

	PRODUCT RANGE						
	Lite 100	100/2	1,000/2	1,000/4	10,000/2	10,000/4	40,000/2
Physical							
Built in Network Interfaces	2	2	2	4	2	4	2
Additional Network Interfaces	n/a	up to 24	up to 24	up to 24	up to 12	up to 24	2
Standard Network Interfaces	GbE Copper	GbE Copper	GbE Copper	GbE Copper	SFP+	10GE Fiber LC-LC	40GE Fiber LC-LC
Optional Network Interfaces	n/a	n/a	SFP / SFP+	SFP+	SFP+	RJ45 / SFP / SFP+	n/a
Max. aggregate Throughput	200 Mbps	200 Mbps	2 Gbps	8 Gbps	20 Gbps	40 Gbps	80 Gbps
Max. packet Rate Per Sec	325k	325k	5.92 million	11.84 million	59.2 million	118.4 million	118.4 million
Full wire rate (64 byte packets)	✓	✓	✓	✓	✓	✓	✓
Storage Capacity (Optional Max)	4GB (8GB)	8GB (16GB)	8GB (64GB)	8GB (64GB)	8GB (1TB)	16GB (1TB)	16GB (1TB)
Dual Redundant Power Supplies	n/a	n/a	⊙	⊙	⊙	⊙	⊙
Dimensions	22x19x6	2u Rack	2u Rack	2u Rack	2u Rack	2u Rack	2u Rack
General							
Timing Precision	1ms	0.01ms	0.01ms	0.01ms	0.01ms	0.01ms	0.01ms
Any Port to Any Port (tm) 4, 8, 24 ports? Packets can be sent between each and any port for complete flexibility	✓	✓	✓	✓	✓	✓	✓
Live Changes Real-time modification of any impairment setting or network map	✓	✓	✓	✓	✓	✓	✓
Maximum Impairments * Until performance is exhausted	64	128	Unlimited*	Unlimited*	Unlimited*	Unlimited*	Unlimited*
Traffic Capture & Replay with Looping Option	⊙	✓	✓	✓	✓	✓	✓
Bi-directional, Independent Emulations	✓	✓	✓	✓	✓	✓	✓
Timeline Schedule changes to emulation settings with no manual intervention required Option: Loop timeline for continuous playback	⊙	⊙	✓	✓	✓	✓	✓
Modes of Operation							
Virtual Routing (Simulate routers / ADSL Gateways) Protocols: DHCP, ARP, ICMP, IGMP, etc DHCP: Enable / Disable Routing Table: Auto generate, manual Multiple WAN Links	⊙	⊙	✓	✓	✓	✓	✓
Cloud / Data Center Simulation Simulate multi-hop routed networks with ease OSPF Support for self healing and Internet simulation	n/a	n/a	⊙	⊙	⊙	⊙	⊙
Bridged Mode Option to impair all traffic sent and received (protocol filtering available)	✓	✓	✓	✓	✓	✓	✓
Delay Emulation (0ms to 30secs, 0.01ms)							
Fixed Latency	✓	✓	✓	✓	✓	✓	✓
Variable Latency	✓	✓	✓	✓	✓	✓	✓
Ramp	✓	✓	✓	✓	✓	✓	✓
Normal / Gaussian	✓	✓	✓	✓	✓	✓	✓
Sinusoidal Wave	✓	✓	✓	✓	✓	✓	✓
Jitter 0.1 ms to 100 ms or 0.1 to 100% of constant delay	✓	✓	✓	✓	✓	✓	✓
Timing Constraints (Specify start and duration of impairments activity) Start / Duration 0.1 ms to 360,000 ms (in 0.1 ms increments)	✓	✓	✓	✓	✓	✓	✓
Bandwidth Emulation							
Constant Throttle	500 Bps to 45 Mbps	500 Bps to 100 Mbps	500 Bps to 1 Gbps	500 Bps to 1 Gbps	500 Bps to 10 Gbps	500 Bps to 10 Gbps	500 Bps to 40 Gbps
Random Range (min to max with time constraints)	501 Bps to 45 Mbps	501 Bps to 100 Mbps	501 Bps to 1 Gbps	501 Bps to 1 Gbps	501 Bps to 10 Gbps	501 Bps to 10 Gbps	501 Bps to 40 Gbps
Random Range Duration 0.1 ms to 10 minutes* (in 0.1ms increments)	✓	✓	✓	✓	✓	✓	✓

	PRODUCT RANGE						
	Lite 100	100/2	1,000/2	1,000/4	10,000/2	10,000/4	40,000/2
Background Traffic Generation							
Fixed Data Rate: 500 bps to 40Gbps Percentage of available link: 1 to 99% Generate broadcast packets Range (min to max with time constraints)	⊙	✓	✓	✓	✓	✓	✓
Range Duration 0.1 ms to 360,000 ms (in 0.1ms increments)	⊙	✓	✓	✓	✓	✓	✓
Reordering							
Time Based Re-order Displace packet from 0.1 to 500 ms	⊙	⊙	✓	✓	✓	✓	✓
Position Base Re-order Displace packet up to 1,000,000 places	⊙	⊙	✓	✓	✓	✓	✓
Corruption							
Bitflips Start and end position (first byte to last byte), 1 to 100%	⊙	✓	✓	✓	✓	✓	✓
Byte Overwrites Start and end position (first byte to last byte) 1 to 100%	⊙	✓	✓	✓	✓	✓	✓
Ethernet Fragmentation MTU: 128 to 9,000	⊙	✓	✓	✓	✓	✓	✓
Bit Error Rate (Per) Simulation x bits in y received (1 bit to IE-14)	⊙	✓	✓	✓	✓	✓	✓
Duplication							
Simple (single duplication) Packets received on link will be immediately duplicated once	⊙	✓	✓	✓	✓	✓	✓
Timed (duplicated every x seconds) Single duplication after specified delay (1 to 1,000 ms)	⊙	✓	✓	✓	✓	✓	✓
Complex (multiple, timed duplication) Specified multiple duplications after specified time delay (1 to 1,000 ms)	⊙	✓	✓	✓	✓	✓	✓
Loss							
Standard Drop x packets in Y received (1x to 99,999,999y)	✓	✓	✓	✓	✓	✓	✓
Percentage Drop 0.1% to 100% (in increments of 0.1%)	✓	✓	✓	✓	✓	✓	✓
Outage Drop all packets received on specified link	✓	✓	✓	✓	✓	✓	✓
Drop Evenly Packets will be dropped regularly throughout emulation	✓	✓	✓	✓	✓	✓	✓
Drops in Bursts Packets will be dropped in continuous groups	✓	✓	✓	✓	✓	✓	✓
Timing Constraints Start / Duration 0.1 ms to 360,000 ms (in 0.1ms increments)	✓	✓	✓	✓	✓	✓	✓
Modification							
Generic Packet Modifier Modify up to 6 bit / byte sections per packet	⊙	⊙	✓	✓	✓	✓	✓
Frame Check Sequence Modification Transport, corrupt and modify the FCS	⊙	⊙	⊙	⊙	⊙	⊙	⊙

	PRODUCT RANGE						
	Lite 100	100/2	1,000/2	1,000/4	10,000/2	10,000/4	40,000/2
TAP (Test Access Point) devices -							
(Extract analysis information from any part of the emulation)							
Bandwidth Graph Show bandwidth utilisation - Export, clipboard, peak and averaging, etc.	✓	✓	✓	✓	✓	✓	✓
Packet Rates Show packet utilisation	✓	✓	✓	✓	✓	✓	✓
RTP Analyser Output detailed information on RTP streams	○	○	○	○	○	○	○
RTCP Analyser Output detailed information on RTCP streams	○	○	○	○	○	○	○
Reports Create customisable reports from various metrics	○	○	○	○	○	○	○
Stateless load generation with multiple load distribution models							
Generic/RAW Load Generator Generic any type of load with extensive stream options	n/a	n/a	○	○	○	○	○
TCP Client Simulate clients with data streams	n/a	n/a	○	○	○	○	○
TCP Server Simulate servers with data streams	n/a	n/a	○	○	○	○	○
RTP / VOIP Simulate audio/video equipment	n/a	n/a	○	○	○	○	○
UDP Raw UDP traffic with payloads	n/a	n/a	○	○	○	○	○
DDOS Simulation Simulate extremely stressful DDOS environments	n/a	n/a	○	○	○	○	○
Audio Visual (AV) Pack							
RTP Filter	○	○	○	○	✓	✓	✓
MPEG H.264 Filter	○	○	○	○	✓	✓	✓
MPEG H.264 Corruptor	○	○	○	○	✓	✓	✓
G.1050 Wizard	○	○	○	○	○	○	○
TIA-921 Wizard	○	○	○	○	○	○	○
Management							
Drag and Drop User Interface Simple User Interface, allowing user to draw out their target network on screen, drop impairments as required and visualise the network under test	✓	✓	✓	✓	✓	✓	✓
Open XML for Test Automation Easy integration with test environments to schedule, run and report on emulations without recourse to user interface	○	✓	✓	✓	✓	✓	✓
Hardware Capacity Monitoring Device load, memory usage, hardware status, load history	✓	✓	✓	✓	✓	✓	✓
Command Line Interface Powerful CLI (with source code) for Windows, Linux and Mac	○	○	✓	✓	✓	✓	✓
SNMP Operational based SNMP traps and alerts	○	○	○	○	○	○	○
Smart Start-Up Automatically launch previous map on boot	✓	✓	✓	✓	✓	✓	✓
Multi-User Support Unlimited GUI instances, share maps etc	○	○	○	○	✓	✓	✓
Hardware NTP / PTPv2 Time Stamping Lock hardware and packet timings to accurate internal / external clocks	○	○	○	○	○	○	○

	PRODUCT RANGE						
	Lite 100	100/2	1,000/2	1,000/4	10,000/2	10,000/4	40,000/2
Filtering (UDP, TCP, Packet count)							
Maximum Filter							
Connect multiple filters in any way to create complex filter rules	32	32	Unlimited*	Unlimited*	Unlimited*	Unlimited*	Unlimited*
IP Source / destination address filtering (impair specific traffic flows)	✓	✓	✓	✓	✓	✓	✓
TCP							
Advanced: Source and destination port filtering (including range)	✓	✓	✓	✓	✓	✓	✓
TCP Packet length filtering							
UDP							
Advanced: Source and destination port filtering (including range)	✓	✓	✓	✓	✓	✓	✓
TCP Packet length filtering							
MAC Address							
Src/Dst single or range	✓	✓	✓	✓	✓	✓	✓
Ethernet Payload							
	✓	✓	✓	✓	✓	✓	✓
Packet Counting							
Fail or Pass filters based on packet count or percentage	✓	✓	✓	✓	✓	✓	✓
Advanced Filtering							
Generic Filter							
Filter on multiple bit / byte values with logic operations	⊙	⊙	✓	✓	✓	✓	✓
IP Protocol: Payload Type and Value							
	⊙	⊙	✓	✓	✓	✓	✓
MPLS: MPLS Label, QoS Value, TTL value							
	⊙	⊙	✓	✓	✓	✓	✓
VLAN: VLAN ID, User Priority							
	⊙	⊙	✓	✓	✓	✓	✓
MPEG Video							
	⊙	⊙	⊙	⊙	⊙	⊙	⊙
RTP A/V							
	⊙	⊙	⊙	⊙	⊙	⊙	⊙
Flow Control (simulation link switching)							
Output Switcher: Up to 4 available outputs							
	⊙	⊙	✓	✓	✓	✓	✓
Input Switcher: Up to 4 available inputs							
	⊙	⊙	✓	✓	✓	✓	✓
Merge Tool							
	⊙	⊙	✓	✓	✓	✓	✓
Network Analysis							
Latency Measurement							
Measure live hardware and network latency to microsecond levels	⊙	⊙	⊙	⊙	⊙	⊙	⊙
Network Conditions Monitor							
Automatically build networks using any wireshark file	⊙	⊙	✓	✓	✓	✓	✓
Instancers							
(create unique impairments for hundreds of streams)							
VLAN Instancer							
	⊙	⊙	⊙	⊙	⊙	⊙	⊙
MPLS Instancer							
	⊙	⊙	⊙	⊙	⊙	⊙	⊙
Reporting							
Live Monitoring							
Bandwidth monitoring, packets per second, export to CSV max / average values,- etc	✓	✓	✓	✓	✓	✓	✓
Wireshark Integration (on up to 200 protocols)							
Allows for live traffic capture and root cause analysis; replay 3rd party traffic streams under impairments, record traffic and replay at a later date	⊙	✓	✓	✓	✓	✓	✓
Customisable End of Emulation Reports							
Reports detailing results of emulation run, such as impairment settings, dropped packets, bandwidth, corruption, jitter etc	⊙	⊙	⊙	⊙	⊙	⊙	⊙

