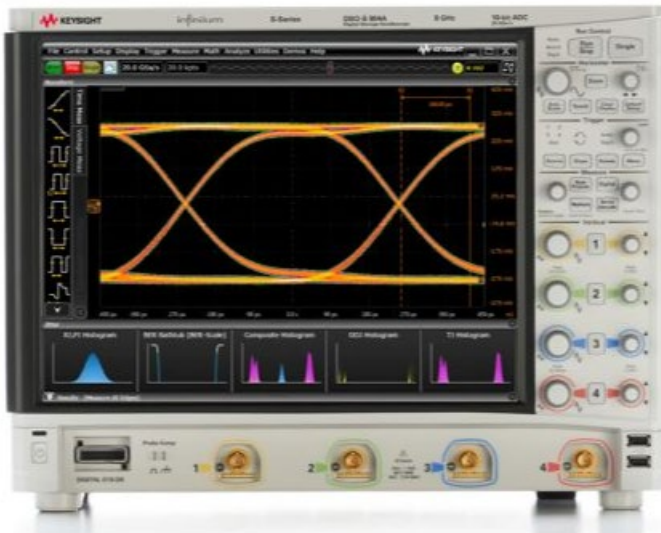


D9010EBZC 10GBASE-T, NBASE-T and MGBASE-T Compliance Test Application Software

The Keysight Technologies, Inc. your D9010EBZC 10GBASE-T, NBASE-T and MGBASE-T compliance test application provides a fast and effortless way to test, debug and characterize your 10GBASE-T, NBASE-T and MGBASE-T Ethernet designs. The Keysight D9010EBZC 10GBASE-T, NBASE-T and MGBASE-T 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 IEEE 802.3-2018 clause 55 (10GBASE-T), IEEE 802.3-2018 clause 126 (5GBASE-T, 2.5GBASE-T) and MGBASE-T-TI100-R (5GBASE-T, 2.5GBASE-T) specifications. Performing these tests gives you confidence in your design. The D9010EBZC 10GBASE-T, NBASE-T and MGBASE-T Compliance Test Application Software helps you execute a wide subset of the compliance tests using an oscilloscope, spectrum analyzer and vector network analyzer. 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 10GBASE-T transmitter electrical specifications as described in clause 55.5.3 of IEEE 802.3-2018.
- Complete coverage of the NBASE-T transmitter electrical specification as described in the IEEE clause 126.5.3 of IEEE 802.3-2018.
- Complete coverage of the MGBASE-T transmitter electrical specifications as described in the MGBASE-T-TI100-R.
- Accurate return loss testing performed with a supported Keysight vector network analyzer.
- Automated measurement setup and programming of oscilloscope, spectrum analyzer and vector network analyzer 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 D9010EBZC 10GBASE-T, NBASE-T and MGBASE-T Compliance Test Application Software, you can use the same oscilloscope you use for everyday debugging to perform automated testing and margin analysis.

D9010EBZC Compliance Test Application Software Saves You Time

The D9010EBZC 10GBASE-T, NBASE-T and MGBASE-T Compliance Test Application Software saves you time by setting the stage for automatic execution of IEEE 802.3-2018 clause 55 (10GBASE-T), IEEE 802.3-2018 clause 126 (5GBASE-T, 2.5GBASE-T) and MGBASE-T-TI100-R (5GBASE-T, 2.5GBASE-T) 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 D9010EBZC 10GBASE-T, NBASE-T and MGBASE-T 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.

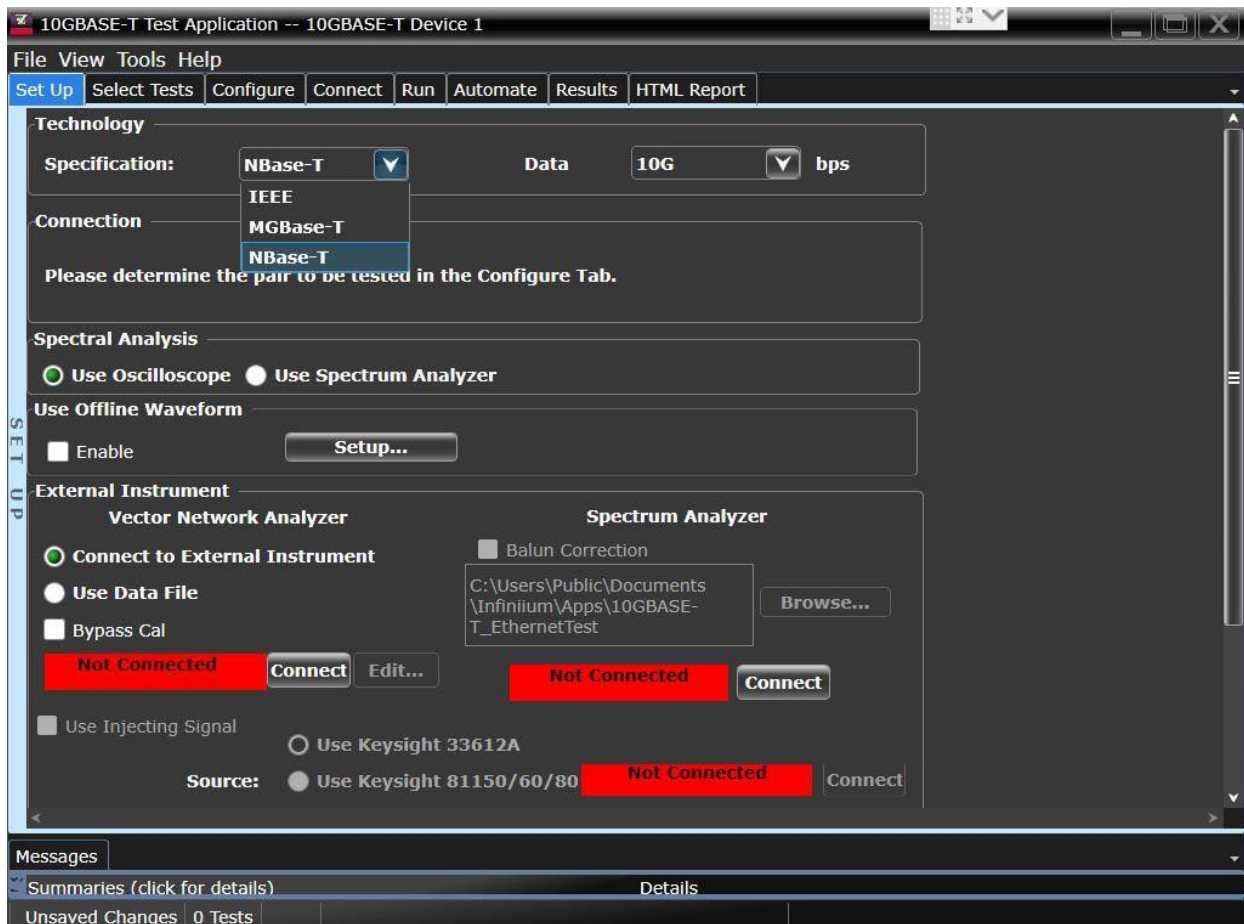


Figure 1. The clean interface of the setup page enables you to quickly make decisions and perform functions that affect the testing task. This is where you select the specification and speed of the device under test and set up your additional instruments.

Easy test definition

The D9010EBZC 10GBASE-T, NBASE-T and MGBASE-T Compliance Test Application Software extends the ease-of-use advantages of Keysight's Infiniium oscilloscopes to testing IEEE 802.3-2018 clause 55.5.3 (10GBASE-T), IEEE 802.3-2018 clause 126.5.3 (5GBASE-T, 2.5GBASE-T) and MGBASE-T-TI100-R (5GBASE-T, 2.5GBASE-T) 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.

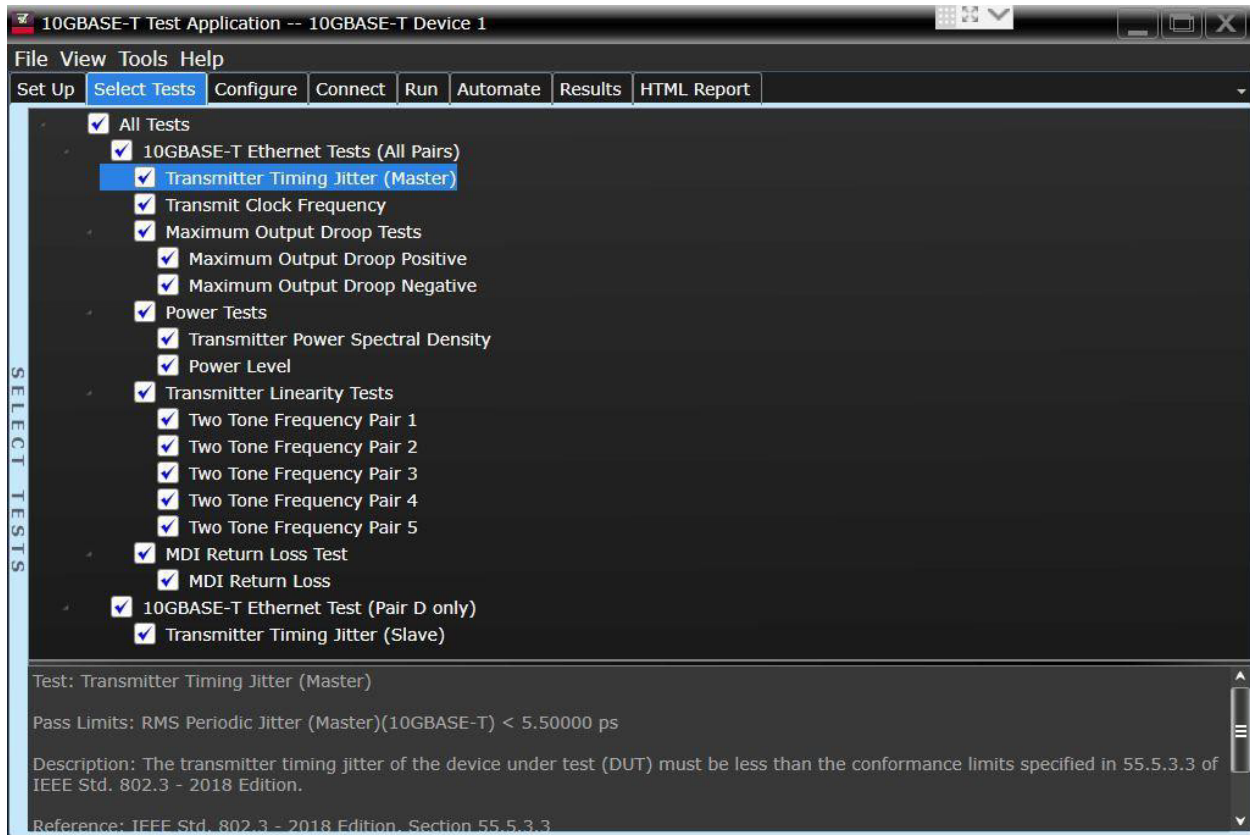


Figure 2. The Keysight automated test engine quickly guides you through selecting and configuring tests, setting up the connection, running the tests, and viewing the results. You can easily select individual tests or groups of tests with a mouse-click.

The following clauses are included in the D9010EBZC 10GBASE-T, NBASE-T and MGBASE-T Compliance Test Application Software:

10GBASE-T Standard reference	Description
IEEE 802.3-2018 Subclause 55.5.3.1	Maximum output droop
IEEE 802.3-2018 Subclause 55.5.3.2	Transmitter linearity
IEEE 802.3-2018 Subclause 55.5.3.3	Transmitter timing jitter
IEEE 802.3-2018 Subclause 55.5.3.4	Transmitter power spectral density (PSD) and power level
IEEE 802.3-2018 Subclause 55.5.3.5	Transmit clock frequency
IEEE 802.3-2018 Subclause 55.8.2.1	MDI return loss

NBASE-T Standard reference	Description
IEEE 802.3-2018 Subclause 126.5.3.1	Maximum output droop test positive/negative
IEEE 802.3-2018 Subclause 126.5.3.2	Transmitter linearity tests
IEEE 802.3-2018 Subclause 126.5.3.3	Transmitter timing jitter
IEEE 802.3-2018 Subclause 126.5.3.4	Transmitter power spectral density (PSD) and power level
IEEE 802.3-2018 Subclause 125.5.3.5	Transmit clock frequency
IEEE 802.3-2018 Subclause 126.8.2.1	MDI return loss

MGBASE-T Standard reference	Description
MGBASE-T PMA Electrical specifications	Maximum output droop test positive/negative
	Transmitter linearity tests
	Transmitter timing jitter
	Transmitter power spectral density (PSD) and power level
	Transmit clock frequency
	MDI return loss

Configurability and Guided Connection

The D9010EBZC 10GBASE-T, NBASE-T and MGBASE-T Compliance Test Application Software 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.

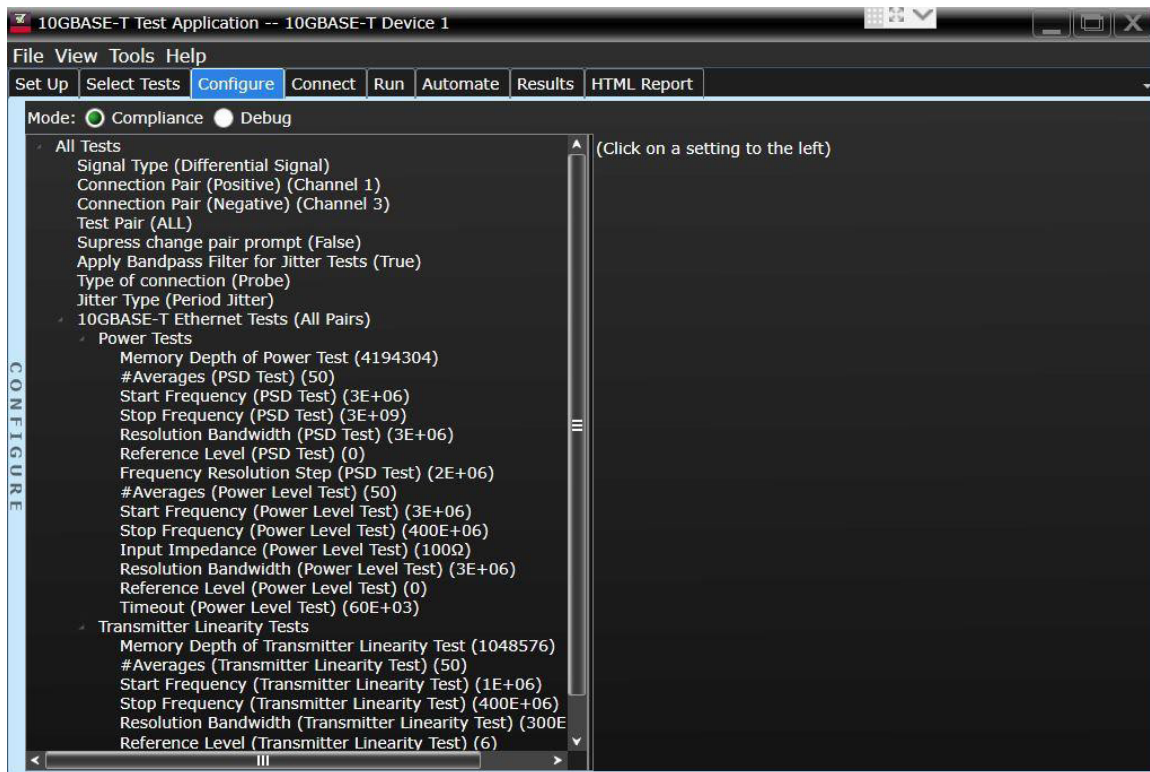


Figure 3. To set up tests, you define the device to test, its configuration, and how the oscilloscope is connected to it.

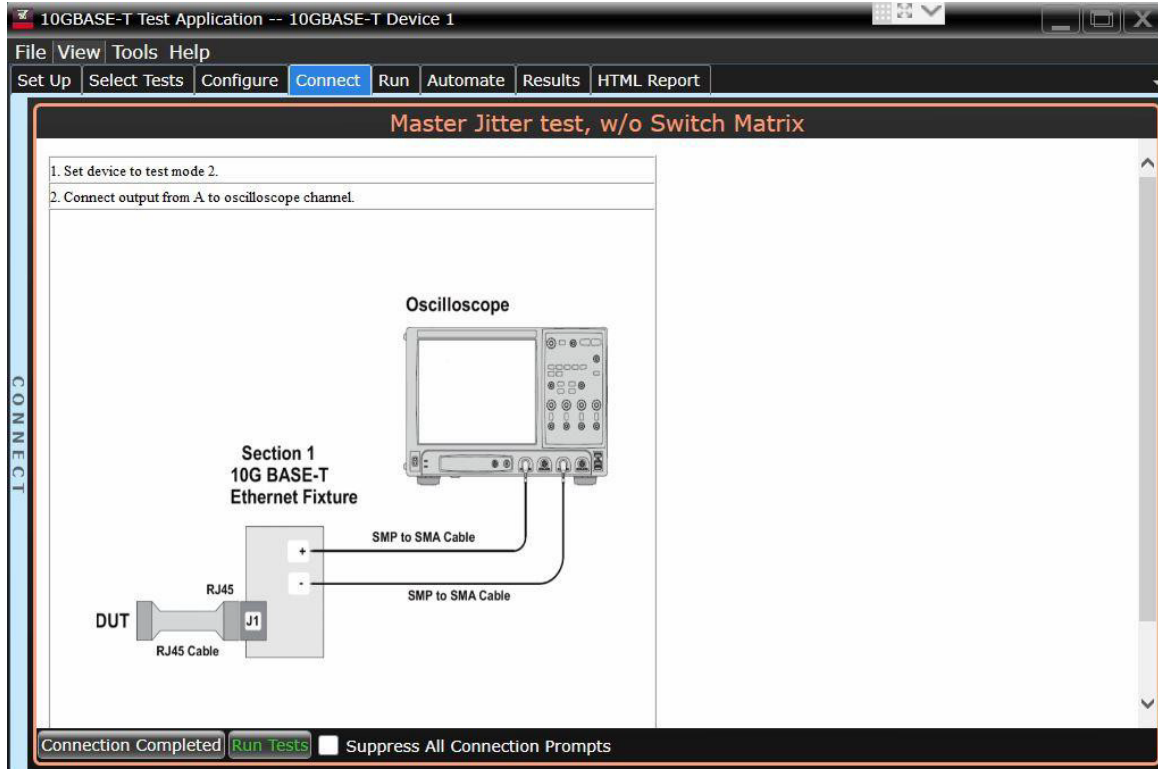


Figure 4. When you make multiple tests where the connections must be changed, the software prompts you with connection diagrams.

Comprehensive Result Analysis

In addition to providing you with measurement results, the D9010EBZC 10GBASE-T, NBASE-T and MGBASE-T 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 IEEE 802.3-2018 clause 55.5.3 (10GBASE-T), IEEE 802.3-2018 clause 126.5.3 (5GBASE-T, 2.5GBASE-T) and MGBASE-T-TI100-R (5GBASE-T, 2.5GBASE-T) specifications.

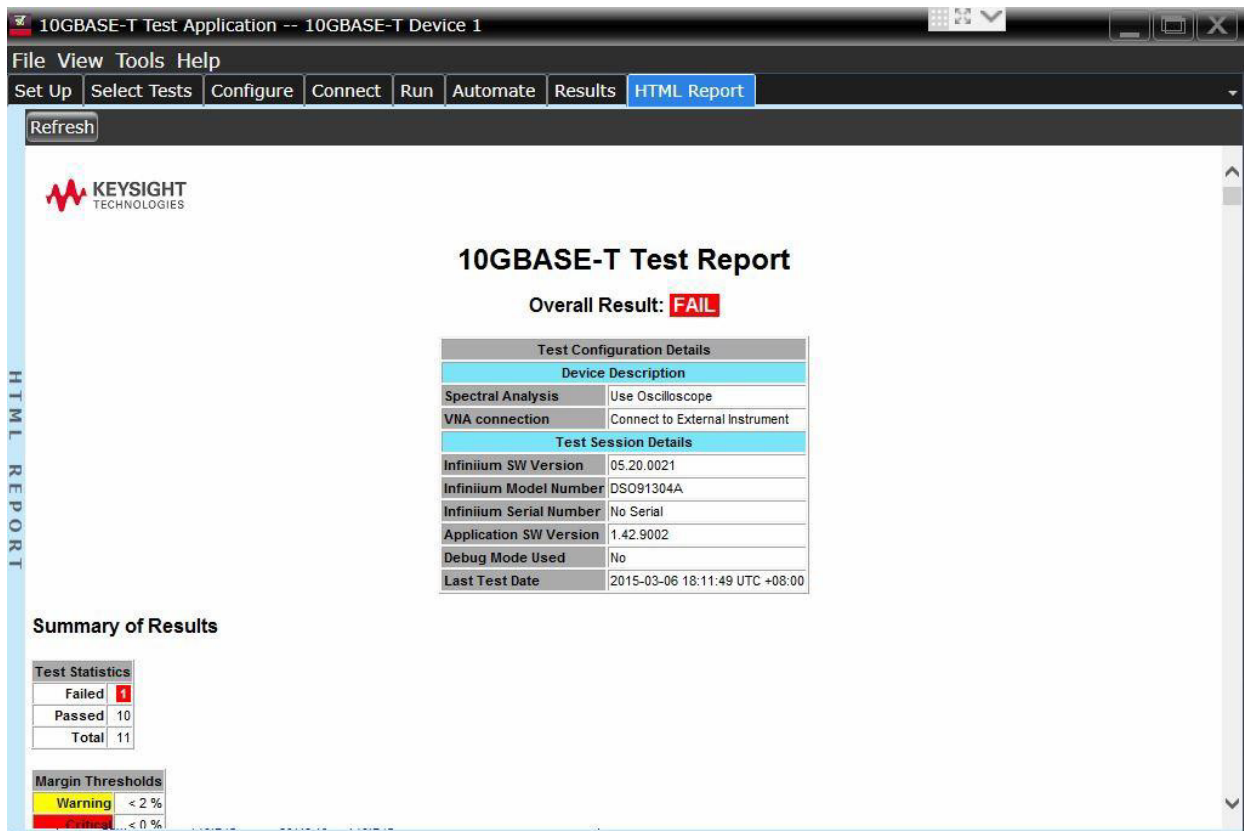


Figure 5. The IEEE802.3bs/cd compliance test application software results screen shows a summary of the tests performed, pass/fail status, and margin. Hyperlinks direct you to the more details of that test.

Thorough Performance Reporting

The D9010EBZC 10GBASE-T, NBASE-T and MGBASE-T 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.

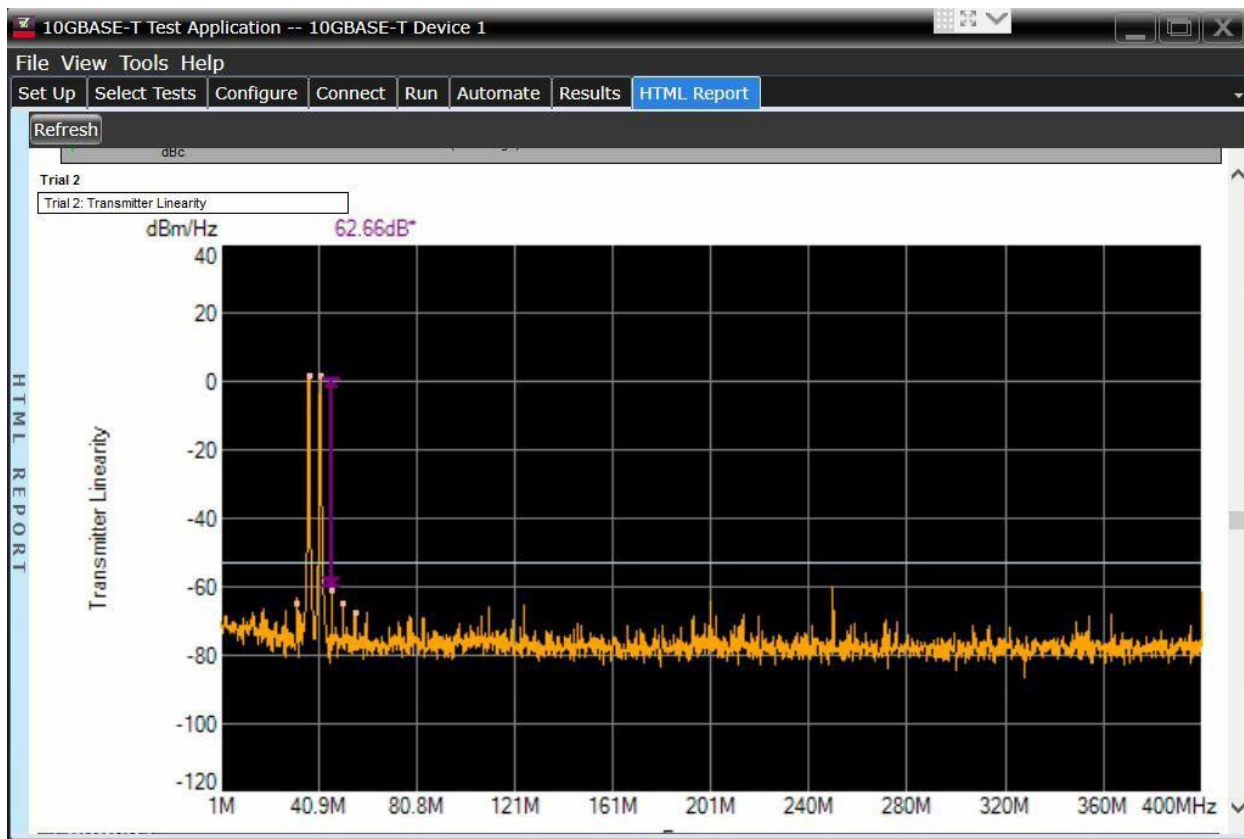


Figure 6. Additional details are available for each test, including the test limits, test description, and test results, including waveforms, if appropriate.

Recommended Oscilloscope

The D9010EBZC 10GBASE-T, NBASE-T and MGBASE-T Compliance Test 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
10 Gb/s	4 GHz	2	All Infiniium oscilloscopes ≥ 4 GHz (MXR Series, V- Series, Z- Series, UXR -Series)
5 Gb/s			
2.5 Gb/s			

Ordering Information

Model number	Description	Note
D9010EBZC	10GBASE-KR Compliance Test Application Software	Required
D9020ASIA	Advanced Signal Integrity Software (EQ, InfiniiSim Advanced)	Optional
D9010JITA	EZJIT Complete - Jitter and Vertical Noise Analysis Software	Required

Example of Hardware Configuration

Model number	Description	Quantity
MXR404A	MXR404A Infiniium MXR-Series Oscilloscope: 4 GHz, 4 Channels	1

Supported Spectrum Analyzers

Supported Keysight spectrum analyzer	Description
N9020A	MXA midrange signal analyzer with frequency range options of 20 Hz to 3.6 GHz, 8.4 GHz, 13.6 GHz, or 26.5 GHz. The N9068A (phase noise measurement application) is a recommended add-on for advanced jitter analysis
N9010A	EXA economy signal analyzer with frequency range options of 9 kHz to 3.6 GHz, 7.0 GHz, 13.6 GHz, or 26.5 GHz. The N9068A (phase noise measurement application) is a recommended add-on for advanced jitter analysis
E4440/3/5/6/7/8A	PSA Series performance spectrum analyzer with frequency range of 3 Hz to 26.5 GHz, 6.7 GHz, 13.2 GHz, 44 GHz, 42.98 GHz, or 50 GHz. Option 226 (phase noise measurement personality) is recommended for advanced jitter analysis Noted: Not recommend using E44XXA as it has higher noise floor if compare with others model.
E4402/4/5/7B	ESA-E Series mid-performance spectrum analyzer with frequency range of 9 kHz to 3.0 GHz, 6.7 GHz, 13.2 GHz, or 26.5 GHz. Option 226 (Phase noise measurement personality) is recommended for advanced jitter analysis
E4403/8B	ESA-L Series low-cost economy spectrum analyzers for basic analysis with frequency range of 9 kHz to 3.0 GHz or 26.5 GHz. These are for basic analysis only and are not recommended if advanced analysis capability is desired.

Vector Network Analyzers for Return Loss Testing

The current Keysight vector network analyzers listed below are supported for return loss testing. Models listed below must be in the configuration where it can support 50 Ohms measurements in the 1 MHz to 500 MHz frequency range.

Supported Keysight Vector Network Analyzer	Description
E5061x/62x/70x/71x	ENA Series network analyzers
4395A/96B	Combination analyzers
N5230A/C	PNA-L Series general-purpose network analyzer with start frequency range of 300 kHz

Fixture and Accessories

Model number	Description	Quantity
U7237A	10GBASE-T Transmitter Electrical Test Fixture for MGBASE-T and NBASE-T	1
54855-67604/1250-2015	Precision BNC(m) to 3.5mm(f) adapter	2

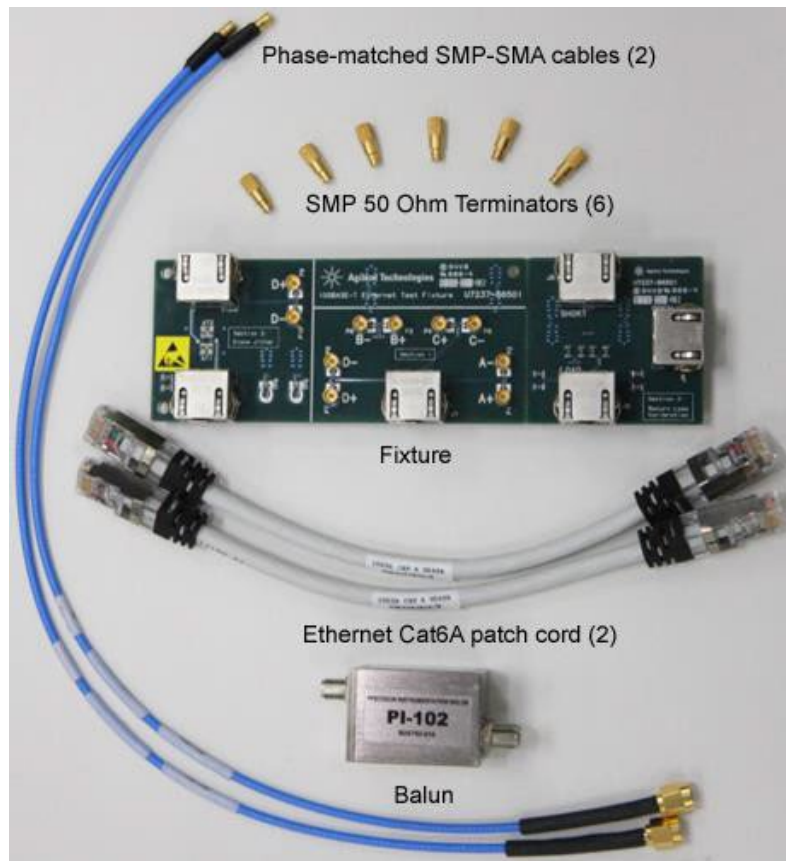


Figure 7. The U7237A fixture kit includes all the required accessories to make both electrical and return loss measurements.

For Transmitter Nonlinear Distortion Tests

Model number	Description	Quantity
33600A series or 81150A/60A/80A	Waveform generator or Pulse Function Arbitrary Noise Generator	1
11667L	DC to 2 GHz Power Splitter with BNC connector	2
11667B	DC to 26.5 GHz Power Splitter with SMA connector	2
54855-67604/1250-2015	Precision BNC(m) to 3.5mm(f) adapter (in addition to those listed above)	2
15443A	Matched SMA cable pair, m-m, 36"	2

Note: Pick just one of the splitters above for transmitter nonlinear distortion test

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.

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.