

TekExpress® FRL Automated Software Application Help

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Click the following link to protect your product.

www.tek.com/register



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In North America, call 1-800-833-9200.

Worldwide, visit www.tek.com to find contacts in your area.

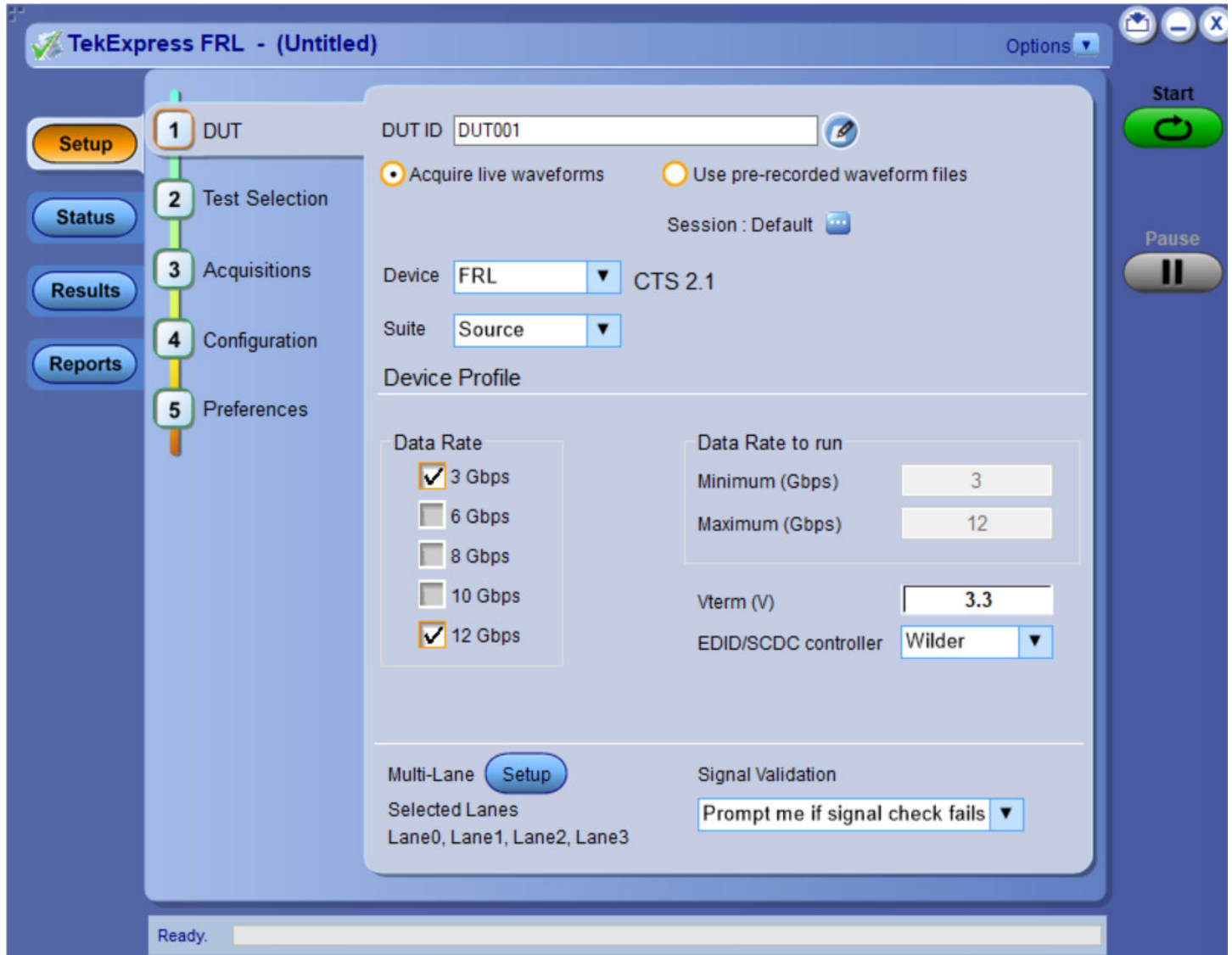
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Welcome

TekExpress FRL HDMI 2.1



Home screen: HDMI 2.1

The FRL (Fixed Rate Link) is a video signaling technology supported in the HDMI 2.1 Specification. FRL supports up to 4 K at 120 Hz and 8 K at 60 Hz - for compressed and uncompressed video content. FRL supports only predefined discrete data rates (3 Gbps, 6 Gbps, 8 Gbps, 10 Gbps, and 12 Gbps) on each of its 4 lanes which means that the FRL supports post encoded link bandwidth of up to 48 Gbps.

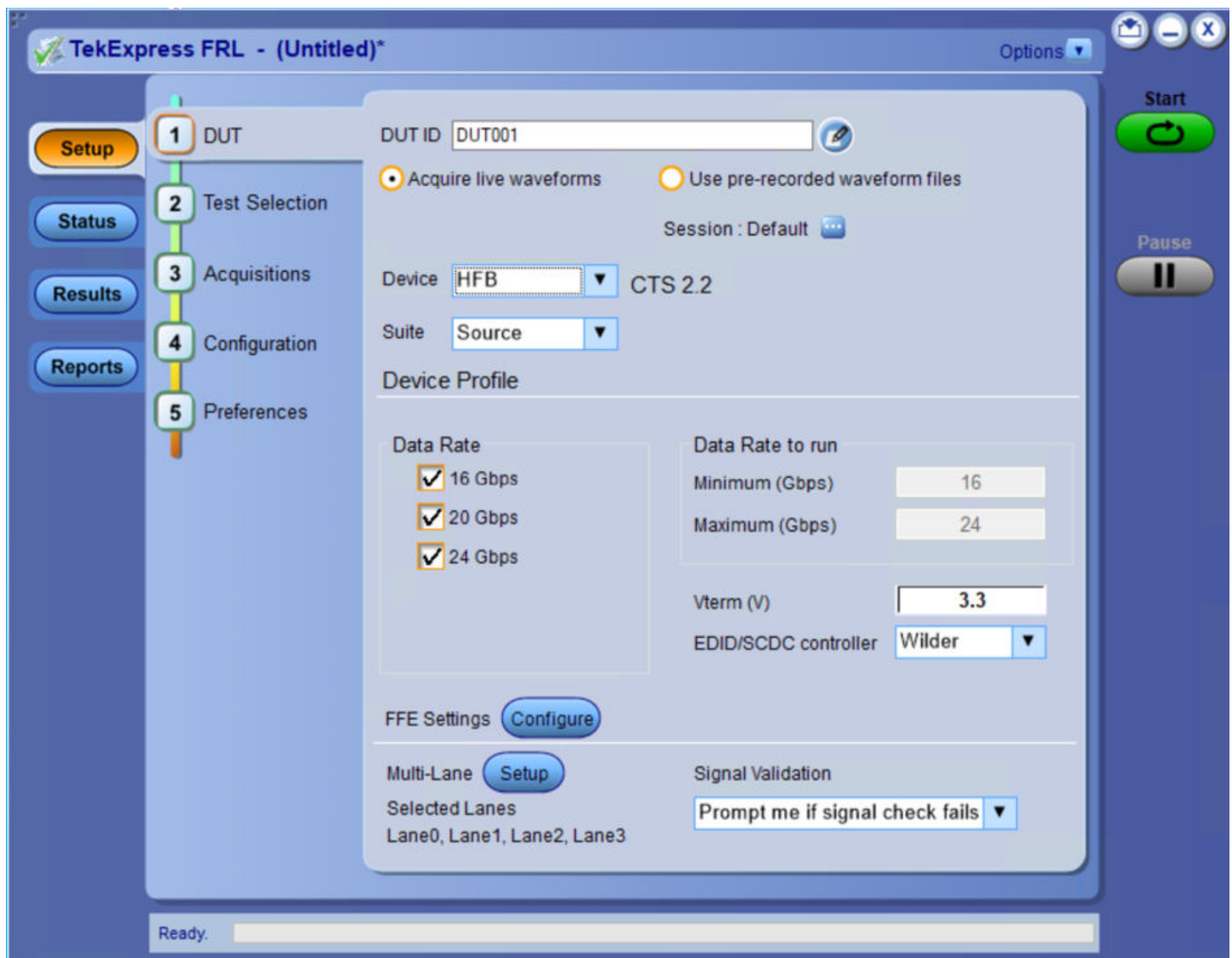
The TekExpress FRL compliance application gives you the tools to easily run the High Definition Multimedia Interface (HDMI) tests under the HDMI compliance test specification 2.1. It displays a complete and reliable solution for quick testing.

Key features

The TekExpress FRL supports the following source measurements for HDMI 2.1:

- HFR1-1: DC Common Mode Voltage
- HFR1-2: Vse_max, Vse_min
- HFR1-3: Rise_Fall Slew Rate
- HFR1-4: Inter-Pair Skew
- HFR1-5: Rates
- HFR1-6: RJ
 - HFR1-6: Data Jitter (Rj) WCM
 - HFR1-6: Data Jitter (Rj) SCM
- HFR1-7: HFR Data Eye Diagram
 - HFR1-7: Data Eye Diagram WCM
 - HFR1-7: Data Eye Diagram SCM
- HFR1-8: AC Common Mode Voltage
- HFR1-9: FFE
- HFR1-9: FFEMethod2

TekExpress FRL HDMI 2.2



Home screen: HDMI 2.2

The HDMI 2.2 is a video signalling technology supported in the HDMI 2.2 specification. It supports up to 10 K at 50/60/100/120 Hz - for video content. HDMI 2.2 supports only predefined discrete data rates (16 Gbps, 20 Gbps, and 24 Gbps) on each of its 4 lanes which means that it supports post encoded link bandwidth of up to 96 Gbps.

The TekExpress FRL compliance application gives you the tools to easily run the HDMI tests under the HDMI compliance test specification 2.2. It displays a complete and reliable solution for quick testing.

Key features

The TekExpress FRL supports the following source measurements for HDMI 2.2:

- HFB1-1: DC Common Mode Voltage
- HFB1-2: Vse_max, Vse_min
- HFB1-3: Rise_Fall Slew Rate
- HFB1-4: Inter-Pair Skew
- HFB1-5: Rates
- HFB1-6: RJ and UDJ

- HFB1-6: Data Jitter (Rj)WCM
- HFB1-6: Data Jitter (Rj)SCM
- HFB1-6: UDJ
- HFB1-7: HFB Data Eye Diagram
 - HFB1-7: Data Eye Diagram WCM
 - HFB1-7: Data Eye Diagram SCM
- HFB1-8: AC Common Mode Voltage
- HFB1-9: FFE
- HFB1-9: FFEMethod2

Getting help and support

Product documents

Use the product documents for more information on the application functions, understand the theory of operation, how to remotely program or operate the application, and do other tasks.

TekExpress Application documents

To learn about	Use this document
How to use the application	TekExpress FRL Help
How to remotely control the instrument	PDF version of this document can be downloaded from www.tek.com/downloads Compiled HTML (CHM) version is integrated with the application. Press F1 key from the keyboard to start the help. Tektronix Part Number: 077-xxxx-xx

Conventions

Help uses the following conventions:

- The term "Application," and "Software" refers to the TekExpress FRL application.
- The term "DUT" is an abbreviation for Device Under Test.
- The term "select" is a generic term that applies to the two methods of choosing a screen item (button, control, list item): using a mouse or using the touch screen.
- A Note identifies important information.

Icon descriptions

Icon	Meaning
	This icon identifies important information.
	This icon identifies conditions or practices that could result in loss of data.
	This icon identifies additional information that will help you use the application more efficiently.

Technical support

Tektronix values your feedback on our products. To help us serve you better, please send us your suggestions, ideas, or comments on your application or oscilloscope. Contact Tektronix through mail, telephone, or the Web site, www.tek.com.

When you contact Tektronix Technical Support, please include the following information (be as specific as possible):

General information

- All instrument model numbers
- Hardware options, if any
- Probes used
- Your name, company, mailing address, phone number, FAX number
- Please indicate if you would like to be contacted by Tektronix about your suggestion or comments.

Application specific information

- Software version number
- Description of the problem such that technical support can duplicate the problem
- If possible, save the setup files for all the instruments used and the application.
- If possible, save the TekExpress setup files, log.xml, *.TekX (session files and folders), and status messages text file.
- If possible, save the waveform on which you are performing the measurement as a .wfm file.

Getting started

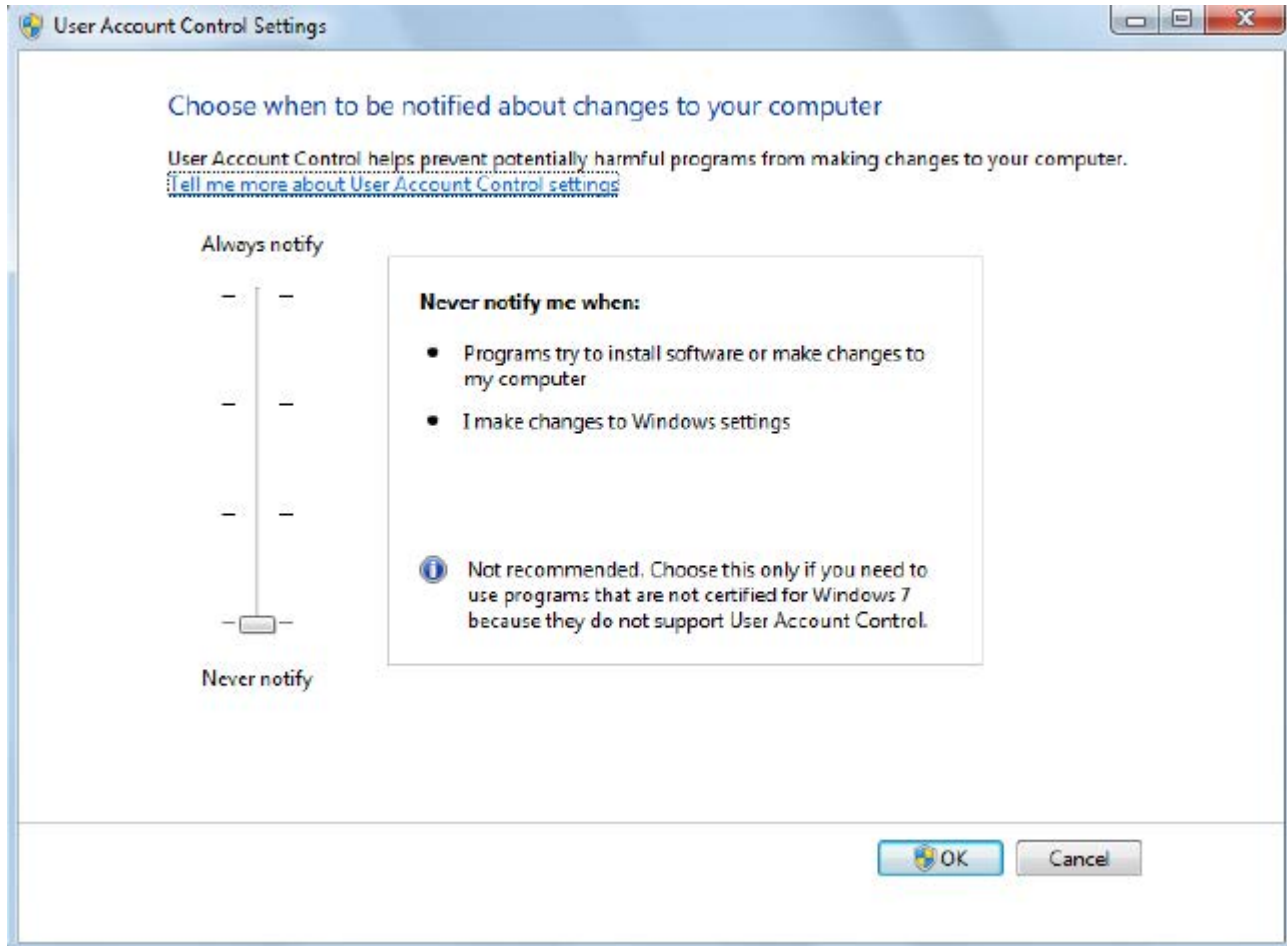
Supported instruments

Resources	Supported models		Quantity
	HDMI 2.1	HDMI 2.2	
Real-time oscilloscope	- DPO70000SX/DX Series with bandwidth ≥ 20 GHz 7 Series DPO AX with bandwidth ≥ 20 GHz	- DPO70000SX/DX Series with bandwidth ≥ 25 GHz 7 Series DPO AX with bandwidth ≥ 25 GHz	
Test adapter	HDMI A2-TPA-P: Wilder Fixture, HDMI Type A (v2.1) test point adapter	HDMI A-TPA-P: Wilder/Luxshare HDMI 2.2 fixture	1
EDID/SCDC controller	HDMI_EDID2.1-EMSS (Wilder) or AJSC-1/1X (Allion)	HDMI_EDID2.2 (Wilder) or AJSC-1/1X (Allion)	1
SMA torque			1
Ethernet hub			1
Probes	P7625/P7633 Tri-mode probe with P76CA-292C P7720 Tri-mode probe with P77C292MM	P7625/P7633 Tri-mode probe with P76CA-292C	4

Windows 10 user accounts

Windows 10 instruments need to have the User Account Control Settings set to **Never Notify**. To set the User Account Control Settings:

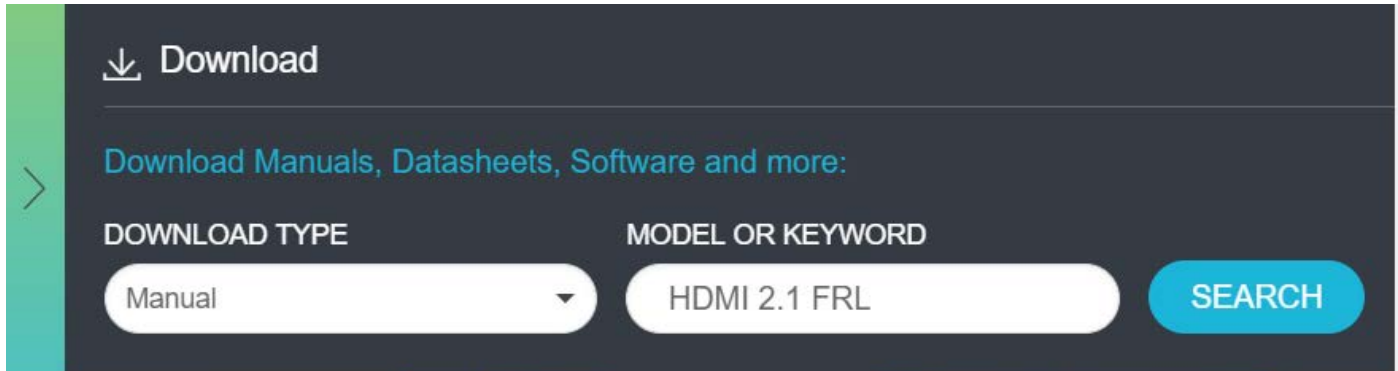
1. Go to **Control Panel > User Accounts > Change User Account Control settings**.
2. Set it to **Never Notify** as shown in the image.



Installing the software

Complete the following steps to download and install the latest FRL application. See Recommended accessories for compatibility.

1. Go to www.tek.com.
2. Click **Downloads**. In the Downloads menu, select DOWNLOAD TYPE as Software and enter the application name in the MODEL OR KEYWORD field and click **SEARCH**.

The screenshot shows a dark-themed web interface for downloading software. At the top, there is a 'Download' link with a downward arrow icon. Below it, a teal-colored sidebar contains a right-pointing arrow. The main content area has the heading 'Download Manuals, Datasheets, Software and more:'. Underneath, there are two input fields: 'DOWNLOAD TYPE' with a dropdown menu currently showing 'Manual', and 'MODEL OR KEYWORD' with the text 'HDMI 2.1 FRL' entered. To the right of these fields is a blue 'SEARCH' button.

3. Select the latest version of software and follow the instructions to download. Copy the executable file to the oscilloscope.
4. Double-click the executable and follow the on-screen instructions. The software is installed at `C:\Program Files\Tektronix\TekExpress\TekExpress FRL`.
5. Select **Analyze** → **Tekexpress FRL** from the TekScope menu to Run the application.

Activate the license

To activate the license, access the oscilloscope's help documentation, navigate to the License Activation section, and follow the on-screen instructions using the oscilloscope interface.

View version information

To view version information of the application, click **Options > About TekExpress**.



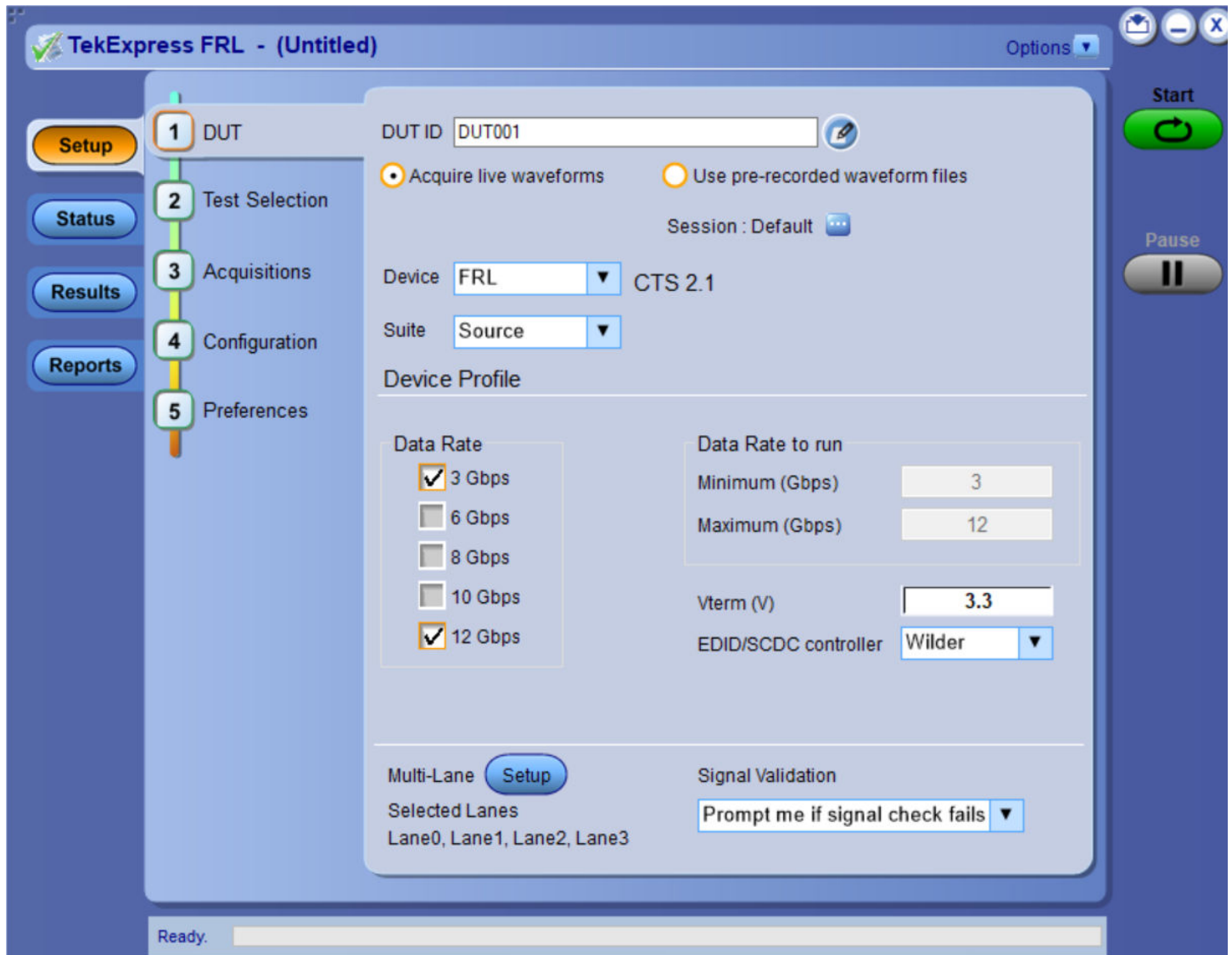
See Also

[Activate the license](#) (on page 13)

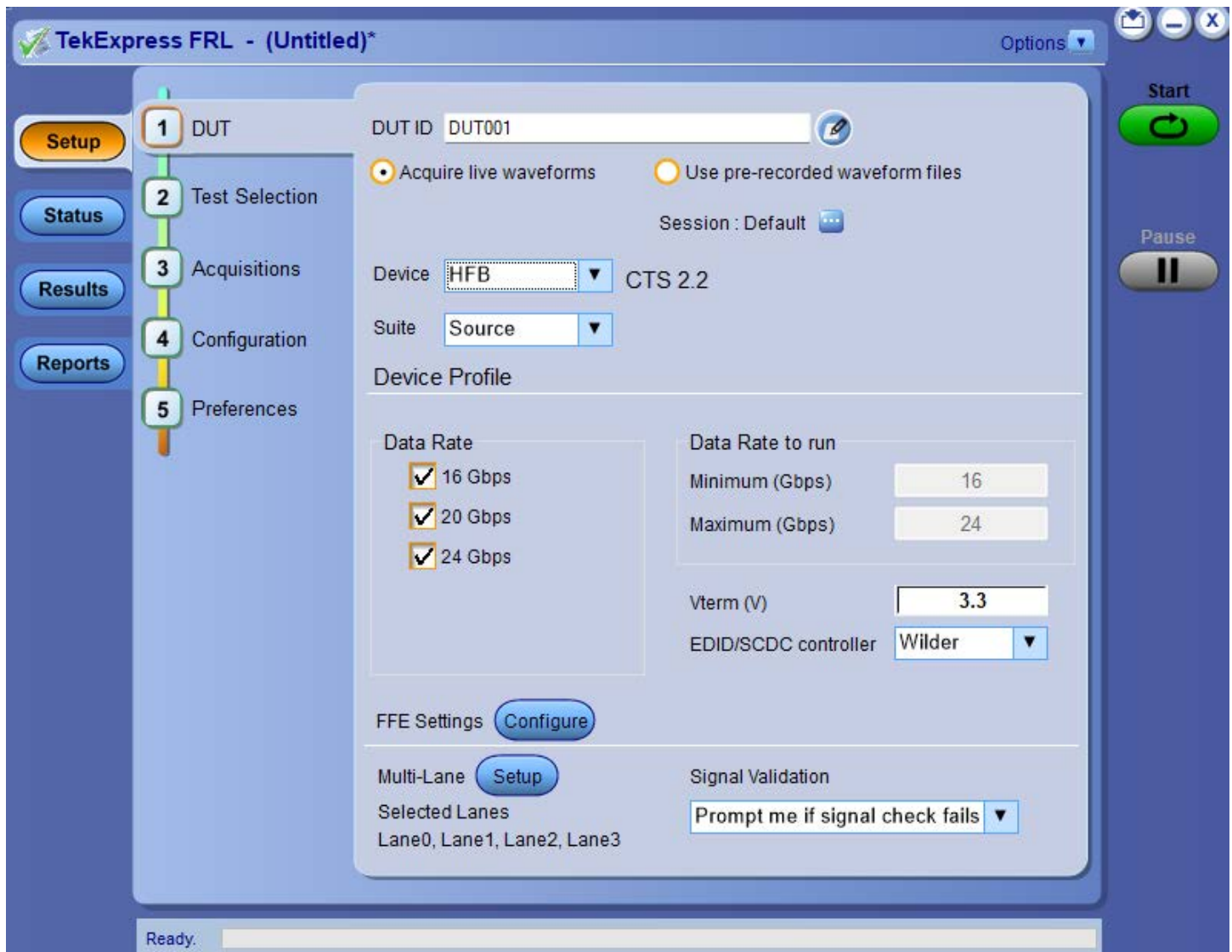
[Options menu](#) (on page 18)

Starting the application

To launch the TekExpress FRL application, select **Analyze > TekExpress FRL** from the TekScope menu.



Home screen: HDMI 2.1



Home screen: HDMI 2.2

During start, a "My TekExpress" folder is created in the Documents folder of the current user and gets mapped to "X" drive. When the application is closed properly, the "X" drive gets unmapped. Session files are then stored inside the X:\HDMI_FRL folder. If this file is not found, the application runs an instrument discovery program to detect connected instruments before starting TekExpress FRL.

To keep the TekExpress FRL application on top of any application, select Keep on top from the options menu. If the application goes behind the oscilloscope application, select Applications/Analyze > TekExpress FRL to bring the application to the front.

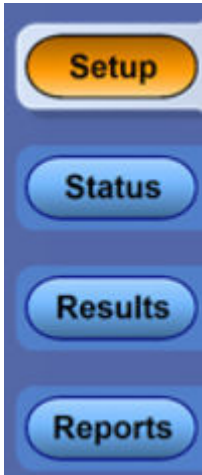
See also

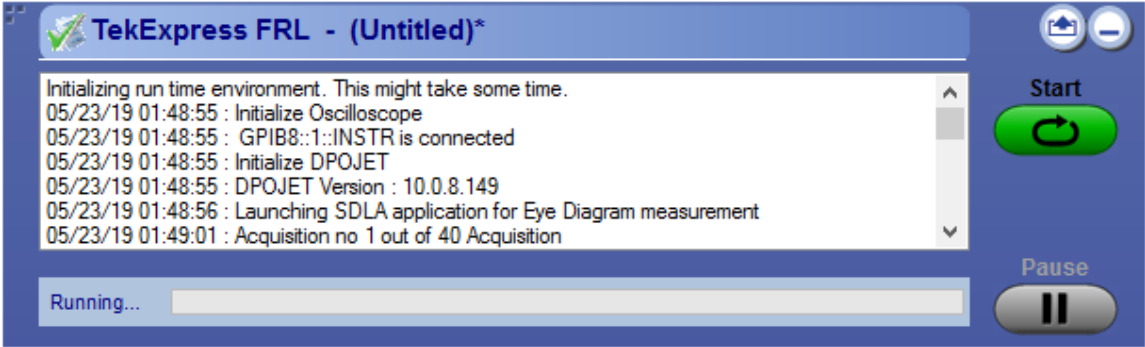
[Application controls](#) (on page 16)

Application controls

This section describes the application controls with functionality and its details.

Application control descriptions

Item	Description
Options menu (on page 18)	Opens the Options menu for access to global controls.
Panels 	Controls that open tabs for configuring test settings and options.
Start button  Stop button 	Use the Start button to start the test run of the measurements in the selected order. If prior acquired measurements are not cleared, then new measurements are added to the existing set. The button toggles to the Stop mode while tests are running. Use the Stop button to abort the test.
Pause \ Continue button 	Use the Pause button to temporarily interrupt the current acquisition. When a test is paused, the button name changes to Continue .
Clear button 	Use the Clear button to clear all existing measurement results. Adding or deleting a measurement, or changing a configuration parameter of an existing measurement, also clears measurements. This is to prevent the accumulation of measurement statistics or sets of statistics that are not coherent. This button is available only on Results panel overview (on page 43). NOTE: This button is visible only when there are results data on the panel.
Application window move icon 	Place the cursor over the top of the application window to move the application window to the desired location.

Item	Description
Minimize icon 	Minimizes the application.
Close icon 	Close the application.
Mini view / Normal view  	Toggles the application between mini view and normal view.  Mini view displays the run messages with the time stamp, progress bar, Start / Stop button, and Pause / Continue button. The application moves to mini view when you click the Start button.

Options menu functions

To access the **Options** menu, click in the upper-right corner of the application. It has the following selections:

Default Test Setup
Open Test Setup
Save Test Setup
Save Test Setup As
Open Recent ▶
Instrument Control Settings
Keep On Top
Email Settings
Suite ▶
Identify AWG-HD
Help
About TekExpress

Menu	Function
Default Test Setup	Opens an untitled test setup with defaults selected.
Open Test Setup	Opens a saved test setup.

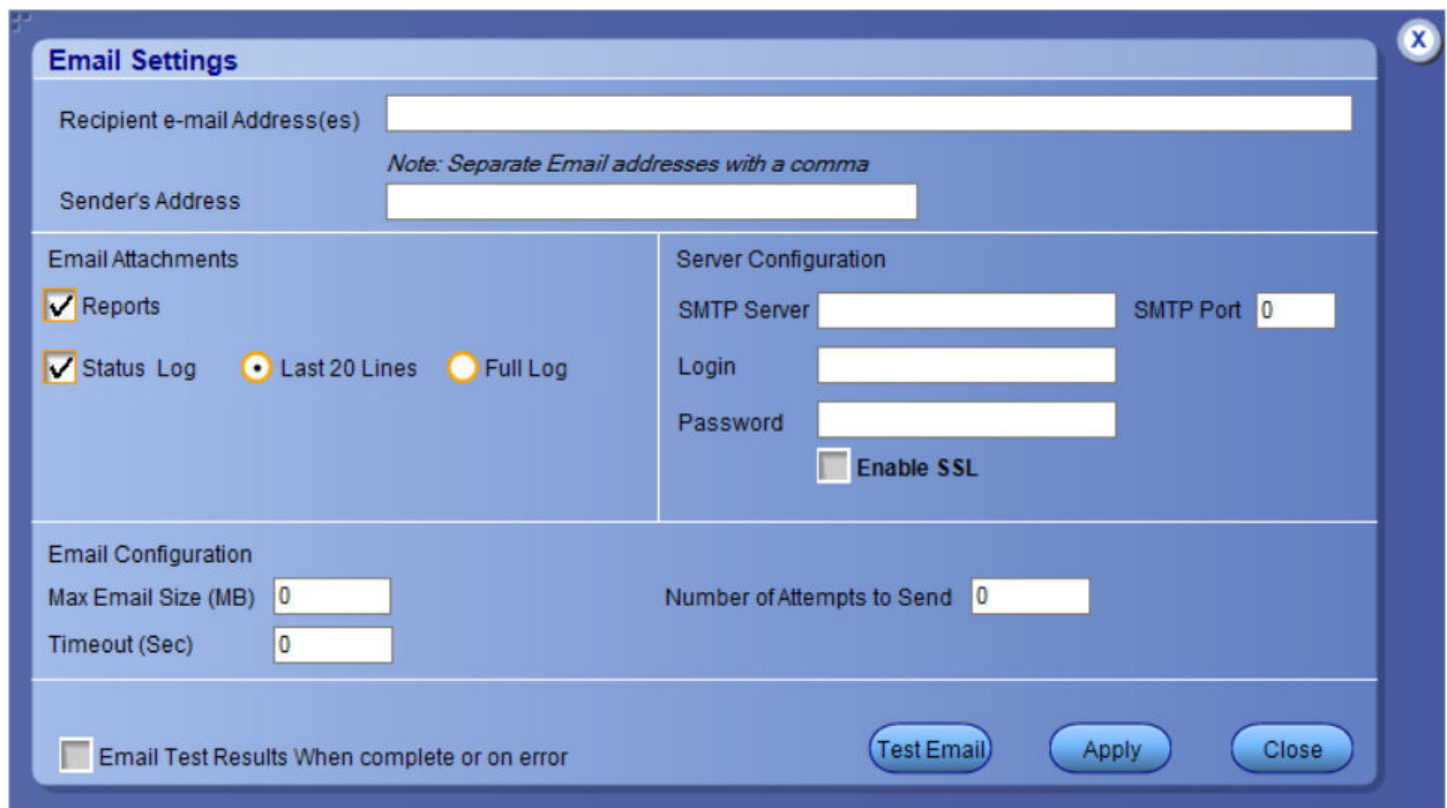
Menu	Function
Save Test Setup	Saves the current test setup selections.
Save Test Setup As	Creates a new test setup based on an existing one.
Open Recent	Displays a menu of recently opened test setups from which to select.
Instrument control settings	Shows the list of instruments connected to the test setup and allows you to locate and refresh connections to connected instruments.
Keep On Top	Keeps the TekExpress FRL utility on top of other open windows on the desktop.
Email Settings	Displays configure email options for test run and results notifications.
Suite	Displays the suite selected as 'Source'.
Help	Displays TekExpress FRL application Help document (This document).
About TekExpress	- Displays application details such as software name, version number, and copyright. - Provides access to View version and license information (on page 13) for your TekExpress FRL application installation. - Provides a link to the Tektronix site.

See also

[Application controls](#) (on page 16)

Configure email settings

Use the **Email Settings** utility to get notified by email when a measurement completes or produces any error condition. Follow the steps to configure email settings:



Email Settings

Recipient e-mail Address(es)

Note: Separate Email addresses with a comma

Sender's Address

Email Attachments

☒ Reports

☒ Status Log ☒ Last 20 Lines ☐ Full Log

Server Configuration

SMTP Server SMTP Port

Login

Password

☐ Enable SSL

Email Configuration

Max Email Size (MB) Number of Attempts to Send

Timeout (Sec)

☐ Email Test Results When complete or on error

1. Select **Options > Email Settings** to open the Email Settings dialog box.
2. (Required) For **Recipient email Address(es)**, enter one or more recipient email addresses. To include multiple addresses, separate the addresses with commas.
3. (Required) For **Sender's Address**, enter the email address used by the instrument. This address consists of the instrument name, followed by an underscore, followed by the instrument serial number, then the @ symbol, and the email server ID. For example: user@yourcompany.com.
4. (Required) In the **Server Configuration** section, type the SMTP Server address of the Mail server configured at the client location, and the SMTP Port number, in the corresponding fields.
If this server requires password authentication, enter a valid login name, password, and host name in the corresponding fields.

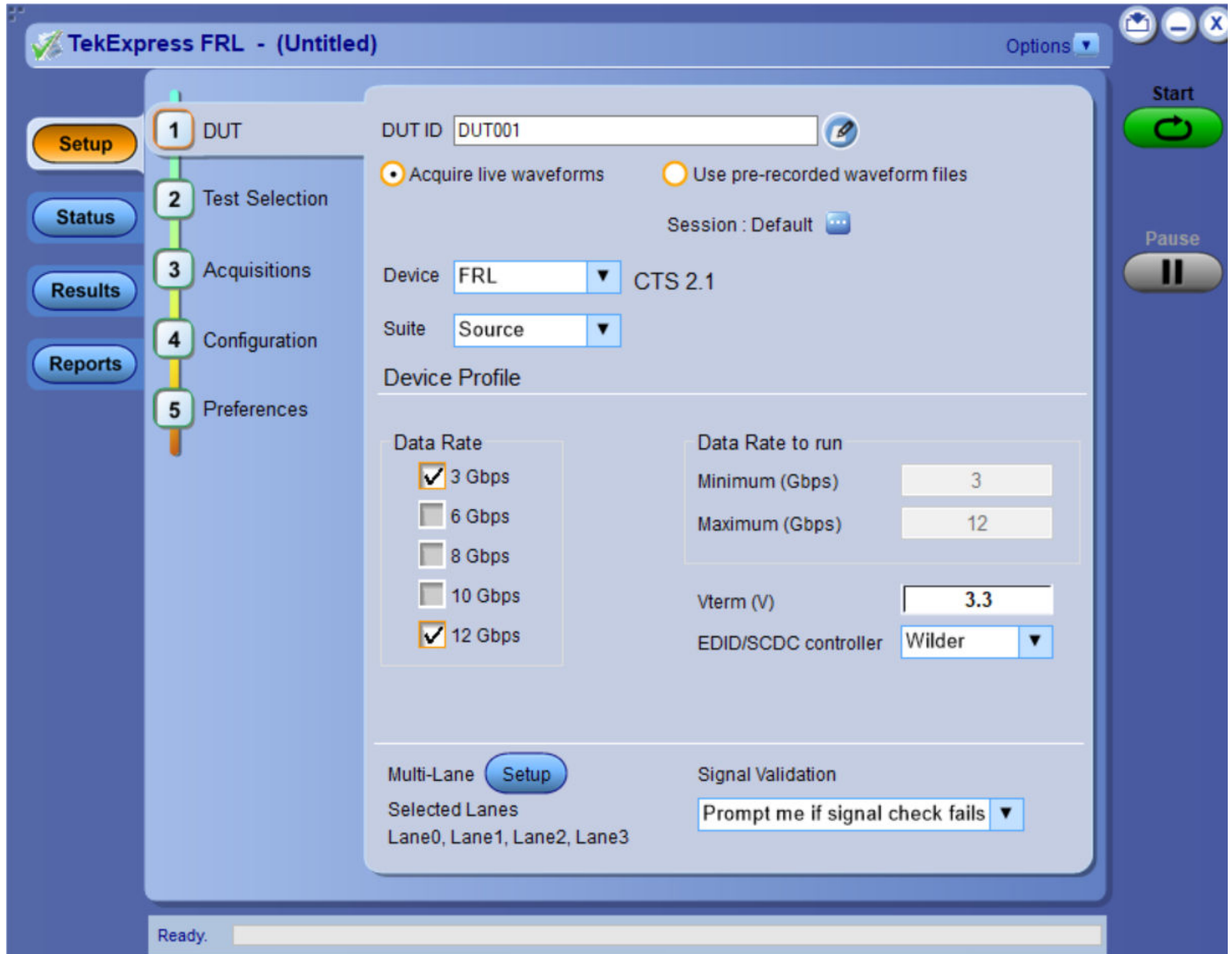
NOTE: If any of the above required fields are left blank, the settings will not be saved, and email notifications will not be sent.

5. In the **Email Attachments** section, select from the following options:
 - **Reports:** Select to receive the test report with the notification email.
 - **Status Log:** Select to receive the test status log with the notification email. If you select this option, then also select whether you want to receive the full log or just the last 20 lines.
6. In the **Email Configuration** section:
 - Enter a maximum file size for the email message. Messages with attachments larger than this limit will not be sent. The default is 0 MB.
 - Enter the number in the Number of Attempts to Send field, to limit the number of attempts that the system makes to send a notification. The default is 1. You can also specify a timeout period.
7. Select the **Email Test Results When complete or on error** check box. Use this check box to quickly enable or disable email notifications.

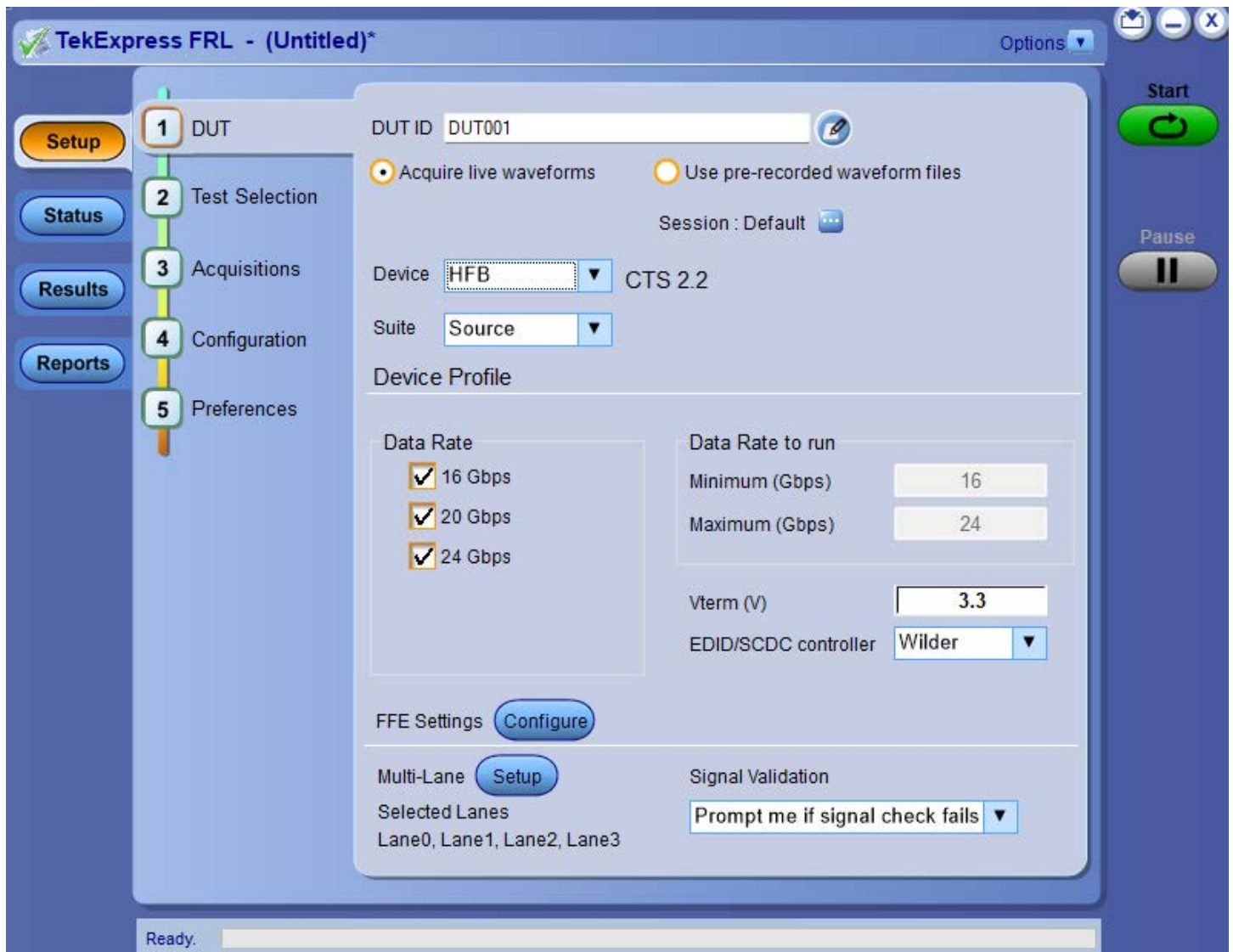
8. To test your email settings, click **Test Email**.
9. To apply your settings, click **Apply**.
10. Click **Close** when finished.

Setup panel: Configure the test setup

The **Setup** panel contains sequentially ordered tabs that you guides through the test setup and execution process.



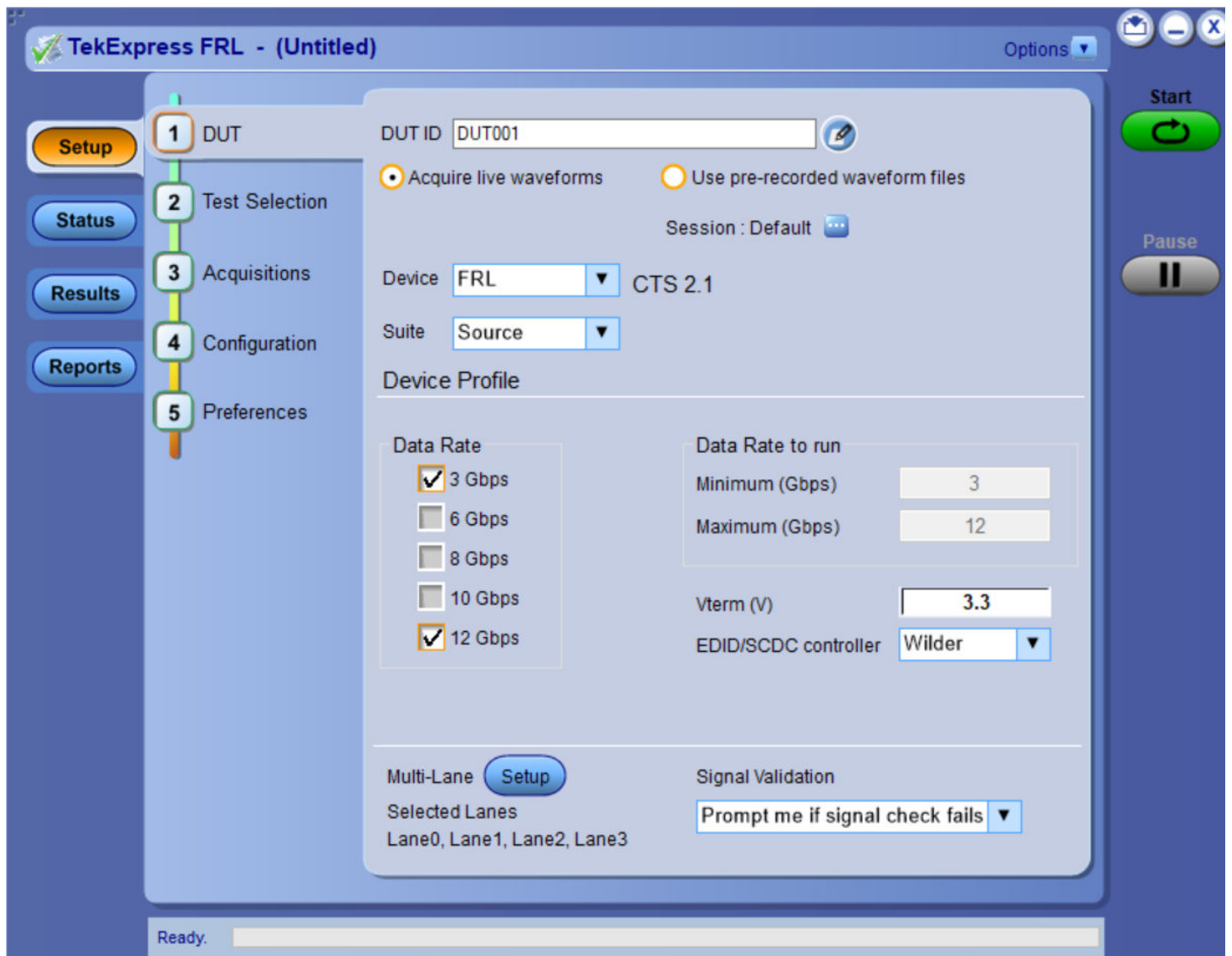
Setup panel: HDMI 2.1



Setup panel: HDMI 2.2

DUT: Set DUT settings

Use the **DUT** tab to select parameters for the device under test. These settings are global and apply to all tests of current session. DUT settings also affect the list of available tests in the Test Selection tab.

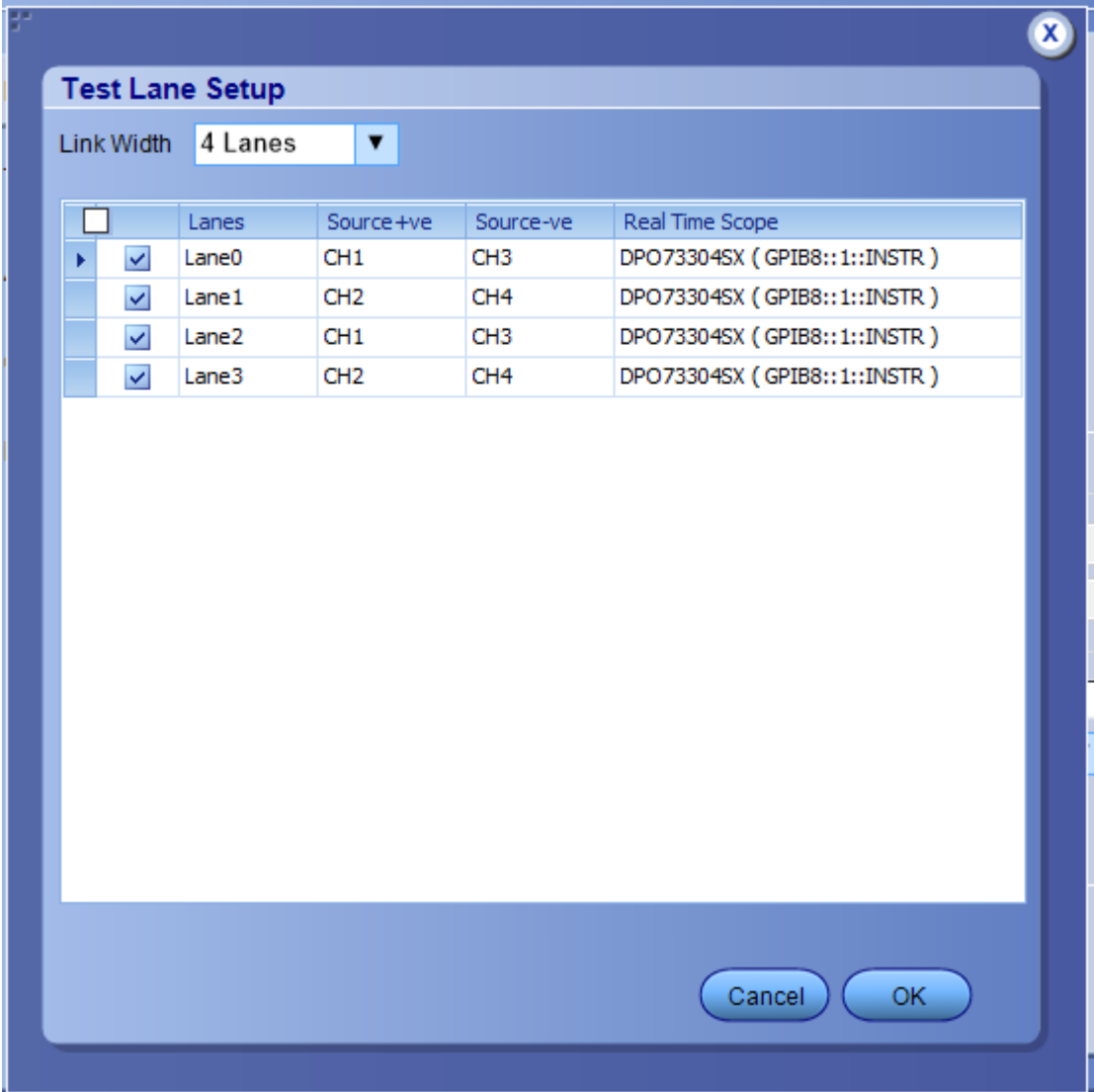


DUT panel: HDMI 2.1



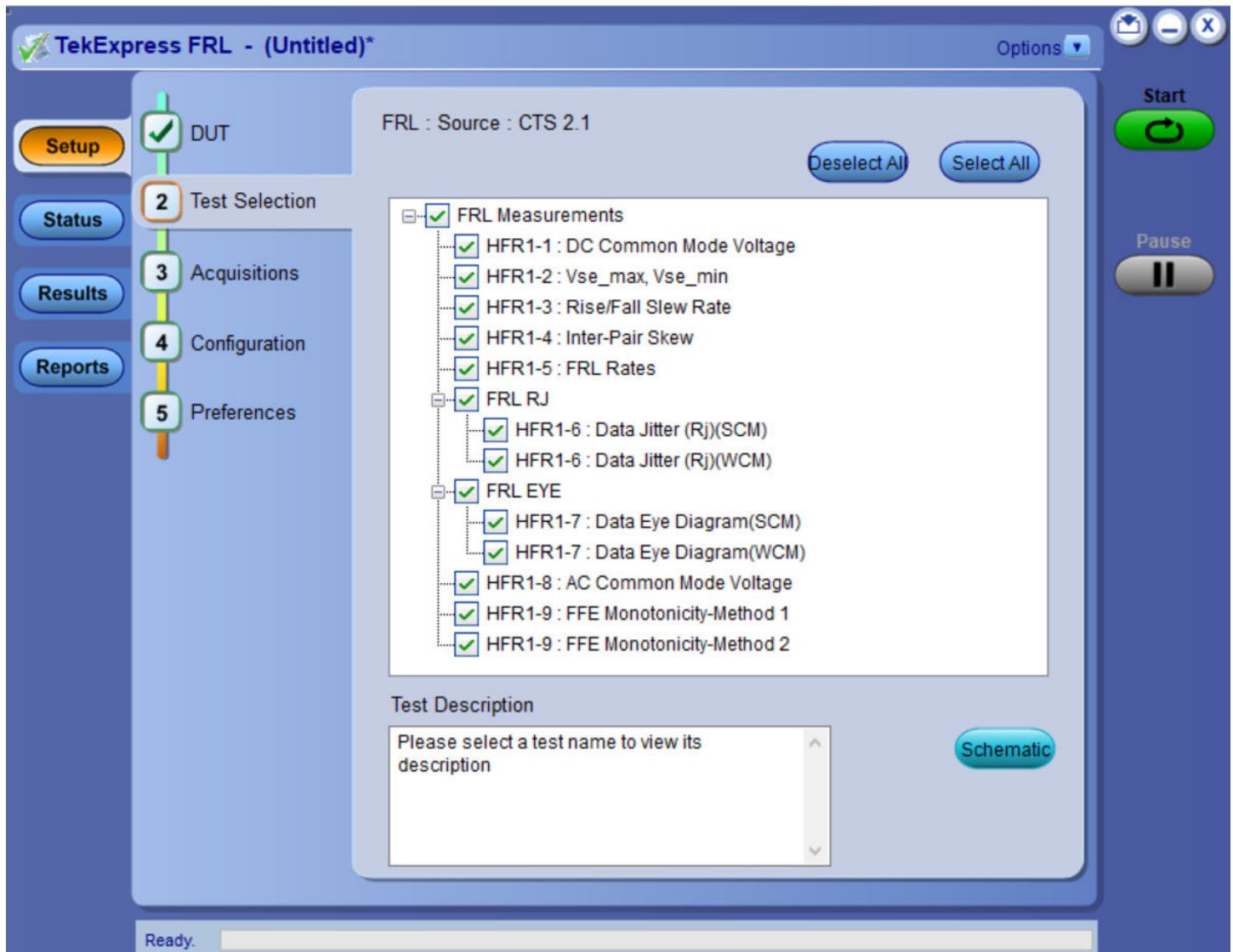
Application Help

Setting	Description
Device Profile	
Data Rate	Select all the data rate supported by the DUT.
Data Rate to run	All selected measurements will run on minimum and/or maximum data rate as per CTS.
Vterm(V)	Applies termination voltage. Vterm value is selected to 3.3 V
EDID/SSDC controller	Select the controller option from the drop-down list. The available options are Allion, Wilder, and None. By default, Wilder is selected. NOTE: Ensure that the Allion driver software is installed on the oscilloscope while using Allion for testing FRL Source.

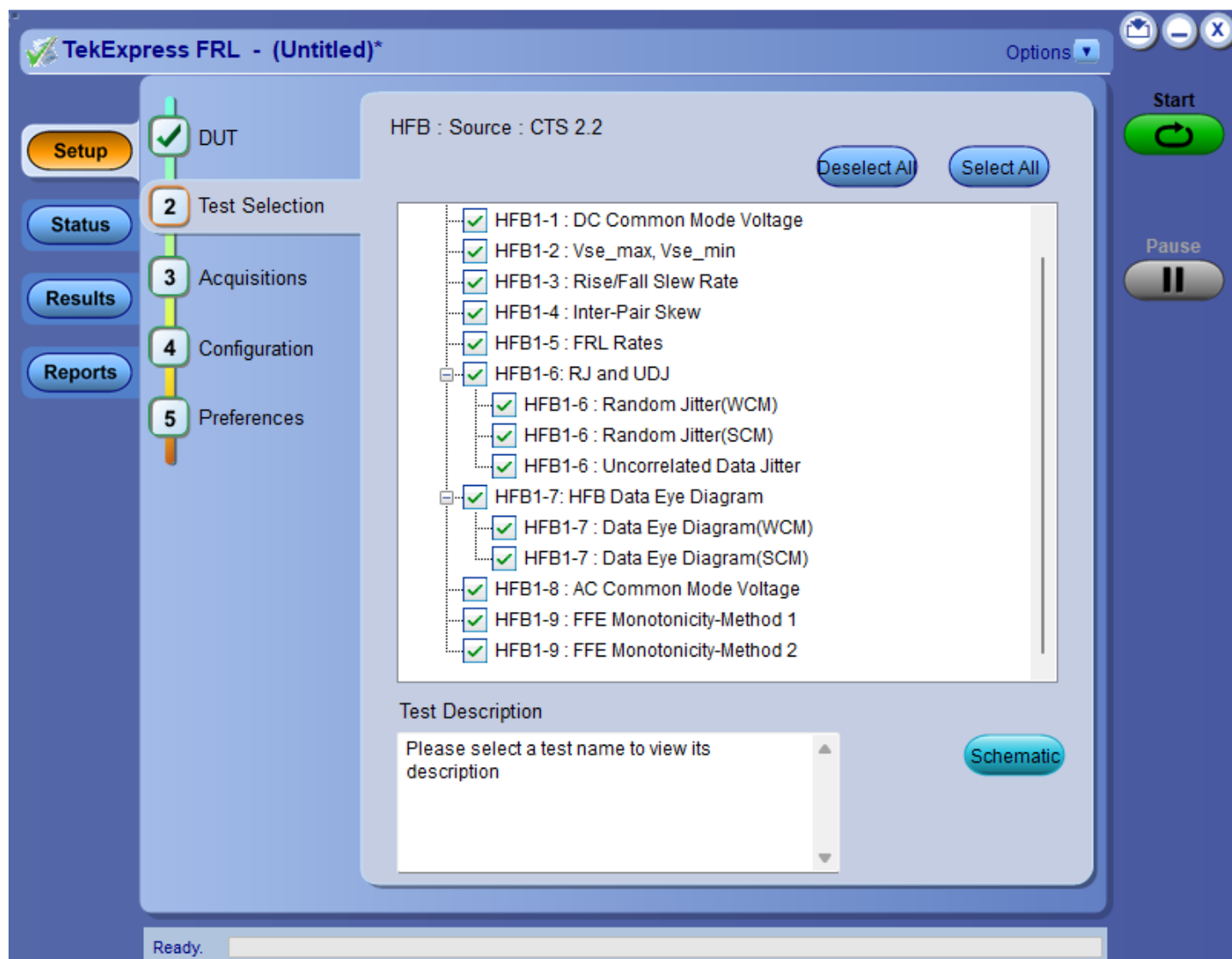
Setting	Description
Multi-Lane Setup	Click Setup to configure the multi-lane setup for the test. Select P76XX/P77XX configuration. - Select P76XX/P77XX and click OK. - In the Test Lane Setup menu, select the number of lanes selected, the Source, and the Probe connection for each lane and click OK. 
Signal Validation	Validation of the Signal can be done by three options and they can be selected from the drop-down list provided: Prompt me if Signal Check Fails When selected, user is prompted if Signal validation fails. The user will be given the option to Reacquire, Use Anyway, Skip and Abort the execution. Skip Test if Signal Check Fails When selected, signal validation fails for the selected test is skipped. Turn Off Signal Check When selected, FRL application does not perform any signal validation.

Test Selection: Select the tests

Use the **Test Selection** tab to select the tests. The test measurements available depends on the settings selected in the DUT tab.



Test selection panel: HDMI 2.1



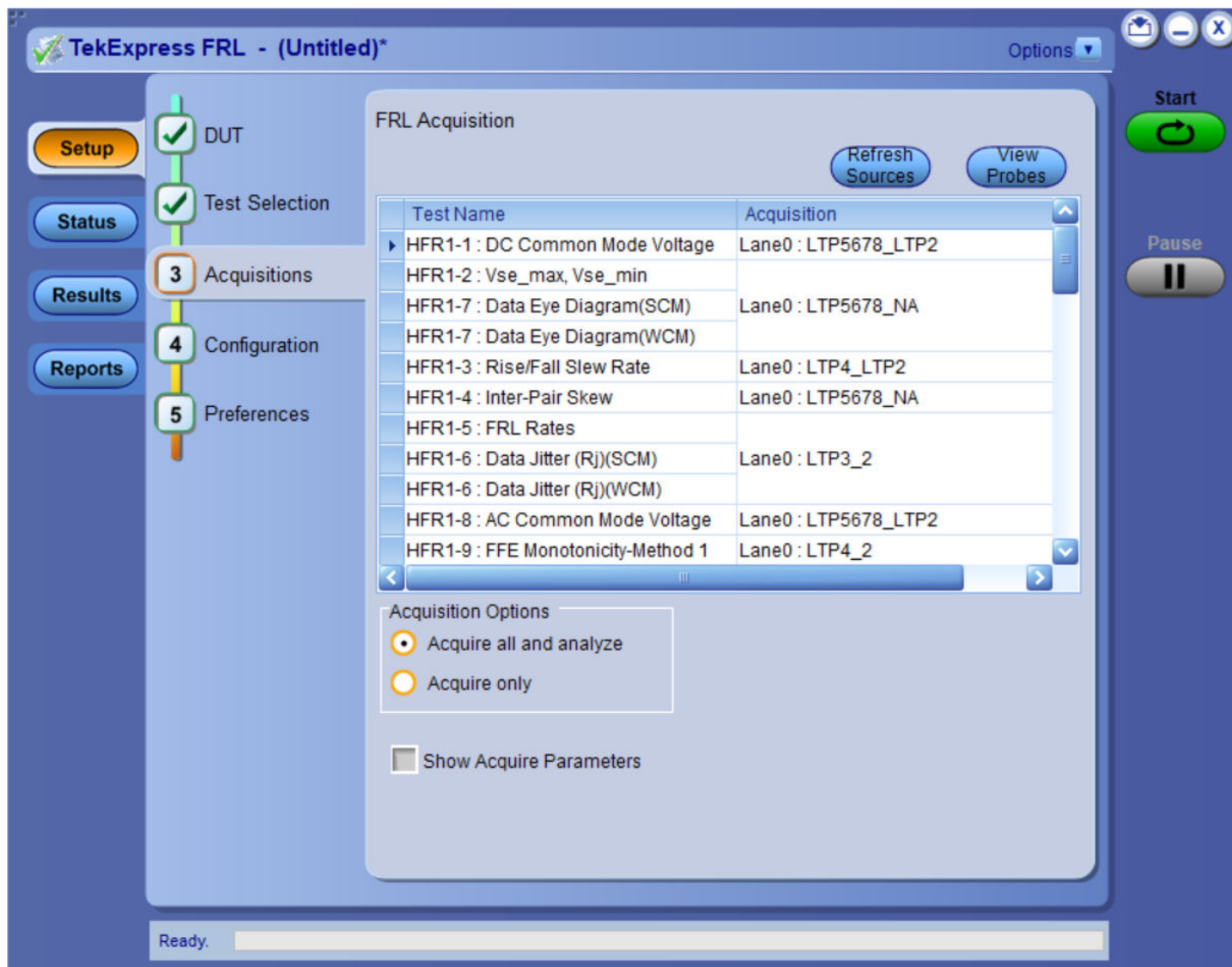
Test selection panel: HDMI 2.2

Test selection tab settings

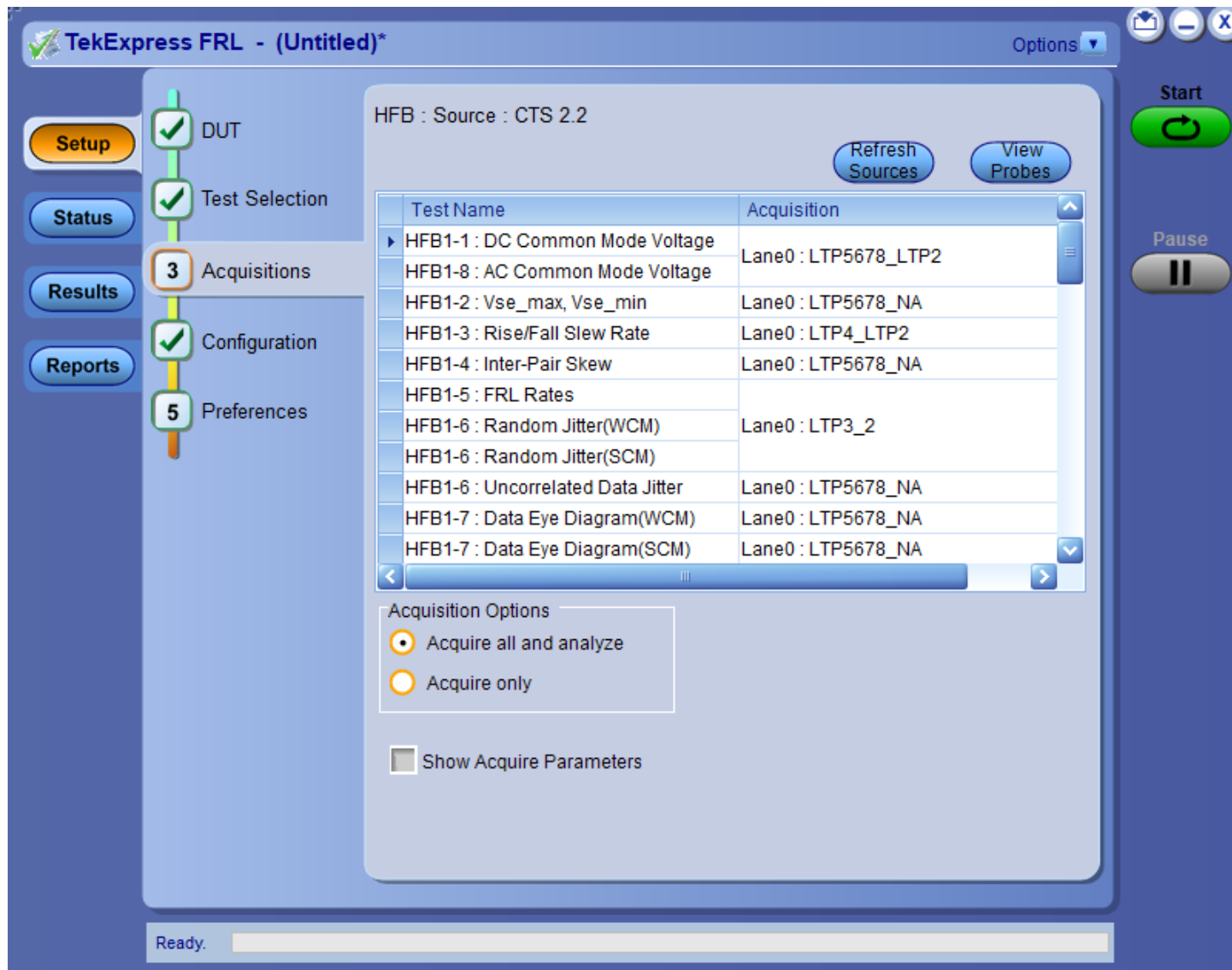
Setting	Description
Deselect All, Select All,	Deselect or selects all tests in the list.
Tests	Click a test to select or deselect. Selecting a test also show details about the selected test in the Test Description panel. All required tests are selected in the Compliance test mode.
Schematic	Displays equipment connection setup for the selected measurements. You need to select at least a measurement before you click the Schematic button.
Test Description	Shows brief description of the highlighted test in the test tree.

Acquisitions: Set waveform acquisition settings

Use **Acquisitions** tab to view the test acquisition parameters. The contents displayed on this tab depends on the DUT type and the tests selected.



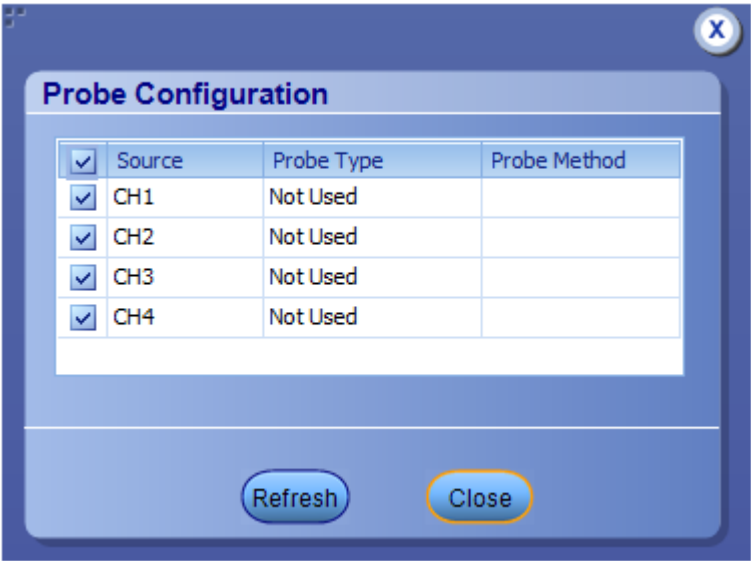
Acquisition panel: HDMI 2.1



Acquisition panel: HDMI 2.2

Acquisition tab settings

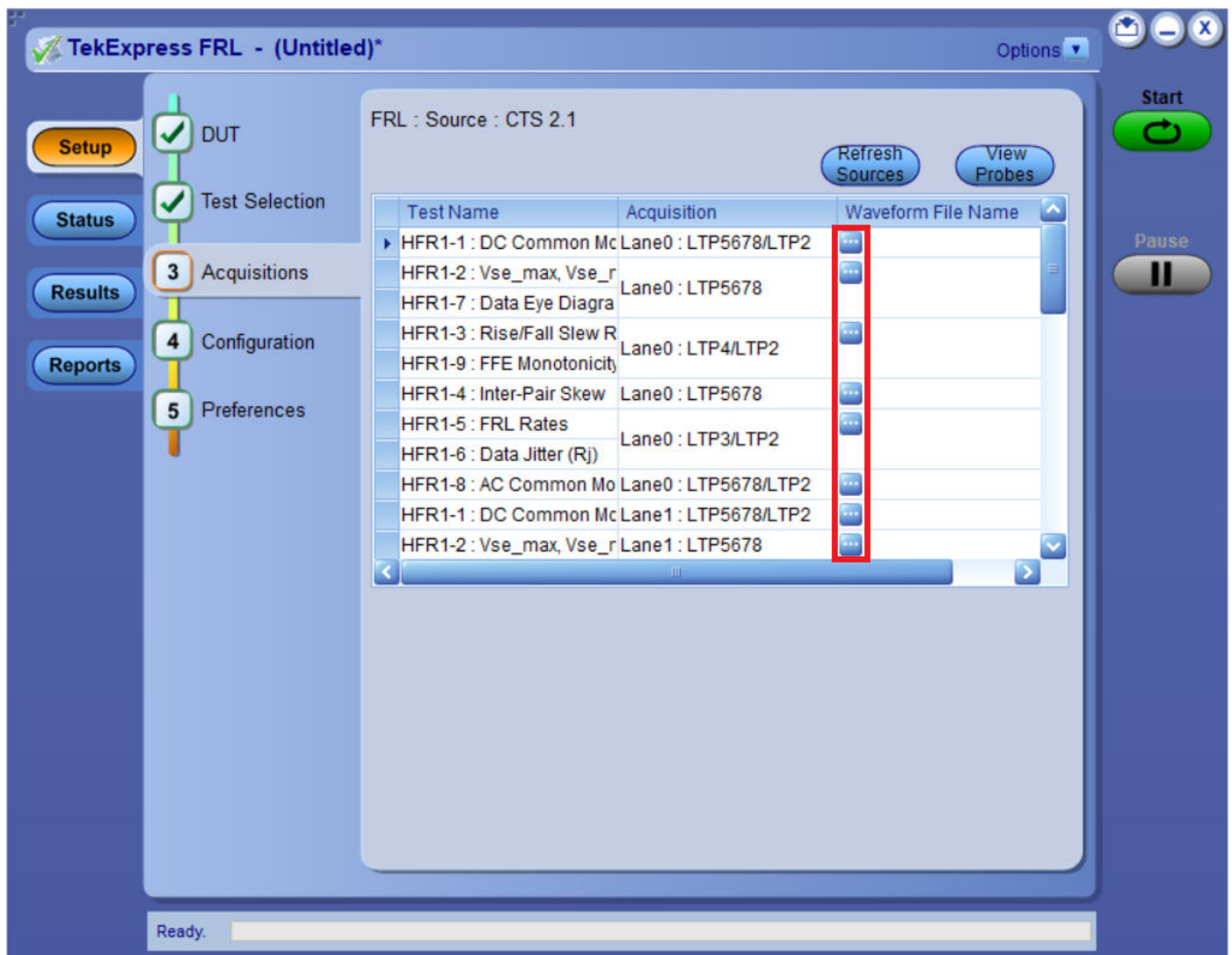
Settings	Description
Refresh Sources	Displays the sources connected to the different channels of the oscilloscope. Updates the list of available channel sources as used by the Source fields in the Device list. Click this button when you change the channel connections in the test setup.

Settings	Description
View Probes	Displays the probes connected to the different channels of the oscilloscope. Click to view the detected probes and enable or disable the probe signal source access in the application. 
Acquisition Options	• Acquire all and analyze Acquire waveforms for all the valid acquisitions and analyzes using the saved waveforms. • Acquire only Acquires waveforms for all the valid acquisitions.
Show Acquire Parameters	Select to review the acquire parameters.

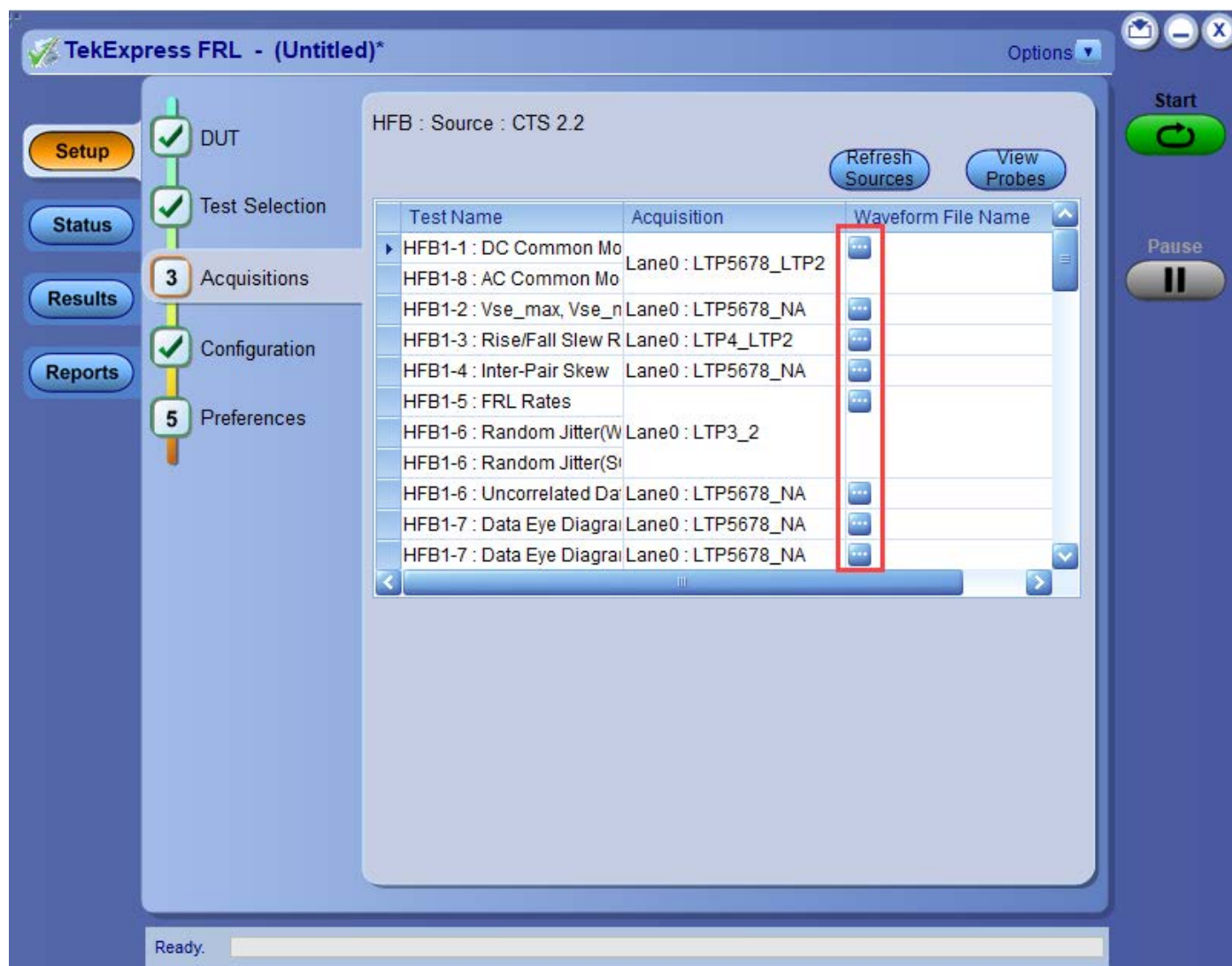
Running tests on prerecorded (saved) waveforms

To load a saved waveform file:

1. Click **DUT**.
2. Click **Use pre-recorded waveform files**.
3. Click **Acquisitions**. The Waveform Filename column now shows browse buttons.



Acquisition pre-recorded: HDMI 2.1



Acquisition pre-recorded: HDMI 2.2

4. Click the browse button () for each test acquisition type (Lane 0, Lane 1, Lane 2, Lane 3)
5. Navigate to and select the appropriate waveform file(s). You must select all waveforms required for the acquisition type.
6. To change, remove, or add a file to the list, click the browse button next to the file name to change, and use the menu items to replace, remove (delete) or add a file in the list.
7. Click **Start**.

NOTE: Waveform naming based on the Acquire Parameters.

Data Rate: 12 Gbps

Target Lane: Lane0

Victim Lane Pattern: LTP5678

Quiet Lane Pattern: NA (When Quiet Lane is not present, Quiet Lane Pattern = NA)

Sample Rate: 100 GS

Record Length: 10 M

Channel: CH1 (Single-Ended Positive) / CH3 (Single-Ended Negative)

Source Type: SEPos / SENeg / Diff

FFE Level: 0 (only for HFR1-9 / HFB1-9 FFE Monotonicity Measurement)

Voltage Level: VN = Normal, VP = Pre-Shoot, VD = De-Emphasis, V0 = No FFE (only for HFR1-9 / HFB1-9 FFE Monotonicity Measurement)

Run no: 1

Example 1:

Lane0-LTP5678_NA-12Gbps-100GS-10M-CH1-SEPos-R1.wfm

Lane0-LTP5678_NA-12Gbps-100GS-10M-CH3-SENeg-R1.wfm

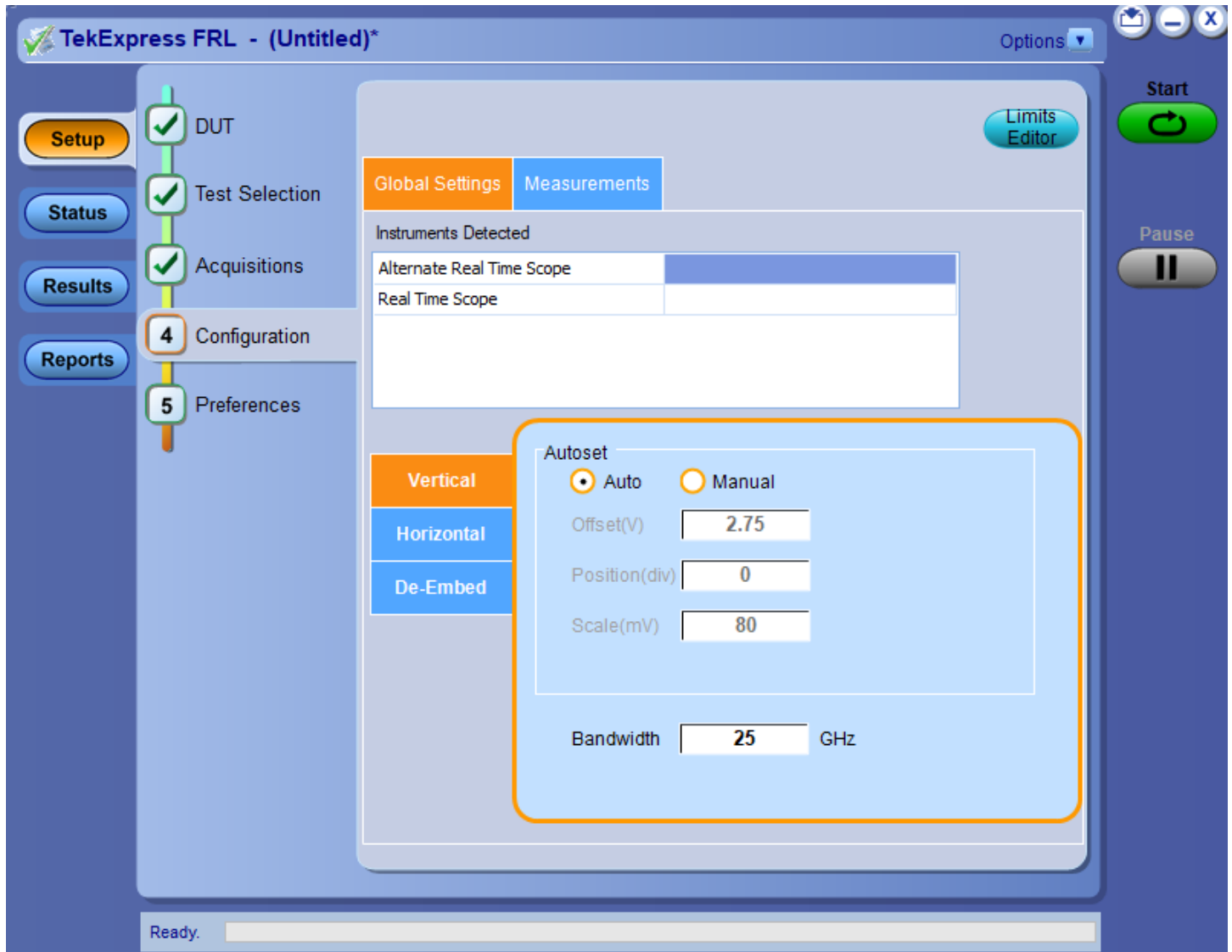
Example 2: Specific to HFR1-9 / HFB1-9 FFE Monotonicity Measurement

Lane0-LTP4_2-12Gbps-FFE0-VP-100GS-10M-CH1-SEPos-R1.wfm

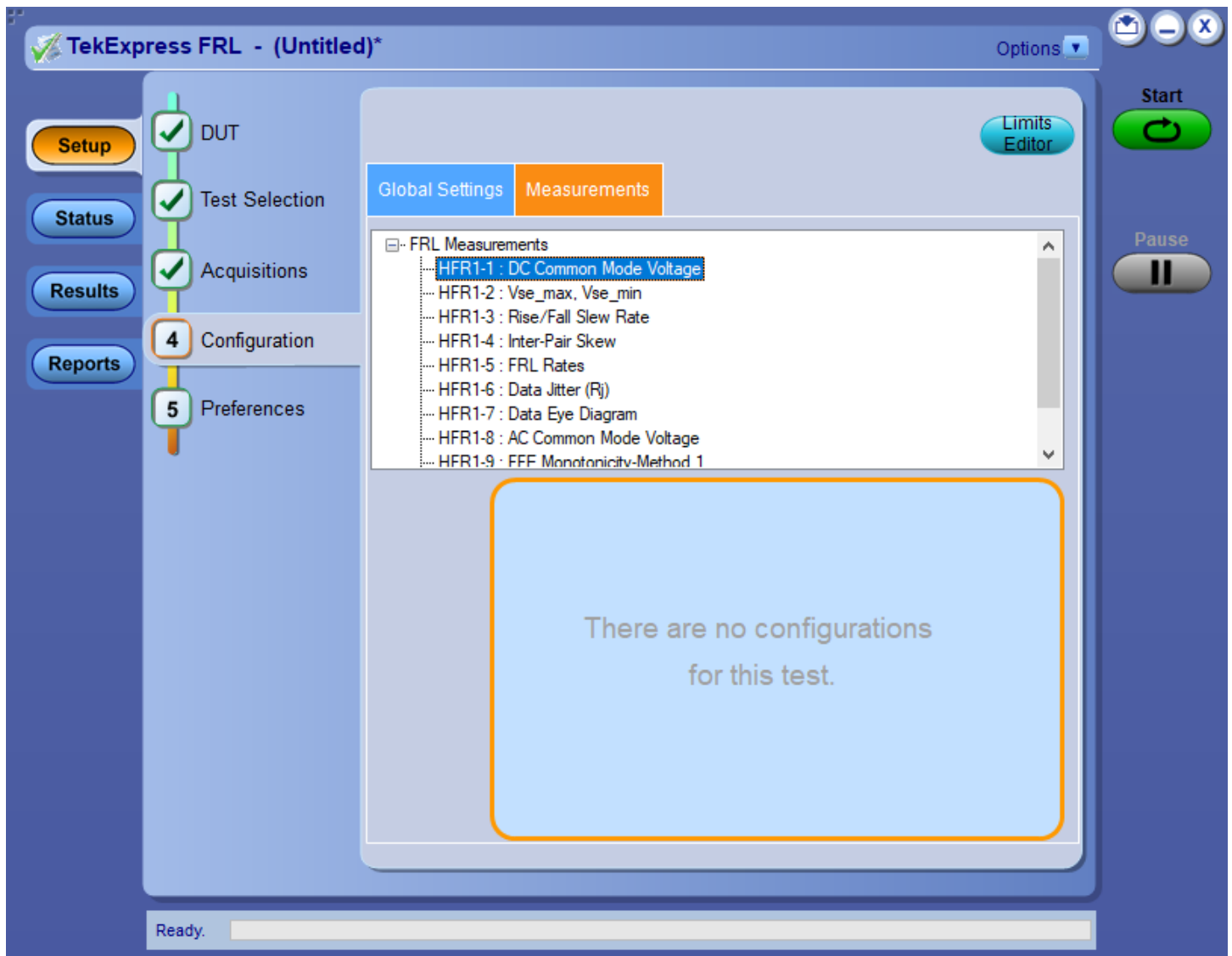
Lane0-LTP4_2-12Gbps-FFE0-VN-100GS-10M-CH3-SENeg-R1.wfm

Configuration: Set measurement limits for tests

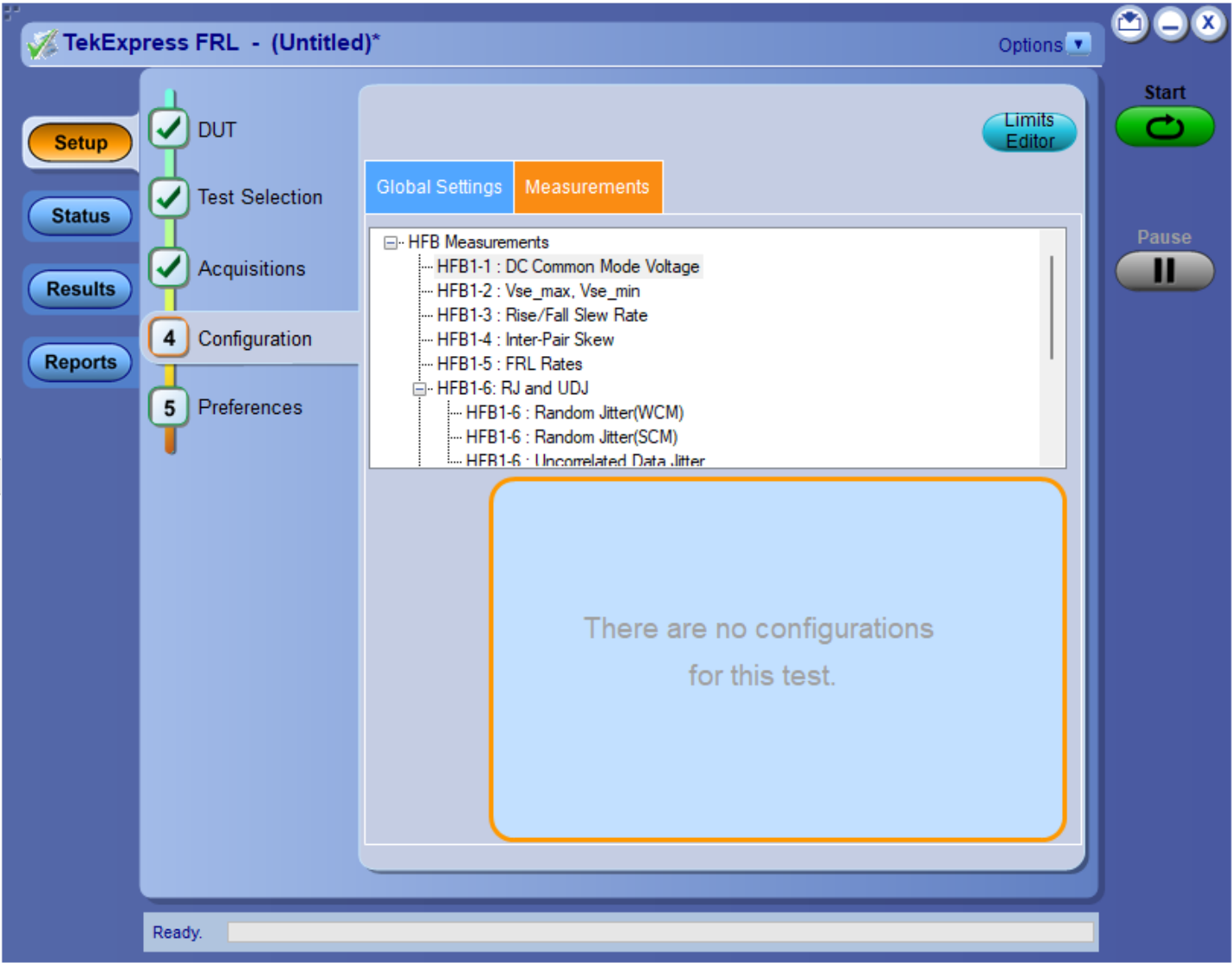
Use the **Configuration** tab to configure the **Global Settings** and **Measurements** settings for the measurements. The measurement specific configurations available in this tab depends on the selections made in the DUT panel and Test Selection panel.



Configuration panel: Global settings



Configuration panel: Measurements tab of HDMI 2.1



Configuration panel: Measurements settings of HDMI 2.2

Source Configuration tab settings

Settings	Description	
Compliance mode settings		
Global settings		
Instruments Detected	Displays the instruments connected to this application. Click on the instrument name to open a list of available (detected) instruments.	
	Select Options > Instrument Control Settings and click Refresh to update the instrument list.	
	NOTE: Verify that the GPIB search criteria (default setting) in the Instrument Control Settings is selected when using the TekExpress FRL application.	
Vertical		
Autoset	Auto (Default value)	Manual

Settings	Description	
Offset (V)	2.75 V	-5 V to 5 V
Position (div)	0	-4 to 4
Scale(mV)	80 mV	3.48 mV to 5350 mV
Bandwidth	Values changes from 2.5 GHz to 21 GHz.	
De-Embed Filter	Apply De-Embed	Select to apply the de-embed filter file. Click Browse and select the de-embedding filter files (.flt). NOTE: Browse option is enabled only when you select Apply De-Embed checkbox.

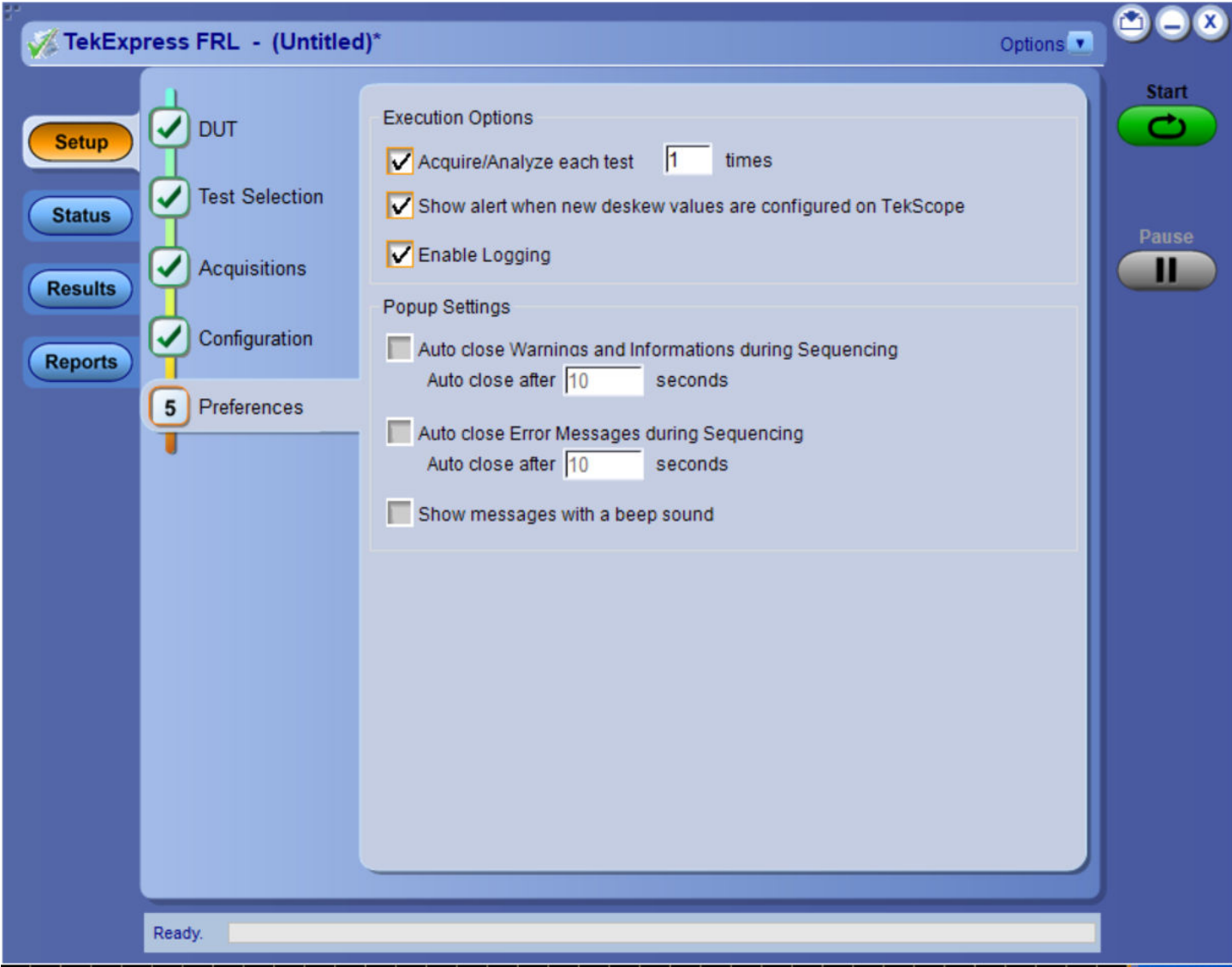
Measurement configurations for source

Measurement Name	Configuration			Default value
HFR1-6: DataJitter (RJ)	ClockRecovery	PLL CustomBW	PLL Model: Type ILoop BW (MHz)	-
			3 Gbps	4
			6 Gbps	4
			8 Gbps	5.333
			10 Gbps	6.666
			12 Gbps	8
	Cable Settings	Cable Model		Both

Measurement Name	Configuration			Default value
HFR1-7: DataEye Diagram	Clock Recovery	PLL CustomBW	PLL Model:Type I Loop BW (MHz)	-
			3 Gbps	4
			6 Gbps	4
			8 Gbps	5.333
			10 Gbps	6.666
			12 Gbps	8
	Cable Settings	Cable Model		Both
		Crosstalk		With
		Equalizer Options		CTLE+DFE
		Apply Custom Mask File		Select to apply the custom mask file. Click Browse and select the custom mask files.
HFR1-8: AC Common Mode Voltage	Acquire	Bandwidth (GHz)	3 Gbps	2
			6 Gbps	3
			8 Gbps	4
			10 Gbps	5
			12 Gbps	6

Preferences: Set the test run preferences

Use **Preferences** tab to set the application action on completion of a measurement. The **Preferences** tab has the feature to enable or disable certain options related to the measurement execution.



Preference panel

Preferences tab settings

Setting	Description
Execution Options	
Acquire/Analyze each test <number> times	Select to repeat the test run by setting the number of times. By default, it is selected with 1 run. The number of run feature is available only during the live mode.
Show alert when new deskew values are configured on TekScope	Select to display the alert when new deskew values are configured on TekScope.

Setting	Description
Enable Logging	Select to record the actions of the user by the application. By default, it is selected.
Popup Settings	
Auto Close Warnings and information during Sequencing Auto close after <number> Seconds	Select to auto close warnings/information during sequencing. Set the Auto close time. By default it is unselected.
Auto Close Error Messages during Sequencing. Auto close after <number> Seconds	Select to auto close Error Messages during Sequencing. Set the Auto close time. By default it is unselected.
Show messages with a beep sound	Select to display the messages with a beep sound. By default it is unselected.

See also

[Select report options](#) (on page 49)

Results panel: View summary of test results

When a test execution is complete, the application automatically opens the **Results** panel to display a summary of test results.

In the **Results** table, each test result occupies a row. By default, results are displayed in summary format with the measurement details collapsed and with the Pass/Fail column visible.

TekExpress FRL - (Untitled)* Options ▾

Test Results Statistics Overall Test Result Pass Preferences ▾

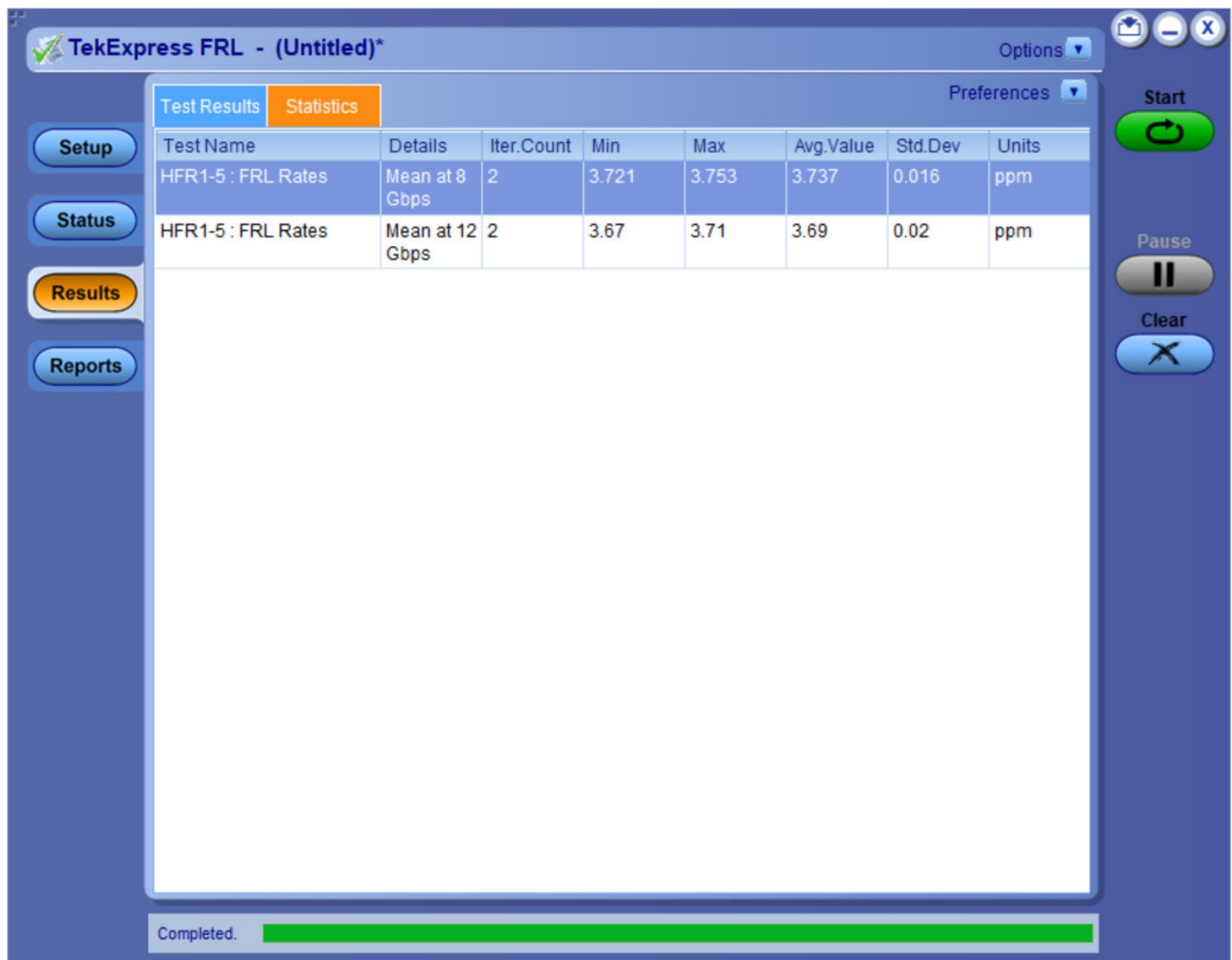
Setup Status **Results** Reports

Test Name	Lane	Pass/Fail	Details	Value	Margin	Units
HFR1-5 : FRL Rates	Lane0	Pass	Mean at 8 Gbps	3.721	LL: 303.72087, HL: 296.27913	ppm
HFR1-5 : FRL Rates	Lane1	Pass	Mean at 8 Gbps	3.753	LL: 303.75309, HL: 296.24691	ppm
HFR1-5 : FRL Rates	Lane0	Pass	Mean at 12 Gbps	3.710	LL: 303.71006, HL: 296.28994	ppm
HFR1-5 : FRL Rates	Lane1	Pass	Mean at 12 Gbps	3.666	LL: 303.66606, HL: 296.33394	ppm

Completed.

Start Pause Clear

Results panel: Test results



Results panel: Statistics

Click  icon on each measurement in the row to expand and to display the minimum and maximum parameter values of the measurement.

Filter the test results

Each column in the result table can be customized and displayed by enabling or disabling any column as per your requirement. You can change the view in the following ways:

TekExpress FRL - (Untitled)*

Options ▾ Start

Test Results Statistics Overall Test Result ✔ Pass

Setup Status Results Reports

Test Name	Lane	Pass/Fail	Details	Value	Margin
HFR1-5 : FRL Rates	Lane0	✔ Pass	Mean at 8 Gbps	3.721	LL: 303.72087 HL: 296.27913
HFR1-5 : FRL Rates	Lane1	✔ Pass	Mean at 8 Gbps	3.753	LL: 303.75308 HL: 296.24691
HFR1-5 : FRL Rates	Lane0	✔ Pass	Mean at 12 Gbps	3.710	LL: 303.71006, ppm HL: 296.28994
HFR1-5 : FRL Rates	Lane1	✔ Pass	Mean at 12 Gbps	3.666	LL: 303.66606, ppm HL: 296.33394

Completed. Completed

Preferences ▾

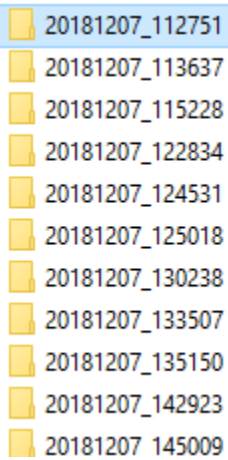
- ☒ Show Pass/Fail
- ☐ View Results Summary
- ☐ View Results Details
- ☒ Enable Wordwrap
- ☐ Group By Lane
- ☒ Group By Test

- To remove or restore the Pass/Fail column, select **Preferences > Show Pass/Fail**.
- To collapse all expanded tests, select **Preferences > View Results Summary**.
- To expand all the listed tests, select **View Results Details** from the **Preferences** menu in the upper right corner.
- To enable or disable the wordwrap feature, select **Preferences > Enable Wordwrap**.
- To view the results grouped by lane or test, select the corresponding item from the **Preferences** menu.
- To expand the width of a column, place the cursor over the vertical line that separates the column from the column to the right. When the cursor changes to a double-ended arrow, hold down the mouse button and drag the column to the desired width.
- To clear all test results displayed, click **Clear**.

View test- related files

Files related to tests are stored in the **Documents\My TekExpress\FRL** folder. In the **FRL** folder, each test setup has a test setup file and a test setup folder, both with the test setup name. The test setup file is preceded by the FRL icon and usually has no visible file extension.

Inside the test setup folder is another folder named for the DUT ID used in the test sessions. The default is DUT001.



- 20181207_112751
- 20181207_113637
- 20181207_115228
- 20181207_122834
- 20181207_124531
- 20181207_125018
- 20181207_130238
- 20181207_133507
- 20181207_135150
- 20181207_142923
- 20181207_145009

Inside the DUT001 folder are the session folders and files. Each session has a folder and file pair, both named for the test session using the naming convention (date)_(time). Each session file is stored outside its matching session folder.

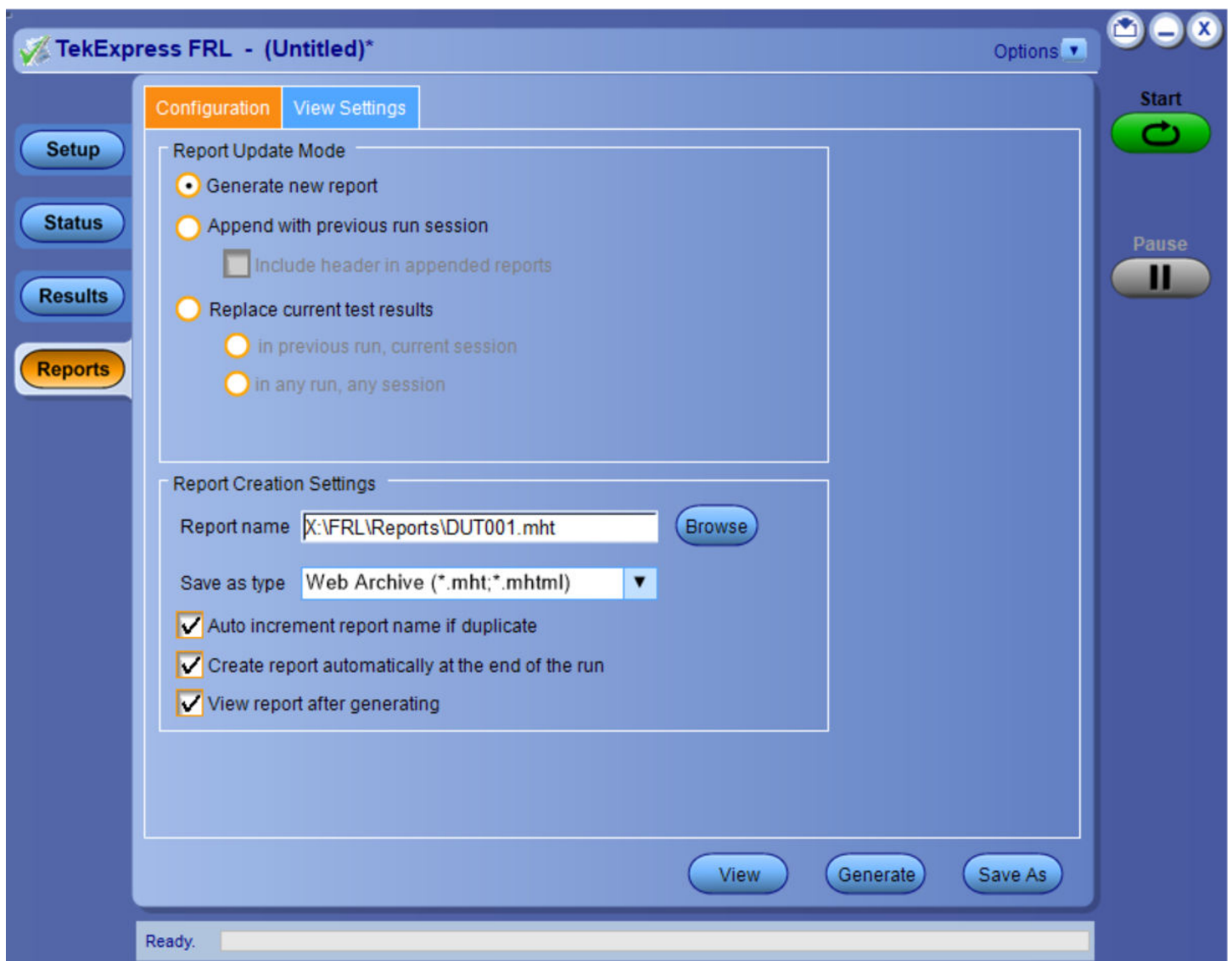
The first time you run a new, unsaved session, the session files are stored in the **Untitled Session** folder located at **..\My TekExpress\FRL**. When you name and save the session, the files are placed in a folder with the name that you specify.

Reports panel: Configure report generation settings

You can use the **Reports** panel to configure report generation settings, select test content to include in reports, generate the report, view the report, browse for reports, name and save reports, and select report viewing options.

Report configuration tab settings

The **Configuration** tab describes the report generation settings to configure the **Reports** panel. Select report settings before running a test or when creating and saving test setups. Report settings configured are included in saved test setups.



Reports panel: Configuration

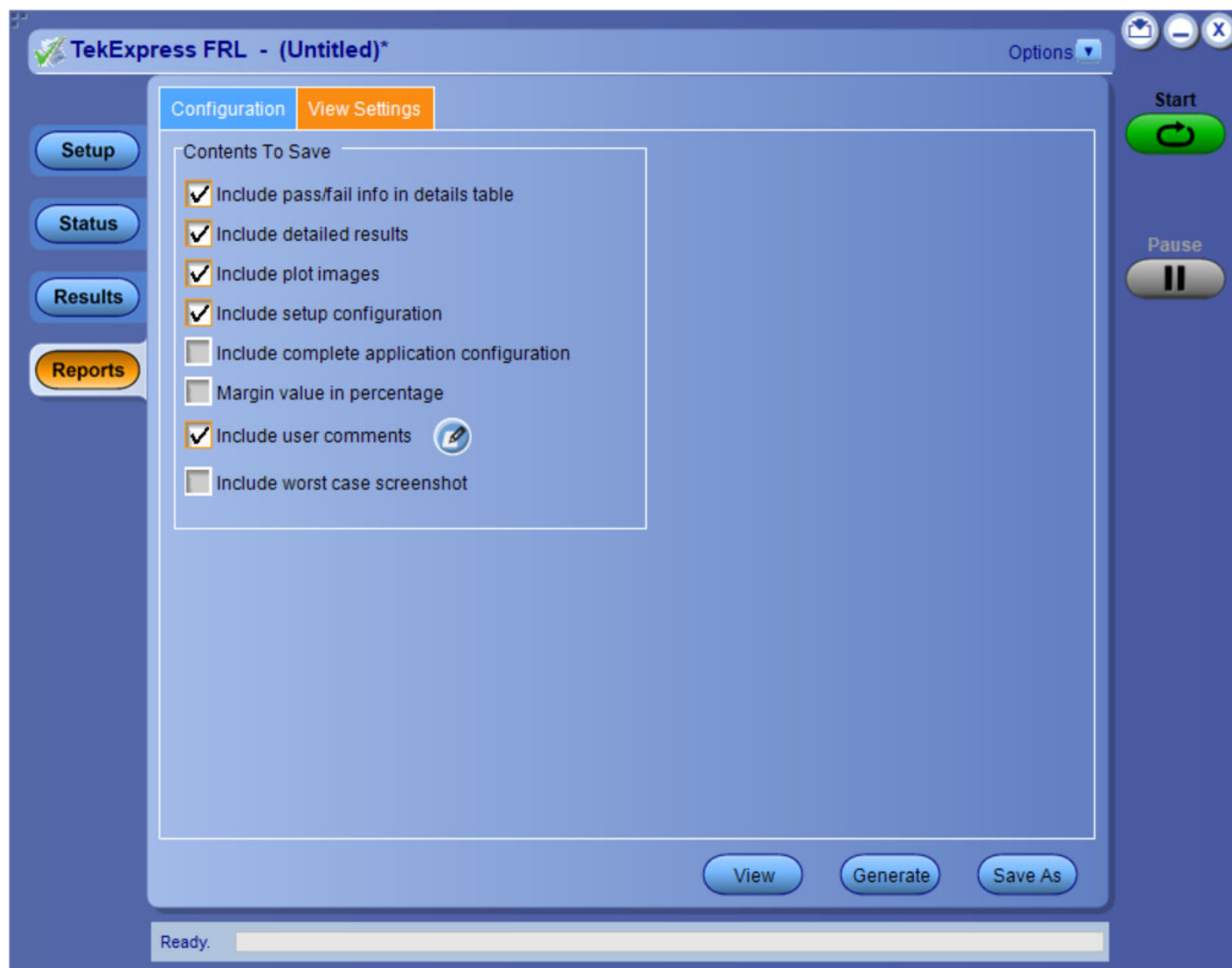
Report configuration panel settings

Control	Description
View	Click to view the most current report.
Generate	Generates a new report based on the current analysis results.
Save As	Specify a name for the report.
Report Update Mode Settings	
Generate new report	Each time when you click Run and when the test execution is complete, it will create a new report. The report can be in either .mht, .pdf, or .csv file formats.
Append with previous run session	Appends the latest test results to the end of the current test results report. Each time when you click this option and run the tests, it will run the previously failed tests and replace the failed test result with the new pass test result in the same report.
Include header in appended reports	Select to include header in appended reports.
Replace current test results	Replaces the previous test results with the latest test results. Results from newly added tests are appended to the end of the report.
In previous run, current session	Select to replace current test results in the report with the test result(s) of previous run in the current session.
In any run, any session	Select to replace current test results in the report with the test result(s) in the selected run session's report. Click and select test result of any other run session.
Report Creation Settings	
Report name	Displays the name and path of the <Application Name> report. The default location is at \My Documents>\My TekExpress\<ApplicationName>\Reports. The report file in this folder gets overwritten each time you run a test unless you specify a unique name or select to auto increment the report name. To change the report name or location, do one of the following: - In the Report Path field, type the current folder path and name. - Double-click in the Report Path field and then make selections from the popup keyboard and click Enter. Be sure to include the entire folder path, the file name, and the file extension. For example: C:\Documents and Settings\your user name\My Documents\My TekExpress\<Application Name> \DUT001.mht. NOTE: You cannot set the file location using the Browse button. Open an existing report Click Browse, locate and select the report file and then click View at the bottom of the panel.

Control	Description
Save as type	Saves a report in the specified file type, selected from the drop-down list. The report is saved in .csv, .pdf, or .mht. NOTE: If you select a file type different from the default, be sure to change the report file name extension in the Report Name field to match.
Auto increment report name if duplicate	Sets the application to automatically increment the name of the report file if the application finds a file with the same name as the one being generated. For example: DUT001, DUT002, DUT003. This option is enabled by default.
Create report automatically at the end of the run	Select to create the report with the settings configured, at the end of run.
View report after generating	Automatically opens the report in a Web browser when the test execution is complete. This option is selected by default.

Configure report view settings

The **View Settings** tab describes the report view settings to configure the **Reports** panel. Select report view settings before running a test or when creating and saving test setups. Report settings configured are included in saved test setups.



Report panel: View settings

Report panel view settings

Control	Description
Contents To Save	
Include pass/fail info in details table	Select to include pass/fail information in the details table of the report.
Include detailed results	Select to include detailed results in the report.
Include plot images	Select to include the plot images in the report.
Include setup configuration	Sets the application to include hardware and software information in the summary box at the top of the report. Information includes: the oscilloscope model and serial number, the oscilloscope firmware version, and software versions for applications used in the measurements.
Include complete application configuration	Select to include the complete application configuration in the report.

Control	Description
Margin value in percentage	Select to displays margin values in percentage format. This shows how close the measurement is to the test limit as a percentage.
Include user comments	Select to include any comments about the test that you or another user have added in the DUT tab of the Setup panel. Comments appear in the Comments section, below the summary box at the beginning of each report.
Include worst case screenshot	Select to include screenshot of the worst case test execution failure.

See also

[View a generated report](#) (on page 51)

View a generated report

The application automatically generates a report when test analysis is completed and displays the report in your default Web browser (unless you cleared the **View Report After Generating** check box in the Reports panel before running the test). If you cleared this check box, or if you want to view a different test report, do the following:

1. Click the **Reports > Browse** button and locate and select the report file to view.

NOTE: If you did not save the test setup after running the test and you either closed the application or you ran another test, the report file was not saved.

2. At the bottom of the Reports panel, click **View**.

For information on changing the file type, file name, and other report options, see [Select report options](#) (on page 49).

Sample report and its contents

A report shows specified test details, as defined in the Reports panel.



TekExpress FRL-Tx

Source Test Report

Setup Information			
DUT ID	DUT001	Scope Model	DPO733045X
Date/Time	5/26/2026 4:01:33 AM	Scope F/W Version	CF:91.1CT FV:10.15.1 Build 3
Device Type	FRL-HD22	Scope Serial Number	QU000056
TekExpress Framework Version	v5.12.0.22	Probe1 Model	1X
TekExpress FRL-Tx Version	v20.0.0.6	Probe1 Serial Number	N/A
CTS Version	2.2	Channel1 Deskew	0.00 ps
Compliance Mode	Yes	Probe2 Model	1X
Execution Mode	Live	Probe2 Serial Number	N/A
Overall Test Result	Pass	Channel2 Deskew	0.00 ps
Overall Execution Time	00:03:55	Probe3 Model	1X
		Probe3 Serial Number	N/A
		Channel3 Deskew	0.00 ps
		Probe4 Model	1X
		Probe4 Serial Number	N/A
		Channel4 Deskew	0.00 ps
DUT COMMENT:	General Comment – FRL		

Test Name Summary Table	
HFR1-5 : FRL Rates	Pass

HFR1-5 : FRL Rates								
Lane	Iteration	Measurement Details	Measured Value	Units	Test Result	Margin	Low Limit	High Limit
Lane0	Run1	Mean at 8 Gbps	3.721	ppm	Pass	LL: 303.72087, HL: 296.27913	-300	300
Lane1	Run1	Mean at 8 Gbps	3.753	ppm	Pass	LL: 303.75309, HL: 296.24691	-300	300
Lane0	Run1	Mean at 12 Gbps	3.710	ppm	Pass	LL: 303.71006, HL: 296.28994	-300	300
Lane1	Run1	Mean at 12 Gbps	3.666	ppm	Pass	LL: 303.66606, HL: 296.33394	-300	300
COMMENTS								

Sample report: HDMI 2.1



TekExpress FRL-Tx

Source Test Report

Setup Information			
DUT ID	DUT001	Scope Model	DPO714AX
Date/Time	6/12/2026 2:56:50 AM	Scope F/W Version	CF:91.1CT FV:2.24.10-release.22
Device Type	HFB-HD22	Scope Serial Number	B010174
TekExpress Framework Version	v5.12.0.22	Probe1 Model	P7720
TekExpress FRL-Tx Version	v20.0.0.15	Probe1 Serial Number	B010954
CTS Version	2.2	Channel1 Deskew	0.00 ps
Compliance Mode	Yes	Probe2 Model	P7720
Execution Mode	Pre-Recorded	Probe2 Serial Number	B013224
Overall Test Result	Pass	Channel2 Deskew	0.00 ps
Overall Execution Time	00:00:12	Probe3 Model	P7720
		Probe3 Serial Number	B000550
		Channel3 Deskew	0.00 ps
		Probe4 Model	P7720
		Probe4 Serial Number	B010958
		Channel4 Deskew	0.00 ps
DUT COMMENT:	General Comment - FRL		

Test Name Summary Table	
HFB1-1 : DC Common Mode Voltage	Pass
HFB1-2 : Vse_max, Vse_min	Pass

HFB1-1 : DC Common Mode Voltage								
Lane	Iteration	Measurement Details	Measured Value	Units	Test Result	Margin	Low Limit	High Limit
Lane0	Run1	Mean at 16 Gbps	2846.084	mV	Pass	LL: 196.08443, HL: 483.91557	2650	3330
COMMENTS								

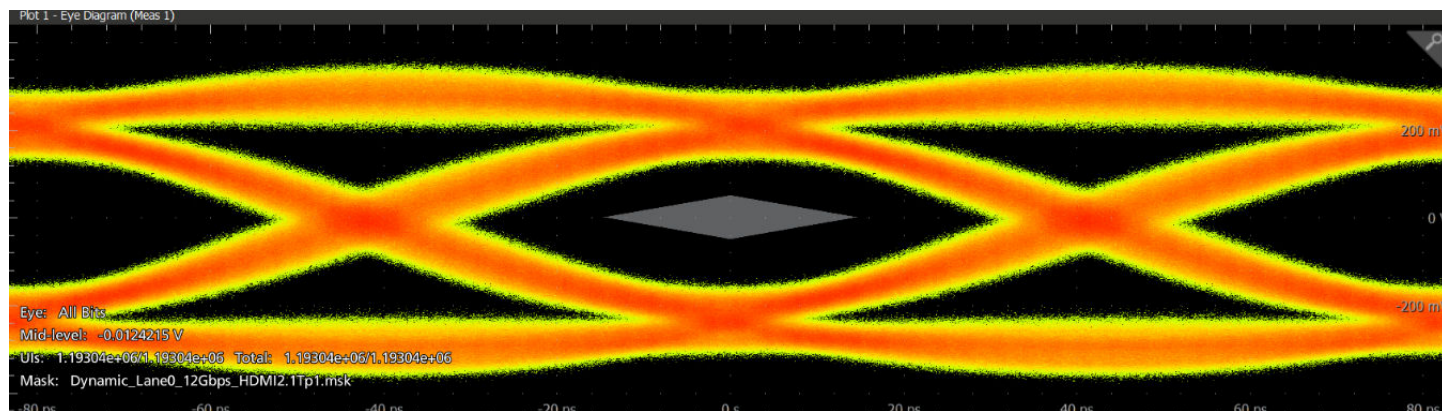
[Back to Summary Table](#)

HFB1-2 : Vse_max, Vse_min								
Lane	Iteration	Measurement Details	Measured Value	Units	Test Result	Margin	Low Limit	High Limit
Lane0	Run1	Pos_Max at 16 Gbps	3066.480	mV	Pass	LL: , HL: 104.6045	NA	3171.0844
Lane0	Run1	Pos_Min at 16 Gbps	2617.040	mV	Pass	LL: 95.9555, HL:	2521.0844	NA
Lane0	Run1	Neg_Max at 16 Gbps	3069.520	mV	Pass	LL: , HL: 101.56441	NA	3171.0844
Lane0	Run1	Neg_Min at 16 Gbps	2615.840	mV	Pass	LL: 94.7556, HL:	2521.0844	NA
COMMENTS		Lane0, DataRate=16 Gbps, DCCM=2846.08mV						

[Back to Summary Table](#)

Sample report: HDMI 2.2

Settings	Description
Setup Information	The summary box at the beginning of the report lists setup configuration information. This information includes the oscilloscope model and serial number, optical module model and serial number, and software version numbers of all associated applications.
User comments	If you had selected to include comments in the test report, any comments you added in the DUT tab are shown at the top of the report.
Test Name Summary Table	The test summary table lists all the tests which are executed with its result status.
Measurement	The measurement table displays the measurement related details with its parameter value.
Plot	Any plot associated to the measurements executed.



Eye diagram

Exit the application

Use the following method to exit the application:



1. Click  on the application title bar.
2. Do one of the following:
 - If you have an unsaved session or test setup open, you are asked to save it before exiting. To save it, click **Yes**. Otherwise click **No**. The application closes.
 - A message box appears asking if you really want to exit TekExpress. To exit, click **Yes**.

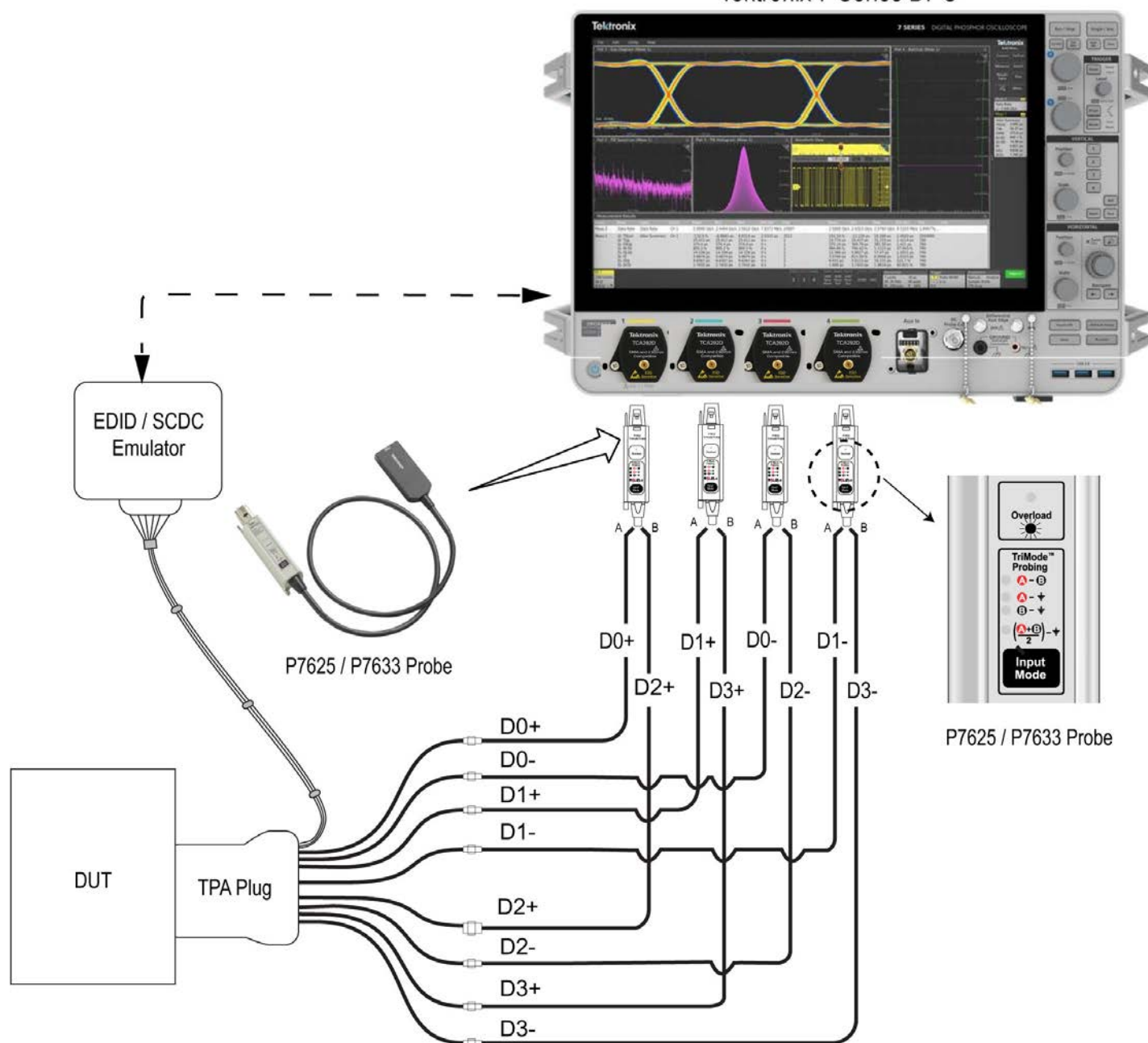
NOTE: Using other methods to exit the application results in abnormal termination of the application.

Running tests

Equipment connection setup for source

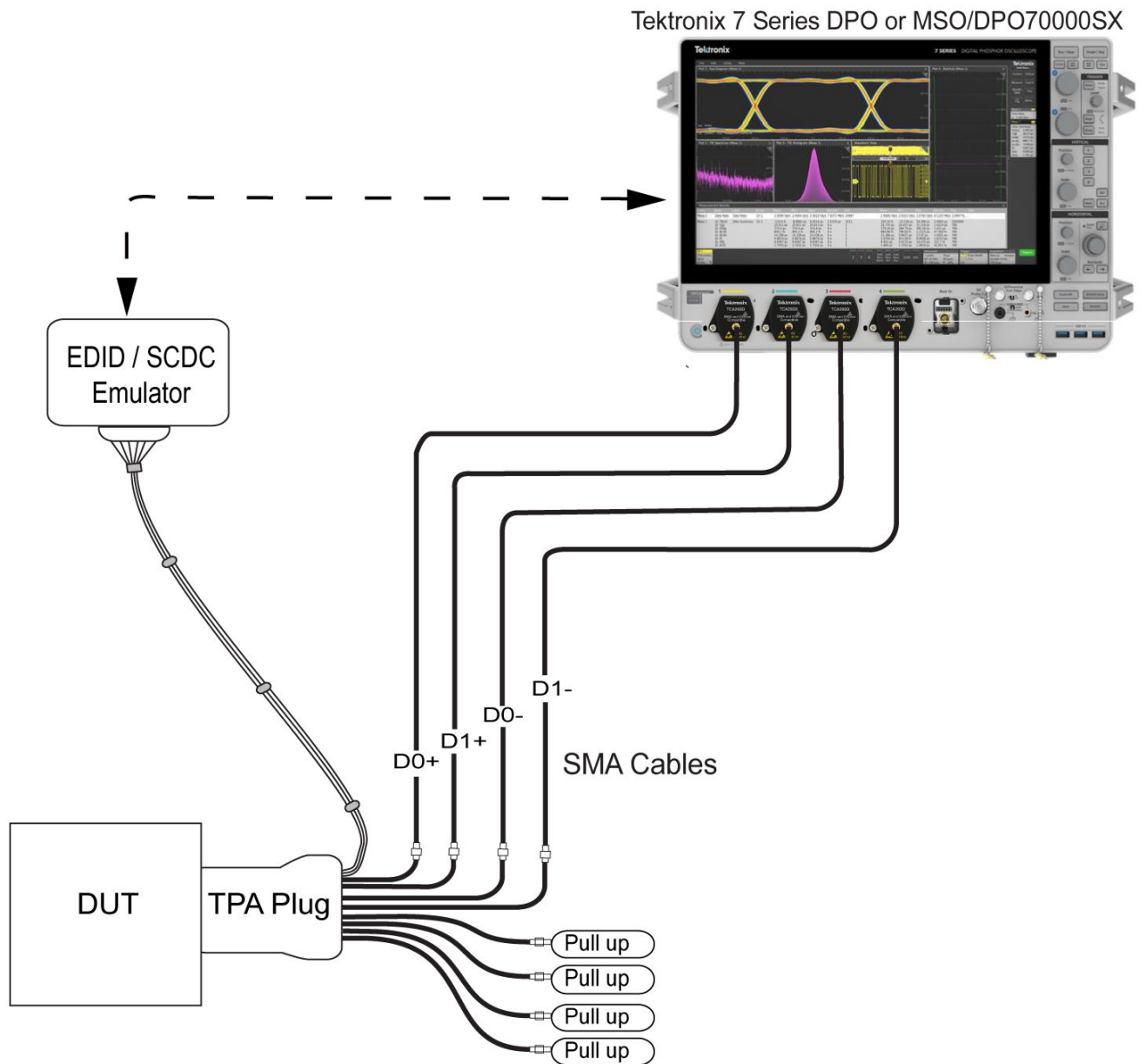
All the tests can be performed by connecting the equipments in probe configuration or stack configuration.

Tektronix 7 Series DPO



1506-007

Probe configuration



Note: Pull up - Connect all unoccupied lanes to a biased 50 Ω termination.

1506-008

See also

[Supported instruments](#) (on page 11)

Prerequisite

Compensate the signal path

Use the following procedure to compensate the internal signal acquisition path. Perform this procedure if the ambient temperature has changed more than 5 °C (9 °F) since you performed the last signal path compensation. Perform the signal path compensation once a week. Failure to do so may result in the instrument not meeting warranted performance levels.

1. Power on and wait for the instrument to complete its warm up period before continuing with this procedure.
2. Disconnect any probes you have connected to the input channels.
3. Set the instrument to Menu mode.
4. Select Instrument Calibration from the Utilities menu.
5. Note any instructions that appear in the resulting control window.
6. Click Run SPC to begin the procedure. The procedure may take several minutes to complete.
7. Verify that the Status changes to Compensated after the procedure is complete. If the Calibration Status field indicates anything other than Compensated, see Signal Path Compensation Status for information on the readout and recommended action.

NOTE: When making measurements at vertical scale settings less than or equal to 5 mV, you should perform the signal path compensation at least once a week. Failure to do so may result in the instrument not meeting warranted performance levels at those volts/div settings.

Deskew

If skew is present between positive and negative channels, then the channels need to be deskewed before being used for waveform measurements. TekExpress FRL provides support for channel deskew and attenuation using the following method:

There are no different types of deskew methods. These are the pre-requisites that need to be performed before running the measurements.

For source:

1. Stack deskew :
 - a. Perform scope SPC
 - b. Perform scope channel deskew
2. Probe deskew :
 - a. Perform scope SPC
 - b. Probe DC Compensation

Running tests

[Select tests](#) (on page 28), [Set acquisition parameters](#) (on page 30), [Set configuration tab parameters](#) (on page 36), [Set test notification preferences](#) (on page 41), and click **Start** to run the tests. While tests are running, you cannot access the Setup or Reports panels. To monitor the test progress, switch between the Status panel and the Results panel.

While the tests are running, other applications may display windows in the background. The TekScope application takes precedence over other applications, but you can switch to other applications by using **Alt + Tab** key combination. To keep the TekExpress FRL application on top, select **Keep On Top** from the TekExpress Options menu.

Once the test execution is completed, the application displays the report.

Prerun checklist:

1. Make sure that the instruments are warmed up (approximately 20 minutes) and stabilized.
2. Perform compensation: In the oscilloscope main menu, select **Utilities**→ **Instrument Compensation**. Click **Help** in the compensation window for steps to perform instrument compensation.

Saving and recalling test setup

Test setup files overview

Saved test setup information (such as the selected oscilloscope, general parameters, acquisition parameters, measurement limits, waveforms (if applicable), and other configuration settings) are saved under the setup name at **X:\FRL**.

Use test setups to:

- Run a new session, acquiring live waveforms, using a saved test configuration.
- Create a new test setup using an existing one.
- View all the information associated with a saved test, including the log file, the history of the test status as it executed, and the results summary.
- Run a saved test using saved waveforms.

See also

[Save a test setup](#) (on page 59)

[Open \(load\) a saved test setup](#) (on page 59)

Save a test setup

You can save a test setup before or after running a test. You can create a test setup from [Create a test setup using an existing one](#) (on page 60), or using [Create a test setup from default settings](#) (on page 59). When you select the default test setup, the parameters are set to the application's default value.

Select **Options > Save Test Setup** to save the opened setup.

Select **Options > Save Test Setup As** to save the setup with different name.

Open (load) a saved test setup

To Open (load) a saved test setup, do the following:

1. Select **Options > Open Test Setup**.
2. Select the setup from the list and click **Open**. Setup files are located at **X:\FRL**.

See also

[Test setup files overview](#) (on page 59)

[Create a test setup using an existing one](#) (on page 60)

[Create a test setup from default settings](#) (on page 59)

Create a test setup from default settings

To create a test setup using default settings, follow the steps:

1. Select **Options > Default Test Setup**. For default test setup, the parameters are set to the application's default value.
2. Click application [Setup panel](#) (on page 22) and set the parameters
3. Click application [Reports panel](#) (on page 47) and set the report options
4. Optional: Click **Start** to run the test and verify that it runs correctly and captures the specified test information and reports. If it does not, then edit the parameters and repeat this step until the test runs to your satisfaction
5. Select **Options > Save Test Setup**. Enter the file name and click Save. The application saves the file to X:\FRL\<session_name>

Create a test setup using an existing one

To create a test setup using an existing one, follow the steps:

1. Select **Options > Open Test Setup**
2. Select a setup from the list and then click **Open**
3. Click application [Setup panel](#) (on page 22) and modify the parameters
4. Click application [Reports panel](#) (on page 47) and modify the report options
5. Select **Options > Save Test Setup As**
6. Enter test setup name, and click **Save**

FRL source tests

Required test equipment

[Equipment connection setup for source](#) (on page 55)

[Supported instruments](#) (on page 11)

HDMI 2.1 source test measurements

- HFR1-1: DC Common Mode
- HFR1-2: VSE_Max, VSE_Min
- HFR1-3: Slew Rate
- HFR1-4: Inter-Pair Skew
- HFR1-5: FRL Rates
- HFR1-6: Random Jitter
- HFR1-7: Data Lane Eye Diagram
- HFR1-8: AC Common Mode Noise
- HFR1-9: FFE Monotonicity

NOTE: The method of implementation (MOI) for the measurements can be accessed from the HDMI forum, by accessing [HDMI 2.1 MOI](#).

HDMI 2.2 source test measurements

- HFB1-1: DC Common Mode Voltage for 16, 20, 24 Gbps FRL Rates
- HFB1-2: VSE_Max, VSE_Min for 16, 20, 24 Gbps FRL Rates
- HFB1-3: Slew Rate for 16, 20, 24 Gbps FRL Rates
- HFB1-4: Inter-Pair Skew for 16, 20, 24 Gbps FRL Rates
- HFB1-5: FRL Rates Above 12Gbps
- HFB1-6: Random Jitter and Uncorrelated Deterministic Jitter for 16, 20, 24 Gbps FRL Rates
- HFB1-7: Data Lane Eye Diagram for 16, 20, 24 Gbps FRL Rates
- HFB1-8: AC Common Mode Noise for 16, 20, 24 Gbps FRL Rates
- HFB1-9: FFE Monotonicity for 16, 20, 24 Gbps FRL Rates

NOTE: The method of implementation (MOI) for the measurements can be accessed from the HDMI forum, by accessing [HDMI 2.2 MOI](#).

SCPI commands

About SCPI command

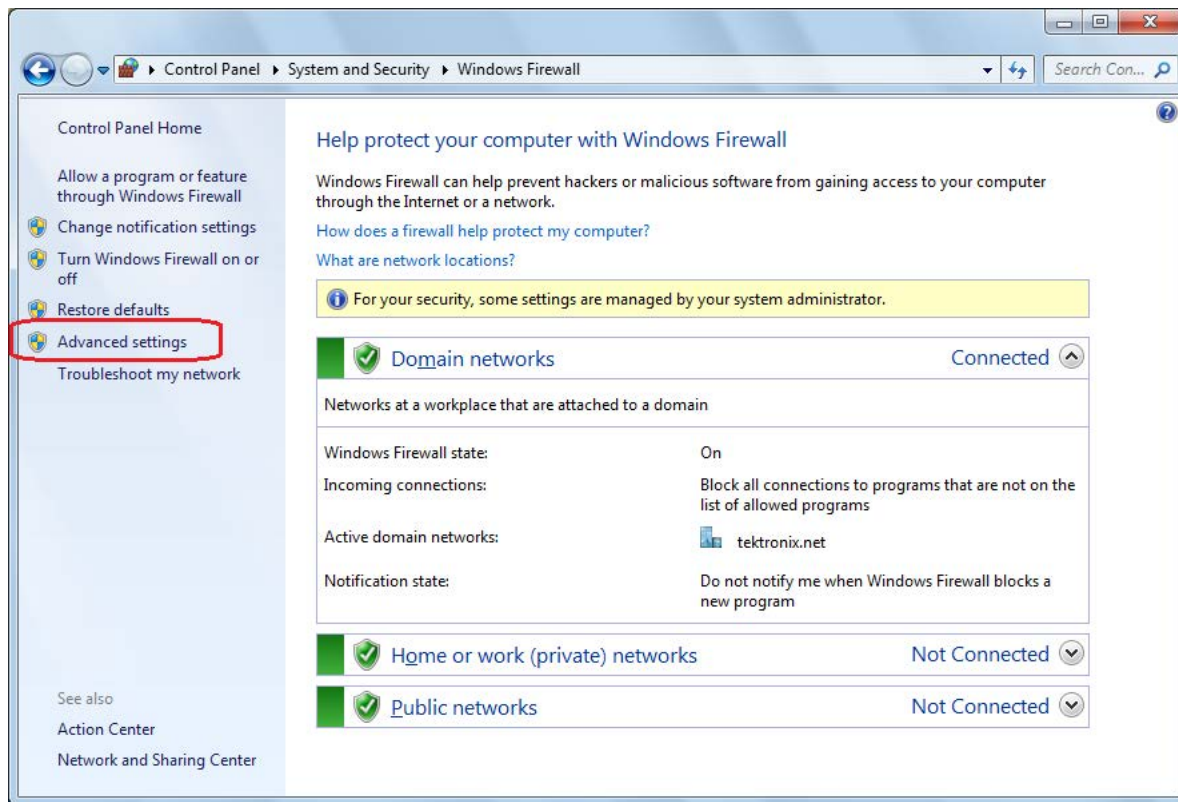
You can use Standard Commands for Programmable Instruments (SCPI) to communicate with the TekExpress application.

Socket configuration for SCPI commands

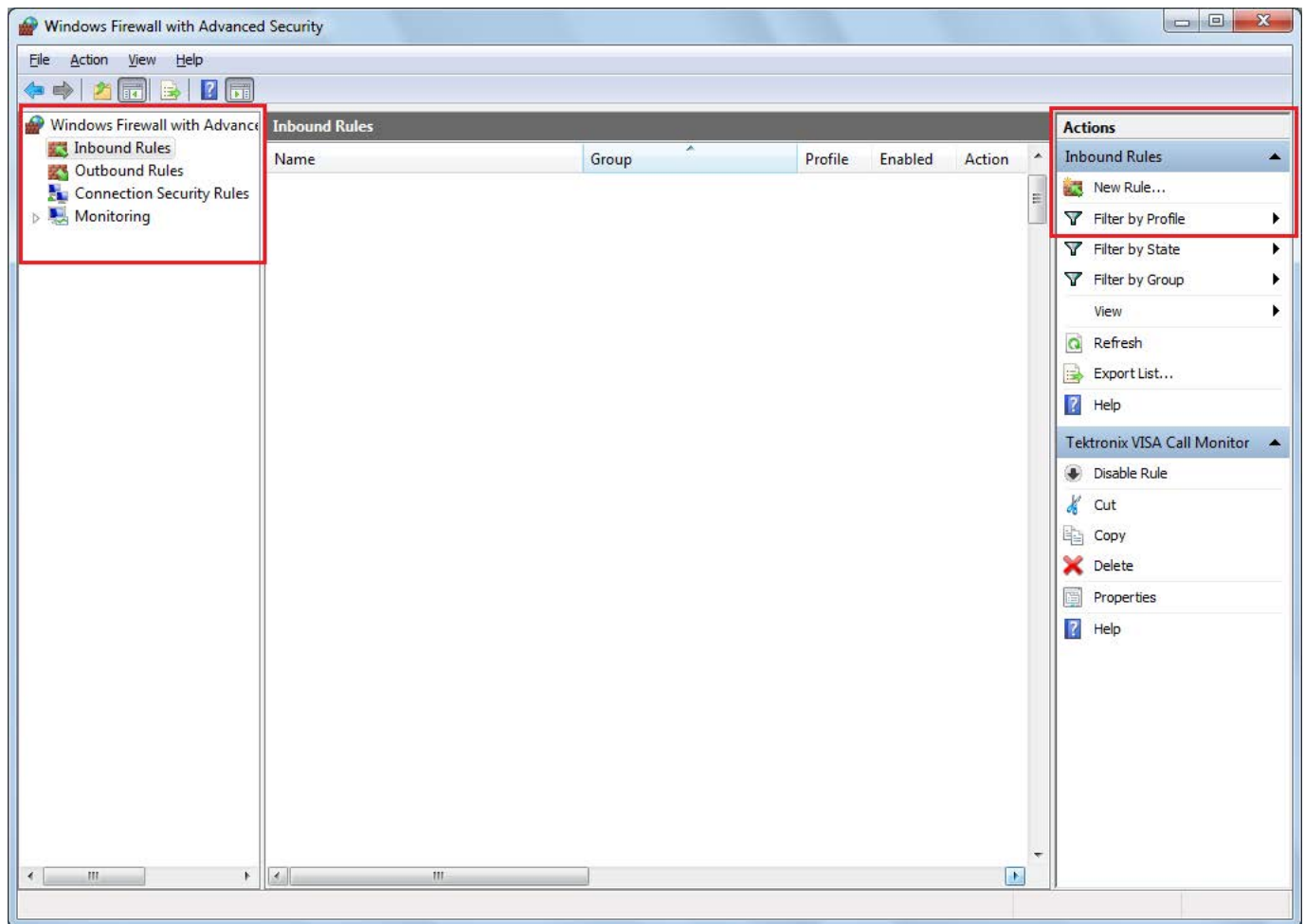
This section describes the steps for TCP/IP socket configuration and TekVISA configuration to execute the SCPI commands.

TCP/IP socket configuration

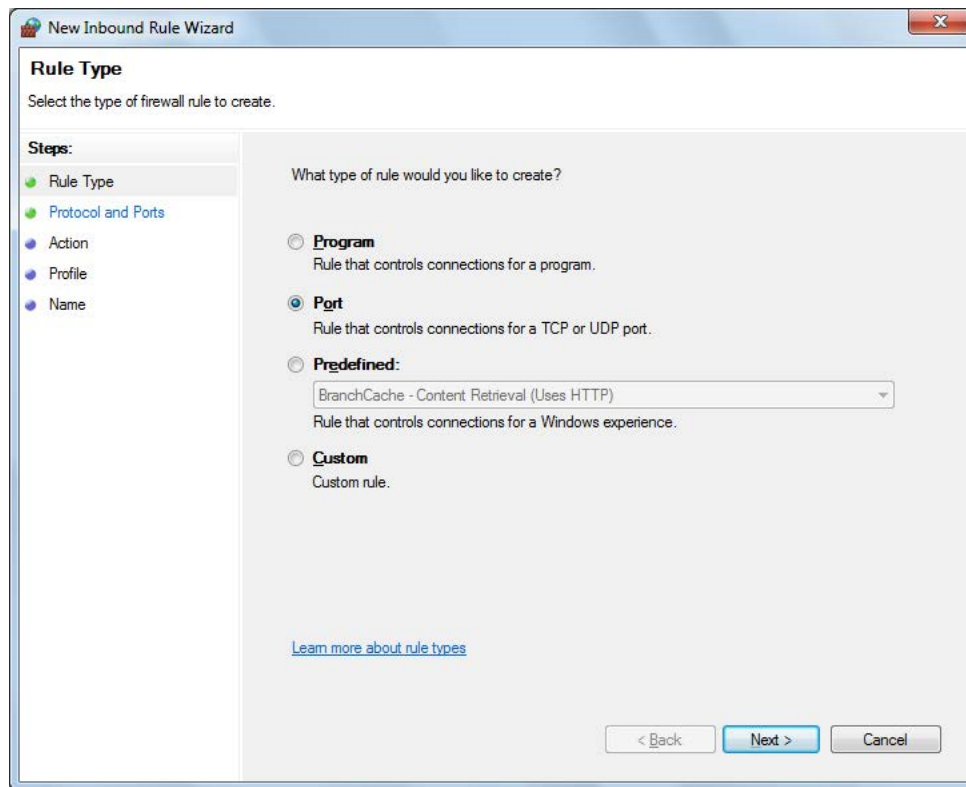
1. Click **Start**→ **Control Panel**→ **System and Security**→ **Windows Firewall**→ **Advanced settings**.



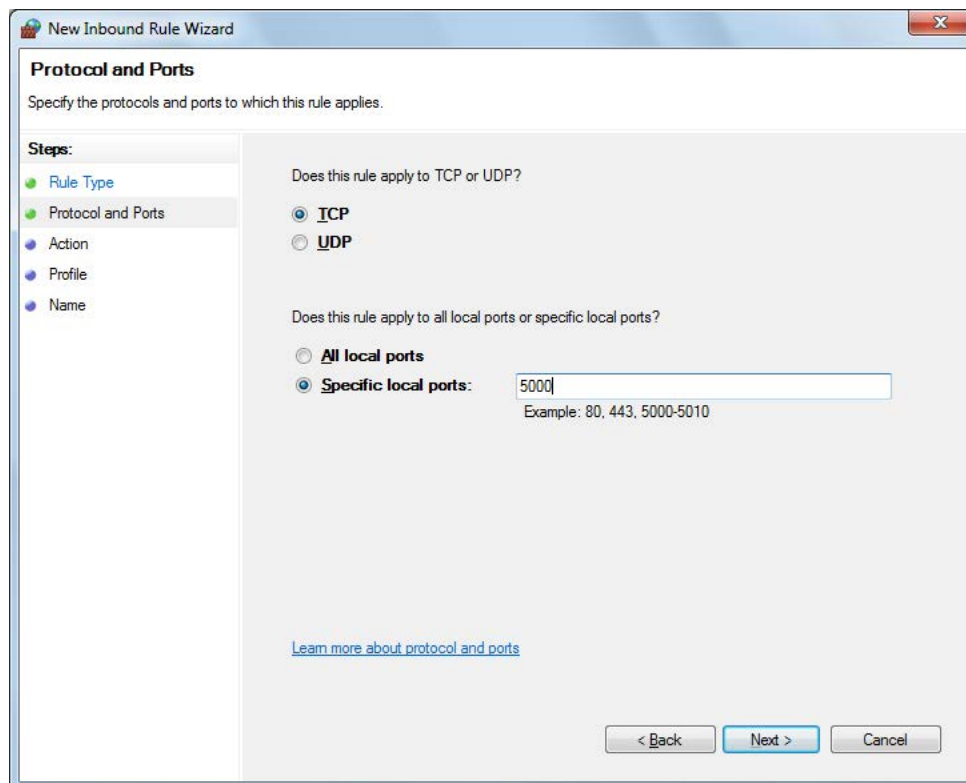
2. In Windows Firewall with Advanced Security menu, select **Windows Firewall with Advanced Security on Local Computer**→ **Inbound Rules** and click New Rule...



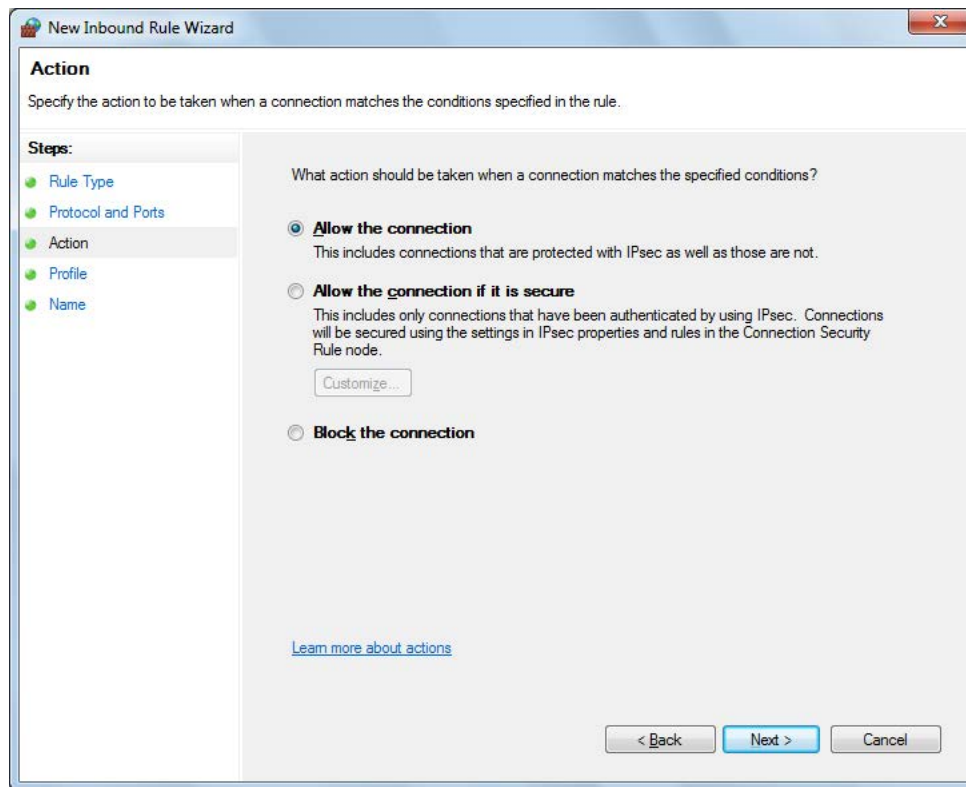
3. In New Inbound Rule Wizard menu
 - a. Select **Port** and click **Next**.



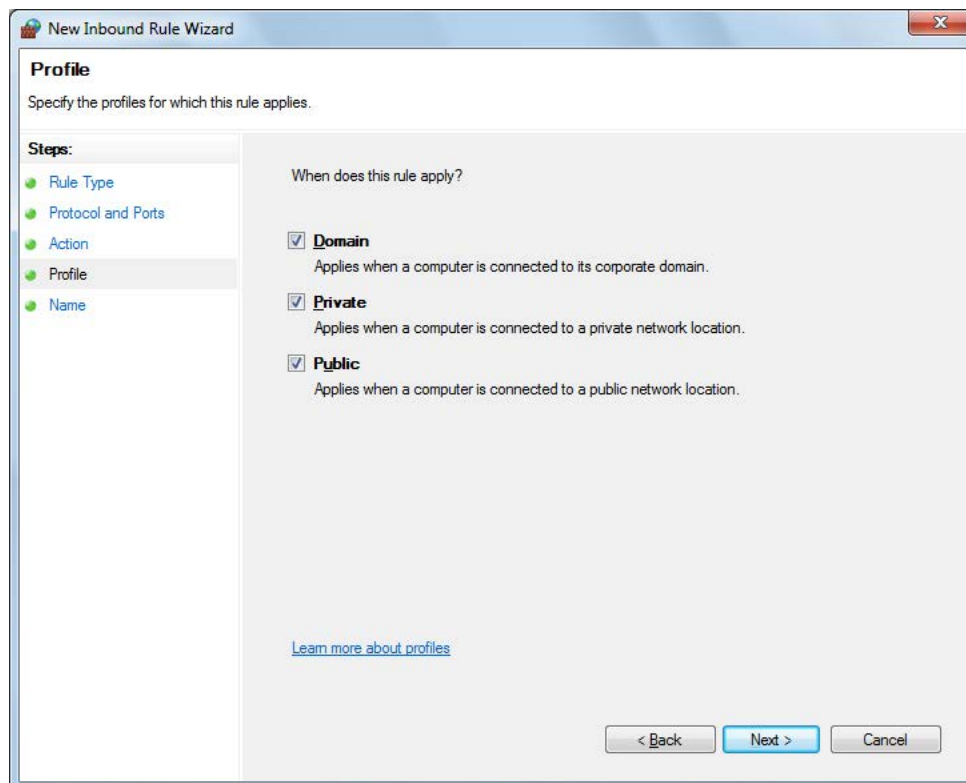
- b. Select **TCP** as rule apply and enter 5000 for **Specific local ports** and click **Next**.



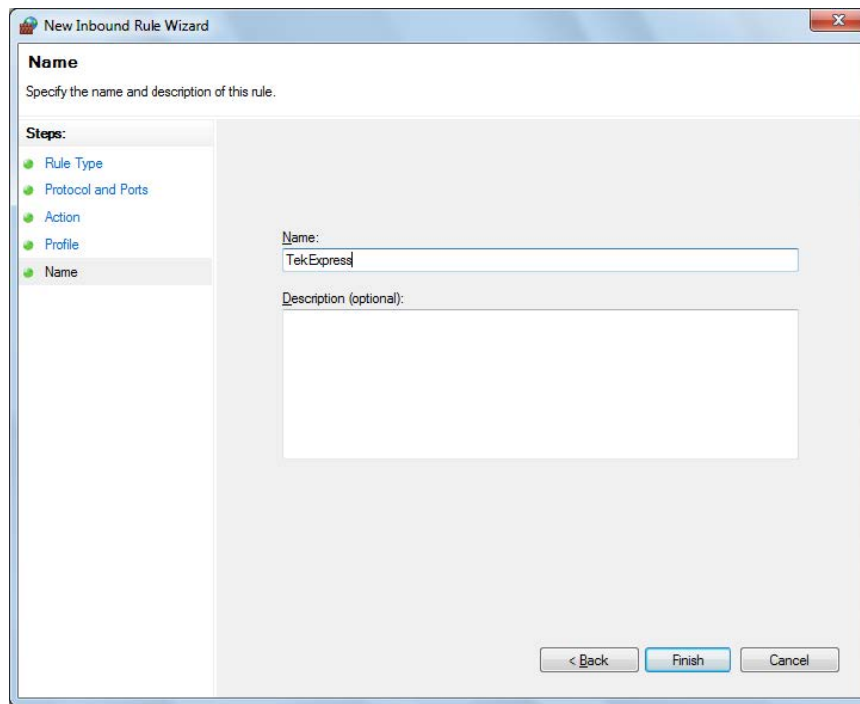
- c. Select **Allow the connection** and click **Next**.



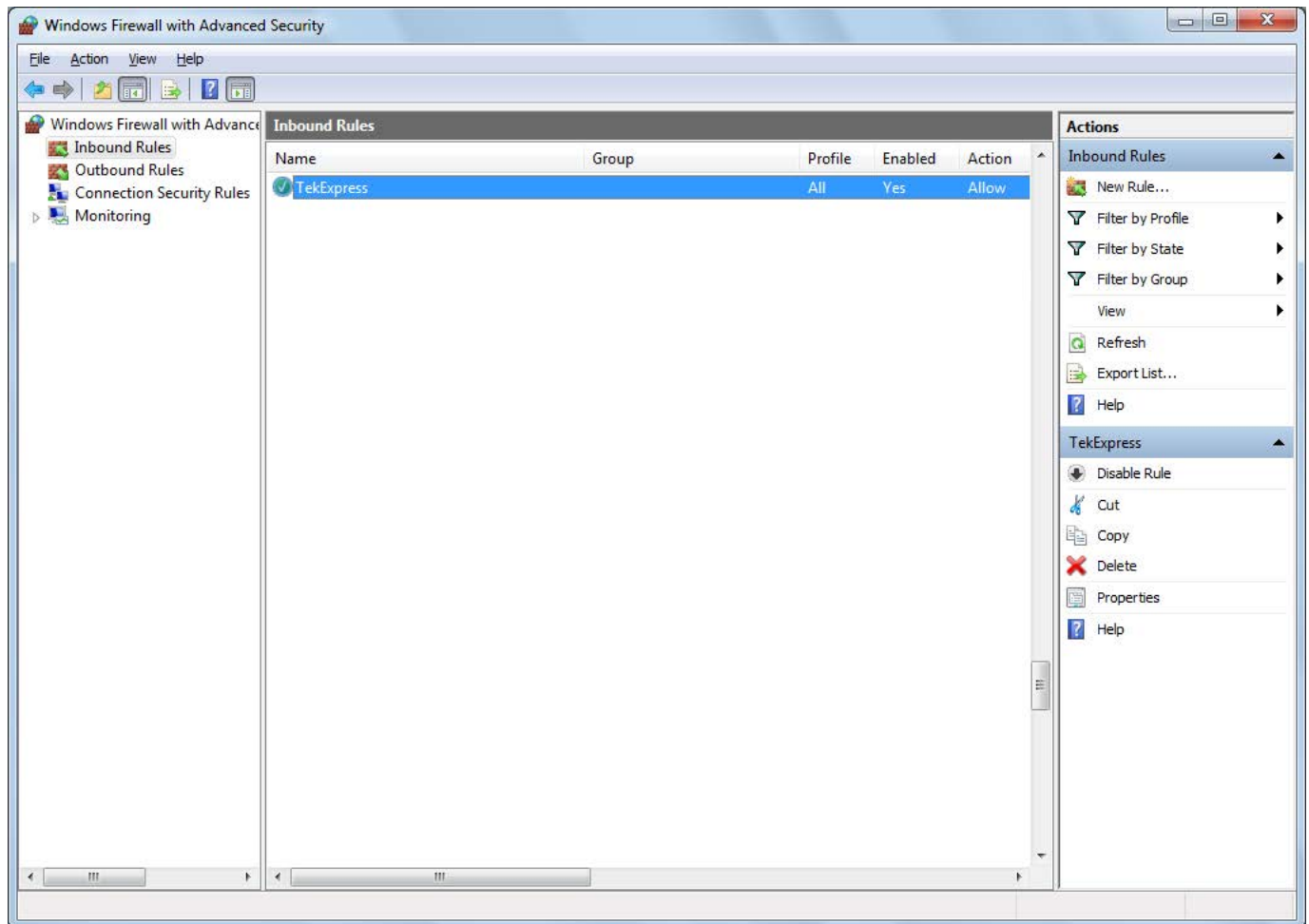
d. Select **Domain**, **Private**, **Public** and click **Next**.



e. Enter **Name**, Description (optional), and click **Finish**.

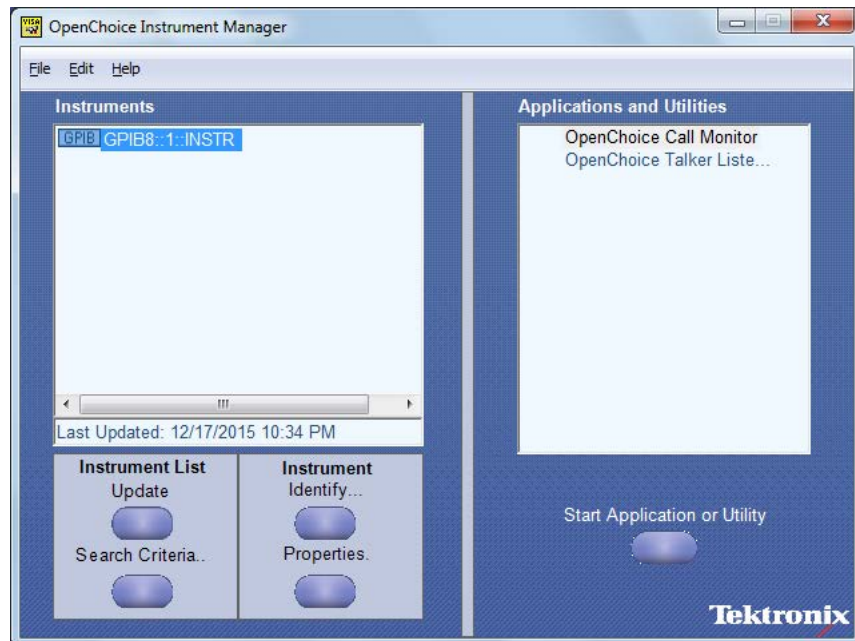


4. Check whether the Rule name is displayed in **Windows Firewall with Advanced Security** menu→ **Inbound Rules**.



TekVISA configuration

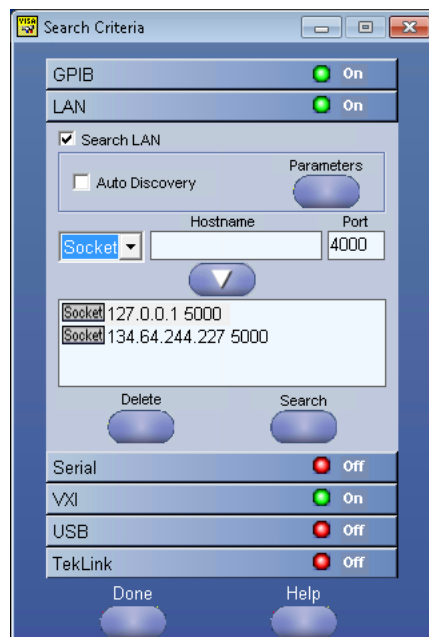
1. Click **Start**→ **All Programs**→ **TekVISA**→ **OpenChoice Instrument Manager**.



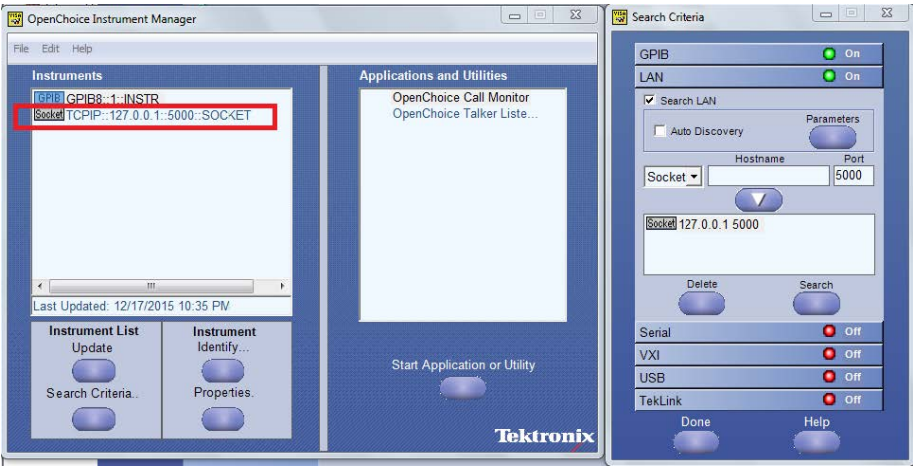
2. Click **Search Criteria**. In Search Criteria menu, click **LAN** to Turn-on. Select **Socket** from the drop-down list, enter

the IP address of the TekExpress device in **Hostname** and type **Port** as 5000. Click  to configure the IP address with Port.

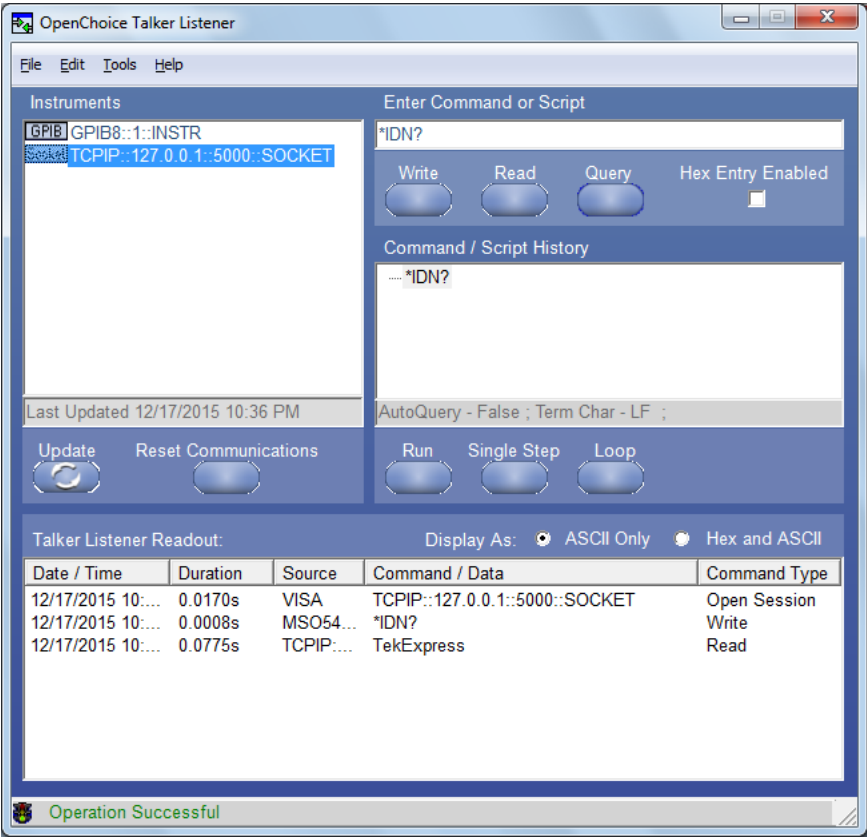
Enter the Hostname as 127.0.0.1 if the TekVISA and TekExpress application are in the same system, else enter the IP address of the TekExpress application system.



3. Click **Search** to setup the TCP/IP connection with the host. Check whether the TCP/IP host name is displayed in **OpenChoice Instrument Manager**→ **Instruments**.



4. Double-click **OpenChoice Talker Listener** and enter the Command ***IDN?** in command entry field and click **Query**. Check that the Operation is successful and Talker Listener Readout displays the Command / Data.



TEKEXP:*IDN?

This command queries the active TekExpress application name running on the oscilloscope.

Syntax

TEKEXP:*IDN?\n

Inputs

NA

Outputs

Returns active TekExpress application name running on the oscilloscope.

TEKEXP:*OPC?

This command queries the execution status of the last executed command.

Syntax

```
TEKEXP:*OPC?\n
```

Inputs

NA

Outputs

0 - last command execution is not complete

1 - last command execution is complete

TEKEXP:ACQUIRE_MODE

This command sets the acquire mode as live or pre-recorded.

Syntax

```
TEKEXP:ACQUIRE_MODE {LIVE | PRE-RECORDED}\n
```

Inputs

```
{LIVE | PRE-RECORDED}
```

Outputs

NA

TEKEXP:ACQUIRE_MODE?

This command queries the acquire mode type.

Syntax

```
TEKEXP:ACQUIRE_MODE?\n
```

Inputs

NA

Outputs

```
{LIVE | PRE-RECORDED}
```

TEKEXP:EXPORT

This command returns all the bytes of data to the specified file.

Syntax	Outputs
TEKEXP:EXPORT REPORT\n	Returns the report file in bytes
TEKEXP:EXPORT WFM, "<FileName>"\n	Returns the specified waveform file in bytes
TEKEXP:EXPORT IMAGE, "<FileName>"\n	Returns the specified image file in bytes

Inputs

FileName - Specifies the file name

TEKEXP:INFO?

This command queries the information about the file(s).

Syntax	Outputs
TEKEXP:INFO? REPORT\n	<ReportFileSize>,"<ReportFileName.mht>"
TEKEXP:INFO? WFM\n	<WfmFile1Size>,"<WfmFileName1.wfm>";<WfmFile2Size>,"<WfmFileName2.wfm>";...
TEKEXP:INFO? IMAGE\n	<Image1FileSize>,"<Image1FileName>";<Image2FileSize>,"<Image2FileName>" ;...

TEKEXP:INSTRUMENT

This command sets the value for the selected instrument type.

Syntax

TEKEXP:INSTRUMENT "<InstrumentType>",<Value>"\n

Inputs

InstrumentType

Value

NOTE: Check Command parameters list section for InstrumentType and Value parameters.

Outputs

NA

TEKEXP:INSTRUMENT?

This command queries the instrument selected for the specified instrument type.

Syntax

TEKEXP:INSTRUMENT? "<InstrumentType>"\n

Inputs

InstrumentType

NOTE: Check *Command parameters list* section for InstrumentType parameters.

Outputs

Returns the instrument selected for the specified instrument type

TEKEXP:LASTERROR?

This command queries the last error string occurred for the current TCP session. If there are no errors since startup, or since the last call to TEKEXP:LASTERROR?, this command returns an empty string.

Syntax

TEKEXP:LASTERROR?\n

Inputs

NA

Outputs

<string>

TEKEXP:LIST?

This command queries the list of available device, suite, test, version or instrument.

Syntax	Outputs
TEKEXP:LIST? DEVICE\n	Returns the list of available device(s) as comma separated values.
TEKEXP:LIST? SUITE\n	Returns the list of available suite(s) as comma separated values.
TEKEXP:LIST? TEST\n	Returns the list of available test(s) as comma separated values.
TEKEXP:LIST? VERSION\n	Returns the list of available version(s) as comma separated values.
TEKEXP:LIST? INSTRUMENT,"<InstrumentType>"\n	Returns the list of available instruments' for the given Instrument type as comma separated values.

NOTE: This command returns the list of items within double quotes (""). Iterate the receive procedure until the list ends with double quotes otherwise the next query commands won't work as expected.

Inputs

InstrumentType

NOTE: Check Command parameters list section for InstrumentType parameters.

TEKEXP:MODE

This command sets the execution mode as compliance or user defined.

Syntax

```
TEKEXP:MODE {COMPLIANCE | USER-DEFINED}\n
```

Inputs

```
{COMPLIANCE | USER-DEFINED}
```

Outputs

NA

TEKEXP:MODE?

This command queries the execution mode type.

Syntax

```
TEKEXP:MODE?\n
```

Inputs

NA

Outputs

```
{COMPLIANCE | USER-DEFINED}
```

TEKEXP:POPUP

This command sets the response to the active popup shown in the application.

Syntax

```
TEKEXP:POPUP "<PopupResponse>"\n
```

Inputs

PopupResponse

Outputs

NA

TEKEXP:POPUP?

This command queries the active popup information shown in the application.

Syntax

```
TEKEXP:POPUP?\n
```

Inputs

Application Help

NA

Outputs

Returns the active popup information in the application.

TEKEXP:REPORT

This command generates the report for the current session.

Syntax

TEKEXP:REPORT GENERATE\n

Inputs

GENERATE

Outputs

NA

TEKEXP:REPORT?

This command queries the queried header field value in the report.

Syntax

TEKEXP:REPORT? "<HeaderField>"\n

Inputs

HeaderField - Specifies to return the measured value for the indicated test.

NOTE: Check **Report** for HeaderField parameters.

Outputs

Returns the queried header field value in the report

TEKEXP:RESULT?

This command queries the result available in report summary/details table.

Syntax	Outputs
TEKEXP:RESULT? "<TestName>"\n	Return Pass/Fail status of the test.
TEKEXP:RESULT? "<TestName>","<ColumnName>"\n	Returns all the row values of the specified column for the test.
TEKEXP:RESULT? "<TestName>","<ColumnName>",<RowNumber>\n	Returns the column value for the specified row number

Inputs

TestName - Specifies the name of the test for which to obtain the test result value.

ColumnName - Specifies the column name for the measurement

RowNumber - Specifies the row number of the measurement

NOTE: Check **Results** panel for TestName, ColumnName, and RowNumber parameters.

TEKEXP:SELECT

This command selects the device, suite, version, or test.

Syntax

```
TEKEXP:SELECT <string1>,<string2>,<string4>\n
TEKEXP:SELECT TEST,<string3>,<string4>\n
```

Inputs

- <string1> = {DEVICE | SUITE | VERSION}
- <string2> = {DeviceName | SuiteName | VersionName}
- <string3> = {"<TestName>"| ALL| REQUIRED }
- <string4> = {TRUE | FALSE}

NOTE: Check Command parameters list section for DeviceName, SuiteName, VersionName, and TestName parameters.

Outputs

NA

TEKEXP:SELECT?

This command queries the name of the selected device, suite, version, or test.

Syntax

```
TEKEXP:SELECT? {DEVICE | SUITE | TEST | VERSION}\n
```

Inputs

```
{DEVICE | SUITE | TEST | VERSION}
```

Outputs

Returns the name of the selected device, suite, version, or test.

TEKEXP:SETUP

This command sets the value of the current setup.

Syntax	Outputs
TEKEXP:SETUP DEFAULT\n	Restore to default Setup
TEKEXP:SETUP OPEN,"<SessionName>"\n	Open the session
TEKEXP:SETUP SAVE\n	Saves the already existing modified session

Syntax	Outputs
TEKEXP:SETUP SAVE,"<SessionName>"\n	Save the session

Inputs

SessionName - The name of the session

TEKEXP:STATE

This command sets the execution state of the application.

Syntax

```
TEKEXP:STATE {RUN | STOP | PAUSE | RESUME}\n
```

Inputs

```
{RUN | STOP | PAUSE | RESUME}
```

Outputs

NA

TEKEXP:STATE?

This command queries the current setup state.

Syntax	Outputs
TEKEXP:STATE?	RUNNING PAUSED WAIT ERROR READY
TEKEXP:STATE? SETUP	SAVED NOT_SAVED

TEKEXP:VALUE

This command sets the value of parameters of type General, Acquire, Analyze, or DUTID.

Syntax

```
TEKEXP:VALUE GENERAL,"<ParameterName>","<Value>"\n
```

```
TEKEXP:VALUE ACQUIRE,"<TestName>","<AcquireType>","<ParameterName>","<Value>"\n
```

```
TEKEXP:VALUE ANALYZE,"<TestName>","<ParameterName>". "<Value>"\n
```

```
TEKEXP:VALUE DUTID,"<Value>"\n
```

```
TEKEXP:VALUE VERBOSE,{TRUE | FALSE}\n
```

```
TEKEXP:VALUE WFMFILE,<Test_Name>,<Acquire_Type>,<FileName1$FileName2>\n
```

Inputs

ParameterName - Specifies the parameter name

TestName - Specifies the test name

AcquireType - Specifies the acquire type

Value - Specifies the value to set

FileName1\$FileName2 - Specifies the waveform file name

TRUE - Pop-ups are enabled

FALSE - Pop-ups are disabled

NOTE: Check Command parameters list section for ParameterName, AcquireType, and Value parameters.

Outputs

NA

TEKEXP:VALUE?

This command queries the value of the parameter for type General, Acquire, Analyze, or DUTID.

Syntax	Outputs
TEKEXP:VALUE? GENERAL, "<ParameterName>"\n	Returns the value of Parameter for type GENERAL
TEKEXP:VALUE? ACQUIRE, "<TestName>", "<AcquireType>", "<ParameterName>"\n	Returns the value of Parameter for type ACQUIRE
TEKEXP:VALUE? ANALYZE, "<TestName>", "<ParameterName>"\n	Returns the value of Parameter for type ANALYZE
TEKEXP:VALUE? DUTID\n	Returns the DUTID value
TEKEXP:VALUE? WFMFILE, <Test_Name>, <Acquire_Type>\n	Returns the waveform file name
TEKEXP:VALUE? VERBOSE	Returns the verbose mode type

Inputs

ParameterName - Specifies the parameter name

TestName - Specifies the test name

AcquireType - Specifies the acquire type

TRUE - Pop-ups are enabled

FALSE - Pop-ups are disabled

NOTE: Check *Command parameters list* section for ParameterName and AcquireType parameters.

Outputs

Returns the value of Parameter for type GENERAL | ACQUIRE | ANALYZE | DUTID.

Command parameters

This section provides the parameters list for the SCPI commands.

Specifies the Parameter Name and Value for DUT, Test selection, Acquisition, Configuration and Preferences tabs.

Parameters	Description	
	HDMI 2.1	HDMI 2.2
DUT ID	Specifies the value parameters For DUTID, valid value is: Comment	
Acquiremode	Specifies the acquire mode parameters - Acquire live waveforms - Use pre-recorded waveform files	
Version	CTS 2.1	CTS 2.2
Suite	Source	
Device Profile		
Data Rate	For 3 Gbps, 6 Gbps, 8 Gbps, 10 Gbps, and 12 Gbps: - TRUE - FALSE	For 16 Gbps, 20 Gbps, and 24 Gbps: - TRUE - FALSE
Data Rate to run Minimum (Gbps)	3	Not applicable
Data Rate to run Maximum (Gbps)	12	Not applicable
Vterm(V)	0 to 3.4	
EDID/SCDC Controller	None	- Allion - Allion 1x - Wilder - None
Signal Validation	- Prompt me if Signal Check Fails - Skip Test if Signal Check Fails - Turn Off Signal Check	
Multi-Lane (Setup)	- Lane 0 - Lane 1 - Lane 2 - Lane 3	
FFE level	Not applicable	0 to 7

Parameters	Description	
	HDMI 2.1	HDMI 2.2
Set for cable ID	Not applicable	▪ With ▪ Without ▪ Both
Set FLT update after LTS3	Not applicable	▪ TRUE ▪ FALSE
EDID Change	Not applicable	▪ No Change ▪ Only Max FRL rate ▪ Default

Parameter name and value for Test Selection tab

Parameters	Description	
	HDMI 2.1	HDMI 2.2
Source	Specifies the following test measurement name : • HFR1-1: DC Common Mode Voltage • HFR1-2: Vse_max ,Vse_min • HFR1-3: Rise/Fall Slew Rate • HFR1-4: Inter-Pair Skew • HFR1-5: FRL Rates • HFR1-6: Data Jitter(RJ) • HFR1-7: Data Eye Diagram • HFR1-8: AC Common Mode Voltage • HFR1-9: FFE Monotonicity-Method 1 • HFR1-9: FFE Monotonicity-Method 2	Specifies the following test measurement name: • HFB1-1: DC Common Mode Voltage • HFB1-2: Vse_max, Vse_min • HFB1-3: Rise_Fall Slew Rate • HFB1-4: Inter-Pair Skew • HFB1-5: Rates • HFB1-6: RJ and UDJ • HFB1-6: Data Jitter (Rj)WCM • HFB1-6: Data Jitter (Rj)SCM • HFB1-6: UDJ • HFB1-7: HFB Data Eye Diagram • HFB1-7: Data Eye Diagram WCM • HFB1-7: Data Eye Diagram SCM • HFB1-8: AC Common Mode Voltage • HFB1-9: FFE • HFB1-9: FFEMethod2

Parameter name and value for Acquisitions tab

Parameters	Description
Acquisition Options	▪ Acquire all and analyze ▪ Acquire only
Waveform Options	▪ Retain ▪ Delete
Show Acquire Parameters	▪ TRUE ▪ FALSE

Parameter name and value for Preferences tab

Parameters	Description
Number of Runs	
Acquire/Analyze each test	▪ TRUE ▪ FALSE 1 to 1000 times
Popup Settings	

Parameters	Description
Auto close Warnings and informations during Sequencing	▪ TRUE ▪ FALSE Specify the value in seconds
Auto close Error Messages during Sequencing. Show in Reports	▪ TRUE ▪ FALSE Specify the value in seconds
Show messages with a beep sound	▪ TRUE ▪ FALSE

Parameter name and value for general

Parameters	Description
Generate new report	▪ TRUE ▪ FALSE
Append with previous run session	▪ TRUE ▪ FALSE
Replace current test results	▪ TRUE ▪ FALSE • in previous run, current session • in any run, any session
Include Header in appended reports	▪ TRUE ▪ FALSE
Save As Type	▪ Web Archive (*.mht;*.mhtml) ▪ PDF (*.pdf) ▪ CSV (*.csv)
Auto increment report name if duplicate	▪ TRUE ▪ FALSE
Create report automatically at the end of the run	▪ TRUE ▪ FALSE
Include pass/fail results Summary	▪ TRUE ▪ FALSE
Include detailed results	▪ TRUE ▪ FALSE
Include plot images	▪ TRUE ▪ FALSE
Include setup configuration	▪ TRUE ▪ FALSE

Parameters	Description
Include user comments	▪ TRUE ▪ FALSE
Margin value in percentage	▪ TRUE ▪ FALSE
View report after generating	▪ TRUE ▪ FALSE
Vertical Autoset	▪ Auto ▪ Manual
Vertical Offset(V)	▪ HDMI 2.1: 0 to 4 ▪ HDMI 2.2: -5 to 5
Vertical Position(div)	▪ HDMI 2.1: -1 to 1 ▪ HDMI 2.2: -4 to 4
Vertical Scale(mV)	30 to 100
Vertical Bandwidth	▪ HDMI 2.1: 0.5 to 21 ▪ HDMI 2.2: 0.5 to 25
Horizontal Sampling Rate(GS/s)	50 to 200
Record Length	▪ HDMI 2.1: 8000000 to 16000000 ▪ HDMI 2.2: 100000000 to 125000000
Apply DE-Embed	▪ TRUE ▪ FALSE

Examples

Example	Description
Common commands	
TEKEXP: *IDN?	It returns the active TekExpress application name running on the scope.
TEKEXP: *OPC?	It returns the last command execution status.
TEKEXP: ACQUIRE_MODE PRE-RECORDED	It sets the acquire mode as pre-recorded.
TEKEXP: ACQUIRE_MODE?	It returns LIVE when acquire mode is set to live.
TEKEXP: EXPORT REPORT	It returns the report file in bytes. This can be written into another file for further analysis.
TEKEXP: INFO? REPORT	It returns "100,"ReportFileName.mht", when 100 is the filesize in bytes for the filename ReportFileName.

Example	Description
TEKEXP:INFO? WFM	It returns "100,"WfmFileName1.wfm"";200,"WfmFileName2.wfm"" when 100 is the filesize in bytes for the filename WfmFileName1.wfm and 200 is the filesize in bytes for the filename WfmFileName2.wfm.
TEKEXP:INSTRUMENT "Real Time Scope",DPO72504D (GPIB8::1::INSTR)	It sets the instrument value as DPO73304SX (GPIB8::1::INSTR) for the selected instrument type Real Time Scope.
TEKEXP:INSTRUMENT? "Real Time Scope"	It returns "DPO73304SX (GPIB8::1::INSTR), when DPO73304SX (GPIB8::1::INSTR)" is the selected instrument for the instrument type Real Time Scope.
TEKEXP:LASTERROR?	It returns ERROR: INSTRUMENT_NOT_FOUND, when no instrument is found.
TEKEXP:LIST? DEVICE	It lists the device "FRL" or "HFB".
TEKEXP:LIST? SUITE	It returns to the selected suite "Source".
TEKEXP:LIST? INSTRUMENT,"Real Time Scope"	It returns "DPO73304SX (GPIB8::1::INSTR),DPO73304SX (TCPIP::134.64.248.91::INSTR)" when DPO73304SX (GPIB8::1::INSTR), DPO73304SX (TCPIP::134.64.248.91::INSTR) are the list of available instruments.
TEKEXP:MODE?	It returns COMPLIANCE when the execution mode is compliance.
TEKEXP:POPOP "OK"	It sets OK as the response to active popup in the application.
TEKEXP:POPOP?	It returns "OK", when OK is the active popup information shown in the application.
TEKEXP:REPORT GENERATE	It generates report for the current session.
TEKEXP:REPORT? "Scope Model"	It returns "DPO73304SX" when DPO73304SX is the scope model.
TEKEXP:REPORT? "DUT ID"	It returns "DUT001" when DNI_DUT001 is the DUT ID.
TEKEXP:SELECT DEVICE,"FRL"	It selects device as "Source".
TEKEXP:SETUP DEFAULT	It restores the application to default setup.
TEKEXP:STATE STOP	It stops the test execution.
TEKEXP:STATE?	It returns as READY when the application is ready to run next measurement.
TEKEXP:STATE? SETUP	It returns as NOT_SAVED when the current setup is not saved.
TEKEXP:VALUE GENERAL, "Execute","Verify Calibration"	It selects "Verify Calibration" in the drop-down from DUT panel.
HDMI 2.1	
TEKEXP:RESULT? "HFRL-1: DC Common Mode"	It returns to Results, value "Pass" indicates that the test result is Pass.

Example	Description
TEKEXP:RESULT? "HFR1-1: DC Common Mode", "Margin"	It returns a list of values representing the Margin column data.
TEKEXP:RESULT? TEKEXP:RESULT? "HFR1-1: DC Common Mode", "Units",0	It returns the unit of the first result row.
TEKEXP:VALUE GENERAL, "3 Gbps", "False "	It selects 3 Gbps data rate in the DUT panel by deselecting the checkbox.
TEKEXP:SELECT TEST , "HFR2-1: Max Differential Swing Tolerance", True	The test "HFR2-1: Max Differential Swing Tolerance" is selected in test selection panel.
TEKEXP:SELECT TEST, "HFR1-1: DC Common Mode", TRUE	It selects "HFR1-1: DC Common Mode" measurement.
HDMI 2.2	
TEKEXP:RESULT? "HFB1-1: DC Common Mode Voltage"	It returns to Results, value "Pass" indicates that the test result is Pass.
TEKEXP:RESULT? "HFB1-1: DC Common Mode Voltage", "Margin"	It returns a list of values representing the Margin column data.
TEKEXP:RESULT? TEKEXP:RESULT? "HFB1-1: DC Common Mode Voltage", "Units",0	It returns the unit of the first result row.
TEKEXP:SELECT TEST, "HFB1-1: DC Common Mode Voltage", TRUE	It selects "HFB1-1: DC Common Mode" measurement.
TEKEXP:VALUE GENERAL, "20 Gbps", "False "	It selects 20 Gbps data rate in the DUT panel by deselecting the checkbox.
TEKEXP:SELECT TEST , "HFB1-2: Vse_max, Vse_min Differential Swing Tolerance", True	The test "HFB1-2: Vse_max, Vse_min Differential Swing Tolerance" is selected in test selection panel.
TEKEXP:VALUE GENERAL, "FFE Levels", 3	It sets the FFE level to the specified value.
TEKEXP:VALUE GENERAL, "Set for cable ID", Without	It sets the cable ID mode to the specified value.
TEKEXP:VALUE? GENERAL, "Set for cable ID"	It returns the current cable ID setting.
TEKEXP:VALUE GENERAL, "Set FLT update after LTS3", True	It enables FLT update after LTS3.
TEKEXP:VALUE GENERAL, "EDID Change", "Only Max FRL rate"	It sets the EDID change mode to the specified value.