

D9342DPPC

DisplayPort UHBR Transmitter Compliance Test Software

Keysight Technologies, Inc. DisplayPort UHBR Transmitter Compliance Test Software for Infiniium Series oscilloscopes provide a fast and easy way to debug and characterize the physical layer of DisplayPort designs for source ICs, motherboard systems, computers and graphics cards against the DisplayPort 2.1 Specification. D9342DPPC is the perfect tool for silicon validation engineers, and its use is highly recommended to DisplayPort Authorized Test Centers.

Features

The DisplayPort UHBR Transmitter Compliance Test Software is a full-featured package to simplify the validation process of DisplayPort designs:

- Covers DisplayPort UHBR10, UHBR13.5 and UHBR20 speeds
- Supports Enhanced DP, Enhanced mDP and USB-C® connectors
- Full test automation with AUX channel controller
- Cable and test fixture embedding and de-embedding for accurate measurements
- Switching solution for automated multilane testing
- Supports D9310AGGC Compliance Test Measurement Server (Disaggregation)



Comprehensive Test Coverage

DisplayPort electrical testing is a complex task as it requires the connection of the product under test to the test instrument with specific test point access fixtures, the configuration and execution of advanced measurements and, finally, the evaluation of test results against the limits described in the specification. The sources of errors are too high to take any risks. The DisplayPort UHBR Transmitter Compliance Test Software greatly reduces the chances of failure and the time spent in testing by providing a guided setup and automated configuration of the test instrument and interpretation of test results. That way, you can leave the complexity of the test setup to the application and focus on the most important: the product under test.

Easy Test Setup

The DisplayPort UHBR Transmitter Compliance Test software blends the advanced measurements of Keysight's Infiniium Series oscilloscopes with an intuitive user interface to provide unmatched testing capabilities. It is as simple as entering DUT attributes like connector type, lane under test and bitrates, and the application takes care of guiding the user through all necessary configuration steps to ensure the correctness of the test execution.

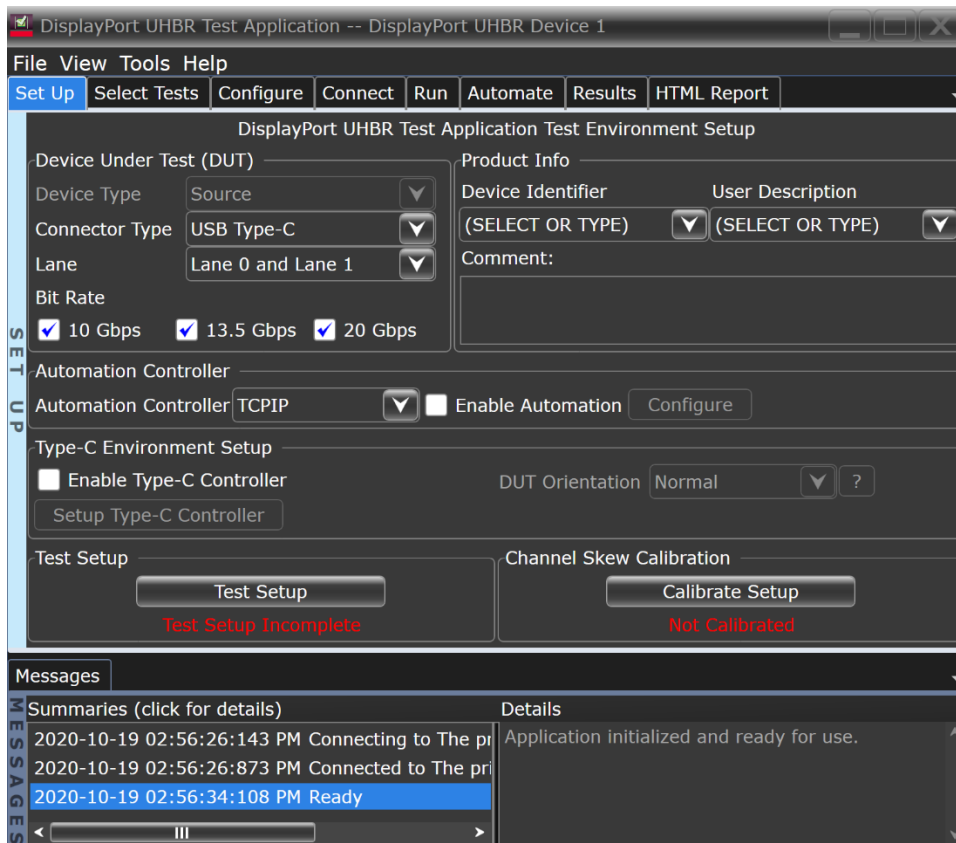


Figure 1. DisplayPort UHBR Transmitter Compliance Test Software main screen

Equalization Optimization

The DisplayPort 2.1 Specification defines new, complex equalization schemes to compensate the channel effects, which become severe at the ultra-high bitrates. These comprehend transmitter Feed-Forward Equalization (FFE) on the DP Source, and receiver Continuous-Time Linear Equalization (CTLE) combined with Decision Feedback Equalization (DFE) on the DP Sink. In normal operation, the fine-tuning of the equalization settings during link training is key for an error-free communication.

DisplayPort defines two test points for Source testing: TP2 and TP3EQ. TP2 is located at the test interface on a mated Test Point Access fixture connected to the DP Source port. At TP2, the only equalization scheme present is the transmitter FFE. TP3EQ is located at the test interface on a mated Test Point Access fixture connected to the DP Sink port, using a defined cable model, with equalization enabled. At TP3EQ, all equalization schemes mentioned previously are present.

The DisplayPort UHBR Transmitter Compliance Test software gives you full control of the link equalization. The software can run an optimization, sweeping the transmitter FFE preset at TP2 and the transmitter FFE preset vs the receiver CTLE DC gain at TP3EQ. Then, the software will use the best settings for the Source tests based on the optimization criteria defined by the user: maximum eye height, eye width or eye area, or minimum inter-symbol interference or data-dependent jitter. If the user prefers to run the Source tests with predefined settings, it is also possible to enter them directly and skip the optimization phase.

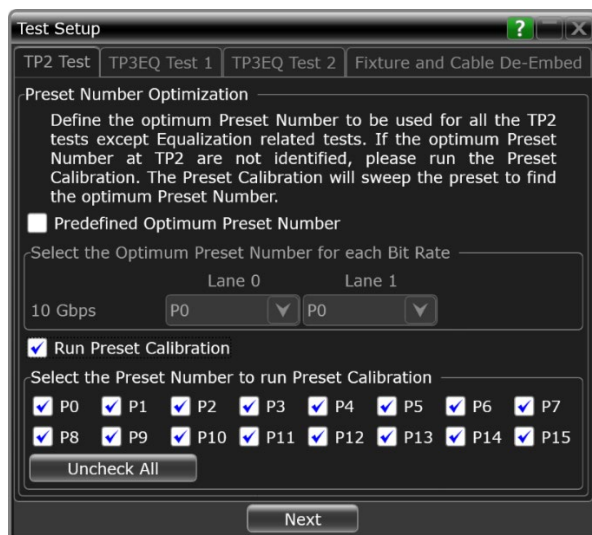


Figure 2. Transmitter FFE preset optimization at TP2

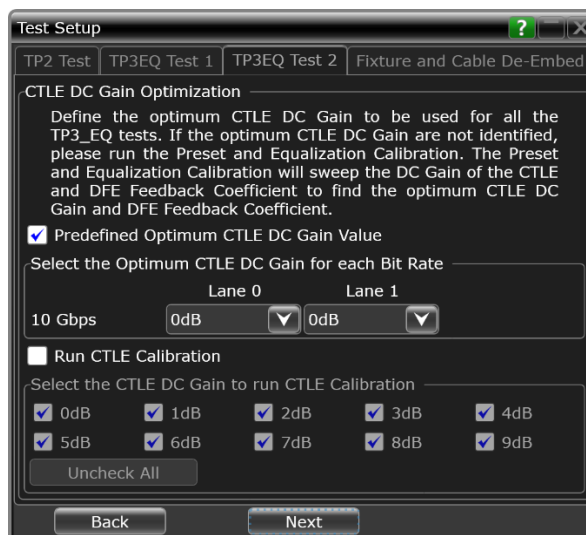


Figure 3. Transmitter FFE preset optimization at TP2

Fixture and Cable De-embedding

The software allows to remove the effect of the test point access fixtures and RF cables used for the measurements. To do so, simply enable the de-embedding options and specify the corresponding S-Parameter files. The flexible configuration allows to use the same S-Parameter file for all tested lanes, or different S-Parameter files per tested lane for a most accurate setup. The software will generate the corresponding transfer functions and use them during the tests.

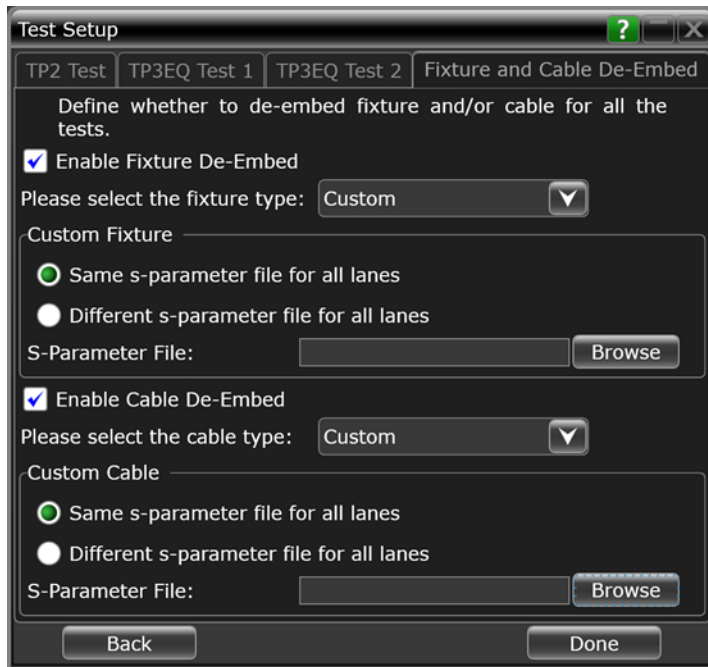


Figure 4. Fixture and cable de-embedding features

Automation

You can completely automate execution of your application's tests and Add-Ins from a separate PC using the included Remote Interface feature (visit www.keysight.com/find/scope-apps-sw to download a free toolkit). You can even create and execute automation scripts right inside the application using a convenient built-in client.

The commands required for each task may be created using a command wizard or from "remote hints" accessible throughout the user interface. Using automation, you can accelerate complex testing scenarios and even automate manual tasks such as:

- Opening projects, executing tests and saving results
- Executing tests repeatedly while changing configurations
- Sending commands to external instruments
- Executing tests in a different order than pre-established

Combine the power of built-in automation and extensibility to transform your application into a complete test suite:

- Interact with your device controller to place it into desired states or test modes before test execution.
- Configure additional instruments used in your test suite such as a pattern generator and probe switch matrix.
- Export data generated by your tests and post-process using your favorite environment, such as MATLAB, Python, LabVIEW, C, C++, Visual Basic etc.
- Sequence or repeat the tests and “Add-In” custom steps execution in any order for complete test coverage of the test plan.

Switch Matrix

The Keysight switch matrix software option for the transmitter compliance test application, used together with switch matrix hardware, enables fully automated testing for multi-lane digital bus interfaces. The benefits of this automated switching solution include:

- Eliminate reconnections, which save time and reduce errors through automating test setup for each lane of a multi-lane bus.
- Maintain accuracy with the use of unique PrecisionProbe or InfiniiSim features to compensate for switch path losses and skew.
- Customize testing by using remote programming interface and the user-defined application tool for device control, instrument control and test customization.

Compliance Test Measurement Server – Measurement Disaggregation

The DisplayPort Electrical Performance Validation and Compliance software is compatible with the D9310AGGC Compliance Test Software Measurement Server, which provides the capability to offload measurements to one or multiple virtual machines or measurement servers, enabling concurrent data acquisition and computation of test results, drastically reducing the overall test time. Please contact us if you would like more information about this powerful feature.

Ordering Information

Recommended Oscilloscope

The DisplayPort UHBR Transmitter Compliance Test Software is compatible with the following Infiniium series oscilloscopes:

Data Rate	Recommended Bandwidth	Oscilloscope
Up to UHBR10 (10 Gb/s)	16 GHz minimum	Infiniium XR8, UXR series oscilloscope
Up to UHBR13.5 (13.5 Gb/s)	21 GHz minimum	Infiniium XR8, UXR series oscilloscope
Up to UHBR20 (20 Gb/s)	21 GHz minimum	Infiniium XR8, UXR series oscilloscope

Software

Model Number	Description	Note
D9342DPPC	DisplayPort UHBR Transmitter Compliance Test Software	Required
D9320ASIA	Advanced Signal Integrity Software (EQ, InfiniiSim Advanced)	Required
D9320JITA	Jitter, Vertical and Phase Noise Analysis Software	Required
D9010DMBA	Precision Cable Calibration	Optional
D9020SCNA	InfiniiScan Event Identification Software	Optional
KS6810A	Data Analytics software (1 license)	Optional

DisplayPort Compliance Test with D9310AGGC Compliance Test Measurement Server

Model Number	Description	Quantity
D9342DPPC	DisplayPort UHBR Transmitter Compliance Test Software. To be installed and licensed on the Infiniium Manager PC. Recommended hardware: 8G RAM, 100G storage.	1
D9320ASIA	Advanced Signal Integrity Software (EQ, InfiniiSim Advanced) To be installed on the oscilloscope.	1
D9320JITA	Jitter, Vertical and Phase Noise Analysis Software. To be installed on the oscilloscope.	1
D9310AGGC	Measurement server license. To be installed on each measurement server: PC or virtual machine. The quantity depends on the desired speed improvement.	N
KS8108A	Resource Arbiter Server To be installed and licensed on any host of the network.	1

AUX Channel Controller

Purchase the AUX controller for automated control of a DisplayPort Transmitter device under test using the Keysight DisplayPort Electrical Performance Validation and Compliance software, order:

Model Number	Description	Quantity
Unigraf UCD-323	AUX controller. Requires hardware and software license from Unigraf Oy. www.unigraf.fi	1

Note: Download and install appropriate Unigraf drivers and software on the oscilloscope.

Unattended Testing with Probes or Switch Matrix

For one connection testing with full automation in DisplayPort either each lane is connected to a differential probe amplifier and SMA probe head, or a switch matrix under control of the DisplayPort Electrical Performance Validation and Compliance software is used. For accuracy, direct connection to oscilloscope as always preferred, however, Keysight enables test automation through these two methods to support validation productivity.

One Connection Solution	Description	Vendor and Details
Four-channel differential connection	Amplifiers: MX0025A (require N2852A interface adapter for XR8-series oscilloscope) Probe heads: MX0105A	Keysight probe solutions supported by the D9342DPPC.
Switch matrix (Only UXR-series oscilloscope is supported)	U3020AS26 OR BIT-2100B: BIT-4000-2114-1 modules, quantity = 2 (4:1 switches) Mainframe BIT-4000-2100-1	BitifEye Corporation

Contact your local Keysight representative for test fixture recommendations.

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 software support 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

Subscription-Based Compliance Test Software Suites

A new ownership model of multiple Compliance Test Software Applications is now available.

With this new subscription-based model, the DisplayPort software suits bundle the Compliance Test Software Applications under a model number. Using subscription-based ownership, you can enjoy all the test software features covered under DisplayPort across multiple generations and variants.

Software Support and Continuity

Under the subscription plan, software support is made available with no extra support cost. Ensuring your software always stays up to date with the latest enhancements and measurement standards while having access to our team of technical experts when you need support.

On top of that all upgrades are made available to you as the DisplayPort standards progress with no additional costs.

Each suite comes with a 12, 24, or 36-month software suite subscription.

Model Number	Options Available
SW30DSPP DisplayPort Validation License	DisplayPort UHBR Transmitter Compliance Test Software (D9342DPPC)
SW32DSPP DisplayPort Full Validation License	DisplayPort UHBR Transmitter Compliance Test Software (D9342DPPC)

Keysight enables innovators to push the boundaries of engineering by quickly solving design, emulation, and test challenges to create the best product experiences. Start your innovation journey at www.keysight.com.



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