MS2830A
Signal Analyzer
Operation Manual

Analog Radio
Automatic Measurement
Software

Second 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 "MS2830A Signal Analyzer Operation Manual (Mainframe Operation)" and "MX269018A Analog Measurement Software Operation Manual (Operation)." Please also refer to either of these documents before using the equipment.**
- **Keep this manual with the equipment.**

ANRITSU CORPORATION

Safety Symbols

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

Symbols used in manual

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

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

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

Safety Symbols Used on Equipment and in Manual

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

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

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

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

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

These indicate that the marked part should be recycled.

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 of 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 DVD version.

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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.

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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.

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3. You are not permitted to reverse engineer this software.

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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.

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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.

Before Using VISA[1]

To use this product, a NI-VISA™[2] from National Instruments™ (hereafter NI™) must be installed on the PC controller. We recommend using NI-VISA™[2] provided in the DVD attached to this product.

You are allowed to use NI-VISA™[2] in the DVD only for this product. Use of this software for any other product or purpose is prohibited. When uninstalling this product from the PC controller, uninstall the NI-VISA™ that was installed from the DVD as well.

Glossary of Terms:
 * [1] : VISA: Virtual Instrument Software Architecture
   I/O software specification for remote control of measuring instruments using interfaces such as GPIB, Ethernet, USB, etc.
 * [2] : NI-VISA™
   World de facto standard I/O software interface developed by NI and standardized by the VXI Plug&Play Alliance.

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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.

Protection Against Computer Virus Infections

Prior to the software installation
Before installing this software or any other software recommended or approved by Anritsu, run a virus scan on your computer, including removable media (e.g. USB memory stick and CF memory card) you want to connect to your computer.

When using this software and connecting with the measuring instrument
- Copying files and data
  On your computer, do not save any copies other than the following:
  - Files and data provided by Anritsu
  - Files created by this software
  - Files specified in this document
  Before copying these files and/or data, run a virus scan, including removable media (e.g. USB memory stick and CF memory card).
- Connecting to network
  Connect your computer to the network that provides adequate protection against computer viruses.

Cautions on Proper Operation of Software

This software may not operate normally if any of the following operations are performed on your computer:
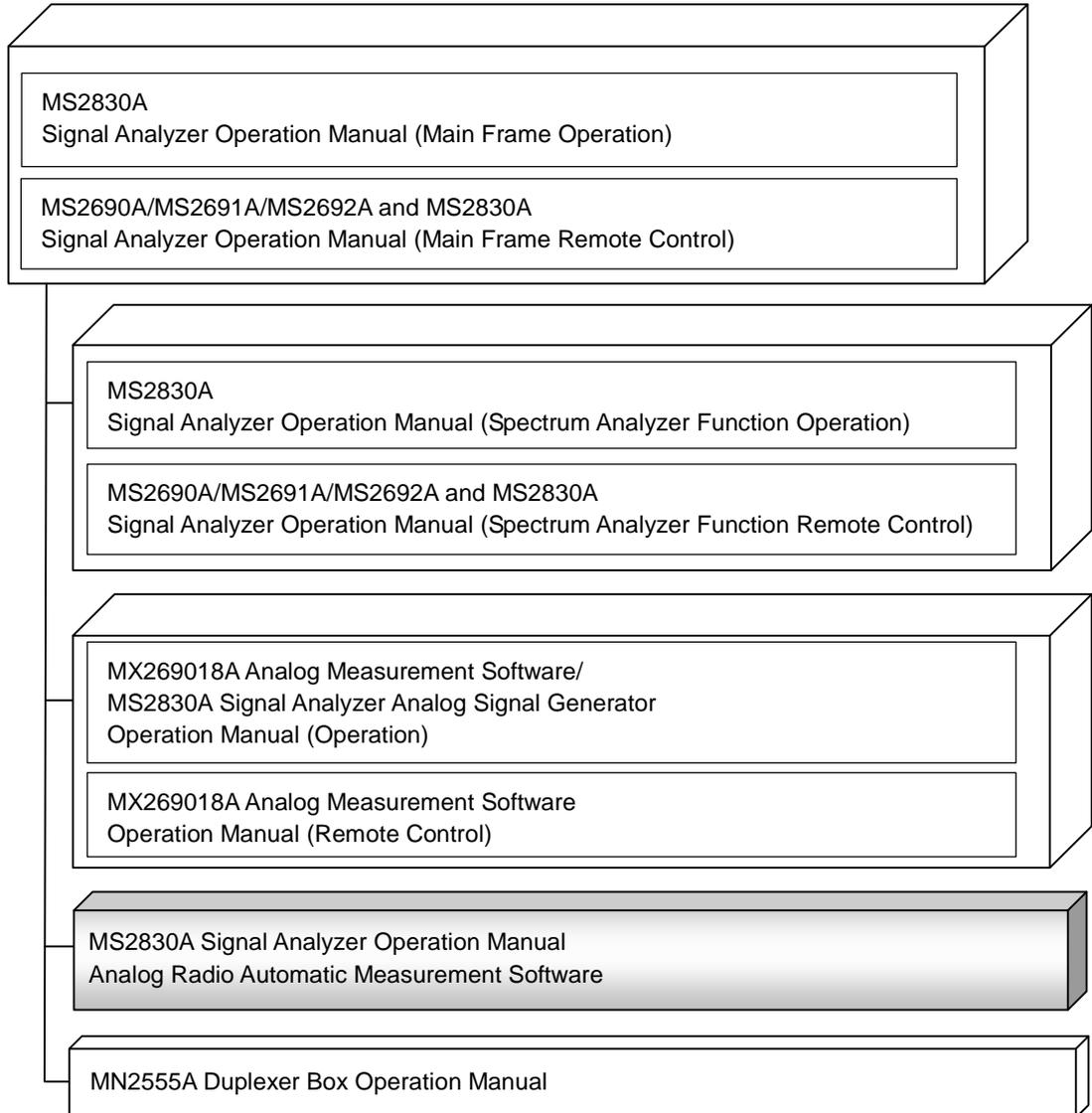- Simultaneously running any software other than that recommended or approved by Anritsu
- Closing the lid (Laptop computer)
- Turning on the screen saver function
- Turning on the battery-power saving function (Laptop computer)
For how to turn off the functions, refer to the operation manual that came with your computer.

About This Manual

■ **Composition of Operation Manuals**

The operation manuals for the Analog Radio Automatic Measurement Software is comprised as shown in the figure below.

MS2830A
Signal Analyzer Operation Manual (Main Frame Operation)

MS2690A/MS2691A/MS2692A and MS2830A
Signal Analyzer Operation Manual (Main Frame Remote Control)

MS2830A
Signal Analyzer Operation Manual (Spectrum Analyzer Function Operation)

MS2690A/MS2691A/MS2692A and MS2830A
Signal Analyzer Operation Manual (Spectrum Analyzer Function Remote Control)

MX269018A Analog Measurement Software/
MS2830A Signal Analyzer Analog Signal Generator
Operation Manual (Operation)

MX269018A Analog Measurement Software
Operation Manual (Remote Control)

MS2830A Signal Analyzer Operation Manual
Analog Radio Automatic Measurement Software

MN2555A Duplexer Box Operation Manual

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

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

- **Signal Analyzer Operation Manual**
  (Spectrum Analyzer Function Operation)
- **Signal Analyzer Operation Manual**
  (Spectrum Analyzer Function Remote Control)

These manuals describe basic operations, functions and remote functions of the spectrum analyzer function.

- **Analog Measurement Software/Signal Analyzer Analog Signal**
  Generator Operation Manual (Operation)

This manual describes operations and functions of the Analog Measurement Software.

- **Analog Measurement Software Operation Manual (Remote Control)**

This manual describes remote control of the Analog Measurement Software.

- **Signal Analyzer Operation Manual**
  Analog Radio Automatic Measurement Software
  <This document>

This manual describes operations and functions of the Analog Radio Automatic Measurement Software.

- **Duplexer Box Operation Manual**

This manual describes the operation and maintenance of the Duplexer Box.

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IV.

Chapter 1 Overview

This chapter provides an overview and the product configuration of the Analog Radio Automatic Measurement Software.

1

Overview

1.1 Product Overview

This software is a Windows-based software application that controls the MX269018A Analog Measurement Software (hereafter, MX269018A) and the spectrum analyzer function of MS2830A, for automatic measurement. This software is usable on a Windows PC for control or the MS2830A. This software has two types: a product version called MX289057A and a free version with limited functions. For the difference between the two versions, refer to Table 1.1-1.

The necessary parameters are automatically set by selecting the standard corresponding to the communication system you want to test.

This software provides the following measurements.

Tx Measurement
      Power
      Frequency
      Audio Sensitivity
      Maximum Deviation
      Modulation Frequency Characteristic
      S/N
      Distortion
      Deviation*
      Spurious
      Occupied Band Width
      Adjacent Channel Leakage Power
Rx Measurement
      AF Level
      Receiving Sensitivity (SINAD)
      Receiving Sensitivity (NQ)
      Bandwidth
      Rx Frequency*
      S/N
      Distortion
      Demodulation Frequency Characteristic*
*: Only for Product version

The following option is required to use this software.
・ MS2830A-018   Audio Analyzer
・ MS2830A-062/066   Low Phase Noise Performance
・ MX269018A   Analog Measurement Software

To use the function of signal output for RX measurement of MX269018A, either one of the following hardware options of MS2830A is required.
- MS2830A-088   3.6GHz Analog Signal Generator
- MS2830A-029   Analog Function Extension for Vector Signal Generator

The following USB power sensors are available.
- MA24106A, MA24108A, MA24118A USB power sensor

If you are using the free version, you will be able to use MX283058A (Product version) with more enhanced features by purchasing an MX283058A license key that matches the serial number of your MS2830A.

Table 1.1-1 shows the difference between Product and Free Versions.

Table 1.1-1   Function comparison between Product and Free Versions

Measurement Items•Functions		Product Version	Free Version	Remarks
TX measurement	Power measurement	✓	✓	Pass/Fail evaluation is available only in Product version.
	Frequency measurement	✓	✓	Pass/Fail evaluation is available only in Product version.
	Audio Sensitivity measurement	✓	✓	Pass/Fail evaluation is available only in Product version.
	Max Deviation measurement	✓	✓	Pass/Fail evaluation is available only in Product version.
	Modulation Frequency Characteristic	✓	✓	
	S/N measurement	✓	✓	Pass/Fail evaluation is available only in Product version.
	Distortion measurement	✓	✓	Pass/Fail evaluation is available only in Product version.
	Frequency deviation measurement	✓		
	Spurious measurement	✓	✓	Pass/Fail evaluation is available only in Product version.
	Occupied Band Width measurement	✓	✓	Pass/Fail evaluation is available only in Product version.
	Adjacent Channel Leakage Power measurement	✓	✓	Pass/Fail evaluation is available only in Product version.

Table 1.1-1 Function comparison between Product and Free Versions (Cont'd)

Measurement Items•Functions		Product Version	Free Version	Remarks
RX measurement	AF Level measurement	✓	✓	Pass/Fail evaluation is available only in Product version.
	SINAD Method measurement	✓	✓	Pass/Fail evaluation is available only in Product version.
	NQ Method measurement	✓	✓	Pass/Fail evaluation is available only in Product version.
	Bandwidth measurement	✓	✓	Pass/Fail evaluation is available only in Product version.
	RX Frequency measurement	✓		
	S/N measurement	✓	✓	Pass/Fail evaluation is available only in Product version.
	Distortion measurement	✓	✓	Pass/Fail evaluation is available only in Product version.
	Demodulation Frequency Characteristic	✓		
Others	Total Result	✓		Displays the total result.
	Saving and Loading the parameter files	✓		

1.2 Product Configuration

1.2.1 Standard configuration

Table 1.2.1-1 and Table 1.2.1-2 shows the standard configuration for this software.

Table 1.2.1-1 This Software Standard Configuration

Items	Model/ Symbol	Product Name	Q'ty	Remarks
Software	—	Analog Radio Automatic Measurement Software Lite	1	

Table 1.2.1-2 MX283058A Standard Configuration

Items	Model/ Symbol	Product Name	Q'ty	Remarks
Software	MX283058A	Analog Radio Automatic Measurement Software	1	
Accessories	—	Installation DVD-ROM	1	Application software, NI-VISA 5.0.3, Operation manual DVD-ROM

1.2.2 Applicable parts

Table 1.2.2-1 lists the applicable parts for this software.

Table 1.2.2-1 Applicable Parts

Model/Symbol	Product Name	Remarks
W3778AE	MS2830A Signal Analyzer Operation Manual Analog Radio Automatic Measurement Software	English, Printed version

1.3 Specifications

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

Attenuator Mode: Mechanical Attenuator Only

Nominal values are for designing and do not guarantee performance as standard values.

Typ. value does not represent guaranteed performance. The value just shows the level where the most products have satisfactory performance.

1.3.1 Product specifications

Table 1.3.1-1 shows the specifications of this software.

Table 1.3.1-1   Specifications

Item	Specification
Tx Measurement	
Measurement frequency range	10 to 990 MHz, 1010 to 2000 MHz
Measurement level range	Same as MS2830A, MX269018A or USB Power sensor
Tx Measurement filter	Low pass filter: Off/ 300 Hz/ 3 kHz/ 15 kHz/ 20 kHz High pass filter: Off / 50 Hz/ 300 Hz/ 400 Hz/ 30 kHz De-emphasis: Off/ 750 μs/ 500 μs/ 75 μs/ 50 μs/ 25 μs Weighting filter: CCITT, C-Message
Measurement function	
Frequency	Accuracy: Same as MX269018A

Power	When not using USB Power sensor (MA24106A/MA24108A/MA24118A)
	    Accuracy: Same as MX269018A
	When using USB Power sensor (MA24106A/MA24108A/MA24118A)
	    Accuracy: Same as MS2830A Power meter function

Audio Sensitivity	Accuracy: Same as MX269018A
Maximum Deviation	Accuracy: Same as MX269018A
Modulation Frequency Characteristic	Accuracy: Same as MX269018A
S/N	Accuracy: Same as MX269018A
Distortion	Accuracy: Same as MX269018A
Deviation	Accuracy: Same as MX269018A
Spurious	Accuracy: Same as MS2830A Spectrum analyzer function Supports the parameter auto setting function for TELEC T208 F3E.
Occupied Band Width	Accuracy: Same as MS2830A Spectrum analyzer function Supports the parameter auto setting function for TELEC T208 F3E.
Adjacent Channel Leakage Power	Accuracy: Same as MS2830A Spectrum analyzer function Supports the parameter auto setting function for TELEC T208 F3E.

Table 1.3.1-2 Specifications (Cont'd)

Item	Specification
Rx Measurement	
Measurement frequency range	10 to 990 MHz, 1010 to 2000 MHz
Measurement level range	Same as MS2830A-029/129, MX2830A-088/188 or MX269018A
Rx Measurement filter	Low pass filter: Off/ 3 kHz/ 15 kHz/ 20 kHz/ 30 kHz/ 50 kHz High pass filter: Off / 20 Hz/ 50 Hz/ 100 Hz/ 300 Hz/ 400 Hz/ 30 kHz Weighting filter: CCITT, C-Message
Measurement function	
AF Level	Accuracy: Same as MX269018A
Receiving Sensitivity (SINAD)	Accuracy: Same as MX269018A
Receiving Sensitivity (NQ)	Accuracy: Same as MX269018A
Bandwidth	Accuracy: Same as MX269018A
Rx Frequency	Accuracy: Same as MX269018A
S/N	Accuracy: Same as MX269018A
Distortion	Accuracy: Same as MX269018A
Demodulation Frequency Characteristic	Accuracy: Same as MX269018A
Function	
Correction	Loads the correction data for MN2555A.
Language	Changes the language between English and Japanese.
Parameter Save / Load	Saves and loads the parameter settings. (This function is available only for MX283058A.)

Chapter 2 Preparation

This chapter describes the preparations required for using the application you are using. Refer to the *MS2830A Signal Analyzer Operation Manual (Mainframe Operation)* for common features of the MS2830A not included in this manual.

2

Preparation

2.1 Previous Arrangement

2.1.1 Operating by control PC

The following items are required when you control the MS2830A using the control PC with this software.

■ **Control PC**

Table 2.1.1-1   Operating Environment for the control PC

PC	
OS	Windows 7 32bit/64bit
CPU	At least 1 GHz or faster Pentium III or equivalent
Memory	1 GB or more (32 bit), 2 GB or more (64 bit)
Hard disk	5 GB or more free space in the drive where this software is to be installed.
Peripheral device	
Display	Displays with a resolution of 1024 × 768 pixels are best viewed using a small font setting.
Software	NI-VISA 5.0.3 .NET Framework 4.0 version 4.0.30319 or later*

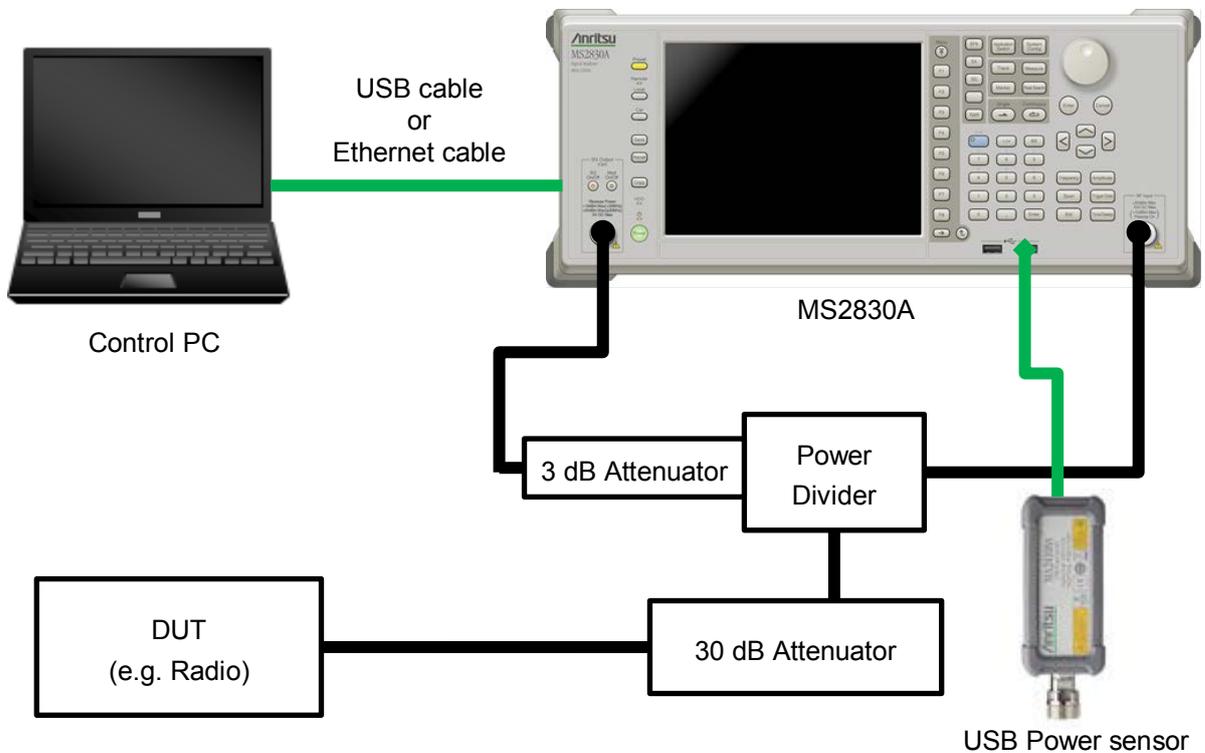*:   Installer contains this software.

■ **Hardware required**
・ USB cable or Ethernet cable
・ Attenuator, Power divider, Coaxial cables for measurement, etc.

■ **Software required**
・ NI-VISA 5.0.3 (Only for operating by control PC. Please note that the operation was not verified with other versions.)
・ MS2830A firmware Version 7.03.00 or later
  For how to confirm the version of the firmware, refer to 2.4.1 "Version confirmation".

■ Connection Example

Referring to the connection example above, configure the measurement system appropriate for the device you want to test.

Connect the Control PC and MS2830A using a USB or Ethernet cable. For more information, refer to the *MS2690A/MS2691A/MS2692A and MS2830A Signal Analyzer Operation Manual (Mainframe Remote Control)*.

If the output power of the DUT is greater than 10 mW, be sure to use an attenuator.

2.1.2 Operating on MS2830A

The following items are required when you operate this software on MS2830A.
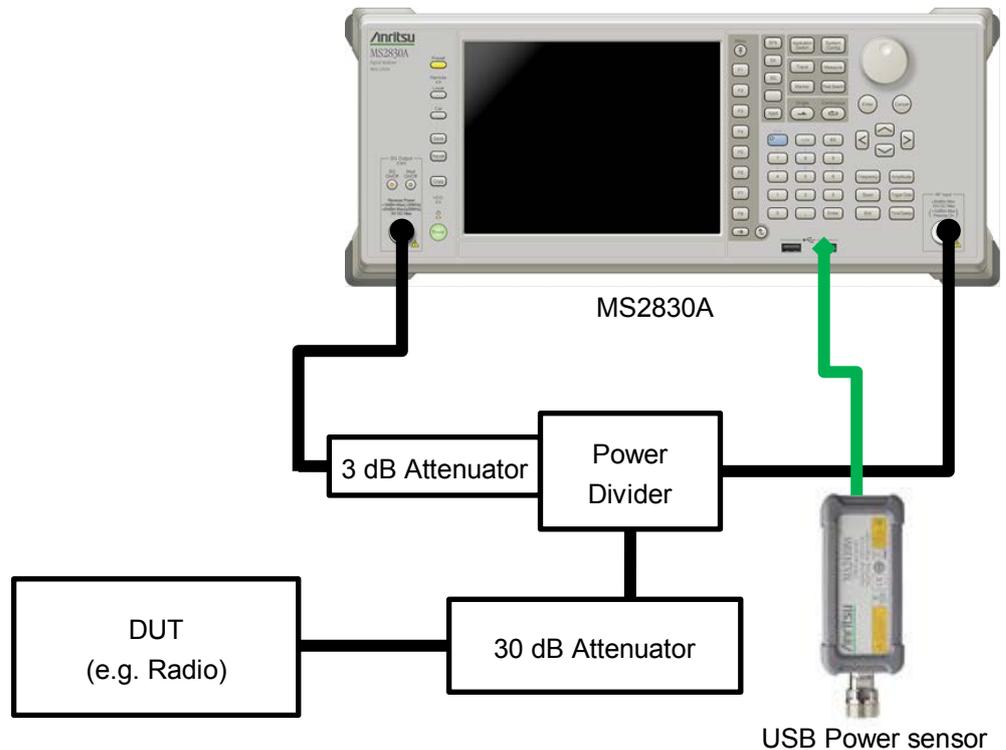
■ Hardware required

- Attenuator, Power divider, Coaxial cables for measurement, etc.
- USB Mouse

■ Software required

- MS2830A firmware Version 7.03.00 or later

  For how to confirm the version of the firmware, refer to 2.4.1 "Version confirmation".

■ Connection Example

Referring to the connection example above, configure the measurement system appropriate for the device you want to test.

If the output power of the DUT is greater than 10 mW, be sure to use an attenuator.

2.2 Installing licenses

If you purchase the MX269057A separately from the mainframe, a license key of the MX269057A should be installed on the MS2830A before starting to use.

For how to install licenses, refer to Section 3.8 "Installing and Uninstalling" in the *MS2830A Signal Analyzer Operation Manual Mainframe Operation*.

2

Preparation

2.3   Installation/Uninstallation Procedure

This section describes how to install this software according to the Setup Wizard.

If resident antivirus program is running on your PC, exit them before activating the setup program, as well as other Windows applications in progress.

> **Note:**
>
> This software requires you to have installed Microsoft .Net Framework 4.0. The installer of this software contains Microsoft .Net Framework 4.0 (version 4.0.30319).

2.3.1   Installation procedure

Follow the procedure below to install this software on the hard disk of your PC or MS2830A.

<Procedure>

1.   Copy the Installer of this software, "setup.exe" file onto the desktop of the PC or the MS2830. Double-click the "setup.exe" file.*

   *:   The Installer is common between the Free version and Product version (MX283058A).

2.   If Microsoft .Net Framework 4 is not installed, the installation of Microsoft .Net Framework 4 Setup starts automatically.

   The License Agreement screen is displayed. Read the license agreement terms, and click the **Yes** button if you agree with the contents.
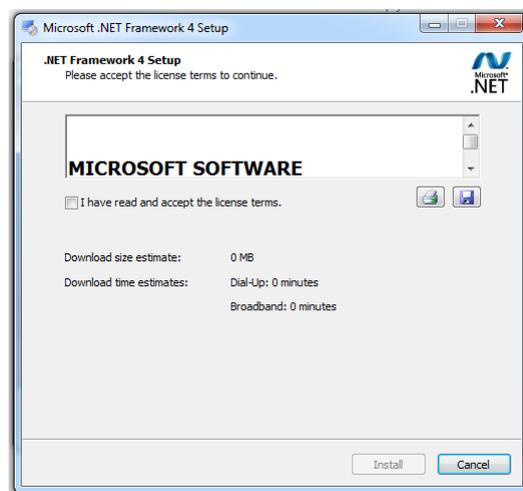

Figure 2.2.1-1   Installation of the Microsoft .Net Framework 4

3.   When Microsoft .Net Framework 4 version 4.0.30319 or later has been already installed, start the installation of this software.

To check the version information of Microsoft .Net Framework 4, click **Control Panel**, and then click **Uninstall a program**.

4.   In the License Agreement screen, read the license terms, and then click the **Yes** button to accept the license terms and continue.

5.   When "**Install Complete**" is displayed, click the **Finish** button.

2.3.2   Upgrade procedure

Follow the procedure below to upgrade this software.

The upgrade process is run by double-clicking the setup.exe file for the later version than the version currently installed on your PC.

<Procedure>

1   Double-click the setup.exe file in the folder where this software is stored. To install using **the setup disk** for this software, double-click the setup.exe file stored in the **\AutoMeasure\Analog** folder on **the setup disk**.

2.   When you see the following message after this software setup program starts, click the **Yes** button: "This setup will perform an upgrade of 'Anritsu Analog Radio Automatic Measurement'. Do you want to continue?"

3.   When you see the following message, click the **Next** button to start upgrade: "Resuming the InstallShield Wizard for AutoMeasure"

4.   When you see the following message, click the **Finish** button: "Update Complete"

2

Preparation

2.3.3   Uninstallation procedure

Follow the procedure below to uninstall this software from the hard disk of your PC.

<Procedure>

1.   On the Windows task bar, click the **Start** button, and then click **Control Panel**.

2.   Double-click **Programs and Features**.

3.   In the **Uninstall or change a program** dialog box, double-click **Anritsu Analog Radio Automatic Measurement** in the list of currently installed programs.

4.   When you see the following message, click the **OK** button to start uninstall: "Are you sure you want to completely remove 'Anritsu Analog Radio Automatic Measurement."

5.   When "Uninstall Complete" is displayed, click the **Finish** button.

Note：

When uninstalling the software, a folder is sometimes left. Eliminate a folder manually in that case.

2.4 NI-VISA Installation procedure

When you want to install this software to a PC, you need to install NI-VISA 5.0.3 or later to the PC. This procedure is not required when installing to MS2830A.

NI-VISA 5.0.3 is stored in the DVD provided with the MS2830A as standard equipment. *
Please note that the operation was not verified with other versions.

*: NI-VISA 5.0.3 is not stored in the DVDs shipped before May 7, 2015. However, you can download it from the below site of National Instruments.
http://www.ni.com/downloads/ni-drivers/ja/

<Procedure>

1. Double-click the setup.exe file in the folder where the files of the NI-VISA are stored. When installing the NI-VISA using **the setup disk**, double-click the "visa503full.exe" file in the **\AutoMeasure\NI-VISA** directory of **the setup disk**. When you see the following message, click the **OK** button
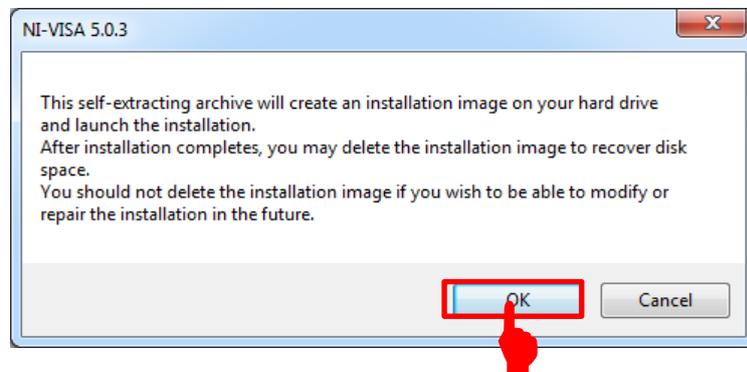
2. When you see the following screen, make sure the **Overwrite files without prompting** and **When done unzipping open** check boxes (1) are selected, and then click the **Unzip** button.
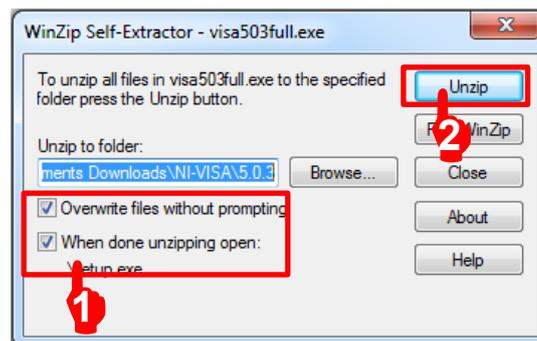
3.   When you see the following screen, click the **Next** button.

4.   When you see the following screen, click the **Next** button.
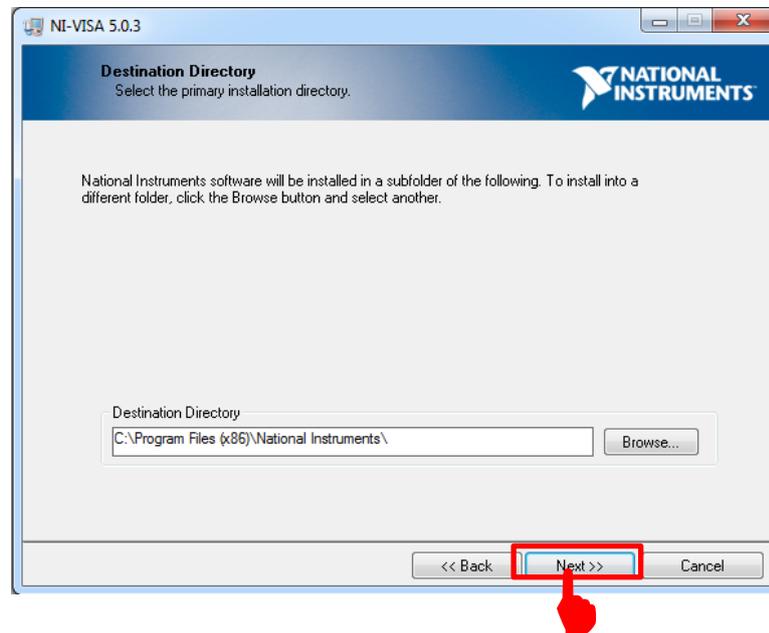
5.   When you see the following screen, click the icon (1) on the left side of the "NI-VISA 5.0.3", and click the (2) **Do not install this feature**.
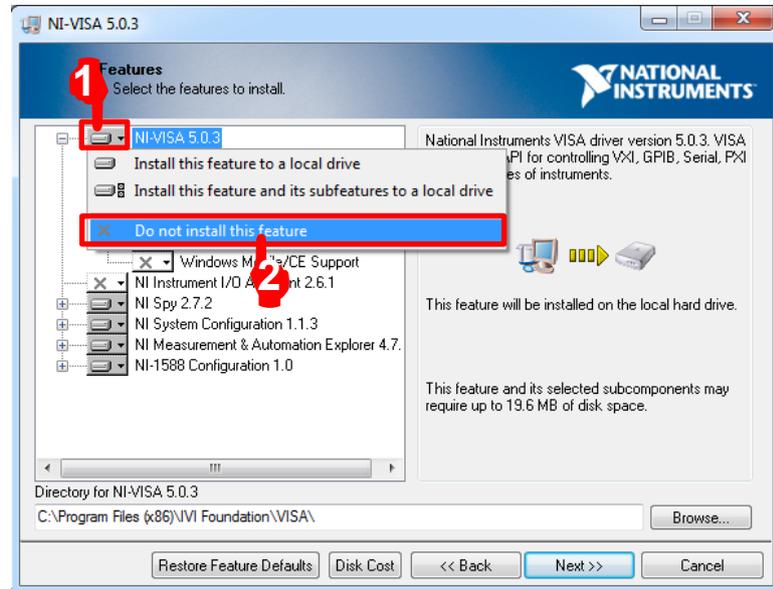
6.   When you see the following screen, click the icon (1) on the left side of the "NI-1588 Configuration 1.0", and click the (2) **Do not install this feature**.

7. When you see the following screen, click the icon (1) on the left side of the "NI System Configuration 1.1.3", and click the (2) **Show dependent feature…**.
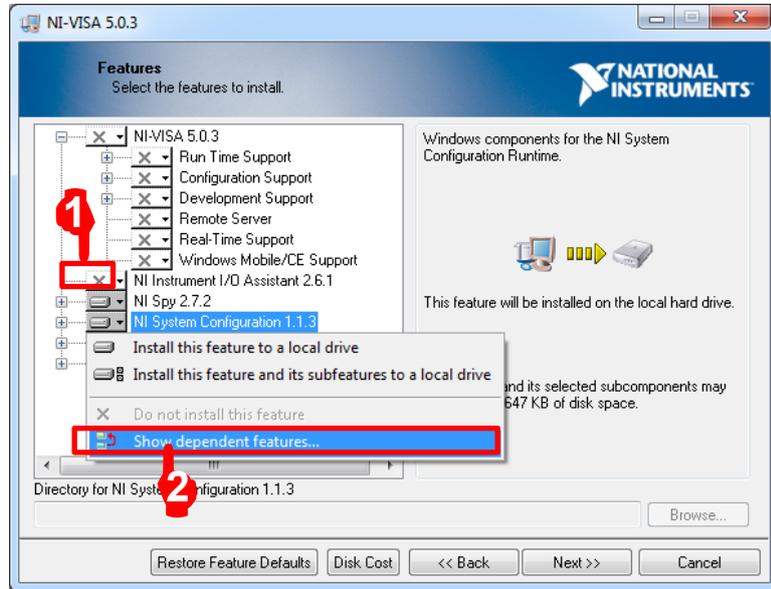
8. When you see the following screen, click the (2) **Deselect All** button.
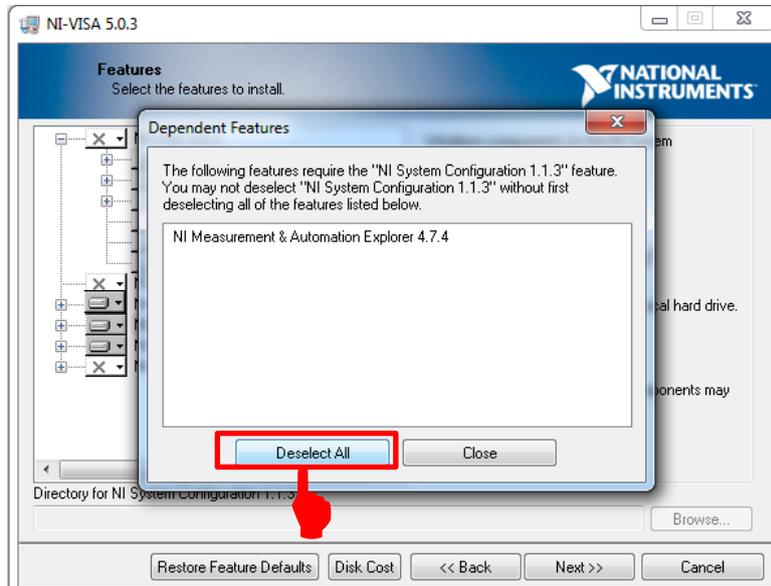
9. Click the (1) **[+]** on the left side of the "NI-VISA 5.0.3."
    Click the icon (2) on the left side of the "Run Time Support"
    Click the (3) **Install this feature to a local drive**.
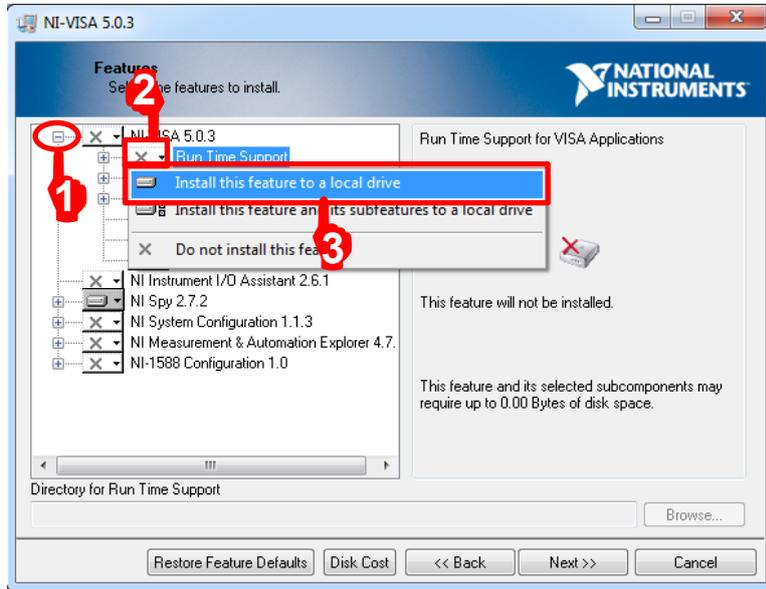
10. Click the (1) **[+]** on the left side of the "Development Support".
    Click the icon (2) on the left side of the ".NET Framework 4.0
    Languages Support".
    Click the (3) **Install this feature to a local drive**.

2

Preparation
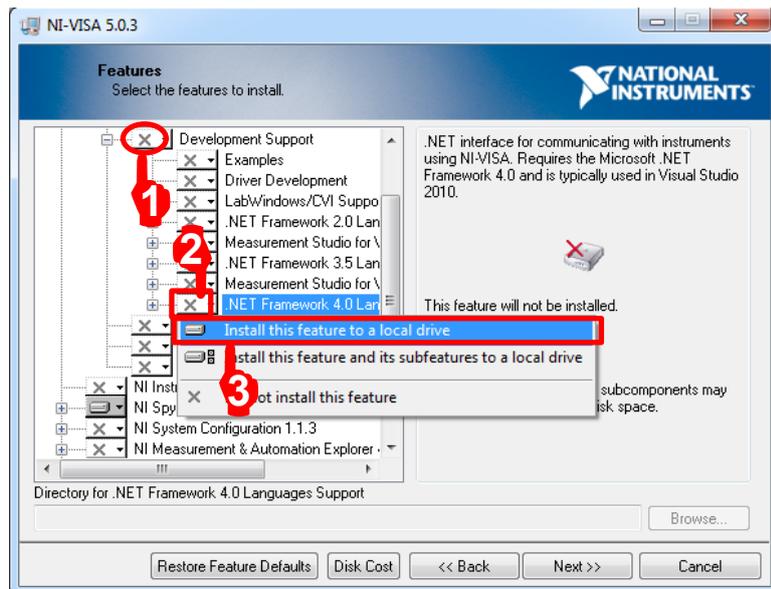
11. When you see the following screen, click the icon (1) on the left side of
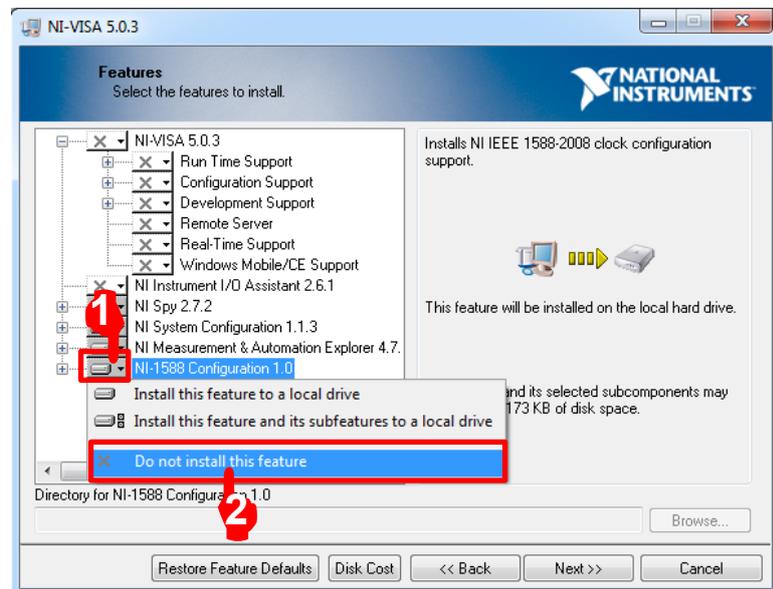the "NI Spy 2.7.2", and click the (2) **Do not install this feature**.
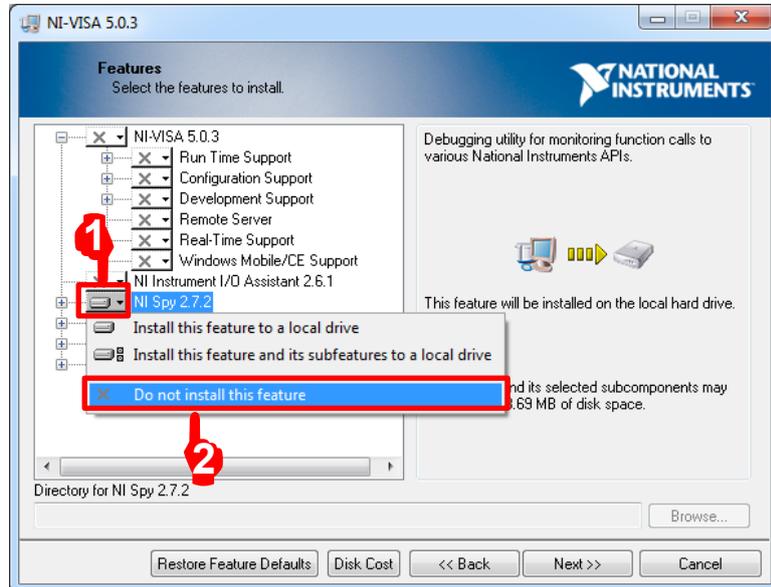
12. When you see the following screen, click the **Next** button.
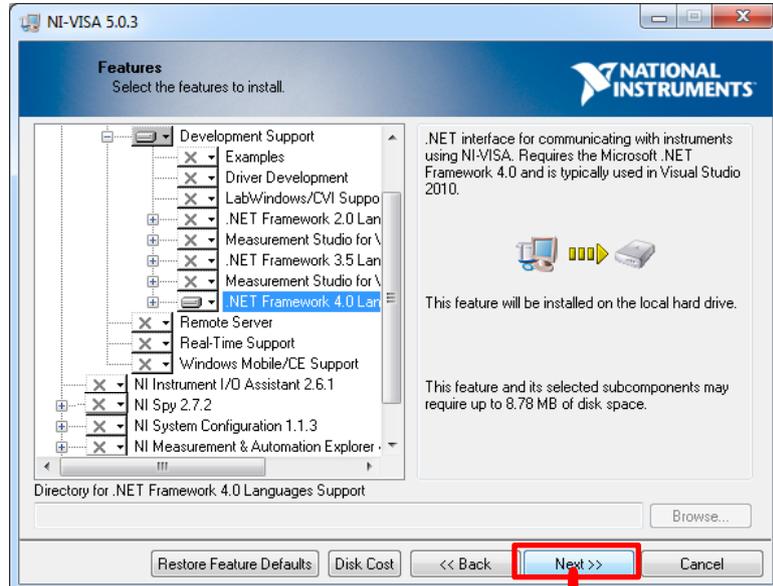
13. When you see the following screen, read the following message (1), select the check box if required, and then click the (2) **Next** button.
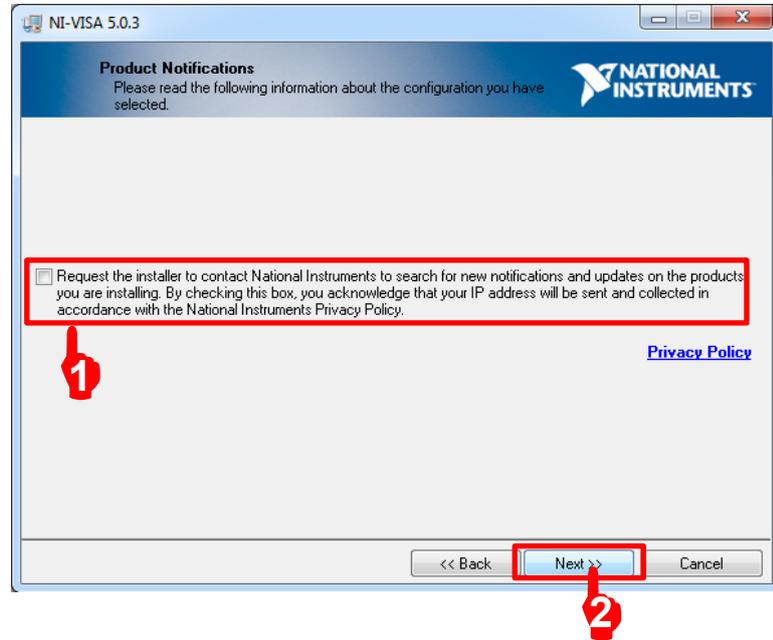
14. When you see the NATIONAL INSTRUMENTS SOFTWARE LICENSE AGREEMENT, select the (1) **I accept the License Agreement**, and click the (2) **Next** button.
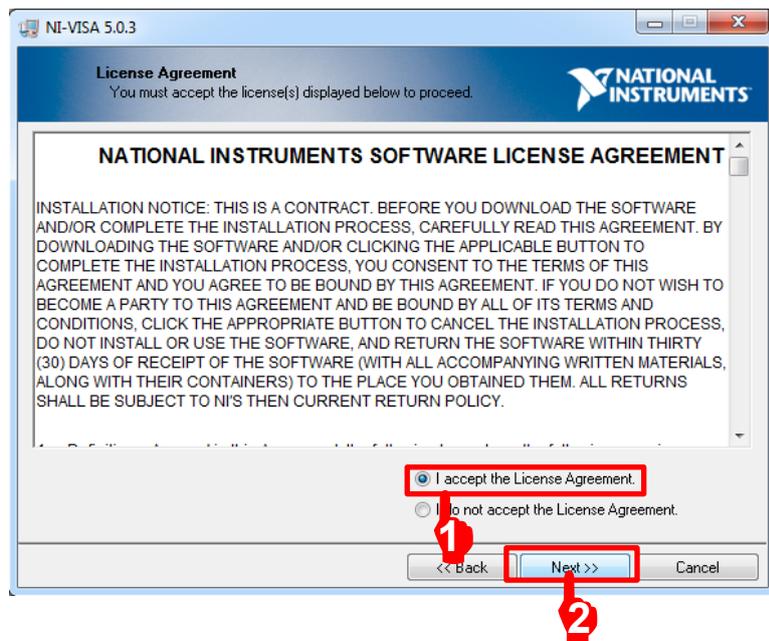
15. When you see the LICENSE AGREEMENT, select the (1) **I accept the License Agreement**, and click the (2) **Next** button.
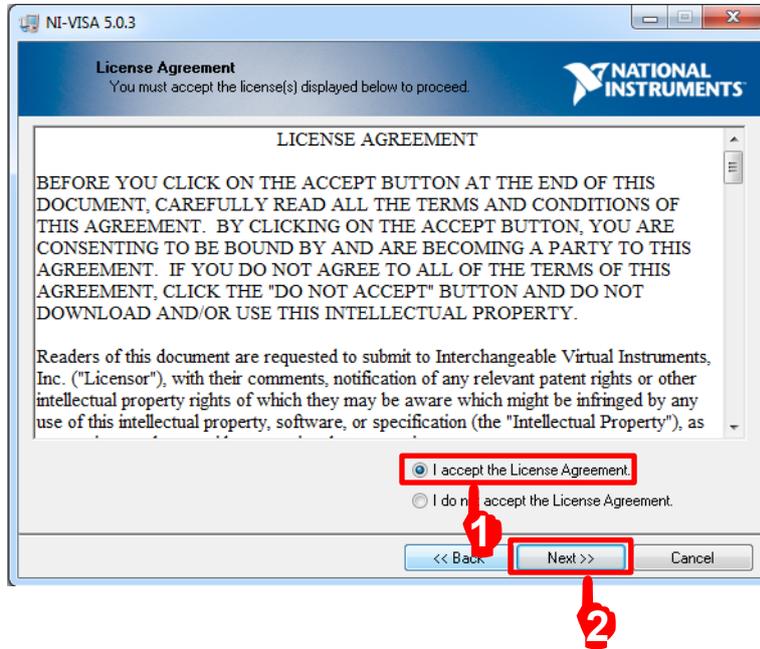
16. When you see the following screen, click the **Next** button to start the installation.
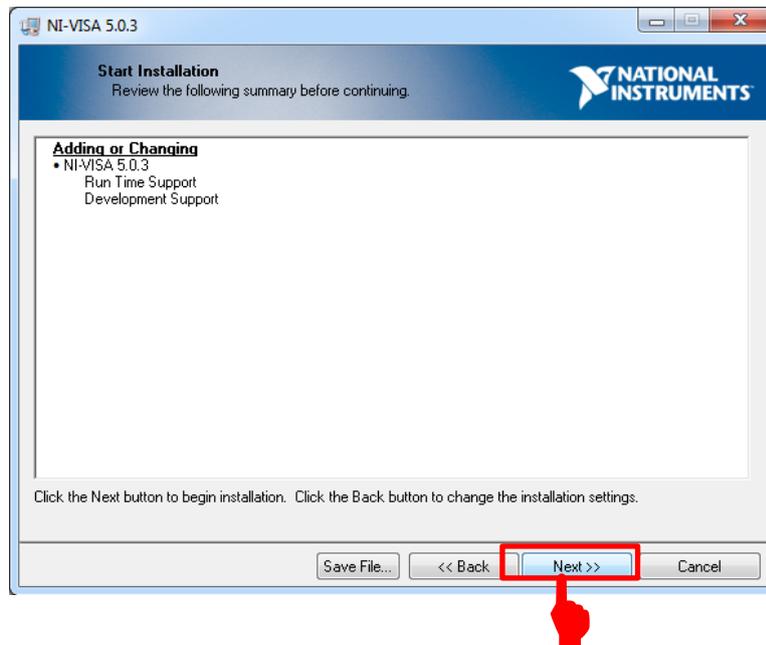
17. After installation completion, click the **Finish** button.
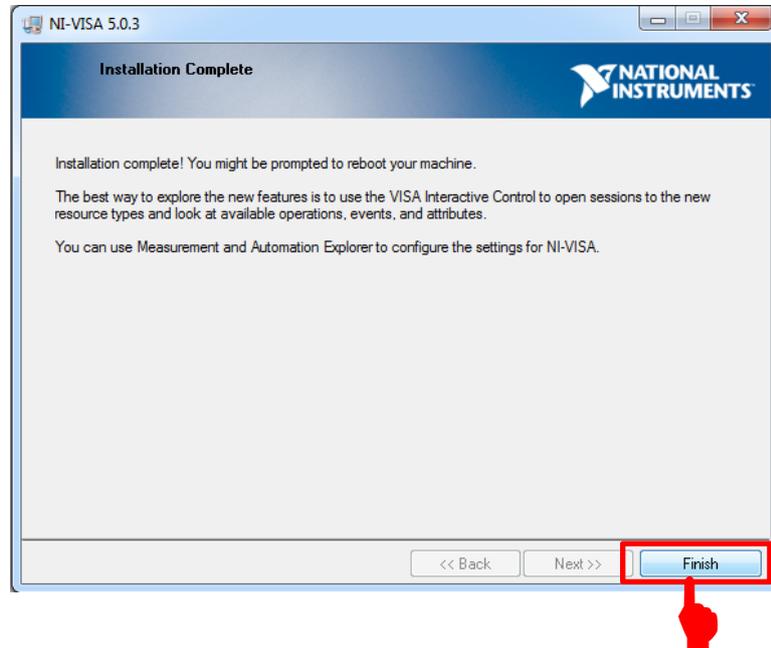
Now, the NI VISA driver has been successfully installed.
Delete the visa503full.exe file copied on the desktop and restart the PC.

2.5   Preparations of MS2830A

2.5.1   Version confirmation

Press the **System Config** key, press **F5 System Information**, and then press **F2 Software Version View**.

Confirm that the Package Version is 7.03.00 or later.

If the firmware version is older than 7.03.00, upgrade it to the latest version.

For how to install the latest version, refer to the *MS2830A Signal Analyzer Operation Manual Mainframe Operation,* 3.8.1 "Installing software".
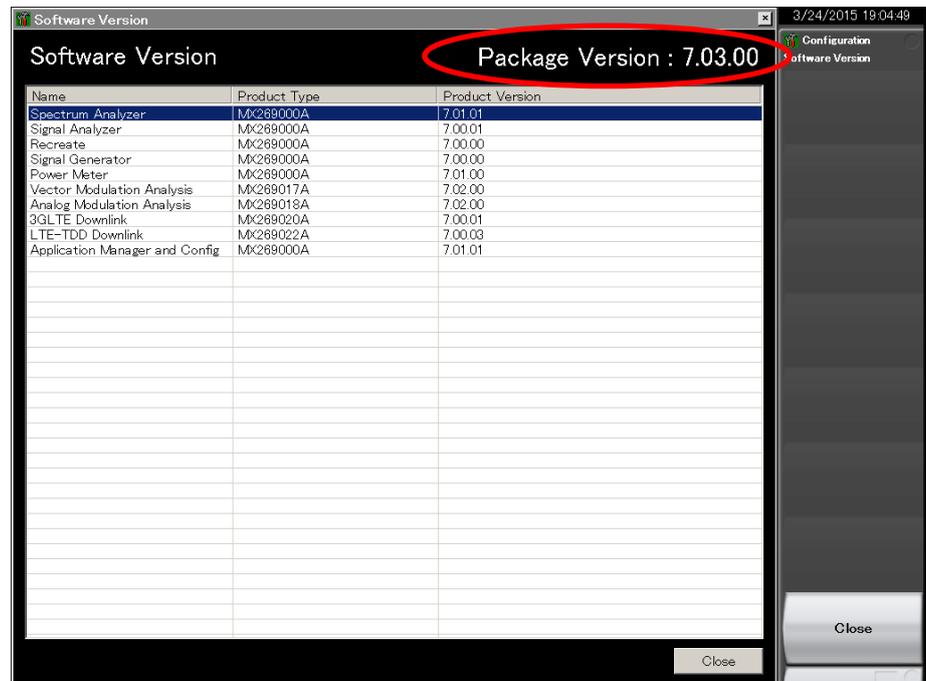
2.5.2   Loading applications

1. Press the **System Config** key, and press **F4 Application Switch Setting**, and then press **F1 Load Application Select**.

2. Select the following applications by the rotary knob, and press the **Enter** key to load.

Loading multiple applications causes an increase in CPU load, and thus results in a startup delay when powering on. Uninstalling unnecessary applications is recommended.

The applications are controlled automatically during execution of this software. Do not change the parameters of the applications.

Type	Name
MX269000A	Spectrum Analyzer
MX269000A	Power Meter
MX269018A	Analog Modulation Analysis
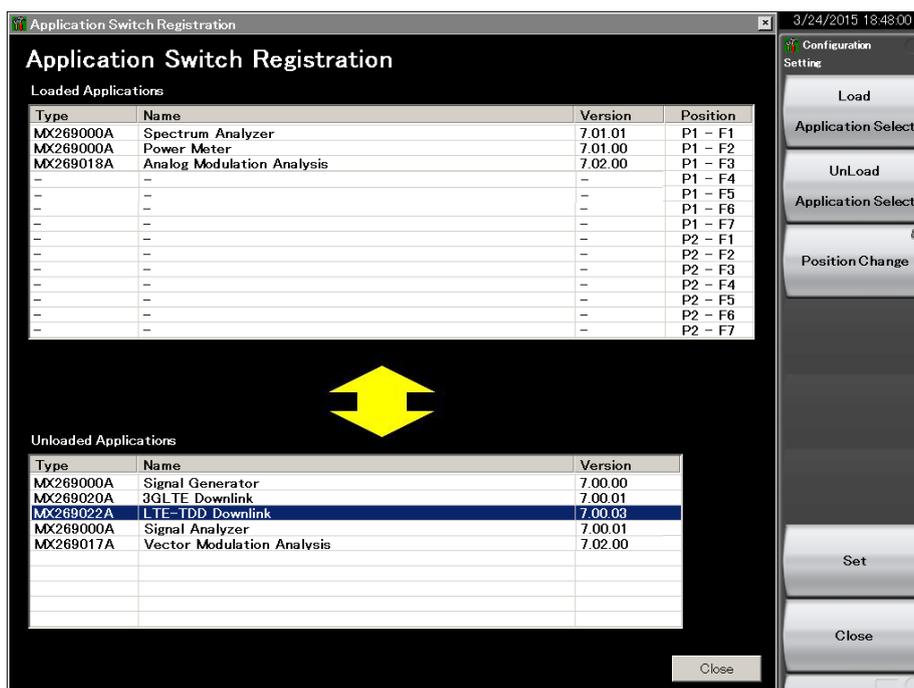
2.5.3   Calibration

Press the **Power** switch, and then warm up MS2830A for at least 30 minutes before calibration.

Calibration takes about 30 seconds. If the MS2830A-077/078 Analysis Bandwidth Extension Hardware is installed, calibration takes about 2 minutes.

1.   Make sure that no signal is input to the RF Input terminal.

2.   Press the **Application Switch** key, and then press **F1 Spectrum Analyzer**.

3.   Press the **Cal** key, and then press **F1 SIGANA All** to start the calibration process. The following progress bar is displayed while the calibration is in progress.
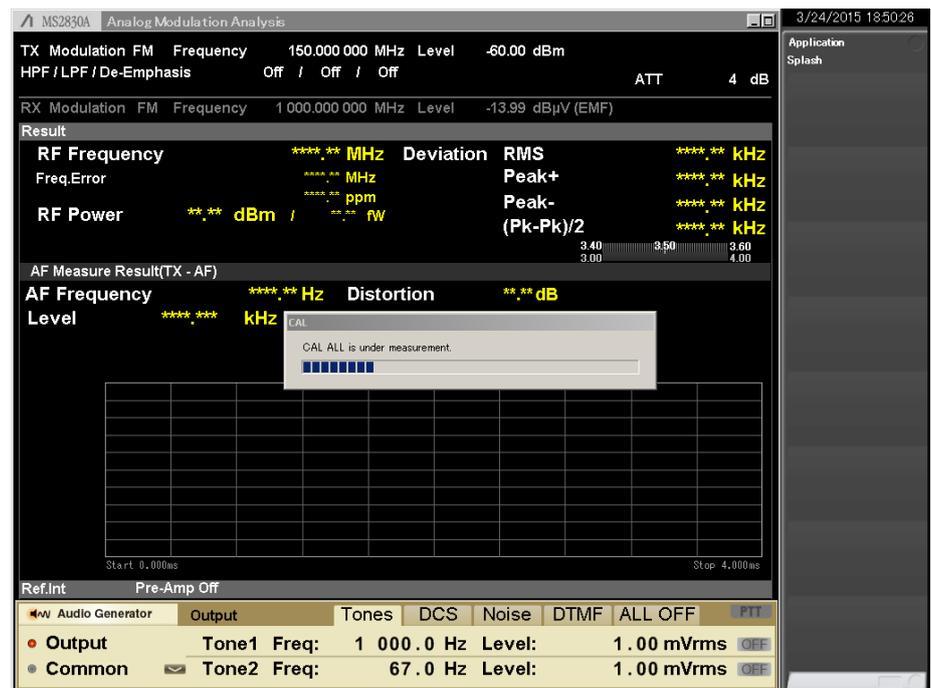
Chapter 3   Measurement

This section describes the measurement function, the parameter contents, the setting methods and the measurement results for this software.

3

Measurement

3.1 Automatic Measurement Software

You can start this software using one of the following procedures.

On the taskbar, click the **Start** button, point to **All Programs**, click **Anritsu Corporation**, click **AutoMeasure**, and then click **AnalogAutoMeasurement**.

3.1.1 Initial screen
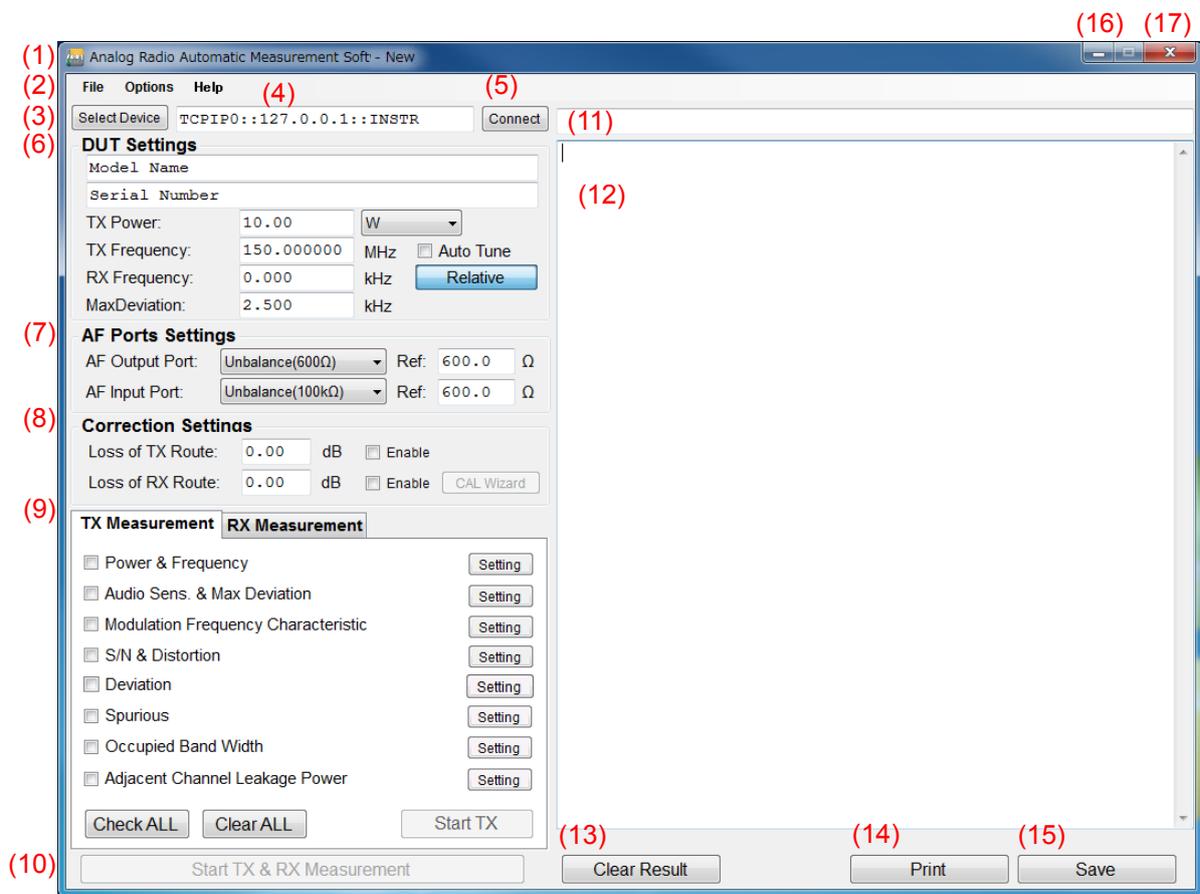
No.	Item	Description
1	Analog Radio Automatic Measurement Software - New	Software name - Parameter file name The parameter file name is displayed only when the software you are using is MX283058A. Default:　　New
2	File, Options, Help	Pulls down the file, Options, Help menu. Refer to 3.1.2 "Menu bar".
3	Select Device	When installed on the Control PC: 　　　　Displays the dialog box where you can select a destination address. When installed on MS2830A: 　　　　Grayed (unavailable) Refer to 3.1.4 "Connecting with MS2830A".
4	(Text box)	Displays the address selected in the **VISA Setting** dialog box. When installed on MS2830A: Grayed (unavailable)
5	Connect	Connects to MS2830A from this software installed on the Control PC. Refer to 3.1.4 "Connecting with MS2830A". Refer to 3.1.5 "Disconnecting with MS2830A".
6	DUT Settings	Sets the parameter of the DUT Refer to 3.2.1 "DUT settings".
7	AF Ports Settings	Sets the parameter of the AF Ports. Refer to 3.2.2 "AF Ports settings".
8	Correction Settings	Sets the correction. Refer to 3.3 "Correction Settings".
9	TX Measurement/ RX Measurement	Toggles between the **TX Measurement** tab and **RX Measurement** tab. Refer to 3.4 "Setting Tx Measurement". Refer to 3.5 "Setting Rx Measurement".
10	Start TX & RX Measurement	Starts TX & RX Measurement
11	Status area (Text box)	Displays Measurement status and Error messages. Refer to 3.7 "Status Messages".
12	Measurement result area (Text box)	Displays the measurement results. Refer to 3.6 "Measurement, Results".
13	Clear Result	Clears, Prints, Saves the measurement results. Refer to 3.6.22 "Clearing/printing/saving measurement results".
14	Print	
15	Save	
16	(minimize button)	Minimizes this software window.
17	(close button)	Exits this software. The parameter settings are saved automatically when exiting this software.

3.1.2 Menu bar

The menu bar contains the following submenus.
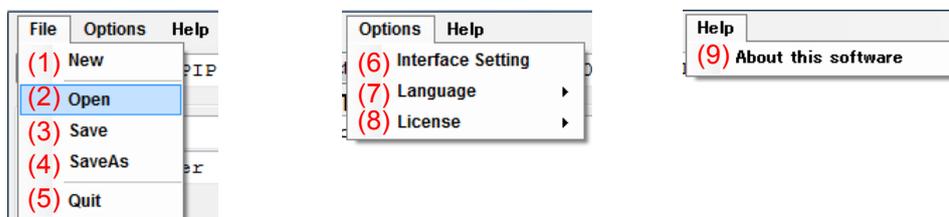
No.	Menu		Description
1	File	New	All measurement items are made defaults.
2	File	Open	Available only for MX283058A. Reads the parameter file.
3		Save	Available only for MX283058A. Saves the parameter file. File name: MeasParamyyyymmdd_hhmmss.xml (Default)
4		SaveAs	Available only for MX283058A. Names the parameter file and saves it.
5		Quit	Exits the software. The parameter settings are saved automatically when exiting this software.
6	Options	Interface Setting	Displays the **Interface Setting** dialog box. Refer to 3.1.3 "Interface settings".
7		Language	Selects the language. It's necessary to change the language before measurement execution. English: Language: English (Default) Japanese: Language: Japanese
8		License	Selects the license. ***Note:*** When connecting to MS2830A without a purchased license, only **Free** is available as the license option. For the unit with a purchased license, either **Product** or **Free** version can be selected. Product Version: Purchased license (Default) Free Version: Free license
9	Help	About this software	Displays the Version information etc..

3

Measurement

3.1.3 Interface settings

When using MN2555A, copy the correction data from the USB memory stick that comes with MN2555A, and then load it.
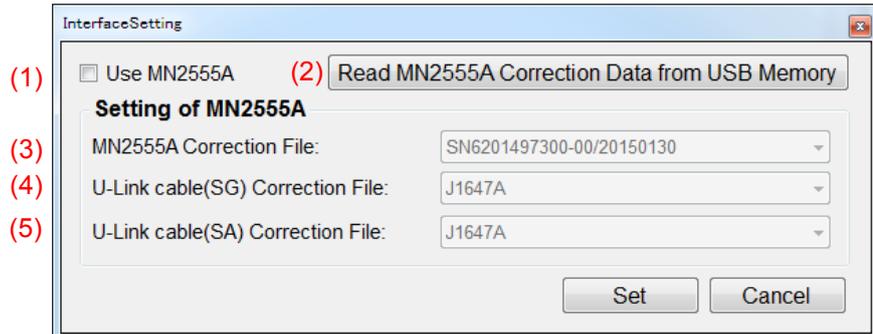
No.	Item	Description
	Interface Setting	
1	Use MN2555A	Sets the usage of MN2555A. Check the box: Uses MN2555A Uncheck the box: Does not use MN2555A (Default)
2	Read MN2555A Correction Data from USB Memory	Loads the MN2555A correction data from the connected USB memory stick.
	Setting of MN2555A	
3	MN2555A Correction File	Serial Number / Date of calibration In the list of the correction data loaded from the USB memory stick that comes with MN2555A, select a correction data file that is appropriate to your MN2555A (serial number and date of calibration).
4	U-Link cable(SG) Correction File	Displays the U-Link cable(SG) Correction file list. Selects from the indicated list. Default: J1647A
5	U-Link cable(SA) Correction File	Displays the U-Link cable(SA) Correction file list. Selects from the indicated list. Default: J1647A

Note:

These settings will not be saved in the parameter file.

3.1.4   Connecting with MS2830A

This software needs to be connected to MS2830A before measurement. This section describes how to connect this software to MS2830A.

<Procedure>

1. To control MS2830A using the Control PC, click (1) **Select Device** to open the (2) **VISA Setting** dialog box.
    This step is not required if this software is used on MS2830A.

2. To control MS2830A using the Control PC, select a communication interface (4), and then click (3) **Set**.
    This step is not required if this software is used on MS2830A.

3. Click (5) **Connect**. When the interface connection is established, the background color of **Connect** turns green.
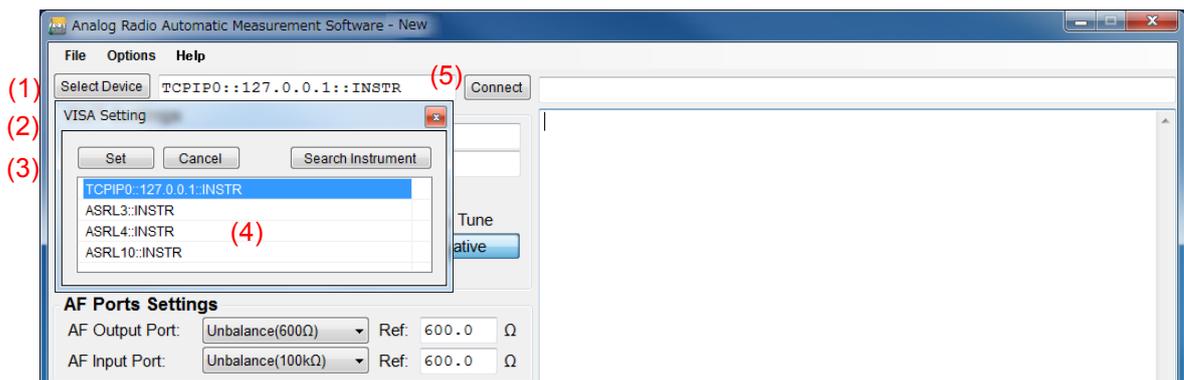
3.1.5   Disconnecting with MS2830A

To control MS2830A using control software other than this software, disconnect the connection to MS2830A, in advance, according to the following procedure.

Click **Connect** displayed on a green background.
Then, the connection to MS2830A is disconnected and the background color of **Connect** returns to normal.

3

Measurement

3.2   Setting Common Items

This section describes how to set the parameters that are common to all measurement items.

3.2.1   DUT settings

This section describes how to set the parameters for the Device under test (DUT).

Configure the parameter settings according to the table below.

No.	Item	Description
	DUT Settings	
1	(Text box)	Inputs the model name of DUT. Characters: Up to 50 characters Default: Model Name
2	(Text box)	Inputs the serial number of DUT. Characters: Up to 50 characters Default: Serial Number
3	TX Power	Sets the TX power of DUT. Range: 1 µW to 100 W (Converted value) Default: 10.00
4	(Menu)	Selects the unit of TX Power. Options: dBm, W, mW Default: W
5	TX Frequency	Sets the TX frequency of DUT. Range: 31 to 990 MHz, 1010 to 2000 MHz Default: 150.000000 MHz
6	Auto Tune	Sets whether to get the TX frequency automatically. When selected, the measurement items that need Spectrum Analyzer are not available. Check the box: Automatically obtains the frequency. Uncheck the box: Does not automatically obtain the frequency.

No.	Item	Description
7	RX Frequency	Sets the RX frequency of DUT. Range: 31 to 990 MHz, 1010 to 2000 MHz Default: 0 kHz (Relative)
8	Relative/Absolute	Toggles the RX frequency setting method. Relative: Uses a value relative to the TX frequency. (Default) Absolute: Uses an absolute value.
9	Max Deviation	Sets the maximum deviation of DUT. Range: 2 to 20 kHz Default: 5.0 kHz

3.2.2   AF Ports settings

This section describes how to set the parameters for the AF ports.

Configure the parameter settings according to the table below.

No.	Item	Description
	Audio Ports Settings	
1	AF Output Port	Selects the AF Output connector to use on MS2830A rear panel. Unbalance(50Ω): Uses Unbal connector (BNC) by 50 Ω. Unbalance(600Ω): Uses Unbal connector (BNC) by 600 Ω. (Default) Balance(100Ω): Uses Bal connector (Standard phone jack) by 100 Ω. Balance(600Ω): Uses Bal connector (Standard phone jack) by 600 Ω.
2	Ref	Sets the AF output impedance of DUT. Range: 0.1 to 100000 Ω Default: 600.0 Ω
3	AF Input Port*	Selects the AF Input connector to use on MS2830A rear panel. Unbalance(100kΩ): Uses Unbal 100kΩ connector (BNC) (Default) Balance(200kΩ): Uses Bal 200kΩ connector (Standard phone jack)
4	Ref*	Sets the AF input impedance of DUT. Range: 0.1 to 100000 Ω Default: 600.0 Ω

∗ : Available when MS2830A-029 or 088 is installed.

3.3 Correction Settings

This section describes how to set the path losses between MS2830A and DUT (radio device).

■ Uncheck the [Use MN2555A] box

Correction Settings

(1) Loss of TX Route: 0.00 dB (2) ☐ Enable

(3) Loss of RX Route: 0.00 dB (4) ☐ Enable (5) CAL Wizard

The following path loss values are reflected to measurement results.

No.	Item	Description
	Correction Settings	
1	Loss of TX Route	Sets the path loss between antenna terminal of DUT (radio device) and RF input terminal of MS2830A. Range: –50 to 50 dB Default: 0.00 dB
2	Enable	Sets whether to reflect the value set in the **Loss of TX Route** box to measurement results. Check the box: Reflects. Uncheck the box: Does not reflect. (Default)
3	Loss of RX Route*	Sets the path loss between antenna terminal of DUT (radio device) and SG Output terminal of MS2830A. Range: –50 to 50 dB Default: 0.00 dB
4	Enable*	Sets whether to reflect the value set in the Loss of RX Route box to measurement results. Check the box: Reflects. Uncheck the box: Does not reflect. (Default)
5	CAL Wizard*	Starts the Calibration Wizard that guides you through the process of measuring cable losses in TX and RX paths. When using the Calibration Wizard, the following jig tools are required in addition to the cables for TX and RX paths. J1628A 50 Ω Terminator, J1629A Attenuator (50 W 30 dB), J1609A Signal Divider, J0576B Coaxial Cord (2 sets) 1.0 m, MP721C Fixed Attenuator

*: Available when MS2830A-029 or 088 is installed.

Note:

These settings will not be saved in the parameter file.

■ Check the [Use MN2555A] box

(1) **MN2555A - SN6201497300-00:2015/01/30**
(2) Cable Loss: `0.00` dB
(3) Use Port: High Power RF Input/Output ▼

No.	Item	Description
1	MN2555A - SN6201497300-00: 2015/01/30	Displays the correction data information (Model name, Serial number, Calibration date of Duplexer box) set in the **Interface Setting** dialog box.
2	Cable Loss	Sets the path loss between antenna terminal of DUT (radio device) and terminal of the Duplexer Box. Range: −50 to 50 dB Default: 0.00 dB
3	Use Port	Selects the using port of Duplexer box. Options: High Power RF Input/Output (Default) Low Power RF Input/Output

Note:

These settings will not be saved in the parameter file.

3

Measurement

3.4 Setting TX Measurement

Before starting TX measurement, you need to select the measurement items and set the parameters. This section describes how to set the parameters for TX measurement.

3.4.1 Selecting TX measurement items

This section describes how to select a measurement item(s) to be included in TX measurement. Only the measurement item(s) selected here will be measured.

Note:

Some of the measurement items cannot be measured unless the other measurement item(s) is(are) complete. In this case, the check box(es) for the required measurement item(s) will be selected automatically.
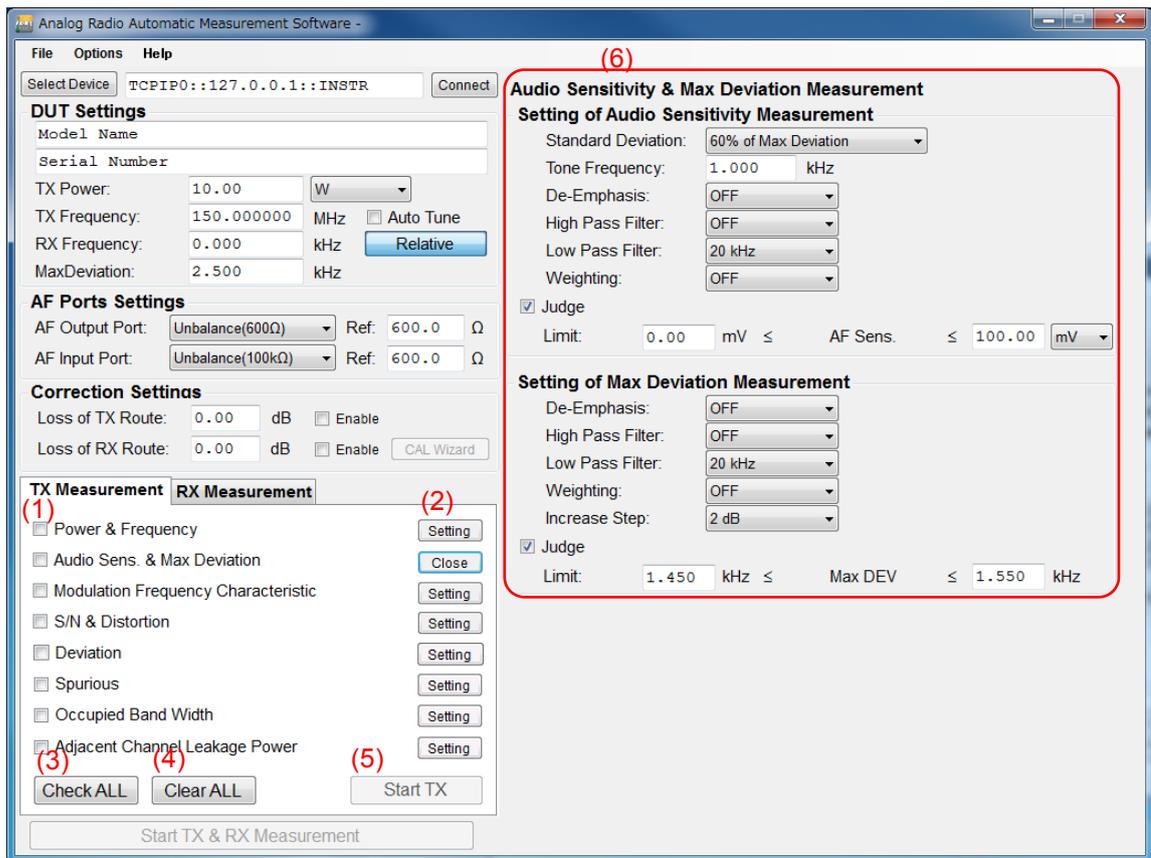
No.	Item	Description
1	(Check box)	Select the check box(es) for the TX measurement item(s) you want to test. Default: All off
2	Setting/Close	Displays/hides the detailed settings for the measurement item in the display area.
3	Check All	Sets all TX measurement check boxes to On.
4	Clear All	Sets all TX measurement check boxes to Off.
5	Start TX	Performs the selected measurement item(s) sequentially. Measurement cannot be started until this software is successfully connected to MS2830A. Refer to 3.1.4 "Connecting with MS2830A".
6	Display area	Displays the detailed settings for the measurement item if the caption on the button (2) is **Setting**. Hides them if the caption is **Close**.

3

Measurement

3.4.2 Power & Frequency measurement

This section describes how to set the Power & Frequency Measurement parameters.

To save any changes you make to the settings, click **Close**.

No.	Item	Description
	Power & Frequency measurement	
	Setting of Power Measurement	
1	Use USB Power Sensor. (MA24106A /MA24108A /MA24118A)	Sets whether to use the USB power sensor in TX power measurement. The supported models are MA24106A, MA24108A and MA24118A. Check the box: Uses USB Power sensor Uncheck the box: Does not use USB Power sensor (Default)
2	Judge	Sets the Pass/Fail evaluation. Available only for MX283058A. Check the box: Enabled (Default) Uncheck the box: Disabled
3	Limit	Sets the limit value for Pass/Fail evaluation. Available only for MX283058A. Range: −100 to 100% (0 W to twice the setting TX power) Lower limit Default: −50% Upper limit Default: 20%
	Setting of Frequency Measurement	
4	Judge	Sets the Pass/Fail evaluation. Available only for MX283058A. Judgement cannot be made when automatically obtaining the TX frequency. Check the box: Enabled (Default) Uncheck the box: Disabled
5	Limit	Sets the limit value for Pass/Fail evaluation. Available only for MX283058A. Range: 0 to 100 ppm Default: 15 ppm

3.4.3   Audio sensitivity & Max deviation measurement

This section describes how to set the Audio Sensitivity & Max Deviation Measurement parameters.

Audio Sensitivity & Max Deviation Measurement

Setting of Audio Sensitivity Measurement

(1) Standard Deviation:	60% of Max Deviation	▼
(2) Tone Frequency:	1.000	kHz
(3) De-Emphasis:	OFF	▼
(4) High Pass Filter:	OFF	▼
(5) Low Pass Filter:	20 kHz	▼
(6) Weighting:	OFF	▼

(7) ☑ Judge

(8) Limit: 0.00 mV ≤   AF Sens.   ≤ 100.00 (9) mV ▼

Setting of Max Deviation Measurement

(10) De-Emphasis:	OFF	▼
(11) High Pass Filter:	OFF	▼
(12) Low Pass Filter:	20 kHz	▼
(13) Weighting:	OFF	▼
(14) Increase Step:	2 dB	▼

(15) ☑ Judge

(16) Limit: 1.450 kHz ≤   Max DEV   ≤ 1.550 kHz

To save any changes you make to the settings, click **Close**.

No.	Item	Description
	Audio Sensitivity & Max Deviation Measurement	
	Setting of Audio Sensitivity Measurement	

1	Standard Deviation	Selects the standard deviation.
		Options:
		70% of Max Deviation:
		   e.g. If the Max Deviation of DUT is 2.5 kHz (default),
		      the standard deviation becomes 1.75 kHz
		60% of Max Deviation (Default):
		   e.g. If the Max Deviation of DUT is 2.5 kHz (default),
		      the standard deviation becomes 1.5 kHz

2	Tone Frequency	Sets the tone frequency Range: 0.01 to 50 kHz Default: 1.000 kHz
3	De-Emphasis	Selects the de-emphasis. Options: OFF, 750 µs, 500 µs, 75 µs, 50 µs, 25 µs Default: OFF

No.	Item	Description
4	High Pass Filter	Selects the high pass filter. Options: OFF, 50 Hz, 300 Hz, 400 Hz, 30 kHz Default: OFF
5	Low Pass Filter	Selects the low pass filter. Options: OFF, 300 Hz, 3 kHz, 15 kHz, 20 kHz Default: 20 kHz
6	Weighting	Selects the weighting. Options: OFF, CCITT, C-Message Default: OFF
7	Judge	Sets the Pass/Fail evaluation. Available only for MX283058A. Check the box: Enabled (Default) Uncheck the box: Disabled
8	Limit	Sets the limit value for Pass/Fail evaluation. Available only for MX283058A. Range: −100 to 100 (Unit dBm) Range: 0 to 1000 (Unit other than dBm) Lower limit Default: 0.00 mV Upper limit Default: 100.00 mV
9	(Menu)	Selects the unit of limit value. Options: mV, V, mW, W, dBm Default: mV
	Setting of Max Deviation Measurement	
10	De-Emphasis	Selects the de-emphasis. Options: OFF, 750 μs, 500 μs, 75 μs, 50 μs, 25 μs Default: OFF
11	High Pass Filter	Selects the high pass filter. Options: OFF, 50 Hz, 300 Hz, 400 Hz, 30 kHz Default: OFF
12	Low Pass Filter	Selects the low pass filter. Options: OFF, 300 Hz, 3 kHz, 15 kHz, 20 kHz Default: 20 kHz
13	Weighting	Selects the weighting. Options: OFF, CCITT, C-Message Default: OFF
14	Increase step	Selects the Increase step. Options: 2 dB, 20 dB Default: 2 dB **Note:** If the Audio Generator output exceeds the upper limit at the Maximum deviation measurement, the measurement will be interrupted as a failure.
15	Judge	Sets the Pass/Fail evaluation. Available only for MX283058A. Check the box: Enabled (Default) Uncheck the box: Disabled

No.	Item	Description
16	Limit	Sets the limit value for Pass/Fail evaluation. Available only for MX283058A. Range: 0 to 60 kHz Lower limit Default: 1.450 kHz Upper limit Default: 1.550 kHz

3.4.4   Modulation frequency characteristic measurement

This section describes how to set the Modulation Frequency Characteristic Measurement parameters. Make sure the audio sensitivity measurement has already been performed.

To save any changes you make to the settings, click **Close**.

No.	Item	Description
	Modulation Frequency Characteristic	
	Setting of Modulation Frequency Characteristic	
1	De-Emphasis	Selects the de-emphasis. Options: OFF, 750 μs, 500 μs, 75 μs, 50 μs, 25 μs Default: OFF
2	High Pass Filter	Selects the high pass filter. Options: OFF, 50 Hz, 300 Hz, 400 Hz, 30 kHz Default: OFF

No.	Item	Description
3	Low Pass Filter	Selects the low pass filter. Options: OFF, 300 Hz, 3 kHz, 15 kHz, 20 kHz Default: 20 kHz
4	Weighting	Selects the weighting. Options: OFF, CCITT, C-Message Default: OFF
5	Reference Frequency	Sets the reference frequency. The set frequency is used as the 0 dB reference. Range: 10 to 50000 Hz Default: 1000 Hz
	Frequency List	
6	FREQ	Select only the check box(es) for the a frequency or frequencies you want to measure. Default: On (FREQ 1 to 7) Default: Off (FREQ 8 to 20)
7	(Text box)	Sets the tone frequency of each of the selected a frequency or frequencies. Up to 20 types of frequency can be measured. Range: 10 to 5000 Hz Default: Refer to Table 3.4.4-1

Table 3.4.4-1   Default for frequency on Modulation Frequency Characteristic Measurement

Frequency No.	Frequency (Hz)	Frequency No.	Frequency (Hz)	Frequency No.	Frequency (Hz)	Frequency No.	Frequency (Hz)
1	100.0	6	3000.0	11	1000.0	16	1000.0
2	200.0	7	5000.0	12	1000.0	17	1000.0
3	300.0	8	1000.0	13	1000.0	18	1000.0
4	500.0	9	1000.0	14	1000.0	19	1000.0
5	2000.0	10	1000.0	15	1000.0	20	1000.0

3.4.5   S/N & Distortion

This section describes how to set the S/N & Distortion Measurement parameters.

Make sure the audio sensitivity measurement has already been performed.

To save any changes you make to the settings, click **Close**.

No.	Item	Description
	S/N &Distortion	
	Setting of S/N Measurement	
1	De-Emphasis	Selects the de-emphasis. Options: OFF, 750 µs, 500 µs, 75 µs, 50 µs, 25 µs Default: OFF
2	High Pass Filter	Selects the high pass filter. Options: OFF, 50 Hz, 300 Hz, 400 Hz, 30 kHz Default: 300 Hz
3	Low Pass Filter	Selects the low pass filter. Options: OFF, 300 Hz, 3 kHz, 15 kHz, 20 kHz Default: 3 kHz
4	Weighting	Selects the weighting. Options: OFF, CCITT, C-Message Default: OFF

No.	Item	Description
5	Judge	Sets the Pass/Fail evaluation. Available only for MX283058A. Check the box: Enabled (Default) Uncheck the box: Disabled
6	Limit	Sets the limit value for Pass/Fail evaluation. Available only for MX283058A. Range: 0 to 99.9 dB Default: 40.0 dB
	Setting of Distortion Measurement	
7	De-Emphasis	Selects the de-emphasis. Options: OFF, 750 µs, 500 µs, 75 µs, 50 µs, 25 µs Default: OFF
8	High Pass Filter	Selects the high pass filter. Options: OFF, 50 Hz, 300 Hz, 400 Hz, 30 kHz Default: 300 Hz
9	Low Pass Filter	Selects the low pass filter. Options: OFF, 300 Hz, 3 kHz, 15 kHz, 20 kHz Default: 3 kHz
10	Weighting	Selects the weighting. Options: OFF, CCITT, C-Message Default: OFF
11	Judge	Sets the Pass/Fail evaluation. Available only for MX283058A. Check the box: Enabled (Default) Uncheck the box: Disabled
12	Limit	Sets the limit value for Pass/Fail evaluation. Available only for MX283058A Range: −60 to 0 dB Range: 0 to 100 % Default: −30.0 dB
13	(Menu)	Selects the unit of Limit. Available only for MX283058A Options: dB, % Default: dB

3.4.6   Deviation

This section describes how to set the Deviation measurement parameters. This functions is available only for MX283058A.

Deviation Measurement
Setting of Deviation Measurement
(1) De-Emphasis: OFF
(2) High Pass Filter: OFF
(3) Low Pass Filter: 20 kHz
(4) Weighting: OFF
(5) Start AF Level: −40.00 dBm
(6) Stop AF Level: 5.00 dBm
(7) AF Level Step: 5.0 dBm
(8) ☑ Output deviation based data(converted from measured data).
(9) Start Deviation: 0.000 kHz
(10) Stop Deviation: 100.000 kHz
(11) Deviation Step: 0.5 kHz

Frequency List:
(12) (13)
FREQ 1 ☑ 500 Hz
FREQ 2 ☑ 1000 Hz
FREQ 3 ☑ 2000 Hz
FREQ 4 ☑ 3000 Hz
FREQ 5 ☑ 5000 Hz

Output Data (14)
Data1: Deviation RMS
Data2: Deviation Peak+
Data3: Deviation Peak- (Absolute value)
Data4: Deviation Peak-
Data5: Deviation (Pk-Pk)/2

To save any changes you make to the settings, click **Close**.

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Measurement

No.	Item	Description
	Deviation Measurement	
	Setting of Deviation Measurement	
1	De-Emphasis	Selects the de-emphasis. Options: OFF, 750 µs, 500 µs, 75 µs, 50 µs, 25 µs Default: OFF
2	High Pass Filter	Selects the high pass filter. Options: OFF, 50 Hz, 300 Hz, 400 Hz, 30 kHz Default: OFF Hz
3	Low Pass Filter	Selects the low pass filter. Options: OFF, 300 Hz, 3 kHz, 15 kHz, 20 kHz Default: 20 kHz
4	Weighting	Selects the weighting. Options: OFF, CCITT, C-Message Default: OFF
5	Start AF Level	Sets the starting level of the audio generator output. Range: −57.00 to 20 dBm Default: −34.00 dBm
6	Stop AF Level	Sets the stopping level of the audio generator output. Range: −57.00 to 20 dBm Default: 0.00 dBm
7	AF Level Step	Selects the increasing step of the audio generator output. Options: 0.2 dB, 0.25 dB, 0.5 dB, 1.0 dB, 2.0 dB, 2.5 dB, 5.0 dB, 10.0 dB Default: 0.25 dB
8	Output deviation based data (converted from measured data)	Calculates the data of "Deviation vs. AF Level", if selected. Calculates the data of "Deviation vs. AF Level" from the linear interpolation of "AF level vs. Deviation" obtained by increasing the AF level. The measurement accuracy depends on AF level step width.(0.25 dB or under recommended)
9	Start Deviation	Sets the starting point of the deviation. Range: 0 to 10.00 kHz Default: 0.5 kHz
10	Stop Deviation	Sets the stopping point of the deviation. Range: 0 to 10.00 kHz Default: 6.0 kHz
11	Deviation Step	Selects the increasing step of the deviation. Options: 0.1 kHz, 0.2 kHz, 0.25 kHz, 0.5 kHz Default: 0.2 kHz
	Frequency List	
12	FREQ	Select only the check box(es) for the a frequency or frequencies you want to measure. Range: ON, OFF Default: Refer to Table 3.4.6-1
13	(Text box)	Sets the tone frequency of each of the selected a frequency or frequencies. Up to 20 types of frequency can be measured. Range: 10 to 5000 Hz Default: Refer to Table 3.4.6-1

No.	Item	Description
14	Output Data	Selects the deviation type to output. Options: OFF, Deviation RMS, Deviation Peak+, Deviation Peak–, Deviation Peak– (Absolute value), Deviation (Pk-Pk)/2 Default: Refer to Table 3.4.6-2

The measurement result is saved by clicking the Save Result button. The files are named as below when saved.

- File name for "AF Level vs. Deviation":

    File name specified for Save Result + _LvD. csv[*1]

- File name for "Deviation vs. AF Level":

    File name specified for Save Result + _DvL. csv[*2]

[*1]: The converted result is output whether or not **Output deviation based data (converted from measured data)** is selected (Item No. 8 in the above table).

[*2]: The converted result is output when **Output deviation based data (converted from measured data)** is selected (Item No. 8 in the above table).

Table 3.4.6-1   Default for Deviation and Measurement Frequency

Frequency No	ON/OFF	Frequency (Hz)
1	**OFF**	500.0
2	**ON**	1000.0
3	**OFF**	2000.0
4	**OFF**	3000.0
5	**OFF**	5000.0

Table 3.4.6-2   Default for Output Data on Deviation Measurement.

Data No.	Output Data
1	Deviation RMS
2	Deviation Peak+
3	Deviation Peak– (Absolute value)
4	Deviation (Pk-Pk)/2
5	OFF

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Measurement

3.4.7   Spurious Measurement

This section describes how to set the Spurious Measurement parameters. The spectrum analyzer function is used when measuring spurious emissions.
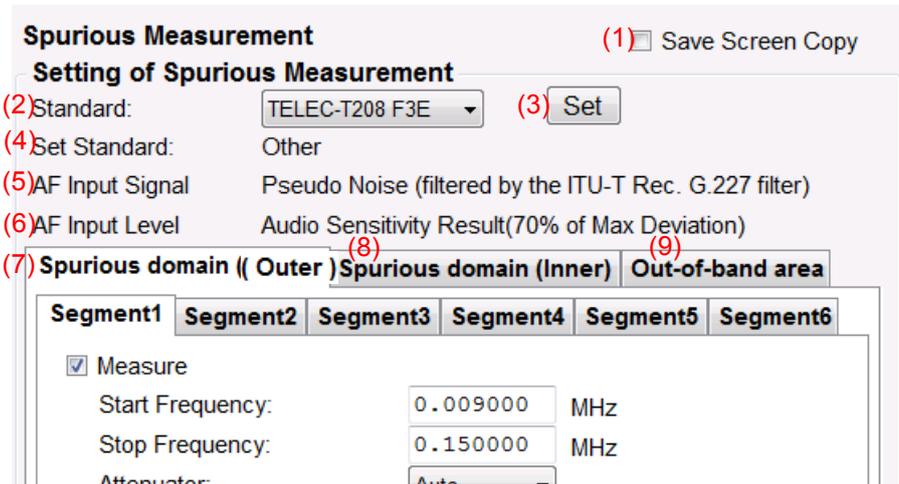
To save any changes you make to the settings, click **Close**.

No.	Item	Description
	Spurious Measurement	
1	Save Screen Copy	Sets whether to save a screen shot of MS2830A. The screen shot is saved to MS2830A. Check the box: Save Uncheck the box: Does not save (Default)
	Setting of Spurious Measurement	
2	Standard	Select the standard you want to set automatically. Options: TELEC T208 F3E (Default)
3	Set	Sets each parameter automatically according to the standard selected in the **Standard** box.
4	Set Standard	Displays the standard set automatically. If you make any changes to the settings, the standard name is replaced by "Other".
5	AF Input Signal	Performs the spurious measurement with "Pseudo Noise (filtered by the ITU-T Rec. G 277 filter)".
6	AF Input Level	Performs the spurious measurement with "Audio Sensitivity Result (70% of Max Deviation)+10 dB".
7	Spurious Domain (Outer)	Refer to 3.4.7.1 "Spurious Domain (Outer)".
8	Spurious Domain (Inner)	Refer to 3.4.7.2 "Spurious Domain (Inner)".
9	Out-of-band area	Refer to 3.4.7.3 "Out-of-band area".

3.4.7.1   Spurious Domain (Outer)

This section describes how to set the Spurious Measurement parameters for spurious domain (outer).
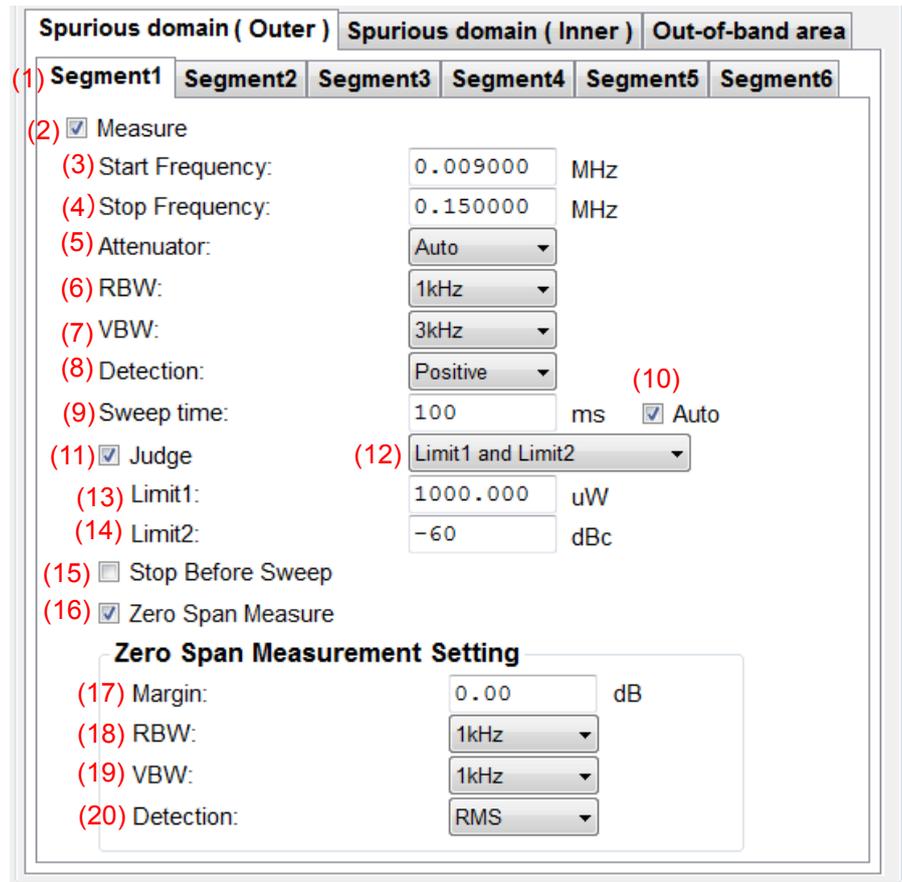
No.	Item	Description
	Spurious domain (Outer)	
1	Segment1 to 6	Displays the setting dialog boxes of segment 1 to 6 in Outer.
2	Measure	Sets the measurement. Check the box: Enabled Uncheck the box: Disabled Default: On (Segment 1 to 5), Off (Segment 6)
3	Start Frequency	Sets the start frequency in measurement area. Range: 0.009 to 6000 MHz Default: Refer to Table 3.4.7.1-1
4	Stop Frequency	Sets the stop frequency in measurement area. Range: 0.009 to 6000 MHz Default: Refer to Table 3.4.7.1-1

No.	Item	Description
5	Attenuator	Sets the attenuator in measurement area. Options: Auto, 0, 2, 4, 6, … 58, 60 dB Default: Auto (Segment 1 to 6)

6	RBW	Selects the RBW in measurement area.
		Options: 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz,
		                        30 kHz, 100 kHz, 300 kHz, 1 MHz, 3 MHz,
		                        10 MHz
		Default: Refer to Table 3.4.7.1-1

7	VBW	Selects the VBW in measurement area.
		Options: 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz,
		                        30 kHz, 100 kHz, 300 kHz, 1 MHz, 3 MHz,
		                        10 MHz
		Default: Refer to Table 3.4.7.1-1

8	Detection	Selects the detection in measurement area. Options: Normal, Positive, Negative, Sample, RMS Default: Positive (Segment 1 to 6)
9	Sweep time	Sets the sweep time in measurement area. Range: 1 to 1000000 ms Default: 100 ms (Segment 1 to 6)
10	Auto	Sets the sweep time mode to auto/manual. Check the box: Auto (Default: Segment 1 to 6) Uncheck the box: Manual
11	Judge	Sets the Pass/Fail evaluation. Check the box: Enabled (Default: Segment 1 to 6) Uncheck the box: Disabled
12	(Menu)	Selects the evaluation mode of the limit value. Options: Limit1, Limit2, Limit1 and Limit2, Limit1 or Limit2 Default: Limit1 and Limit2 (Segment 1 to 6)
13	Limit1	Sets the limit value for Pass/Fail evaluation in µW unit. Range: 0.001 to 1000000 µW Default: 1000 µW (Segment 1 to 6)
14	Limit2	Sets the limit value for Pass/Fail evaluation in dBc unit. Range: −100 to 0 dBc Default: −60 dBc (Segment 1 to 6)
15	Stop Before Sweep	Sets whether to pause before sweeping. Check the box: Enabled Uncheck the box: Disabled (Default: Segment 1 to 6)
16	Zero Span Measure	Sets whether to perform power adjustment (zero span) measurement when the measurement doesn't meet the limit. Check the box: Enabled (Default: Segment 1 to 6) Uncheck the box: Disabled

No.	Item	Description
	Zero Span Measurement Setting	
17	Margin	Sets the condition for power adjustment (zero span) measurement. Power adjustment (zero span) measurement is performed if the difference between measured value and limit value is no more than the value set here. Range: 0 to 50 dB Default: 0.00 dB (Segment 1 to 6)
18	RBW	Selects the RBW in Zero Span Measurement. Options: 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz, 3 MHz, 10 MHz Default: Refer to Table 3.4.7.1-1
19	VBW	Selects the VBW in Zero Span Measurement. Options: 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz, 3 MHz, 10 MHz Default: Refer to Table 3.4.7.1-1
20	Detection	Selects the detection in Zero Span Measurement. Options: Normal, Positive, Negative, Sample, RMS Default: RMS (Segment 1 to 6)

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Measurement

Table 3.4.7.1-1　Default for Out of close-in area

Segment	Start Frequency (MHz)	Stop Frequency (MHz)	RBW (Hz)	VBW (Hz)	Zero Span Measurement RBW (Hz)	Zero Span Measurement VBW (Hz)
1	0.009000	0.150000	1 k	3 k	1 k	1 k
2	0.150000	30.000000	10 k	10 k	10 k	10 k
3	30.000000	149.000000	100 k	100 k	100 k	100 k
4	151.000000	1000.000000	100 k	100 k	100 k	100 k
5	1000.000000	1500.000000	1 M	1 M	1 M	1 M
6	1500.000000	3600.000000	1 M	1 M	1 M	1 M

3.4.7.2   Spurious Domain (Inner)

This section describes how to set the Spurious Measurement parameters for spurious domain (inner).

No.	Item	Description
	Spurious domain (Inner)	
1	Upper Measure	Sets the upper side measurement. Check the box: Enabled (Default) Uncheck the box: Disabled
2	Lower Measure	Sets the lower side measurement. Check the box: Enabled (Default) Uncheck the box: Disabled
3	Span	Sets the span in measurement area. Range: 0.001 to 100 MHz Default: 1.000000 MHz
4	(exclude ±[ ] kHz)	Sets the excluding span frequency. Range: 0.1 to 100000 kHz Default: 62.500 kHz

No.	Item	Description
5	Attenuator	Sets the attenuator in measurement area. Options: Auto, 0, 2, 4, 6, … 58, 60 dB Default: Auto
6	RBW	Selects the RBW in measurement area. Options: 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz, 3 MHz, 10 MHz Default: 3 kHz
7	VBW	Selects the VBW in measurement area. Options: 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz, 3 MHz, 10 MHz Default: 3 kHz
8	Detection	Selects the detection in measurement area. Options: Normal, Positive, Negative, Sample, RMS Default: Positive
9	Sweep time	Sets the sweep time in measurement area. Range: 1 to 1000000 ms Default: 100 ms
10	Auto	Sets the sweep time mode to auto/manual. Check the box: Auto (Default) Uncheck the box: Manual
11	Judge	Sets the Pass/Fail evaluation. Check the box: Enabled (Default) Uncheck the box: Disabled
12	(Menu)	Selects the evaluation mode of the limit value. Options: Limit 1, Limit 2, Limit 1 and Limit 2, Limit 1 or Limit 2 Default: Limit 1 and Limit 2
13	Limit1	Sets the limit value for Pass/Fail evaluation in µW unit. Limit value is adjusted by RBW setting Adjusted value for RBW = 10 × log (Reference bandwidth / RBW) Range: 0.001 to 1000000 µW Default: 1000.000 µW
14	Limit2	Sets the limit value for Pass/Fail evaluation in dBc unit. Limit value is adjusted by RBW setting Adjusted value for RBW = 10 × log (Reference bandwidth / RBW) Range: −100 to 0 dBc Default: −60
15	Detail Measurement	Sets the Detail Measurement when the measurement doesn't meet the limit. Check the box: Enabled (Default) Uncheck the box: Disabled

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Measurement

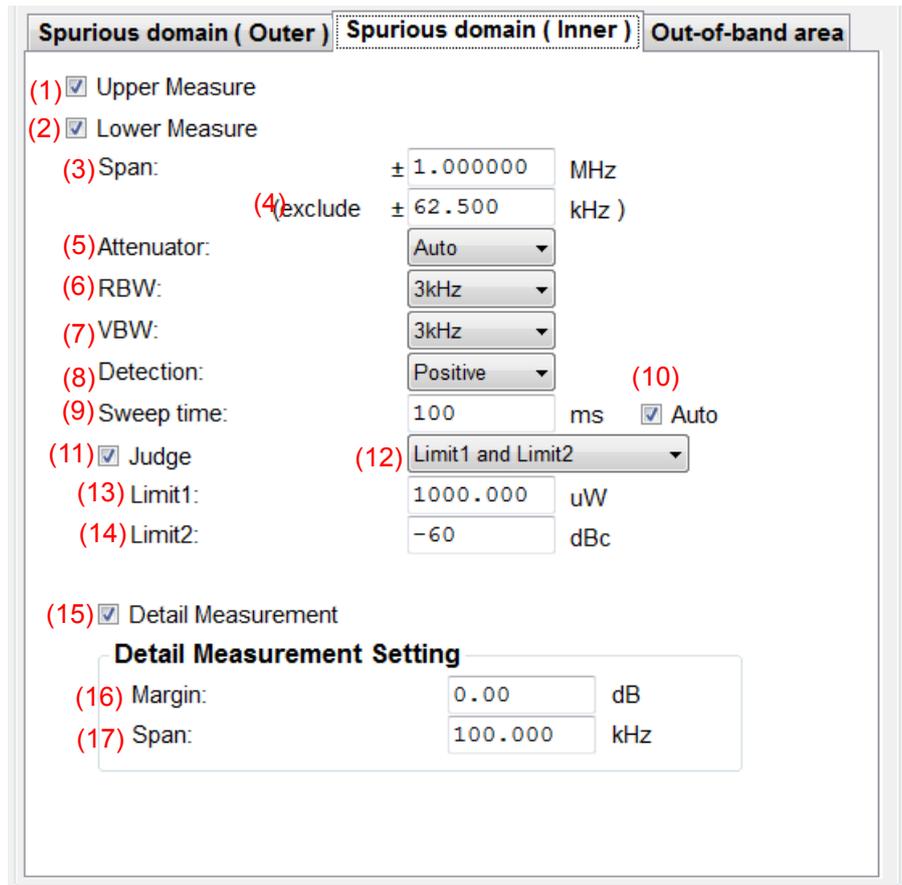| No.	Item	Description
	Detail Measurement Setting	
16	Margin	Sets the condition for detail measurement. Detail measurement is performed if the difference between measured value and limit value is no more than the value set here. Range: 0 to 50 dB Default: 0.00 dB
17	Span	Sets the span (kHz unit) in Detail Measurement Range: 0 to 1000 kHz Default: 100.000 kHz

3.4.7.3   Out-of-band area

This section describes how to set the Spurious Measurement parameters for out-of-band area.

No.	Item	Description
	Out-of-band area	
1	Upper Measure	Sets the upper side measurement. Check the box:　　　　Enabled (Default) Uncheck the box:　　　Disabled
2	Lower Measure	Sets the lower side measurement. Check the box:　　　　Enabled (Default) Uncheck the box:　　　Disabled
3	Span	Sets the span in Out-of-band area. Range:　　　　0.1 to 100000 kHz Default:　　　62.500 kHz
4	(exclude ±[　] kHz /2)	Sets the excluding span frequency. Range:　　　　0.1 to 500 kHz Default:　　　8.500 kHz
5	Attenuator	Sets the attenuator in Out-of-band area. Options:　　　Auto, 0, 2, 4, 6, … 58, 60 dB Default:　　　Auto
6	RBW	Selects the RBW in Out-of-band area. Options:　　　30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 　　　　30 kHz, 100 kHz, 300 kHz, 1 MHz, 3 MHz, 　　　　10 MHz Default:　　　100 Hz
7	VBW	Selects the VBW in Out-of-band area. Options:　　　30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 　　　　30 kHz, 100 kHz, 300 kHz, 1 MHz, 3 MHz, 　　　　10 MHz Default:　　　100 Hz
8	Detection	Selects the detection in Out-of-band area. Options:　　　Normal, Positive, Negative, Sample, RMS Default:　　　Positive
9	Judge	Sets the Pass/Fail evaluation. Check the box:　　　　Enabled (Default) Uncheck the box:　　　Disabled
10	(Menu)	Selects the evaluation mode of the limit value. Options:　　　Limit 1, Limit 2, Limit 1 and Limit 2, 　　　　Limit 1 or Limit 2 Default:　　　Limit 1 and Limit 2
11	Limit1	Sets the limit value for Pass/Fail evaluation in µW unit. Range:　　　　0.001 to 1000000 µW Default:　　　1000.000 µW
12	Limit2	Sets the limit value for Pass/Fail evaluation in dBc unit. Range:　　　　−100 to 0 dBc Default:　　　−60 dBc
13	Detail Measurement	Sets the Detail Measurement when the measurement doesn't meet the limit. Check the box:　　　　Enabled (Default) Uncheck the box:　　　Disabled

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Measurement

3.4.8 Occupied Band Width Measurement

This section describes how to set the Occupied Band Width Measurement parameters. The spectrum analyzer function is used when measuring the occupied bandwidth.
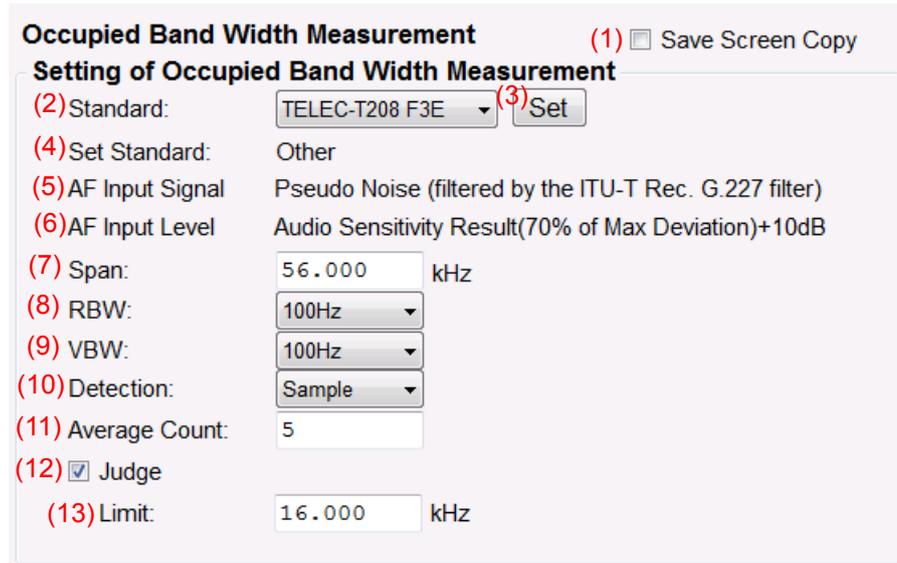
To save any changes you make to the settings, click **Close**.

No.	Item	Description
	Occupied Band Width Measurement	
1	Save Screen Copy	Sets whether to save a screen shot of MS2830A. The screen shot is saved to MS2830A. Check the box: Save Uncheck the box: Does not save (Default)
	Setting of Occupied Band Width Measurement	
2	Standard	Select the standard you want to set automatically. Options: TELEC T208 F3E (Default)
3	Set	Sets each parameter automatically according to the standard selected in the **Standard** box.
4	Set Standard	Displays the standard set automatically. If you make any changes to the settings, the standard name is replaced by "Other".
5	AF Input Signal	Performs the spurious measurement with "Pseudo Noise (filtered by the ITU-T Rec. G 277 filter)".
6	AF Input Level	Performs the spurious measurement with "Audio Sensitivity Result(70% of Max Deviation)+10 dB".
7	Span	Sets the span frequency. Range: 1 to 500 kHz Default: 56.000 kHz

No.	Item	Description
8	RBW	Selects the RBW. Options: 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz, 3 MHz, 10 MHz Default: 100 Hz
9	VBW	Selects the VBW. Options: 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz, 3 MHz, 10 MHz Default: 100 Hz
10	Detection	Selects the detection. Options: Normal, Positive, Negative, Sample, RMS Default: Sample
11	Average Count	Sets the average count. Range: 1 to 100 Default: 5
12	Judge	Sets the Pass/Fail evaluation. Check the box: Enabled (Default) Uncheck the box: Disabled
13	Limit	Sets the limit value for Pass/Fail evaluation. Range: 0 to 500 kHz Default: 16.000 kHz

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Measurement

3.4.9   Adjacent Channel Leakage Power Measurement

This section describes how to set the Adjacent Channel Leakage Power Measurement parameters. The spectrum analyzer function is used when measuring the adjacent channel leakage power. Make sure the audio sensitivity measurement has already been performed.

To save any changes you make to the settings, click **Close**.

No.	Item	Description
	Adjacent Channel Leakage Power Measurement	
1	Save screen copy	Sets whether to save a screen shot of MS2830A. The screen shot is saved to MS2830A. Check the box: Save Uncheck the box: Does not save (Default)
	Setting of Adjacent Channel Leakage Power Measurement	
2	Standard	Select the standard you want to set automatically. Options: TELEC-T208 F3E (Default)
3	Set	Sets each parameter automatically according to the standard selected in the **Standard** box.
4	Set Standard	Displays the standard set automatically. If you make any changes to the settings, the standard name is replaced by "Other".

No.	Item	Description
	Setting of Audio Sensitivity Measurement	
5	Standard Deviation	Selects the standard deviation Options: 70% of Max Deviation: e.g. If the Max Deviation of DUT is 2.5 kHz (default), the standard deviation becomes 1.75 kHz 60% of Max Deviation (Default): e.g. If the Max Deviation of DUT is 2.5 kHz (default), the standard deviation becomes 1.5 kHz
6	Tone Frequency	Sets the AF tone frequency. Range: 0.01 to 50 kHz Default: 1.250 kHz
7	De-Emphasis	Selects the de-emphasis. Options: OFF, 750 µs, 500 µs, 75 µs, 50 µs, 25 µs Default: OFF
8	High Pass Filter	Selects the high pass filter. Options: OFF, 50 Hz, 300 Hz, 400 Hz, 30 kHz Default: OFF
9	Low Pass Filter	Selects the low pass filter. Options: OFF, 300 Hz, 3 kHz, 15 kHz, 20 kHz Default: 20 kHz
10	Weighting	Selects the weighting. Options: OFF, CCITT, C-Message Default: OFF
11	Span	Sets the sweep frequency. Range: 1 to 500 kHz Default: 40.000 kHz
12	RBW	Selects the RBW. Options: 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz, 3 MHz, 10 MHz Default: 100 Hz
13	VBW	Selects the VBW. Options: 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz, 3 MHz, 10 MHz Default: 100 Hz
14	Detection	Selects the detection. Options: Normal, Positive, Negative, Sample, RMS Default: Positive
15	Specified Bandwidth	Sets the specified bandwidth. Range: 1 to 500 kHz Default: 8.500 kHz
16	Channel Spacing	Sets the channel spacing. Range: 1 to 500 kHz Default: 12.500 kHz

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Measurement

No.	Item	Description
17	Judge	Sets the Pass/Fail evaluation. Check the box: Enabled (Default) Uncheck the box: Disabled
18	Limit	Sets the limit value for Pass/Fail evaluation. Range: −100 to 0 dBc Default: −60 dBc

3.5 Setting RX Measurement

Before starting RX measurement, you need to select the measurement items and set the parameters. This section describes how to set the parameters for RX measurement.

3.5.1 Selecting RX measurement items

Click the **RX Measurement** tab, and then select a measurement item(s) to be included in RX measurement. Only the measurement item(s) selected here will be measured.

Note:

Some of the measurement items cannot be measured unless the other measurement item(s) is(are) complete. In this case, the check box(es) for the required measurement item(s) will be selected automatically.
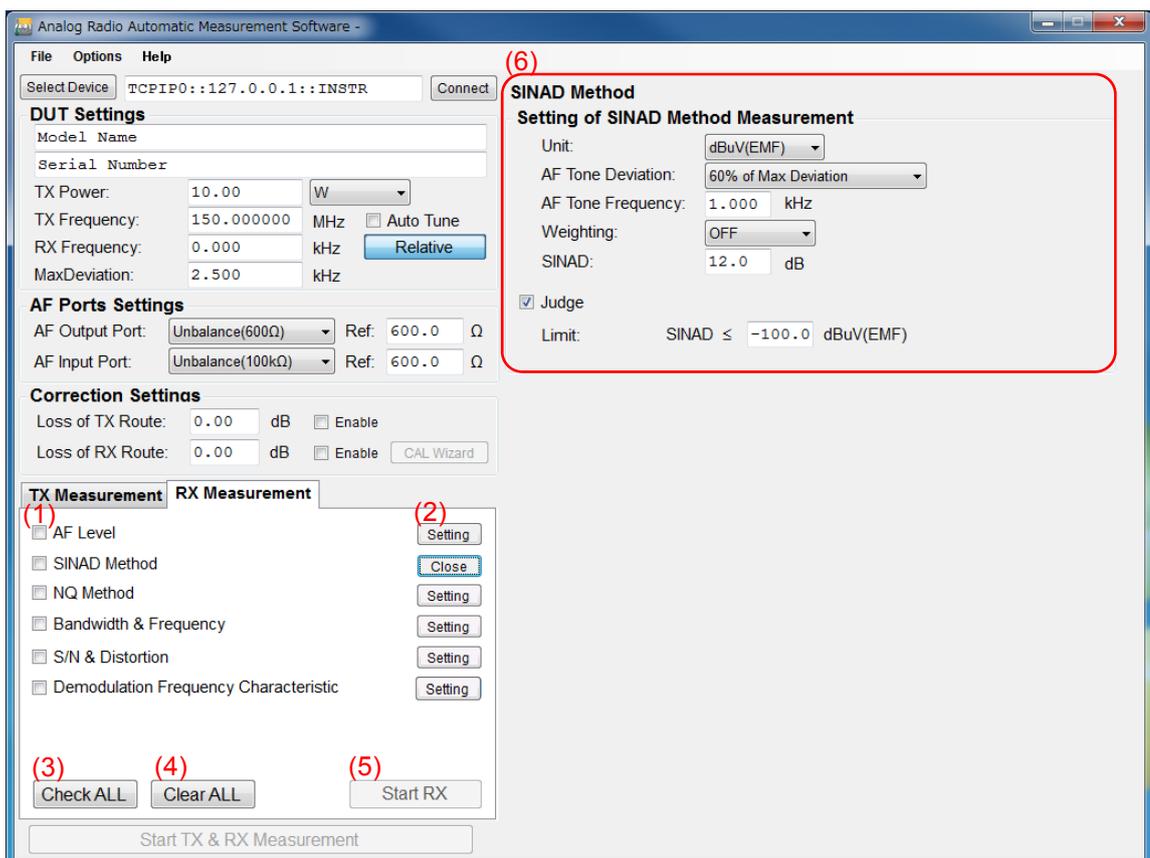
No.	Item	Description
1	(Check box)	Select the check box(es) for the RX measurement item(s) you want to test. Default:　　　All off
2	Setting/Close	Displays/hides the detailed settings for the measurement item in the display area.
3	Check ALL	Sets all TX measurement check boxes to On.
4	Clear ALL	Sets all TX measurement check boxes to Off.
5	Start RX	Performs the selected measurement item(s) sequentially. Measurement cannot be started until this software is successfully connected to MS2830A. 　　　　　　　　　Refer to 3.1.4 "Connecting with MS2830A".
6	Display area	Displays the detailed settings for the measurement item if the caption on the button (2) is Setting. Hides them if the caption is Close.

3.5.2 AF level

This section describes how to set the AF Level Measurement parameters.

AF Level
Setting of AF Level Measurement
(1) Unit: mV ▼
(2) AF Tone Deviation: 60% of Max Deviation ▼
(3) AF Tone Frequency: 1.000   kHz
(4) Weighting: OFF ▼
(5) ☑ Judge
(6) Limit: 2.0   mV   ≤   AF Level   ≤   5.0   mV

To save any changes you make to the settings, click **Close**.

No.	Item	Description
	AF Level	
	Setting of AF Level Measurement	
1	Unit	Selects the unit for measurement results Options: mV, V, dBm Default: mV
2	AF Tone Deviation	Selects the AF tone deviation Options: 70% of Max Deviation: e.g. If the Max Deviation of DUT is 2.5 kHz (default), the AF tone deviation becomes 1.75 kHz 60% of Max Deviation (Default): e.g. If the Max Deviation of DUT is 2.5 kHz (default), the AF tone deviation becomes 1.5 kHz
3	AF Tone Frequency	Sets the AF tone frequency. Range: 0.02 to 40 kHz Default: 1.000 kHz
4	Weighting	Selects the weighting. Options: OFF, CCITT, C-Message Default: OFF
5	Judge	Sets the Pass/Fail evaluation. Available only for MX283058A. Check the box: Enabled (Default) Uncheck the box: Disabled
6	Limit	Sets the limit value for Pass/Fail evaluation. Available only for MX283058A. Range: −100 to 1000 Lower limit Default: 2.0 Upper limit Default: 5.0

3.5.3 SINAD Method

This section describes how to set the SINAD Measurement parameters.

To save any changes you make to the settings, click **Close**.

No.	Item	Description
	SINAD Method	
	Setting of SINAD Method Measurement	
1	Unit	Selects the unit for measurement results Options: dBµV(EMF), dBµV(Term), dBm Default: dBµV(EMF)

2	AF Tone Deviation	Selects the AF tone deviation
		Options:
		70% of Max Deviation:
		    e.g. If the Max Deviation of DUT is 2.5 kHz (default),
		          the AF tone deviation becomes 1.75 kHz
		60% of Max Deviation (Default):
		    e.g. If the Max Deviation of DUT is 2.5 kHz (default),
		          the AF tone deviation becomes 1.5 kHz

3	AF Tone Frequency	Sets the AF tone frequency. Range: 0.02 to 40 kHz Default: 1.000 kHz
4	Weighting	Selects the weighting. Options: OFF, CCITT, C-Message Default: OFF
5	SINAD	Sets the SINAD. Range: 5 to 50 dB Default: 12.0 dB
6	Judge	Sets the Pass/Fail evaluation. Available only for MX283058A. Check the box: Enabled (Default) Uncheck the box: Disabled

No.	Item	Description
7	Limit	Sets the limit value for Pass/Fail evaluation. Available only for MX283058A. Range: −150 to 150 Default: 6.0

3.5.4 NQ measurement

This section describes how to set the NQ Measurement parameters.

To save any changes you make to the settings, click **Close**.

No.	Item	Description
	NQ Method	
	Setting of NQ Method Measurement	
1	Unit	Selects the unit for measurement results Options: dBμV(EMF), dBμV(Term), dBm Default: dBμV(EMF)
2	Weighting	Selects the weighting. Options: OFF, CCITT, C-Message Default: OFF
3	NQ	Sets the NQ. Range: 5 to 50 dB Default: 20.0 dB
4	Judge	Sets the Pass/Fail evaluation. Available only for MX283058A. Check the box: Enabled (Default) Uncheck the box: Disabled
5	Limit	Sets the limit value for Pass/Fail evaluation. Available only for MX283058A. Range: −150 to 150 Default: 6.0

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Measurement

3.5.5   Bandwidth & RX Frequency measurement

This section describes how to set the Bandwidth & RX Frequency Measurement parameters. Make sure the RX sensitivity measurement (NQ) has already been performed. RX Frequency Measurement is available only for MX283058A.

To save any changes you make to the settings, click **Close**.

No.	Item	Description
	Bandwidth RX Frequency measurement	
	Setting of Bandwidth	
1	Weighting	Selects the weighting. Options: OFF, CCITT, C-Message Default: OFF
2	Standard Level	Enter the value to be added to the sensitivity level obtained by the NQ sensitivity measurement. The output of the signal generator is: (Result of NQ sensitivity measurement) + (Value set for Standard Level) Range: 3 to 100 dB Default: 6.0 dB
3	Judge	Sets the Pass/Fail evaluation. Available only for MX283058A. Check the box: Enabled (Default) Uncheck the box: Disabled
4	Limit	Sets the limit value for Pass/Fail evaluation. Available only for MX283058A. Range: 0 to 99.999 kHz Lower limit Default: 12.000 kHz Upper limit Default: 18.000 kHz

No.	Item	Description
	Setting of RX Frequency	
5	Judge	Sets the Pass/Fail evaluation. Available only for MX283058A. Check the box: Enabled (Default) Uncheck the box: Disabled
6	Limit	Sets the limit value for Pass/Fail evaluation. Available only for MX283058A. Range: 0 to 9999.999 ppm Default: 20.000 ppm

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Measurement

3.5.6   S/N & Distortion

This section describes how to set the S/N & Distortion Measurement parameters.

To save any changes you make to the settings, click **Close**.

No.	Item	Description
	S/N & Distortion	
	Setting of S/N Measurement	

1	AF Tone Deviation	Selects the AF tone deviation
		Options:
		70% of Max Deviation:
		   e.g. If the Max Deviation of DUT is 2.5 kHz (default),
		      the AF tone deviation becomes 1.75 kHz
		60% of Max Deviation (Default):
		   e.g. If the Max Deviation of DUT is 2.5 kHz (default),
		      the AF tone deviation becomes 1.5 kHz

2	AF Tone Frequency	Sets the AF tone frequency. Range: 0.02 to 40 kHz Default: 1.000 kHz
3	Weighting	Selects the weighting. Options: OFF, CCITT, C-Message Default: OFF
4	Judge	Sets the Pass/Fail evaluation. Available only for MX283058A. Check the box: Enabled (Default) Uncheck the box: Disabled

No.	Item	Description
5	Limit	Sets the limit value for Pass/Fail evaluation. Available only for MX283058A. Range: 0 to 70 dB Default: 30.00 dB
	Setting of Distortion Measurement	
6	AF Tone Deviation	Selects the AF tone deviation Options: 70% of Max Deviation: 　e.g. If the Max Deviation of DUT is 2.5 kHz (default), the AF tone deviation becomes 1.75 kHz 60% of Max Deviation (Default): 　e.g. If the Max Deviation of DUT is 2.5 kHz (default), the AF tone deviation becomes 1.5 kHz
7	AF Tone Frequency	Sets the AF tone frequency. Range: 0.02 to 40 kHz Default: 1.000 kHz
8	Weighting	Selects the weighting. Options: OFF, CCITT, C-Message Default: OFF
9	Judge	Sets the Pass/Fail evaluation. Available only for MX283058A. Check the box: Enabled (Default) Uncheck the box: Disabled
10	Limit	Sets the limit value for Pass/Fail evaluation. Available only for MX283058A. Range: −70 to 0 dB Default: −30.00 dB
11	(Menu)	Selects the unit of Limit. Options: dB, % Default: dB

3

Measurement

3.5.7   Demodulation frequency characteristic measurement

This section describes how to set the Demodulation Frequency Characteristic Measurement parameters. Make sure the audio sensitivity measurement has already been performed. This functions is available only for MX283058A.

To save any changes you make to the settings, click **Close**.

No.	Item	Description
	Demodulation Frequency Characteristic	
	Setting of Demodulation Frequency Characteristic	

1	Deviation	Selects the deviation.
		Options:
		70% of Max Deviation:
		    e.g. If the Max Deviation of DUT is 2.5 kHz (default),
		        the standard deviation becomes 1.75 kHz
		60% of Max Deviation (Default):
		    e.g. If the Max Deviation of DUT is 2.5 kHz (default),
		        the standard deviation becomes 1.5 kHz

2	Weighting	Selects the weighting. Options: OFF, CCITT, C-Message Default: OFF
3	Reference Frequency	Sets the reference frequency. The set frequency is used as the 0 dB reference. Range: 20 to 40000 Hz Default: 1000 Hz

No.	Item	Description
	Frequency List	
4	FREQ	Select only the check box(es) for the a frequency or frequencies you want to measure. Default:　　　ON (Frequency 1 to 7) Default:　　　OFF (Frequency 8 to 20)
5	(Text box)	Sets the tone frequency of each of the selected **a frequency or frequencies**. Up to 20 types of frequency can be measured. Available only for MX283058A. Range:　　　20 to 40000 Hz Default:　　　Refer to Table 3.5.7-1

3

Measurement

Table 3.5.7-1　Default frequency for Demodulation Frequency Characteristic Measurement

Frequency No.	Frequency (Hz)	Frequency No.	Frequency (Hz)	Frequency No.	Frequency (Hz)	Frequency No.	Frequency (Hz)
1	100.0	6	3000.0	11	1000.0	16	1000.0
2	200.0	7	5000.0	12	1000.0	17	1000.0
3	300.0	8	1000.0	13	1000.0	18	1000.0
4	500.0	9	1000.0	14	1000.0	19	1000.0
5	2000.0	10	1000.0	15	1000.0	20	1000.0

3.6 Measurement, Results

This section describes the start measurement in 3.6.1 to 3.6.3, the measurement results in 3.6.4 to 3.6.23, 3.6.25, 3.6.26, the saving results in 3.6.24.

3.6.1 Starting the measurement

Make sure the parameters have been set according to 3.4 "Setting TX Measurement" and/or 3.5 "Setting RX Measurement" before starting measurement.

To start measurement, click on one of the **Start** buttons (1 to 3) that fits the type of measurement. The caption "Start" on the clicked button will be replaced by "Stop".
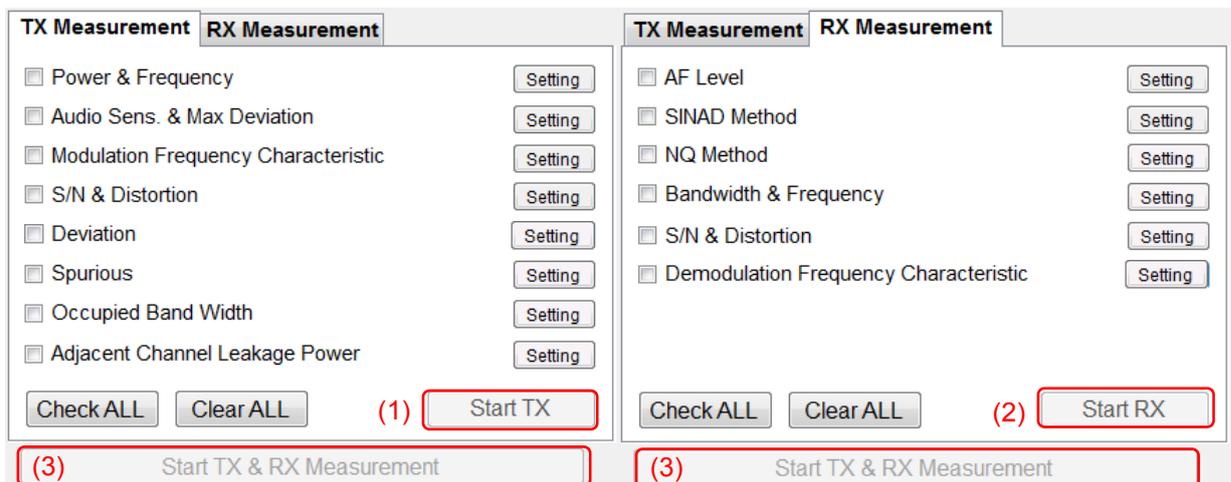
No.	Item	Description
1	Start TX	Starts TX measurement for the selected measurement item(s).
2	Start RX	Starts RX measurement for the selected measurement item(s).
3	Start TX & RX Measurement	Starts TRX measurement for the selected measurement items.

3.6.2 Stopping the measurement

To stop the measurement, click the **Stop** button.

The measurement may not be able to be stopped while MS2830A is performing measurement.

3.6.3 Progress indication

This section describes the items that appear on the screen during measurement.
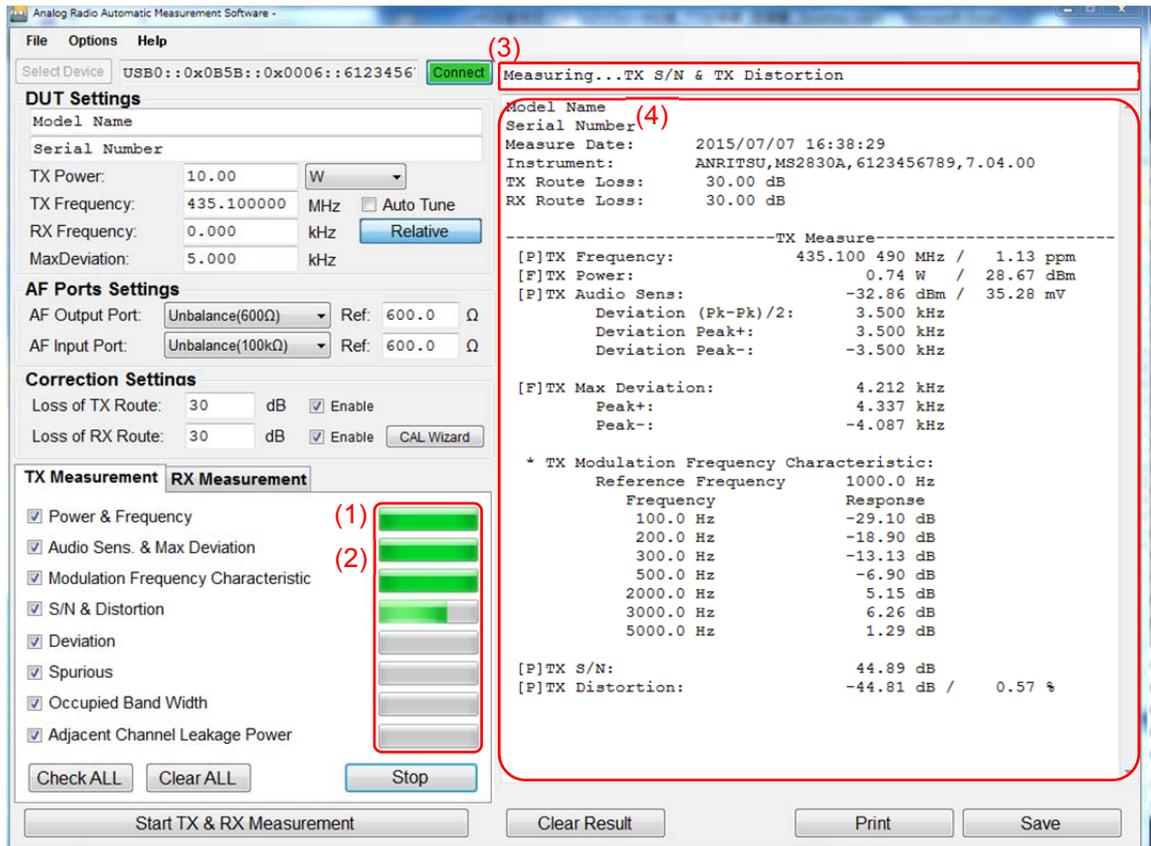
No.	Item	Description
1	Progress bar for TX measurement	Displays the progress of the TX measurement.
2	Progress bar for RX measurement	Displays the progress of the RX measurement. The RX Measurement tab is displayed when the TX measurement is complete.
3	Status message	Displays the measurement status message.
4	Measurement results	Displays the measurement results in the selected language.

3.6.4   TX measurement: TX frequency

```
(2)
[P]TX Frequency:                    434.100 378 MHz /   0.87 ppm            (1)
```

No.	Item	Description
1	TX Frequency	Displays the TX frequency/error measurement results. **.*** Hz / **.** ppm The frequency error [ppm] is not displayed if the TX frequency is obtained automatically.
2	(Judge)	Displays Pass/Fail evaluation. [P]: Pass [F]: Fail * : Not evaluated. Judgement isn't made if the TX frequency is obtained automatically.

3.6.5   TX measurement: TX power

```
(2)
[F]TX Power:                        9.28 W   /  39.68 dBm            (1)
```

No.	Item	Description
1	TX Power	Displays the TX power measurement results. **.*** W / **.** dBm When using USB power sensor, "(Power Sensor)" is indicated.
2	(Judge)	Displays Pass/Fail evaluation. [P]: Pass [F]: Fail * : Not evaluated.

3.6.6 TX measurement: Audio sensitivity

```
(5)
[P]TX Audio Sens:              -21.18 dBm / 135.20 mV          (1)
         Deviation (Pk-Pk)/2:    3.500 kHz                    (2)
         Deviation Peak+:        3.504 kHz                    (3)
         Deviation Peak-:       -3.496 kHz                    (4)
```

No.	Item	Description
1	TX Audio Sens	Displays the Audio Sensitivity measurement results. **.*** dBm / **.** mV
2	Deviation (Pk-Pk)/2	Displays the Deviation (Pk-Pk)/2 measurement result. **.*** kHz
3	Deviation Peak+	Displays the Deviation Peak+ measurement result. **.*** kHz
4	Deviation Peak–	Displays the Deviation Peak– measurement result. **.*** kHz
5	(Judge)	Displays Pass/Fail evaluation. [P]: Pass [F]: Fail * : Not evaluated.

3.6.7 TX measurement: Max deviation

```
(4)
[F]TX Max Deviation:            4.400 kHz                     (1)
         Peak+:                 4.446 kHz                     (2)
         Peak-:                -4.353 kHz                     (3)
```

No.	Item	Description
1	Max Deviation	Displays the max deviation (Pk-Pk)/2 measurement result. **.*** kHz
2	Peak+	Displays the max deviation Peak+ measurement result. **.*** kHz
3	Peak–	Displays the max deviation Peak– measurement result. **.*** kHz
4	(Judge)	Displays Pass/Fail evaluation. [P]: Pass [F]: Fail * : Not evaluated.

3

Measurement

3.6.8   TX measurement: Modulation frequency characteristic

```
∗ TX Modulation Frequency Characteristic:
       Reference Frequency       1000.0 Hz                    (1)
    (2)  Frequency           (3)  Response
         100.0 Hz                 -28.07 dB
         200.0 Hz                 -21.16 dB
         300.0 Hz                 -12.37 dB
         500.0 Hz                  -6.90 dB
        2000.0 Hz                   5.17 dB
        3000.0 Hz                   6.28 dB
        5000.0 Hz                   1.42 dB
```

No.	Item	Description
	TX Modulation Frequency Characteristic	
1	Reference Frequency	Displays the reference frequency. ***.* Hz
2	Frequency	Displays the tone frequency. ***.* Hz
3	Response	Displays the tone response level. The reference frequency level is used as the 0 dB reference. **.** dB

3.6.9   TX measurement: S/N

```
(2)
[F]TX S/N:                         42.60 dB                   (1)
```

No.	Item	Description
1	TX SN	Displays the S/N measurement result. **.** dB
2	(Judge)	Displays Pass/Fail evaluation. [P]: Pass [F]: Fail * : Not evaluated.

3.6.10 TX measurement: Distortion

```
(2)
[P]TX Distortion:              -42.27 dB /    0.77 %              (1)
```

No.	Item	Description
1	TX Distortion	Displays the Distortion measurement results. **.** dB / **.** %
2	(Judge)	Displays Pass/Fail evaluation. [P]: Pass [F]: Fail * : Not evaluated.

3.6.11 TX measurement: Deviation

```
 * TX Deviation:       Measurement End                           (1)
```

No.	Item	Description
1	TX Deviation	**Measurement End** or **Measurement Failure** is displayed. When **Measurement End** is displayed, the measurement result is saved in csv format by clicking Save Result . When **Measurement Failure** is displayed, the measurement result is not saved even if clicking Save Result.

3

Measurement

3.6.12   TX measurement: Spurious

```
 * Spurious
   Carrier                    434.100 000 MHz        -3.05 dBm          (1)
   Section       Frequency          PeakLevel              Limit
 [-]SDo1          9.000 kHz    -85.49 dBc( -45.56 dBm)   -26.02 dBm
 [-]SDo2         14.069 MHz    -86.09 dBc( -46.16 dBm)   -26.02 dBm
 [-]SDo3        432.858 MHz    -77.19 dBc( -37.26 dBm)   -26.02 dBm
 [-]SDo4        868.209 MHz    -57.47 dBc( -17.54 dBm)   -26.02 dBm
 [F]SDo4-Z                     -75.74 dBc( -35.81 dBm)
 [-]SDo5       2604.600 MHz    -66.81 dBc( -26.88 dBm)   -26.02 dBm

 [-]SDiL        433.979 MHz    -73.65 dBc( -33.72 dBm)   -41.25 dBm
 [F]SDiL-D                     -82.90 dBc( -42.97 dBm)   -26.02 dBm
 [-]SDiU        434.171 MHz    -73.75 dBc( -33.82 dBm)   -41.25 dBm
 [F]SDiU-D                     -78.26 dBc( -38.33 dBm)   -26.02 dBm

 [-]OoBL        434.093 MHz    -63.62 dBc( -23.69 dBm)   -26.02 dBm
 [F]OoBL-D      434.090 MHz    -66.59 dBc( -26.66 dBm)   RBW=30Hz
 [-]OoBU        434.105 MHz    -59.72 dBc( -19.79 dBm)   -26.02 dBm
 [F]OoBU-D      434.108 MHz    -65.57 dBc( -25.64 dBm)   RBW=30Hz
 (2)    (3)        (4)              (5)                     (6)
```

No.	Item	Description
	Spurious	
1	Carrier	Displays the measured frequency and power level of the carrier. **.*** MHz **.** dBm
2	(Judge)	Displays Pass/Fail evaluation. [P]: Pass [F]: Fail [-]: Zero span or Detail measurement was performed because the measured value exceeded the limit. * : Not evaluated.
3	Section	Displays the spurious measurement section. SDoN: Spurious Domain (Outer) segment 1 to 6 SDoN-Z: Spurious Domain (Outer) Zero Span segment 1 to 6 SDiL: Spurious Domain (Inner) Lower SDiL-D: Spurious Domain (Inner) Lower Detail SDiU: Spurious Domain (Inner) Upper SDiU-D: Spurious Domain (Inner) Upper Detail OoBL: Out-of-band area Lower OoBL-D: Out-of-band area Lower Detail OoBU: Out-of-band area Upper OoBU-D: Out-of-band area Upper Detail
4	Frequency	Displays the frequency in each segment. ****.*** kHz: If the measured frequency is lower than 1 MHz ****.*** MHz: If the measured frequency is 1 MHz or higher
5	Peak Level	Displays the peak level in each segment. **.** dBc (**.** dBm) dBc = (Peak level in each section) – (CW measurement results)
6	Limit	Displays the limits in each section. **.** dBm RBW=*** Hz: RBW when measuring

3.6.13 TX measurement: Occupied Band Width

```
(2)
[F]Occupied Band Width          10.168 kHz                    (1)
```

No.	Item	Description
1	Occupied Band Width	Displays the occupied band width measurement result. **.**kHz
2	(Judge)	Displays Pass/Fail evaluation. [P]: Pass [F]: Fail * : Not evaluated.

3.6.14 TX measurement: Adjacent Channel Power Ratio

```
＊ Adjacent Channel Leakage Power
          Offset          Bandwidth      Level         Limit
   [F]   12.500 kHz(L)    8.500 kHz    -39.52 dBc    -60.00 dBc
   [F]   12.500 kHz(U)    8.500 kHz    -40.19 dBc    -60.00 dBc
   (1)        (2)            (3)          (4)           (5)
```

No.	Item	Description
	Adjacent Channel Leakage Power	
1	(Judge)	Displays Pass/Fail evaluation. [P]: Pass [F]: Fail ＊ : Not evaluated.
2	Offset	Displays the specified offset. **.*** kHz(L): Lower side offset **.*** kHz(U): Upper side offset
3	Bandwidth	Displays the bandwidth. **.** kHz
4	Level	Displays the measurement results. **.** dBc
5	Limit	Displays the limit.

3.6.15 RX measurement: AF level

```
(4)
[F]RX AF Level:                    579.69 mV                    (1)
        FM Deviation:                3.500 kHz                  (2)
        FM Frequency:                1.000 kHz                  (3)
```

No.	Item	Description
1	RX AF Level	Displays the AF Level measurement result. **.** mV
2	FM Deviation	Displays the setting FM deviation. *.*** kHz
3	FM Frequency	Displays the setting FM frequency. *.*** kHz
4	(Judge)	Displays Pass/Fail evaluation. [P]: Pass [F]: Fail * : Not evaluated.

3.6.16 RX measurement: SINAD method

```
(2)
[F]RX SINAD Method:                0.94 dBuV(EMF)               (1)
```

No.	Item	Description
1	RX SINAD Method	Displays the SINAD measurement results. Unit indication depends on setting of the GUI. **.** dBµV (EMF)
2	(Judge)	Displays Pass/Fail evaluation. [P]: Pass [F]: Fail * : Not evaluated.

3

Measurement

3.6.17   RX measurement: NQ method

```
(2)
[F]RX NQ Method:                  -1.36 dBuV(EMF)          (1)
```

No.	Item	Description
1	RX NQ Method	Displays the NQ measurement results. Unit indication depends on setting of the GUI. **.** dBµV (EMF)
2	(Judge)	Displays Pass/Fail evaluation. [P]: Pass [F]: Fail * : Not evaluated.

3.6.18   RX measurement: Bandwidth

```
(5)                (1)
[F]RX Bandwidth:(6.0dB):
        +SIDE =                    2.97 kHz              (2)
        -SIDE =                    8.90 kHz              (3)
        TOTAL =                   11.87 kHz              (4)
```

No.	Item	Description
	RX Bandwidth	
1	(6.0dB)	Displays the setting Standard Level.
2	+SIDE	Displays the +SIDE measurement result. **.** kHz
3	–SIDE	Displays the –SIDE measurement result. **.** kHz
4	TOTAL	Displays the TOTAL measurement result. **.** kHz
5	(Judge)	Displays Pass/Fail evaluation. [P]: Pass [F]: Fail * : Not evaluated.

3.6.19   RX measurement: RX Frequency

```
(2)
[F]RX Frequency:              434.097033 MHz                    (1)
```

No.	Item	Description
1	RX Frequency	Displays the RX Frequency measurement results. ***.*** MHz
2	(Judge)	Displays Pass/Fail evaluation. [P]: Pass [F]: Fail * : Not evaluated.

3.6.20   RX measurement: S/N

```
(2)
[F]RX S/N:                    32.58 dB                          (1)
```

No.	Item	Description
1	RX SN	Displays the RX SN measurement result. **.** dB
2	(Judge)	Displays Pass/Fail evaluation. [P]: Pass [F]: Fail * : Not evaluated.

3.6.21   RX measurement: Distortion

```
(2)
[F]RX Distortion(THD+N):        -23.4 dB /   6.76 %             (1)
```

No.	Item	Description
1	RX Distortion (THD+N)	Displays the RX distortion measurement results. **.* dB / **.**%
2	(Judge)	Displays Pass/Fail evaluation. [P]: Pass [F]: Fail * : Not evaluated.

3

Measurement

3.6.22   RX measurement: Demodulation frequency characteristic

```
 * RX Demodulation Frequency Characteristics:
          Reference Frequency      1000.0 Hz                        (1)
     (2)  Frequency         (3)   Response
            100.0 Hz               -28.07 dB
            200.0 Hz               -21.16 dB
            300.0 Hz               -12.37 dB
            500.0 Hz                -6.90 dB
           2000.0 Hz                 5.17 dB
           3000.0 Hz                 6.28 dB
           5000.0 Hz                 1.42 dB
```

No.	Item	Description
	RX Demodulation Frequency Characteristic	
1	Reference Frequency	Displays the reference frequency. ***.* Hz
2	Frequency	Displays the tone frequency. ***.* Hz
	Response	Displays the tone response level. The reference frequency level is used as the 0 dB reference. **.** dB

3.6.23 Total Result

This item is displayed only if both of the following conditions are met:

・The software you are using is MX283058A.

・Pass/Fail evaluation has been performed.

```
(2)
[F]Total Result: [Fail]                                           (1)
```

No.	Item	Description
1	Total Result	Displays the total result. [PASS]: All the evaluation results are PASS. [FAIL]: At least one evaluation result is FAIL.
2	(Judge)	Displays the total result. [P]: Pass [F]: Fail

3

Measurement

3.6.24   Clearing/printing/saving measurement results

This section describes how to clear/print/save the results obtained by measurement.

No.	Item	Description
1	Clear Result	Clears the measurement results displayed in the measurement result area.
2	Print	Prints the measurement results displayed in the measurement result area. Refer to your printer operation manual. The results cannot be printed when this software is installed on MS2830A.
3	Save	Saves the measurement results displayed in the measurement result area, in text or csv format. File name: Results_yyyymmdd_hhmmss.txt (Default) File name: Results_yyyymmdd_hhmmss.csv (Default) Destination folder C:\Anritsu\AutoMeasure\Analog\UserData.Analog\Results The results of the Deviation measurement are saved in a file named as below. "Specified file name"+"_LvD.csv" "Specified file name"+"_DvL.csv"* *: The file(s) is saved only when **Output deviation based data (converted from measured data**) is enabled.

3.6.25   Deviation measurement results file (AF Level vs. Deviation)

The two types of data are output as the measurement result of the Deviation measurement (AF Level vs. Deviation).

- Measurement data of deviations based on frequency (output for every frequency)
- Measurement data of deviations based on deviation type (output for every deviation type).

3.6.25.1   Measurement data of deviations based on frequency

The measurement results based on the frequency or frequencies selected in the Frequency List are output in the format below. The data of every selected frequency in the Frequency List is output.

(1) (2) (3)

AF Level[dBm]	Deviation RMS[kHz]	Deviation Peak+[kHz]	Deviation Peak−(Abs.)[kHz]	Deviation (Pk−Pk)/2[kHz]
−34	0.46	0.68	0.67	0.68
−32	0.57	0.84	0.83	0.84
−30	0.72	1.04	1.05	1.04
−28	0.91	1.32	1.30	1.31
−26	1.14	1.63	1.64	1.64
−24	1.44	2.05	2.05	2.05
−22	1.81	2.58	2.58	2.58
−20	2.27	3.23	3.25	3.24
−18	2.86	4.08	4.02	4.05
−16	3.26	4.92	4.55	4.74
−14	3.40	5.24	4.86	5.05
−12	3.46	5.35	5.04	5.19
−10	3.50	5.40	5.15	5.27
−8	3.52	5.43	5.21	5.32
−6	3.53	5.45	5.24	5.34
−4	3.54	5.46	5.27	5.36
−2	3.54	5.47	5.28	5.38
0	3.54	5.47	5.29	5.38
2	3.55	5.48	5.30	5.39
4	3.55	5.48	5.31	5.39

Frequency = 1000 Hz

No.	Item	Description
1	Frequency	Displays the AF tone frequency specified in the Frequency List.
2	AF Level	Displays the AF Level (signal level output by Audio Generator) at Deviation measurement. The values from **Start AF Level** to **Stop AF Level** increased by **AF Level Step** are output.
3	Deviation	The measurement results of deviation for AF Level are output for every deviation type specified in the **Output Data** field.

3.6.25.2 Measurement data of deviation based on deviation type

The measurement results according to the deviation types specified in the **Output Data** field are output in the following format. The data of every specified deviation type in the **Output Data** field is output.

(1)

(3)

(2)

Deviation RMS[kHz]			
AF Level[dBm]	Frequency=1000 Hz	Frequency=2000 Hz	Frequency=3000 Hz
−34	0.46	0.46	0.46
−32	0.57	0.57	0.57
−30	0.72	0.72	0.72
−28	0.91	0.91	0.91
−26	1.14	1.14	1.14
−24	1.44	1.44	1.44
−22	1.81	1.81	1.81
−20	2.27	2.27	2.27
−18	2.86	2.86	2.86
−16	3.26	3.26	3.26
−14	3.40	3.40	3.40
−12	3.46	3.46	3.46
−10	3.50	3.50	3.50
−8	3.52	3.52	3.52
−6	3.53	3.53	3.53
−4	3.54	3.54	3.54
−2	3.54	3.54	3.54
0	3.54	3.54	3.54
2	3.55	3.55	3.55
4	3.55	3.55	3.55

No.	Item	Description
1	Deviation	Displays the deviation type specified in the **Output Data** field.
2	AF Level	Displays AF Level (signal level output from Audio Generator) at Deviation measurement. The values from **Start AF Level** to **Stop AF Level** increased by **AF Level Step** are output.
3	Frequency	The measurement results of deviation for AF Level are output for every frequency selected in the Frequency List.

3.6.26 Deviation measurement results file (Deviation vs. AF Level)

The two types of data are output as the measurement results of the Deviation measurement (Deviation vs. AF Level).

- Measurement data of each AF Level based on frequency (Output for every selected frequency)
- Measurement data of each AF Level based on AF Level type (Output for every specified deviation type)

3.6.26.1 Measurement results

The Deviation measurement result file (Deviation vs. AF Level) is the AF Level calculated by linear interpolation from the Deviation measurement result file (AF Level vs. Deviation).

The red points in the following figure show an example of the measurement result of "AF Level vs. Deviation" measured in the following conditions. The red solid line connects the measurement results.

Start AF Level:	–34 dBm
Stop AF Level:	4 dBm
AF Level Step:	2 dB

For the output result of "Deviation vs. AF Level", AF Level according to the specified deviation is calculated by linear interpolation (red solid line).

The blue points in the following figure show the calculation results in the settings below.

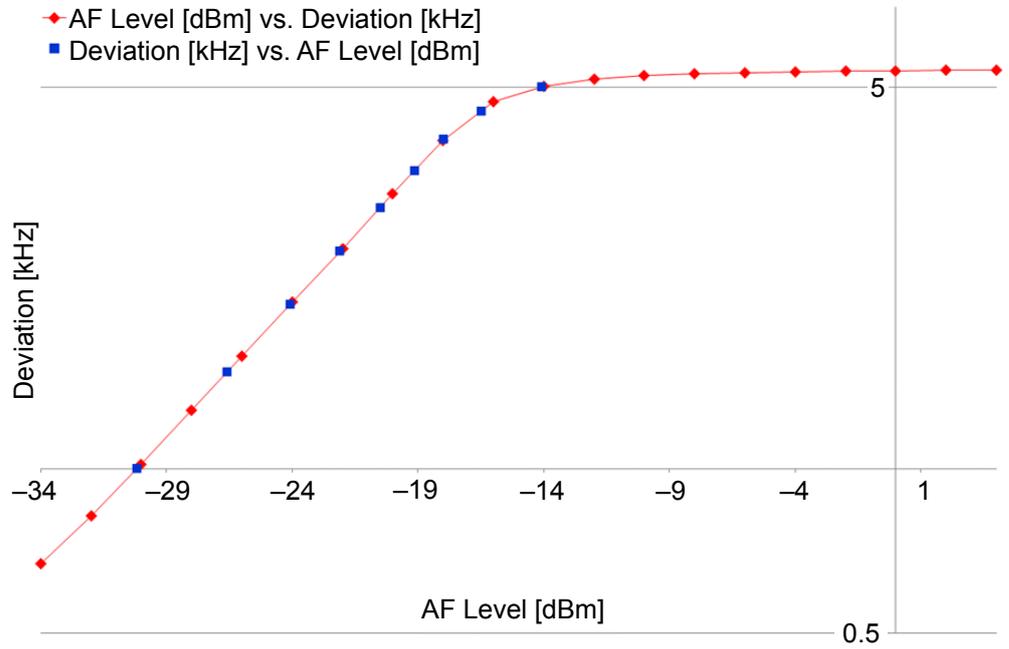|	
Start Deviation:	1 kHz
Stop Deviation:	5 kHz
Deviation Step:	0.5 kHz

3

Measurement

Figure 3.6.26.1-1 Comparison of "AF Level vs. Deviation (red)" and "Deviation vs. AF Level (blue)"

3.6.26.2 Calculation data of AF Level based on frequency

The calculation results of AF Level for the frequency or frequencies selected in the Frequency List are output in the format below. The data of every selected frequency is output.

(1)
(3)
(2)

Frequency = 1000 Hz				
Deviation[kHz]	AF Level(Dev. RMS)[dBm]	AF Level(Dev. P+)[dBm]	AF Level(Dev. P-)[dBm]	AF Level(Dev. P2P/2)[dBm]
0.5	-33.07	NoData	NoData	NoData
1.0	-26.97	-30.20	-30.30	-30.25
1.5	-23.46	-26.58	-26.61	-26.60
2.0	-20.94	-24.10	-24.10	-24.10
2.5	-19.00	-22.11	-22.14	-22.13
3.0	-17.01	-20.50	-20.52	-20.51
3.5	-6.76	-19.15	-19.11	-19.13
4.0	NoData	-18.04	-17.87	-17.99
4.5	NoData	-16.78	-16.01	-16.47
5.0	NoData	-15.16	-12.05	-14.08

No.	Item	Description
1	Frequency	Displays the AF tone frequency specified in the Frequency List.
2	Deviation	Displays the deviation. The values from **Start Deviation** to **Stop Deviation** increased by **Deviation Step** are output.
3	AF Level	The AF Level calculation result is output for each deviation type specified in the **Output Data** field. **NoData** is output for the non-measured range.

3.6.26.3 AF Level calculation data based on AF Level type

The AF Level calculation results are output for the deviation types specified in the **Output Data** field in the following format. The data of every specified deviation type is output.

(1)
(2)
(3)

AF Level(Dev. RMS)[dBm]

Deviation[kHz]	Frequency=1000 Hz	Frequency=2000 Hz	Frequency=3000 Hz
0.5	-33.07	-33.07	-33.07
1.0	-26.97	-26.97	-26.97
1.5	-23.46	-23.46	-23.46
2.0	-20.94	-20.94	-20.94
2.5	-19.00	-19.00	-19.00
3.0	-17.01	-17.01	-17.01
3.5	-6.76	-6.76	-6.76
4.0	NoData	NoData	NoData
4.5	NoData	NoData	NoData
5.0	NoData	NoData	NoData

No.	Item	Description
1	AF Level	Displays the AF Level type. This is the same as the deviation type specified in the **Output Data** field.
2	Deviation	Displays the deviation. The values from **Start Deviation** to **Stop Deviation** increased by **Deviation Step** are output.
3	Frequency	The AF Level calculation result is output for each frequency selected in the Frequency List. **NoData** is output for the non-measured range.

3.7 Status Messages

3.7.1 Measurement status messages

This section describes the measurement status messages that may be displayed in black in the status area.

Status	Description
(Blank)	Software has already been started. (Initial state)
Connected	Connection to MS2830A has already been established.
Disconnected	Connection to MS2830A has already been disconnected.
Measuring…(Measurement item)	The displayed item is being measured.
Measurement Complete	Measurement has completed.

3.7.2   Error messages

This section describes the error messages that may be displayed in red in the status area.

Error Message List
Not connected to MS2830A.
Connection Error
Timeout
Failed to set a parameter to MS2830A.
Failed to send a command.
Failed to receive a command.
Failed to query.
Some setting parameters are irregal.
Failed to authorize. (device must be MS2830A)
Failed to authorize. (MS2830A-018 option needed)
Aborted.
Invalid result.
RF Input signal is not correct.
RF Input level is too high.
RF Input level is too low.
Uncal. Some settings maybe not correct.
Setting of TX Power is out of range.
Any USB Power sensor has not been connected yet.
Some errors occurred on the USB Power sensor.
Connected USB Power Sensor is not compatible.
AF Output was clipped.
AF Input level is too high.
Measurement was not completed.