

Spirent TestCenter™

C50 WLAN 802.11ac Wave-2 Appliance

Applications

- Multi-client WLAN network testing scenarios
- AP Personal and Enterprise security type testing
- AP interwork testing with various mixes of different IEEE 802.11 mode clients
- Association processing and timing testing under various authentication selections
- Benchmark or baseline testing for traffic throughput, TCP goodput, and forwarding rate
- RFC-style testing originating from a large number of clients across APs through the WLAN RF interface
- Maximum client support, medium capacity testing, throughput vs packet size, throughput vs associated client numbers, etc.
- Roaming, drop and re-association process, admission control and load balancing
- Rate vs range testing

Spirent TestCenter supports the highest performing and most realistic wireless local area network (WLAN) multi-client emulation for direct functionality and performance testing of Access Points (APs) and end-to-end testing of WLAN ecosystems that include WLAN access controllers, and gateways.

Spirent TestCenter C50 WLAN Appliance combines Spirent's industry-leading IEEE 802.11 WLAN interface cards with Spirent's BASE-T 2.5G/5G Ethernet card in a compact 3U appliance form factor. Users can emulate a large number of realistic 802.11 a/b/g/n/ac WLAN clients to connect with an access point via a cabled conductive or over-the-air (OTA) link. Basic WLAN control plane and data plane features along with the advanced RFC style network traffic and throughput performance test cases are supported over the WLAN network involving the emulated clients and the APs under test.

The WLAN interfaces installed in the C50 Appliance consist of multiple IEEE 802.11 radios and provide the maximum user configurability and flexibility to emulate various IEEE 802.11ac SU-MIMO or MU-MIMO clients on 5GHz band and other legacy 802.11 a/b/g/n clients on either 2.4GHz or 5GHz band. A single Wave-2 WLAN radio supports 802.11ac Wave-2 clients with different spatial stream configurations up to 4x4 for the best realistic client emulation scenarios in either SU-MIMO or MU-MIMO mode. Designed for testing WLAN network infrastructure devices, including the latest 802.11ac Wave-2 carrier or enterprise thin APs with controllers, consumer APs, and integrated broadband WLAN gateway, Spirent TestCenter WLAN solutions offer the best-in-class traffic generation and analysis for testing functionality, performance, and scalability.



Spirent TestCenter C50 WLAN Wave-2 Appliance

Platform Configurations

- Spirent TestCenter C50 Appliance-based WLAN testing solutions
- Unique hardware configurations with one Spirent 802.11ac Wave-1 WLAN card and two Spirent 802.11ac Wave-2 WLAN cards
- Spirent BASE-T 4-Port Quint-Speed (100M/1G/2.5G/5G/10G) or Quad-Speed (100M/1G/2.5G/5G) Ethernet card with copper RJ45 interface
- Hardware timing card for precise timing synchronization between different ports and between different appliances

Features & Benefits

- Utilize both the Ethernet and multiple WLAN cards installed in the appliance for emulating a very large number of realistic 802.11 WLAN clients with traffic generation and analysis
- Support 802.11 b/g/n on 2.4GHz and 802.11 a/n/ac on 5GHz frequency bands
- Support 802.11ac Wave-2 with 80 MHz channel bandwidth for MIMO up to 4x4
- Support 802.11ac Wave-2 with 80+80 MHz and 160MHz channel bandwidth for MIMO up to 2x2
- 802.11ac explicit transmit beamforming (TxBF) and legacy implicit TxBF for beamformee
- Internal channel attenuation up to 31dB for both TX and RX with 0.25dB resolution for the Wave-2 WLAN cards
- Switchable between SU-MIMO and MU-MIMO configurations for the Wave-2 WLAN cards
- Support various 802.11ac Wave-2 client configurations for MU-MIMO grouping testing
- Support various channel selection plan for different geographic regions globally
- Maximally interoperable with various different chipset vendors based WLAN AP products
- Best -in-class realistic traffic generation and analysis between WLAN and Ethernet interfaces or amongst multiple WLAN interfaces with an AP involved
- Capable of providing multiple traffic flows per client with each flow offering stateful traffic at layers 2 through 7
- Capable of generating realistic and stateful WLAN client traffic individually on per client basis
- Support individually controlled client behavior providing accurate control of 802.11, 802.3, and IP characteristics, including medium access control, authentication and encryption, frame size, and rate
- Emulate client association mode in either a designated sequential or more realistic random fashion
- Support various RFC style test cases (RFC2544 and RFC2889) for throughput, routing, forwarding performance testing
- Each emulated client supports the full MAC per 802.11 standard independently
- 802.1x supplicant supports full EAP stack per client
- Upper layer protocols (e.g., DHCP and TCP) are fully supported using independent protocol tasks
- Test AP's data plane performance using flow packets of different sizes, protocol types, encryptions, and rates
- 802.3 Ethernet transmit capability - Wire-speed hardware packet generation with timestamps, sequence numbers, data integrity signature, and flow group Identifiers
- 802.3 Ethernet receive capability - Wire-speed packet filtering, data integrity, and sequence checking, capture, real-time latency measurement on each flow
- Support different 802.3 Ethernet packet length control functionalities including fixed, increment, decrement by user-defined step or automatic, list, random and shuffle.
- Per port statistics and rate counters - Link State, User programmable Line Speed, Packets Sent, Signature Valid Packets Received, Bytes Sent/Received, Fragments Received, Undersize, Oversize, VLAN Tagged Frames, FCS errors, Bad Sequence Errors, Bad Payload Checksum, ARP, DHCP and Ping requests and replies, IP/ICMP/UDP/TCP checksum errors, IP Multicast packets, Sent/Received IP Packets
- Support a sniffer type IEEE 802.11 packet over-the-medium capture for a real-time Wireshark display or other precise post processing
- Simultaneously 802.3 packet capture and 802.11 packet capture up to 256mb per port, respectively
- Filter options with specific types of packets, SSIDs, BSSIDs, etc. for reducing the capture file size or for a longer capture
- Extensive 802.11 stats, counters, and statistics report in either real-time or periodically on per client or per port basis
- Support 802.3 and 802.11 real-time port statistics, per flow statistics, and port-level histogram
- Support per card reservation for WLAN cards and per port reservation for the 2.5G/5G Ethernet ports

Technical Specifications

WLAN NIC Technical Specifications

802.11 Protocols	IEEE 802.11 a/b/g/n/ac capable on 2.4GHz and 5GHz frequency band
Maximum Number of Emulated Clients	64 per radio and total 512 per appliance <ul style="list-style-type: none"> ■ 256 per one Wave-1 WLAN NIC ■ 256 per two Wave-2 WLAN NICs
MIMO Supported	Support various MIMO configurations 1x1, 2x2, 3x3, and 4x4
MU-MIMO Supported	Support MU-MIMO clients with 1x1, 2x2, 3x3, and 4x4 MIMO configurations
Beamforming Support	802.11ac explicit transmit beamforming (TxBF) and legacy implicit TxBF for beamformee
Coding Supported	Supports Spatial Multiplexing, Cyclic-Delay Diversity (CDD), Low-Density Parity Check (LDPC), Maximum Ratio combining (MRC), Space Time Block Code (STBC)
Frequency Band	2.4GHz (802.11 b/g/n) and 5 GHz (802.11 a/n/ac)
Guard Interval	Guard interval selection - 800/400 ns for 802.11 n/ac
PHY Rates	PHY rates - 6.5 Mbps (802.11b) to 600 Mbps (802.11n, 40MHz, 4x4, MCS31) and 1734.2 Mbps (802.11ac, 80MHz, 4x4, MCS9, or 80MHz+80MHz/160MHz, 2x2, MCS9)
MCS Type	Full MCS index support in 802.11 n/ac: <ul style="list-style-type: none"> ■ all 0-31 MCS index for 802.11n ■ all 0-9 MCS index for 802.11ac
Rate Adaptation	Support full rate adaptation by default
Coding Rates	FEC coding rates - 1/1, 2/3, 3/4, 5/6
Channel Bandwidth	20 MHz, 40 MHz, 80 MHz, 80 MHz+80 MHz, 160 MHz
Frame Aggregation	802.11 n/ac Aggregation types: Both Tx and Rx A-MPDU, A-MSDU, and Block ACK
DFS Support	Supports Dynamic Frequency Selection (DFS)
Maximum TX Power (5GHz)	Maximum default TX power per chain: 5dBm (+-2dB tolerance) on 5GHz band
Transmit Power Control	Transmit power control: 16dB range in 1 dB step
Channel Attenuation	Programmable RX/TX attenuation up to 31dB with 0.25dB resolution (Wave 2 only)
RX Sensitivity (5GHz)	Minimum receiver sensitivity level: -75 dBm (+-2dB tolerance) on 5GHz band
Channel and Frequency	Operation Channels: <ul style="list-style-type: none"> ■ 2.412 to 2.484 GHz: 1 to 14 ■ 5.180 to 5.320 GHz: 36, 40, 44, 48, 52, 56, 60, 64 ■ 5.500 to 5.720 GHz: 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140, 144 ■ 5.740 to 5.825 GHz: 149, 153, 157, 161, 165
Interface Connector	Antenna interface connectors: <ul style="list-style-type: none"> ■ SMA female connector, standard thread, AC coupled, 50 Ohms
Authentication Support	802.1x - PEAP/MSCHAPv2, TLS, LEAP/EAP-FAST, TTLS
Encryption Support	WEP-40 and WEP-104, TKIP (WPA), AES-CCMP (WPA2)

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.

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Product Information

Description	Part Number
C50 WLAN Appliance W/ 4-PORT 10G/5G/2.5G/1G/100M Copper 3 WiFi NICs, 2.4GHZ/5GHZ, 802.11ac Wave-2 Support	C50-KIT-16-START
C50 WLAN Appliance W/ 4-PORT 5G/2.5G/1G/100M Copper 3 WiFi NICs, 2.4GHZ/5GHZ, 802.11ac Wave-2 Support	C50-KIT-17-START

A full suite of Spirent protocol and test packages are available with perpetual and subscription licensing options. Please contact your Spirent sales representative to select the right option for your test needs.