Data Sheet

VIAVI
Xgig Exerciser
for CXL v1.1/v2.0

Approved for CXL 1.1 Gold Suite compliance testing, the CXL Exerciser generates CXL data streams and responses for compliance testing and analysis

The VIAVI Xgig® CXL Exerciser for CXL v1.1/v2.0 brings turn-key compliance test capability to the Xgig CXL product portfolio. An Exerciser is also a valuable tool for debugging difficult protocol communication problems because it provides full, bit-level, repeatable control over the CXL data traffic.

An Exerciser generates CXL compliant data traffic and can respond to CXL inputs with appropriate branching. It operates in two modes: Root Complex (RC) or host mode and End Point (EP) Mode. In RC emulation mode, the Exerciser enables endpoint testing. In EP mode, the Exerciser enables testing a host system.

The Exerciser supports detailed validation and debug of the state machine of a CXL controller. It enables debug and performance tuning of firmware and application software. The Exerciser can be programmed to non-compliant CXL sequences to enable testing of boundary and stress conditions that are not normal to correct system operation and would otherwise be very difficult to evaluate.

The Exerciser works in tight association with the Analyzer function to provide detailed trace capture and full detail of operation. Bidirectional data of hundreds of gigabytes can be saved for detailed analysis using VIAVI tools such as Expert™.

A scripting API is available so that complex, custom Exerciser test scripts can be created; either as original or modified from pre-defined library scripts.

Interposers provide a physical link between the Xgig PCIe 5.0 and 6.0 platforms and the Device-Under-Test (DUT). Different Interposers support testing of endpoint devices or host systems.

Key Features

- Approved by the CXL Consortium for CXL Gold Suite workshop compliance testing
- Emuates either a Root Complex or an End Point device
- Generates and responds to CXL compliant data packets
- Operates to 32GT/s, and supports all other PCIe data rates of 2.5, 5.0, 8.0 and 16GT/s
- Supports links of 1, 2, 4, 8 and 16-lanes
- Set link rates and widths and control transitions other rates
- Tightly aligned operation with the Analyzer for fully detailed bit-level trace captures
- Performs LTSSM testing: both positive and negative test scenarios via VIAVI LTSSM Override function
- LTSSM state tracker with history log
- Save and load custom test configurations
- User-configurable custom test configurations for positive and negative test cases
- Scripting API allows complex, user-created test cases
- Graphical control interface provides easy visual presentation and setup of test procedures
- Xgig tools suite and the Exerciser user interface operate on a Windows 10 enabled PC
- Runs on VIAVI 5P16, 5P8 and 6P4 platforms

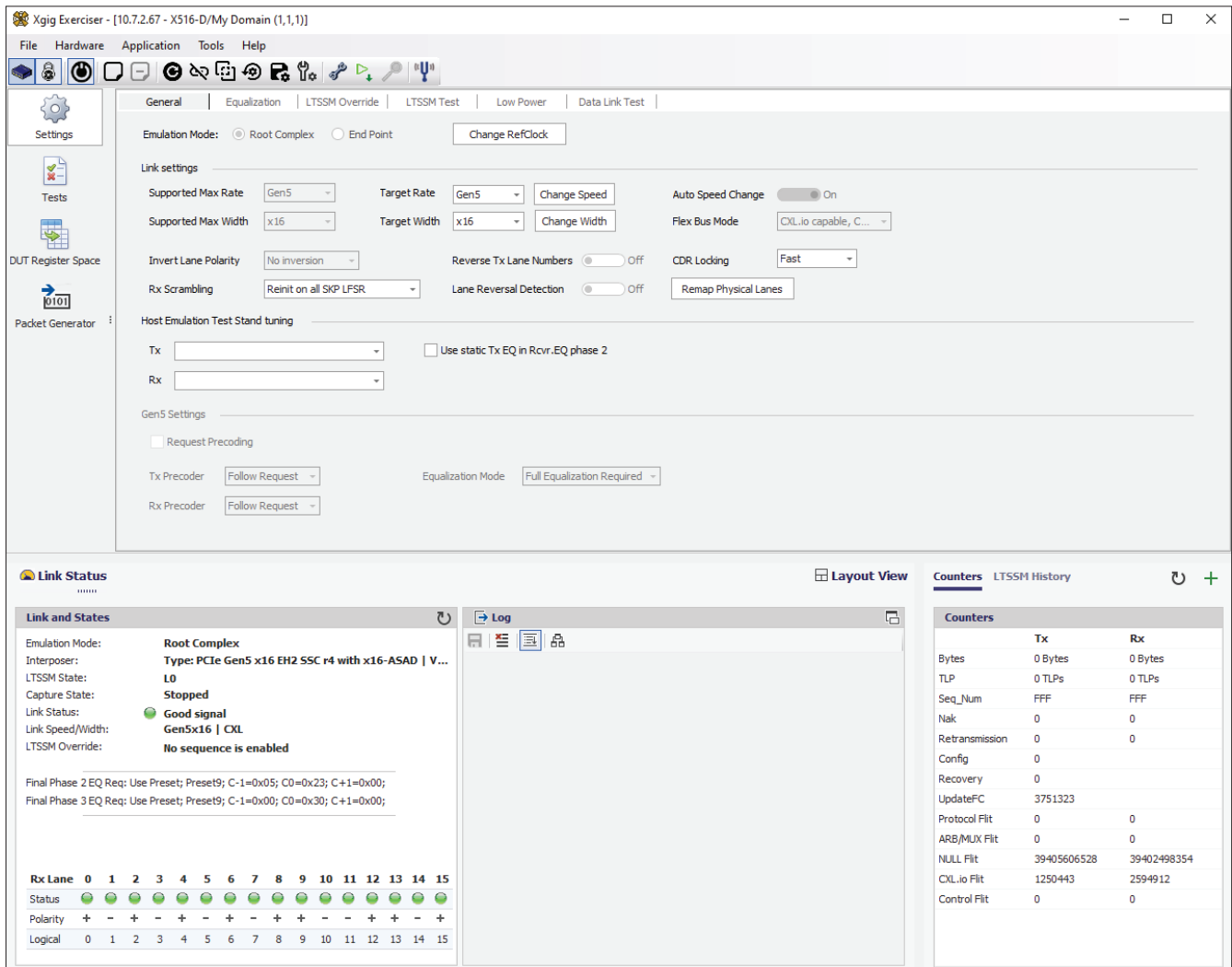# Xgig CXL Exerciser Interface – Start Page

Figure 1 – Exerciser Start Screen

Exerciser User Interface

The Xgig CXL Exercsier user interface makes it easy to set up and execute a test. Figure 1 above shows the Exerciser launch screen. The top bar includes the typical Windows™ control items. The second bar down has various quick launch buttons for tasks done often.

On the left side are icons for Settings, Compliance Tests, and other features. The Settings>General tab is the first that is presented. Information on the test bench configuration is provided including clocking, reset and other basic controls.

From Settings, controls for the extensive Exerciser parameters are accessible. The LTSSM tab provides control over link settings and operation.

For example, TX and RX setting can be adjusted from this tab. It also allows setting timeouts and other parameters. The Settings tab allows forcing limits on the test data rate and maximum link width.

Below the Settings icon, the Compliance Test icon opens a panel for selecting tests to be run. This is as shown in the next figure.

Below the Compliance Test icon the Config Space icon opens for defining the Exerciser's CXL configuration space parameters.

Always available at the bottom of the Exerciser window is the current test and bench status.

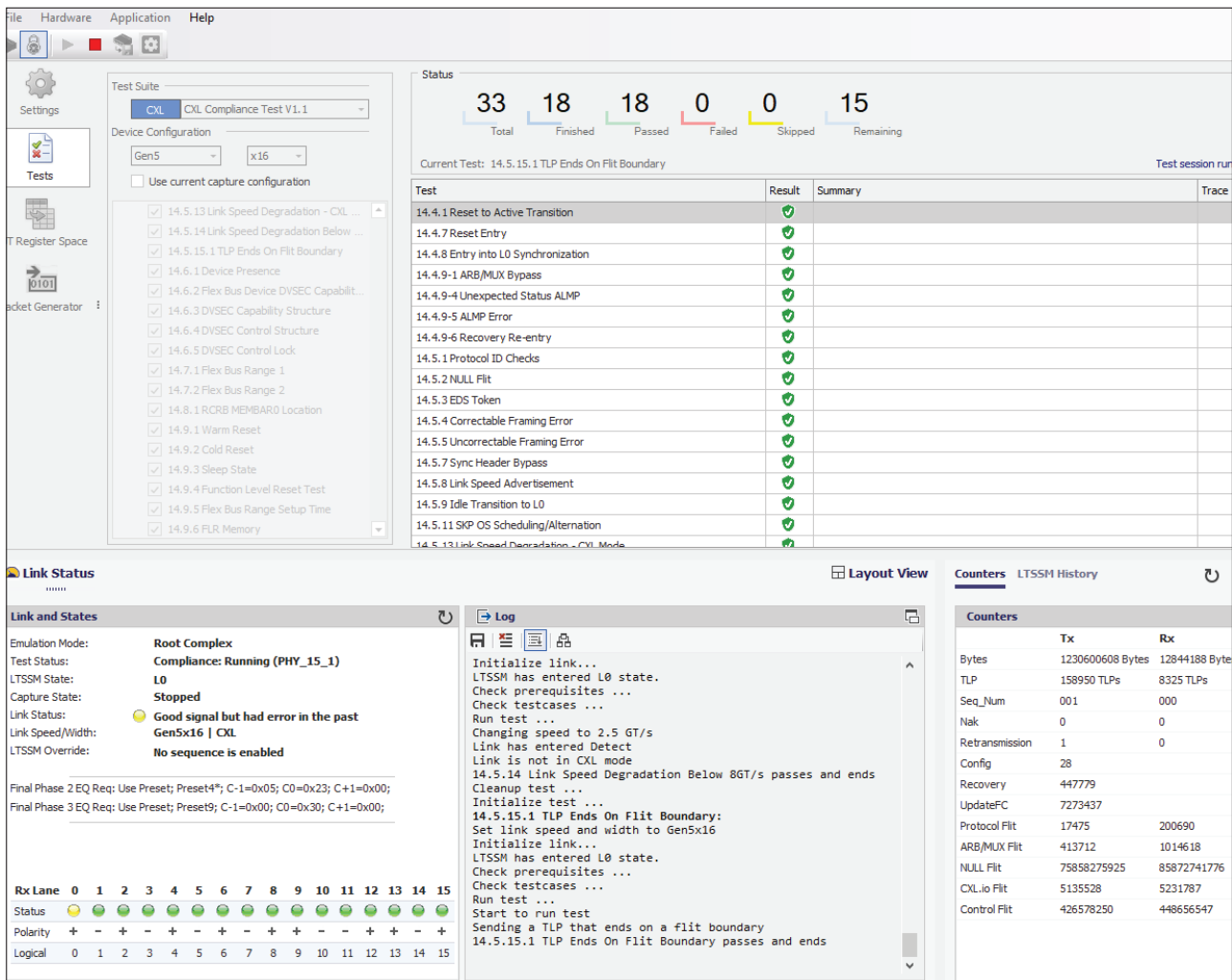# Xgig CXL Exerciser Interface – Compliance Testing

Figure 2. Test Selection Screen

CXL Compliance Testing

The CXL Consortium performs official certification testing to ensure that every device meets the minimum requirements of the CXL specification. Testing is done at two levels: (1) Electrical, and (2) Protocol. Electrical testing is performed using BERT and oscilloscope instruments. Protocol testing is performed using CXL exercisers such as this one.

Compliance testing is an important function of a CXL Exerciser. The VIAVI Exerciser enables quick pre-certification to the Protocol Compliance test suite. All the CXL 1.1 tests can be run today.

Tests can be executed individually, in groups, or all in sequence. A simple pass-fail response is provided, and as an option, a full trace of the communication can be saved for detailed analysis if a problem is reported. A detailed trace can help to get problems identified and resolved quickly. An example listing of some of the required Compliance tests is shown in Figure 2 above.

Compliance tests are pre-defined and locked to ensure execution follows CXL specifications. However, they can be copied, edited and saved as a new script to create a similar, but different, test when needed.

Test Applications

The following table lists some of the features available and tests that can be done using the Xgig CXL Exerciser.

Control and validate reset functions
Control DUT power
LTSSM supported states: Detect, Quiet, Configuration, L0, L1, Recovery
Set data rate
Set link width
Edit LTSSM state transitions
Control link width changes
Control link rate changes
Test transitions: any speed/width to any other
Control link state changes
Set TX parameters
Set RX parameters
Control equalization procedure
Inject disparity errors option
Inject symbol errors option
Inject Sync Bit errors option
Validate state timeouts
Set replay timeouts
Save and load custom test configurations
User-configurable custom test suites and execution sequence
View test description
View test results
View extensive error count information

Ordering Information

License Keys for up-to 16-lanes, 8-lanes or 4-lanes operation are available to match your specific test needs.

Part Number	Description
Xgig5P-PCIe5-X16-EC	Xgig 16-lane Exerciser License Key for CXL v1.1/v2.0
Xgig5P-PCIe5-X8-EC	Xgig 8-lane Exerciser License Key for CXL v1.1/v2.0
Xgig5P-PCIe5-X4-EC	Xgig 4-lane Exerciser License Key for CXL v1.1/v2.0
Xgig5P-PCIe5-X16-CX	Xgig 16-lane Analyzer License Key for CXL v1.1/v2.0
Xgig5P-PCIe5-X8-CX	Xgig 8-lane Analyzer License Key for CXL v1.1/v2.0
Xgig5P-PCIe5-X4-CX	Xgig 4-lane Analyzer License Key for CXL v1.1/v2.0

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