

Example LANforge WiFi Test Reports

With the release of LANforge version 5.3.9, we have significantly improved our automated test cases and reports. The older WiFi Capacity, Port Reset, and WiFi Mobility tests have been improved and can now be launched from our new Chamber View scenario creation and management system. In addition, we have added new Rate vs Range, Dataplane throughput, and Receiver Sensitivity tests. When the tests are completed, they can be saved as html and pdf with the click of a button. Candela Technologies can provide all of the LANforge WiFi traffic generators, RF Chambers, and programmable attenuators used to run these test cases.

Dataplane Throughput Test



The Candela WiFi data plane test is designed to conduct an automatic testing of all combinations of station types, MIMO types, Channel Bandwidths, Traffic types, Traffic direction, Frame sizes etc... It will run a quick throughput test at every combination of these test variables and plot all the results in a set of charts to compare performance. The user is allowed to define an intended load as a percentage of the max theoretical PHY rate for every test combination. The expected behavior is that for every test combination the achieved throughput should be at least 70% of the theoretical max PHY rate under ideal test conditions. This test provides a way to go through hundreds of combinations in a fully automated fashion and very easily find patterns and problem areas which can be further debugged using more specific testing.

Requirements

Requires just a LANforge WiFi test system, but RF chambers are very helpful.

Example Chart

Dataplane Test



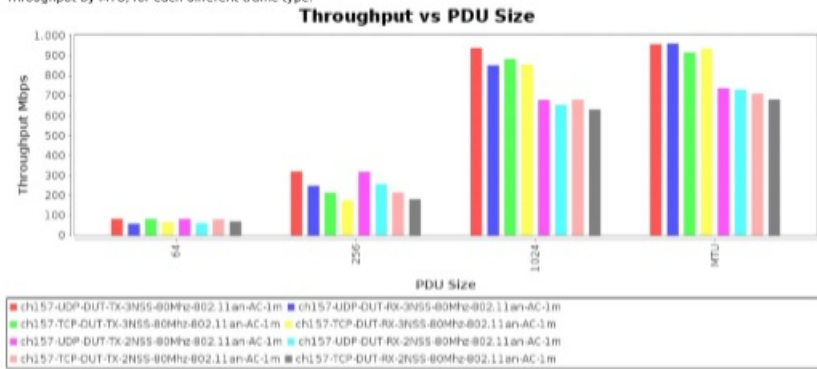
Sat Jun 01 06:42:53 PDT 2019

Device Under Test	Name	APUT		
	Software Version	v5.62.1		
	Model Number	AP640	Serial Number	234-23-sd-35
	SSIDs	labap		
	BSSIDs	78:42:94:0f:10:43		
Operator	John.Smith@awesomeAP.com			

Objective

The Candela WiFi data plane test is designed to conduct an automatic testing of all combinations of station types, MIMO types, Channel Bandwidths, Traffic types, Traffic direction, Frame sizes etc... It will run a quick throughput test at every combination of these test variables and plot all the results in a set of charts to compare performance. The user is allowed to define an intended load as a percentage of the max theoretical PHY rate for every test combination. The expected behavior is that for every test combination the achieved throughput should be at least 70% of the theoretical max PHY rate under ideal test conditions. This test provides a way to go through hundreds of combinations in a fully automated fashion and very easily find patterns and problem areas which can be further debugged using more specific testing.

Throughput by MTU, for each different traffic type.



Pps throughput by MTU, for each different traffic type. The values are estimated packets-per-second over the DUT, but some protocols such as TCP make this difficult to know for certain, so the value is extrapolated.

Example Report

[Example Dataplane report.](#)

Cookbook

[Dataplane Cookbook](#)

Rate vs Range



[Example Report](#) [Cookbook](#) [Video](#)

This test measures the performance over distance of the Device Under Test. Distance is emulated using programmable attenuation and a throughput test is run at each distance/RSSI step and plotted on a chart. The test allows the user to plot RSSI curves both upstream and downstream for different types of traffic and different station types.

Requirements

Requires LANforge WiFi test system, programmable attenuator. RF Chambers are required to test at the lowest signal levels, but you can test at modestly weak signal without chambers.

Sample Report

Rate vs Range Test



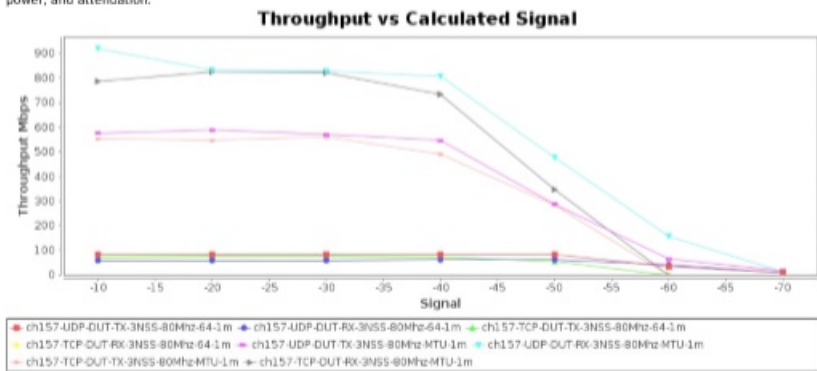
Sat Jun 01 10:01:31 PDT 2019

Test Setup Information				
Device Under Test	Name	APUT		
	Software Version	v5.62.1		
	Model Number	AP640	Serial Number	234-23-sd-35
	SSIDs	labap		
	BSSIDs	78:42:94:0f:10:43		
Operator	[BLANK]			

Objective

This test measures the performance over distance of the Device Under Test. Distance is emulated using programmable attenuation and a throughput test is run at each distance/RSSI step and plotted on a chart. The test allows the user to plot RSSI curves both upstream and downstream for different types of traffic and different station types.

Throughput vs calculated RF Signal for each different traffic type. The signal is calculated based on the configured path-loss, transmit power, and attenuation.



Realtime Graph shows summary download and upload RX bps of connections created by this test.

Example Rate vs Range report.

Cookbook

[Rate vs Range Cookbook](#)

Receiver Sensitivity

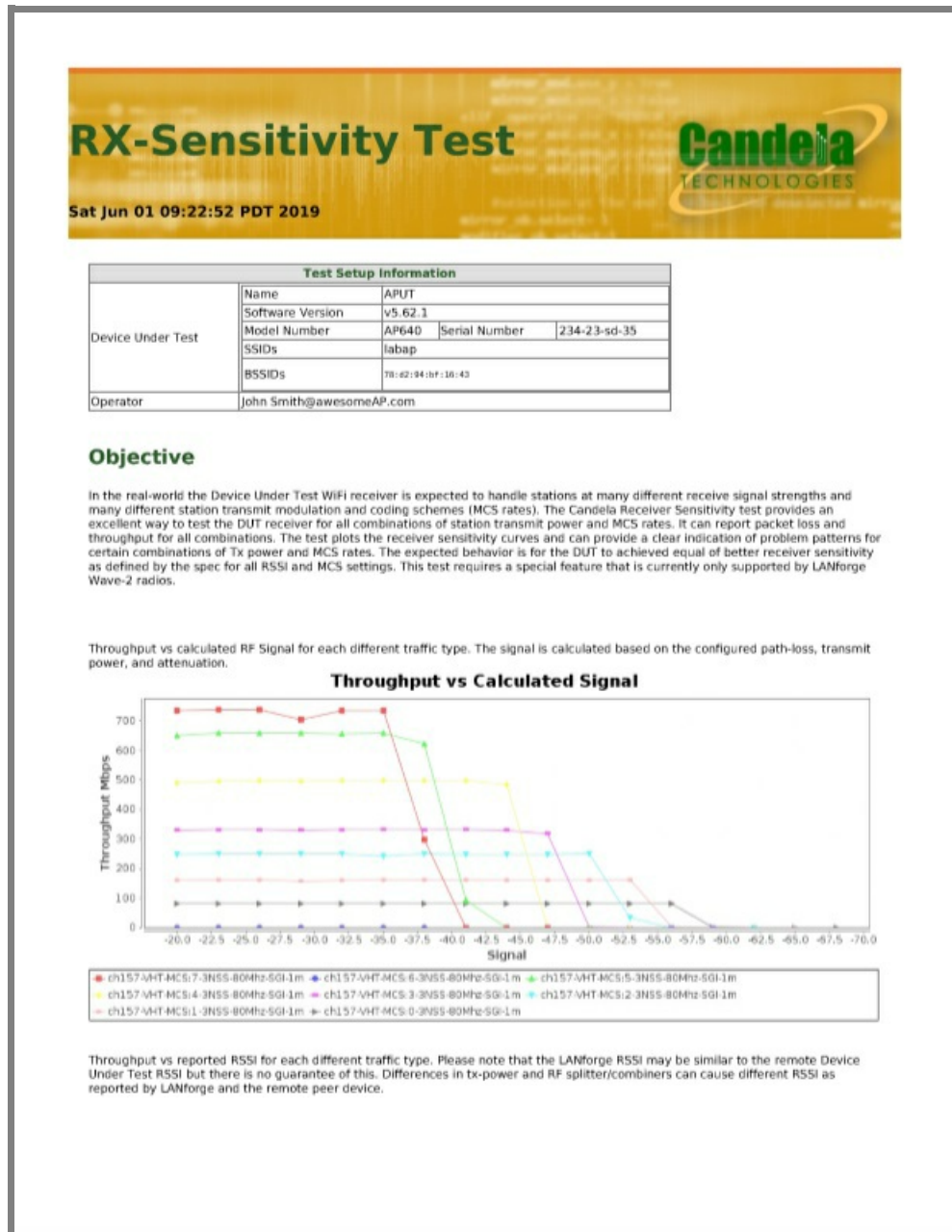


In the real-world the Device Under Test WiFi receiver is expected to handle stations at many different receive signal strengths and many different station transmit modulation and coding schemes (MCS rates). The Candela Receiver Sensitivity test provides an excellent way to test the DUT receiver for all combinations of station transmit power and MCS rates. It can report packet loss and throughput for all combinations. The test plots the receiver sensitivity curves and can provide a clear indication of problem patterns for certain combinations of Tx power and MCS rates. The expected behavior is for the DUT to achieved equal or better receiver sensitivity as defined by the spec for all RSSI and MCS settings.

Requirements

Requires LANforge WiFi test system with Wave-2 radio (4x4 /AC), programmable attenuator. RF Chambers are required to test at the lowest signal levels, but you can test at modestly weak signal without chambers.

Sample Chart



Example Report

[Example Receiver Sensitivity report.](#)

Cookbook

[Receiver Sensitivity Cookbook](#)

WiFi Capacity

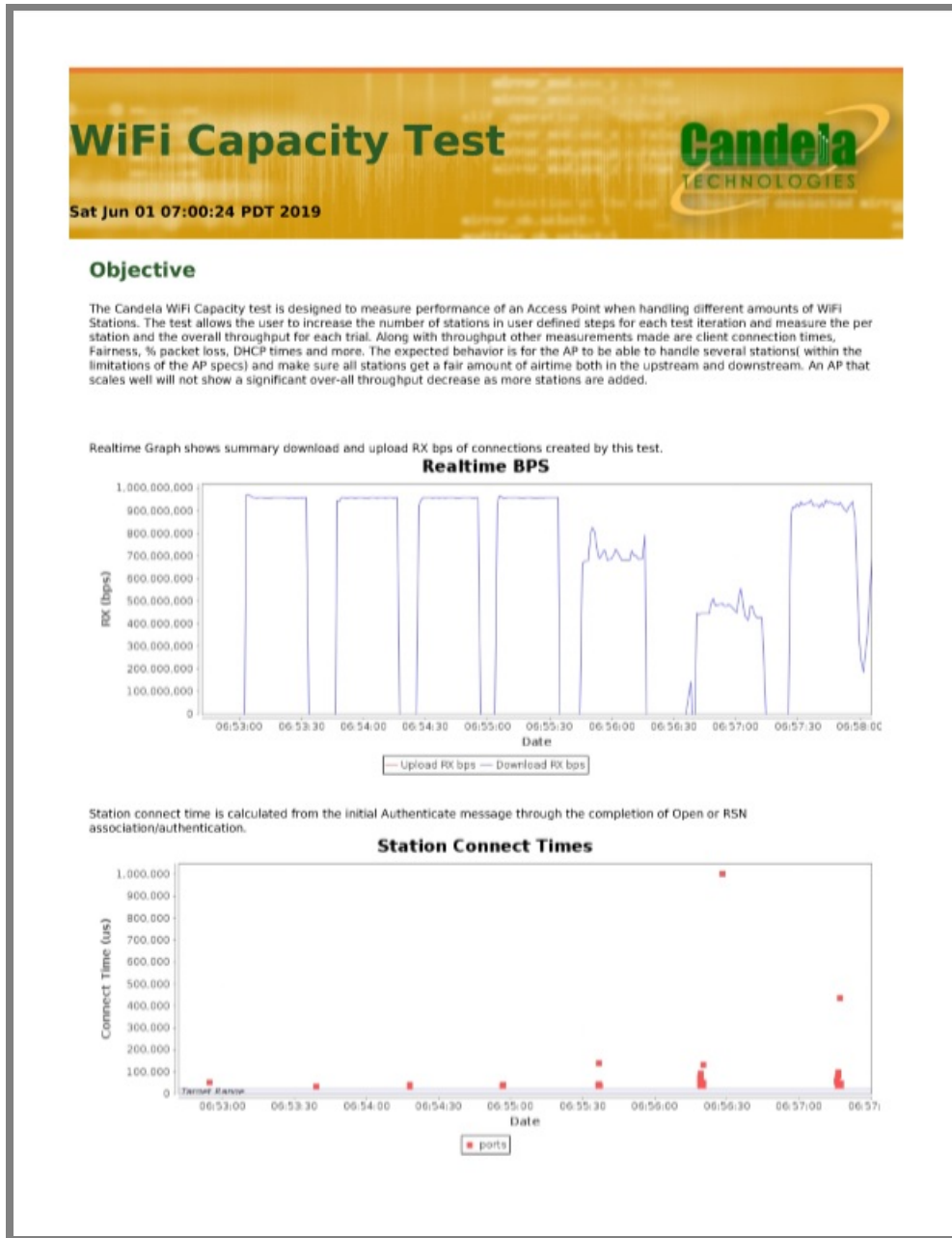


The Candela WiFi Capacity test is designed to measure performance of an Access Point when handling different amounts of WiFi Stations. The test allows the user to increase the number of stations in user defined steps for each test iteration and measure the per station and the overall throughput for each trial. Along with throughput other measurements made are client connection times, Fairness, % packet loss, DHCP times and more. The expected behavior is for the AP to be able to handle several stations(within the limitations of the AP specs) and make sure all stations get a fair amount of airtime both in the upstream and downstream. An AP that scales well will not show a significant over-all throughput decrease as more stations are added.

Requirements

Requires LANforge WiFi test system. RF Chambers are suggested for repeatability and good performance. Programmable or fixed attenuators may be needed to attain optimal RF signal quality.

Sample Chart



Example Report

[Example WiFi Capacity report.](#)

Cookbook

[WiFi Capacity Cookbook](#)

WiFi Mobility and Roaming



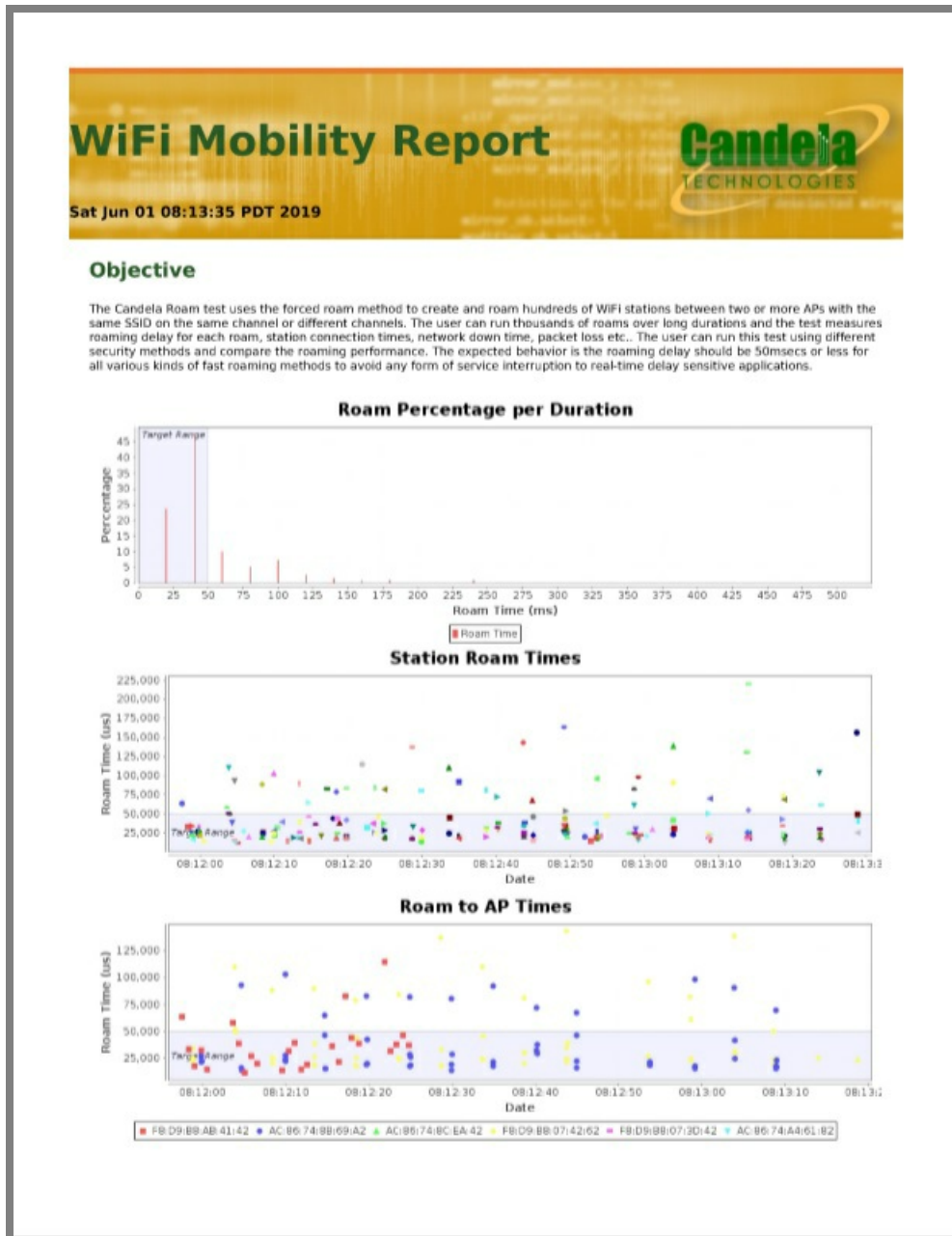
The Candela Roam test uses the forced roam method to create and roam hundreds of WiFi stations between two or more APs with the same SSID on the same channel or different channels. The user can run thousands of roams over long durations and the test measures roaming delay for each roam, station connection times, network down time, packet loss etc.. The user can run this test using different security methods and compare the roaming performance. The

expected behavior is the roaming delay should be 50msecs or less for all various kinds of fast roaming methods to avoid any form of service interruption to real-time delay sensitive applications.

Requirements

Requires LANforge WiFi test system. RF Chambers are suggested for repeatability and good performance. Programmable or fixed attenuators may be needed to attain optimal RF signal quality.

Sample Chart



Example Report

[Example WiFi Roaming report.](#)

Cookbook

[WiFi Roaming Cookbook Example](#)

Port Reset Test



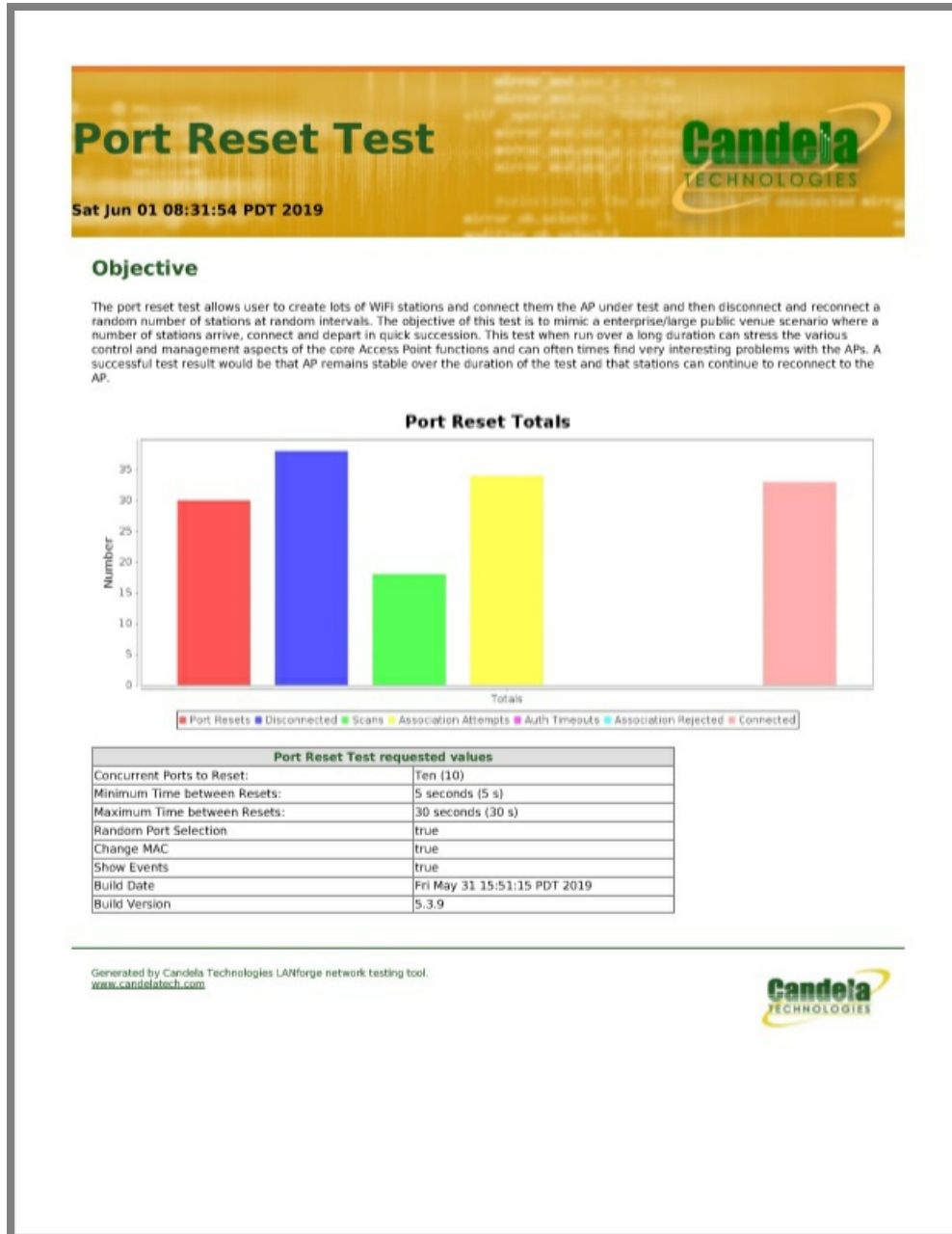
The port reset test allows user to create lots of WiFi stations and connect them the AP under test and then disconnect and reconnect a random number of stations at random intervals. The objective of this test is to mimic a enterprise/large

public venue scenario where a number of stations arrive, connect and depart in quick succession. This test when run over a long duration can stress the various control and management aspects of the core Access Point functions and can often find very interesting problems with the APs. A successful test result would be that AP remains stable over the duration of the test and that stations can continue to reconnect to the AP.

Requirements

Requires LANforge WiFi test system. RF Chambers are suggested for repeatability and good performance. Programmable or fixed attenuators may be useful for testing association performance at various RF signal levels.

Sample Chart



Example Report

Example Report.

Cookbook

WiFi Port Reset Cookbook