

MX269012A W-CDMA/HSPA Uplink Measurement Software Operation Manual Operation

Seventh Edition

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

ANRITSU CORPORATION

Safety Symbols

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

Symbols used in manual



DANGER

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



WARNING

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



CAUTION

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

Safety Symbols Used on Equipment and in Manual

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



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



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



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



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



These indicate that the marked part should be recycled.

MX269012A
W-CDMA/HSPA Uplink Measurement Software
Operation Manual Operation

30 January 2008 (First Edition)
28 April 2017 (Seventh Edition)

Copyright © 2008-2017, ANRITSU CORPORATION.

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

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

Printed in Japan

Equipment Certificate

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

Anritsu Warranty

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

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

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

Anritsu Corporation Contact

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

Notes On Export Management

This product and its manuals may require an Export License/Approval by the Government of the product's country of origin for re-export from your country.

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

When you dispose of export-controlled items, the products/manuals need to be broken/shredded so as not to be unlawfully used for military purpose.

Software End-User License Agreement (EULA)

Please read this Software End-User License Agreement (hereafter this EULA) carefully before using (includes executing, copying, registering, etc.) this software (includes programs, databases, scenarios, etc., used to operate, set, etc., Anritsu electronic equipment). By reading this EULA and using this software, you are agreeing to be bound by the terms of its contents and Anritsu Corporation (hereafter Anritsu) hereby grants you the right to use this Software with the Anritsu-specified equipment (hereafter Equipment) for the purposes set out in this EULA.

1. Grant of License and Limitations

1. Regardless of whether this Software was purchased from or provided free-of-charge by Anritsu, you agree not to rent, lease, lend, or otherwise distribute this Software to third parties and further agree not to disassemble, recompile, reverse engineer, modify, or create derivative works of this Software.
2. You may make one copy of this Software for backup purposes only.
3. You are not permitted to reverse engineer this software.
4. This EULA allows you to install one copy of this Software on one piece of Equipment.

2. Disclaimers

To the extent not prohibited by law, in no event shall Anritsu be liable for personal injury, or any incidental, special, indirect or consequential damages whatsoever, including, without limitation, damages for loss of profits, loss of data, business interruption or any other commercial damages or losses, arising out of or related to your use or inability to use this Software.

3. Limitation of Liability

- a. If a fault (bug) is discovered in this Software, preventing operation as described in the operation manual or specifications whether or not the customer uses this software as described in the manual, Anritsu shall at its own discretion, fix the bug, or exchange the software, or suggest a workaround, free-of-charge. However, notwithstanding the above, the following items shall be excluded from repair and warranty.
 - i) If this Software is deemed to be used for purposes not described in the operation manual or specifications.
 - ii) If this Software is used in conjunction with other non-Anritsu-approved software.
 - iii) Recovery of lost or damaged data.
 - iv) If this Software or the Equipment has been modified, repaired, or otherwise altered without Anritsu's prior approval.
 - v) For any other reasons out of Anritsu's direct control and responsibility, such as but not limited to, natural disasters, software virus infections, etc.
- b. Expenses incurred for transport, hotel, daily allowance, etc., for on-site repairs by Anritsu engineers necessitated by the above faults shall be borne by you.
- c. The warranty period for faults listed in article 3a above covered by this EULA shall be either 6 months from the date of purchase of this Software or 30 days after the date of repair, whichever is longer.

4. Export Restrictions

You may not use or otherwise export or re-export directly or indirectly this Software except as authorized by Japanese and United States law. In particular, this software may not be exported or re-exported (a) into any Japanese or US embargoed countries or (b) to anyone on the Japanese or US Treasury Department's list of Specially Designated Nationals or the US Department of Commerce Denied Persons List or Entity List. By using this Software, you warrant that you are not located in any such country or on any such list. You also agree that you will not use this Software for any purposes prohibited by Japanese and US law, including, without limitation, the development, design and manufacture or production of missiles or nuclear, chemical or biological weapons of mass destruction.

5. Termination

Anritsu shall deem this EULA terminated if you violate any conditions described herein. This EULA shall also be terminated if the conditions herein cannot be continued for any good reason, such as violation of copyrights, patents, or other laws and ordinances.

6. Reparations

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

7. Responsibility after Termination

Upon termination of this EULA in accordance with item 5, you shall cease all use of this Software immediately and shall as directed by Anritsu either destroy or return this Software and any backup copies, full or partial, to Anritsu.

8. Dispute Resolution

If matters of dispute or items not covered by this EULA arise, they shall be resolved by negotiations in good faith between you and Anritsu.

9. Court of Jurisdiction

This EULA shall be interpreted in accordance with Japanese law and any disputes that cannot be resolved by negotiation described in Article 8 shall be settled by the Japanese courts.

Cautions against computer virus infection

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

CE Conformity Marking

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

CE marking



1. Product Model

Software: MX269012A W-CDMA/HSPA Uplink Measurement Software

2. Applied Directive and Standards

When the MX269012A W-CDMA/HSPA Uplink Measurement Software is installed in the MS2690A/MS2691A/MS2692A, MS2830A or MS2850A, the applied directive and standards of this unit conform to those of the MS2690A/MS2691A/MS2692A, MS2830A or MS2850A main frame.

PS: About main frame

Please contact Anritsu for the latest information on the main frame types that the MX269012A can be used with.

RCM Conformity Marking

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

RCM marking



1. Product Model

Software: MX269012A W-CDMA/HSPA Uplink Measurement Software

2. Applied Directive and Standards

When the MX269012A W-CDMA/HSPA Uplink Measurement Software is installed in the MS2690A/MS2691A/MS2692A, MS2830A, or MS2850A, the applied directive and standards of this unit conform to those of the MS2690A/MS2691A/MS2692A, MS2830A, or MS2850A main frame.

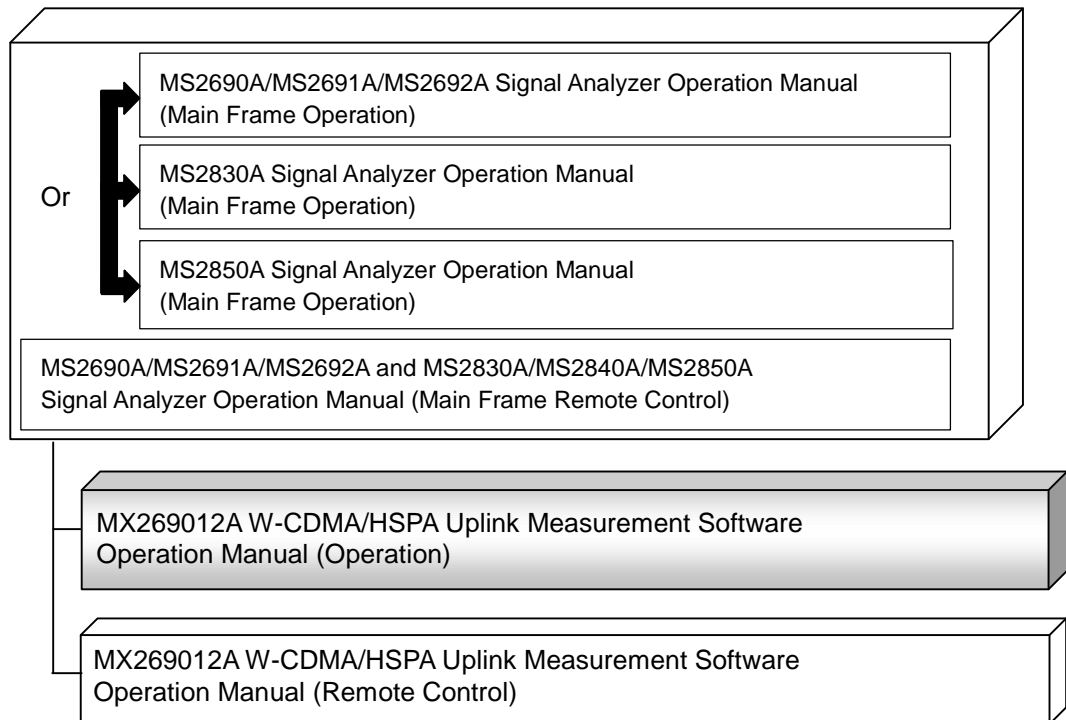
PS: About main frame

Please contact Anritsu for the latest information on the main frame types that the MX269012A can be used with.

About This Manual

■ Organization of Operation Manuals

The operation manuals for the MX269012A W-CDMA/HSPA Uplink Measurement Software are organized as shown below.



- Mainframe Operation
- Mainframe Remote Control

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

- MX269012A W-CDMA/HSPA Uplink Measurement Software Operation Manual (Operation) <This document>

This manual describes the operating methods of the MX269012A W-CDMA/HSPA Uplink Software.

- MX269012A W-CDMA/HSPA Uplink Measurement Software Operation Manual (Remote Control)

This manual describes remote control of the MX269012A W-CDMA/HSPA Uplink Measurement Software.

Convention Used in This Manual

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

Table of Contents

About This Manual.....	I
Chapter 1 Overview.....	1-1
1.1 Product Overview.....	1-2
1.2 Product Configuration	1-3
1.3 Specifications	1-3
Chapter 2 Preparation.....	2-1
2.1 Part Names	2-2
2.2 Signal Path Setup	2-14
2.3 Application Startup and Selection	2-15
2.4 Initialization and Calibration	2-16
Chapter 3 Measurement	3-1
3.1 Basic Operation	3-2
3.2 Setting Frequency	3-5
3.3 Setting Level	3-6
3.4 Setting Common Items	3-7
3.5 Setting Measurement Items	3-8
3.6 Modulation Analysis	3-13
3.7 Code Domain Analysis.....	3-27
3.8 Setting Trigger	3-46

Chapter 4	Performance Test	4-1
4.1	Overview of Performance Test	4-2
4.2	Performance Test Items.....	4-3
Chapter 5	Other Functions.....	5-1
5.1	Selecting Other Functions.....	5-2
5.2	Setting Title	5-2
5.3	Erasing Warmup Message	5-2
Appendix A	Error Messages.....	A-1
Appendix B	Initial Value List	B-1
Index		Index-1

1
2
3
4
5
Appendix
Index

Chapter 1 Overview

This chapter provides an overview of the MX269012A W-CDMA/HSPA Uplink Measurement Software and describes the product configuration.

1.1	Product Overview	1-2
1.2	Product Configuration	1-3
	1.2.1 Standard configuration	1-3
	1.2.2 Applicable parts	1-3
1.3	Specifications	1-3

1.1 Product Overview

The MS269x Series, MS2830A, or MS2850A Signal Analyzer enables high-speed, high-accuracy, and simple measurements of transmission characteristics of base stations and mobile stations for various types of mobile communications. The MS2690A/MS2691A/MS2692A or MS2830A 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 MX269012A W-CDMA/HSPA Uplink Measurement Software (hereinafter referred to as “MX269012A”) is a software option for measuring the RF characteristics of W-CDMA/HSPA (FDD) uplink specified by 3GPP.

The MX269012A provides the following measurement features.

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

MS2830A-006/106 is required to use the MX269012A on MS2830A.

1.2 Product Configuration

1.2.1 Standard configuration

Table 1.2.1-1 lists the standard configuration of the MX269012A.

Table 1.2.1-1 Standard configuration

Item	Model Name/Symbol	Product Name	Q'ty	Remarks
Application	MX269012A	W-CDMA/HSPA Uplink Measurement Software	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 MX269012A.

Table 1.2.2-1 Applicable parts

Model Name/Symbol	Product Name	Remarks
W3060AE	MX269012A W-CDMA/HSPA Uplink Measurement Software Operation Manual (Operation)	English, printed version
W3061AE	MX269012A W-CDMA/HSPA Uplink Measurement Software Operation Manual (Remote Control)	English, Printed Version

1.3 Specifications

Table 1.3-1 lists the specifications for the MX269012A.

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

Attenuator Mode: Mechanical Atten Only

Table 1.3-1 Specifications

Item	Specification
Common Specifications	
Channel bandwidth	5 MHz
Target signal	Uplink
Modulation/Frequency Measurement	
Measurement frequency ranges	400 to 3000 MHz

Table 1.3-1 Specifications (Continued)

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 measurement accuracy	After CAL execution at 18 to 28°C For a signal of EVM = 1% MS269x Series : \pm (accuracy of reference crystal oscillator \times carrier frequency + 5 Hz) MS2830A : \pm (accuracy of reference crystal oscillator \times carrier frequency + 6 Hz) MS2850A : \pm (accuracy of reference crystal oscillator \times carrier frequency + 6 Hz)
Residual EVM	After CAL execution at 18 to 28°C, the signal measured is within the measurement level range and less than or equal to Input Level. MS269x Series : $\leq 1.0\%$ (rms) MS2830A : $\leq 1.2\%$ (rms) MS2850A : $\leq 1.2\%$ (rms)
Transmitter power measurement accuracy	After CAL execution, input attenuator ≥ 10 dB, at 18 to 28°C, the signal measured is within the measurement level range and less than or equal to Input Level. MS269x Series ± 0.6 dB (at Pre-Amp Off, or Pre-Amp not installed.) ± 1.1 dB (at Pre-Amp On) MS2830A ± 0.6 dB (at Pre-Amp Off, or Pre-Amp not installed.) MS2850A ± 0.6 dB (at Pre-Amp Off, or Pre-Amp not installed.) Transmitter power measurement accuracy is calculated from an RSS (root summed square) error of the absolute amplitude accuracy and the in-band frequency characteristics.
Code Domain Measurement	
Code domain power measurement Accuracy	After CAL execution, input at 18 to 28°C, the signal measured is within the measurement level range and less than or equal to Input Level. MS269x Series : ± 0.02 dB (code power ≥ -10 dBc) ± 0.05 dB (code power ≥ -20 dBc) ± 0.10 dB (code power ≥ -30 dBc) MS2830A : ± 0.02 dB (Code Power ≥ -10 dBc) ± 0.10 dB (Code Power ≥ -20 dBc) ± 0.15 dB (Code Power ≥ -30 dBc) MS2850A : ± 0.02 dB (Code Power ≥ -10 dBc) ± 0.10 dB (Code Power ≥ -20 dBc) ± 0.15 dB (Code Power ≥ -30 dBc)
Residual code domain error	MS269x Series : ≤ -46 dB MS2830A : ≤ -42 dB MS2850A : ≤ -42 dB
Code domain error measurement accuracy	± 0.3 dB (for code domain error of -30 dBc) ± 1.0 dB (for code domain error of -40 dBc)

Table 1.3-1 Specifications (Continued)

Adjacent Channel Power Measurement	
Measurement method	Execution of the adjacent channel power measurement function of the Spectrum Analyzer or Signal Analyzer
Occupied Bandwidth Measurement	
Measurement method	Execution of the occupied bandwidth measurement function of the Spectrum Analyzer or Signal Analyzer
Channel Power Measurement	
Measurement method	Execution of the channel power measurement function of the Spectrum Analyzer or Signal Analyzer
Spectrum Emission Mask Measurement	
Measurement method	Execution of the spectrum emission mask measurement function of the Spectrum Analyzer

Chapter 2 Preparation

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

2

Preparation

2.1	Part Names	2-2
2.1.1	Front panel	2-2
2.1.2	Rear panel	2-9
2.2	Signal Path Setup	2-14
2.3	Application Startup and Selection.....	2-15
2.3.1	Launching application.....	2-15
2.3.2	Selecting application.....	2-15
2.4	Initialization and Calibration.....	2-16
2.4.1	Initialization.....	2-16
2.4.2	Calibration	2-16

2.1 Part Names

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

2.1.1 Front panel

This section describes the front-panel keys and connectors.

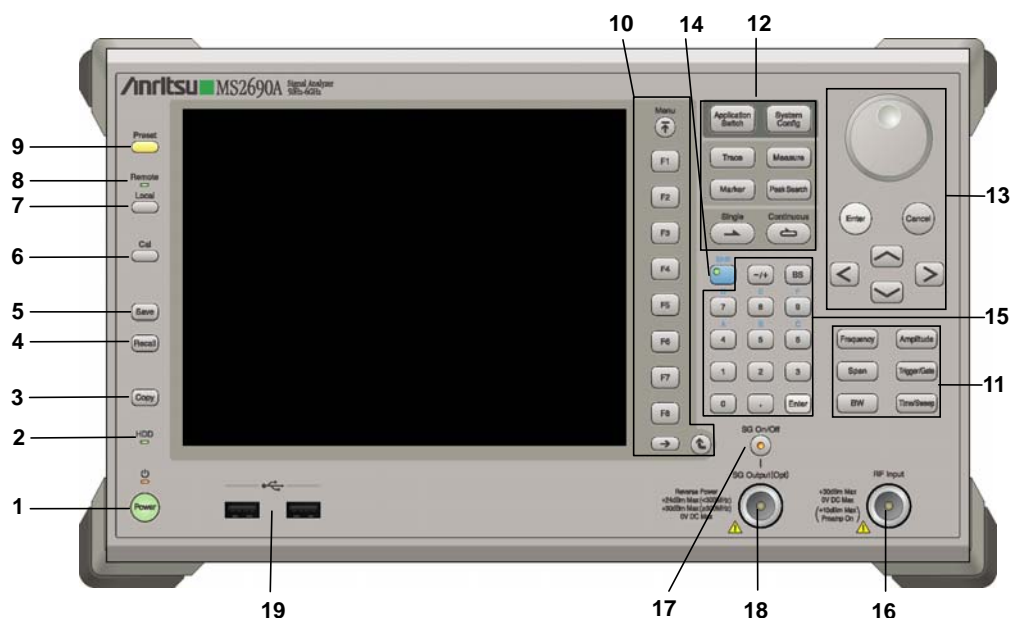


Figure 2.1.1-1 MS269x series front panel

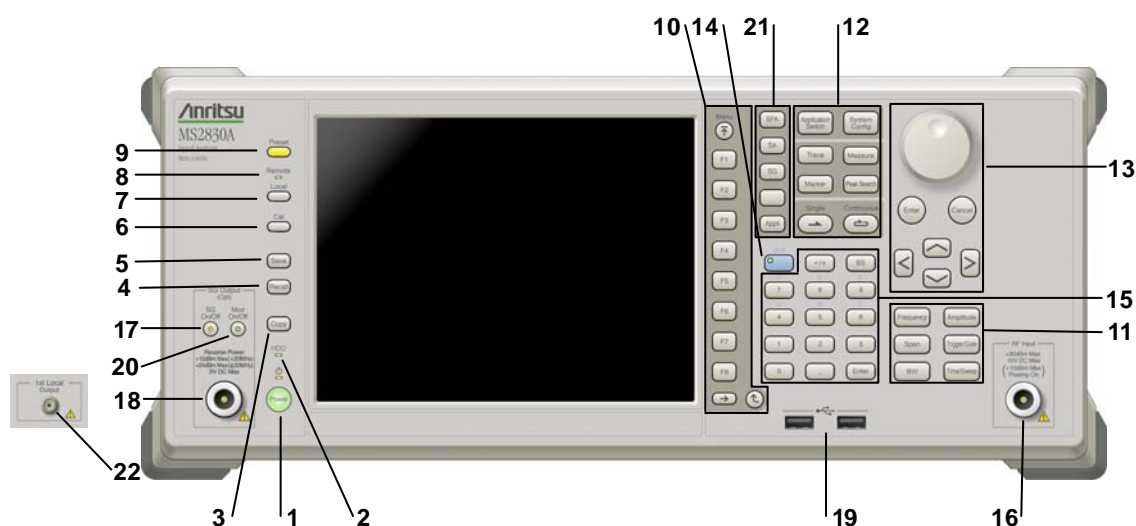










Figure 2.1.1-2 MS2830A/MS2850A front panel (MS2830A Example)

- | | | |
|---|--|---|
| 1 |  | Power Switch
Press to switch between the standby state (AC power supplied) and power-on state. The Power lamp  lights orange at Standby and green at Power On. Press the power switch for about 2 seconds. |
| 2 | 
 | Hard disk access lamp (MS269x series, MS2830A)
Lights up when the internal hard disk is accessed.

SSD access lamp (MS2850A)
Lights up when the internal SSD is accessed . |
| 3 |  | Copy key
Press to capture display screen and save to file. |
| 4 |  | Recall key
Press to recall parameter file. |
| 5 |  | Save key
Press to save parameter file. |
| 6 |  | Cal key
Press to display the Calibration menu. |

7



Local key

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

8



Remote lamp

Lights when in remote-control state.

9



Preset key


Resets parameters to initial settings.

10



Function keys

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

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

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


11




Main function keys 1


Press to set or execute main functions.


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


 Press to set frequency parameters.

 Press to set level parameters.

 No function is assigned to this key.

 Press to set trigger parameters.

 No function is assigned to this key.

 Press to set measurement item parameters.


12




Main function keys 2


Press to set or execute main functions.


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

 Press to switch application.


 Press to display Configuration screen.


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

 Press to set measurement item parameters.

 Use when switching graph marker operation.

 Press to set parameters related to the peak search function.

 Press to start single measurement.


 Press to start continuous measurements.


13



Rotary knob/Cursor key/Enter key/Cancel key

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

Press  to set the entered or selected data.

Press  to cancel input or selected data.

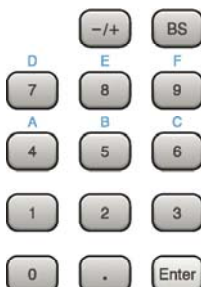
14



Shift key


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




15



Numeric keypad

Enters numbers on parameter setup screens.

Press  to delete the last entered digit or character.

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

16 RF Input



RF Input connector


Inputs RF signal. This is an N type input connector.

For the MS2830A with the MS2830A-045 and the MS2850A, a K type input connector is installed.

17 SG On/Off



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

Press  to switch on/off the modulation of RF signal when the Vector Signal Generator option is installed. The RF output control key lamp lights orange when the RF signal output is set to On.

This cannot be installed on the MS2830A with the MS2830A-044/045, or on the MS2850A.

18 SG Output(Opt)

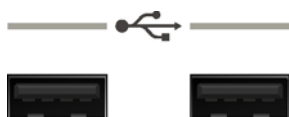


RF Output connector (when MS269xA-020/120, MS2830A-020/120/021/121 installed)

Outputs RF signal, when the Vector Signal Generator option is installed. This is an N type output connector.

This cannot be installed on the MS2830A with the MS2830A-044/045, or on the MS2850A

19




USB connector (type A)

Connect the accessory USB keyboard, mouse or USB memory.

20



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

Press to switch on/off the modulation of RF signal when the Vector Signal Generator option is installed. The lamp  on the key lights up in green in the modulation On state.

This cannot be installed on the MS2830A with the MS2830A-044/045, or on the MS2850A.

21



Application key (MS2830A, MS2850A)

Press to switch between applications.



Press to display the Spectrum Analyzer main screen.



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



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



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



Displays the main screen of the application that is selected using the Application Switch (Auto), or displays that of the pre-selected application (Manual).

For details, refer to 3.5.4 “Changing application layout” in *MS2830A Signal Analyzer Operation Manual (Mainframe Operation)* or *MS2850A Signal Analyzer Operation Manual (Mainframe Operation)*.

22



1st Local Output connector (MS2830A), (MS2850A: Future extensions)

This is installed with the MS2830A-044/045.

Supplies local signal and bias current to the external mixer, and receives the IF signal with its frequency converted.

2.1.2 Rear panel

This section describes the rear-panel connectors.

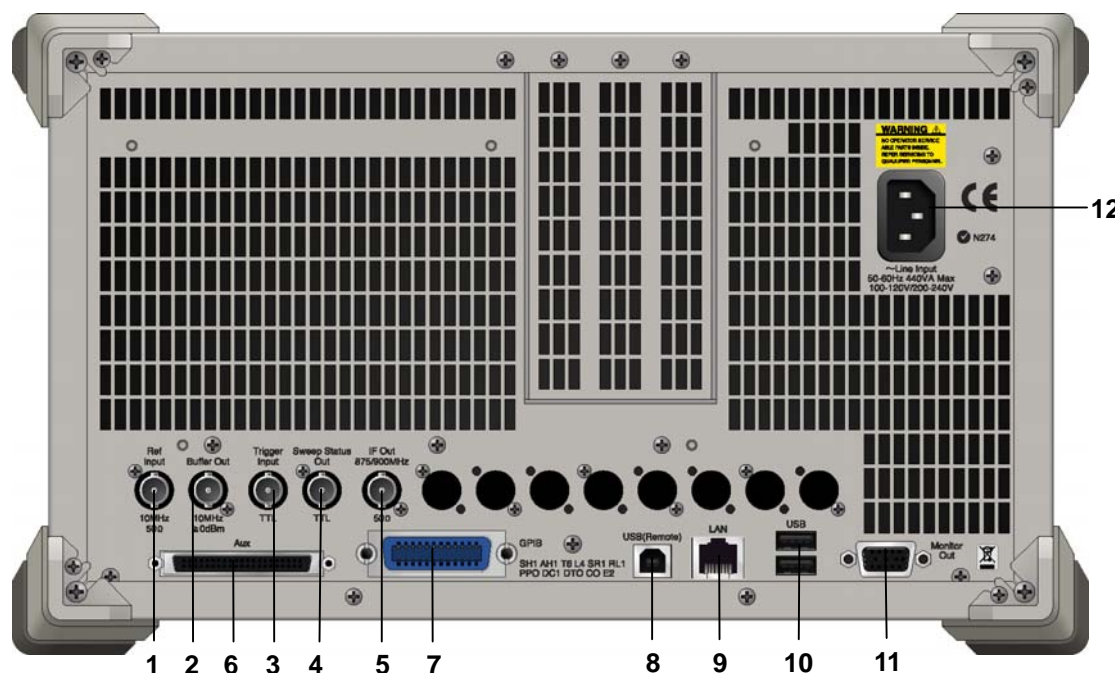


Figure 2.1.2-1 MS269x series rear panel

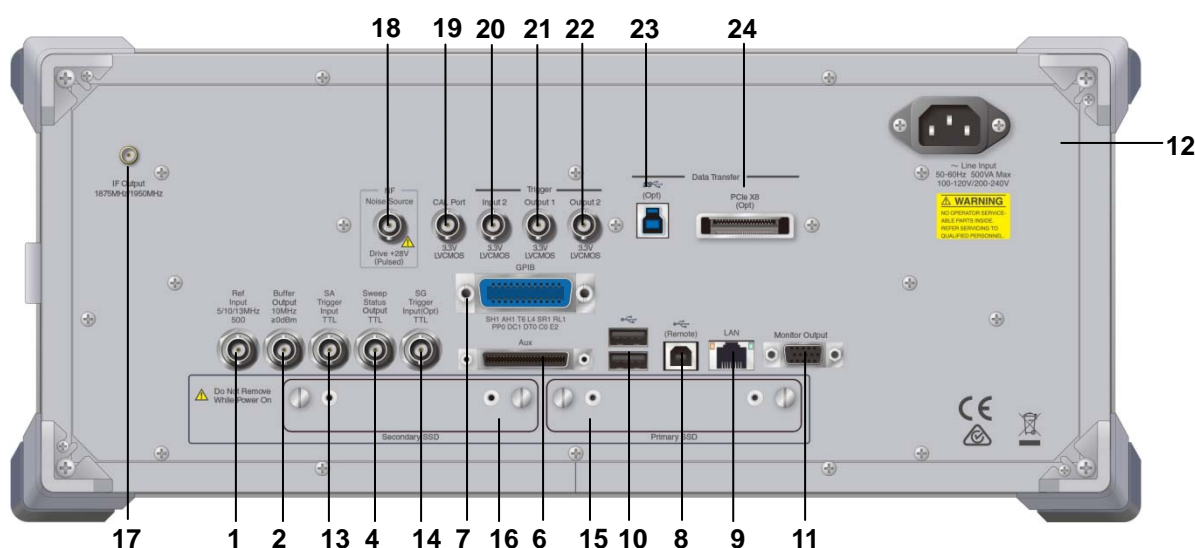



Figure 2.1.2-2 MS2830A/MS2850A rear panel (MS2850A Example)

- 1


Ref Input



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


MS269x series: 10 MHz/13 MHz
MS2830A, MS2850A: 5 MHz/10 MHz/13 MHz
- 2

Buffer Out




Buffer Out connector (reference frequency signal output connector)
Outputs the internal reference frequency signal (10 MHz). It is for synchronizing frequencies between other equipment and the MS2690A/MS2691A/MS2692A or MS2830A, MS2850A.
- 3

Trigger Input




Trigger Input connector (MS269x series only)
Inputs trigger signal from external device.
- 4

Sweep Status Out




Sweep Status Out connector
Outputs signal when internal measurement is performed or measurement data is obtained.
- 5

IF Out
875/900MHz




IF Out connector (MS269x series only)
Not used.
- 6

Aux




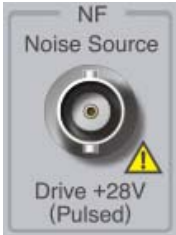





AUX connector
Not used.
- 7

GP-IB



GP-IB connector
For external control via GPIB.

- | | | | |
|----|----------------------------------|--|---|
| 8 | USB(Remote) | | USB connector (type B)
For external control via USB. |
| 9 | LAN | | Ethernet connector
Connects PC or Ethernet network. |
| 10 | USB | | USB connector (type A)
Used to connect a USB keyboard or mouse or the USB memory supplied. |
| 11 | Monitor Out | | Monitor Out connector
Connects external display. |
| 12 | | | AC inlet
Supplies power. |
| 13 | | | SA Trigger Input connector (MS2830A, MS2850A)
This is a BNC connector for inputting external trigger signal (TTL) for SPA and SA applications. |
| 14 | | | SG Trigger Input connector (MS2830A)
This is a BNC connector for inputting external trigger signal (TTL) for Vector Signal Generator option. |
| 15 | HDD or
Primary HDD/SSD | | HDD slot (MS2830A)
SSD slot (MS2850A)
This is a standard HDD slot.
This is a standard SSD slot. |
| 16 | HDD(Opt) or
Secondary HDD/SSD | | HDD slot for Option (MS2830A)
SSD slot (MS2850A)
This is a HDD slot for the options.
This is a SSD slot for the options. |

- 17**  IF output connector (MS2830A, MS2850A)
This is installed with the MS2830A-044/045 or on the MS2850A.
Monitor output of the internal IF signal.
- 18**  Noise Source connector
Supply (+28 V) of the Noise Source Drive.
This is available when the Option 017/117 is installed.
- 19**  CAL Port connector (Future extensions) (MS2850A)
- 20**  Input 2
Trigger Input 2 connector (MS2850A)
Input the trigger signal (3.3 V LVCMOS) for SPA and SA applications.
- 21**  Output 1
Trigger Output 1 connector (MS2850A)
Output the trigger signal (3.3 V LVCMOS).
- 22**  Output 2
Trigger Output 2 connector (MS2850A)
Output the trigger signal (3.3 V LVCMOS).
- 23**  USB 3.0 connector (Future extensions) (MS2850A)

24



PCIe X8 connector (Future extensions) (MS2850A)

2

Preparation

2.2 Signal Path Setup

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

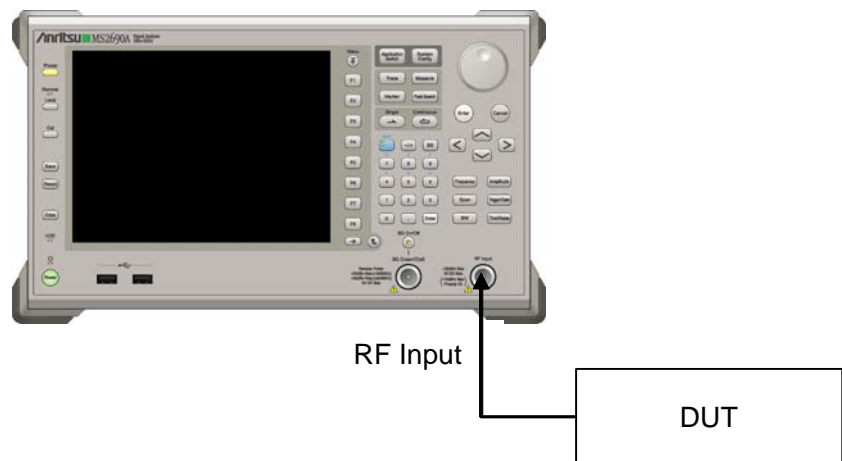


Figure 2.2-1 Signal path setup example

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

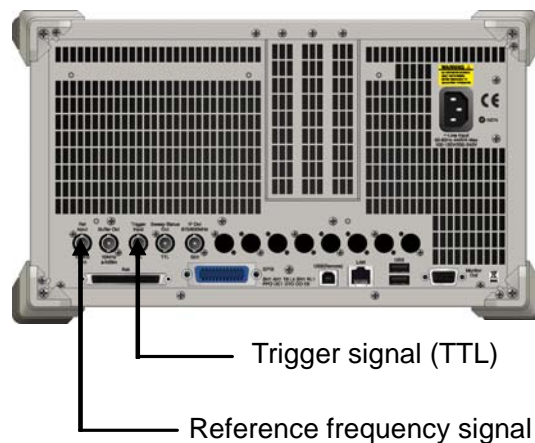


Figure 2.2-2 External signal input

2.3 Application Startup and Selection

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





2.3.1 Launching application

The application startup procedure is described below.

Note:

The XXX indicates the application name currently in use.


<Procedure>

1. Press  to display the Configuration screen.
2. Press  (Application Switch Settings) to display the Application Switch Registration screen.
3. Press  (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  (Set) to load the application. If “XXX” is displayed in the **Loaded Applications** list, this means that the application is already loaded.

2.3.2 Selecting application

The selection procedure is described below.

<Procedure>

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

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

2.4 Initialization and Calibration

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

2.4.1 Initialization



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

Note:

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

The initialization procedure is as follows.



<Procedure>

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

2.4.2 Calibration

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

<Procedure>

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

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

Chapter 3 Measurement

This chapter describes the measurement function, the parameter contents and the setting methods for the MX269012A.

3.1	Basic Operation	3-2
3.1.1	Screen layout.....	3-2
3.1.2	Function menu.....	3-3
3.1.3	Performing measurement.....	3-4
3.2	Setting Frequency.....	3-5
3.3	Setting Level	3-6
3.4	Setting Common Items	3-7
3.5	Setting Measurement Items.....	3-8
3.5.1	Adjacent Channel Power Measurement (ACP).....	3-9
3.5.2	Channel Power Measurement.....	3-10
3.5.3	Occupied Bandwidth Measurement (OBW) ...	3-11
3.5.4	Spectrum Emission Mask Measurement (SEM)	3-12
3.6	Modulation Analysis.....	3-13
3.6.1	Analysis Time	3-14
3.6.2	Trace	3-15
3.6.3	Numerical Results	3-18
3.6.4	Graphical Results	3-20
3.6.5	Setting Marker (Modulation Analysis).....	3-25
3.7	Code Domain Analysis	3-27
3.7.1	Analysis Time	3-28
3.7.2	Analysis Code.....	3-29
3.7.3	Analysis Slot	3-30
3.7.4	Trace	3-31
3.7.5	Numerical Results	3-35
3.7.6	Graphical Results	3-37
3.7.7	Setting Marker (Code Domain Analysis)	3-44
3.8	Setting Trigger	3-46

3.1 Basic Operation

3.1.1 Screen layout

This section describes the screen layout of the MX269012A.

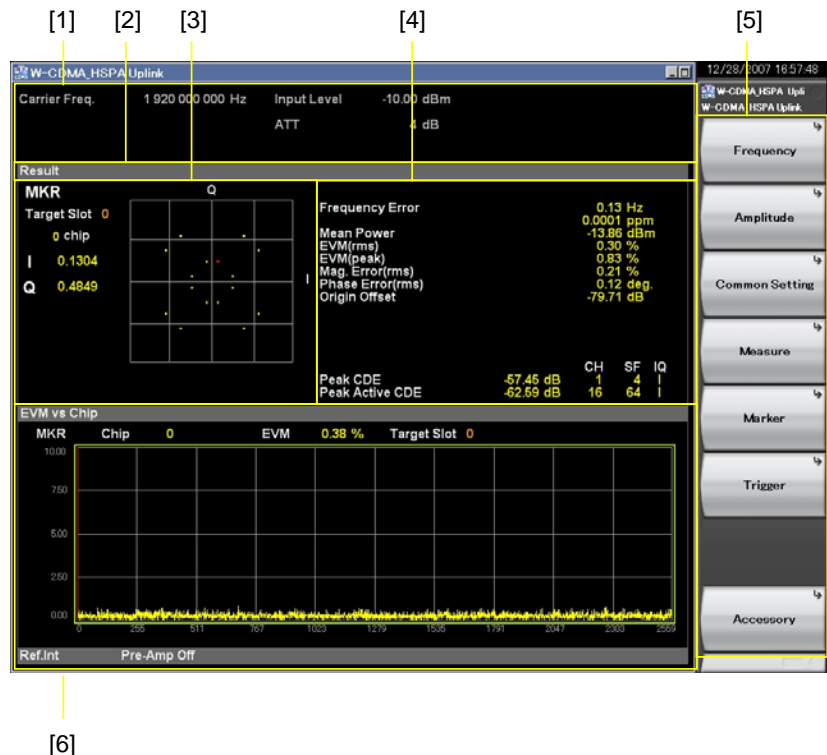


Figure 3.1.1-1 Screen Layout (Modulation Analysis)

- [1] Measurement parameter
Displays parameters.
- [2] Status message
Displays the status of signals.
- [3] Upper Graph window
Displays a graph of measurement results.
- [4] Result window
Displays the numerical values of measurement results.
- [5] Function menu
Displays the functions executable with function keys.
- [6] Lower Graph window
Displays a graph of measurement results.

3.1.2 Function menu

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

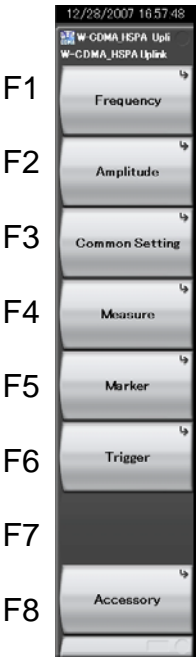


Figure 3.1.2-1 Main function menu

Table 3.1.2-1 Main function menu

Menu Display	Function
Frequency	Sets a frequency 3.2 "Setting Frequency"
Amplitude	Sets level. 3.3 "Setting Level"
Common Setting	Sets common items. 3.4 "Setting Common Items"
Measure	Sets measurement items. 3.5 "Setting Measurement Items"
Marker	Sets a marker. 3.6.5 "Setting Maker (Modulation Analysis)" 3.7.7 "Setting Maker (Code Domain Analysis)"
Trigger	Sets a trigger. 3.8 "Setting Trigger"
Accessory	Sets other functions. 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.

Single

The selected measurement items are measured only for the measurement count (Storage Count) before measurement is stopped.

<Procedure>

1. Press .



Continuous

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 stops if other applications are selected.

<Procedure>

1. Press .

3.2 Setting Frequency

Perform the frequency settings. Pressing  (Frequency) on the main function menu displays the Frequency function menu. Pressing  displays the Frequency function menu and opens the Carrier Frequency dialog box.

Carrier Frequency

■ Summary

Sets a carrier frequency.

■ Setting range

100 MHz to the upper limit of the main unit

3.3 Setting Level

Perform the level settings. Pressing **F2** (Amplitude) on the main function menu displays the Amplitude function menu. Pressing **Amplitude** displays the Amplitude function menu and opens the Input Level dialog box.

Input Level

■ Summary

Sets the input level from the target DUT.

■ Setting range

For Pre-Amp: On :

$(-80.00 + \text{Offset Value})$ to $(10.00 + \text{Offset Value})$ dBm

For Pre-Amp: Off:

$(-60.00 + \text{Offset Value})$ to $(30.00 + \text{Offset Value})$ dBm

Pre-Amp

■ Summary

Toggles the Pre-Amp function between On and Off.

■ Selection options

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

Offset

■ Summary

Toggles the Offset function between On and Off.

■ Selection options

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

Offset Value

■ Summary

Sets the level offset coefficient.

■ Setting range

-99.99 to + 99.99 dB

■ Setting example

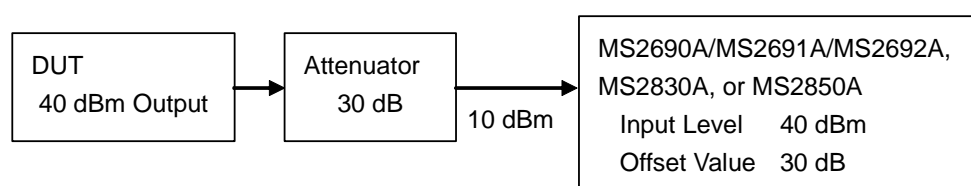



Figure 3.3-1 Input level and offset level setting example

3.4 Setting Common Items

Perform the settings for the common items. Pressing  (Common Setting) on the main function menu displays the Common Setting function menu.

Scrambling Code

■ Summary

Sets the scrambling code used for the measured signal.

■ Setting range

000000 to FFFFFFFF

Transient Periods

■ Summary

Specifies whether to include the transient period in the measurement. The transient period is specified in 3GPP TS34.121 as 25 μ s before and after slot boundary.

■ Selection options

Incl.	Includes transient period in the measurement.
Excl.	Excludes transient period in the measurement.

Origin Offset

■ Summary

Specifies whether to include the origin offset in the EVM measurement.

■ Selection options

Incl.	Calculates EVM, including the origin offset.
Excl.	Calculates EVM, excluding the origin offset.

Active Code Threshold

■ Summary

Sets the threshold to identify the code as the active code.

■ Setting range

−40.00 to −10.00 dB

3.5 Setting Measurement Items

Sets measurement items. Pressing **F4** (Measure) on the main function menu or **Measure** displays the Measure function menu.

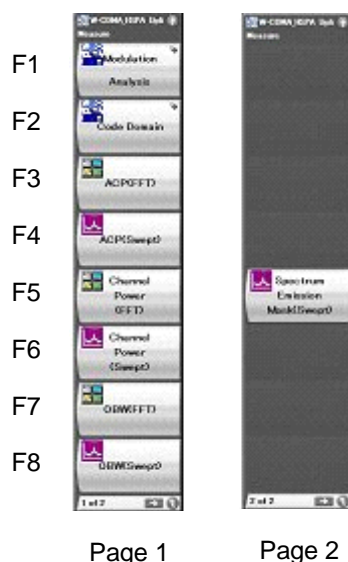











Figure 3.5-1 Measure function menu

Table 3.5-1 Measure function menu

Menu Display	Function
Modulation Analysis	Selects modulation analysis.  3.6 Modulation Analysis
Code Domain	Selects code domain analysis.  3.7 Code Domain Analysis
ACP (FFT)	Selects adjacent channel power in Signal Analyzer function.  3.5.1 Adjacent Channel Power Measurement (ACP)
ACP (Swept)	Selects adjacent channel power in Spectrum Analyzer function.  3.5.1 Adjacent Channel Power Measurement (ACP)
Channel Power (FFT)	Selects channel power measurement in Signal Analyzer function.  3.5.2 Channel Power Measurement
Channel Power (Swept)	Selects channel power measurement in Spectrum Analyzer function.  3.5.2 Channel Power Measurement
OBW (FFT)	Selects occupied bandwidth measurement in Signal Analyzer function.  3.5.3 Occupied Bandwidth Measurement (OBW)
OBW (Swept)	Selects occupied bandwidth measurement in Spectrum Analyzer function.  3.5.3 Occupied Bandwidth Measurement (OBW)
Spectrum Emission Mask (Swept)	Selects spectrum emission mask measurement in Spectrum Analyzer function.  3.5.4 Spectrum Emission Mask Measurement (SEM)

3.5.1 Adjacent Channel Power Measurement (ACP)

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

ACP (FFT)

■ Summary

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

ACP (Swept)

■ Summary

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

3.5.2 Channel Power Measurement

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

Channel Power (FFT)

■ Summary

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

Channel Power (Swept)

■ Summary

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

3.5.3 Occupied Bandwidth Measurement (OBW)

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

OBW (FFT)

■ Summary

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

OBW (Swept)

■ Summary

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

3.5.4 Spectrum Emission Mask Measurement (SEM)


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

Spectrum Emission Mask (Swept)

■ Summary

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

3.6 Modulation Analysis

Pressing  (Modulation Analysis) on the Measure function menu displays the Modulation Analysis function menu.

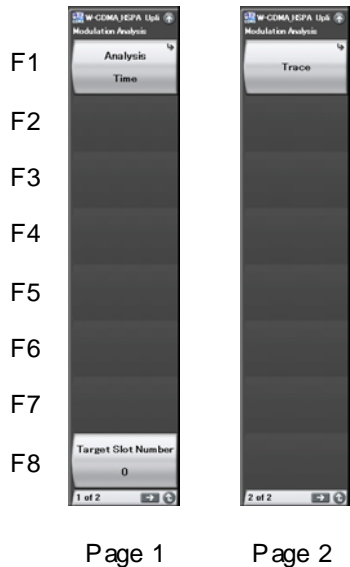







Figure 3.6-1 Modulation Analysis function menu

Table 3.6-1 Modulation Analysis function menu

Menu Display	Function
Analysis Time	Sets analysis period in a single capture.  3.6.1 Analysis Time
Target Slot Number	Sets slot number of graphical results in the upper and lower Graph window.  3.6.4 Graphical Results
Trace	Sets values related to the results displayed.  3.6.2 Trace

3.6.1 Analysis Time

Set the continuous measurement period for analysis with a single capture. Pressing  (Analysis Time) on page 1 of the Modulation Analysis function menu or  displays the Analysis Time function menu.

Starting Slot Number

- Summary

Sets the starting slot number of continuous measurement period.

- Setting range

0 to 14

Measurement Interval

- Summary

Sets continuous measurement period in slot.



- Setting range

1 to (15 – Starting Slot Number)

Example

When 2 is set for the Starting Slot Number and 6 for the Measurement Interval, measurement between slots #2 and #7 is performed.

3.6.2 Trace

Perform the settings related to the graph results. Pressing  (Trace) on page 2 of the Modulation Analysis function menu or  displays the Trace function menu.

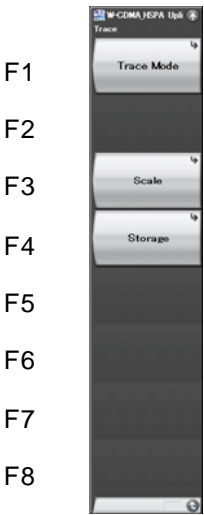


Figure 3.6.2-1 Trace function menu

Table 3.6.2-1 Trace function menu

Menu Display	Function
Trace Mode	Selects a graphical result in the lower Graph window.
Scale	Sets vertical scale of a graphical result.
Storage	Sets number of measurements and displayed format of numerical results.

Trace Mode

■ Summary

Selects a graphical result in the lower Graph window.

■ Selection options

EVM vs Chip Displays vector error at each chip.

Mag. Error vs Chip
 Displays magnitude error at each chip.

Phase Error vs Chip
 Displays phase error at each chip.

Scale: Trace Scale

■ Summary

Sets vertical scale of a graphical result.

■ Selection options

For EVM vs Chip

5%	Sets upper limit to 5%.
10%	Sets upper limit to 10%.
20%	Sets upper limit to 20%.
50%	Sets upper limit to 50%.

For Mag. Error vs Chip

±5%	Sets upper and lower limit to ±5%.
±10%	Sets upper and lower limit to ±10%.
±20%	Sets upper and lower limit to ±20%.
±50%	Sets upper and lower limit to ±50%.

For Phase Error vs Chip

±5degree	Sets upper and lower limit to ±5 degrees.
±10degree	Sets upper and lower limit to ±10 degrees.
±20degree	Sets upper and lower limit to ±20 degrees.
±50degree	Sets upper and lower limit to ±50 degrees.

Storage

- Summary
 - Sets number of measurements and displayed format of numerical results.
- Selection options
 - ModeSelects displayed format of numerical results.
 - CountSets number of measurements.

Storage:Mode

- Summary
 - Selects displayed format of numerical results.
- Selection options
 - OffDisplays the numerical results in a single measurement.
 - AverageDisplays the averages of numerical results in specified number of measurements.
 - Average & MaxDisplays the averages and maximums of numerical results in specified number of measurements.

Storage:Count

- Summary
 - Sets number of measurements (number of captures). This value is used for selecting Average or Average & Max to Storage:Mode.
- Setting range
 - 2 to 9999

Example

When 2 is set for Starting Slot Number, 6 for Measurement Interval, Average & Max for Storage:Mode, and 3 for Storage:Count, the measurement between slots #2 and #7 is performed three times and the average and maximum results are displayed.

3.6.3 Numerical Results

The Result window shows the numerical results in the analysis time specified with the Starting Slot Number and Measurement Interval. The displayed contents differ depending on the Storage Mode setting: analysis results for a single measurement are displayed for Off, the averages of analysis results for the specified number of measurements are displayed for Average, and the average and maximum values of analysis results for the specified number of measurements are displayed for Average & Max. For the analysis results of Mean Power, however, the average, maximum and minimum values are displayed for Average & Max.

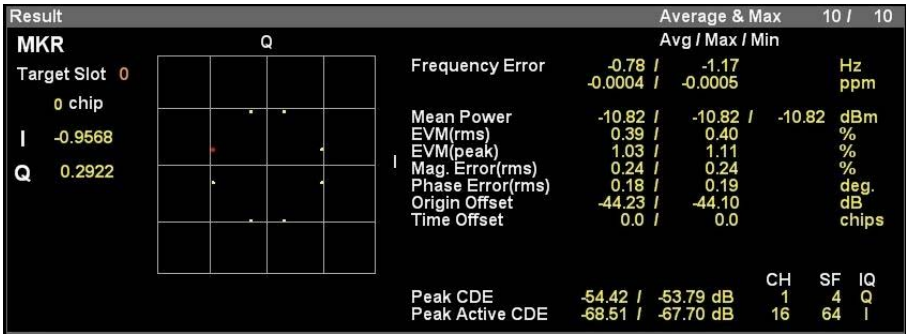


Figure 3.6.3-1 Result window

Frequency Error

■ Summary

Displays frequency error in the analysis time.

Mean Power

■ Summary

Displays mean power in the analysis time.

EVM (rms)

■ Summary

Displays vector error in RMS in the analysis time.

EVM (peak)

■ Summary

Displays peak of vector error in each chip in the analysis time.

Mag. Error (rms)

■ Summary

Displays magnitude error in RMS in the analysis time.

Phase Error (rms)

■ Summary

Displays phase error in RMS in the analysis time.

Origin Offset

■ Summary

Displays origin offset in the analysis time.

Time Offset

■ Summary

Displays time offset between the triggered time and slot boundary of slot#0 of the signal measured. This result is displayed when trigger switch is set to On.



3.8 Setting Trigger

Peak CDE

■ Summary

Displays peak of code domain error of the codes with spreading factor 4 in analysis time. The code number (CH), spreading factor (SF), and axis (IQ) of the code with peak value are also displayed.

Peak Active CDE

■ Summary

Displays peak of code domain error of the active codes in analysis time. The code number (CH), spreading factor (SF), and axis (IQ) of the active code with peak value are also displayed.

3.6.4 Graphical Results

The upper Graph window and lower Graph window show a graphical result in the analysis time in the last capture, specified with the Starting Slot Number and Measurement Interval. The displayed interval is one slot, and a graphical result of the slot specified with Target Slot Number is displayed.

Target Slot Number

■ Summary

Sets slot number of a graphical result in the Graph window.

■ Setting range

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

 3.6.1 Analysis Time

Example

When 2 is set for Starting Slot Number and 6 for Measurement Interval, values of 2 to 7 can be set as Target Slot Number.

3.6.4.1 IQ Constellation

The IQ constellation in the slot specified with Target Slot Number is displayed in the upper Graph window. The IQ at the marker-selected chip is displayed in red.

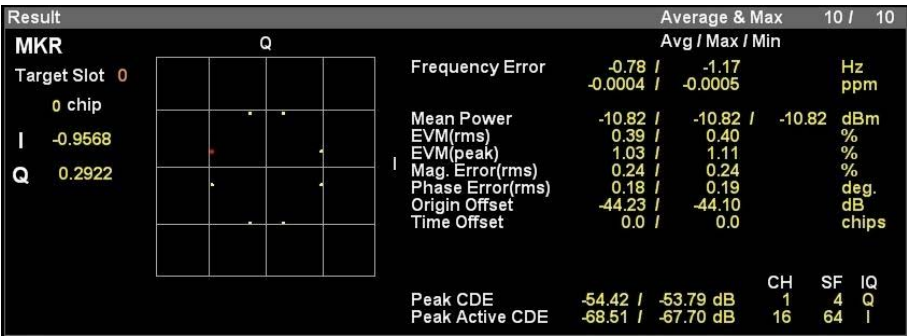


Figure 3.6.4.1-1 IQ Constellation display

Target Slot

■ Summary

Displays slot number specified with Target Slot Number.

Chip

■ Summary

Displays chip number specified with Constellation Marker Number.


I/Q

■ Summary

Displays IQ amplitude values at the chip specified with Constellation Marker Number.

3.6.4.2 EVM vs Chip

When EVM vs Chip is set for Trace:Trace Mode, the vector error in the slot specified with Target Slot Number is displayed in the lower Graph window. The vector error at the marker-selected chip is displayed in red.

 3.6.2 Trace

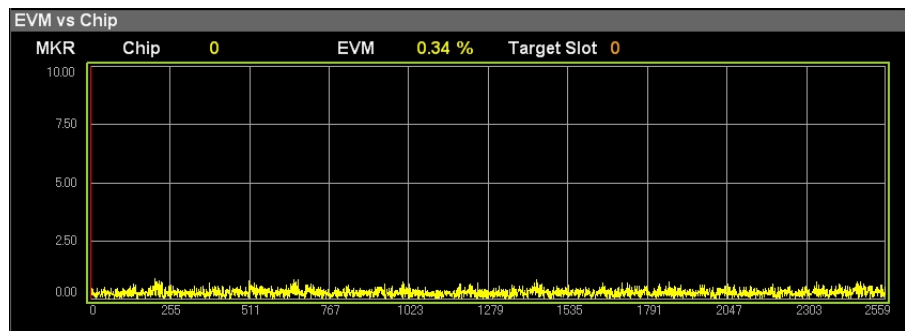


Figure 3.6.4.2-1 EVM vs Chip display

Chip

■ Summary

Displays chip number specified with Bottom Graph Marker Number.

EVM

■ Summary

Displays vector error at the chip specified with Bottom Graph Marker Number.


Target Slot

■ Summary

Displays slot number specified with Target Slot Number.

3.6.4.3 Magnitude Error vs Chip

When Mag. Error vs Chip is set for Trace:Trace Mode, the magnitude error in the slot specified with Target Slot Number is displayed in the lower Graph window. The magnitude error at the marker-selected chip is displayed in red.

 3.6.2 Trace

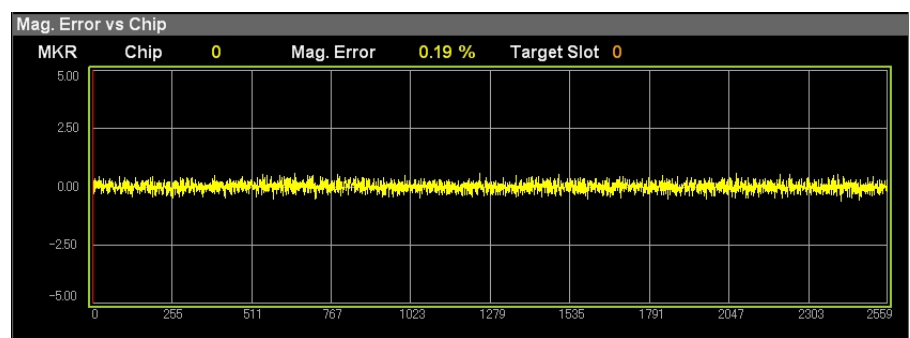


Figure 3.6.4.3-1 Magnitude Error vs Chip display

3
Measurement

Chip

- Summary
Displays chip number specified with Bottom Graph Marker Number.

Mag Error

- Summary
Displays magnitude error at the chip specified with Bottom Graph Marker Number.

Target Slot

- Summary
Displays slot number specified with Target Slot Number.

3.6.4.4 Phase Error vs Chip

When Phase Error vs Chip is set for Trace:Trace Mode, the phase error in the slot specified with Target Slot Number is displayed in the lower Graph window. The phase error at the marker-selected chip is displayed in red.


 3.6.2 Trace



Figure 3.6.4.4-1 Phase Error vs Chip display

Chip

■ Summary

Displays chip number specified with Bottom Graph Marker Number.

Phase Error

■ Summary

Displays phase error at the chip specified with Bottom Graph Marker Number.

Target Slot

■ Summary

Displays slot number specified with Target Slot Number.

3.6.5 Setting Marker (Modulation Analysis)

Perform the marker-related settings. Pressing **F5** (Marker) on the main function menu or **Marker** displays the Marker function menu.

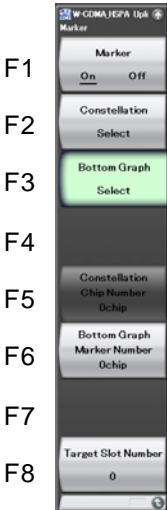


Figure 3.6.5-1 Marker function menu

Table 3.6.5-1 Marker function menu

Menu Display	Function
Marker	Toggles marker function between On and Off.
Constellation Select	Sets target of operation for the rotary knob and the cursor key to Constellation.
Bottom Graph Select	Sets target of operation for the rotary knob and the cursor key to lower Graph window.
Constellation Chip Number	Sets marker position of IQ constellation in chip.
Bottom Graph Marker Number	Sets marker position of lower Graph window with chip number.
Target Slot Number	Displays slot number specified with Target Slot Number.

Marker

■ Summary

Toggles marker function between On and Off.

■ Selection options

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

Constellation Select

■ Summary

Sets target of operation for the rotary knob and the cursor key to Constellation.

Bottom Graph Select

■ Summary

Sets target of operation for the rotary knob and the cursor key to lower Graph window.

Constellation Chip Number

■ Summary

Sets marker position of IQ constellation in chip.

This operation is invalid when Bottom Graph Select is selected.

■ Setting range

0 to 2559

Bottom Graph Marker Number

■ Summary

Sets marker position of lower Graph window with chip number.

This operation is invalid when Constellation Select is selected.

■ Setting range

0 to 2559

Target Slot Number



3.6.4 Graphical Results

3.7 Code Domain Analysis

Pressing **F2** (Code Domain) on the Measure function menu displays the Code Domain function menu.

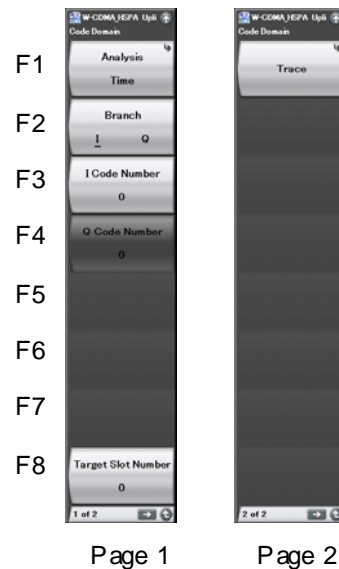










Figure 3.7-1 Code Domain function menu

Table 3.7-1 Code Domain function menu

Menu Display	Function
Analysis Time	Sets analysis period in a single capture.  3.7.1 Analysis Time
Branch	Sets branch analyzed.  3.7.2 Analysis Code
I Code Number	Sets code number of I branch analyzed.  3.7.2 Analysis Code
Q Code Number	Sets code number of Q branch analyzed.  3.7.2 Analysis Code
Target Slot Number	Sets slot number of graphical results on Graph window.  3.7.3 Analysis Slot
Trace	Sets values related to the results displayed.  3.7.4 Trace

3.7.1 Analysis Time

Sets continuous measurement period in a single capture. Pressing  (Analysis Time) on page 1 of the Code Domain function menu or  displays the Analysis Time function menu.

Starting Slot Number

■ Summary

Sets starting slot number in continuous measurement period.

■ Setting range

0 to 14

Measurement Interval

■ Summary

Sets continuous measurement period in slot.

■ Setting range

1 to (15 – Starting Slot Number)

Example

When 2 is set for Starting Slot Number and 6 for Measurement Interval, measurement between slots #2 and #7 is performed.

3.7.2 Analysis Code

Set the code branch and code number to be analyzed.

Branch

■ Summary

Toggles the branch to be analyzed between I and Q.

■ Selection options

I	Sets I branch for analysis.
Q	Sets Q branch for analysis.

I Code Number

■ Summary

Sets the code number of I branch to be analyzed. The code number converted to spreading factor 256 should be set. Refer to the example below.

■ Setting range

0 to 255

Q Code Number

■ Summary

Sets the code number of Q branch to be analyzed. The code number converted to spreading factor 256 should be set. Refer to the example below.

■ Setting range

0 to 255

Example

For analysis of active code with spreading factor 64 and code number 64, the value of 64 ($16 \times 256 / 64$) should be set as the analysis code number.


3.7.3 Analysis Slot

Set the slot number to be analyzed.

Target Slot Number

■ Summary

Sets the slot number to be analyzed. The numerical results and graphical results specified with Target Slot Number are displayed in the upper and lower Graph window.

 3.7.5 Numerical Results

 3.7.6 Graphical Results

■ Setting range

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

 3.6.1 Analysis Time

Example

When 2 is set for Starting Slot Number and 6 for Measurement Interval, values of 2 to 7 can be set as Target Slot Number.

3.7.4 Trace

Sets values related to the results displayed. Pressing **F1** (Trace) on page 2 of the Code Domain function menu or **Trace** displays the Trace function menu.



Figure 3.7.4-1 Trace function menu

Table 3.7.4-1 Trace function menu

Menu Display	Function
Trace Mode	Selects a graphical result in the Graph window.
Scale	Sets vertical scale of a graphical result.

Trace Mode: Code Domain Mode

■ Summary

Selects graphical result in the upper Graph window.

■ Selection options

Power	Displays code domain power result.
Error	Displays code domain error result.

Trace Mode

■ Summary

Selects graphical result in the lower Graph window.

■ Selection options

Constellation	Displays symbol constellation of specified code in specified slot.
EVM vs Symbol	Displays vector error at each symbol of specified code in specified slot.
Mag Error vs Symbol	Displays magnitude error at each symbol of specified code in specified slot.
Code Power vs Symbol	Displays power at each symbol of specified code in specified slot.

Code Power Scale Offset

■ Summary

Sets the shift amount on the vertical scale of the Code Power vs Symbol graph.

■ Selection options

0div	Does not shift.
1div	Shifts by 1 div. div is a unit of one scale of the graph. The shift amount (dB) depends on the setting for the vertical scale of the Code Power vs Symbol graph.

Scale:Code Domain Scale

■ Summary

Sets vertical scale for the graphical result in the upper Graph window.

■ Selection options

For Power selected as Code Domain Mode

20 dB	Sets lower limit to -20 dB.
40 dB	Sets lower limit to -40 dB.
60 dB	Sets lower limit to -60 dB.
80 dB	Sets lower limit to -80 dB.

For Error selected as Code Domain Mode

20 dB	Sets upper limit to -60 dB.
40 dB	Sets upper limit to -40 dB.
60 dB	Sets upper limit to -20 dB.
80 dB	Sets upper limit to 0 dB.

Scale:Trace Scale

■ Summary

Sets vertical scale for the graphical result in the lower Graph window.

■ Selection options

For EVM vs Symbol

5%	Sets upper limit to 5%.
10%	Sets upper limit to 10%.
20%	Sets upper limit to 20%.
50%	Sets upper limit to 50%.

For Mag Error vs Symbol

±5%	Sets the upper and lower limit to ±5%.
±10%	Sets the upper and lower limit to ±10%.
±20%	Sets the upper and lower limit to ±20%.
±50%	Sets the upper and lower limit to ±50%.

For Code Power vs Symbol

When Code Power Scale Offset = 0 div.:

20 dB Sets scale range from -20 to 0 dB.

40 dB Sets scale range from -40 to 0 dB.

60 dB Sets scale range from -60 to 0 dB.

80 dB Sets scale range from -80 to 0 dB.

When Code Power Scale Offset = 1 div.:

20 dB Sets scale range from -15 to +5 dB.




40 dB Sets scale range from -30 to +10 dB.

60 dB Sets scale range from -45 to +15 dB.

80 dB Sets scale range from -60 to +20 dB.

3.7.5 Numerical Results

The Result window shows the numerical results in the analysis time specified with the Starting Slot Number and Measurement Interval.

-  3.7.1 Analysis Time
-  3.7.2 Analysis Code
-  3.7.3 Analysis Slot

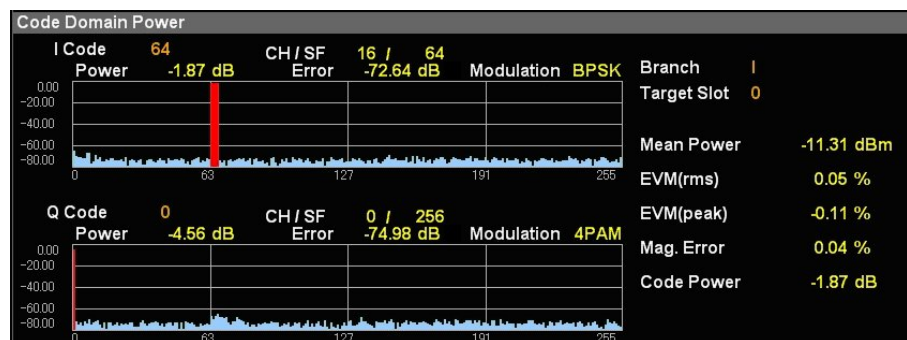


Figure 3.7.5-1 Result window

3

Measurement

Branch

■ Summary

Displays branch to be analyzed specified with Branch.

Target Slot

■ Summary

Displays slot number specified with Target Slot Number.

Mean Power

■ Summary

Displays mean power in the slot specified with Target Slot Number.

EVM (rms)

■ Summary

Displays vector error in RMS of the specified code in the slot specified with Target Slot Number.

EVM (peak)

■ Summary

Displays peak of vector error in each symbol of the specified code in the slot specified with Target Slot Number.

Mag. Error (rms)

■ Summary

Displays magnitude error in RMS of the specified code in the slot specified with Target Slot Number.

Code Power

■ Summary

Displays mean power of the specified code in the slot specified with Target Slot Number.

3.7.6 Graphical Results

The upper Graph window and the lower Graph window shows a graphical result of the slot specified with Target Slot Number in the analysis time, specified with the Starting Slot Number and Measurement Interval.

- 3.7.1 Analysis Time
- 3.7.3 Analysis Slot

3.7.6.1 Code Domain Power

When Power is set for Trace:Code Domain Mode, the code domain power in the slot specified with Target Slot Number is displayed in the upper Graph window. The code power at the marker-selected code is displayed in red.

- 3.7.2 Analysis Code

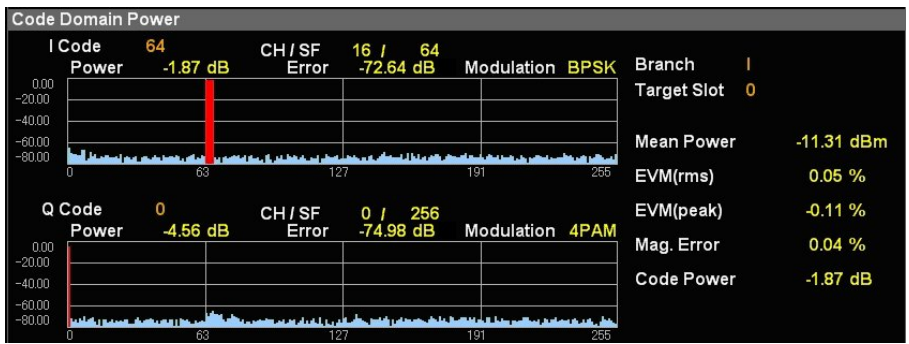


Figure 3.7.6.1-1 Code Domain Power window

I Code

■ Summary

Displays code number specified with I Code Number.

Q Code

■ Summary

Displays code number specified with Q Code Number.

CH / SF

■ Summary

Displays channel code number and spreading factor of the code specified with I Code Number and Q Code Number.

Power

■ Summary

Displays code power of the code specified with I Code Number and Q Code Number.

Modulation

■ Summary

Displays modulation method of the code specified with I Code Number or Q Code Number.

3.7.6.2 Code Domain Error

When Error is set for Trace:Code Domain Mode, the code domain error in the slot specified with Target Slot Number is displayed in the upper Graph window. The code error at the marker-selected code is displayed in red.

 3.7.2 Analysis Code

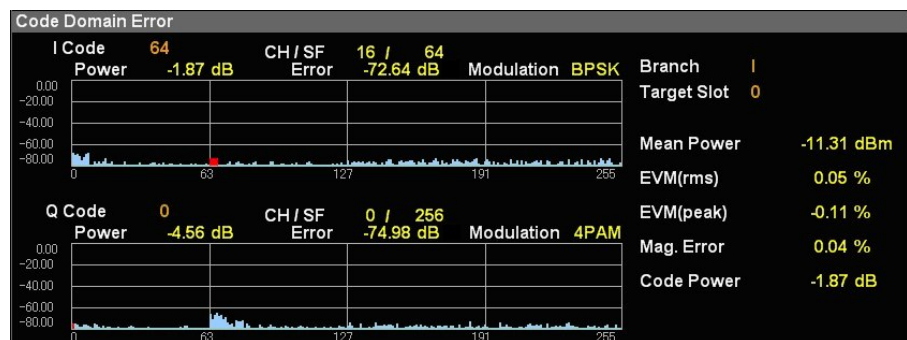


Figure 3.7.6.2-1 Code Domain Error window

3

Measurement

I Code

■ Summary

Displays code number specified with I Code Number.

Q Code

■ Summary

Displays code number specified with Q Code Number.

CH / SF

■ Summary

Displays channel code number and spreading factor of the code specified with I Code Number and Q Code Number.

Error

■ Summary

Displays code error of the code specified with I Code Number and Q Code Number.

Modulation

■ Summary

Displays modulation method of the code specified with I Code Number or Q Code Number.

3.7.6.3 Constellation

When Constellation is set for Trace:Trace Mode, The symbol constellation of the code specified with I Code Number or Q Code Number in the slot specified with Target Slot Number is displayed in the lower Graph window. The constellation at the marker-selected symbol is displayed in red.

 3.7.2 Analysis Code

 3.7.7 Setting Marker(Code Domain Analysis)

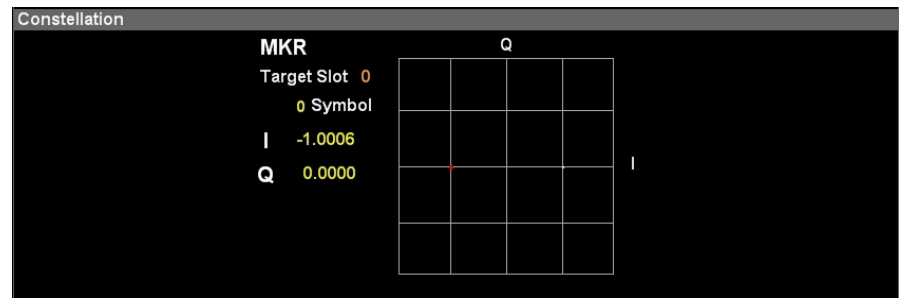



Figure 3.7.6.3-1 Constellation window (I Branch)

- Target Slot
 - Summary
 - Displays slot number specified with Target Slot Number.
- Symbol
 - Summary
 - Displays symbol number specified with Marker Number.
- I, Q
 - Summary
 - Displays either I or Q amplitude at the symbol specified with Marker Number.

3.7.6.4 EVM vs Symbol

When EVM vs Symbol is set for Trace:Trace Mode, the vector error of the code specified with I Code Number or Q Code Number in the slot specified with Target Slot Number is displayed in the lower Graph window. The vector error at the marker-selected symbol is displayed in red.

 3.7.2 Analysis Code

 3.7.7 Setting Marker (Code Domain Analysis)

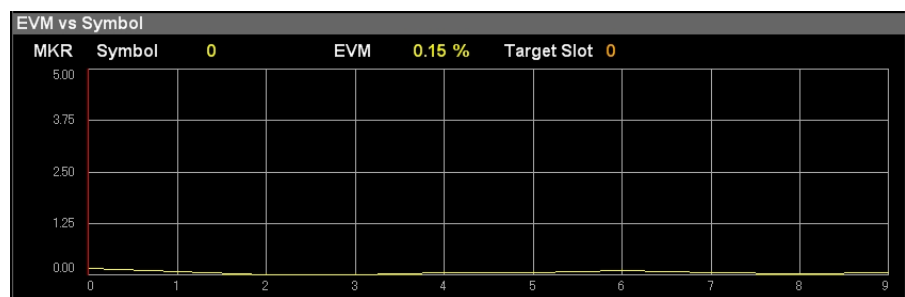


Figure 3.7.6.4-1 EVM vs Symbol window

Symbol

■ Summary

Displays symbol number specified with Marker Number.

EVM

■ Summary

Displays vector error at the symbol specified with Marker Number.

Target Slot

■ Summary

Displays slot number specified with Target Slot Number.

3.7.6.5 Magnitude Error vs Symbol

When Mag. Error is set for Trace:Trace Mode, the magnitude error of the code specified with I Code Number or Q Code Number in the slot specified with Target Slot Number is displayed in the lower Graph window. The magnitude error at the marker-selected symbol is displayed in red.

-  3.7.2 Analysis Code
-  3.7.7 Setting Marker (Code Domain Analysis)

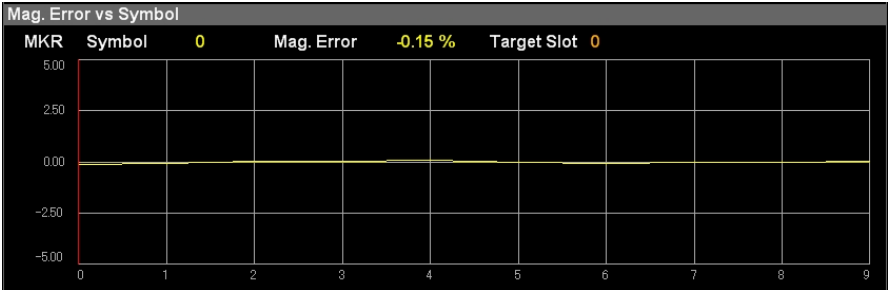


Figure 3.7.6.5-1 Magnitude Error vs Symbol window

- Symbol
- Summary
Displays symbol number specified with Marker Number.
- Mag. Error
- Summary
Displays magnitude error at the symbol specified with Marker Number.
- Target Slot
- Summary
Displays slot number specified with Target Slot Number.

3.7.6.6 Code Power vs Symbol

When Code Power vs Symbol is set for Trace:Trace Mode, the code power of the code specified with I Code Number or Q Code Number in the slot specified with Target Slot Number is displayed in the lower Graph window. The code power at the marker-selected symbol is displayed in red.

 3.7.2 Analysis Code

 3.7.7 Setting Marker (Code Domain Analysis)

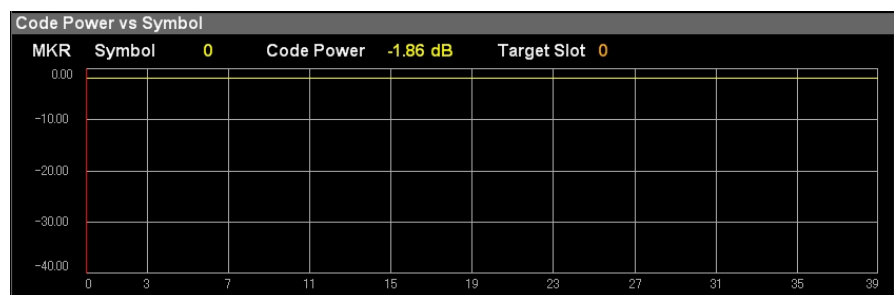


Figure 3.7.6.6-1 Code Power vs Symbol window

Symbol

■ Summary

Displays symbol number specified with Marker Number.

Code Power

■ Summary

Displays code power at the symbol specified with Marker Number.

Target Slot

■ Summary

Displays slot number specified with Target Slot Number.

3.7.7 Setting Marker (Code Domain Analysis)

Perform the marker-related settings. Pressing **F5** (Marker) on the main function menu or **Marker** displays the Marker function menu.

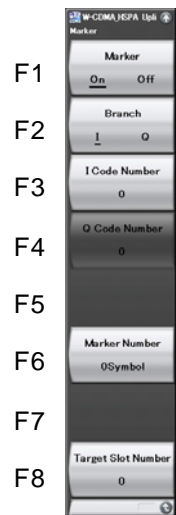


Figure 3.7.7-1 Marker function menu

Marker

■ Summary

Toggles the marker function between On and Off.

■ Selection options

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

Branch

 3.7.2 Analysis Code

I Code Number

 3.7.2 Analysis Code

Q Code Number

 3.7.2 Analysis Code

Marker Number


■ Summary

Sets the marker position in the lower Graph window with a symbol number.

■ Setting range

0 to $(2560/SF - 1)$, where SF is spreading factor.



Target Slot Number

 3.7.3 Analysis Slot

3

Measurement

3.8 Setting Trigger

Perform the trigger-related settings. Pressing  (Trigger) on the main function menu or  displays the Trigger function menu.

Trigger Switch

■ Summary

Toggles trigger synchronization between On and Off.

■ Selection options

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

Trigger Source

■ Summary

Sets the trigger source.

■ Selection options

External* ¹	Starts measurement by the trigger input from an external trigger.
External 2* ²	Starts measurement by the trigger input from an external trigger 2.
SG Marker	Starts measurement by timing inside the Vector Signal Generator.

*1: External 1 is displayed only for MS2850A.

*2: External 2 is selectable only for MS2850A.

Trigger Slope

■ Summary

Sets the trigger polarity.

■ Selection options

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

Trigger Delay

■ Summary

Sets the trigger delay.

■ Setting range

–2 to +2 s

Chapter 4 *Performance Test*

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

- 4.1 Overview of Performance Test 4-2
 - 4.1.1 Performance test 4-2
- 4.2 Performance Test Items 4-3
 - 4.2.1 Testing methods 4-3



4.1 Overview of Performance Test

4.1.1 Performance test

Performance tests are performed as part of preventive maintenance in order to prevent degradation of the performance.

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

- Carrier frequency accuracy
- Residual EVM

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

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

4.2 Performance Test Items

Warm up the device to be tested and the measuring instruments for at least 30 minutes except if specified otherwise, in order to stabilize them sufficiently before running performance tests. Maximum measurement accuracy requires, in addition to the above, conducting performance tests under ambient temperatures and with little AC power supply voltage fluctuations, as well as the absence of noise, vibrations, dust, humidity and other problems.

4.2.1 Testing methods

- (1) Test target standards
 - Carrier frequency accuracy
 - Residual EVM
- (2) Measuring instrument for tests
 - Vector signal generator
 - Power meter
 - 3 dB attenuator $\times 2$

(3) Setup

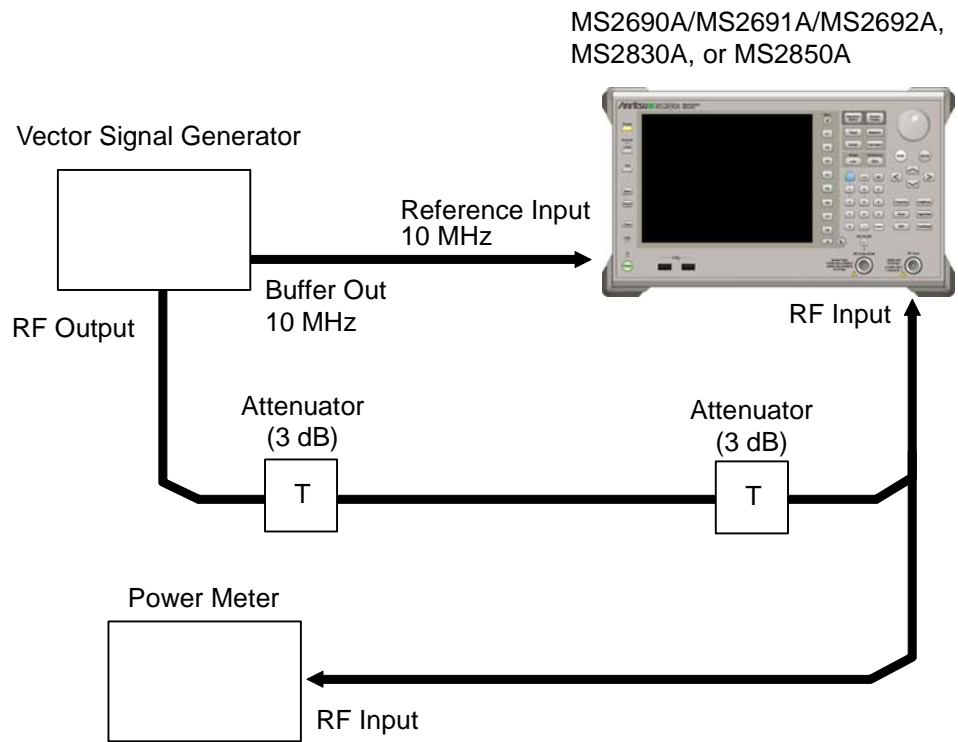



















Figure 4.2.1-1 Performance Test

(4) Test procedure




(a) Signal source adjustment

1. Input the 10-MHz reference signal output from the vector signal generator to the Reference Input connector.
2. Output a W-CDMA uplink signal with RMC12.2K from the vector signal generator.
3. Input the vector signal generator output signal into the power meter and measure the power.

(b) Settings of the main unit

1. Turn on the power switch on the front panel and then wait until the internal temperature stabilizes (approx. 1.5 hours after the temperature in the thermostatic bath stabilizes).
2. Press , then press the menu function key displaying the character string “W-CDMA Uplink.”
3. Press .
4. Press  (Preset) to perform initialization.
5. Press .
6. Press  (SIGANA All) to perform calibration.
7. Press  (Close).
8. Press , enter the frequency output by the vector signal generator using the numeric keypad, then press .
9. Press , enter the power meter measurement result using the numeric keypad, then press .
10. Press  then press  (Storage) and press  (Mode) to choose Average using the cursor key or the rotary knob, then press .
11. Press  (Count), enter the measurement count, using the numeric keypad, then press .
12. Press  to perform measurement.

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

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

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

(5) Test results

Table 4.2.1-1 Carrier frequency accuracy

Frequency	Min. limit	Deviation (Hz)	Max. limit	Uncertainty	Pass/Fail
400 MHz	MS269xA -5 Hz		MS269xA +5 Hz	MS269xA ±1 Hz	
1950 MHz	MS2830A -6 Hz		MS2830A +6 Hz	MS2830A ±0.7 Hz	
3000 MHz	MS2850A -6 Hz		MS2850A +6 Hz	MS2850A ±0.7 Hz	

Table 4.2.1-2 Residual vector error

Frequency	Measured value [% (rms)]	Max. limit	Uncertainty	Pass/Fail
400 MHz		MS269xA 1.0% (rms)	MS269xA 0.1% (rms)	
1950 MHz		MS2830A 1.2% (rms)	MS2830A 0.1% (rms)	
3000 MHz		MS2850A 1.2% (rms)	MS2850A 0.1% (rms)	

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

5.3 Erasing Warmup Message

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

<Procedure>

1. Press  (Accessory) on the main function menu.
2. Press  (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 Constellation Select.	This operation is invalid when Constellation is selected.
Not available in Bottom Graph Select.	This operation is invalid when Bottom Graph is selected.
Not available with I selected as Branch.	This operation is invalid when Branch I is selected.
Not available with Q selected as Branch.	This operation is invalid when Branch Q is selected.
Please Load Signal Analyzer.	The Signal Analyzer function must be loaded.
Please Load Spectrum Analyzer.	The Spectrum Analyzer function must be loaded.
No file to read.	There is no file that can be read.
File read error.	File reading has failed.
File format error.	The file format is invalid.
Invalid character	—

Appendix B Initial Value List

<Common Parameters>

Frequency	
Carrier Frequency	1.920 GHz
Amplitude	
Input Level	-10.00 dBm
Level Offset On/Off	Off
Level Offset Value	0.00 dB
Pre-Amp	Off
Trigger	
Trigger Switch	Off
Trigger Source	External
Trigger Slope	Rise

<W-CDMA/HSPA Basic Parameters>

Common Setting	
Scrambling Code	000000
Transient Period	Include
EVM Origin Offset	Include
Active Code Threshold	-30.0 dB

<Modulation Analysis>

Analysis Time	
Starting Slot Number	0
Measurement Interval	1 slot
Target Slot Number	0
Trace Mode	EVM vs Chip
Scale	
EVM vs Chip	10%
Mag Error vs Chip	±5%
Phase Error vs Chip	±5 degree
Storage	
Mode	Off
Count	10
Marker	
Marker	On
Constellation Marker Number	0
Bottom Graph Marker Number	0

Appendix B Initial Value List

<Code Domain>

Analysis Time	
Starting Slot Number	0
Measurement Interval	1 slot
Branch	I
I Code Number	0
Q Code Number	0
Target Slot Number	0
Trace Mode	Code Power vs Symbol
Scale	
Code Domain Power	80 dB
Code Domain Error	80 dB
EVM vs Symbol	5%
Mag Error vs Symbol	±5%
Code Power vs Symbol	40 dB
Code Power Scale Offset	0 div
Marker	
Marker	On
Marker Number	0 symbol

<Accessory>

Accessory	
Title	On
Title Entry	W-CDMA_HSPA Uplink

References are to section numbers.

A

Accessory	3.1.2, 5.1
AC inlet	2.1.2
ACP	3.5.1
Active Code Threshold	3.4
Adjacent Channel Power	3.5.1
Amplitude	3.3
Analysis Time	3.6.1, 3.7.1
Application Switch	2.3.2
Application key	2.1.1
AUX connector	2.1.2

B

Bottom Graph Select	3.6.5
Bottom Graph Marker Number	3.6.5
Branch	3.7.2
Buffer Out connector	2.1.2

C

Calibration	2.4.2
Cal key	2.1.1
Cancel key	2.1.1
Carrier Frequency	3.2
Channel Power	3.5.2
Code Domain	3.7
Code Domain Error	3.7.6.2
Code Domain Power	3.7.6.1
Code Power	3.7.5
Code Power vs Symbol	3.7.6.6
Common Setting	3.4
Constellation	3.6.4.1, 3.7.6.3
Constellation Chip Number	3.6.5
Constellation Select	3.6.5
Continuous	3.1.3
Copy key	2.1.1
Count	3.1.3, 3.6.2
Cursor keys	2.1.1

E

Enter key	2.1.1
Erase Warm Up Message	5.3
Ethernet	2.1.1
Ethernet connector	2.1.2
EVM(peak)	3.6.3, 3.7.5
EVM(rms)	3.6.3, 3.7.5
EVM vs Chip	3.6.4.2
EVM vs Symbol	3.7.4, 3.7.6.4

F

Frequency	3.1.2, 3.2
Frequency Error	3.6.3
Function keys	2.1.1

G

GPIB	2.1.1
GPIB connector	2.1.2
Graph window	3.1.1, 3.6, 3.6.4, 3.7.4

H

Hard disk access lamp	2.1.1
HDD slot	2.1.2

I

I Code Number	3.7.2
IF Out connector	2.1.2
IQ Constellation	3.6.4.1

L

Load Application Select	2.3.1
Local key	2.1.1

Index

M

Magnitude Error	3.6.3, 3.7.5
Magnitude Error vs Chip	3.6.4.3
Magnitude Error vs Symbol	3.7.6.5
Main function keys	2.1.1
Marker	3.6.5, 3.7.7
Mean Power	3.5.2, 3.6.3, 3.7.5
Measure	3.5, 3.6, 3.7
Measurement Interval	3.6.1, 3.7.1
Modulation Analysis	3.6
Modulation control key	2.1.1
Monitor Out connector	2.1.2

N

Numeric keypad	2.1.1
----------------	-------

O

OBW	3.5.3
Occupied Bandwidth	3.5.3
Offset	3.3
Offset Value	3.3
Origin Offset	3.4

P

Peak Active CDE	3.6.3
Peak CDE	3.6.3
Phase Error	3.6.3
Phase Error vs Chip	3.6.4.4
Power Switch	2.1.1
Pre-Amp	3.3
Preset	2.4.1
Preset key	2.1.1

Q

Q Code Number	3.7.2
---------------	-------

R

Recall key	2.1.1
Reference frequency signal	2.1.2
Ref Input connector	2.1.2
Remote lamp	2.1.1

Result window	3.1.1
RF input connector	2.1.1
RF output connector	2.1.1
RF Output control key	2.1.1
RRC Filtered Mean Power	3.5.2
Rotary knob	2.1.1

S

Save key	2.1.1
SA Trigger Input connector	2.1.2
Scale	3.6.2, 3.7.4
Scrambling Code	3.4
SEM	3.5.4
SG Trigger Input connector	2.1.2
Shift key	2.1.1
Single	3.1.3
Spectrum Emission Mask	3.5.4
Starting Slot Number	3.6.1, 3.7.1
Status message	3.1.1
Storage	3.6.2
Sweep Status Out connector	2.1.2

T

Target Slot Number	3.6.4, 3.7.3
Time Offset	3.6.3
Title	5.2
Trace	3.6.2, 3.7.4
Trace Mode	3.6.2, 3.7.4
Transient Periods	3.4
Trigger	3.8
Trigger Delay	3.8
Trigger Input connector	2.1.2
Trigger signal	2.1.2
Trigger Slope	3.8
Trigger Source	3.8
Trigger Switch	3.8

U

USB	2.1.1, 2.1.2
USB connector (type A)	2.1.1, 2.1.2
USB connector (type B)	2.1.2