MX269020A
LTE Downlink Measurement
Software
Operation Manual
Operation

28th Edition

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

ANRITSU CORPORATION

Document No.: M-W3014AE-28.0

Safety Symbols

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

Symbols used in manual

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

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

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

Safety Symbols Used on Equipment and in Manual

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

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

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

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

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

These indicate that the marked part should be recycled.

MX269020A
LTE Downlink Measurement Software
Operation Manual Operation

29 October 2007 (First Edition)
30 October 2017 (28th Edition)

Equipment Certificate

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

Anritsu Warranty

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

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

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

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- Copying files and data
  Only files that have been provided directly from Anritsu or generated using Anritsu equipment should be copied to the instrument.
  All other required files should be transferred by means of USB or CompactFlash media after undergoing a thorough virus check.
- Adding software
  Do not download or install software that has not been specifically recommended or licensed by Anritsu.
- Network connections
  Ensure that the network has sufficient anti-virus security protection in place.

CE Conformity Marking

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

CE marking

1. Product Model

Software: MX269020A LTE Downlink Measurement Software

2. Applied Directive and Standards

When the MX269020A LTE Downlink Measurement Software is installed in the MS2690A/MS2691A/MS2692A, MS2830A, or MS2850A, the applied directive and standards of this unit conform to those of the MS2690A/MS2691A/ MS2692A, MS2830A, or MS2850A main frame.

PS: About main frame
Please contact Anritsu for the latest information on the main frame types that the MX269020A can be used with.

RCM Conformity Marking

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

RCM marking

1. Product Model

Software: MX269020A LTE Downlink Measurement Software

2. Applied Directive and Standards

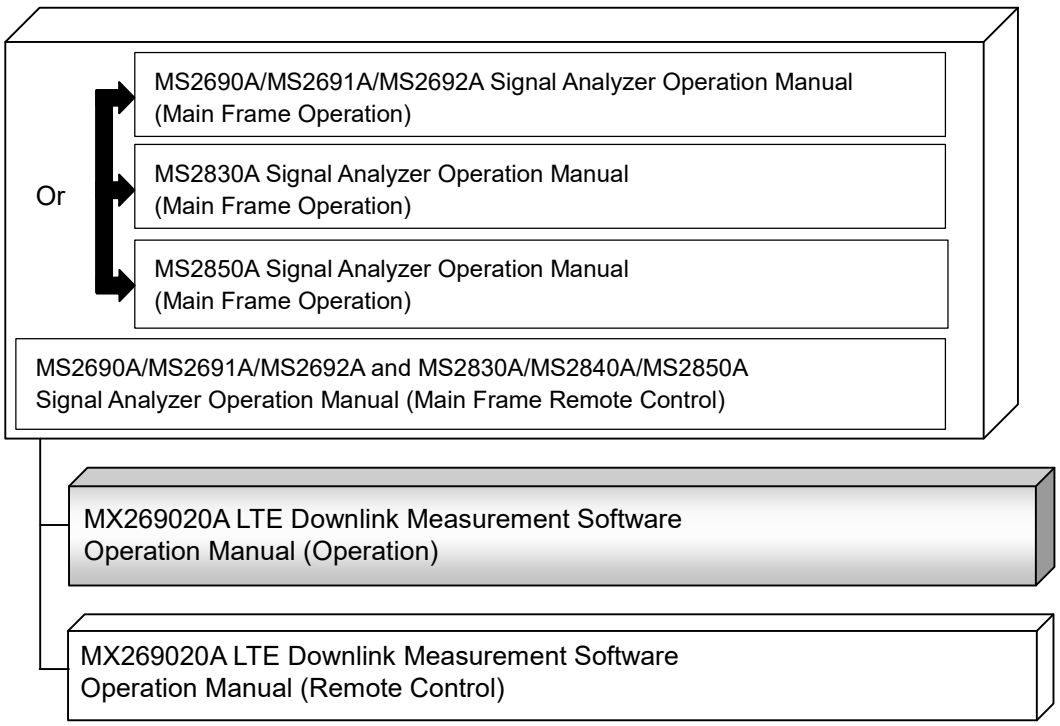
When the MX269020A LTE Downlink Measurement Software is installed in the MS2690A/MS2691A/MS2692A, MS2830A, or MS2850A, the applied directive and standards of this unit conform to those of the MS2690A/MS2691A/MS2692A, MS2830A, or MS2850A main frame.

PS: About main frame
Please contact Anritsu for the latest information on the main frame types that the MX269020A can be used with.

About This Manual

■ **Composition of Operation Manuals**

The operation manuals for the MX269020A LTE Downlink Measurement Software are comprised as shown in the figure below.



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

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

- LTE Downlink Measurement Software Operation Manual (Operation) <This document>

This manual describes basic operating methods, and functions of the LTE Downlink Measurement Software.

As for signal analyzer hardware and its basic functions and operation outline, refer to *MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe Operation)*, *MS2830A Signal Analyzer Operation Manual (Mainframe Operation),* or *MS2850A Signal Analyzer Operation Manual (Mainframe Operation)*.

- LTE Downlink Measurement Software Operation Manual (Remote Control)

This manual describes remote control of the LTE Downlink Measurement Software.

As for signal analyzer application's basic remote control functions and its definitions of common commands, refer to *MS2690A/MS2691A/MS2692A and MS2830A/MS2840A/MS2850A Signal Analyzer Operation Manual (Mainframe Remote Control)*.

Convention Used in This Manual

Throughout this document, the use of MS269x Series is assumed unless otherwise specified. If using MS2830A or MS2850A, change MS269xA to read MS2830A, MS2850A.

In this document,  indicates a panel key.

Table of Contents

Chapter 1 Overview

This chapter provides an overview of the MX269020A LTE Downlink Measurement Software and describes the product configuration.

1.1 Product Overview

The MS269x Series, MS2830A and MS2850A Signal Analyzer enables high-speed, high-accuracy, and simple measurements of transmission characteristics of base stations and mobile stations for various mobile communications types. The MS2690A/MS2691A/MS2692A, MS2830A or MS2850A is equipped with high-performance signal analyzer and spectrum analyzer functions as standard, with optional measurement software allowing modulation analysis functionality supporting various digital modulation modes.

The MX269020A LTE Downlink Measurement Software (hereinafter, referred to as "MX269020A") is a software option for measuring RF characteristics of LTE (FDD) downlink specified by 3GPP.

The MX269020A provides the following measurement features.

- Modulation accuracy measurement
- Carrier frequency measurement
- Transmitter power measurement

MS2830A-005/105 and MS2830A-006/106 is required to use the MX269020A on MS2830A.

1.2 Product Configuration

1.2.1 Standard configuration

Table 1.2.1-1 lists the standard configuration of the MX269020A.

Table 1.2.1-1 Standard configuration

Item	Model Name/Symbol	Product Name	Q'ty	Remarks
Application	MX269020A	LTE Downlink Measurement Software	1	
Accessory	—	Installation CD-ROM	1	Application software, operation manual CD-ROM

1.2.2 Option

Tables 1.2.2-1 list the option for the MX269020A. This is sold separately.

Table 1.2.2-1 Option

Option No.	Product Name	Remarks
MX269020A-001	LTE-Advanced FDD Downlink Measurement Software	Only for MS269xA, MS2830A, MS2850A

1.2.3 Applicable parts

Table 1.2.3-1 lists the applicable parts for the MX269020A.

Table 1.2.3-1 Applicable parts

Model Name/Symbol	Product Name	Remarks
W3014AE	MX269020A LTE Downlink Measurement Software Operation Manual (Operation)	English, printed version
W3064AE	MX269020A LTE Downlink Measurement Software Operation Manual (Remote Control)	English, printed version

1.3 Specifications

Table 1.3-1 shows the specifications for the MX269020A.

When MS2830A, MS2850A is used, this software's specification is specified by the condition below, unless otherwise noted.

Attenuator Mode: Mechanical Atten Only

Table 1.3-1 Specifications

Item	Specification
Common Specifications	
Channel bandwidth	1.4, 3, 5, 10, 15, 20 MHz
Target signal	Downlink
Capture time	Capture Time = Auto : 1 Frame Capture Time = Manual : 1 to 200 Frame
Modulation/Frequency Measurement	
Measurement frequency ranges	MS269x Series: 600 to 4000 MHz MS2830A: 600 to 4000 MHz MS2830A-040: 600 to 3600 MHz MS2850A: 600 to 4000 MHz (Analysis bandwidth ≤ 31.25 MHz) 800 to 4000 MHz (Analysis bandwidth > 31.25 MHz)
Measurement level range	–15 to +30 dBm (at Pre-Amp Off, or Pre-Amp not installed.) –15 to +10 dBm (at Pre-Amp On)
Carrier frequency accuracy	After CAL execution at 18 to 28°C For a signal of EVM = 1% For Measurement Interval = 10 subframe MS269x Series ± (accuracy of reference frequency × carrier frequency + 3 Hz) (Excluding the Batch Measurement when MS269xA-004/104 is installed) MS2830A ± (accuracy of reference frequency × carrier frequency + 3.5 Hz) (When the center frequency is from 600 MHz to 2700 MHz and MS2830A-078/178 is not installed) ± (accuracy of reference frequency × carrier frequency + 8.0 Hz) (When the center frequency is from 2700 MHz to 4000 MHz and MS2830A-078/178 is not installed) ± (accuracy of reference frequency × carrier frequency + 4.0 Hz) (In the CC of the center frequency when the center frequency is from 600 MHz to 2700 MHz and MS2830A-078/178 is installed) (At the input level of –4 dBm when MS2830A-045 is installed) ± (accuracy of reference frequency × carrier frequency + 8.0 Hz) (In the CC of the center frequency when the center frequency is from 2700 MHz to 4000 MHz and MS2830A-078/178 is installed) (At the input level of –4 dBm when MS2830A-045 is installed)

Table 1.3-1 Specifications (Cont'd)

Item	Specification
Carrier frequency accuracy (Cont'd)	MS2850A ± (accuracy of reference frequency × carrier frequency + 3.5 Hz) (Center frequency 600 to 2700 MHz (Analysis bandwidth ≤ 31.25 MHz)) (Center frequency 800 to 2700 MHz (Analysis bandwidth > 31.25 MHz)) ± (accuracy of reference frequency × carrier frequency + 8.0 Hz) (Center frequency 2700 to 4000 MHz)
Residual EVM	After CAL execution at 18 to 28°C At measurement Interval = 10 subframe MS269x Series : < 1.0% (rms) (When MS269xA-078/178 is not installed, or excluding the Batch Measurement when MS269xA-004/104 is installed) < 1.3% (rms) (In the CC of the center frequency when MS269xA-078/178 is installed) MS2830A : < 1.3% (rms) (At the input level of –4 dBm when MX2830A-045 is installed) MS2850A : < 1.3% (rms)
Transmitter power accuracy	After CAL execution, input attenuator ≥ 10 dB, at 18 to 28°C, the input signal is within the measurement level range and below the value set in Input Level. MS269x Series ±0.6 dB (at Pre-Amp Off, or Pre-Amp not installed.) ±1.1 dB (at Pre-Amp On) (Excluding the Batch Measurement when MS269xA-004/104 is installed) MS2830A ±0.6 dB (at Pre-Amp Off, or Pre-Amp not installed.) MS2850A ±0.6 dB (at Pre-Amp Off, or Pre-Amp not installed.) ±1.1 dB (at Pre-Amp On) Transmitter power accuracy is calculated from an RSS (root summed square) error of the absolute amplitude accuracy and the in-band frequency characteristics of the MS2690A/MS2691A/MS2692A, MS2830A, or MS2850A.
Waveform display	Provides functions for displaying waveforms below. Constellation EVM vs Subcarrier EVM vs Symbol Power vs Resource Block EVM vs Resource Block Spectral Flatness

Table 1.3-1 Specifications (Cont'd)

Item	Specification
Adjacent Channel Power Measurement	
Measurement method	Executes the adjacent channel power measurement function of the Spectrum Analyzer or Signal Analyzer.
Occupied Bandwidth Measurement	
Measurement method	Executes the occupied bandwidth measurement function of the Spectrum Analyzer or Signal Analyzer.
Channel Power Measurement	
Measurement method	Executes the channel power measurement function of the Spectrum Analyzer or Signal Analyzer.
Spectrum Emission Mask Measurement	
Measurement method	Executes the spectrum emission mask measurement function of the Spectrum Analyzer.
Digitize Function	
Function overview	Capable of outputting captured waveform data to internal storage device or external storage device.
Waveform Data	Format: I,Q (32 bit floating point binary format) Level: Assumes as $\sqrt{I^2+Q^2}$ =1 for 0 dBm input Level accuracy: Same as the absolute amplitude accuracy and in-band frequency characteristics of the signal analyzer.
Replay Function	
Function	Analyzes traces of saved waveform data Format: I, Q (32 bit floating point binary format) Sampling rate: 50 MHz

Chapter 2 Preparation

This chapter describes the preparations required for using the application you are using. Refer to the *MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe Operation)*, *MS2830A Signal Analyzer Operation Manual (Mainframe Operation)* or *MS2850A Signal Analyzer Operation Manual (Mainframe Operation)* for common features not included in this manual.

2.1 Part Names

This section describes the panel keys for operating the instrument and connectors used to connect external devices. For general points of caution, refer to the *MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe Operation)*, *MS2830A Signal Analyzer Operation Manual (Mainframe Operation)* or *MS2850A Signal Analyzer Operation Manual (Mainframe Operation)*.

2.1.1 Front panel

This section describes the front-panel keys and connectors.

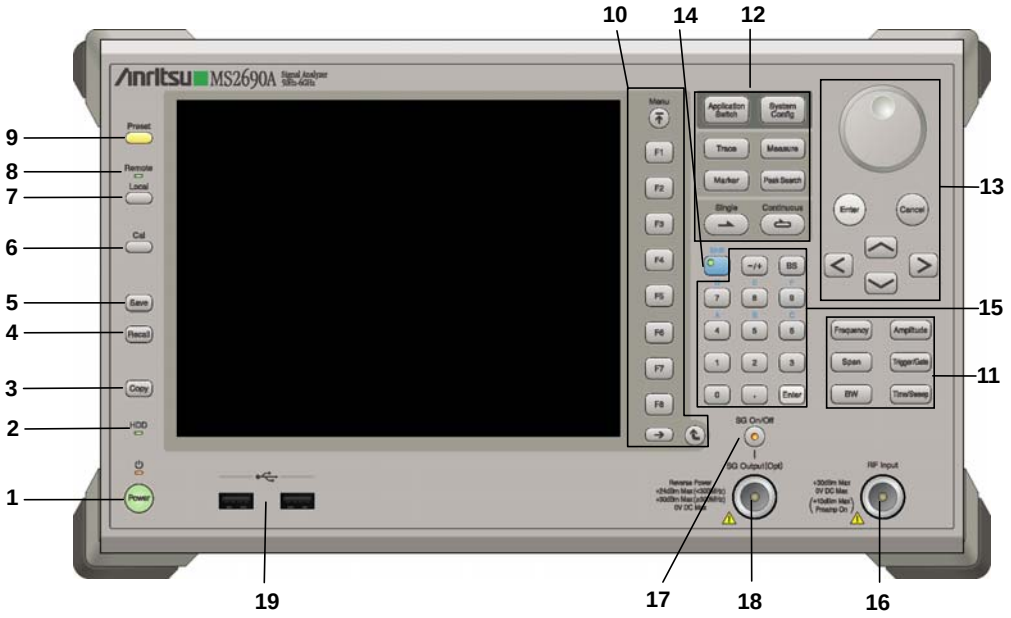


Figure 2.1.1-1 MS269x series front panel

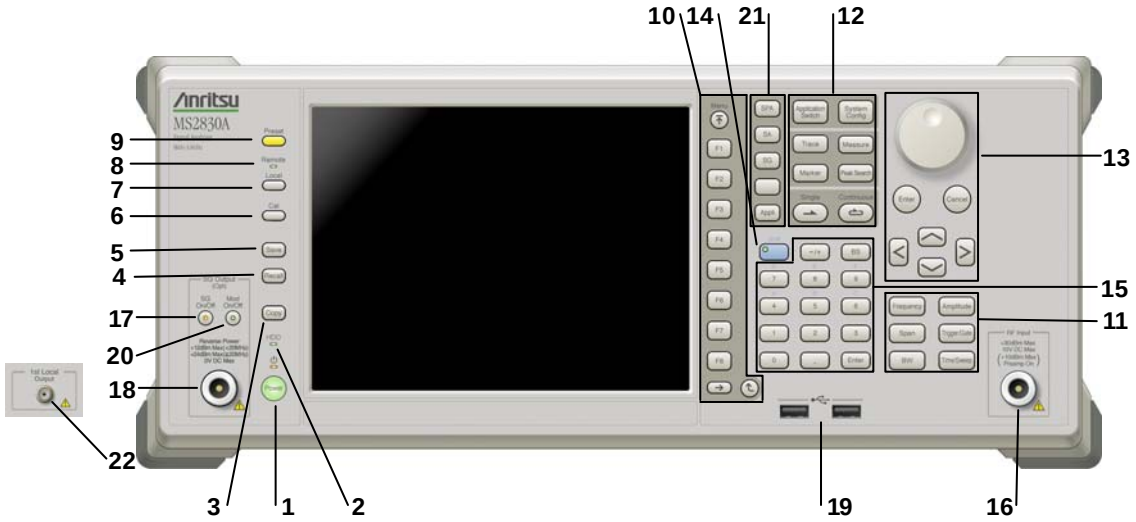


Figure 2.1.1-2 MS2830A/MS2850A front panel (MS2830A Example)

1 

Power Switch

Press to switch between the standby state (AC power supplied) and power-on state. The Power lamp lights orange at Standby and green at Power On. Press the power switch for about 2 seconds.

2 

Hard disk access lamp (MS269x series, MS2830A)

Lights up when the internal hard disk is accessed.

SSD access lamp (MS2850A)

Lights up when the internal SSD is accessed .

3 

Copy key

Press to capture display screen and save to file.

4 

Recall key

Press to recall parameter file.

5 

Save key

Press to save parameter file.

6 

Cal key

Press to display the Calibration menu.

7 

Local key

Press to return to local operation from remote control via GPIB, Ethernet, or USB (B), and enable panel settings.

8 

Remote lamp

Lights when in remote-control state.

9 

Preset key

Resets parameters to initial settings.

10 

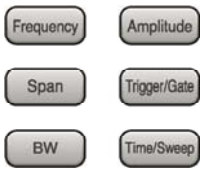
Function keys

Selects or configures function menu displayed on the right of the screen. The function menu is provided in multiple pages and layers.

Press → to fetch next function menu page. The current page number is displayed at the bottom of the function menu, as in "1 of 2".

Sub-menus may be displayed when a function menu is pressed. Press ↑ to go back to the previous menu. Press Menu to go back to the top menu.

11



Main function keys 1

Press to set or execute main functions.

Executable functions vary with the current application. When nothing happens with the press, it indicates that the application in use does not support the key.

Frequency Press to set frequency parameters.

Amplitude Press to set level parameters.

Span No function is assigned to this key.

Trigger/Gate Press to set trigger parameters.

BW No function is assigned to this key.

Time/Sweep Press to set measurement item parameters.

12

Main function keys 2

Press to set or execute main functions.

Executable functions vary with the current application. When nothing happens with the press, it indicates that the application in use does not support the key.

Application Switch Press to switch application.

System Config Press to display Configuration screen.

Trace Press to set the trace items or to switch the operation window.

Measure Press to set measurement item parameters.

Marker Use when switching graph marker operation.

Peak Search Press to set parameters related to the peak search function.

Single Press to start single measurement.

Continuous Press to start continuous measurements.

13

Rotary knob/Cursor key/Enter key/Cancel key

The rotary knob and cursor keys select display items or change settings.

Press Enter to set the entered or selected data.

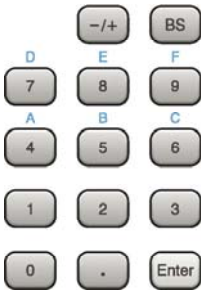
Press Cancel to cancel input or selected data.

14

Shift key

Operates keys with functions in blue characters on panel. Press the Shift key so the key lamp is green and then press the target key.

15



Numeric keypad

Enters numbers on parameter setup screens.

Press BS to delete the last entered digit or character.

[A] to [F] can be entered by pressing keys 4 to 9 while the Shift key lamp Shift is green.

16 RF Input

RF Input connector

Inputs RF signal. This is an N type input connector.
For the MS2830A with the MS2830A-045 and the MS2850A, a K type input connector is installed.

17 SG On/Off

RF Output Control key (when MS269xA-020/120, MS2830A-020/120/021/121 is installed)

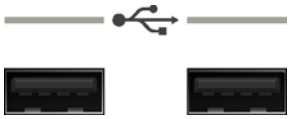
Press SG On/Off to switch on/off the modulation of RF signal when the Vector Signal Generator option is installed. The RF output control key lamp lights orange when the RF signal output is set to On.
This cannot be installed on the MS2830A with the MS2830A-044/045, or on the MS2850A.

18 SG Output(Opt)

RF Output connector (when MS269xA-020/120, MS2830A-020/120/021/121 installed)

Outputs RF signal, when the Vector Signal Generator option is installed.
This is an N type output connector.
This cannot be installed on the MS2830A with the MS2830A-044/045, or on the MS2850A

19



USB connector (type A)

Connect the accessory USB keyboard, mouse or USB memory.

20

Modulation control key (when MS2830A-020/120/021/121 installed)

Press to switch on/off the modulation of RF signal when the Vector Signal Generator option is installed. The lamp  on the key lights up in green in the modulation On state.
This cannot be installed on the MS2830A with the MS2830A-044/045, or on the MS2850A.

21

Application key (MS2830A, MS2850A)

Press to switch between applications.

Press to display the Spectrum Analyzer main screen.

Press to display the Signal Analyzer main screen, when MS2830A-005/105/007/006/106/009/109/077/078 or MS2850A are installed.

Press to display the Signal Generator main screen, when Vector Signal Generator option is installed. (MS2830A only)

This is a blank key. Not used. (MS2830A only)

Displays the main screen of the application that is selected using the Application Switch (Auto), or displays that of the pre-selected application (Manual).
For details, refer to 3.5.4 “Changing application layout” in *MS2830A Signal Analyzer Operation Manual (Mainframe Operation) or MS2850A Signal Analyzer Operation Manual (Mainframe Operation)*.

22 

1st Local Output connector (MS2830A, MS2850A)
This is installed with the MS2830A-044/045, or MS2850A.
Supplies local signal and bias current to the external mixer, and receives the IF signal with its frequency converted.

2.1.2 Rear panel

This section describes the rear-panel connectors.

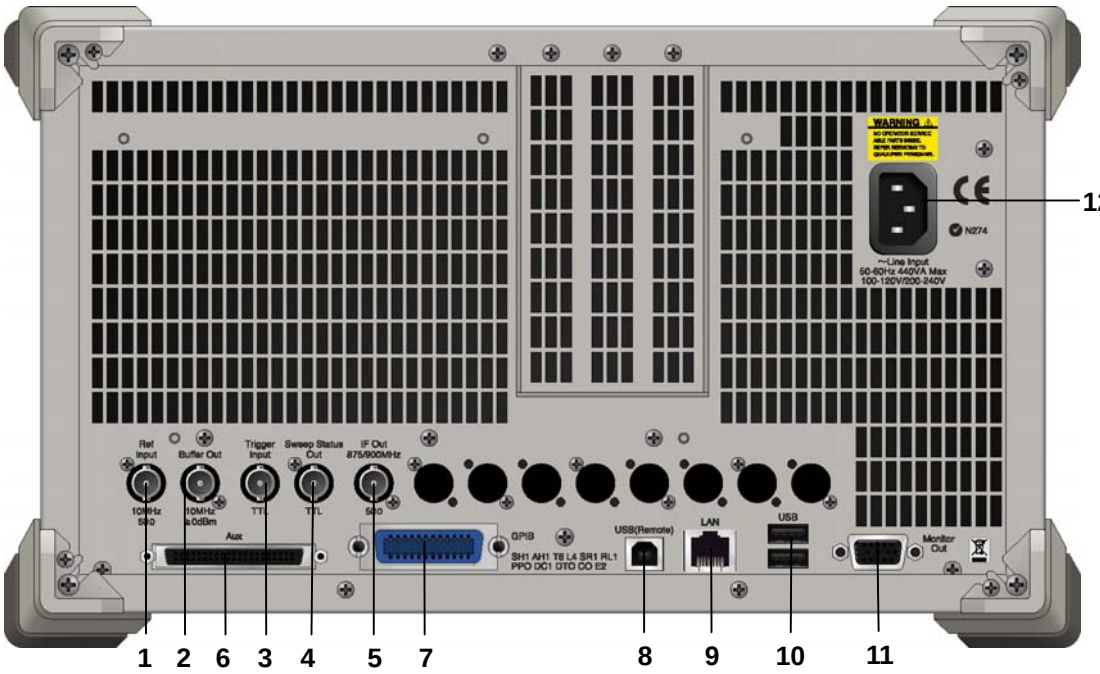


Figure 2.1.2-1 MS269x series rear panel

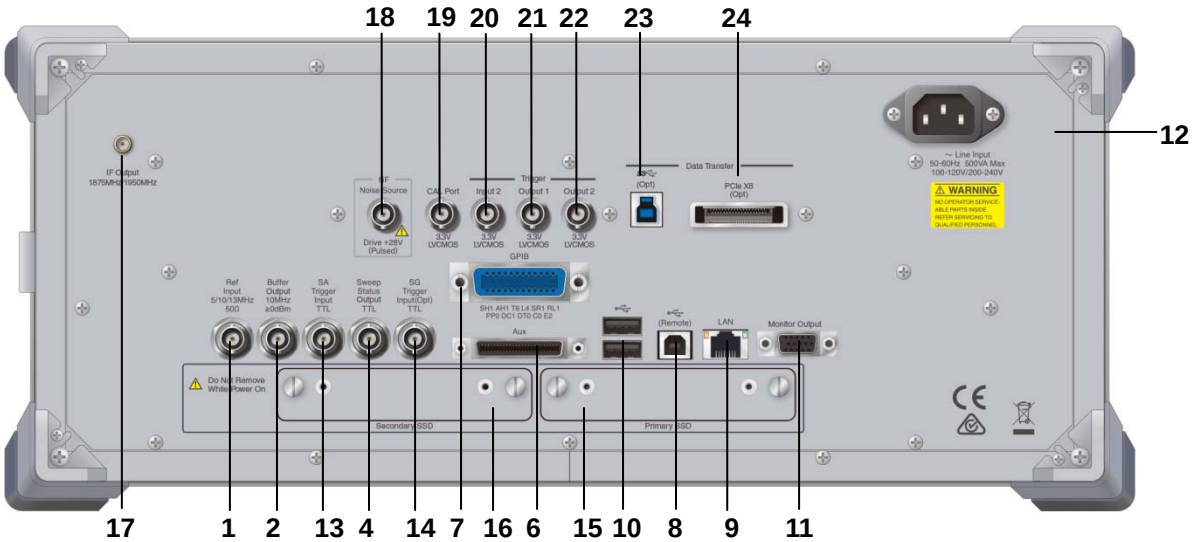


Figure 2.1.2-2 MS2830A/MS2850A rear panel (MS2850A Example)

1

Ref Input connector (reference frequency signal input connector)

Inputs external reference frequency signal. It is for inputting reference frequency signals with higher accuracy than the instrument's internal reference signal, or for synchronizing the frequency of the MS2690A/MS2691A/MS2692A or MS2830A, MS2850A to that of other equipment. The following frequencies are supported:

MS269x series: 10 MHz/13 MHz
MS2830A, MS2850A: 5 MHz/10 MHz/13 MHz

2

Buffer Out connector (reference frequency signal output connector)

Outputs the internal reference frequency signal (10 MHz). It is for synchronizing frequencies between other equipment and the MS2690A/MS2691A/MS2692A or MS2830A, MS2850A.

3

Trigger Input connector (MS269x series only)

Inputs trigger signal from external device.

4

Sweep Status Out connector

Outputs signal when internal measurement is performed or measurement data is obtained.

5

IF Out connector (MS269x series only)

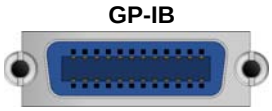
Not used.

6

AUX connector

Not used.

7



GPIB connector

For external control via GPIB.

8 USB(Remote)

USB connector (type B)
For external control via USB.

9 LAN

Ethernet connector
Connects PC or Ethernet network.

10 USB

USB connector (type A)
Used to connect a USB keyboard or mouse or the USB memory supplied.

11 **Monitor Out**

Monitor Out connector
Connects external display.

12

AC inlet
Supplies power.

13

SA Trigger Input connector (MS2830A, MS2850A)
This is a BNC connector for inputting external trigger signal (TTL) for SPA and SA applications.

14

SG Trigger Input connector (MS2830A)
This is a BNC connector for inputting external trigger signal (TTL) for Vector Signal Generator option.

15	**HDD** or **Primary HDD/SSD**	HDD slot (MS2830A) SSD slot (MS2850A)	This is a standard HDD slot. This is a standard SSD slot.
16	**HDD(Opt)** or **Secondary HDD/SSD**	HDD slot for Option (MS2830A) SSD slot (MS2850A)	This is a HDD slot for the options. This is a SSD slot for the options.

17 

IF output connector (MS2830A, MS2850A)
This is installed with the MS2830A-044/045 or on the MS2850A.
Monitor output of the internal IF signal.

18 

Noise Source connector
Supply (+28 V) of the Noise Source Drive.
This is available when the Option 017/117 is installed.

19 

CAL Port connector (Future extensions) (MS2850A)

20 

Trigger Input 2 connector (MS2850A)
Input the trigger signal (3.3 V LVCMOS) for SPA and SA applications.

21 

Trigger Output 1 connector (MS2850A)
Output the trigger signal (3.3 V LVCMOS).

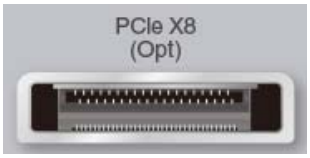
22 

Trigger Output 2 connector (MS2850A)
Output the trigger signal (3.3 V LVCMOS).

23 

USB 3.0 connector (MS2850A)
This is available when the MS2850A-054/154 is installed.

24



PCIe X8 connector (MS2850A)

This is available when the MS2850A-053/153 is installed.

2.2 Signal Path Setup

As shown in Figure 2.2-1, connect the instrument and the DUT using an RF cable, so that the signal to be tested is input to the RF Input connector. To prevent an excessive level signal from being input, do not input the signal before setting the input level using this application.

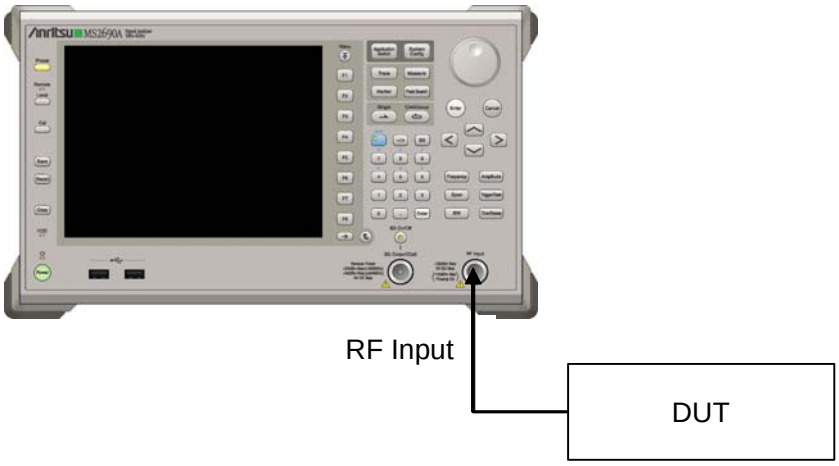


Figure 2.2-1 Signal path setup example

Set the reference signal and/or trigger signal paths from external sources, as required.

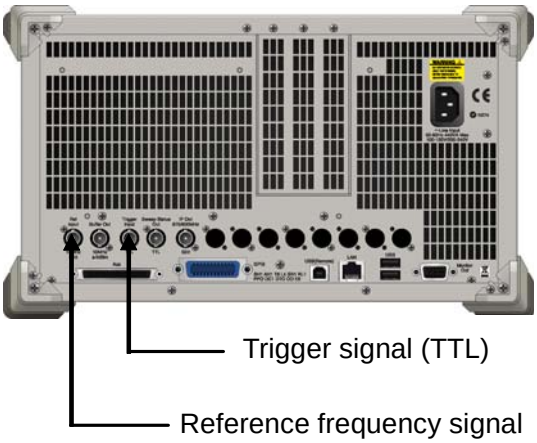


Figure 2.2-2 External signal input

2.3 Application Startup and Selection

To use this application, it is necessary to load (start up) and select the application.

2.3.1 Launching application

The application startup procedure is described below.

Note:

The XXX indicates the application name currently in use.

<Procedure>

1. Press System Config to display the Configuration screen.
2. Press F4 (Application Switch Settings) to display the Application Switch Registration screen.
3. Press F1 (Load Application Select), and move the cursor to "XXX" in the **Unloaded Applications** list.
   If "XXX" is displayed in the **Loaded Applications** list, this means that the application is already loaded.
   If "XXX" appears in neither the **Loaded Applications** nor **Unloaded Applications** list, this means that the application has not been installed.
4. Press F7 (Set) to load the application. If "XXX" is displayed in the **Loaded Applications** list, this means that the application is already loaded.

2.3.2 Selecting application

The selection procedure is described below.

<Procedure>

1. Press Application Switch to display the Application Switch menu.
2. Press the menu function key displaying "XXX".

The application can also be selected with mouse, by clicking "XXX" on the task bar.

2.4 Initialization and Calibration

This section describes the parameter settings and the preparations required before starting measurement.

2.4.1 Initialization

After selecting this application, first perform initialization. Initialization returns the settable parameters to their default value in order to clear the measurement status and measurement results.

Note:

When another software application is switched to or this application is unloaded (ended), the application keeps the parameter settings at that time. The parameter values that were last set will be applied when this application is selected next time.

The initialization procedure is as follows.

<Procedure>

1. Press Preset to display the Preset function menu.
2. Press F1 (Preset).

2.4.2 Calibration

Perform calibration before performing measurement. Calibration sets the level accuracy frequency characteristics for the input level to flat, and adjusts level accuracy deviation caused by internal temperature fluctuations. Calibration should be performed when first performing measurement after turning on power, or if beginning measurement when there is a difference in ambient temperature from the last time calibration was performed.

<Procedure>

1. Press Cal to display the Application Cal function menu.
2. Press F1 (SIGANA All).

For details on calibration functionality only executable with this instrument, refer to the *MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe Operation), MS2830A Signal Analyzer Operation Manual (Mainframe Operation)*or *MS2850A Signal Analyzer Operation Manual (Mainframe Operation)*.

Chapter 3 Measurement

This chapter describes the measurement function, the parameter contents and setting methods for the MX269020A.

3.1 Basic Operation

3.1.1 Screen layout

This section describes the screen layout for the MX269020A.

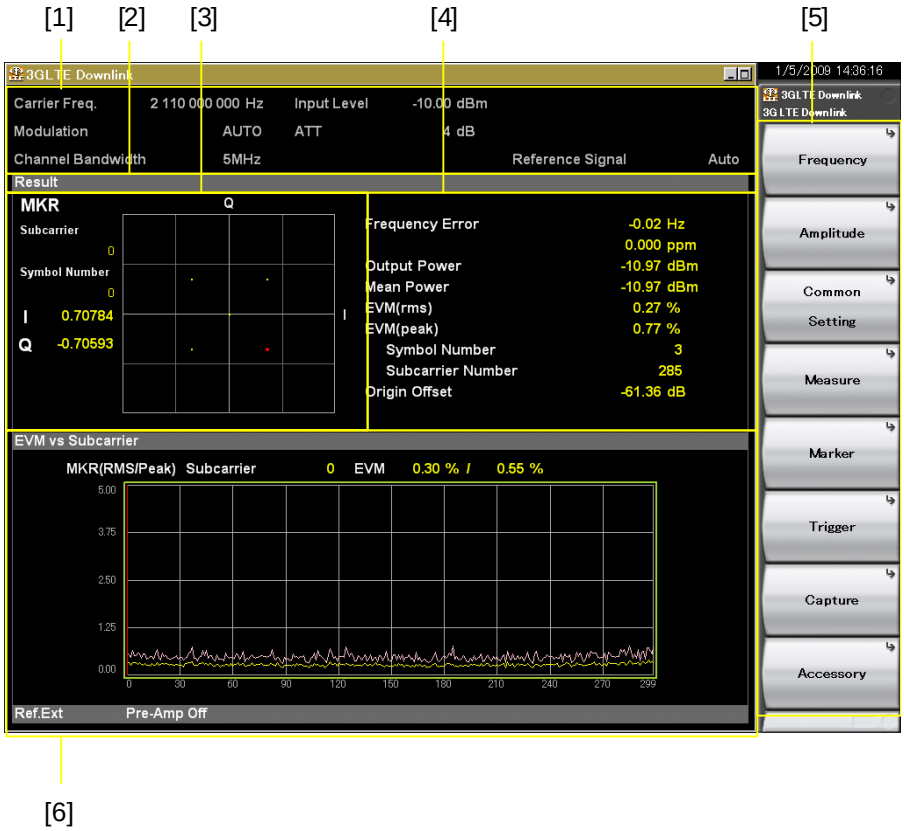


Figure 3.1.1-1 Screen Layout

[1] Measurement parameter
Displays the set parameters.

[2] Status message
Displays the status of signals.

[3] Constellation
Displays a constellation of the selected symbol.

[4] Result window
Displays measurement results.

[5] Function menu
Displays the functions executable with the function keys.

[6] Graph window
Displays a graph of the measurement results.

3.1.2 Function menu

This section describes the main function menu on the main screen.

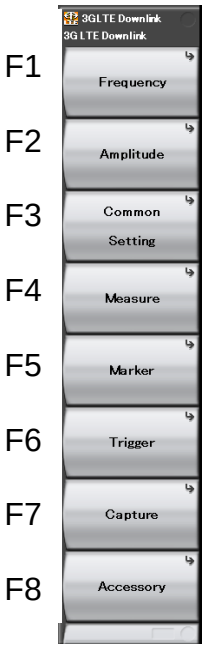


Figure 3.1.2-1 Main function menu

Table 3.1.2-1 Main function menu

Menu Display	Function
Frequency	Sets the frequency ☞ 3.2 "Frequency Function Menu"
Amplitude	Sets level. ☞ 3.3 "Amplitude Function Menu"
Common Setting	Sets common items. ☞ 3.5 "Common Setting Function Menu"
Measure	Sets measurement items. ☞ 3.6 "Measure Function Menu"
Marker	Sets a marker. ☞ 3.7 "Setting Maker"
Trigger	Sets a trigger. ☞ 3.8 "Setting Trigger"
Capture	Configures settings for IQ data capture. ☞ 3.4 "Capture IQ Data Function Menu"
Accessory	Sets other functions. ☞ 6.1 "Selecting Other Functions"

3.1.3 Performing measurement

There are two measurement modes: single and continuous. Measurement is performed once in the single measurement mode, and continuously in the continuous measurement mode, respectively.

Single

Following capture of an input signal based on the settings of Capture Time, the selected measurement items are measured only for the measurement count (Storage Count) before measurement is stopped.

<Procedure>

1. Press  .

Continuous

Following capture of an input signal based on the settings of Capture Time, the selected measurement items are continuously measured for the measurement count (Storage Count). Measurement will continue even if parameters are changed or the window display is changed. Measurement will be stopped if another application is selected or if the Replay function is executed.

<Procedure>

1. Press  .

Note:

The two measurement modes are not available when the Replay function is executed. If the Replay function is executed, analysis is started when an IQ data file is specified.

☞ 4.2 “Replay Function”

3.2 Frequency Function Menu

Configure the frequency settings in the Frequency function menu that is displayed by pressing F1 (Frequency) on the main function menu. Also, press Frequency to display the Frequency function menu and open the Carrier Frequency dialog box.

Note:

You cannot set any frequency when the Replay function is executed.

Carrier Frequency

■ Summary

Sets the carrier frequency.

■ Setting range

30 MHz to the upper limit of the main unit

(When MS269xA-004/104/078/178 or MS2830A-078 are not installed)

100 MHz to the upper limit of the main unit
(When MS269xA-004/104/078/178 are installed to the mainframe)

300 MHz to the upper limit of the main unit
(When MS2830A-078 is installed to the mainframe)

300 MHz to the upper limit of the main unit
(When MS2850A)

RF Spectrum

■ Summary

Sets whether to measure with IQ spectrum reversed.

■ Selection options

Norm.	Measures without IQ spectrum reversed.
Rvs.	Measures with IQ spectrum reversed.

3.3 Amplitude Function Menu

Configure the level settings in the Amplitude function menu that is displayed by pressing F2 (Amplitude) on the main function menu. Also, press Amplitude to display the Amplitude function menu and open the Input Level dialog box.

Note:

You cannot set a level when the Replay function is executed.

Input Level

■ Summary

Sets the input level from the target DUT.

■ Setting range

For Pre-Amp: On :
(–80.00 + Offset Value) to (10.00 + Offset Value) dBm
For Pre-Amp: Off:
(–60.00 + Offset Value) to (30.00 + Offset Value) dBm

Pre-Amp

■ Summary

Sets On/Off for the Pre-Amp function.

■ Selection options

On	Enables the Pre-Amp function.
Off	Disables the Pre-Amp function.

Offset

■ Summary

Sets On/Off for the Offset function.

■ Selection options

On	Enables the offset function.
Off	Disables the offset function.

Offset Value

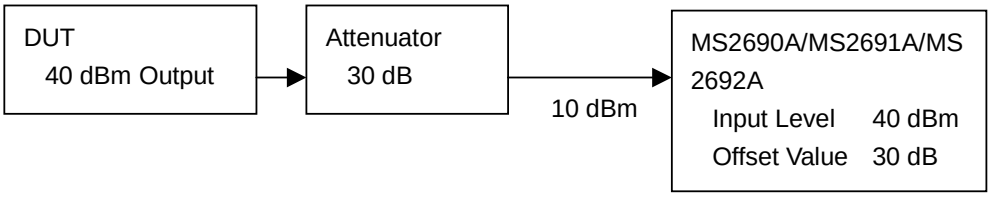
■ Summary

Sets the level offset coefficient.

■ Setting range

–99.99 to 99.99 dB

■ Setting example



Auto Range

■ Summary

This function adjusts input level according to input signal.
You cannot set a frequency and level when the Replay function is executed.

☞4.2 “Replay Function"

3.4 Capture IQ Data Function Menu

Configure the IQ data settings in the Capture function menu that is displayed by pressing F7 (Capture) on the main function menu.

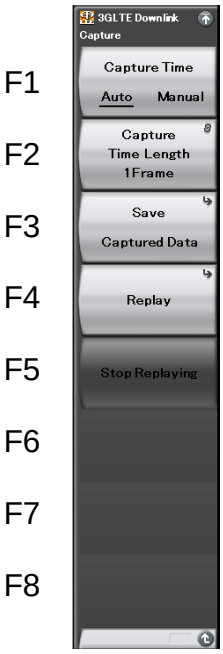


Figure 3.4-1 Capture function menu

Table 3.4-1 Capture function menu

Menu Display	Function
Capture Time (Auto/Manual)	Switches between the two capture modes of IQ data (auto setting and manual setting).
Capture Time Length	Sets the capture time length of IQ data.
Save Captured Data	Saves the captured IQ data. ☞Chapter 4 “Digitize Function”
Replay	Replays the captured IQ data. ☞Chapter 4 “Digitize Function”
Stop Replaying	Stops replaying the captured IQ data. ☞Chapter 4 “Digitize Function”

3.4.1 Setting capture time

Set the Capture Time (capture mode) and the Capture Time Length.

- Auto
  The data required to measure one frame per measurement is automatically captured if Auto is selected (Auto mode is specified). The Auto mode is set by default for the MX269020A.
- Manual
  The number of frames per measurement can be specified if Manual is selected to specify the Manual mode. The number of frames to be measured can be specified by using Capture Time Length. The setting range for Capture Time Length is from 1 to 200 frames. The frames in the area specified by Capture Time Length are continuous. The Manual mode is selected automatically if Capture Time Length is specified.

When performing adjacent channel power (ACP) measurement, channel power measurement, or occupied bandwidth (OBW) measurement by using the Replay function, save IQ data in the Manual mode.

3.4.2 Averaging IQ data

The averaging method depends on the capture time mode.

- Auto
  In the Auto mode, capture of one frame starts at the trigger timing. After the measurement is completed, capture of another frame starts at the next trigger timing. The average and maximum values are calculated from the measurement results at each storage count. The frames of multiple measurements are not necessarily consecutive.
  The storage count and the capture count are the same in single measurement. In continuous measurement, the average and maximum values are calculated from the last data of the storage count after measurement has been performed the number of times corresponding to the storage count.
- Manual
  In the Manual mode, if measurement starts at the trigger timing, frames are continuously captured for the number specified by Capture Time Length. After each frame measurement, the average and maximum values are calculated from the measurement results at each storage count.
  In single measurement, the storage count is reached at each capture.
  In continuous measurement, the single measurement operation is performed repeatedly.

In the manual mode, the storage count never exceeds the capture time length. Therefore, the maximum storage count equals the capture time length. If the capture time length is changed, the storage count is accordingly changed within the setting range.

3.5 Common Setting Function Menu

Set the common items in the Common Setting function menu that is displayed by pressing F3 (Common Setting) on the main function menu.

Channel Bandwidth

■ Summary

Selects the band of the input signal.

■ Selection options

1.4 MHz	Analyzes an input signal as a 1.4-MHz band.
3 MHz	Analyzes an input signal as a 3-MHz band.
5 MHz	Analyzes an input signal as a 5-MHz band.
10 MHz	Analyzes an input signal as a 10-MHz band.
15 MHz	Analyzes an input signal as a 15-MHz band.
20 MHz	Analyzes an input signal as a 20-MHz band

Test Model

■ Summary

Selects the type of the test model defined in 3GPP TS36.141.

■ Selection options

Off	Select when measuring signals other than the test model.
E-TM1.1	Select when measuring E-TM1.1 signals.
E-TM1.2	Select when measuring E-TM1.2 signals.
E-TM2	Select when measuring E-TM2 signals.
E-TM2a	Select when measuring E-TM2a signals.
E-TM3.1	Select when measuring E-TM3.1 signals.
E-TM3.1a	Select when measuring E-TM3.1a signals.
E-TM3.2	Select when measuring E-TM3.2 signals.
E-TM3.3	Select when measuring E-TM3.3 signals.

Synchronization Mode

■ Summary

Sets the synchronized signal.

■ Selection options

Synchronization signal
Sets Synchronization Signal for the synchronized signal.

Reference Signal Sets Reference Signal for the synchronized signal.

Note:

If Synchronization Signal is selected, the input signal includes Primary Synchronization Signal (P-SS) and Secondary Synchronization Signal (S-SS).

Table 3.5-1 shows the synchronization methods for signals of the MX269020A.

Table 3.5-1 Synchronization method

Synchronization Mode	Reference Signal Mode	Synchronization Method
Synchronization Signal (SS)	Auto	Searches for a synchronization signal from the received signal, and estimates the cell ID based on the searched signal. Generates a reference signal based on the estimated cell ID, and estimates the channel.
	Using Cell ID	Searches for a synchronization signal from the received signal. Generates a reference signal based on the set cell ID, and estimates the channel.
	Load File	Searches for a synchronization signal from the received signal. Estimates the channel based on the reference signal defined in the external file.
Reference Signal (RS)	Using Cell ID	Generates a reference signal based on the set cell ID, and synchronizes frames and estimates the channel.
	Load File	Synchronizes frames and estimates the channel based on the reference signal defined in the external file.

Reference Signal

■ Summary

Sets Reference Signal.

■ Selection options

Reference Signal Mode
: Sets the Reference Signal mode.

Reference Signal Load
: Specifies a file in which a reference signal is defined.

Frequency Shift
: Sets the frequency shift of the Reference Signal.

Cell ID
: Sets the Cell ID of the Reference Signal.

Power Boosting
: Sets the boost level of the reference signal.

Number of Antenna Ports
: Sets the number of antennas to be used for transmission.

Antenna Port
: Sets the antenna port number to be measured.

Reference Signal: Reference Signal Mode

■ Summary

Sets the Reference Signal mode.

■ Selection options

Auto
: Determines the Reference Signal through automatic judgment.

Using Cell ID
: Determines the Reference Signal according to the Cell ID setting.

Load File
: Determines the Reference Signal according to an external file.

Note:

Auto can be selected only when Synchronization Mode is set to Synchronization Signal.

Reference Signal: Reference Signal Load

■ Summary

Sets Reference Signal Load. This setting is enabled if Reference Signal Mode is set to Load File. If no file is specified, the default definition for the software applies.

■ Selection options

Device	Specifies the drive in which the reference signal is defined.
Load File	Selects the file in which the reference signal is defined. It is selectable from a csv file in a root directory of the drive specified by Device.
Default Load	Returns the reference signal to default.

Reference Signal: Frequency Shift

■ Summary

Sets the frequency shift of the Reference Signal. This setting is enabled when Load File is set for Reference Signal Mode.

■ Setting range

0 to 5

Reference Signal: Cell ID

■ Summary

Sets the Cell ID of the Reference Signal. This setting is enabled when CC Settings: Reference Signal Mode is set to Using Cell ID.

■ Setting range

0 to 503

Reference Signal: Power Boosting

■ Summary

Sets the boost level of the Reference Signal.

■ Setting range

–20.000 to +20.000 dB

Reference Signal: Number of Antenna Ports

■ Summary

Sets the number of antennas.

■ Selection options

1	Analyzes under the condition that the number of antennas used for transmission is 1.
2	Analyzes under the condition that the number of antennas used for transmission is 2.
4	Analyzes under the condition that the number of antennas used for transmission is 4.

Reference Signal: Antenna Port

■ Summary

Sets the antenna port number to be measured.

■ Setting range

0 to Number of Antenna Ports – 1

3.6 Measure Function Menu

To set the measurement items, press F4 (Measure) on the main function menu or Measure to display the Measure function menu.

3.6.1 Modulation Analysis

To set modulation analysis items, press F1 (Modulation Analysis) on the Measure function menu to display the Modulation Analysis function menu.

The Modulation Analysis function menu consists of two pages that are toggled by pressing →.

Table 3.6.1-1 Modulation Analysis function menu

Position	Menu Display	Function
Page 1 [F1]	Analysis Time	Sets measurement position. ☞ 3.6.1.1 "Analysis Time"
Page 1 [F2]	PDSCH Modulation Scheme	Sets PDSCH Modulation Scheme.
Page 1 [F3]	Channel Bandwidth	Sets Channel Bandwidth. ☞ 3.5 "Common Setting Function Menu"
Page 1 [F5]	Total EVM & Constellation Composite	Sets the channel to be targeted for the total EVM calculation and displayed in a constellation.
Page 1 [F6]	EVM Window Length	Sets FFT window length.
Page 1 [F7]	Detail Settings	Sets details of measured signal.
Page 1 [F8]	Optional Measurements	Sets whether to analyze IQ skew, IQ imbalance, and IQ quadrature error.
Page 2 [F1]	Trace	Sets Trace. ☞ 3.6.1.2 "Trace"
Page 2 [F8]	PDCCH Mapping Load	Loads the PDCCH configuration file.

PDSCH Modulation Scheme

■ Summary

Sets PDSCH Modulation Scheme.
Select AUTO if the measurement target includes multiple modulation schemes.

■ Selection options

QPSK Analyzes an input signal as a QPSK modulated signal.
16QAM Analyzes an input signal as a 16QAM modulated signal.
64QAM Analyzes an input signal as a 64QAM modulated signal.
256QAM Analyzes an input signal as a 256QAM modulated signal.
AUTO Analyzes an input signal after judging its modulation scheme automatically (Excluding 256QAM).

Total EVM & Constellation Composite

■ Summary

Sets the channel to be targeted for the total EVM calculation and displayed in a constellation. The possible channels are RS, PDSCH, PBCH, P-SS, S-SS, PDCCH, PCFICH,PHICH, and DTX.

■ Selection options

Include Includes the channel in the calculation.
Exclude Excludes the channel from the calculation.

EVM Window Length

■ Summary

Sets FFT window length. There are two setting methods: Ts and W. If the channel bandwidth is changed, the setting is restored to the default value according to the changed channel bandwidth. (See Table 3.6.1-2.)

■ Setting range

Ts 0 to 142
W When Channel Bandwidth is set to 1.4 MHz: 0 to 8
When Channel Bandwidth is set to 3 MHz: 0 to 17
When Channel Bandwidth is set to 5 MHz: 0 to 35
When Channel Bandwidth is set to 10 MHz: 0 to 71
When Channel Bandwidth is set to 15 MHz: 0 to 106
When Channel Bandwidth is set to 20 MHz: 0 to 142

Table 3.6.1-2 Default value of Channel Bandwidth and EVM Window Length

Channel Bandwidth	EVM Window Length (W)	Conversion from W to Ts
1.4 MHz	5	× 16
3 MHz	12	× 8
5 MHz	32	× 4
10 MHz	66	× 2
15 MHz	102	× (2048 / 1536)
20 MHz	136	×1

Detail Setting: Test Model

■ Summary

Sets the type of test models. The value is the same as that displayed in the Common Setting function menu.

☞ 3.5 “Common Setting Function Menu”

Detail Setting: Synchronization Mode

■ Summary

Sets the synchronized signal. The value is the same as that displayed in the Common Setting function menu.

☞ 3.5 “Common Setting Function Menu”

Detail Setting: Reference Signal Mode

■ Summary

Sets the mode of Reference Signal.
The value is the same as that displayed in the Common Setting function menu.

☞ 3.5 “Common Setting Function Menu”

Detail Setting: Frequency Shift

■ Summary

Sets the amount of frequency shifts for the reference signal.
The value is the same as that displayed in the Common Setting function menu.

☞ 3.5 “Common Setting Function Menu”

Detail Setting: Cell ID

■ Summary

Sets the cell ID for the reference signal.
The value is the same as that displayed in the Common Setting function menu.

☞ 3.5 “Common Setting Function Menu”

Detail Setting: Reference Signal Power Boosting

■ Summary

Sets the boosting level for the reference signal.
The value is the same as that displayed in the Common Setting function menu.

☞ 3.5 “Common Setting Function Menu”

Detail Setting : Number of Antenna Ports

■ Summary

Sets the number of antennas. The value is the same as that displayed in the Common Setting function menu.

☞ 3.5 "Common Setting Function Menu"

Detail Setting : Antenna Port

■ Summary

Sets the antenna port number to be measured.
The value is the same as that displayed in the Common Setting function menu.

☞ 3.5 "Common Setting Function Menu"

Detail Setting : PBCH On/Off

■ Summary

Selects whether to include PBCH for the target measurement.
Available when Test Model is set to Off.

■ Selection options

Checked	Target measurement includes PBCH.
Non-Checked	Target measurement does not include PBCH.

Detail Setting: PBCH Power Boosting (Auto/Manual)

■ Summary

Selects whether to detect PBCH power automatically or manually.
Available when Test Model is set to Off and PBCH is set to On.

■ Selection options

Auto	Automatic detection
Manual	Manual detection

Detail Setting: PBCH Power Boosting

■ Summary

Sets a value relative to the reference signal level to the PBCH level .
This setting is enabled when PBCH is set to On and when PBCH Power Boosting is set to Manual.

■ Setting range

–20.000 to +20.000 dB

Detail Setting: P-SS On/Off

■ Summary

Selects whether the measurement target includes the primary synchronization signal. The check box is always selected if Synchronization Signal is selected for Synchronization Mode.
Available when Test Model is set to Off.

■ Selection options

Checked	The measurement target includes P-SS.
Non-Checked	The measurement target does not include P-SS.

Detail Setting: P-SS Power Boosting (Auto/Manual)

■ Summary

Selects whether to detect the primary synchronization signal power automatically or manually.
Available when Test Model is set to Off and P-SS is set to On.

■ Selection options

Auto	Automatic detection
Manual	Manual detection

Detail Setting: P-SS Power Boosting

■ Summary

Sets a value relative to the reference signal level to the primary synchronization signal level.
This setting is enabled when P-SS is set to On and when P-SS Power Boosting is set to Manual.

■ Setting range

–20.000 to +20.000 dB

Detail Setting: S-SS On/Off

■ Summary

Select whether the measurement target includes the primary synchronization signal. The check box is always selected if Synchronization Signal is selected for Synchronization Mode.
Available when Test Model is set to Off.

■ Selection options

Checked	The measurement target includes S-SS.
Non-Checked	The measurement target does not include S-SS.

Detail Setting: S-SS Power Boosting (Auto/Manual)

■ Summary

Selects whether to detect the secondary synchronization signal power automatically or manually.
Available when Test Model is set to Off and S-SS is set to On.

■ Selection options

Auto	Automatic detection
Manual	Manual detection

Detail Setting: S-SS Power Boosting

■ Summary

Sets a value relative to the reference signal level to the secondary synchronization signal level. This setting is enabled when S-SS is set to On and when S-SS Power Boosting is set to Manual.

■ Setting range

–20.000 to +20.000 dB

Detail Setting: PDCCH On/Off

■ Summary

Select whether the measurement target includes PDCCH.
Available when Test Model is set to Off.

■ Selection options

Checked	The measurement target includes PDCCH.
Non-Checked	The measurement target does not include PDCCH.

Detail Setting: PDCCH Power Boosting (Auto/Manual)

■ Summary

Selects whether to detect the PDCCH power automatically or manually.
Available when Test Model is set to Off, PDCCH is set to On, and Number of PDCCHs is more than 1.

■ Selection options

Auto	Automatic detection
Manual	Manual detection

Detail Setting: PDCCH Power Boosting

■ Summary

Sets a value relative to the reference signal level to the PDCCH level. This setting is enabled if PDCCH is On, Number of PDCCH is set to 1 or greater, and PDCCH Power Boosting is set to Manual.

■ Setting range

–20.000 to +20.000 dB

Detail Setting: PCFICH On/Off

■ Summary

Select whether the measurement target includes PCFICH.
Available when Test Model is set to Off.

■ Selection options

Checked	The measurement target includes PCFICH.
Non-Checked	The measurement target does not include PCFICH.

Detail Setting: PCFICH Power Boosting (Auto/Manual)

■ Summary

Selects whether to detect the PCFICH power automatically or manually.
Available when Test Model is set to Off and PCFICH is set to On.

■ Selection options

Auto	Automatic detection
Manual	Manual detection

Detail Setting: PCFICH Power Boosting

■ Summary

Sets a value relative to the reference signal level to the PCFICH level. .
This setting is enabled when PCFICH is set to On and when PCFICH Power Boosting is set to Manual.

■ Setting range

–20.000 to +20.000 dB

Detail Setting: PHICH On/Off

■ Summary

Select whether the measurement target includes PHICH.
Available when Test Model is set to Off.

■ Selection options

Checked	The measurement target includes PCHICH.
Non-Checked	The measurement target does not include PCHICH.

Detail Setting: PHICH Power Boosting (Auto/Manual)

■ Summary

Selects whether to detect the power of the PHICH group automatically or manually.
Available when Test Model is set to Off and PHICH is set to On.

■ Selection options

Auto	Automatic setting
Manual	Manual setting

Detail Setting: PHICH Power Boosting

■ Summary

Sets a value relative to the reference signal level to the level of the PHICH group.
This setting is enabled when PHICH is set to On and when PHICH Power Boosting is set to Manual.

■ Setting range

–20.000 to +20.000 dB

Detail Setting: PDSCH Power Boosting (Auto/Manual)

■ Summary

This selects automatic detection and manual setting of the PDCCH power. Available when Test Model is set to Off.

■ Selection options

Auto	Detects automatically.
Manual	Sets manually.

Detail Setting: PDSCH Power Boosting

■ Summary

Sets value relative to reference signal level at PDSCH level. This is enabled only when the PDSCH Power Boosting is set to Manual.

■ Setting range

–20.000 to +20.000 dB

Detail Setting: PHICH Ng

■ Summary

Sets a parameter (Ng) to determine the number of PHICH groups.

■ Selection options

1/6	1/6 is set for Ng.
1/2	1/2 is set for Ng.
1	1 is set for Ng.
2	2 is set for Ng.

Detail Setting: PHICH Duration

■ Summary

Sets the PHICH duration.

■ Selection options

Normal	Normal
Extended	Extended

Detail Setting: Number of PDCCH Symbols (Auto/Manual)

■ Summary

Selects whether to detect the number of PDCCH symbols automatically or manually. The automatic detection is performed by decoding PCFICH. This setting is enabled when PCFICH is set to On.

■ Selection options

Auto	Automatic detection
Manual	Manual detection

Details Setting: Number of PDCCH Symbols

■ Summary

Sets the number of symbol for PDCCH.

■ Setting range

When Channel Bandwidth is set to 1.4 MHz: 0 to 4

When Channel Bandwidth is set to other than 1.4 MHz: 0 to 3

Detail Setting: PDCCH Mapping

■ Summary

Sets mapping of PDCCH and NIL (dummy PDCCH) to the control channel elements (CCEs).

■ Setting range

Auto	Automatically evaluates and measures PDCCH and NIL
Full	Performs measurement assuming that only PDCCHs are mapped (no NIL). Even if REG is a value smaller than the CCE unit, measurement is performed assuming that PDCCHs are mapped.
Easy	Performs measurement for all subframes according to the PDCCH mapping that is determined by the PDCCH Format and Number of PDCCHs parameters. Measurement is performed assuming that PDCCHs are mapped sequentially from the first CCE for the number specified by Number of PDCCHs in the unit specified by PDCCH Format.
Load File	Performs measurement according to the setting in the loaded file that is specified by PDCCH Mapping Load.

Detail Setting: PDCCH Mapping - PDCCH Format

■ Summary

Sets the type of PDCCH format. This setting applies if PDCCH Mapping is set to Easy.

■ Setting range

0 to 3

Detail Setting: PDCCH Mapping - Number of PDCCHs

■ Summary

Sets the number of PDCCHs to be mapped. This setting applies if PDCCH Mapping is set to Easy.

PDCCHs are mapped sequentially from CCE(0) for the number specified by this parameter, in the unit specified by PDCCH Format. If a value greater than the number of PDCCHs that can be mapped is specified, measurement is performed assuming that PDCCHs are mapped to all CCEs to which PDCCHs can be mapped.

■ Setting range

1 to 88

Detail Setting: Pseudo-Random Sequence

■ Summary

Selects the version of 3GPP TS36.211 to which the specifications of the pseudo-random sequence should conform.

■ Selection options

TS36. 211 V8. 2. 0 (2008-03)	Definitions in 3GPP TS36. 211 V8.2.0
TS36. 211 V8. 3. 0 (2008-05)	Definitions in 3GPP TS36. 211 V8.3.0 to V8.7.0 and later

Detail Setting: Channel Estimation

■ Summary

Sets the Channel Estimation function to On/Off.

■ Selection options

Checked	Enables the Channel Estimation function.
Non-Checked	Disables the Channel Estimation function.

Detail Setting: Moving Average Filter

■ Summary

Sets the window size for the 10th and subsequent subcarriers defined in 3GPP TS36. 141 F3. 4 Post FFT equalization. This is available when Channel Estimation is set to On.

■ Setting range

1 to 71

Detail Setting: Measurement Filter Type

■ Summary

Selects filter type used for modulation analysis.

Notes:

- This function is not available for Mean Power and Output Power measurements.
- This is available when Extended Freq Lock Range is set to Off.

■ Selection options

Normal	Use this when measuring single carrier signal.
Narrow	Use this when measuring multi-carrier signal. (This measures one carrier signal.)

Detail Setting: Extended Freq Lock Range

■ Summary

Use this function for signal with large frequency difference. This function may make measurement possible.

Note:

This is available when Measurement Filter is set to Narrow.

■ Selection options

Off	Use this for normal signal.
On	Use this for signal with large frequency difference.

Detail Setting: Cyclic Prefix Mode

■ Summary

Sets the Cyclic Prefix of the measurement target signal.

Note:

Available only when Measurement function is set to MIMO Summary.

■ Selection options

Normal	Use this to measure the Normal Cyclic Prefix signals.
Extended	Use this to measure the Extended Cyclic Prefix signals.

Detail Setting: Time Offset Reference

■ Summary

Sets RS Time Offset Reference.
When Antenna is selected for Timing Offset Reference, RS Timing Offset displays the signal timing difference between the antenna port specified for Antenna Port and each antenna port.
When Ext. Trigger is selected for Timing Offset Reference, RS Timing Offset displays the signal timing difference between the trigger and each antenna port.

Note:

Available only when Measurement function is set to MIMO Summary.

■ Selection options

Antenna	References the signals from the antenna port specified by Antenna Port
Ext. Trigger	References External Trigger

PDSCH EVM Calculation

■ Summary

Specifies resource block that is PDSCH EVM calculation target. This parameter is applied only to the results for PDSCH ALL EVM, PDSCH QPSK EVEM, PDSCH 16QAM, and PDSCH 64QAM, PDSCH 256QAM displayed in Summary.

■ Selection options

3GPP — This is the measurement method defined by 3GPP. When Channel Bandwidth is 1.4 MHz, the calculation target is only 2 pairs of resource block including 138 resource elements. When Channel Bandwidth is not 1.4 MHz, the calculation target is only 2 pairs of resource blocks including 150 resource elements.

All PDSCH Resource Elements — The calculation target is all resource elements allocated to PDSCH.

Table 3.6.1-3 shows the correspondences between the PDSCH EVM Calculation setting and the measurement result type.

Table 3.6.1-3 Correspondence between PDSCH EVM Calculation setting and measurement result type

Measurement Result Types	Parameter PDSCH EVM Calculation	Measurement Target	Value Referenced as Ideal Signal Power During EVM Calculation
PDSCH ALL EVM PDSCH QPSK EVM PDSCH 16QAM EVM PDSCH 64QAM EVM PDSCH 256QAM EVM	3GPP	A set of two resource blocks that consist of PDSCH only	Power calculated using the ideal PDSCH symbol
	All PDSCH EVM Resource Elements	A set of all target PDSCH resource elements	Average power for the input reference signal
Power vs. RB EVM for specific resource block displayed in EVM vs. RB	3GPP	All PDSCH resource elements included in the specified resource block	Power calculated using the ideal PDSCH symbol
	All PDSCH EVM Resource Elements	All PDSCH resource elements included in the specified resource block	Average power for the input reference signal
EVM for PDSCH included when calculating total EVM	— (Not applicable)	All PDSCH resource elements	Average power for the input reference signal
PDSCH EVM for specific OFDMA symbols and subcarriers (EVM displayed in EVM vs. Subcarrier and EVM vs. Symbol graphs)	— (Not applicable)	Specified PDSCH resource element	Average power for the input reference signal

Virtual Resource Block type

■ Summary

This specifies the Virtual Resource Block Type.

■ Selection options

Localized	The Power vs RB analysis results are displayed for each subframe.
Distributed	The Power vs RB analysis results are displayed for each slot.

Detail Setting: Restore Default Values

■ Summary

To reset the parameters within the dialog box, press F1 (Restore Default Values) while the Detail Setting dialog box is displayed. However, the default values are not used for measurement until F7 (Set) is pressed.

PDCCH Mapping Load

■ Summary

Specifies the file to measure. This setting applies if PDCCH Mapping is set to Load File. If no file is specified, measurement is performed assuming PDCCH Mapping is Full.

■ Selection options

Device	Specifies the drive that contains the file specified for PDCCH Mapping.
Load File	Selects the file specified for PDCCH Mapping. An XML file in the root directory of the drive specified for Device can be selected.

3.6.1.1 Analysis Time

Set the measurement position in the Analysis Time function menu that is displayed by pressing F1 (Analysis Time) on page 1 of the Modulation Analysis function menu or Time/Sweep.

The MX269020A captures data based on the value specified by Capture Time Length, and synchronizes the data in frame units. Also, the MX269020A analyzes the data in subframe units, and then displays the results. Specify the position to start synchronization for the captured data by using the Analysis Frame Position and Analysis Offset Time parameters. Specify the position to start analysis based on the synchronization point by using the Starting Subframe Number parameter. Specify the subframes to be analyzed by using the Measurement Interval parameter.

Starting Subframe Number

■ Summary

Sets the analysis starting position. In Figure 3.6.1.1-1, 3 is set for Starting Subframe Number.

■ Setting range

0 to 9

Measurement Interval

■ Summary

Sets the analysis Subframe length (Measurement Interval). Each measurement result is the value averaged at the interval set by this parameter. In Figure 3.6.1.1-1, 5 is set for Measurement Interval.

■ Setting range

1 to (10 – Starting Subframe Number)

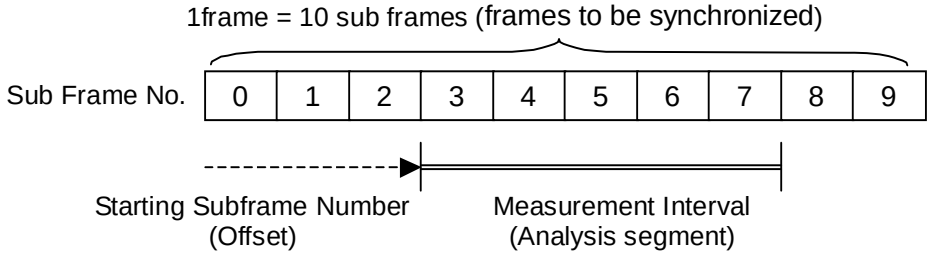


Figure 3.6.1.1-1 Starting Subframe Number and Measurement Interval settings

Analysis Frame Position

■ Summary

Sets the position to start analysis in frame units.
This setting is enabled when Capture Time is set to Manual.
If Storage Mode is set to Off, the setting range is determined assuming that the storage count is 1.

If the value of Capture Time Length or Storage Count is changed, this parameter is accordingly set within the setting range.

■ Setting range

0 to (Capture Time Length – Storage Count)

Analysis Offset Time

■ Summary

Sets the offset from the analysis start position set by Analysis Frame Position by time.
This setting is enabled when Capture Time is set to Manual. If Storage Mode is set to Off, the setting range is determined assuming that the storage count is 1.

If the value of Capture Time Length, Storage Count, or Analysis Frame Position is changed, this parameter is accordingly set within the setting range.

■ Setting range

0 for Analysis Frame Position, and same value for Capture Time Length and Storage Count:
0 ms (fixed)

0 for Analysis Frame Position, and larger value for Capture Time Length than Storage Count:
0 ms to 4.999999 ms

1 or larger for Analysis Frame Position, and same value for Capture Time Length and (Storage Count + Analysis Frame Position):
–4.999999 ms to 0 ms

Other than the above:
–4.999999 ms to 4.999999 ms

Figure 3.6.1.1-2 shows a parameter relationship example if Capture Time Length is set to 3, Analysis Frame Position is set to 1, Analysis Offset Time is set to a negative value, and Storage Count is set to 2.

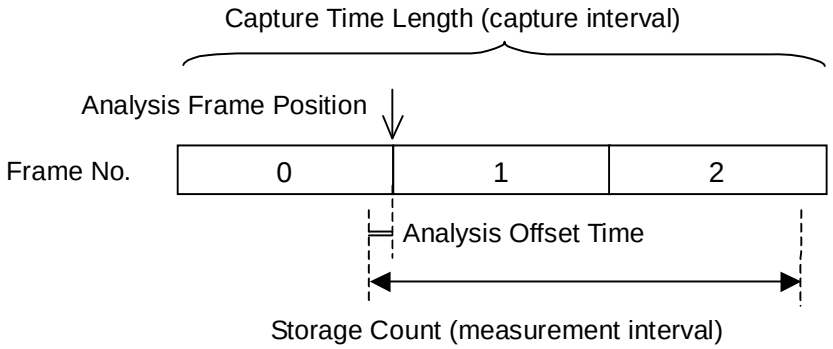


Figure 3.6.1.1-2 Analysis Frame Position and Analysis Offset Time settings

3.6.1.2 Trace (EVM vs Subcarrier, EVM vs Symbol, Spectral Flatness, RE Map)

Set Trace in the Trace function menu that is displayed by pressing F1 (Trace) on page 2 of the Modulation Analysis function menu or Trace.

Table 3.6.1.2-1 Trace function menu

Position	Menu Display	Function
Page 1 [F1]	Trace Mode	Sets type of result displayed in a graph window.
Page 1 [F2]	Constellation Display Range	Sets the range of symbols to be displayed in a constellation.
Page 1 [F3]	Scale	Sets vertical scale of graphical result.
Page 1 [F5]	Storage	Sets storage method.
Page 1 [F6]	Subcarrier Number	Sets symbol number of Marker position and EVM vs Subcarrier displayed.
Page 1 [F7]	Symbol Number	Sets subcarrier number of Marker position and EVM vs Symbol displayed.
Page 1 [F8]	EVM vs Subcarrier View	Sets whether to enable averaging in EVM vs Subcarrier, and the display type.
	EVM vs Symbol View	Sets whether to enable averaging in EVM vs Symbol, and the display type.
	Spectral Flatness Type	Sets type of Spectral Flatness displayed.

Trace Mode

■ Summary

Sets the type of result displayed in a graph window.

Note:

The Trace function menu configuration changes depending on the settings of this function.

■ Selection options

EVM vs Subcarrier	Displays EVM vs Subcarrier in a graph window.
EVM vs Symbol	Displays EVM vs Symbol in a graph window.
Spectral Flatness	Displays Spectral Flatness in a graph window.
Power vs Resource Block	Displays Power vs Resource Block in a graph window.
EVM vs Resource Block	Displays EVM vs Resource Block in a graph window.
Summary	Displays EVM of each channel and power of each slot in a graph window.
Test Model Summary	Display Test Model signal measurement result in a graph window.
RE Map	Displays a layout map of resource blocks and elements in a graph window.

Notes:

- Constellation is not displayed when Trace Mode is set to Summary or Test Model Summary.
- Trace Mode Summary is available when Test Model is not Off.

☞ 3.5 “Common Setting Function Menu"

Constellation Display Range

■ Summary

Sets the range of symbols to be displayed in a constellation.

■ Selection options

Symbol	Displays a constellation for the symbols specified for Symbol Number.
Composite	Displays a constellation for the symbols determined by the Starting Subframe Number and Measurement Interval parameters.

Scale

■ Summary

Sets vertical scale of graphical result.

■ Selection options

EVM Unit	Sets a unit of EVM (% / dB)
EVM Scale	Sets the scale upper limit value of EVM in %: 1 to 100%, in dB: – 60 to 0 dB
Flatness Scale	Sets a scale of Spectral Flatness.

Scale: Flatness Scale

■ Summary

Sets a scale of Spectral Flatness.

■ Setting range

Amplitude	Sets the upper and lower limit values of Amplitude in Spectral Flatness (1.0 to 100.0 dB).
Difference Amplitude	Sets the upper and lower limit values of Difference Amplitude in Spectral Flatness (0.1 to 10.0 dB).
Phase	Sets the upper and lower limit values of Phase in Spectral Flatness (1.0 to 180.0 deg).
Group Delay	Sets the upper and lower limit values of Group Delay in Spectral Flatness (1.0 to 10000.0 dB).

Storage

■ Summary

Sets storage method. This setting is disabled when Capture Time is set to Manual and when Capture Time Length is set to 1.

■ Selection options

Mode	Sets the storage mode.
Count	Sets the measurement count.

Storage: Mode

■ Summary

Sets the storage mode.

■ Selection options

Off	Updates data per measurement.
Average	Displays the average per measurement.
Average & Max	Displays the average and maximum values per measurement.

Storage: Count

■ Summary

Sets the measurement count.

■ Setting range

When Capture Time is Auto: 2 to 9999

When Capture Time is Manual: 2 to Capture Time Length

Subcarrier Number

■ Summary

Sets subcarrier number of Marker position and EVM vs Symbol displayed.

■ Setting range

0 to 1199	Channel Bandwidth: 20 MHz
0 to 899	Channel Bandwidth: 15 MHz
0 to 599	Channel Bandwidth: 10 MHz
0 to 299	Channel Bandwidth: 5 MHz
0 to 179	Channel Bandwidth: 3 MHz
0 to 71	Channel Bandwidth: 1.4 MHz

☞3.5 “Common Setting Function Menu"

Symbol Number

■ Summary

Sets symbol number of marker position and the constellation displayed.

■ Setting range

0 to (Measurement Interval × 14 Symbol) –1

☞ 3.6.1.1 “Analysis Time"

EVM vs Subcarrier View

■ Summary

Sets whether to enable averaging in EVM vs Subcarrier, and the display type.

■ Selection options

Each Symbol	Displays EVM vs Subcarrier of Symbol set in EVM vs Subcarrier Symbol Number.
Averaged over all Symbols	Displays EVM vs Subcarrier of the analysis Subframe length set in Measurement Interval.
Graph View	Selects a graph display type of EVM vs Subcarrier from the average (RMS), and the average value and peak value (RMS&Peak).

☞ 3.6.1.1 “Analysis Time"

EVM vs Symbol View

■ Summary

Sets whether to enable averaging in EVM vs Symbol, and the display type.

■ Selection options

Each Subcarrier	Displays EVM vs Symbol of Subcarrier set in EVM vs Symbol Subcarrier Number.
Averaged over all subcarriers	Displays EVM vs Symbol in all subcarriers.
Graph View	Selects a graph display type of EVM vs Subcarrier from the average (RMS), and the average value and peak value (RMS&Peak).

Spectral Flatness Type

■ Summary

Sets the type of Spectral Flatness displayed.

■ Selection options

Amplitude	Displays Amplitude in Spectral Flatness.
Difference Amplitude	Displays Difference Amplitude in Spectral Flatness.
Phase	Displays Phase in Spectral Flatness.
Group Delay	Displays Group Delay in Spectral Flatness.

3.6.1.3 Trace (Power vs Resource Block, EVM vs Resource Block)

Set Trace in the Trace function menu that is displayed by pressing F1 (Trace) on page 2 of the Modulation Analysis function menu or Trace.

Table 3.6.1.3-1 Trace function menu

Position	Menu Display	Function
Page 1 [F1]	Trace Mode	Sets a graphical result in the Graph window.
Page 1 [F3]	Scale	Sets vertical scale of a graphical result.
Page 1 [F4]	Storage	Sets the storage mode.
Page 1 [F6]	Subframe Number	Sets a subframe number. This is displayed when Virtual Resource Block Type is Localized.
	Slot Number	Sets the slot number. This is displayed when Virtual Resource Block type is Distributed.
Page 1 [F7]	Resource Block Number	Sets the resource block number.
Page 1 [F8]	Power vs RB View	Sets the display type of Power vs Resource Block.
	Graph View	Selects either average value (RMS) or average value and peak value (RMS&Peak) for the graph display type of EVM vs Resource Block.

Trace Mode

■ Summary

Sets a graphical result in the Graph window.

Note:

The Trace function menu configuration changes depending on the settings of this function.

■ Selection options

EVM vs Subcarrier

Displays EVM vs Subcarrier in a graph window.

EVM vs Symbol

Displays EVM vs Symbol in a graph window.

Spectral Flatness

Displays Spectral Flatness in a graph window.

Power vs Resource Block

Displays Power vs Resource Block in a graph window.

EVM vs Resource Block

Displays EVM vs Resource Block in a graph window.

Summary	Displays EVM of each channel and power of each slot in a graph window.
RE Map	Displays a layout map of resource blocks and elements in a graph window.

Note:

The constellation is not displayed when Trace Mode is set to Summary.

Scale

■ Summary

Sets vertical scale of a graphical result.

■ Selection options

EVM Unit	Sets the unit of EVM (% / dB).
EVM Scale	Sets the upper limit for the EVM scale. in %: 1 to 100%, in dB: – 60 to 0 dB

Note:

EVM Scale is valid only for EVM vs Resource Block.

Storage

■ Summary

Sets the storage mode. This setting is disabled when Capture Time is set to Manual and Capture Time Length is set to 1.

■ Selection options

Mode	Sets the storage mode.
Count	Sets the number of measurements.

Storage: Mode

■ Summary

Sets the storage mode.

■ Selection options

Off	Updates the data every time it measures.
Average	Displays the average value every time it measures.
Average & Max	Displays the average value and maximum value every time it measures.

Storage: Count

■ Summary

Sets the number of measurements.

■ Setting range

When Capture Time is Auto:

2 to 9999

When Capture Time is set to Manual:

2 to Capture Time Length

Subframe Number

■ Summary

Sets the subframe number to be displayed for PDSCH Constellation and Bottom Graph.

Notes:

- This is displayed when Virtual Resource Block Type is Localized.
- This setting is common for Constellation and Bottom Graph.

■ Setting range

Starting Subframe Number to Starting Subframe Number + Measurement Interval –1

☞ 3.6.1.1 “Analysis Time”

Slot Number

■ Summary

Sets the slot number to be displayed for PDSCH Constellation and Bottom Graph.

Notes:

- This is displayed when Virtual Resource Block type is Distributed.
- This setting applies to both Constellation and Bottom Graph.

■ Setting range

Starting Subframe Number × 2
to (Starting Subframe Number + Measurement Interval) × 2 – 1

Resource Block Number

■ Summary

Sets the resource block number.

Note:

This setting is common for Constellation and Bottom Graph.

■ Setting range

0 to 99	Channel Bandwidth: 20 MHz
0 to 74	Channel Bandwidth: 15 MHz
0 to 49	Channel Bandwidth: 10 MHz
0 to 24	Channel Bandwidth: 5 MHz
0 to 14	Channel Bandwidth: 3 MHz
0 to 5	Channel Bandwidth: 1.4 MHz

☞3.5 “Common Setting Function Menu”

Power vs RB View

■ Summary

Sets the display type of Power vs Resource Block.

Note:

This setting is enabled only for Power vs Resource Block.

■ Selection options

Each Subframe	Displays Power vs Resource Block of the subframe set by Subframe Number.
Overall	Displays Power vs Resource Block for all subframes.
Graph View	Selects either average value (RMS) or average value and peak value (RMS&Peak) for the EVM display type.

Graph View

■ Summary

Selects either average value (RMS) or average value and peak value (RMS&Peak) for the graph display type of EVM vs Resource Block.

Note:

When Trace Mode is set to Power vs Resource Block, the setting is for the display type of MKR EVM.

■ Selection options

RMS	Displays the average value of EVM vs Resource Block.
RMS&Peak	Displays the average value and peak value of EVM vs Resource Block.

3.6.1.4 Trace (Summary)

Set Trace in the Trace function menu that is displayed by pressing F1 (Trace) on page 2 of the Modulation Analysis function menu or Trace.

Table 3.6.1.4-1 Trace function menu

Position	Menu Display	Function
Page 1 [F1]	Trace Mode	Sets a graphical result in the Graph window.
Page 1 [F3]	Scale	Sets a unit of EVM.
Page 1 [F4]	Storage	Sets the result storage method.
Page 1 [F8]	Page Number	Sets the page number to be displayed.

Trace Mode

■ Summary

Sets a graphical result in the Graph window.

Note:

The Trace function menu configuration changes depending on the settings of this function.

■ Selection options

EVM vs Subcarrier

Displays EVM vs Subcarrier in a graph window.

EVM vs Symbol

Displays EVM vs Symbol in a graph window.

Spectral Flatness

Displays Spectral Flatness in a graph window.

Power vs Resource Block

Displays Power vs Resource Block in a graph window.

EVM vs Resource Block

Displays EVM vs Resource Block in a graph window.

Summary Displays EVM of each channel and power of each slot in a graph window.

RE Map Displays a layout map of resource blocks and elements in a graph window.

Note:

The constellation is not displayed when Trace Mode is set to Summary.

Scale

■ Summary

Sets vertical scale of a graphical result.

■ Selection options

EVM Unit	Sets a unit of EVM (% / dB)

Storage

■ Summary

Sets the result storage method. This setting is disabled when Capture Time is set to Manual AND when Capture Time Length is set to 1.

■ Selection options

Mode	Sets the storage mode.
Count	Sets the number of measurements.

Storage: Mode

■ Summary

Sets the storage mode.

■ Selection options

Off	Updates the data every time it measures.
Average	Displays the average value every time it measures.
Average & Max	Displays the average value and maximum value every time it measures.

Storage: Count

■ Summary

Sets the number of measurements.

■ Setting range

When Capture Time is Auto:	2 to 9999
When Capture Time is Manual:	2 to Capture Time Length

Page Number

■ Summary

Sets the page number.

■ Setting range

1 to 9

3.6.2 MIMO Summary

Set the analysis items for MIMO signal in the MIMO Summary function menu that is displayed by pressing F2 (MIMO Summary) in the Measure menu.

Table 3.6.2-1 MIMO Summary function menu

Position	Menu display	Function
[F1]	Analysis Time	Sets measurement position. Shares modulation analysis and setting values. ☞ 3.6.1.1 "Analysis Time"
[F3]	Channel Bandwidth	Sets Channel Bandwidth. Shares modulation analysis and setting values. ☞ 3.5 "Common Setting Function Menu"
[F7]	Detail Settings	Sets details of measured signal. Shares modulation analysis and setting values. ☞ 3.6.1 "Modulation Analysis"
[F8]	Active Antenna Threshold	Sets a signal detection level.

Active Antenna Threshold

■ Summary

Sets the threshold value for On/Off evaluation of the Antenna Port signal. The RS power of the set Antenna Port signal is used as the reference to evaluate the RS power of the signal of each Antenna Port.

■ Setting range

–100 to 0 dB

3.6.3 Adjacent Channel Power Measurement (ACP)

The ACP function of the Signal Analyzer function or Spectrum Analyzer function is recalled by automatically reflecting the settings of Carrier Frequency, Input level, Offset, Offset Value, and Pre-Amp to the corresponding parameters. Recall Current Application described in Section 3.6.2 “Recalling parameters” of the *MS2690A/MS2691A/MS2692A Operation Manual (Mainframe Operation), MS2830A Operation Manual (Mainframe Operation),* or *MS2850A Operation Manual (Mainframe Operation)* cannot be executed when this function is being recalled.

ACP (FFT)

■ Summary

Recalls the ACP function of the Signal Analyzer function and measures the adjacent channel power for the reflected parameter settings. ACP (FFT) is enabled only when a Channel Bandwidth is set to 1.4, 3, or 5 MHz.

ACP (Swept)

■ Summary

Recalls the ACP function of the Spectrum Analyzer function and measures the adjacent channel leakage power for the reflected parameter settings.

3.6.4 Channel Power Measurement (Channel Power)

The Channel Power function of the Signal Analyzer function or Spectrum Analyzer function is recalled by automatically reflecting the settings of Carrier Frequency, Input level, Offset, Offset Value and Pre-Amp to the corresponding parameters. Recall Current Application described in Section 3.6.2 “Recalling parameters” of the *MS2690A/MS2691A/MS2692A Operation Manual (Mainframe Operation), MS2830A Operation Manual (Mainframe Operation)*, or *MS2850A Operation Manual (Mainframe Operation)* cannot be executed when this function is being recalled.

Channel Power (FFT)

■ Summary

Recalls the Channel Power function of the Signal Analyzer function and measures the channel power for the reflected parameter settings.

Channel Power (Swept)

■ Summary

Recalls the Channel Power function of the Spectrum Analyzer function and measures the channel power for the reflected parameter settings.

3.6.5 Occupied Bandwidth Measurement (OBW)

The OBW function of the Signal Analyzer function or Spectrum Analyzer function is recalled by automatically reflecting the settings of Carrier Frequency, Input level, Offset, Offset Value, and Pre-Amp to the corresponding parameters. Recall Current Application described in Section 3.6.2 “Recalling parameters” of the *MS2690A/MS2691A/MS2692A Operation Manual (Mainframe Operation)*, *MS2830A Operation Manual (Mainframe Operation)*, or *MS2850A Operation Manual (Mainframe Operation)* cannot be executed when this function is being recalled.

OBW (FFT)

■ Summary

Recalls the OBW function of the Signal Analyzer function and measures the occupied bandwidth for the reflected parameter settings.

OBW (Swept)

■ Summary

Recalls the OBW function of the Spectrum Analyzer function and measures the occupied bandwidth for the reflected parameter settings.

3.6.6 Spectrum Emission Mask Measurement (SEM)

The Spectrum Emission Mask function of the Spectrum Analyzer function is recalled by automatically reflecting the settings of Carrier Frequency, Input level, Offset, Offset Value, and Pre-Amp to the corresponding parameters. Recall Current Application described in Section 3.6.2 “Recalling parameters” of the *MS2690A/MS2691A/MS2692A Operation Manual (Mainframe Operation)*, *MS2830A Operation Manual (Mainframe Operation)*, or *MS2850A Operation Manual (Mainframe Operation)* cannot be executed when this function is being recalled.

Spectrum Emission Mask (Swept)

■ Summary

Recalls the Spectrum Emission Mask function of the Signal Analyzer function and measures the spectrum emission mask for the reflected parameter settings.

3.6.7 Advanced Settings

This allows you to configure various settings related to the measurement functions.

Coupled Ref & ATT in Swept & FTT

■ Summary

This command sets whether to inherit ATT setting when switching function among the followings:

- ACP of Spectrum analyzer function
- Channel Power
- OBW
- Spectrum Emission Mask (SEM)
- ACP
- Channel Power
- OBW

ATT setting may not be inherited when function is switched among Modulation Analysis and MIMO measurement.

3.6.8 Batch Measurement

Set the batch measurement parameters in the Batch Measurement function menu that is displayed by pressing **Batch Measurement** on the Measure function menu.

Table 3.6.8-1 Batch Measurement function menu

Position	Menu Display	Function
Page 1 [F1]	Batch Settings	Sets the Batch Measurement parameters. ☞ 3.6.8.1 "Batch Settings"

3.6.8.1 Batch Settings

This menu is used to set the batch measurement parameters.

Common Settings: Storage Mode

■ Summary

Sets the storage mode of Modulation Analysis.

■ Selection options

Off	Updates data per measurement.
Average	Displays the average per measurement.
Average & Max	Displays the average and maximum values per measurement.

Common Settings: Storage Count

■ Summary

Sets the measurement count of Modulation Analysis.

■ Setting range

2 to 9999

Common Settings: Storage Mode for Unwanted Emissions

■ Summary

Sets the storage mode for Unwanted Emissions.

■ Selection options

Off	Updates data per measurement.
Average	Displays the average per measurement.

Common Settings: Storage Count for Unwanted Emissions

■ Summary

Sets the measurement count for Unwanted Emissions.

■ Setting range

2 to 9999

Common Settings: Starting Subframe Number

■ Summary

Sets the analysis starting position of Modulation Analysis.

■ Setting range

0 to 9

Common Settings: Measurement Interval

■ Summary

Sets the analysis subframe length (Measurement Interval) of Modulation Analysis. Each measurement result is the value averaged at the interval set by this parameter.

■ Setting range

1 to (10 –Common Settings: Starting Subframe Number)

Common Settings: Starting OFDM Symbol Number

■ Summary

Sets the analysis starting position of Unwanted Emissions.

■ Setting range

0 to 139

Common Settings: Measurement Interval for Unwanted Emissions

■ Summary

Sets the analysis OFDM Symbol length of Unwanted Emissions. Each measurement result is the value averaged at the interval set by this parameter.

■ Setting range

1 to (140 – Common Settings : Starting OFDM Symbol Number)

Common Settings: Modulation Analysis

■ Summary

Enables/disables of Modulation Analysis.

■ Selection options

Off	Disables the Modulation Analysis
On	Enables the Modulation Analysis

Common Settings: OBW

■ Summary

Enables/disables of OBW measurement. The measurement is not executed if the required frequency bandwidth exceeds the analysis bandwidth.

■ Selection options

Off	Disables the OBW measurement
On	Enables the OBW measurement

Common Settings: ACLR (Adjacent Channel Leakage Ratio)

■ Summary

Enables/disables of ACLR measurement. The measurement is not executed if the required frequency bandwidth exceeds the analysis bandwidth.

■ Selection options

Off	Disables the ACLR measurement
On	Enables the ACLR measurement

Common Settings: OBUE (Operating Band Unwanted Emissions)

■ Summary

Enables/disables of OBUE measurement. The measurement is not executed if the required frequency bandwidth exceeds the analysis bandwidth.

■ Selection options

Off	Disables the OBUE measurement
On	Enables the OBUE measurement

Band Settings: Measurement Item

■ Summary

Sets the measurement items for every Band.

■ Setting items

Band #0	Measures the Band 0.
Band #1	Measures the Band 1.
Band #2	Measures the Band 2.

Notes:

- When the MX269020A-001 is not installed, this is fixed to Band 0.
- When MS2830A-078 is installed to the mainframe, this is fixed to Band 0.

Band Settings: Carrier Frequency

■ Summary

Sets a carrier frequency.

■ Setting range

30 MHz to the upper limit of the main unit
(When MS269xA-004/104/078/178 or MS2830A-078 are not installed)

100 MHz to the upper limit of the main unit
(When MS269xA-004/104/078/178 are installed to the mainframe)

300 MHz to the upper limit of the main unit
(When MS2830A-078 is installed to the mainframe)

300 MHz to the upper limit of the main unit
(When MS2850A)

Band Settings: Input Level

■ Summary

Sets the input level from the target DUT.

■ Setting range

For Pre-Amp: On :
(–80.00 + Offset Value) to (10.00 + Offset Value) dBm
For Pre-Amp: Off:
(–60.00 + Offset Value) to (30.00 + Offset Value) dBm

Band Settings: Pre-Amp

■ Summary

Sets On/Off for the Pre-Amp function.

■ Selection options

On	Enables the Pre-Amp function.
Off	Disables the Pre-Amp function.

Band Settings: Offset

■ Summary

Sets On/Off for the offset function.

■ Selection options

On	Enables the offset function.
Off	Disables the offset function.

Band Settings: Offset Value

■ Summary

Sets the level offset coefficient.

■ Setting range

–99.99 to 99.99 dB

Band Settings: Contiguous Mode

■ Summary

Sets On/Off for the contiguous mode.

■ Selection options

On	Enables the Contiguous Mode.
Off	Disables the Contiguous Mode.

Note:

When the MX269020A-001 is not installed, it is fixed to Off.

Band Settings: OBUE Standard

■ Summary

Sets the standard template for OBUE measurement.

■ Selection options

WideBS Cat.A<1G	Wide Area BS Category A <1G
WideBS Cat.A 1-3G	Wide Area BS Category A 1-3G
WideBS Cat.A >3G	Wide Area BS Category A >3G
WideBS Cat.B Opt.1 <1G	Wide Area BS Category B Option 1 <1G
WideBS Cat.B Opt.1 1-3G	Wide Area BS Category B Option 1 1-3G
WideBS Cat.B Opt.1 >3G	Wide Area BS Category B Option 1 >3G
WideBS Cat.B Opt.2	Wide Area BS Category B Option 2
LocalBS Cat.A&B ≤3G	Local Area BS Category A&B ≤3G
LocalBS Cat.A&B >3G	Local Area BS Category A&B >3G
HomeBS Cat.A&B ≤3G	Home BS Category A&B ≤3G
HomeBS Cat.A&B >3G	Home BS Category A&B >3G

Band Settings: OBUE Standard Additional

■ Summary

Sets the additional standard template for OBUE measurement.

■ Selection options

Off	Not use the additional standard template.
Band 5	Band 5
Band 2,4,10,23,25,35,36,41	Band 2, 4, 10, 23, 25, 35, 36, 41
Band 12,13,14,17	Band 12, 13, 14, 17

CC Settings: Measurement Item

■ Summary

Sets the measurement items for every CC.

■ Setting items

CC #0	Measures the CC 0.
CC #1	Measures the CC 1.
CC #2	Measures the CC 2.
CC #3	Measures the CC 3.
CC #4	Measures the CC 4.

■ Default

When the MX269020A-001 is installed:

CC #0	On
CC #1,2,3,4	Off

When the MX269020A-001 is not installed:

CC #0	On fixed
CC #1,2,3,4	Off fixed

CC Settings: Frequency Band

■ Summary

Sets the frequency band.

■ Setting items

Band #0	Measures as the CC of Band 0.
Band #1	Measures as the CC of Band 1.
Band #2	Measures as the CC of Band 2.

Notes:

- When the MX269020A-001 is not installed, this is fixed to Band 0.
- When MS2830A-078 is installed to the mainframe, this is fixed to Band 0.

CC Settings: Frequency Offset

■ Summary

Sets the frequency offset.

■ Setting range

–50000000 + (CC Settings: Channel Bandwidth / 2) to
50000000 – (CC Settings: Channel Bandwidth / 2) Hz
(When MS269xA-004/104/078/178 or MS2830A-078 are installed, or MS2850A.)

–15625000 + (CC Settings: Channel Bandwidth / 2) to
15625000 – (CC Settings: Channel Bandwidth / 2) Hz
(When MS269xA-004/104/078/178 or MS2830A-078 are not installed.)

Notes:

- When the MX269020A-001 is not installed, it is fixed to 0 Hz.
- The resolution is 300 kHz when Band Settings: Contiguous Mode is set to On.
- The resolution is 1 kHz when Band Settings: Contiguous Mode is set to Off.

CC Settings: Channel Bandwidth

■ Summary

Selects a band of an input signal.

■ Selection options

1.4 MHz	Analyzes an input signal as a 1.4 MHz band.
3 MHz	Analyzes an input signal as a 3 MHz band.
5 MHz	Analyzes an input signal as a 5 MHz band.
10 MHz	Analyzes an input signal as a 10 MHz band.
15 MHz	Analyzes an input signal as a 15 MHz band.
20 MHz	Analyzes an input signal as a 20 MHz band

CC Settings: Test Model

■ Summary

Selects the type of the test model defined in 3GPP TS36.141.

■ Selection options

Off	Selects when measuring signals other than the test model.
E-TM1.1	Selects when measuring E-TM1.1 signals.
E-TM1.2	Selects when measuring E-TM1.2 signals.
E-TM2	Selects when measuring E-TM2 signals.
E-TM2a	Selects when measuring E-TM2a signals.
E-TM3.1	Selects when measuring E-TM3.1 signals.
E-TM3.1a	Selects when measuring E-TM3.1a signals.
E-TM3.2	Selects when measuring E-TM3.2 signals.

E-TM3.3	Selects when measuring E-TM3.3 signals.

CC Settings: Synchronization Mode

■ Summary

Sets the synchronized signal.

■ Selection options

SS	Sets Synchronization Signal for the synchronized signal.
RS	Sets Reference Signal for the synchronized signal.

Note:

Available when CC Settings: Test Model is set to Off.

CC Settings: Reference Signal Mode

■ Summary

Sets the reference signal mode.

■ Selection options

Auto	Determines the Reference Signal through automatic judgment.
Using Cell ID	Determines the Reference Signal according to the Cell ID setting.

Note:

Auto can be selected only when CC Settings: Synchronization Mode is set to Synchronization Signal.

CC Settings: Cell ID

■ Summary

Sets the Cell ID of the Reference Signal. This setting is enabled when CC Settings: Reference Signal Mode is set to Using Cell ID.

■ Setting range

0 to 503

CC Settings: CRS Power Boosting

■ Summary

Sets the boost level of the CRS.

■ Setting range

–20.000 to +20.000 dB

CC Settings: CRS Number of Antenna Ports

■ Summary

Sets the number of antennas for the CRS.

■ Selection options

1	Analyzes under the condition that the number of antennas used for transmission is 1.
2	Analyzes under the condition that the number of antennas used for transmission is 2.
4	Analyzes under the condition that the number of antennas used for transmission is 4.

CC Settings: CSI-RS Number of Antenna Ports

■ Summary

Sets the number of antennas for the CSI-RS.

■ Selection options

1	Analyzes under the condition that the number of antennas used for transmission is 1.
2	Analyzes under the condition that the number of antennas used for transmission is 2.
4	Analyzes under the condition that the number of antennas used for transmission is 4
8	Analyzes under the condition that the number of antennas used for transmission is 8

Note:

This can be set when CC Settings: CSI-RS On/Off is checked.

CC Settings: CRS Antenna Port

■ Summary

Sets the antenna port number to be measured.

■ Setting range

0 to CRS Number of Antenna Ports – 1

CC Settings: CSI-RS Antenna Port

■ Summary

Sets the antenna port number to be measured.

■ Setting range

15 to CSI-RS Number of Antenna Ports + 14

Note:

This can be set when CC Settings: CSI-RS On/Off is checked.

CC Settings: PDSCH Modulation Scheme

■ Summary

Sets PDSCH Modulation Scheme.
Select AUTO if the measurement target includes multiple modulation schemes.

■ Selection options

QPSK	Analyzes an input signal as a QPSK modulated signal.
16QAM	Analyzes an input signal as a 16QAM modulated signal.
64QAM	Analyzes an input signal as a 64QAM modulated signal.
256QAM	Analyzes an input signal as a 256QAM modulated signal.
AUTO	Analyzes an input signal after judging its modulation scheme automatically (Excluding 256QAM).

CC Settings: EVM Window Length

■ Summary

Sets FFT window length. There are two setting methods: Ts and W.
If the CC Settings: Channel Bandwidth is changed, the setting is restored to the default value according to the CC Settings: Channel Bandwidth. (See Table 3.6.1-2.)

■ Setting range

Ts	0 to 142
W	When CC Settings: Channel Bandwidth is set to 1.4 MHz: 0 to 8 When CC Settings: Channel Bandwidth is set to 3 MHz: 0 to 17 When CC Settings: Channel Bandwidth is set to 5 MHz: 0 to 35 When CC Settings: Channel Bandwidth is set to 10 MHz: 0 to 71 When CC Settings: Channel Bandwidth is set to 15 MHz: 0 to 106 When CC Settings: Channel Bandwidth is set to 20 MHz: 0 to 142

CC Settings: Channel Estimation

■ Summary

Sets the Channel Estimation function to On/Off.

■ Selection options

Checked	Enables the Channel Estimation function.
Non-Checked	Disables the Channel Estimation function.

CC Settings: Measurement Filter Type

■ Summary

Selects filter type used for modulation analysis.

■ Selection options

Normal	Use this when measuring single carrier signal.
Narrow	Use this when measuring multi-carrier signal. (This measures one carrier signal.)

Notes:

- This can be set when Band Settings: Contiguous Mode is set to Off.
- Even if Narrow is selected, this function measures only one carrier signal.
- For the internal processing, the wideband filter intended for Carrier Aggregation is selected.

CC Settings: PBCH On/Off

■ Summary

Selects whether to include PBCH for the target measurement.
Available when CC Settings: Test Model is set to Off.

■ Selection options

Checked	Target measurement includes PBCH.
Non-Checked	Target measurement does not include PBCH.

CC Settings: PBCH Power Boosting (Auto/Manual)

■ Summary

Selects whether to detect PBCH power automatically or manually.
Available when CC Settings: Test Model is set to Off and CC Settings: PBCH is set to On.

■ Selection options

Auto	Automatic detection
Manual	Manual detection

CC Settings: PBCH Power Boosting

■ Summary

Sets a value relative to the reference signal level to the PBCH level .
This setting is enabled when CC Settings: PBCH is set to On and when CC Settings: PBCH Power Boosting is set to Manual.

■ Setting range

–20.000 to +20.000 dB

CC Settings: P-SS On/Off

■ Summary

Selects whether the measurement target includes the primary synchronization signal. This parameter is fixed ON if Synchronization Signal is selected for Synchronization Mode.
Available when CC Settings: Test Model is set to Off.

■ Selection options

Checked	The measurement target includes P-SS.
Non-Checked	The measurement target does not include P-SS.

CC Settings: P-SS Power Boosting (Auto/Manual)

■ Summary

Selects whether to detect the primary synchronization signal power automatically or manually.
Available when CC Settings: Test Model is set to Off and CC Settings: P-SS is set to On.

■ Selection options

Auto	Automatic detection
Manual	Manual detection

CC Settings: P-SS Power Boosting

■ Summary

Sets a value relative to the reference signal level to the primary synchronization signal level.
This setting is enabled when CC Settings: P-SS is set to On and when CC Settings: P-SS Power Boosting is set to Manual.

■ Setting range

–20.000 to +20.000 dB

CC Settings: S-SS On/Off

■ Summary

Select whether the measurement target includes the secondary synchronization signal. The check box is always selected if Synchronization Signal is selected for Synchronization Mode.
Available when CC Settings: Test Model is set to Off.

■ Selection options

Checked	The measurement target includes S-SS.
Non-Checked	The measurement target does not include S-SS.

CC Settings: S-SS Power Boosting (Auto/Manual)

■ Summary

Selects whether to detect the secondary synchronization signal power automatically or manually.
Available when CC Settings: Test Model is set to Off and CC Settings: S-SS is set to On.

■ Selection options

Auto	Automatic detection
Manual	Manual detection

CC Settings: S-SS Power Boosting

■ Summary

Sets a value relative to the reference signal level to the secondary synchronization signal level. This setting is enabled when CC Settings: S-SS is set to On and when CC Settings: S-SS Power Boosting is set to Manual.

■ Setting range

–20.000 to +20.000 dB

CC Settings: PDCCH On/Off

■ Summary

Select whether the measurement target includes PDCCH.
Available when CC Settings: Test Model is set to Off.

■ Selection options

Checked	The measurement target includes PDCCH.
Non-Checked	The measurement target does not include PDCCH.

CC Settings: PDCCH Power Boosting (Auto/Manual)

■ Summary

Selects whether to detect the PDCCH power automatically or manually.
Available when CC Settings: PDCCH is set to On and CC Settings: PDCCH Mapping - Number of PDCCHs is more than 1.

■ Selection options

Auto	Automatic detection
Manual	Manual detection

CC Settings: PDCCH Power Boosting

■ Summary

Sets a value relative to the reference signal level to the PDCCH level.
This setting is enabled if CC Settings: PDCCH is On and CC Settings: PDCCH Power Boosting is set to Manual.

■ Setting range

–20.000 to +20.000 dB

CC Settings: PCFICH On/Off

■ Summary

Select whether the measurement target includes PCFICH.
Available when CC Settings: Test Model is set to Off.

■ Selection options

Checked	The measurement target includes PCFICH.
Non-Checked	The measurement target does not include PCFICH.

CC Settings: PCFICH Power Boosting (Auto/Manual)

■ Summary

Selects whether to detect the PCFICH power automatically or manually.
Available when CC Settings: Test Model is set to Off and CC Settings: PCFICH is set to On.

■ Selection options

Auto	Automatic detection
Manual	Manual detection

CC Settings: PCFICH Power Boosting

■ Summary

Sets a value relative to the reference signal level to the PCFICH level. .
This setting is enabled when CC Settings: PCFICH is set to On and when CC Settings: PCFICH Power Boosting is set to Manual.

■ Setting range

–20.000 to +20.000 dB

CC Settings: PHICH On/Off

■ Summary

Select whether the measurement target includes PHICH.
Available when CC Settings: Test Model is set to Off.

■ Selection options

Checked	The measurement target includes PCHICH.
Non-Checked	The measurement target does not include PCHICH.

CC Settings: PHICH Power Boosting (Auto/Manual)

■ Summary

Selects whether to detect the power of the PHICH group automatically or manually. Available when CC Settings: Test Model is set to Off and CC Settings: PHICH is set to On.

■ Selection options

Auto	Automatic setting
Manual	Manual setting

CC Settings: PHICH Power Boosting

■ Summary

Sets a value relative to the reference signal level to the level of the PHICH group.
This setting is enabled when CC Settings: PHICH is set to On and when CC Settings: PHICH Power Boosting is set to Manual.

■ Setting range

–20.000 to +20.000 dB

CC Settings: PDSCH Power Boosting (Auto/Manual)

■ Summary

This selects automatic detection and manual setting of the PDSCH power. Available when CC Settings: PDSCH is set to On.

■ Selection options

Auto	Detects automatically.
Manual	Sets manually.

CC Settings: PDSCH Power Boosting

■ Summary

Sets value relative to reference signal level at PDSCH level. This is enabled only when CC Settings: PDSCH Power Boosting is set to Manual.

■ Setting range

–20.000 to +20.000 dB

CC Settings: PHICH Ng

■ Summary

Sets a parameter (Ng) to determine the number of PHICH groups. This setting is enabled when CC Settings: PHICH is set to On.

■ Selection options

1/6	1/6 is set for Ng.
1/2	1/2 is set for Ng.
1	1 is set for Ng.
2	2 is set for Ng.

CC Settings: PHICH Duration

■ Summary

Sets the PHICH duration. This setting is enabled when CC Settings: PHICH is set to On.

■ Selection options

Normal	Normal
Extended	Extended

CC Settings: Number of PDCCH Symbols (Auto/Manual)

■ Summary

Selects whether to detect the number of PDCCH symbols automatically or manually. The automatic detection is performed by decoding PCFICH. This setting is enabled when CC Settings: PCFICH is set to On and CC Settings: PDCCH is set to On.

■ Selection options

Auto	Automatic detection
Manual	Manual detection

CC Settings: Number of PDCCH Symbols

■ Summary

Sets the Symbol number of PDCCH. This setting is enabled when CC Settings: Test Model is set to Off, CC Settings: PDCCH is set to On and CC Settings: Number of PDCCH Symbols is set to Manual.

■ Setting range

When CC Settings: Channel Bandwidth is set to 1.4 MHz:
0 to 4
When CC Settings: Channel Bandwidth is set to other than 1.4 MHz:
0 to 3

CC Settings: PDCCH Mapping

■ Summary

Sets mapping of PDCCH and NIL (dummy PDCCH) to the control channel elements (CCEs). This setting is enabled when CC Settings: Test Model is set to Off and CC Settings: PDCCH is set to On.

■ Setting range

Auto	Automatically evaluates and measures PDCCH and NIL
Full	Performs measurement assuming that only PDCCHs are mapped (no NIL). Even if REG is a value smaller than the CCE unit, measurement is performed assuming that PDCCHs are mapped.
Easy	Performs measurement for all subframes according to the PDCCH mapping that is determined by the PDCCH Format and Number of PDCCHs parameters. Measurement is performed assuming that PDCCHs are mapped sequentially from the first CCE for the number specified by Number of PDCCHs in the unit specified by PDCCH Format.

CC Settings: PDCCH Mapping - PDCCH Format

■ Summary

Sets the type of PDCCH format. This setting is enabled when CC Settings: PDCCH is set to On and CC Settings: PDCCH Mapping is set to Easy.

■ Setting range

0 to 3

CC Settings: PDCCH Mapping - Number of PDCCHs

■ Summary

Sets the number of PDCCHs to be mapped. This setting is enabled when CC Settings: PDCCH is set to On and CC Settings: PDCCH Mapping is set to Easy.

PDCCHs are mapped sequentially from CCE(0) for the number specified by this parameter, in the unit specified by PDCCH Format. If a value greater than the number of PDCCHs that can be mapped is specified, measurement is performed assuming that PDCCHs are mapped to all CCEs to which PDCCHs can be mapped.

■ Setting range

1 to 88

CC Settings: CSI-RS On/Off

■ Summary

Select whether the measurement target includes CSI-RS.
Available when CC Settings: Test Model is set to Off.

■ Selection options

Checked	The measurement target includes CSI-RS.
Non-Checked	The measurement target does not include CSI-RS.

Note:

When the MX269020A-001 is not installed, it is fixed to Non-Checked.

CC Settings: CSI-RS Configuration

■ Summary

Sets CSI-RS Configuration.

■ Setting range

When CSI-RS Number of Antenna Ports is set to 8: 0 to 4
When CSI-RS Number of Antenna Ports is set to 4: 0 to 9
When CSI-RS Number of Antenna Ports is set to 2: 0 to 19
When CSI-RS Number of Antenna Ports is set to 1: 0 to 19

Note:

This can be set when CC Settings: CSI-RS On/Off is checked.

CC Settings: CSI-RS Periodicity T

■ Summary

Sets CSI-RS Periodicity T.

■ Selection options

5	Measures with CSI-RS Periodicity T set to 5.
10	Measures with CSI-RS Periodicity T set to 10.

Note:

This can be set when CC Settings: CSI-RS On/Off is checked.

CC Settings: CSI-RS Subframe Offset

■ Summary

Sets CSI-RS Subframe Offset.

■ Setting range

When CSI-RS Periodicity T is set to 10: 0 to 9

When CSI-RS Periodicity T is set to 5: 0 to 4

Note:

This can be set when CC Settings: CSI-RS On/Off is checked.

3.7 Setting Marker

Configure the marker settings in the Marker function menu that is displayed by pressing F5 (Marker) on the main function menu or Marker. Also, press Peak Search to display page 2 of the Marker function menu.

The Marker function menu consists of 2 pages that are toggled by pressing →.

Note:

When Trace Mode is set to Summary, settings related to the marker function cannot be configured.

Marker

■ Summary

Sets On/Off for the marker function.

■ Selection options

On	Enables the marker function.
Off	Disables the marker function.

Subcarrier Number

■ Summary

Sets the position of the subcarrier targeted for the marker.

■ Setting range

When the Trace Mode is EVM vs Subcarrier, EVM vs Symbol, Spectral Flatness, or RE Map:

0 to 1199	Channel Bandwidth: 20 MHz
0 to 899	Channel Bandwidth: 15 MHz
0 to 599	Channel Bandwidth: 10 MHz
0 to 299	Channel Bandwidth: 5 MHz
0 to 179	Channel Bandwidth: 3 MHz
0 to 71	Channel Bandwidth: 1.4 MHz

☞ 3.5 “Common Setting Function Menu”

When the Trace Mode is Power vs Resource Block or EVM vs Resource Block:

Cannot be set. The subcarrier number set for Subframe Number or the number for the resource element determined by the Slot Number and Resource Block Number parameters is displayed.

Note:

The subcarrier number might be out of the graph display range for Difference Amplitude and Group Delay in Spectral Flatness. In this case, the marker is displayed at the minimum or maximum value of the graph display range.

Symbol Number

■ Summary

Sets the position of the symbol targeted for the marker.

■ Setting range

0 to (Measurement Interval × 14 Symbol) – 1

☞ 3.6.1.1 "Analysis Time"

Subframe Number

■ Summary

Sets the subframe number to be displayed for PDSCH Constellation and Bottom Graph.

Notes:

- This is displayed when Virtual Resource Block Type is Localized.
- This setting is valid only for Power vs Resource Block and EVM vs Resource Block.

■ Setting range

Starting Subframe Number to (Starting Subframe Number + Measurement Interval – 1)

☞ 3.6.1.1 "Analysis Time"

Slot Number

■ Summary

Sets the slot number displayed in PDSCH Constellation and Bottom Graph.

Notes:

- This is displayed when Virtual Resource Block type is Distributed.
- This setting applies to both Constellation and Bottom Graph.

■ Setting range

Starting Subframe Number × 2
to (Starting Subframe Number + Measurement Interval) × 2 – 1

Resource Block Number

■ Summary

Sets the resource block number to be displayed for Constellation and Bottom Graph.

Note:

This setting is enabled only for Power vs Resource Block and EVM vs Resource Block.

■ Setting range

0 to 99	Channel Bandwidth: 20 MHz
0 to 74	Channel Bandwidth: 15 MHz
0 to 49	Channel Bandwidth: 10 MHz
0 to 24	Channel Bandwidth: 5 MHz
0 to 14	Channel Bandwidth: 3 MHz
0 to 5	Channel Bandwidth: 1.4 MHz

3.5 "Common Setting Function Menu"

Peak Search

■ Summary

Moves the marker to the maximum level point within the measurement range. When there are multiple maximum level points, the point corresponding to the smallest value (left side of the scale) on the horizontal axis (Subcarrier, Symbol, or Resource Block) is selected.

Note:

When Trace Mode is set to Power vs Resource Block (Overall) and there are multiple maximum level points, the point corresponding to the smallest values on the horizontal and vertical (Subframe) axes is selected.

Next Peak

■ Summary

Moves the marker to the next largest level point after the current marker level within the measurement range. When there are multiple points, the point corresponding to the smallest value (left side of the scale) on the horizontal axis is selected. However, if the point is the same value as the marker level, the marker is moved to the next maximum point to the horizontal axis position of the marker.

Note:

When Trace Mode is set to Power vs Resource Block (Overall), the point corresponding to the smallest values on the horizontal and vertical axes is selected.

Dip Search

■ Summary

Moves the marker to the minimum level position within the measurement range. When there are multiple minimum level points, the greatest point (right side of the scale) on the horizontal axis is selected.

Note:

When Trace Mode is set to Power vs Resource Block (Overall) and there are multiple minimum level points, the greatest point on the horizontal axis and vertical axis is selected.

Next Dip

■ Summary

Moves the marker to the minimum level point next to the current marker level within the measurement range. When there are multiple points, the greatest point (right side of the scale) on the horizontal axis is selected. However, if the point is the same value as the marker level, the marker is moved to the next minimum point to the horizontal axis position of the marker.

Note:

When Trace Mode is set to Power vs Resource Block (Overall), the greatest point on the horizontal axis and vertical axis is selected.

3.8 Setting Trigger

Configure the trigger settings in the Trigger function menu that is displayed by pressing F6 (Trigger) on the main function menu or Trigger/Gate.

Note:

You cannot set a trigger when the Replay function is executed.

4.2 "Replay Function"

Trigger Switch

■ Summary

Sets the trigger synchronization On/Off.

■ Selection options

On	Enables the trigger function.
Off	Disables the trigger function.

Trigger Source

■ Summary

Sets the trigger source.

■ Selection options

External*1	Starts measurement by the trigger input from an external trigger.
External 2*2	Starts measurement by the trigger input from an external trigger 2.
SG Marker	Starts measurement by timing inside the Vector Signal Generator option.
Wide IF Video	An IF signal with a wide passing band of about 50 MHz or greater is detected, and waveform capture starts in synchronization with the rise or fall of the detected signal.
Frame	This equipment-internal trigger signal is used to start waveform capturing.
Frame Sync Setup	Specifies the trigger start source for Frame Trigger if Frame is specified for Trigger Source/Gate Source. Pressing Frame Sync Setup displays the Frame Sync Setup function menu.

*1: External 1 is displayed only for MS2850A.

*2: External 2 is selectable only for MS2850A.

Table 3.8-1 Frame Sync Setup Function Menu

Position	Menu Display	Function
[F1]	Off	Captures waveforms according to the equipment-internal trigger signal.
[F2]	Wide IF Video	Captures waveforms according to the equipment-internal trigger signal. The trigger signal is resynchronized according to the Wide IF Video signal.
[F3]	External*1	Captures waveforms according to the equipment-internal trigger signal. The trigger signal is resynchronized according to an external trigger.
[F4]	External 2*2	Captures waveforms according to the equipment-internal trigger signal. The trigger signal is resynchronized according to an external trigger 2.
[F7]	Frame Trigger Period	Sets the generation period for the frame trigger signal.
[F8]	Frame Sync Offset	Sets the offset time from when a trigger signal (the equipment-internal trigger signal, Wide IF Video signal, or external trigger signal) is generated until a trigger actually occurs.

Note:

The frame trigger is available with MS2830A, MS2850A. This function is not displayed in the MS269xA.

*1: External 1 is displayed only for MS2850A.

*2: External 2 is selectable only for MS2850A.

Trigger Slope

■ Summary

Sets the trigger polarity.

■ Selection options

Rise	Synchronizes with rising edge of the trigger.
Fall	Synchronizes with falling edge of the trigger.

Wide IF Video Trigger Level

■ Summary

Selects the trigger level for the wide IF video trigger.

■ Setting range

–60 to 50 dBm

Trigger Hold

■ Summary

Sets whether to enable or disable the function for disabling trigger input for a fixed time from when the first trigger is input until the next trigger is input.

■ Selection options

On	Enable the trigger hold.
Off	Disable the trigger hold.

Trigger Hold Time

■ Summary

Sets the fixed time for the above function.

■ Setting range

0 to 1 s

Note:

The trigger hold is available with MS2830A, MS2850A. This function is not displayed in the MS269xA.

Trigger Delay

■ Summary

Sets the trigger delay.

■ Setting range

–2 to +2 s	(When the Measure is Modulation Analysis or MIMO Summary.)
–0.5 to +0.5 s	(When the Measure is Batch Measurement.)

3.9 EVM Display (Modulation Analysis)

EVM analysis results are displayed according to the storage mode setting. When setting to Off, the analysis results are displayed every time. When setting to Average, the average values of analysis results are displayed. When setting to Average & Max, the average and maximum value of analysis results are displayed.

☞ 3.6.1.2 "Trace"

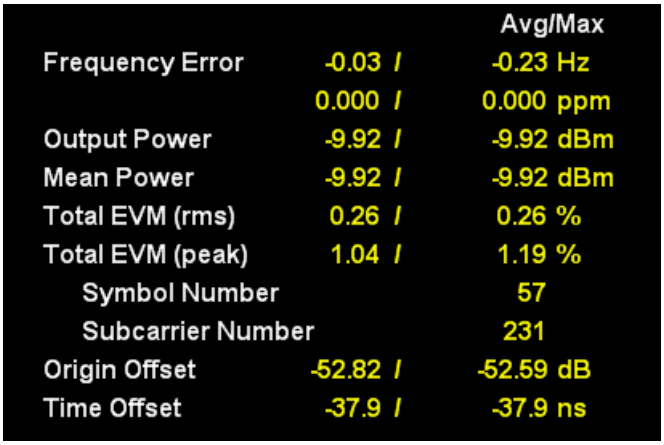


Figure 3.9-1 Result window

Frequency Error

■ Summary

Displays the average frequency error in the range set in Starting Subframe Number and Measurement Interval.

☞ 3.6.1.2 "Trace"

Output Power

■ Summary

Displays the average RF level including Cyclic Prefix in the range set in Starting Subframe Number and Measurement Interval.

Mean Power

■ Summary

Displays the mean power value including Cyclic Prefix in the bandwidth defined by Channel Bandwidth in the range set in Starting Subframe Number and Measurement Interval.

Total EVM (rms)

■ Summary

Displays the root mean square EVM of all subcarriers for the channels specified by Total EVM Calculation within the range determined by Starting Subframe Number and Measurement Interval.
Switches between % and dB according to settings of EVM Unit.

3.6.1.2 “Trace”

Total EVM (peak)

■ Summary

Displays the maximum EVM of all subcarriers and all symbols in the range set in Starting Subframe Number and Measurement Interval.
Switches between % and dB according to the settings of the EVM Unit.

Symbol Number

■ Summary

Displays the symbol number of Total EVM (peak).

Subcarrier Number

■ Summary

Displays the subcarrier number of Total EVM (peak).

Origin Offset

■ Summary

Displays the average origin offset in the range set in Starting Subframe Number and Measurement Interval.

Time Offset

■ Summary

Displays the time offset between the trigger input and the head of the frame.
This is enabled in the following situations:

- When the trigger function is On and when Capture Time is Auto.
- When the trigger function is On, when Capture Time is Manual, and when Storage Mode is Off
- When the Replay function is executed and when the Storage Mode is Off.

3.10 Constellation Display (Modulation Analysis)

For the MX269020A, the constellation parameters depend on the Trace Mode settings.

3.10.1 Constellation (EVM vs Subcarrier, EVM vs Symbol, Spectral Flatness, RE Map)

The constellation in the symbol range specified by Constellation Display Range is displayed.

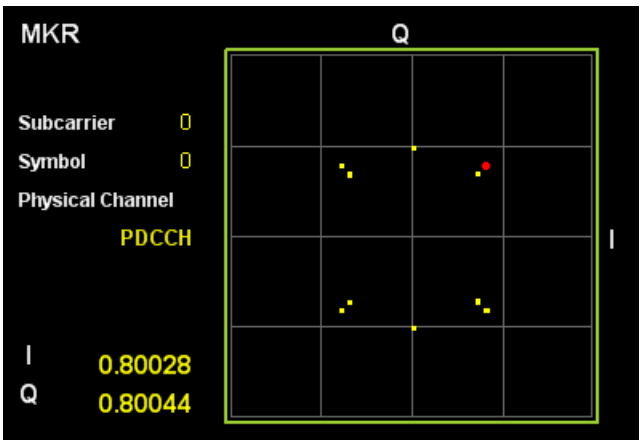


Figure 3.10.1-1 Constellation display

Graph display

■ Summary

If Constellation Display Range is Symbol, this graph displays a constellation of all subcarriers in the symbol set in Constellation Symbol Number, with it overlapped.

If Constellation Display Range is Composite, this graph displays a constellation for all subcarriers of all symbols in the range determined by Starting Subframe Number and Measurement Interval, over the other constellations.

The marker-selected subcarrier is displayed in red.

3.6.1.2 "Trace"

MKR Subcarrier

■ Summary

Displays the marker-selected subcarrier number. The marker can be moved with the cursor key or the rotary knob.

MKR I/Q

■ Summary

Displays the amplitude value of I/Q of the marker-selected subcarrier. The marker can be moved with the cursor key or the rotary knob. The amplitude value is normalized in the value in which that of Reference Signal is set to 1.0.

MKR Symbol

■ Summary

Displays the symbol number set in Constellation Symbol Number.

MKR Physical Channel

■ Summary

Displays the type of physical channel for the resource element selected by the marker.

3.10.2 Constellation (Power vs Resource Block, EVM vs Resource Block)

The PDSCH constellations specified by Subframe Number or Slot Number and Resource Block Number are displayed.

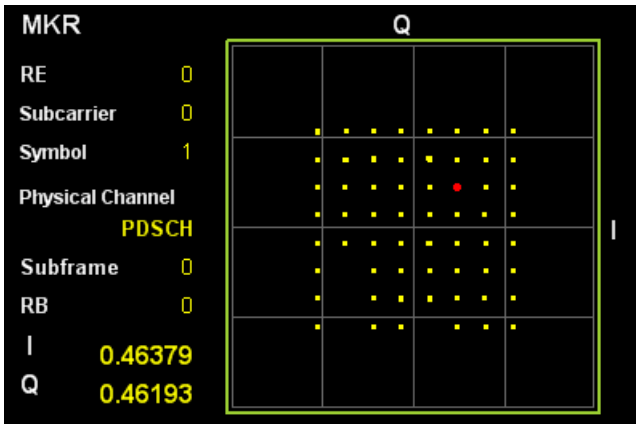


Figure 3.10.2-1 Constellation display

Displaying Graph

■ Summary

Displays overlapping the constellations of all resource elements of the resource block that is determined by the Subframe Number or Slot Number and Block Number settings.

The resource element selected by the marker is displayed in red.

3.6.1.3 "Trace"

MKR Resource Element Number

■ Summary

Displays the number of the resource element selected by the marker. The marker can be moved by using the cursor keys or the rotary knob.

MKR Subcarrier

■ Summary

Displays the subcarrier number of the resource element selected by the marker. The marker can be moved by using the cursor keys or the rotary knob.

MKR Symbol

■ Summary

Displays the symbol number of the resource element selected by the marker. The marker can be moved by using the cursor keys or the rotary knob.

MKR I/Q

■ Summary

Displays the I/Q amplitude value of the resource element selected by the marker. The marker can be moved by using the cursor keys or the rotary knob.

The amplitude value is normalized to the value obtained by setting the amplitude value of Reference Signal to 1.0.

MKR Physical Channel

■ Summary

Displays the type of physical channel for the resource element selected by the marker.

Subframe Number

■ Summary

Displays the subframe number set by Subframe Number.

Note:

This is displayed when Virtual Resource Block Type is Localized.

Slot Number

■ Summary

Displays the slot number set by Slot Number.

Note:

This is displayed when Virtual Resource Block type is Distributed.

Resource Block Number

■ Summary

Displays the resource block number set by Resource Block Number.

3.11 EVM vs Subcarrier Display (Modulation Analysis)

EVM for each subcarrier is displayed.

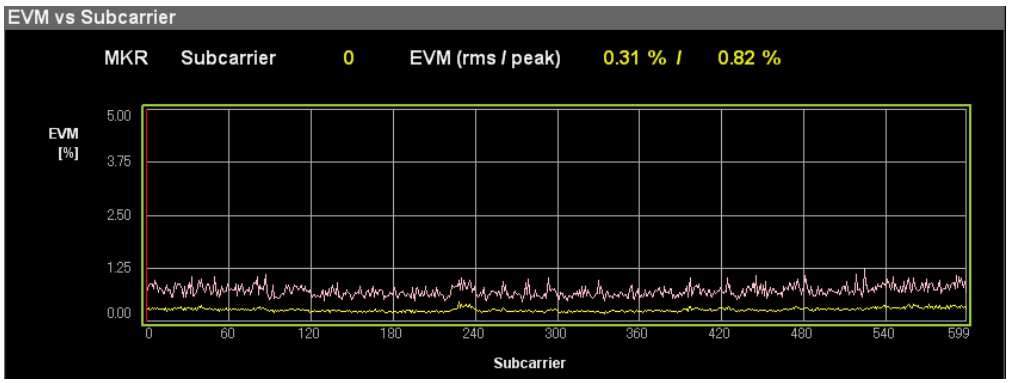


Figure 3.11-1 EVM vs Subcarrier display

Graph display

■ Summary

Displays EVM for each subcarrier. EVM for each subcarrier is based on settings of EVM vs Subcarrier View.

The marker-selected subcarrier is displayed in red.

3.6.1.2 "Trace"

MKR Subcarrier

■ Summary

Displays the marker-selected subcarrier number. The marker can be moved with the cursor key or the rotary knob.

MKR EVM

■ Summary

Displays EVM of the marker-selected subcarrier.

The EVM value is submitted to the settings of EVM vs Subcarrier View.

MKR Symbol

■ Summary

Displays the symbol number set in EVM vs Subcarrier Symbol Number.

Note:

Displays it only when the settings of EVM vs Subcarrier View is Each Symbol.

MKR Physical Channel

■ Summary

Displays the type of physical channel for the resource element selected by the marker.

3.12 EVM vs Symbol Display (Modulation Analysis)

EVM for each Symbol is displayed.

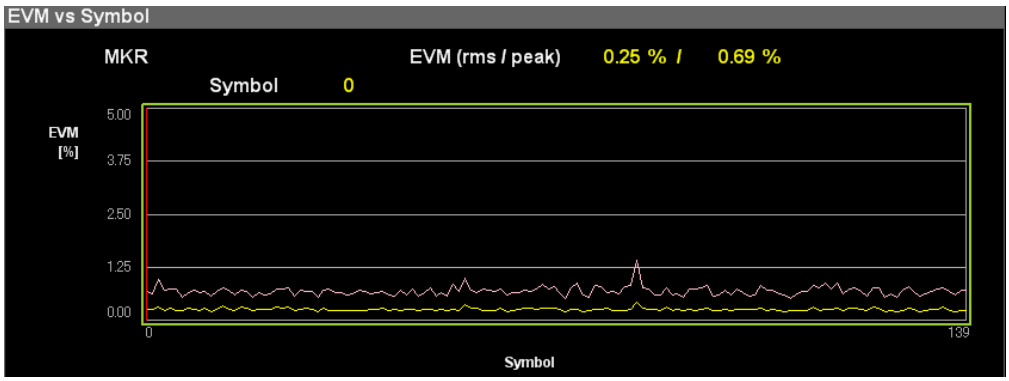


Figure 3.12-1 EVM vs Symbol display (Averaged over Subcarriers)

Graph display

■ Summary

Displays EVM for each symbol. EVM of each symbol is based on settings of EVM vs Symbol View.

The marker-selected Subcarrier is displayed in red.

3.6.1.2 "Trace"

MKR Symbol

■ Summary

Displays the marker-selected symbol number. The marker can be moved with the cursor key or the rotary knob.

MKR EVM

■ Summary

Displays the average EVM of all subcarriers in the marker-selected symbol. The EVM value is submitted to the settings of EVM vs Symbol View.

MKR Subcarrier

■ Summary

Displays the subcarrier number set in EVM vs Symbol Subcarrier Number.

Note:

Displays it only when the settings of EVM vs Symbol View are Each Subcarrier.

MKR Physical Channel

■ Summary

Displays the type of physical channel for the resource element selected by the marker.

3.13 Spectral Flatness Display (Modulation Analysis)

The measurement results of Spectral Flatness are displayed.

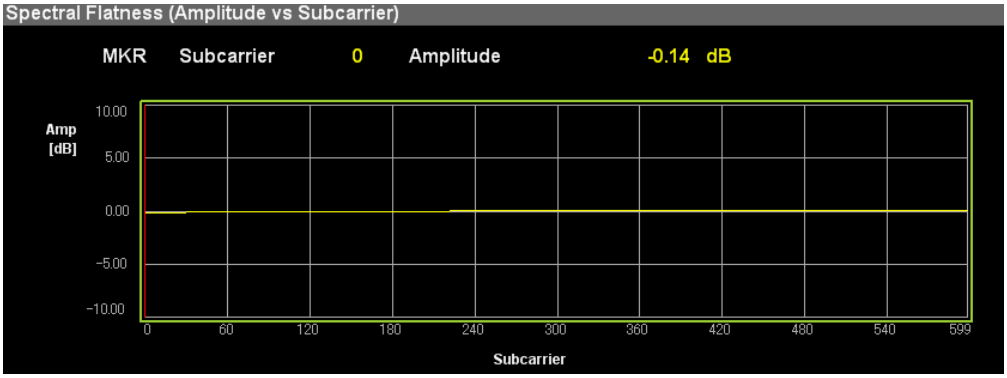


Figure 3.13-1 Amplitude of Spectral Flatness display

Graph display

■ Summary

Displays the Spectral Flatness value of an input signal. This Spectral Flatness value is based on the average in the range set in Starting Subframe Number and Measurement Interval.
The marker-selected subcarrier is displayed in red.

MKR Subcarrier

■ Summary

Displays the marker-selected subcarrier number. The marker can be moved with the cursor key or the rotary knob.

MKR Amplitude

■ Summary

Displays Amplitude of Spectral Flatness in the marker-selected subcarrier.

MKR Difference Amplitude

■ Summary

Displays the Difference Amplitude (level difference between subcarriers which are side by side) of Spectral Flatness in the marker-selected subcarrier.

MKR Phase

■ Summary

Displays the Phase of Spectral Flatness in the marker-selected subcarrier.

MKR Group Delay

■ Summary

Displays the Group Delay of Spectral Flatness in the marker-selected subcarrier.

3.14 Power vs Resource Block Display (Modulation Analysis)

Displays the PDSCH power for each resource block.

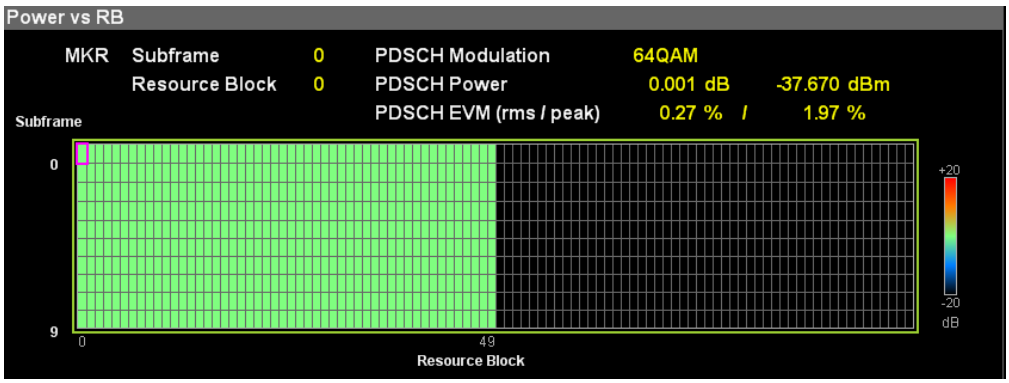


Figure 3.14-1 Power vs Resource Block display

Displaying Graph

■ Summary

Displays the power for each resource block.

The resource block selected by the marker is displayed in pink.

MKR Subframe

■ Summary

Displays the number of the subframe set by Subframe Number.

Note:

This is displayed when Virtual Resource Block Type is Localized.

MKR Slot

■ Summary

Displays the slot number set by Slot Number.

Note:

This is displayed when Virtual Resource Block type is Distributed.

MKR Resource Block

■ Summary

Displays the number of the resource block selected by the marker. The marker can be moved by using the cursor keys or the rotary knob.

MKR PDSCH Modulation

■ Summary

Displays the modulation scheme of the PDSCH resource block selected by the marker.

MKR PDSCH Power

■ Summary

Displays the power of the PDSCH resource block selected by the marker. dB unit is a value relative to the reference signal power.

MKR PDSCH EVM

■ Summary

Displays EVM of the PDSCH resource block selected by the marker. The EVM value depends on the Graph View setting.

3.15 EVM vs Resource Block Display (Modulation Analysis)

PDSCH EVM for each resource block is displayed.

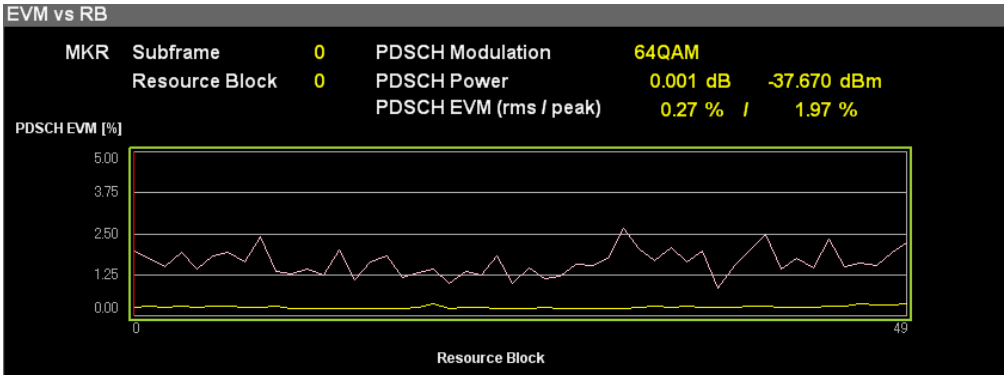


Figure 3.15-1 EVM vs Resource Block display

Displaying Graph

■ Summary

Displays EVM for each resource block. EVM of each resource block depends on the Graph View setting.

The symbol selected by the marker is displayed in red.

MKR Subframe

■ Summary

Displays the number of the subframe set by Subframe Number.

Note:

This is displayed when Virtual Resource Block Type is Localized.

MKR Slot

■ Summary

Displays the slot number set by Slot Number.

Note:

This is displayed when Virtual Resource Block type is Distributed.

MKR Resource Block

■ Summary

Displays the number of the resource block selected by the marker. The marker can be moved by using the cursor keys or the rotary knob.

MKR PDSCH Modulation

■ Summary

Displays the modulation scheme of the PDSCH resource block selected by the marker.

MKR PDSCH Power

■ Summary

Displays the power of the PDSCH resource block selected by the marker. dB unit is a value relative to the reference signal power.

MKRPDSCH EVM

■ Summary

Displays EVM of the PDSCH resource block selected by the marker. The EVM value differs depending on the Graph View setting.

3.16 Summary Display (Modulation Analysis)

EVM and power of each channel and power of each slot are displayed.

EVM/Power of Each Channel (Page No. 1)

■ Summary

Displays the average EVM and Power of the input signal for each channel. The channels that are excluded in Detail Setting are not displayed.

Symbol Clock Error, IQ Skew, IQ Imbalance, IQ Quad Error (Page No. 1)

■ Summary

Displays the symbol clock error, IQ skew, IQ imbalance, and IQ quadrature error.

Note:

IQ skew, IQ imbalance, and IQ quad error are not displayed if Optional Measurements is Off.

EVM of Each Channel (Page No. 2 to 7)

■ Summary

Displays EVM for each channel of the input signal. The channels that are excluded in Detail Setting are not displayed.
The types of channels are as follows.

■ Channel type

Total EVM
(The channels selected by Total EVM Calculation are displayed.)
PDSCH (ALL/QPSK/16QAM/64QAM/256QAM)
PDCCH (Not displayed when Number of PDCCH is 0)
RS
SS (P-SS and S-SS)
P-SS
S-SS
PBCH
PCFICH
PHICH
DTX

Power vs Slot (Page No. 8)

■ Summary

Displays the power of each slot within the range that is determined by the Starting Subframe Number and Measurement Interval settings.

☞ 3.6.1.1 “Analysis Time”

Power per channel (Page No. 10)

■ Summary

Displays the average power of each channel per resource element. The channels that are excluded in Detail Setting are not displayed.
If the channel is set to On and the average power of a channel is lower than –30 dB, the channel is judged to be DTX, and EVM is calculated from the ratio of the noise level to the total power.

■ Channel type

RS
P-SS
S-SS
PBCH
PDCCH (Not displayed when Number of PDCCH is 0.)
PCFICH
PHICH (PHICH group)

Cell ID (Page No. 1)

■ Summary

Displays the cell ID. It differs depending on the reference signal mode as shown in Table 3.16-1 below. This measurement result is not included for averaging.

Table 3.16-1 Results of Cell ID

Reference Signal Mode	Cell ID
Auto	Analysis result of input signal (value of last subframe)
Using Cell ID	Value set for Reference Signal Cell ID
Load File・No file is specified (Default)	Always 0
Load File・A file is specified	Not displayed

Number of PDCCH Symbols (Page No. 1)

■ Summary

Displays the number of PDCCH Symbols. The display differs depending on the setting of PCCH On/Off and Number of PDCCH Symbols in Detail Setting as described in Table 3.16-2. This measurement result is not included for averaging.

Table 3.16-2 Results of Summary Number of PDCCH Symbols

Detail Setting - PDCCH On/Off • Number of PDCCH Symbols	Summary - Number of PDCCH Symbols
On/Auto	Analysis result of input signal (value of last subframe)
On/Manual	Value set for Number of PDCCH Symbols
Off	Always 0

OFDM Symbol Tx Power (Page No. 9)

■ Summary

Displays the OFDM symbol Tx power (PDSCH power of the 4th symbol) per subframe within the range determined by Starting Subframe Number and Measurement Interval.

RS Power (Page No. 9)

■ Summary

Displays the RS power per subframe within the range determined by Starting Subframe Number and Measurement Interval.

3.17 Test Model Summary Display (Modulation Analysis)

The analysis results for the signal types set at Test Model are displayed when Test Model is not Off.

☞ 3.5 “Common Setting Function Menu”

Page Number

■ Summary

This switches the type of results displayed in Test Model Summary.

RS boosting of each subframe (Page No. 1)

■ Summary

The RS boosting level of each subframe for the range set by Subframe Number and Measurement Interval is displayed.

EPRE of each Channel of each Subframe (Page No. 2)

■ Summary

Each channel EPRE (Energy Per Resource Element) value of each subframe for the range set by Subframe Number and Measurement Interval is displayed.

EPRE of PDSCH for each Subframe modulation method (Page No. 3)

■ Summary

The PDSCH EPRE value of each subframe for the range set by Starting Subframe Number and Measurement Interval is displayed at each modulation method.

3.18 Displaying RE Map (Modulation Analysis)

The RE Map graph shows a layout map of resource blocks and elements.

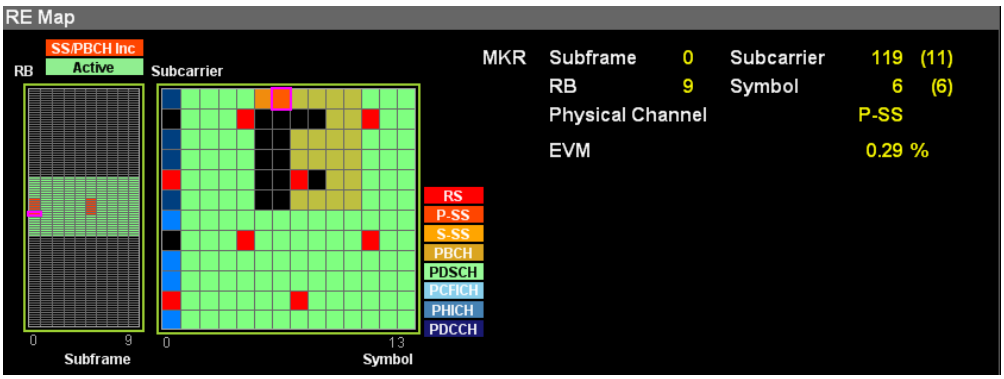


Figure 3.18-1 Displaying RE Map

Graph display

■ Summary

Displays a layout map of resource blocks (left) and resource elements (right)

In the resource block diagram on the left, each block indicates one resource block, which contains resource elements consisting of 14 symbols and 12 subcarriers. A black block indicates there is no resource block assigned. The meanings of the other block colors are shown in the color legend on the graph.

SS/PBCH Inc	Resource blocks containing P-SS, S-SS, or PBCH
Active	Active resource blocks other than the above

The layout of resource elements in the resource block selected by the marker is displayed on the right. A black block indicates that there are no resource elements assigned. The meanings of the other block colors are shown in the color legend on the graph.

MKR Subframe

■ Summary

Displays the subframe number selected by the marker in the resource block diagram.

MKR Resource Block

■ Summary

Displays the resource block number selected by the marker in the resource block diagram.

MKR Subcarrier

■ Summary

Displays the subcarrier number selected by the marker in the resource element diagram.

MKR Symbol

■ Summary

Displays the symbol number selected by the marker in the resource element diagram.

MKR Physical Channel

■ Summary

Displays the type of physical channel selected by the marker in the resource element diagram.

3.19 MIMO Summary Display

The results for each antenna port are displayed when measuring MIMO. The results are displayed for the number of antenna signals specified at Number of Antenna Ports. The Number of Antenna Ports and target measurement port are listed in Table 3.19-1).

☞ 3.5 "Common Setting Function Menu"

Table 3.19-1 Number of Antenna ports and Target Measurement Port

Number of Antenna Ports	Target Measurement Port
1	Antenna Port0
2	Antenna Port 0, 1
4	Antenna Port 0, 1, 2, 3

RS Power (dB)

■ Summary

This displays the difference in the RS Power between the antenna port signal specified by Antenna Port and each antenna signal.

RS Power (dBm)

■ Summary

This displays RS Power of each antenna port signal in absolute values.

RS EVM (rms)

■ Summary

This displays the RS EVM (rms) of each antenna port signal.

RS Timing Offset

■ Summary

When Antenna is selected for Timing Offset Reference,
this displays the timing difference between the antenna port signal specified by Antenna Port and each antenna port signal.
When Ext. Trigger is selected for Timing Offset Reference,
this displays the timing difference between the trigger and each antenna port signal.

RS Freq

■ Summary

This displays the difference in the RS Freq between the antenna port signal specified by Antenna Port and each antenna signal.

RS Phase

■ Summary

This displays the difference in the RS Phase between the antenna port signal specified by Antenna Port and each antenna signal.

3.20 Batch Measurement Display

The batch measurement results are displayed according to the storage mode setting. When setting to Off, the analysis results are displayed every time. When setting to Average, the average values of analysis results are displayed. When setting to Average & Max, the maximum value of analysis results are displayed.

Band: Frequency Error

■ Summary

Displays the average frequency error of the CC included in Band.

Band: PDSCH EVM

■ Summary

Displays the average PDSCH EVM of the CC included in Band.

Band: Band Power

■ Summary

Displays the RF level of the Band.
When MS269xA-004/104/078/178 or MS2830A-078 are not installed, no measurement results are displayed. When MS269xA-004/104/078/178 or MS2830A-078 are installed, the measurement result of 125 MHz bandwidth is displayed.

Band: RS Power

■ Summary

Displays the average RS power value of the CC included in Band.

Band: OSTP

■ Summary

Displays the average OSTP (OFDM Symbol TX power) of the CC included in Band.

Band: OBW (Cont. CA)

■ Summary

Displays the OBW when Band Settings: Contiguous Mode is On.
When the measurement bandwidth exceeds the analysis bandwidth, no measurement results are displayed.

Band: ACLR UTRA

■ Summary

Displays the ACLR UTRA. When the measurement bandwidth exceeds the analysis bandwidth, no measurement results are displayed.

Band: ACLR E-UTRA

■ Summary

Displays the ACLR E-UTRA. When the measurement bandwidth exceeds the analysis bandwidth, no measurement results are displayed.

Band: OBUE Margin

■ Summary

Displays the OBUE worst peak level relative to the standard template. When the measurement bandwidth exceeds the analysis bandwidth, no measurement results are displayed.

Band: OBUE Peak Absolute Level

■ Summary

Displays the OBUE worst peak absolute level. When the measurement bandwidth exceeds the analysis bandwidth, no measurement results are displayed.

Band: OBUE Peak Frequency

■ Summary

Displays the OBUE worst peak frequency. When the measurement bandwidth exceeds the analysis bandwidth, no measurement results are displayed.

CC: Frequency Error

■ Summary

Displays the average frequency error of the CC.

CC: PDSCH EVM

■ Summary

Displays the average PDSCH EVM of the CC.

CC: CC Power

■ Summary

Displays the average RF level of the CC.

CC: RS Power

■ Summary

Displays the RS power value of the CC.

CC: OSTP

■ Summary

Displays the OSTP of the CC.

CC: Time Offset

■ Summary

Displays the time difference between the CCs in the band. The reference is the CC with the smallest number in the band.

CC: OBW (CC)

■ Summary

Displays the OBW of the CC when Band Settings : Contiguous Mode is Off. When the measurement bandwidth exceeds the analysis bandwidth, no measurement results are displayed.

3.21 Saving Measurement Results

Save measurement results to the internal hard disk or USB memory in the Save function menu that is displayed by pressing Save with the 3G LTE Downlink screen open.

Note:

Use the USB memory supplied. Other USB memory may malfunction due to incompatibilities.

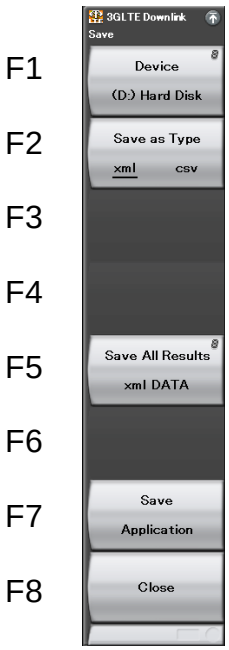


Figure 3.21-1 Save function menu

Table 3.21-1 Save function menu

Menu Display	Function
Device	Sets the save destination drive.
Save as Type	Sets the type of the file to be saved.
Save All Results	Saves all results measured by the MX269020A.
Save Application	Sets measurement parameters. *MS2690A/MS2691A/MS2692A, MS2830A,* or *MS2850A Signal Analyzer Operation Manual Mainframe Operation*
Close	Closes the Save function menu.

Device

■ Summary

Sets the save destination drive.

■ Selection options

D, E, F, …

All available drives except drive C

Save as Type

■ Summary

Sets the type of the file to be saved.

■ Selection options

xml	Saves in xml format.
csv	Saves in csv format.

Save All Results

■ Summary

Saves measurement results. The measurement results that can be read by the `:FETCh:EVM[n]?`, `:READ:EVM[n]?`, and `:MEASure:EVM[n]?` remote commands are saved. For details on measurement results, see Table 2.7-2 "Responses to Modulation Measurement Results" in the *MX269020A LTE Downlink Measurement Software Operation Manual (Mainframe Remote Control)*.

The saved file is output under the name format of "LTEDL*date_sequence number*.xml". When measurement results are saved several times on the same date, the sequence number starting from "00" is suffixed to each file name, like "LTEDL*date*_00.xml," "LTEDL*date*_01.xml," "LTEDL*date*_02.xml," …, up to "LTED*date*_99.xml."

The sequential numbers suffixed to a file name are 0 to 99. Since the file number returns to 00 after 99, files with the same name are overwritten.

Files are saved to the following directory of the target drive specified using F1 (Device).

The application folders are located under the following directory in the saving target drive specified by (Device).

\Anritsu Corporation\Signal Analyzer\User Data\Measurement Results\3GLTE Downlink

The maximum number of files that can be saved in a folder is 100, each for xml files and csv files.

Close

■ Summary

Closes the Save function menu.

Chapter 4 Digitize Function

This chapter describes how to save IQ data to an external memory and replay the stored IQ data.

4.1 Saving IQ Data

After pressing F7 (Capture) on the Main function menu, press F3 (Save Captured Data) to display the Save Captured Data function menu.

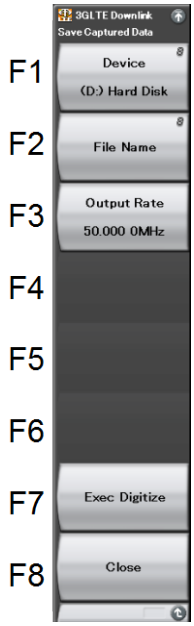


Figure 4.1-1 Save Captured Data function menu

Table 4.1-1 Save Captured Data function menu

Menu Display	Function
Device	Selects the location of the file to be saved.
File Name	Sets the name of the file to be saved.
Output Rate	Sets the rate of the output data.
Exec Digitize	Executes saving.
Close	Closes the Save Captured Data function menu.

The IQ data stored in the internal memory at the time of execution of this function is saved to the external memory.

Example: To save IQ data

<Procedure>

1. Press F7 (Capture) on the main function menu.
2. Press F3 (Save Captured Data).
3. Press F1 (Device) on the Save Captured Data function menu to select a data file for saving the IQ data.
4. Press F2 (File Name) to set the file name.
5. Press F7 (Exec Digitize) to save the IQ data.

When save processing is executed, the following files are created.

- "[File Name].dgz" Data file (binary format)
- "[File Name].xml" Data information file (XML format)

The IQ data row is saved to the data file. The information on the saved data is saved to the data information file.

If a file name was not specified, the file is automatically named "Digitize *date_sequential number*". The sequential number range is from 000 to 999.

Files are saved to the following directory of the target drive specified using F1 (Device).
\Anritsu Corporation\Signal Analyzer\User Data\Digitized Data\3GLTE Downlink
Up to 1000 files can be saved in a folder.

4.1.1 Format of data information file

The information on the saved IQ data is recorded in the data information file. Table 4.1.1-1 shows the details of the recorded parameters.

Table 4.1.1-1 Format of data information file

Item	Descriptions
CaptureDate	Day/Month/Year of the captured data in the "DD/MM/YYYY" format.
CaptureTime	Data captured time in "HH/MM/SS" format
FileName	Data file name
Format	Data format, fixed to "Float"
CaptureSample	Number of samples of the recorded data [Sample]
Condition	Error status of the recorded data "Normal": No error "OverLoad": Level over
TriggerPosition	Trigger occurrence position [Sample] The start point of the recorded data is 0.
CenterFrequency	Center frequency [Hz]
SpanFrequency	Frequency span [Hz]
SamplingClock	Sampling rate [Hz]
PreselectorBandMode	Frequency band switch mode "Normal": Normal mode (fixed)
ReferenceLevel	Reference level [dBm] Note that this value does not include the reference level offset.
AttenuatorLevel	Attenuator value [dB]
InternalGain	Internal gain value [dB] This is an internal parameter.
PreAmp	Gain value obtained by 6 GHz PreAmp [dB]
IQReverse	IQ reverse setting, fixed to "Normal"
TriggerSwitch	Trigger On/Off setting "FreeRun":Trigger is not used "Triggered":Trigger is used

Table 4.1.1-1 Format of data information file (Cont'd)

Item	Descriptions
TriggerSource	Trigger source "External": External trigger "SGMarker": SG marker trigger "WideIF": Wide IF video trigger "Frame": Frame trigger
TriggerLevel	Trigger level [dBm] Note that this value does not include the reference level offset. It is in dBm units, even if the scale mode is Lin.
TriggerDelay	Trigger delay time [s] It is the relative time from the trigger input position to the start point of the recorded data.
IQReference0dBm	Reference IQ amplitude value that indicates 0 dB Fixed to "1".
ExternalReferenceDisp	Reference signal information "Ref.Int":Internal reference signal "Ref.Ext":External reference signal "Ref.Int Unlock":Internal reference signal is unlocked. "Ref.Ext Unlock":External reference signal is unlocked.
Correction Factor	Correction value of correction function [dB] The correction factor is added to the IQ data in a data file. 0.000 is automatically set when the Correction function is set to Off.
Terminal	Signal input terminal "RF": RF terminal
ReferencePosition	0-second reference position Indicates the 0-second reference position using the digitized data point position. During Replay function execution, the reference position is displayed as 0 s.
Trigger Slope	Selects the edge where the trigger is generated (rise or fall). "Rise": Rising edge "Fall": Falling edge

4.1.2 Format of data file

The data file is created in binary format. From the beginning of the file, I-phase data and Q-phase data are recorded by 4 bytes. The I-phase data and Q-phase data are recorded as a float type (IEEE real*4).

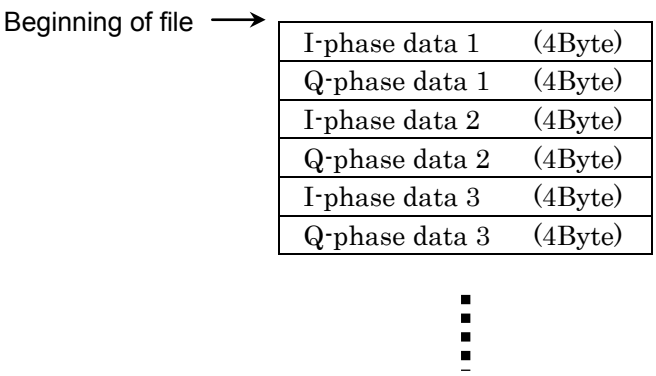


Figure 4.1.2-.1 Format of data file

The IQ data can be converted to power based on the following formula:

$$P = 10Log_{10}\left(I^2 + Q^2\right)$$

P: Power [dBm]
I: I-phase data
Q: Q-phase data

4.2 Replay Function

The Replay function enables the saved IQ data to be reanalyzed .After pressing F7 (Capture) on the main function menu, press F4 (Replay) to display the Replay function menu.

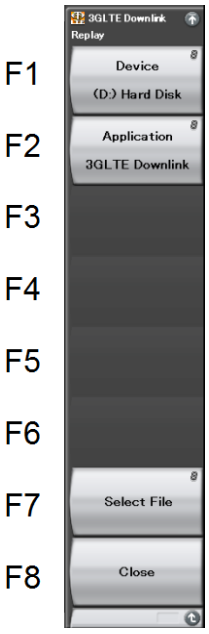


Figure 4.2-1 Replay Function Menu

Table 4.2-1 Replay Function Menu

Menu Display	Function
Device	Selects the drive in which the target file is stored.
Application	Selects the name of the application used to save the target file.
Select File	Selects the target file. After selecting the file, the Replay function is executed.
Close	Closes the Replay function menu.

4.2.1 Starting Replay Function

Start the Replay function using the following procedure:

<Procedure>

1. Press F7 (Capture) on the main function menu.
2. Press F4 (Replay) on the Capture function menu.
3. Press F1 (Device) on the Replay function menu and select the drive in which the target file is stored.
4. Press F2 (Application) and select the application used to save the target file.
5. Press F7 (Select File) to display the file selection dialog box. The Replay function starts after a file is selected. Then, Replaying is displayed on the screen.

Notes:

- This function is executed only for an IQ data file whose sampling rate is 50 MHz.
- Once Replay starts, the settings are initialized except for the parameters specified in Table 4.1.1-1.

4.2.2 Display During Replay Function Execution

Replay Error Info. is displayed if the target IQ data file meets the following conditions:

- Frequency reference is Unlocked when IQ data is saved.
- Level Over occurs when IQ data is saved.

4.2.3 Restriction During Replay Function Execution

The functions shown in Table 4.2.3-1 are disabled when Replay is executed.

Table 4.2.3-1 Functions Restricted During Replay

Function
Center Frequency
Input Level
Pre Amp
Trigger Switch
Trigger Source
Trigger Slope
Trigger Delay
Wide IF Trigger Level
Continuous Measurement
Single Measurement
Capture Time Auto/Manual
Capture Time Length
Trigger Hold

4.2.4 Conditions for IQ Data Files That Can Be Replayed

Table 4.2.4-1 shows the conditions for IQ data files for which replay analysis can be performed.

Table 4.2.4-1 IQ data file that can be replayed

Name	Value
Format	I, Q (32-bit Float Binary format)
Sampling rate	50 MHz
Sample numbers	More than the number equivalent to one frame Modulation Analysis: 1100000 or more ACP/OBW/Channel Power: 1230000 or more

4.2.5 Stopping Replay

Stop the Replay function using the following procedure:

<Procedure>

1. Press F7 (Capture) on the main function menu.
2. Press F5 (Stop Replaying) to stop the Replay function.

Chapter 5 Performance Test

This chapter describes measurement devices, setup methods, and performance test procedures required for performing performance tests as preventive maintenance.

5.1 Overview of Performance Test

5.1.1 Performance test

Performance tests are performed as part of preventive maintenance in order to prevent the performance of the MS2690A/MS2691A/MS2692A, MS2830A, or MS2850A from being degraded before it occurs.

Use performance tests when required for acceptance inspection, routine inspection and performance verification after repairs. Perform items deemed critical at regular intervals as preventive maintenance. Perform the following performance tests for acceptance inspection, routine inspection and performance verification after repairs.

- Carrier frequency accuracy
- Residual EVM

Perform items deemed critical at regular intervals as preventive maintenance. A recommended cycle for routine tests of once or twice a year is desirable.

If items that do not meet the required level are detected during performance testing, contact an Anritsu Service and Sales office. Contact information can be found on the last page of the printed version of this manual, and is available in a separate file on the PDF version.

5.2 Performance Test Items

Warm up the subject testing device and measuring instruments for at least 30 minutes except where directed, in order to stabilize them sufficiently before running performance tests. Demonstrating maximum measurement accuracy requires, in addition to the above, conducting performance tests under ambient temperatures, little AC power supply voltage fluctuations, as well as the absence of noise, vibrations, dust, humidity or other problems.

5.2.1 Testing methods

(1) Test target standards

- Carrier frequency accuracy
- Residual EVM

(2) Measuring instrument for tests

- Vector signal generator
- Frequency standard device — Unnecessary if signal source has sufficient frequency accuracy
- Power meter — Unnecessary if signal source has sufficient transmitter power accuracy

(3) Setup

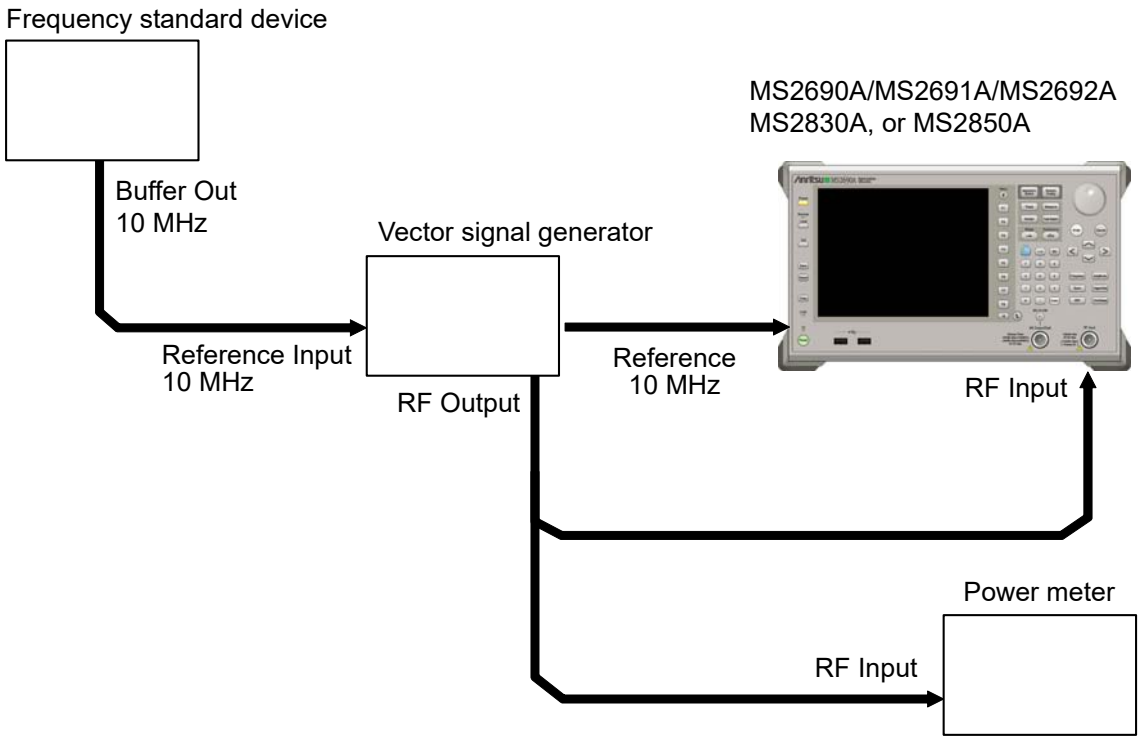


Figure 5.2.1-1 Performance test

(4) Test procedure

(a) Signal source adjustment

1. Input the 10-MHz reference signal output from the frequency standard device into the Reference Input connector of the vector signal generator.
2. Input the 10 MHz reference signal output from the signal generator to the Reference Input connector.
3. Output an LTE Downlink modulation signal from the vector signal generator.
4. Input the vector signal generator output signal into the power meter and measure the power.

(b) Settings of the main unit

1. Turn On the power switch on the front panel then wait until the internal temperature stabilizes (approx. 1.5 hours after the temperature in the thermostatic bath stabilizes).
2. Press Application Switch, then press the menu function key displaying the character string "3GLTE Downlink."
3. Press Preset.
4. Press F1 (Preset) to perform initialization.
5. Press Cal.
6. Press F1 (SIGANA All) to perform calibration.
7. Press F8 (Close).
8. Press Frequency, enter the frequency output by the vector signal generator using the numeric keypad, then press Enter.
9. Press Amplitude, enter the power meter measurement result using the numeric keypad, then press Enter.
10. Press Trace then press F4 (Storage) and press F1 (Mode) to choose Average using the cursor key or the rotary knob , then press Enter.
11. Press F2 (Count), enter the measurement count, using the numeric keypad, then press Enter.
12. Press Single to measure.

    When measuring the carrier frequency accuracy, select **Auto** for **Reference Signal**. When measuring the residual vector error, select **Fixed to Internal**.

    Press F3 (System Settings) after pressing System Config to display the System Settings screen. Select and set Reference Signal with cursor key, and then press F7 (Set).

13. Confirm whether the measured Frequency Error (carrier frequency accuracy) is within the specifications.
14. Confirm whether the measured EVM (rms) (residual vector error) value is within the specifications.

(5) Test Result

Table 5.2.1-1 Carrier frequency accuracy

Frequency	Min. limit	Deviation (Hz)	Max. limit	Uncertainty	Pass/Fail
600 MHz	MS269xA –3 Hz		MS269xA +3 Hz	MS269xA ±1 Hz	
1500 MHz	MS2830A –3.5 Hz		MS2830A +3.5 Hz	MS2830A ±0.5 Hz	
2000 MHz	MS2830A-078 –4.0 Hz		MS2830A-078 +4.0 Hz	MS2830A-078 ±0.8 Hz	
2700 MHz	MS2850A –3.5 Hz		MS2850A +3.5 Hz	MS2850A ±0.5 Hz	
4000 MHz 3600 MHz (MS2830A-040)	MS269xA –3 Hz MS2830A –8.0 Hz MS2830A-078 –8.0 Hz MS2850A –8.0 Hz		MS269xA +3 Hz MS2830A +8.0 Hz MS2830A-078 +8.0 Hz MS2850A +8.0 Hz	MS269xA ±1 Hz MS2830A ±1.1 Hz MS2830A-078 ±1.1 Hz MS2850A ±1.1 Hz	

Table 5.2.1-2 Residual vector error

Frequency	Measured value [% (rms)]	Max. limit	Uncertainty	Pass/Fail
600 MHz		MS269xA 1.0% (rms) MS2830A 1.3% (rms) MS2850A 1.3% (rms)	MS269xA 0.1% (rms) MS2830A 0.1% (rms) MS2850A 0.1% (rms)	
1500 MHz				
2000 MHz				
2700 MHz				
4000 MHz 3600 MHz (MS2830A-040)				

Chapter 6 Other Functions

This chapter describes other functions of this application.

6.1 Selecting Other Functions

Pressing F8 (Accessory) on the main function menu displays the Accessory function menu.

Table 6.1-1 Accessory function menu

Function Keys	Menu Display	Function
F1	Title	Sets the title character string.
F2	Title (On/Off)	Displays (On) or hides (Off) the title character string.
F4	Erase Warm Up Message	Erases the warmup message display.

6.2 Setting Title

A title of up to 32 characters can be displayed on the screen. (Character strings of up to 17 characters can be displayed on a function menu. The maximum number of characters to be displayed on the top of the function menu varies according to character string.)

<Procedure>

1. Press F8 (Accessory) on the main function menu.
2. Press F1 (Title) to display the character string input screen. Select a character using the rotary knob, and enter it by pressing Enter. Enter the title by repeating this operation. When the title is entered, press F7 (Set).
3. Press F2 (Title) and then select "Off " to hide the title.

6.3 Erasing Warmup Message

The warmup message (Warm Up), which is displayed upon power-on and indicates that the level and frequency are not stable, can be deleted.

<Procedure>

1. Press F8 (Accessory) on the main function menu.
2. Press F4 (Erase Warm Up Message) to erase the warmup message.

Appendix A Error Messages

Table A-1 Error Messages

Message	Description
Out of range.	The settable range is exceeded.
Not available in RE Map Trace.	This operation is invalid when Active Trace is in the RE Map state.
Not available in Summary Trace.	This operation is invalid when Active Trace is in the Summary state.
Not available when Synchronization Mode is set to Reference Signal.	This operation is invalid when the synchronization signal is Reference Signal.
Not available when Synchronization Mode is set to Synchronization Signal.	This operation is invalid when the synchronization signal is Synchronization Signal.
Not available in 20MHz Channel Bandwidth.	This operation is invalid when Channel Bandwidth is set to 20 MHz.
Not available in 15MHz Channel Bandwidth.	This operation is invalid when Channel Bandwidth is set to 15 MHz.
Not available in 10MHz Channel Bandwidth.	This operation is invalid when Channel Bandwidth is set to 10 MHz.
Please Load Signal Analyzer.	The Signal Analyzer function is required to be loaded.
Please Load Spectrum Analyzer.	The Spectrum Analyzer function is required to be loaded.
No file to read.	There is no file that can be read.
File read error.	File reading has failed.
File format error.	The file format is invalid.
Write error.	File writing has failed.
Number of the letters over.	This operation is invalid because the maximum number of characters has been exceeded.
The model of the main instrument is different.	This operation is invalid because the specified model name does not match.
The option configuration is different.	This operation is invalid because the option configuration does not match.
File Open error.	Failed to open the specified file.
File Close error.	Failed to close the file.
Empty File Name	No character is entered.
Save File Limit < 100	The save destination contains the maximum number of files (100).
Cannot find device.	The specified device could not be found.
Search error	A search error has occurred.
Not available when Capture Time is set to Auto.	This operation is invalid when Capture Time is set to Auto.
File not found.	The specified file could not be found.
Cannot find device.	The specified device could not be found.
Selected item is empty.	The selected item (file, etc.) could not be found.
Not available when PDCCH Mapping is Full.	This operation is invalid when PDCCH Mapping is set to Full.

Table A-1 Error Messages (Continued)

Message	Description
Not available when PDCCH Mapping is Load File.	This operation is invalid when PDCCH Mapping is set to Load File.
Available when Test Model is set to off.	This operation is valid when Test Model is set to Off.
Not available when PBCH is set to Off.	This operation is invalid when PBCH is set to Off.
Not available when P-SS is set to Off.	This operation is invalid when P-SS is set to Off.
Not available when S-SS is set to Off.	This operation is invalid when S-SS is set to Off.
Not available when PDCCH is set to Off.	This operation is invalid when PDCCH is set to Off.
Not available when PCFICH is set to Off.	This operation is invalid when PCFICH is set to Off.
Not available when PHICH is set to Off.	This operation is invalid when PHICH is set to Off.
Not available when Number of PDCCH Symbols in set Auto.	This operation is invalid when Number of PDCCH Symbols is set to Auto.
Not available when Capture Time is Manual and Capture Time Length is 1 Frame.	This operation is invalid when Capture Time is set to Manual and when Capture Time Length is set to 1 Frame.
Available in Using Load File Mode.	This operation is valid when Reference Signal Mode is set to Using Load File Mode.
Not available when Power Boosting is set to Auto.	This operation is invalid when Power Boosting is set to Auto.
Not available when Reference Signal Mode is set to AUTO.	—
Only available while replaying.	This operation is invalid when the Replay function is not executed.
Shortage of data samples in IQ data file.	Analysis cannot be performed because the number of data samples of the IQ data file is less than the minimum number of data samples required for analysis.
Unsupported SpanFrequency.	The frequency span is not supported.
Unsupported SamplingClock.	The sampling rate is not supported.
Not available if not re-capture after changing common parameter.	This operation is invalid when recapture is not executed after common parameter change.
Not available during measurement.	This operation is invalid during measurement.
Invalid character	–

Appendix B Default Value List

Frequency	
Carrier Frequency	2.110 GHz
RF Spectrum	Normal
Amplitude	
Input Level	–10.00 dBm
Pre-Amp	Off
Offset	Off
Offset Value	0.00 dB
Common Setting	
Channel Bandwidth	5 MHz
Test Model	Off
Reference Signal	Auto
Reference Signal Load	Default
Power Boosting	0.00 dB
Reference Signal Mode	Auto
Frequency Shift	0
Cell ID	0
Number of Antenna Ports	1
Antenna Port	0
Synchronization Mode	Synchronization Signal
Modulation Analysis	
Analysis Time	
Starting Subframe Number	0
Measurement Interval	1
PDSCH Modulation Scheme	AUTO
Total EVM & Constellation Composite	
RS/PDSCH/PBCH/P-SS/S-SS	
PDCCH/PCFICH/PHICH	Include
DTX	Exclude
EVM Window Length	W, 32
Detail Setting	
PBCH	On, Auto, 0.000 dB
P-SS	On, Auto, 0.000 dB
S-SS	On, Auto, 0.000 dB
PDCCH	On, Auto, 0.000 dB
PCFICH	On, Auto, 0.000 dB
PHICH	On, Auto, 0.000 dB
PDSCH	Auto, 0.000 dB
PHICH Ng	1/6
PHICH Duration	Normal
Number of PDCCH Symbol	Auto, 1
PDCCH Mapping	Auto
Number of PDCCHs	1

	PDCCH Format	0
	Pseudo-Random Sequence	TS36.211 V8.3.0 (2008-05)
	Channel Estimation	Checked
	Moving Average Filter	19
	Measurement Filter Type	Normal
	PDSCH EVM Calculation	3GPP
	Virtual Resource Block Type	Localized
	Optional Measurements	Off
	Cyclic Prefix Mode	Normal
	Timing Offset Reference	Antenna
Trace		
	Trace Mode	EVM vs Subcarrier
	Constellation Display Range	Symbol
	Scale	
	EVM Unit	%
	EVM Scale	5%
	Flatness Scale	10 dB
	Storage	
	Mode	Off
	Count	10
	Symbol Number	0 Symbol
	Subcarrier Number	0 Subcarrier
	EVM vs Subcarrier View	Averaged over all Symbols
	Graph View	RMS&Peak
	EVM vs Symbol View	Averaged over all Subcarriers
	Graph View	RMS&Peak
	Spectral Flatness Type	Amplitude
	Subframe Number	0
	Resource Block Number	0
	Power vs Resource Block View	Overall
	Graph View	RMS&Peak
	Page Number	1
Marker		
	Marker	On
	Subcarrier Number	0 Subcarrier
	Symbol Number	0 Symbol

Trigger	
Trigger Switch	Off
Trigger Source	External
Trigger Slope	Rise
Wide IF Video Trigger Level	–20 dBm
Trigger Hold	Off
Trigger Hold Time	100 µs
Trigger Delay	0 s
Frame Sync Setup	Off
Frame Trigger Period	10 ms
Frame Sync Offset	0 s
Accessory	
Title	On, "3GLTE Downlink"
Batch Settings	
Common Settings	
Storage Mode	Off
Storage Count	10
Starting Subframe Number	0
Measurement Interval	1
Band Settings	
Measurement Band	On (Band 0) Off (Band 1) Off (Band 2)
Carrier Frequency	2.140 GHz (Band 0) 1.960 GHz (Band 1) 1.8425 GHz (Band 2)
Input Level	–10.00 dBm
Pre-Amp	Off
Offset	Off
Offset Value	0.00 dB
Contiguous Mode	On

CC Settings		
	Measurement CC	On (CC 0)
		Off (CC 1)
		Off (CC 2)
		Off (CC 3)
		Off (CC 4)
	Frequency Band	Band 0
	Frequency Offset	0 Hz
	Bandwidth	5 MHz
	Test Model	Off
	Synchronization Mode	SS
	Reference Signal Mode	Auto
	Cell ID	0
	CRS Power Boosting	0.00 dB
	CSI-RS Power Boosting	0.00 dB
	CRS Number of Antenna Ports	1
	CRS Antenna Port	0
	CSI-RS Number of Antenna Ports	1
	CSI-RS Antenna Port	15
	PDSCH Modulation Scheme	AUTO
	EVM Window Length	32 W
	Channel Estimation	On
	Measurement Filter Type	Normal
	PBCH	On, Auto, 0.000 dB
	P-SS	On, Auto, 0.000 dB
	S-SS	On, Auto, 0.000 dB
	PDCCH	On, Auto, 0.000 dB
	PCFICH	On, Auto, 0.000 dB
	PHICH	On, Auto, 0.000 dB
	PDSCH	Auto, 0.000 dB
	PHICH Ng	1/6
	PHICH Duration	Normal
	Number of PDCCH Symbol	Auto, 1
	CSI-RS	On
	CSI-RS Configuration	0
	CSI-RS Periodicity T	5
	CSI-RS Subframe Offset	0

Appendix C LTE Downlink Signal Configuration

This appendix describes the configuration of the LTE Downlink signal, which is to be measured by the MX269020A.

C.1 Overview of LTE Downlink Signal

The MX269020A can analyze signals based on the following parameters of the 3GPP TS36.211 V8.9.0 (2009-12) Physical channels and modulation (Release 8) (hereinafter, referred to as "3GPP specifications"). Refer to the 3GPP specifications for details on the parameters.

Table C.1-1 Parameters of LTE Downlink signal

Parameter	Setting
Frame structure	Type 1 (FDD)
Physical channels	PDSCH, PBCH, PDCCH, PCFICH, PHICH
Physical signals	Reference signal, Synchronization signal
Downlink bandwidth configuration	100 Resource Block (20 MHz bandwidth) 75 Resource Block (15 MHz bandwidth) 50 Resource Block (10 MHz bandwidth) 25 Resource Block (5 MHz bandwidth) 12 Resource Block (3 MHz bandwidth) 6 Resource Block (1.4 MHz bandwidth)
Cyclic prefix	Normal cyclic prefix
Δf	15 kHz
Virtual resource block	Localized type
Preceding	Single antenna, transmit diversity
Reference signals	Cell-specific reference signals

C.2 Details of Each Channel and Signal

As described above, the MX269020A can analyze signals configured by the PDCH, PBCH, PDCCH, PCFICH, PHICH, Reference Signal, and Synchronization Signal parameters. This section describes details of each of the channels and signals.

C.2.1 Reference Signal

Details of the Reference Signal are as follows. Depending on the Reference Signal Mode setting, the Reference Signal is switched between three types of operations. The operation of each mode is shown in Tables C.2.1-1 through C.2.1-3. The Reference Signal level is normalized to the value set by Power Boosting, to be used as the reference value for the other channels.

Table C.2.1-1 Parameters when Reference Signal Mode = Auto

Parameter	Setting
Modulation	QPSK
Resource element mapping	Based on the 3GPP specifications, the Reference Signal is mapped to the resource element determined by the number of antennas and the antenna port number. The Shift Value is determined by the Cell ID that is estimated from the Synchronization Signal.
Symbol sequence	Value determined by the Cell ID that is estimated from the Synchronization Signal

Table C.2.1-2 Parameters when Reference Signal Mode = Using Cell ID

Parameter	Setting
Modulation	QPSK
Resource element mapping	Based on the 3GPP specifications, the Reference Signal is mapped to the resource element determined by the number of antennas and the antenna port number. The Shift Value is determined by the setting value of Cell ID.
Symbol sequence	Value determined by the setting value of Cell ID

Table C.2.1-3 Parameters when Reference Signal Mode = Load File

Parameter	Setting
Modulation	QPSK
Resource element mapping	Based on the 3GPP specifications, the Reference Signal is mapped to the resource element determined by the number of antennas, the antenna port number, and Shift Value.
Symbol sequence	Value defined by external file

External files in the format described below are valid.

- Number of rows is either 8,800 or 4,400 rows.
- Each row, I-phase amplitude value, and Q-phase amplitude value are listed separated by a comma.
- The first row indicates the IQ map of the reference signal with the smallest symbol number and smallest subcarrier number.
- The second row indicates the IQ map of the reference signal with the smallest symbol number and the second smallest subcarrier number.
- The row following the smallest symbol number and greatest subcarrier number indicates the IQ map of the second smallest symbol number and smallest subcarrier number.
- The sum of the squares for each row is normalized to be 1.0.
- The demodulation mode of the IQ map is QPSK.
- For antenna ports 2 and 3, the latter 4,400 rows are not used.
- The default format is the same as the case when Cell ID = 0.

Table C.2.1-4 shows an example when the antenna port number and Frequency Shift are both set to 0.

Table C.2.1-4 External file example for Reference Signal

Row No.	IQ Map of Reference Signal
Row 1	Reference Signal when subframe = 0, Symbol = 0, Subcarrier = 0
Row 2	Reference Signal when subframe = 0, Symbol = 0, Subcarrier = 6
Row 3	Reference Signal when subframe = 0, Symbol = 0, Subcarrier = 12
:	:
Row 220	Reference Signal when subframe = 0, Symbol = 0, Subcarrier = 1314
Row 221	Reference Signal when subframe = 0, Symbol = 4, Subcarrier = 3
Row 222	Reference Signal when subframe = 0, Symbol = 4, Subcarrier = 9
:	:
Row 440	Reference Signal when subframe = 0, Symbol = 4, Subcarrier = 1317
Row 441	Reference Signal when subframe = 0, Symbol = 7, Subcarrier = 0
:	:
Row 880	Reference Signal when subframe = 0, Symbol = 11, Subcarrier = 1317
Row 881	Reference Signal when subframe = 1, Symbol = 0, Subcarrier = 0
:	:
Row 8798	Reference Signal when subframe = 9, Symbol = 11, Subcarrier = 1305
Row 8799	Reference Signal when subframe = 9, Symbol = 11, Subcarrier = 1311
Row 8800	Reference Signal when subframe = 9, Symbol = 11, Subcarrier = 1317

C.2.2 Synchronization Signal

Details of the Synchronization Signal are as follows. Depending on the Primary/Secondary Synchronization Signal On/Off setting, the Synchronization Signal is switched between two types of operations.

Table C.2.2-1 Parameters when Primary/Secondary Synchronization Signal is set to On

Parameter	Setting
Modulation	Set according to 3GPP specifications.
Resource element mapping	Set according to 3GPP specifications.
Symbol sequence	Set based on Cell ID estimated according to 3GPP specifications.
Reference level	Reference Signal Level – Power Boosting

Table C.2.2-2 Parameter when Primary/Secondary Synchronization Signal is set to Off

Parameter	Setting
Modulation	Transmission off (DTX)
Resource element mapping	Set according to 3GPP specifications.
Symbol sequence	Resource element to which Synchronization Signal is mapped is regarded as DTX.
Reference level	Off

C.2.3 PDSCH

Details of PDSCH are as follows. Depending on whether Modulation Scheme is set to Auto or other than Auto, operation is performed in two different ways. The modulation mode and reference level are estimated every subframe. When PDCH is set to other than Auto, all PDSCHs are analyzed in the specified modulation mode.

Table C.2.3-1 Parameters when PDSCH Modulation Scheme is Auto

Parameter	Setting
Modulation	Automatically judged for each resource block.
Resource element mapping	Set according to 3GPP specifications.
Reference level	Automatically estimated for each resource block.

Table C.2.3-2 Parameters when PDSCH Modulation Scheme is other than Auto

Parameter	Setting
Modulation	Set according to the modulation mode setting value.
Resource element mapping	Set according to 3GPP specifications.
Reference level	Reference Signal Level – Power Boosting

C.2.4 PBCH

Details of PBCH are as follows. Depending on the PBCH On/Off setting, operation is performed in two different ways.

Table C.2.4-1 Parameters when PBCH is set to On

Parameter	Setting
Modulation	QPSK
Resource element mapping	Set according to 3GPP specifications.
Reference level	Reference Signal Level – Power Boosting

Table C.2.4-2 Parameters when PBCH is set to Off

Parameter	Setting
Modulation	Transmission off (DTX)
Resource element mapping	Set according to 3GPP specifications.
Reference level	Off

C.2.5 PDCCH

Details of PDCCH are as follows. Depending on the PDCCH On/Off setting, operation is performed in two different ways.

Table C.2.5-1 Parameters when PDCCH is set to On and Number of PDCCH is 1 or more.

Parameter	Setting
Modulation	QPSK
Resource element mapping	Set according to 3GPP specifications.
Reference Level	Reference Signal Level – Power Boosting

Table C.2.5-2 Parameters when PDCCH is set to Off or Number of PDCCH is 0

Parameter	Setting
Modulation	QPSK
Resource element mapping	Set according to 3GPP specifications.
Reference Level	Reference Signal Level – Power Boosting

C.2.6 PCFICH

Details of PCFICH are as follows. Depending on the PCFICH On/Off setting, operation is performed in two different ways.

Table C.2.6-1 Parameters when PCFICH is set to On.

Parameter	Setting
Modulation	QPSK
Resource element mapping	Set according to 3GPP specifications.
Reference Level	Reference Signal Level – Power Boosting

Table C.2.6-2 Parameters when PCFICH is set to Off.

Parameter	Setting
Modulation	Transmission Off (DTX)
Resource element mapping	Set according to 3GPP specifications.
Reference Level	Off

C.2.7 PHICH

Details of PHICH are as follows. Depending on the PHICH On/Off setting, operation is performed in two different ways.

Table C.2.7-1 Parameters when PHICH is set to On.

Parameter	Setting
Modulation	BPSK
Resource element mapping	Set according to 3GPP specifications.
Reference Level	Reference Signal Level – Power Boosting

Table C.2.7-2 Parameters when PHICH is set to Off.

Parameter	Setting
Modulation	Transmission Off (DTX)
Resource element mapping	Set according to 3GPP specifications.
Reference Level	Off

References are to section numbers.

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