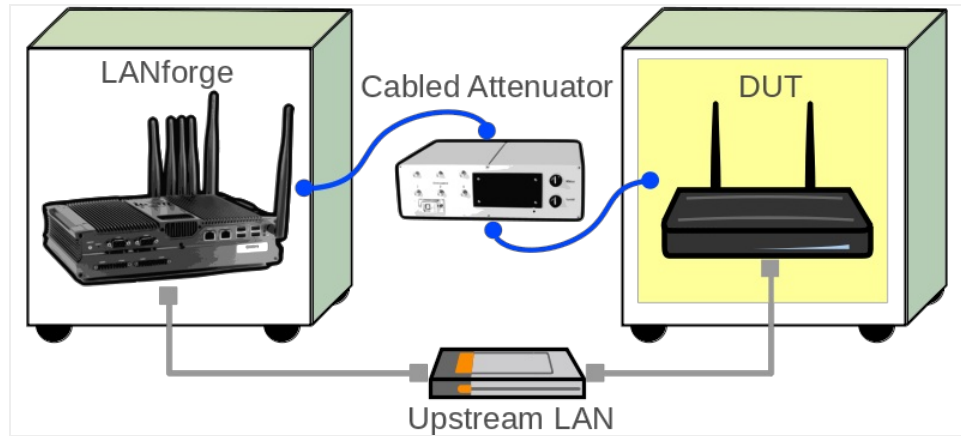


Testing Latency at different packet sizes using the Hunt test

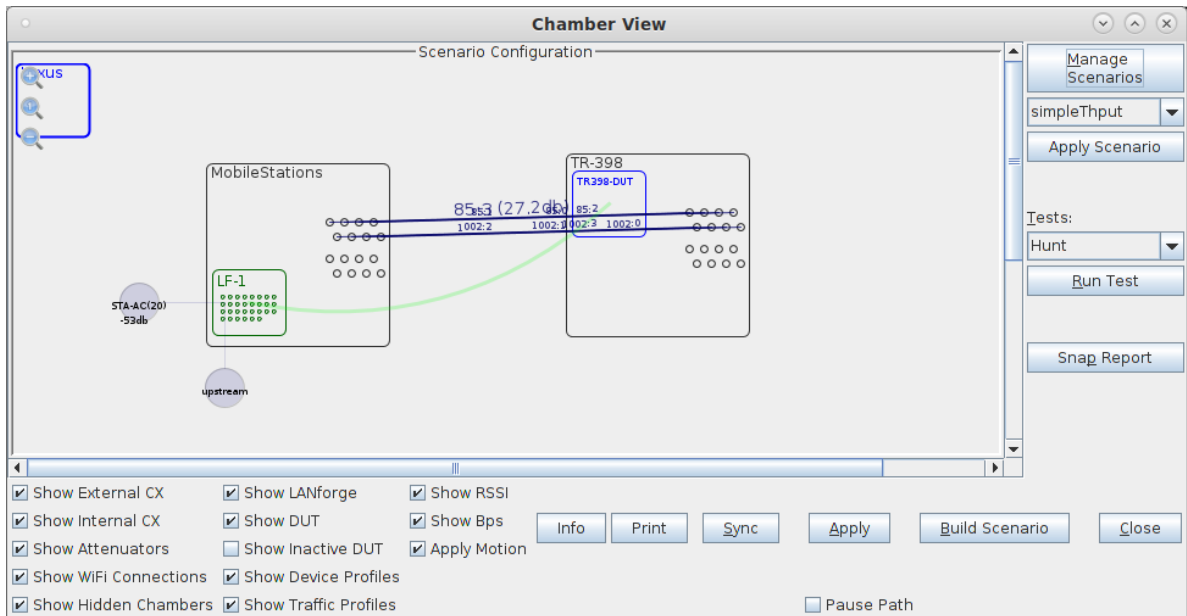
Goal: Setup and run a Hunt test for an AP using the LANforge CT523c or similar system in order to test Latency at the highest throughput rate supported by the DUT.

In this test scenario, the LANforge CT523c is used to generate packets of different sizes in the downstream direction through an AP. The test hunts to find the best throughput, and then re-runs the traffic test configured to a percentage of the best actual throughput. Latency graphs show how well the DUT performs. This guide assumes you have some experience with Chamber View, and that you have a LANforge system, a programmable attenuator like the CT704b and two isolation chambers like the CT820a. The AP should be in one chamber, the LANforge system is in the other chamber, and the attenuator is cabled between them. In this example, the Attenuator is left at an optimal configuration, but you can also use this same Hunt test to generate a report at different RF signal levels using the Attenuator. This feature requires LANforge version 5.4.2 or higher.



1. Configure Chamber View for Hunt and Similar Tests.

- 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.



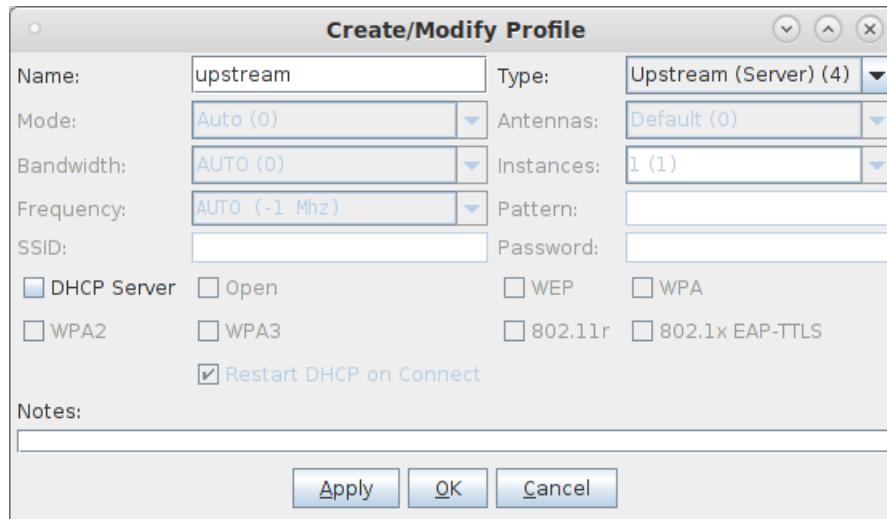
- B. Create a Device Under Test (DUT) Profile that matches your AP. The BSSID is important to configured so that LANforge knows when it is connected to the correct AP.

The Create/Modify DUT dialog box is used to configure a Device Under Test (DUT) profile. It contains fields for Name, Image file, SW Info, HW Info, Model Number, Serial Number, Serial port, LAN, API version, SSID-1, SSID-2, SSID-3, Password-1, Password-2, Password-3, Mgt IP, Num Ant Radio 1, Num Ant Radio 2, Num Ant Radio 3, BSSID-1, BSSID-2, BSSID-3, and checkboxes for STA DUT, WEP, WPA, WPA2, WPA3, 802.11r, 802.1x EAP-TTLS, Provides DHCP on LAN, and Provides DHCP on WAN. The BSSID-1 and BSSID-2 fields are highlighted in orange.

- D. Create a chamber object to hold the LANforge system, and add the LANforge to it. Add connections from this chamber to the DUT chamber, specifying the proper Attenuator modules. Please view our other cookbook on [setting up attenuator connections in LANforge](#).

Create/Modify Chamber									
Name:	<input type="text" value="MobileStations"/>	Width:	<input type="text" value="150"/>	Height:	<input type="text" value="150"/>				
Chamber Type	<input type="text" value="Medium (1)"/>	Isolation	<input type="text" value="80"/>	Speed (rpm)	<input type="text" value="0.0"/>				
Turntable Type	<input type="text" value="CT850A (0)"/>	Turntable	<input type="text" value=""/>	Position (deg)	<input type="text" value="0.0"/>	Tilt (deg)	<input type="text" value="0.0"/>		
Managed By:	<input type="text" value="None"/>	Turntable Rpt: Position: 0.0 Tilt: 0.0 RPM: 0.0			<input type="checkbox"/> Virtual	<input type="checkbox"/> Open	<input type="checkbox"/> Hide		
DUT-1	<input type="text" value=""/>	DUT-2	<input type="text" value=""/>						
DUT-3	<input type="text" value=""/>	DUT-4	<input type="text" value=""/>						
LANforge-1	<input type="text" value="1 (TR-398)"/>	LANforge-2	<input type="text" value="None"/>						
LANforge-3	<input type="text" value="None"/>	LANforge-4	<input type="text" value="None"/>						
Int CX A	Int CX B	Int Atten	Ext CX A	Ext CX B	Ext Atten	Atten Floor	Zero-Atten RSSI 2.4Ghz	Zero-Atten RSSI 5Ghz	
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	Chamber.MobileStations.0	Chamber.TR-398.0	<input type="text" value="1.1.85.3"/>	<input type="text" value="OTA (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value=""/>
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	Chamber.MobileStations.1	Chamber.TR-398.1	<input type="text" value="1.1.85.2"/>	<input type="text" value="OTA (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value=""/>
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	Chamber.MobileStations.2	Chamber.TR-398.2	<input type="text" value="1.1.85.1"/>	<input type="text" value="OTA (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value=""/>
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	Chamber.MobileStations.3	Chamber.TR-398.3	<input type="text" value="1.1.85.0"/>	<input type="text" value="OTA (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value=""/>
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	Chamber.MobileStations.4	Chamber.TR-398.4	<input type="text" value="1.1.1002.3"/>	<input type="text" value="OTA (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value=""/>
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	Chamber.MobileStations.5	Chamber.TR-398.5	<input type="text" value="1.1.1002.2"/>	<input type="text" value="OTA (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value=""/>
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	Chamber.MobileStations.6	Chamber.TR-398.6	<input type="text" value="1.1.1002.1"/>	<input type="text" value="OTA (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value=""/>
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	Chamber.MobileStations.7	Chamber.TR-398.7	<input type="text" value="1.1.1002.0"/>	<input type="text" value="OTA (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value=""/>
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value="Cable (100 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value=""/>
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value="Cable (100 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value=""/>
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value="Cable (100 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value=""/>
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value="Cable (100 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value=""/>
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value="Cable (100 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value=""/>
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value="Cable (100 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value=""/>
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value="Cable (100 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value=""/>
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value="Cable (100 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value=""/>
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value="Cable (100 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value=""/>
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value="Cable (100 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value="None (0 ddb)"/>	<input type="text" value=""/>

E. Configure an Upstream profile using eth1 on the LANforge system.



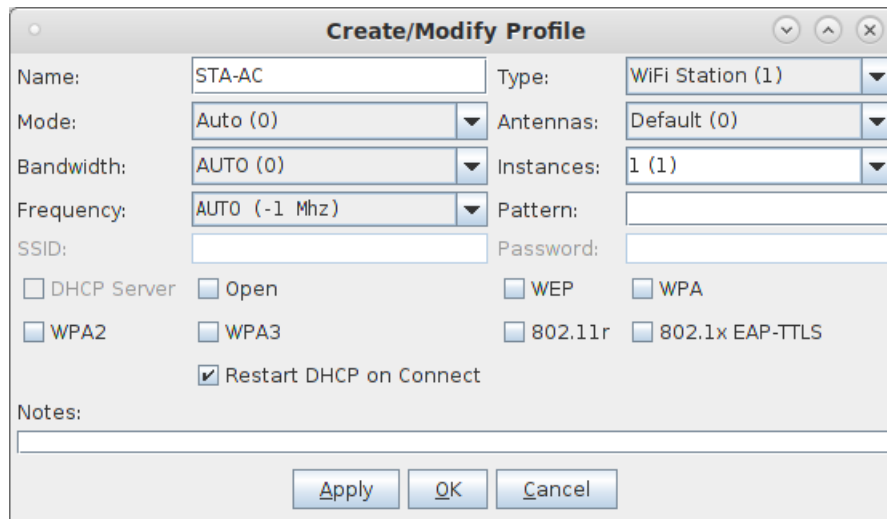
The 'Create/Modify Profile' dialog for an Upstream profile. The Name is 'upstream' and the Type is 'Upstream (Server) (4)'. Mode is 'Auto (0)', Antennas is 'Default (0)', Bandwidth is 'AUTO (0)', Instances is '1 (1)', Frequency is 'AUTO (-1 Mhz)', and SSID is empty. Password is empty. Security options include 'Restart DHCP on Connect' (checked), 'WPA2', 'WPA3', 'WEP', '802.11r', and '802.1x EAP-TTLS'. There are 'Apply', 'OK', and 'Cancel' buttons at the bottom.

Name:	upstream	Type:	Upstream (Server) (4)
Mode:	Auto (0)	Antennas:	Default (0)
Bandwidth:	AUTO (0)	Instances:	1 (1)
Frequency:	AUTO (-1 Mhz)	Pattern:	
SSID:		Password:	
<input type="checkbox"/> DHCP Server <input type="checkbox"/> Open		<input type="checkbox"/> WEP <input type="checkbox"/> WPA	
<input type="checkbox"/> WPA2 <input type="checkbox"/> WPA3		<input type="checkbox"/> 802.11r <input type="checkbox"/> 802.1x EAP-TTLS	
<input checked="" type="checkbox"/> Restart DHCP on Connect			

Notes:

Apply OK Cancel

F. Configure an STA profile on the LANforge system.



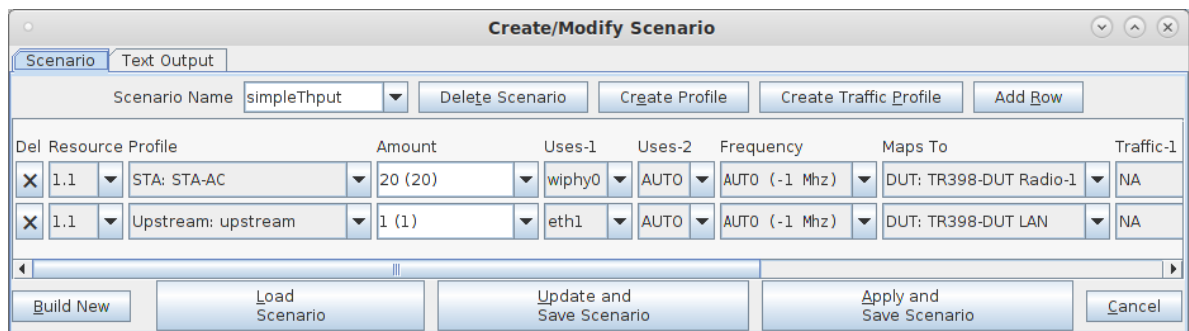
The 'Create/Modify Profile' dialog for a WiFi Station profile. The Name is 'STA-AC' and the Type is 'WiFi Station (1)'. Mode is 'Auto (0)', Antennas is 'Default (0)', Bandwidth is 'AUTO (0)', Instances is '1 (1)', Frequency is 'AUTO (-1 Mhz)', and SSID is empty. Password is empty. Security options include 'Restart DHCP on Connect' (checked), 'WPA2', 'WPA3', 'WEP', '802.11r', and '802.1x EAP-TTLS'. There are 'Apply', 'OK', and 'Cancel' buttons at the bottom.

Name:	STA-AC	Type:	WiFi Station (1)
Mode:	Auto (0)	Antennas:	Default (0)
Bandwidth:	AUTO (0)	Instances:	1 (1)
Frequency:	AUTO (-1 Mhz)	Pattern:	
SSID:		Password:	
<input type="checkbox"/> DHCP Server <input type="checkbox"/> Open		<input type="checkbox"/> WEP <input type="checkbox"/> WPA	
<input type="checkbox"/> WPA2 <input type="checkbox"/> WPA3		<input type="checkbox"/> 802.11r <input type="checkbox"/> 802.1x EAP-TTLS	
<input checked="" type="checkbox"/> Restart DHCP on Connect			

Notes:

Apply OK Cancel

G. 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).



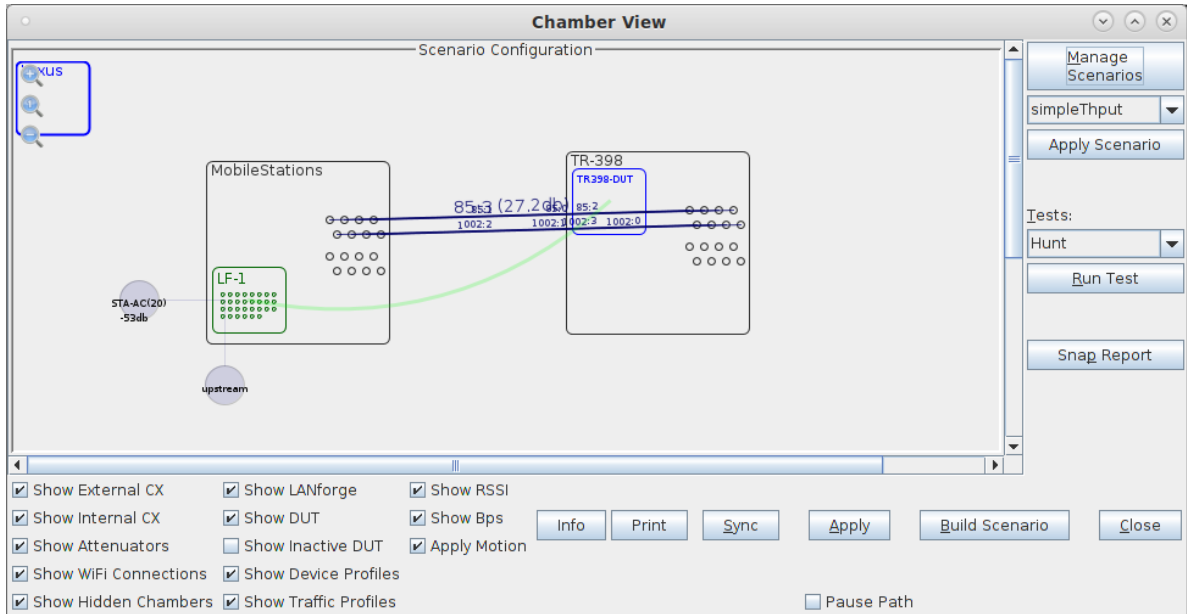
The 'Create/Modify Scenario' dialog. The Scenario Name is 'simpleThput'. It has buttons for 'Delete Scenario', 'Create Profile', 'Create Traffic Profile', and 'Add Row'. Below is a table with columns: Del, Resource Profile, Amount, Uses-1, Uses-2, Frequency, Maps To, and Traffic-1. There are two rows: one for 'STA: STA-AC' mapped to 'DUT: TR398-DUT Radio-1' and another for 'Upstream: upstream' mapped to 'DUT: TR398-DUT LAN'. At the bottom are buttons for 'Build New', 'Load Scenario', 'Update and Save Scenario', 'Apply and Save Scenario', and 'Cancel'.

Del	Resource Profile	Amount	Uses-1	Uses-2	Frequency	Maps To	Traffic-1
X	1.1 STA: STA-AC	20 (20)	wiphy0	AUTO	AUTO (-1 Mhz)	DUT: TR398-DUT Radio-1	NA
X	1.1 Upstream: upstream	1 (1)	eth1	AUTO	AUTO (-1 Mhz)	DUT: TR398-DUT LAN	NA

Build New Load Scenario Update and Save Scenario Apply and Save Scenario Cancel

2. Use Chamber View for Hunt test.

- A. Open Chamber View by clicking on the 'Chamber View' button in the LANforge-GUI. Load appropriate scenario. Apply the Scenario, then Build the scenario.



- B. Select the **Hunt** test and click **Run Test**. You should see the Hunt 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 and packet sizes you wish to send.

The screenshot shows the 'Hunt Test' configuration window in the LANforge GUI. The window has three tabs: 'Settings', 'Advanced Configuration', and 'Report Configuration'. The 'Settings' tab is active. It contains the following fields and controls:

- Selected DUT:** TR398-DUT (dropdown)
- Duration:** 15 sec (15 s) (dropdown)
- Downstream/WiFi Port:** 1.1.10 sta00000 (dropdown)
- Upstream Port:** 1.1.1 eth1 (dropdown)
- Initial Rate:** 85% (dropdown)
- Opposite Rate:** 56Kbps (dropdown)
- Path Loss:** 25 (text input)
- Packet Size:** A list of packet sizes: 60, 142, 256, 512, 1024, MTU, 4000, 9000. The '256' and '512' options are highlighted.
- Custom Packet Sizes:** An empty text area.
- Traffic Type:** A list of traffic types: UDP, TCP, Arm-UDP. The 'UDP' option is highlighted.
- Direction:** A list of directions: DUT Transmit, DUT Receive. The 'DUT Transmit' option is highlighted.
- Attenuator 1:** NONE (0) (dropdown). Below it are checkboxes for 1 through 8, all of which are checked.
- Attenuator 2:** NONE (0) (dropdown). Below it are checkboxes for 1 through 8, all of which are checked.
- Turntable:** NONE (0) (dropdown). Below it is a text input field containing '0...+45..359'.

At the bottom of the window, there are buttons for 'Start', 'Another Iteration', 'Pause', and 'Cancel'.

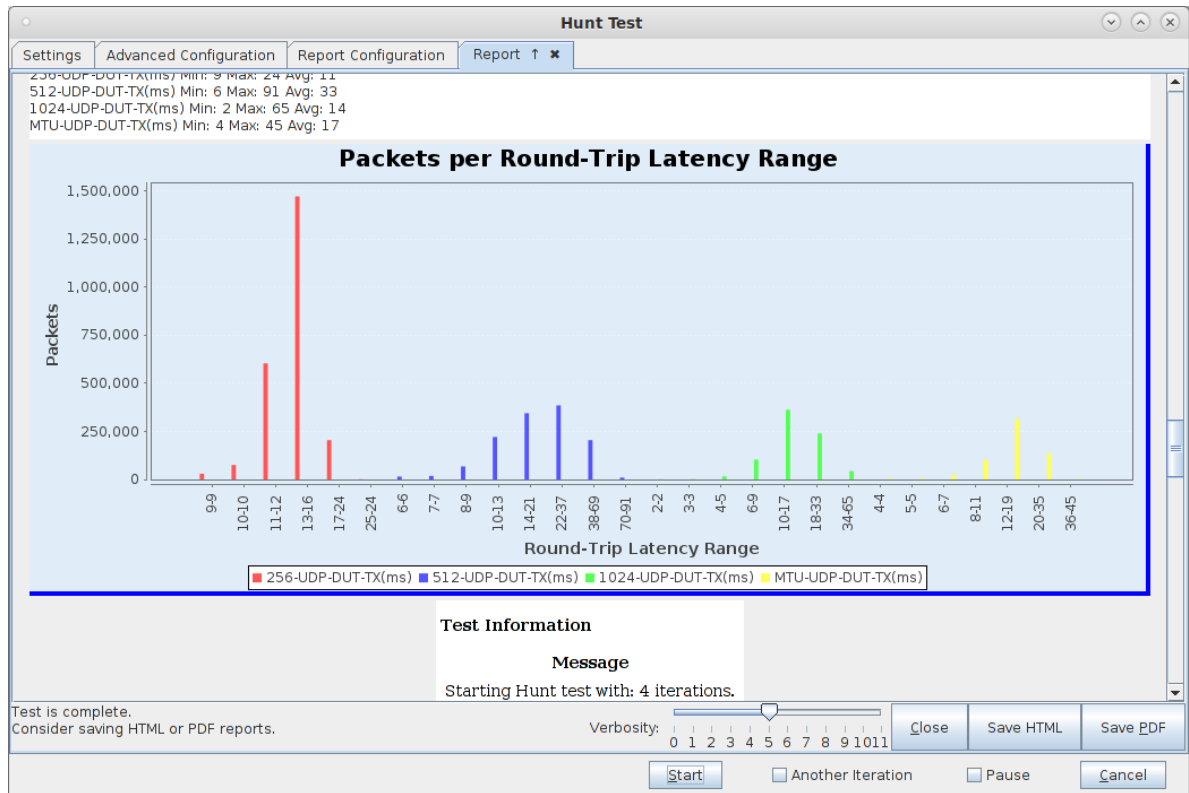
- C. The Advanced Configuration screen can tune the hunt criteria, save/restore configuration and other options.

The screenshot shows the 'Hunt Test' window with the 'Advanced Configuration' tab selected. The window has three tabs: 'Settings', 'Advanced Configuration', and 'Report Configuration'. The 'Advanced Configuration' tab contains several controls: a 'Save' button, a 'Load' button, and a 'Delete' button, each followed by a text field containing 'DEFAULT'. Below these are three dropdown menus: 'IP ToS:' set to 'Best Effort (0)', 'Loop Iterations:' set to 'Single (1)', and a checkbox for 'Pause After Each Iteration' which is unchecked. Further down are three more dropdown menus: 'Multi-Conn:' set to 'One (1)', 'Multi-Pkt:' set to '1000', and 'Hunt Rate Precision:' set to '5% (5%)'. Below these are two more dropdown menus: 'Adjust Calculated Tx Speed:' set to '95% (95%)' and 'Allowed Overdrive Percentage:' set to '5% (5%)'. At the bottom of the window are four buttons: 'Start', 'Another Iteration' (with an unchecked checkbox), 'Pause' (with an unchecked checkbox), and 'Cancel'.

- D. The Report Configuration screen can tune how the reports are generated.

The screenshot shows the 'Hunt Test' window with the 'Report Configuration' tab selected. The window has three tabs: 'Settings', 'Advanced Configuration', and 'Report Configuration'. The 'Report Configuration' tab contains several checkboxes: 'Show Events' (checked), 'Show 3s Bps Averages' (unchecked), 'Show Goodput Graphs' (checked), 'Show Bar Graph Labels' (checked), 'Show Log Entries' (unchecked), 'Show 1m Bps Averages' (checked), 'Show Low-Level Graphs' (unchecked), and 'Auto Save Report' (unchecked). Below these are two dropdown menus: 'Min RSSI Bounds:' set to '-150' and 'Max RSSI Bounds:' set to '0'. Below these are two text fields: 'Graph Background Color:' set to '0xE0ECF8' and 'Operator Information:' which is empty. Below these are two text fields: 'Report Location:' which is empty and 'Notes to be added near the top of the report:' which is a large text area. At the bottom of the window are four buttons: 'Start', 'Another Iteration' (with an unchecked checkbox), 'Pause' (with an unchecked checkbox), and 'Cancel'.

- E. 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.



- F. 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 Hunt Report](#).