DATASHEET

Octobox Pal-7

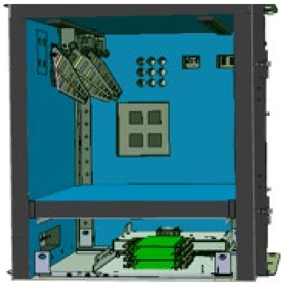
Spirent's Wi-Fi 7 testbeds incorporate RF chambers and instruments controlled by an integrated server with a browser-based UI and a complete API for test automation. The Octobox Pals function as Wi-Fi 7 traffic endpoints or Octobox Synchrosniffer probes probes for performance testing and expert analysis of Wi-Fi devices and systems. This document describes the Octobox Pal-7 subsystems shown below and the Octobox personal testbeds that incorporate them.

Octobox Pal-7

Wi-Fi 7 and legacy Wi-Fi
Qualcomm Waikiki chipset QCN9274

Octobox Smartbox-7

Octobox chamber with
built-in instruments add, built-in Pal-7 4 sniffer probe with virtual stations (vSTAs) supported



Octobox Mini Server

The Octobox Mini Server is a useful add-on device for Wi-Fi 7 testbeds. The Mini Server is a high performance industrial form factor computer pre-integrated with Octobox.

Suggested Usage

- As a traffic generator end point (WAN or LAN) to enable high throughput measurement scenarios (3 Gbps+)
- With a bridged device to improve Pal performance

Performance

- Built-in Multiperf tested up to 9.5 Gbps throughput
- Separated traffic and management ports to enable simultaneous measurement and data visualization

Features

- 802.11be up to 4x4 MIMO OTA transmission
- 2.4, 5, and 6 GHz 802.11a/b/g/n/ac/ax/be radios
- Pal-7 supports 6 GHz Wi-Fi 7
- Octobox Wireshark Synchrosniffer with sniffer probes on Pal-7
- Complete isolation from outside interference
- REST API for test automation
- Quickly and easily verify new and legacy Wi-Fi devices in the ideal MIMO-OTA environment that supports MU-MIMO
- Use multipoint-to-multipoint traffic while automatically recovering from dropped links during long test sequences
- Use a Smartbox to combine off-the-shelf devices with the built-in Pals
- Perform root cause analysis of issues using built-in multi-probe Synchrosniffing

Benefits

- Verify 6 GHz using the Pal-7
- Quickly and easily verify new and legacy Wi-Fi devices in the ideal MIMO-OTA environment that supports MU-MIMO
- Use multipoint-to-multipoint traffic while automatically recovering from dropped links during long test sequences
- Test OFDMA and MU-MIMO simultaneously using a compact Octobox personal testbed
- Use a Smartbox to combine off-the-shelf devices with the built-in Pals
- Perform root cause analysis of issues using built-in multi-probe Octobox Synchrosniffing
- Pal-7 can function as traffic endpoints or Synchrosniffer probes. Pal-7 also implements 80 vSTAs, Pal-7 as a stand-alone or built into an Octobox chamber, making that chamber a Smartbox. The Pal-7 open form factors can be used with an antenna system for testing in open air or in a walk-in test chamber
- Pal-7 supports all the Wi-Fi protocols: IEEE 802.11a/b/g/n/ac/ax/be. Pal-7 also supports the new Wi-Fi 7 6 GHz frequency band and AP (access point) modes

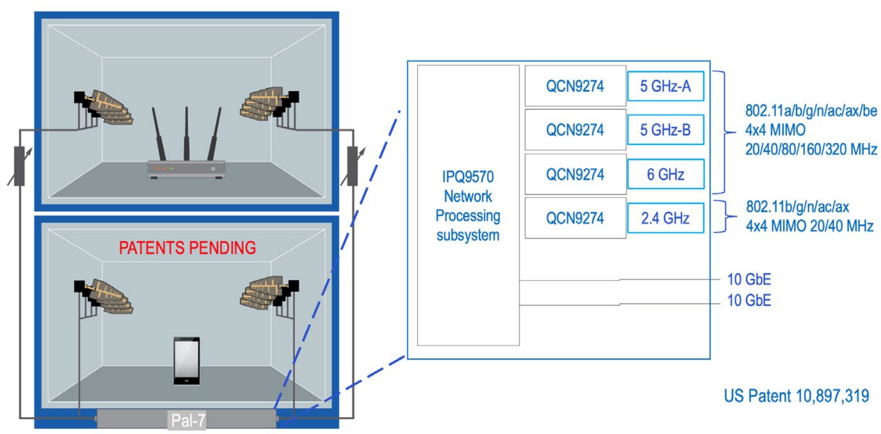
Parallel Throughput and Synchrosniffing

Based on the latest 6 GHz capable 802.11be chipset and with fine controls at the firmware and driver level, Pal-7 can function as an station or as an AP. For example a set data rate, bandwidth and number of spatial streams (Nss). To test receiver sensitivity, Pal-7 can operate at a fixed modulation coding scheme (MCS).

Pal-7 features four 802.11be radios. The 6 GHz radios support up to 4x4 MIMO in channels of up to 320 MHz. The 5 GHz radio supports 4x4 up to 160 MHz and the 2.4 GHz radio 4x4 up to 40MHz.

Pal-7 features three 10GbE ports, two for traffic and one other for streaming plot statistics and PCAP captures.

Pal-7 open module



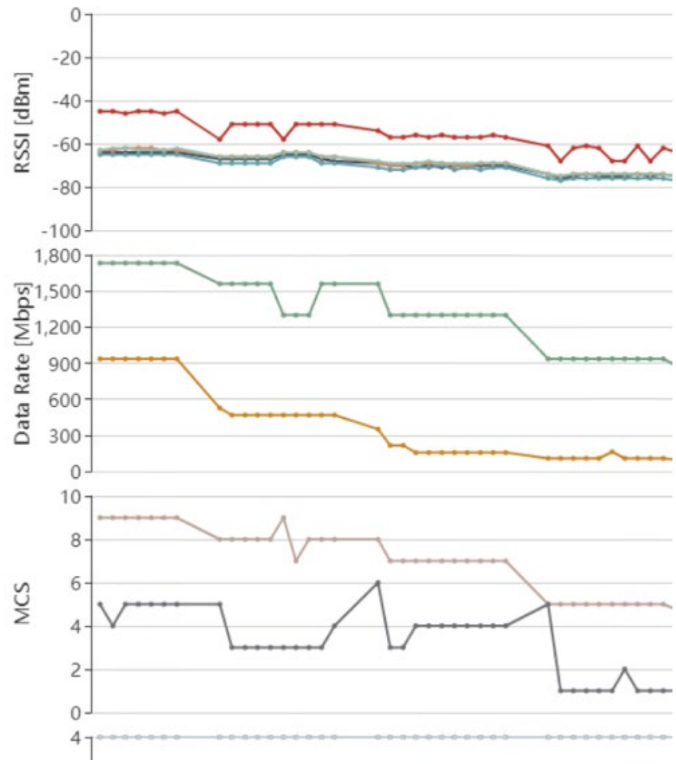
Pal-7 built into the Smartbox; block diagram

Pal-7 open with the antenna subsystem

Pal-7 can function as a real-time analyzer to show adaptation behavior of modern Wi-Fi systems. It can monitor and plot RSSI, data rate, number of spatial streams, channel width and other physical layer information.

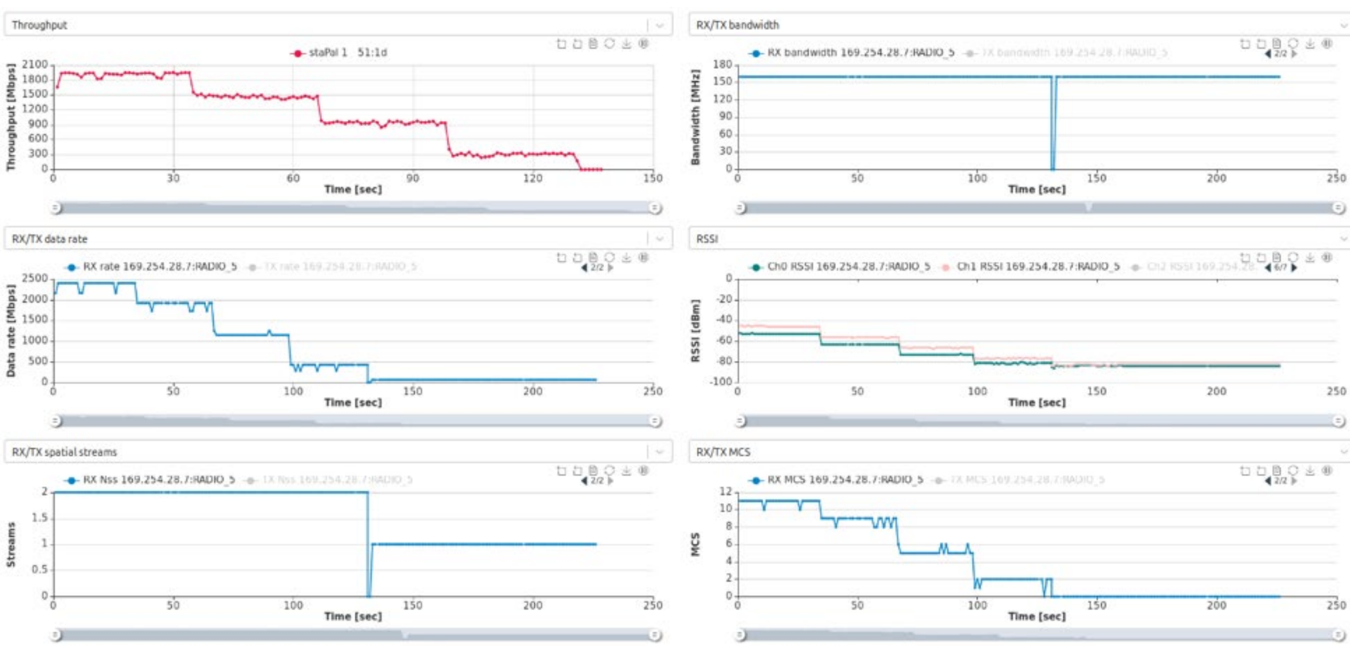
Access Point Testing

To test access point (AP) performance or to emulate a realistic network with multi-station traffic, Pal-7 can emulate up to 80 vSTAs.



Station Testing

The Pal-7 radios can be configured as APs so they can be traffic partners to the station under test. The radios can also be used as sniffers. Station tests include throughput vs. range vs. orientation, RX sensitivity, data rate adaptation performance, roaming, and more.



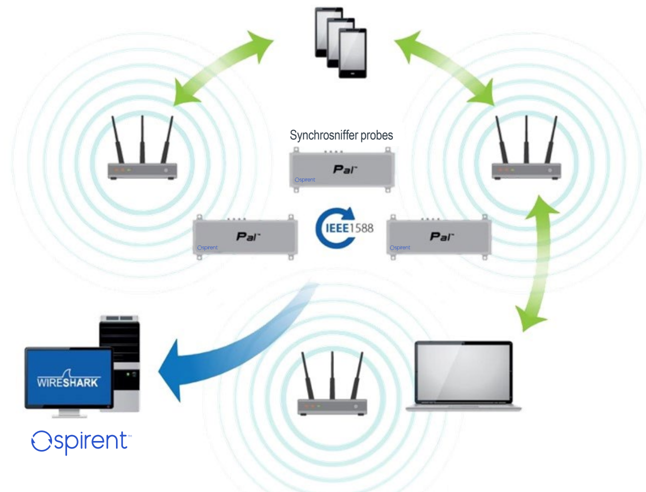
Octobox Software shows throughput, statistics and performance analysis plots

Octobox Synchrosniffer

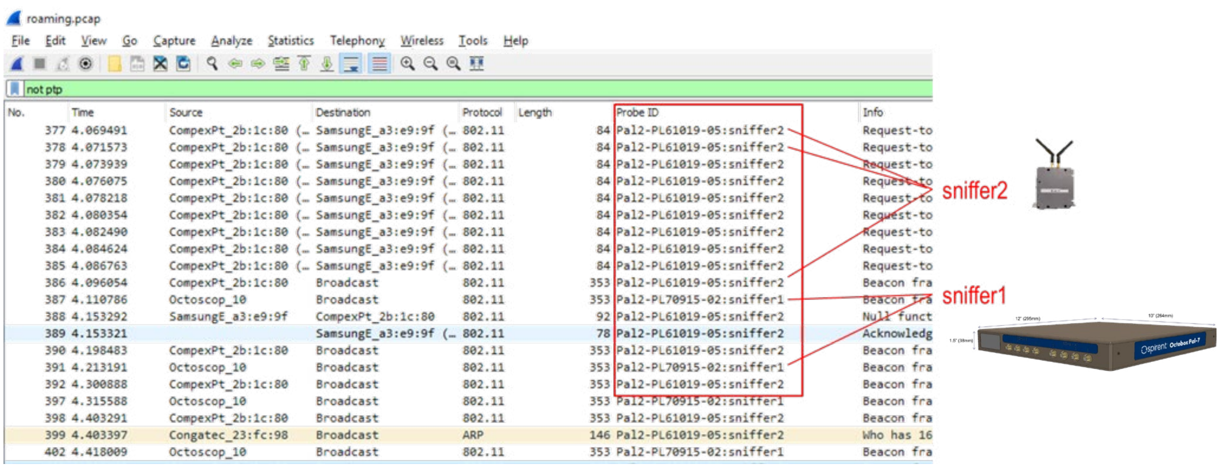
Pal-7 can capture and stream packets in PCAP format to Wireshark in real-time. All the Pal radios are synchronized via the Precision Time Protocol (PTP).

The captures from each radio in the Octobox testbed are combined by the Synchrosniffer engine running on the server into a common PCAP stream viewable in the Octobox-customized Wireshark for easy analysis. In this custom Wireshark application, you can identify captures by probe (i.e. Pal radio).

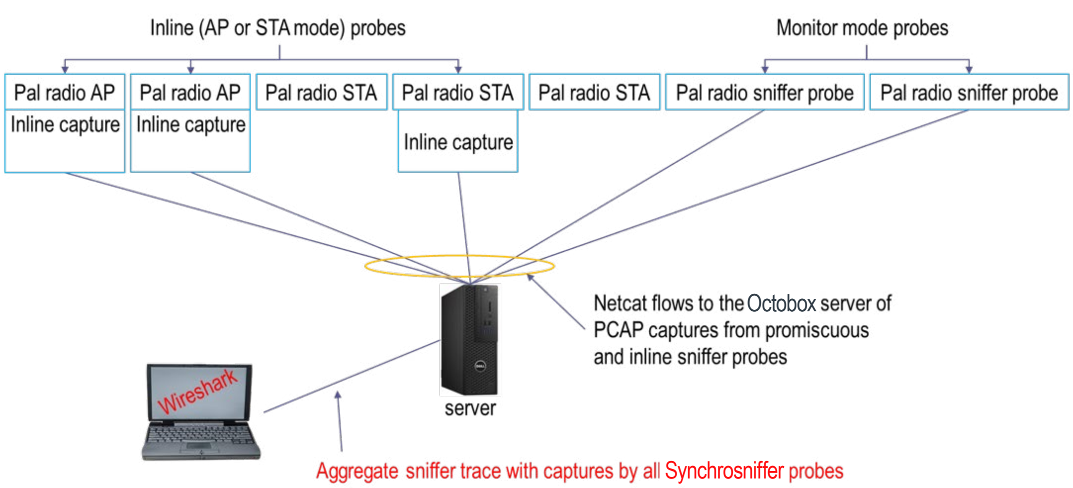
This aggregate multiprobe view helps analyze complex band steering, roaming and mesh behavior in the presence of motion, interference, path loss, multipath and device under test (DUT) orientation. Synchrosniffer is required for OFDMA to simultaneously capture traffic on multiple AIDs (association IDs) that are assigned to different RUs (resource units).



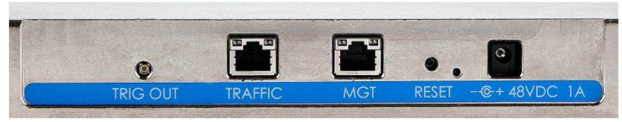
In addition to conventional monitor mode sniffing, Pal-7 radios can also work as in-line sniffer probes when configured as an AP or a STA. These Pal-7 radios can be Synchrosniffer probes in two modes: monitor (capturing all packets) or inline AP/STA (capturing packets addressed to the AP/STA).



No.	Time	Source	Destination	Protocol	Length	Probe ID	Info
377	4.069491	CompexPt_2b:1c:80 (…	SamsungE_a3:e9:9f (…	802.11	84	Pal2-PL61019-05:sniffer2	Request-to
378	4.071573	CompexPt_2b:1c:80 (…	SamsungE_a3:e9:9f (…	802.11	84	Pal2-PL61019-05:sniffer2	Request-to
379	4.073939	CompexPt_2b:1c:80 (…	SamsungE_a3:e9:9f (…	802.11	84	Pal2-PL61019-05:sniffer2	Request-to
380	4.076075	CompexPt_2b:1c:80 (…	SamsungE_a3:e9:9f (…	802.11	84	Pal2-PL61019-05:sniffer2	Request-to
381	4.078218	CompexPt_2b:1c:80 (…	SamsungE_a3:e9:9f (…	802.11	84	Pal2-PL61019-05:sniffer2	Request-to
382	4.080354	CompexPt_2b:1c:80 (…	SamsungE_a3:e9:9f (…	802.11	84	Pal2-PL61019-05:sniffer2	Request-to
383	4.082490	CompexPt_2b:1c:80 (…	SamsungE_a3:e9:9f (…	802.11	84	Pal2-PL61019-05:sniffer2	Request-to
384	4.084624	CompexPt_2b:1c:80 (…	SamsungE_a3:e9:9f (…	802.11	84	Pal2-PL61019-05:sniffer2	Request-to
385	4.086763	CompexPt_2b:1c:80 (…	SamsungE_a3:e9:9f (…	802.11	84	Pal2-PL61019-05:sniffer2	Request-to
386	4.096054	CompexPt_2b:1c:80	Broadcast	802.11	353	Pal2-PL61019-05:sniffer2	Beacon fra
387	4.110786	Octoscop_10	Broadcast	802.11	353	Pal2-PL70915-02:sniffer1	Beacon fra
388	4.153292	SamsungE_a3:e9:9f	CompexPt_2b:1c:80	802.11	92	Pal2-PL61019-05:sniffer2	Null funct
389	4.153321		SamsungE_a3:e9:9f (…	802.11	78	Pal2-PL61019-05:sniffer2	Acknowledg
390	4.198483	CompexPt_2b:1c:80	Broadcast	802.11	353	Pal2-PL61019-05:sniffer2	Beacon fra
391	4.213191	Octoscop_10	Broadcast	802.11	353	Pal2-PL70915-02:sniffer1	Beacon fra
392	4.300888	CompexPt_2b:1c:80	Broadcast	802.11	353	Pal2-PL61019-05:sniffer2	Beacon fra
397	4.315588	Octoscop_10	Broadcast	802.11	353	Pal2-PL70915-02:sniffer1	Beacon fra
398	4.403291	CompexPt_2b:1c:80	Broadcast	802.11	353	Pal2-PL61019-05:sniffer2	Beacon fra
399	4.403397	Congatec_23:fc:98	Broadcast	ARP	146	Pal2-PL61019-05:sniffer2	Who has 16
402	4.418009	Octoscop_10	Broadcast	802.11	353	Pal2-PL70915-02:sniffer1	Beacon fra



Octobox Multiperf Managed Traffic Endpoints



Spirent's Multiperf traffic tool:

- Supports multipoint-to-multipoint traffic
- Automatically recovers from disconnections that are common when testing the dynamic range to a point of disassociation due to low signal level; restarts traffic after reconnection
- Supports iperf2, iperf3, and ping
- Synchronized endpoints for one-way delay measurements and for correlating sniffer captures to the performance metrics plots
- Supports bridging traffic for video, audio and other application-layer metrics

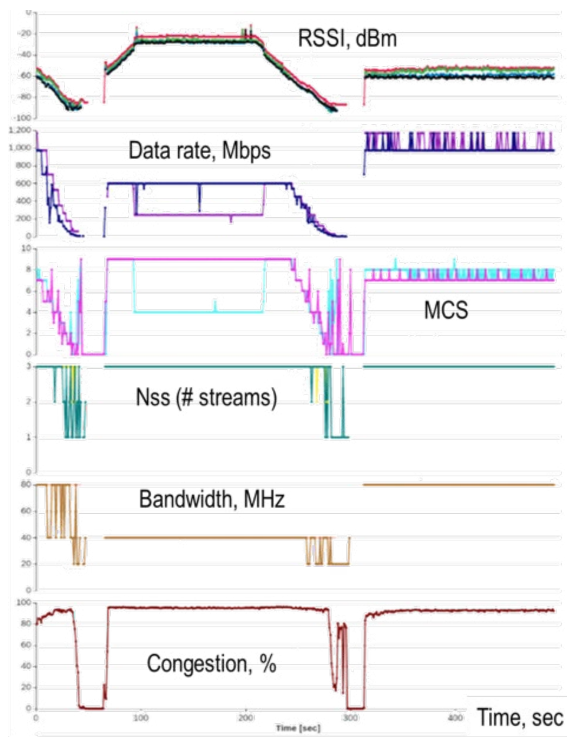
Each Multiperf traffic endpoint is controlled and monitored via an out-of-band management link. Both traffic and management Ethernet networks in the Octobox testbeds are 10 Gbps and have enough capacity to support multipoint traffic, sniffer captures and status reporting.

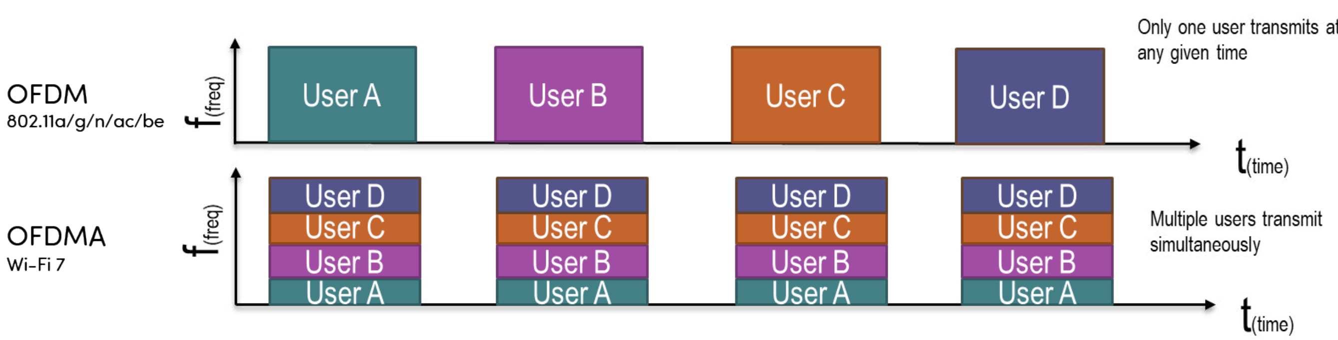
Multiperf is compatible with Windows, Linux, Android, iOS, and macOS devices, and all Pal test instruments can be configured as Multiperf endpoints.

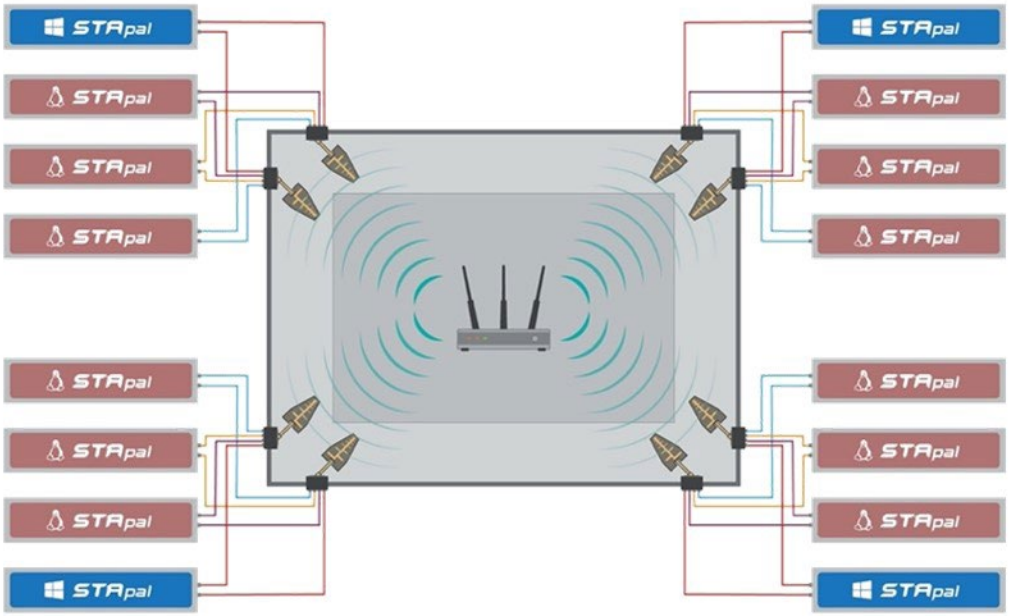
Octobox KPIs and Deep Performance Metrics Plots

The Octobox system produces most of its Layer 1 and Layer 2 statistics from the underlying Wi-Fi chipset operating in the test instrument. There are up to 56 individual KPIs available for tracking and plotting. Examples are: RSSI, data rate, MCS, Nss (# of streams), and bandwidth. As long as a test scenario involves at least one test instrument, statistics for both directions of the RF link (uplink and downlink) can be obtained, even if the Spirent test instrument was only one endpoint in the link.

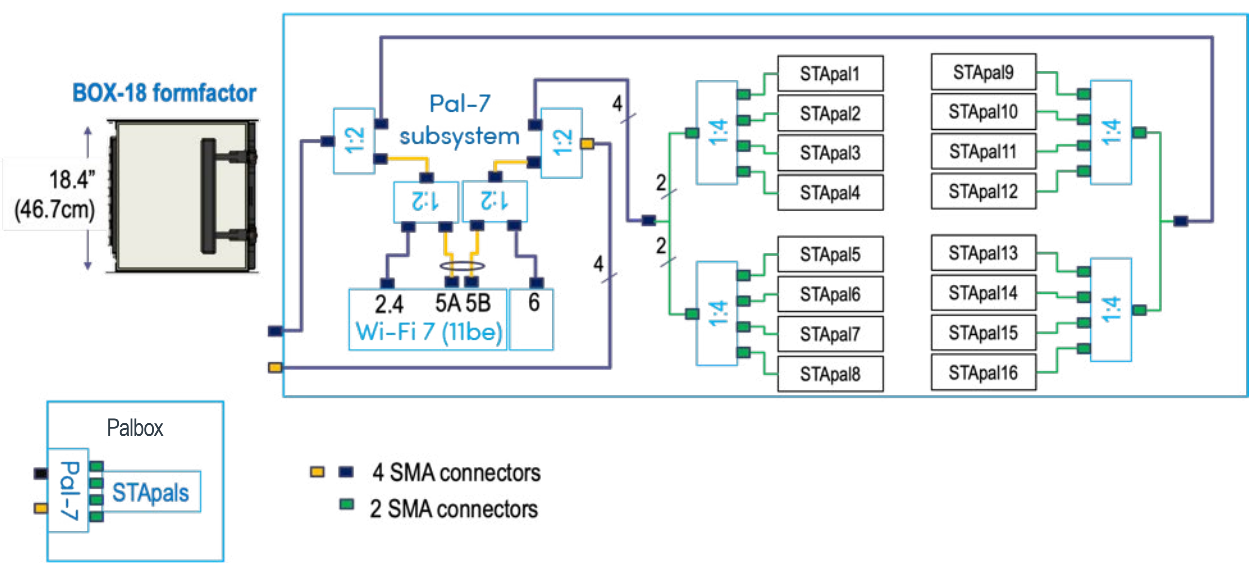
In scenarios where Spirent Octobox Wi-Fi test instruments aren't part of an RF link, such as a Wi-Fi capable cell phone connected to an off-the-shelf Access Point, OCTOBOX Software provides deep performance metrics for Layers 1 and 2. However, with the new Deep Performance Metrics feature, this changes. By configuring an Octobox as a sniffer to monitor the RF link's channel in the chamber where the RF link takes place, a subset of these KPIs can be generated.







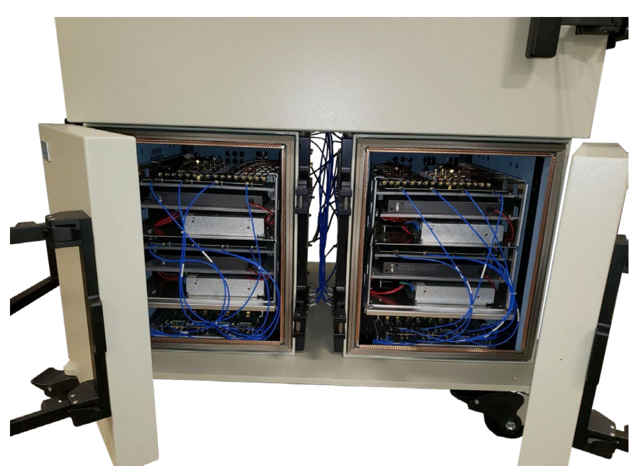
The Palbox also incorporates a Pal-7 subsystem that connects to the same 8 antennas as the STApal-6Es. The figure below shows a detailed block diagram of the Palbox and its symbol as used in the Octobox testbed diagrams.



If you are testing with a reasonable number of OFDMA STAs and need dedicated Synchrosniffer probes, you can use multiple Palboxes in a testbed. The photo to the right shows a testbed with 2 Palboxes with their doors open.

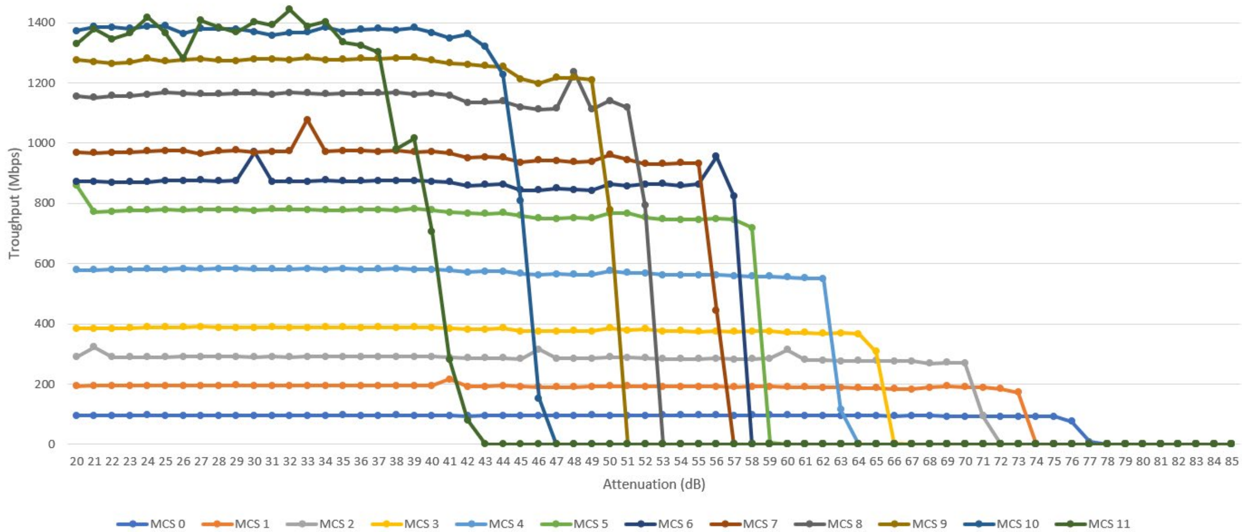
The Palbox incorporates a Pal-7 subsystem that can be used to emulate up to 80 vSTAs for testing an access point under a heavy load.

With a Palbox, you can generate OFDMA and MU-MIMO traffic simultaneously, plus traffic load from up to 80 virtual stations – a lot of parallel traffic and analysis power in a small space.



Using Pal-7 to Test Rate Adaptation

When debugging early stage devices with rate adaptation issues, it is necessary to force DUT operation at some fixed parameters including fixed MCS, fixed Nss, etc. Here's an example of a test with a Pal-7 using fixed MCS one by one and observing throughput operation for each MCS setting vs. attenuation. The ideal rate adaptation would result in a throughput plot at the top perimeter of this waterfall curve.



Octobox Pal-7 Open

Use the Octobox Pal-7 Open in a walk-in isolation chamber or in an open-air test environment, such as a test house. All the RF connectors for the Wi-Fi 7 radios and interference can be directly connected to the antennas. The open antenna subsystem supports all Spirent's antenna carriers, including high-gain antennas and dipole antennas for open air testing.

Open antenna system can be configured with any of the Octobox antennas

Pal-7 Open can also be placed inside an Octobox chamber as a portable Synchrosniffer or as traffic endpoints.

Pal-7 Open photo showing all the RF ports

Pal-7 Specifications

Wi-Fi	**Pal-7**
Channels	2.4 GHz, 5 GHz and 6 GHz
Bandwidth	20, 40, 80, 160, 320 MHz
Standards	801.11a, 802.11b, 802.11g, 802.11n, 802.11ac (wave 2), 802.11ax, 802.11be
Virtual stations	80 per-radio
Traffic replay	From PCAP file
Monitor	Detailed statistics from the Wi-Fi chipset
Sniffer	Synchrosniffer Wireshark captures
802.11ax PHY	DL/UP OFDMA in AP mode DL MU-MIMO in AP mode and beamforming
802.11ax MAC	• Trigger frame support • Non-trigger based and trigger-based sounding for beamforming • Multi-user RTS and CTS • Buffer status report • UL-OFDMA Random Access • Multiple BSSID • Bandwidth query report

General	**Pal-7**
Traffic endpoints	Multiperf, iperf3, iperf2, ping
	Trigger out connector for triggering external RF instruments
Traffic Management	Two 10 Gbps Ethernet
Power	Power adapter
Dimensions	23” x 10.4” x 1.4” (58 √ 26 √ 3.5cm)
TX power	MCS, # streams, frequency and channel width dependent (see below)
Processor subsystem	Quad-core ARM Cortex-A73 at 2.2 GHz

Pal-7 Real-Time Radio Status

STA	AP	MON	Pal-7
√	√	√	Offline
√	√	√	Monitor
√			Scanning <CH #>
√	√		PHY mode <HT20, OFDMA, HE40, etc.>
√	√	√	Channel primary and secondary
√			Bandwidth
	√		Associated STAs <#> hover over to show list of STAs
√			MAC address
√	√		BSSIDs <list>
	√		SSID

RF Performance Table at 2.4GHz

RF Performance for 2.4GHz

	Data Rate	Tx Power (Per Chain)	Tx Power (4 Chains)	Tolerance
2.4GHz 802.11be EHT20	MCS 0	22dBm	28dBm	±2dB
	MCS 1	22dBm	28dBm	±2dB
	MCS 2	22dBm	28dBm	±2dB
	MCS 3	22dBm	28dBm	±2dB
	MCS 4	22dBm	28dBm	±2dB
	MCS 5	22dBm	28dBm	±2dB
	MCS 6	22dBm	28dBm	±2dB
	MCS 7	22dBm	28dBm	±2dB
	MCS 8	22dBm	28dBm	±2dB
	MCS 9	22dBm	28dBm	±2dB
	MCS 10	21dBm	27dBm	±2dB
	MCS 11	21dBm	27dBm	±2dB
	MCS 12	21dBm	27dBm	±2dB
	MCS 13	21dBm	27dBm	±2dB
2.4GHz 802.11 be EHT40	MCS 0	22dBm	28dBm	±2dB
	MCS 1	22dBm	28dBm	±2dB
	MCS 2	22dBm	28dBm	±2dB
	MCS 3	22dBm	28dBm	±2dB
	MCS 4	22dBm	28dBm	±2dB
	MCS 5	22dBm	28dBm	±2dB
	MCS 6	22dBm	28dBm	±2dB
	MCS 7	22dBm	28dBm	±2dB
	MCS 8	22dBm	28dBm	±2dB
	MCS 9	22dBm	28dBm	±2dB
	MCS 10	21dBm	27dBm	±2dB
	MCS 11	21dBm	27dBm	±2dB
	MCS 12	21dBm	27dBm	±2dB
	MCS 13	21dBm	27dBm	±2dB

	Data Rate	Rx Specifications Sensitivity	Tolerance
2.4GHz 802.11be EHT20	MCS 0	-97dBm	±2dB
	MCS 1	-95dBm	±2dB
	MCS 2	-93dBm	±2dB
	MCS 3	-90dBm	±2dB
	MCS 4	-88dBm	±2dB
	MCS 5	-84dBm	±2dB
	MCS 6	-81dBm	±2dB
	MCS 7	-79dBm	±2dB
	MCS 8	-75dBm	±2dB
	MCS 9	-73dBm	±2dB
	MCS 10	-69dBm	±2dB
	MCS 11	-67dBm	±2dB
	MCS 12	-64dBm	±2dB
	MCS 13	-61dBm	±2dB
2.4GHz 802.11 be EHT40	MCS 0	-95dBm	±2dB
	MCS 1	-93dBm	±2dB
	MCS 2	-91dBm	±2dB
	MCS 3	-88dBm	±2dB
	MCS 4	-85dBm	±2dB
	MCS 5	-81dBm	±2dB
	MCS 6	-78dBm	±2dB
	MCS 7	-76dBm	±2dB
	MCS 8	-73dBm	±2dB
	MCS 9	-70dBm	±2dB
	MCS 10	-67dBm	±2dB
	MCS 11	-65dBm	±2dB
	MCS 12	-61dBm	±2dB
	MCS 13	-58dBm	±2dB

RF Performance Table at 5GHz

RF Performance for 5GHz

	Data Rate	Tx Power (Per Chain)	Tx Power (4 Chains)	Tolerance
5GHz 802.11be EHT20	MCS0	22dBm	28dBm	±2dB
	MCS1	22dBm	28dBm	±2dB
	MCS2	22dBm	28dBm	±2dB
	MCS3	22dBm	28dBm	±2dB
	MCS4	22dBm	28dBm	±2dB
	MCS5	22dBm	28dBm	±2dB
	MCS6	21dBm	27dBm	±2dB
	MCS7	21dBm	27dBm	±2dB
	MCS8	20dBm	26dBm	±2dB
	MCS9	20dBm	26dBm	±2dB
	MCS10	19dBm	25dBm	±2dB
	MCS11	19dBm	25dBm	±2dB
	MCS12	18dBm	24dBm	±2dB
	MCS13	18dBm	24dBm	±2dB
5GHz 802.11 be EHT40	MCS0	22dBm	28dBm	±2dB
	MCS1	22dBm	28dBm	±2dB
	MCS2	22dBm	28dBm	±2dB
	MCS3	22dBm	28dBm	±2dB
	MCS4	22dBm	28dBm	±2dB
	MCS5	22dBm	28dBm	±2dB
	MCS6	21dBm	27dBm	±2dB
	MCS7	21dBm	27dBm	±2dB
	MCS8	20dBm	26dBm	±2dB
	MCS9	20dBm	26dBm	±2dB
	MCS10	19dBm	25dBm	±2dB
	MCS11	19dBm	25dBm	±2dB
	MCS12	18dBm	24dBm	±2dB
	MCS13	18dBm	24dBm	±2dB

	Data Rate	Rx Specifications Sensitivity	Tolerance
5GHz 802.11be EHT20	MCS0	-96dBm	±2dB
	MCS1	-93dBm	±2dB
	MCS2	-91dBm	±2dB
	MCS3	-87dBm	±2dB
	MCS4	-84dBm	±2dB
	MCS5	-80dBm	±2dB
	MCS6	-78dBm	±2dB
	MCS7	-77dBm	±2dB
	MCS8	-73dBm	±2dB
	MCS9	-70dBm	±2dB
	MCS10	-67dBm	±2dB
	MCS11	-64dBm	±2dB
	MCS12	-61dBm	±2dB
	MCS13	-58dBm	±2dB
5GHz 802.11 be EHT40	MCS 0	-93dBm	±2dB
	MCS 1	-91dBm	±2dB
	MCS 2	-88dBm	±2dB
	MCS 3	-84dBm	±2dB
	MCS 4	-82dBm	±2dB
	MCS 5	-78dBm	±2dB
	MCS 6	-76dBm	±2dB
	MCS 7	-75dBm	±2dB
	MCS 8	-71dBm	±2dB
	MCS 9	-68dBm	±2dB
	MCS 10	-64dBm	±2dB
	MCS 11	-61dBm	±2dB
	MCS 12	-59dBm	±2dB
	MCS 13	-56dBm	±2dB

RF Performance Table at 5GHz (cont'd)

RF Performance for 5GHz

	Data Rate	Tx Power (Per Chain)	Tx Power (4 Chains)	Tolerance
5GHz 802.11be EHT80	MCS 0	22dBm	28dBm	±2dB
	MCS 1	22dBm	28dBm	±2dB
	MCS 2	22dBm	28dBm	±2dB
	MCS 3	22dBm	28dBm	±2dB
	MCS 4	22dBm	28dBm	±2dB
	MCS 5	22dBm	28dBm	±2dB
	MCS 6	21dBm	27dBm	±2dB
	MCS 7	21dBm	27dBm	±2dB
	MCS 8	20dBm	26dBm	±2dB
	MCS 9	20dBm	26dBm	±2dB
	MCS 10	19dBm	25dBm	±2dB
	MCS 11	19dBm	25dBm	±2dB
	MCS 12	18dBm	24dBm	±2dB
	MCS 13	18dBm	24dBm	±2dB
5GHz 802.11 be EHT160	MCS 0	22dBm	28dBm	±2dB
	MCS 1	22dBm	28dBm	±2dB
	MCS 2	22dBm	28dBm	±2dB
	MCS 3	22dBm	28dBm	±2dB
	MCS 4	22dBm	28dBm	±2dB
	MCS 5	22dBm	28dBm	±2dB
	MCS 6	21dBm	27dBm	±2dB
	MCS 7	21dBm	27dBm	±2dB
	MCS 8	20dBm	26dBm	±2dB
	MCS 9	19dBm	25dBm	±2dB
	MCS 10	19dBm	25dBm	±2dB
	MCS 11	18dBm	24dBm	±2dB
	MCS 12	18dBm	24dBm	±2dB
	MCS 13	18dBm	24dBm	±2dB

	Data Rate	Rx Specifications Sensitivity	Tolerance
5GHz 802.11be EHT80	MCS 0	-90dBm	±2dB
	MCS 1	-88dBm	±2dB
	MCS 2	-85dBm	±2dB
	MCS 3	-82dBm	±2dB
	MCS 4	-79dBm	±2dB
	MCS 5	-75dBm	±2dB
	MCS 6	-73dBm	±2dB
	MCS 7	-71dBm	±2dB
	MCS 8	-67dBm	±2dB
	MCS 9	-65dBm	±2dB
	MCS 10	-61dBm	±2dB
	MCS 11	-59dBm	±2dB
	MCS 12	-55dBm	±2dB
	MCS 13	-52dBm	±2dB
5GHz 802.11 be EHT160	MCS 0	-88dBm	±2dB
	MCS 1	-84dBm	±2dB
	MCS 2	-82dBm	±2dB
	MCS 3	-79dBm	±2dB
	MCS 4	-76dBm	±2dB
	MCS 5	-72dBm	±2dB
	MCS 6	-70dBm	±2dB
	MCS 7	-68dBm	±2dB
	MCS 8	-64dBm	±2dB
	MCS 9	-62dBm	±2dB
	MCS 10	-58dBm	±2dB
	MCS 11	-55dBm	±2dB
	MCS 12	-53dBm	±2dB
	MCS 13	-50dBm	±2dB

RF Performance Table at 6GHz

RF Performance for 6GHz

	Data Rate	Tx Power (Per Chain)	Tx Power (4 Chains)	Tolerance
6GHz 802.11be EHT20	MCS0	22dBm	28dBm	±2dB
	MCS1	22dBm	28dBm	±2dB
	MCS2	21dBm	27dBm	±2dB
	MCS3	21dBm	27dBm	±2dB
	MCS4	20dBm	26dBm	±2dB
	MCS5	20dBm	26dBm	±2dB
	MCS6	19dBm	25dBm	±2dB
	MCS7	18dBm	24dBm	±2dB
	MCS8	18dBm	24dBm	±2dB
	MCS9	17dBm	23dBm	±2dB
	MCS10	17dBm	23dBm	±2dB
	MCS11	17dBm	23dBm	±2dB
	MCS12	16dBm	22dBm	±2dB
	MCS13	16dBm	22dBm	±2dB
6GHz 802.11 be EHT40	MCS0	22dBm	28dBm	±2dB
	MCS1	22dBm	28dBm	±2dB
	MCS2	21dBm	27dBm	±2dB
	MCS3	21dBm	27dBm	±2dB
	MCS4	20dBm	26dBm	±2dB
	MCS5	20dBm	26dBm	±2dB
	MCS6	19dBm	25dBm	±2dB
	MCS7	18dBm	24dBm	±2dB
	MCS8	18dBm	24dBm	±2dB
	MCS9	17dBm	23dBm	±2dB
	MCS10	17dBm	23dBm	±2dB
	MCS11	17dBm	23dBm	±2dB
	MCS12	16dBm	22dBm	±2dB
	MCS13	16dBm	22dBm	±2dB
6GHz 802.11 be EHT80	MCS 0	22dBm	28dBm	±2dB
	MCS 1	22dBm	28dBm	±2dB
	MCS 2	21dBm	27dBm	±2dB
	MCS 3	21dBm	27dBm	±2dB
	MCS 4	20dBm	26dBm	±2dB
	MCS 5	20dBm	26dBm	±2dB
	MCS 6	19dBm	25dBm	±2dB
	MCS 7	18dBm	24dBm	±2dB
	MCS 8	18dBm	24dBm	±2dB
	MCS 9	17dBm	23dBm	±2dB
	MCS 10	17dBm	23dBm	±2dB
	MCS 11	17dBm	23dBm	±2dB
	MCS 12	16dBm	22dBm	±2dB
	MCS 13	16dBm	22dBm	±2dB

	Data Rate	Rx Specifications Sensitivity	Tolerance
6GHz 802.11be EHT20	MCS0	-92dBm	±2dB
	MCS1	90dBm	±2dB
	MCS2	-88dBm	±2dB
	MCS3	84dBm	±2dB
	MCS4	-81dBm	±2dB
	MCS5	-78dBm	±2dB
	MCS6	-76dBm	±2dB
	MCS7	-74dBm	±2dB
	MCS8	-71dBm	±2dB
	MCS9	-68dBm	±2dB
	MCS10	-65dBm	±2dB
	MCS11	-62dBm	±2dB
	MCS12	-59dBm	±2dB
	MCS13	-57dBm	±2dB
6GHz 802.11 be EHT40	MCS0	-90dBm	±2dB
	MCS1	-87dBm	±2dB
	MCS2	-85dBm	±2dB
	MCS3	-82dBm	±2dB
	MCS4	-79dBm	±2dB
	MCS5	-75dBm	±2dB
	MCS6	-73dBm	±2dB
	MCS7	-71dBm	±2dB
	MCS8	-68dBm	±2dB
	MCS9	-66dBm	±2dB
	MCS10	-62dBm	±2dB
	MCS11	-60dBm	±2dB
	MCS12	-57dBm	±2dB
	MCS13	-55dBm	±2dB
6GHz 802.11 be EHT80	MCS 0	-88dBm	±2dB
	MCS 1	-85dBm	±2dB
	MCS 2	-82dBm	±2dB
	MCS 3	-79dBm	±2dB
	MCS 4	-76dBm	±2dB
	MCS 5	-71dBm	±2dB
	MCS 6	-70dBm	±2dB
	MCS 7	-67dBm	±2dB
	MCS 8	-65dBm	±2dB
	MCS 9	-62dBm	±2dB
	MCS 10	-59dBm	±2dB
	MCS 11	-56dBm	±2dB
	MCS 12	-54dBm	±2dB
	MCS 13	-52dBm	±2dB

RF Performance Table at 6GHz (cont'd)

RF Performance for 6GHz

	Data Rate	Tx Power (Per Chain)	Tx Power (4 Chains)	Tolerance
6GHz 802.11be EHT160	MCS 0	22dBm	28dBm	±2dB
	MCS 1	22dBm	28dBm	±2dB
	MCS 2	21dBm	27dBm	±2dB
	MCS 3	21dBm	27dBm	±2dB
	MCS 4	20dBm	26dBm	±2dB
	MCS 5	19dBm	25dBm	±2dB
	MCS 6	19dBm	25dBm	±2dB
	MCS 7	18dBm	24dBm	±2dB
	MCS 8	18dBm	24dBm	±2dB
	MCS 9	17dBm	23dBm	±2dB
	MCS 10	17dBm	23dBm	±2dB
	MCS 11	16dBm	22dBm	±2dB
	MCS 12	16dBm	22dBm	±2dB
	MCS 13	16dBm	22dBm	±2dB
6GHz 802.11be EHT320	MCS 0	22dBm	28dBm	±2dB
	MCS 1	22dBm	28dBm	±2dB
	MCS 2	21dBm	27dBm	±2dB
	MCS 3	21dBm	27dBm	±2dB
	MCS 4	20dBm	26dBm	±2dB
	MCS 5	19dBm	25dBm	±2dB
	MCS 6	19dBm	25dBm	±2dB
	MCS 7	18dBm	24dBm	±2dB
	MCS 8	18dBm	24dBm	±2dB
	MCS 9	17dBm	23dBm	±2dB
	MCS 10	17dBm	23dBm	±2dB
	MCS 11	16dBm	22dBm	±2dB
	MCS 12	16dBm	22dBm	±2dB
	MCS 13	16dBm	22dBm	±2dB

	Data Rate	Rx Specifications Sensitivity	Tolerance
6GHz 802.11be EHT160	MCS 0	-84dBm	±2dB
	MCS 1	-82dBm	±2dB
	MCS 2	-79dBm	±2dB
	MCS 3	-77dBm	±2dB
	MCS 4	-73dBm	±2dB
	MCS 5	-68dBm	±2dB
	MCS 6	-66dBm	±2dB
	MCS 7	-65dBm	±2dB
	MCS 8	-61dBm	±2dB
	MCS 9	-59dBm	±2dB
	MCS 10	-56dBm	±2dB
	MCS 11	-53dBm	±2dB
	MCS 12	-51dBm	±2dB
	MCS 13	-48dBm	±2dB
6GHz 802.11be EHT320	MCS 0	-82dBm	±2dB
	MCS 1	-79dBm	±2dB
	MCS 2	-76dBm	±2dB
	MCS 3	-73dBm	±2dB
	MCS 4	-70dBm	±2dB
	MCS 5	-65dBm	±2dB
	MCS 6	-63dBm	±2dB
	MCS 7	-61dBm	±2dB
	MCS 8	-58dBm	±2dB
	MCS 9	-55dBm	±2dB
	MCS 10	-52dBm	±2dB
	MCS 11	-50dBm	±2dB
	MCS 12	-47dBm	±2dB
	MCS 13	-45dBm	±2dB

About Spirent

Spirent Communications (LSE: SPT) is a global leader with deep expertise and decades of experience in testing, assurance, analytics and security, serving developers, service providers, and enterprise networks. We help bring clarity to increasingly complex technological and business challenges. Spirent's customers have made a promise to their customers to deliver superior performance. Spirent assures that those promises are fulfilled.

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Glossary

A2DP	advanced audio distribution profile
ACS	automated channel selection
AFH	adaptive frequency hopping
AID	association ID
AP	access point
BE	best effort (priority)
BK	background (priority)
BLE	Bluetooth low energy
BT	Bluetooth
DFS	dynamic frequency selection
DL	downlink
HE	high efficiency
HFP	hands free profile
HID	human interface device profile
KPI	key performance indicator
MCS	modulation coding scheme
MIMO	multiple input multiple output
MP2MP	multi-point to multi-point (traffic generator)
MU	multi-user
Nss	number of spatial streams
OFDMA	orthogonal frequency domain multiple access
OPP	object push profile
OTA	over the air
RSSI	receive signal strength indicator
RU	resource unit
RvR	rate vs. range
RvRvO	rate vs. range vs. orientation
RvOvR	rate vs. orientation vs. range
RX	receive
STA	station (aka client)
TX	transmit
UL	uplink
VI	video (priority)
VO	voice (priority)
vSTA	virtual STA

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