

**CombiView**

**MX880056A**

**IEEE 802.15.4 Application Applet  
Operation Manual**

# 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.



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



### **CAUTION**

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## Safety Symbols Used on Equipment and in Manual

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



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



These indicate that the marked part should be recycled.

MX880056A

IEEE 802.15.4 Application Applet

Operation Manual

24 October 2014 (First Edition)

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## **Anritsu Warranty**

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Prior to the software installation

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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.

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- 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.

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## CE marking



### 1. Product Model

Software: MX880056A IEEE 802.15.4 Application Applet

### 2. Applied Directive and Standards

When the MX880056A IEEE 802.15.4 Application Applet is installed in the MT8870A, the applied directive and standards of this software conform to that of the MT8870A main frame.

PS: About main frame

Contact Anritsu for the latest information about main frame types supporting the MX880056A IEEE 802.15.4 Application Applet.



# C-tick Conformity Marking

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

## C-tick marking



### 1. Product Model

Software: MX880056A IEEE 802.15.4 Application Applet

### 2. Applied Directive and Standards

When the MX880056A IEEE 802.15.4 Application Applet is installed in the MT8870A, the applied directive and standards of this software conform to that of the MT8870A main frame.

PS: About main frame

Contact Anritsu for the latest information about main frame types supporting the MX880056A IEEE 802.15.4 Application Applet.




# About This Manual

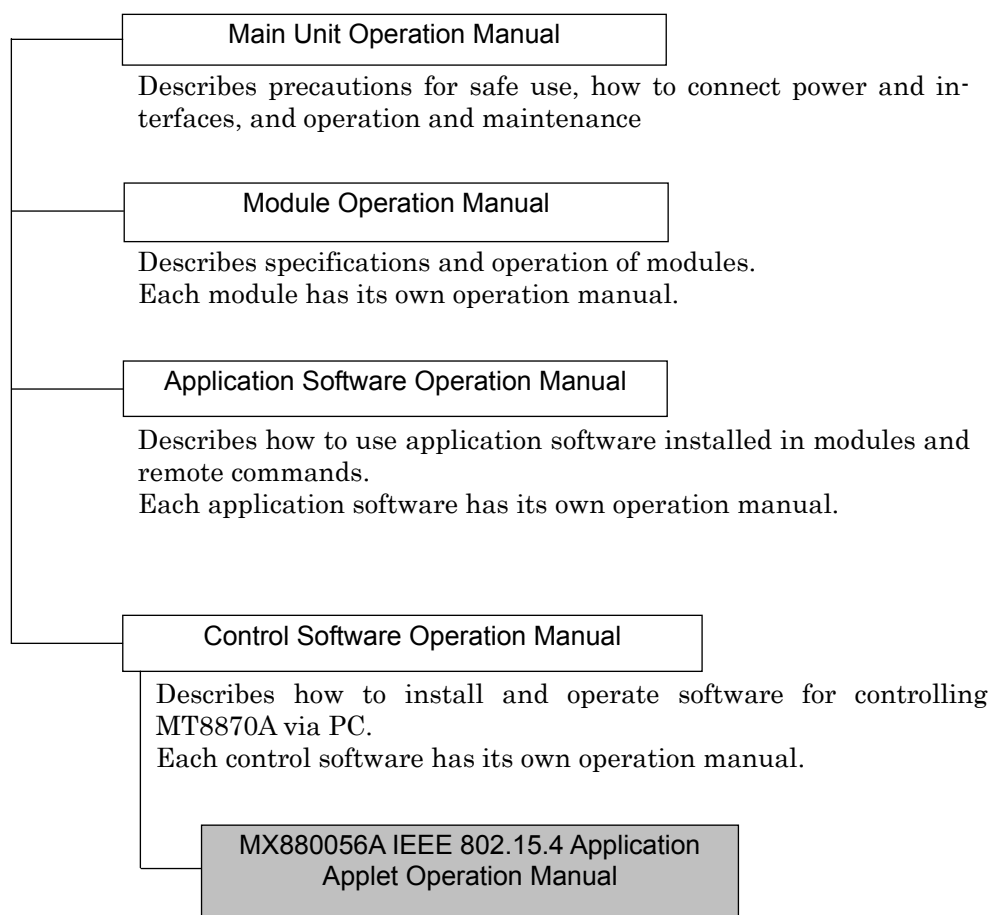
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This manual mainly describes the operation of the MX880056A IEEE 802.15.4 Application Applet.

Products relevant to the MT8870A Universal Wireless Test Set include:

- MT8870A Universal Wireless Test Set (main unit)
- Modules installed in the MT8870A
- Application software installed in modules
- Control software installed in external PC controller

These products are called the Universal Wireless Test Set Series. The operation manuals for the Universal Wireless Test Set Series consist of separate documents for the main unit, module(s), application software, and control software as listed below.  indicates this manual.



# Contents

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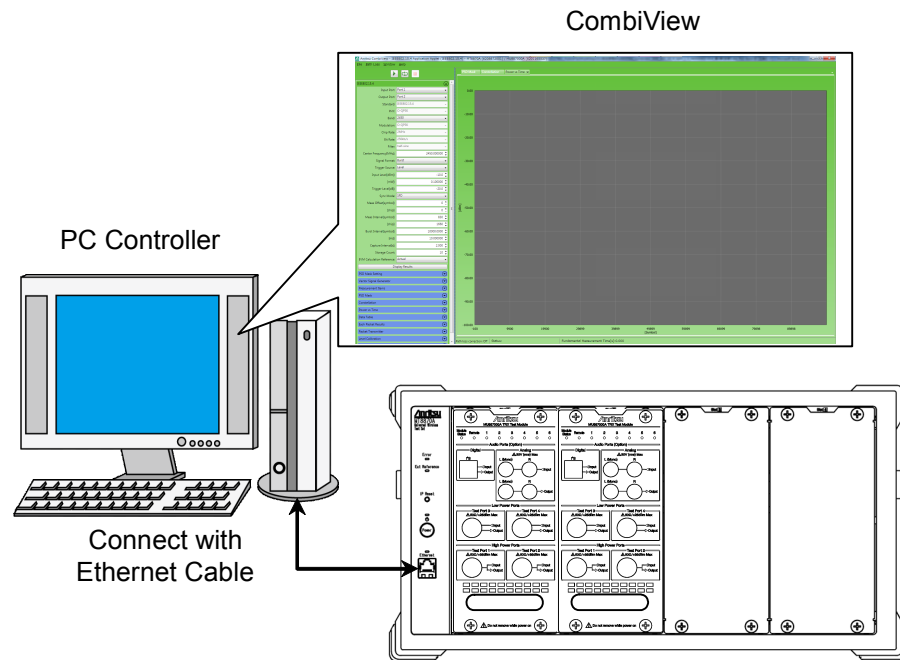
About This Manual.....	I
Chapter 1 Outline .....	1-1
1.1 CombiView introduction .....	1-1
1.2 Composition .....	1-6
Chapter 2 Before Use .....	2-1
2.1 Operating Environment .....	2-1
2.2 Connecting to MT8870A .....	2-3
2.3 Installing and Uninstalling MX880056A .....	2-4
2.4 Starting and Stopping CombiView .....	2-5
2.5 Names of CombiView Screens .....	2-8
Chapter 3 Operation .....	3-1
3.1 Basic Operations .....	3-1
3.2 IEEE 802.15.4 .....	3-11

# Chapter 1 — Overview

## 1.1 CombiView Introduction

CombiView is PC application software for the external PC controller used to control the MT8870A Universal Wireless Test Set (hereafter MT8870A).

CombiView allows the user to configure measurements and display results.



**Figure 1.1-1** Ethernet Connection between PC Controller and MT8870A

The CombiView application:

- Supports measurement using the MT8870A without creating remote control programs.
- Automatically detects application software registered in the MT8870A.
- Runs in the Windows 7 and Windows XP OS environments.
- Supports remote control over Ethernet (IPv4) and GPIB.
- Supports multiple measurement standards with additional Applets.

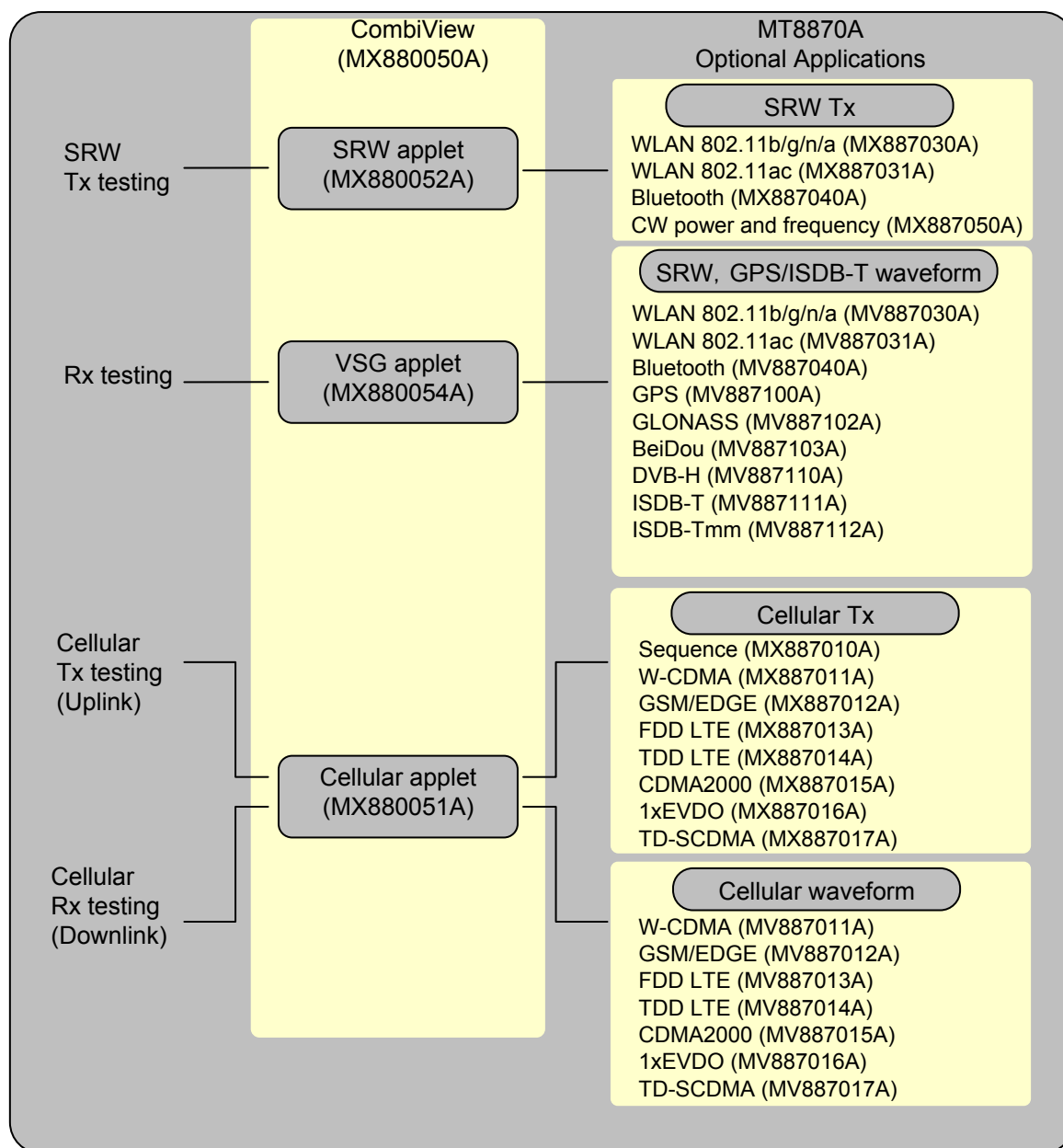
CombiView supports the following Applets.

**Table 1.1-1** CombiView Applets

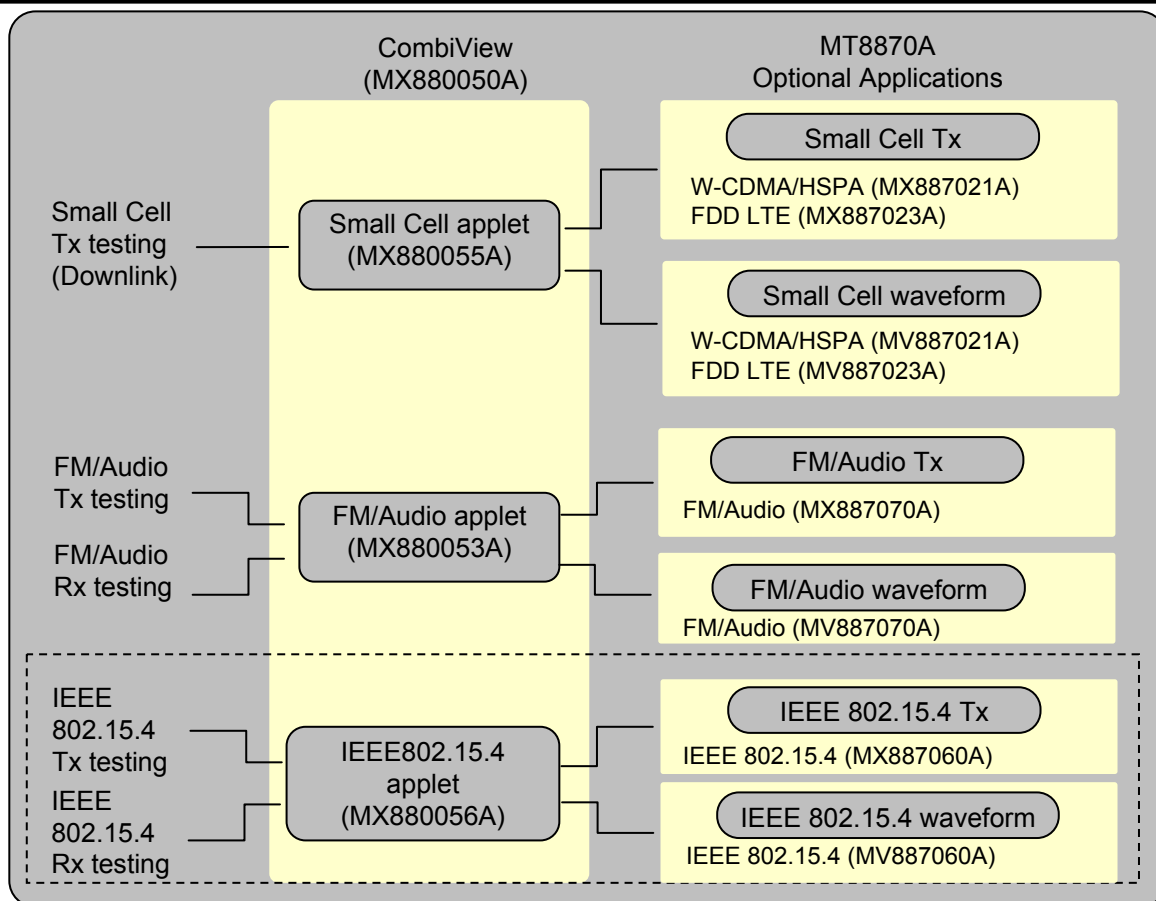
Model/Code	Product Name
MX880051A	Cellular Application Applet
MX880052A	SRW Application Applet
MX880053A	FM/Audio SRW Application Applet
MX880054A	Signal Generator Application Applet
MX880055A	Small Cell Application Applet
MX880056A	IEEE802.15.4 Application Applet

The MX880056A IEEE802.15.4 Application Applet (hereafter MX880056A) adds measurements based on cellular phone standards to CombiView.

The Six CombiView applets and the optional applications that each applet supports are shown in the figure below. This manual provides information on the area enclosed by the dotted line.



**Figure 1.1-2** CombiView Applets and Associated MT8870A Applications Options (1/2)



**Figure 1.1-2** CombiView Applets and Associated MT8870A Applications Options (2/2)

At least one of following application software licenses must be registered in the MT8870A to control it using the MX880056A.

**Table 1.1-2** Application Software Licenses Required by MT8870A

Model/Code	Product Name
MX887060A	IEEE 802.15.4 Tx Measurement



An example of the MX880056A screen is shown below. A parameter setting dialog box is displayed when a setting item in the left frame is clicked. The measurement results are displayed on the main window.

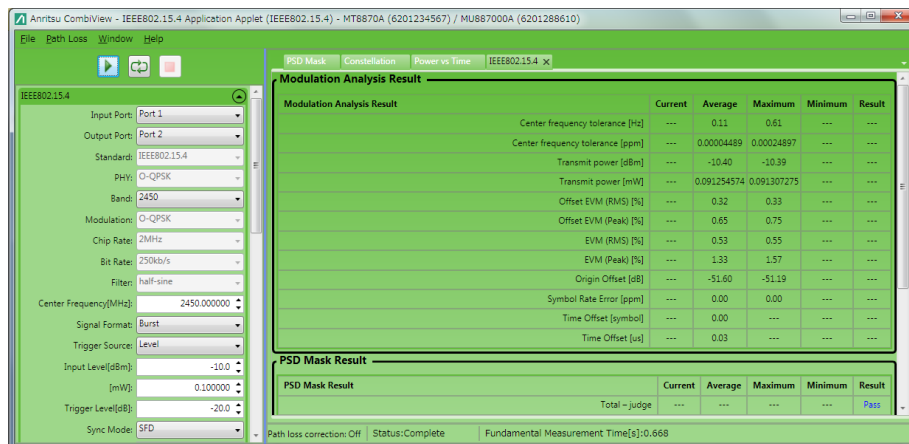


Figure 1.1-3 MX880056A Screen

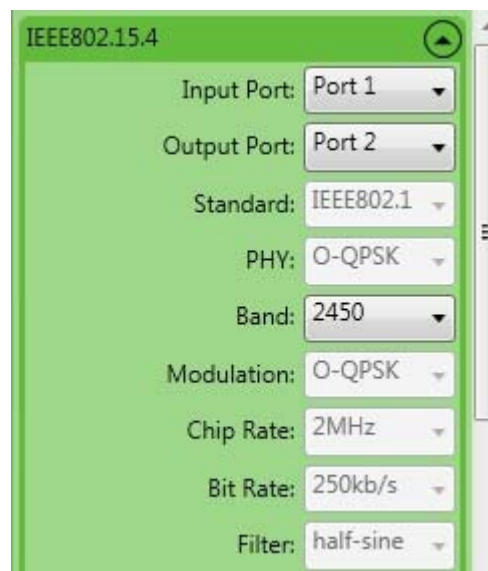


Figure 1.1-4 Parameter Setting Screen

## 1.2 Composition

The MX887056A composition is listed in the following table.

The electronic files are stored in one or more storage media (DVD, etc.).

**Table 1.2-1** Composition

Model/Code	Product Name	Remarks
MX880056A	IEEE 802.15.4 Application Applet	—
W3746AE	MX880056A IEEE 802.15.4 Application Applet Operation Manual	English

## Chapter 2 — Before Use

This chapter explains how to start the MX880056A.

### 2.1 Operating Environment

This section describes the MX880056A operating environment.

**Table 2.1-1** Operating Environment

Item	Specification
OS	Windows XP Professional Service Pack 3, Japanese/English* <sup>1</sup> Windows 7 Service Pack 1, Japanese/English
Display	Resolution: 1024 × 768 or better
Memory	Capacity: ≥1 GB
Hard disk free space	≥200 MB* <sup>2</sup>
VISA	NI-VISA* <sup>3</sup>
.NET Framework	.NET Framework 4.0 (Full set version) or .NET Framework 4.5

\*1: Using the Windows Update tool updates to the latest Service Pack 3 version of Windows.

\*2: This is the free space required by the CombiView software. More free space is required to install VISA and .NET Framework.

\*3: For version compatibility among OS, .NET Framework, and NI-VISA, refer to Table 2.1-2 and Table 2.1-3.

**Table 2.1-2** Compatibility Table of OS and .NET Framework

OS	.NET Framework 4.0	.NET Framework 4.5
Windows XP	✓	—
Windows 7	✓	✓

✓: Compatible    —: Incompatible

**Table 2.1-3** Compatibility Table of .NET Framework and NI-VISA

NET Framework	NI-VISA 5.0.3 to 5.2	NI-VISA 5.3 to 14.0
.NET Framework 4.0	✓	✓
.NET Framework 4.5	—	✓

✓: Compatible    —: Incompatible

**Table 2.1-4** NI-VISA Version

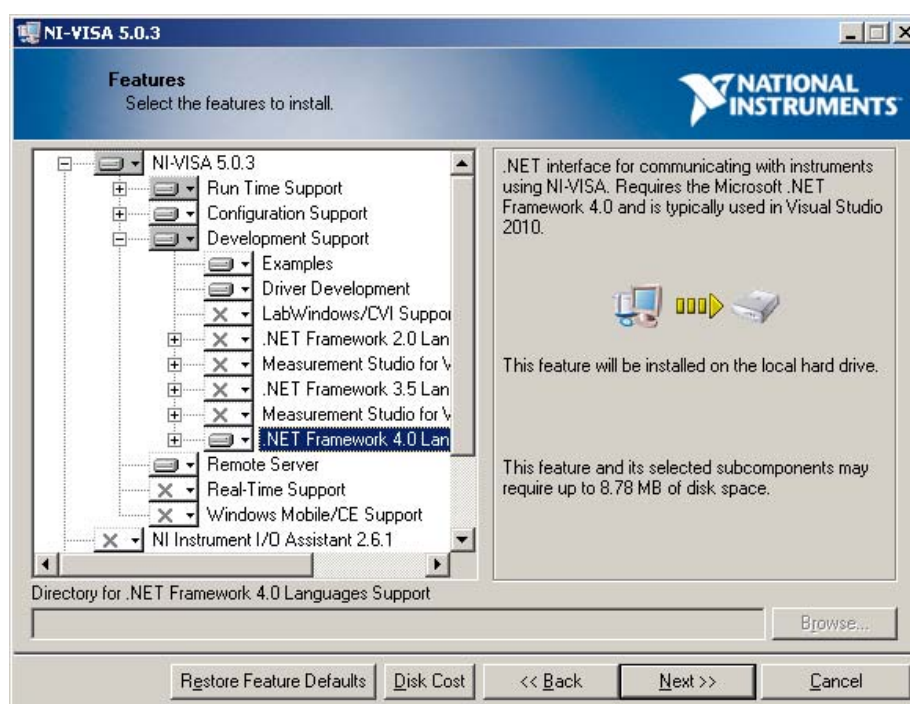
CombiView Package Version	NI-VISA Version
Ver 01.06.01 or older	Version 5.03 to Version 5.4
Ver 01.07.00 or later	Version 5.03 to Version 5.4.1, and Version 14.0

For package version compatibility with CombiView and cellular applet, refer to Table 2.1-5. They may not function properly in combinations that are not shown in the table.

**Table 2.1-5** Package Version Compatibility

Package	CombiView	IEEE802.15.4 Applet
Ver 01.06.01	1.4.3.0	1.0.16.0
Ver 01.07.00	1.6.2.0	1.1.0.0
Ver 01.07.09	1.6.10.0	1.1.5.0
Ver 01.08.00	1.6.10.0	1.1.6.0

To use the package of Ver 01.06.01 or older, select [.NET Framework 4.0 Language support] at NI-VISA installation.



**Figure 2.1-1** Selecting .NET Framework4.0 Language Support

## 2.2 Connecting to MT8870A

Connect the PC controller running CombiView to the MT8870A. Refer to section 2.5 “Connecting Cables” in *the MT8870A Universal Wireless Test Set Operation Manual*.

CombiView detects connected instruments automatically. It is not necessary to set the IP address or GPIB address of connected instruments.

### 2.2.1 Connecting Ethernet cable

Connect a category-5 or later, straight-through Ethernet cable to one of the Ethernet connectors on the front or rear panel.

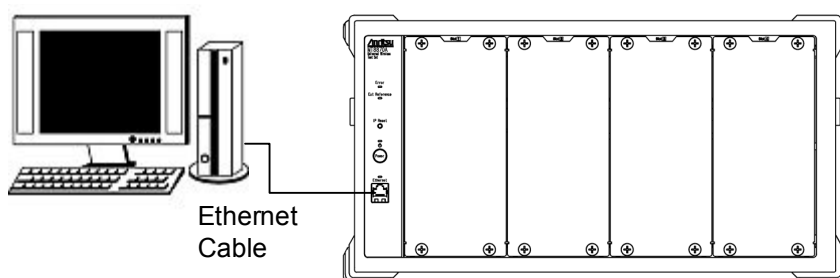


Figure 2.2.1-1 Connecting to Front Ethernet Connector

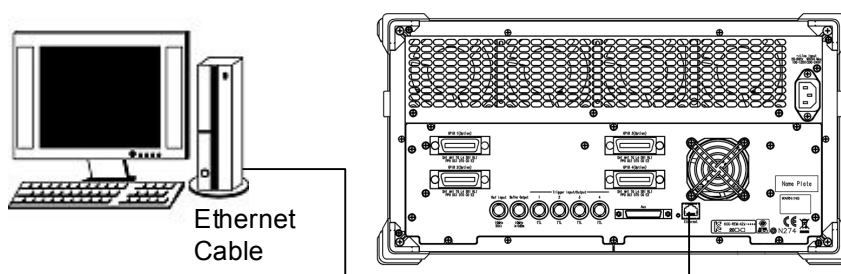


Figure 2.2.1-2 Connecting to Rear Ethernet Connector

### 2.2.2 Connecting GPIB cables

Option 001/101 adds GPIB connectors for each module to the MT8870A rear panel. Connectors 1 to 4 correspond to slots 1 to 4. A GPIB interface must also be added to the PC controller. The operation of CombiView over the National Instruments GPIB interface has been verified by Anritsu.

1. Connect a GPIB cable to the GPIB interface added to the PC controller.
2. Connect a GPIB cable to the GPIB connector on the MT8870A rear panel.

---

## 2.3 Installing and Uninstalling MX880056A

### 2.3.1 Installing

To install the MX880056A, run the installation file on the storage media as follows:

1. Open the CombiView folder in the Installer folder on the storage media.
2. Double-click **CombiViewSetup.msi**.
3. Follow the instructions displayed by the installation dialog.
4. Double-click **CombiView.MT8870x.LRWPAN.Installer.msi**.
5. Follow the instructions displayed by the installation dialog.

### 2.3.2 Uninstalling

1. Windows XP: At the Windows Control Panel, click **Add or Remove Programs**, click **Remove or Change Programs** or **Remove Programs**, and then double-click the **MX880056A CombiView IEEE 802.15.4 Applet** button.

Windows 7: At the Windows Control Panel, click **Programs and Features**, and then double-click the **MX880056A CombiView IEEE 802.15.4 Applet** button.

2. Message to confirm uninstallation is displayed. Click **Yes** to uninstall the MX880056A.
3. Same as step2, uninstall Anritsu CombiView.

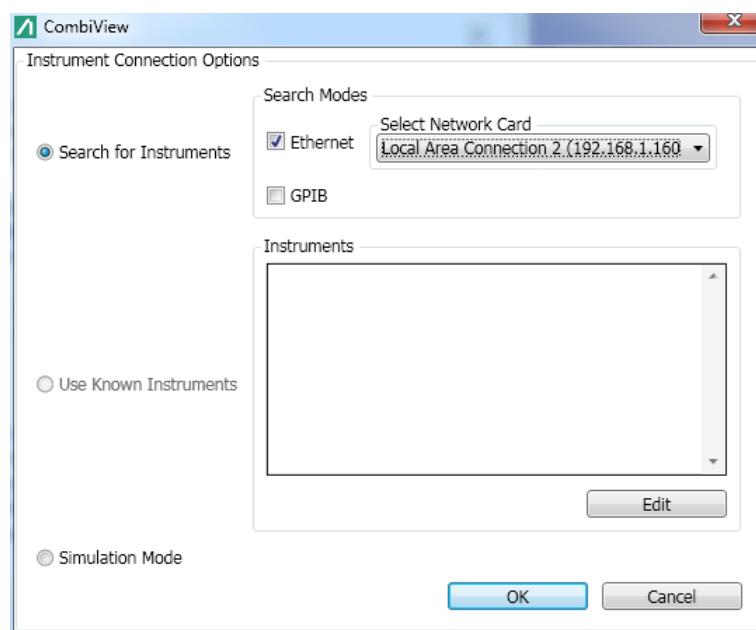
## 2.4 Starting and Stopping CombiView

### Starting CombiView

When using Windows XP, Start CombiView at the PC controller by clicking **Start Menu > Program > Anritsu > CombiView > CombiView**.

When using Windows 7, Start CombiView at the PC controller by clicking **Start > All Programs > Anritsu > CombiView > CombiView**.

When starting CombiView, the Instrument Connection Options dialog box is displayed.



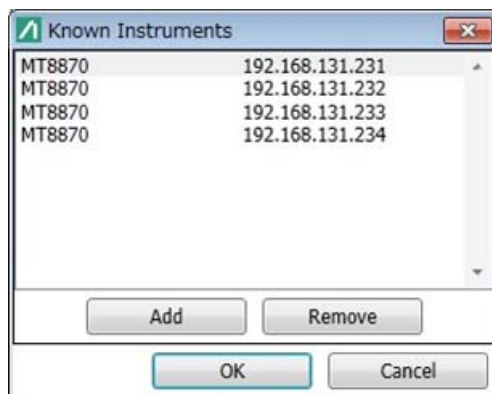
**Figure 2.4-1** Instrument Connection Options Dialog Box

CombiView searches for MT8870As on network by the selected search method.

**Table 2.4-1 Search Methods for MT8870A**

Name	Description
Search for Instruments	Searches for all MT8870As that exist on the selected network.
Use Known Instruments	Searches for a MT8870A that is installed with the specified IP address module.
Simulation Mode	Operates in the Offline mode (without communicating with connected instruments) without searching for MT8870A.

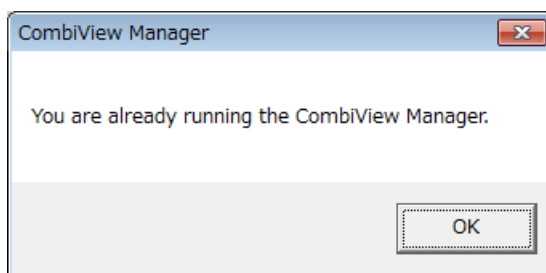
To edit the IP addresses of the Known Instruments, click the **Edit** button of Use Known Instruments.



**Figure 2.4-2** Known Instruments Dialog Box

To add another MT8870A to the Known Instruments, click the **Add** button and input its IP address. To remove one, select the MT8870A and click the **Remove** button.

**Note:** Multiple instances of CombiView cannot be started simultaneously. The following message is displayed if CombiView is already running.

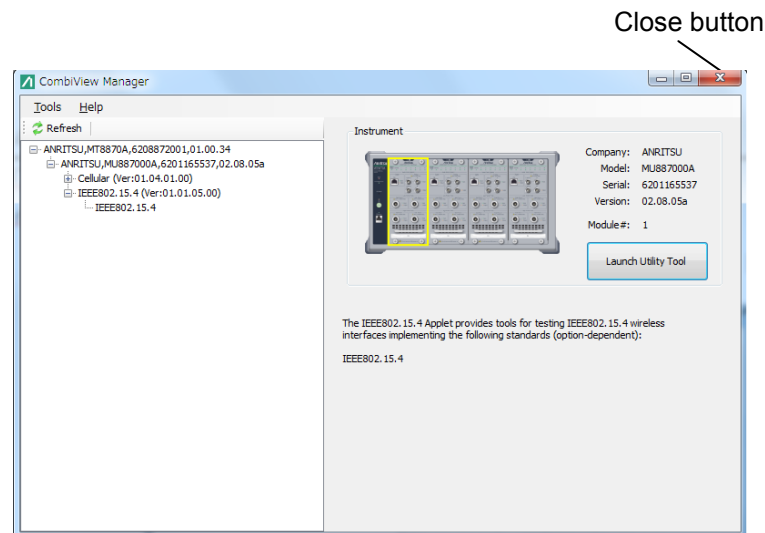


**Figure 2.4-3** Message when CombiView is running



## Stopping CombiView

Click the **Close** button at the top right corner of the window.



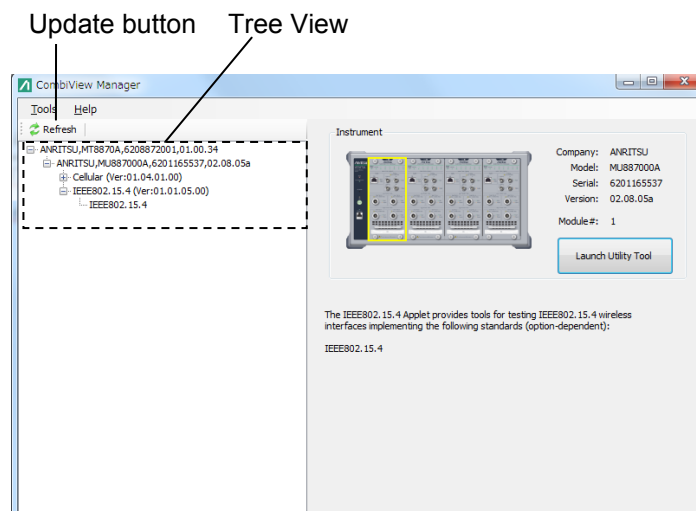
**Figure 2.4-4** Close Button

**Note:**

When the MX880056A stops, the MT8870A remote command language is the Native mode. To change to the SCPI language mode, send the `SYST:LANG SCPI` command.

## 2.5 Names of CombiView Screens

This section names each part of the CombiView screens.



**Figure 2.5-1** CombiView Manager Dialog Box

**Table 2.5-1** Menu of CombiView Manager Dialog Box

Name	Description
Tools	
Update Connection Options	CombiView opens the Instrument Connection Options Dialog Box, and re-searches for MT8870As in network.
MT8870A Utility tool	Starts MX887900A Utility Tool.
Help	
About	Displays information about hardware and applets.

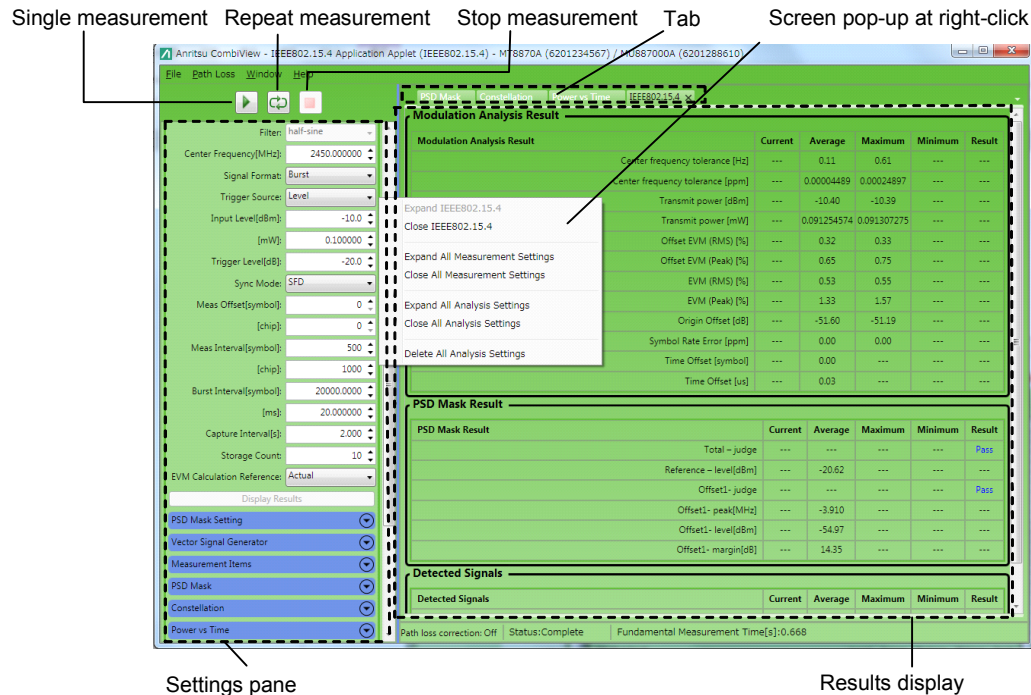


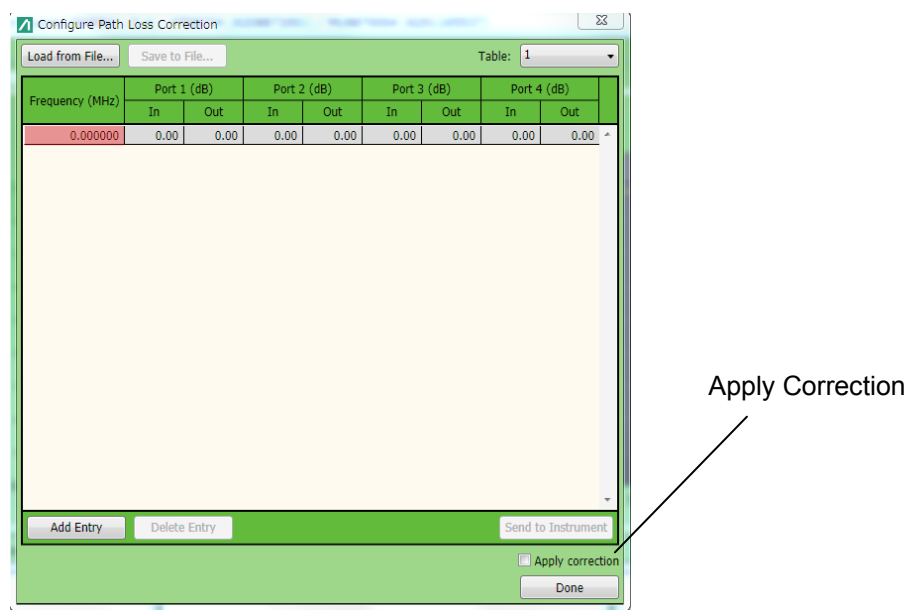
Figure 2.5-2 CombiView Screen

The width of the settings pane is changed by dragging the border between settings pane and the results display.

Table 2.5-2 Menu of CombiView Screen

Name	Description
File	
Load Settings	Loads the parameter settings from the parameter file saved in xml format.
Save Settings	Saves the parameter settings to an existing xml file.
Save Settings As...	Saves the parameter settings to a new xml file.
Exit	Closes CombiView screen
Path Loss	
Configure Correction...	Sets a correction value for power loss of each port.
Apply Correction	Apply the parameter value set by Configure Correction...
Window	
Tile Horizontal	Arranges multiple result tabs in a vertical stack.
Tile Vertical	Arranges multiple result tabs side by side.
Reset Window Layout	Resets the view to Normal.
Help	
About	Displays MX880056A information

Click **Configure Correction** to display the window below. This window allows setting a power loss value from cable, etc. Adding lines to the table enables settings for multiple measurement frequencies.



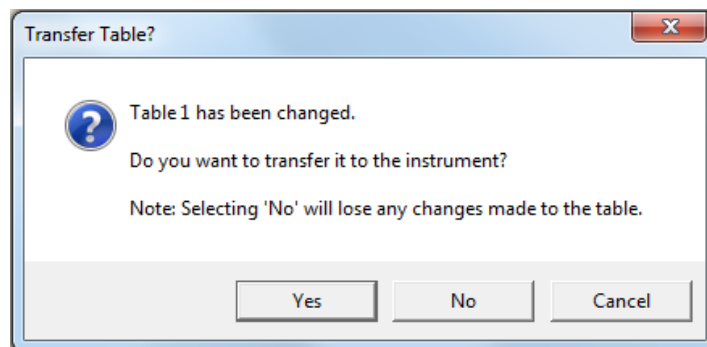
**Figure 2.5-3** Configure Path Loss Correction Window

**Table 2.5-3** Configure Path Loss Correction Menu

Name	Description
Load from File...	Loads the Path Loss parameter file and reflect the values in the setting parameters.
Save to File...	Saves the Path Loss setting parameters in csv format.
Table	Changes the table to set Path Loss. Up to 16 tables can be created.
Add Entry	Adds new lines.
Delete Entry	Deletes the selected lines.
Send to Instrument	Sends the Path Loss settings to the MU887000A.
Done	Ends Path Loss Configure Correction.

Select the checkbox of Apply Correction to apply the Path Loss setting. This function is the same as **Apply Correction** in the CombiView menu.

When trying to change a table or close Configure Pass Loss Correction without sending the edited parameters to the MU887000A, the message below is displayed.



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**Figure 2.5-4** Transfer Table? Message

When selecting Yes, the edited parameters are sent to the MU887000A. When selecting No, the parameters are not sent to the MU887000A, and any changes made to the table are deleted.



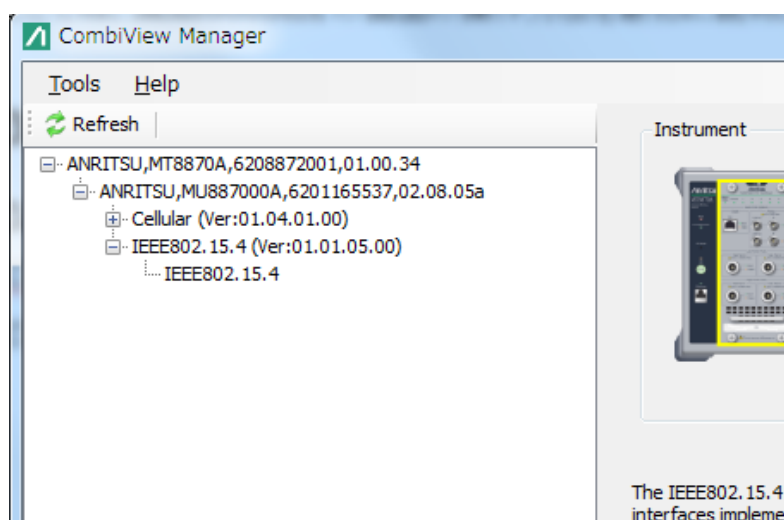
# Chapter 3 — Operation

This chapter describes basic operation of the MX880056A, as well as the items displayed at each measurement.


## 3.1 Basic Operations

### 3.1.1 Selecting measurement Items


When CombiView is started, the **CombiView Manager** tree view screen displays information about the detected hardware (MT8870A).



**Figure 3.1.1-1** Tree View

1. Click the  button to open the IEEE802.15.4 tree view to set the MX880056A measurements and display the results.

Uninstalled applications are also shown in the tree view. Attempting to start an uninstalled application displays an alert dialog.

2. Click the  **Refresh** button to update the display.
3. Double-click the name of the application to start.
4. Establishing communications with the MT8870A may require several seconds before the **CombiView** screen opens.

The MT8870A setting parameters are displayed in the settings pane.

### 3.1.2 Operations at measurement settings pane

#### Measurement settings pane

The measurement settings pane consists of text boxes and buttons to set measurement parameters.

The screenshot shows the 'Measurement Settings Pane' for the IEEE802.15.4 standard. The settings are as follows:

- Input Port: Port 1
- Output Port: Port 2 (Right-click to access the settings)
- Standard: IEEE802.15.4
- PHY: O-QPSK
- Band: 2450
- Modulation: O-QPSK
- Chip Rate: 2MHz
- Bit Rate: 250kb/s
- Filter: half-sine
- Center Frequency[MHz]: 2450.000000
- Signal Format: Burst
- Trigger Source: Level
- Input Level[dBm]: -10.0
- [mW]: 0.100000
- Trigger Level[dB]: -20.0
- Sync Mode: SFD
- Meas Offset[symbol]: 0
- [chip]: 0
- Meas Interval[symbol]: 830
- [chip]: 1660
- Burst Interval[symbol]: 10000.0000
- [ms]: 10.000000
- Capture Interval[s]: 2.000
- Storage Count: 10
- EVM Calculation Reference: Actual

Buttons and expandable sections at the bottom:

- Display Results
- PSD Mask Setting
- Vector Signal Generator
- Measurement Items
- PSD Mask
- Constellation
- Power vs Time

**Figure 3.1.2-1** Measurement Settings Pane



The contents of the measurement settings pane vary with the measurement item, but the following buttons are always displayed.

**Table 3.1.2-1** Measurement Settings Pane Buttons




Name	Description
Input Port*	Sets MU887000A RF signal input port
Output Port*	Sets MU887000A VSG RF signal output port
Display Results	Displays measurement results
Vector Signal Generator	Sets MU887000A output signal
Level Calibration	Executes the calibration of the MU887000A. Calibration type can be selected
Test Command	Sends input command

\*: Either Port3 or Port4 can be set.

#### Starting/stopping measurement

To start or stop measurement, click the following buttons.

**Table 3.1.2-2** Measurement Start/Stop Buttons

Button	Name	Behavior
	Measurement Start Button	Starts and executes one measurement
	Continuous Measurement Start Button	Repeats measurement until Stop button click
	Measurement Stop Button	Stops measurement

The status indication lamp 3 of MU887000A is lit in green during the execution of measurement.

When the measurement error occurs, the status indication lamp 3 of MU887000A is lit in red.

In that case, query the cause by using :STATus:LRWPan:MEASurement? command.



For the command explanation, refer to the operation manual of the application software.

#### Measurement results display

Click the **Display Results** button at the measurement settings pane to display numeric data.

#### Graph display

There are 3 types of graphs: PSD Mask, Constellation, and Power vs Time.

To display the results as graphs, select the checkbox  in the related dialog box at the measurement settings pane before starting measurement. When the checkbox is selected, the waveform data is loaded into the MX880056A after measurement completion. When the  icon at the measurement settings pane is clicked, a tab for displaying the measurement results as graphs is displayed.

Dragging this tab displays the result in a separate floating window.

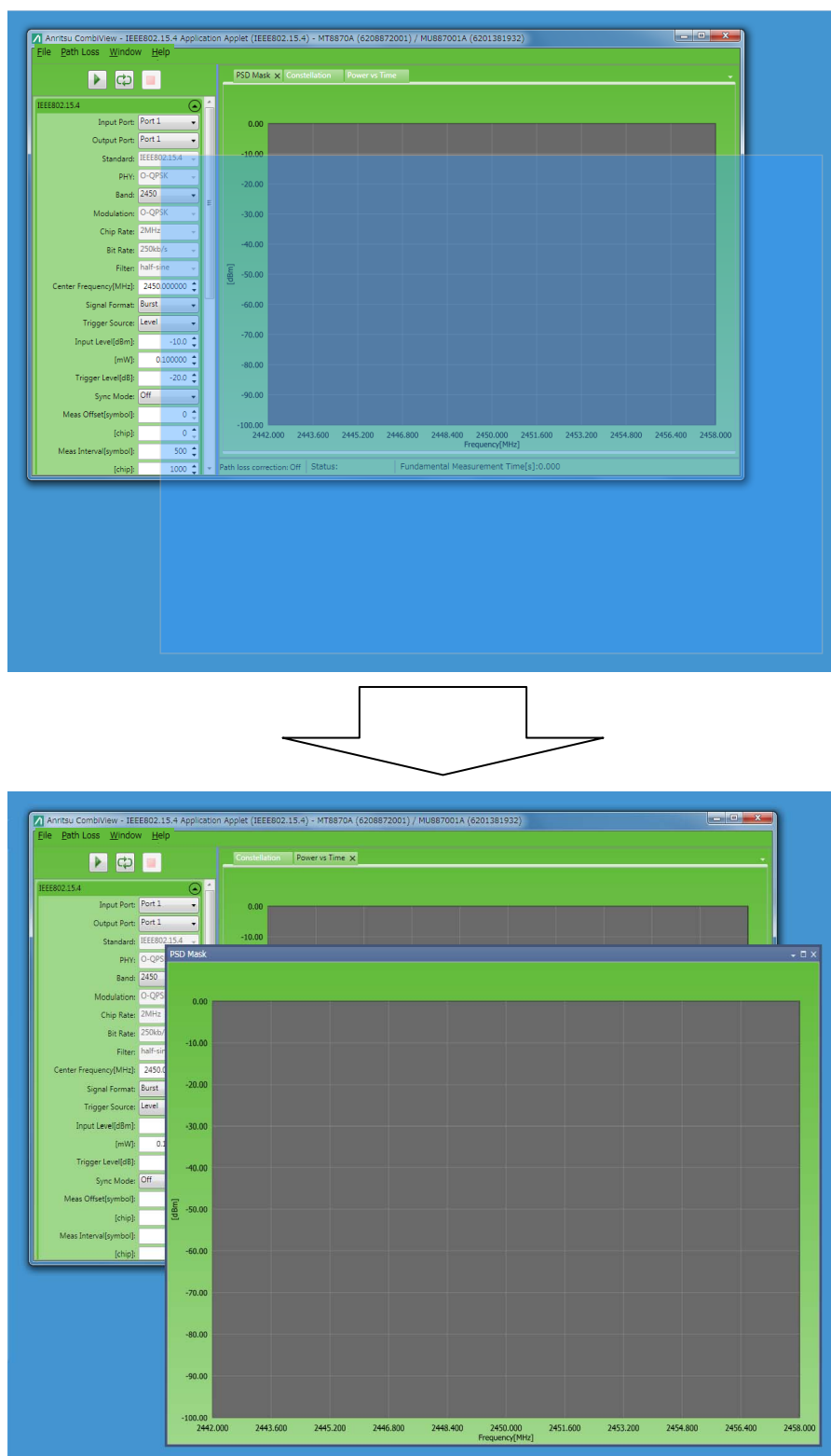
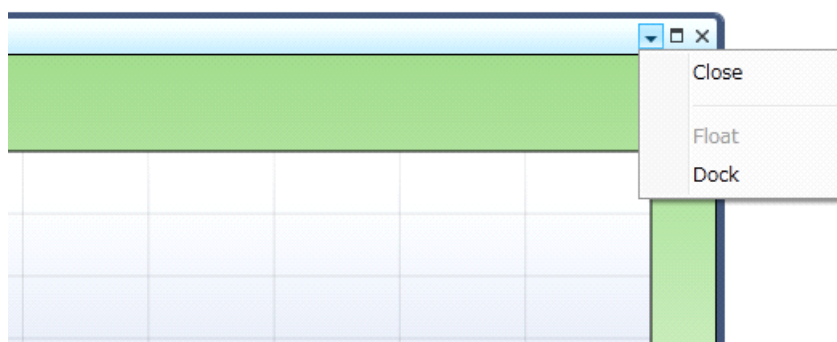


Figure 3.1.2-2 Floating Window

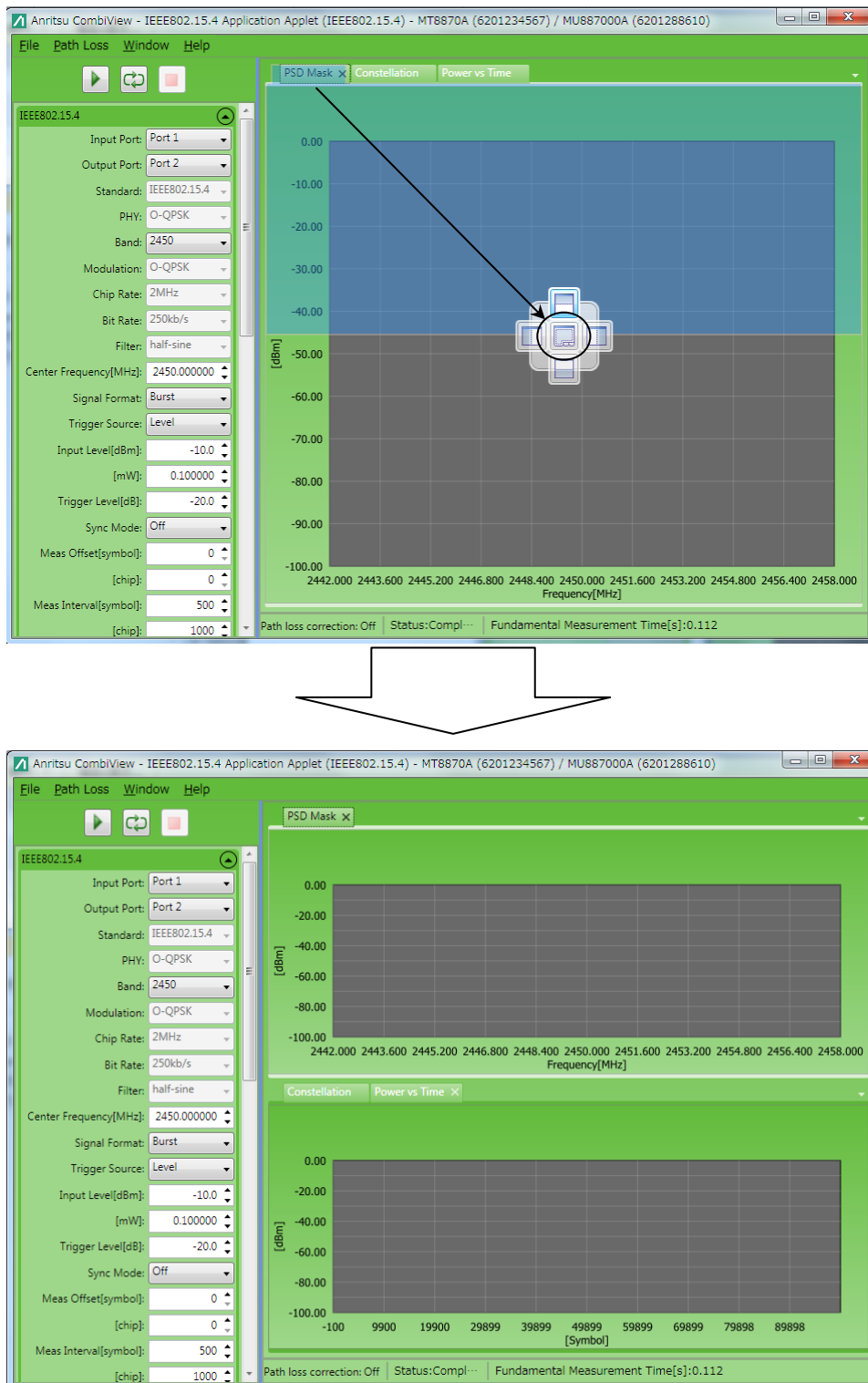
To move the floating window back to its original position, click the ▼ button in the top right corner of the window to display a pull-down menu and click the **Dock** button in the menu.



**Figure 3.1.2-3** Floating Window Pull-Down Menu

To close the measurement results display, click the [×] button at the measurement results tab or at the top right of the floating window.

When drag the measurement results tab, a cross-like icon appears at the center of the screen. Drag the tab onto one of the four squares of the icon to display the measurement results in split sections.



**Figure 3.1.2-4** Example of Split Window

To restore the original display, drag the split windows onto the center square of the cross-like icon.

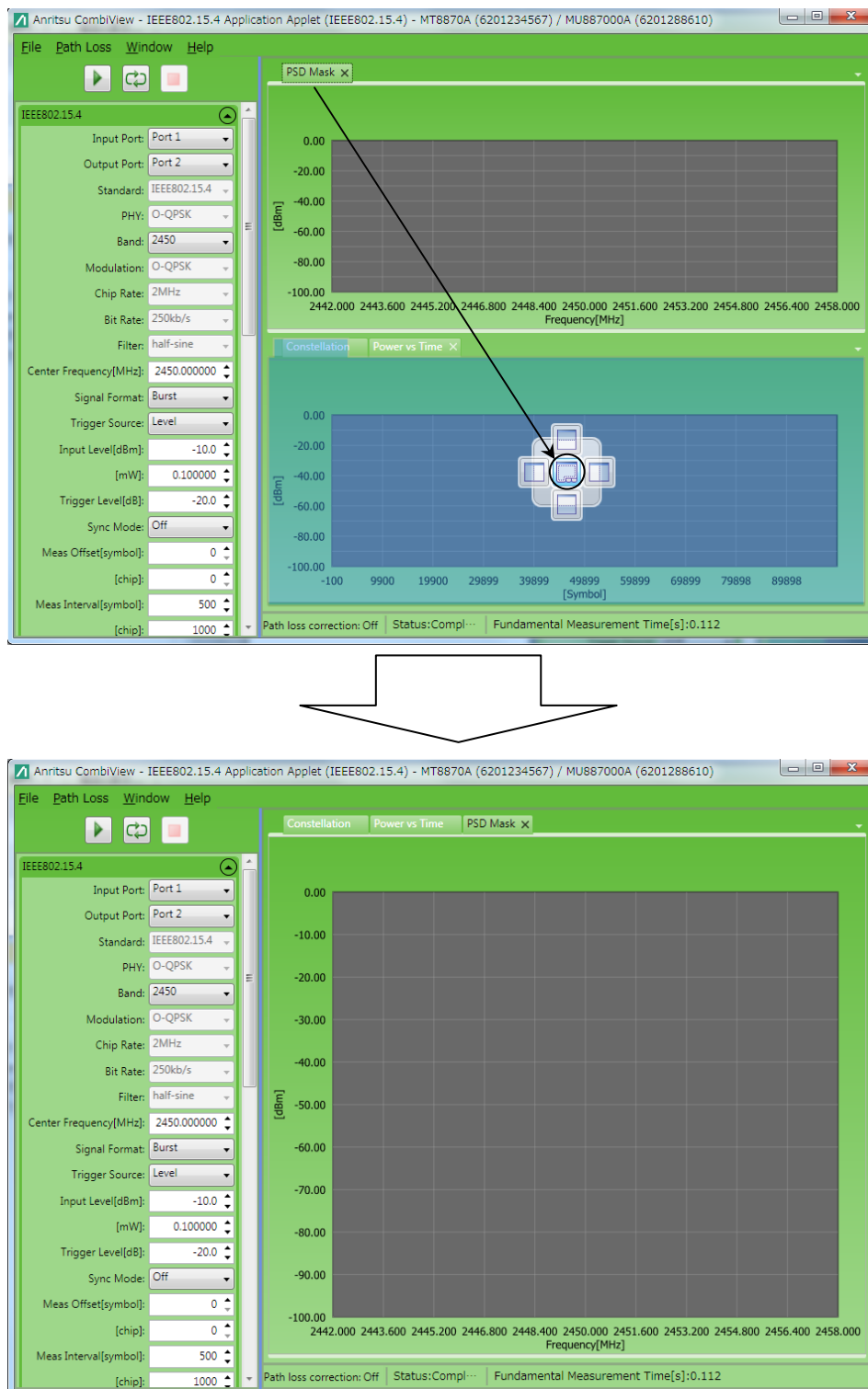
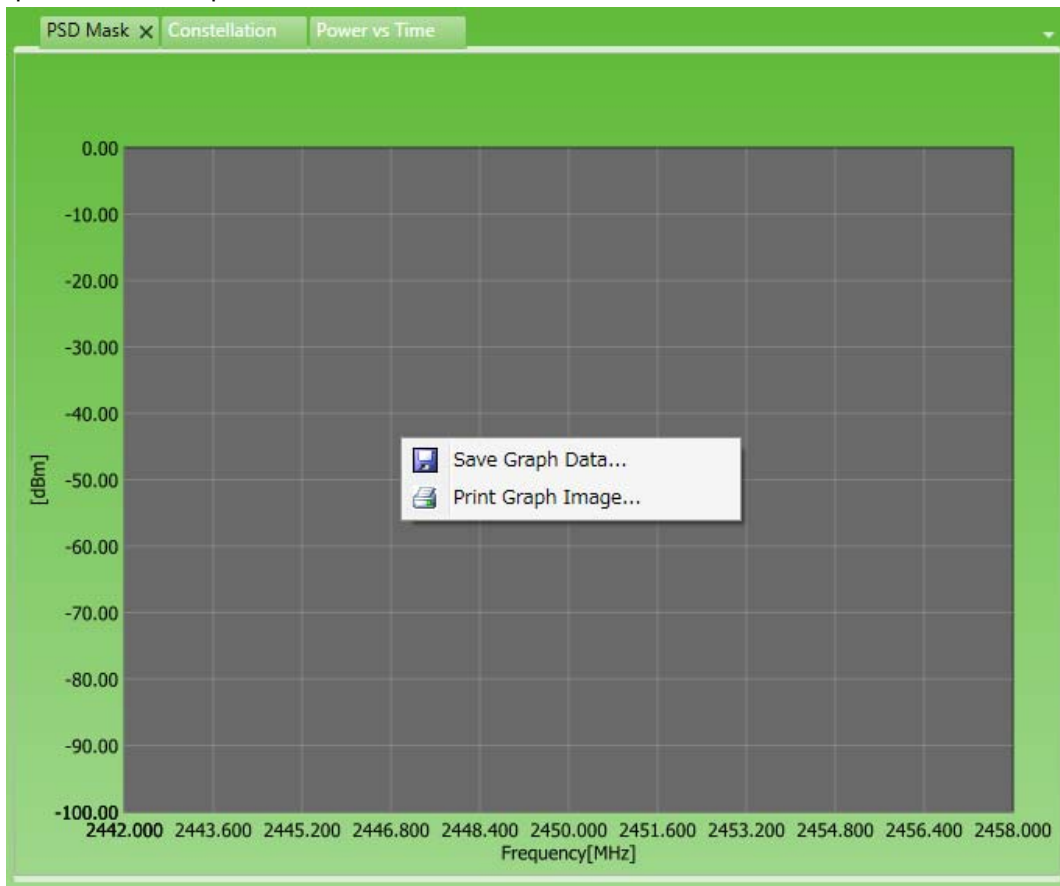


Figure 3.1.2-5 Cancel Window Split

## Save Graph and Print Graph

**Figure 3.1.2-6** Save Graph and Print Graph

Right-click on graph shows **Save Graph Data** and **Print Graph Image**.


Click the **Save Graph Data** to show folder selecting dialog box.

Select folder to save and input file name, then click **OK**.

Click the **Print Graph Image** to show print dialog box.

Select the printer and print format, then click **Print**.

**Error messages**

If set parameters have an error, an error message is displayed when clicking the Measurement Start button .

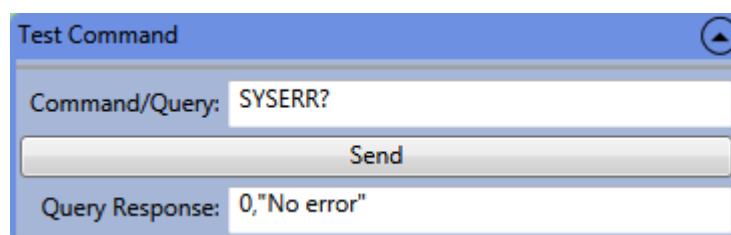
For the details of the error message, refer to the description of “SYSERR?” command in *the MU887000A TRX Test Module Operation Manual*.

### 3.1.3 Sending commands

To execute other commands not provided in the measurement settings pane and query the MU887000A status:

1. Click the **Test Command** button on the measurement settings pane to open the **Test Command** dialog.
2. Input the command in the **Command/Query** text box.
3. Click the **Send** button. When Query is sent, the response is displayed in the **Query Response** text box.

- Notes:**
- An error code and error message pop up when the sent command is not correct. An error code and error message appear in the Query Response field when the sent command is not correct. For details of ErrorCode-format messages, refer to the description of the “SYSERR?” command in the MU887000A TRX Test Module Operation Manual.
  - To use this function, switch the language mode for remote control command as needed. Additionally, when the language mode is switched, return the remote language mode to the original setting before performing subsequent applet operations.



**Figure 3.1.3-1** Test Command Dialog

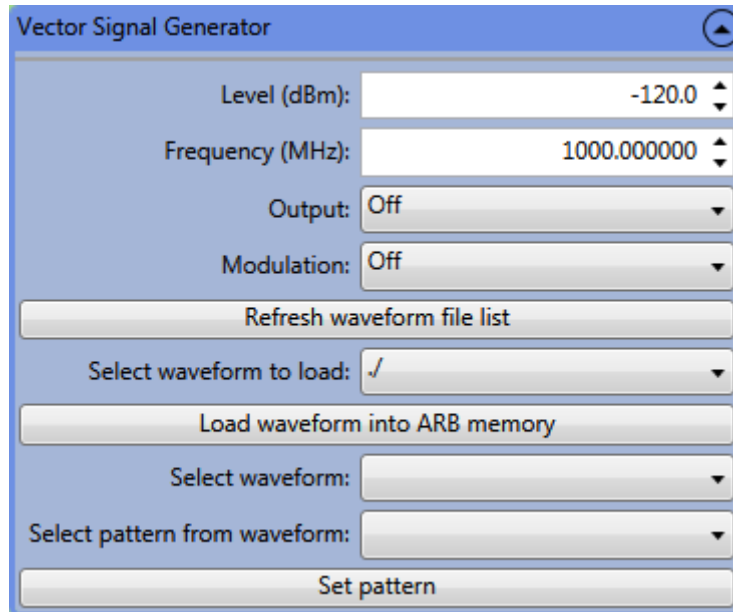
If the sent command is not correct, the status lamp of the MU887000A blinks. For the explanation of the status lamp, refer to Appendix D “Status indication of lamps” in *the MU887000A TRX Test Module Operation Manual*.

### 3.1.4 Setting output signals

The MU887000A can output RF signals during RF signal measurement. Set the RF signal as follows:

1. Click the **Vector Signal Generator** button to open the dialog.
2. Input a value in the **Level (dBm)** and **Frequency (MHz)** text boxes.
3. Set the **Output** button to On to generate the signal.
4. Set the **Modulation** button to On to modulate the signal output.
5. Click **Refresh waveform file list** to update the file list before file loading.
6. Click the **Select waveform to load** button to specify the file.
7. Click **Load waveform into ARB memory** to load the file.
8. Click the **Select waveform** button to select the waveform package.
9. Click the **Select pattern from waveform** button to select the waveform pattern.

- Click the **Set pattern** button to set the selected waveform pattern as the VSG modulation pattern.



**Figure 3.1.4-1** Vector Signal Generator Setting

The file set by **Select waveform to load** button is loaded to the memory in the MU887000A by clicking **Load waveform into ARB memory** button.

While loading the file, the status indication lamp 2 of the MU887000A blinks in green.

When the loading error occurs, the status indication lamp 2 of the MU887000A is lit in red.

In that case, query the cause by using :SOURce:GPRF:GENerator:ARB:FILE:LOAD? command.

For description of the command, refer to Chapter 5 “SCPI Command Reference” in *the MU887000A TRX Test Module Operation Manual*.

Following parameters are sent to MU887000A by clicking **Set pattern** button.

**Select waveform, Select pattern from waveform**



## 3.2 IEEE 802.15.4

Refer to Chapter 2 “Fundamental Measurement” in *the MX887060A IEEE802.15.4 TX Measurement Operation Manual* for a description of the IEEE802.15.4 TX Measurement parameters.

This section describes the IEEE802.15.4 settings and displays.

### 3.2.1 Measurement settings

The IEEE802.15.4 settings pane is shown below. Click the ▲ and ▼ buttons to change the parameter settings.

**IEEE802.15.4**

Input Port: Port 1

Output Port: Port 2

Standard: IEEE802.15.4

PHY: O-QPSK

Band: 2450

Modulation: O-QPSK

Chip Rate: 2MHz

Bit Rate: 250kb/s

Filter: half-sine

Center Frequency[MHz]: 2450.000000

Signal Format: Burst

Trigger Source: Level

Input Level[dBm]: -10.0

[mW]: 0.100000

Trigger Level[dB]: -20.0

Sync Mode: Off

Meas Offset[symbol]: 0

[chip]: 0

Meas Interval[symbol]: 500

[chip]: 1000

Burst Interval[symbol]: 10000.0000

[ms]: 10.000000

Capture Interval[s]: 2.000

Storage Count: 1

EVM Calculation Reference: Actual

Display Results

PSD Mask Setting

Vector Signal Generator

Measurement Items

PSD Mask

Constellation

Power vs Time

**PSD Mask Setting**

PSD Mask Type: IEEE802.15.4 2450MHz Band

PSD Mask Limit - Offset abs[dB]: 0.0

PSD Mask Limit - Offset rel[dB]: 0.0

**Vector Signal Generator**

Level (dBm): -120.0

Frequency (MHz): 1000.000000

Output: Off

Modulation: Off

Refresh waveform file list

Select waveform to load: ✓

Load waveform into ARB memory

Select waveform:

Select pattern from waveform:

Set pattern

**Measurement Items**

Measurement Items All Off

Measurement Items All On

Modulation Analysis: On

Symbol Rate Error: Off

PSD Mask: Off

Constellation: Off

Power vs Time: Off

Data Table: Off

Power Monitor: Off

**Figure 3.2.1-1** IEEE802.15.4 Measurement Settings Pane (1/2)

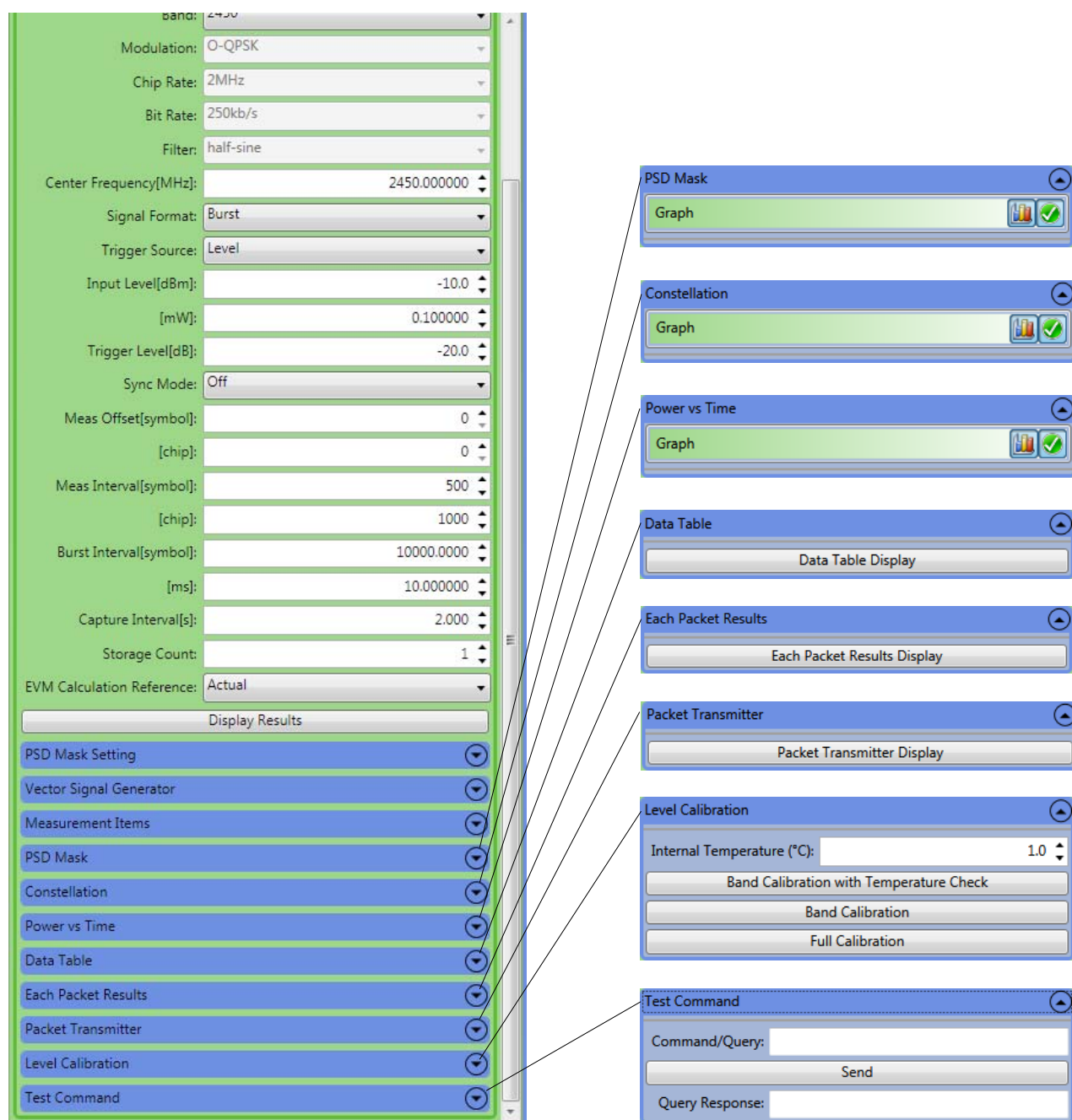



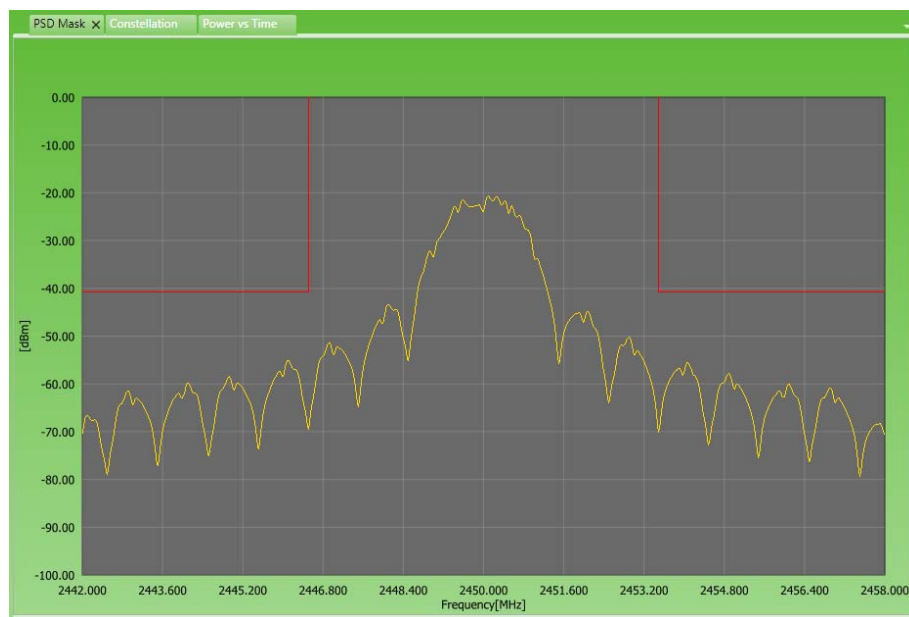


Figure 3.2.1-2 IEEE802.15.4 Measurement Settings Pane (2/2)

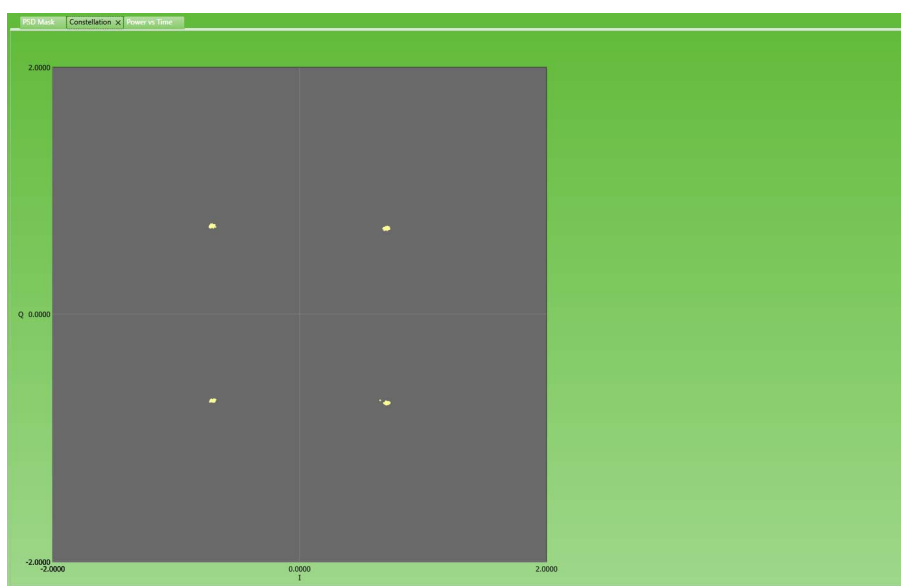
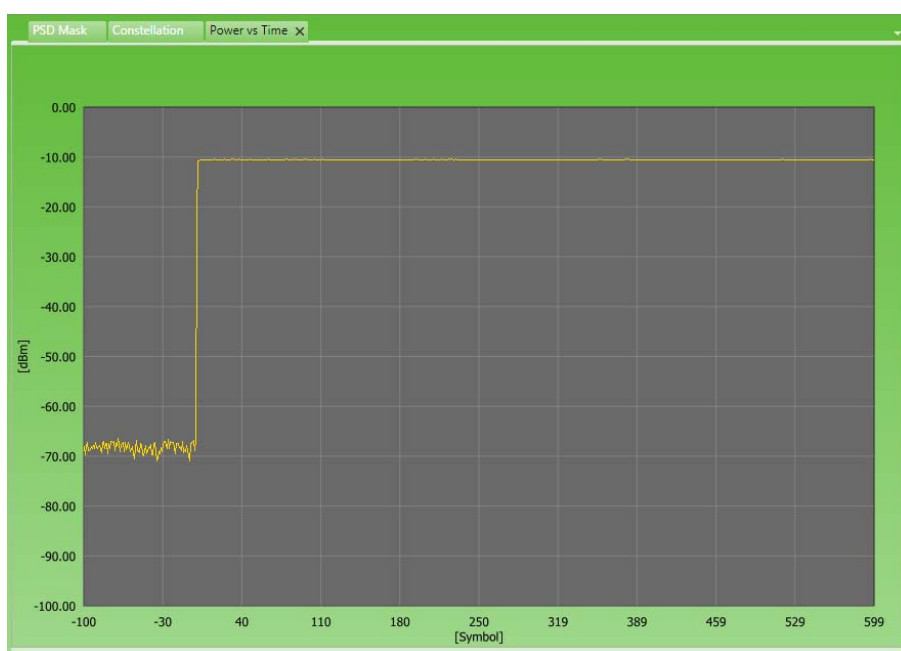
### 3.2.2 Measurement and results

To perform measurement:

1. Set the parameters for all buttons from **Input Port** to **EVM Calculation Reference**.
2. Click the **PSD Mask Setting** button to open the dialog and set the parameters.
3. Click the **Measurement Items** button to open the dialog and set the parameters.
4. Select a checkbox  in each dialog for **PSD Mask**, **Constellation**, and **Power vs Time** to display the graph.
5. Click the **Display Results** button to display the **IEEE802.15.4** tab.
6. Click the **Display Table** button and **Data Table Display** button to display the Data Table. The Data Table window is displayed.
7. Click the **Each Packet Results** button and **Each Packet Results Display** button to display the Each Packet Results. The Each Packet Results window is displayed.
8. Click the  **Measurement Start** button.
9. The numerical data are displayed in the **IEEE802.15.4** tab when measurement is completed.
10. Click the  button in the **PSD Mask**, **Constellation**, and **Power vs Time** dialogs to display the graph.



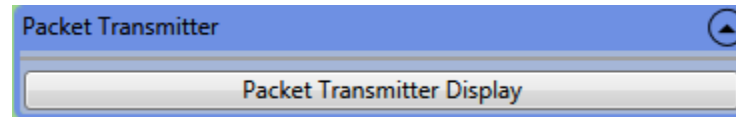
**Figure 3.2.2-1** IEEE802.15.4 (PSD Mask) Graph

**Figure 3.2.2-2** IEEE802.15.4 (Constellation) Graph**Figure 3.2.2-3** IEEE802.15.4 (Power vs Time) Graph

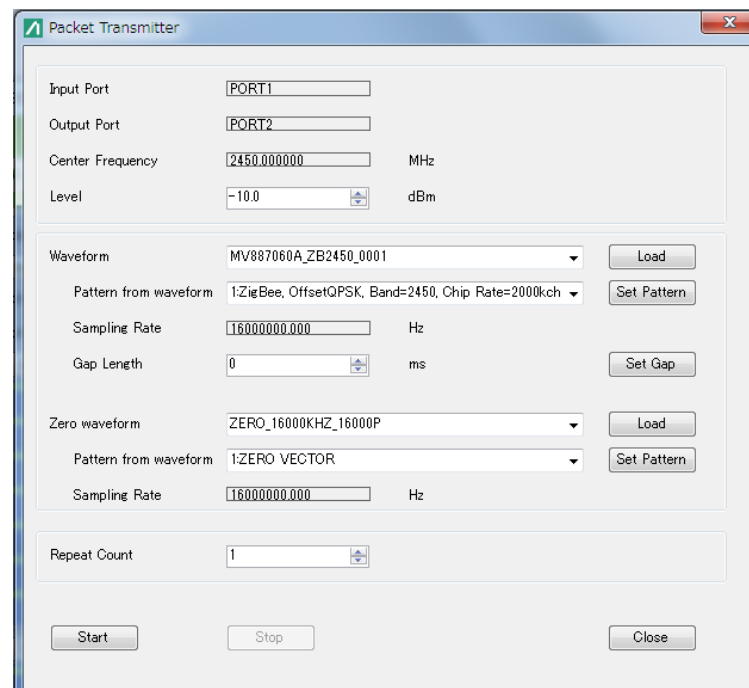
### 3.2.3 Packet Transmitter

Click **Packet Transmitter Display** on the Packet Transmitter setting panel to use Packet Transmitter.

This function can output a waveform selected by **Waveform** for the number of times set by **Repeat Count**.



**Figure 3.2.3-1** Measurement Settings Pane (Packet Transmitter)



**Figure 3.2.3-2** Packet Transmitter Screen

To perform measurement:

1. Sets a value for Level.
2. Select a waveform to output for **Waveform** and click **Load**.
3. Select a pattern for **Pattern from waveform** below **Waveform** and click **Set Pattern**.
4. Sets a value for Gap Length.

The Off section of the set Gap Length is added to the selected Waveform.

The added Off section is maintained until the Gap Length is reset or the waveform file is deleted from the memory.

5. Select a zero waveform file to output for **Zero waveform**, and click **Load**.

---

Setting a waveform for **Zero waveform** is required for stopping unnecessary signal output before and after outputting the waveform selected by **Waveform** for the specified number of times.

The waveform selected by **Zero waveform** should have the same sampling rate with the waveform selected by **Waveform**. Check the Sampling Rate below the waveform boxes.

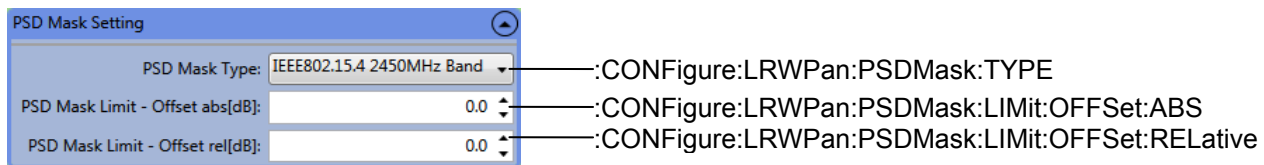
6. Select a pattern for **Pattern from waveform** below **Zero waveform** and click **Set Pattern**.
7. Set the number of times for **Repeat Count**.
8. Clicking **Start** outputs the signals according to the set value.
9. Click **Stop** to abort the signal output.

### 3.2.4 Related SCPI Commands

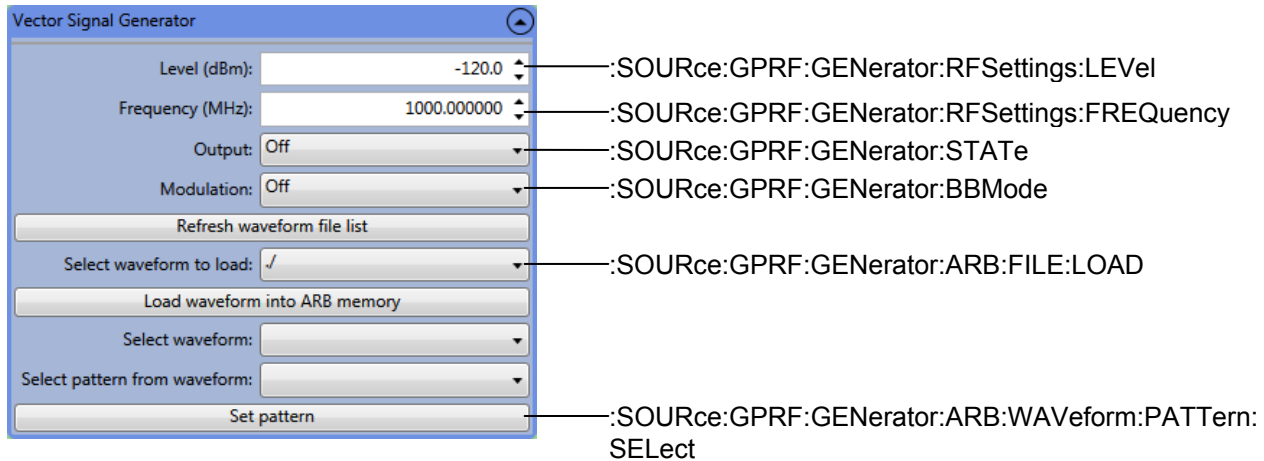
The SCPI commands for remote control of the MX887060A IEEE802.15.4 TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of the commands, refer to Chapter 3 “SCPI Command Reference” in *the MX887060A IEEE802.15.4 TX Measurement Operation Manual*.



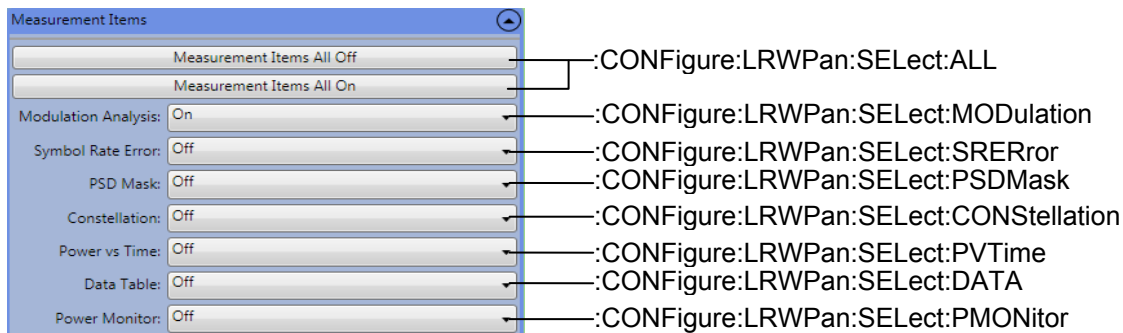
**Figure 3.2.4-1** Measurement Settings Pane



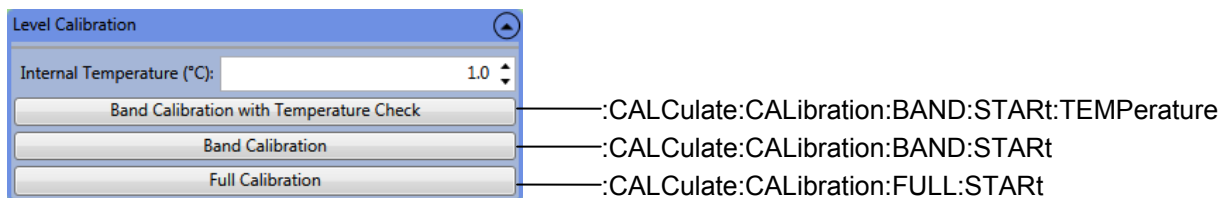
**Figure 3.2.4-2** Measurement Settings Pane (PSD Mask Setting)



**Figure 3.2.4-3** Measurement Settings Pane (Vector Signal Generator)



**Figure 3.2.4-4** Measurement Settings Pane (Measurement Items)



**Figure 3.2.4-5** Measurement Settings Pane (Level Calibration)



Modulation Analysis Result					
Modulation Analysis Result	Current	Average	Maximum	Minimum	Result
Center frequency tolerance [Hz]	---	0.11	0.61	---	---
Center frequency tolerance [ppm]	---	0.00004489	0.00024897	---	---
Transmit power [dBm]	---	-10.40	-10.39	---	---
Transmit power [mW]	---	0.091254574	0.091307275	---	---
Offset EVM (RMS) [%]	---	0.32	0.33	---	---
Offset EVM (Peak) [%]	---	0.65	0.75	---	---
EVM (RMS) [%]	---	0.53	0.55	---	---
EVM (Peak) [%]	---	1.33	1.57	---	---
Origin Offset [dB]	---	-51.60	-51.19	---	---
Symbol Rate Error [ppm]	---	0.00	0.00	---	---
Time Offset [symbol]	---	0.00	---	---	---
Time Offset [us]	---	0.03	---	---	---

:FETCh:LRWPan:MODulation1?

Figure 3.2.4-6 Modulation Analysis Results

PSD Mask Result					
PSD Mask Result	Current	Average	Maximum	Minimum	Result
Total – judge	---	---	---	---	Pass
Reference – level[dBm]	---	-22.46	---	---	---
Offset1- judge	---	---	---	---	Pass
Offset1- peak[MHz]	---	-3.902	---	---	---
Offset1- level[dBm]	---	-60.99	---	---	---
Offset1- margin[dB]	---	18.53	---	---	---

:FETCh:LRWPan:PSDMask?

Figure 3.2.4-7 PSD Mask Results

Detected Signals					
Detected Signals	Current	Average	Maximum	Minimum	Result
Setting Burst Count	1	---	---	---	---
Detection Burst Count	1	---	---	---	---

:FETCh:LRWPan:DSIGnals?

Figure 3.2.4-8 Detected Signals Results

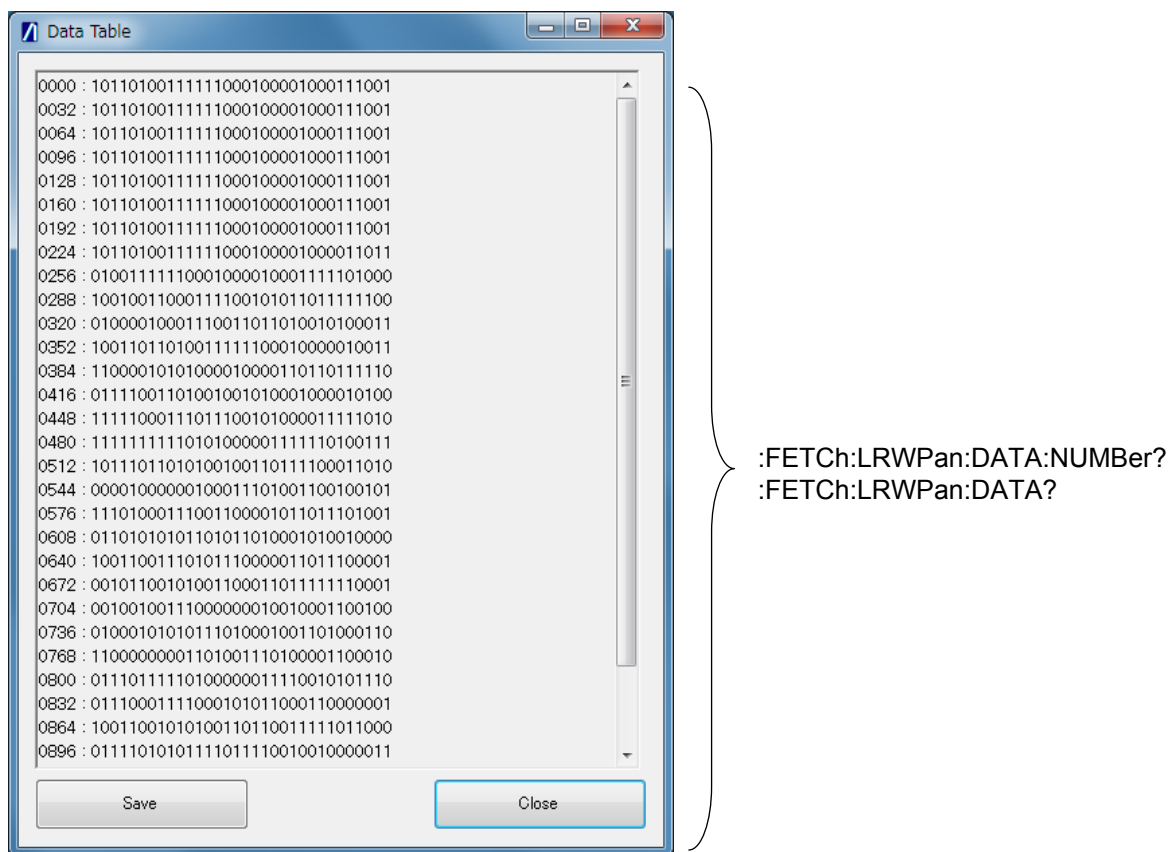


Figure 3.2.4-9 Data Table Results

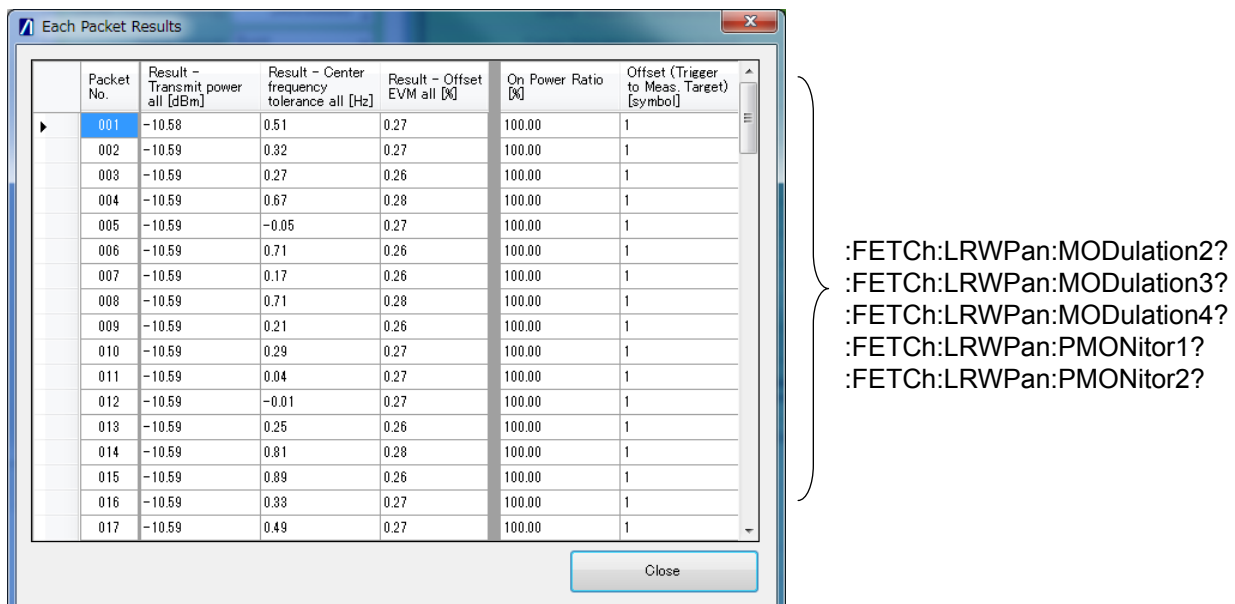
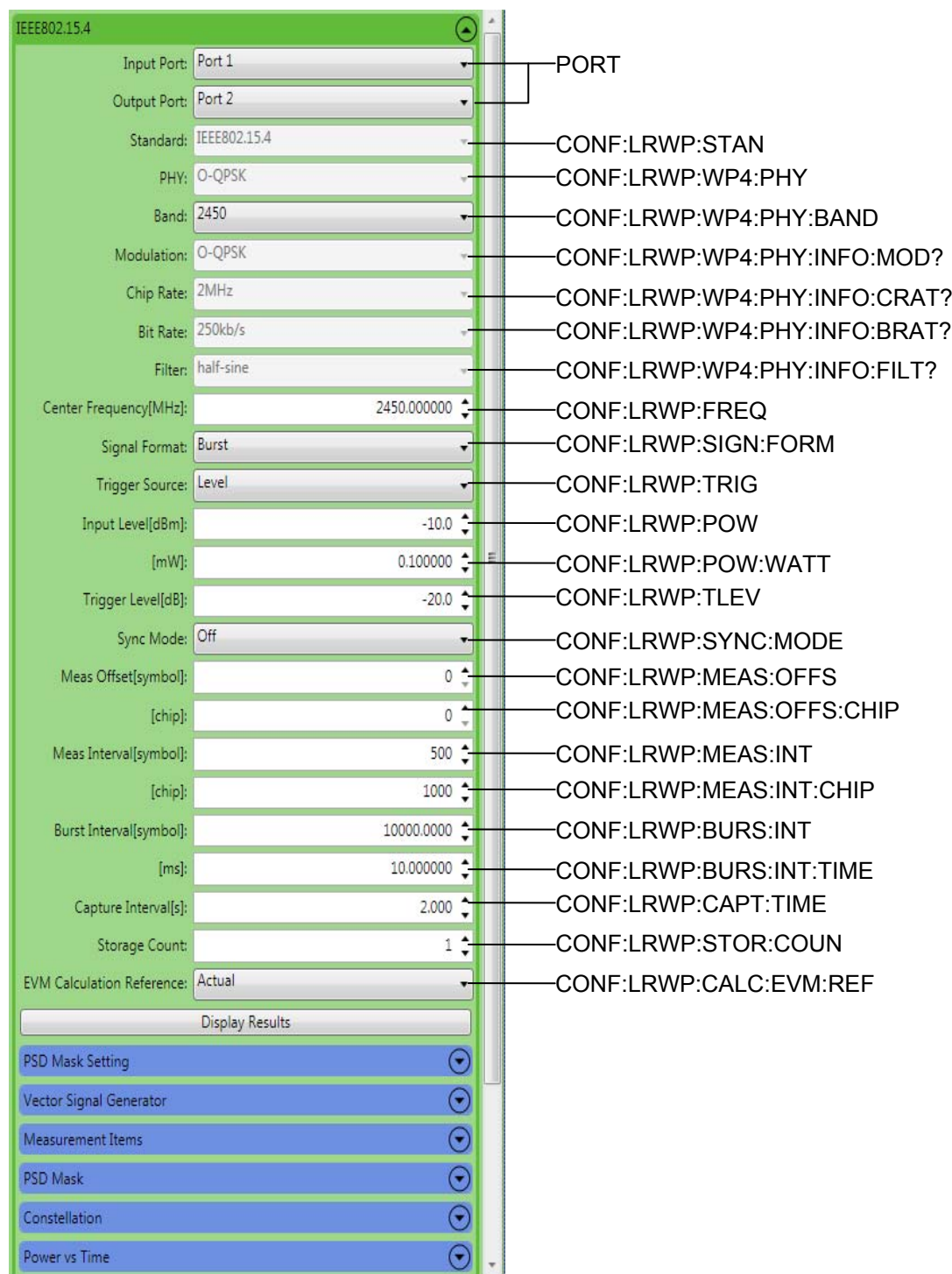


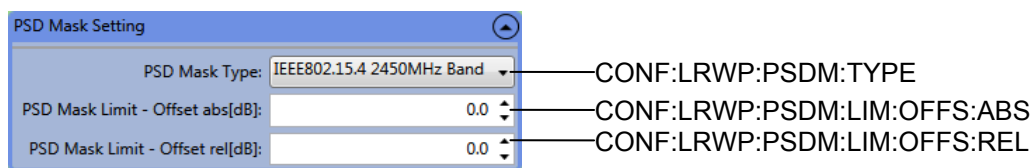
Figure 3.2.4-10 Each Packet Results

### 3.2.5 Related Native Commands

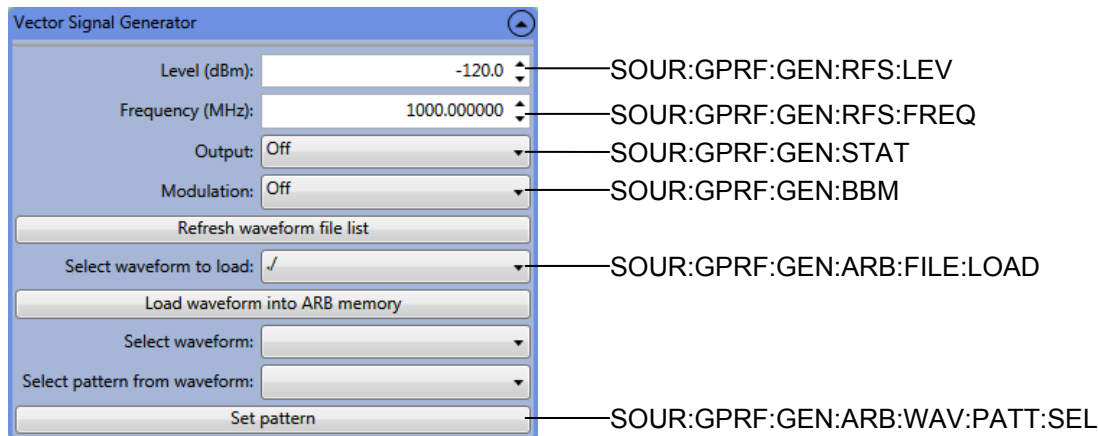
The Native commands for remote control of the MX887060A IEEE802.15.4 TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of the commands, refer to Chapter 4 “Native Command Reference” in *the MX887060A IEEE802.15.4 TX Measurement Operation Manual*.



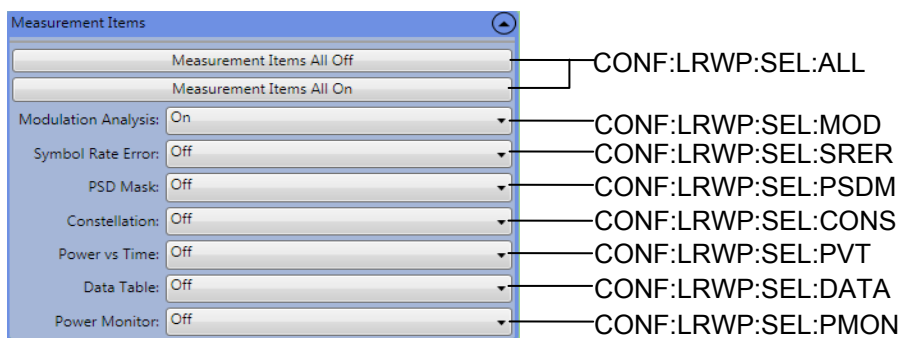
**Figure 3.2.5-1** Measurement Settings Pane



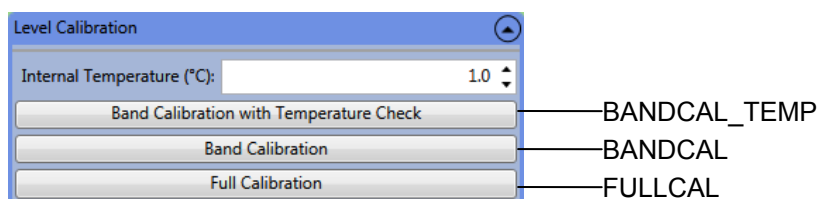
**Figure 3.2.5-2** Measurement Settings Pane (PSD Mask Setting)



**Figure 3.2.5-3** Measurement Settings Pane (Vector Signal Generator)



**Figure 3.2.5-4** Measurement Settings Pane (Measurement Items)



**Figure 3.2.5-5** Measurement Settings Pane (Level Calibration)

Modulation Analysis Result					
Modulation Analysis Result	Current	Average	Maximum	Minimum	Result
Center frequency tolerance [Hz]	---	0.11	0.61	---	---
Center frequency tolerance [ppm]	---	0.00004489	0.00024897	---	---
Transmit power [dBm]	---	-10.40	-10.39	---	---
Transmit power [mW]	---	0.091254574	0.091307275	---	---
Offset EVM (RMS) [%]	---	0.32	0.33	---	---
Offset EVM (Peak) [%]	---	0.65	0.75	---	---
EVM (RMS) [%]	---	0.53	0.55	---	---
EVM (Peak) [%]	---	1.33	1.57	---	---
Origin Offset [dB]	---	-51.60	-51.19	---	---
Symbol Rate Error [ppm]	---	0.00	0.00	---	---
Time Offset [symbol]	---	0.00	---	---	---
Time Offset [us]	---	0.03	---	---	---

FETC:LRWP:MOD1?

Figure 3.2.5-6 Modulation Analysis Results

PSD Mask Result					
PSD Mask Result	Current	Average	Maximum	Minimum	Result
Total – judge	---	---	---	---	Pass
Reference – level[dBm]	---	-22.46	---	---	---
Offset1- judge	---	---	---	---	Pass
Offset1- peak[MHz]	---	-3.902	---	---	---
Offset1- level[dBm]	---	-60.99	---	---	---
Offset1- margin[dB]	---	18.53	---	---	---

FETC:LRWP:PSDM?

Figure 3.2.5-7 PSD Mask Results

Detected Signals					
Detected Signals	Current	Average	Maximum	Minimum	Result
Setting Burst Count	1	---	---	---	---
Detection Burst Count	1	---	---	---	---

FETC:LRWP:DSIG?

Figure 3.2.5-8 Detected Signals Results

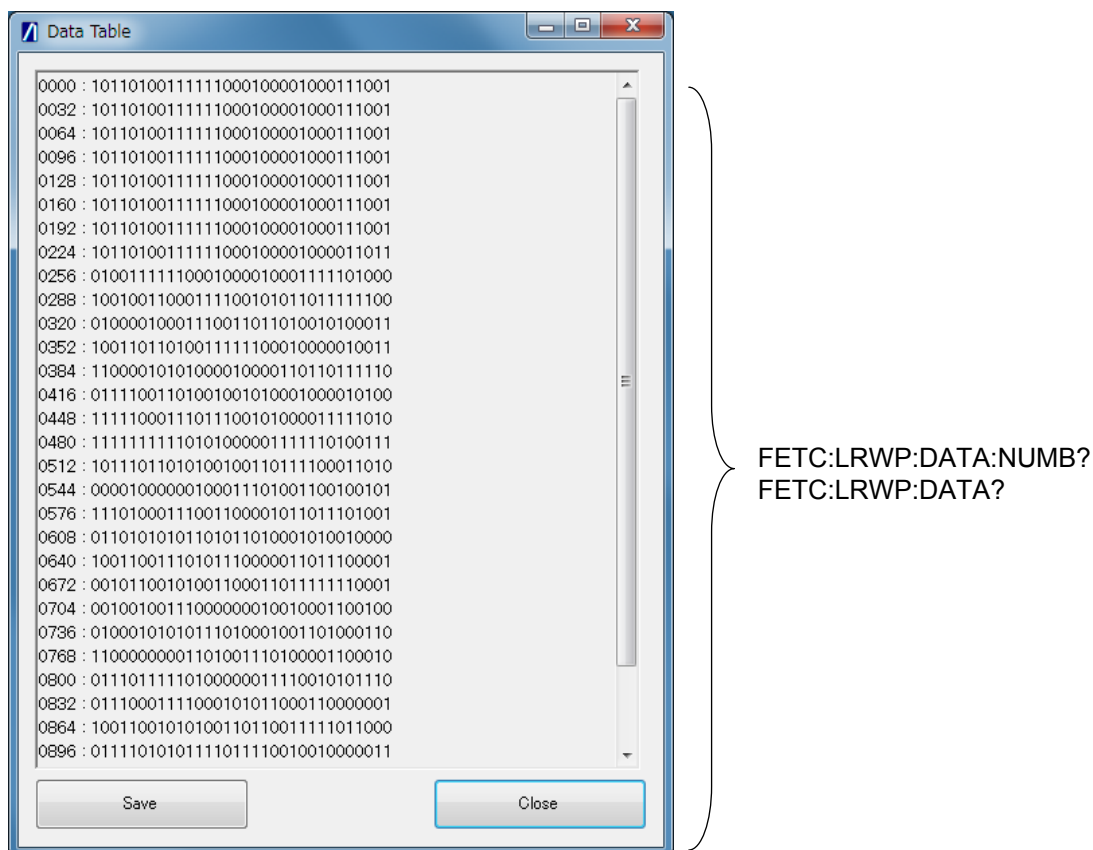


Figure 3.2.5-9 Data Table Results

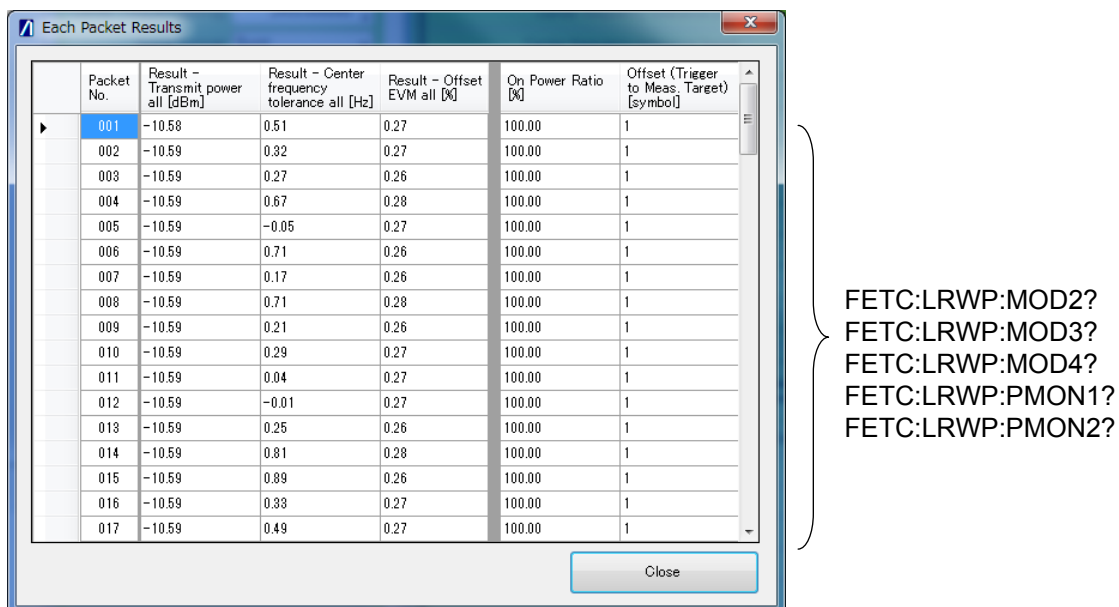


Figure 3.2.5-10 Each Packet Results