D9010XAUC XAUI Compliance Test Application Software with 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO Support

The Keysight Technologies, Inc. D9010XAUC XAUI Compliance Test Application Software with 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO Support for Infiniium oscilloscopes provides you with an easy and accurate way to verify and debug your XAUI, 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO designs. The Ethernet electrical test software allows you to automatically execute Ethernet physical-layer (PHY) electrical tests and displays the results in a flexible report format. In addition to the measurement data, the report provides a margin analysis that shows how closely your device passed or failed each test. The D9010XAUC XAUI Compliance Test Application Software with 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO Support performs a wide range of electrical tests required to meet the XAUI, 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO electrical specifications as documented in the XAUI (IEEE 802.3-2005, Clause 47), 10GBASE-CX4 (IEEE 802.3-2005, Clause 54), XAUI-based CPRI, OBSAI RP3, and Serial RapidIO standards. To meet signal quality requirements, your product must successfully pass conformance testing based on these specifications. Performing these tests gives you confidence in your design. The D9010XAUC XAUI Compliance Test Application Software with 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO Support helps you execute a wide subset of the conformance tests that can be measured with an oscilloscope.

KEYSIGHT

Transform complexity into simplicity

- The D9010XAUC XAUI Compliance Test Application Software with 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO Support offers several features to simplify the validation of Ethernet designs:
- Setup wizard for quick and clear setup, configuration and test
- Wide range of XAUI, 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO electrical tests for standards conformance
- Accurate and repeatable results with Keysight Infiniium oscilloscopes
- Automated reporting in a comprehensive HTML format with margin analysis

With the D9010XAUC XAUI Compliance Test Application Software with 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO Support, you can use the same oscilloscope you use for everyday debugging to perform automated testing and margin analysis based on those electrical standards.

D9010XAUC Compliance Test Application Software Saves You Time

The D9010XAUC XAUI Compliance Test Application Software with 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO Support saves you time by setting the stage for automatic execution of all the required 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 D9010XAUC XAUI Compliance Test Application Software with 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO Support 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 specification.

Easy test definition

The D9010XAUC XAUI Compliance Test Application Software with 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO Support extends the ease-of-use advantages of Keysight's Infiniium oscilloscopes to testing XAUI, 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO 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.

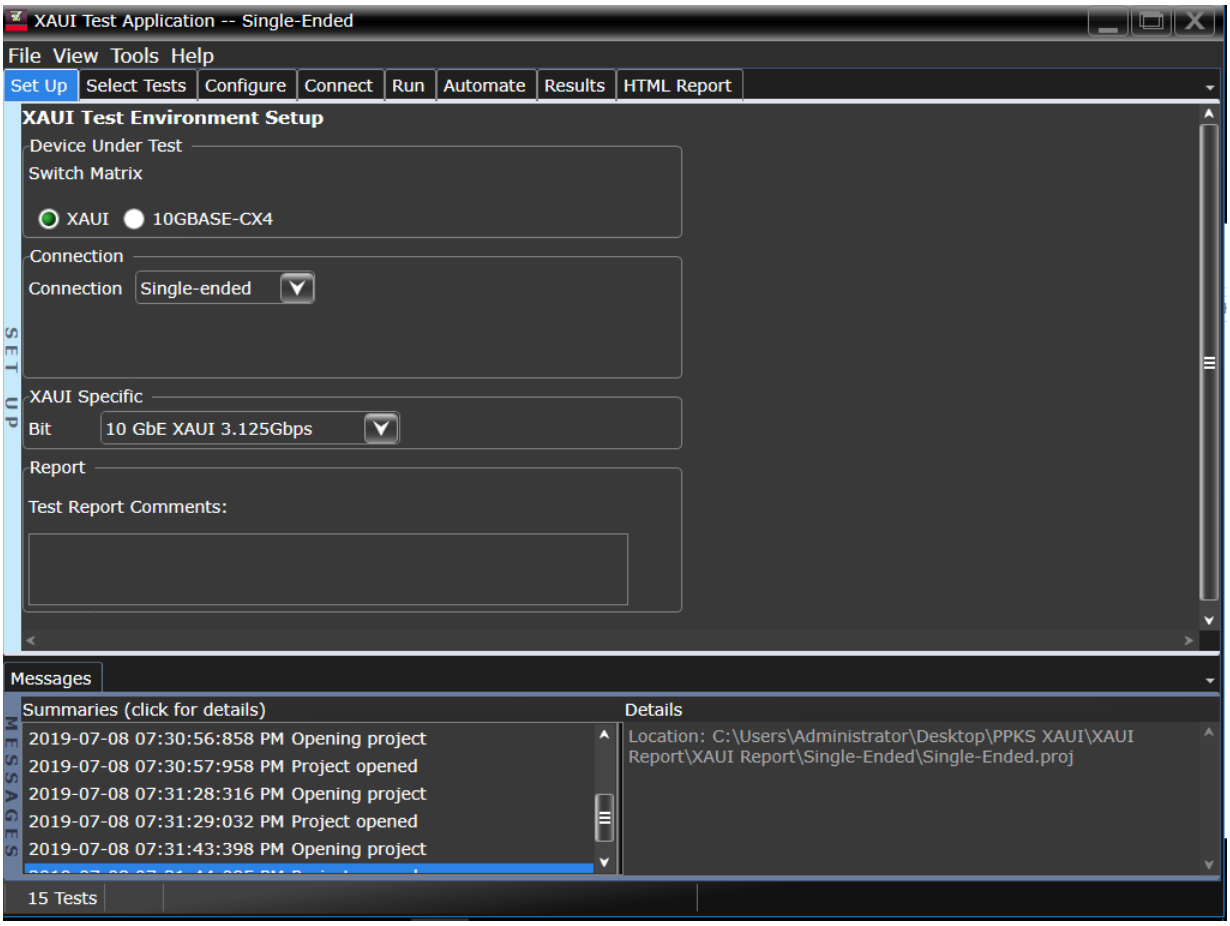


Figure 1. The clean interface of the setup page enables you to quickly make decisions and perform functions that affect the testing task.

Compliance measurement tests

The D9010XAUC XAUI Compliance Test Application Software with 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO Support allows you to run single or multiple tests based on your needs. Highlight a test to show more details including tests limits and references to related details of the specification. Accurate and repeatable results give you confidence in your measurements.

You can also specify the number of test trials and only stop running selected tests when the stop condition is met. The application will save the worst-case test result to help you track down the anomalies in your signals.

Test performed

The D9010XAUC XAUI electrical validation application covers transmitter electrical parameters of XAUI and 10GBASE-CX4 devices based on the specifications from IEEE 802.3-2005. In addition, the application's debug mode allows control of parameters that can be changed to test to other XAUI-derived specifications.

The D9010XAUC also provides support for tests common to 10-gigabit Ethernet XAUI for the following standards:

- Common Public Radio Interface (CPRI) based on version 3.0 of the specification
- Open Base Station Architecture Initiative (OBSAI) Reference Point 3 (RP3) based on version 3.1 of the specification
- Serial RapidIO based on Part 6 of the RapidIO Interconnect Specification Rev. 1.3
- 10-gigabit Fibre Channel XAUI

These standards were based on the XAUI electrical interface from IEEE 802.3-2005 clause 47, with the goal that electrical designs for XAUI may be reused after suitable modification.

Parameter	Subclause
Baud rate	47.3.3
Driver output amplitude Differential Single-ended	47.3.3.2
Transition time Rise-time Fall-time	47.3.3.3
Driver eye template tests Near-end Far-end	47.3.3.5
Driver transmit jitter Total jitter Determinstic	47.3.3.5

Supported XAUI transmitter parameters from clause 47, IEEE 802.3-2005

Parameter	Subclause
Baud rate	54.6.3.3
Differential output amplitude	54.6.3.4
Lane-to-lane amplitude difference	54.6.3.4
Differential output template	54.6.3.6
Transition time Rise-time Fall-time	54.6.3.7
Driver transmit jitter Total jitter Determinstic	54.6.3.8

Supported 10GBASE-CX4 transmitter parameters from clause 54, IEEE 802.3-2005

Standard	Baud Rate
CPRI	614.4 MBaud 1228.8 MBaud 2457.6 MBaud 3072.0 MBaud
OBSAI RP3	768 MBaud 1536 MBaud 3072 MBaud
Serial RapidIO (both long and short run)	1.25 GBaud 2.50 GBaud 3.125 GBaud
10-gigabit Fibre Channel XAUI	3.1875 GBaud

Supported baud rates for various XAUI-based standards

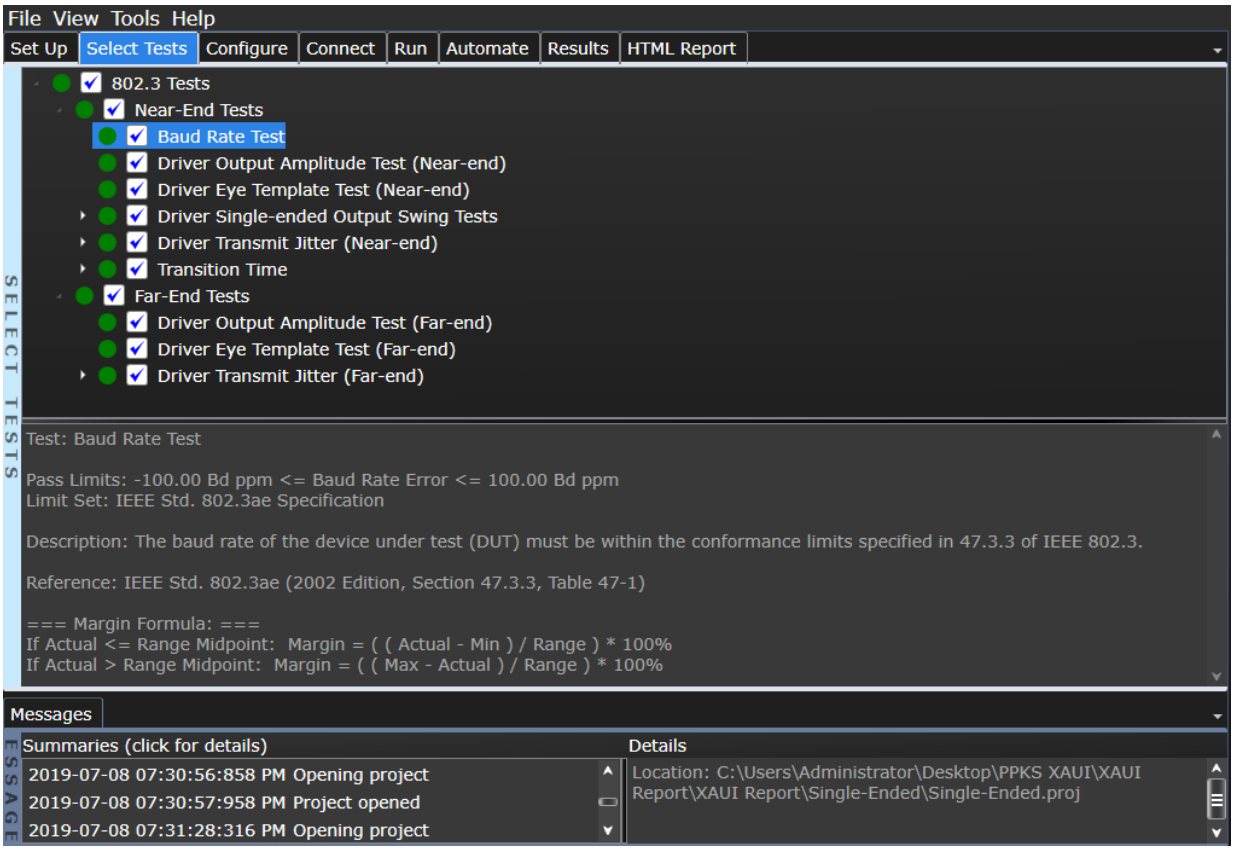


Figure 2. The Keysight automated test engine quickly guides you through selecting and configuring tests, setting up the connection, running the tests, and viewing the results. You can easily select individual tests or groups of tests with a mouse-click.

Configurability and Guided Connection

The D9010XAUC XAUI Compliance Test Application Software with 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO Support provides flexibility in your test setup. The application lets you define controls for critical test parameters such as voltage threshold values, number of waveforms 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.

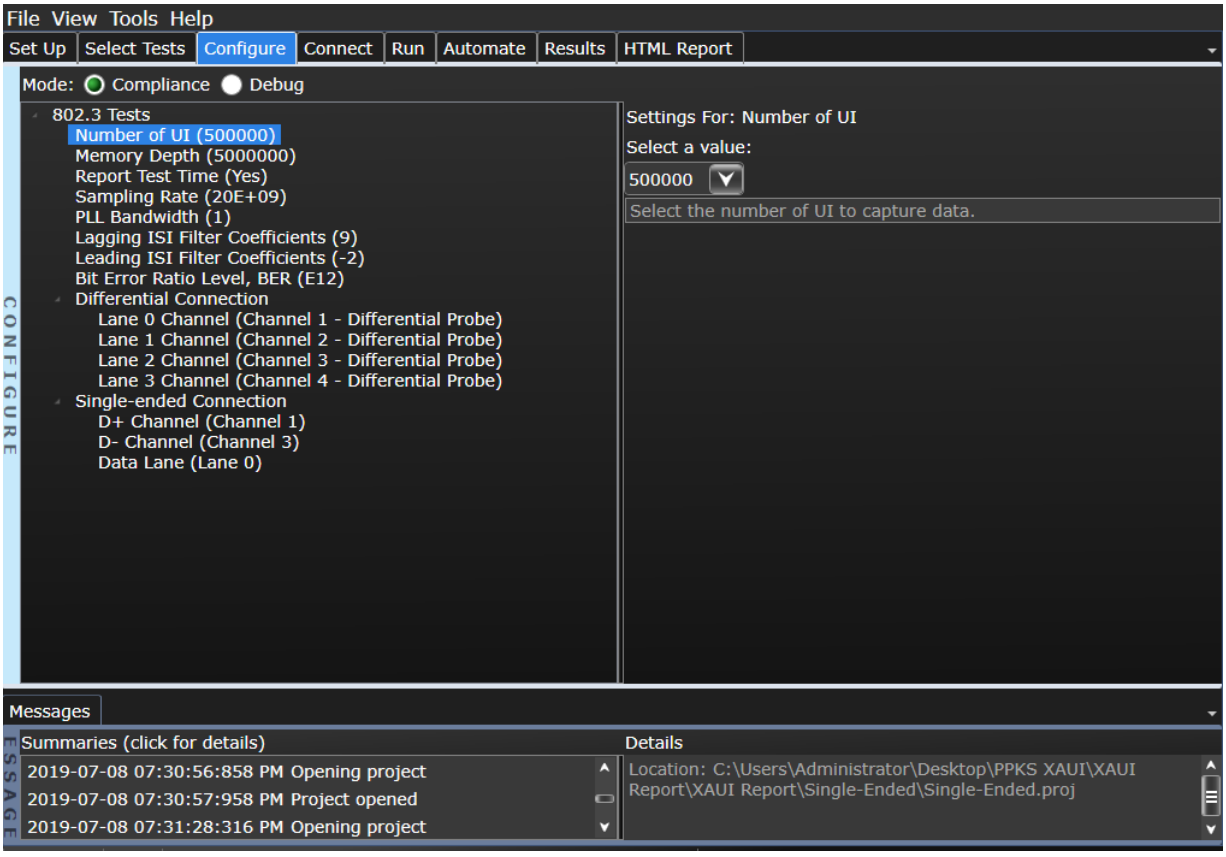


Figure 3. To set up tests, you define the device to test, its configuration, and how the oscilloscope is connected to it.

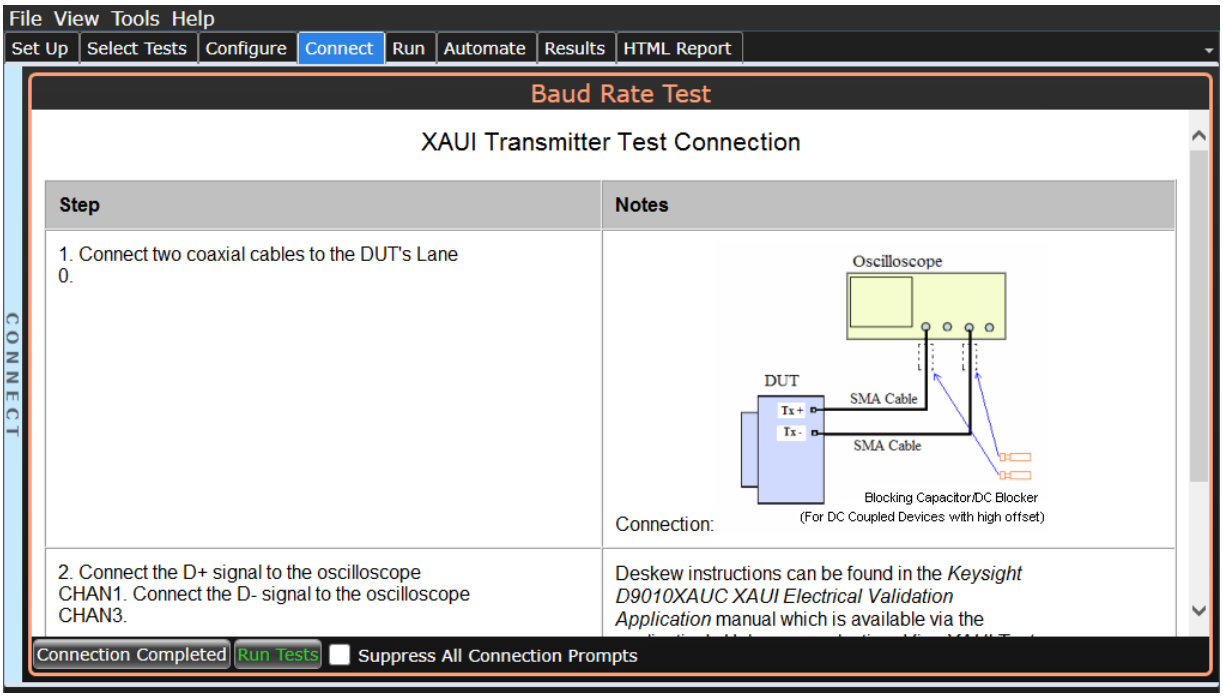
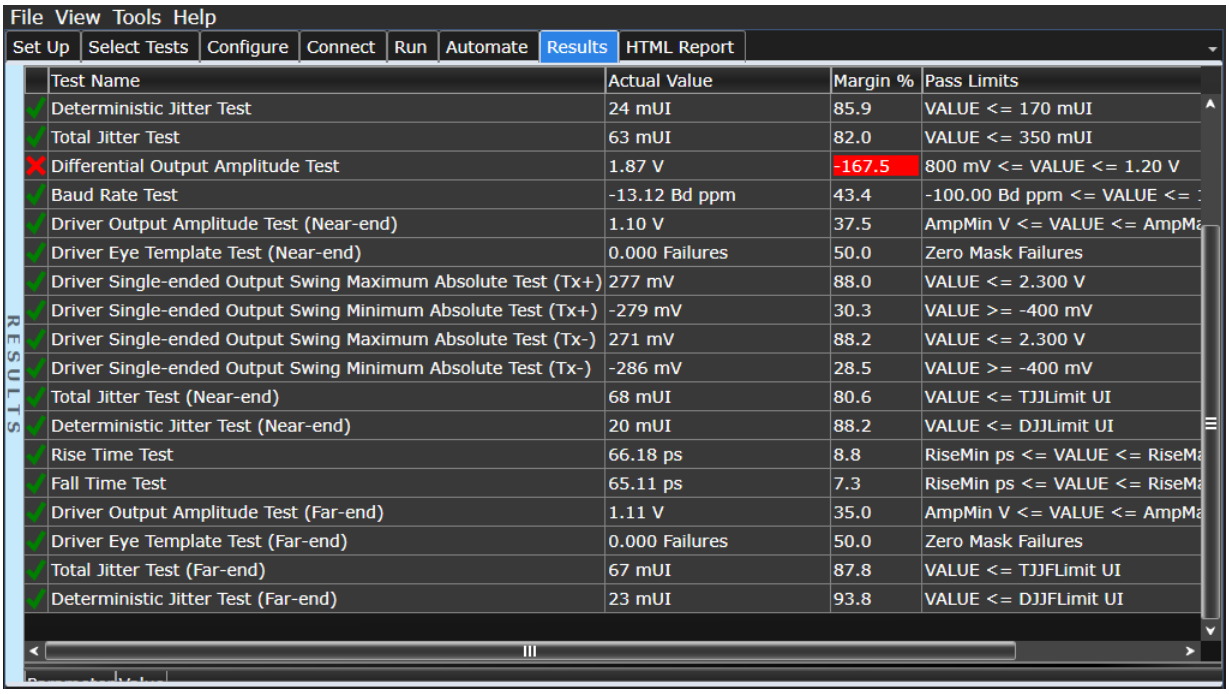


Figure 4. When you make multiple tests where the connections must be changed, the software prompts you with connection diagrams.

Comprehensive Result Analysis

In addition to providing you with measurement results, the D9010XAUC XAUI Compliance Test Application Software with 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO Support 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 XAUI, 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO specifications.



Test Name	Actual Value	Margin %	Pass Limits
Deterministic Jitter Test	24 mUI	85.9	VALUE <= 170 mUI
Total Jitter Test	63 mUI	82.0	VALUE <= 350 mUI
Differential Output Amplitude Test	1.87 V	-167.5	800 mV <= VALUE <= 1.20 V
Baud Rate Test	-13.12 Bd ppm	43.4	-100.00 Bd ppm <= VALUE <=
Driver Output Amplitude Test (Near-end)	1.10 V	37.5	AmpMin V <= VALUE <= AmpMa
Driver Eye Template Test (Near-end)	0.000 Failures	50.0	Zero Mask Failures
Driver Single-ended Output Swing Maximum Absolute Test (Tx+)	277 mV	88.0	VALUE <= 2.300 V
Driver Single-ended Output Swing Minimum Absolute Test (Tx+)	-279 mV	30.3	VALUE >= -400 mV
Driver Single-ended Output Swing Maximum Absolute Test (Tx-)	271 mV	88.2	VALUE <= 2.300 V
Driver Single-ended Output Swing Minimum Absolute Test (Tx-)	-286 mV	28.5	VALUE >= -400 mV
Total Jitter Test (Near-end)	68 mUI	80.6	VALUE <= TJJLimit UI
Deterministic Jitter Test (Near-end)	20 mUI	88.2	VALUE <= DJJLimit UI
Rise Time Test	66.18 ps	8.8	RiseMin ps <= VALUE <= RiseMa
Fall Time Test	65.11 ps	7.3	RiseMin ps <= VALUE <= RiseMa
Driver Output Amplitude Test (Far-end)	1.11 V	35.0	AmpMin V <= VALUE <= AmpMa
Driver Eye Template Test (Far-end)	0.000 Failures	50.0	Zero Mask Failures
Total Jitter Test (Far-end)	67 mUI	87.8	VALUE <= TJJFLimit UI
Deterministic Jitter Test (Far-end)	23 mUI	93.8	VALUE <= DJJFLimit UI

Figure 5. The D9010XAUC XAUI Compliance Test Application Software with 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO Support results screen shows a summary of the tests performed, pass/fail status, and margin. Clicking on a specific test also shows the test specification and a measurement waveform, if appropriate.

Thorough Performance Reporting

The D9010XAUC XAUI Compliance Test Application Software with 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO Support 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.

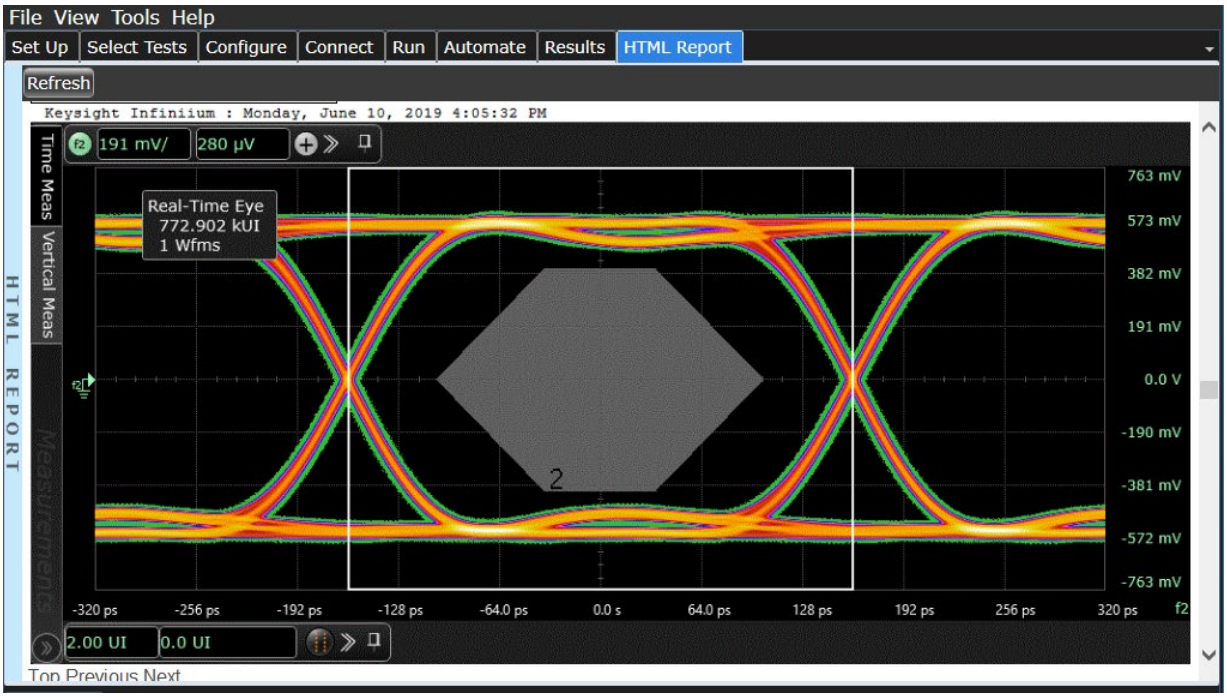


Figure 6. Additional details are available for each test, including the test limits, test description, and test results, including waveforms, if appropriate.

Recommended Oscilloscope

The D9010XAUC XAUI Compliance Test Application Software with 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO Support is compatible with Keysight Infiniium Series oscilloscopes with operating software revision 6.30 or higher.

Data rates	Minimum bandwidth	Minimum channels	Compatible oscilloscopes
3.1875 Gbps	13 GHz	2	V- Series, Z-Series, and UXR -Series

Note: Data rates vary from 614.4 MBaud to 3.1875 GBaud based on technology. Highest data rate shown based on 10G Fibre Channel XAUI. Minimum oscilloscope bandwidth based on fastest transition times between 60 and 130 ps and available oscilloscope model based on that bandwidth.

Maximum frequency content = 0.4/fastest rise or fall time (20-80%)

Scope bandwidth required = 1.4x maximum signal frequency for 3% accuracy measurements

Scope bandwidth required = 1.2x maximum signal frequency for 5% accuracy measurements

Scope bandwidth required = 1.0x maximum signal frequency for 10% accuracy measurements

Rise-Time	Recommended bandwidth	Bandwidth of recommended oscilloscope	Compatible oscilloscopes
60 ps	10 GHz	13 GHz	V-Series, Z-Series and UXR
70 ps – 80 ps	8 GHz	8 GHz	S-Series
90 ps	6 GHz	6 GHz	S-Series, MXR

Ordering Information

Model number	Description	Note
D9010XAUC	XAUI Compliance Test Application Software with 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO Support	Required
D9020ASIA	Advanced Signal Integrity Software (EQ, InfiniiSim Advanced)	Optional
D9010JITA	EZJIT Complete - Jitter and Vertical Noise Analysis Software	Optional[1]
D9010DMBA	De-embedding Software (PrecisionProbe, InfiiniSim Basic)	Optional

1. Required for Jitter related test.

Example of Hardware Configuration

Model number	Description	Quantity
UXR0134A	13 GHz Infiniium UXR-series oscilloscope	1

Recommended accessories

Model number	Description
1134A	7-GHz differential probe amplifier
1168A	10-GHz differential probe amplifier
1169A	12-GHz differential probe amplifier
N5380A	InfiniiMax II 12-GHz differential SMA probe head and accessories
N5381A	InfiniiMax II 12-GHz differential solder-in probe head and accessories
N5382A	InfiniiMax II 12-GHz differential browser
E2695A	InfiniiMax 8-GHz differential SMA probe head
E2677A	InfiniiMax 7-GHz differential solder-in probe head and accessories
N5382A	InfiniiMax II 12-GHz differential browser
E2695A	InfiniiMax 8-GHz differential SMA probe head
E2677A	InfiniiMax 7-GHz differential solder-in probe head and propagation delay within 25 ps (or equivalent)
11742A	DC blocking capacitor, 0.045 to 26.5 GHz, 3.5-mm (m-f) connectors
54855-67604	Precision BNC (m) to 3.5mm (f) adapter

Third party accessories

Select the test accessories that best meet your signal probing requirements.

Model number	Description
IBNTSTCX4	CX4 plug to SMA adapter. Orderable from W.L. Gore and Associates, Inc. www.gore.com
4X-SMA-12R	4X InfiniBand connector (SFF-8470) to SMA test adapter board. Order from Efficere Technologies www.efficere.com
TX/RX SignalBlade	Test card for HM-Zd (f) to SMA (f) access. Order from F9 Systems, Inc. www.F9-Systems.com
TX/RX BenchBlade	Test card for HM-Zd (m) to SMA (f) access. Order from F9 Systems, Inc. www.F9-Systems.com

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 (e.g. 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.

KeysightCare Software Support Subscription provides peace of mind amid evolving technologies

- Ensure your software is always current with the latest enhancements and measurement standards.
- Gain additional insight into your problems with live access to our team of technical experts.
- Stay on schedule with fast turnaround times and priority escalations when you need support.