



Tektronix DPO71604SX Compliance DDR Transmitter User Guide

[Home](#) » [Tektronix](#) » Tektronix DPO71604SX Compliance DDR Transmitter User Guide 

Contents

- 1 Tektronix DPO71604SX Compliance DDR Transmitter
- 2 Clarius Compliance DDR Transmitter Release
- 3 Supported models
- 4 Release Features
- 5 Release features of DDR5 DRAM Tx
- 6 Known limitations
- 7 Version 1.0.0
- 8 Supported models
- 9 Release features
- 10 Release features of LPDDR4:
- 11 Known issues
- 12 Product Specifications
- 13 QUICK Product Usage Instructions
 - 13.1 Installation
 - 13.2 Setup
 - 13.3 Operation
- 14 Frequently Asked Questions (FAQ)
 - 14.1 Q: What are the known limitations of Version 2.0.0?
 - 14.2 Q: Are there any known issues with Version 1.0.0?
- 15 Documents / Resources
 - 15.1 References
- 16 Related Posts

Tektronix DPO71604SX Compliance DDR Transmitter

USER GUIDE

Clarius Compliance DDR Transmitter Release

Notes

Version 2.0.0

Clarius Compliance DDR Tx Application	<ul style="list-style-type: none">• Version -2.0.0• Release month: Dec-2024
Compatible version of Clarius Automation Framework	<ul style="list-style-type: none">• Version -2.0.0• Release month: Dec-2024

Supported models

Oscilloscope for DDR5 DRAM Tx

- DPO71604SX, DPO72004SX, DPO72304SX, DPO72504SX, and DPO73304SX.
- Non-ATI channels of DPO75002SX, DPO75902SX, DPO7702SX, DPS75004SX, DPS75904SX, and DPS77004SX.

Oscilloscope for LPDDR4

- DPO71304SX, MSO71254DX, DPO71254DX, DPO71604SX, DPO72004SX, DPO72304SX, DPO72504SX, and DPO73304SX.
- Non-ATI channels of DPO75002SX, DPO75902SX, DPO7702SX, DPS75004SX, DPS75904SX, and DPS77004SX.

Release Features

Test bench creation enhancements

- Simplified test bench creation aligned with user workflows.
- Capability to create test benches for various acquisition modes, including Live and Recorded.
- Display of necessary instruments for selected applications/technologies on the Live Test Bench.
- Capability to fetch the instrument properties of the connected instruments on providing the VISA resource addresses in live setup
- Functionality to check instrument service connectivity during test bench creation and display connectivity status within the test bench list.
- Enables flexible instrument control for application-defined instruments. Supports integration with diverse instrument classes (e.g., AFG, AWG) or custom specific controls.
- Refreshing master oscilloscope properties ensures all extension scopes are visible.

Test creation and test run enhancements

- Simplified access to acquisition mode selection for a test

- Recorded tests utilize pre-acquired data from specified waveform folder path. Standardized for the test rather than for individual applications
- Flexibility to run recorded tests on Recorded and Live test benches, while Live tests are exclusive to Live test benches.
- Flexibility to run recorded tests with Instrument Service installed on the Clarius installed computer either during the initial installation or added subsequently.
- Notifies the user on start of the test if Clarius disk storage is over 90% capacity or essential Clarius services are not operational.
- Test execution terminates automatically if Clarius disk storage exceeds 90% allocated capacity or the essential Clarius services are not operational.

Test and waveform deletion enhancements:

- Facilitates efficient storage management and ensures retention of relevant data by enabling users to delete multiple selected tests or waveforms.

Bulk waveform download using SDK:

- Enables users to download waveforms (exceeding 1GB) using SDK.

Notification enhancements:

- Critical Error and Warning Indicators as notifications in Clarius UI, upon exceeding thresholds [user-configurable].
- System Error notification displayed when essential Clarius services are not operational.

Clarius Admin Console

- Streamlined service management with start, stop, and restart capabilities.
- User Configurable settings [threshold and alert frequency] for Critical Error and Warning notifications.

In-App Help:

- A comprehensive in-app help is enabled in the Clarius webpage under Help for immediate user assistance and guidance.

Release features of DDR5 DRAM Tx

- DUAL Rank DUT support.
- Support to Number of UIs measurement for 3 Test Group (Tx DQS Jitter, Tx DQ Jitter, Tx DQ Stressed Eye).
- For Live Tests, when DUT automation is enabled, the DUT will be initialized only once for any selected test group/s.
- For the Stressed Eye test group, two distinct analysis methods are available.

- Use one edge of the UI
- Use both edges of the UI
- When the Stressed Eye Tests runs across multiple UIs, only the first acquisition waveform set will be saved.
- A Pause feature is now supported before starting waveform acquisition.
- Application is updated in-line with latest specification JESD79-5C.01_v1.31.

Known limitations

- Search feature on the Reports & Test List page is confined to the results of the page currently being viewed.
- If user creates a duplicate user name for test, no error is displayed but duplicate user name will not be created.
- Test tab > View Results > Generate report generates report only for 30 tests displayed in the current page.
- New notifications are populated at the end of the list within the notification widget.
- Maximum of 10 applications can be added in a single sequence.
- Installation operations cannot be cancelled once they are in progress.
- Pan and zoom capabilities are limited in waveform view.
- The “Fail” status in Tests > List of Tests page and in Reports indicates that either the test execution was unsuccessful or the measurements did not meet the specified limits.
- Re-analysis of waveforms captured from a previous test can only be done by downloading waveforms and analyzing them in pre-recorded mode.
- Export/Import of tests from one Clarius VM to another is not supported.
- The progress bar reflects the count of scenarios executed. If certain scenarios require more time, the progress bar will remain in the same status until those scenarios are fully executed.
- When test is configured with multiple sequences; progress bar of individual sequences does not function.
- The functions of starting, restarting, and stopping instances of test benches (instrument service) and monitor remote instances of measurement services are not available.
- In multi-stack oscilloscope scenarios, extension oscilloscope instrument services cannot be monitored.
- When running tests back to back in LIVE acquisition mode, test may have different run times or fail intermittently due to instrument connectivity. User may provide a time delay between test runs to avoid failure or contact Tektronix to update TekVisa.
- In multi-iteration acquisition mode, the software determines overall measurement pass/fail status based solely on the results of the final acquisition. However, the results from all individual acquisition iterations are accessible through the SDK, allowing users to perform custom calculations and determine their own overall measurement status if desired.
- Based on the timeout duration, when Instrument does not respond, test gets aborted and a log message detailing the error is available.
- There is no differentiation between the error icons for critical or system errors in notification.
- Admin account passwords cannot be reset, while passwords for non-admin accounts are resettable.
- If the waveform size exceeds 2 GB, you cannot download all waveforms together from the Clarius GUI instead, you can download it one by one.
- For a stacked oscilloscope setup, instrument service should be launched on the master and all supported extension oscilloscopes.
- DCA Training is supported for 4-Phase DUTs of DDR5 DRAM Tx only.
- Tx DQ Stressed Eye measurement scenario supports acquisitions of signals up to 500 M UIs.
- For optimal results of the Tx DQ Stressed Eye measurement scenario, execute with 500 M UIs selected with a

50 M Record Length is suggested.

- When “Abort on Fail” is selected for Signal validation in the DDR5 DRAM Tx application, the scenario/test group gets aborted.

Known issues

- Hyper-V Default switch issues: Windows updates may cause the default Hyper-V switch used by Clarius Core Services to become unresponsive. This can lead to installation failures or connectivity problems. Refer to the FAQ section in Clarius Getting Started guide for resolution steps.
- Clarius Compliance user interface may become unresponsive due to lack of required resources such as network speed, memory, disk space, and CPU. This can be tracked by using the Admin console and Monitoring.
- Uninstalling Clarius instrument service necessitates re-installation of required application instrument service.
- When the test is running, the Events and Logs pages would refresh to the most recent page even if the user selects to view a different page.
- In some cases, due to temporary disruptions in internal services (example: constraint service in admin console) may lead to inconsistent error messages in the UI and SDK.
- Doing a web page refresh will reset the filter selections to default.
- When import sequence is performed to execute a new test, you need to configure the sources and signals before starting the test.
- Recorded Mode tests do not complete when math waveforms are not available in the waveform folder path.
- When Recorded mode is selected before preparing a sequence, reset all setting to default in the Global settings of the added sequence.
- When acquisition mode is selected as Recorded before preparing a sequence, Global settings are to be reset by clicking on reset all settings to default.
- The system does not support the simultaneous use of single-ended and differential probes in a single test.
- Using the SDK, some interdependent UI functionalities may require additional fine-tuning to achieve the actual output.
- The Test List filter resets when a user navigates to the View Result page and then returns to Test page.
- Ensure that “Test Setup Configuration” is always checked while generating the report.

Version 1.0.0

Clarius Automation Framework	<ul style="list-style-type: none">• Version -1.1.0• Release: Aug-2024
Clarius Compliance DDR Tx Application	<ul style="list-style-type: none">• Version -1.0.0• Release: Aug-2024

Supported models

Oscilloscope for DDR5 DRAM Tx

- DPO71604SX, DPO72004SX, DPO72304SX, DPO72504SX, and DPO73304SX.
- Non-ATI channels of DPO75002SX, DPO75902SX, DPO7702SX, DPS75004SX, DPS75904SX, and

DPS77004SX.

Oscilloscope for LPDDR4

- DPO71304SX, MSO71254DX, DPO71254DX, DPO71604SX, DPO72004SX, DPO72304SX, DPO72504SX, and DPO73304SX.
- Non-ATI channels of DPO75002SX, DPO75902SX, DPO7702SX, DPS75004SX, DPS75904SX, and DPS77004SX.

Release features

Release features of DDR5 DRAM Tx

- Supports 34 measurements of DDR5 DRAM Tx Tests as per DDR5 JEDEC (JESD79-5C_v1.30) specification:
 1. Supports 11 Tx DQS Jitter Tests
 2. Supports 12 Tx DQ Jitter Tests
 3. Supports 11 Tx DQ Stressed Eye Tests
- The user-defined acquisition mode enables users to conduct application measurements by adjusting the oscilloscope settings, such as sample rate, record length, bandwidth, and other parameters according to their preferences and requirements mode for all scenarios.
- Retain Vertical Scale setting supported during acquisition for all scenarios.
- Number of UIs supports for Tx DQ Stressed Eye test scenario.
- Custom BER supports for Tx DQ Stressed Eye tests scenario.
- Custom Limit support for all tests.
- Multi-run feature is applicable for all scenarios.
- Supports all the data rate as per JEDEC (JESD79-5C_v1.30) for all measurements.
- Custom Data Rate support up to 15000 MT/s.
- Signal Validation support for all scenarios.
- De-embedding support for all scenarios.
- DUT Automation support.
- Automatic and manual support of Noise Compensation for Tx DQS and Tx DQ Jitter tests.
- Automatic and manual support of DCA Training.
- Variable DUT Termination voltage support.
- Vref-DQ Mode support for Tx DQ Jitter and Stressed Eye tests using different methods.
 1. Widest Eye Opening
 2. Peak to Peak
 3. Amplitude
 4. User Defined
- DUT Power Cycle Utility: Manage power states (ON/OFF) and adjust voltage/current across all channels of a Keithley Power Supply via direct address connectivity.

- Import sequence feature allows for recalling test setups, so users don't have to manually configure each time.

Release features of LPDDR4:

- Supports 109 measurements of LPDDR4 System Transmitter Tests as per LPDDR4 JEDEC (JESD209-4D) specification:
 1. 18 Clock differential measurements
 2. 15 Clock single ended measurements
 3. 26 Write burst differential measurements
 4. 19 Write burst single ended measurement
 5. 19 Read burst differential measurements
 6. 12 Address command measurements
- The user-defined acquisition mode enables users to conduct application measurements by adjusting the oscilloscope settings, such as sample rate, record length, bandwidth, and other parameters, according to their preferences and requirements mode for all scenarios.
- Retain Vertical Scale setting supported during acquisition for all scenarios.
- Custom limit support for all tests.
- Supports all the data rate as per JEDEC (JESD209-4D) for all measurements after custom data rate support.
- Custom data rate support up to 15000 MT/s.
- De-embedding support for all scenarios.
- Multi-run feature is applicable for all scenarios.
- Time to Test : The user can perform multiple JEDEC (JESD209-4D) measurements on multiple edges, multiple Read or Write bursts with a single acquisition. The user can also provide statistical analysis with a single acquisition.
- Statistical analysis : The LPDDR4 application allows the user to capture long record lengths, identify Read and Write bursts automatically, perform multiple measurements on the entire record length, and perform statistical analysis.
- Zoom to the worst-case region of the waveform for measurements.
- Easy to use measurement configuration allows the adjustment of test parameters for tests by group to save time over configuring each measurement individually.
- Test report to reflect advanced statistics of the measurement
- The user can select the source and the channel in the Source and Signal panel.
- Multiple burst detection methods are supported : Read and Write, Write only, and Read only.
- Support to tDQ2DQ measurement with multiple DQs.
- Support for simultaneous running Write Burst differential and single ended measurements for multi-DQ (up to 32-DQs).
- Support for simultaneous running address command measurements for multi-CA (up to 8-CAs).
- Auto and manual support for calculating Vcent-DQ and Vcent-CA.

Known limitations

- In the Manage>Test Bench section, while adding Instruments, the Model field should be set to "default".

- Download and installation operations cannot be cancelled once they are in progress.
- Limits are not shown with explicit units in the Results section and are presented in the same row of individual results indicating they take the same units as Value (measurement result).
- Waveform view controls have limitations with respect to pan and zoom.
- “Fail” status in Tests > List of Tests page and in Reports indicates that either the test execution failed or measurements have failed against limits.
- Re-analysis of waveforms captured from a previous test can only be done by downloading waveforms and analyzing them in Pre-Recorded mode.
- Export/Import of tests from one Clarius VM to another is not supported.
- Progress bar only shows progress based on number of scenarios executed. When some scenarios take a long time to run, progress bar will remain in the same status until the scenario is executed completely.
- User account will be locked after three unsuccessful login attempts and cannot be unlocked for an hour.
- The functions of starting, restarting, and stopping instances of test benches (instrument service) and monitor remote instances of measurement services are not available.
- Support for monitoring extension oscilloscopes instrument services of multi-scope scenarios is not available as functionality in this release.
- When running tests back to back in LIVE acquisition mode, test may have different run times or fail intermittently due to instrument connectivity. You may provide a time delay between test runs to avoid failure or contact Tektronix to update TekVisa.
- In multi-iteration acquisition mode, the software determines overall measurement pass/fail status based solely on the results of the final acquisition. However, the results from all individual acquisition iterations are accessible through the SDK, allowing users to perform custom calculations and determine their own overall measurement status if desired.
- For LPDDR4, if you are using a stack configuration for oscilloscopes, make sure all extension oscilloscopes configured in test bench are available and the Instrument service must be running in all the oscilloscopes before running a test.
- Admin account passwords cannot be reset, while passwords for non-admin accounts are resettable.
- If the waveform size exceeds 2 GB, you cannot download all waveforms together from the Clarius GUI instead, you can download it one by one.
- For a stacked oscilloscope setup, instrument service should be launched on the master and all supported extension oscilloscopes.
- DUT Automation is supported for Single Rank DUTs of DDR5 DRAM Tx only.
- DCA Training is supported for 4-Phase Single Rank DUTs of DDR5 DRAM Tx only.
- Tx DQ Stressed Eye measurement scenario supports acquisitions of signals up to 200 M UIs.
- Tx DQ Stressed Eye measurement scenario with 200 M UIs selected can run up to 3 Iteration only.
- DPOJET Scope Noise Characterization (SNC) plugin does not work with termination voltage.

Known issues

- Occasionally, the default switch in the Windows system becomes unresponsive and the Clarius automation framework installation may fail. Rebooting the system and installing any pending windows updates should fix the issue.
- Clarius Compliance user interface may become unresponsive due to lack of required resources such as

network speed, memory, disk space, and CPU. This can be tracked by using the Monitoring and Admin console under 'Clarius Platform' in your system.

- When multiple applications are present in the system or oscilloscope, uninstalling one “application instrument service” necessitates re-installation of the required application instrument service.
- When the test is running, the Events and Logs pages would refresh to the most recent page even if the user selects to view a different page.
- The Generate Report button will not be functional for the test results that are listed after first page under the Tests tab. You can generate results for those tests from the result page of the test.
- Performance issues may be observed for the test with higher record length and higher iteration count.
- When you want to rerun the test, sources and signals have to be configured before the run.
- The scroll bar in the local settings window is functional only with the keyboard arrow keys and does not work with mouse controls.
- Doing a web page refresh will reset the filter selections to default.
- Selecting Cancel in the “Filter By” window will not revert the configurations back to the previous selections.

Product Specifications

- Product Name: Clarius Compliance DDR Transmitter
- Version: 2.0.0
- Application: Clarius Compliance DDR Tx Application
- Compatible with: Clarius Automation Framework
- Supported models: DPS77004SX Oscilloscope for LPDDR4

QUICK Product Usage Instructions

Installation

Ensure you have the compatible version of Clarius Automation Framework installed before setting up the Clarius Compliance DDR Transmitter.

Setup

1. Connect the Clarius Compliance DDR Transmitter to the compatible oscilloscope model DPS77004SX.
2. Power on both devices and ensure they are properly connected.
3. Launch the Clarius Compliance DDR Tx Application on your system.

Operation

Follow the specific instructions provided in the user manual for utilizing the features of the DDR5 DRAM Tx using the Clarius Compliance DDR Transmitter.

Frequently Asked Questions (FAQ)


Q: What are the known limitations of Version 2.0.0?

A: The known limitations for Version 2.0.0 are listed in the user manual and should be reviewed before usage.



Q: Are there any known issues with Version 1.0.0?

A: Yes, there are known issues with Version 1.0.0 which are

Documents / Resources

	Tektronix DPO71604SX Compliance DDR Transmitter [pdf] User Guide DPO71604SX, DPO71604SX Compliance DDR Transmitter, Compliance DDR Transmitter, DDR Transmitter, Transmitter
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References

-  [Test and Measurement Equipment | Tektronix](#)
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