M80896RCA LPDDR6 Receiver

Conformance and characterization software

The Keysight Technologies, Inc. M80896RCA LPDDR6 receiver conformance and characterization software provides an early evaluation which offers a fast and easy way to test, debug and characterize your LPDDR6 designs. LPDDR6 technology offers higher data rates which enables higher bandwidth for data transfer with lower power. The M80896RCA enables testing of receiver physical layer of the LPDDR6 DRAM and memory controller. The LPDDR6 test methodology is a standard pre-release development by Keysight Technologies, Inc, facilitating design pathfinding and early adoption.

Features

- Automatic and unattended conformance testing and characterization measurements
- Automated calibration to ensure repeatable and real-world system impairments
- Remote control of the main test instrumentation
- Quick and easy measurement results to assess the performance of your DUT without expertise in BERT

KEYSIGHT

Comprehensive Test Coverage

The M80896RCA allows you to use the M8040A BERT to perform automated testing on your LPDDR6 receiver design. The application automatically configures the J-BERT for each test and provides an informative test result. The LPDDR6 receiver test application automates the measurement, which helps to save test time and design cost.

Easy Test Definition and DUT Control

The M80896RCA enhances the usability of the Keysight M8040A BERTs and Keysight Infiniium oscilloscopes for testing LPDDR6 devices which includes the DRAM and memory controller. The Keysight automated test framework guides you quickly through the steps required to define and calibrate the test setup, perform the tests and view the test results. In addition to selecting the type of DUT and to put it into test mode, you can select categories of tests or select individual tests. The user interface is designed to minimize unnecessary reconnections, which will help save test time and minimize potential operator errors. You can save the tests results and configurations as project files and recall them for quick testing and review previous results.

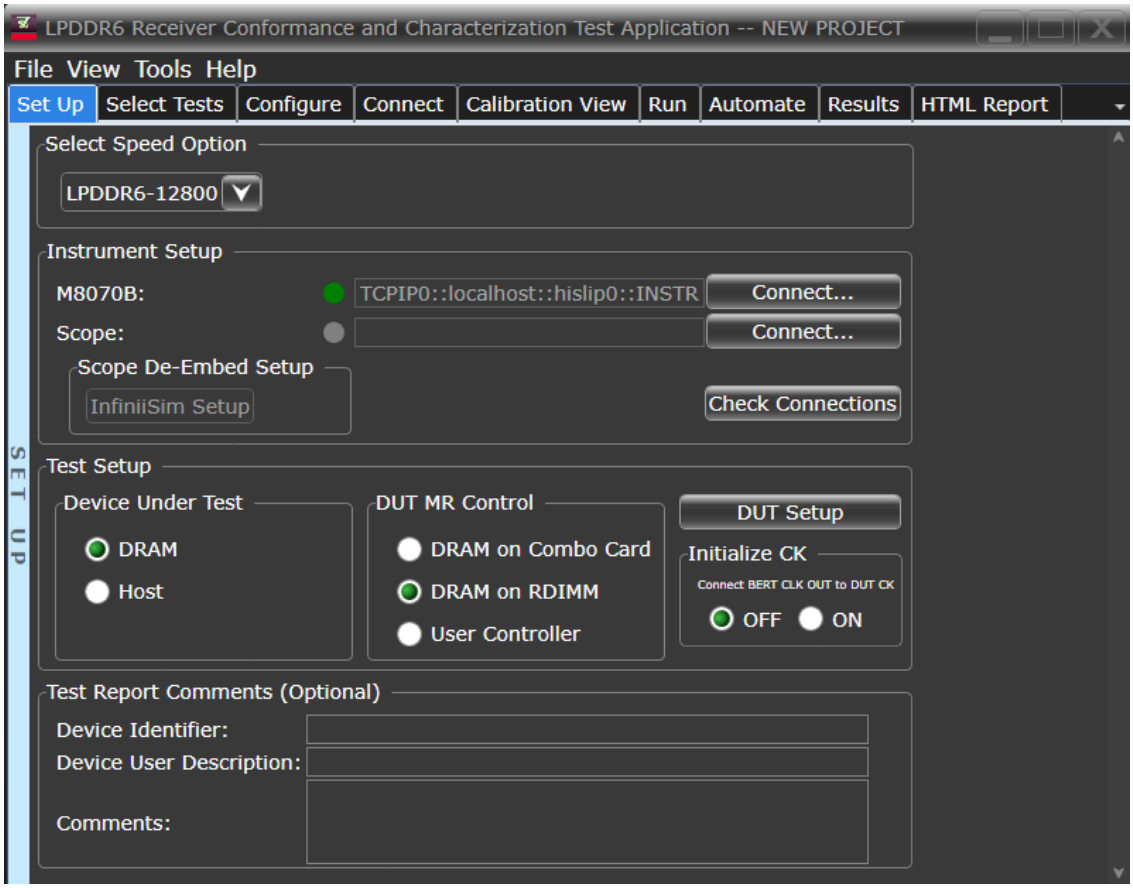


Figure 1. M80896RCA test setup screen. Select the speed grade of your device.

Configurability and Guided Connection

The LPDDR6 compliance test application provides flexibility in your test setup. The application lets you define controls for critical test parameters such as termination voltage, amplitude and delay step sizes target BER ratio and target confidence level. 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.

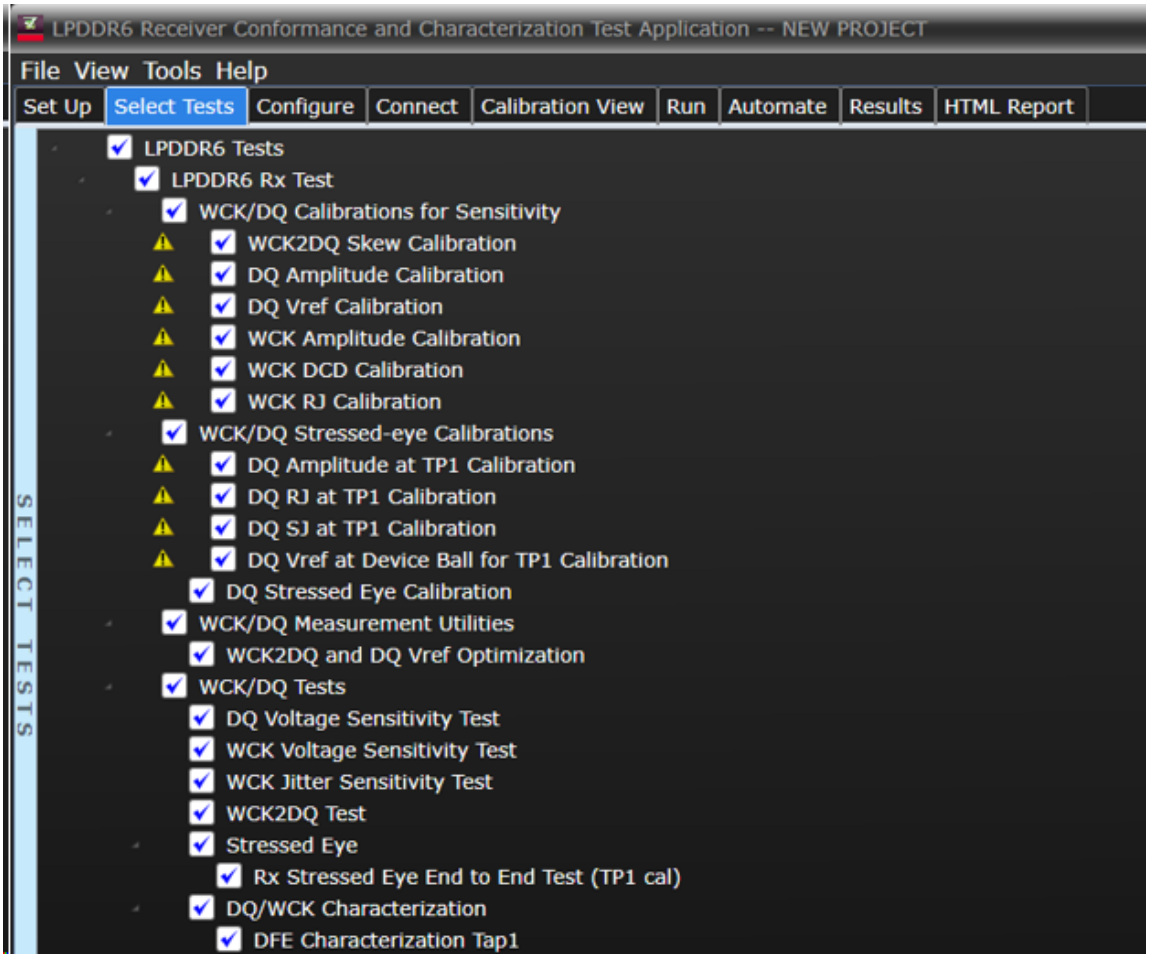


Figure 2. The Select Tests Tab list all calibrations and tests available in your setup. You can easily setup individual tests or groups of tests.

Comprehensive Result Analysis

In addition to providing you with measurement results, the M80896RCA reports the measured test results.

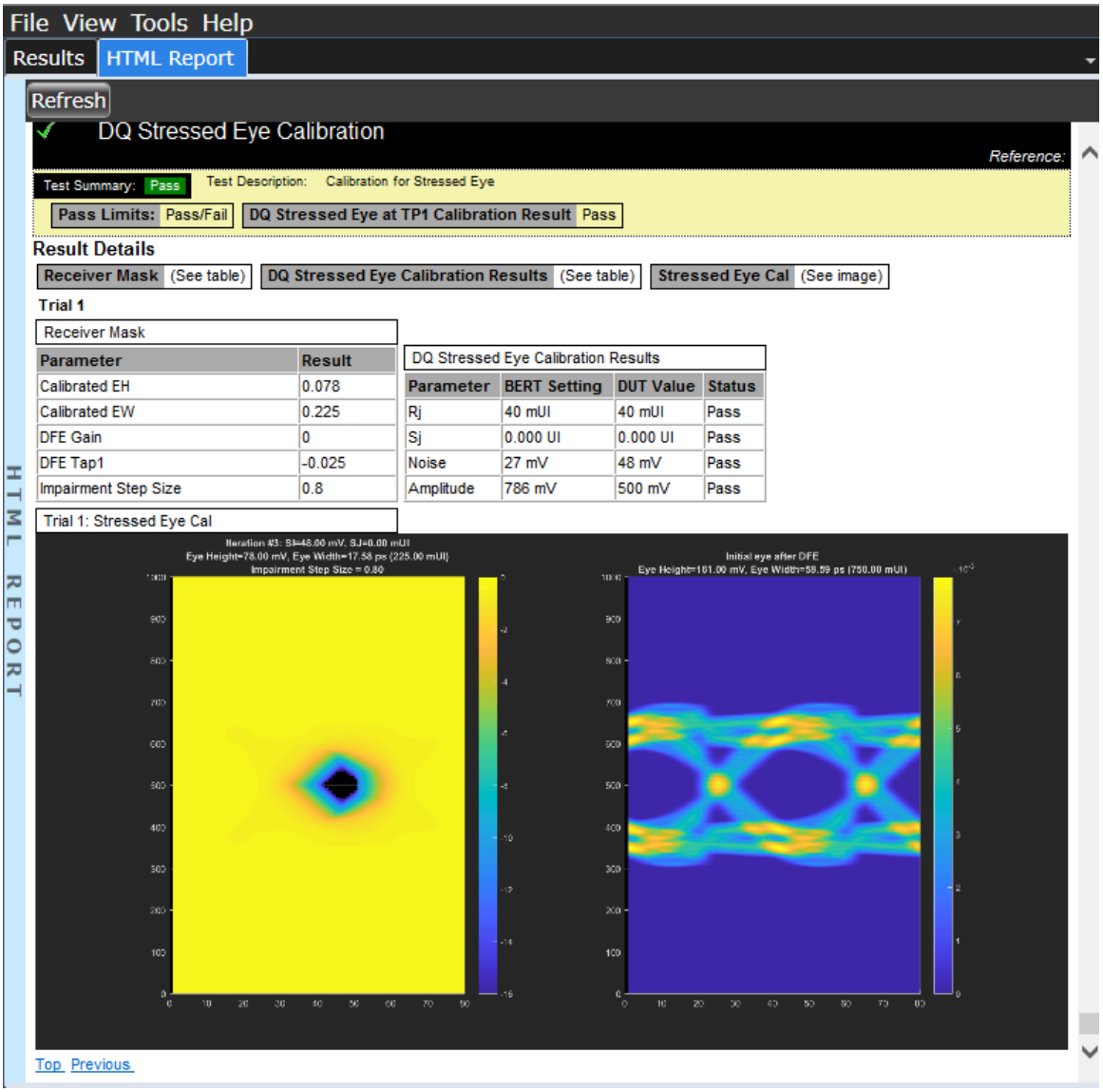


Figure 3. The M80896RCA documents calibration data values.

The M80896RCA documents your test parameters, pass or fail status and measured values.

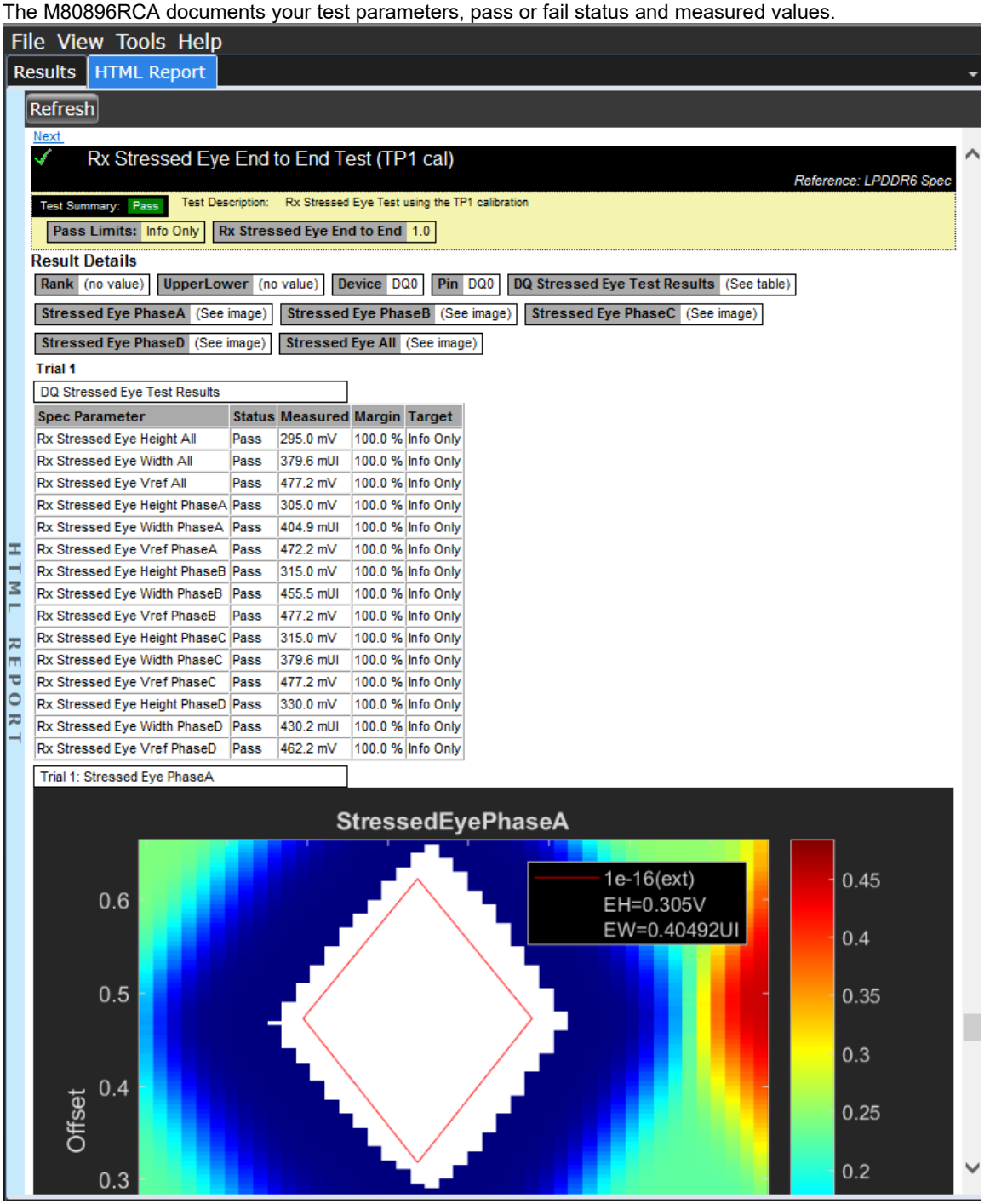


Figure 4. The M80896RCA documents your test parameters, pass or fail status and measured values.

Test Setup Calibration

The M80896RCA supports automatic calibration of the test setup. All calibration steps are automated. The test application prompts the user when user interaction is required for connecting the test setup. Detailed connection diagrams and instructions are provided by the test application. Calibration results are visualized in the Calibration View Tab.

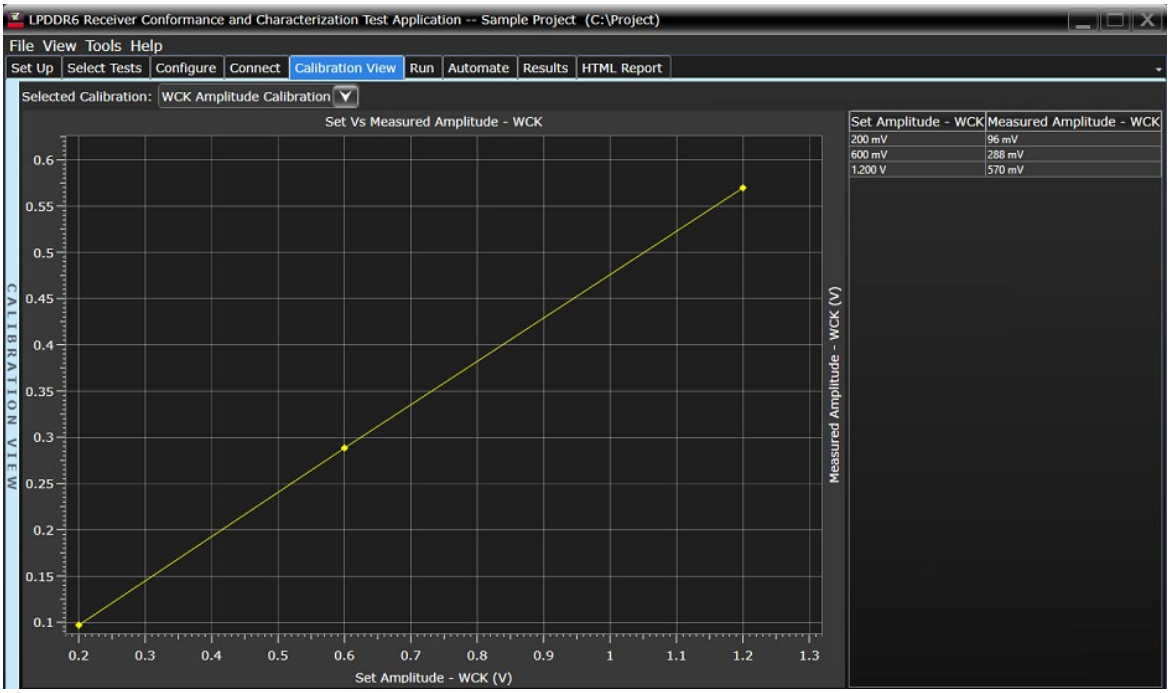


Figure 5. Individual calibration results can be visualized in the Calibration View Tab.

Flexibility and Customization for Stressed Eye Calibration

The M80896RCA supports user-defined calibration parameter test limits, allowing for customized testing scenarios that can be tailored to the specific requirements of LPDDR6 devices. This flexibility ensures that the test setup can adapt to the evolving standards and unique characteristics of LPDDR6.

User-defined stressed eye width and height simulates real-world conditions. This helps with precise debugging and optimization, supports custom standards, and prepares designs for the future. It improves product performance and speeds up development, giving engineers a competitive edge.

User-defined impairment creates specific stress conditions for the receiver designs, like custom jitter (Random Jitter, Sinusoidal Jitter, Inter-Symbol Interference), noise, or Vswing changes. This helps thoroughly test the receiver's tolerance and robustness in extreme or unusual situations, ensuring it meets compliance and real-world reliability standards.

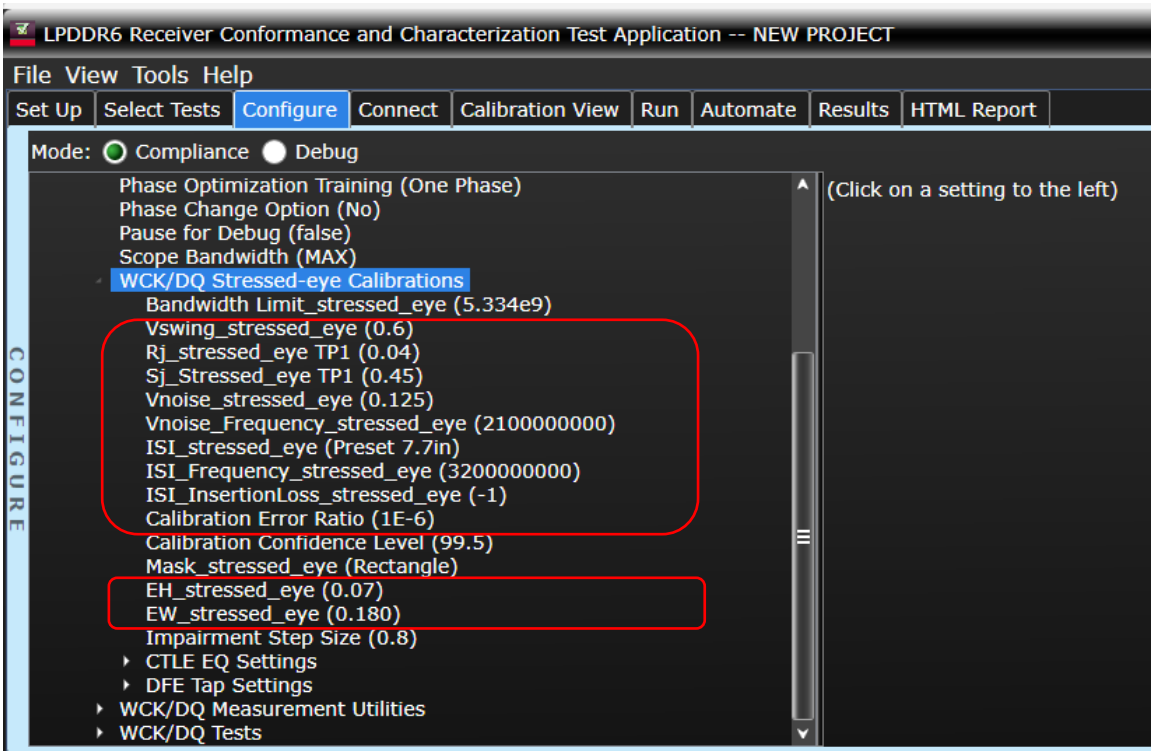
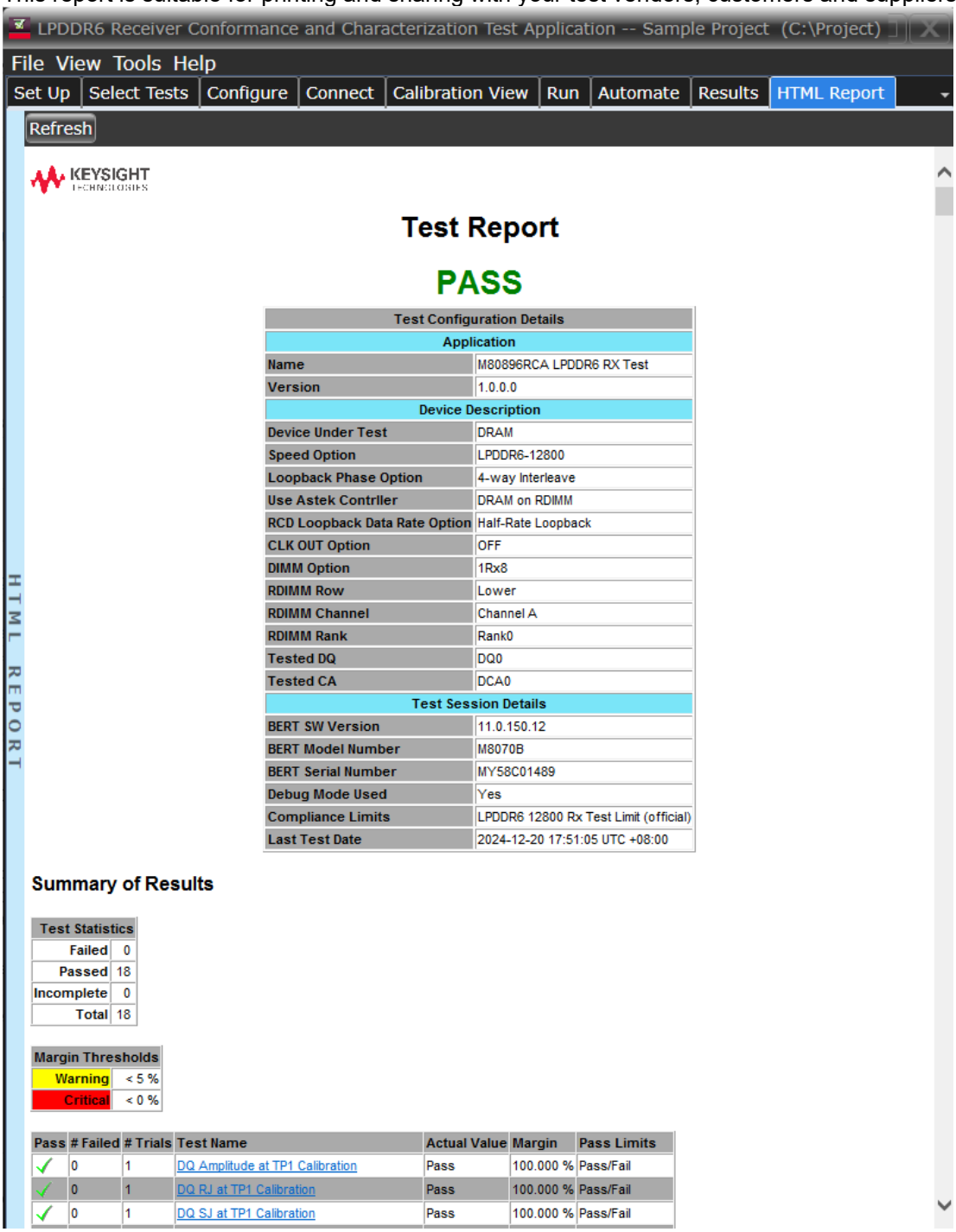


Figure 6. User defined stressed eye width, stressed eye height, and different type of impairments.

Thorough Test Reporting

The M80896RCA generates HTML reports that captures the performance and status of your device under test. It also visualizes number of bit errors over amplitude and skew and extrapolation to the target BER. This report is suitable for printing and sharing with your test vendors, customers and suppliers.



Test Configuration Details	
Application	
Name	M80896RCA LPDDR6 RX Test
Version	1.0.0.0
Device Description	
Device Under Test	DRAM
Speed Option	LPDDR6-12800
Loopback Phase Option	4-way Interleave
Use Astek Contrller	DRAM on RDIMM
RCD Loopback Data Rate Option	Half-Rate Loopback
CLK OUT Option	OFF
DIMM Option	1Rx8
RDIMM Row	Lower
RDIMM Channel	Channel A
RDIMM Rank	Rank0
Tested DQ	DQ0
Tested CA	DCA0
Test Session Details	
BERT SW Version	11.0.150.12
BERT Model Number	M8070B
BERT Serial Number	MY58C01489
Debug Mode Used	Yes
Compliance Limits	LPDDR6 12800 Rx Test Limit (official)
Last Test Date	2024-12-20 17:51:05 UTC +08:00

Test Statistics	
Failed	0
Passed	18
Incomplete	0
Total	18

Margin Thresholds	
Warning	< 5 %
Critical	< 0 %

Pass	# Failed	# Trials	Test Name	Actual Value	Margin	Pass Limits
✓	0	1	DQ Amplitude at TP1 Calibration	Pass	100.000 %	Pass/Fail
✓	0	1	DQ RJ at TP1 Calibration	Pass	100.000 %	Pass/Fail
✓	0	1	DQ SJ at TP1 Calibration	Pass	100.000 %	Pass/Fail

Figure 7. The M80896RCA generates a summary report for quick results viewing. The report includes details such as test description and test results.

Recommended Instrument Configurations

The M80896RCA LPDDR6 Receiver Test application supports the Keysight M8040A High-Performance BERT platform. The BERT must be equipped appropriately to cover the required data rates, analyzer equalization, deemphasis, jitter injection and external Intersymbol Interference (ISI).

The LPDDR6 RX test methodology requires a bandwidth of 25 GHz for the calibrations at the fastest bitrate. To meet this requirement, Keysight recommends an Infiniium UXR-series real-time oscilloscope with a bandwidth of at least 33 GHz. The oscilloscope must be equipped with embedding capabilities as well as serial data analysis capabilities.

For detailed information on product configurations, applications, or services, please reach out to your local Keysight office. Additionally, you can visit our website at www.keysight.com/find/m80896rca for more comprehensive details.