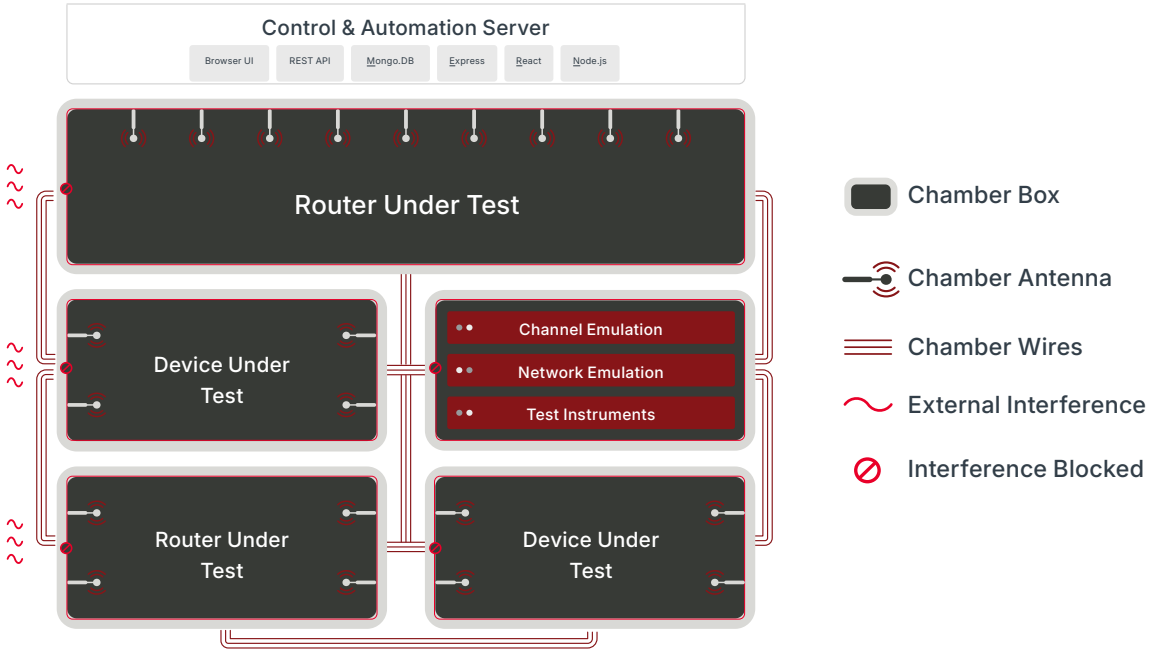
Octobox Automated Testbeds

For End-To-End System-Level Wi-Fi and 5G Testing

This datasheet describes the functionality of Octobox Automated Testbeds, which enable end-to-end system-level Wi-Fi and 5G testing for testing wireless devices and systems. They isolate the devices under test from outside interference and create a stable environment for achieving repeatable throughput and other test measurements.

Octobox testbeds come fully integrated with a built-in turntable, multipath emulator, interference generator, internal antennas, and programmable RF attenuators, and arrive ready to test MIMO throughput, roaming, and other wireless performance characteristics. The Octobox series enables service providers, device manufacturers, and chipset vendors to optimize wireless service reliability and capacity thanks to the ease and speed of automated repeatable testing. It is available in four standard configurations and can be customized based on individual needs.

With the addition of the Octobox Pal-7 test instrument, Octobox testbeds are ready to verify the operation and performance of devices supporting any Wi-Fi standards: 802.11b/g/a/n/ac/ax/be, including the new 6GHz band. The Pal-7 and STApal-7s function as a traffic partner, sniffer, virtual station emulator, and a load generator for testing throughput, capacity, roaming, band steering, and more characteristics.



The Octobox Stack provides a modular approach to testing that includes automated testbeds with isolation chambers, antennas, emulators, and test instruments that can be rapidly configured and deployed.

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Applications

- Verify the operation and performance of devices supporting Wi-Fi standards 802.11b/g/a/n/ac/ax/be
- Reduce wireless test time from weeks to hours
  - Complete isolation and repeatable RF environment minimizes time-consuming open-air testing
  - Automation accelerates data collection, improving test coverage and product quality
- Demonstrate highest achievable performance
  - Ideal MIMO environment for highest possible throughput
  - Supports the latest technologies such as Wi-Fi 7, OFDMA, Wi-Fi Mesh, MU-MIMO, and Beamforming
- Qualify user experience
  - Emulate real-world challenges
  - Programmable range of conditions from best MIMO environment to challenging real-life impairments

Octobox Software Packages

There are key Octobox software packages that extend the capabilities of the Octobox solutions:

Tracker: The Tracker enables playback of motion captures recorded in real-world environments. Motion patterns can be recorded in the field and replayed in the Stack system to enable complex test scenarios such as roaming, steering, and load balancing of multi-AP mesh networks. Mesh networks, stations, and access points experience the motion in the testbed just as it was recorded in the real world. The solution combines the benefits of real-world testing with repeatability that only a controlled testing environment can deliver. This results in the speed and cost of in-lab testing with the confidence that the test results represent realistic end-user scenarios.

TR-398 automation package: TR-398 is an industry-standard test plan created by the Broadband Forum. The primary goal of the specification is to provide a standard set of test cases and framework to measure aspects of the performance between access points (APs) and one or more reference stations (STA) under controlled laboratory conditions. Keysight's implementation of TR-398 features a web user interface to execute each of the test cases in TR-398 individually, in groups, or all at once. A printable HTML report can be generated at the end of the execution of the test cases.

RFC 2544 automation package: IETF RFC 2544 defines a specific set of benchmark tests that can be used to evaluate equipment performance. Having a set of industry-supported tests built around the standards is important. This automation package defines a set of four tests: throughput,

latency, frame loss rate, and back-to-back frames. Networks referred to in RFC 2544 can be local area networks (LAN) or wide area networks (WAN).

Mesh automation package: Mesh access point systems are becoming an increasingly popular solution to deliver broadband internet throughout a home or an office. Currently, there is no performance testing standard that covers this space. Keysight has created a mesh automation package to address a unique set of test cases to help characterize the performance of a mesh system. The mesh automation package characterizes the mesh network in terms of the level of service that it delivers to the end user. The automation package simulates real, recorded homes in the lab. The testing is performed using a black box testing principle: no assumptions are taken about how the mesh operates.

Comparison

Table 1. Comparison: Stack-AP-7-Min, -Mid, and -Max

	Stack-AP-7-Min	Stack-AP-7-Mid	Stack-AP-7-Max
RvR	•	•	•
RvRvO, RvOvR, RvRwR	•	•	•
Single band throughput	•	•	•
Dual band throughput		•	•
Tri band throughput			•
DFS	Requires iGen	Requires iGen	Requires iGen
Multipath testing	Requires MPE	Requires MPE	Requires MPE
Band steering			•
MU-MIMO OTA		•(up to 2 STA)	•
320 MHz SU-MIMO OTA	•	•	•
OFDMA			•
Traffic replay	•	•	•
SynchroSniffer probes		4	20
Inline sniffing	•	•	•
Number of STA partners	4	8	24
Number of off-the-shelf STA			
Number of single vSTA partners	4*64	2*4*64	2*4*64
Number of simultaneous STA locations in relation to DUT	1	2	4
Off-the-shelf STA support, including KPIs	•	•	•
Adjacent channel interference emulation		•	•

Table 2. Comparison: Stack-Mesh-Min, -Mid, and -Max

	Stack-Mesh-Min	Stack-Mesh-Mid	Stack-Mesh-Max
RvR	•	•	•
RvRvO, RvOvR, RvRwR	•	•	•
Quad band throughput	•	•	•
Band steering	•	•	•
AP steering	•	•	•
Roaming	•	•	•
4x4 MU-MIMO OTA			•
Max-throughput single band	Upgrade	Upgrade	Upgrade
OFDMA	4 STA	16 STA	16 STA
DFS	Requires iGen	Requires iGen	Requires iGen
Traffic replay	•	•	•
SynchroSniffer probes	4	16	20
Inline sniffing			•
Number of mesh nodes	3	3	4
Number of real STA	4	16	20
Number of vSTA	0	4*64	2*4*64
Number of simultaneous STA locations in relation to DUT	1	4	5
Off-the-shelf STA support, including KPIs	•	•	•
Co-channel AP emulation		•	•
Adjacent channel AP emulation		•	•
Tracker	•	•	•

Table 3. Comparison: Stack-STA-7-Min, -Mid, and -Max

	Stack-STA-7-Min	Stack-STA-7-Mid	Stack-STA-7-Max
RvR	•	•	•
RvRvO, RvOvR, RvRwR	•	•	•
Single band throughput	•	•	•
Dual band throughput		•	•
Tri band throughput		•	
Band steering	*	*	*
AP steering	*	*	*
Roaming		•	•
4x4 MU-MIMO OTA		•	•
160 MHz SU-MIMO OTA	•	•	•
OFDMA		16 STA	16 STA
Traffic replay	Requires iGen	•	•
SynchroSniffer probes		24	24
Inline sniffing	•	•	•
Number of AP partners		2	2
Number of off-the-shelf AP partners		1	2
Number of real STA partners		24	28
Number of off-the-shelf STA	1	2	3
Number of vSTA	4*64	2*4*64	2*4*64
Number of simultaneous AP locations in relation to DUT	1	1+2	2+2
Off-the-shelf STA support, including KPIs	•	•	•
Co-channel AP emulation		•	•
Adjacent channel AP emulation		•	•
Tracker	•	•	•

* Available on request

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