

# D9010SFPC SFP+ and QSFP+ Compliance Test Application Software

The Keysight Technologies, Inc. D9010SFPC SFP+ and QSFP+ compliance test application provides a fast and effortless way to test, debug and characterize your SFP+ and QSFP+ Ethernet designs. The Keysight D9010SFPC SFP+ and QSFP+ Compliance Test Application Software for Infiniium real-time oscilloscopes saves you time and money by automating the task of performing compliance measurements. The tests performed by the software are based on the SFF-8431 standard. The D9010SFPC SFP+ and QSFP+ also covers tests found in the IEEE 802.3ba Annex 86A standard. Performing these tests gives you confidence in your design. The D9010SFPC SFP+ and QSFP+ Compliance Test Application Software helps you execute a wide subset of the compliance tests using an oscilloscope. The test application offers a user-friendly setup wizard and a comprehensive report that includes margin analysis.



## Transform complexity into simplicity

- Complete coverage of the SFP+ and QSFP+ transmitter electrical specifications as described in SFF-8431 standard.
- Complete coverage of the 10GSFP+Cu transmitter electrical specification as described in the SFF-8431 Revision 4.1 standard.
- Complete coverage of the XLPP1 transmitter electrical specifications as described in the IEEE802.3ba, Annex 86A standard.
- Automated measurement setup and programming of oscilloscope for increased accuracy, time-savings and repeatability.
- Automated test engine with extremely user-friendly interface, allowing you to set up instruments and select and configure tests to be run, resulting in a comprehensive report of test results with margin analysis.
- With the D9010SFPC SFP+ and QSFP+ Compliance Test Application Software, you can use the same oscilloscope you use for everyday debugging to perform automated testing and margin analysis.

## D9010SFPC SFP+ and QSFP+ Compliance Test Application Software Saves You Time

The D9010SFPC SFP+ and QSFP+ Compliance Test Application Software saves you time by setting the stage for automatic execution of SFF-8431 standard, SFF-8431 Revision 4.1 standard, and IEEE802.3ba, Annex 86A standard electrical tests. Part of the difficulty of performing electrical tests for Ethernet transmitters is properly connecting to the oscilloscope, loading the proper setup files, and then analyzing the measured results by comparing them to limits published in the specification. The Ethernet electrical compliance test application software does much of this work for you. The D9010SFPC SFP+ and QSFP+ Compliance Test Application Software automatically configures the oscilloscope for each test, and it provides an informative results report that includes margin analysis indicating how close your product is to passing or failing that test specification.

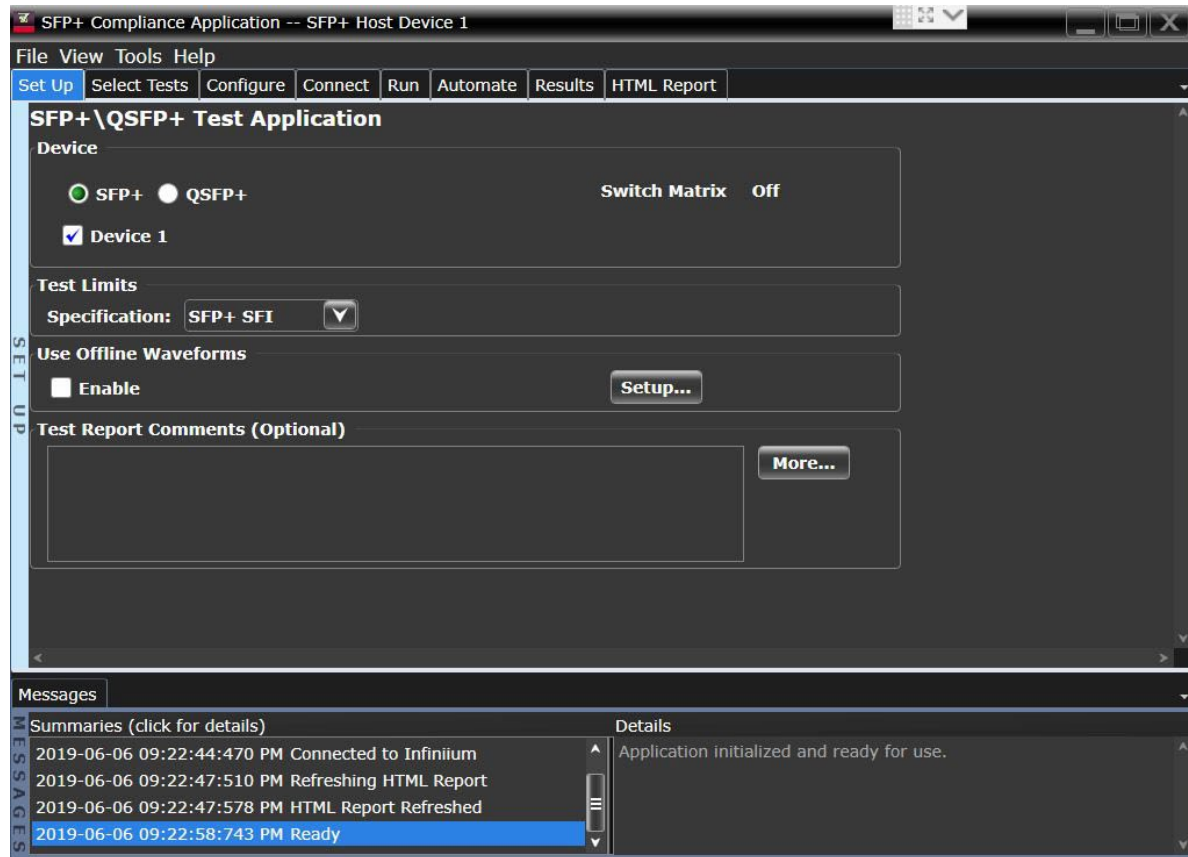


Figure 1. The clean interface of the setup page enables you to quickly make decisions and perform functions that affect the testing task. This is where you select the specification and speed of the device under test and set up your additional instruments.

## Easy test definition

The D9010SFPC SFP+ and QSFP+ Compliance Test Application Software extends the ease-of-use advantages of Keysight's Infiniium oscilloscopes to testing SFF-8431 standard, SFF-8431 Revision 4.1 standard, and IEEE802.3ba, Annex 86A designs. The Keysight automated test engine walks you quickly through the steps required to define the tests you want to make, set up the tests, perform the tests, and view the test results. A setup page enables you to quickly make decisions from the outset regarding the choice of tests and perform functions that affect the testing task. The test selections available in the following steps are then filtered according to the choices made in the setup page. While selecting tests, you can select a category of tests all at once or specify individual tests. You can save tests and configurations as project files and recall them later for quick testing and review of previous test results. Straightforward menus let you perform tests with a minimum of mouse clicks.

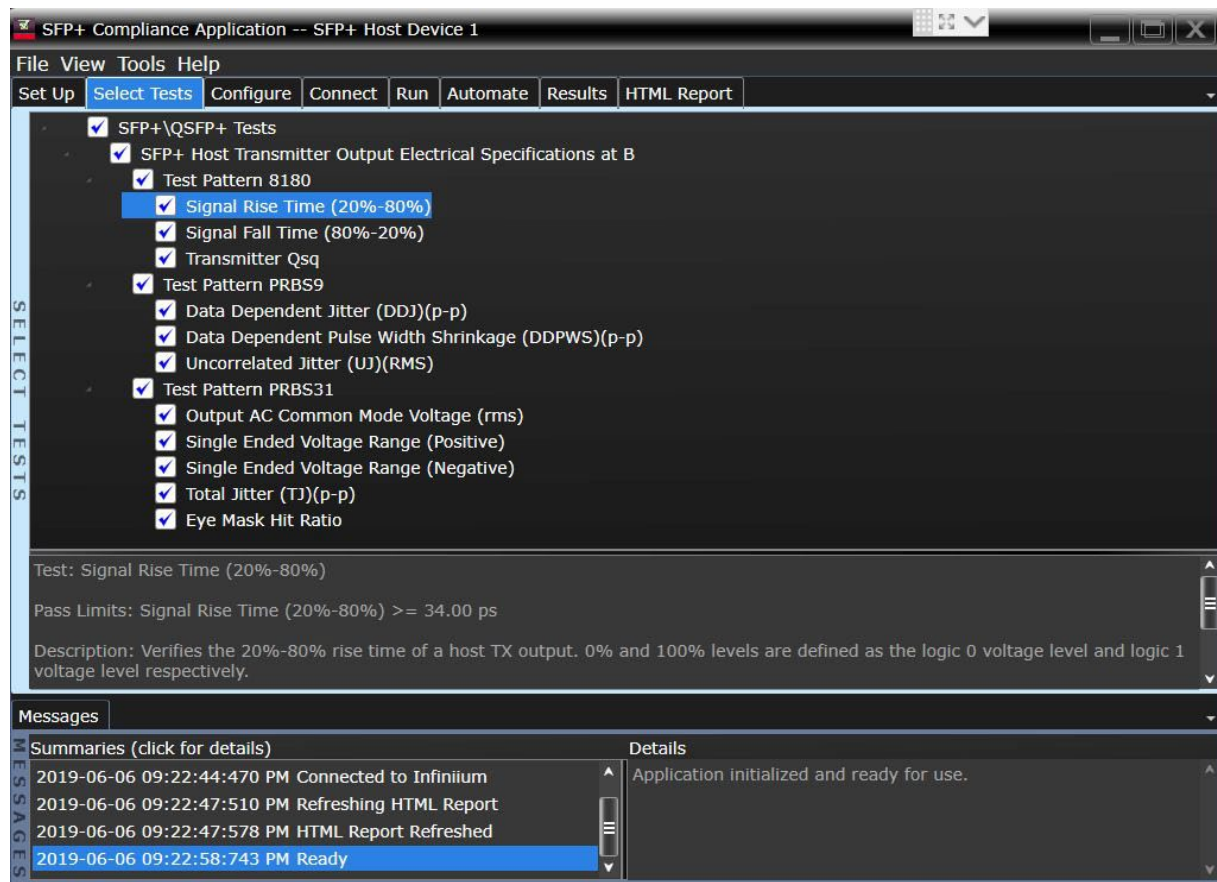


Figure 2. The Keysight automated test engine quickly guides you through selecting and configuring tests, setting up the connection, running the tests, and viewing the results. You can easily select individual tests or groups of tests with a mouse-click.

The following clauses are included in the D9010SFPC SFP+ and QSFP+ Compliance Test Application Software:

SFP+/QSFP+ Standard reference	Description
SFF-8431, Revision 4.1, Table 11, host transmitter output tests	Single-ended voltage range (+)
	Single-ended voltage range (-)
	Output AC common mode voltage
SFF-8431, Revision 4.1, Table 12, host transmitter output tests Signal rise	Signal rise time (20%-80%)
	Signal fall time (80%-20%)
	Total jitter (TJ)
	Data dependent jitter (DDJ)
	Data dependent pulse width shrinkage (DDPWS)
	Uncorrelated jitter (UJ)
	Transmitter Qsq
	Eye mask hit ratio
SFF-8431, Revision 4.1, Table 33, host transmitter output for Cu tests	Voltage modulation amplitude (VMA)(for Cu)
	Transmitter Qsq (for Cu)
	Output AC common mode voltage (for Cu)
	Host output TWDPc

XLPPi Standard reference	Description
IEEE 802.3ba, Annex 86A, Table 86A-1, host to module output for XLPPi tests	Single-ended output voltage (+)
	Single-ended output voltage (-)
	AC common mode output voltage
	Output rise time (20%-80%)
	Output fall time (80%-20%)
	J2 jitter output
	J9 jitter output
	Data dependent pulse width shrinkage (DDPWS)
	Qsq
	Eye mask hit ratio

Calibration Standard reference	Description
IEEE 802.3ba, Annex 86A, Table 86A-1, test signal calibration tests	Crosstalk source VMA
	Crosstalk source rise time (20% to 80%)
	Crosstalk source fall time (80% to 20%)

## Configurability and Guided Connection

The D9010SFPC SFP+ and QSFP+ Compliance Test Application Software provides flexibility in your test setup. The application lets you define controls for critical test parameters such as signaling rate, rise/fall time averages used for analysis and customizable violation settings. Once you have configured the tests, the connection page will display the connection diagram for the test you have selected. The compliance application guides you to make connection changes with hookup diagrams when the tests you select require it. You connect the oscilloscope to the device under test using the Wilder SFP+ or QSFP+ test fixture ([www.wilder-tech.com](http://www.wilder-tech.com)). SMA cables may be required to attach the Wilder test fixtures to the Keysight Infiniium oscilloscope. See ordering information for more details.

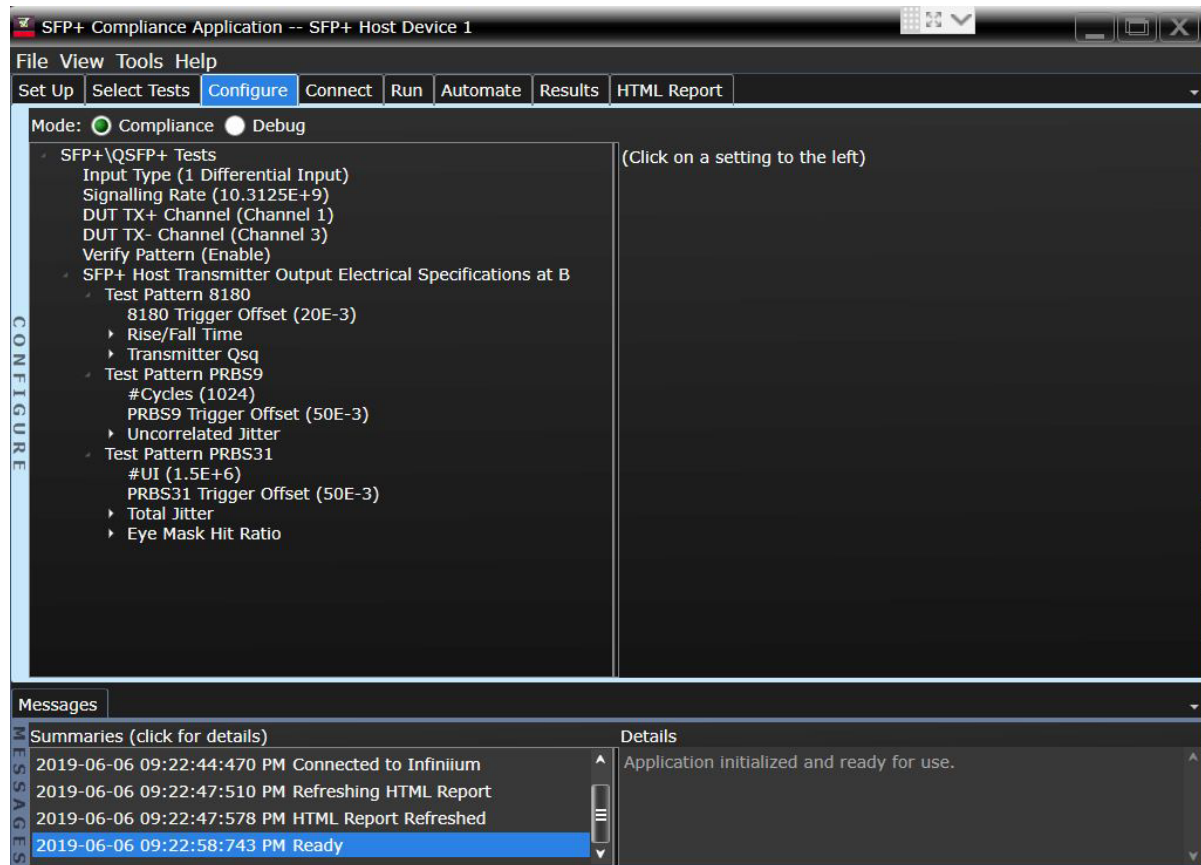


Figure 3. To set up tests, you define the device to test, its configuration, and how the oscilloscope is connected to it.

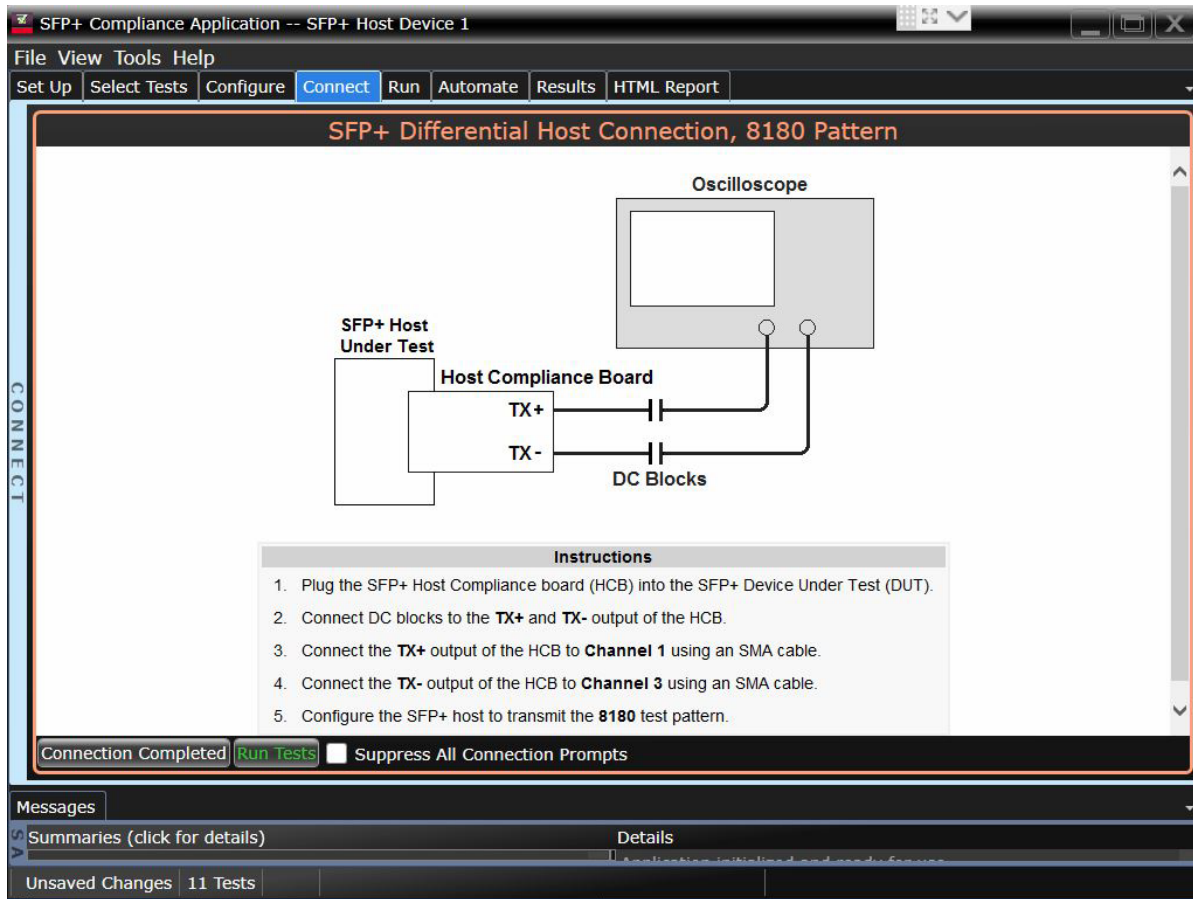


Figure 4. When you make multiple tests where the connections must be changed, the software prompts you with connection diagrams.



## Comprehensive Result Analysis

In addition to providing you with measurement results, the D9010SFPC SFP+ and QSFP+ Compliance Test Application Software provides a report format that shows you not only where your product passes or fails, but also reports how close you are to the limits specified for a test. You can select the margin test report parameter, which means you can specify the level at which warnings are issued to alert you to electrical tests where your product is operating close to the official test limit defined by the SFF-8431 standard, SFF-8431 Revision 4.1 standard, and IEEE802.3ba, Annex 86A specifications.

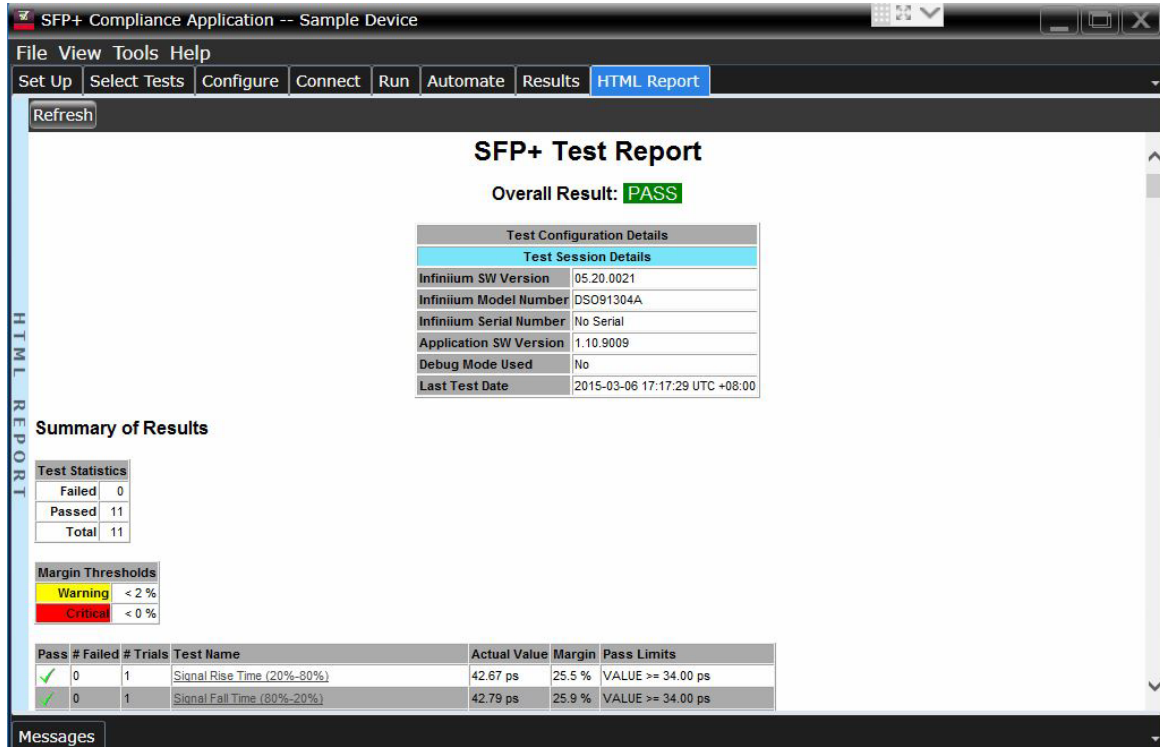


Figure 5. The IEEE802.3bs/cd compliance test application software results screen shows a summary of the tests performed, pass/fail status, and margin. Hyperlinks direct you to the more details of that test.

## Thorough Performance Reporting

The D9010SFPC SFP+ and QSFP+ Compliance Test Application Software generates HTML reports that captures the performance, status and margins of your device under test. It also captures screenshots of critical measurements of your reference and documentation. This report is suitable for printing and sharing with your test vendors, customers and suppliers.

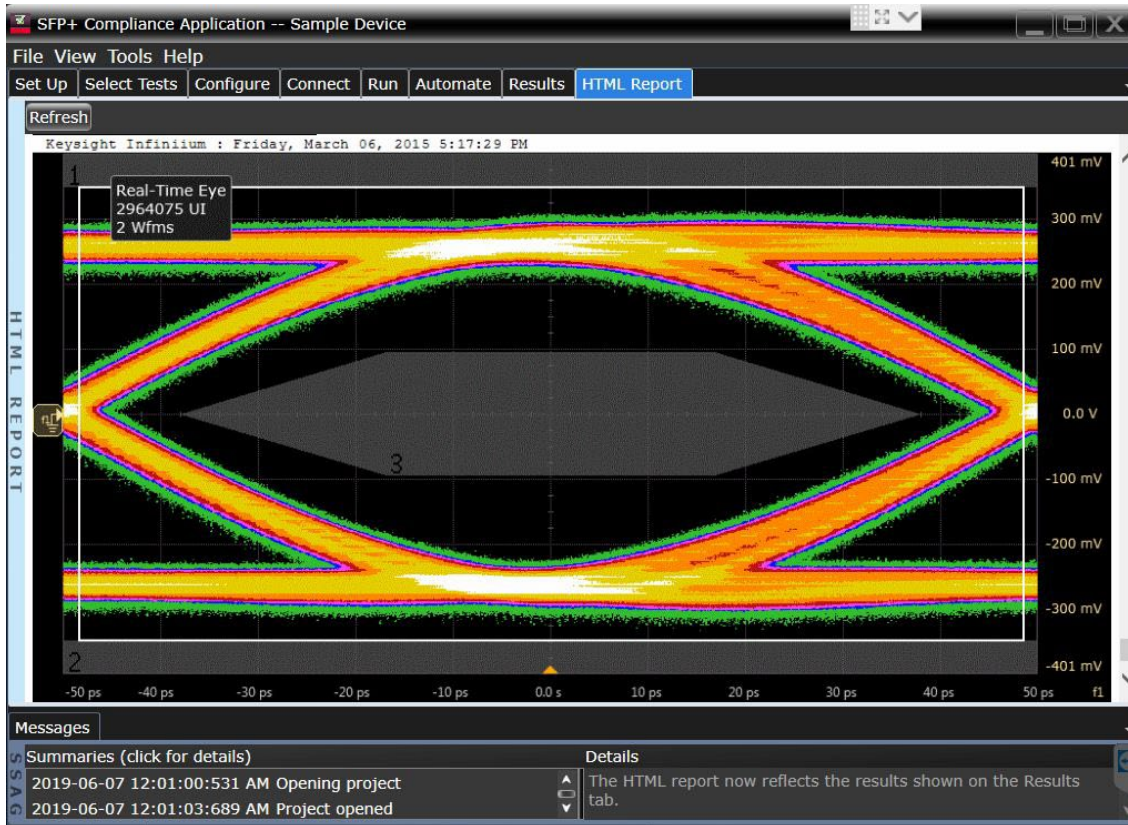


Figure 6. Additional details are available for each test, including the test limits, test description, and test results, including waveforms, if appropriate.



## Recommended Oscilloscope

The D9010SFPC SFP+ and QSFP+ Compliance Test Application Software is compatible with Keysight Infiniium Series oscilloscopes with operating software revision 6.30 or higher.

Data rate	Minimum Bandwidth	Minimum Channels	Description
10 Gb/s	25 GHz	2	All Infiniium oscilloscopes $\geq$ 25 GHz

## Ordering Information

Model number	Description	Note
D9010SFPC	SFP+ and QSFP+ Compliance Test Application Software	Required
D9120ASIA	Advanced Signal Integrity Software (EQ, InfiniiSim Advanced)	Optional
D9120JITA	EZJIT Complete - Jitter and Vertical Noise Analysis Software	Required
D9110DMBA	De-embedding Software (PrecisionProbe, InfiniiSim Basic)	Optional
D9120SCNA	InfiniiScan Event Identification Software for V/Z/UXR-Series	Required

Note: MATLAB basic software package is required for running TWDPc tests - TWDPc script is not provided by Keysight; user is responsible for obtaining the script from the SFF-8431 standard. (User Defined Function (UDF) is required to run Matlab and is included in the Keysight Infiniium oscilloscope software version 6.30.)

## Example of Hardware Configuration

Model number	Description	Quantity
UXR0252A	25 GHz Infiniium UXR-series oscilloscope	1

## Fixtures and Accessories

Model number	Description	Quantity
SFP+-TPA-HCB-P	Wilder Technologies SFP+ plug adapter	1
QSFP+-TPA40G-HCB-P	Wilder Technologies QSFP+ plug adapter	1
N9399C	DC block (N9398C/F/G or N9399C/F)	2
1810-0118	SMA (m) 50 $\Omega$ termination	2
1250-1158	Adapter, SMA (f) to SMA (f)	2
N2812A	High performance input cable, 2.92 mm connectors, 1 m length	2 (SFP+) or 10 (QSFP+)
8493C	8493C Coaxial Fixed Attenuator, DC to 26.5 GHz	2

Note: Select one or both SFP+ and QSFP+ adapters based on host adapter technology and customer needs.

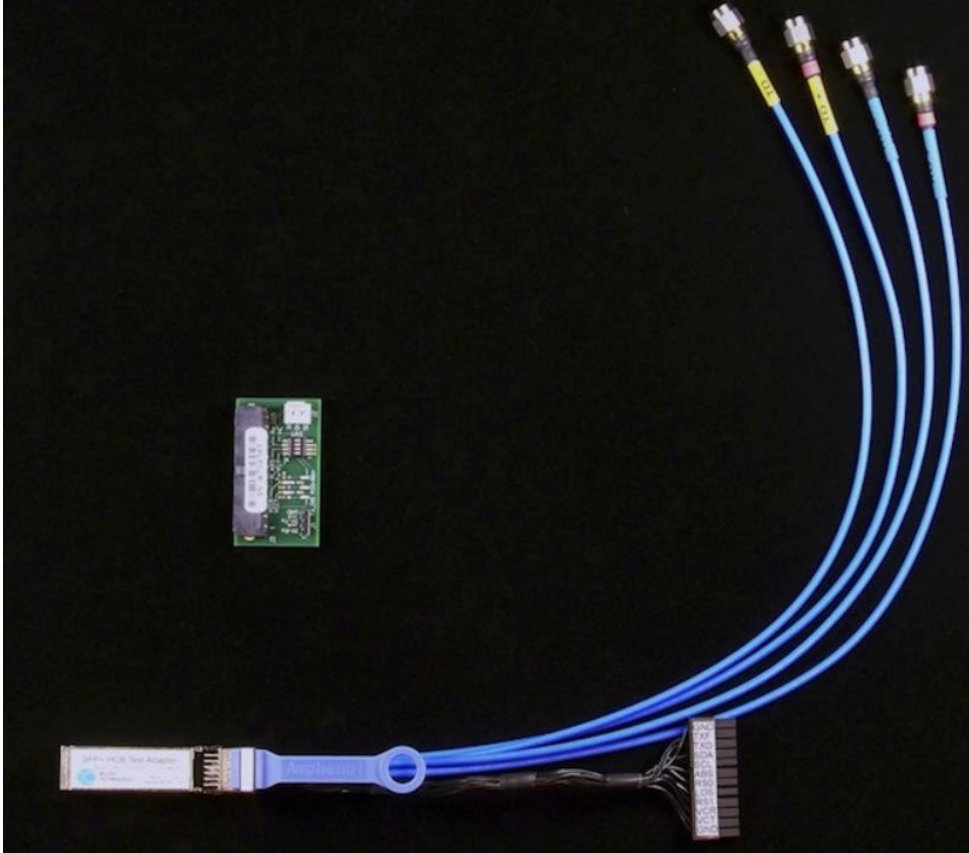


Figure 7. The Wilder SFP+ fixture model number SFP+-TPA-HCB-P, used for SFP+ host electrical testing.

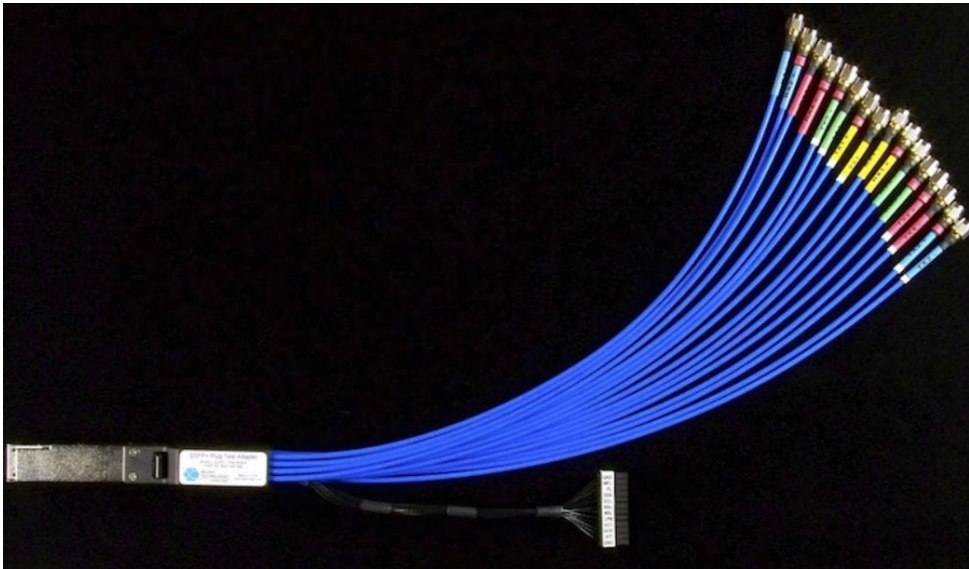


Figure 8. The Wilder QSFP+ fixture model number QSFP+-TPA40G-HCB-P, used for SFP+ host electrical testing.

## Flexible Software Licensing and KeysightCare Software Support Subscriptions

Keysight offers a variety of flexible licensing options to fit your needs and budget. Choose your license term, license type, and KeysightCare software support subscription.

### License Terms

**Perpetual** – Perpetual licenses can be used indefinitely.

**Subscription** – Subscription licenses can be used through the term of the license only (6, 12, 24, or 36 months).

### License Types

**Node-locked** – License can be used on one specified instrument/computer.

**Transportable** – License can be used on one instrument/computer at a time but may be transferred to another using Keysight Software Manager (internet connection required).

**USB Portable** – License can be used on one instrument/computer at a time but may be transferred to another using a certified USB dongle (available for additional purchase with Keysight part number E8900-D10).

**Floating (single site)** – Networked instruments/computers can access a license from a server one at a time. Multiple licenses can be purchased for concurrent usage.

### KeysightCare Software Support Subscriptions

Perpetual licenses are sold with a 12 (default), 24, 36, or 60-month software support subscription. Support subscriptions can be renewed for a fee after that.

Subscription licenses include a software support subscription through the term of the license.

### Selecting your license

- Step 1.** Choose your software product (eg. S1234567A).
- Step 2.** Choose your license term: perpetual or subscription.
- Step 3.** Choose your license type: node-locked, transportable, USB portable, or floating.
- Step 4.** Depending on the license term, choose your support subscription duration.

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