

D9040USBC

USB4 TX Test Application Software

The Keysight Technologies, Inc. USB4 Transmitter test application provides a fast and easy way to test, debug and characterize your USB4 products. The tests performed by the D9040USBC software are based on the USB4 Compliance Test Specification (CTS). The test application offers a user-friendly setup wizard and a comprehensive report that includes margin analysis. In addition to the automated testing, there is also a Configuration menu that allows customized setups including different cable models and jitter setups.

Comprehensive Test Coverage

The USB4 test application automatically configures the oscilloscope for each test and provides results which include margin and statistical analysis. The tests coverage includes electrical, timing and eye diagram tests as stated in the USB4 specification and the CTS. The signal is optimized for most accurate test result and measurement repeatability.



- Setup wizard for quick setup, configuration and test selection
- Covers 10/10.3125/20/20.625 Gbps rates
- Automated test setup and execution for ease of use
- Simultaneous two-lane testing as well as single or dual port
- Cable and test fixture embedding and de-embedding to provide more accurate margin estimates
- Test results report generation
- Pass/fail margin analysis
- Test framework that reports multi trial results with full array of statistics for each measurement with worst case measurement result

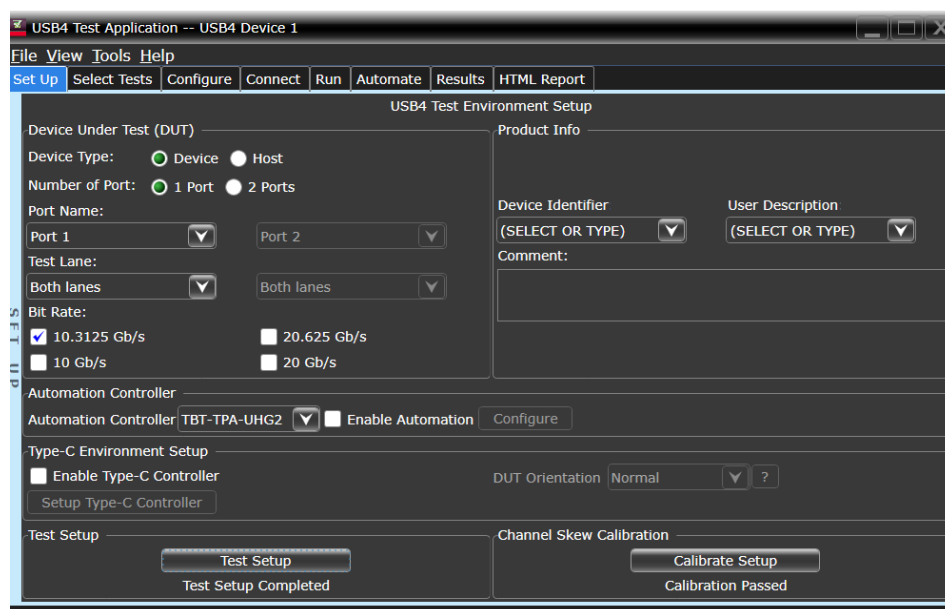


Figure 1: USB4 application test setup screen.

One of the unique requirements of USB4 testing is Preset Calibration and CTLE calibration. The USB4 test application automatically determines the optimal Preset and CTLE.

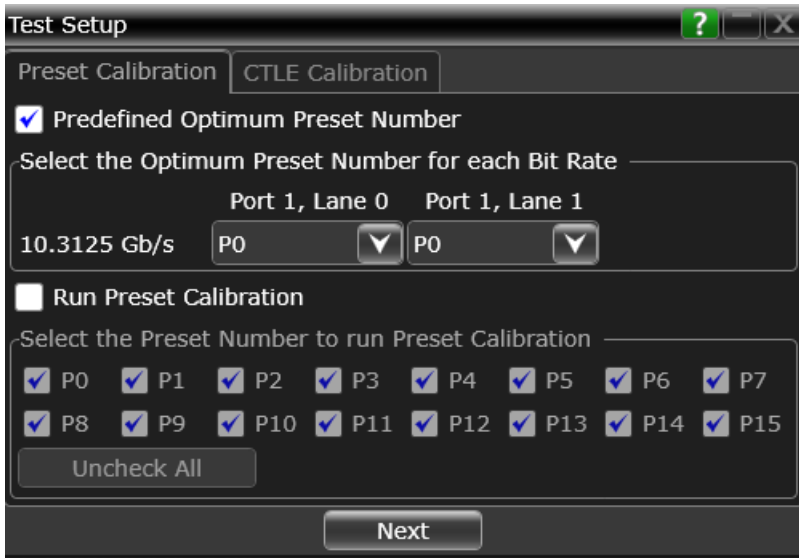


Figure 2: Preset Calibration

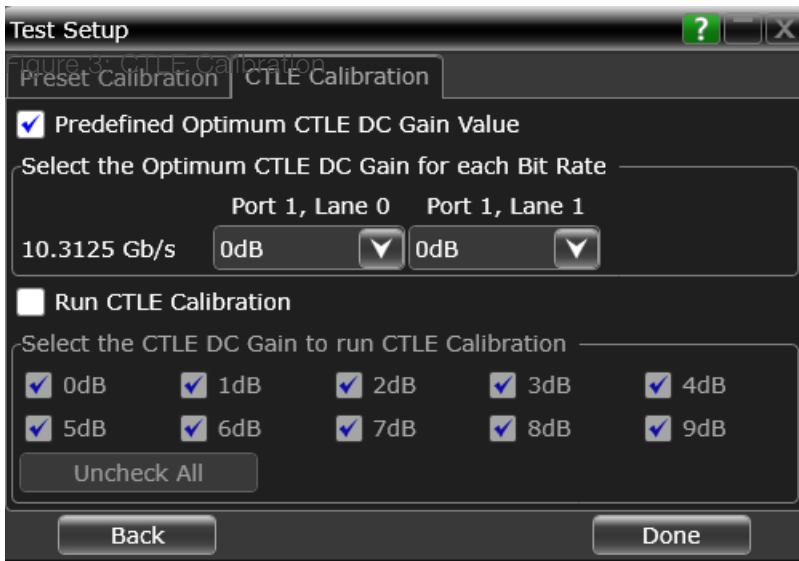


Figure 3: CTLE Calibration

Easy Test Definition

The test application enhances the usability of Keysight Infiniium oscilloscopes for testing USB4 products. The Keysight automated test framework guides you quickly through the steps required to define the setup, perform the tests and view the test results. You can select a category of tests or select an individual test. The user interface is designed to minimize unnecessary reconnections, which will help save test time and minimize potential operator error. You can save the tests and configurations as project files and recall them for quick testing and review previous results.

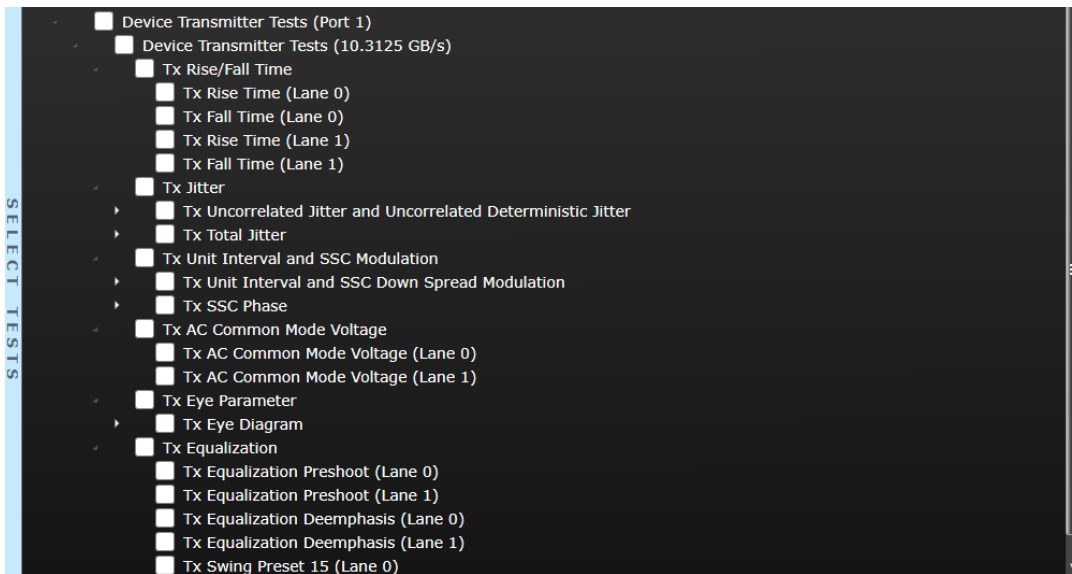


Figure 4: The Select tab list all the tests available in your setup. You can easily setup the individual test or group of tests.

Configurability and Guided Connection

The USB4 test application provides flexibility in your test setup. Once you have configured the tests, the connection page will display the connection diagram for the test you have selected.

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.

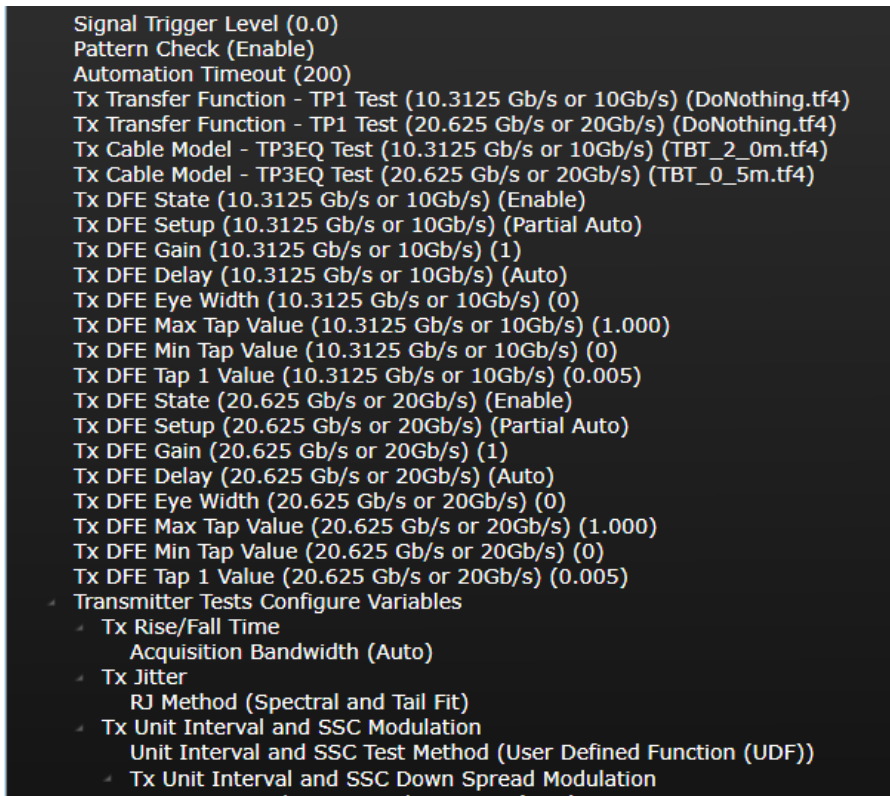


Figure 5: Configuration menu allows for flexible and customized test conditions.

Comprehensive Result Analysis

In addition to providing you with measurement results, the test application reports how close your test results are to the specified test limit. You can specify the level at which warnings are to be issued. You are provided a full array of statistics for each measurement.

Thorough Performance Reporting

The USB4 test application 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.

Pass	# Failed	# Trials	Test Name	Actual Value	Margin	Pass Limits
		1	3.3.1a Tx Preset Calibration (Port 1, Lane 0)	P1		Pass/Fail
		1	3.3.1b Tx CTLE Calibration (Port 1, Lane 0)	5dB		Pass/Fail
	0	1	3.5.9a Tx Rise Time (Port 1, Lane 0)	22.545 ps	125.5 %	VALUE >= 10.000 ps
	0	1	3.5.9b Tx Fall Time (Port 1, Lane 0)	22.505 ps	125.1 %	VALUE >= 10.000 ps
	0	1	3.5.11 Tx Uncorrelated Jitter (Port 1, Lane 0)	167.5 mUI	46.0 %	VALUE <= 310.0 mUI
	0	1	3.5.12 Tx Uncorrelated Deterministic Jitter (Port 1, Lane 0)	57.4 mUI	66.2 %	VALUE <= 170.0 mUI
	0	1	3.5.14 Tx Duty Cycle Distortion (Port 1, Lane 0)	2.9 mUI	90.3 %	VALUE <= 30.0 mUI
	0	1	3.5.13 Tx Low Frequency Uncorrelated Deterministic Jitter (Port 1, Lane 0)	21.7 mUI	69.0 %	VALUE <= 70.0 mUI
	0	1	3.5.17 Tx Uncorrelated Jitter TP3EQ (Port 1, Lane 0)	185.6 mUI	40.1 %	VALUE <= 310.0 mUI
	0	1	3.5.18 Tx Uncorrelated Deterministic Jitter TP3EQ (Port 1, Lane 0)	39.3 mUI	76.9 %	VALUE <= 170.0 mUI
	0	1	3.5.10 Tx Total Jitter (Port 1, Lane 0)	327.7 mUI	28.8 %	VALUE <= 460.0 mUI
	0	1	3.5.16 Tx Total Jitter TP3EQ (Port 1, Lane 0)	458.5 mUI	23.6 %	VALUE <= 600.0 mUI
	0	1	3.5.3a Tx Unit Interval Mean, Min (Port 1, Lane 0)	50.1242 ps	46.4 %	50.1102 ps <= VALUE <= 50.1404 ps
	0	1	3.5.3b Tx Unit Interval Mean, Max (Port 1, Lane 0)	50.1243 ps	46.7 %	50.1102 ps <= VALUE <= 50.1404 ps
	0	1	3.5.2a Tx Unit Interval, Min (Port 1, Lane 0)	50.0095 ps	3.8 %	50.0000 ps <= VALUE <= 50.2513 ps
	0	1	3.5.2b Tx Unit Interval, Max (Port 1, Lane 0)	50.2394 ps	4.7 %	50.0000 ps <= VALUE <= 50.2513 ps
	0	1	3.5.5 Tx SSC Down Spread Rate (Port 1, Lane 0)	30.790 kHz	26.3 %	30.000 kHz <= VALUE <= 33.000 kHz
	0	1	3.5.4 Tx SSC Down Spread Range (Port 1, Lane 0)	457.5 m%	42.5 %	400.0 m% <= VALUE <= 500.0 m%
	0	1	3.5.8 Tx SSC Slew Rate (Port 1, Lane 0)	426.8 ppm/us	57.3 %	VALUE <= 1.0000 kppm/us
	0	1	3.5.6 Tx SSC Phase Deviation (Port 1, Lane 0)	20.402 ns	8.2 %	2.500 ns <= VALUE <= 22.000 ns
	0	1	3.5.14 Tx AC Common Mode Voltage (Port 1, Lane 0)	51.15 mV	48.9 %	VALUE <= 100.00 mV
	0	1	3.5.15 Tx Eye Diagram (Port 1, Lane 0)	Pass	100.0 %	Pass/Fail
	0	1	3.5.19 Tx Eye Diagram TP3EQ (Port 1, Lane 0)	Pass	100.0 %	Pass/Fail
	0	1	3.5.1a Tx Equalization Preshoot (Port 1, Lane 0)	Pass	100.0 %	Pass/Fail
	0	1	3.5.1b Tx Equalization Deemphasis (Port 1, Lane 0)	Pass	100.0 %	Pass/Fail
	0	1	3.5.1c Tx Swing Preset 15 (Port 1, Lane 0)	3.3736 dB	43.7 %	2.5000 dB <= VALUE <= 4.5000 dB

Figure 6: The USB4 test application generates a summary report for quick results viewing. The report includes details such as test limits, test description and test results.

The D9040USBC USB4 Test Application Software is compatible with the Infiniium series oscilloscope.

Data rate	Recommended Bandwidth	Minimum Channels	Description
20 Gb/s	33 GHz. Higher bandwidth is required if debugging close to silicon	4	Z- series, UXR oscilloscopes

Ordering Information

Model number	Description	Note
D9040USBC	USB4 TX Test Software	Required
D9020ASIA	Advanced Signal Integrity Software (EQ, InfiniiSim Advanced)	Required
D9020JITA	EZJIT Complete	Required

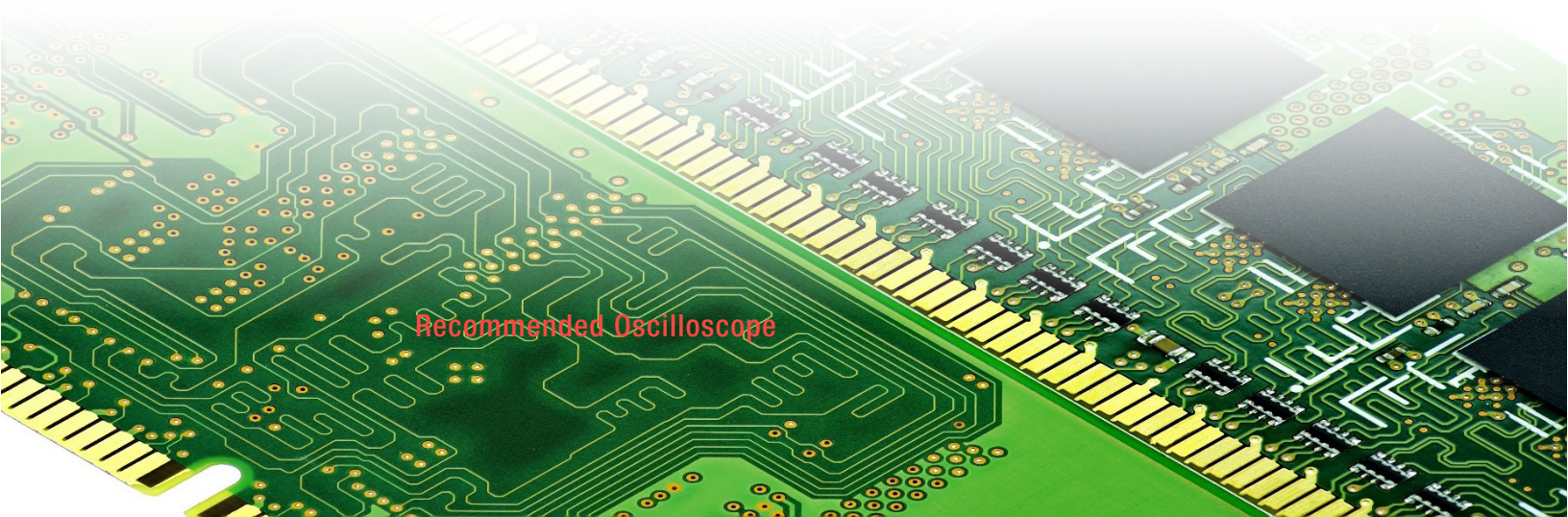


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Recommended Oscilloscope



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License Types

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

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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.

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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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