

Spirent Attero-100G

100/40/25GbE Impairment Testing

Key Highlights

- Prove 100GbE, 40GbE and 25GbE device performance with full line-rate network emulation
- Full line-rate delay of up to 80 ms at 100GbE, 200 ms at 40GbE, and 320 ms at 25GbE
- Boost full line-rate delay (optional) to 256 ms at 100GbE, 640 ms at 40GbE, and 1024 ms at 25GbE
- 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

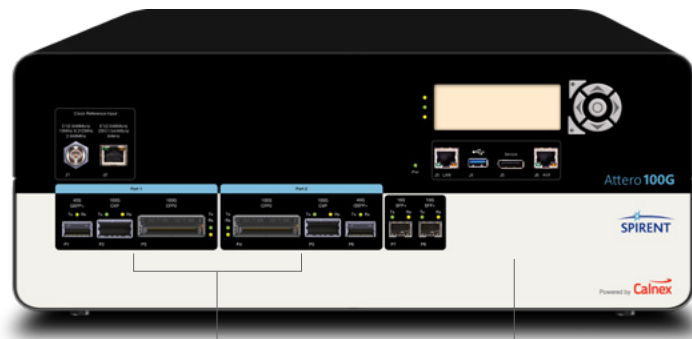
Test with Real-World Network Conditions in Your Lab

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.

It is impractical and almost impossible to use large, unwieldy and expensive drums of fiber to test your design margins and tolerance to the effects of latency—a 200 km drum of fiber only provides 1 ms of delay, is not controllable and needs amplification due to signal loss. Not much help when you need to emulate a long-haul network. Alternatively, you could use the Spirent Attero-100G. 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, and 1024 ms at 25GbE. 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.



High speed interface ports for both 100GbE, 40GbE and 25GbE are supported:

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

* SR4 is a future release

** Using CFP2 to SFP28 adapters (supplied)

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.

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100/40/25GbE Impairment Testing

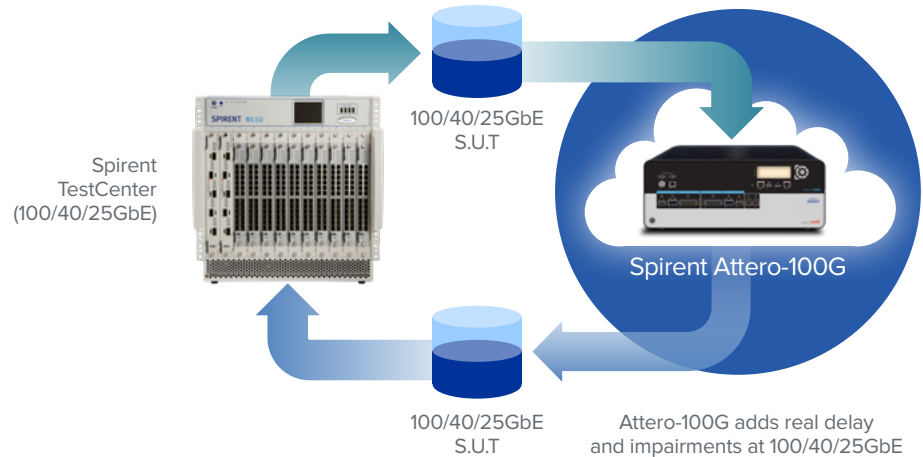
Use the Spirent Attero-100G for testing:

- 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 Fronthaul

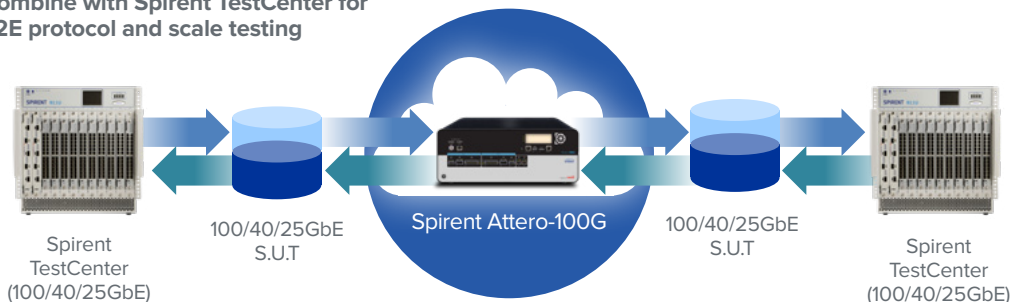
Applications

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



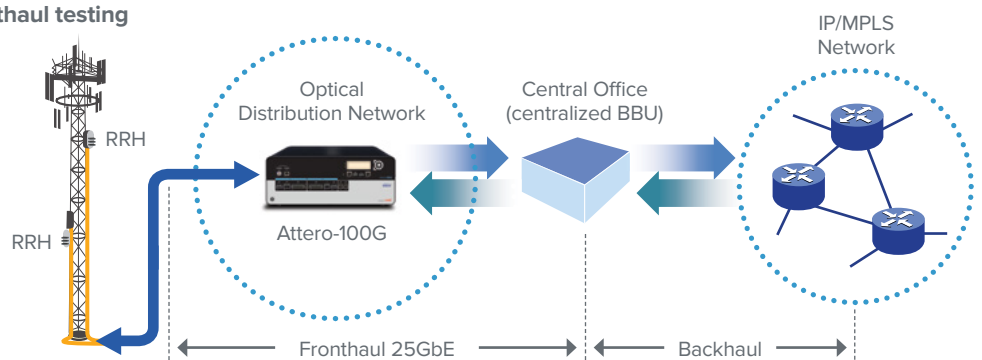
Combine with Spirent TestCenter for E2E protocol and scale testing



Use stand-alone for inline 100/40/25GbE emulation



Use stand-alone for 25GbE Fronthaul testing



Web-Based User Interface

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



Avoid the 'Wait-and-See' Approach

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.

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, and 25GbE 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.



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Spirent Services

Spirent Global Services provides a variety of professional services, support services and education services—all focused on helping customers meet their complex testing and service assurance requirements. For more information, visit the Global Services website at www.spirent.com or contact your Spirent sales representative.

Technical Specifications

Optical Interfaces	Ethernet (optical CXP, CFP2 and QSFP+ modules not supplied). <ul style="list-style-type: none">100GbE: CXP (SR10) – 2 slots (optional)100GbE: CFP2 (LR4/SR4) – 2 slots (optional); Note: 100GbE SR4 is a future release40GbE: QSFP+ (LR4/SR4) – 2 slots (optional)25GbE: SFP28 (LR/SR with FEC enabled) – 2 ports (optional) using CFP2 to SFP28 adapters (supplied) Order the 100GbE, 40GbE and/or the 25GbE option. At least one must be ordered.
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Internal reference clock	Frequency Stability over Temp: $\pm 1.5 \times 10^{-7}$
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Network Emulation

Line rate delay	Full line-rate delay of 80 ms at 100GbE, 200 ms at 40GbE, and 320 ms at 25GbE
Delay boost	Full line-rate delay of 256 ms at 100GbE, 640 ms at 40GbE, and 1024 ms at 25GbE

Selection of flow from multi-flow environment (Free update*/future release)	<ul style="list-style-type: none">Powerful user-configurable filters including ranges and wildcards (e.g. VLAN ID, IP/MAC addresses, MPLS labels, TCP/UDP port, etc.)Targeted GTPv2 control message impairments (e.g. create session request, modify bearer request etc.)
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Impairment Profiles	Standard product includes 2 profiles allowing 1 flow of impaired packets in each direction. Future release provides 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 direction8 profiles allows 4 flows of impaired packets in each direction16 profiles allows 8 flows of impaired packets in each direction
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Packet Corruption (Free update*/future release)	<ul style="list-style-type: none">Errored packets, lost packets, repeated packets, mis-ordered packetsCorruption modes: burst (1-10,000), rate (0.00001 to 100%)Continuous or On/Off/Repeat based on time or number of packets
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Jitter	Add independent delay/jitter distribution to each profile simultaneously <ul style="list-style-type: none">Jitter range from 100 ms to 400 msGaussian, Gamma (Internet), Step or Uniform distribution of delayReadout of Max, Min Jitter and Max Delay for the applied distribution
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Timing accuracy	5 ns
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General

Web browser UI	Integrated Web-based user interface (supports Chrome, IE and Firefox)
Management port	RJ45 LAN with Static or DHCP settable IP address
Remote control	<ul style="list-style-type: none">Scripting via TCL, Perl and PythonAutomatic Script Recorder for TCL, Perl and Python
Rackmount	Rackmount kit included
Power Input	100 -240 Vac
Maintenance	First Year SW and HW 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 24 ports at 1GbE, or 12 ports at 10GbE and 40GbE.

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.

Spirent TestCenter™ Virtual is the industry-leading solution that optimizes the performance of new cloud-enabled network services and innovations like SDN and NFV. TestCenter Virtual creates testing topologies to run on both control plane and data plane to stress simulated, virtualized network functions.

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