Compatibility Testing Environment for NVMe™ SSDs

Miki Takahashi
Executive Vice President of Engineering
Granite River Labs
PCIe® and NVM Express™ compatibility testing is robust and available

- Both PCI-SIG® and NVM Express™ organizations define robust tests that:
  - Are validated by members
  - Are then used to validate compliance of products to the specification

- These tests are implemented by Test Manufacturers where:
  - The test equipment is validated by the organization and members to match the specified tests
  - The test equipment is then used to validate compliance of products
What tests needs to be done?

Protocol Test
- PCIe® Protocol
  - Config Space Test
  - Link/Transaction Layer Test
- NVMe™ Protocol
  - Functional Test
  - Interoperability Test

Electrical Test
- PCIe® Electrical Test
  - Transmitter Test
  - Receiver Test
  - PLL Test
PCIe® Electrical Test (For Device)

Test Fixture Concept
(XFMEXPRESS™ to PCIe® Add-In Card adapter)

Adapter goes to CEM connector on CBB
PCIe® Electrical Test (For Host)

Test Fixture Concept
(XFMEXPRESS™ to PCIe® CEM Adapter)

Adapter goes to Host System

Flex Cable

PCIe® CEM Connector

PCI-SIG CLB goes to Host Test Adapter

- BERT TX
- CLB
- System

Variable 6x Board (including cable) Nominal 2.0 - 5.0 dB trace matched across all lanes

Nominal 1.0 dB cable from signal generator

Nominal 1.0 dB cable to error detector

0.2 dB SMP to 2.92 mm Adapter

4.0 dB CLB

2.0 dB System Tx trace matched across all lanes

2.0 dB System

DUT
Protocol Test (For Device)

Test Fixture Concept
(XFMEXPRESS™ to PCIe® Add-In Card Adapter)

Adapter goes to CEM Slot on Exerciser, Analyzer or PCIe® Protocol Test Platform

PCle® Exerciser and Analyzer are available in the market and they have test suites for PCle®/NVMe™.
Protocol Test (For Host)

Adapter goes to CEM Slot on Host System

Flex Cable

XFMEXPRESS™ Device Case

Test Fixture Concept (XFMEXPRESS™ to PCIe® CEM Adapter)

Exerciser, Analyzer or PCIe® Test Platform goes to CEM Slot on Host Test Adapter
Conclusion

• Minimize the effort/the cost to built XFMEXPRESS™ Test Platform by leveraging existing PCIe® /NVMe™ Test Solution as much as possible

• Need to define XFMEXPRESS™ unique test items, if required (Performance and Reliability)

• Make sure that additional electrical loss from Test Adapter gives reasonable margin (not excessive)
Thank you!

Point to Booth 307, Toshiba Memory