

MX269013A
GSM/EDGE Measurement Software
Operation Manual
Remote Control

Eighth 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) or MS2830A Signal Analyzer Operation Manual (Mainframe operation) and MX269013A GSM/EDGE Measurement Software Operation Manual (Operation). Please also refer to these documents before using the equipment.
- Keep this manual with the equipment.

ANRITSU CORPORATION

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.

MX269013A

GSM/EDGE Measurement Software
Operation Manual Remote Control

21 May 2008 (First Edition)
11 April 2014 (Eighth Edition)

Copyright © 2008-2014 ANRITSU CORPORATION.

All rights reserved. No part of this manual may be reproduced without the prior written permission of the publisher.

The contents of this manual may be changed without prior notice.

Printed in Japan

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.

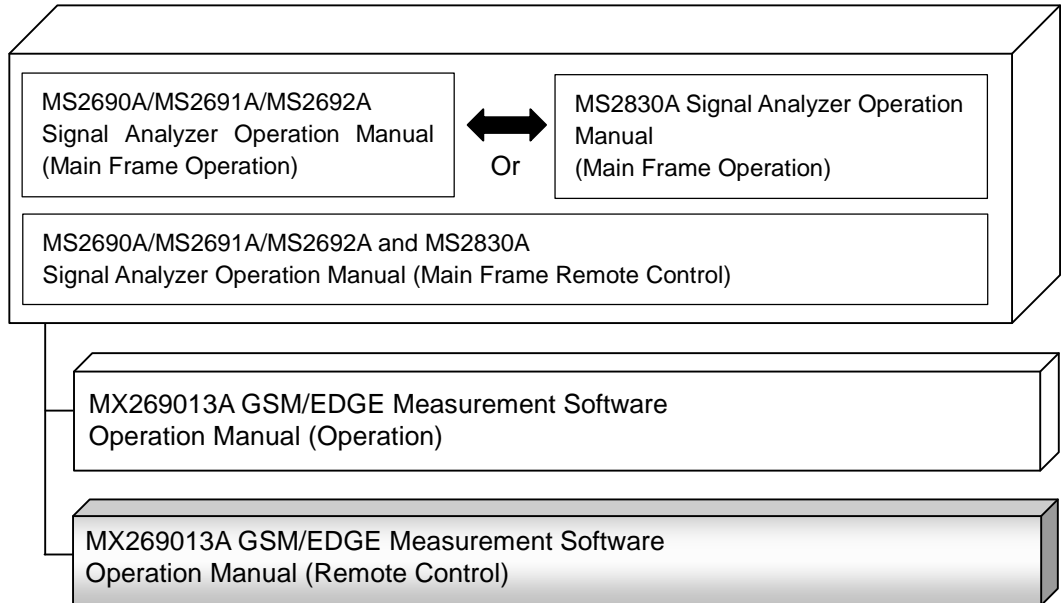
Before re-exporting the product or manuals, please contact us to confirm whether they are export-controlled items or not.

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

■ About this document

This operation manual is for MX269013A GSM/EDGE Measurement Software (Remote Control).



- Mainframe: Operation
- Mainframe: Remote Control

These describe basic operations, maintenance procedures, common functions and common remote functions of the signal analyzer.

- MX269013A GSM/EDGE Measurement Software Operation Manual (Operation)

This document describes the operation of MX269013A Measurement Software.

- MX269013A GSM/EDGE Measurement Software Operation Manual (Remote Control : This document)

This document describes the remote control of MX269013A GSM/EDGE Measurement Software Operation Manual.

Table of Contents

| | |
|--|------------|
| Chapter 1 Overview..... | 1-1 |
| 1.1 Overview | 1-2 |
| 1.2 Basic Flow of Control | 1-3 |
| 1.3 Native Mode..... | 1-16 |
| 1.4 Setting Numeric Program Data..... | 1-19 |
| | |
| Chapter 2 SCPI Device Message Details.. | 2-1 |
| 2.1 Selecting Application..... | 2-4 |
| 2.2 Setting Basic Parameter | 2-11 |
| 2.3 Setting System Parameter | 2-24 |
| 2.4 Utility Function | 2-45 |
| 2.5 Common Measurement Function | 2-48 |
| 2.6 Burst Average Power Measurement..... | 2-58 |
| 2.7 Modulation Analysis..... | 2-60 |
| 2.8 Output RF Spectrum | 2-83 |
| 2.9 Power vs Time | 2-121 |
| | |
| Chapter 3 SCPI Status Register | 3-1 |
| 3.1 Reading Out Measurement Status | 3-2 |
| 3.2 STATus:QUESTionable Register..... | 3-3 |
| 3.3 STATus:OPERation Register | 3-15 |

| |
|---|
| 1 |
| 2 |
| 3 |

Chapter 1 Overview

This chapter provides an overview of the remote control of the MX269013A GSM/EDGE Measurement Software and MX269013A-001 EDGE Evolution Measurement Software (hereinafter, referred to as “this application”).

1

Overview


| | | |
|-----|---|------|
| 1.1 | Overview | 1-2 |
| | 1.1.1 Interface..... | 1-2 |
| | 1.1.2 Controlled Application..... | 1-2 |
| 1.2 | Basic Flow of Control..... | 1-3 |
| | 1.2.1 Initial Setting | 1-4 |
| | 1.2.2 Setting Basic Parameter..... | 1-6 |
| | 1.2.3 Configuring Common Settings | 1-7 |
| | 1.2.4 Modulation Analysis..... | 1-9 |
| | 1.2.5 Output RF Spectrum..... | 1-11 |
| | 1.2.6 Power vs Time..... | 1-13 |
| | 1.2.7 Burst Average Power Measurement | 1-15 |
| 1.3 | Native Mode..... | 1-16 |
| 1.4 | Setting Numeric Program Data..... | 1-19 |

1.1 Overview

This application can be controlled from an external controller (PC) by remote control commands using the MS269x Series and MS2830A Signal Analyzer. 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. Those interfaces cannot be used at the same time.

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  lamp lights; the lamp is off at local-interface operation.

Refer to the “MS2690A/MS2691A/MS2692A and MS2830A 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 or all the applications (hereinafter, referred to as, “Common command”), and the other commands unique to a specific application. Common commands can be executed at any time and do not depend on the currently controlled application. However, a command unique to a specific 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 activated at the same time. Only one application resource can be executed per piece of hardware at one time. This application measures an input signal by using the resource of RF input. Thus, this application 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 remote control, you need to select this application while it has been activated. Furthermore, this application can be executed at the same time with another application that uses by itself a resource not used by this application, such as the Vector Signal Generator Option.

1.2 Basic Flow of Control

This section describes the basic remote control command programming operations for measuring GSM/EDGE signals.

Figure 1.2-1 shows the control flow for a basic test. Note the parameter settings for the measurement, type of measurement function, and measurement execution order, although the measurement order can be changed.

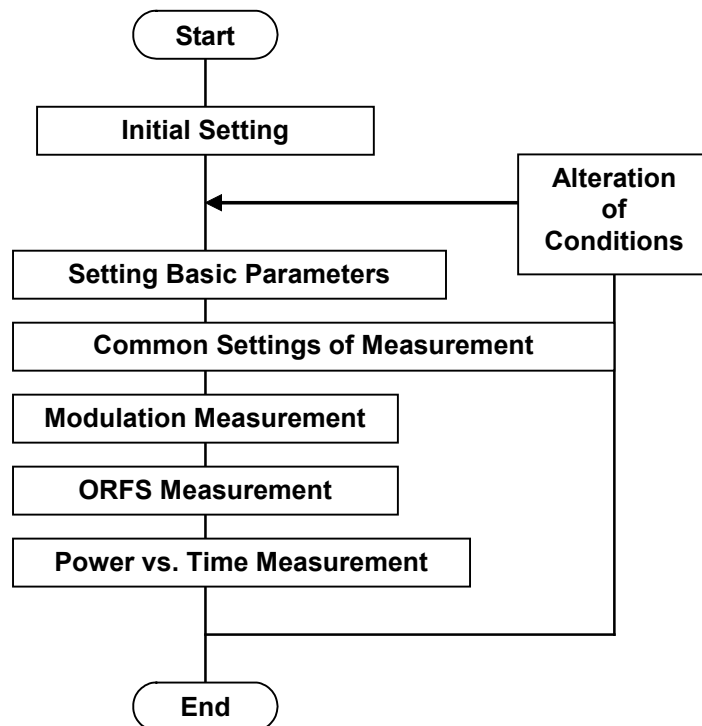


Figure 1.2-1 Basic Test Flow

(1) Initial Setting

The communication interface is initialized, the communication mode is set, the application is activated/selected, and the parameter is initialized.

 1.2.1 Initial Setting

(2) Setting of Basic Parameters

The carrier frequency, input level and all other measurement parameters are set.

 1.2.2 Setting Basic Parameter


(3) **Configuring Common Settings**

Parameters common to the functions that this application executes, such as Modulation Analysis, Output RF Spectrum, and Power vs Time, are set. The parameters include the trigger, Signal Direction, and BTS Type.

 1.2.3 **Configuring Common Settings**

(4) **Modulation Analysis/Output RF Spectrum/Power vs Time**

The measurement functions to be executed in this application are executed according to the order. First, select a measurement function. Next, set parameters such as trace/storage mode for each measurement function in order to execute the measurement and read out the measurement result.

 1.2.4 **Modulation Analysis**

 1.2.5 **Output RF Spectrum**

 1.2.6 **Power vs Time**

1.2.1 Initial Setting

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. Refer to the instruction manual of the interface for details.

(2) **Setting Language Mode and Response Format**

The language mode and the response format used to communicate are set. Refer to the “MS2690A/MS2691A/MS2692A and MS2830A Signal Analyzer manual (Mainframe Remote Control)” for details.

(3) **Starting the Application**

The application is started. The signal analyzer and spectrum analyzer applications can also be loaded (started).

(4) **Selecting the Application**

The target application is selected.

(5) **Initialization**

All parameters and states are reset at initialization.

(6) **Setting Measurement Mode.**

After initialization, the measurement mode is at continuous measurement one. To select the single measurement mode, switch it to the single measurement one.

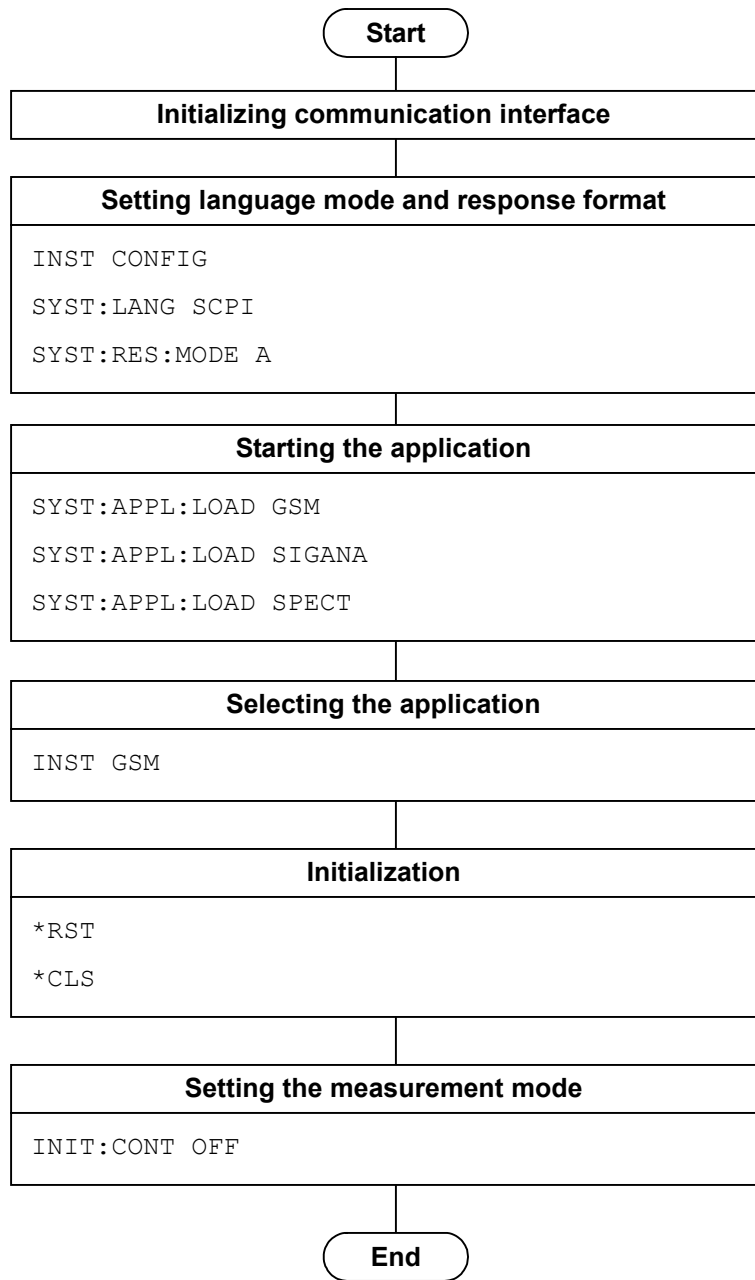


Figure 1.2.1-1 Initialization Flow and Command Example

1.2.2 Setting Basic Parameter

Set the parameters used in common for all measurements, such as carrier frequency and input level. The basic parameters include the following:

- (1) ARFCN/Carrier Frequency
- (2) Input Level (Reference Level • Attenuator)
- (3) Level Offset
- (4) Pre-Amp (Option)

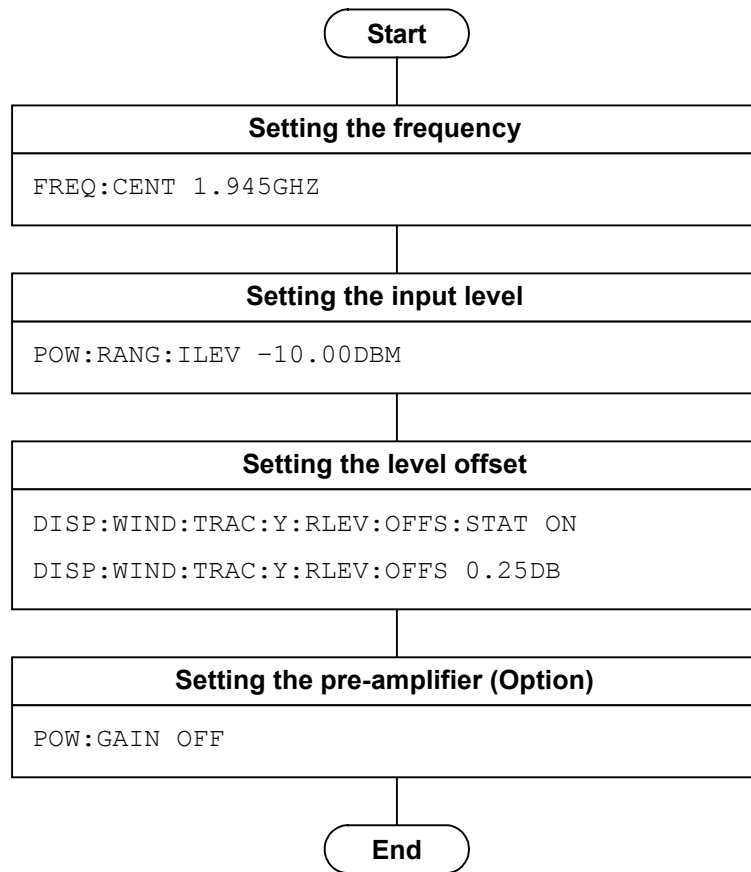


Figure 1.2.2-1 Basic Parameter Setting Flow and Command Examples

1.2.3 Configuring Common Settings

Set the parameters used in common for the Modulation Analysis/Output RF Spectrum/Power vs Time measurement functions executed in this application. Unless specified, there is no specific parameter setting order.

- (1) Trigger
 - (a) Trigger Switch
 - (b) Trigger Source
 - (c) Trigger Slope
 - (d) Trigger Delay
- (2) Signal Direction
- (3) Band
- (4) Modulation
- (5) RF Signal
- (6) Burst Synch
- (7) Active Slot Threshold
- (8) Symbol Rotation
Where Modulation is QPSK, and where RF Signal is Normal Burst.
- (9) Measurement Offset
Where Trigger Switch is On.
- (10) Pulse Shaping
Where Signal Direction is UL, and where RF Signal is Higher Symbol Rate Burst.
- (11) Power Control Level
Where Signal Direction is UL.
- (12) BTS Type
Where Signal Direction is DL.
- (13) BTS Power Level
Where Signal Direction is DL.
- (14) SCPIR
Where Modulation is AQPSK.

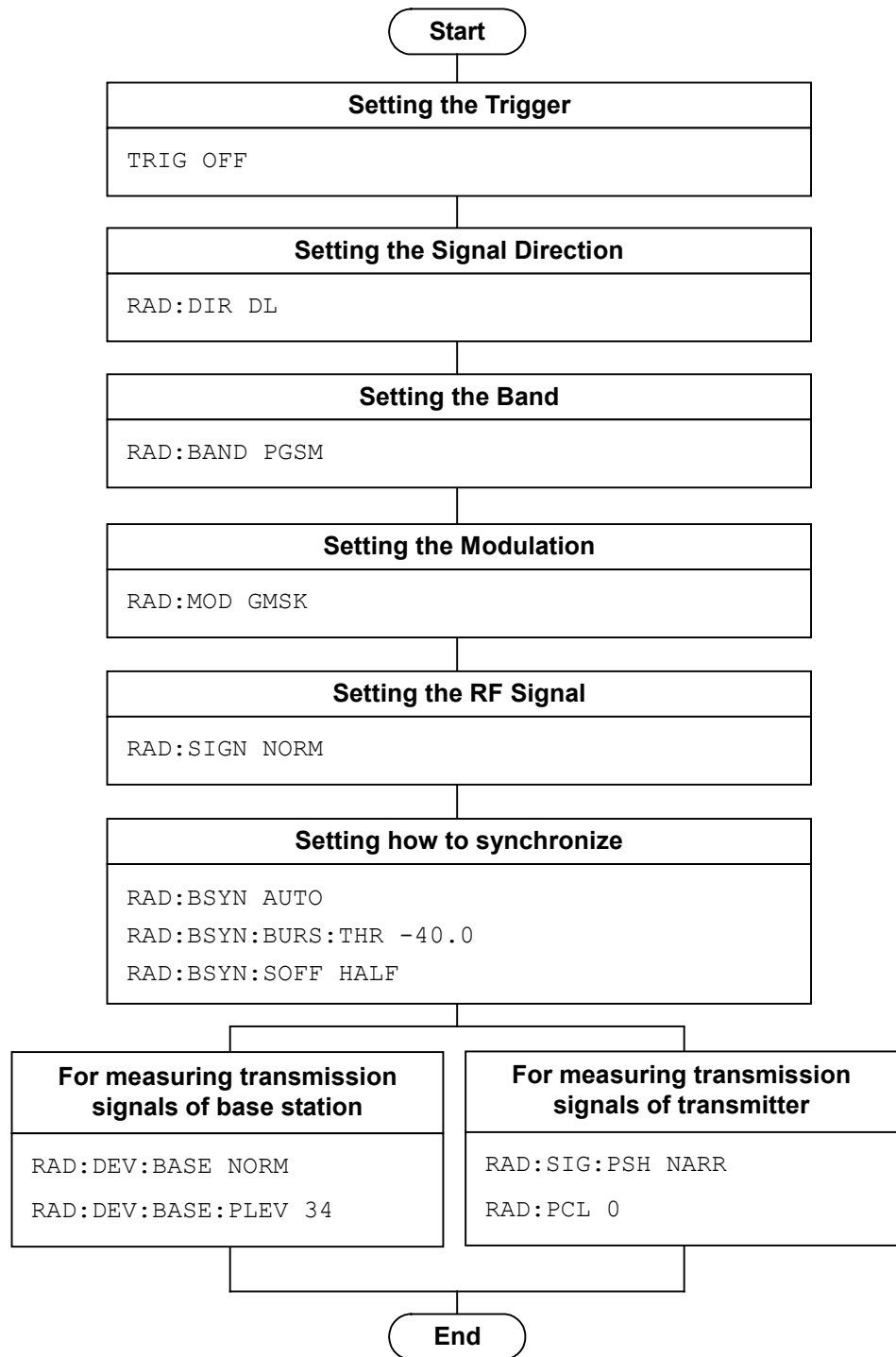


Figure 1.2.3-1 Flow of Common Settings for Measurement Functions and Command Examples

1.2.4 Modulation Analysis

This executes the Modulation Analysis function in the following order:

- (1) Select the measurement function.
- (2) Set the measurement parameters.

The following parameters are only applied to Modulation Analysis:

- (a) Storage Mode
- (b) Storage Count
- (c) Average Type

Where Modulation is 8PSK/QPSK/16QAM/32QAM/AQPSK.

- (3) Execute measurement and read out the result.
- (4) Set the display content.

This setting is required for displaying measured results on the screen, in a manner similar to the manual operation, although it is not necessary when only reading out measured results through remote control.

- (a) Trace
- (b) Scale
- (c) Marker

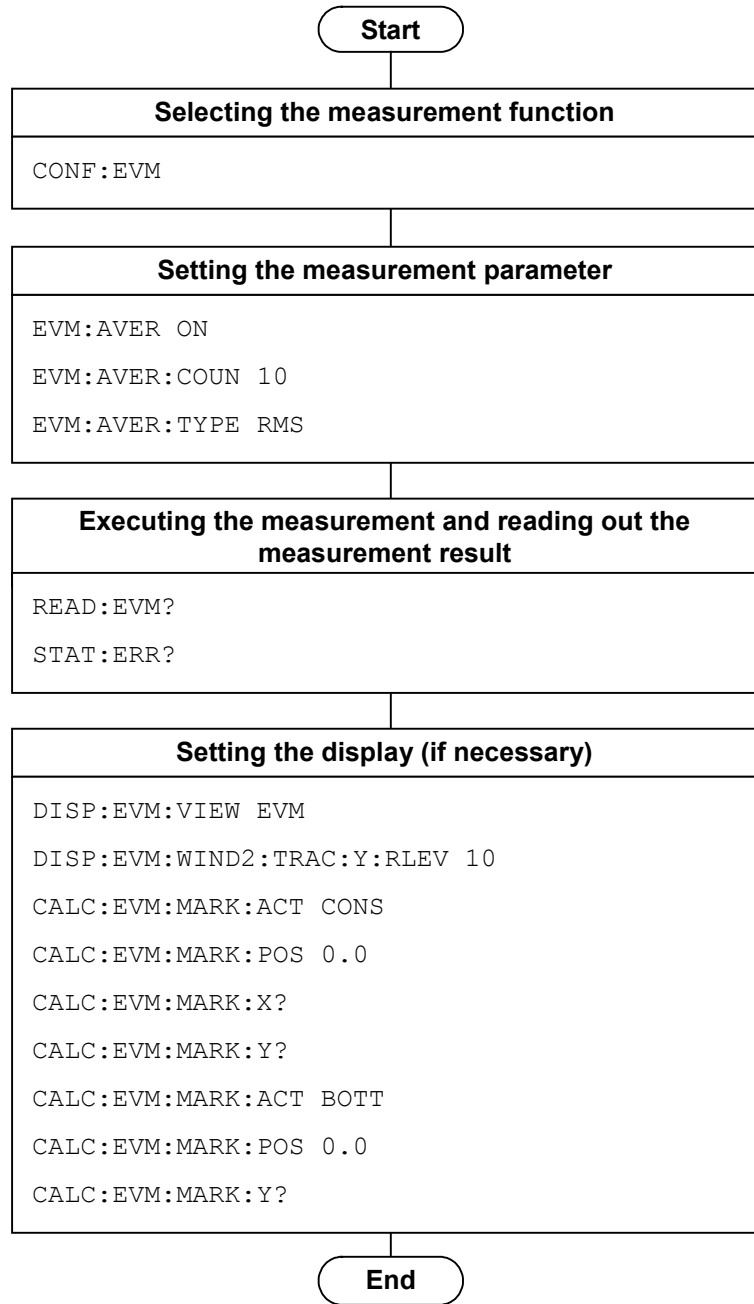


Figure 1.2.4-1 Flow of Modulation Analysis and Command Examples

1.2.5 Output RF Spectrum

This executes the Output RF Spectrum function in the following order:

- (1) Select the measurement function.
- (2) Set the measurement parameter.

The following parameters are only applied to Output RF Spectrum:

- (a) Select Mask
 - (b) Mask Setup
 - (c) Storage Mode
 - (d) Storage Count
- (3) Execute measurement and read out the result.
 - (4) Set the display content.

This setting is required for displaying measured results on the screen, in a manner similar to the manual operation, although it is not necessary when only reading out measured results through remote control.

- (a) Trace Mode
- (b) Unit

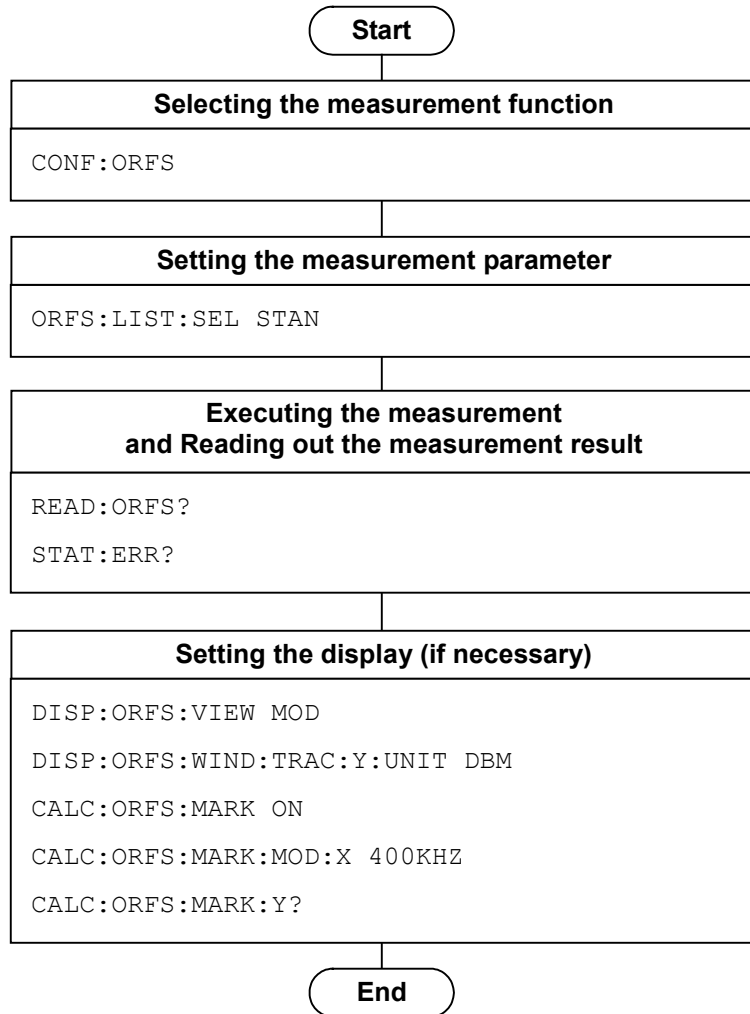


Figure 1.2.5-1 Flow of Output RF Spectrum and Command Examples

1.2.6 Power vs Time

This executes the Power vs Time function in the following order:

- (1) Select the measurement function
- (2) Set the measurement parameter

The following parameters are only applied to Power vs Time:

- (a) Select Mask
 - (b) Mask Setup
 - (c) Storage Mode
 - (d) Storage Count
 - (e) Average Type
- (3) Execute measurement and read out the result.
 - (4) Set the display content.

This setting is required for displaying measured results on the screen, in a manner similar to the manual operation, although it is not necessary when only reading out measured results through remote control.

- (a) Trace Mode
- (b) Unit
- (c) Display Item
- (d) Slot
- (e) Marker

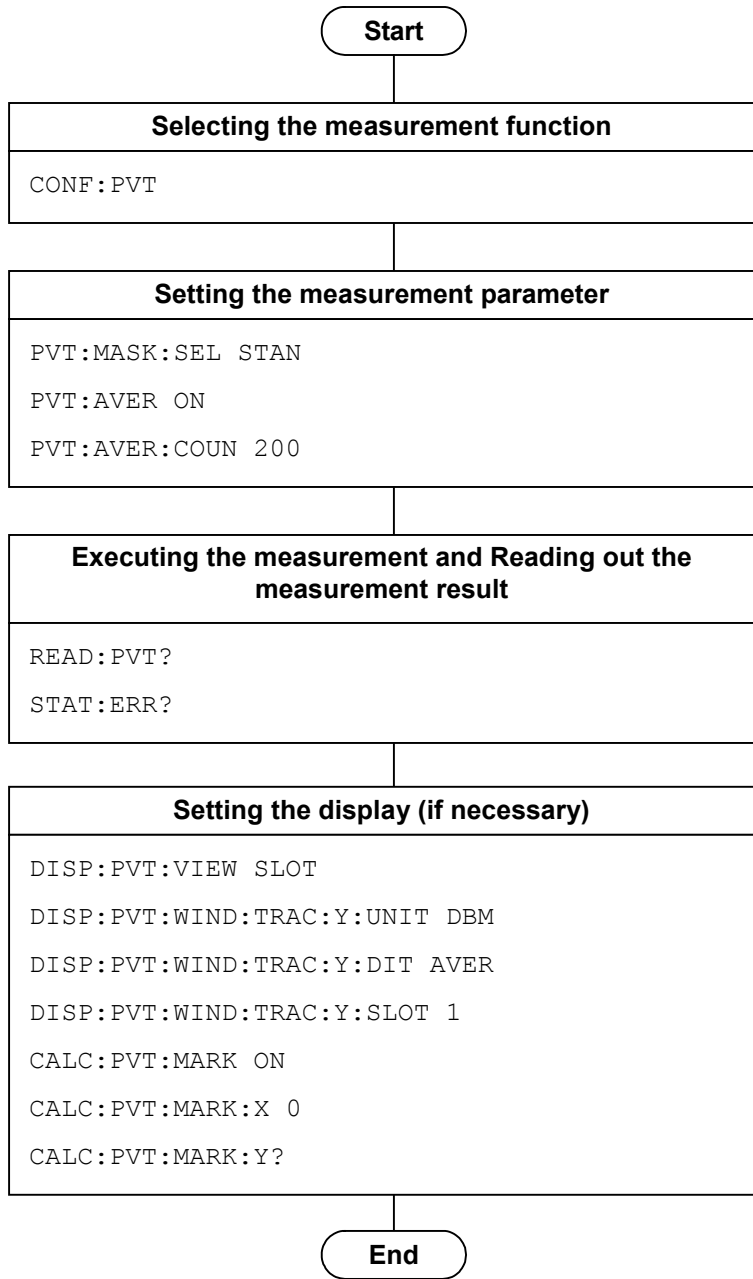


Figure 1.2.6-1 Flow of Power vs Time and Command Examples

1.2.7 Burst Average Power Measurement

This executes the Burst Average Power in the following order:

- (1) Select the application to use and the measurement function.
The application switches to Signal Analyzer when Burst Average Power is selected. The basic parameter values are reflected in the Signal Analyzer. From this point, only the commands and queries available for Signal Analyzer can be used.
- (2) Setting measurement parameters
The following parameters apply only to the specific application selected.
 - (a) Trigger
 - (b) Time Length, Filter Type, Storage (Signal 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.

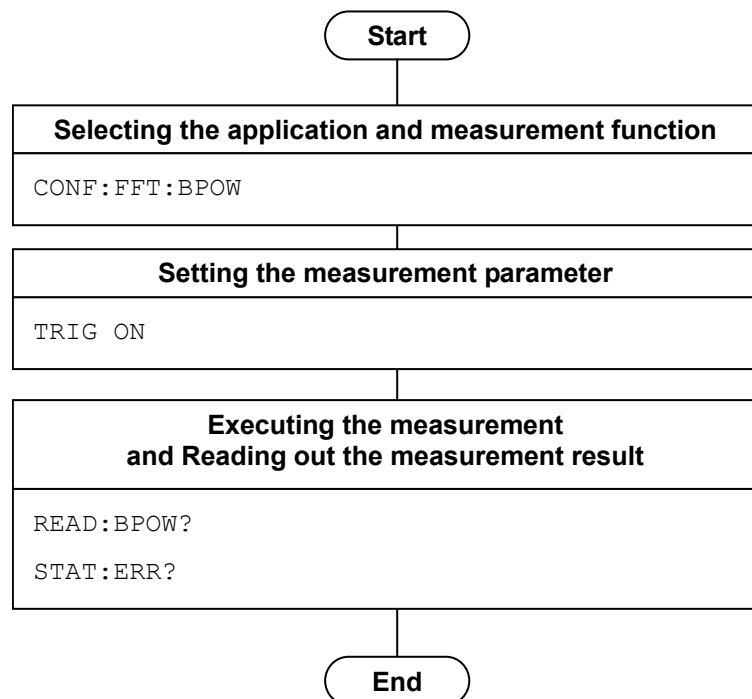


Figure 1.2.7-1 Flow of Burst Average Power measurement and Command Examples

1.3 Native Mode

In this instrument, the syntax/format types of the remote control commands are defined 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 command `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.

Note:

The `STATus:QUEStionable` and `STATus:OPERation` registers cannot be used, even when the corresponding commands are converted to Native-mode commands according to the conversion rules.

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

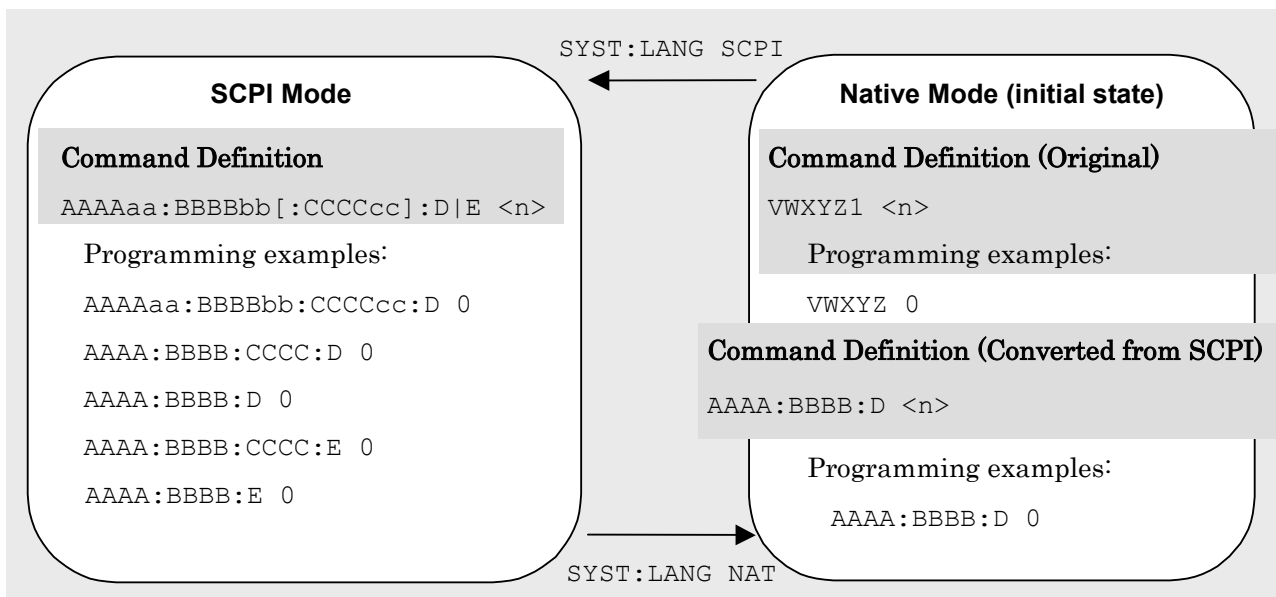


Figure 1.3-1 SCPI and Native modes

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

Conversion Rules:

- (1) Move the numeric parameter in the program header of an SCPI command before the argument. Delete a numeric parameter which only has one value and can be deleted. Describe the argument if it cannot be deleted.
- (2) Use the first node if multiple ones can be selected.
- (3) Delete those layers which can be deleted.
- (4) Alter all the long-formed characters into short-formed ones.
- (5) Delete the colon mark (“:”) at the head.

Example 1:

To convert :CALCulate:MARKer[1]|2[:SET]:CENTer into a Native mode command.

- (1) Move the numeric parameter in the program header before the argument.

```
:CALCulate:MARKer[1]|2[:SET]:CENTer
```

↓

```
:CALCulate:MARKer[:SET]:CENTer <integer>
```

(A numeric value(1 or 2) is put <integer>.)

- (2) Delete the layers which can be deleted.

```
:CALCulate:MARKer[:SET]:CENTer <integer>
```

↓

```
:CALCulate:MARKer:CENTer <integer>
```

- (3) Alter all the long-formed characters into short-formed ones.

```
: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:

To convert [:SENSe]:BPOWer|:TXPower[:STATe]? into a Native mode command.

- (1) Use the first node if multiple ones can be selected.

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

↓

[:SENSe]:BPOWer[:STATe]?

- (2) Delete the layers which can be deleted.

[:SENSe]:BPOWer[:STATe]?

↓

:BPOWer?

- (3) Alter all the long-formed characters into short-formed ones.

:BPOWer?

↓

:BPOW?

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

:BPOW?

↓

BPOW?

Example 3:

To convert :FETCh:EVM[n]? into a Native mode command.

- (1) Move the numeric parameter in the program header before the argument.

:FETCh:EVM[n]?

↓

:FETCh:EVM? <integer>

(A numeric value is put in <integer>.)

- (2) Alter all the long-formed characters into short-formed ones.

:FETCh:EVM? <integer>

↓

:FETC:EVM? <integer>

- (3) Delete the colon mark (":") at the head.

:FETC:EVM? <integer>

↓

FETC:EVM? <integer>

- (4) Set a numeric value to the argument.

:FETC:EVM? <integer>

↓

FETC:EVM? 1

1.4 Setting Numeric Program Data

The following character programs can be used for setting numeric program data (numeric parameter).

(1) DEFault

After DEFault has been set to numeric program data, the target parameter is set to the initial value.

(2) MINimum

After MINimum has been set to numeric program data, the target parameter is set to the minimum value.

(3) MAXimum

After MAXimum has been set to numeric program data, the target parameter is set to the maximum value.

In this application, DEFault, MINimum, and MAXimum can be used for the following parameters:

<numeric_value>

<freq>

<real>

<rel_power>

<integer>

<rel_ampl>

<time>

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 each function. Refer to the “MS2690A/MS2691A/MS2692A and MS2830A Signal Analyzer Instruction Manual (Mainframe Remote Control)” for the detailed specifications of the IEEE488.2 common device messages and application common device messages.

2

SCPI Device Message Details

| | | |
|--------|-----------------------------------|------|
| 2.1 | Selecting Application | 2-4 |
| 2.1.1 | Loading Application | 2-5 |
| 2.1.2 | Selecting Application | 2-6 |
| 2.1.3 | Initialization | 2-10 |
| 2.2 | Setting Basic Parameter | 2-11 |
| 2.2.1 | ARFCN | 2-12 |
| 2.2.2 | Carrier Frequency..... | 2-14 |
| 2.2.3 | Input Level | 2-16 |
| 2.2.4 | Level Offset | 2-18 |
| 2.2.5 | Level Offset State | 2-19 |
| 2.2.6 | Auto Range..... | 2-20 |
| 2.2.7 | Pre-Amp State | 2-21 |
| 2.2.8 | Lowest ATT Setting | 2-23 |
| 2.3 | Setting System Parameter..... | 2-24 |
| 2.3.1 | Signal Direction | 2-25 |
| 2.3.2 | Band | 2-26 |
| 2.3.3 | Modulation | 2-28 |
| 2.3.4 | RF Signal..... | 2-30 |
| 2.3.5 | Burst Sync | 2-32 |
| 2.3.6 | Active Slot Threshold..... | 2-34 |
| 2.3.7 | Symbol Rotation | 2-35 |
| 2.3.8 | Pulse Shaping | 2-36 |
| 2.3.9 | Measurement Offset..... | 2-37 |
| 2.3.10 | Power Control Level | 2-38 |
| 2.3.11 | BTS Type..... | 2-39 |
| 2.3.12 | BTS Power Level..... | 2-41 |
| 2.3.13 | SCPIR..... | 2-44 |
| 2.4 | Utility Function | 2-45 |
| 2.4.1 | Erase Warm Up Message | 2-45 |
| 2.4.2 | Display Title | 2-46 |
| 2.4.3 | Title Entry | 2-47 |
| 2.5 | Common Measurement Function | 2-48 |
| 2.5.1 | Measurement and Control..... | 2-49 |
| 2.5.2 | Trigger Switch..... | 2-52 |

| | | |
|--------|---|-------|
| 2.5.3 | Trigger Source..... | 2-53 |
| 2.5.4 | Trigger Slope..... | 2-55 |
| 2.5.5 | Trigger Delay..... | 2-56 |
| 2.6 | Burst Average Power Measurement..... | 2-58 |
| 2.7 | Modulation Analysis..... | 2-60 |
| 2.7.1 | Measure..... | 2-64 |
| 2.7.2 | Trace Mode..... | 2-66 |
| 2.7.3 | Scale – EVM..... | 2-67 |
| 2.7.4 | Scale – Magnitude Error..... | 2-69 |
| 2.7.5 | Scale – Phase Error..... | 2-71 |
| 2.7.6 | Storage Mode..... | 2-73 |
| 2.7.7 | Storage Count..... | 2-74 |
| 2.7.8 | Average Type..... | 2-75 |
| 2.7.9 | Droop – On/Off..... | 2-76 |
| 2.7.10 | Marker – On/Off..... | 2-77 |
| 2.7.11 | Active Trace..... | 2-78 |
| 2.7.12 | Marker Position..... | 2-79 |
| 2.7.13 | Marker Value..... | 2-81 |
| 2.8 | Output RF Spectrum..... | 2-83 |
| 2.8.1 | Measure..... | 2-88 |
| 2.8.2 | Trace Mode..... | 2-91 |
| 2.8.3 | Mask Setup – Modulation – Relative limits..... | 2-93 |
| 2.8.4 | Mask Setup – Modulation – Absolute limits ... | 2-95 |
| 2.8.5 | Mask Setup – Modulation – Fail Logic..... | 2-97 |
| 2.8.6 | Mask Setup – Switching – Relative limits..... | 2-99 |
| 2.8.7 | Mask Setup – Switching – Absolute limits.... | 2-101 |
| 2.8.8 | Mask Setup – Switching – Fail Logic..... | 2-103 |
| 2.8.9 | Select Standard..... | 2-105 |
| 2.8.10 | Load Standard Setting..... | 2-106 |
| 2.8.11 | Storage Mode..... | 2-107 |
| 2.8.12 | Storage Count..... | 2-108 |
| 2.8.13 | Unit..... | 2-109 |
| 2.8.14 | Marker – On/Off..... | 2-111 |
| 2.8.15 | Marker Position – Modulation..... | 2-112 |
| 2.8.16 | Marker Position – Switching..... | 2-114 |
| 2.8.17 | Marker Value..... | 2-116 |
| 2.8.18 | 1800kHz Offset RBW (for Modulation Meas BW)..... | 2-118 |
| 2.8.19 | Noise Cancel..... | 2-119 |
| 2.8.20 | Reference Mode for Switching..... | 2-120 |
| 2.9 | Power vs Time..... | 2-121 |
| 2.9.1 | Measure..... | 2-126 |
| 2.9.2 | Trace Mode..... | 2-129 |
| 2.9.3 | Unit..... | 2-130 |

| | | |
|--------|--------------------------------------|-------|
| 2.9.4 | Display Item | 2-132 |
| 2.9.5 | Slot..... | 2-133 |
| 2.9.6 | Select Standard | 2-135 |
| 2.9.7 | Load Standard Setting..... | 2-136 |
| 2.9.8 | Upper – Rise – Time..... | 2-137 |
| 2.9.9 | Upper – Rise – Absolute limits | 2-139 |
| 2.9.10 | Upper – Rise – Relative limits | 2-141 |
| 2.9.11 | Upper – Rise – Fail Logic | 2-143 |
| 2.9.12 | Upper – Fall – Time | 2-145 |
| 2.9.13 | Upper – Fall – Absolute limits..... | 2-147 |
| 2.9.14 | Upper – Fall – Relative limits..... | 2-149 |
| 2.9.15 | Upper – Fall – Fail Logic | 2-151 |
| 2.9.16 | Lower – Rise – Time..... | 2-153 |
| 2.9.17 | Lower – Rise – Absolute limits | 2-155 |
| 2.9.18 | Lower – Rise – Relative limits | 2-157 |
| 2.9.19 | Lower – Rise – Fail Logic | 2-159 |
| 2.9.20 | Lower – Fall – Time | 2-161 |
| 2.9.21 | Lower – Fall – Absolute limits..... | 2-163 |
| 2.9.22 | Lower – Fall – Relative limits..... | 2-165 |
| 2.9.23 | Lower – Fall – Fail Logic | 2-167 |
| 2.9.24 | Storage Mode | 2-169 |
| 2.9.25 | Storage Count | 2-170 |
| 2.9.26 | Average Type | 2-171 |
| 2.9.27 | Filtler Type..... | 2-172 |
| 2.9.28 | Filtler BW | 2-173 |
| 2.9.29 | Marker – On/Off..... | 2-174 |
| 2.9.30 | Active Trace..... | 2-175 |
| 2.9.31 | Marker Position..... | 2-176 |
| 2.9.32 | Marker Value | 2-178 |

2.1 Selecting Application

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

Table 2.1-1 Selecting Application

| Parameter | Device Message |
|--------------------|---|
| Load Application | :SYSTem:APPLication:LOAD GSM |
| Unload Application | :SYSTem:APPLication:UNLoad GSM |
| Application Switch | :INSTrument[:SElect] GSM CONFIG |
| | :INSTrument[:SElect]? |
| Application Status | :INSTrument:SYSTem GSM, [ACTive] INACTive MINimum |
| | :INSTrument:SYSTem? GSM |
| Initialization | :INSTrument:DEFault |
| | :SYSTem:PRESet |

2.1.1 Loading Application

:SYSTem:APPLication:LOAD GSM

Load Application

Function

This command loads this application.

Command

```
:SYSTem:APPLication:LOAD GSM
```

Details

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

This function is available when the control-targeted application is Config.

Example of Use

To load this application.

```
SYST:APPL:LOAD GSM
```

:SYSTem:APPLication:UNLoad GSM

Unload Application

Function

This command unloads this application.

Command

```
:SYSTem:APPLication:UNLoad GSM
```

Details

This function unloads the running application and removes it from the Application Switch menu.

This function is available when the control-targeted application is Config.

Example of Use

To unload this application.

```
SYST:APPL:UNL GSM
```

2.1.2 Selecting Application

:INSTrument[:SElect] GSM|CONFIG

Application Switch

Function

This command selects the control-targeted application.

Command

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

Parameter

| <apl_name> | Application name |
|------------|------------------|
| GSM | GSM |
| CONFIG | Config |

Example of Use

To switch the control-targeted application into this one.

```
INST GSM
```

:INSTrument[:SElect]?

Application Switch Query

Function

This command reads out the control-targeted application.

Query

`:INSTrument[:SElect]?`

Response

`<apl_name>`

Parameter

| | |
|-------------------------------|------------------|
| <code><apl_name></code> | Application name |
| GSM | GSM |
| CONFIG | Config |

Example of Use

To read out the control-targeted application.

```
INST?  
> GSM
```

:INSTrument:SYSTem GSM,[ACTive]|INACTive|MINimum

Application Switch And Window Status

Function

This command selects the control-targeted application by specifying the window status.

Command

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

Parameter

| | |
|---------------|-------------------|
| <apl_name> | Application name |
| GSM | This application |
| SIGANA | Signal Analyzer |
| SPECT | Spectrum Analyzer |
| CONFIG | Config |
| <window> | Window status |
| ACTive | Active status |
| INACTive | Inactive status |
| MINimum | Minimized |
| When omitted: | Active status |

Example of Use

To select this application window which is active.

```
INST:SYST GSM,ACT
```

:INSTrument:SYSTem? GSM

Application Switch And Window Status Query

Function

This command reads out the application status.

Query

`:INSTrument:SYSTem? <apl_name>`

Response

`<status>,<window>`

Parameter

| | |
|-------------------------------|---------------------------------------|
| <code><apl_name></code> | Application name |
| GSM | GSM |
| SIGANA | Signal Analyzer |
| SPECT | Spectrum Analyzer |
| CONFIG | Config |
| <code><status></code> | Application status |
| CURR | Executed and targeted for control |
| RUN | Executed but not targeted for control |
| IDLE | Loaded but not executed |
| UNL | Not loaded |
| <code><window></code> | Window status |
| ACTive | Active status |
| INACTive | Inactive status |
| MINimum | Minimized |
| NON | Window not displayed |

Example of Use

To read out this application status.

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

2.1.3 Initialization

:INSTrument:DEFault

Preset Current Application

Function

This command initializes the setting and the status of the selected application.

Command

```
:INSTrument:DEFault
```

Example of Use

To initialize the setting and the status of the selected application.

```
INST:DEF
```

:SYSTem:PRESet

Preset Current Application

Function

This command initializes the setting and the status of the selected application.

Refer to :INSTrument:DEFault.

Example of Use

To initialize the setting and the status of the selected application.

```
SYST:PRES
```

2.2 Setting Basic Parameter

Table 2.2-1 lists device messages for setting the parameters commonly applied to this application, such as frequency and level.

Table 2.2-1 Basic Parameter Settings

| Parameter | Device Message |
|--------------------|--|
| ARFCN | <code>[:SENSE] :CHANnel :ARFCn <integer></code> |
| | <code>[:SENSE] :CHANnel :ARFCn ?</code> |
| Carrier Frequency | <code>[:SENSE] :FREQuency :CENTer <freq></code> |
| | <code>[:SENSE] :FREQuency :CENTer ?</code> |
| Input Level | <code>[:SENSE] :POWer [:RF] :RANGE :ILEvel <real></code> |
| | <code>[:SENSE] :POWer [:RF] :RANGE :ILEvel ?</code> |
| Level Offset | <code>:DISPlay :WINDow [1] :TRACe :Y [:SCALE] :RLEvel :OFFSet <rel_power></code> |
| | <code>:DISPlay :WINDow [1] :TRACe :Y [:SCALE] :RLEvel :OFFSet ?</code> |
| Level Offset State | <code>:DISPlay :WINDow [1] :TRACe :Y [:SCALE] :RLEvel :OFFSet :STATE OFF ON 0 1</code> |
| | <code>:DISPlay :WINDow [1] :TRACe :Y [:SCALE] :RLEvel :OFFSet :STATE ?</code> |
| Auto Range | <code>[:SENSE] :POWer [:RF] :RANGE :AUTO ONCE</code> |
| Pre-Amp State | <code>[:SENSE] :POWer [:RF] :GAIN [:STATE] OFF ON 0 1</code> |
| | <code>[:SENSE] :POWer [:RF] :GAIN [:STATE] ?</code> |
| Lowest ATT Setting | <code>[:SENSE] :POWer [:RF] :ATTenuation :LOWest :SETTing 0DB 4DB</code> |
| | <code>[:SENSE] :POWer [:RF] :ATTenuation :LOWest :SETTing ?</code> |

2.2.1 ARFCN

`[[:SENSE]:CHANnel:ARFCn <integer>`

ARFCN

Function

This command sets ARFCN.

Command

`[[:SENSE]:CHANnel:ARFCn <integer>`

Parameter

| <integer> | ARFCN |
|---------------|--|
| Range | When Band is P-GSM: 1 to 124 When Band is E-GSM: 0 to 124, 975 to 1023 When Band is R-GSM: 0 to 124, 955 to 1023 When Band is GSM450: 259 to 293 When Band is GSM480: 306 to 340 When Band is GSM750: 438 to 511 When Band is GSM850: 128 to 511 When Band is DCS1800: 512 to 885 When Band is PCS1900: 512 to 810 |
| Resolution | 1 |
| Suffix code | None |
| Initial value | 1 |

Example of Use

To set 1 to ARFCN.

`CHAN:ARFC 1`

[[:SENSe]:CHANnel:ARFCn?

ARFCN Query

Function

This command reads out the ARFCN setting.

Query

`[[:SENSe]:CHANnel:ARFCn?`

Response

`<integer>`

Parameter

| | |
|------------------------------|--|
| <code><integer></code> | ARFCN |
| Range | When Band is P-GSM: 1 to 124 When Band is E-GSM: 0 to 124, 975 to 1023 When Band is R-GSM: 0 to 124, 955 to 1023 When Band is GSM450: 259 to 293 When Band is GSM480: 306 to 340 When Band is GSM750: 438 to 511 When Band is GSM850: 128 to 511 When Band is DCS1800: 512 to 885 When Band is PCS1900: 512 to 810 |
| Resolution | 1 |
| Suffix code | None |

Example of Use

To read out the ARFCN setting.

```
CHAN:ARFC?
> 1
```

2.2.2 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

| | |
|---------------------------|--|
| <code><freq></code> | Carrier frequency |
| Range | 10 MHz to upper limit of the main unit |
| Resolution | 1 Hz |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ |
| | Hz is used when omitted. |
| Initial value | 935.2 MHz |

Example of Use

To set the carrier frequency to 800 MHz.

`FREQ:CENT 800MHZ`

[[:SENSE]:FREQUENCY:CENTER?

Carrier Frequency Query

Function

This command reads out the carrier frequency of the measured signal.

Query

`[[:SENSE]:FREQUENCY:CENTER?`

Response

`<freq>`

Parameter

| | |
|---------------------------|--|
| <code><freq></code> | Carrier frequency |
| Range | 10 MHz to upper limit of the main unit |
| Resolution | 1 Hz |

Value is returned in Hz units.

Example of Use

To read out the carrier frequency.

```
FREQ:CENT?  
> 800000000.00
```

2.2.3 Input Level

`[[:SENSE]:POWER[:RF]:RANGE:ILEVEL <real>`

Input Level

Function

This command sets the input level of RF signal.

Command

`[[:SENSE]:POWER[:RF]:RANGE:ILEVEL <real>`

Parameter

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

Details

The setting range when MS2690A/MS2691A/MS2692A Option 008/108 6 GHz Preamplifier or MS2830A Option 008 Preamplifier (hereinafter referred to as "Option 008") is Off is applied, if the Option 008 is not installed.

Example of Use

To set the input level to -15.00 dBm.

`POW:RANG:ILEV -15.00`

[[:SENSE]:POWER[:RF]:RANGE:ILEVEL?

Input Level Query

Function

This command reads out the input level of RF signal.

Query

`[[:SENSE]:POWER[:RF]:RANGE:ILEVEL?`

Response

`<real>`

Parameter

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

Example of Use

To read out the input level.

```
POW:RANG:ILEV?
> -15.00
```

2.2.4 Level Offset

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

Level Offset

Function

This command sets the offset value of the input level.

Command

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

Parameter

| | |
|--------------------------------|--------------------------|
| <code><rel_power></code> | Offset value |
| Range | -99.99 to 99.99 dB |
| Resolution | 0.01 dB |
| Suffix code | DB |
| | dB is used when omitted. |
| Initial value | 0.00 dB |

Example of Use

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

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

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

Level Offset Query

Function

This command reads out the offset value of the input level.

Query

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

Response

```
<rel_power>
```

Parameter

| | |
|--------------------------------|--------------------|
| <code><rel_power></code> | Offset value |
| Range | -99.99 to 99.99 dB |
| Resolution | 0.01 dB |

Example of Use

To read out the offset value of the input level.

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

2.2.5 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> | Level Offset State |
| OFF 0 | Disabled (Initial value) |
| ON 1 | Enabled |

Example of Use

To enable the offset value of the input level.

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

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

Level Offset State Query

Function

This command reads out whether the offset function of the input level is enabled/disabled.

Query

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

Response

```
<switch>
```

Parameter

| | |
|----------|--------------------|
| <switch> | Level Offset State |
| OFF 0 | Disabled |
| ON 1 | Enabled |

Example of Use

To read out whether the offset function of the input level is enabled/disabled.

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

2.2.6 Auto Range

`[[:SENSE]:POWER[:RF]:RANGE:AUTO ONCE`

Auto Range

Function

This command adjusts input level according to input signal.

Command

`[[:SENSE]:POWER[:RF]:RANGE:AUTO ONCE`

Details

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

Example of Use

To auto-adjust the level.
`POW:RANG:AUTO ONCE`

2.2.7 Pre-Amp State

`[[:SENSE]:POWER[:RF]:GAIN[:STATE] OFF|ON|0|1`

Pre-Amp State

Function

This command sets Pre-Amp to On/Off.

Command

`[[:SENSE]:POWER[:RF]:GAIN[:STATE] <switch>`

Parameter

| | |
|-----------------------------|---------------------|
| <code><switch></code> | Pre-Amp On/Off |
| <code>OFF 0</code> | Off (Initial value) |
| <code>ON 1</code> | On |

Details

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

Example of Use

To set Pre-Amp to On.

`POW:GAIN ON`

[[:SENSE]:POWER[:RF]:GAIN[:STATE]?

Pre-Amp State Query

Function

This command reads out Pre-Amp On/Off.

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 read out the Pre-Amp setting.

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

2.2.8 Lowest ATT Setting

`[:SENSE]:POWER[:RF]:ATTenuation:LOWest:SETTING 0dB|4dB`

Lowest ATT Setting

Function

This command sets the lowest attenuator value.

Command

`[:SENSE]:POWER[:RF]:ATTenuation:LOWest:SETTING <mode>`

Parameter

| | |
|--------|--------------------|
| <mode> | lowest ATT Setting |
| 0DB | 0 dB |
| 4DB | 4 dB (Default) |

Example of Use

To set the lowest attenuator setting to 0 dB.
`POW:ATT:LOW:SETT 0DB`

`[:SENSE]:POWER[:RF]:ATTenuation:LOWest:SETTING?`

Lowest ATT Setting Query

Function

This command queries the lowest attenuator value.

Query

`[:SENSE]:POWER[:RF]:ATTenuation:LOWest:SETTING?`

Response

<mode>

Parameter

| | |
|--------|--------------------|
| <mode> | lowest ATT Setting |
| 0DB | 0 dB |
| 4DB | 4 dB |

Example of Use

To query the lowest attenuator value.
`POW:ATT:LOW:SETT?`
`>4DB`

2.3 Setting System Parameter

Table 2.3-1 lists the device messages for setting the parameters on the communication system to be measured. These parameters are commonly applied to Modulation Analysis /Output RF Spectrum /Power vs Time.

Table 2.3-1 System Parameter Settings

| Parameter | Device Message |
|--------------------------|--|
| Signal Direction | [:SENSE]:RADio:SDIRection DL UL |
| | [:SENSE]:RADio:SDIRection? |
| Band | [:SENSE]:RADio:BAND PGSM EGSM RGSM GSM450 GSM480 GSM750 GSM850 DCS1800 PCS1900 |
| | [:SENSE]:RADio:BAND? |
| Modulation | [:SENSE]:RADio:MODulation GMSK 8PSK QPSK 16Qam 32Qam AQPSk |
| | [:SENSE]:RADio:MODulation? |
| RF Signal | [:SENSE]:RADio:SIGNal NORMal HSRBurst CONTinuous |
| | [:SENSE]:RADio:SIGNal? |
| Burst Sync | [:SENSE]:RADio:BSYNc AUTO TSC0 TSC1 TSC2 TSC3 TSC4 TSC5 TSC6 TSC7 |
| | [:SENSE]:RADio:BSYNc? |
| Active Slot Threshold | [:SENSE]:RADio:BSYNc:BURSt:THREshold <rel_power> |
| | [:SENSE]:RADio:BSYNc:BURSt:THREshold? |
| Symbol Rotation | [:SENSE]:RADio:BSYNc:SROtation 1PI2 1PI4 3PI8 |
| | [:SENSE]:RADio:BSYNc:SROtation? |
| Pulse Shaping | [:SENSE]:RADio:SIGNal:PSHaping NARROW WIDE |
| | [:SENSE]:RADio:SIGNal:PSHaping? |
| Measurement Offset | [:SENSE]:RADio:BSYNc:MOFFset <integer> |
| | [:SENSE]:RADio:BSYNc:MOFFset? |
| Power Control Level | [:SENSE]:RADio:PCLevel <integer> |
| | [:SENSE]:RADio:PCLevel? |
| BTS Type | [:SENSE]:RADio:DEVice:BASE[:TYPE] NORMal MICR1 MICR2 MICR3 PICO |
| | [:SENSE]:RADio:DEVice:BASE[:TYPE]? |
| BTS Power Level | [:SENSE]:RADio:DEVice:BASE:PLEVel <integer> |
| | [:SENSE]:RADio:DEVice:BASE:PLEVel? |
| SCPIR | [:SENSE]:RADio:SCPIr <rel_power> |
| | [:SENSE]:RADio:SCPIr? |

2.3.1 Signal Direction

`[:SENSE] :RADio:SDIRectio n DL|UL`

Signal Direction

Function

This command sets Signal Direction.

Command

```
[ :SENSE ] :RADio:SDIRectio n DL|UL
```

Parameter

| | |
|---------------------------|--------------------------|
| <code><mode></code> | Signal Direction |
| DL | Downlink (Initial value) |
| UL | Uplink |

Example of Use

To set Signal Direction to Uplink.

```
RAD:SDIR UL
```

`[:SENSE] :RADio:SDIRectio n ?`

Signal Direction Query

Function

This command reads the setting value of Signal Direction.

Query

```
[ :SENSE ] :RADio:SDIRectio n ?
```

Response

```
<mode>
```

Parameter

| | |
|---------------------------|------------------|
| <code><mode></code> | Signal Direction |
| DL | Downlink |
| UL | Uplink |

Example of Use

To read out the setting value of Signal Direction.

```
RAD:SDIR?
```

```
> UL
```

2.3.2 Band

[[:SENSe]:RADio]:BAND

PGSM|EGSM|RGSM|GSM450|GSM480|GSM750|GSM850|DCS1800|PCS1900

Band

Function

This command sets Band.

Command

[[:SENSe]:RADio]:BAND <mode>

Parameter

| <mode> | Band |
|---------|-----------------------|
| PGSM | P-GSM (Initial value) |
| EGSM | E-GSM |
| RGSM | R-GSM |
| GSM450 | GSM450 |
| GSM480 | GSM480 |
| GSM750 | GSM750 |
| GSM850 | GSM850 |
| DCS1800 | DCS1800 |
| PCS1900 | PCS1900 |

Example of Use

To set Band to PCS1900.

RAD:BAND PCS1900

[[:SENSe]:RADio:BAND?

Band Query

Function

This command reads out the setting value of Band.

Query

[:SENSe]:RADio:BAND?

Response

<mode>

Parameter

| <mode> | Band |
|---------|---------|
| PGSM | P-GSM |
| EGSM | E-GSM |
| RGSM | R-GSM |
| GSM450 | GSM450 |
| GSM480 | GSM480 |
| GSM750 | GSM750 |
| GSM850 | GSM850 |
| DCS1800 | DCS1800 |
| PCS1900 | PCS1900 |

Example of Use

To read out the setting value of Band.

```
RAD:BAND?
> PCS1900
```

2.3.3 Modulation

`[[:SENSe]:RADio:MODulation GMSK|8PSK|QPSK|16Qam|32Qam|AQPSk`

Modulation

Function

This command sets Modulation.

Command

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

Parameter

| <mode> | Modulation |
|--------|----------------------|
| GMSK | GMSK (Initial value) |
| 8PSK | 8PSK |
| QPSK | QPSK |
| 16Qam | 16QAM |
| 32Qam | 32QAM |
| AQPSk | AQPSK |

Details

QPSK/16QAM/32QAM can be selected when the MX269013A Option 001 EDGE Evolution Measurement Software (Option 001) is enabled. AQPSK can be selected when Signal Direction is DL, and when RF Signal is Normal Burst or Continuous.

Example of Use

To set Modulation to GMSK.

`RAD:MOD GMSK`

[[:SENSE]:RADio:MODulation?

Modulation Query

Function

This command reads out the setting value of Modulation.

Query

[:SENSE]:RADio:MODulation?

Response

<mode>

Parameter

| <mode> | Modulation |
|--------|----------------------|
| GMSK | GMSK (Initial value) |
| 8PSK | 8PSK |
| QPSK | QPSK |
| 16Q | 16QAM |
| 32Q | 32QAM |
| AQPS | AQPSK |

Example of Use

To read out the setting value of Modulation.

```
RAD:MOD?
> GMSK
```

2.3.4 RF Signal

`[[:SENSE]:RADio:SIGNal NORMal|HSRBurst|CONTinuous`

RF Signal

Function

This command sets RF Signal.

Command

`[[:SENSE]:RADio:SIGNal <mode>`

Parameter

| | |
|---------------------------|--------------------------|
| <code><mode></code> | RF Signal |
| <code>NORM</code> | Normal Burst |
| <code>HSRB</code> | Higher Symbol Rate Burst |
| <code>CONT</code> | Continuous |

Details

Higher Symbol Rate Burst can be selected only when the Option 001 is enabled.

Example of Use

To set RF Signal to Normal Burst.

`RAD:SIGN NORM`

[[:SENSE]:RADio:SIGNal?

RF Signal Query

Function

This command reads out the setting value of RF Signal.

Query

[:SENSE]:RADio:SIGNal?

Response

<mode>

Parameter

| | |
|--------|--------------------------|
| <mode> | RF Signal |
| NORM | Normal Burst |
| CONT | Continuous |
| HSRB | Higher Symbol Rate Burst |

Example of Use

To read out the setting value of RF Signal.

```
RAD:SIGN?
> NORM
```

2.3.5 Burst Sync

`[[:SENSE]:RADio:BSYNc`

`AUTO|TSC0|TSC1|TSC2|TSC3|TSC4|TSC5|TSC6|TSC7`

Burst Sync

Function

This command sets Burst Sync.

Command

`[[:SENSE]:RADio:BSYNc <mode>`

Parameter

| <code><mode></code> | Burst Sync |
|---------------------------|----------------------|
| AUTO | Auto (Initial value) |
| TSC0 | TSC0 |
| TSC1 | TSC1 |
| TSC2 | TSC2 |
| TSC3 | TSC3 |
| TSC4 | TSC4 |
| TSC5 | TSC5 |
| TSC6 | TSC6 |
| TSC7 | TSC7 |

Example of Use

To set Burst Sync to Auto.

`RAD:BSYN AUTO`

[[:SENSE]:RADio:BSYNc?

Burst Sync Query

Function

This command reads out the setting value of Burst Sync.

Query

[:SENSE]:RADio:BSYNc?

Response

<mode>

Parameter

| <mode> | Burst Sync. |
|--------|-------------|
| AUTO | Auto |
| TSC0 | TSC0 |
| TSC1 | TSC1 |
| TSC2 | TSC2 |
| TSC3 | TSC3 |
| TSC4 | TSC4 |
| TSC5 | TSC5 |
| TSC6 | TSC6 |
| TSC7 | TSC7 |

Example of Use

To read out the setting value of Burst Sync.

```
RAD:BSYN?
> AUTO
```

2.3.6 Active Slot Threshold

`[[:SENSE]:RADio:BSYNc:BURSt:THReshold <rel_power>`

Active Slot Threshold

Function

This command sets Active Slot Threshold.

Command

`[[:SENSE]:RADio:BSYNc:BURSt:THReshold <rel_power>`

Parameter

| | |
|--------------------------------|--------------------------|
| <code><rel_power></code> | Active Slot Threshold |
| Range | -40.0 to -10.0 dB |
| Resolution | 0.1 dB |
| Suffix code | dB |
| | dB is used when omitted. |
| Initial value | -40.0 dB |

Example of Use

To set Active Slot Threshold to -10.0 dB.

`RAD:BSYN:BURSt:THR -10.0`

`[[:SENSE]:RADio:BSYNc:BURSt:THReshold?`

Active Slot Threshold Query

Function

This command reads out the setting value of Active Slot Threshold.

Query

`[[:SENSE]:RADio:BSYNc:BURSt:THReshold?`

Response

`<rel_power>`

Parameter

| | |
|--------------------------------|-----------------------|
| <code><rel_power></code> | Active Slot Threshold |
| Range | -40.0 to -10.0 dB |
| Resolution | 0.1 dB |

Example of Use

To read out the setting value of Active Slot Threshold.

`RAD:BSYN:BURSt:THR?`

`> -10.0`

2.3.7 Symbol Rotation

`[:SENSe]:RADio:BSYNc:SROtation 1PI2|1PI4|3PI8`

Symbol Rotation

Function

This command sets the rotation phase of the symbol when RF Signal is Normal Burst and Modulation is QPSK.

Command

`[:SENSe]:RADio:BSYNc:SROtation <mode>`

Parameter

| <mode> | Symbol Rotation |
|--------|-------------------|
| 1PI2 | $\pi/2$ (Default) |
| 1PI4 | $\pi/4$ |
| 3PI8 | $3\pi/8$ |

Example of Use

To set Symbol Rotation to $\pi/2$.

`RAD:BSYN:SROT 1PI4`

`[:SENSe]:RADio:BSYNc:SROtation?`

Symbol Rotation Query

Function

This command returns the symbol rotation settings.

Query

`[:SENSe]:RADio:BSYNc:SROtation?`

Response

<mode>

Parameter

| <mode> | Symbol Rotation |
|--------|-----------------|
| 1PI2 | $\pi/2$ |
| 1PI4 | $\pi/4$ |
| 3PI8 | $3\pi/8$ |

Example of Use

To query the symbol rotation settings.

`RAD:BSYN:SROT?`

`> 1PI2`

2.3.8 Pulse Shaping

`[[:SENSE]:RADio:SIGNal:PSHaping NARRow|WIDE`

Pulse Shaping Filter

Function

This command sets Pulse Shaping.
This function is available only when Signal Direction is Uplink and RF Signal is Higher Symbol Rate Burst.

Command

```
[[:SENSE]:RADio:SIGNal:PSHaping NARRow|WIDE
```

Parameter

| | |
|---------------------------|------------------------|
| <code><mode></code> | Pulse Shaping |
| <code>NARRow</code> | Narrow (Initial value) |
| <code>WIDE</code> | Wide |

Example of Use

To set Pulse Shaping to Narrow.

```
RAD:SIGN:PSH NARR
```

`[[:SENSE]:RADio:SIGNal:PSHaping?`

Pulse Shaping Query

Function

This command reads out the setting value of Pulse Shaping.

Query

```
[[:SENSE]:RADio:SIGNal:PSHaping?
```

Response

```
<mode>
```

Parameter

| | |
|---------------------------|---------------|
| <code><mode></code> | Pulse Shaping |
| <code>NARR</code> | Narrow |
| <code>WIDE</code> | Wide |

Example of Use

To read out the setting value of Pulse Shaping.

```
RAD:SIGN:PSH?  
> NARR
```


2.3.9 Measurement Offset

`[[:SENSe]:RADio:BSYNc:MOFFset <integer>`

Measurement Offset

Function

This command sets Measurement Offset. This command sets Measurement Offset when the Trigger Switch parameter is On.

Command

```
[[:SENSe]:RADio:BSYNc:MOFFset <integer>
```

Parameter

| | |
|------------------------------|--------------------|
| <code><integer></code> | Measurement Offset |
| Range | 0 to 7 |
| Resolution | 1 |
| Initial value | 0 |

Example of Use

To set Measurement Offset to 0.

```
RAD:BSYN:MOFF 0
```

`[[:SENSe]:RADio:BSYNc:MOFFset?`

Measurement Offset Query

Function

This command reads out the Measurement Offset setting.

Query

```
[[:SENSe]:RADio:BSYNc:MOFFset?
```

Response

```
<integer>
```

Parameter

| | |
|------------------------------|--------------------|
| <code><integer></code> | Measurement Offset |
| Range | 0 to 7 |
| Resolution | 1 |

Example of Use

To read out the Measurement Offset setting.

```
RAD:BSYN:MOFF?
> 10
```

2.3.10 Power Control Level

`[[:SENSE]:RADio:PCLevel <integer>`

Power Control Level

Function

This command sets Power Control Level.

Command

`[[:SENSE]:RADio:PCLevel <integer>`

Parameter

| | |
|------------------------------|---------------------|
| <code><integer></code> | Power Control Level |
| Range | 0 to 31 |
| Resolution | 1 |
| Suffix code | None |
| Initial value | 0 |

Example of Use

To set Power Control Level to 0.

`RAD:PCL 0`

`[[:SENSE]:RADio:PCLevel?`

Power Control Level Query

Function

This command reads out the setting value of Power Control Level.

Query

`[[:SENSE]:RADio:PCLevel?`

Response

`<integer>`

Parameter

| | |
|--------------------------------|---------------------|
| <code>< integer ></code> | Power Control Level |
| Range | 0 to 31 |
| Resolution | 1 |
| Suffix code | None |

Example of Use

To read out the setting value of Power Control Level.

`RAD:PCL?`

`> 0`

2.3.11 BTS Type

`[:SENSE] :RADio :DEVice :BASE [:TYPE] NORMal | MICR1 | MICR2 | MICR3 | PICO`

BTS Type

Function

This command sets the BTS type when Signal Direction is Downlink.

Command

`[:SENSE] :RADio :DEVice :BASE [:TYPE] <mode>`

Parameter

| <mode> | BTS type |
|--------|----------------------------|
| NORMal | Normal BTS (Initial value) |
| MICR1 | Micro1 BTS |
| MICR2 | Micro1 BTS |
| MICR3 | Micro1 BTS |
| PICO | Pico BTS |

Example of Use

To set the BTS type to Normal BTS.

`RAD : DEV : BASE NORM`

[[:SENSe]:RADio:DEVIce:BASE[:TYPE]?]

BTS Type Query

Function

This command reads out the setting value of the BTS type.

Query

```
[[:SENSe]:RADio:DEVIce:BASE[:TYPE]?]
```

Response

```
<mode>
```

Parameter

| | |
|--------|------------|
| <mode> | BTS type |
| NORM | Normal BTS |
| MICR1 | Micro1 BTS |
| MICR2 | Micro1 BTS |
| MICR3 | Micro1 BTS |
| PICO | Pico BTS |

Example of Use

To read out the setting of the BTS type.

```
RAD:DEV:BASE?  
> NORM
```

2.3.12 BTS Power Level

`[[:SENSE]:RADio:DEVIce:BASE:PLEVel <integer>`

BTS Power Level

Function

This command sets BTS Power Level.

Command

`[[:SENSE]:RADio:DEVIce:BASE:PLEVel <integer>`

Parameter

`<integer>`

BTS Power Level

Range

When BTS Type is Normal BTS:

34 to 46

When BTS Type is Micro1 BTS, and when Band is P-GSM, E-GSM, R-GSM, GSM750 or GSM850:

19 to 24

When BTS Type is Micro1 BTS, and when Band is DCS1800 or PCS1900:

27 to 32

When BTS Type is Micro2 BTS, and when Band is P-GSM, E-GSM, R-GSM, GSM750 or GSM850:

14 to 19

When BTS Type is Micro2 BTS, and when Band is DCS1800 or PCS1900:

22 to 27

When BTS Type is Micro3 BTS, and when Band is P-GSM, E-GSM, R-GSM, GSM750 or GSM850:

9 to 14

When BTS Type is Micro3 BTS, and when Band is DCS1800 or PCS1900:

17 to 22

When BTS Type is Pico BTS, and when Band is P-GSM, E-GSM, R-GSM, GSM750 or GSM850:

13 to 20

When BTS Type is Micro2 BTS, and when Band is DCS1800 or PCS1900:

16 to 23

| | |
|---------------|---------------------------|
| Resolution | 1 |
| Suffix code | DEB |
| | dBm is used when omitted. |
| Initial value | 46 |

Example of Use

To set BTS Power Level to 46 dBm.

```
RAD:DEV:BASE:PLEV 46
```

[[:SENSE]:RADio:DEVIce:BASE:PLEV]?

BTS Power Level Query

Function

This command reads out the setting value of BTS Power Level.

Query

```
[[:SENSE]:RADio:DEVIce:BASE:PLEV]?
```

Response

<integer>

Parameter

<integer>
Range

BTS Power Level

When BTS Type is Normal BTS:

34 to 46

When BTS Type is Micro1 BTS, and when Band is P-GSM, E-GSM, R-GSM, GSM750 or GSM850:

19 to 24

When BTS Type is Micro1 BTS, and when Band is DCS1800 or PCS1900:

27 to 32

When BTS Type is Micro2 BTS, and when Band is P-GSM, E-GSM, R-GSM, GSM750 or GSM850:

14 to 19

When BTS Type is Micro2 BTS, and when Band is DCS1800 or PCS1900:

22 to 27

When BTS Type is Micro3 BTS, and when Band is P-GSM, E-GSM, R-GSM, GSM750 or GSM850:

9 to 14

When BTS Type is Micro3 BTS, and when Band is DCS1800 or PCS1900:

17 to 22

When BTS Type is Pico BTS, and when Band is P-GSM, E-GSM, R-GSM, GSM750 or GSM850:

13 to 20

When BTS Type is Pico BTS, and when Band is DCS1800 or PCS1900:

16 to 23

| | |
|-------------|------|
| Resolution | 1 |
| Suffix code | None |

Example of Use

To read out the setting of BTS Power Level.

```
RAD:DEV:BASE:PLEV?  
> 46
```

2.3.13 SCPIR

[[:SENSE]: RADio:SCPIr <rel_power>

SCPIR

Function

This command sets SCPIR parameter of vamos signal.

Command

`[[:SENSE]: RADio:SCPIr <rel_power>`

Parameter

| | |
|--------------------------------|--------------------|
| <code><rel_power></code> | SCPIR |
| Range | -10.00 to 10.00 dB |
| Resolution | 0.01 dB |
| Initial value | 0.00 dB |

Details

This function is available when the Modulation is AQPSK.

Example of Use

To set SCPIR to 10.00 dB.
`RAD:SCP 10`

[[:SENSE]: RADio:SCPIr?

SCPIR Query

Function

This command reads out the setting value of SCPIR.

Query

`[[:SENSE]: RADio:SCPIr?`

Response

`<rel_power>`

Parameter

| | |
|--------------------------------|--------------------|
| <code><rel_power></code> | SCPIR |
| Range | -10.00 to 10.00 dB |
| Resolution | 0.01 dB |

Example of Use

To read out the setting value of SCPIR.
`RAD:SCP?`
`> 10.00`

2.4 Utility Function

Table 2.4-1 lists device messages for utility functions to be measured.

Table 2.4-1 Utility Function

| Parameter | Device Message |
|-----------------------|--|
| 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 warm-up messages displayed right after activation.

Command

```
:DISPlay:ANNotation:WUP:ERASe
```

Example of Use

To erase the warm-up messages.

```
DISP:ANN:WUP:ERAS
```

2.4.2 Display Title

:DISPlay:ANNotation:TITLe[:STATe] OFF|ON|0|1

Display Title

Function

This command displays/hides the title.

Command

`:DISPlay:ANNotation:TITLe[:STATe] <switch>`

Parameter

| | |
|-----------------------------|----------------------|
| <code><switch></code> | Title display On/Off |
| OFF 0 | Off (Initial value) |
| ON 1 | On |

Example of Use

To display the title.

`DISP:ANN:TITL ON`

:DISPlay:ANNotation:TITLe[:STATe]?

Display Title Query

Function

This command reads out On/Off of the title display.

Query

`:DISPlay:ANNotation:TITLe[:STATe]?`

Response

`<switch>`

Parameter

| | |
|-----------------------------|----------------------|
| <code><switch></code> | Title display On/Off |
| 0 | Off |
| 1 | On |

Example of Use

To read out the title display setting.

`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> Character string within 32 characters enclosed by double quotation marks (“ ”) or single quotation marks (‘ ’)

Example of Use

To set the title character string to TEST.

```
DISP:ANN:TITL:DATA `TEST`
```

:DISPlay:ANNotation:TITLe:DATA?

Title Entry Query

Function

This command reads out the title character string.

Query

```
:DISPlay:ANNotation:TITLe:DATA?
```

Response

```
<string>
```

Parameter

<string> Character string within 32 characters enclosed by double quotation marks (“ ”) or single quotation marks (‘ ’)

Example of Use

To read out the title character string.

```
DISP:ANN:TITL:DATA?
```

```
> TEST
```

2.5 Common Measurement Function

Table 2.5-1 lists device messages for carrying out common operations to all the measurement functions.

Table 2.5-1 Common Measurement Function

| Parameter | Device Message |
|------------------------|---|
| Continuous Measurement | :INITiate:CONTInuous OFF ON 0 1 |
| | :INITiate:CONTInuous? |
| | :INITiate:MODE:CONTInuous |
| Single Measurement | :INITiate:MODE:SINGLE |
| Initiate | :INITiate[:IMMediate] |
| Configure | :CONFigure? |
| Trigger Switch | :TRIGger[:SEQuence][:STATe] ON OFF 1 0 |
| | :TRIGger[:SEQuence][:STATe]? |
| Trigger Source | :TRIGger[:SEQuence]:SOURce EXTernal[1] IMMediate SG |
| | :TRIGger[:SEQuence]:SOURce? |
| Trigger Slope | :TRIGger[:SEQuence]:SLOPe POSitive NEGative |
| | :TRIGger[:SEQuence]:SLOPe? |
| Trigger Delay | :TRIGger[:SEQuence]:DELay <time> |
| | :TRIGger[:SEQuence]:DELay? |

2.5.1 Measurement and Control

:INITiate:CONTinuous OFF|ON|0|1

Continuous Measurement

Function

This command sets the measurement mode.

Command

```
:INITiate:CONTinuous <switch>
```

Parameter

| | |
|----------|--|
| <switch> | Measurement mode |
| 0 OFF | Single measurement |
| 1 ON | Continuous measurement (Initial value) |

Details

Continuous measurement starts when it is set to On, and no measurement starts when set to Off and in Single.

Example of Use

To execute continuous measurement.

```
INIT:CONT ON
```

:INITiate:CONTinuous?

Continuous Measurement Query

Function

This command reads out the measurement mode.

Query

```
:INITiate:CONTinuous?
```

Response

```
<switch>
```

Parameter

| | |
|----------|------------------------|
| <switch> | Measurement mode |
| 0 | Single measurement |
| 1 | Continuous measurement |

Example of Use

To read out the measurement mode setting.

```
INIT:CONT?
> 0
```

:INITiate:MODE:CONTInuous

Continuous Measurement

Function

This command starts continuous measurement.

Command

`:INITiate:MODE:CONTInuous`

Example of Use

To execute continuous measurement.

`INIT:MODE:CONT`

:INITiate:MODE:SINGle

Single Measurement

Function

This command starts single measurement.

Command

`:INITiate:MODE:SINGle`

Example of Use

To execute single measurement.

`INIT:MODE:SING`

:INITiate[:IMMEDIATE]

Initiate

Function

This command starts measurement in the measurement mode.

Command

`:INITiate:[IMMEDIATE]`

Example of Use

To start measurement.

`INIT`

:CONFigure?

Configure Query

Function

This command reads out the current measurement function.

Query

```
:CONFigure?
```

Response

```
<mode>
```

Parameter

| | |
|--------|----------------------|
| <mode> | Measurement function |
| EVM | Modulation Analysis |
| ORFS | Output RF Spectrum |
| PVT | Power vs Time |

Example of Use

To read out the measurement function.

```
CONF?
```

2.5.2 Trigger Switch

:TRIGger[:SEQuence][:STATe] OFF|ON|0|1

Trigger Switch

Function

This command sets the trigger wait to On/Off.

Command

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

Parameter

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

Example of Use

To set to the trigger wait.

`TRIG ON`

:TRIGger[:SEQuence][:STATe]?

Trigger Switch Query

Function

This command reads out On/Off of the trigger wait.

Query

`:TRIGger[:SEQuence][:STATe]?`

Response

`<switch>`

Parameter

| | |
|-----------------------------|---------------------|
| <code><switch></code> | Trigger wait On/Off |
| <code>0</code> | On |
| <code>1</code> | Off |

Example of Use

To read out the trigger wait setting.

`TRIG?`

`> 0`

2.5.3 Trigger Source

`:TRIGger[:SEQuence]:SOURce EXTernal[1]|IMMEDIATE|SG`

Trigger Source

Function

This command selects the trigger signal source.

Command

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

Parameter

| | |
|-------------|--------------------------|
| <source> | Trigger Signal Source |
| EXTernal[1] | External input(External) |
| IMMEDIATE | Free run |
| SG | SG Marker |

Details

SG marker can be selected only when the Vector Signal Generator Option is installed.

Example of Use

To set the trigger signal source to external input.

```
TRIG:SOUR EXT
```

:TRIGger[:SEQuence]:SOURce?

Trigger Source Query

Function

This command reads out the trigger signal source.

Query

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

Response

```
<source>
```

Parameter

| | |
|----------|---------------------------|
| <source> | Trigger Source |
| EXT | External input (External) |
| IMM | Free run |
| SG | SG Marker |

Details

SG marker can be selected only when the Vector Signal Generator Option is installed.

Example of Use

To read out 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/falling).

Command

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

Parameter

| | |
|----------|---|
| <mode> | Trigger detection mode |
| POSitive | Detects at the rising edge (Initial value). |
| NEGative | Detects at the falling edge. |

Example of Use

To detect a trigger at the rising edge.

```
TRIG:SLOP POS
```

:TRIGger[:SEQuence]:SLOPe?

Trigger Slope Query

Function

This command reads out the trigger detection mode (rising/falling).

Query

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

Response

```
<mode>
```

Parameter

| | |
|--------|------------------------------|
| <mode> | Trigger detection mode |
| POS | Detects at the rising edge. |
| NEG | Detects at the falling edge. |

Example of Use

To read out 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 generating the trigger to the starting position of the frame.

Command

:TRIGger[:SEQuence]:DELay <time>

Parameter

| | |
|---------------|--|
| <time> | Delay time from generating the trigger to the starting position of the frame |
| Range | -2 to 2 s |
| Resolution | 50 ns |
| Suffix code | NS, US, MS, S s is used when omitted. |
| Initial value | 0 s |

Example of Use

To set the trigger delay time to 20 ms.

TRIG:DEL 20MS

:TRIGger[:SEQuence]:DELay?

Trigger Delay Query

Function

This command reads out the setting of the delay time from generating the trigger to the starting position of the frame.

Query

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

Response

```
<time>
```

Parameter

| | |
|------------|---|
| <time> | Delay time from generating the trigger to the starting position of the frame. |
| Range | -2 to 2 s |
| Resolution | 50 ns |
| | Value is returned in s units. |

Example of Use

To read out the trigger delay time.

```
TRIG:DEL?  
> 0.02000000
```

2.6 Burst Average Power Measurement

Table 2.6-1 shows the device message that calls the Burst Average Power measurement function. The applications to be used (Signal Analyzer) must be loaded in advance.

Refer to the *MS2690A/MS2691A/MS2692A and MS2830A Signal Analyzer Operation Manual Signal Analyzer Function Remote Control* for details of control commands and queries once the measurement functions are recalled.

Table 2.6-1 Burst Average Power function

| Function | Device Message |
|---------------------------------|--------------------------------|
| Configure - Burst Average Power | :CONFigure:FFT:BPOwer :TXPower |

Note:

Except for the Modulation Analysis, Output RF Spectrum, Power vs Time measurement, FETCh:<measure>, INITiate:<measure>, READ:<measure>, and MEASure:<measure> - these commands are not available when this application is selected. The commands/queries can be used when Signal Analyzer is selected after executing CONFigure:<measure>.

:CONFigure:FFT:BPOWer|:TXPower

Burst Average Power

Function

This command selects Burst Average Power Measurement function.

Command

```
:CONFigure:FFT:BPOWer|:TXPower
```

Details

No measurement is made.

Burst Average Power measurement function is available only for Signal Analyzer.

Example of Use

To select Burst Average Power measurement function for Signal Analyzer.

```
CONF:FFT:BPOW
```

2.7 Modulation Analysis

Table 2.7-1 lists device messages for Modulation Analysis.

Table 2.7-1 Device Messages for Executing Modulation Analysis and Reading Results.

| Function | Device Message |
|-----------|-------------------|
| Configure | :CONFigure:EVM |
| Initiate | :INITiate:EVM |
| Fetch | :FETCh:EVM[n] ? |
| Read | :READ:EVM[n] ? |
| Measure | :MEASure:EVM[n] ? |

Table 2.7-2 lists responses to Parameter n on Table 2.7-1. –999.0 is returned when Result Mode is B.

Table 2.7-2 Responses of Modulation Analysis Result

| n | Result Mode | Response |
|--------------|-------------|--|
| 1 or omitted | A | <p>Responses are returned with comma-separated value formats in the following order:</p> <ol style="list-style-type: none"> 1. Frequency Error [Hz] (Average value for Storage Count) 2. Frequency Error [Hz] (Maximum value for Storage Count) 3. Frequency Error [ppm] (Average value for Storage Count) 4. Frequency Error [ppm] (Maximum value for Storage Count) 5. Magnitude Error (RMS) [%]*2 (Average value for Storage Count) 6. Magnitude Error (RMS) [%]*2 (Maximum value for Storage Count) 7. Phase Error (RMS) [degree] (Average value for Storage Count) 8. Phase Error (RMS) [degree] (Maximum value for Storage Count) 9. Phase Error (Peak)*[degree] *1 (Average value for Storage Count) 10. Phase Error (Peak) [degree] *1 (Maximum value for Storage Count) 11. EVM (RMS) [%]*2 (Average value for Storage Count) 12. EVM (RMS) [%]*2 (Maximum value for Storage Count) 13. EVM (Peak) [%]*2 (Average value for Storage Count) 14. EVM (Peak) [%]*2 (Maximum value for Storage Count) 15. Origin Offset [dB]*2 (Average value for Storage Count) 16. Origin Offset [dB]*2 (Maximum value for Storage Count) 17. 95:th percentile [%]*2 *3 (Calculated value for all Storage Counts) 18. Droop[nepers/s]*2 (Average value for Storage Count) 19. Droop[nepers/s]*2 (Maximum value for Storage Count) 20. Droop[dB]*2 (Average value for Storage Count) 21. Droop[dB]*2 (Maximum value for Storage Count) <p>*1: Where Modulation is other than GMSK: –999.0 *2: Where Modulation is GMSK: –999.0 *3: This is calculated from symbol EVM included in all storages.</p> |
| 2 | A | <p>The EVM graph display data is returned with comma-separated value formats.</p> <p>When RF Signal is Normal Burst or Continuous and Modulation is other than GMSK: 3 to 144 symbols (142)</p> <p>When RF Signal is Higher Symbol Rate Burst: 4 to 172 symbols (169)</p> <p>Unit: %</p> <p>Note: When Modulation is GMSK: 1,471 symbols, –999.0</p> |

Table 2.7-2 Responses of Modulation Analysis Result (Cont'd)

| n | Result Mode | Response |
|----|-------------|--|
| 3 | A | <p>The Magnitude Error graph display data is returned with comma-separated value formats.</p> <p>When RF Signal is Normal Burst or Continuous and Modulation is other than GMSK: 3 to 144 symbols (142)</p> <p>When RF Signal is Higher Symbol Rate Burst: 4 to 172 symbols (169)</p> <p>Unit: %</p> <p><i>Note:</i> When Modulation is GMSK: 1,471 symbols, -999.0</p> |
| 4 | A | <p>The Phase Error graph display data is returned with comma-separated value formats.</p> <p>When Modulation is other than GMSK: 0.0 to 147.0 symbols (1471)</p> <p>When RF Signal is Normal Burst or Continuous and Modulation is other than GMSK: 3 to 144 symbols (142)</p> <p>When RF Signal is Higher Symbol Rate Burst: 3 to 171 symbols (169)</p> <p>Unit: degree</p> |
| 5 | A | <p>The Constellation graph display data is returned for each symbol, with a comma-separated value format and the I- and Q-phase data alternating.</p> <p>When Modulation is other than GMSK: 0.0 to 147.0 symbols (1471 × 2)</p> <p>When RF Signal is Normal Burst or Continuous and Modulation is other than GMSK: 3 to 144 symbols (142 × 2)</p> <p>When RF Signal is Higher Symbol Rate Burst: 4 to 172 symbols (169 × 2)</p> |
| 24 | A | <p>Responses are returned with comma-separated value formats in the following order:</p> <ol style="list-style-type: none"> 1. Value of TSC on subchannel A*1 *2 2. Value of TSC on subchannel B*1 *2 <p>When Modulation is AQPSK.</p> <ul style="list-style-type: none"> • Value of TSC on subchannel A: 100 to 107 (If TSC detected) • Value of TSC on subchannel B: <ol style="list-style-type: none"> (1) If TSC set1 detected: 100 to 107 (2) If TSC set2 detected: 200 to 207 <p>*1: If TSC not detected, returned value is -999.0</p> <p>*2: Where Modulation is not AQPSK, returned value is -999.0</p> |
| 40 | A | <p>Responses are returned with comma-separated value formats in the following order:</p> <ol style="list-style-type: none"> 1. 95:th percentile [%]*2 *3 (Calculated value for all Storage Counts) 2. 95:th percentile [%]*2 *4 (Average value for Storage Count) 3. 95:th percentile [%]*2 *5 (Maximum value for Storage Count) <p>*2: Where Modulation is GMSK: -999.0</p> <p>*3: This is calculated from symbol EVM included in all storages.</p> <p>*4: This is the average value for each storage count.</p> <p>*5: This is the maximum value for each storage count.</p> |

Table 2.7-3 lists device messages for parameter settings for Modulation Analysis.

Table 2.7-3 Device Messages for Parameter Settings of Modulation Analysis

| Parameter | Device Message |
|----------------------------|--|
| Trace Mode | :DISPlay:EVM[:VIEW][:SElect] EVM MAGNitude PHASe |
| | :DISPlay:EVM[:VIEW][:SElect]? |
| Scale – EVM | :DISPlay:EVM[:VIEW]:WINDow2:TRACe:Y[:SCALe]:RLEVel 5 10 20 50 |
| | :DISPlay:EVM[:VIEW]:WINDow2:TRACe:Y[:SCALe]:RLEVel? |
| Scale – Magnitude Error | :DISPlay:EVM[:VIEW]:WINDow3:TRACe:Y[:SCALe]:RLEVel 5 10 20 50 |
| | :DISPlay:EVM[:VIEW]:WINDow3:TRACe:Y[:SCALe]:RLEVel? |
| Scale – Phase | Error :DISPlay:EVM[:VIEW]:WINDow4:TRACe:Y[:SCALe]:RLEVel 5 10 20 50 |
| | :DISPlay:EVM[:VIEW]:WINDow4:TRACe:Y[:SCALe]:RLEVel? |
| Storage Mode | [:SENSe]:EVM:AVERAge[:STATe] OFF ON AMAXimum 0 1 2 |
| | [:SENSe]:EVM:AVERAge[:STATe]? |
| Storage Count | [:SENSe]:EVM:AVERAge:COUNT <integer> |
| | [:SENSe]:EVM:AVERAge:COUNT? |
| Average Type | [:SENSe]:EVM:AVERAge:TYPE POWER LOGPower |
| | [:SENSe]:EVM:AVERAge:TYPE? |
| Droop – On/Off | [:SENSe]:EVM:DROOp OFF ON 0 1 |
| | [:SENSe]:EVM:DROOp? |

Table 2.7-4 lists device messages for setting Modulation Analysis and reading marker position values.

Table 2.7-4 Device Message for Markers of Modulation Analysis

| Parameter | Device Message |
|---------------------------|---|
| 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 X Axis Position | :CALCulate:EVM:MARKer:X:POSition <real> |
| | :CALCulate:EVM:MARKer:X:POSition? |
| Marker X Axis Value | :CALCulate:EVM:MARKer:X? |
| Marker Y Axis Value | :CALCulate:EVM:MARKer:Y? |

2.7.1 Measure

:CONFigure:EVM

Modulation Analysis

Function

This command selects Modulation Analysis.

Command

```
:CONFigure:EVM
```

Details

No measurement is performed.

Example of Use

To select Modulation Analysis.
CONF:EVM

:INITiate:EVM

Modulation Analysis

Function

This command executes Modulation Analysis.

Command

```
:INITiate:EVM
```

Example of Use

To execute Modulation Analysis.
INIT:EVM

:FETCh:EVM[n]?

Modulation Analysis Query

Function

This command reads out the measurement result of Modulation Analysis.

Query

```
:FETCh:EVM[n]?
```

Response

Refer to Table 2.7-2.

Example of Use

To read out the measurement result of Modulation Analysis.
FETC:EVM?

:READ:EVM[n]?

Modulation Analysis Query

Function

This command reads out the result after executing Single measurement of Modulation Analysis by the current setting value.

Query

```
:READ:EVM[n]?
```

Response

Refer to Table 2.7-2.

Example of Use

To execute measurement in order to read out the measurement result of Modulation Analysis.

```
READ:EVM?
```

:MEASure:EVM[n]?

Modulation Analysis Query

Function

This command reads out the result after executing Single measurement of Modulation Analysis by the current setting value.

Query

```
:MEASure:EVM[n]?
```

Response

Refer to Table 2.7-2.

Example of Use

To execute measurement in order to read out the measurement result of Modulation Analysis.

```
MEAS:EVM?
```

2.7.2 Trace Mode

:DISPlay:EVM[:VIEW][:SElect] EVM|MAGNitude|PHASe

Trace Mode

Function

This command sets the graph type on the graph window when Modulation Analysis is selected.

Command

```
:DISPlay:EVM[:VIEW] [:SElect] <mode>
```

Parameter

| | |
|-----------|-----------------------------|
| <mode> | Trace Mode |
| EVM | EVM |
| MAGNitude | Magnitude Error |
| PHASe | Phase Error (Initial value) |

Example of Use

To set Trace Mode to Phase Error.

```
DISP:EVM PHAS
```

:DISPlay:EVM[:VIEW][:SElect]?

Trace Mode Query

Function

This command sets the graph type on the graph window when Modulation Analysis is selected.

Query

```
:DISPlay:EVM[:VIEW] [:SElect]?
```

Parameter

| | |
|--------|-----------------|
| <mode> | Trace Mode |
| EVM | EVM |
| MAGN | Magnitude Error |
| PHAS | Phase Error |

Example of Use

To read out the Trace Mode setting.

```
DISP:EVM?  
> PHAS
```

2.7.3 Scale – EVM

`:DISPlay:EVM[:VIEW]:WINDow2:TRACe:Y[:SCALe]:RLEVel 5|10|20|50`

Scale – EVM

Function

This command sets the vertical-axis scale on the EVM graph. It is available, irrespective of the selected trace mode type.

Command

`:DISPlay:EVM[:VIEW]:WINDow2:TRACe:Y[:SCALe]:RLEVel <mode>`

Parameter

| <mode> | Vertical-axis scale |
|--------|---------------------|
| 5 | 5% (Initial value) |
| 10 | 10% |
| 20 | 20% |
| 50 | 50% |

Example of Use

To set the vertical-axis scale on the EVM graph to 10%.

`DISP:EVM:WIND2:TRAC:Y:RLEV 10`

:DISPlay:EVM[:VIEW]:WINDow2:TRACe:Y[:SCALe]:RLEVel?

Scale – EVM Query

Function

This command reads out the setting of the vertical-axis scale on the EVM graph. It is available, irrespective of the selected trace mode type.

Query

```
:DISPlay:EVM[:VIEW]:WINDow2:TRACe:Y[:SCALe]:RLEVel?
```

Response

```
<mode>
```

Parameter

| <mode> | Vertical-axis scale |
|--------|---------------------|
| 5 | 5% |
| 10 | 10% |
| 20 | 20% |
| 50 | 50% |

Example of Use

To read out the setting of the vertical-axis scale on the EVM graph.

```
DISP:EVM:WIND2:TRAC:Y:RLEV?  
> 10
```


2.7.4 Scale – Magnitude Error

`:DISPlay:EVM[:VIEW]:WINDow3:TRACe:Y[:SCALe]:RLEVel 5|10|20|50`

Scale – Magnitude Error

Function

This command sets the vertical-axis scale on the Magnitude Error graph. It is available, irrespective of the selected trace mode type.

Command

`:DISPlay:EVM[:VIEW]:WINDow3:TRACe:Y[:SCALe]:RLEVel <mode>`

Parameter

| <mode> | Vertical-axis scale |
|--------|--------------------------|
| 5 | –5 to 5% (Initial value) |
| 10 | –10 to 10% |
| 20 | –20 to 20% |
| 50 | –50 to 50% |

Example of Use

To set the vertical-axis scale on the Magnitude Error graph to 10%.

`DISP:EVM:WIND3:TRAC:Y:RLEV 10`

:DISPlay:EVM[:VIEW]:WINDow3:TRACe:Y[:SCALe]:RLEVeI?

Scale – Magnitude Error Query

Function

This command reads out the vertical-axis scale on the Magnitude Error graph. It is available, irrespective of the selected trace mode type.

Query

```
:DISPlay:EVM[:VIEW]:WINDow3:TRACe:Y[:SCALe]:RLEVeI?
```

Response

```
<mode>
```

Parameter

| <mode> | Vertical-axis scale |
|--------|---------------------|
| 5 | -5 to 5% |
| 10 | -10 to 10% |
| 20 | -20 to 20% |
| 50 | -50 to 50% |

Example of Use

To read out the setting of the vertical-axis scale on the Magnitude Error graph.

```
DISP:EVM:WIND3:TRAC:Y:RLEV?  
> 10
```

2.7.5 Scale – Phase Error

`:DISPlay:EVM[:VIEW]:WINDow4:TRACe:Y[:SCALe]:RLEVel 5|10|20|50`

Scale – Phase Error

Function

This command sets the vertical-axis scale on the Phase Error graph. It is available, irrespective of the selected trace mode type.

Command

`:DISPlay:EVM[:VIEW]:WINDow4:TRACe:Y[:SCALe]:RLEVel <mode>`

Parameter

| <mode> | Vertical-axis scale |
|--------|--------------------------------|
| 5 | –5 to 5 degree (Initial value) |
| 10 | –10 to 10 degree |
| 20 | –20 to 20 degree |
| 50 | –50 to 50 degree |

Example of Use

To set the vertical-axis scale on the Phase Error graph to 10 degree.

`DISP:EVM:WIND4:TRAC:Y:RLEV 10`

:DISPlay:EVM[:VIEW]:WINDow4:TRACe:Y[:SCALe]:RLEVel?

Scale – Phase Error Query

Function

This command reads out the vertical-axis scale on the Phase Error graph. It is available, irrespective of the selected trace mode type.

Query

`:DISPlay:EVM[:VIEW]:WINDow4:TRACe:Y[:SCALe]:RLEVel?`

Response

`<mode>`

Parameter

| <code><mode></code> | Vertical-axis scale |
|---------------------------|---------------------|
| 5 | –5 to 5 degree |
| 10 | –10 to 10 degree |
| 20 | –20 to 20 degree |
| 50 | –50 to 50 degree |

Example of Use

To read out the setting of the vertical-axis scale on the Phase Error graph.

```
DISP:EVM:WIND4:TRAC:Y:RLEV?  
> 10
```

2.7.6 Storage Mode

`[[:SENSE]:EVM:AVERage[:STATE] OFF|ON|AMAXimum|0|1|2`

Storage Mode

Function

This command sets Storage Mode.

Command

`[[:SENSE]:EVM:AVERage[:STATE] <mode>`

Parameter

| <mode> | Storage Mode |
|------------|---------------------|
| OFF 0 | Off (Initial value) |
| ON 1 | Average |
| AMAXimum 2 | Average & Max |

Example of Use

To set Storage Mode to Average.

```
EVM:AVER ON
```

`[[:SENSE]:EVM:AVERage[:STATE]?`

Storage Mode Query

Function

This command reads out the Storage Mode setting.

Query

`[[:SENSE]:EVM:AVERage[:STATE]?`

Response

<mode>

Parameter

| <mode> | Storage Mode |
|--------|---------------|
| 0 | Off |
| 1 | Average |
| 2 | Average & Max |

Example of Use

To read out the Storage Mode setting.

```
EVM:AVER?
> 1
```

2.7.7 Storage Count

[[:SENSE]:EVM:AVERage:COUNT <integer>

Storage Count

Function

This command sets the Storage Count.

Command

`[[:SENSE]:EVM:AVERage:COUNT <integer>`

Parameter

| | |
|------------------------------|---------------|
| <code><integer></code> | Storage Count |
| Range | 2 to 9999 |
| Resolution | 1 |
| Initial value | 2 |

Example of Use

To set Storage Count to 10.

`EVM:AVER:COUN 10`

[[:SENSE]:EVM:AVERage:COUNT?

Storage Count Query

Function

This command reads out the setting of the Storage Count.

Query

`[[:SENSE]:EVM:AVERage:COUNT?`

Response

`<integer>`

Parameter

| | |
|------------------------------|---------------|
| <code><integer></code> | Storage Count |
| Range | 2 to 9999 |
| Resolution | 1 |

Example of Use

To read out the Storage Count setting.

`EVM:AVER:COUN?`

`> 10`

2.7.8 Average Type

[[:SENSE]:EVM:AVERAge:TYPE POWER|LOGPower

Average Type

Function

This command sets Average Type.

Command

[[:SENSE]:EVM:AVERAge:TYPE <mode>

Parameter

| | |
|----------|-----------------------|
| <mode> | Average Type |
| POWER | Power (Initial value) |
| LOGPower | Log-Power |

Example of Use

To set Average Type to Power.

```
EVM:AVER:TYPE POW
```

[[:SENSE]:EVM:AVERAge:TYPE?

Average Type Query

Function

This command reads out the Average Type setting.

Query

[[:SENSE]:EVM:AVERAge:TYPE?

Response

<mode>

Parameter

| | |
|--------|--------------|
| <mode> | Average Type |
| POW | Power |
| LOGP | Log-Power |

Example of Use

To read out the Average Type setting.

```
EVM:AVER:TYPE?
```

```
> POW
```

2.7.9 Droop – On/Off

[[:SENSE]:EVM:DROop OFF|ON|0|1

Droop – On/Off

Function

This command sets Droop.

Command

`[[:SENSE]:EVM:DROop <switch>`

Parameter

| | |
|-----------------------------|--------------------|
| <code><switch></code> | Droop |
| <code>0 OFF</code> | Off |
| <code>1 ON</code> | On (Initial value) |

Example of Use

To set Droop to On.

`EVM:DRO 1`

[[:SENSE]:EVM:DROop?

Droop – On/Off Query

Function

This command sets the Droop setting.

Query

`[[:SENSE]:EVM:DROop?`

Response

`<switch>`

Parameter

| | |
|-----------------------------|-------|
| <code><switch></code> | Droop |
| <code>0</code> | Off |
| <code>1</code> | On |

Example of Use

To read out the Droop setting.

`EVM:DRO?`

`> 1`

2.7.10 Marker – On/Off

:CALCulate:EVM:MARKer[:STATe] OFF|ON|0|1

Marker – On/Off

Function

This command displays/hides the marker when Modulation Analysis is selected.

Command

```
:CALCulate:EVM:MARKer[:STATe] <switch>
```

Parameter

| | |
|----------|---------------------|
| <switch> | Marker |
| 0 OFF | Off (Initial value) |
| 1 ON | On |

Example of Use

To display the marker.

```
CALC:EVM:MARK 1
```

:CALCulate:EVM:MARKer[:STATe]?

Marker – On/Off Query

Function

This command reads out Marker on/off when Modulation Analysis is selected.

Query

```
:CALCulate:EVM:MARKer[:STATe]?
```

Response

```
<switch>
```

Parameter

| | |
|----------|--------|
| <switch> | Marker |
| 0 | Off |
| 1 | On |

Example of Use

To read out the marker setting.

```
CALC:EVM:MARK?
> 1
```

2.7.11 Active Trace

:CALCulate:EVM:MARKer:ACTive CONSTellation|BOTTom

Active Trace

Function

This command sets the setting-targeted graph (position) of the marker.

Command

```
:CALCulate:EVM:MARKer:ACTive <mode>
```

Parameter

| | |
|---------------|------------------------------|
| <mode> | Active Trace |
| CONSTellation | Constellation |
| BOTTom | Graph window (Initial value) |

Example of Use

To operate the marker on Constellation.

```
CALC:EVM:MARK:ACT CONS
```

:CALCulate:EVM:MARKer:ACTive?

Active Trace Query

Function

This command reads out the Active Trace setting.

Query

```
:CALCulate:EVM:MARKer:ACTive
```

Response

```
<mode>
```

Parameter

| | |
|--------|---------------|
| <mode> | Active Trace |
| CONS | Constellation |
| BOTT | Graph window |

Example of Use

To read out the Active Trace setting.

```
CALC:EVM:MARK:ACT?
```

```
> CONS
```

2.7.12 Marker Position

`:CALCulate:EVM:MARKer:X:POSition <real>`

Marker X Axis Position

Function

This command sets the graph marker position of Active Trace in symbol units.

Command

`:CALCulate:EVM:MARKer:X:POSition <real>`

Parameter

| | |
|---------------------------|---|
| <code><real></code> | Marker position |
| Range | When RF Signal is Normal Burst or Continuous: 0.0 to 147.0 (GMSK) 3 to 144 (8PSK/QPSK/16QAM/32QAM) When RF Signal is Higher Symbol Rate Burst or Higher Symbol Rate Continuous: 4 to 172 |
| Resolution | 0.1 symbol (GMSK) 1 symbol (8PSK/QPSK/16QAM/32QAM) |
| Suffix code | None |
| Initial value | 0.0 |

Example of Use

To set the graph marker position to 12.0.

`CALC:EVM:MARK:X:POS 12.0`

:CALCulate:EVM:MARKer:X:POSition?

Marker X Axis Position Query

Function

This command reads out the graph marker position of Active Trace in symbol units.

Query

:CALCulate:EVM:MARKer:X:POSition?

Response

<real>

Parameter

<real>

Marker position

Range

When RF Signal is Normal Burst or Continuous:

0.0 to 147.0 (GMSK)

3 to 144 (8PSK/QPSK/16QAM/32QAM)

When RF Signal is Higher Symbol Rate Burst or Higher Symbol Rate Continuous:

4 to 172

Resolution

0.1 symbol (GMSK)

1 symbol (8PSK/QPSK/16QAM/32QAM)

Example of Use

To read out the setting of the graph marker position.

```
CALC:EVM:MARK:X:POS?
```

```
> 12.0
```

2.7.13 Marker Value

:CALCulate:EVM:MARKer:X?

Marker X Axis Value – Query

Function

This command reads out the value of the X axis(I phase) at the marker position on Constellation.

Query

```
:CALCulate:EVM:MARKer:X?
```

Response

```
<real>
```

Parameter

```
<real> X axis at marker position on Constellation  
(I phase)
```

Example of Use

To read out the X axis at the Constellation marker position.

```
CALC:EVM:MARK:X?  
> 0.1234
```

:CALCulate:EVM:MARKer:Y?

Marker Y Axis Value – Query

Function

This command reads out the Y-axis value at the graph marker.

Query

:CALCulate:EVM:MARKer:Y?

Response

<real>

Parameter

<real>

Y axis at the graph marker position

When Active Trace is Constellation:

Constellation (Q phase) No unit

When Active Trace is Bottom:

EVM Unit: %

Magnitude Error Unit: %

Phase Error Unit: degree

Example of Use

To read out the Y axis at the marker position.

```
CALC:EVM:MARK:Y?
```

```
> 0.1234
```

2.8 Output RF Spectrum

Table 2.8-1 lists device messages for Output RF Spectrum.

Table 2.8-1 Device Messages for Executing Measurement and Reading Result of Output RF Spectrum

| Function | Device Message |
|-----------|--------------------------|
| Configure | :CONFigure:ORFSpectrum |
| Initiate | :INITiate:ORFSpectrum |
| Fetch | :FETCh:ORFSpectrum[n]? |
| Read | :READ:ORFSpectrum[n]? |
| Measure | :MEASure:ORFSpectrum[n]? |

Table 2.8-2 lists responses corresponding to parameter n in Table 2.8-1. -999.0 is returned when Result Mode is set to B.

Table 2.8-2 Responses for Output RF Spectrum Results

| n | Result Mode | Response |
|--------------|-------------|---|
| 1 or omitted | A | <p>This returns the final judgment for the mask per Modulation/Switching. “0” indicates “Pass”, “1” indicates “Failure”, and “2” indicates “Not judged”. If no judgment has been made, the judgment result is -999.0.</p> <ol style="list-style-type: none"> 1. Modulation final judgment 2. Switching final judgment |
| 2 | A | <p>The Modulation Analysis results are returned by offset frequencies in the following order, in comma-separated value format:</p> <ol style="list-style-type: none"> 1. Modulation reference carrier power [dBm/30 kHz] 2. Offset frequency 1 [Hz] 3. Offset frequency 1 – Lower – Power [dB] 4. Offset frequency 1 – Upper – Power [dB] 5. Offset frequency 1 – Lower – Power [dBm] 6. Offset frequency 1 – Upper – Power [dBm] ... 62. Offset frequency 13 [Hz] 63. Offset frequency 13 – Lower – Power [dB] 64. Offset frequency 13 – Upper – Power [dB] 65. Offset frequency 13 – Lower – Power [dBm] 66. Offset frequency 13 – Upper – Power [dBm] |
| 3 | A | <p>The Modulation Analysis results are returned by offset frequencies in the following order, in comma-separated value format. For the mask judgment results, “0” indicates “Pass,” “1” indicates “Failure,” and “2” indicates “Not judged.” If no judgment is made, the judgment result is -999.0. For the judgment criterion, ABS, REL, or OFF is returned.</p> <ol style="list-style-type: none"> 1. Offset frequency 1 [Hz] 2. Offset frequency 1 – Judgment result 3. Offset frequency 1 – Limit [dB] or [dBm] 4. Offset frequency 1 – Judgment criterion ... 49. Offset frequency 13 [Hz] 50. Offset frequency 13 – Judgment result 51. Offset frequency 13 – Limit [dB] or [dBm] 52. Offset frequency 13 – Judgment criterion |

Table 2.8-2 Responses for Output RF Spectrum Results (Cont'd)

| n | Result Mode | Response |
|---|-------------|---|
| 4 | A | <p>The Switching measurement results are returned by offset frequencies in the following order, in comma-separated value format:</p> <ol style="list-style-type: none"> 1. Switching reference carrier power [dBm/300 kHz] 2. Offset frequency 1 [Hz] 3. Offset frequency 1 – Lower Power [dB] 4. Offset frequency 1 – Upper Power [dB] 5. Offset frequency 1 – Lower Power [dBm] 6. Offset frequency 1 – Upper Power [dBm] ... 17. Offset frequency 4 [Hz] 18. Offset frequency 4 – Lower Power [dB] 19. Offset frequency 4 – Upper Power [dB] 21. Offset frequency 4 – Lower Power [dBm] 21. Offset frequency 4 – Upper Power [dBm] |
| 5 | A | <p>The Switching measurement results are returned by offset frequencies in the following order, in comma-separated value format. For the mask judgment results, “0” indicates “Pass,” “1” indicates “Failure,” and “2” indicates “Not judged.” If no judgment is made, the judgment result is –999.0. For the judgment criterion, ABS, REL, or OFF is returned.</p> <ol style="list-style-type: none"> 1. Offset frequency 1 [Hz] 2. Offset frequency 1 – Judgment result 3. Offset frequency 1 – Limit Power [dB] or [dBm] 4. Offset frequency 1 – Judgment criterion ... 13. Offset frequency 4 [Hz] 14. Offset frequency 4 – Judgment result 15. Offset frequency 4 – Limit Power [dB] or [dBm] 16. Offset frequency 4 – Judgment criterion |

Table 2.8-3 lists device messages for setting Output RF Spectrum parameters.

Table 2.8-3 Device Message for Setting Output RF Spectrum Parameter

| Parameter | Device Message |
|---|--|
| Trace Mode | :DISPlay:ORFSpectrum[:VIEW][:SElect] MODulation SWITching NUMeric |
| | :DISPlay:ORFSpectrum[:VIEW][:SElect]? |
| Mask Setup – Modulation – Relative limits | [[:SENSe]:ORFSpectrum:LIST:MODulation:LIMit[:RELative] <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl> |
| | [[:SENSe]:ORFSpectrum:LIST:MODulation:LIMit[:RELative]? |
| Mask Setup – Modulation – Absolute limits | [[:SENSe]:ORFSpectrum:LIST:MODulation:LIMit:ABSolute <real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>, <real>,<real>,<real>,<real>,<real>,<real> |
| | [[:SENSe]:ORFSpectrum:LIST:MODulation:LIMit:ABSolute? |
| Mask Setup – Modulation – Fail Logic | [[:SENSe]:ORFSpectrum:LIST:MODulation:FLOGic ABSolute RELative OR OFF,ABSolute RELative OR OFF, ABSolute RELative OR OFF,ABSolute RELative OR OFF, ABSolute RELative OR OFF,ABSolute RELative OR OFF, ABSolute RELative OR OFF,ABSolute RELative OR OFF, ABSolute RELative OR OFF,ABSolute RELative OR OFF, ABSolute RELative OR OFF,ABSolute RELative OR OFF, ABSolute RELative OR OFF |
| | [[:SENSe]:ORFSpectrum:LIST:MODulation:FLOGic? |
| Mask Setup – Switching – Relative limits | [[:SENSe]:ORFSpectrum:LIST:SWITching:LIMit[:RELative] <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl> |
| | [[:SENSe]:ORFSpectrum:LIST:SWITching:LIMit[:RELative]? |
| Mask Setup – Switching – Absolute limits | [[:SENSe]:ORFSpectrum:LIST:SWITching:LIMit:ABSolute <real>,<real>,<real>,<real> |
| | [[:SENSe]:ORFSpectrum:LIST:SWITching:LIMit:ABSolute? |
| Mask Setup – Switching – Fail Logic | [[:SENSe]:ORFSpectrum:LIST:SWITching:FLOGic ABSolute RELative OR OFF,ABSolute RELative OR OFF, ABSolute RELative OR OFF,ABSolute RELative OR OFF |
| | [[:SENSe]:ORFSpectrum:LIST:SWITching:FLOGic? |

Table 2.8-3 Device Messages for Setting Output RF Spectrum Parameters (Cont'd)

| Parameter | Device Message |
|------------------------------------|--|
| Mask Setup – Select Mask | <code>[:SENSe]:ORFSpectrum:LIST:SElect STANdard USER</code> |
| | <code>[:SENSe]:ORFSpectrum:LIST:SElect?</code> |
| Mask Setup – Load Standard Setting | <code>[:SENSe]:ORFSpectrum:LIST:LSSetting</code> |
| Storage Mode | <code>[:SENSe]:ORFSpectrum:AVERage[:STATe] OFF ON 0 1</code> |
| | <code>[:SENSe]:ORFSpectrum:AVERage[:STATe]?</code> |
| Storage Count | <code>[:SENSe]:ORFSpectrum:AVERage:COUNT <integer></code> |
| | <code>[:SENSe]:ORFSpectrum:AVERage:COUNT?</code> |
| Unit | <code>:DISPlay:ORFSpectrum[:VIEW]:WINDow[1] 2:TRACe:Y[:SCALe]:UNIT DB DBM</code> |
| | <code>:DISPlay:ORFSpectrum[:VIEW]:WINDow[1] 2:TRACe:Y[:SCALe]:UNIT?</code> |
| 1800kHz Offset RBW | <code>[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:MODulation:OFFSet:FAR 30K 100K</code> |
| | <code>[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:MODulation:OFFSet:FAR?</code> |
| Noise Cancel | <code>[:SENSe]:ORFSpectrum:NCORrection OFF ON 0 1</code> |
| | <code>[:SENSe]:ORFSpectrum:NCORrection?</code> |
| Reference Mode for Switching | <code>[:SENSe]:ORFSpectrum:SWITching:REFerence:MODE PEAK RMS</code> |
| | <code>[:SENSe]:ORFSpectrum:SWITching:REFerence:MODE?</code> |

Table 2.8-4 lists device messages for setting Output RF Spectrum markers and reading out values of the Output RF Spectrum marker positions.

Table 2.8-4 Device Messages for Output RF Spectrum markers

| Parameter | Device Message |
|----------------------------------|--|
| Marker – On/Off | <code>:CALCulate:ORFSpectrum:MARKer[:STATe] OFF ON 0 1</code> |
| | <code>:CALCulate:ORFSpectrum:MARKer[:STATe]?</code> |
| Marker X Axis – Modulation | <code>:CALCulate:ORFSpectrum:MARKer:MODulation:X <freq></code> |
| | <code>:CALCulate:ORFSpectrum:MARKer:MODulation:X?</code> |
| Marker X Axis – Switching | <code>:CALCulate:ORFSpectrum:MARKer:SWITching:X <freq></code> |
| | <code>:CALCulate:ORFSpectrum:MARKer:SWITching:X?</code> |
| Marker Y Axis Value – Modulation | <code>:CALCulate:ORFSpectrum:MARKer:MODulation:Y?</code> |
| Marker Y Axis Value – Absolute | <code>:CALCulate:ORFSpectrum:MARKer:SWITching:Y?</code> |

2.8.1 Measure

:CONFigure:ORFSpectrum

Output RF Spectrum

Function

This command selects Output RF Spectrum.

Command

:CONFigure:ORFSpectrum

Function

No measurement is performed.

Example of Use

To select Output RF Spectrum.

CONF:ORFS

:INITiate:ORFSpectrum

Output RF Spectrum

Function

This command executes Output RF Spectrum.

Command

:INITiate:ORFSpectrum

Example of Use

To execute Output RF Spectrum.

INIT:ORFS

:FETCh:ORFSpectrum[n]?

Output RF Spectrum Query

Function

This command reads out the measurement result of Output RF Spectrum.

Query

:FETCh:ORFSpectrum[n]?

Response

Refer to Table 2.8-2.

Example of Use

To read out the measurement result of Output RF Spectrum.

```
READ:ORFS?
```

:READ:ORFSpectrum[n]?

Output RF Spectrum Query

Function

This command reads out the measurement result after the single measurement of Output RF Spectrum has been executed by the current setting value.

Query

:READ:ORFSpectrum[n]?

Response

Refer to Table 2.8-2.

Example of Use

To execute Output RF Spectrum so that the measurement result is returned.

```
READ:ORFS?
```

Related Command

This command has the same function as the following.

```
:MEASure:ORFSpectrum[n]?
```

:MEASure:ORFSpectrum[n]?

Output RF Spectrum Query

Function

This command reads out the measurement result after the single measurement of Output RF Spectrum has been executed by the current setting value.

Query

:MEASure:ORFSpectrum[n]?

Response

Refer to Table 2.8-2.

Example of Use

To execute Output RF Spectrum so that the measurement result is returned.

MEAS:ORFS?

Related Command

This command has the same function as the following.

:READ:ORFSpectrum[n]?

2.8.2 Trace Mode

`:DISPlay:ORFSpectrum[:VIEW][:SElect] MODulation|SWITching|NUMeric`

Trace Mode

Function

This command sets the graph type on the graph window when Output RF Spectrum is selected.

Command

```
:DISPlay:ORFSpectrum[:VIEW] [:SElect] <mode>
```

Parameter

| | |
|------------|-------------------------|
| <mode> | Trace Mode |
| MODulation | Modulation |
| SWITching | Switching |
| NUMeric | Numeric (Initial value) |

Example of Use

To set Trace Mode to Modulation.

```
DISP:ORFS MOD
```

:DISPlay:ORFSpectrum[:VIEW][:SElect]?

Trace Mode Query

Function

This command reads out the graph type on the graph window when Output RF Spectrum is selected.

Query

:DISPlay:ORFSpectrum[:VIEW][:SElect]?

Response

<mode>

Parameter

| | |
|--------|------------|
| <mode> | Trace Mode |
| MOD | Modulation |
| SWIT | Switching |
| NUM | Numeric |

Example of Use

To read out the Trace Mode setting.

```
DISP:ORFS?  
> MOD
```


2.8.3 Mask Setup – Modulation – Relative limits

```
[[:SENSE]:ORFSpectrum:LIST:MODulation:LIMit[:RELative]
<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,
<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,
<rel_ampl>
```

Mask Setup – Modulation – Relative limits

Function

This command sets the relative reference levels for Modulation Analysis to the offset frequency in order (starting from 100 kHz).

Command

```
[[:SENSE]:ORFSpectrum:LIST:MODulation:LIMit[:RELative]
<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,
<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,
<rel_ampl>,<rel_ampl>,<rel_ampl>
```

Parameter

| | |
|-------------|--------------------------|
| <rel_ampl> | Relative reference level |
| Range | –99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dB |
| Suffix code | DB |
| | dB is used when omitted. |

Example of Use

To set the relative reference level for Modulation Analysis.

```
ORFS:LIST:MOD:LIM
0.5,-30.00,-.00,-60.00,-60.00,-60.00,-60.00,-60.00,
-60.00,-60.00,-63.00,-65.00,-71.00
```

[[:SENSe]:ORFSpectrum:LIST:MODulation:LIMit[:RELative]]?

Mask Setup – Modulation – Relative limits Query

Function

This command reads out the relative reference levels for Modulation Analysis to the offset frequency in order (starting from 100 kHz).

Query

```
[[:SENSe]:ORFSpectrum:LIST:MODulation:LIMit[:RELative]]?
```

Response

```
<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,  
<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,  
<rel_ampl>,<rel_ampl>,<rel_ampl>
```

Parameter

| | |
|------------|--------------------------|
| <rel_ampl> | Relative reference level |
| Range | -99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dB |

Example of Use

To read out the setting value of the relative reference level for Modulation Analysis.

```
ORFS:LIST:MOD:LIM?  
> 0.5,-30.00,-33.00,-60.00,-60.00,-60.00,-60.00,-60.00,  
-60.00,-60.00,-63.00,-65.00,-71.00
```

2.8.4 Mask Setup – Modulation – Absolute limits

```
[ :SENSe]:ORFSpectrum:LIST:MODulation:LIMit:ABSolute <real>,<real>,  
<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>
```

Mask Setup – Modulation – Absolute limits

Function

This command sets the absolute reference levels for Modulation Analysis to the offset frequency in order (starting from 100 kHz).

Command

```
[ :SENSe]:ORFSpectrum:LIST:MODulation:LIMit:ABSolute  
<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>
```

Parameter

| | |
|-------------|---------------------------|
| <real> | Absolute reference level |
| Range | –99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dBm |
| Suffix code | DBM |
| | dBm is used when omitted. |

Example of Use

To set the absolute reference level for Modulation Analysis.

```
ORFS:LIST:MOD:LIM:ABS  
30.5,-60.00,-63.00,-90.00,-90.00,-90.00,-90.00,-90.00,  
-90.00,-90.00,-93.00,-95.00,-101.00
```

`[[:SENSe]:ORFSpectrum:LIST:MODulation:LIMit:ABSolute?`

Mask Setup – Modulation – Absolute limits Query

Function

This command reads out the absolute reference levels for Modulation Analysis to the offset frequency in order (starting from 100 kHz).

Query

```
[[:SENSe]:ORFSpectrum:LIST:MODulation:LIMit:ABSolute?
```

Response

```
<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>
```

Parameter

| | |
|---------------------------|--------------------------|
| <code><real></code> | Absolute reference level |
| Range | -99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dBm |

Example of Use

To read out the setting value of the absolute reference level for Modulation Analysis.

```
ORFS:LIST:MOD:LIM:ABS?  
> 30.5,-60.00,-63.00,-90.00,-90.00,-90.00,-90.00,-90.00,-90.00,-90.00,-90.00,-93.00,-95.00,-101.00
```

2.8.5 Mask Setup – Modulation – Fail Logic

`[[:SENSe]:ORFSpectrum:LIST:MODulation:FLOGic`

`ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,`
`ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,`
`ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,`
`ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,`
`ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,`
`ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,`
`ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,`
`ABSolute|RELative|OR|OFF`

Mask Setup – Modulation – Fail Logic

Function

This command sets the criterion for pass/fail judgment for Modulation Analysis to the offset frequency in order (starting from 100 kHz).

Command

```
[[:SENSe]:ORFSpectrum:LIST:MODulation:FLOGic
<mode>, <mode>, <mode>, <mode>, <mode>, <mode>, <mode>, <mode>,
<mode>, <mode>, <mode>, <mode>, <mode>
```

Parameter

| <real> | Criterion for judgment |
|----------|------------------------|
| ABSolute | Absolute |
| RELative | Relative |
| OR | Relative or Absolute |
| OFF | Off |

Example of Use

To set the judgment criterion for Modulation Analysis.

```
ORFS:LIST:MOD:FLOG
REL, OR, OR, OR, OR, OR, OR, OR, OR, OR, OR, OR, OR, ABS, OFF
```

[:SENSe]:ORFSpectrum:LIST:MODulation:FLOGic?

Mask Setup – Modulation – Fail Logic Query

Function

This command sets the judgment criterion for Modulation Analysis to the offset frequency in order (starting from 100 kHz).

Query

```
[ :SENSe ] :ORFSpectrum:LIST:MODulation:FLOGic?
```

Response

```
<mode>, <mode>, <mode>, <mode>, <mode>, <mode>, <mode>, <mode>,  
<mode>, <mode>, <mode>, <mode>, <mode>
```

Parameter

| <real> | Criterion for judgment |
|--------|------------------------|
| ABS | Absolute |
| REL | Relative |
| OR | Relative or Absolute |
| OFF | Off |

Example of Use

To read out the setting value of the judgment criterion for Modulation Analysis.

```
ORFS:LIST:MOD:FLOG?  
> REL, OR, OR, OR, OR, OR, OR, OR, OR, OR, OR, OR, ABS, OFF
```

2.8.6 Mask Setup – Switching – Relative limits

`[[:SENSE]:ORFSpectrum:LIST:SWITching:LIMit[:RELative] <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>`

Mask Setup – Switching – Relative limits

Function

This command sets the relative reference levels for Switching measurement to the offset frequency in order (starting from 100 kHz).

Command

```
[[:SENSE]:ORFSpectrum:LIST:SWITching:LIMit[:RELative]
<rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>
```

Parameter

| | |
|-------------------------------|--------------------------|
| <code><rel_ampl></code> | Relative reference level |
| Range | –99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dB |
| Suffix code | DB |
| | dB is used when omitted. |

Example of Use

To set the relative reference level for Switching measurement.

```
ORFS:LIST:SWIT:LIM 0.5, -30.00, -33.00, -60.00
```

`[[:SENSE]:ORFSpectrum:LIST:SWITching:LIMit[:RELative]]?`

Mask Setup – Switching – Relative limits Query

Function

This command reads out the relative reference levels for Switching measurement to the offset frequency in order (starting from 100 kHz).

Query

```
[[:SENSE]:ORFSpectrum:LIST:SWITching:LIMit[:RELative]]?
```

Response

```
<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>
```

Parameter

| | |
|-------------------------------|--------------------------|
| <code><rel_ampl></code> | Relative reference level |
| Range | –99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dB |

Example of Use

To read out the setting value of the relative reference level for Switching measurement.

```
ORFS:LIST:SWIT:LIM?  
> 0.5,-30.00,-33.00,-60.00
```


2.8.7 Mask Setup – Switching – Absolute limits

`[[:SENSE]:ORFSpectrum:LIST:SWITching:LIMit:ABSolute <real>,<real>,<real>,<real>`

Mask Setup – Switching – Absolute limits

Function

This command sets the absolute reference levels for Switching measurement to the offset frequency in order (starting from 100 kHz).

Command

`[[:SENSE]:ORFSpectrum:LIST:SWITching:LIMit:ABSolute <real>,<real>,<real>,<real>`

Parameter

| | |
|---------------------------|---------------------------|
| <code><real></code> | Absolute reference level |
| Range | –99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dBm |
| Suffix code | DBM |
| | dBm is used when omitted. |

Example of Use

To set the absolute reference level for Switching measurement.

`ORFS:LIST:SWIT:LIM:ABS 30.5,-60.00,-63.00,-90.00`

[[:SENSE]:ORFSpectrum:LIST:Switching:LIMit:ABSolute

Mask Setup – Switching – Absolute limits Query

Function

This command reads out the absolute reference levels for Switching measurement to the offset frequency in order (starting from 100 kHz).

Query

```
[[:SENSE]:ORFSpectrum:LIST:SWITching:LIMit:ABSolute?
```

Response

```
<real>,<real>,<real>,<real>
```

Parameter

| | |
|------------|--------------------------|
| <real> | Absolute reference level |
| Range | -99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dBm |

Example of Use

To read out the setting value of the absolute reference level for Switching measurement.

```
ORFS:LIST:SWIT:LIM:ABS?  
> 30.5,-60.00,-63.00,-90.00
```

2.8.8 Mask Setup – Switching – Fail Logic

[:SENSe]:ORFSpectrum:LIST:SWITching:FLOGic
 ABSolute|RELative|OR|OFF,ABSolute|RELative|OR|OFF,
 ABSolute|RELative|OR|OFF,ABSolute|RELative|OR|OFF
 Mask Setup – Switching – Fail Logic

Function

This command sets the criterion for pass/fail judgment for Switching measurement to the offset frequency in order (starting from 100 kHz).

Command

```
[:SENSe]:ORFSpectrum:LIST:SWITching:FLOGic  

<mode>,<mode>,<mode>,<mode>
```

Parameter

| <mode> | Criterion for judgment |
|----------|--------------------------|
| ABSolute | Absolute |
| RELative | Relative (Initial value) |
| OR | Relative or Absolute |
| OFF | Off |

Example of Use

To set the judgment criterion for Switching measurement.

```
ORFS:LIST:SWIT:FLOG REL,OR,OR,OR
```

[[:SENSe]:ORFSpectrum:LIST:Switching:FLOGic?

Mask Setup – Switching – Fail Logic Query

Function

This command sets the judgment criterion for Switching measurement to the offset frequency in order (starting from 100 kHz).

Query

```
[[:SENSe]:ORFSpectrum:LIST:SWITching:FLOGic?
```

Response

```
<mode>,<mode>,<mode>,<mode>
```

Parameter

| <mode> | Criterion for judgment |
|--------|------------------------|
| ABS | Absolute |
| REL | Relative |
| OR | Relative or Absolute |
| OFF | Off |

Example of Use

To read out the setting value of the judgment criterion for Switching measurement.

```
ORFS:LIST:SWIT:FLOG?  
> REL,OR,OR,OR
```

2.8.9 Select Standard

[:SENSE]:ORFSpectrum:LIST:SElect STANdard|USER

Mask Setup – Select Standard

Function

This command sets the mask type applied to the judgment.

Command

```
[ :SENSE]:ORFSpectrum:LIST:SElect <mode>
```

Parameter

| | |
|----------|--------------------------|
| <mode> | Mask type |
| STANdard | Standard (Initial value) |
| USER | User |

Example of Use

To set the mask type to Standard.

```
ORFS:LIST:SEL STAN
```

[:SENSE]:ORFSpectrum:LIST:SElect?

Mask Setup – Select Standard Query

Function

This command reads out the setting value applied to the judgment.

Query

```
[ :SENSE]:ORFSpectrum:LIST:SElect?
```

Response

```
<mode>
```

Parameter

| | |
|--------|-----------|
| <mode> | Mask type |
| STAN | Standard |
| USER | User |

Example of Use

To read out the setting of the mask type.

```
ORFS:LIST:SEL?
```

```
> STAN
```

2.8.10 Load Standard Setting

`[:SENSe] :ORFSpectrum :LIST :LSSetting`

Mask Setup – Load Standard Setting

Function

This command loads the standard setting value into the user-established mask.

Command

```
[ :SENSe ] :ORFSpectrum :LIST :LSSetting
```

Example of Use

To load the standard setting value into the user-established mask.

```
ORFS :LIST :LSS
```

2.8.11 Storage Mode

`[[:SENSE]:ORFSpectrum:AVERage[:STATE] OFF|ON|0|1`

Storage Mode

Function

This command sets the storage mode.

Command

`[[:SENSE]:ORFSpectrum:AVERage[:STATE] <mode>`

Parameter

| <mode> | Storage Mode |
|--------|---------------------|
| OFF 0 | Off (Initial value) |
| ON 1 | On |

Example of Use

To set the storage mode to On.

`ORFS:AVER ON`

`[[:SENSE]:ORFSpectrum:AVERage[:STATE]?`

Storage Mode Query

Function

This command reads out the storage mode setting.

Query

`[[:SENSE]:ORFSpectrum:AVERage[:STATE] ?`

Response

<mode>

Parameter

| <mode> | Storage Mode |
|--------|--------------|
| 0 | Off |
| 1 | On |

Example of Use

To read out the storage mode setting.

`ORFS:AVER?`

`> 1`

2.8.12 Storage Count

[[:SENSE]:ORFSpectrum:AVERage:COUNT <integer>

Storage Count

Function

This command sets the Storage Count.

Command

`[[:SENSE]:ORFSpectrum:AVERage:COUNT <integer>`

Parameter

| | |
|------------------------------|---------------|
| <code><integer></code> | Storage Count |
| Range | 2 to 9999 |
| Resolution | 1 |
| Initial value | 10 |

Example of Use

To set the storage count to 10.

`ORFS:AVER:COUN 10`

[[:SENSE]:ORFSpectrum:AVERage:COUNT?

Storage Count Query

Function

This command reads out the setting of the Storage Count.

Query

`[[:SENSE]:ORFSpectrum:AVERage:COUNT?`

Response

`<integer>`

Parameter

| | |
|------------------------------|---------------|
| <code><integer></code> | Storage Count |
| Range | 2 to 9999 |
| Resolution | 1 |

Example of Use

To read out the storage count setting.

`ORFS:AVER:COUN?`
`> 10`

2.8.13 Unit

:DISPlay:ORFSpectrum[:VIEW]:WINDow[1]|2:TRACe:Y[:SCALE]:UNIT

DB|DBM

Unit

Function

This command sets the Y-axis unit on the graph when Output RF Spectrum is selected.

Command

```
:DISPlay:ORFSpectrum[:VIEW]:WINDow[1]|2:TRACe:Y[:SCALE]:
UNIT <mode>
```

Parameter

| <mode> | Unit |
|--------|--------------------|
| DB | dB (Initial value) |
| DBM | dBm |

Example of Use

To set the unit to dB.

```
DISP:ORFS:WIND:TRAC:Y:UNIT DB
```

:DISPlay:ORFSpectrum[:VIEW]:WINDow[1]|2:TRACe:Y[:SCALE]:UNIT?

Unit Query

Function

This command reads out the Y-axis unit on the graph when Output RF Spectrum is selected.

Query

```
:DISPlay:ORFSpectrum[:VIEW]:WINDow[1]|2:TRACe:Y[:SCALE]:UNIT?
```

Response

```
<mode>
```

Parameter

| <mode> | Unit |
|--------|------|
| DB | dB |
| DBM | dBm |

Example of Use

To read out the setting of the unit.

```
DISP:ORFS:WIND:TRAC:Y:UNIT?  
> DB
```

2.8.14 Marker – On/Off

:CALCulate:ORFSpectrum:MARKer[:STATe] OFF|ON|0|1

Marker – On/Off

Function

This command sets Marker On/Off when Output RF Spectrum is selected.

Command

```
:CALCulate:ORFSpectrum:MARKer[:STATe] <switch>
```

Parameter

| | |
|----------|---------------------|
| <switch> | Marker |
| 0 OFF | Off (Initial value) |
| 1 ON | On |

Example of Use

To display the marker.

```
CALC:ORFS:MARK 1
```

:CALCulate:ORFSpectrum:MARKer[:STATe]?

Marker – On/Off Query

Function

This command reads out the setting of Marker On/Off when Output RF Spectrum is selected.

Query

```
:CALCulate:ORFSpectrum:MARKer[:STATe]?
```

Response

```
<switch>
```

Parameter

| | |
|----------|--------|
| <switch> | Marker |
| 0 | Off |
| 1 | On |

Example of Use

To read out the marker setting.

```
CALC:ORFS:MARK?
> 1
```

2.8.15 Marker Position – Modulation

`:CALCulate:ORFSpectrum:MARKer:MODulation:X <freq>`

Marker X Axis Position

Function

This command sets the marker position on the Modulation graph.

Command

`:CALCulate:ORFSpectrum:MARKer:MODulation:X <freq>`

Parameter

| | |
|---------------------------|--|
| <code><freq></code> | Marker position |
| Range | -6000, -3000, -1800, -1600, -1400, -1200, -1000, -800, -600, -400, -250, -200, -100, 0, 100, 200, 250, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 3000, 6000 (Unit: kHz) |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ He is used when omitted. |
| Initial value | 0 kHz |

Example of Use

To set the marker position on the graph to 400 kHz.

`CALC:ORFS:MARK:MOD:X 400KHZ`

:CALCulate:ORFSpectrum:MARKer:MODulation:X?

Marker X Axis Position Query

Function

This command reads out the marker position on the Modulation graph.

Query

`:CALCulate:ORFSpectrum:MARKer:MODulation:X?`

Response

`<freq>`

Parameter

| | |
|---------------------------|--|
| <code><freq></code> | Marker position |
| Range | -6000, -3000, -1800, -1600, -1400, -1200, -1000, -800, -600, -400, -250, -200, -100, 0, 100, 200, 250, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 3000, 6000 (Unit: kHz) |
| Resolution | 1 Hz |
| | Value is returned in Hz units. |

Example of Use

To read out the setting of the marker position on the graph.

```
CALC:ORFS:MARK:MOD:X?
> 400000
```

2.8.16 Marker Position – Switching

:CALCulate:ORFSpectrum:MARKer:SWITching:X <freq>

Marker X Axis Position

Function

This command sets the marker position on the Switching graph.

Command

:CALCulate:ORFSpectrum:MARKer:SWITching:X <freq>

Parameter

| | |
|---------------|---|
| <freq> | Marker position |
| Range | -1800, -1200, -600, -400, 0, 400, 600, 1200, 1800 (Unit: kHz) |
| Suffix code | HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ Hz is used when omitted. |
| Initial value | 0 kHz |

Example of Use

To set the marker position on the graph to 400 kHz.

CALC:ORFS:MARK:SWIT:X 400KHZ

:CALCulate:ORFSpectrum:MARKer:SWITching:X?

Marker X Axis Position Query

Function

This command reads out the marker position on the Switching graph.

Query

`:CALCulate:ORFSpectrum:MARKer:SWITching:X?`

Response

`<freq>`

Parameter

| | |
|---------------------------|---|
| <code><freq></code> | Marker position |
| Range | -1800, -1200, -600, -400, 0, 400, 600, 1200, 1800 (Unit: kHz) |
| Resolution | 1 Hz |
| | Value is returned in Hz units. |

Example of Use

To read out the setting of the marker position on the graph.

```
CALC:ORFS:MARK:SWIT:X?
> 400000
```

2.8.17 Marker Value

:CALCulate:ORFSpectrum:MARKer:MODulation:Y?

Modulation – Marker Y Axis Value – Query

Function

This command reads out the Y-axis value on the Modulation graph marker.

Query

`:CALCulate:ORFSpectrum:MARKer:MODulation:Y?`

Response

`<real>`

Parameter

| | |
|---------------------------|--|
| <code><real></code> | Y-axis at the modulation marker position |
| Resolution | 0.01 dB |
| | Value is returned in the current Y-axis setting units. |

Example of Use

To read out the Y-axis at the marker position.

```
CALC:ORFS:MARK:MOD:Y?  
> -50.12
```


:CALCulate:ORFSpectrum:MARKer:SWITching:Y?

Switching – Marker Y Axis Value – Query

Function

This command reads out the Y-axis value on the Switching graph marker.

Query

`:CALCulate:ORFSpectrum:MARKer:SWITching:Y?`

Response

`<real>`

Parameter

| | |
|---------------------------|--|
| <code><real></code> | Y-axis at the Switching marker position |
| Resolution | 0.01 dB |
| | Value is returned in the current Y-axis setting units. |

Example of Use

To read out the Y-axis at the marker.
`CALC:ORFS:MARK:SWIT:Y?`
> -50.12

2.8.18 1800kHz Offset RBW (for Modulation Meas BW)

`[[:SENSE]:ORFSpectrum:BANDwidth[:RESolution]:MODulation:OFFSet:FAR
30K|100K`

1800kHz Offset RBW

Function

This command sets the RBW of Offset frequency 1800 kHz to be used for Spectrum due to modulation measurement.

Command

`[[:SENSE]:ORFSpectrum:BANDwidth[:RESolution]:MODulation:OFFSet:FAR <rbw>`

Parameter

| <rbw> | RBW |
|-------|-------------------|
| 30K | 30 kHz |
| 100K | 100 kHz (Default) |

Example of Use

To set 1800 kHz Offset RBW to 30 kHz.
`ORFS:BAND:MOD:OFFS:FAR 30K`

`[[:SENSE]:ORFSpectrum:BANDwidth[:RESolution]:MODulation:OFFSet:FAR?`

1800kHz Offset RBW – Query

Function

This command queries the RBW of Offset frequency 1800 kHz to be used for Spectrum due to modulation measurement.

Query

`[[:SENSE]:ORFSpectrum:BANDwidth[:RESolution]:MODulation:OFFSet:FAR?`

Response

<rbw>

Parameter

| <rbw> | RBW |
|-------|---------|
| 30K | 30 kHz |
| 100K | 100 kHz |

Example of Use

To query 1800kHz Offset RBW.
`ORFS:BAND:MOD:OFFS:FAR?`
> 100K

2.8.19 Noise Cancel

`[[:SENSe]:ORFSpectrum:NCORrection OFF|ON|0|1`

Noise Cancel

Function

This command sets On/Off for Noise Cancel when selecting Output RF Spectrum.

Command

`[[:SENSe]:ORFSpectrum:NCORrection <mode>`

Parameter

| <mode> | Noise Cancel |
|--------|---------------|
| OFF 0 | Off (Default) |
| ON 1 | On |

Example of Use

To set Noise Cancel to On when selecting Output RF Spectrum.
`ORFS:NCOR ON`

`[[:SENSe]:ORFSpectrum:NCORrection?`

Noise Cancel – Query

Function

This command reads out the Noise Cancel settings when selecting Output RF Spectrum.

Query

`[[:SENSe]:ORFSpectrum:NCORrection?`

Response

<mode>

Parameter

| <mode> | Noise Cancel |
|--------|--------------|
| 0 | Off |
| 1 | On |

Example of Use

To read out the Noise Cancel setting when selecting Output RF Spectrum.
`ORFS:NCOR?`
> 1

2.8.20 Reference Mode for Switching

`[:SENSE] :ORFSpectrum :SWITching :REFerence :MODE PEAK|RMS`

Reference Mode for Switching

Function

This command sets Reference Power for the switching measurement when selecting Output RF Spectrum.

Command

```
[ :SENSE ] :ORFSpectrum :SWITching :REFerence :MODE <mode>
```

Parameter

| <mode> | Reference Mode |
|--------|----------------|
| PEAK | peak |
| RMS | rms (Default) |

Example of Use

To set the Peak value as the Reference Power at the Switching measurement when selecting Output RF Spectrum.

```
ORFS :SWIT :REF :MODE PEAK
```

`[:SENSE] :ORFSpectrum :SWITching :REFerence :MODE ?`

Reference Mode for Switching – Query

Function

This command reads out the Reference Power settings for the Switching measurement when selecting Output RF Spectrum.

Query

```
[ :SENSE ] :ORFSpectrum :SWITching :REFerence :MODE ?
```

Response

```
<mode>
```

Parameter

| <mode> | Reference Mode |
|--------|----------------|
| PEAK | peak |
| RMS | rms |

Example of Use

To read out Reference Power for the Switching measurement when selecting Output RF Spectrum.

```
ORFS :SWIT :REF :MODE ?
```

```
> PEAK
```

2.9 Power vs Time

Table 2.9-1 lists device messages for Power vs Time.

Table 2.9-1 Device Messages for executing Power vs Time and reading result

| Function | Device Message |
|-----------|-----------------------|
| Configure | :CONFigure:PVTime |
| Initiate | :INITiate:PVTime |
| Fetch | :FETCh:PVTime [n] ? |
| Read | :READ:PVTime [n] ? |
| Measure | :MEASure:PVTime [n] ? |

Table 2.9-2 lists responses to the parameter n on Table 2.9-1.
 -999.0 is returned when Result Mode is set to B.

Table 2.9-2 Responses to Power vs Time result

| n | Result Mode | Response |
|--------------|-------------|---|
| 1 or omitted | A | Responses are returned with comma separated value format in the following order. 0 indicates “Pass”, 1 indicates “Failure”, and 2 indicates “Not judged”. 1. Judgment result for the masks (in all the slots) 2. Slot #0 State (0 = Active, 1 = Inactive) 3. Slot #0 Average Power [dBm] 4. Slot #0 Maximum Power [dBm] 5. Slot #0 Minimum Power [dBm] 6. Slot #0 Judgment result for mask ... 37. Slot #7 State (0 = Active, 1 = Inactive) 38. Slot #7 Average Power [dBm] 39. Slot #7 Maximum Power [dBm] 40. Slot #7 Minimum Power [dBm] 41. Slot #7 Judgment result for mask 42. Time Offset* [s] (Average value for Storage Count) 43. Time Offset* [s] (Maximum value for Storage Count) *: When Trigger Switch is Off: -999.0 |
| 2 | A | Average Power at the measurement point to the selected slot is returned with comma separated value format. The data numbers are as follows. The unit of the return value depends on the value set by Unit. When RF Signal is Normal Burst or Continuous: 3661 When RF Signal is Higher Symbol Rate Burst: 4241 |
| 8 | A | Maximum Power at the measurement point is returned with comma separated value format. The data numbers are as follows. The unit of the return value depends on the value set by Unit. When RF Signal is Normal Burst or Continuous: 3661 When RF Signal is Higher Symbol Rate Burst: 4241 |
| 9 | A | Minimum Power at the measurement point is returned with comma separated value format. The unit of the return value depends on the value set by Unit. When RF Signal is Normal Burst or Continuous: 3661 When RF Signal is Higher Symbol Rate Burst: 4241 |

Table 2.9-3 list device messages for setting Power vs Time parameters.

Table 2.9-3 Device Messages for Setting Power vs Time Parameters

| Parameter | Device Message |
|---|--|
| Trace Mode | :DISPlay:PVTime[:VIEW][:SElect] RAFall SLOT FRAME |
| | :DISPlay:PVTime[:VIEW][:SElect]? |
| Unit | :DISPlay:PVTime[:VIEW]:WINDow[1] 2 3:TRACe:X[:SCALe]:UNIT DB DBM |
| | :DISPlay:PVTime[:VIEW]:WINDow[1] 2 3:TRACe:X[:SCALe]:UNIT? |
| Display Item | :DISPlay:PVTime[:VIEW]:WINDow[1] 2 3:TRACe:Y:DITem AVERAge ALL |
| | :DISPlay:PVTime[:VIEW]:WINDow[1] 2 3:TRACe:Y:DITem |
| Slot | :DISPlay:PVTime[:VIEW]:WINDow[1] 2 3:TRACe:Y[:SCALe]:SLOT <integer> |
| | :DISPlay:PVTime[:VIEW]:WINDow[1] 2 3:TRACe:Y[:SCALe]:SLOT? |
| Mask Setup – Select Mask | [:SENSe]:PVTime:MASK:SElect STANDard USER |
| | [:SENSe]:PVTime:MASK:SElect? |
| Mask Setup – Load Standard Setting | [:SENSe]:PVTime:MASK:LSSetting |
| Mask Setup – Upper limits – Rise – Time | [:SENSe]:PVTime:MASK:LIST:UPPer:RISE:TIME <time>,<time>,<time>,<time>,<time>,<time>,<time>,<time>,<time>,<time> |
| | [:SENSe]:PVTime:MASK:LIST:UPPer:RISE:TIME? |
| Mask Setup – Upper – Rise – Absolute limits | [:SENSe]:PVTime:MASK:LIST:UPPer:RISE:ABSolute <real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real> |
| | [:SENSe]:PVTime:MASK:LIST:UPPer:RISE:ABSolute? |
| Mask Setup – Upper – Rise – Relative limits | [:SENSe]:PVTime:MASK:LIST:UPPer:RISE:RELative <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl> |
| | [:SENSe]:PVTime:MASK:LIST:UPPer:RISE:RELative? |
| Mask Setup – Upper – Rise – Fail Logic | [:SENSe]:PVTime:MASK:LIST:UPPer:RISE:FLOGic ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF |
| | [:SENSe]:PVTime:MASK:LIST:UPPer:RISE:FLOGic? |
| Filter Type | [:SENSe]:PVTime:BANDwidth[:RESolution]:TYPE GAUSSian 5POLe |
| | [:SENSe]:PVTime:BANDwidth[:RESolution]:TYPE? |
| Filter BW | [:SENSe]:PVTime:BANDwidth[:RESolution] 300Khz 500Khz 1MHZ |
| | [:SENSe]:PVTime:BANDwidth[:RESolution]? |

Table 2.9-3 Device messages for setting Power vs Time parameters (Cont'd)

| Parameter | Device Message |
|--|--|
| Mask Setup – Upper limits – Fall – Time | [:SENSe] :PVTime:MASK:LIST:UPPer:FALL:TIME <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time> |
| | [:SENSe] :PVTime:MASK:LIST:UPPer:FALL:TIME? |
| Mask Setup – Upper – Fall – Absolute limits | [:SENSe] :PVTime:MASK:LIST:UPPer:FALL:ABSolute <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real> |
| | [:SENSe] :PVTime:MASK:LIST:UPPer:FALL:ABSolute? |
| Mask Setup – Upper – Fall – Relative limits | [:SENSe] :PVTime:MASK:LIST:UPPer:FALL:RELative <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl> |
| | [:SENSe] :PVTime:MASK:LIST:UPPer:FALL:RELative? |
| Mask Setup – Upper – Fall – Fail Logic | [:SENSe] :PVTime:MASK:LIST:UPPer:FALL:FLOGic ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF |
| | [:SENSe] :PVTime:MASK:LIST:UPPer:FALL:FLOGic? |
| Mask Setup – Lower – Rise – Time | [:SENSe] :PVTime:MASK:LIST:LOWer:RISE:TIME <time>, <time>, <time>, <time>, <time>, <time> |
| | [:SENSe] :PVTime:MASK:LIST:LOWer:RISE:TIME? |
| Mask Setup – Lower limits – Rise – Absolute limits | [:SENSe] :PVTime:MASK:LIST:LOWer:RISE:ABSolute <real>, <real>, <real>, <real>, <real>, <real> |
| | [:SENSe] :PVTime:MASK:LIST:LOWer:RISE:ABSolute? |
| Mask Setup – Lower – Rise – Relative limits | [:SENSe] :PVTime:MASK:LIST:LOWer:RISE:RELative <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl> |
| | [:SENSe] :PVTime:MASK:LIST:LOWer:RISE:RELative? |
| Mask Setup – Lower – Rise – Fail Logic | [:SENSe] :PVTime:MASK:LIST:LOWer:RISE:FLOGic ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF |
| | [:SENSe] :PVTime:MASK:LIST:LOWer:RISE:FLOGic? |

Table 2.9-3 Device messages for Setting Power vs Time parameters (Cont'd)

| Parameter | Device Message |
|---|--|
| Mask Setup – Lower limits – Fall – Time | [:SENSe] :PVTime:MASK:LIST:LOWer:FALL:TIME <time>, <time>, <time>, <time>, <time>, <time> |
| | [:SENSe] :PVTime:MASK:LIST:LOWer:FALL:TIME? |
| Mask Setup – Lower – Fall – Absolute limits | [:SENSe] :PVTime:MASK:LIST:LOWer:FALL:ABSolute <real>, <real>, <real>, <real>, <real>, <real> |
| | [:SENSe] :PVTime:MASK:LIST:LOWer:FALL:ABSolute? |
| Mask Setup – Lower – Fall – Relative limits | [:SENSe] :PVTime:MASK:LIST:LOWer:FALL:RELative <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl> |
| | [:SENSe] :PVTime:MASK:LIST:LOWer:FALL:RELative? |
| Mask Setup – Lower – Fall – Fail Logic | [:SENSe] :PVTime:MASK:LIST:LOWer:FALL:FLOGic ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF, ABSolute RELative OR OFF |
| | [:SENSe] :PVTime:MASK:LIST:LOWer:FALL:FLOGic? |
| Storage Mode | [:SENSe] :PVTime:AVERAge[:STATE] OFF ON 0 1 |
| | [:SENSe] :PVTime:AVERAge[:STATE]? |
| Storage Count | [:SENSe] :PVTime:AVERAge:COUNT <integer> |
| | [:SENSe] :PVTime:AVERAge:COUNT? |
| Average Type | [:SENSe] :PVTime:AVERAge:TYPE POWER LOGPower |
| | [:SENSe] :PVTime:AVERAge:TYPE? |

Table 2.9-4 lists device messages for setting Power vs Time markers and reading out the marker position values

Table 2.9-4 Device messages for Power vs Time markers

| Parameter | Device Message |
|-------------------------------|---|
| Marker – On/Off | :CALCulate:PVTime:MARKer[:STATE] OFF ON 0 1 |
| | :CALCulate:PVTime:MARKer[:STATE]? |
| Marker – Active Trace | :CALCulate:PVTime:MARKer:ACTive RISE FALL |
| | :CALCulate:PVTime:MARKer:ACTive? |
| Marker X Axis | :CALCulate:PVTime:MARKer:X[:POINT] <real> |
| | :CALCulate:PVTime:MARKer:X[:POINT]? |
| Marker Y Axis Value – Average | :CALCulate:PVTime:MARKer:Y[:AVERAge]? |
| Marker Y Axis Value – Maximum | :CALCulate:PVTime:MARKer:Y:MAXimum? |
| Marker Y Axis Value – Minimum | :CALCulate:PVTime:MARKer:Y:MINimum? |

2.9.1 Measure

:CONFigure:PVTime

Power vs Time

Function

This command selects Power vs Time.

Command

```
:CONFigure:PVTime
```

Function

No measurement is performed.

Example of Use

To select Power vs Time.

```
CONF:PVT
```

:INITiate:PVTime

Power vs Time

Function

This command executes Power vs Time.

Command

```
:INITiate:PVTime
```

Example of Use

To execute Power vs Time.

```
INIT:PVT
```

:FETCh:PVTime [n]?

Power vs Time Query

Function

This command reads out the measurement result of Power vs Time.

Query

```
:FETCh:PVTime [n] ?
```

Response

Refer to Table 2.9-2.

Example of Use

To read out the measurement result of Power vs Time.

```
FETC:PVT?
```

:READ:PVTime [n]?

Power vs Time Query

Function

This command reads out the measurement result after the single measurement for Power vs Time has been executed by the current setting value.

Query

```
:READ:PVTime [n] ?
```

Response

Refer to Table 2.9-2.

Example of Use

To execute Power vs Time so that the measurement result is read out.

```
READ:PVT?
```

Related Command

This command has the same function as the following.

```
:MEASure:PVTime [n] ?
```

:MEASure:PVTime [n]?

Power vs Time Query

Function

This command reads out the measurement result after the single measurement for Power vs Time has been executed by the current setting value.

Query

`:MEASure:PVTime [n] ?`

Response

Refer to Table 2.9-2.

Example of Use

To execute Power vs Time so that the measurement result is read out.

`MEAS:PVT?`

Related Command

This command has the same function as the following.

`:READ:PVTime [n] ?`

2.9.2 Trace Mode

:DISPlay:PVTime[:VIEW][:SElect] RAFall|SLOT|FRAMe

Trace Mode

Function

This command sets the graph type on the graph window when Power vs Time is selected.

Command

```
:DISPlay:PVTime[:VIEW][:SElect] <mode>
```

Parameter

| | |
|--------|----------------------|
| <mode> | Trace Mode |
| RAFall | Rise and Fall |
| SLOT | Slot (Initial value) |
| FRAMe | Frame |

Example of Use

To set Trace Mode to Rise and Fall.

```
DISP:PVT RAF
```

:DISPlay:PVTime[:VIEW][:SElect]?

Trace Mode Query

Function

This command reads out the graph type on the graph window when Power vs Time is selected.

Query

```
:DISPlay:PVTime[:VIEW][:SElect]?
```

Response

```
<mode>
```

Parameter

| | |
|--------|---------------|
| <mode> | Trace Mode |
| RAF | Rise and Fall |
| SLOT | Slot |
| FRAM | Frame |

Example of Use

To read out the Trace Mode setting.

```
DISP:PVT?
> FRAM
```

2.9.3 Unit

:DISPlay:PVTime[:VIEW]:WINDow[1]|2|3:TRACe:Y[:SCALe]:UNIT DB|DBM
Unit

Function

This command sets the Y-axis unit on the graph when Power vs Time is selected.

Command

```
:DISPlay:PVTime[:VIEW]:WINDow[1]|2|3:TRACe:Y[:SCALe]:UNIT <mode>
```

Parameter

| <mode> | Unit |
|--------|--------------------|
| DB | dB (Initial value) |
| DBM | dBm |

Example of Use

To set the unit to dB.

```
DISP:PVT:WIND:TRAC:Y:UNIT DB
```

:DISPlay:PVTime[:VIEW]:WINDow[1]|2|3:TRACe:Y[:SCALE]:UNIT?

Unit Query

Function

This command reads out the Y-axis unit setting on the graph when Power vs Time is selected.

Query

```
:DISPlay:PVTime[:VIEW]:WINDow[1]|2|3:TRACe:Y[:SCALE]:UNIT?
```

Response

```
<mode>
```

Parameter

| <mode> | Unit |
|--------|------|
| DB | dB |
| DBM | dBm |

Example of Use

To read out the unit setting.

```
DISP:PVT:WIND:TRAC:Y:UNIT?
> DB
```

2.9.4 Display Item

:DISPlay:PVTime[:VIEW]:WINDow[1]|2|3:TRACe:Y:DITem AVERAge|ALL

Display Item

Function

This command sets the measurement result type on the Power vs Time graph.

Command

`:DISPlay:PVTime[:VIEW]:WINDow[1]|2|3:TRACe:Y:DITem <mode>`

Parameter

| <mode> | Display Item |
|---------|---------------------|
| AVERAge | Average |
| ALL | All (Initial value) |

Example of Use

To set the display item to All.

`DISP:PVT:WIND:TRAC:Y:DIT ALL`

:DISPlay:PVTime[:VIEW]:WINDow[1]|2|3:TRACe:Y:DITem?

Display Item Query

Function

This command reads out the setting of the measurement result type on the Power vs Time graph.

Query

`:DISPlay:PVTime[:VIEW]:WINDow[1]|2|3:TRACe:Y:DITem?`

Response

`<mode>`

Parameter

| <mode> | Unit |
|--------|---------|
| AVER | Average |
| ALL | All |

Example of Use

To read out the setting of the display item.

`DISP:PVT:WIND:TRAC:Y:DIT?`
`> ALL`

2.9.5 Slot

`:DISPlay:PVTime[:VIEW]:WINDow[1]|2|3:TRACe:X[:SCALe]:SLOT <integer>`

Slot

Function

This command sets the slot number on the Power vs Time graph.

Command

```
:DISPlay:PVTime[:VIEW]:WINDow[1]|2|3:TRACe:X[:SCALe]:SLOT
<integer>
```

Parameter

| | |
|------------------------------|--------|
| <code><integer></code> | Slot |
| Range | 0 to 7 |
| Resolution | 1 |
| Initial value | 0 |

Example of Use

To set Slot to 1.

```
DISP:PVT:WIND:TRAC:X:SLOT 1
```

:DISPlay:PVTime[:VIEW]:WINDow[1]|2|3:TRACe:X[:SCALe]:SLOT?

Slot Query

Function

This command reads out the setting of the slot number on the Power vs Time graph.

Query

```
:DISPlay:PVTime[:VIEW]:WINDow[1]|2|3:TRACe:X[:SCALe]:SLOT?
```

Response

```
<integer>
```

Parameter

| | |
|------------|--------|
| <integer> | Slot |
| Range | 0 to 7 |
| Resolution | 1 |

Example of Use

To read out the Slot setting.

```
DISP:PVT:WIND:TRAC:X:SLOT?  
> 1
```

2.9.6 Select Standard

[:SENSe]:PVTime:MASK:SElect STANdard|USER

Mask Setup – Select Mask

Function

This command sets the mask type applied to the judgment.

Command

```
[ :SENSe ] : PVTime : MASK : SElect <mode>
```

Parameter

| | |
|----------|--------------------------|
| <mode> | Mask type |
| STANdrad | Standard (Initial value) |
| USER | User |

Example of Use

To set the mask type to Standard.

```
PVT:MASK:SEL STAN
```

[:SENSe]:PVTime:MASK:SElect?

Mask Setup – Select Mask Query

Function

This command reads out the setting applied to the judgment.

Query

```
[ :SENSe ] : PVTime : MASK : SElect ?
```

Response

```
<mode>
```

Parameter

| | |
|--------|-----------|
| <mode> | Mask type |
| STAN | Standard |
| USER | User |

Example of Use

To read out the mask type setting.

```
PVT:MASK:SEL?
```

```
> STAN
```

2.9.7 Load Standard Setting

`[:SENSe]:PVTime:MASK:LSSetting`

Mask Setup – Load Standard Setting

Function

This command reads the standard setting value into the user-established mask.

Command

```
[ :SENSe ] :PVTime:MASK:LSSetting
```

Example of Use

To read the standard setting value into the user-established mask.

```
PVT:MASK:LSS
```

2.9.8 Upper – Rise – Time

`[[:SENSE]:PVTime:MASK:LIST:UPPER:RISE:TIME`

`<time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>`

Mask Setup – Upper limits – Rise – Time

Function

This command sets the time point for the upper limit line of the power-rising part on the user-established mask.

Command

```
[[:SENSE]:PVTime:MASK:LIST:UPPER:RISE:TIME
<time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>,
<time>, <time>, <time>
```

Parameter

| | |
|---------------------------|--|
| <code><time></code> | Time point |
| Range | -48.00 to 48.00 |
| Resolution | 0.01 |
| Suffix code | NS, US, MS, S s is used when omitted. |

Details

The first, eighth, and ninth arguments are fixed. Values set for them are ignored.

Example of Use

To set the time point of the user-established mask.

```
PVT:MASK:LIST:UPP:RISE:TIME
-48US, -28US, -28US, -18US, -18US, -10US, -10US, 0, 0, 0, 0
```

[[:SENSE]:PVTime:MASK:LIST:UPPer:RISE:TIME?

Mask Setup – Upper limits – Rise – Time Query

Function

This command reads out the setting value of the time point for the upper limit line of the power-rising part on the user-established mask.

Query

```
[[:SENSE]:PVTime:MASK:LIST:UPPer:RISE:TIME?
```

Parameter

| | |
|-------------|-----------------|
| <time> | Time point |
| Range | -40.00 to 48.00 |
| Resolution | 0.01 |
| Suffix code | None |

Value is returned in s units.

Example of Use

To read out the time point of the user-established mask.

```
PVT:MASK:LIST:UPP:RISE:TIME?  
> -0.00004800,-0.00002800,-0.00002800,-0.00001800,  
-0.00001800,-0.0000100,-0.0000100,0.00000000,  
0.00000000,0.00000000,0.00000000
```

2.9.9 Upper – Rise – Absolute limits

`[:SENSe]:PVTime:MASK:LIST:UPPer:RISE:ABSolute`

`<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>`

Mask Setup – Upper – Rise – Absolute limits

Function

This command sets the absolute reference level for the upper limit line of the power-rising part on the user-established mask.

Command

```
[ :SENSe ] :PVTime:MASK:LIST:UPPer:RISE:ABSolute
<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>
<real>,<real>,<real>
```

Parameter

| | |
|---------------------------|--------------------------|
| <code><real></code> | Absolute reference level |
| Range | –99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dBm |
| Suffix code | DBM |

dBm is used when omitted.

Example of Use

To set the absolute reference level of the user-established mask.

```
PVT:MASK:LIST:UPP:RISE:ABS
99.99,99.99,99.99,99.99,99.99,99.99,99.99,99.99,99.99,99.99,
99.99,99.99
```

[:SENSe]:PVTime:MASK:LIST:UPPer:RISE:ABSolute?

Mask Setup – Upper – Rise – Absolute limits Query

Function

This command reads out the setting value of the absolute reference level for the upper limit line of the power-rising part on the user-established mask.

Query

```
[ :SENSe]:PVTime:MASK:LIST:UPPer:RISE:ABSolute?
```

Parameter

| | |
|------------|--------------------------|
| <real> | Absolute reference level |
| Range | -99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dBm |

Example of Use

To read out the setting value of the absolute reference level of the user-established mask.

```
PVT:MASK:LIST:UPP:RISE:ABS?  
> 99.99,99.99,99.99,99.99,99.99,99.99,99.99,99.99,99.99,  
99.99,99.99
```


2.9.10 Upper – Rise – Relative limits

`[[:SENSE]:PVTime:MASK:LIST:UPPer:RISE:RELative`

`<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>`

Mask Setup – Upper – Rise – Relative limits

Function

This command sets the relative reference level for the upper limit line of the power-rising part on the user-established mask.

Command

```
[[:SENSE]:PVTime:MASK:LIST:UPPer:RISE:RELative <rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>
```

Parameter

| | |
|------------------------------|--------------------------|
| <code><rel_amp></code> | Relative reference level |
| Range | –99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dB |
| Suffix code | DB |
| | dB is used when omitted. |

Example of Use

To set the relative reference level of the user-established mask.

```
PVT:MASK:LIST:UPP:RISE:REL
-30.00,-30.00,-30.00,-30.00,-6.00,-6.00,4.00,4.00,1.00,
1.00,1.00
```

[[:SENSE]:PVTime:MASK:LIST:UPPER:RISE:RELATIVE?

Mask Setup – Upper – Rise – Relative limits Query

Function

This command reads out the setting value of the relative reference level for the upper limit line of the power-rising part on the user-established mask.

Query

```
[[:SENSE]:PVTime:MASK:LIST:UPPER:RISE:RELATIVE?
```

Parameter

| | |
|------------|--------------------------|
| <real> | Absolute reference level |
| Range | -99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dB |

Example of Use

To read out the setting value of the relative reference level of the user-established mask.

```
PVT:MASK:LIST:UPPER:RISE:REL?  
> -30.00,-30.00,-30.00,-30.00,-6.00,-6.00,4.00,4.00,1.00,  
1.00,1.00
```

2.9.11 Upper – Rise – Fail Logic

```
[ :SENSe]:PVTime:MASK:LIST:UPPer:RISE:FLOGic
ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,
ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,
ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,
ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,
ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,
ABSolute|RELative|OR|OFF
```

Mask Setup – Upper – Rise – Fail Logic

Function

This command sets the criterion for Pass/Fail judgment for the upper limit line of the power-rising part on the user-established mask.

Command

```
[ :SENSe]:PVTime:MASK:LIST:UPPer:RISE:FLOGic <mode>,
<mode>, <mode>, <mode>, <mode>, <mode>, <mode>,
<mode>, <mode>, <mode>
```

Parameter

| <real> | Criterion for judgment |
|----------|------------------------|
| ABSolute | Absolute |
| RELative | Relative |
| OR | Relative or Absolute |
| OFF | Off |

Example of Use

To set the judgment criterion for the user-established mask.

```
PVT:MASK:LIST:UPP:RISE:FLOG
REL, REL, REL, REL, REL, REL, REL, REL, REL, REL
```

[[:SENSE]:PVTime:MASK:LIST:UPPer:RISE:FLOGic?

Mask Setup – Upper – Rise – Fail Logic Query

Function

This command reads out the setting value of the criterion for Pass/Fail judgment for the upper limit line of the power-rising part on the user-established mask.

Query

```
[[:SENSE]:PVTime:MASK:LIST:UPPer:RISE:FLOGic?
```

Parameter

| | |
|--------|------------------------|
| <real> | Criterion for judgment |
| ABS | Absolute |
| REL | Relative |
| OR | Relative or Absolute |
| OFF | Off |

Example of Use

To read the setting value of the judgment criterion for the user-established mask.

```
PVT:MASK:LIST:UPP:RISE:FLOG?  
> REL,REL,REL,REL,REL,REL,REL,REL,REL,REL,REL
```

2.9.12 Upper – Fall – Time

`[[:SENSE]:PVTime:MASK:LIST:UPPer:FALL:TIME`

`<time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>`

Mask Setup – Upper limits – Fall – Time

Function

This command sets the time point for the upper limit line of the power-falling part on the user-established mask.

Command

```
[[:SENSE]:PVTime:MASK:LIST:UPPer:FALL:TIME
<time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>,
<time>, <time>, <time>
```

Parameter

| | |
|---------------------------|-------------------------|
| <code><time></code> | Time point |
| Range | –48.00 to 48.00 |
| Resolution | 0.01 μ s |
| Suffix code | NS, US, MS, S |
| | s is used when omitted. |

Details

The third, fourth, and eleventh arguments are fixed. Values set for them are ignored.

Example of Use

To set the time point of the user-established mask.

```
PVT:MASK:LIST:UPP:FALL:TIME
0,0,0,0,10US,10US,18US,18US,28US,28US,48US
```

[[:SENSE]:PVTime:MASK:LIST:UPPer:FALL:TIME?

Mask Setup – Upper limits – Fall – Time Query

Function

This command reads out the setting value of the time point for the upper limit line of the power-falling part on the user-established mask.

Query

```
[[:SENSE]:PVTime:MASK:LIST:UPPer:FALL:TIME?
```

Parameter

| | |
|-------------|-----------------|
| <time> | Time point |
| Range | –48.00 to 48.00 |
| Resolution | 0.01 μ s |
| Suffix code | None |

Value is returned in s units.

Example of Use

To read out the time point of the user-established mask.

```
PVT:MASK:LIST:UPP:FALL:TIME?  
> 0.00000000,0.00000000,0.00000000,0.00000000,0.00001000,  
0.00001000,0.00001800,0.00001800,0.00002800,0.00002800,  
0.00004800
```

2.9.13 Upper – Fall – Absolute limits

`[:SENSe]:PVTime:MASK:LIST:UPPer:FALL:ABSolute`

`<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>`

Mask Setup – Upper – Fall – Absolute limits

Function

This command sets the absolute reference level for the upper limit line of the power-falling part on the user-established mask.

Command

```
[:SENSe]:PVTime:MASK:LIST:UPPer:FALL:ABSolute
<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>,<real>
<real>,<real>,<real>
```

Parameter

| | |
|---------------------------|---------------------------|
| <code><real></code> | Absolute reference level |
| Range | –99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dBm |
| Suffix code | DBM |
| | dBm is used when omitted. |

Example of Use

To set the absolute reference level of the user-established mask.

```
PVT:MASK:LIST:UPP:FALL:ABS
99.99,99.99,99.99,99.99,99.99,99.99,99.99,99.99,99.99,99.99,99.99,99.99,
99.99,99.99
```

[[:SENSE]:PVTime:MASK:LIST:UPPer:FALL:ABSolute?

Mask Setup – Upper – Fall – Absolute limits Query

Function

This command reads out the setting value of the absolute reference level for the upper limit line of the power-falling part on the user-established mask.

Query

```
[[:SENSE]:PVTime:MASK:LIST:UPPer:FALL:ABSolute?
```

Parameter

| | |
|------------|--------------------------|
| <real> | Absolute reference level |
| Range | -99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dBm |

Example of Use

To read out the setting value of the absolute reference level.

```
PVT:MASK:LIST:UPP:FALL:ABS?  
> 99.99,99.99,99.99,99.99,99.99,99.99,99.99,99.99,99.99,99.99,  
99.99,99.99
```


2.9.14 Upper – Fall – Relative limits

`[[:SENSE]:PVTime:MASK:LIST:UPPer:FALL:RELative`

`<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>`

Mask Setup – Upper – Fall – Relative limits

Function

This command sets the relative reference level for the upper limit line of the power-falling part on the user-established mask.

Command

```
[[:SENSE]:PVTime:MASK:LIST:UPPer:FALL:RELative <rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>
```

Parameter

| | |
|------------------------------|--------------------------|
| <code><rel_amp></code> | Relative reference level |
| Range | -99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dB |
| Suffix code | DB |
| | dB is used when omitted. |

Example of Use

To set the relative reference level of the user setting mask.

```
PVT:MASK:LIST:UPP:FALL:REL
1.00,1.00,1.00,1.00,1.00,-6.00,-6.00,-30.00,-30.00,-30.00,-30.00
```

[[:SENSE]:PVTime:MASK:LIST:UPPer:FALL:RELative?

Mask Setup – Upper – Fall – Relative limits Query

Function

This command reads out the setting value of the relative reference level for the upper limit line of the power-falling part on the user-established mask.

Query

```
[[:SENSE]:PVTime:MASK:LIST:UPPer:FALL:RELative?
```

Parameter

| | |
|------------|--------------------------|
| <real> | Absolute reference level |
| Range | -99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dB |

Example of Use

To read out the setting value of the relative reference level of the user setting mask.

```
PVT:MASK:LIST:UPP:FALL:REL?  
> 1.00,1.00,1.00,1.00,1.00,-6.00,-6.00,-30.00,-30.00,  
-30.00,-30.00
```

2.9.15 Upper – Fall – Fail Logic

```
[ :SENSe ] :PVTime :MASK :LIST :UPPer :FALL :FLOGic
ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,
ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,
ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,
ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,
ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF
Mask Setup – Upper – Fall – Fail Logic
```

Function

This command sets the criterion for Pass/Fail judgment for the upper limit line of the power-falling part on the user-established mask.

Command

```
[ :SENSe ] :PVTime :MASK :LIST :UPPer :FALL :FLOGic <mode>,
<mode>, <mode>, <mode>, <mode>, <mode>, <mode>,
<mode>, <mode>
```

Parameter

| <mode> | Criterion for judgment |
|----------|------------------------|
| ABSolute | Absolute |
| RELative | Relative |
| OR | Relative or Absolute |
| OFF | Off |

Example of Use

To set the judgment criterion for the user-established mask.

```
PVT :MASK :LIST :UPP :FALL :FLOG
REL, REL, REL, REL, REL, REL, REL, REL, REL, REL
```

[[:SENSe]:PVTime:MASK:LIST:UPPer:FALL:FLOGic?

Mask Setup – Upper – Fall – Fail Logic Query

Function

This command reads out the setting value of the criterion for Pass/Fail judgment for the upper limit line of the power-falling part on the user-established mask.

Query

```
[[:SENSe]:PVTime:MASK:LIST:UPPer:FALL:FLOGic?
```

Parameter

| <mode> | Criterion for judgment |
|--------|------------------------|
| ABS | Absolute |
| REL | Relative |
| OR | Relative or Absolute |
| OFF | Off |

Example of Use

To read out the setting value of the judgment criterion for the user-established mask.

```
PVT:MASK:LIST:UPP:FALL:FLOG?  
> REL,REL,REL,REL,REL,REL,REL,REL,REL,REL
```

2.9.16 Lower – Rise – Time

`[[:SENSE]:PVTime:MASK:LIST:LOWer:RISE:TIME`

`<time>,<time>,<time>,<time>,<time>,<time>`

Mask Setup – Lower limits – Rise – Time

Function

This command sets the time point the lower limit line of the power-rising part on the user-established mask.

Command

```
[[:SENSE]:PVTime:MASK:LIST:LOWer:RISE:TIME
<time>,<time>,<time>,<time>,<time>,<time>
```

Parameter

| | |
|---------------------------|-------------------------|
| <code><time></code> | Time point |
| Range | –8.00 to 8.00 |
| Resolution | 0.01 μ s |
| Suffix code | NS, US, MS, S |
| | s is used when omitted. |

Example of Use

To set the time point of the user-established mask.

```
PVT:MASK:LIST:LOW:RISE:TIME 0,0,2US,2US,4US,4US
```

[[:SENSE]:PVTime:MASK:LIST:LOWer:RISE:TIME?

Mask Setup – Lower limits – Rise – Time Query

Function

This command reads out the setting value of the time point for the lower limit line of the power-rising part on the user-established mask.

Query

```
[[:SENSE]:PVTime:MASK:LIST:LOWer:RISE:TIME?
```

Parameter

| | |
|-------------|---------------|
| <time> | Time point |
| Range | -8.00 to 8.00 |
| Resolution | 0.01 μ s |
| Suffix code | None |

Value is returned in s units.

Example of Use

To read out the time point of the user-established mask.

```
PVT:MASK:LIST:LOW:RISE:TIME?  
> 0.00000000,0.00000000,0.00000200,0.00000200,  
0.00000400,-0.00000400
```

2.9.17 Lower – Rise – Absolute limits

`[[:SENSE]:PVTime:MASK:LIST:LOWer:RISE:ABSolute`

`<real>,<real>,<real>,<real>,<real>,<real>`

Mask Setup – Lower – Rise – Absolute limits

Function

This command sets the absolute reference level for the lower limit line of the power-rising part on the user-established mask.

Command

```
[[:SENSE]:PVTime:MASK:LIST:LOWer:RISE:ABSolute
<real>,<real>,<real>,<real>,<real>,<real>
```

Parameter

| | |
|---------------------------|---------------------------|
| <code><real></code> | Absolute reference level |
| Range | –99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dBm |
| Suffix code | DBM |
| | dBm is used when omitted. |

Example of Use

To set the absolute reference level of the user-established mask.

```
PVT:MASK:LIST:LOW:RISE:ABS
–99.99,–99.99,–99.99,–99.99,–99.99,–99.99
```

[:SENSE] :PVTime :MASK :LIST :LOWer :RISE :ABSolute ?

Mask Setup – Lower – Rise – Absolute limits Query

Function

This command reads out the setting value of the absolute reference level for the lower limit line of the power-rising part on the user-established mask.

Query

```
[ :SENSE ] :PVTime :MASK :LIST :LOWer :RISE :ABSolute ?
```

Parameter

| | |
|------------|--------------------------|
| <real> | Absolute reference level |
| Range | -99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dBm |

Example of Use

To read out the setting of the absolute reference level of the user-established mask.

```
PVT :MASK :LIST :LOW :RISE :ABS ?  
> -99.99, -99.99, -99.99, -99.99, -99.99, -99.99
```


2.9.18 Lower – Rise – Relative limits

`[[:SENSE]:PVTime:MASK:LIST:LOWer:RISE:RELative`

`<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>`

Mask Setup – Lower – Rise – Relative limits

Function

This command sets the relative reference level for the lower limit line of the power-rising part on the user-established mask.

Command

`[[:SENSE]:PVTime:MASK:LIST:LOWer:RISE:RELative <rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>`

Parameter

| | |
|------------------------------|--------------------------|
| <code><rel_amp></code> | Relative reference level |
| Range | –99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dB |
| Suffix code | DB |
| | dB is used when omitted. |

Example of Use

To set the relative reference level of the user-established mask.

```
PVT:MASK:LIST:LOW:RISE
-99.99,-99.99,-1.00,-1.00,-1.00,-1.00
```

[[:SENSE]:PVTime:MASK:LIST:LOWer:RISE[:RELative]]?

Mask Setup – Lower – Rise – Relative limits Query

Function

This command reads out the setting value of the relative reference level for the lower limit line of the power-rising part on the user-established mask.

Query

```
[[:SENSE]:PVTime:MASK:LIST:LOWer:RISE:RELative?
```

Parameter

| | |
|------------|--------------------------|
| <rel_amp> | Relative reference level |
| Range | -99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dB |

Example of Use

To read out the setting value of the relative reference level of the user-established mask.

```
PVT:MASK:LIST:LOW:RISE  
> -99.99,-99.99,-1.00,-1.00,-1.00,-1.00
```

2.9.19 Lower – Rise – Fail Logic

```
[[:SENSE]:PVTime:MASK:LIST:LOWer:RISE:FLOGic
ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,
ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,
ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF
```

Mask Setup – Lower – Rise – Fail Logic

Function

This command sets the criterion for Pass/Fail judgment for the lower limit line of the power-rising part on the user-established mask.

Command

```
[[:SENSE]:PVTime:MASK:LIST:LOWer:RISE:FLOGic <mode>,
<mode>, <mode>, <mode>, <mode>
```

Parameter

| <mode> | Criterion for judgment |
|----------|------------------------|
| ABSolute | Absolute |
| RELative | Relative |
| OR | Relative or Absolute |
| OFF | Off |

Example of Use

To set the judgment criterion for the user-established mask.

```
PVT:MASK:LIST:LOW:RISE:FLOG OFF, OFF, REL, REL, REL, REL
```

[[:SENSE]:PVTime:MASK:LIST:LOWer:RISE:FLOGic?

Mask Setup – Lower – Rise – Fail Logic Query

Function

This command reads out the setting value of the criterion for Pass/Fail judgment for the lower limit line of the power-rising part on the user-established mask.

Query

```
[[:SENSE]:PVTime:MASK:LIST:LOWer:RISE:FLOGic?
```

Parameter

| <mode> | Criterion for judgment |
|--------|------------------------|
| ABS | Absolute |
| REL | Relative |
| OR | Relative or Absolute |
| OFF | Off |

Example of Use

To read out the setting value of the judgment criterion for the user-established mask.

```
PVT:MASK:LIST:LOW:RISE:FLOG?  
> OFF,OFF,REL,REL,REL,REL
```

2.9.20 Lower – Fall – Time

`[[:SENSE]:PVTime:MASK:LIST:LOWer:FALL:TIME`

`<time>,<time>,<time>,<time>,<time>,<time>`

Mask Setup – Lower limits – Fall – Time

Function

This command sets the time point for the lower limit line of the power-falling part on the user-established mask.

Command

```
[[:SENSE]:PVTime:MASK:LIST:LOWer:FALL:TIME
<time>,<time>,<time>,<time>,<time>,<time>
```

Parameter

| | |
|---------------------------|-------------------------|
| <code><time></code> | Time point |
| Range | –8.00 to 8.00 |
| Resolution | 0.01 μ s |
| Suffix code | NS, US, MS, S |
| | s is used when omitted. |

Example of Use

To set the time point of the user-established mask.

```
PVT:MASK:LIST:LOW:FALL:TIME -4US,-4US,-2US,-2US,0,0
```

[[:SENSE]:PVTime:MASK:LIST:LOWer:FALL:TIME?

Mask Setup – Lower limits – Fall – Time Query

Function

This command reads out the setting value of the time point for the lower limit line of the power-falling part on the user-established mask.

Query

```
[[:SENSE]:PVTime:MASK:LIST:LOWer:FALL:TIME?
```

Parameter

| | |
|-------------|---------------|
| <time> | Time point |
| Range | -8.00 to 8.00 |
| Resolution | 0.01 μ s |
| Suffix code | None |

Value is returned in s units.

Example of Use

To read out the time point of the user-established mask.

```
PVT:MASK:LIST:LOW:FALL:TIME?  
> -0.00000400,-0.00000400,-0.00000200,-0.00000200,  
0.00000000,0.00000000
```

2.9.21 Lower – Fall – Absolute limits

`[[:SENSE]:PVTime:MASK:LIST:LOWer:FALL:ABSolute`

`<real>,<real>,<real>,<real>,<real>,<real>`

Mask Setup – Lower – Fall – Absolute limits

Function

This command sets the absolute reference level for the lower limit line of the power-falling part on the user-established mask.

Command

```
[[:SENSE]:PVTime:MASK:LIST:LOWer:FALL:ABSolute
<real>,<real>,<real>,<real>,<real>,<real>
```

Parameter

| | |
|---------------------------|--------------------------|
| <code><real></code> | Absolute reference level |
| Range | –99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dBm |
| Suffix code | DBM |

dBm is used when omitted.

Example of Use

To set the absolute reference level of the user setting mask.

```
PVT:MASK:LIST:LOW:FALL:ABS
–99.99,–99.99,–99.99,–99.99,–99.99,–99.99
```

[:SENSE] :PVTime :MASK :LIST :LOWer :FALL :ABSolute ?

Mask Setup – Lower – Fall – Absolute limits Query

Function

This command reads out the setting value of the absolute reference level for the lower limit line of the power-falling part on the user-established mask.

Query

```
[ :SENSE ] :PVTime :MASK :LIST :LOWer :FALL :ABSolute ?
```

Parameter

| | |
|------------|--------------------------|
| <real> | Absolute reference level |
| Range | -99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dBm |

Example of Use

To read out the setting value of the absolute reference level of the user setting mask.

```
PVT :MASK :LIST :LOW :FALL :ABS ?  
> -99.99,-99.99,-99.99,-99.99,-99.99,-99.99
```


2.9.22 Lower – Fall – Relative limits

[[:SENSE]:PVTime:MASK:LIST:LOWer:FALL[:RELative]

<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>

Mask Setup – Lower – Fall – Relative limits

Function

This command sets the relative reference level for the lower limit line of the power-falling part on the user-established mask.

Command

```
[[:SENSE]:PVTime:MASK:LIST:LOWer:FALL:RELative <rel_amp>,  
<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>,<rel_amp>
```

Parameter

| | |
|-------------|--------------------------|
| <rel_amp> | Relative reference level |
| Range | –99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dB |
| Suffix code | DB |
| | dB is used when omitted. |

Example of Use

To set the relative reference level of the user setting mask.

```
PVT:MASK:LIST:LOW:FALL  
-20.00,0.00,0.00,-2.00,-2.00,-99.00
```

`[[:SENSE]:PVTime:MASK:LIST:LOWer:FALL[:RELative]]?`

Mask Setup – Lower – Fall – Relative limits Query

Function

This command reads out the setting value of the relative reference level for the lower limit line of the power-falling part on the user-established mask.

Query

`[[:SENSE]:PVTime:MASK:LIST:LOWer:FALL:RELative?`

Parameter

| | |
|------------------------------|--------------------------|
| <code><rel_amp></code> | Relative reference level |
| Range | -99.99 to 99.99 |
| Resolution | 0.01 dB |
| Unit | dB |

Example of Use

To read out the setting of the relative reference level of the user-established mask.

```
PVT:MASK:LIST:LOW:FALL:REL?  
> -20.00,0.00,0.00,-2.00,-2.00,-99.00
```

2.9.23 Lower – Fall – Fail Logic

```
[ :SENSe]:PVTime:MASK:LIST:LOWer:FALL:FLOGic
ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,
ABSolute|RELative|OR|OFF, ABSolute|RELative|OR|OFF,
ABSolute|RELative|OR|OFF
```

Mask Setup – Lower – Fall – Fail Logic

Function

This command sets the criterion for Pass/Fail judgment for the lower limit line of the power-falling part on the user-established mask.

Command

```
[ :SENSe]:PVTime:MASK:LIST:LOWer:FALL:FLOGic <mode>,
<mode>, <mode>, <mode>, <mode>
```

Parameter

| | |
|----------|--------------------------|
| <mode> | Criterion for judgment |
| ABSolute | Absolute |
| RELative | Relative (Initial value) |
| OR | Relative or Absolute |
| OFF | Off |

Example of Use

To set the judgment criterion for the user-established mask.

```
PVT:MASK:LIST:LOW:FALL:FLOG REL,REL,REL,REL,REL
```

[[:SENSe]:PVTime:MASK:LIST:LOWer:FALL:FLOGic?

Mask Setup – Lower – Fall – Fail Logic Query

Function

This command reads out the setting value of the criterion for Pass/Fail judgment for the lower limit line of the power-falling part on the user-established mask.

Command

```
[[:SENSe]:PVTime:MASK:LIST:LOWer:FALL:FLOGic?
```

Parameter

| <mode> | Criterion for judgment |
|--------|------------------------|
| ABS | Absolute |
| REL | Relative |
| OR | Relative or Absolute |
| OFF | Off |

Example of Use

To read out the setting value of the judgment criterion for the user-established mask.

```
PVT:MASK:LIST:LOW:FALL:FLOG?  
> REL,OFF,REL,REL,REL
```

2.9.24 Storage Mode

[[:SENSE]:PVTime:AVERage[:STATe] OFF|ON|0|1

Storage Mode

Function

This command sets Storage Mode.

Command

[[:SENSE]:PVTime:AVERage[:STATe] <mode>

Parameter

| <mode> | Storage Mode |
|--------|---------------------|
| OFF 0 | Off (Initial value) |
| 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 reads out the Storage Mode setting.

Query

[[:SENSE]:PVTime:AVERage[:STATe] ?

Response

<mode>

Parameter

| <mode> | Storage Mode |
|--------|--------------|
| 0 | Off |
| 1 | On |

Example of Use

To read out the Storage Mode setting.

```
PVT:AVER?
```

```
> 1
```

2.9.25 Storage Count

[[:SENSE]:PVTime:AVERage:COUNT <integer>

Storage Count

Function

This command sets the Storage Count.

Command

`[[:SENSE]:PVTime:AVERage:COUNT <integer>`

Parameter

| | |
|------------------------------|---------------|
| <code><integer></code> | Storage Count |
| Range | 2 to 9999 |
| Resolution | 1 |
| Initial value | 2 |

Example of Use

To set the storage count to 10.

`PVT:AVER:COUN 10`

[[:SENSE]:PVTime:AVERage:COUNT?

Storage Count Query

Function

This command reads out the setting of the Storage Count.

Query

`[[:SENSE]:PVTime:AVERage:COUNT?`

Response

`<integer>`

Parameter

| | |
|------------------------------|---------------|
| <code><integer></code> | Storage Count |
| Range | 2 to 9999 |
| Resolution | 1 |

Example of Use

To read out the Storage Count setting.

`PVT:AVER:COUN?`
`> 10`

2.9.26 Average Type

[[:SENSE]:PVTime:AVERage:TYPE POWER|LOGPower

Average Type

Function

This command sets Average Type.

Command

```
[[:SENSE]:PVTime:AVERage:TYPE <mode>
```

Parameter

| | |
|----------|-----------------------|
| <mode> | Average Type |
| POWER | Power (Initial value) |
| LOGPower | Log-Power |

Example of Use

To set Average Type to Power.

```
PVT:AVER:TYPE POW
```

[[:SENSE]:PVTime:AVERage:TYPE?

Average Type Query

Function

This command reads out the Average Type setting.

Query

```
[[:SENSE]:PVTime:AVERage:TYPE?
```

Response

```
<mode>
```

Parameter

| | |
|--------|--------------|
| <mode> | Average Type |
| POW | Power |
| LOGP | Log-Power |

Example of Use

To read out the Average Type setting.

```
PVT:AVER:TYPE?
```

```
> POW
```

2.9.27 Filtler Type

[[:SENSE]:PVTime:BANDwidth[:RESolution]:TYPE GAUSSian|5POLe

Filter Type

Function

This command sets the filter type for Power vs Time measurement.

Command

```
[[:SENSE]:PVTime:BANDwidth[:RESolution]:TYPE <type>
```

Parameter

| | |
|----------|-------------------------|
| <type> | Filter type |
| 5POLe | 5 pole Filter (Default) |
| GAUSSian | Gaussian Filter |

Example of Use

To set Filter Type to Gaussian.
PVT:BAND:TYPE GAUS

[[:SENSE]:PVTime:BANDwidth[:RESolution]:TYPE?

Filter Type Query

Function

This command queries the filter type for Power vs Time measurement.

Query

```
[[:SENSE]:PVTime:BANDwidth[:RESolution]:TYPE?
```

Response

```
<type>
```

Parameter

| | |
|----------|-----------------|
| <type> | Filter type |
| 5POLe | 5 pole Filter |
| GAUSSian | Gaussian Filter |

Example of Use

To query the Filter Type.
PVT:BAND:TYPE?
> GAUS

2.9.28 Filtler BW

`[[:SENSe]:PVTime:BANDwidth[:RESolution] 300Khz|500Khz|1MHZ`

Filter Bandwidh

Function

This command sets the filter bandwidth for Power vs Time measurement.

Command

`[[:SENSe]:PVTime:BANDwidth[:RESolution] <bandwidth>`

Parameter

| | |
|--------------------------------|--|
| <code><bandwidth></code> | Filter Bandwidth |
| 300Khz | 300 kHz (Default) |
| 500Khz | 500 kHz |
| 1MHZ | 1 MHz (Available only for Gaussian Filter) |

Example of Use

To set the filter bandwidth to 500 kHz.

`PVT:BAND 500K`

`[[:SENSe]:PVTime:BANDwidth[:RESolution]?`

Filter Bandwidh Query

Function

This command queries the filter bandwidth for Power vs Time measurement.

Query

`[[:SENSe]:PVTime:BANDwidth[:RESolution]?`

Response

`<bandwidth>`

Parameter

| | |
|--------------------------------|------------------|
| <code><bandwidth></code> | Filter bandwidth |
| 300K | 300 kHz |
| 500K | 500 kHz |
| 1MHZ | 1 MHz |

Example of Use

To query the filter bandwidth.

`PVT:BAND?`

`> 500K`

2.9.29 Marker – On/Off

:CALCulate:PVTime:MARKer[:STATe] OFF|ON|0|1

Marker – On/Off

Function

This command sets Marker On/Off when Power vs Time is selected.

Command

`:CALCulate:PVTime:MARKer[:STATe] <switch>`

Parameter

| | |
|-----------------------------|--------------------|
| <code><switch></code> | Marker |
| <code>0 OFF</code> | Off |
| <code>1 ON</code> | On (Initial value) |

Example of Use

To display the marker.

`CALC:PVT:MARK 1`

:CALCulate:PVTime:MARKer[:STATe]?

Marker – On/Off Query

Function

This command reads out the setting of Marker On/Off when Power vs Time is selected.

Query

`:CALCulate:PVTime:MARKer[:STATe]?`

Response

`<switch>`

Parameter

| | |
|-----------------------------|--------|
| <code><switch></code> | Marker |
| <code>0</code> | Off |
| <code>1</code> | On |

Example of Use

To read out the marker setting.

`CALC:PVT:MARK?`

`> 1`

2.9.30 Active Trace

:CALCulate:PVTime:MARKer:ACTive RISE|FALL

Active Trace

Function

This command sets the setting target of the marker when Trace Mode is Rise and Fall.

Command

```
:CALCulate:PVTime:MARKer:ACTive <mode>
```

Parameter

| | |
|--------|-----------------------|
| <mode> | Active Trace |
| RISE | Rise Select (Default) |
| FALL | Fall Select |

Example of Use

To operate the marker displayed in Rise.

```
CALC:PVT:MARK:ACT RISE
```

:CALCulate:PVTime:MARKer:ACTive?

Active Trace Query

Function

This command reads out the setting target of the marker when Trace Mode is Rise and Fall.

Query

```
:CALCulate:PVTime:MARKer:ACTive?
```

Response

```
<mode>
```

Parameter

| | |
|--------|--------------|
| <mode> | Active Trace |
| RISE | Rise Select |
| FALL | Fall Select |

Example of Use

To read out the Active Trace setting.

```
CALC:PVT:MARK:ACT?
```

```
> RISE
```

2.9.31 Marker Position

:CALCulate:PVTIme:MARKer:X[:POINT] <real>

Marker X Axis

Function

This command sets the marker position on the graph in symbol units.

Query

:CALCulate:PVTIme:MARKer:X[:POINT] <real>

Response

<real>

Parameter

<real>

Marker position

Range

When Trace Mode is Rise and Fall:

Normal Burst or Continuous

$-13.00 + (\text{Slot setting value} \times 156.25)$ to $(\text{Slot setting value} \times 156.25) + 13.00$

Higher Symbol Rate Burst

$-13.00 + (\text{Slot setting value} \times 187.5)$ to $(\text{Slot setting value} \times 187.5) + 13.00$

When Trace Mode is Rise and Fall, and Active Trace is Fall Select:

Normal Burst or Continuous

$-13.00 + (\text{Slot setting value} \times 156.25) + 147$ to $(\text{Slot setting value} \times 156.25) + 147 + 13.00$

Higher Symbol Rate Burst

$-13.00 + (\text{Slot setting value} \times 187.5) + 176$ to $(\text{Slot setting value} \times 187.5) + 176 + 13.00$

When Trace Mode is Slot:

Normal Burst or Continuous

$-18.00 + (\text{Slot setting value} \times 156.25)$ to $(\text{Slot setting value} \times 156.25) + 147.00 + 18.00$

Higher Symbol Rate Burst

$-18.00 + (\text{Slot setting value} \times 187.5)$ to $(\text{Slot setting value} \times 187.5) + 176 + 18.00$

When Trace Mode is Frame:

Normal Burst or Continuous
–18.00 to 1258.75

Higher Symbol Rate Burst
–21.60 to 1510.50

| | |
|---------------|------|
| Resolution | 0.05 |
| Suffix code | None |
| Initial value | 0.00 |

Example of Use

To set the graph marker position to 0 point.

```
CALC:PVT:MARK:X 0
```

:CALCulate:PVTime:MARKer:X[:POINT]?

Marker X Axis Position Query

Function

This command reads out the marker position on the graph in symbol units.

Query

```
:CALCulate:PVTime:MARKer:X[:POINT]?
```

Response

```
<real>
```

Parameter

| | |
|--------|---|
| <real> | Marker position |
| | Refer to the description of :CALCulate:PVTime:MARKer:X[:POINT]. |

Example of Use

To read out the setting of the graph marker position.

```
CALC:PVT:MARK:X?
> 0.00
```

2.9.32 Marker Value

`:CALCulate:PVTTime:MARKer:Y[:AVERage]?`

Marker Y Axis Average Value – Query

Function

This command reads out Y axis average on the current graph marker.

Query

`:CALCulate:PVTTime:MARKer:Y[:AVERage]?`

Response

`<real>`

Parameter

`<real>`

Y-axis of the graph marker position

Resolution

0.01 dB

A value in the unit for setting the current Y axis.

Example of Use

To read out the average among the Y coordinates at the markers.

```
CALC:PVT:MARK:Y?
```

```
> 0.12
```

:CALCulate:PVTime:MARKer:Y:Maximum?

Marker Y Axis Maximum Value – Query

Function

This command reads out the maximum value among the Y coordinates at the markers on the currently displayed graph.

Query

```
:CALCulate:PVTime:MARKer:Y:MAXimum?
```

Response

```
<real>
```

Parameter

```
<real>
```

Y coordinate at marker on graph

Resolution

0.01 dB

The value is returned in the unit currently set for the Y axis.

Example of Use

To read out the maximum value among the Y coordinates at the markers.

```
CALC:PVT:MARK:Y:MAX?
```

```
> 0.12
```

:CALCulate:PVTime:MARKer:Y:MINimum?

Marker Y Axis Minimum Value – Query

Function

This command reads out the minimum value among the Y coordinates at the markers on the currently displayed graph.

Query

:CALCulate:PVTime:MARKer:Y:MINimum?

Response

<real>

Parameter

<real>

Y coordinate at marker on graph

Resolution

0.01 dB

The value is returned in the unit currently set for the Y axis.

Example of Use

To read out the minimum value among the Y coordinates at the markers.

```
CALC:PVT:MARK:Y:MIN?
```

```
> 0.12
```


Chapter 3 SCPI Status Register

This chapter describes SCPI commands and Status Register to read out application statuses.

| | | |
|-----|--------------------------------------|------|
| 3.1 | Reading Out Measurement Status | 3-2 |
| 3.2 | STATus:QUESTionable Register..... | 3-3 |
| 3.3 | STATus:OPERation Register | 3-15 |

3.1 Reading Out Measurement Status

:STATus:ERRor?

Measurement Status Query

Function

This command reads out the measurement status.

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 : $2^0 = 1$ Not measured
bit1 : $2^1 = 2$ Exceeded the level.
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 255

Details

0 is returned when it is terminated normally.

Example of Use

To read out the measurement status.
:STAT:ERR?
> 0

3.2 STATUS:QUESTIONABLE Register

Figure 3.2-1, Table 3.2-1, Figure 3.2-2, and Table 3.2-2 show the layer structure of the QUESTIONABLE Status register.

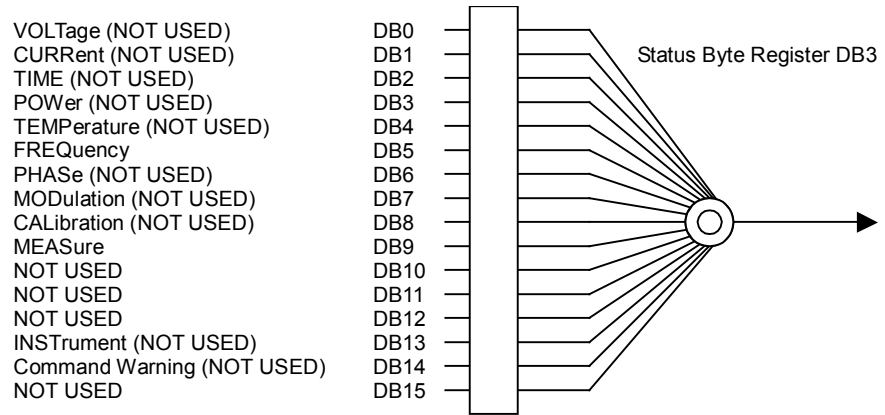


Figure 3.2-1 QUESTIONABLE Status Register

Table 3.2-1 Bit Definition of QUESTIONABLE Status Register

| Byte | Definition |
|------|---------------------------------------|
| DB5 | Unlock of Reference Clock |
| DB9 | QUESTIONABLE Measure Register Summary |

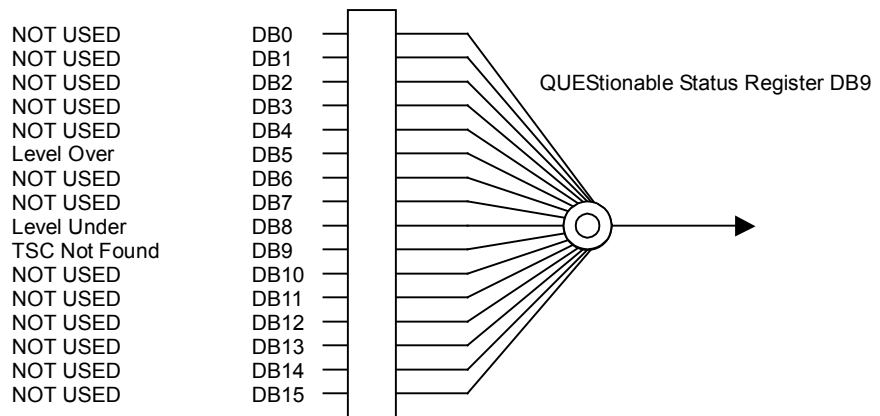


Figure 3.2-2 QUESTIONABLE Measure Register

Table 3.2-2 Bit Definition of QUESTIONABLE Measure Register

| Bit | Definition |
|-----|--|
| DB5 | Level Over |
| DB8 | The level of the input signal is lower than the detection level. |
| DB9 | No training sequence has been found. |

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

This command reads the event register of the QUEStionable Status register.

Query

```
:STATus:QUEStionable[:EVENT]?
```

Response

```
<integer>
```

Parameter

```
<integer>  Byte summation of Event Register
Resolution  1
Range       0 to 65535
```

Example of Use

To read out the contents of the event register of the QUEStionable Status register.

```
:STAT:QUES?
> 0
```

:STATus:QUEStionable:CONDition?

Questionable Status Register Condition

Function

This command reads out the condition register of the QUEStionable Status register.

Query

:STATus:QUEStionable:CONDition?

Response

<integer>

Parameter

<integer> Byte summation of Condition Register
Resolution 1
Range 0 to 65535

Example of Use

To read out the contents of the condition register of the QUEStionable Status register.
:STAT:QUES:COND?
> 0

:STATus:QUEStionable:ENABle <integer>

Questionable Status Register Enable

Function

This command sets the event enable register of the QUEStionable Status register.

Command

:STATus:QUEStionable:ENABle <integer>

Parameter

<integer> Bit summation of Event Enable Register
Resolution 1
Range 0 to 65535

Example of Use

To set 16 to the event enable register of the QUEStionable Status Register.
:STAT:QUES:ENAB 16

:STATus:QUEStionable:ENABle?

Questionable Status Register Enable Query

Function

This command reads out the event enable register of the QUEStionable Status register.

Query

```
:STATus:QUEStionable:ENABle?
```

Response

```
<integer>
```

Parameter

```
<integer>    Bit summation of Event Enable Register
Resolution    1
Range         0 to 65535
```

Example of Use

To read out the event enable register of the QUEStionable Status register.

```
:STAT:QUES:ENAB?
> 16
```

:STATus:QUEStionable:NTRansition <integer>

Questionable Status Register Negative Transition

Function

This command sets the transition filter (negative transition) of the QUEStionable Status register.

Command

```
:STATus:QUEStionable:NTRansition <integer>
```

Parameter

```
<integer>    Bit summation of Transition Filter
              (negativetransition)
Resolution    1
Range         0 to 65535
```

Example of Use

To set 16 to the transition filter (negative transition) of the QUEStionable Status register.

```
:STAT:QUES:NTR 16
```

:STATus:QUEStionable:NTRansition?

Questionable Status Register Negative Transition Query

Function

This command reads out the transition filter (negative transition) of the QUEStionable Status register.

Query

:STATus:QUEStionable:NTRansition?

Response

<integer>

Parameter

<integer> Bit summation of Transition Filter
(negative transition)
Resolution 1
Range 0 to 65535

Example of Use

To read out the transition filter (negative transition) of the QUEStionable Status register.
:STAT:QUES:NTR?
> 16

:STATus:QUEStionable:PTRansition <integer>

Questionable Status Register Positive Transition

Function

This command sets the transition filter (Positive transition) of the QUEStionable Status register.

Command

:STATus:QUEStionable:PTRansition <integer>

Parameter

<integer> Bit summation of Transition Filter
(positive transition)
Resolution 1
Range 0 to 65535

Example of Use

To set 16 to the transition fileter (positive transition) of the QUEStionable status register.
:STAT:QUES:PTR 16

:STATus:QUEStionable:PTRansition?

Questionable Status Register Positive Transition Query

Function

This command reads out the transition filter (positive transition) of the QUEStionable Status Register.

Query

```
:STATus:QUEStionable:PTRansition?
```

Response

```
<integer>
```

Parameter

```
<integer>    Bit summation of Transition Filter  
(positive transition)  
Resolution    1  
Range         0 to 65535
```

Example of Use

To read out the transition filter (positive transition) of the QUEStionable Status Register.

```
:STAT:QUES:PTR?  
> 16
```

:STATus:QUESTIONable:MEASure[:EVENT]?

Questionable Measure Register Event

Function

This command reads out the event register of the QUESTIONable Measure Register.

Query

:STATus:QUESTIONable:MEASure[:EVENT]?

Response

<integer>

Parameter

<integer> Bit summation of Event Register
Resolution 1
Range 0 to 65535

Example of Use

To read out the contents of the event register of the QUESTIONable Measure Register.
:STAT:QUES:MEAS?
> 0

:STATus:QUEStionable:MEASure:CONDition?

Questionable Measure Register Condition

Function

This command reads out the condition register of the QUEStionable Measure register.

Query

```
:STATus:QUEStionable:MEASure:CONDition?
```

Response

```
<integer>
```

Parameter

```
<integer>    Bit summation of Condition Register
Resolution    1
Range         0 to 65535
```

Example of Use

To read out the contents of the condition register of the QUEStionable Measure register.

```
:STAT:QUES:MEAS:COND?
> 0
```

:STATus:QUEStionable:MEASure:ENABLE <integer>

Questionable Measure Register Enable

Function

This command sets the event enable register of the QUEStionable Measure register.

Command

```
:STATus:QUEStionable:MEASure:ENABLE <integer>
```

Parameter

```
<integer>    Bit summation of Event Enable Register
Resolution    1
Range         0 to 65535
```

Example of Use

To set 16 to the event enable register of the QUEStionable Measure register.

```
:STAT:QUES:MEAS:ENAB 16
```

:STATus:QUEStionable:MEASure:ENABle?

Questionable Measure Register Enable Query

Function

This command reads out the event enable register of the QUEStionable Measure register.

Query

:STATus:QUEStionable:MEASure:ENABle?

Response

<integer>

Parameter

<integer> Bit summation of Event Enable Register
Resolution 1
Range 0 to 65535

Example of Use

To read out the event enable register of the QUEStionable Measure Register.
:STAT:QUES:MEAS:ENAB?
> 16

:STATus:QUEStionable:MEASure:NTRansition <integer>

Questionable Measure Register Negative Transition

Function

This command sets the transition filter (negative transition) of the QUEStionable Measure register.

Command

:STATus:QUEStionable:MEASure:NTRansition <integer>

Parameter

<integer> Bit summation of Transition Filter
(negative transition)
Resolution 1
Range 0 to 65535

Example of Use

To set 16 to the transition filter (negative transition) of the QUEStionable Measure register.
:STAT:QUES:MEAS:NTR 16

:STATus:QUEStionable:MEASure:NTRansition?

Questionable Measure Register Negative Transition Query

Function

This command reads out the transition filter (negative transition) of the QUEStionable Measure register.

Query

```
:STATus:QUEStionable:MEASure:NTRansition?
```

Response

```
<integer>
```

Parameter

```
<integer>    Bit summation of Transition Filter
              (negative transition)
Resolution    1
Range         0 to 65535
```

Example of Use

To read out the transition filter (negative transition) of the QUEStionable Measure register.

```
:STAT:QUES:MEAS:NTR?
> 16
```

:STATus:QUEStionable:MEASure:PTRansition <integer>

Questionable Measure Register Positive Transition

Function

This command sets the transition filter (positive transition) of the QUEStionable Measure register.

Command

```
:STATus:QUEStionable:MEASure:PTRansition <integer>
```

Parameter

```
<integer>    Bit summation of Transition Filter
              (positive transition)
Resolution    1
Range         0 to 65535
```

Example of Use

To set 16 to the transition filter (positive transition) of the QUEStionable Measure register.

```
:STAT:QUES:MEAS:PTR 16
```

:STATus:QUEStionable:MEASure:PTRansition?

Questionable Measure Register Positive Transition Query

Function

This command reads out the transition filter (positive transition) of the QUEStionable Measure register.

Query

:STATus:QUEStionable:MEASure:PTRansition?

Response

<integer>

Parameter

<integer> Bit summation of Transition Filter
(positive transition)
Resolution 1
Range 0 to 65535

Example of Use

To read out the transition filter (positive transition) of the QUEStionable Measure register.
:STAT:QUES:MEAS:PTR?
> 16

3.3 STATUS:OPERation Register

Figure 3.3-1 and Table 3.3-1 show the layer structure of the OPERATION Status register.

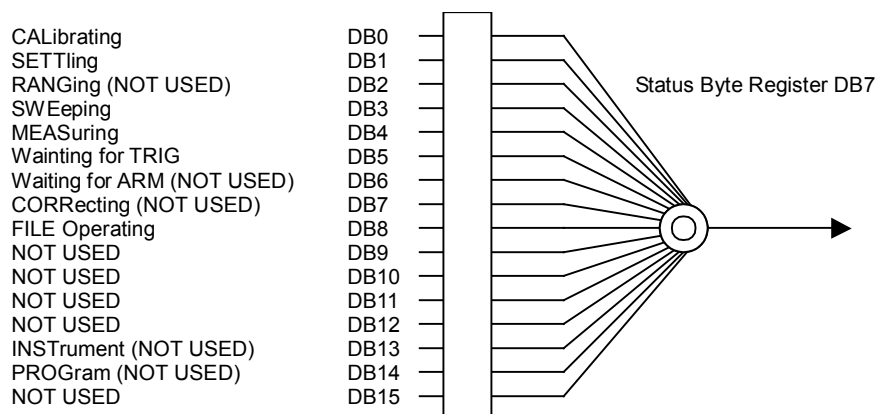


Figure 3.3-1 OPERATION Status register

Table 3.3-1 Definition of OPERATION Status register

| Byte | Definition |
|------|---|
| DB0 | CAL is in execution. |
| DB1 | Warm Up message is being displayed. |
| DB3 | During measurement (including trigger wait, and 1 is returned in Continuous mode) |
| DB5 | Waiting for trigger |
| DB8 | Fiel is in operation. |

Table 3.3-2 lists device messages for the OPERATION Status register.

Table 3.3-2 Device messages for the 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

This command reads out the event register of the OPERATION Status Register.

Query

:STATus:OPERation[:EVENT]?

Response

<integer>

Parameter

<integer> Bit summation of Event Register
Resolution 1
Range 0 to 65535

Example of Use

To read out the contents of the event register of the OPERATION Status Register.
:STAT:OPER?
> 0

:STATus:OPERation:CONDition?

Operation Status Register Condition

Function

This command reads out the condition register of the OPERATION Status Register.

Query

```
:STATus:OPERation:CONDition?
```

Response

```
<integer>
```

Parameter

```
<integer>  Bit summation of Condition Register
Resolution  1
Range       0 to 65535
```

Example of Use

To read out the contents of the condition register of the OPERATION Status Register.

```
:STAT:OPER:COND?
> 0
```

:STATus:OPERation:ENABLE <integer>

Operation Status Register Enable

Function

This command sets the event enable register of the OPERATION Status Register.

Command

```
:STATus:OPERation:ENABle <integer>
```

Parameter

```
<integer>  Bit summation of Event Enable Register
Resolution  1
Range       0 to 65535
```

Example of Use

To set 16 to the event enable register of the OPERATION Status Register.

```
:STAT:OPER:ENAB 16
```

:STATus:OPERation:ENABle?

Operation Status Register Enable Query

Function

This command reads out the event enable register of the OPERATION Status Register.

Query

:STATus:OPERation:ENABle?

Response

<integer>

Parameter

<integer> Bit summation of Event Enable Register
Resolution 1
Range 0 to 65535

Example of Use

To read out the event enable register of the OPERATION Status Register.
:STAT:OPER:ENAB?
> 16

:STATus:OPERation:NTRansition <integer>

Operation Status Register Negative Transition

Function

This command sets the transition filter (negative transition) of the OPERATION Status Register.

Command

:STATus:OPERation:NTRansition <integer>

Parameter

<integer> Bit summation of Transition Filter
(negative transition)
Resolution 1
Range 0 to 65535

Example of Use

To set 16 to the transition filter (negative transition) of the OPERATION Status register.
:STAT:OPER:NTR 16

:STATus:OPERation:NTRansition?

Operation Status Register Negative Transition Query

Function

This command reads out the transition filter (negative transition) of the OPERation Status Register.

Query

```
:STATus:OPERation:NTRansition?
```

Response

```
<integer>
```

Parameter

```
<integer>    Bit summation of Transition Filter  
(negative transition)  
Resolution    1  
Range         0 to 65535
```

Example of Use

To read out the transition filter (negative transition) of the OPERation Status register.

```
:STAT:OPER:NTR?  
> 16
```

:STATus:OPERation:PTRansition <integer>

Operation Status Register Positive Transition

Function

This command sets the transition filter (positive transition) of the OPERATION Status Register.

Command

```
:STATus:OPERation:PTRansition <integer>
```

Parameter

<integer> Bit summation of Transition Filter
(positive transition)
Resolution 1
Range 0 to 65535

Example of Use

To set 16 to the transition filter (positive transition) of the OPERATION Status Register.

```
:STAT:OPER:PTR 16
```

:STATus:OPERation:PTRansition?

Operation Status Register Positive Transition Query

Function

This command reads out the transition filter (positive transition) of the OPERation Status Register.

Query

```
:STATus:OPERation:PTRansition?
```

Response

```
<integer>
```

Parameter

```
<integer>    Bit summation of Transition Filter  
(positive transition)  
Resolution    1  
Range        0 to 65535
```

Example of Use

To read out the transition filter (positive transition) of the OPERation Status Register.

```
:STAT:OPER:PTR?  
> 16
```

