VIAVI TestCenter

AI Data Center Test Solution

Application Overview

In today's rapidly evolving technological landscape, Enterprise and data center networking has undergone significant advancements. With the widespread adoption of AI/ML, edge computing, and high-performance computing (HPC) systems, modern data centers demand a network that delivers exceptional performance and minimal latency. This network must also seamlessly adapt to accommodate the tremendous surge in extremely low latency and lossless high-volume data transfer demands driven by data-intensive and compute-intensive applications.

Remote Direct Memory Access technology (RDMA) technology offers efficient and faster ways to move data between GPUs within AI clusters while boosting network and host performance with lower latency, reduced CPU load, and higher bandwidth.

RDMA over Converged Ethernet version 2 (RoCEv2) extends the reach of RDMA technology to be used across both L2 and L3 networks with multiple subnets. This capability allows efficient clustering for elastic and scalable deployments.

For over a decade, many organizations have been deploying RoCEv2 in their data centers. However, in these large-scale environments, incorrect or non-optimized network settings can lead to poor application performance. Therefore, it is critical to validate switch fabric performance, optimize configurations and ensure network stability and resiliency under congestion conditions.

The pivotal congestion control mechanisms facilitated by switches and NICs encompass Data Center Quantized Congestion Notification (DCQCN) and Priority Flow Control (PFC). While testing with homegrown (with real servers) and open-source test solutions can be valuable, they often fall short of addressing the scale and efficiency requirements.

Ultra Ethernet Transport (UET)* based on the UEC 1.0 specification, addresses key RoCEv2 limitations in AI fabrics by improving scalability, simplifying network operation, efficient adaptive congestion control, and optimizing traffic distribution across large clusters. By reducing dependence on tightly managed lossless behavior and enabling more efficient multi-path delivery, UET helps deliver lower congestion, better link utilization, and more consistent performance demanded by modern AI workloads.

VIAVI offers the industry's most comprehensive AI data center validation solution, with hardware options supporting 100G to 1.6T, by accurately emulating Collective Communication Library (CCL) traffic patterns using RoCEv2 or UET as a transport on Ethernet and measuring KPIs for AI Ethernet fabric. It effectively validates a data center's Ethernet infrastructure's ability to support massive AI workloads without the deployment and management challenges of using GPU-based server farms as testing frameworks.

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Features and Benefits Overview

- **Test coverage options from 100G to 1.6T connectivity**
- **Realistic AI traffic and GPU emulation on Ethernet using RoCEv2 or UET * as a transport between GPUs within AI Clusters —** simulate continuous or burst traffic patterns per test port at line rate and support per-flow congestion control using DCQCN and port-level congestion control using PFC.
- **Validate next-generation Ethernet with UET support ***, featuring stateful Transport and Link Layer emulation, including congestion avoidance, congestion control, and support for the UEC conformance test suite.
- **VIAVI's unique UEC Link Layer Testing*** delivers advanced resiliency validation with built-in error insertion to verify Link Layer Retry and CBFC behavior, including retry timing and recovery parameters, Tx/Rx credit size, total credit, CC/CF interval, message count, and packet overhead.
- **Accelerated time-to-market —** validate switches and networks in AI environments and bring products to market faster
- **Lower Cost of Ownership —** replace racks of real GPU-based servers used for testing and save on CapEx, complexity, and ongoing maintenance
- **Investment Protection —** leverage high-density multi-speed test modules in multiple ways:
  - UPGRADE existing D2, B3 and A1 Appliances and fX3 and mX3 high density test modules to RoCEv2, CCL, and UET testing via simple licensing, subject to platform support*
  - REUSE test platforms for regular L2-3 testing improving your testing ROI
  - LEVERAGE additional speeds for advanced AI testing in future releases
- **Largest Collective Communication Library (CCL) Available —** configure from a large variety AI traffic algorithms and generate comprehensive AI traffic patterns, included mixed and additional background traffic through an easy-to-use GUI-based wizard
- **Leverage Expertise —** simplify the complexity of testing AI data center network fabrics, as a purpose-built testing solution

* CCL is not supported on fX3 and mX3 / UET is not supported on fX3, mX3, and A1.

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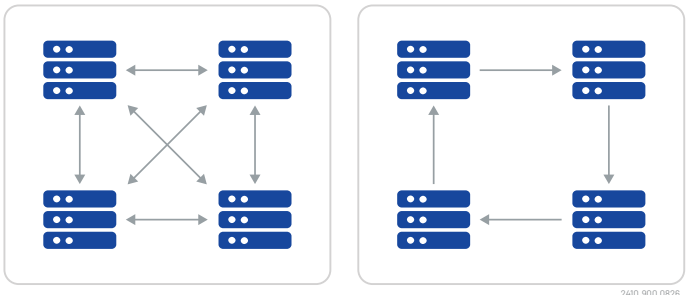
Collective Communication Library (CCL)



Due to the large amount of data communication between GPUs in an AI Data Center, processing this data cannot be handled by a single GPU and must therefore be spread across different GPUs. CCL, built on open MPI, enables high-performance computing and parallel processing in the AI data center. VIAVI's CCL library supports the largest number of CCL diverse traffic patterns available such as AlltoAll with reference to NCCL. Through setup wizards, AI traffic patterns are generated quickly and easily. When network congestion occurs, VIAVI's solution supports the DCQCN and PFC flow control, mirroring real AI Networks. The Job Completion Time (JCT) presented at the end of the test helps evaluate the performance of the network fabric in the AI data center.

VIAVI's **AI test solution** offers a high density, multi-speed testing environment that is readily available, cost-effective and easy to deploy. Built on open and transparent architecture, it ensures consistent and repeatable results. Through CCL, it generates realistic AI traffic patterns at line rate while supporting congestion control. Users can measure key network KPIs, such as JCT, throughput, tail latency, packet latency, packet loss, re-ordered packet count, late packet count, to evaluate an AI fabric. These KPIs help ascertain the resiliency of AI fabric under congestion conditions and link flap scenarios.

It enables users to characterize the performance of AI fabric and optimize the relevant network configurations, including buffer size, ECN, load-balance algorithm, and QoS settings.

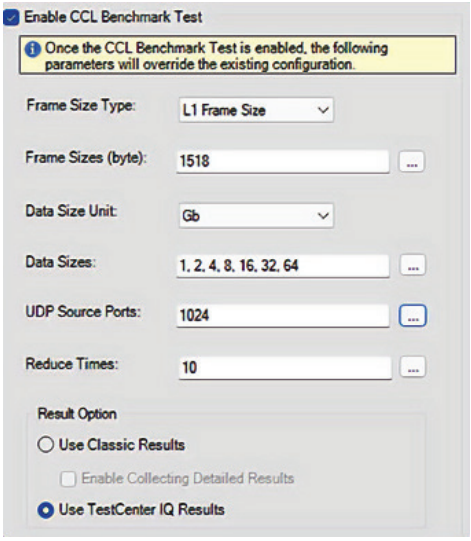
Automatic Benchmark Tool

Modern AI data center networks demand flexibility to support diverse large language models across all operational phases, from training and inference. VIAVI's Automatic Benchmark Tool delivers a robust traffic emulation framework that applies heterogeneous traffic models concurrently across multiple ports.

Each port can simultaneously generate CCL traffic and emulate background traffic, enabling realistic, complex test scenarios. By tuning key parameters, such as data size, UDP source port, source IP and frame size, users can gain deeper insights into network fabric behavior and optimize overall efficiency.

The solution provides a unified, automated testing environment that executes predefined test sequences across multiple scenarios, generating both high-level summaries and detailed performance analyses.

These capabilities allow users to replicate real-world network conditions while streamlining complex workflows, improving accuracy, efficiency, and confidence in network validation.



CCL Automatic Benchmark Test

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Comprehensive Stress Testing of AI Traffic Scheduling

Scheduling algorithms are critical to maximizing network bandwidth utilization. Traditional ECMP hash algorithms often fall short under AI workloads dominated by elephant flows, driving the need for enhanced scheduling strategies that account for additional influencing factors.

VIAVI provides a flexible, high-performance environment for testing and validating these advanced algorithms, supporting a wide range of configurations to emulate complex traffic behaviors:

- Multi-Queue Pair Support per stream block, enabling varied UDP source ports
- Multi-GPU and NIC Emulation per port, each with distinct IP addresses
- Customizable Scheduling Sizes per stream block to stress-test flow collision handling
- Comprehensive QoS Policy Configuration to validate traffic management and prioritization
- Precisely Synchronized Traffic Transmission for maximum stress under controlled conditions
- Long-Duration Testing with variable traffic patterns to ensure long-term reliability and stability

These capabilities enable deep evaluation of scheduling performance, helping identify bottlenecks and validate optimization strategies for AI-driven data center networks.

Multi-Platform and Multi-Rate

VIAVI's **AI test solution** is an innovative offering that runs on four of the existing best-in-class high-density, multi-speed Ethernet test modules.

The **D2 4-port OSFP 1.6T multi-speed appliance** designed for leading AI/ML test validation.

The **B3 4-port and 8-port QSFP-DD and OSFP 800G appliances** with industry-leading port density advantage for QSFP-DD and OSFP.

The **A1 400G 16-port appliance** is the industry's highest density 400GE platform.

These platforms support emulation of AI workloads and are multi-purpose to test both AI and routing/switching use cases concurrently.

FX3-QSFP28-6 offers 3x 100G ports or fan out to 12x 25G ports. In addition, both MX3-QSFP28-4 and FX3-QSFP28-4 offer 2x 100G ports or fan out to 8x 25G ports, making them ideal for RoCEv2 testing.

Multi-user support is available with per-port user reservation. This allows ports from a single test appliance/module to be used in either single or multiple concurrent test sessions. Additionally, these test appliances/modules can be used for regular L2-3 tests on a per port basis (outside RoCEv2 profile) for 1.6T and 800/400/200/100/50/40/25/10G speeds, maximizing your investment.

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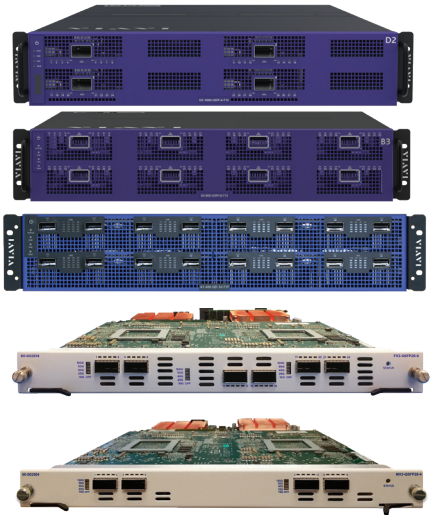
Seamless Integration with VIAVI TestCenter

This solution is an integrated component of VIAVI TestCenter and works with other TestCenter components to deliver easy, consistent TCL and REST API for scripting and Command Sequencer NoCode automation.

Features

- RoCEv2 support for 1.6T and 800G, 400G, 200G, 100G, 25G
- RoCEv2 traffic over Lossy and Lossless fabric using hardware-based, per-flow congestion control triggered by CNP/ECN and hardware-based PFC congestion control at the port level
- UET Transport supports stateful Transport Layer and Link Layer* emulation. Transport Layer supports congestion avoidance, congestion control functionality and UEC Conformance test suite. Link Layer supports LLDP, LLR (with built error insertion capability) and CBFC.
- Integrated CCL traffic patterns with an easy-to-use wizard
- Configuration to optimize congestion control mechanisms DCQCN and PFC according to network requirements
- Background traffic sharing the same port as CCL traffic emulates complicated real-world traffic
- Automatic Benchmark Tool offers convenient and simplified test configuration. A single wizard run can conduct a series of use cases. Test report is available in either TestCenter IQ or Results Reporter
- Facilitation of different traffic scheduling mechanisms and topology options to simulate both GPU and storage data transfers
- Multiple GPU up to 128 GPUs and NICs emulated per port (platform dependent) and RoCEv2 emulation per port and high scale with extensive Queue Pairs per port
- QoS settings for L2 (VLAN) and L3 (DSCP) mode
- Per QP/Flow congestion control support
- JCT, tail latency, and bandwidth reporting
- Simulated One-to-One data transfer between Queue Pairs



TestCenter High-speed Ethernet Appliances and Modules

- By enabling multiple traffic patterns in single test, it is possible to comprehensively evaluate the performance in heterogeneous scenarios, effectively overcoming the limitations of single-traffic pattern verification
- Traffic Chart visually depicts data flow directions and facilitates clear identification of problematic streams
- Emulate Queue Pair Establishment process and support for Reliable Connection
- VIAVI TestCenter+ offers a user-friendly web interface for streamlined test configuration, execution, and results analysis

Benefits

- **Assess and Validate AI Network infrastructures** at massive scale
- **Emulate GPUs** for large scale testing, complexity of in building CCL topology and traffic patterns masked by the RoCEv2 and CCL Wizard
- **Emulate servers** in a test bed, thereby reducing inventory cost and maintenance significantly
- **Reduce time-to-test** with easy configuration of realistic test topology
- **Scale up easily** with extensive Queue Pairs in a few clicks using a wizard
- **Collect key statistics** and generate intuitive reports with TestCenter IQ
- **Expand set of use case coverage** of AI Data Center test functionality in the VIAVI TestCenter+ web-based user interface

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Technical Specifications

Parameters	
AI Testing Support	
CCL Traffic Patterns	• AlltoAll with PXN • All to ALL without PXN • RingAllReduce • Halving and Doubling • RingReduceScatter • RingAllGather • Alternating Ring • Dual Tree • Point to Point • Mixed Traffic Patterns and Background Traffic
LLM Model Emulation	• Chat GPT, llama, DeepSeek, RestNet, and AlexNet to emulate training traffic models
RoCEv2 Configuration	• RoCEv2 profile applied per port • Up to 16K Queue Pairs per port • RC, UD, and UC transport mode • DCQCN congestion control • Traffic mode – Continuous and Bursty • Full mesh, One-to-One, ALLtoALL, • Bi-direction and Uni- direction traffic
UET Configuration *	• State full Link Layer • Link Layer Retry (LLR) • Credit-Based Flow Control (CBFC) • Link Layer Error insertion • State full Transport layer • Reliable ordered delivery (ROD) • Reliable un-ordered delivery (RUD) • High number of Fabric End Point (FEP) • NSSC Congestion control • RCC Congestion Control • Packet trimming • Dynamic entropy change • Traffic mode – Continuous and Bursty • Full mesh, One-to-One, ALLtoALL, Bi-direction and Uni- direction traffic
RoCEv2 Throughput	• 1.6T and 800G, 400G, 200G, 100G
UET - Throughput	• 1.6T and 800G, 400G, 200G, 100G

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Technical Specifications continued

Parameters	
Congestion Avoidance	• Packet Trimming support • Multi pathing support
Congestion Control	• ECN, PFC combination for lossy and lossless fabric • ECN detection, CNP notification • CNP interval • QoS priority for CNP notification • DCQCN • NSSC and RCC
Key Results and Statistics (Available on Web and Windows GUI)	• JCT, Ideal JCT • Tail latency (P95/P99/P99.9) Algorithm bandwidth (algbw) and Bus bandwidth (busbw) based on JCT • CCL Traffic Chart algbw and busbw based on transmission time • Total Transmission Time, Total Training Time • Average Iteration Time, Max Iteration Time, Min Iteration Time • Throughput, packet loss, out of sequence packets, packet latency • ECN, CNP TX/RX • Receiver Window Size • Packet loss • Packet Rate • RTT • Retransmission Rate • Packet Latency
Test Appliance Support	
A1-400-QD-16	**Port Density** for AI testing – 16x 400G ports/32x 200G ports/ 32x 100G PAM4 Ports
B3-800-OSFP, B3-800-QD, B2-800-OSFP, or B2-800-QD	**Port Density** for AI testing for up to 4x800G Ports /8x400G Ports/ 16x200G Ports/16x100G Ports
D2-1600-OSFP	**Port Density** for AI testing up to 4x1.6T Ports / 8x800G Ports/16x400G Ports
RoCEv2 Supported	Yes
CCL Configuration	Yes
GPU Emulation	Up to 128 GPUs emulated per port
User Reservation	Per-port user reservation

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Technical Specifications continued

Test Module Support	
FX3-QSFP28-6	**Port Density** for AI testing – 3x 100G -Or- 12 x 25G ports (L2-3 Testing Datasheet)
FX3-QSFP28-4	**Port Density** for AI testing – 2x 100G -Or- 8 x 25G ports (L2-3 Testing Datasheet)
MX3-QSFP28-4	**Port Density** for AI testing – 2x 100G -Or- 8 x 25G ports (L2-3 Testing Datasheet)
RoCEv2 Supported	Yes
CCL Configuration	No
User Reservation	Per-port user reservation
Chassis Support	
SPT-N12U	**Slots per chassis:** 12 **Port Density** for AI testing: • 36 x 100G -Or- 144 x 25G ports **(FX3-QSFP28-6)** • 24 x 100G -Or- 96 x 25G ports **(MX3-QSFP28-4)** • 24 x 100G -Or- 96 x 25G ports **(FX3-QSFP28-4)**
SPT-N4U	**Slots per chassis:** 2 **Port Density** for AI testing: • 4 x 100G -Or- 16 x 25G ports **(MX3-QSFP28-4)** • 4 x 100G -Or- 16 x 25G ports **(FX3-QSFP28-4)**

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Ordering Information

Part Number	Description
Test Appliance	
A1-400-QD-16	**A1 16-Port QSFP-DD 400G/200G/100G/50G T1 Appliance**
HWO-A1-16-ROCE-ECN-400-16	VIAVI RoCE ECN-400G for A1-400-QD-16. 16 X 400G PAM4 ports total per appliance
HWO-A1-16-ROCE-ECN-200-32	VIAVI RoCE ECN-200G for A1-400-QD-16. 32 X 200G PAM4 ports total per appliance.
HWO-A1-16-ROCE-ECN-100-32	VIAVI RoCE ECN-100G for A1-400-QD-16. 32 X 100G PAM4 ports total per appliance
HWO-A1-16-ROCE-ECN-500A	VIAVI RoCE ECN-400G/100G Suite for A1-400-QD-16. 16 X 400G PAM4 or 32 X 100G PAM4 ports total per appliance
HWO-A1-16-ROCE-ECN-600A	VIAVI RoCE ECN-400G/200G Suite for A1-400-QD-16. 16 X 400G PAM4 or 32 X 200G PAM4 ports total per appliance
HWO-A1-16-ROCE-ECN-700A	VIAVI RoCE ECN-400G/200G/100G Suite for A1-400-QD-16. 16 X 400G PAM4 or 32 X 200G PAM4 or 32 X 100G PAM4 ports total per appliance
HWO-A1-16-CCL-16	VIAVI CCL FOR A1-400-QD-16. All speeds are included. 16 X 400G PAM4 or 32 X 200G PAM4 or 32 X 100G PAM4 ports total per appliance
HWO-A1-8-ROCE-ECN-400-8	VIAVI RoCE ECN-400G for A1-400-QD-16. 8 X 400G PAM4 ports total per appliance
HWO-A1-8-ROCE-ECN-200-16	VIAVI RoCE ECN-200G for A1-400-QD-16. 16 X 200G PAM4 ports total per appliance
HWO-A1-8-ROCE-ECN-100-16	VIAVI RoCE ECN-100G for A1-400-QD-16. 16 X 100G PAM4 ports total per appliance
HWO-A1-8-ROCE-ECN-500A	VIAVI RoCE ECN-400G/100G Suite for A1-400-QD-16. 8 X 400G PAM4 or 16 X 100G PAM4 ports total per appliance
HWO-A1-8-ROCE-ECN-600A	VIAVI RoCE ECN-400G/200G Suite for A1-400-QD-16. 8 X 400G PAM4 or 16 X 200G PAM4 ports total per appliance
HWO-A1-8-ROCE-ECN-700A	VIAVI RoCE ECN-400G/200G/100G Suite for A1-400-QD-16. 8 X 400G PAM4 or 16 X 200G PAM4 or 16 X 100G PAM4 ports total per appliance
HWO-A1-8-CCL-8	VIAVI CCL for A1-400-QD-16. All speeds are included. 8 X 400G PAM4 or 16 X 200G PAM4 or 16 X 100G PAM4 ports total per appliance
AON-A1-AI-16-700A	A1 16-Port RoCE ECN and CCL 400G/200G/100G Bundle (AION)
AON-A1-AI-8-700A	A1 8-Port RoCE ECN and CCL 400G/200G/100G Bundle (AION)

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Ordering Information continued

Part Number	Description
B3-800-OSFP and B3-800-QD	**B3 800G Appliances available in 4-Port and 8-Port configurations for OSFP or QSFP-DD**
HWO-B3-ROCE-ECN-100-8	VIAVI RoCE ECN-100G for B3-800-OSFP or B3-800-QD. 4-port B3: 8 X 100G PAM4 ports. 8-port B3: 16 X 100G PAM4 ports total per test module.
HWO-B3-ROCE-ECN-200-8	VIAVI RoCE ECN-200G for B3-800-OSFP or B3-800-QD. 4-port B3: 8 X 200G PAM4 ports. 8-port B3: 16 X 200G PAM4 ports total per test module.
HWO-B3-ROCE-ECN-400-8	VIAVI RoCE ECN-400G for B3-800-OSFP or B3-800-QD. 4-port B3 and 8-port B3: 8 X 400G PAM4 ports total per test module.
HWO-B3-ROCE-ECN-800-4	VIAVI RoCE ECN-800G for B3-800-OSFP or B3-800-QD. 4-port B3 and 8-port B3: 4 X 800G PAM4 ports total per test module.
HWO-B3-ROCE-ECN-300A	VIAVI RoCE ECN-200G/100 Suite for B3-800-OSFP or B3-800-QD. 4-port B3: 8 X 200G PAM4 or 8 x 100G PAM4 ports. 8-ports B3: 16 X 200G PAM4 or 16 x 100G PAM4 ports total per appliance.
HWO-B3-ROCE-ECN-500A	VIAVI RoCE ECN-400G/100 Suite for B3-800-OSFP or B3-800-QD. 4-port B3: 8 X 400G PAM4 or 8 x 100G PAM4 ports. 8-ports B3: 8 X 400G PAM4 or 16 x 100G PAM4 ports total per appliance.
HWO-B3-ROCE-ECN-600A	VIAVI RoCE ECN-400G/200 Suite for B3-800-OSFP or B3-800-QD. 4-port B3: 8 X 400G PAM4 or 8 x 200G PAM4 ports. 8-ports B3: 8 X 400G PAM4 or 16 x 200G PAM4 ports total per appliance.
HWO-B3-ROCE-ECN-700A	VIAVI RoCE ECN-400G/200/100 Suite for B3-800-OSFP or B3-800-QD. 4-port B3: 8 X 400G PAM4 or 8 x 200G PAM4 or 8 x 100G PAM4 ports. 8-ports B3: 8 X 400G PAM4 or 16 x 200G PAM4 or 16 x 100G PAM4 ports total per appliance.
HWO-B3-ROCE-ECN-900A	VIAVI RoCE ECN-800G/100G Suite for B3-800-OSFP or B3-800-QD. 4-port B3: 4 X 800G PAM4 or 8 X 100G PAM4 ports. 8-port B3: 4 X 800G PAM4 or 16 X 100G PAM4 ports total per test module.
HWO-B3-ROCE-ECN-1000A	VIAVI RoCE ECN-800G/200G Suite for B3-800-OSFP or B3-800-QD. 4-port B3: 4 X 800G PAM4 or 8 X 200G PAM4 ports. 8-port B3: 4X 800G PAM4 or 16 X 200G PAM4 ports total per test module.
HWO-B3-ROCE-ECN-1200A	VIAVI RoCE ECN-800G/400G Suite for B3-800-OSFP or B3-800- QD. 4-port B3 and 8-port B3: 4 X800G PAM4 ports or 8 X 400G* PAM4 ports total per appliance.
HWO-B3-ROCE-ECN-1300A	VIAVI RoCE ECN-800G/400G/100G Suite for B3-800-OSFP or B3-800-QD. 4-port B3: 4 X 800G PAM4 or 8 X 400G PAM4 or 8x100G ports. 8-port B3: 4 X 800G PAM4 or 8 x 400G PAM4 or 16 X 100G PAM4 ports total per test module.
HWO-B3-ROCE-ECN-1400A	VIAVI RoCE ECN-800G/400G/200G Suite FOR B3-800-OSFP or B3-800-QD. 4-port B3: 4 X 800G PAM4 or 8 X 400G PAM4 or 8 X 200G PAM4 ports. 8-port B3: 4 X 800G PAM4 or 8 X 400G PAM4 or 16 X 200G PAM4 ports total per test module.

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Ordering Information continued

Part Number	Description
HWO-B3-ROCE-ECN-1500A	VIAVI RoCE ECN-800G/400G/200G/100G SUITE for B3-800-OSFP or B3-800-QD. 4-port B3: 4 X 800G PAM4 or 8 X 400G PAM4 or 8 X 200G PAM4 or 8 X 100G PAM4 ports. 8-port B3: 4 X 800G PAM4 or 8 X 400G PAM4 or 16 X 200G PAM4 ports or 16 X 100G PAM4 ports total per test module.
HWO-B3-CCL-4	VIAVI CCL for B3-800-OSFP or B3-800-QD. All speeds are included. 4-port B3: 4 X 800G PAM4 or 8 X 400G PAM4 or 8 X 200G PAM4 or 8 X 100G PAM4 ports. 8-port B3: 4 X 800G PAM4 or 8 X 400G PAM4 or 16 X 200G PAM4 ports or 16 X 100G PAM4 ports total per test module.
AON-B3-AI-4-1500A	B3 RoCE ECN and CCL 800G/400G/200G/100G Bundle (AION). 4-port B3: 4 X 800G PAM4 or 8 X 400G PAM4 or 8 X 200G PAM4 or 8 X 100G PAM4 ports. 8-port B3: 4 X 800G PAM4 or 8 X 400G PAM4 or 16 X 200G PAM4 ports or 16 X 100G PAM4 ports total per appliance.
HWO-B3-UET-800-8	UET 800G for B3-800-QD or B3-800-OSFP. 4X 800G PAM4 ports total per test module.
HWO-B3-UET -400-8	UET 400G for B3-800-QD or B3-800-OSFP. 8X 400G PAM4 ports total per test module.
HWO-B3-UET-1500A	UET 800G/400G/200G /100G Suite for B3-800-QD or B3-800-OSFP. 4 port B3:4 X 800G PAM4 or 8 X 400G PAM4 or 8 X 200G PAM4 or 8x100G PAM4 ports . 8 port B3:4 X 800G PAM4 or 8 X 400G PAM4 or 16 X 200G PAM4 or 16x100G PAM4 ports total per test module.
HWO-B3-UET-1200A	UET 800G/400G Suite for B3-800-QD or B3-800-OSFP. 4 port B3:4 X 800G PAM4 or 8 X 400G PAM4 ports 8 port B3 :4 X 800G PAM4 or 8 X 400G PAM4 ports total per test module
HWO-B3-UET-600A	UET 400G/200G Suite for B3-800-QD or B3-800-OSFP. 4 ports B3 8 X 400G PAM4 or 8 X 200G PAM4 ports 8-ports B3 8 X 400G PAM4 or 16 X 200G PAM4 ports total per test module.
HWO-B3-UET-500A	UET 400G/100G Suite for B3-800-QD or B3-800-OSFP. 4-port B3: 8 X 400G PAM4 or 8 X 100G PAM4 ports. 8-port B3: 8 X 400G PAM4 or 16 X 100G PAM4 ports total per test module
HWO-B3- UET-300A	UET 200G/100G Suite for B3-800-QD or B3-800-OSFP. 4-port B3: 8 X 200G PAM4 or 8 X 100G PAM4 ports. 8-port B3: 16X 200G PAM4 or 16 X 100G PAM4 ports total per test module.
HWO-B3- UET-200-8	UET Transport Layer-400G/100G Suite for B3-800-QD or B3-800-OSFP. 4-port B3: 8 X200G PAM4 ports. 8-port B3: 16 X 200G PAM4 ports total per test module.
HWO-B3-UET-100-8	UET 400G/100G Suite for B3-800-QD or B3-800-OSFP. 4-port B3: 8 X100G PAM4 ports. 8-port B3: 16 X 100G PAM4 ports total per test module.

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Ordering Information continued

Part Number	Description
B2-800-OSFP and B2-800-QD	**B2 800G Appliances available in 4-Port and 8-Port configurations for OSFP or QSFP-DD.**
HWO-B2-ROCE-ECN-100-8	VIAVI RoCE ECN-100G for B2-800-OSFP or B2-800-QD. 4-port B2: 8 X 100G PAM4 ports. 8-port B2: 16 X 100G PAM4 ports total per test module.
HWO-B2-ROCE-ECN-200-8	VIAVI RoCE ECN-200G for B2-800-OSFP or B2-800-QD. 4-port B2: 8 X 200G PAM4 ports. 8-port B2: 16 X 200G PAM4 ports total per test module.
HWO-B2-ROCE-ECN-800-4	VIAVI RoCE ECN-800G for B2-800-OSFP or B2-800-QD. 4-port B2 and 8-port B2: 4 X 800G PAM4 ports total per test module.
HWO-B2-ROCE-ECN-400-8	VIAVI RoCE ECN-400G for B2-800-OSFP or B2-800-QD. 4-port B2 and 8-port B2: 8 X 400G PAM4 ports total per test module.
HWO-B2-ROCE-ECN-600A	VIAVI RoCE ECN-400G/200 Suite for B2-800-OSFP or B2-800-QD. 4-port B2:8 X 400G PAM4 or 8 x 200G PAM4 ports. 8-ports B2: 8 X 400G PAM4 or 16 x 200G PAM4 ports total per appliance.
HWO-B2-ROCE-ECN-1000A	VIAVI RoCE ECN-800G/200 Suite for B2-800-OSFP or B2-800-QD. 4-port B2: 4 X 800G PAM4 or 8 x 200G PAM4 ports. 8-ports B2: 4 X 800G PAM4 or 16 x 200G PAM4 ports total per appliance.
HWO-B2-ROCE-ECN-1200A	VIAVI RoCE ECN-800G/400G Suite for B2-800-OSFP or B2-800- QD. 4-port B2 and 8-port B2: 4 X 800G PAM4 ports or 8 X 400G PAM4 ports total per appliance.
HWO-B2-ROCE-ECN-1400A	VIAVI RoCE ECN-800G/400G/200G Suite for B2-800-OSFP or B2-800-QD. 4-port B2: 4 X 800G PAM4 or 8 X 400G PAM4 or 8 X 200G PAM4 ports. 8-port B2: 4 X 800G PAM4 or 8 X 400G PAM4 or 16 X 200G PAM4 ports total per test module.
HWO-B2-ROCE-ECN-1500A	VIAVI RoCE ECN-800G/400G/200G/100G Suite for B2-800-OSFP or B2-800-QD. 4-port B2: 4 X 800G PAM4 or 8 X 400G PAM4 or 8 X 200G PAM4 or 8 X 100G PAM4 ports. 8-port B2: 4 X 800G PAM4 or 8 X 400G PAM4 or 16 X 200G PAM4 ports or 16 X 100G PAM4 ports total per test module.
HWO-B2-CCL-4	VIAVI CCL FOR B2-800-OSFP or B2-800-QD. All speeds are included. 4-port B2: 4 X 800G PAM4 or 8 X 400G PAM4 or 8 X 200G PAM4 or 8 X 100G PAM4 ports. 8-port B2: 4 X 800G PAM4 or 8 X 400G PAM4 or 16 X 200G PAM4 ports or 16 X 100G PAM4 ports total per test module.
AON-B2-AI-4-1500A	B2 RoCE ECN AND CCL 800G/400G/200G/100G Bundle (AION). 4-port B2: 4 X 800G PAM4 or 8 X 400G PAM4 or 8 X 200G PAM4 or 8 X 100G PAM4 ports. 8-port B2: 4 X 800G PAM4 or 8 X 400G PAM4 or 16 X 200G PAM4 ports or 16 X 100G PAM4 ports total per appliance.
TPK-1106	CCL Automation Benchmark Test Package. Requires RoCEv2 and CCL license. Works with A1, B2, and B3 only.

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Ordering Information continued

Part Number	Description
AON-PB-AI	AION AI Basic Bundle. Include TPK-1106 CCL Automation benchmark test package. Requires AON-A1-AI, AON-B2-AI or AON-B3-AI which are sold separately.
D2-1600-OSFP-4	**D2 1.6 Appliance 4-Port OSFP**
HWO-D2-UET-1600-4	UET 1600G FOR D2-1600-OSFP. 4X 1600G PAM4 ports total per test module.
HWO-D2-UET-800-8	UET 1600G FOR D2-1600-OSFP. 8X 800G PAM4 ports total per test module.
HWO-D2-UET-400-16	UET 1600G FOR D2-1600-OSFP. 16X 400G PAM4 ports total per test module.
HWO-D2-UET-200-32	UET 1600G for D2-1600-OSFP. 32X 200G PAM4 ports total per test module.
HWO-D2-UET-3000A	UET 1600G/800G/400G/200G Suite for D2 1600G-OSFP. 4 ports D2 4 X 1600G PAM4 or 8 X 800G PAM4 or 16 X 400G PAM4 or 32 X 200G PAM4 ports total per test module.
HWO-D2-UET-2800A	UET 1600G/800G/400G Suite for D2 1600G-OSFP. 4 ports D2 4 X 1600G PAM4 or 8 X 800G PAM4 or 16 X 400G PAM4 ports total per test module.
HWO-D2-UET-2400A	UET Link Layer 1600G/800G Suite for D2 1600G-OSFP. 4 ports D2 4 X 1600G PAM4 or 8 X 800G ports total per test module.
HWO-D2-UET-2000A	UET 1600G/400G Suite for D2 1600G-OSFP. 4 ports D2 4X 1600G PAM4 or 16 X 400G PAM4 ports total per test module.
HWO-D2-UET-1800A	UET 1600G/400G Suite for D2 1600G-OSFP. 4 ports D2 4X 1600G PAM4 or 32 X 200G PAM4 ports total per test module.
HWO-D2-UET-1200A	UET 800G/400G Suite for D2 1600G-OSFP. 4 ports D2 8 X 800G PAM4 or 16 X 400G PAM4 ports total per test module.
HWO-D2-UET-1000A	UET 800G/400G Suite for D2 1600G-OSFP. 4 ports D2 8 X 800G PAM4 or 32 X 200G PAM4 ports total per test module.
HWO-D2-UET-600A	UET 400G/200G Suite for D2 1600G-OSFP. 4 ports D2 16X 400G PAM4 or 32 X 200G PAM4 ports total per test module.
AON-D2-UET-3000A	AION UET 1600G/800G/400G/200G Suite for D2 1600G-OSFP. 4 ports D2 4 X 1600G PAM4 or 8 X 800G PAM4 or 16 X 400G PAM4 or 32 X 200G PAM4 ports total per test module.
HWO-D2-UET-LL-1600-4	UET Link Layer 1600G for D2-1600-OSFP. 4X 1600G PAM4 ports total per test module.
HWO-D2-UET-LL-800-8	UET Link Layer 1600G for D2-1600-OSFP. 8X 800G PAM4 ports total per test module.
HWO-D2-UET-LL-400-16	UET Link Layer 1600G for D2-1600-OSFP. 16X 400G PAM4 ports total per test module.

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Ordering Information continued

Part Number	Description
HWO-D2-UET-LL-200-32	UET Link Layer 1600G for D2-1600-OSFP. 32X 200G PAM4 ports total per test module.
HWO-D2-UET-LL-3000A	UET Link Layer 1600G/800G/400G/200G SUITE for D2 1600G-OSFP. 4 ports D2 4 X 1600G PAM4 or 8 X 800G PAM4 or 16 X 400G PAM4 or 32 X 200G PAM4 ports total per test module.
HWO-D2-UET-LL-2800A	UET Link Layer 1600G/800G/400G Suite for D2 1600G-OSFP. 4 ports D2 4 X 1600G PAM4 or 8 X 800G PAM4 or 16 X 400G PAM4 ports total per test module.
HWO-D2-UET-LL-2400A	UET Link Layer 1600G/800G Suite for D2 1600G-OSFP. 4 ports D2 4 X 1600G PAM4 or 8 X 800G ports total per test module.
HWO-D2-UET-LL-2000A	UET Link Layer 1600G/400G Suite for D2 1600G-OSFP. 4 ports D2 4X 1600G PAM4 or 16 X 400G PAM4 ports total per test module.
HWO-D2-UET-LL-1800A	UET Link Layer 1600G/400G Suite for D2 1600G-OSFP. 4 ports D2 4X 1600G PAM4 or 32 X 200G PAM4 ports total per test module.
HWO-D2-UET-LL-1200A	UET Link Layer 800G/400G Suite for D2 1600G-OSFP. 4 ports D2 8 X 800G PAM4 or 16 X 400G PAM4 ports total per test module.
HWO-D2-UET-LL-1000A	UET Link Layer 800G/400G Suite for D2 1600G-OSFP. 4 ports D2 8 X 800G PAM4 or 32 X 200G PAM4 ports total per test module.
HWO-D2-UET-LL-600A	UET Link Layer 400G/200G Suite for D2 1600G-OSFP. 4 ports D2 16X 400G PAM4 or 32 X 200G PAM4 ports total per test module.
AON-D2-UET-LL-3000A	AION UET Link Layer 1600G/800G/400G/200G Suite for D2 1600G-OSFP. 4 ports D2 4 X 1600G PAM4 or 8 X 800G PAM4 or 16 X 400G PAM4 or 32 X 200G PAM4 ports total per test module.
D2 RoCEv2 and CCL Options	
HWO-D2-4-ROCE-ECN-1600-4	VIAVI RoCE ECN-1600G for D2-1600-OSFP-4. 4 X 1600G ports total per test module.
HWO-D2-4-ROCE-ECN-800-8	VIAVI RoCE ECN-1600G for D2-1600-OSFP-4. 8X 800G ports total per test module.
HWO-D2-4-ROCE-ECN-400-16	VIAVI RoCE ECN-1600G for D2-1600-OSFP-4. 16X 400G ports total per test module.
HWO-D2-4-ROCE-ECN-200-32	VIAVI RoCE ECN-1600G for D2-1600-OSFP-4. 32X 200G ports total per test module.
HWO-D2-4-ROCE-ECN-2400A	VIAVI RoCE ECN-1600G/800G Suite for D2-1600-OSFP-4. 4X1600 or 8 X 800G ports total per test module.
HWO-D2-4-ROCE-ECN-2800A	VIAVI RoCE ECN-1600G/800G/400G/200G Suite for for D2-1600-OSFP-4. 4X1600 or 8 X 800G or 16 X 400G ports total per test module.
HWO-D2-4-ROCE-ECN-3000A	VIAVI RoCE ECN-1600G/800G/400G/200G/100G Suite for D2-1600-OSFP-4. 4X1600 or 8 X 800G or 16 X 400G or 32 X 200G .
HWO-D2-4-CCL-4	CCL for D2-1600-OSFP-4 all speeds supported.

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Test Modules

Part Number	Description
FX3-QSFP28-4	VIAVI FX3 QSFP28 4-Port
FX3-QSFP28-6	VIAVI FX3 QSFP28 6-Port
MX3-QSFP28-4	VIAVI MX3 QSFP28 4-Port
Chassis	SPT-N12U Chassis, SPT-N4U Chassis
HWO-FX3-6-ROCE-ECN-100-3	VIAVI RoCE ECN-100G Upgrade for FX3 QSFP28-6 - 3 Ports - 3 X 100G ports total per test module. For non-ECN operation, additional normal speed license required.
HWO-FX3-4-ROCE-ECN-100-2	VIAVI RoCE ECN-100G Upgrade for FX3 QSFP28-4 - 2 Ports - 2 X 100G ports total per test module. For non-ECN operation, additional normal speed license required.
HWO-MX3-4-ROCE-ECN-100-2	VIAVI RoCE ECN-100G Upgrade for MX3 QSFP28-4 - 2 Ports - 2 X 100G ports total per test module. For non-ECN operation, additional normal speed license required.
HWO-FX3-6-ROCE-ECN-25-12	VIAVI RoCE ECN-25G Upgrade for FX3 QSFP28-6 - 12 Ports - 12 X 25G ports total per test module. For non-ECN operation, additional normal speed license required.
HWO-FX3-4-ROCE-ECN-25-8	VIAVI RoCE ECN-25G Upgrade for FX3 QSFP28-4 - 8 Ports - 8 X 25G ports total per test module. For non-ECN operation, additional normal speed license required.
HWO-MX3-4-ROCE-ECN-25-8	VIAVI RoCE ECN-25G Upgrade for MX3 QSFP28-4 - 8 Ports - 8 X 25G ports total per test module. For non-ECN operation, additional normal speed license required.

Note: corresponding hardware speed license is required. Some RoCEv2 and CCL features will be available in future software releases on specific platforms. For D2 1.6T appliance and software ordering information, please contact VIAVI sales.

* UET Transport and Link Layer support will be available as a future software license.

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