



octoPal Wireless Partner Device

octoPal is a partner device for testing wireless throughput, capacity and behavior. Based on a popular 802.11ac chipset, octoPal is configurable as a station or AP and can function as a real device or a powerful instrument.

octoPal is an ideal partner device for testing wireless throughput, data rate adaptation, packet error rate, jitter and other important performance parameters. Configurable as a station or AP, it is suitable for testing a variety of devices and systems. octoPal can also monitor device behavior. Unique driver and firmware level controls enable it to perform precision tests such as receiver sensitivity at a selected modulation coding scheme (MCS), packet error rate (PER), jitter, channel adaptation and roaming.



APPLICATIONS

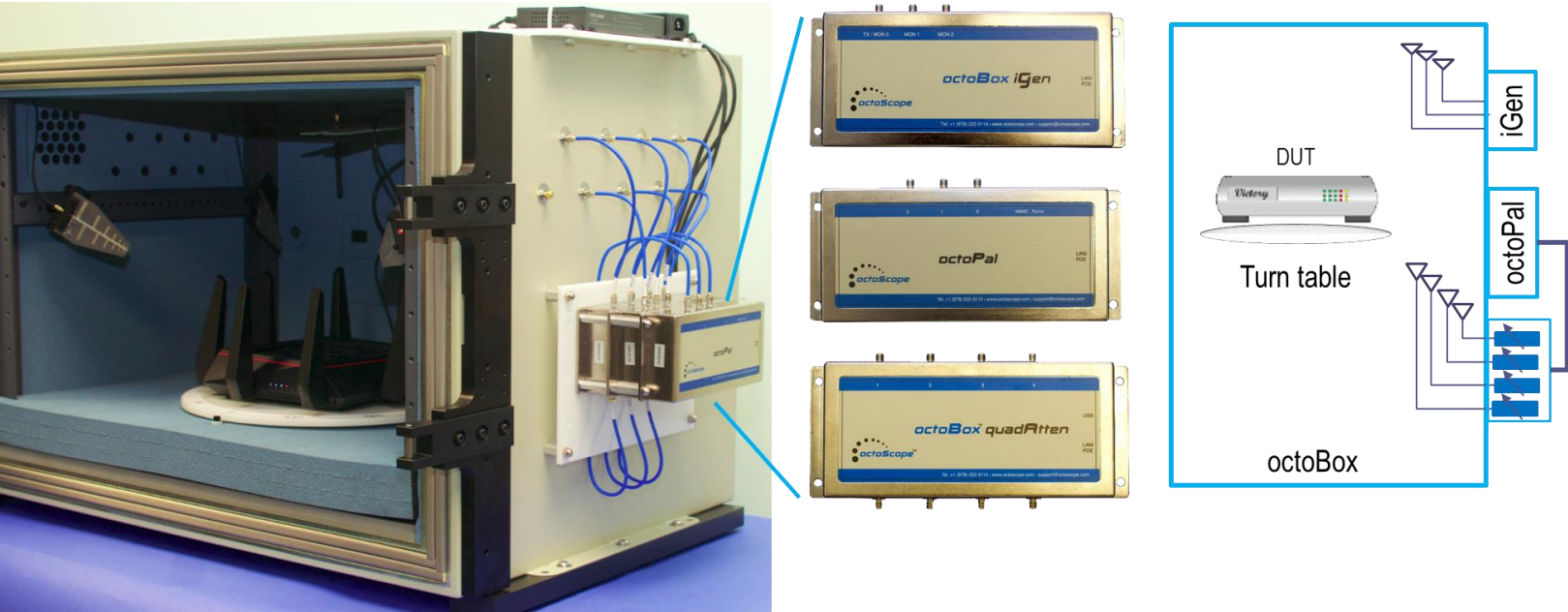
- ✚ MIMO OTA throughput with a single or multiple octoPal devices
- ✚ Packet loss rate, latency, jitter (RFC2544)
- ✚ Roaming
- ✚ Data rate adaptation
- ✚ Channel adaptation
- ✚ Coexistence of Wi-Fi with disparate networks including unlicensed LTE, Bluetooth, Thread, DSRC
- ✚ MCS vs. range
- ✚ STA association behavior
- ✚ Multi-channel monitoring and analysis

FEATURES & BENEFITS

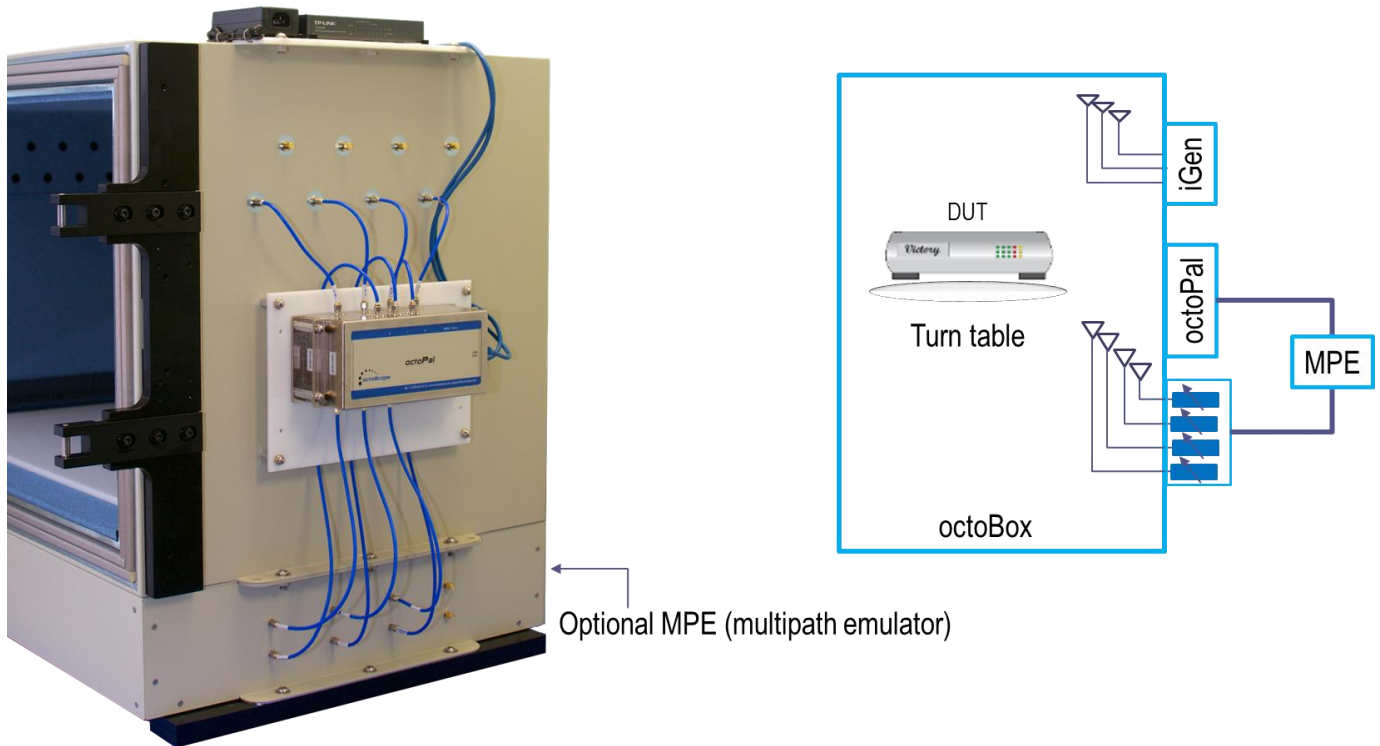
- ✚ 802.11a/b/g/n/ac operation in the 2.4 or 5 GHz band, including the licensed DSRC band
- ✚ Integrated endpoints for automated throughput testing: iperf2, iperf3, AT4-Agents and IxChariot
- ✚ Programmable channel frequency, channel width (20, 40, 80 MHz), MCS (modulation coding scheme) and WMM (wireless multi media) priority
- ✚ Convenient single cable Ethernet/PoE power and control interface, filtered for isolation

PAL THROUGHPUT MEASUREMENT TESTBED


The octoBox PAL-26 and PAL-38-TT testbeds are ideal for testing a single device, AP or client. The '-TT' configuration includes a turn table. octoPal can be mounted on an [octoBox®](#) and connected via a [quadAtten™](#) attenuator module to the antennas inside the octoBox chamber, as shown below.



iGen interference generator is included for a comprehensive throughput and behavior suite of tests under controllable real-life traffic and interference conditions. Multipath Emulator (MPE) can also be included.




octoPal is controllable via a browser-based user interface and an open API (applications programming interface). The API enables you to automate and easily sequence through important performance tests in the ideal conditions and in the presence of controllable impairments.

 System ● Monitor ● Radio Setup File Manager

Mode	Station	▼
SSID	octoscope	
Security	WPA2	▼
Security Password		
IP Address	10.100.100.89	
IP Subnet Mask	255.255.255.0	
802.11 Interface	802.11ac	▼
Channel Width	80 MHz	▼
Guard Interval	Short	▼
MCS (Mbps)	Adapt	▼
Primary Channel	Scan	▼
Secondary Channel		
Priority (WMM)	Best Effort	▼
Maximum Number of Streams	3	▼

Association Status: Associated
Channel: 149 (5745 MHz)
Beacon RSSI: -20 dBm
Data RSSI: -20 dBm
TX Rate: 1.3 Gb/s
RX Rate: 65 Mb/s



Update **Stop**

The commands were submitted successfully. ✕

The iGen interference generator is also GUI and API controllable, allowing you to create powerful automated test scenarios and comprehensive test suites. See the iGen GUI examples below and refer to the [iGen datasheet](#) for further details on the iGen interference generator.

Traffic interference

System **Traffic** Capture Waveform File Manager

802.11 Interface 802.11ac

Channel width 80 MHz

Guard Interval Short

MCS (Mbps) 0 (32.5 Mbps)

Primary Channel 124 (5620 MHz)

Secondary Channel 116, 120, 128

Input file 20_TCIPackets.txt

Play Mode Loop until <stop>

Inter-Packet Gap 0 μ sec

Attenuation 0
0dB to 63dB

Waveform interference

Help

Traffic Capture

Interference Type

- Bluetooth Low Energy
- Microwave Oven
- Baby Monitor
- 802.11 FHSS
- ZigBee
- Custom CSV File
- Pulse
- Continuous Wave**
- Frequency Sweep

Attenuation 0
0 to 60 dB

Frequency 5625
500 to 6000 MHz



OCTOPAL BENEFITS

octoPal's key benefit is its ability to function both as a real device for real-life testing and as a test instrument for precision radio testing and expert analysis.

For example, in order to measure receiver sensitivity, octoPal can operate at a fixed MCS to measure throughput vs. path loss for each MCS.

To qualify MCS adaptation behavior of devices under test, octoPal can function as a real, adaptable device and monitor DUT (device under test) behavior.

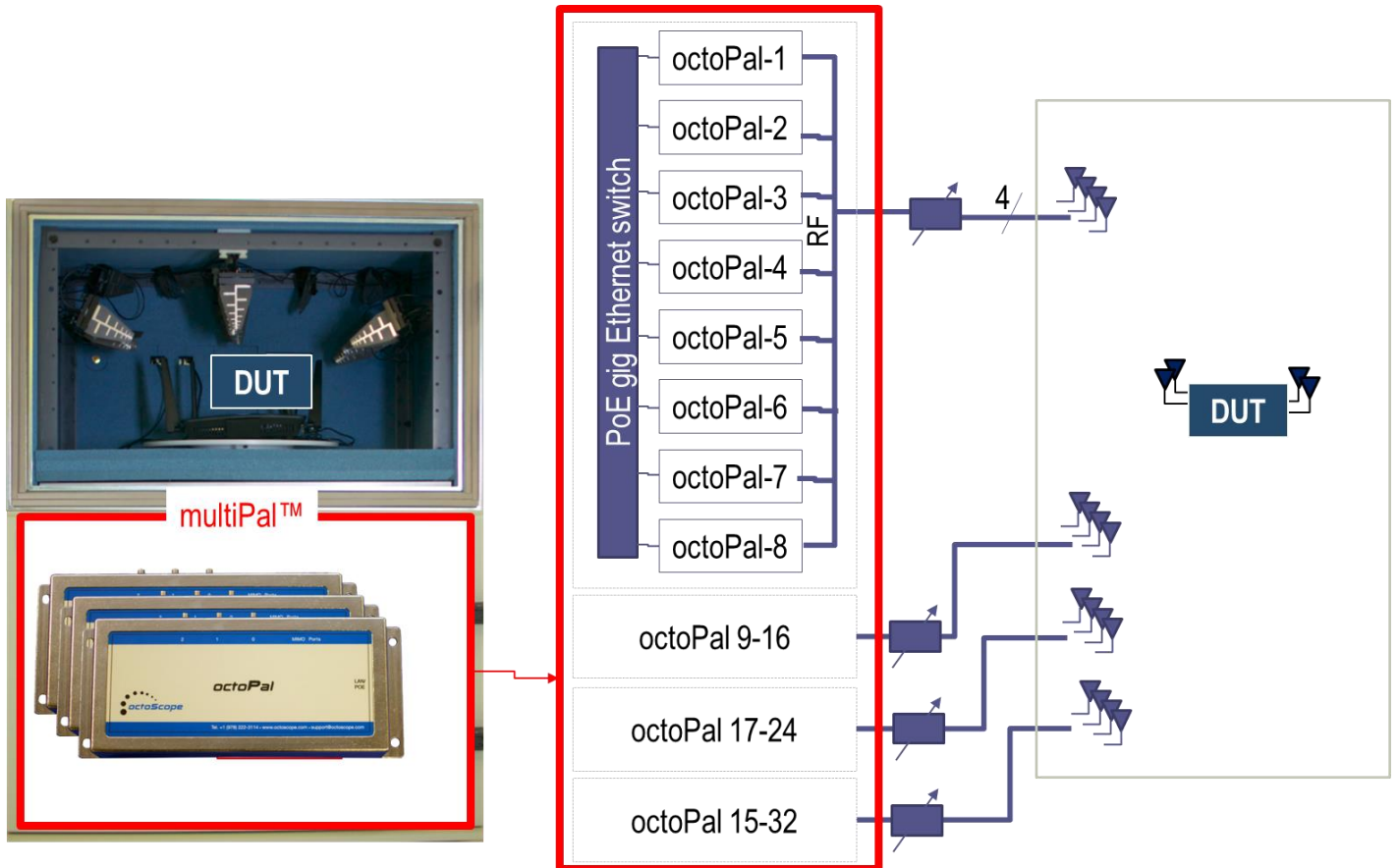
To test fairness of access, octoPal can be configured to operate at any WMM priority. When the airlink is oversubscribed and identical traffic is sent from the octoPal and the DUT in the completely quiet and controlled octoBox environment, throughput will be equal when WMM priorities are equal.

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MULTIPAL FOR LOAD TESTING

A grouping of multiple octoPals, called multiPal™, forms a scalable wireless MIMO-OTA testbed for testing access points and routers with the traffic load from 32 physical 802.11ac radios with up to 64 vPal virtual clients emulated by each radio.

multiPal™ can generate or analyze multi-channel traffic to test router association capacity, throughput performance and ability to function in congested Wi-Fi environments.

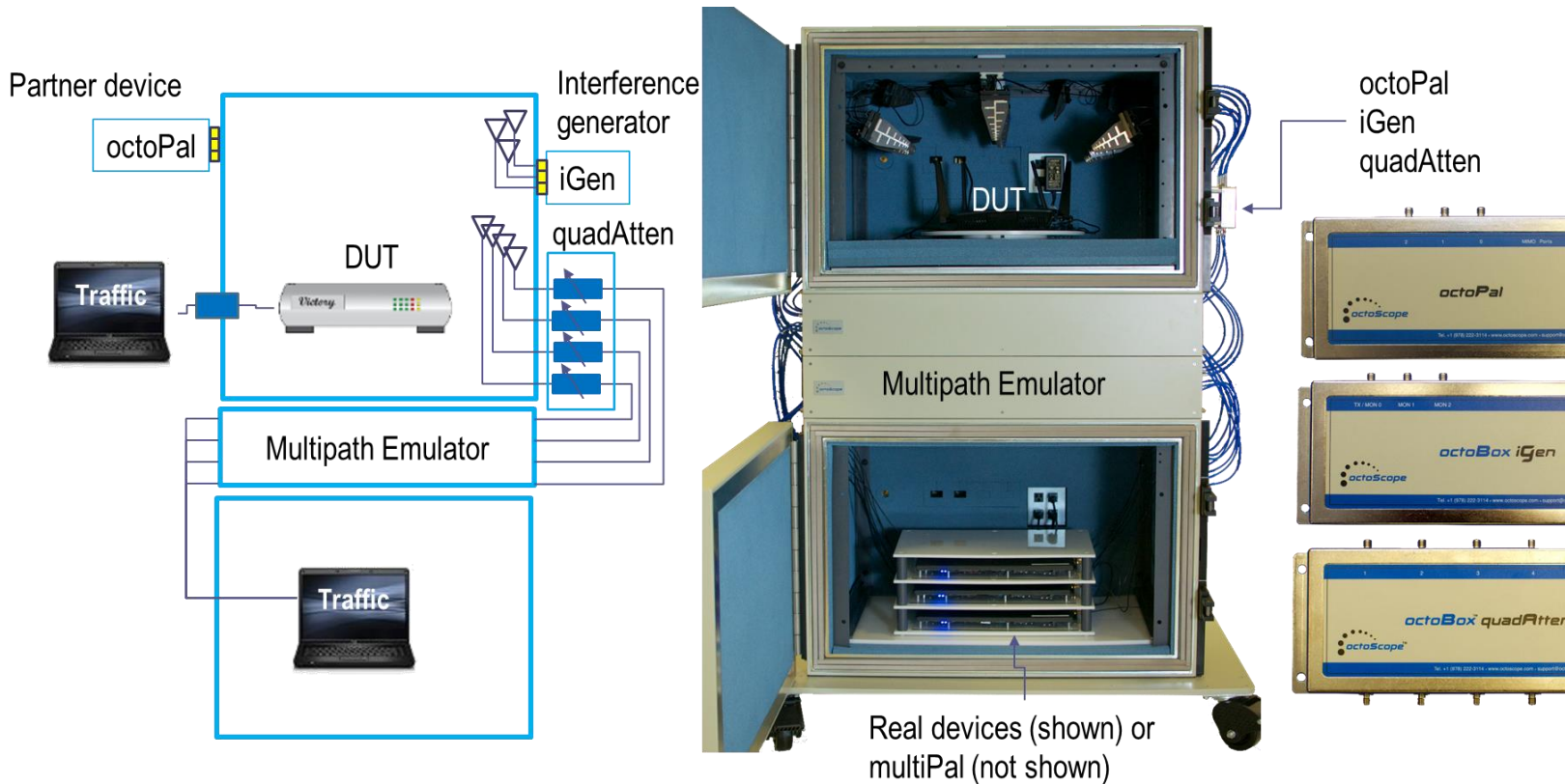


multiPal can be configured in groups of 4, 8, 16 or 32 octoPals. The multiPal-32 configuration shown above consists of 4 groups of 8 octoPals, each group coupled into a quadAttenuator for uniquely programmable signal power. This adds realism of emulated stations being 'located' at different distances from the device under test (DUT). quadAttenuators can also emulate motion of devices by changing attenuation vs. time. The 4 groups of 8 octoPals are coupled via quadAttenuators to 4 high gain 4x4 MIMO antenna arrays inside the octoBox where the device under test is placed.

octoPal and multiPal can be used stand-alone or as part of the octoBox wireless testbed to emulate clients or APs.

STACK WIRELESS TESTBED

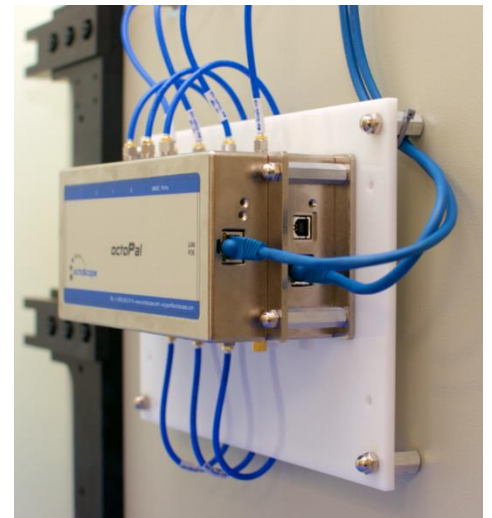
An octoBox STACK throughput testbed has two chambers and a multipath emulator enabling you to test a network of real devices. The included octoPal partner device can serve as a golden reference for throughput testing or as a sophisticated analyzer of device and network behavior. The iGen interference generator emulates neighboring Wi-Fi networks or common sources of interference such as Bluetooth, phones, baby monitors and radar.



The devices in the test network are connected through quadAtten(s) in series with the octoBox multipath emulator (MPE). Test traffic is sent among the devices in the testbed.

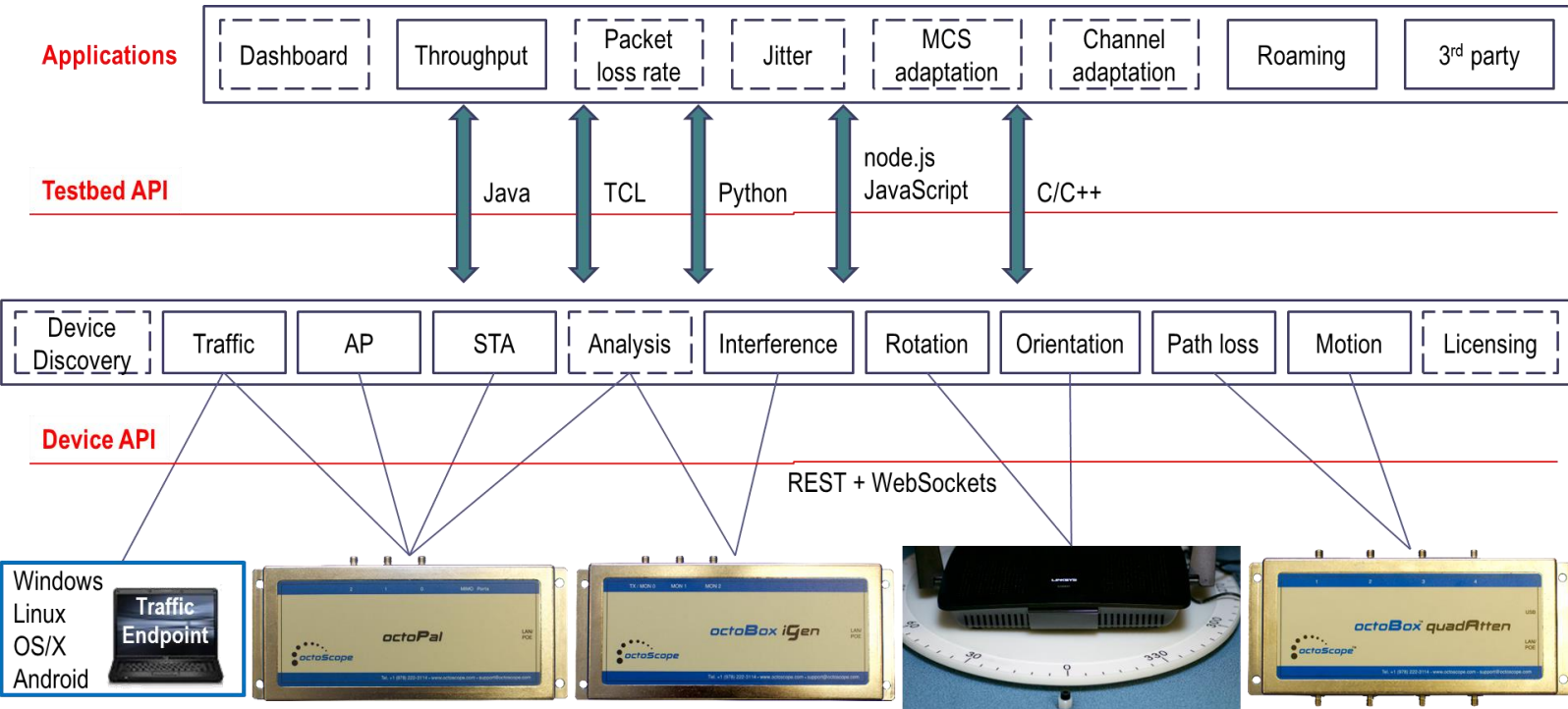
The quadAtten adds path loss while the MPE adds multipath, simulating typical home or office conditions. For more details on the octoBox testbed, read our [throughput application note](#).

The devices in the test network can be real off-the-shelf devices, ideal for interoperability and coexistence testing. They can also be octoPals that emulate a variety of devices. An octoPal can function as legacy 802.11 devices and be programmed to emulate, for example, phones, PCs, sensors or other devices.



OCTOBX TESTBED ARCHITECTURE

The system block diagram of the octoBox testbed is shown below. The API is open and available to help you automate test suites under your own automation framework. Alternatively, you can use the octoBox applications shown in the top row of the diagram below.



OCTOPAL BROWSER AND API SOFTWARE CONTROLS

Mode	Station or AP
SSID	<user entry field>
Security	WPA / WPA2
Security Password	<user entry field>
IP Address	<user entry field>
IP Subnet Mask	<user entry field>
802.11 interface	802.11a, b, g, n, ac
Security	WPA / WPA2
Security Password	<user entry field>
IP Address	<user entry field>
IP Subnet Mask	<user entry field>
802.11 Interface	802.11a, b, g, n, ac
Channel width	10, 20, 40, 80 MHz
Guard Interval	Short, Long
MCS	Adapt, <interface-dependent selections>
Primary Channel	<interface-dependent selections>
Secondary Channel	Automatically selected based on the Primary Channel
Priority (WMM)	Best Effort, Background, Video, Voice
Maximum # of Streams	1, 2, 3

MONITORING

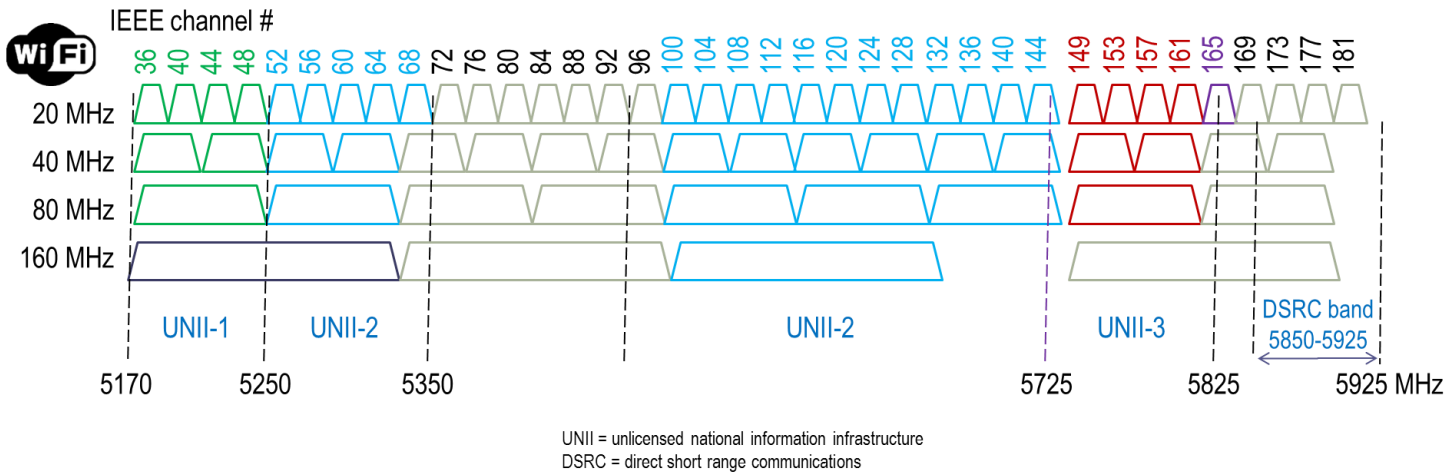
Once associated in the Station mode, octoPal reports the channel, RSSI levels of control and data frames, TX and RX data rate. These statistics are updated at 1 second interval.

Association Status: Associated
Channel: 149 (5745 MHz)
Beacon RSSI: -20 dBm
Data RSSI: -20 dBm
TX Rate: 1.3 Gb/s
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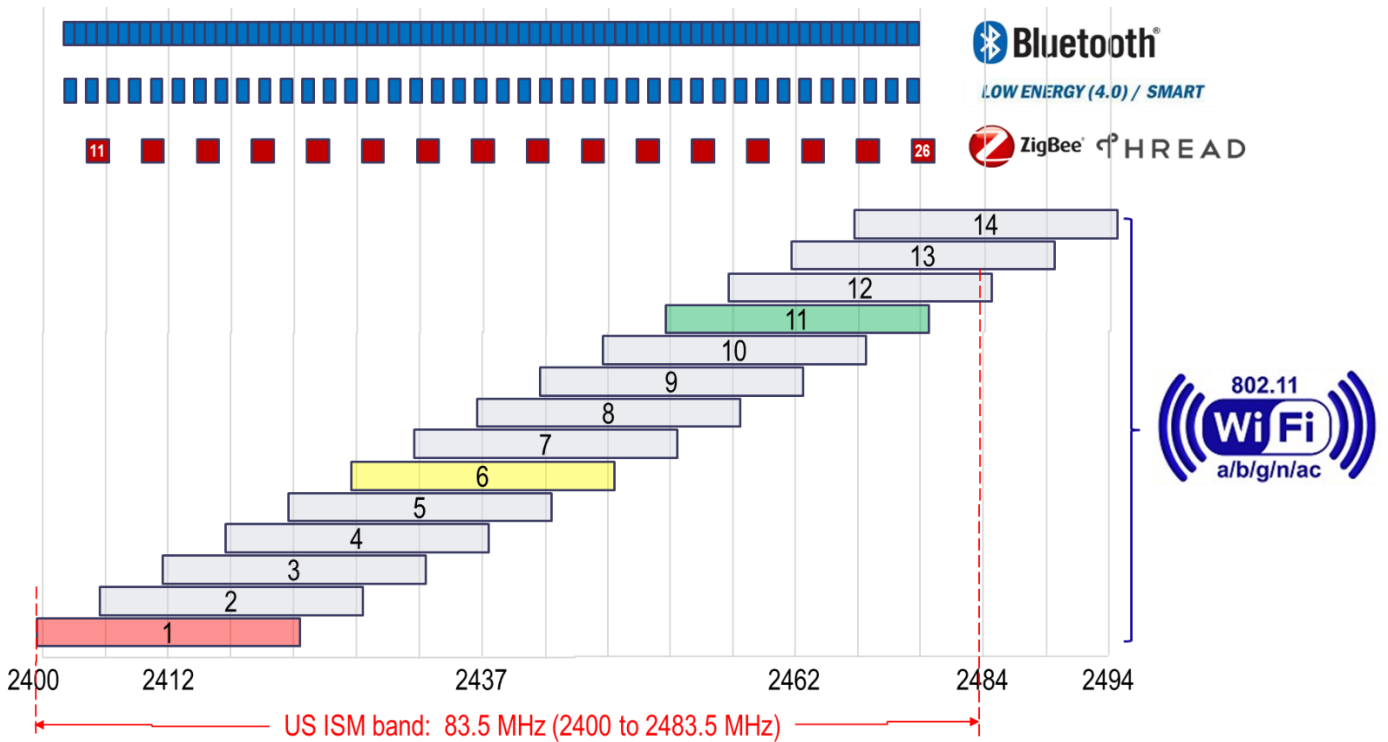
SPECIFICATIONS

Parameter	Specification
Frequency channels	All 2.4 and 5 GHz international 802.11 channels 20/40/80 MHz wide; Wi-Fi operation on 20 MHz wide DSRC channels 173, 177, 181 and 40 MHz wide DSRC 173/177 channel combo
Traffic endpoints	iperf2, iperf3, AT4-Agents and IxChariot
RF connectors	3 SMA connectors for up to 3x3 MIMO operation
Programming	Ethernet
Power	Power over Ethernet (same cable as programming and control)
Dimensions	<p> The image shows two views of the octoPal device. The top view shows a rectangular device with three SMA connectors on the top edge. Dimension lines indicate a width of 9.5" (24 cm) and a height of 1.5" (3.8 cm). The bottom view shows the device from a different angle, highlighting a height of 3.9" (9.9 cm). </p>
TX power	+20 dBm in the 2.4GHz band; according to FCC regulations in the 5 GHz band. See figures below.

5 GHz UNII Band



2.4 GHz ISM Band



octoBox testbed offers three important benefits and enables you to:

- 1. Reduce test time from weeks to hours** Complete isolation and repeatable RF environment minimizes time-consuming open-air testing. Test automation accelerates data collection and improves test coverage and product quality.
- 2. Demonstrate highest achievable performance** Ideal MIMO environment for highest possible throughput Supports latest technologies, such as 160 MHz 802.11ac, 802.11ax, MU-MIMO, Beamforming, and beyond
- 3. Take meaningful measurements on real devices** Real devices = real behaviors. Exercise programmable range of condition from best MIMO environment to challenging real-life impairments.

To learn more, view our instructional [videos featuring the octoBox test configurations](#).

CONTACT

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