DATA SHEET

D9010CEIC OIF-CEI 4.0 Compliance Test Application Software

The Keysight Technologies, Inc. compliance test application provides a fast and effortless way to test, debug and characterize your OIF-CEI 4.0 designs. More and more industry and standards bodies have adopted 4-level pulse amplitude modulation (PAM4) to increase throughput within a given bandwidth compared to Non-Return-to -Zero (NRZ) technology. Working groups within the OIF-CEI are one such group that has adapted PAM4 technology. The Keysight D9010CEIC OIF-CEI 4.0 compliance application for Infiniium real-time oscilloscopes saves you time and money by automating the task of preforming PAM4 and NRZ compliance measurements. The tests performed by the D9010CEIC software are based on the OIF-CEI 4.0 specification. In addition, the application includes other features and utilities such as “Find Optimal CTLE Eye Opening” that help users find the ideal CTLE setting to open even the most closed eyes. The test application offers a user-friendly setup wizard and a comprehensive report that includes margin analysis.

Transform complexity into simplicity

- Setup wizard for quick setup, configuration and test selection.
- Execution speed and proven test algorithm which minimizes test time.
- User-select tests and configuration based on the OIF-CEI 4.0 specification.
- Reduces the time it takes to characterize your PAM4 and NRZ design from hours to minutes.
- Reports multi trial results with statistics for each measurement and worst-case result.
- Accurate and repeatable results with Keysight Technologies Infiniium oscilloscopes
- Automated reporting in a comprehensive HTML format with margin analysis

KEYSIGHT TECHNOLOGIES

With the OIF-CEI 4.0 compliance test software, you can use the same oscilloscope you use for everyday debugging to perform automated testing and margin analysis based on the OIF-CEI 4.0 standard.

D9010CEIC OIF-CEI 4.0 Compliance Application Software Saves You Time

The OIF-CEI 4.0 compliance test application software saves you time by setting the stage for automatic execution of OIF-CEI 4.0 electrical tests. Part of the difficulty of performing electrical tests for 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 compliance test application software does much of this work for you. The OIF-CEI 4.0 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.

Easy test definition

The OIF-CEI 4.0 compliance test application software extends the ease-of-use advantages of Keysight's Infiniium oscilloscopes to testing OIF-CEI 4.0 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.

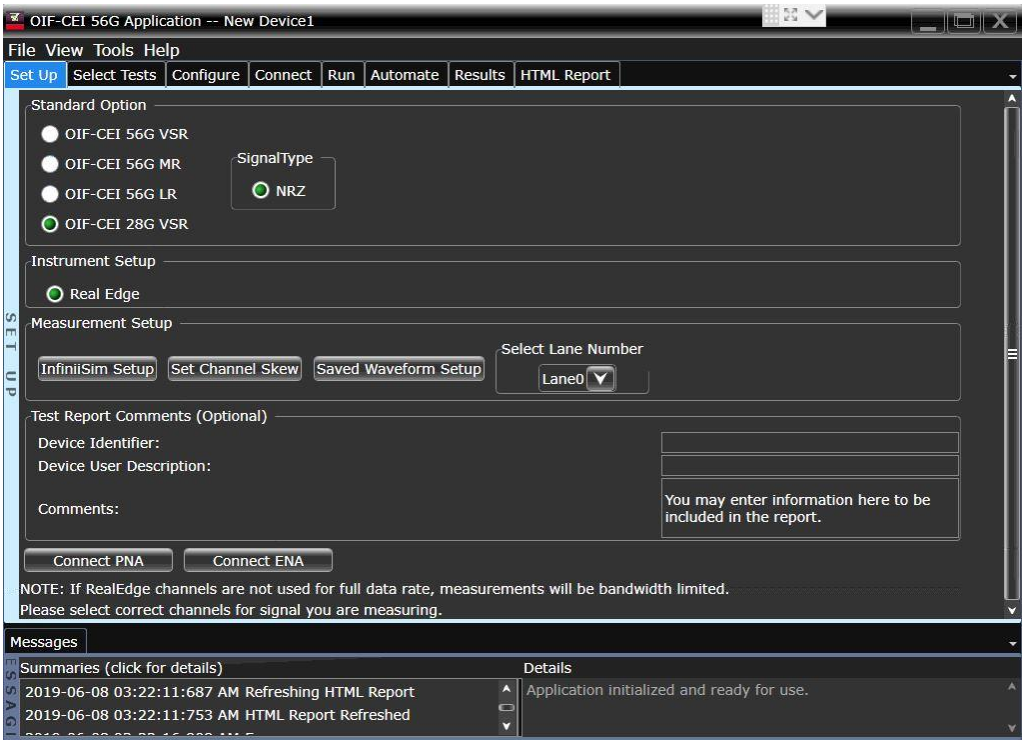

Figure 1. The clean interface allows you select the OIF-CEI 4.0 test category that you need, including PAM4 as well as NRZ signal types.

The following clauses and annexes are included in the OIF-CEI 4.0 compliance test application:

- OIF-CEI 4.0, 56G VSR

- OIF-CEI 4.0, 56G MR

- OIF-CEI 4.0, 56G LR

- OIF-CEI 4.0, 28G VSR

Compliance Measurement Tests

The OIF-CEI 4.0 compliance test application 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.

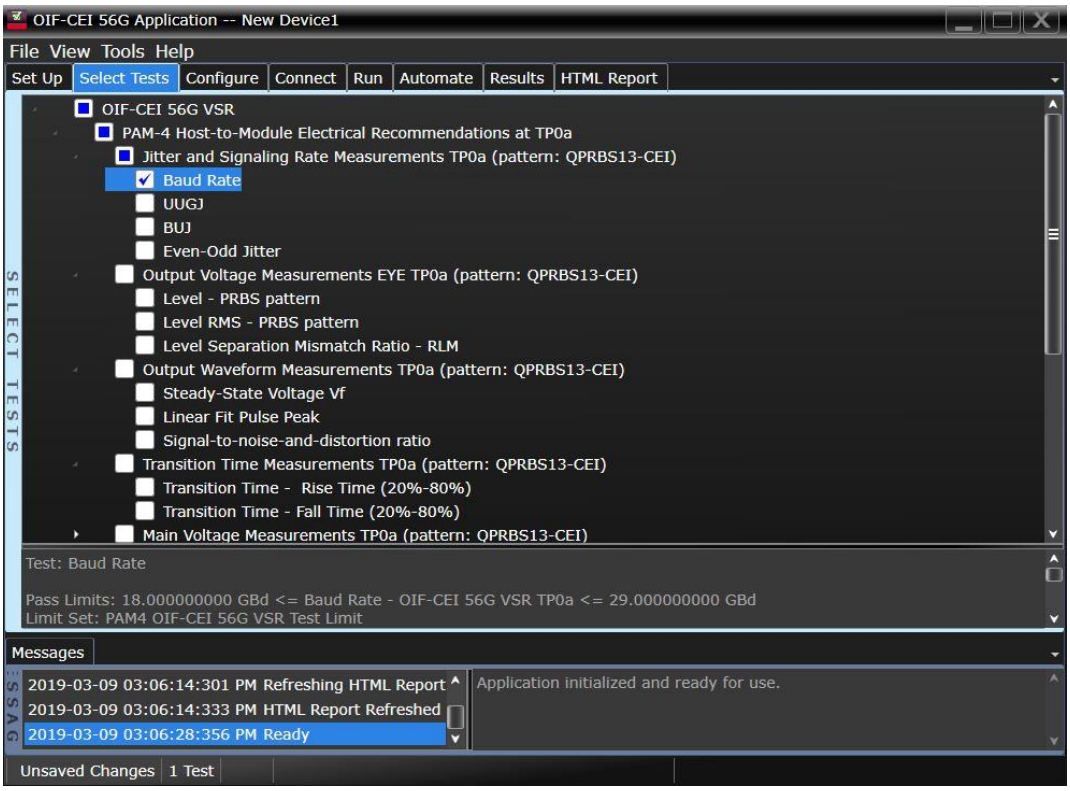

Figure 2. The Keysight automated test engine quickly guides you through selecting and configuring tests, setting up the connection, running the tests, and viewing the results. You can easily select individual tests or groups of tests with a mouse-click.

Configurability and Guided Connection

The OIF-CEI 4.0 compliance test application provides flexibility in your test setup. The application lets you define controls for critical test parameters such as signaling rate, clock recovery 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.

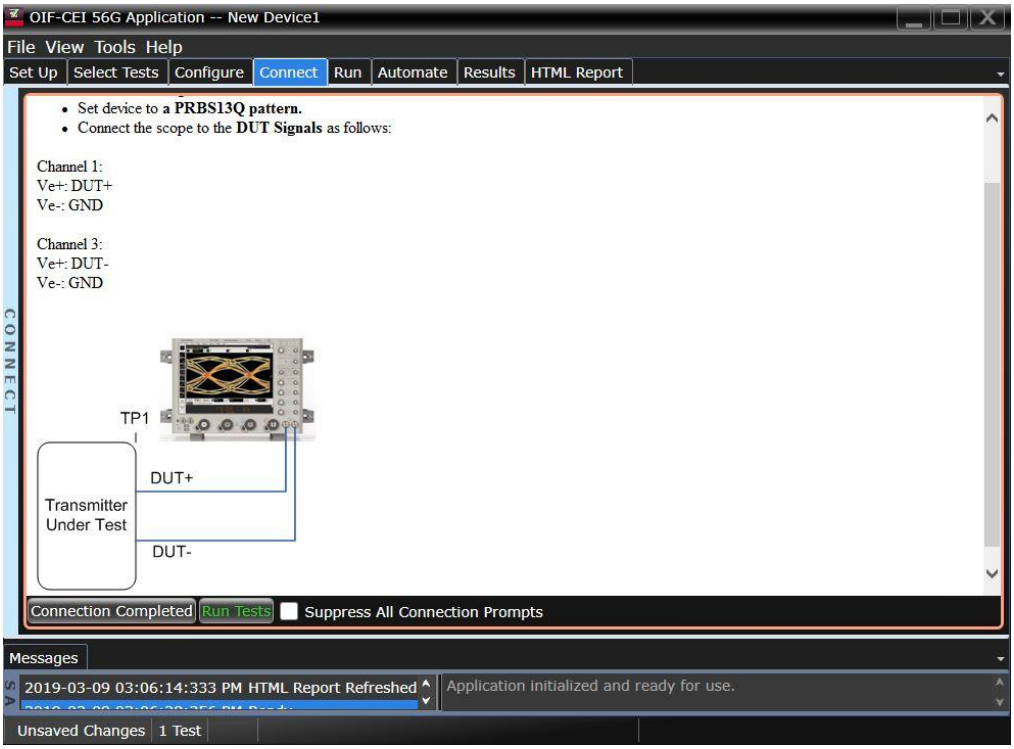

Figure 4. When you make multiple tests where the connections must be changed, the software prompts you with connection diagrams.

Comprehensive Result Analysis

In addition to providing you with measurement results, the OIF-CEI 4.0 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 OIF-CEI 4.0 specifications.

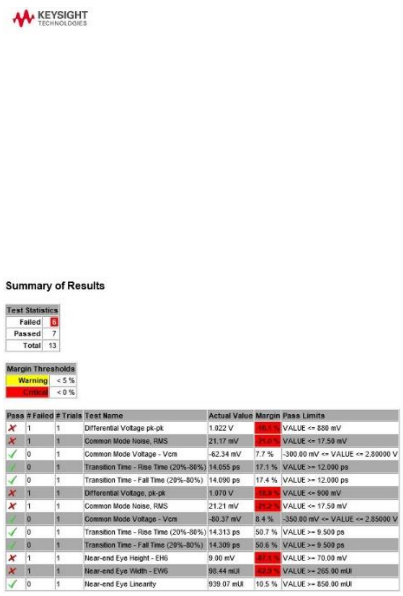

Figure 5. The OIF-CEI 4.0 compliance test application software results screen shows a summary of the tests performed, pass/fail status, and margin. Hyperlinks direct you to the more details of that test.

Thorough Performance Reporting

The OIF-CEI 4.0 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.

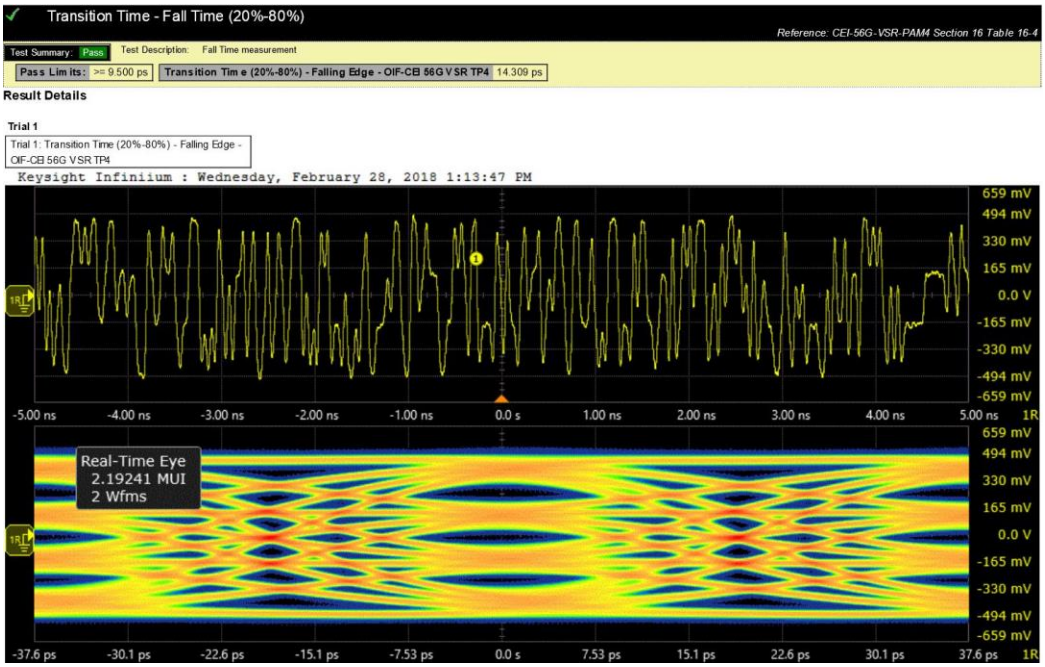

Figure 6. Additional details are available for each test, including the test limits, test description, and test results, including waveforms, if appropriate.

Recommended oscilloscope

The OIF-CEI 4.0 compliance application software is compatible with Keysight Infiniium Series oscilloscopes with operating software revision 6.30 or higher.

Data Rates	Minimum Bandwidth	Minimum Channels	Compatible Oscilloscopes
18 to 29 GBd PAM4 (36 to 58 Gbps) and 39 to 56 Gbps NRZ and 19.6 to 28.1 Gbps NRZ	70 GHz[1,2,3]	2	UXR

Note 1: For OIF-CEI-56G-VSR-NRZ the waveform is observed through a fourth-order Bessel-Thomson response filter with a bandwidth of 43 GHz at 3dB as a result a 65 GHz minimum bandwidth scope is required.

Note 2: For OIF-CEI-56G-VSR-PAM4, OIF-CEI-56G-MR-PAM4, OIF-CEI-56G-LR-PAM4 and OIF-CEI-28G-VSR-NRZ the waveform is observed through a fourth-order Bessel-Thomson response filter with a bandwidth of 40 GHz at 3dB as a result a 60 GHz minimum bandwidth scope is required.

Note 3: A Keysight 70GHz bandwidth oscilloscope is recommended as 65 GHz and 60 GHz models do not exist.

Ordering Information

Model number	Description	Note
D9010CEIC	OIF-CEI 4.0 Compliance Test Application Software	Required
D9010PAMA	Pulse Amplitude Modulation PAM-N Analysis Software	Required
D9020ASIA	Advanced Signal Integrity Software (EQ, InfiniiSim Advanced)	Required
D9020JITA	EZJIT Complete - Jitter and Vertical Noise Analysis Software	Required

Example of Hardware Configuration

Model number	Description	Quantity
UXR0702A	70 GHz Infiniium UXR-series oscilloscope	1

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.

Time-based – Time-based 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.

Time-based licenses include a software support subscription through the term of the license.

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.

Selecting your license:

Step 1. Choose your software product (e.g. S1234567A).
Step 2. Choose your license term: perpetual or time-based.
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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