Dataplane Test

Tue Feb 15 06:27:48 PST 2022

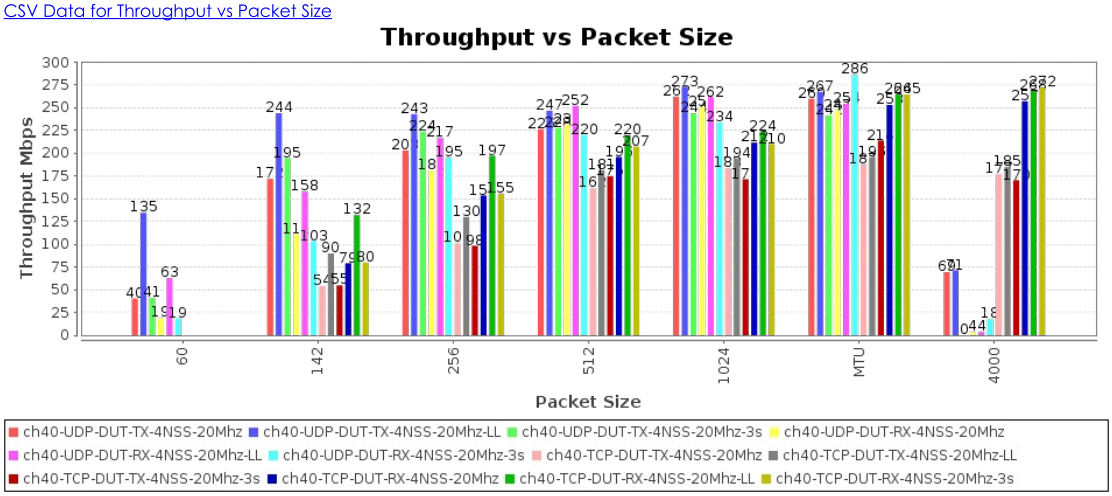
Test Setup Information				
Device Under Test	Name	cisco9130axe		
	Software Version	17.7.1.11	Hardware Version	cisco9130axe
	Model Number	cisco9130axe	Serial Number	FJC2428146G
	SSIDs			
	Passwords			
	BSSIDs			
	Notes	[BLANK]		

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.

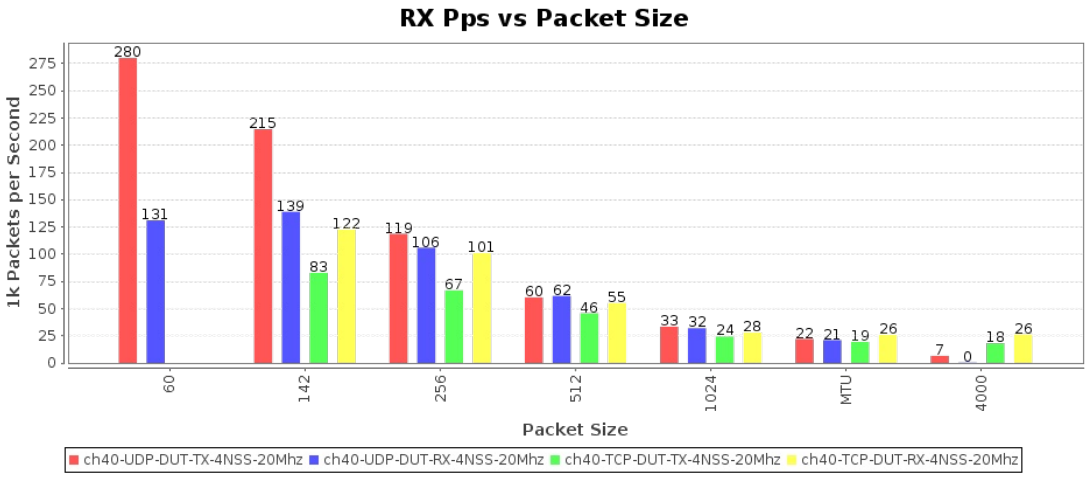
Throughput for each different traffic type. Datasets with names ending in '-LL' will include the IP, TCP, UDP and Ethernet header bytes in their calculation. For Armageddon traffic only, low-level throughput includes the Ethernet FCS and preamble. Other datasets report 'goodput' for the protocol.

CSV Data for Throughput vs Packet Size



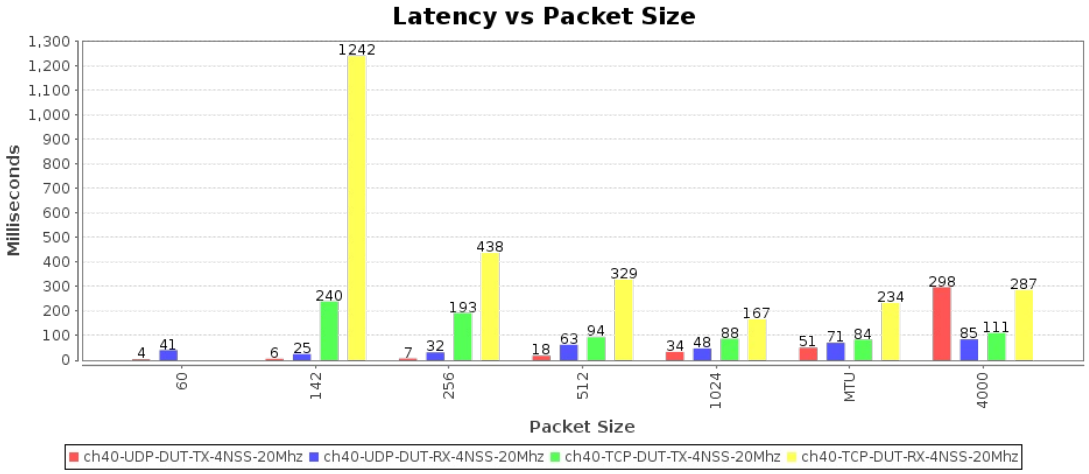
Pps throughput for each different traffic type. The values are estimated packets-per-second over the DUT, but some protocols such as TCP make this difficult to know for certain, so the value is extrapolated.

CSV Data for RX Pps vs Packet Size



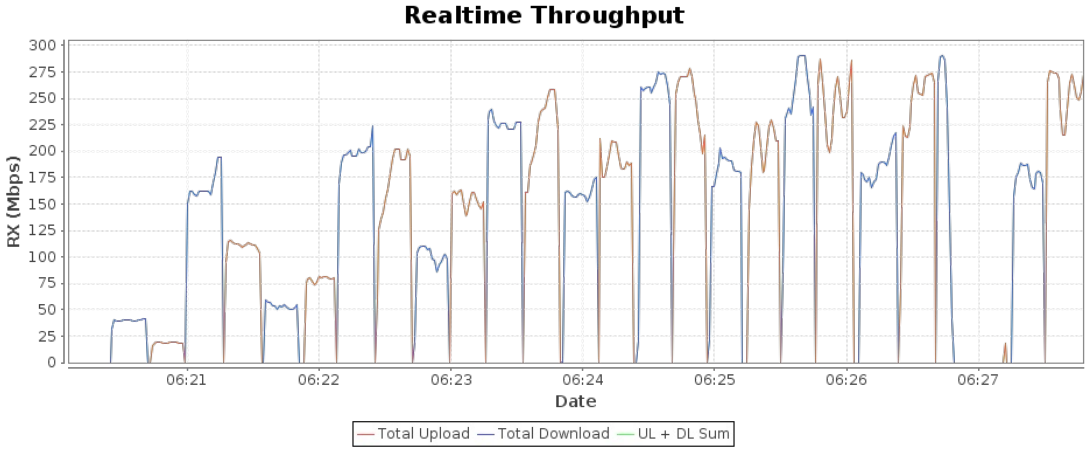
Latency for each different traffic type. If opposite-direction traffic is non-zero, then round-trip time will be reported. Otherwise, one-way latency will be reported.

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	75.959 Mbps	40.238 Mbps	40.351 Mbps	134.502 Mbps	40.969 Mbps	-65	0 / 8104168	0	57.8 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	60	UDP	DUT-RX	NA	NA	18.92 Mbps	18.787 Mbps	18.859 Mbps	62.864 Mbps	18.645 Mbps	-60	381 / 1966637	0.019	346.7 Mbps	289 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	142	UDP	DUT-TX	NA	NA	329.57 Mbps	170.624 Mbps	171.757 Mbps	243.895 Mbps	194.682 Mbps	-65	0 / 6522234	0	346.7 Mbps	385.3 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	142	UDP	DUT-RX	NA	NA	111.091 Mbps	110.308 Mbps	111.108 Mbps	157.773 Mbps	103.474 Mbps	-60	573 / 2205068	0.026	260 Mbps	385.3 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	142	TCP	DUT-TX	NA	NA	54.926 Mbps	53.725 Mbps	54.134 Mbps	89.913 Mbps	54.824 Mbps	-68	0 / 1337633	0	346.7 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	142	TCP	DUT-RX	NA	NA	85.906 Mbps	79.116 Mbps	79.137 Mbps	132.023 Mbps	79.973 Mbps	-66	955 / 1963551	0.049	231.1 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	256	UDP	DUT-TX	NA	NA	327.681 Mbps	202.964 Mbps	203.154 Mbps	243.025 Mbps	223.811 Mbps	-68	0 / 2912444	0	234 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	256	UDP	DUT-RX	NA	NA	181.255 Mbps	180.985 Mbps	181.269 Mbps	216.846 Mbps	194.958 Mbps	-60	384 / 1595483	0.024	288.9 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	256	TCP	DUT-TX	NA	NA	102.395 Mbps	100.826 Mbps	101.089 Mbps	129.935 Mbps	98.383 Mbps	-65	0 / 985986	0	346.7 Mbps	288.9 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	256	TCP	DUT-RX	NA	NA	154.086 Mbps	153.053 Mbps	153.55 Mbps	197.213 Mbps	155.383 Mbps	-65	384 / 1520658	0.025	346.7 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	512	UDP	DUT-TX	NA	NA	328.205 Mbps	225.916 Mbps	226.464 Mbps	246.701 Mbps	227.588 Mbps	-65	0 / 1352182	0	346.7 Mbps	288.9 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	512	UDP	DUT-RX	NA	NA	233.076 Mbps	230.594 Mbps	231.465 Mbps	252.15 Mbps	220.205 Mbps	-61	384 / 925184	0.042	260 Mbps	288.9 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	512	TCP	DUT-TX	NA	NA	161.841 Mbps	161.263 Mbps	161.586 Mbps	181.345 Mbps	174.886 Mbps	-65	0 / 687831	0	346.7 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	512	TCP	DUT-RX	NA	NA	196.477 Mbps	195.15 Mbps	195.826 Mbps	219.604 Mbps	207.294 Mbps	-65	384 / 823496	0.047	346.7 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	1024	UDP	DUT-TX	NA	NA	327.929 Mbps	261.471 Mbps	261.912 Mbps	273.114 Mbps	243.918 Mbps	-65	0 / 652938	0	260 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	1024	UDP	DUT-RX	NA	NA	254.327 Mbps	250.101 Mbps	250.782 Mbps	261.508 Mbps	234.191 Mbps	-62	384 / 480046	0.08	346.7 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	1024	TCP	DUT-TX	NA	NA	184.301 Mbps	182.73 Mbps	183.268 Mbps	193.8 Mbps	171.457 Mbps	-67	0 / 355347	0	260 Mbps	289 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	1024	TCP	DUT-RX	NA	NA	211.743 Mbps	210.908 Mbps	211.659 Mbps	223.728 Mbps	210.128 Mbps	-67	576 / 435705	0.132	346.7 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	MTU	UDP	DUT-TX	NA	NA	328.395 Mbps	259.116 Mbps	259.887 Mbps	267.302 Mbps	241.707 Mbps	-66	0 / 434665	0	346.7 Mbps	289 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	MTU	UDP	DUT-RX	NA	NA	252.68 Mbps	246.634 Mbps	247.322 Mbps	254.379 Mbps	286.205 Mbps	-61	576 / 316270	0.182	346.7 Mbps	288.9 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	MTU	TCP	DUT-TX	NA	NA	187.392 Mbps	187.092 Mbps	187.289 Mbps	195.67 Mbps	213.916 Mbps	-66	0 / 326407	0	346.7 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	MTU	TCP	DUT-RX	NA	NA	256.823 Mbps	252.492 Mbps	253.02 Mbps	264.222 Mbps	264.567 Mbps	-69	576 / 385941	0.149	289 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	4000	UDP	DUT-TX	NA	NA	328.294 Mbps	69.044 Mbps	69.231 Mbps	71.435 Mbps	0 bps	-65	0 / 480954	0	346.7 Mbps	289 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	4000	UDP	DUT-RX	NA	NA	263.396 Mbps	3.526 Mbps	3.538 Mbps	3.65 Mbps	17.781 Mbps	-61	384 / 368577	0.104	346.7 Mbps	289 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	4000	TCP	DUT-TX	NA	NA	177.895 Mbps	176.632 Mbps	176.927 Mbps	184.79 Mbps	170.322 Mbps	-63	0 / 273082	0	346.7 Mbps	288.9 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	4000	TCP	DUT-RX	NA	NA	260.82 Mbps	256.536 Mbps	257.018 Mbps	268.409 Mbps	272.235 Mbps	-64	384 / 442718	0.087	346.7 Mbps	288.9 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	4	VHT	1	20	-65 [-69, -77, -69, -65]	57.8 MBit/s VHT-MCS 1 short GI VHT-NSS 4	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	60	UDP	DUT-RX	VHT	4	8	20	3	VHT	8	20	-59 [-70, -77, -71, -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	UDP	DUT-TX	VHT	4	8	20	4	VHT	8	20	-66 [-70, -77, -69, -67]	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	142	UDP	DUT-RX	VHT	3	8	20	4	VHT	8	20	-60 [-70, -76, -69, -67]	260.0 MBit/s VHT-MCS 8 short GI VHT-NSS 3	385.3 MBit/s VHT-MCS 9 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	142	TCP	DUT-TX	VHT	4	8	20	4	VHT	8	20	-69 [-73, -79, -70, -72]	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	142	TCP	DUT-RX	VHT	4	5	20	4	VHT	5	20	-66 [-70, -78, -72, -66]	231.1 MBit/s VHT-MCS 5 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	6	20	4	VHT	6	20	-69 [-72, -77, -72, -70]	234.0 MBit/s VHT-MCS 6 VHT-NSS 4	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	256	UDP	DUT-RX	VHT	4	7	20	4	VHT	7	20	-61 [-72, -77, -73, -70]	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	256	TCP	DUT-TX	VHT	4	8	20	4	VHT	8	20	-66 [-70, -76, -69, -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

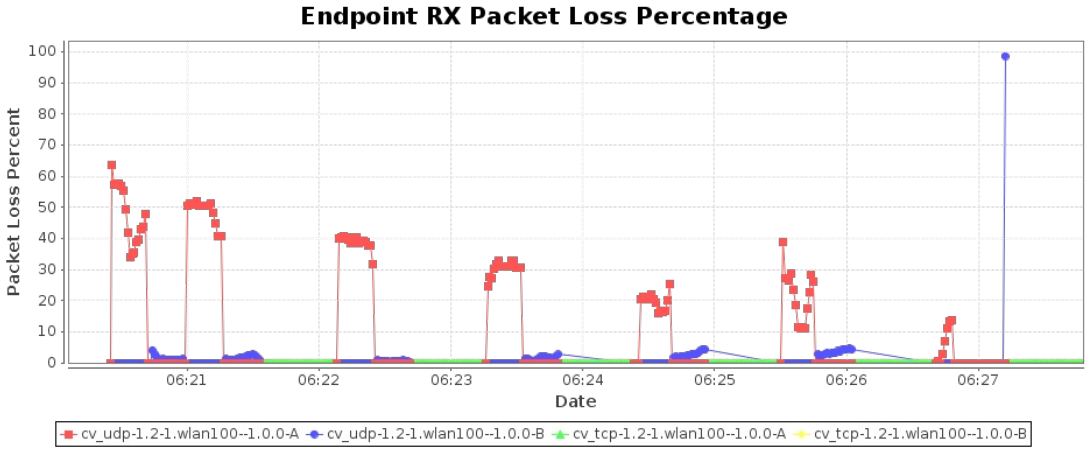
40	5200	WPA2	4	AUTO	20	256	TCP	DUT-RX	VHT	4	8	20	4	VHT	8	20	-66 [-69, -77, -73, -66]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	512	UDP	DUT-TX	VHT	4	8	20	4	VHT	8	20	-66 [-71, -76, -70, -66]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	288.9 MBit/s VHT-MCS 7 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	512	UDP	DUT-RX	VHT	4	6	20	4	VHT	6	20	-61 [-71, -76, -70, -66]	260.0 MBit/s VHT-MCS 6 short GI VHT-NSS 4	288.9 MBit/s VHT-MCS 7 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	512	TCP	DUT-TX	VHT	4	8	20	4	VHT	8	20	-65 [-70, -78, -70, -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	512	TCP	DUT-RX	VHT	3	8	20	4	VHT	8	20	-66 [-70, -77, -69, -67]	260.0 MBit/s VHT-MCS 8 short GI VHT-NSS 3	288.9 MBit/s VHT-MCS 7 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	1024	UDP	DUT-TX	VHT	3	8	20	4	VHT	8	20	-66 [-69, -80, -69, -67]	260.0 MBit/s VHT-MCS 8 short GI VHT-NSS 3	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	1024	UDP	DUT-RX	VHT	3	8	20	4	VHT	8	20	-64 [-72, -78, -74, -68]	260.0 MBit/s VHT-MCS 8 short GI VHT-NSS 3	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	1024	TCP	DUT-TX	VHT	4	6	20	3	VHT	6	20	-68 [-72, -77, -71, -68]	260.0 MBit/s VHT-MCS 6 short GI VHT-NSS 4	289.0 MBit/s VHT-MCS 9 short GI VHT-NSS 3
40	5200	WPA2	4	AUTO	20	1024	TCP	DUT-RX	VHT	4	8	20	4	VHT	8	20	-68 [-72, -79, -69, -71]	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	UDP	DUT-TX	VHT	4	8	20	3	VHT	8	20	-67 [-71, -79, -70, -67]	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	MTU	UDP	DUT-RX	VHT	4	8	20	4	VHT	8	20	-62 [-71, -77, -69, -68]	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	TCP	DUT-TX	VHT	4	8	20	4	VHT	8	20	-66 [-69, -78, -69, -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	MTU	TCP	DUT-RX	VHT	3	9	20	4	VHT	9	20	-70 [-73, -77, -73, -71]	289.0 MBit/s VHT-MCS 9 short GI VHT-NSS 3	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	4000	UDP	DUT-TX	VHT	4	8	20	3	VHT	8	20	-66 [-72, -80, -69, -67]	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	4000	UDP	DUT-RX	VHT	4	8	20	3	VHT	8	20	-61 [-71, -79, -70, -68]	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	4000	TCP	DUT-TX	VHT	4	8	20	4	VHT	8	20	-63 [-68, -75, -71, -63]	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-RX	VHT	4	8	20	4	VHT	8	20	-64 [-67, -76, -70, -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

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	40.24	-59	-65
1	NA	0	18.79	-60	-60
2	NA	0	170.62	-59	-65
3	NA	0	110.31	-60	-60
4	NA	0	53.72	-61	-68
5	NA	0	79.12	-59	-66
6	NA	0	202.96	-62	-68
7	NA	0	180.99	-61	-60
8	NA	0	100.83	-60	-65
9	NA	0	153.05	-60	-65
10	NA	0	225.92	-60	-65
11	NA	0	230.59	-61	-61
12	NA	0	161.26	-59	-65
13	NA	0	195.15	-60	-65
14	NA	0	261.47	-59	-65
15	NA	0	250.10	-62	-62
16	NA	0	182.73	-61	-67
17	NA	0	210.91	-61	-67
18	NA	0	259.12	-60	-66
19	NA	0	246.63	-61	-61
20	NA	0	187.09	-59	-66
21	NA	0	252.49	-61	-69
22	NA	0	69.04	-60	-65
23	NA	0	3.53	-61	-61
24	NA	0	176.63	-59	-63
25	NA	0	256.54	-59	-64

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
