CombiView

MX880051A
Cellular Application Applet
Operation Manual

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MX880051A
Cellular Application Applet
Operation Manual

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22 December 2017 (Ninth Edition)

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Prior to the software installation

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

When using this software and connecting with the measuring instrument

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

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For how to turn off the functions, refer to the operation manual that came with your computer.

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CE marking



1. Product Model

Software: MX880051A Cellular Application Applet

2. Applied Directive and Standards

When the MX880051A Cellular Application Applet is installed in the MT8870A, the applied directive and standards of this software conform to that of the MT8870A main frame.

PS: About main frame
Contact Anritsu for the latest information about main frame types supporting the MX880051A Cellular Application Applet.

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

RCM marking



1. Product Model

Software: MX880051A Cellular Application Applet

2. Applied Directive and Standards

When the MX880051A Cellular Application Applet is installed in the MT8870A, the applied directive and standards of this software conform to that of the MT8870A main frame.

PS: About main frame
Contact Anritsu for the latest information about main frame types supporting the MX880051A Cellular Application Applet.

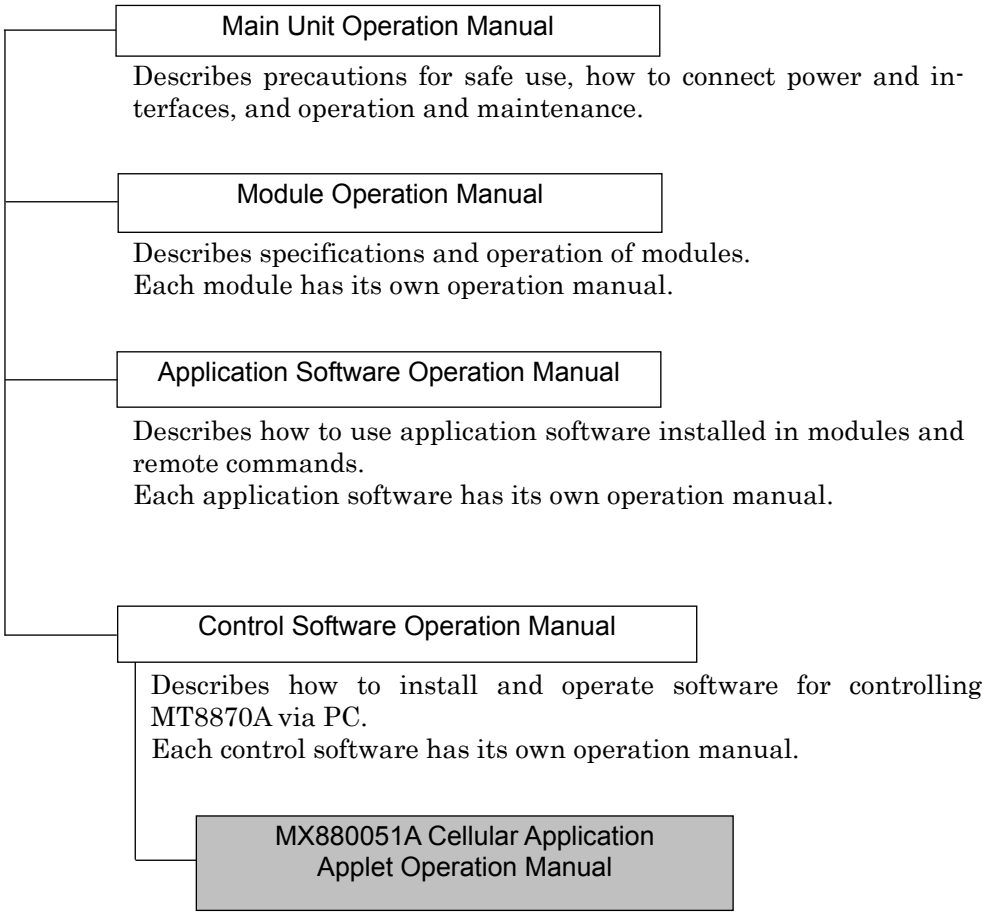
About This Manual

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 modules
- Control software installed in external PC controller

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



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Chapter 1 — Overview

1.1 CombiView Introduction

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

CombiView allows the user to configure measurements and display results.

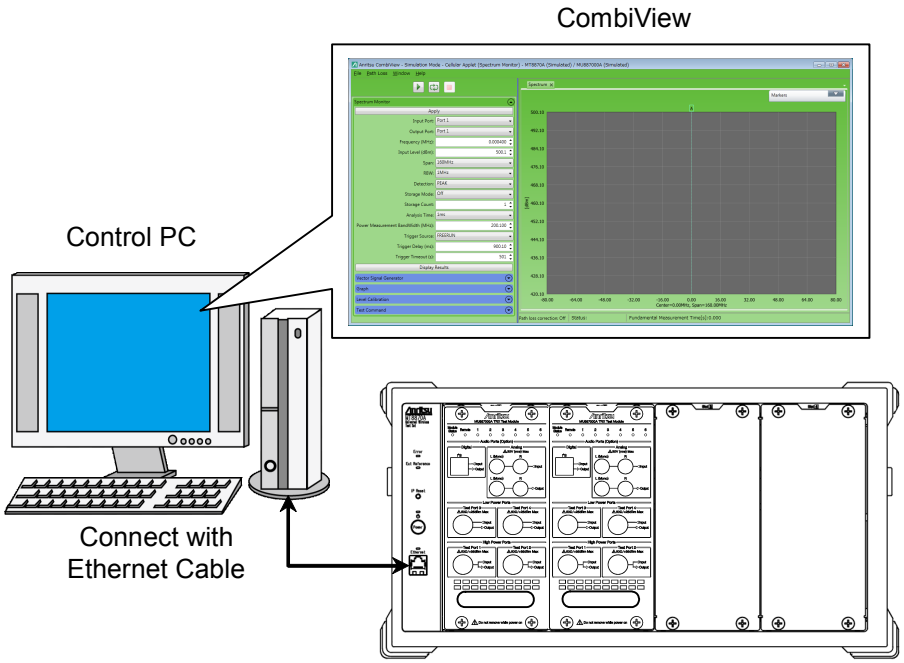


Figure 1.1-1 Ethernet Connection between Control PC and MT8870A

The CombiView application:

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

CombiView supports the following Applets.

Table 1.1-1 CombiView Applets

Model/Code	Product Name
MX880051A	Cellular Application Applet
MX880052A	SRW Application Applet
MX880053A	FM/Audio SRW Application Applet
MX880054A	Signal Generator Application Applet
MX880055A	Small Cell Application Applet
MX880056A	IEEE802.15.4 Application Applet
MX880057A	Z-Wave Application Applet

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

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

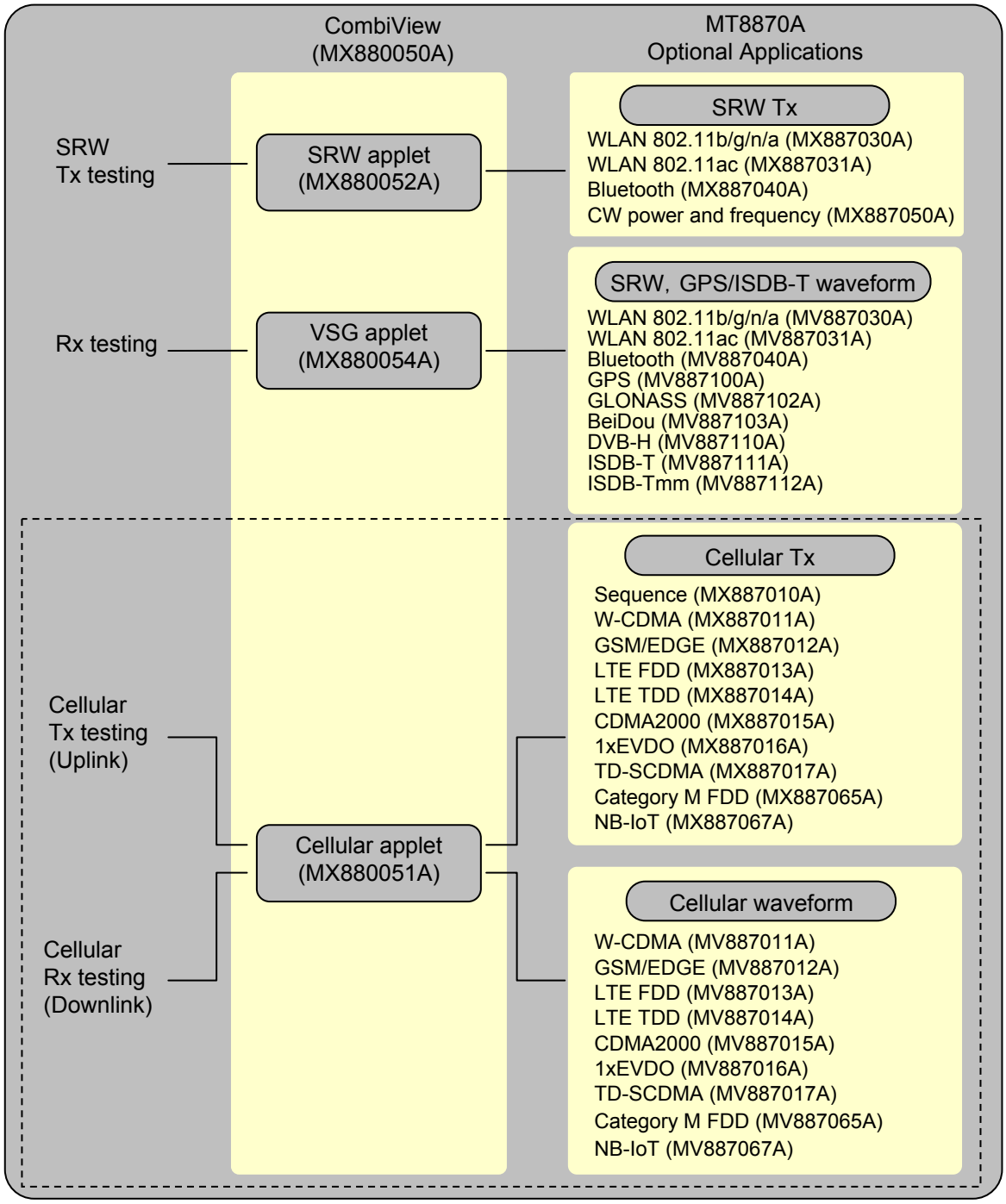


Figure 1.1-2 CombiView Applets and Associated MT8870A Applications Options (1/2)

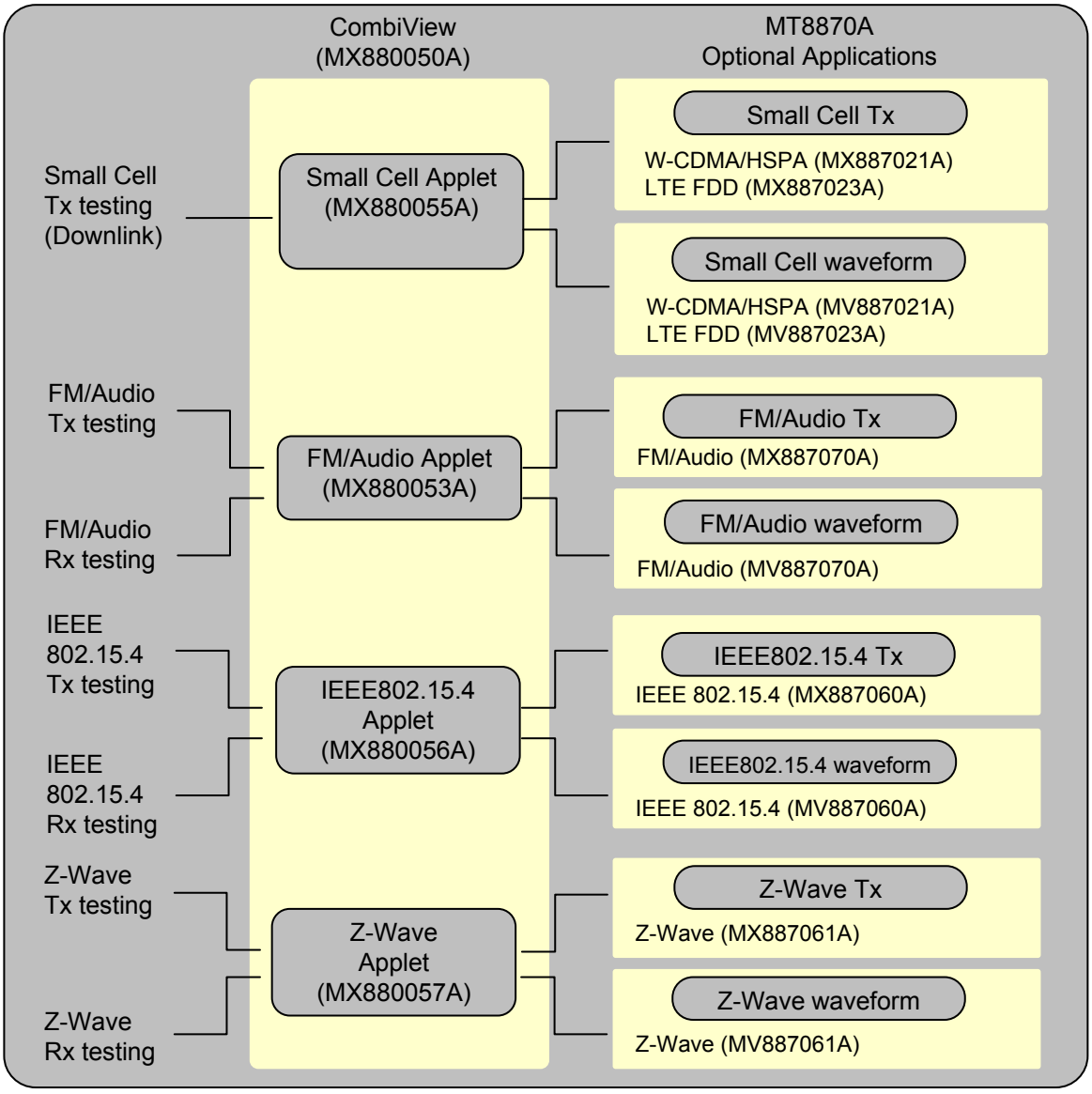


Figure 1.1-3 CombiView Applets and Associated MT8870A Applications Options (2/2)

At least one of following application software licenses must be registered in the MT8870A to control it using the MX880051A. Additionally, the MX887013A-001 LTE-Advanced FDD Uplink CA TX Measurement software is required to measure the LTE FDD Uplink Carrier Aggregation, and MX887014A-001 LTE-Advanced TDD Uplink CA TX Measurement software is required to measure the LTE TDD Uplink Carrier Aggregation.

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
MX887065A	Category M FDD Uplink TX Measurement
MX887067A	NB-IoT Uplink 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.

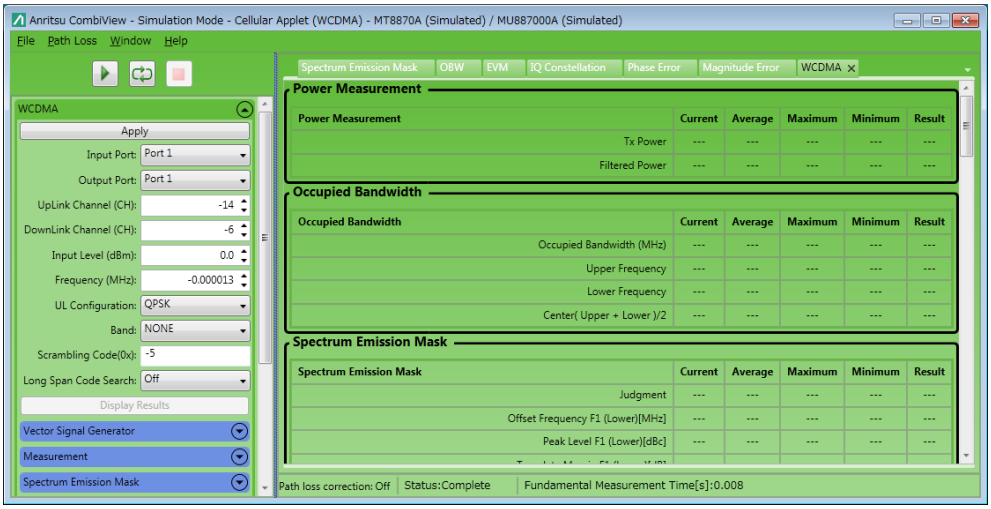


Figure 1.1-4 MX880051A Screen

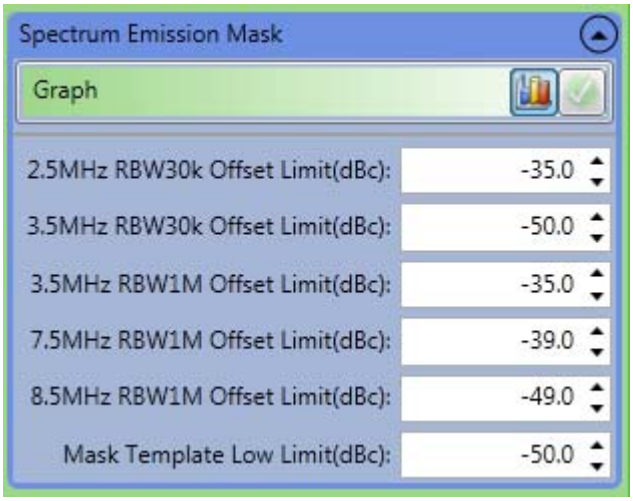


Figure 1.1-5 Parameter Setting Screen

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

*1: If Windows XP Professional Service Pack 3 is applied, be sure to update it using Windows Update.
*2: This is the free space required by the CombiView software. More free space is required to install VISA and .NET Framework.
*3: For version compatibility among OS, .NET Framework, and NI-VISA, refer to Table 2.1-2 and Table 2.1-3.

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

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

✓: Compatible –: Incompatible

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

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

✓: Compatible –: Incompatible

Table 2.1-4 NI-VISA Version

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

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

Table 2.1-5 Package Version Compatibility 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

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

To use the package of Ver 01.06.01 or earlier, select [.NET Framework4.0 Languages Support] at NI-VISA installation.

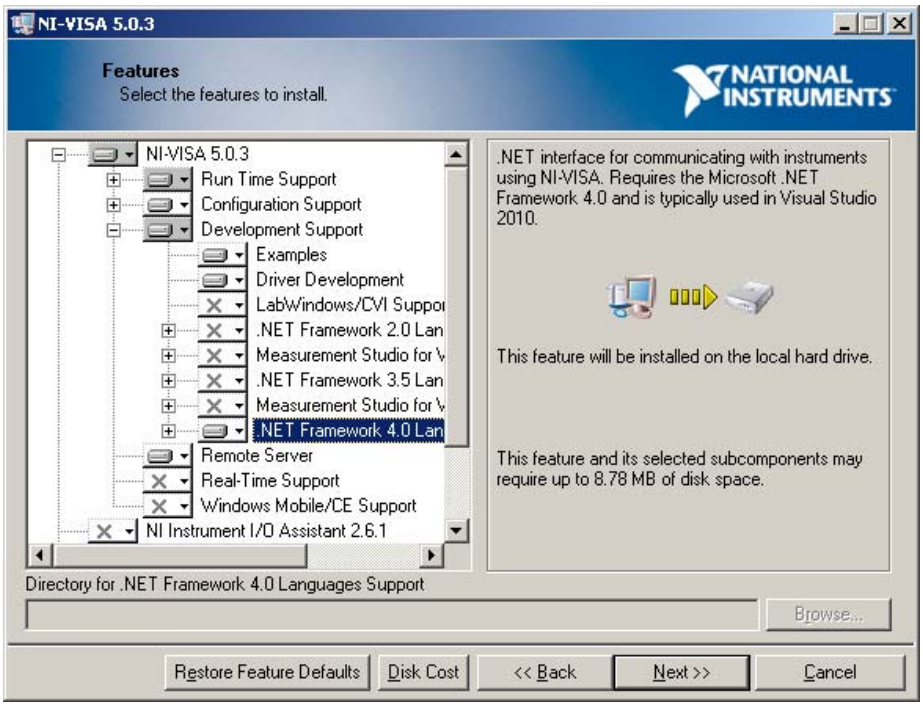


Figure 2.1-1 Selecting .NET Framework4.0 Languages Support

2.2 Connecting to MT8870A

Connect the Control PC having CombiView installed on it to the MT8870A. Refer to section 2.5 "Connecting Cables" in *the MT8870A Universal Wireless Test Set Operation Manual*.

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

2.2.1 Connecting Ethernet cable

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

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

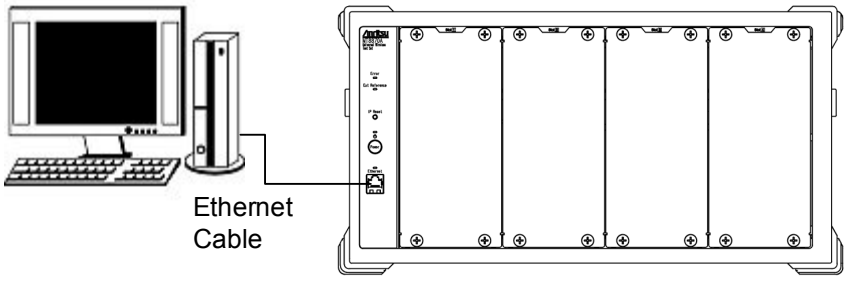


Figure 2.2.1-1 Connecting to Front Ethernet Connector

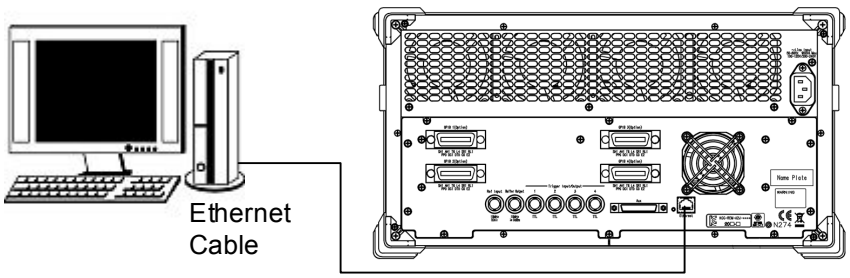


Figure 2.2.1-2 Connecting to Rear Ethernet Connector

2.2.2 Connecting GPIB cables

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

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

2.3 Installing and Uninstalling 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. When using Windows XP:

   At the Windows Control Panel, click **Add or Remove Programs**, and then double-click **MX880051A CombiView Cellular Applet** in the list of **Remove or Change Programs**.

   When using Windows 7:

   At the Windows Control Panel, click **Programs and Features**, and then double-click **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 XP, start CombiView at the Control PC by clicking **Start** > **Programs**> **Anritsu** > **CombiView** > **CombiView**.

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

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

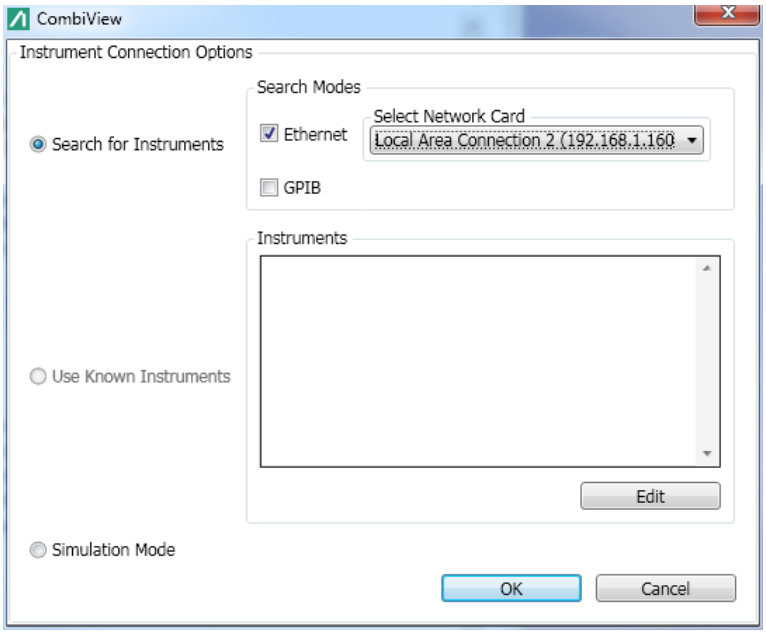


Figure 2.4-1 Instrument Connection Options Dialog Box

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

Table 2.4-1 Search Mode for MT8870As

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

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

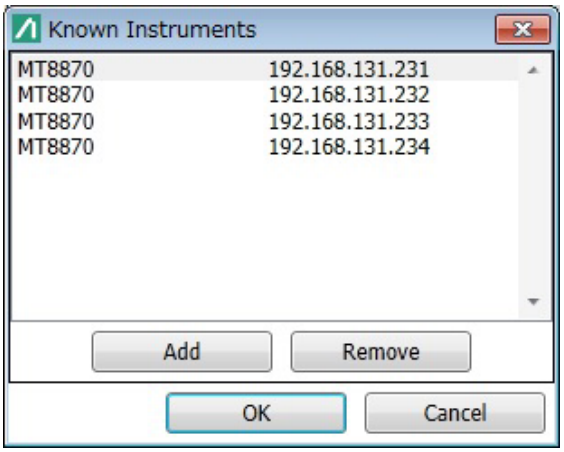


Figure 2.4-2 Known Instruments Dialog Box

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

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

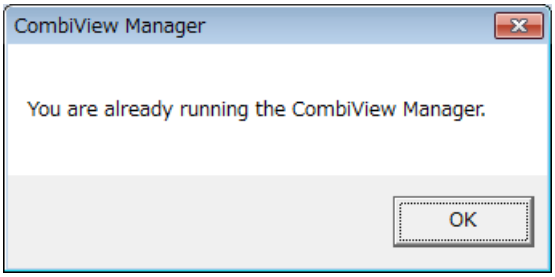


Figure 2.4-3 Message when CombiView is running

Stopping CombiView

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

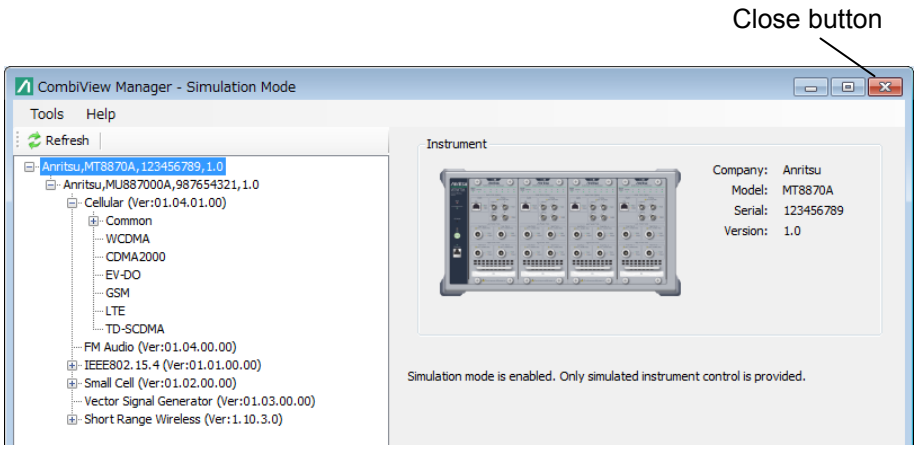


Figure 2.4-4 Close Button

Note:	When the 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.

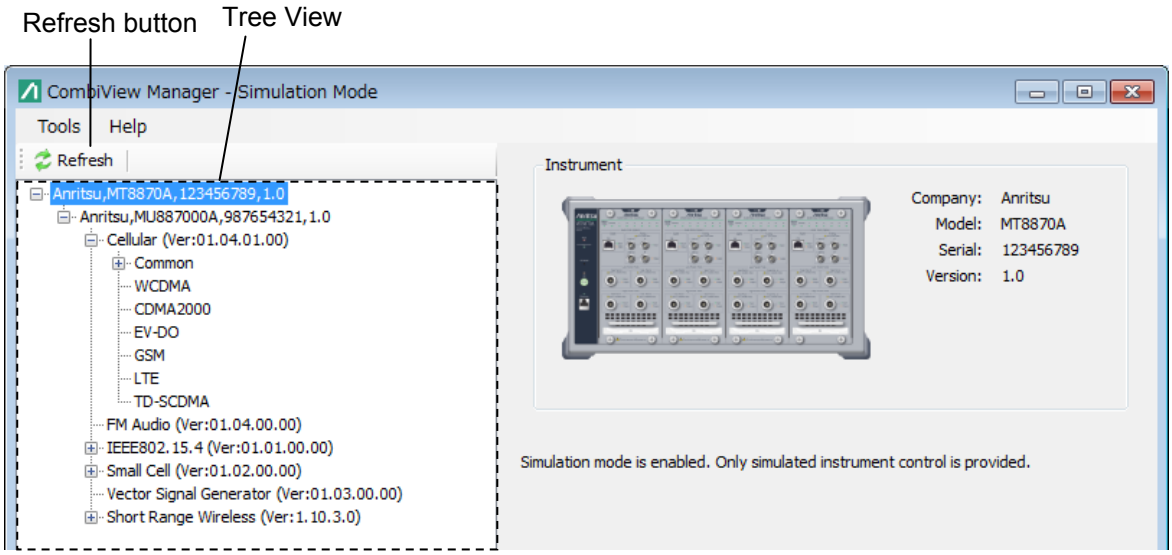


Figure 2.5-1 CombiView Manager Screen

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.

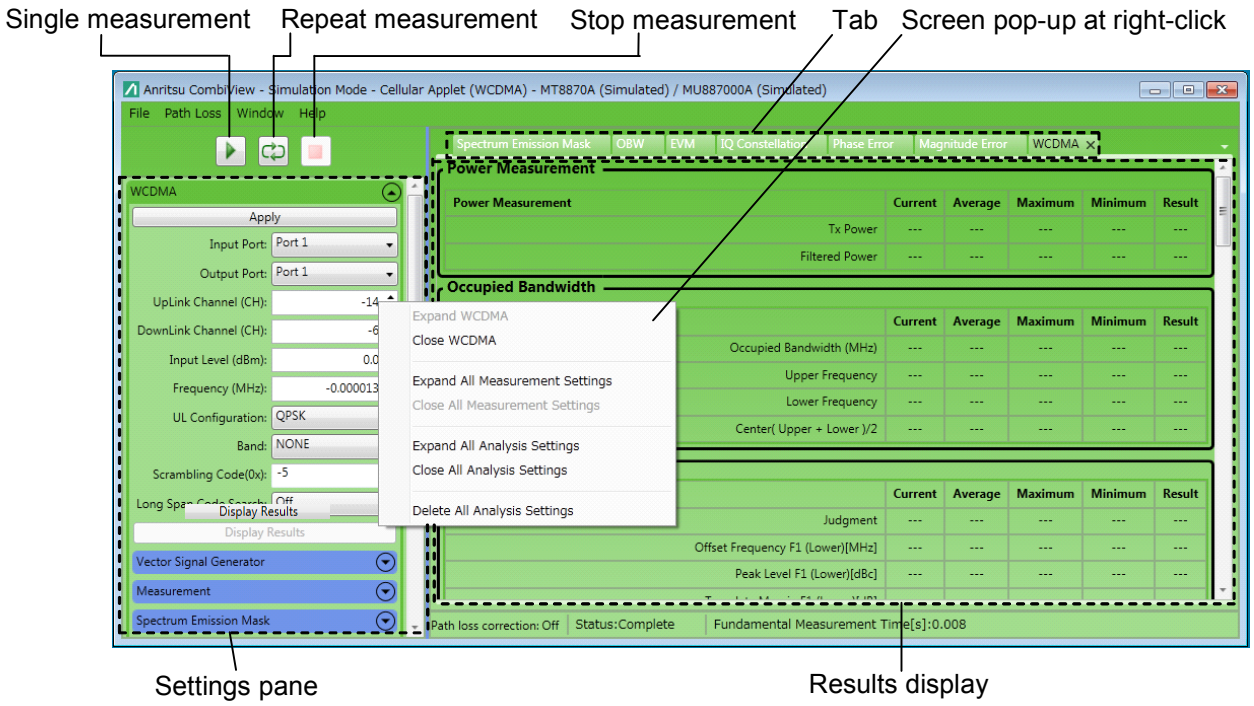


Figure 2.5-2 CombiView Screen

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.

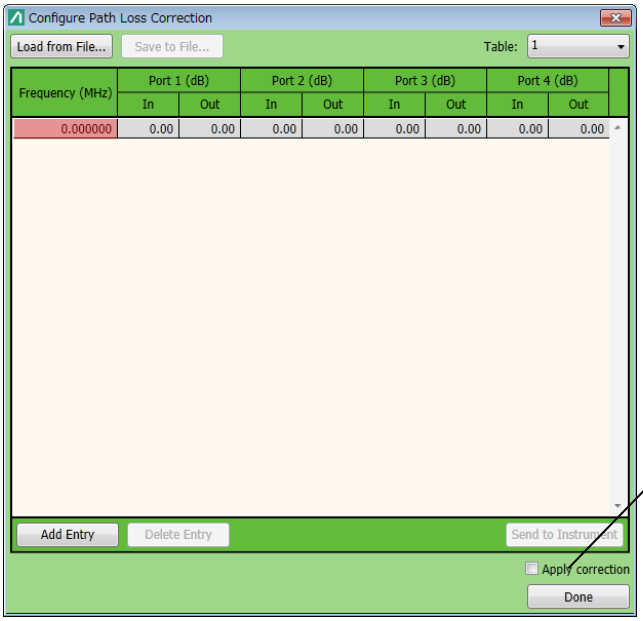


Figure 2.5-3 Configure Path Loss Correction Screen

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.

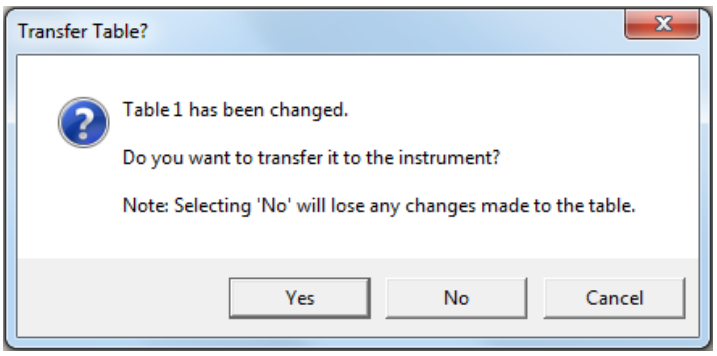


Figure 2.5-4 Transfer Table? Message

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).

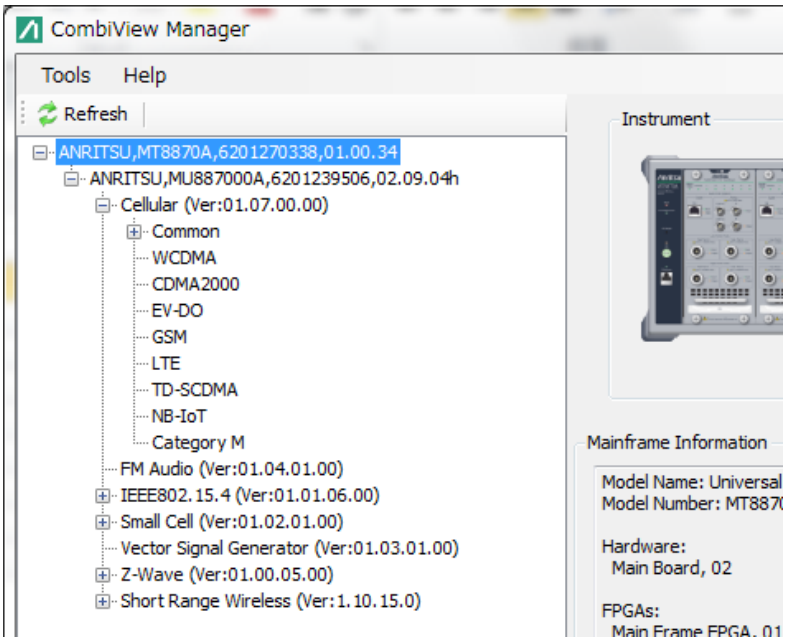


Figure 3.1.1-1 Tree View

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.

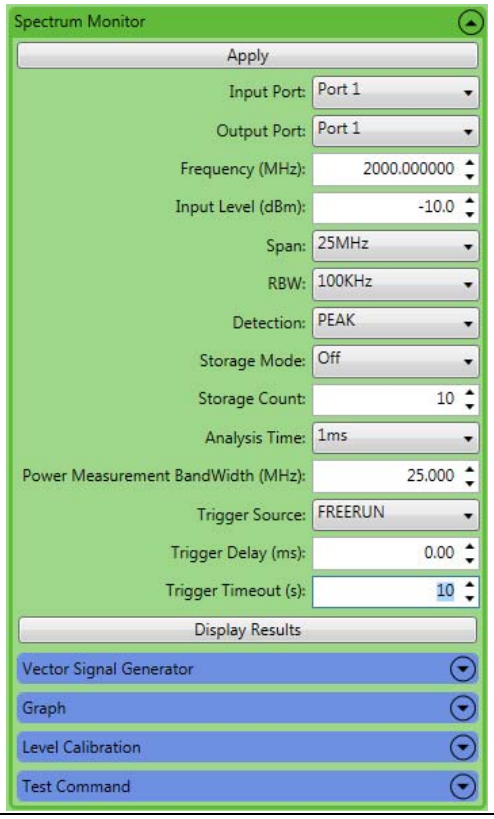


Figure 3.1.2-1 Measurement Settings Pane

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
Output Port*	Sets MU887000A VSG RF signal output port
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

*: Either Port3 or Port4 can be set.

Starting/stopping measurement

To start or stop measurement, click the following buttons.

Table 3.1.2-2 Measurement Start/Stop Buttons

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

The status indication lamp 3 of MU887000A is on during the execution of measurement.

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

In that case, query the cause by using :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.

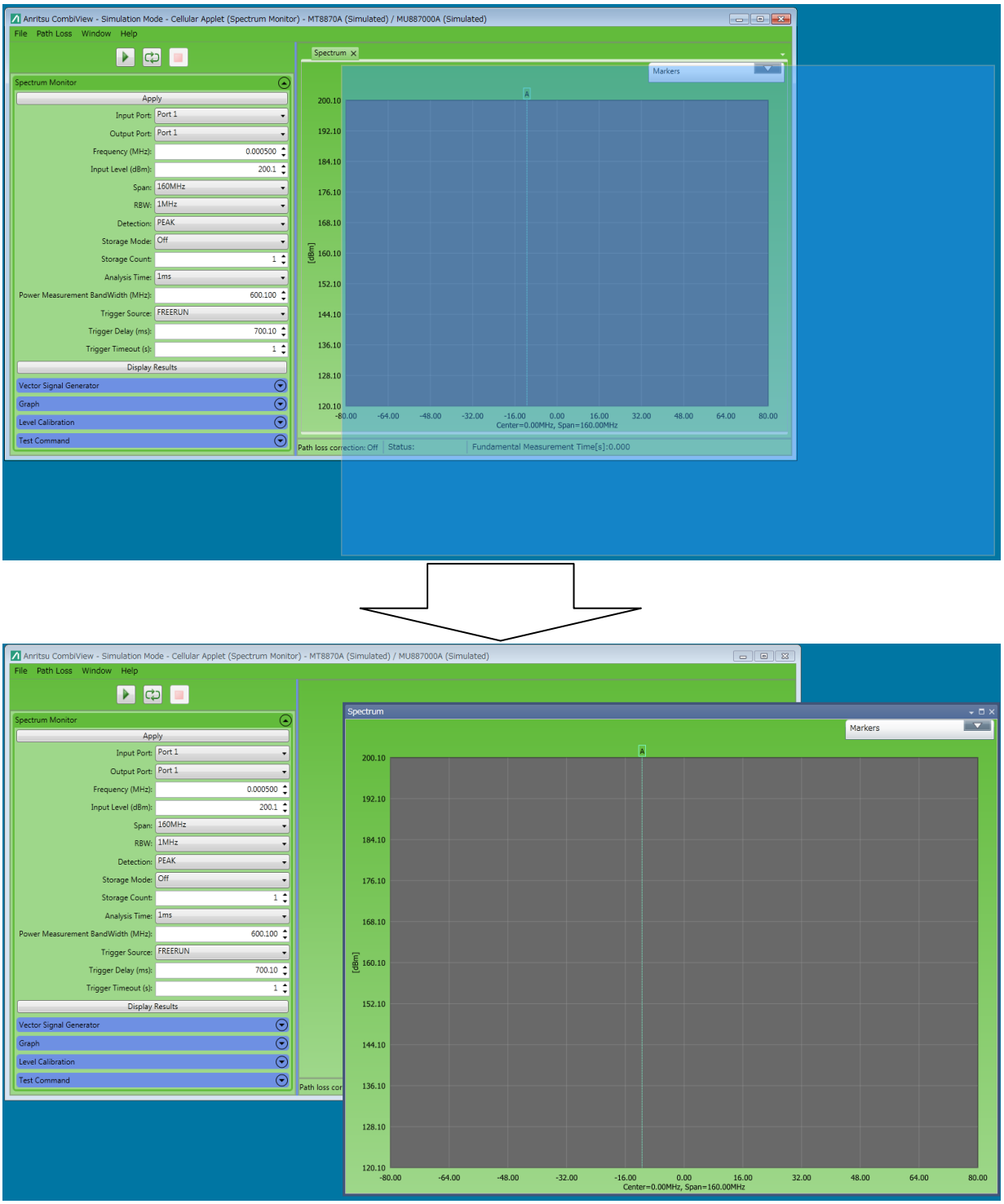


Figure 3.1.2-2 Floating Window

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.

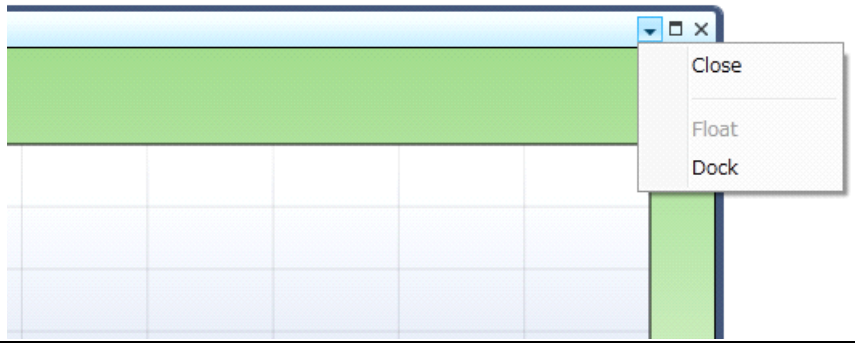


Figure 3.1.2-3 Floating Window Pull-Down Menu

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.

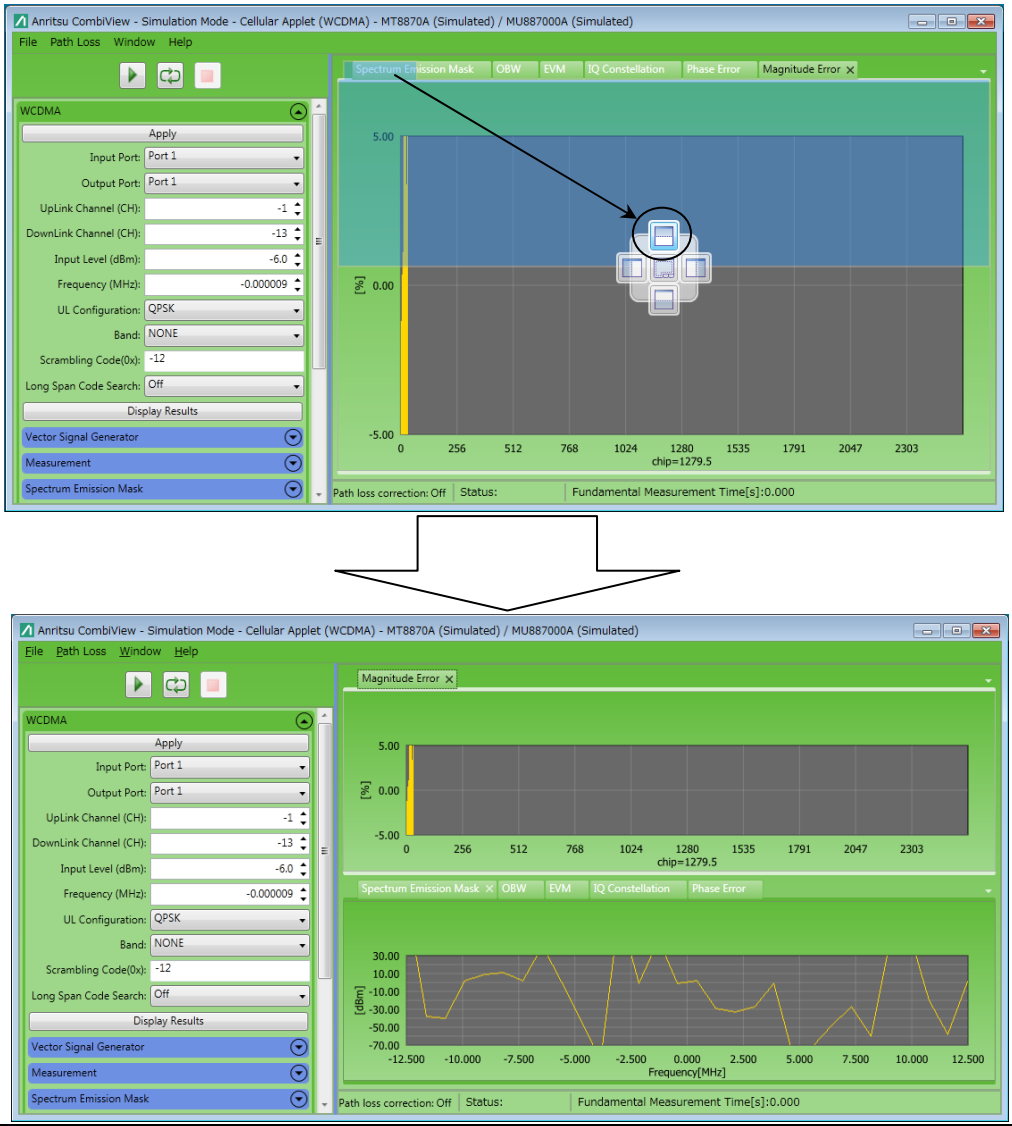


Figure 3.1.2-4 Example of Split Window

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

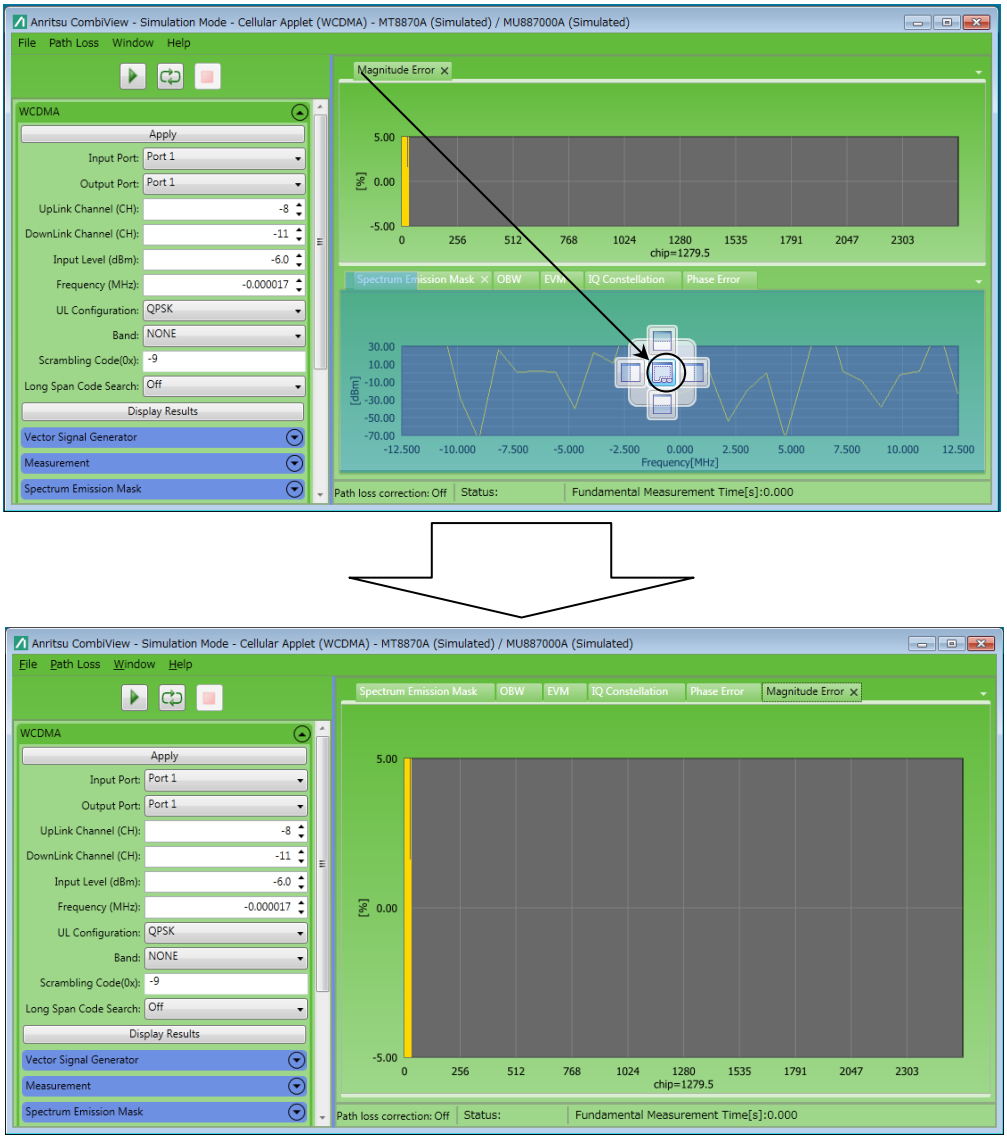


Figure 3.1.2-5 Cancel Window Split

Save Graph and Print Graph

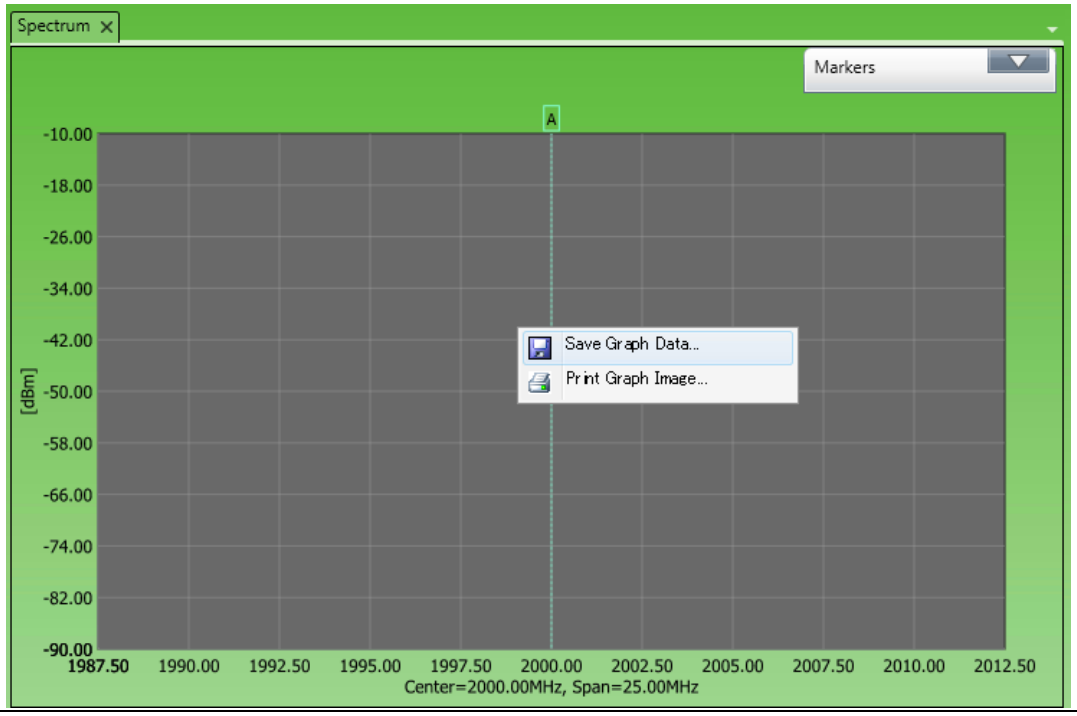


Figure 3.1.2-6 Save Graph and Print Graph

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.

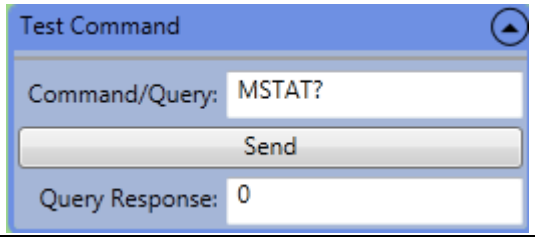


Figure 3.1.3-1 Test Command Dialog

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.

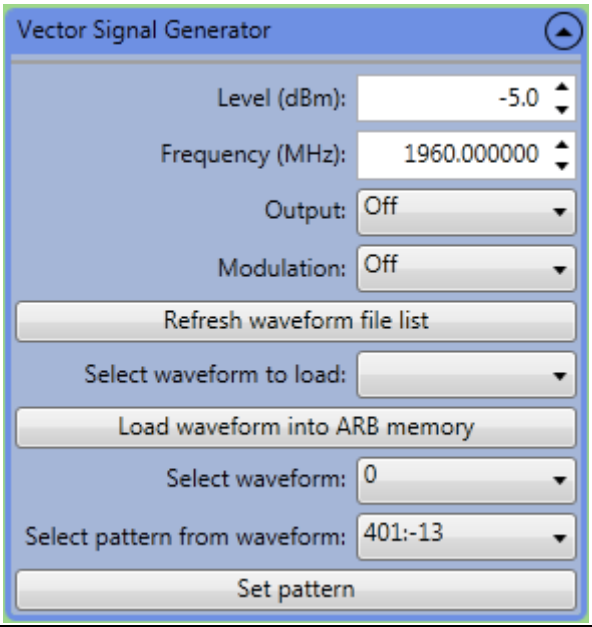


Figure 3.1.4-1 Vector Signal Generator Setting

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.

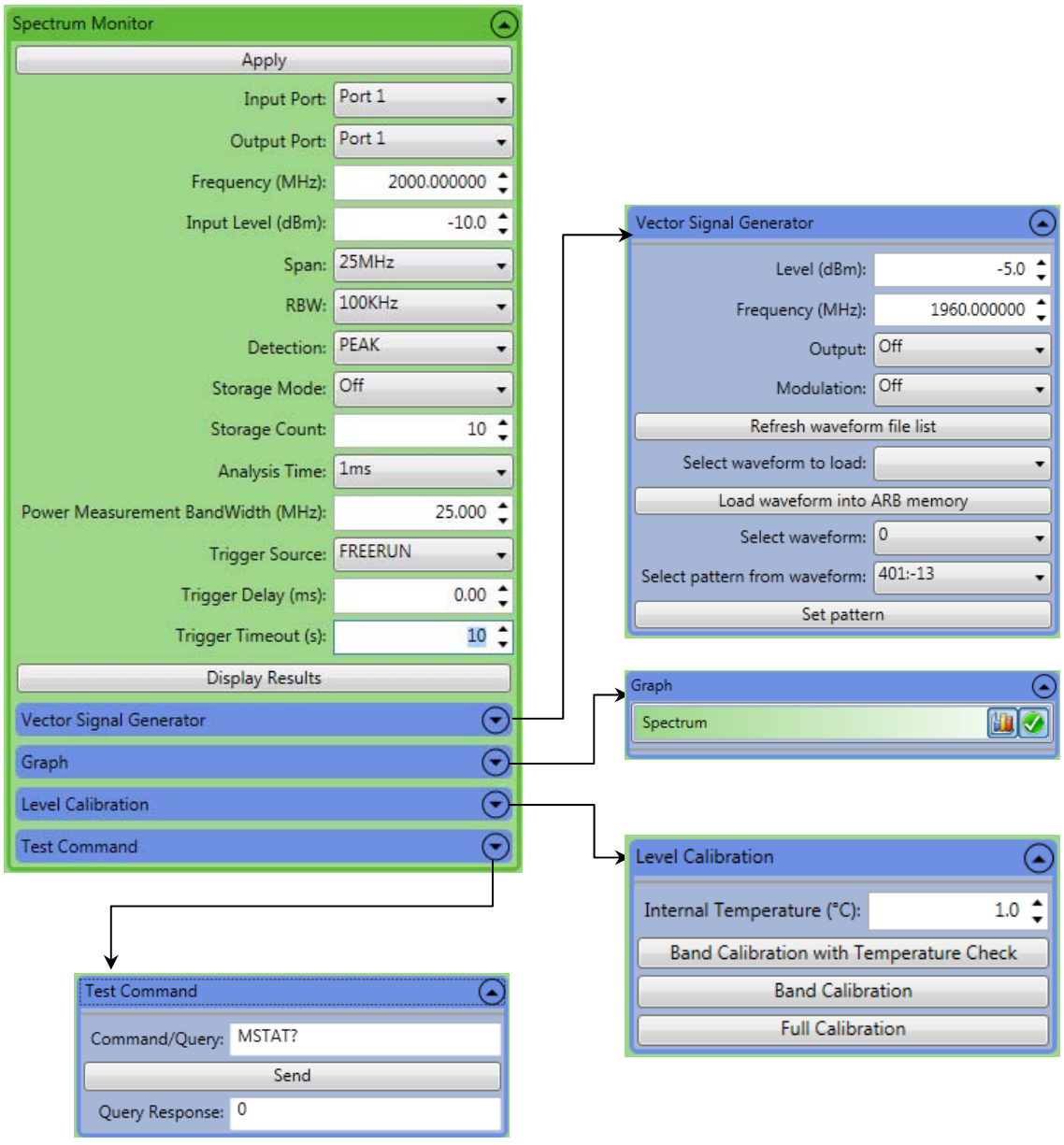


Figure 3.2.1-1 Spectrum Monitor Settings Pane

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.

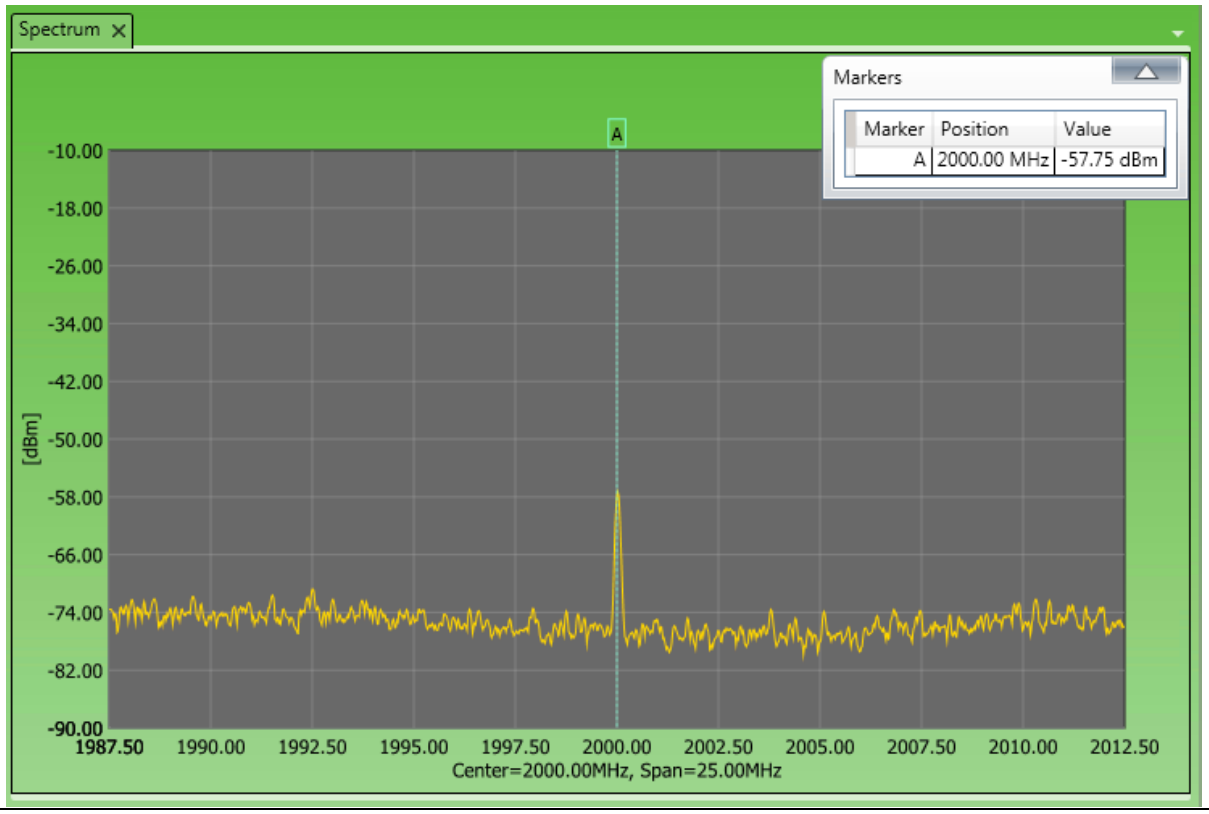


Figure 3.2.2-1 Spectrum Monitor Graph

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*.

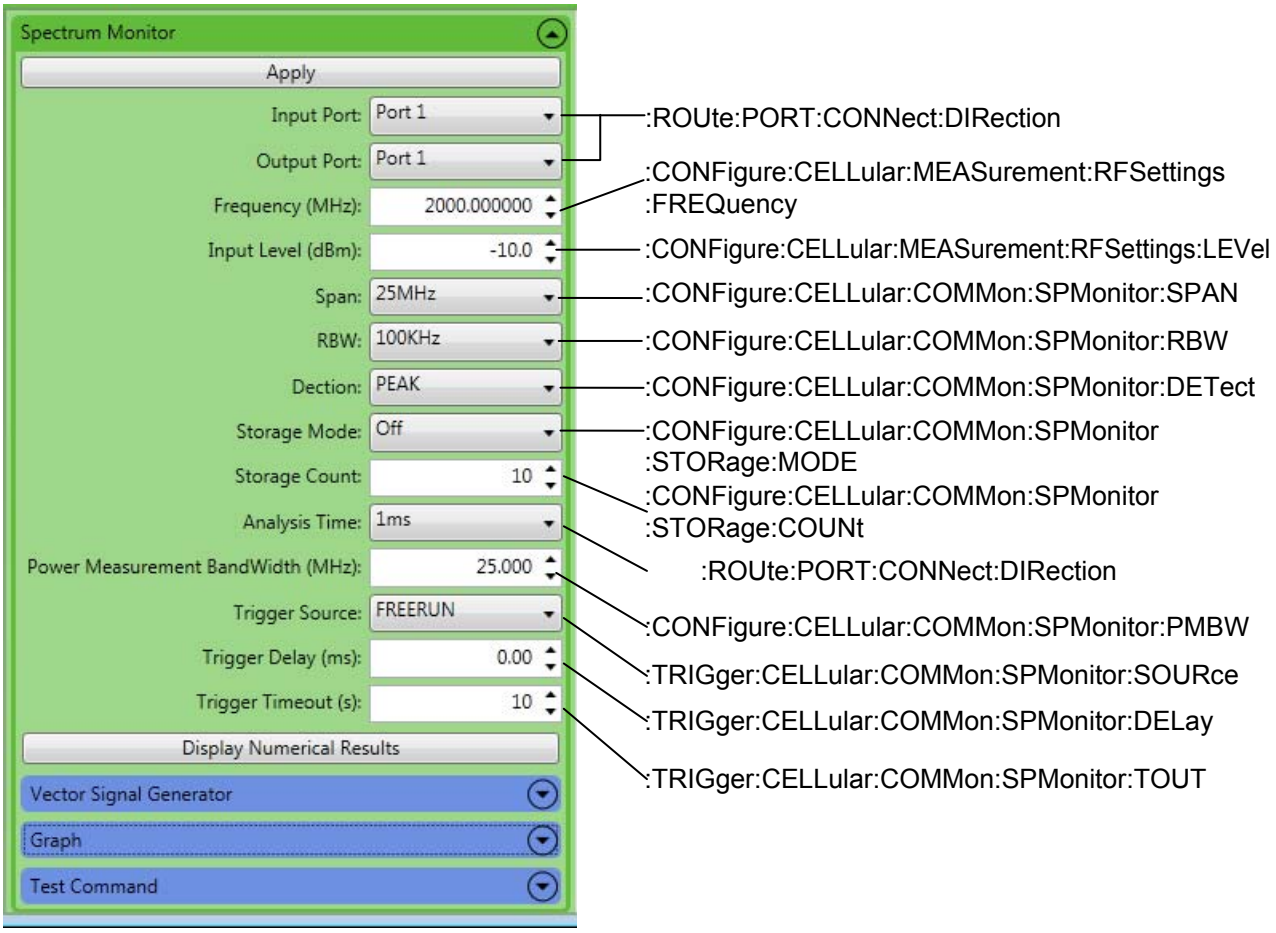


Figure 3.2.3-1 Measurement Settings Pane

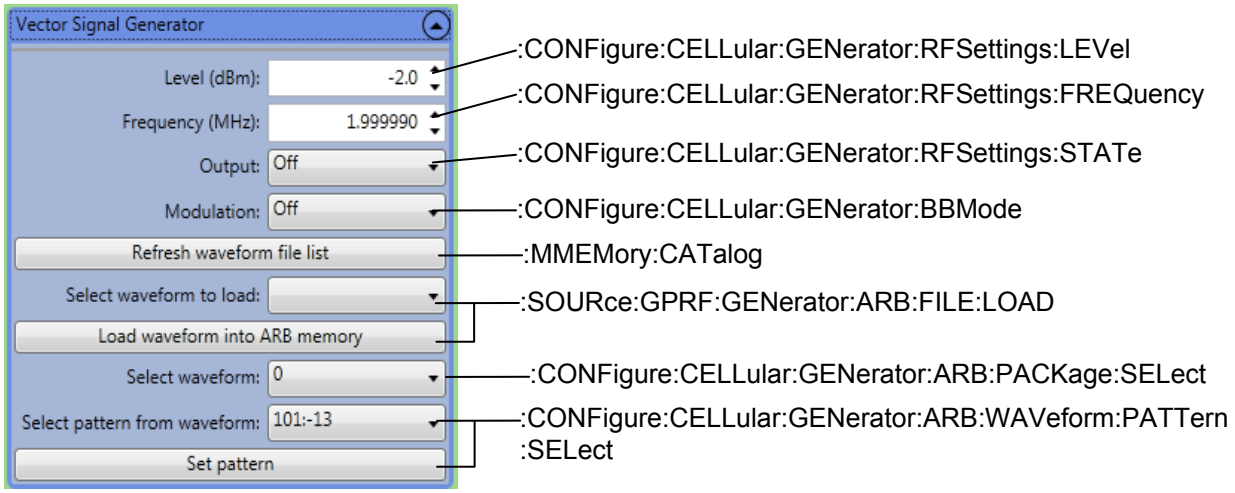


Figure 3.2.3-2 Measurement Settings Pane (Vector Signal Generator)

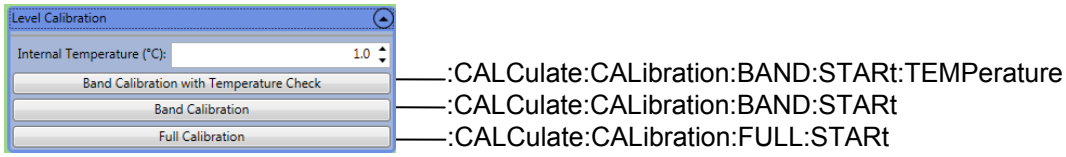


Figure 3.2.3-3 Measurement Settings Pane (Level Calibration)

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*.

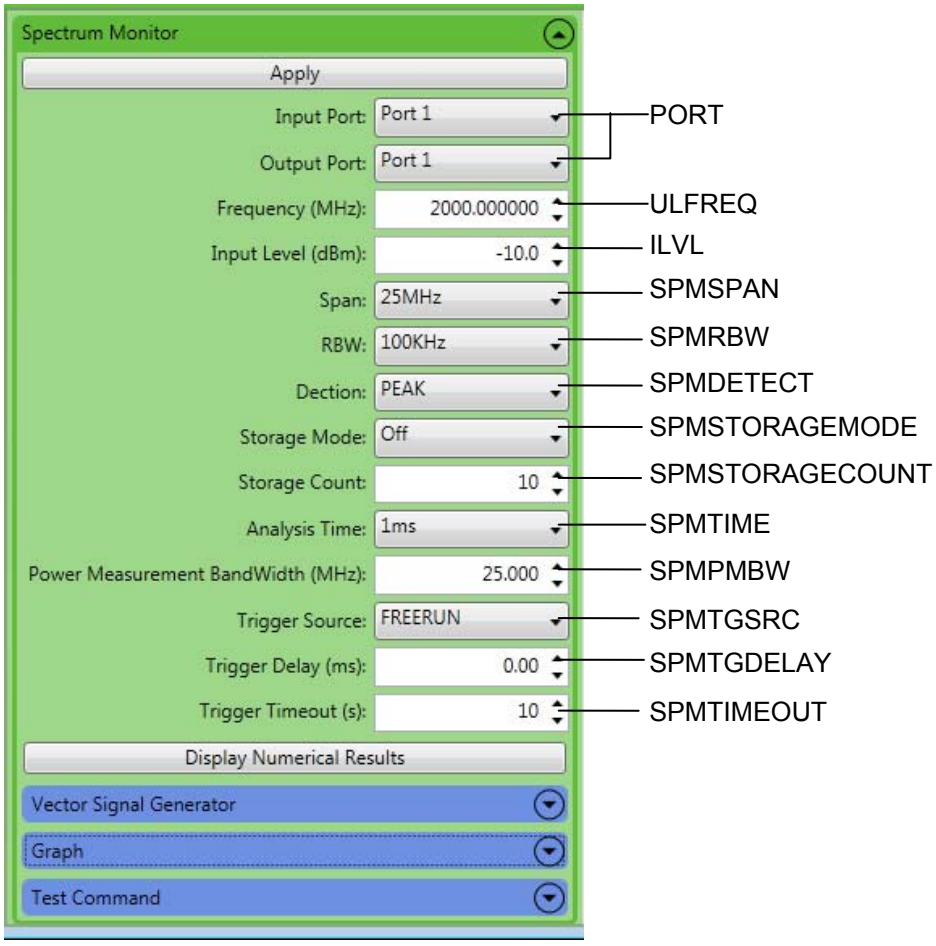


Figure 3.2.4-1 Measurement Settings Pane

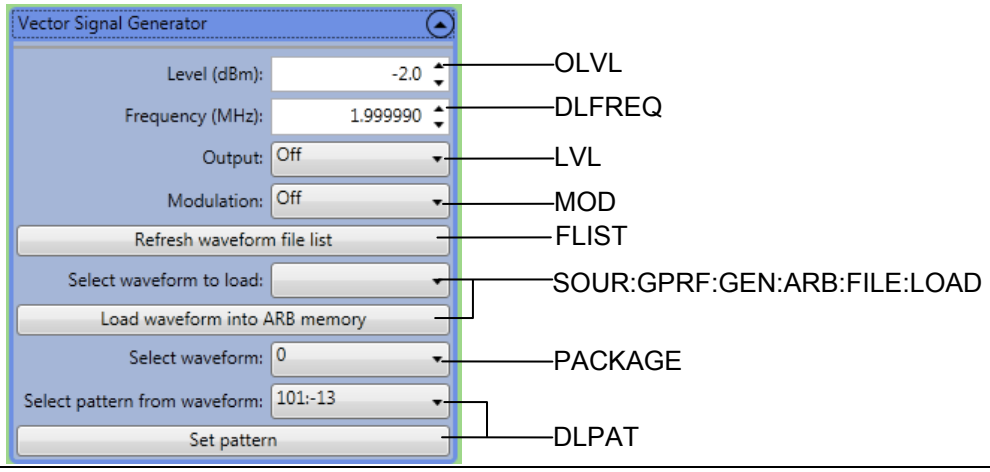


Figure 3.2.4-2 Measurement Settings Pane (Vector Signal Generator Dialog)

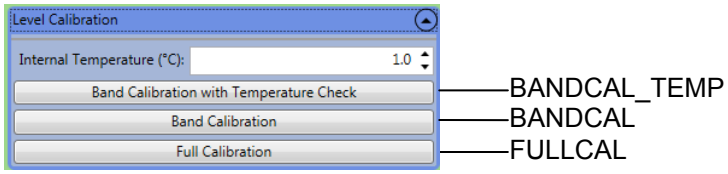


Figure 3.2.4-3 Measurement Settings Pane (Level Calibration)

3.3 WCDMA

Refer to Chapter 2 “Fundamental Measurement” in t*he 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.

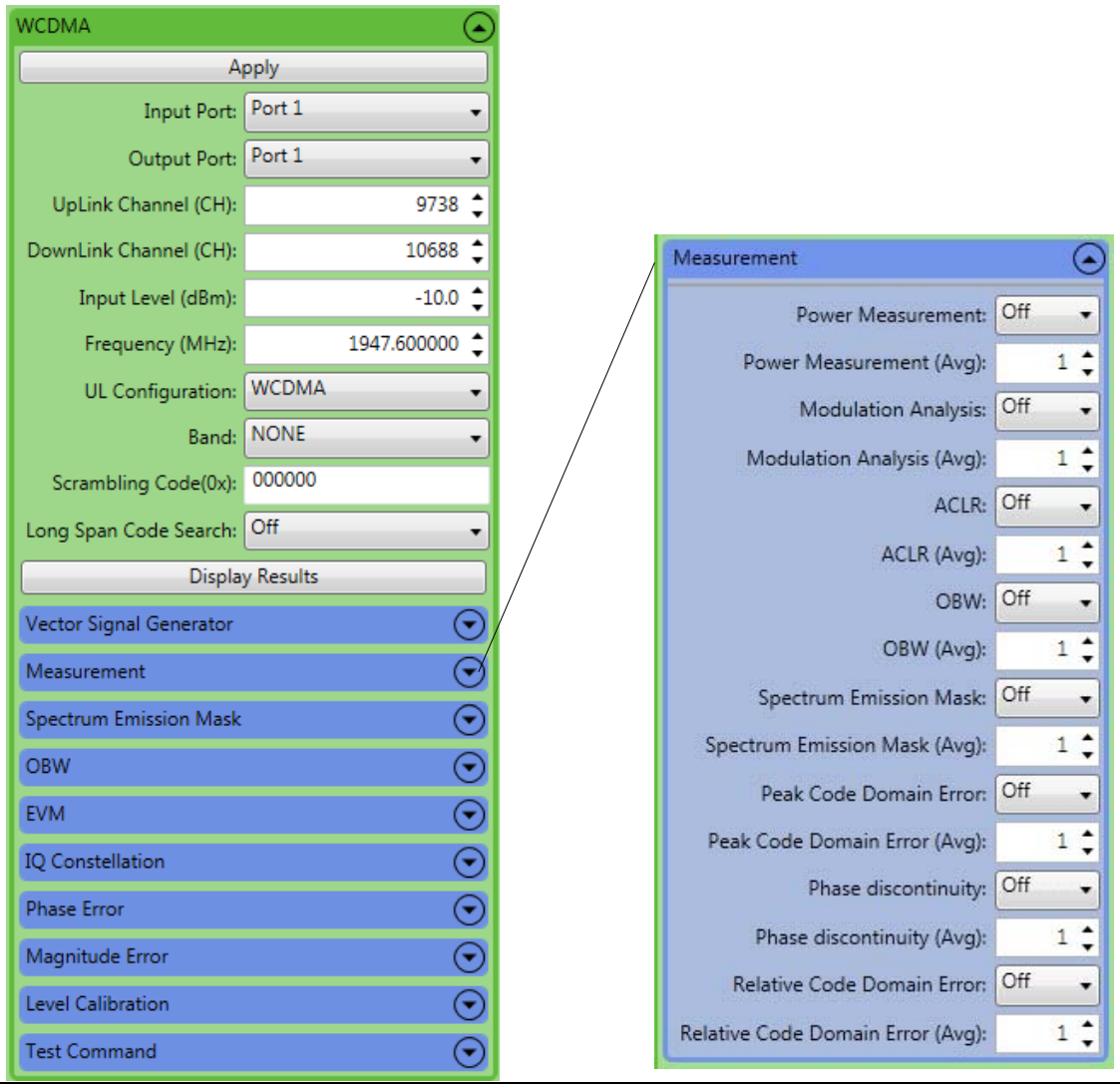


Figure 3.3.1-1 WCDMA Measurement Settings Pane (1/2)



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.

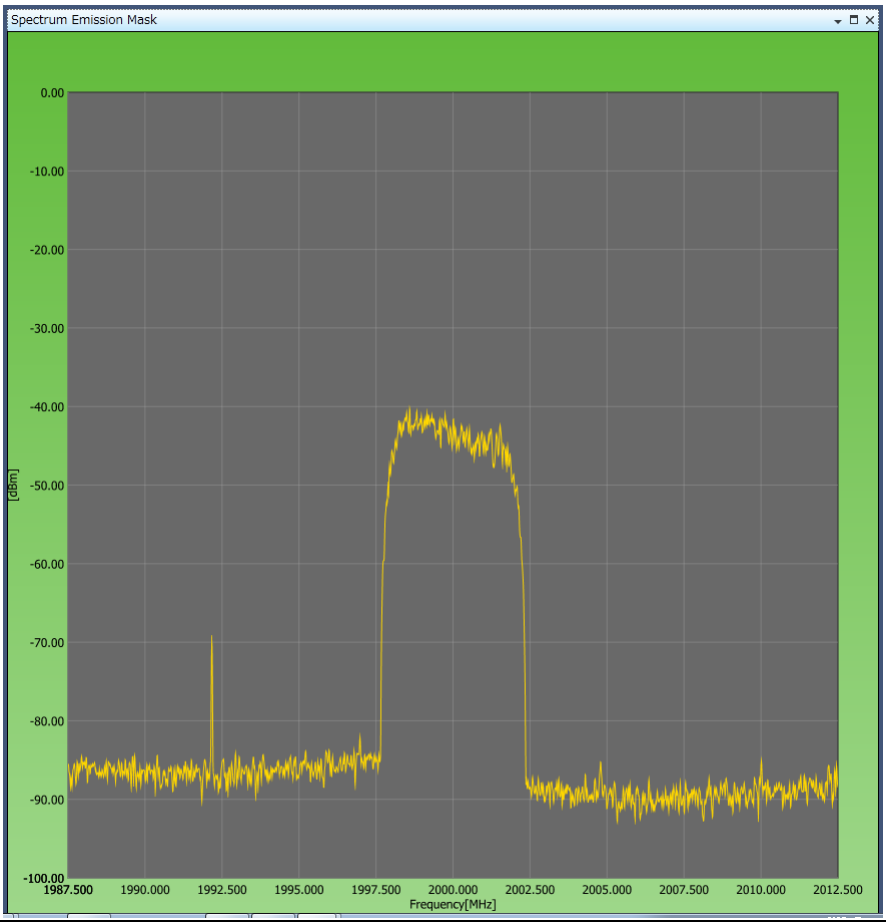


Figure 3.3.2-1 W-CDMA (Spectrum Emission Mask) Graph

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*.

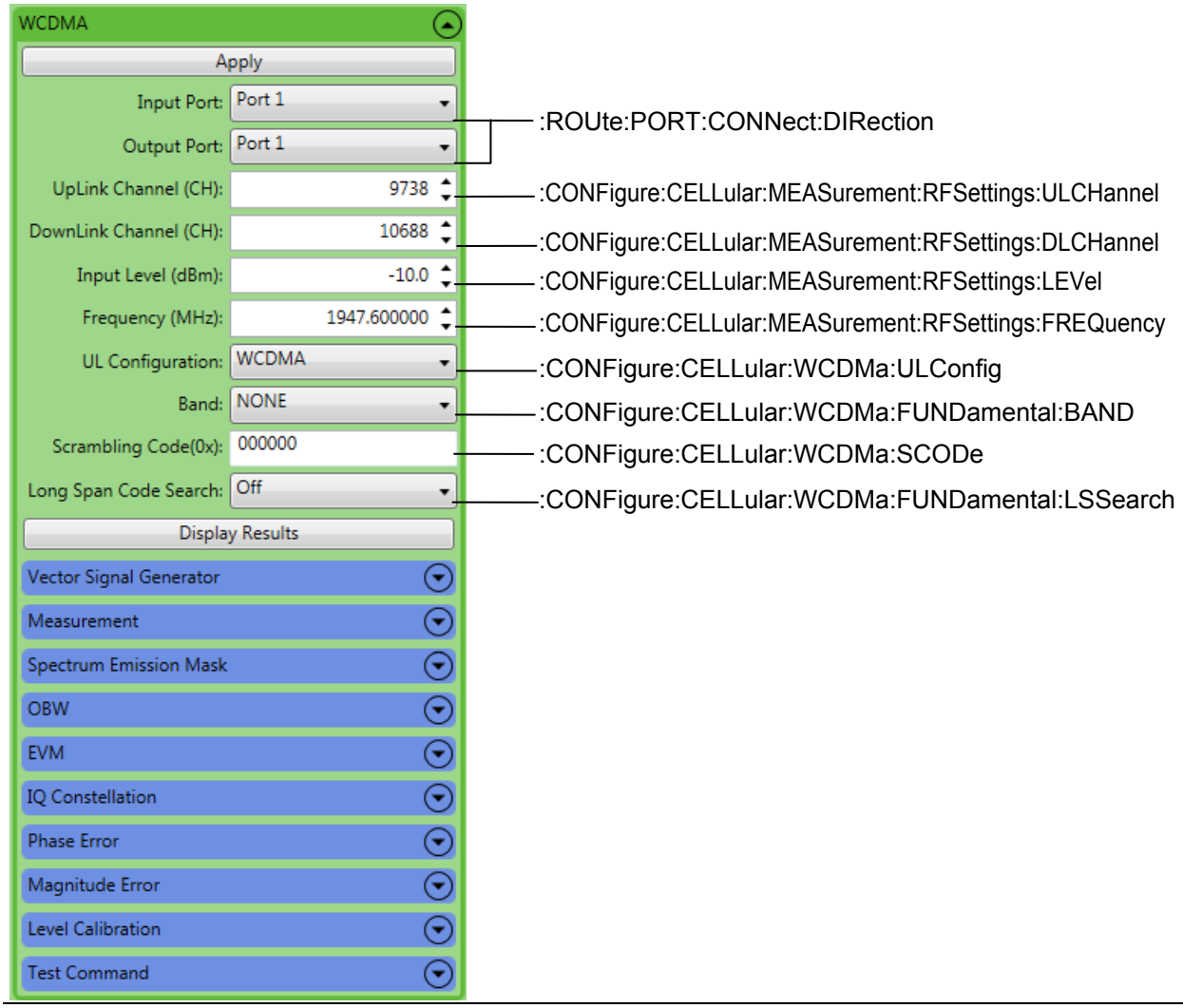


Figure 3.3.3-1 Measurement Settings Pane

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).

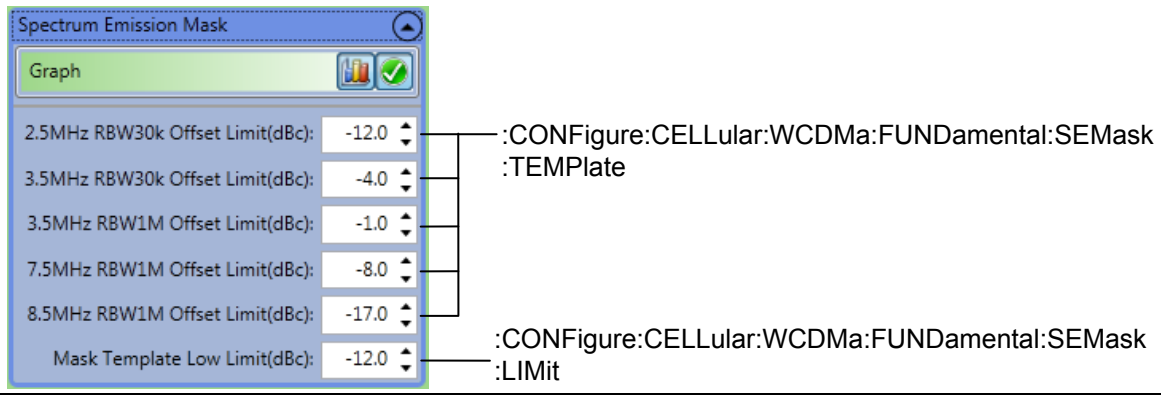


Figure 3.3.3-2 Measurement Settings Pane (Spectrum Emission Mask Dialog)

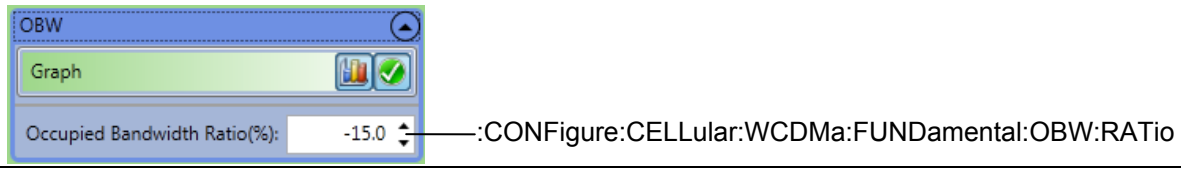


Figure 3.3.3-3 Measurement Settings Pane (OBW Dialog)

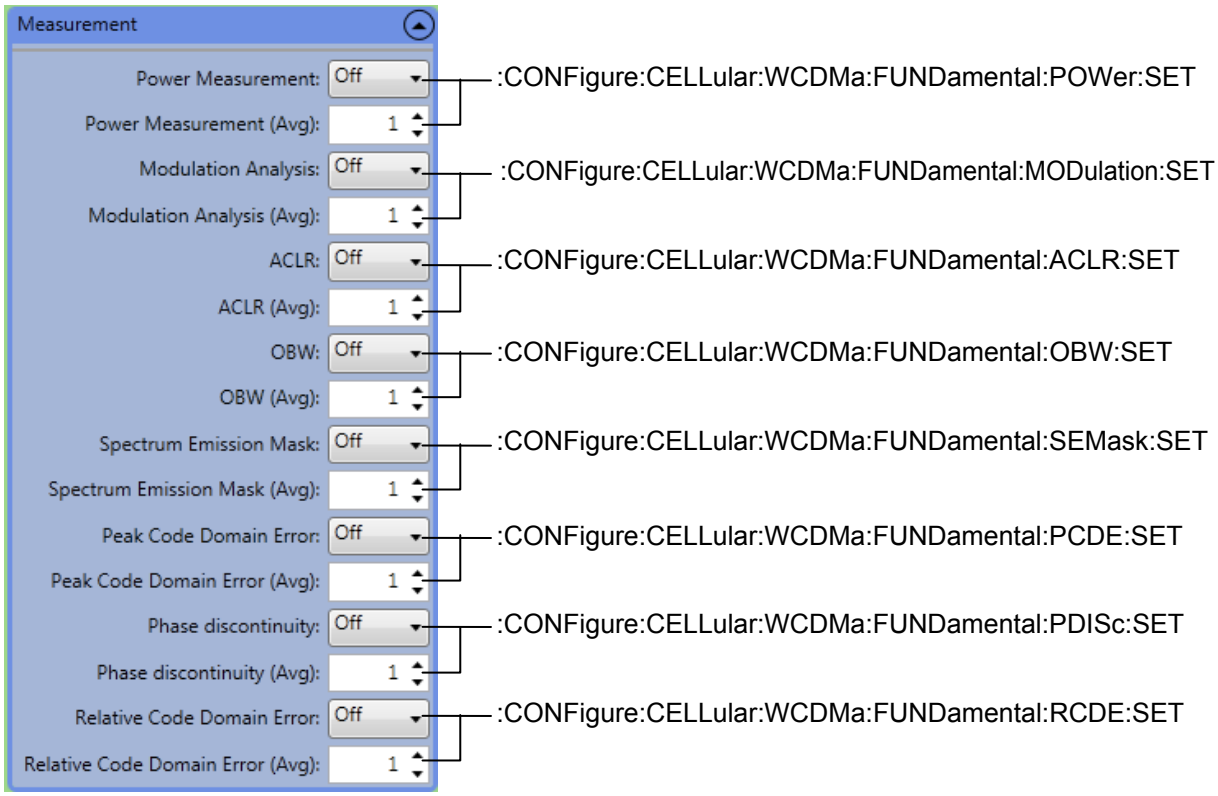


Figure 3.3.3-4 Measurement Settings Pane (Measurement Dialog)

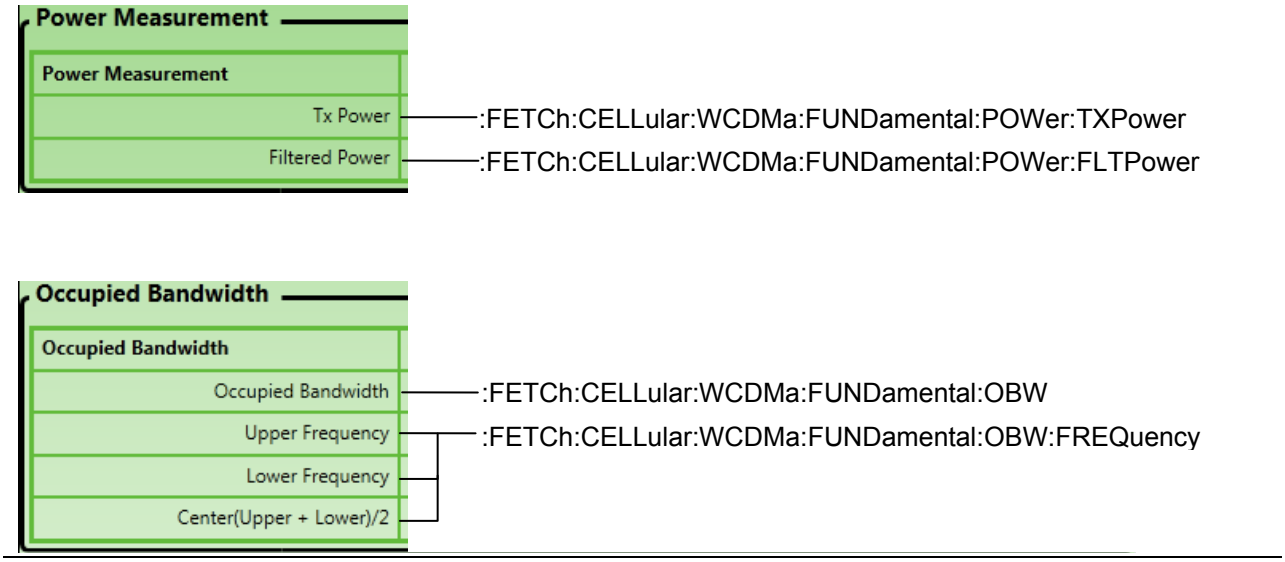


Figure 3.3.3-5 Power Measurement and Occupied Bandwidth Results

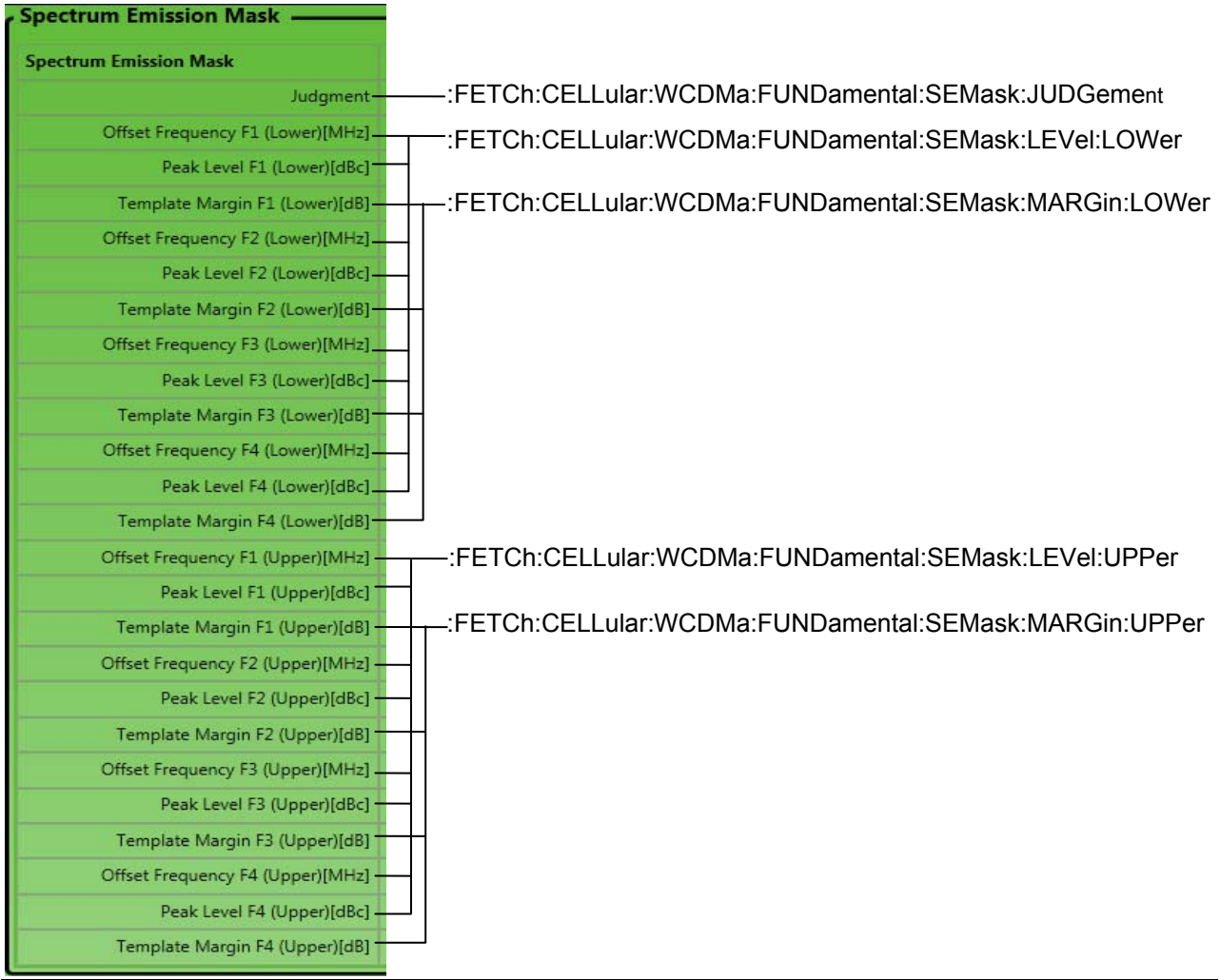


Figure 3.3.3-6 Spectrum Emission Mask Results

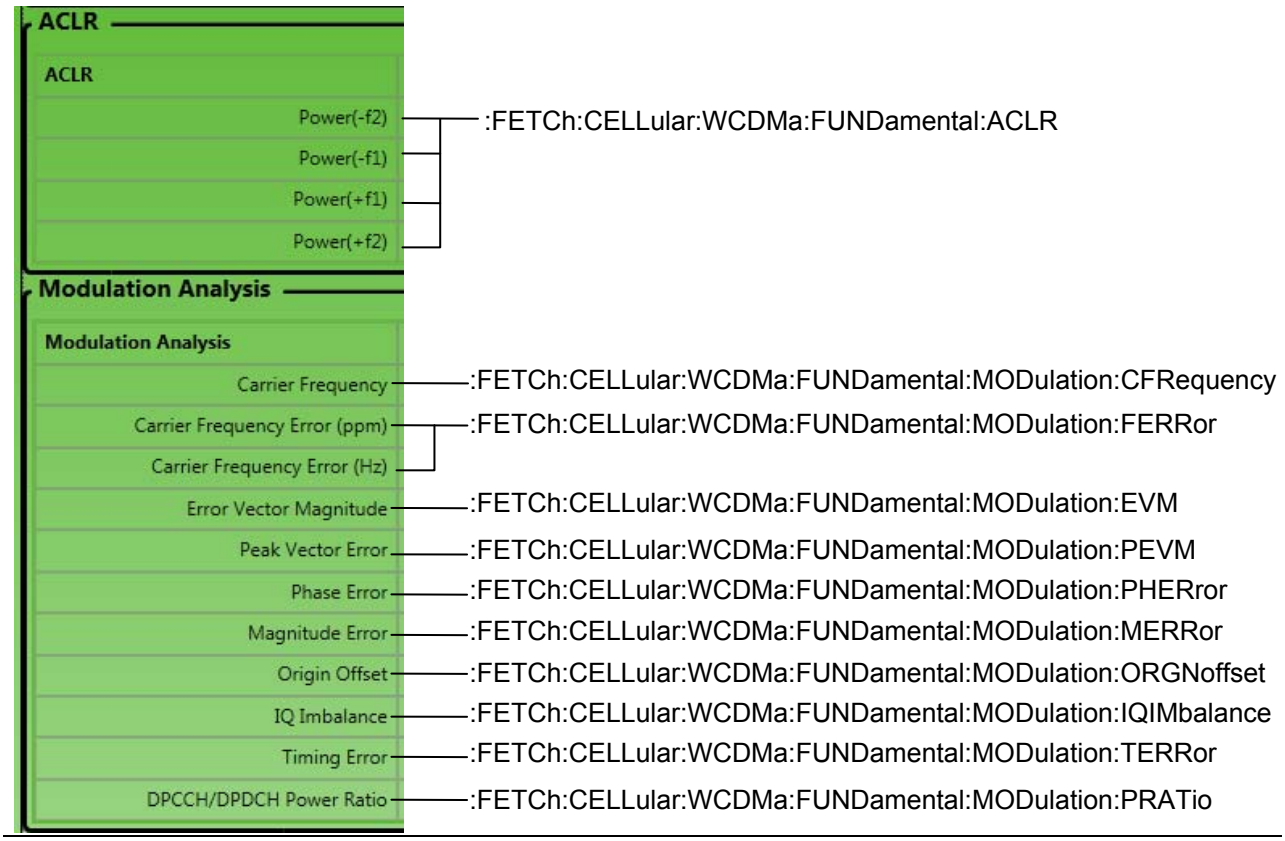


Figure 3.3.3-7 ACLR and Modulation Analysis Results

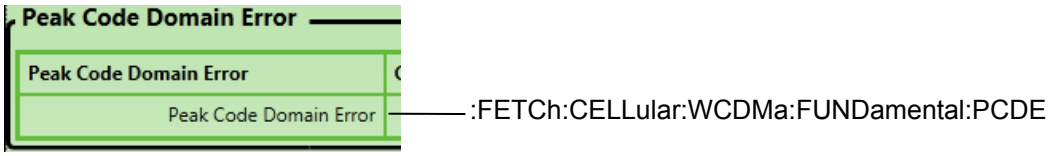


Figure 3.3.3-8 Peak Code Domain Error Results

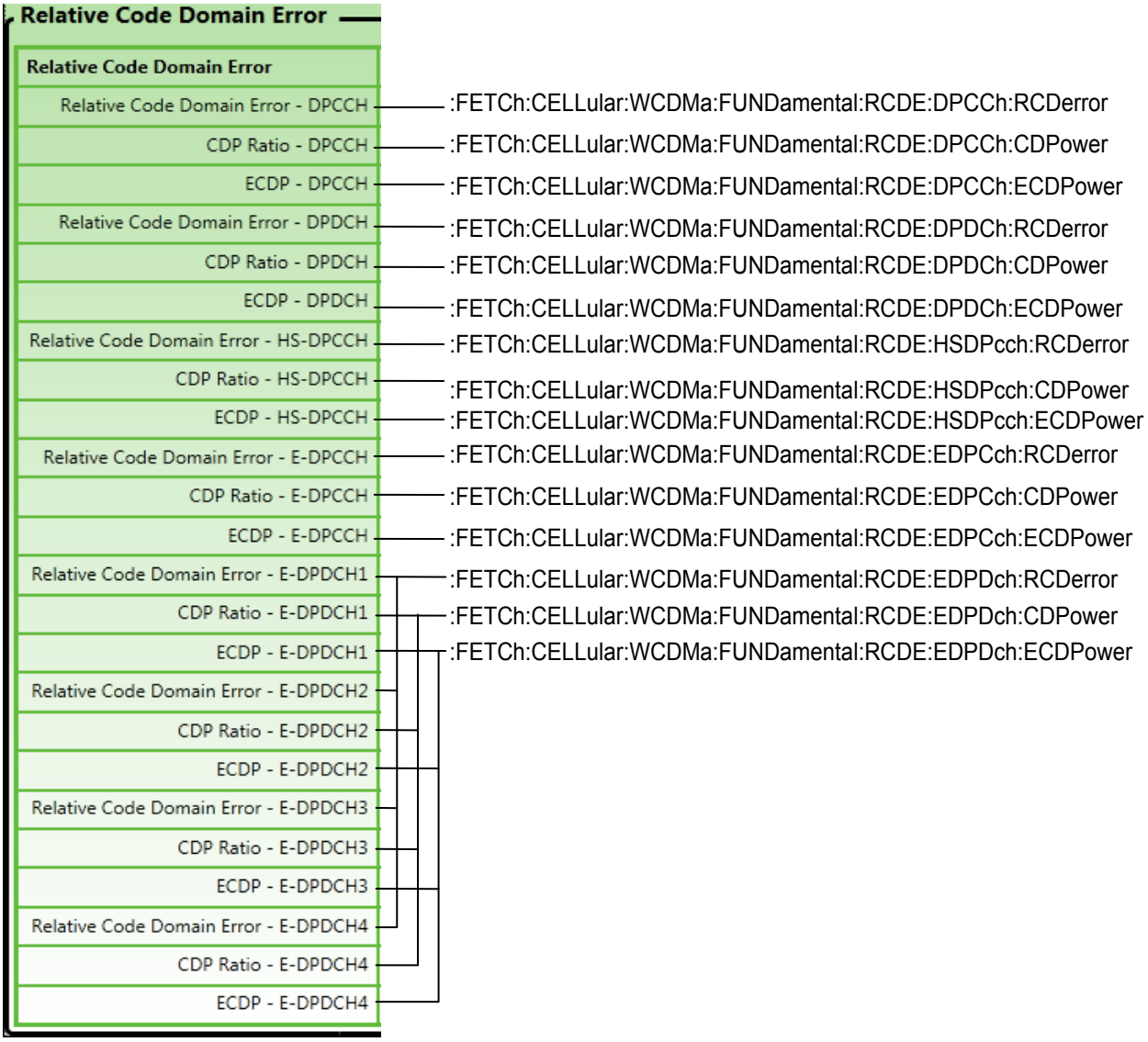


Figure 3.3.3-9 Relative Code Domain Power Results

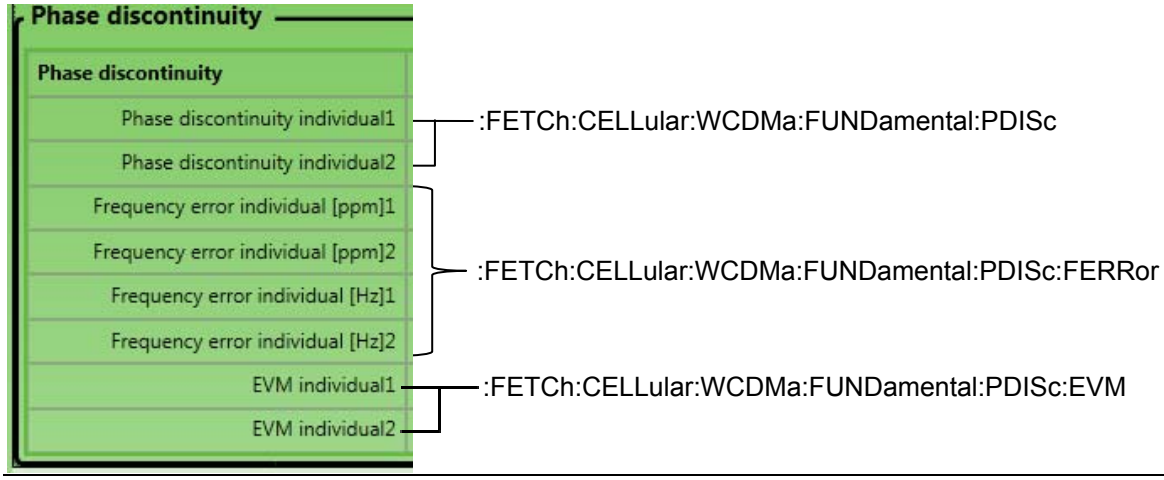


Figure 3.3.3-10 Phase Discontinuity Results

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*.

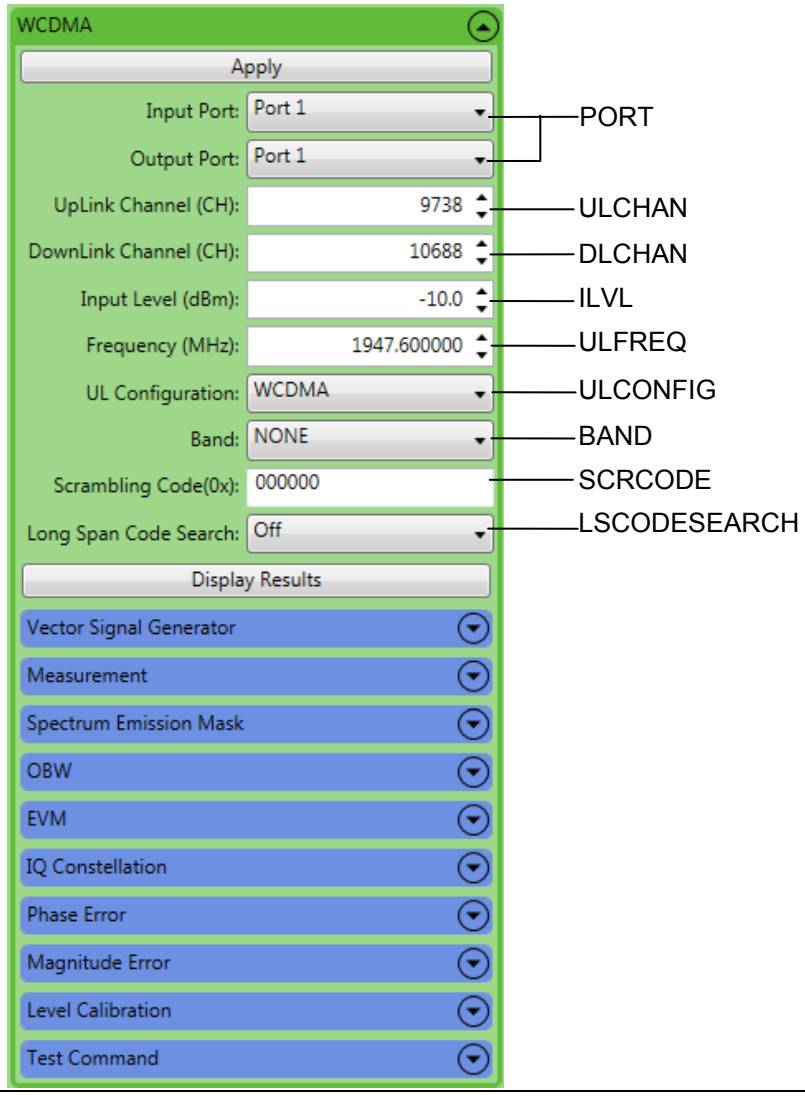


Figure 3.3.4-1 Measurement Settings Pane

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).

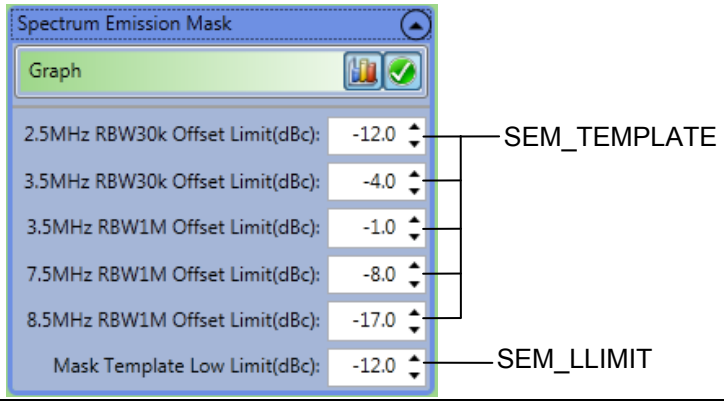


Figure 3.3.4-2 Measurement Settings Pane (Spectrum Emission Mask Dialog)

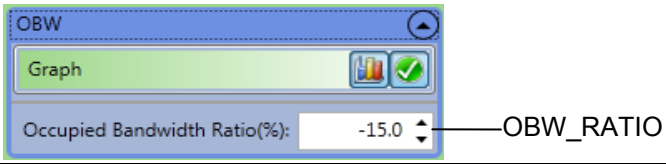


Figure 3.3.4-3 Measurement Settings Pane (OBW Dialog)

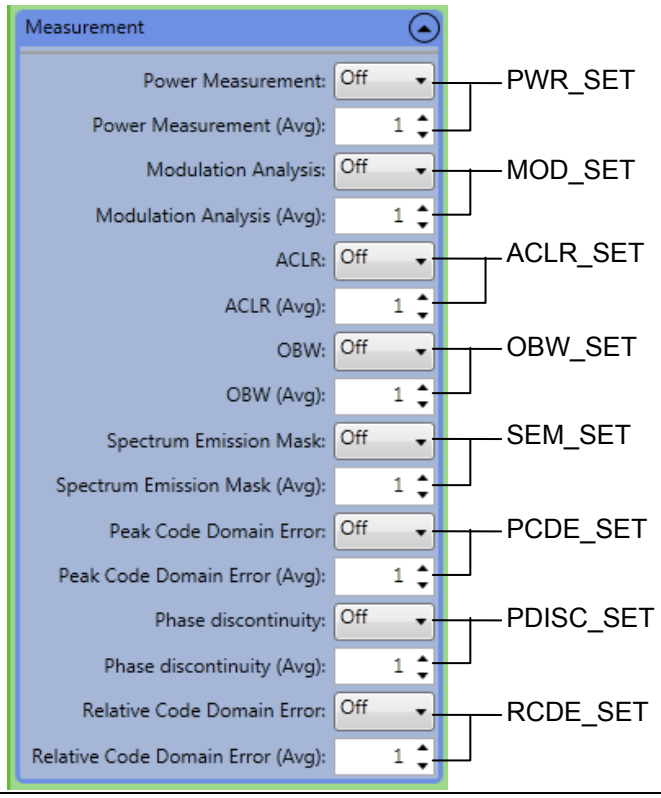


Figure 3.3.4-4 Measurement Settings Pane (Measurement Dialog)

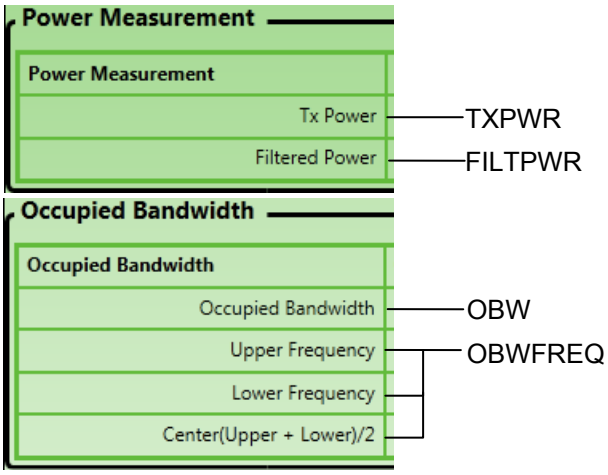


Figure 3.3.4-5 Power Measurement and Occupied Bandwidth Results

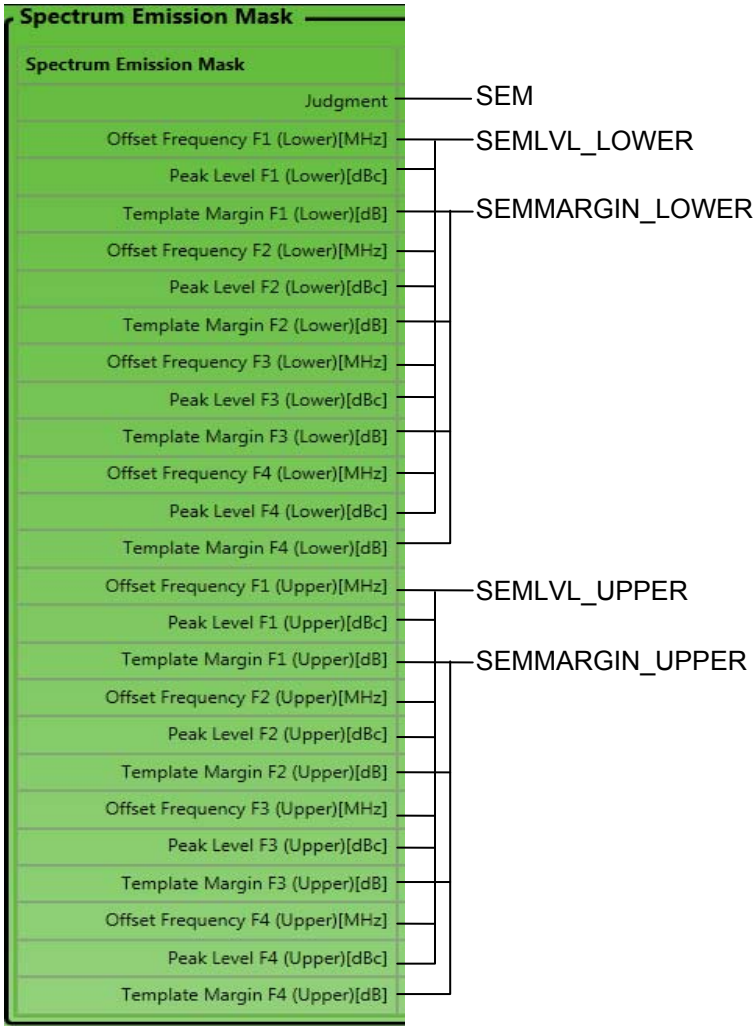


Figure 3.3.4-6 Spectrum Emission Mask Results

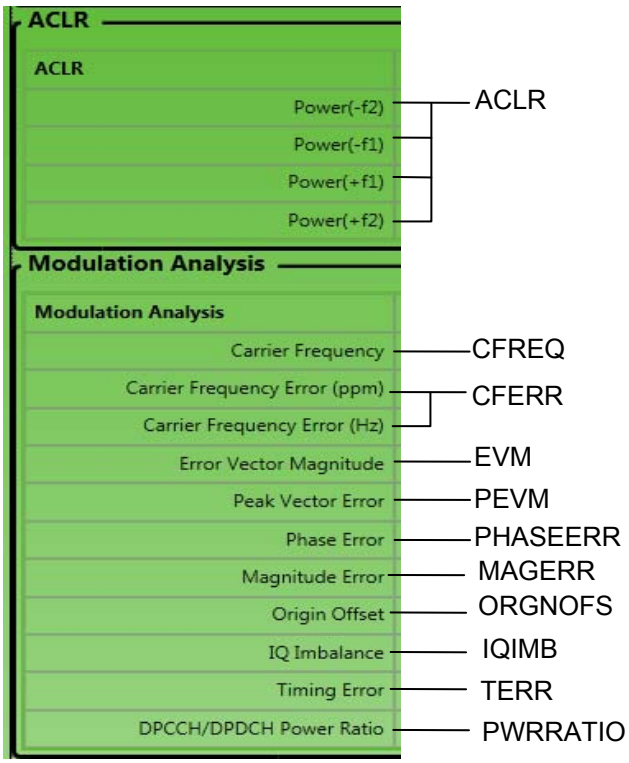


Figure 3.3.4-7 ACLR and Modulation Analysis Results

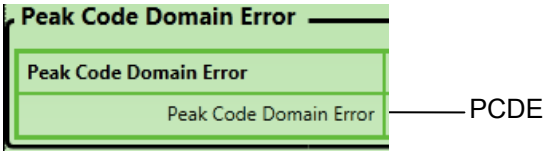


Figure 3.3.4-8 Peak Code Domain Error Results

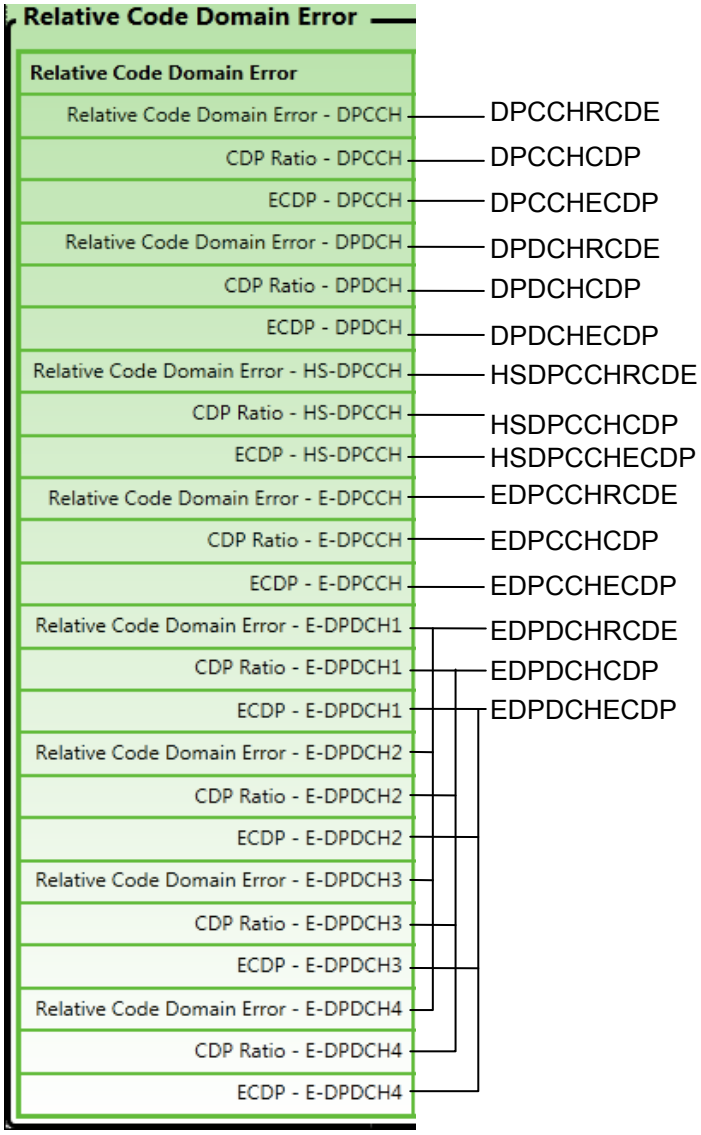


Figure 3.3.4-9 Relative Code Domain Power Results

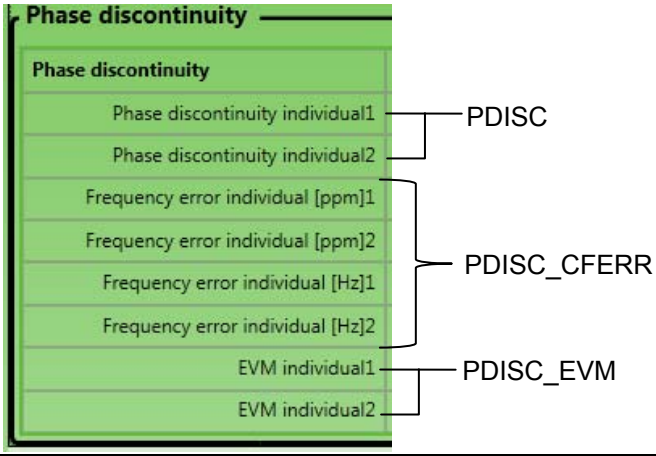


Figure 3.3.4-10 Phase Discontinuity Results

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.

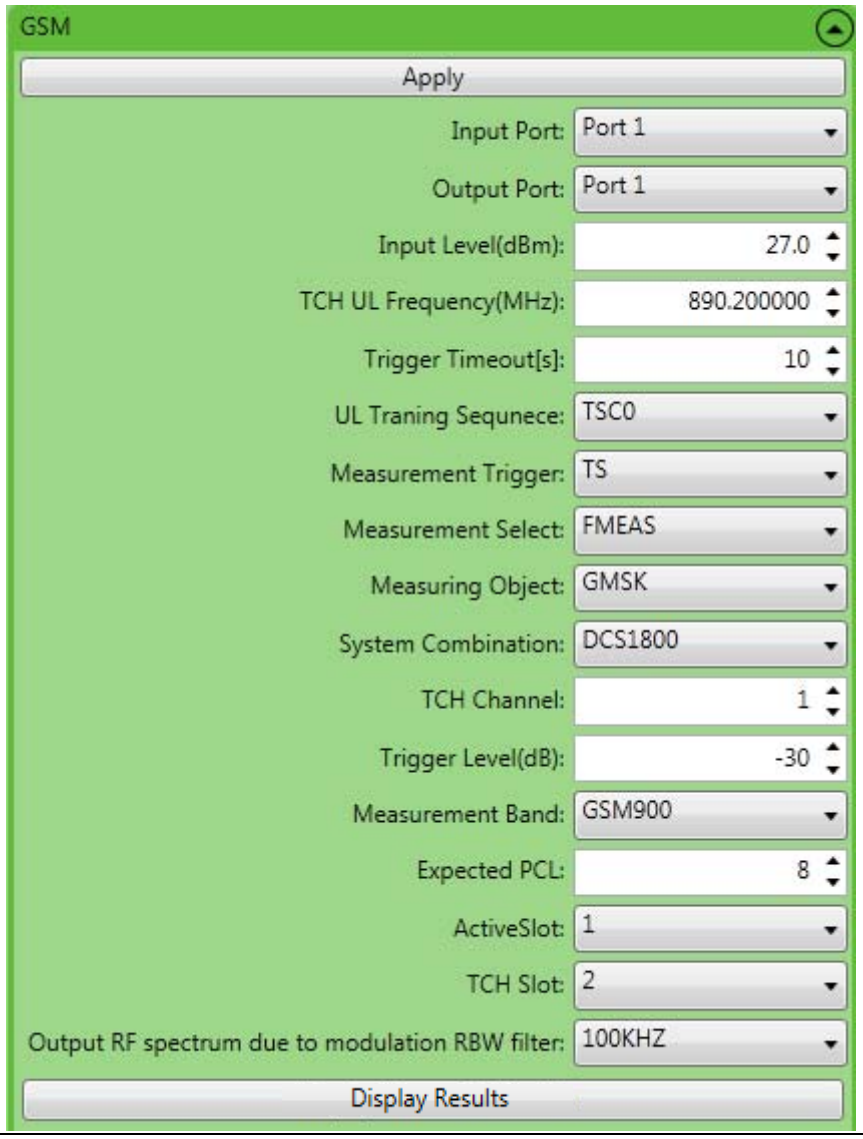


Figure 3.4.1-1 GSM Settings Pane (1/2)

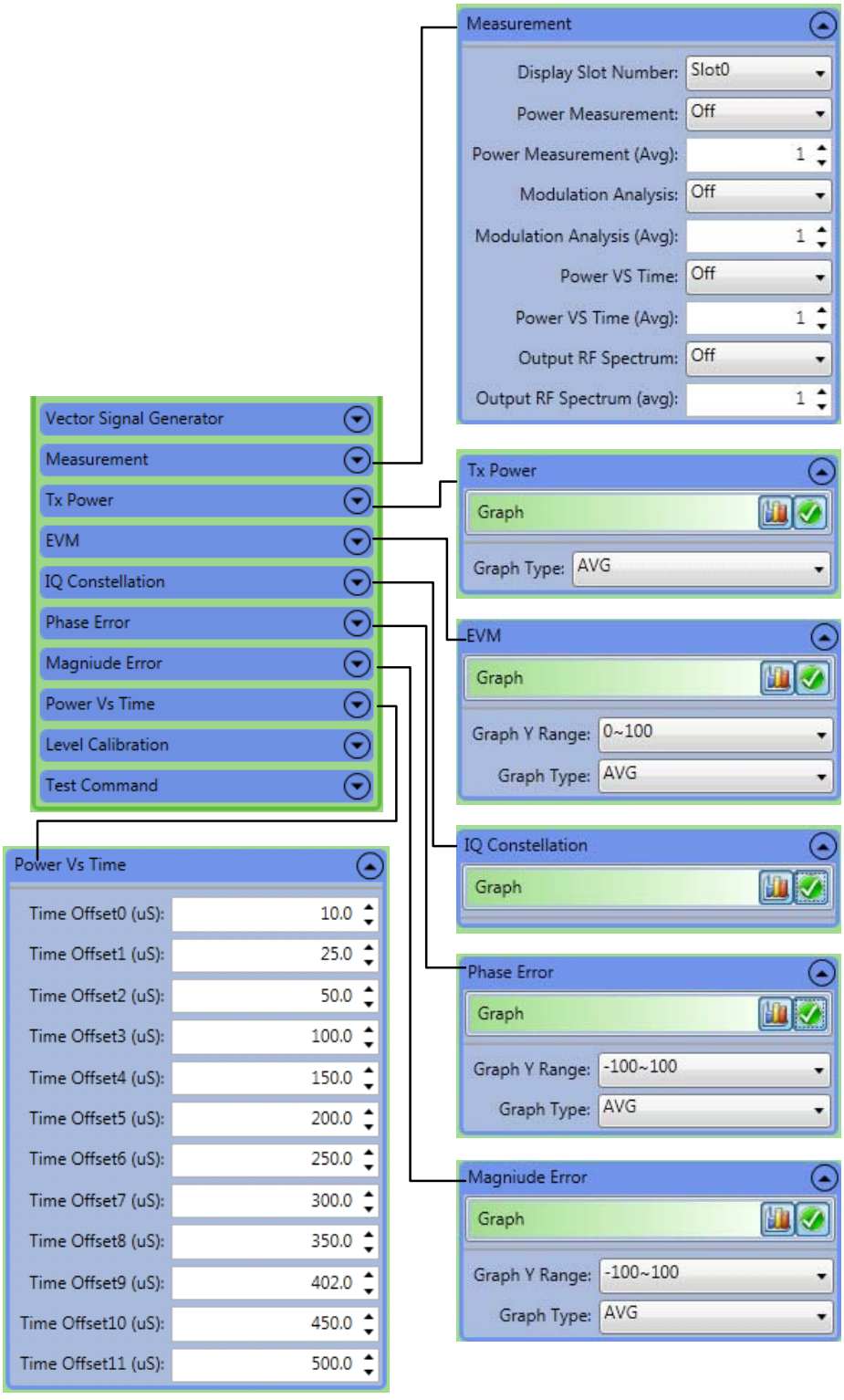


Figure 3.4.1-2 GSM Settings Panes (2/2)

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.

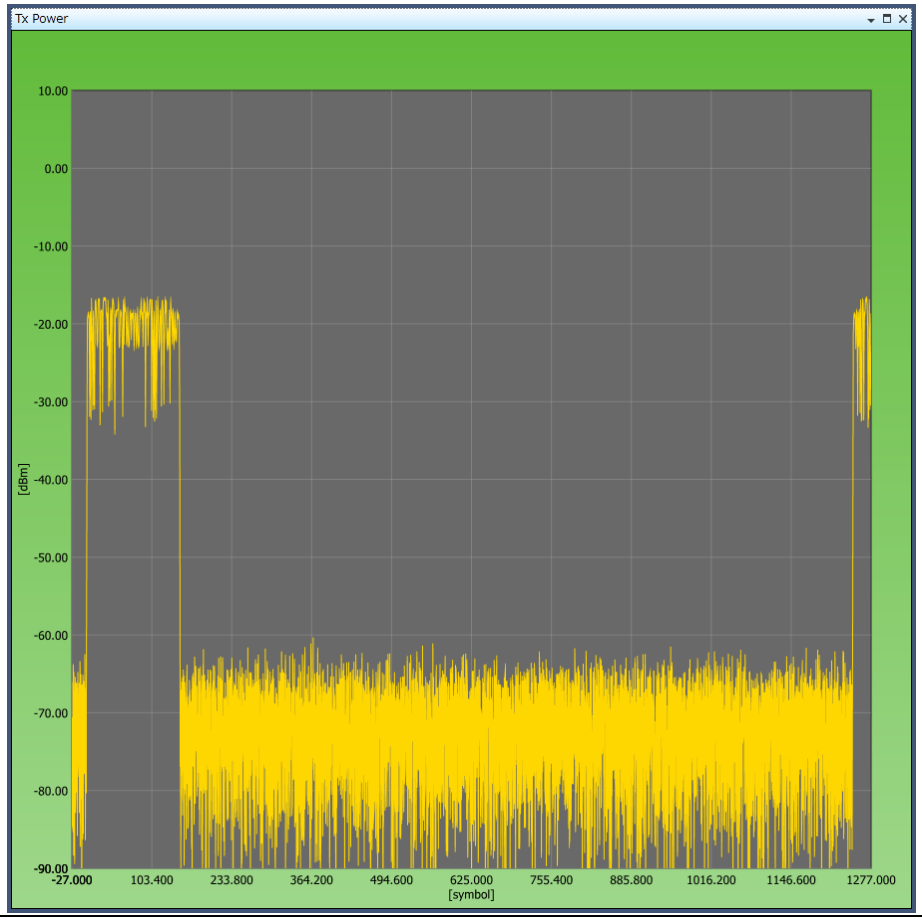


Figure 3.4.2-1 GSM (Tx Power) Graph

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*.

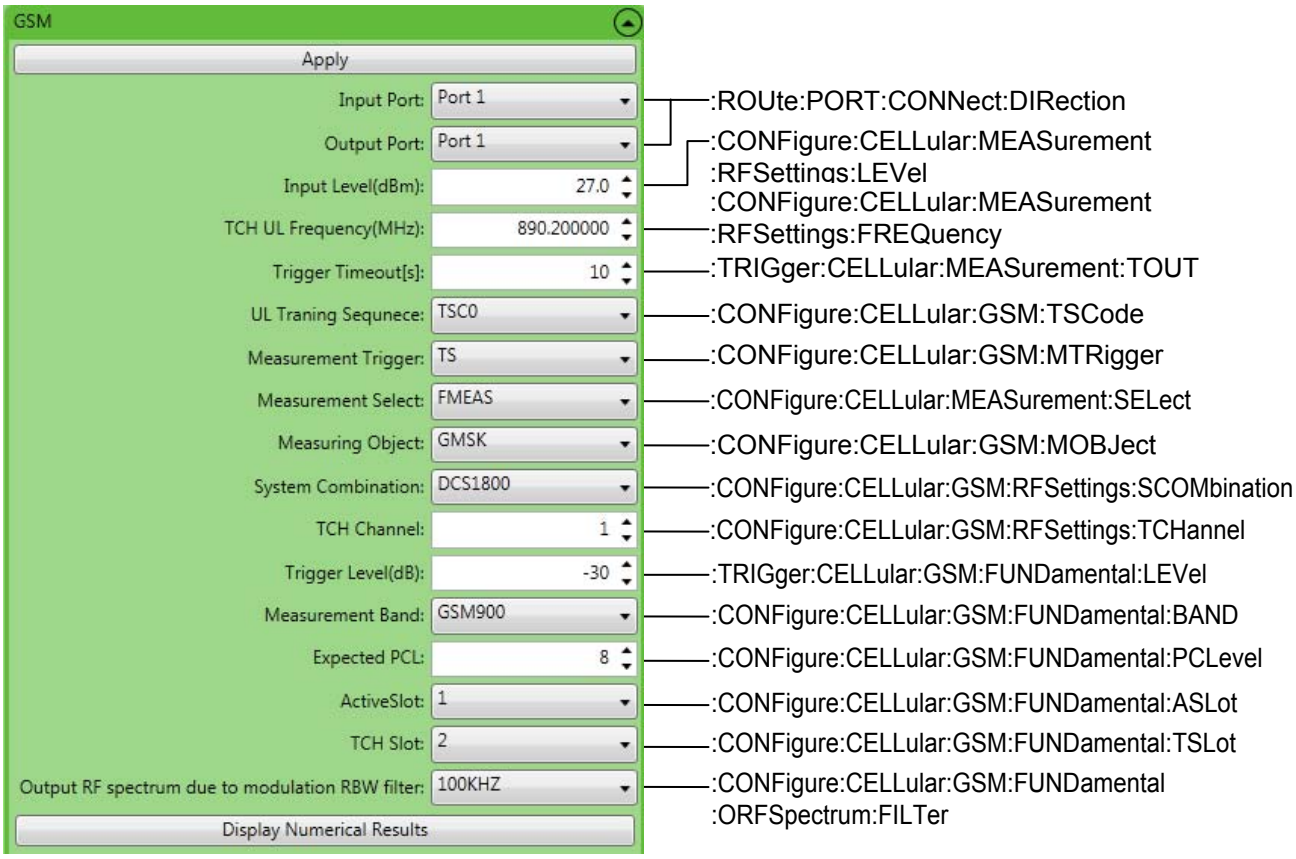


Figure 3.4.3-1 Measurement Settings Pane

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).

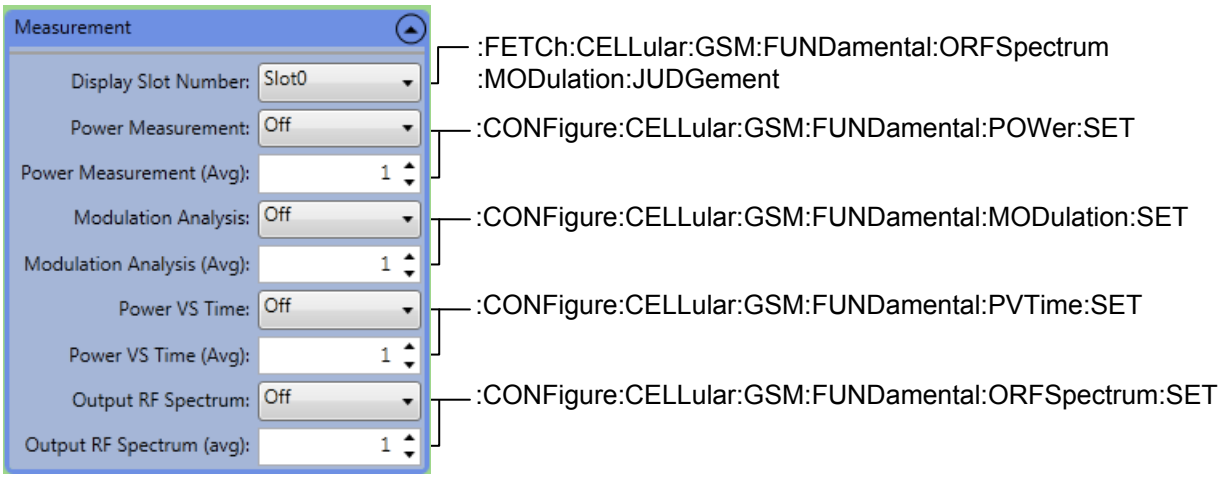


Figure 3.4.3-2 Measurement Settings Pane (Measurement Dialog)

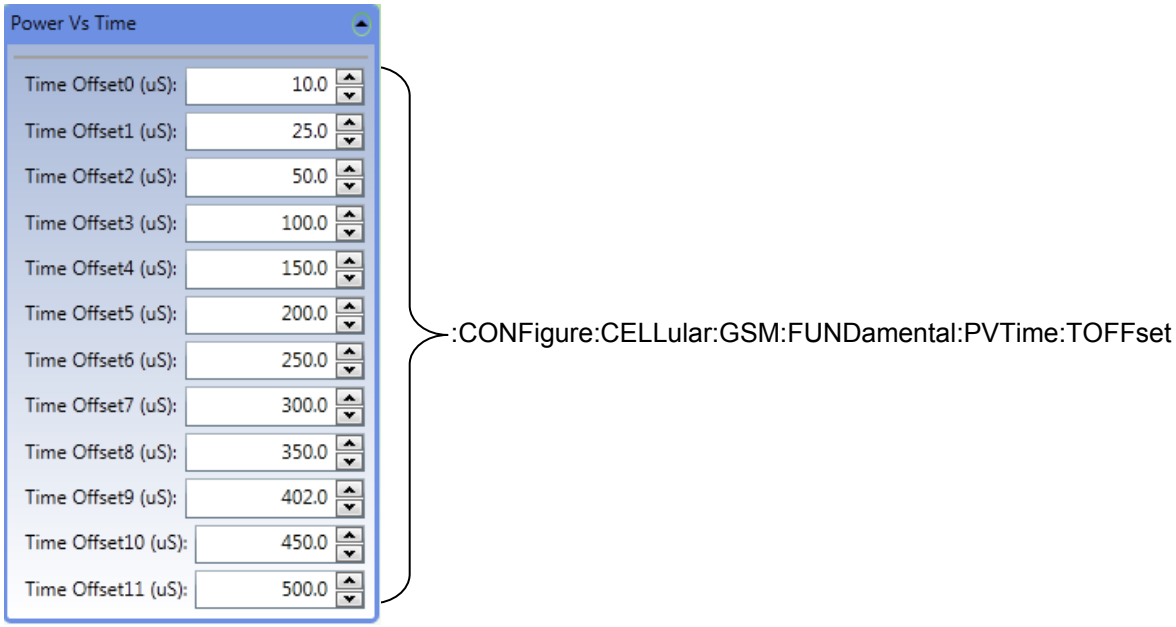


Figure 3.4.3-3 Measurement Settings Pane (Power vs Time Dialog)

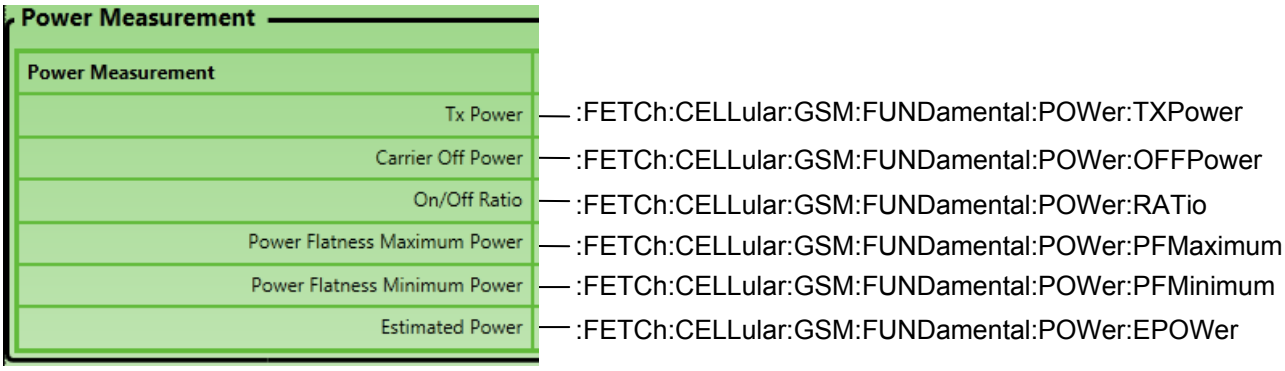


Figure 3.4.3-4 Power Measurement Results

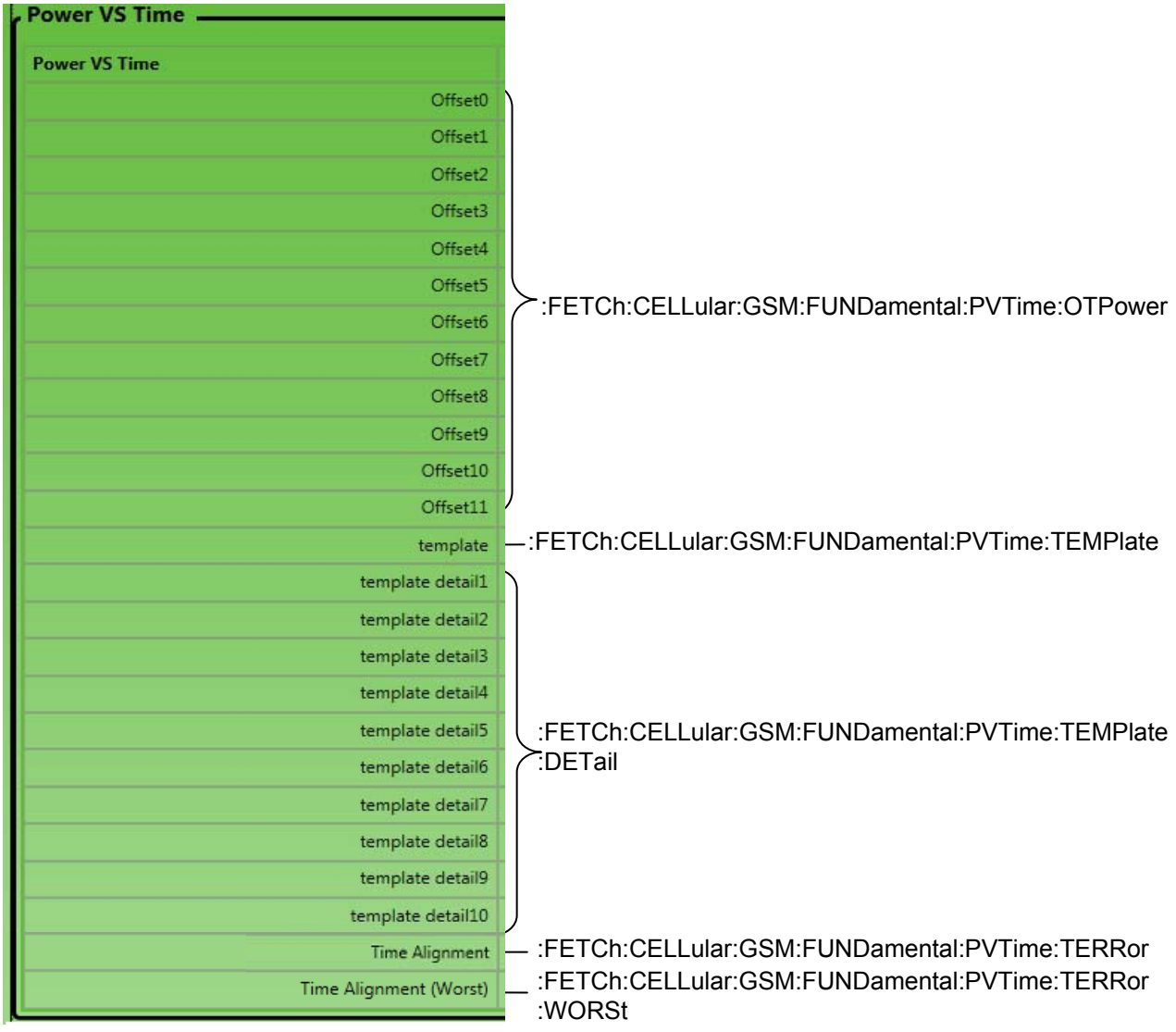


Figure 3.4.3-5 Power vs Time Results

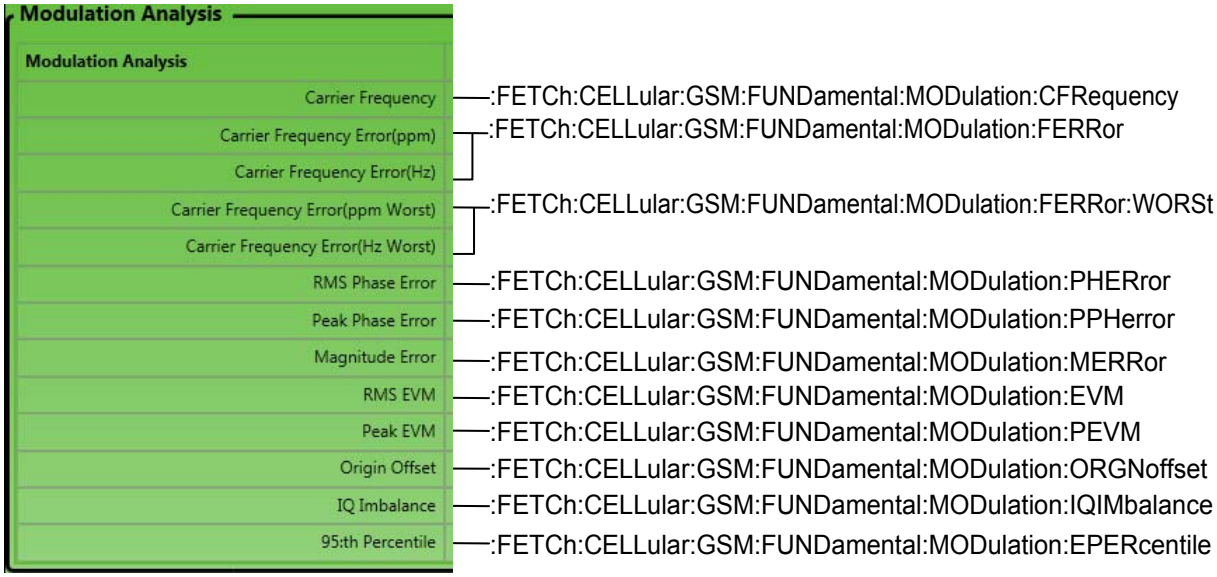


Figure 3.4.3-6 Modulation Analysis Results

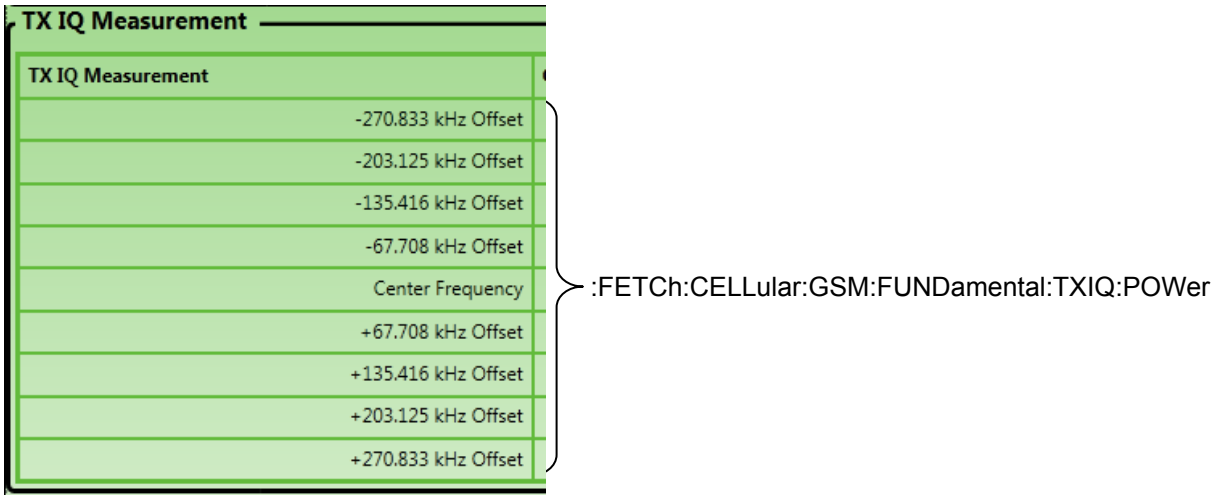


Figure 3.4.3-7 TX IQ Measurement Results

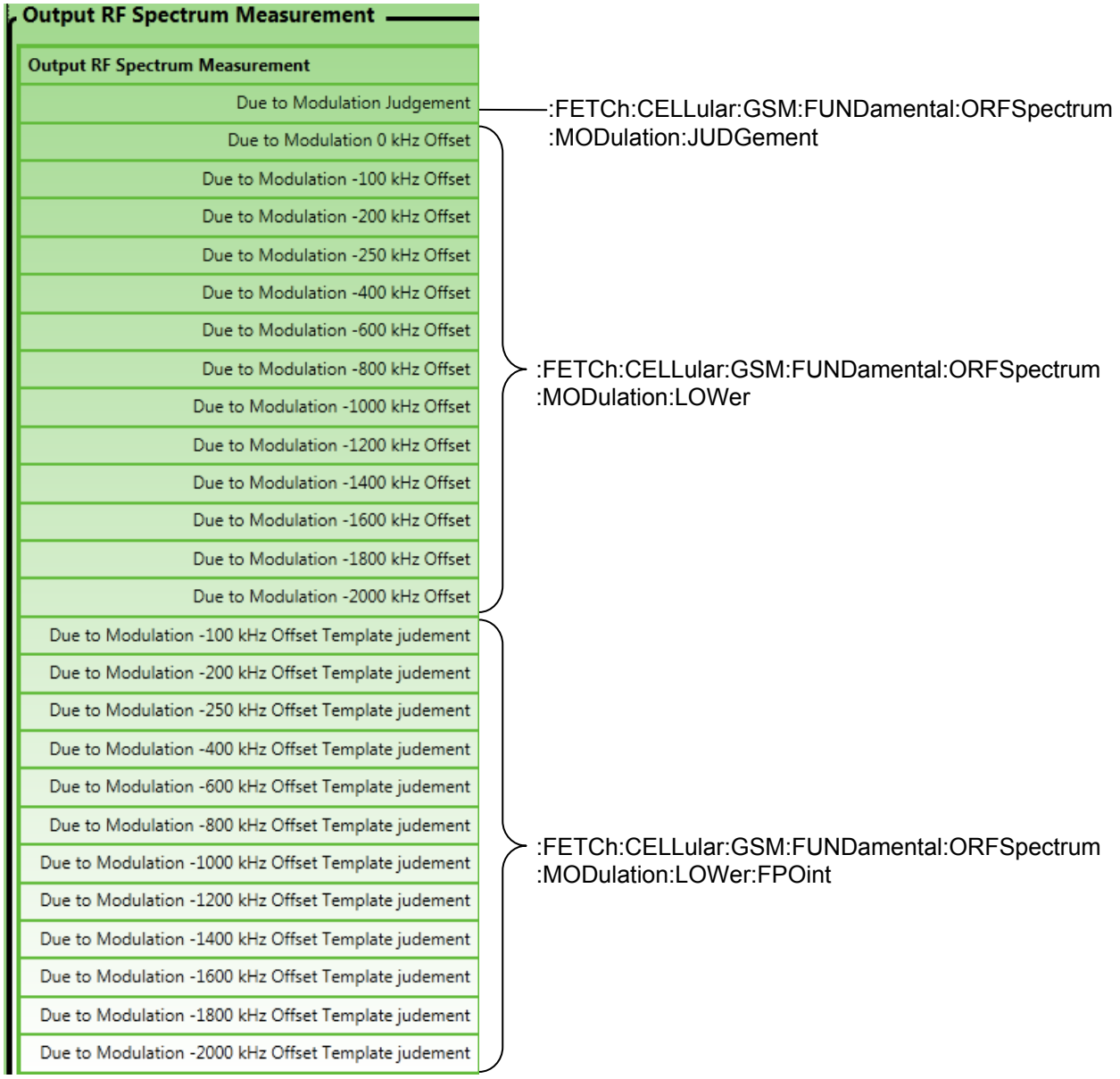


Figure 3.4.3-8 Output RF Spectrum Measurement Results (1/4)



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



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

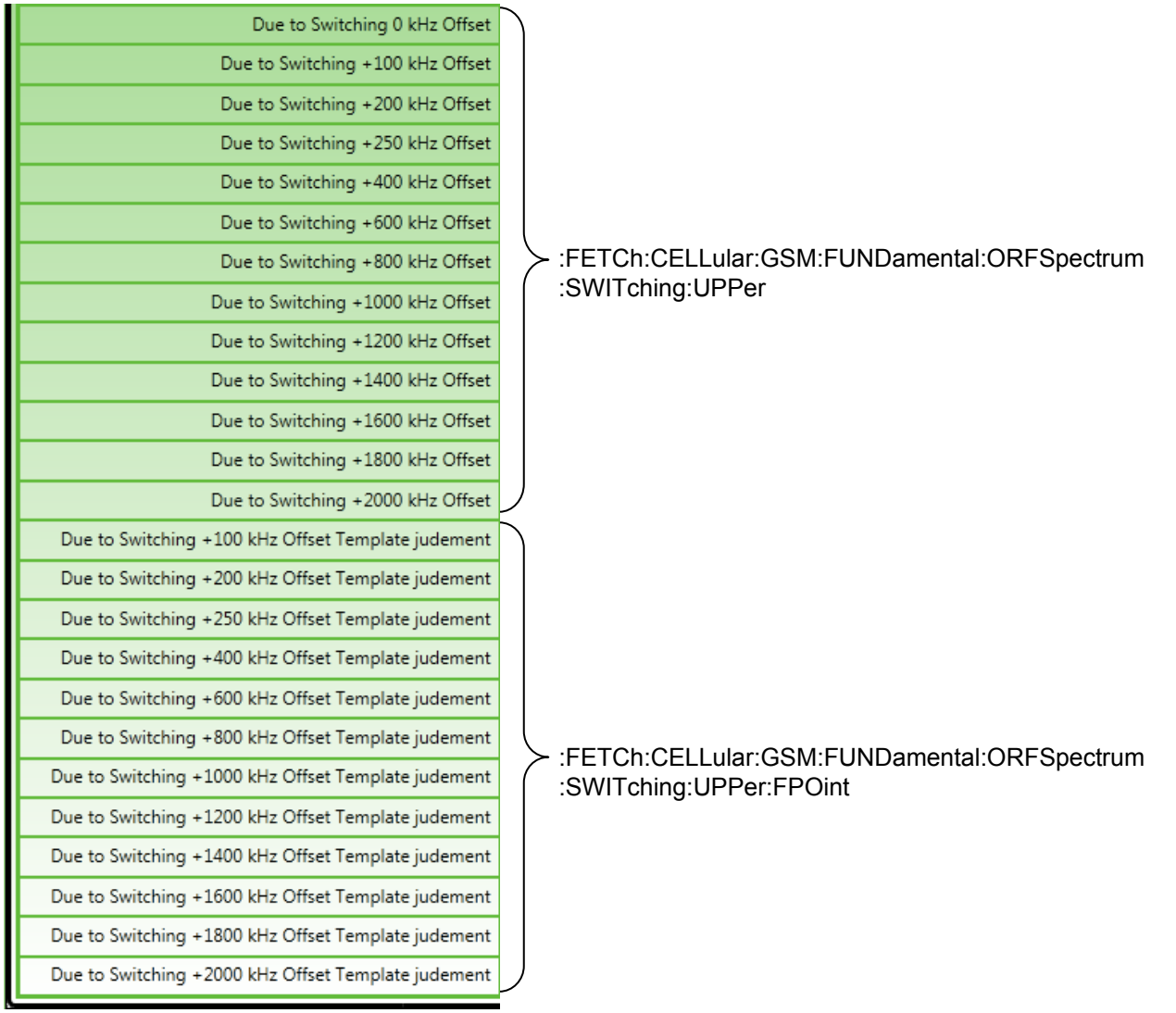


Figure 3.4.3-11 Output RF Spectrum Measurement Results (4/4)

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*.

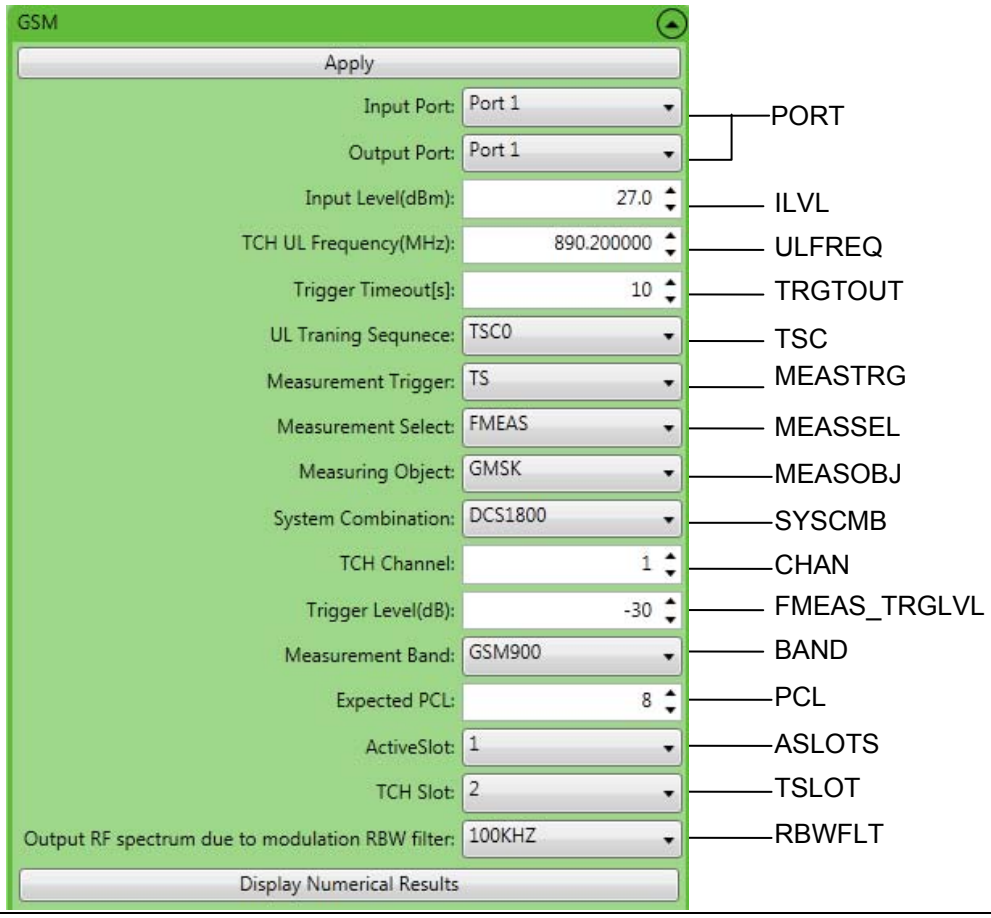


Figure 3.4.4-1 Measurement Setting Pane

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).

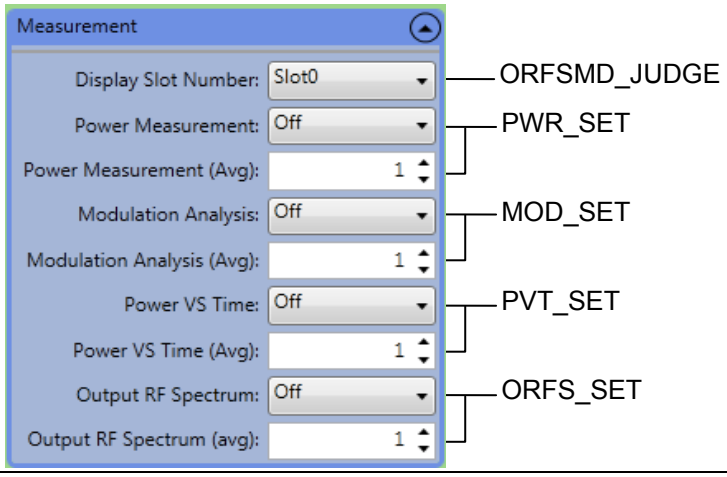


Figure 3.4.4-2 Measurement Settings Pane (Measurement Dialog)

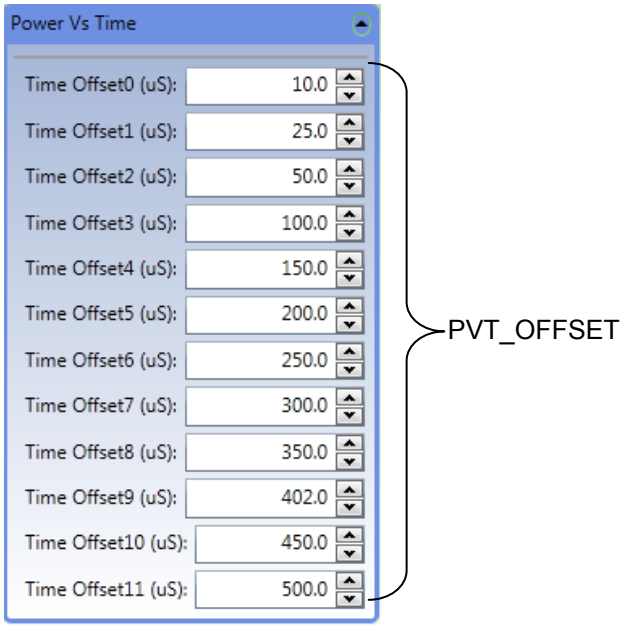


Figure 3.4.4-3 Measurement Settings Pane (Power vs Time Dialog)

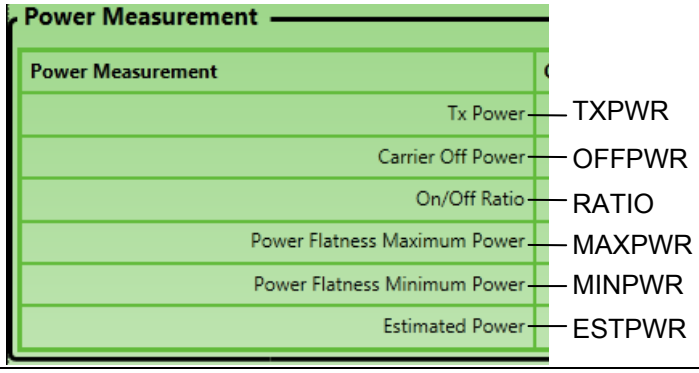


Figure 3.4.4-4 Power Measurement Results

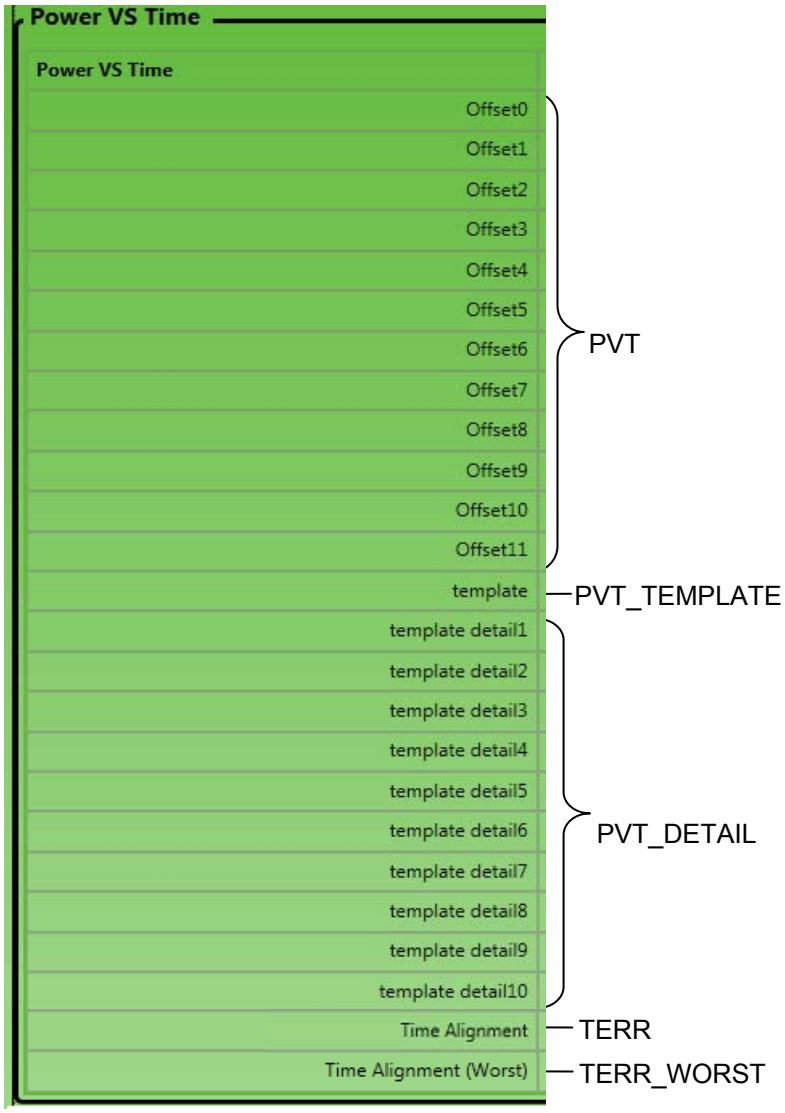


Figure 3.4.4-5 Power vs Time Results

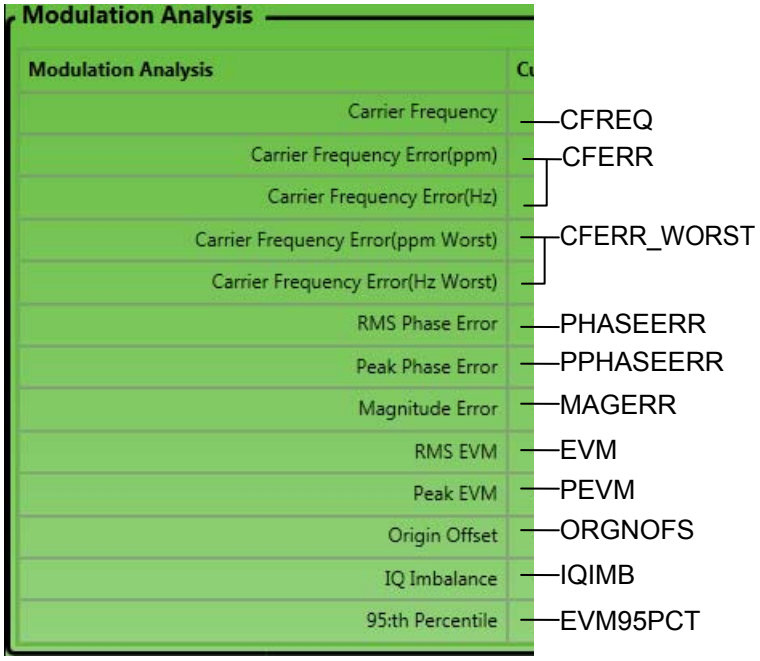


Figure 3.4.4-6 Modulation Analysis Results

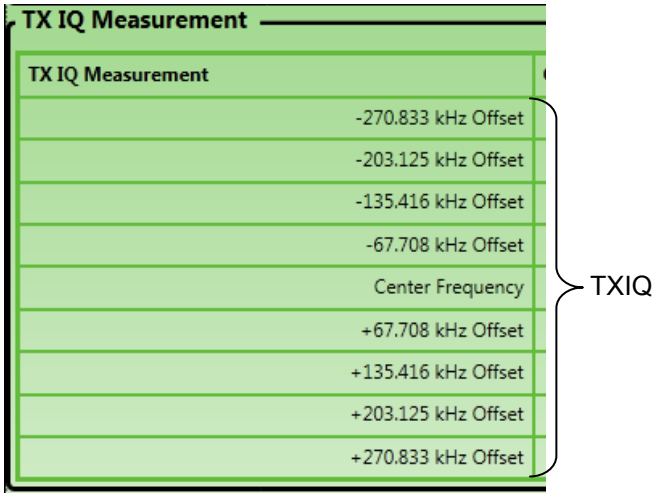


Figure 3.4.4-7 TX IQ Measurement Results

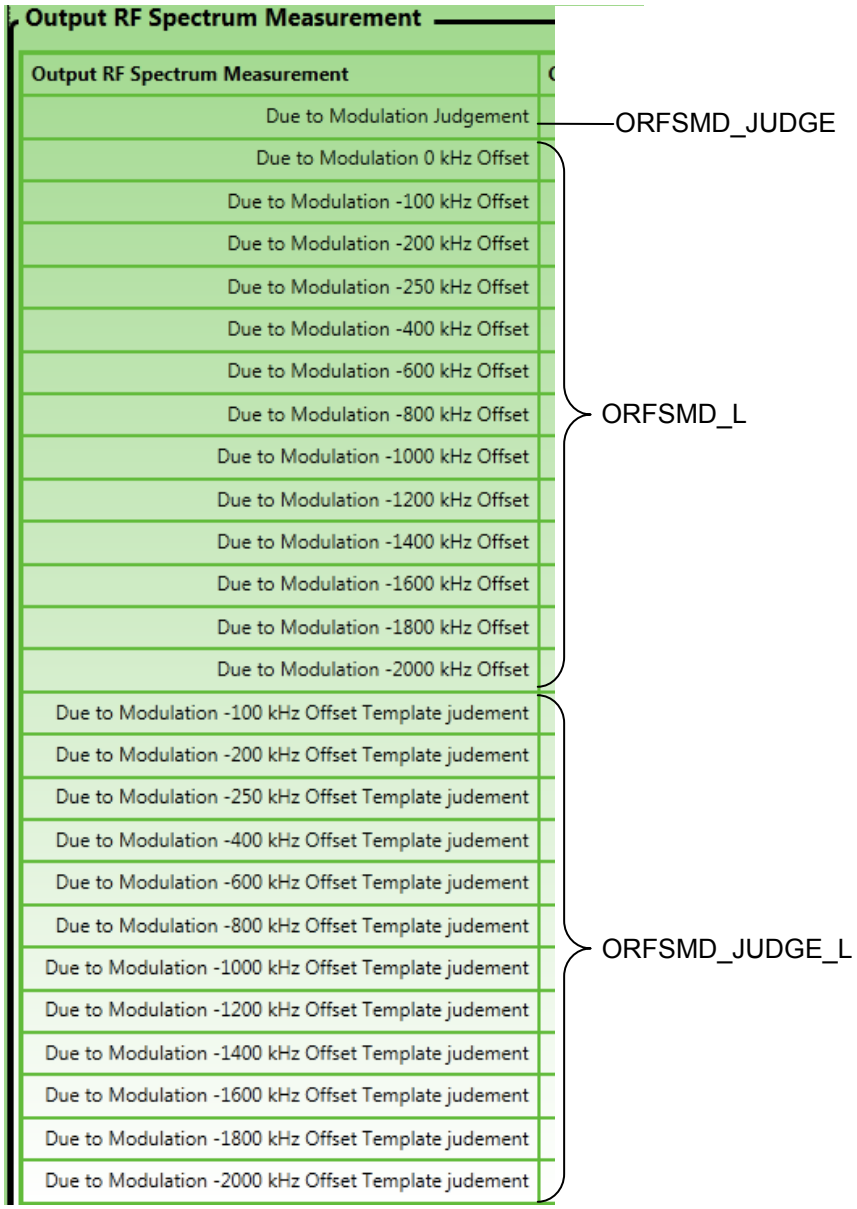


Figure 3.4.4-8 Output RF Spectrum Measurement Results (1/4)

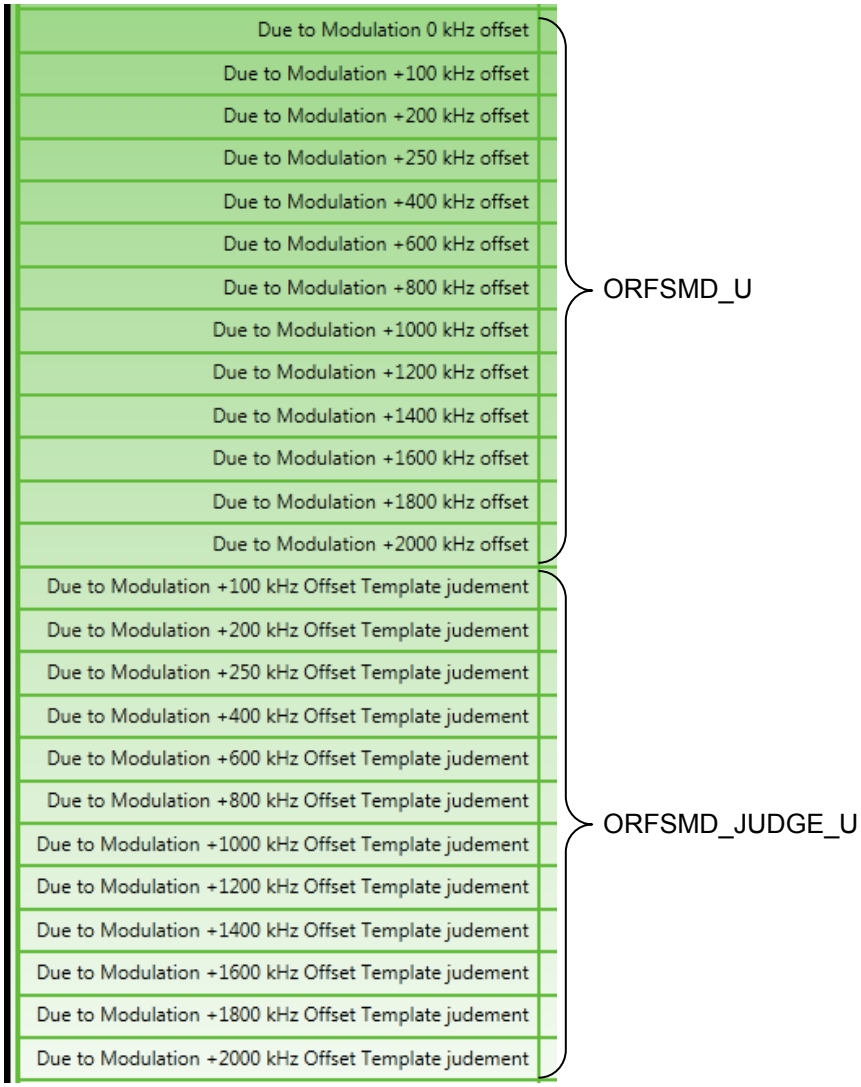


Figure 3.4.4-9 Output RF Spectrum Measurement Results (2/4)

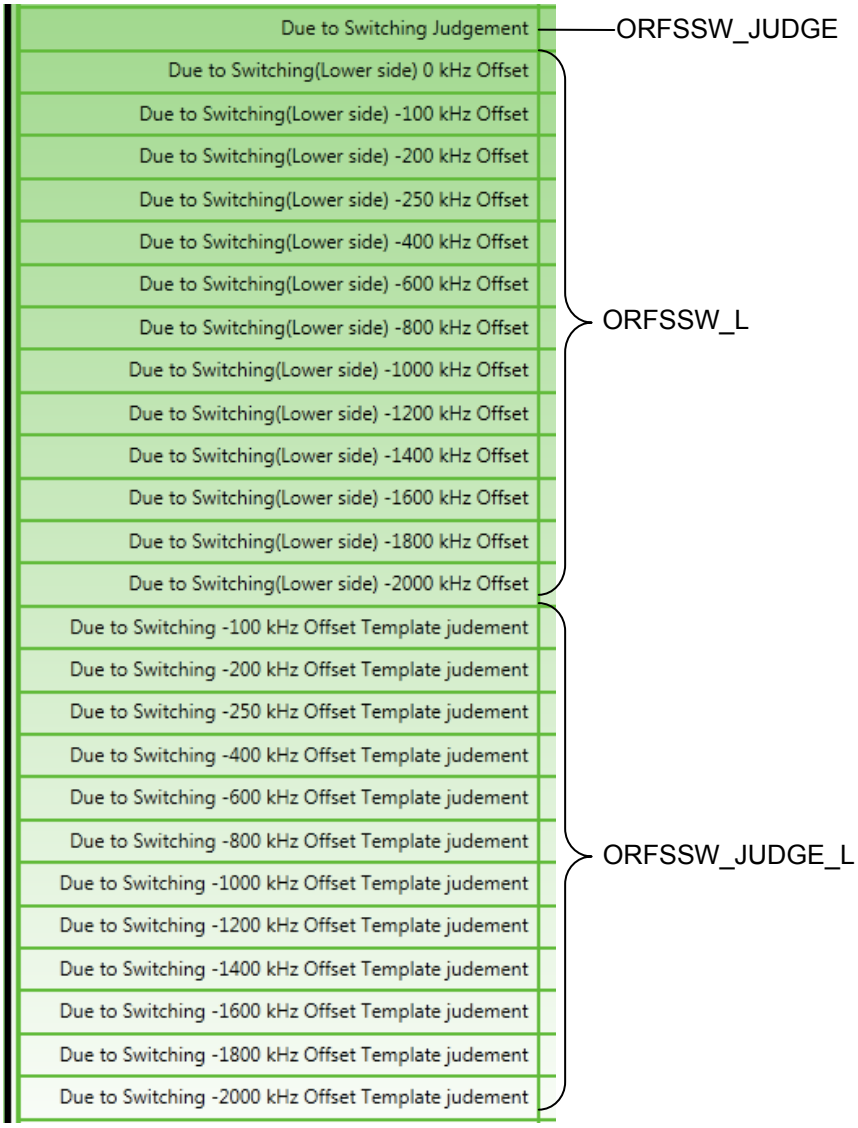


Figure 3.4.4-10 Output RF Spectrum Measurement Results (3/4)

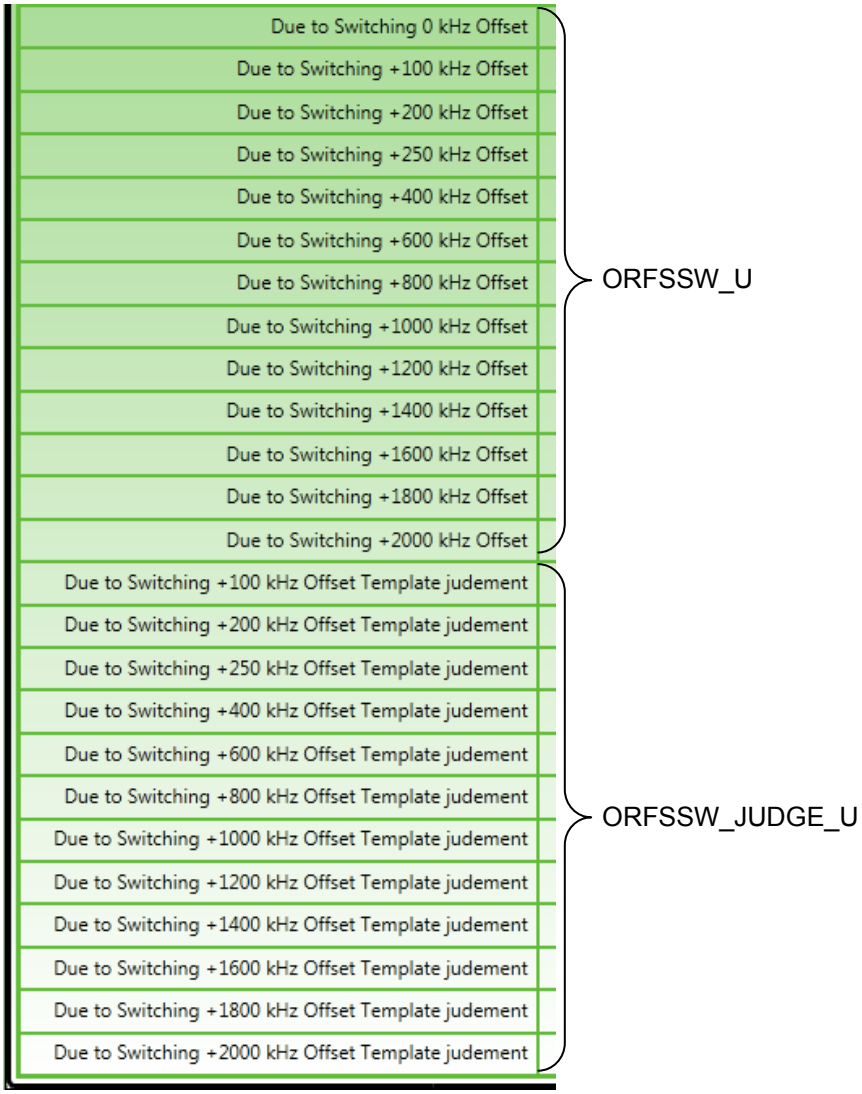


Figure 3.4.4-11 Output RF Spectrum Measurement Results (4/4)

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.

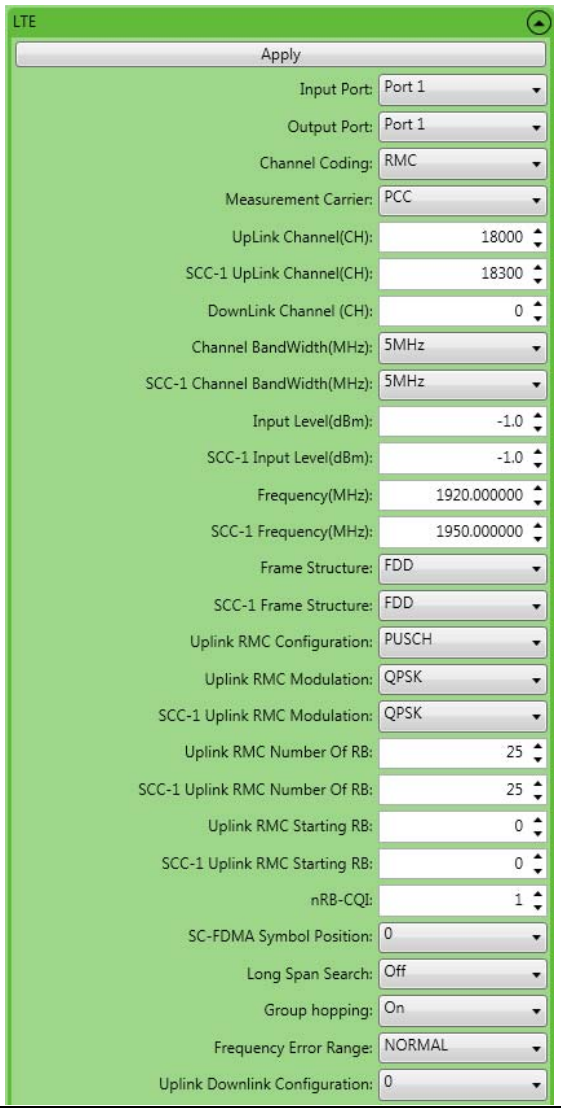


Figure 3.5.1-1 LTE Measurement Settings Pane (1/2)

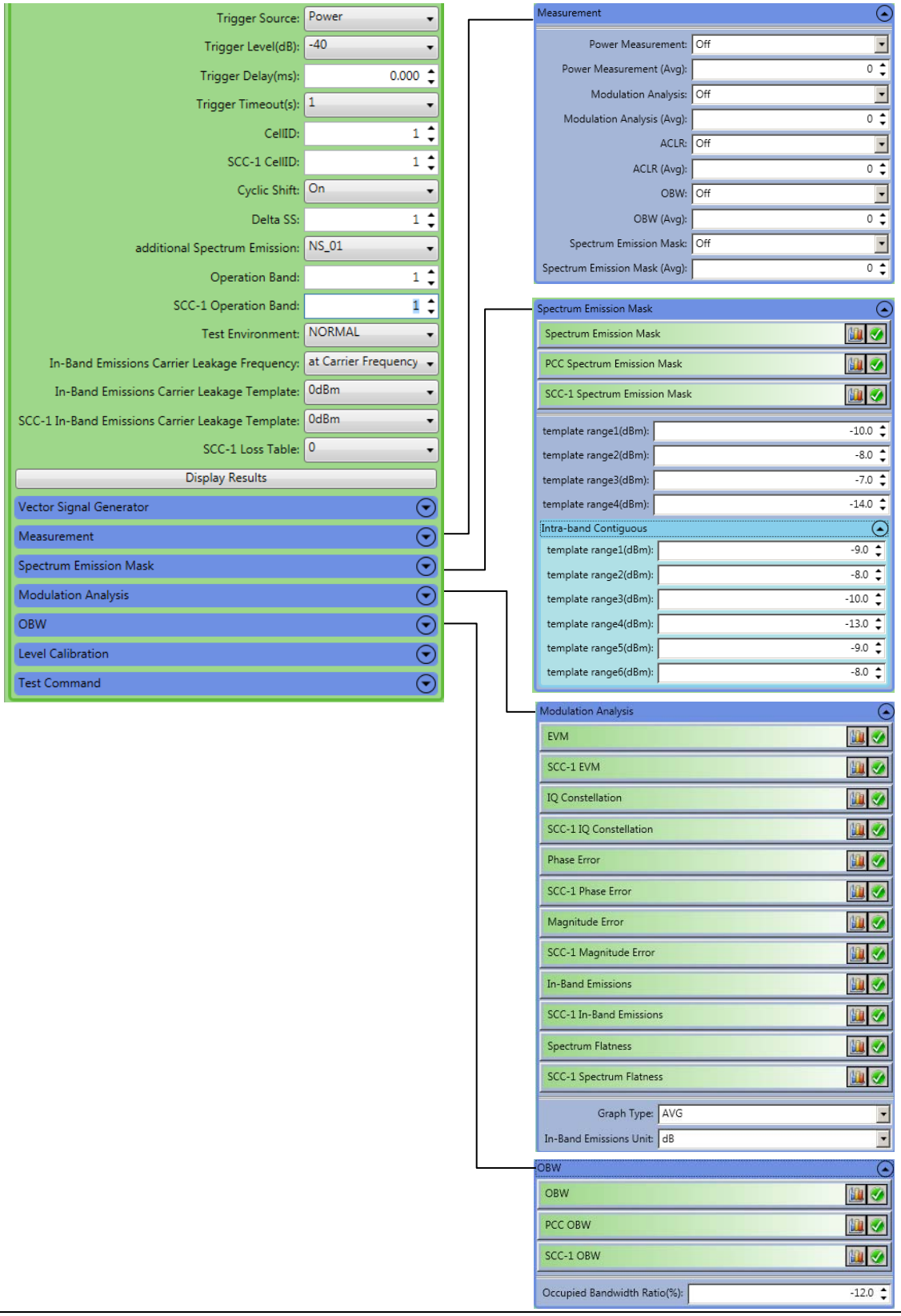


Figure 3.5.1-2 LTE Measurement Settings Pane (2/2)

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.

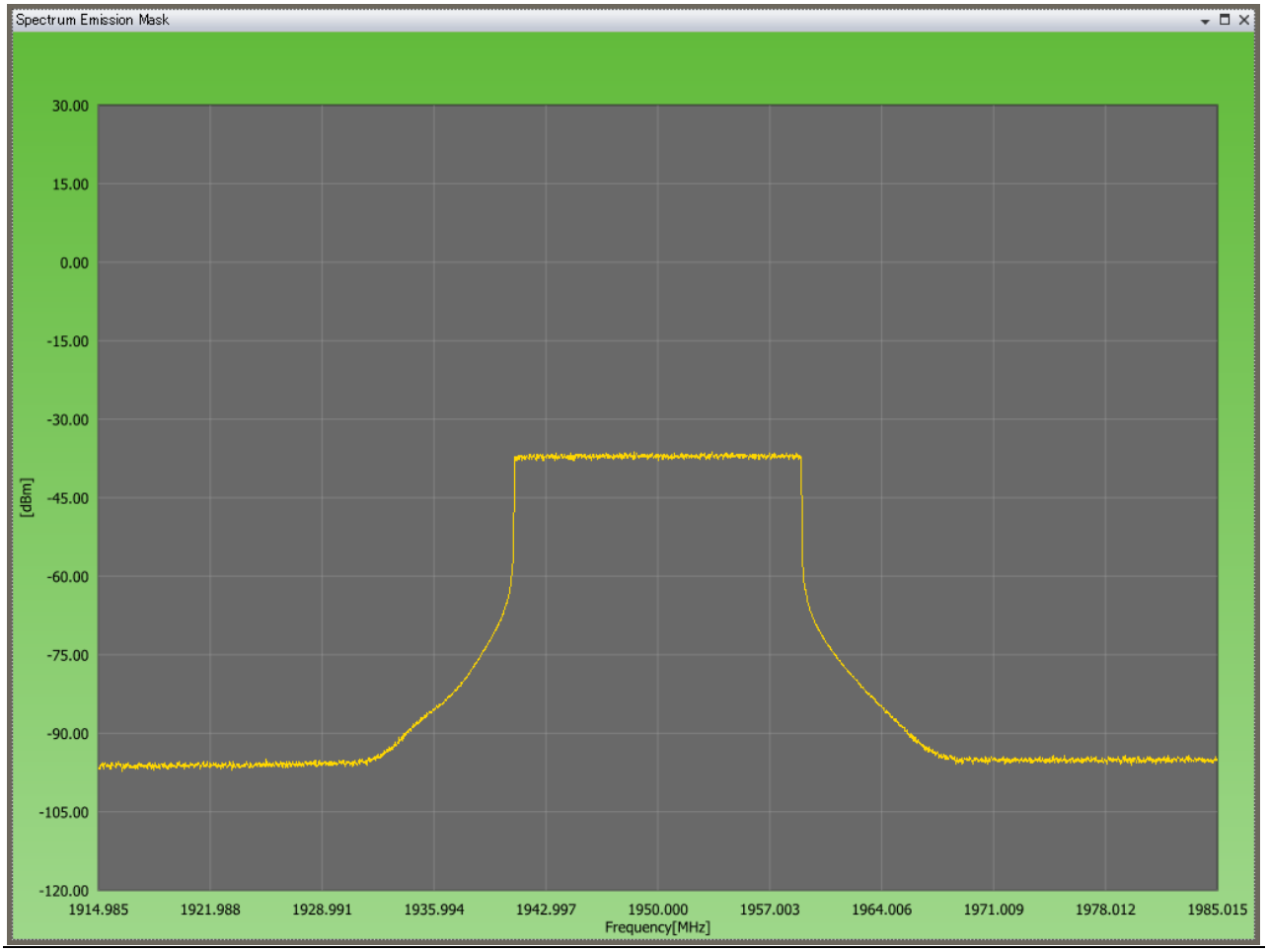


Figure 3.5.2-1 LTE (Spectrum Emission Mask) Graph

3.5.3 Related SCPI Commands

The SCPI commands for remote control of the MX887013A LTE FDD Uplink TX Measurement 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 LTE FDD Uplink TX Measurement Operation Manual*.

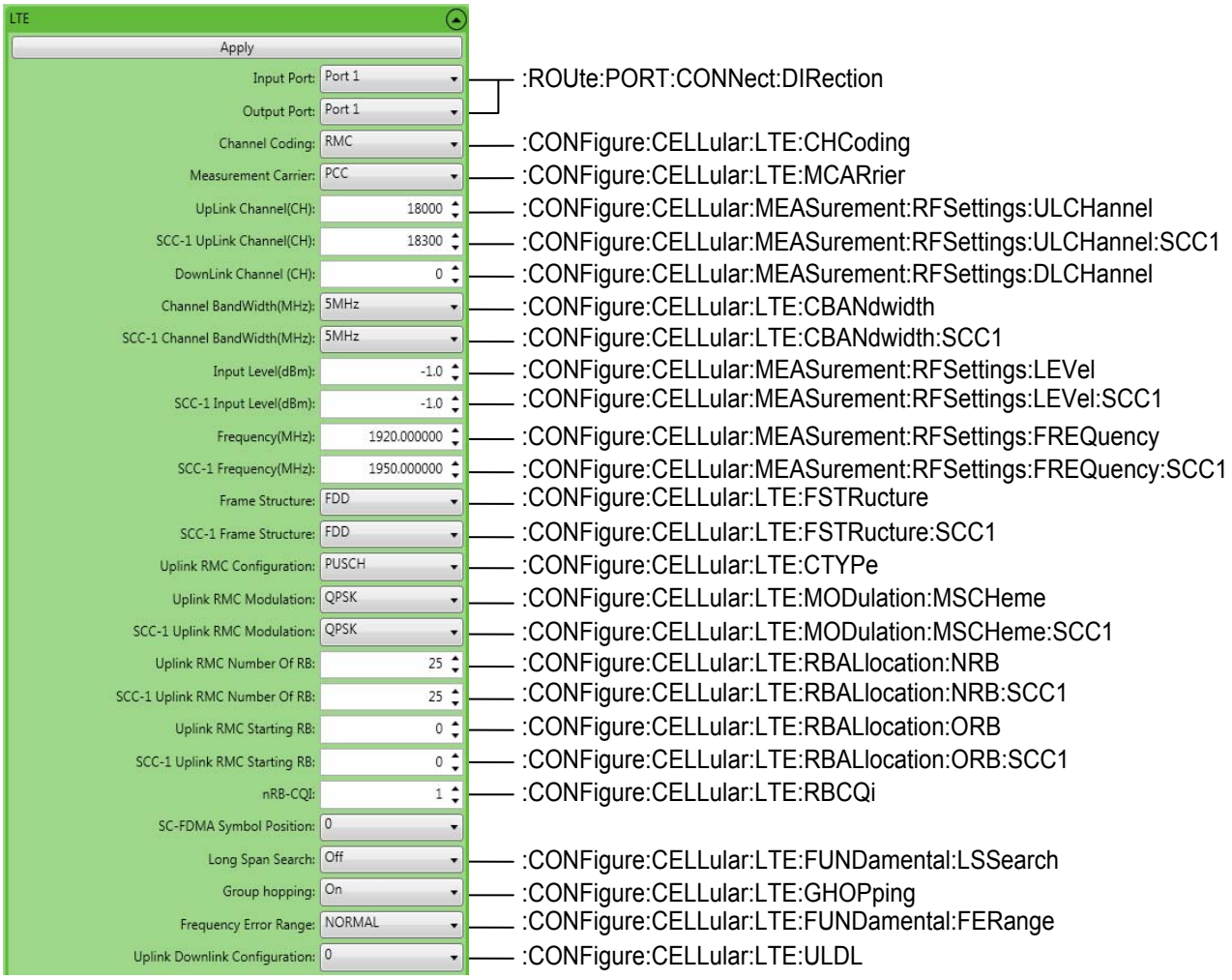


Figure 3.5.3-1 Measurement Settings Pane (1/2)

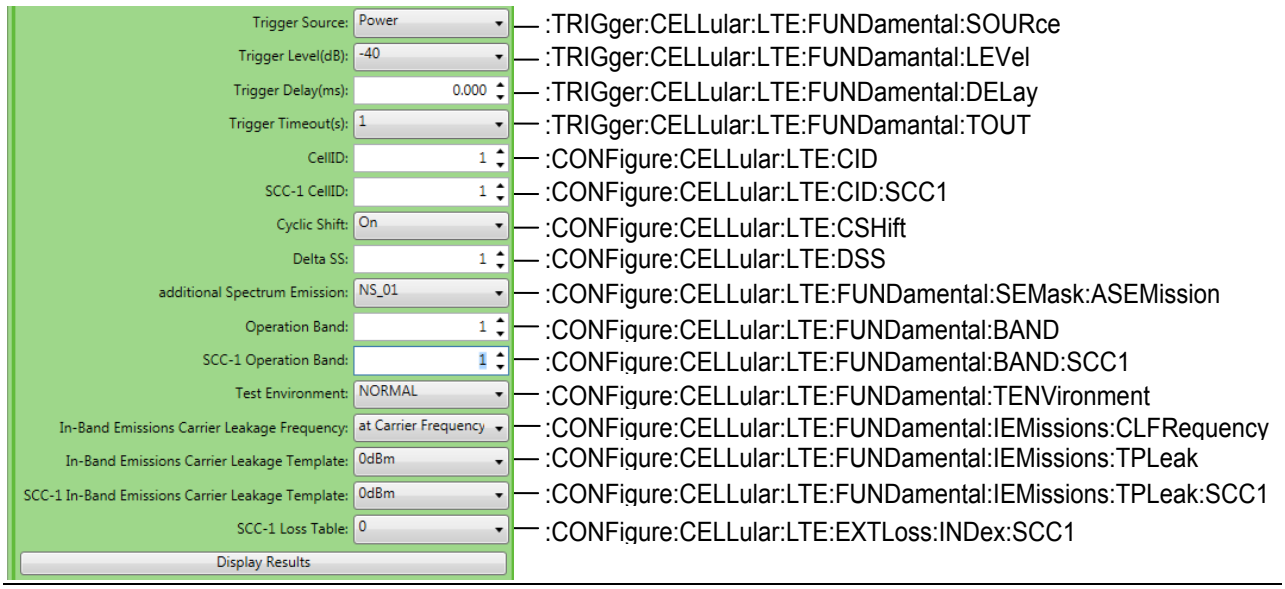


Figure 3.5.3-2 Measurement Settings Pane (2/2)

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).

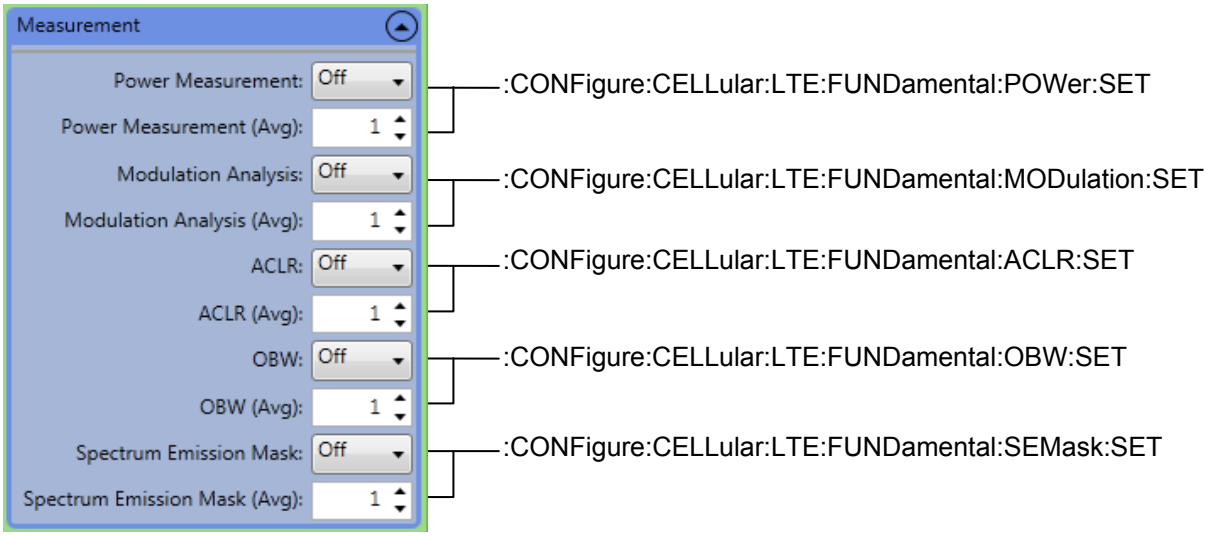


Figure 3.5.3-3 Measurement Settings Pane (Measurement Dialog)

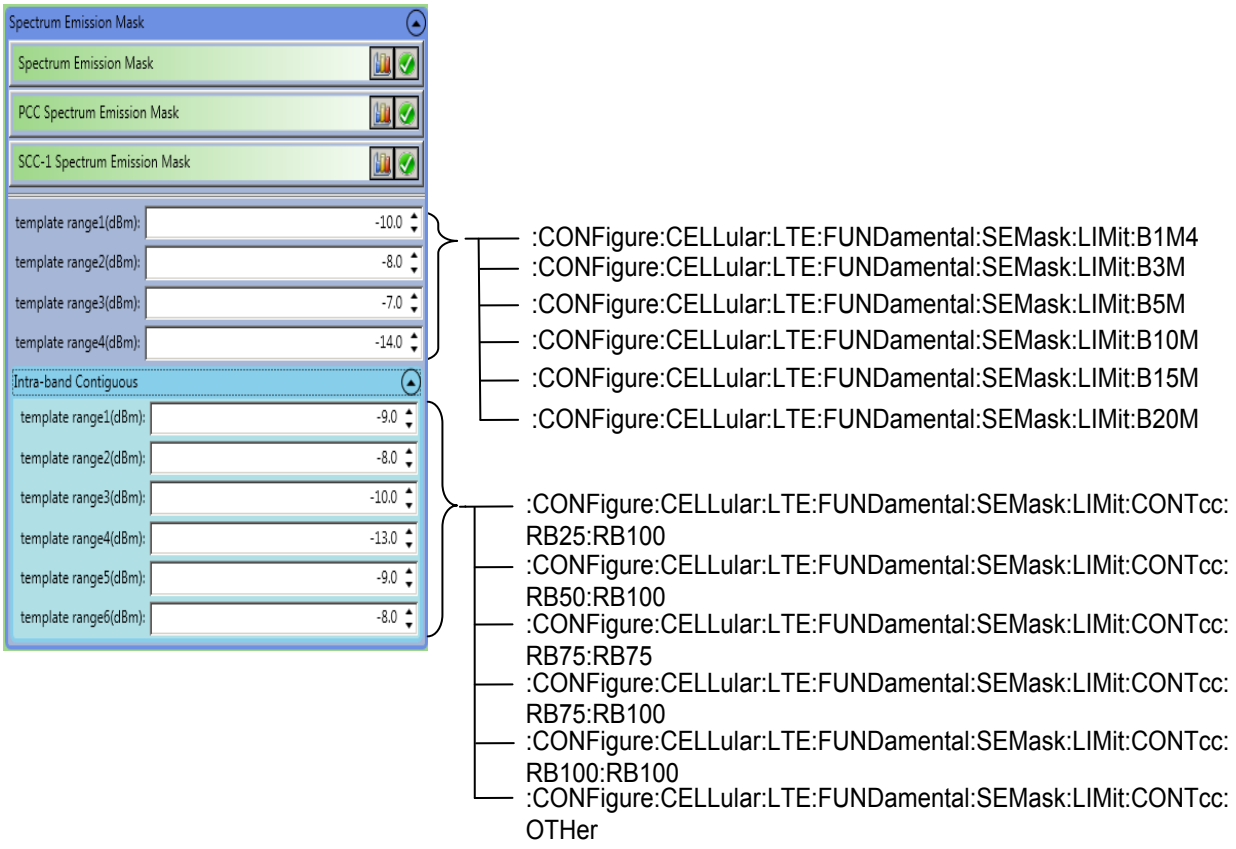


Figure 3.5.3-4 Measurement Settings Pane (Spectrum Emission Mask Dialog)



:CONFigure:CELLular:LTE:FUNDamental:OBW:RATio

Figure 3.5.3-5 Measurement Settings Pane (OBW Dialog)



Figure 3.5.3-6 Measurement Settings Pane (Modulation Analysis)

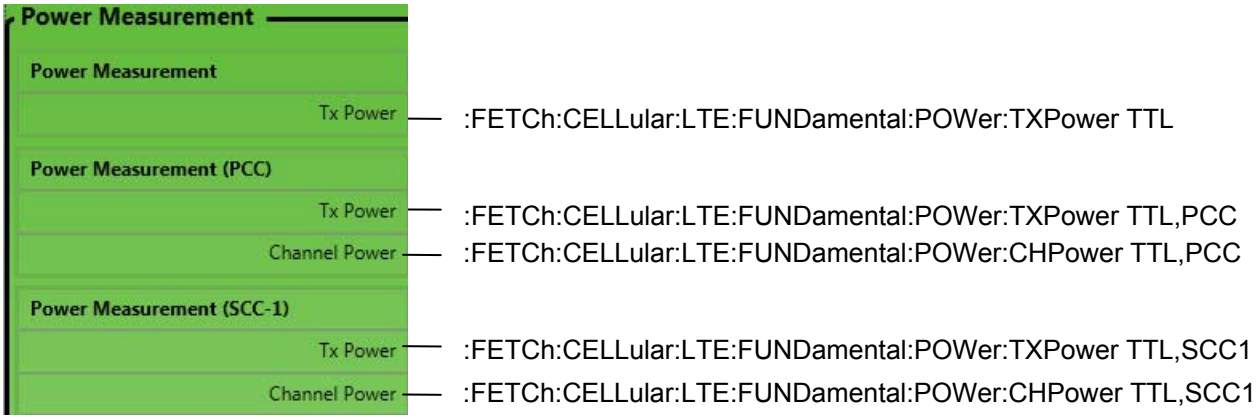


Figure 3.5.3-7 Power Measurement Results

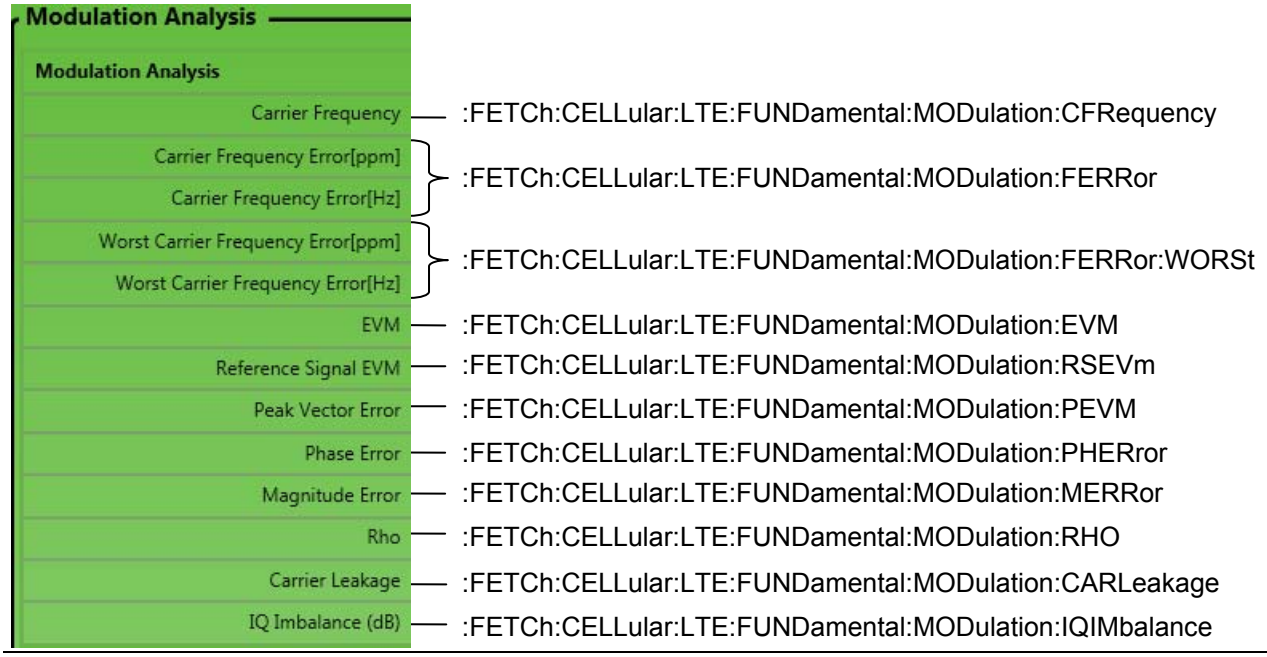


Figure 3.5.3-8 Modulation Analysis Results (1/2)

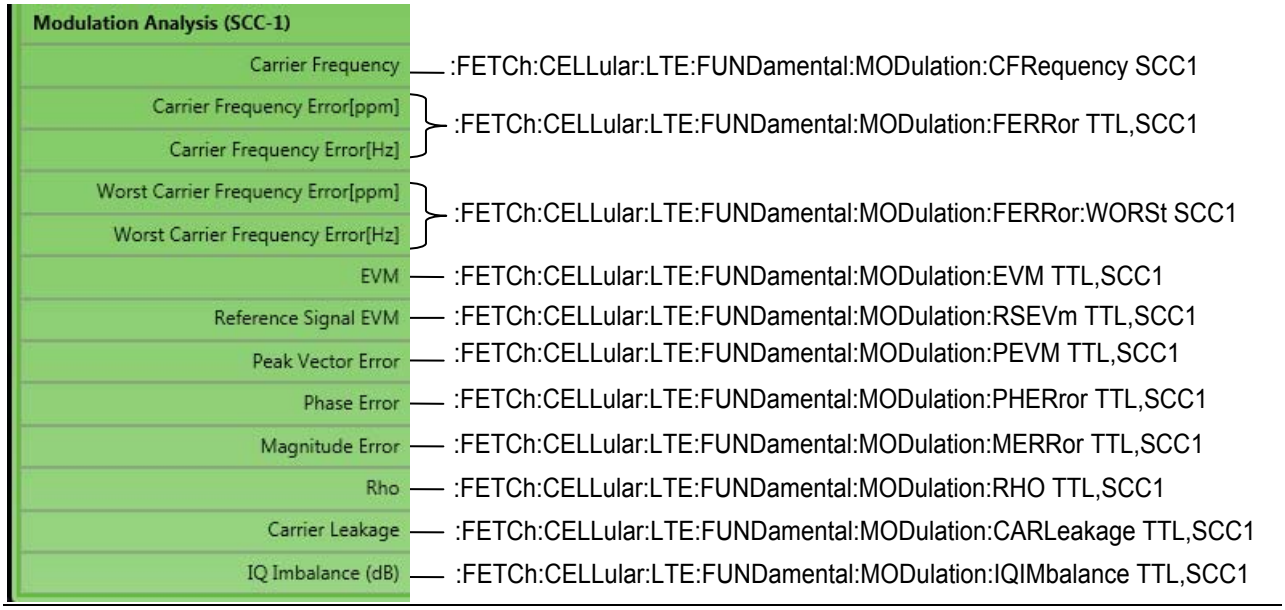


Figure 3.5.3-9 Modulation Analysis Results (2/2)

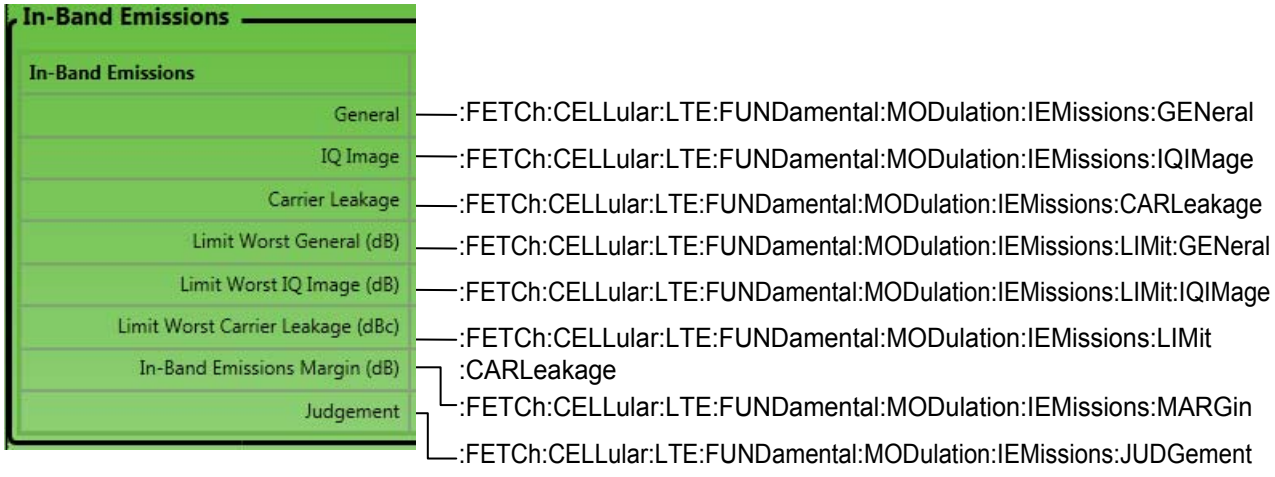


Figure 3.5.3-10 In-Band Emissions Results (1/2)

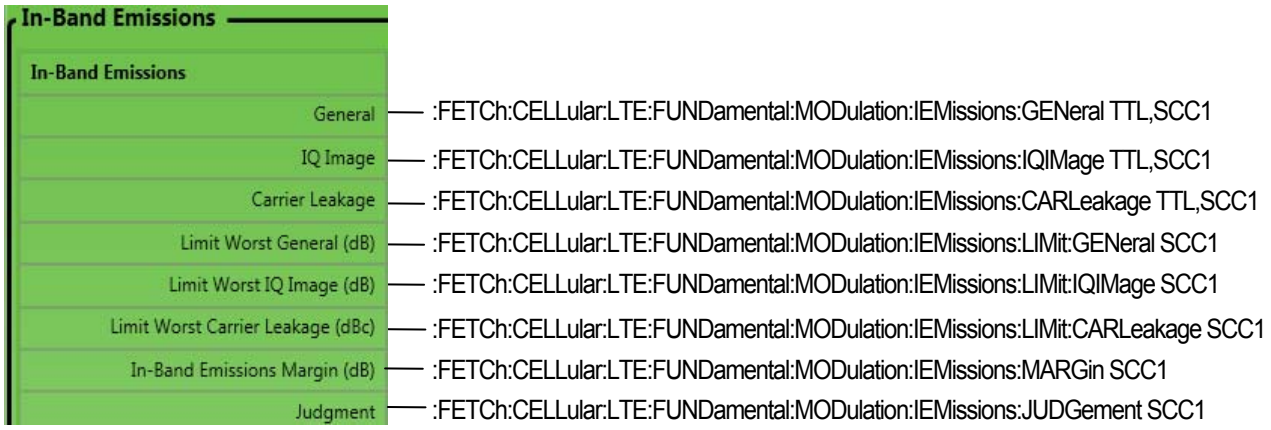


Figure 3.5.3-11 **In-Band** Emissions **Results (2/2)**

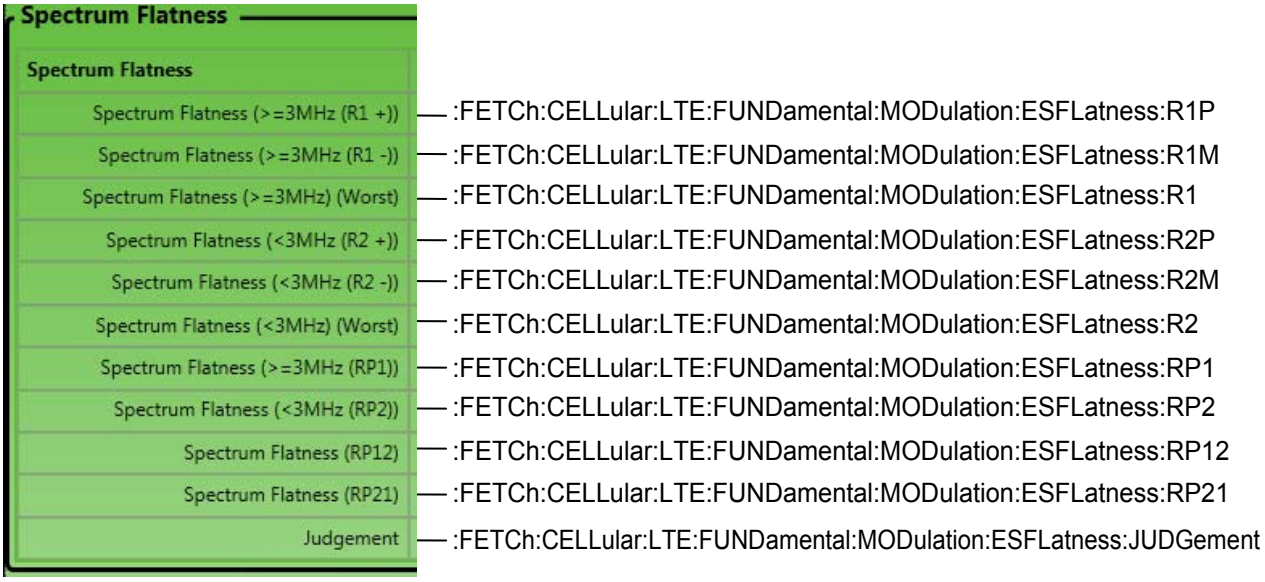


Figure 3.5.3-12 Spectrum Flatness Results (1/2)

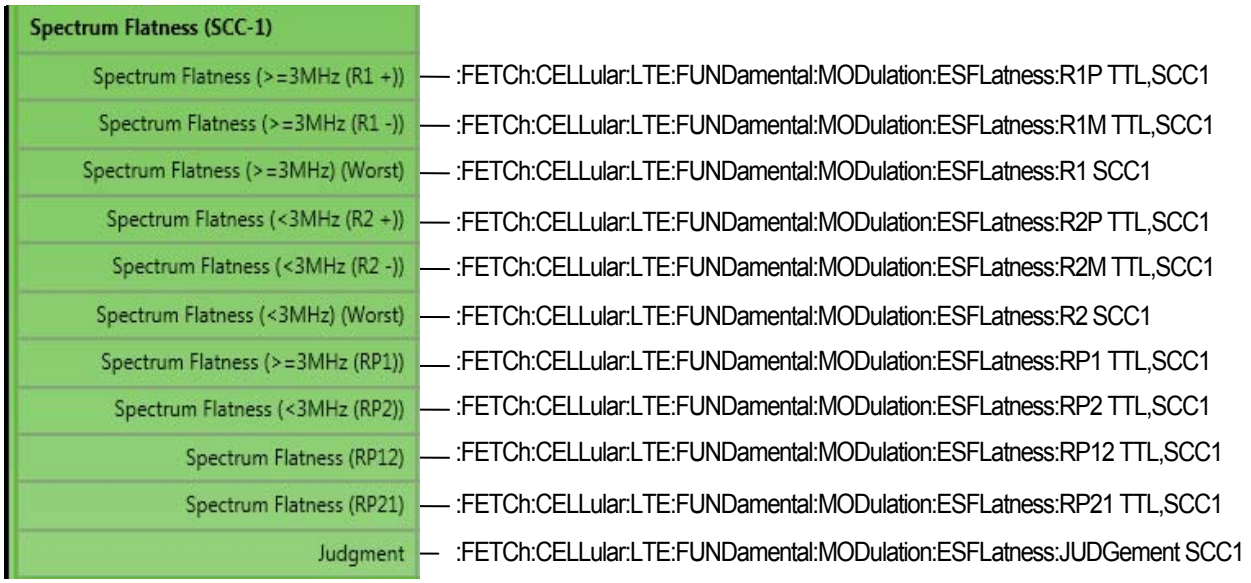


Figure 3.5.3-13 Spectrum Flatness Results (2/2)

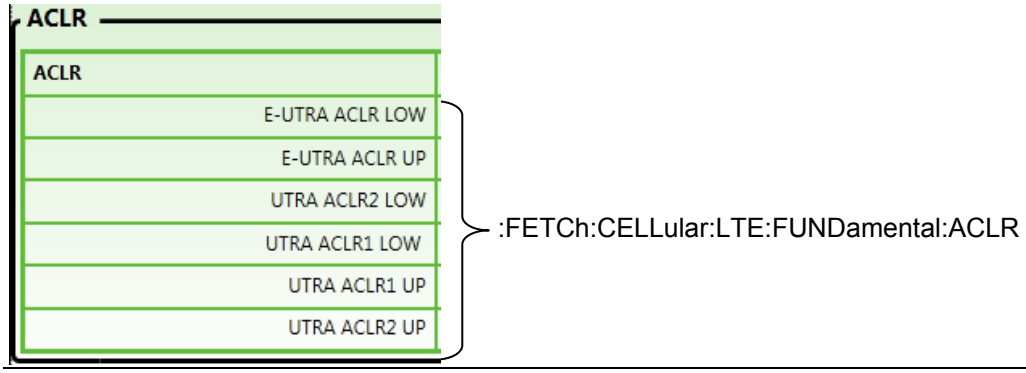


Figure 3.5.3-14 ACLR Results (1/3)

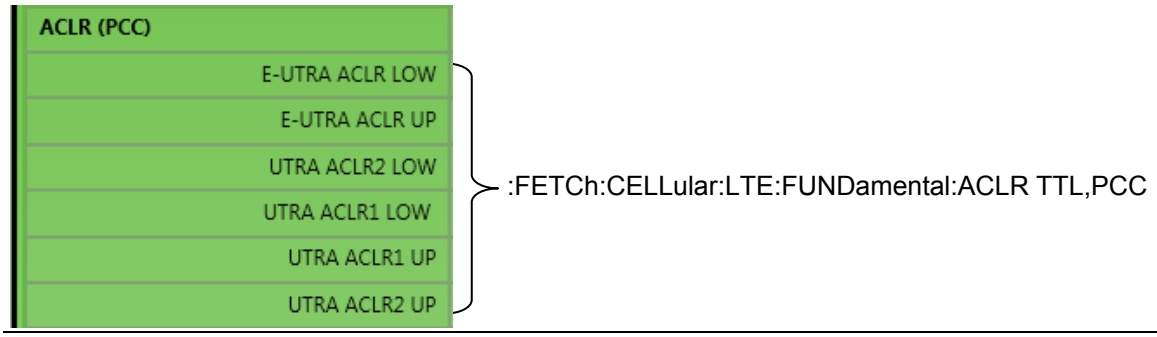


Figure 3.5.3-15 ACLR Results (2/3)

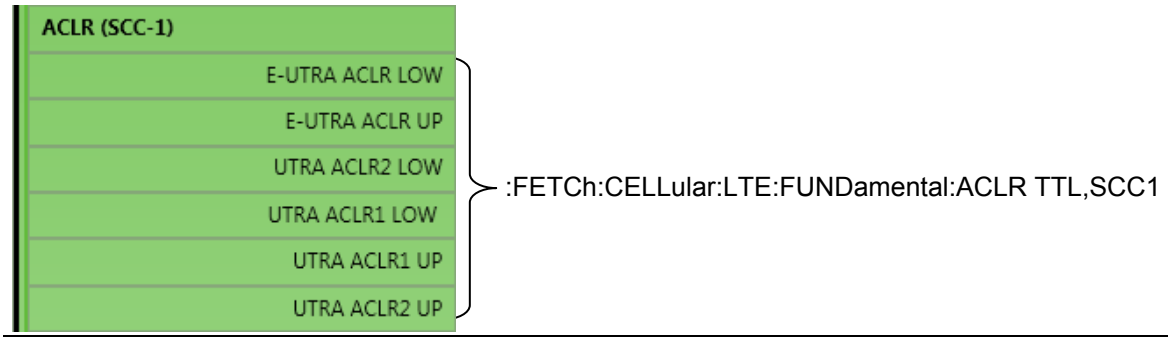


Figure 3.5.3-16 ACLR Results (3/3)

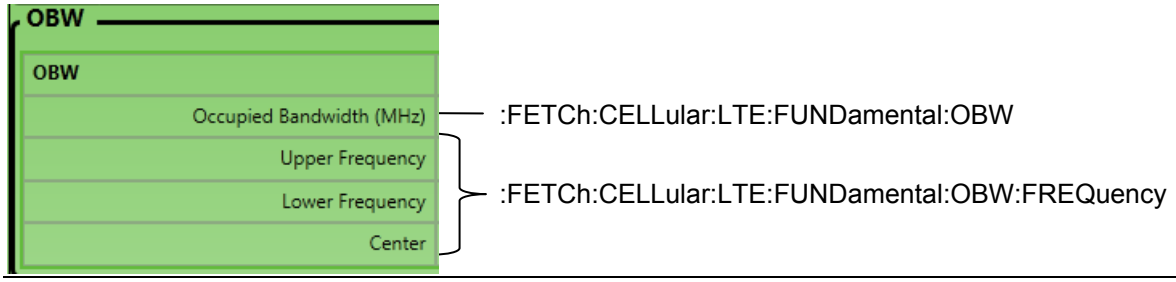


Figure 3.5.3-17 OBW Results (1/3)

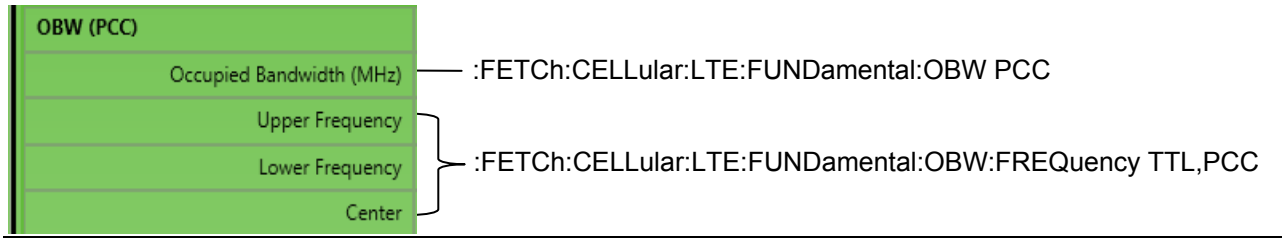


Figure 3.5.3-18 OBW Results (2/3)

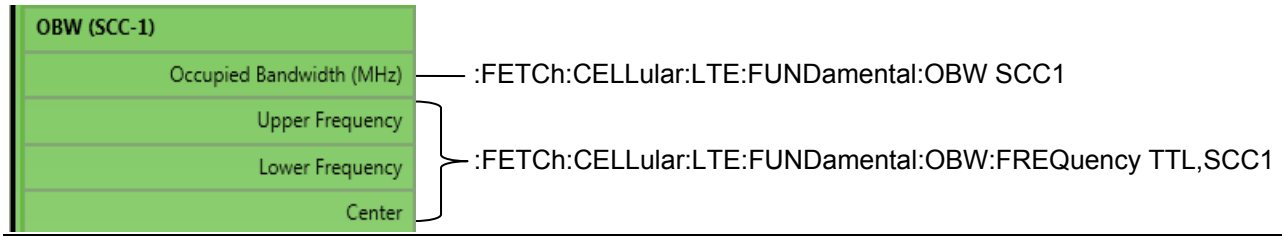


Figure 3.5.3-19 OBW Results (3/3)

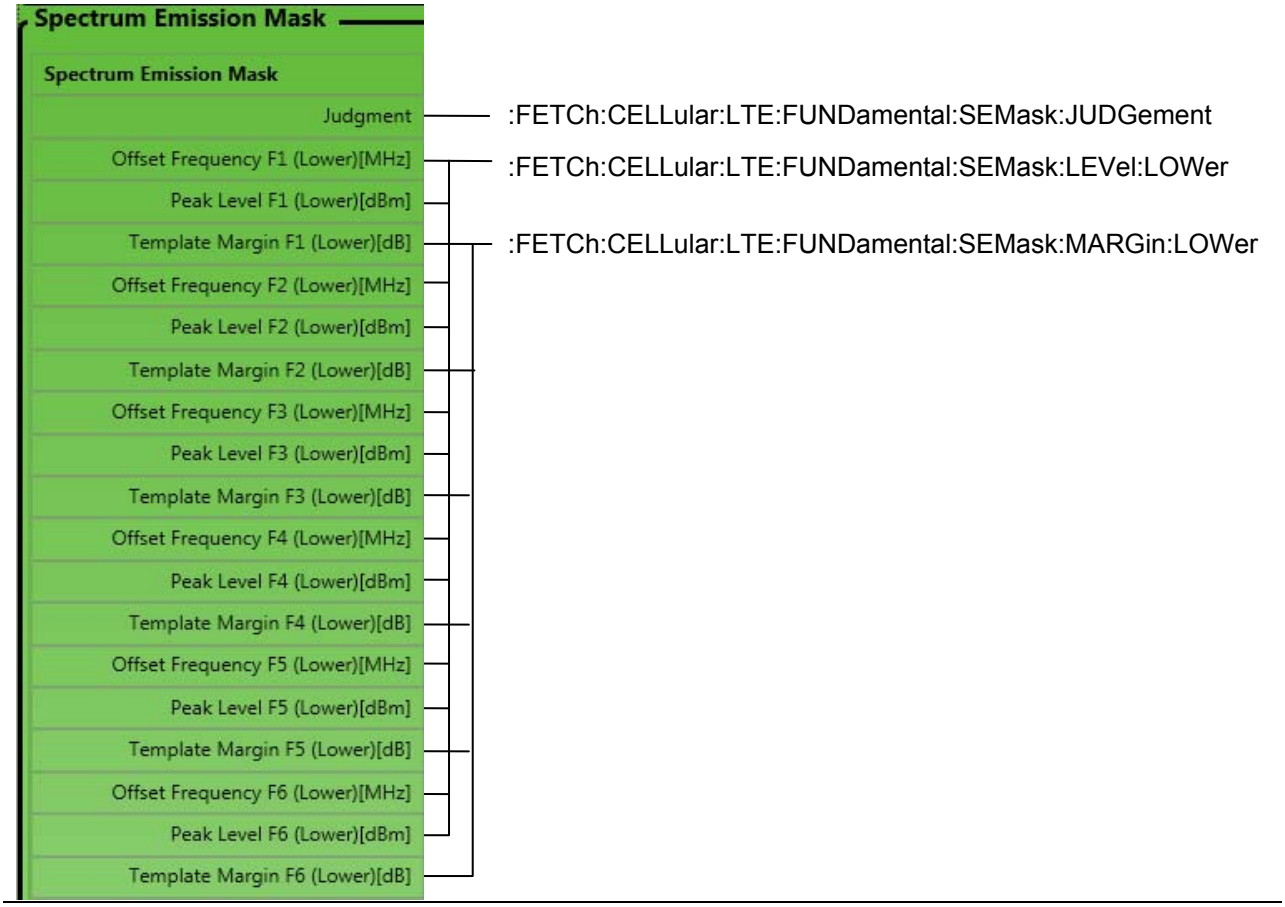


Figure 3.5.3-20 Spectrum Emission Mask Results (1/10)

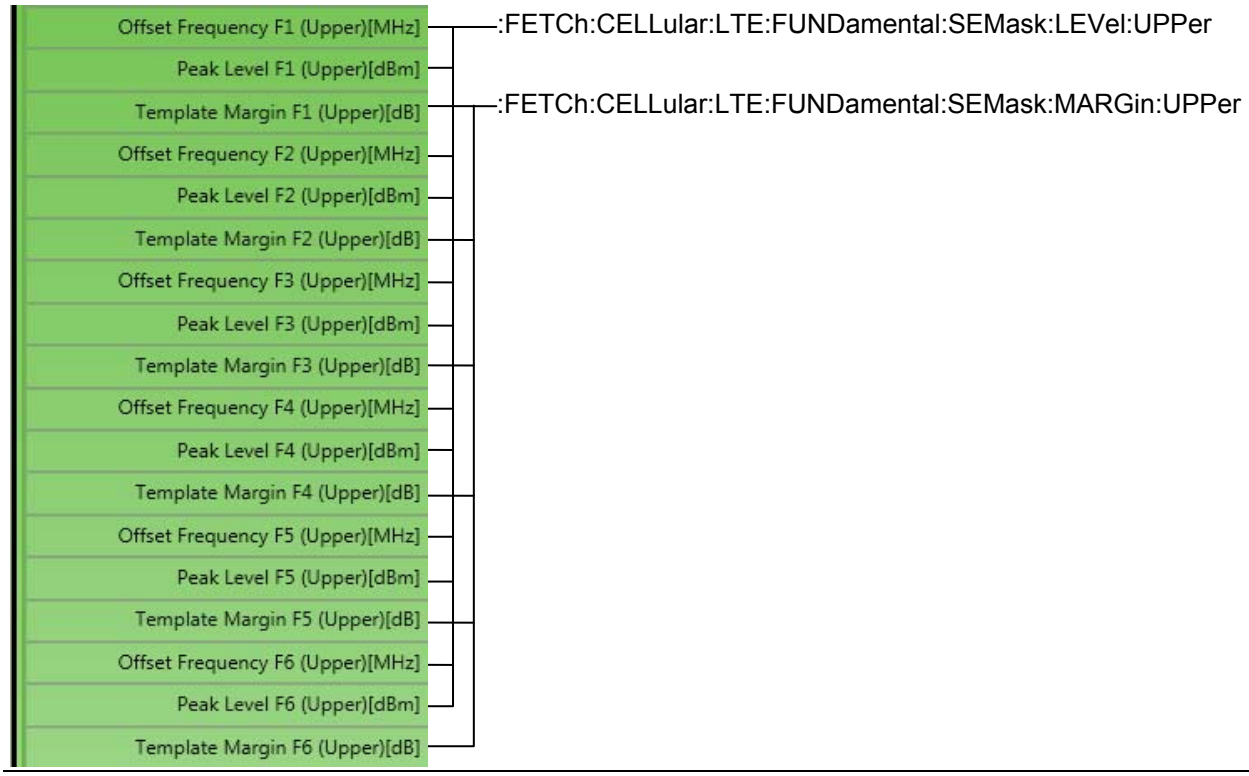


Figure 3.5.3-21 Spectrum Emission Mask Results (2/10)

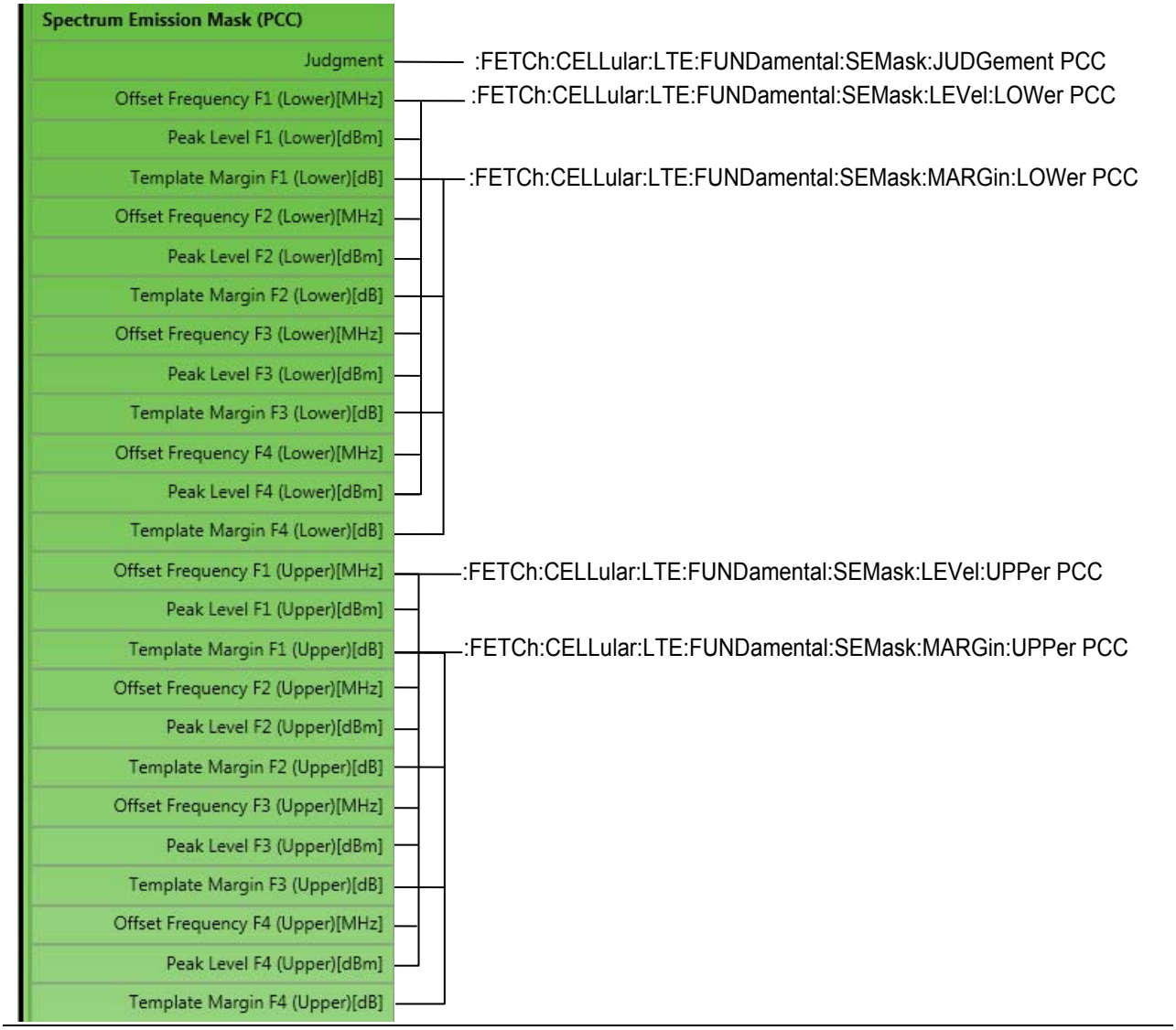


Figure 3.5.3-22 Spectrum Emission Mask Results (3/10)

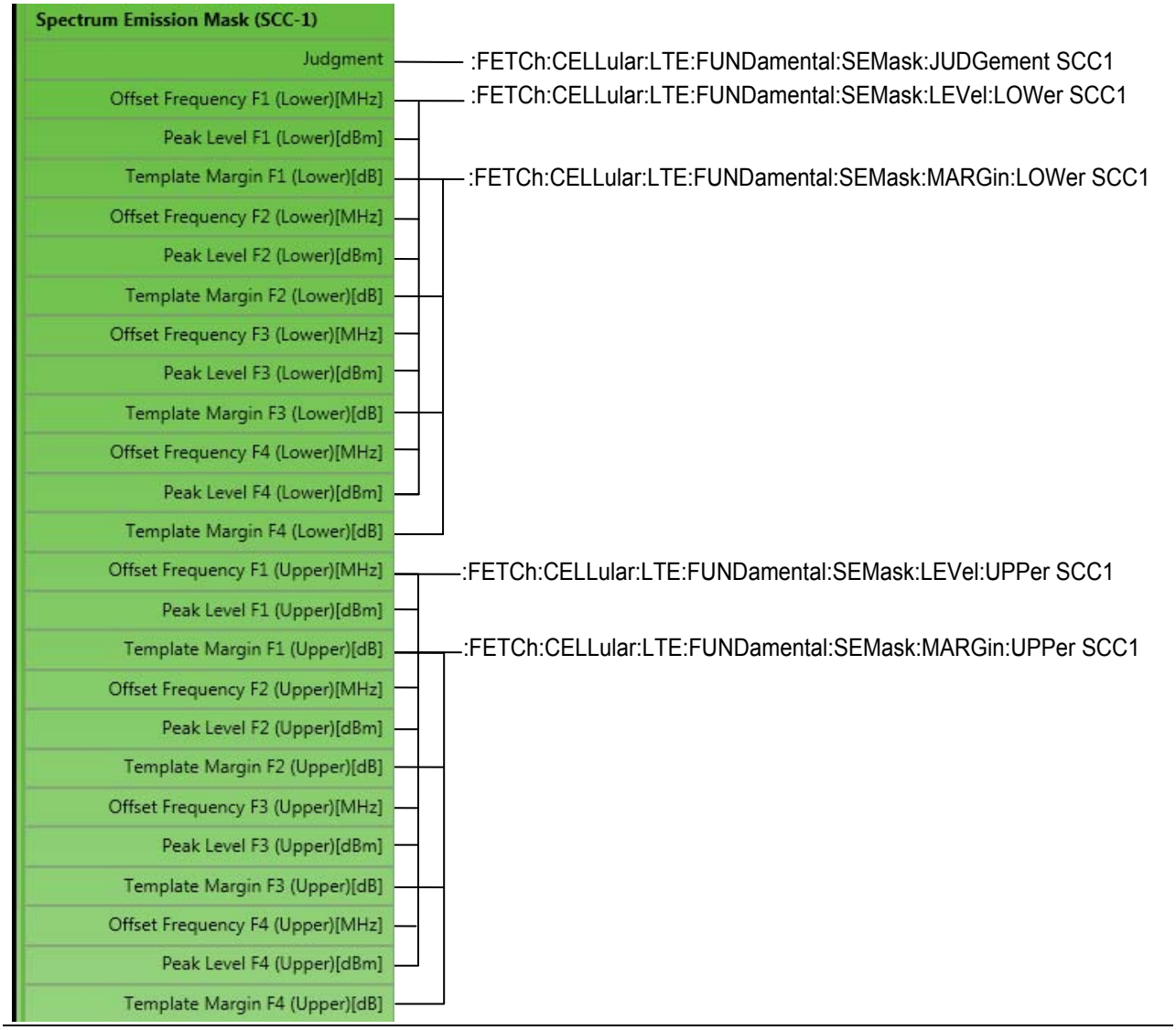


Figure 3.5.3-23 Spectrum Emission Mask Results (4/10)

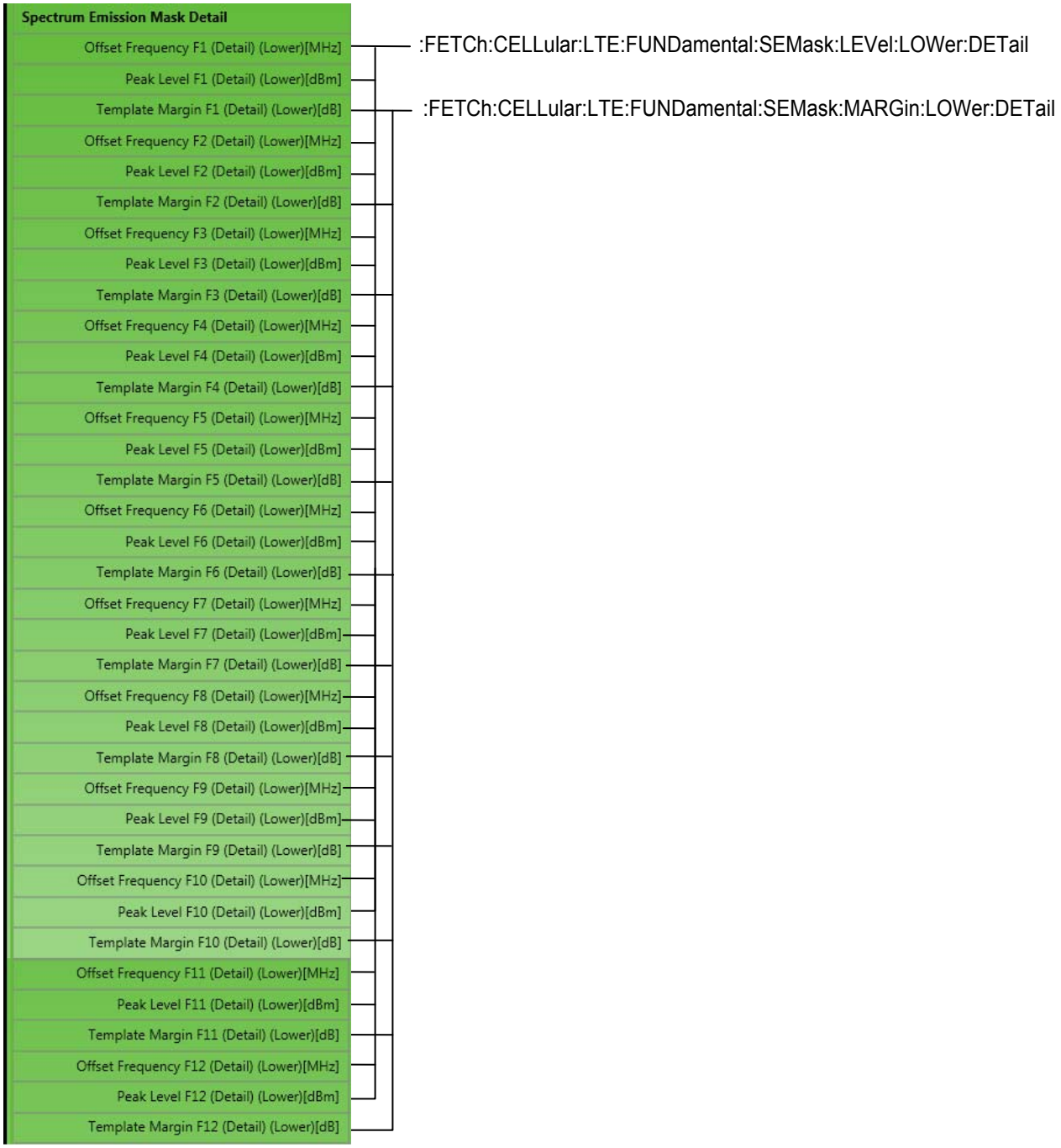


Figure 3.5.3-24 Spectrum Emission Mask Results (5/10)

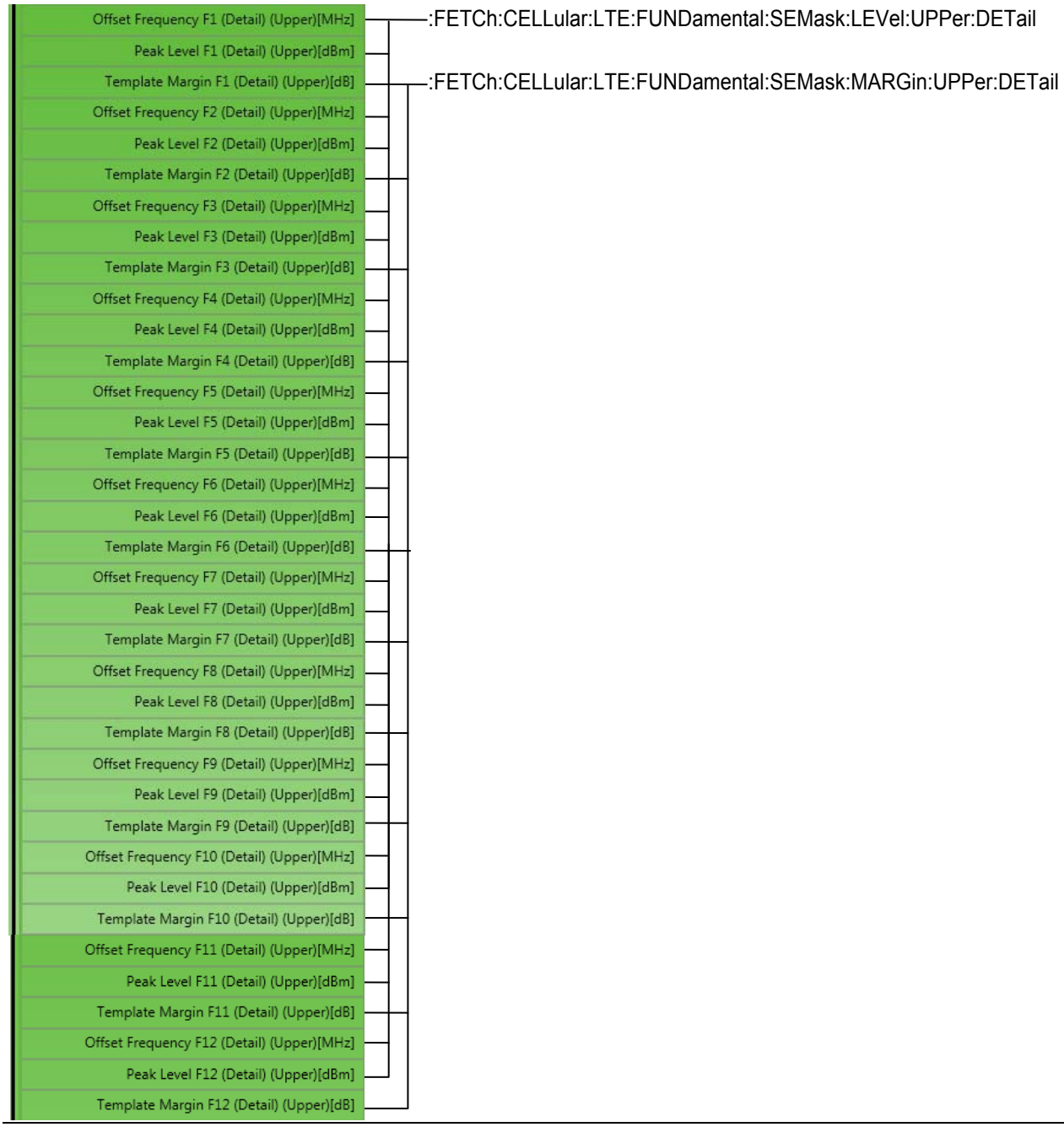


Figure 3.5.3-25 Spectrum Emission Mask Results (6/10)

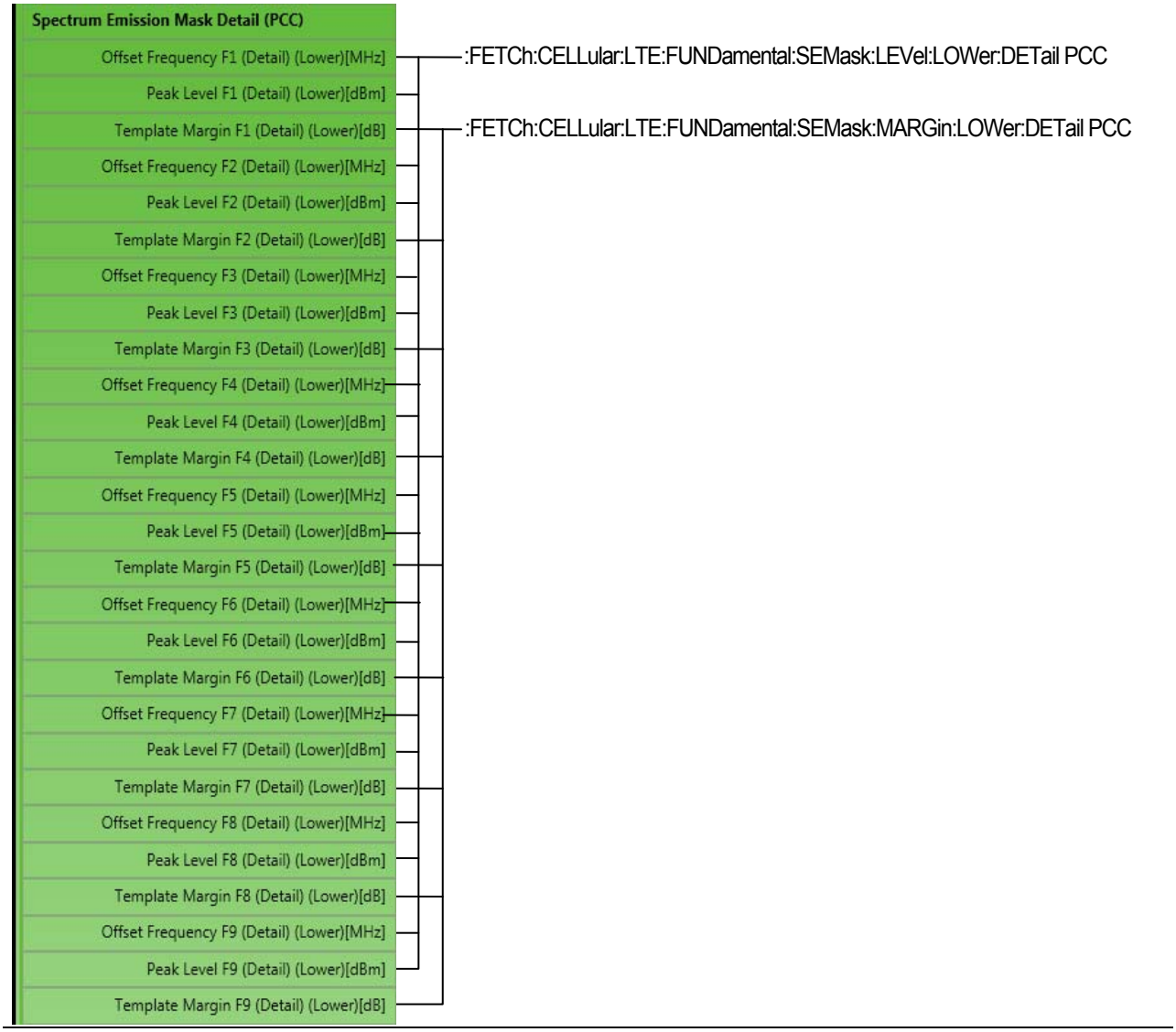


Figure 3.5.3-26 Spectrum Emission Mask Results (7/10)

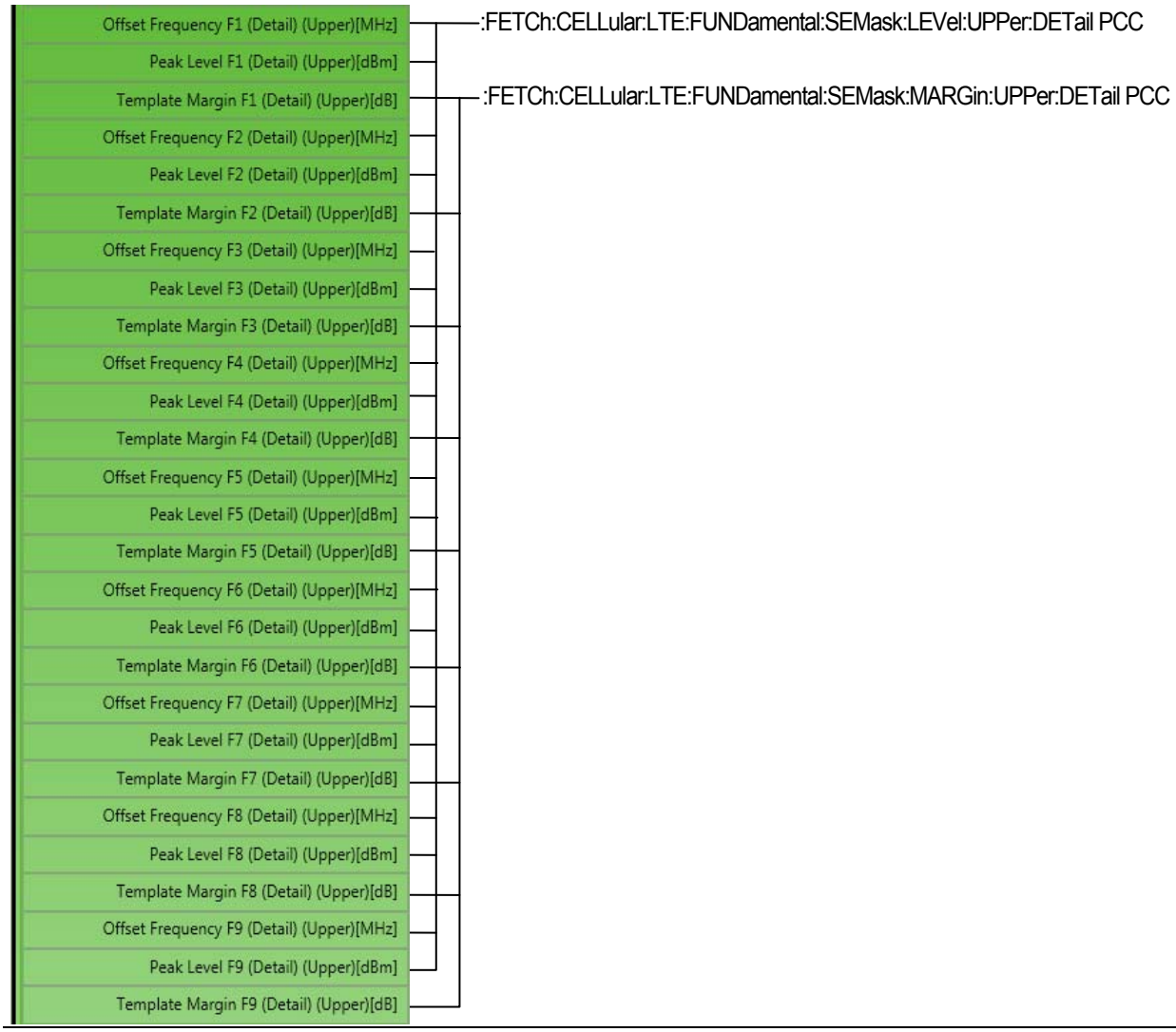


Figure 3.5.3-27 Spectrum Emission Mask Results (8/10)

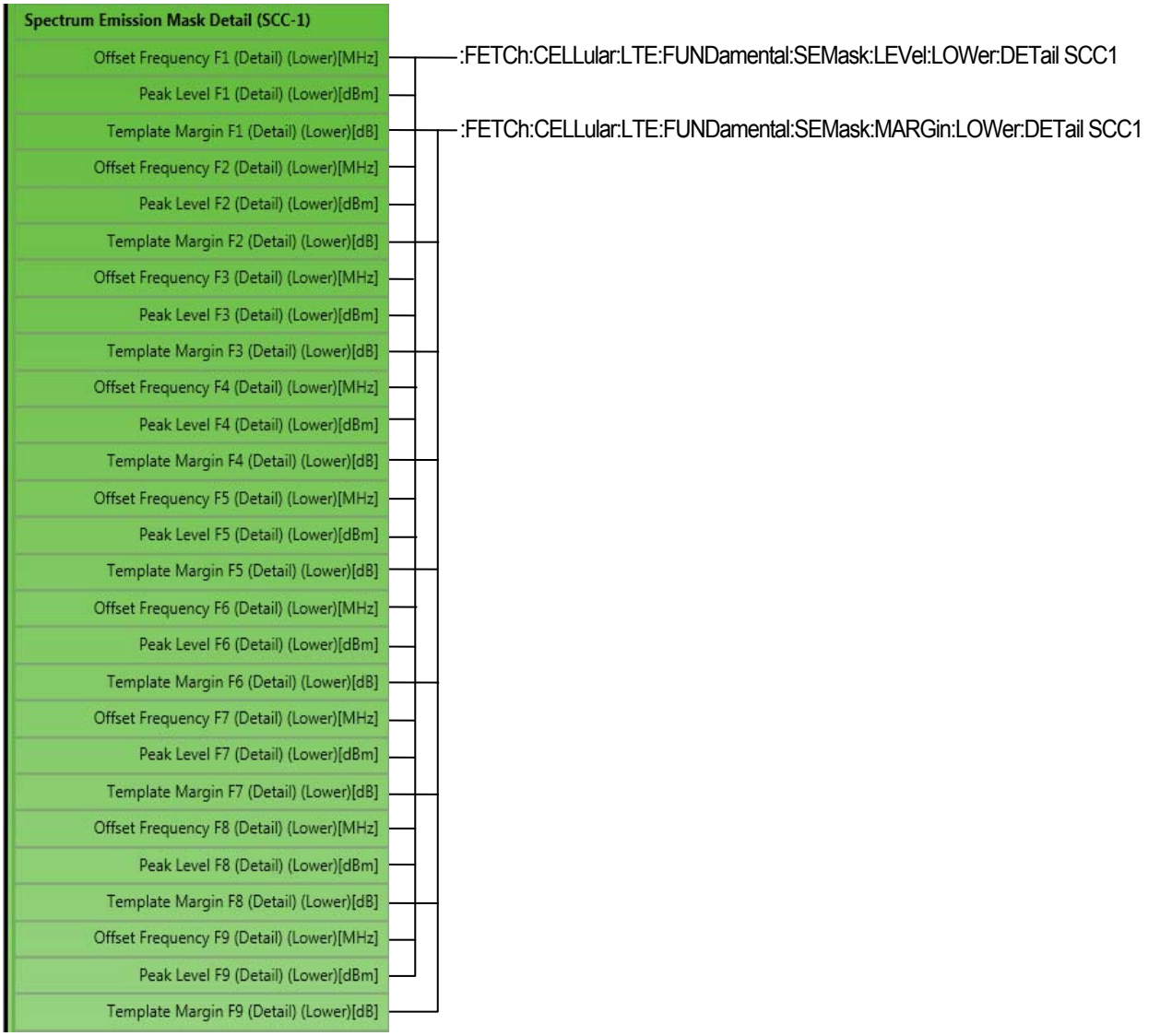


Figure 3.5.3-28 Spectrum Emission Mask Results (9/10)

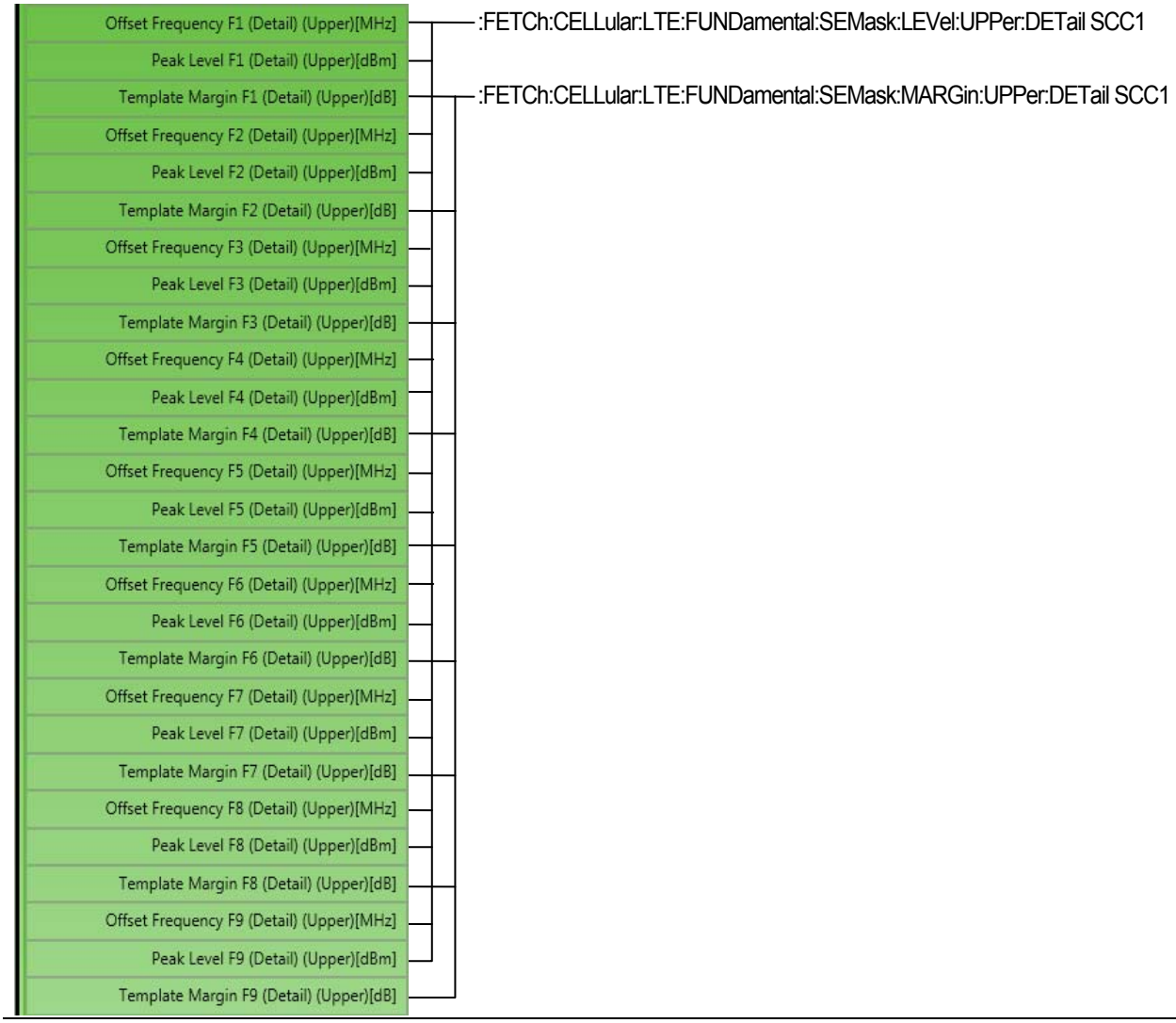


Figure 3.5.3-29 Spectrum Emission Mask Results (10/10)

3.5.4 Related Native Commands

The Native commands for remote of the MX887013A LTE FDD Uplink TX Measurement 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 LTE FDD Uplink TX Measurement Operation Manual*.

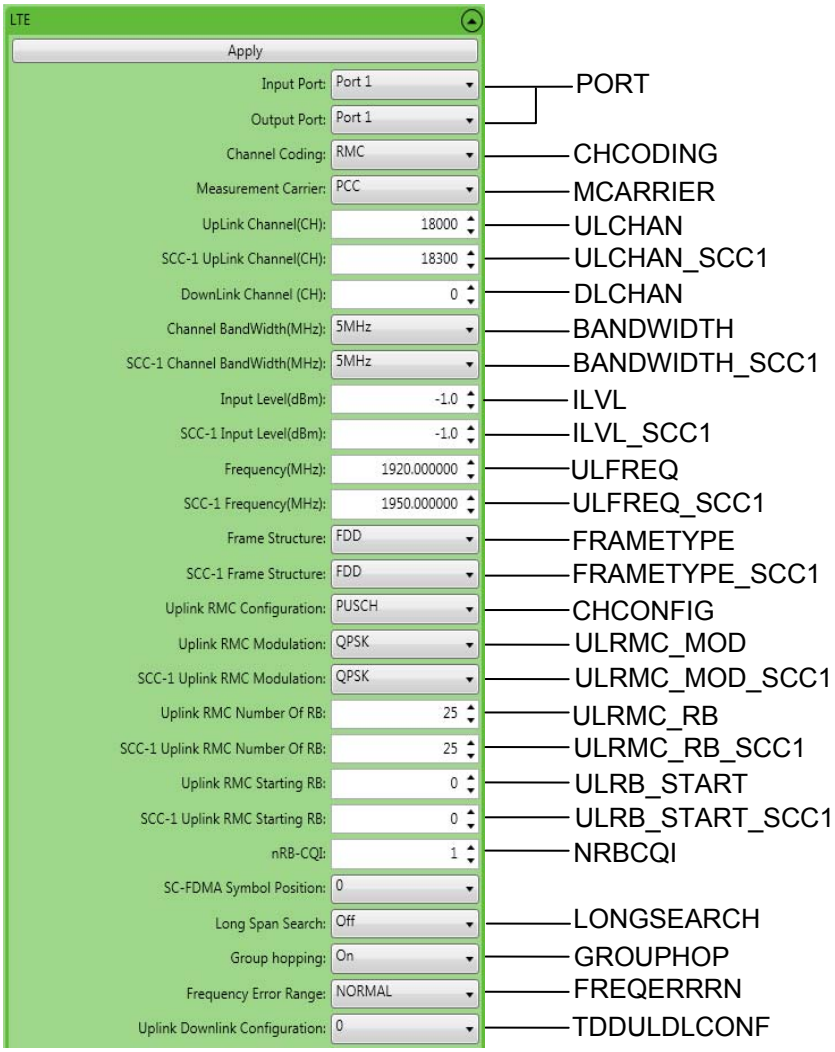


Figure 3.5.4-1 Measurement Settings Pane (1/2)

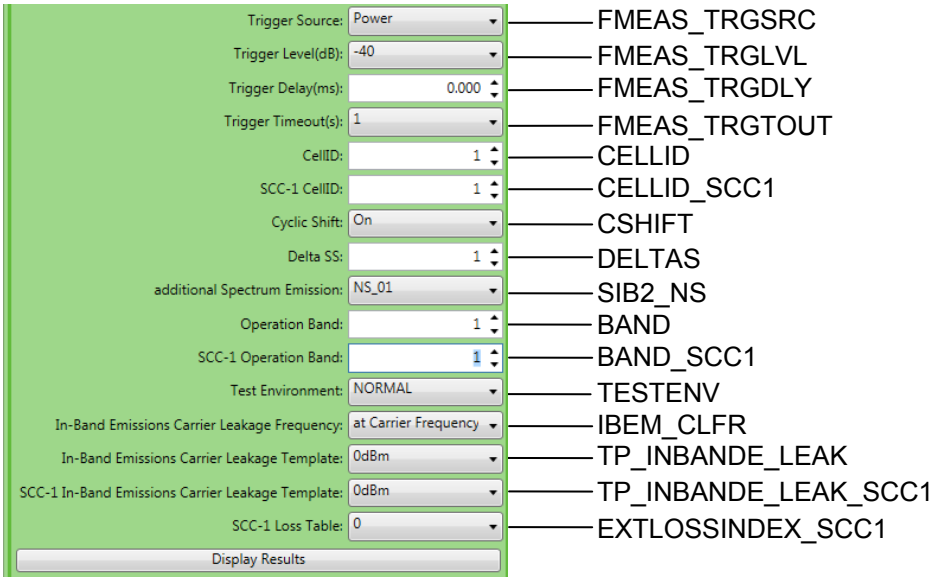


Figure 3.5.4-2 Measurement Settings Pane (2/2)

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).

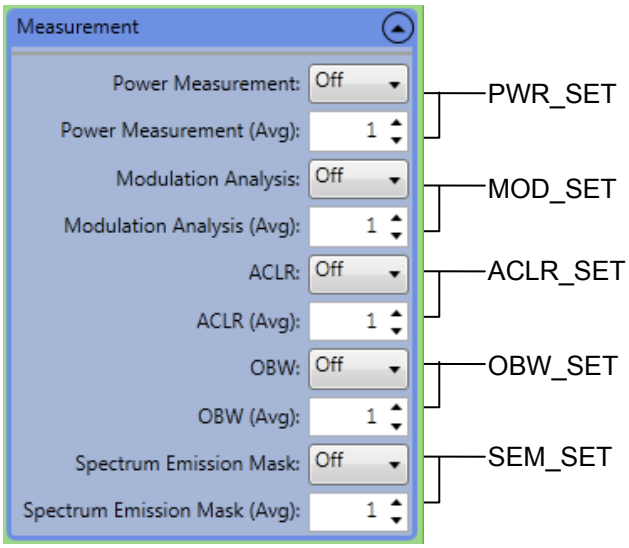


Figure 3.5.4-3 Measurement Settings Pane (Measurement Dialog)

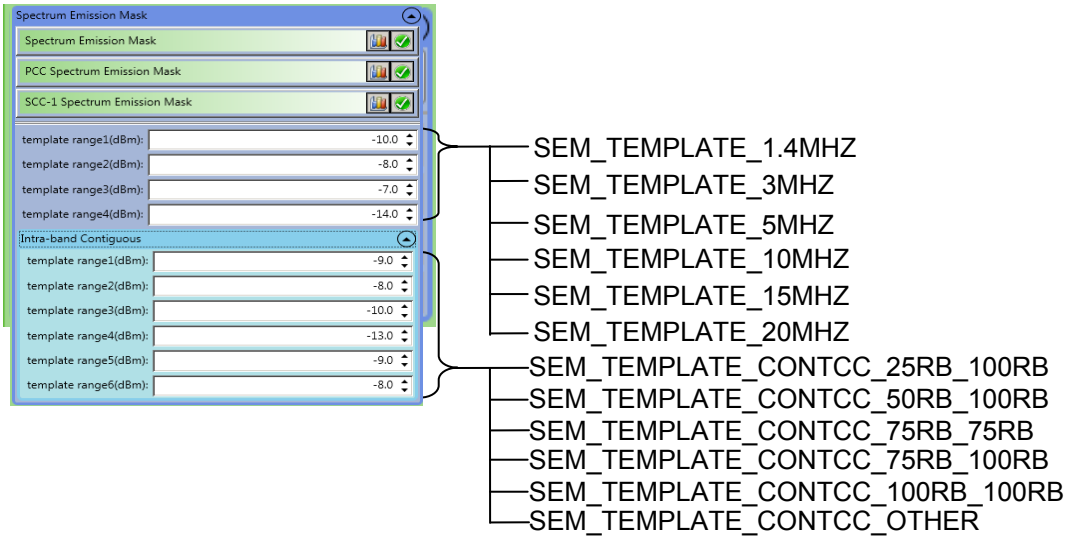


Figure 3.5.4-4 Measurement Settings Pane (Spectrum Emission Mask Dialog)

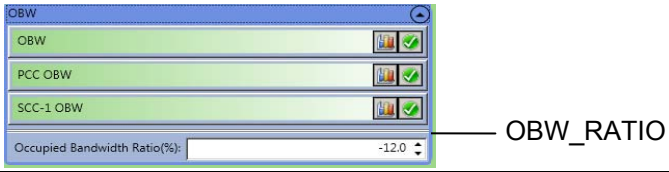


Figure 3.5.4-5 Measurement Settings Pane (OBW Dialog)

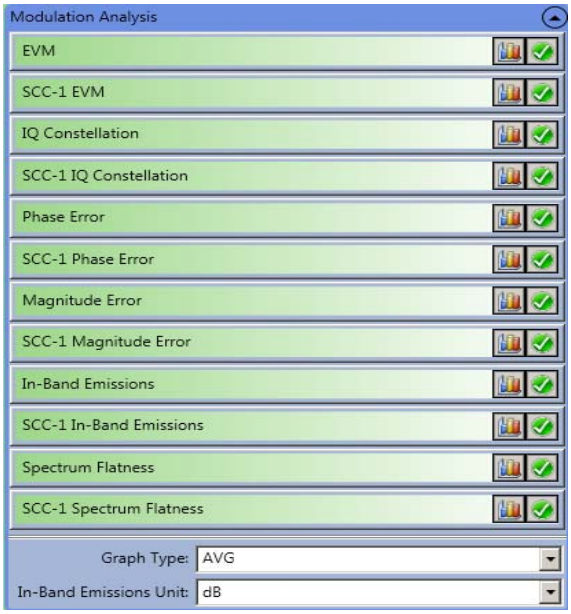


Figure 3.5.4-6 Measurement Settings Pane (Modulation Analysis)

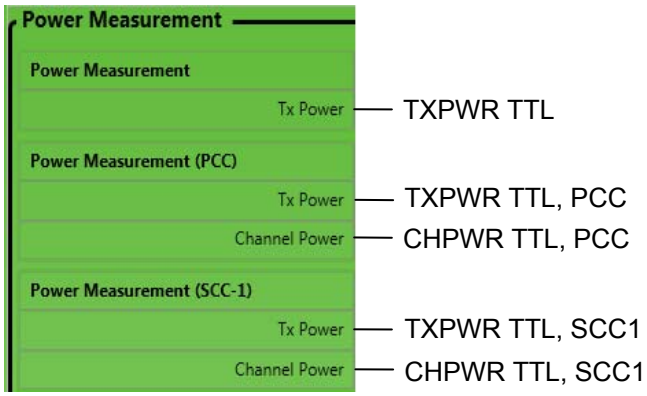


Figure 3.5.4-7 Power Measurement Results

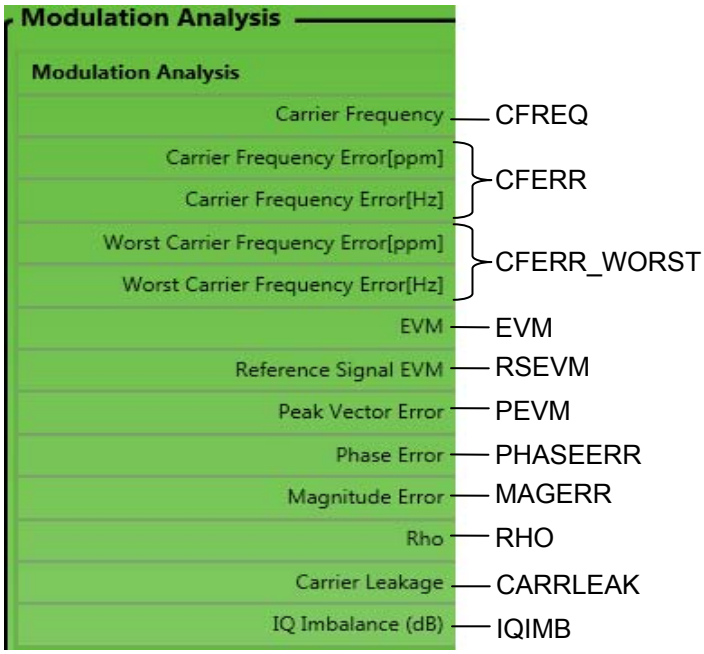


Figure 3.5.4-8 Modulation Analysis Results (1/2)

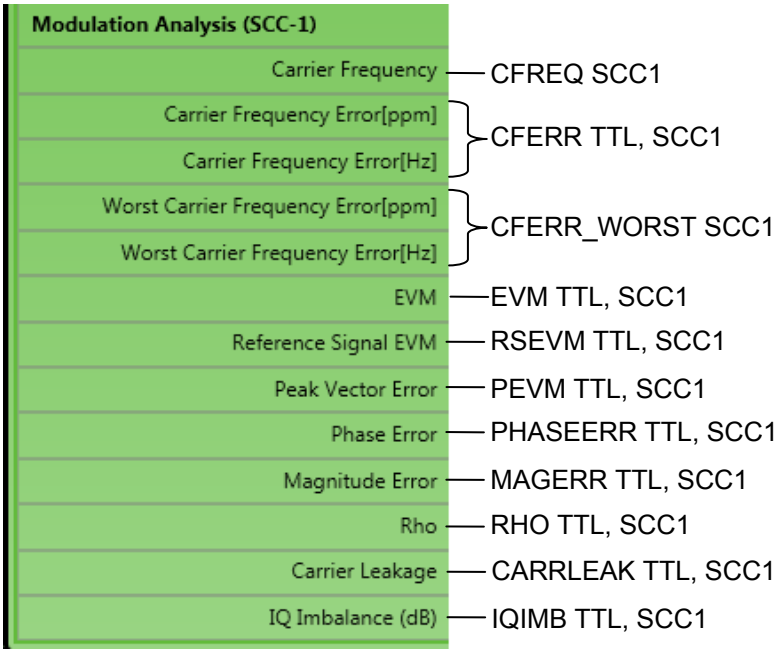


Figure 3.5.4-9 Modulation Analysis Results (2/2)

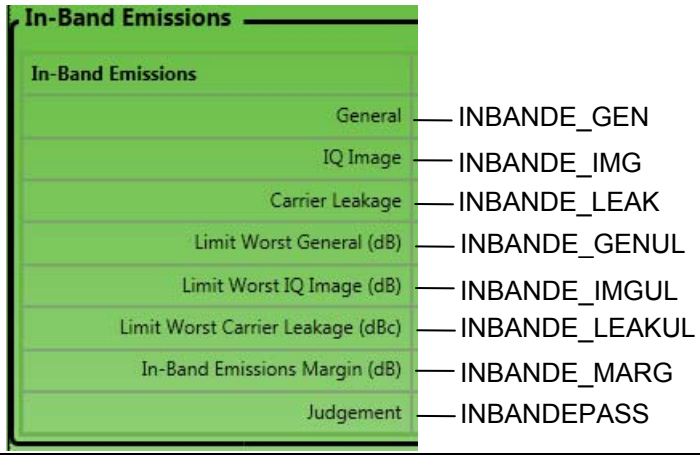


Figure 3.5.4-10 In-Band Emissions Results (1/2)

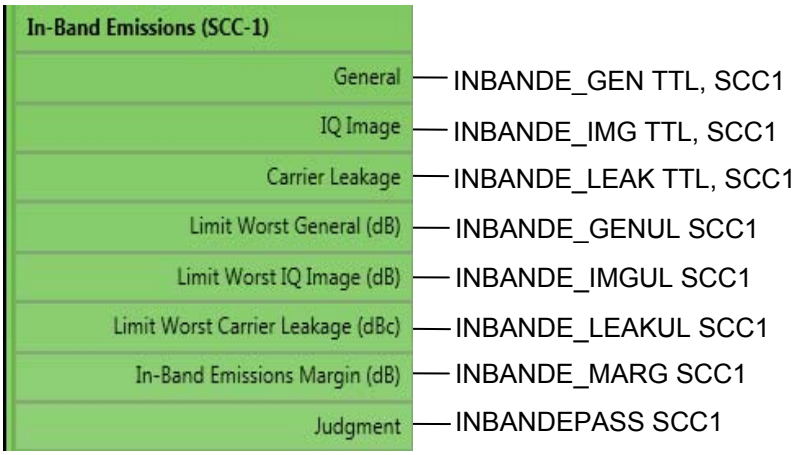


Figure 3.5.4-11 In-Band Emissions Results (1/2)

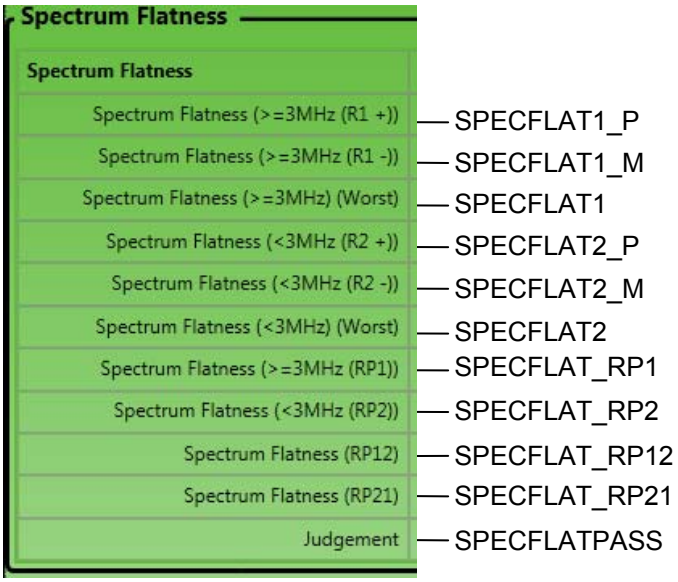


Figure 3.5.4-12 Spectrum Flatness Results (1/2)

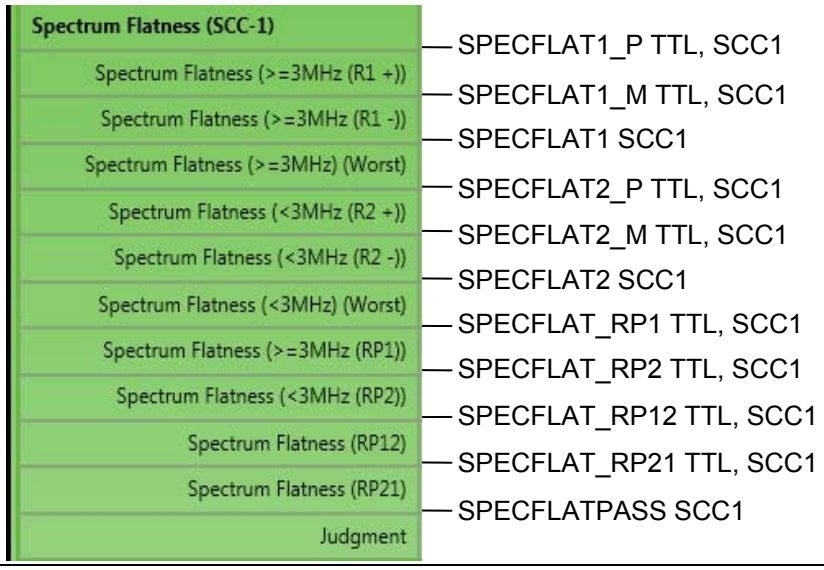


Figure 3.5.4-13 Spectrum Flatness Results (2/2)

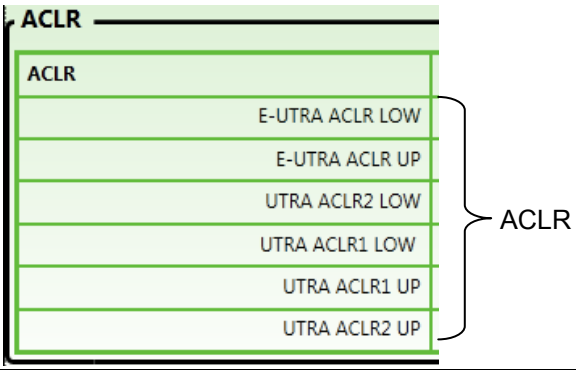


Figure 3.5.4-14 ACLR Results (1/3)

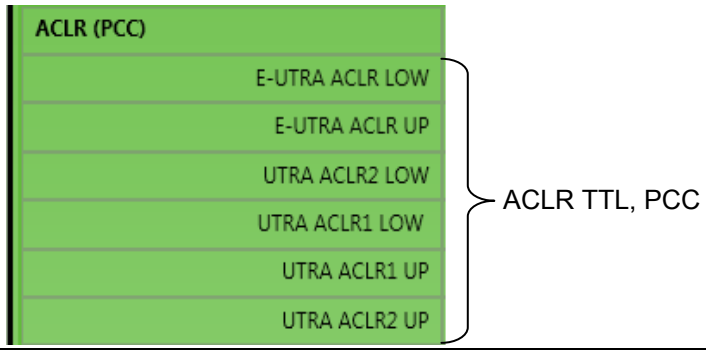


Figure 3.5.4-15 ACLR Results (2/3)

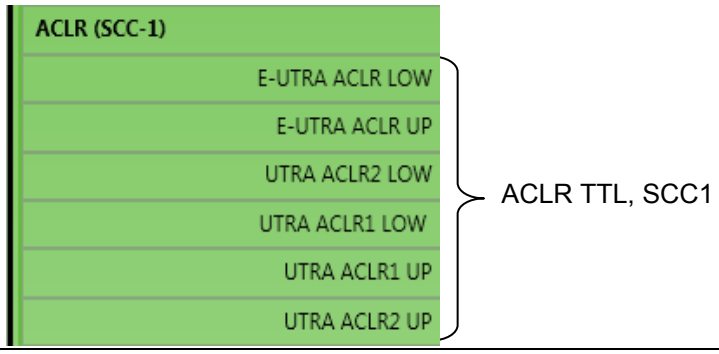


Figure 3.5.4-16 ACLR Results (3/3)

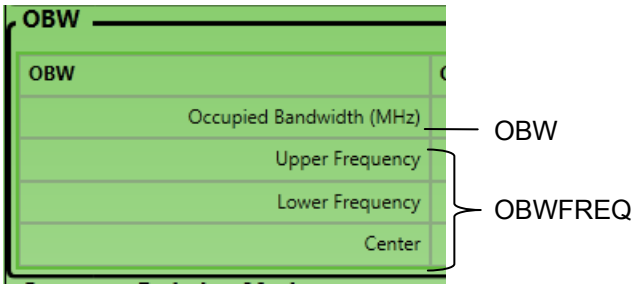


Figure 3.5.4-17 OBW Results (1/3)

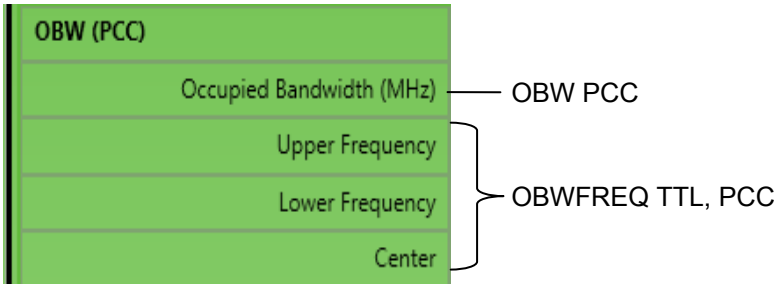


Figure 3.5.4-18 OBW Results (2/3)

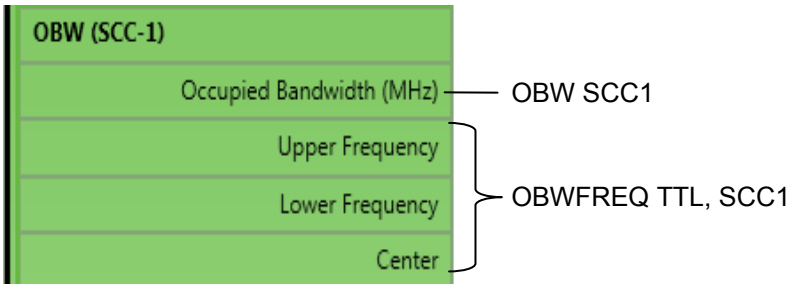


Figure 3.5.4-19 OBW Results (3/3)

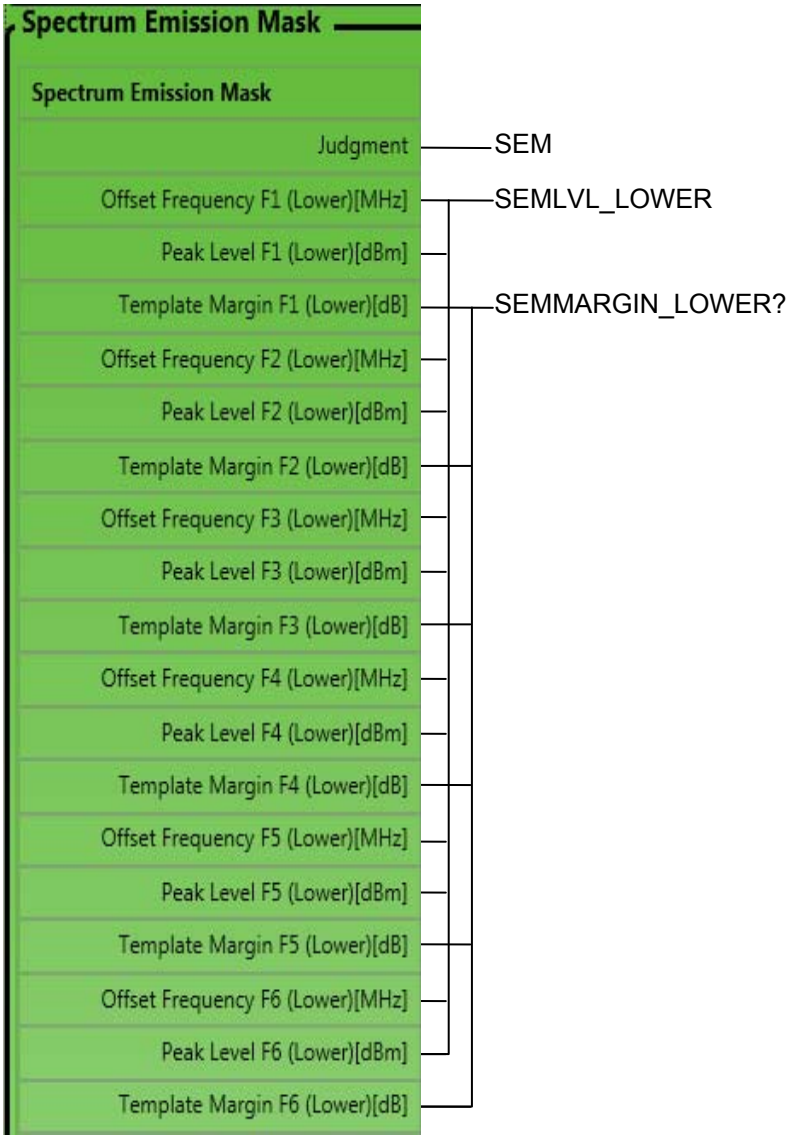


Figure 3.5.4-20 Spectrum Emission Mask Results (1/10)

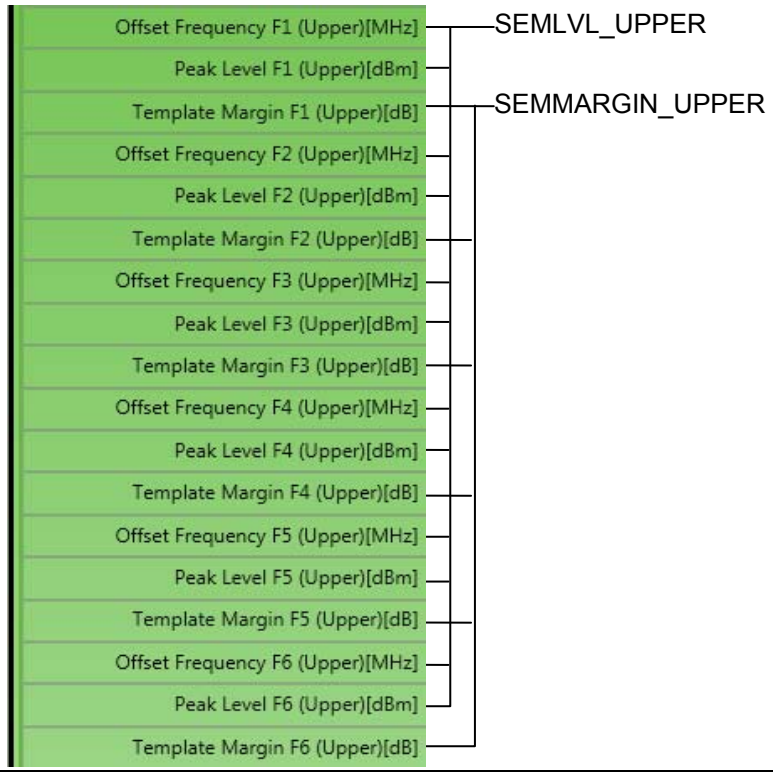


Figure 3.5.4-21 Spectrum Emission Mask Results (2/10)

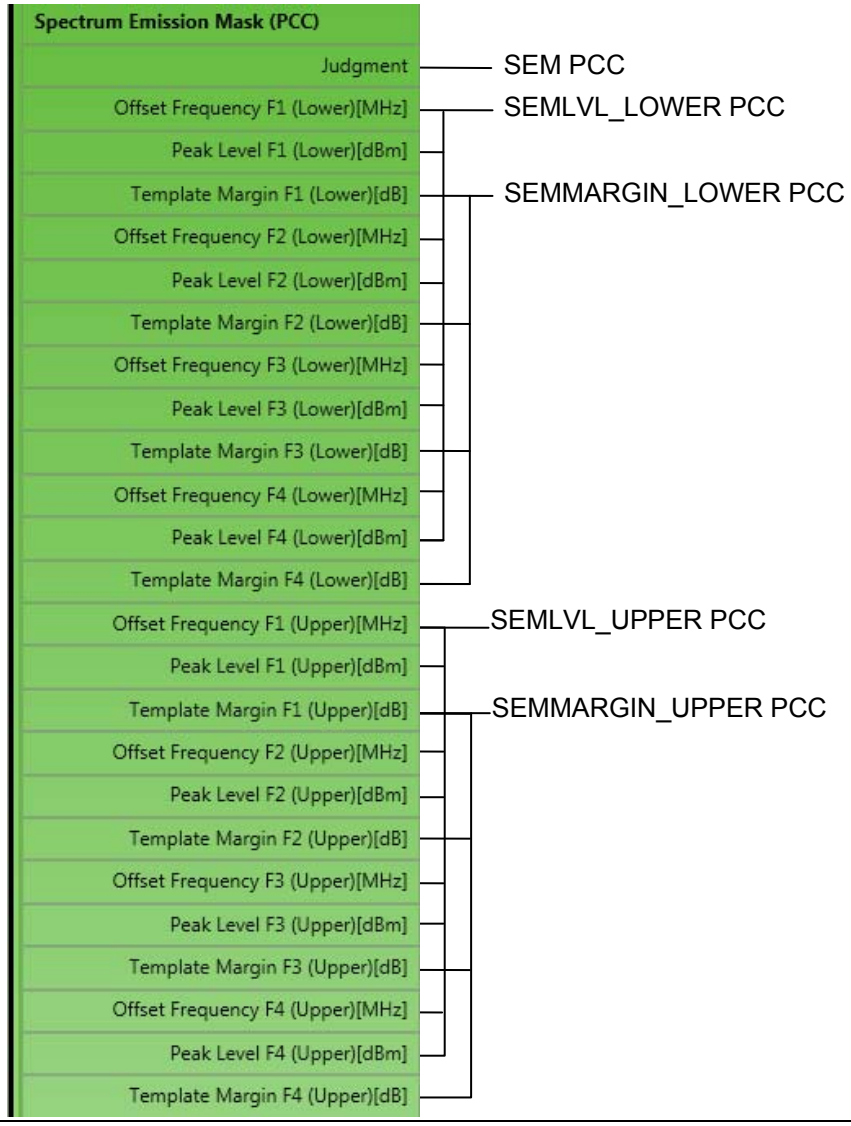


Figure 3.5.4-22 Spectrum Emission Mask Results (3/10)

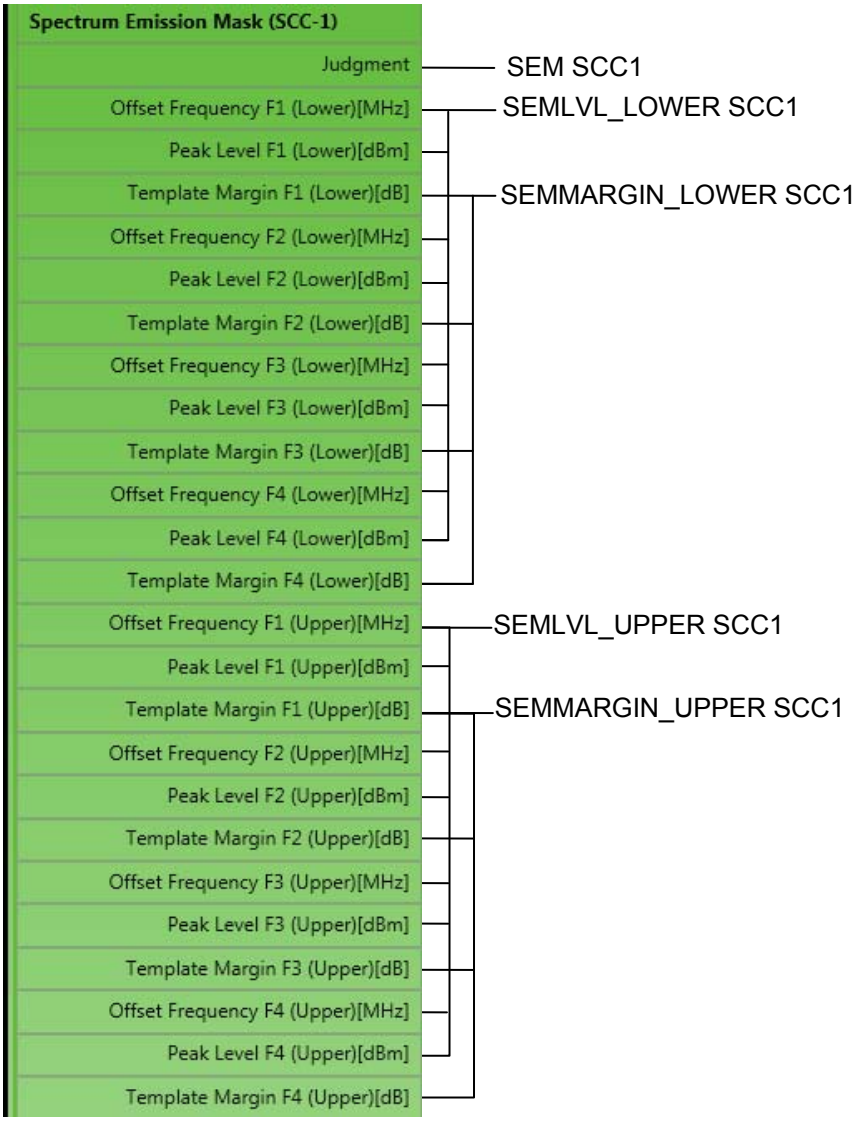


Figure 3.5.4-23 Spectrum Emission Mask Results (4/10)

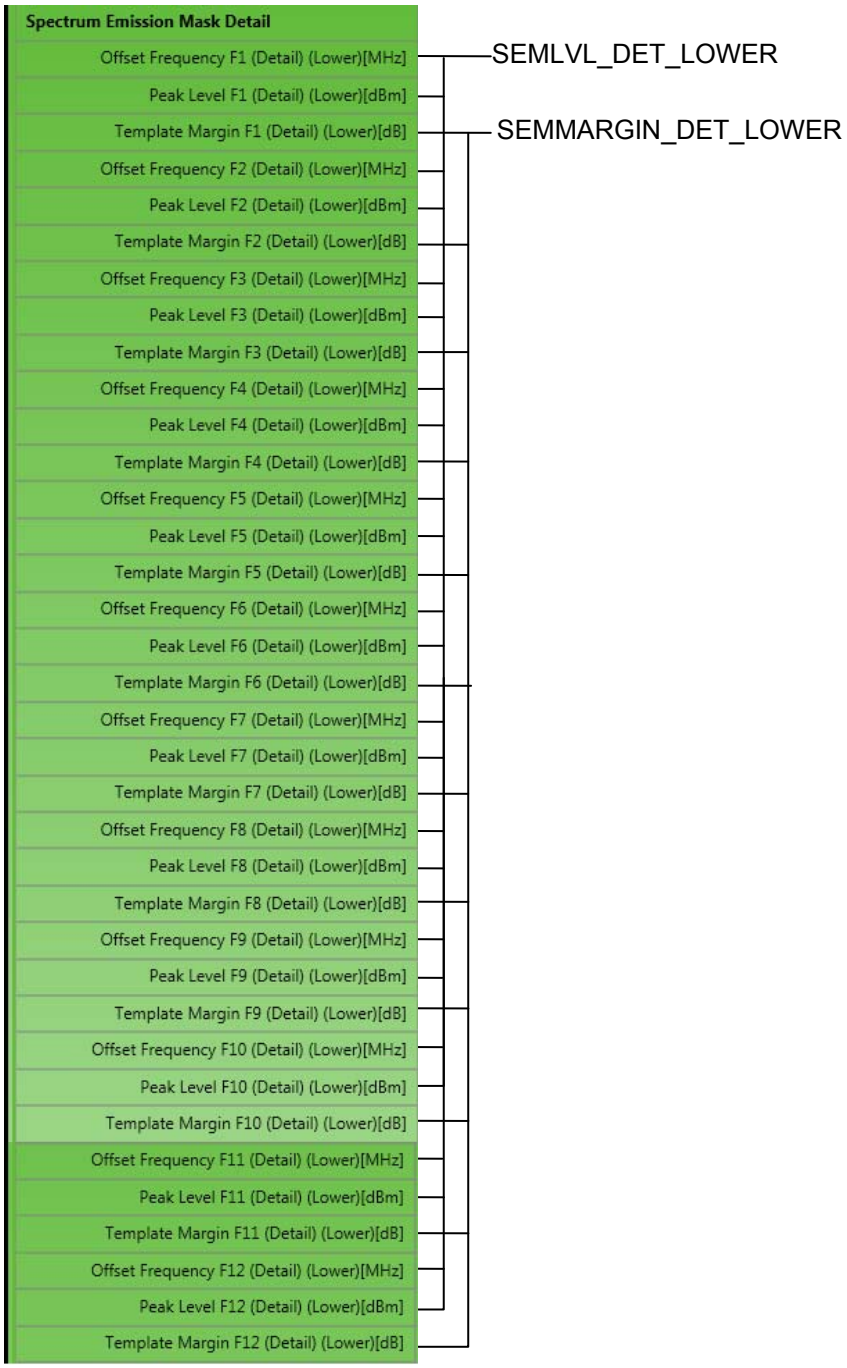


Figure 3.5.4-24 Spectrum Emission Mask Results (5/10)

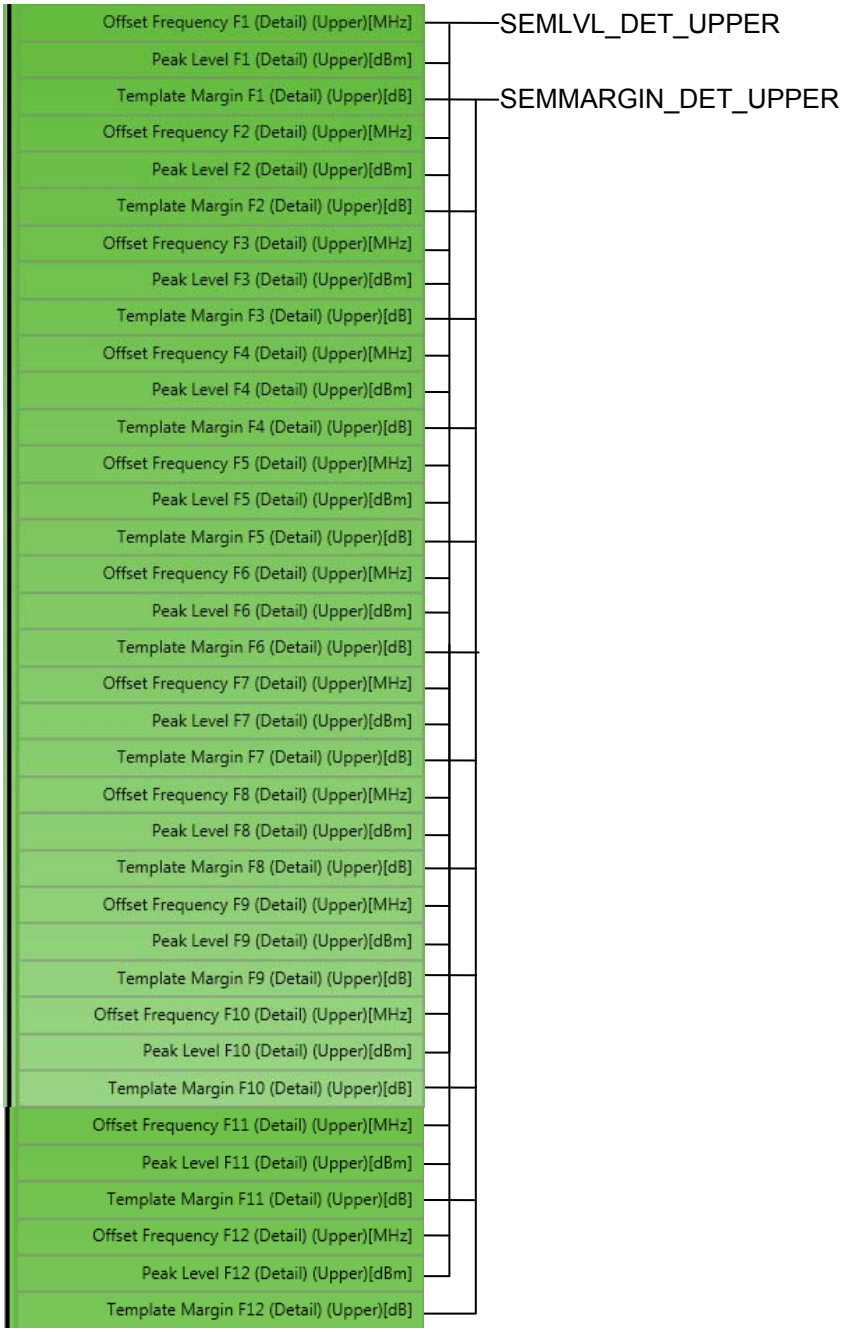


Figure 3.5.4-25 Spectrum Emission Mask Results (6/10)

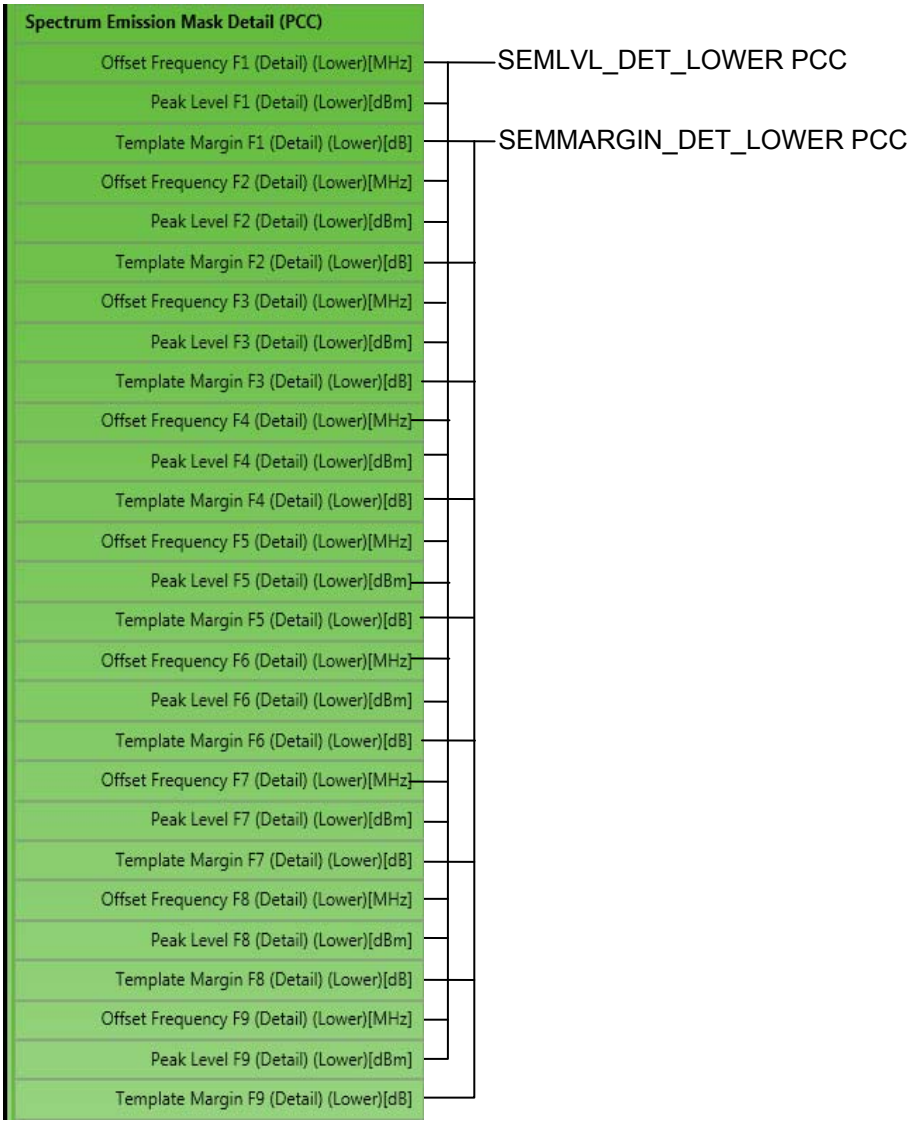


Figure 3.5.4-26 Spectrum Emission Mask Results (7/10)

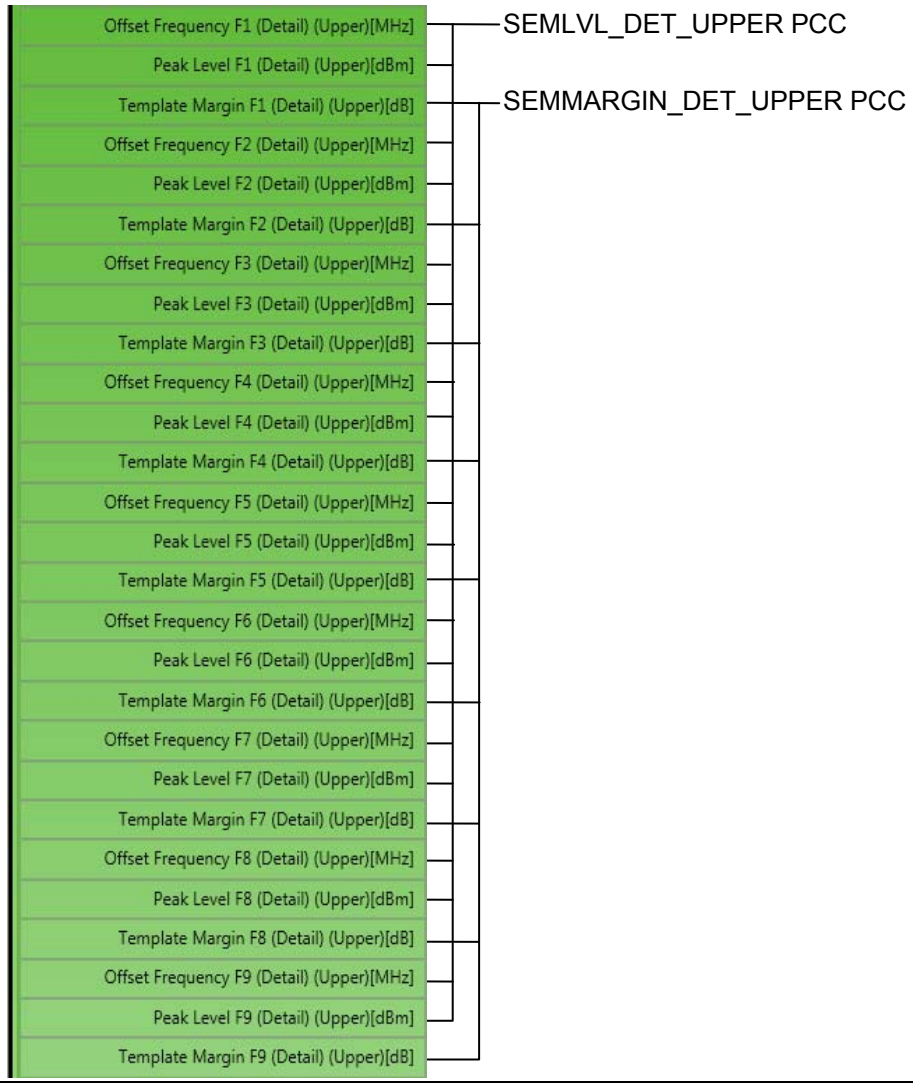


Figure 3.5.4-27 Spectrum Emission Mask Results (8/10)

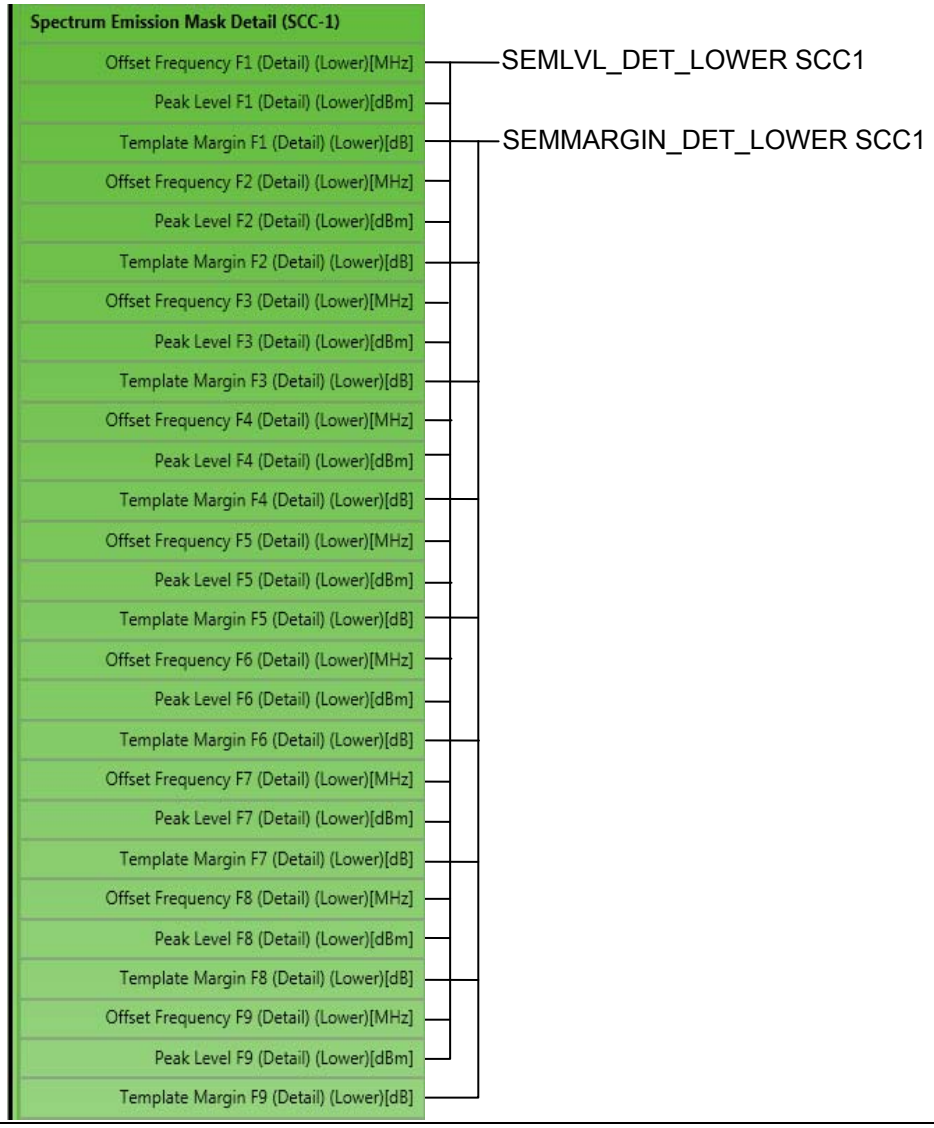


Figure 3.5.4-28 Spectrum Emission Mask Results (9/10)

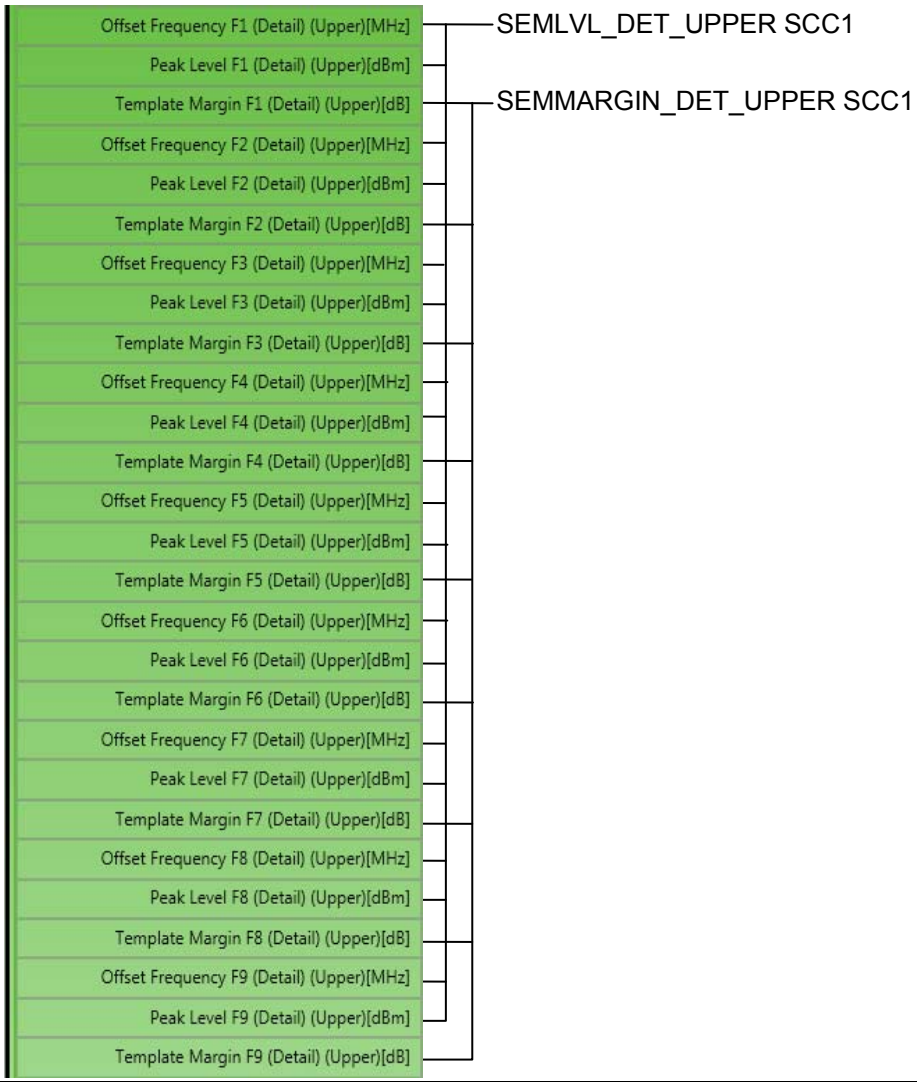


Figure 3.5.4-29 Spectrum Emission Mask Results (10/10)

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.

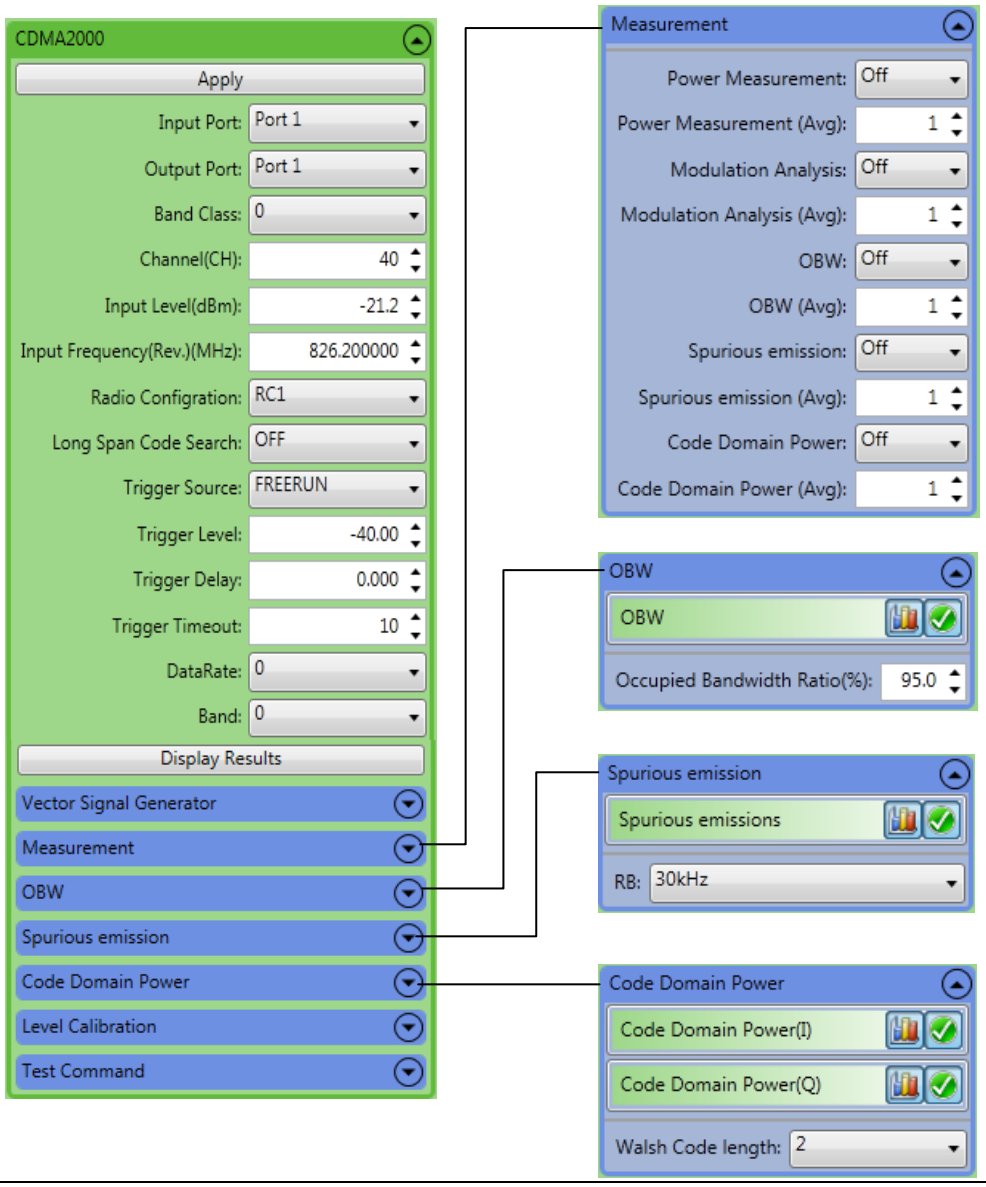


Figure 3.6.1-1 CDMA2000 Measurement Settings Pane

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.

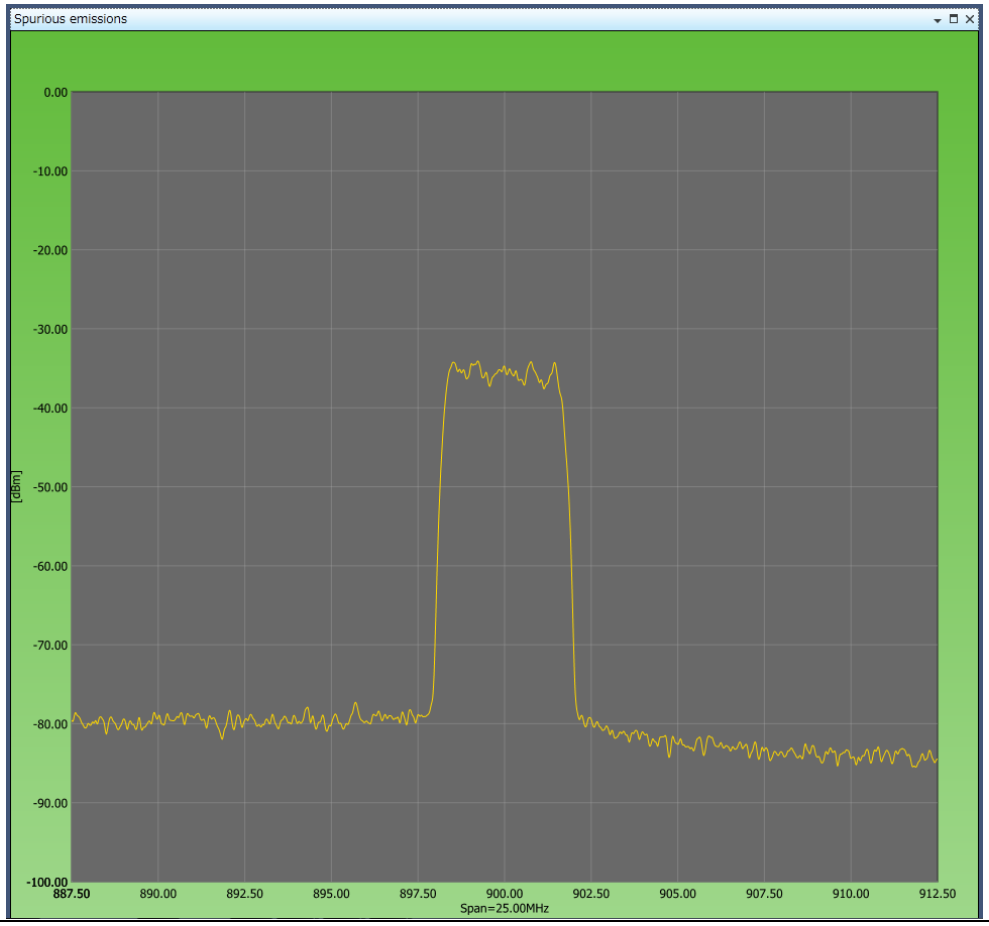


Figure 3.6.2-1 CDMA2000 Spurious Emissions Graph

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*.

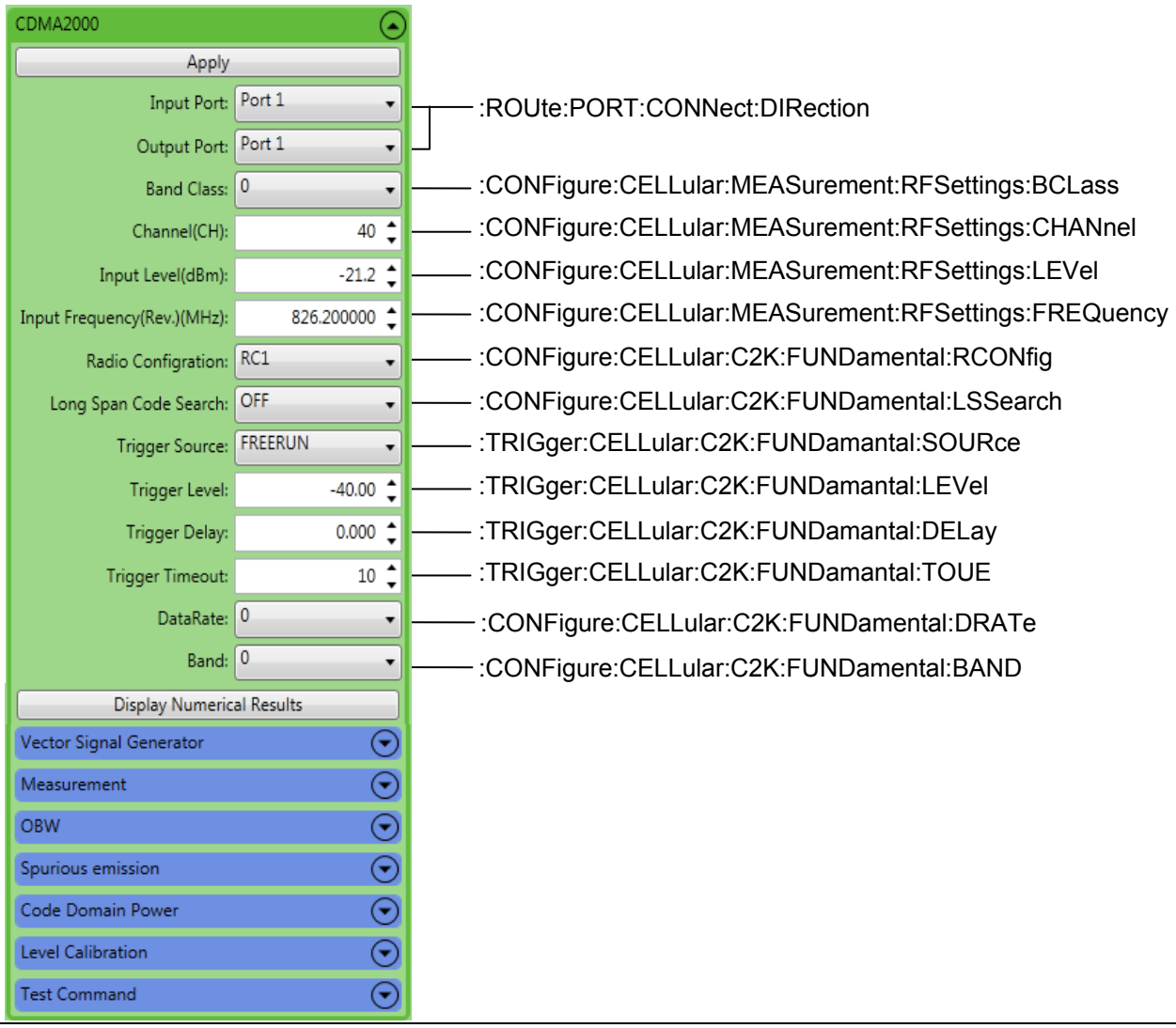


Figure 3.6.3-1 Measurement Settings Pane

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).

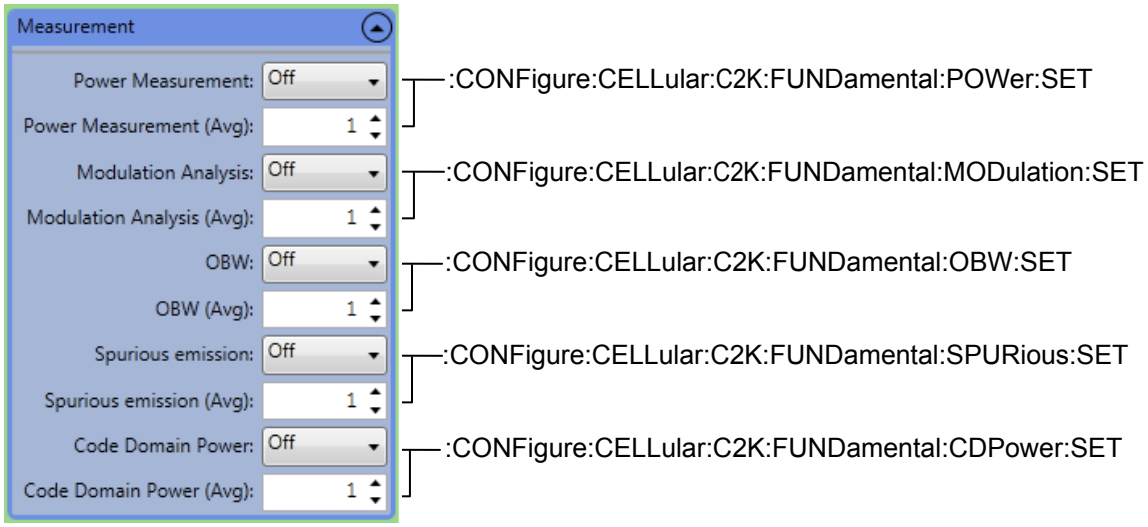


Figure 3.6.3-2 Measurement Settings Pane (Measurement Dialog)

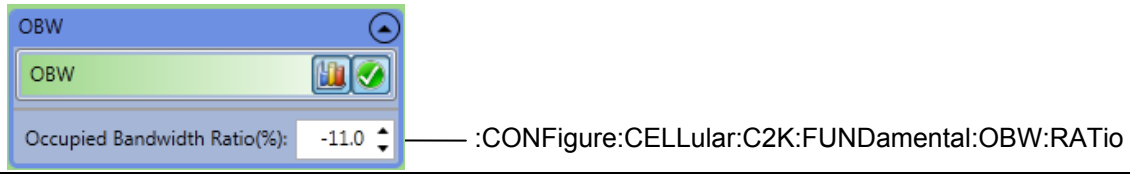


Figure 3.6.3-3 Measurement Settings Pane (OBW Dialog)

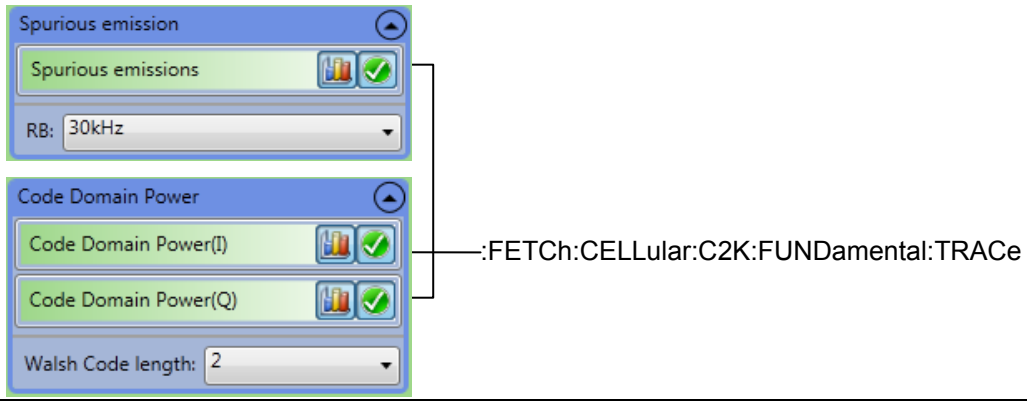


Figure 3.6.3-4 Measurement Settings Pane (Spurious Emission and Code Domain Power Dialog)

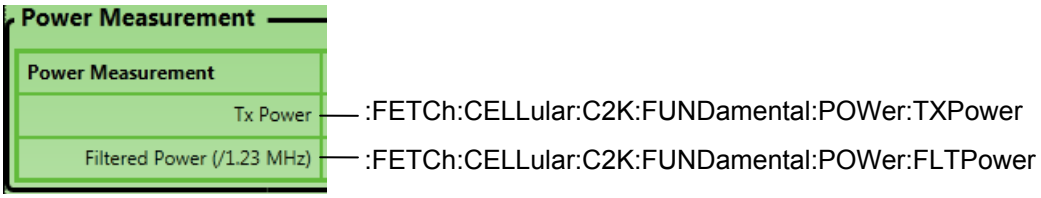


Figure 3.6.3-5 Power Measurement Results

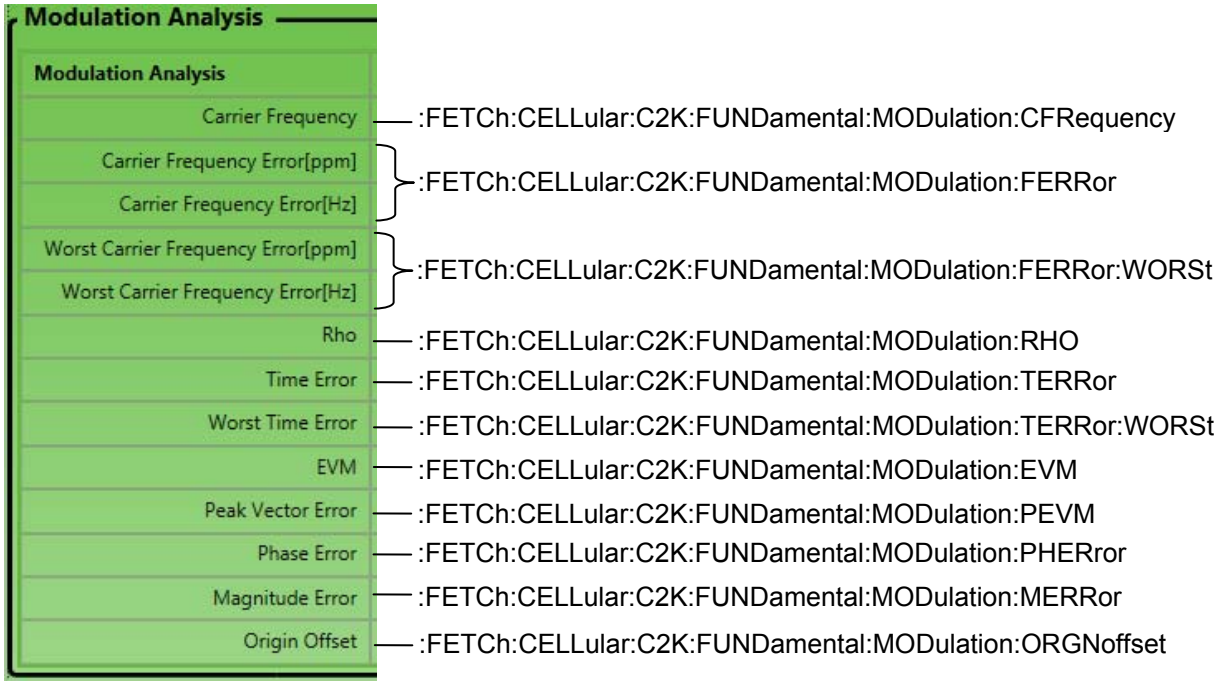


Figure 3.6.3-6 Modulation Analysis Results

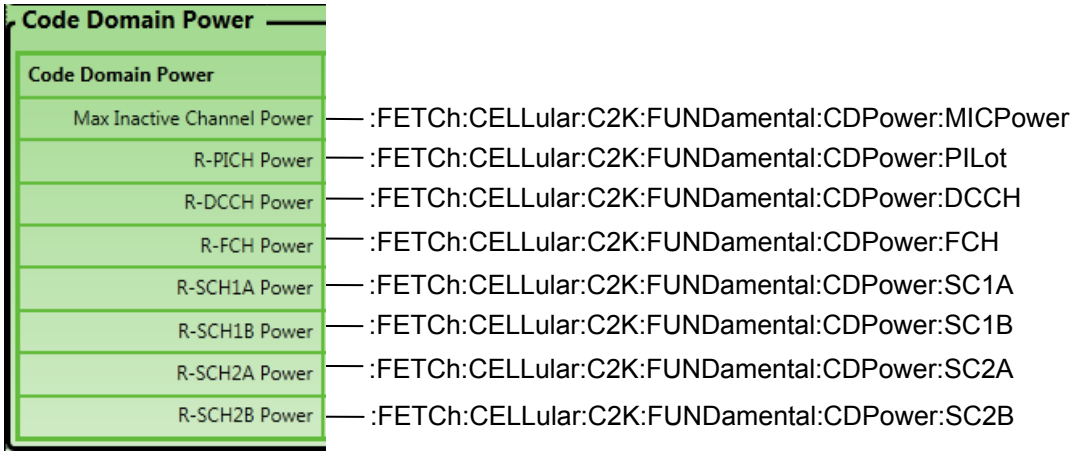


Figure 3.6.3-7 Code Domain Power Results

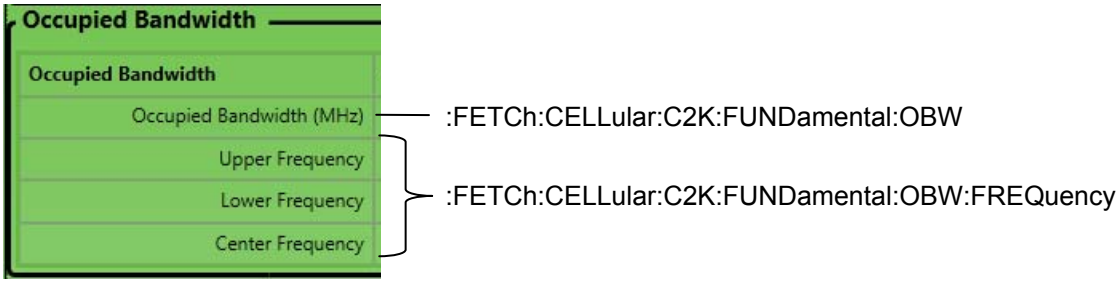


Figure 3.6.3-8 OBW Results

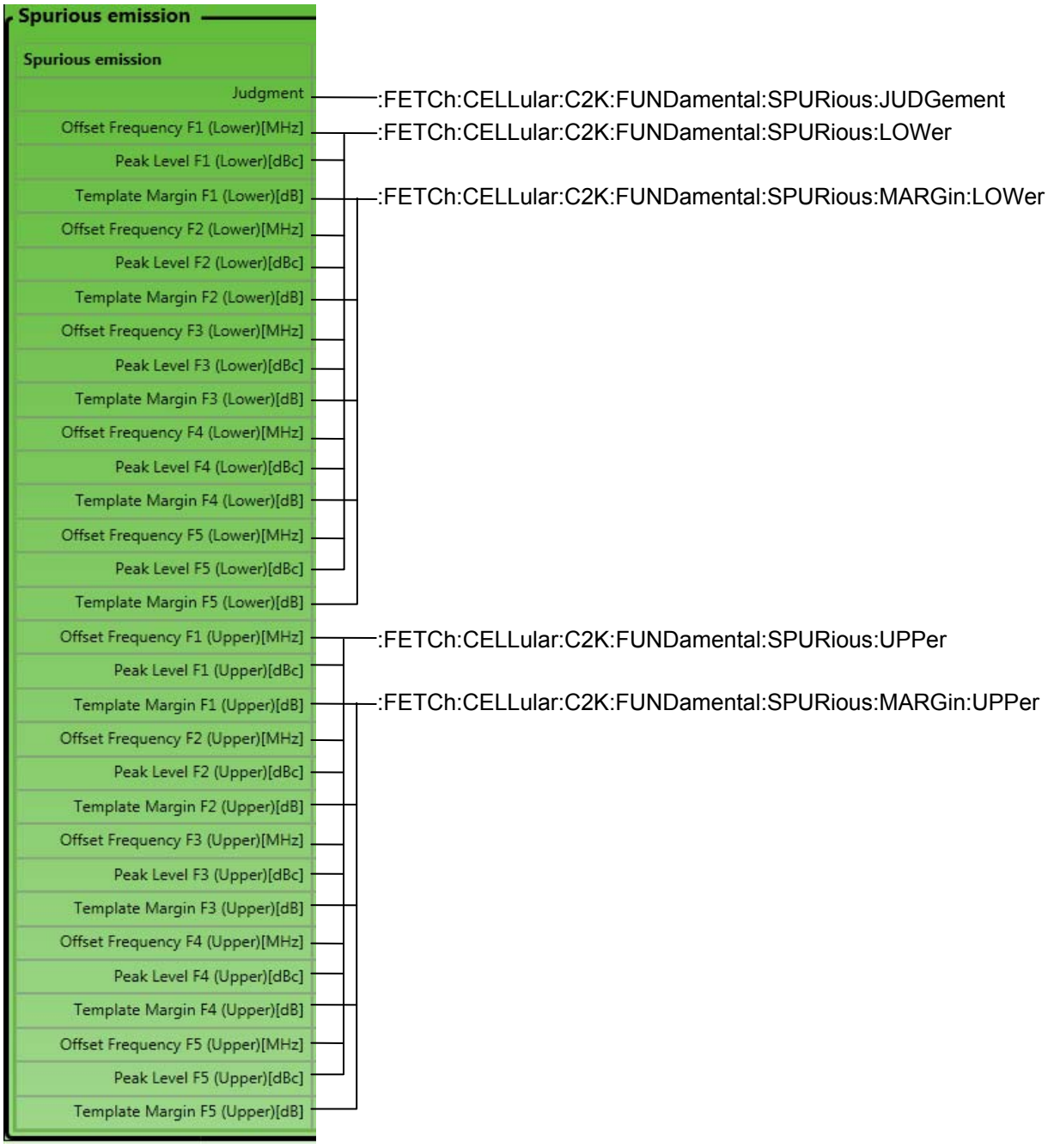


Figure 3.6.3-9 Spectrum Emission Mask Results

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*.

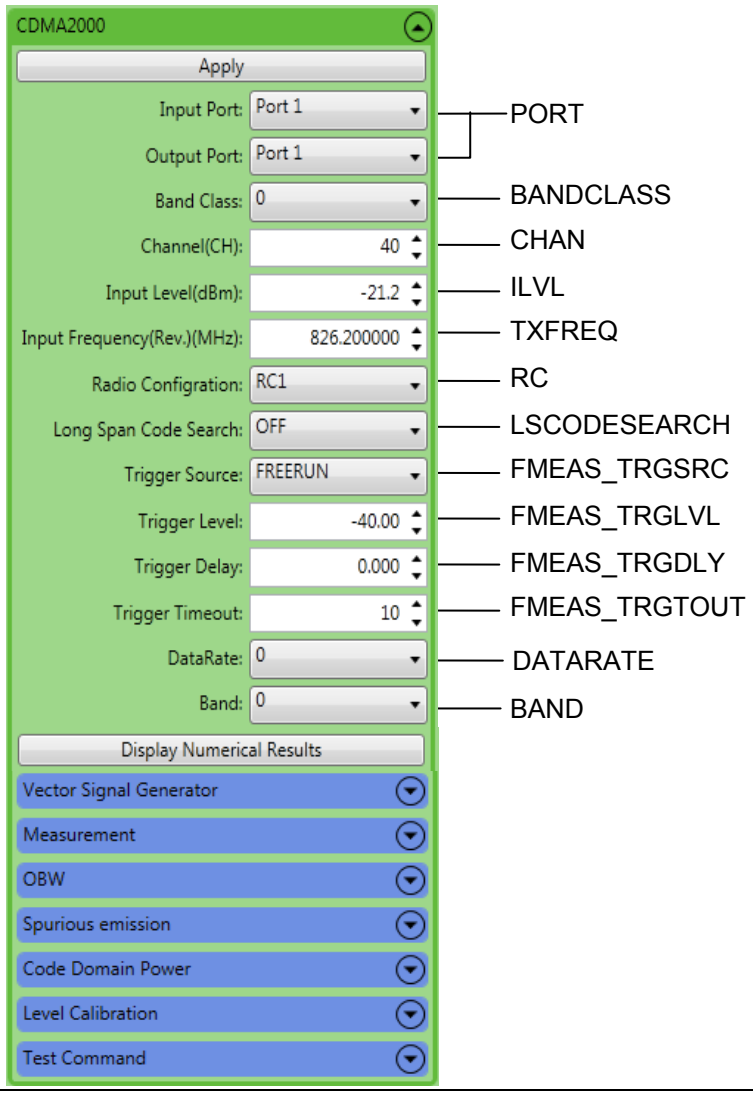


Figure 3.6.4-1 Measurement Settings Pane

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).

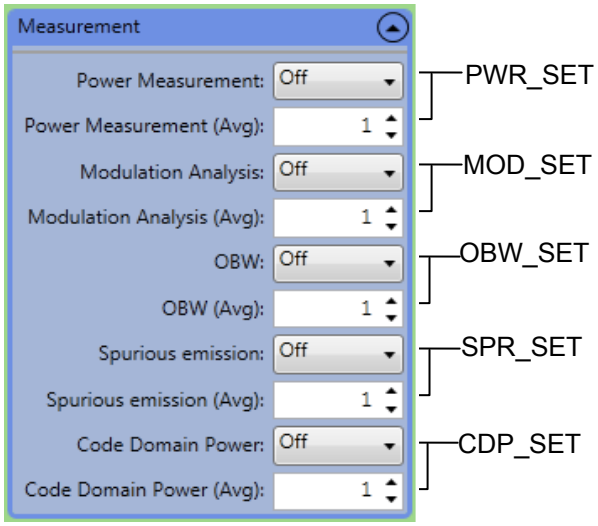


Figure 3.6.4-2 Measurement Settings Pane (Measurement Dialog)

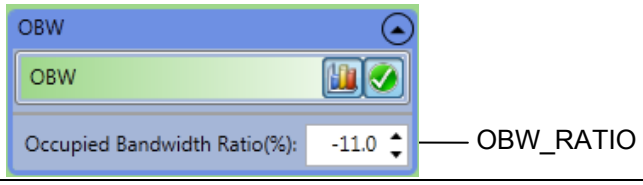


Figure 3.6.4-3 Measurement Settings Pane (OBW Dialog)

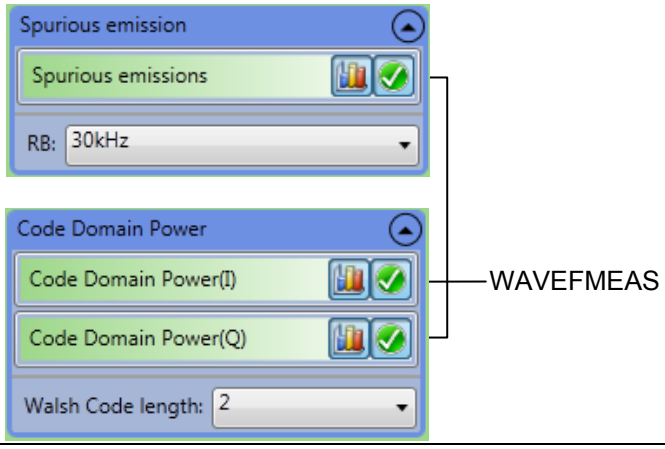


Figure 3.6.4-4 Measurement Settings Pane (Spurious Emission and Code Domain Power Dialog)

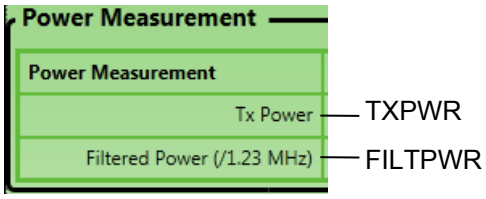


Figure 3.6.4-5 Power Measurement Results

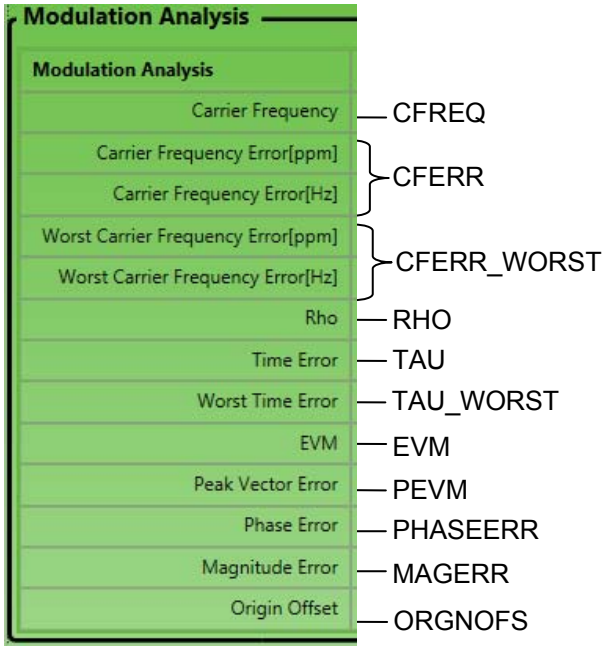


Figure 3.6.4-6 Modulation Analysis Results

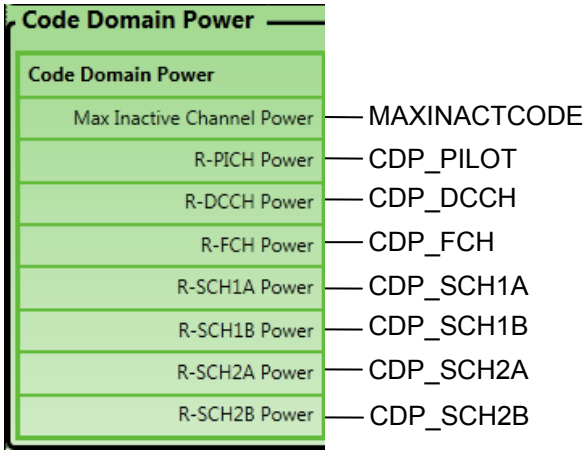


Figure 3.6.4-7 Code Domain Power Results

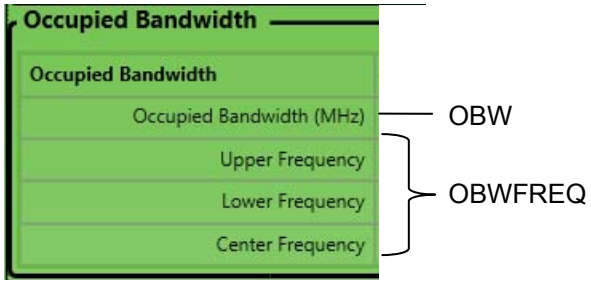


Figure 3.6.4-8 OBW Results

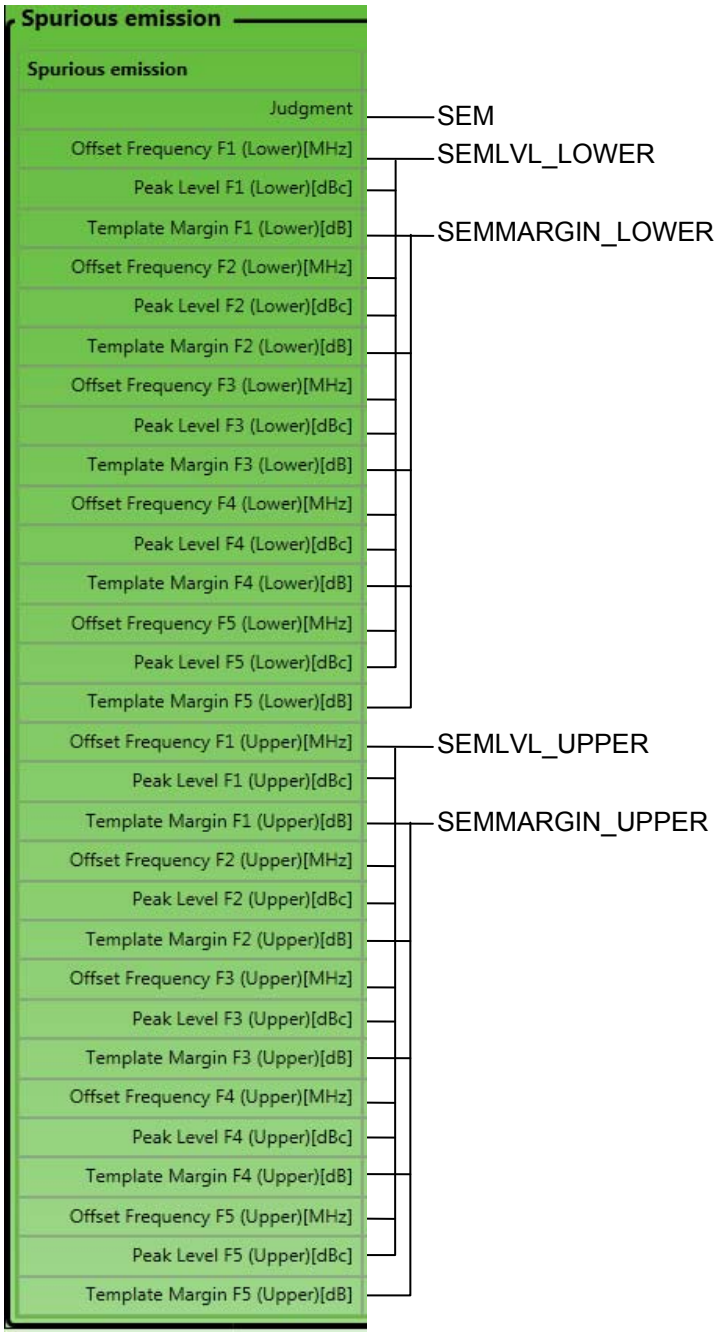


Figure 3.6.4-9 Spurious Emission Results

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.

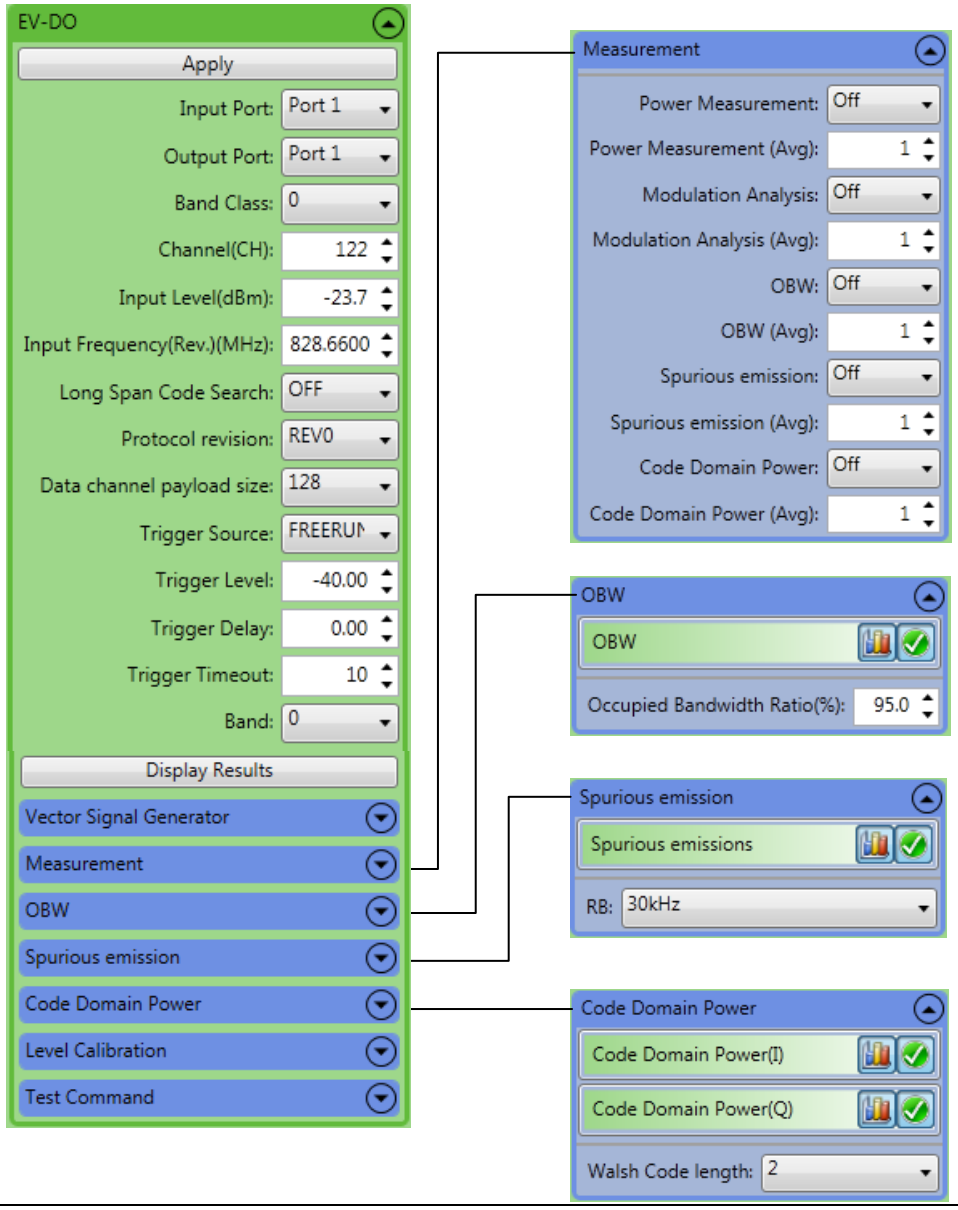


Figure 3.7.1-1 EV-DO Measurement Settings Pane

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.

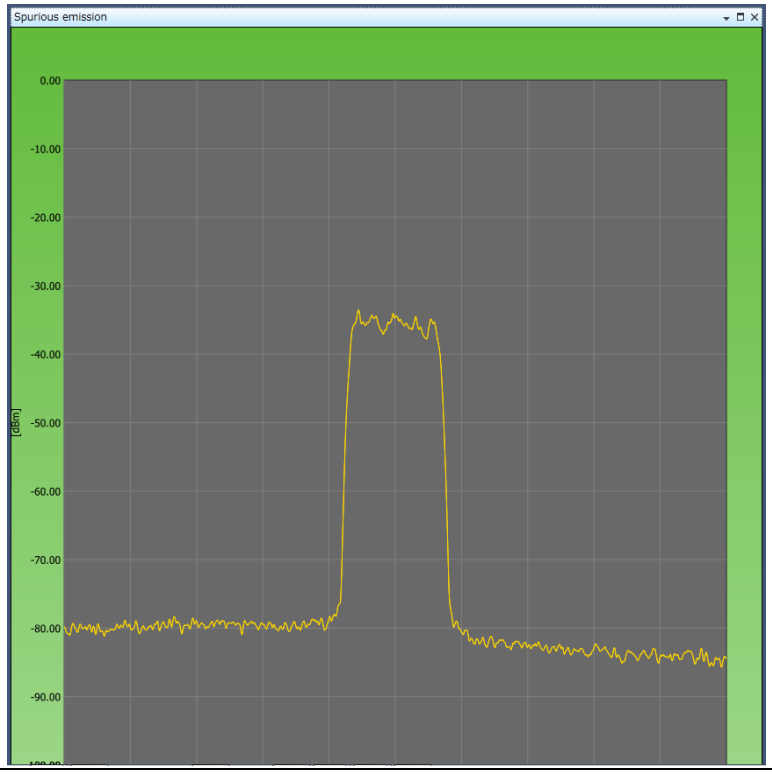


Figure 3.7.2-1 EV-DO Spurious Emissions Graph

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*.

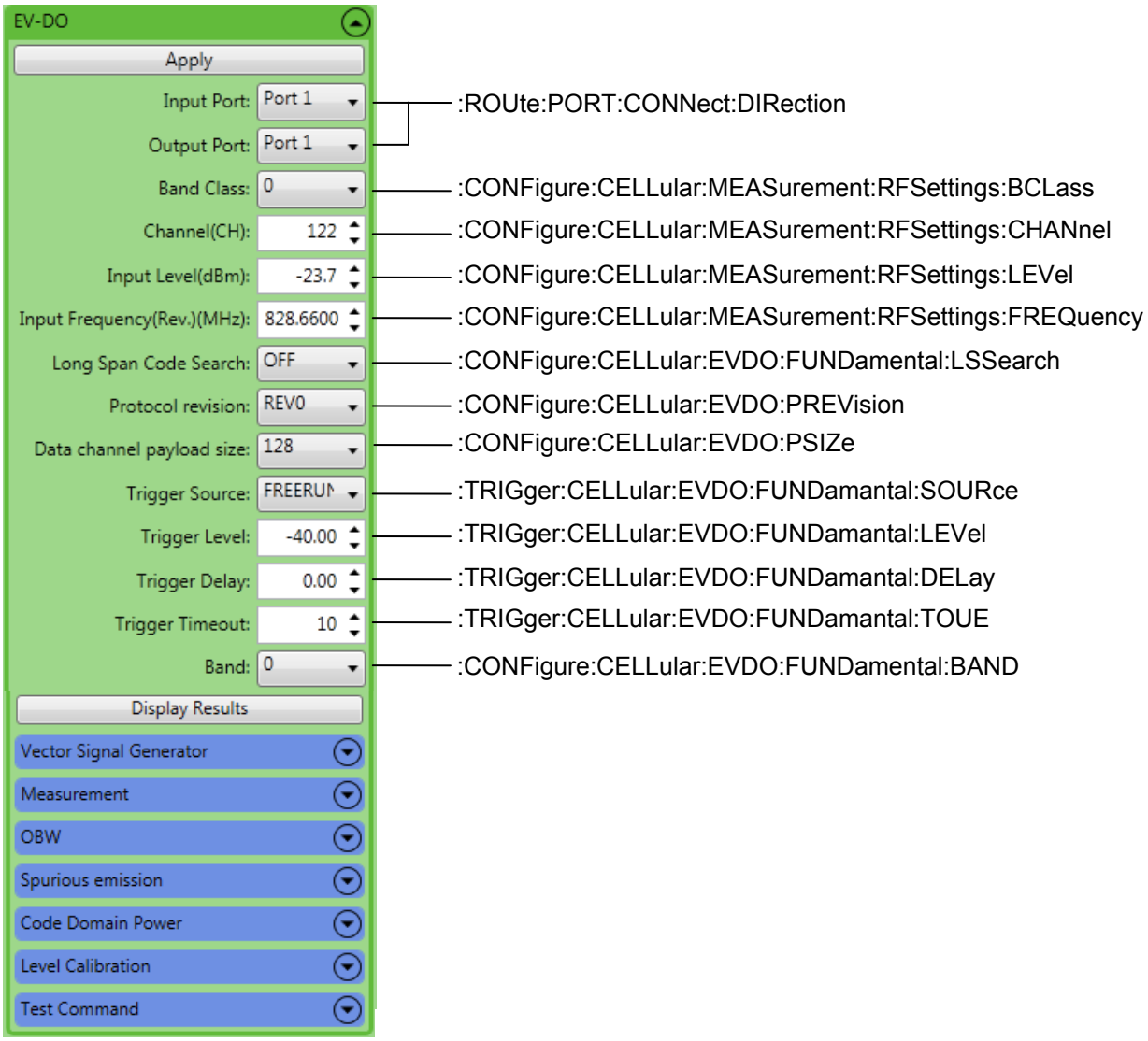


Figure 3.7.3-1 Measurement Settings Pane

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).

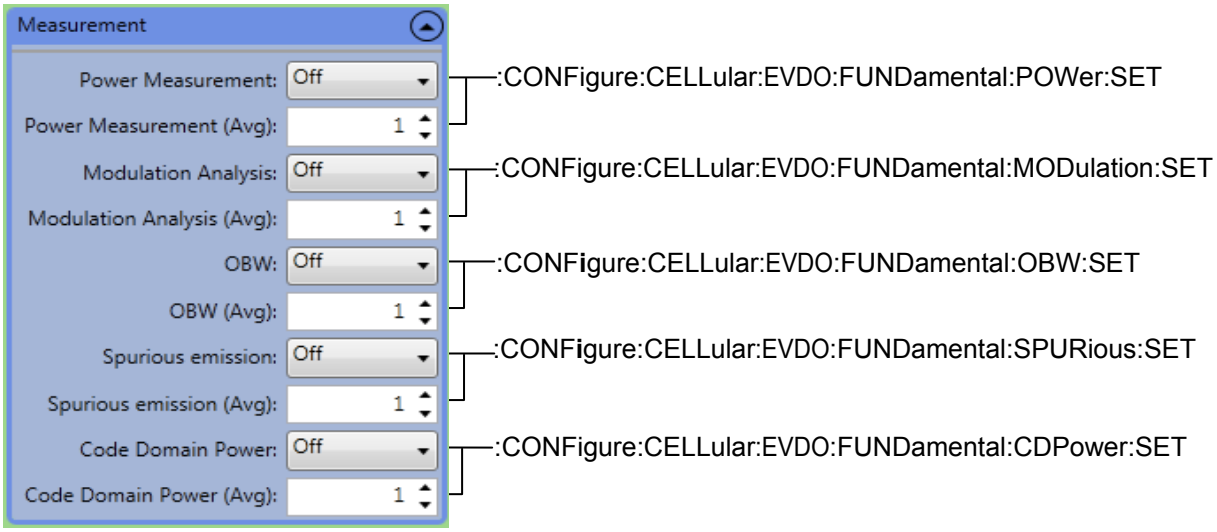


Figure 3.7.3-2 Measurement Settings Pane (Measurement Dialog)

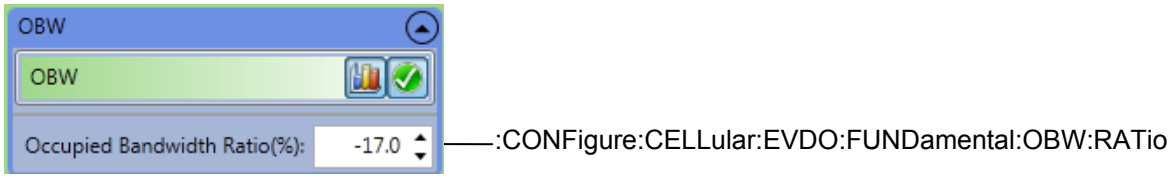


Figure 3.7.3-3 Measurement Settings Pane (OBW Dialog)

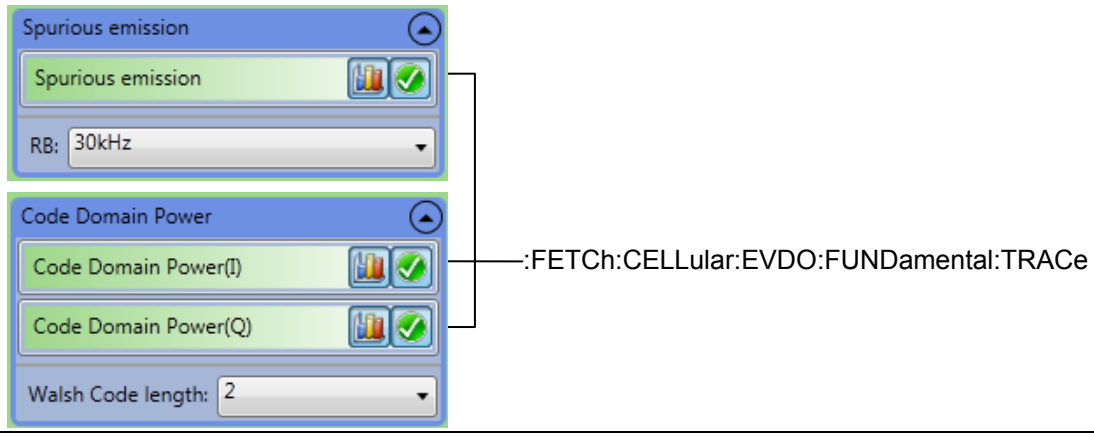


Figure 3.7.3-4 Measurement Settings Pane (Spurious Emission and Code Domain Power Dialog)

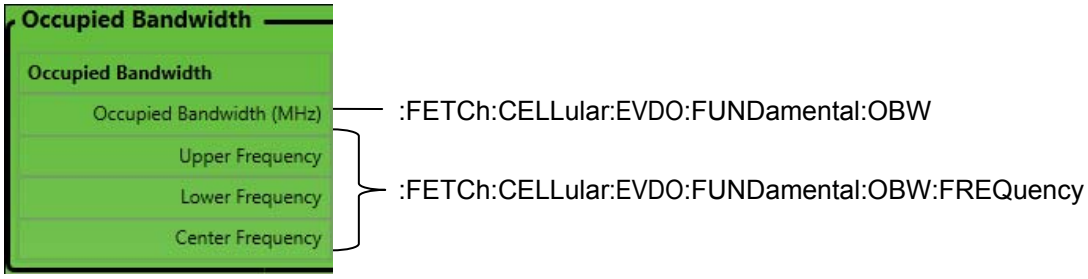


Figure 3.7.3-5 OBW Results

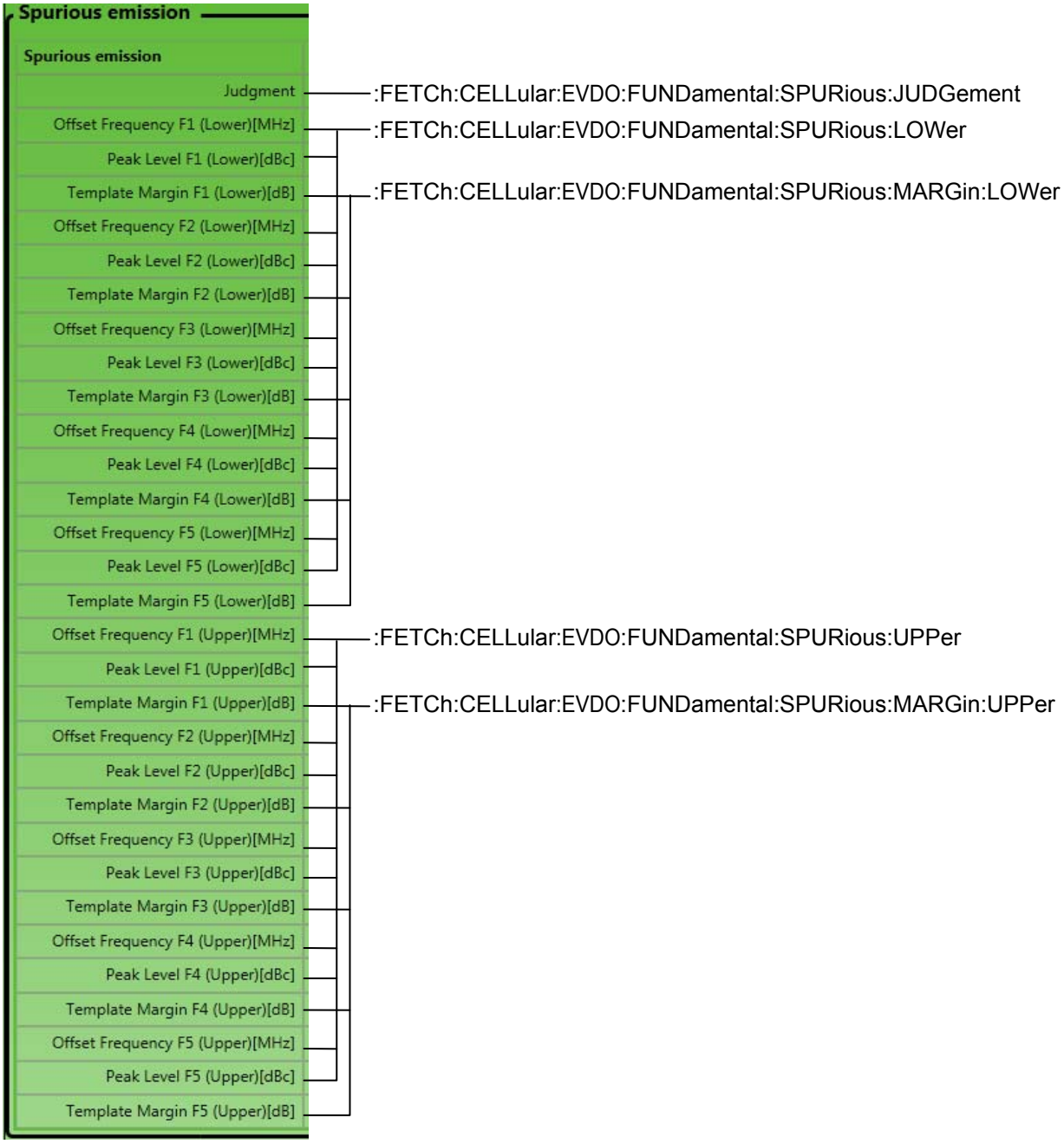


Figure 3.7.3-6 Spectrum Emission Mask Results

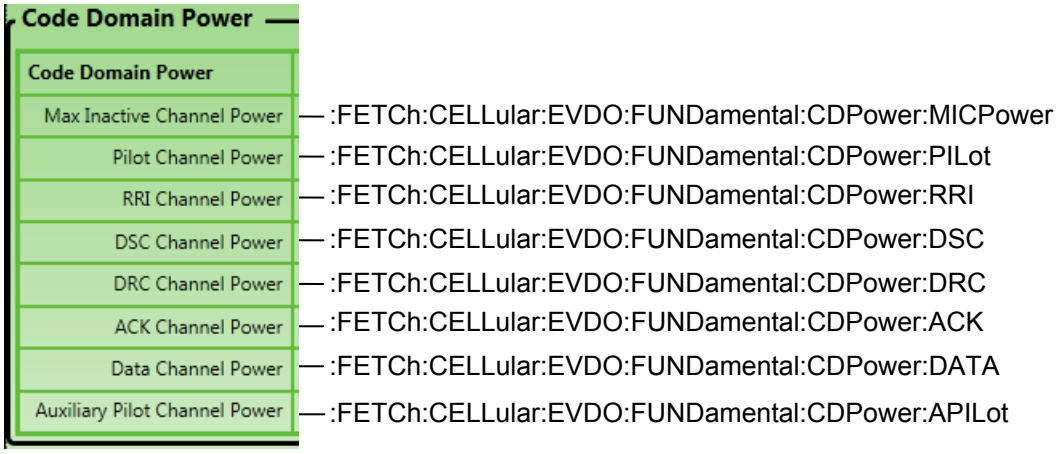


Figure 3.7.3-7 Code Domain Power Results

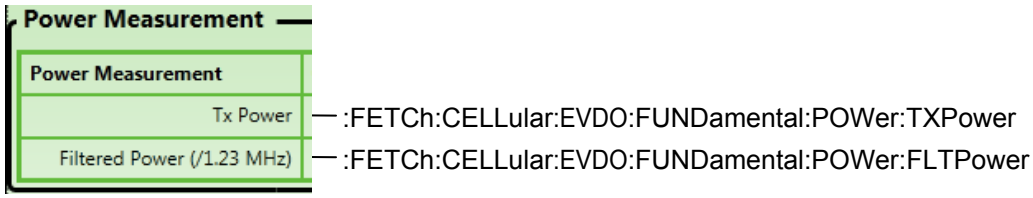


Figure 3.7.3-8 Power Measurement Results

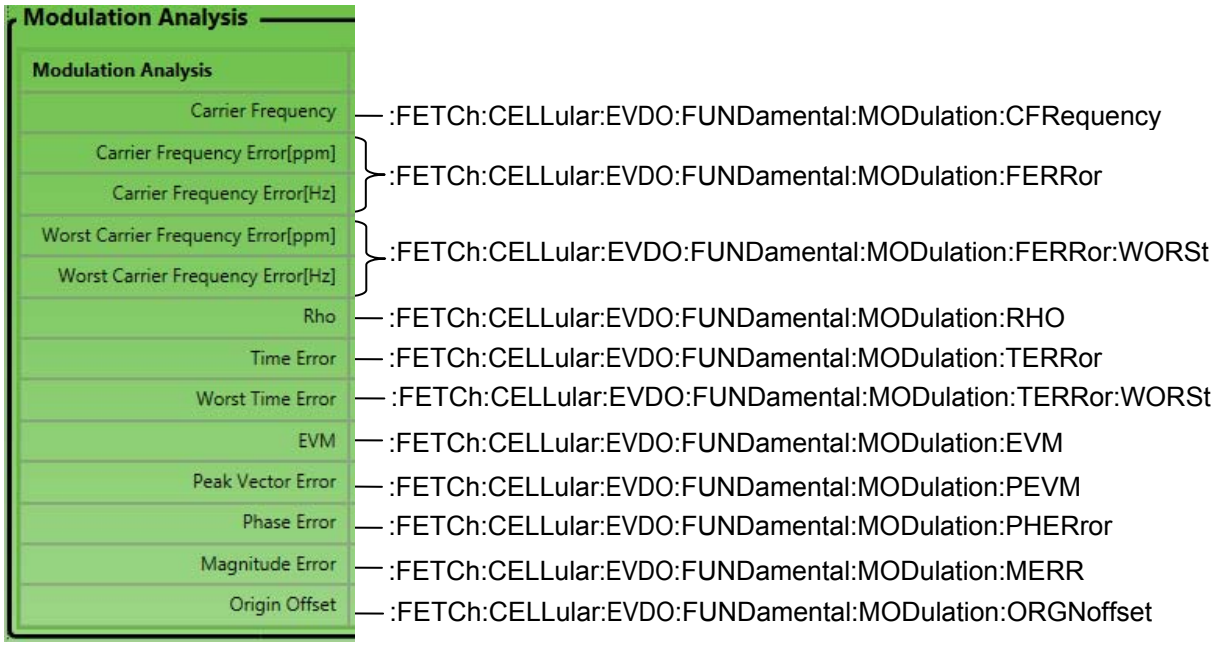


Figure 3.7.3-9 Modulation Analysis Results

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*.

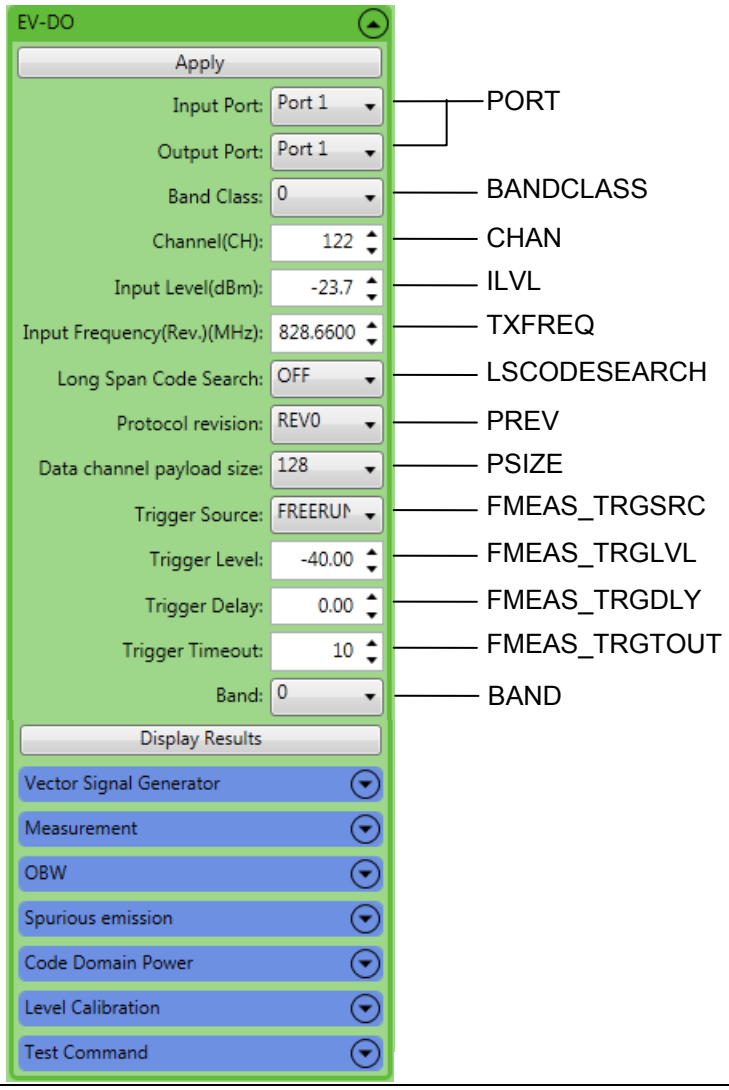


Figure 3.7.4-1 Measurement Settings Pane

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).

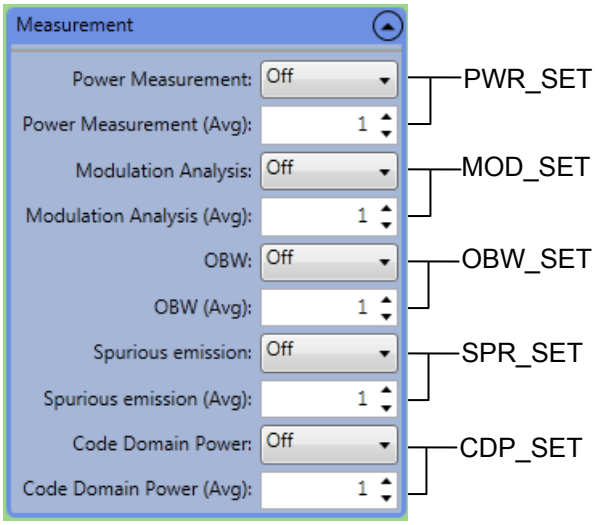


Figure 3.7.4-2 Measurement Settings Pane (Measurement Dialog)

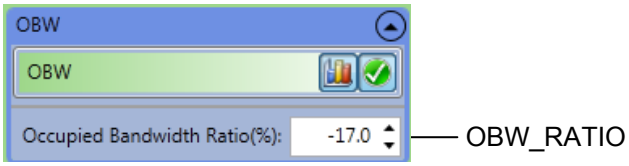


Figure 3.7.4-3 Measurement Settings Pane (OBW Dialog)

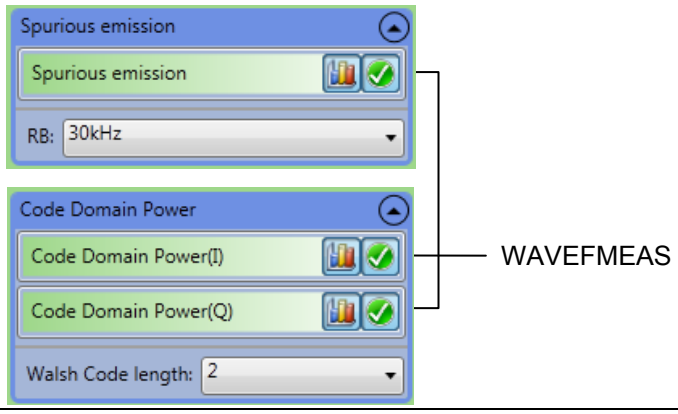


Figure 3.7.4-4 Measurement Settings Pane (Spurious Emission Code Domain Power Dialog)

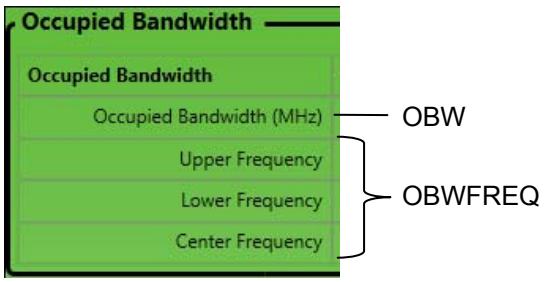


Figure 3.7.4-5 OBW Results

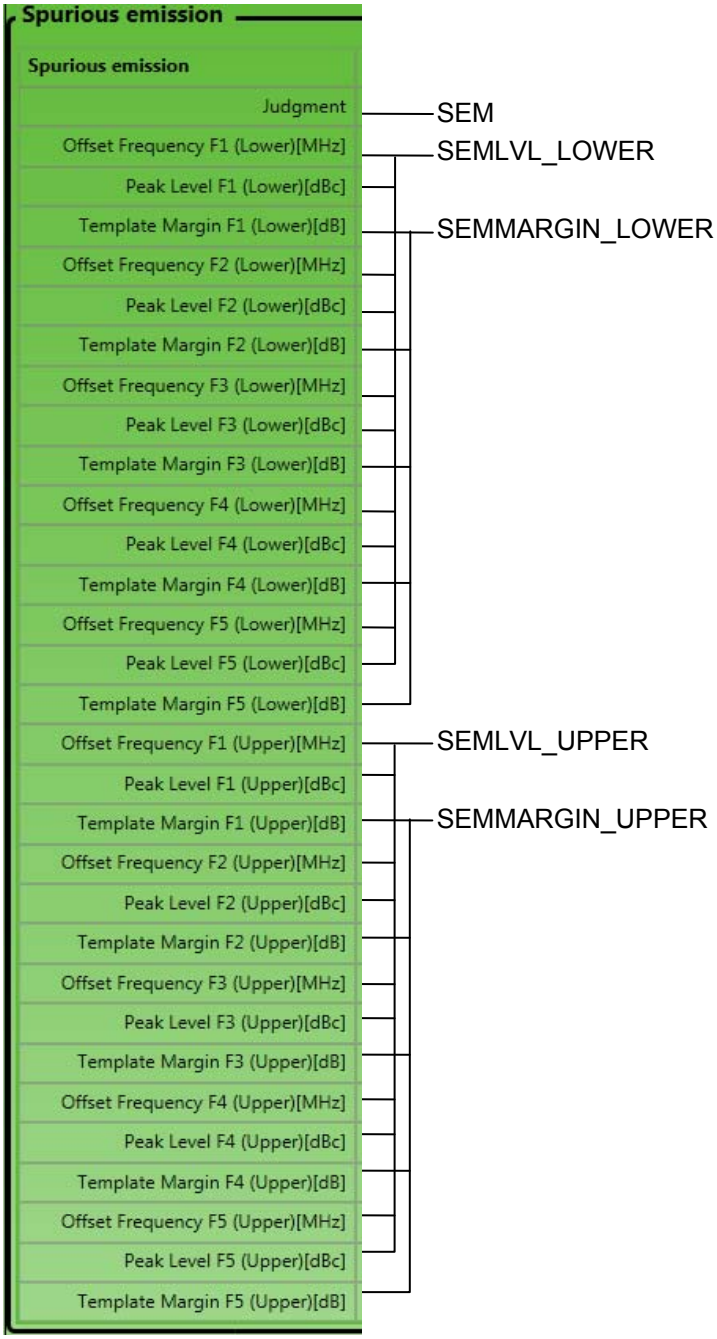


Figure 3.7.4-6 Spectrum Emission Mask Results

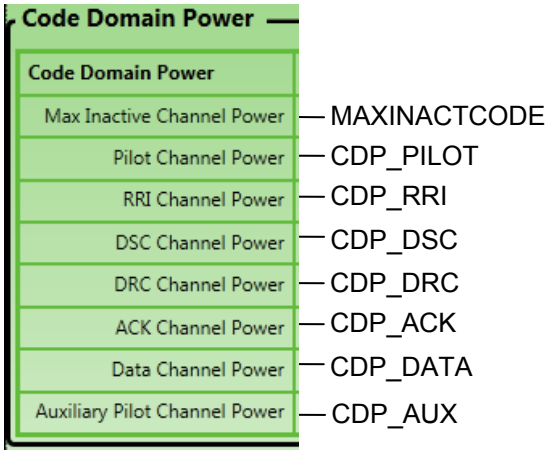


Figure 3.7.4-7 Code Domain Power Results

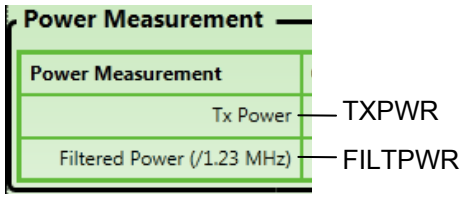


Figure 3.7.4-8 Power Measurement Results

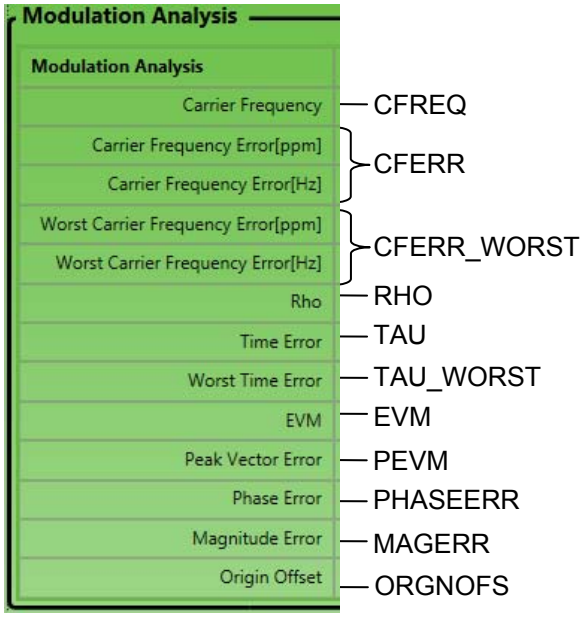


Figure 3.7.4-9 Modulation Analysis Results

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.

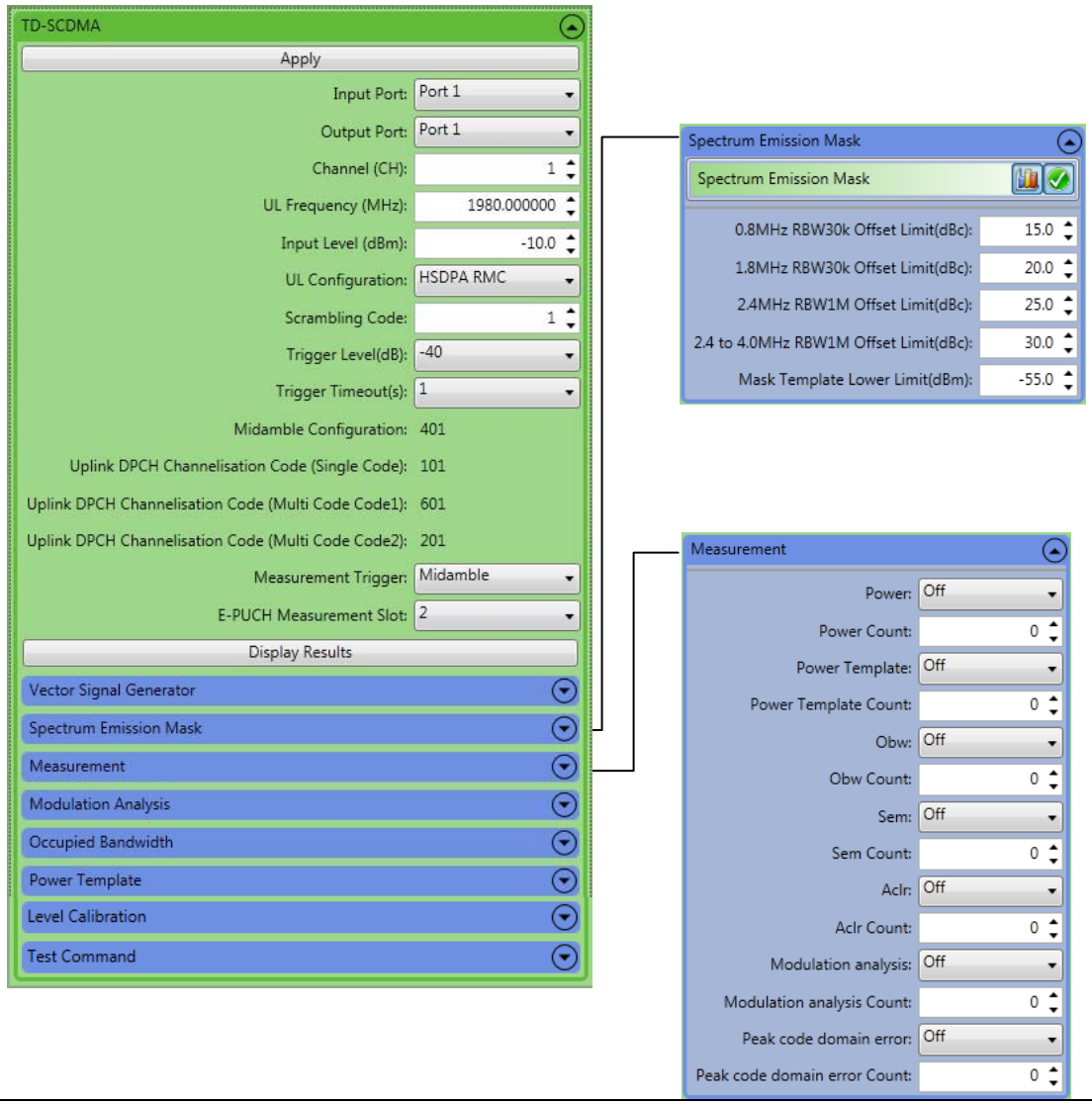


Figure 3.8.1-1 TD-SCDMA Measurement Settings Pane (1/2)

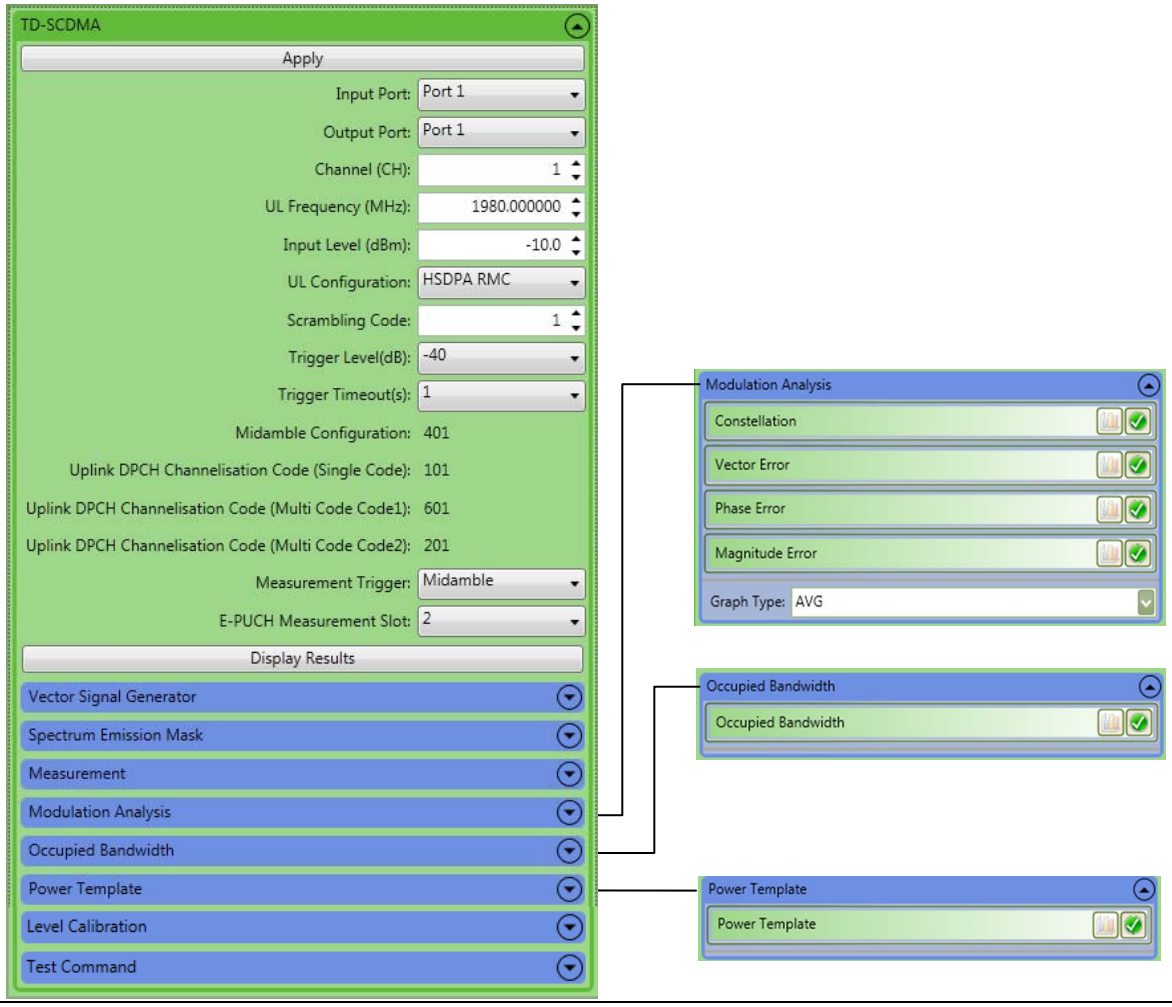


Figure 3.8.1-2 TD-SCDMA Measurement Settings Pane (2/2)

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*.

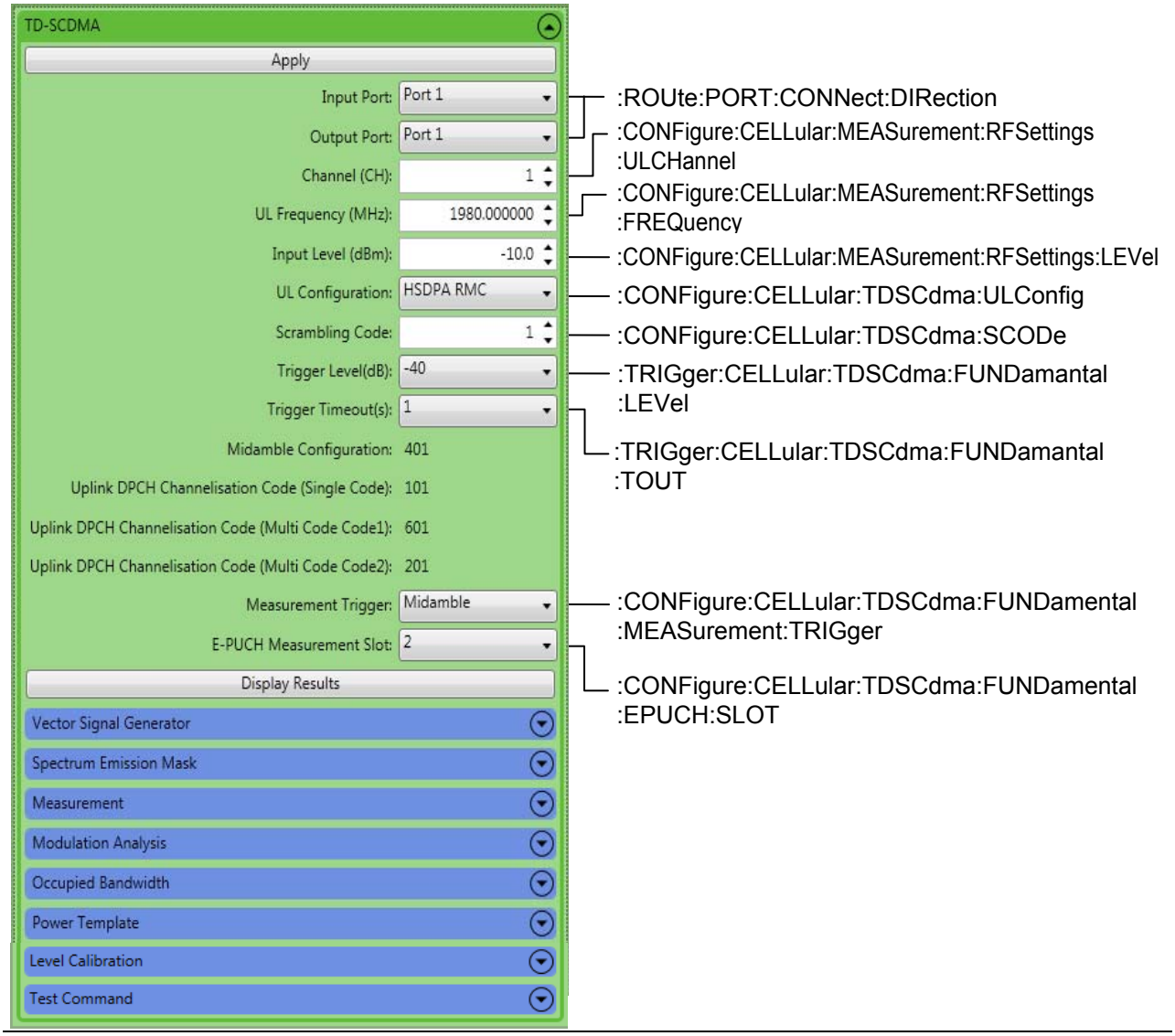


Figure 3.8.3-1 Measurement Settings Pane

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).

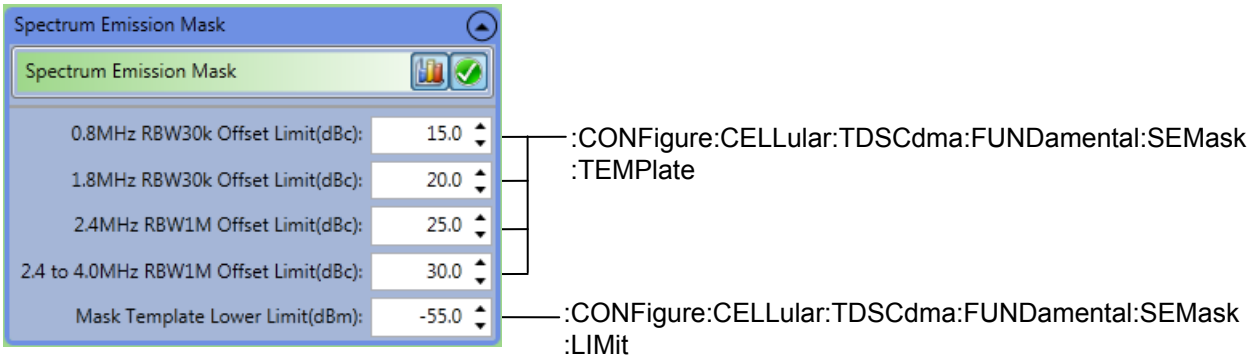


Figure 3.8.3-2 Measurement Settings Pane (Spectrum Emission Mask Dialog)

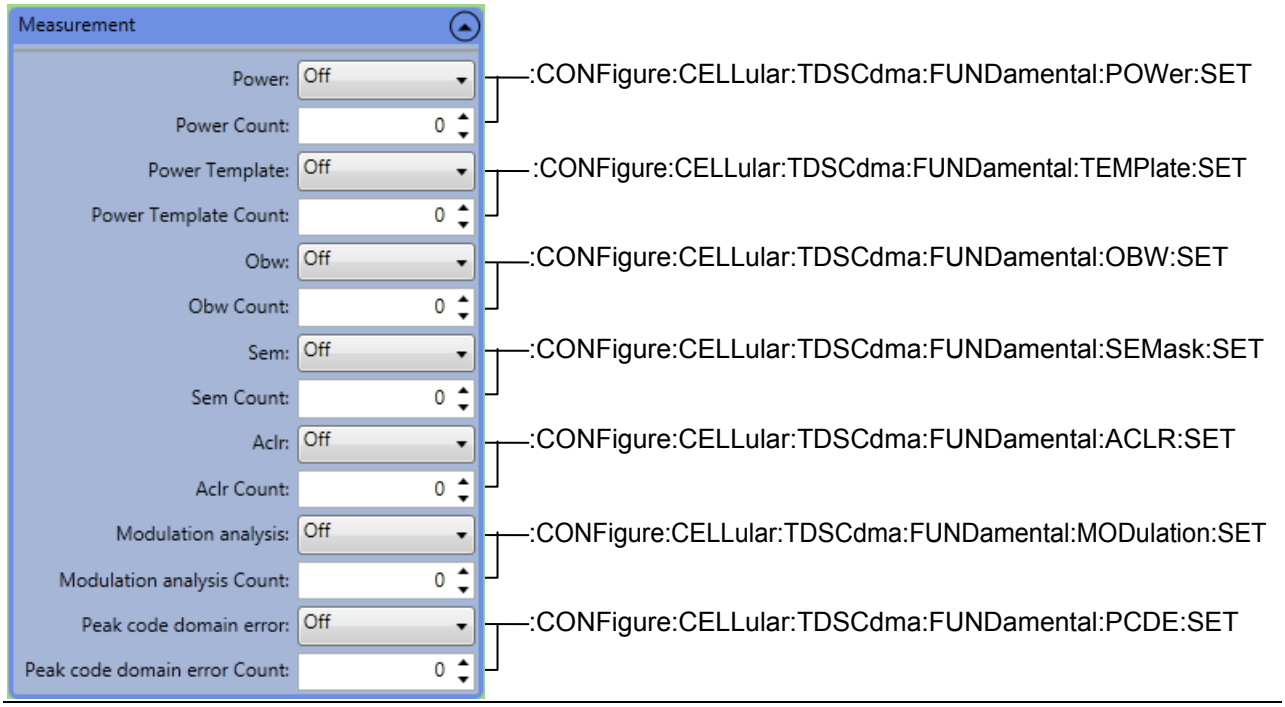


Figure 3.8.3-3 Measurement Settings Pane (Measurement Dialog)

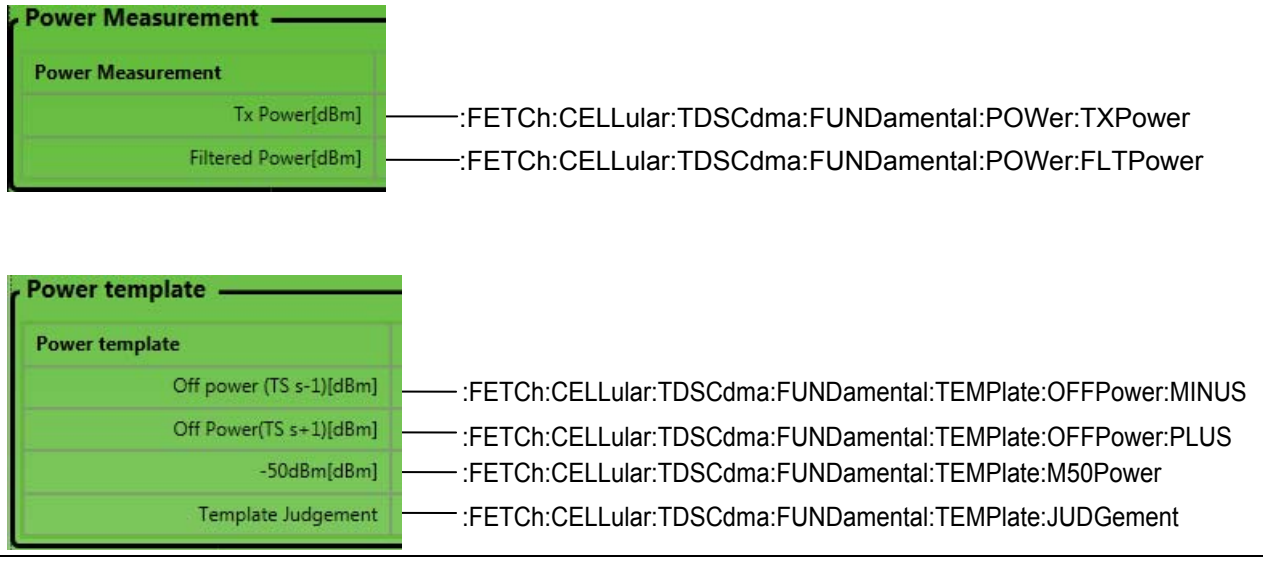


Figure 3.8.3-4 Power Measurement and Power Template Results

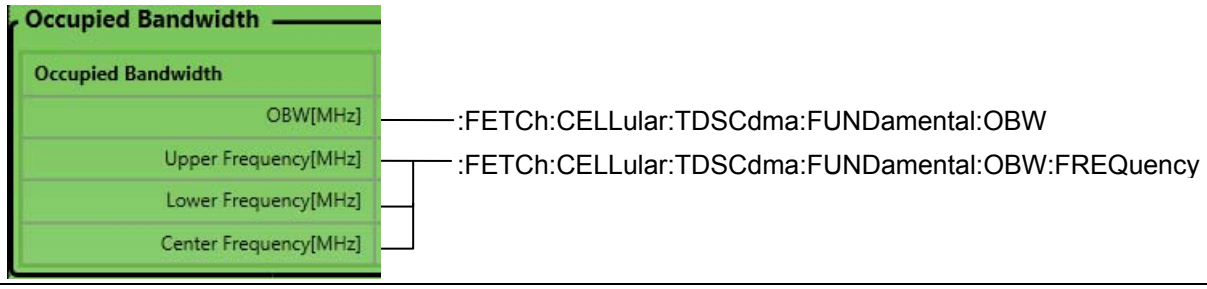


Figure 3.8.3-5 Occupied Bandwidth Results

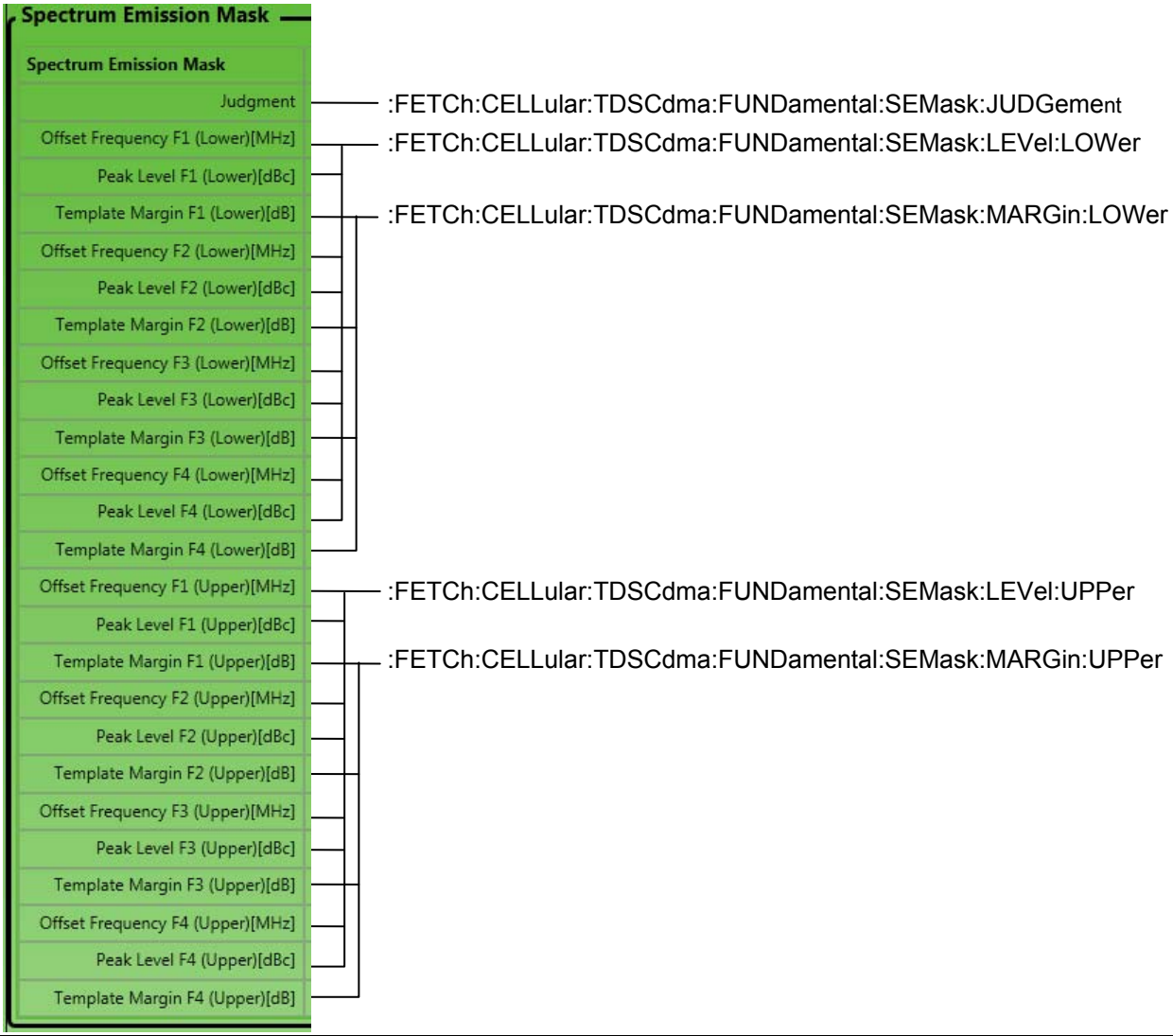


Figure 3.8.3-6 Spectrum Emission Mask Results

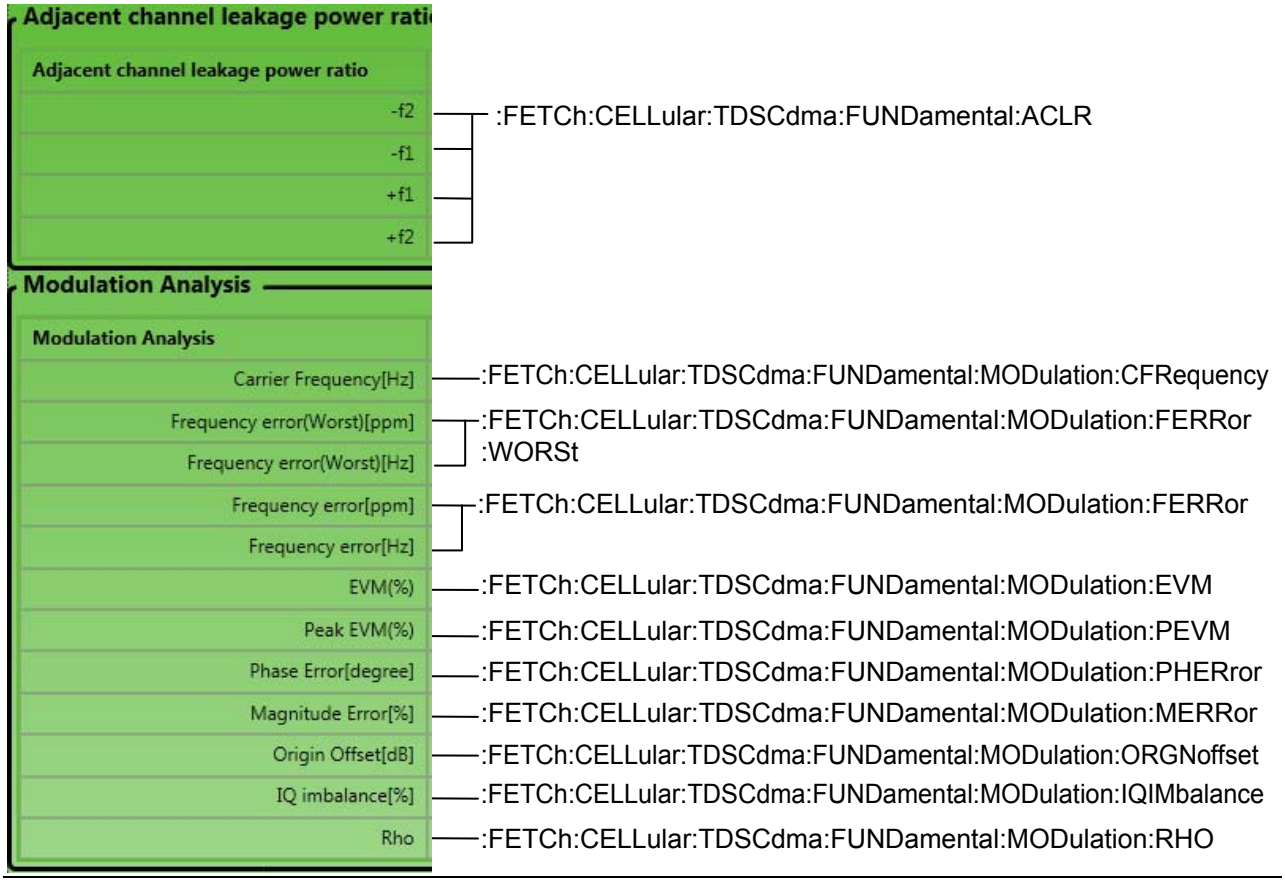


Figure 3.8.3-7 ACLR and Modulation Analysis Results

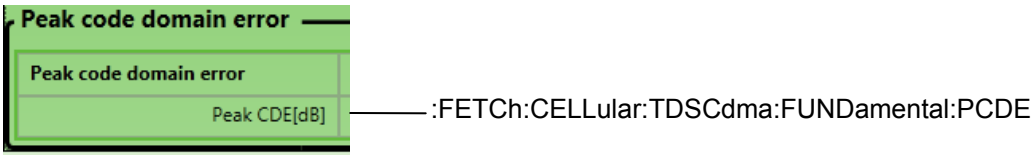


Figure 3.8.3-8 Peak Code Domain Error Results

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*.

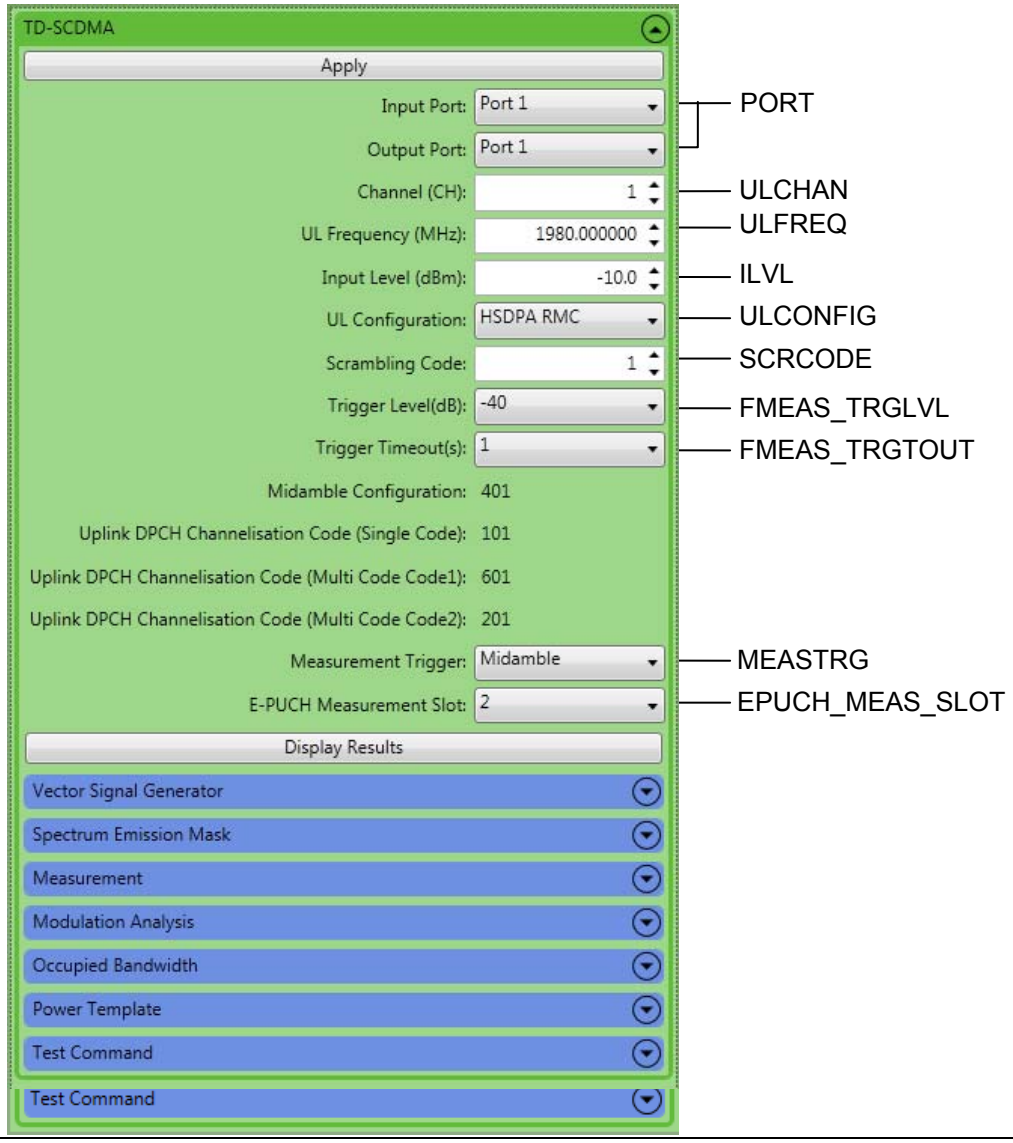


Figure 3.8.4-1 Measurement Settings Pane

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).

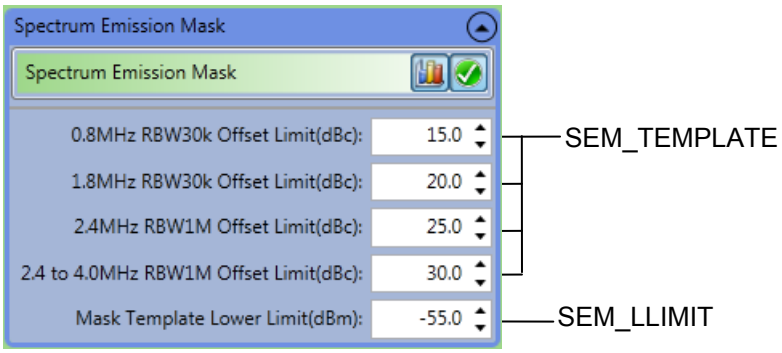


Figure 3.8.4-2 Measurement Settings Pane (Spectrum Emission Mask Dialog)

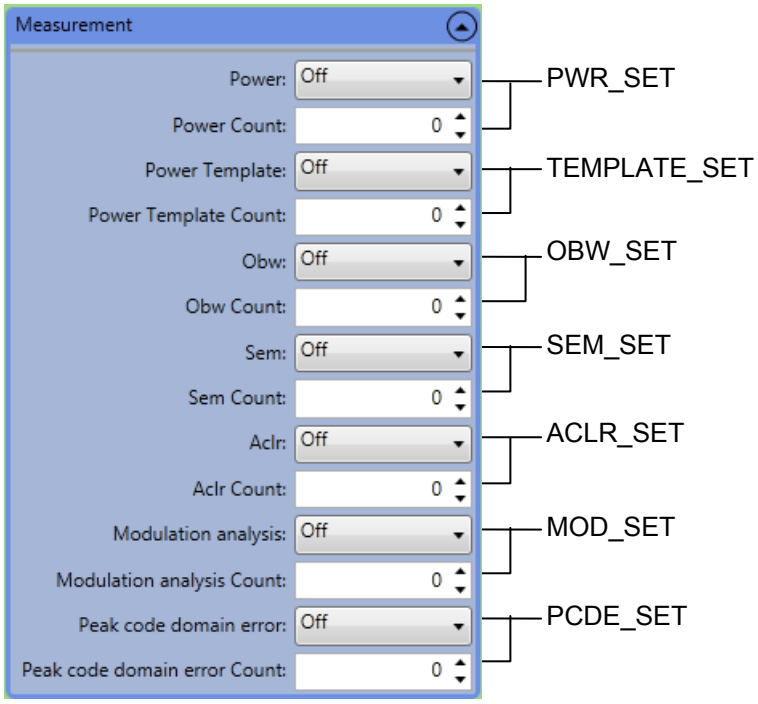


Figure 3.8.4-3 Measurement Settings Pane (Measurement Dialog)

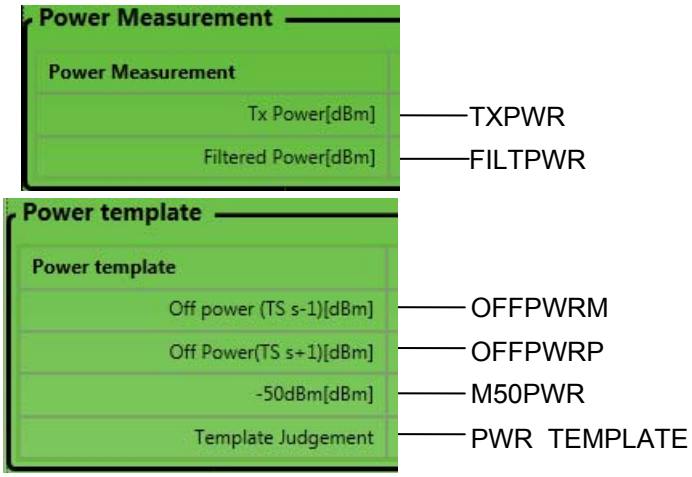


Figure 3.8.4-4 Power Measurement and Power Template Results

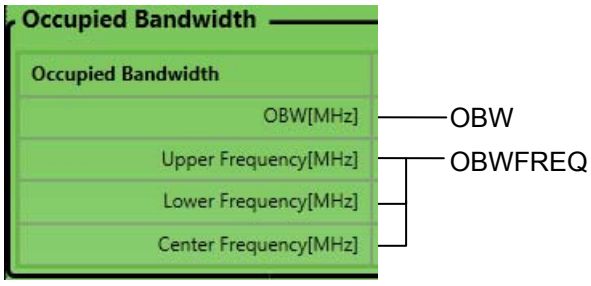


Figure 3.8.4-5 Occupied Bandwidth Results

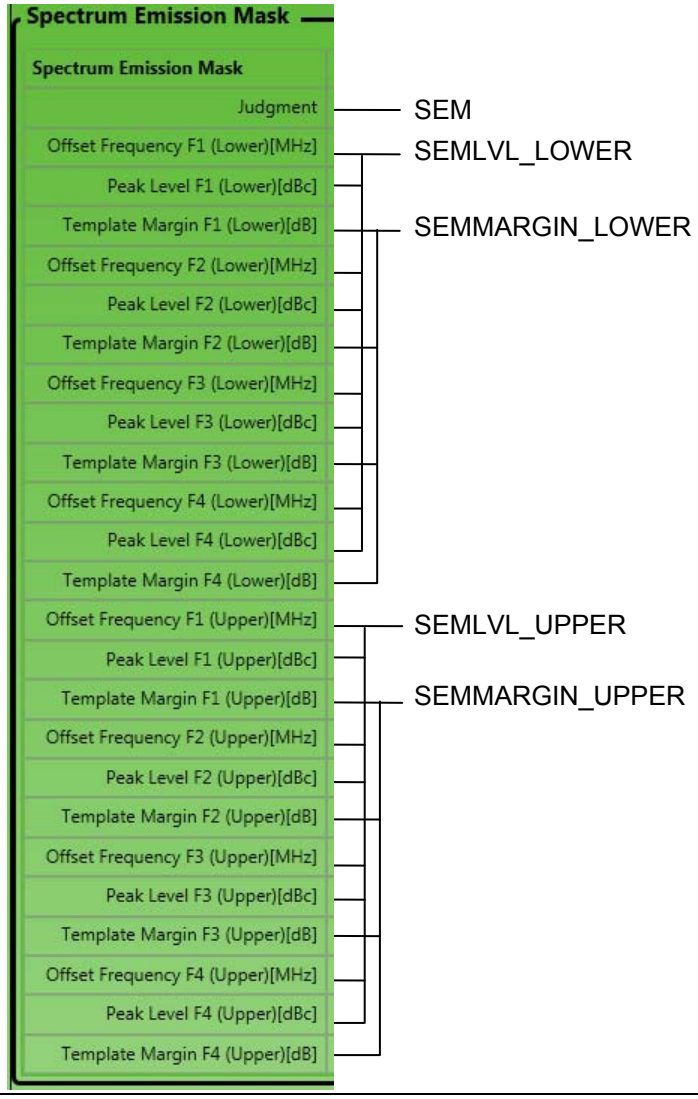


Figure 3.8.4-6 Spectrum Emission Mask Results

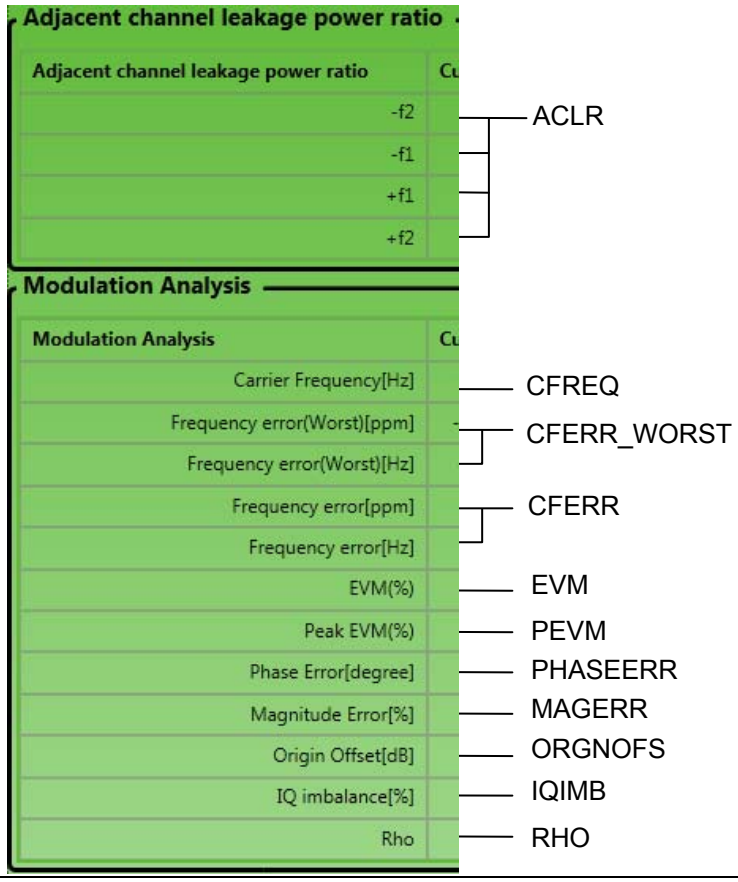


Figure 3.8.4-7 ACLR and Modulation Analysis Results

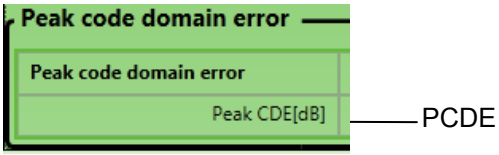


Figure 3.8.4-8 Peak Code Domain Error Results

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.

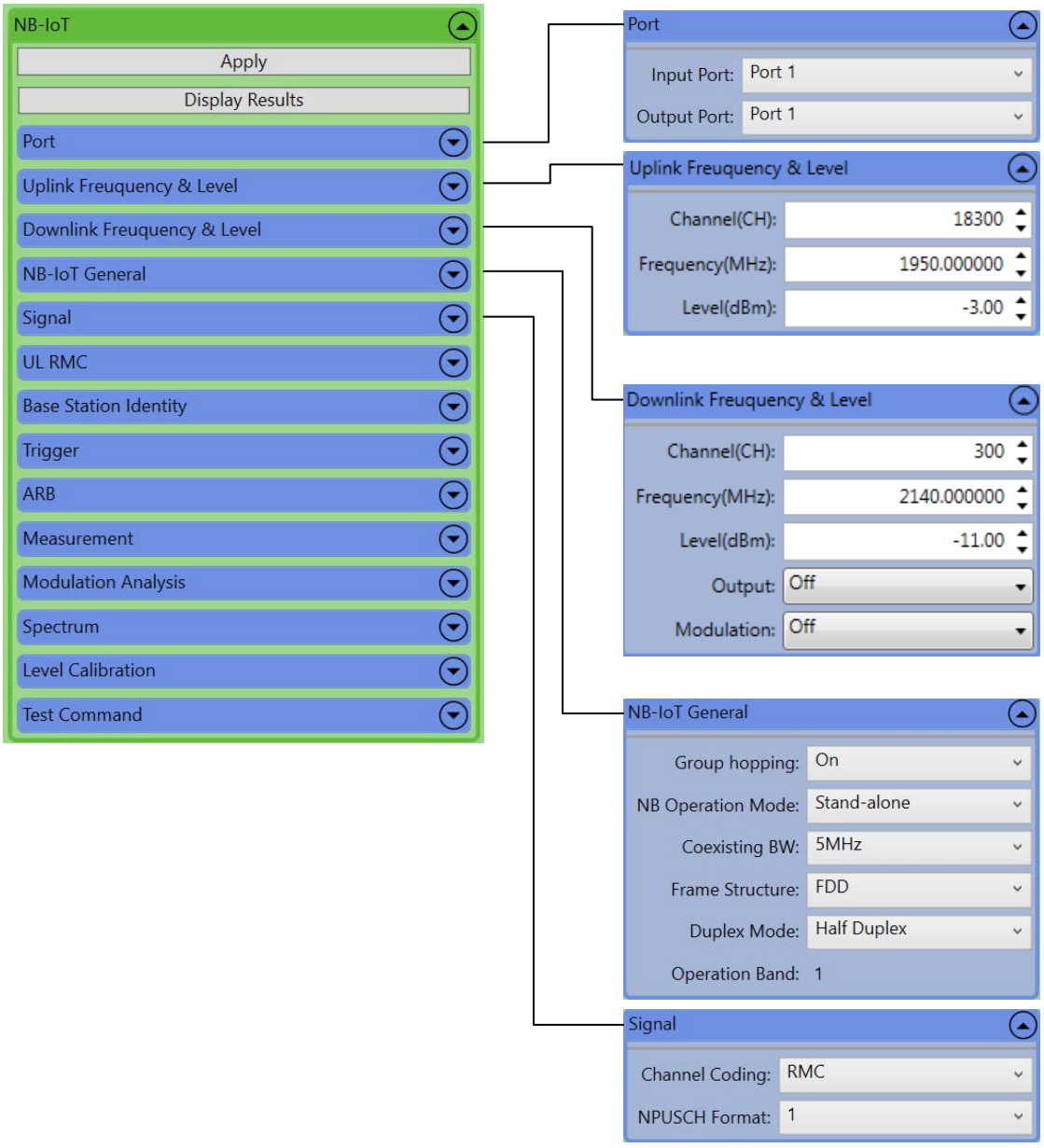


Figure 3.9.1-1 NB-IoT Measurement Settings Pane (1/3)



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

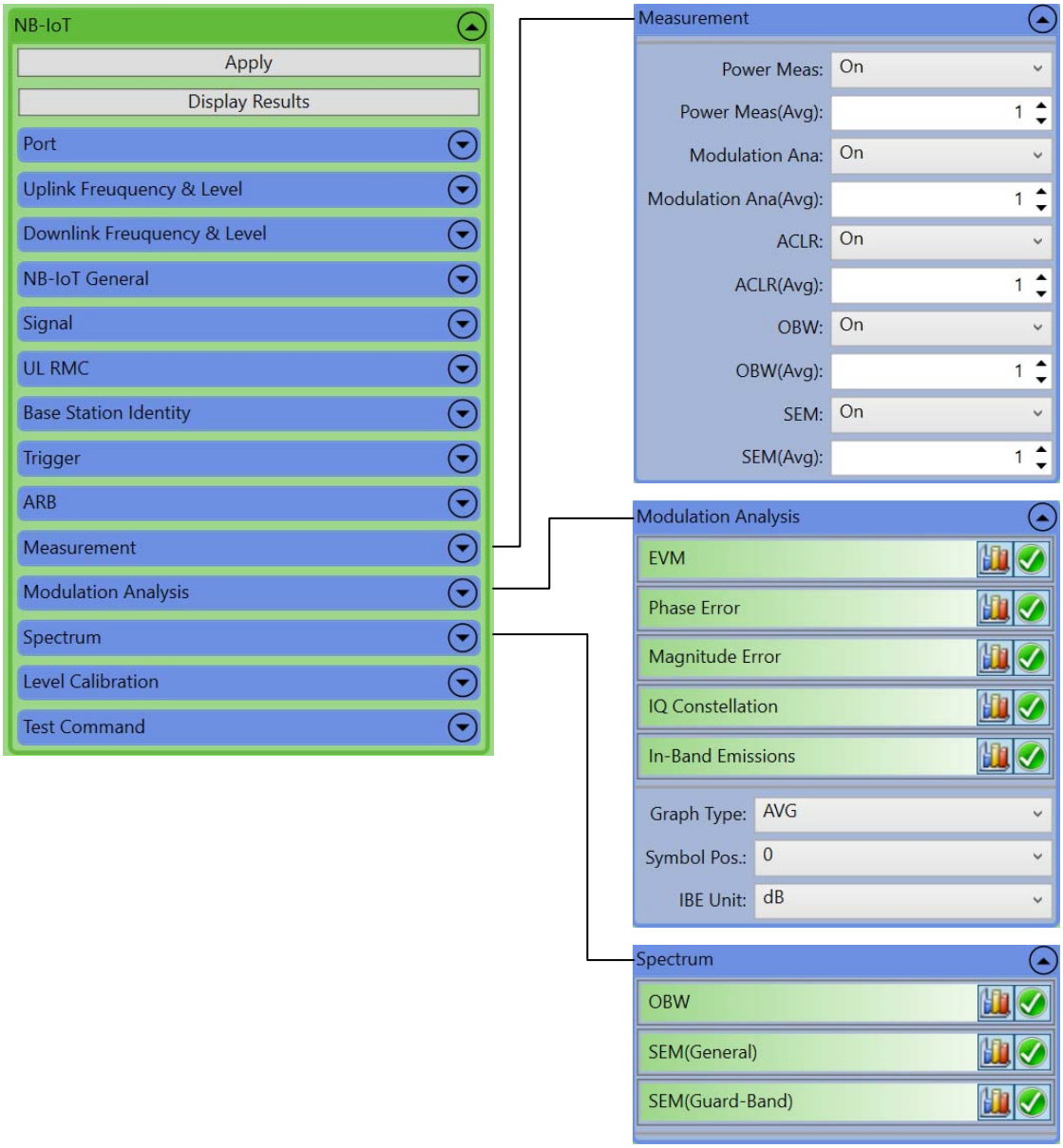


Figure 3.9.1-3 NB-IoT Measurement Settings Pane (3/3)

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.

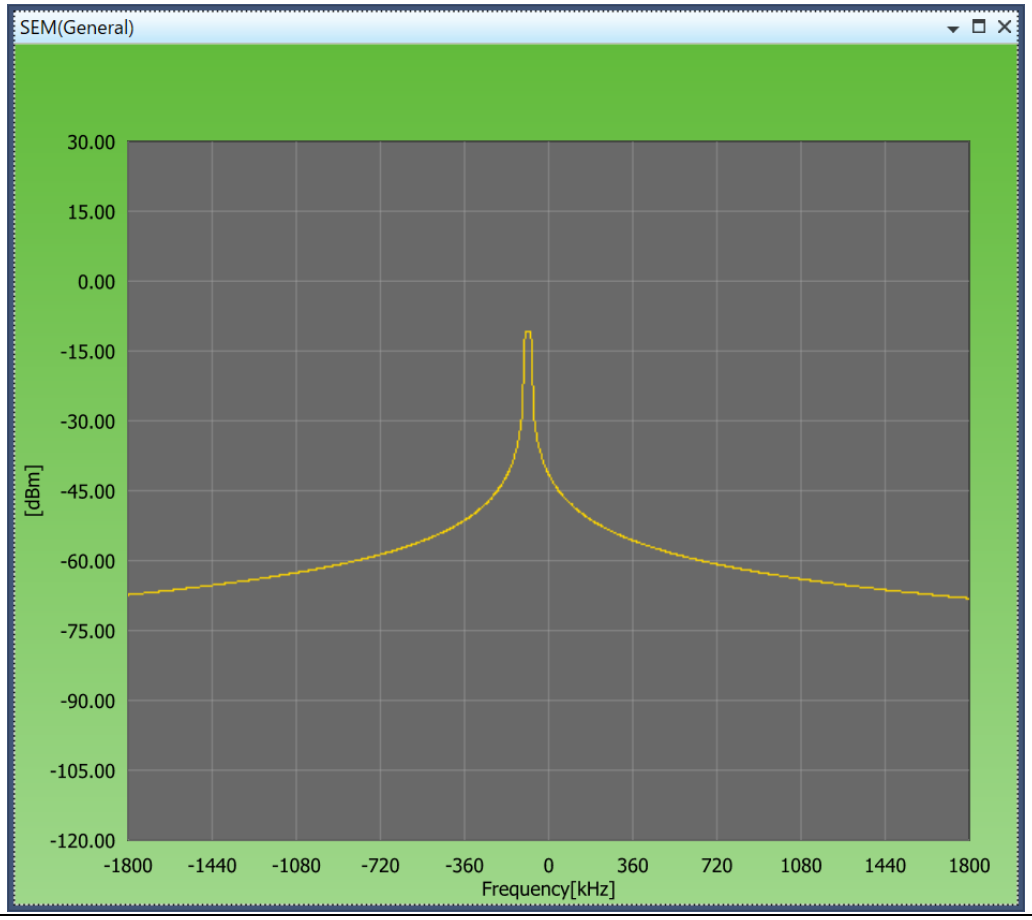


Figure 3.9.2-1 NB-IoT (Spectrum Emission Mask - General) Graph

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*.

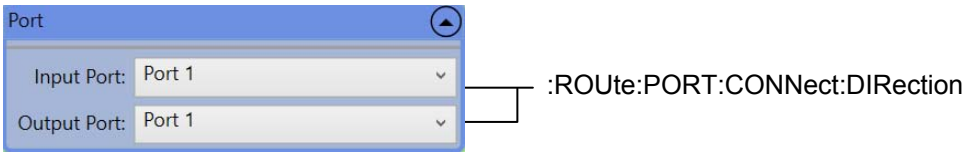


Figure 3.9.3-1 Measurement Settings Pane (Port)

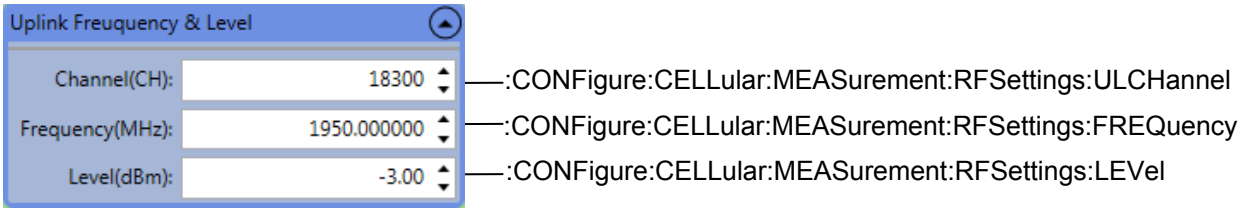


Figure 3.9.3-2 Measurement Settings Pane (Uplink Frequency & Level)

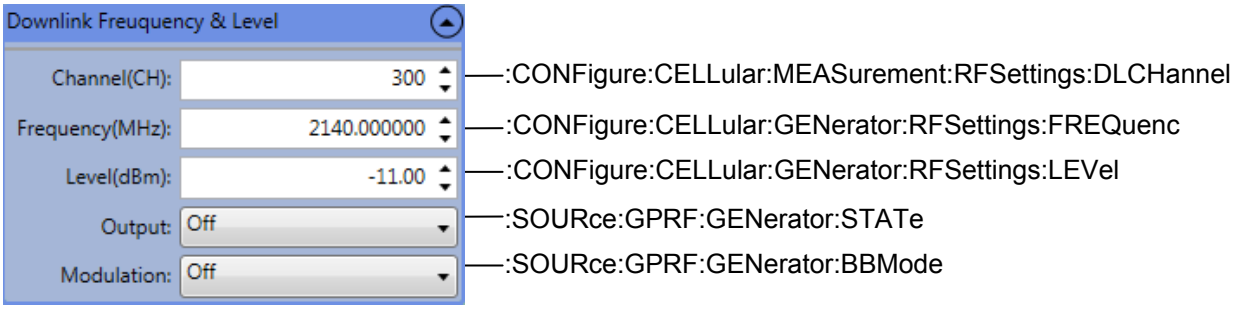


Figure 3.9.3-3 Measurement Settings Pane (Downlink Frequency & Level)

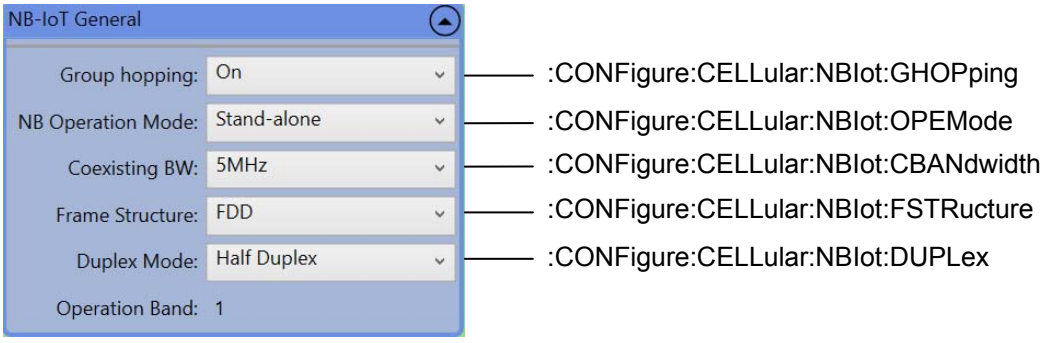


Figure 3.9.3-4 Measurement Settings Pane (NB-IoT General)

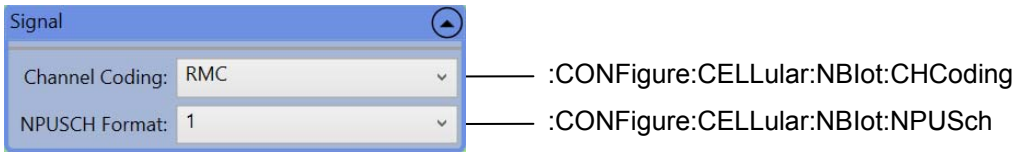


Figure 3.9.3-5 Measurement Settings Pane (Signal)

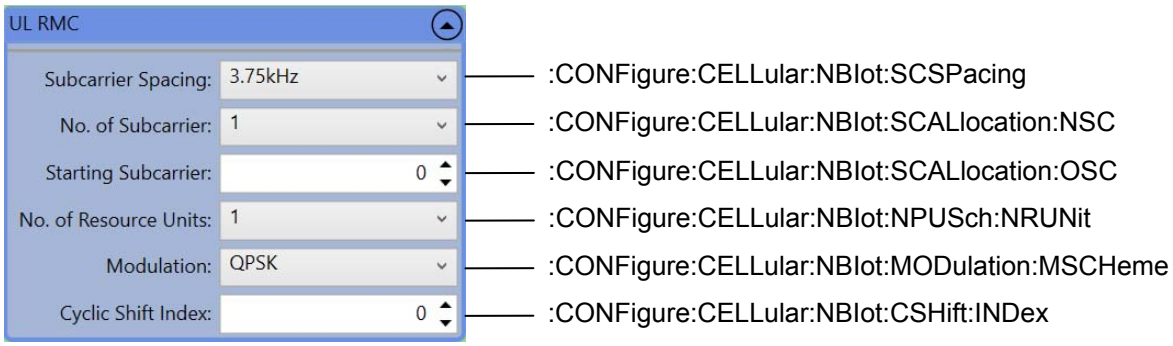


Figure 3.9.3-6 Measurement Settings Pane (UL RMC)

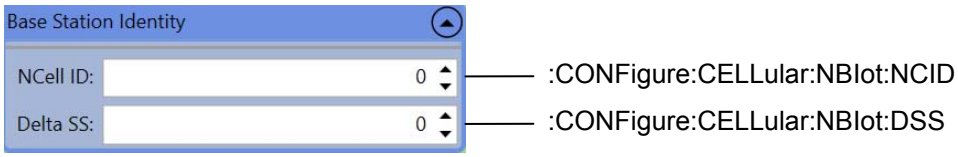


Figure 3.9.3-7 Measurement Settings Pane (Base Station Identity)

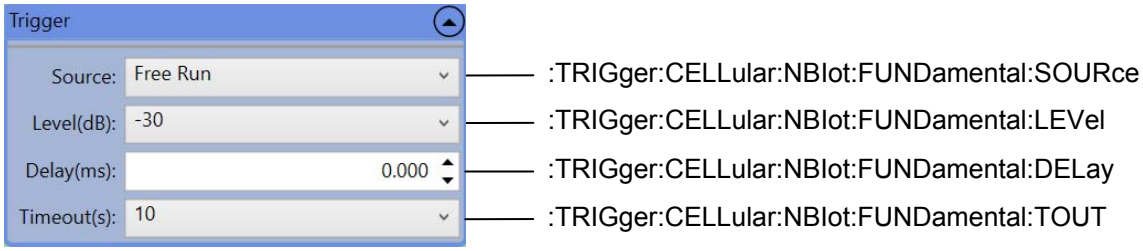


Figure 3.9.3-8 Measurement Settings Pane (Trigger)

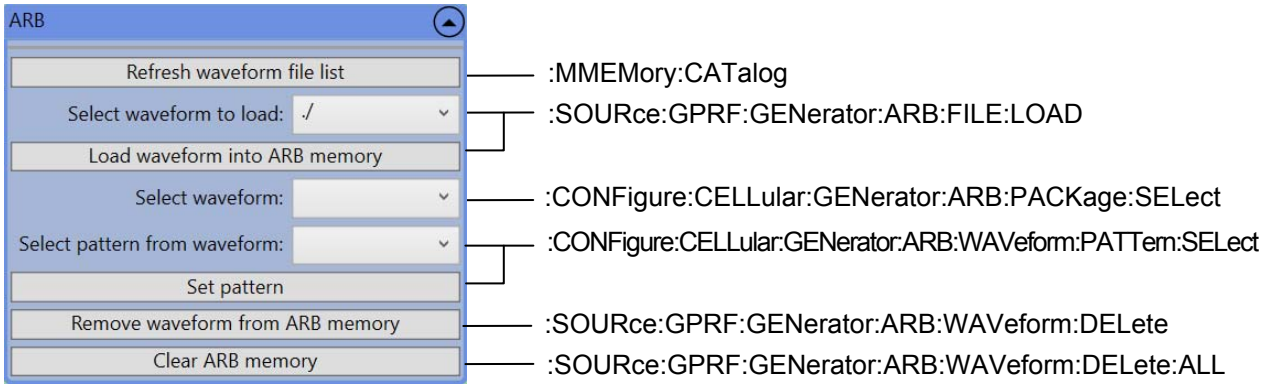


Figure 3.9.3-9 Measurement Settings Pane (ARB)

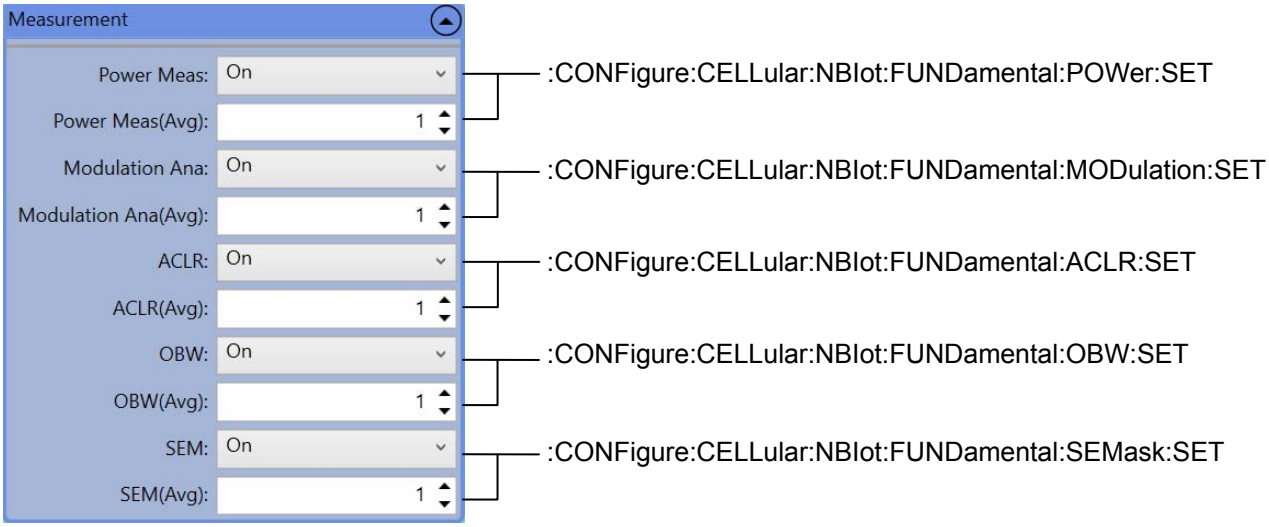


Figure 3.9.3-10 Measurement Settings Pane (Measurement)

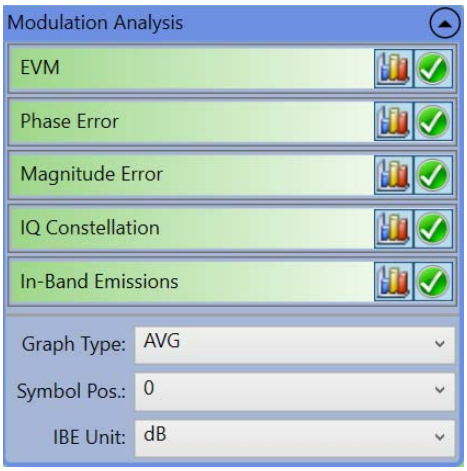


Figure 3.9.3-11 Measurement Settings Pane (Modulation Analysis)

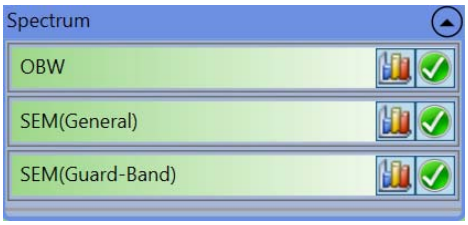


Figure 3.9.3-12 Measurement Settings Pane (Spectrum)

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

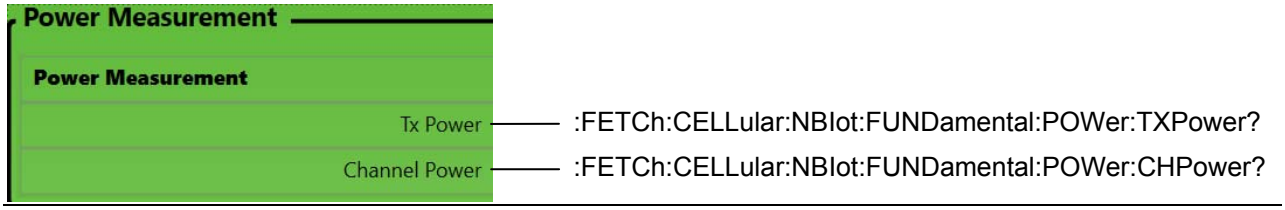


Figure 3.9.3-13 Power Measurement Results

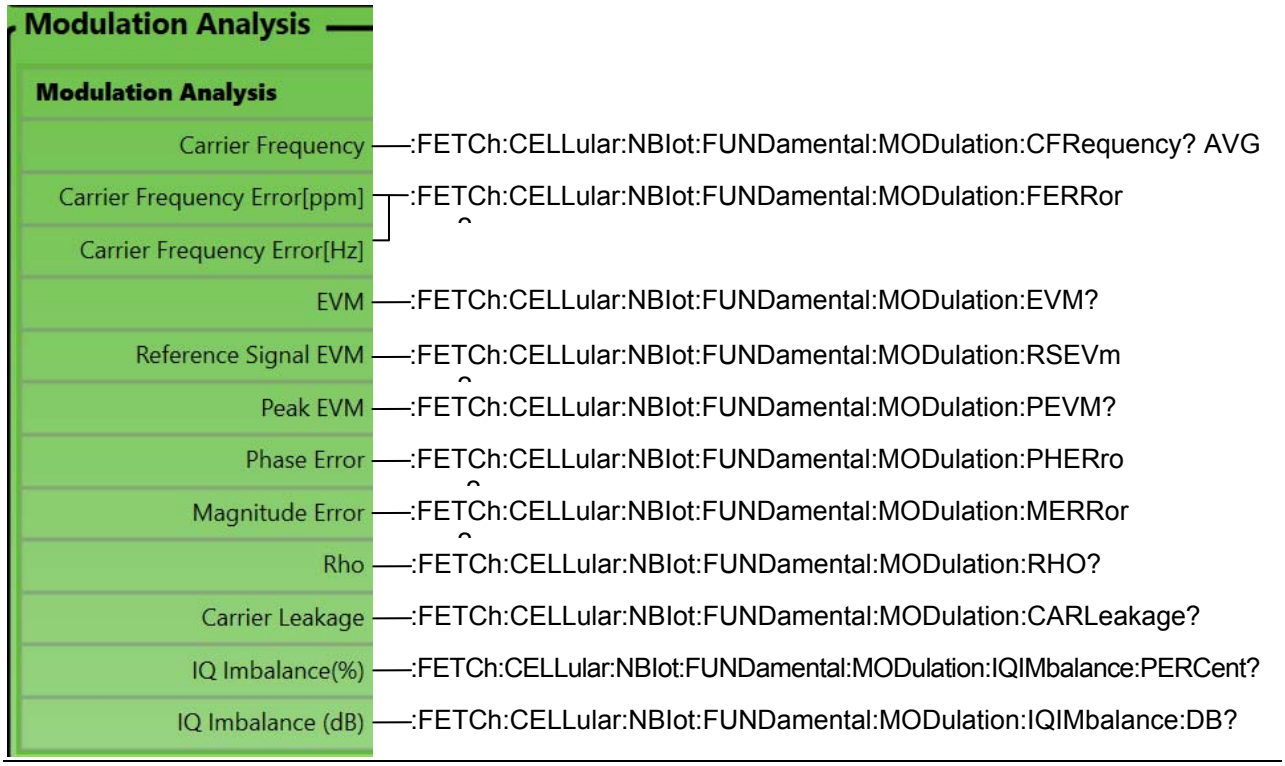


Figure 3.9.3-14 Modulation Analysis Results

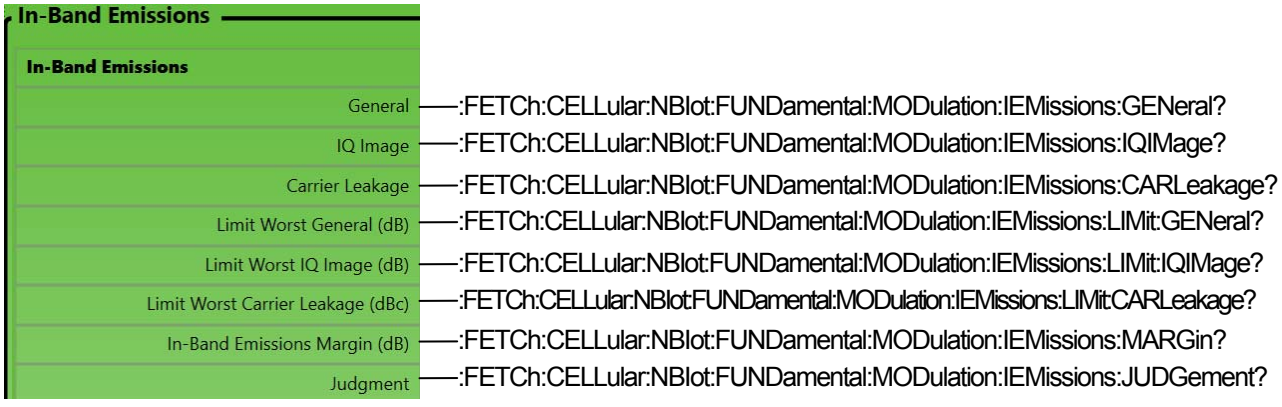


Figure 3.9.3-15 In-Band Emissions Results

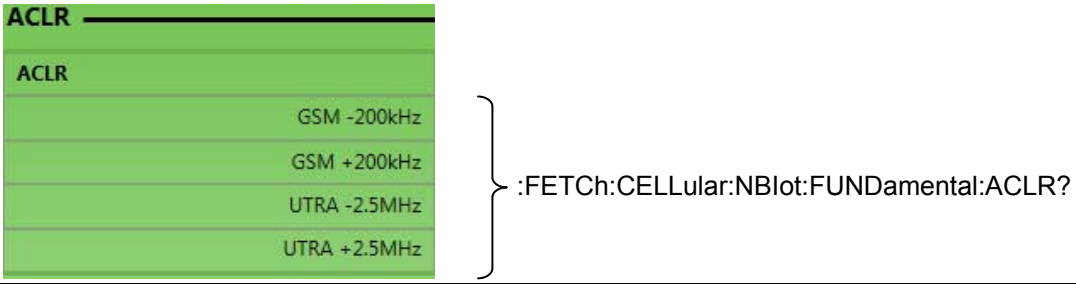


Figure 3.9.3-16 ACLR Results

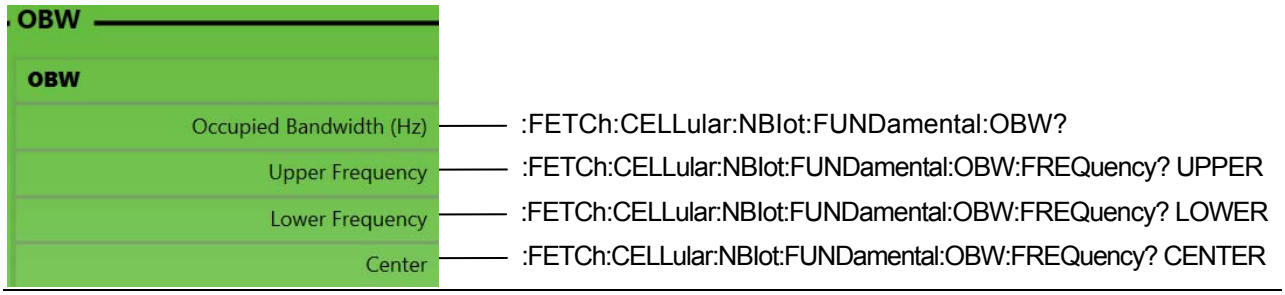


Figure 3.9.3-17 OBW Results



Figure 3.9.3-18 Spectrum Emission Mask (General) Results

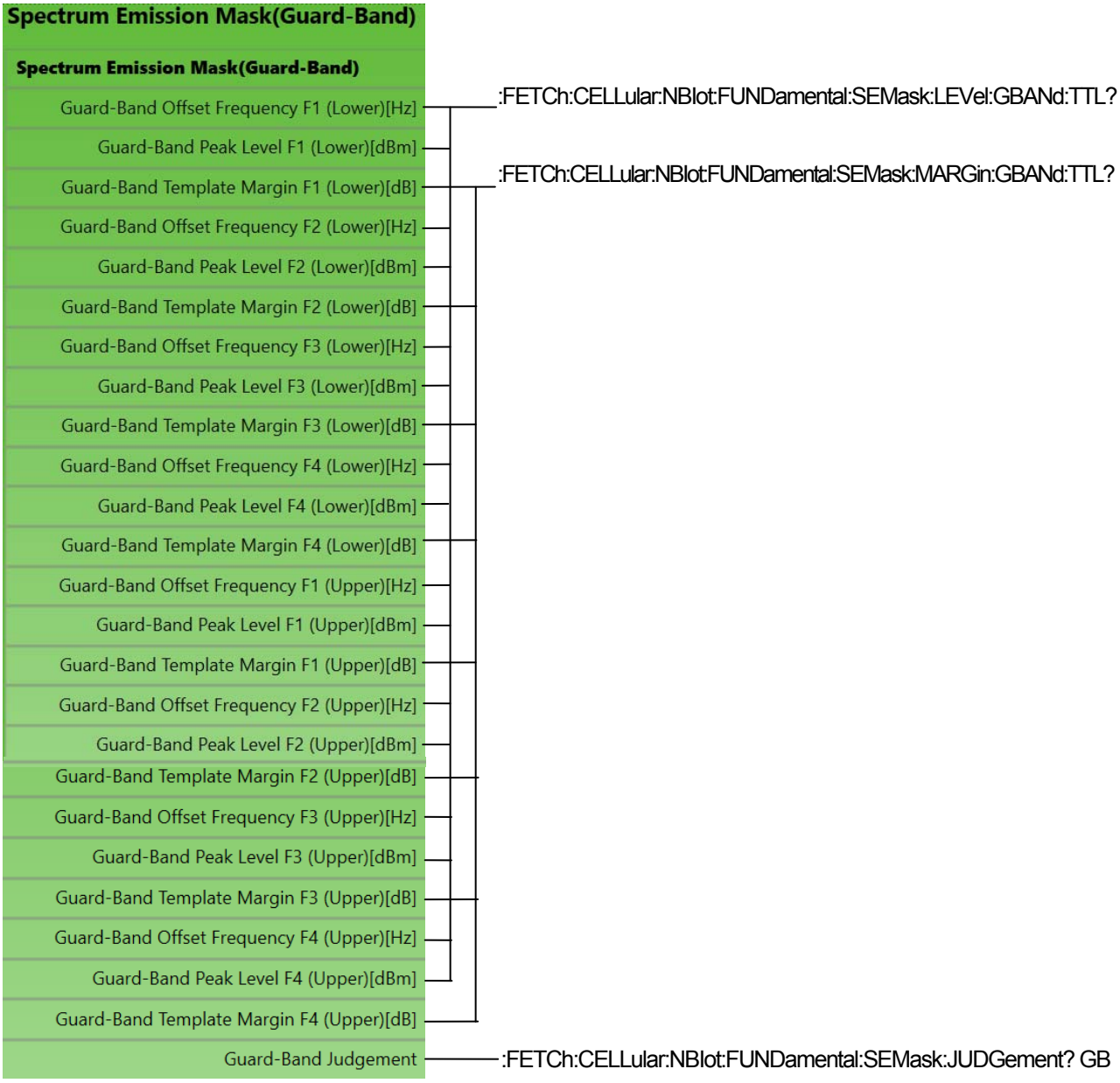


Figure 3.9.3-19 Spectrum Emission Mask (Guard-Band) Results

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)

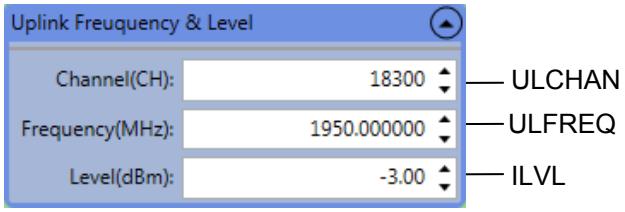


Figure 3.9.4-2 Measurement Settings Pane (Uplink Frequency & Level)

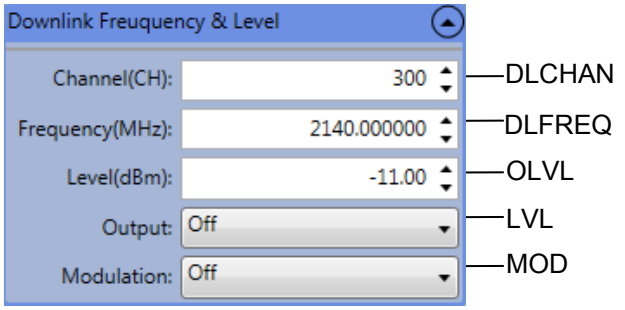


Figure 3.9.4-3 Measurement Settings Pane (Downlink Frequency & Level)

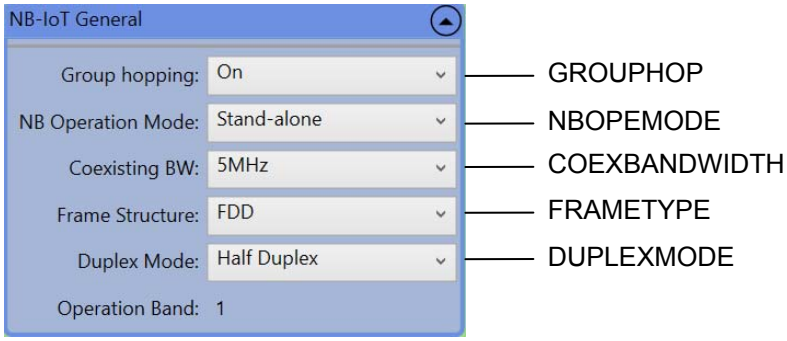


Figure 3.9.4-4 Measurement Settings Pane (NB-IoT General)



Figure 3.9.4-5 Measurement Settings Pane (Signal)

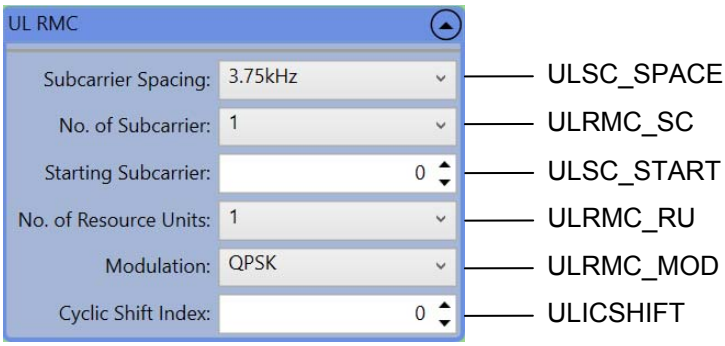


Figure 3.9.4-6 Measurement Settings Pane (UL RMC)



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

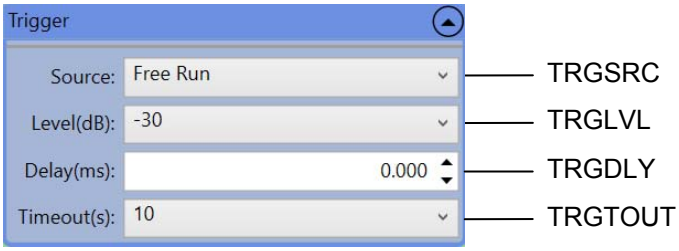


Figure 3.9.4-8 Measurement Settings Pane (Trigger)

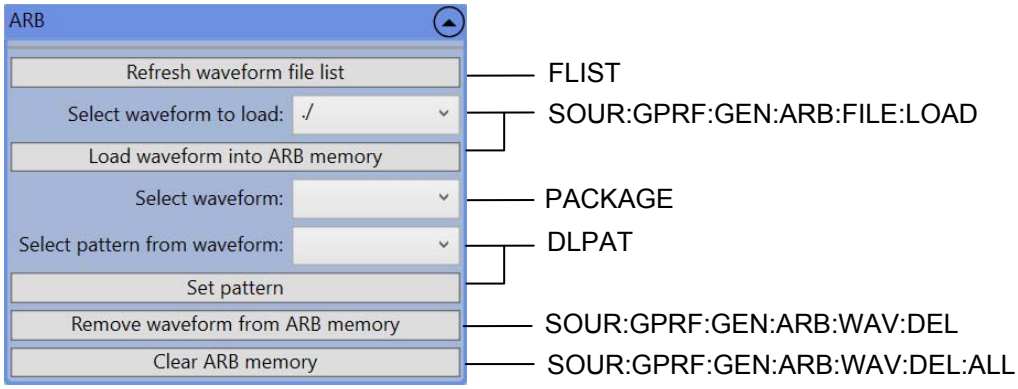


Figure 3.9.4-9 Measurement Settings Pane (ARB)

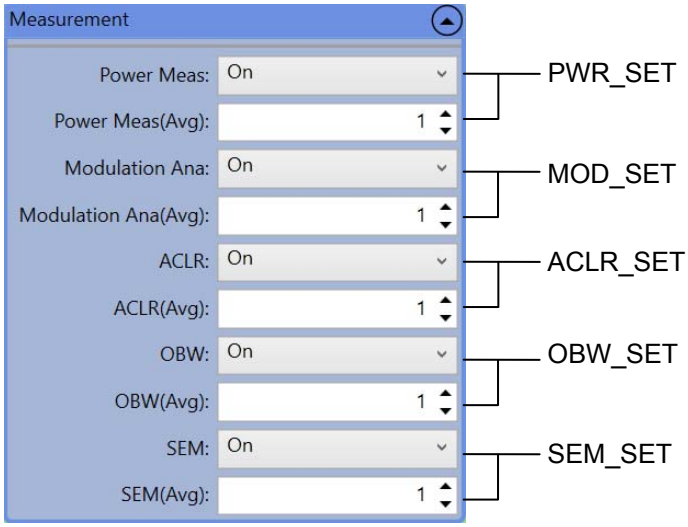


Figure 3.9.4-10 Measurement Settings Pane (Measurement)

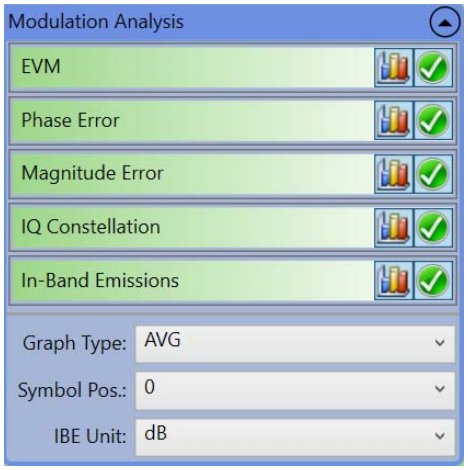


Figure 3.9.4-11 Measurement Settings Pane (Modulation Analysis)

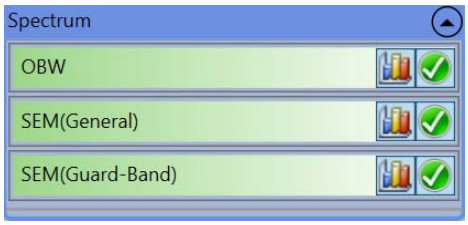


Figure 3.9.4-12 Measurement Settings Pane (Spectrum)

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

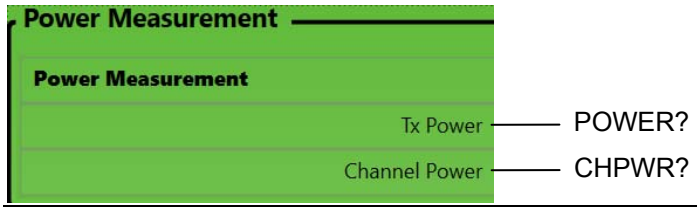


Figure 3.9.4-13 Power Measurement Results

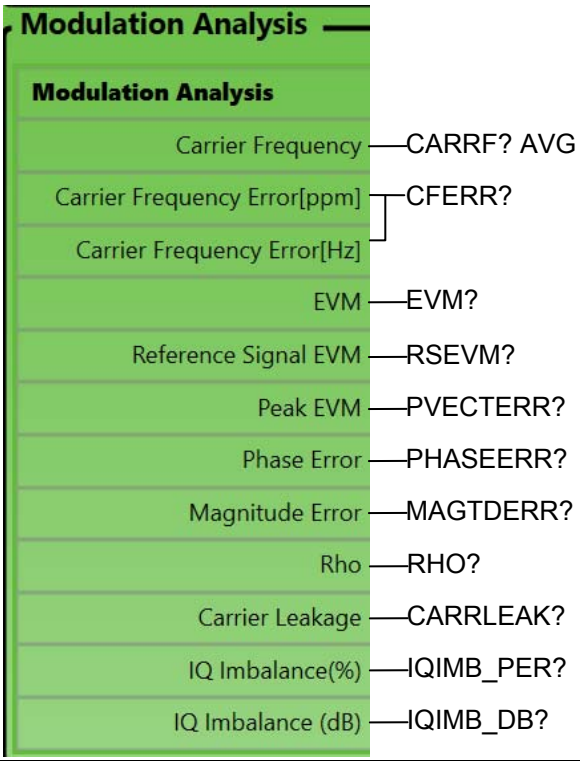


Figure 3.9.4-14 Modulation Analysis Results

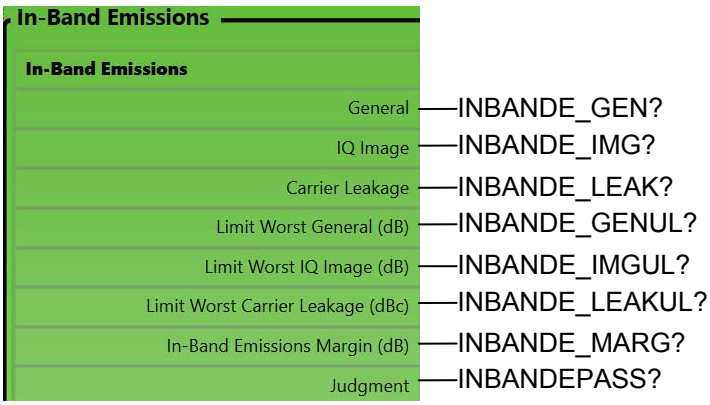


Figure 3.9.4-15 In-Band Emissions Results

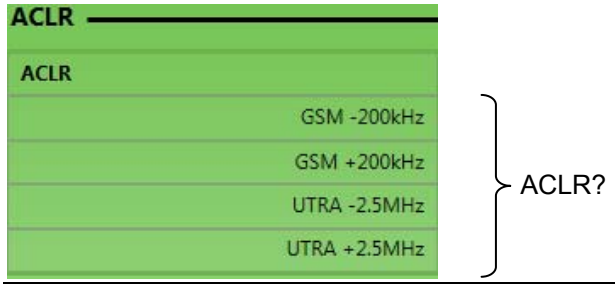


Figure 3.9.4-16 ACLR Results

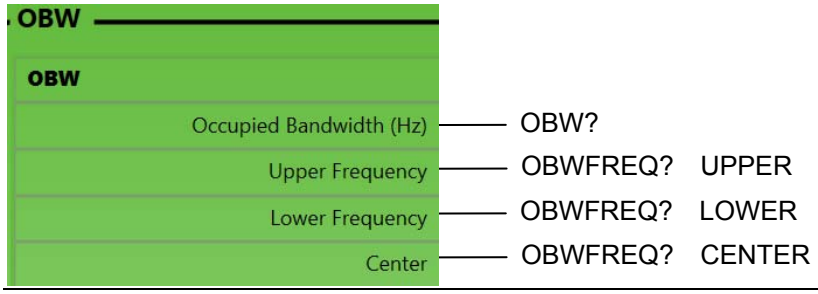


Figure 3.9.4-17 OBW Results

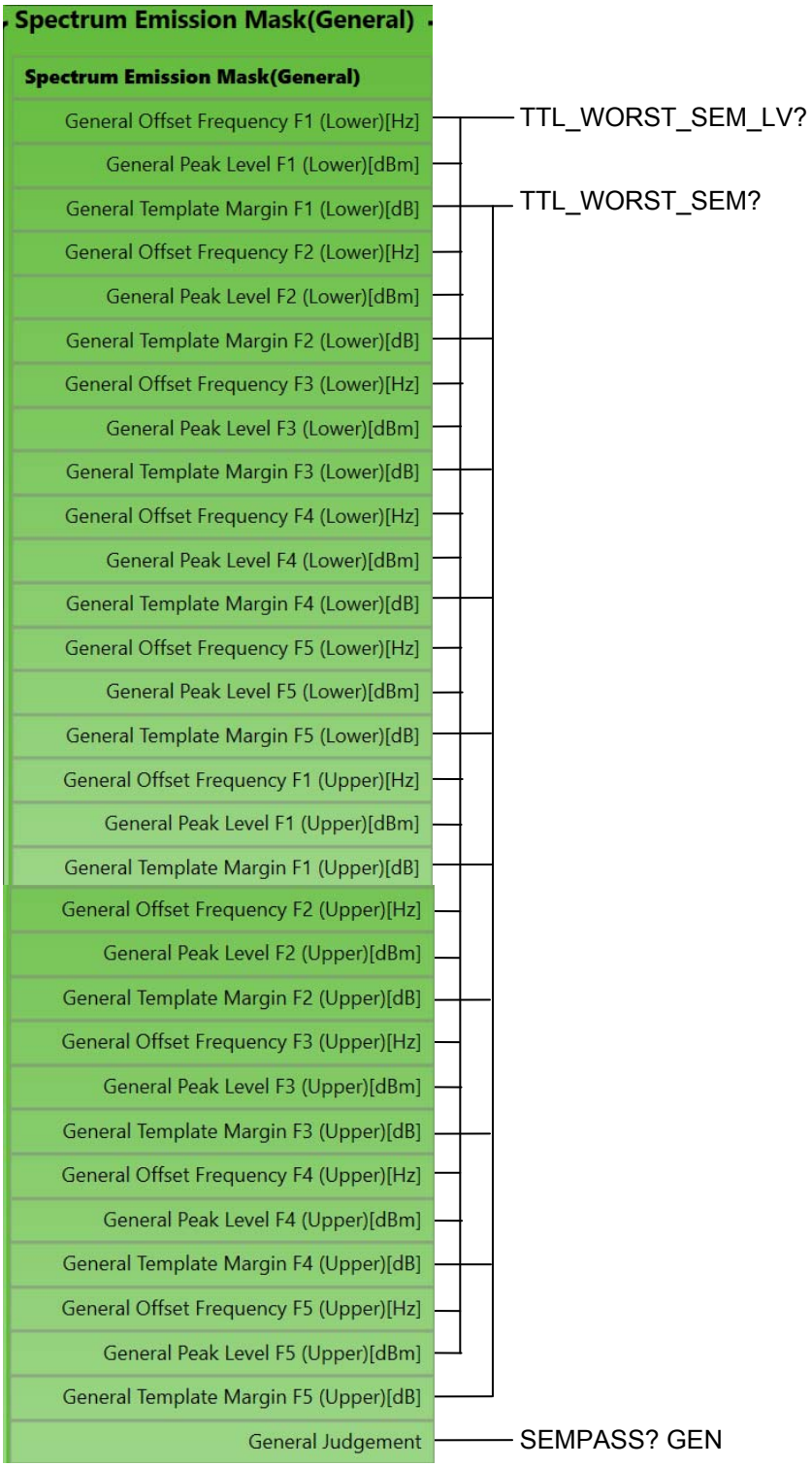


Figure 3.9.4-18 Spectrum Emission Mask (General) Results



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.

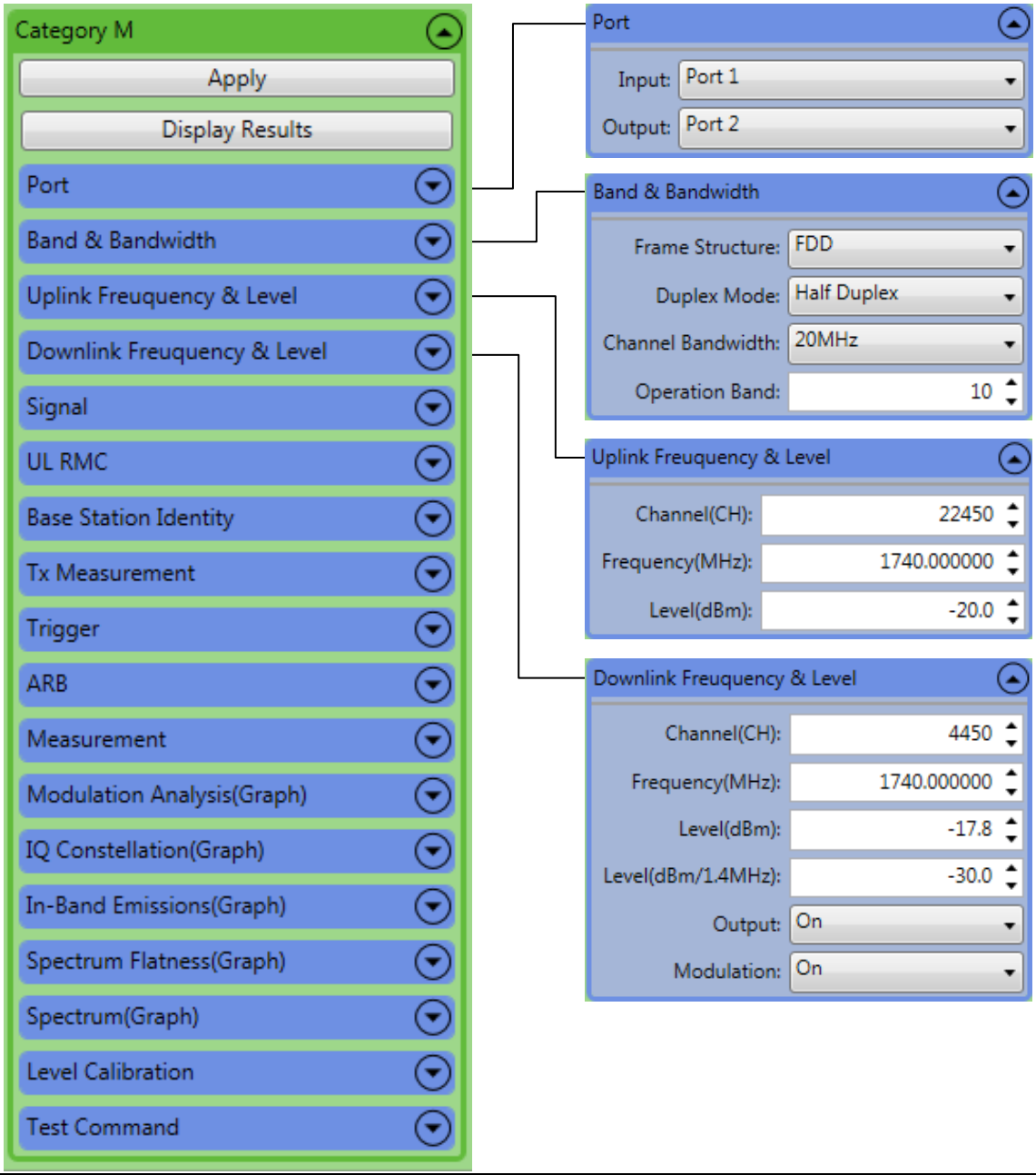


Figure 3.10.1-1 Category M Measurement Settings Pane (1/4)

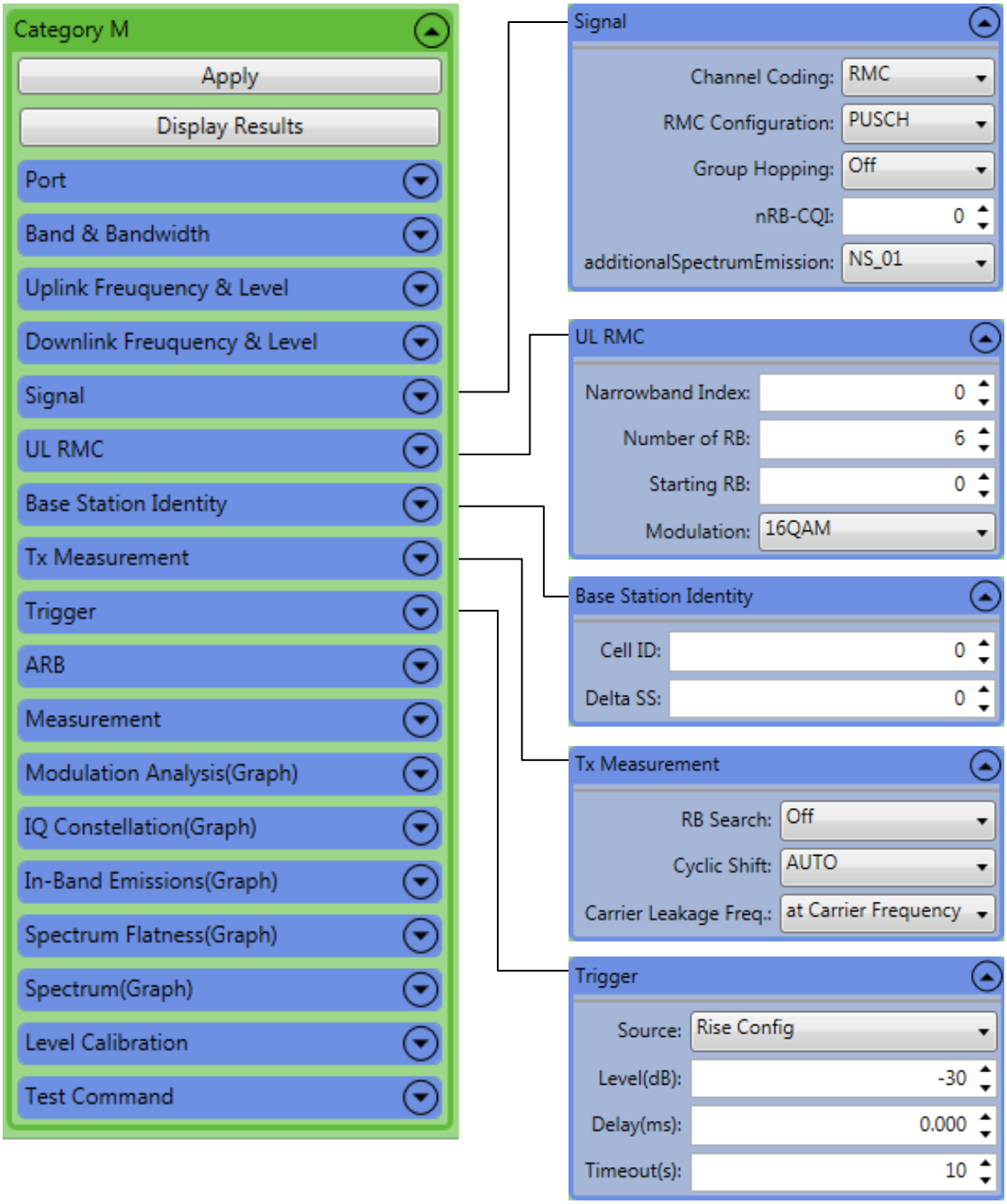


Figure 3.10.1-2 Category M Measurement Settings Pane (2/4)

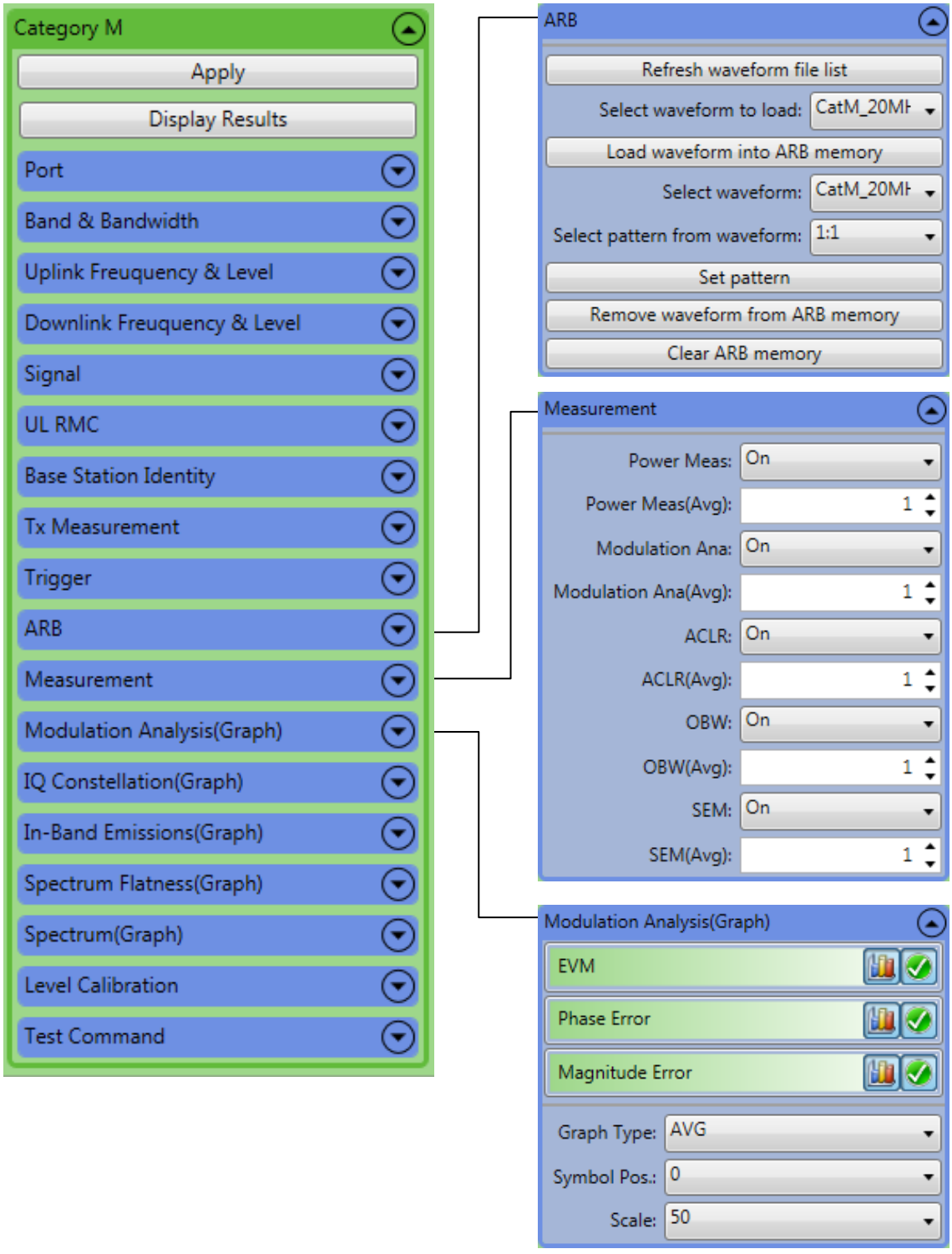


Figure 3.10.1-3 Category M Measurement Settings Pane (3/4)

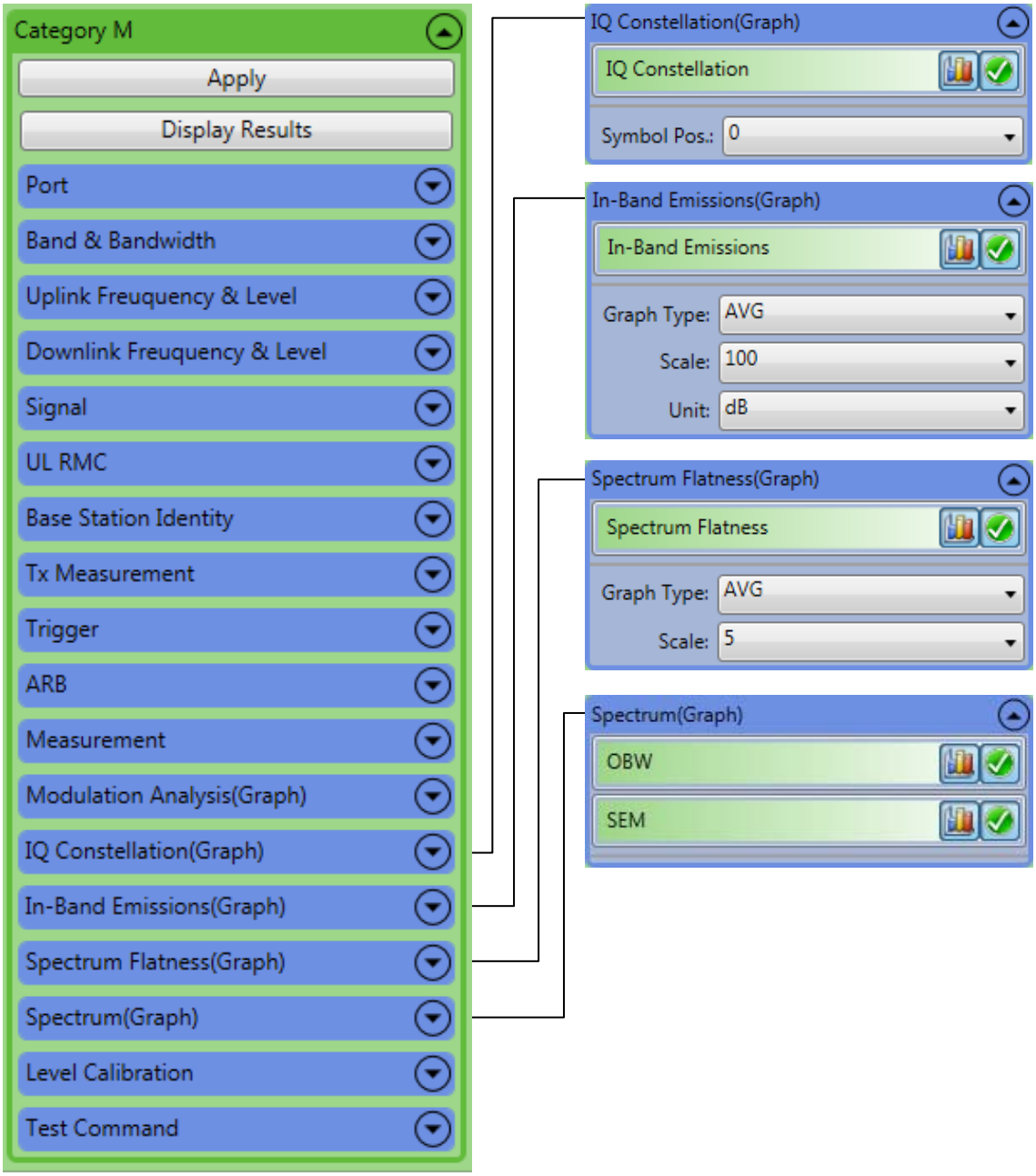


Figure 3.10.1-4 Category M Measurement Settings Pane (4/4)

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.

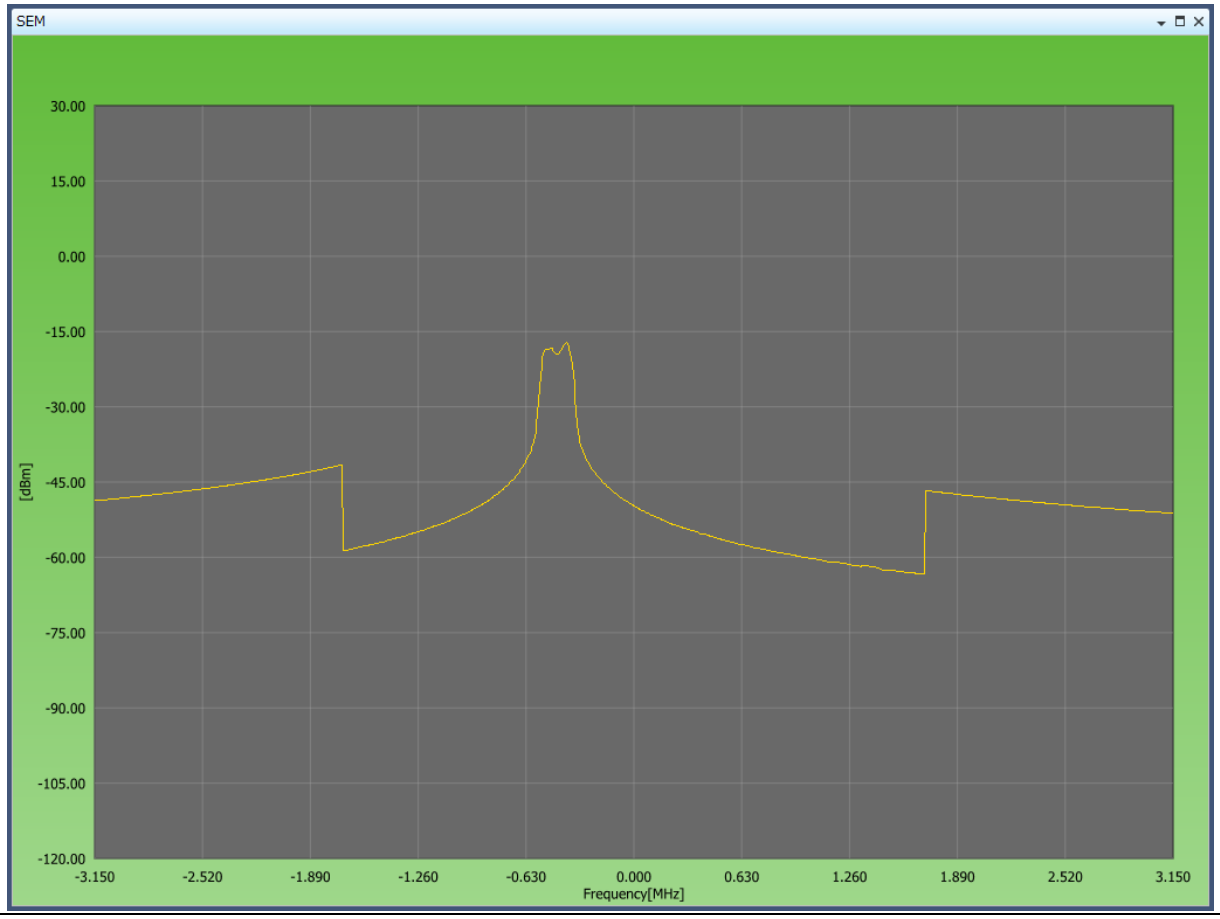


Figure 3.10.2-1 Category M (Spectrum Emission Mask) Graph

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*.

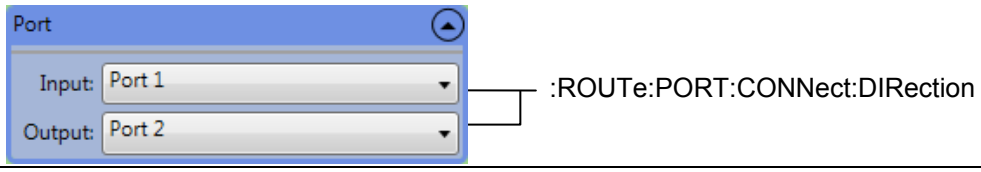


Figure 3.10.3-1 Measurement Settings Pane (Port)

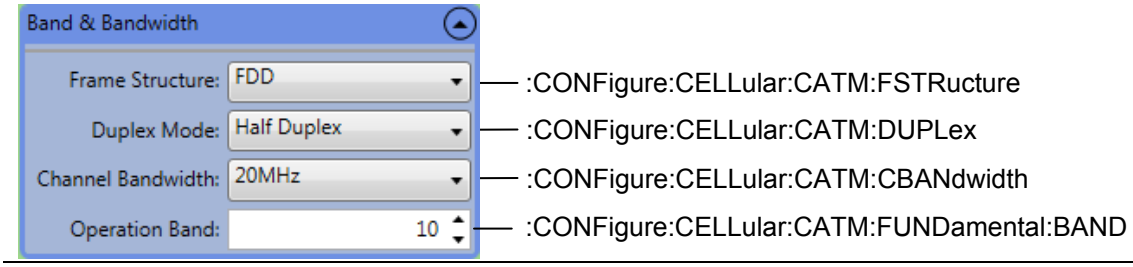


Figure 3.10.3-2 Measurement Settings Pane (Band & Bandwidth)

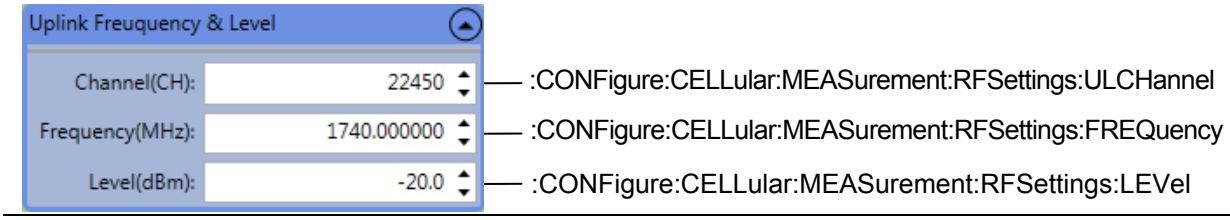


Figure 3.10.3-3 Measurement Settings Pane (Uplink Frequency & Level)

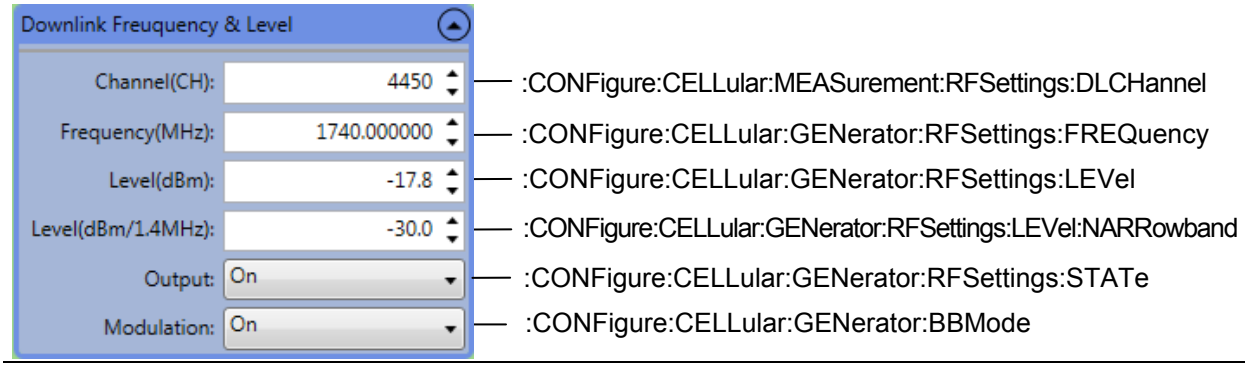


Figure 3.10.3-4 Measurement Settings Pane (Downlink Frequency & Level)

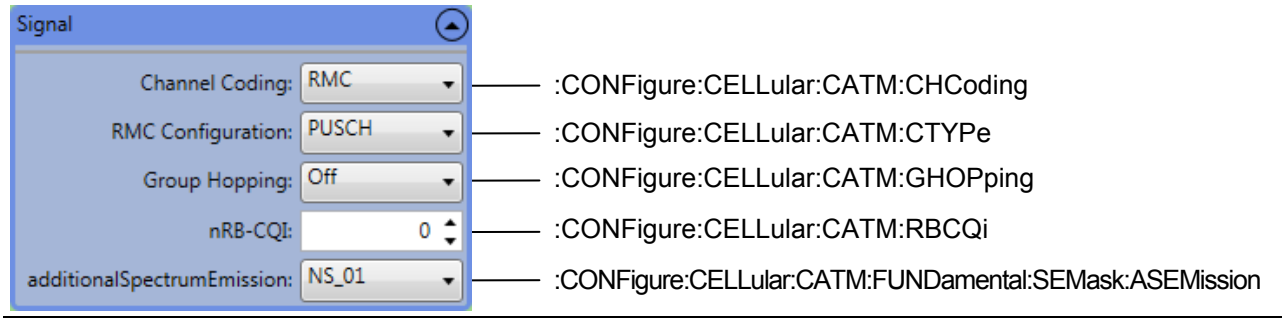


Figure 3.10.3-5 Measurement Settings Pane (Signal)

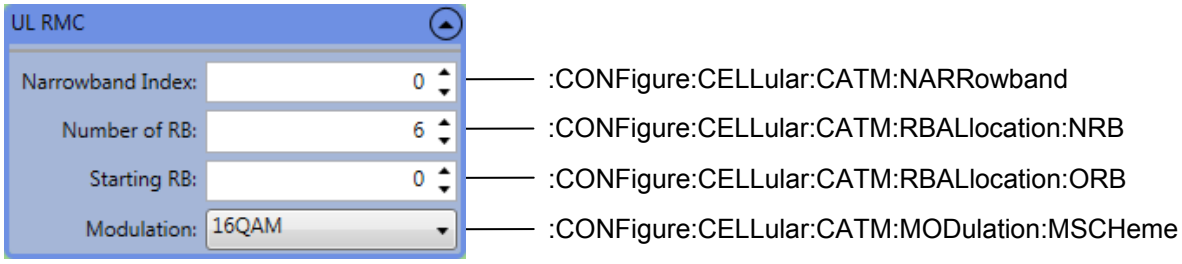


Figure 3.10.3-6 Measurement Settings Pane (UL RMC)

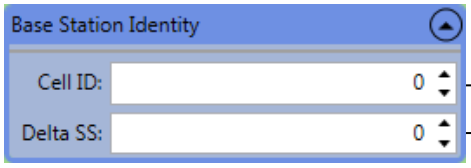


Figure 3.10.3-7 Measurement Settings Pane (Base Station Identity)

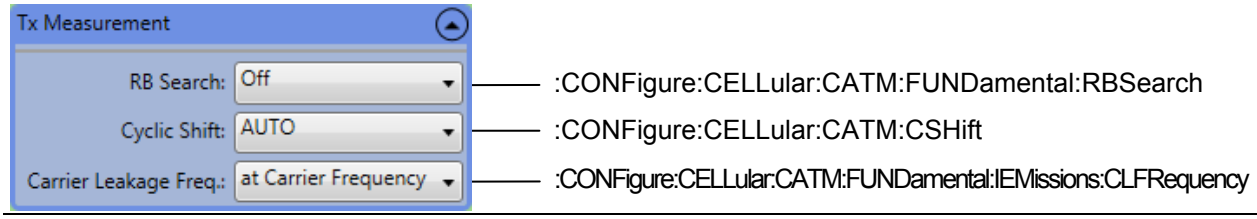


Figure 3.10.3-8 Measurement Settings Pane (Tx Measurement)

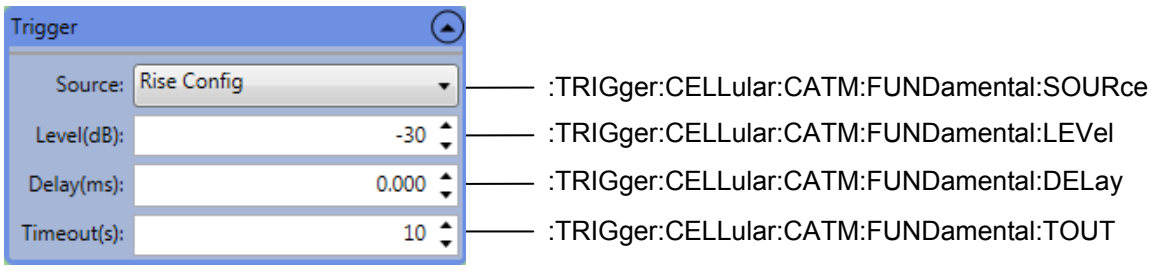


Figure 3.10.3-9 Measurement Settings Pane (Trigger)

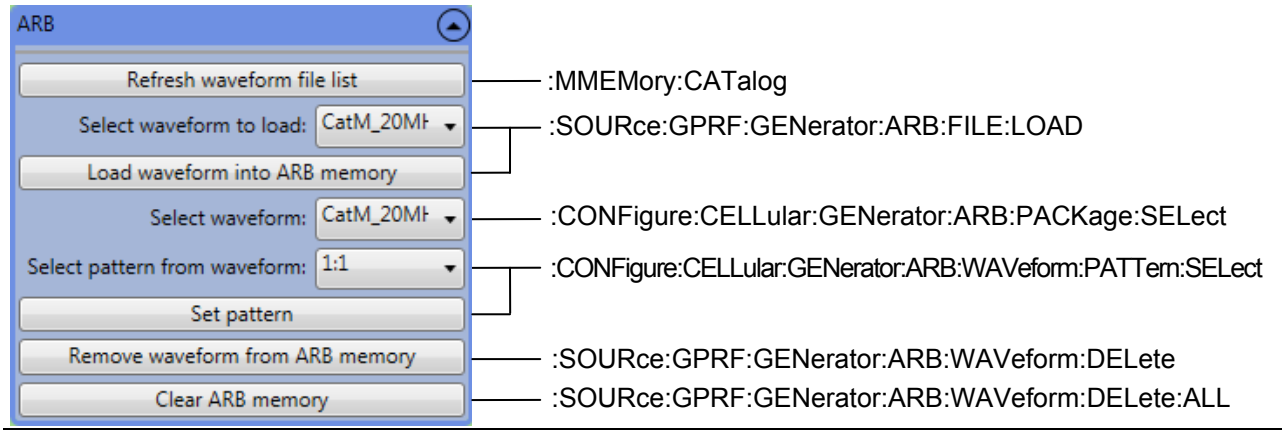


Figure 3.10.3-10 Measurement Settings Pane (ARB)

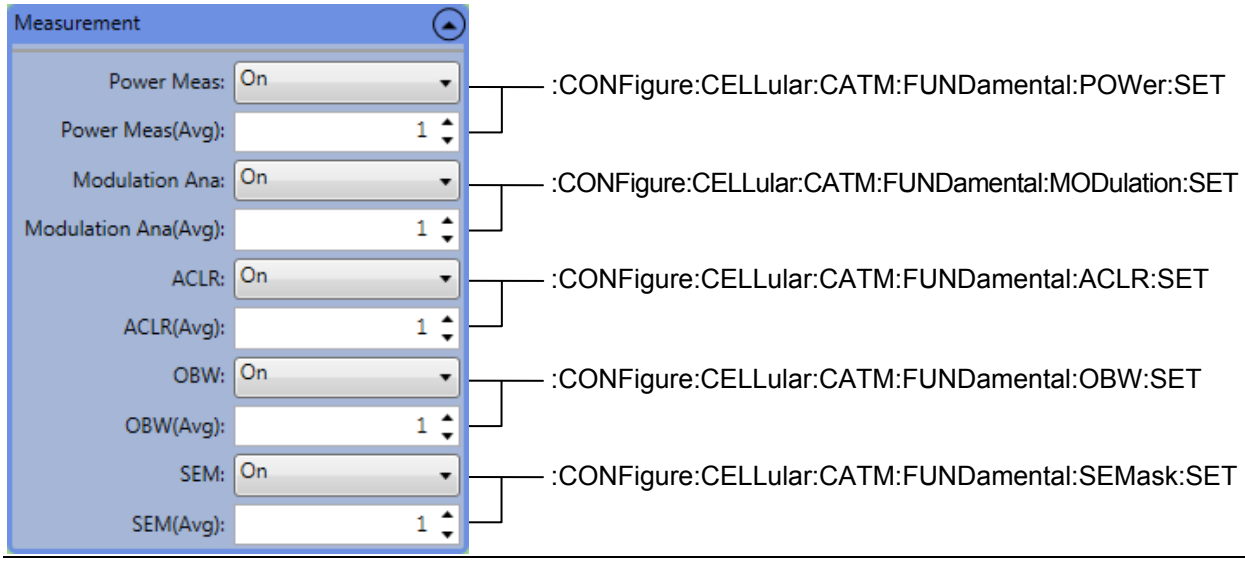


Figure 3.10.3-11 Measurement Settings Pane (Measurement)

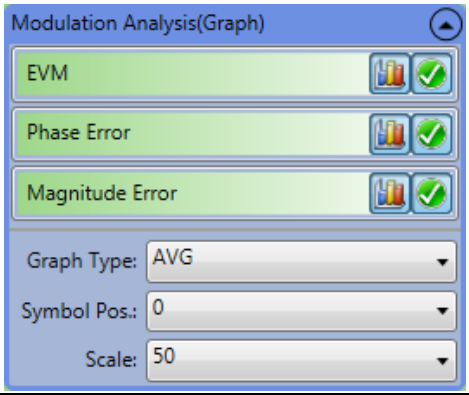


Figure 3.10.3-12 Measurement Settings Pane (Modulation Analysis)

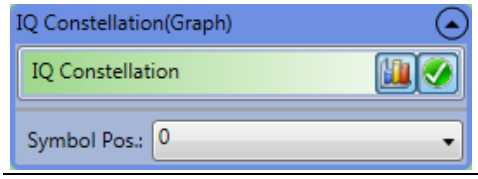


Figure 3.10.3-13 Measurement Settings Pane (IQ Constellation (Graph))

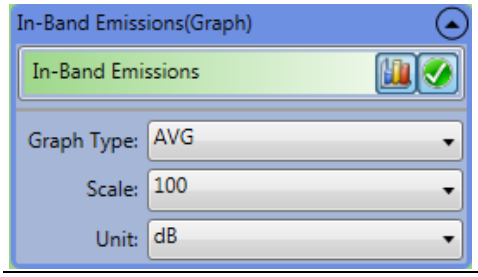


Figure 3.10.3-14 Measurement Settings Pane (In-Band Emission (Graph))

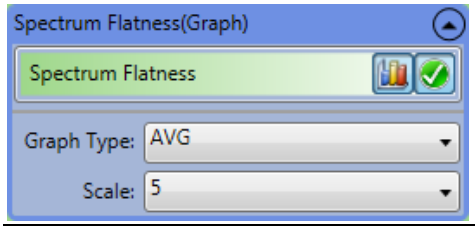


Figure 3.10.3-15 Measurement Settings Pane (Spectrum Flatness (Graph))

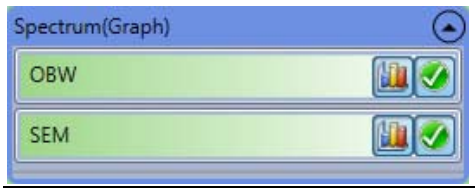


Figure 3.10.3-16 Measurement Settings Pane (Spectrum (Graph))

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

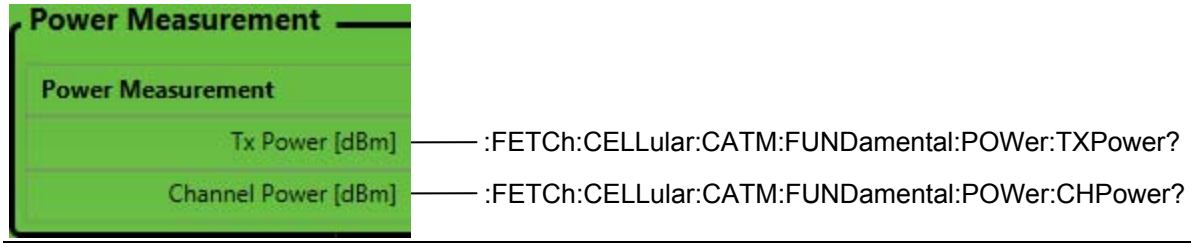


Figure 3.10.3-17 Power Measurement Results

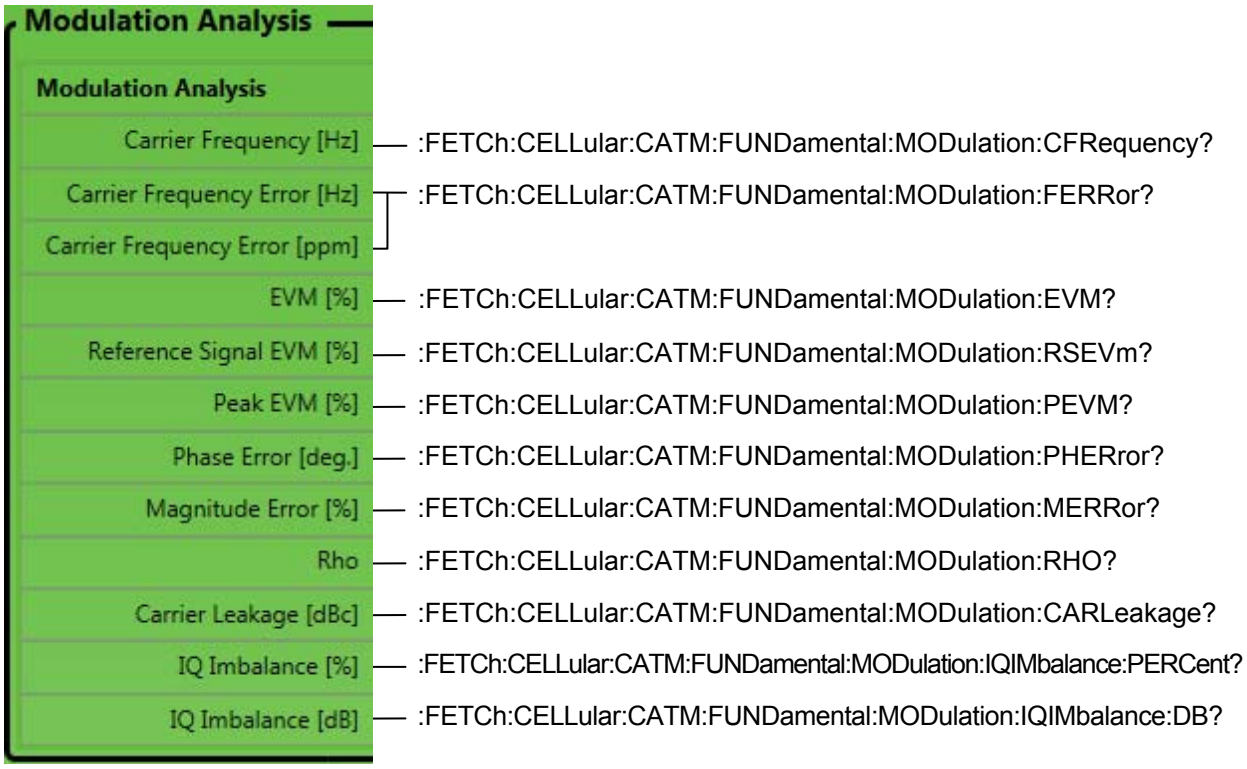


Figure 3.10.3-18 Modulation Analysis Results

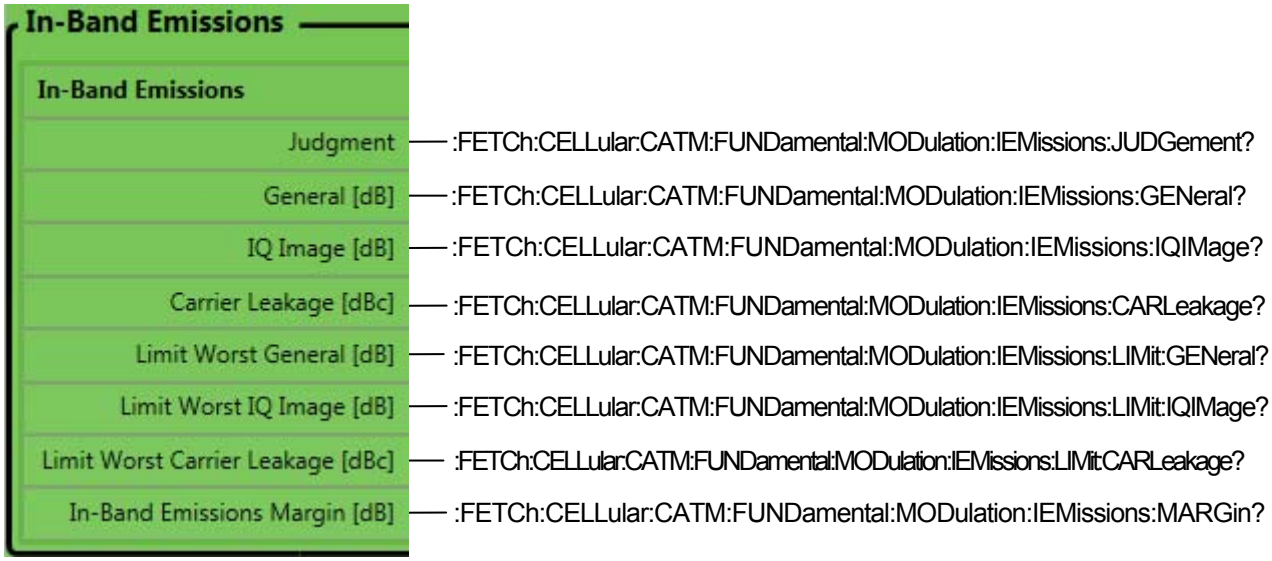


Figure 3.10.3-19 In-Band Emissions Results

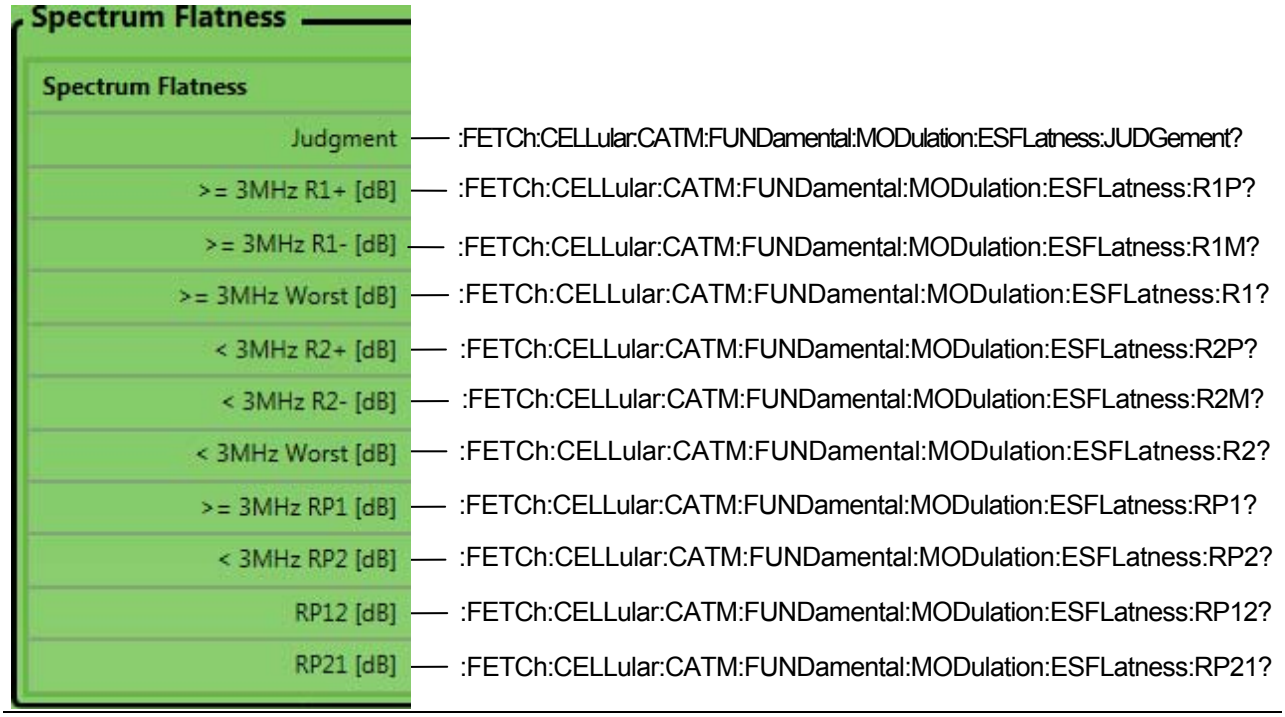


Figure 3.10.3-20 Spectrum Flatness Results

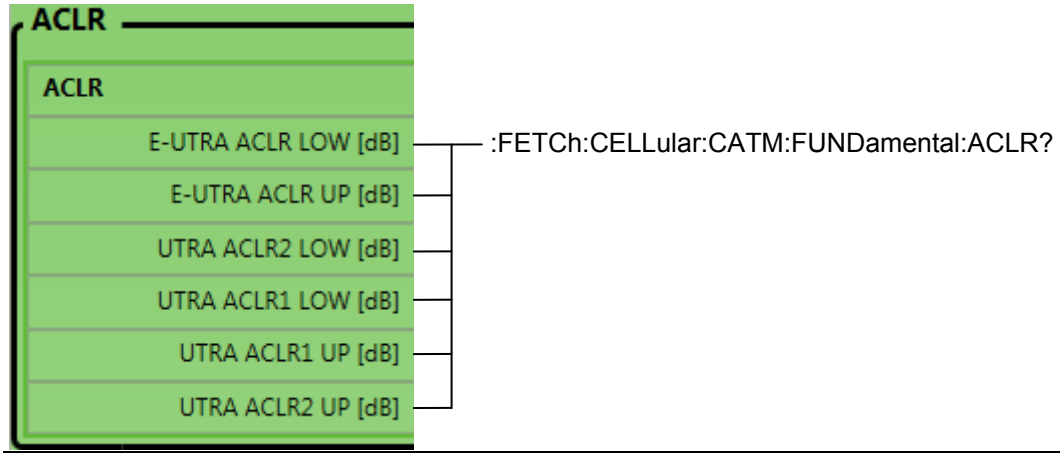


Figure 3.10.3-21 ACLR Results

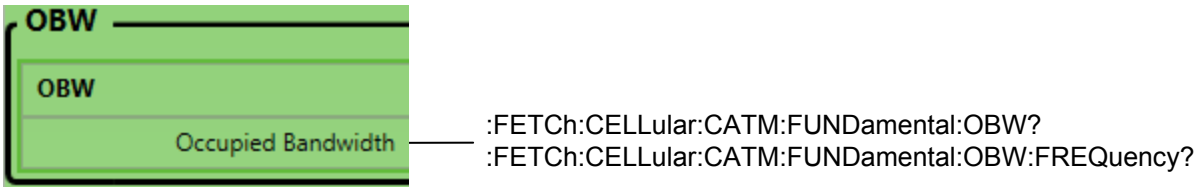


Figure 3.10.3-22 OBW Results

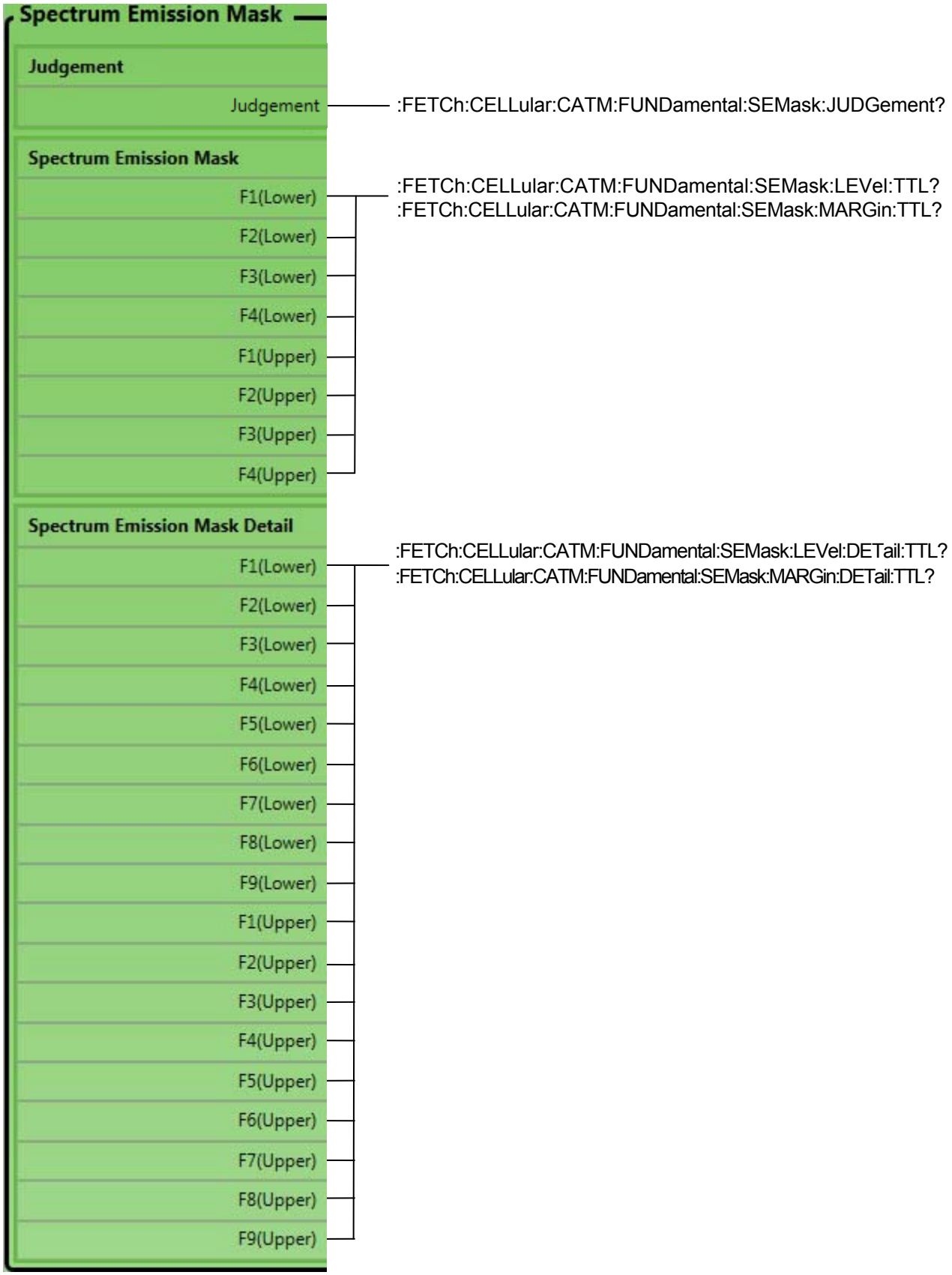


Figure 3.10.3-23 Spectrum Emission Mask Results

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*.

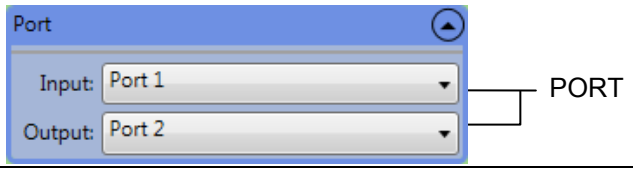


Figure 3.10.4-1 Measurement Settings Pane (Port)

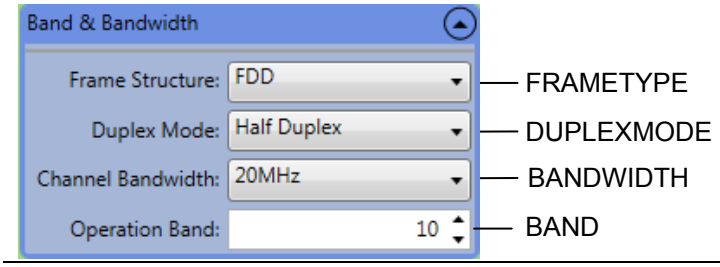


Figure 3.10.4-2 Measurement Settings Pane (Band & Bandwidth)

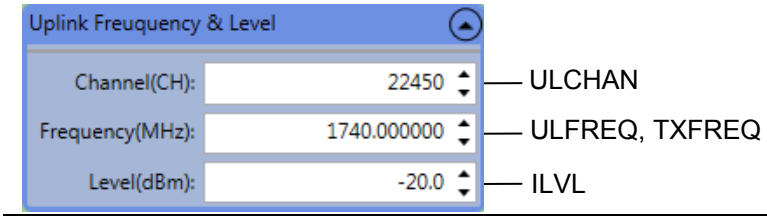


Figure 3.10.4-3 Measurement Settings Pane (Uplink Frequency & Level)

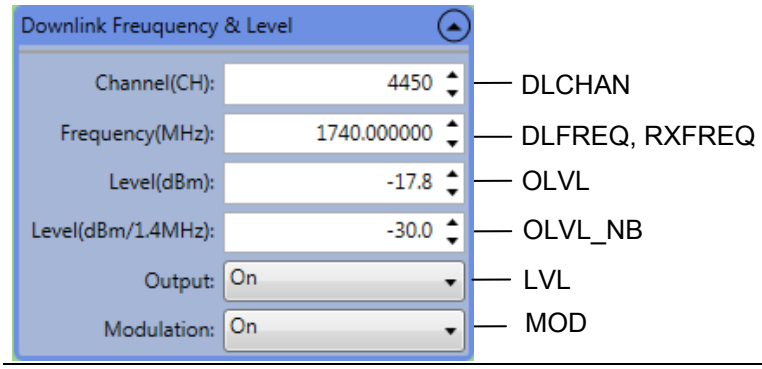


Figure 3.10.4-4 Measurement Settings Pane (Downlink Frequency & Level)

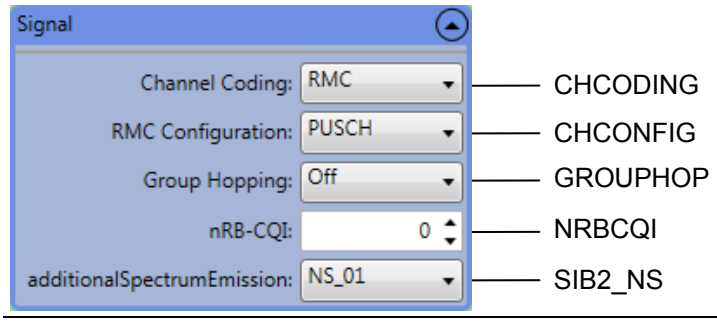


Figure 3.10.4-5 Measurement Settings Pane (Signal)

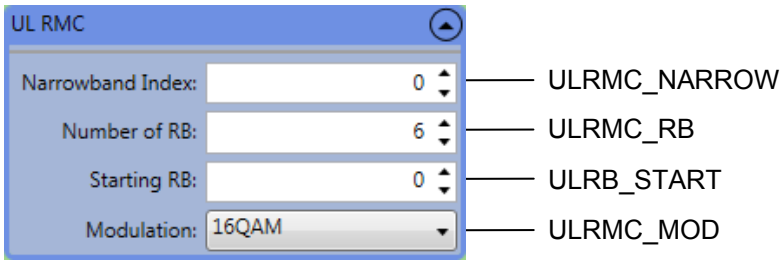


Figure 3.10.4-6 Measurement Settings Pane (UL RMC)

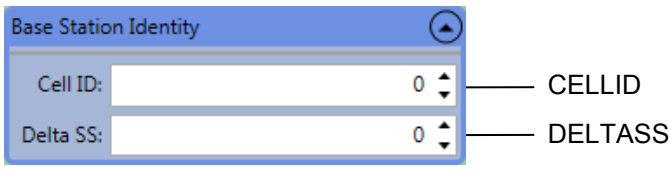


Figure 3.10.4-7 Measurement Settings Pane (Base Station Identity)

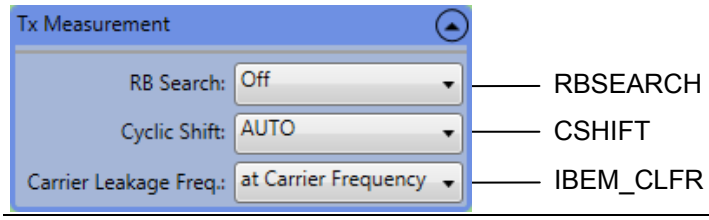


Figure 3.10.4-8 Measurement Settings Pane (Tx Measurement)

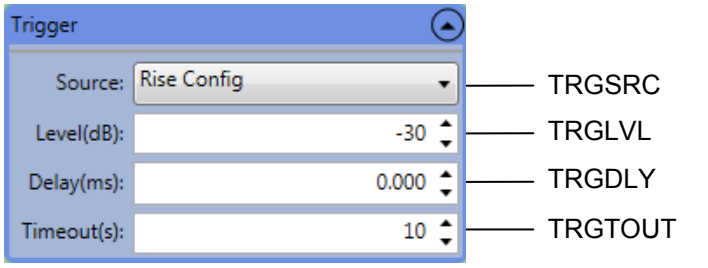


Figure 3.10.4-9 Measurement Settings Pane (Trigger)

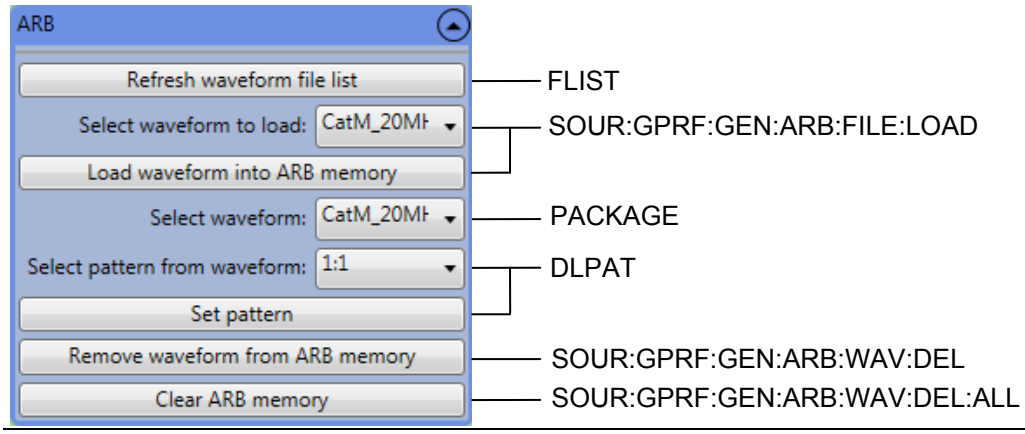


Figure 3.10.4-10 Measurement Settings Pane (ARB)

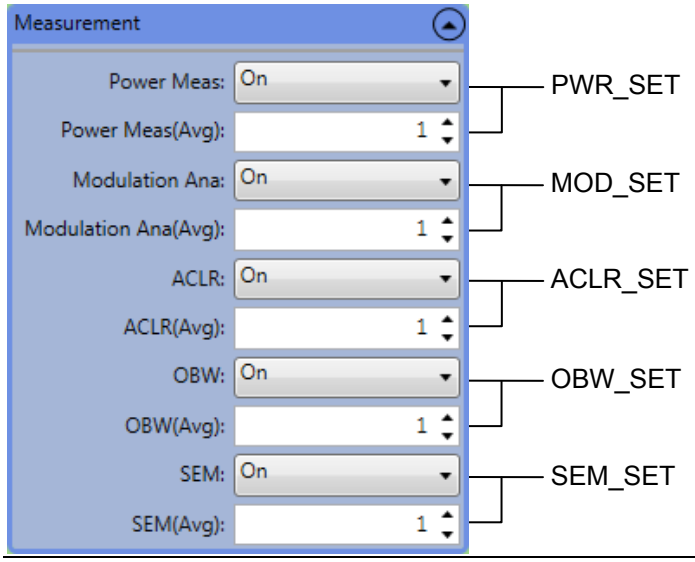


Figure 3.10.4-11 Measurement Settings Pane (Measurement)

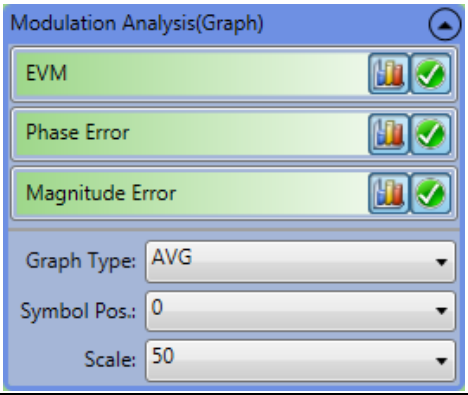


Figure 3.10.4-12 Measurement Settings Pane (Modulation Analysis)

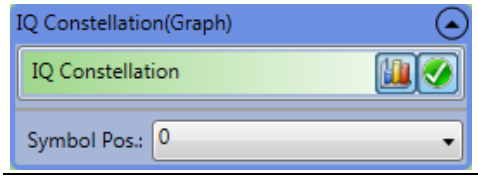


Figure 3.10.4-13 Measurement Settings Pane (IQ Constellation (Graph))

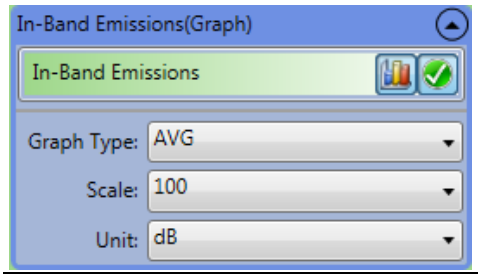


Figure 3.10.4-14 Measurement Settings Pane (In-Band Emission (Graph))

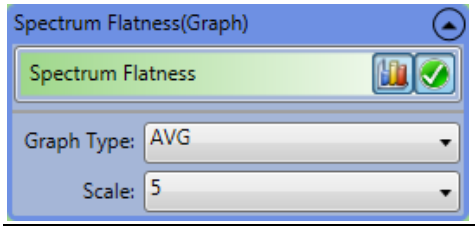


Figure 3.10.4-15 Measurement Settings Pane (Spectrum Flatness (Graph))

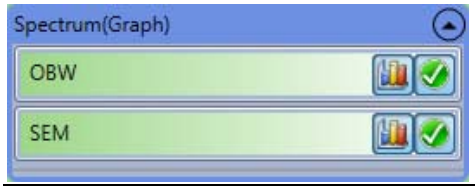


Figure 3.10.4-16 Measurement Settings Pane (Spectrum (Graph))

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

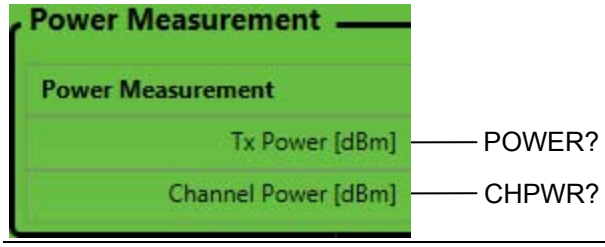


Figure 3.10.4-17 Power Measurement Results

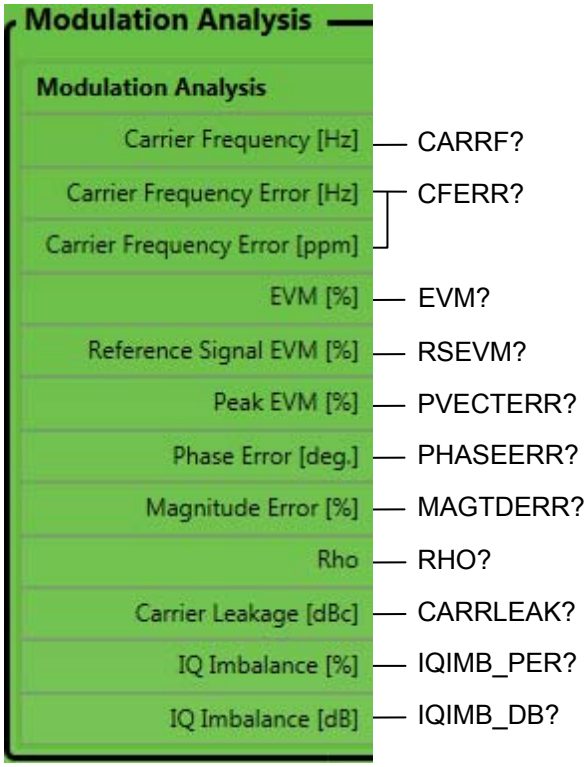


Figure 3.10.4-18 Modulation Analysis Results

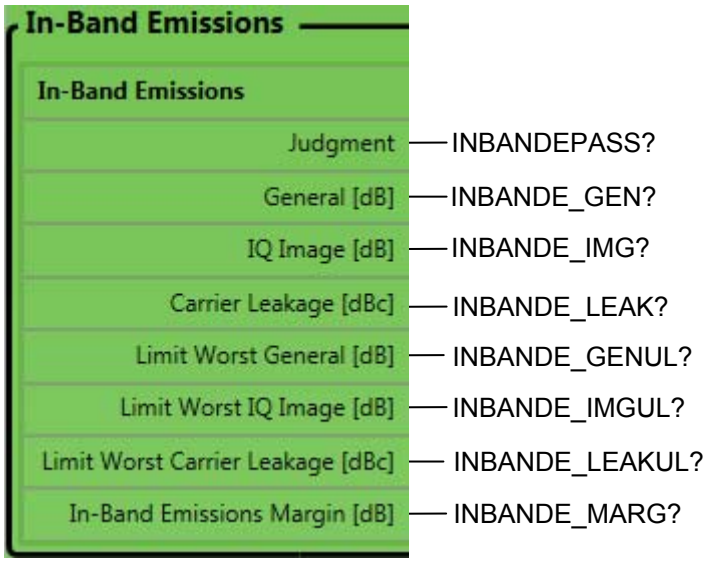


Figure 3.10.4-19 In-Band Emissions Results

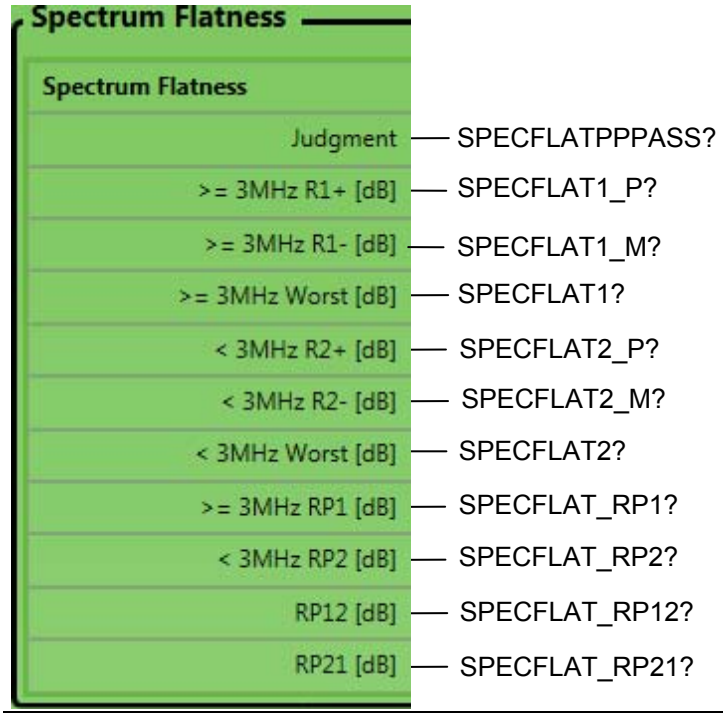


Figure 3.10.4-20 Spectrum Flatness Results

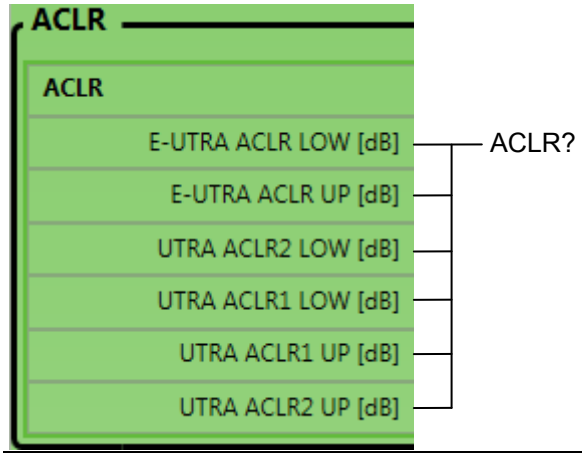


Figure 3.10.4-21 ACLR Results

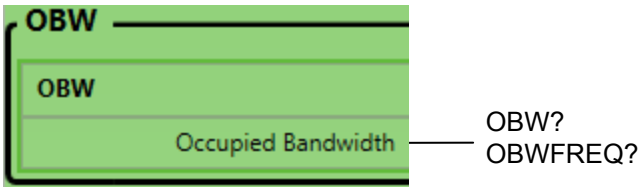


Figure 3.10.4-22 OBW Results

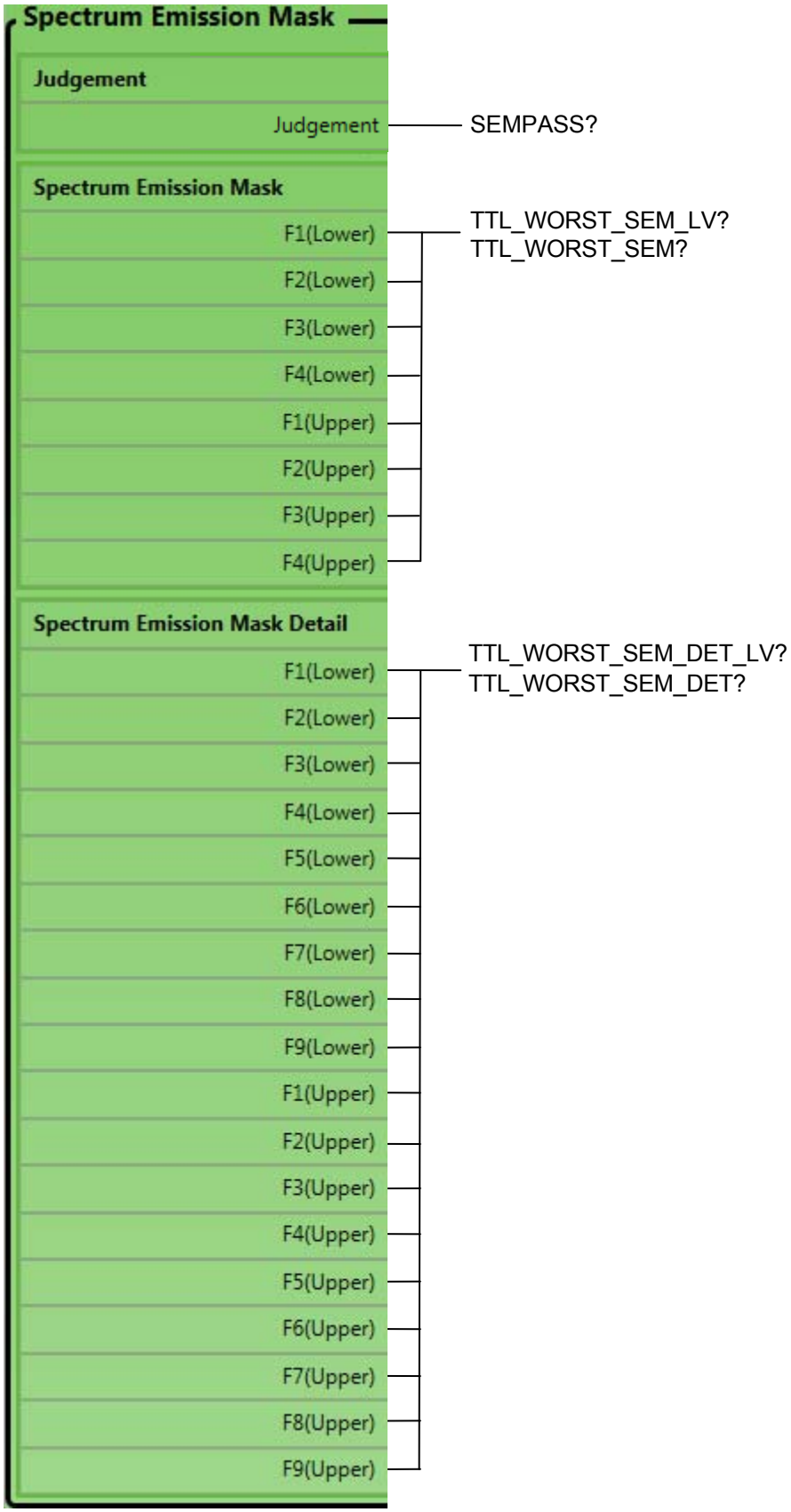


Figure 3.10.4-23 Spectrum Emission Mask Results