

The Tracker field-to-lab replay

The Tracker combines the benefits of real-world testing with the repeatability that only a controlled testing environment can deliver

The Tracker™ enables playback of motion recordings captured in real houses. The recordings are made using octoScope's Recorder tool that runs on the fieldPal™. These recordings can be replayed in an octoBox testbed to test the performance of wireless devices. Mesh networks, stations and access points experience the walk in the testbed just as recorded in the real world.

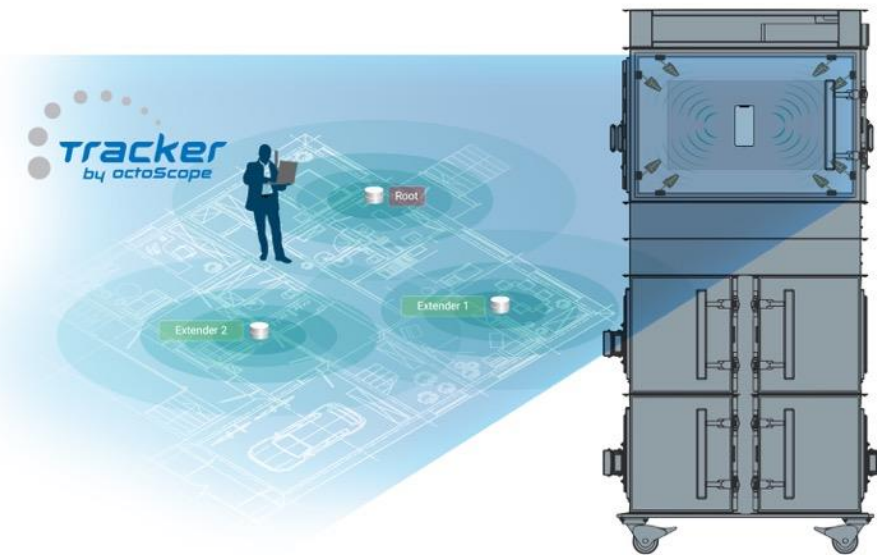


Figure 1 The Tracker concept

The solution combines the benefits of real-world testing with the repeatability that only a controlled testing environment can deliver. The result is the speed and cost of in-the-lab testing with the confidence that the test results represent realistic end user scenarios. For a video demonstrating the power of the Tracker follow [this link](#).

APPLICATIONS

- Field-to-lab replay: studying the performance of a Wi-Fi AP or a mesh in many different kinds of customer homes
- Measuring the performance of wireless handsets or other stations in various indoor mobility scenarios
- Detailed characterization of steering behavior of mesh systems

BENEFITS

- Test Wi-Fi products in the convenience and repeatability of a lab while accurately replaying the common home deployments
- Fully repeatable test scenarios for testing steering and load balancing algorithms
- Study the performance gains available by increasing the number of extenders in a home
- Study the impacts of optimal AP placement in the home

The Recorder tool running on the [fieldPal](#) captures synchronous measurements of pathloss to multiple APs along a walk path in a test house. It records the timing and the speed of the walk as well as path loss in between the APs themselves. The recordings can also be stationary corresponding to fixed locations in a house.



Figure 2 The fieldPal

The recording is imported into an octoScope testbed and stored there for subsequent testing. The test engineer is able to perform any type of test available in the octoBox testbed while a virtual walk corresponding to the recording is performed in the testbed.

The system consists of three parts:

- 1) octoBox STACK-MESH testbed or its subsets for replay of the field captures
- 2) A library of pre-recorded captures is included with the Tracker.
- 3) Recorder feature on a fieldPal test instrument (purchased separately) used during a walk to capture the dynamic environment of a house. Feature is not available yet on the fieldPal.

Use octoScope's synchroSniffer to capture data for analysis while the test is taking place. This allows for detailed recording of any anomalous behavior observed during the testing.

SPECIFICATIONS

Feature	Specification
Bands supported	2.4 GHz, 5 GHz
Walk path selection	Selection available from as imported
Walk path recording	Requires fieldPal, feature not available yet
Flexible mesh network configuration during replay	Yes
Path loss synchronization between APs	Yes
Tests available during replay	All tests available in a standard octoBox testbed: throughput, latency, jitter, packet loss, handover speed
Testbeds supported	STACK-MESH, STACK-MAX and subsets of these testbeds
Number of simultaneous mesh nodes supported	3 maximum

TESTBED DETAILS

The Tracker is useful for testing multi node mesh systems. In the consumer market, mesh systems often come in packs of two or three. **Error! Reference source not found.** illustrates the STACK-MESH testbed suitable for testing up to three node mesh networks. This testbed consists of four chambers: a chamber for each of the mesh nodes and one for the station. The Tracker can also be used in subsets of STACK-MESH or STACK-MAX.

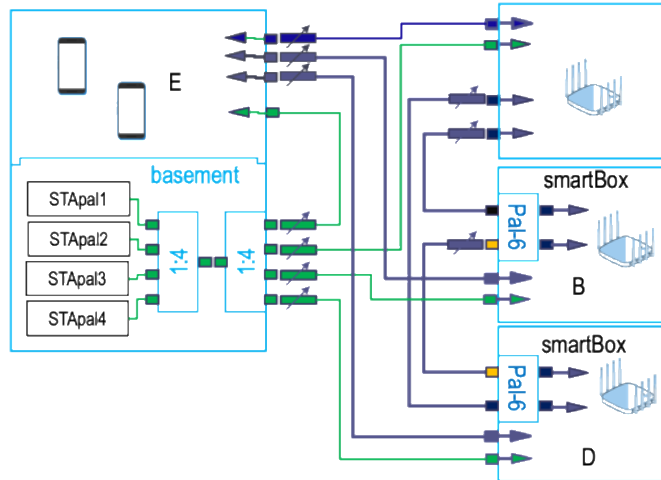


Figure 3 STACK-MESH testbed

Error! Reference source not found. and **Error! Reference source not found.** highlight the paths used to connect the station to the mesh under test. **Error!**

Reference source not found. shows the paths for any station off the shelf station or STApal-open. **Error! Reference source not found.** shows the paths for the STApal subsystem of the smartBox-STA. Path losses for these paths are generated during replay from the captured motion profile. The testbed makes no assumptions about how the station will roam through the mesh as the motion profile is played. The testbed only reproduces the pathloss between the station and all the mesh nodes as captured in the field. Whether the station roams aggressively or acts as a sticky client can be observed in the captures. The testbed doesn't attempt to influence the station behavior in any way.

Similarly, the testbed makes no assumptions about any possible steering behavior by the mesh network under test. AP steering, band steering, channel steering, 802.11k messaging, 802.11v messaging are all possible actions and are transparent to the testbed. The testbed reproduces the pathlosses of the house where the motion profile was captured and exposes the station and mesh network to the house as would have occurred in the real life when the recording was made.

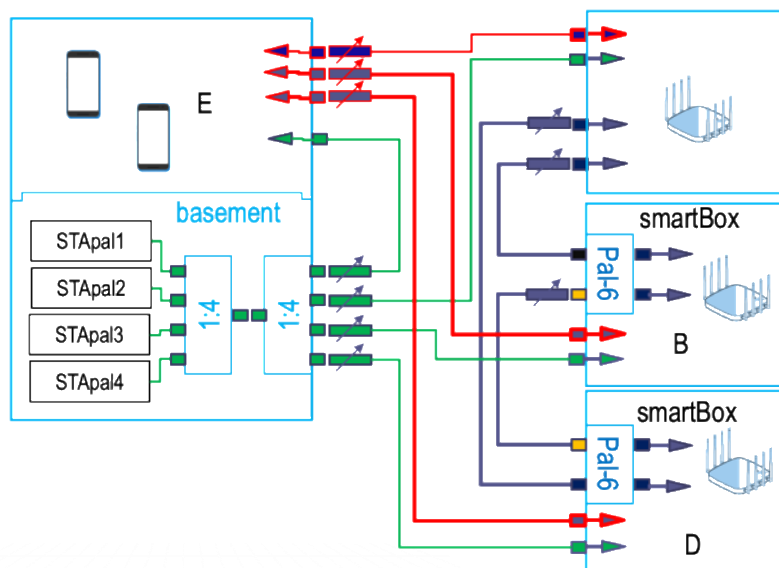


Figure 4 Fronthaul paths used in STACK-MESH when using off-the-shelf devices

Error! Reference source not found. illustrates the paths used in the testbed for backhaul in between the mesh nodes. Wired backhaul in between the nodes is also supported in the testbed. The testbed makes no assumptions about how the mesh system establishes its backhaul links in between the nodes. The testbed just reproduces the pathloss in between the access points as captured in the motion profile from the field.

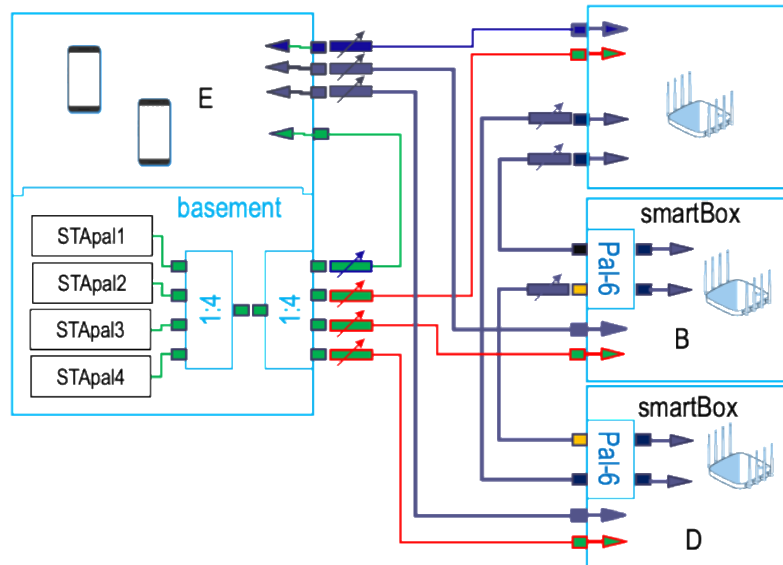


Figure 5 Fronthaul paths used in STACK-mesh when using STApals

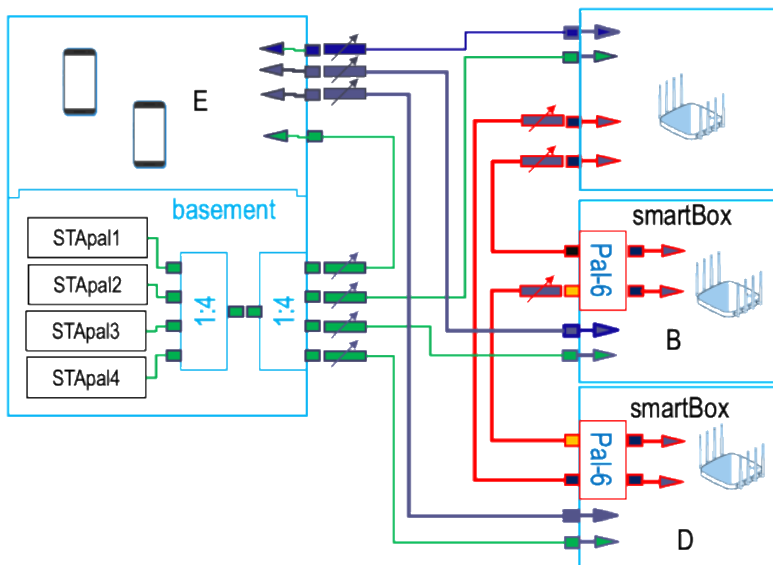


Figure 6 Backhaul paths used in STACK-MESH

TEST CASE DETAILS

The Tracker manipulates the attenuators in the testbed to simulate movement through a mesh network in a home. The Tracker is independent of the test case run. All of the features and testing capabilities available in the octoBox testbeds are available for testing with the Tracker. For example, a throughput test can be run while the motion profile is playing. Also, synchroSniffing can be used to observe the behavior of the mesh under test.

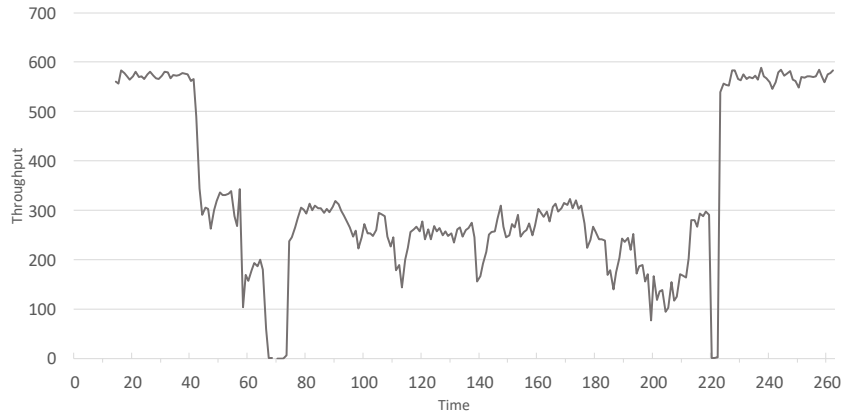


Figure 7 Example outcome of a throughput test while a motion profile was replayed in an octoBox testbed

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