# **Multi-Stream Ethernet Traffic Generation & Analysis**

PacketExpert<sup>™</sup> 100G (1G/10G/25G/40G/50G/100G)



**End-to-End Testing** 

### **Overview**

The <u>Multi Stream Traffic Generator and Analyzer</u> is a basic application available within the <u>PacketExpert<sup>™</sup> 100G</u> platform. This Ethernet tester can generate multi-stream Ethernet traffic with varying protocol headers, packet lengths, payloads and analyze traffic, making it an excellent tool for comprehensive end-to-end testing of Wide Area Networks at speeds up to 100 Gbps.

As depicted in the network diagram, up to 16 traffic streams per port can be generated according to user-defined configurations, including MAC/VLAN/IP/UDP headers, rate, and frame size. Different traffic classes (such as voice, video, and data) can be prioritized based on the configured frame size and rate. The system offers a graphical view of live Packet Loss, Round Trip, Delay and Jitter for all streams to monitor performance.

For more information, please visit Multi Stream Traffic Generator and Analyzer webpage.

### **Main Features**

- Generates traffic from Layer 2 to Layer 4 at up to 100 Gbps with varying protocol headers and packet sizes
- Accommodates frame lengths ranging from 64 bytes to 16,000 bytes (Jumbo frames)
- Generates and analyze packets up to 100Gbps line rates, with zero packet loss
- Supports up to 16 streams per port, enabling the device to handle a total of 32 streams
- Supports synchronization based on Precision Time Protocol (PTP), enabling accurate delay measurements
- Test automation and regression testing via Python and REST APIs
- Traffic Generation:
  - Generates multiple streams with customizable protocol headers, packet sizes and payloads
  - Streams can be defined with various header fields like Source and Destination MAC Address, VLAN and MPLS tags, Source and Destination IP Address, Source and Destination UDP ports
  - Each stream can include a mixture of different frames sizes (up to 5)
  - Emulate Carrier Ethernet traffic with stacked VLANs (C-Tag and S-Tag)
- Traffic Analysis:
  - Real-time statistics of throughput, packet loss, round-trip delay, and jitter across multiple streams
  - Real-time graphs of all statistics mentioned above, for each stream
  - Comprehensive statistics for individual streams
  - Delivers per-port frame statistics such as Total Frames and Bytes Received, Rx Frame Rate, and Rx Data Rate

# B GL Communications Inc.

818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878, U.S.A (Web) <u>www.gl.com</u> - (V) +1-301-670-4784 (F) +1-301-670-9187 - (E-Mail) <u>info@gl.com</u>

# **Traffic Generation**

### Stream Configuration

The stream configuration summary offers a quick view of all the current settings.

Each stream can be customized with attributes such as frame size, header parameters (including VLAN tag details), IP and UDP layer settings, payload patterns and traffic rate.

Pa	cket	Expert ™			🍪 Dashboard 🛛 🗮 Servers	🛗 Event Log	🛔 Admin
	Devic	es Ports	MTGA			Load	Save
;	Sumn	nary Stream	n Configuration St	ream Selection Multistream Results Graphs	Port Statistics All Port Statistics Event L	.og	
						5	
5	trean	1 Configuration	Continuous (	O Duration		SETUP2 🔻	
Ь			-				
	#	Name	Ξ	Summary Frame Size Layer	MAC VLAN MPLS IP	UDP Payload	
	1	Stream1	2		Bandwidth Profile		
н	2	Stream2	2				
Ľ	3	Stream3			Stream1 Configuration		
Ľ	4	Stream4		Description	Left <-> Pight		
Ľ				Frame Size	Type-Fixed [100]		
L.	5	Stream5		Layer	UDP		
ш	6	Stream6	C 🖻	MAC			
Ľ	7	Stream7		Source MAC Address	00-0D-E9-09-72-05 (HW MAC Address)		
L.	·	Stream		Destination MAC Address	00-0D-E9-09-72-06		
ш	8	Stream8	<b>a</b>	Len/Type	08-00		
11	9	Stream9		VLAN	Disabled		
L b				MPLS	Disabled		
L.	10	Stream10		IP Selection	IPv4		
	11	Stream11	@ 💼	Source IP Address	192 168 1.11		
L	10	Otres == 10		Destination IP Address	192.168.1.12		
L.	12	Stream12		Default Gateway	192.168.1.1		
	13	Stream13	2	Subnet Mask	255.255.255.0		
L1	14	Stream14		TTL	128		
L.	14	orreanna		ToS/DS	0		
	15	Stream15	C 🖬	Protocol	17		
	16	Stream16		Header Checksum	Auto		
Ľ				Identification	Auto		
				UDP			
				Source UDP	1001		
				Checkaum	1002		
1				Pavload	Auto		
				Pavload	AB-CD		
				Bandwidth Profile	A000		
				Rate	10 %		

Figure: Stream Configuration Collapsed Summary View

### **Ethernet VLAN C-TAG Configuration**

User can enable VLAN configuration and set the C-Tag (Customer Tag) and S-Tag (Service Tag) VLAN Type, Id, and Priority.

The 2 byte VLAN segment Tag Control Information (TCI) includes a 3-bit Carry Priority Information (PCP) field which indicates traffic priorities, which can be user-configurable.

Summary Frame Size Layer	MAC	AN MP	PLS IP	UDP	Payload	Bandwidth Profile
	Str	ream1 Configur	ation			
VLAN Enable						
	Туре	Id	Priority			
C-Tag	81-00	• 0	0			
S-Tag	81-00	• 0	0			

Figure: VLAN C-Tag Configuration

### Stream Configuration (Contd.)

#### **Payload Configurations**

A 2-byte hex payload can be configured for the test packet, which will be repeated throughout the entire frame payload.



**Figure: Payload Configuration** 

#### **Frame Size Configuration**

Users have the flexibility to configure frame sizes in bytes for each stream, choosing between Fixed and EMIX (Ethernet Mix) Frame Size types. For Fixed frame sizes, users can select any value within the range from just above 64 bytes to a maximum of 1518 bytes for standard frames, or up to 16,000 bytes for Jumbo frames. Additionally, a single Test Flow can incorporate up to five different frame sizes, known as EMIX, to simulate diverse real-time traffic scenarios.

Summary Frame Size Lay	er MAC VLAN MPLS IP UDP	Payload	Bandwidth Profile
	Stream1 Configuration		
		Symmetrical	Asymmetrical
	Left <-> Right		
	Type Fixed ▼ Range (64-16000)		
	Fixed Frame Size 100		

**Figure: Frame Size Configuration** 

#### **Bandwidth Profile Configurations**

This option allows you to set the frame generation rate using various units, such as a percentage (%) of link speed, Mbps, and Gbps.

Summary Frame Size Layer MAC VLAN	MPLS	PUD	P Payload	Bandwidth Profile
Stream1 Conf	iguration			
			Symmetrical	Asymmetrical
Left ←> F	Right			
Rate Unit	% 🔻			
Rate	5 %			
		_		



### **Stream Selection**

Stream selection allows you to choose any configured stream or select all streams for testing. Each port supports up to 16 streams per port at 1G, 10G, 25G, 40G, 50G, or 100G speeds. If selecting all streams, ensure the total bandwidth does not exceed 100Gbps link speed. The configured Frame Size and Rate (Mbps) for each stream are displayed, and the test is conducted simultaneously on all selected streams within the specified time duration until users stop the test.

evices Ports MTGA								Load	Save
ummary Stream Configuration	Stream Selection	Multistream Resu	Ilts Graphs	Port Stati	stics All Po	ort Statistics	Event Log		
Stream Selection Available Bandwidth	L⇒R 20.0000	Gbps R 🄶 L	20.0000	Gbps	Activate All	Deactivate A	-	→ SE	ETUP1 🔻
	Stream No.	Activate/Deactivate	Stream Name	Direction	Frame Size	Rate (Gbps)			
	<b>1</b>	<ul> <li>✓</li> </ul>	Stream1	L → R R → L	Fixed [100] Fixed [100]	5.0000 5.0000			
	2		Stream2	L → R R → L	Fixed [100] Fixed [100]	5.0000 5.0000			
	<b>2</b> 3		Stream3	L→R R→L	Fixed [100] Fixed [100]	5.0000 5.0000			
	☑ 4		Stream4	L → R R → L	Fixed [100] Fixed [100]	5.0000 5.0000			
	☑ 5		Stream5	L→R B→L	Fixed [100] Fixed [100]	5.0000			
	☑ 6		Stream6	L→R B→I	Fixed [100]	5.0000			
	7	2	Stream7	L → R	Fixed [100]	5.0000			
	✓ 8		Stream8	L→R B→I	Fixed [100]	5.0000			
	9		Stream9	L→R B→L	Fixed [100]	5.0000			
	<b>1</b> 0		Stream10	L→R R→1	Fixed [100]	5.0000			
	<b>2</b> 11		Stream11		Fixed [100]	5.0000			
	☑ 12		Stream12	L → R	Fixed [100]	5.0000			
	<b>1</b> 3		Stream13		Fixed [100]	5.0000			
	☑ 14		Stream14	L → R	Fixed [100]	5.0000			
	☑ 15		Stream15		Fixed [100]	5.0000			
	<b>1</b> 6		Stream16		Fixed [100]	5.0000			

**Figure: Stream Selection** 



# **Traffic Analysis**

### Results

The consolidated view of all the streams (16 streams) results are displayed for each configured stream, which includes Stream ID for which the test is running, Test duration in secs, TxRx Frames, Rx Bytes, and Current, Minimum, Maximum, and Average values of

- Frame Loss Frame Loss Count, Frame Loss Rate FLR (%)
- Information Rate Throughput, IR (Gbps)
- Frame Transfer Delay FTD, Delay (msec)
- Frame Delay Variations FDV, Jitter (msec)

etExpert ™								<b>B</b>	Dashboa	ırd	🗟 Serv	/ers	🛗 Eve	nt Log	🖪 Adr
ices Ports MTG	A													Load	Save
nmary Stream Conf	iguration	Stream Select	on Multist	ream Results	Graphs	Port Statis	tics All Por	t Statisti	cs Ev	ent Log					
Time 00:03:29			Throughpu	t Gbps 🔻	Delay Unit	usec 🔻	Jitter Unit us	ec 🔻	Vertical				Activ	ate All	Deactivate
															SETUP2
Stream Name 🔅	Direction	Throughput (Curr)	Throughput (Min)	Throughput (Avg)	Throughput (Max)	FL Count	FL Rate (%)	Delay (Curr)	Delay (Min)	Delay (Avg)	Delay (Max)	Jitter (Curr)	Jitter (Min)	Jitter (Avg)	Jitter (Max)
Stream1	L⇒R R→L	5.000 5.000	1.296 1.215	4.982 4.982	5.000 5.000	4	0.000	0.439 0.441	0.424 0.424	0.439 0.441	0.460 0.460	< 0.01 < 0.01	0.000	< 0.01 < 0.01	< 0.01 < 0.01
Stream2	L⇒R R→L	5.000 5.000	1.296 1.215	4.982 4.982	5.000 5.000	4	0.000	0.442 0.444	0.424 0.424	0.442 0.444	0.460 0.460	< 0.01 < 0.01	0.000 0.000	< 0.01 < 0.01	< 0.01 < 0.01
Stream3	L→R R→L	15.000 15.000	3.889 3.646	14.947 14.946	15.000 15.000	11 10	0.000	0.450 0.452	0.424 0.432	0.450 0.452	0.476 0.476	< 0.01 < 0.01	0.000 0.000	< 0.01 < 0.01	< 0.01 < 0.01
Stream4	L⇒R R→L	5.000 5.000	1.296 1.215	4.982 4.982	5.000 5.000	3 4	0.000	0.401 0.403	0.392 0.396	0.401 0.403	0.416 0.420	< 0.01 < 0.01	0.000 0.000	< 0.01 < 0.01	< 0.01 < 0.01
Stream5	L⇒R R→L	10.000 10.000	2.593 2.431	9.965 9.964	10.000 10.000	7 7	0.000	0.426 0.428	0.392 0.396	0.426 0.428	0.464 0.468	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Stream6	L→R R→L	5.000 5.000	1.296 1.215	4.982 4.982	5.000 5.000	3 4	0.000 0.000	0.407 0.409	0.396 0.396	0.407 0.409	0.424 0.428	< 0.01 < 0.01	0.000 0.000	< 0.01 < 0.01	< 0.01 < 0.01
Stream7	L⇒R R→L	5.000 5.000	1.296 1.215	4.982 4.982	5.000 5.000	3	0.000	0.410 0.412	0.400 0.400	0.410 0.412	0.428 0.432	< 0.01 < 0.01	0.000 0.000	< 0.01 < 0.01	< 0.01 < 0.01
Stream8	L⇒R R→L	5.000 5.000	1.296 1.215	4.982 4.982	5.000 5.000	3 3	0.000 0.000	0.413 0.415	0.404 0.404	0.413 0.415	0.436 0.436	< 0.01 < 0.01	0.000 0.000	< 0.01 < 0.01	< 0.01 < 0.01
Stream9	L⇒R R→L	5.000 5.000	1.296 1.215	4.982 4.982	5.000 5.000	3 3	0.000 0.000	0.416 0.417	0.404 0.408	0.416 0.417	0.436 0.440	< 0.01 < 0.01	0.000 0.000	< 0.01 < 0.01	< 0.01 < 0.01
Stream10	L⇒R R→L	5.000 5.000	1.296 1.215	4.982 4.982	5.000 5.000	3 3	0.000	0.419 0.420	0.408 0.412	0.419 0.420	0.440 0.444	< 0.01 < 0.01	0.000 0.000	< 0.01 < 0.01	< 0.01 < 0.01
Stream11	L→R R→L	5.000 5.000	1.296 1.215	4.982 4.982	5.000 5.000	3 3	0.000	0.421 0.423	0.408 0.412	0.421 0.423	0.440 0.444	< 0.01 < 0.01	0.000 0.000	< 0.01 < 0.01	< 0.01 < 0.01
Stream12	L→R R→L	5.000 5.000	1.296 1.215	4.984 4.983	5.000 5.000	3 4	0.000	0.424 0.426	0.412 0.412	0.424 0.426	0.444 0.448	< 0.01 < 0.01	0.000	< 0.01 < 0.01	< 0.01 < 0.01
Stream13	L⇒R R→L	5.000 5.000	1.296 1.215	4.984 4.983	5.000 5.000	3 4	0.000	0.427 0.429	0.412 0.412	0.427 0.429	0.448 0.448	< 0.01 < 0.01	0.000 0.000	< 0.01 < 0.01	< 0.01 < 0.01
Stream14	L⇒R R→L	5.000 5.000	1.296 1.215	4.984 4.983	5.000 5.000	3 4	0.000 0.000	0.430 0.432	0.420 0.420	0.430 0.432	0.452 0.452	< 0.01 < 0.01	0.000 0.000	< 0.01 < 0.01	< 0.01 < 0.01
Stream15	L→R R→L	5.000 5.000	1.296 1.215	4.984 4.983	5.000 5.000	3 4	0.000	0.433 0.435	0.420 0.424	0.433 0.435	0.452 0.456	< 0.01 < 0.01	0.000	< 0.01 < 0.01	< 0.01 < 0.01
Stream16	L⇒R R→L	5.000 5.000	1.296 1.215	4.984 4.983	5.000 5.000	3	0.000	0.436	0.420	0.436	0.456	< 0.01 < 0.01	0.000	< 0.01 < 0.01	< 0.01 < 0.01

**Figure: Stream Results** 



### Stream-wise Throughput Graph

A real time display of throughput versus time for each stream.



Figure: Stream Throughput Graph

### **FLR Graph**

A real time display of packet loss versus time.



Figure: Frame Loss Graph

### **Port Statistics**

Detailed statistics per port are provided including Frame Count, Frame Rate, Link Utilization, etc. based on various categories such as 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) are displayed for the configured stacks.

mmary Stream Config	uration Stream Sel	ection Multistream F	Results Graphs Port Statistics	All Port Statistics Event Log
t Statistics 💿 Running	•			Port1 V Res
ommon Statistics		^	VLAN Statistics	^
Description	Тх	Rx	Description	Rx
Link Utilization (%)	100.000	100.000	1 Level Stacked VLAN Frames	2,217,521,655
Data Rate (Mbps)	99,406.003	99,384.321	2 Level Stacked VLAN Frames	0
Bad Frames	0	0	3 Level Stacked VLAN Frames	0
Non Test Frames		0		
FCS Error Frames		0	MPLS Statistics	^
IP Checksum Errors		0	Description	Rx
UDP Checksum Errors		0	1 Level Stacked MPLS Frames	0
Total Frames	5,505,942,159	5,706,533,765	2 Level Stacked MPLS Frames	0
Valid Frames	5,505,942,159	5,706,533,765	3 Level Stacked MPLS Frames	0
Number Of Bytes	18,428,558,119,064	18,424,350,288,288		
Frame Rate (frames/sec)	3,712,469	3,847,767	IP Statistics	^
			Description	Rx
acket Type Statistics		^	IP Checksum Errors	0
Description		Tx Rx	IPv4 Packets	5,775,793,470
Description Broadcast Frames	·	<b>Fx Rx</b> 0 0	IPv4 Packets IPv6 Packets	5,775,793,470
Description Broadcast Frames Multicast Frames		Tx         Rx           0         0           0         0	IPv4 Packets IPv6 Packets TCP Packets	5,775,793,470 0 0
Description Broadcast Frames Multicast Frames Control Frames		Fx         Fx           0         0           0         0           0         0	IPv4 Packets IPv6 Packets TCP Packets ICMP Packets	5,775,793,470 5,775,793,470 0 0
Description Broadcast Frames Multicast Frames Control Frames VLAN Frames	2,244,458,97	Rx           0         0         0           0         0         0           0         0         0           0         2,244,435,525         0	IPv4 Packets IPv6 Packets TCP Packets ICMP Packets IGMP Packets	5,775,793,470           0           0           0           0           0           0           0           0           0
Description Broadcast Frames Multicast Frames Control Frames VLAN Frames Pause Frames	2,244,458,97	Rx           0         0           0         0           0         0           0         0           0         2,244,435,525           0         0	IPv4 Packets IPv6 Packets TCP Packets ICMP Packets IGMP Packets IGRP Packets	5,775,793,470 5,775,793,470 0 0 0 0 0 0
Description Broadcast Frames Multicast Frames Control Frames VLAN Frames Pause Frames	2,244,458,97	Tx         Rx           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0	IPv4 Packets IPv6 Packets TCP Packets ICMP Packets IGMP Packets IGRP Packets Other Protocol IP Packets	5,775,793,470           0           0           0           0           0           0           0           0           0           0           0           0           0           0           0           0           0           0           0           0           0
Description Broadcast Frames Multicast Frames Control Frames VLAN Frames Pause Frames ength Statistics	2,244,458,97	Tx         Rx           0         0           0         0           0         0           0         0           0         0           0         0           0         0	IPv4 Packets IPv6 Packets TCP Packets ICMP Packets IGMP Packets IGRP Packets Other Protocol IP Packets	5,775,793,470 5,775,793,470 0 0 0 0 0 0 0
Description Broadcast Frames Multicast Frames Control Frames VLAN Frames Pause Frames ength Statistics Description	2,244,458,91	Tx         Rx           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0	IPv4 Packets IPv6 Packets TCP Packets ICMP Packets IGMP Packets IGRP Packets Other Protocol IP Packets UDP Statistics	5,775,793,470       5,775,793,470       0       0       0       0       0       0       0       0
Description Broadcast Frames Multicast Frames Control Frames VLAN Frames Pause Frames ength Statistics Description Undersized Frames	2,244,458,97	Tx         Rx           0         0           0         0           0         0           0         2,244,435,525           0         0           Tx         Rx           0         0	IPv4 Packets IPv6 Packets TCP Packets ICMP Packets IGMP Packets IGRP Packets Other Protocol IP Packets UDP Statistics Description	5,775,793,470       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0
Description Broadcast Frames Multicast Frames Control Frames VLAN Frames Pause Frames ength Statistics Description Undersized Frames 64 Bytes Length	2,244,458,91	Tx         Rx           0         0           0         0           0         0           0         0           0         2,244,435,525           0         0           Tx         Rx           0         0           0         0	IPv4 Packets IPv6 Packets TCP Packets ICMP Packets IGMP Packets IGMP Packets Other Protocol IP Packets UDP Statistics Description UDP Checksum Errors	3     5,775,793,470       3     0       4     0       5     0       5     0       6     0       7     0       7     8       8     0       10     0
Description Broadcast Frames Multicast Frames Control Frames VLAN Frames Pause Frames ength Statistics Description Undersized Frames 64 Bytes Length 65-127 Byte Length	2,244,458,97	Rx           0         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00         00 <td>IPv4 Packets IPv6 Packets TCP Packets ICMP Packets IGMP Packets IGRP Packets Other Protocol IP Packets UDP Statistics UDP Checksum Errors UDP Packets</td> <td><ul> <li>5,775,793,470</li> <li>5,775,793,470</li> <li>0</li> <li0< li=""> <li>0</li> <li>0</li> <li>0</li> <li1< td=""></li1<></li0<></ul></td>	IPv4 Packets IPv6 Packets TCP Packets ICMP Packets IGMP Packets IGRP Packets Other Protocol IP Packets UDP Statistics UDP Checksum Errors UDP Packets	<ul> <li>5,775,793,470</li> <li>5,775,793,470</li> <li>0</li> <li0< li=""> <li>0</li> <li>0</li> <li>0</li> <li1< td=""></li1<></li0<></ul>
Description Broadcast Frames Multicast Frames Control Frames VLAN Frames Pause Frames ength Statistics Description Undersized Frames 64 Bytes Length 65-127 Byte Length 128-255 Byte Length	2,244,458,91 2,244,458,91 2,244,458,91 448,891,79 448,891,79	Image: Name of the system         Rx           0         0         0           0         0         0           0         2,244,435,525         0           0         2,244,435,525         0           0         0         0           Image: Name of the system         Name of the system           Image: Name of the system         Name of the system           0         0         0           0         0         0           0         448,887,105         0           04         448,887,105         0	IPv4 Packets IPv6 Packets TCP Packets ICMP Packets IGMP Packets IGRP Packets Other Protocol IP Packets UDP Statistics UDP Checksum Errors UDP Packets	3,775,793,470       3,775,793,470       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       5,775,793,470
Description Broadcast Frames Multicast Frames Control Frames VLAN Frames Pause Frames Description Undersized Frames 64 Bytes Length 128-255 Byte Length 256-511 Bytes Length	2,244,458,91 2,244,458,91 2,244,458,91 448,891,79 448,891,79	Image         Rx           0         0           0         0           0         0           0         0           0         2,244,435,525           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         448,887,105           04         448,887,105	IPv4 Packets IPv6 Packets TCP Packets ICMP Packets IGMP Packets IGRP Packets Other Protocol IP Packets UDP Statistics UDP Checksum Errors UDP Checksum Errors UDP Packets	<ul> <li>5,775,793,470</li> <li>5,775,793,470</li> <li>0</li> <li0< li=""> <li>0</li> <li>0</li> <li>0</li> <li1< td=""></li1<></li0<></ul>
Description Broadcast Frames Multicast Frames Control Frames VLAN Frames Pause Frames ength Statistics Description Undersized Frames 64 Bytes Length 65-127 Byte Length 128-255 Byte Length 256-511 Bytes Length 512-1023 Bytes Length	2,244,458,91 2,244,458,91 2,244,458,91 448,891,79 448,891,79 448,891,79	Rx           0         00         0           0         00         0           0         2,244,435,525         0           0         2,244,435,525         0           0         0,00         0           X         Rx         X           0         0,00         0           0         0,00         0           0         448,887,105         448,887,105           04         4448,887,105         4448,887,105	IPv4 Packets IPv6 Packets TCP Packets ICMP Packets IGMP Packets IGRP Packets Other Protocol IP Packets UDP Statistics UDP Checksum Errors UDP Packets	<ul> <li>5,775,793,470</li> <li>5,775,793,470</li> <li>0</li> <li>1</li> <li>0</li> <li0< li=""> <li>0</li> <li>0</li> <li>0</li> <li1< td=""></li1<></li0<></ul>

**Figure: Port Statistics** 

# **Report Generation**

The Report Generation option allows to create detailed test report in PDF and CSV formats. This window lets the user configure the report file details.



#### **PDF Report Sample**

ile Home Insert Page Layout Fo	ormulas Data R	eview View	Automate Help			🖵 Comments 🛛 🖻 S
$[ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	у					
A	В	C	D	E	F	G
Summary						
MTGA Test Results Summary:						
Test Setup	Test Time					
Device1/Port1 <-> Device1/Port2	00:14:48					
Multi Stream Results Summary:						
Test Setup	Direction	Service No	Throughput MAX(Gbps)	FL RATE(%)	Delay MAX(msec)	Jitter MAX(usec)
Device1/Port1 <-> Device1/Port2	L->R	Stream1	5		0 <0.001	0.024
Device1/Port1 <-> Device1/Port2	R->L	Stream1	5	(	0 <0.001	0.024
Device1/Port1 <-> Device1/Port2	L->R	Stream2	5	(	0 <0.001	0.02
Device1/Port1 <-> Device1/Port2	R->L	Stream2	5	(	0 <0.001	0.02
Device1/Port1 <-> Device1/Port2	L->R	Stream3	5	(	0 <0.001	0.024
Device1/Port1 <-> Device1/Port2	R->L	Stream3	5		0 <0.001	0.024
Device1/Port1 <-> Device1/Port2	L->R	Stream4	5		0 <0.001	0.02
Device1/Port1 <-> Device1/Port2	R->L	Stream4	5		0 <0.001	0.02
Device1/Port1 <-> Device1/Port2	L->R	Stream5	5		0 <0.001	0.024
Device1/Port1 <-> Device1/Port2	R->L	Stream5	5		0 <0.001	0.024
Device1/Port1 <-> Device1/Port2	L->R	Stream6	5		0 <0.001	0.024
Device1/Port1 <-> Device1/Port2	R->L	Stream6	5		0 <0.001	0.024
Device1/Port1 <-> Device1/Port2	L->R	Stream7	5		0 <0.001	0.032
Device1/Port1 <-> Device1/Port2	R->L	Stream7	5		0 <0.001	0.028
Device1/Port1 <-> Device1/Port2	L->R	Stream8	5		0 <0.001	0.028
Device1/Port1 <-> Device1/Port2	R->L	Stream8	5		0 <0.001	0.028
Device1/Port1 <-> Device1/Port2	L->R	Stream9	5		0 <0.001	0.024
Device1/Port1 <-> Device1/Port2	R->L	Stream9	5		0 <0.001	0.024
Device1/Port1 <-> Device1/Port2	L->R	Stream10	5		0 <0.001	0.028
Device1/Port1 <-> Device1/Port2	R->L	Stream10	5		0 <0.001	0.028
Device1/Port1 <-> Device1/Port2	L->R	Stream11	5		0 <0.001	0.032
Device1/Port1 <-> Device1/Port2	R->L	Stream11	5		< 0.001	0.032
Device1/Port1 <-> Device1/Port2	L->R	Stream12	5		0 <0.001	0.032
Device1/Port1 <-> Device1/Port2	R->L	Stream12	5		0 <0.001	0.032
Device1/Port1 <-> Device1/Port2	L->R	Stream13	5		0 <0.001	0.032
Device1/Port1 <-> Device1/Port2	R->L	Stream13	5		0 <0.001	0.032
Device1/Port1 <-> Device1/Port2	L->R	Stream14	5		0 <0.001	0.032
Device1/Port1 <-> Device1/Port2	R->L	Stream14	5		0 <0.001	0.032
Device1/Port1 <-> Device1/Port2	L->R	Stream15	5		< 0.001	0.032
Device1/Port1 <-> Device1/Port2	R->L	Stream15	5		< 0.001	0.032
Device1/Port1 <-> Device1/Port2	L->R	Stream16	5		0 <0.001	0.032
Device1/Port1 <-> Device1/Port2	R->L	Stream16	5		0 <0.001	0.032

**CSV Report Sample** 

# **Hardware Specifications**



PacketExpert<sup>™</sup> 100G SmartNIC

SmartNIC Specifications (Per Card)					
Optical Components	<ul> <li>2 x QSFP28 cages for 2 x 100 GbE, 2 x 50GbE, and 2 x 40 GbE</li> <li>Supports 2 x 25 GbE, 2 x 10 GbE, and 2 x 1 GbE with QSFP-to-SFP adapter</li> </ul>				
PCle	PCIe Gen 3, 16 lanes				
RAM	8 GBytes DDR4 SDRAM				
1000Base-T Port	RJ45 for IEEE1588v2				
Single-ended Coaxial I/O	SMA connector, 50 Ohms for External Clock Input/Output				
Temperature Range	0C to 45C				
Operating Humidity	20% to 80%				
Storage	-10 to 60C				
Oscillator Accuracy	+/- 4.6ppm				



# Hardware Specifications (*Contd.*) PacketExpert<sup>™</sup> 100G Rack-mount Platforms

- Ideal for Lab environments that require centralized management of multiple servers and network devices
- Rack-mount units offer flexibility for scaling up or down as needed by adding or removing individual units

#### PacketExpert<sup>™</sup> 100G 4U Rack-mount



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

Specifications						
Dimensions	6.9" H x 16.9" W x 17.5" D					
Weight	72 lbs.					
Number of Supported Cards/Ports	Up to 7 Cards x (2x100G Ports), Maximum of 14 Ports					
Power supply	800W					

#### PacketExpert<sup>™</sup> 100G 2U Rack-mount



2x(2x1G/10G/25G/40G/50G/100G)

Specifications					
Dimensions	3.5" H x 17.2" W x 17.7" D				
Weight	30 lbs.				
Number of Supported Cards/Ports	Up to 2 Cards x (2x100G Ports), Maximum of 4 Ports				
Power supply	800W				

### PacketExpert<sup>™</sup> 100G 1U Rack-mount



Specifications				
Dimensions	1.7" H x 17.2" W x 9.8" D			
Weight	10 lbs.			
Number of Supported Cards/Ports	1 x Full-height 1 Card x (2x100G Ports), Max- imum of 2 Ports			
Power supply	200W			



# PacketExpert<sup>™</sup> 100G Portable Platforms

- Ideal for field engineers, military personnel, or researchers who need a powerful and portable computing solution in remote or rugged locations
- Suitable for environments where traditional desktops or laptops may be too fragile or lack necessary durability

#### Ultra-Portable PacketExpert<sup>™</sup> 100G (Lunchbox)



Specifications		
Dimensions	12.4" H x 16.41" W x 4.39" D	
Display	17.3" 1920x1080	
Weight	16.5 lbs.	
Number of Supported Cards/Ports	Up to 2 Cards x (2x100G Ports), Maximum of 4 Ports	
Power supply	400W (optional 500W)	

### Portable PacketExpert<sup>™</sup> 100G (Lunchbox)



Specifications		
Dimensions	13.62" H x 16.50" W x 7.25" D	
Display	17.3″ 1920x1080	
Weight	~23 lbs. (10.4kg)	
Number of Supported Cards/Ports	Up to 3 Cards x (2x100G Ports), Maximum of 6 Ports	
Power supply	680W 100/240VAC	

### PacketExpert<sup>™</sup> 100G Portable Platform (Lunchbox)



Specifications	
Dimensions	17.06" x 13.67" x 9.02" (H x W x D)
Display	17.3" 1920x1080
Weight	~ 30 lbs.
Number of Supported Cards/Ports	Up to 6 Cards x (2x100G Ports), Maximum of 12 Ports
Power supply	1000W 100-240VAC

### **Buyer's Guide**

Item No	Product Description
<u>PXX100</u>	PacketExpert™ 100G Platform (1G, 10G, 25G), All Port BERT, BERT/Loopback, RFC2544, Y.1564, MTGA
<u>PXX101</u>	Basic Software (Required for PXX100)
<u>PXX103</u>	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)
<u>PXX105</u>	40G, 50G, 100G Optional Software
<u>PXX106</u>	PacketExpert <sup>™</sup> 100 G – One card / 2 Port Platform with MM Kit
<u>PXX107</u>	PacketExpert <sup>™</sup> 100G - Two Card / 4 Port Portable Platform
<u>PXX108</u>	PacketExpert <sup>™</sup> 100 G – One card / 2 Port Platform with SM Kit
<u>PXX109</u>	Optional Software for CLI Support
<u>PXX110</u>	PacketExpert <sup>™</sup> 100 G - Two Card / 4 Port Platform with SM Kit
PXX10X	PacketExpert 100 G – 4 Card Platform / 8 Port Platform
Item No	Related Hardware and Software
<u>PXN100</u>	PacketExpert <sup>™</sup> 10GX
<u>PXN101</u>	10G option for PXN100

**Note:** PCs which include GL hardware/software require Intel or AMD processors for compliance.

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



818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878, U.S.A (Web) <u>www.gl.com</u> - (V) +1-301-670-4784 (F) +1-301-670-9187 - (E-Mail) <u>info@gl.com</u>