

# D9040DDRC DDR4 and LPDDR4 Compliance Test Software

The Keysight Technologies, Inc. DDR4 and LPDDR4 compliance test application provides a fast and easy way to test, debug and characterize your DDR4 and LPDDR4 designs. The tests performed by the D9040DDRC software are based on the JEDEC DDR4 and LPDDR4 Specification. In addition, the application features Custom mode, which covers crucial measurements such as eye-diagram, mask testing, ringing and other tests that are not covered in the specifications but are critical for characterizing DDR4 and LPDDR4 devices. The test application offers a user-friendly setup wizard and a comprehensive report that includes margin analysis.

## Features

The DDR4 and LPDDR4 compliance test application offers several key features to simplify the validation of your designs.

- Intuitive setup wizard for quick test setup, configuration and test.
- AI assisted voltage threshold finding for robust read/write cycle separation.
- DDR4 MSO logic channel trigger option to trigger command protocol.
- Comprehensive test coverage of the DDR4, LPDDR4 (LPDDR4x and LPDDR4y) electrical, timing and eye diagram tests.
- Ability to analyze the loading effect of adjacent RANK of the same memory channel.
- Powerful characterization through multiple trials that show a full array of statistics for each measurement and returns the worst measurement value.
- DDR debug tool allows for navigation to areas of interest in a saved set of waveforms with JEDEC measurement for pre- and post-compliance testing, which includes electrical, timing and multiple eye diagram analysis.
- Offline setup allows for compliance testing on saved waveform files from oscilloscope or ADS simulation tool.

## Comprehensive Test Coverage

The DDR4 and LPDDR4 validation test application allows you to use the oscilloscope to perform automated testing and margin analysis on your design. The application automatically configures the oscilloscope for each test and provides informative test result. It includes margin analysis indicating how close your device comes to passing or failing each test parameter. The DDR4 and LPDDR4 compliance test automates the measurement as specified in the specification, which helps save test time and design cost.

# Easy Test Definition

The DDR4 and LPDDR4 compliance test application automatically configures the oscilloscope for each test and provides information test results which includes margin and statistical analysis. The tests coverage includes electrical, timing and eye diagram tests as stated in the JEDEC specification. The signal is optimized for most accurate test result and measurement repeatability. If you discover a problem with your device, the Custom mode feature and debug tool are available to aid in root-cause analysis. DDR debug tool that enables JEDEC measurement on saved waveform traces with navigation capability and markers to identify problem areas for debug and margin testing. You can also perform multiple eye diagram analysis using saved waveform files or output from ADS simulation software.

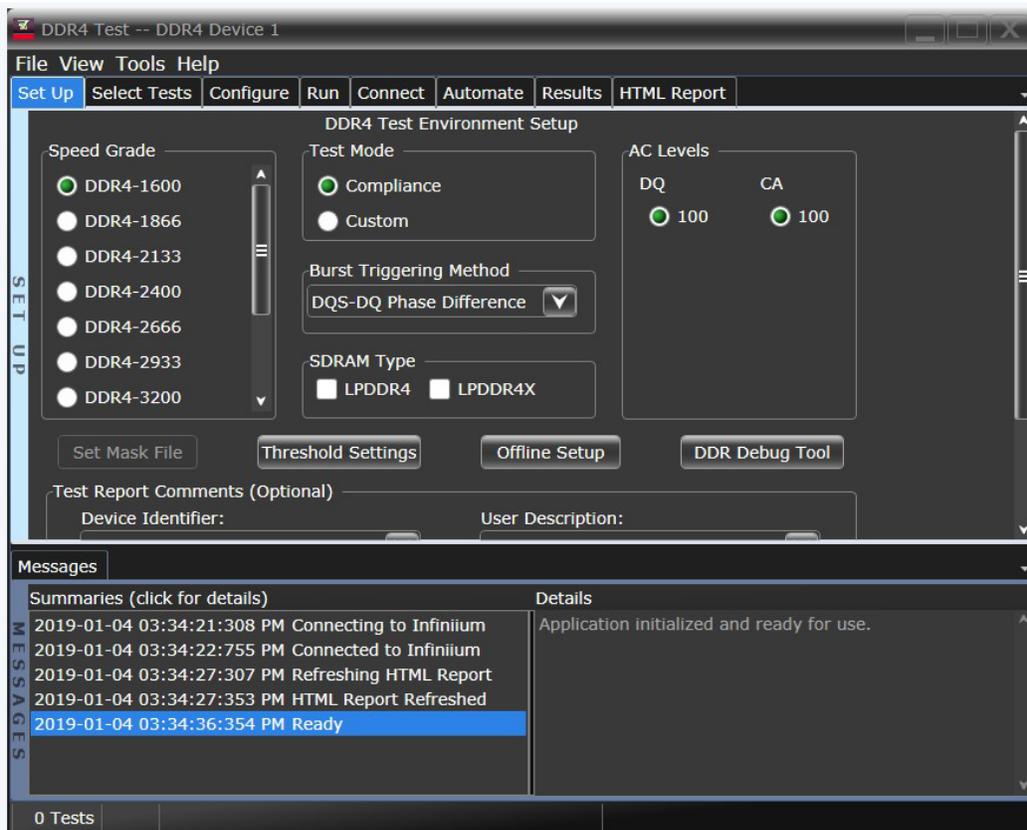
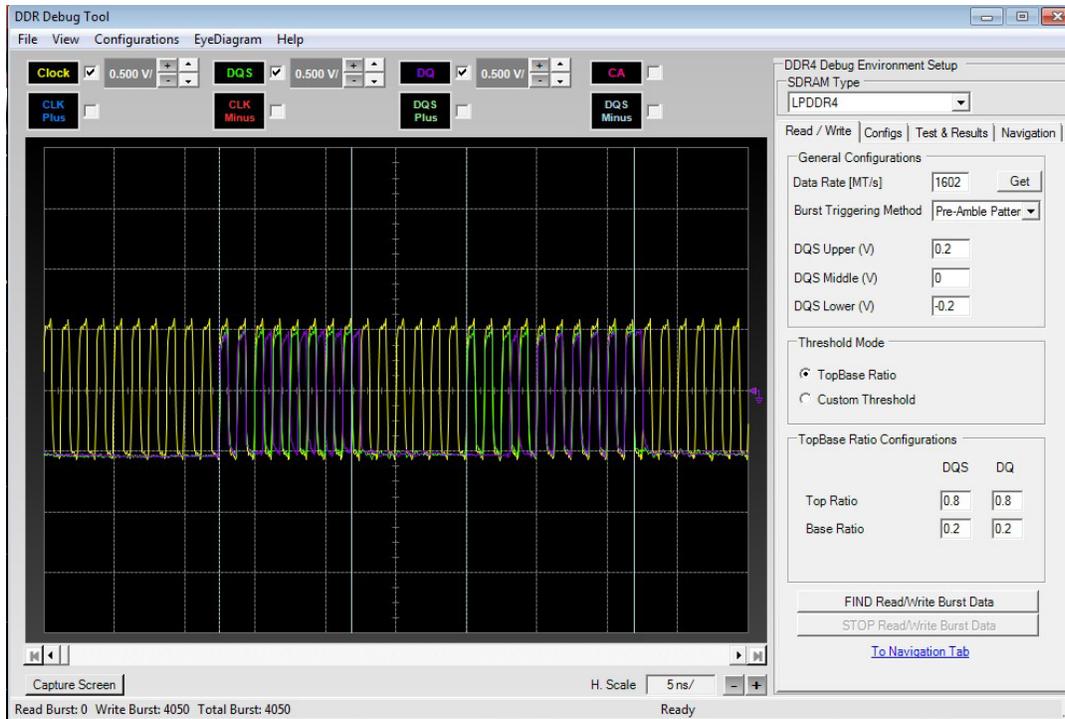


Figure 1. DDR4 and LPDDR4 application test

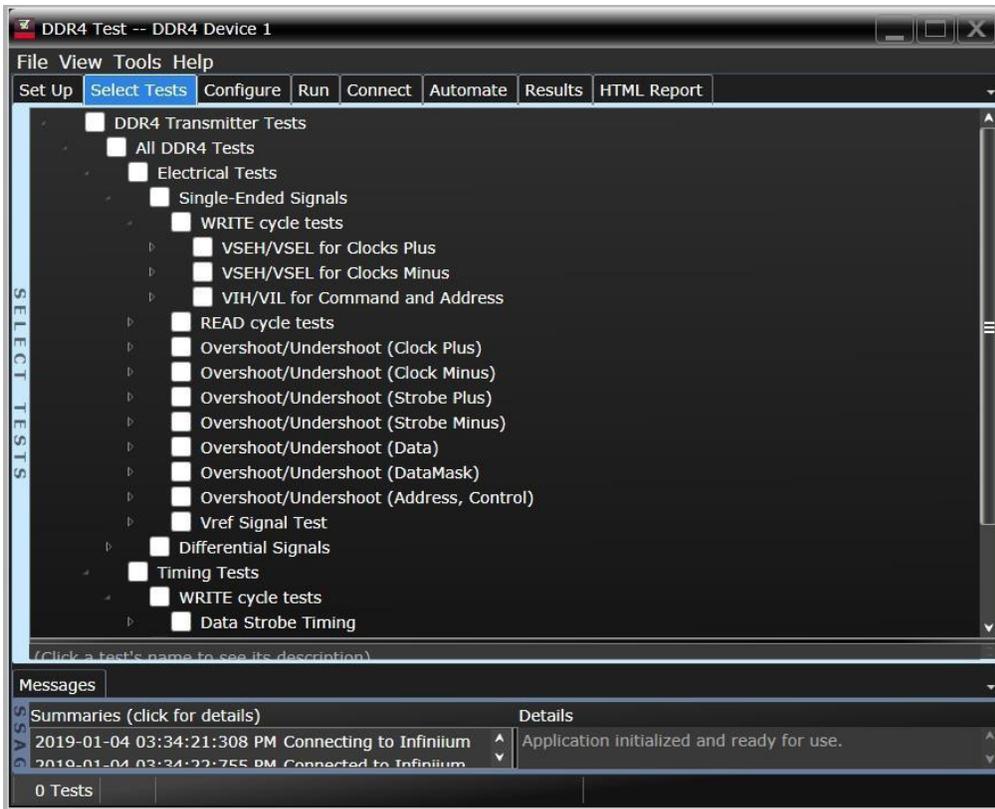


**Figure 2.** DDR debug tool enables markers to help navigate to bursts of interest with JEDEC measurements and statistical results.

## Configurability and Guided Connection

The DDR4 and LPDDR4 compliance test application provides flexibility in your test setup. The application lets you define controls for critical test parameters such as voltage threshold values, number of waveforms 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.

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 3.** The Select Tab list all the tests available in your setup. You can easily setup the individual test or groups of tests

## Artificial Intelligence (AI) Assisted Read/Write Separation Method

The “Auto Threshold” triggering option feature using K-means algorithm uses the implementation of clustering and machine learning to find the burst trigger threshold automatically. This added feature in the configuration will save your time and effort to efficiently identify the read/write data burst in your waveform.

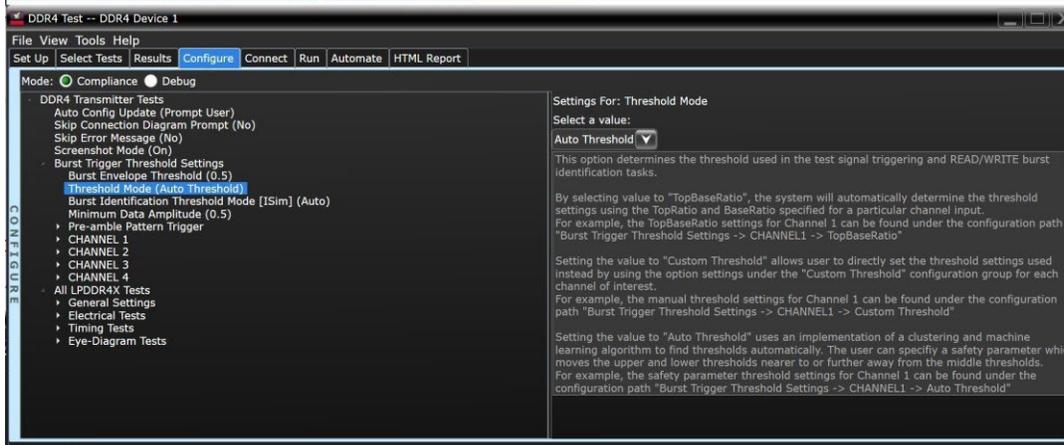


Figure 4. Auto Threshold mode selection in Configure Tab.

## Comprehensive Result Analysis

In addition to provide you with measurement results, the compliance 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.



Figure 5. The DDR4 and LPDDR4 test application documents your test parameters, pass or fail status, test limits, measured values, and margin.

# Thorough Performance Reporting

The DDR4 and LPDDR4 compliance 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.



**Figure 6.** The DDR4 and LPDDR4 test application generates a summary report for quick results viewing. The report includes details such as test limits, test description and test results.

## Recommended Oscilloscope

The D9040DDRC DDR4 and LPDDR4 software is compatible with various series of oscilloscopes. Please refer to the release notes for the recommended oscilloscope software version.

Data Rate	Minimum Bandwidth	Channels	Description
Up to 3200 MT/s	8 GHz	3	Infiniium UXR, V- series, Z- series oscilloscopes

# Ordering Information

## Software

Model Number	Description	Note
D9040DDRC	DDR4 and LPDDR4 Compliance Test Software	Required
D9020JITA	Jitter, Vertical and Phase Noise Analysis Software	Required
D9020ASIA	Advanced Signal Integrity Software (EQ, InfiniiSim Advanced)	Optional
D9020SCNA	InfiniiScan Event Identification Software	Optional

## Example of Hardware Configuration

Model Number	Description	Quantity
UXR0134A	13 GHz Infiniium UXR series oscilloscope	1
MX0021A	13 GHz differential InfiniiMaxRC probe amplifier	Minimum 3
MX0100A	Micro probe head	1 (includes 5 probe heads, 1 bullet adapter)
MX0103A	Bullet adapter	2
N2114/5A	DDR4 BGA adapter (kit of 1 interposer and 1 riser)	1

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## 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 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.

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