Dataplane Test

Wed Feb 16 04:13:22 PST 2022

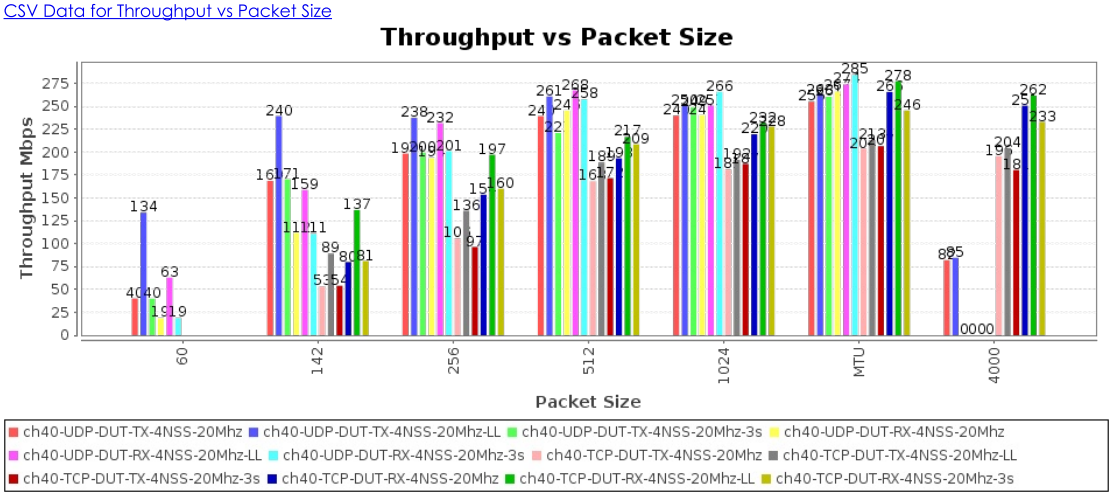
Test Setup Information				
Device Under Test	Name	cisco9130axe		
	Software Version	17.7.1.11	Hardware Version	cisco9130axe
	Model Number	cisco9130axe	Serial Number	FJC2428146G
	SSIDs			
	Passwords			
	BSSIDs			
	Notes	[BLANK]		

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.

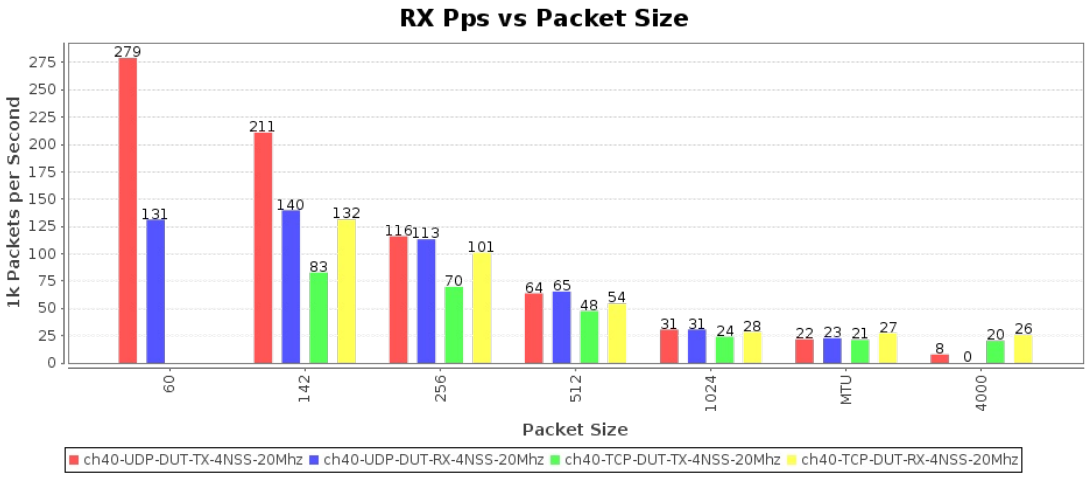
Throughput for each different traffic type. Datasets with names ending in '-LL' will include the IP, TCP, UDP and Ethernet header bytes in their calculation. For Armageddon traffic only, low-level throughput includes the Ethernet FCS and preamble. Other datasets report 'goodput' for the protocol.

CSV Data for Throughput vs Packet Size



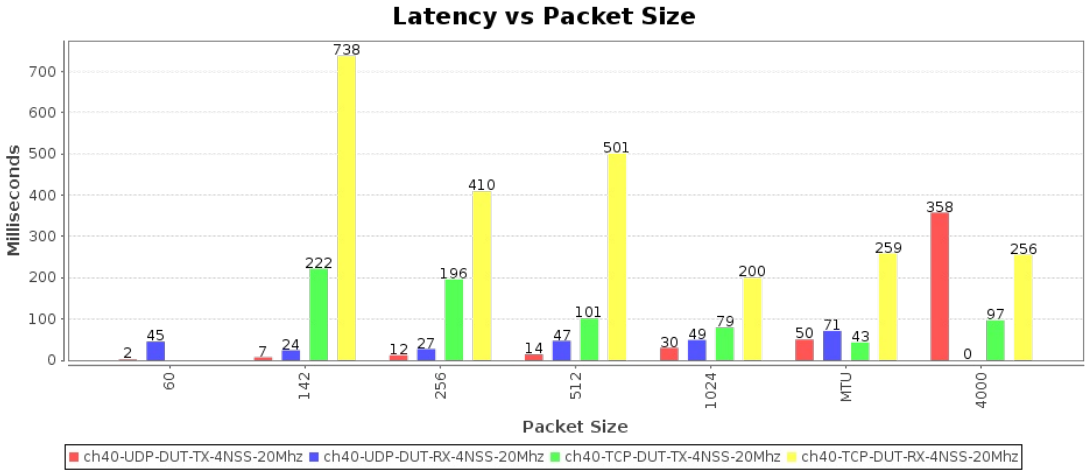
Pps throughput for each different traffic type. The values are estimated packets-per-second over the DUT, but some protocols such as TCP make this difficult to know for certain, so the value is extrapolated.

CSV Data for RX Pps vs Packet Size



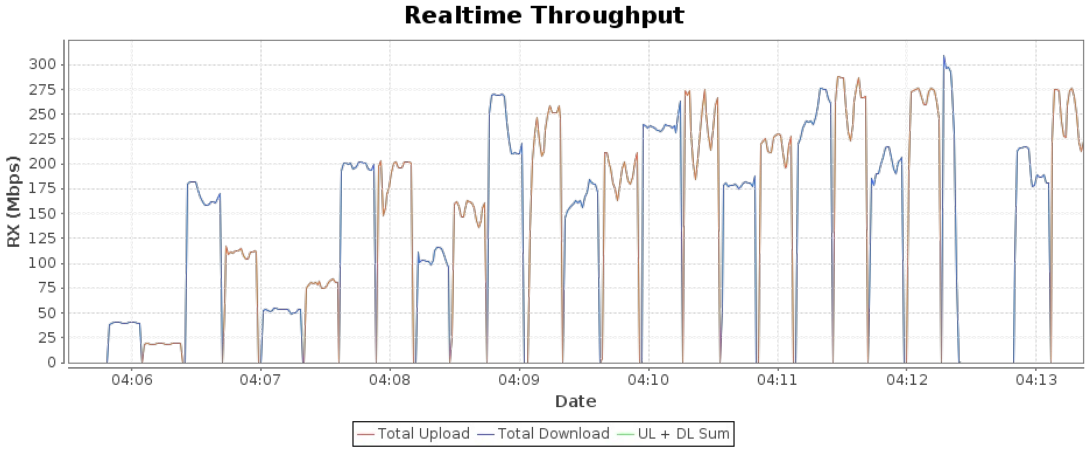
Latency for each different traffic type. If opposite-direction traffic is non-zero, then round-trip time will be reported. Otherwise, one-way latency will be reported.

CSV Data for Latency vs Packet Size



Realtime Graph shows summary download and upload RX Goodput rate of connections created by this test. Goodput does not include Ethernet, IP, UDP/TCP header overhead.

CSV Data for Realtime Throughput



Test Information

Message
Starting dataplane test with: 28 iterations.
Skipping packet size not supported by TCP: 60

Skipping packet size not supported by TCP: 60

Constant values related to the table below.

Iteration-Duration	15s

CSV data focussed on throughput. The values reported are gathered at the end of the test iteration before traffic is stopped. The test iterations consider 'Received' traffic to be received in the dominant direction. So, if the iteration is DUT-TX, then Received traffic is traffic received on the Station from the AP. If the iteration is DUT-RX, then Received traffic is received on Ethernet port from DUT and sent by the station. Columns starting with RSSI are from the perspective of the Station, so Tx-Rate is the Station transmit Phy Rate, and Rx-Rate is the Phy Rate received by the station. Rpt-Mode is negotiated mode, not necessarily Phy Rate mode.

Channel	Frequency	Security	NSS	Cfg-Mode	Bandwidth	Pkt	Traffic-Type	Direction	Atten	Rotation	Offered-1m	Rx-Bps	Rx-Bps-1m	Rx-Bps-LL	Rx-Bps-3s	RSSI	Tx-Failed	Tx-Failed%	Tx-Rate	Rx-Rate	Rpt-Mode	Rpt-Mode-Brief
40	5200	WPA2	4	AUTO	20	60	UDP	DUT-TX	NA	NA	95.324 Mbps	40.103 Mbps	40.204 Mbps	134.013 Mbps	40.046 Mbps	-66	0 / 10073454	0	57.8 Mbps	289 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	60	UDP	DUT-RX	NA	NA	18.958 Mbps	18.835 Mbps	18.896 Mbps	62.985 Mbps	18.928 Mbps	-61	382 / 2365421	0.016	346.7 Mbps	260 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	142	UDP	DUT-TX	NA	NA	320.731 Mbps	167.323 Mbps	168.705 Mbps	239.561 Mbps	170.51 Mbps	-66	0 / 6227663	0	260 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	142	UDP	DUT-RX	NA	NA	111.854 Mbps	110.928 Mbps	111.831 Mbps	158.8 Mbps	110.956 Mbps	-60	767 / 2097143	0.037	346.7 Mbps	346.8 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	142	TCP	DUT-TX	NA	NA	53.753 Mbps	52.913 Mbps	53.352 Mbps	89.126 Mbps	54.101 Mbps	-65	0 / 1478718	0	346.7 Mbps	289 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	142	TCP	DUT-RX	NA	NA	83.916 Mbps	79.359 Mbps	80 Mbps	136.811 Mbps	81.161 Mbps	-65	765 / 1986293	0.039	346.7 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	256	UDP	DUT-TX	NA	NA	327.747 Mbps	198.33 Mbps	198.555 Mbps	237.524 Mbps	199.824 Mbps	-65	0 / 2985157	0	346.7 Mbps	288.9 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	256	UDP	DUT-RX	NA	NA	193.833 Mbps	193.265 Mbps	193.778 Mbps	231.809 Mbps	201.274 Mbps	-59	384 / 1817270	0.021	346.7 Mbps	312 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	256	TCP	DUT-TX	NA	NA	105.973 Mbps	105.615 Mbps	105.91 Mbps	136.031 Mbps	96.501 Mbps	-66	0 / 1037453	0	346.7 Mbps	289 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	256	TCP	DUT-RX	NA	NA	158.035 Mbps	153.107 Mbps	153.619 Mbps	197.295 Mbps	160.166 Mbps	-64	384 / 1524490	0.025	346.7 Mbps	289 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	512	UDP	DUT-TX	NA	NA	328.642 Mbps	238.601 Mbps	239.503 Mbps	260.905 Mbps	221.041 Mbps	-66	0 / 1320329	0	346.7 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	512	UDP	DUT-RX	NA	NA	247.392 Mbps	244.55 Mbps	245.709 Mbps	267.666 Mbps	257.841 Mbps	-62	384 / 981021	0.039	346.7 Mbps	346.8 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	512	TCP	DUT-TX	NA	NA	168.182 Mbps	167.603 Mbps	168.22 Mbps	188.791 Mbps	171.707 Mbps	-66	0 / 733186	0	260.1 Mbps	289 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	512	TCP	DUT-RX	NA	NA	199.115 Mbps	192.399 Mbps	193.306 Mbps	216.826 Mbps	208.659 Mbps	-64	384 / 923476	0.042	346.7 Mbps	288.9 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	1024	UDP	DUT-TX	NA	NA	328.993 Mbps	238.845 Mbps	240.013 Mbps	250.278 Mbps	249.228 Mbps	-66	0 / 729090	0	346.7 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	1024	UDP	DUT-RX	NA	NA	244.326 Mbps	239.339 Mbps	240.759 Mbps	251.056 Mbps	266.17 Mbps	-61	576 / 459933	0.125	346.7 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	1024	TCP	DUT-TX	NA	NA	182.313 Mbps	179.957 Mbps	181.147 Mbps	191.556 Mbps	187.284 Mbps	-66	0 / 356619	0	289 Mbps	385.3 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	1024	TCP	DUT-RX	NA	NA	222.359 Mbps	217.953 Mbps	219.632 Mbps	231.897 Mbps	228.138 Mbps	-66	384 / 429086	0.089	346.7 Mbps	289 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	MTU	UDP	DUT-TX	NA	NA	329.833 Mbps	253.399 Mbps	255.296 Mbps	262.58 Mbps	260.636 Mbps	-65	0 / 425549	0	346.7 Mbps	288.9 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	MTU	UDP	DUT-RX	NA	NA	271.785 Mbps	266.599 Mbps	266.636 Mbps	274.244 Mbps	284.664 Mbps	-62	384 / 341706	0.112	346.7 Mbps	312 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	MTU	TCP	DUT-TX	NA	NA	204.894 Mbps	202.4 Mbps	203.95 Mbps	213.079 Mbps	206.672 Mbps	-65	0 / 302753	0	346.7 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	MTU	TCP	DUT-RX	NA	NA	270.293 Mbps	265.777 Mbps	265.875 Mbps	277.629 Mbps	245.738 Mbps	-67	384 / 405548	0.095	346.7 Mbps	385.3 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	4000	UDP	DUT-TX	NA	NA	329.849 Mbps	81.471 Mbps	82.085 Mbps	84.698 Mbps	0 bps	-68	0 / 483827	0	346.7 Mbps	288.9 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	4000	UDP	DUT-RX	NA	NA	233.689 Mbps	0 bps	0 bps	0 bps	0 bps	-61	768 / 324709	0.237	346.7 Mbps	288.9 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	4000	TCP	DUT-TX	NA	NA	195.799 Mbps	194.29 Mbps	195.729 Mbps	204.488 Mbps	180.537 Mbps	-66	0 / 306584	0	288.9 Mbps	289 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	4000	TCP	DUT-RX	NA	NA	253.322 Mbps	248.867 Mbps	250.862 Mbps	261.93 Mbps	233.314 Mbps	-67	576 / 394134	0.146	346.7 Mbps	346.7 Mbps	802.11an-AC	802.11ac

CSV data focussed on TX and RX Link Rate and RSSI reports. The values reported are gathered at the end of the test iteration before traffic is stopped. The Phy Rate and RSSI are from the perspective of the Station, so Tx-MCS is MCS at which station is sending to the AP, and Rx-MCS is MCS at which the AP is sending to the station.

Channel	Frequency	Security	NSS	Cfg-Mode	Bandwidth	Pkt	Traffic-Type	Direction	Tx-Mode-Rpt	Tx-NSS-Rpt	Tx-MCS	Tx-BW-Rpt	Rx-Mode-Rpt	Rx-NSS-Rpt	Rx-MCS	Rx-BW-Rpt	RSSI dBm	Tx-Phy-Rate	Rx-Phy-Rate
40	5200	WPA2	4	AUTO	20	60	UDP	DUT-TX	VHT	4	1	20	3	VHT	1	20	-66 [-70, -77, -69, -67]	57.8 MBit/s VHT-MCS 1 short GI VHT-NSS 4	289.0 MBit/s VHT-MCS 9 short GI VHT-NSS 3
40	5200	WPA2	4	AUTO	20	60	UDP	DUT-RX	VHT	4	8	20	3	VHT	8	20	-62 [-71, -77, -68, -67]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	260.0 MBit/s VHT-MCS 8 short GI VHT-NSS 3
40	5200	WPA2	4	AUTO	20	142	UDP	DUT-TX	VHT	4	6	20	4	VHT	6	20	-67 [-71, -76, -70, -68]	260.0 MBit/s VHT-MCS 6 short GI VHT-NSS 4	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	142	UDP	DUT-RX	VHT	4	8	20	4	VHT	8	20	-60 [-72, -77, -69, -68]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	346.8 MBit/s VHT-MCS 9 VHT-NSS 4
40	5200	WPA2	4	AUTO	20	142	TCP	DUT-TX	VHT	4	8	20	3	VHT	8	20	-66 [-71, -77, -69, -66]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	289.0 MBit/s VHT-MCS 9 short GI VHT-NSS 3
40	5200	WPA2	4	AUTO	20	142	TCP	DUT-RX	VHT	4	8	20	4	VHT	8	20	-65 [-70, -79, -71, -65]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	256	UDP	DUT-TX	VHT	4	8	20	4	VHT	8	20	-65 [-71, -77, -68, -67]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	288.9 MBit/s VHT-MCS 7 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	256	UDP	DUT-RX	VHT	4	8	20	4	VHT	8	20	-60 [-71, -78, -69, -67]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	312.0 MBit/s VHT-MCS 8 VHT-NSS 4
40	5200	WPA2	4	AUTO	20	256	TCP	DUT-TX	VHT	4	8	20	3	VHT	8	20	-66 [-69, -77, -70, -66]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	289.0 MBit/s VHT-MCS 9 short GI VHT-NSS 3

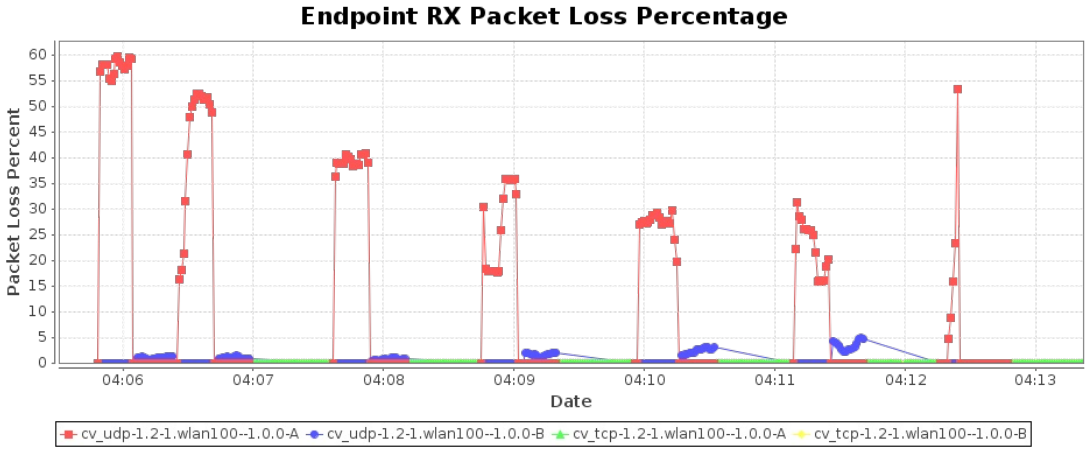
40	5200	WPA2	4	AUTO	20	256	TCP	DUT-RX	VHT	4	8	20	3	VHT	8	20	-65 [-70, -77, -72, -65]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	289.0 MBit/s VHT-MCS 9 short GI VHT-NSS 3
40	5200	WPA2	4	AUTO	20	512	UDP	DUT-TX	VHT	4	8	20	4	VHT	8	20	-67 [-71, -77, -70, -69]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	512	UDP	DUT-RX	VHT	4	6	20	4	VHT	6	20	-63 [-70, -78, -74, -68]	260.0 MBit/s VHT-MCS 6 short GI VHT-NSS 4	346.8 MBit/s VHT-MCS 9 VHT-NSS 4
40	5200	WPA2	4	AUTO	20	512	TCP	DUT-TX	VHT	3	9	20	3	VHT	9	20	-66 [-70, -77, -73, -66]	289.0 MBit/s VHT-MCS 9 short GI VHT-NSS 3	289.0 MBit/s VHT-MCS 9 short GI VHT-NSS 3
40	5200	WPA2	4	AUTO	20	512	TCP	DUT-RX	VHT	4	8	20	4	VHT	8	20	-65 [-70, -77, -69, -65]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	288.9 MBit/s VHT-MCS 7 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	1024	UDP	DUT-TX	VHT	4	8	20	4	VHT	8	20	-66 [-71, -78, -69, -68]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	1024	UDP	DUT-RX	VHT	4	8	20	4	VHT	8	20	-61 [-72, -80, -70, -67]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	1024	TCP	DUT-TX	VHT	3	9	20	4	VHT	9	20	-67 [-71, -78, -70, -69]	289.0 MBit/s VHT-MCS 9 short GI VHT-NSS 3	385.3 MBit/s VHT-MCS 9 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	1024	TCP	DUT-RX	VHT	4	8	20	4	VHT	8	20	-67 [-70, -80, -70, -67]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	312.0 MBit/s VHT-MCS 8 VHT-NSS 4
40	5200	WPA2	4	AUTO	20	MTU	UDP	DUT-TX	VHT	4	8	20	4	VHT	8	20	-65 [-68, -78, -68, -67]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	288.9 MBit/s VHT-MCS 7 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	MTU	UDP	DUT-RX	VHT	4	8	20	4	VHT	8	20	-62 [-72, -80, -70, -71]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	312.0 MBit/s VHT-MCS 8 VHT-NSS 4
40	5200	WPA2	4	AUTO	20	MTU	TCP	DUT-TX	VHT	4	8	20	4	VHT	8	20	-66 [-71, -78, -69, -68]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	MTU	TCP	DUT-RX	VHT	4	8	20	4	VHT	8	20	-68 [-73, -79, -70, -71]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	385.3 MBit/s VHT-MCS 9 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	4000	UDP	DUT-TX	VHT	4	8	20	4	VHT	8	20	-68 [-73, -77, -69, -71]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	288.9 MBit/s VHT-MCS 7 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	4000	UDP	DUT-RX	VHT	4	8	20	4	VHT	8	20	-61 [-71, -77, -71, -65]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	288.9 MBit/s VHT-MCS 7 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	4000	TCP	DUT-TX	VHT	4	7	20	4	VHT	7	20	-67 [-72, -77, -70, -67]	288.9 MBit/s VHT-MCS 7 short GI VHT-NSS 4	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	4000	TCP	DUT-RX	VHT	4	8	20	4	VHT	8	20	-68 [-71, -77, -73, -68]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4

Brief csv report, may be imported into third-party tools.

Step Index	Position [Deg]	Attenuation [dB]	Throughput [Mbps]	Beacon RSSI [dBm]	Data RSSI [dBm]
0	NA	0	40.10	-59	-66
1	NA	0	18.84	-61	-61
2	NA	0	167.32	-60	-66
3	NA	0	110.93	-60	-60
4	NA	0	52.91	-59	-65
5	NA	0	79.36	-60	-65
6	NA	0	198.33	-60	-65
7	NA	0	193.27	-59	-59
8	NA	0	105.61	-59	-66
9	NA	0	153.11	-59	-64
10	NA	0	238.60	-62	-66
11	NA	0	244.55	-62	-62
12	NA	0	167.60	-60	-66
13	NA	0	192.40	-60	-64
14	NA	0	238.84	-61	-66
15	NA	0	239.34	-60	-61
16	NA	0	179.96	-61	-66
17	NA	0	217.95	-60	-66
18	NA	0	253.40	-59	-65
19	NA	0	266.60	-62	-62
20	NA	0	202.40	-60	-65
21	NA	0	265.78	-62	-67
22	NA	0	81.47	-62	-68
23	NA	0	0	-60	-61
24	NA	0	194.29	-61	-66
25	NA	0	248.87	-61	-67

Packet Loss Percentage graph shows the percentage of lost packets as detected by the receiving endpoint due to packet gaps. If there is full packet loss, then this will not report any loss since there will be no gap to detect. TCP protocol tests will never show drops since the TCP protcol will retransmit any lost frames.

CSV Data for Endpoint RX Packet Loss Percentage



Test configuration and LANforge software version	
AP Tx Power:	0
Path Loss	10
Requested Speed	85%
Requested Opposite Speed	0
Multi-Conn	1
Armageddon Multi-Pkt	1000
ToS	0
Station Bringup Wait:	30 sec (30 s)
First Byte Wait:	30 sec (30 s)
Duration:	15 sec (15 s)
Settle Time:	1 sec (1 s)
Send Buffer Size:	OS Default
Receive Buffer Size:	OS Default
RvR Helper Script:	
Channels	AUTO
Spatial Streams	AUTO
Bandwidth	No-Change
Attenuator-1	0
Attenuation-1	0..+50..950
Attenuator-2	0
Attenuation-2	0..+50..950
Turntable Chamber	0
Turntable Angles	0..+45..359
Modes	Auto
Packet Size	60, 142, 256, 512, 1024, MTU, 4000
Security	AUTO
Traffic Type	UDP, TCP
Direction	DUT Transmit, DUT Receive
Upstream Port	1.1.eth2 Firmware: 0x80000aef, 1.1876.0 Resource: ct523c-3011
WiFi Port	1.1.wlan100 Firmware: 10.4b-ct-9984-xtH-13-b1b524c8e5 Resource: ct523c-3011
Outer Loop is Attenuation	false
Show Events	true
Auto Save Report	true
Pass-Fail Tput Criteria	
Build Date	Thu 13 Jan 2022 01:27:32 PM PST
Build Version	5.4.4
Git Version	c419229103db6f1917b40d5169b2c9926b273e51

Key Performance Indicators CSV

META Information for Dataplane Test
