MS2690A/MS2691A/MS2692A
and
MS2830A/MS2840A/MS2850A

Signal Analyzer

Operation Manual

Noise Figure Measurement Function

Operation

Ninth 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), MS2840A Signal Analyzer Operation Manual (Mainframe Operation), or MS2850A Signal Analyzer Operation Manual (Mainframe Operation). Please also refer to this document before using the equipment.**
- **Keep this manual with the equipment.**

ANRITSU CORPORATION

Document No.: M-W3655AE-9.0

Safety Symbols

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

Symbols used in manual

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

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

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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.

MS2690A/MS2691A/MS2692A and MS2830A/MS2840A/MS2850A
Signal Analyzer
Operation Manual Noise Figure Measurement Function Operation

23 October 2012 (First Edition)
20 February 2019 (Ninth Edition)

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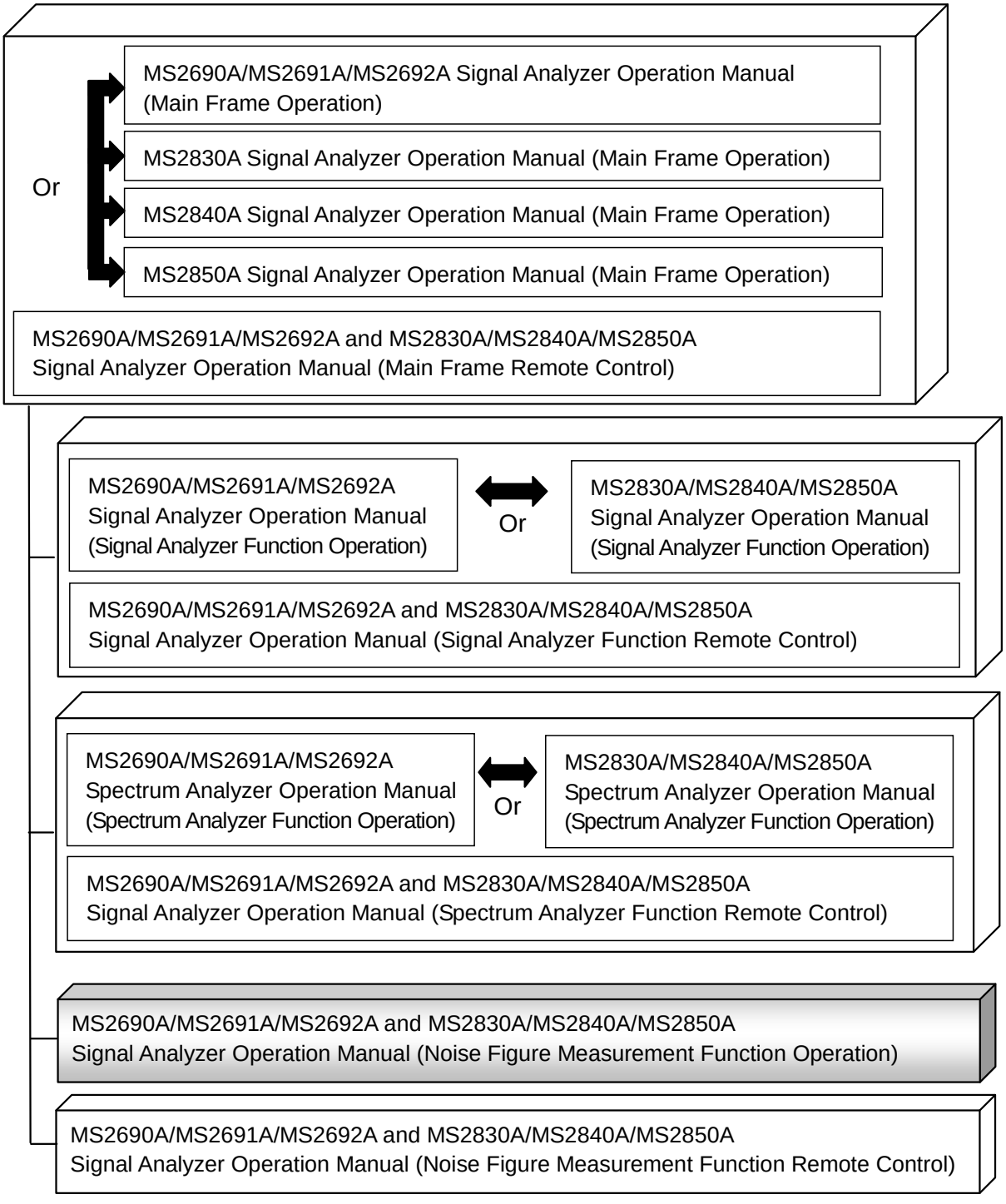
About This Manual

■ Associated Documents

The operation manual configuration of the MS2690A/MS2691A/MS2692A, MS2830A, MS2840A and MS2850A Signal Analyzer is shown below.



- Signal Analyzer Operation Manual (Mainframe)
- Signal Analyzer Operation Manual (Mainframe Remote Control)
  Description of basic operations, maintenance procedures, common functions and common remote functions of the mainframe

- Signal Analyzer Operation Manual (Signal Analyzer Function)
- Signal Analyzer Operation Manual (Signal Analyzer Function Remote Control)
  Description of basic operations, common functions and common remote functions of the signal analyzer

- Signal Analyzer Operation Manual (Spectrum Analyzer Function)
- Signal Analyzer Operation Manual (Spectrum Analyzer Function Remote Control)
  Description of basic operations, common functions and common remote functions of the spectrum analyzer

- Signal Analyzer Operation Manual (Noise Figure Measurement Function) <This document>
- Signal Analyzer Operation Manual (Noise Figure Measurement Function Remote Control)
  Description of basic operations, common functions and common remote functions of the Phase Noise Measurement function

Convention Used in This Manual

Throughout this document, the use of MS269x Series is assumed unless otherwise specified.
If using MS2830A, MS2840A or MS2850A, change MS269xA to read MS2830A, MS2840A or MS2850A.

In this document,  indicates a panel key.

Table of Contents

Chapter 1 Overview

This chapter provides an overview of the Noise Figure Measurement Function.

1.1 Product Overview

The MS2690/MS2691/MS2692A or MS2830A/MS2840A/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 Noise Figure Measurement Function (hereinafter, this application) is to measure Noise Figure (hereinafter, NF) which has a huge effect on noise in systems that handle minute signals such as satellite communications and radars. It can be used in various fields such as evaluations of transceivers and devices and troubleshooting.

NF is measured with the measurement method of Y-factor method which uses a Noise Source.

The NC346 Series noise sources by Noisecom company are supported.

1.2 Product Composition

1.2.1 Option / Software

Table 1.2.1-1 list the Options and Software's.

Table 1.2.1-1 Configuration of Application

Model/Symbol	Product name	Remarks
MS2690A-017 MS2691A-017 MS2692A-017	Noise Figure Measurement Function	
MS2690A-117 MS2691A-117 MS2692A-117	Noise Figure Measurement Function Retrofit	
MS2830A-017	Noise Figure Measurement Function	
MS2830A-117	Noise Figure Measurement Function Retrofit	
MS2840A-017	Noise Figure Measurement Function	
MS2840A-117	Noise Figure Measurement Function Retrofit	
MS2850A-017	Noise Figure Measurement Function	
MS2850A-117	Noise Figure Measurement Function Retrofit	

The MS269xA-017/117 and MS269xA-030 W-CDMA RNC simulator are exclusive options.

1.2.2 Noise Source

The NC346 Series noise sources by Noisecom company are supported. The models and specifications outlines of NC346 Series are as follows. For detailed specifications, refer to the catalog and data sheet for the NC346 Series.

Table 1.2.2-1 Specifications of NC346 Series

Model	DC Offset	Frequency [GHz]	Output ENR [dB]
NC346A	–	0.01 to 18.0	5 to 7
NC346B	–	0.01 to 18.0	14 to 16
NC346D	–	0.01 to 18.0	19 to 25
NC346C	✓	0.01 to 26.5	13 to 17
NC346E	✓	0.01 to 26.5	19 to 25
NC346Ka	✓	0.1 to 40.0	10 to 17

⚠ CAUTION

Some noise sources output DC power. Therefore, when selecting a model from the following models of the RF input specification "0V_DC_max", install a DC block:

- **MS2690A-017/-117**
- **MS2691A-017/-117**
- **MS2692A-017/-117**
- **MS2830A-044, -017/-117**
- **MS2830A-045, -017/-117**
- **MS2840A-044, -017/-117**
- **MS2840A-046, -017/-117**
- **MS2850A-047, -017/-117**
- **MS2850A-046, -017/-117**

1.3 Specifications

Table 1.3-1 show the specifications.

Table 1.3-1 Specifications for this Application

Item		Specification
Frequency	Frequency range	MS2690A: 30 MHz to 6 GHz MS2691A: 30 MHz to 6 GHz MS2692A: 30 MHz to 6 GHz
		MS2830A-040: 30 MHz to 3.6 GHz MS2830A-041: 30 MHz to 6 GHz MS2830A-043: 30 MHz to 13.5 GHz MS2830A-044: 30 MHz to 26.5 GHz MS2830A-045: 30 MHz to 40 GHz
		MS2840A-040: 30 MHz to 3.6 GHz MS2840A-041: 30 MHz to 6 GHz MS2840A-044: 30 MHz to 26.5 GHz MS2840A-046: 30 MHz to 40 GHz
		MS2850A-047: 30 MHz to 32 GHz MS2850A-046: 30 MHz to 40 GHz
	Frequency Setting range	MS2690A: 10 MHz to 6 GHz MS2691A: 10 MHz to 13.5 GHz MS2692A: 10 MHz to 26.5 GHz
		MS2830A-040: 10 MHz to 3.6 GHz MS2830A-041: 10 MHz to 6 GHz MS2830A-043: 10 MHz to 13.5 GHz MS2830A-044: 10 MHz to 26.5 GHz MS2830A-045: 10 MHz to 43 GHz
		MS2840A-040: 10 MHz to 3.6 GHz MS2840A-041: 10 MHz to 6 GHz MS2840A-044: 10 MHz to 26.5 GHz MS2840A-046: 10 MHz to 44.5 GHz
		MS2850A-047: 10 MHz to 32 GHz MS2850A-046: 10 MHz to 44.5 GHz

Table 1.3-1 Specifications for this Application (Cont'd)

Item		Specification
NF Measurement	Measurement range	Within the frequency range (Attenuator = 0 dB, Pre-Amp = On) –20 to 40 dB
	Instrument Uncertainty	Within the measurement range ENR: 4 to 7 dB ±0.02 dB ENR: 12 to 17 dB ±0.025 dB ENR: 20 to 22 dB ±0.03 dB
GAIN Measurement	Measurement range	Within the frequency range –20 to +40 dB
	Instrument Uncertainty	Within the measurement range ≤ 0.07 dB
Resolution Bandwidth	Setting Range	100 kHz to 8 MHz
Noise Source	–	Recommending the NC346 Series noise sources by Noisecom company
Connector	Noise Source	Connector: Rear Panel, BNC-J Output Voltage: 28±0.5 V, Pulsed

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)*, *MS2840A Signal Analyzer Operation Manual (Mainframe Operation)*, or *MS2850A Signal Analyzer Operation Manual (Mainframe Operation)* for common features not included in this manual.

2.1 Part Names

This section describes the panel keys for operating the instrument and connectors used to connect external devices. For general points of caution, refer to the *MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe Operation)*, *MS2830A Signal Analyzer Operation Manual (Mainframe Operation)*, *MS2840A 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.

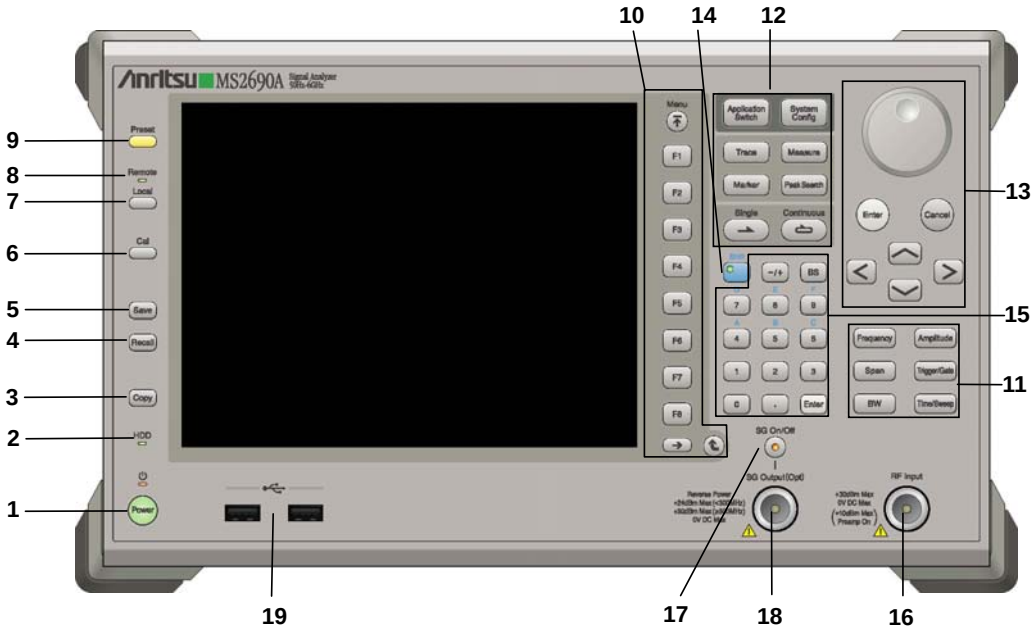


Figure 2.1.1-1 MS269x series front panel

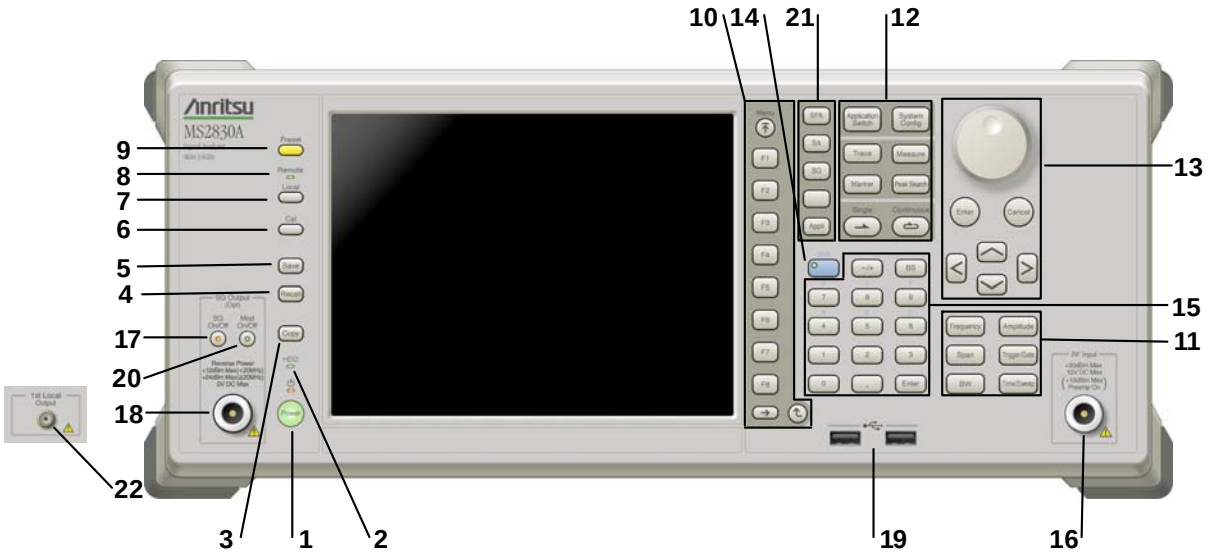


Figure 2.1.1-2 MS2830A/MS2840A/MS2850A front panel (MS2830A Example)

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 accessing the internal hard disk

SSD access lamp (MS2840A, MS2850A)

Lights up when accessing the internal SSD

3

Copy key

Press to capture display screen and save to file.

4

Recall key

Press to recall parameter file.

5

Save key

Press to save parameter file.

6

Cal key

Press to display the Calibration menu.

7 

Local key

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

8 

Remote lamp

Lights when in remote-control state.

9 

Preset key

Resets parameters to initial settings.

10 

Function keys

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

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

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

11

Main function keys 1

Press to set or execute main functions.

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

Frequency Press to set frequency parameters.

Amplitude Press to set level parameters.

Span Press to set span parameters.

Trigger/Gate No function is assigned to this key.

BW Press to set BW parameters.

Time/Sweep Press to set measurement item parameters.

12

Main function keys 2

Press to set or execute main functions.

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

Application Switch Press to switch application.

System Config Press to display Configuration screen.

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

Measure Press to set measurement item parameters.

Marker Use when switching graph marker operation.

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

Single Press to start single measurement.

Continuous Press to start continuous measurements.

13

Rotary knob/Cursor key/Enter key/Cancel key

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

Press Enter to set the entered or selected data.

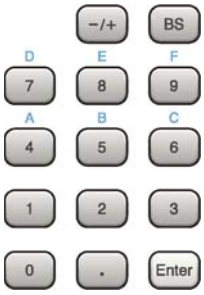
Press Cancel to cancel input or selected data.

14

Shift key

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

15



Numeric keypad

Enters numbers on parameter setup screens.

Press BS to delete the last entered digit or character.

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

16

RF Input connector

Inputs RF signal. This is an N type input connector.
This is a K type input connector when MS2830A-045, MS2840A-046 is installed or MS2850A.

17

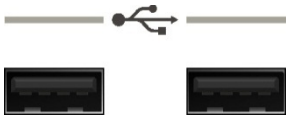
RF Output Control key
(When MS269xA-020/120, MS2830A-020/120/021/121, MS2840A-020/120/021/121 installed)

When the Vector Signal Generator option is installed, the RF output control key lamp lights orange in the RF signal output On state.
This is not available when the MS2830A-044/045, MS2840A-044/046 is installed or MS2850A.

18 SG Output(Opt)

RF Output connector
(When MS269xA-020/120, MS2830A-020/120/021/121, MS2840A-020/120/021/121 installed)
Outputs RF signal, when the Vector Signal Generator option is installed.
This is an N type output connector.
This is not installed when the MS2830A-044/045, MS2840A-044/046 is installed or 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, MS2840A-020/120/021/121 installed)
When the Vector Signal Generator option is installed, the lamp  on the key lights up in green in the modulation On state.
This is not installed when the MS2830A-044/045, MS2840A-044/046 is installed or MS2850A.

21

Application key (MS2830A, MS2840A, 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 MS2840A-005/105/006/106/009/109/077/177/078/178 is installed or MS2850A.

Press to display the Signal Analyzer main screen, when Vector Signal Generator option is installed. (MS2830A, MS2840A)

This is a blank key. Not used. (MS2830A, MS2840A)

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), MS2840A Signal Analyzer Operation Manual (Mainframe Operation), or *MS2850A Signal Analyzer Operation Manual (Mainframe Operation)*.

22 

1st Local Output connector (MS2830A, MS2840A), (MS2850A: Future Extensions)
This is available when the MS2830A-044/045, MS2840A-044/046 is installed.
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.

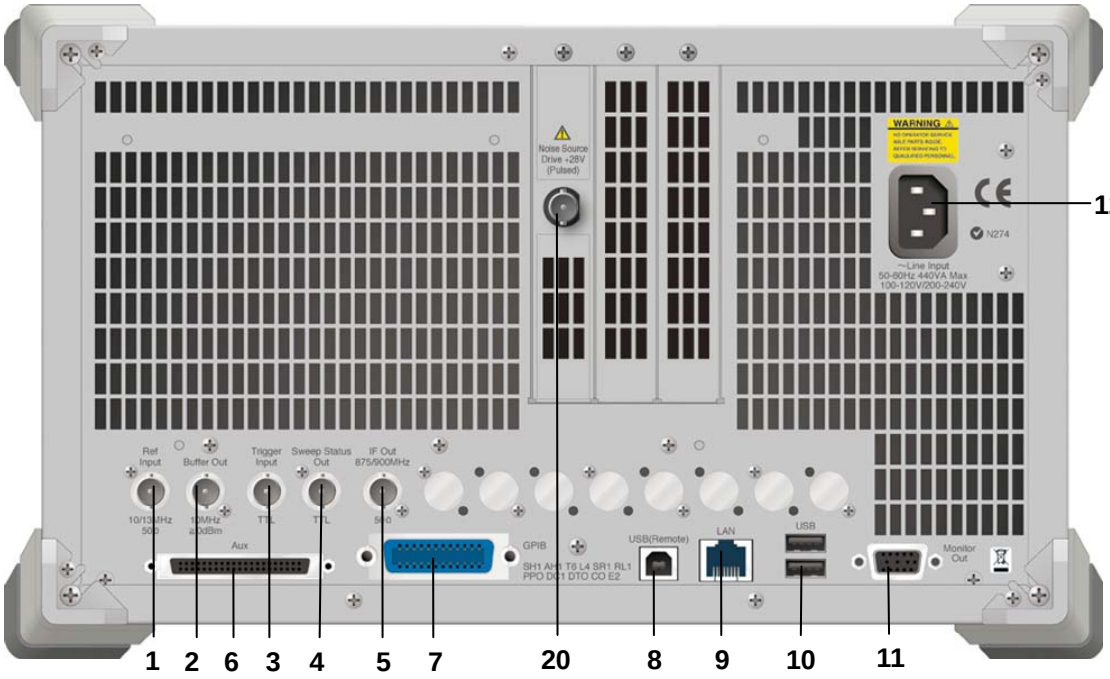


Figure 2.1.2-1 MS269x series rear panel

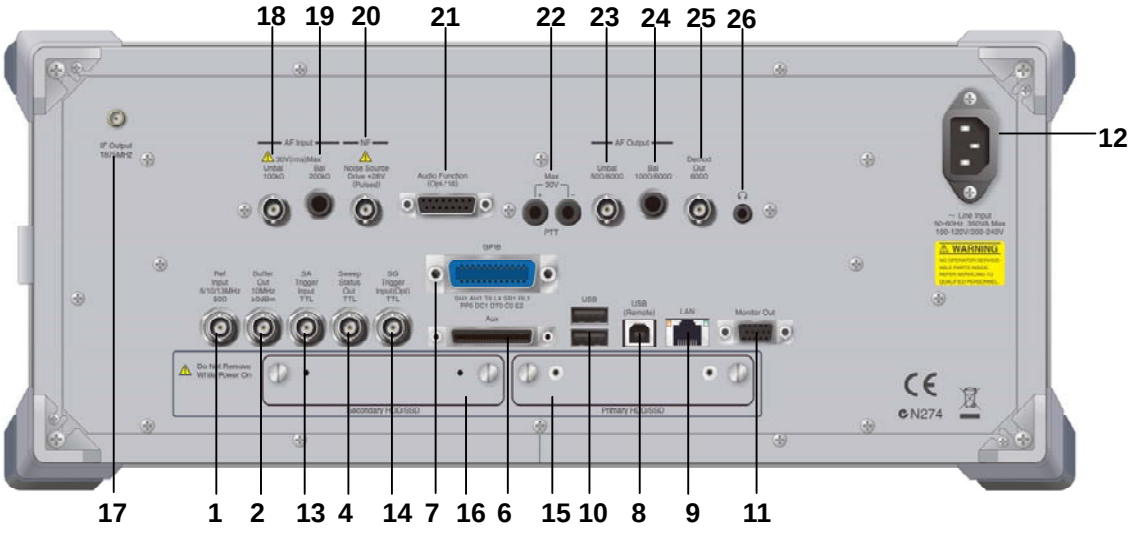


Figure 2.1.2-2 MS2830A/MS2840A rear panel (MS2840A Example)

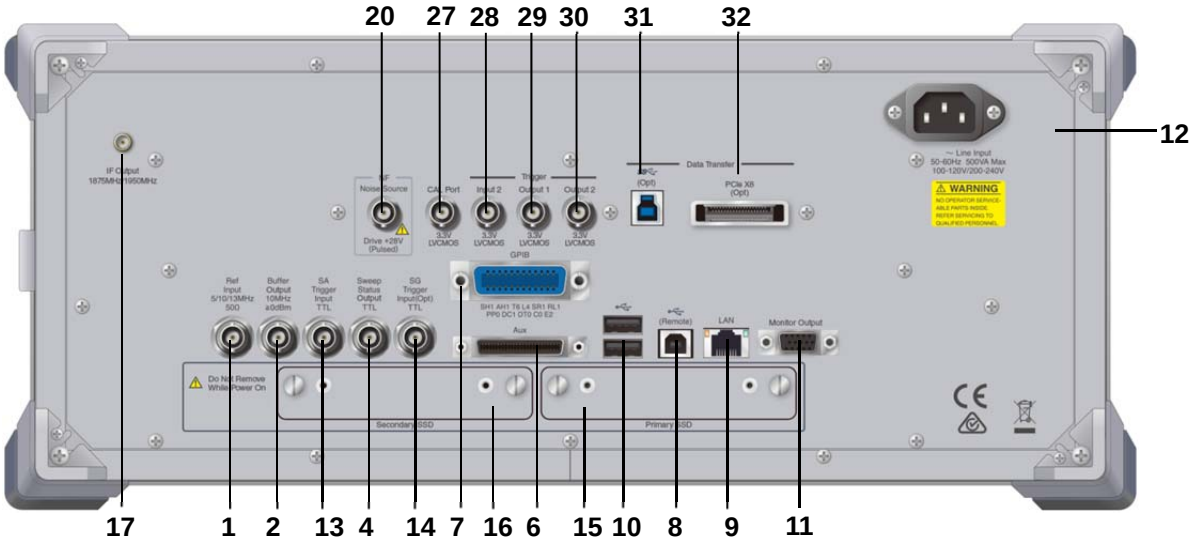


Figure 2.1.2-3 MS2850A rear panel

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/MS2840A to that of other equipment. The following frequencies are supported:

MS269x series:	10 MHz/13 MHz
MS2830A, MS2840A, MS2840A:	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/MS2840A.

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 connector
Not used.

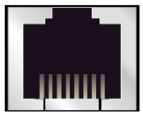
7 GP-IB

GPIB connector
Used to remote-control this unit via GPIB from external controller. For external control via GPIB.

8 USB(Remote)

USB connector (type B)
Used to remote-control this unit via USB from external controller. 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, MS2840A, MS2850A)
This is a BNC connector for inputting external trigger signal (TTL) for SPA and SA applications.

14 

SG Trigger Input connector (MS2830A, MS2840A)
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) — This is a standard HDD slot.
SSD slot (MS2840A, MS2850A) — This is a standard SSD slot.

16 **HDD(Opt)** or **Secondary HDD/SSD**

HDD slot (MS2830A) — This is a HDD slot for the options.
SSD slot (MS2840A, MS2850A) — This is a SSD slot for the options.

17 

IF output connector (MS2830A, MS2840A, MS2850A)
Monitor output of the internal IF signal.
This is installed when the MS2830A-044/045, MS2840A-044/046 is installed or MS2850A.

18 

AF Input connector (unbalanced)
BNC connector to input unbalanced AF signal from external device.
This is available when the MS2830A-018/118 is installed.

19 

AF Input connector (balanced)
Standard phone jack (3 poles, □6.3 mm) connector to input balanced AF signal from external device.
This is available when the MS2830A-018/118 is installed.

20 

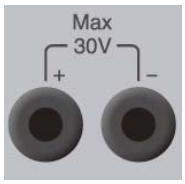
Noise Source connector
Supply (+28V) of the Noise Source Drive.
This is available when the Option 017/117 is installed.

21 

General Input/Output (Audio Function) connector

D-Sub 15 connector for audio function input/output from/to the external device.

This is available when the MS2830A-018/118 is installed.

22 

PTT Control connector

Banana plug jack connector to control PTT (Push to Talk).

This is available when the MS2830A-018/118 is installed.

23 

AF Output connector (unbalanced)

BNC connector to output unbalanced AF signal to external device.

This is available when the MS2830A-018/118 is installed.

24 

AF Output connector (balanced)

Standard phone jack (3 poles, ϕ6.3 mm) connector to output balanced AF signal to external device.

This is available when the MS2830A-018/118 is installed.

25 

Demodulation Output connector

BNC connector to output demodulated AF signal to external device.

This is available when the MS2830A-018/118 is installed.

26 

Headphone Output connector

Mini jack connector to output demodulated AF audio signal to external device.

This is available when the MS2830A-018/118 is installed.

27 

CAL Port connector (Future extensions) (MS2850A)

28 

Trigger Input 2 connector (MS2850A)

Input the trigger signal (3.3 V LVCMOS) for SPA and SA applications.

29 

Trigger Output 1 connector (MS2850A)

Output the trigger signal (3.3 V LVCMOS).

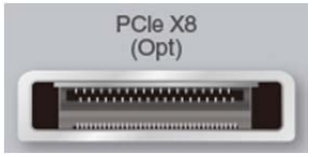
30 

Trigger Output 2 connector (MS2850A)

Output the trigger signal (3.3 V LVCMOS).

31 

USB 3.0 connector (Future extensions) (MS2850A)

32 

PCIe X8 connector (Future extensions) (MS2850A)

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.

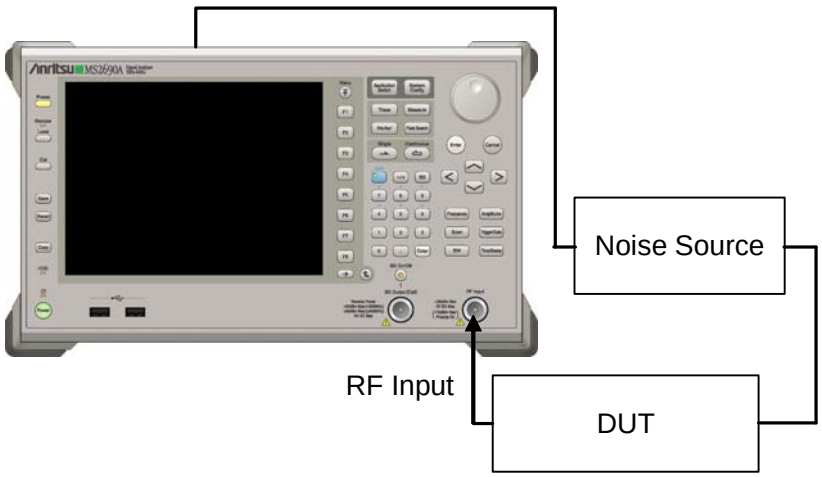


Figure 2.2-1 Signal path setup example

Connect the Noise Source to the Noise Source connector.
Set the reference signal paths from external sources, as required.

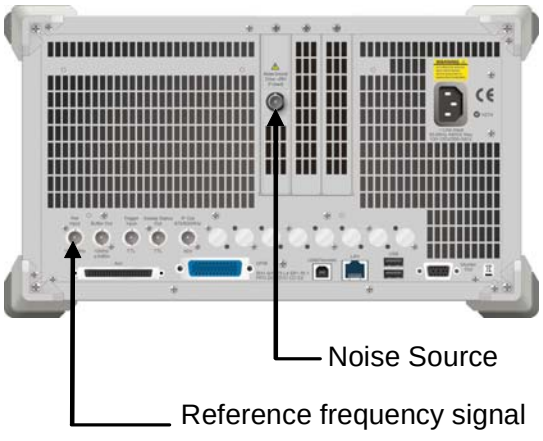


Figure 2.2-2 External signal input

2.3 Application Startup and Selection

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

2.3.1 Launching application

The application startup procedure is described below.

Note:

The XXX indicates the application name currently in use.

<Procedure>

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

2.3.2 Selecting application

The selection procedure is described below.

<Procedure>

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

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

2.4 Initialization and Calibration

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

2.4.1 Initialization

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

Note:

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

The initialization procedure is as follows.

<Procedure>

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

2.4.2 Calibration

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

<Procedure>

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

For details on calibration functionality only executable with this instrument, refer to the *MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe Operation)*, *MS2830A Signal Analyzer Operation Manual (Mainframe Operation)*, *MS2840A Signal Analyzer Operation Manual (Mainframe Operation)*, or *MS2850A Signal Analyzer Operation Manual (Mainframe Operation)*.

After the calibration is complete, execute NF Calibration.
For details on NF Calibration, refer to 3.4.6 “Cal Setup”.

Chapter 3 Measurement

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

3.1 Basic Operation

3.1.1 Screen layout

This section describes the screen layout of the Noise Figure measurement function.

Figure 3.1.1-1 Screen layout

[1] Measurement parameter
Displays the specified parameter. For details about measurement results, refer to Section 3.8 “Measurement Results.”

[2] Measurement Status Area
Displays alarms which indicate measurement errors. For details, refer to Section 3.8 “Measurement Results.”

[3] Measurement Result Window
Displays the measurement results. One of List display, Graph display, and Spot display is displayed depending on the setting of Frequency Mode and Layout. For details, refer to Section 3.8 “Measurement Results.”

[4] Status Area
Displays the Measurement Status.

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

3.1.2 Main function menu

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

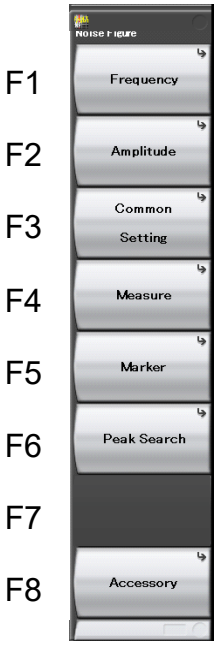


Figure 3.1.2-1 Main Function Menu

Table 3.1.2-1 Main Function Menu

Function Key	Menu Display	Function
F1	Frequency	Sets the frequency. 3.2 Setting Frequency
F2	Amplitude	Sets the level. 3.3 Setting Level
F3	Common Setting	Sets the common items. 3.4 Setting Common Items
F4	Measure	Opens the Measure function. 3.5 Setting the Measure Function
F5	Marker	Opens the Marker function. 3.6 Setting the Marker Function
F6	Peak Search	Opens the Peak Search function. 3.7 Setting the Peak Search Function
F8	Accessary	Performs settings for other functions. Chapter 4 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

Items are measured only for the measurement count (Storage Count) before measurement is stopped.

<Procedure>

Press Single.

Continuous

Measurement will continue even if parameters are changed or the window display is changed. Measurement will be stopped if another application is selected, or DUT Mode is changed.

<Procedure>

Press Continuous.

3.1.4 Restrictions on File Input/Output

This application can save the measurement results and the loss compensation tables, etc. in a file or load them from a file.
The files are input/output in csv format, and saved in different folders by item. One folder can store up to 100 files.

For saving destination and format by item, refer to the description of each item.

3.2 Setting Frequency

This section describes the frequency-related settings. Press F1 (Frequency) on the main function menu to display the Frequency function menu.

Table 3.2-1 Frequency Function Menu

Function Key	Menu Display	Function
F1	Frequency Mode	Opens the Frequency Mode Function Menu. 3.2.1 Frequency Mode
F2	Fixed Setting	Opens the Fixed Setting Function Menu. 3.2.2 Fixed Setting
F3	List Setting	Opens the List Setting Function Menu. 3.2.3 List Setting
F4	Sweep Setting	Opens the Sweep Setting Function Menu. 3.2.4 Sweep Setting

Note:

When DUT Mode is not Amplifier, the setting frequency changes according to LO Mode as in Table 3.2-2.

Table 3.2-2 Setting Frequency when DUT is other than Amplifier

LO Mode	Setting Frequency
Fixed	IF (Output from DUT)Frequency
Variable	RF (Input to DUT)Frequency

3.2.1 Frequency Mode

Press F1 (Frequency Mode) on the Frequency function menu or Frequency to display the Frequency Mode Function menu.

After each mode is set, the setting screen is displayed.

Table 3.2.1-1 Frequency Mode Function Menu

Function Key	Menu Display	Function
—	Frequency	Pressing [Frequency] Displays this function.
F1	Fixed	Sets the Frequency Mode to Fixed. Setting Fixed opens the Fixed Setting Function menu. 3.2.2 Fixed Setting
F2	List	Sets the Frequency Mode to List. Setting Fixed opens the List Setting Function menu. 3.2.3 List Setting
F3	Sweep	Sets the Frequency Mode to Sweep. Setting Fixed opens the Sweep Setting Function menu. 3.2.4 Sweep Setting

3.2.2 Fixed Setting

This section describes the setup to be performed when the Frequency Mode is set to Fixed.

Table 3.2.2-1 Fixed Setting Function Menu

Function Key	Menu Display	Function
F1	Position	Same as the Frequency List Edit function menu "Position". 3.2.3.1 Frequency List Edit
F7	Storage Mode	Same as the Storage function menu "Mode". 3.5.2 Storage
F8	Storage Count	Same as the Storage function menu "Count". 3.5.2 Storage

3.2.3 List Setting

This section describes the setup to be performed when the Frequency Mode is set to List.

Table 3.2.3-1 List Setting Function Menu

Function Key	Menu Display	Function
F1	Device	Specifies the Table file storage destination drive.
F2	Save Frequency List	Saves Frequency List Table in a file.
F3	Recall Frequency List	Recalls Frequency List Table from a file.
F6	Edit	Opens the Frequency List Edit Function Menu. 3.2.3.1 Frequency List Edit

The file format for Frequency List Table is as follows:

Output/input file path: Anritsu Corporation\Signal Analyzer\User Data\NF Data\FreqList\

Default file name for saving: FrequencyListYYYYMMDD_n.csv

File extension: csv format

```
[Filetype: FreqList]   [1]
[Version: 1.0.0.0]     [2]
1000000                [3]
100000000
1000000000
```

[1] File Type: Describe the file type.
Describe FreqList for Frequency List Table.

[2] Describe the version of the file format.

[3] Describe the Frequency member line by line.

3.2.3.1 Frequency List Edit

Press F6 (Edit) on the List Setting function menu to display the Frequency List Edit Function menu.

This section describes the Frequency List Edit Function Menu that is used to edit a Frequency List Table.

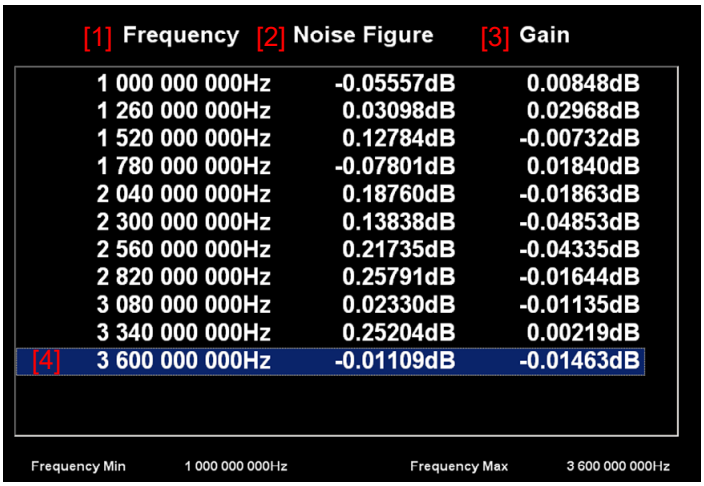


Figure 3.2.3.1-1 Frequency List Table

[1] Frequency: Setting Frequency

[2] Noise Figure: Displays Result Type set to Trace1.

[3] Gain: Displays Result Type set to Trace2.

[4] Cursor: Selects a line in the list, and can be moved by operating the cursor keys ↑ ↓.

Table 3.2.3.1-1 Frequency List Edit Function Menu

Function Key	Menu Display	Function
F1	Position	Selects Position from List on the Table screen. Various settings can be performed for items of the selected Position (number). Setting Range: 1 to (Total Point +1) Default: 1 Maximum: 501
F2	Frequency	Sets the frequency for the selected Position Default: Refer to Table 3.2.3.1-2 Unit: GHz/MHz/kHz/Hz Resolution: 1 Hz
F5	Insert Point Below	Adds Point next to the selected Position. The added Point reflects the current Position value as it is.
F6	Delete Point	Deletes Point of the selected Position.
F7	Sort Table	Sorts Table in ascending order of frequency.
F8	Clear Table	A confirmation message is displayed before clearing and pressing Enter executes the clearing.

Table 3.2.3.1-2 Setting Range of Frequency

DUT Mode	LO Mode	Setting Range
Amplifier	—	Max.: The maximum frequency of the main unit or of Noise Source*3, whichever smaller. Min.: The minimum frequency of the main unit or of Noise Source*3, whichever bigger.
Other than Amplifier	Fixed*1	
	Variable*2	Max.: The maximum frequency of Noise Source*3 Min.: The minimum frequency of Noise Source*3

*1: When LO Mode is Fixed, set as IF frequency (output from DUT).

*2: When LO Mode is Variable, set as RF frequency (input from DUT).

*3: For frequency range, refer to Section 3.4.5.1 “Noise Source Select”.

Note:

When DUT Mode is Down Converter or Up Converter, the frequency input range is limited according to the fixed frequency (Local Freq or IF Freq) and Sideband Mode setting.

3.2.4 Sweep Setting

This section describes the setup to be performed when the Frequency Mode is set to Sweep.

Note:

Frequency List Table is edited by setting in Sweep Mode.

Table 3.2.4-1 Sweep Mode Function Menu

Function Key	Menu Display	Function
F1	Center	Sets the center frequency of the frequency range for sweep. Setting Range: Refer to Table 3.2.3.1-2 Unit: GHz/MHz/kHz/Hz Resolution: 1 Hz Default: 1.805 GHz
F2	Start	Sets the Start frequency of the frequency range for sweep. Setting Range: Refer to Table 3.2.3.1-2 Unit: GHz/MHz/kHz/Hz Resolution: 2 Hz Default: 10 MHz
F3	Stop	Sets the Stop frequency of the frequency range for sweep. Setting Range: Refer to Table 3.2.3.1-2 Unit: GHz/MHz/kHz/Hz Resolution: 2 Hz Default: 3.6 GHz
F4	Span	Sets the frequency span range for sweep. Setting Range: Maximum Stop Frequency – Minimum start frequency Minimum value: 2 Hz Unit: GHz/MHz/kHz/Hz Resolution: 2 Hz Default: 3.59 GHz
F5	Full Span	Sets the frequency span for sweep to maximum.
F8	Sweep Point	Sets the number of points for sweep. The same item with Total Point. Setting range: 3 to 501* Default: 11 *: When the span is 500 Hz or less, the Sweep Point maximum value is span+1

3.3 Setting Level

This section describes the level- related settings. Press F2 (Amplitude) on the main function menu or Amplitude to display the Amplitude function menu.

Table 3.3-1 Amplitude Function Menu

Function Key	Menu Display	Function
—	Amplitude	Pressing [Amplitude] displays this function.
F1	Attenuator	Sets the Input Attenuator. 3.3.1 Attenuator
F2	Pre-Amp	Sets Pre-Amp On/Off. 3.3.2 Pre-Amp
F5	Trace Select	Same as the Trace function menu “Trace Select”. 3.5.1 Trace
F7	Reference	Same as the Trace function menu “Reference Value”. 3.5.1 Trace
F8	Scale/Div	Same as the Trace function menu “Scale/Div Value”. 3.5.1 Trace

3.3.1 Attenuator

This configures the input attenuator settings. The setting range and resolution are as follows:

Table 3.3.1-1 Setting Parameter of Input Attenuator

Item	Setting Parameter
Maximum	60 dB
Minimum	0 dB
Unit	dB
Resolution	MS2830A-045 Installed: 10 dB MS2840A-046 Installed without MS2840A-019/119: 10 dB Others: 2 dB MS2850A 2 dB
Default	0 dB

3.3.2 Pre-Amp

This configures the Pre-Amp On/Off.

(The function is available when MS269xA-008/108, MS2830A-008/108/068/168, MS2840A-008/108/068/168/069/169, or MS2850A-068/168 is installed. This function is fixed to Off if not installed.)

■Options

On	Enables the Pre-Amp function. (Default)
Off	Disables the Pre-Amp function.

3.4 Setting Common Items

This section describes the settings for the common items. Press F3 (Common Setting) on the main function menu to display the Common Setting function menu.

Table 3.4-1 Common Setting Function Menu

Function Key	Menu Display	Function
F1	DUT Mode	Opens the DUT Mode Function menu. 3.4.1 DUT Mode
F2	Convert Setup	Opens the Convert Setup Function Menu. Enable when DUT Mode is not Amplifier. 3.4.2 Convert Setup
F3	External LO Setup	Opens the External LO Setup Function Menu. Enable when DUT Mode is not Amplifier. 3.4.3 External Lo Setup
F4	Loss Comp	Opens the Loss Comp Menu. 3.4.4 Loss Comp
F5	ENR	Opens the ENR Function Menu. 3.4.5 ENR
F8	Cal Setup	Opens the Cal Setup Function Menu. 3.4.6 Cal Setup

3.4.1 DUT Mode

This section describes the DUT Mode function menu.

Table 3.4.1-1 DUT Mode Function Menu

Function Key	Menu Display	Function
F1	Amplifier	Sets the DUT Mode to the Amplifier.
F2	Down Converter	Sets the DUT Mode to Down Converter.
F3	Up Converter	Sets the DUT Mode to Up Converter.

3.4.2 Convert Setup

This section describes how to configure Convert Setup.

Table 3.4.2-1 Convert Setup Function

Function Key	Menu Display	Function
F2	LO Mode	Sets local frequency mode at measurement. Fixed: Fixes local frequency and performs measurement sweeping measurement frequency. (Default) Variable: Performs measurement with variable local frequency and fixed IF frequency.
F3	Local Freq	Sets the local frequency to fix when LO Mode is Fixed. Enable when LO Mode is Fixed. Setting Range: 3 Hz to 325 GHz (When Sideband Mode = LSB) 2 Hz to 325 GHz (When Sideband Mode = USB, DSB) (The external mixer M03HW limits the upper limit frequency.) Resolution: 1 Hz Default: 10000000000 Hz (10 GHz)
F4	IF Freq	Sets IF frequency to fix when LO Mode is variable. Enable when LO Mode is Variable. Setting Range: 1 Hz to the maximum frequency of the main unit Resolution: 1 Hz Default: 30000000 Hz (30 MHz)
F5	LO Power	Sets the output level of Local signal. Enable when LO Control is On. Setting Range: –100 to 100 dBm Resolution: 0.01 dB Default: 0.00 dBm
F8	Sideband Mode	Sets sideband to measure. When DUT Mode is Up Converter, DSB is unavailable. LSB: Lower Sideband (Default) USB: Upper Sideband DSB: Double Sideband

3.4.3 External Lo Setup

This section describes how to configure External LO Setup.

Table 3.4.3-1 External Lo Setup Function

Function Key	Menu Display	Function
F1	LO Control	Sets whether to control inputting external local signal from external device. On: Controls Off: Does not control (Default)
F2	GPIB Address	Sets GPIB address of signal source externally connected. Setting Range: 0 to 30 Default: 18
F3	LO Select	Sets signal source of control target. Setting Range: Actual machines list of VISA Remote Vector SG (built-in SG option installed)
F4	Command Select	Sets control command type of external local signal. Enable when LO Select is not Vector SG. SCPI: SCPI command (Default) Custom: Arbitrary setting command
F5	Command	Opens Command Function Menu. Enable when LO Select is not Vector SG. 3.4.3.1 Command
F6	Settling Time	Sets waiting time for completing external local signal setting. Setting Range: 0 to 5 s Resolution: 1 ms Default: 0 ms
F7	LO MIN Frequency	Sets minimum frequency of external local signal.
F8	LO MAX Frequency	Sets maximum frequency of external local signal.

Note:

The Function F2 to F8 on the menu are unavailable when LO Control is OFF.

3.4.3.1 Command

This section describes how to configure command settings.

Table 3.4.3.1-1 Command Function

Function Key	Menu Display	Function
F1	LO Auxiliary	Sets SG RF Output remote command character string to control external SG. Setting Range: Supports ASCII. Maximum character number: 79 Default: "OUTP:STAT ON"
F2	LO Freq Prefix	Sets SG Frequency remote command character string to control external SG. Setting Range: Supports ASCII. Maximum character number: 79 Default: "FREQ"
F3	LO Freq Suffix	Sets SG Frequency remote command unit character string to control external SG. Setting Range: Supports ASCII. Maximum character number: 79 Default: "HZ"
F4	LO Power Prefix	Sets SG Output Level remote command character string to control external SG. Setting Range: Supports ASCII. Maximum character number: 79 Default: "POW"
F5	LO Power Suffix	Sets SG Output Level remote command unit character string to control external SG. Setting Range: Supports ASCII. Maximum character number: 79 Default: "DBM"

3.4.4 Loss Comp

This section describes how to configure the loss compensation settings.

Table 3.4.4-1 Loss Comp Function Menu

Function Key	Menu Display	Function
F1	Before DUT	Sets the loss compensation before the DUT input port. Select from the following three options. Off: Does not compensate the loss before the DUT input port. Fixed: Compensates the loss with the value of Before DUT Fixed. Table: Compensates the loss with the value of Before DUT Table.*
F2	Before DUT Fixed	Sets the compensation value of Before DUT Fixed. Enable when Before DUT is Fixed. Setting Range: –99.999999 to 99.999999 dB Resolution: 0.000001 dB Default: 0 dB
F3	Before DUT Table	Opens the Before DUT Table Function Menu. Enable when Before DUT is Table. 3.4.4.1 Before DUT Table
F5	After DUT	Sets the loss compensation after the DUT output port. Select from the following three options. Off: Does not compensate the loss after the DUT input port. Fixed: Compensates the loss with the value of After DUT Fixed. Table: Compensates the loss with the value of After DUT Table.
F6	After DUT Fixed	Sets the compensation value of After DUT Fixed. Enable when After DUT is Fixed. Setting Range: –99.999999 to 99.999999 dB Resolution: 0.000001 dB Default: 0 dB
F7	After DUT Table	Opens the After DUT Table Function Menu. Enable when After DUT is Table. 3.4.4.2 After DUT Table

*: When considering the frequency range to which the corrected value is input is from Fa to Fb, a corrected value is applied instead if the displayed frequency is out of the frequency range from Fa to Fb:

- If the displayed frequency range is lower than Fa, then the corrected value La is applied.
- If the displayed frequency range is higher than Fb, then the corrected value Lb is applied.

The value between corrected values is log-interpolated.

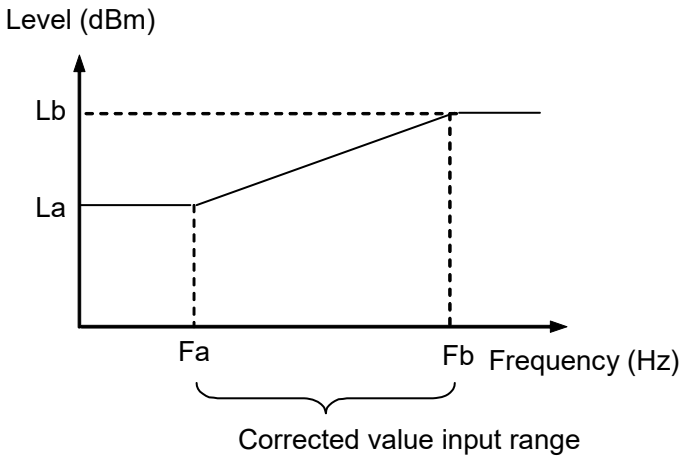


Figure 3.4.4-1 Operation When Correction Values Are Entered

3.4.4.1 Before DUT Table

This menu is used to configure settings for the loss compensation before the DUT input port.

Table 3.4.4.1-1 Before DUT Table Function Menu

Function Key	Menu Display	Function
F1	Device	Specifies the Table file storage destination drive.
F2	Save Loss Comp Before DUT Table	Before DUT Table in a file.
F3	Recall Loss Comp Before DUT Table	Recalls Before DUT Table from a file.
F6	Edit	Opens Loss Comp Before DUT Table dialog box and Before DUT Edit function menu. 3.4.4.1.1 Before DUT Edit

The file format for Before DUT Table is as follows:

Directory to output files to: Anritsu Corporation\Signal Analyzer\User Data\NF Data\LossCompTable\

Default file name for saving: LossCompBeforeDUTYYYYMMDD_n.csv

File extension: csv format

```
[Filetype: LossComp]          [1]
[Version: 1.0.0.0]            [2]
1000000,2                     [3]
100000000,2.000001
1000000000,2.111111
```

[1] File Type: Describe the file type.
Describe LossComp for Loss Comp Table.

[2] Describe the version of the file format.

[3] Describe Frequency and Loss Value in each single line, separating with a comma.

Setting Range of Before DUT Table is as follows:

Frequency: 0 to 100 GHz

Loss Value: –99.999999 to 99.999999 dB

3.4.4.1.1 Before DUT Edit

Edits the Before DUT Table.

Press F6 (Edit) on the Before DUT Table function menu to display the Loss Comp Before DUT Table dialog box and Before DUT Edit function menu.

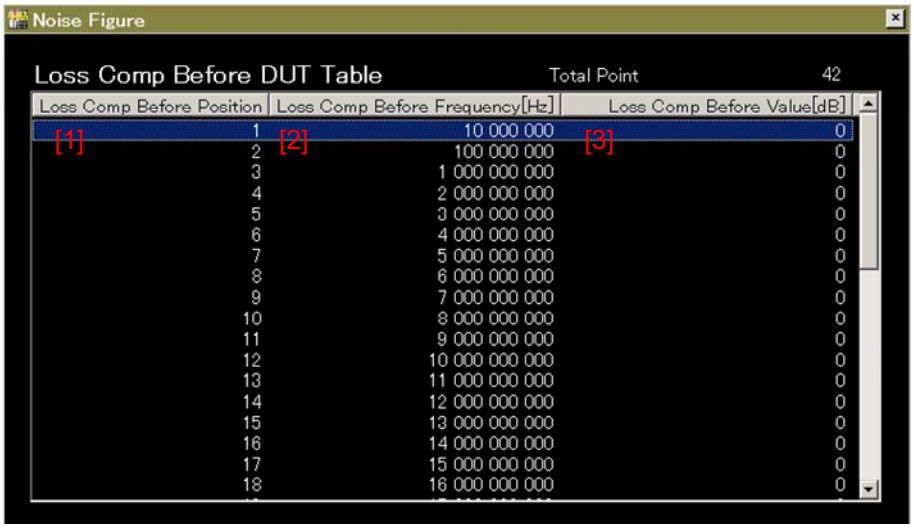


Figure 3.4.4.1.1-1 Loss Comp Before DUT Table Dialog Box

[1] Loss Comp Before Position: Position (Point)

[2] Loss Comp Before Frequency: Frequency of Position (Point)

[3] Loss Comp Before Value: Compensation value of Position (Point)

Table 3.4.4.1.1-1 Before DUT Edit Function Menu

Function Key	Menu Display	Function
F1	Position	Selects Position from List on the Table screen. Various settings can be performed for items of the selected Position (number). Setting Range: 1 to (Total Point + 1) Default: 1 Maximum: 501
F2	Frequency	Sets the frequency for the selected Position.
F3	Level	Sets compensation value of the selected Position.
F5	Insert Point Below	Adds Point next to the selected Position. The added Point reflects the current Position value as it is.
F6	Delete Point	Deletes Point of the selected Position.
F7	Sort Table	Sorts Table in ascending order of frequency.
F8	Clear Loss Comp Before DUT Table	A confirmation message is displayed before clearing and pressing Enter executes the clearing.

3.4.4.2 After DUT Table

This menu is used to configure settings for the loss compensation after the DUT output.

Table 3.4.4.2-1 Description of After DUT Table Functions

Function Key	Menu Display	Function
F1	Device	Specifies a drive for storing the Table file.
F2	Save Loss Comp After DUT Table	Saves the After DUT Table as a file.
F3	Recall Loss Comp After DUT Table	Reads out the After DUT Table from a file.
F6	Edit	Opens Loss Comp After DUT Table dialog box and After DUT Edit function menu. Setting Procedure is same as the Before DUT Edit. 3.4.4.1.1 Before DUT Edit

The file format for After DUT Table is as follows:
Directory to output files to: Anritsu Corporation\Signal Analyzer\User Data\NF Data\LossCompTable\

Default file name for saving: LossCompAfterDUTYYYYMMDD_n.csv

File extension: csv format

```
[Filetype: LossComp]          [1]
[Version: 1.0.0.0]            [2]
1000000,2                     [3]
100000000,2.000001
1000000000,2.111111
```

[1] File Type: Describe the file type.
Describe LossComp for Loss Comp Table.

[2] Describe the version of the file format.

[3] Describe Frequency and Loss Value in each single line, separating with a comma.

Setting Range of After DUT Table is as follows:

Frequency: 0 to 100 GHz
Loss Value: –99.999999 to 99.999999 dB

3.4.5 ENR

This menu is used to configure the ENR (Excess Noise Ratio) function settings.

Table 3.4.5-1 ENR Function Menu

Function Key	Menu Display	Function
F1	Noise Source Select	Selects the Noise Source. ☞ 3.4.5.1 Noise Source Select
F2	Noise Source Settling Time	Sets the measurement waiting time when Noise Source On/Off is switched. Setting range: 0 to 5 s Resolution: 1 ms Default: 0 ms
F3	ENR Mode	Selects the ENR Mode (Table or Spot). Default: Table
F4	Meas Table	Opens the Meas Table menu. This is available only when ENR Mode is Table. ☞ 3.4.5.2 Meas Table
F5	Use Table for Cal	Select the ENR Table for Cal from Meas Table /Cal Table. Default:Meas Table
F6	Cal Table	Opens Cal Table function menu. Enable when Use Table for Cal is Cal Table. ☞ 3.4.5.3 Cal Table
F7	Spot	Opens the Spot menu. This menu is available only when the ENR Mode is Spot. ☞ 3.4.5.4 Spot
F8	T cold	Sets the temperature when Noise Source is Cold. Setting range: 0 K to 29650000 K Setting unit: K, °C, °F Resolution: 0.01 Default: 296.50 K

3.4.5.1 Noise Source Select

The Noise Source Select function selects Noise Source to be used with the measurement. This software supports the NC346 Series noise sources by Noisecom. For detailed specifications, refer to the catalog and data sheet for the NC346 Series.

Table 3.4.5.1-1 Noise Source Select Function

Function Key	Menu Display	Function
F1	NC346A	NC346A (Option1) by Noisecom Frequency range: 0.01 to 18.0 GHz Output ENR 5 to 7 dB
F2	NC346B	NC346B (Option1) by Noisecom Frequency range: 0.01 to 18.0 GHz Output ENR 14 to 16 dB
F3	NC346C	NC346C by Noisecom Frequency range: 0.01 to 26.5 GHz Output ENR 13 to 17 dB
F4	NC346D	NC346D (Option1) by Noisecom Frequency range: 0.01 to 18.0 GHz Output ENR 19 to 25 dB
F5	NC346E	NC346E by Noisecom Frequency range: 0.01 to 26.5 GHz Output ENR 19 to 25 dB
F6	NC346Ka	NC346Ka by Noisecom Frequency range: 0.1 to 40.0 GHz Output ENR 10 to 17 dB
F8	User	Arbitrary noise source

3.4.5.2 Meas Table

This function is used to configure the Meas Table function settings. For description of function keys, refer to Table 3.4.5.2-1.

Table 3.4.5.2-1 Meas Table Function Menu

Function Key	Menu Display	Function
F1	Device	Specifies the Table file storage destination drive.
F2	Save Meas Table	Meas Table in a file.
F3	Recall Meas Table	Recalls Meas Table from a file.
F6	Edit	Opens the Meas Table dialog box and Meas Table Edit function menu. 3.4.5.2.1 Meas Table Edit

The file format for Meas Table is as follows:

Directory to output files to: Anritsu Corporation\Signal Analyzer\User Data\ENR\

Default file name for saving: MeasYYYYMMDD_n.csv

File extension: csv format

```
[Filetype: ENR]                [1]
[Version: 1.0.0.0]             [2]
1000000,15                     [3]
100000000,15.0002
1000000000,15.0111
```

[1] File Type: Describe the file type.
Describe ENR for Meas Table.

[2] Describe the version of the file format.

[3] Describe Frequency and ENR Value in each single line, separating with a comma.

The setting range of Meas Table is as follows:

Frequency: 0 to 100 GHz

Loss Value: –17 to 50 dB

3.4.5.2.1 Meas Table Edit

Edits the Meas Table.

Press F6 (Edit) on the Meas Table function menu to display the Meas Table dialog box and Meas Table Edit function menu.

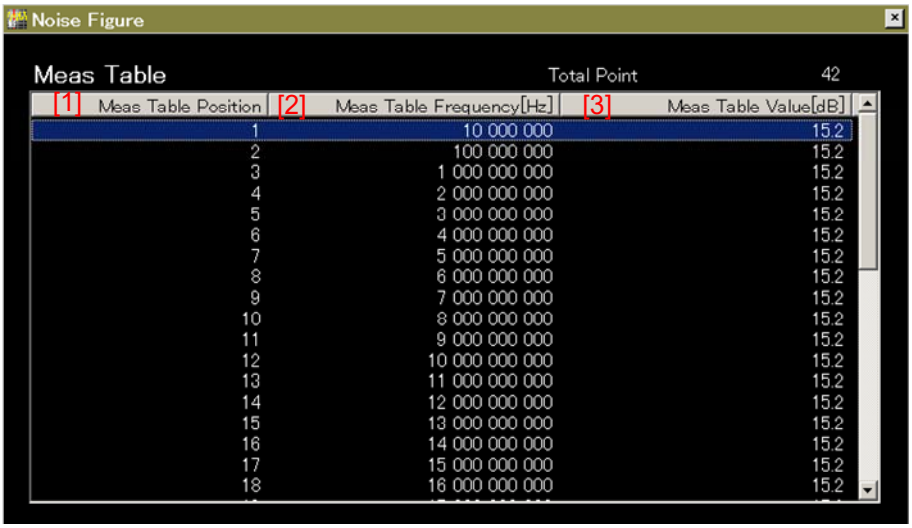


Figure 3.4.5.2.1-1 Meas Table Dialog Box

[1] Meas Table Position: Position (Point)

[2] Meas Table Frequency: Frequency of Position (Point)

[3] Meas Table Value: ENR of Position (Point)

Table 3.4.5.2.1-1 Meas Table Edit Function Menu

Function Key	Menu Display	Function
F1	Position	Selects Position from List on the Table screen. Various settings can be performed for items of the selected Position (number). Setting Range: 1 to (Total Point + 1) Default: 1 Maximum: 501
F2	Frequency	Sets the frequency for the selected Position.
F3	ENR	Sets ENR of the selected Position.
F5	Insert Point Below	Adds Point next to the selected Position. The added Point reflects the current Position value as it is.
F6	Delete Point	Deletes Point of the selected Position.
F7	Sort Table	Sorts Table in ascending order of frequency.
F8	Clear Meas Table	Clears the Table. A confirmation message is displayed before clearing and pressing Enter executes the clearing.

3.4.5.3 Cal Table

This function is used to configure the Meas Table function settings. For description of function keys, refer to Table 3.4.5.3-1.

Table 3.4.5.3-1 Cal Table Function Menu

Function Key	Menu Display	Function
F1	Device	Specifies the Table file storage destination drive.
F2	Save Cal Table	Cal Table in a file.
F3	Recall Cal Table	Recalls Cal Table from a file.
F6	Edit	Opens the Cal Table dialog box and Cal Table Edit function menu. Setting procedure is same as the Meas Table Edit. 3.4.5.2.1 Meas Table Edit

The file format for Cal Table is as follows:

Directory to output files to: Anritsu Corporation\Signal Analyzer\User Data\CalTable\

Default file name for saving: CalYYYYMMDD_n.csv

File extension: csv format

```
[Filetype: ENR]                [1]
[Version: 1.0.0.0]             [2]
1000000,15                     [3]
100000000,15.0002
1000000000,15.0111
```

[1] File Type: Describe the file type.
Describe ENR for Cal Table.

[2] Describe the version of the file format.

[3] Describe Frequency and ENR Value in each single line, separating with a comma.

The setting range of Cal Table is as follows:

Frequency: 0 to 100 GHz

Loss Value: –17 to 50 dB

3.4.5.4 Spot

This section describes how to configure the Spot mode. For description of function keys, refer to Table 3.4.5.4-1.

Table 3.4.5.4-1 Spot Function Menu

Function Key	Menu Display	Function
F1	Spot Mode	Switches Spot Mode to ENR/T hot. Default: ENR
F2	Spot ENR	Sets Spot ENR Value. This is available only when Spot Mode is ENR. Setting range: –17 to 50 dB Resolution: 0.001 dB Default: 15.200 dB
F3	Spot T hot	Sets Spot T hot Value. This is available only when Spot Mode is T hot. Setting Range: 0 to 29650000 K Unit: K, °C, °F Resolution: 0.01 Default: 9982.80 K

3.4.6 Cal Setup

This section describes how to configure the various settings related NF Calibration. Press F8 on the Common Setting function menu or F8 on the Measure function menu to display the Cal Setup function menu.

Note:

Do not execute the CAL function of the main unit after NF Calibration is executed.
If it is executed, correct measurement results cannot be obtained.

Table 3.4.6-1 Cal Setup Function Menu

Function Key	Menu Display	Function
F1	Min ATT	Sets the attenuator value to start NF Calibration. Changing Min ATT value clears NF Calibration data. Setting Range: 0 to 40 dB Resolution: [MS269xA] 2 dB [MS2830A] 2 dB (Other than Option 045) 10 dB (Option 045) [MS2840A] 2 dB (except below) 10 dB (Option 046 without 019/119) [MS2850A] 2 dB Default: 0 dB
F2	Max ATT	Sets the attenuator value to Stop NF Calibration. Changing Max ATT value clears NF Calibration data. Setting Range: 0 to 40 dB Resolution: [MS269xA] 2 dB [MS2830A] 2 dB (Other than Option 045) 10 dB (Option 045) [MS2840A] 2 dB (except below) 10 dB (Option 046 without 019/119) [MS2850A] 2 dB Default: [MS269xA] 2 dB [MS2830A] 2 dB (Other than Option 045) 10 dB (Option 045) [MS2840A] 2 dB (except below) 10 dB (Option 046 without 019/119) [MS2850A] 2 dB

Table 3.4.6-1 Cal Setup Function Menu (Cont'd)

Function Key	Menu Display	Function
F4	Apply Calibration	Switches whether the NF Calibration result is enabled or disabled. On: Enabled. Off: Disabled. Default: On
F6	Clear Cal Data	Clears the NF Calibration data and saved file. If the NF Calibration data does not exist, it cannot be measured correctly.
F8	Calibration Now	Executes NF Calibration. The NF Calibration menu (Refer to Table 3.4.6-2.) is displayed during Calibration is being executed. ***Note:*** When the below settings are changed, Cal Status becomes Uncal. The measurement cannot be performed properly in Uncal state. Make sure to execute NF Calibration. • Frequency List Table • DUT Mode • LO Mode • Local Freq • IF Freq • Sideband Mode • Noise Source Select • ENR • Min ATT • Max ATT

Table 3.4.6-2 NF Calibration Function Menu

Function Key	Menu Display	Function
F8	Cancel	Stops NF Calibration and returns to the Cal Setup menu. In this case, the previous NF Calibration data is not cleared but held.

3.5 Setting the Measure Function

This section describes how to set the Measure menu settings. Press F4 (Measure) on the main function menu or Measure to display the Measure function menu.

Table 3.5-1 Measure Function Menu

Function Key	Menu Display	Function
F1	Trace	Opens the Trace menu. ☞ 3.5.1 Trace
F2	Storage	Opens the Storage menu. ☞ 3.5.2 Storage
F3	Layout	Switches the screen layout mode between Table and Graph. Graph: Graph display Table: Table display Default: Graph ☞ 3.8 Measurement Results
F5	BW	Sets the filter bandwidth when a Gauss filter is applied. This is the same function as Gauss, the filter setting of the Signal Analyzer main unit function. For details, refer to the Operation Manual (Mainframe Operation). (In this application, the maximum is 8 MHz and the minimum is 100 kHz.)
F6	Analysis Time Mode	Switches Analysis Time automatic setting ON/OFF. Auto: Performs the automatic setting. Manual: Sets manually. Default: Auto The analysis time length necessary for NF measurement errors to converge into 2σ (±0.034 dB) is set automatically according to the BW setting when Auto is set.
F7	Analysis Time (Ave. Time)	Sets the Analysis time. Setting range: 2 µs to 200 s (The range is limited by BW.) Setting unit: s, ms, µs, ns Resolution: 1 us to 500 µs (The resolution is limited by BW.) Default: 16.19 ms
F8	Cal Setup	Opens the Cal Setup menu. ☞ 3.4.6 Cal Setup

3.5.1 Trace

This section describes the Trace Function Menu.

Table 3.5.1-1 Description of Trace Functions Menu

Function Key	Menu Display	Function
F1	Trace Select	Switches the active trace between Trace1 and Trace2. 1: Sets the Trace to 1. 2: Sets the Trace to 2. Default: 1
F2	Result Type	Select the measurement result to be displayed for each trace. For details, refer to Table 3.5.1-2.
F7	Reference	Sets the median of the vertical axis of the graph for each Result Type. For the setting parameters by Result Type, refer to Table 3.5.1-3.
F8	Scale / Div	Sets the scale of the vertical axis of the graph for each Result Type. For the setting parameters by Result Type, refer to Table 3.5.1-4.

Table 3.5.1-2 Description of Result Type Menu Functions

Function Key	Menu Display	Function
F1	Noise Figure (dB)	Displays the noise figure (NF).
F2	Noise Factor (Linear)	Displays the noise factor.
F3	Gain	Displays the gain.
F4	Y - Factor	Displays Y-factor (noise power ratio when Noise Source is turned ON/OFF)
F5	T effective	Displays the effective noise temperature.
F6	P Hot	Displays the Power value measured when Noise Source is On.
F7	P Cold	Displays the Power value measured when Noise Source is Off.

Table 3.5.1-3 Reference Setting Parameter List

Result Type	Noise Figure	Noise Factor	Gain	Y-Factor	T effective	P hot	P cold
Maximum	100 dB	1E9	100 dB	100 dB	100 000 000 K	100 dB	100 dB
Minimum	–100 dB	0	–100 dB	–100 dB	–100 000 000 K	–100 dB	–100 dB
Setting unit	dB	None	dB	dB	K, °C, °F	dB	dB
Resolution	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Default	4.0 dB	2.5	15.0 dB	5.0 dB	1000.0 K	5.0 dB	0 dB

Table 3.5.1-4 Scale/Div Setting Parameter List

Result Type	Noise Figure	Noise Factor	Gain	Y-Factor	T effective	P hot	P cold
Maximum	20 dB	100	20 dB	20 dB	20 000 000 K	20 dB	20 dB
Minimum	0.001 dB	0.001	0.001 dB	0.001 dB	0.1 K	0.001 dB	0.001 dB
Setting unit	dB	None	dB	dB	K, °C, °F	dB	dB
Resolution	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Default	1.0 dB	0.715	5.0 dB	1.0 dB	200.0 K	1.0 dB	1.0 dB

3.5.2 Storage

This section describes the Storage Function Menu.

Table 3.5.2-1 Description of Storage Function Menu

Function Key	Menu Display	Function
F1	Storage Mode	Switches Storage to off/Average. Off: Does not perform storage. Average: Turns on the averaging function. (Storage is performed for the measurement results.) Default: Off
F2	Storage Count	Sets the count when Storage Mode is Average. Maximum: 999 Minimum: 2 Resolution: 1 Default: 2

3.6 Setting the Marker Function

Press F5 in the main function menu to display the Marker function menu.

Table 3.6-1 Description of Marker Function Menus

Function Key	Menu Display	Function
Page 1	Marker	—
F1	Active Marker	Sets the Active Marker. Setting range: 1 to 4 (This software does not support Marker 5 and later.)
F2	Normal	Displays the frequency (time) and level.
F3	Delta	The Marker frequency and level display are values relative to the reference point (Marker set with Relative To)
F4	Off	Turns Off the Marker display.
F7	Relative To	Sets the reference marker when Active Maker is Delta.
Page 2	Marker	—
F8	All Marker Off	Turns Off all the markers.

Marker is intended for both Trace1 and Trace2. Additionally, Marker is valid only to the measurement point.

3.7 Setting the Peak Search Function

Press F6 in the main function menu to display the Peak Search function menu.

Table 3.7-1 Description of Peak Search Function Menu

Function Key	Menu Display	Function
F1	Peak Search	Performs a peak search on the active trace according to the type specified by Peak Criteria.
F2	Next Peak	Performs a next search on the active trace according to the type specified by Peak Criteria.
F5	Min Search	Performs a minimum level search on the active trace, and then moves the marker to it.
F6	Next Min	Performs a level search on the active trace, and then moves the marker to a minimum level point larger than the current position.

Table 3.7-1 Description of Peak Search Function Menu (Cont'd)

<table>
<tr><th>Function Key</th><th>Menu Display</th><th>Function</th></tr>
<tr><td>F8</td><td>Peak Criteria</td><td>Search performed by Peak Search and Next Peak depends on the Peak Criteria setting as shown in the table below.
<table>
<tr><th>Peak Criteria</th><th>Peak Search</th><th>Next Peak</th></tr>
<tr><td>Max</td><td>Max Search</td><td>Next Max</td></tr>
<tr><td>Min</td><td>Min Search</td><td>Next Min</td></tr>
<tr><td>Peak to Peak</td><td>Peak to Peak</td><td>Does not perform a search.</td></tr>
</table>
Default Max
The detail of Search types are as follows.
• Max Search
Searches the maximum level point of the active trace and moves the Marker.
• Next Max
Searches the level of the active trace and moves the marker to the maximum level point which level is lower than the current position.
• Min Search
Searches the minimum level point of the active trace and moves the marker.
• Next Min
Searches the level of the active trace and moves the marker to the minimum level point which level is higher than the current position.
• Peak to Peak Search
Searches the level of the active trace, moves the active marker to the maximum level point, and moves the maker set with Relative to of the active marker to the minimum level point.</td></tr>
</table>

3.8 Measurement Results

Measurement results are displayed. The measurement result display depends on the settings of Frequency Mode (Refer to Section 3.2.1 “Frequency Mode”) and Layout (Refer to Section 3.5 “Setting the Measure Function”).

3.8.1 List display

The measurement result is displayed with List display when Frequency Mode and Layout are as follows:

Frequency Mode: List or Sweep
Layout: Table

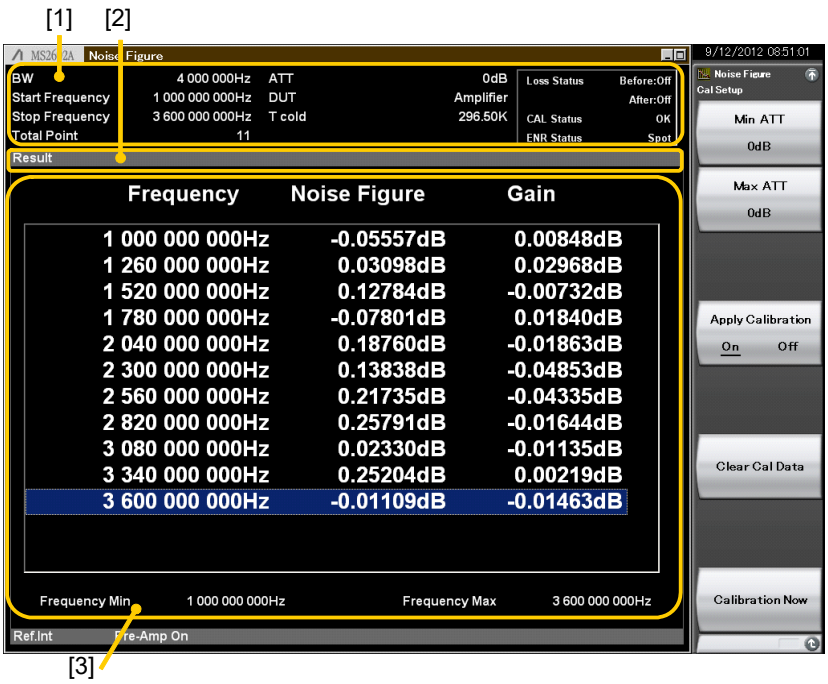


Figure 3.8.1-1 Appearance of the Screen in the List Display Mode

[1] Parameter Area — 3.8.1.1 Parameter Area
[2] Measurement Status Area — 3.8.1.2 Measurement Status Area
[3] List Area — 3.8.1.3 List Area

3.8.1.1 Parameter Area

This section describes the detail of the parameter area. The parameter area is common for all of List display, Graph display, and Spot display.

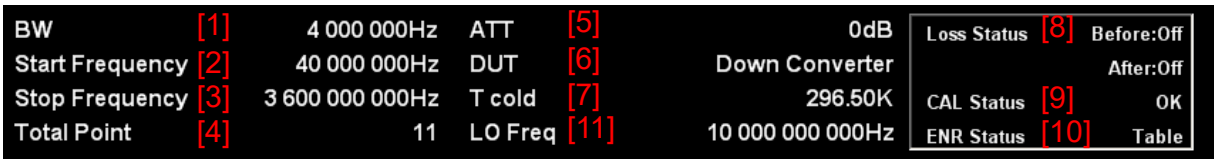


Figure 3.8.1.1-1 Close Up of the Parameter Area

[1] BW: Displays the BW value.

[2] Start Frequency: Displays the value of Start Frequency only when the Frequency mode is set to Sweep.

[3] Stop Frequency: Displays the Stop Frequency value only when the Frequency mode is set to Sweep.

[4] Total Point: Displays the value of Total Point only when the Storage Mode is set to Fixed.

[5] ATT: Displays the Attenuator value.

[6] DUT: Displays the DUT mode.

[7] T Cold: Displays the T Cold value.

[8] Loss Status: Displays the value of Loss Status, depending on the Before DUT and After DUT settings.

Table 3.8.1.1-1 Loss Status Display List

Loss Status Display		Before DUT	After DUT
Before: Off	After: Off	Off	Off
Before: Fixed	After: Off	Fixed	Off
Before: Off	After: Fixed	Off	Fixed
Before: Fixed	After: Fixed	Fixed	Fixed
Before: Table	After: Off	Table	Off
Before: Off	After: Table	Off	Table
Before: Table	After: Table	Table	Table

Note:

When Before DUT or After DUT is set to Table, if Table loading fails, Loss Status is displayed in red. Performing measurements as it is does not provide correct measurement results. After Table loading is completed, perform the measurement.

[9] Cal Status Displays the Cal Status.

Table 3.8.1.1-2 Cal Status Display List

Cal Status Display	Apply Calibration
OK or Uncal	On
Off	Off

Note:

Even when Apply Calibration is On, NF Calibration data is disabled if Cal Status becomes Uncal. When Uncal is displayed, correct measurement results cannot be obtained. Re-execute NF Calibration.

[10] ENR Status Displays the ENR Status.

Table 3.8.1.1-3 ENR Status Display List

ENR Status	ENR Mode
Spot	Spot
Table	Table

Note:

When ENR Mode is Table, ENR Status may be displayed in red. This occurs because Meas Table is not set.

Check the setting of Meas Table when ENR Status is displayed in red.

[11] Lo Freq / IF Freq:

Displays local frequency or IF frequency that is fixed according to LO Mode when DUT Mode is not Amplifier.

Table 3.8.1.1-4 Displayed fixed frequency

LO Mode	Displayed fixed frequency	
Fixed	LO Freq:	Local Frequency
Variable	IF Freq:	IF Frequency

3.8.1.2 Measurement Status Area

The measurement status is displayed. For details, refer to Table 3.8.1.2-1.

Figure 3.8.1.2-1 Measurement Status Area

Table 3.8.1.2-1 List of displays the Measurement Status Area

No.	Parameter	Description
[1]	Warm Up	Indicates that the level and frequency are not stable when the power is turned on.
[2]	Level Over	Displayed when the input signal level exceeds the input range.
[3]	Measure	"Measure" display blinks while the measurement is being executed.
[4]	Storage	Displays Storage Mode off/Average and Count for Average.

3.8.1.3 List Area

This section describes the details of the List Area.

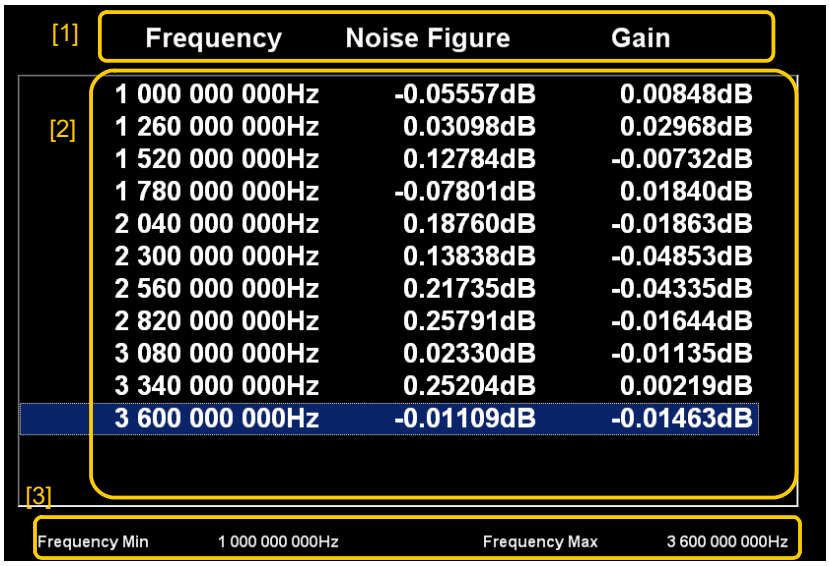


Figure 3.8.1.3-1 Close Up of the List Area

[1] Result Type display area:

Displays Frequency, Result Types of Trace1 and Trace2.
(Result Type: Refer to Section 3.5.1 “Trace”.)

Note:

Frequency display changes to IF Frequency or RF Frequency according to LO Mode setting (Fixed / Variable) when DUT Mode is not Amplifier.

[2] Measurement result display area:

Displays frequencies and measurement results corresponding to the Result Type of Trace1 and Trace2 each.

[3] Minimum/maximum frequency display area:

Displays the minimum/maximum frequencies of the measurement range.

3.8.2 Graph Display

The measurement results are displayed as a graph when Frequency Mode and Layout are set as follows:

Frequency Mode: Sweep or List
Layout: Graph

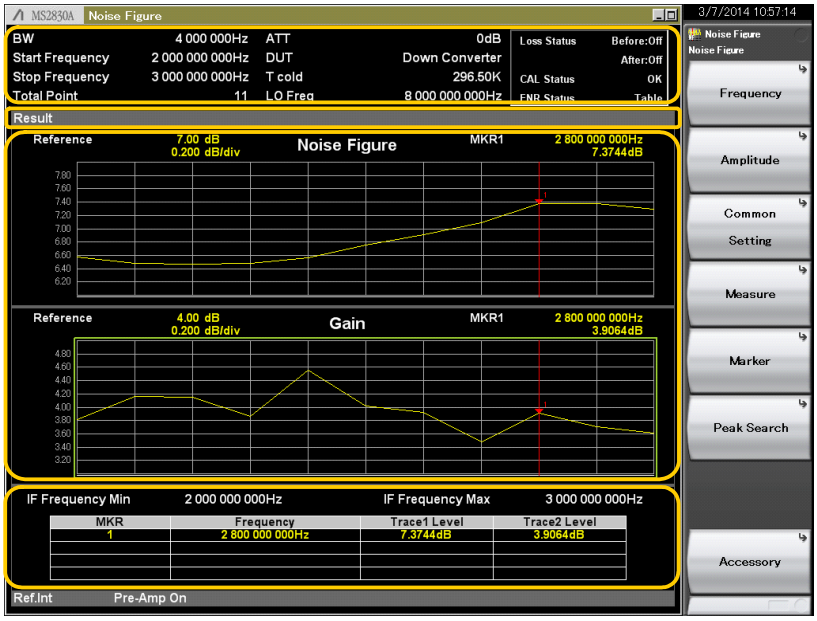


Figure 3.8.2-1 Appearance of the Screen in the Graph Display Mode

[1] Parameter Area — 3.8.2.1 Parameter Area
[2] Measurement Status Area — 3.8.2.2 Measurement Status Area
[3] Graph Area — Upper: Trace1, Lower: Trace2
3.8.2.3 Graph Area
[4] Marker List Area — 3.8.2.4 Marker List Area

3.8.2.1 Parameter Area

The parameter area is common for all of List display, Graph display, and Spot display. Refer to Section 3.8.1.1.

3.8.2.2 Measurement Status Area

The measurement status area is the same for List display, Graph display, and Spot display. Refer to 3.8.1.2.

3.8.2.3 Graph Area

This paragraph describes the Graph Area.

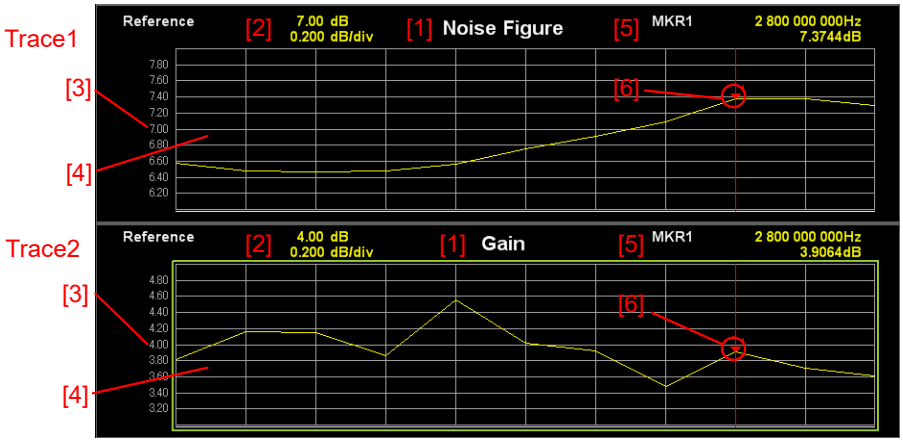


Figure 3.8.2.3-1 Detail of Graph Area

The graph is divided into two. Trace1 result is shown in the upper field and Trace2 result in the lower field.

[1] Result Type display area:

Displays Result Types of Trace1 and Trace2.
(Result Type: Refer to Section 3.5.1 “Trace”.)

[2] Scale/ DIV, Reference display area:

Displays the value of Scale/Div and Reference.

[3] Scale display area:

Displays the scale where the Reference value is in the center.

[4] Graph display area:

Consists of the following items.

Vertical axis maximum value:

Reference + (Scale / div) × 5

Vertical axis minimum value:

Reference – (Scale / div) × 5

Horizontal axis maximum value:

Maximum value of Measure List Parameter “Frequency” in the Measurement List Table

Horizontal axis maximum value:

Minimum value of Measure List Parameter “Frequency” in the Measurement List Table

[5] Active Marker Information display area:

Displays the frequency and level of the marker specified with Active Marker.

[6] Marker: Displays the marker icon at the frequency and level position of the marker specified with Active Marker.

3.8.2.4 Marker List Area

This paragraph describes the Marker List Area.

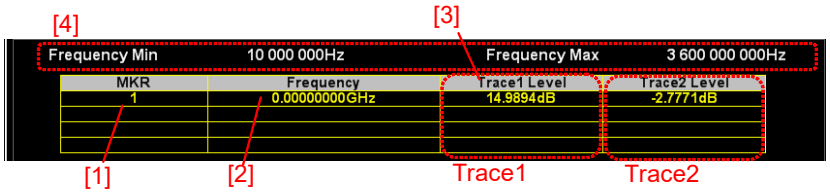


Figure 3.8.2.4-1 Detail of Marker List Area

[1] Marker Mode display area:

The display changes according to Marker Mode.

Marker Mode: Normal

Displays the Marker number as it is.

Marker Mode: Delta

Displays with the marker number form specified with Marker number Δ Relative to.

Marker Mode: Off

Deletes all displays of corresponding rows.

[2] Marker Frequency display area:

Displays the frequency of the Marker position.

[3] Level display area:

Displays the level at the Marker position of Trace1 (left side) and Trace2 (right side) each.

[4] Minimum/Maximum Frequency display area:

Displays the minimum/maximum frequencies of the measurement range.

3.8.3 Spot Display

The measurement results are displayed with Spot display when Frequency Mode is Fixed.

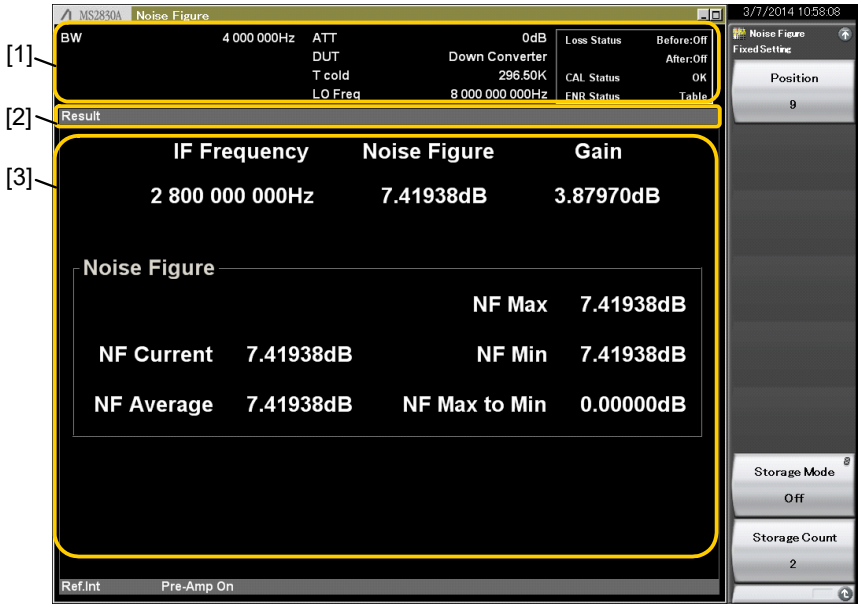


Figure 3.8.3-1 Appearance of the Screen in the Spot Display Mode

[1] Parameter Area — 3.8.3.1 Parameter Area
[2] Measurement Status Area — 3.8.3.2 Measurement Status Area
[3] Spot Area — 3.8.3.3 Spot Area

3.8.3.1 Parameter Area

The parameter area is the same for List display, Graph display, and Spot display. Refer to 3.8.1.1.

3.8.3.2 Measurement Status Area

The measurement status area is the same for List display, Graph display, and Spot display. Refer to 3.8.1.2.

3.8.3.3 Spot Area

This paragraph describes the Spot Area.

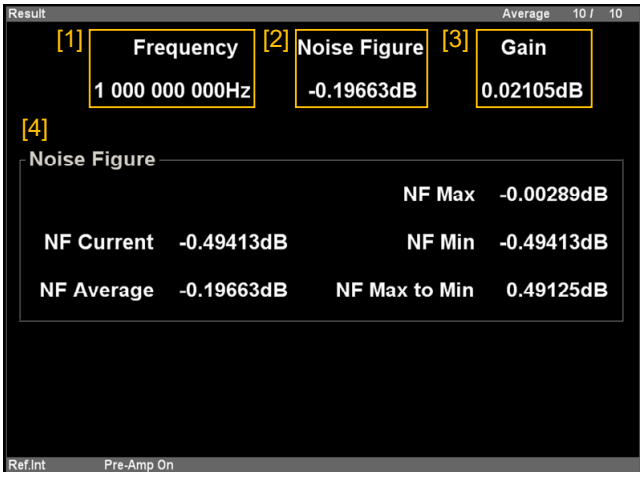


Figure 3.8.3.3-1 Close Up of the Spot Area

[1] Measurement Frequency:

Displays the Measurement Frequency.

Switches between IF Frequency and RF Frequency according to LO Mode (Fixed / Variable) when DUT Mode is not Amplifier.

[2] Trace Level (Trace1):

Displays the trace level (measurement result) according to the Result Type of Trace1.

[3] Trace Level (Trace2):

Displays the trace level (measurement result) according to the Result Type of Trace2.
(Result Type: Refer to Section 3.5.1 “Trace”)

[4] Noise Figure: Displays the measurement results of Noise Figure.

NF Current	Displays the latest measurement value of Noise Figure.
NF Average:	Displays the average value of Noise Figure.
NF Max	Displays the maximum value of Noise Figure.
NF Min	Displays the minimum value of Noise Figure.
NF Max to Min	Displays the difference of the maximum and minimum values of Noise Figure.

3.8.4 Saving Measurement Results

This section describes how to save the measurement results. Press Save in the NF Measurement screen, to display the Save menu.

Table 3.8.4-1 Description of the Save Function Menu

Function Key	Menu Display	Function
F1	Device	Specifies a drive for storing the Table file.
F6	Save All Results	Saves all the measurement results as a file.
F7	Save Application	Saves all the Application settings.
F8	Close	Closes the Save menu.

<Procedure>

1. Press F1 (Device) to change the save destination.
2. When the Setting window is displayed, select the target drive and then press F7 (Set) to set.
3. With the save destination set, press F6 (Save ALL Results).

The file format for the measurement results is as follows:

Output/input file path: Anritsu Corporation\Signal Analyzer\User Data\NF Data\MeasureResult\

Default file name for saving: NFYYYYMMDD_n.csv

File extension: csv format

[Filetype: Measurement Results] (1)
[Version: 1.00.00] (2)

DUT Setup Parameters
DUT Mode,Down Converter (3)

Measurement Parameters
Tcold,296.5 (4)
ENR Mode,Table (5)
Frequency Mode,Sweep (6)
Start Frequency,1000000000 (7)
Stop Frequency,3000000000 (8)
BW,4000000 (9)
Total Point,11 (10)
Spot Mode,Spot ENR (11)
Spot ENR,15.200 (12)
Spot Thot,9982.80 (13)
Storage Mode,Average (14)
Storage Count,10 (15)
Pre Amp,On (16)
Attenuator,8 (17)
LO Mode,Fixed (18)
Local Freq,10000000000 (19)
IF Freq,30000000 (20)
LO Power,0.00 (21)
Sideband Mode,LSB (22)
Use Table for Cal,Meas Tabl (23)

Corrected Measurement Results (24)
Frequency (Hz),Noise Figure (dB),Noise Factor (lin),Gain (dB),T effective (K),Phot (dB),Pcold (dB)
1000000000,-1.79548060894012,0.661381363868713,0.0900244042277336,-98.19
94094848633,15.378791809082,-1.56080520153046
2000000000,2.70877408981323,1.86585295200348,-0.0779658108949661,251.097
351074219,15.3628845214844,2.68265271186829
3000000000,-4.26647281646729,0.374414533376694,0.0959626361727715,-181.4
19784545898,15.3476991653442,-3.91802644729614

Uncorrected Measurement Results (25)
Frequency (Hz),Noise Figure (dB),Noise Factor (lin),Y-Factor (dB),T effective (K),Phot (dB),Pcold (dB)
1000000000,20.8624134063721,121.96671295166,1.04296946525574,35080.34765625,22.3747253417969,21.3317565917969
2000000000,20.2151432037354,105.078628540039,1.18945503234863,30182.80078125,22.2022094726563,21.0127563476563

(1) File Type: Describe the file type. Describe Measurement Results for Measurement Results Table.
(2) Describe the version of the file format.
(3) Describe the DUT mode.
(4) Describe the T cold value.
(5) Describe the ENR Mode value.
(6) Describe the Frequency Mode value.
(7) Describe the Start Frequency value.
(8) Describe the Stop Frequency value.
(9) Describe the BW value.
(10) Describe the Total Point value.
(11) Describe the Spot Mode.
(12) Describe the Spot ENR value.
(13) Describe the Spot T hot value.
(14) Describe the Storage Mode.
(15) Describe the Storage Count value.
(16) Describe the Pre-Amp value.
(17) Describe the Attenuator value.
(18) Describe the LO Mode* value.
(19) Describe the LO Freq* value.
(20) Describe the IF Freq* value.
(21) Describe the LO Power* value.
(22) Describe the Sideband Mode* value.
(23) Describe the Use Table for Cal* value.
(24) Describe the corrected values among the measurement results in the following order, separating with commas:
Frequency, Noise Figure, Noise Factor, Gain, T effective, Phot, and Pcold

(25) Describe the uncorrected values among the measurement results in the following order, separating with commas:
Frequency, Noise Figure, Noise Factor, Y-Factor, T effective, Phot, and Pcold

*: No value is described when DUT Mode is Amplifier.

Chapter 4 Other Functions

This chapter describes other functions of this application.

4.1 Selecting Other Functions

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

Table 4.1-1 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.

4.2 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.

4.3 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.

Chapter 5 Performance Test

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

5.1 Overview of Performance Test

5.1.1 Performance test

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

Use performance tests when required for acceptance inspection, routine inspection and performance verification after repairs.

If items that do not meet the required level are detected during performance testing, contact an Anritsu Service and Sales office.

⚠ CAUTION

Warm up the subject testing device and measuring instruments for at least 30 minutes, in order to stabilize them sufficiently before running performance tests. Demonstrating maximum measurement accuracy requires, in addition to the above, conducting performance tests under ambient temperatures, little AC power supply voltage fluctuations (100 to 120 VAC, 200 to 240 VAC), as well as the absence of noise, vibrations, dust, humidity or other problems.

5.1.2 Performance test items and instruments used

Table 5.1.2-1 lists the performance test items and measuring instruments used for testing each of these test items.

Table 5.1.2-1 List of performance test items and measuring instruments

Test Items		Summary	Main Instruments Used (Anritsu Model Name)
Supply Voltage	Power port operation check	Voltage check on operation (On/Off)/non-operation and measurement of rising/falling time of the power port for the Noise Figure Measurement Function	Oscilloscope

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

5.2 Power Port Operation Check

Perform voltage check on operation/non-operation and measurement of rising/falling time of the power port for the Noise Figure Measurement Function.

Test specifications

Supply Voltage	Operating On:	28 V±0.5 V
	Operating Off:	0 V±0.5 V
	Not Operating:	0 V±0.5 V
	Turn On Time:	≤1 ms
	Turn Off Time:	≤1 ms

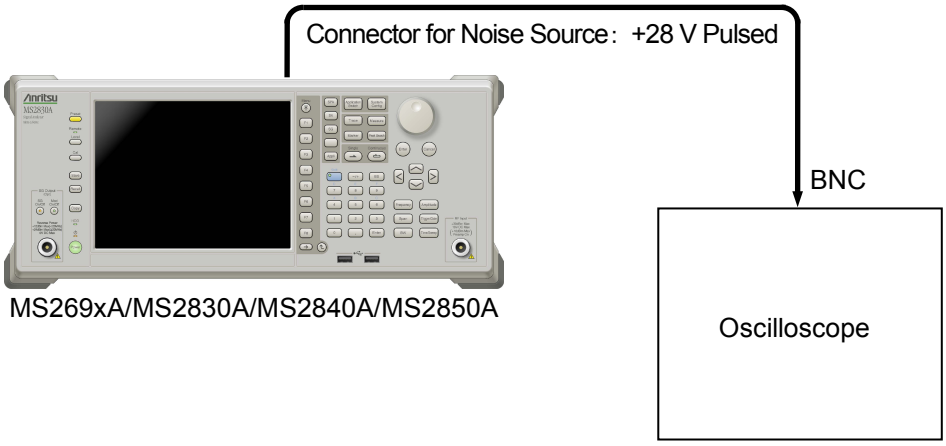


Figure 5.2-1 Power Port Operation Check

Table 5.2-1 Test Conditions and Common Parameters List

MS269xA / MS2830A / MS2840A / MS2850A	Oscilloscope
Application = Noise Figure Measurement Function Frequency Mode = Fixed Fixed Frequency = 1000 MHz RBW = 4 MHz(Default) ENR Mode = Spot Spot ENR = 15 dB	X scale: 1 ms/div Y scale: 5 V/div Input Impedance: 1 MΩ Trigger: Positive Trigger Level: 10 V

Test procedure

1. Execute common parameters (Table 5.2-1) setting for the oscilloscope.
2. After preset, execute common parameters setting (Table 5.2-1) for the Noise Figure Measurement Function of the MS269xA, MS2830A, MS2840A, or MS2850A.
3. Execute Single measurement and monitor the voltage (voltage for On-state and voltage for Off-state) that arises in a terminal for the Noise Source with the oscilloscope.
4. Check the voltage rising time.
5. Change Trigger of the oscilloscope to Negative.
6. Execute Single measurement and monitor the voltage (voltage for On-state and voltage for Off-state) that arises in a terminal for the Noise Source with the oscilloscope.
7. Check the voltage falling time.
8. Confirm that the rising time, falling time, voltage for On-state, voltage for Off-state, and voltage (voltage on non-operation) after Single measurement execution satisfy the specifications.

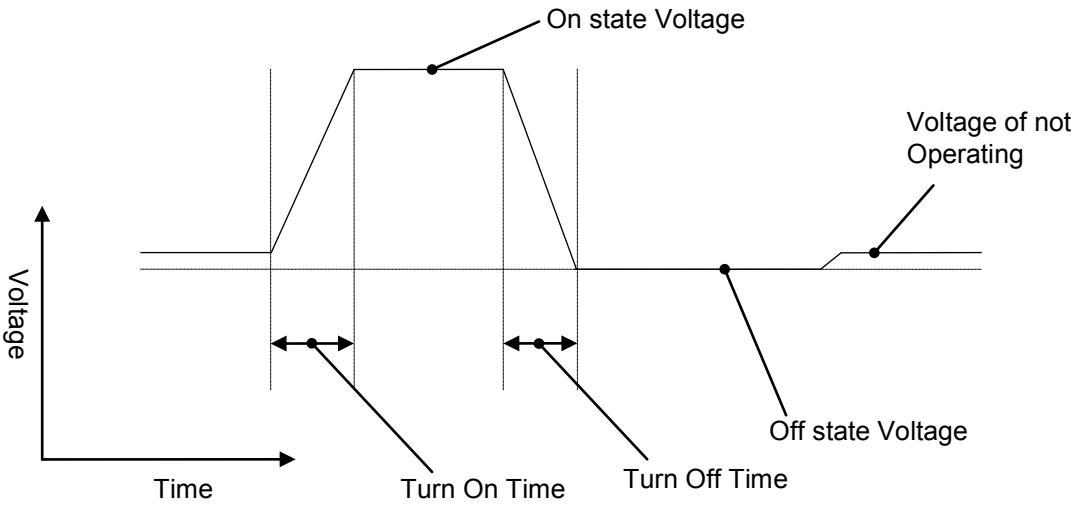


Figure 5.2-2 Power Port Operation Check Reference Figure

Appendix A Error Message

Table A-1 Message Processing and Status

Message	Description
Out of range	The settable range is exceeded.
Not available when Frequency Mode is not Fixed	You can set only when the Frequency Mode is set to Fixed.
Not available when Frequency Mode is not List	You can set only when the Frequency Mode is set to List.
Not available when Frequency Mode is not Sweep	You can set only when the Frequency Mode is set to Sweep.
Not available when Frequency Mode is Fixed	You cannot set when the Frequency Mode is set to Fixed.
Not available when DUT Mode is Amplifier	You cannot set when the DUT Mode is set to Amplifier.
Not available when LO Control is Off	You cannot set when the LO Control is set to Off.
Not available when LO Mode is Variable	You cannot set when the LO Mode is set to Variable.
Not available when LO Mode is Fixed	You cannot set when the LO Mode is set to Fixed.
Remote search result : No device	Local Oscillator is not found.
Not available when LO Select is Vector SG	You cannot set when the LO Select is set to Vector SG.
VISA driver is not installed	VISA driver is not installed.
The local oscillator is not connected	The local oscillator is not externally connected.
Local Frequency Error Noise Source Maximum Frequency	Error when LO Mode is Fixed The setting exceeds the maximum frequency of Noise Source.
Local Frequency Error Noise Source Minimum Frequency	Error when LO Mode is Fixed The setting falls below the minimum frequency of Noise Source.
Local Frequency Error SA Maximum Frequency	Error when LO Mode is Fixed The setting exceeds the maximum frequency of the main unit.
IF Frequency Error Noise Source Maximum Frequency	Error when LO Mode is Variable The setting exceeds the maximum frequency of Noise Source.
IF Frequency Error Noise Source Minimum Frequency	Error when LO Mode is Variable The setting falls below the minimum frequency of Noise Source.
IF Frequency Error SA Maximum Frequency	Error when LO Mode is Variable The setting exceeds the maximum frequency of the main unit.
Not available when Loss Comp before DUT is not Fixed	You can set only when the Loss Comp before DUT is set to Fixed.

Table A-1 Message Processing and Status (Cont'd)

Message	Description
Not available when Loss Comp before DUT is not Table	You can set only when the Loss Comp before DUT is set to Table.
Not available when Loss Comp after DUT is not Fixed	You can set only when the Loss Comp after DUT is set to Fixed.
Not available when Loss Comp after DUT is not Table	You can set only when the Loss Comp after DUT is set to Table.
Not available when ENR Mode is not Table	You can set only when the ENR Mode is set to Table.
Not available when ENR Mode is not Spot	You can set only when the ENR Mode is set to Spot.
Not available when Use Table for Cal is not Cal Table	You can set only when the Use Table for Cal is set to Cal Table.
Not available when Spot Mode is not ENR	You can set only when the Spot Mode is set to ENR.
Not available when Spot Mode is not T hot	You can set only when the Spot Mode is set to T hot.
Not available when Peak Criteria is Peak to Peak	You cannot set when the Peak Criteria is set to Peak to Peak.
Measurement disable	The measurement does not start unless the frequency is set correctly.
Calibration disable	The calibration does not start unless the frequency is set correctly.
Not available during Calibration	The operation is unavailable during NF Calibration.
No file to read	No file to read is found.
File read error	File read error occurred.
File format error	File format error occurred.
Empty Title Name	The title name field is empty.
Empty File Name	The file name field is empty.
Invalid character	Invalid characters are input.

Appendix B Default Value List

<Frequency>

Frequency Mode	Sweep
Sweep Setting	
Center Frequency	1.805 GHz
Start Frequency	10 MHz
Stop Frequency	3.6 GHz
Span	3.59 GHz
Sweep Point	11
Measurement List Table	
Index0	10 MHz
Index1	369 MHz
Index2	728 MHz
Index3	1.087 GHz
Index4	1.446 GHz
Index5	1.805 GHz
Index6	2.164 GHz
Index7	2.523 GHz
Index8	2.882 GHz
Index9	3.241 GHz
Index10	3.600 GHz

<Amplitude>

Amplitude	
Attenuator	0 dB
Pre-Amp	On

<Common Setting>

DUT Mode	Amplifier
Convert Setup	
LO Mode	Fixed
Local Freq	10.00 GHz
IF Freq	30.00 MHz
LO Power	0.00 dBm
Sideband Mode	LSB
External LO Setup	
LO Control	Off
GPIB Address	18
LO Select	Vector SG (with built-in option SG installed)
Command Select	SCPI
Settling Time	0.000 s

	Loss Comp	
	Before DUT	Off
	Before DUT Fixed	0 dB
	After DUT	Off
	After DUT Fixed	0 dB
	ENR	
	Noise Source Select	User
	Noise Source Settling Time	0 ms
	ENR Mode	Table
	Meas Table	15.200 dB
	Use Table for Cal	Meas Table
	Cal Table	15.200 dB
	T cold	296.50 K
	Spot	
	Spot Mode	ENR
	Spot ENR	15.200 dB
	Spot T Hot	9892.80 K
	Cal Setup	
	Min ATT	0 dB
	Max ATT	2 dB (MS269xA) 2 dB (MS2830A-040/041/043/044) 10 dB (MS2830A-045) 2 dB (MS2840A-040/041/044) 10 dB (MS2840A-046) 2 dB (MS2850A)
	Apply Calibration	On
<Measure>		
	Trace	
	Trace Select	Trace1
	Result Type	Noise Figure
	Reference	4.00 dB
	Scale/Div	1.000 dB
	Storage	
	Storage Mode	Off
	Storage Count	2
	Layout	Graph
	BW	4.000 MHz
	Analysis Time Mode	Auto
	Analysis Time Mode (Ave. Time)	16.189 ms
<Peak Search>		
	Peak Criteria	Max

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