<integer>`	n_DMRS1, n_DMRS2 for PUSCH measurement
Range	0 to 10 (1.5.7 is not available)
Resolution	1
Suffix code	None
Default	0

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set the value of n_DMRS1 to 3 for PUSCH measurement.

```
CALC:EVM:PUSC:RSIG:DMRS1 3
```

:CALCulate:EVM:PUSCh:RSIGnal:DMRS1|DMRS2?

PUSCH Reference Signal - nDMRS1,nDMRS2 Query

Function

This command queries the n_DMRS_1 and n_DMRS_2 value for PUSCH measurement.

Query

```
:CALCulate:EVM:PUSCh:RSIGnal:DMRS1|DMRS2?
```

Response

```
<integer>
```

Parameter

`<integer>`	n_DMRS1, n_DMRS2 for PUSCH measurement
Range	0 to 10 (1, 5, and 7 are not returned.)
Resolution	1

Details

When Standard is LTE-A, this can be queried for each CC individually.
To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the value of n_DMRS1 for PUSCH measurement.

```
CALC:EVM:PUSC:RSIG:DMRS1?
> 3
```

:CALCulate:EVM:PUSCh:RSIGnal:DSS <integer>

PUSCH Reference Signal - Delta SS

Function

This command sets the Delta SS value for PUSCH measurement.

Command

```
:CALCulate:EVM:PUSCh:RSIGnal:DSS <integer>
```

Parameter

`<integer>`	Delta SS for PUSCH measurement
Range	0 to 29
Resolution	1
Suffix code	None
Default	0

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set the value of Delta SS to 0 for PUSCH measurement.

```
CALC:EVM:PUSC:RSIG:DSS 0
```

:CALCulate:EVM:PUSCh:RSIGnal:DSS?

PUSCH Reference Signal - Delta SS Query

Function

This command queries the Delta SS value for PUSCH measurement.

Query

```
:CALCulate:EVM:PUSCh:RSIGnal:DSS?
```

Response

```
<integer>
```

Parameter

`<integer>`	Delta SS for PUSCH measurement
Range	0 to 29
Resolution	1

Details

When Standard is LTE-A, this can be queried for each CC individually.
To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the Delta SS value for PUSCH measurement.

```
CALC:EVM:PUSC:RSIG:DSS?
> 0
```

:CALCulate:EVM:PUSCh:RSIGnal:SGRoup:HOPPing OFF|ON|0|1

PUSCH Reference Signal - Group Hopping

Function

This command disables/enables Group Hopping for PUSCH measurement.

Command

```
:CALCulate:EVM:PUSCh:RSIGnal:SGRoup:HOPPing <mode>
```

Parameter

`<mode>`	Group Hopping setting
`OFF|0`	Disabled
`ON|1`	Enabled (Default)

Details

This parameter is changed automatically to Disabled when PUSCH Sequence Hopping is changed to Enabled.
When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To enable Group Hopping for PUSCH measurement

```
CALC:EVM:PUSC:RSIG:SGR:HOPP 1
```

:CALCulate:EVM:PUSCh:RSIGnal:SGRoup:HOPPing?

PUSCH Reference Signal - Group Hopping Query

Function

This command queries the Group Hopping status for PUSCH measurement.

Query

```
:CALCulate:EVM:PUSCh:RSIGnal:SGRoup:HOPPing?
```

Response

```
<mode>
```

Parameter

`<mode>`	Group Hopping
`0`	Disabled
`1`	Enabled

Details

When Standard is LTE-A, this can be queried for each CC individually.
To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the Group Hopping status for PUCCH measurement.

```
CALC:EVM:PUSC:RSIG:SGR:HOPP?
> 1
```

:CALCulate:EVM:PUSCh:RSIGnal:BSEQuence:HOPPing OFF|ON|0|1

PUSCH Reference Signal - Sequence Hopping

Function

This command disables/enables Sequence Hopping for PUSCH measurement.

Command

```
:CALCulate:EVM:PUSCh:RSIGnal:BSEQuence:HOPPing <mode>
```

Parameter

`<mode>`	Sequence Hopping setting
`OFF|0`	Disabled (Default)
`ON|1`	Enabled

Details

This Parameter is changed automatically to Disabled when PUSCH Group Hopping is changed to Enabled.
When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To enable Sequence Hopping for PUSCH measurement

```
CALC:EVM:PUSC:RSIG:BSEQ:HOPP 1
```

:CALCulate:EVM:PUSCh:RSIGnal:BSEQuence:HOPPing?

PUSCH Reference Signal - Sequence Hopping Query

Function

This command queries the Sequence Hopping status for PUSCH measurement.

Query

```
:CALCulate:EVM:PUSCh:RSIGnal:BSEQuence:HOPPing?
```

Response

```
<mode>
```

Parameter

`<mode>`	Sequence Hopping
`0`	Disabled
`1`	Enabled

Details

When Standard is LTE-A, this can be queried for each CC individually.
To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the Sequence Hopping status for PUSCH measurement.

```
CALC:EVM:PUSC:RSIG:BSEQ:HOPP?
> 1
```

[:SENSe]:RADio:PUSCh:ASSignment:SUBFrame[0]|1|2|3|4|5|6|7|8|9 OFF|ON|0|1

PUSCH DMRS Parameters – Subframe 0-9 Assignment

Function

This command sets whether to target every Subframe of PUSCH measurement for the measurement.

Command

```
[:SENSe]:RADio:PUSCh:ASSignment:SUBFrame[0]|1|2|3|4|5|6|
7|8|9 <switch>
```

Parameter

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

Details

According to the Uplink-downlink Configuration setting, the Downlink Subframe will not be the measurement target regardless of this setting.
When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set Subframe 3 as the measurement target.

```
RAD:PUSC:ASS:SUBF3 1
```

[:SENSe]:RADio:PUSCh:ASSignment:SUBFrame[0]|1|2|3|4|5|6|7|8|9?

PUSCH DMRS Parameters – Subframe 0-9 Assignment Query

Function

This command queries whether to target every Subframe of PUSCH measurement for the measurement.

Query

```
[:SENSe]:RADio:PUSCh:ASSignment:SUBFrame[0]|1|2|3|4|5|6|
7|8|9?
```

Response

```
<switch>
```

Parameter

<switch>	Measurement On/Off
0	OFF
1	ON

Details

When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query whether Subframe 3 is the measurement target or not.

```
RAD:PUSC:ASS:SUBF3?
> 1
```

[:SENSe]:RADio:PUSCh:ASSignment OFF|ON|0|1

PUSCH DMRS Parameters - Subframe All Assignment

Function

This command sets collectively whether to target all subframes of PUSCH measurement.

Command

```
[:SENSe]:RADio:PUSCh:ASSignment <switch>
```

Parameter

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

Details

According to the Uplink-downlink Configuration setting, the Downlink Subframe will not be the measurement target regardless of this setting.
When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set all Subframes as the measurement target.
```
RAD:PUSC:ASS 1
```

[:SENSe]:RADio:PUSCh:ASSignment?

PUSCH DMRS Parameters - Subframe All Assignment Query

Function

This command queries collectively whether to target all subframes of PUSCH measurement.

Query

```
[:SENSe]:RADio:PUSCh:ASSignment?
```

Response

```
<switch>
```

Parameter

`<switch>`	Measurement On/Off
`0`	Off
`1`	On

Details

When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query whether all the Subframes are the measurement target or not.

```
RAD:PUSC:ASS?
> 1,1,1,1,1,1,1,1,1,1
```

2.3.15 Reference Signal PUCCH

:CALCulate:EVM:PUCCh:RSIGnal:CELLid <integer>

PUCCH Reference Signal - Cell ID

Function

This command sets the Cell ID for PUCCH measurement.

Command

```
:CALCulate:EVM:PUCCh:RSIGnal:CELLid <integer>
```

Parameter

`<integer>`	Cell ID for PUCCH measurement
Range	0 to 503
Resolution	1
Suffix code	None
Default	0

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set the Cell ID to 10 for PUCCH measurement.

```
CALC:EVM:PUCC:RSIG:CELL 0
```

:CALCulate:EVM:PUCCh:RSIGnal:CELLid?

PUCCH Reference Signal - Cell ID Query

Function

This command queries the Cell ID for PUCCH measurement.

Query

```
:CALCulate:EVM:PUCCh:RSIGnal:CELLid?
```

Response

```
<integer>
```

Parameter

`<integer>`	Cell ID for PUCCH measurement
Range	0 to 503
Resolution	1

Details

When Standard is LTE-A, this can be queried for each CC individually.
To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To set the Cell ID for PUCCH measurement.

```
CALC:EVM:PUCC:RSIG:CELL?
> 0
```

:CALCulate:EVM:PUCCh:RSIGnal:NCS1 <integer>

PUCCH Reference Signal - N_cs_1

Function

This command sets the N_cs_1 value for PUCCH measurement.

Command

```
:CALCulate:EVM:PUCCh:RSIGnal:NCS1 <integer>
```

Parameter

`<integer>`	N_cs_1 for PUCCH measurement
Range	0 to 7
Resolution	1
Suffix code	None
Default	6

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set the value of N_cs_1 to 0 for PUCCH measurement.

```
CALC:EVM:PUCC:RSIG:NCS1 0
```

:CALCulate:EVM:PUCCh:RSIGnal:NCS1?

PUCCH Reference Signal - N_cs_1 Query

Function

This command queries the N_cs_1 value for PUCCH measurement.

Query

```
:CALCulate:EVM:PUCCh:RSIGnal:NCS1?
```

Response

```
<integer>
```

Parameter

`<integer>`	N_cs_1 for PUCCH measurement
Range	0 to 7
Resolution	1

Details

When Standard is LTE-A, this can be queried for each CC individually.
To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the N_cs_1 value for PUCCH measurement.

```
CALC:EVM:PUCC:RSIG:NCS1?
> 0
```

:CALCulate:EVM:PUCCh:RSIGnal:NRB2 <integer>

PUCCH Reference Signal - N_RB_2

Function

This command sets the N_RB_2 value for PUCCH measurement.

Command

```
:CALCulate:EVM:PUCCh:RSIGnal:NRB2 <integer>
```

Parameter

`<integer>`	N_RB_2 for PUCCH measurement	
Range	0 to 98	(Channel Bandwidth: 20 MHz)
	0 to 74	(Channel Bandwidth: 15 MHz)
	0 to 49	(Channel Bandwidth: 10 MHz)
	0 to 24	(Channel Bandwidth: 5 MHz)
	0 to 14	(Channel Bandwidth: 3 MHz)
	0 to 5	(Channel Bandwidth: 1.4 MHz)
Resolution	1	
Suffix code	None	
Default	8	(Channel Bandwidth 20 MHz)
	6	(Channel Bandwidth 15 MHz)
	4	(Channel Bandwidth 10 MHz)
	2	(Channel Bandwidth 5 MHz)
	2	(Channel Bandwidth 3 MHz)
	2	(Channel Bandwidth 1.4 MHz)

Details

When N_cs_1 = 0, the minimum value is 1.
When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set the value of N_RB_2 to 5 for PUCCH measurement.

```
CALC:EVM:PUCC:RSIG:NRB2 5
```

:CALCulate:EVM:PUCCh:RSIGnal:NRB2?

PUCCH Reference Signal - N_RB_2 Query

Function

This command queries the N_RB_2 value for PUCCH measurement.

Query

```
:CALCulate:EVM:PUCCh:RSIGnal:NRB2?
```

Response

```
<integer>
```

Parameter

`<integer>`	N_RB_2 for PUCCH measurement	
Range	0 to 98	(Channel Bandwidth: 20 MHz)
	0 to 74	(Channel Bandwidth: 15 MHz)
	0 to 49	(Channel Bandwidth: 10 MHz)
	0 to 24	(Channel Bandwidth: 5 MHz)
	0 to 14	(Channel Bandwidth: 3 MHz)
	0 to 5	(Channel Bandwidth: 1.4 MHz)
Resolution	1	

Details

When N_cs_1 = 0, the minimum value is 1.
When Standard is LTE-A, this can be queried for each CC individually.
To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the N_RB_2 value for PUCCH measurement.

```
CALC:EVM:PUCC:RSIG:NRB2?
> 5
```

:CALCulate:EVM:PUCCh:RSIGnal:NPUCch1:SUBFrame[0]|1|2|3|4|5|6|7|8|9 <integer>

PUCCH Reference Signal - nPUCCH1

Function

This command sets the n_PUCCH_1 value for every subframe of PUCCH measurement.

Command

```
:CALCulate:EVM:PUCCh:RSIGnal:NPUCch1:SUBFrame[0]|1|2|3|4
|5|6|7|8|9 <integer>
```

Parameter

`<integer>`	n_PUCCH_1	
Range	0 to 7199	(Channel Bandwidth: 20 MHz)
	0 to 5399	(Channel Bandwidth: 15 MHz)
	0 to 3599	(Channel Bandwidth: 10 MHz)
	0 to 1799	(Channel Bandwidth: 5 MHz)
	0 to 1079	(Channel Bandwidth: 3 MHz)
	0 to 431	(Channel Bandwidth: 1.4 MHz)
Resolution	1	
Suffix code	None	
Default	0	

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set the value of n_PUCCH_1 to 5 for Subframe 3 of PUCCH measurement.

```
CALC:EVM:PUCC:RSIG:NPUC1:SUBF3 5
```

:CALCulate:EVM:PUCCh:RSIGnal:NPUCch1:SUBFrame[0]|1|2|3|4|5|6|7|8|9?

PUCCH Reference Signal - nPUCCH1 Query

Function

This command queries the n_PUCCH_1 value for every subframe of PUCCH measurement.

Query

```
:CALCulate:EVM:PUCCh:RSIGnal:NPUCch1:SUBFrame[0]|1|2|3|4
|5|6|7|8|9?
```

Response

`<integer>`

Parameter

`<integer>`	n_PUCCH_1	
Range	0 to 7199	(Channel Bandwidth: 20 MHz)
	0 to 5399	(Channel Bandwidth: 15 MHz)
	0 to 3599	(Channel Bandwidth: 10 MHz)
	0 to 1799	(Channel Bandwidth: 5 MHz)
	0 to 1079	(Channel Bandwidth: 3 MHz)
	0 to 431	(Channel Bandwidth: 1.4 MHz)
Resolution	1	

Details

When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the n_PUCCH_1 value for Subframe 3 of PUCCH measurement.

```
CALC:EVM:PUCC:RSIG:NPUC1:SUBF3?
> 5
```

:CALCulate:EVM:PUCCh:RSIGnal:NPUCch2 <integer>

PUCCH Reference Signal - nPUCCH2

Function

This command sets the n_PUCCH_2 value for PUCCH measurement.

Command

```
:CALCulate:EVM:PUCCh:RSIGnal:NPUCch2 <integer>
```

Parameter

`<integer>`		n_PUCCH_2
	Range	0 to (N_RB_2×12 + Ceiling (Ncs_1/8)×(12–Ncs_1–2)–1)
	Resolution	1
	Suffix code	None
	Default	0

Example of Use

To set the value of n_PUCCH_2 to 5 for PUCCH measurement.

```
CALC:EVM:PUCC:RSIG:NPUC2 5
```

:CALCulate:EVM:PUCCh:RSIGnal:NPUCch2?

PUCCH Reference Signal - nPUCCH2 Query

Function

This command queries the n_PUCCH_2 value for PUCCH measurement.

Query

```
:CALCulate:EVM:PUCCh:RSIGnal:NPUCch2?
```

Response

```
<integer>
```

Parameter

`<integer>`		n_PUCCH_2
	Range	0 to (N_RB_2×12+Ceiling (Ncs_1/8)×(12–Ncs_1–2)–1)
	Resolution	1

Example of Use

To query the n_PUCCH_2 value for PUCCH measurement.

```
CALC:EVM:PUCC:RSIG:NPUC2?
> 5
```

:CALCulate:EVM:PUCCh:RSIGnal:NPUCch3:SUBFrame[0]|1|2|3|4|5|6|7|8|9 <integer>

PUCCH Auto Calculate Params n_PUCCH3

Function

This command sets the n_PUCCH_3 value for every subframe of PUCCH measurement.

Command

```
:CALCulate:EVM:PUCCh:RSIGnal:NPUCch3:SUBFrame[0]|1|2|3|4|5|6|7|8|9 <integer>
```

Parameter

`<integer>`	n_PUCCH_3	
Range	0 to 499	(Channel Bandwidth 20 MHz)
	0 to 374	(Channel Bandwidth 15 MHz)
	0 to 249	(Channel Bandwidth 10 MHz)
	0 to 124	(Channel Bandwidth 5 MHz)
	0 to 74	(Channel Bandwidth 3 MHz)
	0 to 29	(Channel Bandwidth 1.4 MHz)
Resolution	1	
Suffix code	None	
Default	0	

Details

This can be set when MX269021A-001 is installed and Standard is LTE-A and PUCCH Format is 3.
It can be set for each CC individually. To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set the value of n_PUCCH_3 to 5 for Subframe 0 of PUCCH measurement.

```
CALC:EVM:PUCC:RSIG:NPUC3:SUBF0 5
```

:CALCulate:EVM:PUCCh:RSIGnal:NPUCch3:SUBFrame[0]|1|2|3|4|5|6|7|8|9?

PUCCH Auto Calculate Params n_PUCCH3 Query

Function

This command queries the n_PUCCH_3 value for every subframe of PUCCH measurement.

Query

```
:CALCulate:EVM:PUCCh:RSIGnal:NPUCch3:SUBFrame[0]|1|2|3|4
|5|6|7|8|9?
```

Response

`<integer>`

Parameter

`<integer>`	n_PUCCH_3	
Range	0 to 499	(Channel Bandwidth 20 MHz)
	0 to 374	(Channel Bandwidth 15 MHz)
	0 to 249	(Channel Bandwidth 10 MHz)
	0 to 124	(Channel Bandwidth 5 MHz)
	0 to 74	(Channel Bandwidth 3 MHz)
	0 to 29	(Channel Bandwidth 1.4 MHz)
Resolution	1	

Details

It can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the n_PUCCH_3 value for Subframe 0 of PUCCH measurement.

```
CALC:EVM:PUCC:RSIG:NPUC3:SUBF0?
> 5
```

:CALCulate:EVM:PUCCh:RSIGnal:DSHift <integer>

PUCCH Reference Signal - Delta Shift PUCCH

Function

This command sets the Delta Shift PUCCH value.

Command

`:CALCulate:EVM:PUCCh:RSIGnal:DSHift <integer>`

Parameter

`<integer>`	Delta Shift for PUCCH measurement
Range	1 to 3
Resolution	1
Suffix code	None
Default	2

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set the value of Delta Shift to 1 for PUCCH measurement.

```
CALC:EVM:PUCC:RSIG:DSH 1
```

:CALCulate:EVM:PUCCh:RSIGnal:DSHift?

PUCCH Reference Signal - Delta Shift PUCCH Query

Function

This command queries the Delta Shift PUCCH value.

Query

`:CALCulate:EVM:PUCCh:RSIGnal:DSHift?`

Response

`<integer>`

Parameter

`<integer>`	Delta Shift for PUCCH measurement
Range	1 to 3
Resolution	1

Details

When Standard is LTE-A, this can be queried for each CC individually.
To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the Delta Shift PUCCH value.

```
CALC:EVM:PUCC:RSIG:DSH?
> 1
```

:CALCulate:EVM:PUCCh:RSIGnal:SGRoup:HOPPing OFF|ON|0|1

PUCCH Reference Signal - Sequence Group Hopping

Function

This command disables/enables Group Hopping for PUCCH measurement.

Command

```
:CALCulate:EVM:PUCCh:RSIGnal:SGRoup:HOPPing <mode>
```

Parameter

`<mode>`	Group Hopping setting
`OFF|0`	Disabled
`ON|1`	Enabled (Default)

Details

When Standard is LTE-A, this can be set for each CC individually. To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To enable Group Hopping for PUCCH.

```
CALC:EVM:PUCC:RSIG:SGR:HOPP ON
```

:CALCulate:EVM:PUCCh:RSIGnal:SGRoup:HOPPing?

PUCCH Reference Signal - Sequence Group Hopping Query

Function

This command queries the Group Hopping status for PUCCH measurement.

Query

```
:CALCulate:EVM:PUCCh:RSIGnal:SGRoup:HOPPing?
```

Response

```
<mode>
```

Parameter

`<mode>`	Group Hopping setting
`0`	Disabled
`1`	Enabled

Details

When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the Group Hopping status for PUCCH measurement.

```
CALC:EVM:PUCC:RSIG:SGR:HOPP?
> 1
```

[:SENSe]:RADio:PUCCh:ASSignment:SUBFrame[0]|1|2|3|4|5|6|7|8|9 OFF|ON|0|1

PUCCH DMRS Parameters – Subframe 0-9 Assignment

Function

This command sets whether to target each Subframe of PUCCH measurement for the measurement.

Command

```
[:SENSe]:RADio:PUCCh:ASSignment:SUBFrame[0]|1|2|3|4|5|6|
7|8|9 <switch>
```

Parameter

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

Details

According to the Uplink-downlink Configuration setting, the Downlink Subframe will not be the measurement target regardless of this setting.
When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set Subframe 3 as the measurement target.

```
RAD:PUCC:ASS:SUBF3 ON
```

[:SENSe]:RADio:PUCCh:ASSignment:SUBFrame[0]|1|2|3|4|5|6|7|8|9?

PUCCH DMRS Parameters - Subframe0-9 Assignment Query

Function

This command queries whether to target each Subframe of PUCCH measurement for the measurement.

Query

`[:SENSe]:RADio:PUCCh:ASSignment:SUBFrame[0]|1|2|3|4|5|6|7|8|9?`

Response

`<switch>`

Parameter

`<switch>`	Measurement On/Off
0	Off
1	On

Details

When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query whether Subframe 3 is the measurement target or not.

```
RAD:PUCC:ASS:SUBF3?
> 1
```

[:SENSe]:RADio:PUCCh:ASSignment OFF|ON|0|1

PUCCH DMRS Parameters - Subframe All Assignment

Function

This command sets whether to measure all subframes of PUCCH measurement collectively.

Command

```
[:SENSe]:RADio:PUCCh:ASSignment <switch>
```

Parameter

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

Details

According to the Uplink-downlink Configuration setting, the Downlink Subframe will not be the measurement target regardless of this setting.
When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set all subframes as the measurement target collectively.

```
RAD:PUCC:ASS ON
```

[:SENSe]:RADio:PUCCh:ASSignment?

PUCCH DMRS Parameters - Subframe All Assignment Query

Function

This command queries collectively whether to measure all subframes of PUCCH measurement.

Query

`[:SENSe]:RADio:PUCCh:ASSignment?`

Response

`<switch>`

Parameter

`<switch>`	Measurement On/Off
0	Off
1	On

Details

When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query collectively whether to measure all subframes.

```
RAD:PUCC:ASS?
> 1,1,1,1,1,1,1,1,1,1
```

2.3.16 PRACH

:CALCulate:EVM:PRACh:CONFiguration <integer>

PRACH - Configuration

Function

This command sets the Configuration value for PRACH measurement.

Command

```
:CALCulate:EVM:PRACh:CONFiguration <integer>
```

Parameter

`<integer>`	PRACH Configuration
Range	0 to 57 However, the setting for the following is disabled with the Uplink-downlink Configuration. 0 : 11, 19 1 : 8, 13, 14, 40 to 47 2 : 5, 7, 8, 11, 13, 14, 17, 19 to 47 3 : 10, 11, 19, 22, 24, 32, 34, 42, 44, 50, 52 4 : 5, 7, 8, 11, 13, 14, 17, 19, 22, 24, 32, 34, 40 to 47, 50, 52 5 : 2, 4, 5, 7, 8, 10, 11, 13, 14, 16, 17, 19 to 47, 50, 52 6 : 16, 17, 42, 44
Resolution	1
Suffix code	None
Default	51

Details

This can be set when Standard is LTE.
PRACH Format corresponds to PRACH Configuration as below.
PRACH Format0 : 0 to 19
PRACH Format1 : 20 to 29
PRACH Format2 : 30 to 39
PRACH Format3 : 40 to 47
PRACH Format4 : 48 to 57

Example of Use

To set the Configuration value for PRACH to 10.

```
CALC:EVM:PRAC:CONF 10
```

:CALCulate:EVM:PRACh:CONFiguration?

PRACH - Configuration Query

Function

This command queries the Configuration value for PRACH measurement.

Query

`:CALCulate:EVM:PRACh:CONFiguration?`

Response

`<integer>`

Parameter

`<integer>` PRACH Configuration

Range: 0 to 57
However, the following are not returned due to the Uplink-downlink Configuration. The setting is disabled.
0 : 11, 19
1 : 8, 13, 14, 40 to 47
2 : 5, 7, 8, 11, 13, 14, 17, 19 to 47
3 : 10, 11, 19, 22, 24, 32, 34, 42, 44, 50, 52
4 : 5, 7, 8, 11, 13, 14, 17, 19, 22, 24, 32, 34, 40 to 47, 50, 52
5 : 2, 4, 5, 7, 8, 10, 11, 13, 14, 16, 17, 19 to 47, 50, 52
6 : 16, 17, 42, 44

Resolution: 1

Example of Use

To query the Configuration value for PRACH.

```
CALC:EVM:PRAC:CONF?
> 10
```

:CALCulate:EVM:PRACh:PRSequence:NUMBer <integer>

PRACH - Physical Root Sequence Number

Function

This command sets the Physical Root Sequence Number value for PRACH measurement.

Command

```
:CALCulate:EVM:PRACh:PRSequence:NUMBer <integer>
```

Parameter

<integer>	Physical Root Sequence Number for PRACH	
Range	PRACH Configuration Index:	
	For 0 to 47:	1 to 838
	For 48 to 57:	1 to 138
Resolution	1	
Suffix code	None	
Default	1	

Details

This can be set when Standard is LTE.

Example of Use

To set the Physical Root Sequence Number for PRACH to 10.

```
CALC:EVM:PRAC:PRS:NUMB 10
```

:CALCulate:EVM:PRACh:PRSequence:NUMBer?

PRACH - Physical Root Sequence Number Query

Function

This command queries the Physical Root Sequence Number value for PRACH measurement.

Query

```
:CALCulate:EVM:PRACh:PRSequence:NUMBer?
```

Response

```
<integer>
```

Parameter

<integer>	Physical Root Sequence Number for PRACH	
Range	PRACH Configuration Index:	
	For 0 to 47:	1 to 838
	For 48 to 57:	1 to 138
Resolution	1	

Example of Use

To query the Physical Root Sequence Number for PRACH.

```
CALC:EVM:PRAC:PRS:NUMB?
> 10
```

:CALCulate:EVM:PRACh:CSHift <integer>

PRACH - Cyclic Shift Value

Function

This command sets the Cyclic Shift Value for PRACH measurement.

Command

```
:CALCulate:EVM:PRACh:CSHift <integer>
```

Parameter

`<integer>`	Cyclic Shift Value for PRACH measurement	
Range	PRACH Configuration Index:	
	For 0 to 47:	0 to 838
	For 48 to 57:	0 to 138
Resolution	1	
Suffix code	None	
Default	120	

Details

This can be set when Standard is LTE.

Example of Use

To set the Cyclic Shift Value for PRACH measurement to 10.

```
CALC:EVM:PRAC:CSH 10
```

:CALCulate:EVM:PRACh:CSHift?

PRACH - Cyclic Shift Value Query

Function

This command queries the Cyclic Shift Value for PRACH measurement.

Query

```
:CALCulate:EVM:PRACh:CSHift?
```

Response

```
<integer>
```

Parameter

`<integer>`	Cyclic Shift Value for PRACH measurement	
Range	PRACH Configuration Index:	
	For 0 to 47:	0 to 838
	For 48 to 57:	0 to 138
Resolution	1	

Example of Use

To query the Cyclic Shift Value for PRACH measurement.

```
CALC:EVM:PRAC:CSH?
> 10
```

2.3.17 Measurement Interval Resolution

[:SENSe]:EVM:CAPTure:TIME:RESolution SUBFrame|SLOT

Measurement Interval Resolution

Function

This command sets the measurement interval resolution of the analysis starting number and analysis length.

Command

```
[:SENSe]:EVM:CAPTure:TIME:RESolution <mode>
```

Parameter

<mode>	Measurement interval resolution
SUBFrame	Subframe (Default)
SLOT	Slot

Example of Use

To set the measurement interval resolution of the analysis starting number and analysis length to Subframe.

```
EVM:CAPT:TIME:RES SUBF
```

[:SENSe]:EVM:CAPTure:TIME:RESolution?

Measurement Interval Resolution Query

Function

This command queries the measurement interval resolution of the analysis starting number and analysis length.

Query

`[:SENSe]:EVM:CAPTure:TIME:RESolution?`

Response

`<mode>`

Parameter

`<mode>`	Measurement interval resolution
`SUBF`	Subframe
`SLOT`	Slot

Example of Use

To query the measurement interval resolution of the analysis starting number and analysis length to Subframe.

```
EVM:CAPT:TIME:RES?
> SUBF
```

2.3.18 Starting Subframe Number

[:SENSe]:EVM:CAPTure:TIME:STARt <integer>

Starting Subframe Number

Function

This command sets the analysis starting subframe number when the measurement interval resolution is set to subframe.

Command

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

Parameter

`<integer>`	Subframe number
Range	When the Uplink-downlink configuration is as follows:
	0: 2, 3, 4, 7, 8, 9 + 10×N
	1: 2, 3, 7, 8 + 10×N
	2: 2, 7 + 10×N
	3: 2, 3, 4 + 10×N
	4: 2, 3 + 10×N
	5: 2 + 10×N
	6: 2, 3, 4, 7, 8 + 10×N
	N=0 to 4
Resolution	1
Default	2

Example of Use

To set the analysis starting subframe number to 2

```
EVM:CAPT:TIME:STAR 2
```

[:SENSe]:EVM:CAPTure:TIME:STARt?

Starting Subframe Number Query

Function

This command queries the analysis starting subframe number when the measurement interval resolution is set to subframe.

Query

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

Response

`<integer>`

Parameter

`<integer>`	Subframe number
Range	When the Uplink-downlink configuration is as follows: 0: 2, 3, 4, 7, 8, 9 + 10×N 1: 2, 3, 7, 8 + 10×N 2: 2, 7 + 10×N 3: 2, 3, 4 + 10×N 4: 2, 3 + 10×N 5: 2 + 10×N 6: 2, 3, 4, 7, 8 + 10×N N=0 to 4
Resolution	1

Example of Use

To query the analysis starting subframe number.

```
EVM:CAPT:TIME:STAR?
> 2
```

2.3.19 Measurement Interval (Subframe)

[:SENSe]:EVM:CAPTure:TIME:LENGth <integer>

Measurement Interval (Subframe)

Function

This command sets the analysis subframe length when the measurement interval resolution is set to subframe.

Command

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

Parameter

`<integer>`	Analysis subframe length
Range	1 to (50 – Starting Subframe Number)
Resolution	1
Default	8

Example of Use

To set the analysis subframe length to 2.

```
EVM:CAPT:TIME:LENG 2
```

[:SENSe]:EVM:CAPTure:TIME:LENGth?

Measurement Interval (Subframe) Query

Function

This command queries the analysis subframe length when the measurement interval resolution is set to subframe.

Query

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

Response

```
<integer>
```

Parameter

`<integer>`	Analysis subframe length
Range	1 to (50 – Starting Subframe Number)
Resolution	1

Example of Use

To query the analysis subframe length.

```
EVM:CAPT:TIME:LENG?
> 2
```

2.3.20 Starting Slot Number

[:SENSe]:EVM:CAPTure:TIME:STARt:SLOT <integer>

Starting Slot Number

Function

This command sets the analysis starting slot number when the measurement interval resolution is set to slot.

Command

```
[:SENSe]:EVM:CAPTure:TIME:STARt:SLOT <integer>
```

Parameter

`<integer>`	Slot number
Range	When the Uplink-downlink configuration is as follows: 0: 5, 6, 7, 8, 9, 15, 16, 17, 18, 19 + 20×N 1: 5, 6, 7, 15, 16, 17 + 20×N 2: 5, 15 + 20×N 3: 5, 6, 7, 8, 9 + 20×N 4: 5, 6, 7 + 20×N 5: 5 + 20×N 6: 5, 6, 7, 8, 9, 15, 16, 17 + 20×N N=0 to 4
Resolution	1
Default	5

Example of Use

To set the analysis starting slot number to 5.

```
EVM:CAPT:TIME:STAR:SLOT 5
```

[:SENSe]:EVM:CAPTure:TIME:STARt:SLOT?

Starting Slot Number Query

Function

This command sets the analysis starting slot number when the measurement interval resolution is set to slot.

Query

```
[:SENSe]:EVM:CAPTure:TIME:STARt:SLOT?
```

Response

```
<integer>
```

Parameter

<integer>	Slot number
Range	When the Uplink-downlink configuration is as follows: 0: 5, 6, 7, 8, 9, 15, 16, 17, 18, 19 + 20×N 1: 5, 6, 7, 15, 16, 17 + 20×N 2: 5, 15 + 20×N 3: 5, 6, 7, 8, 9 + 20×N 4: 5, 6, 7 + 20×N 5: 5 + 20×N 6: 5, 6, 7, 8, 9, 15, 16, 17 + 20×N N=0 to 4
Resolution	1

Example of Use

To query the analysis starting slot number.

```
EVM:CAPT:TIME:STAR:SLOT?
> 5
```

2.3.21 Measurement Interval (Slot)

[:SENSe]:EVM:CAPTure:TIME:LENGth:SLOT <integer>

Measurement Interval (Slot)

Function

This command sets the analysis slot length when the measurement interval resolution is set to slot.

Command

```
[:SENSe]:EVM:CAPTure:TIME:LENGth:SLOT <integer>
```

Parameter

`<integer>`	Analysis slot length
Range	1 to (100 – Starting Slot Number)
Resolution	1
Default	62

Example of Use

To set the analysis slot length to 3.

```
EVM:CAPT:TIME:LENG:SLOT 3
```

[:SENSe]:EVM:CAPTure:TIME:LENGth:SLOT?

Measurement Interval (Slot) Query

Function

This command queries the analysis slot length when the measurement interval resolution is set to slot.

Query

```
[:SENSe]:EVM:CAPTure:TIME:LENGth:SLOT?
```

Response

```
<integer>
```

Parameter

`<integer>`	Analysis slot length
Range	1 to (100 – Starting Slot Number)
Resolution	1

Example of Use

To query the analysis slot length.

```
EVM:CAPT:TIME:LENG:SLOT?
> 3
```

2.3.22 Analysis Frame Position

[:SENSe]:EVM:CAPTure:TIME:FPOSition <integer>

Analysis Frame Position

Function

This command sets the analysis starting frame number.

Command

```
[:SENSe]:EVM:CAPTure:TIME:FPOSition <integer>
```

Parameter

`<integer>`		Analysis starting frame number
Range	When Capture Time is Auto.	
		0
	When Capture Time is Manual.	
		Storage is set to Off.
		0 to (Capture Time Length – 5)
		Other than above,
		0 to (Capture Time Length – Storage Count × 5)
Resolution		1
Default		0

Details

This setting is enabled when Capture Time is set to Manual.

Example of Use

To set 2 for the analysis starting frame number

```
EVM:CAPT:TIME:FPOS 2
```

[:SENSe]:EVM:CAPTure:TIME:FPOSition?

Analysis Frame Position Query

Function

This command queries the analysis starting frame number.

Query

`[:SENSe]:EVM:CAPTure:TIME:FPOSition?`

Response

`<integer>`

Parameter

`<integer>` Analysis starting frame number

Range
When Capture Time is Auto.
0
When Capture Time is Manual.
Storage is set to Off.
0 to (Capture Time Length – 5)
Other than above.
0 to (Capture Time Length – Storage Count × 5)

Resolution 1

Example of Use

To query the analysis starting frame number.

```
EVM:CAPT:TIME:FPOS?
> 2
```

2.3.23 PUSCH Modulation Scheme

:CALCulate:EVM:PUSCh:MODulation QPSK|16Qam|64Qam|AUTO

PUSCH Modulation Scheme

Function

This command sets the PUSCH Modulation Scheme.

Command

```
:CALCulate:EVM:PUSCh:MODulation <mode>
```

Parameter

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

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set the modulation scheme for PUSCH to QPSK.

```
CALC:EVM:PUSC:MOD QPSK
```

:CALCulate:EVM:PUSCh:MODulation?

PUSCH Modulation Scheme Query

Function

This command queries the modulation scheme for PUSCH.

Query

`:CALCulate:EVM:PUSCh:MODulation?`

Response

`<mode>`

Parameter

`<mode>`	Modulation scheme
`QPSK`	Sets QPSK modulation method for analysis.
`16Q`	Sets 16QAM modulation scheme for analysis.
`64Q`	Sets 64QAM modulation scheme for analysis.
`AUTO`	Automatically determines modulation scheme for analysis

Details

When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the modulation scheme for PUSCH.

```
CALC:EVM:PUSC:MOD?
> QPSK
```

2.3.24 PUCCH Format

:CALCulate:EVM:PUCCh:FORMat 1|1A|1B|2|2A|2B|3

PUCCH Format

Function

This command sets the PUCCH format for modulation analysis.

Command

```
:CALCulate:EVM:PUCCh:FORMat <mode>
```

Parameter

<mode>	PUCCH format
1	Analyzes as Format1 (Default).
1A	Analyzes as Format1a.
1B	Analyzes as Format1b.
2	Analyzes as Format2.
2A	Analyzes as Format2a
2B	Analyzes as Format2b.
3	Analyzes as Format3.(Only when Standard is LTE A)

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set PUCCH format to Format2.

```
CALC:EVM:PUCC:FORM 2
```

:CALCulate:EVM:PUCCh:FORMat?

PUCCH Format Query

Function

This command queries the format of PUCCH.

Query

`:CALCulate:EVM:PUCCh:FORMat?`

Response

`<mode>`

Parameter

`<mode>`	PUCCH format
`1`	Analyzes as Format1.
`1A`	Analyzes as Format1a.
`1B`	Analyzes as Format1b.
`2`	Analyzes as Format2.
`2A`	Analyzes as Format2a.
`2B`	Analyzes as Format2b.
`3`	Analyzes as Format3.(Only when Standard is LTE A)

Example of Use

To query the format of PUCCH.

```
CALC:EVM:PUCC:FORM?
> 2
```

2.3.25 EVM Window Length

:CALCulate:EVM:WLENgth <integer>

Window Length (Ts unit)

Function

This command sets the FFT window length.

Command

```
:CALCulate:EVM:WLENgth <integer>
```

Parameter

`<integer>`	FFT window length	
Range	When Target Channel is set except PRACH	
	0 to 142 Ts	
	When Target Channel is set to PRACH	
	0 to 3166 Ts	(PRACH Format0)
	0 to 21022 Ts	(PRACH Format1)
	0 to 6238 Ts	(PRACH Format2)
	0 to 21022 Ts	(PRACH Format3)
	0 to 446 Ts	(PRACH Format4)
Resolution	1 Ts	
Default	When Target Channel is set except PRACH	
	80 Ts	(Channel Bandwidth 1.4 MHz)
	96 Ts	(Channel Bandwidth 3 MHz)
	128 Ts	(Channel Bandwidth 5 MHz)
	132 Ts	(Channel Bandwidth 10 MHz)
	136 Ts	(Channel Bandwidth 15 MHz)
	136 Ts	(Channel Bandwidth 20 MHz)
	When Target Channel is set to PRACH	
	3072 Ts	(PRACH Format0)
	20928 Ts	(PRACH Format1)
	6144 Ts	(PRACH Format2)
	20928 Ts	(PRACH Format3)
	432 Ts	(PRACH Format4)

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set 10 for the FFT window length.

```
CALC:EVM:WLEN 10
```

:CALCulate:EVM:WLENgth?

Window Length (Ts unit) Query

Function

This command queries the FFT window length.

Query

```
:CALCulate:EVM:WLENgth?
```

Response

```
<integer>
```

Parameter

`<integer>` FFT window length

Range
When Target Channel is set except PRACH
0 to 142 Ts
When Target Channel is set to PRACH

0 to 3166 Ts	(PRACH Format0)
0 to 21022 Ts	(PRACH Format1)
0 to 6238 Ts	(PRACH Format2)
0 to 21022 Ts	(PRACH Format3)
0 to 446 Ts	(PRACH Format4)

Resolution 1 Ts

Details

When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the setting of the FFT window.

```
CALC:EVM:WLEN?
> 10
```

:CALCulate:EVM:WLENgth:W <integer>

Window Length (W unit)

Function

This command sets the FFT window length as constant W specified by 3GPP.

Command

```
:CALCulate:EVM:WLENgth:W <integer>
```

Parameter

`<integer>`	FFT window length	
Range	When Target Channel is set except PRACH	
	0 to 8 W	(Channel Bandwidth 1.4 MHz)
	0 to 17 W	(Channel Bandwidth 3 MHz)
	0 to 35 W	(Channel Bandwidth 5 MHz)
	0 to 71 W	(Channel Bandwidth 10 MHz)
	0 to 106 W	(Channel Bandwidth 15 MHz)
	0 to 142 W	(Channel Bandwidth 20 MHz)
	When Target Channel is set to PRACH	
	0 to 3166 W	(PRACH Format0)
	0 to 21022 W	(PRACH Format1)
	0 to 6238 W	(PRACH Format2)
	0 to 21022 W	(PRACH Format3)
	0 to 446 W	(PRACH Format4)
Resolution	1 W	
Default	When Target Channel is set except PRACH	
	5 W	(Channel Bandwidth 1.4 MHz)
	12 W	(Channel Bandwidth 3 MHz)
	32 W	(Channel Bandwidth 5 MHz)
	66 W	(Channel Bandwidth 10 MHz)
	102 W	(Channel Bandwidth 15 MHz)
	136 W	(Channel Bandwidth 20 MHz)
	When Target Channel is set to PRACH	
	3072 W	(PRACH Format0)
	20928 W	(PRACH Format1)
	6144 W	(PRACH Format2)
	20928 W	(PRACH Format3)
	432 W	(PRACH Format4)

Details

The value of EVM Window Length when changing Channel Bandwidth is set to the default value corresponding to the Channel Bandwidth value.

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.
There is no correlation between the values set as Ts and W. The

command `:CALCulate:EVM:WLENgth:TYPE` sets which of Ts or W to apply at measurement.

Example of Use

To set 32 for the FFT window length.

```
CALC:EVM:WLEN:W 32
```

:CALCulate:EVM:WLENgth:W?

Window Length (W unit) Query

Function

This command queries the FFT window length as constant W specified by 3GPP.

Query

```
:CALCulate:EVM:WLENgth:W?
```

Response

```
<integer>
```

Parameter

`<integer>` FFT window length

Range: When Target Channel is set except PRACH

0 to 8 W	(Channel Bandwidth 1.4 MHz)
0 to 17 W	(Channel Bandwidth 3 MHz)
0 to 35 W	(Channel Bandwidth 5 MHz)
0 to 71 W	(Channel Bandwidth 10 MHz)
0 to 106 W	(Channel Bandwidth 15 MHz)
0 to 142 W	(Channel Bandwidth 20 MHz)

When Target Channel is set to PRACH

0 to 3166 W	(PRACH Format0)
0 to 21022 W	(PRACH Format1)
0 to 6238 W	(PRACH Format2)
0 to 21022 W	(PRACH Format3)
0 to 446 W	(PRACH Format4)

Resolution: 1 W

Details

When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the setting of the FFT window.

```
CALC:EVM:WLEN:W?
> 32
```

:CALCulate:EVM:WLENgth:TYPE TS|W

Window Length Unit

Function

This command sets the type of EVM window length to be applied for measurement.

Command

```
:CALCulate:EVM:WLENgth:TYPE <mode>
```

Parameter

`<mode>`	EVM Window Length Type
`W`	W (Default)
`TS`	Ts

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set Ts for the EVM window length type.

```
CALC:EVM:WLEN:TYPE TS
```

:CALCulate:EVM:WLENgth:TYPE?

Window Length Unit Query

Function

This command queries the type of EVM window length to be applied for measurement.

Query

```
:CALCulate:EVM:WLENgth:TYPE?
```

Response

```
<mode>
```

Parameter

`<mode>`	EVM Window Length Type
`W`	W
`TS`	Ts

Details

When Standard is LTE-A, this can be queried for each CC individually.
To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the EVM window length type.

```
CALC:EVM:WLEN:TYPE?
> TS
```

2.3.26 Channel Bandwidth Selective Filter

[:SENSe]:RADio:CBANdwidth:FILTer OFF|ON|0|1

Channel Bandwidth Selective Filter

Function

This command sets the band filter On and Off.

Command

`[:SENSe]:RADio:CBANdwidth:FILTer <switch>`

Parameter

`<switch>`	Channel Bandwidth Selective Filter On/Off
`OFF|0`	Off (Default)
`ON|1`	On

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set band filter to On.
`RAD:CBAN:FILT ON`

[:SENSe]:RADio:CBANdwidth:FILTer?

Channel Bandwidth Selective Filter Query

Function

This command queries the band filter setting.

Query

`[:SENSe]:RADio:CBANdwidth:FILTer?`

Response

`<switch>`

Parameter

`<switch>`	Channel Bandwidth Selective Filter On/Off
`0`	Off
`1`	On

Details

When Standard is LTE-A, this can be queried for each CC individually.
To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query band filter setting.
```
RAD:CBAN:FILT?
> 1
```

2.3.27 RB Type of In-Band Emission Query

:CALCulate:EVM:WINDow11:RBLock:TYPE?

RB Type of In-Band Emission Query

Function

This command queries the internal parameter RB type setting.

Query

```
:CALCulate:EVM:WINDow11:RBLock:TYPE?
```

Response

```
<status_0>,<status_1>,…,<status_(i-1)>
```

Parameter

`<status_(i-1)>`	RB type
Value	Combination of below values. =bit0+bit1+bit2
0	Non-Allocated RB (General In-Band Emission)
bit0=1	Allocated RB
bit1=2	Non-Allocated RB (DC In-Band Emission)
bit2=4	Non-Allocated RB (IQ Image In-Band Emission)
Range	0 to 6
`i`	The number of RBs in the Slot.
Range	1 to The number of RBs in the Slot.

Details

The number of responses varies according to the band setting.
The setting value of the slot specified with Frame Offset and Bottom Graph Slot number is returned.
RB type is judged when analyzed. Therefore, the response of all –999.0 is returned when the measurement is not performed yet.
When In-band Emission View is Averaged over all Slots, the response of all –999.0 is returned.
When In-band Emission View is Each Slot and the measurement is in progress, a non-measured subframe returns 0.
When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the internal parameter RB type setting.

```
CALC:EVM:WIND11:RBL:TYPE?
> 0,1,0,0,0,0,0,0,0,0,0,0,2,0,0,…
```

2.3.28 Delta RB of In-Band Emission Query

:CALCulate:EVM:WINDow11:RBLock:DELTa?

Delta RB of In-Band Emission Query

Function

This command queries the internal parameter ΔRB value.

Query

```
:CALCulate:EVM:WINDow11:RBLock:DELTa?
```

Response

```
<value_0>,<value_1>,…,<value_(i-1)>
```

Parameter

`<value_(i-1)>`	ΔRB Value
Value	Returns ΔRB for each RB (distance from Allocated RB defined in 3GPP TS 36.521-1).
Resolution	0.00001
`i`	The number of RBs in the Slot.
Range	1 to The number of RBs in the Slot.

Details

The number of responses varies according to the band setting.
ΔRB is judged when analyzed. Therefore, the response of all *** is returned when the measurement is not performed yet.
When In-band Emission View is Averaged over all Slots, the response of all *** is returned.

When the measurement range is over multiple CCs in LTE-Advanced measurement, the measured value is likely to be fractional. Thus, the response is returned as an actual number with five digits after decimal point, which is the same resolution as constellation.

When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the internal parameter ΔRB value.

```
:CALC:EVM:WIND11:RBL:DELT?
> -1.00000,+0.00000,+1.00000,+2.00000,+3.00000,…
```

2.3.29 Exclusion Period

:CALCulate:EVM:EPERiod:SUBFrame[0]|1|2|3|4|5|6|7|8|9 OFF|ON|0|1

Exclusion Period Subframe0-9

Function

This command sets whether to target the burst rising/falling of each Subframe for the measurement.
The burst rising/falling of each Subframe correspond to EVM with exclusion period defined in 3GPP TS 36.521-1.

Command

```
:CALCulate:EVM:EPERiod:SUBFrame[0]|1|2|3|4|5|6|7|8|9 <switch>
```

Parameter

`<switch>`	Measurement On, Off.
`OFF|0`	Off
`ON|1`	On (Default)

Details

When Standard is LTE-A, this can be set for each CC individually. To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set the burst rising/falling of Subframe2 not to target for the measurement.

```
CALC:EVM:EPER:SUBF2 1
```

:CALCulate:EVM:EPERiod:SUBFrame[0]|1|2|3|4|5|6|7|8|9?

Exclusion Period Subframe0-9 Query

Function

This command queries whether to target the burst rising/falling of each Subframe for the measurement.
The burst rising/falling of each Subframe correspond to EVM with exclusion period defined in 3GPP TS 36.521-1.

Query

```
:CALCulate:EVM:EPERiod:SUBFrame[0]|1|2|3|4|5|6|7|8|9?
```

Response

```
<switch>
```

Parameter

`<switch>`	Measurement On, Off.
`0`	Off
`1`	On

Details

When Standard is LTE-A, this can be queried for each CC individually.
To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query whether the burst rising/falling of Subframe2 is the measurement target.

```
CALC:EVM:EPER:SUBF2?
> 1
```

2.3.30 Leading Exclusion Period

:CALCulate:EVM:EPERiod:LEADing:SUBFrame[0]|1|2|3|4|5|6|7|8|9 <time>

Leading Exclusion Period Subframe0-9

Function

This command sets the time length for the burst rising of each Subframe. The burst rising/falling of each Subframe correspond to EVM with exclusion period defined in 3GPP TS 36.521-1.

Command

```
:CALCulate:EVM:EPERiod:LEADing:SUBFrame[0]|1|2|3|4|5|6|7
|8|9 <time>
```

Parameter

<time>	Time length for the burst rising
Range	0 to 70 μs
Resolution	10 ns
Suffix code	NS, US, MS, S
	s is used when omitted.
Default	25 μs

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set the time length for the burst rising of Subframe2 to 100 ns.

```
CALC:EVM:EPER:LEAD:SUBF2 100NS
```

:CALCulate:EVM:EPERiod:LEADing:SUBFrame[0]|1|2|3|4|5|6|7|8|9?

Leading Exclusion Period Subframe0-9 Query

Function

This command queries the time length for the burst rising of each Subframe.
The burst rising/falling of each Subframe correspond to EVM with exclusion period defined in 3GPP TS 36.521-1.

Query

```
:CALCulate:EVM:EPERiod:LEADing:SUBFrame[0]|1|2|3|4|5|6|7|8|9?
```

Response

```
<time>
```

Parameter

<time>	Time length for the burst rising
Range	0 to 70 μs
Resolution	10 ns

Details

When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the time length for the burst rising of Subframe2.

```
CALC:EVM:EPER:LEAD:SUBF2?
> 0.00000010
```

2.3.31 Lagging Exclusion Period

:CALCulate:EVM:EPERiod:LAGGing:SUBFrame[0]|1|2|3|4|5|6|7|8|9 <time>

Lagging Exclusion Period Subframe0-9

Function

This command sets the time length for the burst falling of each Subframe.
The burst rising/falling of each Subframe correspond to EVM with exclusion period defined in 3GPP TS 36.521-1.

Command

```
:CALCulate:EVM:EPERiod:LAGGing:SUBFrame[0]|1|2|3|4|5|6|7
|8|9 <time>
```

Parameter

`<time>`	Time length for the burst falling
Range	0 to 70 μs
Resolution	10 ns
Suffix code	NS, US, MS, S s is used when omitted.
Default	25 μs

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set the time length for the burst falling of Subframe2 to 100 ns.

```
CALC:EVM:EPER:LAGG:SUBF2 100NS
```

:CALCulate:EVM:EPERiod:LAGGing:SUBFrame[0]|1|2|3|4|5|6|7|8|9?

Lagging Exclusion Period Subframe0-9 Query

Function

This command queries the time length for the burst falling of each Subframe.
The burst rising/falling of each Subframe correspond to “EVM with exclusion period” defined in 3GPP TS 36.521-1.

Query

```
:CALCulate:EVM:EPERiod:LAGGing:SUBFrame[0]|1|2|3|4|5|6|7
|8|9?
```

Response

```
<time>
```

Parameter

`<time>`	Time length for the burst falling
Range	0 to 70 µs
Resolution	10 ns

Details

When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the time length for the burst falling of Subframe2.

```
CALC:EVM:EPER:LAGG:SUBF2?
> 0.00000010
```

2.3.32 RB Setting

:CALCulate:EVM:PUSCh:RBLock:FIRSt <integer>

PUSCH - First RB all Subframe

Function

This command sets the First RB for all Subframes of PUSCH measurement.

Command

```
:CALCulate:EVM:PUSCh:RBLock:FIRSt <integer>
```

Parameter

`<integer>`	First RB number for PUSCH measurement	
Range	0 to 5	(Channel Bandwidth 1.4 MHz)
	0 to 14	(Channel Bandwidth 3 MHz)
	0 to 24	(Channel Bandwidth 5 MHz)
	0 to 49	(Channel Bandwidth 10 MHz)
	0 to 74	(Channel Bandwidth 15 MHz)
	0 to 99	(Channel Bandwidth 20 MHz)
Resolution	1	
Suffix code	None	
Default	0	

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set the First RB to 1 for all Subframes of PUSCH measurement.

```
CALC:EVM:PUSC:RBL:FIRS 1
```

:CALCulate:EVM:PUSCh:RBLock:FIRSt?

PUSCH - First RB all Subframe Query

Function

This command queries the First RB for all Subframes of PUSCH measurement.

Query

```
:CALCulate:EVM:PUSCh:RBLock:FIRSt?
```

Response

```
<integer>
```

Parameter

`<integer>`	First RB number for PUSCH measurement	
Range	0 to 5	(Channel Bandwidth 1.4 MHz)
	0 to 14	(Channel Bandwidth 3 MHz)
	0 to 24	(Channel Bandwidth 5 MHz)
	0 to 49	(Channel Bandwidth 10 MHz)
	0 to 74	(Channel Bandwidth 15 MHz)
	0 to 99	(Channel Bandwidth 20 MHz)
Resolution	1	

Details

When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the First RB of all subframes of PUCCH measurement collectively.

```
CALC:EVM:PUSC:RBL:FIRS?
> 1,1,1,1,1,1,1,1,1,1
```

:CALCulate:EVM:PUSCh:RBLock:FIRSt:SUBFrame[0]|1|2|3|4|5|6|7|8|9 <integer>

PUSCH - First RB Subframe0-9

Function

This command sets the First RB for every Subframe of PUSCH measurement.

Command

```
:CALCulate:EVM:PUSCh:RBLock:FIRSt:SUBFrame[0]|1|2|3|4|5|
6|7|8|9 <integer>
```

Parameter

`<integer>`	First RB number for PUSCH measurement	
Range	0 to 5	(Channel Bandwidth 1.4 MHz)
	0 to 14	(Channel Bandwidth 3 MHz)
	0 to 24	(Channel Bandwidth 5 MHz)
	0 to 49	(Channel Bandwidth 10 MHz)
	0 to 74	(Channel Bandwidth 15 MHz)
	0 to 99	(Channel Bandwidth 20 MHz)
Resolution	1	
Suffix code	None	
Default	0	

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set the First RB to 1 for Subframe 3 of PUSCH measurement.

```
CALC:EVM:PUSC:RBL:FIRS:SUBF3 1
```

:CALCulate:EVM:PUSCh:RBLock:FIRSt:SUBFrame[0]|1|2|3|4|5|6|7|8|9?

PUSCH - First RB Subframe0-9 Query

Function

This command queries the First RB for every Subframe of PUSCH measurement.

Command

```
:CALCulate:EVM:PUSCh:RBLock:FIRSt:SUBFrame[0]|1|2|3|4|5|
6|7|8|9?
```

Response

```
<integer>
```

Parameter

<integer>	First RB number for PUSCH measurement	
Range	0 to 5	(Channel Bandwidth 1.4 MHz)
	0 to 14	(Channel Bandwidth 3 MHz)
	0 to 24	(Channel Bandwidth 5 MHz)
	0 to 49	(Channel Bandwidth 10 MHz)
	0 to 74	(Channel Bandwidth 15 MHz)
	0 to 99	(Channel Bandwidth 20 MHz)
Resolution	1	

Details

When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the First RB for Subframe 3 of PUSCH measurement.

```
CALC:EVM:PUSC:RBL:FIRS:SUBF3?
> 1
```

:CALCulate:EVM:PUSCh:RBLock:NUMBer <integer>

PUSCH - Number of RBs all Subframe

Function

This command sets the Number of RBs for all Subframes of PUSCH measurement.

Command

```
:CALCulate:EVM:PUSCh:RBLock:NUMBer <integer>
```

Parameter

`<integer>`	Number of RBs for PUSCH measurement	
Range	1 to (100–First RB)	(Channel Bandwidth 20 MHz)
	1 to (75–First RB)	(Channel Bandwidth 15 MHz)
	1 to (50–First RB)	(Channel Bandwidth 10 MHz)
	1 to (25–First RB)	(Channel Bandwidth 5 MHz)
	1 to (15–First RB)	(Channel Bandwidth 3 MHz)
	1 to (6–First RB)	(Channel Bandwidth 1.4 MHz)
Resolution	1	
Suffix code	None	
Default	100	(Channel Bandwidth 20 MHz)
	75	(Channel Bandwidth 15 MHz)
	50	(Channel Bandwidth 10 MHz)
	25	(Channel Bandwidth 5 MHz)
	15	(Channel Bandwidth 3 MHz)
	6	(Channel Bandwidth 1.4 MHz)

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set the Number of RBs to 1 for all Subframes of PUSCH measurement.

```
CALC:EVM:PUSC:RBL:NUMB 1
```

:CALCulate:EVM:PUSCh:RBLock:NUMBer?

PUSCH - Number of RBs all Subframe Query

Function

This command queries the Number of RBs for all Subframes of PUSCH measurement.

Query

```
:CALCulate:EVM:PUSCh:RBLock:NUMBer?
```

Response

```
<integer>
```

Parameter

`<integer>`	Number of RBs for PUSCH measurement	
Range	1 to (100–First RB)	(Channel Bandwidth 20 MHz)
	1 to (75–First RB)	(Channel Bandwidth 15 MHz)
	1 to (50–First RB)	(Channel Bandwidth 10 MHz)
	1 to (25–First RB)	(Channel Bandwidth 5 MHz)
	1 to (15–First RB)	(Channel Bandwidth 3 MHz)
	1 to (6–First RB)	(Channel Bandwidth 1.4 MHz)
Resolution	1	

Details

When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the Number of RBs for all Subframes of PUSCH measurement.

```
CALC:EVM:PUSC:RBL:NUMB?
> 1,1,1,1,1,1,1,1,1,1
```

:CALCulate:EVM:PUSCh:RBLock:NUMBer:SUBFrame[0]|1|2|3|4|5|6|7|8|9 <integer>

PUSCH - Number of RBs Subframe0-9

Function

This command sets the Number of RBs for every Subframe of PUSCH measurement.

Command

```
:CALCulate:EVM:PUSCh:RBLock:NUMBer:SUBFrame[0]|1|2|3|4|5
|6|7|8|9 <integer>
```

Parameter

`<integer>`	Number of RBs for PUSCH measurement	
Range	1 to (100–First RB)	(Channel Bandwidth 20 MHz)
	1 to (75–First RB)	(Channel Bandwidth 15 MHz)
	1 to (50–First RB)	(Channel Bandwidth 10 MHz)
	1 to (25–First RB)	(Channel Bandwidth 5 MHz)
	1 to (15–First RB)	(Channel Bandwidth 3 MHz)
	1 to (6–First RB)	(Channel Bandwidth 1.4 MHz)
Resolution	1	
Suffix code	None	
Default	100	(Channel Bandwidth 20 MHz)
	75	(Channel Bandwidth 15 MHz)
	50	(Channel Bandwidth 10 MHz)
	25	(Channel Bandwidth 5 MHz)
	15	(Channel Bandwidth 3 MHz)
	6	(Channel Bandwidth 1.4 MHz)

Details

When Standard is LTE-A, this can be set for each CC individually.
To change the CC to set, edit Setting/Result Target CC#.

Example of Use

To set the Number of RBs to 1 for Subframe 3 of PUSCH measurement.

```
CALC:EVM:PUSC:RBL:NUMB:SUBF3 1
```

:CALCulate:EVM:PUSCh:RBLock:NUMBer:SUBFrame[0]|1|2|3|4|5|6|7|8|9?

PUSCH - Number of RBs Subframe0-9 Query

Function

This command queries the Number of RBs for every Subframe of PUSCH measurement.

Query

```
:CALCulate:EVM:PUSCh:RBLock:NUMBer:SUBFrame[0]|1|2|3|4|5
|6|7|8|9?
```

Response

```
<integer>
```

Parameter

`<integer>`	Number of RBs for PUSCH measurement	
Range	1 to (100–First RB)	(Channel Bandwidth 20 MHz)
	1 to (75–First RB)	(Channel Bandwidth 15 MHz)
	1 to (50–First RB)	(Channel Bandwidth 10 MHz)
	1 to (25–First RB)	(Channel Bandwidth 5 MHz)
	1 to (15–First RB)	(Channel Bandwidth 3 MHz)
	1 to (6–First RB)	(Channel Bandwidth 1.4 MHz)
Resolution	1	

Details

When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the Number of RBs for Subframe 3 of PUSCH measurement.

```
CALC:EVM:PUSC:RBL:NUMB:SUBF3?
> 1
```

:CALCulate:EVM:PRACh:FREQuency:OFFSet <integer>

PRACH - Frequency Offset

Function

This command sets the Frequency Offset for PRACH measurement.

Command

```
:CALCulate:EVM:PRACh:FREQuency:OFFSet <integer>
```

Parameter

`<integer>`	PRACH Frequency Offset	
Range	0 to 94	(Channel Bandwidth 20 MHz)
	0 to 69	(Channel Bandwidth 15 MHz)
	0 to 44	(Channel Bandwidth 10 MHz)
	0 to 19	(Channel Bandwidth 5 MHz)
	0 to 9	(Channel Bandwidth 3 MHz)
	0	(Channel Bandwidth 1.4 MHz)
Resolution	1	
Suffix code	None	
Default	0	

Details

This is available when Standard is LTE.

Example of Use

To set the Frequency Offset for PRACH to 1.

```
CALC:EVM:PRAC:FREQ:OFFS 1
```

:CALCulate:EVM:PRACh:FREQuency:OFFSet?

PRACH - Frequency Offset Query

Function

This command queries the Frequency Offset for PRACH measurement.

Query

`:CALCulate:EVM:PRACh:FREQuency:OFFSet?`

Response

`<integer>`

Parameter

`<integer>`	PRACH Frequency Offset	
Range	0 to 94	(Channel Bandwidth 20 MHz)
	0 to 69	(Channel Bandwidth 15 MHz)
	0 to 44	(Channel Bandwidth 10 MHz)
	0 to 19	(Channel Bandwidth 5 MHz)
	0 to 9	(Channel Bandwidth 3 MHz)
	0	(Channel Bandwidth 1.4 MHz)
Resolution	1	

Example of Use

To query the Frequency Offset for PRACH

```
CALC:EVM:PRAC:FREQ:OFFS?
> 1
```

2.4 Utility Function

Table 2.4-1 lists the device messages for the utility function of the measurement target.

Table 2.4-1 Device Messages for Utility Function

Function	Device Messages
Erase Warm Up Message	:DISPlay:ANNotation:WUP:ERASe
Display Title	:DISPlay:ANNotation:TITLe[:STATe] ON|OFF|1|0
	:DISPlay:ANNotation:TITLe[:STATe]?
Title Entry	:DISPlay:ANNotation:TITLe:DATA <string>
	:DISPlay:ANNotation:TITLe:DATA?

2.4.1 Erase Warm Up Message

:DISPlay:ANNotation:WUP:ERASe

Erase Warm Up Message

Function

This command erases the warmup message displayed immediately after startup.

Command

`:DISPlay:ANNotation:WUP:ERASe`

Example of Use

To erase the warmup message
`DISP:ANN:WUP:ERAS`

2.4.2 Display Title

:DISPlay:ANNotation:TITLe[:STATe] OFF|ON|0|1

Display Title

Function

This command turns the title on/off.

Command

`:DISPlay:ANNotation:TITLe[:STATe] <switch>`

Parameter

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

Example of Use

To display the title.

`DISP:ANN:TITL ON`

:DISPlay:ANNotation:TITLe[:STATe]?

Display Title Query

Function

This command queries whether the title display is enabled/disabled.

Query

`:DISPlay:ANNotation:TITLe[:STATe]?`

Response

`<switch>`

Parameter

`<switch>`	Title display On/Off
`0`	Off
`1`	On

Example of Use

To query the title display On/Off state.

```
DISP:ANN:TITL?
> 1
```

2.4.3 Title Entry

:DISPlay:ANNotation:TITLe:DATA <string>

Title Entry

Function

This command sets the title character string.

Command

`:DISPlay:ANNotation:TITLe:DATA <string>`

Parameter

`<string>`	Title characters Character string within 32 characters enclosed by double quotes (“ ”) or single quotes (‘ ’)

Example of Use

To set the title character string.

`DISP:ANN:TITL:DATA 'TEST'`

:DISPlay:ANNotation:TITLe:DATA?

Title Entry Query

Function

This command queries the title character string.

Query

`:DISPlay:ANNotation:TITLe:DATA?`

Response

`<string>`

Parameter

`<string>`	Title characters Character string within 32 characters enclosed by double quotes (“ ”) or single quotes (‘ ’)

Example of Use

To query the title character string.

```
DISP:ANN:TITL:DATA?
> TEST
```

2.5 Common Measurement Function

Table 2.5-1 lists the device messages for performing operations common to the measurement functions.

Table 2.5-1 Device Messages for Operations Common to Measurement Functions

Function	Device Messages
Continuous Measurement	:INITiate:CONTinuous OFF|ON|0|1
	:INITiate:CONTinuous?
	:INITiate:MODE:CONTinuous
Single Measurement	:INITiate:MODE:SINGle
Initiate	:INITiate[:IMMediate]
Calculate	:INITiate:CALCulate
Configure Query	:CONFigure?
Save Captured Data	:MMEMory:STORe:IQData <filename>,<device>
Cancel Execute Save Captured Data	:MMEMory:STORe:IQData:CANCel
Output Rate for Save Captured Data	:MMEMory:STORe:IQData:RATE <freq>
	:MMEMory:STORe:IQData:RATE?
Capture Time Auto/Manual	[:SENSe]:SWEep:TIME:AUTO ON|OFF|1|0
	[:SENSe]:SWEep:TIME:AUTO?
Capture Time Length	[:SENSe]:SWEep:TIME <time>
	[:SENSe]:SWEep:TIME?
Trigger Switch	:TRIGger[:SEQuence][:STATe] ON|OFF|1|0
	:TRIGger[:SEQuence][:STATe]?
Trigger Source	:TRIGger[:SEQuence]:SOURce EXTernal[1|2]|EXT2|IMMediate|SG|VIDeo
	:TRIGger[:SEQuence]:SOURce?
Trigger Slope	:TRIGger[:SEQuence]:SLOPe POSitive|NEGative
	:TRIGger[:SEQuence]:SLOPe?
Trigger Delay	:TRIGger[:SEQuence]:DELay <time>
	:TRIGger[:SEQuence]:DELay?
Trigger Video Level	:TRIGger[:SEQuence]:VIDeo:LEVel[:LOGarithmic] <power>
	:TRIGger[:SEQuence]:VIDeo:LEVel[:LOGarithmic]?

Note:

The trigger settings are separately retained for each application, and are commonly applied to the measurement functions within the application.

2.5.1 Measurement and control

:INITiate:CONTinuous OFF|ON|0|1

Continuous Measurement

Function

This command sets continuous or single measurement mode.

Command

```
:INITiate:CONTinuous <switch>
```

Parameter

<switch>	Measurement mode
OFF|0	Single measurement
ON|1	Continuous measurement mode (Default)

Details

When ON is set, continuous measurement starts. When set to Off, the Single measurement mode is set but measurement does not start at that time.

Example of Use

To make a continuous measurement.

```
INIT:CONT ON
```

:INITiate:CONTinuous?

Continuous Measurement Query

Function

This command queries the measurement mode.

Query

```
:INITiate:CONTinuous?
```

Response

```
<switch>
```

Parameter

<switch>	Measurement mode
0	Single measurement
1	Continuous measurement mode

Example of Use

To query the measurement mode.

```
INIT:CONT?
> 1
```

:INITiate:MODE:CONTinuous

Continuous Measurement

Function

This command sets continuous or single measurement mode.

Command

`:INITiate:MODE:CONTinuous`

Example of Use

To start continuous measurement.
`INIT:MODE:CONT`

:INITiate:MODE:SINGle

Single Measurement

Function

This command starts single measurement.

Command

`:INITiate:MODE:SINGle`

Example of Use

To start a single measurement.
`INIT:MODE:SING`

:INITiate[:IMMediate]

Initiate

Function

Measurement starts with the current measurement mode.

Command

`:INITiate[:IMMediate]`

Example of Use

To start the measurement in the current measurement mode.
`INIT`

:INITiate:CALCulate

Calculate

Function

This command executes analysis without capturing waveforms. This command is used when executing re-analysis for the same captured waveform by changing parameters.

Command

`:INITiate:CALCulate`

Details

If a waveform is not captured or if a parameter that requires waveform recapturing is changed, the waveform is captured before analysis is executed.

Another command or query can be accepted even if this function is being executed. Note, however, if a command that requires waveform recapturing or trace recalculation is received, this function is stopped and the received command is executed.

To query the measurement results after executing this command, use the `*WAI` command to control synchronization.

Note that synchronization control during the Continuous mode is not supported.

Example of Use

To start the measurement in the current measurement mode.

`INIT:CALC`

:CONFigure?

Configure Query

Function

This command queries the name of the current measurement mode.

Query

`:CONFigure?`

Response

`<mode>`

Parameter

`<mode>`	Measurement function
`EVM`	Modulation Analysis measurement
`PVT`	Power vs Time measurement
`ACP`	ACP measurement
`CHP`	Channel Power measurement
`OBW`	OBW measurement
`SEM`	SEM measurement
Default	`EVM`

Example of Use

To query the current measurement function.

```
CONF?
> EVM
```

:MMEMory:STORe:IQData <filename>,<device>

Save Captured Data

Function

This command saves the captured waveform data in a file.

Command

```
:MMEMory:STORe:IQData <filename>,<device>
```

Parameter

`<filename>`	Name of the file to be saved Specify with any character string enclosed by double quotes (“ ”) or single quotes (‘ ’)
`<device>`	Name of the drive to be saved Drive name: D, E

Details

This function is available when the waveform is captured under the following conditions:

- A single measurement is completed.

Files are saved to the following directory in the specified drive.

\Anritsu Corporation\Signal Analyzer\User Data\Digitized Data\LTE-TDD Uplink

Up to 1000 files can be saved in a folder.

Example of Use

To save waveform data into drive D using the file name “DATA”.

```
MMEM:STOR:IQD “DATA”,D
```

:MMEMory:STORe:IQData:CANCel

Cancel Execute Save Captured Data

Function

This command cancels the saving of a waveform data file.

Command

```
:MMEMory:STORe:IQData:CANCel
```

Example of Use

To cancel digitizing.

```
MMEM:STOR:IQD:CANC
```

:MMEMory:STORe:IQData:RATE <freq>

Output Rate for Save Captured Data

Function

This command saves the output rate when executing Save Captured Data.

Command

```
:MMEMory:STORe:IQData:RATE <freq>
```

Parameter

`<freq>`	Output rate	
Range	MS269xA, MS2830A	
	20 to 50 MHz	(Span 31.25 MHz)
	50 to 100 MHz	(Span 62.5 MHz)
	100 to 200 MHz	(Span 125 MHz)
	MS2850A	
	20 to 50 MHz	(Span 31.25 MHz)
	50 to 81.25 MHz	(Span 62.5 MHz)
	81.25 to 162.5 MHz	(Span 125 MHz)
Resolution	100 Hz	(Span 31.25 MHz)
	1 kHz	(Span 62.5 MHz or 125 MHz)
Suffix code	`HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ`	
	Hz is used when omitted.	
Default	MS269xA, MS2830A	
	50 MHz	(Span 31.25 MHz)
	100 MHz	(Span 62.5 MHz)
	200 MHz	(Span 125 MHz)
	MS2850A	
	50 MHz	(Span 31.25 MHz)
	81.25 MHz	(Span 62.5 MHz)
	162.5 MHz	(Span 125 MHz)

Example of Use

To set 30 MHz for the output rate.

```
MMEM:STOR:IQD:RATE 30MHZ
```

:MMEMory:STORe:IQData:RATE?

Output Rate for Save Captured Data Query

Function

This command queries the output rate when executing Save Captured Data.

Query

```
:MMEMory:STORe:IQData:RATE?
```

Response

```
<freq>
```

Parameter

<freq>	Output rate	
Range	MS269xA, MS2830A	
	20000000 to 50000000	(Span 31.25 MHz)
	50000000 to 100000000	(Span 62.5 MHz)
	100000000 to 200000000	(Span 125 MHz)
	MS2850A	
	20000000 to 50000000	(Span 31.25 MHz)
	50000000 to 81250000	(Span 62.5 MHz)
	81250000 to 162500000	(Span 125 MHz)
Resolution	100 Hz	(Span 31.25 MHz)
	1 kHz	(Span 62.5 MHz or 125 MHz)

Example of Use

To query the output rate.

```
MMEM:STOR:IQD:RATE?
> 30000000
```

[:SENSe]:SWEep:TIME:AUTO ON|OFF|1|0

Capture Time Auto/Manual

Function

This command selects whether the waveform capture time (Capture Time) is automatically or manually specified.

Command

```
[:SENSe]:SWEep:TIME:AUTO <switch>
```

Parameter

<switch>	Automatic/Manual setting of Capture Time
ON|1	Automatic setting (Default)
OFF|0	Manual setting

Details

This command is not available when the Replay function is executed.

Example of Use

To set the waveform capture time automatically.

```
SWE:TIME:AUTO ON
```

[:SENSe]:SWEep:TIME:AUTO?

Capture Time Auto/Manual Query

Function

This command queries whether the waveform capture time (Capture Time) is automatically or manually specified.

Query

```
[:SENSe]:SWEep:TIME:AUTO?
```

Response

```
<switch>
```

Parameter

<switch>	Automatic/Manual setting of Capture Time
1	Automatic setting
0	Manual setting

Example of Use

To query whether the waveform capture time is set automatically or manually.

```
SWE:TIME:AUTO?
> 1
```

[:SENSe]:SWEep:TIME <time>

Capture Time Length

Function

This command sets the capture time of the waveform.

Command

```
[:SENSe]:SWEep:TIME <time>
```

Parameter

`<time>`	Capture time (in frame units)	
Range	5 to 150	(Span 31.25 MHz)
	5 to 100	(Span 62.5 MHz)
	5 to 50	(Span 125 MHz)
Resolution	5	When Target Channel is other than PRACH
	1	When Target Channel is PRACH
Default	5	

Details

The automatic mode is switched to the manual mode when the capture time is set.

This command is not available when the Replay function is executed.

Example of Use

To set 5 frames for the capture time.

```
SWE:TIME 5
```

[:SENSe]:SWEep:TIME?

Capture Time Length Query

Function

This command queries the capture time of the waveform.

Query

```
[:SENSe]:SWEep:TIME?
```

Response

```
<time>
```

Parameter

`<time>`	Capture time (in frame units)	
Range	5 to 150	(Span 31.25 MHz)
	5 to 100	(Span 62.5 MHz)
	5 to 50	(Span 125 MHz)
Resolution	5	When Target Channel is other than PRACH
	1	When Target Channel is PRACH

Example of Use

To query the capture time of the waveform.

```
SWE:TIME?
> 5
```

2.5.2 Trigger Switch

:TRIGger[:SEQuence][:STATe] OFF|ON|0|1

Trigger Switch

Function

This command sets the trigger wait state On/Off.

Command

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

Parameter

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

Details

This command is not available when the Replay function is executed.

This command is not available when Target Channel is PRACH.

Example of Use

To set the trigger wait state to On.

```
TRIG ON
```

:TRIGger[:SEQuence][:STATe]?

Trigger Switch Query

Function

This command queries the trigger wait state On/Off.

Query

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

Response

`<switch>`

Parameter

`<switch>`	Trigger wait state On/Off
`0`	Off
`1`	On

Example of Use

To query the trigger wait state setting.

```
TRIG?
> 1
```

2.5.3 Trigger Source

:TRIGger[:SEQuence]:SOURce EXTernal[1|2]|EXT2|IMMediate|SG|VIDeo

Trigger Source

Function

This command selects the trigger signal source.

Command

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

Parameter

`<mode>`	Trigger signal source
`EXTernal[1]`	External input (External)
`EXTernal2|EXT2`	External input 2 (External 2)
`IMMediate`	Free run (Default)
`SG`	SG Marker (SG Marker)
`VIDeo`	Video Trigger

Details

Video Trigger can be selected only when PRACH is set to Include as the Target Channel. (When PRACH is set to Include, only Video Trigger can be selected.)
SG marker can be selected only when the Option 020 is installed.
This command is not available when the Replay function is executed.
External input 2 (External 2) is selectable only for MS2850A.

Example of Use

To set the trigger signal source to External input.

```
TRIG:SOUR EXT
```

:TRIGger[:SEQuence]:SOURce?

Trigger Source Query

Function

This command queries the trigger signal source.

Query

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

Response

<mode>

Parameter

<mode>	Trigger signal source
EXT	External input (External)
EXT2	External input 2 (External 2)
IMM	Free run
SG	SG Marker (SG Marker)
VID	Video Trigger

Details

SG marker is returned only when Option 020 is installed.

Example of Use

To query the trigger signal source.

```
TRIG:SOUR?
> EXT
```

2.5.4 Trigger Slope

:TRIGger[:SEQuence]:SLOPe POSitive|NEGative

Trigger Slope

Function

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

Command

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

Parameter

`<mode>`	Trigger detection mode
`POSitive`	Detects a trigger at the rising edge (Default).
`NEGative`	Detects a trigger at the falling edge.

Details

This command is not available when the Replay function is executed.

Example of Use

To detect a trigger at the rising edge.

```
TRIG:SLOP POS
```

:TRIGger[:SEQuence]:SLOPe?

Trigger Slope Query

Function

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

Query

`:TRIGger[:SEQuence]:SLOPe?`

Response

`<mode>`

Parameter

`<mode>`	Trigger detection mode
`POS`	Detects a trigger at the rising edge.
`NEG`	Detects a trigger at the falling edge.

Example of Use

To query the trigger detection mode.

```
TRIG:SLOP?
> POS
```

2.5.5 Trigger Delay

:TRIGger[:SEQuence]:DELay <time>

Trigger Delay

Function

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

Command

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

Parameter

`<time>`	Delay time from generation of trigger to start of capture	
Range	–2 to +2 s	(Span 31.25 MHz)
	–1 to +1 s	(Span 62.5 MHz)
	–0.5 to +0.5 s	(Span 125 MHz)
Resolution	Refer to *MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual Signal Analyzer Function Operation* or *MS2830A/MS2840A/MS2850A Signal Analyzer Operation Manual Signal Analyzer Function Operation*.	
Suffix code	`NS, US, MS, S` s is used when the suffix code is omitted.	
Default	0 s	

Details

This command is not available when the Replay function is executed.

Example of Use

To set the trigger delay time to 20 ms.

```
TRIG:DEL 20MS
```

:TRIGger[:SEQuence]:DELay?

Trigger Delay Query

Function

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

Query

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

Response

```
<time>
```

Parameter

`<time>`	Delay time from generation of trigger to start of capture	
Range	–2 to +2 s	(Span 31.25 MHz)
	–1 to +1 s	(Span 62.5 MHz)
	–0.5 to +0.5 s	(Span 125 MHz)
Resolution	Refer to *MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual Signal Analyzer Function Operation* or *MS2830A/MS2840A/MS2850A Signal Analyzer Operation Manual Signal Analyzer Function Operation*.	
Suffix code	None, Value is returned in s units.	

Example of Use

To query the delay time.

```
TRIG:DEL?
> 0.02000000
```

2.5.6 Video Trigger Level

:TRIGger[:SEQuence]:VIDeo:LEVel[:LOGarithmic] <power>

Video Trigger Level

Function

This command sets the Video trigger detection level.

Command

```
:TRIGger[:SEQuence]:VIDeo:LEVel[:LOGarithmic] <power>
```

Parameter

`<power>`	Video trigger detection level
Range	–150 to 50 dBm
Resolution	0.01 dB
Suffix code	`DBM` dBm when omitted
Default	–40 dBm

Details

This command is enabled when PRACH is Include as the Target Channel.

This command is not available when the Replay function is executed.

Example of Use

To set Video trigger level to 5 dBm.

```
TRIG:VID:LEV 5
```

:TRIGger[:SEQuence]:VIDeo:LEVel[:LOGarithmic]?

Video Trigger Level Query

Function

This command queries the Video trigger detection level.

Query

```
:TRIGger[:SEQuence]:VIDeo:LEVel[:LOGarithmic]?
```

Response

```
<power>
```

Parameter

`<power>`	Video trigger detection level
Range	–150 to +50 dBm
Resolution	0.01 dB

Example of Use

To query Video trigger detection level.

```
TRIG:VID:LEV?
> 5
```

2.6 ACP/Channel Power/OBW/SEM Measurement Functions

Table 2.6-1 lists device messages for fetching the ACP/Channel Power/OBW/SEM measurement functions. The applications to be used (Signal Analyzer or Spectrum Analyzer) must be loaded in advance.

Refer to the *MS2690A/MS2691A/MS2692A and MS2830A/MS2840A/MS2850A Signal Analyzer Operation Manual (Signal Analyzer Function Remote Control)* or *MS2690A/MS2691A/MS2692A and MS2830A/MS2840A/MS2850A Signal Analyzer Operation Manual (Spectrum Analyzer Function Remote Control)* for commands/queries to be used for control after these measurement functions have been fetched.

Table 2.6-1 Device Messages for ACP, Channel Power, OBW, and SEM Measurement Functions

Function	Device Messages
Configure - ACP	`:CONFigure[:FFT|SWEPt]:ACP`
Configure - Channel Power	`:CONFigure[:FFT|SWEPt]:CHPower`
Configure - OBW	`:CONFigure[:FFT|SWEPt]:OBWidth`
Configure - SEM	`:CONFigure[:SWEPt]:SEMask`
Using application for ACP	`[:SENSe]:ACPower:INSTrument[:SELect] FFT|SWEPt`
	`[:SENSe]:ACPower:INSTrument[:SELect]?`
Using application for Channel Power	`[:SENSe]:CHPower:INSTrument[:SELect] FFT|SWEPt`
	`[:SENSe]:CHPower:INSTrument[:SELect]?`
Using application for OBW	`[:SENSe]:OBWidth:INSTrument[:SELect] FFT|SWEPt`
	`[:SENSe]:OBWidth:INSTrument[:SELect]?`

Note:

`FETCh:<measure>`,`INITiate:<measure>`,`READ:<measure>`, and `MEASure:<measure>` cannot used when this application is selected, except for Modulation measurement. The commands/queries can be used when Signal Analyzer or Spectrum Analyzer is selected after executing `CONFigure:<measure>`.

With this application, the ACP measurement function of the Signal Analyzer is enabled only when Channel Bandwidth is set to 1.4, 3, or 5 MHz.

:CONFigure[:FFT|SWEPt]:ACP

ACP

Function

This command selects the ACP measurement function.

The measurement mode can be set by `[:SENSe]:ACPower:INSTrument[:SELect] FFT|SWEPt`, if `FFT` or `SWEPt` is omitted.

Command

`:CONFigure[:FFT|SWEPt]:ACP`

Details

No measurement is made.

This function is only enabled when Channel Bandwidth is set to 1.4, 3, and 5 MHz.

Example of Use

To select the ACP measurement function of Spectrum Analyzer.

`CONF:SWEP:ACP`

:CONFigure[:FFT|SWEPt]:CHPower

Channel Power

Function

This command selects the Channel Power measurement function.

The measurement mode can be set by `[:SENSe]:CHPower:INSTrument[:SELect] FFT|SWEPt`, if `FFT` or `SWEPt` is omitted.

Command

`:CONFigure[:FFT|SWEPt]:CHPower`

Details

No measurement is made.

Example of Use

To select the Channel Power measurement function of Spectrum Analyzer.

`CONF:SWEP:CHP`

:CONFigure[:FFT|SWEPt]:OBWidth

OBW

Function

This command selects the OBW measurement function.

The measurement mode can be set by `[:SENSe]:OBWidth:INSTrument[:SELect] FFT|SWEPt`, if `FFT` or `SWEPt` is omitted.

Command

`:CONFigure[:FFT|SWEPt]:OBWidth`

Details

No measurement is made.

Example of Use

To select the OBW measurement function of Spectrum Analyzer.
`CONF:SWEP:OBW`

:CONFigure[:SWEPt]:SEMask

SEM

Function

This command selects the SEM measurement function.

Command

`:CONFigure[:SWEPt]:SEMask`

Details

No measurement is made.
The SEM measurement function is enabled only for the Spectrum Analyzer.

Example of Use

To select the SEM measurement function of Spectrum Analyzer.
`CONF:SEM`

[:SENSe]:ACPower:INSTrument[:SELect] FFT|SWEPt

Measurement Method for ACP

Function

This command sets the measurement mode to be applied when `:CONFigure:ACP` is executed.

Command

`[:SENSe]:ACPower:INSTrument[:SELect] <mode>`

Parameter

`<mode>`	Measurement mode
`FFT`	Signal Analyzer function
`SWEPt`	Spectrum Analyzer function (Default)

Details

No measurement is made.

Example of Use

To use the Signal Analyzer function when executing the ACP measurement function.

```
ACP:INST FFT
```

[:SENSe]:ACPower:INSTrument[:SELect]?

Measurement Method for ACP Query

Function

This command queries the measurement mode to be applied when `:CONFigure:ACP` is executed.

Query

`[:SENSe]:ACPower:INSTrument[:SELect]?`

Response

`<mode>`

Parameter

`<mode>`	Measurement mode
`FFT`	Signal Analyzer function
`SWEP`	Spectrum analyzer function

Example of Use

To query the measurement mode to be applied when executing the ACP measurement function.

```
ACP:INST?
> FFT
```

[:SENSe]:CHPower:INSTrument[:SELect] FFT|SWEPt

Measurement Method for Channel Power

Function

This command sets the measurement mode to be applied when `:CONFigure:ACP` is executed.

Command

`[:SENSe]:CHPower:INSTrument[:SELect] <mode>`

Parameter

`<mode>`	Measurement mode
`FFT`	Signal Analyzer function
`SWEPt`	Spectrum Analyzer function (Default)

Details

No measurement is made.

Example of Use

To use the Signal Analyzer function when executing the Channel Power measurement function.

```
CHP:INST FFT
```

[:SENSe]:CHPower:INSTrument[:SELect]?

Measurement Method for Channel Power Query

Function

This command queries the measurement mode to be applied when `:CONFigure:CHPower` is executed.

Query

`[:SENSe]:CHPower:INSTrument[:SELect]?`

Response

`<mode>`

Parameter

`<mode>`	Measurement mode
`FFT`	Signal Analyzer function
`SWEP`	Spectrum analyzer function

Example of Use

To query the measurement mode to be applied when executing the Channel Power measurement function.

```
CHP:INST?
> FFT
```

[:SENSe]:OBWidth:INSTrument[:SELect] FFT|SWEPt

Measurement Method for OBW

Function

This command sets the measurement mode to be applied when `:CONFigure:OBWidth` is executed.

Command

`[:SENSe]:OBWidth:INSTrument[:SELect] <mode>`

Parameter

`<mode>`	Measurement mode
`FFT`	Signal Analyzer function
`SWEPt`	Spectrum Analyzer function (Default)

Details

No measurement is made.

Example of Use

To use the Signal Analyzer function when executing the OBW measurement function.

```
OBW:INST FFT
```

[:SENSe]:OBWidth:INSTrument[:SELect]?

Measurement Method for OBW Query

Function

This command queries the measurement mode to be applied when `:CONFigure:OBWidth` is executed.

Query

`[:SENSe]:OBWidth:INSTrument[:SELect]? <mode>`

Response

`<mode>`

Parameter

`<mode>`	Measurement mode
`FFT`	Signal Analyzer function
`SWEP`	Spectrum analyzer function

Example of Use

To query the measurement mode to be applied when executing the OBW measurement function.

```
OBW:INST?
> FFT
```

2.7 Modulation Measurement Function

This section describes device messages for Modulation measurement.

Table 2.7-1 lists device messages for executing Modulation measurement and querying the result.

Table 2.7-1 Device Messages for Modulation Measurement Functions

Function	Device Messages
Configure	:CONFigure:EVM
Initiate	:INITiate:EVM
Fetch	:FETCh:EVM[n]?
Read/Measure	:READ:EVM[n]?
	:MEASure:EVM[n]?

Table 2.7-2 lists the responses to parameter [n] of the device messages in Table 2.7-1.

Table 2.7-2 Responses to Modulation Measurement Results

n	Result Mode	Response
1 or omitted	A/B	The measurement results for the Channel included at Target Channel are returned in the following order separated by commas (,). 1. Frequency Error (Average) in Hz 2. Frequency Error (Maximum) in Hz 3. Frequency Error (Average) in ppm 4. Frequency Error (Maximum) in ppm 5. Output Power (Average) in dBm 6. Output Power (Maximum) in dBm 7. Output Power (Minimum) in dBm 8. Mean Power (Average) in dBm 9. Mean Power (Maximum) in dBm 10. Mean Power (Minimum) in dBm 11. EVM rms (Average) in % 12. EVM rms (Maximum) in % 13. EVM peak (Average) in % 14. EVM peak (Maximum) in % 15. EVM peak Demod-Symbol (|Subcarrier) Number 16. EVM peak Symbol (|Preamble Sequence) Number 17. EVM peak Frame Number 18. Origin Offset (Average) in dB 19. Origin Offset (Maximum) in dB 20. Time Offset (Average) in seconds 21. Time Offset (Maximum) in seconds

2

SCPI Device Message Details

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
2	A/B	Responses are returned with comma-separated value formats in the following order: 1. Total EVM (Freq) result valid (1 = valid/0 = invalid) 2. Total EVM (Freq) rms (Average) 3. Total EVM (Freq) rms (Maximum) 4. Total EVM (Freq) peak (Average) 5. Total EVM (Freq) peak (Maximum) 6. Total EVM (Freq) peak Subcarrier Number 7. Total EVM (Freq) peak Symbol Number 8. Total EVM (Freq) peak Frame Number 9. Total EVM (Freq) High rms (Average) 10. Total EVM (Freq) High rms (Maximum) 11. Total EVM (Freq) High peak (Average) 12. Total EVM (Freq) High peak (Maximum) 13. Total EVM (Freq) High peak Subcarrier Number 14. Total EVM (Freq) High peak Symbol Number 15. Total EVM (Freq) High peak Frame Number 16. Total EVM (Freq) Low rms (Average) 17. Total EVM (Freq) Low rms (Maximum) 18. Total EVM (Freq) Low peak (Average) 19. Total EVM (Freq) Low peak (Maximum) 20. Total EVM (Freq) Low peak Subcarrier Number 21. Total EVM (Freq) Low peak Symbol Number 22. Total EVM (Freq) Low peak Frame Number

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
3	A/B	1. PUSCH ALL (Freq) EVM result valid (1 = valid/0 = invalid) 2. PUSCH ALL (Freq) EVM rms (Average) 3. PUSCH ALL (Freq) EVM rms (Maximum) 4. PUSCH ALL (Freq) EVM peak (Average) 5. PUSCH ALL (Freq) EVM peak (Maximum) 6. PUSCH ALL (Freq) EVM peak Subcarrier Number 7. PUSCH ALL (Freq) EVM peak Symbol Number 8. PUSCH ALL (Freq) EVM peak Frame Number 9. PUSCH ALL (Freq) EVM High rms (Average) 10. PUSCH ALL (Freq) EVM High rms (Maximum) 11. PUSCH ALL (Freq) EVM High peak (Average) 12. PUSCH ALL (Freq) EVM High peak (Maximum) 13. PUSCH ALL (Freq) EVM High peak Subcarrier Number 14. PUSCH ALL (Freq) EVM High peak Symbol Number 15. PUSCH ALL (Freq) EVM High peak Frame Number 16. PUSCH ALL (Freq) EVM Low rms (Average) 17. PUSCH ALL (Freq) EVM Low rms (Maximum) 18. PUSCH ALL (Freq) EVM Low peak (Average) 19. PUSCH ALL (Freq) EVM Low peak (Maximum) 20. PUSCH ALL (Freq) EVM Low peak Subcarrier Number 21. PUSCH ALL (Freq) EVM Low peak Symbol Number 22. PUSCH ALL (Freq) EVM Low peak Frame Number

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
4	A/B	1. PUSCH QPSK (Freq) EVM result valid (1 = valid/0 = invalid) 2. PUSCH QPSK (Freq) EVM rms (Average) 3. PUSCH QPSK (Freq) EVM rms (Maximum) 4. PUSCH QPSK (Freq) EVM peak (Average) 5. PUSCH QPSK (Freq) EVM peak (Maximum) 6. PUSCH QPSK (Freq) EVM peak Subcarrier Number 7. PUSCH QPSK (Freq) EVM peak Symbol Number 8. PUSCH QPSK (Freq) EVM peak Frame Number 9. PUSCH QPSK (Freq) EVM High rms (Average) 10. PUSCH QPSK (Freq) EVM High rms (Maximum) 11. PUSCH QPSK (Freq) EVM High peak (Average) 12. PUSCH QPSK (Freq) EVM High peak (Maximum) 13. PUSCH QPSK (Freq) EVM High peak Subcarrier Number 14. PUSCH QPSK (Freq) EVM High peak Symbol Number 15. PUSCH QPSK (Freq) EVM High peak Frame Number 16. PUSCH QPSK (Freq) EVM Low rms (Average) 17. PUSCH QPSK (Freq) EVM Low rms (Maximum) 18. PUSCH QPSK (Freq) EVM Low peak (Average) 19. PUSCH QPSK (Freq) EVM Low peak (Maximum) 20. PUSCH QPSK (Freq) EVM Low peak Subcarrier Number 21. PUSCH QPSK (Freq) EVM Low peak Symbol Number 22. PUSCH QPSK (Freq) EVM Low peak Frame Number

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
5	A/B	1. PUSCH 16QAM (Freq) EVM result valid (1 = valid/0 = invalid) 2. PUSCH 16QAM (Freq) EVM rms (Average) 3. PUSCH 16QAM (Freq) EVM rms (Maximum) 4. PUSCH 16QAM (Freq) EVM peak (Average) 5. PUSCH 16QAM (Freq) EVM peak (Maximum) 6. PUSCH 16QAM (Freq) EVM peak Subcarrier Number 7. PUSCH 16QAM (Freq) EVM peak Symbol Number 8. PUSCH 16QAM (Freq) EVM peak Frame Number 9. PUSCH 16QAM (Freq) EVM High rms (Average) 10. PUSCH 16QAM (Freq) EVM High rms (Maximum) 11. PUSCH 16QAM (Freq) EVM High peak (Average) 12. PUSCH 16QAM (Freq) EVM High peak (Maximum) 13. PUSCH 16QAM (Freq) EVM High peak Subcarrier Number 14. PUSCH 16QAM (Freq) EVM High peak Symbol Number 15. PUSCH 16QAM (Freq) EVM High peak Frame Number 16. PUSCH 16QAM (Freq) EVM Low rms (Average) 17. PUSCH 16QAM (Freq) EVM Low rms (Maximum) 18. PUSCH 16QAM (Freq) EVM Low peak (Average) 19. PUSCH 16QAM (Freq) EVM Low peak (Maximum) 20. PUSCH 16QAM (Freq) EVM Low peak Subcarrier Number 21. PUSCH 16QAM (Freq) EVM Low peak Symbol Number 22. PUSCH 16QAM (Freq) EVM Low peak Frame Number

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
6	A/B	1. PUSCH 64QAM (Freq) EVM result valid (1 = valid/0 = invalid) 2. PUSCH 64QAM (Freq) EVM rms (Average) 3. PUSCH 64QAM (Freq) EVM rms (Maximum) 4. PUSCH 64QAM (Freq) EVM peak (Average) 5. PUSCH 64QAM (Freq) EVM peak (Maximum) 6. PUSCH 64QAM (Freq) EVM peak Subcarrier Number 7. PUSCH 64QAM (Freq) EVM peak Symbol Number 8. PUSCH 64QAM (Freq) EVM peak Frame Number 9. PUSCH 64QAM (Freq) EVM High rms (Average) 10. PUSCH 64QAM (Freq) EVM High rms (Maximum) 11. PUSCH 64QAM (Freq) EVM High peak (Average) 12. PUSCH 64QAM (Freq) EVM High peak (Maximum) 13. PUSCH 64QAM (Freq) EVM High peak Subcarrier Number 14. PUSCH 64QAM (Freq) EVM High peak Symbol Number 15. PUSCH 64QAM (Freq) EVM High peak Frame Number 16. PUSCH 64QAM (Freq) EVM Low rms (Average) 17. PUSCH 64QAM (Freq) EVM Low rms (Maximum) 18. PUSCH 64QAM (Freq) EVM Low peak (Average) 19. PUSCH 64QAM (Freq) EVM Low peak (Maximum) 20. PUSCH 64QAM (Freq) EVM Low peak Subcarrier Number 21. PUSCH 64QAM (Freq) EVM Low peak Symbol Number 22. PUSCH 64QAM (Freq) EVM Low peak Frame Number

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
7	A/B	1. Total EVM (Time) result valid (1 = valid/0 = invalid) 2. Total EVM (Time) rms (Average) 3. Total EVM (Time) rms (Maximum) 4. Total EVM (Time) peak (Average) 5. Total EVM (Time) peak (Maximum) 6. Total EVM (Time) peak Demod-Symbol Number 7. Total EVM (Time) peak Symbol Number 8. Total EVM (Time) peak Frame Number 9. Total EVM (Time) High rms (Average) 10. Total EVM (Time) High rms (Maximum) 11. Total EVM (Time) High peak (Average) 12. Total EVM (Time) High peak (Maximum) 13. Total EVM (Time) High peak Demod-Symbol Number 14. Total EVM (Time) High peak Symbol Number 15. Total EVM (Time) High peak Frame Number 16. Total EVM (Time) Low rms (Average) 17. Total EVM (Time) Low rms (Maximum) 18. Total EVM (Time) Low peak (Average) 19. Total EVM (Time) Low peak (Maximum) 20. Total EVM (Time) Low peak Demod-Symbol Number 21. Total EVM (Time) Low peak Symbol Number 22. Total EVM (Time) Low peak Frame Number

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
8	A/B	1. PUSCH ALL (Time) EVM result valid (1 = valid/0 = invalid) 2. PUSCH ALL (Time) EVM rms (Average) 3. PUSCH ALL (Time) EVM rms (Maximum) 4. PUSCH ALL (Time) EVM peak (Average) 5. PUSCH ALL (Time) EVM peak (Maximum) 6. PUSCH ALL (Time) EVM peak Demod-Symbol Number 7. PUSCH ALL (Time) EVM peak Symbol Number 8. PUSCH ALL (Time) EVM peak Frame Number 9. PUSCH ALL (Time) EVM High rms (Average) 10. PUSCH ALL (Time) EVM High rms (Maximum) 11. PUSCH ALL (Time) EVM High peak (Average) 12. PUSCH ALL (Time) EVM High peak (Maximum) 13. PUSCH ALL (Time) EVM High peak Demod-Symbol Number 14. PUSCH ALL (Time) EVM High peak Symbol Number 15. PUSCH ALL (Time) EVM High peak Frame Number 16. PUSCH ALL (Time) EVM Low rms (Average) 17. PUSCH ALL (Time) EVM Low rms (Maximum) 18. PUSCH ALL (Time) EVM Low peak (Average) 19. PUSCH ALL (Time) EVM Low peak (Maximum) 20. PUSCH ALL (Time) EVM Low peak Demod-Symbol Number 21. PUSCH ALL (Time) EVM Low peak Symbol Number 22. PUSCH ALL (Time) EVM Low peak Frame Number

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
9	A/B	1. PUSCH QPSK (Time) EVM result valid (1 = valid/0 = invalid) 2. PUSCH QPSK (Time) EVM rms (Average) 3. PUSCH QPSK (Time) EVM rms (Maximum) 4. PUSCH QPSK (Time) EVM peak (Average) 5. PUSCH QPSK (Time) EVM peak (Maximum) 6. PUSCH QPSK (Time) EVM peak Demod-Symbol Number 7. PUSCH QPSK (Time) EVM peak Symbol Number 8. PUSCH QPSK (Time) EVM peak Frame Number 9. PUSCH QPSK (Time) EVM High rms (Average) 10. PUSCH QPSK (Time) EVM High rms (Maximum) 11. PUSCH QPSK (Time) EVM High peak (Average) 12. PUSCH QPSK (Time) EVM High peak (Maximum) 13. PUSCH QPSK (Time) EVM High peak Demod-Symbol Number 14. PUSCH QPSK (Time) EVM High peak Symbol Number 15. PUSCH QPSK (Time) EVM High peak Frame Number 16. PUSCH QPSK (Time) EVM Low rms (Average) 17. PUSCH QPSK (Time) EVM Low rms (Maximum) 18. PUSCH QPSK (Time) EVM Low peak (Average) 19. PUSCH QPSK (Time) EVM Low peak (Maximum) 20. PUSCH QPSK (Time) EVM Low peak Demod-Symbol Number 21. PUSCH QPSK (Time) EVM Low peak Symbol Number 22. PUSCH QPSK (Time) EVM Low peak Frame Number

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
10	A/B	1. PUSCH 16QAM (Time) EVM result valid (1 = valid/0 = invalid) 2. PUSCH 16QAM (Time) EVM rms (Average) 3. PUSCH 16QAM (Time) EVM rms (Maximum) 4. PUSCH 16QAM (Time) EVM peak (Average) 5. PUSCH 16QAM (Time) EVM peak (Maximum) 6. PUSCH 16QAM (Time) EVM peak Demod-Symbol Number 7. PUSCH 16QAM (Time) EVM peak Symbol Number 8. PUSCH 16QAM (Time) EVM peak Frame Number 9. PUSCH 16QAM (Time) EVM High rms (Average) 10. PUSCH 16QAM (Time) EVM High rms (Maximum) 11. PUSCH 16QAM (Time) EVM High peak (Average) 12. PUSCH 16QAM (Time) EVM High peak (Maximum) 13. PUSCH 16QAM (Time) EVM High peak Demod-Symbol Number 14. PUSCH 16QAM (Time) EVM High peak Symbol Number 15. PUSCH 16QAM (Time) EVM High peak Frame Number 16. PUSCH 16QAM (Time) EVM Low rms (Average) 17. PUSCH 16QAM (Time) EVM Low rms (Maximum) 18. PUSCH 16QAM (Time) EVM Low peak (Average) 19. PUSCH 16QAM (Time) EVM Low peak (Maximum) 20. PUSCH 16QAM (Time) EVM Low peak Demod-Symbol Number 21. PUSCH 16QAM (Time) EVM Low peak Symbol Number 22. PUSCH 16QAM (Time) EVM Low peak Frame Number

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
11	A/B	1. PUSCH 64QAM (Time) EVM result valid (1 = valid/0 = invalid) 2. PUSCH 64QAM (Time) EVM rms (Average) 3. PUSCH 64QAM (Time) EVM rms (Maximum) 4. PUSCH 64QAM (Time) EVM peak (Average) 5. PUSCH 64QAM (Time) EVM peak (Maximum) 6. PUSCH 64QAM (Time) EVM peak Demod-Symbol Number 7. PUSCH 64QAM (Time) EVM peak Symbol Number 8. PUSCH 64QAM (Time) EVM peak Frame Number 9. PUSCH 64QAM (Time) EVM High rms (Average) 10. PUSCH 64QAM (Time) EVM High rms (Maximum) 11. PUSCH 64QAM (Time) EVM High peak (Average) 12. PUSCH 64QAM (Time) EVM High peak (Maximum) 13. PUSCH 64QAM (Time) EVM High peak Demod-Symbol Number 14. PUSCH 64QAM (Time) EVM High peak Symbol Number 15. PUSCH 64QAM (Time) EVM High peak Frame Number 16. PUSCH 64QAM (Time) EVM Low rms (Average) 17. PUSCH 64QAM (Time) EVM Low rms (Maximum) 18. PUSCH 64QAM (Time) EVM Low peak (Average) 19. PUSCH 64QAM (Time) EVM Low peak (Maximum) 20. PUSCH 64QAM (Time) EVM Low peak Demod-Symbol Number 21. PUSCH 64QAM (Time) EVM Low peak Symbol Number 22. PUSCH 64QAM (Time) EVM Low peak Frame Number

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
12	A/B	1. PUSCH DMRS EVM result valid (1 = valid/0 = invalid) 2. PUSCH DMRS EVM rms (Average) 3. PUSCH DMRS EVM rms (Maximum) 4. PUSCH DMRS EVM peak (Average) 5. PUSCH DMRS EVM peak (Maximum) 6. PUSCH DMRS EVM peak Subcarrier Number 7. PUSCH DMRS EVM peak Symbol Number 8. PUSCH DMRS EVM peak Frame Number 9. PUSCH DMRS EVM High rms (Average) 10. PUSCH DMRS EVM High rms (Maximum) 11. PUSCH DMRS EVM High peak (Average) 12. PUSCH DMRS EVM High peak (Maximum) 13. PUSCH DMRS EVM High peak Subcarrier Number 14. PUSCH DMRS EVM High peak Symbol Number 15. PUSCH DMRS EVM High peak Frame Number 16. PUSCH DMRS EVM Low rms (Average) 17. PUSCH DMRS EVM Low rms (Maximum) 18. PUSCH DMRS EVM Low peak (Average) 19. PUSCH DMRS EVM Low peak (Maximum) 20. PUSCH DMRS EVM Low peak Subcarrier Number 21. PUSCH DMRS EVM Low peak Symbol Number 22. PUSCH DMRS EVM Low peak Frame Number

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
13	A/B	1. PUCCH EVM result valid (1 = valid/0 = invalid) 2. PUCCH EVM rms (Average) 3. PUCCH EVM rms (Maximum) 4. PUCCH EVM peak (Average) 5. PUCCH EVM peak (Maximum) 6. PUCCH EVM peak Subcarrier Number 7. PUCCH EVM peak Symbol Number 8. PUCCH EVM peak Frame Number 9. PUCCH EVM High rms (Average) 10. PUCCH EVM High rms (Maximum) 11. PUCCH EVM High peak (Average) 12. PUCCH EVM High peak (Maximum) 13. PUCCH EVM High peak Subcarrier Number 14. PUCCH EVM High peak Symbol Number 15. PUCCH EVM High peak Frame Number 16. PUCCH EVM Low rms (Average) 17. PUCCH EVM Low rms (Maximum) 18. PUCCH EVM Low peak (Average) 19. PUCCH EVM Low peak (Maximum) 20. PUCCH EVM Low peak Subcarrier Number 21. PUCCH EVM Low peak Symbol Number 22. PUCCH EVM Low peak Frame Number

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
14	A/B	1. PUCCH DMRS EVM result valid (1 = valid/0 = invalid) 2. PUCCH DMRS EVM rms (Average) 3. PUCCH DMRS EVM rms (Maximum) 4. PUCCH DMRS EVM peak (Average) 5. PUCCH DMRS EVM peak (Maximum) 6. PUCCH DMRS EVM peak Subcarrier Number 7. PUCCH DMRS EVM peak Symbol Number 8. PUCCH DMRS EVM peak Frame Number 9. PUCCH DMRS EVM High rms (Average) 10. PUCCH DMRS EVM High rms (Maximum) 11. PUCCH DMRS EVM High peak (Average) 12. PUCCH DMRS EVM High peak (Maximum) 13. PUCCH DMRS EVM High peak Subcarrier Number 14. PUCCH DMRS EVM High peak Symbol Number 15. PUCCH DMRS EVM High peak Frame Number 16. PUCCH DMRS EVM Low rms (Average) 17. PUCCH DMRS EVM Low rms (Maximum) 18. PUCCH DMRS EVM Low peak (Average) 19. PUCCH DMRS EVM Low peak (Maximum) 20. PUCCH DMRS EVM Low peak Subcarrier Number 21. PUCCH DMRS EVM Low peak Symbol Number 22. PUCCH DMRS EVM Low peak Frame Number

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
15	A/B	1. PRACH EVM result valid (1 = valid/0 = invalid) 2. PRACH EVM rms (Average) 3. PRACH EVM rms (Maximum) 4. PRACH EVM peak (Average) 5. PRACH EVM peak (Maximum) 6. PRACH EVM peak Subcarrier Number 7. PRACH EVM peak Preamble Sequence Number 8. PRACH EVM High rms (Average) 9. PRACH EVM High rms (Maximum) 10. PRACH EVM High peak (Average) 11. PRACH EVM High peak (Maximum) 12. PRACH EVM High peak Subcarrier Number 13. PRACH EVM High peak Preamble Sequence Number 14. PRACH EVM Low rms (Average) 15. PRACH EVM Low rms (Maximum) 16. PRACH EVM Low peak (Average) 17. PRACH EVM Low peak (Maximum) 18. PRACH EVM Low peak Subcarrier Number 19. PRACH EVM Low peak Preamble Sequence Number

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
17	A/B	1. I-phase constellation of the 0th data symbol 2. Q-phase constellation of the 0th data symbol … 2×N–1. I-phase constellation of the (N–1)th data symbol 2×N. Q-phase constellation of the (N–1)th data symbol
18	A/B	1. EVM (rms) of the 0th subcarrier 2. EVM (rms) of the 1st subcarrier … N. EVM (rms) of the (N–1)th subcarrier
19	A/B	1. EVM (peak) of the 0th subcarrier 2. EVM (peak) of the 1st subcarrier … N. EVM (peak) of the (N–1)th subcarrier
20	A/B	1. EVM (rms) of the 0th symbol 2. EVM (rms) of the 1st symbol … 140. EVM (rms) of the 139th symbol
21	A/B	1. EVM (Peak) of the 0th symbol 2. EVM (Peak) of the 1st symbol … 140. EVM (Peak) of the 139th symbol
22	A/B	1. EVM (rms) of the 0th Demod-Symbol 2. EVM (rms) of the 1st Demod-Symbol … N. EVM (rms) of the (N–1)th Demod-Symbol
23	A/B	1. EVM (Peak) of the 0st Demod-Symbol 2. EVM (Peak) of the 1st Demod-Symbol … N. EVM (Peak) of the (N–1)th Demod-Symbol
24	A/B	1. EVM (rms) of the 0th symbol 2. EVM (rms) of the 1st symbol … 140. EVM (rms) of the 139th symbol

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
25	A/B	1. EVM (Peak) of the 0th symbol 2. EVM (Peak) of the 1st symbol … 140. EVM (Peak) of the 139th symbol
26	A/B	1. Spectral Flatness – Amplitude (Ave) of the 0th subcarrier 2. Spectral Flatness – Amplitude (Ave) of the 1st subcarrier … N. Spectral Flatness – Amplitude (Ave) of the (N–1)th subcarrier
27	A/B	1. Spectral Flatness – Amplitude (Max) of the 0th subcarrier 2. Spectral Flatness – Amplitude (Max) of the 1st subcarrier … N. Spectral Flatness – Amplitude (Max) of the (N–1)th subcarrier
28	A/B	1. Spectral Flatness – Amplitude (Min) of the 0th subcarrier 2. Spectral Flatness – Amplitude (Min) of the 1st subcarrier … N. Spectral Flatness – Amplitude (Min) of the (N–1)th subcarrier
29	A/B	1. Spectral Flatness – Differential (Ave) of the 1st subcarrier, relative to the 0th subcarrier 2. Spectral Flatness – Differential (Ave) of the 2nd subcarrier, relative to the 1st subcarrier … N–2. Spectral Flatness – Differential (Ave) of the (N–2)th subcarrier, relative to the (N-1)th subcarrier
30	A/B	1. Spectral Flatness – Differential (Max) of the 1st subcarrier, relative to the 0th subcarrier 2. Spectral Flatness – Differential (Max) of the 2nd subcarrier, relative to the 1st subcarrier … N–2. Spectral Flatness – Differential (Max) of the (N–2)th subcarrier, relative to the (N–1)th subcarrier

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
31	A/B	1. Spectral Flatness – Differential (Min) of the 1st subcarrier, relative to the 0th subcarrier 2. Spectral Flatness – Differential (Min) of the 2nd subcarrier, relative to the 1st subcarrier … N–2. Spectral Flatness – Differential (Min) of the (N–2)th subcarrier, relative to the (N–1)th subcarrier
32	A/B	1. Spectral Flatness – Phase (Ave) of the 0th subcarrier 2. Spectral Flatness – Phase (Ave) of the 1st subcarrier … N. Spectral Flatness – Phase (Ave) of the (N–1)th subcarrier
33	A/B	1. Spectral Flatness – Phase (Max) of the 0th subcarrier 2. Spectral Flatness – Phase (Max) of the 1st subcarrier … N. Spectral Flatness – Phase (Max) of the (N–1)th subcarrier
34	A/B	1. Spectral Flatness – Phase (Min) of the 0th subcarrier 2. Spectral Flatness – Phase (Min) of the 1st subcarrier … N. Spectral Flatness – Phase (Min) of the (N–1)th subcarrier
35	A/B	1. Spectral Flatness – Group Delay (Ave) of the 0th subcarrier 2. Spectral Flatness – Group Delay (Ave) of the 1st subcarrier … N–2. Spectral Flatness – Group Delay (Ave) of the (N–1)th subcarrier
36	A/B	1. Spectral Flatness – Group Delay (Max) of the 0th subcarrier 2. Spectral Flatness – Group Delay (Max) of the 1st subcarrier … N–2. Spectral Flatness – Group Delay (Max) of the (N–1)th subcarrier
37	A/B	1. Spectral Flatness – Group Delay (Min) of the 0th subcarrier 2. Spectral Flatness – Group Delay (Min) of the 1st subcarrier … N–2. Spectral Flatness – Group Delay (Min) of the (N–1)th subcarrier
38	A/B	1. In-band Emission General/IQ Image (Ave) of RB 0 2. In-band Emission General/IQ Image (Ave) of RB 1 … N. In-band Emission General/IQ Image (Ave) of the (N–1)th RB

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
39	A/B	1. In-band Emission General/IQ Image (max) of RB 0 2. In-band Emission General/IQ Image (max) of RB 1 … N. In-band Emission General/IQ Image (Max) of the (N–1)th RB
40	A/B	1. In-band Emission General/IQ Image (Min) of RB 0 2. In-band Emission General/IQ Image (Min) of RB 1 … N. In-band Emission General/IQ Image (Min) of the (N–1)th RB
41	A/B	1. In-band Emission Carrier Leakage (Ave) of RB 0 2. In-band Emission Carrier Leakage (Ave) of RB 1 … N. In-band Emission Carrier Leakage (Ave) of the (N–1)th RB
42	A/B	1. In-band Emission Carrier Leakage (max) of RB 0 2. In-band Emission Carrier Leakage (max) of RB 1 … N. In-band Emission Carrier Leakage (max) of the (N–1)th RB
43	A/B	1. In-band Emission Carrier Leakage (Min) of RB 0 2. In-band Emission Carrier Leakage (Min) of RB 1 … N. In-band Emission Carrier Leakage (Min) of the (N–1)th RB
44	A/B	1. Frequency Error (Ave) of 0th slot of frame 0 [Hz] 2. Frequency Error (Max) of 0th slot of frame 0 [Hz] … 199. Frequency Error (Ave) of 19th slot of frame 4 [Hz] 200. Frequency Error (Max) of 19th slot of frame 4 [Hz]
45	A/B	1. Frequency Error (Ave) of 0th slot of frame 0 [ppm] 2. Frequency Error (Max) of 0th slot of frame 0 [ppm] … 199. Frequency Error (Ave) of 19th slot of frame 4 [ppm] 200. Frequency Error (Max) of 19th slot of frame 4 [ppm]
46	A/B	1. Origin Offset (Ave) of 0th slot of frame 0 [dB] 2. Origin Offset (Max) of 0th slot of frame 0 [dB] … 199. Origin Offset (Ave) of 19th slot of frame 4 [Hz] 200. Origin Offset (Max) of 19th slot of frame 4 [Hz]

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
47	A/B	1. Inside Flatness (≤ 3 MHz) Avg. (Average) 2. Inside Flatness (≤ 3 MHz) Avg. (max) 3. Inside Flatness (≤ 3 MHz) Positive peak. (Average) 4. Inside Flatness (≤ 3 MHz) Positive peak. (max) 5. Inside Flatness (≤ 3 MHz) Positive peak Subcarrier Number 6. Inside Flatness (≤ 3 MHz) Positive peak Slot Number 7. Inside Flatness (≤ 3 MHz) Positive peak Frame Number 8. Inside Flatness (≤ 3 MHz) Negative peak. (Average) 9. Inside Flatness (≤ 3 MHz) Negative peak. (max) 10. Inside Flatness (≤ 3 MHz) Negative peak Subcarrier Number 11. Inside Flatness (≤ 3 MHz) Negative peak Slot Number 12. Inside Flatness (≤ 3 MHz) Negative peak Frame Number 13. Outside Flatness (> 3 MHz) Avg. (Average) 14. Outside Flatness (> 3 MHz) Avg. (max) 15. Outside Flatness (> 3 MHz) Positive peak. (Average) 16. Outside Flatness (> 3 MHz) Positive peak. (max) 17. Outside Flatness (> 3 MHz) Positive peak Subcarrier Number 18. Outside Flatness (> 3 MHz) Positive peak Slot Number 19. Outside Flatness (> 3 MHz) Positive peak Frame Number 20. Outside Flatness (> 3 MHz) Negative peak. (Average) 21. Outside Flatness (> 3 MHz) Negative peak. (max) 22. Outside Flatness (> 3 MHz) Negative peak Subcarrier Number 23. Outside Flatness (> 3 MHz) Negative peak Slot Number 24. Outside Flatness (> 3 MHz) Negative peak Frame Number 25. Inside Flatness (≤ 5 MHz) Avg. (Average) 26. Inside Flatness (≤ 5 MHz) Avg. (max) 27. Inside Flatness (≤ 5 MHz) Positive peak. (Average) 28. Inside Flatness (≤ 5 MHz) Positive peak. (max) 29. Inside Flatness (≤ 5 MHz) Positive peak Subcarrier Number 30. Inside Flatness (≤ 5 MHz) Positive peak Slot Number 31. Inside Flatness (≤ 5 MHz) Positive peak Frame Number 32. Inside Flatness (≤ 5 MHz) Negative peak. (Average) 33. Inside Flatness (≤ 5 MHz) Negative peak. (max) 34. Inside Flatness (≤ 5 MHz) Negative peak Subcarrier Number 35. Inside Flatness (≤ 5 MHz) Negative peak Slot Number 36. Inside Flatness (≤ 5 MHz) Negative peak Frame Number

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
47	A/B	37. Outside Flatness (> 5 MHz) Avg. (Average) 38. Outside Flatness (> 5 MHz) Avg. (max) 39. Outside Flatness (> 5 MHz) Positive peak. (Average) 40. Outside Flatness (> 5 MHz) Positive peak. (max) 41. Outside Flatness (> 5 MHz) Positive peak Subcarrier Number 42. Outside Flatness (> 5 MHz) Positive peak Slot Number 43. Outside Flatness (> 5 MHz) Positive peak Frame Number 44. Outside Flatness (> 5 MHz) Negative peak. (Average) 45. Outside Flatness (> 5 MHz) Negative peak. (max) 46. Outside Flatness (> 5 MHz) Negative peak Subcarrier Number 47. Outside Flatness (> 5 MHz) Negative peak Slot Number 48. Outside Flatness (> 5 MHz) Negative peak Frame Number
48	A/B	1. Inside Flatness Avg of 0th slot of frame 0 (Average) 2. Inside Flatness Avg of 0th slot of frame 0 (max) 3. Inside Flatness Positive peak of 0th slot of frame 0 (Average) 4. Inside Flatness Positive peak of 0th slot of frame 0 (max) 5. Inside Flatness Positive peak Subcarrier Number of 0th slot of frame 0 6. Inside Flatness Negative peak of 0th slot of frame 0 (Average) 7. Inside Flatness Negative peak of 0th slot of frame 0 (max) 8. Inside Flatness Negative peak Subcarrier Number of 0th slot of frame 0 … 793. Inside Flatness Avg of 19th slot of frame 4 (Average) 794. Inside Flatness Avg of 19th slot of frame 4 (max) 795. Inside Flatness Positive peak of 19th slot of frame 4 (Average) 796. Inside Flatness Positive peak of 19th slot of frame 4 (max) 797. Inside Flatness Positive peak Subcarrier Number of 19th slot of frame 4 798. Inside Flatness Negative peak of 19th slot of frame 4 (Average) 799. Inside Flatness Negative peak of 19th slot of frame 4 (max) 800. Inside Flatness Negative peak Subcarrier Number of 19th slot of frame 4

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
49	A/B	1. Outside Flatness Avg of 0th slot of frame 0 (Average) 2. Outside Flatness Avg of 0th slot of frame 0 (max) 3. Outside Flatness Positive peak of 0th slot of frame 0 (Average) 4. Outside Flatness Positive peak of 0th slot of frame 0 (max) 5. Outside Flatness Positive peak Subcarrier Number of 0th slot of frame 0 6. Outside Flatness Negative peak of 0th slot of frame 0 (Average) 7. Outside Flatness Negative peak of 0th slot of frame 0 (max) 8. Outside Flatness Negative peak Subcarrier Number of 0th slot of frame 0 … 793. Outside Flatness Avg of 19th slot of frame 4 (Average) 794. Outside Flatness Avg of 19th slot of frame 4 (max) 795. Outside Flatness Positive peak of 19th slot of frame 4 (Average) 796. Outside Flatness Positive peak of 19th slot of frame 4 (max) 797. Outside Flatness Positive peak Subcarrier Number of 19th slot of frame 4 798. Outside Flatness Negative peak of 19th slot of frame 4 (Average) 799. Outside Flatness Negative peak of 19th slot of frame 4 (max) 800. Outside Flatness Negative peak Subcarrier Number of 19th slot of frame 4
50	A/B	Result equivalent to n=48.
51	A/B	Result equivalent to n=49.

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
52	A/B	1. Flatness RP_11 (normal conditions) Avg. (Average) 2. Flatness RP_11 (normal conditions) Avg. (max) 3. Flatness RP_11 (normal conditions) peak. (Average) 4. Flatness RP_11 (normal conditions) peak. (max) 5. Flatness RP_11 (normal conditions) peak Positive Slot Number 6. Flatness RP_11 (normal conditions) peak Positive Frame Number 7. Flatness RP_22 (normal conditions) Avg. (Average) 8. Flatness RP_22 (normal conditions) Avg. (max) 9. Flatness RP_22 (normal conditions) peak. (Average) 10. Flatness RP_22 (normal conditions) peak. (max) 11. Flatness RP_22 (normal conditions) peak Positive Slot Number 12. Flatness RP_22 (normal conditions) peak Positive Frame Number 13. Flatness RP_12 (normal conditions) Avg. (Average) 14. Flatness RP_12 (normal conditions) Avg. (max) 15. Flatness RP_12 (normal conditions) peak. (Average) 16. Flatness RP_12 (normal conditions) peak. (max) 17. Flatness RP_12 (normal conditions) peak Positive Slot Number 18. Flatness RP_12 (normal conditions) peak Positive Frame Number 19. Flatness RP_21 (normal conditions) Avg. (Average) 20. Flatness RP_21 (normal conditions) Avg. (max) 21. Flatness RP_21 (normal conditions) peak. (Average) 22. Flatness RP_21 (normal conditions) peak. (max) 23. Flatness RP_21 (normal conditions) peak Positive Slot Number 24. Flatness RP_21 (normal conditions) peak Positive Frame Number
53	A/B	Result equivalent to n=52.

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
54	A/B	1. Flatness RP_11 of 0th slot of frame 0 (Average) 2. Flatness RP_11 of 0th slot of frame 0 (Max) 3. Flatness RP_22 of 0th slot of frame 0 (Average) 4. Flatness RP_22 of 0th slot of frame 0 (Max) 5. Flatness RP_12 of 0th slot of frame 0 (Average) 6. Flatness RP_12 of 0th slot of frame 0 (Max) 7. Flatness RP_21 of 0th slot of frame 0 (Average) 8. Flatness RP_21 of 0th slot of frame 0 (Max) … 793. Flatness RP_11 of 19th slot of frame 4 (Average) 794. Flatness RP_11 of 19th slot of frame 4 (Max) 795. Flatness RP_22 of 19th slot of frame 4 (Average) 796. Flatness RP_22 of 19th slot of frame 4 (Max) 797. Flatness RP_12 of 19th slot of frame 4 (Average) 798. Flatness RP_12 of 19th slot of frame 4 (Max) 799. Flatness RP_21 of 19th slot of frame 4 (Average) 800. Flatness RP_21 of 19th slot of frame 4 (Max)
55	A/B	1. Flatness RP_11 of 0th slot of frame 0 (Average) 2. Flatness RP_11 of 0th slot of frame 0 (Max) 3. Flatness RP_22 of 0th slot of frame 0 (Average) 4. Flatness RP_22 of 0th slot of frame 0 (Max) 5. Flatness RP_12 of 0th slot of frame 0 (Average) 6. Flatness RP_12 of 0th slot of frame 0 (Max) 7. Flatness RP_21 of 0th slot of frame 0 (Average) 8. Flatness RP_21 of 0th slot of frame 0 (Max) … 793. Flatness RP_11 of 19th slot of frame 4 (Average) 794. Flatness RP_11 of 19th slot of frame 4 (Max) 795. Flatness RP_22 of 19th slot of frame 4 (Average) 796. Flatness RP_22 of 19th slot of frame 4 (Max) 797. Flatness RP_12 of 19th slot of frame 4 (Average) 798. Flatness RP_12 of 19th slot of frame 4 (Max) 799. Flatness RP_21 of 19th slot of frame 4 (Average) 800. Flatness RP_21 of 19th slot of frame 4 (Max)

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
56	A/B	1. General (Exclude Carrier Leakage /IQ) Emission (Average) 2. General (Exclude Carrier Leakage /IQ) Emission (max) 3. General (Exclude Carrier Leakage /IQ) Emission peak (Average) 4. General (Exclude Carrier Leakage /IQ) Emission peak (max) 5. General (Exclude Carrier Leakage /IQ) Emission peak Power 6. General (Exclude Carrier Leakage /IQ) Emission peak Resource Block Number 7. General (Exclude Carrier Leakage /IQ) Emission peak Slot Number 8. General (Exclude Carrier Leakage /IQ) Emission peak Frame Number 9. IQ Image Emission (Average) 10. IQ Image Emission (max) 11. IQ Image Emission peak (Average) 12. IQ Image Emission peak (max) 13. IQ Image Emission peak Power 14. IQ Image Emission peak Resource Block Number 15. IQ Image Emission peak Slot Number 16. IQ Image Emission peak Frame Number 17. Carrier Leakage Emission (Average) 18. Carrier Leakage Emission (max) 19. Carrier Leakage Emission peak (Average) 20. Carrier Leakage Emission peak (max) 21. Carrier Leakage Emission peak Power 22. Carrier Leakage Emission peak Resource Block Number 23. Carrier Leakage Emission peak Slot Number 24. Carrier Leakage Emission peak Frame Number 25. General Emission (Average) 26. General Emission (max) 27. General Emission peak (Average) 28. General Emission peak (max) 29. General Emission peak Power 30. General Emission peak Resource Block Number 31. General Emission peak Slot Number 32. General Emission peak Frame Number

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
57	A/B	Responses are returned with comma-separated value formats in the following order: 1. General (Excl.DC/IQ) In-Band Emission of 0th slot of frame 0 (Average) 2. General (Excl.DC/IQ) In-Band Emission of 0th slot of frame 0 (max) 3. General (Excl.DC/IQ) In-Band Emission peak of 0th slot of frame 0 (Average) 4. General (Excl.DC/IQ) In-Band Emission peak of 0th slot of frame 0 (max) 5. General (Excl.DC/IQ) In-Band Emission peak Power of 0th slot of frame 0 6. General (Excl.DC/IQ) In-Band Emission peak RB Number of 0th slot of frame 0 ... 595. General (Excl.DC/IQ) In-Band Emission of 19th slot of frame 4 (Average) 596. General (Excl.DC/IQ) In-Band Emission of 19th slot of frame 4 (max) 597. General (Excl.DC/IQ) In-Band Emission peak of 19th slot of frame 4 (Average) 598. General (Excl.DC/IQ) In-Band Emission peak of 19th slot of frame 4 (max) 599. General (Excl.DC/IQ) In-Band Emission peak Power of 19th slot of frame 4 600. General (Excl.DC/IQ) In-Band Emission peak RB Number of 19th slot of frame 4
58	A/B	1. IQ Image In-Band Emission of 0th slot of frame 0 (Average) 2. IQ Image In-Band Emission of 0th slot of frame 0 (max) 3. IQ Image In-Band Emission peak of 0th slot of frame 0 (Average) 4. IQ Image In-Band Emission peak of 0th slot of frame 0 (max) 5. IQ Image In-Band Emission peak Power of 0th slot of frame 0 6. IQ Image In-Band Emission peak RB Number of 0th slot of frame 0 ... 595. IQ Image In-Band Emission of 19th slot of frame 4 (Average) 596. IQ Image In-Band Emission of 19th slot of frame 4 (max) 597. IQ Image In-Band Emission peak of 19th slot of frame 4 (Average) 598. IQ Image In-Band Emission peak of 19th slot of frame 4 (max) 599. IQ Image In-Band Emission peak Power of 19th slot of frame 4 600. IQ Image In-Band Emission peak RB Number of 19th slot of frame 4

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
59	A/B	1. Carrier Leakage In-Band Emission of 0th slot of frame 0 (Average) 2. Carrier Leakage In-Band Emission of 0th slot of frame 0 (max) 3. Carrier Leakage In-Band Emission peak of 0th slot of frame 0 (Average) 4. Carrier Leakage In-Band Emission peak of 0th slot of frame 0 (max) 5. Carrier Leakage In-Band Emission peak Power of 0th slot of frame 0 6. Carrier Leakage In-Band Emission peak RB Number of 0th slot of frame 0 … 595. Carrier Leakage In-Band Emission of 19th slot of frame 4 (Average) 596. Carrier Leakage In-Band Emission of 19th slot of frame 4 (max) 597. Carrier Leakage In-Band Emission peak of 19th slot of frame 4 (Average) 598. Carrier Leakage In-Band Emission peak of 19th slot of frame 4 (max) 599. Carrier Leakage In-Band Emission peak Power of 19th slot of frame 4 600. Carrier Leakage In-Band Emission peak RB Number of 19th slot of frame 4
60	A/B	1. General In-Band Emission of 0th slot of frame 0 (Average) 2. General In-Band Emission of 0th slot of frame 0 (max) 3. General In-Band Emission peak of 0th slot of frame 0 (Average) 4. General In-Band Emission peak of 0th slot of frame 0 (max) 5. General In-Band Emission peak Power of 0th slot of frame 0 6. General In-Band Emission peak RB Number of 0th slot of frame 0 … 595. General In-Band Emission of 19th slot of frame 4 (Average) 596. General In-Band Emission of 19th slot of frame 4 (max) 597. General In-Band Emission peak of 4th slot of frame 4 (Average) 598. General In-Band Emission peak of 19th slot of frame 4 (max) 599. General In-Band Emission peak Power of 19th slot of frame 4 600. General In-Band Emission peak RB Number of 19th slot of frame 4

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
61	A/B	1. General (Excl.DC/IQ) In-Band Emission margin peak of 0th slot of frame 0 (Max) 2. General (Excl.DC/IQ) In-Band Emission RB Number of 0th slot of frame 0 3. General (Excl.DC/IQ) In-Band Emission spec relative of 0th slot of frame 0 4. General (Excl.DC/IQ) In-Band Emission spec parameter of 0th slot of frame 0 5. General (Excl.DC/IQ) In-Band Emission spec value of 0th slot of frame 0 6. P_RB of 0th slot of frame 0 … 595. General (Excl.DC/IQ) In-Band Emission margin peak of 19th slot of frame 4 (Max) 596. General (Excl.DC/IQ) In-Band Emission RB Number of 19th slot of frame 4 597. General (Excl.DC/IQ) In-Band Emission spec relative of 19th slot of frame 4 598. General (Excl.DC/IQ) In-Band Emission spec parameter of 19th slot of frame 4 599. General (Excl.DC/IQ) In-Band Emission spec value of 19th slot of frame 4 600. P_RB of 19th slot of frame 4
62	A/B	1. IQ Image In-Band Emission margin peak of 0th slot of frame 0 (Max) 2. IQ Image In-Band Emission RB Number of 0th slot of frame 0 3. IQ Image In-Band Emission spec relative of 0th slot of frame 0 4. IQ Image In-Band Emission spec parameter of 0th slot of frame 0 5. IQ Image In-Band Emission spec value of 0th slot of frame 0 6. P_RB of 0th slot of frame 0 … 595. IQ Image In-Band Emission margin peak of 19th slot of frame 4 (Max) 596. IQ Image In-Band Emission RB Number of 19th slot of frame 4 597. IQ Image In-Band Emission spec relative of 19th slot of frame 4 598. IQ Image In-Band Emission spec parameter of 19th slot of frame 4 599. IQ Image In-Band Emission spec value of 19th slot of frame 4 600. P_RB of 19th slot of frame 4

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
63	A/B	1. Carrier Leakage In-Band Emission margin peak of 0th slot of frame 0 (Max) 2. Carrier Leakage In-Band Emission RB Number of 0th slot of frame 0 3. Carrier Leakage In-Band Emission spec relative of 0th slot of frame 0 4. Carrier Leakage In-Band Emission spec parameter of 0th slot of frame 0 5. Carrier Leakage In-Band Emission spec value of 0th slot of frame 0 6. P_RB of 0th slot of frame 0 … 595. Carrier Leakage In-Band Emission margin peak of 19th slot of frame 4 (Max) 596. Carrier Leakage In-Band Emission RB Number of 19th slot of frame 4 597. Carrier Leakage In-Band Emission spec relative of 19th slot of frame 4 598. Carrier Leakage In-Band Emission spec parameter of 19th slot of frame 4 599. Carrier Leakage In-Band Emission spec value of 19th slot of frame 4 600. P_RB of 19th slot of frame 4
64	A/B	1. General In-Band Emission margin peak of 0th slot of frame 0 (Max) 2. General In-Band Emission RB Number of 0th slot of frame 0 3. General In-Band Emission spec relative of 0th slot of frame 0 4. General In-Band Emission spec parameter of 0th slot of frame 0 5. General In-Band Emission spec value of 0th slot of frame 0 6. P_RB of 0th slot of frame 0 … 595. General In-Band Emission margin peak of 19th slot of frame 4 (Max) 596. General In-Band Emission RB Number of 19th slot of frame 4 597. General In-Band Emission spec relative of 19th slot of frame 4 598. General In-Band Emission spec parameter of 19th slot of frame 4 599. General In-Band Emission spec value of 19th slot of frame 4 600. P_RB of 19th slot of frame 4
65	A/B	1. In-band Emission Mask Line of RB 0 2. In-band Emission Mask Line of RB 1 … N. In-band Emission Mask Line of the (n-1)th RB

Table 2.7-2 Responses to Modulation Measurement Results (Cont'd)

n	Result Mode	Response
66	A/B	1. General (Exclude Carrier Leakage /IQ) Emission (Margin Peak) (Max) 2. General (Exclude Carrier Leakage /IQ) Emission (Margin Peak) Resource Block Number 3. General (Exclude Carrier Leakage /IQ) Emission (Margin Peak) Slot Number 4. General (Exclude Carrier Leakage /IQ) Emission (Margin Peak) Frame Number 5. General (Exclude Carrier Leakage /IQ) Spec parameter 6. General (Exclude Carrier Leakage /IQ) Spec value 7. IQ Image Emission (Margin Peak) (Max) 8. IQ Image Emission (Margin Peak) Resource Block Number 9. IQ Image Emission (Margin Peak) Slot Number 10. IQ Image Emission (Margin Peak) Frame Number 11. IQ Image Spec parameter 12. IQ Image Spec value 13. Carrier Leakage Emission (Margin Peak) (Max) 14. Carrier Leakage Emission (Margin Peak) Resource Block Number 15. Carrier Leakage Emission (Margin Peak) Slot Number 16. Carrier Leakage Emission (Margin Peak) Frame Number 17. Carrier Leakage Spec parameter 18. Carrier Leakage Spec value 19. General Emission (Margin Peak) (Max) 20. General Emission (Margin Peak) Resource Block Number 21. General Emission (Margin Peak) Slot Number 22. General Emission (Margin Peak) Frame Number 23. General Spec parameter 24. General Spec value
67	A/B	1. EVM (rms) of 0th slot of frame 0 (Average) 2. EVM (rms) of 0th slot of frame 0 (Max) … 199. EVM (rms) of 19th slot of frame 4 (Average) 200. EVM (rms) of 19th slot of frame 4 (Max)
68	A/B	1. EVM (rms) of 0th slot of frame 0 (Average) 2. EVM (rms) of 0th slot of frame 0 (Max) … 199. EVM (rms) of 19th slot of frame 4 (Average) 200. EVM (rms) of 19th slot of frame 4 (Max)

Table 2.7-3 lists device messages on Parameter Setting for Modulation Measurement

Table 2.7-3 Device Messages for Setting Parameters for Modulation Measurement

Function	Device Messages
Storage Mode	[:SENSe]:EVM:AVERage[:STATe] OFF|ON|0|1
	[:SENSe]:EVM:AVERage[:STATe]?
Storage Count	[:SENSe]:EVM:AVERage:COUNt <integer>
	[:SENSe]:EVM:AVERage:COUNt?
Scale - EVM Unit	:DISPlay:EVM[:VIEW]:WINDow2|3|7|9|10:TRACe:Y[:SCALe]:SPACing LINear|LOGarithmic|PERCent|DB
	:DISPlay:EVM[:VIEW]:WINDow2|3|7|9|10:TRACe:Y[:SCALe]:SPACing?
Scale - EVM	:DISPlay:EVM[:VIEW]:WINDow2|3|9|10:TRACe:Y[:SCALe]:RLEVel <integer>
	:DISPlay:EVM[:VIEW]:WINDow2|3|9|10:TRACe:Y[:SCALe]:RLEVel?
Scale - Flatness	:DISPlay:EVM[:VIEW]:WINDow4:TRACe:Y[:SCALe]:RLEVel <real>
	:DISPlay:EVM[:VIEW]:WINDow4:TRACe:Y[:SCALe]:RLEVel?
Trace Mode	:DISPlay:EVM[:VIEW]:SELect EVSubcarrier|EVSYmbol|TBEVm|EVDemod|FLATness|IBEMission|SUMMary
	:DISPlay:EVM[:VIEW]:SELect?
Constellation Display Range	:DISPlay:EVM[:VIEW]:WINDow[1]:RANGe SYMBol|COMPosite
	:DISPlay:EVM[:VIEW]:WINDow[1]:RANGe?
Frame Offset	:DISPlay:EVM[:VIEW]:WINDow[1]|2|3|4|9|10|11:TRACe:X:FRAMe:OFFSet <integer>
	:DISPlay:EVM[:VIEW]:WINDow[1]|2|3|4|9|10|11:TRACe:X:FRAMe:OFFSet?
Flatness Type	:CALCulate:EVM:WINDow4:TYPE AMPLitude|DAMPlitude|PHASe|GDELay
	:CALCulate:EVM:WINDow4:TYPE?
In-band Emission Type	:CALCulate:EVM:WINDow11:TYPE GI|DC
	:CALCulate:EVM:WINDow11:TYPE?

Table 2.7-3 Device Messages for Modulation Measurement Functions (Cont'd)

Function	Device Messages
Graph View Setting	:CALCulate:EVM:WINDow2:MODE EACH|AVERage
	:CALCulate:EVM:WINDow2:MODE?
	:CALCulate:EVM:WINDow3:MODE EACH|AVERage
	:CALCulate:EVM:WINDow3:MODE?
	:CALCulate:EVM:WINDow4:MODE EACH|AVERage
	:CALCulate:EVM:WINDow4:MODE?
	:CALCulate:EVM:WINDow10:MODE EACH|AVERage
	:CALCulate:EVM:WINDow10:MODE?
	:CALCulate:EVM:WINDow11:MODE EACH|AVERage
	:CALCulate:EVM:WINDow11:MODE?
Constellation Symbol Number	:CALCulate:EVM:WINDow[1]:SYMBol:NUMBer <integer>
	:CALCulate:EVM:WINDow[1]:SYMBol:NUMBer?
Bottom Graph Symbol Number	:CALCulate:EVM:WINDow2|10:SYMBol:NUMBer <integer>
	:CALCulate:EVM:WINDow2|10:SYMBol:NUMBer?
EVM vs Symbol Subcarrier Number	:CALCulate:EVM:WINDow3:SUBCarrier:NUMBer <integer>
	:CALCulate:EVM:WINDow3:SUBCarrier:NUMBer?
Bottom Graph Slot Number	:CALCulate:EVM:WINDow4|11:SLOT:NUMBer <integer>
	:CALCulate:EVM:WINDow4|11:SLOT:NUMBer?
Constellation Sequence Number	:CALCulate:EVM:WINDow[1]:PSEQuence:NUMBer <integer>
	:CALCulate:EVM:WINDow[1]:PSEQuence:NUMBer?
Bottom Graph Sequence Number	:CALCulate:EVM:WINDow2:PSEQuence:NUMBer <integer>
	:CALCulate:EVM:WINDow2:PSEQuence:NUMBer?
Display Page Number	:DISPlay:EVM[:VIEW]:WINDow7:PAGE:NUMBer <integer>
	:DISPlay:EVM[:VIEW]:WINDow7:PAGE:NUMBer?

Table 2.7-4 lists the device messages for setting the marker and reading out the value at the marker position for Modulation measurement.

Table 2.7-4 Marker Setting for Modulation Measurement

Function	Device Messages
Marker - On/Off	:CALCulate:EVM:MARKer[:STATe] OFF|ON|0|1
	:CALCulate:EVM:MARKer[:STATe]?
Active Trace	:CALCulate:EVM:MARKer:ACTive CONStellation|BOTTom
	:CALCulate:EVM:MARKer:ACTive?
Marker Position Number	:CALCulate:EVM:MARKer:SUBCarrier <integer>
	:CALCulate:EVM:MARKer:SUBCarrier?
	:CALCulate:EVM:MARKer:SYMBol <integer>
	:CALCulate:EVM:MARKer:SYMBol?
	:CALCulate:EVM:MARKer:RB <integer>
	:CALCulate:EVM:MARKer:RB?
	:CALCulate:EVM:MARKer:DEModsymbol <integer>
	:CALCulate:EVM:MARKer:DEModsymbol?
Marker Value	:CALCulate:EVM:MARKer:X?
	:CALCulate:EVM:MARKer:Y[:RMS]?
	:CALCulate:EVM:MARKer:Y:PEAK?
	:CALCulate:EVM:MARKer:EVM[:RMS]?
	:CALCulate:EVM:MARKer:EVM:PEAK?
	:CALCulate:EVM:MARKer:Y:MAXimum?
	:CALCulate:EVM:MARKer:Y:MINimum?
Peak Search	:CALCulate:MARKer:MAXimum
	:CALCulate:MARKer:MAXimum:NEXT
	:CALCulate:MARKer:MINimum
	:CALCulate:MARKer:MINimum:NEXT

2.7.1 Measure

:CONFigure:EVM

Modulation

Function

This command selects the Modulation measurement function.

Command

`:CONFigure:EVM`

Details

No measurement is made.

Example of Use

To selecte the Modulation measurement function.
`CONF:EVM`

:INITiate:EVM

Modulation

Function

This command executes the Modulation measurement function.

Command

`:INITiate:EVM`

Example of Use

To execute the Modulation measurement.
`INIT:EVM`

:FETCh:EVM[n]?

Modulation Query

Function

This command queries the result of the Modulation measurement.

Query

```
:FETCh:EVM[n]?
```

Response

See Table 2.7-2.

Details

–999.0 is returned when no measurement is made or an error occurs. Note, however, that “999999999999” is returned in the case of a Frequency Error.

The unit of the read EVM value depends on the setting of EVM Unit.

When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the result of the Modulation measurement.

```
FETC:EVM?
> 5.20, 1.03, 1,0.53, 38, 3, 2.34,…
```

:READ:EVM[n]?

Modulation Query

Function

This command performs Modulation measurement once (single measurement) with the current settings, and then queries the measured result.

Query

`:READ:EVM[n]?`

Response

See Table 2.7-2.

Details

–999.0 is returned when no measurement is made or an error occurs. Note, however, that “999999999999” is returned in the case of a Frequency Error.
The unit of the read EVM value depends on the setting of EVM Unit.

When Standard is LTE-A, this can be queried for each CC individually.
To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To perform single Modulation measurement and query the measured result.
`READ:EVM?`

Related command

This command has the same function as the following command.
`:MEASure:EVM[n]?`

:MEASure:EVM[n]?

Modulation Query

Function

This command performs Modulation measurement once (single measurement) with the current settings, and then queries the measured result.

Query

`:MEASure:EVM[n]?`

Response

See Table 2.7-2.

Details

–999.0 is returned when no measurement is made or an error occurs. Note, however, that "999999999999" is returned in the case of a Frequency Error.

The unit of the read EVM value depends on the setting of EVM Unit.

When Standard is LTE-A, this can be queried for each CC individually. To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To perform single Modulation measurement and query the measured result.

`MEAS:EVM?`

Related command

This command has the same function as the following command.

`:READ:EVM[n]?`

2.7.2 Storage Mode

[:SENSe]:EVM:AVERage[:STATe] OFF|ON| 0|1|

Storage Mode

Function

This command sets the Storage Mode.

Command

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

Parameter

`<mode>`	Storage Mode
`OFF|0`	Off (Default)
`ON|1`	On

Details

When Capture Time is set to Manual and Target Channel is set to PUSCH or PUCCH, the capture time length must be 10 frames or more to perform measurement in Storage Mode.
When Capture Time is set to Manual and Target Channel is set to PRACH, the capture time length must be 4 frames or more to perform measurement in Storage Mode.

Example of Use

To set the storage mode to On.

```
EVM:AVER ON
```

[:SENSe]:EVM:AVERage[:STATe]?

Storage Mode Query

Function

This command queries the setting of the Storage Mode.

Query

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

Response

`<mode>`

Parameter

`<mode>`	Storage Mode
`0`	Off
`1`	On

Example of Use

To query the setting of the Storage Mode.

```
EVM:AVER?
> 1
```

2.7.3 Storage Count

[:SENSe]:EVM:AVERage:COUNt <integer>

Storage Count

Function

This command sets the Storage Count.

Command

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

Parameter

`<integer>` Storage Count

Range
- When Capture Time is Auto
  - 2 to 9999
- When Capture Time is Manual
  - 2 to Capture Time Length/2 (Target Channel is PRACH)
  - 2 to Capture Time Length (When Target Channel is not PRACH, and Measurement is Power vs Time)
  - 2 to Capture Time Length/5 (Target Channel is not PRACH, and Measurement is Modulation Analysis)

Resolution 1

Default 10

Example of Use

To set the Storage Count to 10.

```
EVM:AVER:COUN 10
```

[:SENSe]:EVM:AVERage:COUNt?

Storage Count Query

Function

This command queries the Storage Count.

Query

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

Response

`<integer>`

Parameter

`<integer>` Storage Count

Range
- When Capture Time is Auto
  - 2 to 9999
- When Capture Time is Manual
  - 2 to Capture Time Length/2 (Target Channel is PRACH)
  - 2 to Capture Time Length (When Target Channel is not PRACH, and Measurement is Power vs Time)
  - 2 to Capture Time Length/5 (Target Channel is not PRACH, and Measurement is Modulation Analysis)

Resolution 1

Example of Use

To query the Storage Count.

```
EVM:AVER:COUN?
> 10
```

2.7.4 Scale - EVM Unit

:DISPlay:EVM[:VIEW]:WINDow2|3|7|9|10:TRACe:Y[:SCALe]:SPACing LINear|LOGarithmic|PERCent|DB

Scale - EVM Unit

Function

This command sets the unit for EVM of measurement results.

Command

```
:DISPlay:EVM[:VIEW]:WINDow2|3|7|9|10:TRACe:Y[:SCALe]:SPACing <mode>
```

Parameter

<mode>	EVM Unit
LINear	% scale
LOGarithmic	dB scale
PERCent	% scale (Default)
DB	dB scale

Example of Use

To set the unit of EVM to dB scale.

```
DISP:EVM:WIND2:TRAC:Y:SPAC DB
```

:DISPlay:EVM[:VIEW]:WINDow2|3|7|9|10:TRACe:Y[:SCALe]:SPACing?

Scale EVM Unit Query

Function

This command queries the scale unit for EVM.

Query

```
:DISPlay:EVM[:VIEW]:WINDow2|3|7|9|10:TRACe:Y[:SCALe]:SPACing?
```

Response

```
<mode>
```

Parameter

<mode>	EVM Unit
PERC	% scale
DB	dB scale

Example of Use

To query the unit of EVM.

```
DISP:EVM:WIND2:TRAC:Y:SPAC?
> DB
```

2.7.5 Scale - EVM Scale

:DISPlay:EVM[:VIEW]:WINDow2|3|9|10:TRACe:Y[:SCALe]:RLEVel <integer>

Scale - EVM Scale

Function

This command sets the vertical axis scale of the EVM vs Subcarrier/EVM vs Symbol/Time Based EVM/EVM vs Demod-Symbol graph. The unit depends on the setting of EVM Unit.

Command

```
:DISPlay:EVM[:VIEW]:WINDow2|3|9|10:TRACe:Y[:SCALe]:RLEVe
<integer>
```

Parameter

`<integer>`	Vertical scale Range	
Range	1 to 100%	When EVM Unit is set to %
	–60 to 0 dB	When EVM Unit is set to dB
Resolution	1	
Default	5%	When EVM Unit is set to %
	–40 dB	When EVM Unit is set to dB

Details

The selectable arguments depend on the setting of EVM Unit.

Example of Use

To set the vertical axis scale of the result graph to 10%.

```
DISP:EVM:WIND2:TRAC:Y:RLEV 10
```

:DISPlay:EVM[:VIEW]:WINDow2|3|9|10:TRACe:Y[:SCALe]:RLEVel?

Scale EVM Scale Query

Function

This command queries the vertical axis scale of the EVM vs Subcarrier/EVM vs Symbol/Time Based EVM/EVM vs Demod-Symbol graph. The unit of the readout value depends on the setting of the EVM Unit.

Query

```
:DISPlay:EVM[:VIEW]:WINDow2|3|9|10:TRACe:Y[:SCALe]:RLEVel?
```

Response

`<integer>`

Parameter

`<integer>`	Vertical scale Range	
Range	1 to 100%	When EVM Unit is set to %
	–60 to 0 dB	When EVM Unit is set to dB
Resolution	1	

Example of Use

To query the vertical axis scale of the result graph.

```
DISP:EVM:WIND2:TRAC:Y:RLEV?
> 10
```

2

SCPI Device Message Details

2.7.6 Scale - Flatness

:DISPlay:EVM[:VIEW]:WINDow4:TRACe:Y[:SCALe]:RLEVel <real>

Scale - Flatness Scale

Function

This command sets the vertical scale of the Flatness graph. The unit depends on the setting of Flatness Type.

Command

```
:DISPlay:EVM:WINDow4:TRACe:Y[:SCALe]:RLEVel <integer>
```

Parameter

`<integer>` Vertical scale Range

When Spectral Flatness Type is Amplitude:

Range	1.0 to 100.0
Resolution	0.1
Default	10.0 dB

When Spectral Flatness Type is Difference Amplitude:

Range	0.1 to 10.0
Resolution	0.1
Default	1.0 dB

When Spectral Flatness Type is Phase:

Range	1.0 to 180.0
Resolution	0.1
Default	60.0 degree

When Spectral Flatness Type is Group Delay:

Range	1.0 to 1000.0
Resolution	0.1
Default	50.0 ns

Example of Use

To set the vertical axis scale of the result graph to 10.0 dB.

```
DISP:EVM:WIND4:TRAC:Y:RLEV 10.0
```

:DISPlay:EVM[:VIEW]:WINDow4:TRACe:Y[:SCALe]:RLEVel?

Scale - Flatness Query

Function

This command queries the vertical scale of the Flatness graph. The unit of the readout value depends on the setting of the Flatness Type.

Query

```
:DISPlay:EVM[:VIEW]:WINDow4:TRACe:Y[:SCALe]:RLEVel?
```

Response

```
<real>
```

Parameter

`<real>` Vertical scale Range

When Spectral Flatness Type is Amplitude:

Range	1.0 to 100.0
Resolution	0.1

When Spectral Flatness Type is Difference Amplitude:

Range	0.1 to 10.0
Resolution	0.1

When Spectral Flatness Type is Phase:

Range	1.0 to 180.0
Resolution	0.1

When Spectral Flatness Type is Group Delay:

Range	1.0 to 1000.0
Resolution	0.1

Example of Use

To query the vertical axis scale of the result graph.

```
DISP:EVM:WIND4:TRAC:Y:RLEV?
> 10.0
```

2.7.7 Trace Mode

:DISPlay:EVM[:VIEW]:SELect EVSubcarrier|EVSYmbol|TBEVm|EVDemod FLATness|IBEMission|SUMMary

Trace Mode

Function

This command sets the result type to be displayed on the graph window.

Command

`:DISPlay:EVM[:VIEW]:SELect <mode>`

Parameter

`<mode>`	Display result
`EVSubcarrier`	Displays EVM vs Subcarrier (Default)
`EVSYmbol`	Displays EVM vs Symbol.
`TBEVm`	Displays Time Based EVM
`EVDemod`	Displays EVM vs Demod-Symbol
`FLATness`	Displays Spectral Flatness.
`IBEMission`	Displays In-Band Emission
`SUMMary`	Displays Summary.

Details

Constellation is not displayed when Trace Mode is set to Summary.
The Marker function is invalid when Trace Mode is set to Summary.

You cannot select Time Based EVM and EVM vs Demod-Symbol when Target Channel is set to PUCCH.

You cannot select EVM vs Symbol, Time Based EVM, EVM vs Demod-Symbol, Spectral Flatness, and In-Band Emission when Target Channel is set to PRACH.

Example of Use

To display Spectral Flatness in the graph window.

`DISP:EVM:SEL FLAT`

:DISPlay:EVM[:VIEW]:SELect?

Trace Mode Query

Function

This command queries the result type to be displayed on the graph window.

Command

```
:DISPlay:EVM[:VIEW]:SELect?
```

Response

<mode>

Parameter

<mode>	Display result
EVS	Displays EVM vs Subcarrier
EVSY	Displays EVM vs Symbol
TBEV	Displays Time Based EVM
EVD	Displays EVM vs Demod-Symbol
FLAT	Displays Spectral Flatness.
IBEM	Displays In-Band Emission
SUMM	Displays Summary.

Example of Use

To query a graphical result in the graph window.

```
DISP:EVM:SEL?
> FLAT
```

2.7.8 Constellation Display Range

:DISPlay:EVM[:VIEW]:WINDow[1]:RANGe SYMBol|COMPosite

Constellation Display Range

Function

This command sets the symbol range to be displayed in Constellation.

Command

```
:DISPlay:EVM[:VIEW]:WINDow[1]:RANGe <mode>
```

Parameter

<mode>	Symbol range to be displayed in Constellation
SYMBol	Displays the constellation of Constellation Symbol Number symbol (Default).
COMPosite	Displays constellation of all symbols.

Details

This command is not available when Target Channel is set to PRACH.

Example of Use

To set the symbol range to be displayed in Constellation to Symbol.

```
DISP:EVM:WIND:RANG SYMB
```

:DISPlay:EVM[:VIEW]:WINDow[1]:RANGe?

Constellation Display Range Query

Function

This command queries the symbol range to be displayed in Constellation.

Query

```
:DISPlay:EVM[:VIEW]:WINDow[1]:RANGe?
```

Response

```
<mode>
```

Parameter

<mode>	Symbol range to be displayed in Constellation
SYMB	Displays the constellation of Constellation Symbol Number symbol.
COMP	Displays constellation of all symbols.

Example of Use

To query the symbol range to be displayed in Constellation.

```
DISP:EVM:WIND:RANG?
> SYMB
```

2.7.9 Frame Offset

:DISPlay:EVM[:VIEW]:WINDow[1]|2|3|4|9|10|11:TRACe:X:FRAMe:OFFSet <integer>

Frame Offset

Function

This command sets the frame offset of displayed graph.

Command

```
:DISPlay:EVM[:VIEW]:WINDow[1]|2|3|4|9|10|11:TRACe:X:FRAMe:OFFSet <integer>
```

Parameter

`<integer>`	Frame Offset
Range	0 to 4
Resolution	1
Default	0

Example of Use

To set Frame Offset to 0.

```
DISP:EVM:WIND:TRAC:X:FRAM:OFFS 0
```

:DISPlay:EVM[:VIEW]:WINDow[1]|2|3|4|9|10|11:TRACe:X:FRAMe:OFFSet?

Frame Offset Query

Function

This command queries the frame offset of displayed graph.

Query

```
:DISPlay:EVM[:VIEW]:WINDow[1]|2|3|4|9|10|11:TRACe:X:FRAMe:OFFSet?
```

Response

```
<integer>
```

Parameter

`<integer>`	Frame Offset
Range	0 to 4
Resolution	1

Example of Use

To query the Frame Offset.

```
DISP:EVM:WIND:TRAC:X:FRAM:OFFS?
> 0
```

2.7.10 Spectral Flatness Type

:CALCulate:EVM:WINDow4:TYPE AMPLitude|DAMPlitude|PHASe|GDELay

Flatness Type

Function

This command sets the Spectral Flatness display type.

Command

`:CALCulate:EVM:WINDow4:TYPE <mode>`

Parameter

`<mode>`	Display type of spectral flatness graph
`AMPLitude`	Displays Amplitude (Default)
`DAMPlitude`	Displays Difference Amplitude.
`PHASe`	Displays Phase.
`GDELay`	Displays Group Delay.

Example of Use

To set the display type of the spectral flatness graph to Amplitude.

```
CALC:EVM:WIND4:TYPE AMPL
```

:CALCulate:EVM:WINDow4:TYPE?

Flatness Type Query

Function

This command queries the Spectral Flatness graph display type.

Query

`:CALCulate:EVM:WINDow4:TYPE?`

Response

`<mode>`

Parameter

`<mode>`	Display type of spectral flatness graph
`AMPL`	Displays Amplitude
`DAMP`	Displays Difference Amplitude.
`PHAS`	Displays Phase.
`GDEL`	Displays Group Delay.

Example of Use

To query the Spectral Flatness graph display type.

```
CALC:EVM:WIND4:TYPE?
> AMPL
```

2.7.11 In-band Emission Type

:CALCulate:EVM:WINDow11:TYPE GI|DC

In-band Emission Type

Function

This command sets the In-band Emission graph display type.

Command

`:CALCulate:EVM:WINDow11:TYPE <mode>`

Parameter

`<mode>`	Display type of In-Band Emission graph
`GI`	Displays the graph for General & IQ Image (Default)
`DC`	Displays the graph for Carrier Leakage

Example of Use

To set In-band Emission graph display type to DC.

```
CALC:EVM:WIND11:TYPE DC
```

:CALCulate:EVM:WINDow11:TYPE?

In-band Emission Type Query

Function

This command queries the In-band Emission graph display type.

Query

`:CALCulate:EVM:WINDow11:TYPE?`

Response

`<mode>`

Parameter

`<mode>`	Display type of In-band Emission
`GI`	Displays the graph for General & IQ Image
`DC`	Displays the graph for Carrier Leakage

Example of Use

To query the In-band Emission graph display type.

```
CALC:EVM:WIND11:TYPE?
> DC
```

2.7.12 Graph View Setting

:CALCulate:EVM:WINDow2:MODE EACH|AVERage

EVM vs Subcarrier View

Function

This command sets whether to display the averaged or unaveraged EVM vs Subcarrier.

Command

`:CALCulate:EVM:WINDow2:MODE <mode>`

Parameter

`<mode>`	Averaging status
Target Channel = PUSCH	
`EACH`	Unaveraged Each Symbol
`AVERage`	Averaged over all Symbols (Default)
Target Channel = PUCCH	
`EACH`	Unaveraged Each Symbol (Default)
Target Channel = PRACH	
PRACH Format 0, 1, 4	
`EACH`	Unaveraged Each Preamble Sequence (Default)
PRACH Format 2, 3	
`EACH`	Unaveraged Each Preamble Sequence (Default)
`AVERage`	Averaged over all Symbols

Example of Use

To display the averaged EVM vs Subcarrier.

```
CALC:EVM:WIND2:MODE AVER
```

:CALCulate:EVM:WINDow2:MODE?

EVM vs Subcarrier View Query

Function

This command queries whether the displayed EVM vs Subcarrier is averaged.

Query

```
:CALCulate:EVM:WINDow2:MODE?
```

Response

```
<mode>
```

Parameter

`<mode>` Averaging status

Target Channel = PUSCH

`EACH`	Unaveraged Each Symbol
`AVER`	Averaged over all Symbols

Target Channel = PUCCH

`EACH`	Unaveraged Each Symbol

Target Channel = PRACH

PRACH Format 0, 1, 4

`EACH`	Unaveraged Each Preamble Sequence

PRACH Format 2, 3

`EACH`	Unaveraged Each Preamble Sequence
`AVER`	Averaged over all Symbols

Example of Use

To query whether the displayed EVM vs Subcarrier is averaged.

```
CALC:EVM:WIND2:MODE?
> AVER
```

:CALCulate:EVM:WINDow3:MODE EACH|AVERage

EVM vs Symbol View

Function

This command sets whether to display the averaged or unaveraged EVM vs Symbol.

Command

```
:CALCulate:EVM:WINDow3:MODE <mode>
```

Parameter

`<mode>`	Averaging status
`EACH`	Displays the unaveraged EVM vs Symbol.
`AVERage`	Displays the averaged EVM vs Symbol (Default).

Example of Use

To display the averaged EVM vs Symbol.

```
CALC:EVM:WIND3:MODE AVER
```

:CALCulate:EVM:WINDow3:MODE?

EVM vs Symbol View Query

Function

This command queries whether the displayed EVM vs Symbol is averaged.

Query

```
:CALCulate:EVM:WINDow3:MODE?
```

Response

```
<mode>
```

Parameter

`<mode>`	Averaging status
`EACH`	Displays the unaveraged EVM vs Symbol.
`AVER`	Displays the averaged EVM vs Symbol.

Example of Use

To query whether the displayed EVM vs Symbol is averaged.

```
CALC:EVM:WIND3:MODE?
> AVER
```

:CALCulate:EVM:WINDow4:MODE EACH|AVERage

Spectral Flatness View

Function

This command sets whether to enable averaging for Spectral Flatness.

Command

`:CALCulate:EVM:WINDow4:MODE <mode>`

Parameter

`<mode>`	Averaging status
`EACH`	Displays unaveraged Spectral Flatness.
`AVERage`	Displays averaged Spectral Flatness (Default).

Example of Use

To display averaged Spectral Flatness.

`CALC:EVM:WIND4:MODE AVER`

:CALCulate:EVM:WINDow4:MODE?

Spectral Flatness View Query

Function

This command queries the Spectral Flatness averaging setting.

Query

`:CALCulate:EVM:WINDow4:MODE?`

Response

`<mode>`

Parameter

`<mode>`	Averaging status
`EACH`	Displays unaveraged Spectral Flatness.
`AVER`	Displays averaged Spectral Flatness.

Example of Use

To query the Spectral Flatness averaging setting.

```
CALC:EVM:WIND4:MODE?
> AVER
```

2

SCPI Device Message Details

:CALCulate:EVM:WINDow10:MODE EACH|AVERage

EVM vs Demod-Symbol View

Function

This command sets whether the displayed EVM vs Demod-Symbol is averaged.

Command

`:CALCulate:EVM:WINDow10:MODE <mode>`

Parameter

`<mode>`	Averaging status
`EACH`	Displays the unaveraged EVM vs Demod-Symbol.
`AVERage`	Displays the averaged EVM vs Demod-Symbol (Default).

Example of Use

To display the averaged EVM vs Demod-Symbol.

```
CALC:EVM:WIND10:MODE AVER
```

:CALCulate:EVM:WINDow10:MODE?

EVM vs Demod-Symbol View Query

Function

This command queries whether the displayed EVM vs Demod-Symbol is averaged.

Query

`:CALCulate:EVM:WINDow10:MODE?`

Response

`<mode>`

Parameter

`<mode>`	Averaging status
`EACH`	Displays the unaveraged EVM vs Demod-Symbol.
`AVER`	Displays the averaged EVM vs Demod-Symbol.

Example of Use

To query whether the displayed EVM vs Demod-Symbol is averaged.

```
CALC:EVM:WIND10:MODE?
> AVER
```

:CALCulate:EVM:WINDow11:MODE EACH|AVERage

In-band Emission View

Function

This command sets whether to enable averaging for In-band Emission.

Command

`:CALCulate:EVM:WINDow11:MODE <mode>`

Parameter

`<mode>`	Averaging status
`EACH`	Displays In-band Emission without averaging.
`AVERage`	Displays averaged In-band Emission (Default)

Example of Use

To display averaged In-band Emission

`CALC:EVM:WIND11:MODE AVER`

:CALCulate:EVM:WINDow11:MODE?

In-band Emission View Query

Function

This command queries the averaging status for In-band Emission.

Query

`:CALCulate:EVM:WINDow11:MODE?`

Response

`<mode>`

Parameter

`<mode>`	Averaging status
`EACH`	Displays In-Band Emission without averaging.
`AVER`	Displays averaged In-Band Emission

Example of Use

To query the averaging status for In-band Emission.

```
CALC:EVM:WIND11:MODE?
> AVER
```

2.7.13 Constellation Symbol Number

:CALCulate:EVM:WINDow[1]:SYMBol:NUMBer <integer>

Constellation Symbol Number

Function

This command sets the symbol number of the constellation displayed.

Command

```
:CALCulate:EVM:WINDow[1]:SYMBol:NUMBer <integer>
```

Parameter

`<integer>`	Symbol number
Range	0 to 139
Resolution	1
Suffix Code	None
Default	28

Example of Use

To set the symbol number of the displayed Constellation to 110.

```
CALC:EVM:WIND:SYMB:NUMB 110
```

:CALCulate:EVM:WINDow[1]:SYMBol:NUMBer?

Constellation Symbol Number Query

Function

This command queries the symbol number of the displayed Constellation.

Query

```
:CALCulate:EVM:WINDow[1]:SYMBol:NUMBer?
```

Response

```
<integer>
```

Parameter

`<integer>`	Symbol number
Range	0 to 139
Resolution	1

Example of Use

To query the symbol number of the displayed Constellation.

```
CALC:EVM:WIND:SYMB:NUMB?
> 110
```

2.7.14 Bottom Graph Symbol Number

:CALCulate:EVM:WINDow2|10:SYMBol:NUMBer <integer>

Bottom Graph Symbol Number

Function

This command sets the symbol number of the displayed EVM vs Subcarrier/EVM vs Demod-Symbol.

Command

```
:CALCulate:EVM:WINDow2|10:SYMBol:NUMBer <integer>
```

Parameter

`<integer>`	Symbol number
Range	0 to 139
Resolution	1
Suffix code	None
Default	28

Example of Use

To set the symbol number of the displayed EVM vs Subcarrier to 110.

```
CALC:EVM:WIND2:SYMB:NUMB 110
```

:CALCulate:EVM:WINDow2|10:SYMBol:NUMBer?

Bottom Graph Symbol Number Query

Function

This command queries the symbol number of the displayed EVM vs Subcarrier/EVM vs Demod-Symbol.

Query

```
:CALCulate:EVM:WINDow2|10:SYMBol:NUMBer?
```

Response

```
<integer>
```

Parameter

`<integer>`	Symbol number
Range	0 to 139
Resolution	1

Example of Use

To query the symbol number of the displayed EVM vs Subcarrier.

```
CALC:EVM:WIND2:SYMB:NUMB?
> 110
```

2.7.15 EVM vs Symbol Subcarrier Number

:CALCulate:EVM:WINDow3:SUBCarrier:NUMBer <integer>

EVM vs Symbol Subcarrier Number

Function

This command sets the subcarrier number of the displayed EVM vs Symbol.

Command

```
:CALCulate:EVM:WINDow3:SUBCarrier:NUMBer <integer>
```

Parameter

`<integer>`	Subcarrier number	
Range	0 to 1199	(Channel Bandwidth: 20 MHz)
	0 to 899	(Channel Bandwidth: 15 MHz)
	0 to 599	(Channel Bandwidth: 10 MHz)
	0 to 299	(Channel Bandwidth: 5 MHz)
	0 to 179	(Channel Bandwidth: 3 MHz)
	0 to 71	(Channel Bandwidth: 1.4 MHz)
Resolution	1	
Suffix code	None	
Default	0	

Details

This is enabled when EVM vs Symbol View is set to Each Subcarrier.

Example of Use

To set the subcarrier number of the displayed EVM vs Symbol to 110.

```
CALC:EVM:WIND3:SUBC:NUMB 110
```

:CALCulate:EVM:WINDow3:SUBCarrier:NUMBer?

EVM vs Symbol Subcarrier Number Query

Function

This command queries the subcarrier number of the displayed EVM vs Symbol.

Query

`:CALCulate:EVM:WINDow3:SUBCarrier:NUMBer?`

Response

`<integer>`

Parameter

`<integer>`	Subcarrier number	
Range	0 to 1199	(Channel Bandwidth: 20 MHz)
	0 to 899	(Channel Bandwidth: 15 MHz)
	0 to 599	(Channel Bandwidth: 10 MHz)
	0 to 299	(Channel Bandwidth: 5 MHz)
	0 to 179	(Channel Bandwidth: 3 MHz)
	0 to 71	(Channel Bandwidth: 1.4 MHz)
Resolution	1	

Example of Use

To query the subcarrier number of the displayed EVM vs Symbol.

```
CALC:EVM:WIND3:SUBC:NUMB?
> 110
```

2.7.16 Bottom Graph Slot Number

:CALCulate:EVM:WINDow4|11:SLOT:NUMBer <integer>

Bottom Graph Slot Number

Function

This command sets the Bottom Graph display Slot number.

Command

```
:CALCulate:EVM:WINDow4|11:SLOT:NUMBer <integer>
```

Parameter

`<integer>`	Display Slot number
Range	0 to 19
Resolution	1
Suffix code	None
Default	4

Details

This is enabled when Trace mode is Spectral Flatness, and In-band Emission.

Example of Use

To set the Spectral Flatness display Slot number to 4.

```
CALC:EVM:WIND4:SLOT:NUMB 4
```

:CALCulate:EVM:WINDow4|11:SLOT:NUMBer?

Bottom Graph Slot Number Query

Function

This command queries the Bottom Graph display Slot number.

Query

```
:CALCulate:EVM:WINDow4|11:SLOT:NUMBer?
```

Response

```
<integer>
```

Parameter

`<integer>`	Slot number
Range	0 to 19
Resolution	1

Example of Use

To query the Bottom Graph display Slot number.

```
CALC:EVM:WIND4:SLOT:NUMB?
> 4
```

2.7.17 Constellation Sequence Number

:CALCulate:EVM:WINDow[1]:PSEQuence:NUMBer <integer>

Constellation Sequence Number

Function

This command sets the preamble sequence number of a constellation displayed.

Command

```
:CALCulate:EVM:WINDow[1]:PSEQuence:NUMBer <integer>
```

Parameter

`<integer>`	Display preamble sequence number	
Range	0	(PRACH Format: 0, 1, 4)
	0 to 1	(PRACH Format: 2, 3)
Resolution	1	
Suffix code	None	
Default	0	

Example of Use

To set the preamble sequence number of the displayed Constellation to 0.

```
CALC:EVM:WIND:PSEQ:NUMB 0
```

:CALCulate:EVM:WINDow[1]:PSEQuence:NUMBer?

Constellation Sequence Number Query

Function

This command queries the preamble sequence number of the displayed Constellation.

Query

```
:CALCulate:EVM:WINDow[1]:PSEQuence:NUMBer?
```

Response

```
<integer>
```

Parameter

`<integer>`	Display preamble sequence number	
Range	0	(PRACH Format: 0, 1, 4)
	0 to 1	(PRACH Format: 2, 3)
Resolution	1	

Example of Use

To query the preamble sequence number of the displayed Constellation.

```
CALC:EVM:WIND:PSEQ:NUMB?
> 0
```

2.7.18 Bottom Graph Sequence Number

:CALCulate:EVM:WINDow2:PSEQuence:NUMBer <integer>

Bottom Graph Sequence Number

Function

This command sets the preamble sequence number of EVM vs Subcarrier displayed.

Command

```
:CALCulate:EVM:WINDow2:PSEQuence:NUMBer <integer>
```

Parameter

`<integer>`	Display preamble sequence number	
Range	0	(PRACH Format: 0, 1, 4)
	0 to 1	(PRACH Format: 2, 3)
Resolution	1	
Suffix code	None	
Default	0	

Example of Use

To set the preamble sequence number of the displayed EVM vs Subcarrier to 0.

```
CALC:EVM:WIND2:PSEQ:NUMB 0
```

:CALCulate:EVM:WINDow2: PSEQuence:NUMBer?

Bottom Graph Sequence Number Query

Function

This command queries the preamble sequence number of the displayed EVM vs Subcarrier.

Query

```
:CALCulate:EVM:WINDow2:PSEQuence:NUMBer?
```

Response

```
<integer>
```

Parameter

`<integer>`	Display preamble sequence number	
Range	0	(PRACH Format: 0, 1, 4)
	0 to 1	(PRACH Format: 2, 3)
Resolution	1	

Example of Use

To query the preamble sequence number of the displayed EVM vs Subcarrier.

```
CALC:EVM:WIND2:PSEQ:NUMB?
> 0
```

2.7.19 Display Page

:DISPlay:EVM[:VIEW]:WINDow7:PAGE:NUMBer <integer>

Display Page Number

Function

This command sets the page number of the displayed Summary.

Command

```
:DISPlay:EVM[:VIEW]:WINDow7:PAGE:NUMBer <integer>
```

Parameter

`<integer>`	Page number	
Range	1 to 16	(Target Channel: PUSCH)
	1 to 13	(Target Channel: PUCCH)
	1	(Target Channel: PRACH)
Resolution	1	
Suffix code	None	
Default	1	

Example of Use

To set the page number of the displayed Summary to 1.

```
DISP:EVM:WIND7:PAGE:NUMB 1
```

:DISPlay:EVM[:VIEW]:WINDow7:PAGE:NUMBer?

Display Page Number Query

Function

This command queries the page number of the displayed Summary.

Query

```
:DISPlay:EVM[:VIEW]:WINDow7:PAGE:NUMBer?
```

Response

```
<integer>
```

Parameter

`<integer>`	Page number	
Range	1 to 16	(Target Channel: PUSCH)
	1 to 13	(Target Channel: PUCCH)
	1	(Target Channel: PRACH)
Resolution	1	

Example of Use

To query the page number of the displayed Summary.

```
DISP:EVM:WIND7:PAGE:NUMB?
> 1
```

2.7.20 Marker - On/Off

:CALCulate:EVM:MARKer[:STATe] OFF|ON|0|1

Marker - On/Off

Function

This command sets whether to display the marker.

Command

`:CALCulate:EVM:MARKer[:STATe] <switch>`

Parameter

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

Example of Use

To display the marker.

```
CALC:EVM:MARK 1
```

:CALCulate:EVM:MARKer[:STATe]?

Marker – On/Off Query

Function

This command queries the marker display On/Off state.

Query

`:CALCulate:EVM:MARKer[:STATe]?`

Response

`<switch>`

Parameter

`<switch>`	Marker
`0`	Off
`1`	On

Example of Use

To query the Marker settings.

```
CALC:EVM:MARK?
> 1
```

2.7.21 Active Trace

:CALCulate:EVM:MARKer:ACTive CONStellation|BOTTom

Active Trace

Function

This command sets the target graph of the marker.

Command

`:CALCulate:EVM:MARKer:ACTive <mode>`

Parameter

<mode>	Target graph
CONStellation	Constellation
BOTTom	Graph window (Default)

Example of Use

To set the target graph of the marker to the Constellation.

```
CALC:EVM:MARK:ACT CONS
```

:CALCulate:EVM:MARKer:ACTive?

Active Trace Query

Function

This command queries the target graph of the marker.

Query

`:CALCulate:EVM:MARKer:ACTive?`

Response

<mode>

Parameter

<mode>	Target graph
CONS	Constellation
BOTT	Graph window

Example of Use

To query the target graph of the marker.

```
CALC:EVM:MARK:ACT?
> CONS
```

2.7.22 Marker Position Number

:CALCulate:EVM:MARKer:SUBCarrier <integer>

Marker Subcarrier Number

Function

This command sets the position of the marker on the Constellation or on the graph window, in subcarrier number. The target graph is set by Active Trace.

Command

```
:CALCulate:EVM:MARKer:SUBCarrier <integer>
```

Parameter

`<integer>` Subcarrier number

Range

When Target Channel is PUSCH or PUCCH

Constellation,EVM vs Subcarrier,Spectral Flatness -Amplitude or Spectral Flatness -Phase

0 to 1199	(Channel Bandwidth: 20 MHz)
0 to 899	(Channel Bandwidth: 15 MHz)
0 to 599	(Channel Bandwidth: 10 MHz)
0 to 299	(Channel Bandwidth: 5 MHz)
0 to 179	(Channel Bandwidth: 3 MHz)
0 to 71	(Channel Bandwidth: 1.4 MHz)

Spectral Flatness- Difference Amplitude or Spectral Flatness - Group Delay

1 to 1198	(Channel Bandwidth: 20 MHz)
1 to 898	(Channel Bandwidth: 15 MHz)
1 to 598	(Channel Bandwidth: 10 MHz)
1 to 298	(Channel Bandwidth: 5 MHz)
1 to 178	(Channel Bandwidth: 3 MHz)
1 to 70	(Channel Bandwidth: 1.4 MHz)

When Target Channel is PRACH

Constellation

0 to 838	(Preamble Format: other than 4)
0 to 138	(Preamble Format: 4)

EVM vs Subcarrier

0 to 2047

Resolution	1
Suffix code	None
Default	0

Example of Use

To set the position of the marker on the Constellation to 100.

```
CALC:EVM:MARK:SUBC 100
```

:CALCulate:EVM:MARKer:SUBCarrier?

Marker Subcarrier Number Query

Function

This command queries the position of the marker on the Constellation or on the graph window, in subcarrier number. The target graph is set by Active Trace.

Command

```
:CALCulate:EVM:MARKer:SUBCarrier?
```

Response

```
<integer>
```

Parameter

`<integer>` Subcarrier number

Range
When Target Channel is PUSCH or PUCCH
Constellation,EVM vs Subcarrier,Spectral Flatness -Amplitude or Spectral Flatness -Phase
0 to 1199 (Channel Bandwidth: 20 MHz)
0 to 899 (Channel Bandwidth: 15 MHz)
0 to 599 (Channel Bandwidth: 10 MHz)
0 to 299 (Channel Bandwidth: 5 MHz)
0 to 179 (Channel Bandwidth: 3 MHz)
0 to 71 (Channel Bandwidth: 1.4 MHz)
Spectral Flatness- Difference Amplitude or Spectral Flatness - Group Delay
1 to 1198 (Channel Bandwidth: 20 MHz)
1 to 898 (Channel Bandwidth: 15 MHz)
1 to 598 (Channel Bandwidth: 10 MHz)
1 to 298 (Channel Bandwidth: 5 MHz)
1 to 178 (Channel Bandwidth: 3 MHz)
1 to 70 (Channel Bandwidth: 1.4 MHz)
When TargetChannel is PRACH
Constellation
0 to 838 (Preamble Format: other than 4)
0 to 138 (Preamble Format: 4)
EVM vs Subcarrier
0 to 2047

Resolution 1

Example of Use

To query the position of the marker on the Constellation in subcarrier number.

```
CALC:EVM:MARK:SUBC?
> 100
```

:CALCulate:EVM:MARKer:SYMBol <integer>

Marker Symbol Number

Function

This command sets the position of the marker on the EVM vs Symbol/Time Based EVM graph in symbol number.

Command

```
:CALCulate:EVM:MARKer:SYMBol <integer>
```

Parameter

`<integer>`	Symbol number
Range	0 to 139
Resolution	1
Suffix code	None
Default	28

Example of Use

To set the position of the marker on the EVM vs Symbol graph to 100.

```
CALC:EVM:MARK:SYMB 100
```

:CALCulate:EVM:MARKer:SYMBol?

Marker Symbol Number Query

Function

This command queries the position of the marker on the EVM vs Symbol/Time Based EVM graph in symbol number.

Command

```
:CALCulate:EVM:MARKer:SYMBol?
```

Response

```
<integer>
```

Parameter

`<integer>`	Symbol number
Range	0 to 139
Resolution	1

Example of Use

To query the position of the marker on the EVM vs Symbol graph.

```
CALC:EVM:MARK:SYMB?
> 100
```

:CALCulate:EVM:MARKer:RB <integer>

Marker Resource Block Number

Function

This command sets the In-band Emission graph marker position as the resource block number.

Command

```
:CALCulate:EVM:MARKer:RB <integer>
```

Parameter

`<integer>`	Resource block number	
Range	0 to 99	(Channel Bandwidth: 20 MHz)
	0 to 74	(Channel Bandwidth: 15 MHz)
	0 to 49	(Channel Bandwidth: 10 MHz)
	0 to 24	(Channel Bandwidth: 5 MHz)
	0 to 14	(Channel Bandwidth: 3 MHz)
	0 to 5	(Channel Bandwidth: 1.4 MHz)
Resolution	1	
Suffix code	None	
Default	0	

Example of Use

To set In-band Emission marker to 10.

```
CALC:EVM:MARK:RB 10
```

:CALCulate:EVM:MARKer:RB?

Marker Resource Block Number Query

Function

This command queries the In-band Emission graph marker position as the resource block number.

Command

```
:CALCulate:EVM:MARKer:RB?
```

Response

`<integer>`

Parameter

`<integer>`	Resource block number	
Range	0 to 99	(Channel Bandwidth: 20 MHz)
	0 to 74	(Channel Bandwidth: 15 MHz)
	0 to 49	(Channel Bandwidth: 10 MHz)
	0 to 24	(Channel Bandwidth: 5 MHz)
	0 to 14	(Channel Bandwidth: 3 MHz)
	0 to 5	(Channel Bandwidth: 1.4 MHz)
Resolution	1	

Example of Use

To query In-band Emission marker target.

```
CALC:EVM:MARK:RB?
> 10
```

:CALCulate:EVM:MARKer:DEModsymbol <integer>

Marker Demod Symbol Number

Function

This command sets the Constellation or EVM vs Demod Symbol graph marker position as Demod Symbol number. The target graph is set by Active Trace.

Command

```
:CALCulate:EVM:MARKer:DEModsymbol <integer>
```

Parameter

`<integer>`	Demod Symbol number	
Range	When Target Channel is PUSCH or PUCCH	
	0 to 1199	(Channel Bandwidth: 20 MHz)
	0 to 899	(Channel Bandwidth: 15 MHz)
	0 to 599	(Channel Bandwidth: 10 MHz)
	0 to 299	(Channel Bandwidth: 5 MHz)
	0 to 179	(Channel Bandwidth: 3 MHz)
	0 to 71	(Channel Bandwidth: 1.4 MHz)
Resolution	1	
Suffix code	None	
Default	0	

Example of Use

To set EVM vs Demod Symbol marker target to 10.

```
CALC:EVM:MARK:DEM 10
```

:CALCulate:EVM:MARKer:DEModsymbol?

Marker Demod Symbol Number Query

Function

This command queries the Constellation or EVM vs Demod Symbol graph marker position as Demod Symbol number. The target graph is set by Active Trace.

Command

`:CALCulate:EVM:MARKer:DEModsymbol?`

Response

`<integer>`

Parameter

`<integer>`		Demod Symbol number	
Range	When Target Channel is PUSCH or PUCCH		
		0 to 1199	(Channel Bandwidth: 20 MHz)
		0 to 899	(Channel Bandwidth: 15 MHz)
		0 to 599	(Channel Bandwidth: 10 MHz)
		0 to 299	(Channel Bandwidth: 5 MHz)
		0 to 179	(Channel Bandwidth: 3 MHz)
		0 to 71	(Channel Bandwidth: 1.4 MHz)
Resolution		1	

Example of Use

To query EVM vs Demod Symbol marker target.

```
CALC:EVM:MARK:DEM?
> 10
```

2.7.23 Marker Value

:CALCulate:EVM:MARKer:X?

Marker X Axis Value Query

Function

This command queries the X-coordinate value at the marker position on the Constellation.

Query

```
:CALCulate:EVM:MARKer:X?
```

Response

```
<real>
```

Parameter

<real>	X-coordinate value at the marker on the Constellation

Details

This command is not available when Trace Mode is set to Summary.
–999.0 is returned when no measurement is made or an error occurs.

Example of Use

To query the X-coordinate value at the marker on the Constellation.

```
CALC:EVM:MARK:X?
> 0.12345
```

:CALCulate:EVM:MARKer:Y[:RMS]?

Marker Y Axis Value (RMS) Query

Function

This command queries the RMS value on the Y-coordinate at the marker on the target graph.

Query

```
:CALCulate:EVM:MARKer:Y[:RMS]?
```

Response

```
<real>
```

Parameter

<real>	RMS value on Y coordinate at maker on target graph	

When Active Trace is set to Constellation:

	Constellation	No unit

When Active Trace is graph window and Trace Mode is EVM vs Subcarrier/EVM vs Symbol/Time Based EVM/EVM vs Demod-Symbol

	When EVM Unit is set to %:	Unit: %
	When EVM Unit is set to dB:	Unit: dB

When Active Trace is graph window and Trace Mode is Spectral Flatness

	Amplitude	Unit: dB
	Difference Amplitude	Unit: dB
	Phase	Unit: degree
	Group Delay	Unit: ns

When Trace Mode is In-Band Emission :

		Unit: dB

Details

This command is not available when Trace Mode is set to Summary.
–999.0 is returned when no measurement is made or an error occurs.

Example of Use

To query the RMS value on the Y-coordinate at the marker.

```
CALC:EVM:MARK:Y?
> -20.00
```

:CALCulate:EVM:MARKer:Y:PEAK?

Marker Y Axis Value (Peak) Query

Function

This command queries the Peak value on the Y-coordinate at the marker on the graph window.

Query

```
:CALCulate:EVM:MARKer:Y:PEAK?
```

Response

```
<real>
```

Parameter

`<real>`	Peak value on Y coordinate at maker on target graph

When Trace Mode is EVM vs Subcarrier/EVM vs Symbol/Time Based EVM/EVM vs Demod-Symbol

When EVM Unit is set to %:	Unit: %
When EVM Unit is set to dB:	Unit: dB

When Spectral Flatness is selected for Trace Mode:

Amplitude	Unit: dB
Difference Amplitude	Unit: dB
Phase	Unit: degree
Group Delay	Unit: ns

When Trace Mode is In-Band Emission :

Unit: dB

Details

This command is not available when Trace Mode is set to Summary.
–999.0 is returned when no measurement is made or an error occurs.

Example of Use

To query the Peak value on the Y-coordinate at the marker on the target graph.

```
CALC:EVM:MARK:Y:PEAK?
> -20.00
```

2

SCPI Device Message Details

:CALCulate:EVM:MARKer:EVM[:RMS]?

Marker EVM Value (RMS) Query

Function

This command queries the RMS value of EVM at the marker position on the target graph.

Query

`:CALCulate:EVM:MARKer:EVM[:RMS]?`

Response

`<real>`

Parameter

`<real>`	RMS value at marker on target graph. When EVM Unit is set to %: Unit: % When EVM Unit is set to dB: Unit: dB

Details

–999.0 is returned when no measurement is made or an error occurs.
This command is not available when Trace Mode is Summary, Spectral Flatness, or In-Band Emission.

Example of Use

To query the RMS value of EVM at the marker position.

```
CALC:EVM:MARK:EVM?
> -20.00
```

:CALCulate:EVM:MARKer:EVM:PEAK?

Marker EVM Value (Peak) Query

Function

This command queries the Peak value of EVM at the marker position in the graph window.

Query

```
:CALCulate:EVM:MARKer:EVM:PEAK?
```

Response

```
<real>
```

Parameter

<real>	Peak value of EVM at the marker position on the target graph When EVM Unit is set to %: Unit: % When EVM Unit is set to dB: Unit: dB

Details

–999.0 is returned when no measurement is made or an error occurs.
This command is not available when Trace Mode is Summary, Spectral Flatness, or In-Band Emission.

Example of Use

To query the Peak value of EVM at the marker position.

```
CALC:EVM:MARK:EVM:PEAK?
> -20.00
```

:CALCulate:EVM:MARKer:Y:MAXimum?

Marker Y Axis Value (Max) Query

Function

This command queries the Max value of the Y-coordinate at the graph window marker position.

Query

`:CALCulate:EVM:MARKer:Y:MAXimum?`

Response

`<real>`

Parameter

`<real>` Max value on Y coordinate at maker on target graph

When Trace Mode is EVM vs Subcarrier/EVM vs Symbol/Time Based EVM/EVM vs Demod-Symbol

When EVM Unit is set to %:	Unit: %
When EVM Unit is set to dB:	Unit: dB

When Spectral Flatness is selected for Trace Mode:

Amplitude	Unit: dB
Difference Amplitude	Unit: dB
Phase	Unit: degree
Group Delay	Unit: ns

When Trace Mode is In-Band Emission:

Unit: dB

Details

This command is not available when Trace Mode is set to Summary.
–999.0 is returned when no measurement is made or an error occurs.

Example of Use

To query the Max value on the Y-coordinate at the marker.

```
CALC:EVM:MARK:Y:MAX?
> -20.00
```

:CALCulate:EVM:MARKer:Y:MINimum?

Marker Y Axis Value (Min) Query

Function

This function queries the Min value of the Y-coordinate at the graph window marker position.

Query

```
:CALCulate:EVM:MARKer:Y:MINimum?
```

Response

```
<real>
```

Parameter

<real> Min value on Y coordinate at maker on target graph

When Spectral Flatness is selected for Trace Mode:

Amplitude	Unit: dB
Difference Amplitude	Unit: dB
Phase	Unit: degree
Group Delay	Unit: ns

When In-Band Emission is selected for Trace Mode:

Unit: dB

Details

It is invalid when Trace Mode is EVM vs Subcarrier/EVM vs Symbol/Time Based EVM/EVM vs Demod-Symbol/Summary.
–999.0 is returned when no measurement is made or an error occurs.

Example of Use

To query the Min value on the Y-coordinate at the marker.

```
CALC:EVM:MARK:Y:MIN?
> -20.00
```

2.7.24 Peak Search

:CALCulate:MARKer:MAXimum

Peak Search

Function

This command searches for the maximum level point of the active trace and moves the marker point to that point.

Command

```
:CALCulate:MARKer:MAXimum
```

Details

This function is available on the following traces:

- EVM vs Subcarrier
- EVM vs Symbol
- Time Based EVM
- EVM vs Demod-Symbol
- Spectral flatness
- In-Band Emission

When reading out a marker value after executing this command, use the `*WAI` command and execute synchronization control.

Note that synchronization control during the Continuous mode is not supported.

Example of Use

To move the marker to the maximum level point and query the marker value.

```
CALC:MARK:MAX
*WAI
CALC:EVM:MARK:Y?
```

:CALCulate:MARKer:MAXimum:NEXT

Next Peak Search

Function

This command searches for the feature point on the active trace and moves the marker point to the peak point with a level lower than the current marker level.

Command

`:CALCulate:MARKer:MAXimum:NEXT`

Details

This function is available on the following traces:

- EVM vs Subcarrier
- EVM vs Symbol
- Time Based EVM
- EVM vs Demod-Symbol
- Spectral flatness
- In-Band Emission

When reading out a marker value after executing this command, use the `*WAI` command to execute synchronization control.

Note that synchronization control during the Continuous mode is not supported.

Example of Use

To move the marker to the next peak point and query the marker value.

```
CALC:MARK:MAX:NEXT
*WAI
CALC:EVM:MARK:Y?
```

:CALCulate:MARKer:MINimum

Dip Search

Function

This command searches for the minimum level point of the active trace and moves the marker point to that point.

Command

`:CALCulate:MARKer:MINimum`

Details

This function can be set when the following traces are active.

- EVM vs Subcarrier
- EVM vs Symbol
- Time Based EVM
- EVM vs Demod-Symbol
- Spectral flatness
- In-Band Emission

When reading out a marker value after executing this command, use the `*WAI` command to execute synchronization control.

Note that synchronization control during the Continuous mode is not supported.

Example of Use

To move the marker to the minimum level point and query the marker value.

```
CALC:MARK:MIN
*WAI
CALC:EVM:MARK:Y?
```

:CALCulate:MARKer:MINimum:NEXT

Next Dip Search

Function

This command searches for the feature point on the active trace and moves the marker point to the peak point with a level larger than the current marker level.

Command

`:CALCulate:MARKer:MINimum:NEXT`

Details

This function can be set when the following traces are active.

- EVM vs Subcarrier
- EVM vs Symbol
- Time Based EVM
- EVM vs Demod-Symbol
- Spectral flatness
- In-Band Emission

When reading out a marker value after executing this command, use the `*WAI` command to execute synchronization control.

Note that synchronization control during the Continuous mode is not supported.

Example of Use

To move the marker to the next minimum peak point and query the marker value.

```
CALC:MARK:MIN:NEXT
*WAI
CALC:EVM:MARK:Y?
```

2.8 Power vs Time Measurement Function

This section describes device messages for Power vs Time measurement.

Table 2.8-1 lists device messages for executing Power vs Time measurement and querying the result.

Table 2.8-1 Device Messages for Power vs Time Measurement Functions

Function	Device Messages
Configure	:CONFigure:PVTime
Initiate	:INITiate:PVTime
Fetch	:FETCh:PVTime[n]?
Read/Measure	:READ:PVTime[n]?
	:MEASure:PVTime[n]?

Table 2.8-2 lists the responses to parameter [n] of the device messages in Table 2.8-1.

Table 2.8-2 Responses to Power vs Time Measurement Results

n	Result Mode	Response
3	A/B	Responses are returned with comma-separated value formats in the following order: 1. PRACH On Power (Average) 2. PRACH On Power (Max) 3. PRACH On Power (Min) 4. Off Power before PRACH (Average) 5. Off Power before PRACH (Max) 6. Off Power before PRACH (Min) 7. Off Power after PRACH (Average) 8. Off Power after PRACH (Max) 9. Off Power after PRACH (Min)
4	A/B	Responses are returned with comma-separated value formats in the following order: 1. PUSCH On Power (Average) 2. PUSCH On Power (Max) 3. PUSCH On Power (Min) 4. Off Power before PUSCH (Average) 5. Off Power before PUSCH (Max) 6. Off Power before PUSCH (Min) 7. Off Power after PUSCH (Average) 8. Off Power after PUSCH (Max) 9. Off Power after PUSCH (Min)
31	A/B	The Power numeric results for each Sample Point are returned in the following comma-separated order. 1. Sample Point #0 Power (Average) 2. Sample Point #1 Power (Average) 3. Sample Point #2 Power (Average) … 709631. Sample Point #709630 Power (Average) 709632. Sample Point #709631 Power (Average) ***Note:*** PvT waveform at every sample point of Ts resolution (30.72 Msps). Sample Point #0 is 1 ms + 50 μs (= 32256 [Ts]) ahead from the frame head. (For PRACH, 1 ms + 50 μs ahead of PRACH burst.)

2

SCPI Device Message Details

Table 2.8-2 Responses to Power vs Time Measurement Results (Cont'd)

n	Result Mode	Response
32	A/B	The Power numeric results for each Sample Point are returned in the following comma-separated order. 1. Sample Point #0 Power (Maximum) 2. Sample Point #1 Power (Maximum) 3. Sample Point #2 Power (Maximum) … 709631. Sample Point #709630 Power (Maximum) 709632. Sample Point #709631 Power (Maximum) ***Note:*** PvT waveform at every sample point of Ts resolution (30.72 Msps). Sample Point #0 is 1 ms + 50 µs (= 32256 [Ts]) ahead from the frame head. (For PRACH, 1 ms + 50 µs ahead of PRACH burst.)
33	A/B	The Power numeric results for each Sample Point are returned in the following comma-separated order. 1. Sample Point #0 Power (Minimum) 2. Sample Point #1 Power (Minimum) 3. Sample Point #2 Power (Minimum) … 709631. Sample Point #709630 Power (Minimum) 709632. Sample Point #709631 Power (Minimum) ***Note:*** PvT waveform at every sample point of Ts resolution (30.72 Msps). Sample Point #0 is 1 ms + 50 µs (= 32256 [Ts]) ahead from the frame head. (For PRACH, 1 ms + 50 µs ahead of PRACH burst.)

Table 2.8-3 lists device messages on Parameter Setting for Power vs Time Measurement

Table 2.8-3 Device Messages for Setting Parameters for Power vs Time Measurement

<table>
<tr><th>Parameter</th><th>Device Messages</th></tr>
<tr><td rowspan="2">Storage Mode</td><td>[:SENSe]:PVTime:AVERage[:STATe] OFF|ON|0|1</td></tr>
<tr><td>[:SENSe]:PVTime:AVERage[:STATe]?</td></tr>
<tr><td rowspan="2">Storage Count</td><td>[:SENSe]:PVTime:AVERage:COUNt <integer></td></tr>
<tr><td>[:SENSe]:PVTime:AVERage:COUNt?</td></tr>
<tr><td rowspan="2">Trace Mode</td><td>: DISPlay:PVTime[:VIEW]:SELect BURSt|TRANsient|NOGRaph</td></tr>
<tr><td>:DISPlay:PVTime[:VIEW]:SELect?</td></tr>
<tr><td rowspan="2">Reference Level Upper - Burst / Transient</td><td>:DISPlay:PVTime[:VIEW]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel:UPPer <integer></td></tr>
<tr><td>:DISPlay:PVTime[:VIEW]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel:UPPer?</td></tr>
<tr><td rowspan="2">Reference Level Lower - Burst / Transient</td><td>:DISPlay:PVTime[:VIEW]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel:LOWer <integer></td></tr>
<tr><td>:DISPlay:PVTime[:VIEW]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel:LOWer?</td></tr>
<tr><td rowspan="2">Marker - On/Off</td><td>:CALCulate:PVTime:MARKer[:STATe] OFF|ON|0|1</td></tr>
<tr><td>:CALCulate:PVTime:MARKer[:STATe]?</td></tr>
<tr><td rowspan="2">Marker - Ts Number</td><td>:CALCulate:PVTime:MARKer:TS <integer></td></tr>
<tr><td>:CALCulate:PVTime:MARKer:TS?</td></tr>
<tr><td rowspan="4">Peak Search</td><td>:CALCulate:MARKer:MAXimum</td></tr>
<tr><td>:CALCulate:MARKer:MAXimum:NEXT</td></tr>
<tr><td>:CALCulate:MARKer:MINimum</td></tr>
<tr><td>:CALCulate:MARKer:MINimum:NEXT</td></tr>
</table>

2.8.1 Power vs Time

:CONFigure:PVTime

Power vs Time

Function

This command selects the Power vs Time measurement function.

Command

`:CONFigure:PVTime`

Details

No measurement is made.

Example of Use

To select the Power vs Time measurement function.

`CONF:PVT`

:INITiate:PVTime

Power vs Time

Function

This command executes the Power vs Time measurement function.

Command

`:INITiate:PVTime`

Example of Use

To execute the Power vs Time measurement.

`INIT:PVT`

:FETCh:PVTime[n]?

Power vs Time Query

Function

This command queries the result of the Power vs Time measurement.

Query

```
:FETCh:PVTime[n]?
```

Response

See Table 2.8-2.

Details

–999.0 is returned when no measurement is made or an error occurs.
The unit of the read EVM value depends on the setting of EVM Unit.
When Standard is LTE-A, this can be queried for each CC individually.
To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To query the result of the Power vs Time measurement.

```
FETC:PVT3?
> -10.64,-10.64,-10.64,-77.14,-77.14, …
```

:READ:PVTime[n]?

Power vs Time Query

Function

This command performs Power vs Time measurement once (single measurement) with the current settings, and then queries the measured result.

Query

`:READ:PVTime[n]?`

Response

See Table 2.8-2.

Details

–999.0 is returned when no measurement is made or an error occurs.
The unit of the read EVM value depends on the setting of EVM Unit.
When Standard is LTE-A, this can be queried for each CC individually.
To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To perform single Power vs Time measurement and query the measured result.
`READ:PVT3?`

Related command

This command has the same function as the following command.
`:MEASure:PVTime[n]?`

:MEASure:PVTime[n]?

Power vs Time Query

Function

This command performs Power vs Time measurement once (single measurement) with the current settings, and then queries the measured result.

Query

```
:MEASure:PVTime[n]?
```

Response

See Table 2.8-2.

Details

–999.0 is returned when no measurement is made or an error occurs.
The unit of the read EVM value depends on the setting of EVM Unit.
When Standard is LTE-A, this can be queried for each CC individually.
To change the CC to query, edit Setting/Result Target CC#.

Example of Use

To perform single Power vs Time measurement and query the measured result.

```
MEAS:PVT3?
```

Related command

This command has the same function as the following command.

```
:READ:PVTime[n]?
```

2.8.2 Storage Mode

[:SENSe]:PVTime:AVERage[:STATe] OFF|ON|0|1

Storage Mode

Function

This command sets the Storage Mode.

Command

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

Parameter

`<mode>`	Storage Mode
`OFF|0`	Off (Default)
`ON|1`	On

Example of Use

To set the storage mode to On.

`PVT:AVER ON`

[:SENSe]:PVTime:AVERage[:STATe]?

Storage Mode Query

Function

This command queries the setting of the Storage Mode.

Query

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

Response

`<mode>`

Parameter

`<mode>`	Storage Mode
`0`	Off
`1`	On

Example of Use

To query the setting of the Storage Mode.

```
PVT:AVER?
> 1
```

2.8.3 Storage Count

[:SENSe]:PVTime:AVERage:COUNt <integer>

Storage Count

Function

This command sets the Storage Count.

Command

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

Parameter

`<integer>` Storage Count

Range
When Capture Time is Auto
2 to 9999
When Capture Time is Manual
2 to Capture Time Length/2
(Target Channel is PRACH)
2 to Capture Time Length
(When Target Channel is not PRACH, and Measurement is Power vs Time.)
2 to Capture Time Length/5
(Target Channel is not PRACH, and Measurement is Modulation Analysis.)

Resolution 1

Default 10

Example of Use

To set the Storage Count to 10.

```
PVT:AVER:COUN 10
```

[:SENSe]:PVTime:AVERage:COUNt?

Storage Count Query

Function

This command queries the Storage Count.

Query

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

Response

`<integer>`

Parameter

`<integer>` Storage Count

Range When Capture Time is Auto

2 to 9999

When Capture Time is Manual

2 to Capture Time Length/2

(Target Channel is PRACH)

2 to Capture Time Length

(When Target Channel is not PRACH, and Measurement is Power vs Time.)

2 to Capture Time Length/5

(Target Channel is not PRACH, and Measurement is Modulation Analysis.)

Resolution 1

Example of Use

To query the Storage Count.

`PVT:AVER:COUN?`

> 10

2.8.4 Trace Mode

:DISPlay:PVTime[:VIEW]:SELect BURSt|TRANsient|NOGRaph

Trace Mode

Function

This command sets the result type to be displayed on the graph window in Power vs Time measurement.

Command

```
:DISPlay:PVTime[:VIEW]:SELect <mode>
```

Parameter

<mode>	Trace Mode
BURSt	Burst (Default)
TRANsient	Transient
NOGRaph	No Graph (The graph is not displayed.)

Example of Use

To set the Trace Mode to Burst.

```
DISP:PVT:SEL BURS
```

:DISPlay:PVTime[:VIEW]:SELect?

Trace Mode Query

Function

This command queries the result type to be displayed on the graph window in Power vs Time measurement.

Query

```
:DISPlay:PVTime[:VIEW]:SELect?
```

Response

```
<mode>
```

Parameter

<mode>	Trace Mode
BURS	Burst (Default)
TRAN	Transient
NOGR	No Graph (The graph is not displayed.)

Example of Use

To query the setting of Trace Mode

```
DISP:PVT:SEL?
> BURS
```

2.8.5 Reference Level Upper - Burst / Transient

:DISPlay:PVTime[:VIEW]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel:UPPer <integer>

Reference Level Upper - Burst / Transient

Function

This command sets the upper end of the vertical scale in the Burst / Transient graph in Power vs Time measurement.

Command

```
:DISPlay:PVTime[:VIEW]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel:UPPer <integer>
```

Parameter

`<integer>`	Reference Level Upper
Range	(–100+Level Offset) to (50+Level Offset) Make sure to perform the setting so that Reference Level Upper is bigger than Reference Level Lower.
Resolution	1
Suffix code	`DBM` dBm when omitted.
Default	20

Example of Use

To set the upper end value in the graph to 20.

```
DISP:PVT:WIND1:TRAC:Y:RLEV:UPP 20
```

:DISPlay:PVTime[:VIEW]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel:UPPer?

Reference Level Upper - Burst / Transient Query

Function

This command queries the upper end of the vertical scale in the Burst / Transient graph in Power vs Time measurement.

Query

```
:DISPlay:PVTime[:VIEW]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel:UPPer?
```

Response

```
<integer>
```

Parameter

<integer>	Reference Level Upper
Range	(–100+Level Offset) to (50+Level Offset)
Resolution	1

Example of Use

To query the upper end value of the vertical scale in the graph.

```
DISP:PVT:WIND1:TRAC:Y:RLEV:UPP?
> 20
```

2.8.6 Reference Level Lower - Burst / Transient

:DISPlay:PVTime[:VIEW]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel:LOWer <integer>

Reference Level Lower - Burst / Transient

Function

This command sets the lower end of the vertical scale in the Burst / Transient graph in Power vs Time measurement.

Command

```
:DISPlay:PVTime[:VIEW]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel:LOWer <integer>
```

Parameter

`<integer>`	Reference Level Lower
Range	(–100+Level Offset) to (50+Level Offset) Make sure to perform the setting so that Reference Level Upper is bigger than Reference Level Lower.
Resolution	1
Suffix code	`DBM` dBm when omitted.
Default	–80

Example of Use

To set the lower end value of the vertical scale in the graph to –80.

```
DISP:PVT:WIND1:TRAC:Y:RLEV:LOW -80
```

:DISPlay:PVTime[:VIEW]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel:LOWer?

Reference Level Lower - Burst / Transient Query

Function

This command queries the lower end of the vertical scale in the Burst / Transient graph in Power vs Time measurement.

Query

```
:DISPlay:PVTime[:VIEW]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel:LOWer?
```

Response

```
<integer>
```

Parameter

<integer>	Reference Level Lower
Range	(–100+Level Offset) to (50+Level Offset)
Resolution	1

Example of Use

To query the lower end value of the vertical scale in the graph.

```
DISP:PVT:WIND1:TRAC:Y:RLEV:LOW?
> -80
```

2

SCPI Device Message Details

2.8.7 Marker - On/Off

:CALCulate:PVTime:MARKer[:STATe] OFF|ON|0|1

Marker - On/Off

Function

This command sets whether to display the marker on Power vs Time measurement.

Command

`:CALCulate:PVTime:MARKer[:STATe] <switch>`

Parameter

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

Example of Use

To display the marker on Power vs Time measurement.

```
CALC:PVT:MARK 1
```

:CALCulate:PVTime:MARKer[:STATe]?

Marker - On/Off Query

Function

This command queries the marker display On/Off state on Power vs Time measurement.

Query

`:CALCulate:PVTime:MARKer[:STATe]?`

Response

`<switch>`

Parameter

`<switch>`	Marker
`0`	Off
`1`	On

Example of Use

To query the Marker settings on Power vs Time measurement.

```
CALC:PVT:MARK?
> 1
```

2.8.8 Marker - Ts Number

:CALCulate:PVTime:MARKer:TS <integer>

Marker - Ts Number

Function

This command sets the marker position in Ts unit (sample number calculated by Sampling Rate of 30.72 MHz) in the Burst / Transient graph in Power vs Time measurement.
To query the marker value (Y coordinate), the command of Modulation measurement (2.7.23 Marker Value) is used.

Command

```
:CALCulate:PVTime:MARKer:TS <integer>
```

Parameter

`<integer>` Marker position

Range 39504 to 122879 Ts

Resolution 1

Default When Target Channel is PUSCH or PUCCH

It is the same as the minimum value of the selected subframe.

When Target Channel is PRACH

0

Details

The above range varies according to Trace Mode setting.

Example of Use

To set the graph marker position to 61440 in Power vs Time measurement.

```
CALC:PVT:MARK:TS 61440
```

:CALCulate:PVTime:MARKer:TS?

Marker - Ts Number Query

Function

This command queries the marker position in Ts unit (sample number calculated by Sampling Rate of 30.72 MHz) in the Burst / Transient graph in Power vs Time measurement.

Query

```
:CALCulate:PVTime:MARKer:TS?
```

Response

```
<integer>
```

Parameter

<integer>	Marker position
Range	39504 to 122879 Ts
Resolution	1

Example of Use

To query the graph marker position in Power vs Time measurement.

```
CALC:PVT:MARK:TS?
> 61440
```

2.8.9 Peak Search

:CALCulate:MARKer:MAXimum

Peak Search

Function

This command searches for the maximum level point of the active trace and moves the marker point to that point.

Command

```
:CALCulate:MARKer:MAXimum
```

Details

This function is available on the following traces:

- Burst
- Transient

When reading out a marker value after executing this command, use the `*WAI` command and execute synchronization control.

Note that synchronization control during the Continuous mode is not supported.

Example of Use

To move the marker to the maximum level point and query the marker value.

```
CALC:MARK:MAX
*WAI
CALC:EVM:MARK:Y?
```

:CALCulate:MARKer:MAXimum:NEXT

Next Peak Search

Function

This command searches for the feature point on the active trace and moves the marker point to the peak point with a level lower than the current marker level.

Command

`:CALCulate:MARKer:MAXimum:NEXT`

Details

This function is available on the following traces:

- Burst
- Transient

When reading out a marker value after executing this command, use the `*WAI` command to execute synchronization control.

Note that synchronization control during the Continuous mode is not supported.

Example of Use

To move the marker to the next peak point and query the marker value.

```
CALC:MARK:MAX:NEXT
*WAI
CALC:EVM:MARK:Y?
```

:CALCulate:MARKer:MINimum

Dip Search

Function

This command searches for the minimum level point of the active trace and moves the marker point to that point.

Command

```
:CALCulate:MARKer:MINimum
```

Details

This function can be set when the following traces are active.

- Burst
- Transient

When reading out a marker value after executing this command, use the `*WAI` command to execute synchronization control.

Note that synchronization control during the Continuous mode is not supported.

Example of Use

To move the marker to the minimum level point and query the marker value.

```
CALC:MARK:MIN
*WAI
CALC:EVM:MARK:Y?
```

:CALCulate:MARKer:MINimum:NEXT

Next Dip Search

Function

This command searches for the feature point on the active trace and moves the marker point to the peak point with a level larger than the current marker level.

Command

`:CALCulate:MARKer:MINimum:NEXT`

Details

This function can be set when the following traces are active.

- Burst
- Transient

When reading out a marker value after executing this command, use the `*WAI` command to execute synchronization control.

Note that synchronization control during the Continuous mode is not supported.

Example of Use

To move the marker to the next minimum peak point and query the marker value.

```
CALC:MARK:MIN:NEXT
*WAI
CALC:EVM:MARK:Y?
```

2.9 Replay Function

Table 2.9-1 lists device messages for setting the Replay function.

Table 2.9-1 Device messages for Replay function

Function	Device Messages
Stop Replay	:MMEMory:LOAD:IQData:STOP
Execute Replay	:MMEMory:LOAD:IQData <filename>,<device>,<application>
Replay File Information Query	:MMEMory:LOAD:IQData:INFormation?
Replay Execute Query	:MMEMory:LOAD:IQData:INFormation:STATe?
Replay Filename Query	:MMEMory:LOAD:IQData:INFormation:FILE?
Replay Device Query	:MMEMory:LOAD:IQData:INFormation:DEVice?
Replay Application Query	:MMEMory:LOAD:IQData:INFormation:APPLication?
Replay Level Over Query	:MMEMory:LOAD:IQData:INFormation:CONDition?
Replay Error Icon Query	:MMEMory:LOAD:IQData:INFormation:ERRor?
Replay Correction Query	:MMEMory:LOAD:IQData:INFormation:CORRection?
Replay External Reference Query	:MMEMory:LOAD:IQData:INFormation:ROSCillator?

:MMEMory:LOAD:IQData:STOP

Stop Replay

Function

This command stops the Replay function.

Command

:MMEMory:LOAD:IQData:STOP

Details

This command is available only when the Replay function is executed.

Example of Use

To stop the Replay function.

MMEM:LOAD:IQD:STOP

:MMEMory:LOAD:IQData <filename>,<device>,<application>

Execute Replay

Function

This command executes the Replay function. Set a file, a drive, and an application to select the target IQ data.

Command

:MMEMory:LOAD:IQData <filename>,<device>,<application>

Parameter

<filename>	Target file name Character string within 32 characters enclosed by double quotes (“ ”) or single quotes (‘ ’) (excluding extension) The following characters cannot be used: \ / : * ? “ ” ‘ ’ < > |
<device>	Drive name D,E,F,...
<application>	Application to load IQ data file
LTETDDDL	LTE TDD Uplink measurement software
SIGANA	Signal Analyzer

Details

The span value during replay is fixed to the span of the waveform data.
Replaying the 62.5 MHz or 125 MHz waveform is available when MX269023A-001 is installed.
When replaying the waveform of 62.5 MHz or 125 MHz span, Standard is fixed to LTE-A.

Example of Use

To load the IQ data file named TEST in D drive and to execute the Replay function.

MMEM:LOAD:IQD “TEST”,D,LTETDDUL

:MMEMory:LOAD:IQData:INFormation?

Replay File Information Query

Function

This command queries the information of the file for which the Replay function is executed.

Query

```
:MMEMory:LOAD:IQData:INFormation?
```

Response

```
<filename>,<time_length>
```

Parameter

`<filename>`	File name Character string within 32 characters (excluding extension) *** is returned when the Replay function is not executed.
`<time_length>`	Time length of analyzable IQ data
Resolution	1 frame
Suffix code	None –999999999999 is returned when the Replay function is not executed.

Example of Use

To query the information of the file for which the Replay function is executed.

```
MMEM:LOAD:IQD:INF?
> TEST,1
```

:MMEMory:LOAD:IQData:INFormation:STATe?

Replay Execute Query

Function

This command queries whether the Replay function is executed.

Query

`:MMEMory:LOAD:IQData:INFormation:STATe?`

Response

`<switch>`

Parameter

`<switch>`	Replay On/Off
`1`	Replay function is being executed.
`0`	Off

Example of Use

To query whether the Replay function is executed.

```
MMEM:LOAD:IQD:INF:STAT?
> 1
```

:MMEMory:LOAD:IQData:INFormation:FILE?

Replay Filename Query

Function

This command queries the name of the file for which the Replay function is executed.

Query

`:MMEMory:LOAD:IQData:INFormation:FILE?`

Response

`<filename>`

Parameter

`<filename>`	File name Character string within 32 characters (excluding extension) *** is returned when the Replay function is not executed.

Example of Use

To query the name of the file for which the Replay function is executed.

```
MMEM:LOAD:IQD:INF:FILE?
> TEST
```

:MMEMory:LOAD:IQData:INFormation:DEVice?

Replay Device Query

Function

This command queries the name of the drive for which the Replay function is executed.

Query

`:MMEMory:LOAD:IQData:INFormation:DEVice?`

Response

`<device>`

Parameter

`<device>`	Drive name `D,E,F,...` *** is returned when the Replay function is not executed.

Example of Use

To query the name of the drive for which the Replay function is executed.

```
MMEM:LOAD:IQD:INF:DEV?
> D
```

:MMEMory:LOAD:IQData:INFormation:APPLication?

Replay Application Query

Function

This command queries the name of the application for which the Replay function is executed.

Query

`:MMEMory:LOAD:IQData:INFormation:APPLication?`

Response

`<application>`

Parameter

`<application>`	Application to load IQ data file
`LTETDDDL`	LTE TDD Uplink measurement software *** is returned when the Replay function is not executed.

Example of Use

To query the name of the application for which the Replay function is executed.

```
MMEM:LOAD:IQD:INF:APPL?
> LTETDDUL
```

2

SCPI Device Message Details

:MMEMory:LOAD:IQData:INFormation:CONDition?

Replay Level Over Query

Function

This command queries whether Level Over is displayed while the Replay function is executed.

Query

`:MMEMory:LOAD:IQData:INFormation:CONDition?`

Response

`<switch>`	Displayed
1	Level Over is displayed
0	Normal
	–999.0 is returned when the Replay function is not executed.

Example of Use

To query whether Level Over is displayed while the Replay function is executed.

```
MMEM:LOAD:IQD:INF:COND?
> 0
```

:MMEMory:LOAD:IQData:INFormation:ERRor?

Replay Error Icon Query

Function

This command queries whether the Replay Error Info. icon is displayed while the Replay function is executed.

Query

`:MMEMory:LOAD:IQData:INFormation:ERRor?`

Response

`<switch>`	Displayed
1	Replay Error Info. icon is displayed.
0	Normal
	–999.0 is returned when the Replay function is not executed.

Details

The Replay Error Info. icon is displayed if the loaded xml file contains error information.

Example of Use

To query whether the Replay Error Info. icon is displayed while the Replay function is executed.

```
MMEM:LOAD:IQD:INF:ERR?
> 0
```

:MMEMory:LOAD:IQData:INFormation:CORRection?

Replay Correction Query

Function

This command queries the Correction value while the Replay function is executed.

Query

```
:MMEMory:LOAD:IQData:INFormation:CORRection?
```

Response

```
<real>
```

Parameter

`<real>`	Correction level
Range	–100 to 100 dB 0.000 is returned when Correction is Off. –999.0 is returned when the Replay function is not executed.

Example of Use

To query the Correction value while the Replay function is executed.

```
MMEM:LOAD:IQD:INF:CORR?
> 0.000
```

:MMEMory:LOAD:IQData:INFormation:ROSCillator?

Replay External Reference Query

Function

This command queries the frequency reference signal source when the Replay function is executed.

Query

`:MMEMory:LOAD:IQData:INFormation:ROSCillator?`

Response

`<source>`

Parameter

`<source>`	Frequency reference signal source
INT	Internal reference signal source
INTU	Internal reference signal source (Unlock state)
EXT	External reference signal source
EXTU	External reference signal source (Unlock state)
	*** is returned when the Replay function is not executed.

Example of Use

To query the frequency reference signal source when the Replay function is executed.

```
MMEM:LOAD:IQD:INF:ROSC?
> INT
```

Chapter 3 SCPI Status Register

This chapter explains the SCPI commands used to read the state of the application and the status register.

3.1 Reading Measurement Status

:STATus:ERRor?

Measurement Status Error Query

Function

Queries measurement error.

Query

```
:STATus:ERRor?
```

Response

`<status>`

Parameter

`<status>`	Measurement Status

Value = bit0 + bit1 + bit2 + bit3 + bit4 + bit5 + bit6 + bit7 + bit8 + bit9 + bit10 + bit11 + bit12 + bit13 + bit14 + bit15

bit0: $2^0 = 1$	No measurement
bit1: $2^1 = 2$	Level Over
bit2: $2^2 = 4$	Signal Abnormal
bit3: $2^3 = 8$	(Not Used)
bit4: $2^4 = 16$	(Not Used)
bit5: $2^5 = 32$	(Not Used)
bit6: $2^6 = 64$	(Not Used)
bit7: $2^7 = 128$	(Not Used)
bit8: $2^8 = 256$	(Not Used)
bit9: $2^9 = 512$	(Not Used)
bit10: $2^{10} = 1024$	(Not Used)
bit11: $2^{11} = 2048$	(Not Used)
bit12: $2^{12} = 4096$	(Not Used)
bit13: $2^{13} = 8192$	(Not Used)
bit14: $2^{14} = 16384$	(Not Used)
bit15: $2^{15} = 32768$	(Not Used)
Range	0 to 65535

Details

0 is returned at normal termination

Usage Example

Queries measurement error.

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

3.2 STATus:QUEStionable Register

The hierarchical structure of the QUEStionable Status register is described in Figures 3.2-1 and 3.2-2, and Tables 3.2-1 and 3.2-2.

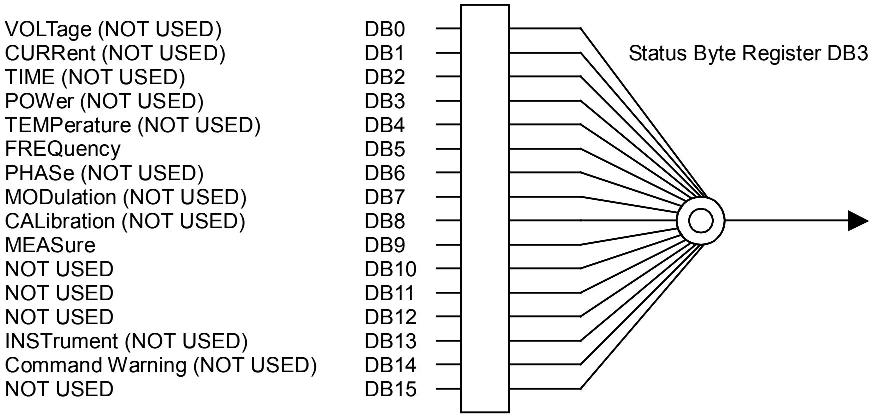


Figure 3.2-1 QUEStionable Status Register

Table 3.2-1 Bit Definition of QUEStionable Status Register

Bit	Definition
DB5	Reference Clock Unlock
DB9	QUEStionable Measure Register Summary

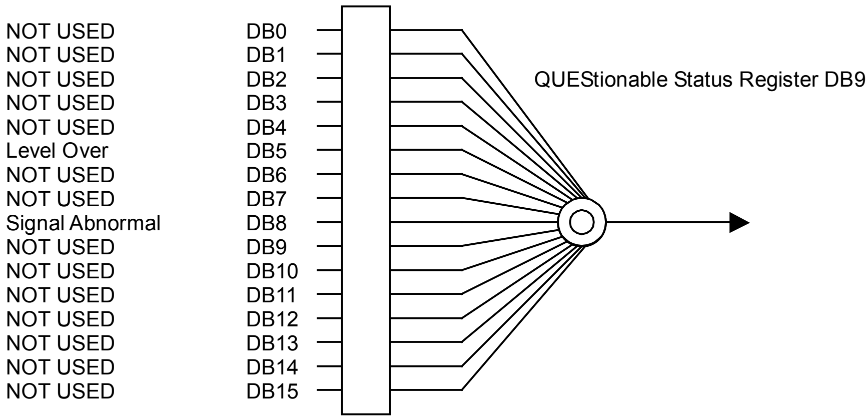


Figure 3.2-2 QUEStionable Measure Register

Table 3.2-2 Bit Definition of QUEStionable Measure Register

Bit	Definition
DB5	Level Over
DB8	Signal Abnormal

Table 3.2-3 lists the device messages for the QUEStionable Status register.

Table 3.2-3 Device Messages for QUEStionable Status Register

Function	Device Message
Questionable Status Register Event	:STATus:QUEStionable[:EVENt]?
Questionable Status Register Condition	:STATus:QUEStionable:CONDition?
Questionable Status Register Enable	:STATus:QUEStionable:ENABle <integer>
	:STATus:QUEStionable:ENABle?
Questionable Status Register Negative Transition	:STATus:QUEStionable:NTRansition <integer>
	:STATus:QUEStionable:NTRansition?
Questionable Status Register Positive Transition	:STATus:QUEStionable:PTRansition <integer>
	:STATus:QUEStionable:PTRansition?
Questionable Measure Register Event	:STATus:QUEStionable:MEASure[:EVENt]?
Questionable Measure Register Condition	:STATus:QUEStionable:MEASure:CONDition?
Questionable Measure Register Enable	:STATus:QUEStionable:MEASure:ENABle <integer>
	:STATus:QUEStionable:MEASure:ENABle?
Questionable Measure Register Negative Transition	:STATus:QUEStionable:MEASure:NTRansition <integer>
	:STATus:QUEStionable:MEASure:NTRansition?
Questionable Measure Register Positive Transition	:STATus:QUEStionable:MEASure:PTRansition <integer>
	:STATus:QUEStionable:MEASure:PTRansition?

:STATus:QUEStionable[:EVENt]?

Questionable Status Register Event

Function

Reads Event register of QUEStionable Status register.

Query

`:STATus:QUEStionable[:EVENt]?`

Response

`<integer>`

Parameter

`<integer>`	Bit Sum Total of Event Register
Resolution	1
Range	0 to 65535

Usage Example

Reads event register of QUEStionable Status register.

```
:STAT:QUES?
> 0
```

:STATus:QUEStionable:CONDition?

Questionable Status Register Condition

Function

Reads Condition register of QUEStionable Status register.

Query

`:STATus:QUEStionable:CONDition?`

Response

`<integer>`

Parameter

`<integer>`	Bit Sum Total of Condition Register
Resolution	1
Range	0 to 65535

Usage Example

Reads Condition register of QUEStionable Status register.

```
:STAT:QUES:COND?
> 0
```

:STATus:QUEStionable:ENABle <integer>

Questionable Status Register Enable

Function

Sets Event Enable register of QUEStionable Status register.

Command

```
:STATus:QUEStionable:ENABle <integer>
```

Parameter

`<integer>`	Bit Sum Total of Event Enable Register
Resolution	1
Range	0 to 65535

Usage Example

Sets the value of Event Enable register of QUEStionable Status register to 16.

```
:STAT:QUES:ENAB 16
```

:STATus:QUEStionable:ENABle?

Questionable Status Register Enable Query

Function

Reads Event Enable register of QUEStionable Status register.

Query

```
:STATus:QUEStionable:ENABle?
```

Response

```
<integer>
```

Parameter

`<integer>`	Bit Sum Total of Event Enable Register
Resolution	1
Range	0 to 65535

Usage Example

Reads Event Enable register of QUEStionable Status register.

```
:STAT:QUES:ENAB?
> 16
```

:STATus:QUEStionable:NTRansition <integer>

Questionable Status Register Negative Transition

Function

Sets transition filter (Negative Transition) of QUEStionable Status register.

Command

```
:STATus:QUEStionable:NTRansition <integer>
```

Parameter

`<integer>`	Bit Sum Total of Transition Filter (Negative Transition)
Resolution	1
Range	0 to 65535

Usage Example

Sets transition filter (Negative Transition) of QUEStionable Status register to 16.

```
:STAT:QUES:NTR 16
```

:STATus:QUEStionable:NTRansition?

Questionable Status Register Negative Transition Query

Function

Queries transition filter (Negative Transition) of QUEStionable Status register.

Query

```
:STATus:QUEStionable:NTRansition?
```

Response

```
<integer>
```

Parameter

`<integer>`	Bit Sum Total of Transition Filter (Negative Transition)
Resolution	1
Range	0 to 65535

Usage Example

Queries transition filter (Negative Transition) of QUEStionable Status register.

```
:STAT:QUES:NTR?
> 16
```

:STATus:QUEStionable:PTRansition <integer>

Questionable Status Register Positive Transition

Function

Sets transition filter (Positive Transition) of QUEStionable Status register.

Command

`:STATus:QUEStionable:PTRansition <integer>`

Parameter

`<integer>`	Bit Sum Total of Transition Filter (Positive Transition)
Resolution	1
Range	0 to 65535

Usage Example

Sets transition filter (Positive Transition) of QUEStionable Status register to 16.

`:STAT:QUES:PTR 16`

:STATus:QUEStionable:PTRansition?

Questionable Status Register Positive Transition Query

Function

Queries transition filter (Positive Transition) of QUEStionable Status register.

Query

`:STATus:QUEStionable:PTRansition?`

Response

`<integer>`

Parameter

`<integer>`	Bit Sum Total of Transition Filter (Positive Transition)
Resolution	1
Range	0 to 65535

Usage Example

Queries transition filter (Positive Transition) of QUEStionable Status register.

```
:STAT:QUES:PTR?
> 16
```

:STATus:QUEStionable:MEASure[:EVENt]?

Questionable Measure Register Event

Function

Reads Event register of QUEStionable Measure register.

Query

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

Response

`<integer>`

Parameter

`<integer>`	Bit Sum Total of Event Register
Resolution	1
Range	0 to 65535

Usage Example

Reads Event register of QUEStionable Measure register.

```
:STAT:QUES:MEAS?
> 0
```

:STATus:QUEStionable:MEASure:CONDition?

Questionable Measure Register Condition

Function

Reads Condition register of QUEStionable Measure register.

Query

`:STATus:QUEStionable:MEASure:CONDition?`

Response

`<integer>`

Parameter

`<integer>`	Bit Sum Total of Condition Register
Resolution	1
Range	0 to 65535

Usage Example

Reads Condition register of QUEStionable Measure register.

```
:STAT:QUES:MEAS:COND?
> 0
```

:STATus:QUEStionable:MEASure:ENABle <integer>

Questionable Measure Register Enable

Function

Sets Event Enable register of QUEStionable Measure register.

Command

`:STATus:QUEStionable:MEASure:ENABle <integer>`

Parameter

`<integer>`	Bit Sum Total of Event Enable Register
Resolution	1
Range	0 to 65535

Usage Example

Sets value of Event Enable register of QUEStionable Measure register to 16.

```
:STAT:QUES:MEAS:ENAB 16
```

:STATus:QUEStionable:MEASure:ENABle?

Questionable Measure Register Enable Query

Function

Reads Event Enable register of QUEStionable Measure register.

Query

`:STATus:QUEStionable:MEASure:ENABle?`

Response

`<integer>`

Parameter

`<integer>`	Bit Sum Total of Event Enable Register
Resolution	1
Range	0 to 65535

Usage Example

Reads Event Enable register of QUEStionable Measure register.

```
:STAT:QUES:MEAS:ENAB?
> 16
```

:STATus:QUEStionable:MEASure:NTRansition <integer>

Questionable Measure Register Negative Transition

Function

Sets transition filter (Negative Transition) of QUEStionable Measure register.

Command

```
:STATus:QUEStionable:MEASure:NTRansition <integer>
```

Parameter

`<integer>`	Bit Sum Total of Transition Filter (Negative Transition)
Resolution	1
Range	0 to 65535

Usage Example

Sets transition filter (Negative Transition) of QUEStionable Measure register to 16.

```
:STAT:QUES:MEAS:NTR 16
```

:STATus:QUEStionable:MEASure:NTRansition?

Questionable Measure Register Negative Transition Query

Function

Queries transition filter (Negative Transition) of QUEStionable Measure register.

Query

```
:STATus:QUEStionable:MEASure:NTRansition?
```

Response

```
<integer>
```

Parameter

`<integer>`	Bit Sum Total of Transition Filter (Negative Transition)
Resolution	1
Range	0 to 65535

Usage Example

Queries transition filter (Negative Transition) of QUEStionable Measure register.

```
:STAT:QUES:MEAS:NTR?
> 16
```

:STATus:QUEStionable:MEASure:PTRansition <integer>

Questionable Measure Register Positive Transition

Function

Sets transition filter (Positive Transition) of QUEStionable Measure register.

Command

`:STATus:QUEStionable:MEASure:PTRansition <integer>`

Parameter

`<integer>`	Bit Sum Total of Transition Filter (Positive Transition)
Resolution	1
Range	0 to 65535

Usage Example

Sets transition filter (Positive Transition) of QUEStionable Measure register to 16.

`:STAT:QUES:MEAS:PTR 16`

:STATus:QUEStionable:MEASure:PTRansition?

Questionable Measure Register Positive Transition Query

Function

Queries transition filter (Positive Transition) of QUEStionable Measure register.

Query

`:STATus:QUEStionable:MEASure:PTRansition?`

Response

`<integer>`

Parameter

`<integer>`	Bit Sum Total of Transition Filter (Positive Transition)
Resolution	1
Range	0 to 65535

Usage Example

Queries transition filter (Positive Transition) of QUEStionable Measure register.

```
:STAT:QUES:MEAS:PTR?
> 16
```

3.3 STATus:OPERation Register

The hierarchical structure of the OPERation Status register is described in Figure 3.3-1 and Table 3.3-1.

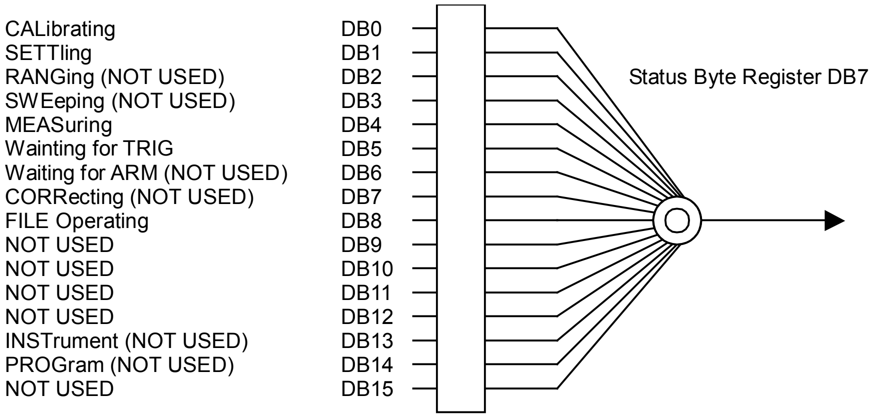


Figure 3.3-1 OPERation Status Register

Table 3.3-1 Definition for OPERation Status Register

Bit	Definition
DB0	CAL Executed
DB1	Warm-up displayed
DB4	Capture executed (Always 1 at Continuous measurement)
DB5	Waiting for trigger signal
DB8	Operating on file

Table 3.3-2 lists the device messages for the OPERation status register.

Table 3.3-2 Device Messages for OPERation Status Register

Function	Device Message
Operation Status Register Event	`:STATus:OPERation[:EVENt]?`
Operation Status Register Condition	`:STATus:OPERation:CONDition?`
Operation Status Register Enable	`:STATus:OPERation:ENABle <integer>`
	`:STATus:OPERation:ENABle?`
Operation Status Register Negative Transition	`:STATus:OPERation:NTRansition <integer>`
	`:STATus:OPERation:NTRansition?`
Operation Status Register Positive Transition	`:STATus:OPERation:PTRansition <integer>`
	`:STATus:OPERation:PTRansition?`

:STATus:OPERation[:EVENt]?

Operation Status Register Event

Function

Reads Event register of OPERation Status register.

Query

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

Response

```
<integer>
```

Parameter

<integer>		Bit Sum Total of Event Register
	Resolution	1
	Range	0 to 65535

Usage Example

Reads Event register of OPERation Status register.

```
:STAT:OPER?
> 0
```

:STATus:OPERation:CONDition?

Operation Status Register Condition

Function

Reads Condition register of OPERation Status register.

Query

```
:STATus:OPERation:CONDition?
```

Response

```
<integer>
```

Parameter

<integer>		Bit Sum Total of Condition Register
	Resolution	1
	Range	0 to 65535

Usage Example

Reads Condition register of OPERation Status register.

```
:STAT:OPER:COND?
> 0
```

:STATus:OPERation:ENABle <integer>

Operation Status Register Enable

Function

Sets Event Enable register of OPERation Status register.

Command

```
:STATus:OPERation:ENABle <integer>
```

Parameter

`<integer>`	Bit Sum Total of Event Enable Register
Resolution	1
Range	0 to 65535

Usage Example

Sets Event Enable register of OPERation Status register to 16.

```
:STAT:OPER:ENAB 16
```

:STATus:OPERation:ENABle?

Operation Status Register Enable Query

Function

Reads Event Enable register of OPERation Status register.

Query

```
:STATus:OPERation:ENABle?
```

Response

```
<integer>
```

Parameter

`<integer>`	Bit Sum Total of Event Enable Register
Resolution	1
Range	0 to 65535

Usage Example

Reads Event Enable register of OPERation Status register.

```
:STAT:OPER:ENAB?
> 16
```

:STATus:OPERation:NTRansition <integer>

Operation Status Register Negative Transition

Function

Sets transition filter (Negative Transition) of OPERation Status register.

Command

```
:STATus:OPERation:NTRansition <integer>
```

Parameter

`<integer>`		Bit Sum Total of Transition Filter (Negative Transition)
	Resolution	1
	Range	0 to 65535

Usage Example

Sets transition filter (Negative Transition) of OPERation Status register to 16.

```
:STAT:OPER:NTR 16
```

:STATus:OPERation:NTRansition?

Operation Status Register Negative Transition Query

Function

Reads transition filter (Negative Transition) of OPERation Status register.

Query

```
:STATus:OPERation:NTRansition?
```

Response

```
<integer>
```

Parameter

`<integer>`		Bit Sum Total of Transition Filter (Negative Transition)
	Resolution	1
	Range	0 to 65535

Usage Example

Reads transition filter (Negative Transition) of OPERation Status register.

```
:STAT:OPER:NTR?
> 16
```

:STATus:OPERation:PTRansition <integer>

Operation Status Register Positive Transition

Function

Sets transition filter (Positive Transition) of OPERation Status register.

Command

```
:STATus:OPERation:PTRansition <integer>
```

Parameter

`<integer>`	Bit Sum Total of Transition Filter (Positive Transition)
Resolution	1
Range	0 to 65535

Usage Example

Sets transition filter (Positive Transition) of OPERation Status register to 16.

```
:STAT:OPER:PTR 16
```

:STATus:OPERation:PTRansition?

Operation Status Register Positive Transition Query

Function

Reads transition filter (Positive Transition) of OPERation Status register.

Query

```
:STATus:OPERation:PTRansition?
```

Response

```
<integer>
```

Parameter

`<integer>`	Bit Sum Total of Transition Filter (Positive Transition)
Resolution	1
Range	0 to 65535

Usage Example

Reads transition filter (Positive Transition) of OPERation Status register.

```
:STAT:OPER:PTR?
> 16
```