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# PacketExpert™ 100G ExpertSAM™ (Up to 100 Gbps)

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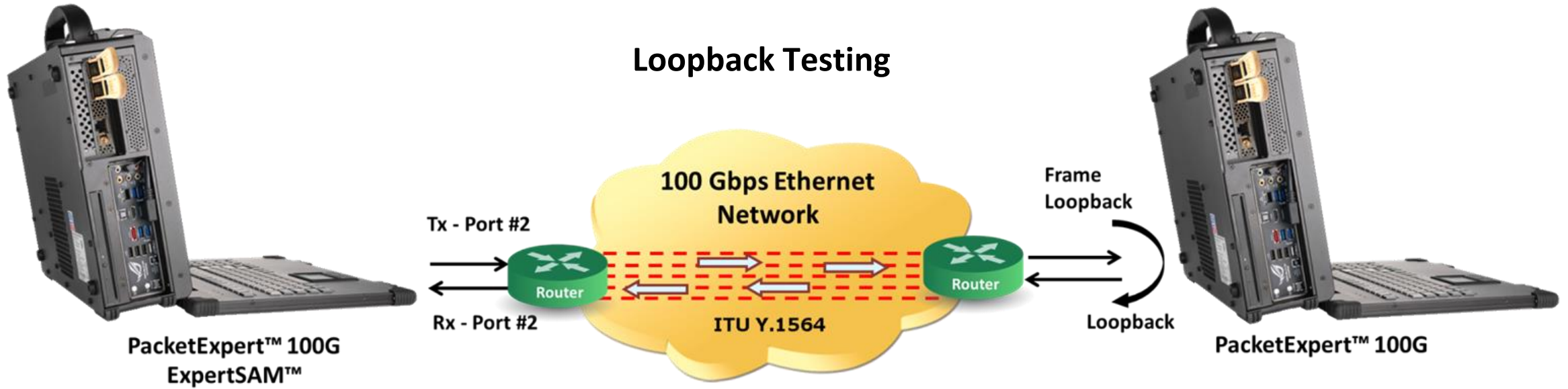
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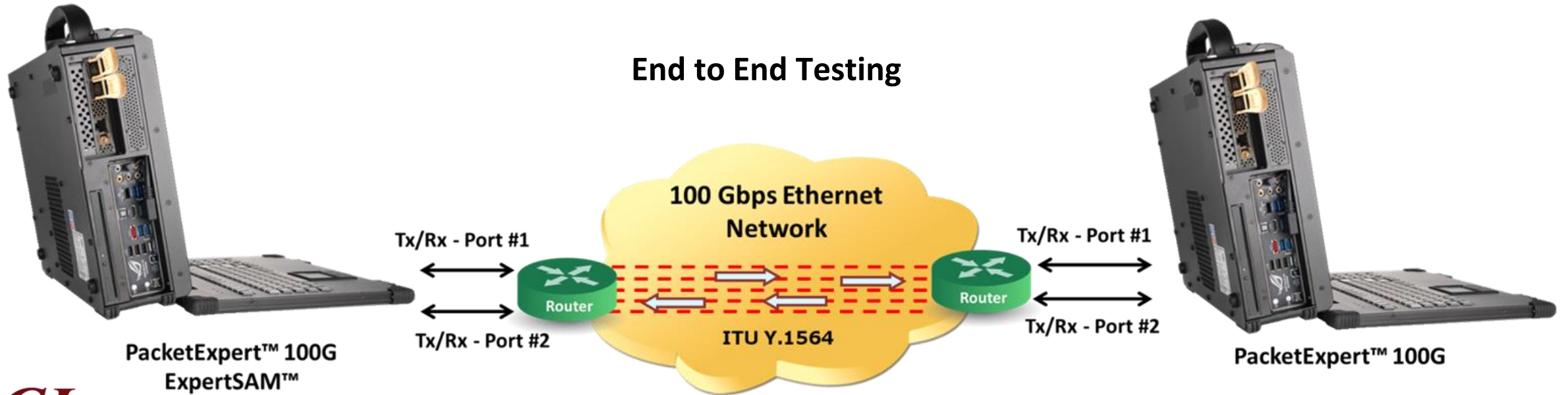
818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878  
Phone: (301) 670-4784 Fax: (301) 670-9187 Email: [info@gl.com](mailto:info@gl.com)  
Website: <https://www.gl.com>

# Ethernet Network Testing

## Loopback Testing



## End to End Testing

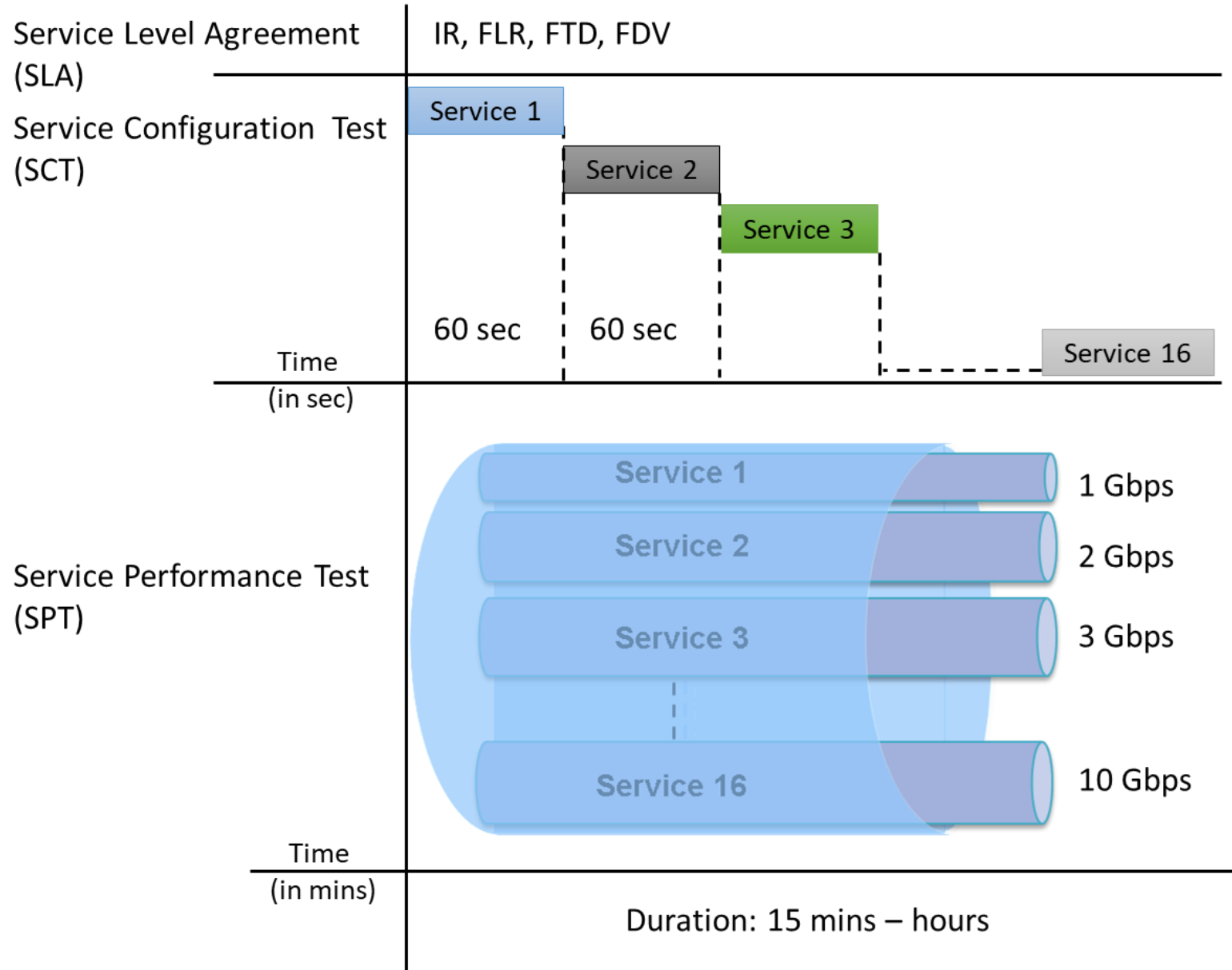


# Ethernet Network Testing

- A single test to validate service-level agreements (SLAs) as per ITU-T Y.1564 standard
- ITU-T Y.1564 completes this testing in two phases based on the SLA parameters:
  - Service Level Agreement Parameters: Information Rate (IR), Frame Transfer Delay (FTD), Frame Delay Variation (FDV), Frame Loss Ratio (FLR)
  - Service Configuration Test
  - Service Performance Test

# Y.1564 (ExpertSAM™)

- **Service Configuration Test** - confirms the end-to-end configuration with the SLA parameters for all configured traffic streams
- **Service Performance Test** - transmits all configured traffic streams simultaneously at the committed information rate (CIR), confirming all traffic is able to transverse the network under full load with the above-mentioned parameters



# RFC 2544 vs. Y.1564 (ExpertSAM™)

	RFC 2544	Y.1564
Measurements	Throughput, burstability, frame loss and latency	Throughput, burstability, frame loss, latency, packet jitter, QoS
Services	Link level	Multiple concurrent service levels
Performance	Measuring maximum performance	Key performance indicators (KPI) validation
Throughput	No separation of the committed and excess traffic	CIR, EIR and Traffic Policing constantly ensuring that KPI are met during the test
Frame Delay	Tests one frame in every test time and does not consider any latency variation that might occur over a longer test period.	Latency is measured during the test on all the generated frames measuring any deviation out of the defined range
Frame loss	Frame loss is measured during rate distribution throughput test where the frame loss distribution doesn't align with committed rate without complying to the KPI	Frame loss measurement during throughput test
Frame Delay Variation	Frame delay variation is not measured	Frame delay variation is measured for traffic generated up to the CIR ensuring proper traffic prioritization

# Loading ExpertSAM™ Application

PacketExpert™ Dashboard Servers Event Log Admin

Devices Ports ExpertSAM Load Save Export Quick Config nr

### Devices

Serial Number	Availability	User	Speed	Application	Test Status
0000-278023	<span>Reserved</span>	Admin	100G ▼	ExpertSAM <span>Unload</span>	●

#### License Details

Part Number	Description	Status
PXX101	PacketExpert 100G	✓
PXX105	PacketExpert 100G - Option for 100G, 40/50G	✓

#### Device Details

Name	Serial Number	Model#	BoardName
Device1	0000-278023	860-0001-01-20	NT200A02-01

#### MAC Addresses

Port #1	Port #2
00-0D-E9-09-9F-4A	00-0D-E9-09-9F-4B

#### Version

Description	Value
FPGA Version	24.9.2
Software Version	24.9.13.0

#### System Monitor

Name	Value	Alarm
Board Temperature	36 °C	●
Core Supply Temperature	38 °C	●

# Test Setup

**Edit Test Setup** ✕

Name

Bidirectional  Remote Loopback

Local Port  ▼

Remote Port  ▼

Tx  Rx  Tx/Rx

Tx  Rx  Tx/Rx

# Service Configuration Summary

PacketExpert™ Dashboard Servers Event Log Admin

Devices Ports ExpertSAM Load Save Export

Summary Service Configuration Service Selection Test Configuration Service Configuration Results Service Performance Results Graphs

Port Statistics All Port Statistics Event Log

Service Configuration  Y.1564 Specific SAM1

Summary Frame Size Layer MAC VLAN MPLS IP UDP Payload

Bandwidth Profile Color Aware SLA Parameters

No	Name	
1	Svc1	<input type="checkbox"/> <input type="checkbox"/>
2	Svc2	<input type="checkbox"/> <input type="checkbox"/>
3	Svc3	<input type="checkbox"/> <input type="checkbox"/>
4	Svc4	<input type="checkbox"/> <input type="checkbox"/>
5	Svc5	<input type="checkbox"/> <input type="checkbox"/>
6	Svc6	<input type="checkbox"/> <input type="checkbox"/>
7	Svc7	<input type="checkbox"/> <input type="checkbox"/>
8	Svc8	<input type="checkbox"/> <input type="checkbox"/>
9	Svc9	<input type="checkbox"/> <input type="checkbox"/>
10	Svc10	<input type="checkbox"/> <input type="checkbox"/>
11	Svc11	<input type="checkbox"/> <input type="checkbox"/>
12	Svc12	<input type="checkbox"/> <input type="checkbox"/>
13	Svc13	<input type="checkbox"/> <input type="checkbox"/>
14	Svc14	<input type="checkbox"/> <input type="checkbox"/>
15	Svc15	<input type="checkbox"/> <input type="checkbox"/>
16	Svc16	<input type="checkbox"/> <input type="checkbox"/>

**Svc1 Configuration**

**Description** Left <-> Right

**Frame Size** Type-EMix [67, 129, 257, 513, 1025]

**Layer** UDP

**MAC**

Source MAC Address 00-0D-E9-09-9F-4A (HW MAC Address)

Destination MAC Address 00-0D-E9-09-9F-4B

Len/Type 08-00

**VLAN** Disabled

**MPLS** Disabled

**IP**

IP Selection IPv4

Source IP Address 192.168.1.11

Destination IP Address 192.168.1.12

Default Gateway 192.168.1.1

Subnet Mask 255.255.255.0

TTL 128

ToS/DS 0

Protocol 17

Header Checksum Auto

Identification Auto

**UDP**

Source UDP 1001

Destination UDP 1002

Checksum Auto

**Payload**

Payload AB-CD

**Bandwidth Profile**

CIR 8 %

EIR 10 %

Traffic Policing Rate 20 %

**Color Aware**

Color Aware Enable Enabled

Color Method IP DSCP

Green Frames 1

Yellow Frames 2

**SLA Parameters**

Frame Loss 10 %

Frame Transfer Delay 12 msec

Frame Delay Variation 12 usec



# Service Configuration - Fixed Frame Size

Summary **Frame Size** Layer MAC VLAN MPLS IP UDP Payload Bandwidth Profile

Color Aware SLA Parameters

Svc1 Configuration

Symmetrical Asymmetrical

Left <-> Right

Type Fixed ▼ Range (64-16000)

Fixed Frame Size 64

# Service Configuration - Emix Frame Size

Summary **Frame Size** Layer MAC VLAN MPLS IP UDP Payload Bandwidth Profile Color Aware

SLA Parameters

Svc1 Configuration

Symmetrical **Asymmetrical**

Left <-> Right

Type **EMix** ▼ Range (64-16000)

Quantity **5** ▼

66 128 256 512 1024

# Service Configuration - Bandwidth Profile

Summary   Frame Size   Layer   MAC   VLAN   MPLS   IP   UDP   Payload   **Bandwidth Profile**

Color Aware   SLA Parameters

Svc1 Configuration

**Symmetrical**   Asymmetrical

Left <-> Right

Rate Unit   %   ▼

CIR   8   %

EIR   10   %

Traffic Policing Rate   20   %

# Service Configuration - Color Aware

Summary Frame Size Layer MAC VLAN MPLS IP UDP Payload Bandwidth Profile

Color Aware SLA Parameters

### Svc1 Configuration

Color Aware Enable

Color Method IP DSCP ▼

Green Frames 1

Yellow Frames 2

# Service Configuration - SLA Parameters

Summary Frame Size Layer MAC VLAN MPLS IP UDP Payload Bandwidth Profile Color Aware

SLA Parameters

Svc1 Configuration

Symmetrical Asymmetrical

Left <-> Right

- Frame Loss 10 %
- Frame Transfer Delay 12 msec ▼
- Frame Delay Variation 12 usec ▼

# Service Selection

PacketExpert™ Dashboard Servers Event Log Admin

Devices Ports ExpertSAM Load Save

Summary Service Configuration Service Selection Test Configuration Service Configuration Results Service Performance Results Graphs Port Statistics

All Port Statistics Event Log

Service Selection Available Bandwidth L → R 35.0000 % R → L 35.0000 %  Y.1564 Specific ← → SAM1 Bandwidth\_SLA

<input checked="" type="checkbox"/> Svc No.	Service Name	Direction	Frame Size	CIR (%)	FLR (%)	Max FTD (msec)	Max FDV (msec)	Edit
<input checked="" type="checkbox"/> 1	Svc1	L → R R → L	Fixed [86] Fixed [100]	5.0000 5.0000	10.000 10.000	12.000 12.000	0.012 0.012	<input type="checkbox"/>
<input checked="" type="checkbox"/> 2	Svc2	L → R R → L	Fixed [100] Fixed [100]	5.0000 5.0000	10.000 10.000	12.000 12.000	0.012 0.012	<input type="checkbox"/>
<input checked="" type="checkbox"/> 3	Svc3	L → R R → L	Fixed [100] Fixed [100]	5.0000 5.0000	10.000 10.000	12.000 12.000	0.020 0.020	<input type="checkbox"/>
<input checked="" type="checkbox"/> 4	Svc4	L → R R → L	Fixed [100] Fixed [100]	5.0000 5.0000	10.000 10.000	12.000 12.000	0.020 0.020	<input type="checkbox"/>
<input checked="" type="checkbox"/> 5	Svc5	L → R R → L	Fixed [100] Fixed [100]	5.0000 5.0000	10.000 10.000	12.000 12.000	0.012 0.012	<input type="checkbox"/>
<input checked="" type="checkbox"/> 6	Svc6	L → R R → L	Fixed [100] Fixed [100]	5.0000 5.0000	10.000 10.000	12.000 12.000	0.012 0.012	<input type="checkbox"/>
<input checked="" type="checkbox"/> 7	Svc7	L → R R → L	Fixed [100] Fixed [100]	5.0000 5.0000	10.000 10.000	12.000 12.000	0.020 0.020	<input type="checkbox"/>
<input checked="" type="checkbox"/> 8	Svc8	L → R R → L	Fixed [100] Fixed [100]	5.0000 5.0000	10.000 10.000	12.000 12.000	0.012 0.012	<input type="checkbox"/>
<input checked="" type="checkbox"/> 9	Svc9	L → R R → L	Fixed [100] Fixed [100]	5.0000 5.0000	10.000 10.000	12.000 12.000	0.020 0.020	<input type="checkbox"/>
<input checked="" type="checkbox"/> 10	Svc10	L → R R → L	Fixed [100] Fixed [100]	5.0000 5.0000	10.000 10.000	12.000 12.000	0.020 0.020	<input type="checkbox"/>
<input checked="" type="checkbox"/> 11	Svc11	L → R R → L	Fixed [100] Fixed [100]	5.0000 5.0000	10.000 10.000	12.000 12.000	0.020 0.020	<input type="checkbox"/>
<input checked="" type="checkbox"/> 12	Svc12	L → R R → L	Fixed [100] Fixed [100]	5.0000 5.0000	10.000 10.000	12.000 12.000	0.020 0.020	<input type="checkbox"/>
<input checked="" type="checkbox"/> 13	Svc13	L → R R → L	Fixed [100] Fixed [100]	5.0000 5.0000	10.000 10.000	12.000 12.000	0.012 0.012	<input type="checkbox"/>
<input type="checkbox"/> 14	Svc14	L → R R → L	Fixed [100] Fixed [100]	5.0000 5.0000	10.000 10.000	12.000 12.000	0.012 0.012	<input type="checkbox"/>
<input type="checkbox"/> 15	Svc15	L → R R → L	Fixed [100] Fixed [100]	5.0000 5.0000	10.000 10.000	12.000 12.000	0.012 0.012	<input type="checkbox"/>
<input type="checkbox"/> 16	Svc16	L → R R → L	Fixed [100] Fixed [100]	5.0000 5.0000	10.000 10.000	12.000 12.000	0.012 0.012	<input type="checkbox"/>

# Test Configuration

PacketExpert™ Dashboard Servers Event Log Admin

Devices Ports ExpertSAM Load Save

Summary Service Configuration Service Selection Test Configuration Service Configuration Results Service Performance Results Graphs

Port Statistics All Port Statistics Event Log

### Test Configuration

Service Configuration Test

CIR Configuration Test  
 Simple CIR  Step Load CIR

EIR Configuration Test

Traffic Policing Test

Step Duration:  (5-60 sec)

+ Step	Rate (% of CIR)		
1	<input type="text" value="10"/>		
2	<input type="text" value="20"/>		
3	<input type="text" value="25"/>		
4	<input type="text" value="CIR"/>		
5	<input type="text" value="EIR"/>		
6	<input type="text" value="Traffic Policir"/>		

Seconds

Legend: Steps (green), CIR (dark green), EIR (yellow), Traffic Policing (red)

Service Performance Test  
Duration:

# Overall Results Summary

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Devices Ports ExpertSAM Load Save Home

Summary Service Configuration Service Selection Test Configuration Service Configuration Results Service Performance Results Graphs Port Statistics All Port Statistics Event Log

ExpertSAM Summary Start Selected Stop Selected Report

Setup	Connection Status	Config	Start/Stop	Test	Active Service	Active Step	Test Time	Remaining Time	Service Configuration Verdict	Service Performance Verdict
Port1 - Port2	<span>●</span> <span>●</span> <span>●</span>	<span>⚙️</span>	<span>▶️</span>	Service Performance Test	-	-	00:20:14	00:00:00	<span>✖️</span>	<span>✔️</span>

Test Time: 00:01:00 | Throughput: Gbps | Delay Unit: msec | Jitter Unit: usec | Vertical

Service Name	Direction	Verdict	IR				FL Count	FL Rate (%)	FTD				FDV			
			(Curr)	(Min)	(Avg)	(Max)			(Curr)	(Min)	(Avg)	(Max)	(Curr)	(Min)	(Avg)	(Max)
Svc1	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	0.018	0.084
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc2	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.100
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc3	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc4	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.100
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.100
Svc5	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.100
Svc6	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc7	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc8	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc9	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.100
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc10	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc11	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.100
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.100
Svc12	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc13	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.104
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc14	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.100
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.092
Svc15	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.108
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc16	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.104



# Service Configuration Results - Overview

PacketExpert™ Dashboard Servers Event Log Admin

Devices Ports **ExpertSAM** Load Save

Summary Service Configuration Service Selection Test Configuration **Service Configuration Results** Service Performance Results Graphs

Port Statistics All Port Statistics Event Log

Service Configuration Results - Overview Details Y.1564 Specific SAM1

Status ● IR Gbps FTD Unit msec FDV Unit usec

Service Name	Direction	Verdict	FLR/FTD/FDV	Current Step	Max IR	FLR (%)	Max FTD	Max FDV
● Svc1	L → R	Pass	● ● ●	-	10.000	0.000	< 0.001	0.032
	R → L	Pass	● ● ●	-	10.000	0.000	< 0.001	0.024
● Svc2	L → R	Pass	● ● ●	-	10.000	0.000	< 0.001	0.020
	R → L	Pass	● ● ●	-	10.000	0.000	< 0.001	0.020
● Svc3	L → R	Pass	● ● ●	-	10.000	0.000	< 0.001	0.132
	R → L	Pass	● ● ●	-	10.000	0.000	< 0.001	0.136
● Svc4	L → R	Pass	● ● ●	-	10.000	0.000	< 0.001	0.020
	R → L	Pass	● ● ●	-	10.000	0.000	< 0.001	0.020
● Svc5	L → R	Pass	● ● ●	-	10.000	0.000	< 0.001	0.024
	R → L	Pass	● ● ●	-	10.000	0.000	< 0.001	0.136
● Svc6	L → R	Pass	● ● ●	-	10.000	0.000	< 0.001	0.124
	R → L	Pass	● ● ●	-	10.000	0.000	< 0.001	0.128
● Svc7	L → R	Pass	● ● ●	-	10.000	0.000	< 0.001	0.020
	R → L	Pass	● ● ●	-	10.000	0.000	< 0.001	0.020
● Svc8	L → R	Pass	● ● ●	-	10.000	0.000	< 0.001	0.024
	R → L	Pass	● ● ●	-	10.000	0.000	< 0.001	0.024
● Svc9	L → R	Pass	● ● ●	-	10.000	0.000	< 0.001	0.024
	R → L	Pass	● ● ●	-	10.000	0.000	< 0.001	0.024
● Svc10	L → R	Pass	● ● ●	-	15.000	0.000	< 0.001	0.020
	R → L	Pass	● ● ●	-	15.000	0.000	< 0.001	0.020
● Svc11	L → R	Pass	● ● ●	-	10.000	0.000	< 0.001	0.024
	R → L	Pass	● ● ●	-	10.000	0.000	< 0.001	0.024
● Svc12	L → R	Pass	● ● ●	-	10.000	0.000	< 0.001	0.024
	R → L	Pass	● ● ●	-	10.000	0.000	< 0.001	0.024
● Svc13	L → R	Pass	● ● ●	-	10.000	0.000	< 0.001	0.024
	R → L	Pass	● ● ●	-	10.000	0.000	< 0.001	0.024
● Svc14	L → R	Pass	● ● ●	-	10.000	0.000	< 0.001	0.024
	R → L	Pass	● ● ●	-	10.000	0.000	< 0.001	0.024
● Svc15	L → R	Pass	● ● ●	-	15.000	0.000	< 0.001	0.032
	R → L	Pass	● ● ●	-	15.000	0.000	< 0.001	0.032
● Svc16	L → R	Pass	● ● ●	-	10.000	0.000	< 0.001	0.024
	R → L	Pass	● ● ●	-	10.000	0.000	< 0.001	0.024

# Service Configuration Test Results - Detail

PacketExpert™ Dashboard Servers Event Log Admin

Devices Ports ExpertSAM Load Save

Summary Service Configuration Service Selection Test Configuration Service Configuration Results Service Performance Results Graphs Port Statistics

All Port Statistics Event Log

Y.1564 Specific SAM1

Overview **Details**

Service Svc1 Test Time 00:19:10 IR Gbps FTD Unit msec FDV Unit usec Vertical

Test	Direction	Verdict	IR (Curr)	IR (Min)	IR (Avg)	IR (Max)	FL Count	FL Rate (%)	FTD (Curr)	FTD (Min)	FTD (Avg)	FTD (Max)	FDV (Curr)	FDV (Min)	FDV (Avg)	FDV (Max)
Step1	L → R	Pass	0.000	0.261	0.460	0.500	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.020
	R → L	Pass	0.000	0.253	0.459	0.500	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.020
Step2	L → R	Pass	0.000	0.443	1.000	1.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.020
	R → L	Pass	0.000	0.537	1.000	1.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.020
Step3	L → R	Pass	0.000	0.597	1.250	1.250	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.020
	R → L	Pass	0.000	0.578	1.250	1.250	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.020
Step4	L → R	Pass	0.000	0.676	1.250	1.250	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.020
	R → L	Pass	0.000	0.657	1.250	1.250	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.020
Step5	L → R	Pass	0.000	0.548	1.250	1.250	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.020
	R → L	Pass	0.000	0.666	1.250	1.250	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.020
Step6	L → R	Pass	0.000	0.553	1.250	1.250	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.020
	R → L	Pass	0.000	0.671	1.250	1.250	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.020
CIR	L → R	Pass	0.000	2.348	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.020
	R → L	Pass	0.000	2.268	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.020
EIR	L → R	Pass	0.000	4.712	10.000	10.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.084
	R → L	Pass	0.000	4.556	10.000	10.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.092
Traffic Policing	L → R	Pass	0.000	9.649	20.000	20.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.084
	R → L	Pass	0.000	9.340	20.000	20.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096

# Service Performance Results - Overview

PacketExpert™ Dashboard Servers Event Log Admin

Devices Ports ExpertSAM Load Save

Summary Service Configuration Service Selection Test Configuration Service Configuration Results Service Performance Results Graphs

Port Statistics All Port Statistics Event Log

Service Performance Results - ● Overview Details Y.1564 Specific SAM1

Status ● IR Gbps FTD Unit msec FDV Unit usec

Service Name	Direction	Verdict	FLR/FTD/FDV	Max IR	FLR (%)	Max FTD	Max FDV
Svc1	L → R	Pass	● ● ●	5.000	0.000	< 0.001	0.084
	R → L	Pass	● ● ●	5.000	0.000	< 0.001	0.096
Svc2	L → R	Pass	● ● ●	5.000	0.000	< 0.001	0.100
	R → L	Pass	● ● ●	5.000	0.000	< 0.001	0.096
Svc3	L → R	Pass	● ● ●	5.000	0.000	< 0.001	0.096
	R → L	Pass	● ● ●	5.000	0.000	< 0.001	0.096
Svc4	L → R	Pass	● ● ●	5.000	0.000	< 0.001	0.100
	R → L	Pass	● ● ●	5.000	0.000	< 0.001	0.100
Svc5	L → R	Pass	● ● ●	5.000	0.000	< 0.001	0.096
	R → L	Pass	● ● ●	5.000	0.000	< 0.001	0.100
Svc6	L → R	Pass	● ● ●	5.000	0.000	< 0.001	0.096
	R → L	Pass	● ● ●	5.000	0.000	< 0.001	0.096
Svc7	L → R	Pass	● ● ●	5.000	0.000	< 0.001	0.096
	R → L	Pass	● ● ●	5.000	0.000	< 0.001	0.096
Svc8	L → R	Pass	● ● ●	5.000	0.000	< 0.001	0.096
	R → L	Pass	● ● ●	5.000	0.000	< 0.001	0.096
Svc9	L → R	Pass	● ● ●	5.000	0.000	< 0.001	0.100
	R → L	Pass	● ● ●	5.000	0.000	< 0.001	0.096
Svc10	L → R	Pass	● ● ●	5.000	0.000	< 0.001	0.096
	R → L	Pass	● ● ●	5.000	0.000	< 0.001	0.096
Svc11	L → R	Pass	● ● ●	5.000	0.000	< 0.001	0.100
	R → L	Pass	● ● ●	5.000	0.000	< 0.001	0.100
Svc12	L → R	Pass	● ● ●	5.000	0.000	< 0.001	0.096
	R → L	Pass	● ● ●	5.000	0.000	< 0.001	0.096
Svc13	L → R	Pass	● ● ●	5.000	0.000	< 0.001	0.104
	R → L	Pass	● ● ●	5.000	0.000	< 0.001	0.096
Svc14	L → R	Pass	● ● ●	5.000	0.000	< 0.001	0.100
	R → L	Pass	● ● ●	5.000	0.000	< 0.001	0.092
Svc15	L → R	Pass	● ● ●	5.000	0.000	< 0.001	0.108
	R → L	Pass	● ● ●	5.000	0.000	< 0.001	0.096
Svc16	L → R	Pass	● ● ●	5.000	0.000	< 0.001	0.096
	R → L	Pass	● ● ●	5.000	0.000	< 0.001	0.104

# Service Performance Results - Detail

PacketExpert™ Dashboard Servers Event Log Admin

Devices Ports **ExpertSAM** Load Save

Summary Service Configuration Service Selection Test Configuration Service Configuration Results **Service Performance Results** Graphs

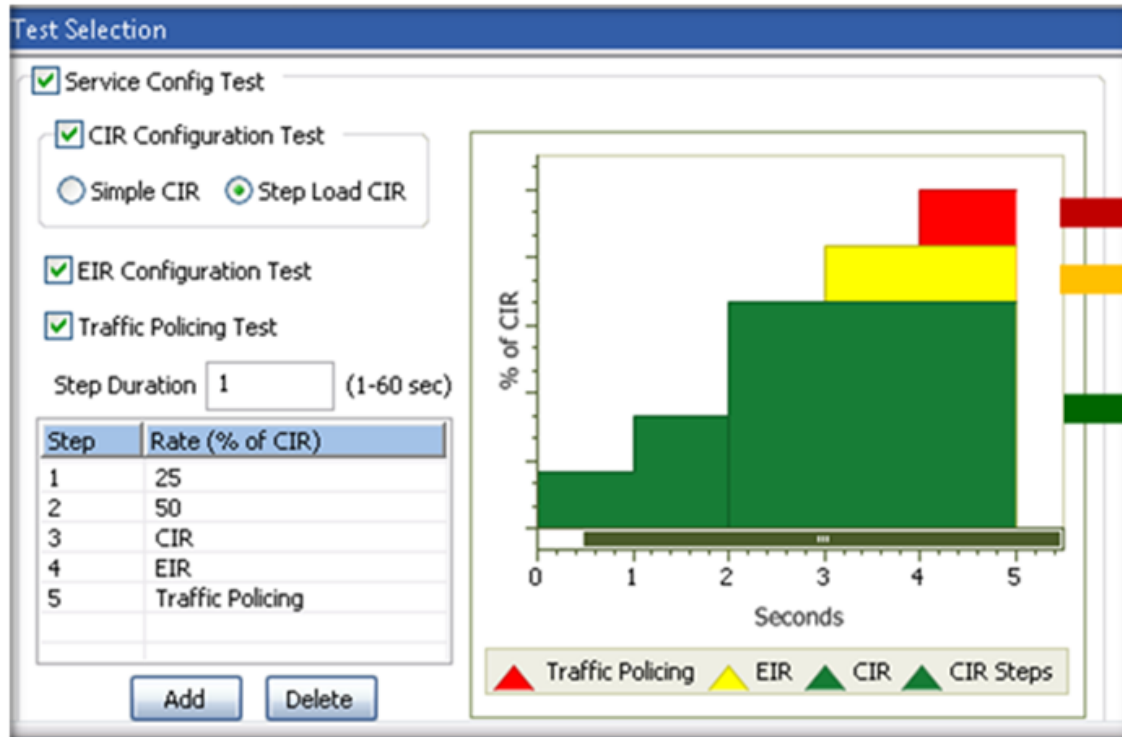
Port Statistics All Port Statistics Event Log

Y.1564 Specific SAM1

Test Time 00:01:00 IR Gbps FTD Unit msec FDV Unit usec Vertical

Service Name	Direction	Verdict	IR (Curr)	IR (Min)	IR (Avg)	IR (Max)	FL Count	FL Rate (%)	FTD (Curr)	FTD (Min)	FTD (Avg)	FTD (Max)	FDV (Curr)	FDV (Min)	FDV (Avg)	FDV (Max)
Svc1	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	0.018	0.084
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc2	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.100
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc3	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc4	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.100
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.100
Svc5	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.100
Svc6	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc7	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc8	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc9	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.100
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc10	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc11	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.100
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.100
Svc12	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc13	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.104
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc14	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.100
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.092
Svc15	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.108
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
Svc16	L → R	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.096
	R → L	Pass	0.000	2.965	5.000	5.000	0	0.000	0.000	< 0.001	< 0.001	< 0.001	0.000	0.000	< 0.01	0.104

# ITU-T Y.1564 (ExpertSAM™) Graph



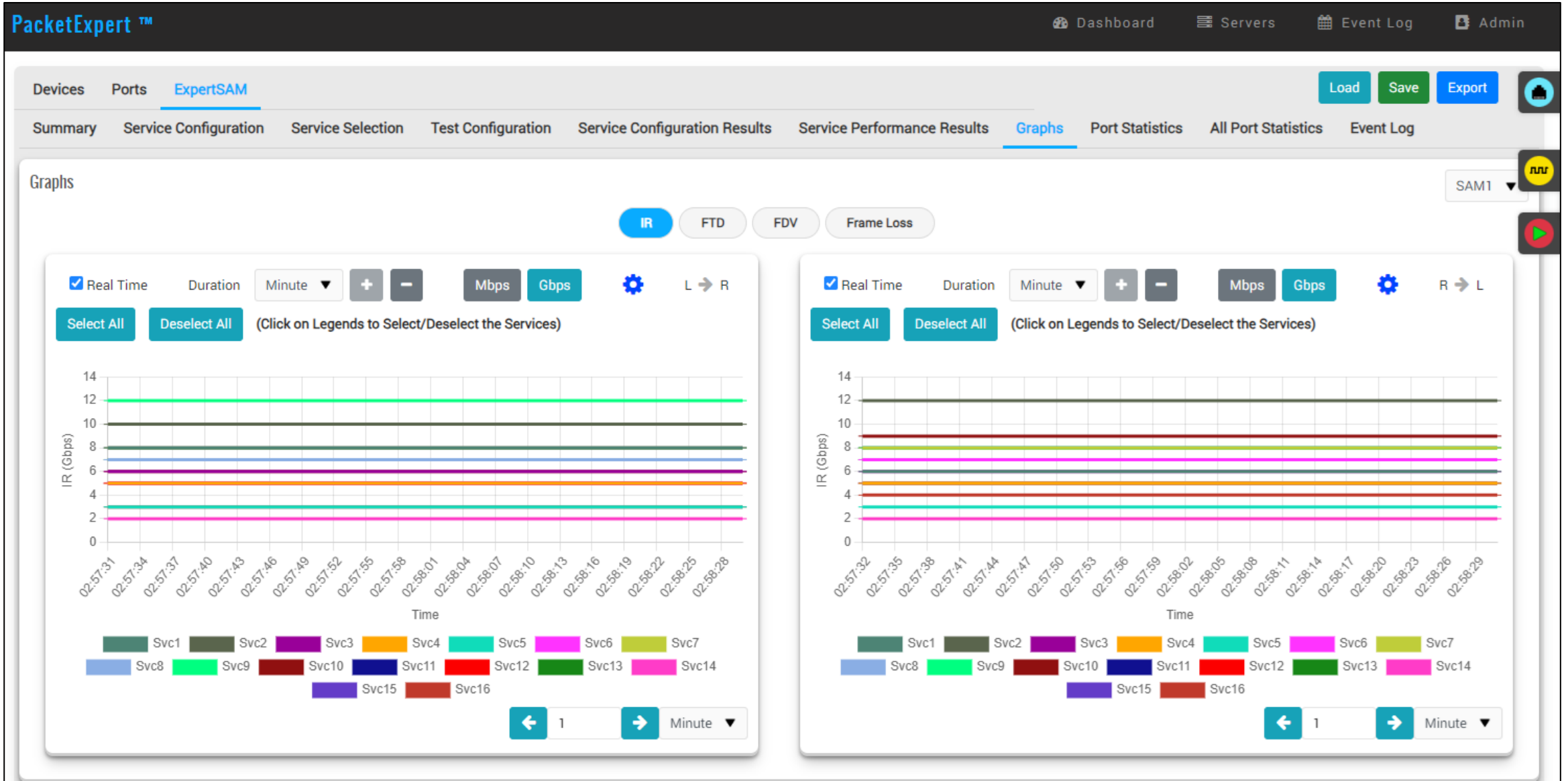
Dropped bandwidth (everything over EIR)

Best effort bandwidth (everything between CIR and EIR)

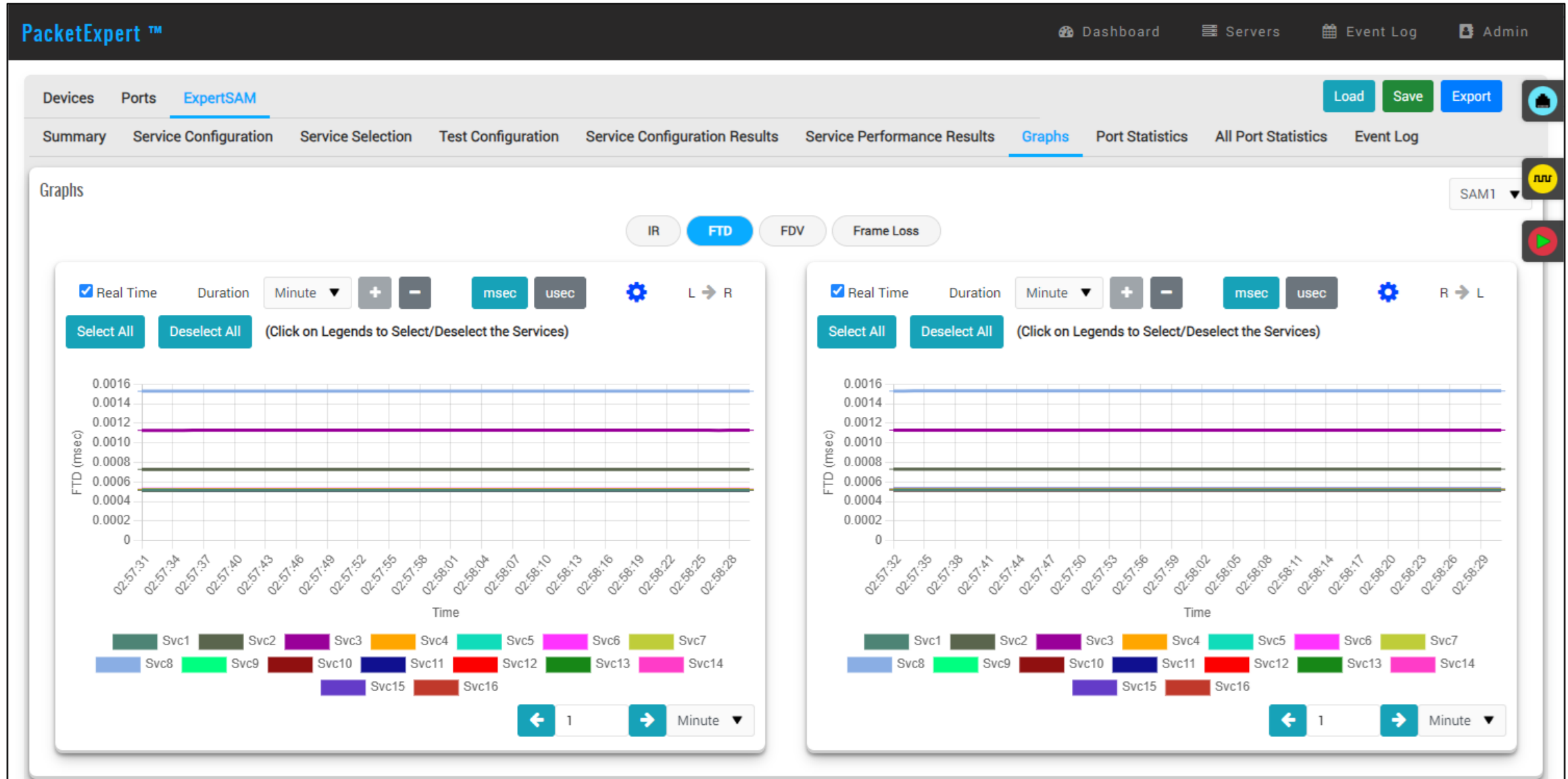
Guaranteed bandwidth (everything under CIR)

- Committed information rate or CIR is the average bandwidth guaranteed by a service provider. At any given time, the bandwidth should not fall below this committed figure
- Excess Information Rate or EIR is the CIR plus excess rate that service provider claims to provide on a 'best-effort' basis

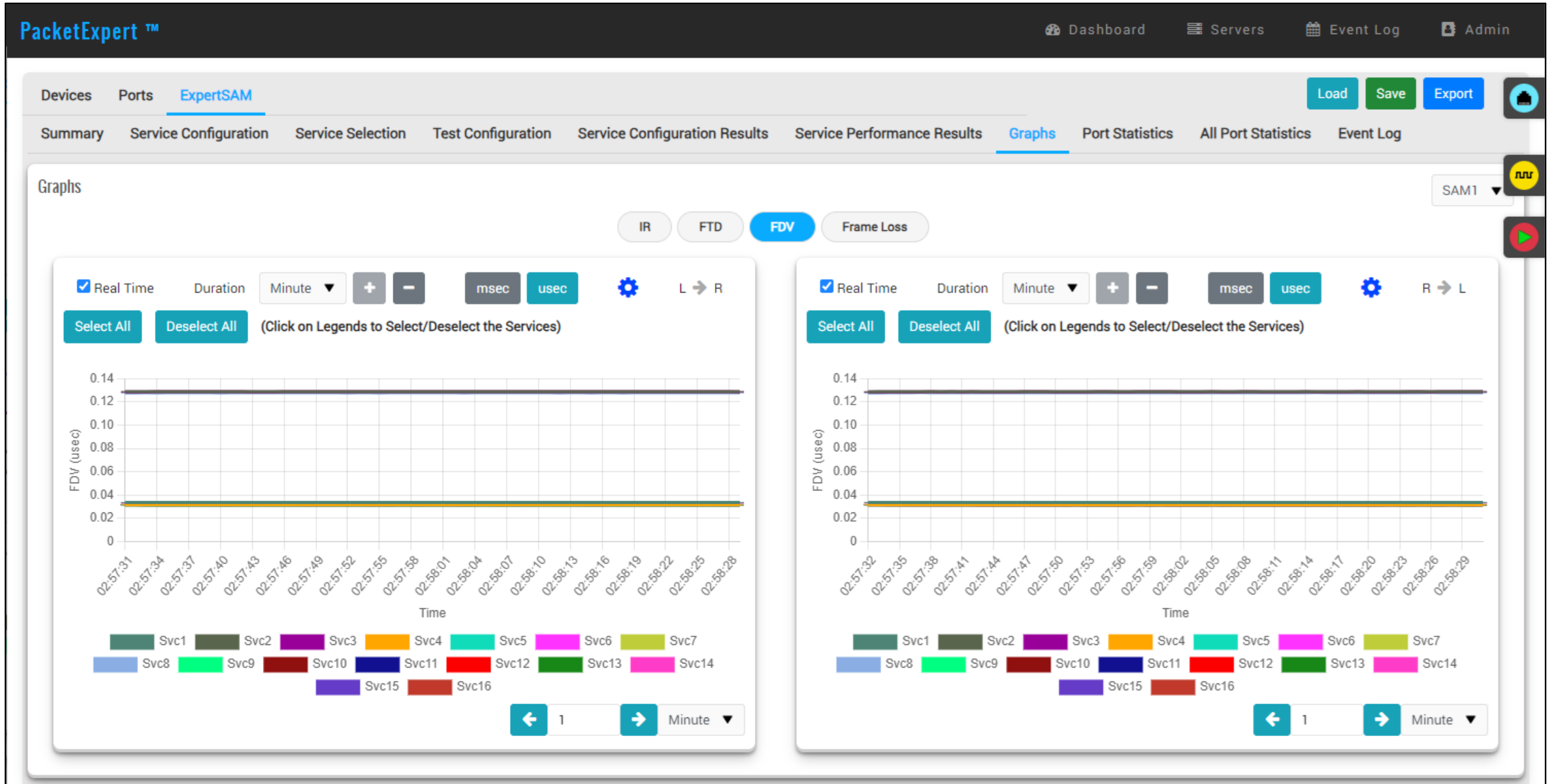
# Throughput Graph



# Frame Transfer Delay Graph

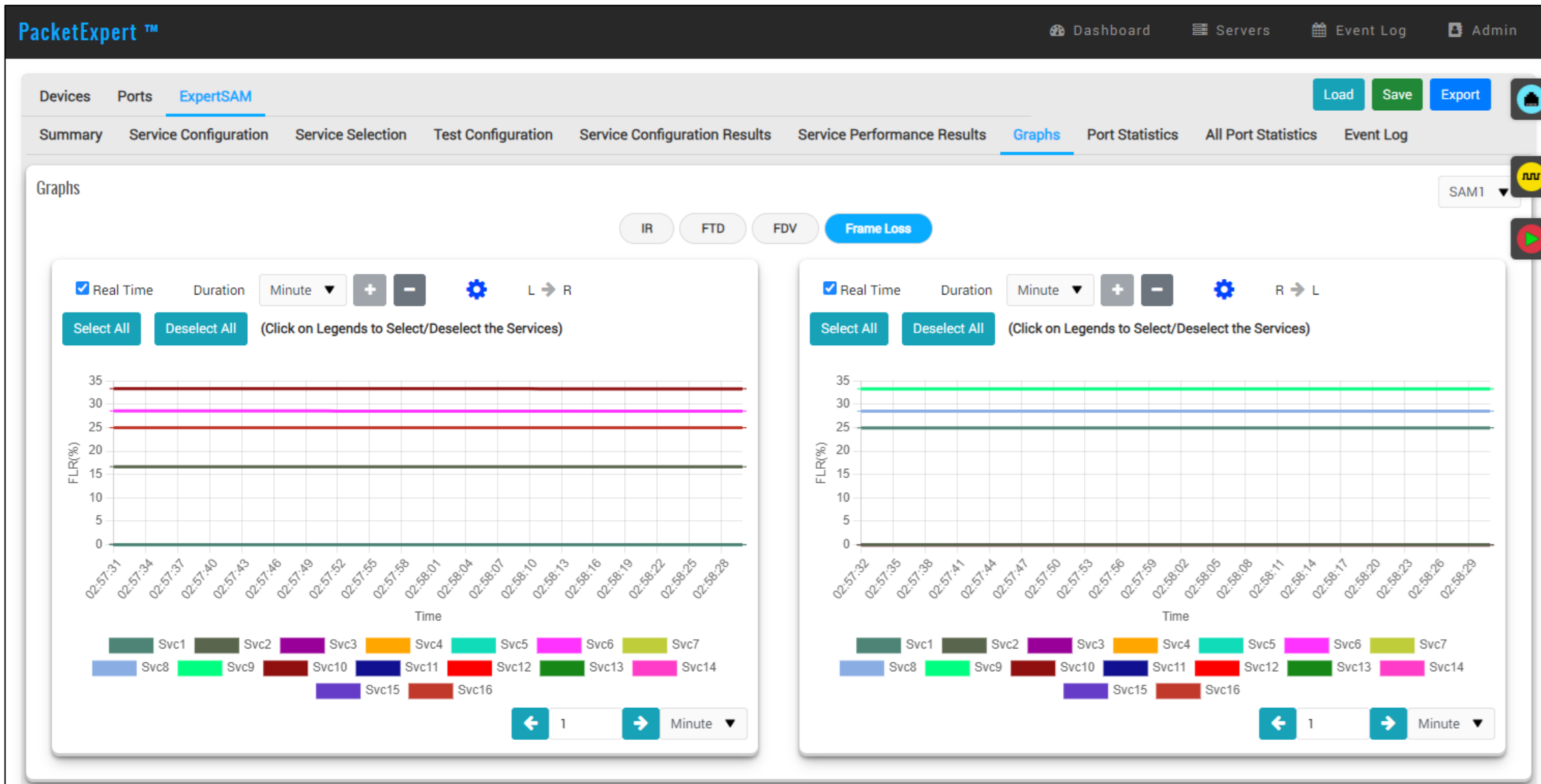


# Frame Delay Variation Graph





# Frame Loss Graph



# Port Statistics

PacketExpert™ Dashboard Servers Event Log Admin

Devices Ports **ExpertSAM** Load Save

Summary Service Configuration Service Selection Test Configuration Service Configuration Results Service Performance Results Graphs

Port Statistics All Port Statistics Event Log

Port Statistics Idle

Port1 Reset

### Common Statistics

Description	Tx	Rx
Link Utilization (%)	0.000	0.000
Data Rate (Mbps)	0.000	0.000
Bad Frames	0	0
Non Test Frames	-	0
FCS Error Frames	-	0
IP Checksum Errors	-	0
UDP Checksum Errors	-	0
Total Frames	8,967,724,525	8,892,786,472
Valid Frames	8,967,724,525	8,892,786,472
Number Of Bytes	887,874,045,220	889,278,647,200
Frame Rate (frames/sec)	0	0

### Packet Type Statistics

Description	Tx	Rx
Broadcast Frames	0	0
Multicast Frames	0	0
Control Frames	0	0
VLAN Frames	635,600,520	561,379,798
Pause Frames	0	0

### Length Statistics

Description	Tx	Rx
Undersized Frames	0	0
64 Bytes Length	0	0
65-127 Byte Length	8,967,724,525	8,892,786,472
128-255 Byte Length	0	0
256-511 Bytes Length	0	0
512-1023 Bytes Length	0	0
1024-1518 Byte Length	0	0
Oversized Frames	0	0

### VLAN Statistics

Description	Rx
1 Level Stacked VLAN Frames	561,379,798
2 Level Stacked VLAN Frames	0
3 Level Stacked VLAN Frames	0

### MPLS Statistics

Description	Rx
1 Level Stacked MPLS Frames	0
2 Level Stacked MPLS Frames	0
3 Level Stacked MPLS Frames	0

### IP Statistics

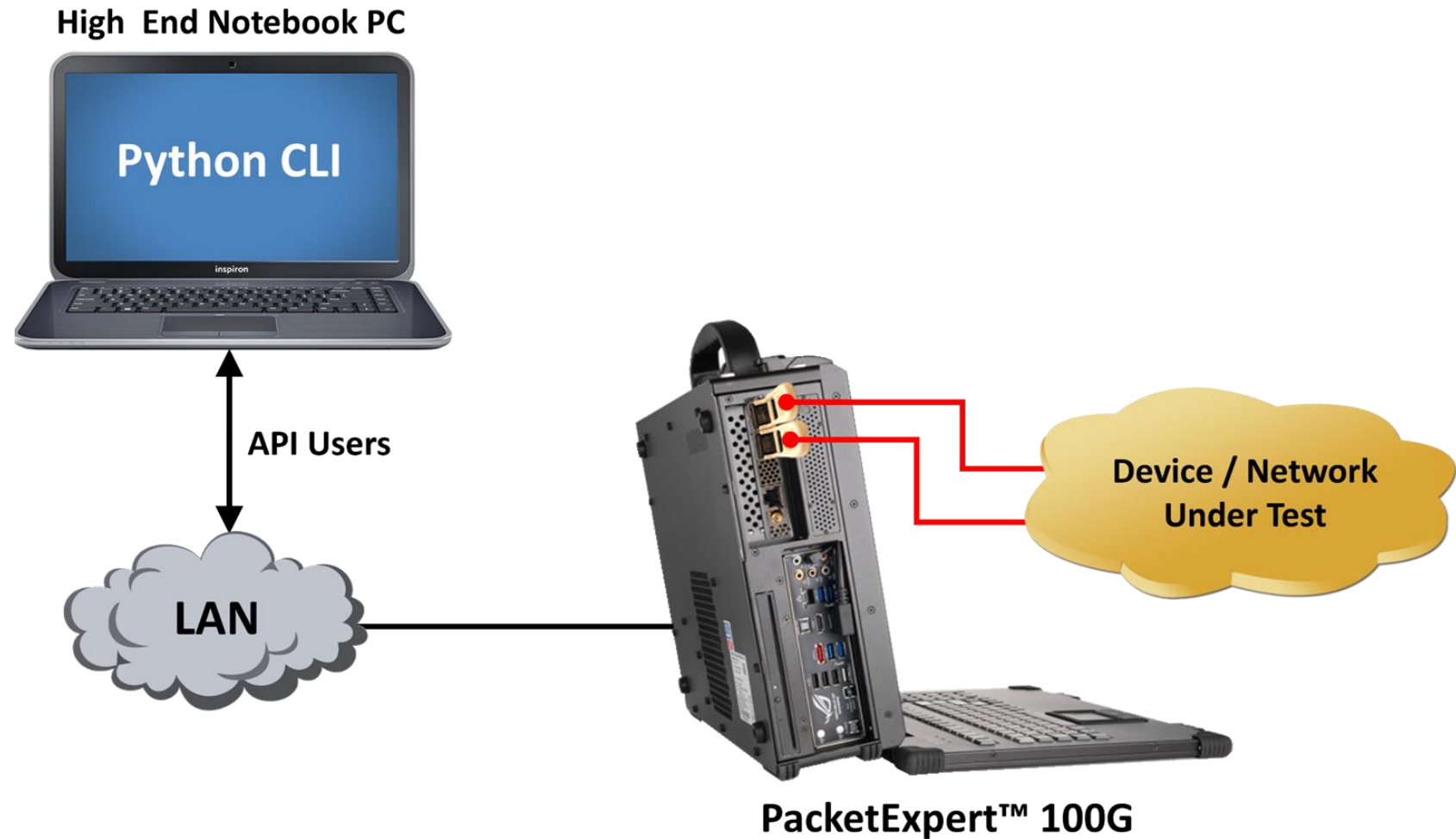
Description	Rx
IP Checksum Errors	0
IPv4 Packets	8,892,786,472
IPv6 Packets	0
TCP Packets	0
ICMP Packets	0
IGMP Packets	0
IGRP Packets	0
Other Protocol IP Packets	0

### UDP Statistics

Description	Rx
UDP Checksum Errors	0
UDP Packets	8,892,786,472

# CLI Python Client

- Test automation and regression testing via Python and REST APIs



# Python Script

```
AllPortBert_Sample_app.py x
1 from Core.Utils import *
2 from PacketExpertTests import *
3 import time
4
5
6 def main():
7     # Specify server details and test configuration
8     server_ip = "192.168.1.152"
9     server_port = 3333
10    device_list = [1]
11    port_list = [1, 2]
12
13    err, device_test_configuration = set_device_traffic_config(device_list)
14
15    # Configure TC1 Bert Test Parameters
16
17    device_test_configuration[1].port_mode = PortMode.Gbps100
18    device_test_configuration[1].start_frame_size = 64
19    device_test_configuration[1].start_rate = 1
20    device_test_configuration[1].start_error_rate = 4 # Bit error insertion rate 10^-4
21
22    test_duration = 10
23
24    default_json_path = 'C:\\Users\\Desktop\\PXXPythonClient-Release\\JSON\\'
25    result_file_path = 'C:\\Users\\Desktop\\PXXPythonClient-Release\\Log\\'
26    result_file_name = "Bert_Results"
27
28    generate_report_info = GenerateReport()
29    generate_report_info.test_conducted_by = "GLIndia"
30    generate_report_info.filename = "Bert_Report"
31    generate_report_info.title = "All Port Bert"
32
33    generate_report_info.init_selected_ports(device_list, port_list, AppName.AllPortBERT)
34
35    enable_generate_report = True
```

**Thank you**