RFC 2544 Network Testing on PacketExpert™100G
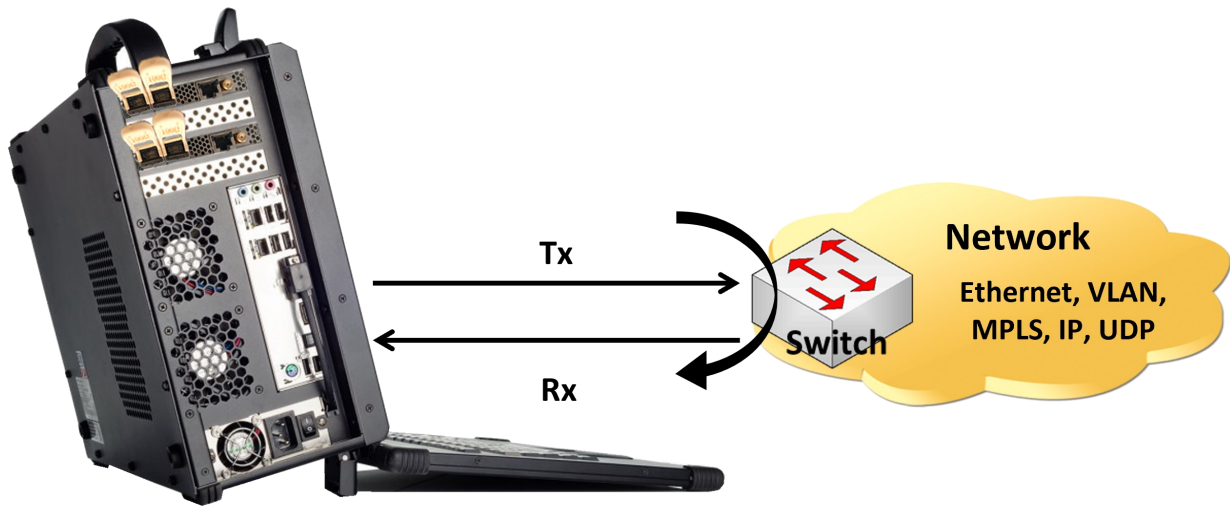
(Ethernet Throughput, Latency, Frame Loss, and Back-to-Back Performance Tests)

PacketExpert™ 100G

Overview

RFC 2544 is an industry standard testing methodology designed to measure essential packet statistics such as throughput, packet loss and latency. The PacketExpert™ 100G offers RFC 2544 testing by default over a wide range of data rates and traffic types. It supports various protocols such as Framed Ethernet (Layer 2), Stacked VLAN (Q-in-Q), Stacked MPLS, IP, and UDP. This ensures a thorough evaluation of network capabilities across different network layers and configurations.

User access is provided through an easy-to-use web interface and all parameters of the test are configurable including data rate (1G/10G/25G/40/50G/100G), frame sizes, trial duration, protocol headers and more.

In the Dual Port RFC 2544 test, both ports of the PacketExpert™ 100G are connected to the device under test (i.e. a switch). Both Ports can simultaneously transmit and receive traffic and therefore conduct the RFC 2544 test in both directions simultaneously.

In the Single Port RFC 2544 test, two PacketExpert™ 100G devices are used at both ends of the network under test. Test traffic is sent from the PacketExpert™ 100G at the near-end to the far-end PacketExpert™ 100G where it is then looped back to the source. As the packets arrive back at the source PacketExpert™ 100G, the measurements are performed such as round-trip delay, packet loss, throughput, etc.
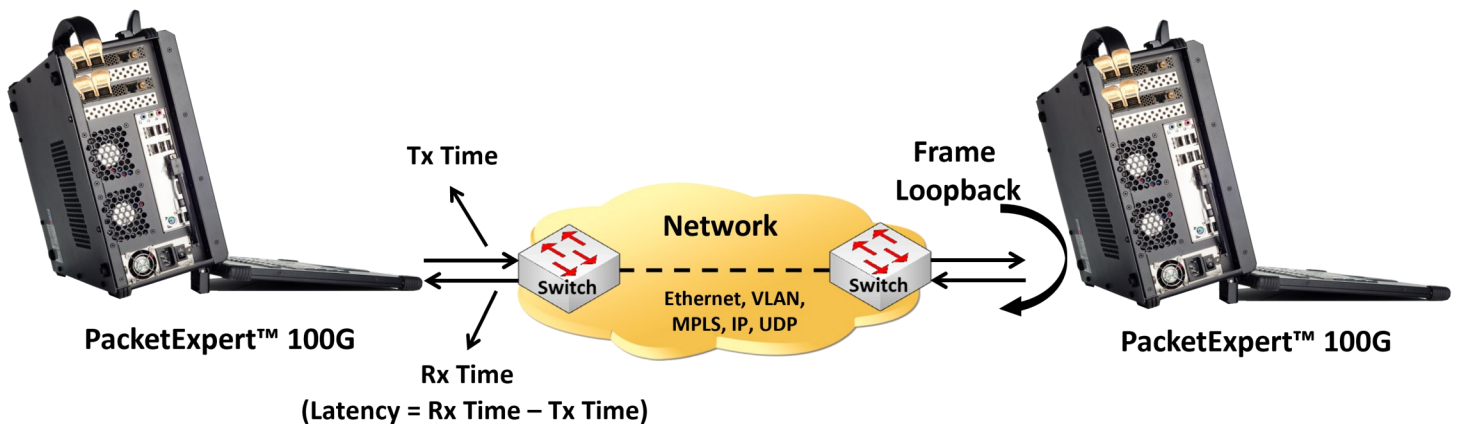

Figure: Single Port RFC 2544 Test

Main Features

- Throughput, back-to-back, latency and frame loss testing supporting uni-directional and bi-directional traffic between ports
- Supports RFC 2544 on Optical 1G/10G/25G/100G ports (40G and 50G are coming soon)
- Support for frame lengths from 68 bytes to Jumbo frames (up to 16000 bytes)
- Includes various parameter configurations such as Test Selection, Frame Sizes selection, Unidirectional/Bidirectional, Number of trials, Trial Duration, and many more
- User-defined options to configure various packet header parameters, like MAC addresses, IP addresses, UDP ports, VLAN ID, MPLS Labels, and more
- Results are displayed in both tabular as well as graphical format

RFC 2544 Application on PacketExpert™ 100G Web interface

The software is designed to offer a seamless user experience through its intuitive web interface. Accessible from any standard web browser, this convenient feature allows you to control the hardware from multiple locations and various devices such as PCs, laptops, and tablets. Moreover, the software is compatible with different operating systems like Windows, Linux, Android, and more, as long as they support a web browser.

Figure: Loading RFC 2544 Application on PacketExpert™ 100G

Global Configurations

Global configuration includes various parameter configurations that are common to all the 4 tests - Throughput, Latency, Back-to-Back, Frame Loss. option to configure with the minimum frame length required. RFC 2544 recommends 20 different frame sizes for Ethernet.
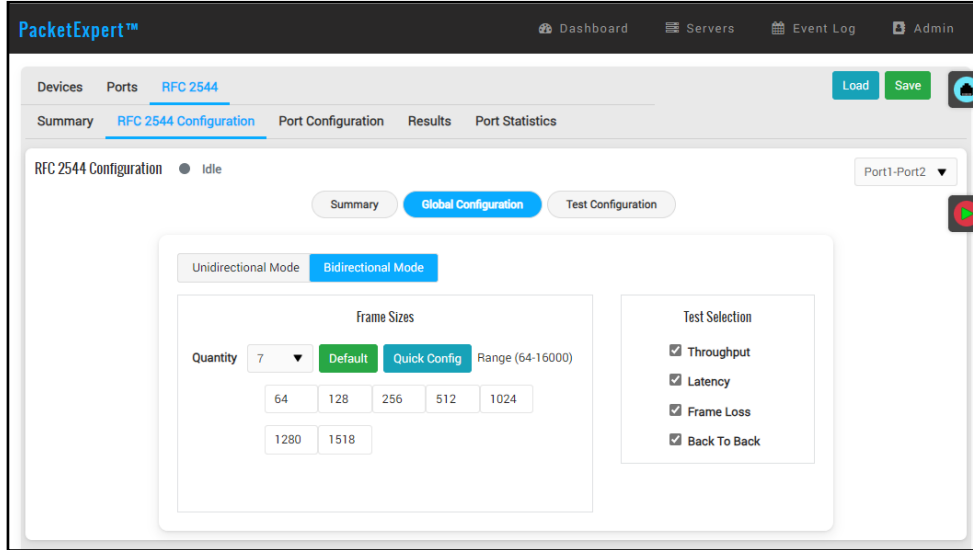

Figure: Global Configurations

Test Configurations

Test configurations includes Minimum and Maximum Bandwidth parameter settings for Throughput/Latency/Frameloss tests, and Burst size and no. of bursts settings for Back-to-back test for both the directions.
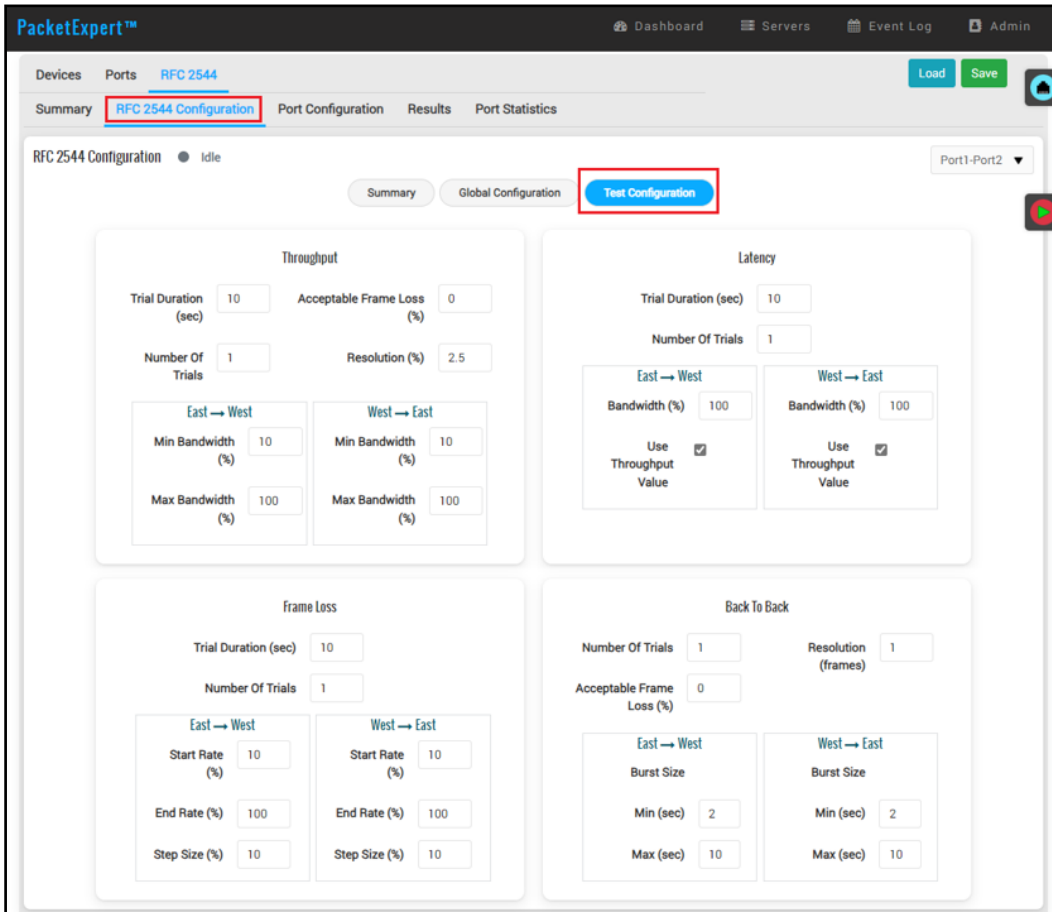

Figure: Test Configurations

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Port Level Statistics

Detailed statistics per port are provided. In addition to statistics like Frame Count, Frame Rate, Link Utilization, others are provided based on various categories like Frame Type (Unicast/Broadcast/Multicast, VLAN), Frame Lengths (64, 65-127, 1024-1518, Oversized, Undersized), Protocol Type (IPv4, IPv6, UDP, TCP, ICMP, IGRP, etc). VLAN Statistics (per Stack position), MPLS Statistics (per stack position) are also displayed for the configured stacks.
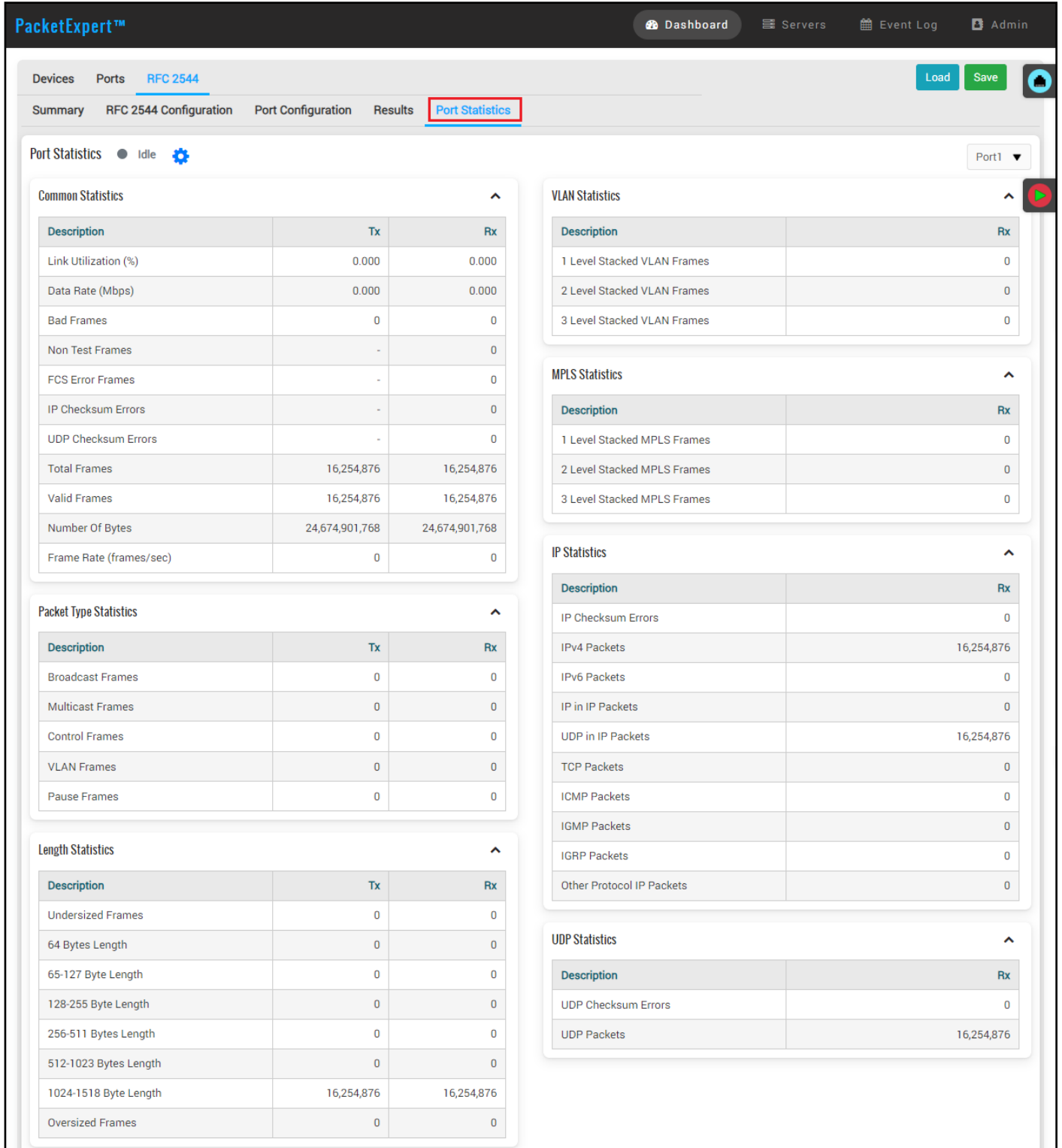

Figure: Per Port Statistics

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RFC 2544 Test Results

Results are displayed in both tabular as well as graph format. Supports test report generation in both PDF and CSV formats.

Status – displays test status such as In Progress, Completed, and Aborted. In addition, it displays status of learning frames and test frames for the current trial along with Bandwidth, Frame Size, and Frame Count.

Throughput – Throughput results are displayed in terms of bandwidth (both in percentage as well as Mbps) for each frame size. Graphically, it is plotted as throughput vs frame size.

Latency – Latency values are displayed in terms of microseconds for each frame size. Graphically, the latency value is plotted against frame size.

Back-to-Back – Back-to-Back values are displayed in terms of the burst size (in milliseconds) for each frame size. Graphically, the burst size is plotted against frame size.

Frame Loss – Frame Loss results are displayed in terms of the throughput (in percentage) measured over the range of input rates (in percentage) for each frame size. Graphically, for each frame size, the throughput is plotted against the test rate.
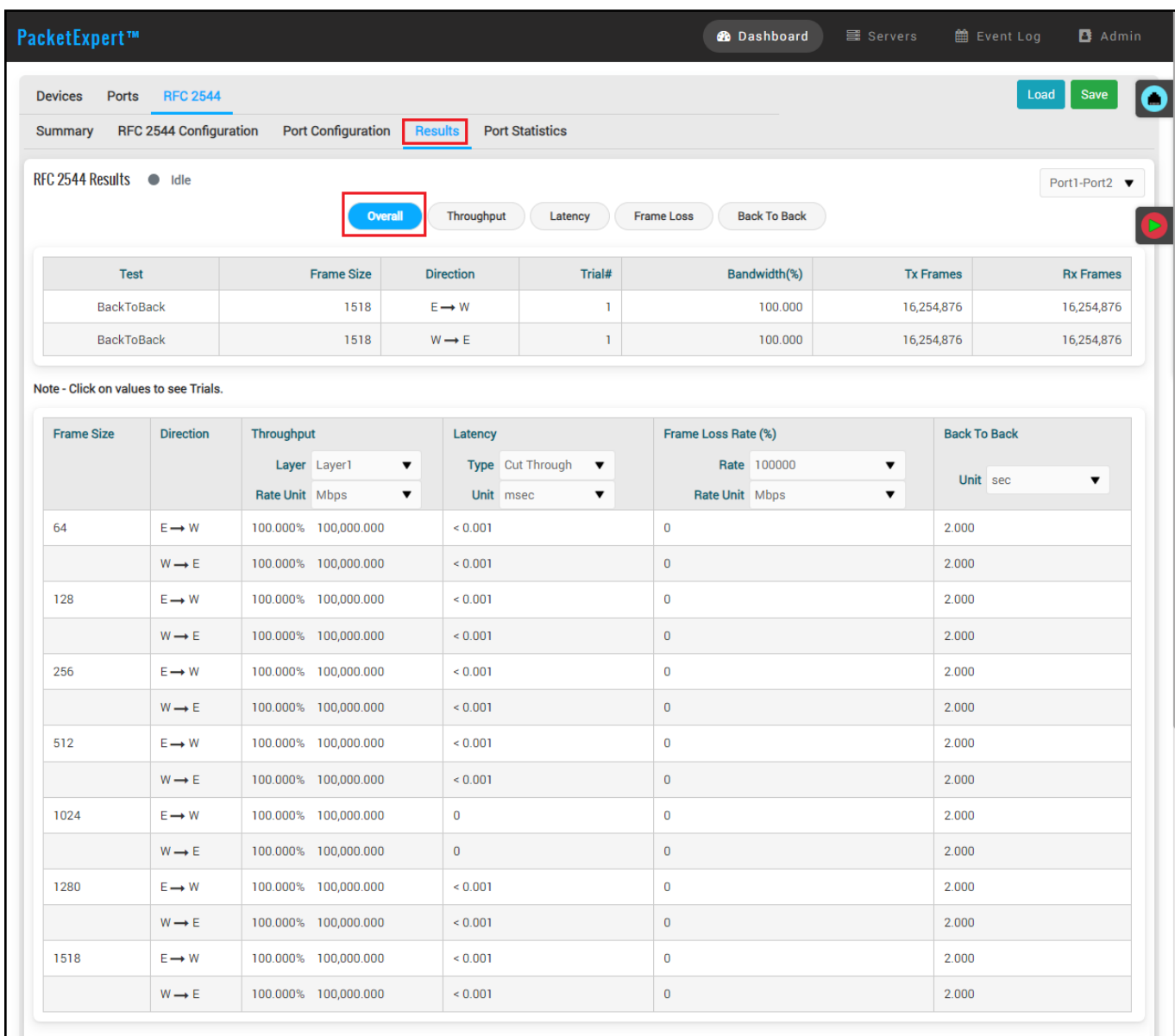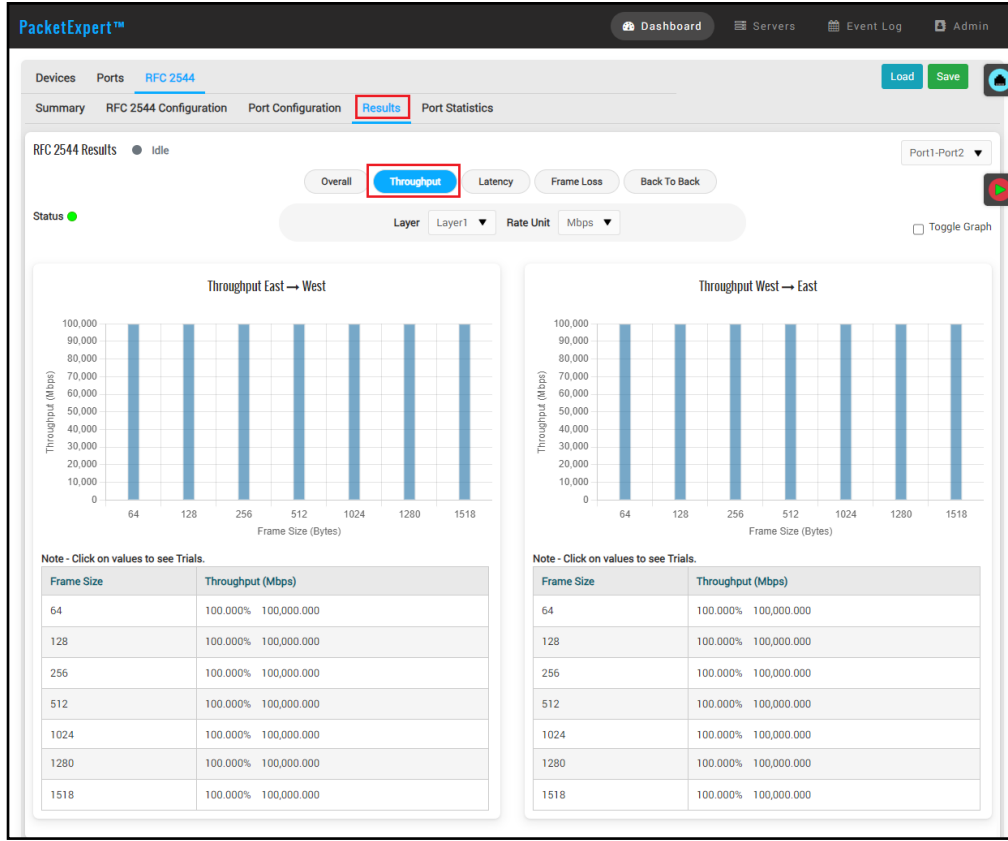

Figure: Overall Test Results

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RFC 2544 Test Results (Contd.)

Figure: Throughput Test Results
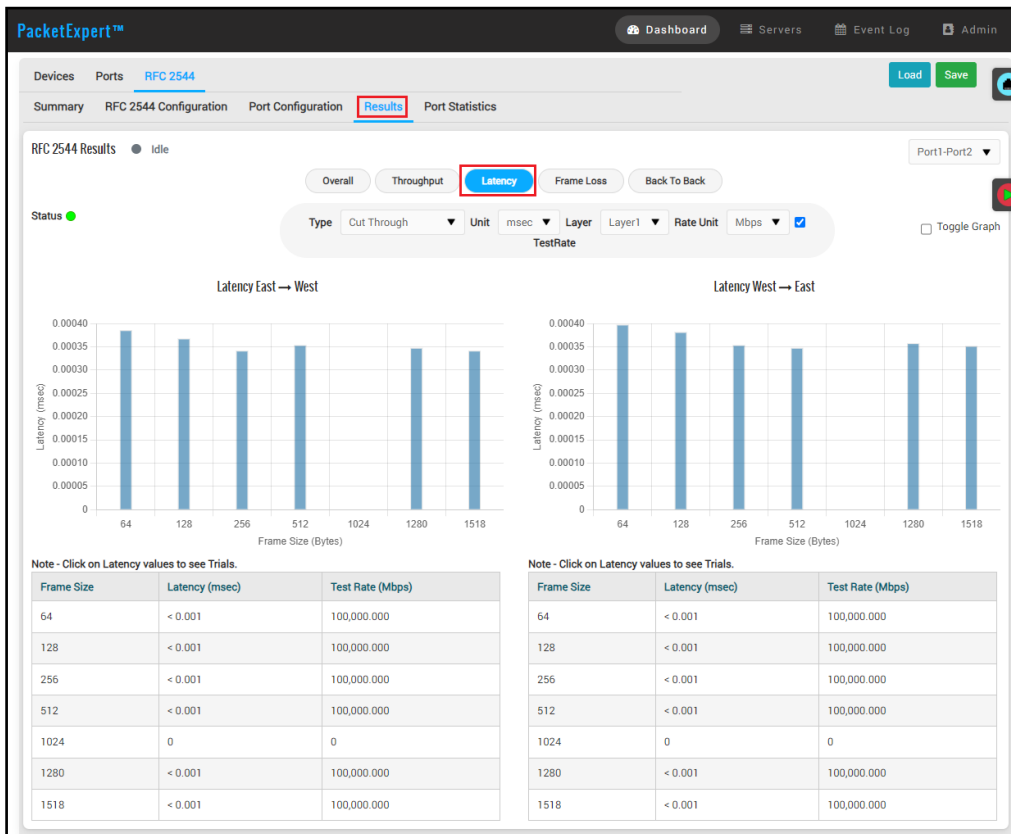
Figure: Latency Test Results

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RFC 2544 Test Results (Contd.)
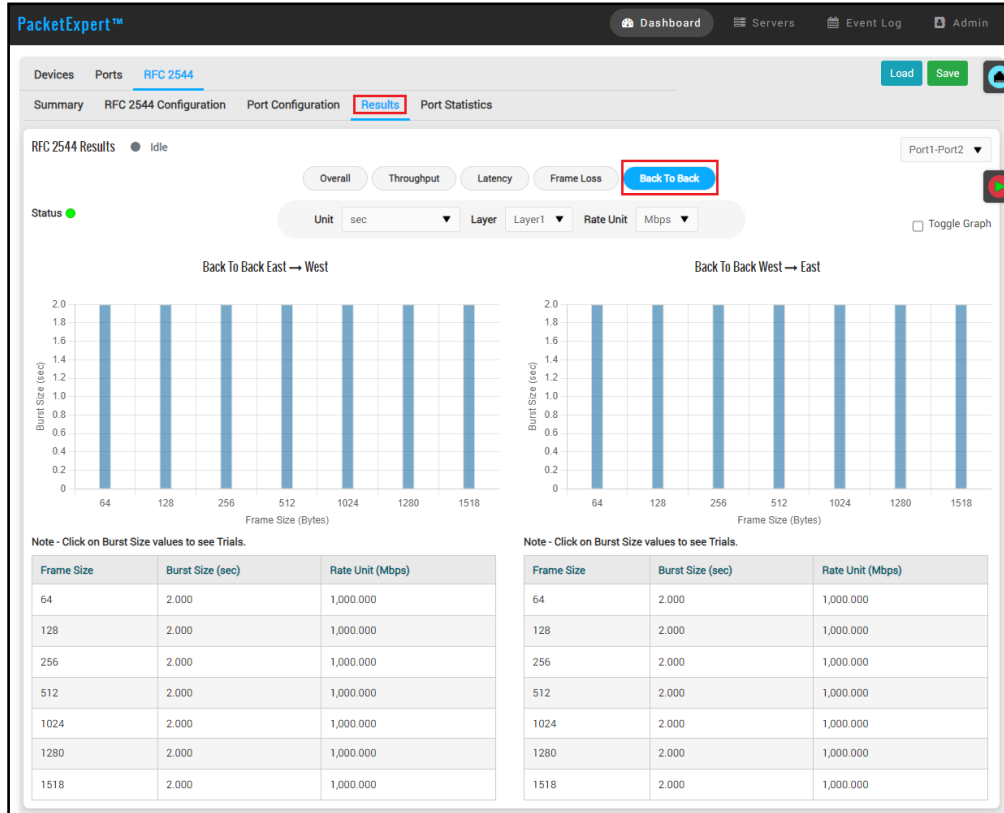
Figure: Back-to-Back Test Results
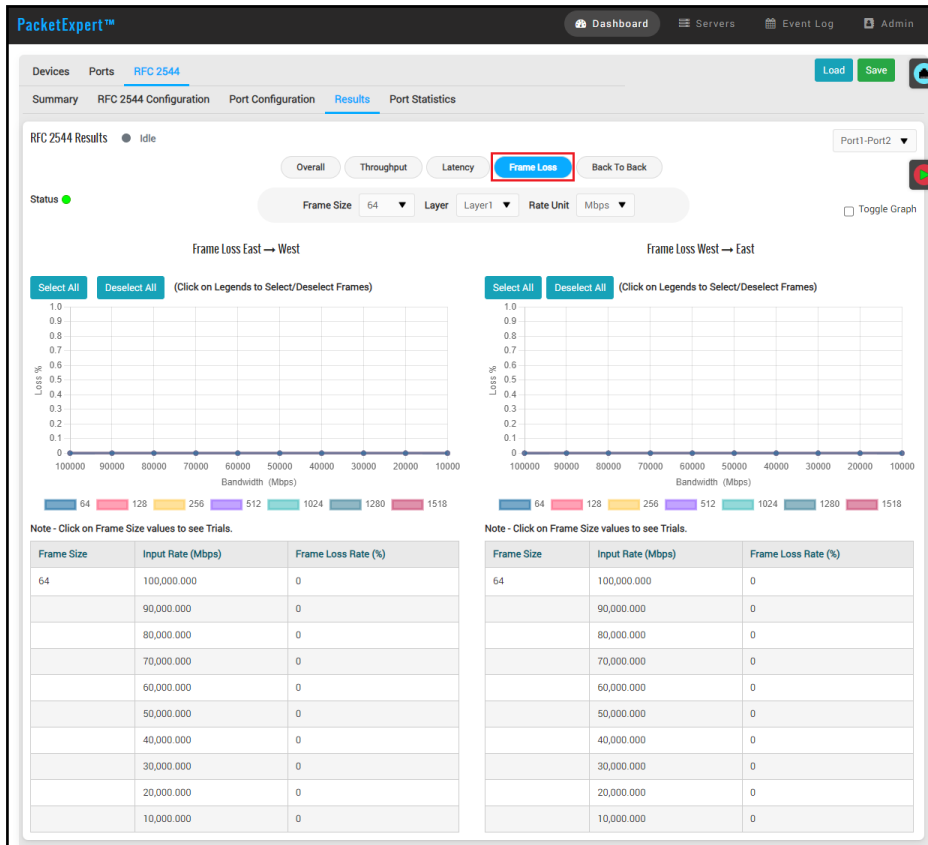
Figure: Frame Loss Test Results

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PacketExpert™ 100G Hardware Platforms

PacketExpert™ 100G 4U Rack PC

Total 8 Ports
4x(2x1G/10G/25G/40G/50G/100G)
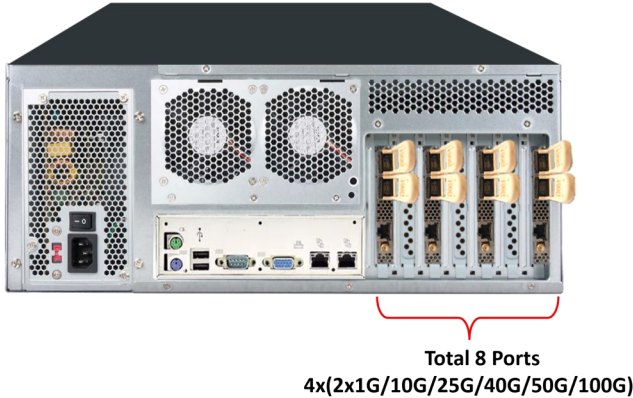
Specifications	
Dimensions	6.9" H x 16.9" W x 17.5" D
Weight	72 lbs.
Expansion slots	7
Power supply	Redundant 1200W

Ultra-Portable PacketExpert™ 100G (Lunchbox)

1G/10G/25G/40G/50G/100G

Specifications	
Dimensions	12.4" H x 16.41" W x 4.39" D
Display	17.3" 1920x1080
Weight	16.5 lbs.
Expansion slots	Up to 2
Power supply	400W (optional 500W)

Portable PacketExpert™ 100G (Lunchbox)

2x(2x1G/10G/25G/40G/50G/100G)
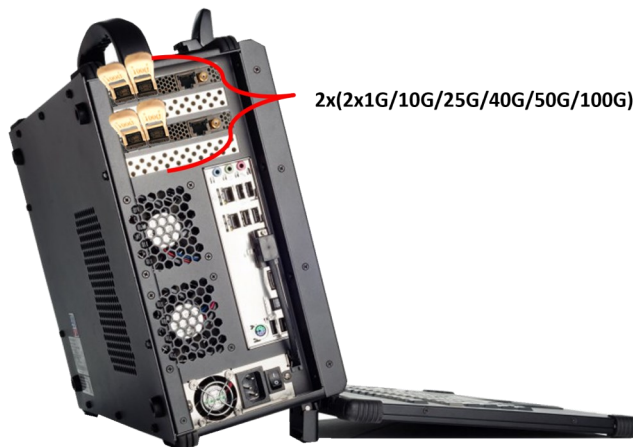
Specifications	
Dimensions	13.62" H x 16.50" W x 7.25" D
Display	17.3" 1920x1080
Weight	~23 LBS (10.4KG)
Expansion slots	Up to 4
Power supply	680W 100/240VAC

Document Number: PXX100-01

PacketExpert™ 100G Hardware Platforms

PacketExpert™ 100G 1U Rack PC

2x1G/10G/25G/40G/50G/100G
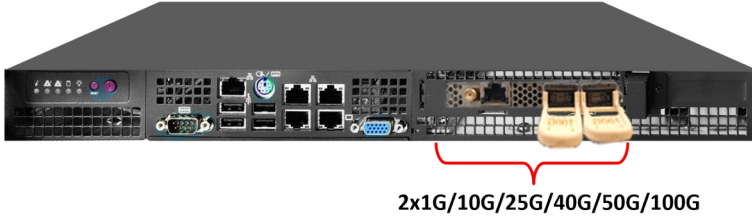
Specifications

Dimensions	1.7" H x 17.2" W x 9.8" D
Weight	10 lbs
Expansion slots	1x Full-height
Power supply	200W

PacketExpert™ 100G Portable Platform (Lunchbox)

Total 8 Ports
4x(2x1G/10G/25G/
40G/50G/100G)

Specifications

Dimensions	6.9" H x 16.9" W x 17.5" D
Display	17.3" 1920x1080
Weight	72 lbs.
Expansion slots	7
Power supply	Redundant 1200W

Buyer's Guide

Item No	Product Description
PXX100	PacketExpert™ 100G Platform (1G, 10G, 25G)
PXX101	Basic Software (Required for PXX100)
PXX103	Additional 2-port card with Basic Software (Up to 4, 2-Port Cards (including the basic 2-Port Card) total per system for 8-Port testing; required for PXX107)
PXX105	40G, 50G, 100G Optional Software
PXX107	PacketExpert™ 100G - Two Card / 4 Port Platform
PXX109	Optional Software for CLI Support
Item No	**Related Hardware and Software**
PXN100	PacketExpert™ 10GX
PXN101	10G option for PXN100

For more information, visit PacketExpert™ 100G- Comprehensive Ethernet/IP Testing Solution webpage.