Comparing performance of different AP configurations

**Goal:** Compare dataplane throughput for several different APs set up in a similar manner. This allows comparing different hardware performance, and a similar test case can compare different firmware/software versions or other configuration changes.

In this test scenario, the LANforge CT522 is used to create a station and generate packets at different packet sizes to and from a series of APs. We will run one set of iterations of the dataplane test, pause it, make changes to use a different SSID, and then restart the test. The result is a report showing the differences in performance of the different APs under test. This specific test case is run over-the-air in an office. It would perform better and be more repeatable if RF chambers like the CT1820a were used.

1. **Configure Chamber View for DUT testing.**
   A. Open Chamber View by clicking on the ‘Chamber View’ button in the LANforge-GUI. If you have an appropriate scenario already created, then skip to the next section, otherwise you will need to build a scenario that matches your system. You can right-click in Chamber-View to create various objects.
B. Create a Device Under Test (DUT) Profile that matches your AP. The BSSID is important to configured so that LANforge knows when it is connected to the correct AP. Create additional DUTs as needed.

C. This example uses a second DUT as well.
D. Configure an Upstream profile using eth1 on the LANforge system.

E. Configure an STA profile on the LANforge system.

F. Configure a Chamber View Scenario and add the STA profile (mapped to desired wiphyX radio and DUT). Add an upstream profile mapped to DUT LAN side (or possibly WAN side if that is more appropriate for your DUT). Please note that we will manually configure the station to connect to the second DUT as part of the test steps below.

2. Use Chamber View to run a Dataplane comparison test.
A. Open Chamber View by clicking on the ‘Chamber View’ button in the LANforge-GUI. Load appropriate scenario or create a new scenario as needed. Apply the Scenario, then Build the scenario.

B. Select the Dataplane test and click Run Test. You should see the RX Sensitivity Test configuration window pop up. It will remember the last configuration for most fields. Select the DUT and WiFi station device, and select the combinations of traffic types you wish to send. Select the Another Iteration checkbox to allow comparison graphs.
C. We have 4 total BSSIDs that we wish to test. The Scenario creation logic will have chosen one of the BSSIDs for the station, but we will need to override that for each of our comparison runs. Go to the Port-Mgr tab in the LANforge-GUI, double-click the station, and make sure that its SSID is correct. In case you are using different passwords you could change that at this time as well. When complete, click Apply. You can leave the window open as you will need it in future steps:
D. When the configuration is complete, click the Start button [which will change to 'Stop' once start is clicked] to start the test. An interactive report window will be created and will be updated as the test runs.

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.

Add your notes below:

- OTS test, 2x2 open-air, bridge mode, about 35 feet from LBNP test device, moderately busy RF environment, channel 36.
- LBNP STA is in test PHY mode.
- Run 1: SP is 2x2 open-air-1, 9000 vendor C
- Run 2: SP is 2x2 open-air-2, 9000 vendor C
- Run 3: SP is 2x2 open-air-1, 9000 vendor C
- Run 4: SP is 2x2 open-air-2, 9000 vendor C

Throughput by MTU, for each different traffic type.

Throughput vs PDU Size

Throughput (Mbps) vs PDU Size

- ch36-UDP-DUT-TX-1m
- ch36-UDP-DUT-RX-1m
- ch36-UDP-DUT-TX-2:3m
- ch36-UDP-DUT-RX-2:3m
- ch36-UDP-DUT-TX-3:1m
- ch36-UDP-DUT-RX-3:1m
- ch36-UDP-DUT-TX-4:1m
- ch36-UDP-DUT-RX-4:1m

Verbosity: 0 1 2 3 4 5 6 7 8 9 10 11
E. When the first comparison run is complete, a popup window will be shown, and the **Paused** checkbox will be selected. Select new BSSID by reconfiguring the station with a new BSSID, and when the reconfiguration is complete, un-select the Paused checkbox on the Dataplane test to do the next comparison run. Continue to run new comparisons in this manner until the full test is complete. When complete, unselect the **Another Iteration**, and then unselect "Paused" to have the test complete.

F. This is the pause message, it is just informational and you can close it after it pops up.

G. When the test is complete, click the **Save HTML** button to save an HTML report and generate the PDF. The PDF file will be linked from the HTML page. You can also click "Save PDF" and the browser will be directed to open the pdf file directly. Please see this example **Dataplane Comparison Report**.