

Testing Receiver Sensitivity for a WiFi Device

Goal: Setup and run a Receiver Sensitivity test for an AP using the LAN forge CT523c or similar system in order to test how well the AP can receive packets with different MCS at different RF Signal levels.

In this test scenario, the LANforge CT523c is used to generate packets at specific MCS and spatial streams at a range of attenuation. This example assumes you are familar with Chamber View, and that you have a LANforge system with a wave-2 WiFi Card, 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. This feature is in LANforge version 5.3.9 and higher.



1. Configure Chamber View for Dataplane 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.

•	Create/Modify DUT				
Name	APUT	Image file			
SW Info	v5.62.1	HW Info			
Model Number	AP640	Serial Number	234-23-sd-35		
Serial port		WAN			
LAN		API version	0		
SSID-1	labap	Password-1	Lanforge12345!		
SSID-2		Password-2			
SSID-3		Password-3			
Mgt IP	0.0.0.0	Ant-1	0		
Ant-2	0	Ant-3	0		
BSSID-1	78:d2:94:bf:16:43	BSSID-2	00:00:00:00:00:00		
BSSID-3	00:00:00:00:00	✓ Active	AP DUT		
STA DUT	WEP	WPA	WPA2		
WPA3	✓ Provides DHCP on LAN	Provides DHCP on WAN			
Notes					
<u>Apply</u> <u>OK</u> <u>Cancel</u>					

C. Create a chamber object to hold the DUT, and add the DUT to that chamber. If you have no chambers, you can create a fake chamber, but your test will not be isolated and may not function as desired.

•		c	reate/Modify Cham	ber		×
Name:	DUT	Width:	150	Height:	150	
Chamber Type	TOJOIN-MED (1)	Isolation	80			
		🗌 Pha	ntom 🗌 Virtual 🛛	Open		
DUT-1	APUT <	DUT-2	SurfacePro4 🗸			
DUT-3		DUT-4				
LANforge-1	None 💌	LANforge-2	None 💌			
LANforge-3	None 🗸	LANforge-4	None]		
Int CX A	Int CX B	Int Atten	Ext CX A	Ext CX B	Ext Atten	Atten Floor
-		-		-	-	Long Cable (100) 🔻
•					•	Long Cable (100) 🔻
		-		-	-	Long Cable (100) 🔻
-		-		-	-	Long Cable (100) 🛛 👻
		-		-	-	Long Cable (100) 🔻
~				-	-	Long Cable (100) 🔻
•		•		-	•	Long Cable (100) 🔻
•		•		-	•	Long Cable (100) 🔻
•		•		-	•	Long Cable (100) 🔻
•	•	•		-	•	Long Cable (100) 🔻
•	•	•		-	•	Long Cable (100) 🔻
-	-	-		-	-	Long Cable (100) 👻
-	-	-		-	-	Long Cable (100) 👻
-		-		-	-	Long Cable (100) 👻
-		-	-	-	-	Long Cable (100) 👻
-	-	•	-	-	-	Long Cable (100) 👻
			OK Cancel			

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.

•		C	reate/Modify Chamb	er		×
Name:	Tester	Width:	150	Height:	150	
Chamber Type	TOJOIN-MED (1)	Isolation	80			
		Pha	ntom 🗌 Virtual 🗌	Open		
DUT-1		DUT-2		•		
DUT-3		DUT-4	•	•		
LANforge-1	1 (MobileStations) 💌	LANforge-2	None	-		
LANforge-3	None	LANforge-4	None	-		
Int CX A	Int CX B	Int Atten	Ext CX A	Ext CX B	Ext Atten	Atten Floor
-			Chamber.Tester.0	Chamber.DUT.0	1.1.71.0	OTA (0) 🔽
	-	-	Chamber.Tester.1	Chamber.DUT.1	• 1.1.71.1 💌	OTA (0) 🔻
	·	•	Chamber.Tester.2	Chamber.DUT.2	• 1.1.71.2 💌	OTA (0) 🔻
			Chamber.Tester.3	Chamber.DUT.3	• 1.1.71.3 💌	OTA (0) 🗸
		•		· ·	·	Long Cable (100) 🛛 👻
-				·	· 🔽	Long Cable (100) 👻
	-	-		-	·	Long Cable (100) 👻
		~		-	· 🔽	Long Cable (100) 👻
			•	· ·	·	Long Cable (100) 🛛 👻
-				·	· 🔽	Long Cable (100) 🛛 🖵
-				·	· •	Long Cable (100) 👻
	-	-		· ·	·	Long Cable (100) 🛛 👻
				· ·	·	Long Cable (100) 🛛 👻
-			•	· ·	·	Long Cable (100) 🛛 🖵
-	-			·	· 🔽	Long Cable (100) 👻
		•		· ·	-	Long Cable (100) 👻
			OK Cancel			

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

•	Create/Modify P	rofile	(•	×
Name:	upstream	Туре:	Upstream (4)		•
Mode:	Auto (0) 💌	Antennas:	Default (0)		•
Instances:	1 (1) 🗸	Frequency:	AUTO (-1 Mhz)		•
SSID:		Password:			
Pattern:		DHCP Server	WEP		
WPA	WPA2	WPA3	802.11r		
802.1x EAP-TTLS	Restart DHCP on Connect	Notes:			
					٦
	<u>A</u> pply <u>O</u> K	<u>C</u> ancel			

F. Configure an STA profile on the LANforge system.

•	Create/Modify P	rofile		\odot \land \times	
Name:	STA-AC	Туре:	STA (1)	-	
Mode:	Auto (0) 🗸	Antennas:	Default (0)	-	
Instances:	1(1) 💌	Frequency:	AUTO (-1 Mhz)	-	
SSID:		Password:			
Pattern:		DHCP Server	WEP		
WPA	WPA2	WPA3	🗌 802.11r		
802.1x EAP-TTLS	☑ Restart DHCP on Connect	Notes:			
Apply <u>O</u> K <u>C</u> ancel					

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).

•		Create/Modify Scenario)			
Scenario Text Output						
Scenari	rio Name APThputTest	▼ Delete Scenario Create	Profile Create Traffic <u>P</u> rofile	Add <u>R</u> ow		
Del Resource Profile Mod	d Amount Uses-1	Uses-2 Frequency	Maps To	Traffic-1	Traffic-2	Traffic-3
🗙 1.1 🔻 STA: STA-AC 🔍 🔍	1 (1) 👻 wiphy0	AUTO 🕶 157 (5785 Mhz) 💌	DUT: APUT Radio-1 🔹	udp-down 💌	udp-up 💌	NA
🗙 1.1 🔻 Upstream: upstream 💌 🔍	1 (1) 🔻 eth1	▼ AUTO ▼ AUTO (-1 Mhz) ▼	DUT: APUT LAN	NA	NA 💌	NA
4		II				•
Build Now Load		<u>U</u> pdate and		Apply and		Concol
Scenario		Save Scenario		Save Scenario		Gaucei

2. Use Chamber View to run a Receiver Sensitivity 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 **RX Sensitivity** 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.:

RX Sensitivity Test 📀 🔿 😣					
Settings Report Co	nfiguration				
Selected DUT:	APUT 🗸	Duration:	5 sec (5 s) 💌	-	
Selected WiFi Port:	1.1.7 sta0000	Upstream Port:	1.1.1 eth1 💌		
Path Loss:	23	Rate:	75% 💌		
Channels	Preamble:	MCS			
AUTO No-Change 1 2 3 4	CCK OFDM HT VHT	0 CCK, OFDM, HT 1 CCK, OFDM, HT 2 CCK, OFDM, HT 3 CCK, OFDM, HT 4 OFDM, HT, VH 5 OFDM, HT, VH	r, VHT r, VHT r, VHT r, VHT r r		
Spatial Streams	Bandwidth	Short Gaurd Inte	erval:		
1 2 3 4	20 40 80 160	OFF ON			
Retries:	Tx-Power:	Attenuator:			
No Retry, No-Ack No Retry 2 5 10	17 4 16 15 14 13 12 11 10 9 8 •	1.1.71 0+30700	▼	Ī	
Start Another Iteration Pause Close					

C. 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.



D. 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 RX Sensitivity Report

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