

CombiView

MX880055A

**Small Cell Application Applet
Operation Manual**

Anritsu

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MX880055A

Small Cell Application Applet
Operation Manual

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- Files and data provided by Anritsu
- Files created by this software
- Files specified in this document

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1. Product Model

Software: MX880055A Small Cell Application Applet

2. Applied Directive and Standards

When the MX880055A Small Cell 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 MX880055A Small Cell Application Applet.

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C-tick marking



1. Product Model

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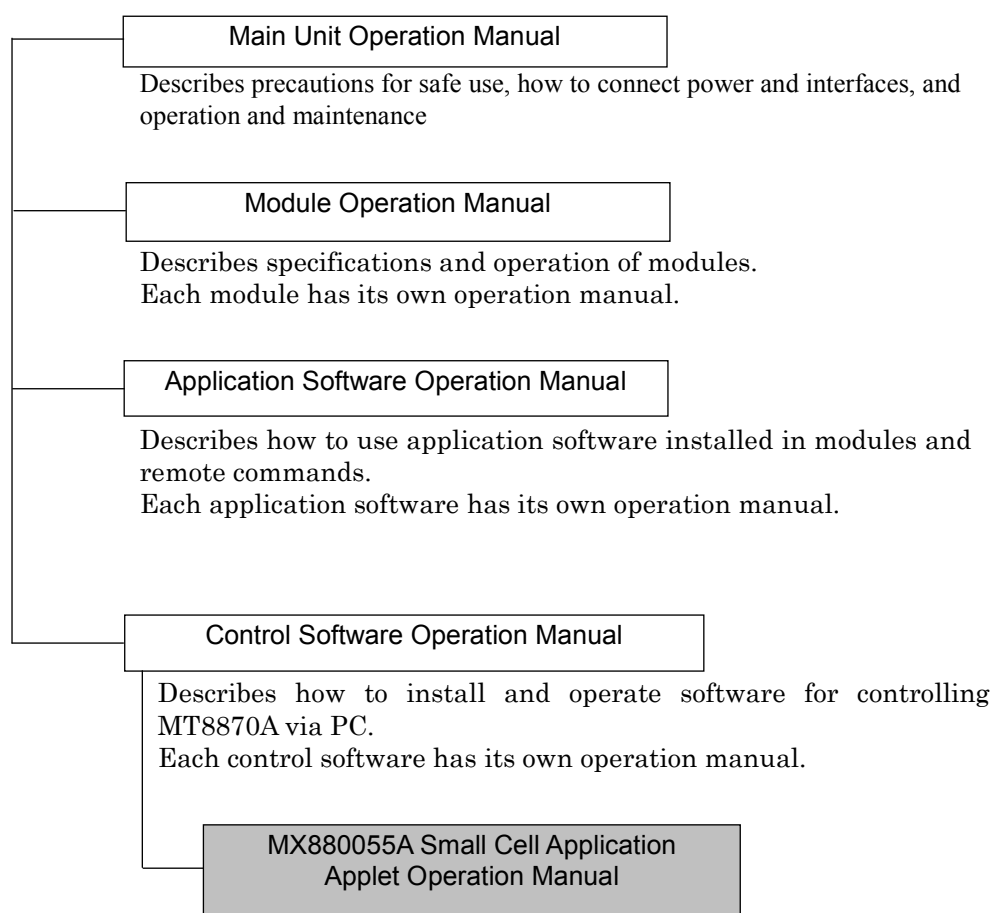
About This Manual

This manual mainly describes the operation of the MX880055A Small Cell 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.



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Chapter 1 — Overview

1.1 CombiView Introduction

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

CombiView allows the user to configure measurements and display results.

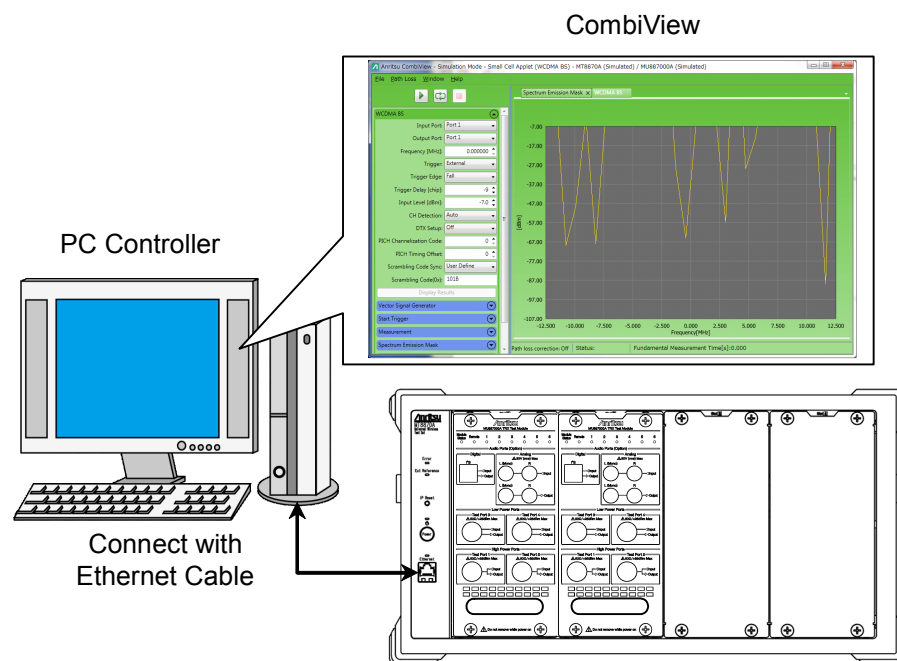


Figure 1.1-1 Ethernet Connection between Control PC and MT8870A

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 MX880055A Small Cell Application Applet (hereafter MX880055A) adds measurements based on base station 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.

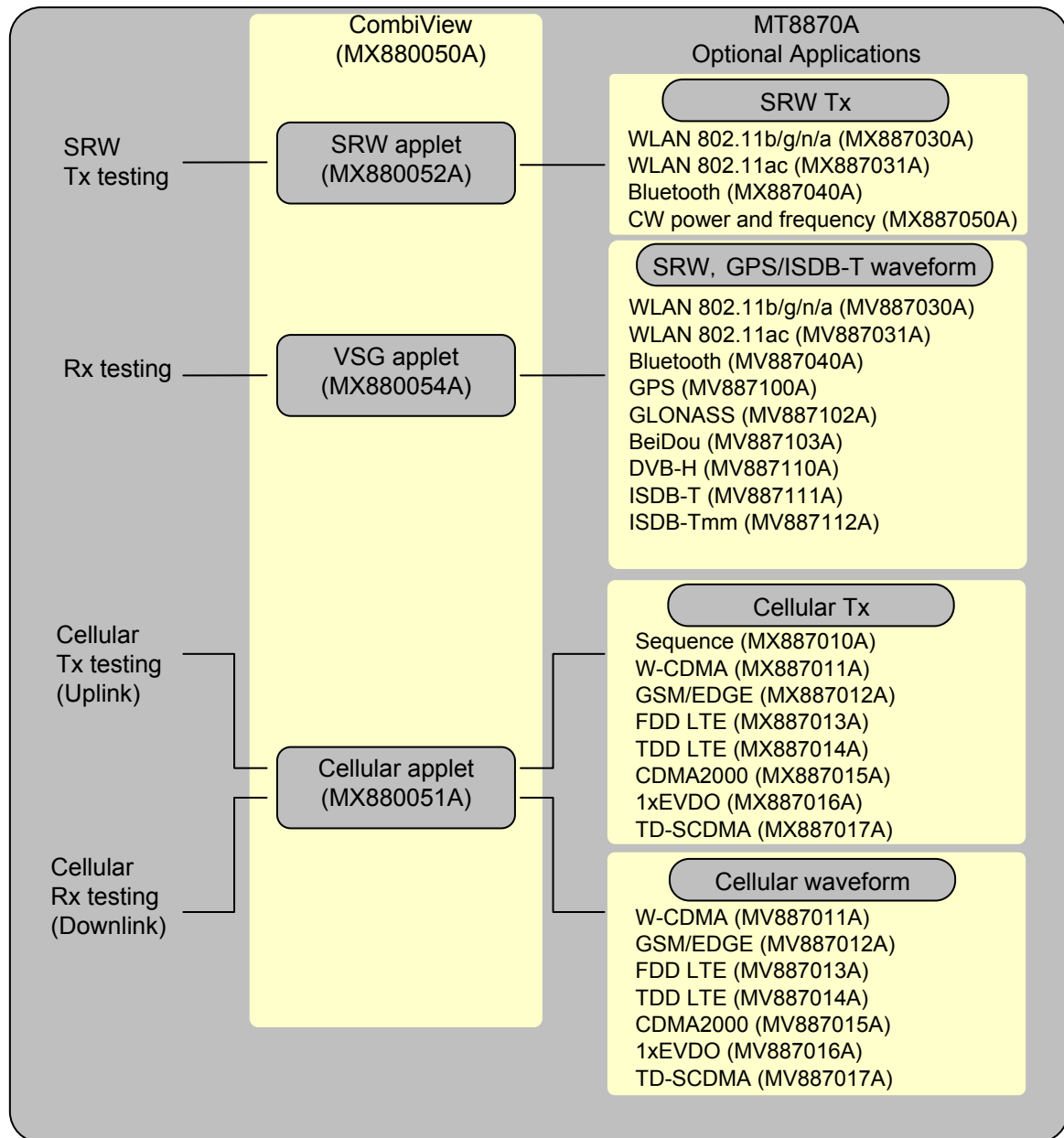


Figure 1.1-2 CombiView Applets and Associated MT8870A Applications Options (1/2)

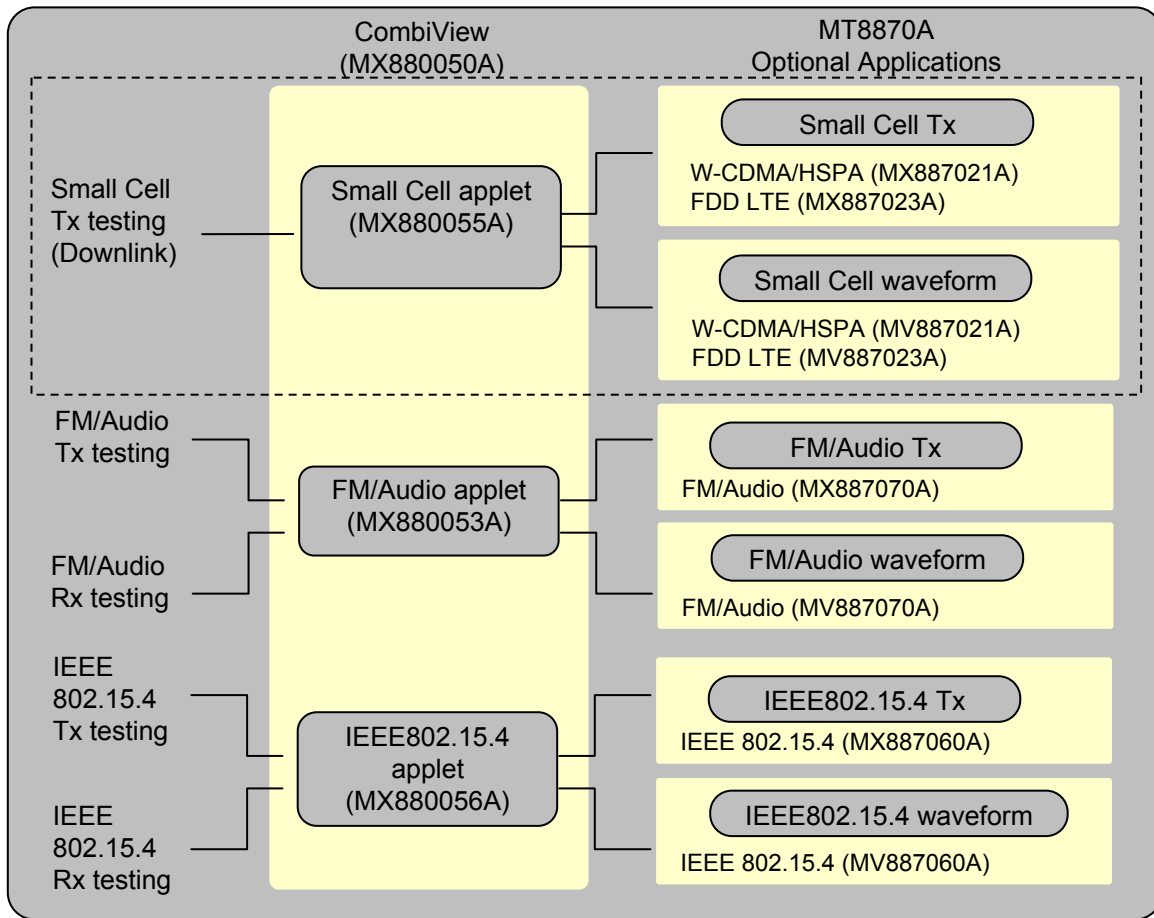


Figure 1.1-3 CombiView Applets and Associated MT8870A Applications Options (2/2)

At least one of following application software licenses must be registered in the MT8870A to control it using the MX880055A.

Table 1.1-2 Application Software Licenses Required by MT8870A

Model/Code	Product Name
MX887021A	W-CDMA/HSPA Downlink Tx Measurement
MX887023A	LTE FDD Downlink TX Measurement

An example of the MX880055A 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.

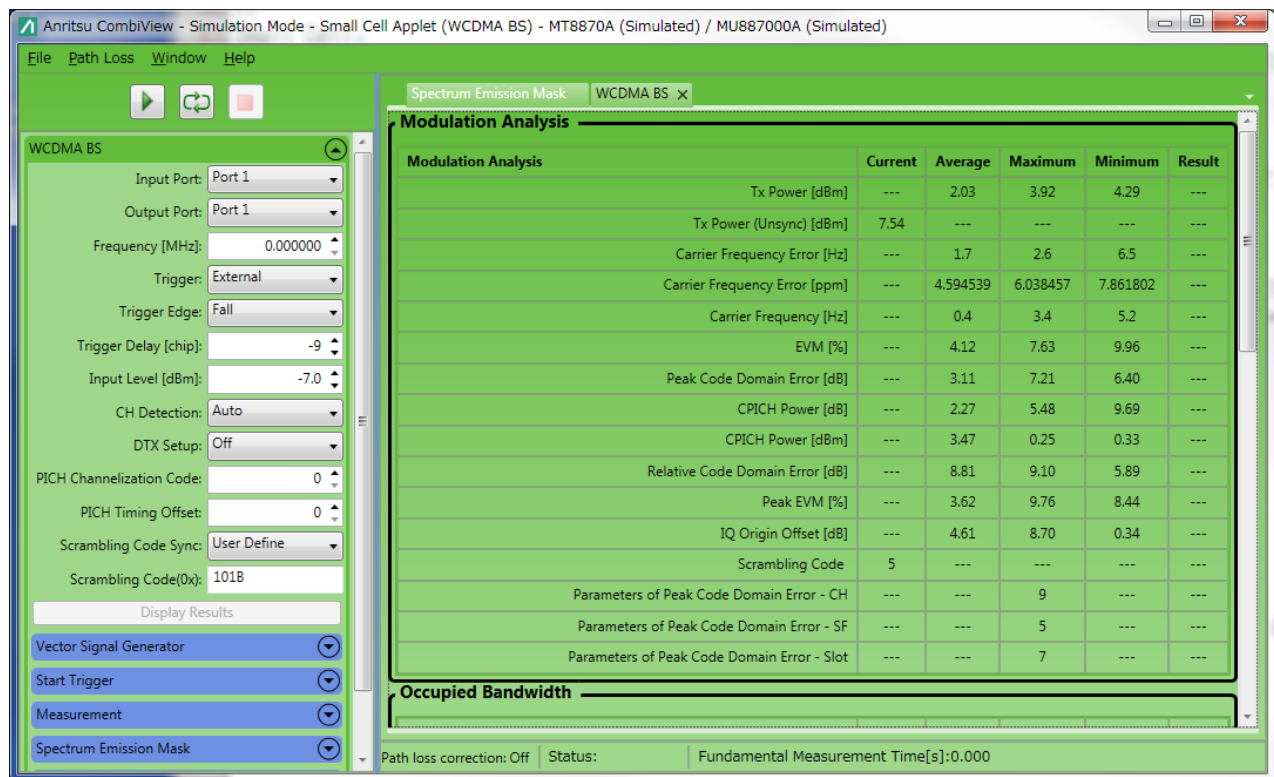


Figure 1.1-4 MX880055A Screen

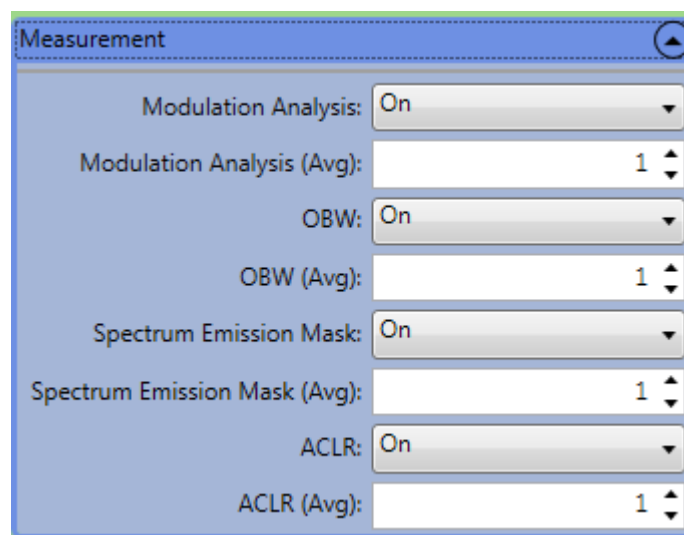


Figure 1.1-5 Parameter Setting Screen

1.2 Composition

The MX887055A 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
MX880055A	Small Cell Application Applet	—
W3706AE	MX880055A Small Cell Application Applet Operation Manual	English

Chapter 2 — Before Use

This chapter explains how to start the MX880055A.

2.1 Operating Environment

This section describes the MX880055A operating environment.

Table 2.1-1 Operating Environment

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

*1: If Windows XP Professional Service Pack 3 is applied, be sure to update it using Windows Update.

*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	Small Cell applet
Ver 01.06.01	1.4.3.0	1.1.14.0
Ver 01.07.00	1.6.2.0	1.2.0.0
Ver 01.07.09	1.6.10.0	1.2.1.0

To use the package of Ver 01.06.01 or earlier, select [.NET Framework 4.0 Languages Support] at NI-VISA installation.

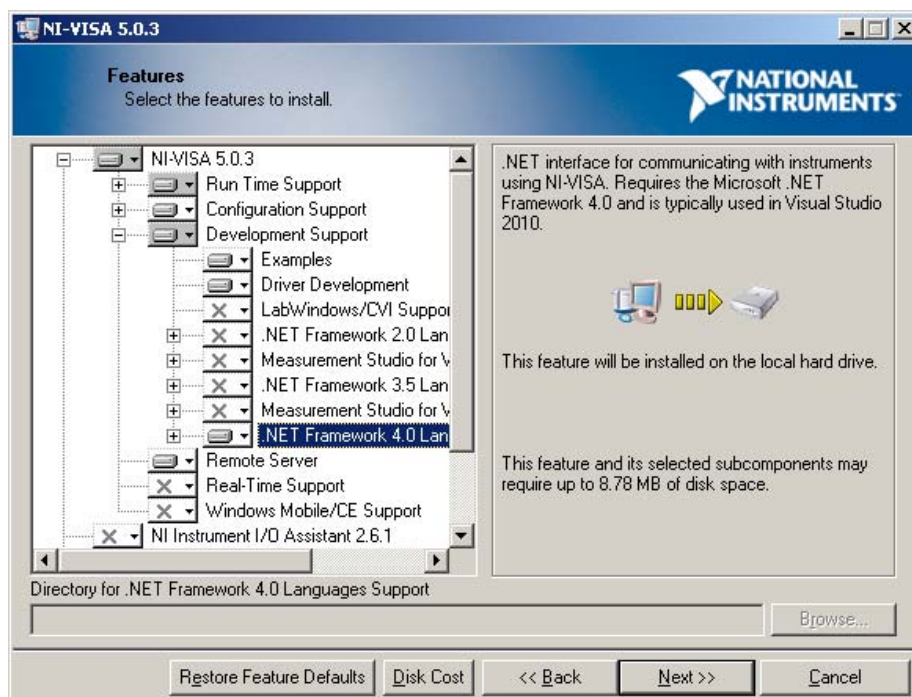


Figure 2.1-1 Selecting .NET Framework 4.0 Languages Support

2.2 Connecting to MT8870A

Connect the Control PC having CombiView installed on it 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

Use an Ethernet cable that is category-5 or better and straight-through.

1. Connect the Ethernet cable to the Control PC.
2. Connect the other end of the Ethernet cable to the Ethernet connector on the front or rear panel of MT8870A.

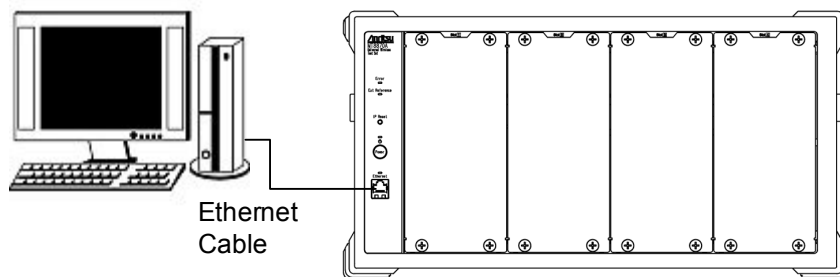


Figure 2.2.1-1 Connecting to Front Ethernet Connector

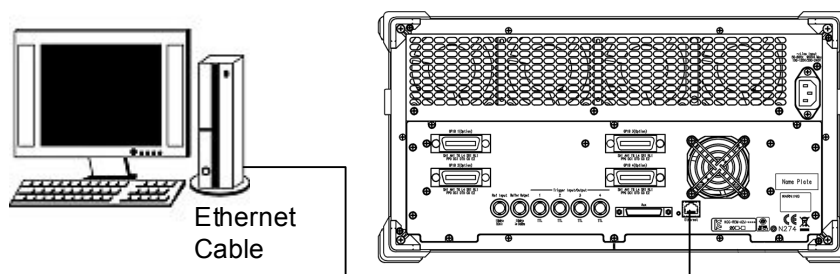


Figure 2.2.1-2 Connecting to Rear Ethernet Connector

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 Control PC. 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 Control PC.
2. Connect the other end of the GPIB cable to the GPIB connector on the MT8870A rear panel.

2.3 Installing and Uninstalling MX880055A

2.3.1 Installing

To install the MX880055A, run the installation file on the storage media as follows:

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

2.3.2 Uninstalling

1. When using Windows XP: At the Windows Control Panel, click **Add or Remove Programs**, and then double-click **MX880055A CombiView SmallCell Applet** in the list of **Remove or Change Programs**.

When using Windows 7: At the Windows Control Panel, click **Programs and Features**, and then double-click **MX880055A CombiView SmallCell Applet** in the list of **Uninstall or change program**.
2. When you are asked if you really want to uninstall the MX880055A, click **Yes** to uninstall it.
3. Similarly as step2, uninstall Anritsu CombiView.

2.4 Starting and Stopping CombiView

Starting CombiView

When using Windows XP, start CombiView at the Control PC by clicking **Start > Programs > Anritsu > CombiView > CombiView**.

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

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

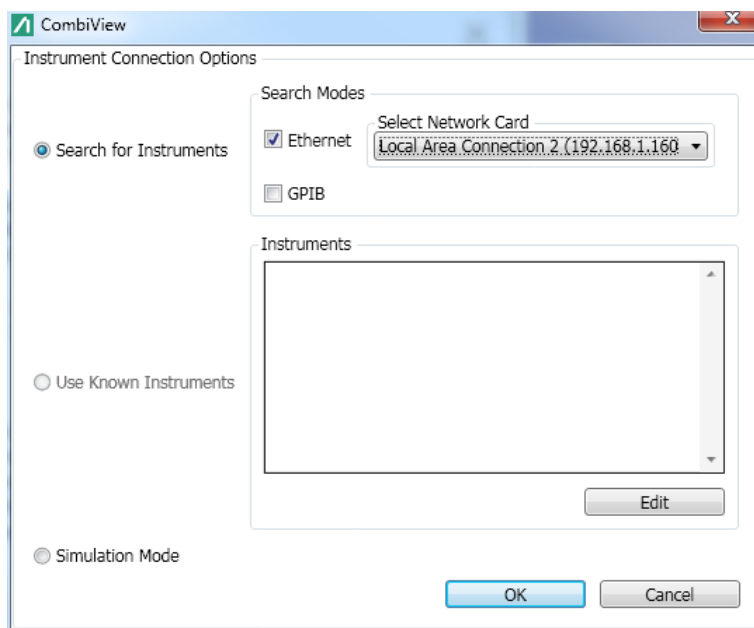


Figure 2.4-1 Instrument Connection Options Dialog Box

In the selected search mode, CombiView searches for MT8870As in the network.

Table 2.4-1 Search Mode for MT8870As

Name	Description
Search for Instruments	Searches for all MT8870As existing in the selected network.
Use Known Instruments	Searches for MT8870As to which the modules with IP addresses specified are installed.
Simulation Mode	Places CombiView offline (the state where there is no communication with connected instruments) without searching for MT8870As.

To edit the IP addresses of known MT8870As, click **Use Known Instruments**, and then click **Edit**

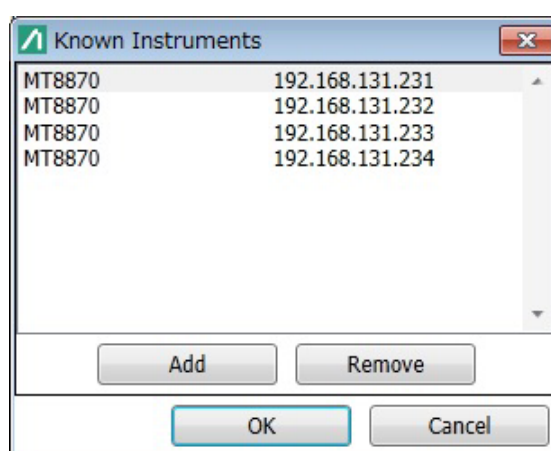


Figure 2.4-2 Known Instruments Dialog Box

To add a known MT8870A, click **Add**, and then enter its IP address. To delete an MT8870A from the list, select it, and then click **Remove**.

Note:

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

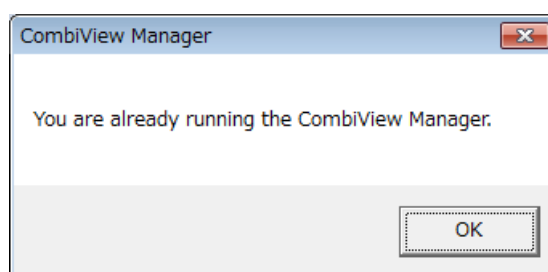


Figure 2.4-3 Message when CombiView is running

Stopping CombiView

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



Figure 2.4-4 Close Button

Note:

When the MX880055A 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 Elements

This section names each part of the CombiView screens.

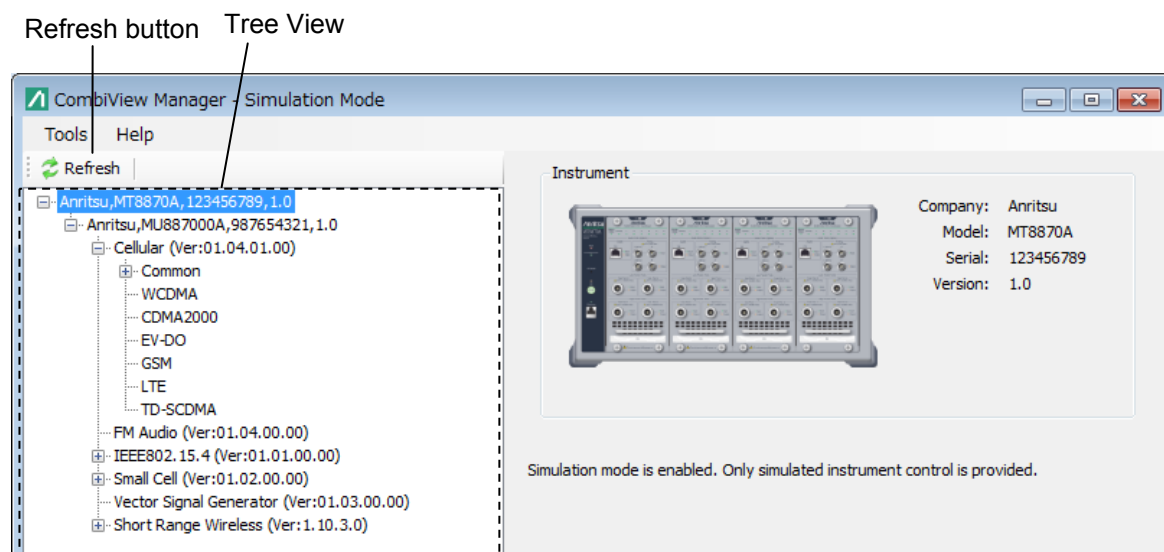
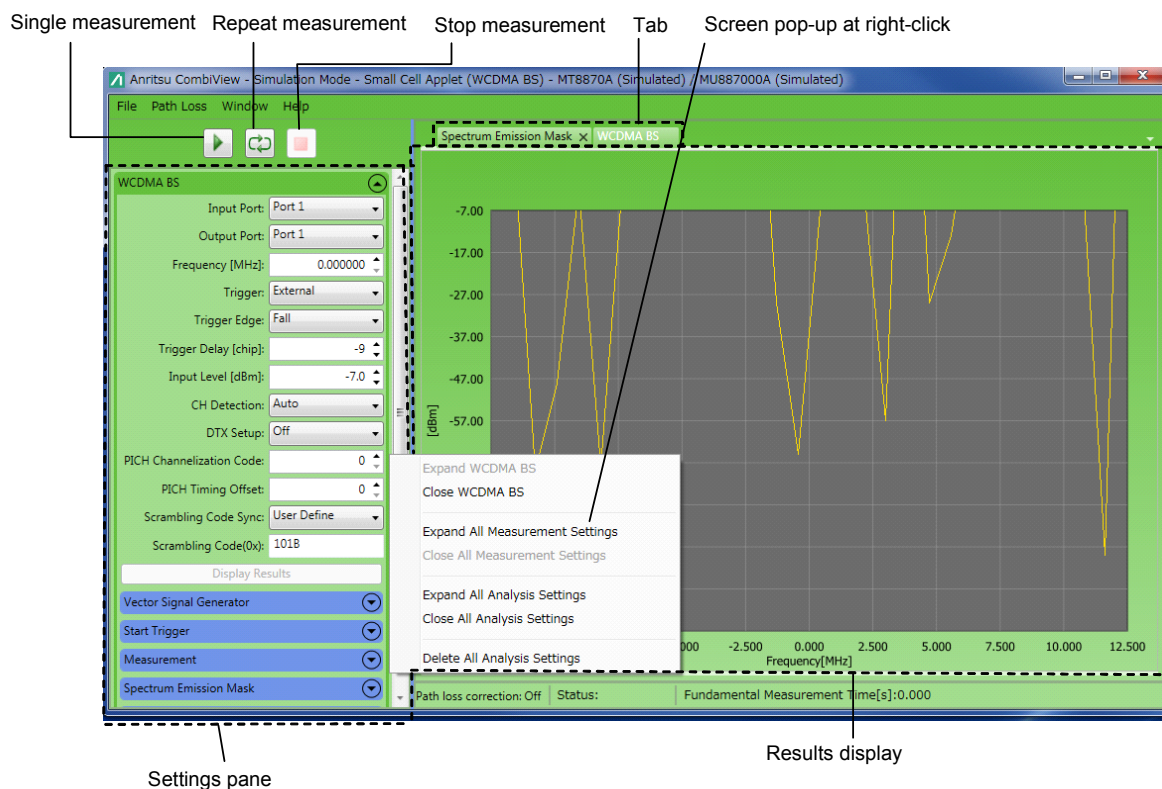


Figure 2.5-1 CombiView Manager Screen

Table 2.5-1 Menu of CombiView Manager Screen

Name	Description
Tools	
Update Connection Options	Opens the Instrument Connection Options dialog box to search for MT8870As again in the network.
MT8870A Utility tool	Starts the MX887900A Utility Tool
Help	
About	Displays information about hardware and applets

**Figure 2.5-2** CombiView Screen

The width of the Settings pane can be adjusted by dragging the vertical bar that separates the Settings pane from the results display area.

Table 2.5-2 Menus of CombiView Screen

Name	Description
File	
Load Settings	Loads the settings pane information from the file.
Save Settings	Saves the settings pane information to the file.
Save Settings As...	Saves the settings pane information to a file specifying the name.
Exit	Closes the CombiView screen
Path Loss	
Configure Correction...	Sets a correction value for power loss of each port.
Apply Correction	Applies 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 information about MX880055A

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.

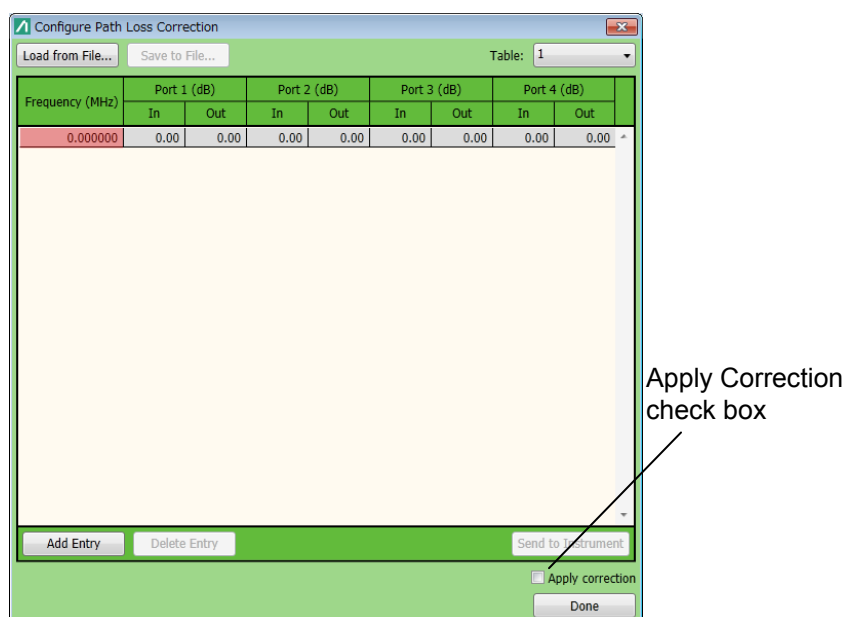


Figure 2.5-3 Configure Path Loss Correction Window

Table 2.5-3 Configure Path Loss Correction Menu

Name	Description
Load from File...	Loads settings from a Path Loss parameter file to the table.
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 **Apply Correction** check box 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.

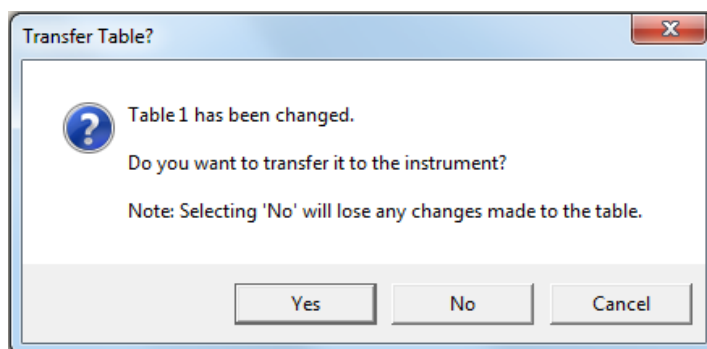


Figure 2.5-4 Transfer Table? Message

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 MX880055A, 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).

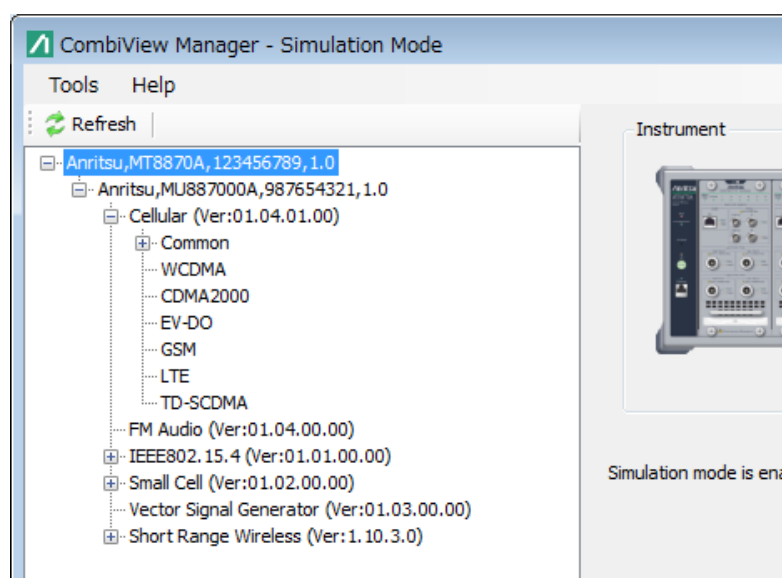




Figure 3.1.1-1 Tree View

1. Click the  button to open the Small Cell tree view to set the MX880055A 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.

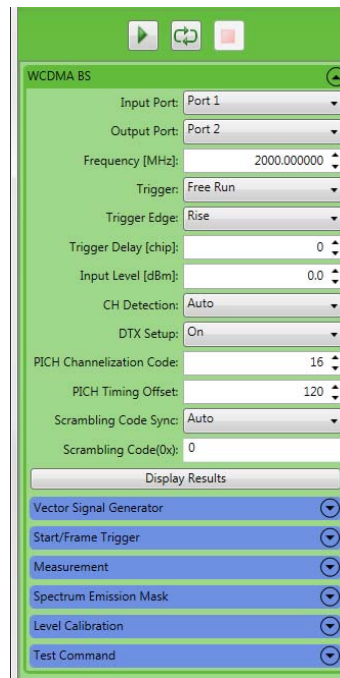


Figure 3.1.2-1 Measurement Settings Pane

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
Start Trigger	Sets the trigger that controls the uplink signal output from the MU887000A's VSG.
Level Calibration	Executes MU887000A calibration with the calibration type 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 on 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 the following command.

W-CDMA: MSTAT?, :STATus:ERRor?

LTE FDD DL: :STATus:ERRor?

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



MX887021A W-CDMA/HSPA Downlink TX Measurement Operation Manual

MX887023A LTE FDD Downlink TX Measurement Operation Manual

Measurement results display

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

Graph display

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 MX880055A 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.

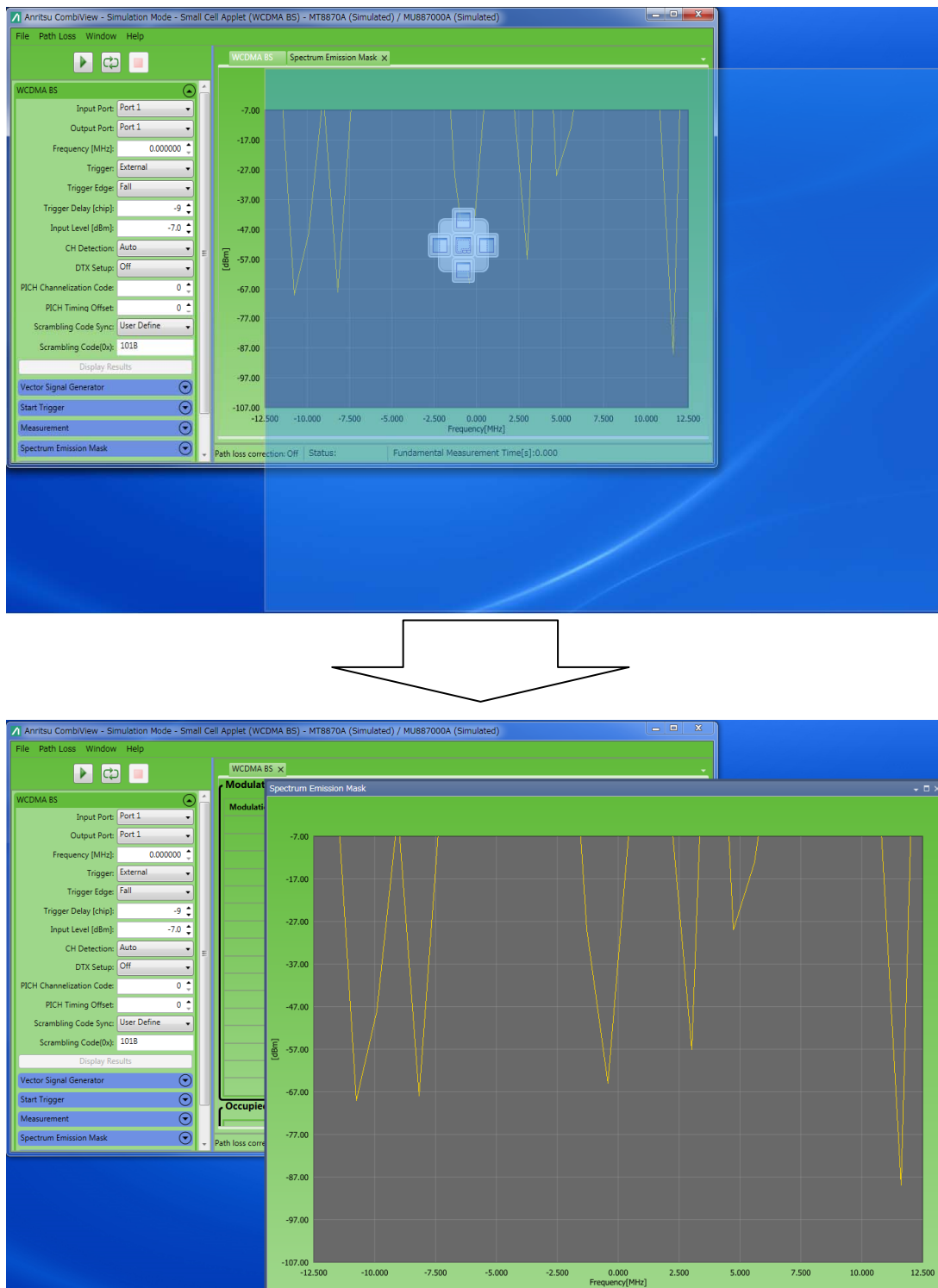


Figure 3.1.2-2 Floating Window

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.

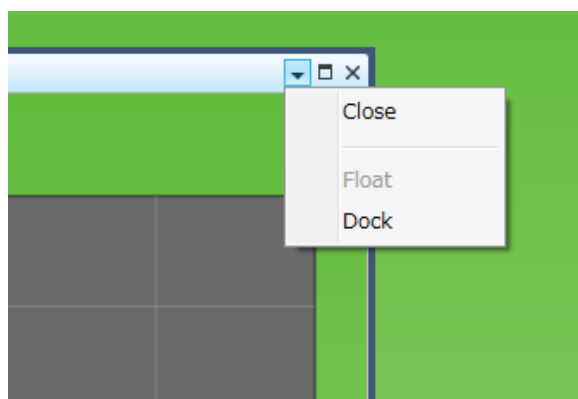


Figure 3.1.2-3 Floating Window Pull-Down Menu

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.

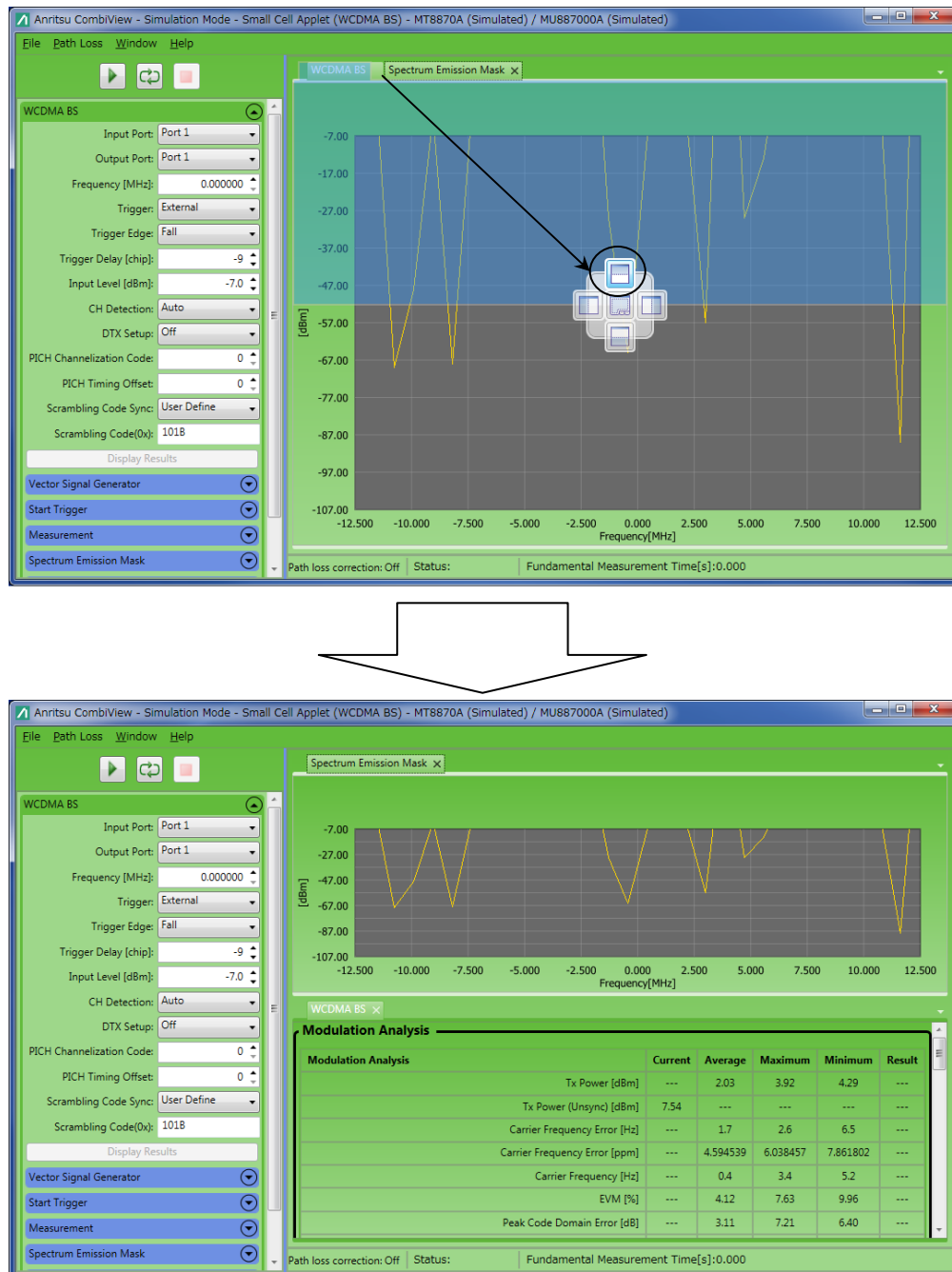


Figure 3.1.2-4 Example of Split Window

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

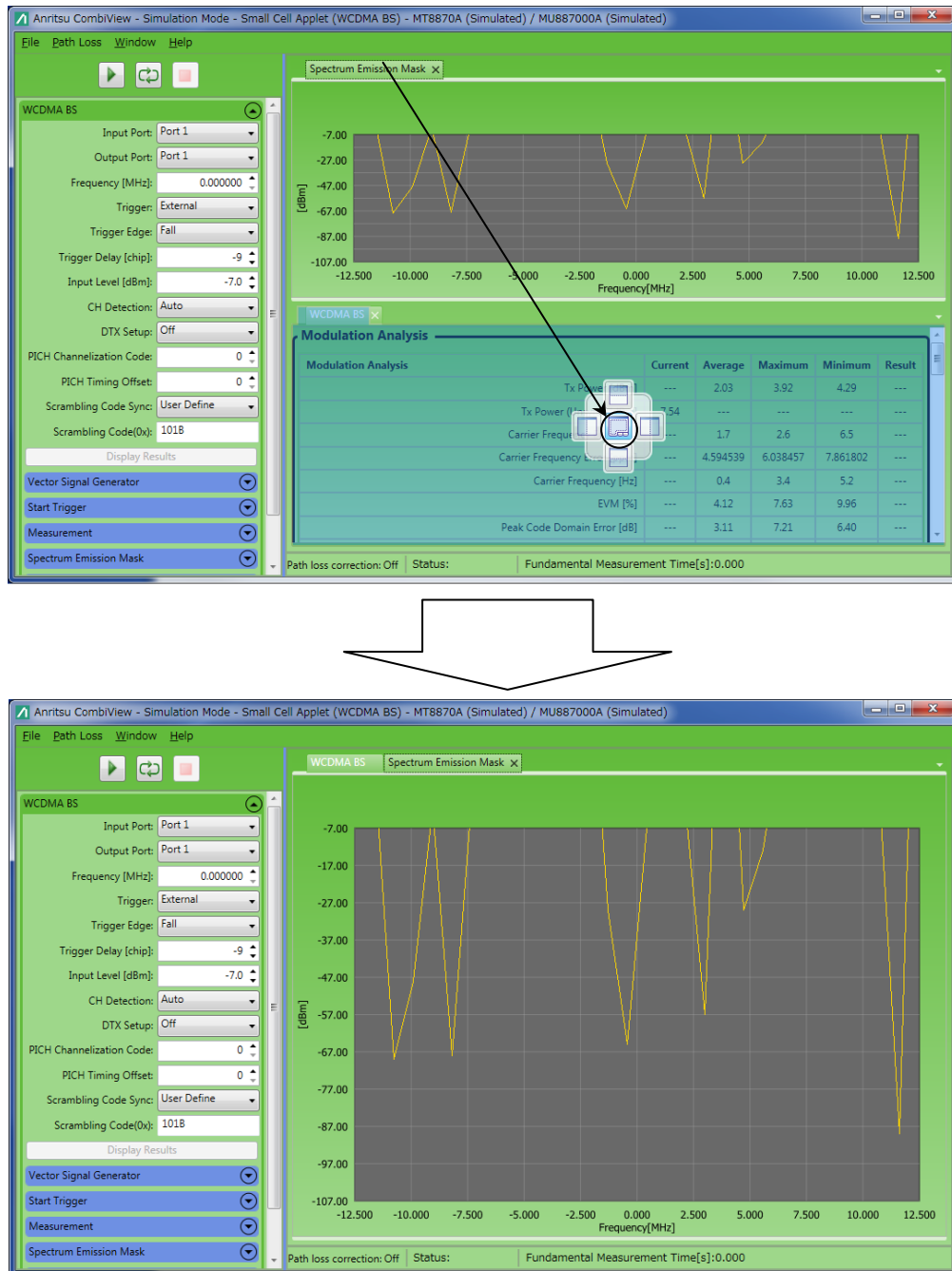


Figure 3.1.2-5 Cancel Window Split

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

An error message appears when an invalid parameter value is entered.

For the details of the error message, refer to the description of “:SYSTem:ERRor” 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: | <ul style="list-style-type: none">• 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 “:SYSTem:ERRor?” command in the MU887000A TRX Test Module Operation Manual.• Do not switch the language mode of remote control commands. If the language mode is switched, a command error occurs in subsequent applet operations. |
|---------------|---|

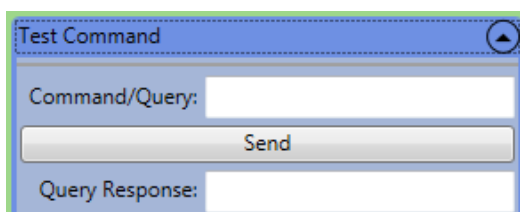


Figure 3.1.3-1 Test Command Dialog

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 (Uplink) 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.

10. Click the **Set pattern** button to set the selected waveform pattern to the VSG.

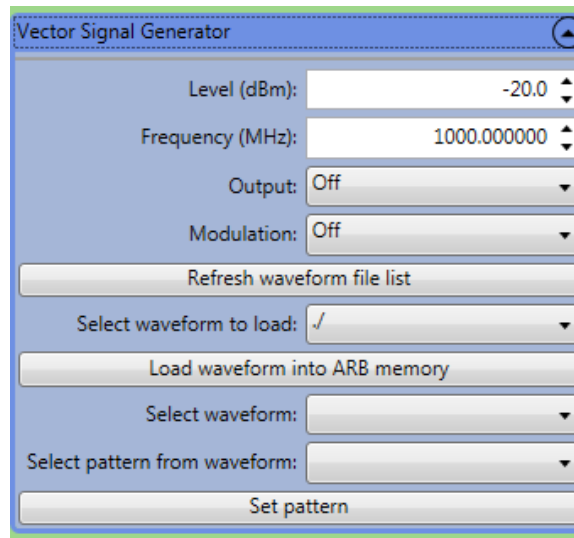


Figure 3.1.4-1 Vector Signal Generator Setting

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” in *the MU887000A Transmitter and Receiver Module Operation Manual*.

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

Select waveform, Select pattern from waveform

3.2 WCDMA

Refer to Chapter 2 “Fundamental Measurement” in the *MX887021A W-CDMA/HSPA Downlink TX Measurement Operation Manual* for a description of the W-CDMA/HSPA Downlink TX Measurement parameters. This section describes the WCDMA settings and displays.

3.2.1 Measurement settings

The WCDMA setting pane is shown below. Click the ▲ and ▼ buttons to change the parameters.

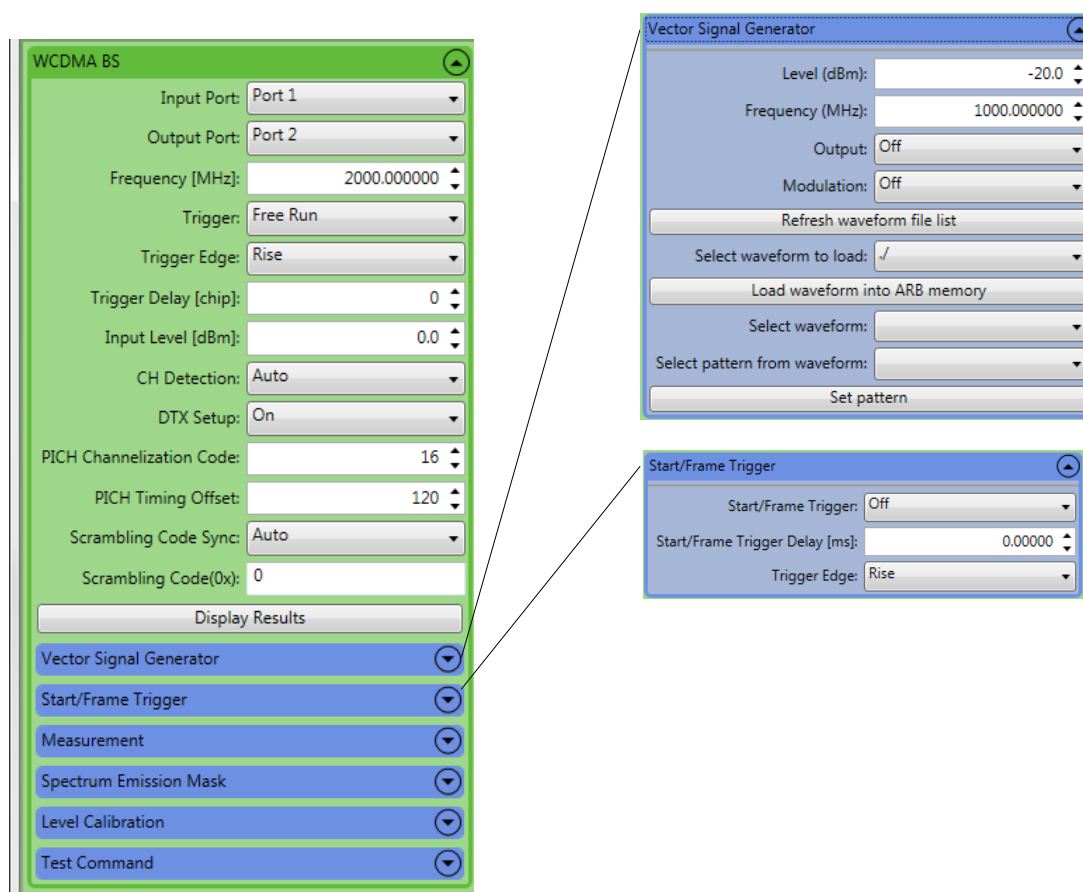


Figure 3.2.1-1 WCDMA Measurement Settings Pane (1/2)

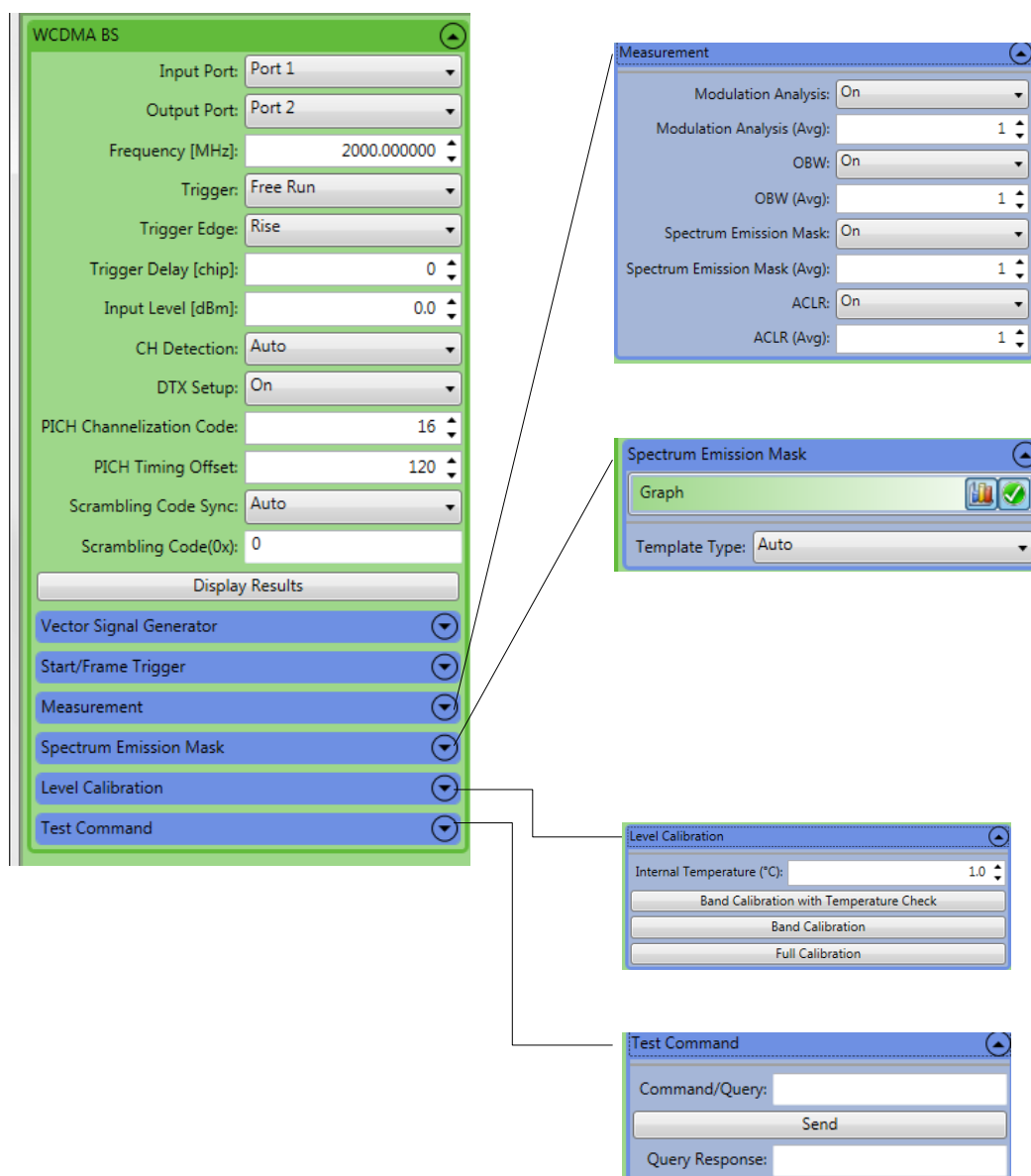





Figure 3.2.1-2 WCDMA Measurement Settings Pane (2/2)

3.2.2 Measurement and results

To perform measurement:

1. Set the parameters for all buttons from **Input Port** to **Scrambling Code(0x)**.
2. Click the **Measurement** button to open the dialog and set the parameters.
3. Click the **Spectrum Emission Mask** button to open the dialog and set the Template of the Spectrum Emission Mask measurement.
4. Set a checkmark in the  checkboxes in each dialog for **Spectrum Emission Mask** to open the graph displays.
5. Click the **Display Results** button to display the **WCDMA BS** tab.
6. Click the  Measurement Start button
7. The numerical data are displayed in the **WCDMA BS** tab when measurement is completed.
8. Click the  button in the **Spectrum Emission Mask** dialogs to open the graph displays.

Expand **Start Trigger**, and you can set the Trigger-related parameters.

Expand **Level Calibration**, and you will find a set of Calibration-related buttons.



Figure 3.2.2-1 W-CDMA (Spectrum Emission Mask) Graph

3.2.3 Related SCPI Commands

The Native commands for remote control of the MX887021A W-CDMA/HSPA Downlink 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 MX887021A W-CDMA/HSPA Downlink TX Measurement Operation Manual* and Chapter 5 “SCPI Command Reference” in *the MU887000A TRX Test Module Operation Manual*.

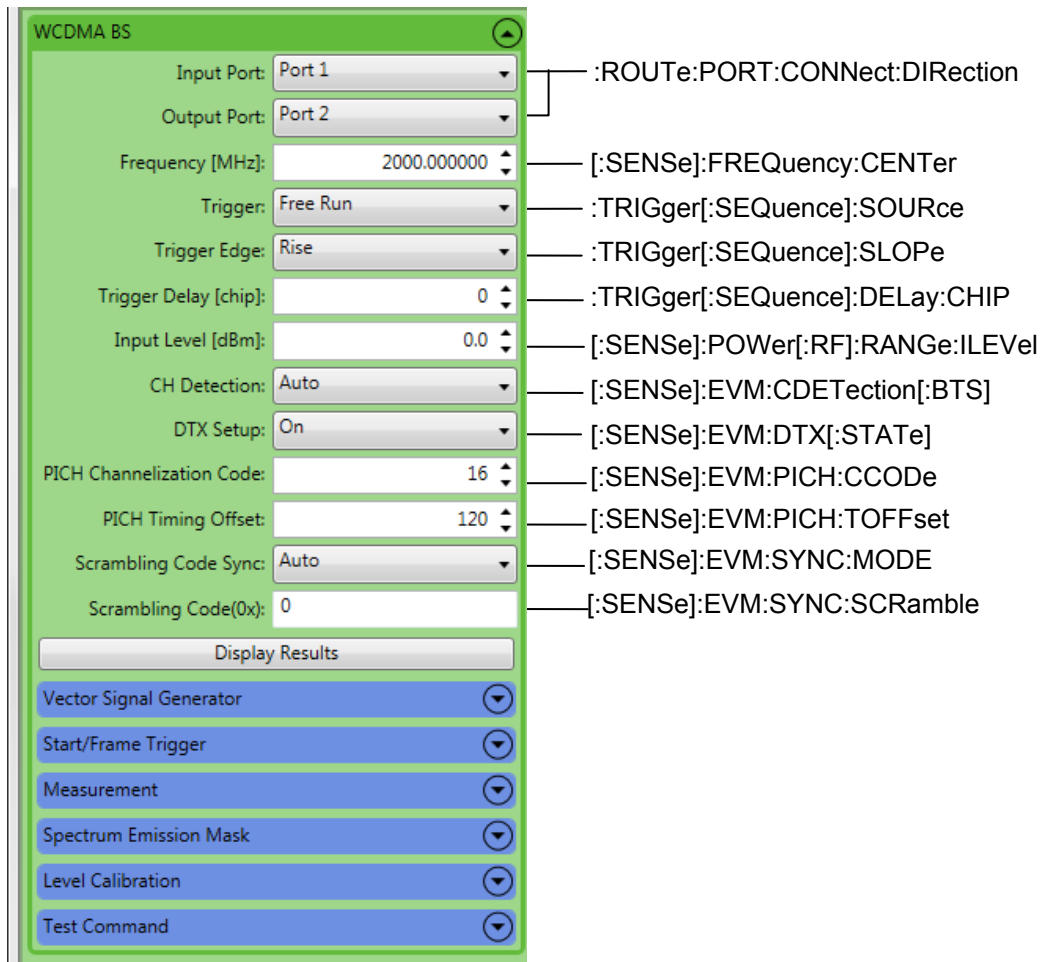


Figure 3.2.3-1 Measurement Settings Pane

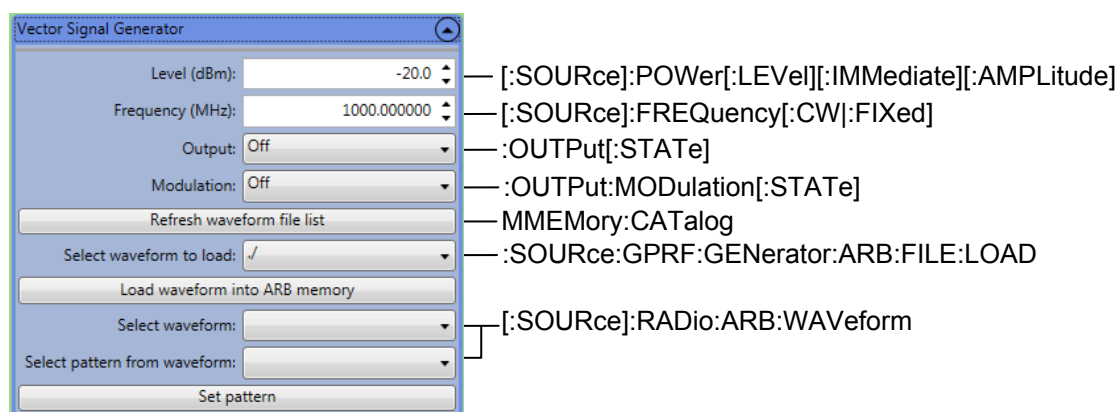


Figure 3.2.3-2 Measurement Settings Pane (Vector Signal Generator)

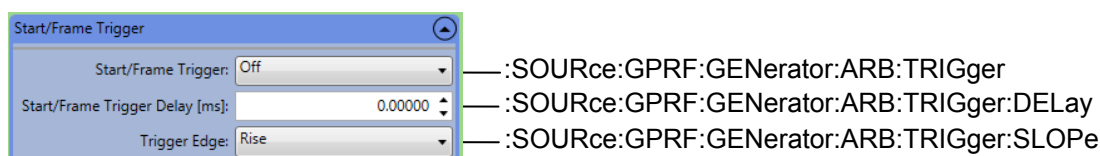


Figure 3.2.3-3 Measurement Settings Pane (Start Trigger)

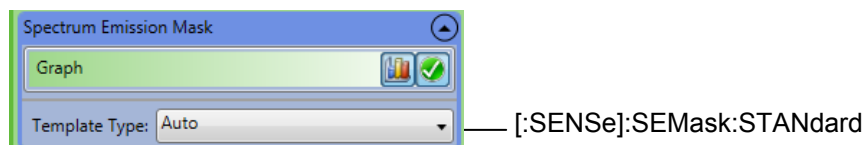


Figure 3.2.3-4 Measurement Settings Pane (Spectrum Emission Mask)

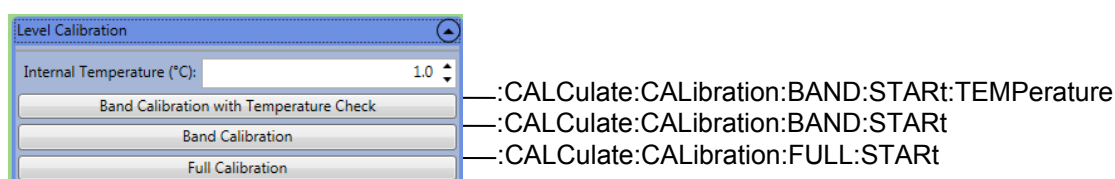


Figure 3.2.3-5 Measurement Settings Pane (Level Calibration)

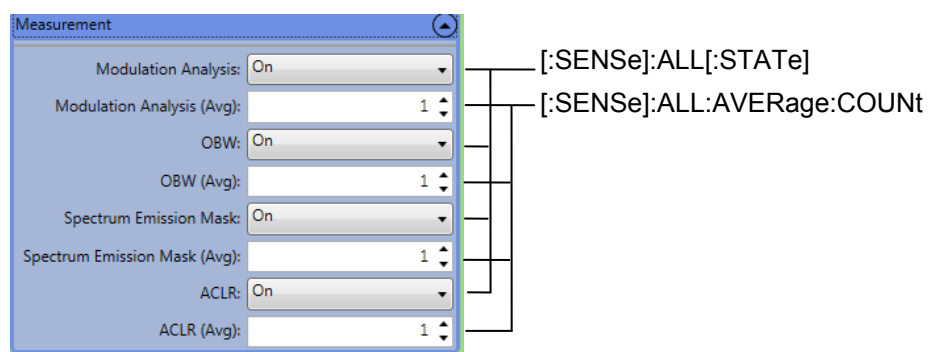


Figure 3.2.3-6 Measurement Settings Pane (Measurement)

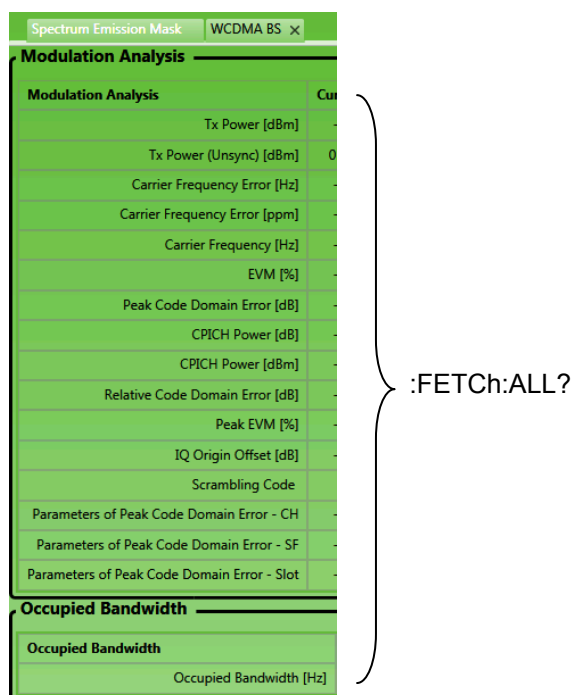


Figure 3.2.3-7 Modulation Analysis, Occupied Bandwidth Results

Spectrum Emission Mask	
Spectrum Emission Mask	
Judgment	
Range E (-range) [dBm]	
Range E (-range) [dB]	
Range D (-range) [dBm]	
Range D (-range) [dB]	
Range C (-range) [dBm]	
Range C (-range) [dB]	
Range B (-range) [dBm]	
Range B (-range) [dB]	
Range A (-range) [dBm]	
Range A (-range) [dB]	
Range A (+range) [dBm]	
Range A (+range) [dB]	
Range B (+range) [dBm]	
Range B (+range) [dB]	
Range C (+range) [dBm]	
Range C (+range) [dB]	
Range D (+range) [dBm]	
Range D (+range) [dB]	
Range E (+range) [dBm]	
Range E (+range) [dB]	

ACLR	
ACLR	
-10 MHz [dB]	
-5 MHz [dB]	
5 MHz [dB]	
10 MHz [dB]	

:FETCh:ALL?

Figure 3.2.3-8 Spectrum Emission Mask, ACLR Results

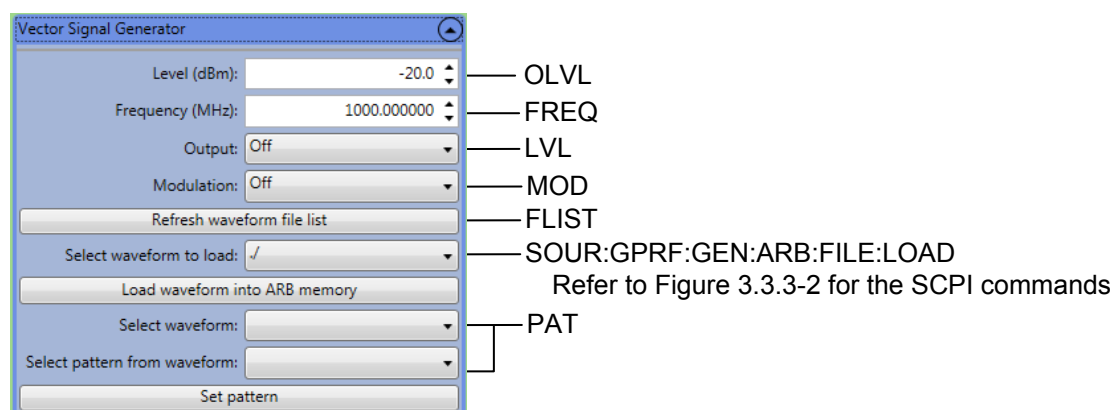
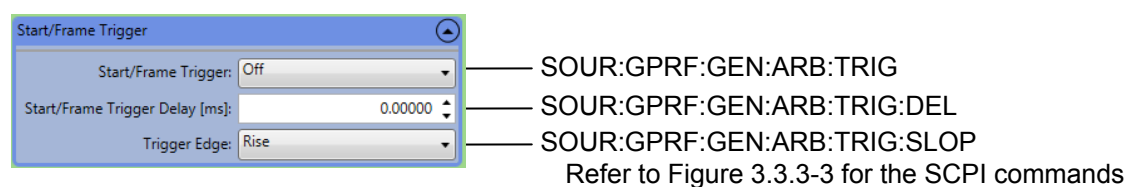
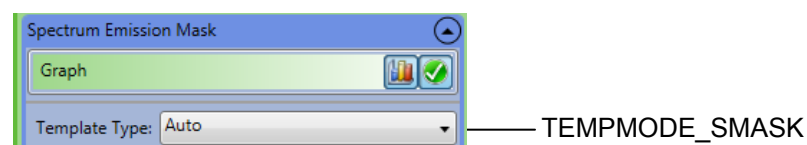
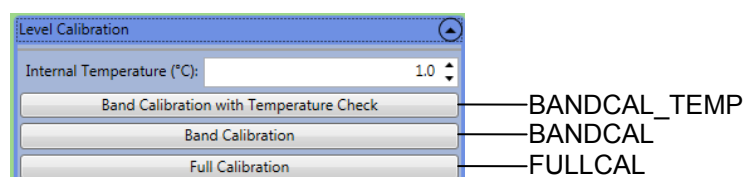
3.2.4 Related Native Commands

The Native commands for remote control of the MX887021A W-CDMA/HSPA Downlink 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 MX887021A W-CDMA/HSPA Downlink TX Measurement Operation Manual* and Chapter 5 “SCPI Command Reference” in *the MU887000A TRX Test Module Operation Manual*.

WCDMA BS

Input Port:	Port 1	PORT
Output Port:	Port 2	
Frequency [MHz]:	2000.000000	FREQ
Trigger:	Free Run	TRG
Trigger Edge:	Rise	TRGEDGE
Trigger Delay [chip]:	0	TRGDLY
Input Level [dBm]:	0.0	INPUTLVL
CH Detection:	Auto	CHDET
DTX Setup:	On	DTXSETUP_MOD
PICH Channelization Code:	16	PICHNO_MOD
PICH Timing Offset:	120	PICHTIMINGOFS_MOD
Scrambling Code Sync:	Auto	SCRSYNC
Scrambling Code(0x):	0	SCRCODE
Display Results		
Vector Signal Generator		
Start/Frame Trigger		
Measurement		
Spectrum Emission Mask		
Level Calibration		
Test Command		

Figure 3.2.4-1 Measurement Settings Pane

**Figure 3.2.4-2** Measurement Settings Pane (Vector Signal Generator)**Figure 3.2.4-3** Measurement Settings Pane (Start Trigger)**Figure 3.2.4-4** Measurement Settings Pane (Spectrum Emission Mask)**Figure 3.2.4-5** Measurement Settings Pane (Level Calibration)

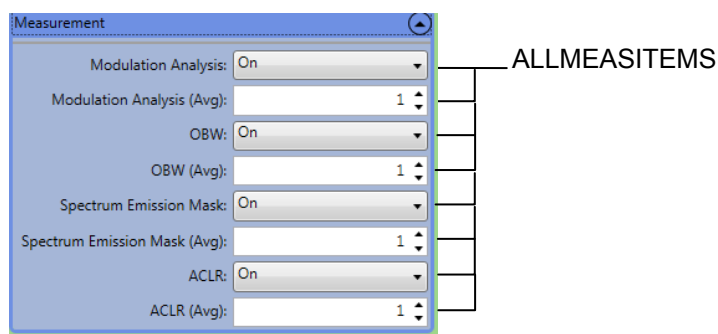


Figure 3.2.4-6 Measurement Settings Pane (Measurement)

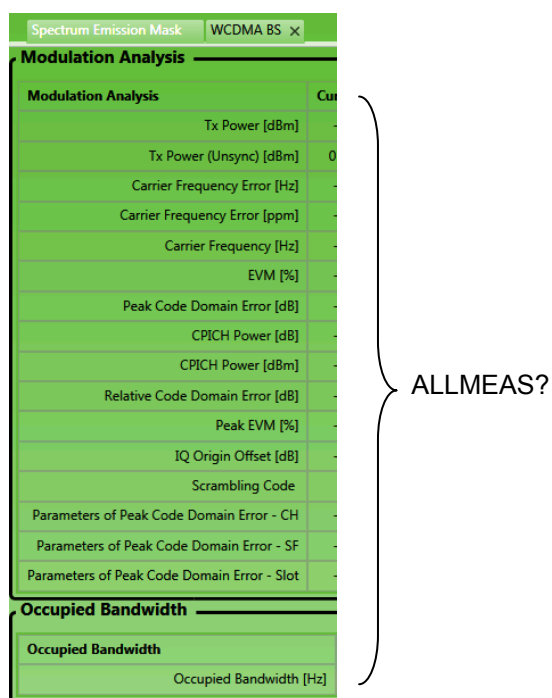


Figure 3.2.4-7 Modulation Analysis, Occupied Bandwidth Results

Spectrum Emission Mask	
Spectrum Emission Mask	
	Judgment
	Range E (-range) [dBm]
	Range E (-range) [dB]
	Range D (-range) [dBm]
	Range D (-range) [dB]
	Range C (-range) [dBm]
	Range C (-range) [dB]
	Range B (-range) [dBm]
	Range B (-range) [dB]
	Range A (-range) [dBm]
	Range A (-range) [dB]
	Range A (+range) [dBm]
	Range A (+range) [dB]
	Range B (+range) [dBm]
	Range B (+range) [dB]
	Range C (+range) [dBm]
	Range C (+range) [dB]
	Range D (+range) [dBm]
	Range D (+range) [dB]
	Range E (+range) [dBm]
	Range E (+range) [dB]

ACLR	
ACLR	
	-10 MHz [dB]
	-5 MHz [dB]
	5 MHz [dB]
	10 MHz [dB]

ALLMEAS?

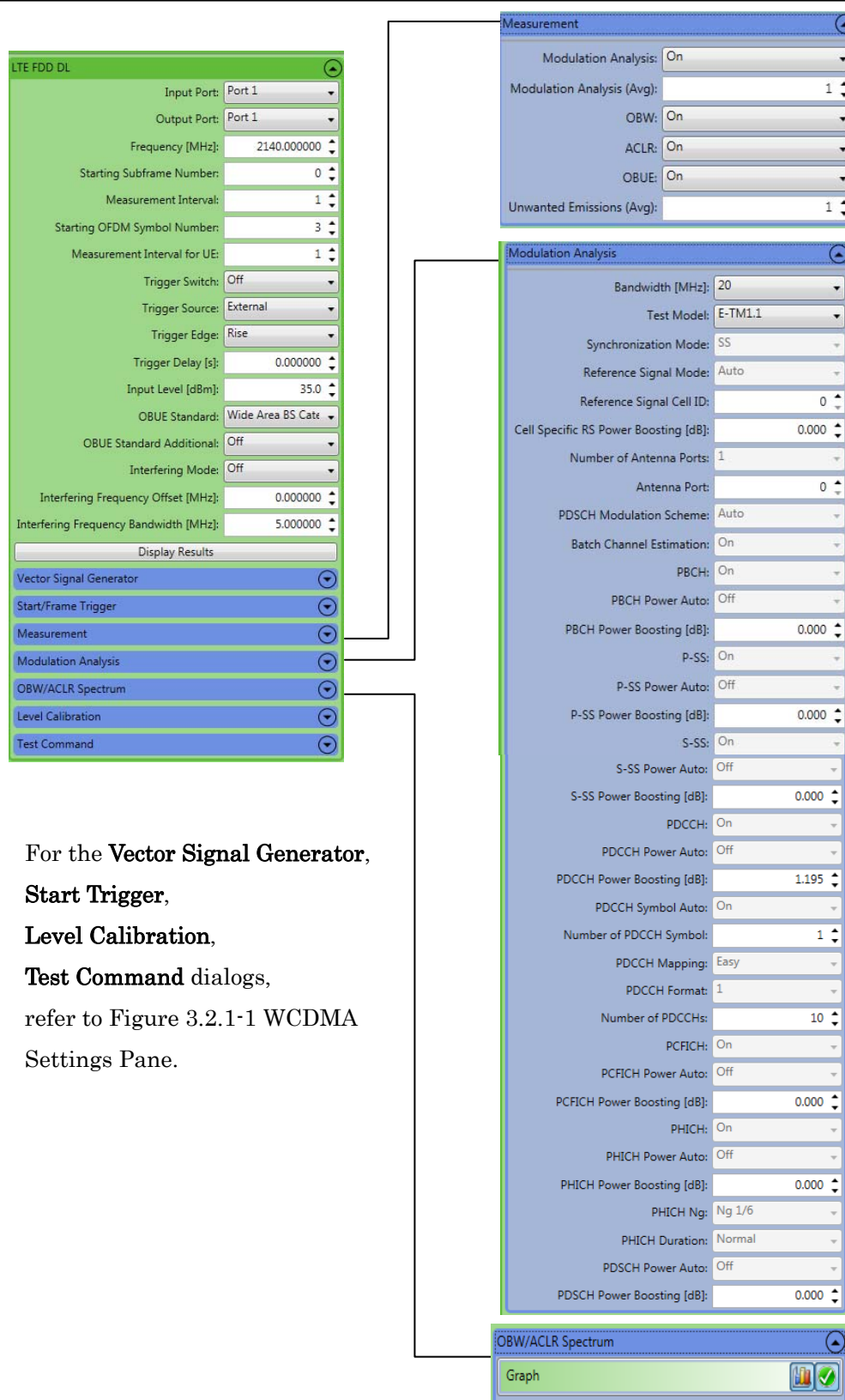
Figure 3.2.4-8 Spectrum Emission Mask, ACLR Results

3.3 LTE FDD DL

Refer to Chapter 2 “Fundamental Measurement” in *the MX887023A LTE FDD Downlink TX Measurement Operation Manual* for a description of LTE FDD Downlink TX Measurement items. This section describes the LTE measurements and displays.

3.3.1 Measurement settings




The LTE settings pane is shown below. Click the ▲ and ▼ buttons to change the parameters.



For the **Vector Signal Generator**,
Start Trigger,
Level Calibration,
Test Command dialogs,
refer to Figure 3.2.1-1 WCDMA
Settings Pane.

Figure 3.3.1-1 LTE Measurement Settings Pane

3.3.2 Measurement and results

1. Set the parameters for all buttons from **Input Port** to **Interfering Frequency Bandwidth**.
2. Click the **Measurement** button to open the dialog and set the parameters.
3. Click **Modulation Analysis** to open the window and set the each parameter.
4. Set a checkmark in the  checkboxes in each dialog for **OBW/ACLR Spectrum** to open the graph displays.
5. Click the **Display Results** button to display the **LTE FDD DL** tab.
6. Click the  **Measurement Start** button
7. The numerical data are displayed in the **LTE FDD DL** tab after measurement is completed.
8. Click the  button in the **OBW/ACLR Spectrum** dialogs to open the graph displays.

Expand **Start Trigger**, and you can set the Trigger-related parameters.

Expand **Level Calibration**, and you will find a set of Calibration-related buttons.

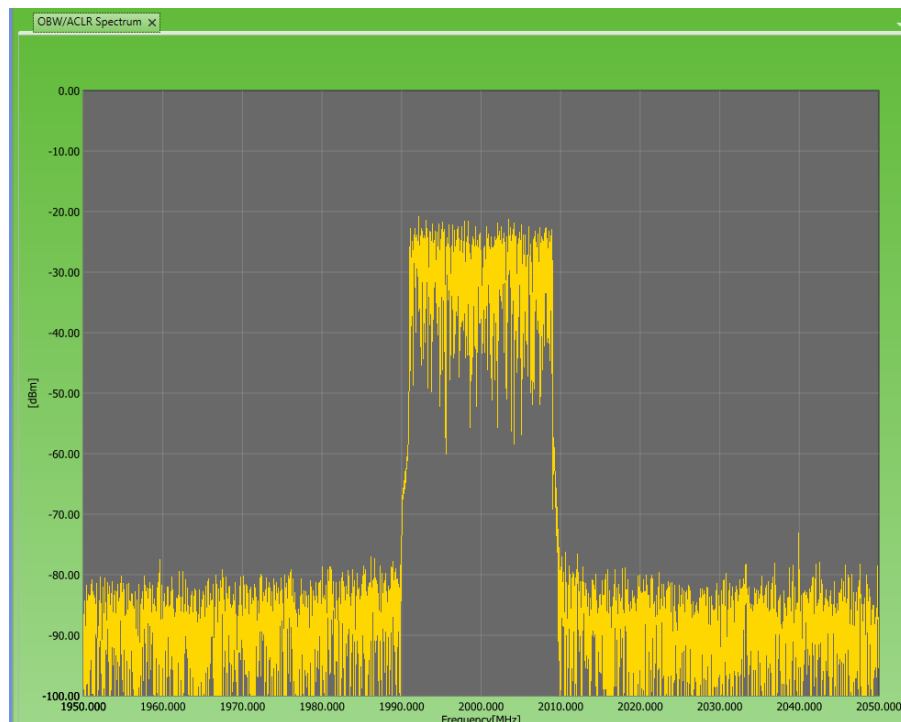


Figure 3.3.2-1 LTE (OBW/ACLR Spectrum) Graph

3.3.3 Related SCPI Commands

The SCPI commands for remote control of the MX887023A LTE FDD Downlink 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 MX887023A LTE FDD Downlink TX Measurement Operation Manual* and Chapter 5 “SCPI Command Reference” in *the MU887000A TRX Test Module Operation Manual*.

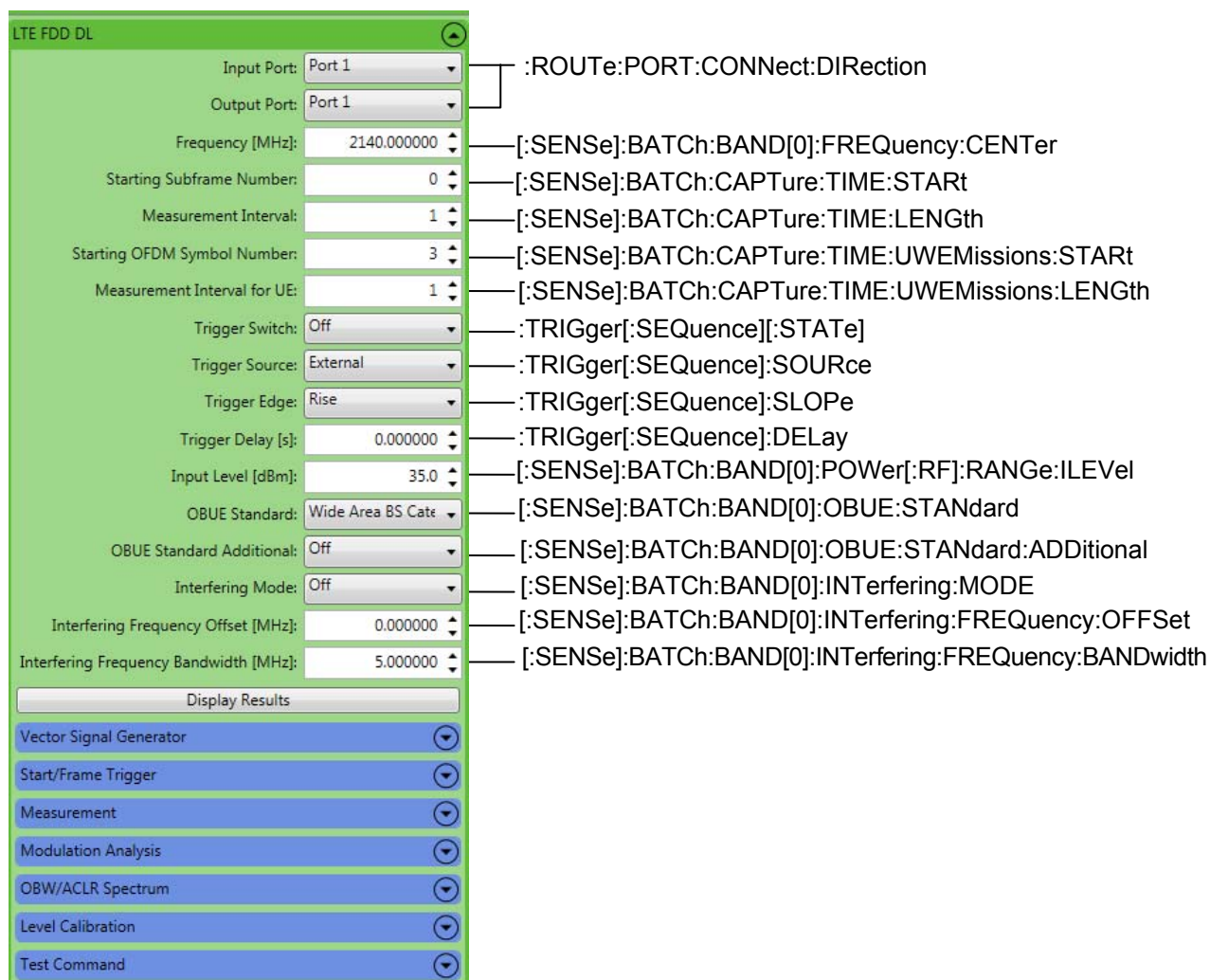


Figure 3.3.3-1 Measurement Settings Pane

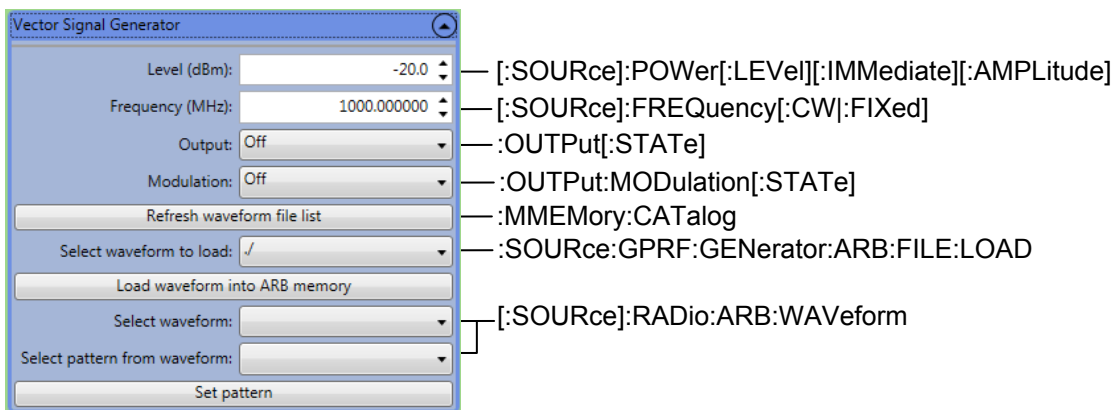


Figure 3.3.3-2 Measurement Settings Pane (Vector Signal Generator)

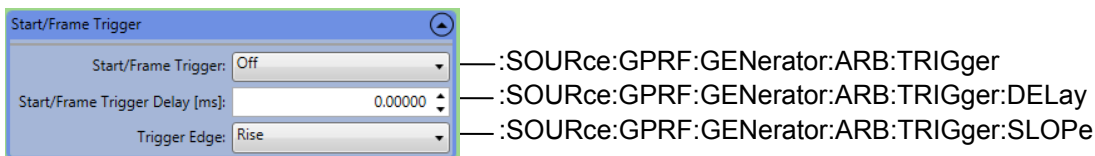


Figure 3.3.3-3 Measurement Settings Pane (Start Trigger)

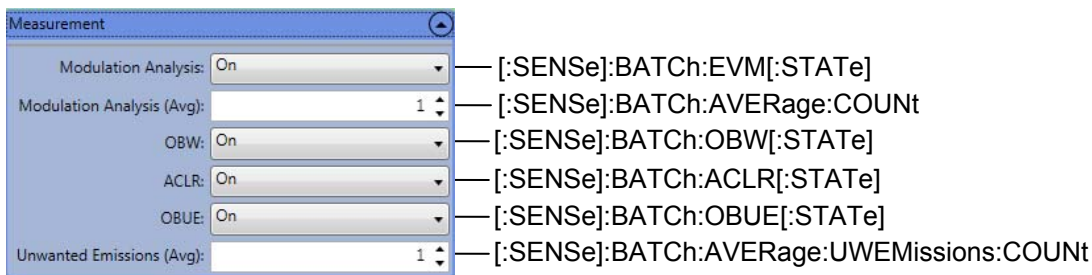


Figure 3.3.3-4 Measurement Settings Pane (Measurement)

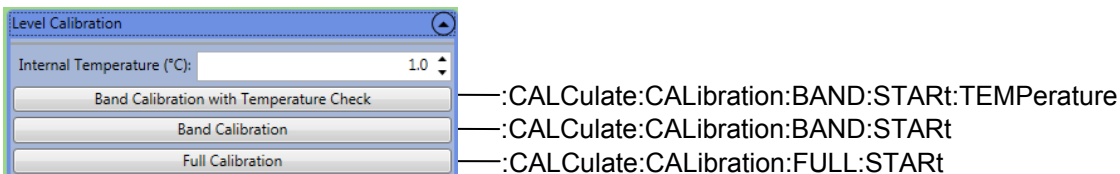


Figure 3.3.3-5 Measurement Settings Pane (Level Calibration)

Modulation Analysis	
Bandwidth [MHz]:	20 — [:SENSe]:BATCh:CC[0]:RADio:CBANdwidth
Test Model:	E-TM1.1 — [:SENSe]:BATCh:CC[0]:RADio:TMODeI
Synchronization Mode:	SS — [:SENSe]:BATCh:CC[0]:RADio:SYNChronization:MODE
Reference Signal Mode:	Auto — :CALCulate:BATCh:CC[0]:RSIGnal:MODE
Reference Signal Cell ID:	0 — :CALCulate:BATCh:CC[0]:RSIGnal:CELLId
Cell Specific RS Power Boosting [dB]:	0.000 — :CALCulate:BATCh:CC[0]:RSIGnal:POWer:BOOSTing
Number of Antenna Ports:	1 — :CALCulate:BATCh:CC[0]:ANTenna:NUMBer
Antenna Port:	0 — :CALCulate:BATCh:CC[0]:APORt
PDSCH Modulation Scheme:	Auto — :CALCulate:BATCh:CC[0]:PDSCh:MODulation
Batch Channel Estimation:	On — :CALCulate:BATCh:CC[0]:CHANnel:ESTimation
PBCH:	On — :CALCulate:BATCh:CC[0]:PBCH[:STATe]
PBCH Power Auto:	Off — :CALCulate:BATCh:CC[0]:PBCH:POWer:AUTO
PBCH Power Boosting [dB]:	0.000 — :CALCulate:BATCh:CC[0]:PBCH:POWer:BOOSTing
P-SS:	On — :CALCulate:BATCh:CC[0]:PSS[:STATe]
P-SS Power Auto:	Off — :CALCulate:BATCh:CC[0]:PSS:POWer:AUTO
P-SS Power Boosting [dB]:	0.000 — :CALCulate:BATCh:CC[0]:PSS:POWer:BOOSTing
S-SS:	On — :CALCulate:BATCh:CC[0]:SSS[:STATe]
S-SS Power Auto:	Off — :CALCulate:BATCh:CC[0]:SSS:POWer:AUTO
S-SS Power Boosting [dB]:	0.000 — :CALCulate:BATCh:CC[0]:SSS:POWer:BOOSTing
PDCCH:	On — :CALCulate:BATCh:CC[0]:PDCCh[:STATe]
PDCCH Power Auto:	Off — :CALCulate:BATCh:CC[0]:PDCCh:POWer:AUTO
PDCCH Power Boosting [dB]:	1.195 — :CALCulate:BATCh:CC[0]:PDCCh:POWer:BOOSTing
PDCCH Symbol Auto:	On — :CALCulate:BATCh:CC[0]:PDCCh:SYMBol:AUTO
Number of PDCCH Symbol:	1 — :CALCulate:BATCh:CC[0]:PDCCh:SYMBol:NUMBer
PDCCH Mapping:	Easy — :CALCulate:BATCh:CC[0]:PDCCh:MAPPing
PDCCH Format:	1 — :CALCulate:BATCh:CC[0]:PDCCh:MAPPing:EASY:FORMat
Number of PDCCHs:	10 — :CALCulate:BATCh:CC[0]:PDCCh:MAPPing:EASY:NUMBer
PCFICH:	On — :CALCulate:BATCh:CC[0]:PCFich[:STATe]
PCFICH Power Auto:	Off — :CALCulate:BATCh:CC[0]:PCFich:POWer:AUTO
PCFICH Power Boosting [dB]:	0.000 — :CALCulate:BATCh:CC[0]:PCFich:POWer:BOOSTing
PHICH:	On — :CALCulate:BATCh:CC[0]:PHIch[:STATe]
PHICH Power Auto:	Off — :CALCulate:BATCh:CC[0]:PHIch:POWer:AUTO
PHICH Power Boosting [dB]:	0.000 — :CALCulate:BATCh:CC[0]:PHIch:POWer:BOOSTing
PHICH Ng:	Ng 1/6 — :CALCulate:BATCh:CC[0]:PHIch:NG
PHICH Duration:	Normal — :CALCulate:BATCh:CC[0]:PHIch:DURation
PDSCH Power Auto:	Off — :CALCulate:BATCh:CC[0]:PDSCh:POWer:AUTO
PDSCH Power Boosting [dB]:	0.000 — :CALCulate:BATCh:CC[0]:PDSCh:POWer:BOOSTing

Figure 3.3.3-6 Measurement Settings Pane (Modulation Analysis)

OBW/ACLR Spectrum		LTE FDD DL	x
Modulation Analysis			
Modulation Analysis		Current	
Frequency Error [Hz]		---	:FETCh:BATCh[n]? (n=1)
Frequency Error [ppm]		---	
PDSCH EVM [%]		---	
PDSCH QPSK EVM [%]		---	
PDSCH 16QAM EVM [%]		---	
PDSCH 64QAM EVM [%]		---	
Tx Power [dBm]		---	
Tx Power (Unsync) [dBm]		999.99	
RS Power [dBm]		---	
OSTP Power [dBm]		---	
OBW			
OBW		---	:FETCh:BATCh[n]? (n=2)
OBW [MHz]		999	
ACLR			
ACLR		---	:FETCh:BATCh[n]? (n=2)
E-UTRA L2 [dB]		---	
E-UTRA L1 [dB]		---	
E-UTRA U1 [dB]		---	
E-UTRA U2 [dB]		---	
UTRA L2 [dB]		---	
UTRA L1 [dB]		---	
UTRA U1 [dB]		---	
UTRA U2 [dB]		---	

Figure 3.3.3-7 Modulation Analysis, Occupied Bandwidth, ACLR Results

OBUE	
OBUE	
Margin [dB]	:FETCh:BATCh[n]? (n=2)
Peak Absolute Level [dBm]	
Peak Frequency [MHz]	
OBUE Pass/Fail	
Range #0 Lower OBUE Margin (Normal) [dB]	:FETCh:BATCh[n]? (n=6)
Range #0 Lower OBUE Peak Absolute Level (Normal) [dBm]	
Range #0 Lower OBUE Peak Frequency (Normal) [MHz]	
Range #0 Lower OBUE Pass/Fail (Normal)	
Range #0 Upper OBUE Margin (Normal) [dB]	
Range #0 Upper OBUE Peak Absolute Level (Normal) [dBm]	
Range #0 Upper OBUE Peak Frequency (Normal) [MHz]	
Range #0 Upper OBUE Pass/Fail (Normal)	
Range #1 Lower OBUE Margin (Normal) [dB]	
Range #1 Lower OBUE Peak Absolute Level (Normal) [dBm]	
Range #1 Lower OBUE Peak Frequency (Normal) [MHz]	
Range #1 Lower OBUE Pass/Fail (Normal)	
Range #1 Upper OBUE Margin (Normal) [dB]	
Range #1 Upper OBUE Peak Absolute Level (Normal) [dBm]	
Range #1 Upper OBUE Peak Frequency (Normal) [MHz]	
Range #1 Upper OBUE Pass/Fail (Normal)	
Range #2 Lower OBUE Margin (Normal) [dB]	
Range #2 Lower OBUE Peak Absolute Level (Normal) [dBm]	
Range #2 Lower OBUE Peak Frequency (Normal) [MHz]	
Range #2 Lower OBUE Pass/Fail (Normal)	
Range #2 Upper OBUE Margin (Normal) [dB]	
Range #2 Upper OBUE Peak Absolute Level (Normal) [dBm]	
Range #2 Upper OBUE Peak Frequency (Normal) [MHz]	
Range #2 Upper OBUE Pass/Fail (Normal)	

Figure 3.3.3-8 OBUE Results (1/2)

Range #3 Lower OBUE Margin (Normal) [dB]	}	:FETCh:BATCh[n]? (n=6)
Range #3 Lower OBUE Peak Absolute Level (Normal) [dBm]		
Range #3 Lower OBUE Peak Frequency (Normal) [MHz]		
Range #3 Lower OBUE Pass/Fail (Normal)		
Range #3 Upper OBUE Margin (Normal) [dB]		
Range #3 Upper OBUE Peak Absolute Level (Normal) [dBm]		
Range #3 Upper OBUE Peak Frequency (Normal) [MHz]		
Range #3 Upper OBUE Pass/Fail (Normal)		
Range #4 Lower OBUE Margin (Normal) [dB]		
Range #4 Lower OBUE Peak Absolute Level (Normal) [dBm]		
Range #4 Lower OBUE Peak Frequency (Normal) [MHz]		
Range #4 Lower OBUE Pass/Fail (Normal)		
Range #4 Upper OBUE Margin (Normal) [dB]		
Range #4 Upper OBUE Peak Absolute Level (Normal) [dBm]		
Range #4 Upper OBUE Peak Frequency (Normal) [MHz]		
Range #4 Upper OBUE Pass/Fail (Normal)		
Range #5 Lower OBUE Margin (Normal) [dB]	}	:FETCh:BATCh[n]? (n=7)
Range #5 Lower OBUE Peak Absolute Level (Normal) [dBm]		
Range #5 Lower OBUE Peak Frequency (Normal) [MHz]		
Range #5 Lower OBUE Pass/Fail (Normal)		
Range #5 Upper OBUE Margin (Normal) [dB]		
Range #5 Upper OBUE Peak Absolute Level (Normal) [dBm]		
Range #5 Upper OBUE Peak Frequency (Normal) [MHz]		
Range #5 Upper OBUE Pass/Fail (Normal)		
Lower OBUE Margin (Additional) [dB]		
Lower OBUE Peak Absolute Level (Additional) [dBm]		
Lower OBUE Peak Frequency (Additional) [MHz]		
Lower OBUE Pass/Fail (Additional)		
Upper OBUE Margin (Additional) [dB]		
Upper OBUE Peak Absolute Level (Additional) [dBm]		
Upper OBUE Peak Frequency (Additional) [MHz]		
Upper OBUE Pass/Fail (Additional)		

Figure 3.3.3-9 OBUE Results (2/2)