DATA SHEET

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 preforming 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 analyz



• 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.

10GBASE-T Test Application 10GBASE-T Devi	ce 1	
File View Tools Help		
Set Up Select Tests Configure Connect Run	Automate Results HTML Report	•
Technology		^
Specification: NBase-T	Data 10G 🔽 bps	
IEEE		
ConnectionMGBase-T		
NBase-T Please determine the pair to be tested in t	he Configure Tab.	
Spectral Analysis		
🔘 Use Oscilloscope 🌔 Use Spectrum Ana	lyzer	
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Messages		•
Summaries (click for details)	Details	
Unsaved Changes 0 Tests		

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.

10GBASE-T Test Application 10GBASE-T Device 1		
File View Tools Help		
Set Up Select Tests Configure Connect Run Automate Results HTML Report		÷
 All Tests 10GBASE-T Ethernet Tests (All Pairs) Transmitter Timing Jitter (Master) Transmit Clock Frequency Maximum Output Droop Tests Maximum Output Droop Positive Maximum Output Droop Negative Maximum Output Droop Negative Maximum Output Droop Negative Maximum Output Droop Negative Yower Tests Transmitter Power Spectral Density Power Level Transmitter Linearity Tests Two Tone Frequency Pair 1 Two Tone Frequency Pair 2 Two Tone Frequency Pair 3 Two Tone Frequency Pair 4 Two Tone Frequency Pair 5 MDI Return Loss MDI Return Loss Transmitter Timing Jitter (Slave) 		
Test: Transmitter Timing Jitter (Master) Pass Limits: RMS Periodic Jitter (Master)(10GBASE-T) < 5.50000 ps		Î
Description: The transmitter timing jitter of the device under test (DUT) must be less than the co IEEE Std. 802.3 - 2018 Edition.	onformance limits specifi	ed in 55.5.3.3 of 📙
Reference: IEEE Std. 802.3 - 2018 Edition. Section 55.5.3.3		v

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
MGBASE-T PMA Electrical specifications	Transmitter linearity tests
MGBASE-T PMA Electrical specifications	Transmitter timing jitter
MGBASE-T PMA Electrical specifications	Transmitter power spectral density (PSD) and power level
MGBASE-T PMA Electrical specifications	Transmit clock frequency
MGBASE-T PMA Electrical specifications	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.

3	10GE	BASE-T Test Ap	plication	10GBASE-	T Dev	ice 1			12 ×	
Fil	File View Tools Help									
Se	et Up	Select Tests	Configure	Connect	Run	Automate	Results	HTML Report		÷
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CONFIGURE		# Average Start Free Stop Free Resolutio Reference Frequence Start Fre Stop Free Stop Free Resolutio Reference Timeout Transmitter Memory I # Average Start Fre Stop Free Resolutio	ir (Positive) ir (Negative) e pair prom ss Filter for ction (Probe hernet Tests f) Depth of Poi es (PSD Tesi quency (PSI quency (PSI quency (PSI quency (PSI e Level (PSI e Level (PSI e Level (PSI to Bandwidti e Level (Power Lev quency (Power Lev quency (Power Lev pedance (Pow n Bandwidti e Level (Power Lev e Level (Power Lev e Level (Power Lev com Bandwidti e Level (Power Lev pedance (Power Lev pedance (Power Lev pedance) (Power Lev pedan	(Channel) (Channel) (Channel pt (False)) itter Tests) ; (All Pairs wer Test (4 ;) (50) D Test) (35 D Test) (4 Ver Level T ver Level T ver Level T er Level T er Level T ter Level T ter Level T ter Level T h (Power L ter Level T h (Power Level	3) (True) (11943) (1943) (1943) (1943) (1943) (1943) (1943) (1943) (1943) (1943) (1944) (194	 406) (2E+06) 3E+06) 400E+06) (100Ω) est) (3E+06) (100Ω) ty Test (104 t) (50) ty Test) (1E- y Test) (1E- y Test) (1E- y Test) (1E- y Test) (1E- 	8576) ⊦06) E+06)	(Click on a setting to t	he left)	

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

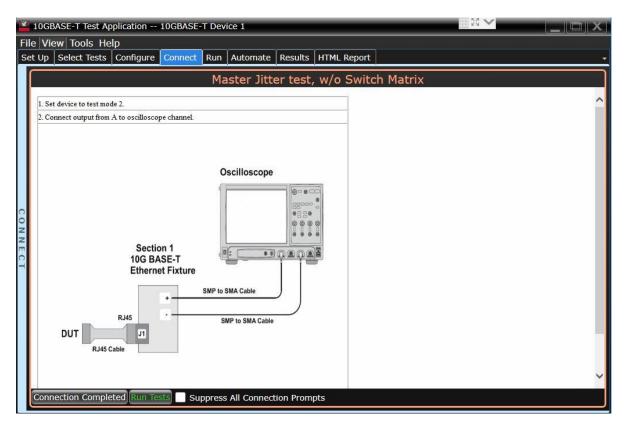


Figure 4. When you make multiple tests where the connections must be changed, the software prompts you with connection diagrams.

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.

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Test Session Details Infinitium SW Version 05.20.0021 Infinitium Model Number DS091304A Infinitium Serial Number No Serial Application SW Version 1.42.9002 Debug Model Used No Last Test Date 2015-03-06 18:11:49 UTC +08:00	
Infinitium SW Version 05:20:0021 Infinitium Model Number DS091304A Infinitium Serial Number No Serial Application SW Version 1:42:9002 Debug Mode Used No Last Test Date 2015-03:06 18:11:49 UTC +08:00 Summary of Results	
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Test Statistics Failed Passed 10 Total	
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Total 11	
Margin Thresholds	
Warning <2%	

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.

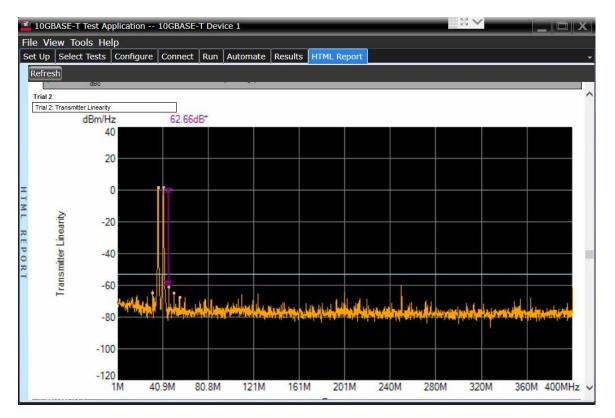


Figure 6. Additional details are available for each test, including the test limits, test description, and test results, including waveforms, if appropriate.

Recommended oscilloscope

The D9010EBZC 10GBASE-T, NBASE-T and MGBASE-T Compliance Test Application Software is compatible with Keysight Infinitum Series oscilloscopes with operating software revision 6.30 or higher.

Data Rates	Minimum Bandwidth	Minimum Channels	Compatible Oscilloscopes
10Gb/s			
5Gb/s	4 GHz	2	All Infiniium oscilloscopes ≥ 4
2.5Gb/s			GHz

Ordering Information

Model number	Description	Note
D9010EBZC	10GBASE-T, NBASE-T and MGBASE-T Compliance Test Application 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
UXR0502A	50 GHz Infiniium UXR-series oscilloscope	1

Fixture and Accessories

Model number	Description	Quantity
U7237A	10GBASE-T Transmitter Electrical Test Fixture for MGBASE-T and NBASE-T	1
11667L	DC to 2 GHz Power Splitter with BNC connector	1
11667B	DC to 26.5 GHz Power Splitter with SMA connector	1

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

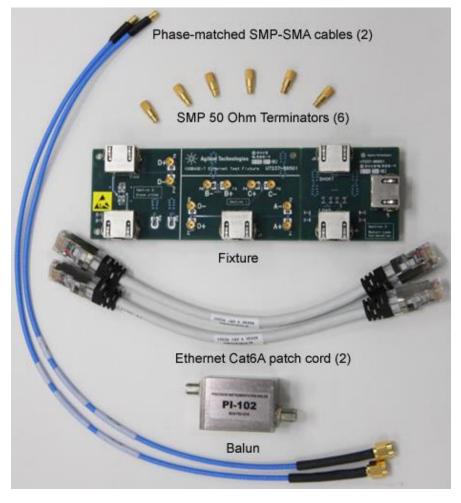


Figure 7. The U7237A fixture kit includes all the required accessories to make both electrical and return loss measurements.

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.

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.

Learn more at: www.keysight.com

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus



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.