

Spirent **Attero-100G**

100/40/25/10GbE Impairment Testing

Key Highlights

- Prove 100GbE, 40GbE, 25GbE and 10GbE device performance with full line-rate network emulation
- Full line-rate delay of up to 80 ms at 100GbE, 200 ms at 40GbE, 320 ms at 25GbE, and 800 ms at 10GbE
- Boost full line-rate delay (optional) to 256 ms at 100GbE, 640 ms at 40GbE, 1024 ms at 25GbE, and 2560 ms at 10GbE
- Introduce lost, mis-ordered, errored and repeated packets
- Latency and jitter to nanosecond accuracy means repeatable testing
- Flexible profile options to test multi-flow CoS impairments
- Extensive and powerful set of filters to configure and inject impairments
- Web-based GUI with built-in controller
- FPGA architecture protects your investment
- Integrated Tshark support
- RESTful API
- SyncE – Pass Thru Mode

Test with Real-World Network Conditions in Your Lab

Latency in networks really is a big deal. It dramatically reduces throughput and when it affects high speed links carrying applications such as real-time gaming and streaming video, consumers can get pretty disgruntled. Even the financial industry now demands ultra-low latency as algorithmic trading becomes more widespread. So when you are developing high-precision network products, it is critical that you validate their performance with real-world network conditions. And that means latency.

This high speed Ethernet impairment tester can be used to emulate propagation, routing, switching and buffering delays by up to 256 ms at 100GbE, 640 ms at 40GbE, 1024 ms at 25GbE and 2560 ms at 10GbE. That's the equivalent of over 50,000 km of fiber at 100 Gb/s. Plus, the Attero-100G offers precise adjustment of the network delay so that you can easily and conveniently model different fiber lengths to emulate:

- Global, continental and transoceanic networks
- Delay sensitive video traffic
- Delay critical data transmission for financial services applications

What's more, you can assess the impact of network congestion, queuing issues or multi-path fading on your device's performance. Attero-100G lets you introduce lost, mis-ordered, errored and repeated packets with nanosecond accuracy to help you define the performance limits of your device, tune performance, or to detect and eliminate problems before deployment. In other words, you don't need to build inflexible, unrealistic and costly networks to validate your device's performance. Simply use the Attero-100G to simulate real-world network conditions for maximum stress-testing.

The Attero-100G offers extensive traffic filtering capabilities allowing you to create simultaneous multi-profile impairments. Plus, you can add delay and packet corruptions to each independent profile.



External Clock Reference Input:

- 2.048 MHz
- 5 MHz
- 6.312 MHz
- 10 MHz
- 15 MHz
- E1

Supported high-speed interface ports:

- Two CFP2/QSFP28* ports for 100GbE LR4/SR4*
- Two CXP ports for 100GbE SR10
- Two QSFP+ ports for 40GbE
- Two SFP28 ports for 25GbE**
- Two SFP+ ports for 10GbE

* QSFP28 (and SR4) is via a CFP2 to QSFP28 adapter (supplied)
 ** Using CFP2 to SFP28 adapters (supplied)

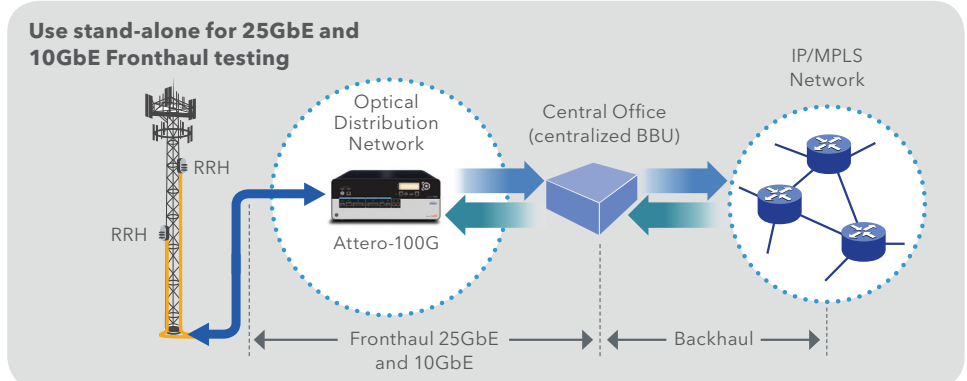
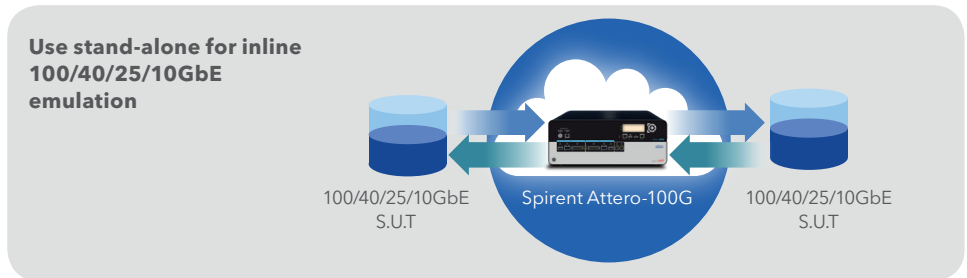
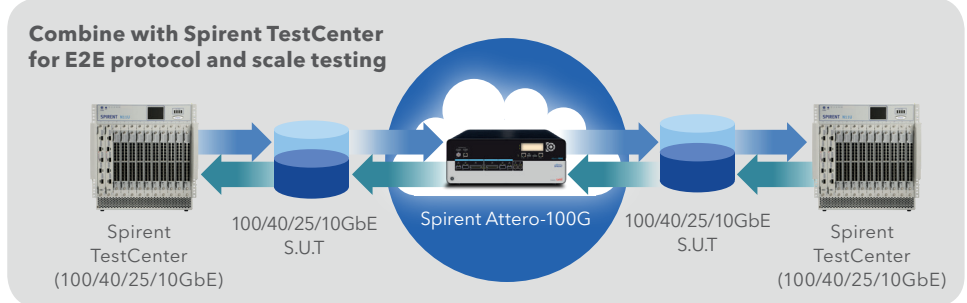
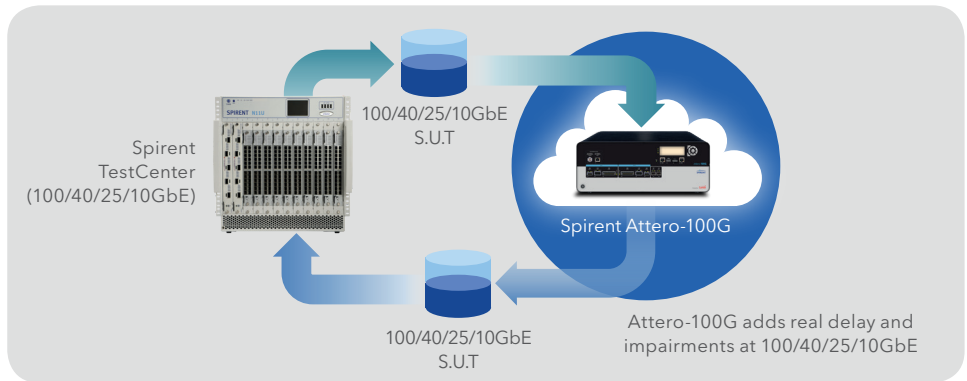
Use the Spirent Attero-100G for testing:

- IPTV, VoIP
- Cloud Computing
- CoS/QoS Levels
- Server Actualization/ Consolidation
- WAN Acceleration
- Telecom/Federal Applications
- ADSL, FTTH
- LAN/WAN Emulation
- Customer Proof of Concept
- SLA Verification
- ITU-T Y.1731
- IEEE 802.1 ag
- Storage Networks
- Mobile Subscriber Networks
- Content Delivery
- Cable/Broadband
- Carrier Wi-Fi
- 25GbE and 10GbE Fronthaul

Applications

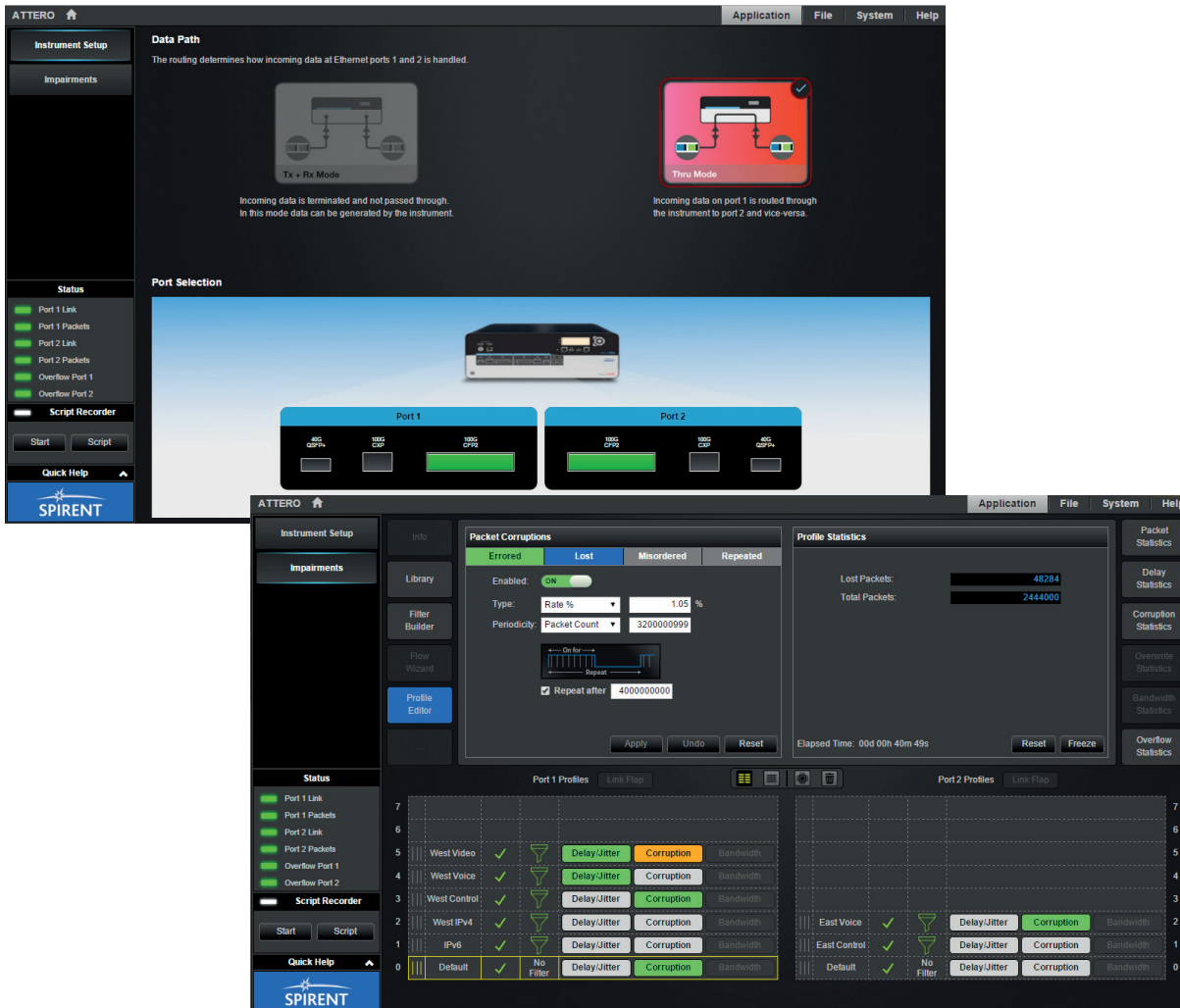
Use Spirent TestCenter to emulate user and network traffic and test switches, routers, applications, even new routing protocols under realistic network conditions:

- Introduce different impairments for different CoS levels
- Add delays that are accurate to nanoseconds
- Optimize network throughput performance



Web-Based User Interface

Control the Attero-100G from any web-enabled device, including your tablet.



Powered by Calnex

The Attero-100G is powered by technology from Calnex Solutions, proven leaders in precision test equipment with best-in-class accuracy and performance.



Avoid the 'Wait-and-See' Approach

Validate the performance of your applications, services, protocols or devices against a wide range of delay, bandwidth and impairment conditions found in real-world networks. The Attero-100G lets you prove 100GbE, 40GbE, 25GbE and 10GbE network and device performance with full line rate network simulation, allowing you to:

- Evaluate performance and characterize end user experience
- Perform negative or conformance type testing (corruption, modification, etc.)
- Discover and fix network related issues early

For more information on the Spirent Attero-100G, call your Spirent sales representative or visit us at www.spirent.com.



Technical Specifications

Physical Interfaces	Ethernet (optical CXP, CFP2, QSFP28, QSFP+ and SFP28 – optical modules not supplied) <ul style="list-style-type: none"> • 100GbE: CFP2/QSFP28 (LR4/SR4) – 2 ports (optional); Note: QSFP28 is via CFP2 to QSFP28 adapter • 100GbE: CXP (SR10) – 2 ports (optional) • 40GbE: QSFP+ (LR4/SR4) – 2 ports (optional) • 25GbE: SFP28 (LR/SR with FEC enabled) – 2 ports (optional) using CFP2 to SFP28 adapters (supplied) • 10GbE: SFP+ (LR/SR) – 2 ports (optional)
Number of Test Ports	2 x 100G xR4, 2 x 100G SR10, 2 x 40G, 2 x 25G and 2 x 10G Ethernet
Interface Support	<ul style="list-style-type: none"> • 100G-BASE-SR4/LR4 • 100G-BASE-SR10 • 40GBASE-SR4/LR4 • 25GBASE-SR/LR • 10GBASE-SR/LR
Forward Error Correction	<ul style="list-style-type: none"> • RS-FEC IEEE 802.3 Clause 91 (100GbE) • RS-FEC IEEE 802.3 Clause 108 (25GbE)
Internal Reference Clock	Frequency Stability over Temp: $\pm 1.5 \times 10^{-7}$
Tx Line Rate Adjust	Supported via external reference clock inputs
External Ref. Clock Inputs	2.048 MHz, 5 MHz, 6.312 MHz, 10 MHz, 15 MHz, E1 and also SyncE-Pass Thru Mode
SyncE Pass Thru	All ports can sync to recovered clock and from external clock (via GUI and RESTful API)
Flows	
Impairment Profiles	Standard product includes 2 profiles allowing 1 flow of impaired packets in each direction. Choice of 2, 4, 8 or 16 profiles. Each profile can be configured individually: <ul style="list-style-type: none"> • 4 profiles allows 2 flows of impaired packets in each direction • 8 profiles allows 4 flows of impaired packets in each direction • 16 profiles allows 8 flows of impaired packets in each direction
Selection of flow from multi-flow environment	Powerful user-configurable filters including ranges and wildcards: <ul style="list-style-type: none"> • MAC Source and Destination Address, Length/Type • VLAN (Priority, VLAN ID & Type), CustomVLAN • CustomVLAN Length, Offset, Mask, Value • MPLS Label, CustomMPLS • CustomMPLS Length, Offset, Mask, Value • IPv4 Source and Destination Address • IPv4 Version No, DiffServ/ToS, Protocol • IPv6 Source and Destination Address • CustomL3 Length, Offset, Mask, Value • UDP/TCP Source port, Destination port • CustomL4 Length, Offset, Mask, Value
GTPv2	Targeted GTPv2 control message impairments (e.g. create session request, modify bearer request, etc.) <ul style="list-style-type: none"> • GTPv2 Version, Type, Tunnel EndPoint ID
eCPRI	Targeted eCPRI impairments <ul style="list-style-type: none"> • eCPRI Revision, Concatenation Indicator, Message Type
RoE	Targeted RoE (Radio over Ethernet) impairments <ul style="list-style-type: none"> • RoE Subtype
CustomL5	<ul style="list-style-type: none"> • Length, Offset, Mask, Value
TShark	Integrated TShark decode
Impairments	
Packet Corruption	<ul style="list-style-type: none"> • Errorred packets: Corruption modes: burst (1-10,000), rate (0.00001 to 100%) Continuous or On/Off/Repeat based on time or number of packets • Lost packets: Corruption modes: burst (1-10,000), rate (0.00001 to 100%) Continuous or On/Off/Repeat based on time or number of packets • Repeated packets: Corruption modes: burst (1-10,000), rate (0.00001 to 100%) Continuous or On/Off/Repeat based on time or number of packets • Mis-ordered packets: Corruption modes: burst (1-10,000), rate (0.00001 to 100%) Continuous or On/Off/Repeat based on time or number of packets

Technical Specifications

Impairments (continued)

Latency/Delay & PDV/Jitter	<ul style="list-style-type: none"> • Gaussian distribution of delay • Gamma (internet) distribution of delay • Uniform distribution of delay • Step distribution of delay • Import from an external file • Jitter range from 100 ms to 400 ms • Add independent delay/jitter distribution to each profile simultaneously • Readout of Max, Min Jitter and Max Delay for the applied distribution
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Maximum Delay	Line rate delay: Full line-rate delay of <ul style="list-style-type: none"> • 80 ms at 100GbE • 200 ms at 40GbE • 320 ms at 25GbE • 800 ms at 10GbE
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Maximum Delay Boost	Delay Boost extends full line-rate delay to <ul style="list-style-type: none"> • 256 ms at 100GbE • 640 ms at 40GbE • 1024 ms at 25GbE • 2560 ms at 10GbE
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Extended Delay	Extended delay up to 20 s (at reduced bandwidth)
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Timing Accuracy	5 ns
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General

Web Browser UI	Integrated web-based user interface (supports Chrome, IE, Edge and Firefox)
Management Port	RJ45 LAN with Static or DHCP settable IP address with optional password authentication
Remote Control	<ul style="list-style-type: none"> • RESTful API • Scripting via TCL and Python; automatic Script Recorder for TCL and Python
Rackmount	Rackmount kit included
Power Input	100 - 240 Vac
Maintenance	First year software and hardware maintenance included (extensions available)

Related Products

Spirent Network Emulator is a highly flexible multi-port and multi-user solution for both network emulation and network simulation. Supports up to 16 ports at 1GbE, or 12 ports at 10GbE and 4 ports at 25GbE.

The **Attero-X, Attero-Lite and Attero-Virtual** family of Ethernet Network Emulators use dedicated impairment engines to provide nanosecond accuracy and full line rate traffic throughput from 100 Mb/s to 10 Gb/s. Apply delay, jitter and packet corruptions to selected traffic or capture 'real network' jitter profiles and replay these in the test lab.

Spirent TestCenter™ is an end-to-end testing solution for next-generation networks—providing traditional performance testing to the rigorous analysis of Virtualization, Cloud Computing, Mobile Backhaul, and High Speed Ethernet.

Contact Us

For more information, call your Spirent sales representative or visit us on the web at www.spirent.com/ContactSpirent.

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