

CombiView

MX880051A

**Cellular Application Applet
Operation Manual**

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

Symbols used in manual



DANGER

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



WARNING

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



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

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



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



These indicate that the marked part should be recycled.

MX880051A
Cellular Application Applet
Operation Manual

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Revision History:

February 29th, 2020

December 17th, 2021

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 flash drive 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 flash drive and CF memory card).

- Connecting to network

Connect your computer to the network that provides adequate protection against computer viruses.

- Protection against malware (malicious software such as viruses).

To connect your computer to network, the following is advised.

- Activate Firewall.
- Install important updates of Windows.
- Use antivirus software.

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.

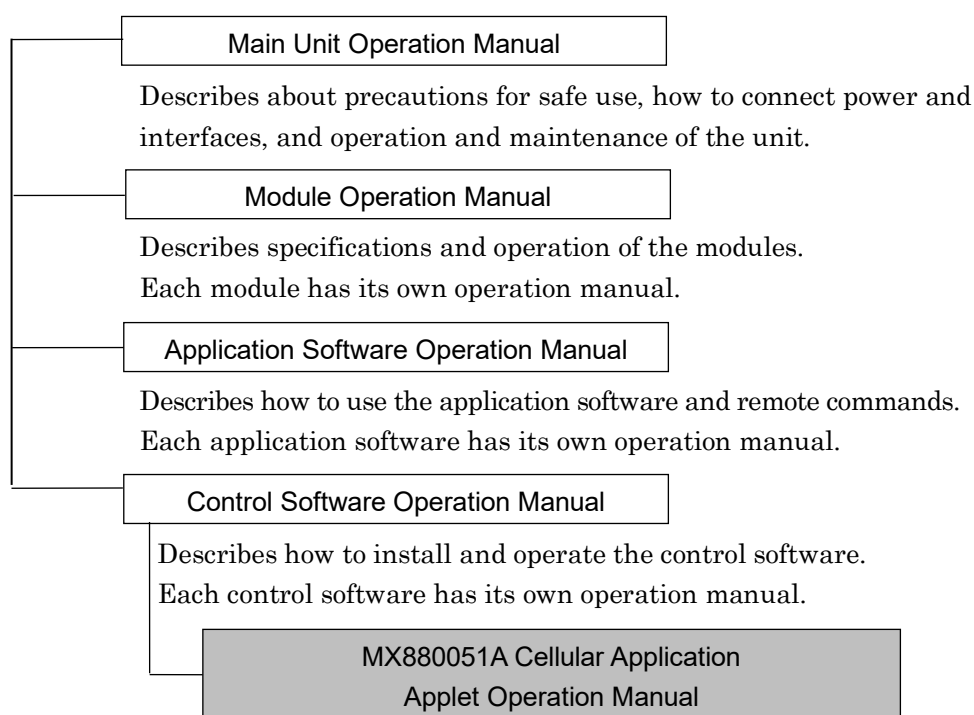
About This Manual

This manual mainly describes the operation of the MX880051A Cellular 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 the MT8870A
- Control software installed in a PC to control the MT8870A remotely

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



Convention Used in This Manual

Except where there is a good reason to do otherwise, this manual assumes the use of MT8870A and MU887000A.

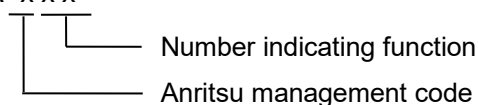
Note that the descriptions in this manual also apply to MT8872A, MU887001A, or MU887002A.

MU887000A/01A means the MU887000A or MU887001A.

Additionally, the Anritsu management code of the options described in this manual is “0” unless there is a reason.

The option number: The option number is indicated by three digits.

MU88700XA- x x x



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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.

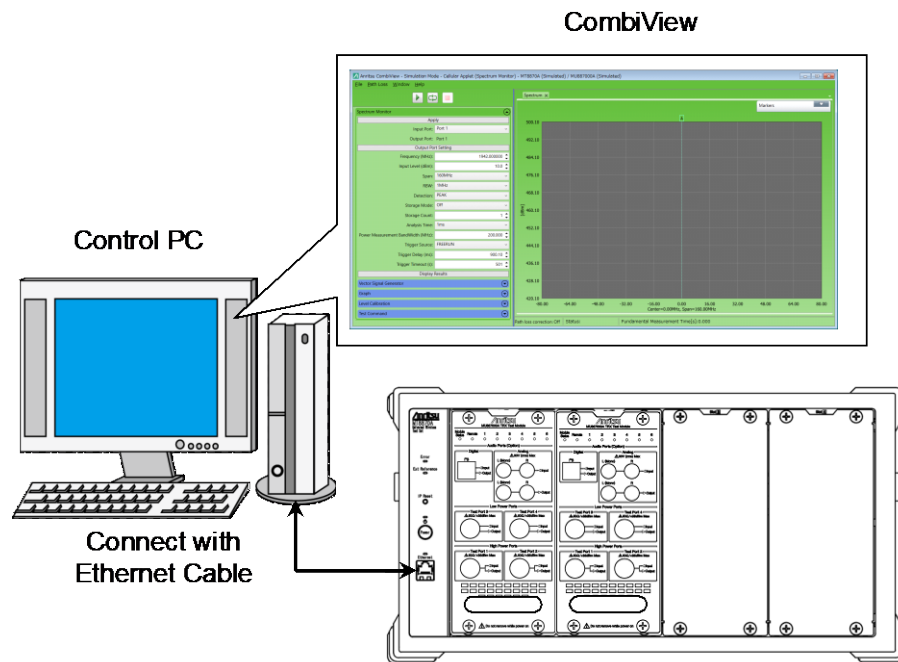


Figure 1.1-1 Ethernet Connection between Control PC and MT8870A

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 10 OS environments.
- Supports remote control over Ethernet (IPv4) and GPIB.
Note: MU887002A does not support 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
MX880057A	Z-Wave Application Applet

Note: MU887002A does not support MX880053A.

The MX880051A Cellular Application Applet (hereafter MX880051A) adds measurements based on cellular phone standards to CombiView.

The 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.

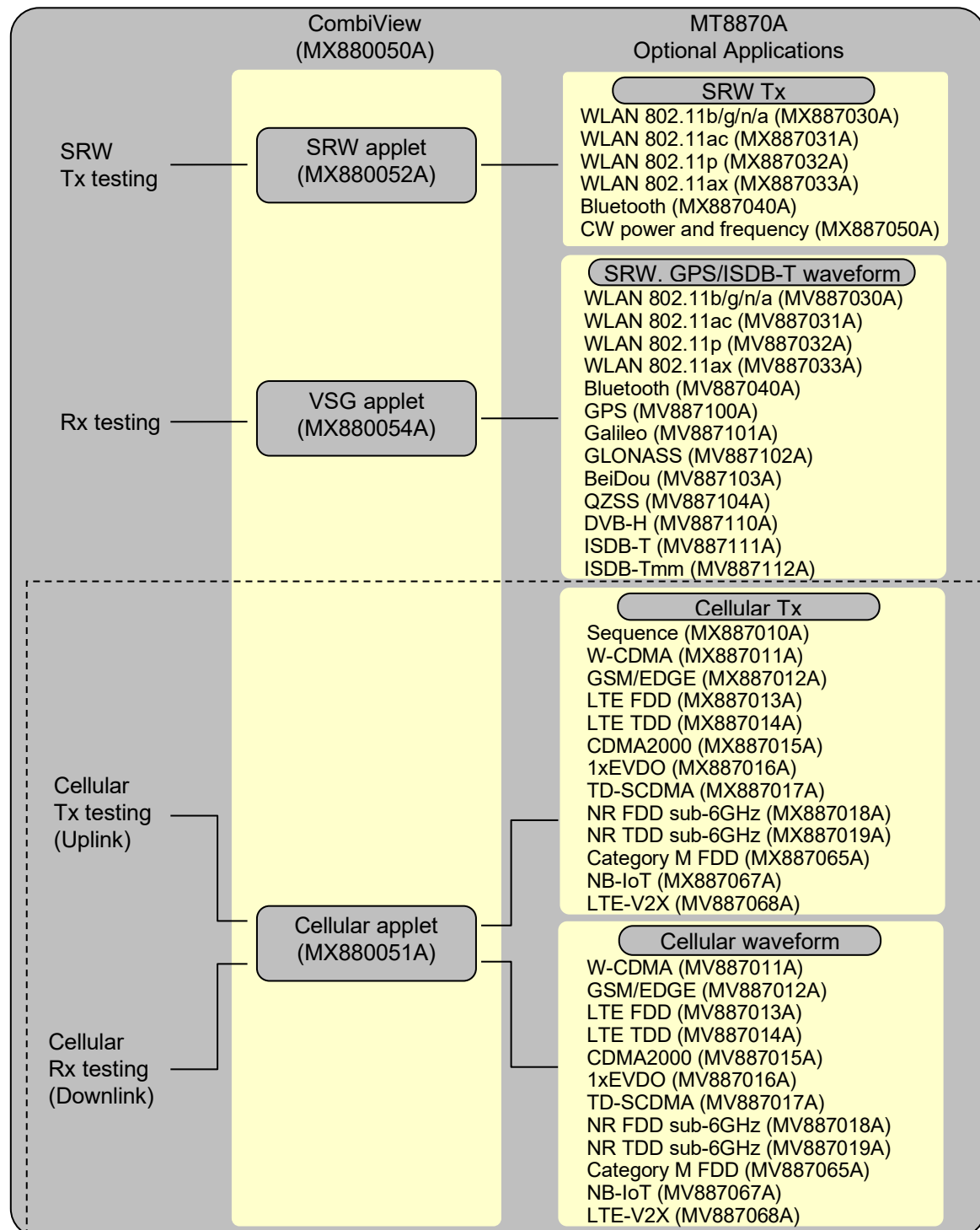


Figure 1.1-2 CombiView Applets and Associated MT8870A Applications Options (1/2)

Note: MU887002A does not support MV887112A.

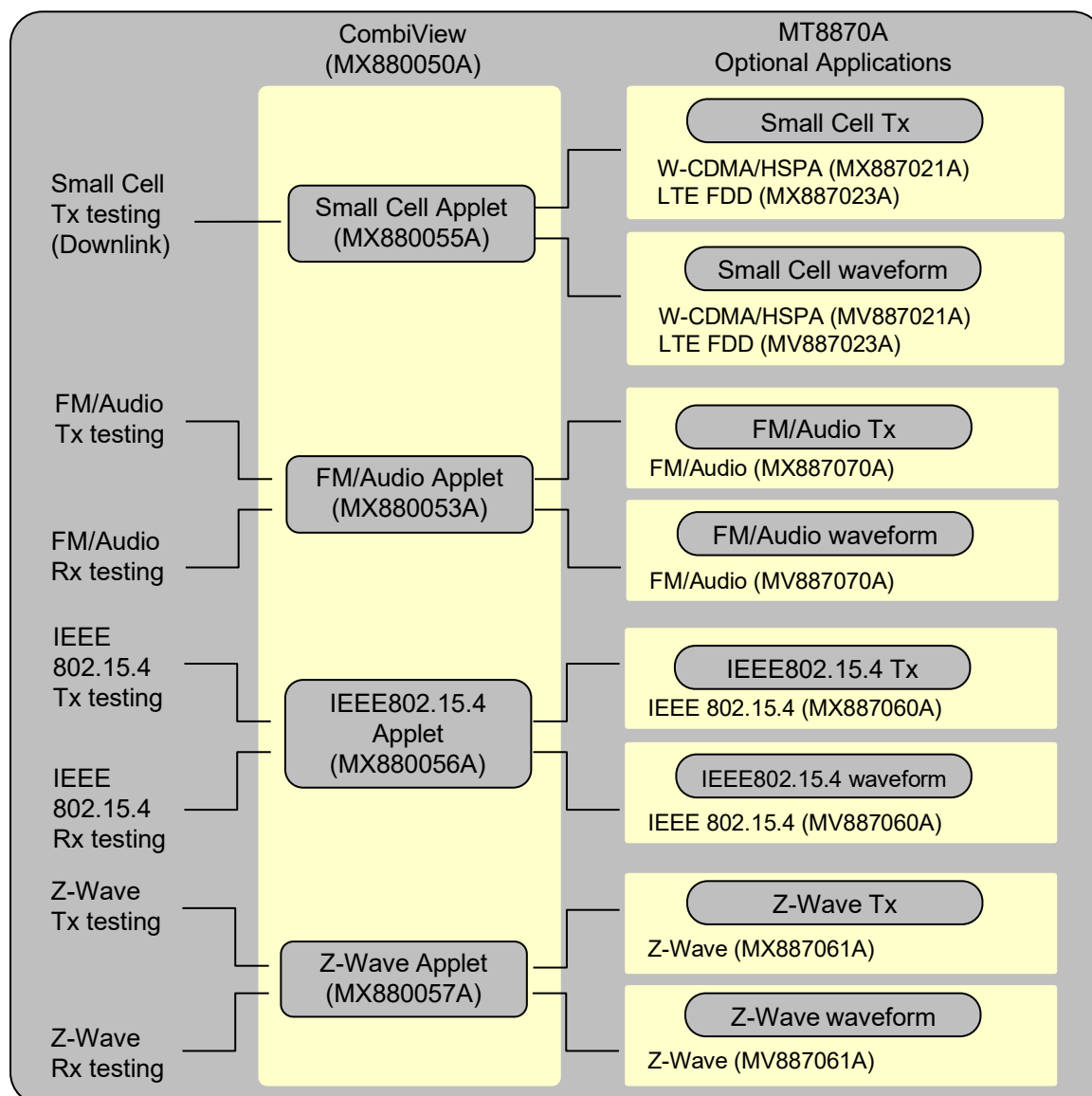


Figure 1.1-3 CombiView Applets and Associated MT8870A Applications Options (2/2)

Note: MU887002A does not support MX880053A, MX887070A, and MV887070A.

At least one of following application software licenses must be registered in the MT8870A to control it using the MX880051A.

In addition, the following are required according to the measurement item.

LTE FDD Uplink Carrier Aggregation measurement:

- MX887013A-001 LTE-Advanced FDD Uplink CA TX Measurement software

LTE TDD Uplink Carrier Aggregation Measurement:

- MX887014A-001 LTE-Advanced TDD Uplink CA TX Measurement software

NR FDD Contiguous ENDC measurement:

- MX887018A-001 NR FDD Contiguous ENDC TX Measurement software

NR TDD Contiguous ENDC Measurement:

- MX887019A-001 NR TDD Contiguous ENDC TX Measurement software

LTE-V2X PSCCH Measurement:

- MX887068A-001 LTE-V2X PSCCH TX Measurement software

Table 1.1-2 Application Software Licenses Required by MT8870A

Model/Code	Product Name
MX887010A	Cellular Standards Sequence Measurement
MX887011A	W-CDMA/HSPA Uplink TX Measurement
MX887012A	GSM/EGDE Uplink TX Measurement
MX887013A	LTE FDD Uplink TX Measurement
MX887014A	LTE TDD Uplink TX Measurement
MX887015A	CDMA2000 Reverse Link TX Measurement
MX887016A	1xEV-DO Reverse Link TX Measurement
MX887017A	TD-SCDMA Uplink TX Measurement
MX887018A	NR FDD sub-6GHz Uplink TX Measurement
MX887019A	NR TDD sub-6GHz Uplink TX Measurement
MX887065A	Category M FDD Uplink TX Measurement
MX887067A	NB-IoT Uplink TX Measurement
MX887068A	LTE-V2X TX Measurement

An example of the MX880051A 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.

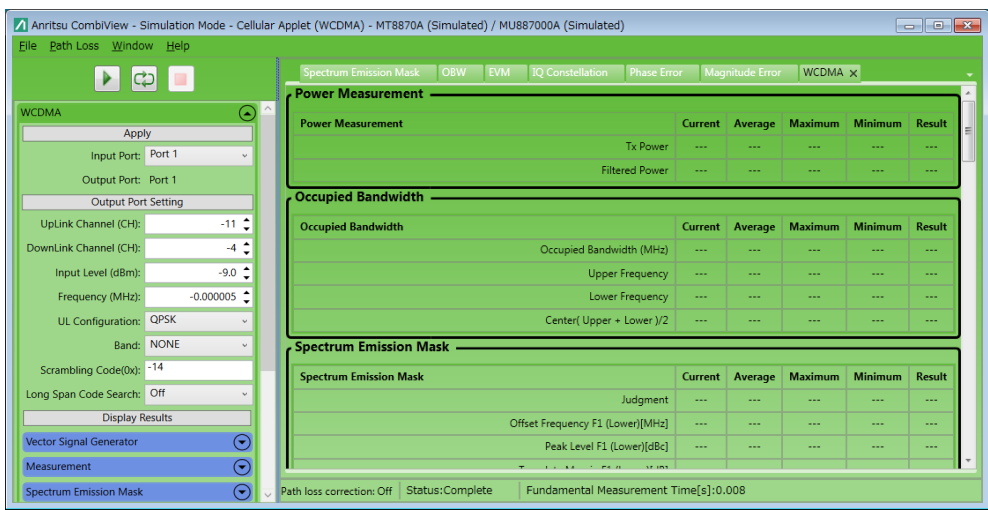


Figure 1.1-4 MX880051A Screen

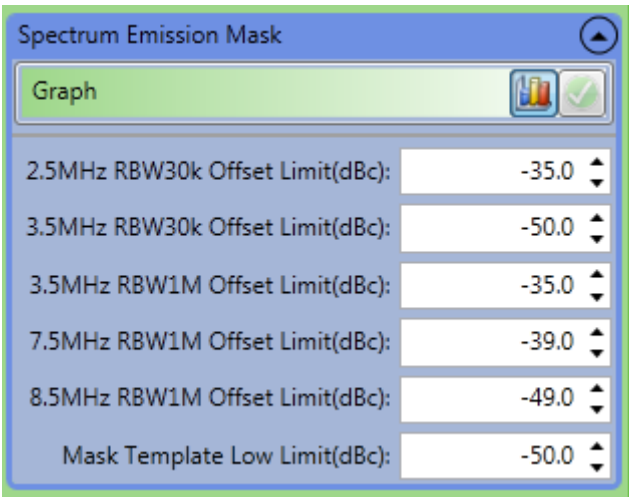


Figure 1.1-5 Parameter Setting Screen

1.2 Composition

The MX880051A 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
MX880051A	Cellular Application Applet	—
W3613AE	MX880051A Cellular Application Applet Operation Manual	English

Chapter 2 — Before Use

This chapter explains how to start the MX880051A.

2.1 Operating Environment

This section describes the MX880051A operating environment.

Table 2.1-1 Operating Environment

Item	Specification
OS	Windows 7 Service Pack 1, Japanese/English Windows 10 Japanese/English
Display	Resolution: 1024 × 768 or better
Memory	Capacity: ≥1 GB
Hard disk free space	≥200 MB*1
VISA	NI-VISA*2
.NET Framework	.NET Framework 4.0 (Full set version) or .NET Framework 4.5

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

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

Table 2.1-2 Void

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 or later
.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 or later

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 Table

Package	CombiView	Cellular Applet
Ver 01.00.03	1.0.4584.26870	1.0.2.0
Ver 01.02.08	1.2.4702.26073	1.2.8.0
Ver 01.03.04	1.2.4821.28484	1.3.1.0
Ver 01.04.15	1.4.1.0	1.3.1.0
Ver 01.04.16	1.4.3.0	1.3.1.0
Ver 01.06.01	1.4.3.0	1.3.1.0
Ver 01.07.00	1.6.2.0	1.4.0.0
Ver 01.07.09	1.6.10.0	1.4.2.0
Ver 01.09.02	1.6.10.0	1.5.0.0
Ver 01.10.01	1.6.12.0	1.6.1.0
Ver 01.11.02	1.6.12.0	1.7.4.0
Ver 01.12.02	1.6.12.0	1.8.5.0
Ver 01.12.07	1.6.12.0	1.8.7.0
Ver 01.12.09	1.6.12.0	1.8.9.0
Ver 01.13.01	1.6.12.0	1.9.2.0
Ver 02.00.03	2.0.3.0	2.0.3.0
Ver 02.00.04	2.0.3.0	2.0.4.0
Ver 02.00.05	2.0.5.0	2.0.4.1
Ver 02.00.07	2.0.6.3	2.0.7.0
Ver 02.00.11	2.0.6.3	2.0.11.0

For package versions compatible with a module to be used, refer to Table 2.1-6.

Table 2.1-6 Compatible Versions

Module Model	Package
MU887000A	All versions
MU887001A	Ver 01.04.16 or later
MU887002A	Ver 02.00.03 or later
MU887002A-007	Ver 02.00.05 or later

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

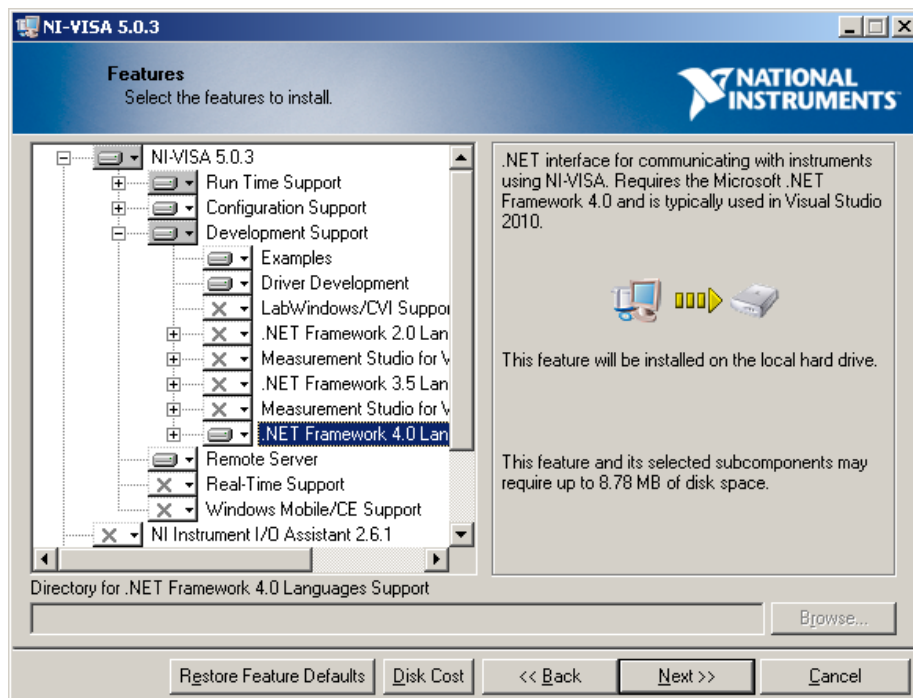


Figure 2.1-1 Selecting .NET Framework 4.0 Languages Support

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.

Note: MU887002A does not support GPIB.

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.

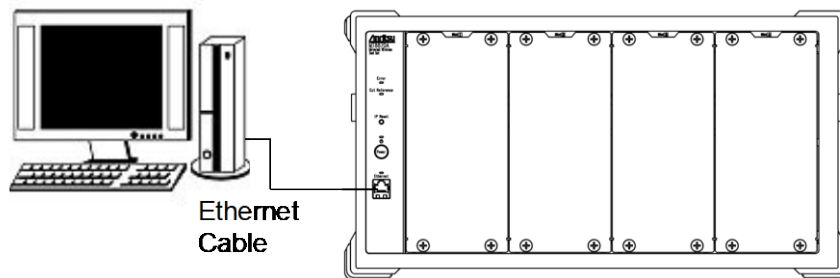


Figure 2.2.1-1 Connecting to Front Ethernet Connector

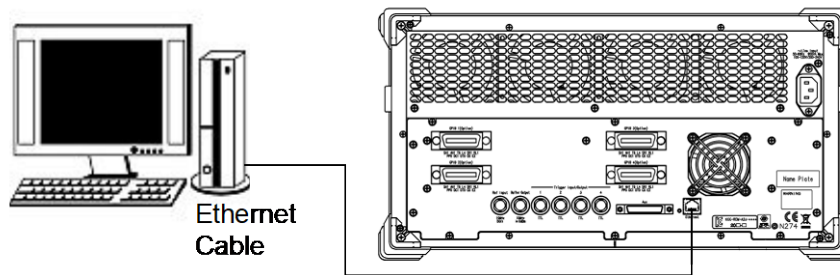


Figure 2.2.1-2 Connecting to Rear Ethernet Connector

2.2.2 Connecting GPIB cables

MT8870A-001 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 MX880051A

2.3.1 Installing

To install the MX880051A, 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.Cellular.Installer.msi**.
5. Follow the instructions displayed by the installation dialog.

2.3.2 Uninstalling

1. At the Windows Control Panel, click **Programs and Features**, and then double-click **MX880051A CombiView Cellular Applet** in the list of **Uninstall or change program**.
2. When you are asked if you really want to uninstall the MX880051A, click **Yes** to uninstall it.
3. Similarly as step 2, uninstall Anritsu CombiView.

2.4 Starting and Stopping CombiView

Starting CombiView

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

When using Windows 10: Start CombiView at the Control PC by clicking **Start > A column of the app list > Anritsu > CombiView**.

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

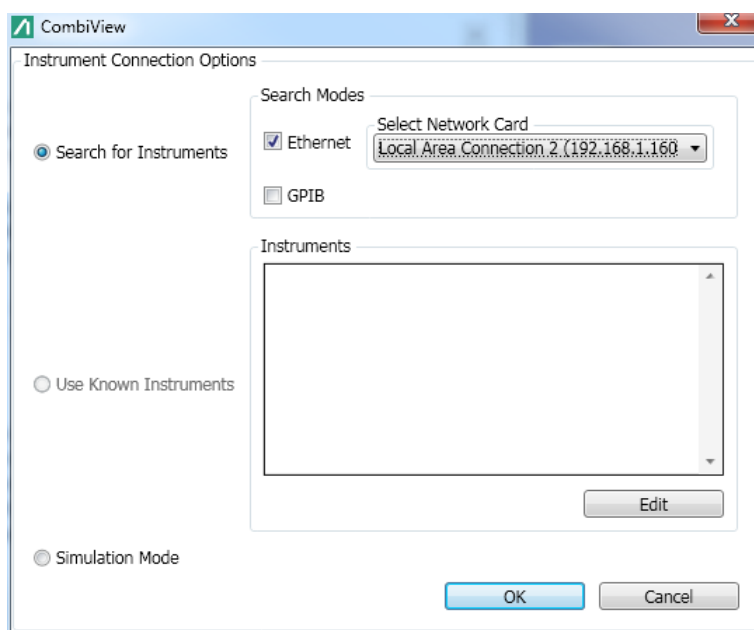


Figure 2.4-1 Instrument Connection Options Dialog Box

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**.

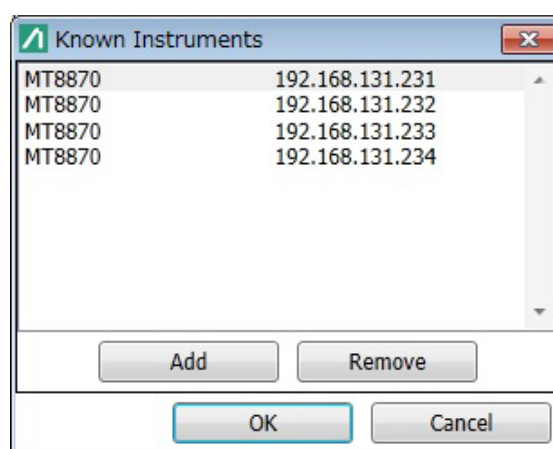


Figure 2.4-2 Known Instruments Dialog Box

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.

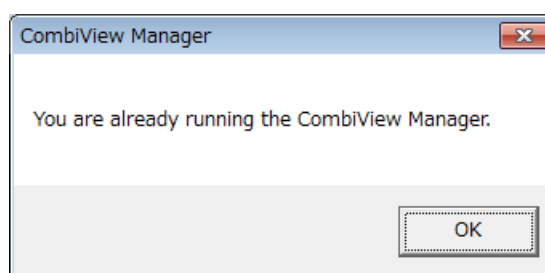


Figure 2.4-3 Message when CombiView is running

Stopping CombiView

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

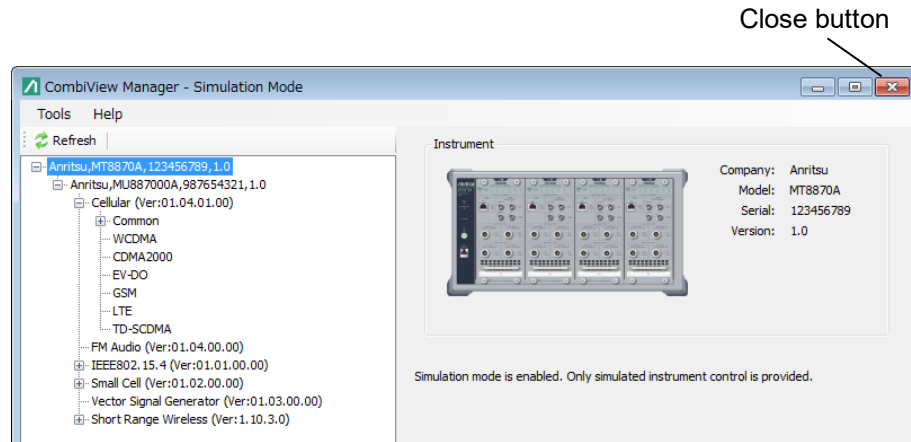


Figure 2.4-4 Close Button

Note:

When the MX880051A 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.

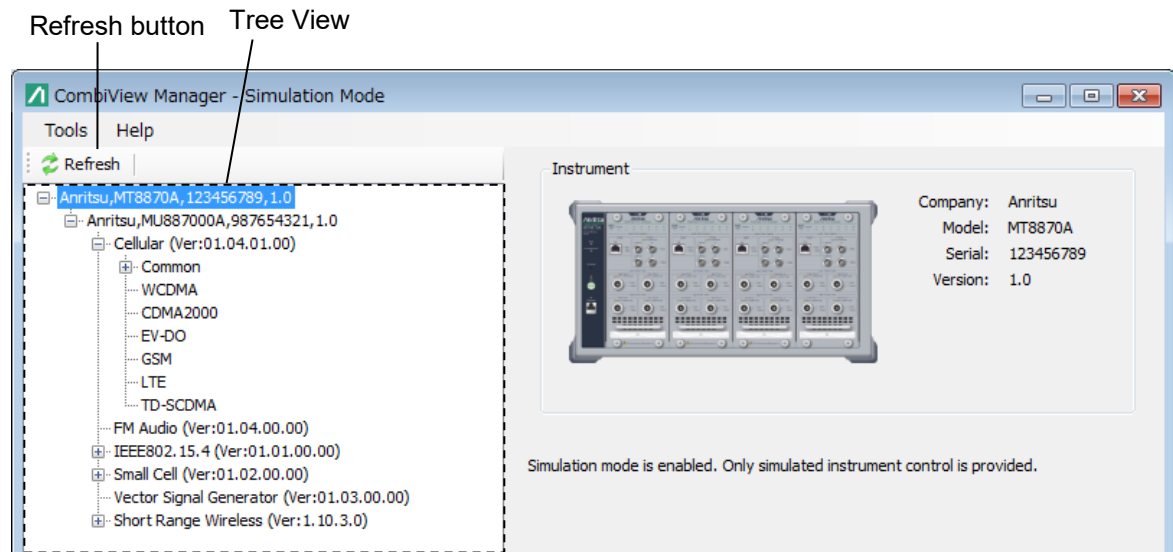


Figure 2.5-1 CombiView Manager Screen

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.

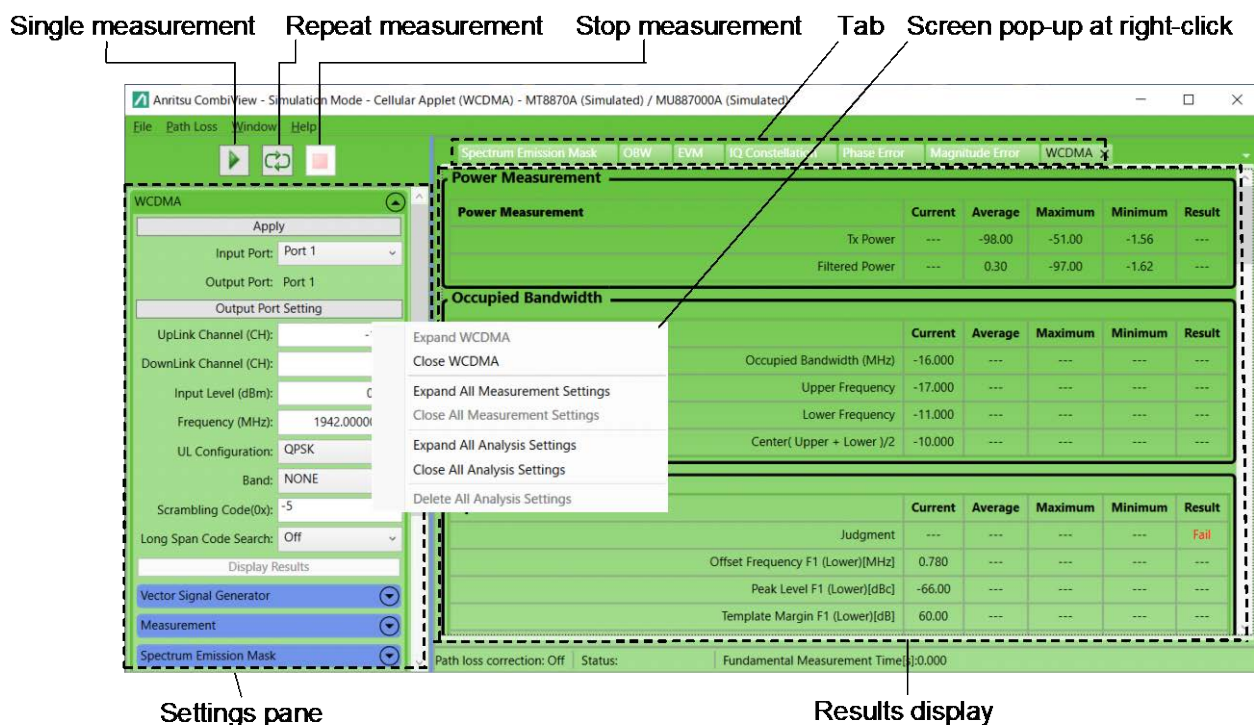


Figure 2.5-2 CombiView Screen

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	Releases the result tab display in order.
Help	
About	Displays information about MX880051A.

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.

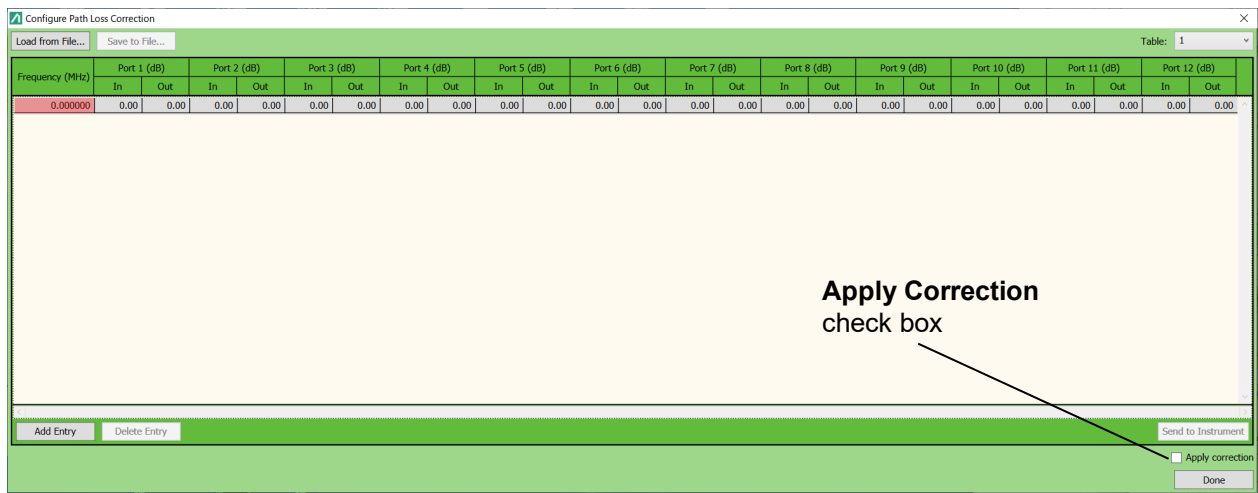


Figure 2.5-3 Configure Path Loss Correction Screen

Table 2.5-3 Configure Path Loss Correction Screen 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.

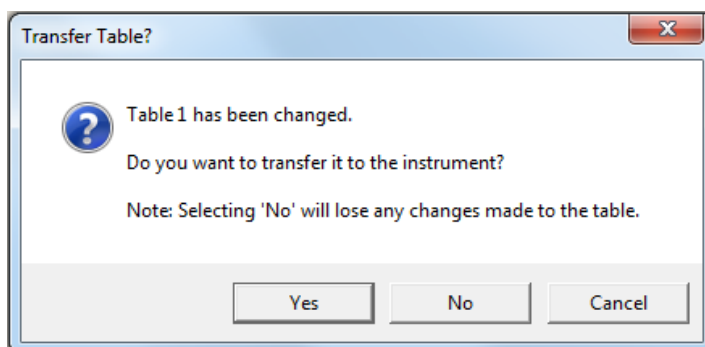


Figure 2.5-4 Transfer Table? Message

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 MX880051A, 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).

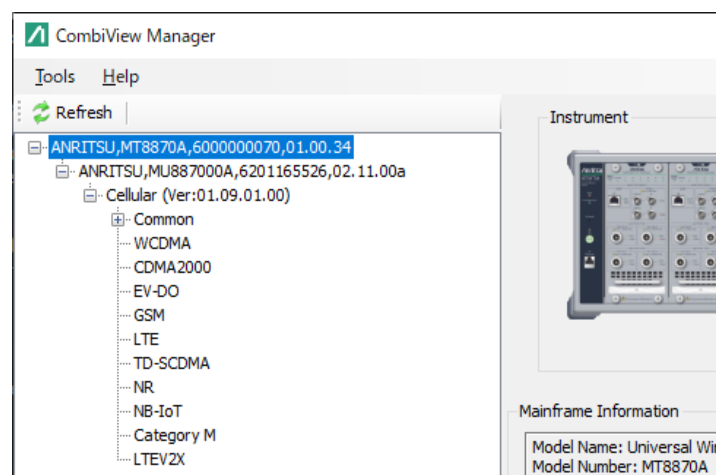


Figure 3.1.1-1 Tree View

1. Click the  button to open the Cellular tree view to set the MX880051A 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.

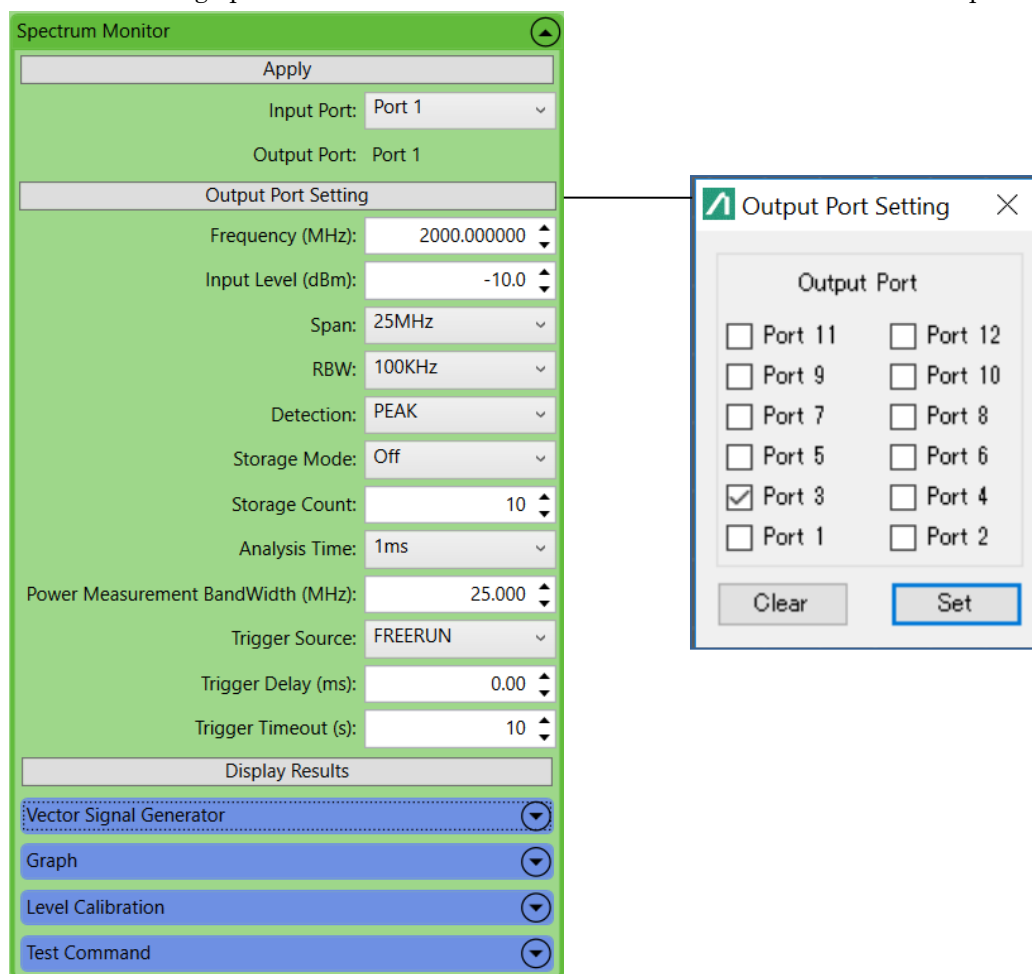


Figure 3.1.2-1 Measurement Settings Pane

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
Apply	Sends settings at settings pane
Input Port*	Sets MU887000A RF signal input port Port 1 to Port 12: Input ports, Off: No any input ports
Output Port*	Shows MU887000A VSG RF signal output port Port 1 to Port 12: Output ports, Broadcast: Outputs from multiple ports
Output Port Setting	Sets MU887000A VSG RF signal output port Set: Sets the selected output ports. Clear: Clears all the selected output ports.

Display Results	Displays numerical measurement results
Vector Signal Generator	Sets MU887000A output signal
Level Calibration	Executes calibration of the MU887000A. Calibration type can be selected before executing.
Test Command	Sends input command

- *: For MU887000A; Port1 and Port2 can be set for both input and output.
Port 3 and Port 4 can be set for either input or output.
For MU887001A; Port 1 to Port 4 can be set for both input and output.
For MU887002A; Port 1 to Port 12 can be set for both input and output.

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 :MSTAT? command.

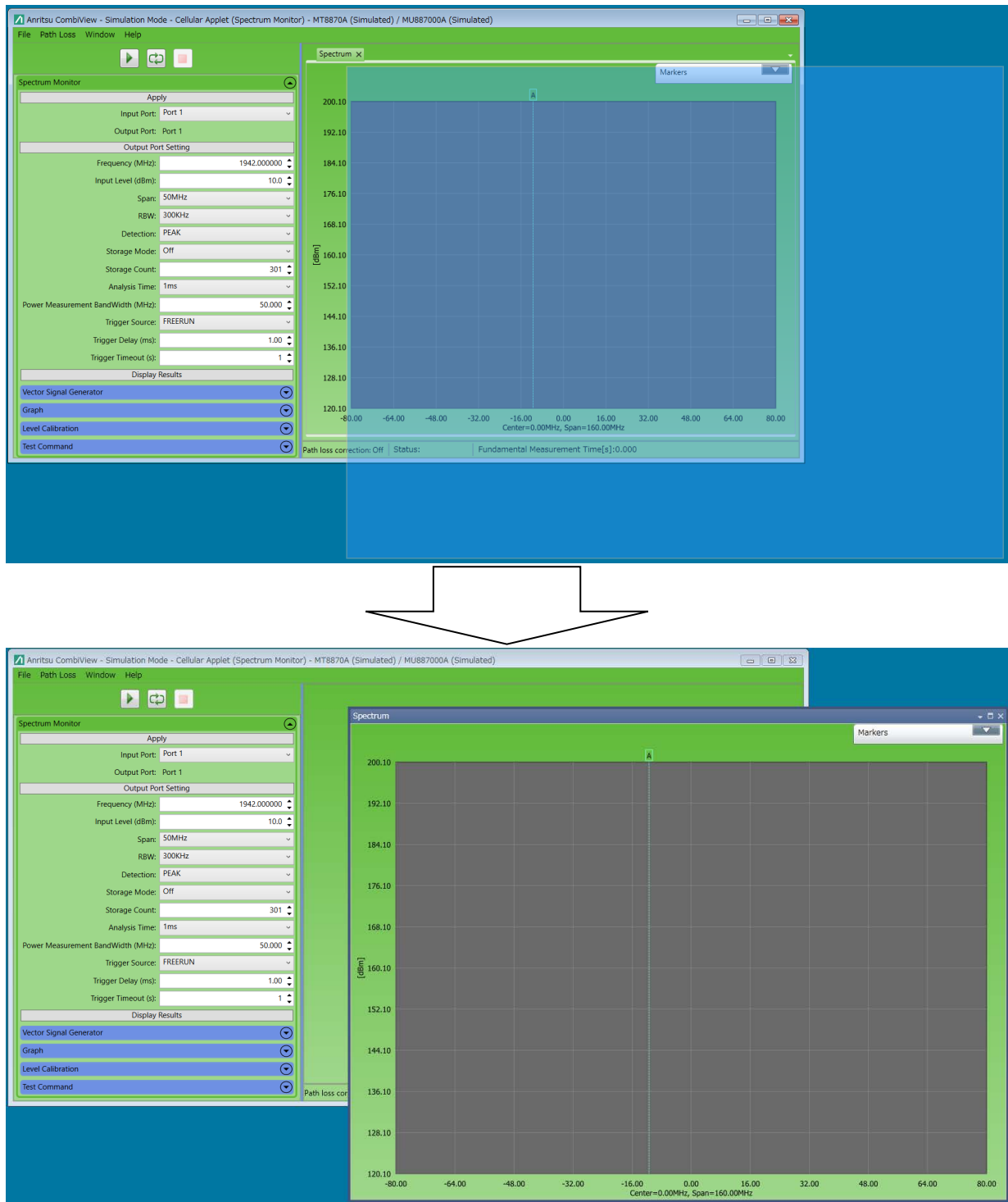
For the command explanation, refer to the operation manual of the application software.

Measurement results display

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

Graph display

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 MX880051A 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.

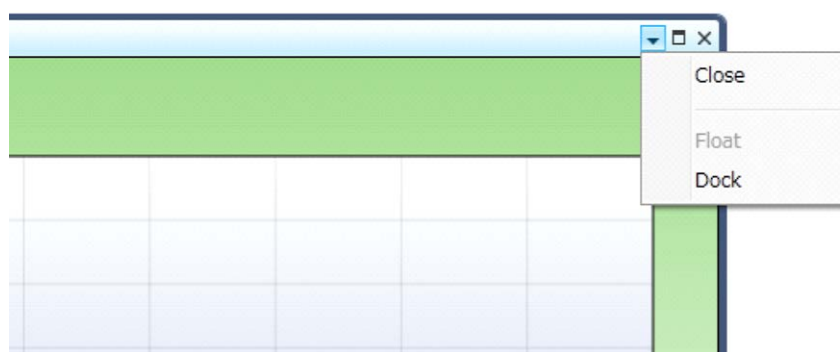


Figure 3.1.2-3 Floating Window Pull-Down Menu

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.

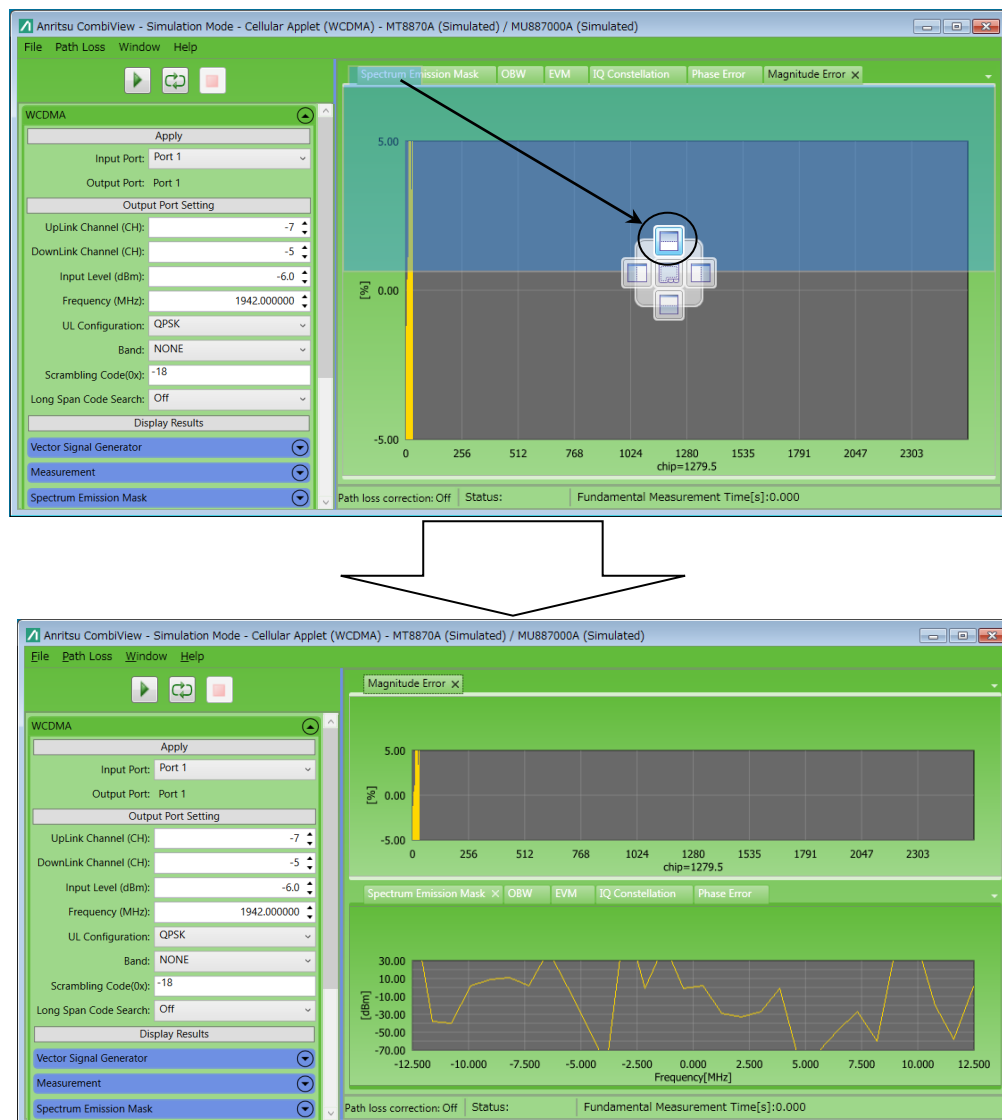


Figure 3.1.2-4 Example of Split Window

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

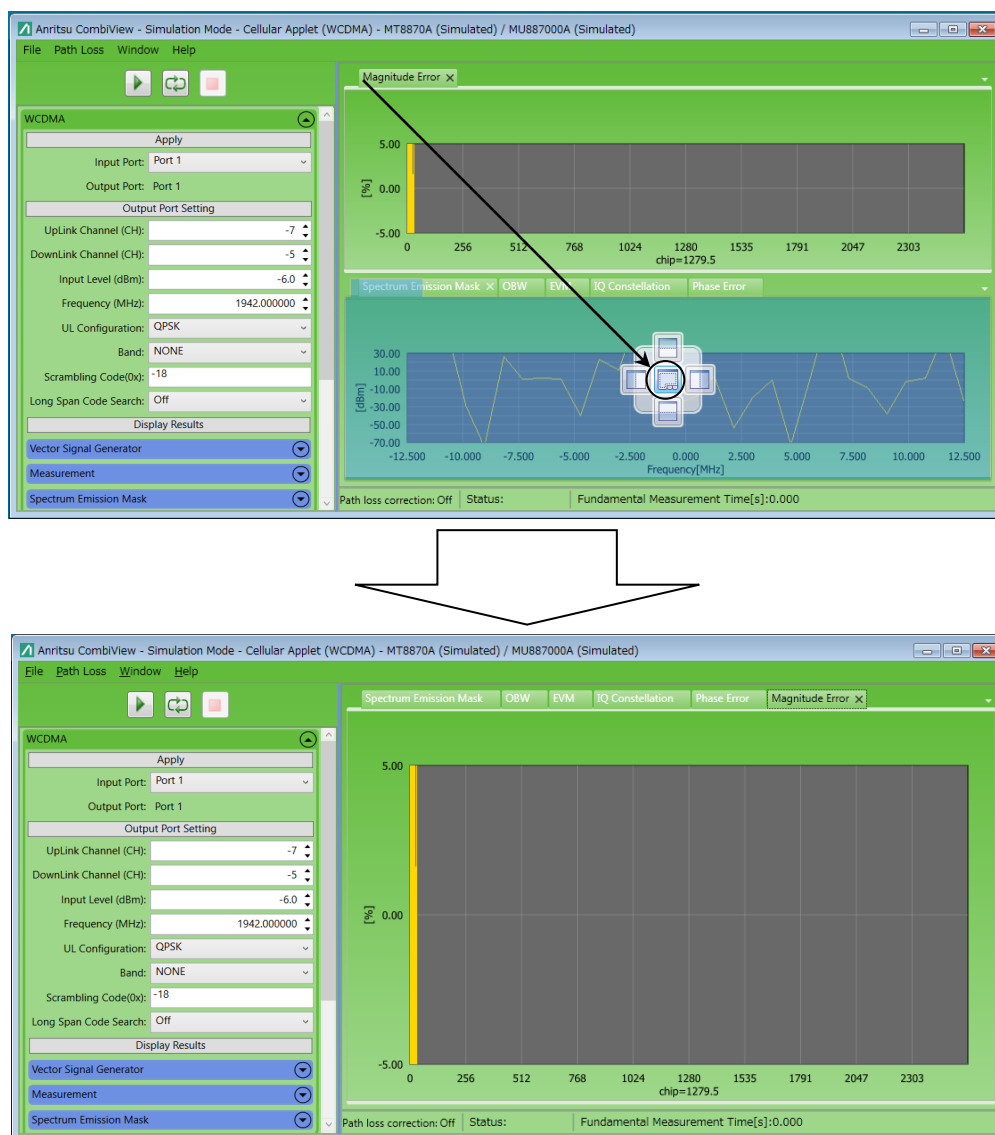
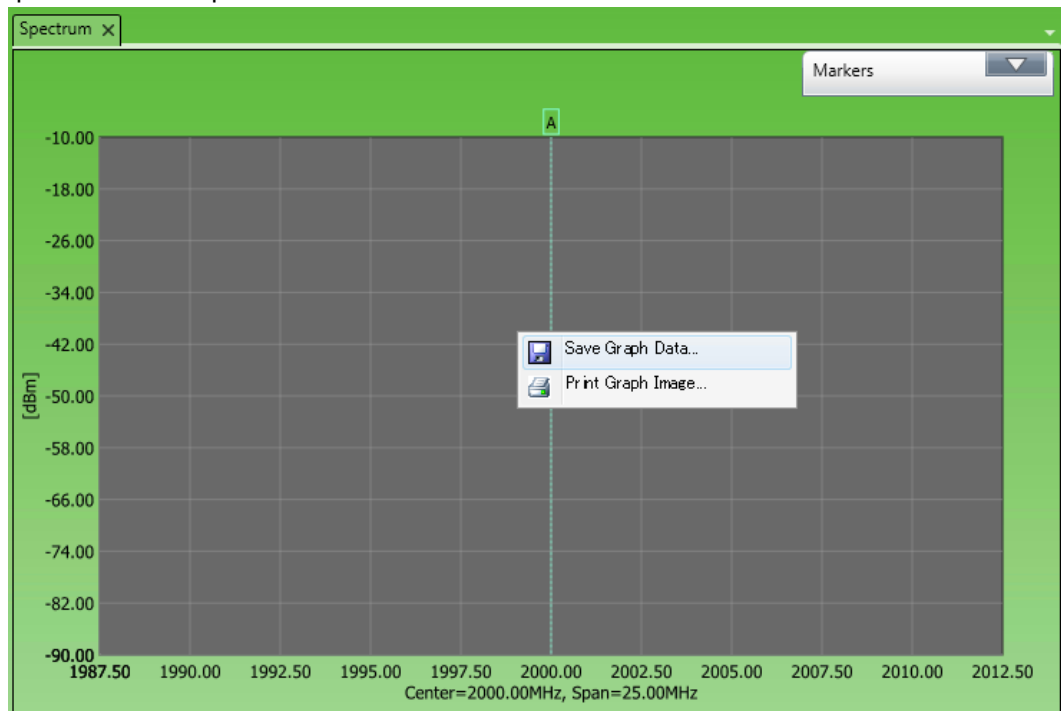


Figure 3.1.2-5 Cancel Window Split

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  or **Apply**.

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:**
- Clicking the **Apply** button does not send the command in the **Command/Query** text box.
 - 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.

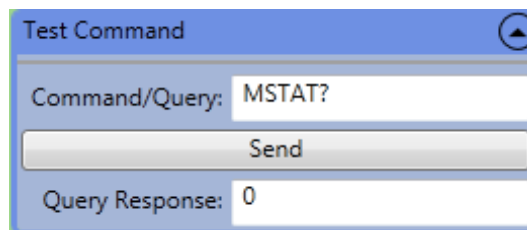


Figure 3.1.3-1 Test Command Dialog

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 (downlink or forward link) 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 as the VSG modulation pattern.

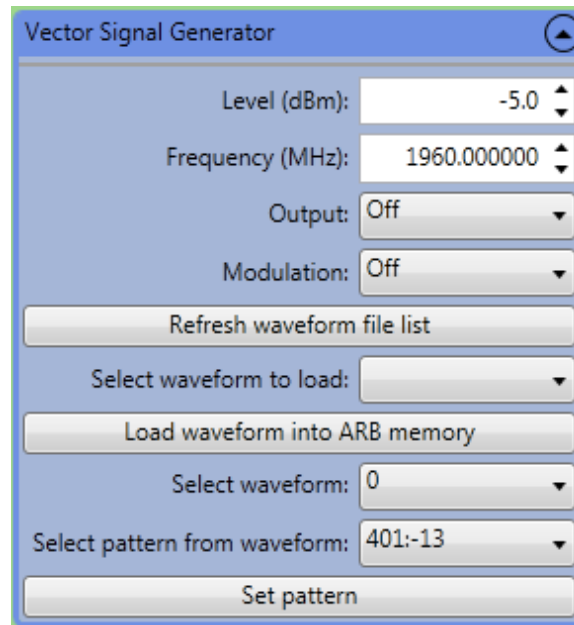


Figure 3.1.4-1 Vector Signal Generator Setting

Following parameters are sent to MU887000A by clicking **Apply** button.

Level (dBm), Frequency (MHz), Output, Modulation

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 TRX Test Module Operation Manual*.

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

Select waveform, Select pattern from waveform

3.2 Spectrum Monitor

Refer to Chapter 2 “Fundamental Measurement” in *the MX887010A Cellular Standards Sequence Measurement Operation Manual* for a description of the Spectrum Monitor function.

This section describes the Spectrum Monitor function displays.

3.2.1 Measurement settings

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

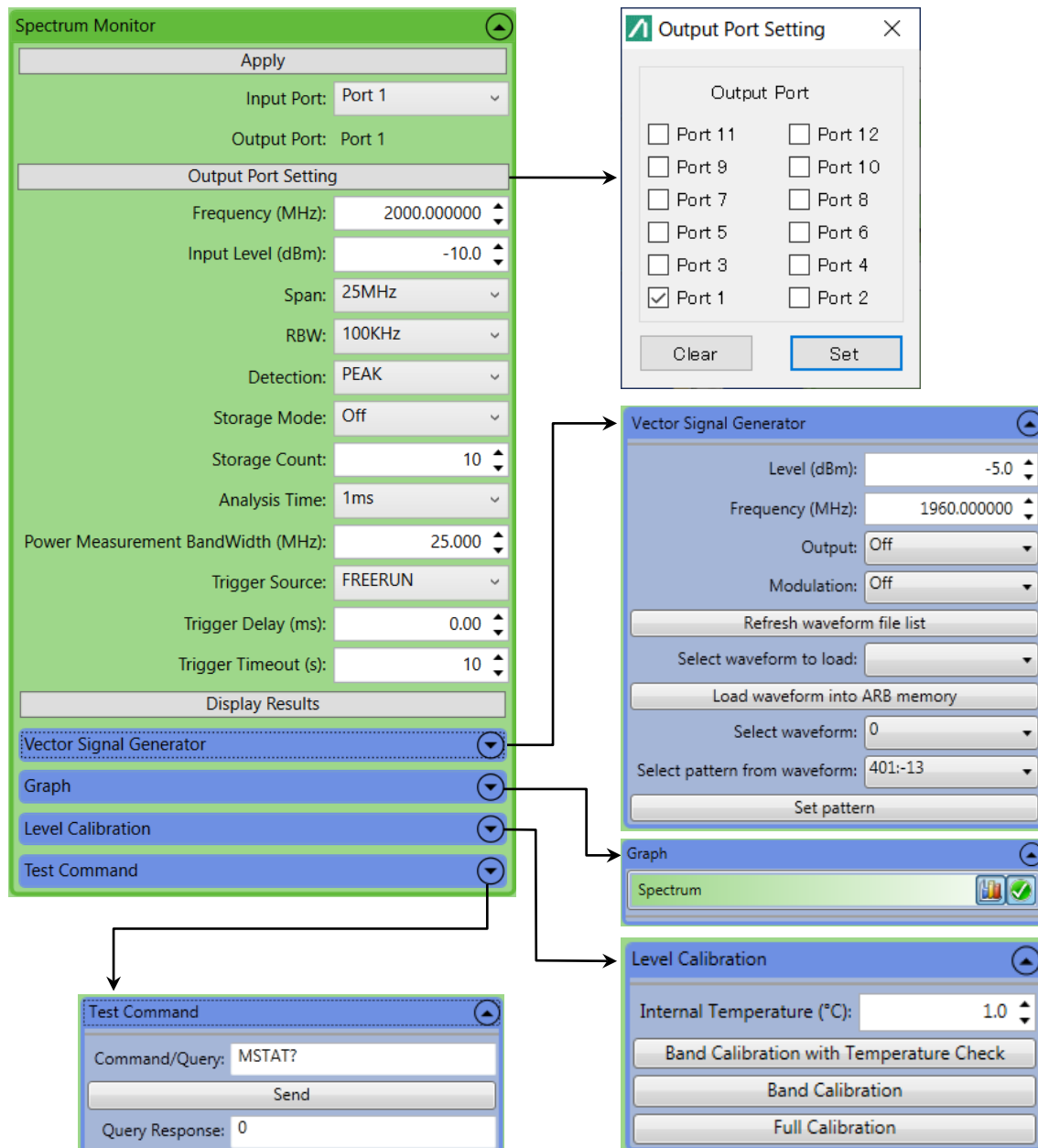


Figure 3.2.1-1 Spectrum Monitor Settings Pane

3.2.2 Measurement and results

To perform measurement:

1. Set the parameters for all buttons from **Input Port** to **Trigger Timeout (s)**.
2. Click the **Apply** button to send the parameters to the hardware.
3. Click the **Display Results** button to display the Spectrum Monitor tab.
4. Click the  **Measurement Start** button
5. The numerical data are displayed when measurement is completed.
6. Clicking **Graph** on the Spectrum Monitor settings panel displays the **Spectrum** button.
7. Click the **Spectrum**  button at the settings pane to open the graph display.
8. To display the marker position and value, Click the  button at the top-right of the graph. The marker position and value of marker are confirmed by dragging marker.

Click **Level Calibration** to display the buttons to execute calibrations.

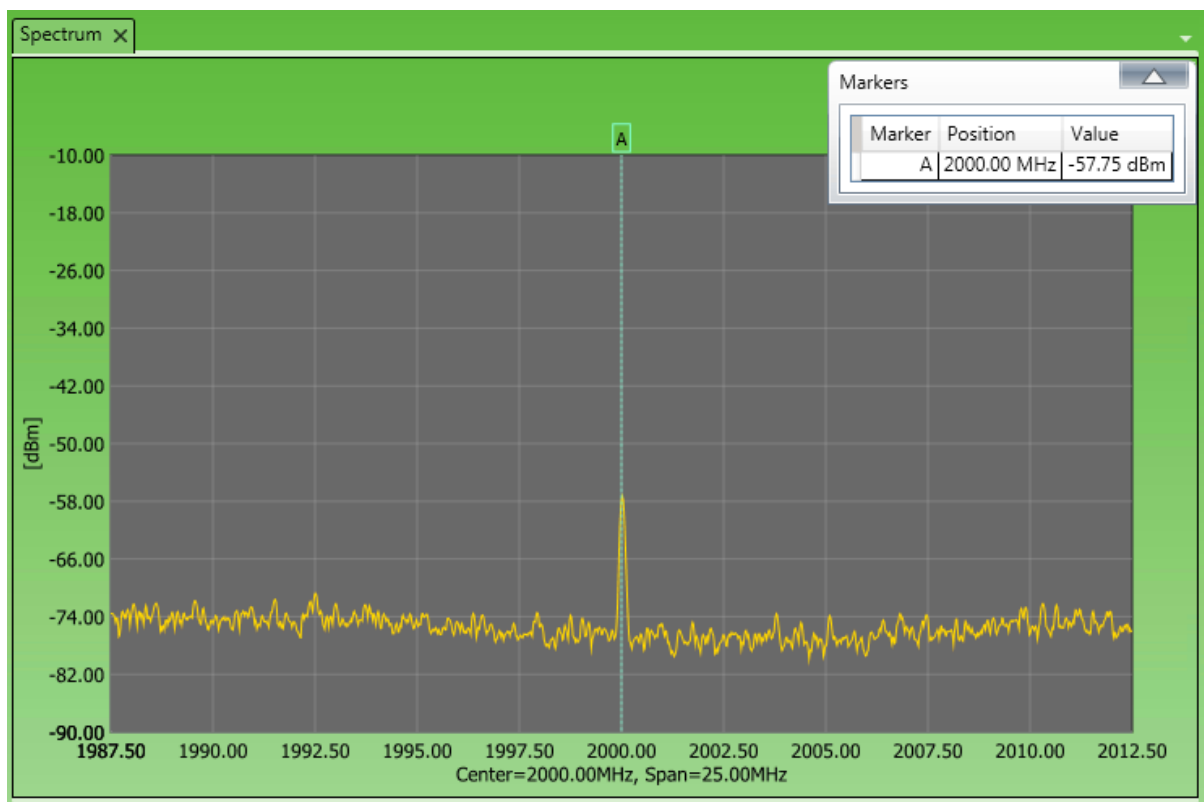


Figure 3.2.2-1 Spectrum Monitor Graph

3.2.3 Related SCPI Commands

The SCPI commands for remote control of the MX887010A Cellular Specification Sequence that are related to the measurement settings pane parameters are described below. For detailed descriptions of the commands, refer to Chapter 4 “SCPI Command Reference” in *the MX887010A Cellular Standards Sequence Measurement Operation Manual* and Chapter 5 “SCPI Command Reference” in *the MU887000A TRX Test Module Operation Manual*.

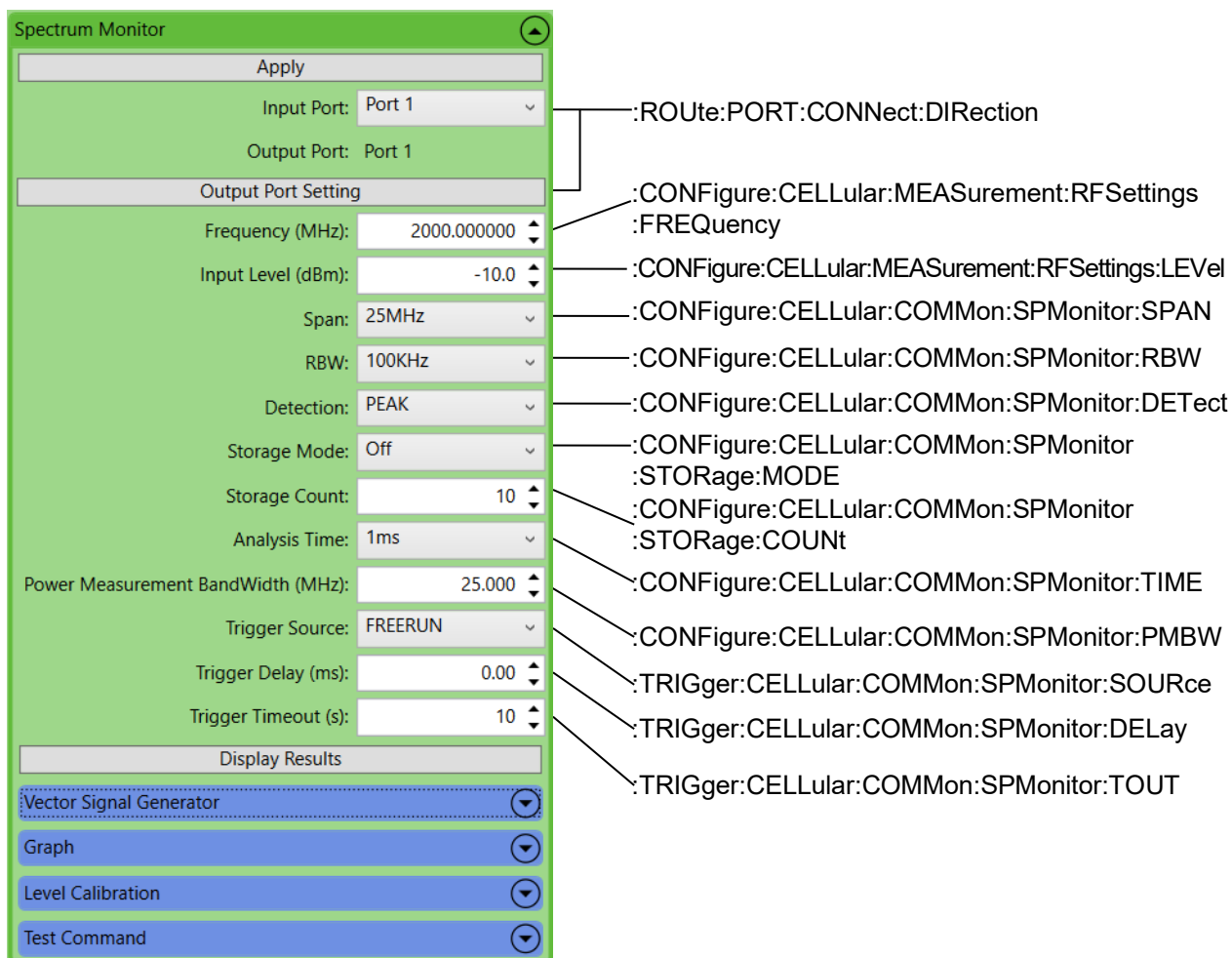


Figure 3.2.3-1 Measurement Settings Pane

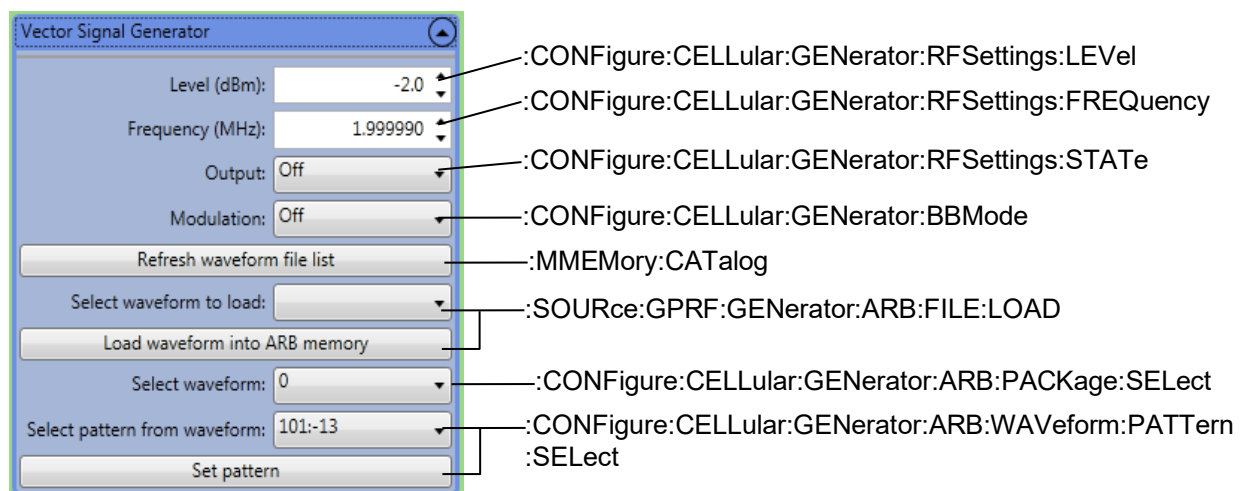


Figure 3.2.3-2 Measurement Settings Pane (Vector Signal Generator)

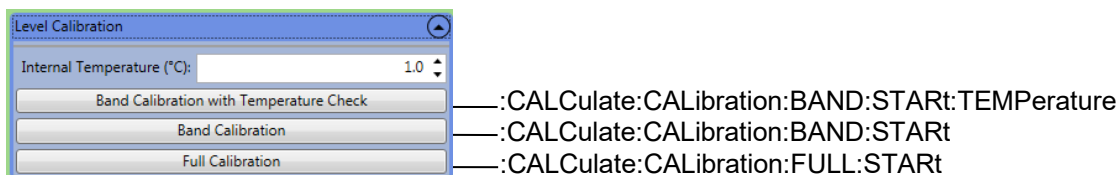


Figure 3.2.3-3 Measurement Settings Pane (Level Calibration)

3.2.4 Related Native Commands

The Native commands for remote control of the MX887010A Cellular Standards Sequence Measurement that are related to the measurement settings pane parameters are described below. For detailed descriptions of the commands, refer to Chapter 5 “Native Command Reference” in *the MX887010A Cellular Standards Sequence Measurement Operation Manual* and Chapter 6 “Native Command Reference” in *the MU887000A TRX Test Module Operation Manual*.

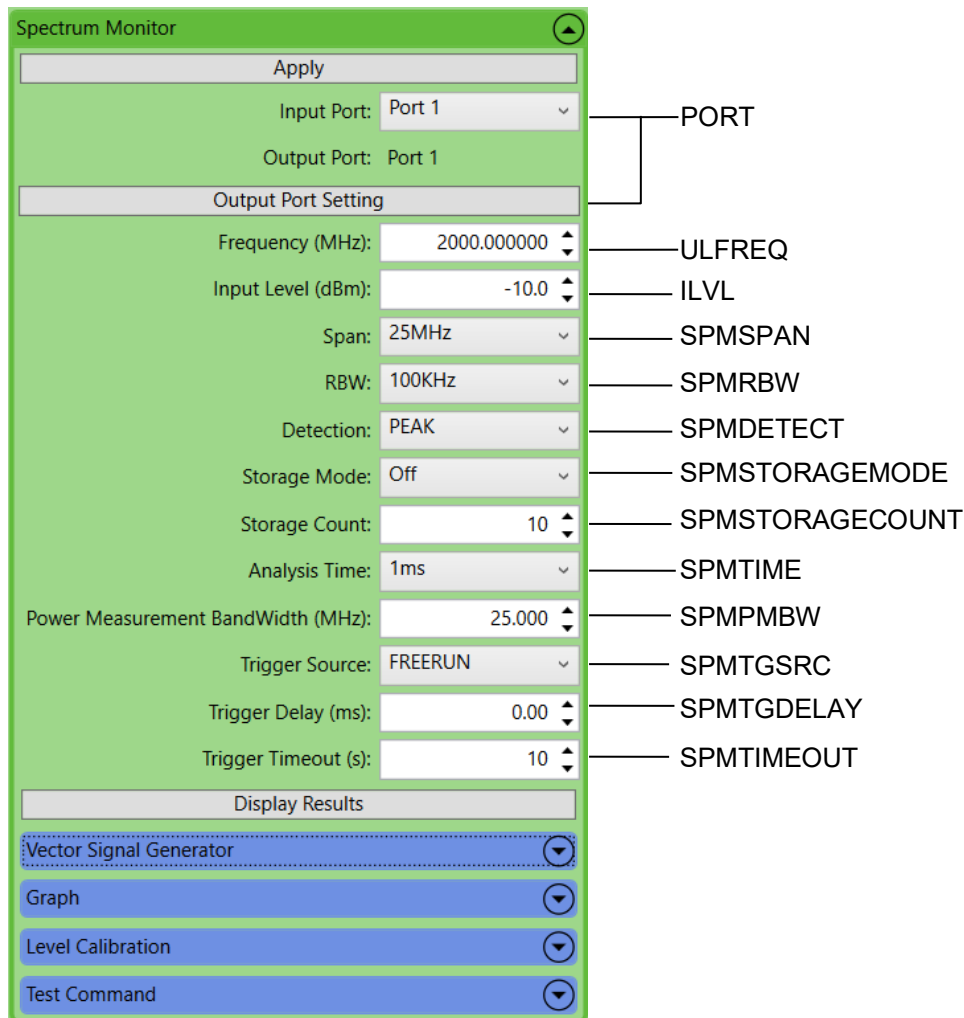


Figure 3.2.4-1 Measurement Settings Pane

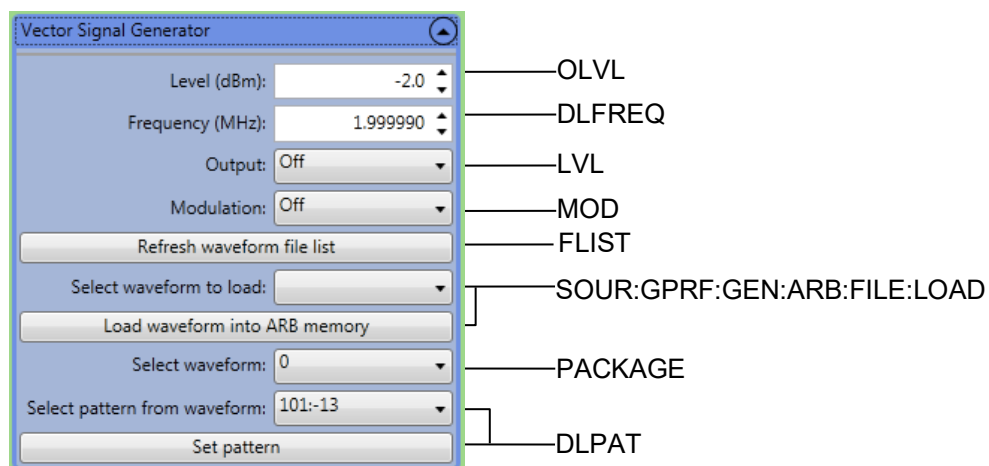


Figure 3.2.4-2 Measurement Settings Pane (Vector Signal Generator Dialog)

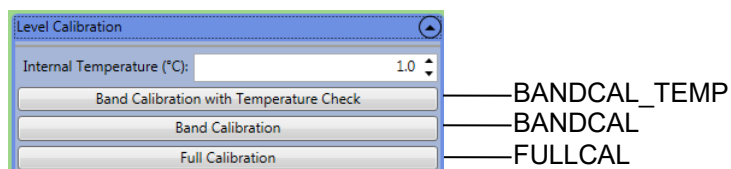


Figure 3.2.4-3 Measurement Settings Pane (Level Calibration)

3.3 WCDMA

Refer to Chapter 2 “Fundamental Measurement” in the *MX887011A W-CDMA/HSPA Uplink TX Measurement Operation Manual* for a description of the W-CDMA/HSPA Uplink TX Measurement items.

This section describes the WCDMA settings and displays.

3.3.1 Measurement settings

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



Figure 3.3.1-1 WCDMA Measurement Settings Pane (1/2)



Figure 3.3.1-2 WCDMA Measurement Settings Pane (2/2)

For the expandable menus of Vector Signal Generator, Level Calibration, and Test Command, refer to Figure 3.2.1-1 Spectrum Monitor Settings Pane.

3.3.2 Measurement and results

To perform measurement:

1. Set the parameters for all buttons from **Input Port** to **Long Span Code Search**.
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 specifications.
4. Click the **OBW** button to open the dialog and set the specifications.
5. Set a checkmark in the  checkboxes in each dialog for **Spectrum Emission Mask**, **OBW**, **EVM**, **IQ Constellation**, **Phase Error**, and **Magnitude Error** to open the graph displays.
6. Click the **Apply** button to send the parameters to the hardware.
7. Click the **Display Results** button to display the **WCDMA** tab.
8. Click the  Measurement Start button
9. The numerical data are displayed in the **WCDMA** tab when measurement is completed.
10. Click the  button in the **Spectrum Emission Mask**, **OBW**, **EVM**, **IQ Constellation**, **Phase Error**, and **Magnitude Error** dialogs to open the graph displays.

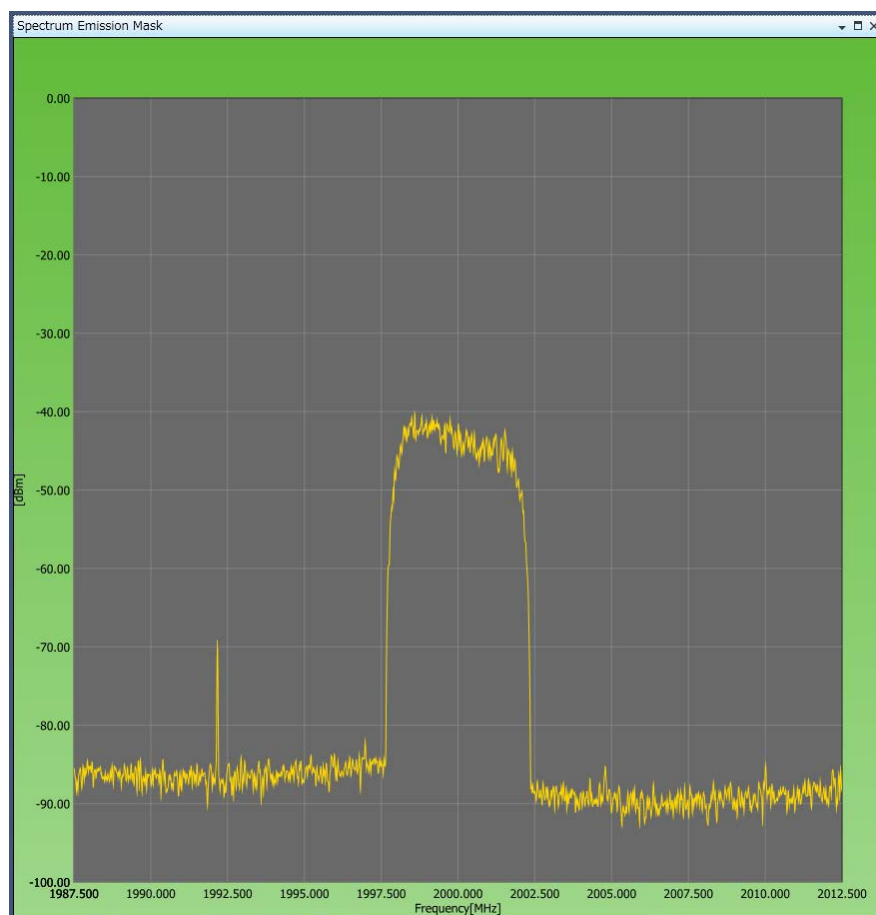


Figure 3.3.2-1 W-CDMA (Spectrum Emission Mask) Graph

3.3.3 Related SCPI Commands

The SCPI commands for remote control of the MX887011A W-CDMA/HSPA Uplink TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of the commands, refer to Chapter 4 “SCPI Command Reference” in *the MX887011A W-CDMA/HSPA Uplink TX Measurement Operation Manual*.



Figure 3.3.3-1 Measurement Settings Pane

For the SCPI remote control commands of the Vector Signal Generator, refer to Figure 3.2.3-2 Measurement Settings Pane (Vector Signal Generator).

For the SCPI remote control commands of Level Calibration, refer to Figure 3.2.3-3 Measurement Settings Pane (Level Calibration).

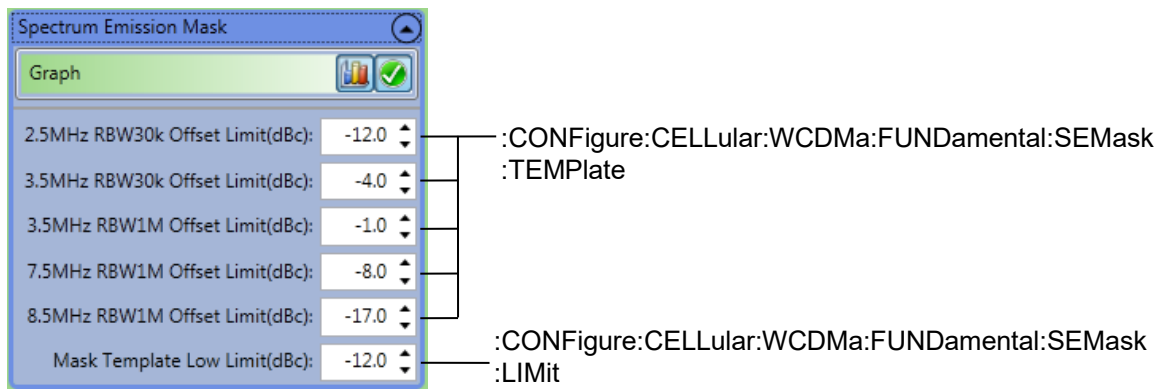


Figure 3.3.3-2 Measurement Settings Pane (Spectrum Emission Mask Dialog)



Figure 3.3.3-3 Measurement Settings Pane (OBW Dialog)

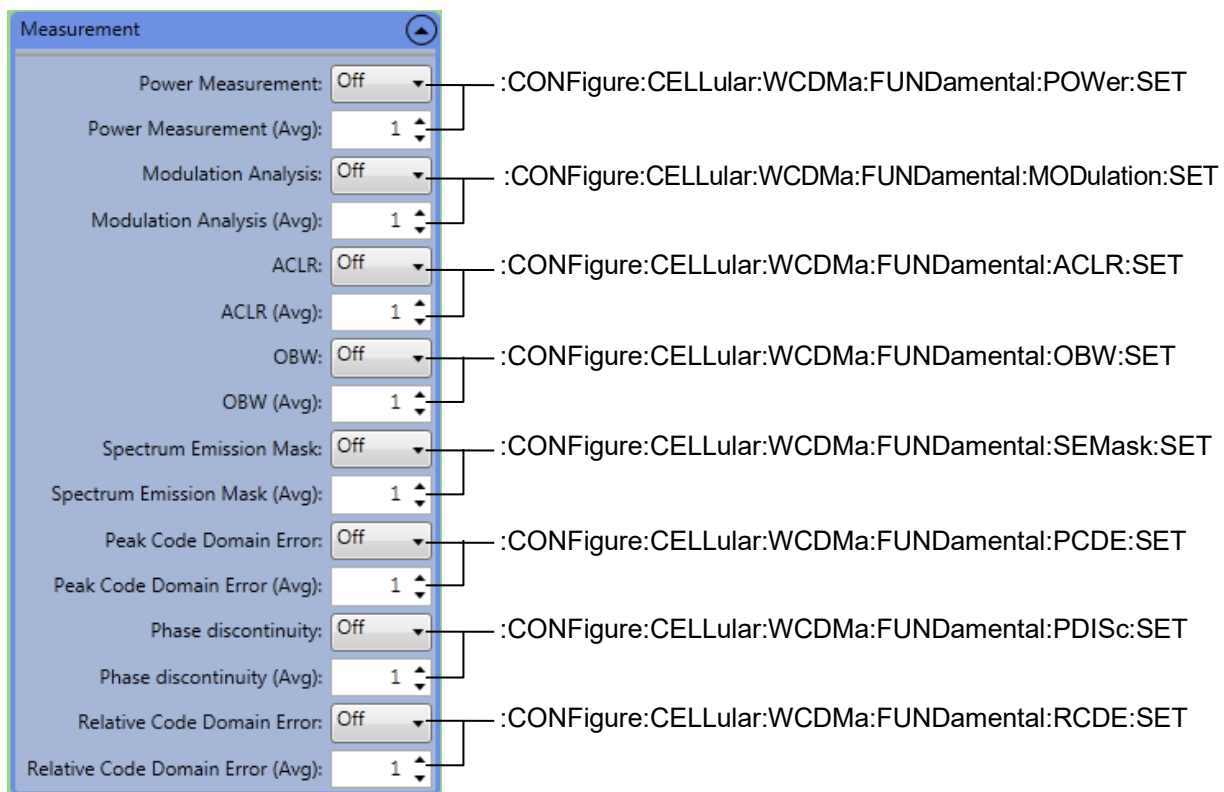


Figure 3.3.3-4 Measurement Settings Pane (Measurement Dialog)

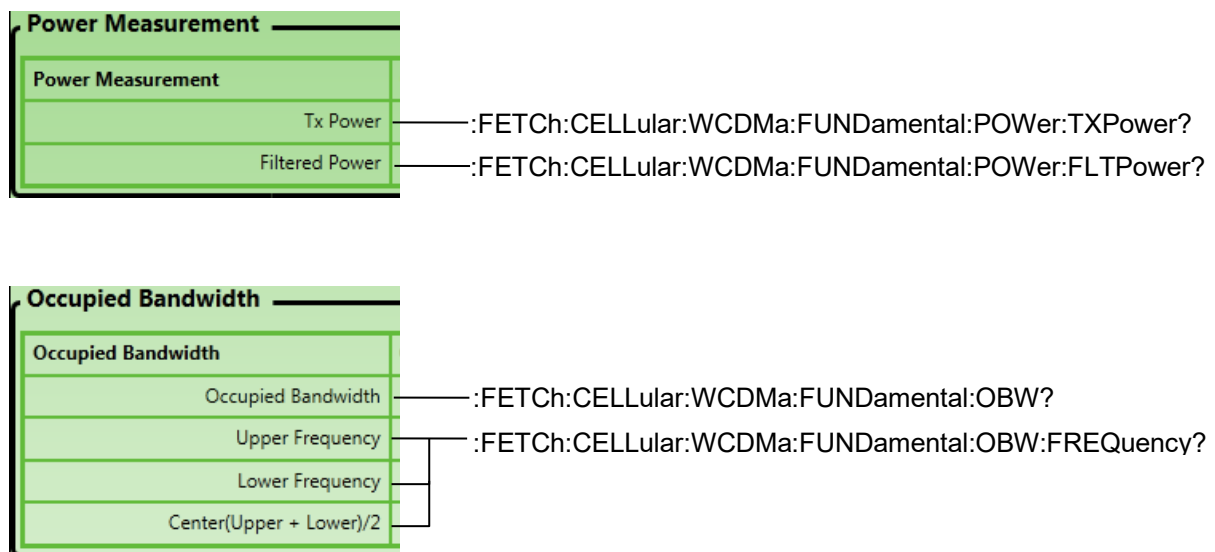


Figure 3.3.3-5 Power Measurement and Occupied Bandwidth Results

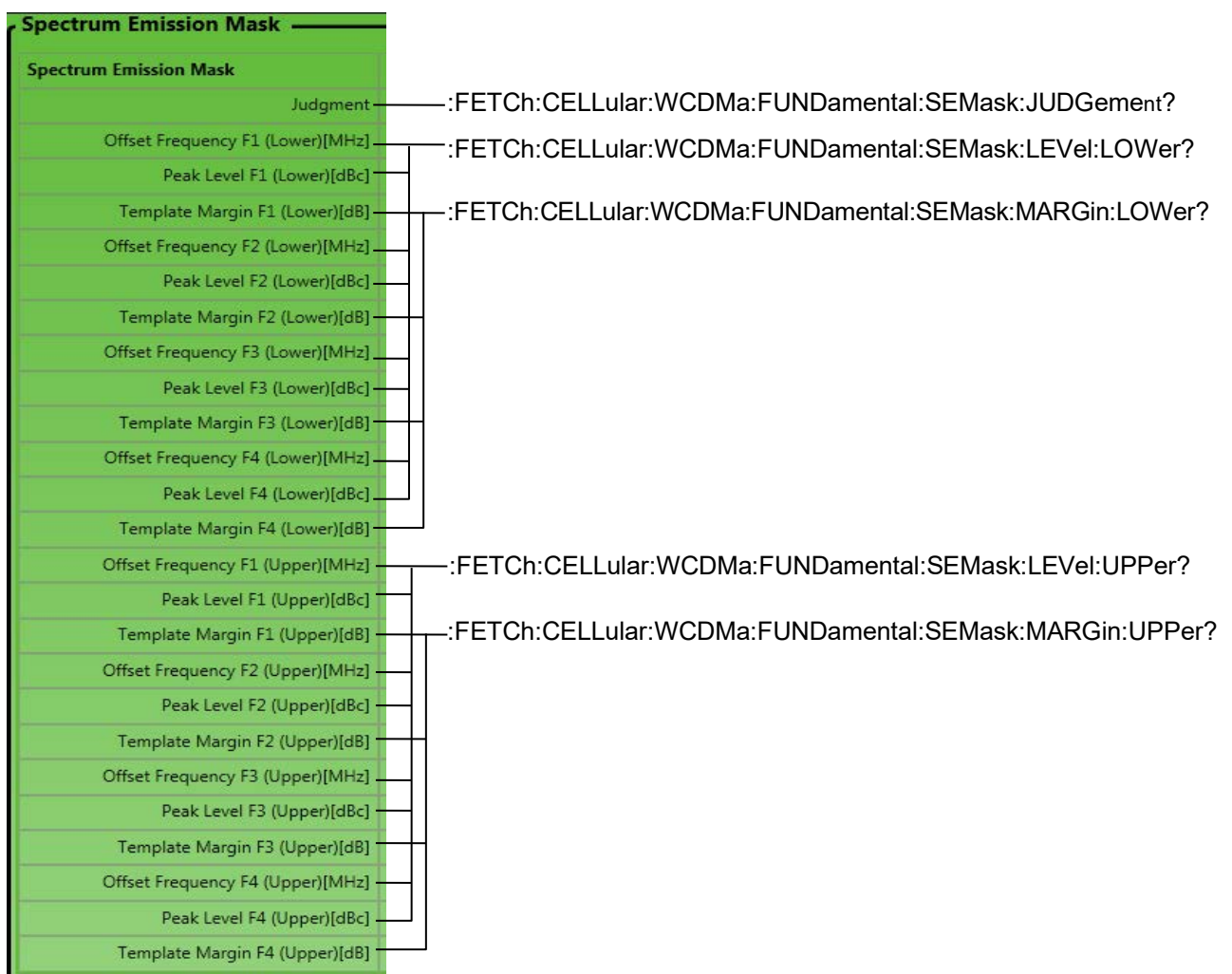


Figure 3.3.3-6 Spectrum Emission Mask Results

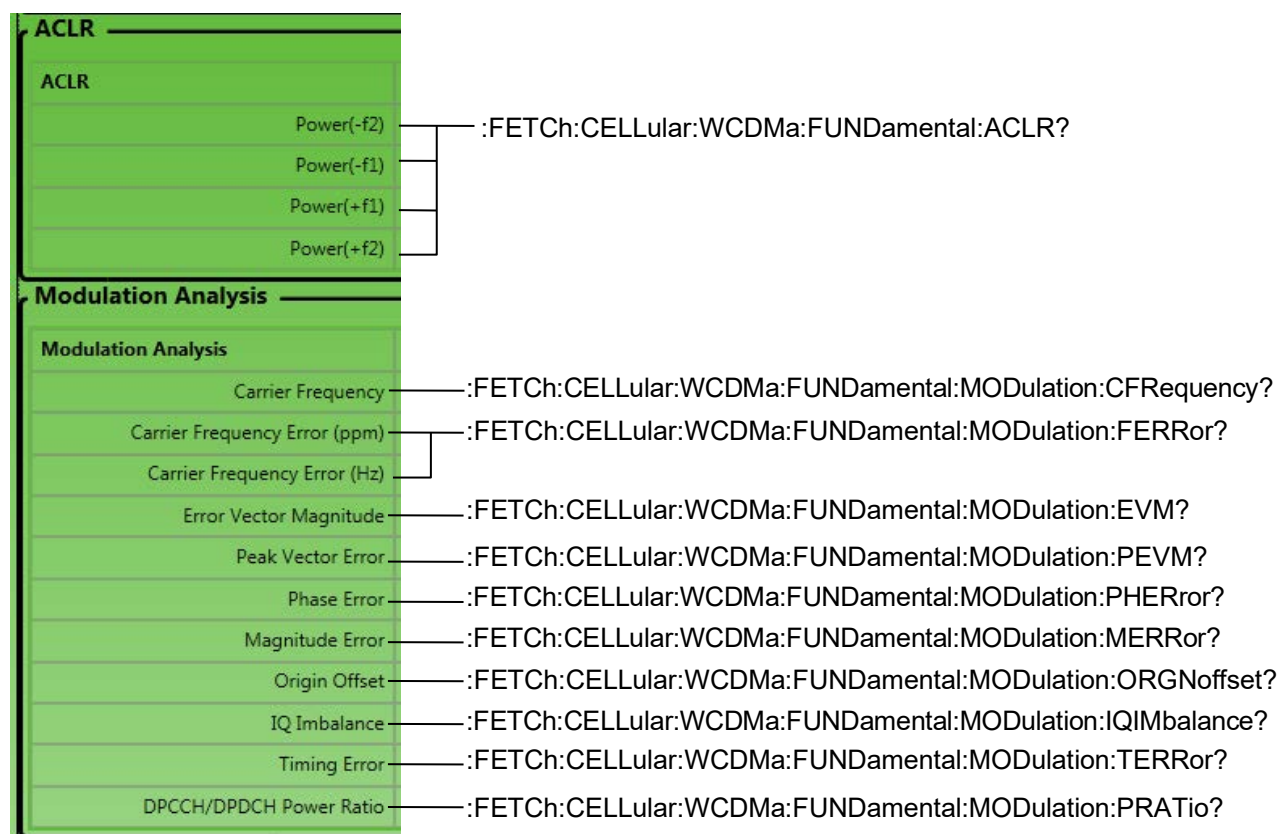


Figure 3.3.3-7 ACLR and Modulation Analysis Results

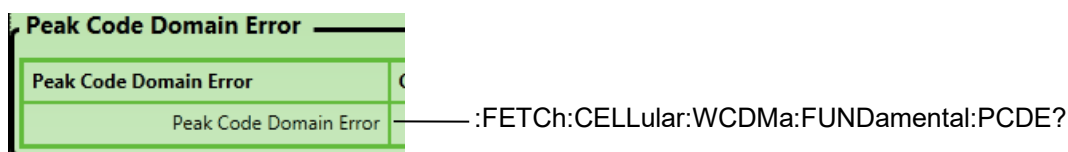


Figure 3.3.3-8 Peak Code Domain Error Results

Relative Code Domain Error	
Relative Code Domain Error	
Relative Code Domain Error - DPCCH	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPCCh:RCDerror?
CDP Ratio - DPCCH	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPCCh:CDPower?
ECDP - DPCCH	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPCCh:ECDPower?
Relative Code Domain Error - DPDCH	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPDCh:RCDerror?
CDP Ratio - DPDCH	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPDCh:CDPower?
ECDP - DPDCH	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:DPDCh:ECDPower?
Relative Code Domain Error - HS-DPCCH	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:HSDPcch:RCDerror?
CDP Ratio - HS-DPCCH	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:HSDPcch:CDPower?
ECDP - HS-DPCCH	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:HSDPcch:ECDPower?
Relative Code Domain Error - E-DPCCH	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPCch:RCDerror?
CDP Ratio - E-DPCCH	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPCch:CDPower?
ECDP - E-DPCCH	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPCch:ECDPower?
Relative Code Domain Error - E-DPDCH1	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPDch:RCDerror?
CDP Ratio - E-DPDCH1	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPDch:CDPower?
ECDP - E-DPDCH1	:FETCh:CELLular:WCDMa:FUNDamental:RCDE:EDPDch:ECDPower?
Relative Code Domain Error - E-DPDCH2	
CDP Ratio - E-DPDCH2	
ECDP - E-DPDCH2	
Relative Code Domain Error - E-DPDCH3	
CDP Ratio - E-DPDCH3	
ECDP - E-DPDCH3	
Relative Code Domain Error - E-DPDCH4	
CDP Ratio - E-DPDCH4	
ECDP - E-DPDCH4	

Figure 3.3.3-9 Relative Code Domain Power Results

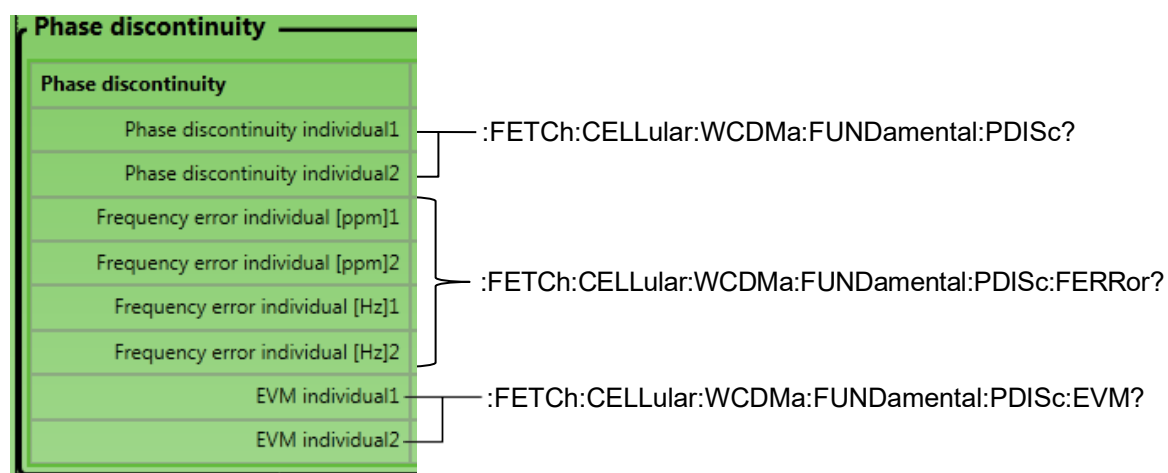


Figure 3.3.3-10 Phase Discontinuity Results

3.3.4 Related Native Commands

The Native commands for remote control of the MX887011A W-CDMA/HSPA Uplink TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of the commands, refer to Chapter 5 “Native Command Reference” in *the MX887011A W-CDMA/HSPA Uplink TX Measurement Operation Manual*.

The screenshot shows the 'WCDMA' settings pane. It includes an 'Apply' button at the top. Below it are 'Input Port' and 'Output Port' dropdown menus, both set to 'Port 1'. A bracket labeled 'PORT' spans these two. An 'Output Port Setting' button is below. The main settings section includes: 'UpLink Channel (CH)' (9738) labeled 'ULCHAN'; 'DownLink Channel (CH)' (10688) labeled 'DLCHAN'; 'Input Level (dBm)' (-10.0) labeled 'ILVL'; 'Frequency (MHz)' (1947.600000) labeled 'ULFREQ'; 'UL Configuration' (WCDMA) labeled 'ULCONFIG'; 'Band' (NONE) labeled 'BAND'; 'Scrambling Code(0x)' (0) labeled 'SCRCODE'; and 'Long Span Code Search' (Off) labeled 'LSCODESEARCH'. A 'Display Results' button is at the bottom of the settings section. Below this is a list of measurement options, each with a dropdown arrow: 'Vector Signal Generator', 'Measurement', 'Spectrum Emission Mask', 'OBW', 'EVM', 'IQ Constellation', 'Phase Error', 'Magnitude Error', 'Level Calibration', and 'Test Command'.

Figure 3.3.4-1 Measurement Settings Pane

For the Native remote control commands of the Vector Signal Generator, refer to Figure 3.2.4-2 Measurement Settings Pane (Vector Signal Generator).

For the Native remote control commands of Level Calibration, refer to Figure 3.2.4-3 Measurement Settings Pane (Level Calibration).

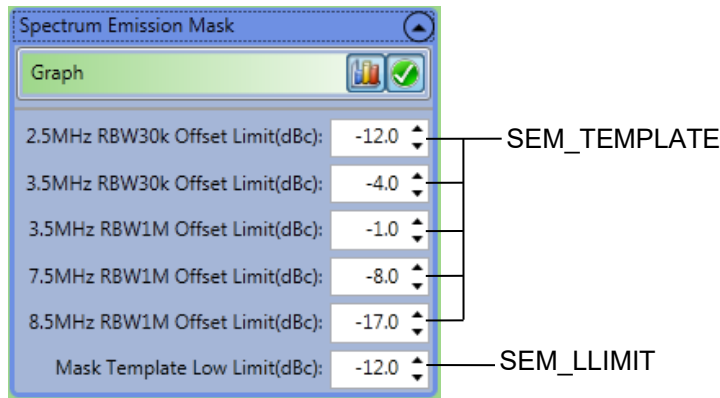


Figure 3.3.4-2 Measurement Settings Pane (Spectrum Emission Mask Dialog)

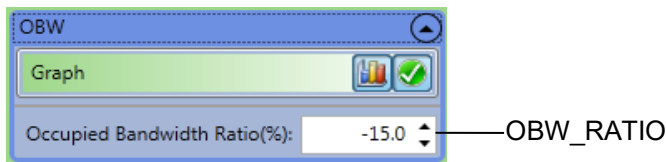


Figure 3.3.4-3 Measurement Settings Pane (OBW Dialog)

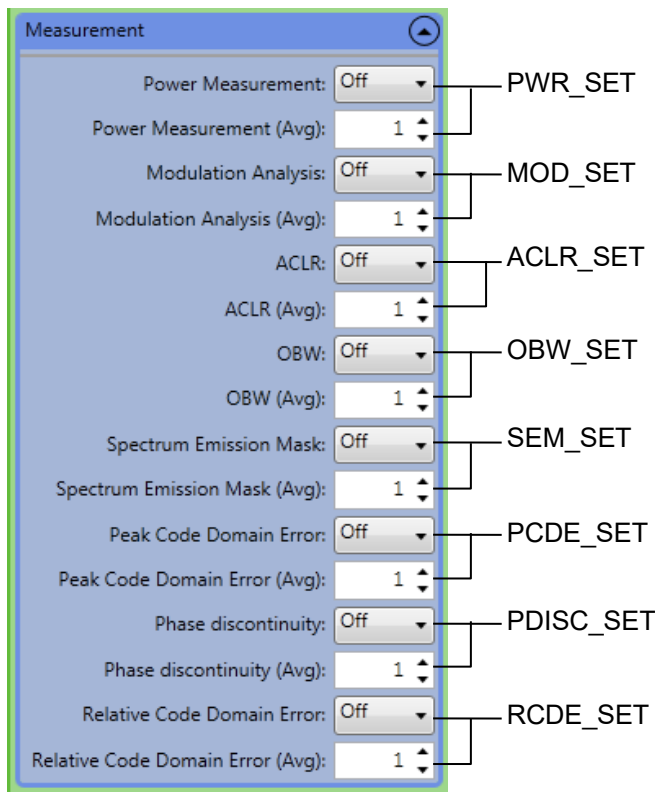


Figure 3.3.4-4 Measurement Settings Pane (Measurement Dialog)

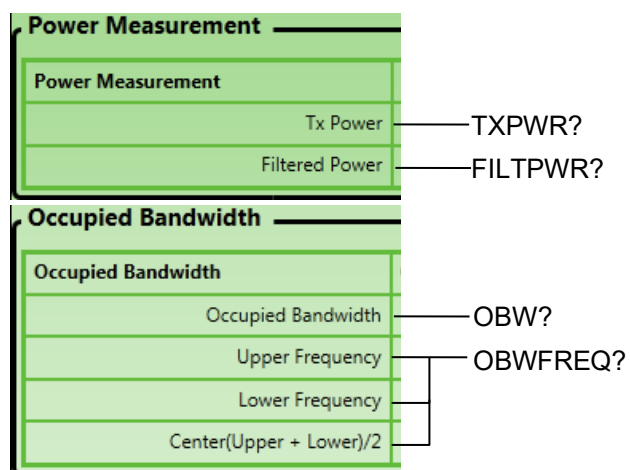


Figure 3.3.4-5 Power Measurement and Occupied Bandwidth Results

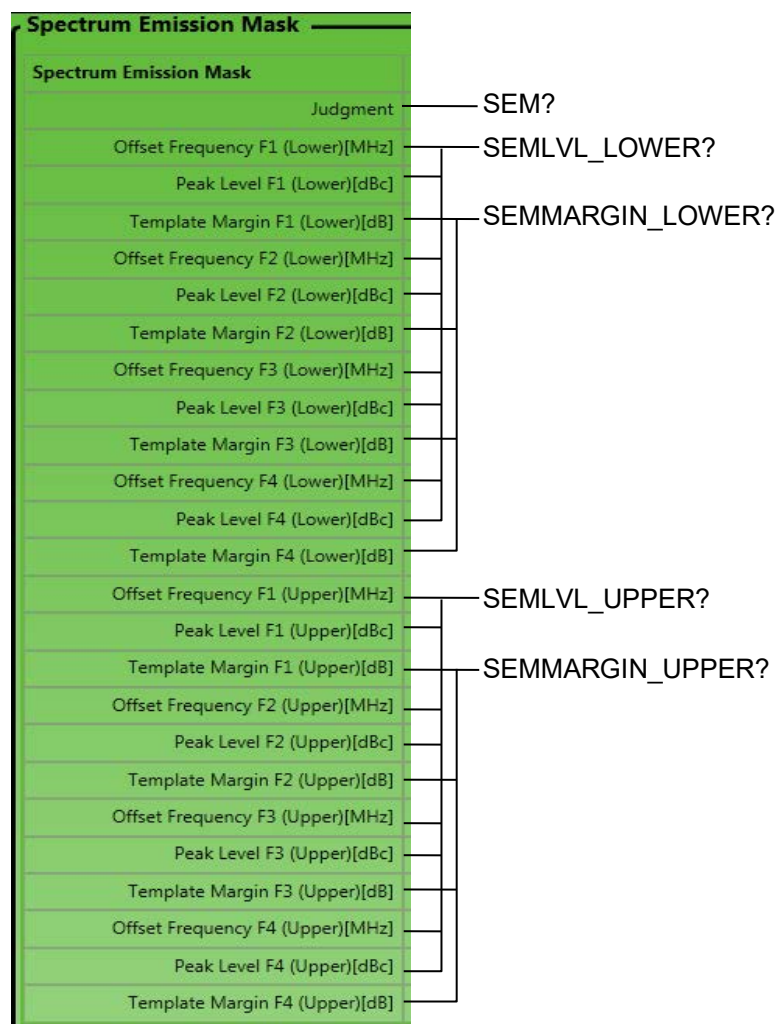


Figure 3.3.4-6 Spectrum Emission Mask Results

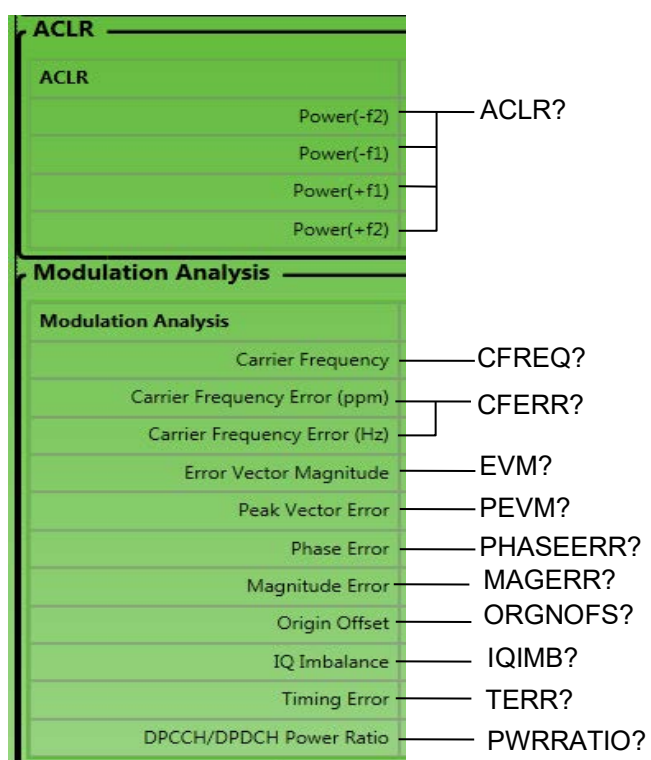


Figure 3.3.4-7 ACLR and Modulation Analysis Results

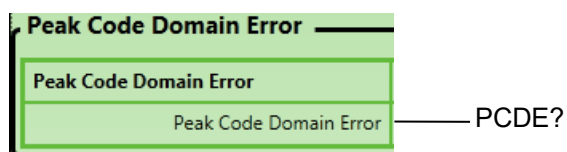


Figure 3.3.4-8 Peak Code Domain Error Results

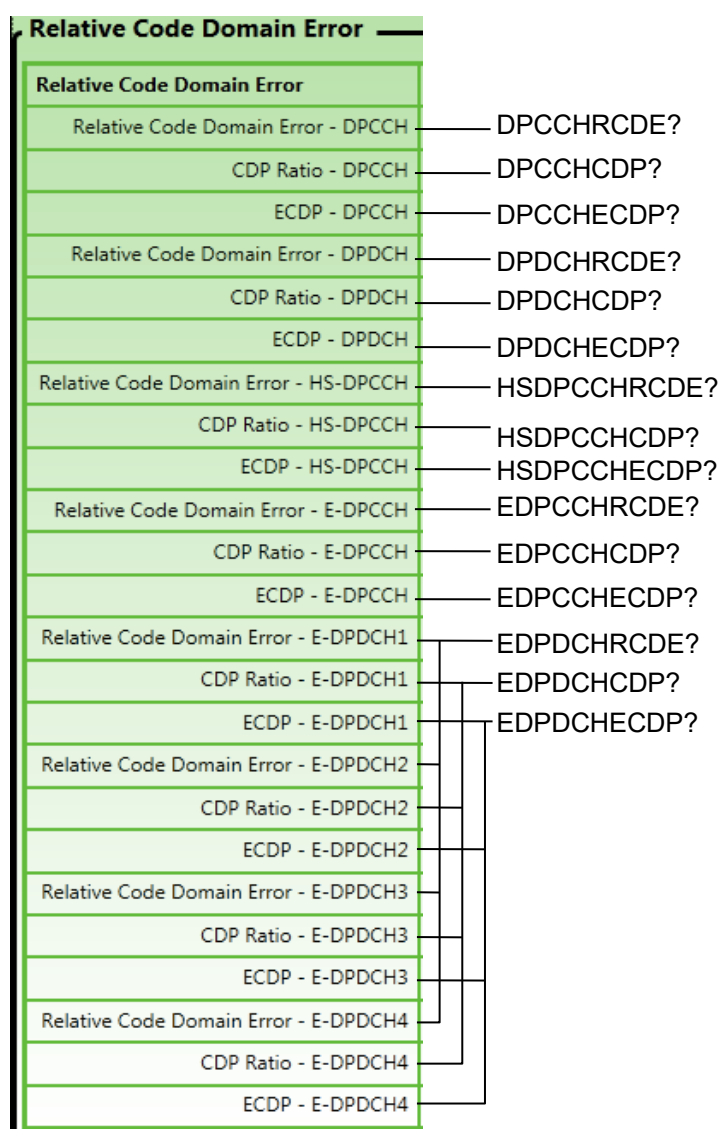


Figure 3.3.4-9 Relative Code Domain Power Results

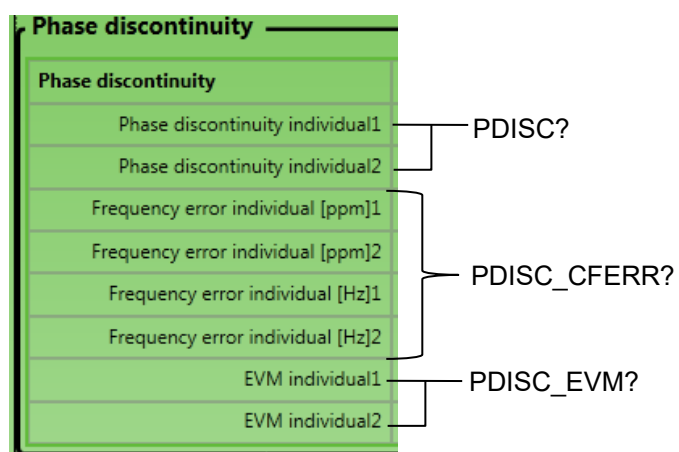


Figure 3.3.4-10 Phase Discontinuity Results

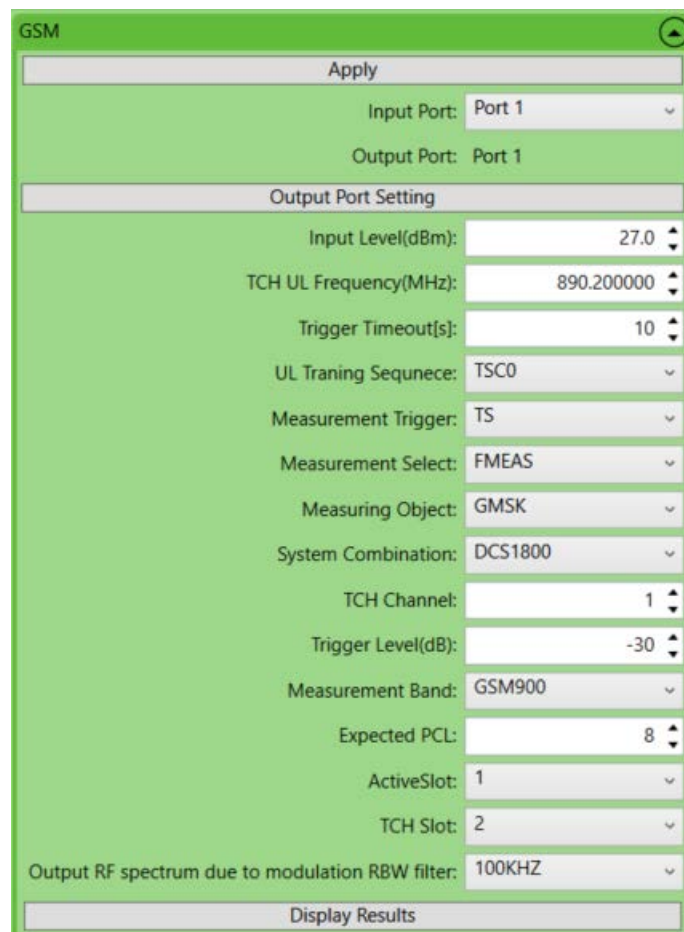
3.4 GSM

Refer to Chapter 2 “Fundamental Measurement” in *the MX887012A GSM/EDGE Uplink TX Measurement Operation Manual* for a description of the GSM/EDGE Uplink TX Measurement items.

This section describes the GSM settings and displays.

3.4.1 Measurement settings

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



The screenshot shows the 'GSM' settings pane with a green header and a green background. It contains several sections and parameters:

- Apply** button at the top.
- Input Port:** Port 1 (dropdown)
- Output Port:** Port 1 (dropdown)
- Output Port Setting** section header.
- Input Level(dBm):** 27.0 (spin button)
- TCH UL Frequency(MHz):** 890.200000 (spin button)
- Trigger Timeout[s]:** 10 (spin button)
- UL Training Sequence:** TSC0 (dropdown)
- Measurement Trigger:** TS (dropdown)
- Measurement Select:** FMEAS (dropdown)
- Measuring Object:** GMSK (dropdown)
- System Combination:** DCS1800 (dropdown)
- TCH Channel:** 1 (spin button)
- Trigger Level(dB):** -30 (spin button)
- Measurement Band:** GSM900 (dropdown)
- Expected PCL:** 8 (spin button)
- ActiveSlot:** 1 (dropdown)
- TCH Slot:** 2 (dropdown)
- Output RF spectrum due to modulation RBW filter:** 100KHZ (dropdown)
- Display Results** button at the bottom.

Figure 3.4.1-1 GSM Settings Pane (1/2)

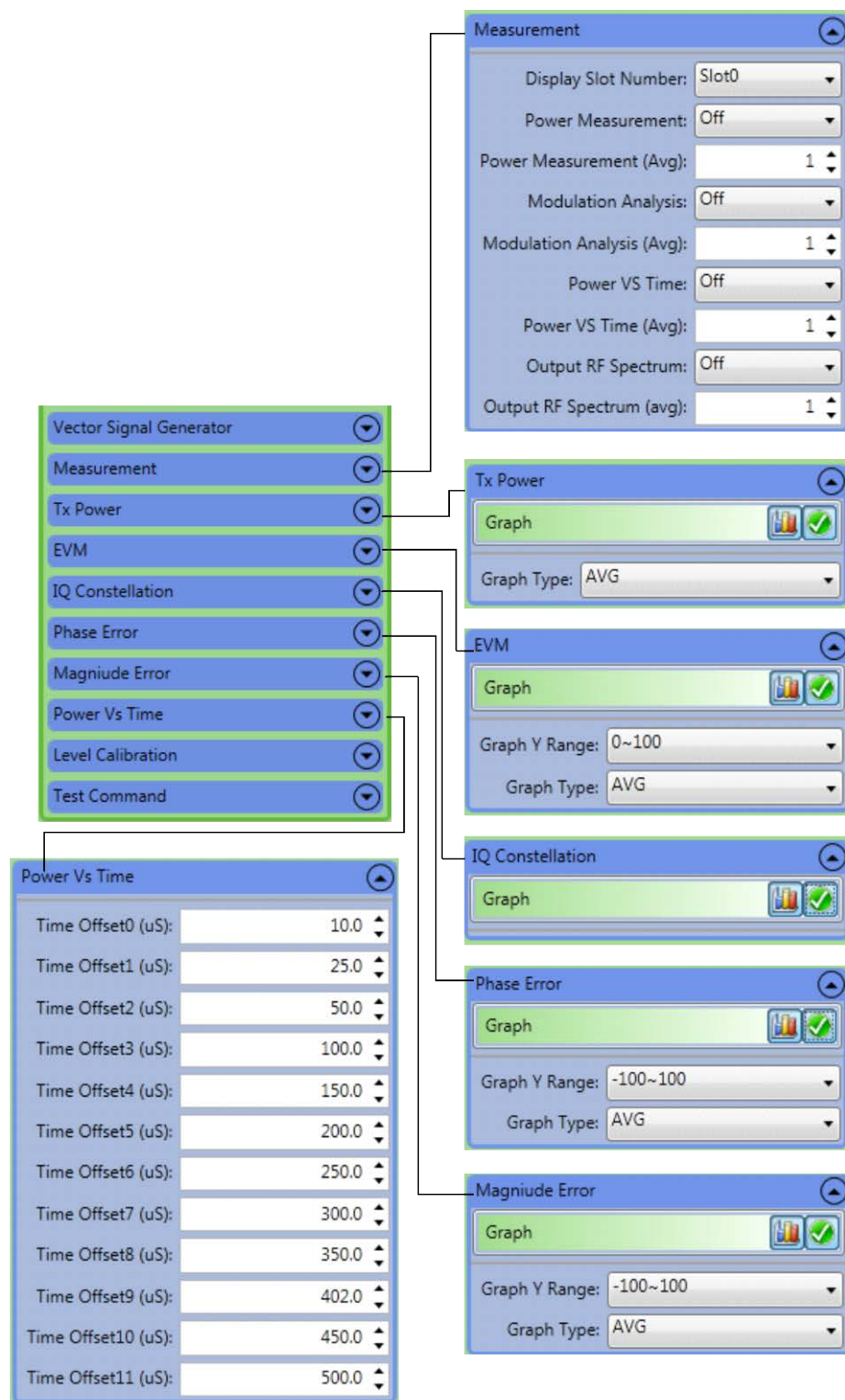


Figure 3.4.1-2 GSM Settings Panes (2/2)

For the expandable menus of Vector Signal Generator, Level Calibration, and Test Command, refer to Figure 3.2.1-1 Spectrum Monitor Settings Pane.

3.4.2 Measurement and results

To perform measurement:

1. Set the parameters for all buttons from **Input Port** to **TCH Slot**.
2. Click the **Measurement** button to open the dialog and set the parameters.
3. Set a checkmark in the  checkboxes in each dialog for **Spectrum Emission Mask**, **OBW**, **EVM**, **IQ Constellation**, **Phase Error**, and **Magnitude Error** to open the graph displays.
4. Select the data save method (**Graph Type**) in each of the **Tx Power**, **EVM**, **Phase Error** and **Magnitude Error** dialogs.
5. Select the graph scale (**Graph Y Range**) for each of the **EVM**, **Phase Error** and **Magnitude Error** dialogs.
6. Click the **Power vs Time** button to open the dialog and specify each Time Offset.
7. Click the **Apply** button to send the parameters to the hardware.
8. Click the **Display Results** button to display the **GSM** tab.
9. Click the  **Measurement Start** button
10. The numerical data are displayed in the **GSM** tab after measurement is completed.
11. Click the  button in the **Tx Power**, **EVM**, **IQ Constellation**, **Phase Error**, and **Magnitude Error** dialogs to open the graph displays.

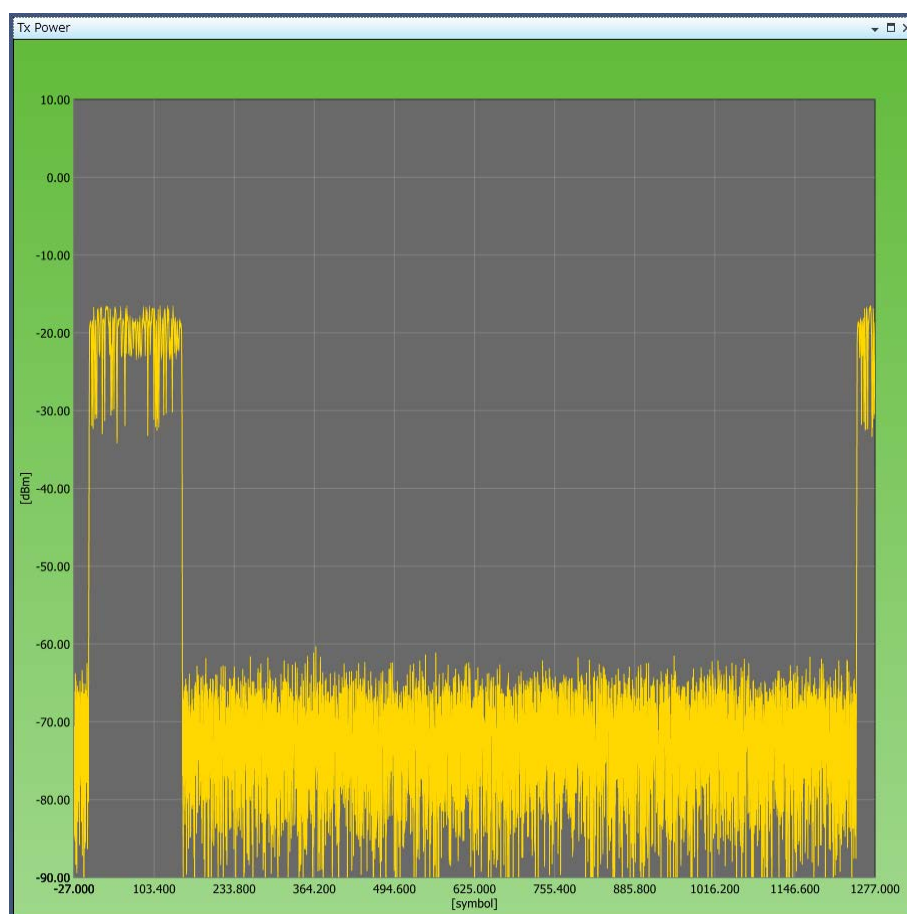


Figure 3.4.2-1 GSM (Tx Power) Graph

3.4.3 Related SCPI Commands

The SCPI commands for remote control of the MX887012A GSM/EDGE Uplink TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of the commands, refer to Chapter 4 “SCPI Command Reference” in *the MX887012A GSM/EDGE Uplink TX Measurement Operation Manual*.

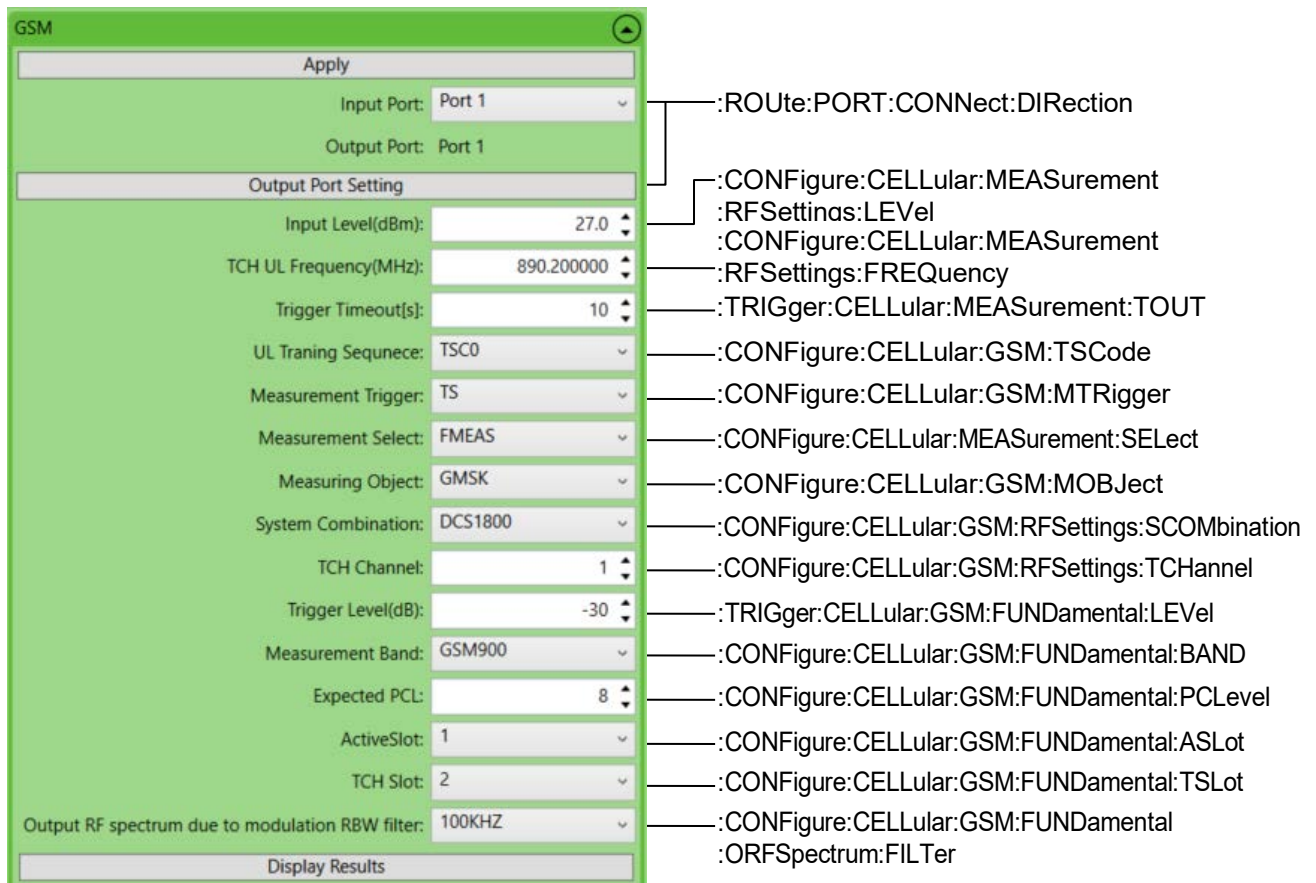


Figure 3.4.3-1 Measurement Settings Pane

For the SCPI remote control commands of the Vector Signal Generator, refer to Figure 3.2.3-2 Measurement Settings Pane (Vector Signal Generator).

For the SCPI remote control commands of Level Calibration, refer to Figure 3.2.3-3 Measurement Settings Pane (Level Calibration).

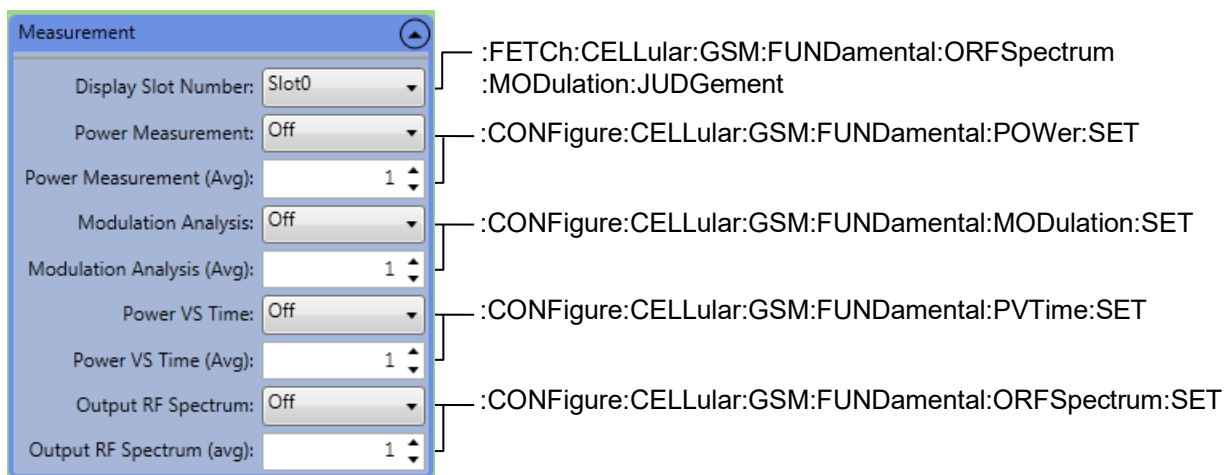


Figure 3.4.3-2 Measurement Settings Pane (Measurement Dialog)

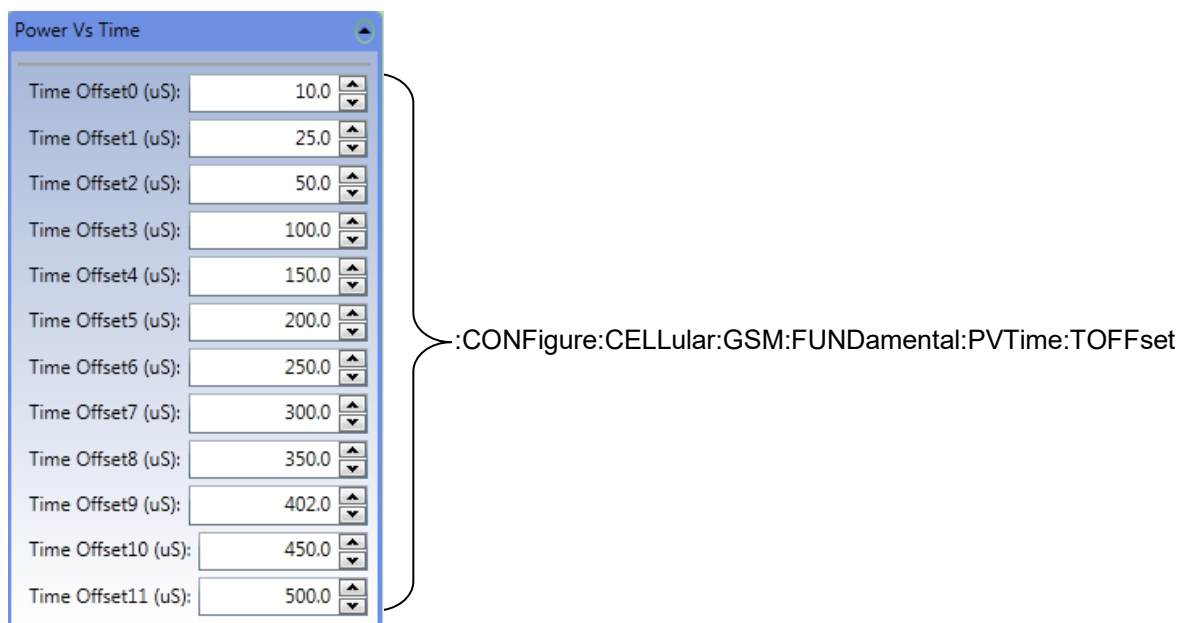


Figure 3.4.3-3 Measurement Settings Pane (Power vs Time Dialog)

Power Measurement	
Power Measurement	
Tx Power	:FETCh:CELLular:GSM:FUNDamental:POWer:TXPower?
Carrier Off Power	:FETCh:CELLular:GSM:FUNDamental:POWer:OFFPower?
On/Off Ratio	:FETCh:CELLular:GSM:FUNDamental:POWer:RATio?
Power Flatness Maximum Power	:FETCh:CELLular:GSM:FUNDamental:POWer:PFMaximum?
Power Flatness Minimum Power	:FETCh:CELLular:GSM:FUNDamental:POWer:PFMinimum?
Estimated Power	:FETCh:CELLular:GSM:FUNDamental:POWer:EPOWer?

Figure 3.4.3-4 Power Measurement Results

Power VS Time	
Power VS Time	
Offset0	:FETCh:CELLular:GSM:FUNDamental:PVTime:OTPower?
Offset1	
Offset2	
Offset3	
Offset4	
Offset5	
Offset6	
Offset7	
Offset8	
Offset9	
Offset10	
Offset11	
template	:FETCh:CELLular:GSM:FUNDamental:PVTime:TEMPlate?
template detail1	:FETCh:CELLular:GSM:FUNDamental:PVTime:TEMPlate :DETail?
template detail2	
template detail3	
template detail4	
template detail5	
template detail6	
template detail7	
template detail8	
template detail9	
template detail10	
Time Alignment	:FETCh:CELLular:GSM:FUNDamental:PVTime:TERRor?
Time Alignment (Worst)	:FETCh:CELLular:GSM:FUNDamental:PVTime:TERRor :WORSt?

Figure 3.4.3-5 Power vs Time Results

Modulation Analysis	
Modulation Analysis	
Carrier Frequency	:FETCh:CELLular:GSM:FUNDamental:MODulation:CFRequency?
Carrier Frequency Error(ppm)	:FETCh:CELLular:GSM:FUNDamental:MODulation:FERRor?
Carrier Frequency Error(Hz)	
Carrier Frequency Error(ppm Worst)	
Carrier Frequency Error(Hz Worst)	
RMS Phase Error	:FETCh:CELLular:GSM:FUNDamental:MODulation:PHERror?
Peak Phase Error	:FETCh:CELLular:GSM:FUNDamental:MODulation:PPHerror?
Magnitude Error	:FETCh:CELLular:GSM:FUNDamental:MODulation:MERRor?
RMS EVM	:FETCh:CELLular:GSM:FUNDamental:MODulation:EVM?
Peak EVM	:FETCh:CELLular:GSM:FUNDamental:MODulation:PEVM?
Origin Offset	:FETCh:CELLular:GSM:FUNDamental:MODulation:ORGNoffset?
IQ Imbalance	:FETCh:CELLular:GSM:FUNDamental:MODulation:IQIMbalance?
95:th Percentile	:FETCh:CELLular:GSM:FUNDamental:MODulation:EPERcentile?

Figure 3.4.3-6 Modulation Analysis Results

TX IQ Measurement	
TX IQ Measurement	
-270.833 kHz Offset	:FETCh:CELLular:GSM:FUNDamental:TXIQ:POWer?
-203.125 kHz Offset	
-135.416 kHz Offset	
-67.708 kHz Offset	
Center Frequency	
+67.708 kHz Offset	
+135.416 kHz Offset	
+203.125 kHz Offset	
+270.833 kHz Offset	

Figure 3.4.3-7 TX IQ Measurement Results

Output RF Spectrum Measurement	
Output RF Spectrum Measurement	
Due to Modulation Judgement	:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum :MODulation:JUDGement?
Due to Modulation 0 kHz Offset	:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum :MODulation:LOWer?
Due to Modulation -100 kHz Offset	
Due to Modulation -200 kHz Offset	
Due to Modulation -250 kHz Offset	
Due to Modulation -400 kHz Offset	
Due to Modulation -600 kHz Offset	
Due to Modulation -800 kHz Offset	
Due to Modulation -1000 kHz Offset	
Due to Modulation -1200 kHz Offset	
Due to Modulation -1400 kHz Offset	
Due to Modulation -1600 kHz Offset	
Due to Modulation -1800 kHz Offset	
Due to Modulation -2000 kHz Offset	
Due to Modulation -100 kHz Offset Template judgement	:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum :MODulation:LOWer:FPOint?
Due to Modulation -200 kHz Offset Template judgement	
Due to Modulation -250 kHz Offset Template judgement	
Due to Modulation -400 kHz Offset Template judgement	
Due to Modulation -600 kHz Offset Template judgement	
Due to Modulation -800 kHz Offset Template judgement	
Due to Modulation -1000 kHz Offset Template judgement	
Due to Modulation -1200 kHz Offset Template judgement	
Due to Modulation -1400 kHz Offset Template judgement	
Due to Modulation -1600 kHz Offset Template judgement	
Due to Modulation -1800 kHz Offset Template judgement	
Due to Modulation -2000 kHz Offset Template judgement	

Figure 3.4.3-8 Output RF Spectrum Measurement Results (1/4)

Due to Modulation 0 kHz offset	:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum :MODulation:UPPer?
Due to Modulation +100 kHz offset	
Due to Modulation +200 kHz offset	
Due to Modulation +250 kHz offset	
Due to Modulation +400 kHz offset	
Due to Modulation +600 kHz offset	
Due to Modulation +800 kHz offset	
Due to Modulation +1000 kHz offset	
Due to Modulation +1200 kHz offset	
Due to Modulation +1400 kHz offset	
Due to Modulation +1600 kHz offset	
Due to Modulation +1800 kHz offset	
Due to Modulation +2000 kHz offset	
Due to Modulation +100 kHz Offset Template judgement	:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum :MODulation:UPPer:FPOint?
Due to Modulation +200 kHz Offset Template judgement	
Due to Modulation +250 kHz Offset Template judgement	
Due to Modulation +400 kHz Offset Template judgement	
Due to Modulation +600 kHz Offset Template judgement	
Due to Modulation +800 kHz Offset Template judgement	
Due to Modulation +1000 kHz Offset Template judgement	
Due to Modulation +1200 kHz Offset Template judgement	
Due to Modulation +1400 kHz Offset Template judgement	
Due to Modulation +1600 kHz Offset Template judgement	
Due to Modulation +1800 kHz Offset Template judgement	
Due to Modulation +2000 kHz Offset Template judgement	

Figure 3.4.3-9 Output RF Spectrum Measurement Results (2/4)

Due to Switching Judgement	:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum :SWITching:JUDGement?
Due to Switching(Lower side) 0 kHz Offset	
Due to Switching(Lower side) -100 kHz Offset	
Due to Switching(Lower side) -200 kHz Offset	
Due to Switching(Lower side) -250 kHz Offset	
Due to Switching(Lower side) -400 kHz Offset	
Due to Switching(Lower side) -600 kHz Offset	
Due to Switching(Lower side) -800 kHz Offset	:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum :SWITching:LOWer?
Due to Switching(Lower side) -1000 kHz Offset	
Due to Switching(Lower side) -1200 kHz Offset	
Due to Switching(Lower side) -1400 kHz Offset	
Due to Switching(Lower side) -1600 kHz Offset	
Due to Switching(Lower side) -1800 kHz Offset	
Due to Switching(Lower side) -2000 kHz Offset	
Due to Switching -100 kHz Offset Template judgement	
Due to Switching -200 kHz Offset Template judgement	
Due to Switching -250 kHz Offset Template judgement	
Due to Switching -400 kHz Offset Template judgement	
Due to Switching -600 kHz Offset Template judgement	
Due to Switching -800 kHz Offset Template judgement	:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum :SWITching:LOWer:FPOint?
Due to Switching -1000 kHz Offset Template judgement	
Due to Switching -1200 kHz Offset Template judgement	
Due to Switching -1400 kHz Offset Template judgement	
Due to Switching -1600 kHz Offset Template judgement	
Due to Switching -1800 kHz Offset Template judgement	
Due to Switching -2000 kHz Offset Template judgement	

Figure 3.4.3-10 Output RF Spectrum Measurement Results (3/4)

Due to Switching 0 kHz Offset	:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum :SWITching:UPPer?
Due to Switching +100 kHz Offset	
Due to Switching +200 kHz Offset	
Due to Switching +250 kHz Offset	
Due to Switching +400 kHz Offset	
Due to Switching +600 kHz Offset	
Due to Switching +800 kHz Offset	
Due to Switching +1000 kHz Offset	
Due to Switching +1200 kHz Offset	
Due to Switching +1400 kHz Offset	
Due to Switching +1600 kHz Offset	
Due to Switching +1800 kHz Offset	
Due to Switching +2000 kHz Offset	
Due to Switching +100 kHz Offset Template judgement	:FETCh:CELLular:GSM:FUNDamental:ORFSpectrum :SWITching:UPPer:FPOint?
Due to Switching +200 kHz Offset Template judgement	
Due to Switching +250 kHz Offset Template judgement	
Due to Switching +400 kHz Offset Template judgement	
Due to Switching +600 kHz Offset Template judgement	
Due to Switching +800 kHz Offset Template judgement	
Due to Switching +1000 kHz Offset Template judgement	
Due to Switching +1200 kHz Offset Template judgement	
Due to Switching +1400 kHz Offset Template judgement	
Due to Switching +1600 kHz Offset Template judgement	
Due to Switching +1800 kHz Offset Template judgement	
Due to Switching +2000 kHz Offset Template judgement	

Figure 3.4.3-11 Output RF Spectrum Measurement Results (4/4)

3.4.4 Related Native Commands

The Native commands for remote control of the MX887012A GSM/EDGE Uplink TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of the commands, refer to Section 5 “Native Command Reference” in *the MX887012A GSM/EDGE Uplink TX Measurement Operation Manual*.

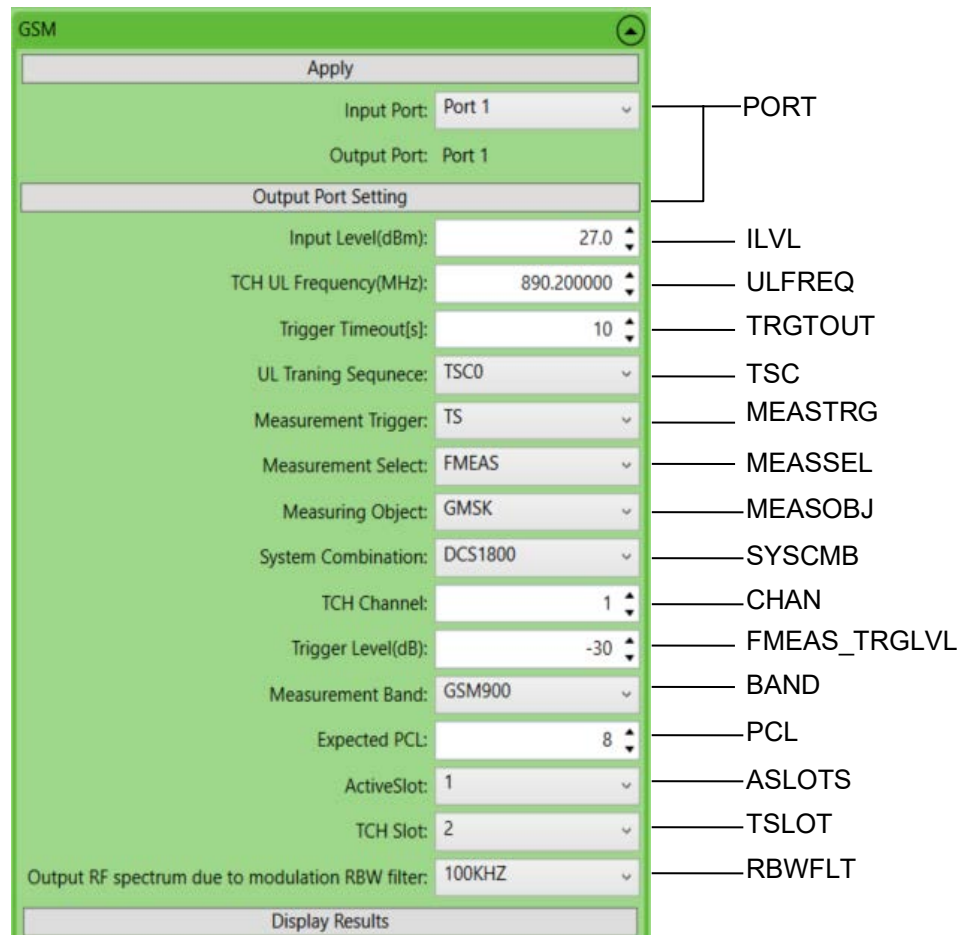


Figure 3.4.4-1 Measurement Setting Pane

For the Native remote control commands of the Vector Signal Generator, refer to Figure 3.2.4-2 Measurement Settings Pane (Vector Signal Generator).

For the Native remote control commands of Level Calibration, refer to Figure 3.2.4-3 Measurement Settings Pane (Level Calibration).

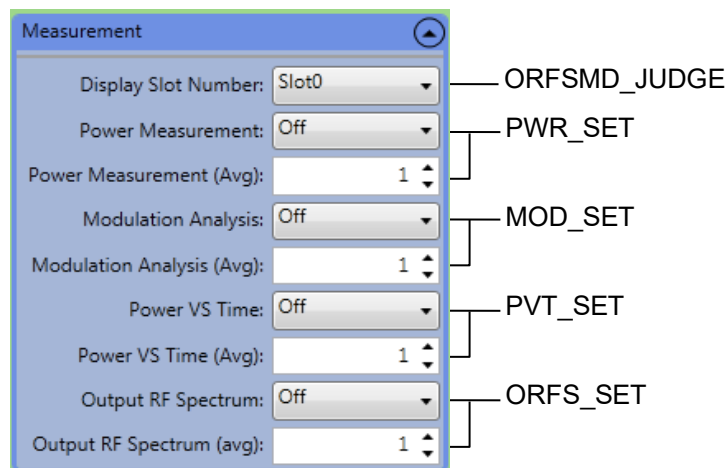


Figure 3.4.4-2 Measurement Settings Pane (Measurement Dialog)

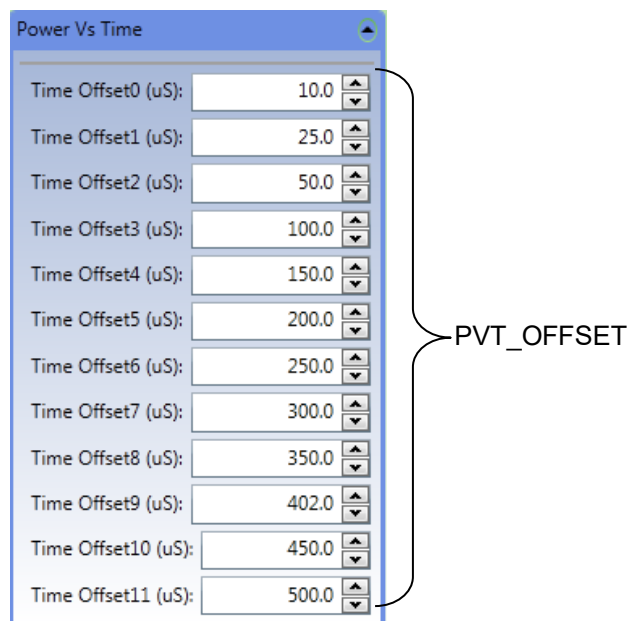


Figure 3.4.4-3 Measurement Settings Pane (Power vs Time Dialog)

Power Measurement	
Power Measurement	
Tx Power	TXPWR?
Carrier Off Power	OFFPWR?
On/Off Ratio	RATIO?
Power Flatness Maximum Power	MAXPWR?
Power Flatness Minimum Power	MINPWR?
Estimated Power	ESTPWR?

Figure 3.4.4-4 Power Measurement Results

Power VS Time	
Power VS Time	
Offset0	PVT?
Offset1	
Offset2	
Offset3	
Offset4	
Offset5	
Offset6	
Offset7	
Offset8	
Offset9	
Offset10	
Offset11	
template	PVT_TEMPLATE?
template detail1	PVT_DETAIL?
template detail2	
template detail3	
template detail4	
template detail5	
template detail6	
template detail7	
template detail8	
template detail9	
template detail10	
Time Alignment	TERR?
Time Alignment (Worst)	TERR_WORST?

Figure 3.4.4-5 Power vs Time Results

Modulation Analysis	
Modulation Analysis	Column
Carrier Frequency	CFREQ?
Carrier Frequency Error(ppm)	CFERR?
Carrier Frequency Error(Hz)	CFERR_WORST?
Carrier Frequency Error(ppm Worst)	
Carrier Frequency Error(Hz Worst)	
RMS Phase Error	PHASEERR?
Peak Phase Error	PPHASEERR?
Magnitude Error	MAGERR?
RMS EVM	EVM?
Peak EVM	PEVM?
Origin Offset	ORGNOFS?
IQ Imbalance	IQIMB?
95:th Percentile	EVM95PCT?

Figure 3.4.4-6 Modulation Analysis Results

TX IQ Measurement	
TX IQ Measurement	Column
-270.833 kHz Offset	TXIQ?
-203.125 kHz Offset	
-135.416 kHz Offset	
-67.708 kHz Offset	
Center Frequency	
+67.708 kHz Offset	
+135.416 kHz Offset	
+203.125 kHz Offset	
+270.833 kHz Offset	

Figure 3.4.4-7 TX IQ Measurement Results

Output RF Spectrum Measurement	
Output RF Spectrum Measurement	C
Due to Modulation Judgement	ORFSMD_JUDGE?
Due to Modulation 0 kHz Offset	ORFSMD_L?
Due to Modulation -100 kHz Offset	
Due to Modulation -200 kHz Offset	
Due to Modulation -250 kHz Offset	
Due to Modulation -400 kHz Offset	
Due to Modulation -600 kHz Offset	
Due to Modulation -800 kHz Offset	
Due to Modulation -1000 kHz Offset	
Due to Modulation -1200 kHz Offset	
Due to Modulation -1400 kHz Offset	
Due to Modulation -1600 kHz Offset	ORFSMD_JUDGE_L?
Due to Modulation -1800 kHz Offset	
Due to Modulation -2000 kHz Offset	
Due to Modulation -100 kHz Offset Template judgement	
Due to Modulation -200 kHz Offset Template judgement	
Due to Modulation -250 kHz Offset Template judgement	
Due to Modulation -400 kHz Offset Template judgement	
Due to Modulation -600 kHz Offset Template judgement	
Due to Modulation -800 kHz Offset Template judgement	
Due to Modulation -1000 kHz Offset Template judgement	
Due to Modulation -1200 kHz Offset Template judgement	
Due to Modulation -1400 kHz Offset Template judgement	
Due to Modulation -1600 kHz Offset Template judgement	
Due to Modulation -1800 kHz Offset Template judgement	
Due to Modulation -2000 kHz Offset Template judgement	

Figure 3.4.4-8 Output RF Spectrum Measurement Results (1/4)

Due to Modulation 0 kHz offset	ORFSMD_U?
Due to Modulation +100 kHz offset	
Due to Modulation +200 kHz offset	
Due to Modulation +250 kHz offset	
Due to Modulation +400 kHz offset	
Due to Modulation +600 kHz offset	
Due to Modulation +800 kHz offset	
Due to Modulation +1000 kHz offset	
Due to Modulation +1200 kHz offset	
Due to Modulation +1400 kHz offset	
Due to Modulation +1600 kHz offset	
Due to Modulation +1800 kHz offset	
Due to Modulation +2000 kHz offset	
Due to Modulation +100 kHz Offset Template judgement	ORFSMD_JUDGE_U?
Due to Modulation +200 kHz Offset Template judgement	
Due to Modulation +250 kHz Offset Template judgement	
Due to Modulation +400 kHz Offset Template judgement	
Due to Modulation +600 kHz Offset Template judgement	
Due to Modulation +800 kHz Offset Template judgement	
Due to Modulation +1000 kHz Offset Template judgement	
Due to Modulation +1200 kHz Offset Template judgement	
Due to Modulation +1400 kHz Offset Template judgement	
Due to Modulation +1600 kHz Offset Template judgement	
Due to Modulation +1800 kHz Offset Template judgement	
Due to Modulation +2000 kHz Offset Template judgement	

Figure 3.4.4-9 Output RF Spectrum Measurement Results (2/4)

Due to Switching Judgement	ORFSSW_JUDGE?
Due to Switching(Lower side) 0 kHz Offset	ORFSSW_L?
Due to Switching(Lower side) -100 kHz Offset	
Due to Switching(Lower side) -200 kHz Offset	
Due to Switching(Lower side) -250 kHz Offset	
Due to Switching(Lower side) -400 kHz Offset	
Due to Switching(Lower side) -600 kHz Offset	
Due to Switching(Lower side) -800 kHz Offset	
Due to Switching(Lower side) -1000 kHz Offset	
Due to Switching(Lower side) -1200 kHz Offset	
Due to Switching(Lower side) -1400 kHz Offset	
Due to Switching(Lower side) -1600 kHz Offset	
Due to Switching(Lower side) -1800 kHz Offset	
Due to Switching(Lower side) -2000 kHz Offset	
Due to Switching -100 kHz Offset Template judgement	ORFSSW_JUDGE_L?
Due to Switching -200 kHz Offset Template judgement	
Due to Switching -250 kHz Offset Template judgement	
Due to Switching -400 kHz Offset Template judgement	
Due to Switching -600 kHz Offset Template judgement	
Due to Switching -800 kHz Offset Template judgement	
Due to Switching -1000 kHz Offset Template judgement	
Due to Switching -1200 kHz Offset Template judgement	
Due to Switching -1400 kHz Offset Template judgement	
Due to Switching -1600 kHz Offset Template judgement	
Due to Switching -1800 kHz Offset Template judgement	
Due to Switching -2000 kHz Offset Template judgement	

Figure 3.4.4-10 Output RF Spectrum Measurement Results (3/4)

Due to Switching 0 kHz Offset	ORFSSW_U?
Due to Switching +100 kHz Offset	
Due to Switching +200 kHz Offset	
Due to Switching +250 kHz Offset	
Due to Switching +400 kHz Offset	
Due to Switching +600 kHz Offset	
Due to Switching +800 kHz Offset	
Due to Switching +1000 kHz Offset	
Due to Switching +1200 kHz Offset	
Due to Switching +1400 kHz Offset	
Due to Switching +1600 kHz Offset	
Due to Switching +1800 kHz Offset	
Due to Switching +2000 kHz Offset	
Due to Switching +100 kHz Offset Template judgement	ORFSSW_JUDGE_U?
Due to Switching +200 kHz Offset Template judgement	
Due to Switching +250 kHz Offset Template judgement	
Due to Switching +400 kHz Offset Template judgement	
Due to Switching +600 kHz Offset Template judgement	
Due to Switching +800 kHz Offset Template judgement	
Due to Switching +1000 kHz Offset Template judgement	
Due to Switching +1200 kHz Offset Template judgement	
Due to Switching +1400 kHz Offset Template judgement	
Due to Switching +1600 kHz Offset Template judgement	
Due to Switching +1800 kHz Offset Template judgement	
Due to Switching +2000 kHz Offset Template judgement	

Figure 3.4.4-11 Output RF Spectrum Measurement Results (4/4)

3.5 LTE

Refer to Chapter 2 “Fundamental Measurement” in *the MX887013A/14A LTE FDD/TDD Uplink TX Measurement Operation Manual* for a description of LTE FDD Uplink TX Measurement items.

This section describes the LTE measurements and displays.

3.5.1 Measurement settings

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

LTE	
Apply	
Input Port:	Port 1
Output Port:	Port 1
Output Port Setting	
Channel Coding:	RMC
Measurement Carrier:	PCC
UpLink Channel(CH):	18000
SCC-1 UpLink Channel(CH):	18300
DownLink Channel (CH):	0
Channel BandWidth(MHz):	5MHz
SCC-1 Channel BandWidth(MHz):	5MHz
Input Level(dBm):	-1.0
SCC-1 Input Level(dBm):	-1.0
Frequency(MHz):	1920.000000
SCC-1 Frequency(MHz):	1950.000000
Frame Structure:	FDD
SCC-1 Frame Structure:	FDD
Uplink RMC Configuration:	PUSCH
Uplink RMC Modulation:	QPSK
SCC-1 Uplink RMC Modulation:	QPSK
Uplink RMC Number Of RB:	25
SCC-1 Uplink RMC Number Of RB:	25
Uplink RMC Starting RB:	0
SCC-1 Uplink RMC Starting RB:	0
nRB-CQI:	1
SC-FDMA Symbol Position:	0
Long Span Search:	Off
Group hopping:	On
Frequency Error Range:	NORMAL
Uplink Downlink Configuration:	0

Figure 3.5.1-1 LTE Measurement Settings Pane (1/2)

The screenshot displays the LTE Measurement Settings Pane (2/2) with various configuration options. The pane is divided into several sections, each with a set of controls and a status indicator (a green checkmark icon).

Trigger Source: Power

Trigger Level(dB): -40

Trigger Delay(ms): 0.000

Trigger Timeout(s): 1

CellID: 1

SCC-1 CellID: 1

Cyclic Shift: On

Delta SS: 1

additional Spectrum Emission: NS_01

Operation Band: 1

SCC-1 Operation Band: 1

Test Environment: NORMAL

In-Band Emissions Carrier Leakage Frequency: at Carrier Frequency

In-Band Emissions Carrier Leakage Template: 0dBm

SCC-1 In-Band Emissions Carrier Leakage Template: 0dBm

SCC-1 Loss Table: 0

Display Results

Measurement

Power Measurement: Off

Power Measurement (Avg): 0

Modulation Analysis: Off

Modulation Analysis (Avg): 0

ACLR: Off

ACLR (Avg): 0

OBW: Off

OBW (Avg): 0

Spectrum Emission Mask: Off

Spectrum Emission Mask (Avg): 0

Spectrum Emission Mask

Spectrum Emission Mask

PCC Spectrum Emission Mask

SCC-1 Spectrum Emission Mask

template range1(dBm): -10.0

template range2(dBm): -8.0

template range3(dBm): -7.0

template range4(dBm): -14.0

Intra-band Contiguous

template range1(dBm): -9.0

template range2(dBm): -8.0

template range3(dBm): -10.0

template range4(dBm): -13.0

template range5(dBm): -9.0

template range6(dBm): -8.0

Modulation Analysis

EVM

SCC-1 EVM

IQ Constellation

SCC-1 IQ Constellation

Phase Error

SCC-1 Phase Error

Magnitude Error

SCC-1 Magnitude Error

In-Band Emissions

SCC-1 In-Band Emissions

Spectrum Flatness

SCC-1 Spectrum Flatness

Graph Type: AVG

In-Band Emissions Unit: dB

OBW

OBW

PCC OBW

SCC-1 OBW

Occupied Bandwidth Ratio(%): -12.0

Figure 3.5.1-2 LTE Measurement Settings Pane (2/2)

For the expandable menus of Vector Signal Generator, Level Calibration, and Test Command, refer to

Figure 3.2.1-1 Spectrum Monitor Settings Pane.

3.5.2 Measurement and results

1. Set the parameters for all buttons from **Input Port** to **AWGN Level**.
2. Click the **Measurement** button to open the dialog and set the parameters.
3. Click the **Spectrum Emission Mask** to open the dialog and set the specifications.
4. Click **Modulation Analysis** to open the window and set the data storage method (Graph Type) and vertical scale units.
5. Click **OBW** to open the dialog and set the specifications.
6. Set a checkmark in the  checkboxes in each dialog for **Spectrum Emission Mask**, **Modulation Analysis**, **OBW** and **Spectrum Flatness** to open the graph displays.
7. Click the **Apply** button to send the parameters to the hardware.
8. Click the **Display Results** button to display the **LTE** tab.
9. Click the  **Measurement Start** button
10. The numerical data are displayed in the **LTE** tab after measurement is completed.
11. Click the  button in the **Spectrum Emission Mask**, **Modulation Analysis**, **OBW**, and **Spectrum Flatness** dialogs to open the graph displays.

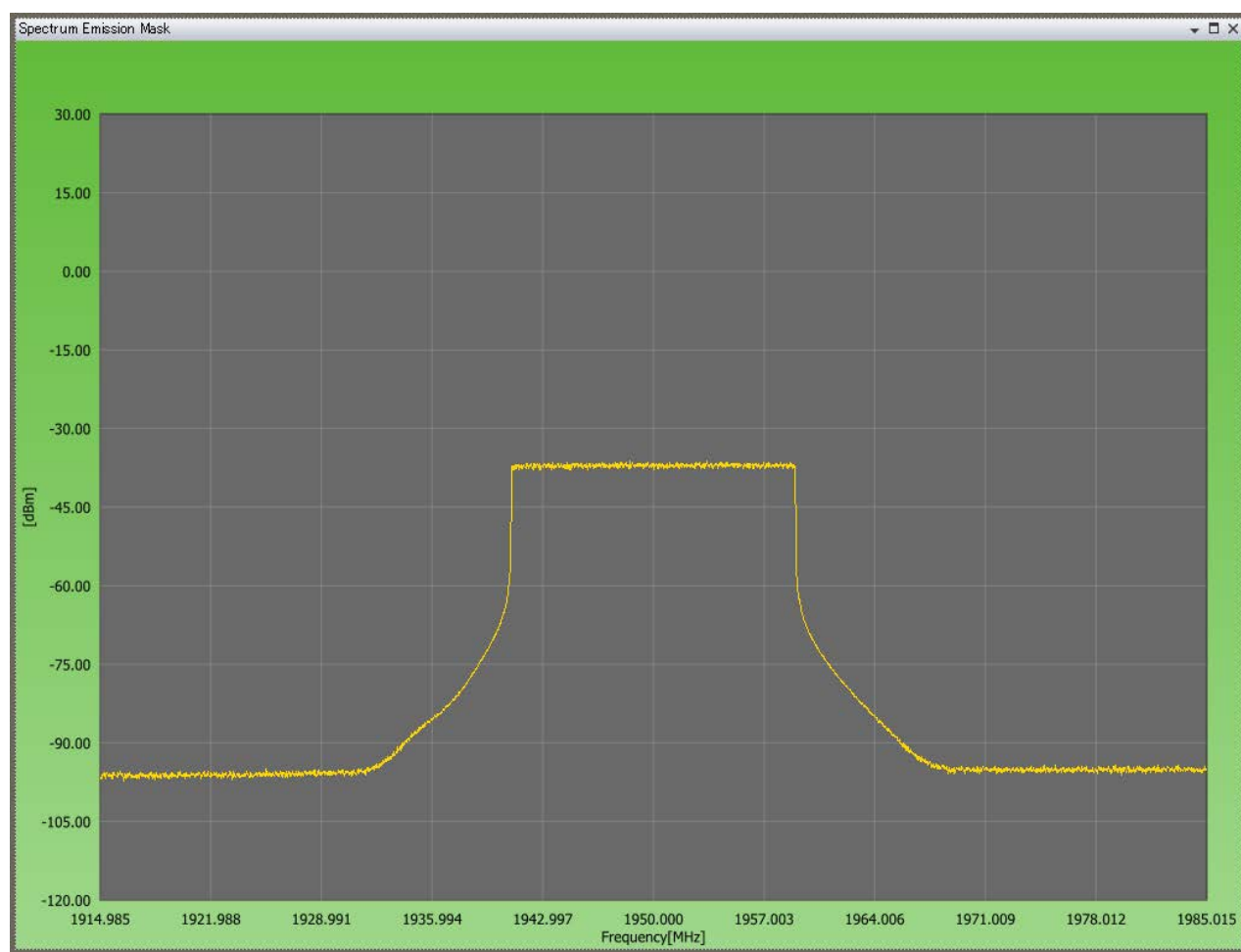


Figure 3.5.2-1 LTE (Spectrum Emission Mask) Graph

3.5.3 Related SCPI Commands

The SCPI commands for remote control of the MX887013A LTE FDD Uplink TX Measurement and MX887014A LTE TDD Uplink TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of the commands, refer to Chapter 4 “SCPI Command Reference” in *the MX887013A/14A LTE FDD/TDD Uplink TX Measurement Operation Manual*.

The screenshot shows the 'LTE' settings pane with various parameters and their corresponding SCPI commands. The parameters are listed on the left, and the SCPI commands are listed on the right, connected by lines.

Parameter	SCPI Command
Apply	:ROUTe:PORT:CONNect:DIRection
Input Port: Port 1	
Output Port: Port 1	
Output Port Setting	
Channel Coding: RMC	:CONFigure:CELLular:LTE:CHCoding
Measurement Carrier: PCC	:CONFigure:CELLular:LTE:MCARrier
UpLink Channel(CH): 18000	:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel
SCC-1 UpLink Channel(CH): 18300	:CONFigure:CELLular:MEASurement:RFSettings:ULCHannel:SCC1
DownLink Channel (CH): 0	:CONFigure:CELLular:MEASurement:RFSettings:DLCHannel
Channel BandWidth(MHz): 5MHz	:CONFigure:CELLular:LTE:CBANdwidth
SCC-1 Channel BandWidth(MHz): 5MHz	:CONFigure:CELLular:LTE:CBANdwidth:SCC1
Input Level(dBm): -1.0	:CONFigure:CELLular:MEASurement:RFSettings:LEVel
SCC-1 Input Level(dBm): -1.0	:CONFigure:CELLular:MEASurement:RFSettings:LEVel:SCC1
Frequency(MHz): 1920.000000	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency
SCC-1 Frequency(MHz): 1950.000000	:CONFigure:CELLular:MEASurement:RFSettings:FREQuency:SCC1
Frame Structure: FDD	:CONFigure:CELLular:LTE:FSTRucture
SCC-1 Frame Structure: FDD	:CONFigure:CELLular:LTE:FSTRucture:SCC1
Uplink RMC Configuration: PUSCH	:CONFigure:CELLular:LTE:CTYPE
Uplink RMC Modulation: QPSK	:CONFigure:CELLular:LTE:MODulation:MSCHeme
SCC-1 Uplink RMC Modulation: QPSK	:CONFigure:CELLular:LTE:MODulation:MSCHeme:SCC1
Uplink RMC Number Of RB: 25	:CONFigure:CELLular:LTE:RBAllocation:NRB
SCC-1 Uplink RMC Number Of RB: 25	:CONFigure:CELLular:LTE:RBAllocation:NRB:SCC1
Uplink RMC Starting RB: 0	:CONFigure:CELLular:LTE:RBAllocation:ORB
SCC-1 Uplink RMC Starting RB: 0	:CONFigure:CELLular:LTE:RBAllocation:ORB:SCC1
nRB-CQI: 1	:CONFigure:CELLular:LTE:RBCQI
SC-FDMA Symbol Position: 0	
Long Span Search: Off	:CONFigure:CELLular:LTE:FUNDamental:LSSearch
Group hopping: On	:CONFigure:CELLular:LTE:GHOPping
Frequency Error Range: NORMAL	:CONFigure:CELLular:LTE:FUNDamental:FERange
Uplink Downlink Configuration: 0	:CONFigure:CELLular:LTE:ULDL

Figure 3.5.3-1 Measurement Settings Pane (1/2)

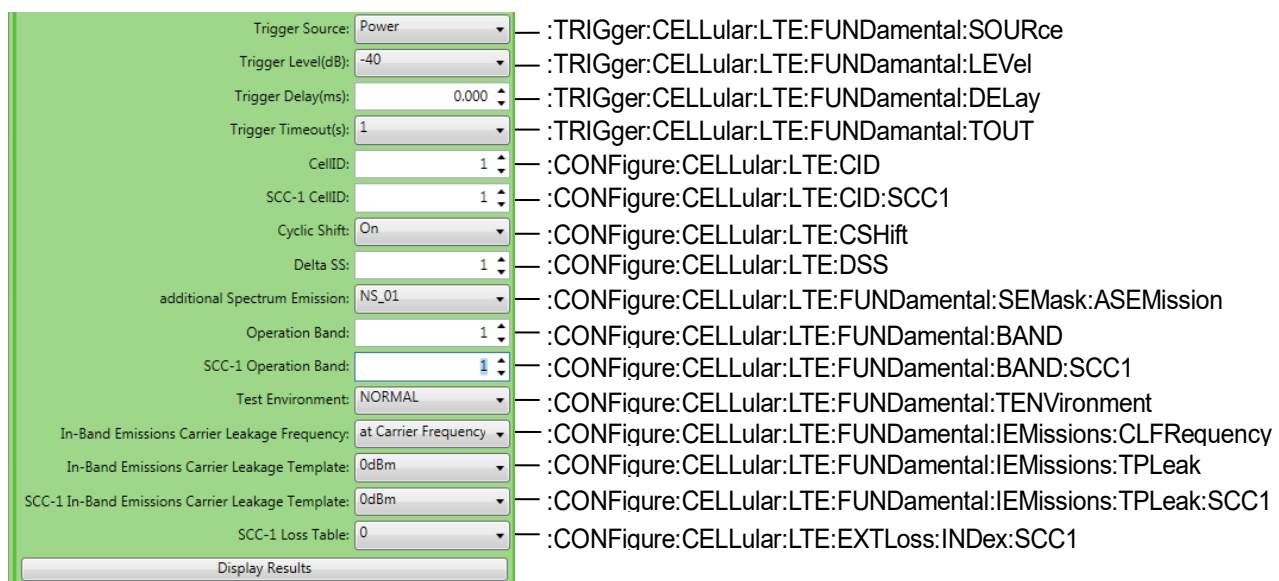


Figure 3.5.3-2 Measurement Settings Pane (2/2)

For the SCPI remote control commands of the Vector Signal Generator, refer to Figure 3.2.3-2 Measurement Settings Pane (Vector Signal Generator).

For the SCPI remote control commands of Level Calibration, refer to Figure 3.2.3-3 Measurement Settings Pane (Level Calibration).

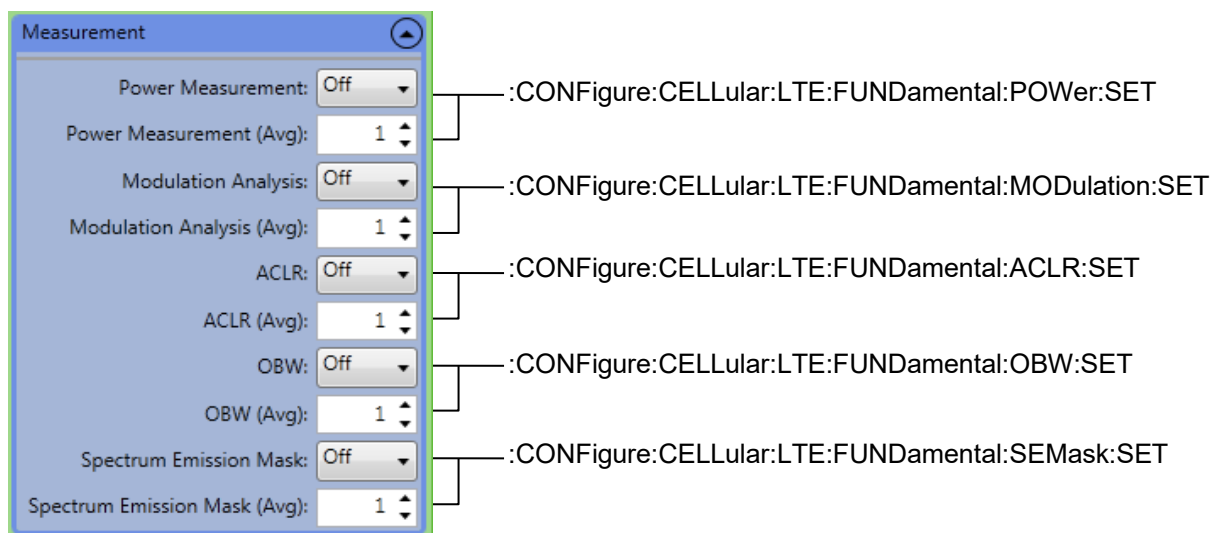


Figure 3.5.3-3 Measurement Settings Pane (Measurement Dialog)

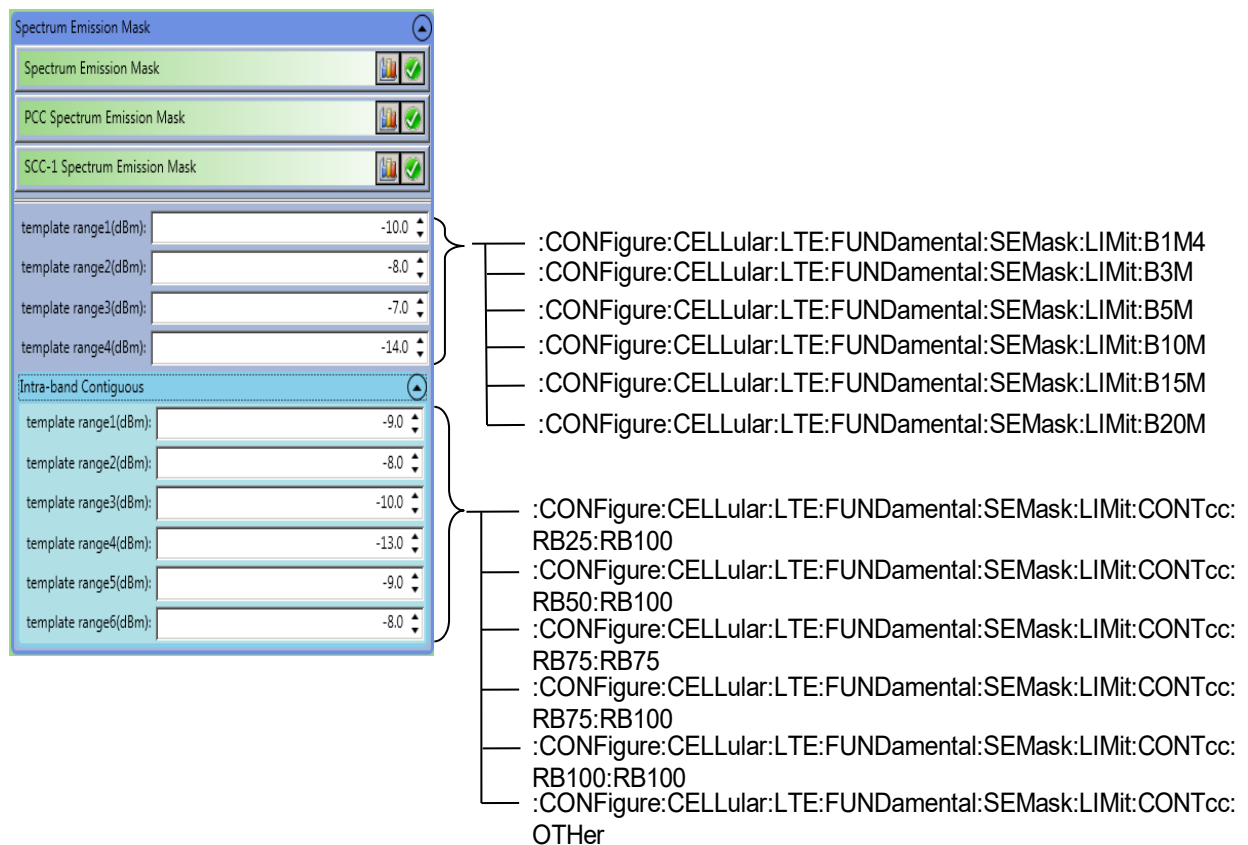


Figure 3.5.3-4 Measurement Settings Pane (Spectrum Emission Mask Dialog)

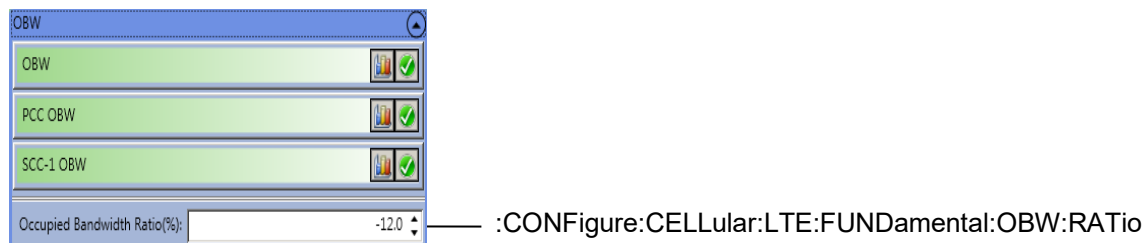


Figure 3.5.3-5 Measurement Settings Pane (OBW Dialog)

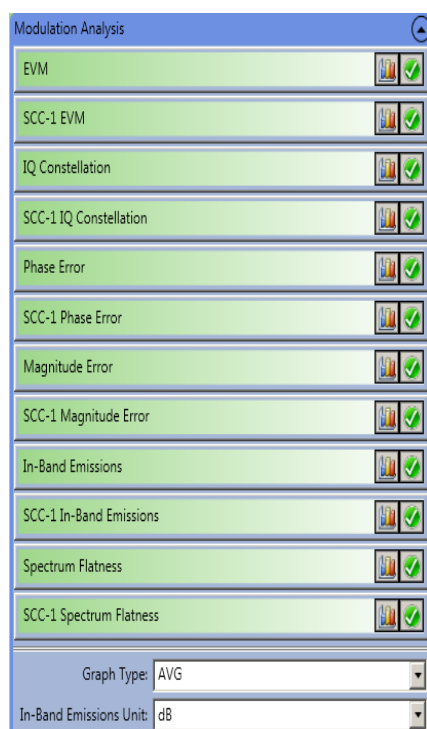


Figure 3.5.3-6 Measurement Settings Pane (Modulation Analysis)

Power Measurement	
Power Measurement	
Tx Power	:FETCh:CELLular:LTE:FUNDamental:POWer:TXPower? TTL
Power Measurement (PCC)	
Tx Power	:FETCh:CELLular:LTE:FUNDamental:POWer:TXPower? TTL,PCC
Channel Power	:FETCh:CELLular:LTE:FUNDamental:POWer:CHPower? TTL,PCC
Power Measurement (SCC-1)	
Tx Power	:FETCh:CELLular:LTE:FUNDamental:POWer:TXPower? TTL,SCC1
Channel Power	:FETCh:CELLular:LTE:FUNDamental:POWer:CHPower? TTL,SCC1

Figure 3.5.3-7 Power Measurement Results

Modulation Analysis	
Modulation Analysis	
Carrier Frequency	:FETCh:CELLular:LTE:FUNDamental:MODulation:CFRequency?
Carrier Frequency Error[ppm]	:FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor?
Carrier Frequency Error[Hz]	
Worst Carrier Frequency Error[ppm]	:FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor:WORSt?
Worst Carrier Frequency Error[Hz]	
EVM	:FETCh:CELLular:LTE:FUNDamental:MODulation:EVM?
Reference Signal EVM	:FETCh:CELLular:LTE:FUNDamental:MODulation:RSEV m?
Peak Vector Error	:FETCh:CELLular:LTE:FUNDamental:MODulation:PEVM?
Phase Error	:FETCh:CELLular:LTE:FUNDamental:MODulation:PHERror?
Magnitude Error	:FETCh:CELLular:LTE:FUNDamental:MODulation:MERRor?
Rho	:FETCh:CELLular:LTE:FUNDamental:MODulation:RHO?
Carrier Leakage	:FETCh:CELLular:LTE:FUNDamental:MODulation:CARLeakage?
IQ Imbalance (dB)	:FETCh:CELLular:LTE:FUNDamental:MODulation:IQIMbalance?

Figure 3.5.3-8 Modulation Analysis Results (1/2)

Modulation Analysis (SCC-1)	
Carrier Frequency	:FETCh:CELLular:LTE:FUNDamental:MODulation:CFRequency? SCC1
Carrier Frequency Error[ppm]	:FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor? TTL,SCC1
Carrier Frequency Error[Hz]	
Worst Carrier Frequency Error[ppm]	:FETCh:CELLular:LTE:FUNDamental:MODulation:FERRor:WORSt? SCC1
Worst Carrier Frequency Error[Hz]	
EVM	:FETCh:CELLular:LTE:FUNDamental:MODulation:EVM? TTL,SCC1
Reference Signal EVM	:FETCh:CELLular:LTE:FUNDamental:MODulation:RSEV m? TTL,SCC1
Peak Vector Error	:FETCh:CELLular:LTE:FUNDamental:MODulation:PEVM? TTL,SCC1
Phase Error	:FETCh:CELLular:LTE:FUNDamental:MODulation:PHERror? TTL,SCC1
Magnitude Error	:FETCh:CELLular:LTE:FUNDamental:MODulation:MERRor? TTL,SCC1
Rho	:FETCh:CELLular:LTE:FUNDamental:MODulation:RHO? TTL,SCC1
Carrier Leakage	:FETCh:CELLular:LTE:FUNDamental:MODulation:CARLeakage? TTL,SCC1
IQ Imbalance (dB)	:FETCh:CELLular:LTE:FUNDamental:MODulation:IQIMbalance? TTL,SCC1

Figure 3.5.3-9 Modulation Analysis Results (2/2)

In-Band Emissions	
In-Band Emissions	
General	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEmissions:GENeral?
IQ Image	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEmissions:IQIMage?
Carrier Leakage	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEmissions:CARLeakage?
Limit Worst General (dB)	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEmissions:LIMit:GENeral?
Limit Worst IQ Image (dB)	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEmissions:LIMit:IQIMage?
Limit Worst Carrier Leakage (dBc)	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEmissions:LIMit
In-Band Emissions Margin (dB)	:CARLeakage?
Judgement	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEmissions:MARGin?
	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEmissions:JUDGement?

Figure 3.5.3-10 In-Band Emissions Results (1/2)

In-Band Emissions	
In-Band Emissions	
General	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEmissions:GENeral? TTL,SCC1
IQ Image	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEmissions:IQIMage? TTL,SCC1
Carrier Leakage	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEmissions:CARLeakage? TTL,SCC1
Limit Worst General (dB)	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEmissions:LIMit:GENeral? SCC1
Limit Worst IQ Image (dB)	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEmissions:LIMit:IQIMage? SCC1
Limit Worst Carrier Leakage (dBc)	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEmissions:LIMit:CARLeakage? SCC1
In-Band Emissions Margin (dB)	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEmissions:MARGin? SCC1
Judgment	:FETCh:CELLular:LTE:FUNDamental:MODulation:IEmissions:JUDGement? SCC1

Figure 3.5.3-11 In-Band Emissions Results (2/2)

Spectrum Flatness	
Spectrum Flatness	
Spectrum Flatness ($\geq 3\text{MHz}$ (R1 +))	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1P?
Spectrum Flatness ($\geq 3\text{MHz}$ (R1 -))	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1M?
Spectrum Flatness ($\geq 3\text{MHz}$) (Worst)	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1?
Spectrum Flatness ($< 3\text{MHz}$ (R2 +))	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2P?
Spectrum Flatness ($< 3\text{MHz}$ (R2 -))	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2M?
Spectrum Flatness ($< 3\text{MHz}$) (Worst)	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2?
Spectrum Flatness ($\geq 3\text{MHz}$ (RP1))	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP1?
Spectrum Flatness ($< 3\text{MHz}$ (RP2))	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP2?
Spectrum Flatness (RP12)	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP12?
Spectrum Flatness (RP21)	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP21?
Judgement	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:JUDGement?

Figure 3.5.3-12 Spectrum Flatness Results (1/2)

Spectrum Flatness (SCC-1)	
Spectrum Flatness ($\geq 3\text{MHz}$ (R1 +))	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1P? TTL,SCC1
Spectrum Flatness ($\geq 3\text{MHz}$ (R1 -))	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1M? TTL,SCC1
Spectrum Flatness ($\geq 3\text{MHz}$) (Worst)	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R1? SCC1
Spectrum Flatness ($< 3\text{MHz}$ (R2 +))	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2P? TTL,SCC1
Spectrum Flatness ($< 3\text{MHz}$ (R2 -))	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2M? TTL,SCC1
Spectrum Flatness ($< 3\text{MHz}$) (Worst)	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:R2? SCC1
Spectrum Flatness ($\geq 3\text{MHz}$ (RP1))	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP1? TTL,SCC1
Spectrum Flatness ($< 3\text{MHz}$ (RP2))	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP2? TTL,SCC1
Spectrum Flatness (RP12)	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP12? TTL,SCC1
Spectrum Flatness (RP21)	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:RP21? TTL,SCC1
Judgment	— :FETCh:CELLular:LTE:FUNDamental:MODulation:ESFLatness:JUDGement? SCC1

Figure 3.5.3-13 Spectrum Flatness Results (2/2)

ACLR	
ACLR	
E-UTRA ACLR LOW	:FETCh:CELLular:LTE:FUNDamental:ACLR?
E-UTRA ACLR UP	
UTRA ACLR2 LOW	
UTRA ACLR1 LOW	
UTRA ACLR1 UP	
UTRA ACLR2 UP	

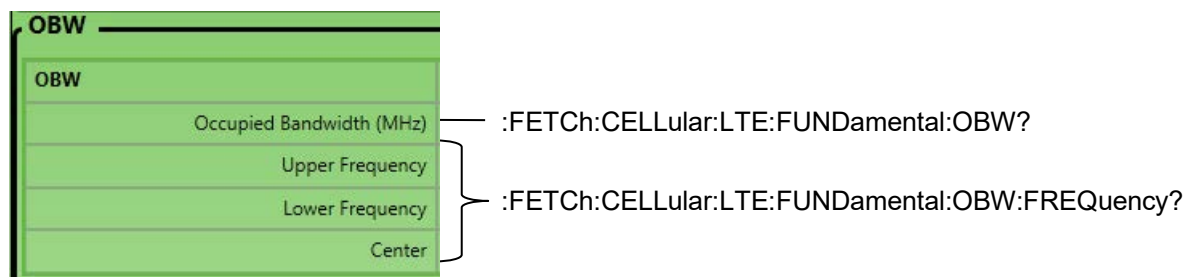
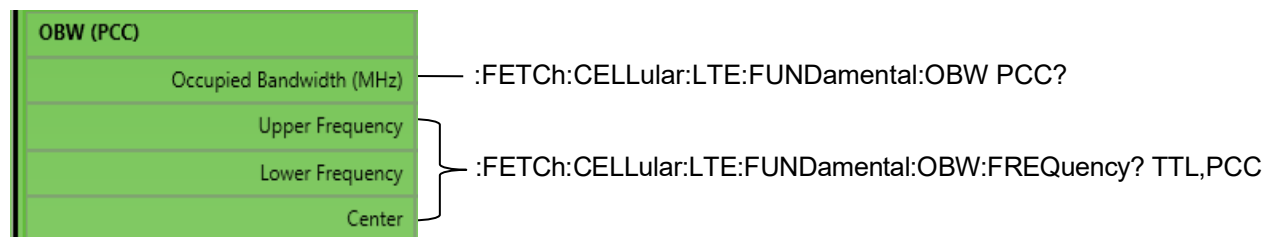
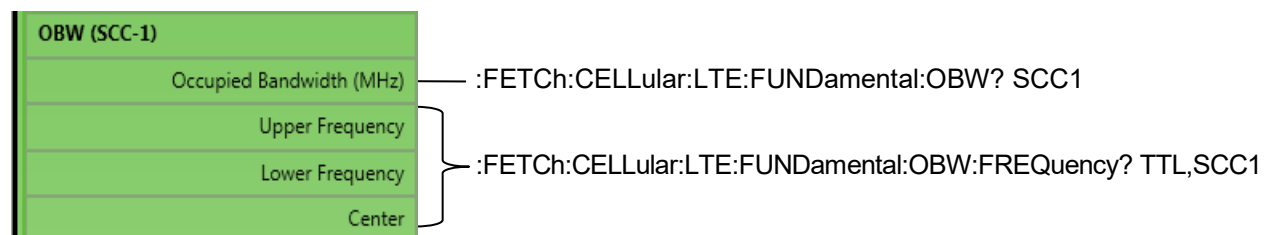
Figure 3.5.3-14 ACLR Results (1/3)

ACLR (PCC)	
E-UTRA ACLR LOW	:FETCh:CELLular:LTE:FUNDamental:ACLR? TTL,PCC
E-UTRA ACLR UP	
UTRA ACLR2 LOW	
UTRA ACLR1 LOW	
UTRA ACLR1 UP	
UTRA ACLR2 UP	

Figure 3.5.3-15 ACLR Results (2/3)

ACLR (SCC-1)	
E-UTRA ACLR LOW	:FETCh:CELLular:LTE:FUNDamental:ACLR? TTL,SCC1
E-UTRA ACLR UP	
UTRA ACLR2 LOW	
UTRA ACLR1 LOW	
UTRA ACLR1 UP	
UTRA ACLR2 UP	

Figure 3.5.3-16 ACLR Results (3/3)

**Figure 3.5.3-17** OBW Results (1/3)**Figure 3.5.3-18** OBW Results (2/3)**Figure 3.5.3-19** OBW Results (3/3)

Spectrum Emission Mask	
Spectrum Emission Mask	
Judgment	:FETCh:CELLular:LTE:FUNDamental:SEMask:JUDGement?
Offset Frequency F1 (Lower)[MHz]	:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer?
Peak Level F1 (Lower)[dBm]	
Template Margin F1 (Lower)[dB]	
Offset Frequency F2 (Lower)[MHz]	:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGIn:LOWer?
Peak Level F2 (Lower)[dBm]	
Template Margin F2 (Lower)[dB]	
Offset Frequency F3 (Lower)[MHz]	
Peak Level F3 (Lower)[dBm]	
Template Margin F3 (Lower)[dB]	
Offset Frequency F4 (Lower)[MHz]	
Peak Level F4 (Lower)[dBm]	
Template Margin F4 (Lower)[dB]	
Offset Frequency F5 (Lower)[MHz]	
Peak Level F5 (Lower)[dBm]	
Template Margin F5 (Lower)[dB]	
Offset Frequency F6 (Lower)[MHz]	
Peak Level F6 (Lower)[dBm]	
Template Margin F6 (Lower)[dB]	

Figure 3.5.3-20 Spectrum Emission Mask Results (1/10)

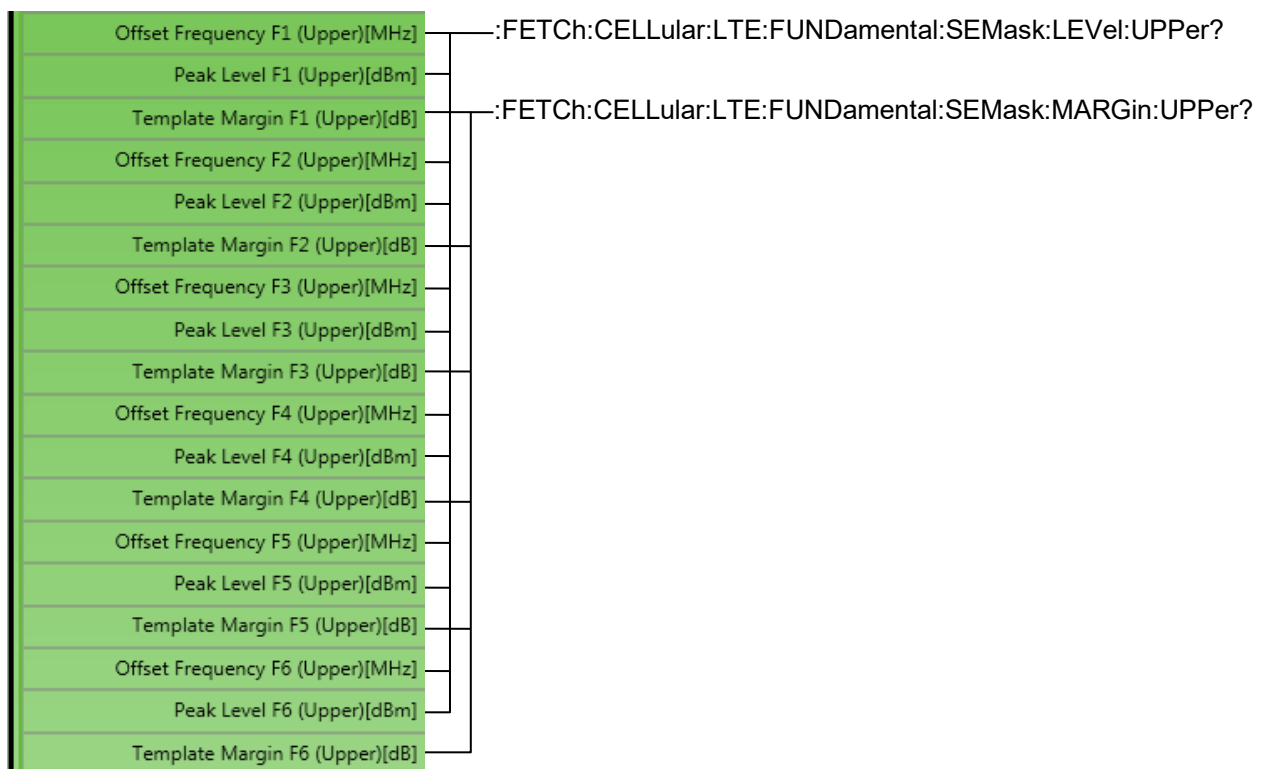


Figure 3.5.3-21 Spectrum Emission Mask Results (2/10)

Spectrum Emission Mask (PCC)	
Judgment	:FETCh:CELLular:LTE:FUNDamental:SEMask:JUDGement? PCC
Offset Frequency F1 (Lower)[MHz]	:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer? PCC
Peak Level F1 (Lower)[dBm]	:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:LOWer? PCC
Template Margin F1 (Lower)[dB]	
Offset Frequency F2 (Lower)[MHz]	
Peak Level F2 (Lower)[dBm]	
Template Margin F2 (Lower)[dB]	:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer? PCC
Offset Frequency F3 (Lower)[MHz]	
Peak Level F3 (Lower)[dBm]	
Template Margin F3 (Lower)[dB]	
Offset Frequency F4 (Lower)[MHz]	:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer? PCC
Peak Level F4 (Lower)[dBm]	
Template Margin F4 (Lower)[dB]	
Offset Frequency F1 (Upper)[MHz]	:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer? PCC
Peak Level F1 (Upper)[dBm]	:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer? PCC
Template Margin F1 (Upper)[dB]	
Offset Frequency F2 (Upper)[MHz]	
Peak Level F2 (Upper)[dBm]	
Template Margin F2 (Upper)[dB]	:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer? PCC
Offset Frequency F3 (Upper)[MHz]	
Peak Level F3 (Upper)[dBm]	
Template Margin F3 (Upper)[dB]	
Offset Frequency F4 (Upper)[MHz]	:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer? PCC
Peak Level F4 (Upper)[dBm]	
Template Margin F4 (Upper)[dB]	

Figure 3.5.3-22 Spectrum Emission Mask Results (3/10)

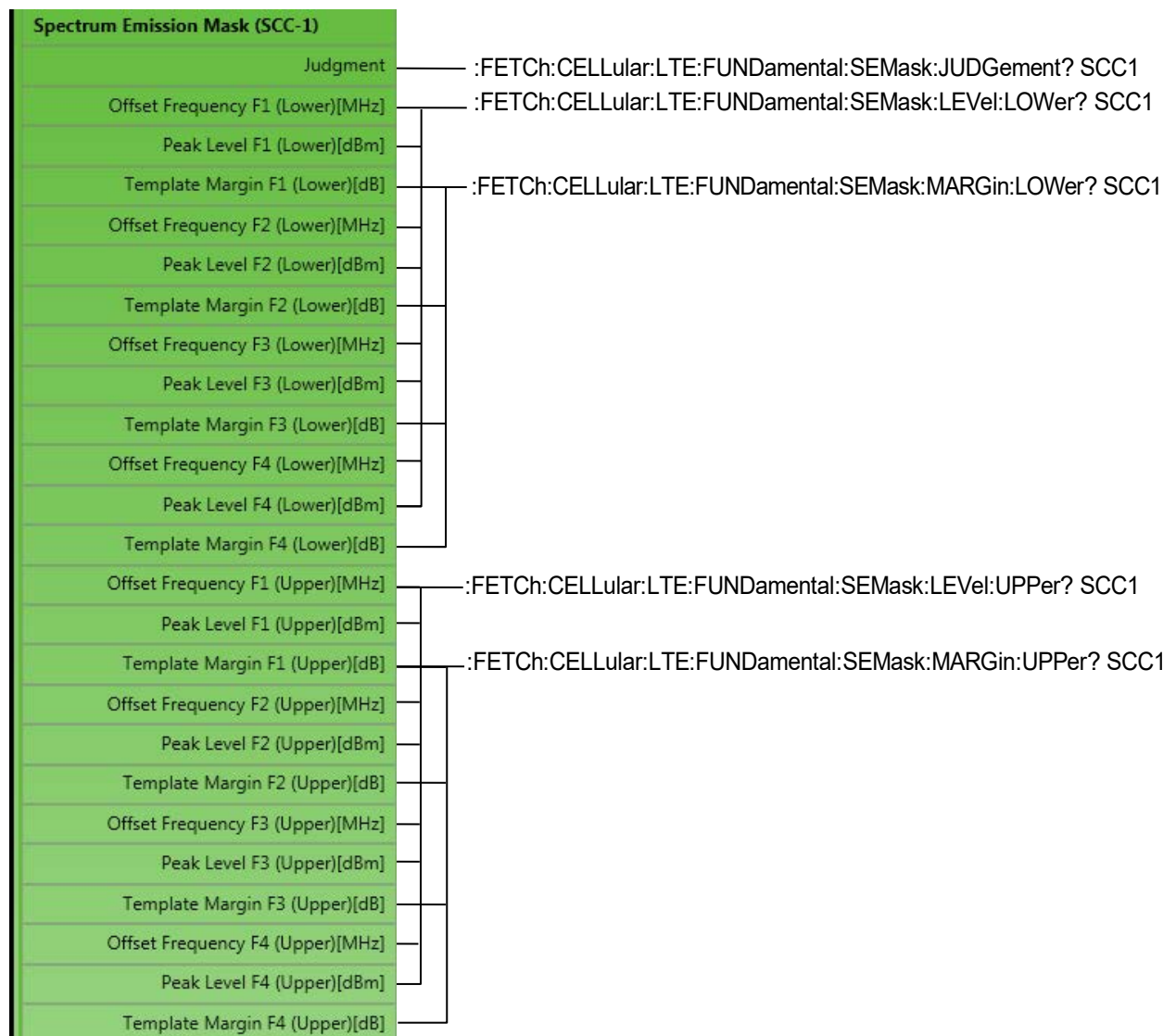


Figure 3.5.3-23 Spectrum Emission Mask Results (4/10)

Spectrum Emission Mask Detail	
Offset Frequency F1 (Detail) (Lower)[MHz]	:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer:DETail?
Peak Level F1 (Detail) (Lower)[dBm]	
Template Margin F1 (Detail) (Lower)[dB]	:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGIn:LOWer:DETail?
Offset Frequency F2 (Detail) (Lower)[MHz]	
Peak Level F2 (Detail) (Lower)[dBm]	
Template Margin F2 (Detail) (Lower)[dB]	
Offset Frequency F3 (Detail) (Lower)[MHz]	
Peak Level F3 (Detail) (Lower)[dBm]	
Template Margin F3 (Detail) (Lower)[dB]	
Offset Frequency F4 (Detail) (Lower)[MHz]	
Peak Level F4 (Detail) (Lower)[dBm]	
Template Margin F4 (Detail) (Lower)[dB]	
Offset Frequency F5 (Detail) (Lower)[MHz]	
Peak Level F5 (Detail) (Lower)[dBm]	
Template Margin F5 (Detail) (Lower)[dB]	
Offset Frequency F6 (Detail) (Lower)[MHz]	
Peak Level F6 (Detail) (Lower)[dBm]	
Template Margin F6 (Detail) (Lower)[dB]	
Offset Frequency F7 (Detail) (Lower)[MHz]	
Peak Level F7 (Detail) (Lower)[dBm]	
Template Margin F7 (Detail) (Lower)[dB]	
Offset Frequency F8 (Detail) (Lower)[MHz]	
Peak Level F8 (Detail) (Lower)[dBm]	
Template Margin F8 (Detail) (Lower)[dB]	
Offset Frequency F9 (Detail) (Lower)[MHz]	
Peak Level F9 (Detail) (Lower)[dBm]	
Template Margin F9 (Detail) (Lower)[dB]	
Offset Frequency F10 (Detail) (Lower)[MHz]	
Peak Level F10 (Detail) (Lower)[dBm]	
Template Margin F10 (Detail) (Lower)[dB]	
Offset Frequency F11 (Detail) (Lower)[MHz]	
Peak Level F11 (Detail) (Lower)[dBm]	
Template Margin F11 (Detail) (Lower)[dB]	
Offset Frequency F12 (Detail) (Lower)[MHz]	
Peak Level F12 (Detail) (Lower)[dBm]	
Template Margin F12 (Detail) (Lower)[dB]	

Figure 3.5.3-24 Spectrum Emission Mask Results (5/10)

Offset Frequency F1 (Detail) (Upper)[MHz]	:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer:DETail?
Peak Level F1 (Detail) (Upper)[dBm]	
Template Margin F1 (Detail) (Upper)[dB]	:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGIn:UPPer:DETail?
Offset Frequency F2 (Detail) (Upper)[MHz]	
Peak Level F2 (Detail) (Upper)[dBm]	
Template Margin F2 (Detail) (Upper)[dB]	
Offset Frequency F3 (Detail) (Upper)[MHz]	
Peak Level F3 (Detail) (Upper)[dBm]	
Template Margin F3 (Detail) (Upper)[dB]	
Offset Frequency F4 (Detail) (Upper)[MHz]	
Peak Level F4 (Detail) (Upper)[dBm]	
Template Margin F4 (Detail) (Upper)[dB]	
Offset Frequency F5 (Detail) (Upper)[MHz]	
Peak Level F5 (Detail) (Upper)[dBm]	
Template Margin F5 (Detail) (Upper)[dB]	
Offset Frequency F6 (Detail) (Upper)[MHz]	
Peak Level F6 (Detail) (Upper)[dBm]	
Template Margin F6 (Detail) (Upper)[dB]	
Offset Frequency F7 (Detail) (Upper)[MHz]	
Peak Level F7 (Detail) (Upper)[dBm]	
Template Margin F7 (Detail) (Upper)[dB]	
Offset Frequency F8 (Detail) (Upper)[MHz]	
Peak Level F8 (Detail) (Upper)[dBm]	
Template Margin F8 (Detail) (Upper)[dB]	
Offset Frequency F9 (Detail) (Upper)[MHz]	
Peak Level F9 (Detail) (Upper)[dBm]	
Template Margin F9 (Detail) (Upper)[dB]	
Offset Frequency F10 (Detail) (Upper)[MHz]	
Peak Level F10 (Detail) (Upper)[dBm]	
Template Margin F10 (Detail) (Upper)[dB]	
Offset Frequency F11 (Detail) (Upper)[MHz]	
Peak Level F11 (Detail) (Upper)[dBm]	
Template Margin F11 (Detail) (Upper)[dB]	
Offset Frequency F12 (Detail) (Upper)[MHz]	
Peak Level F12 (Detail) (Upper)[dBm]	
Template Margin F12 (Detail) (Upper)[dB]	

Figure 3.5.3-25 Spectrum Emission Mask Results (6/10)

Spectrum Emission Mask Detail (PCC)	
Offset Frequency F1 (Detail) (Lower)[MHz]	:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer:DETail? PCC
Peak Level F1 (Detail) (Lower)[dBm]	
Template Margin F1 (Detail) (Lower)[dB]	:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGIn:LOWer:DETail? PCC
Offset Frequency F2 (Detail) (Lower)[MHz]	
Peak Level F2 (Detail) (Lower)[dBm]	
Template Margin F2 (Detail) (Lower)[dB]	
Offset Frequency F3 (Detail) (Lower)[MHz]	
Peak Level F3 (Detail) (Lower)[dBm]	
Template Margin F3 (Detail) (Lower)[dB]	
Offset Frequency F4 (Detail) (Lower)[MHz]	
Peak Level F4 (Detail) (Lower)[dBm]	
Template Margin F4 (Detail) (Lower)[dB]	
Offset Frequency F5 (Detail) (Lower)[MHz]	
Peak Level F5 (Detail) (Lower)[dBm]	
Template Margin F5 (Detail) (Lower)[dB]	
Offset Frequency F6 (Detail) (Lower)[MHz]	
Peak Level F6 (Detail) (Lower)[dBm]	
Template Margin F6 (Detail) (Lower)[dB]	
Offset Frequency F7 (Detail) (Lower)[MHz]	
Peak Level F7 (Detail) (Lower)[dBm]	
Template Margin F7 (Detail) (Lower)[dB]	
Offset Frequency F8 (Detail) (Lower)[MHz]	
Peak Level F8 (Detail) (Lower)[dBm]	
Template Margin F8 (Detail) (Lower)[dB]	
Offset Frequency F9 (Detail) (Lower)[MHz]	
Peak Level F9 (Detail) (Lower)[dBm]	
Template Margin F9 (Detail) (Lower)[dB]	

Figure 3.5.3-26 Spectrum Emission Mask Results (7/10)

Offset Frequency F1 (Detail) (Upper)[MHz]	:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer:DETail? PCC
Peak Level F1 (Detail) (Upper)[dBm]	
Template Margin F1 (Detail) (Upper)[dB]	:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer:DETail? PCC
Offset Frequency F2 (Detail) (Upper)[MHz]	
Peak Level F2 (Detail) (Upper)[dBm]	
Template Margin F2 (Detail) (Upper)[dB]	
Offset Frequency F3 (Detail) (Upper)[MHz]	
Peak Level F3 (Detail) (Upper)[dBm]	
Template Margin F3 (Detail) (Upper)[dB]	
Offset Frequency F4 (Detail) (Upper)[MHz]	
Peak Level F4 (Detail) (Upper)[dBm]	
Template Margin F4 (Detail) (Upper)[dB]	
Offset Frequency F5 (Detail) (Upper)[MHz]	
Peak Level F5 (Detail) (Upper)[dBm]	
Template Margin F5 (Detail) (Upper)[dB]	
Offset Frequency F6 (Detail) (Upper)[MHz]	
Peak Level F6 (Detail) (Upper)[dBm]	
Template Margin F6 (Detail) (Upper)[dB]	
Offset Frequency F7 (Detail) (Upper)[MHz]	
Peak Level F7 (Detail) (Upper)[dBm]	
Template Margin F7 (Detail) (Upper)[dB]	
Offset Frequency F8 (Detail) (Upper)[MHz]	
Peak Level F8 (Detail) (Upper)[dBm]	
Template Margin F8 (Detail) (Upper)[dB]	
Offset Frequency F9 (Detail) (Upper)[MHz]	
Peak Level F9 (Detail) (Upper)[dBm]	
Template Margin F9 (Detail) (Upper)[dB]	

Figure 3.5.3-27 Spectrum Emission Mask Results (8/10)

Spectrum Emission Mask Detail (SCC-1)	
Offset Frequency F1 (Detail) (Lower)[MHz]	:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:LOWer:DETail? SCC1
Peak Level F1 (Detail) (Lower)[dBm]	
Template Margin F1 (Detail) (Lower)[dB]	:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGIN:LOWer:DETail? SCC1
Offset Frequency F2 (Detail) (Lower)[MHz]	
Peak Level F2 (Detail) (Lower)[dBm]	
Template Margin F2 (Detail) (Lower)[dB]	
Offset Frequency F3 (Detail) (Lower)[MHz]	
Peak Level F3 (Detail) (Lower)[dBm]	
Template Margin F3 (Detail) (Lower)[dB]	
Offset Frequency F4 (Detail) (Lower)[MHz]	
Peak Level F4 (Detail) (Lower)[dBm]	
Template Margin F4 (Detail) (Lower)[dB]	
Offset Frequency F5 (Detail) (Lower)[MHz]	
Peak Level F5 (Detail) (Lower)[dBm]	
Template Margin F5 (Detail) (Lower)[dB]	
Offset Frequency F6 (Detail) (Lower)[MHz]	
Peak Level F6 (Detail) (Lower)[dBm]	
Template Margin F6 (Detail) (Lower)[dB]	
Offset Frequency F7 (Detail) (Lower)[MHz]	
Peak Level F7 (Detail) (Lower)[dBm]	
Template Margin F7 (Detail) (Lower)[dB]	
Offset Frequency F8 (Detail) (Lower)[MHz]	
Peak Level F8 (Detail) (Lower)[dBm]	
Template Margin F8 (Detail) (Lower)[dB]	
Offset Frequency F9 (Detail) (Lower)[MHz]	
Peak Level F9 (Detail) (Lower)[dBm]	
Template Margin F9 (Detail) (Lower)[dB]	

Figure 3.5.3-28 Spectrum Emission Mask Results (9/10)

Offset Frequency F1 (Detail) (Upper)[MHz]	:FETCh:CELLular:LTE:FUNDamental:SEMask:LEVel:UPPer:DETail? SCC1
Peak Level F1 (Detail) (Upper)[dBm]	
Template Margin F1 (Detail) (Upper)[dB]	:FETCh:CELLular:LTE:FUNDamental:SEMask:MARGin:UPPer:DETail? SCC1
Offset Frequency F2 (Detail) (Upper)[MHz]	
Peak Level F2 (Detail) (Upper)[dBm]	
Template Margin F2 (Detail) (Upper)[dB]	
Offset Frequency F3 (Detail) (Upper)[MHz]	
Peak Level F3 (Detail) (Upper)[dBm]	
Template Margin F3 (Detail) (Upper)[dB]	
Offset Frequency F4 (Detail) (Upper)[MHz]	
Peak Level F4 (Detail) (Upper)[dBm]	
Template Margin F4 (Detail) (Upper)[dB]	
Offset Frequency F5 (Detail) (Upper)[MHz]	
Peak Level F5 (Detail) (Upper)[dBm]	
Template Margin F5 (Detail) (Upper)[dB]	
Offset Frequency F6 (Detail) (Upper)[MHz]	
Peak Level F6 (Detail) (Upper)[dBm]	
Template Margin F6 (Detail) (Upper)[dB]	
Offset Frequency F7 (Detail) (Upper)[MHz]	
Peak Level F7 (Detail) (Upper)[dBm]	
Template Margin F7 (Detail) (Upper)[dB]	
Offset Frequency F8 (Detail) (Upper)[MHz]	
Peak Level F8 (Detail) (Upper)[dBm]	
Template Margin F8 (Detail) (Upper)[dB]	
Offset Frequency F9 (Detail) (Upper)[MHz]	
Peak Level F9 (Detail) (Upper)[dBm]	
Template Margin F9 (Detail) (Upper)[dB]	

Figure 3.5.3-29 Spectrum Emission Mask Results (10/10)

3.5.4 Related Native Commands

The Native commands for remote of the MX887013A LTE FDD Uplink TX Measurement and MX887014A LTE TDD Uplink TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of the commands, refer to Section 5 “Native Command Reference” in *the MX887013A/14A LTE FDD/TDD Uplink TX Measurement Operation Manual*.

Parameter	Value	Native Command
Input Port:	Port 1	PORT
Output Port:	Port 1	
Channel Coding:	RMC	CHCODING
Measurement Carrier:	PCC	MCARRIER
UpLink Channel(CH):	18000	ULCHAN
SCC-1 UpLink Channel(CH):	18300	ULCHAN_SCC1
DownLink Channel (CH):	0	DLCHAN
Channel BandWidth(MHz):	5MHz	BANDWIDTH
SCC-1 Channel BandWidth(MHz):	5MHz	BANDWIDTH_SCC1
Input Level(dBm):	-1.0	ILVL
SCC-1 Input Level(dBm):	-1.0	ILVL_SCC1
Frequency(MHz):	1920.000000	ULFREQ
SCC-1 Frequency(MHz):	1950.000000	ULFREQ_SCC1
Frame Structure:	FDD	FRAMETYPE
SCC-1 Frame Structure:	FDD	FRAMETYPE_SCC1
Uplink RMC Configuration:	PUSCH	CHCONFIG
Uplink RMC Modulation:	QPSK	ULRMC_MOD
SCC-1 Uplink RMC Modulation:	QPSK	ULRMC_MOD_SCC1
Uplink RMC Number Of RB:	25	ULRMC_RB
SCC-1 Uplink RMC Number Of RB:	25	ULRMC_RB_SCC1
Uplink RMC Starting RB:	0	ULRB_START
SCC-1 Uplink RMC Starting RB:	0	ULRB_START_SCC1
nRB-CQI:	1	NRBCQI
SC-FDMA Symbol Position:	0	
Long Span Search:	Off	LONGSEARCH
Group hopping:	On	GROUPHOP
Frequency Error Range:	NORMAL	FREQERRRN
Uplink Downlink Configuration:	0	TDDULDLCONF

Figure 3.5.4-1 Measurement Settings Pane (1/2)

Trigger Source:	Power	FMEAS_TRGSRG
Trigger Level(dB):	-40	FMEAS_TRGLVL
Trigger Delay(ms):	0.000	FMEAS_TRGDLY
Trigger Timeout(s):	1	FMEAS_TRGTOUT
CellID:	1	CELLID
SCC-1 CellID:	1	CELLID_SCC1
Cyclic Shift:	On	CSHIFT
Delta SS:	1	DELTAS
additional Spectrum Emission:	NS_01	SIB2_NS
Operation Band:	1	BAND
SCC-1 Operation Band:	1	BAND_SCC1
Test Environment:	NORMAL	TESTENV
In-Band Emissions Carrier Leakage Frequency:	at Carrier Frequency	IBEM_CLFR
In-Band Emissions Carrier Leakage Template:	0dBm	TP_INBANDE_LEAK
SCC-1 In-Band Emissions Carrier Leakage Template:	0dBm	TP_INBANDE_LEAK_SCC1
SCC-1 Loss Table:	0	EXTLOSSINDEX_SCC1
Display Results		

Figure 3.5.4-2 Measurement Settings Pane (2/2)

For the Native remote control commands of the Vector Signal Generator, refer to Figure 3.2.4-2 Measurement Settings Pane (Vector Signal Generator).

For the Native remote control commands of Level Calibration, refer to Figure 3.2.4-3 Measurement Settings Pane (Level Calibration).

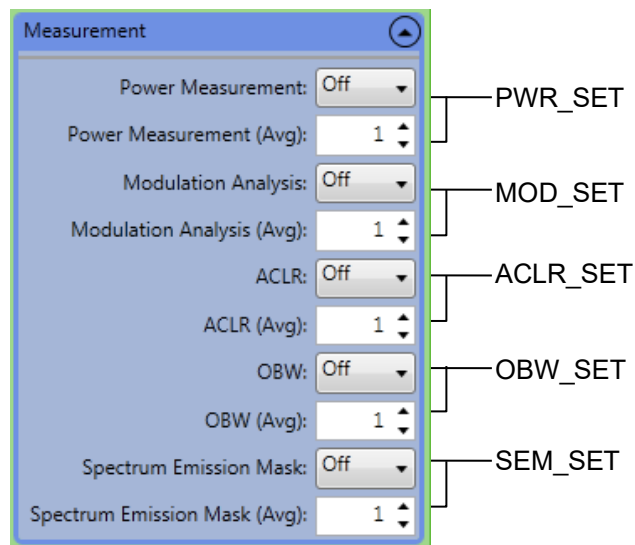


Figure 3.5.4-3 Measurement Settings Pane (Measurement Dialog)

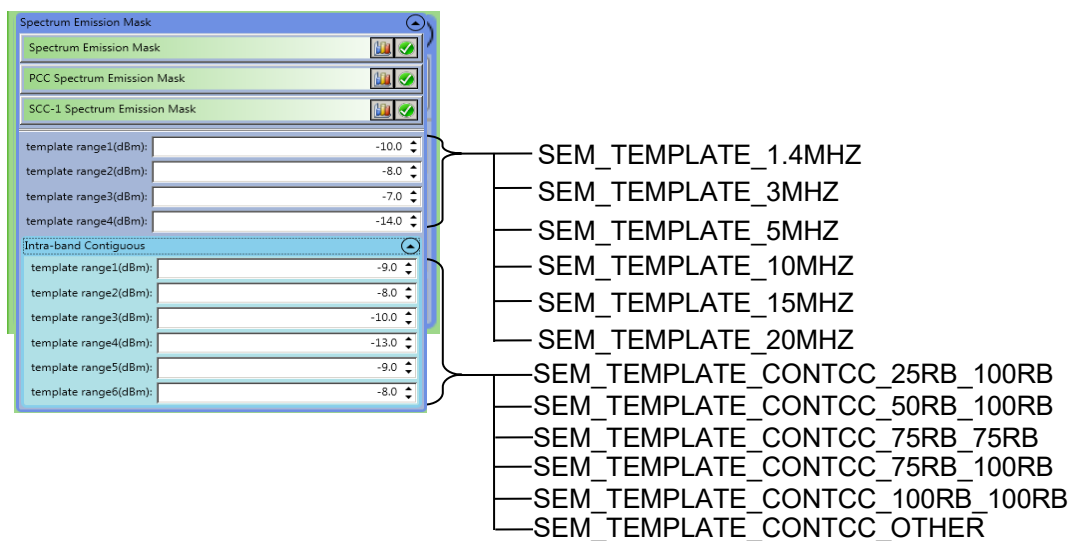


Figure 3.5.4-4 Measurement Settings Pane (Spectrum Emission Mask Dialog)

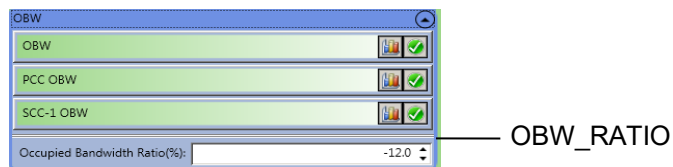


Figure 3.5.4-5 Measurement Settings Pane (OBW Dialog)

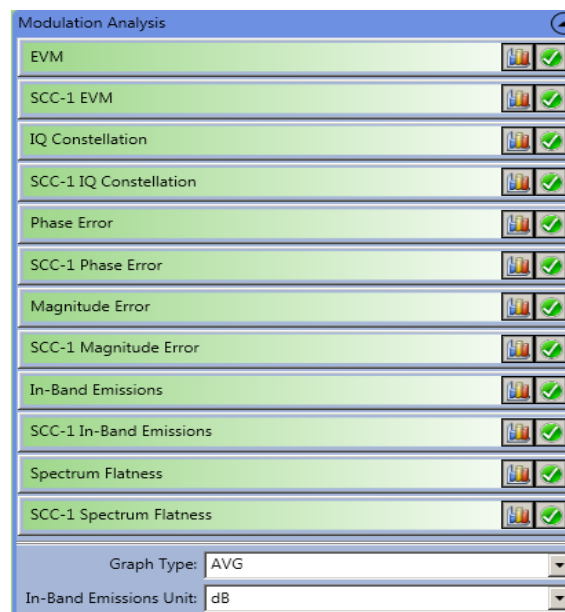


Figure 3.5.4-6 Measurement Settings Pane (Modulation Analysis)

Power Measurement	
Power Measurement	
Tx Power	TXPWR? TTL
Power Measurement (PCC)	
Tx Power	TXPWR? TTL,PCC
Channel Power	CHPWR? TTL,PCC
Power Measurement (SCC-1)	
Tx Power	TXPWR? TTL,SCC1
Channel Power	CHPWR? TTL,SCC1

Figure 3.5.4-7 Power Measurement Results

Modulation Analysis	
Modulation Analysis	
Carrier Frequency	CFREQ?
Carrier Frequency Error[ppm]	CFERR?
Carrier Frequency Error[Hz]	
Worst Carrier Frequency Error[ppm]	CFERR_WORST?
Worst Carrier Frequency Error[Hz]	
EVM	EVM?
Reference Signal EVM	RSEVM?
Peak Vector Error	PEVM?
Phase Error	PHASEERR?
Magnitude Error	MAGERR?
Rho	RHO?
Carrier Leakage	CARRLEAK?
IQ Imbalance (dB)	IQIMB?

Figure 3.5.4-8 Modulation Analysis Results (1/2)

Modulation Analysis (SCC-1)	
Carrier Frequency	CFREQ? SCC1
Carrier Frequency Error[ppm]	CFERR? TTL,SCC1
Carrier Frequency Error[Hz]	
Worst Carrier Frequency Error[ppm]	CFERR_WORST? SCC1
Worst Carrier Frequency Error[Hz]	
EVM	EVM? TTL,SCC1
Reference Signal EVM	RSEVM? TTL,SCC1
Peak Vector Error	PEVM? TTL,SCC1
Phase Error	PHASEERR? TTL,SCC1
Magnitude Error	MAGERR? TTL,SCC1
Rho	RHO? TTL,SCC1
Carrier Leakage	CARRLEAK? TTL,SCC1
IQ Imbalance (dB)	IQIMB? TTL,SCC1

Figure 3.5.4-9 Modulation Analysis Results (2/2)

In-Band Emissions	
In-Band Emissions	
General	INBANDE_GEN?
IQ Image	INBANDE_IMG?
Carrier Leakage	INBANDE_LEAK?
Limit Worst General (dB)	INBANDE_GENUL?
Limit Worst IQ Image (dB)	INBANDE_IMGUL?
Limit Worst Carrier Leakage (dBc)	INBANDE_LEAKUL?
In-Band Emissions Margin (dB)	INBANDE_MARG?
Judgement	INBANDEPASS?

Figure 3.5.4-10 In-Band Emissions Results (1/2)

In-Band Emissions (SCC-1)	
General	INBANDE_GEN? TTL,SCC1
IQ Image	INBANDE_IMG? TTL,SCC1
Carrier Leakage	INBANDE_LEAK? TTL,SCC1
Limit Worst General (dB)	INBANDE_GENUL? SCC1
Limit Worst IQ Image (dB)	INBANDE_IMGUL? SCC1
Limit Worst Carrier Leakage (dBc)	INBANDE_LEAKUL? SCC1
In-Band Emissions Margin (dB)	INBANDE_MARG? SCC1
Judgment	INBANDEPASS? SCC1

Figure 3.5.4-11 In-Band Emissions Results (2/2)

Spectrum Flatness	
Spectrum Flatness	
Spectrum Flatness ($\geq 3\text{MHz}$ (R1 +))	SPECFLAT1_P?
Spectrum Flatness ($\geq 3\text{MHz}$ (R1 -))	SPECFLAT1_M?
Spectrum Flatness ($\geq 3\text{MHz}$) (Worst)	SPECFLAT1?
Spectrum Flatness ($< 3\text{MHz}$ (R2 +))	SPECFLAT2_P?
Spectrum Flatness ($< 3\text{MHz}$ (R2 -))	SPECFLAT2_M?
Spectrum Flatness ($< 3\text{MHz}$) (Worst)	SPECFLAT2?
Spectrum Flatness ($\geq 3\text{MHz}$ (RP1))	SPECFLAT_RP1?
Spectrum Flatness ($< 3\text{MHz}$ (RP2))	SPECFLAT_RP2?
Spectrum Flatness (RP12)	SPECFLAT_RP12?
Spectrum Flatness (RP21)	SPECFLAT_RP21?
Judgement	SPECFLATPASS?

Figure 3.5.4-12 Spectrum Flatness Results (1/2)

Spectrum Flatness (SCC-1)	
Spectrum Flatness ($\geq 3\text{MHz}$ (R1 +))	SPECFLAT1_P? TTL, SCC1
Spectrum Flatness ($\geq 3\text{MHz}$ (R1 -))	SPECFLAT1_M? TTL, SCC1
Spectrum Flatness ($\geq 3\text{MHz}$) (Worst)	SPECFLAT1? SCC1
Spectrum Flatness ($< 3\text{MHz}$ (R2 +))	SPECFLAT2_P? TTL, SCC1
Spectrum Flatness ($< 3\text{MHz}$ (R2 -))	SPECFLAT2_M? TTL, SCC1
Spectrum Flatness ($< 3\text{MHz}$) (Worst)	SPECFLAT2? SCC1
Spectrum Flatness ($\geq 3\text{MHz}$ (RP1))	SPECFLAT_RP1? TTL, SCC1
Spectrum Flatness ($< 3\text{MHz}$ (RP2))	SPECFLAT_RP2? TTL, SCC1
Spectrum Flatness (RP12)	SPECFLAT_RP12? TTL, SCC1
Spectrum Flatness (RP21)	SPECFLAT_RP21? TTL, SCC1
Judgment	SPECFLATPASS? SCC1

Figure 3.5.4-13 Spectrum Flatness Results (2/2)

ACLR	
ACLR	
E-UTRA ACLR LOW	ACLR?
E-UTRA ACLR UP	
UTRA ACLR2 LOW	
UTRA ACLR1 LOW	
UTRA ACLR1 UP	
UTRA ACLR2 UP	

Figure 3.5.4-14 ACLR Results (1/3)

ACLR (PCC)	
E-UTRA ACLR LOW	ACLR? TTL,PCC
E-UTRA ACLR UP	
UTRA ACLR2 LOW	
UTRA ACLR1 LOW	
UTRA ACLR1 UP	
UTRA ACLR2 UP	

Figure 3.5.4-15 ACLR Results (2/3)

ACLR (SCC-1)	
E-UTRA ACLR LOW	ACLR? TTL,SCC1
E-UTRA ACLR UP	
UTRA ACLR2 LOW	
UTRA ACLR1 LOW	
UTRA ACLR1 UP	
UTRA ACLR2 UP	

Figure 3.5.4-16 ACLR Results (3/3)

OBW	
OBW	
Occupied Bandwidth (MHz)	OBW?
Upper Frequency	OBWFREQ?
Lower Frequency	
Center	

Figure 3.5.4-17 OBW Results (1/3)

OBW (PCC)	
Occupied Bandwidth (MHz)	OBW? PCC
Upper Frequency	OBWFREQ? TTL,PCC
Lower Frequency	
Center	

Figure 3.5.4-18 OBW Results (2/3)

OBW (SCC-1)	
Occupied Bandwidth (MHz)	OBW? SCC1
Upper Frequency	OBWFREQ? TTL,SCC1
Lower Frequency	
Center	

Figure 3.5.4-19 OBW Results (3/3)

Spectrum Emission Mask	
Spectrum Emission Mask	
Judgment	SEM?
Offset Frequency F1 (Lower)[MHz]	SEMLVL_LOWER?
Peak Level F1 (Lower)[dBm]	
Template Margin F1 (Lower)[dB]	
Offset Frequency F2 (Lower)[MHz]	SEMMARGIN_LOWER?
Peak Level F2 (Lower)[dBm]	
Template Margin F2 (Lower)[dB]	
Offset Frequency F3 (Lower)[MHz]	
Peak Level F3 (Lower)[dBm]	
Template Margin F3 (Lower)[dB]	
Offset Frequency F4 (Lower)[MHz]	
Peak Level F4 (Lower)[dBm]	
Template Margin F4 (Lower)[dB]	
Offset Frequency F5 (Lower)[MHz]	
Peak Level F5 (Lower)[dBm]	
Template Margin F5 (Lower)[dB]	
Offset Frequency F6 (Lower)[MHz]	
Peak Level F6 (Lower)[dBm]	
Template Margin F6 (Lower)[dB]	

Figure 3.5.4-20 Spectrum Emission Mask Results (1/10)

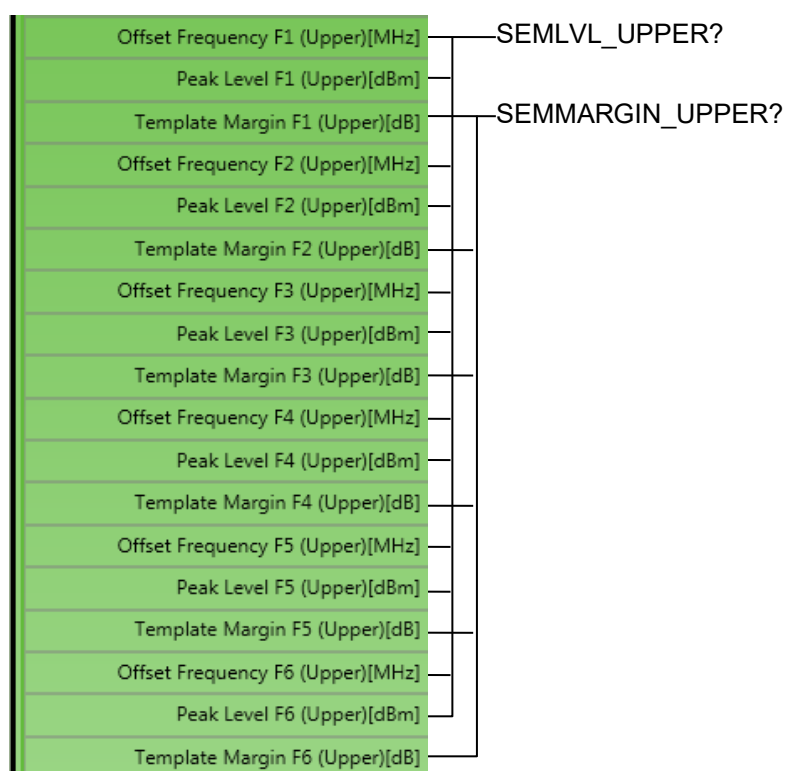


Figure 3.5.4-21 Spectrum Emission Mask Results (2/10)

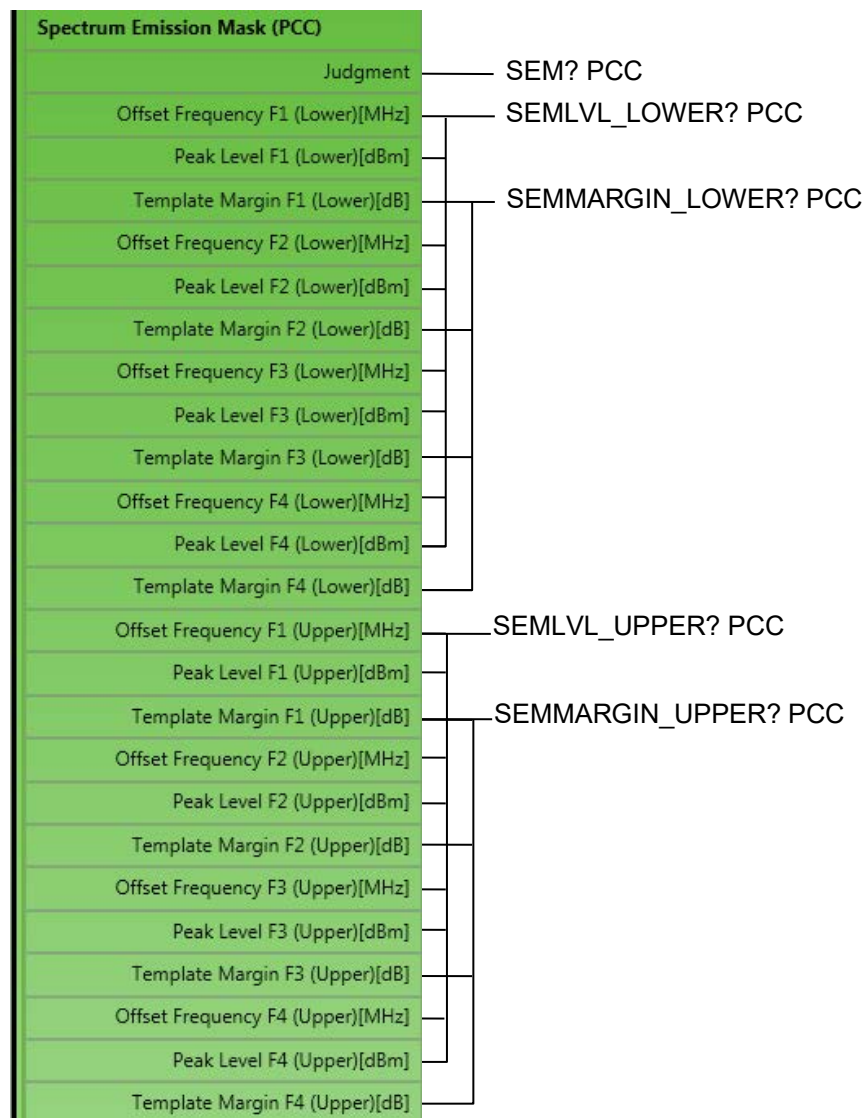


Figure 3.5.4-22 Spectrum Emission Mask Results (3/10)

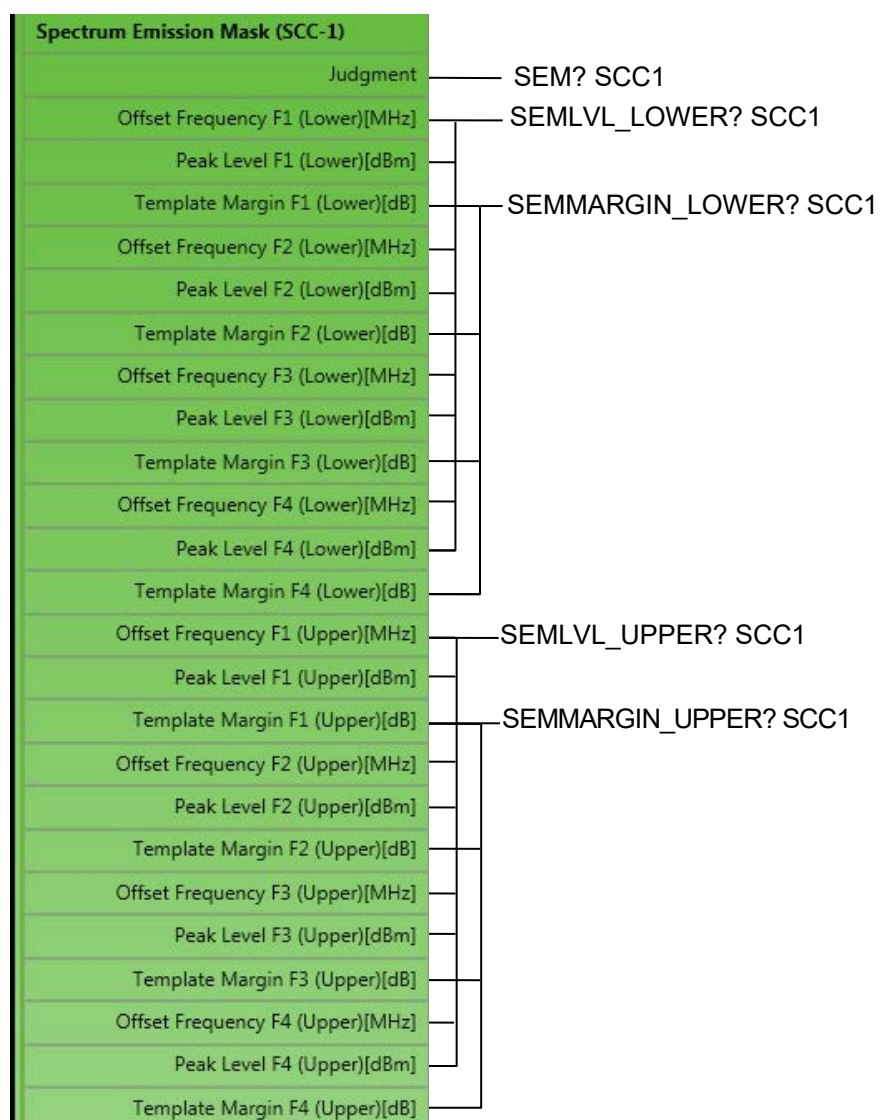


Figure 3.5.4-23 Spectrum Emission Mask Results (4/10)

Spectrum Emission Mask Detail	
Offset Frequency F1 (Detail) (Lower)[MHz]	SEMLVL_DET_LOWER?
Peak Level F1 (Detail) (Lower)[dBm]	
Template Margin F1 (Detail) (Lower)[dB]	SEMMARGIN_DET_LOWER?
Offset Frequency F2 (Detail) (Lower)[MHz]	
Peak Level F2 (Detail) (Lower)[dBm]	
Template Margin F2 (Detail) (Lower)[dB]	
Offset Frequency F3 (Detail) (Lower)[MHz]	
Peak Level F3 (Detail) (Lower)[dBm]	
Template Margin F3 (Detail) (Lower)[dB]	
Offset Frequency F4 (Detail) (Lower)[MHz]	
Peak Level F4 (Detail) (Lower)[dBm]	
Template Margin F4 (Detail) (Lower)[dB]	
Offset Frequency F5 (Detail) (Lower)[MHz]	
Peak Level F5 (Detail) (Lower)[dBm]	
Template Margin F5 (Detail) (Lower)[dB]	
Offset Frequency F6 (Detail) (Lower)[MHz]	
Peak Level F6 (Detail) (Lower)[dBm]	
Template Margin F6 (Detail) (Lower)[dB]	
Offset Frequency F7 (Detail) (Lower)[MHz]	
Peak Level F7 (Detail) (Lower)[dBm]	
Template Margin F7 (Detail) (Lower)[dB]	
Offset Frequency F8 (Detail) (Lower)[MHz]	
Peak Level F8 (Detail) (Lower)[dBm]	
Template Margin F8 (Detail) (Lower)[dB]	
Offset Frequency F9 (Detail) (Lower)[MHz]	
Peak Level F9 (Detail) (Lower)[dBm]	
Template Margin F9 (Detail) (Lower)[dB]	
Offset Frequency F10 (Detail) (Lower)[MHz]	
Peak Level F10 (Detail) (Lower)[dBm]	
Template Margin F10 (Detail) (Lower)[dB]	
Offset Frequency F11 (Detail) (Lower)[MHz]	
Peak Level F11 (Detail) (Lower)[dBm]	
Template Margin F11 (Detail) (Lower)[dB]	
Offset Frequency F12 (Detail) (Lower)[MHz]	
Peak Level F12 (Detail) (Lower)[dBm]	
Template Margin F12 (Detail) (Lower)[dB]	

Figure 3.5.4-24 Spectrum Emission Mask Results (5/10)

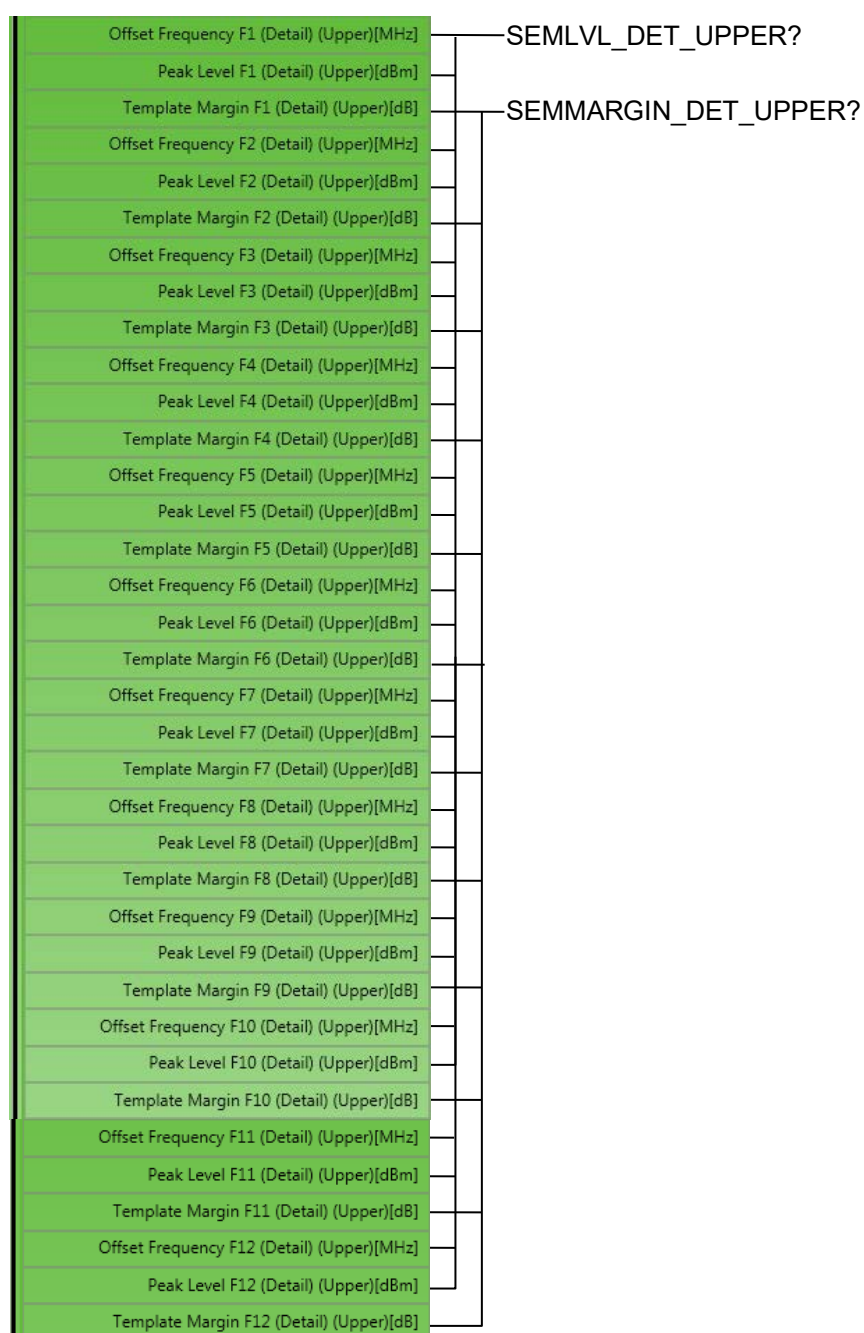


Figure 3.5.4-25 Spectrum Emission Mask Results (6/10)

Spectrum Emission Mask Detail (PCC)	
Offset Frequency F1 (Detail) (Lower)[MHz]	SEMLVL_DET_LOWER? PCC
Peak Level F1 (Detail) (Lower)[dBm]	
Template Margin F1 (Detail) (Lower)[dB]	
Offset Frequency F2 (Detail) (Lower)[MHz]	SEMMARGIN_DET_LOWER? PCC
Peak Level F2 (Detail) (Lower)[dBm]	
Template Margin F2 (Detail) (Lower)[dB]	
Offset Frequency F3 (Detail) (Lower)[MHz]	
Peak Level F3 (Detail) (Lower)[dBm]	
Template Margin F3 (Detail) (Lower)[dB]	
Offset Frequency F4 (Detail) (Lower)[MHz]	
Peak Level F4 (Detail) (Lower)[dBm]	
Template Margin F4 (Detail) (Lower)[dB]	
Offset Frequency F5 (Detail) (Lower)[MHz]	
Peak Level F5 (Detail) (Lower)[dBm]	
Template Margin F5 (Detail) (Lower)[dB]	
Offset Frequency F6 (Detail) (Lower)[MHz]	
Peak Level F6 (Detail) (Lower)[dBm]	
Template Margin F6 (Detail) (Lower)[dB]	
Offset Frequency F7 (Detail) (Lower)[MHz]	
Peak Level F7 (Detail) (Lower)[dBm]	
Template Margin F7 (Detail) (Lower)[dB]	
Offset Frequency F8 (Detail) (Lower)[MHz]	
Peak Level F8 (Detail) (Lower)[dBm]	
Template Margin F8 (Detail) (Lower)[dB]	
Offset Frequency F9 (Detail) (Lower)[MHz]	
Peak Level F9 (Detail) (Lower)[dBm]	
Template Margin F9 (Detail) (Lower)[dB]	

Figure 3.5.4-26 Spectrum Emission Mask Results (7/10)

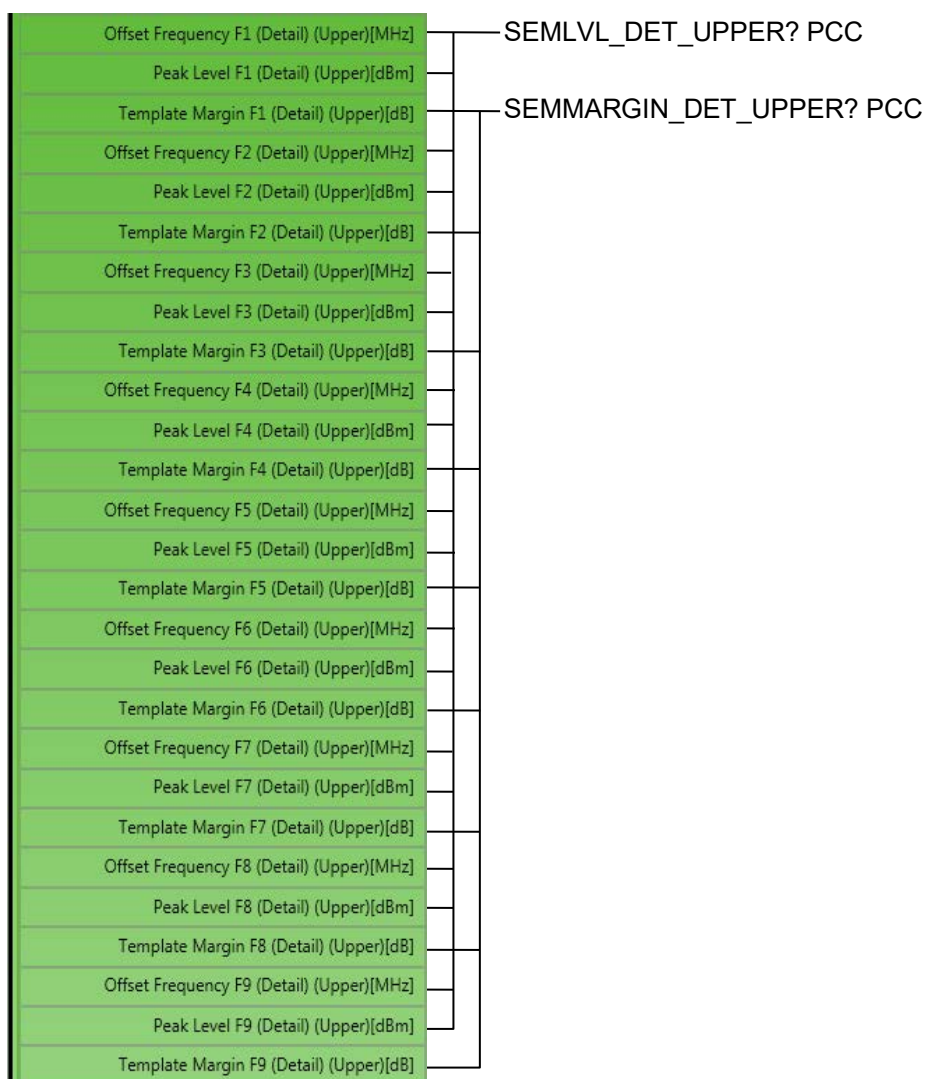


Figure 3.5.4-27 Spectrum Emission Mask Results (8/10)

Spectrum Emission Mask Detail (SCC-1)	
Offset Frequency F1 (Detail) (Lower)[MHz]	SEMLVL_DET_LOWER? SCC1
Peak Level F1 (Detail) (Lower)[dBm]	
Template Margin F1 (Detail) (Lower)[dB]	SEMMARGIN_DET_LOWER? SCC1
Offset Frequency F2 (Detail) (Lower)[MHz]	
Peak Level F2 (Detail) (Lower)[dBm]	
Template Margin F2 (Detail) (Lower)[dB]	
Offset Frequency F3 (Detail) (Lower)[MHz]	
Peak Level F3 (Detail) (Lower)[dBm]	
Template Margin F3 (Detail) (Lower)[dB]	
Offset Frequency F4 (Detail) (Lower)[MHz]	
Peak Level F4 (Detail) (Lower)[dBm]	
Template Margin F4 (Detail) (Lower)[dB]	
Offset Frequency F5 (Detail) (Lower)[MHz]	
Peak Level F5 (Detail) (Lower)[dBm]	
Template Margin F5 (Detail) (Lower)[dB]	
Offset Frequency F6 (Detail) (Lower)[MHz]	
Peak Level F6 (Detail) (Lower)[dBm]	
Template Margin F6 (Detail) (Lower)[dB]	
Offset Frequency F7 (Detail) (Lower)[MHz]	
Peak Level F7 (Detail) (Lower)[dBm]	
Template Margin F7 (Detail) (Lower)[dB]	
Offset Frequency F8 (Detail) (Lower)[MHz]	
Peak Level F8 (Detail) (Lower)[dBm]	
Template Margin F8 (Detail) (Lower)[dB]	
Offset Frequency F9 (Detail) (Lower)[MHz]	
Peak Level F9 (Detail) (Lower)[dBm]	
Template Margin F9 (Detail) (Lower)[dB]	

Figure 3.5.4-28 Spectrum Emission Mask Results (9/10)

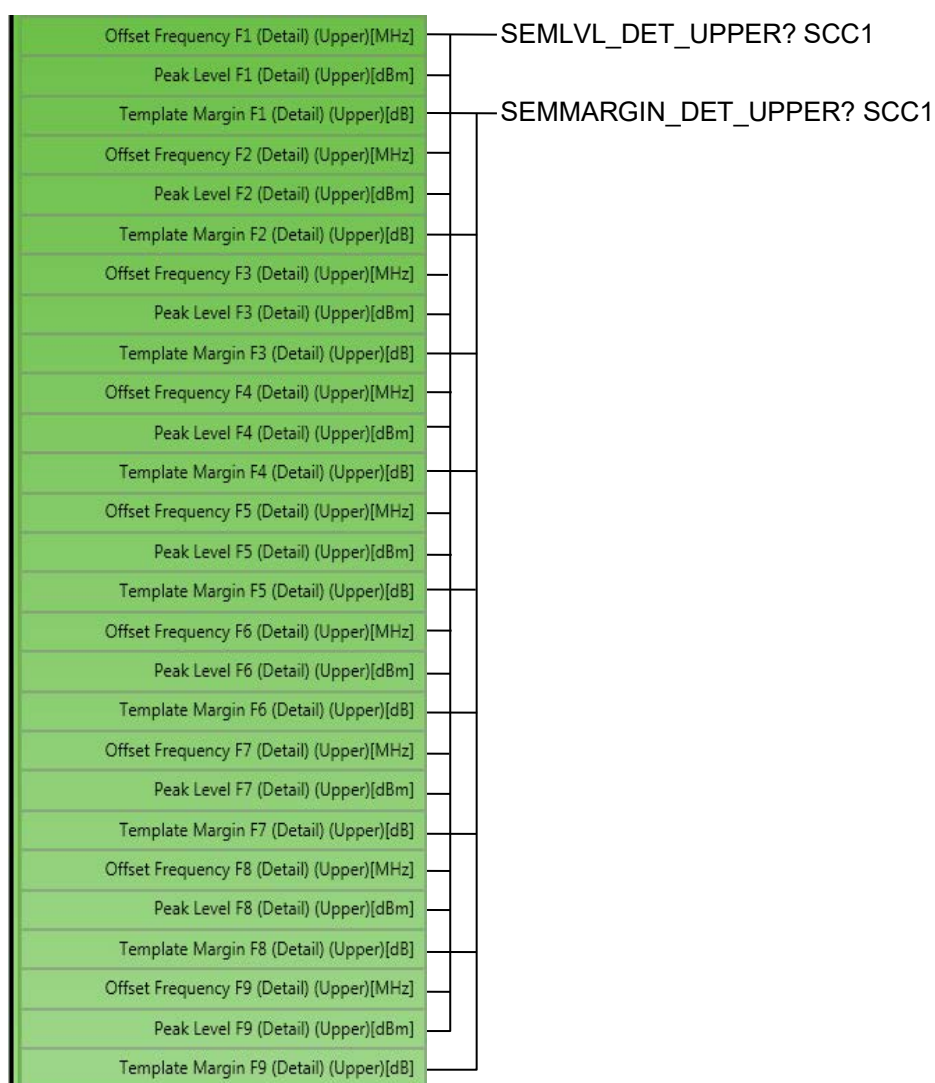


Figure 3.5.4-29 Spectrum Emission Mask Results (10/10)

3.6 CDMA2000

Refer to Chapter 2 “Fundamental Measurement” in *the MX887015A CDMA2000 Reverse Link TX Measurement Operation Manual* for a description of CDMA2000 Reverse Link TX Measurement items.

This section describes the CDMA2000 measurements and displays.

3.6.1 Measurement settings

The CDMA2000 settings pane is shown below. Click the ▲ and ▼ buttons to change the parameters.

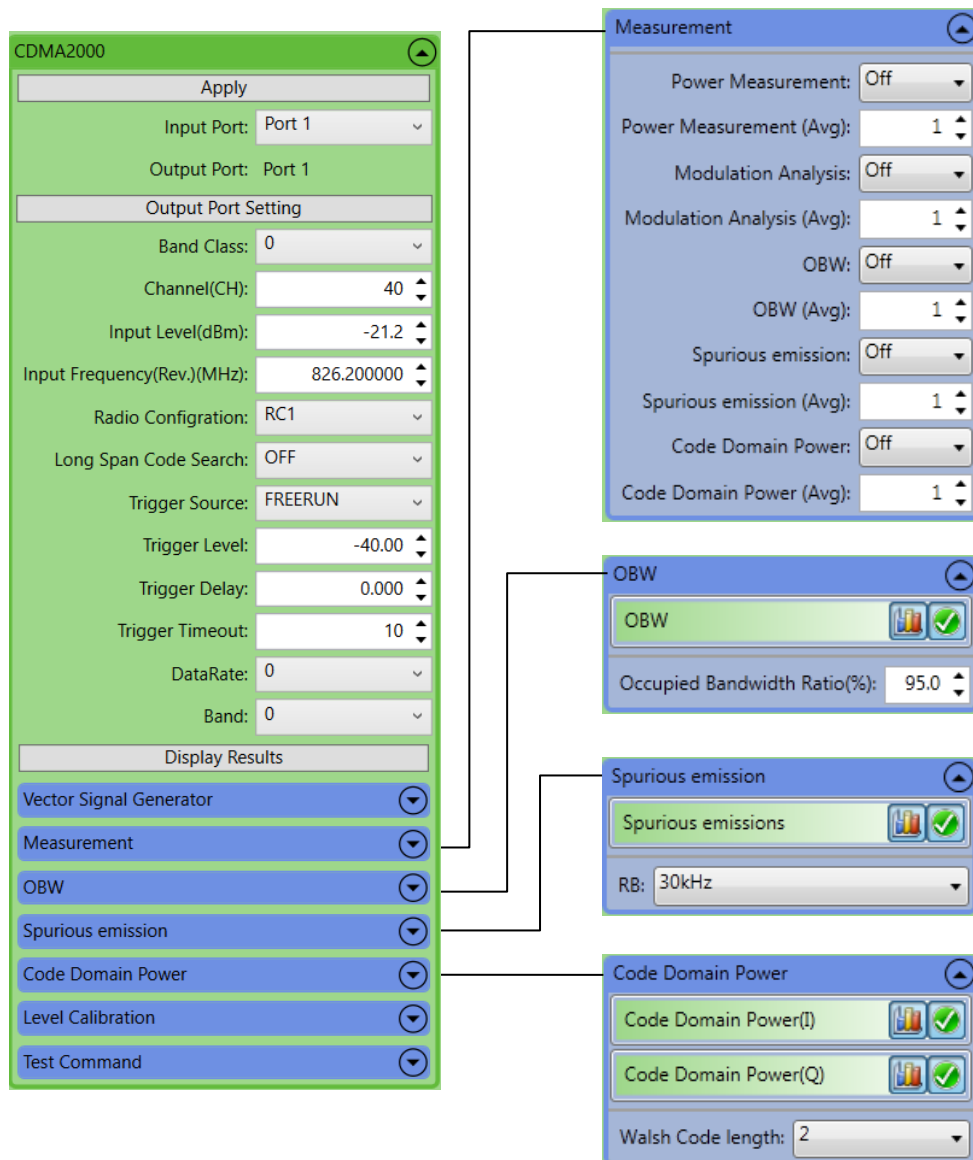


Figure 3.6.1-1 CDMA2000 Measurement Settings Pane

For the expandable menus of Vector Signal Generator, Level Calibration, and Test Command, refer to Figure 3.2.1-1 Spectrum Monitor Settings Pane.

3.6.2 Measurements and results

To perform measurement:

1. Set the parameters for all buttons from **Input Port** to **AGWN Level**.
2. Click the **Measurement** button to open the dialog and set the parameters.
3. Click **OBW** to open the dialog and set the specifications.
4. Set a checkmark in the  checkboxes in each dialog for **OBW**, **Spurious emissions**, and **Code Domain Power** to open the graph displays.
5. Set the resolution bandwidth (RBW) in the **Spurious emission** dialog.
6. Select the Walsh Code length for the **Code Domain Power** graph display.
7. Click the **Apply** button to send the parameters to the hardware.
8. Click the **Display Results** button to display the **CDMA2000** tab.
9. Click the  **Measurement Start** button
10. The numerical data are displayed in the **CDMA2000** tab after measurement is completed.
11. Click the  button in the **OBW**, **Spurious emissions**, **Code Domain Power (I)**, and **Code Domain Power (Q)** dialogs to open the graph displays.

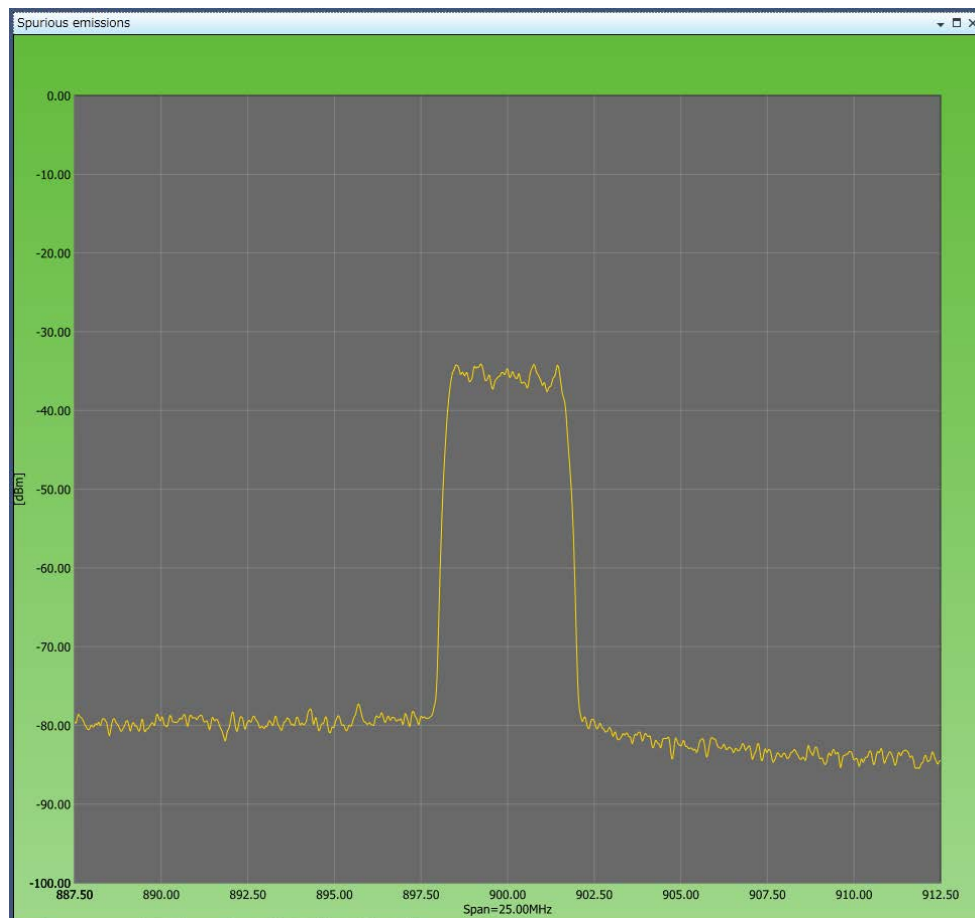


Figure 3.6.2-1 CDMA2000 Spurious Emissions Graph

3.6.3 Related SCPI Commands

The SCPI commands for remote control of the MX887015A CDMA2000 Reverse Link TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of commands, refer to Section 4 “SCPI Command Reference” in *the MX887015A CDMA2000 Reverse Link TX Measurement Operation Manual*.

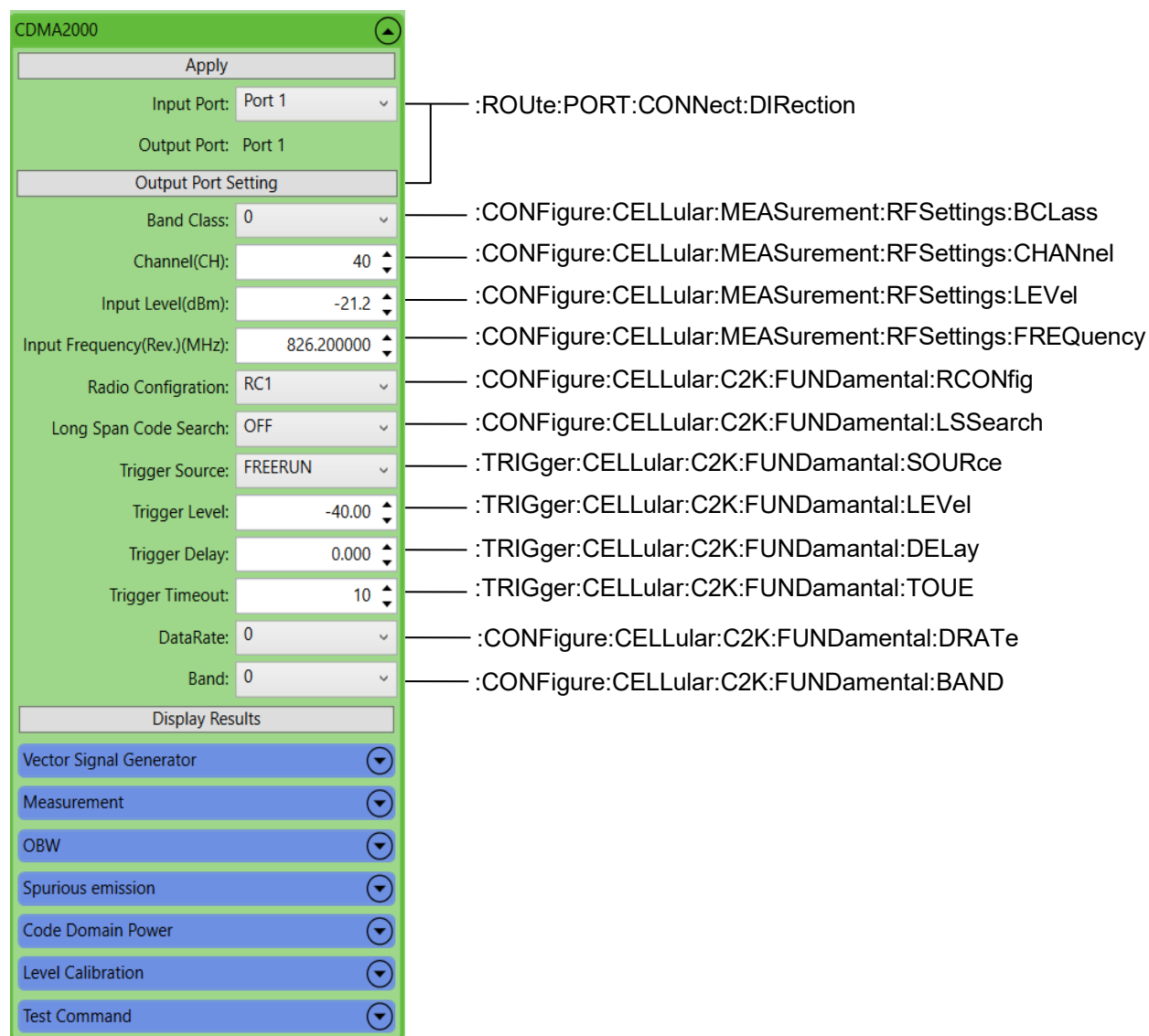


Figure 3.6.3-1 Measurement Settings Pane

For the SCPI remote control commands of the Vector Signal Generator, refer to Figure 3.2.3-2 Measurement Settings Pane (Vector Signal Generator).

For the SCPI remote control commands of Level Calibration, refer to Figure 3.2.3-3 Measurement Settings Pane (Level Calibration).

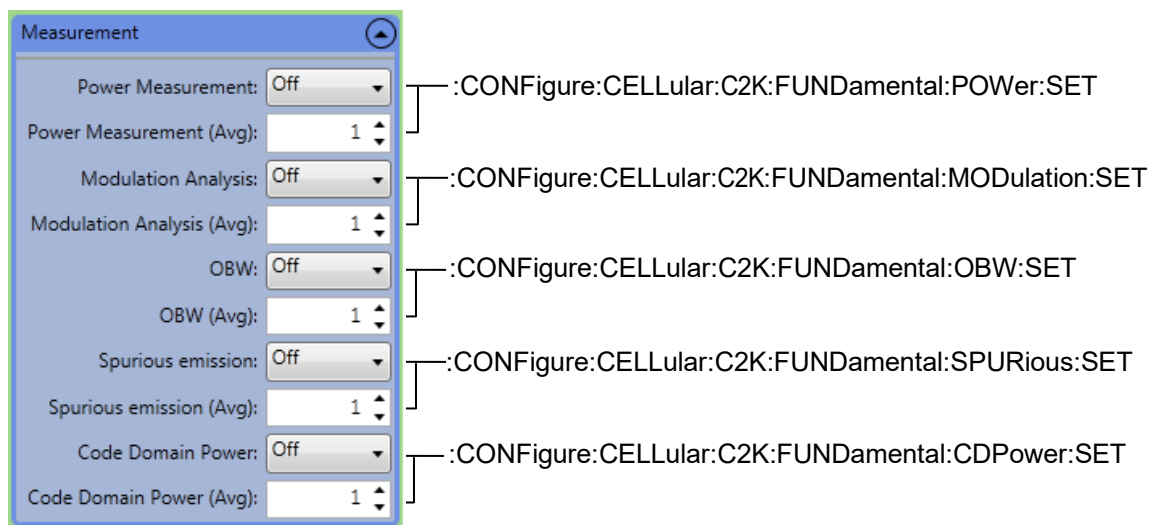


Figure 3.6.3-2 Measurement Settings Pane (Measurement Dialog)



Figure 3.6.3-3 Measurement Settings Pane (OBW Dialog)

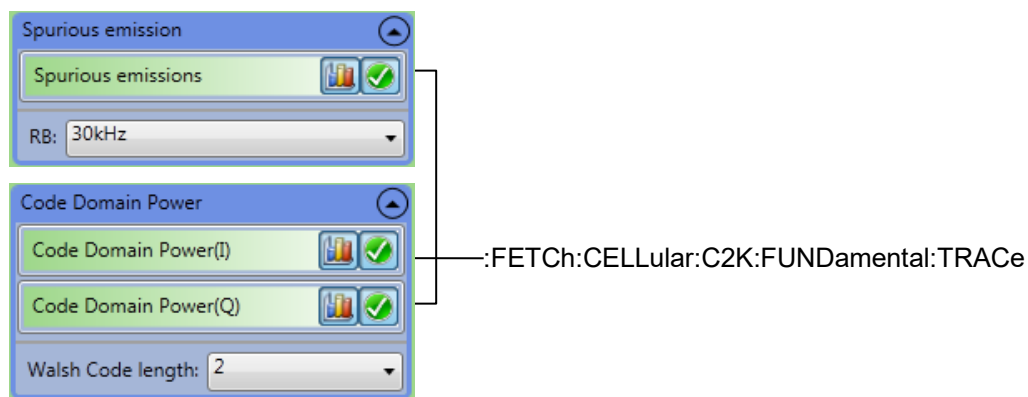


Figure 3.6.3-4 Measurement Settings Pane (Spurious Emission and Code Domain Power Dialog)

Power Measurement	
Power Measurement	
Tx Power	:FETCh:CELLular:C2K:FUNDamental:POWer:TXPower?
Filtered Power (/1.23 MHz)	:FETCh:CELLular:C2K:FUNDamental:POWer:FLTPower?

Figure 3.6.3-5 Power Measurement Results

Modulation Analysis	
Modulation Analysis	
Carrier Frequency	:FETCh:CELLular:C2K:FUNDamental:MODulation:CFRequency?
Carrier Frequency Error[ppm]	:FETCh:CELLular:C2K:FUNDamental:MODulation:FERRor?
Carrier Frequency Error[Hz]	
Worst Carrier Frequency Error[ppm]	:FETCh:CELLular:C2K:FUNDamental:MODulation:FERRor:WORSt?
Worst Carrier Frequency Error[Hz]	
Rho	:FETCh:CELLular:C2K:FUNDamental:MODulation:RHO?
Time Error	:FETCh:CELLular:C2K:FUNDamental:MODulation:TERRor?
Worst Time Error	:FETCh:CELLular:C2K:FUNDamental:MODulation:TERRor:WORSt?
EVM	:FETCh:CELLular:C2K:FUNDamental:MODulation:EVM?
Peak Vector Error	:FETCh:CELLular:C2K:FUNDamental:MODulation:PEVM?
Phase Error	:FETCh:CELLular:C2K:FUNDamental:MODulation:PHERRor?
Magnitude Error	:FETCh:CELLular:C2K:FUNDamental:MODulation:MERRor?
Origin Offset	:FETCh:CELLular:C2K:FUNDamental:MODulation:ORGNoffset?

Figure 3.6.3-6 Modulation Analysis Results

Code Domain Power	
Code Domain Power	
Max Inactive Channel Power	:FETCh:CELLular:C2K:FUNDamental:CDPower:MICPower?
R-PICH Power	:FETCh:CELLular:C2K:FUNDamental:CDPower:PILot?
R-DCCH Power	:FETCh:CELLular:C2K:FUNDamental:CDPower:DCCH?
R-FCH Power	:FETCh:CELLular:C2K:FUNDamental:CDPower:FCH?
R-SCH1A Power	:FETCh:CELLular:C2K:FUNDamental:CDPower:SC1A?
R-SCH1B Power	:FETCh:CELLular:C2K:FUNDamental:CDPower:SC1B?
R-SCH2A Power	:FETCh:CELLular:C2K:FUNDamental:CDPower:SC2A?
R-SCH2B Power	:FETCh:CELLular:C2K:FUNDamental:CDPower:SC2B?

Figure 3.6.3-7 Code Domain Power Results

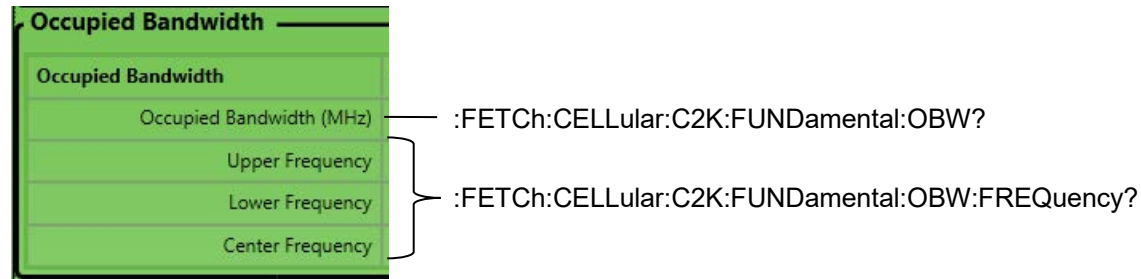


Figure 3.6.3-8 OBW Results

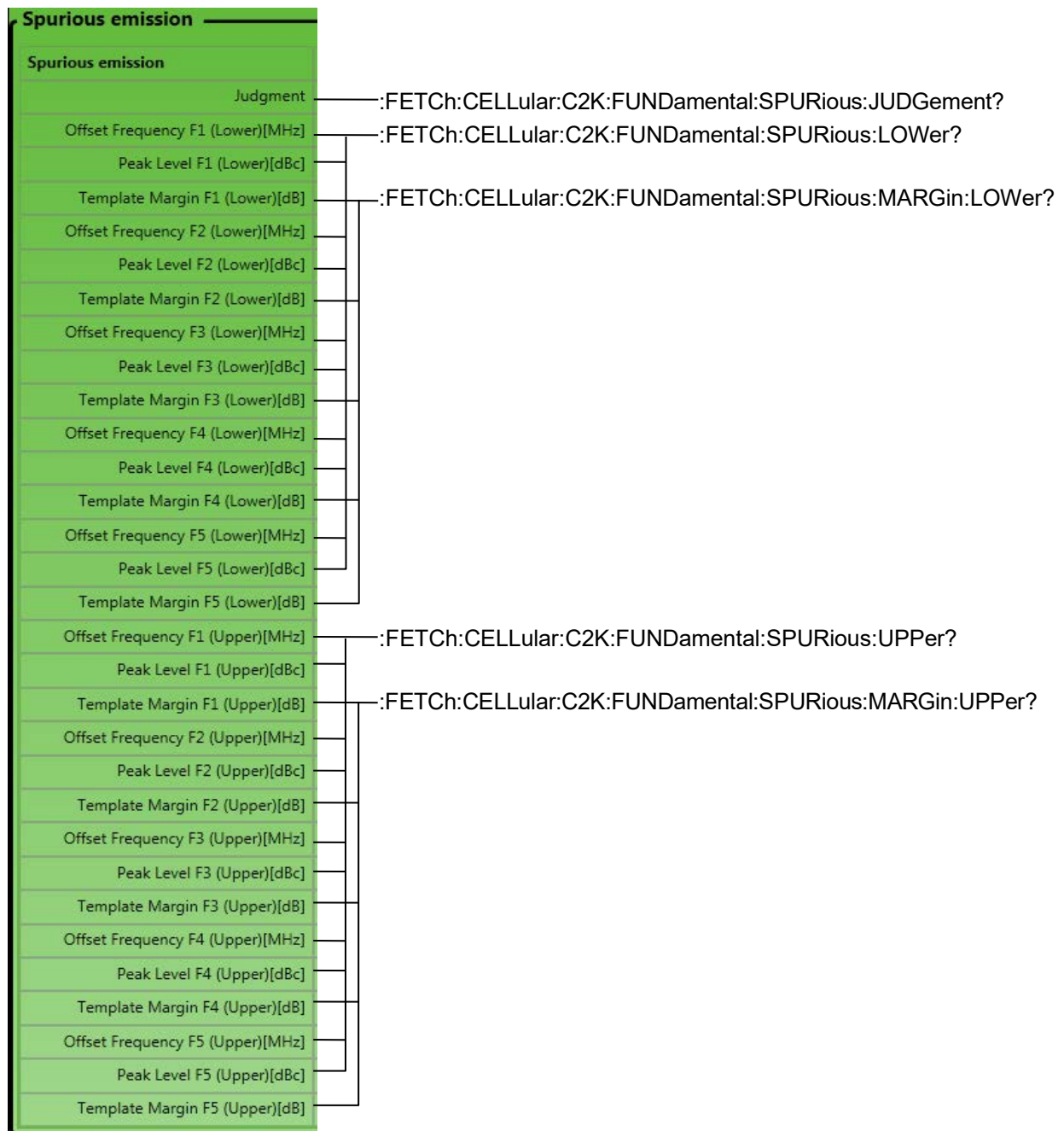


Figure 3.6.3-9 Spectrum Emission Mask Results

3.6.4 Related Native Commands

The Native commands for remote control of the MX887015A CDMA2000 Reverse Link TX Measurement that are related to setting pane parameters are described below. For detailed descriptions of the commands, refer to Section 5 “Native Command Reference” in *the MX887015A CDMA2000 Reverse Link TX Measurement Operation Manual*.

The screenshot shows the 'CDMA2000' Measurement Settings Pane. It contains several sections and parameters:

- Apply** button
- Input Port:** Port 1 (dropdown)
- Output Port:** Port 1 (dropdown)
- Output Port Setting** button
- Band Class:** 0 (dropdown)
- Channel(CH):** 40 (numeric input)
- Input Level(dBm):** -21.2 (numeric input)
- Input Frequency(Rev.)(MHz):** 826.200000 (numeric input)
- Radio Configuration:** RC1 (dropdown)
- Long Span Code Search:** OFF (dropdown)
- Trigger Source:** FREERUN (dropdown)
- Trigger Level:** -40.00 (numeric input)
- Trigger Delay:** 0.000 (numeric input)
- Trigger Timeout:** 10 (numeric input)
- DataRate:** 0 (dropdown)
- Band:** 0 (dropdown)
- Display Results** button
- Vector Signal Generator** (dropdown menu)
- Measurement** (dropdown menu)
- OBW** (dropdown menu)
- Spurious emission** (dropdown menu)
- Code Domain Power** (dropdown menu)
- Level Calibration** (dropdown menu)
- Test Command** (dropdown menu)

Labels on the right side of the pane point to the following parameters:

- PORT** (points to Input Port and Output Port)
- BANDCLASS** (points to Band Class)
- CHAN** (points to Channel(CH))
- ILVL** (points to Input Level(dBm))
- TXFREQ** (points to Input Frequency(Rev.)(MHz))
- RC** (points to Radio Configuration)
- LSCODESEARCH** (points to Long Span Code Search)
- FMEAS_TRGSR** (points to Trigger Source)
- FMEAS_TRGLVL** (points to Trigger Level)
- FMEAS_TRGDLY** (points to Trigger Delay)
- FMEAS_TRGTOUT** (points to Trigger Timeout)
- DATARATE** (points to DataRate)
- BAND** (points to Band)

Figure 3.6.4-1 Measurement Settings Pane

For the Native remote control commands of the Vector Signal Generator, refer to Figure 3.2.4-2 Measurement Settings Pane (Vector Signal Generator).

For the Native remote control commands of Level Calibration, refer to Figure 3.2.4-3 Measurement Settings Pane (Level Calibration).

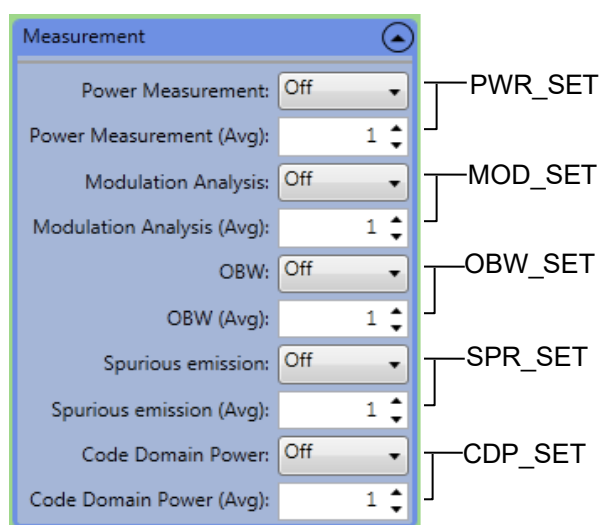


Figure 3.6.4-2 Measurement Settings Pane (Measurement Dialog)

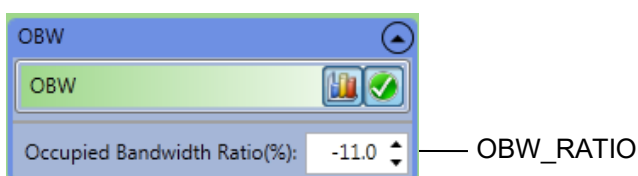


Figure 3.6.4-3 Measurement Settings Pane (OBW Dialog)

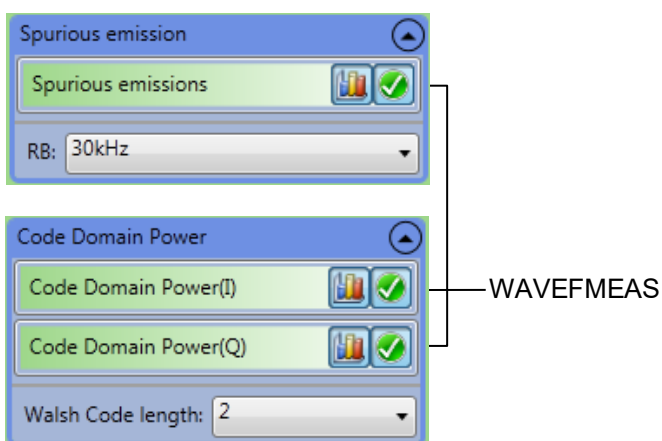


Figure 3.6.4-4 Measurement Settings Pane (Spurious Emission and Code Domain Power Dialog)

Power Measurement	
Power Measurement	
Tx Power	TXPWR?
Filtered Power (/1.23 MHz)	FILTPWR?

Figure 3.6.4-5 Power Measurement Results

Modulation Analysis	
Modulation Analysis	
Carrier Frequency	CFREQ?
Carrier Frequency Error[ppm]	CFERR?
Carrier Frequency Error[Hz]	
Worst Carrier Frequency Error[ppm]	CFERR_WORST?
Worst Carrier Frequency Error[Hz]	
Rho	RHO?
Time Error	TAU?
Worst Time Error	TAU_WORST?
EVM	EVM?
Peak Vector Error	PEVM?
Phase Error	PHASEERR?
Magnitude Error	MAGERR?
Origin Offset	ORGNOFS?

Figure 3.6.4-6 Modulation Analysis Results

Code Domain Power	
Code Domain Power	
Max Inactive Channel Power	MAXINACTCODE?
R-PICH Power	CDP_PILOT?
R-DCCH Power	CDP_DCCH?
R-FCH Power	CDP_FCH?
R-SCH1A Power	CDP_SCH1A?
R-SCH1B Power	CDP_SCH1B?
R-SCH2A Power	CDP_SCH2A?
R-SCH2B Power	CDP_SCH2B?

Figure 3.6.4-7 Code Domain Power Results

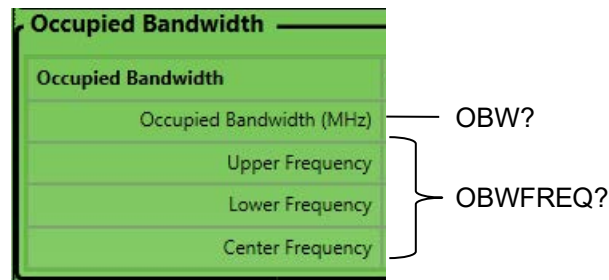


Figure 3.6.4-8 OBW Results

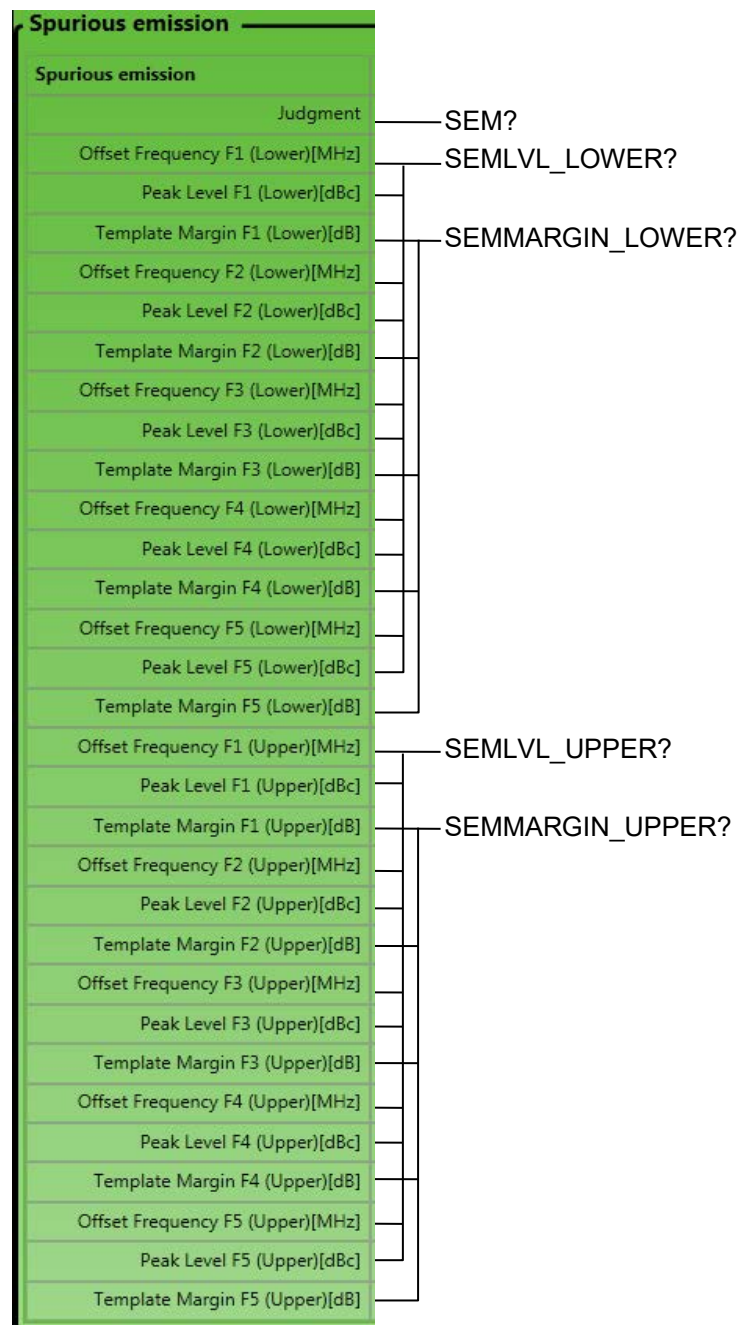


Figure 3.6.4-9 Spurious Emission Results

3.7 EVDO

Refer to Chapter 2 “Fundamental Measurement” in *the MX887016A 1xEV-DO Reverse Link TX Measurement Operation Manual* for a description of EV-DO Reverse Link TX Measurement items.

This section describes the EVDO measurements and displays.

3.7.1 Measurement settings

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

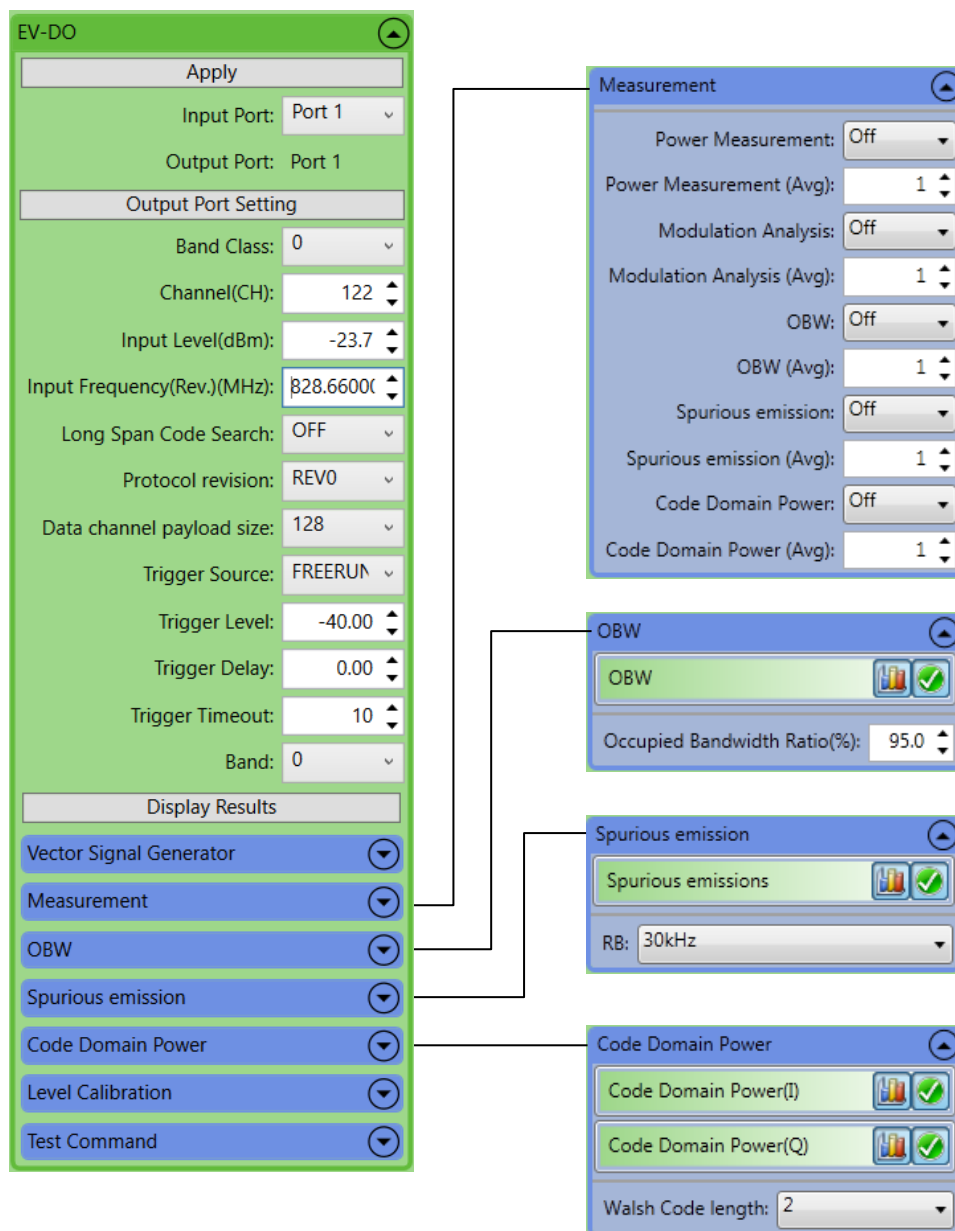


Figure 3.7.1-1 EV-DO Measurement Settings Pane

For the expandable menus of Vector Signal Generator, Level Calibration, and Test Command, refer to

Figure 3.2.1-1 Spectrum Monitor Settings Pane.

3.7.2 Measurement and results

To perform measurement:

1. Set the parameters for all buttons on the settings pane.
2. Click the **Measurement** button to open the dialog and set the parameters.
3. Click **OBW** to open the dialog and set the specifications.
4. Set a checkmark in the  checkboxes in each dialog for **OBW**, **Spurious Emissions** and **Code Domain Power** to open the graph displays.
5. Set the resolution bandwidth (RBW) in the **Spurious Emissions** dialog.
6. Select the Walsh Code length in the **Code Domain Power** dialog on the graph display.
7. Click the **Apply** button to send the parameters to the hardware.
8. Click the **Display Results** button to display the **EV-DO** tab.
9. Click the  **Measurement Start** button.
10. The numerical data are displayed in the **EV-DO** tab after measurement is completed.
11. Click the  button in the **OBW**, **Spurious Emissions**, and **Code Domain Power** dialogs to open the graph displays.

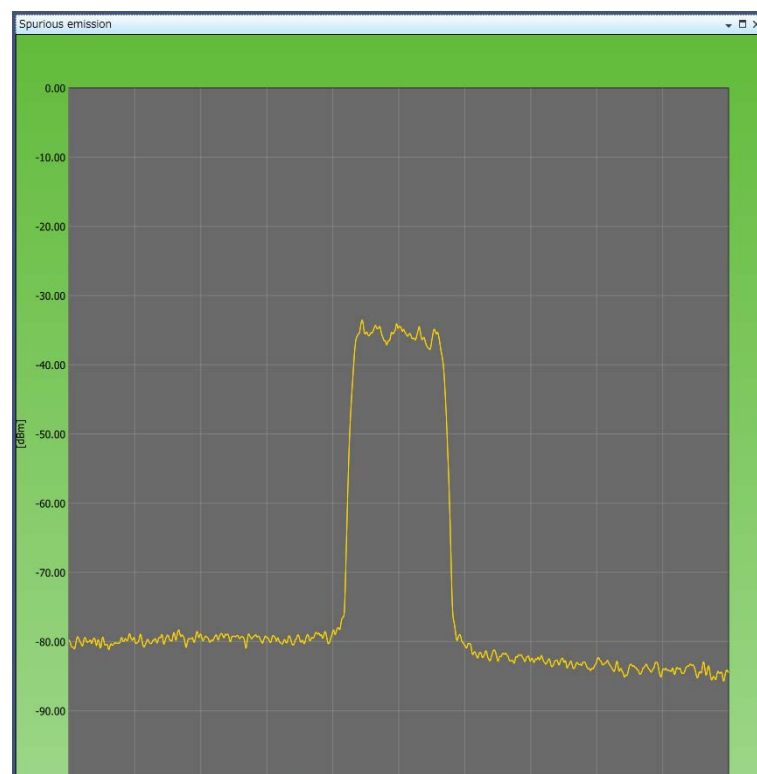


Figure 3.7.2-1 EV-DO Spurious Emissions Graph

3.7.3 Related SCPI Commands

The SCPI commands for remote control of the MX887016A 1xEV-DO Reverse Link TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of commands, refer to Section 4 “SCPI Command Reference” in the *MX887016A 1xEV-DO Reverse Link TX Measurement Operation Manual*.

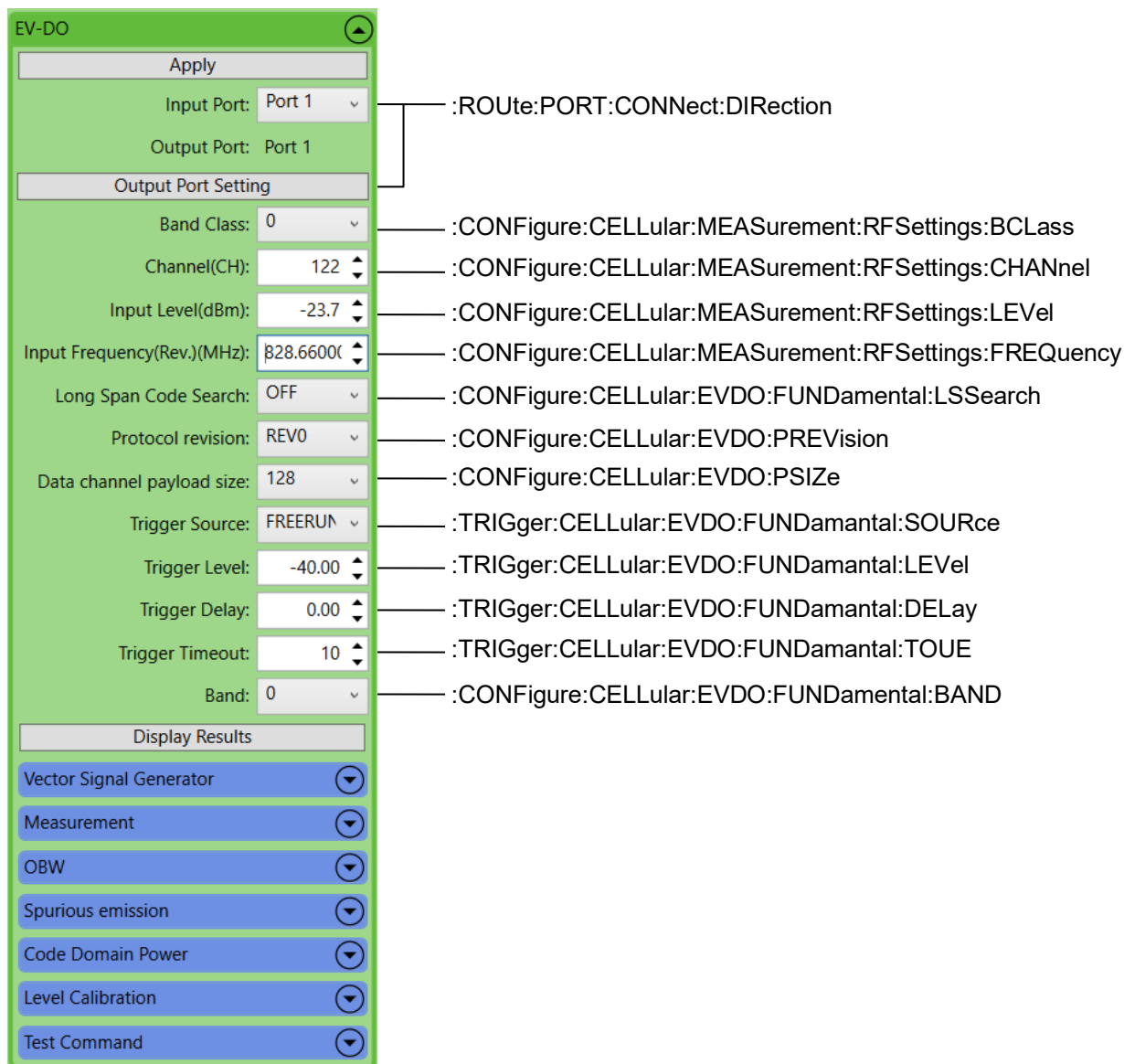


Figure 3.7.3-1 Measurement Settings Pane

For the SCPI remote control commands of the Vector Signal Generator, refer to Figure 3.2.3-2 Measurement Settings Pane (Vector Signal Generator).

For the SCPI remote control commands of Level Calibration, refer to Figure 3.2.3-3 Measurement Settings Pane (Level Calibration).

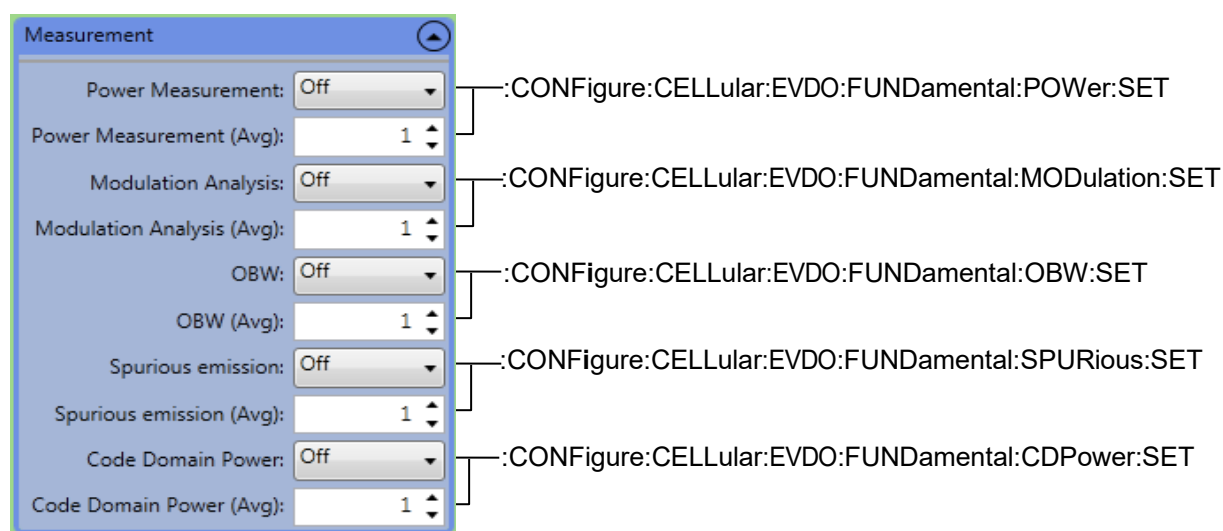


Figure 3.7.3-2 Measurement Settings Pane (Measurement Dialog)



Figure 3.7.3-3 Measurement Settings Pane (OBW Dialog)

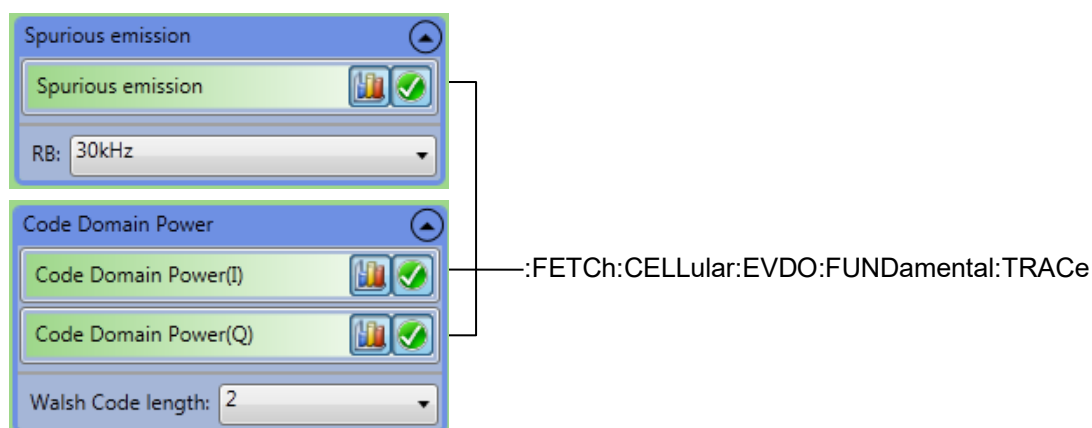


Figure 3.7.3-4 Measurement Settings Pane (Spurious Emission and Code Domain Power Dialog)

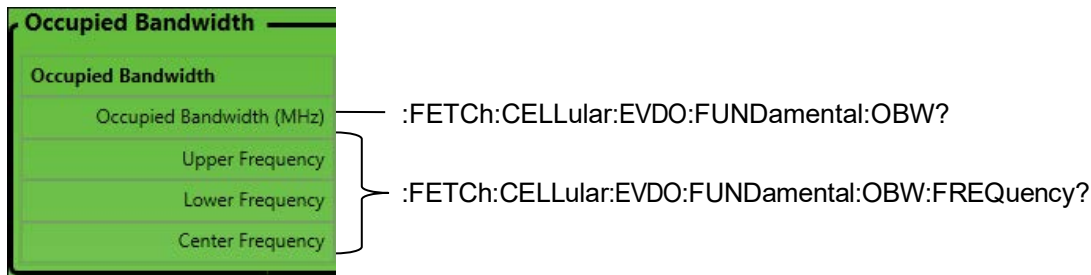


Figure 3.7.3-5 OBW Results

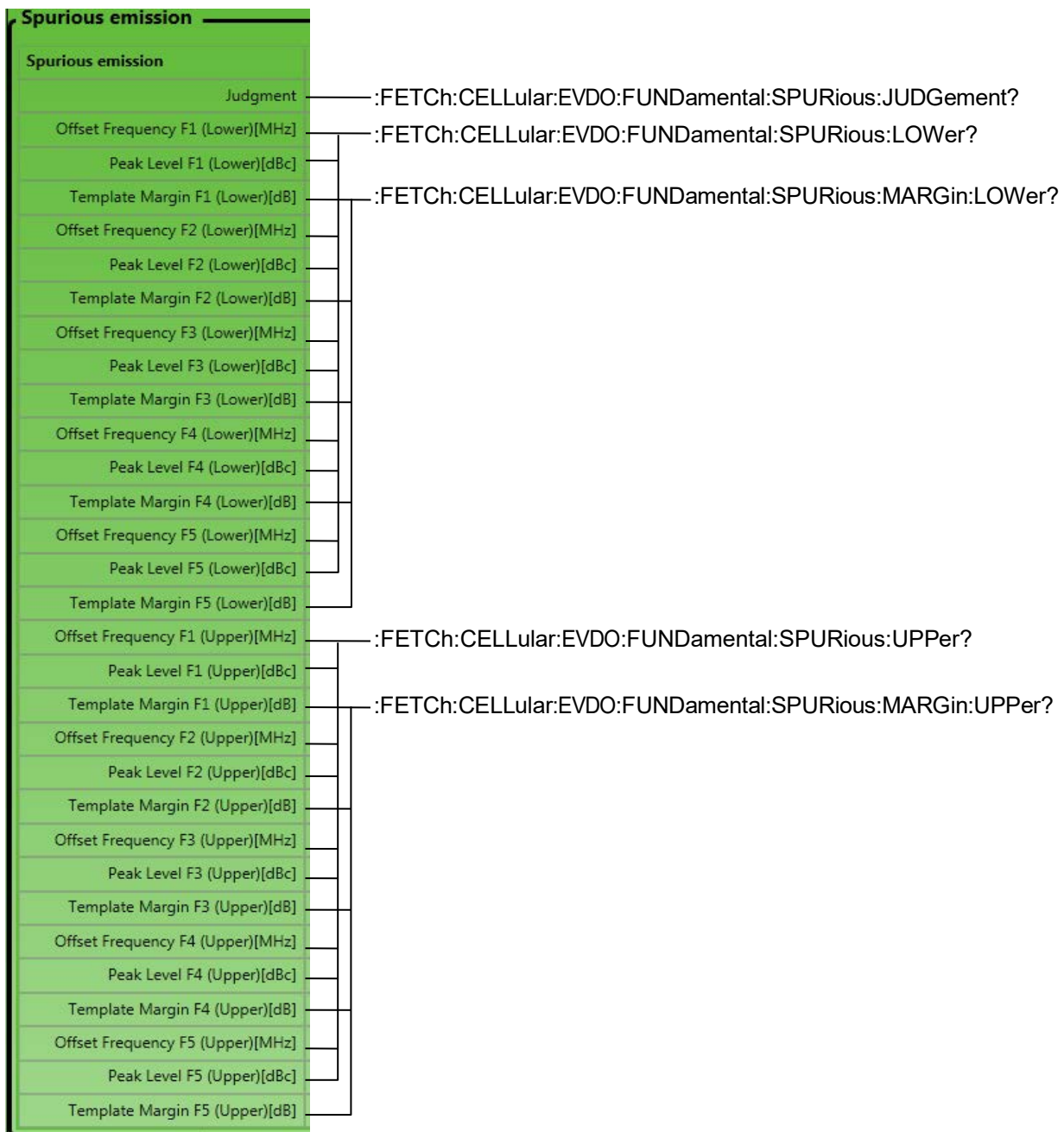


Figure 3.7.3-6 Spectrum Emission Mask Results

Code Domain Power	
Code Domain Power	
Max Inactive Channel Power	:FETCh:CELLular:EVDO:FUNDamental:CDPower:MICPower?
Pilot Channel Power	:FETCh:CELLular:EVDO:FUNDamental:CDPower:PILot?
RRI Channel Power	:FETCh:CELLular:EVDO:FUNDamental:CDPower:RRI?
DSC Channel Power	:FETCh:CELLular:EVDO:FUNDamental:CDPower:DSC?
DRC Channel Power	:FETCh:CELLular:EVDO:FUNDamental:CDPower:DRC?
ACK Channel Power	:FETCh:CELLular:EVDO:FUNDamental:CDPower:ACK?
Data Channel Power	:FETCh:CELLular:EVDO:FUNDamental:CDPower:DATA?
Auxiliary Pilot Channel Power	:FETCh:CELLular:EVDO:FUNDamental:CDPower:APILot?

Figure 3.7.3-7 Code Domain Power Results

Power Measurement	
Power Measurement	
Tx Power	:FETCh:CELLular:EVDO:FUNDamental:POWER:TXPower?
Filtered Power (/1.23 MHz)	:FETCh:CELLular:EVDO:FUNDamental:POWER:FLTPower?

Figure 3.7.3-8 Power Measurement Results

Modulation Analysis	
Modulation Analysis	
Carrier Frequency	:FETCh:CELLular:EVDO:FUNDamental:MODulation:CFrequency?
Carrier Frequency Error[ppm]	:FETCh:CELLular:EVDO:FUNDamental:MODulation:FERRor?
Carrier Frequency Error[Hz]	
Worst Carrier Frequency Error[ppm]	:FETCh:CELLular:EVDO:FUNDamental:MODulation:FERRor:WORSt?
Worst Carrier Frequency Error[Hz]	
Rho	:FETCh:CELLular:EVDO:FUNDamental:MODulation:RHO?
Time Error	:FETCh:CELLular:EVDO:FUNDamental:MODulation:TERRor?
Worst Time Error	:FETCh:CELLular:EVDO:FUNDamental:MODulation:TERRor:WORSt?
EVM	:FETCh:CELLular:EVDO:FUNDamental:MODulation:EVM?
Peak Vector Error	:FETCh:CELLular:EVDO:FUNDamental:MODulation:PEVM?
Phase Error	:FETCh:CELLular:EVDO:FUNDamental:MODulation:PHERRor?
Magnitude Error	:FETCh:CELLular:EVDO:FUNDamental:MODulation:MERRor?
Origin Offset	:FETCh:CELLular:EVDO:FUNDamental:MODulation:ORGNoffset?

Figure 3.7.3-9 Modulation Analysis Results

3.7.4 Related Native Commands

The Native commands for remote control of the MX887016A 1xEV-DO Reverse Link TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of the commands, refer to Section 5 “Native Command Reference” in *the MX887016A 1xEV-DO Reverse Link TX Measurement Operation Manual*.

EV-DO

Apply

Input Port: Port 1

Output Port: Port 1

Output Port Setting

Band Class: 0

Channel(CH): 122

Input Level(dBm): -23.7

Input Frequency(Rev.)(MHz): 828.6600

Long Span Code Search: OFF

Protocol revision: REV0

Data channel payload size: 128

Trigger Source: FREERUN

Trigger Level: -40.00

Trigger Delay: 0.00

Trigger Timeout: 10

Band: 0

Display Results

Vector Signal Generator

Measurement

OBW

Spurious emission

Code Domain Power

Level Calibration

Test Command

PORT

BANDCLASS

CHAN

ILVL

TXFREQ

LSCODESEARCH

PREV

PSIZE

FMEAS_TRGSRG

FMEASTRGLVL

FMEAS_TRGDLY

FMEAS_TRGTOUT

BAND

Figure 3.7.4-1 Measurement Settings Pane

For the Native remote control commands of the Vector Signal Generator, refer to Figure 3.2.4-2 Measurement Settings Pane (Vector Signal Generator).

For the Native remote control commands of Level Calibration, refer to Figure 3.2.4-3 Measurement Settings Pane (Level Calibration).

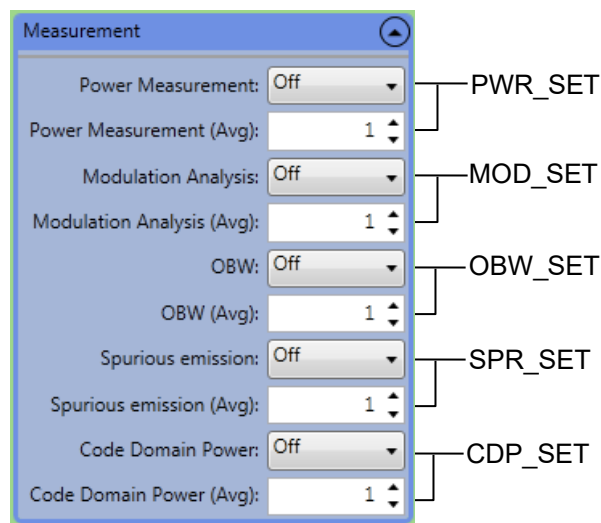


Figure 3.7.4-2 Measurement Settings Pane (Measurement Dialog)

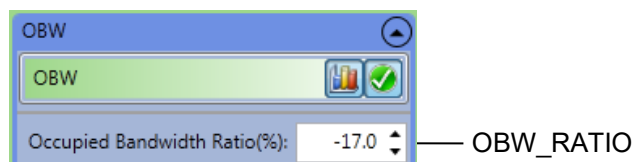


Figure 3.7.4-3 Measurement Settings Pane (OBW Dialog)

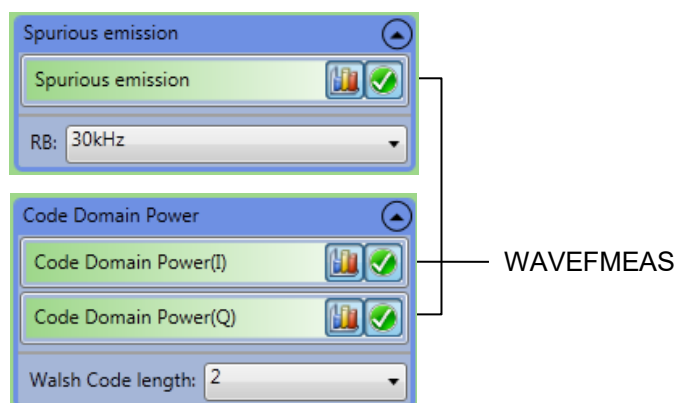


Figure 3.7.4-4 Measurement Settings Pane (Spurious Emission Code Domain Power Dialog)

Occupied Bandwidth	
Occupied Bandwidth	
Occupied Bandwidth (MHz)	OBW?
Upper Frequency	OBWFREQ?
Lower Frequency	
Center Frequency	

Figure 3.7.4-5 OBW Results

Spurious emission	
Spurious emission	
Judgment	SEM?
Offset Frequency F1 (Lower)[MHz]	SEMLVL_LOWER?
Peak Level F1 (Lower)[dBc]	
Template Margin F1 (Lower)[dB]	
Offset Frequency F2 (Lower)[MHz]	
Peak Level F2 (Lower)[dBc]	SEMMARGIN_LOWER?
Template Margin F2 (Lower)[dB]	
Offset Frequency F3 (Lower)[MHz]	
Peak Level F3 (Lower)[dBc]	
Template Margin F3 (Lower)[dB]	SEMLVL_UPPER?
Offset Frequency F4 (Lower)[MHz]	
Peak Level F4 (Lower)[dBc]	
Template Margin F4 (Lower)[dB]	
Offset Frequency F5 (Lower)[MHz]	SEMLVL_UPPER?
Peak Level F5 (Lower)[dBc]	
Template Margin F5 (Lower)[dB]	
Offset Frequency F1 (Upper)[MHz]	
Peak Level F1 (Upper)[dBc]	SEMMARGIN_UPPER?
Template Margin F1 (Upper)[dB]	
Offset Frequency F2 (Upper)[MHz]	
Peak Level F2 (Upper)[dBc]	SEMLVL_LOWER?
Template Margin F2 (Upper)[dB]	
Offset Frequency F3 (Upper)[MHz]	
Peak Level F3 (Upper)[dBc]	
Template Margin F3 (Upper)[dB]	SEMLVL_UPPER?
Offset Frequency F4 (Upper)[MHz]	
Peak Level F4 (Upper)[dBc]	
Template Margin F4 (Upper)[dB]	
Offset Frequency F5 (Upper)[MHz]	SEMLVL_LOWER?
Peak Level F5 (Upper)[dBc]	
Template Margin F5 (Upper)[dB]	

Figure 3.7.4-6 Spectrum Emission Mask Results

Code Domain Power	
Code Domain Power	
Max Inactive Channel Power	MAXINACTCODE?
Pilot Channel Power	CDP_PILOT?
RRI Channel Power	CDP_RRI?
DSC Channel Power	CDP_DSC?
DRC Channel Power	CDP_DRC?
ACK Channel Power	CDP_ACK?
Data Channel Power	CDP_DATA?
Auxiliary Pilot Channel Power	CDP_AUX?

Figure 3.7.4-7 Code Domain Power Results

Power Measurement	
Power Measurement	
Tx Power	TXPWR?
Filtered Power (/1.23 MHz)	FILTPWR?

Figure 3.7.4-8 Power Measurement Results

Modulation Analysis	
Modulation Analysis	
Carrier Frequency	CFREQ?
Carrier Frequency Error[ppm]	CFERR?
Carrier Frequency Error[Hz]	
Worst Carrier Frequency Error[ppm]	CFERR_WORST?
Worst Carrier Frequency Error[Hz]	
Rho	RHO?
Time Error	TAU?
Worst Time Error	TAU_WORST?
EVM	EVM?
Peak Vector Error	PEVM?
Phase Error	PHASEERR?
Magnitude Error	MAGERR?
Origin Offset	ORGNOFS?

Figure 3.7.4-9 Modulation Analysis Results

3.8 TD-SCDMA

Refer to Chapter 2 “Fundamental Measurement” in *the MX887017A TD-SCDMA Uplink TX Measurement Operation Manual* for a description of the TD-SCDMA Uplink TX Measurement items.

This section describes the TD-SCDMA settings and displays.

3.8.1 Measurement settings

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

The image displays the TD-SCDMA Measurement Settings Pane, which is divided into several sections for configuring measurement parameters.

TD-SCDMA Section:

- Apply:** A button to apply the settings.
- Input Port:** Set to Port 1.
- Output Port:** Set to Port 1.
- Output Port Setting:**
 - Channel (CH):** 1
 - UL Frequency (MHz):** 1980.000000
 - Input Level (dBm):** -10.0
 - UL Configuration:** HSDPA RMC
 - Scrambling Code:** 1
 - Trigger Level(dB):** -40
 - Trigger Timeout(s):** 1
 - Midamble Configuration:** 401
 - Uplink DPCH Channelisation Code (Single Code):** 301
 - Uplink DPCH Channelisation Code (Multi Code Code1):** 501
 - Uplink DPCH Channelisation Code (Multi Code Code2):** 301
 - Measurement Trigger:** Midamble
 - E-PUCH Measurement Slot:** 2
- Display Results:** A list of measurement items with expand/collapse buttons:
 - Vector Signal Generator
 - Spectrum Emission Mask
 - Measurement
 - Modulation Analysis
 - Occupied Bandwidth
 - Power Template
 - Level Calibration
 - Test Command

Spectrum Emission Mask Section:

- Spectrum Emission Mask:** A button to open the mask settings.
- 0.8MHz RBW30k Offset Limit(dBc):** 15.0
- 1.8MHz RBW30k Offset Limit(dBc):** 20.0
- 2.4MHz RBW1M Offset Limit(dBc):** 25.0
- 2.4 to 4.0MHz RBW1M Offset Limit(dBc):** 30.0
- Mask Template Lower Limit(dBm):** -55.0

Measurement Section:

- Power:** Off
- Power Count:** 0
- Power Template:** Off
- Power Template Count:** 0
- Obw:** Off
- Obw Count:** 0
- Sem:** Off
- Sem Count:** 0
- Aclr:** Off
- Aclr Count:** 0
- Modulation analysis:** Off
- Modulation analysis Count:** 0
- Peak code domain error:** Off
- Peak code domain error Count:** 0

Figure 3.8.1-1 TD-SCDMA Measurement Settings Pane (1/2)

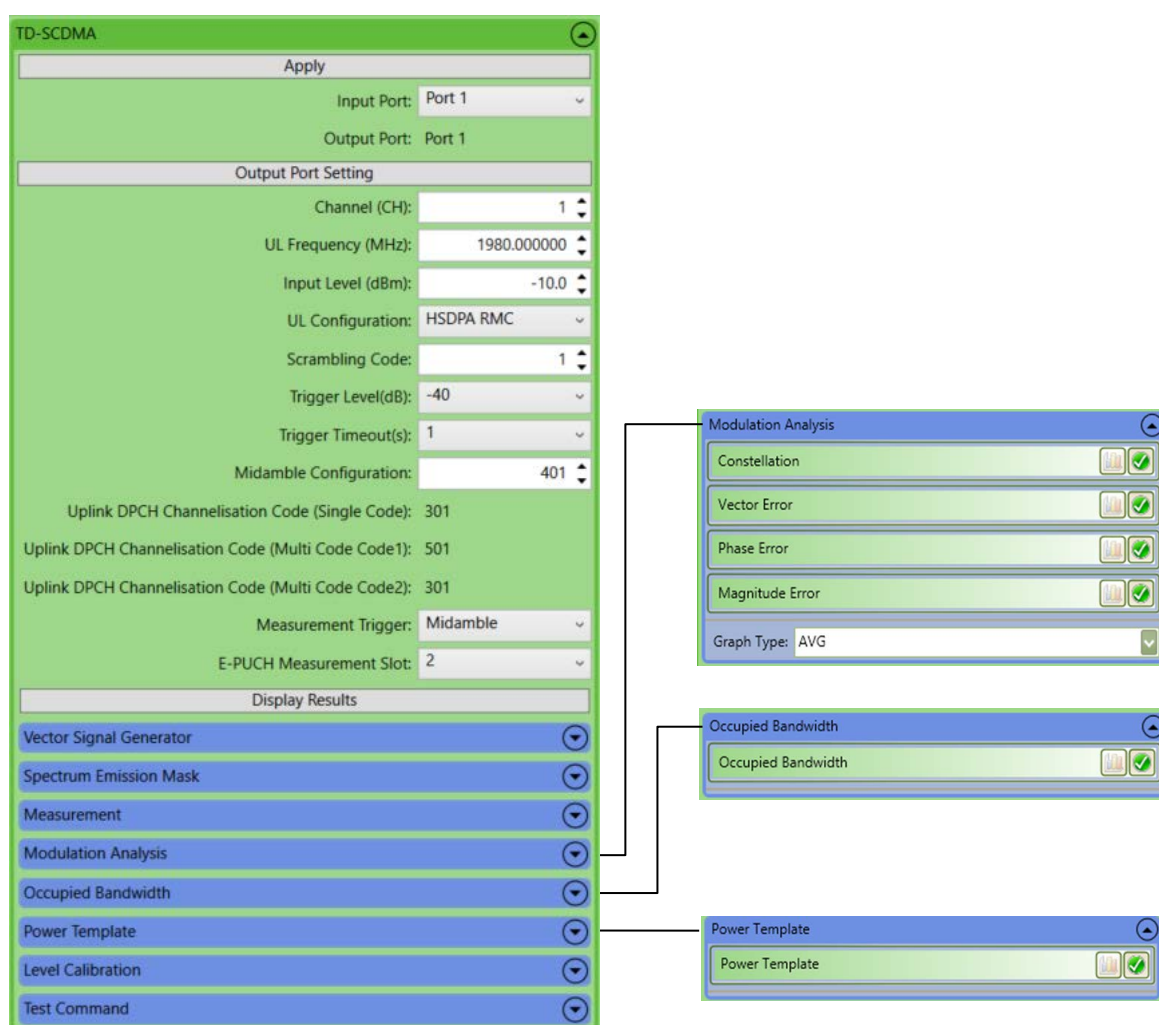


Figure 3.8.1-2 TD-SCDMA Measurement Settings Pane (2/2)

For the expandable menus of Vector Signal Generator, Level Calibration, and Test Command, refer to Figure 3.2.1-1 Spectrum Monitor Settings Pane.

3.8.2 Measurement and results

To perform measurement:

1. Set the parameters for all buttons from **Input Port** to **E-PUCH Measurement Slot**.
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 specifications.
4. Set a checkmark in the  checkboxes in each dialog for **Spectrum Emission Mask**, **Occupied Band Width**, **EVM**, **Constellation**, **Vector Error**, **Phase Error**, **Magnitude Error**, and **Power Template** to open the graph displays.
5. Click the **Apply** button to send the parameters to the hardware.
6. Click the **Display Results** button to display the **TD-SCDMA** tab.
7. Click the  **Measurement Start** button
8. The numerical data are displayed in the **TD-SCDMA** tab when measurement is completed.
9. Click the  button in the **Spectrum Emission Mask**, **Occupied Band Width**, **Constellation**, **Vector Error**, **Phase Error**, **Magnitude Error**, and **Power Template** dialogs to open the graph displays.

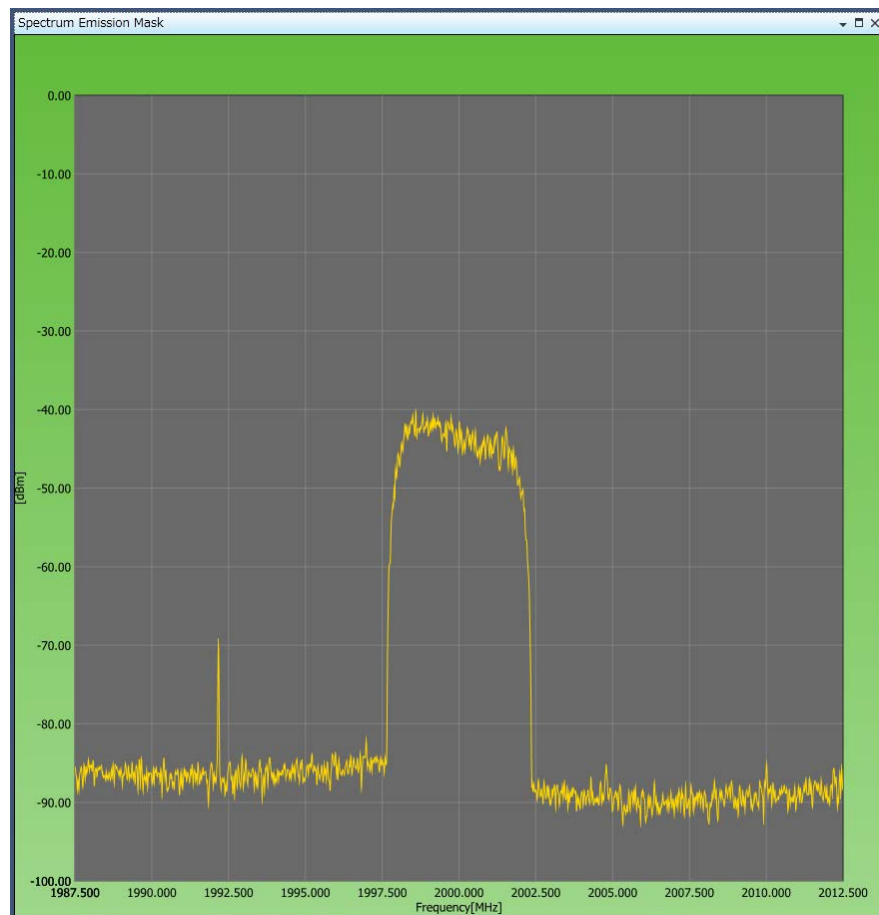


Figure 3.8.2-1 TD-SCDMA (Spectrum Emission Mask) Graph

3.8.3 Related SCPI Commands

The SCPI commands for remote control of the MX887017A TD-SCDMA Uplink TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of the commands, refer to Chapter 4 “SCPI Command Reference” in *the MX887017A TD-SCDMA Uplink TX Measurement Operation Manual*.

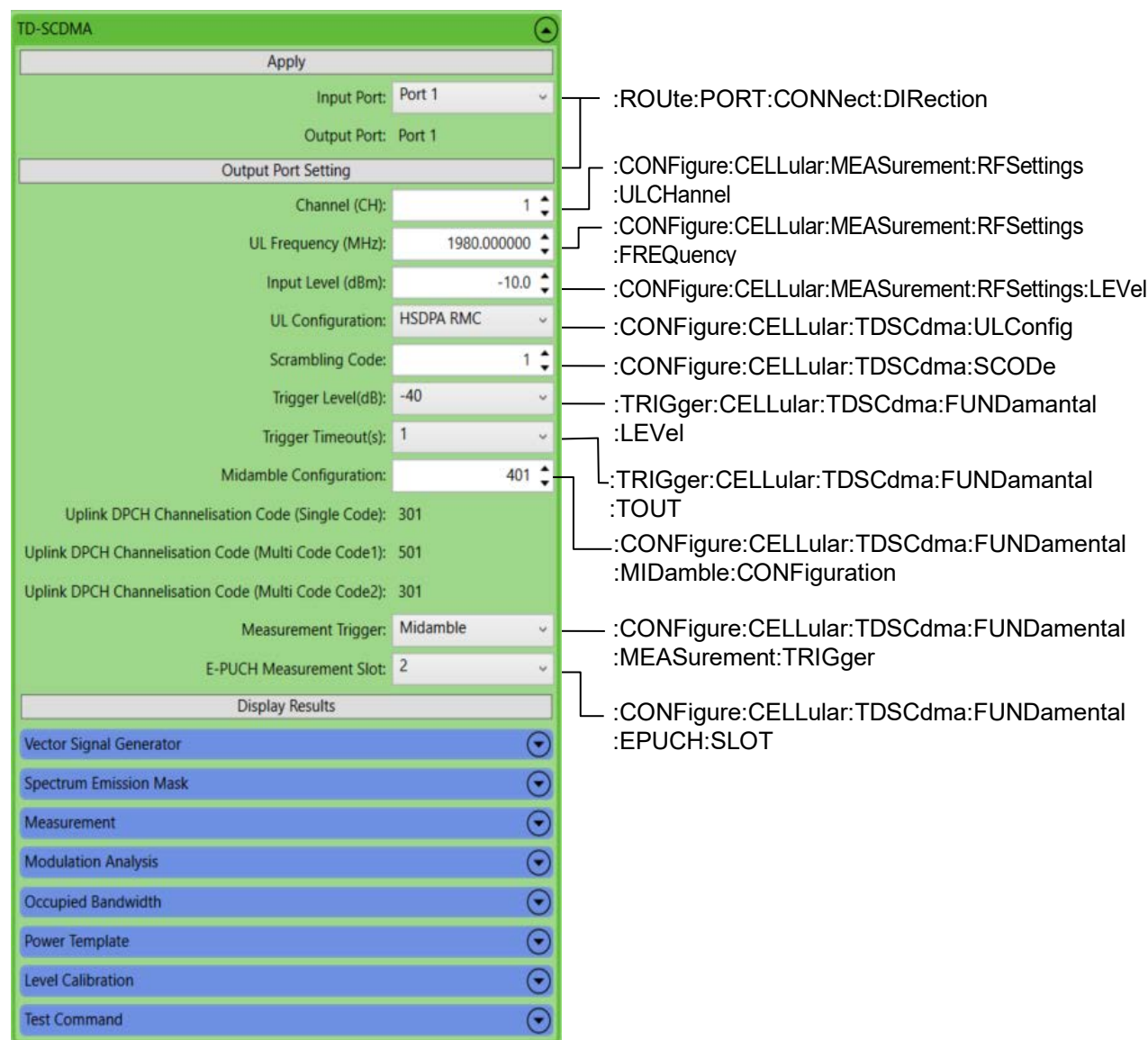


Figure 3.8.3-1 Measurement Settings Pane

For the SCPI remote control commands of the Vector Signal Generator, refer to Figure 3.2.3-2 Measurement Settings Pane (Vector Signal Generator).

For the SCPI remote control commands of Level Calibration, refer to Figure 3.2.3-3 Measurement Settings Pane (Level Calibration).

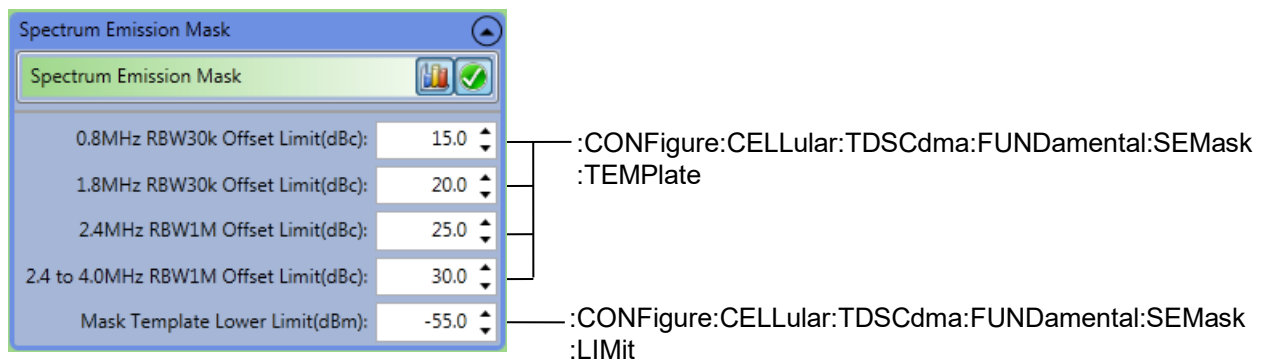


Figure 3.8.3-2 Measurement Settings Pane (Spectrum Emission Mask Dialog)

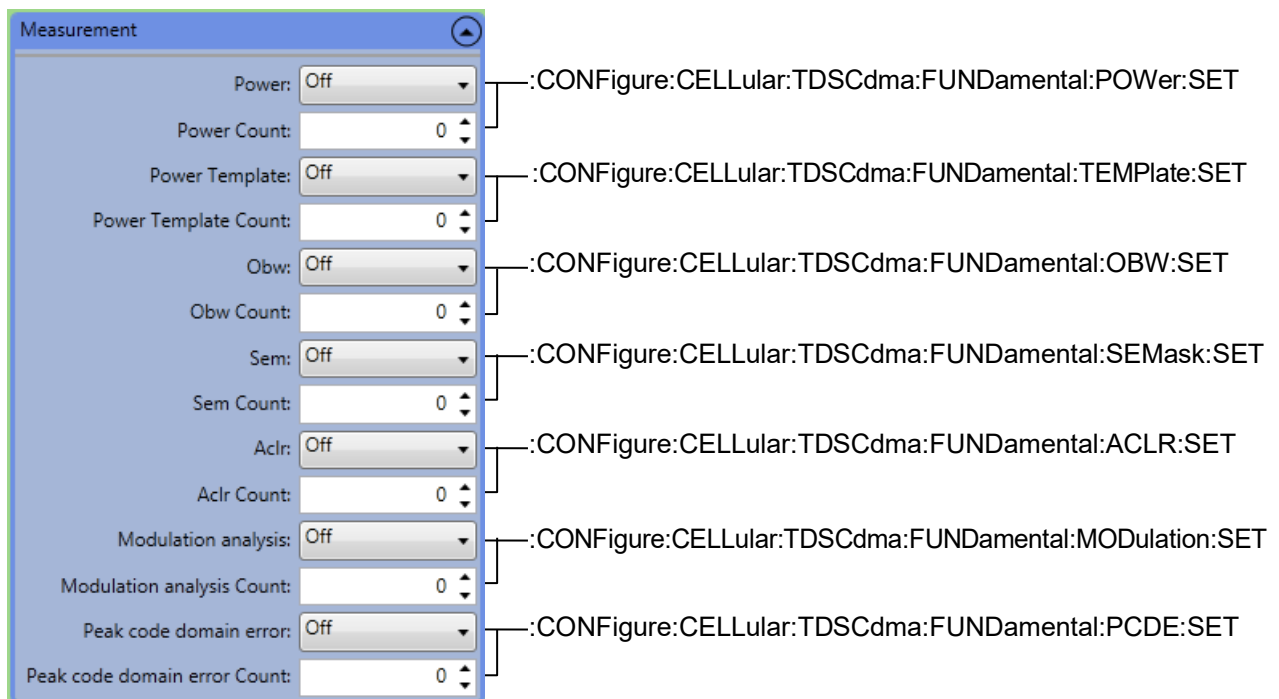


Figure 3.8.3-3 Measurement Settings Pane (Measurement Dialog)

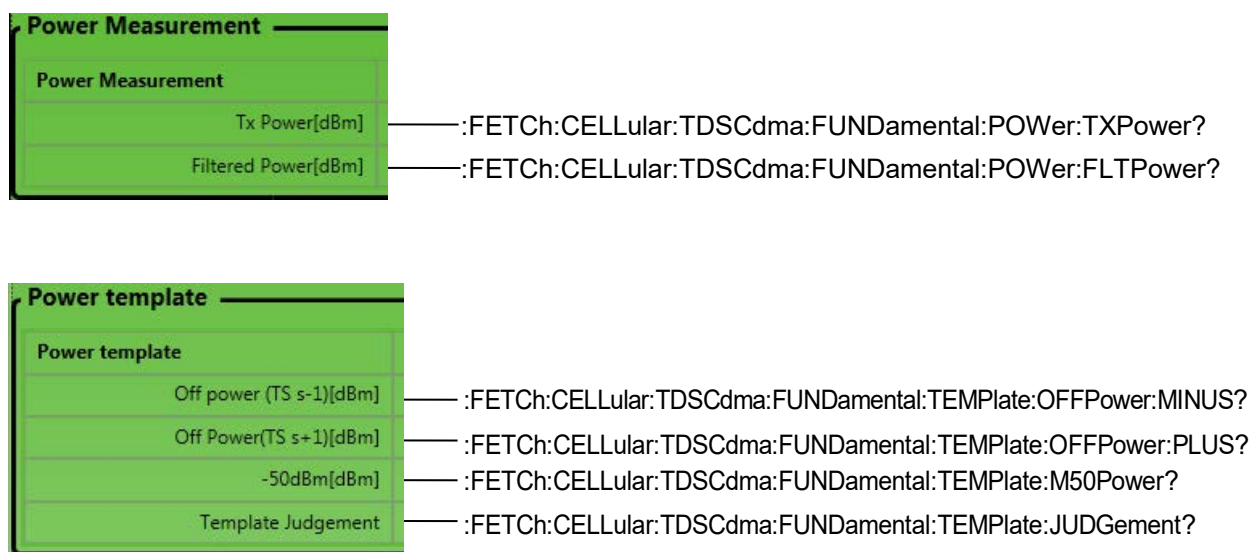


Figure 3.8.3-4 Power Measurement and Power Template Results

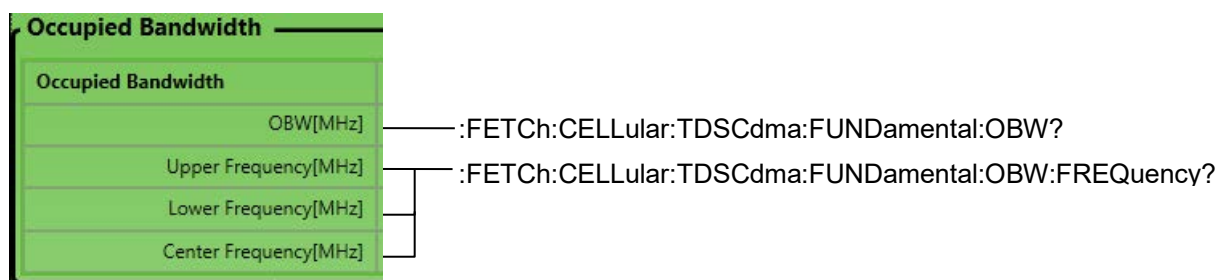


Figure 3.8.3-5 Occupied Bandwidth Results

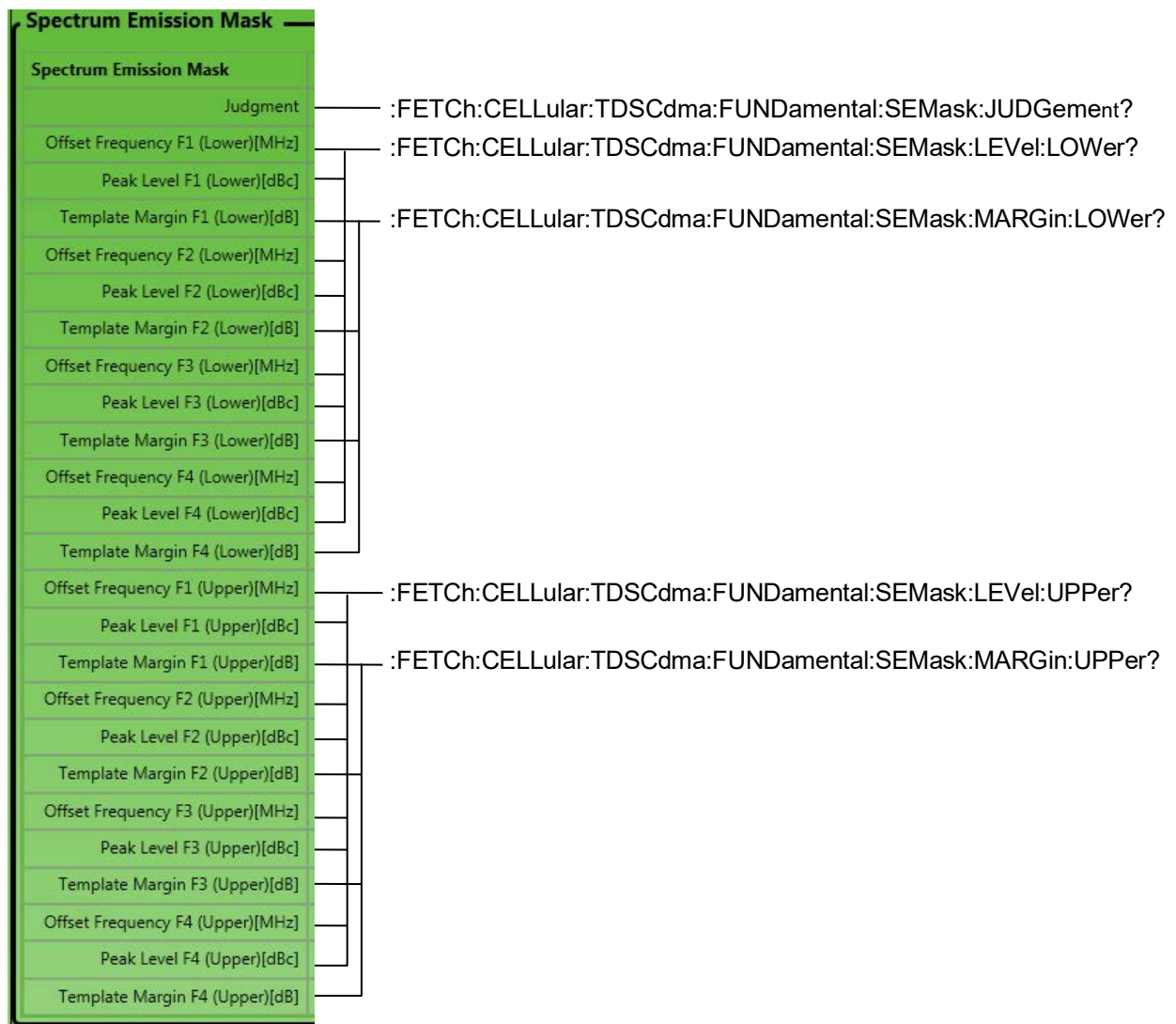


Figure 3.8.3-6 Spectrum Emission Mask Results

Adjacent channel leakage power ratio	
Adjacent channel leakage power ratio	
-f2	:FETCh:CELLular:TDSCdma:FUNDamental:ACLR?
-f1	
+f1	
+f2	
Modulation Analysis	
Modulation Analysis	
Carrier Frequency[Hz]	:FETCh:CELLular:TDSCdma:FUNDamental:MODulation:CFRequency?
Frequency error(Worst)[ppm]	:FETCh:CELLular:TDSCdma:FUNDamental:MODulation:FERRor
Frequency error(Worst)[Hz]	:WORSt?
Frequency error[ppm]	:FETCh:CELLular:TDSCdma:FUNDamental:MODulation:FERRor?
Frequency error[Hz]	
EVM(%)	:FETCh:CELLular:TDSCdma:FUNDamental:MODulation:EVM?
Peak EVM(%)	:FETCh:CELLular:TDSCdma:FUNDamental:MODulation:PEVM?
Phase Error[degree]	:FETCh:CELLular:TDSCdma:FUNDamental:MODulation:PHERror?
Magnitude Error[%]	:FETCh:CELLular:TDSCdma:FUNDamental:MODulation:MERRor?
Origin Offset[dB]	:FETCh:CELLular:TDSCdma:FUNDamental:MODulation:ORGNoffset?
IQ imbalance[%]	:FETCh:CELLular:TDSCdma:FUNDamental:MODulation:IQIMbalance?
Rho	:FETCh:CELLular:TDSCdma:FUNDamental:MODulation:RHO?

Figure 3.8.3-7 ACLR and Modulation Analysis Results

Peak code domain error	
Peak code domain error	
Peak CDE[dB]	:FETCh:CELLular:TDSCdma:FUNDamental:PCDE?

Figure 3.8.3-8 Peak Code Domain Error Results

3.8.4 Related Native Commands

The Native commands for remote control of the MX887017A TD-SCDMA Uplink TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of the commands, refer to Chapter 5 “Native Command Reference” in *the MX887017A TD-SCDMA Uplink TX Measurement Operation Manual*.

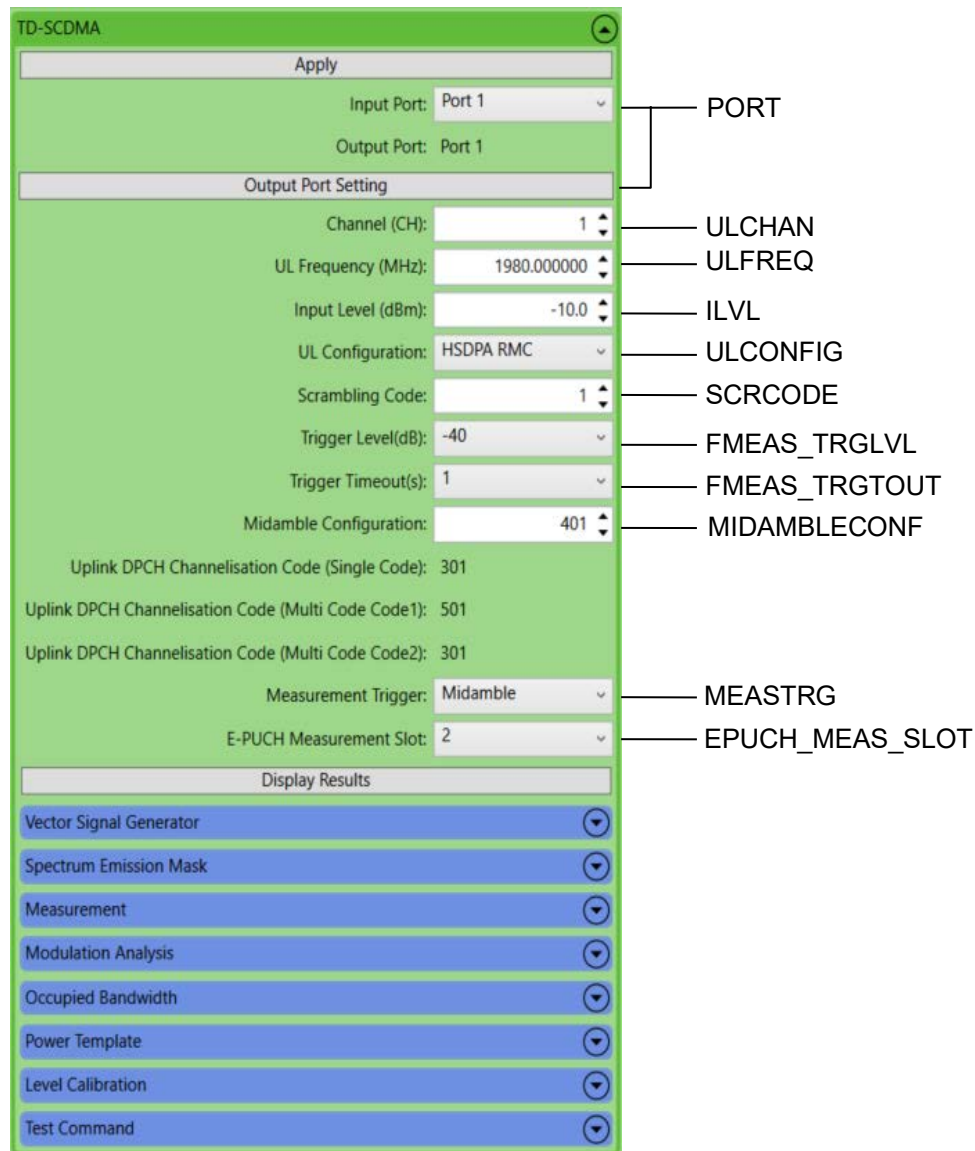


Figure 3.8.4-1 Measurement Settings Pane

For the Native remote control commands of the Vector Signal Generator, refer to Figure 3.2.4-2 Measurement Settings Pane (Vector Signal Generator).

For the Native remote control commands of Level Calibration, refer to Figure 3.2.4-3 Measurement Settings Pane (Level Calibration).

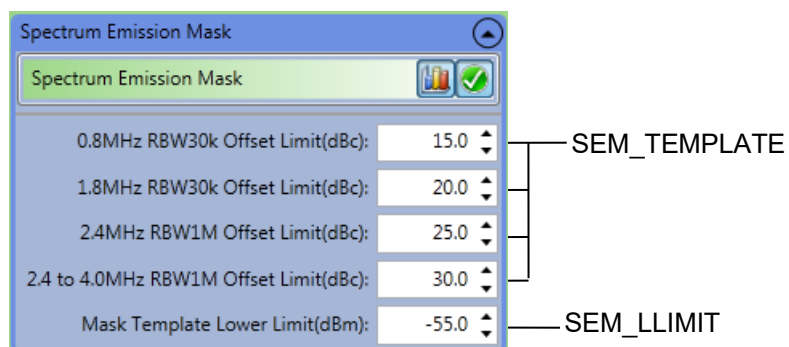


Figure 3.8.4-2 Measurement Settings Pane (Spectrum Emission Mask Dialog)

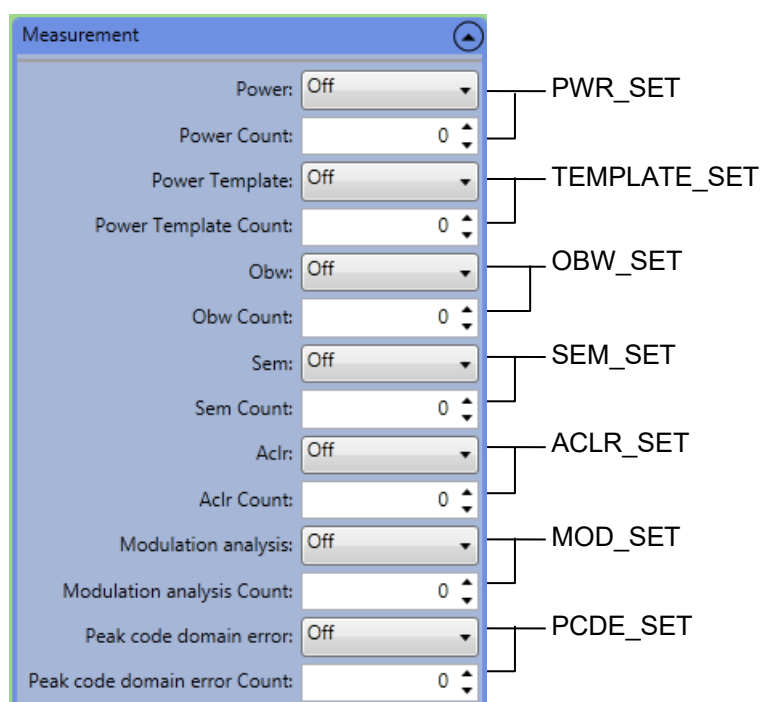


Figure 3.8.4-3 Measurement Settings Pane (Measurement Dialog)

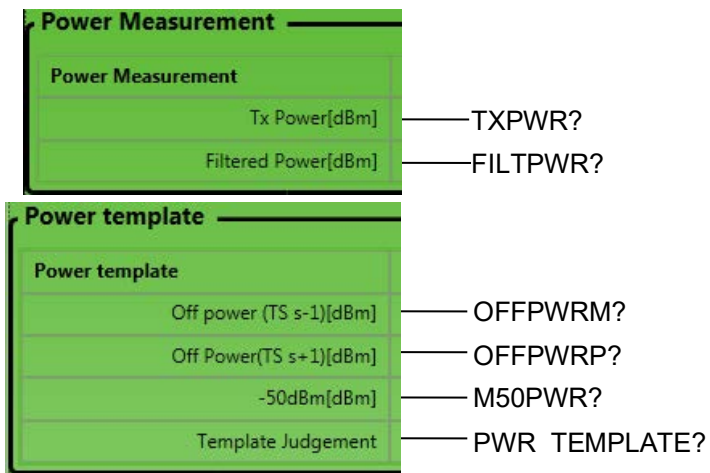


Figure 3.8.4-4 Power Measurement and Power Template Results

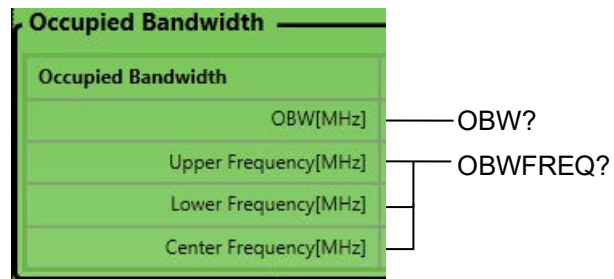


Figure 3.8.4-5 Occupied Bandwidth Results

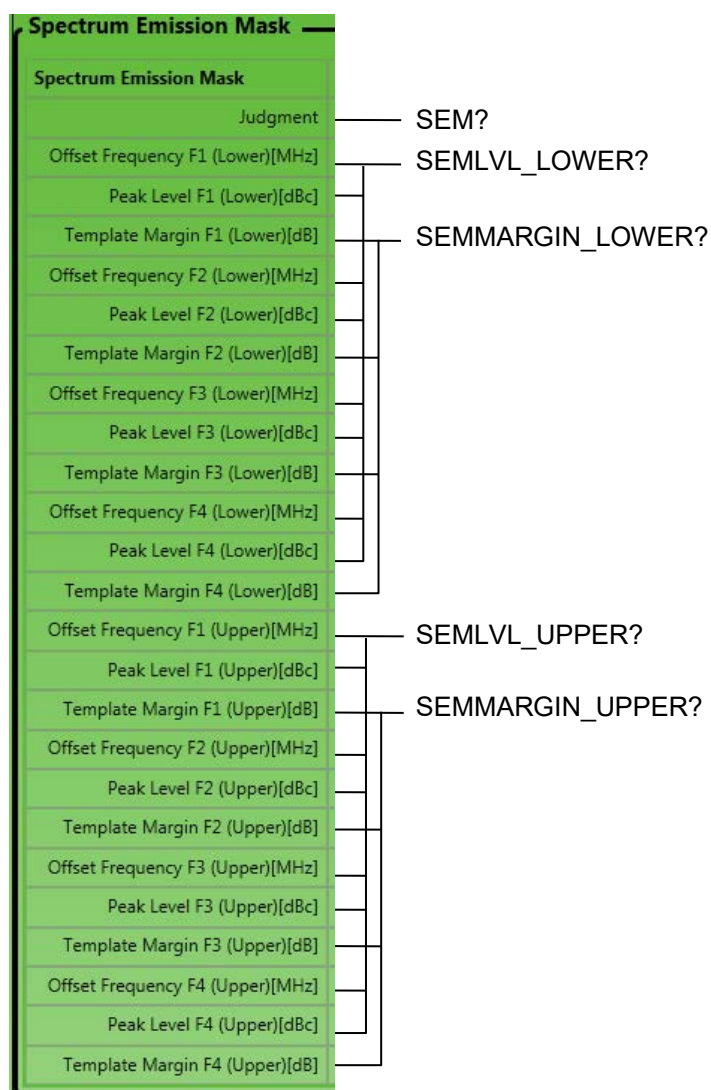


Figure 3.8.4-6 Spectrum Emission Mask Results

Adjacent channel leakage power ratio	
Adjacent channel leakage power ratio	Cu
-f2	ACLR?
-f1	
+f1	
+f2	
Modulation Analysis	
Modulation Analysis	Cu
Carrier Frequency[Hz]	CFREQ?
Frequency error(Worst)[ppm]	CFERR_WORST?
Frequency error(Worst)[Hz]	
Frequency error[ppm]	CFERR?
Frequency error[Hz]	
EVM(%)	EVM?
Peak EVM(%)	PEVM?
Phase Error[degree]	PHASEERR?
Magnitude Error[%]	MAGERR?
Origin Offset[dB]	ORGNOSFS?
IQ imbalance[%]	IQIMB?
Rho	RHO?

Figure 3.8.4-7 ACLR and Modulation Analysis Results

Peak code domain error	
Peak code domain error	
Peak CDE[dB]	PCDE?

Figure 3.8.4-8 Peak Code Domain Error Results

3.9 NB-IoT

Refer to Chapter 2 “Fundamental Measurement” in the *MX887067A NB-IoT Uplink TX Measurement Operation Manual* for a description of the NB-IoT Uplink TX Measurement items.

This section describes the NB-IoT settings and displays.

3.9.1 Measurement settings

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

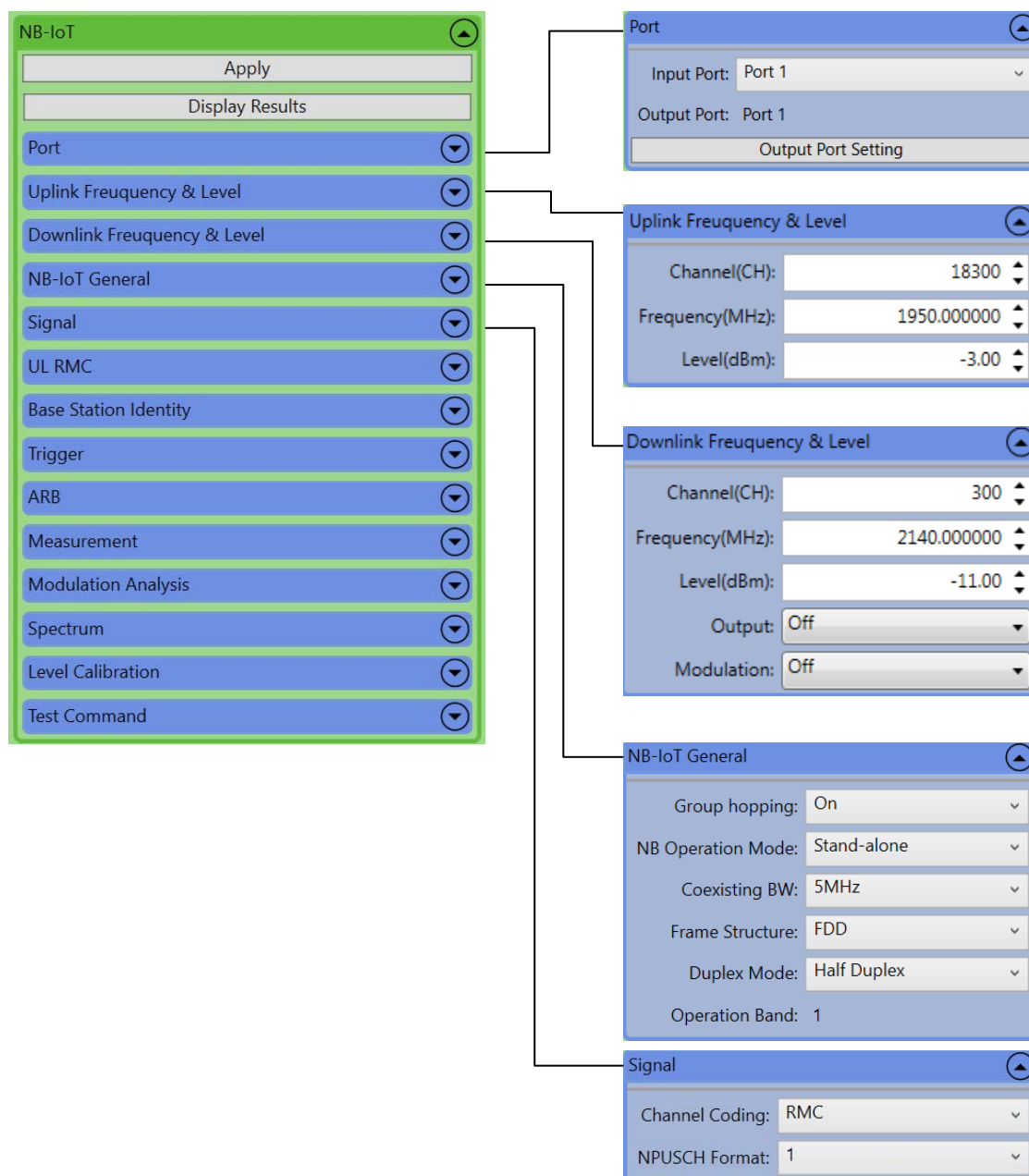


Figure 3.9.1-1 NB-IoT Measurement Settings Pane (1/3)

NB-IoT

Apply

Display Results

Port

Uplink Frequency & Level

Downlink Frequency & Level

NB-IoT General

Signal

UL RMC

Base Station Identity

Trigger

ARB

Measurement

Modulation Analysis

Spectrum

Level Calibration

Test Command

UL RMC

Subcarrier Spacing: 3.75kHz

No. of Subcarrier: 1

Starting Subcarrier: 0

No. of Resource Units: 1

Modulation: QPSK

Cyclic Shift Index: 0

Base Station Identity

NCell ID: 0

Delta SS: 0

Trigger

Source: Free Run

Level(dB): -30

Delay(ms): 0.000

Timeout(s): 10

ARB

Refresh waveform file list

Select waveform to load: /

Load waveform into ARB memory

Select waveform:

Select pattern from waveform:

Set pattern

Remove waveform from ARB memory

Clear ARB memory

Figure 3.9.1-2 NB-IoT Measurement Settings Pane (2/3)

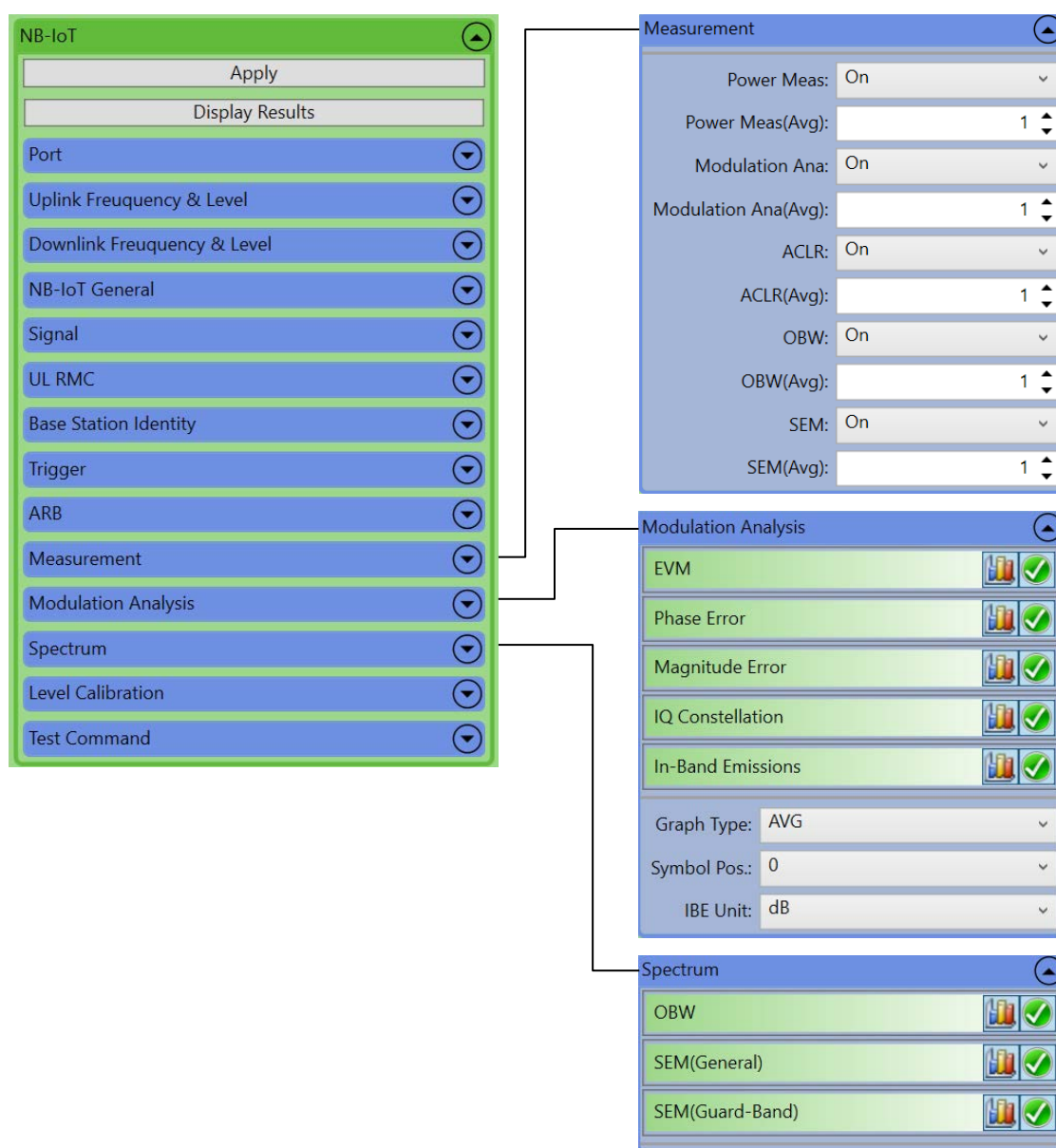


Figure 3.9.1-3 NB-IoT Measurement Settings Pane (3/3)

For the expandable menus of Level Calibration, and Test Command, refer to Figure 3.2.1-1 “Spectrum Monitor Settings Pane”.

3.9.2 Measurement and results

To perform measurement:

1. Set the parameters for all buttons from **Port** to **ARB**.
2. Click the **Measurement** button to open the dialog and set the parameters.
3. Click **Modulation Analysis** to open the window and set the data storage method (Graph Type) and vertical scale units.
4. Set a checkmark in the  checkboxes in each dialog for **Modulation Analysis** and **Spectrum** to open the graph displays.
5. Click the **Apply** button to send the parameters to the hardware.
6. Click the **Display Results** button to display the **NB-IoT** tab.
7. Click the  **Measurement Start** button
8. The numerical data are displayed in the **NB-IoT** tab after measurement is completed.
9. Click the  button in the **Modulation Analysis** and **Spectrum** dialogs to open the graph displays.

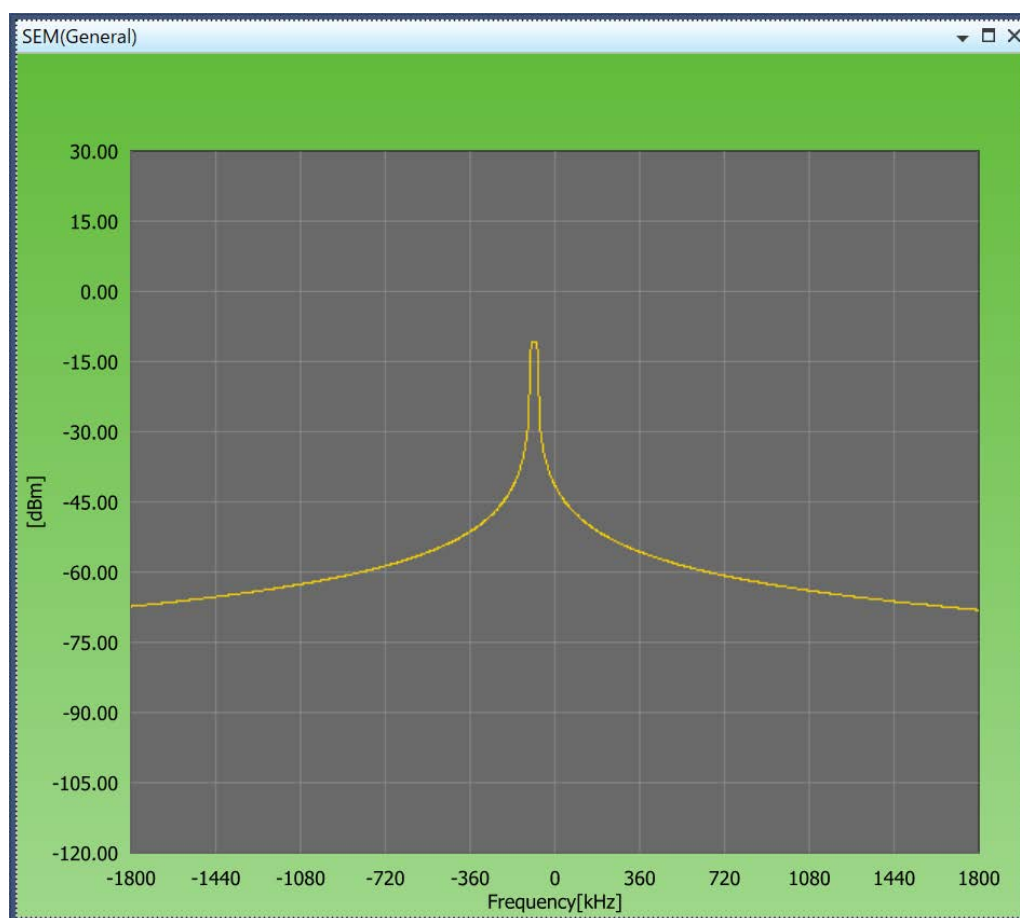


Figure 3.9.2-1 NB-IoT (Spectrum Emission Mask - General) Graph

3.9.3 Related SCPI Commands

The SCPI commands for remote control of the MX887067A NB-IoT Uplink TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of the commands, refer to Chapter 4 “SCPI Command Reference” in *the MX887067A NB-IoT Uplink TX Measurement Operation Manual*.

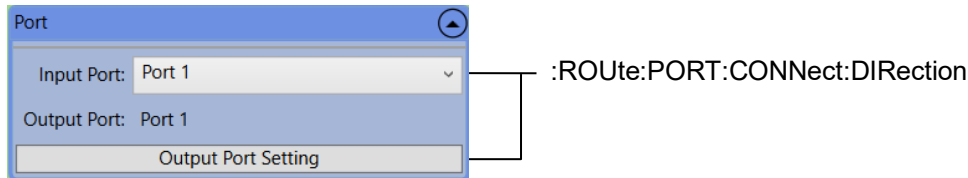


Figure 3.9.3-1 Measurement Settings Pane (Port)

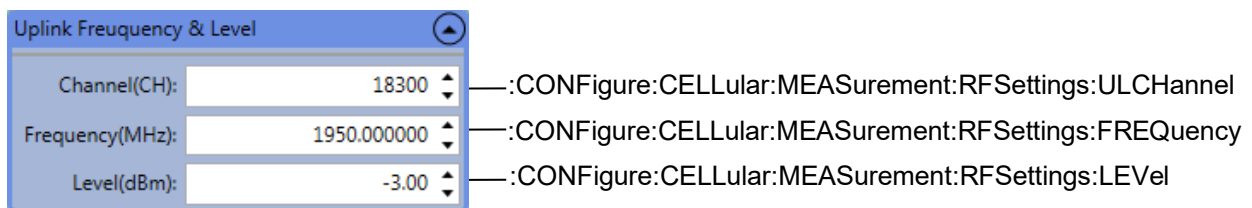


Figure 3.9.3-2 Measurement Settings Pane (Uplink Frequency & Level)

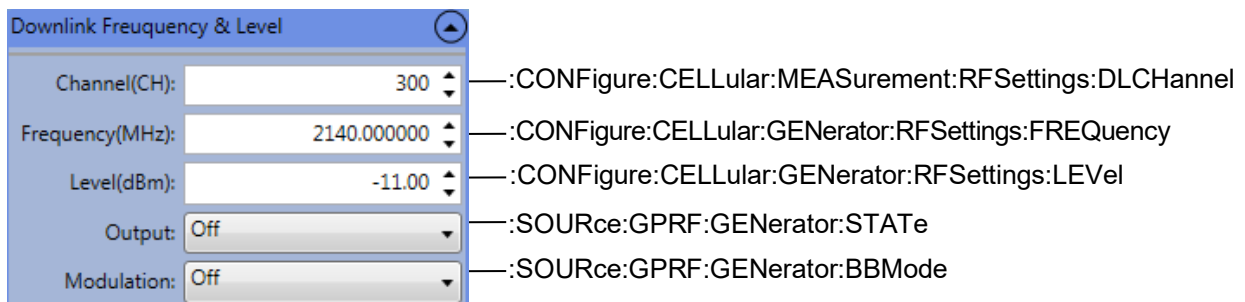


Figure 3.9.3-3 Measurement Settings Pane (Downlink Frequency & Level)

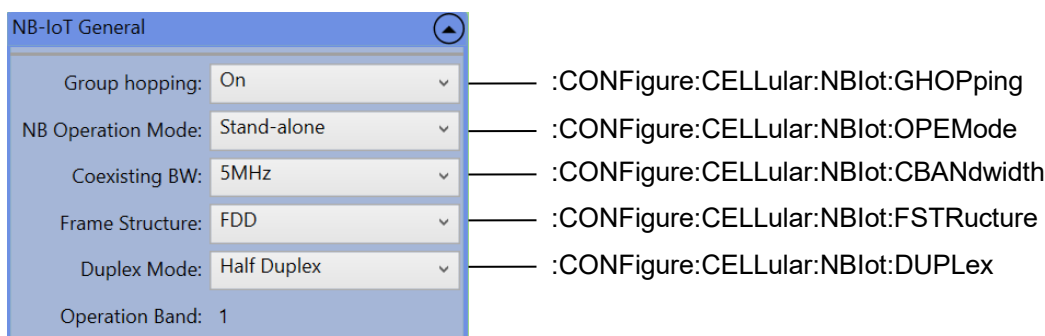
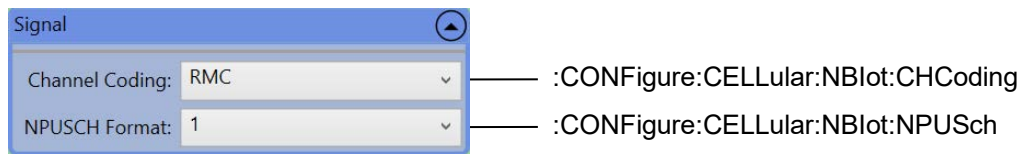
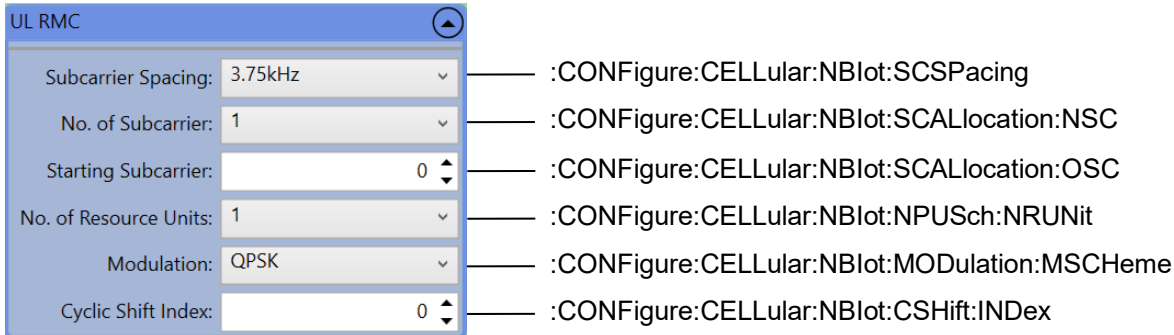
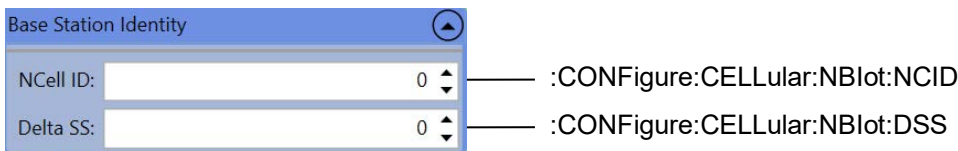
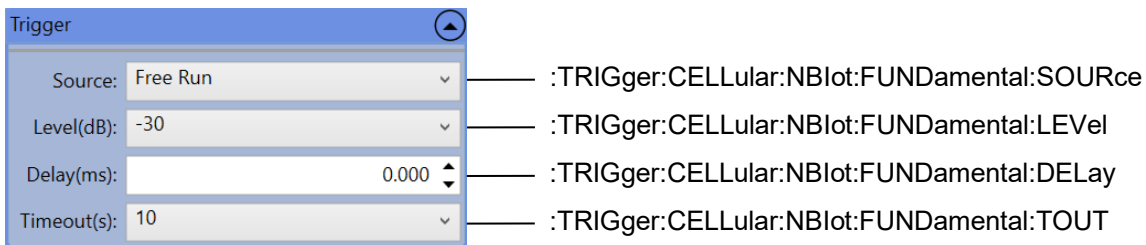
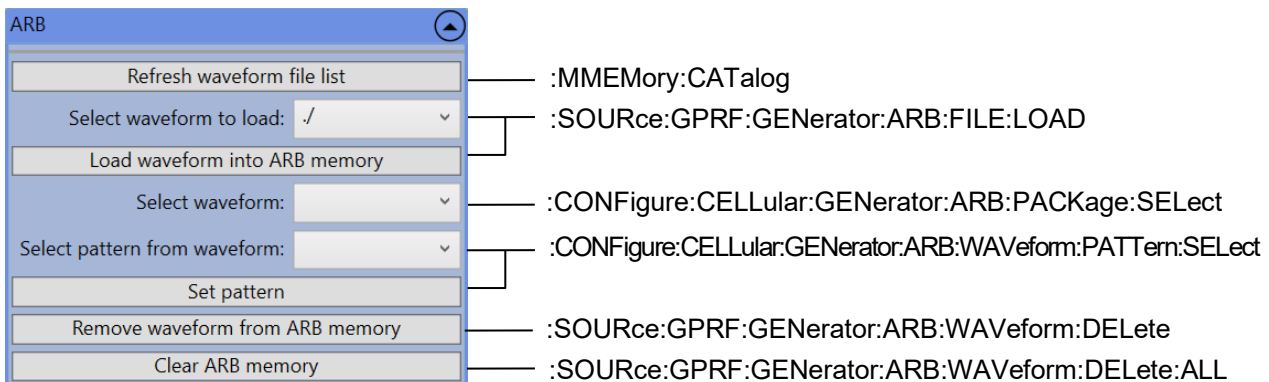


Figure 3.9.3-4 Measurement Settings Pane (NB-IoT General)

**Figure 3.9.3-5** Measurement Settings Pane (Signal)**Figure 3.9.3-6** Measurement Settings Pane (UL RMC)**Figure 3.9.3-7** Measurement Settings Pane (Base Station Identity)**Figure 3.9.3-8** Measurement Settings Pane (Trigger)**Figure 3.9.3-9** Measurement Settings Pane (ARB)

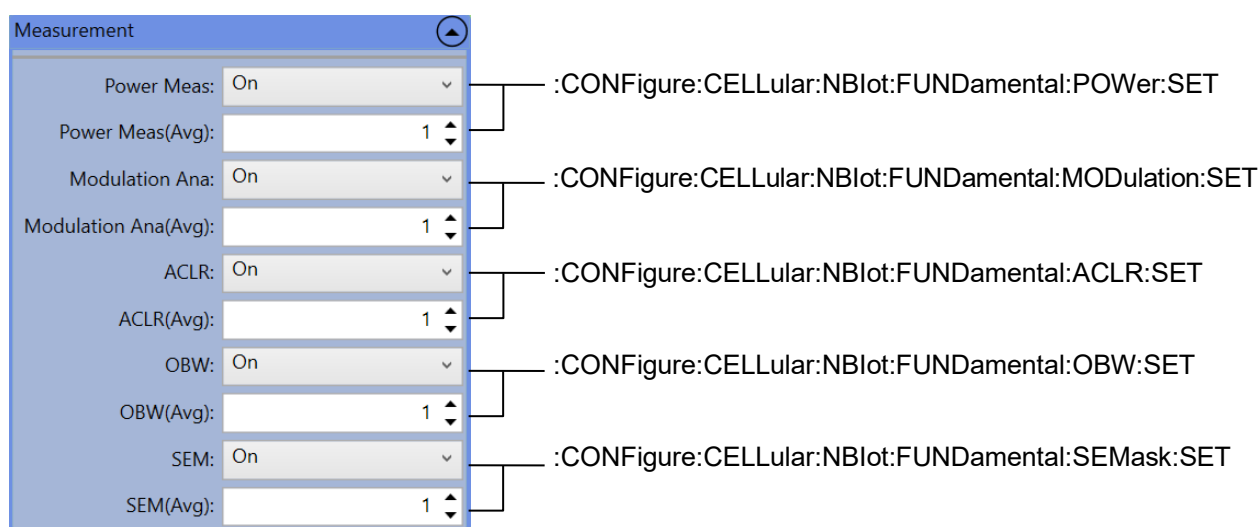


Figure 3.9.3-10 Measurement Settings Pane (Measurement)

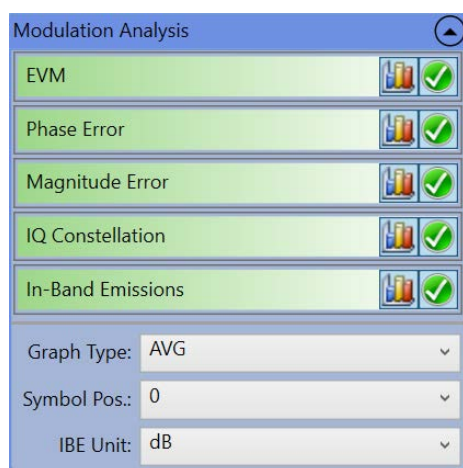


Figure 3.9.3-11 Measurement Settings Pane (Modulation Analysis)

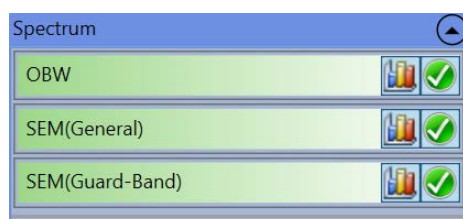


Figure 3.9.3-12 Measurement Settings Pane (Spectrum)

Refer to Figure 3.2.3-3 “Measurement Settings Pane (Level Calibration)” for the SCPI commands for Level Calibration remote control.

Power Measurement	
Power Measurement	
Tx Power	:FETCh:CELLular:NBloT:FUNDamental:POWer:TXPower?
Channel Power	:FETCh:CELLular:NBloT:FUNDamental:POWer:CHPower?

Figure 3.9.3-13 Power Measurement Results

Modulation Analysis	
Modulation Analysis	
Carrier Frequency	:FETCh:CELLular:NBloT:FUNDamental:MODulation:CFRequency? AVG
Carrier Frequency Error[ppm]	:FETCh:CELLular:NBloT:FUNDamental:MODulation:FERRor?
Carrier Frequency Error[Hz]	
EVM	:FETCh:CELLular:NBloT:FUNDamental:MODulation:EVM?
Reference Signal EVM	:FETCh:CELLular:NBloT:FUNDamental:MODulation:RSEVm?
Peak EVM	:FETCh:CELLular:NBloT:FUNDamental:MODulation:PEVM?
Phase Error	:FETCh:CELLular:NBloT:FUNDamental:MODulation:PHERror?
Magnitude Error	:FETCh:CELLular:NBloT:FUNDamental:MODulation:MERRor?
Rho	:FETCh:CELLular:NBloT:FUNDamental:MODulation:RHO?
Carrier Leakage	:FETCh:CELLular:NBloT:FUNDamental:MODulation:CARLeakage?
IQ Imbalance(%)	:FETCh:CELLular:NBloT:FUNDamental:MODulation:IQIMbalance:PERCent?
IQ Imbalance (dB)	:FETCh:CELLular:NBloT:FUNDamental:MODulation:IQIMbalance:DB?

Figure 3.9.3-14 Modulation Analysis Results

In-Band Emissions	
In-Band Emissions	
General	:FETCh:CELLular:NBloT:FUNDamental:MODulation:IEMissions:GENeral?
IQ Image	:FETCh:CELLular:NBloT:FUNDamental:MODulation:IEMissions:IQIMage?
Carrier Leakage	:FETCh:CELLular:NBloT:FUNDamental:MODulation:IEMissions:CARLeakage?
Limit Worst General (dB)	:FETCh:CELLular:NBloT:FUNDamental:MODulation:IEMissions:LIMit:GENeral?
Limit Worst IQ Image (dB)	:FETCh:CELLular:NBloT:FUNDamental:MODulation:IEMissions:LIMit:IQIMage?
Limit Worst Carrier Leakage (dBc)	:FETCh:CELLular:NBloT:FUNDamental:MODulation:IEMissions:LIMit:CARLeakage?
In-Band Emissions Margin (dB)	:FETCh:CELLular:NBloT:FUNDamental:MODulation:IEMissions:MARGin?
Judgment	:FETCh:CELLular:NBloT:FUNDamental:MODulation:IEMissions:JUDGement?

Figure 3.9.3-15 In-Band Emissions Results

ACLR	
ACLR	
	GSM -200kHz
	GSM +200kHz
	UTRA -2.5MHz
	UTRA +2.5MHz

} :FETCh:CELLular:NBloT:FUNDamental:ACLR?

Figure 3.9.3-16 ACLR Results

OBW	
OBW	
Occupied Bandwidth (Hz)	:FETCh:CELLular:NBloT:FUNDamental:OBW?
Upper Frequency	:FETCh:CELLular:NBloT:FUNDamental:OBW:FREQuency? UPPER
Lower Frequency	:FETCh:CELLular:NBloT:FUNDamental:OBW:FREQuency? LOWER
Center	:FETCh:CELLular:NBloT:FUNDamental:OBW:FREQuency? CENTER

Figure 3.9.3-17 OBW Results



Figure 3.9.3-18 Spectrum Emission Mask (General) Results

Spectrum Emission Mask(Guard-Band)	
Spectrum Emission Mask(Guard-Band)	
Guard-Band Offset Frequency F1 (Lower)[Hz]	:FETCh:CELLular:NBloT:FUNDamental:SEMask:LEVel:GBANd:TTL?
Guard-Band Peak Level F1 (Lower)[dBm]	
Guard-Band Template Margin F1 (Lower)[dB]	:FETCh:CELLular:NBloT:FUNDamental:SEMask:MARGIn:GBANd:TTL?
Guard-Band Offset Frequency F2 (Lower)[Hz]	
Guard-Band Peak Level F2 (Lower)[dBm]	
Guard-Band Template Margin F2 (Lower)[dB]	
Guard-Band Offset Frequency F3 (Lower)[Hz]	
Guard-Band Peak Level F3 (Lower)[dBm]	
Guard-Band Template Margin F3 (Lower)[dB]	
Guard-Band Offset Frequency F4 (Lower)[Hz]	
Guard-Band Peak Level F4 (Lower)[dBm]	
Guard-Band Template Margin F4 (Lower)[dB]	
Guard-Band Offset Frequency F1 (Upper)[Hz]	
Guard-Band Peak Level F1 (Upper)[dBm]	
Guard-Band Template Margin F1 (Upper)[dB]	
Guard-Band Offset Frequency F2 (Upper)[Hz]	
Guard-Band Peak Level F2 (Upper)[dBm]	
Guard-Band Template Margin F2 (Upper)[dB]	
Guard-Band Offset Frequency F3 (Upper)[Hz]	
Guard-Band Peak Level F3 (Upper)[dBm]	
Guard-Band Template Margin F3 (Upper)[dB]	
Guard-Band Offset Frequency F4 (Upper)[Hz]	
Guard-Band Peak Level F4 (Upper)[dBm]	
Guard-Band Template Margin F4 (Upper)[dB]	
Guard-Band Judgement	:FETCh:CELLular:NBloT:FUNDamental:SEMask:JUDGement? GB

Figure 3.9.3-19 Spectrum Emission Mask (Guard-Band) Results

3.9.4 Related Native Commands

The Native commands for remote control of the MX887067A NB-IoT Uplink TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of the commands, refer to Chapter 5 “Native Command Reference” in *the MX887067A NB-IoT Uplink TX Measurement Operation Manual*.

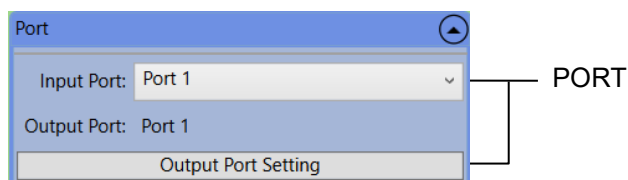


Figure 3.9.4-1 Measurement Settings Pane (Port)

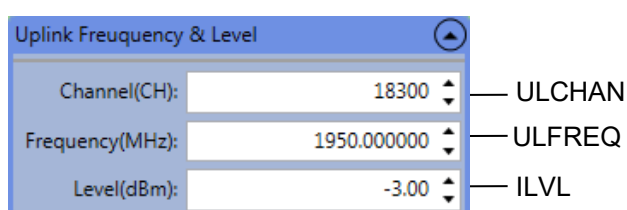


Figure 3.9.4-2 Measurement Settings Pane (Uplink Frequency & Level)

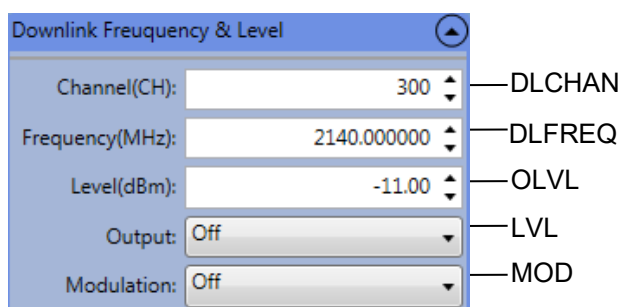


Figure 3.9.4-3 Measurement Settings Pane (Downlink Frequency & Level)

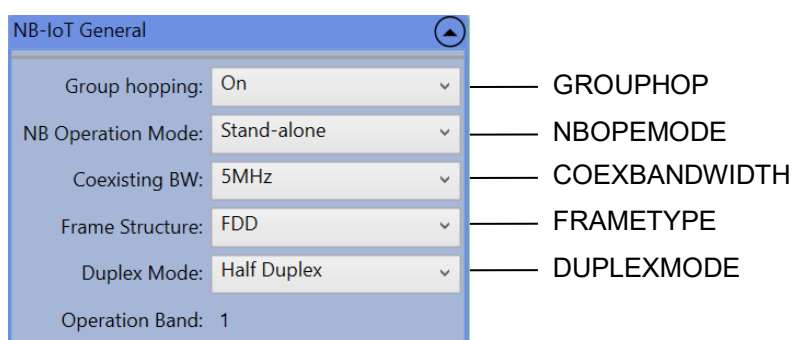


Figure 3.9.4-4 Measurement Settings Pane (NB-IoT General)

Signal	
Channel Coding:	RMC
NPUSCH Format:	1

CHCODING

NPUSCH

Figure 3.9.4-5 Measurement Settings Pane (Signal)

UL RMC	
Subcarrier Spacing:	3.75kHz
No. of Subcarrier:	1
Starting Subcarrier:	0
No. of Resource Units:	1
Modulation:	QPSK
Cyclic Shift Index:	0

ULSC_SPACE

ULRMC_SC

ULSC_START

ULRMC_RU

ULRMC_MOD

ULICSHIFT

Figure 3.9.4-6 Measurement Settings Pane (UL RMC)

Base Station Identity	
NCell ID:	0
Delta SS:	0

NCELLID

DELTASS

Figure 3.9.4-7 Measurement Settings Pane (Base Station Identity)

Trigger	
Source:	Free Run
Level(dB):	-30
Delay(ms):	0.000
Timeout(s):	10

TRGSRC

TRGLVL

TRGDLY

TRGTOUT

Figure 3.9.4-8 Measurement Settings Pane (Trigger)

ARB	
Refresh waveform file list	
Select waveform to load:	/
Load waveform into ARB memory	
Select waveform:	
Select pattern from waveform:	
Set pattern	
Remove waveform from ARB memory	
Clear ARB memory	

FLIST

SOUR:GPRF:GEN:ARB:FILE:LOAD

PACKAGE

Figure 3.9.4-9 Measurement Settings Pane (ARB)

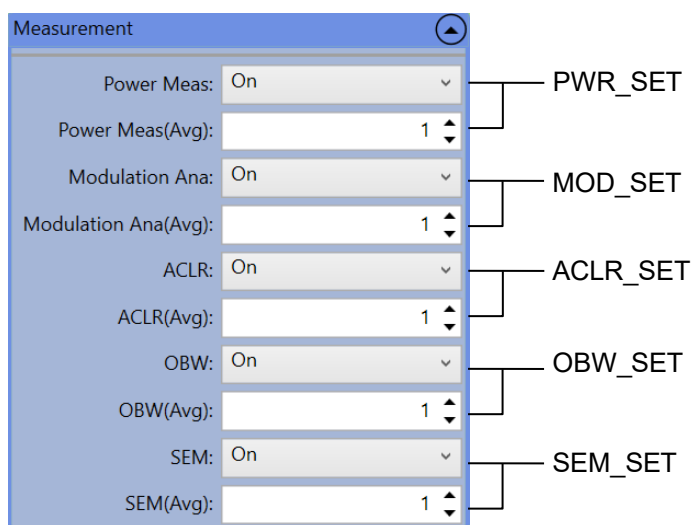


Figure 3.9.4-10 Measurement Settings Pane (Measurement)

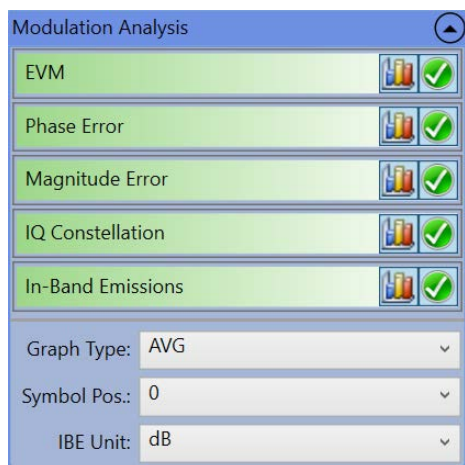


Figure 3.9.4-11 Measurement Settings Pane (Modulation Analysis)

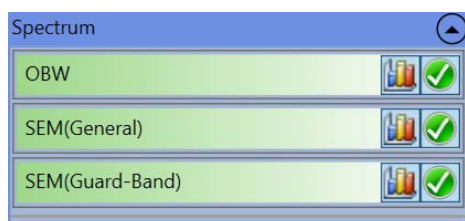


Figure 3.9.4-12 Measurement Settings Pane (Spectrum)

Refer to Figure 3.2.4-3 “Measurement Settings Pane (Level Calibration)” for the Native commands for Level Calibration remote control.

Power Measurement	
Power Measurement	
Tx Power	POWER?
Channel Power	CHPWR?

Figure 3.9.4-13 Power Measurement Results

Modulation Analysis	
Modulation Analysis	
Carrier Frequency	CARRF? AVG
Carrier Frequency Error[ppm]	CFERR?
Carrier Frequency Error[Hz]	
EVM	EVM?
Reference Signal EVM	RSEVM?
Peak EVM	PVECTERR?
Phase Error	PHASEERR?
Magnitude Error	MAGTDERR?
Rho	RHO?
Carrier Leakage	CARRLEAK?
IQ Imbalance(%)	IQIMB_PER?
IQ Imbalance (dB)	IQIMB_DB?

Figure 3.9.4-14 Modulation Analysis Results

In-Band Emissions	
In-Band Emissions	
General	INBANDE_GEN?
IQ Image	INBANDE_IMG?
Carrier Leakage	INBANDE_LEAK?
Limit Worst General (dB)	INBANDE_GENUL?
Limit Worst IQ Image (dB)	INBANDE_IMGUL?
Limit Worst Carrier Leakage (dBc)	INBANDE_LEAKUL?
In-Band Emissions Margin (dB)	INBANDE_MARG?
Judgment	INBANDEPASS?

Figure 3.9.4-15 In-Band Emissions Results

ACLR	
ACLR	
	GSM -200kHz
	GSM +200kHz
	UTRA -2.5MHz
	UTRA +2.5MHz

} ACLR?

Figure 3.9.4-16 ACLR Results

OBW	
OBW	
Occupied Bandwidth (Hz)	OBW?
Upper Frequency	OBWFREQ? UPPER
Lower Frequency	OBWFREQ? LOWER
Center	OBWFREQ? CENTER

Figure 3.9.4-17 OBW Results

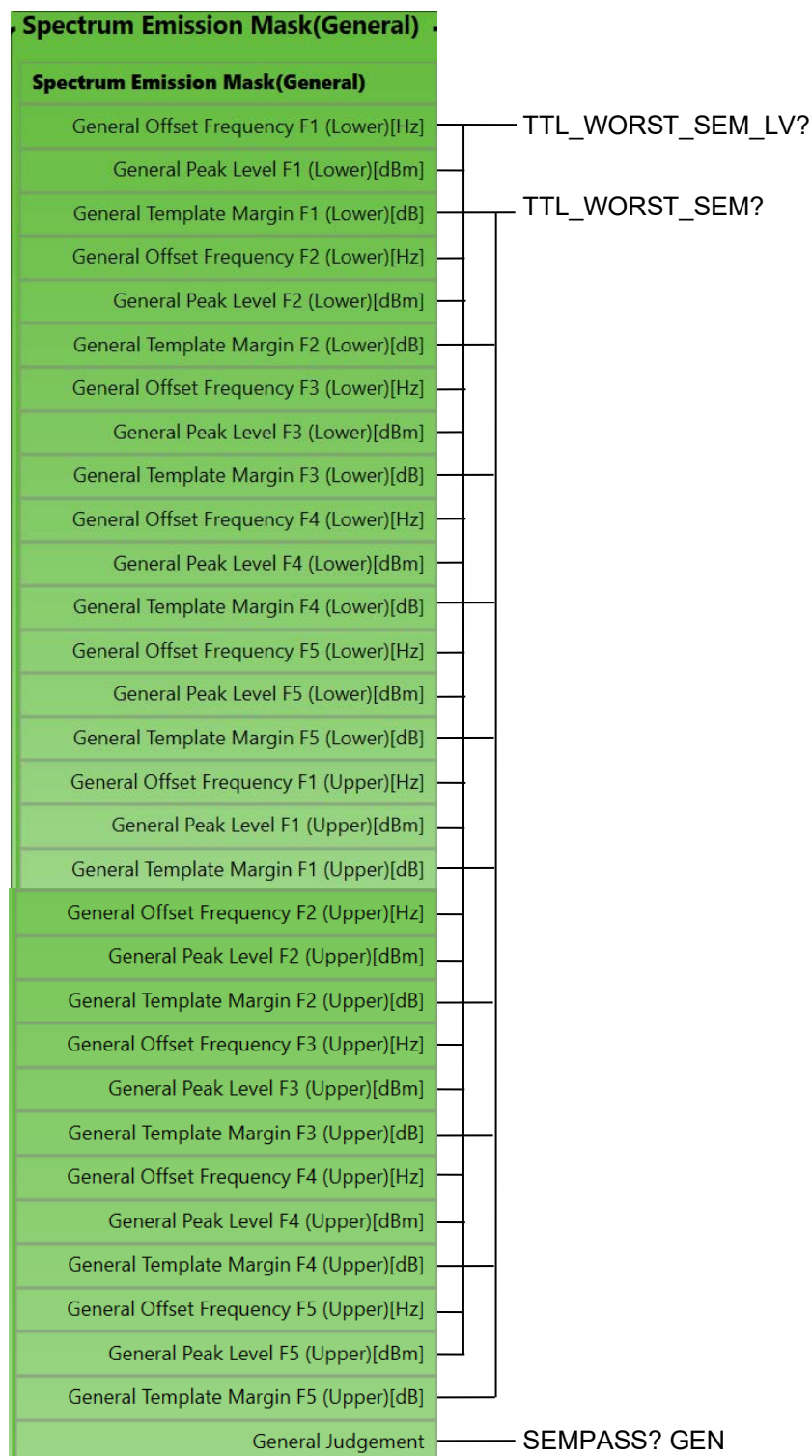


Figure 3.9.4-18 Spectrum Emission Mask (General) Results



Figure 3.9.4-19 Spectrum Emission Mask (Guard-Band) Results

3.10 Category M

Refer to Chapter 2 “Fundamental Measurement” in the *MX887065A Category M FDD Uplink TX Measurement Operation Manual* for a description of the Category M FDD Uplink TX Measurement items.

This section describes the Category M settings and displays.

3.10.1 Measurement settings

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

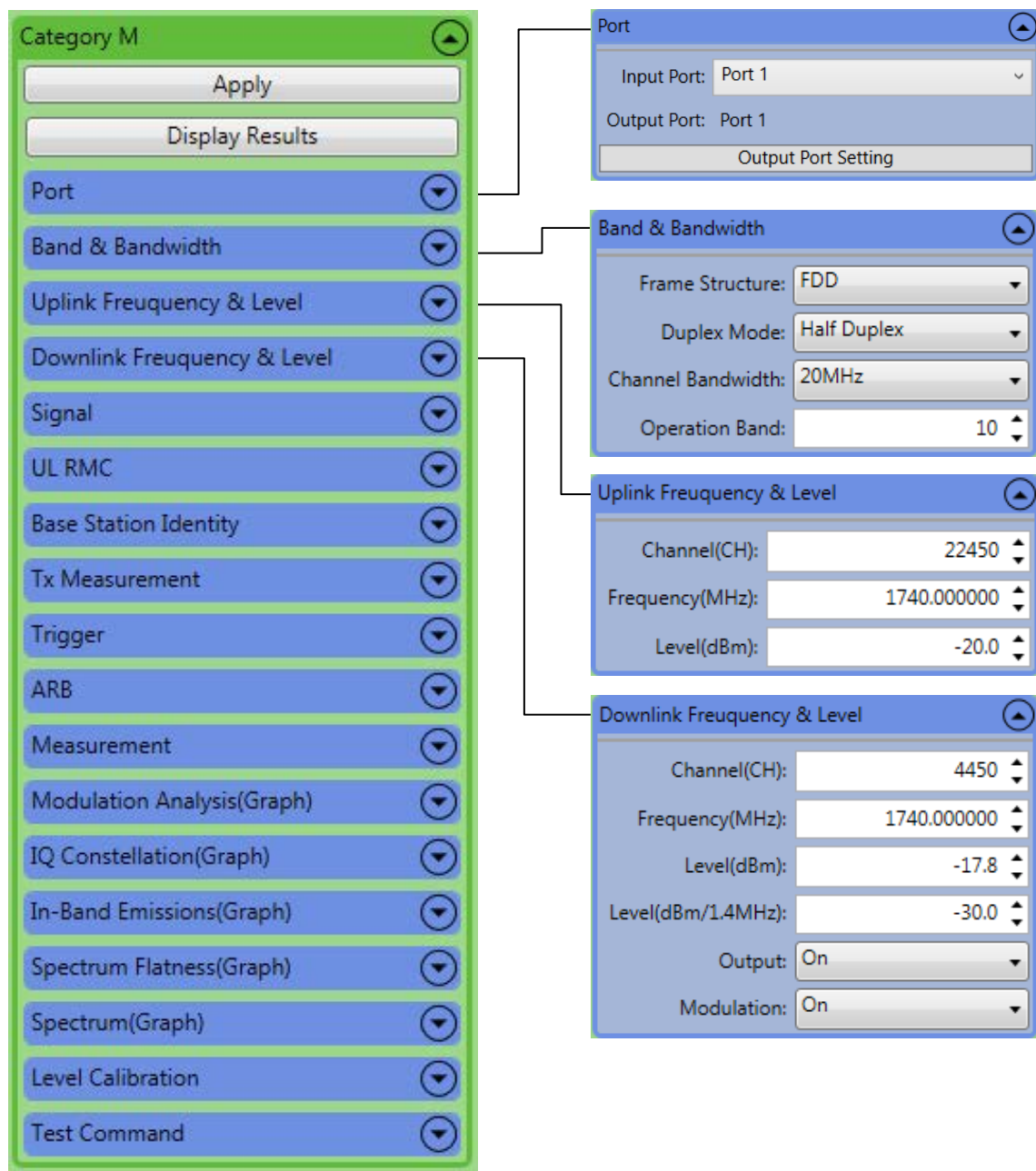


Figure 3.10.1-1 Category M Measurement Settings Pane (1/4)

The image displays the 'Category M' measurement settings interface. On the left is a vertical pane with a green header and a list of settings, each with a dropdown arrow. On the right are four detailed configuration panels, each with a blue header and a close button. Lines connect the settings in the left pane to their respective configuration panels on the right.

Category M Settings List:

- Apply
- Display Results
- Port
- Band & Bandwidth
- Uplink Frequency & Level
- Downlink Frequency & Level
- Signal
- UL RMC
- Base Station Identity
- Tx Measurement
- Trigger
- ARB
- Measurement
- Modulation Analysis(Graph)
- IQ Constellation(Graph)
- In-Band Emissions(Graph)
- Spectrum Flatness(Graph)
- Spectrum(Graph)
- Level Calibration
- Test Command

Signal Configuration Panel:

- Channel Coding: RMC
- RMC Configuration: PUSCH
- Group Hopping: Off
- nRB-CQI: 0
- additionalSpectrumEmission: NS_01

UL RMC Configuration Panel:

- Narrowband Index: 0
- Number of RB: 6
- Starting RB: 0
- Modulation: 16QAM

Base Station Identity Configuration Panel:

- Cell ID: 0
- Delta SS: 0

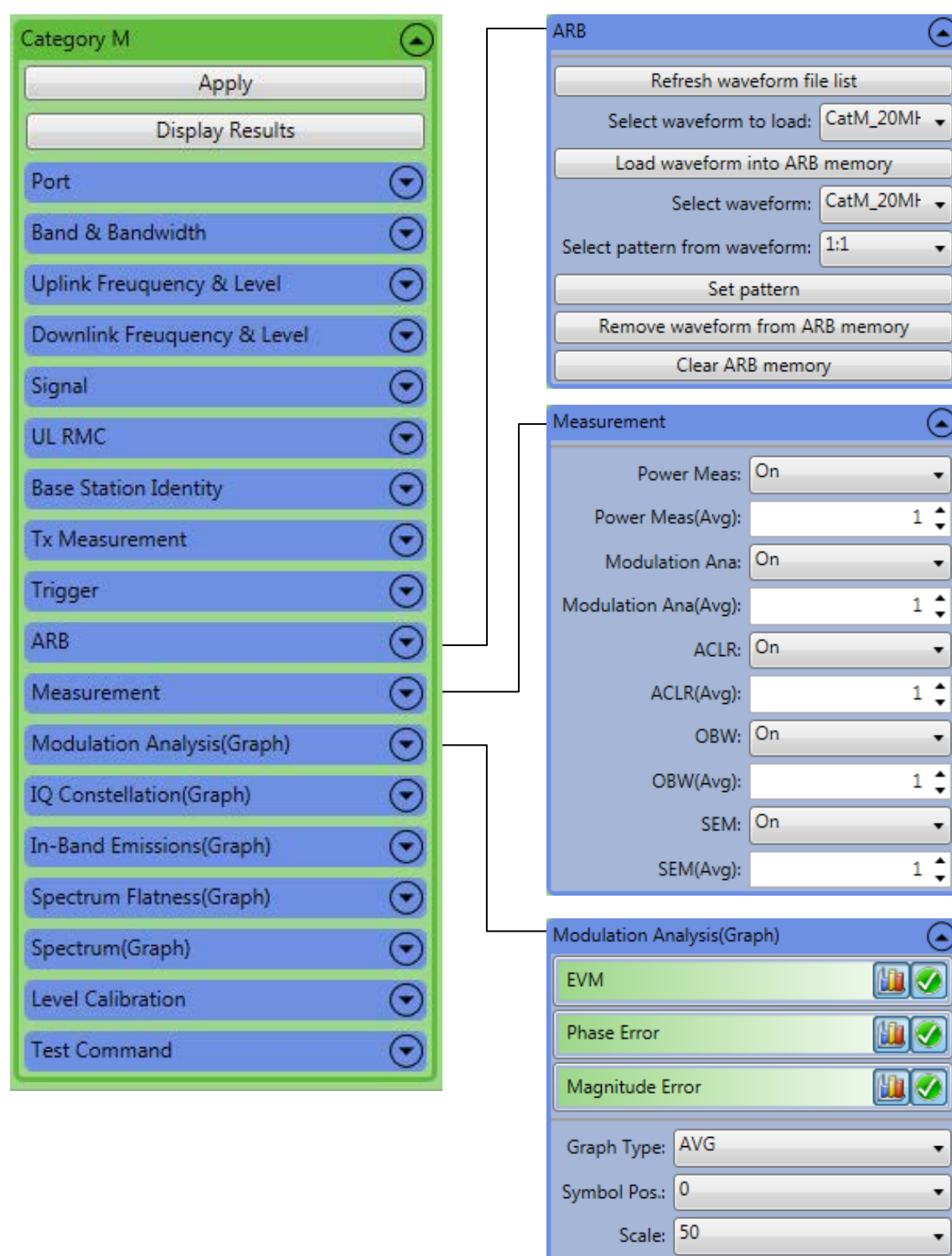
Tx Measurement Configuration Panel:

- RB Search: Off
- Cyclic Shift: AUTO
- Carrier Leakage Freq.: at Carrier Frequency

Trigger Configuration Panel:

- Source: Rise Config
- Level(dB): -30
- Delay(ms): 0.000
- Timeout(s): 10

Figure 3.10.1-2 Category M Measurement Settings Pane (2/4)

**Figure 3.10.1-3** Category M Measurement Settings Pane (3/4)

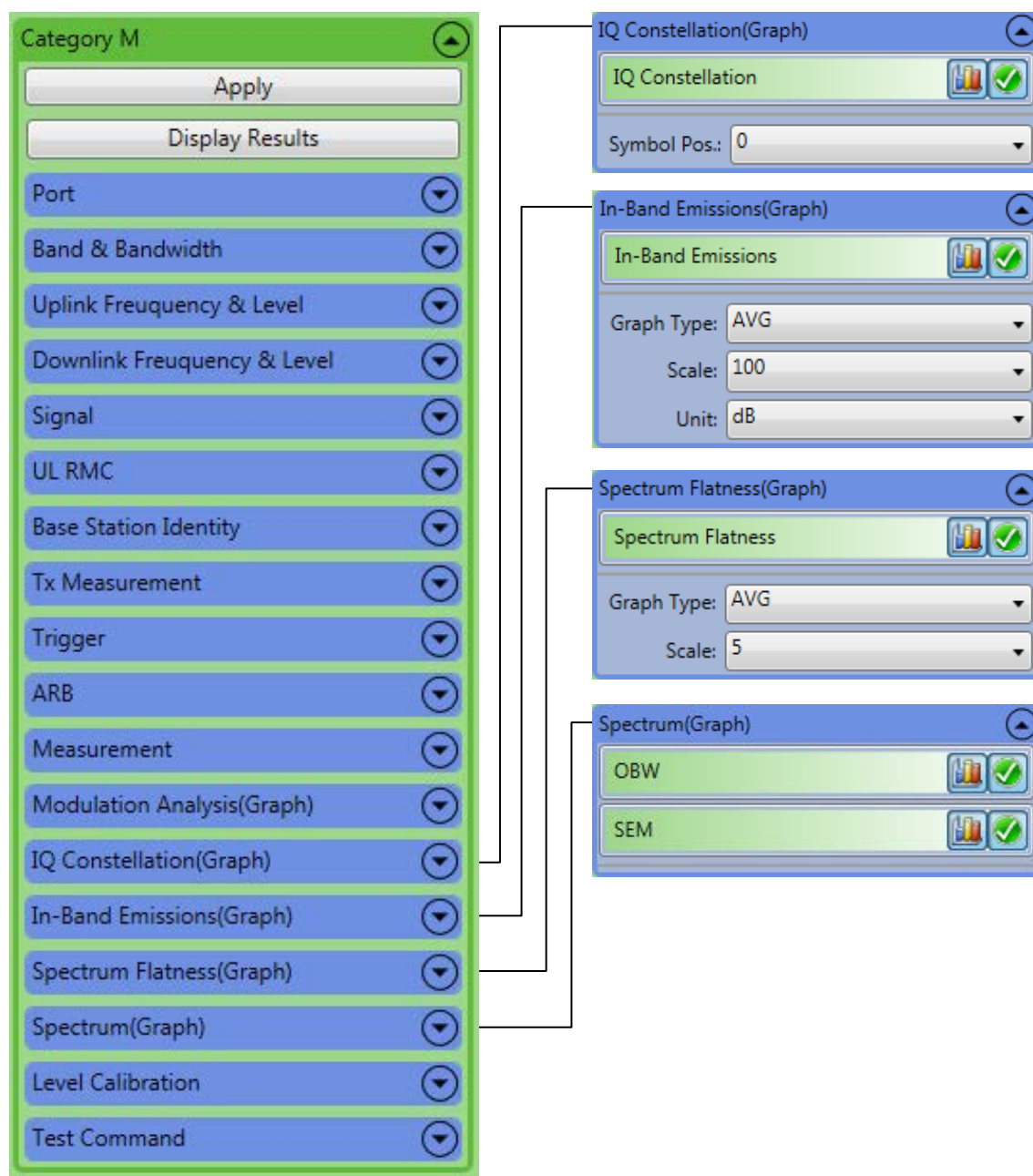


Figure 3.10.1-4 Category M Measurement Settings Pane (4/4)

For the expandable menus of Level Calibration, and Test Command, refer to Figure 3.2.1-1 “Spectrum Monitor Settings Pane”.

3.10.2 Measurement and results

To perform measurement:

1. Set the parameters for all buttons from **Port** to **ARB**.
2. Click the **Measurement** button to open the dialog and set the parameters.
3. Click **Modulation Analysis** to open the window and set the data storage method (Graph Type) and vertical scale units.
4. Set a checkmark in the  checkboxes in each dialog for **Modulation Analysis** and **Spectrum** to open the graph displays.
5. Click the **Apply** button to send the parameters to the hardware.
6. Click the **Display Results** button to display the **Category M** tab.
7. Click the  **Measurement Start** button
8. The numerical data are displayed in the **Category M** tab after measurement is completed.
9. Click the  button in the **Modulation Analysis** and **Spectrum** dialogs to open the graph displays.

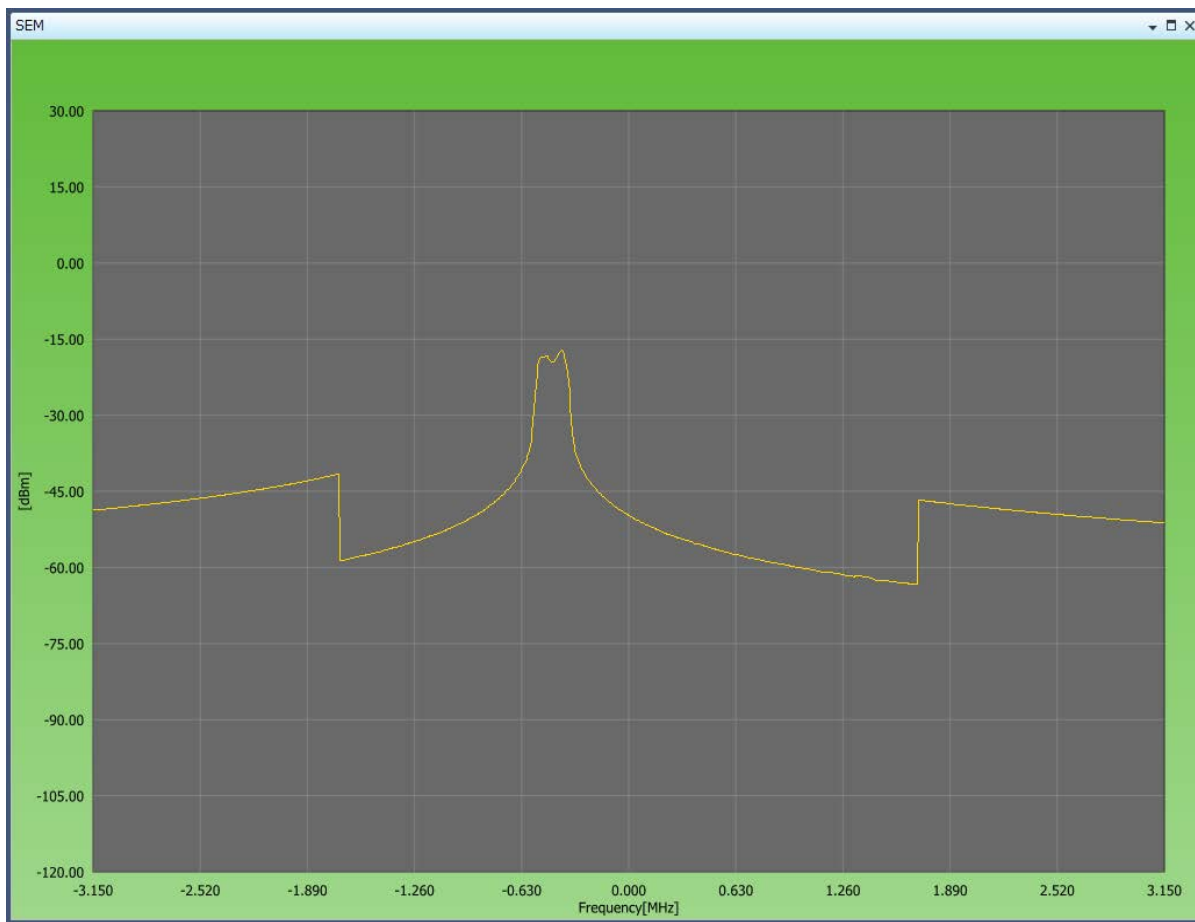


Figure 3.10.2-1 Category M (Spectrum Emission Mask) Graph

3.10.3 Related SCPI Commands

The SCPI commands for remote control of the MX887065A Category M FDD Uplink TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of the commands, refer to Chapter 4 “SCPI Command Reference” in *the MX887065A Category M FDD Uplink TX Measurement Operation Manual*.

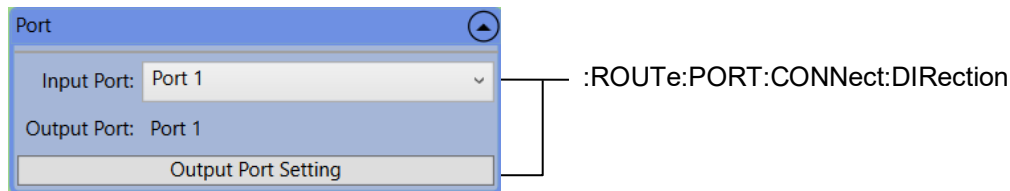


Figure 3.10.3-1 Measurement Settings Pane (Port)

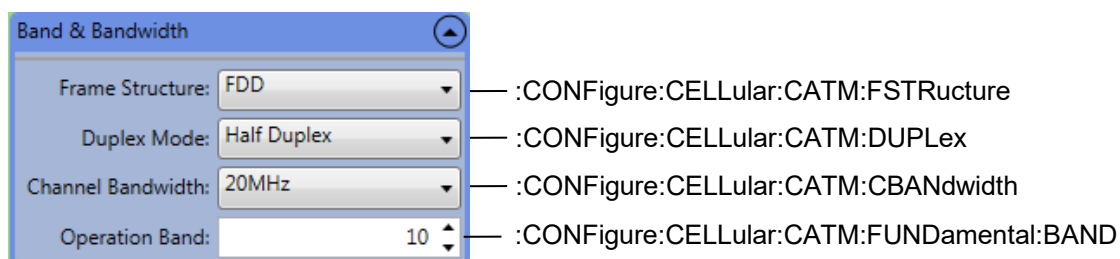


Figure 3.10.3-2 Measurement Settings Pane (Band & Bandwidth)

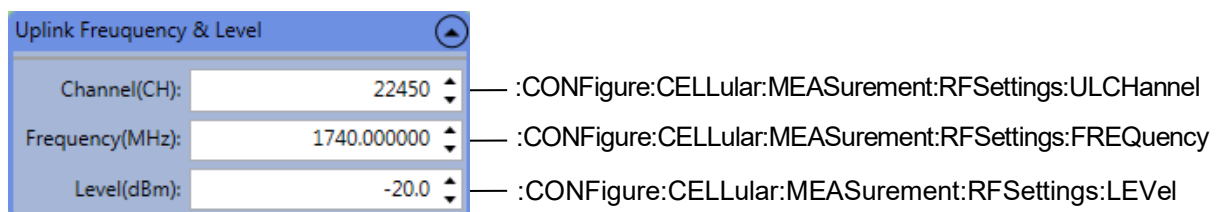


Figure 3.10.3-3 Measurement Settings Pane (Uplink Frequency & Level)

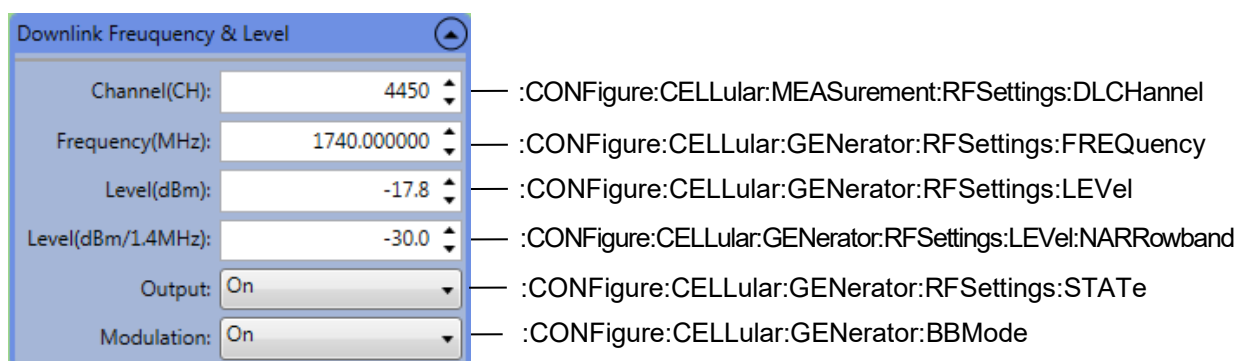


Figure 3.10.3-4 Measurement Settings Pane (Downlink Frequency & Level)

Signal		
Channel Coding:	RMC	:CONFigure:CELLular:CATM:CHCoding
RMC Configuration:	PUSCH	:CONFigure:CELLular:CATM:CTYPE
Group Hopping:	Off	:CONFigure:CELLular:CATM:GHOPping
nRB-CQI:	0	:CONFigure:CELLular:CATM:RBCQI
additionalSpectrumEmission:	NS_01	:CONFigure:CELLular:CATM:FUNDamental:SEMask:ASEMission

Figure 3.10.3-5 Measurement Settings Pane (Signal)

UL RMC		
Narrowband Index:	0	:CONFigure:CELLular:CATM:NARRowband
Number of RB:	6	:CONFigure:CELLular:CATM:RBAllocation:NRB
Starting RB:	0	:CONFigure:CELLular:CATM:RBAllocation:ORB
Modulation:	16QAM	:CONFigure:CELLular:CATM:MODulation:MSCHeme

Figure 3.10.3-6 Measurement Settings Pane (UL RMC)

Base Station Identity		
Cell ID:	0	:CONFigure:CELLular:CATM:CID
Delta SS:	0	:CONFigure:CELLular:CATM:DSS

Figure 3.10.3-7 Measurement Settings Pane (Base Station Identity)

Tx Measurement		
RB Search:	Off	:CONFigure:CELLular:CATM:FUNDamental:RBSearch
Cyclic Shift:	AUTO	:CONFigure:CELLular:CATM:CSHift
Carrier Leakage Freq.:	at Carrier Frequency	:CONFigure:CELLular:CATM:FUNDamental:IEmissions:CLFRequency

Figure 3.10.3-8 Measurement Settings Pane (Tx Measurement)

Trigger		
Source:	Rise Config	:TRIGger:CELLular:CATM:FUNDamental:SOURce
Level(dB):	-30	:TRIGger:CELLular:CATM:FUNDamental:LEVel
Delay(ms):	0.000	:TRIGger:CELLular:CATM:FUNDamental:DELay
Timeout(s):	10	:TRIGger:CELLular:CATM:FUNDamental:TOUT

Figure 3.10.3-9 Measurement Settings Pane (Trigger)

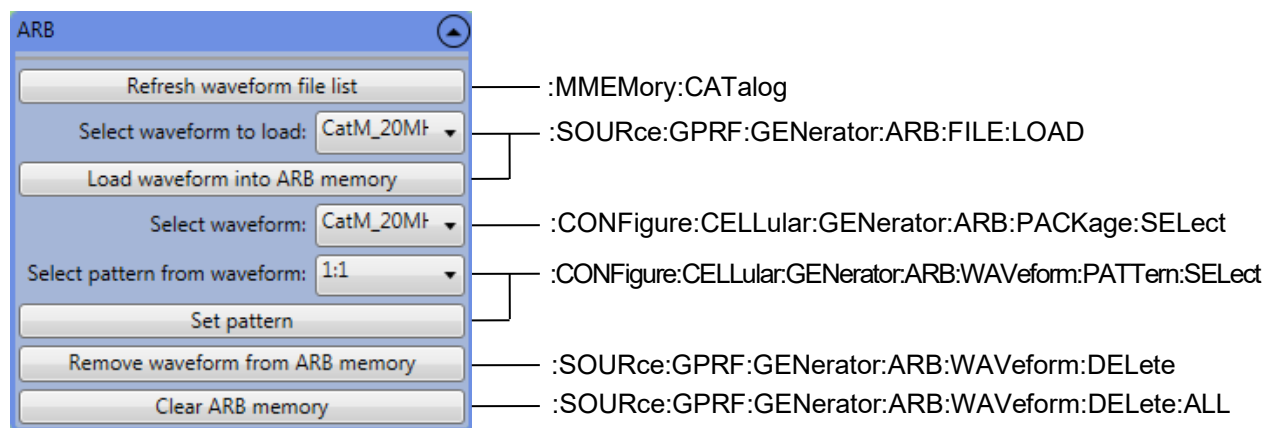


Figure 3.10.3-10 Measurement Settings Pane (ARB)

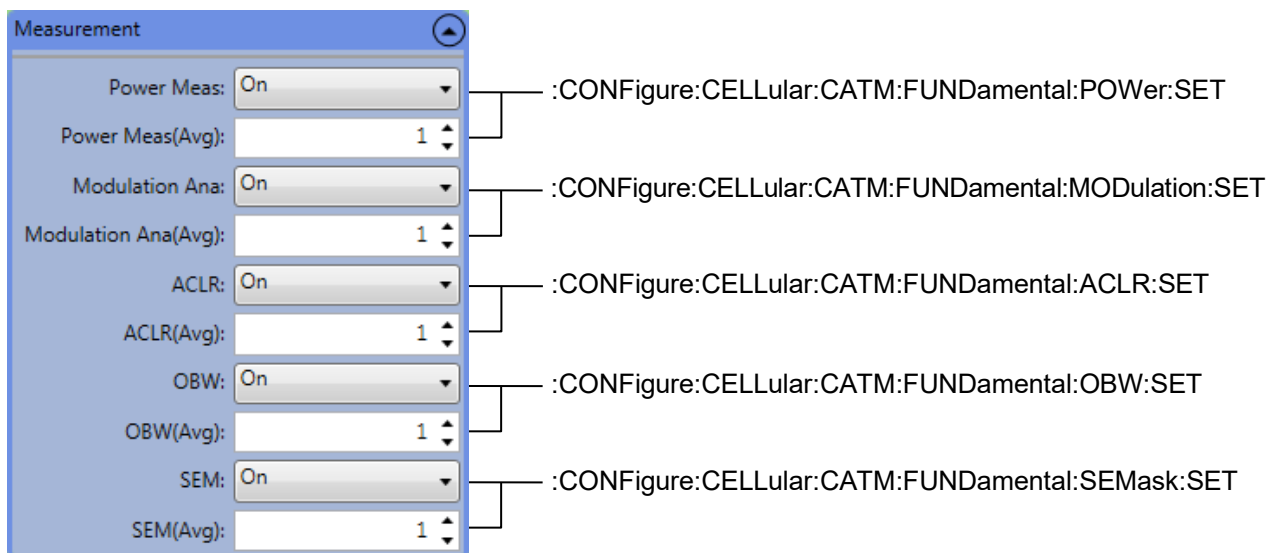


Figure 3.10.3-11 Measurement Settings Pane (Measurement)

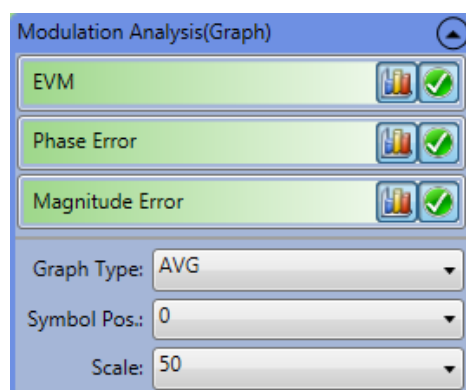


Figure 3.10.3-12 Measurement Settings Pane (Modulation Analysis)

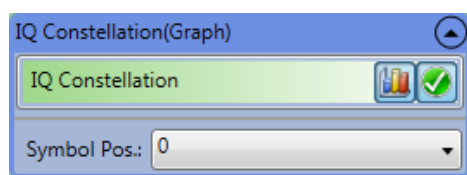


Figure 3.10.3-13 Measurement Settings Pane (IQ Constellation (Graph))

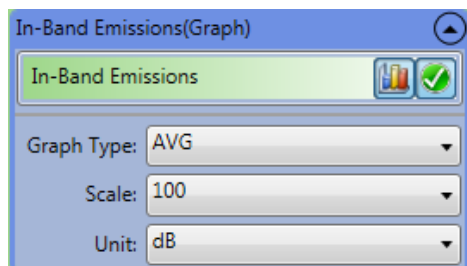


Figure 3.10.3-14 Measurement Settings Pane (In-Band Emission (Graph))

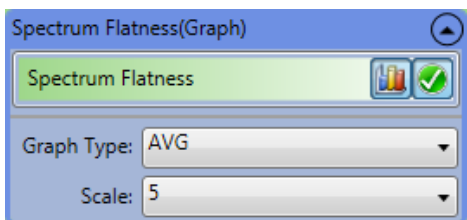


Figure 3.10.3-15 Measurement Settings Pane (Spectrum Flatness (Graph))

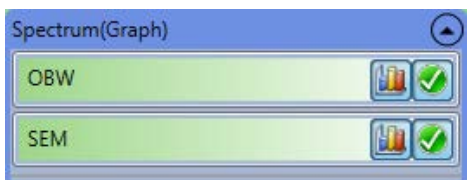


Figure 3.10.3-16 Measurement Settings Pane (Spectrum (Graph))

Refer to Figure 3.2.3-3 “Measurement Settings Pane (Level Calibration)” for the SCPI commands for Level Calibration remote control.

Power Measurement	
Power Measurement	
Tx Power [dBm]	:FETCh:CELLular:CATM:FUNDamental:POWer:TXPower?
Channel Power [dBm]	:FETCh:CELLular:CATM:FUNDamental:POWer:CHPower?

Figure 3.10.3-17 Power Measurement Results

Modulation Analysis	
Modulation Analysis	
Carrier Frequency [Hz]	:FETCh:CELLular:CATM:FUNDamental:MODulation:CFRequency?
Carrier Frequency Error [Hz]	:FETCh:CELLular:CATM:FUNDamental:MODulation:FERRor?
Carrier Frequency Error [ppm]	
EVM [%]	:FETCh:CELLular:CATM:FUNDamental:MODulation:EVM?
Reference Signal EVM [%]	:FETCh:CELLular:CATM:FUNDamental:MODulation:RSEVm?
Peak EVM [%]	:FETCh:CELLular:CATM:FUNDamental:MODulation:PEVM?
Phase Error [deg.]	:FETCh:CELLular:CATM:FUNDamental:MODulation:PHERror?
Magnitude Error [%]	:FETCh:CELLular:CATM:FUNDamental:MODulation:MERRor?
Rho	:FETCh:CELLular:CATM:FUNDamental:MODulation:RHO?
Carrier Leakage [dBc]	:FETCh:CELLular:CATM:FUNDamental:MODulation:CARLeakage?
IQ Imbalance [%]	:FETCh:CELLular:CATM:FUNDamental:MODulation:IQIMbalance:PERCent?
IQ Imbalance [dB]	:FETCh:CELLular:CATM:FUNDamental:MODulation:IQIMbalance:DB?

Figure 3.10.3-18 Modulation Analysis Results

In-Band Emissions	
In-Band Emissions	
Judgment	:FETCh:CELLular:CATM:FUNDamental:MODulation:IEmissions:JUDGement?
General [dB]	:FETCh:CELLular:CATM:FUNDamental:MODulation:IEmissions:GENeral?
IQ Image [dB]	:FETCh:CELLular:CATM:FUNDamental:MODulation:IEmissions:IQImage?
Carrier Leakage [dBc]	:FETCh:CELLular:CATM:FUNDamental:MODulation:IEmissions:CARLeakage?
Limit Worst General [dB]	:FETCh:CELLular:CATM:FUNDamental:MODulation:IEmissions:LIMit:GENeral?
Limit Worst IQ Image [dB]	:FETCh:CELLular:CATM:FUNDamental:MODulation:IEmissions:LIMit:IQImage?
Limit Worst Carrier Leakage [dBc]	:FETCh:CELLular:CATM:FUNDamental:MODulation:IEmissions:LIMit:CARLeakage?
In-Band Emissions Margin [dB]	:FETCh:CELLular:CATM:FUNDamental:MODulation:IEmissions:MARGin?

Figure 3.10.3-19 In-Band Emissions Results

Spectrum Flatness	
Spectrum Flatness	
Judgment	:FETCh:CELLular:CATM:FUNDamental:MODulation:ESFLatness:JUDGement?
>= 3MHz R1+ [dB]	:FETCh:CELLular:CATM:FUNDamental:MODulation:ESFLatness:R1P?
>= 3MHz R1- [dB]	:FETCh:CELLular:CATM:FUNDamental:MODulation:ESFLatness:R1M?
>= 3MHz Worst [dB]	:FETCh:CELLular:CATM:FUNDamental:MODulation:ESFLatness:R1?
< 3MHz R2+ [dB]	:FETCh:CELLular:CATM:FUNDamental:MODulation:ESFLatness:R2P?
< 3MHz R2- [dB]	:FETCh:CELLular:CATM:FUNDamental:MODulation:ESFLatness:R2M?
< 3MHz Worst [dB]	:FETCh:CELLular:CATM:FUNDamental:MODulation:ESFLatness:R2?
>= 3MHz RP1 [dB]	:FETCh:CELLular:CATM:FUNDamental:MODulation:ESFLatness:RP1?
< 3MHz RP2 [dB]	:FETCh:CELLular:CATM:FUNDamental:MODulation:ESFLatness:RP2?
RP12 [dB]	:FETCh:CELLular:CATM:FUNDamental:MODulation:ESFLatness:RP12?
RP21 [dB]	:FETCh:CELLular:CATM:FUNDamental:MODulation:ESFLatness:RP21?

Figure 3.10.3-20 Spectrum Flatness Results

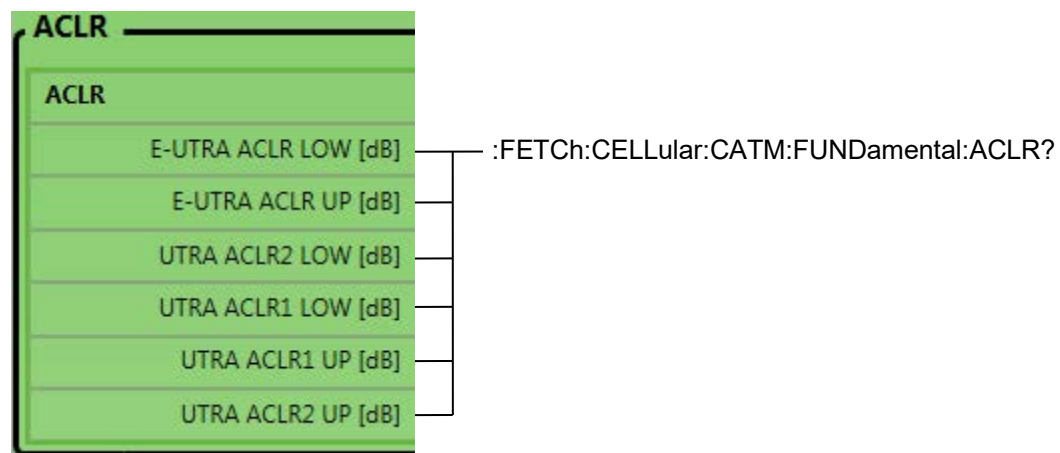


Figure 3.10.3-21 ACLR Results

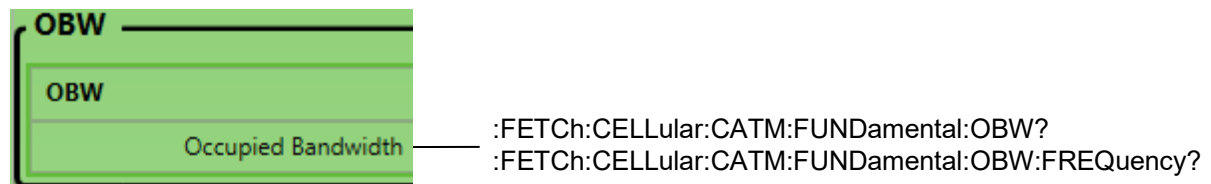


Figure 3.10.3-22 OBW Results

Spectrum Emission Mask	
Judgement	:FETCh:CELLular:CATM:FUNDamental:SEMask:JUDGement?
Spectrum Emission Mask	
F1(Lower)	:FETCh:CELLular:CATM:FUNDamental:SEMask:LEVel:TTL?
F2(Lower)	:FETCh:CELLular:CATM:FUNDamental:SEMask:MARGin:TTL?
F3(Lower)	
F4(Lower)	
F1(Upper)	
F2(Upper)	
F3(Upper)	
F4(Upper)	
Spectrum Emission Mask Detail	
F1(Lower)	:FETCh:CELLular:CATM:FUNDamental:SEMask:LEVel:DETail:TTL?
F2(Lower)	:FETCh:CELLular:CATM:FUNDamental:SEMask:MARGin:DETail:TTL?
F3(Lower)	
F4(Lower)	
F5(Lower)	
F6(Lower)	
F7(Lower)	
F8(Lower)	
F9(Lower)	
F1(Upper)	
F2(Upper)	
F3(Upper)	
F4(Upper)	
F5(Upper)	
F6(Upper)	
F7(Upper)	
F8(Upper)	
F9(Upper)	

Figure 3.10.3-23 Spectrum Emission Mask Results

3.10.4 Related Native Commands

The Native commands for remote control of the MX887065A Category M FDD Uplink TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of the commands, refer to Chapter 5 “Native Command Reference” in *the MX887065A Category M FDD Uplink TX Measurement Operation Manual*.

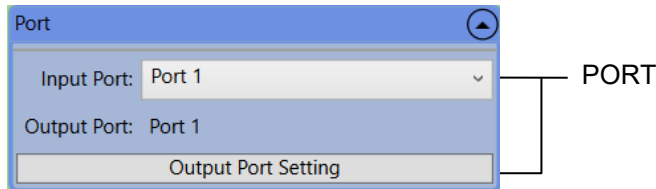


Figure 3.10.4-1 Measurement Settings Pane (Port)

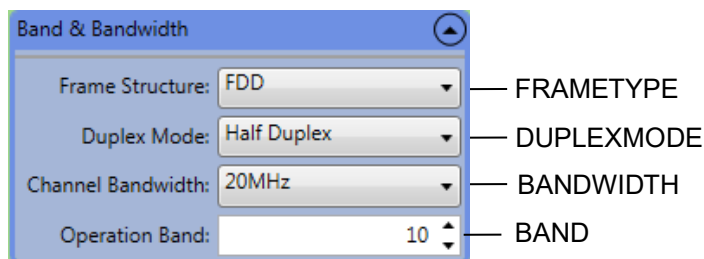


Figure 3.10.4-2 Measurement Settings Pane (Band & Bandwidth)

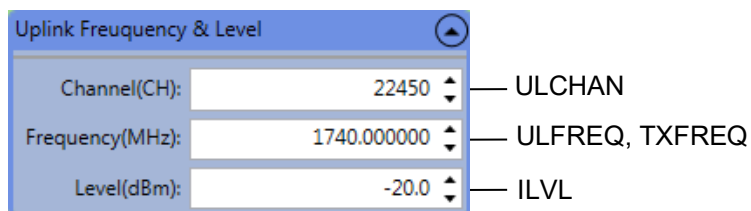


Figure 3.10.4-3 Measurement Settings Pane (Uplink Frequency & Level)

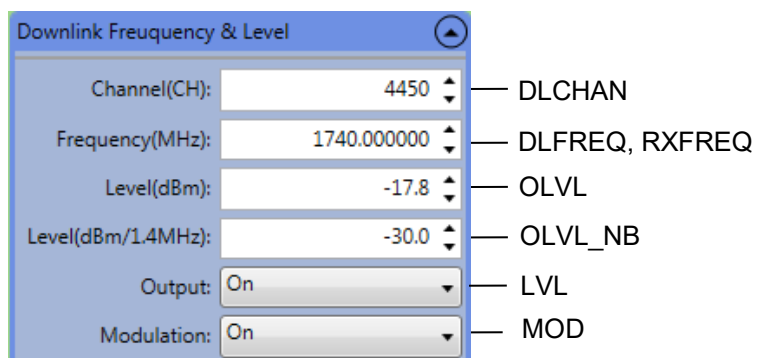


Figure 3.10.4-4 Measurement Settings Pane (Downlink Frequency & Level)

Signal	
Channel Coding:	RMC
RMC Configuration:	PUSCH
Group Hopping:	Off
nRB-CQI:	0
additionalSpectrumEmission:	NS_01

CHCODING
CHCONFIG
GROUPOP
NRBCQI
SIB2_NS

Figure 3.10.4-5 Measurement Settings Pane (Signal)

UL RMC	
Narrowband Index:	0
Number of RB:	6
Starting RB:	0
Modulation:	16QAM

ULRMC_NARROW
ULRMC_RB
ULRB_START
ULRMC_MOD

Figure 3.10.4-6 Measurement Settings Pane (UL RMC)

Base Station Identity	
Cell ID:	0
Delta SS:	0

CELLID
DELTASS

Figure 3.10.4-7 Measurement Settings Pane (Base Station Identity)

Tx Measurement	
RB Search:	Off
Cyclic Shift:	AUTO
Carrier Leakage Freq.:	at Carrier Frequency

RBSEARCH
CSHIFT
IBEM_CLFR

Figure 3.10.4-8 Measurement Settings Pane (Tx Measurement)

Trigger	
Source:	Rise Config
Level(dB):	-30
Delay(ms):	0.000
Timeout(s):	10

TRGSRC
TRGLVL
TRGDLY
TRGTOUT

Figure 3.10.4-9 Measurement Settings Pane (Trigger)

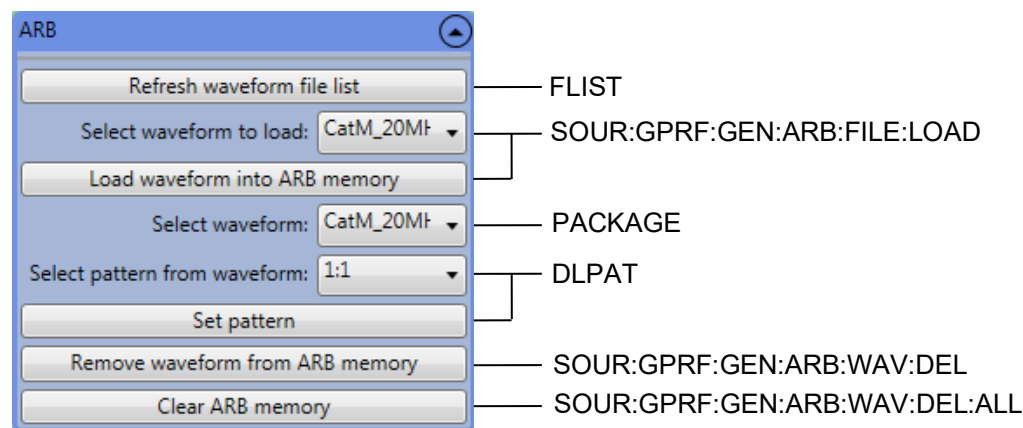


Figure 3.10.4-10 Measurement Settings Pane (ARB)

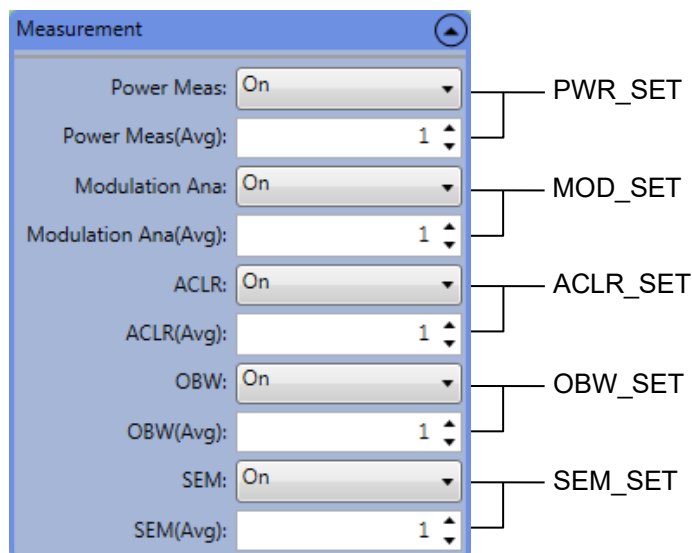


Figure 3.10.4-11 Measurement Settings Pane (Measurement)

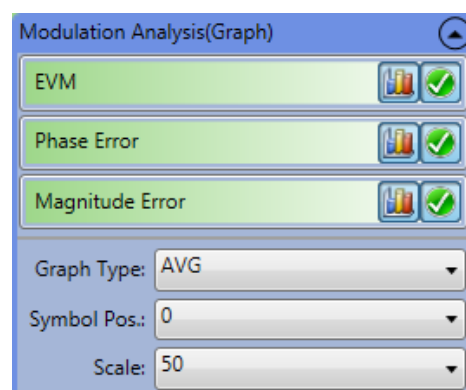


Figure 3.10.4-12 Measurement Settings Pane (Modulation Analysis)

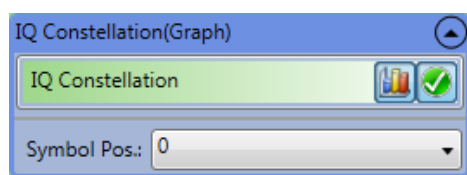


Figure 3.10.4-13 Measurement Settings Pane (IQ Constellation (Graph))

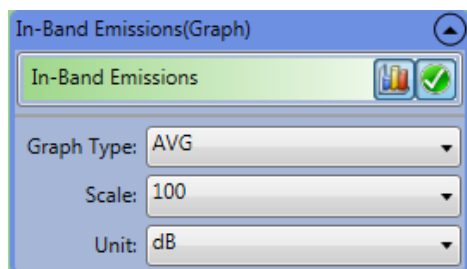


Figure 3.10.4-14 Measurement Settings Pane (In-Band Emission (Graph))

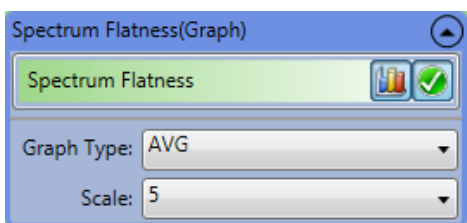


Figure 3.10.4-15 Measurement Settings Pane (Spectrum Flatness (Graph))

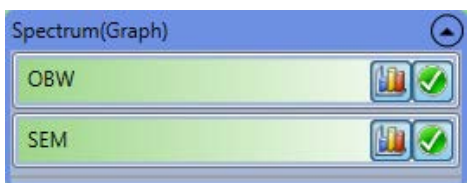


Figure 3.10.4-16 Measurement Settings Pane (Spectrum (Graph))

Refer to Figure 3.2.4-3 “Measurement Settings Pane (Level Calibration)” for the Native commands for Level Calibration remote control.

Power Measurement	
Power Measurement	
Tx Power [dBm]	POWER?
Channel Power [dBm]	CHPWR?

Figure 3.10.4-17 Power Measurement Results

Modulation Analysis	
Modulation Analysis	
Carrier Frequency [Hz]	CARRF?
Carrier Frequency Error [Hz]	CFERR?
Carrier Frequency Error [ppm]	
EVM [%]	EVM?
Reference Signal EVM [%]	RSEVM?
Peak EVM [%]	PVECTERR?
Phase Error [deg.]	PHASEERR?
Magnitude Error [%]	MAGTDERR?
Rho	RHO?
Carrier Leakage [dBc]	CARRLEAK?
IQ Imbalance [%]	IQIMB_PER?
IQ Imbalance [dB]	IQIMB_DB?

Figure 3.10.4-18 Modulation Analysis Results

In-Band Emissions	
In-Band Emissions	
Judgment	INBANDEPASS?
General [dB]	INBANDE_GEN?
IQ Image [dB]	INBANDE_IMG?
Carrier Leakage [dBc]	INBANDE_LEAK?
Limit Worst General [dB]	INBANDE_GENUL?
Limit Worst IQ Image [dB]	INBANDE_IMGUL?
Limit Worst Carrier Leakage [dBc]	INBANDE_LEAKUL?
In-Band Emissions Margin [dB]	INBANDE_MARG?

Figure 3.10.4-19 In-Band Emissions Results

Spectrum Flatness	
Spectrum Flatness	
Judgment	SPECFLATPPPASS?
$\geq 3\text{MHz R1+}$ [dB]	SPECFLAT1_P?
$\geq 3\text{MHz R1-}$ [dB]	SPECFLAT1_M?
$\geq 3\text{MHz Worst}$ [dB]	SPECFLAT1?
$< 3\text{MHz R2+}$ [dB]	SPECFLAT2_P?
$< 3\text{MHz R2-}$ [dB]	SPECFLAT2_M?
$< 3\text{MHz Worst}$ [dB]	SPECFLAT2?
$\geq 3\text{MHz RP1}$ [dB]	SPECFLAT_RP1?
$< 3\text{MHz RP2}$ [dB]	SPECFLAT_RP2?
RP12 [dB]	SPECFLAT_RP12?
RP21 [dB]	SPECFLAT_RP21?

Figure 3.10.4-20 Spectrum Flatness Results

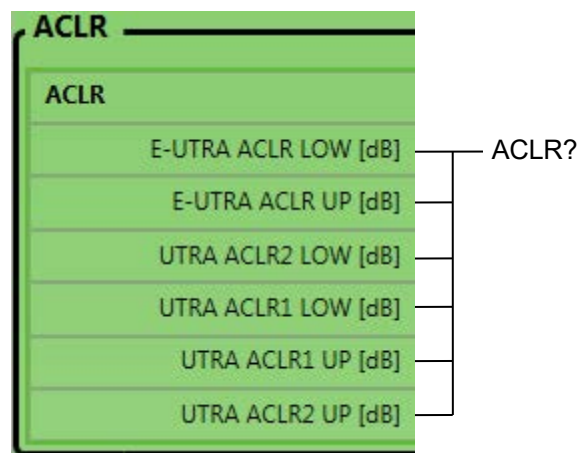


Figure 3.10.4-21 ACLR Results

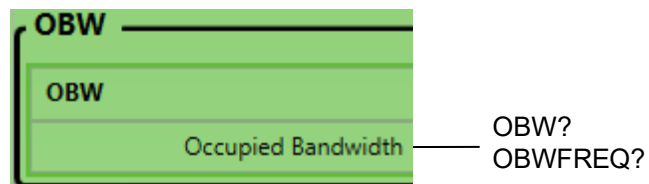


Figure 3.10.4-22 OBW Results

Spectrum Emission Mask	
Judgement	
Judgement	SEMPASS?
Spectrum Emission Mask	
F1(Lower)	TTL_WORST_SEM_LV? TTL_WORST_SEM?
F2(Lower)	
F3(Lower)	
F4(Lower)	
F1(Upper)	
F2(Upper)	
F3(Upper)	
F4(Upper)	
Spectrum Emission Mask Detail	
F1(Lower)	TTL_WORST_SEM_DET_LV? TTL_WORST_SEM_DET?
F2(Lower)	
F3(Lower)	
F4(Lower)	
F5(Lower)	
F6(Lower)	
F7(Lower)	
F8(Lower)	
F9(Lower)	
F1(Upper)	
F2(Upper)	
F3(Upper)	
F4(Upper)	
F5(Upper)	
F6(Upper)	
F7(Upper)	
F8(Upper)	
F9(Upper)	

Figure 3.10.4-23 Spectrum Emission Mask Results

3.11 NR

Refer to Chapter 2 “Fundamental Measurement” in the *MX887018A/19A NR FDD/TDD sub-6GHz Uplink TX Measurement Operation Manual* for a description of the NR TDD Uplink TX Measurement items.

This section describes the NR settings and displays.

3.11.1 Measurement settings

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

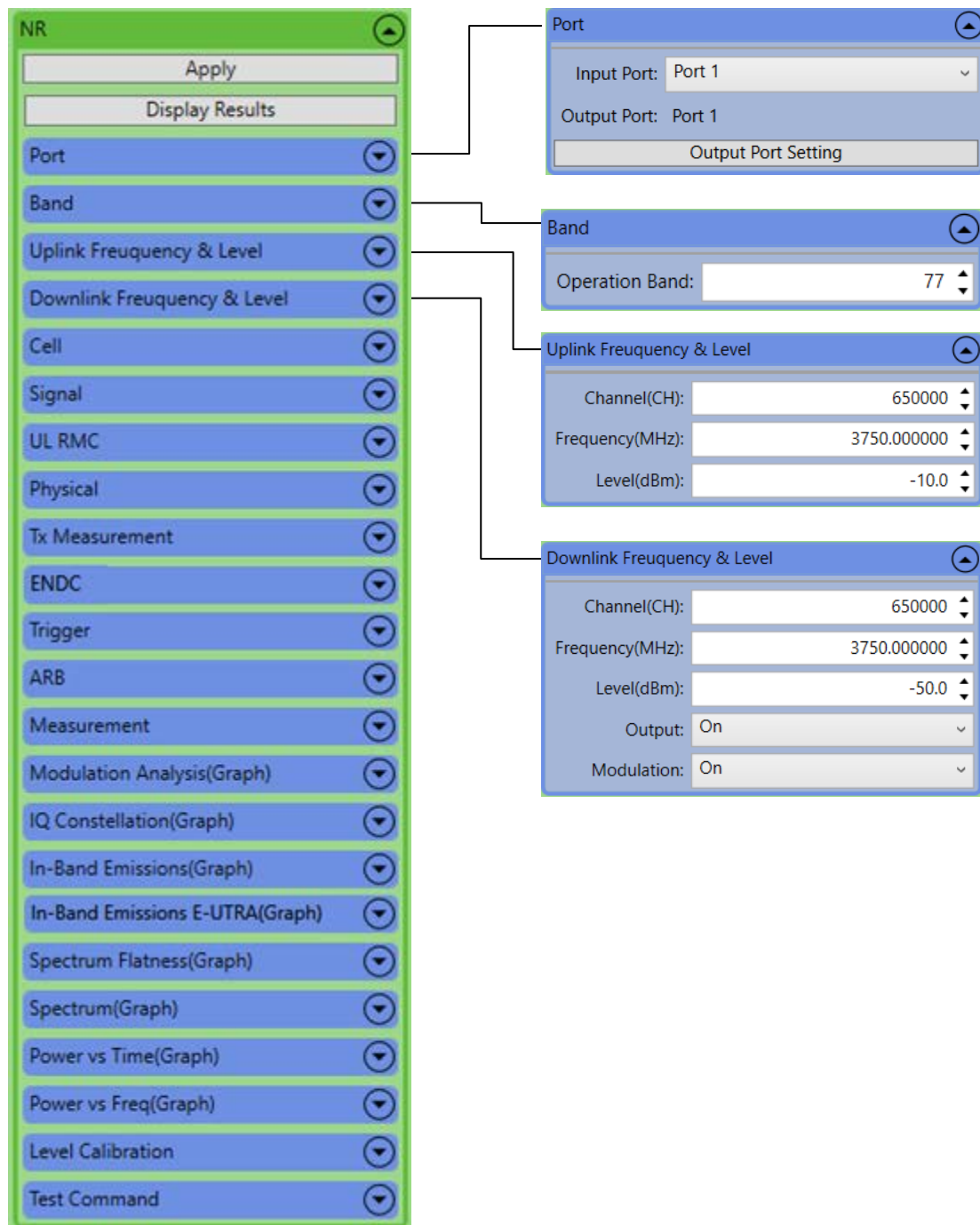


Figure 3.11.1-1 NR Measurement Settings Pane (1/5)

NR

Apply

Display Results

Port

Band

Uplink Frequency & Level

Downlink Frequency & Level

Cell

Signal

UL RMC

Physical

Tx Measurement

ENDC

Trigger

ARB

Measurement

Modulation Analysis(Graph)

IQ Constellation(Graph)

In-Band Emissions(Graph)

In-Band Emissions E-UTRA(Graph)

Spectrum Flatness(Graph)

Spectrum(Graph)

Power vs Time(Graph)

Power vs Freq(Graph)

Level Calibration

Test Command

Cell

Frame Structure: TDD

Frequency Range: FR1

UL Channel Bandwidth: 100MHz

UL Subcarrier Spacing: 30kHz

Cell ID: 0

DL/UL Periodicity: 10MS

UL Duration: 10

Signal

RMC Configuration: PUSCH

UL RMC

Waveform: CPOFDM

Number of RB: 273

Starting RB: 0

Modulation: QPSK

Physical

DMRS Duration: SINGLE

Mapping Type: TYPEA

Antenna port: 0

DMRS add pos: 0

DMRS typeA pos: 2

UL DMRS Config Type: TYPE1

Group Hopping: OFF

Sequence Hopping: OFF

Tx Measurement

Measurement Offset(symbol): 0.0

Pre Phase Correction: Off

Figure 3.11.1-2 NR Measurement Settings Pane (2/5)

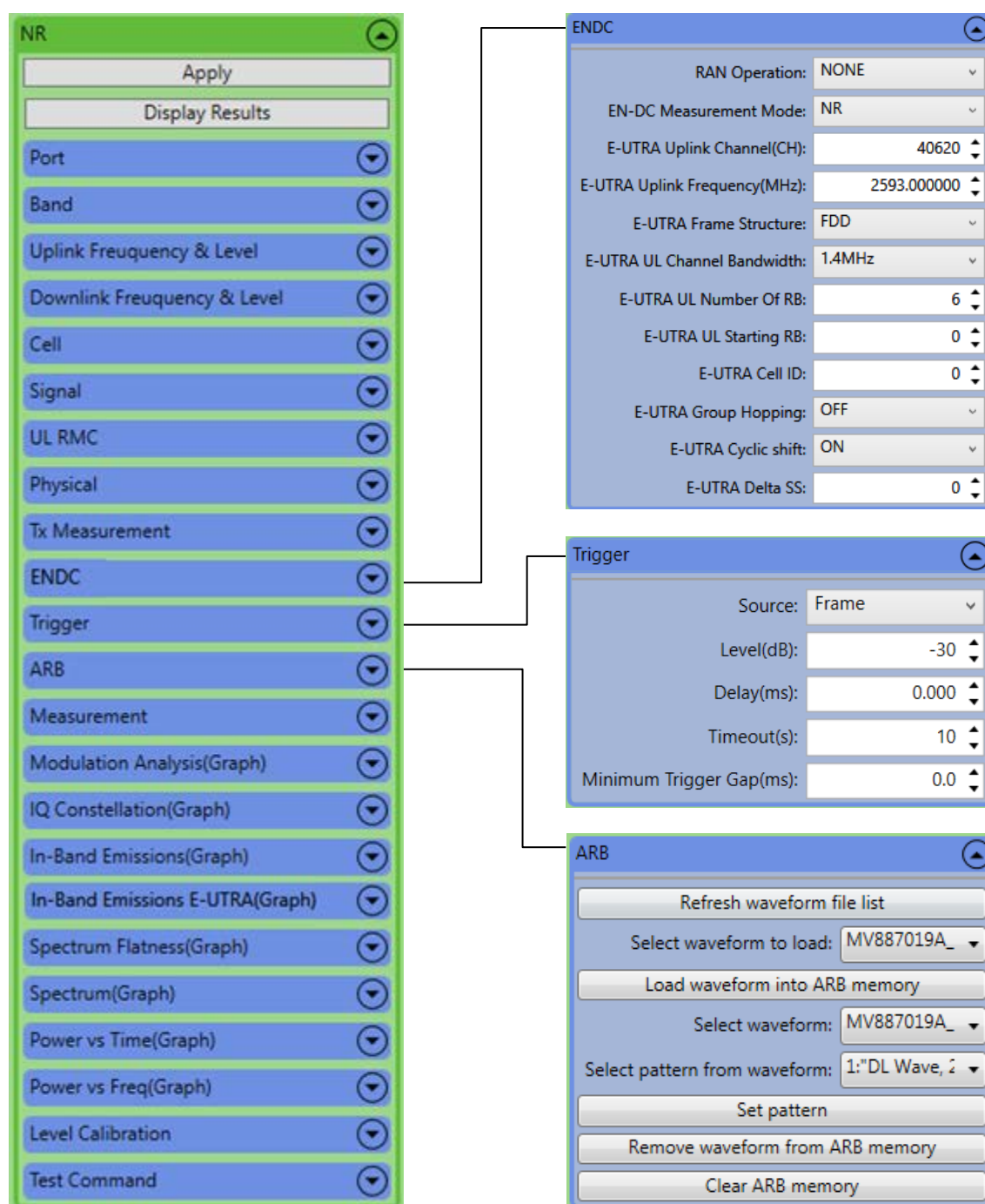


Figure 3.11.1-3 NR Measurement Settings Pane (3/5)



Figure 3.11.1-4 NR Measurement Settings Pane (4/5)

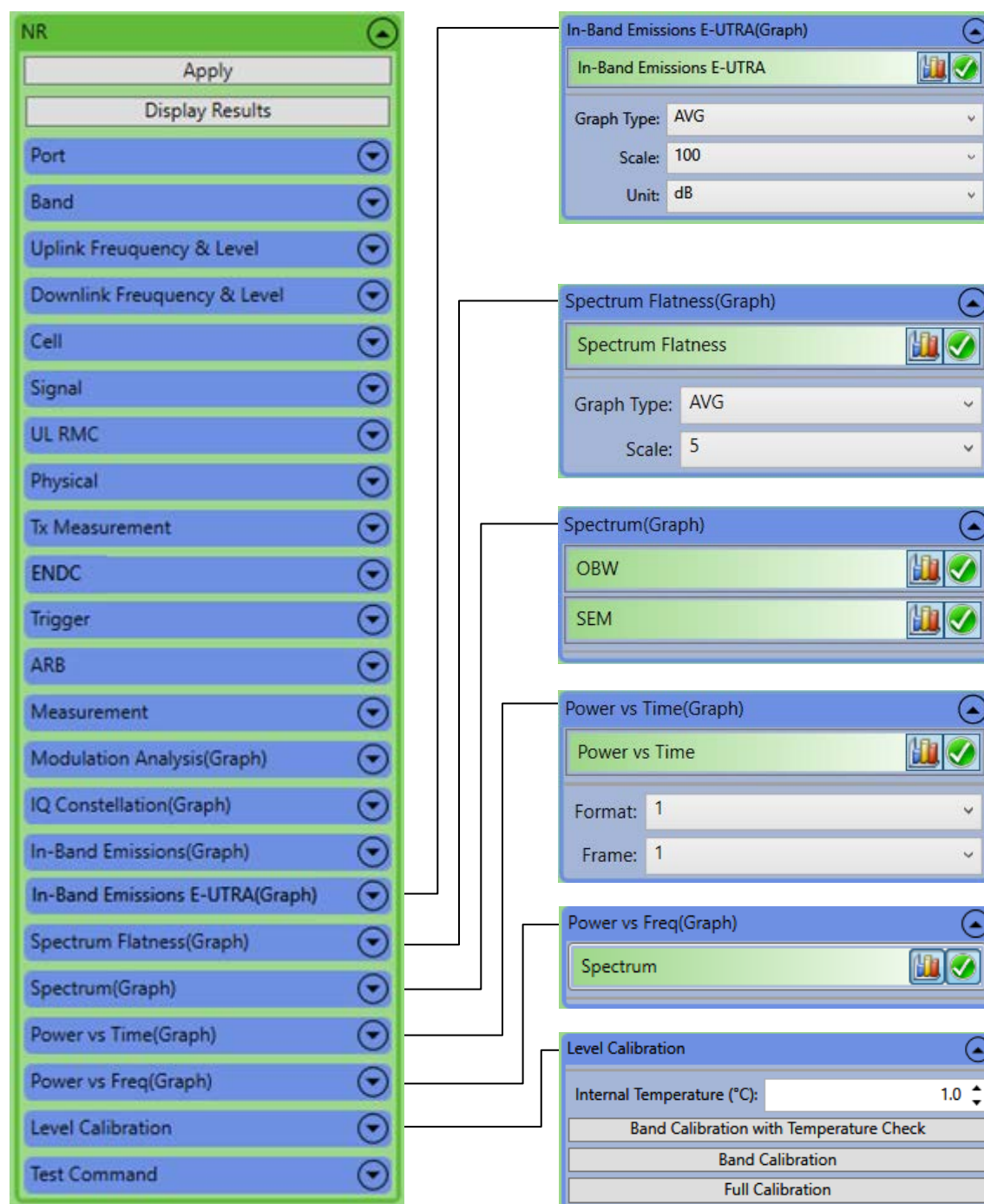


Figure 3.11.1-5 NR Measurement Settings Pane (5/5)

For the expandable menus of Level Calibration, and Test Command, refer to Figure 3.2.1-1 “Spectrum Monitor Settings Pane”.

3.11.2 Measurement and results

To perform measurement:

1. Set the parameters for all buttons from **Port** to **Trigger**.
2. Click the **Measurement** button to open the dialog and set the parameters.
3. Click **Modulation Analysis(Graph)** to open the window and set the data storage method (Graph Type), Symbol Pos., and vertical upper limit (Scale).
4. Click **IQ Constellation(Graph)** to open the window and set the Symbol Pos.
5. Click **In-Band Emissions(Graph)** to open the window and set the data storage method (Graph Type), vertical upper limit (Scale), and scale units (Unit).
6. Click **Spectrum Flatness(Graph)** to open the window and set the data storage method (Graph Type), and vertical upper limit (Scale).
7. Click **Power vs Time(Graph)** to open the window and set the Format, and Frame.
8. Set a checkmark in the  checkboxes on the following dialogs to open the graph displays. **Modulation Analysis(Graph)**, **IQ Constellation(Graph)**, **In-Band Emission(Graph)**, **Spectrum Flatness(Graph)**, **Spectrum(Graph)**, **Power vs Time(Graph)**, **Power vs Freq(Graph)**
9. Click the **Apply** button to send the parameters to the hardware.
10. Click the **Display Results** button to display the **NR** tab.
11. Click the  **Measurement Start** button
12. The numerical data are displayed in the **NR** tab after measurement is completed.
13. Click the  button on the following dialogs to open the graph displays. **Modulation Analysis(Graph)**, **IQ Constellation(Graph)**, **In-Band Emission(Graph)**, **Spectrum Flatness(Graph)**, **Spectrum(Graph)**, **Power vs Time(Graph)**, **Power vs Freq(Graph)**

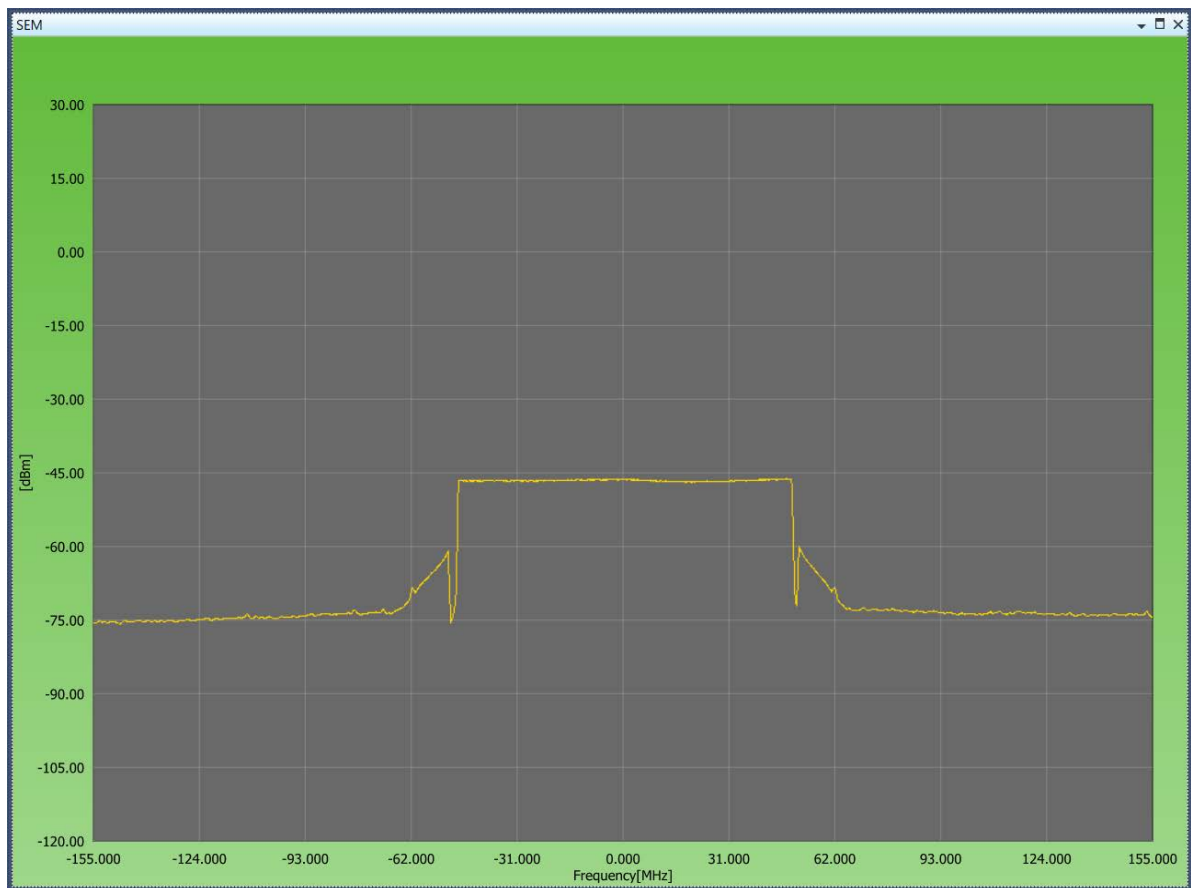


Figure 3.11.2-1 NR (Spectrum Emission Mask) Graph

3.11.3 Related SCPI Commands

The SCPI commands for remote control of the MX887018A NR FDD sub-6GHz Uplink TX Measurement and MX887019A NR TDD sub-6GHz Uplink TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of the commands, refer to Chapter 4 “SCPI Command Reference” in *the MX887018A/19A NR FDD/TDD sub-6GHz Uplink TX Measurement Operation Manual*.

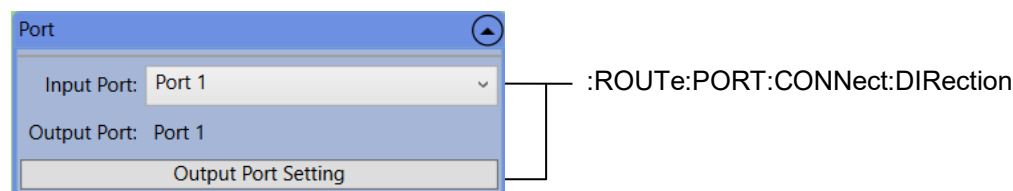


Figure 3.11.3-1 Measurement Settings Pane (Port)

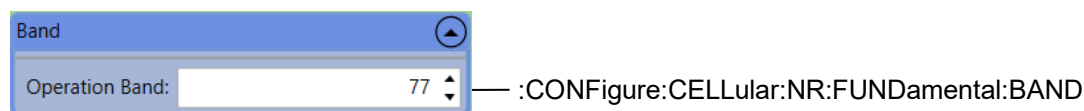


Figure 3.11.3-2 Measurement Settings Pane (Band)

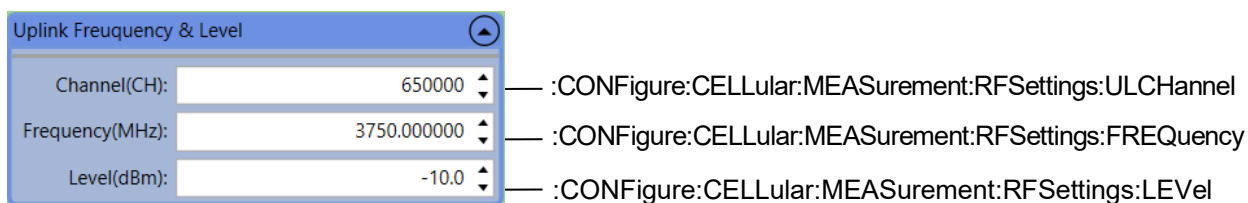


Figure 3.11.3-3 Measurement Settings Pane (Uplink Frequency & Level)

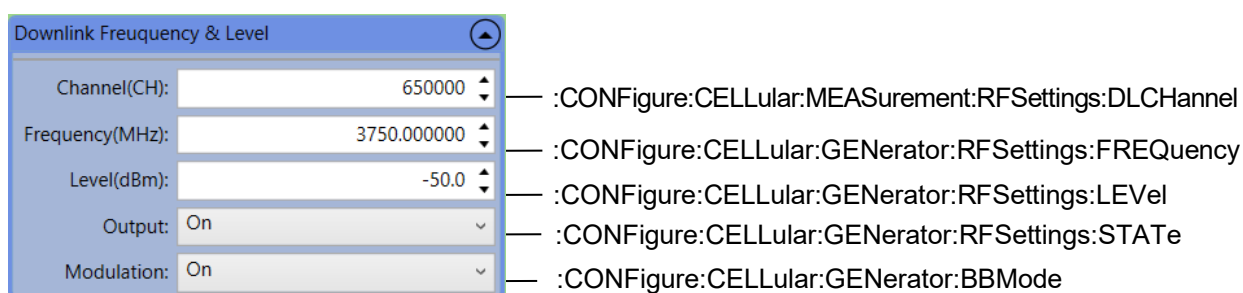


Figure 3.11.3-4 Measurement Settings Pane (Downlink Frequency & Level)

Cell		
Frame Structure:	TDD	:CONFigure:CELLular:NR:FSTRucture
Frequency Range:	FR1	:CONFigure:CELLular:NR:FREQuency:RANGe
UL Channel Bandwidth:	100MHz	:CONFigure:CELLular:NR:CBANdwidth
UL Subcarrier Spacing:	30kHz	:CONFigure:CELLular:NR:SCS
Cell ID:	0	:CONFigure:CELLular:NR:CID
DL/UL Periodicity:	10MS	:CONFigure:CELLular:NR:DLUL:PERiod
UL Duration:	10	:CONFigure:CELLular:NR:UL:DURation

Figure 3.11.3-5 Measurement Settings Pane (Cell)

Signal		
RMC Configuration:	PUSCH	:CONFigure:CELLular:NR:CTYPE

Figure 3.11.3-6 Measurement Settings Pane (Signal)

UL RMC		
Waveform:	CPOFDM	:CONFigure:CELLular:NR:WAVEform
Number of RB:	273	:CONFigure:CELLular:NR:RBAllocation:NRB
Starting RB:	0	:CONFigure:CELLular:NR:RBAllocation:ORB
Modulation:	QPSK	:CONFigure:CELLular:NR:MODulation:MSCHeme

Figure 3.11.3-7 Measurement Settings Pane (UL RMC)

Physical		
DMRS Duration:	SINGLE	:CONFigure:CELLular:NR:DMRS:DURation
Mapping Type:	TYPEA	:CONFigure:CELLular:NR:PUSCh:MTYPE
Antenna port:	0	:CONFigure:CELLular:NR:DMrs:PORT
DMRS add pos:	0	:CONFigure:CELLular:NR:DMRS:ADDPos
DMRS typeA pos:	2	:CONFigure:CELLular:NR:DMRS:TYPE:APOSition
UL DMRS Config Type:	TYPE1	:CONFigure:CELLular:NR:DMRS:TYPE
Group Hopping:	OFF	:CONFigure:CELLular:NR:DMRS:GHOPping
Sequence Hopping:	OFF	:CONFigure:CELLular:NR:DMRS:SHOPping

Figure 3.11.3-8 Measurement Settings Pane (Physical)

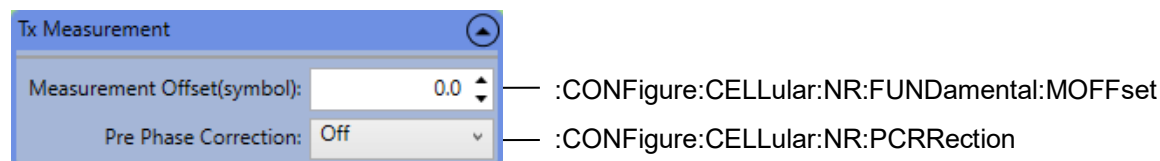


Figure 3.11.3-9 Measurement Settings Pane (Tx Measurement)

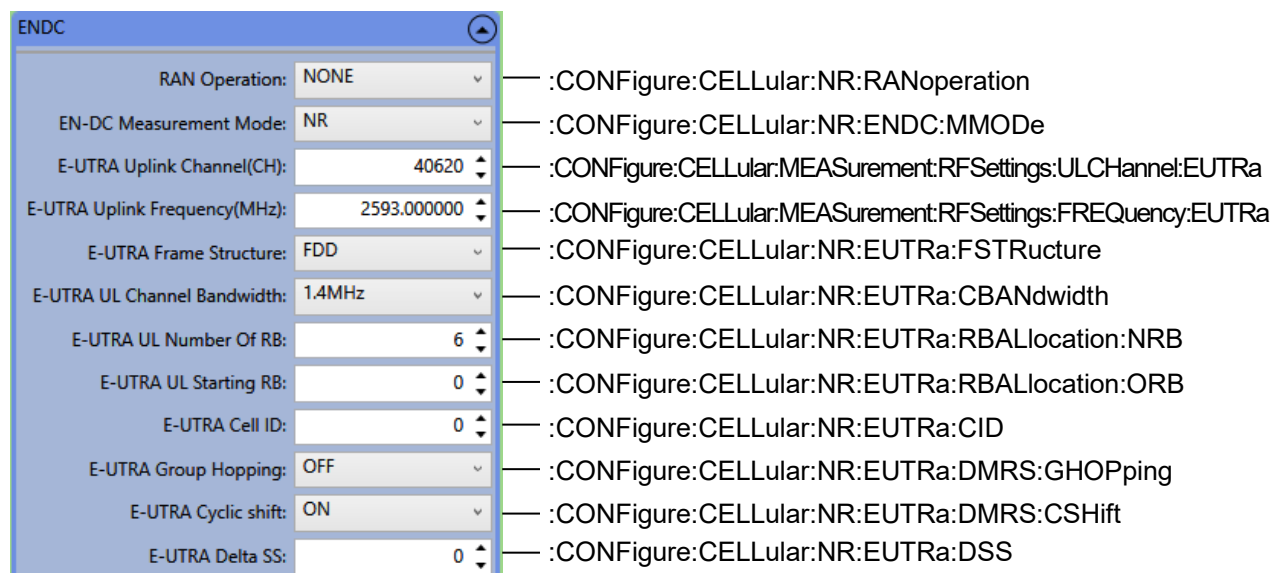


Figure 3.11.3-10 Measurement Settings Pane (ENDC)

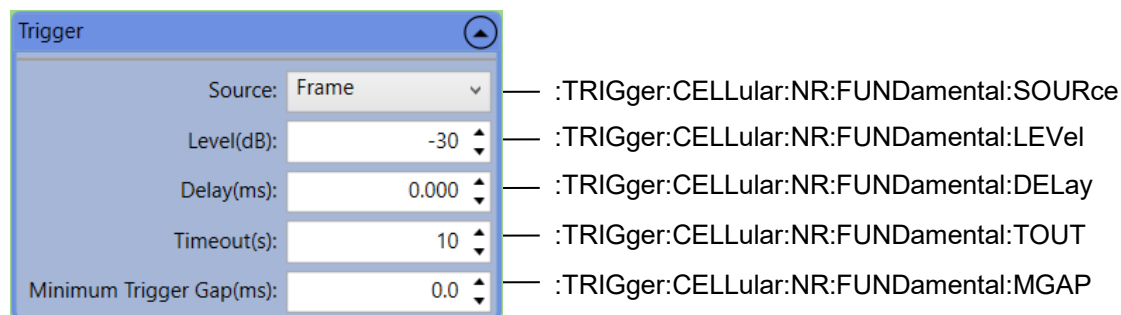


Figure 3.11.3-11 Measurement Settings Pane (Trigger)

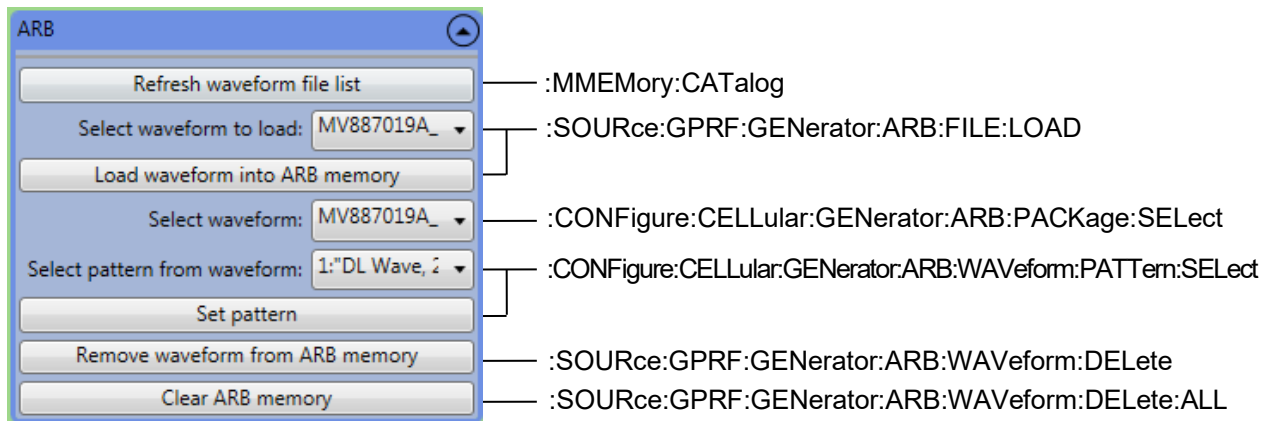


Figure 3.11.3-12 Measurement Settings Pane (ARB)

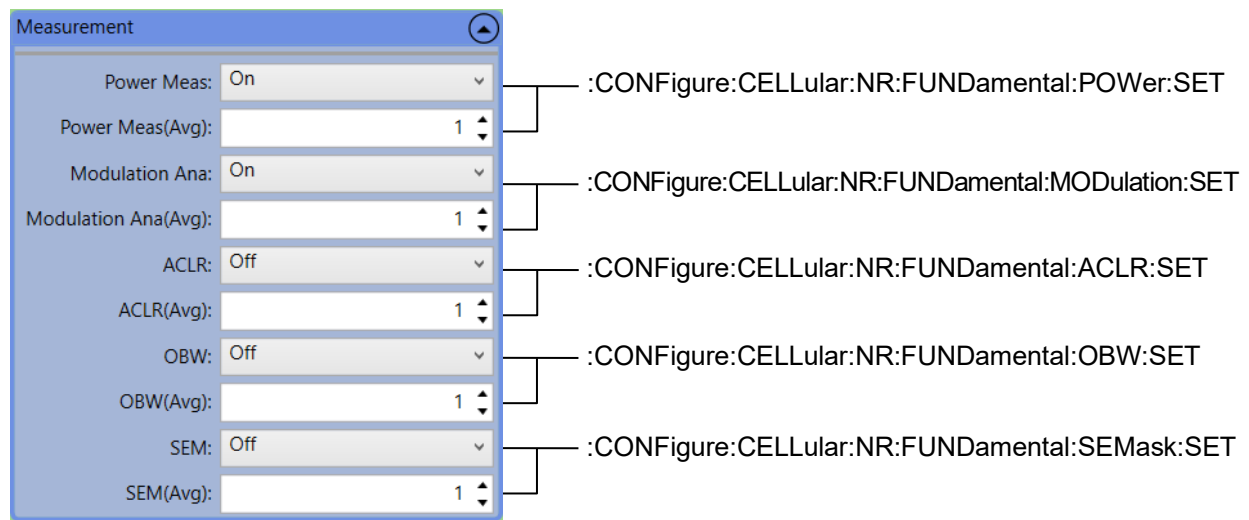


Figure 3.11.3-13 Measurement Settings Pane (Measurement)

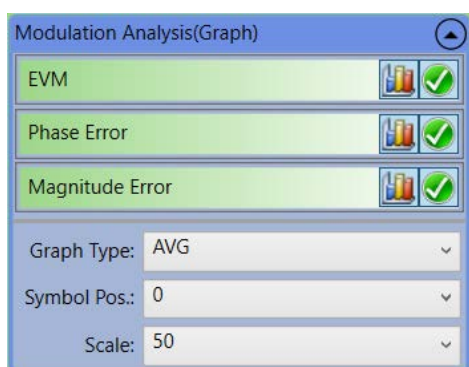


Figure 3.11.3-14 Measurement Settings Pane (Modulation Analysis (Graph))

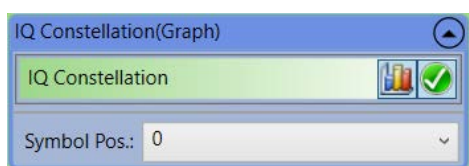


Figure 3.11.3-15 Measurement Settings Pane (IQ Constellation (Graph))

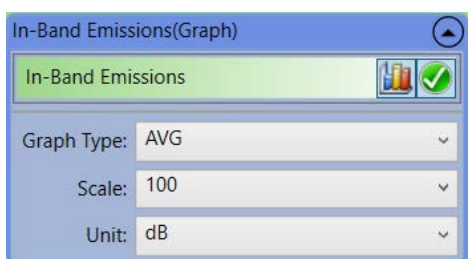


Figure 3.11.3-16 Measurement Settings Pane (In-Band Emission (Graph))

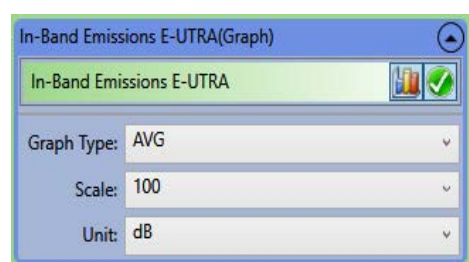


Figure 3.11.3-17 Measurement Settings Pane (In-Band Emission E-UTRA (Graph))



Figure 3.11.3-18 Measurement Settings Pane (Spectrum Flatness (Graph))

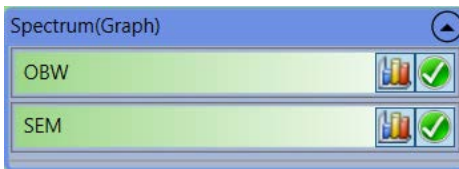


Figure 3.11.3-19 Measurement Settings Pane (Spectrum (Graph))

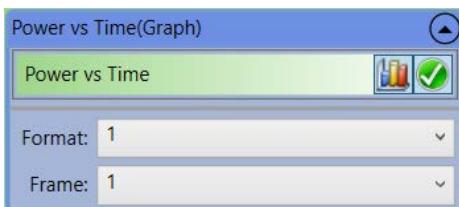


Figure 3.11.3-20 Measurement Settings Pane (Power vs Time (Graph))



Figure 3.11.3-21 Measurement Settings Pane (Power vs Freq (Graph))

Refer to Figure 3.2.3-3 “Measurement Settings Pane (Level Calibration)” for the SCPI commands for Level Calibration remote control.

Status	
Status	
Measurement Status	:FETCh:CELLular:MEASurement:STATe?

Figure 3.11.3-22 Status Results

Power Measurement	
Power Measurement	
Tx Power [dBm]	:FETCh:CELLular:NR:FUNDamental:POWer:TXPower?
Channel Power [dBm]	:FETCh:CELLular:NR:FUNDamental:POWer:CHPower?

Figure 3.11.3-23 Power Measurement Results

Modulation Analysis	
Modulation Analysis	
Carrier Frequency [MHz]	:FETCh:CELLular:NR:FUNDamental:MODulation:CFRequency?
Carrier Frequency Error [Hz]	:FETCh:CELLular:NR:FUNDamental:MODulation:FERRor?
Carrier Frequency Error [ppm]	
EVM [%]	:FETCh:CELLular:NR:FUNDamental:MODulation:EVM?
Reference Signal EVM [%]	:FETCh:CELLular:NR:FUNDamental:MODulation:RSEVm?
Peak EVM [%]	:FETCh:CELLular:NR:FUNDamental:MODulation:PEVM?
Phase Error [deg.]	:FETCh:CELLular:NR:FUNDamental:MODulation:PHERror?
Magnitude Error [%]	:FETCh:CELLular:NR:FUNDamental:MODulation:MERRor?
Rho	:FETCh:CELLular:NR:FUNDamental:MODulation:RHO?
Carrier Leakage [dBc]	:FETCh:CELLular:NR:FUNDamental:MODulation:CARLeakage?

Figure 3.11.3-24 Modulation Analysis Results

In-Band Emissions	
In-Band Emissions	
Judgment	:FETCh:CELLular:NR:FUNDamental:MODulation:IEmissions:JUDGement?
General [dB]	:FETCh:CELLular:NR:FUNDamental:MODulation:IEmissions:GENeral?
IQ Image [dB]	:FETCh:CELLular:NR:FUNDamental:MODulation:IEmissions:IQIMage?
Carrier Leakage [dBc]	:FETCh:CELLular:NR:FUNDamental:MODulation:IEmissions:CARLeakage?
Limit Worst General [dB]	:FETCh:CELLular:NR:FUNDamental:MODulation:IEmissions:LIMit:GENeral?
Limit Worst IQ Image [dB]	:FETCh:CELLular:NR:FUNDamental:MODulation:IEmissions:LIMit:IQIMage?
Limit Worst Carrier Leakage [dBc]	:FETCh:CELLular:NR:FUNDamental:MODulation:IEmissions:LIMit:CARLeakage?
In-Band Emissions Margin [dB]	:FETCh:CELLular:NR:FUNDamental:MODulation:IEmissions:LIMit:MARGin?
In-Band Emissions E-UTRA	
Judgment	:FETCh:CELLular:NR:FUNDamental:MODulation:IEmissions:EUTRa:JUDGement?
General [dB]	:FETCh:CELLular:NR:FUNDamental:MODulation:IEmissions:EUTRa:GENeral?
IQ Image [dB]	:FETCh:CELLular:NR:FUNDamental:MODulation:IEmissions:EUTRa:IQIMage?
Carrier Leakage [dBc]	:FETCh:CELLular:NR:FUNDamental:MODulation:IEmissions:EUTRa:CARLeakage?
Limit Worst General [dB]	:FETCh:CELLular:NR:FUNDamental:MODulation:IEmissions:EUTRa:LIMit:GENeral?
Limit Worst IQ Image [dB]	:FETCh:CELLular:NR:FUNDamental:MODulation:IEmissions:EUTRa:LIMit:IQIMage?
Limit Worst Carrier Leakage [dBc]	:FETCh:CELLular:NR:FUNDamental:MODulation:IEmissions:EUTRa:LIMit:CARLeakage?
In-Band Emissions Margin [dB]	:FETCh:CELLular:NR:FUNDamental:MODulation:IEmissions:EUTRa:LIMit:MARGin?

Figure 3.11.3-25 In-Band Emissions Results

Spectrum Flatness	
Spectrum Flatness	
Judgment	:FETCh:CELLular:NR:FUNDamental:MODulation:ESFLatness:JUDGement?
$\geq 3\text{MHz R1+ [dB]}$	:FETCh:CELLular:NR:FUNDamental:MODulation:ESFLatness:R1P?
$\geq 3\text{MHz R1- [dB]}$	:FETCh:CELLular:NR:FUNDamental:MODulation:ESFLatness:R1M?
$< 3\text{MHz R2+ [dB]}$	:FETCh:CELLular:NR:FUNDamental:MODulation:ESFLatness:R2P?
$< 3\text{MHz R2- [dB]}$	:FETCh:CELLular:NR:FUNDamental:MODulation:ESFLatness:R2M?
$\geq 3\text{MHz RP1 [dB]}$	:FETCh:CELLular:NR:FUNDamental:MODulation:ESFLatness:RP1?
$< 3\text{MHz RP2 [dB]}$	:FETCh:CELLular:NR:FUNDamental:MODulation:ESFLatness:RP2?
RP12 [dB]	:FETCh:CELLular:NR:FUNDamental:MODulation:ESFLatness:RP12?
RP21 [dB]	:FETCh:CELLular:NR:FUNDamental:MODulation:ESFLatness:RP21?

Figure 3.11.3-26 Spectrum Flatness Results

ACLR	
ACLR	
NR LOW [dB]	:FETCh:CELLular:NR:FUNDamental:ACLR?
NR UP [dB]	
UTRA ACLR2 LOW [dB]	
UTRA ACLR1 LOW [dB]	
UTRA ACLR1 UP [dB]	
UTRA ACLR2 UP [dB]	

Figure 3.11.3-27 ACLR Results

OBW	
OBW	
Occupied Bandwidth	:FETCh:CELLular:NR:FUNDamental:OBW? :FETCh:CELLular:NR:FUNDamental:OBW:FREQuency?

Figure 3.11.3-28 OBW Results

Spectrum Emission Mask	
Judgement	
Judgement	:FETCh:CELLular:NR:FUNDamental:SEMask:JUDGement?
Spectrum Emission Mask	
F1(Lower)	:FETCh:CELLular:NR:FUNDamental:SEMask:LEVel:TTL?
F2(Lower)	:FETCh:CELLular:NR:FUNDamental:SEMask:MARGin:TTL?
F3(Lower)	
F4(Lower)	
F1(Upper)	
F2(Upper)	
F3(Upper)	
F4(Upper)	
Spectrum Emission Mask Detail	
F1(Lower)	:FETCh:CELLular:NR:FUNDamental:SEMask:LEVel:DETail:TTL?
F2(Lower)	:FETCh:CELLular:NR:FUNDamental:SEMask:MARGin:DETail:TTL?
F3(Lower)	
F4(Lower)	
F5(Lower)	
F6(Lower)	
F7(Lower)	
F8(Lower)	
F9(Lower)	
F10(Lower)	
F11(Lower)	
F12(Lower)	
F13(Lower)	
F14(Lower)	
F15(Lower)	
F16(Lower)	

Figure 3.11.3-29 Spectrum Emission Mask Results (1/2)

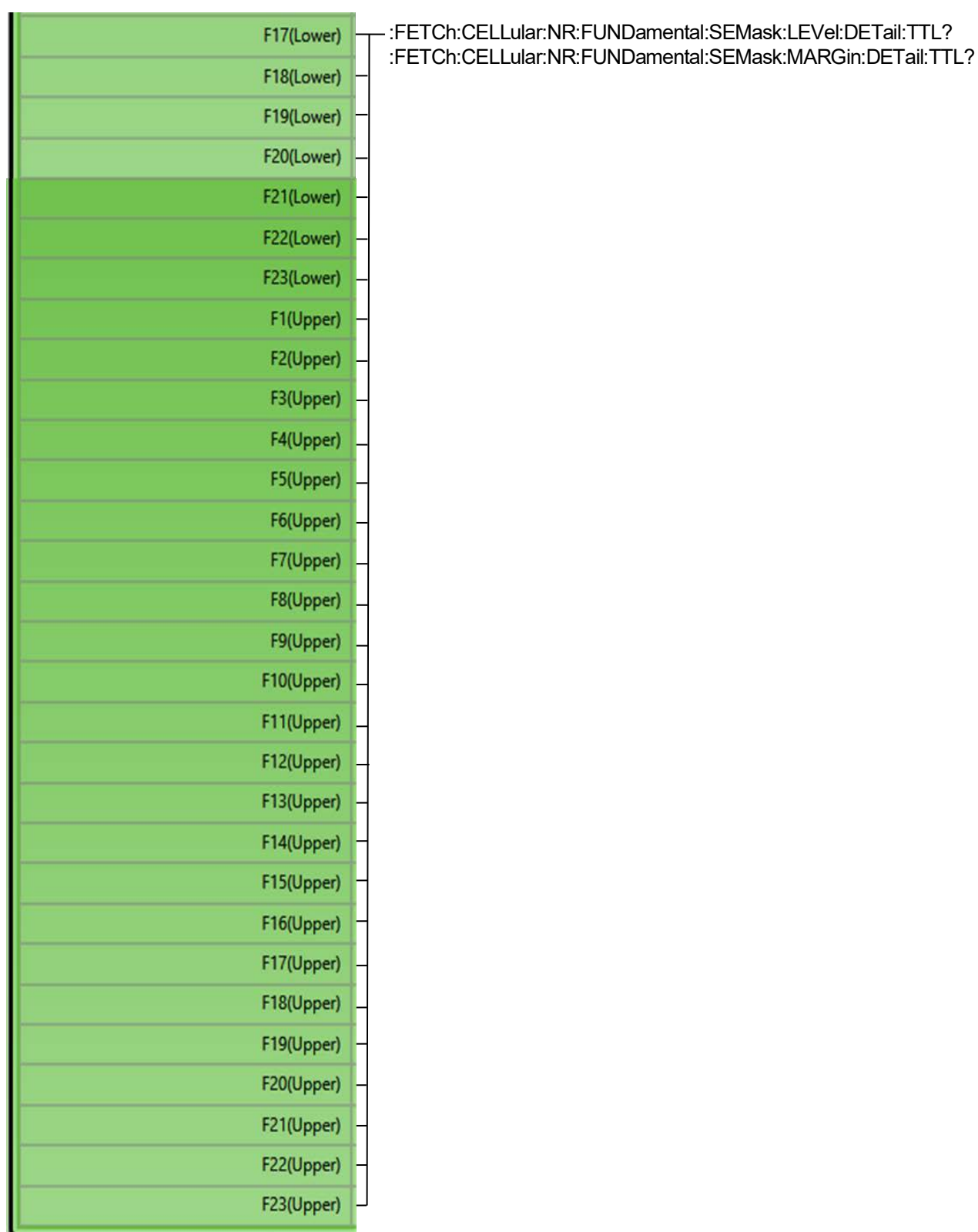


Figure 3.11.3-30 Spectrum Emission Mask Results (2/2)

3.11.4 Related Native Commands

The Native commands for remote control of the MX887018A Category M FDD Uplink TX Measurement and MX887019A Category M TDD Uplink TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of the commands, refer to Chapter 5 “Native Command Reference” in *the MX887018A/19A NR FDD/TDD sub-6GHz Uplink TX Measurement Operation Manual*.

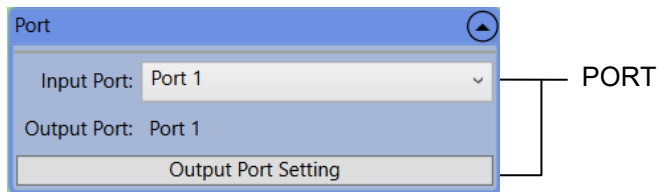


Figure 3.11.4-1 Measurement Settings Pane (Port)

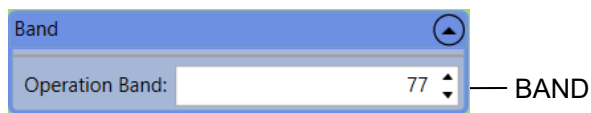


Figure 3.11.4-2 Measurement Settings Pane (Band)

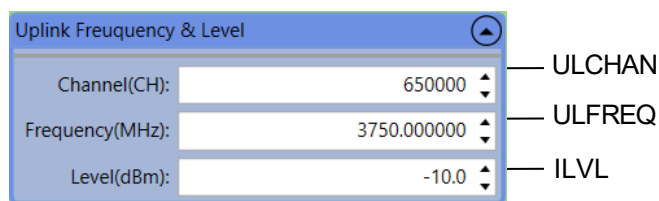


Figure 3.11.4-3 Measurement Settings Pane (Uplink Frequency & Level)

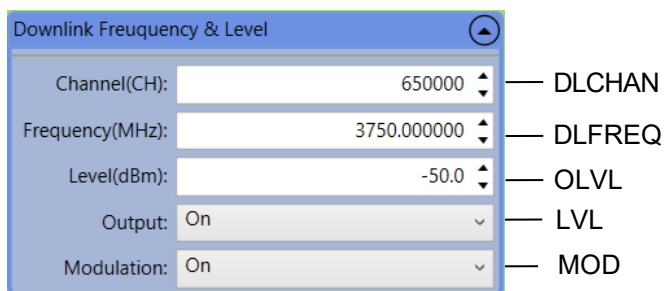


Figure 3.11.4-4 Measurement Settings Pane (Downlink Frequency & Level)

Cell	
Frame Structure:	TDD
Frequency Range:	FR1
UL Channel Bandwidth:	100MHz
UL Subcarrier Spacing:	30kHz
Cell ID:	0
DL/UL Periodicity:	10MS
UL Duration:	10

FRAMETYPE
FREQRANGE
ULBANDWIDTH
ULSCS
CELLID
DLULPERIOD
ULDURATION

Figure 3.11.4-5 Measurement Settings Pane (Cell)

Signal	
RMC Configuration:	PUSCH

CHCONFIG

Figure 3.11.4-6 Measurement Settings Pane (Signal)

UL RMC	
Waveform:	CPOFDM
Number of RB:	273
Starting RB:	0
Modulation:	QPSK

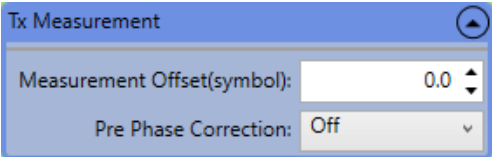
ULWAVEFORM
ULRMC_RB
ULRB_START
ULRMC_MOD

Figure 3.11.4-7 Measurement Settings Pane (UL RMC)

Physical	
DMRS Duration:	SINGLE
Mapping Type:	TYPEA
Antenna port:	0
DMRS add pos:	0
DMRS typeA pos:	2
UL DMRS Config Type:	TYPE1
Group Hopping:	OFF
Sequence Hopping:	OFF

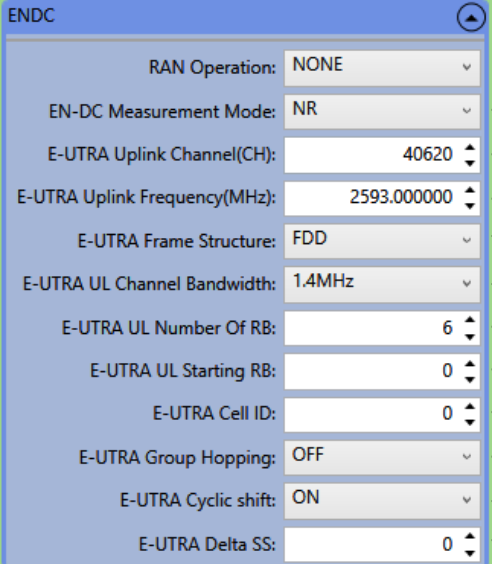
ULDMRSDURATION
ULMAPPINGTYPE
ULDMRSPORT
ULDMRSADDPOS
ULDMRSTYPEAPOS
ULDMRSTYPE
GROUPHOPPING
SEQUENCEHOPPING

Figure 3.11.4-8 Measurement Settings Pane (Physical)



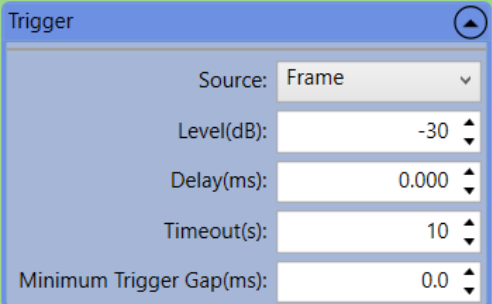
The 'Tx Measurement' pane contains two settings: 'Measurement Offset(symbol):' with a value of 0.0 and 'Pre Phase Correction:' set to 'Off'.

Setting	Value	Parameter
Measurement Offset(symbol):	0.0	MEASOFFSET
Pre Phase Correction:	Off	PREPHASECORR

Figure 3.11.4-9 Measurement Settings Pane (Tx Measurement)

The 'ENDC' pane contains the following settings:

Setting	Value	Parameter
RAN Operation:	NONE	RANOP
EN-DC Measurement Mode:	NR	ENDCMEASMODE
E-UTRA Uplink Channel(CH):	40620	ULCHAN_EUTRA
E-UTRA Uplink Frequency(MHz):	2593.000000	ULFREQ_EUTRA
E-UTRA Frame Structure:	FDD	FRAMETYPE_EUTRA
E-UTRA UL Channel Bandwidth:	1.4MHz	ULBANDWIDTH_EUTRA
E-UTRA UL Number Of RB:	6	ULRMC_RB_EUTRA
E-UTRA UL Starting RB:	0	ULRB_START_EUTRA
E-UTRA Cell ID:	0	CELLID_EUTRA
E-UTRA Group Hopping:	OFF	GROUPHOPPING_EUTRA
E-UTRA Cyclic shift:	ON	CSHIFT_EUTRA
E-UTRA Delta SS:	0	DELTASS_EUTRA

Figure 3.11.4-10 Measurement Settings Pane (ENDC)

The 'Trigger' pane contains the following settings:

Setting	Value	Parameter
Source:	Frame	TRGSRC
Level(dB):	-30	TRGLVL
Delay(ms):	0.000	TRGDLY
Timeout(s):	10	TRGTOUT
Minimum Trigger Gap(ms):	0.0	TRGMGAP

Figure 3.11.4-11 Measurement Settings Pane (Trigger)

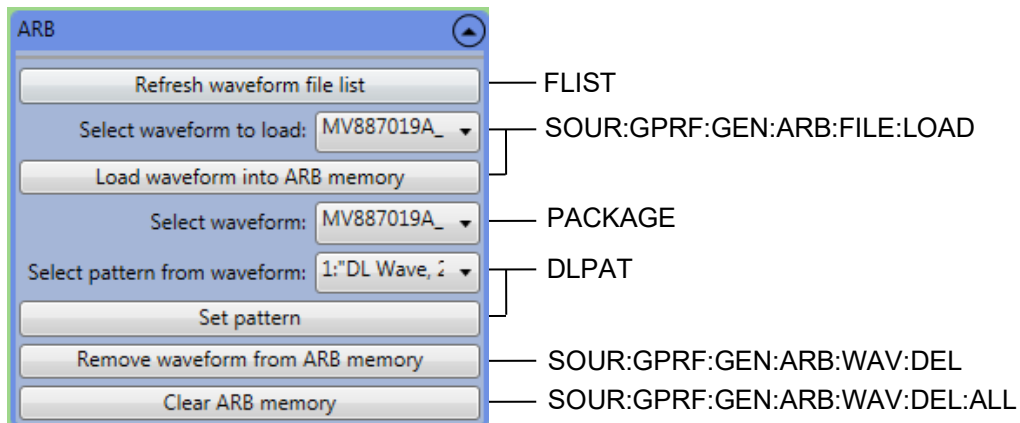


Figure 3.11.4-12 Measurement Settings Pane (ARB)

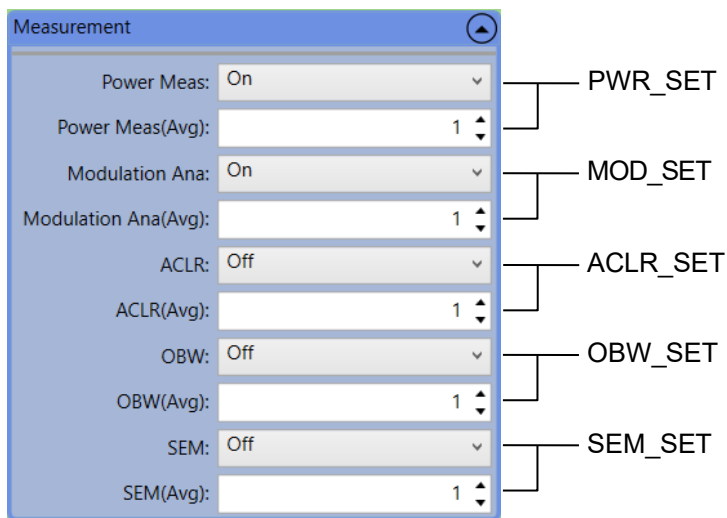


Figure 3.11.4-13 Measurement Settings Pane (Measurement)

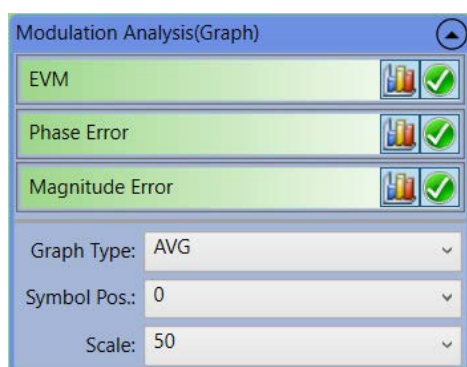


Figure 3.11.4-14 Measurement Settings Pane (Modulation Analysis (Graph))

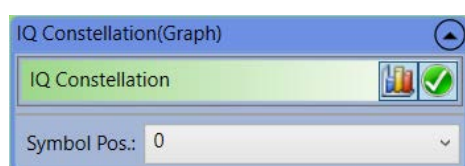


Figure 3.11.4-15 Measurement Settings Pane (IQ Constellation (Graph))

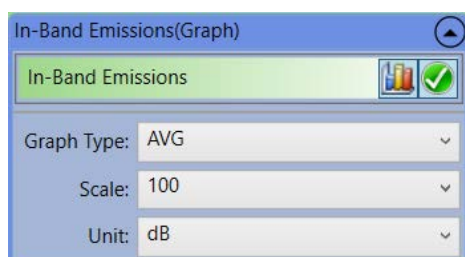


Figure 3.11.4-16 Measurement Settings Pane (In-Band Emission (Graph))

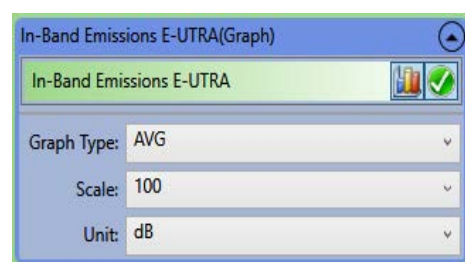


Figure 3.11.4-17 Measurement Settings Pane (In-Band Emission E-UTRA (Graph))

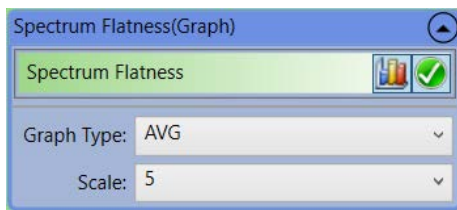


Figure 3.11.4-18 Measurement Settings Pane (Spectrum (Graph))

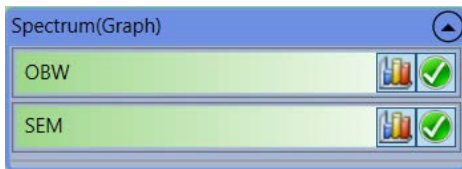


Figure 3.11.4-19 Measurement Settings Pane (Spectrum (Graph))

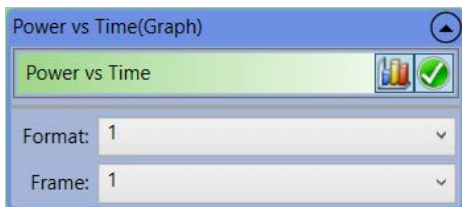


Figure 3.11.4-20 Measurement Settings Pane (Power vs Time (Graph))



Figure 3.11.4-21 Measurement Settings Pane (Power vs Freq (Graph))

Refer to Figure 3.2.4-3 “Measurement Settings Pane (Level Calibration)” for the Native commands for Level Calibration remote control.

Status	
Status	
Measurement Status	MSTAT?

Figure 3.11.4-22 Status Results

Power Measurement	
Power Measurement	
Tx Power [dBm]	POWER?
Channel Power [dBm]	CHPWR?

Figure 3.11.4-23 Power Measurement Results

Modulation Analysis	
Modulation Analysis	
Carrier Frequency [MHz]	CARRF?
Carrier Frequency Error [Hz]	CFERR?
Carrier Frequency Error [ppm]	
EVM [%]	EVM?
Reference Signal EVM [%]	RSEVM?
Peak EVM [%]	PVECTERR?
Phase Error [deg.]	PHASEERR?
Magnitude Error [%]	MAGTDERR?
Rho	RHO?
Carrier Leakage [dBc]	CARRLEAK?

Figure 3.11.4-24 Modulation Analysis Results

In-Band Emissions	
In-Band Emissions	
Judgment	INBANDEPASS?
General [dB]	INBANDE_GEN?
IQ Image [dB]	INBANDE_IMG?
Carrier Leakage [dBc]	INBANDE_LEAK?
Limit Worst General [dB]	INBANDE_GENUL?
Limit Worst IQ Image [dB]	INBANDE_IMGUL?
Limit Worst Carrier Leakage [dBc]	INBANDE_LEAKUL?
In-Band Emissions Margin [dB]	INBANDE_MARG?
In-Band Emissions E-UTRA	
Judgment	INBANDEPASS_EUTRA?
General [dB]	INBANDE_GEN_EUTRA?
IQ Image [dB]	INBANDE_IMG_EUTRA?
Carrier Leakage [dBc]	INBANDE_LEAK_EUTRA?
Limit Worst General [dB]	INBANDE_GENUL_EUTRA?
Limit Worst IQ Image [dB]	INBANDE_IMGUL_EUTRA?
Limit Worst Carrier Leakage [dBc]	INBANDE_LEAKUL_EUTRA?
In-Band Emissions Margin [dB]	INBANDE_MARG_EUTRA?

Figure 3.11.4-25 In-Band Emissions Results

Spectrum Flatness	
Spectrum Flatness	
Judgment	SPECFLATPPPASS?
$\geq 3\text{MHz R1+ [dB]}$	SPECFLAT1_P?
$\geq 3\text{MHz R1- [dB]}$	SPECFLAT1_M?
$< 3\text{MHz R2+ [dB]}$	SPECFLAT2_P?
$< 3\text{MHz R2- [dB]}$	SPECFLAT2_M?
$\geq 3\text{MHz RP1 [dB]}$	SPECFLAT_RP1?
$< 3\text{MHz RP2 [dB]}$	SPECFLAT_RP2?
RP12 [dB]	SPECFLAT_RP12?
RP21 [dB]	SPECFLAT_RP21?

Figure 3.11.4-26 Spectrum Flatness Results

ACLR	
ACLR	
NR LOW [dB]	ACLR?
NR UP [dB]	
UTRA ACLR2 LOW [dB]	
UTRA ACLR1 LOW [dB]	
UTRA ACLR1 UP [dB]	
UTRA ACLR2 UP [dB]	

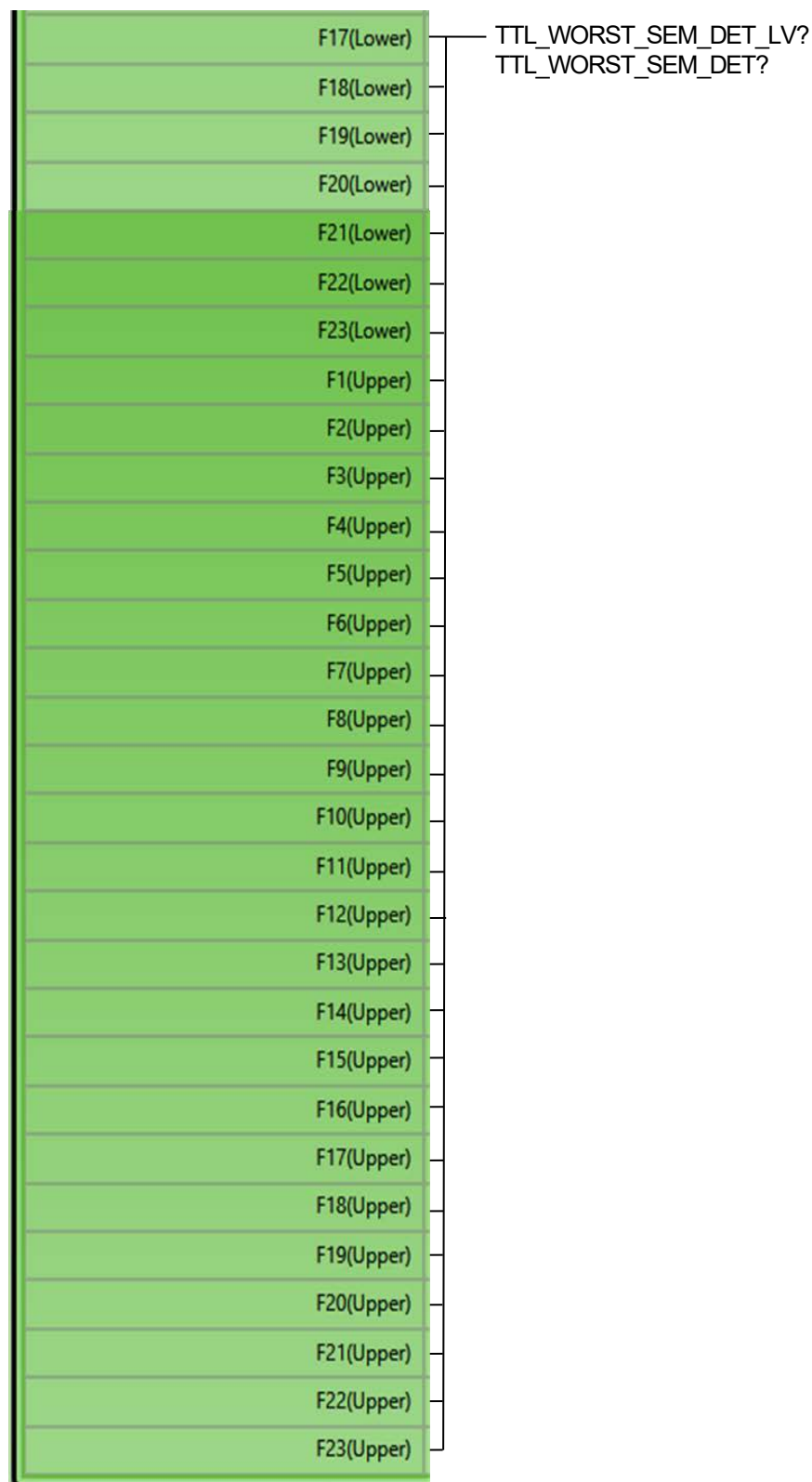
Figure 3.11.4-27 ACLR Results

OBW	
OBW	
Occupied Bandwidth	OBW? OBWFREQ?

Figure 3.11.4-28 OBW Results

Spectrum Emission Mask	
Judgement	
Judgement	SEMPASS?
Spectrum Emission Mask	
F1(Lower)	TTL_WORST_SEM_LV? TTL_WORST_SEM?
F2(Lower)	
F3(Lower)	
F4(Lower)	
F1(Upper)	
F2(Upper)	
F3(Upper)	
F4(Upper)	
Spectrum Emission Mask Detail	
F1(Lower)	TTL_WORST_SEM_DET_LV? TTL_WORST_SEM_DET?
F2(Lower)	
F3(Lower)	
F4(Lower)	
F5(Lower)	
F6(Lower)	
F7(Lower)	
F8(Lower)	
F9(Lower)	
F10(Lower)	
F11(Lower)	
F12(Lower)	
F13(Lower)	
F14(Lower)	
F15(Lower)	
F16(Lower)	

Figure 3.11.4-29 Spectrum Emission Mask Results (1/2)

**Figure 3.11.4-30** Spectrum Emission Mask Results (2/2)

3.12 LTE-V2X

Refer to Chapter 2 “Fundamental Measurement” in the *MX887068A LTE-V2X TX Measurement Operation Manual* for a description of the LTE-V2X TX Measurement items.

This section describes the LTE-V2X settings and displays.

3.12.1 Measurement settings

The LTE-V2X settings pane is shown below. Click the ▲ and ▼ buttons to change parameters.

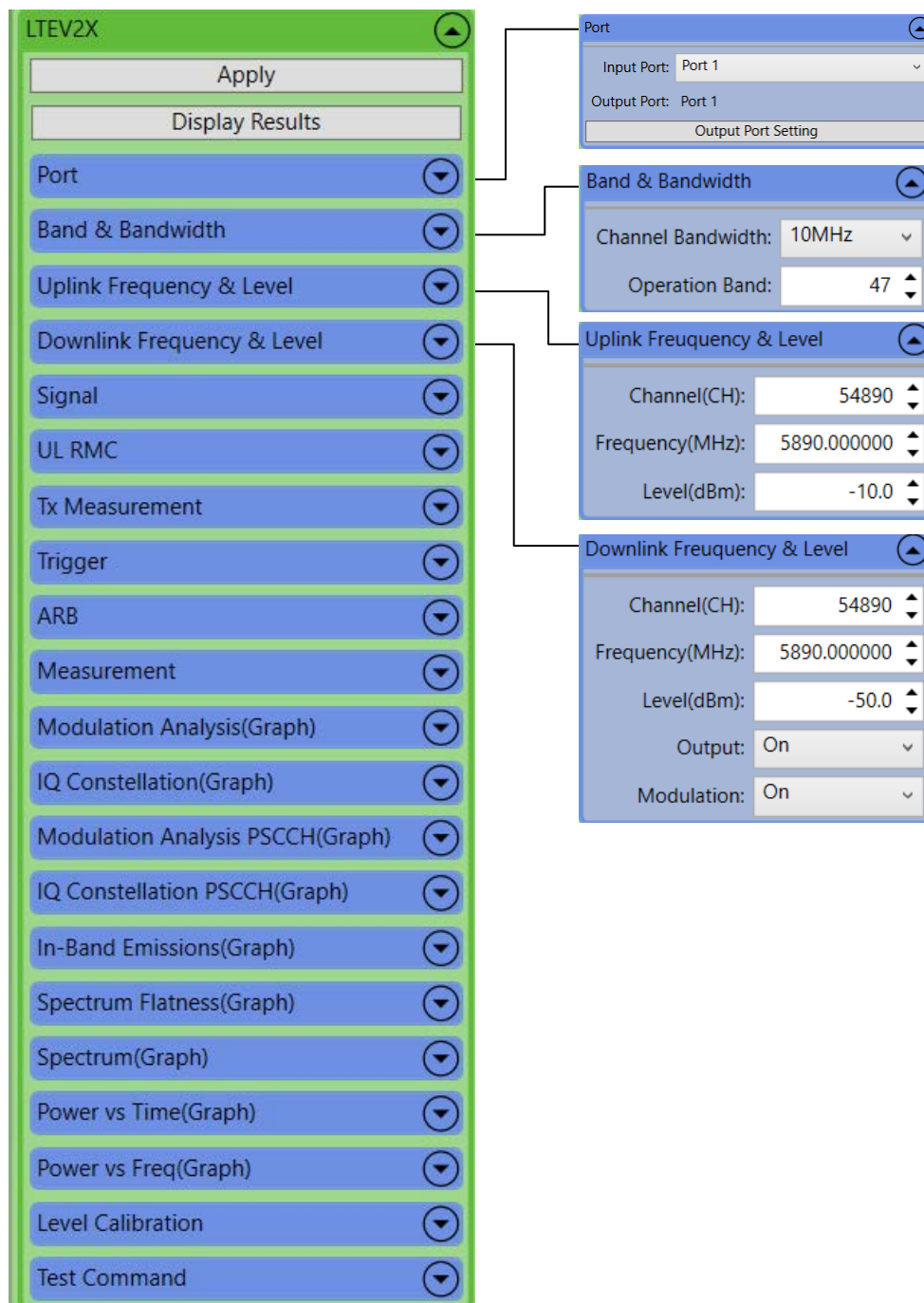


Figure 3.12.1-1 LTE-V2X Measurement Settings Pane (1/5)

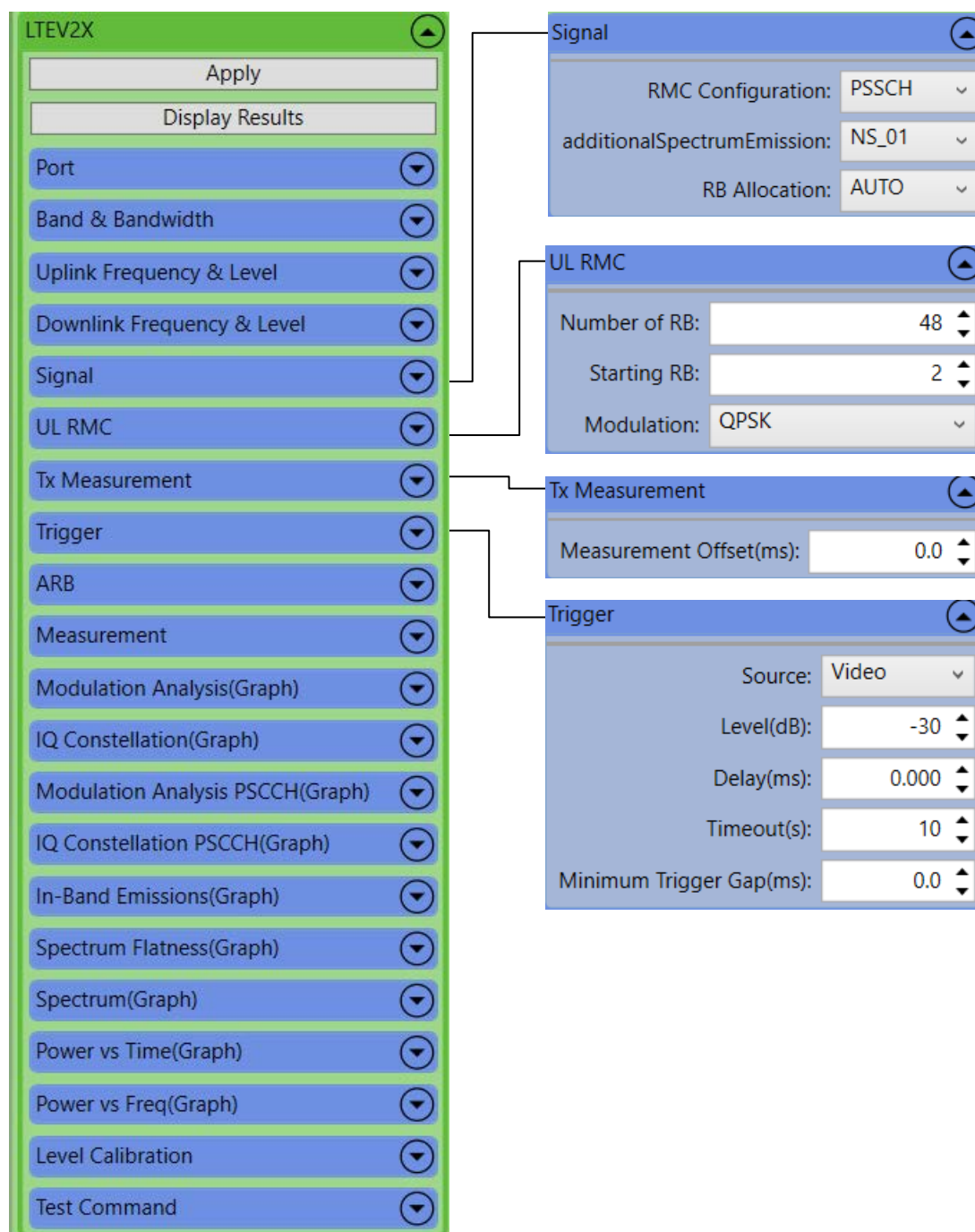


Figure 3.12.1-2 LTE-V2X Measurement Settings Pane (2/5)

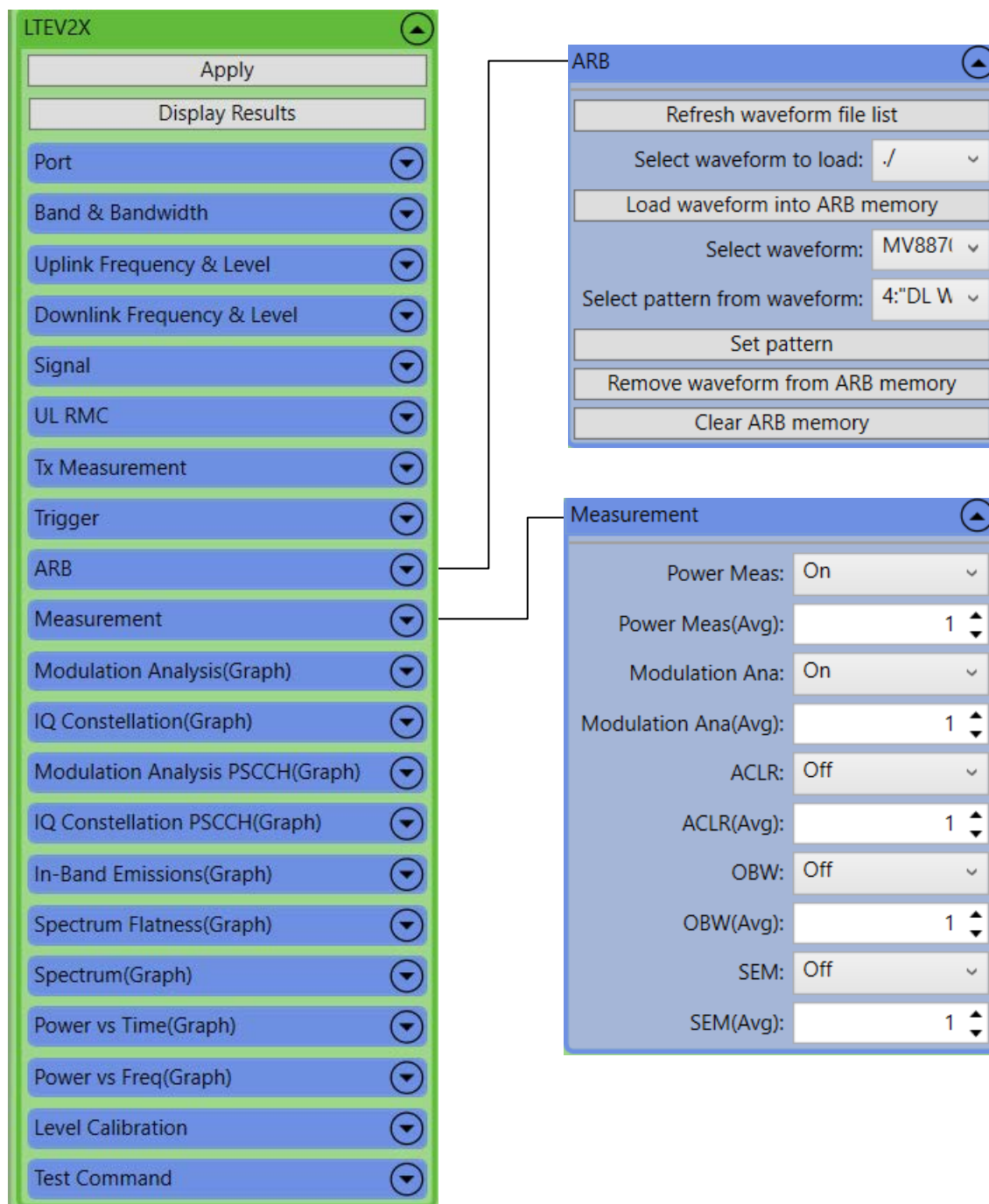


Figure 3.12.1-3 LTE-V2X Measurement Settings Pane (3/5)

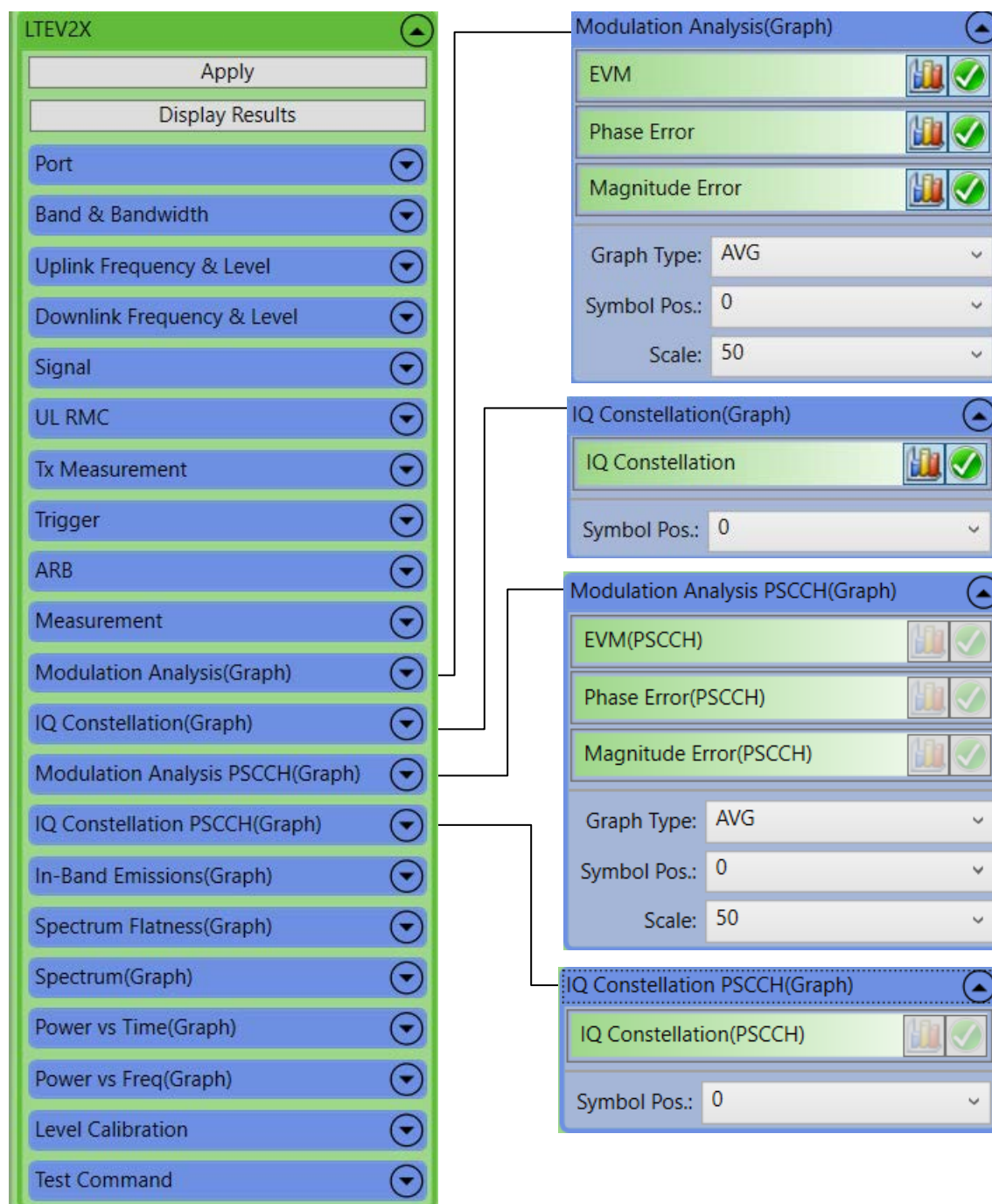


Figure 3.12.1-4 LTE-V2X Measurement Settings Pane (4/5)

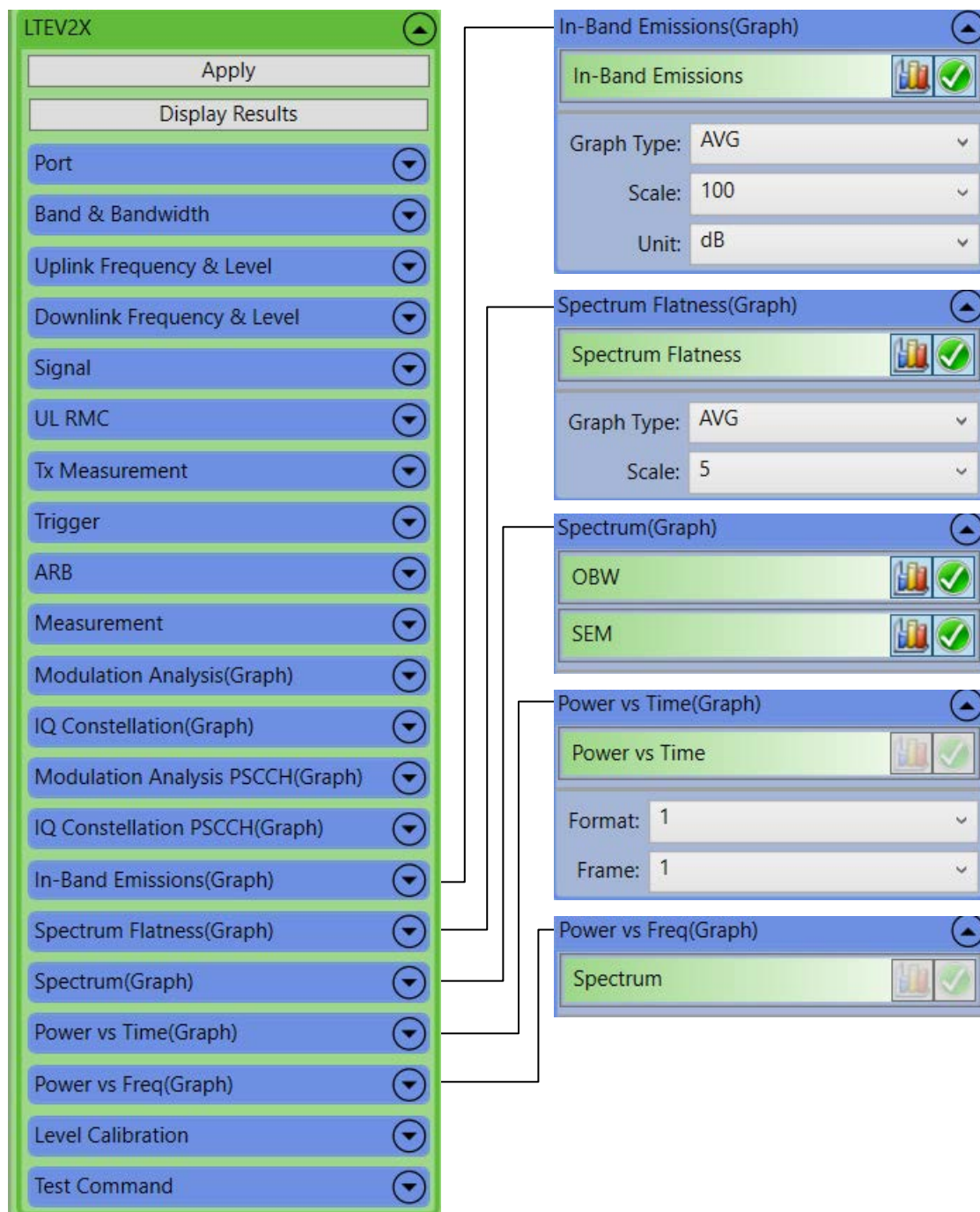


Figure 3.12.1-5 LTE-V2X Measurement Settings Pane (5/5)

For the expandable menus of Level Calibration, and Test Command, refer to Figure 3.2.1-1 “Spectrum Monitor Settings Pane”.

3.12.2 Measurement and results

To perform measurement:

MX887068A-001 is required to measure the PSCCH.

1. Set the parameters for all buttons from **Port** to **Trigger**.
2. Click the **Measurement** button to open the dialog and set the parameters.
3. Click **Modulation Analysis(Graph)** to open the window and set the data storage method (Graph Type), Symbol Pos., and vertical upper limit (Scale).
4. Click **IQ Constellation(Graph)** to open the window and set the Symbol Pos.
5. Click **Modulation Analysis PSCCH(Graph)** to open the window and set the data storage method (Graph Type), Symbol Pos., and vertical upper limit (Scale).
6. Click **IQ Constellation PSCCH(Graph)** to open the window and set the Symbol Pos.
7. Click **In-Band Emissions(Graph)** to open the window and set the data storage method (Graph Type), vertical upper limit (Scale), and scale units (Unit).
8. Click **Spectrum Flatness(Graph)** to open the window and set the data storage method (Graph Type), and vertical upper limit (Scale).
9. Click **Power vs Time(Graph)** to open the window and set the Format, and Frame.
10. Set a checkmark in the  checkboxes on the following dialogs to open the graph displays.
Modulation Analysis(Graph), **IQ Constellation(Graph)**,
Modulation Analysis PSCCH(Graph), **IQ Constellation PSCCH(Graph)**,
In-Band Emission(Graph), **Spectrum Flatness(Graph)**, **Spectrum(Graph)**,
Power vs Time(Graph), **Power vs Freq(Graph)**
11. Click the **Apply** button to send the parameters to the hardware.
12. Click the **Display Results** button to display the **LTEV2X** tab.
13. Click the  **Measurement Start** button
14. The numerical data are displayed in the **LTEV2X** tab after measurement is completed.
15. Click the  button on the following dialogs to open the graph displays.
Modulation Analysis(Graph), **IQ Constellation(Graph)**,
Modulation Analysis PSCCH(Graph), **IQ Constellation PSCCH(Graph)**,
In-Band Emission(Graph), **Spectrum Flatness(Graph)**, **Spectrum(Graph)**,
Power vs Time(Graph), **Power vs Freq(Graph)**

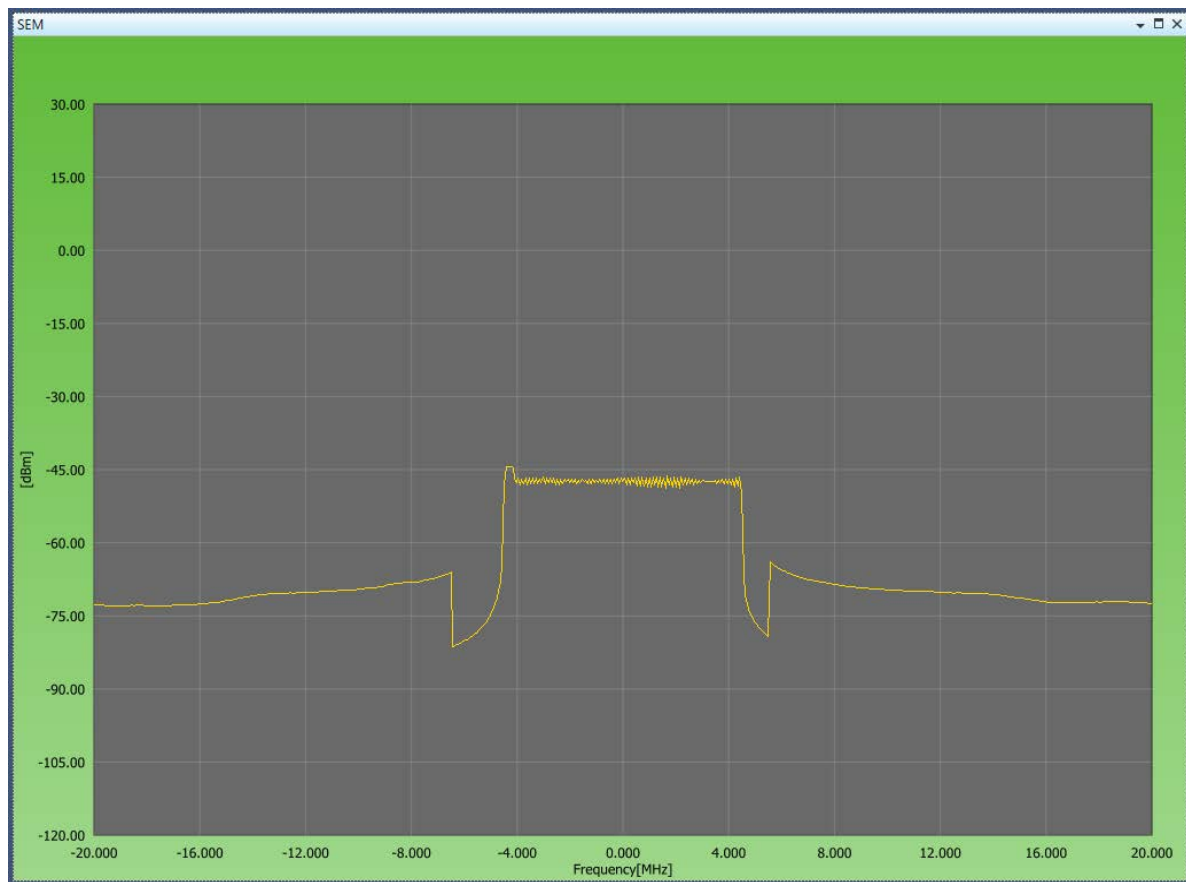


Figure 3.12.2-1 LTE-V2X (Spectrum Emission Mask) Graph

3.12.3 Related SCPI Commands

The SCPI commands for remote control of the MX887068A LTE-V2X TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of the commands, refer to Chapter 4 “SCPI Command Reference” in the *MX887068A LTE-V2X TX Measurement Operation Manual*.

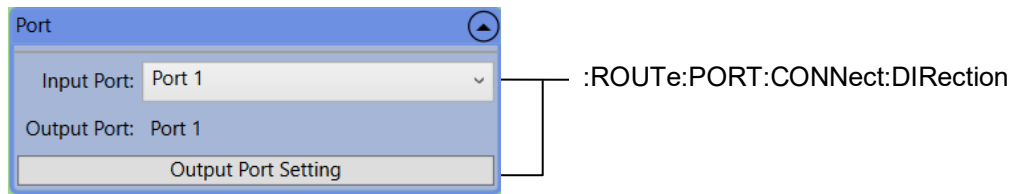


Figure 3.12.3-1 Measurement Settings Pane (Port)

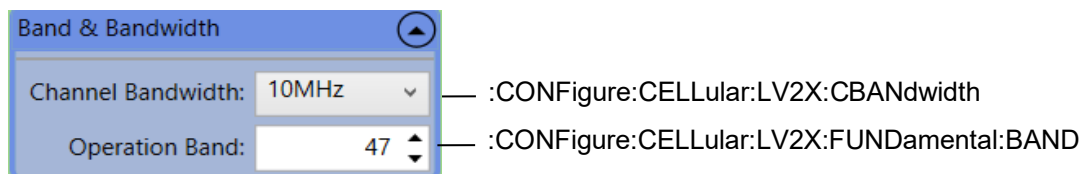


Figure 3.12.3-2 Measurement Settings Pane (Band & Bandwidth)

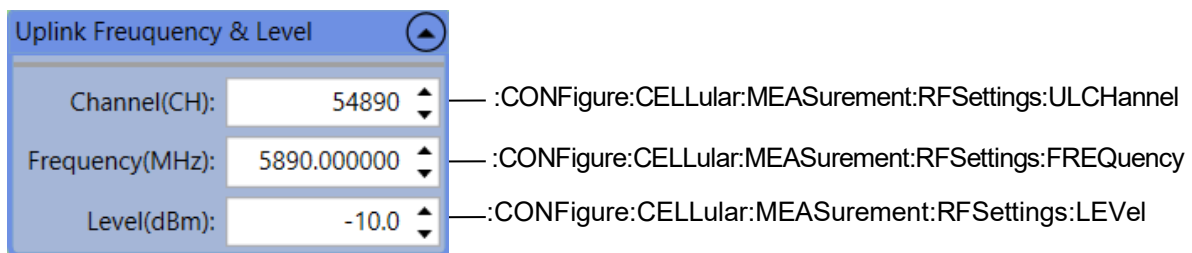


Figure 3.12.3-3 Measurement Settings Pane (Uplink Frequency & Level)

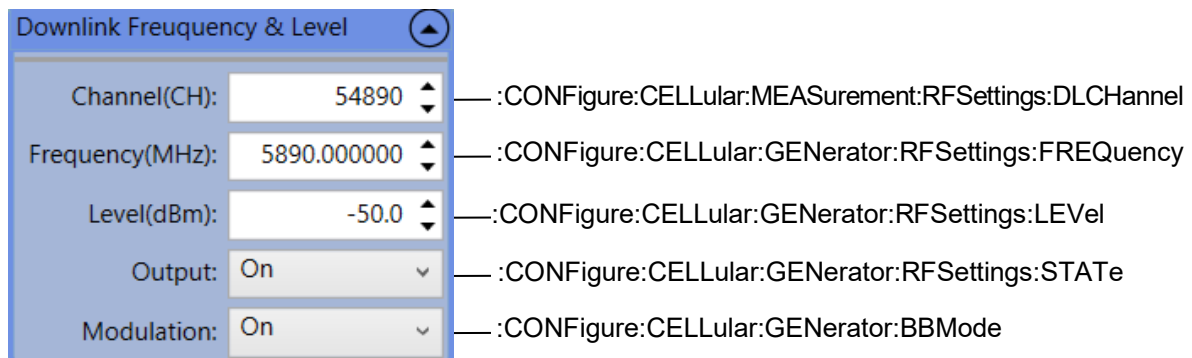


Figure 3.12.3-4 Measurement Settings Pane (Downlink Frequency & Level)

Signal		
RMC Configuration:	PSSCH	:CONFigure:CELLular:LV2X:CTYPE
additionalSpectrumEmission:	NS_01	:CONFigure:CELLular:LV2X:FUNDamental:SEMask:ASEMission
RB Allocation:	AUTO	:CONFigure:CELLular:LV2X:RBAllocation

Figure 3.12.3-5 Measurement Settings Pane (Signal)

UL RMC		
Number of RB:	48	:CONFigure:CELLular:LV2X:RBAllocation:NRB
Starting RB:	2	:CONFigure:CELLular:LV2X:RBAllocation:ORB
Modulation:	QPSK	:CONFigure:CELLular:LV2X:MODulation:MSCHeme

Figure 3.12.3-6 Measurement Settings Pane (UL RMC)

Tx Measurement		
Measurement Offset(ms):	0.0	:CONFigure:CELLular:LV2X:FUNDamental:MOFFset

Figure 3.12.3-7 Measurement Settings Pane (Tx Measurement)

Trigger		
Source:	Video	:TRIGger:CELLular:LV2X:FUNDamental:SOURce
Level(dB):	-30	:TRIGger:CELLular:LV2X:FUNDamental:LEVel
Delay(ms):	0.000	:TRIGger:CELLular:LV2X:FUNDamental:DELay
Timeout(s):	10	:TRIGger:CELLular:LV2X:FUNDamental:TOUT
Minimum Trigger Gap(ms):	0.0	:TRIGger:CELLular:LV2X:FUNDamental:MGAP

Figure 3.12.3-8 Measurement Settings Pane (Trigger)

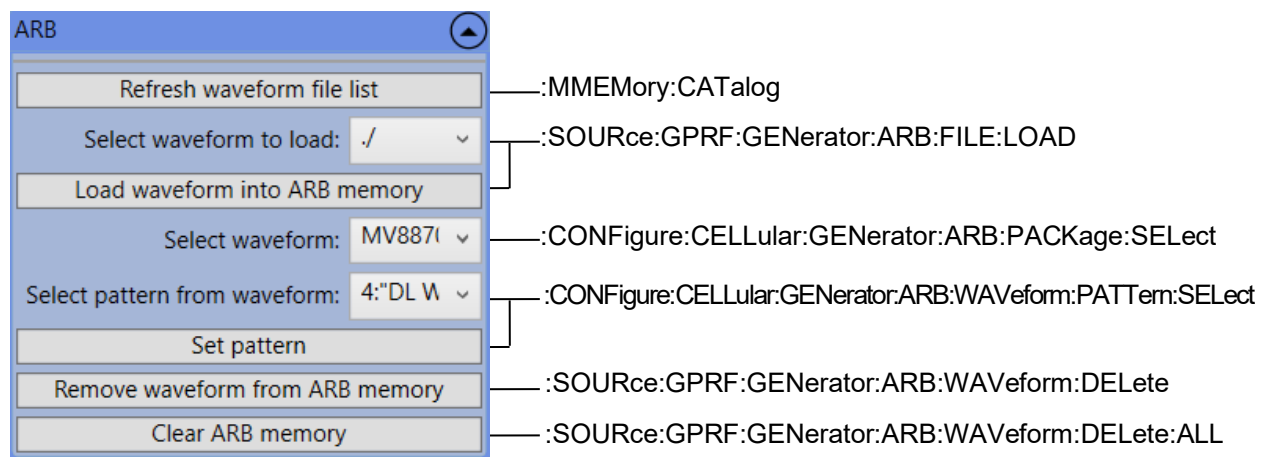


Figure 3.12.3-9 Measurement Settings Pane (ARB)

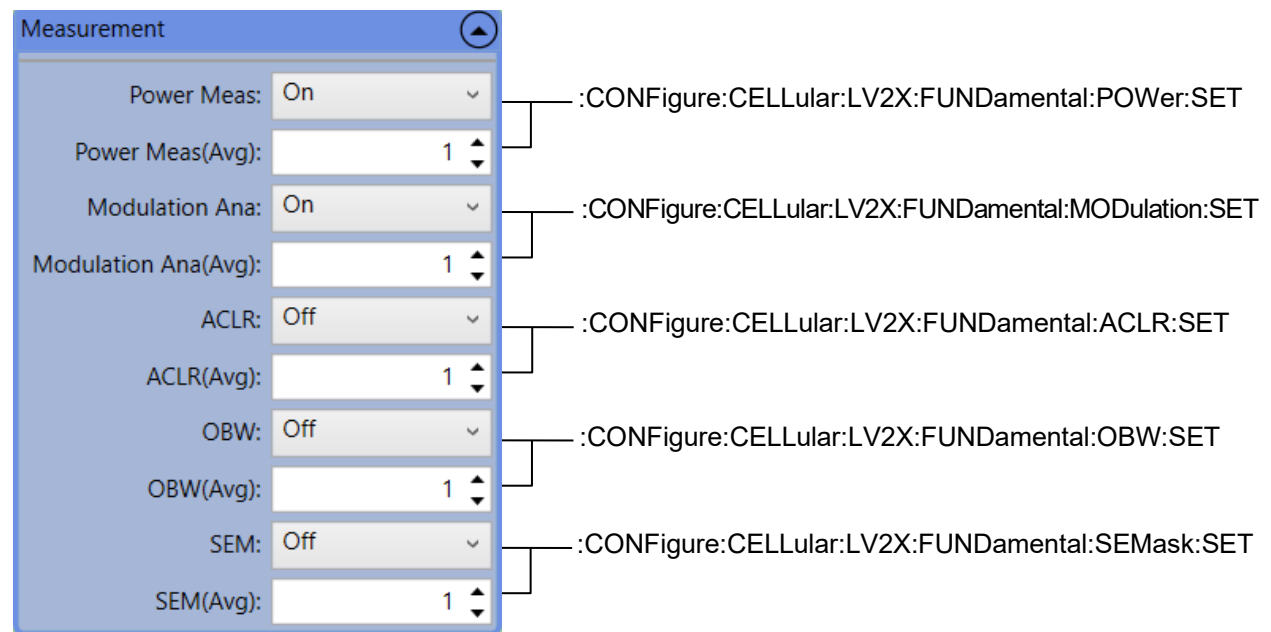


Figure 3.12.3-10 Measurement Settings Pane (Measurement)

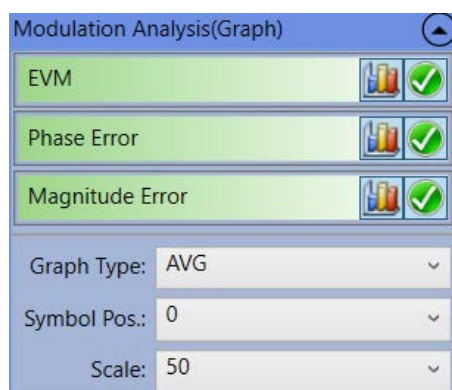


Figure 3.12.3-11 Measurement Settings Pane (Modulation Analysis (Graph))

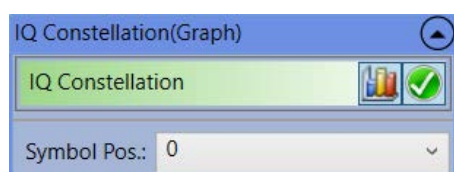


Figure 3.12.3-12 Measurement Settings Pane (IQ Constellation (Graph))

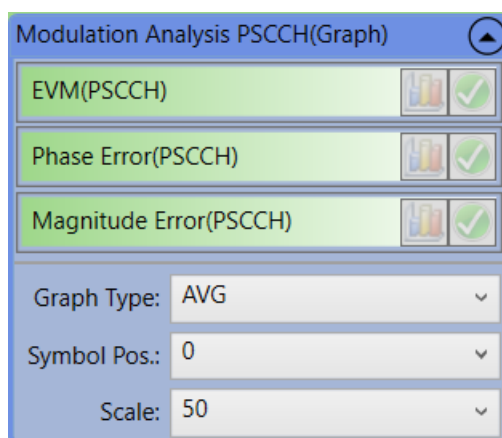


Figure 3.12.3-13 Measurement Settings Pane (Modulation Analysis PSCCH (Graph))

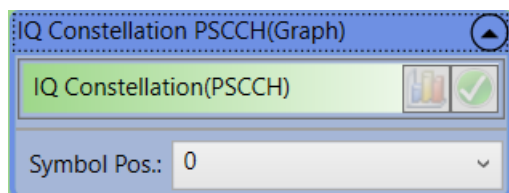


Figure 3.12.3-14 Measurement Settings Pane (IQ Constellation PSCCH (Graph))

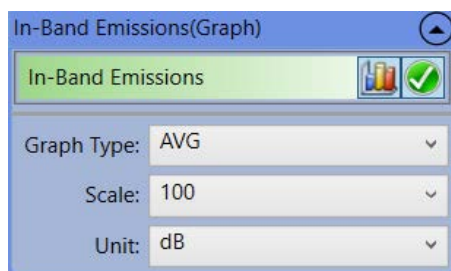


Figure 3.12.3-15 Measurement Settings Pane (In-Band Emission (Graph))

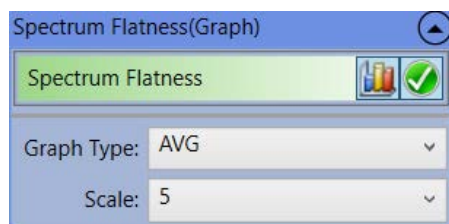


Figure 3.12.3-16 Measurement Settings Pane (Spectrum Flatness (Graph))

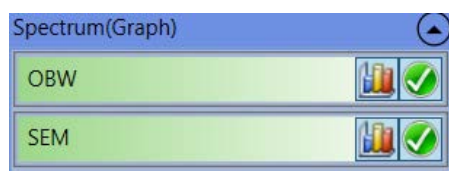


Figure 3.12.3-17 Measurement Settings Pane (Spectrum (Graph))

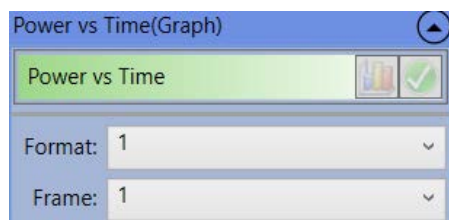


Figure 3.12.3-18 Measurement Settings Pane (Power vs Time (Graph))

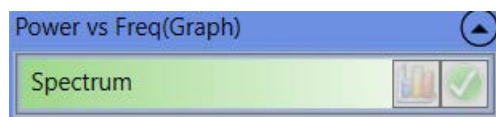


Figure 3.12.3-19 Measurement Settings Pane (Power vs Freq (Graph))

Refer to Figure 3.2.3-3 “Measurement Settings Pane (Level Calibration)” for the SCPI commands for Level Calibration remote control.

Power Measurement	
Power Measurement	
Tx Power [dBm]	:FETCh:CELLular:LV2X:FUNDamental:POWer:TXPower?
Channel Power [dBm]	:FETCh:CELLular:LV2X:FUNDamental:POWer:CHPower?

Figure 3.12.3-20 Power Measurement Results

Modulation Analysis	
Modulation Analysis	
Carrier Frequency [MHz]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:CFRequency?
Carrier Frequency Error [Hz]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:FERRor?
Carrier Frequency Error [ppm]	
EVM [%]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:EVM?
Reference Signal EVM [%]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:RSEVm?
Peak EVM [%]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:PEVM?
Phase Error [deg.]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:PHERror?
Magnitude Error [%]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:MERRor?
Carrier Leakage [dBc]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:CARLeakage?
Detected Number of RB	:FETCh:CELLular:LV2X:FUNDamental:RBAllocation:NRB?
Detected Starting RB	:FETCh:CELLular:LV2X:FUNDamental:RBAllocation:ORB?

Figure 3.12.3-21 Modulation Analysis Results

Modulation Analysis PSCCH	
Modulation Analysis PSCCH	
Carrier Frequency(PSCCH) [MHz]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:PSCCh:CFRequency?
Carrier Frequency Error(PSCCH) [Hz]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:PSCCh:FERRor?
Carrier Frequency Error(PSCCH) [ppm]	
EVM(PSCCH) [%]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:PSCCh:EVM?
Reference Signal EVM(PSCCH) [%]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:PSCCh:RSEVm?
Peak EVM(PSCCH) [%]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:PSCCh:PEVM?
Phase Error(PSCCH) [deg.]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:PSCCh:PHERror?
Magnitude Error(PSCCH) [%]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:PSCCh:MERRor?

Figure 3.12.3-22 Modulation Analysis PSCCH Results

In-Band Emissions	
In-Band Emissions	
Judgment	:FETCh:CELLular:LV2X:FUNDamental:MODulation:IEmissions:JUDGement?
General [dB]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:IEmissions:GENeral?
IQ Image [dB]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:IEmissions:IQIMage?
Carrier Leakage [dBc]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:IEmissions:CARLeakage?
Limit Worst General [dB]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:IEmissions:LIMit:GENeral?
Limit Worst IQ Image [dB]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:IEmissions:LIMit:IQIMage?
Limit Worst Carrier Leakage [dBc]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:IEmissions:LIMit:CARLeakage?
In-Band Emissions Margin [dB]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:IEmissions:LIMit:MARGIN?

Figure 3.12.3-23 In-Band Emissions Results

Spectrum Flatness	
Spectrum Flatness	
Judgment	:FETCh:CELLular:LV2X:FUNDamental:MODulation:ESFlatness:JUDGement?
>= 3MHz R1+ [dB]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:ESFlatness:R1P?
>= 3MHz R1- [dB]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:ESFlatness:R1M?
< 3MHz R2+ [dB]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:ESFlatness:R2P?
< 3MHz R2- [dB]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:ESFlatness:R2M?
>= 3MHz RP1 [dB]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:ESFlatness:RP1?
< 3MHz RP2 [dB]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:ESFlatness:RP2?
RP12 [dB]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:ESFlatness:RP12?
RP21 [dB]	:FETCh:CELLular:LV2X:FUNDamental:MODulation:ESFlatness:RP21?

Figure 3.12.3-24 Spectrum Flatness Results

ACLR	
ACLR	
E-UTRA ACLR LOW [dB]	:FETCh:CELLular:LV2X:FUNDamental:ACLR?
E-UTRA ACLR UP [dB]	

Figure 3.12.3-25 ACLR Results

OBW	
OBW	
Occupied Bandwidth	:FETCh:CELLular:LV2X:FUNDamental:OBW? :FETCh:CELLular:LV2X:FUNDamental:OBW:FREQuency?

Figure 3.12.3-26 OBW Results

Spectrum Emission Mask	
Judgement	
Judgement	:FETCh:CELLular:LV2X:FUNDamental:SEMask:JUDGement?
Spectrum Emission Mask	
F1(Lower)	:FETCh:CELLular:LV2X:FUNDamental:SEMask:LEVel:LOWer?
F2(Lower)	:FETCh:CELLular:LV2X:FUNDamental:SEMask:MARGin:LOWer?
F3(Lower)	
F4(Lower)	
F1(Upper)	:FETCh:CELLular:LV2X:FUNDamental:SEMask:LEVel:UPPer?
F2(Upper)	:FETCh:CELLular:LV2X:FUNDamental:SEMask:MARGin:UPPer?
F3(Upper)	
F4(Upper)	
Spectrum Emission Mask Detail	
F1(Lower)	:FETCh:CELLular:LV2X:FUNDamental:SEMask:LEVel:LOWer:DETail?
F2(Lower)	:FETCh:CELLular:LV2X:FUNDamental:SEMask:MARGin:LOWer:DETail?
F3(Lower)	
F4(Lower)	
F5(Lower)	
F6(Lower)	
F7(Lower)	
F8(Lower)	
F9(Lower)	
F1(Upper)	:FETCh:CELLular:LV2X:FUNDamental:SEMask:LEVel:UPPer:DETail?
F2(Upper)	:FETCh:CELLular:LV2X:FUNDamental:SEMask:MARGin:UPPer:DETail?
F3(Upper)	
F4(Upper)	
F5(Upper)	
F6(Upper)	
F7(Upper)	
F8(Upper)	
F9(Upper)	

Figure 3.12.3-27 Spectrum Emission Mask Results

3.12.4 Related Native Commands

The Native commands for remote control of the MX887068A LTE-V2X TX Measurement that are related to the settings pane parameters are described below. For detailed descriptions of the commands, refer to Chapter 5 “Native Command Reference” in the *MX887068A LTE-V2X TX Measurement Operation Manual*.

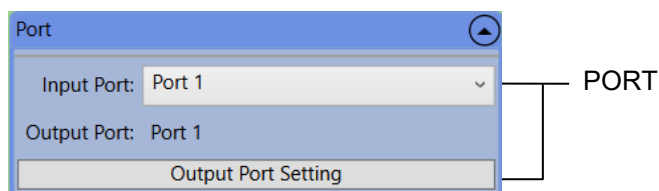


Figure 3.12.4-1 Measurement Settings Pane (Port)

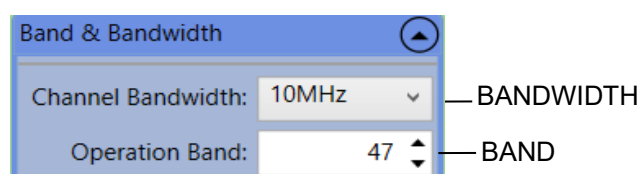


Figure 3.12.4-2 Measurement Settings Pane (Band & Bandwidth)

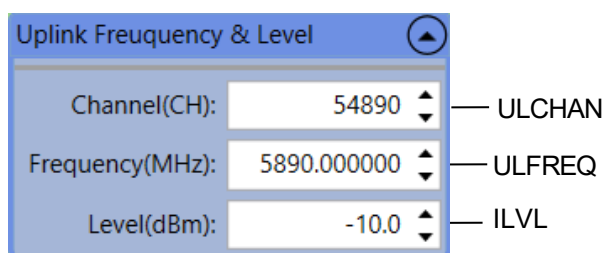


Figure 3.12.4-3 Measurement Settings Pane (Uplink Frequency & Level)

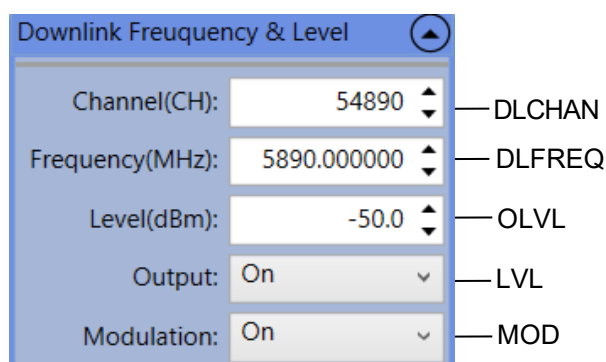


Figure 3.12.4-4 Measurement Settings Pane (Downlink Frequency & Level)

Signal

RMC Configuration: PSSCH — CHCONFIG

additionalSpectrumEmission: NS_01 — SIB2_NS

RB Allocation: AUTO — RB_ALLOC

Figure 3.12.4-5 Measurement Settings Pane (Signal)

UL RMC

Number of RB: 48 — ULRMC_RB

Starting RB: 2 — ULRB_START

Modulation: QPSK — ULRMC_MOD

Figure 3.12.4-6 Measurement Settings Pane (UL RMC)

Tx Measurement

Measurement Offset(ms): 0.0 — MEASOFFSET

Figure 3.12.4-7 Measurement Settings Pane (Tx Measurement)

Trigger

Source: Video — TRGSRC

Level(dB): -30 — TRGLVL

Delay(ms): 0.000 — TRGDLY

Timeout(s): 10 — TRGTOUT

Minimum Trigger Gap(ms): 0.0 — TRGMGAP

Figure 3.12.4-8 Measurement Settings Pane (Trigger)

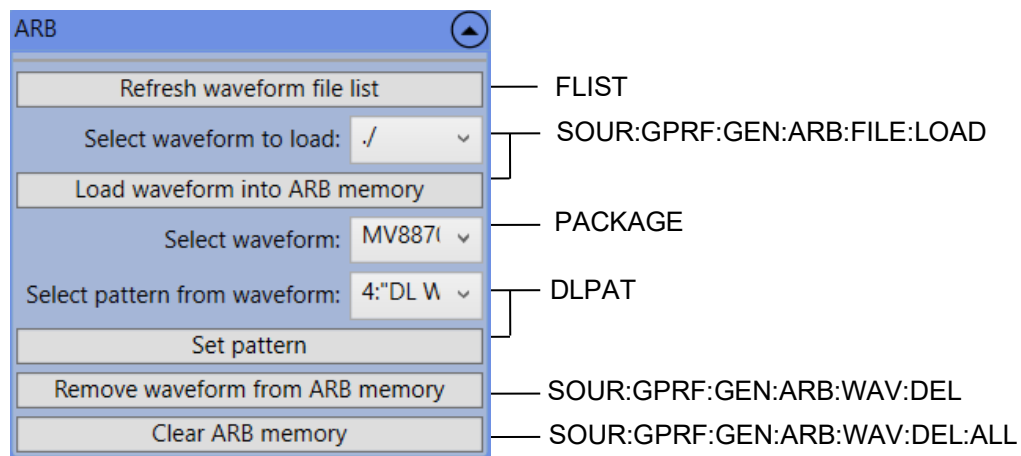


Figure 3.12.4-9 Measurement Settings Pane (ARB)

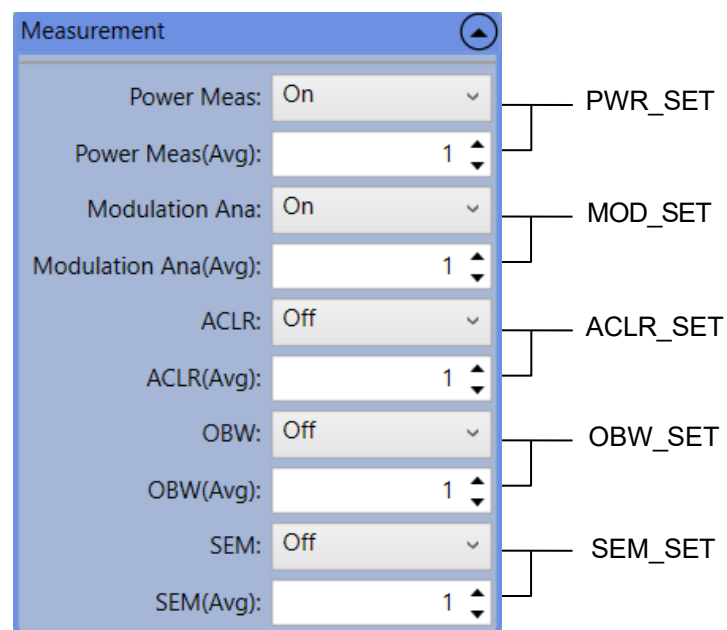


Figure 3.12.4-10 Measurement Settings Pane (Measurement)

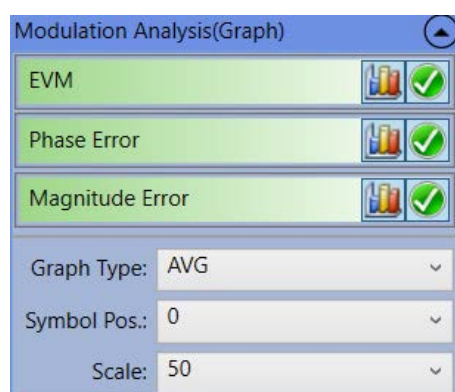


Figure 3.12.4-11 Measurement Settings Pane (Modulation Analysis (Graph))

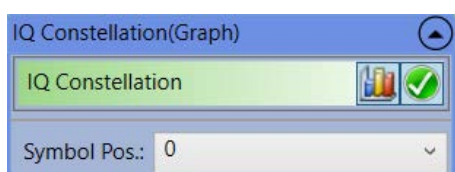


Figure 3.12.4-12 Measurement Settings Pane (IQ Constellation (Graph))

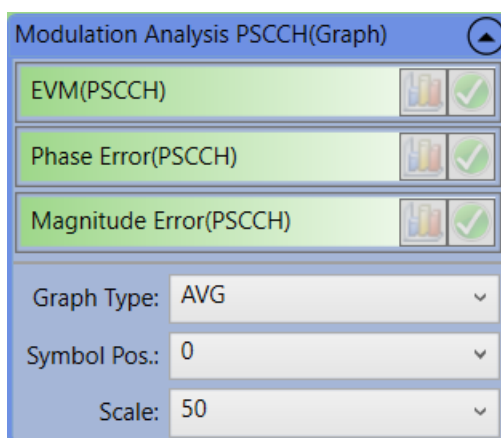


Figure 3.12.4-13 Measurement Settings Pane (Modulation Analysis PSCCH (Graph))

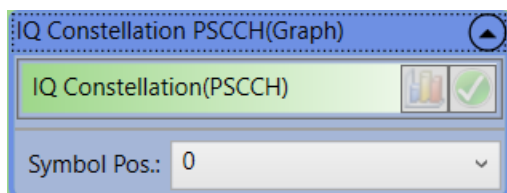


Figure 3.12.4-14 Measurement Settings Pane (IQ Constellation PSCCH (Graph))

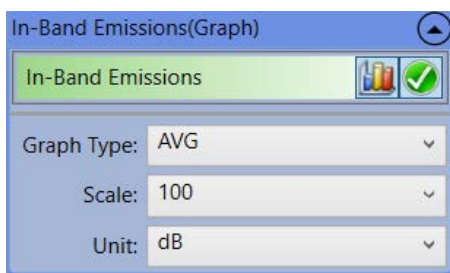


Figure 3.12.4-15 Measurement Settings Pane (In-Band Emission (Graph))

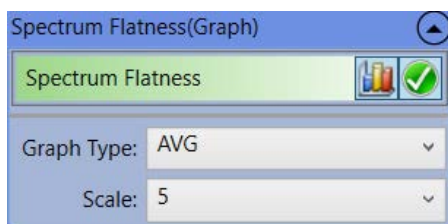


Figure 3.12.4-16 Measurement Settings Pane (Spectrum Flatness (Graph))

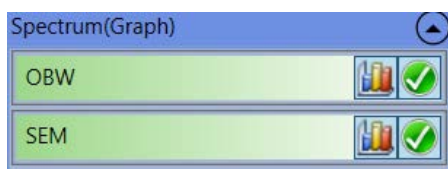


Figure 3.12.4-17 Measurement Settings Pane (Spectrum (Graph))

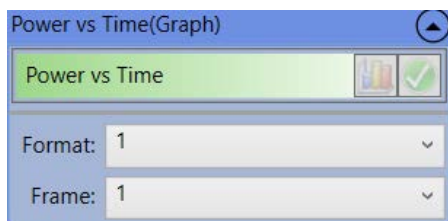


Figure 3.12.4-18 Measurement Settings Pane (Power vs Time (Graph))

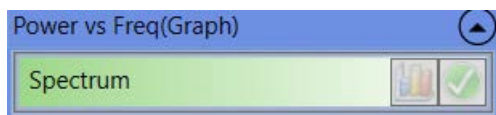


Figure 3.12.4-19 Measurement Settings Pane (Power vs Freq (Graph))

Refer to Figure 3.2.4-3 “Measurement Settings Pane (Level Calibration)” for the Native commands for Level Calibration remote control.

Power Measurement	
Power Measurement	
Tx Power [dBm]	POWER?
Channel Power [dBm]	CHPWR?

Figure 3.12.4-20 Power Measurement Results

Modulation Analysis	
Modulation Analysis	
Carrier Frequency [MHz]	CARRF?
Carrier Frequency Error [Hz]	CFERR?
Carrier Frequency Error [ppm]	
EVM [%]	EVM?
Reference Signal EVM [%]	RSEVM?
Peak EVM [%]	PEVM?
Phase Error [deg.]	PHASEERR?
Magnitude Error [%]	MAGERR?
Carrier Leakage [dBc]	CARRLEAK?
Detected Number of RB	DETECT_ULRMC_RB?
Detected Starting RB	DETECT_ULRB_START?

Figure 3.12.4-21 Modulation Analysis Results

Modulation Analysis PSCCH	
Modulation Analysis PSCCH	
Carrier Frequency(PSCCH) [MHz]	PSCCH_CARRF?
Carrier Frequency Error(PSCCH) [Hz]	PSCCH_CFERR?
Carrier Frequency Error(PSCCH) [ppm]	
EVM(PSCCH) [%]	PSCCH_EVM?
Reference Signal EVM(PSCCH) [%]	PSCCH_RSEVM?
Peak EVM(PSCCH) [%]	PSCCH_PEVM?
Phase Error(PSCCH) [deg.]	PSCCH_PHASEERR?
Magnitude Error(PSCCH) [%]	PSCCH_MAGERR?

Figure 3.12.4-22 Modulation Analysis PSCCH Results

In-Band Emissions	
In-Band Emissions	
Judgment	INBANDEPASS?
General [dB]	INBANDE_GEN?
IQ Image [dB]	INBANDE_IMG?
Carrier Leakage [dBc]	INBANDE_LEAK?
Limit Worst General [dB]	INBANDE_GENUL?
Limit Worst IQ Image [dB]	INBANDE_IMGUL?
Limit Worst Carrier Leakage [dBc]	INBANDE_LEAKUL?
In-Band Emissions Margin [dB]	INBANDE_MARG?

Figure 3.12.4-23 In-Band Emissions Results

Spectrum Flatness	
Spectrum Flatness	
Judgment	SPECFLATPPPASS?
$\geq 3\text{MHz R1+ [dB]}$	SPECFLAT1_P?
$\geq 3\text{MHz R1- [dB]}$	SPECFLAT1_M?
$< 3\text{MHz R2+ [dB]}$	SPECFLAT2_P?
$< 3\text{MHz R2- [dB]}$	SPECFLAT2_M?
$\geq 3\text{MHz RP1 [dB]}$	SPECFLAT_RP1?
$< 3\text{MHz RP2 [dB]}$	SPECFLAT_RP2?
RP12 [dB]	SPECFLAT_RP12?
RP21 [dB]	SPECFLAT_RP21?

Figure 3.12.4-24 Spectrum Flatness Results

ACLR	
ACLR	
E-UTRA ACLR LOW [dB]	ACLR?
E-UTRA ACLR UP [dB]	

Figure 3.12.4-25 ACLR Results

OBW	
OBW	
Occupied Bandwidth	OBW? OBWFREQ?

Figure 3.12.4-26 OBW Results

Spectrum Emission Mask	
Judgement	
Judgement	SEM?
Spectrum Emission Mask	
F1(Lower)	SEMLVL_LOWER? SEMMARGIN_LOWER?
F2(Lower)	
F3(Lower)	
F4(Lower)	
F1(Upper)	SEMLVL_UPPER? SEMMARGIN_UPPER?
F2(Upper)	
F3(Upper)	
F4(Upper)	
Spectrum Emission Mask Detail	
F1(Lower)	SEMLVL_DET_LOWER? SEMMARGIN_DET_LOWER?
F2(Lower)	
F3(Lower)	
F4(Lower)	
F5(Lower)	
F6(Lower)	
F7(Lower)	
F8(Lower)	
F9(Lower)	
F1(Upper)	SEMLVL_DET_UPPER? SEMMARGIN_DET_UPPER?
F2(Upper)	
F3(Upper)	
F4(Upper)	
F5(Upper)	
F6(Upper)	
F7(Upper)	
F8(Upper)	
F9(Upper)	

Figure 3.12.4-27 Spectrum Emission Mask Results