MX285051A-001
Pre-Standard CP-OFDM Downlink
MX285051A-051
Pre-Standard CP-OFDM Uplink
Operation Manual
Operation

Third 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 MS2850A Signal Analyzer Operation Manual (Mainframe Operation), and MX285051A 5G Standard Measurement Software (Base License) Operation Manual. Please also refer to it before using the equipment.**
- **Keep this manual with the equipment.**

ANRITSU CORPORATION

Document No.: M-W3924AE-3.0

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MX285051A-001 Pre-Standard CP-OFDM Downlink
MX285051A-051 Pre-Standard CP-OFDM Uplink
Operation Manual Operation

28 April 2017 (First Edition)
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Revision History:

February 29th, 2020

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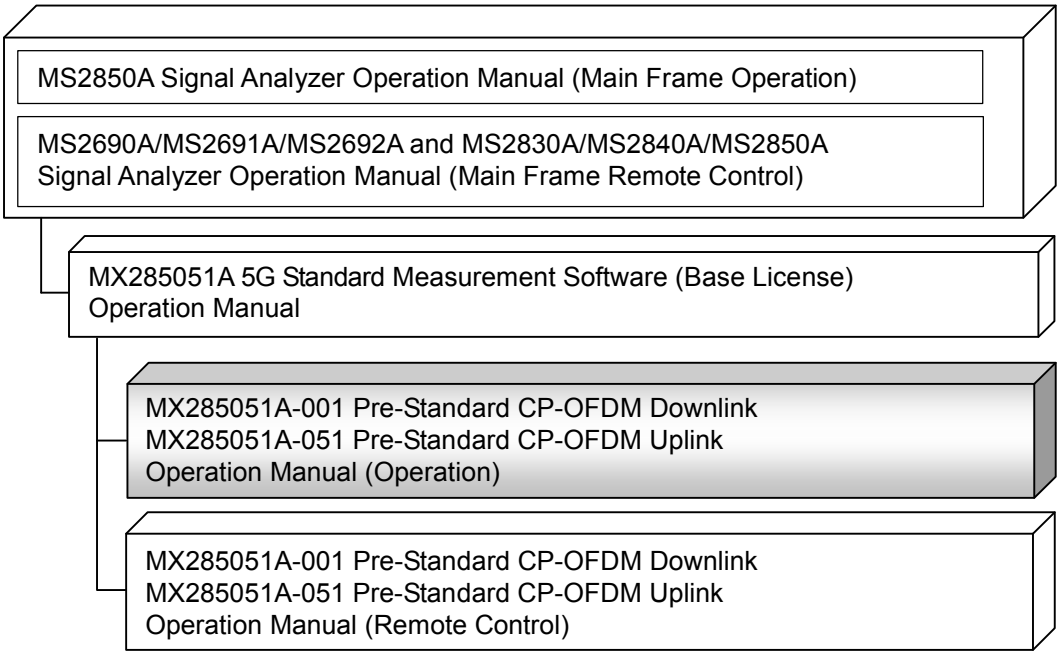
- Network connections
  Ensure that the network has sufficient anti-virus security protection in place.
- Protection against malware (malicious software such as viruses).
  This equipment runs on Windows Operating System.
  To connect this equipment to network, the following is advised.
  - Activate Firewall.
  - Install important updates of Windows.
  - Use antivirus software.

About This Manual

■ **Composition of Operation Manuals**

The operation manuals for the MX285051A-001 Pre-Standard CP-OFDM Downlink/MX285051A-051 Pre-Standard CP-OFDM Uplink 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.

- 5G Standard Measurement Software (Base License) Operation Manual

This manual describes operating methods of the 5G Standard Measurement Software (Base License).

- MX285051A-001 Pre-Standard CP-OFDM Downlink
  MX285051A-051 Pre-Standard CP-OFDM Uplink
  Operation Manual (Operation) <This document>

This manual describes basic operating methods, and functions of the MX285051A-001 Pre-Standard CP-OFDM Downlink / MX285051A-051 Pre-Standard CP-OFDM Uplink.
As for signal analyzer hardware and its basic functions and operation outline, refer to *MS2850A Signal Analyzer Operation Manual (Mainframe Operation)*.

- MX285051A-001 Pre-Standard CP-OFDM Downlink
  MX285051A-051 Pre-Standard CP-OFDM Uplink
  Operation Manual (Remote Control)

This manual describes remote control of the MX285051A-001 Pre-Standard CP-OFDM Downlink / MX285051A-051 Pre-Standard CP-OFDM Uplink.
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

In this document, indicates a panel key.

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Chapter 1 Overview

This chapter provides an overview of the MX285051A-001 Pre-Standard CP-OFDM Downlink and MX285051A-051 Pre-Standard CP-OFDM Uplink and describes the product configuration.

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1.1 Product Overview

The 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 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 MX285051A-001 Pre-Standard CP-OFDM Downlink and MX285051A-051 Pre-Standard CP-OFDM Uplink (hereinafter, referred to as “MX285051A-001/051”) is a software option for measuring RF characteristics specified by 5G Standard.

The MX285051A-001/051 provides the following measurement features.

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

The MX285051A 5G Standard Measurement Software (Base License) is required to use the MX285051A-001/051.

1.2 Product Configuration

1.2.1 Standard configuration

Table 1.2.1-1 and Table 1.2.1-2 list the standard configuration of the MX285051A-001/051.

Table 1.2.1-1 MX285051A-001 Pre-Standard CP-OFDM Downlink Standard configuration

Item	Model Name/Symbol	Product Name	Q'ty	Remarks
Application	MX285051A-001	Pre-Standard CP-OFDM Downlink	1	
Accessory	—	Installation CD-ROM	1	Application software, operation manual CD-ROM

Table 1.2.1-2 MX285051A-001 Pre-Standard CP-OFDM Uplink Standard configuration

Item	Model Name/Symbol	Product Name	Q'ty	Remarks
Application	MX285051A-051	Pre-Standard CP-OFDM Uplink	1	
Accessory	—	Installation CD-ROM	1	Application software, operation manual CD-ROM

1.2.2 Applicable parts

Table 1.2.2-1 lists the applicable parts for the MX285051A-001/051.

Table 1.2.2-1 Applicable parts

Model Name/Symbol	Product Name	Remarks
W3924AE	MX285051A-001 Pre-Standard CP-OFDM Downlink / MX285051A-051 Pre-Standard CP-OFDM Uplink Operation Manual (Operation)	English, printed version
W3925AE	MX285051A-001 Pre-Standard CP-OFDM Downlink / MX285051A-051 Pre-Standard CP-OFDM Uplink Operation Manual (Remote Control)	English, printed version

1.3 Specifications

Table 1.3-1 shows the specifications for the MX285051A-001/051.
Nominal values do not guarantee the performance as specifications.

Table 1.3-1 Specifications

Item	Specification
MX285051A-001 Pre-Standard CP-OFDM Downlink	
Channel bandwidth	100 MHz
Number of Carriers	MS2850A-032: Up to 2 carriers MS2850A-033/133: Up to 5 carriers MS2850A-034/134: Up to 8 carriers
Capture time	1 Frame
Setting frequency range	MS2850A-047: 800 MHz to 32 GHz MS2850A-046: 800 MHz to 44.5 GHz
Measurement level range	–15 to +30 dBm (at Pre-Amp Off, or Pre-Amp not installed.) –30 to +10 dBm (at Pre-Amp On)
Carrier frequency accuracy	When measuring in the following conditions at 18 to 28°C, after CAL execution, ・Measurement signal: EVM = 2% of Downlink signal, ・Measurement time: 50 subframes, ・1 carrier of 100 MHz bandwidth in center frequency ± (accuracy of reference frequency × carrier frequency + 10 Hz) (Nominal)
Residual EVM	When measuring in the following conditions at 18 to 28°C, after CAL execution, ・Measurement time: 50 subframes, ・1 carrier of 100 MHz bandwidth in center frequency < 2.0% (rms) (Nominal)
Transmitter power accuracy	When measuring in the following conditions at 18 to 28°C, after CAL execution, ・Input attenuator ≥ 10 dB, ・Input signal: Within the range of measurement level and equal to input level or under ・1 carrier of 100 MHz bandwidth in center frequency ±2.54 dB (Nominal) (at Pre-Amp Off, or Pre-Amp not installed.) ±3.74 dB (Nominal) (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.

Table 1.3-1 Specifications (Cont'd)

Item	Specification
MX285051A-001 Pre-Standard CP-OFDM Downlink (Cont'd)	
Waveform display	When measuring the single carrier: Constellation EVM vs Subcarrier EVM vs Symbol Power vs Resource Block EVM vs Resource Block Spectral Flatness When measuring the multi-carrier: Power vs Resource Block EVM vs Resource Block
MX285051A-051 Pre-Standard CP-OFDM Uplink	
Channel bandwidth	100 MHz
Number of Carriers	MS2850A-032: Up to 2 carriers MS2850A-033/133: Up to 5 carriers MS2850A-034/134: Up to 8 carriers
Capture time	1 Frame
Setting frequency range	MS2850A-047: 800 MHz to 32 GHz MS2850A-046: 800 MHz to 44.5 GHz
Measurement level range	–15 to +30 dBm (at Pre-Amp Off, or Pre-Amp not installed.) –30 to +10 dBm (at Pre-Amp On)
Carrier frequency accuracy	When measuring in the following conditions at 18 to 28°C, after CAL execution, ・Measurement signal: EVM = 2% of uplink signal ・Measurement time: 50 subframes, ・1 carrier of 100 MHz bandwidth in center frequency ± (accuracy of reference frequency × carrier frequency + 10 Hz) (Nominal)
Residual EVM	When measuring in the following conditions at 18 to 28°C, after CAL execution, ・Measurement time: 50 subframes, ・1 carrier of 100 MHz bandwidth in center frequency < 2.0% (rms) (Nominal)
Transmitter power accuracy	When measuring in the following conditions at 18 to 28°C, after CAL execution, ・Input attenuator ≥ 10 dB, ・Input signal: Within the range of measurement level and equal to input level or under ・1 carrier of 100 MHz bandwidth in center frequency ±2.54 dB (Nominal) (at Pre-Amp Off, or Pre-Amp not installed.) ±3.74 dB (Nominal) (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.

Table 1.3-1 Specifications (Cont'd)

Item	Specification
MX285051A-051 Pre-Standard CP-OFDM Uplink (Cont'd)	
Waveform display	When measuring the single carrier: Constellation EVM vs Subcarrier EVM vs Symbol Power vs Resource Block EVM vs Resource Block Spectral Flatness When measuring the multi-carrier: Power vs Resource Block EVM vs Resource Block
Common items for MX285051A-001/051	
Digitize Function	
Function	Capable of outputting captured waveform data to internal storage or external storage.
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: MX285051A-001 MS2850A-032: 325 MHz MS2850A-033/133: 650 MHz MS2850A-034/134: 1300 MHz MX285051A-051 MS2850A-032: 325 MHz MS2850A-033/133: 650 MHz MS2850A-034/134: 1300 MHz Carrier Aggregation measurement is performed dividing CCs of input signals into two groups under the following conditions. Thus, the measured IQ data can be replayed only in this application. ・ Center Frequency < 4.2 GHz ・ Number of Carriers≧6

Chapter 2 Preparation

This chapter describes the preparations required for using the application you are using.
Refer to *MS2850A Signal Analyzer Operation Manual (Mainframe Operation)* for common features, the panel keys, connectors used to connect external devices and general points of caution of the MS2850A not included in this manual.

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2.1 Signal Path Setup

As shown in Figure 2.1-1, connect the mainframe and the DUT using an RF cable, so that the signal to be tested is input to the RF Input connector.

⚠ CAUTION

Do not input a signal that has an excessive level to MS2850A.

Figure 2.1-1 Signal path setup example

Set the 5 MHz/10 MHz/13 MHz reference signal from external sources, as required.

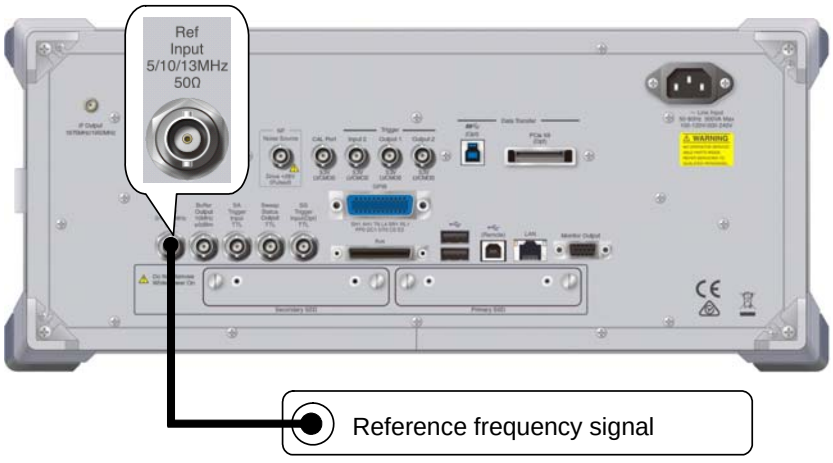

Figure 2.1-2 External signal input

2.2 Application Startup and Selection

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

2.2.1 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.

2.2.2 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.

2.3 Initialization and Calibration

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

2.3.1 Initialization

After selecting this application, first perform initialization. Initialization should be performed in order to return the settable parameters to their default settings.

The initialization procedure is as follows.

■ Procedure

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

2.3.2 Calibration

Perform calibration before 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 the MS2850A, refer to *MS2850A Signal Analyzer Operation Manual (Mainframe Operation)*.

Chapter 3 Measurement

This chapter describes the measurement function, the parameter contents and setting methods for the MX285051A-001/051.

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3.16 EVM vs Resource Block Display (Modulation Analysis) 3-70
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3.1 Basic Operation

3.1.1 Screen layout

This section describes the screen layout for the MX285051A-001/051.

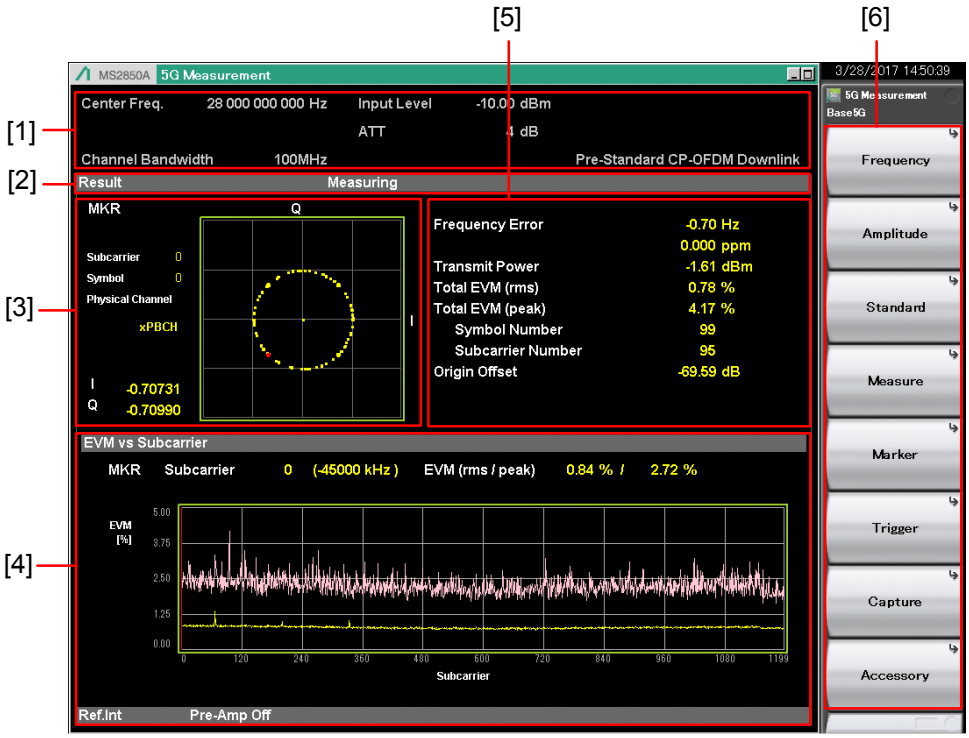


Figure 3.1.1-1 Screen Layout

[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] Graph window

Displays a graph of the measurement results.

[5] Result window

Displays measurement results.

[6] Function menu

Displays the functions executable with the function keys.

3.1.2 Function menu

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

Table 3.1.2-1 Main function menu

Function Key	Menu Display	Function
Page 1	5G Measurement	Press **5G Measurement** to display.
F1	Frequency	Sets the frequency Refer to 3.2 “Frequency Function Menu”
F2	Amplitude	Sets the level and attenuator. Refer to 3.3 “Amplitude Function Menu”
F3	Standard	Selects the measurement signal. Refer to 3.5 “Standard Setting”
F4	Measure	Sets measurement items. Refer to 3.6 “Pre-Standard CP-OFDM Downlink”, 3.7 “Pre-Standard CP-OFDM Uplink”
F5	Marker	Sets a marker. Refer to 3.8 “Setting Maker”
F6	Trigger	Sets a trigger. Refer to 3.9 “Setting Trigger”
F7	Capture	Configures settings for IQ data capture. Refer to 3.4 “Capture IQ Data Function Menu”
F8	Accessory	Sets other functions. Refer to 5.1 “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.

Refer to 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 Center Frequency dialog box.

Note:

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

■Center Frequency

Summary Sets the center frequency.

Setting range 800 MHz to the upper limit of the main unit

■RF Spectrum

Summary Sets whether to measure with IQ spectrum reversed.

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.

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

■Attenuator (Auto/Manual)

Summary Selects automatic setting or manual setting of the input attenuator.

Options Auto The input attenuator is automatically set.
Manual The input attenuator is manually set.

■Attenuator

Summary Sets the input attenuator manually.

Range

Table 3.3-1 Input attenuator setting range (When Pre-amp is set to Off)

Attenuator Manual	
Lower limit	**Upper limit**
Logic* ($\alpha = 0, \beta = 1, \gamma = 2$) The minimum value is 0 dB.	60 dB

Table 3.3-2 Input attenuator setting range (When Pre-amp is set to On)

Attenuator Manual	
Lower limit	**Upper limit**
Logic* ($\alpha = 20, \beta = 21, \gamma = 22$) The minimum value is 0 dB	60 dB

*: The following rules apply:

<1> If the reference level is 0 or if it is divisible by 2.
Attenuator (dB) = RL*1 + α

<2> Not <1>, and INT (RL)*2 is an odd number.
Attenuator (dB) = INT (RL)*2 + β

<3> Not <1>, and INT (RL) is an even number.

Attenuator (dB) = INT (RL)*2 + γ

*1: Reference level (dBm)

*2: Maximum integer not exceeding reference level.

■Pre-Amp

Summary Sets On/Off for the Pre-Amp function.

Options On Enables the Pre-Amp function.

Off Disables the Pre-Amp function.

■Auto Range

Summary Sets the input level and attenuator value so that the EVM measurement results are optimal according to the input level.

■Offset

Summary Sets On/Off for the Offset function.

Options On Enables the offset function.

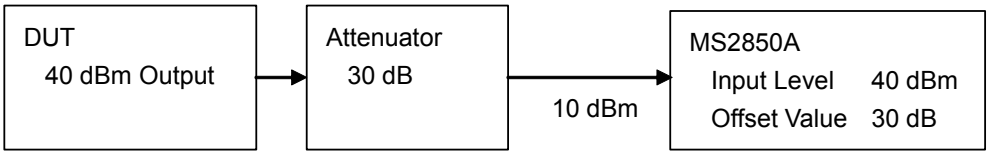
Off Disables the offset function.

■Offset Value

Summary Sets the level offset coefficient.

Range –99.99 to 99.99 dB

Setting example



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.

Table 3.4-1 Capture function menu

Function Key	Menu Display	Function
Page 1	Capture	Press **Capture** to display.
F1	Capture Time	Switches between the two capture modes of IQ data (auto setting and manual setting).
F2	Capture Time Length	Sets the capture time length of IQ data.
F3	Save Captured Data	Saves the captured IQ data. Refer to Chapter 4 “Digitize Function”
F4	Replay	Replays the captured IQ data. Refer to Chapter 4 “Digitize Function”
F5	Stop Replaying	Stops replaying the captured IQ data. Refer to Chapter 4 “Digitize Function”

3.4.1 Setting capture time

The capture time length is the time to capture data necessary for measuring one frame per measurement.

3.4.2 Averaging IQ data

The following is the method for averaging IQ data.

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.

3.5 5G Standard Setting

Set the 5G Standard in the Standard function menu that is displayed by pressing F3 (Standard) on the main function menu.

Table 3.5-1 Standard function menu

Function Key	Menu Display	Function
Page 1	Standard	Press **Standard** to display.
F1	Pre-Standard CP-OFDM Downlink	Sets 5G Standard to Pre-Standard CP-OFDM Downlink. It is available when MX285051A-001 is installed.
F2	Pre-Standard CP-OFDM Uplink	Sets 5G Standard to Pre-Standard CP-OFDM Uplink. It is available when MX285051A-051 is installed.

3.6 Pre-Standard CP-OFDM Downlink

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

Table 3.6-1 Measure function menu (Pre-Standard CP-OFDM Downlink)

Function Key	Menu Display	Function
Page 1	Measure	Press **Measure** to display.
F1	Modulation Analysis	Switches the measurement function to Modulation Analysis. It is available when MX285051A-001 is installed.
F2	Carrier Aggregation Analysis	Switches the measurement function to Carrier Aggregation Analysis. It is available when MX285051A-001 is installed.

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

Function Key	Menu Display	Function
Page 1	Modulation Analysis	Press **Modulation Analysis** to display.
F1	Analysis Time	Sets measurement position. Refer to 3.6.1.1 “Analysis Time”
F2	Basic Settings	Sets the basic parameters. Refer to 3.6.1.2 “Basic Settings”
F7	Advanced Settings	Sets the parameters for each channel and signal. Refer to 3.6.1.3 “Advanced Settings”
Page 2	Modulation Analysis	Press **Modulation Analysis** and then → to display.
F1	Trace	Sets the trace Refer to 3.6.1.4, 3.6.1.5, 3.6.1.6 “Trace”

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.

Table 3.6.1.1-1 Analysis Time function menu

Function Key	Menu Display	Function
Page 1	Analysis Time	Press **Analysis Time** to display.
F1	Starting Subframe Number	Sets the starting subframe number. It is fixed to 0 subframe in the MX285051A-001.
F2	Measurement Interval	Sets the analysis subframe length. It is fixed to 50 subframes in the MX285051A-001.

3.6.1.2 Basic Settings

Set the basic parameters for modulation analysis. The Basic Settings function menu is displayed by pressing F2 (Basic Settings) on page 1 of the Modulation Analysis function menu.

Table 3.6.1.2-1 Basic Settings function menu

Function Key	Menu Display	Function
Page 1	Basic Settings	Press **Basic Settings** to display.
F1	Channel Bandwidth	Sets the channel bandwidth. It is fixed to 100 MHz in the MX285051A-001.
F2	Number of Antenna Port	Sets the number of antennas. Range: 1 to 8
F3	Antenna Port	Sets the antenna port number to be measured. Range: 0 to (Number of Antenna Port – 1)
F5	Subframe Type	Sets the subframe type. Refer to Table 3.6.1.2-2
F7	xPDCCH/ UE-Specific RS	Sets the xPDCCH and UE-Specific Reference Signal. Refer to Table 3.6.1.2-3
F8	xPDSCH/ UE-Specific RS	Sets the xPDSCH and UE-Specific Reference Signal. Refer to Table 3.6.1.2-4
Page 2	Basic Settings	Press **Basic Settings** and then → to display.
F1	Carrier Spacing	Sets the carrier spacing. Options: 99MHz Analyzes the carrier spacing as 99 MHz. 100MHz Analyzes the carrier spacing as 100 MHz.
F2	Number of Carriers	Sets the number of carriers. Range: 1 to 2 (With MS2850A-032) 1 to 5 (With MS2850A-033/133) 1 to 8 (With MS2850A-034/134)
F3	Reference Carrier	Sets the reference carrier for analysis. Range: 0 to (Number of Carriers – 1)
F4	Equalizer Use Data	Sets whether to include data subcarriers in the calculation of Channel Estimation. Range: Off Does not include data subcarriers in the calculation. On Includes data subcarriers in the calculation.

Table 3.6.1.2-1 Basic Settings function menu (Cont'd)

Function Key	Menu Display	Function
F5	Synchronization Mode	Sets the synchronization signal. Options: Synchronization Signal Sets the synchronization signal to UE-specific reference signals associated with xPDSCH. Reference Signal Sets the synchronization signal to Reference Signal.
F6	Cell ID	Sets the Cell ID. Range: 0 to 503

Note:

The following table shows the relation between the Antenna Port setting and the physical channel mapping.

Antenna Port	Physical Channel			
	P-SS, S-SS, E-SS	xPBCH, BRS	xPDCCH	xPDSCH/UE-Specific RS
0	p300	p0	p107	p8
1	p301	p1	p109	p9
2	p302	p2	–	p10
3	p303	p3	–	p11
4	p304	p4	–	p12
5	p305	p5	–	p13
6	p306	p6	–	p14
7	p307	p7	–	p15

Table 3.6.1.2-2 Subframe Type function menu

Function Key	Menu Display	Function
Page 1	Subframe Type	Press **Subframe Type** to display.
F1	Subframe Number	Sets the subframe number to be set the subframe type. Range: 0 to 49
F2	Subframe Type	Sets the subframe type. The subframe 0 and 25 are fixed to Type a. Options: Off Target measurement does not include the subframe. Type a Measures the subframe as Type a. Type b Measures the subframe as Type b.
Page 2	Subframe Type	Press **Subframe Type** and then → to display.
F1	Copy to All Subframe	Copy the specified subframe type to all subframes.
F3	Restore Default Current Subframe	Initializes the subframe type of the selected subframe number.
F4	Restore Default All Subframe	Initializes all subframe types.

Table 3.6.1.2-3 xPDCCH/UE-Specific RS function menu

Function Key	Menu Display	Function
Page 1	xPDCCH/UE-Specific RS	Press **xPDCCH/UE-Specific RS** to display.
F1	Subframe Number	Sets the subframe number to be set the xPDCCH/UE-Specific RS. Range: 0 to 49
F4	Number of xPDCCH Symbols	Sets the number of xPDCCH Symbols. Range: 1, 2
F7	xPDCCH Mapping	Sets how to judge xPDCCH mapping. It is fixed to Auto. Range: Auto Judges xPDCCH position automatically and performs measurement.
Page 2	xPDCCH/UE-Specific RS	Press **xPDCCH/UE-Specific RS** and then → to display.
F1	Copy to All Subframe	Copy the xPDCCH/UE-Specific RS setting to all subframes.
F3	Restore Default Current Subframe	Initializes the xPDCCH/UE-Specific RS setting of the currently selected subframe number.
F4	Restore Default All Subframe	Initializes the xPDCCH/UE-Specific RS setting of all subframes.

Table 3.6.1.2-4 xPDSCH/UE-Specific RS function menu

Function Key	Menu Display	Function
Page 1	xPDSCH/UE-Specific RS	Press **xPDSCH/UE-Specific RS** to display.
F1	Subframe Number	Sets the subframe number to be set the xPDSCH/UE-Specific RS. Range: 0 to 49
F4	Modulation Scheme	Sets xPDSCH Modulation Scheme. Range: 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. Auto Analyzes an input signal after judging its modulation scheme automatically.
F5	Starting of xPDSCH	Displays the mapping start symbol of xPDSCH. Calculates automatically from the set value of Number of xPDCCH Symbols.
F6	Stopping of xPDSCH	Sets the mapping stop symbol of xPDSCH. When Subframe Type is Type a, it is fixed to 13. When Subframe Type is Type b, it is fixed to 12.
Page 2	xPDSCH/UE-Specific RS	Press **xPDSCH/UE-Specific RS** and then → to display.
F1	Copy to All Subframe	Copy the xPDSCH/UE-Specific RS setting to all subframes.
F3	Restore Default Current Subframe	Initializes the xPDSCH/UE-Specific RS setting of the currently selected subframe number.
F4	Restore Default All Subframe	Initializes the xPDSCH/UE-Specific RS setting of all subframes.

3.6.1.3 Advanced Settings

Set the advanced parameters for modulation analysis. The Advanced Settings function menu and a dialog box are displayed by pressing F7 (Advanced Settings) on page 1 of the Modulation Analysis function menu.

Table 3.6.1.3-1 Advanced Settings function menu

Function Key	Menu Display	Function
Page 1	Advanced Settings	Press **Advanced Settings** to display.
F1	Restore Default Values	Initializes all parameters set on the Advanced Settings dialog box.
F7	Set	Determines parameter change made on the Advanced Settings dialog box.
F8	Cancel	Cancels parameter change made on the Advanced Settings dialog box. The change will be discarded when cancelled.

■P-SS On/Off

Summary Selects whether the measurement target includes the primary synchronization signal. When Synchronization Mode is Synchronization Signal, it is fixed to Checked.

■S-SS On/Off

Summary Selects whether the measurement target includes the secondary synchronization signal. When Synchronization Mode is Synchronization Signal, it is fixed to Checked.

■E-SS On/Off

Summary Selects whether the measurement target includes the extended synchronization signal. When Synchronization Mode is Synchronization Signal, it is fixed to Checked.

■xPBCH On/Off

Summary Selects whether the measurement target includes xPBCH.

Options
- Checked — The measurement target includes xPBCH.
- Non-Checked — The measurement target does not include xPBCH.

■xPDCCH On/Off

Summary Selects whether the measurement target includes xPDCCH.

Options
- Checked — The measurement target includes xPDCCH.
- Non-Checked — The measurement target does not include xPDCCH.

■xPDSCH On/Off

Summary Selects whether the measurement target includes xPDSCH. It is fixed to Checked.

■PCRS AP60 On/Off

Summary Selects whether to map Antenna Ports60 PCRS to resource elements.

Options

Checked	Maps Antenna Ports60 PCRS. The resource elements to which Antenna Ports60 PCRS is mapped are excluded from the EVM calculation range.
Non-Checked	Does not map Antenna Ports60 PCRS.

■PCRS AP61 On/Off

Summary Selects whether to map Antenna Ports61 PCRS to resource elements.

Options

Checked	Maps Antenna Ports61 PCRS. The resource elements to which Antenna Ports61 PCRS is mapped are excluded from the EVM calculation range.
Non-Checked	Does not map Antenna Ports61 PCRS.

3.6.1.4 Trace (EVM vs Subcarrier, EVM vs Symbol, Spectral Flatness)

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.

When EVM vs Subcarrier, EVM vs Symbol, or Spectral Flatness is selected by F1: Trace Mode, the function menu is as shown in the following table.

Table 3.6.1.4-1 Trace function menu

Function Key	Menu Display	Function
Page 1	Trace	Press **Trace** to display.
F1	Trace Mode	Sets a graphical result in the graph window. ***Note:*** The Trace function menu configuration changes depending on the settings of this function. 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 RB Displays Power vs Resource Block in a graph window. EVM vs RB Displays EVM vs Resource Block in a graph window. Summary Displays EVM and power of each channel in a graph window.
F3	Scale	Sets vertical scale of graphical result. Refer to Table 3.6.1.4-2
F4	Storage	Sets storage method. Refer to Table 3.6.1.4-3
F6	Subcarrier Number	Sets subcarrier number of Marker position and EVM vs Symbol displayed. Range: 0 to 1199
F7	Symbol Number	Sets symbol number of Marker position and EVM vs Subcarrier displayed. Range: 0 to 699

Table 3.6.1.4-1 Trace function menu (Cont'd)

Function Key	Menu Display	Function
F8	EVM vs Subcarrier View	Displayed when EVM vs Subcarrier is selected by F1: Trace Mode. Sets whether to enable averaging in EVM vs Subcarrier, and the display type. Options: Each Symbol Displays EVM vs Subcarrier of Symbol set in Symbol Number when EVM vs Subcarrier is displayed. 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).
	EVM vs Symbol View	Displayed when EVM vs Symbol is selected by F1: Trace Mode. Sets whether to enable averaging in EVM vs Symbol, and the display type. Options: Each Subcarrier Displays EVM vs Symbol of Subcarrier set in Subcarrier Number when EVM vs Symbol is displayed. Averaged over all Subcarrier 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	Displayed when Spectral Flatness is selected by F1: Trace Mode. Sets type of Spectral Flatness displayed. Options: Amplitude Displays Amplitude in Spectral Flatness. Phase Displays Phase in Spectral Flatness.

Table 3.6.1.4-2 Scale function menu

Function Key	Menu Display	Function
Page 1	Scale	Press **Scale** to display.
F1	EVM Unit	Sets the unit of EVM. Options: % dB
F2	EVM Scale	Sets the upper limit for the EVM scale. Range: 2%, 5%, 10%, 20% (in %) –40 dB, –20 dB, 0 dB (in dB)
F3	Flatness Scale	Sets a scale of Spectral Flatness. Options: Amplitude Sets the upper and lower limit values of Amplitude in Spectral Flatness (±10 dB, ±3 dB, ±1 dB). Phase Sets the upper and lower limit values of Phase in Spectral Flatness (±60 deg, ±20 deg, ±6 deg).

Table 3.6.1.4-3 Storage function menu

Function Key	Menu Display	Function
Page 1	Storage	Press **Storage** to display.
F1	Mode	Sets the storage mode. Options: Off Updates data per measurement. Average Displays the average per measurement. Average & Max Displays the average and maximum values per measurement.
F2	Count	Sets the measurement count. Range: 2 to 9999

3.6.1.5 Trace (Power vs RB, EVM vs RB)

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.

When Power vs RB or EVM vs RB is selected by F1: Trace Mode, the function menu is as shown in the following table.

Table 3.6.1.5-1 Trace function menu

Function Key	Menu Display	Function
Page 1	Trace	Press **Trace** to display.
F1	Trace Mode	Sets a graphical result in the graph window. ***Note:*** The Trace function menu configuration changes depending on the settings of this function. 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 RB Displays Power vs Resource Block in a graph window. EVM vs RB Displays EVM vs Resource Block in a graph window. Summary Displays EVM and power of each channel in a graph window.
F3	Scale	Sets vertical scale of a graphical result. Refer to Table 3.6.1.5-2
F6	Subframe Number	Sets subframe number of Marker position, Power vs RB, and EVM vs RB displayed. Range: 0 to 49
F7	Resource Block Number	Sets resource block number of Marker position, Power vs RB, and EVM vs RB displayed. Range: 0 to 99

Table 3.6.1.5-2 Scale function menu

Function Key	Menu Display	Function
Page 1	Scale	Press **Scale** to display.
F1	EVM Unit	Sets the unit of EVM. Options: % dB
F2	EVM Scale	Sets the upper limit for the EVM scale. Range: 2%, 5%, 10%, 20% (in %) –40 dB, –20 dB, 0 dB (in dB) ***Note:*** EVM Scale is valid only for EVM vs RB.

3.6.1.6 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.

When Summary is selected by F1: Trace Mode, the function menu is as shown in the following table.

Table 3.6.1.6-1 Trace function menu

Function Key	Menu Display	Function
Page 1	Trace	Press **Trace** to display.
F1	Trace Mode	Sets a graphical result in the graph window. ***Note:*** The Trace function menu configuration changes depending on the settings of this function. 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 RB Displays Power vs Resource Block in a graph window. EVM vs RB Displays EVM vs Resource Block in a graph window. Summary Displays EVM and power of each channel in a graph window.
F3	Scale	Sets the unit of EVM measurement result. Refer to Table 3.6.1.6-2
F4	Storage	Sets the storage mode. Refer to Table 3.6.1.6-3

Table 3.6.1.6-2 Scale function menu

Function Key	Menu Display	Function
Page 1	Scale	Press **Scale** to display.
F1	EVM Unit	Sets the unit of EVM. Options: % dB

Table 3.6.1.6-3 Storage function menu

Function Key	Menu Display	Function
Page 1	Storage	Press **Storage** to display.
F1	Mode	Sets the storage mode. Options: Off Updates data per measurement. Average Displays the average per measurement. Average & Max Displays the average and maximum values per measurement.
F2	Count	Sets the measurement count. Range: 2 to 9999

3.6.2 Carrier Aggregation Analysis

To set modulation analysis items, press F2 (Carrier Aggregation Analysis) on the Measure function menu to display the Carrier Aggregation Analysis function menu.

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

Table 3.6.2-1 Carrier Aggregation Analysis function menu

Function Key	Menu Display	Function
Page 1	Carrier Aggregation Analysis	Press **Carrier Aggregation Analysis** to display.
F1	Analysis Time	Sets measurement position. Refer to 3.6.2.1 “Analysis Time”
F2	Basic Settings	Sets Basic parameters. Refer to 3.6.2.2 “Basic Settings”
F7	Advanced Settings	Sets the parameters for each channel and signal. Refer to 3.6.2.3 “Advanced Settings”
Page 2	Carrier Aggregation Analysis	Press **Carrier Aggregation Analysis** and then → to display.
F1	Trace	Sets the trace. Refer to 3.6.2.4 “Trace”

3.6.2.1 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 Carrier Aggregation Analysis function menu.

Table 3.6.2.1-1 Analysis Time function menu

Function Key	Menu Display	Function
Page 1	Analysis Time	Press **Analysis Time** to display.
F1	Starting Subframe Number	Sets the Starting Subframe Number. It is fixed to 0 subframe in the MX285051A-001.
F2	Measurement Interval	Sets the analysis Subframe length. It is fixed to 50 subframes in the MX285051A-001.

3.6.2.2 Basic Settings

Set the basic parameters for modulation analysis. The Basic Settings function menu is displayed by pressing F2 (Basic Settings) on page 1 of the Modulation Analysis function menu.

Table 3.6.2.2-1 Basic Settings function menu

Function Key	Menu Display	Function
Page 1	Basic Settings	Press **Basic Settings** to display.
F1	Channel Bandwidth	Sets the channel bandwidth. It is fixed to 100 MHz in the MX285051A-001.
F2	Carrier Spacing	Sets the carrier spacing. Range: 99MHz Analyzes the carrier spacing as 99 MHz. 100MHz Analyzes the carrier spacing as 100 MHz.
F3	Number of Carrier	Sets the number of carriers. Range: 1 to 2 (With MS2850A-032) 1 to 5 (With MS2850A-033/133) 1 to 8 (With MS2850A-034/134)
F4	Carrier Settings	Sets the carrier settings. Refer to Table 3.6.2.2-2
F5	Reference Carrier	Sets the reference carrier for analysis. Range: 0 to (Number of Carriers – 1)
F6	Equalizer Use Data	Sets whether to include data subcarriers in the calculation of Channel Estimation. Range: Off Does not include data subcarriers in the calculation. On Includes data subcarriers in the calculation.

Table 3.6.2.2-2 Carrier Settings function menu

Function Key	Menu Display	Function
Page 1	Carrier Settings	Press **Carrier Settings** to display.
F1	Carrier Number	Sets the carrier number to be set. Range: 0 to 7
F2	State	Selects whether to include the carrier for the target measurement. Range: On Target measurement includes the carrier. Off Target measurement does not include the carrier.
F3	Number of Antenna Port	Sets the number of antennas. Range: 1 to 8
F4	Antenna Port	Sets the antenna port number to be measured. Range: 0 to (Number of Antenna Port – 1)
F5	Subframe Type	Sets the subframe type. Refer to Table 3.6.2.2-3
F7	xPDCCH/ UE-Specific RS	Sets the xPDCCH and UE-Specific Reference Signal. Refer to Table 3.6.2.2-4
F8	xPDSCH/ UE-Specific RS	Sets the xPDSCH and UE-Specific Reference Signal. Refer to Table 3.6.2.2-5
Page 2	Carrier Settings	Press **Carrier Settings** and then → to display.
F1	Copy to All Carrier	Copy the specified carrier settings to all carriers.
F3	Restore Default Current Carrier	Initializes the carrier settings of the currently selected carrier number.
F4	Restore Default All Carrier	Initializes all carrier settings.
F5	Synchronization Mode	Sets the synchronization signal. Options: Synchronization Signal Sets the synchronization signal to UE-specific reference signals associated with xPDSCH. Reference Signal Sets the synchronization signal to Reference Signal.
F6	Cell ID	Sets the Cell ID. Range: 0 to 503

Table 3.6.2.2-3 Subframe Type function menu

Function Key	Menu Display	Function
Page 1	Subframe Type	Press **Subframe Type** to display.
F1	Subframe Number	Sets the subframe number to be set the subframe type. Range: 0 to 49
F3	Subframe Type	Sets the subframe type. The subframe 0 and 25 are fixed to Type a. Options: Off Target measurement does not include the subframe. Type a Measures the subframe as Type a. Type b Measures the subframe as Type b.
Page 2	Subframe Type	Press **Subframe Type** and then → to display.
F1	Copy to All Subframe	Copy the specified subframe type to all subframes.
F3	Restore Default Current Subframe	Initializes the subframe type of the selected subframe number.
F4	Restore Default All Subframe	Initializes all subframe types.

Table 3.6.2.2-4 xPDCCH/UE-Specific RS function menu

Function Key	Menu Display	Function
Page 1	xPDCCH/UE-Specific RS	Press **xPDCCH/UE-Specific RS** to display.
F1	Subframe Number	Sets the subframe number to be set the xPDCCH/UE-Specific RS. Range: 0 to 49
F4	Number of xPDCCH Symbols	Sets the number of xPDCCH Symbols. Range: 1, 2
F7	xPDCCH Mapping	Sets how to judge xPDCCH mapping. It is fixed to Auto. Options: Auto Judges xPDCCH position automatically and performs measurement.
Page 2	xPDCCH/UE-Specific RS	Press **xPDCCH/UE-Specific RS** and then → to display.
F1	Copy to All Subframe	Copy the xPDCCH/UE-Specific RS setting to all subframes.
F3	Restore Default Current Subframe	Initializes the xPDCCH UE Specific RS setting of the currently selected subframe number.
F4	Restore Default All Subframe	Initializes the xPDCCH UE Specific RS setting of all subframes.

Table 3.6.2.2-5 xPDSCH/UE-Specific RS function menu

Function Key	Menu Display	Function
Page 1	xPDSCH/UE-Specific RS	Press **xPDSCH/UE-Specific RS** to display.
F1	Subframe Number	Sets the subframe number to be set the xPDSCH/UE-Specific RS. Range: 0 to 49
F4	Modulation Scheme	Sets xPDSCH Modulation Scheme. 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. Auto Analyzes an input signal after judging its modulation scheme automatically.
F5	Starting of xPDSCH	Sets the mapping start symbol of xPDSCH. Calculates automatically from the set value of Number of xPDCCH Symbols.
F6	Stopping of xPDSCH	Sets the mapping stop symbol of xPDSCH. When Subframe Type is Type a, it is fixed to 13. When Subframe Type is Type b, it is fixed to 12.
Page 2	xPDSCH/UE-Specific RS	Press **xPDSCH/UE-Specific RS** and then → to display.
F1	Copy to All Subframe	Copy the setting of xPDSCH/UE-Specific RS to all subframes.
F3	Restore Default Current Subframe	Initializes the setting of xPDSCH/UE Specific RS of the currently selected subframe number.
F4	Restore Default All Subframe	Initializes the setting of xPDSCH/UE Specific RS of all subframes.

3.6.2.3 Advanced Settings

Set the advanced parameters for modulation analysis. The Advanced Settings function menu and a dialog box are displayed by pressing F7 (Advanced Settings) on page 1 of the Carrier Aggregation Analysis function menu.

Table 3.6.2.3-1 Advanced Settings function menu

Function Key	Menu Display	Function
Page 1	Advanced Settings	Press **Advanced Settings** to display.
F1	Restore Default Values	Initializes all parameters set on the Advanced Settings dialog box.
F7	Set	Determines parameter change on the Advanced Settings dialog box.
F8	Cancel	Cancels parameter change made on the Advanced Settings dialog box. The change will be discarded when cancelled.

■P-SS On/Off (CC#0 to 7)

Summary Selects whether the measurement target includes the primary synchronization signal. When Synchronization Mode is Synchronization Signal, it is fixed to Checked.

■S-SS On/Off (CC#0 to 7)

Summary Selects whether the measurement target includes the secondary synchronization signal. When Synchronization Mode is Synchronization Signal, it is fixed to Checked.

■E-SS On/Off (CC#0 to 7)

Summary Selects whether the measurement target includes the extended synchronization signal. When Synchronization Mode is Synchronization Signal, it is fixed to Checked.

■xPBCH On/Off (CC#0 to 7)

Summary Selects whether the measurement target includes xPBCH.

Options
- Checked — The measurement target includes xPBCH.
- Non-Checked — The measurement target does not include xPBCH.

■xPDCCH On/Off (CC#0 to 7)

Summary Selects whether the measurement target includes xPDCCH.

Options
- Checked — The measurement target includes xPDCCH.
- Non-Checked — The measurement target does not include xPDCCH.

■xPDSCH On/Off (CC#0 to 7)

Summary Selects whether the measurement target includes xPDSCH. It is fixed to Checked.

■PCRS AP60 On/Off (CC#0 to 7)

Summary	Selects whether to map Antenna Ports60 PCRS to resource elements.	
Options	Checked	Maps Antenna Ports60 PCRS. The resource elements to which Antenna Ports60 PCRS is mapped are excluded from the EVM calculation range.
	Non-Checked	Does not map Antenna Ports60 PCRS.

■PCRS AP61 On/Off (CC#0 to 7)

Summary	Selects whether to map Antenna Ports61 PCRS to resource elements.	
Options	Checked	Maps Antenna Ports61 PCRS. The resource elements to which Antenna Ports61 PCRS is mapped are excluded from the EVM calculation range.
	Non-Checked	Does not map Antenna Ports61 PCRS.

3.6.2.4 Trace (Power vs RB, EVM vs RB)

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

Table 3.6.2.4-1 Trace function menu

Function Key	Menu Display	Function
Page 1	Trace	Press **Trace** to display.
F1	Trace Mode	Sets a graphical result in the graph window. ***Note:*** The Trace function menu configuration changes depending on the settings of this function. Options: Power vs RB Displays Power vs Resource Block in a graph window. EVM vs RB Displays EVM vs Resource Block in a graph window. Summary Displays EVM and power of each channel in a graph window.
F3	Scale	Sets vertical scale of a graphical result. Refer to Table 3.6.2.4-2
F4	Carrier Number	Sets carrier number. Range: 0 to 1 (With MS2850A-032) 0 to 4 (With MS2850A-033/133) 0 to 7 (With MS2850A-034/134)
F6	Subframe Number	Sets subframe number of Marker position, Power vs RB, and EVM vs RB displayed. Range: 0 to 49
F7	Resource Block Number	Sets resource block number of Marker position, Power vs RB, and EVM vs RB displayed. Range: 0 to 99

Table 3.6.2.4-2 Scale function menu

Function Key	Menu Display	Function
Page 1	Scale	Press **Scale** to display.
F1	EVM Unit	Sets the unit of EVM. Options: % dB
F2	EVM Scale	Sets the upper limit for the EVM scale. Range: 2%, 5%, 10%, 20% (in %) –40 dB, –20 dB, 0 dB (in dB) ***Note:*** EVM Scale is valid only for EVM vs RB.

3.7 Pre-Standard CP-OFDM Uplink

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

Table 3.7-1 Measure function menu (Pre-Standard CP-OFDM Uplink)

Function Key	Menu Display	Function
Page 1	Measure	Press **Measure** to display.
F1	Modulation Analysis	Switches the measurement function to Modulation Analysis. It is available when MX285051A-051 is installed.
F2	Carrier Aggregation Analysis	Switches the measurement function to Carrier Aggregation Analysis. It is available when MX285051A-051 is installed.

3.7.1 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 3.7.1-1 Modulation Analysis function menu

Function Key	Menu Display	Function
Page 1	Modulation Analysis	Press **Modulation Analysis** to display.
F1	Analysis Time	Sets measurement position. Refer to 3.7.1.1 "Analysis Time"
F2	Basic Settings	Sets Basic parameters. Refer to 3.7.1.2 "Basic Settings"
F7	Advanced Settings	Sets the parameters for each channel and signal. Refer to 3.7.1.3 "Advanced Settings"
Page 2	Modulation Analysis	Press **Modulation Analysis** and then → to display.
F1	Trace	Sets the trace. Refer to 3.7.1.4, 3.7.1.5, 3.7.1.6 "Trace"

3.7.1.1 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.

Table 3.7.1.1-1 Analysis Time function menu

Function Key	Menu Display	Function
Page 1	Analysis Time	Press **Analysis Time** to display.
F1	Starting Subframe Number	Sets the Starting Subframe Number. It is fixed to 0 subframe in the MX285051A-051.
F2	Measurement Interval	Sets the analysis Subframe length. It is fixed to 50 subframes in the MX285051A-051.

3.7.1.2 Basic Settings

Set the basic parameters for modulation analysis. The Basic Settings function menu is displayed by pressing F1 (Basic Settings) on page 1 of the Modulation Analysis function menu.

Table 3.7.1.2-1 Basic Settings function menu

Function Key	Menu Display	Function
Page 1	Basic Settings	Press **Basic Settings** to display.
F1	Channel Bandwidth	Sets the channel bandwidth. It is fixed to 100 MHz in the MX285051A-051.
F2	Number of Antenna Port	Sets the number of antennas. Range: 1, 2
F3	Cell ID	Sets the Cell ID. Range: 0 to 503
F4	RE Mapping Index	Sets the RE Mapping Index. Range: 0, 1, 2, 3
F5	Subframe Type	Sets the subframe type. Refer to Table 3.7.1.2-2
F6	Equalizer Use Data	Sets whether to include data subcarriers in the calculation of Channel Estimation. Range: Off Does not include data subcarriers in the calculation. On Includes data subcarriers in the calculation.
F8	xPUSCH/DM-RS	Sets the xPUSCH and Demodulation Reference Signal.
ページ2	Basic Settings	Press **Basic Settings** and then → to display.
F1	Carrier Spacing	Sets the carrier spacing. Options: 99MHz Analyzes the carrier spacing as 99 MHz. 100MHz Analyzes the carrier spacing as 100 MHz.
F2	Number of Carriers	Sets the number of carriers. Range: 1 to 2 (With MS2850A-032) 1 to 5 (With MS2850A-033/133) 1 to 8 (With MS2850A-034/134)
F3	Reference Carrier	Sets the reference carrier for analysis. Range: 0 to (Number of Carriers – 1)

Table 3.7.1.2-2 Subframe Type function menu

Function Key	Menu Display	Function
Page 1	Subframe Type	Press **Subframe Type** to display.
F1	Subframe Number	Sets the subframe number to be set the subframe type. Range: 0 to 49
F2	Subframe Type	Sets the subframe type. The subframe 0 and 25 are fixed to Off. Range: Off Target measurement does not include the subframe. Type c Measures the subframe as Type c.
Page 2	Subframe Type	Press **Subframe Type** and then → to display.
F1	Copy to All Subframe	Copy the specified subframe type to all subframes.
F3	Restore Default Current Subframe	Initializes the subframe type of the selected subframe number.
F4	Restore Default All Subframe	Initializes all subframe types.

Table 3.7.1.2-3 xPUSCH/DM-RS function menu

Function Key	Menu Display	Function
Page 1	xPUSCH/DM-RS	Press **xPUSCH/DM-RS** to display.
F1	Subframe Number	Sets the subframe number to be set the xPUSCH/DM-RS. Range: 0 to 49
F4	Modulation Scheme	Sets xPUSCH Modulation Scheme. 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. Auto Analyzes an input signal after judging its modulation scheme automatically.
F6	Stopping of xPUSCH	Sets the mapping stop symbol of xPUSCH. It is fixed to 13.
Page 2	xPUSCH/DM-RS	Press **xPUSCH/DM-RS** and then → to display.
F1	Copy to All Subframe	Copy the setting of xPUSCH/DM-RS to all subframes.
F3	Restore Default Current Subframe	Initializes the xPUSCH/DM-RS setting of the currently selected subframe number.
F4	Restore Default All Subframe	Initializes the xPUSCH/DM-RS setting of all subframes.

3.7.1.3 Advanced Settings

Set the advanced parameters for modulation analysis. The Advanced Settings function menu and a dialog box are displayed by pressing F7 (Advanced Settings) on page 1 of the Modulation Analysis function menu.

Table 3.7.1.3-1 Advanced Settings function menu

Function Key	Menu Display	Function
Page 1	Advanced Settings	Press **Advanced Settings** to display.
F1	Restore Default Values	Initializes all parameters set on the Advanced Settings dialog box.
F7	Set	Determines parameter change on the Advanced Settings dialog box.
F8	Cancel	Cancels parameter change made on the Advanced Settings dialog box. The change will be discarded when cancelled.

■xPUSCH On/Off

Summary Selects whether the measurement target includes the xPUSCH. It is fixed to Checked.

■PCRS

Summary Selects whether to map the PCRS to resource elements.

Options
- Checked — Maps the PCRS. The resource elements to which the PCRS is mapped are excluded from the EVM calculation range.
- Non-Checked — Does not map the PCRS

3.7.1.4 Trace (EVM vs Subcarrier, EVM vs Symbol, Spectral Flatness)

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.

When EVM vs Subcarrier, EVM vs Symbol, or Spectral Flatness is selected by F1: Trace Mode, the function menu is as shown in the following table.

Table 3.7.1.4-1 Trace function menu

Function Key	Menu Display	Function
Page 1	Trace	Press **Trace** to display.
F1	Trace Mode	Sets a graphical result in the graph window. ***Note:*** The Trace function menu configuration changes depending on the settings of this function. 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 RB Displays Power vs Resource Block in a graph window. EVM vs RB Displays EVM vs Resource Block in a graph window. Summary Displays EVM and power of each channel in a graph window.
F3	Scale	Sets vertical scale of graphical result. Refer to Table 3.7.1.4-2
F4	Storage	Sets storage method. Refer to Table 3.7.1.4-3
F6	Subcarrier Number	Sets subcarrier number of Marker position and EVM vs Symbol displayed. Range: 0 to 1199
F7	Symbol Number	Sets symbol number of Marker position and EVM vs Subcarrier displayed. Range: 0 to 699

Table 3.7.1.4-1 Trace function menu (Cont'd)

Function Key	Menu Display	Function
F8	EVM vs Subcarrier View	Displayed when EVM vs Subcarrier is selected by F1: Trace Mode. Sets whether to enable averaging in EVM vs Subcarrier, and the display type. Options: Each Symbol Displays EVM vs Subcarrier of Symbol set in Symbol Number when EVM vs Subcarrier is displayed. 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).
	EVM vs Symbol View	Displayed when EVM vs Symbol is selected by F1: Trace Mode. Sets whether to enable averaging in EVM vs Symbol, and the display type. Options: Each Subcarrier Displays EVM vs Symbol of Subcarrier set in Subcarrier Number when EVM vs Symbol is displayed. 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	Displayed when Spectral Flatness is selected by F1: Trace Mode. Sets type of Spectral Flatness displayed. Options: Amplitude Displays Amplitude in Spectral Flatness. Phase Displays Phase in Spectral Flatness.

Table 3.7.1.4-2 Scale function menu

Function Key	Menu Display	Function
Page 1	Scale	Press **Scale** to display.
F1	EVM Unit	Sets the unit of EVM. Options: % dB
F2	EVM Scale	Sets the upper limit for the EVM scale. Range: 2%, 5%, 10%, 20% (in %) –40 dB, –20 dB, 0 dB (in dB)
F3	Flatness Scale	Sets a scale of Spectral Flatness. Options: Amplitude Sets the upper and lower limit values of Amplitude in Spectral Flatness (±10 dB, ±3 dB, ±1 dB). Phase Sets the upper and lower limit values of Phase in Spectral Flatness (±60 deg, ±20 deg, ±6 deg).

Table 3.7.1.4-3 Storage function menu

Function Key	Menu Display	Function
Page 1	Storage	Press **Storage** to display.
F1	Mode	Sets the storage mode. Options: Off Updates data per measurement. Average Displays the average per measurement. Average & Max Displays the average and maximum values per measurement.
F2	Count	Sets the measurement count. Range: 2 to 9999

3.7.1.5 Trace (Power vs RB, EVM vs RB)

To set Trace, press F1 (Trace) on page 2 of the Modulation Analysis function menu or Trace to display the Trace function menu.

When Power vs RB or EVM vs RB is selected by F1: Trace Mode, the function menu is as shown in the following table.

Table 3.7.1.5-1 Trace function menu

Function Key	Menu Display	Function
Page 1	Trace	Press **Trace** to display.
F1	Trace Mode	Sets a graphical result in the graph window. ***Note:*** The Trace function menu configuration changes depending on the settings of this function. 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 RB Displays Power vs Resource Block in a graph window. EVM vs RB Displays EVM vs Resource Block in a graph window. Summary Displays EVM and power of each channel in a graph window.
F3	Scale	Sets vertical scale of a graphical result. Refer to Table 3.7.1.5-2
F6	Subframe Number	Sets subframe number of Marker position, Power vs RB, and EVM vs RB displayed. Range: 0 to 49
F7	Resource Block Number	Sets resource block number of Marker position, Power vs RB, and EVM vs RB displayed. Range: 0 to 99

Table 3.7.1.5-2 Scale function menu

Function Key	Menu Display	Function
Page 1	Scale	Press **Scale** to display.
F1	EVM Unit	Sets the unit of EVM. Options: % dB
F2	EVM Scale	Sets the upper limit for the EVM scale. Range: 2%, 5%, 10%, 20% (in %) –40 dB, –20 dB, 0 dB (in dB) ***Note:*** EVM Scale is valid only for EVM vs RB.

3.7.1.6 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. When Summary is selected by F1: Trace Mode, the function menu is as shown in the following table.

Table 3.7.1.6-1 Trace function menu

Function Key	Menu Display	Function
Page 1	Trace	Press **Trace** to display.
F1	Trace Mode	Sets a graphical result in the graph window. ***Note:*** The Trace function menu configuration changes depending on the settings of this function. 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 RB Displays Power vs Resource Block in a graph window. EVM vs RB Displays EVM vs Resource Block in a graph window. Summary Displays EVM and power of each channel in a graph window. ***Note:*** The constellation is not displayed when Trace Mode is set to Summary.
F3	Scale	Sets the unit of EVM measurement result. Refer to Table 3.7.1.6-2
F4	Storage	Sets the storage mode. Refer to Table 3.7.1.6-3

Table 3.7.1.6-2 Scale function menu

Function Key	Menu Display	Function
Page 1	Scale	Press **Scale** to display.
F1	EVM Unit	Sets the unit of EVM. Options: % dB

Table 3.7.1.6-3 Storage function menu

Function Key	Menu Display	Function
Page 1	Storage	Press **Storage** to display.
F1	Mode	Sets the storage mode. Options: Off Updates data per measurement. Average Displays the average per measurement. Average & Max Displays the average and maximum values per measurement.
F2	Count	Sets the measurement count. Range: 2 to 9999

3.7.2 Carrier Aggregation Analysis

To set modulation analysis items, press F2 (Carrier Aggregation Analysis) on the Measure function menu to display the Carrier Aggregation Analysis function menu.

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

Table 3.7.2-1 Carrier Aggregation Analysis function menu

Function Key	Menu Display	Function
Page 1	Carrier Aggregation Analysis	Press **Carrier Aggregation Analysis** to display.
F1	Analysis Time	Sets measurement position. Refer to 3.7.2.1 “Analysis Time”
F2	Basic Settings	Sets Basic parameters. Refer to 3.7.2.2 “Basic Settings”
F7	Advanced Settings	Sets the parameters for each channel and signal. Refer to 3.7.2.3 “Advanced Settings”
Page 2	Carrier Aggregation Analysis	Press **Carrier Aggregation Analysis** and then → to display.
F1	Trace	Sets the trace. Refer to “3.7.2.4 Trace”

3.7.2.1 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 Carrier Aggregation Analysis function menu.

Table 3.7.2.1-1 Analysis Time function menu

Function Key	Menu Display	Function
Page 1	Analysis Time	Press **Analysis Time** to display.
F1	Starting Subframe Number	Sets the Starting Subframe Number. It is fixed to 0 subframe in the MX285051A-051.
F2	Measurement Interval	Sets the analysis Subframe length. It is fixed to 50 subframes in the MX285051A-051.

3.7.2.2 Basic Settings

Set the basic parameters for modulation analysis. The Basic Settings function menu is displayed by pressing F2 (Basic Settings) on page 1 of the Modulation Analysis function menu.

Table 3.7.2.2-1 Basic Settings function menu

Function Key	Menu Display	Function
Page 1	Basic Settings	Press **Basic Settings** to display.
F1	Channel Bandwidth	Sets the channel bandwidth. It is fixed to 100 MHz in the MX285051A-001.
F2	Carrier Spacing	Sets the carrier spacing. Range: 99MHz Analyzes the carrier spacing as 99 MHz. 100MHz Analyzes the carrier spacing as 100 MHz.
F3	Number of Carriers	Sets the number of carriers. Range: 1 to 2 (With MS2850A-032) 1 to 5 (With MS2850A-033/133) 1 to 8 (With MS2850A-034/134)
F4	Carrier Settings	Sets the carrier settings. Refer to Table 3.7.2.2-2
F5	Reference Carrier	Sets the reference carrier for analysis. Range: 0 to (Number of Carriers – 1)
F6	Equalizer Use Data	Sets whether to include data subcarriers in the calculation of Channel Estimation. Range: Off Does not include data subcarriers in the calculation. On Includes data subcarriers in the calculation.

Table 3.7.2.2-2 Carrier Settings function menu

Function Key	Menu Display	Function
Page 1	Carrier Settings	Press **Carrier Settings** to display.
F1	Carrier Number	Sets the carrier number to be set. Range: 0 to 7
F2	State	Selects whether to include the carrier for the target measurement. Range: On Target measurement includes the carrier. Off Target measurement does not include the carrier.
F3	Number of Antenna Port	Sets the number of antennas. Range: 1, 2
F4	Cell ID	Sets the Cell ID Range: 0～503
F5	RE Mapping Index	Sets the RE Mapping Index Range: 0, 1, 2, 3
F6	Subframe Type	Sets the subframe type. Refer to Table 3.7.2.2-3
F8	xPUSCH/DM-RS	Sets the xPUSCH and Demodulation Reference Signal
Page 2	Carrier Settings	Press **Carrier Settings** and then → to display.
F1	Copy to All Carrier	Copy the specified carrier settings to all carriers.
F3	Restore Default Current Carrier	Initializes the carrier settings of the currently selected carrier number.
F4	Restore Default All Carrier	Initializes all carrier settings.

Table 3.7.2.2-3 Subframe Type function menu

Function Key	Menu Display	Function
Page 1	Subframe Type	Press **Subframe Type** to display.
F1	Subframe Number	Sets the subframe number to be set the subframe type. Range: 0 to 49
F3	Subframe Type	Sets the subframe type. The subframe 0 and 25 are fixed to Type a. Options: Off Target measurement does not include the subframe. Type c Measures the subframe as Type c.
Page 2	Subframe Type	Press **Subframe Type** and then → to display.
F1	Copy to All Subframe	Copy the specified subframe type to all subframes.
F3	Restore Default Current Subframe	Initializes the subframe type of the selected subframe number.
F4	Restore Default All Subframe	Initializes all subframe types.

Table 3.7.2.2-4 xPUSCH/ DM-RS function menu

Function Key	Menu Display	Function
ページ1	xPUSCH/DM-RS	Press **xPUSCH/DM-RS** to display.
F1	Subframe Number	Sets the subframe number to be set the xPUSCH/DM-RS. Range: 0 to 49
F4	Modulation Scheme	Sets xPUSCH Modulation Scheme. 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. Auto Analyzes an input signal after judging its modulation scheme automatically.
F6	Stopping of xPUSCH	Sets the mapping stop symbol of xPUSCH. It is fixed to 13.
Page 2	xPUSCH/DM-RS	Press **xPUSCH/DM-RS** and then → to display.
F1	Copy to All Subframe	Copy the setting of xPUSCH/DM-RS to all subframes.
F3	Restore Default Current Subframe	Initializes the setting of xPUSCH/DM-RS of the currently selected subframe number.
F4	Restore Default All Subframe	Initializes the setting of xPUSCH/DM-RS of all subframes.

3.7.2.3 Advanced Settings

Set the advanced parameters for modulation analysis. The Advanced Settings function menu and a dialog box are displayed by pressing F7 (Advanced Settings) on page 1 of the Carrier Aggregation Analysis function menu.

Table 3.7.2.3-1 Advanced Settings function menu

Function Key	Menu Display	Function
Page 1	Advanced Settings	Press **Advanced Settings** to display.
F1	Restore Default Values	Initializes all parameters set on the Advanced Settings dialog box.
F7	Set	Determines parameter change on the Advanced Settings dialog box.
F8	Cancel	Cancels parameter change made on the Advanced Settings dialog box. The change will be discarded when cancelled.

■xPUSCH On/Off

Summary Selects whether the measurement target includes PUSCH. It is fixed to Checked.

■PCRS

Summary Selects whether to map the PCRS to resource elements.

Options

Checked	Maps the PCRS. The resource elements to which the PCRS is mapped are excluded from the EVM calculation range.
Non-Checked	Does not map the PCRS.

3.7.2.4 Trace (Power vs RB, EVM vs RB)

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

Table 3.7.2.4-1 Trace function menu

Function Key	Menu Display	Function
Page 1	Trace	Press **Trace** to display.
F1	Trace Mode	Sets a graphical result in the graph window. ***Note:*** The Trace function menu configuration changes depending on the settings of this function. Options: Power vs RB Displays Power vs Resource Block in a graph window. EVM vs RB Displays EVM vs Resource Block in a graph window. Summary Displays EVM and power of each channel in a graph window.
F3	Scale	Sets vertical scale of a graphical result. Refer to Table 3.7.2.4-2
F5	Carrier Number	Sets carrier number. Range: 0 to 1 (With MS2850A-032) 0 to 4 (With MS2850A-033/133) 0 to 7 (With MS2850A-034/134)
F6	Subframe Number	Sets subframe number of Marker position, Power vs RB, and EVM vs RB displayed. Range: 0 to 49
F7	Resource Block Number	Sets resource block number of Marker position, Power vs RB, and EVM vs RB displayed. Range: 0 to 99

Table 3.7.2.4-2 Scale function menu

Function Key	Menu Display	Function
Page 1	Scale	Press **Scale** to display.
F1	EVM Unit	Sets the unit of EVM. Options: % dB
F2	EVM Scale	Sets the upper limit for the EVM scale. Range: 2%, 5%, 10%, 20% (in %) –40 dB, –20 dB, 0 dB (in dB) ***Note:*** EVM Scale is valid only for EVM vs RB.

3.8 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.

Table 3.8-1 Marker function menu

Function Key	Menu Display	Function
Page 1	Marker	Press **Marker** to display.
F1	Marker	Sets On/Off for the marker function. Option: On Enables the marker function. Off Disables the marker function.
F5	Constellation Marker Number	Displayed when Modulation Analysis is selected by the Measure function menu. Sets the position of the resource element targeted for the marker. ***Note:*** This setting is enabled only for Power vs RB and EVM vs RB. Range: Number of resource elements detected as 0 to xPDSCH or xPUSCH.
	Carrier Number	Displayed when Carrier Aggregation Analysis is selected by the Measure function menu. Sets the carrier number targeted for the marker. ***Note:*** This setting is enabled only for Power vs RB and EVM vs RB. Range: Same as Number of Carriers.
F6	Subcarrier Number	Displayed when Trace Mode is other than Power vs RB or EVM vs RB. Sets the position of the subcarrier targeted for the marker. Range: 0 to 1199
	Subframe Number	Displayed when Trace Mode is Power vs RB or EVM vs RB. Sets the subframe number to be displayed. Range: 0 to 49

Table 3.8-1 Marker function menu (Con'd)

Function Key	Menu Display	Function
F7	Symbol Number	Displayed when Trace Mode is other than Power vs RB or EVM vs RB. Sets the position of the symbol targeted for the marker. Range: 0 to 699
	Resource Block Number	Displayed when Trace Mode is Power vs RB or EVM vs RB. Sets the resource block number to be displayed. Range: 0 to 99
Page 2	Marker	Press **Marker** and then → to display.
F1	Peak Search	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 and there are multiple maximum level points, the point corresponding to the smallest values on the horizontal and vertical (Subframe) axes is selected.
F2	Next Peak	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, the point corresponding to the smallest values on the horizontal and vertical axes is selected.
F3	Dip Search	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 and there are multiple minimum level points, the greatest point on the horizontal axis and vertical axis is selected.
F4	Next Dip	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, the greatest point on the horizontal axis and vertical axis is selected.

3.9 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.

Refer to 4.2 “Replay Function”

Table 3.9-1 Trigger function menu

Function Key	Menu Display	Function
Page 1	Trigger	Press **Trigger** to display.
F1	Trigger Switch	Sets the trigger synchronization On/Off. Options: On Enables the trigger function. Off Disables the trigger function.
F2	Trigger Source	Sets the trigger source. Options: External Starts measurement by the trigger input from an external trigger. External2 Starts measurement by the trigger input from an external trigger 2.
F3	Trigger Slope	Sets the trigger polarity. Options: Rise Synchronizes with rising edge of the trigger. Fall Synchronizes with falling edge of the trigger.
F4	Trigger Delay	Sets the trigger delay. Range: –6.4 to +6.4 s (With MS2850A-032) –3.2 to +3.2 s (With MS2850A-033/133) –1.6 to +1.6 s (With MS2850A-034/134)

3.10 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.

Refer to 3.6.1.4 “Trace”

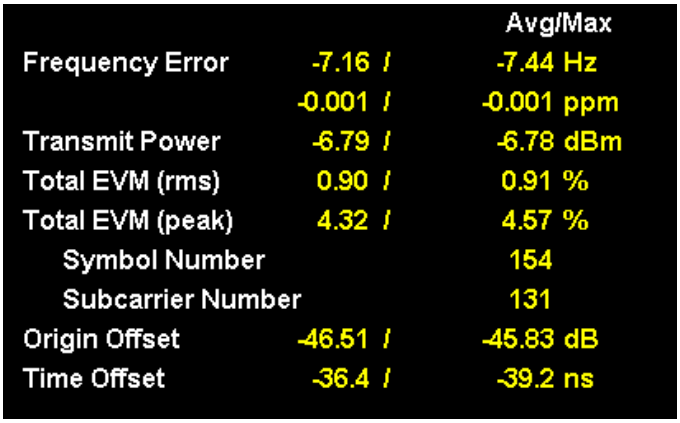


Figure 3.10-1 Result window

■Frequency Error

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

Refer to 3.6.1.4 “Trace”

■Transmit 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 within the range determined by Starting Subframe Number and Measurement Interval.
Switches between % and dB according to settings of EVM Unit.

Refer to 3.6.1.4 “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 Trigger Switch is On.
- When the Replay function is executed and when the Storage Mode is Off.

3.11 Constellation Display (Modulation Analysis)

For the MX285051A-001/051, the constellation parameters depend on the Trace Mode settings.

3.11.1 Constellation (EVM vs Subcarrier, EVM vs Symbol, Spectral Flatness)

The constellation is displayed.

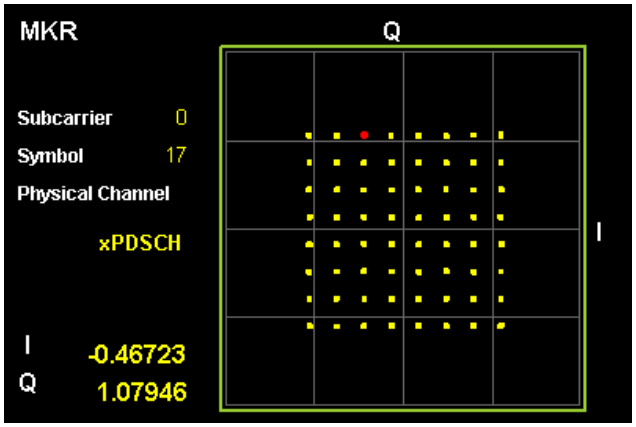


Figure 3.11.1-1 Constellation display

■Graph display

Summary This graph displays a constellation for all subcarriers of all symbols together in the range determined by Starting Subframe Number and Measurement Interval.
The marker-selected subcarrier is displayed in red.

Refer to 3.6.1.4 “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.

3.11.2 Constellation (Power vs RB, EVM vs RB)

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

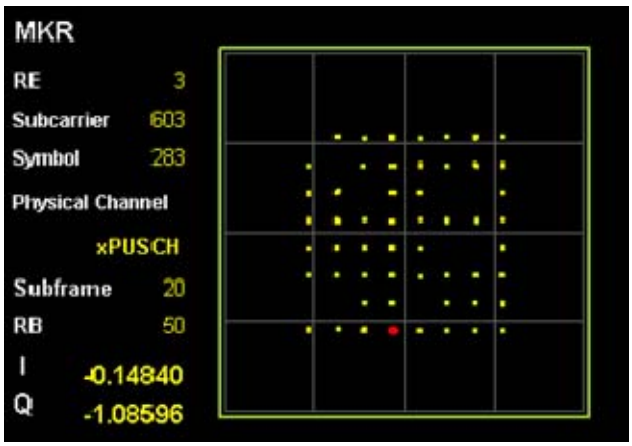


Figure 3.11.2-1 Constellation display

■Displaying Graph

Summary Displays overlapping the constellations of all resource elements of the resource block that is determined by the Subframe Number or Block Number settings.
The resource element selected by the marker is displayed in red.

Refer to 3.6.1.5 “Trace”

■MKR Resource Element Number (RE)

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.

■Resource Block Number (RB)

Summary Displays the resource block number set by Resource Block Number.

3.12 EVM vs Subcarrier Display (Modulation Analysis)

EVM for each subcarrier is displayed.

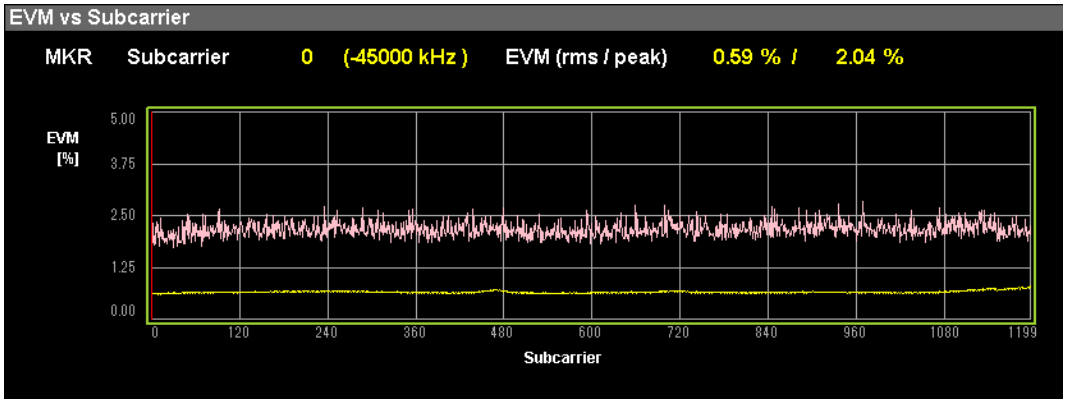


Figure 3.12-1 EVM vs Subcarrier display (Averaged over Symbols)

■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.

Refer to 3.6.1.4 “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.

3.13 EVM vs Symbol Display (Modulation Analysis)

EVM for each Symbol is displayed.

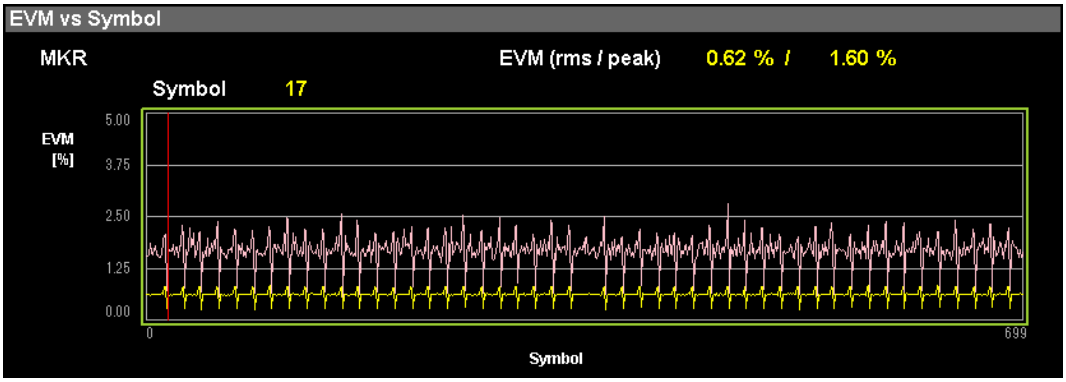


Figure 3.13-1 EVM vs Symbol display (Averaged over Subcarriers)

■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.
Refer to 3.6.1.4 “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.

3.14 Spectral Flatness Display (Modulation Analysis)

The measurement results of Spectral Flatness are displayed.

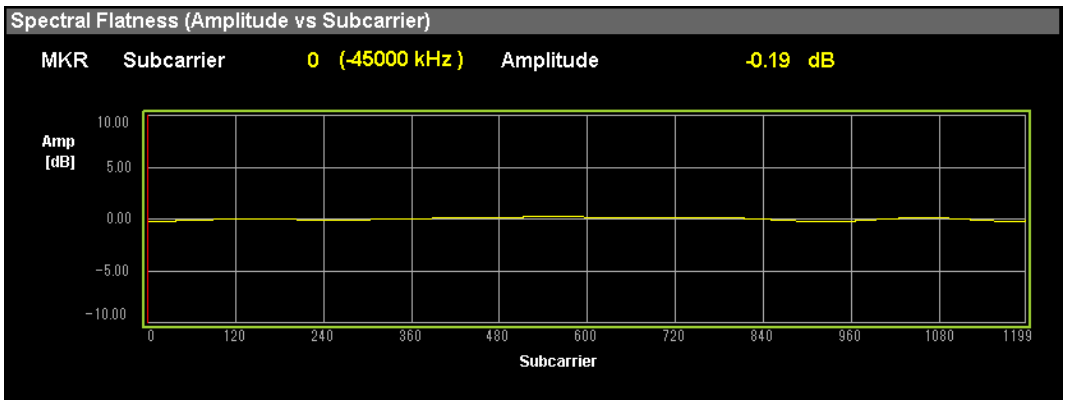


Figure 3.14-1 Amplitude of Spectral Flatness display

■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 Phase

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

3.15 Power vs Resource Block Display (Modulation Analysis)

Displays the power for each resource block.

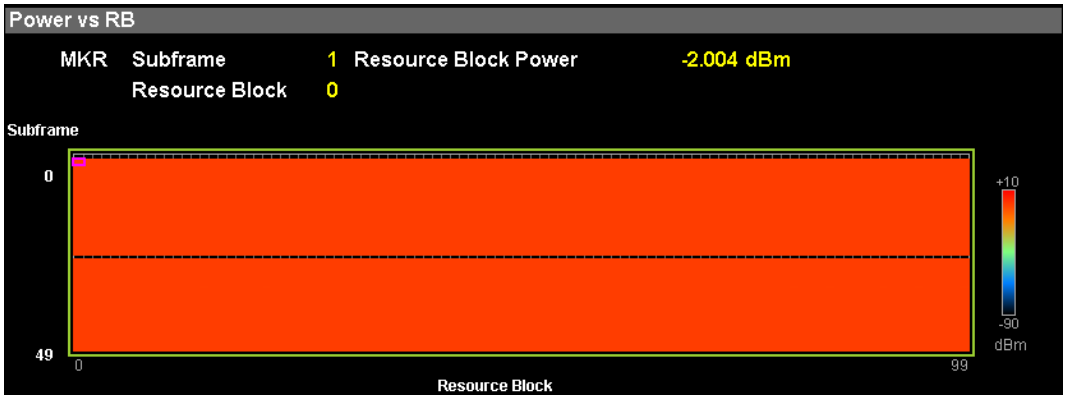


Figure 3.15-1 Power vs Resource Block display

■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.

■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 Resource Block Power

Summary Displays the power of the resource block selected by the marker.

3.16 EVM vs Resource Block Display (Modulation Analysis)

EVM for each resource block is displayed.

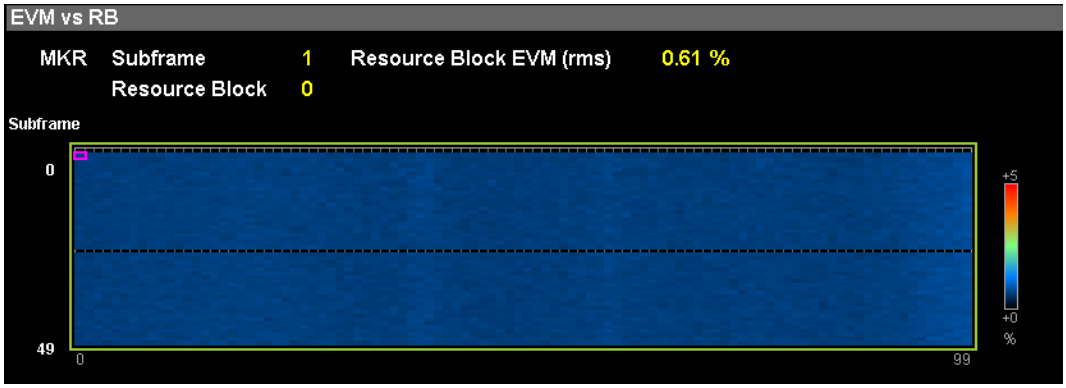


Figure 3.16-1 EVM vs Resource Block display

■Displaying Graph

Summary Displays EVM for each resource block.
The symbol selected by the marker is displayed in a pink frame.

■MKR Subframe

Summary Displays the number of the subframe set by Subframe Number.

■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 Resource Block EVM

Summary Displays EVM of the resource block selected by the marker.

3.17 Summary Display (Modulation Analysis)

EVM and power of each channel are displayed.

■Channel Summary

Summary — Displays the average EVM, average Power, and peak EVM of the input signal for each channel. The channels that are excluded in Advanced Setting are not displayed.

Avg EVM (rms): Average EVM

Max EVM (peak): Peak EVM and its Subcarrier, and Symbol

Avg Power: Average Power

Channel: Input signal channels

P-SS
S-SS
E-SS
xPBCH
xPDSCH (QPSK/16QAM/64QAM/256QAM)
UE-RS (xPDSCH)
xPDCCH
UE-RS (xPDCCH)

xPUSCH
UE-RS (xPUSCH)

■Symbol Clock Error, IQ Skew, IQ Imbalance, IQ Quad Error

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

■Cell ID

Summary — Displays the cell ID.

3.18 Power vs RB Display (Carrier Aggregation)

Displays the power for each resource block.

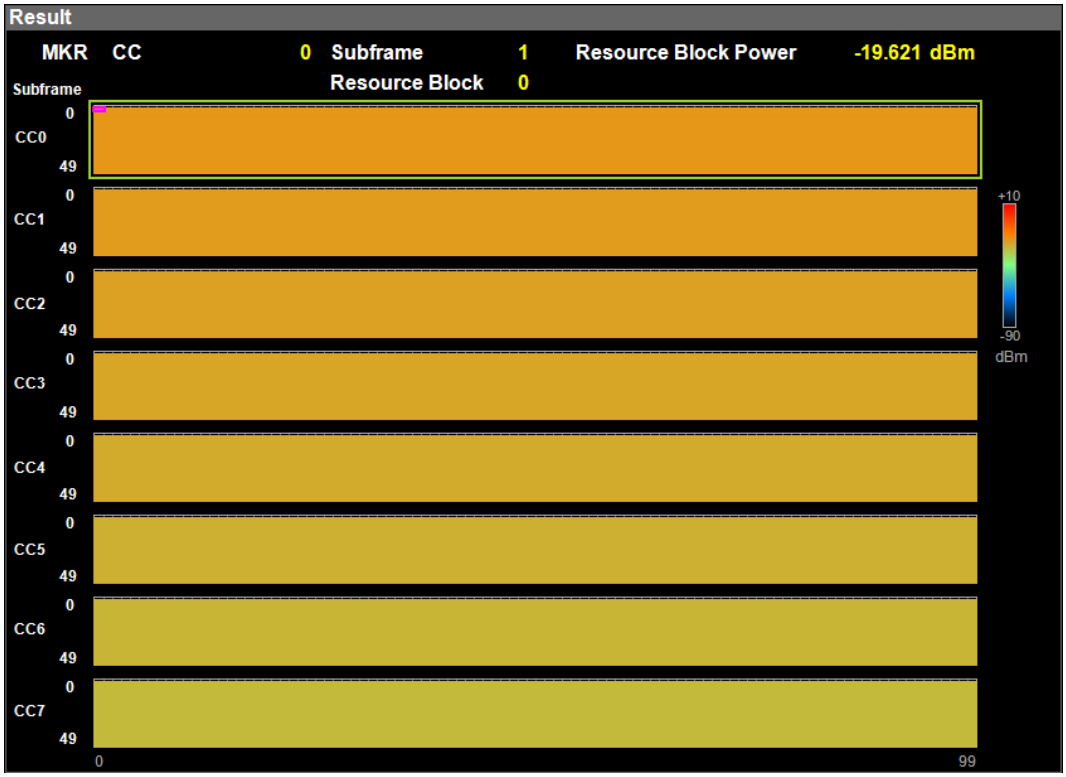


Figure 3.18-1 Power vs Resource Block (Overall) display

■Displaying Graph

Summary Displays the power for each resource block.
The resource block selected by the marker is displayed in pink.

■MKR CC

Summary Displays the number of the CC set by Carrier Number.

■MKR Subframe

Summary Displays the number of the subframe set by Subframe Number.

■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 Resource Block Power

Summary Displays the power of the PDSCH resource block selected by the marker.

3.19 EVM vs RB Display (Carrier Aggregation)

EVM for each resource block is displayed.

Figure 3.19-1 EVM vs Resource Block display

■Displaying Graph

Summary Displays EVM for each resource block.
The symbol selected by the marker is displayed in a pink frame.

■MKR CC

Summary Displays the number of the CC set by Carrier Number.

■MKR Subframe

Summary Displays the number of the subframe set by Subframe Number.

■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 Resource Block EVM

Summary Displays EVM of the resource block selected by the marker.

3.20 Summary Display (Carrier Aggregation)

The following values are displayed.

Tx Total Power

Summary Displays the total value of the transmit power of all CCs.

Tx Power Flatness

Summary Displays the difference between the maximum and minimum values of transmit power among CCs of the input signals.

Frequency Error
Transmit Power
EVM (rms)
EVM (peak)
Timing Difference

Summary Displays the values of each CC (CC0 to CC7) of input signals. Timing Difference shows the difference between the CC specified for Reference Carrier (marked by "Ref.") and other CCs.

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 4-2
4.1.1 Format of data information file 4-4
4.1.2 Format of data file 4-6
4.2 Replay Function 4-7
4.2.1 Starting Replay Function 4-8
4.2.2 Display During Replay Function Execution 4-8
4.2.3 Restriction During Replay Function Execution 4-9
4.2.4 Conditions for IQ Data Files That Can Be Replayed 4-9
4.2.5 Stopping Replay 4-9

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.

Table 4.1-1 Save Captured Data function menu

Function Key	Menu Display	Function
Page 1	Save Captured Data	Displayed by pressing **Save Captured Data.**
F1	Device	Selects the location of the file to be saved.
F2	File Name	Sets the name of the file to be saved.
F3	Output Rate	Sets the rate of the output data.
F7	Exec Digitize	Executes saving.
F8	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\5G Measurement
Up to 1000 files can be saved in a folder.

Carrier Aggregation measurement is performed dividing CCs of input signals into two groups under the following conditions. Thus, the measured IQ data can be replayed only in this application.

- Center Frequency < 4.2 GHz
- Number of Carriers ≥ 6

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 "External2": External trigger 2
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
5GMeasurement Standard	Standard "PreStandardCPOFDMDownlink":Downlink "PreStandardCPOFDMUplink":Uplink
5GMeasurement AttenuatorLevel	Attenuator value [dB] when the attenuator is set to Manual.

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).

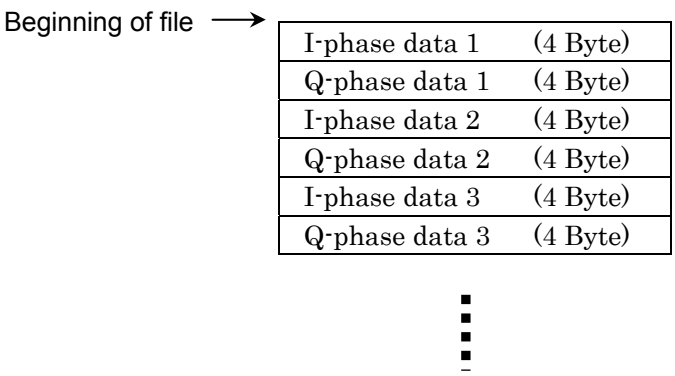


Figure 4.1.2-1 Format of data file

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.

Table 4.2-1 Replay Function Menu

Function Key	Menu Display	Function
Page 1	Replay	Press **Replay** to display.
F1	Device	Selects the drive in which the target file is stored.
F2	Application	Selects the name of the application used to save the target file.
F7	Select File	Selects the target file. After selecting the file, the Replay function is executed.
F8	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:

- MX285051A-001 performs the Replay function only for an IQ data file whose sampling rate is 325 MHz, 650 MHz, or 1300 MHz.
- MX285051A-051 performs the Replay function only for an IQ data file whose sampling rate is 325 MHz, 650 MHz, or 1300 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
Attenuator Auto/Manual
Attenuator
Pre Amp
Trigger Switch
Trigger Source
Trigger Slope
Trigger Delay
Continuous Measurement
Single Measurement
Erase Warm Up Message

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	MX285051A-001 325 MHz, 650 MHz, 1300 MHz MX285051A-051 325 MHz, 650 MHz, 1300 MHz
Sample numbers	20.42 ms 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 Other Functions

This chapter describes other functions of this application.

5.1 Selecting Other Functions 5-2
5.2 Setting Title 5-2
5.3 Erasing Warmup Message 5-2

5.1 Selecting Other Functions

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

Table 5.1-1 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.

5.2 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.

5.3 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.
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.

Table A-1 Error Messages (Cont'd)

Message	Description
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 Measurable Signal

This appendix describes the configuration of the signal that can be measured by the MX285051A-001/051.

B.1 Overview of Signal B-2

B.1 Overview of Signal

Table B.1-1 and B.1-2 show the minimum requirements of the signals that the MX285051A-001/051 can measure. To measure with the MX285051A-001/051, check that the input signal satisfies the conditions in Table B.1-1 and B.1-2 and that the MX285051A-001/051 settings match these conditions.

Table B.1-1 Signal measurable with the MX285051A-001 (Minimum requirements)

Item	Contents
Wireless Standard	TS V5G.211 V1.7 (2016-10)
Channel Bandwidth	100 MHz
Δf	75 kHz
Measurable Maximum Number of Carriers	2 (With MS2850A-032) 5 (With MS2850A-033/133) 8 (With MS2850A-034/134)
Subframe Type	a. Subframe including DL control channel and DL data channel b. Subframe including DL control channel, DL data channel and UL control channel Note that only xPDCCH and xPDSCH are measured in Type b.
Physical Channels	xPBCH xPDSCH xPDCCH
Physical Signals	Primary synchronization signal Secondary synchronization signal Extended synchronization signal UE-specific reference signals associated with xPDSCH UE-specific reference signals associated with xPDCCH Beam reference signal
Others	• xPDSCH should be mapped to all RBs in the subframes to analyze. • Two or more subframes should be mapped to xPDSCH. • The following channels or signals must be mapped. xPDSCH UE-specific reference signals associated with xPDSCH

Table B.1-2 Signal measurable with the MX285051A-051 (Minimum requirements)

Item	Contents
Wireless Standard	TS V5G.211 V1.7 (2016-10)
Channel Bandwidth	100 MHz
Δf	75 kHz
Measurable Maximum Number of Carriers	2 (With MS2850A-032) 5 (With MS2850A-033/133) 8 (With MS2850A-034/134)
Subframe Type	c. Subframe including DL control channel UL data channel.
Physical Channels	xPUSCH
Physical Signals	Demodulation reference signals associated with xPUSCH
Others	• xPUSCH should be mapped to all RBs in the subframes to analyze. • Two or more subframes should be mapped to xPUSCH. • The following channels or signals must be mapped. xPUSCH Demodulation reference signals associated with xPUSCH