Dataplane Test

Tue Feb 15 23:40:38 PST 2022

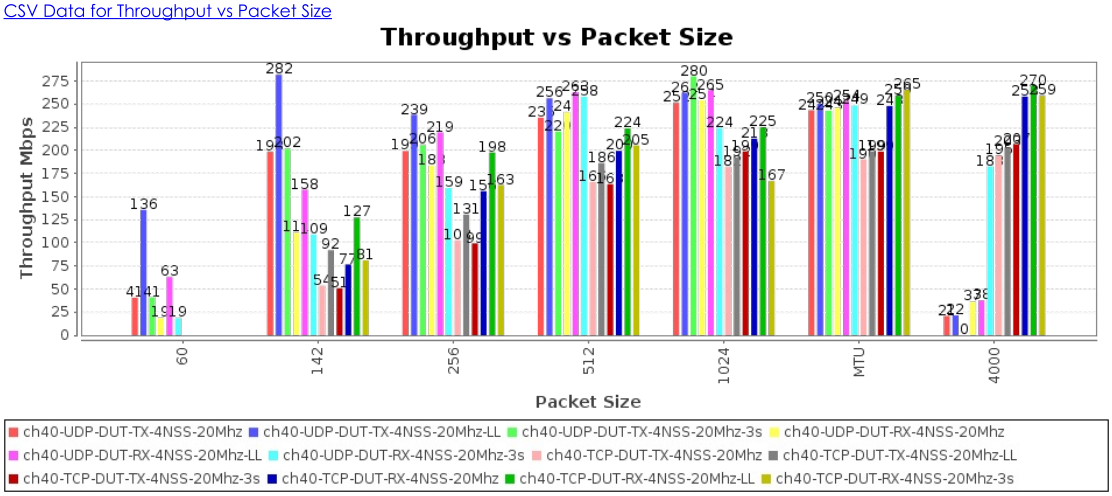
Test Setup Information				
Device Under Test	Name	cisco9130axe		
	Software Version	17.7.1.11	Hardware Version	cisco9130axe
	Model Number	cisco9130axe	Serial Number	FJC2428146G
	SSIDs			
	Passwords			
	BSSIDs			
	Notes	[BLANK]		

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.

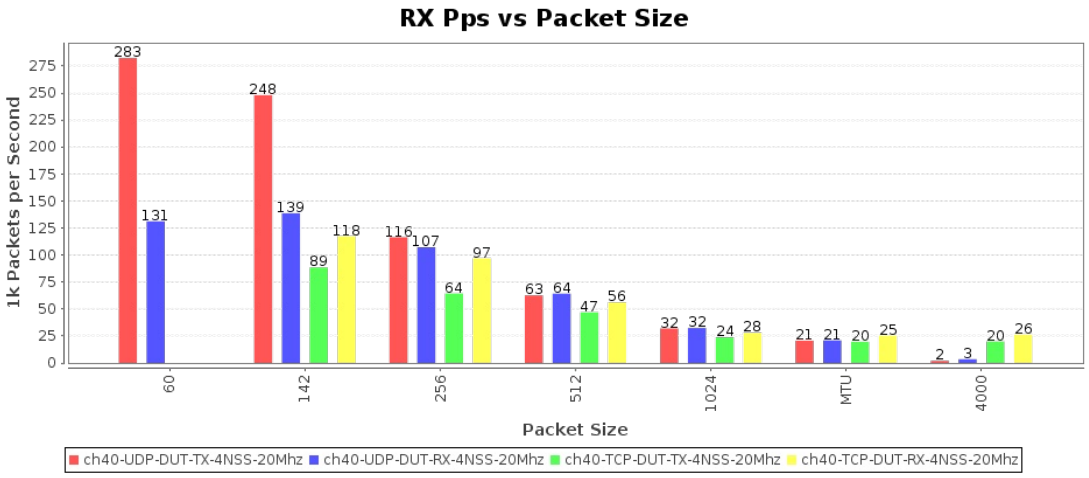
Throughput for each different traffic type. Datasets with names ending in '-LL' will include the IP, TCP, UDP and Ethernet header bytes in their calculation. For Armageddon traffic only, low-level throughput includes the Ethernet FCS and preamble. Other datasets report 'goodput' for the protocol.

CSV Data for Throughput vs Packet Size



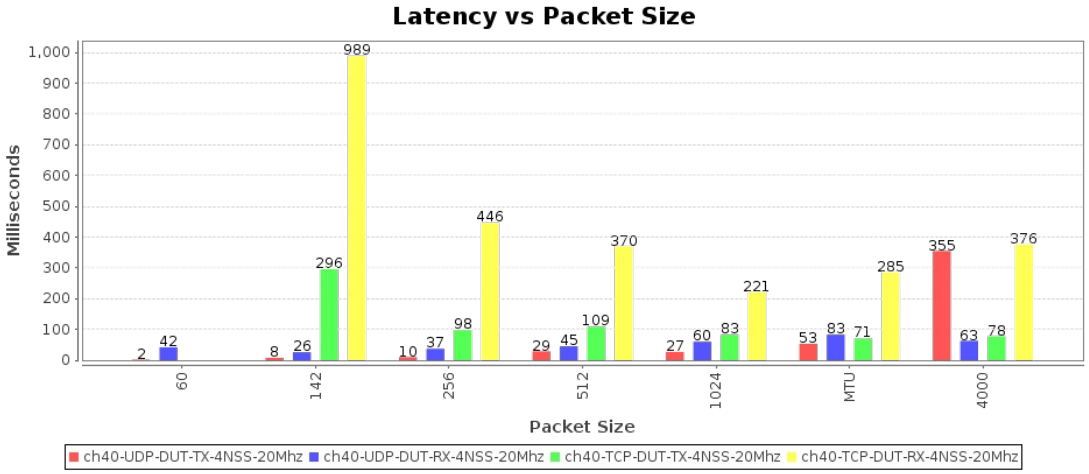
Pps throughput for each different traffic type. The values are estimated packets-per-second over the DUT, but some protocols such as TCP make this difficult to know for certain, so the value is extrapolated.

CSV Data for RX Pps vs Packet Size



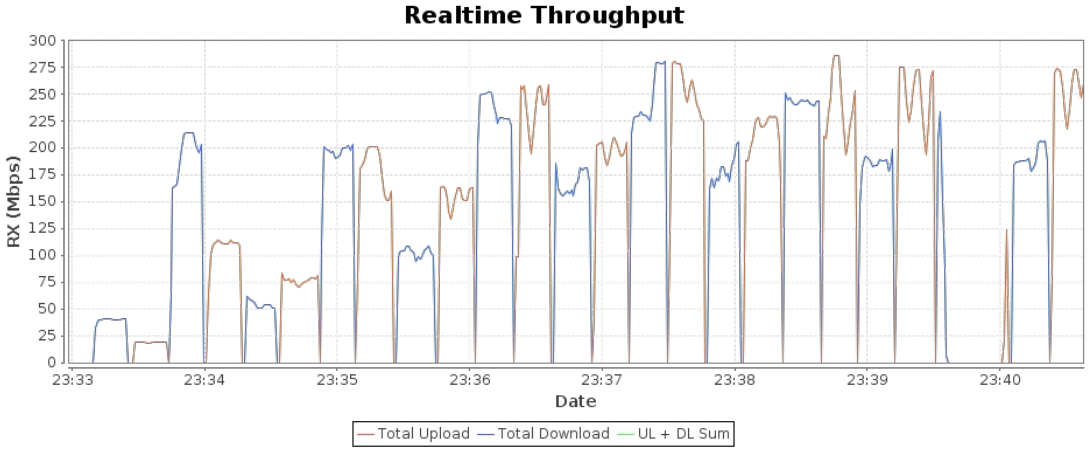
Latency for each different traffic type. If opposite-direction traffic is non-zero, then round-trip time will be reported. Otherwise, one-way latency will be reported.

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	91.207 Mbps	40.448 Mbps	40.684 Mbps	135.612 Mbps	41.092 Mbps	-64	0 / 9694853	0	57.8 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	60	UDP	DUT-RX	NA	NA	18.961 Mbps	18.772 Mbps	18.894 Mbps	62.98 Mbps	18.593 Mbps	-61	379 / 2092405	0.018	346.7 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	142	UDP	DUT-TX	NA	NA	328.122 Mbps	198.026 Mbps	198.453 Mbps	281.803 Mbps	201.939 Mbps	-67	0 / 6475831	0	346.7 Mbps	385.3 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	142	UDP	DUT-RX	NA	NA	110.968 Mbps	110.651 Mbps	110.962 Mbps	157.565 Mbps	109.079 Mbps	-61	574 / 2090162	0.027	288.9 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	142	TCP	DUT-TX	NA	NA	53.916 Mbps	53.61 Mbps	53.73 Mbps	91.97 Mbps	50.903 Mbps	-66	0 / 1341815	0	346.7 Mbps	289 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	142	TCP	DUT-RX	NA	NA	81.299 Mbps	76.42 Mbps	76.596 Mbps	127.406 Mbps	81.045 Mbps	-66	765 / 2153867	0.036	346.7 Mbps	289 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	256	UDP	DUT-TX	NA	NA	328.051 Mbps	198.999 Mbps	199.404 Mbps	238.539 Mbps	205.873 Mbps	-65	0 / 2978544	0	346.7 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	256	UDP	DUT-RX	NA	NA	183.472 Mbps	182.998 Mbps	183.453 Mbps	219.458 Mbps	159.342 Mbps	-60	384 / 1730621	0.022	260 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	256	TCP	DUT-TX	NA	NA	103.227 Mbps	102.425 Mbps	102.712 Mbps	130.538 Mbps	99.423 Mbps	-66	0 / 1110971	0	346.7 Mbps	289 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	256	TCP	DUT-RX	NA	NA	159.955 Mbps	155.302 Mbps	155.834 Mbps	197.757 Mbps	162.569 Mbps	-65	384 / 1745791	0.022	346.7 Mbps	288.9 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	512	UDP	DUT-TX	NA	NA	328.157 Mbps	234.763 Mbps	235.32 Mbps	256.349 Mbps	220.346 Mbps	-66	0 / 1355820	0	346.7 Mbps	288.9 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	512	UDP	DUT-RX	NA	NA	243.174 Mbps	240.783 Mbps	241.497 Mbps	263.078 Mbps	258.119 Mbps	-60	384 / 965758	0.04	346.7 Mbps	288.9 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	512	TCP	DUT-TX	NA	NA	166.317 Mbps	165.621 Mbps	165.945 Mbps	186.237 Mbps	163.422 Mbps	-64	0 / 799184	0	346.7 Mbps	288.9 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	512	TCP	DUT-RX	NA	NA	204.654 Mbps	198.963 Mbps	199.565 Mbps	223.847 Mbps	205.377 Mbps	-67	384 / 842555	0.046	346.7 Mbps	289 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	1024	UDP	DUT-TX	NA	NA	328.195 Mbps	250.871 Mbps	251.512 Mbps	262.27 Mbps	280.033 Mbps	-66	0 / 653416	0	346.7 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	1024	UDP	DUT-RX	NA	NA	257.82 Mbps	253.319 Mbps	254.234 Mbps	265.108 Mbps	224.303 Mbps	-60	576 / 486472	0.118	288.9 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	1024	TCP	DUT-TX	NA	NA	182.74 Mbps	181.371 Mbps	181.969 Mbps	192.246 Mbps	198.852 Mbps	-66	0 / 344389	0	260 Mbps	289 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	1024	TCP	DUT-RX	NA	NA	214.802 Mbps	211.777 Mbps	212.695 Mbps	224.815 Mbps	166.754 Mbps	-65	576 / 473410	0.122	260 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	MTU	UDP	DUT-TX	NA	NA	329.006 Mbps	242.329 Mbps	243.51 Mbps	250.458 Mbps	242.991 Mbps	-64	0 / 433481	0	260 Mbps	289 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	MTU	UDP	DUT-RX	NA	NA	251.867 Mbps	245.362 Mbps	246.517 Mbps	253.551 Mbps	248.745 Mbps	-60	576 / 332501	0.173	288.9 Mbps	289 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	MTU	TCP	DUT-TX	NA	NA	191.326 Mbps	189.334 Mbps	190.314 Mbps	198.829 Mbps	198.657 Mbps	-65	0 / 289975	0	288.9 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	MTU	TCP	DUT-RX	NA	NA	251.409 Mbps	246.552 Mbps	248.036 Mbps	259.015 Mbps	265.454 Mbps	-67	384 / 375698	0.102	346.7 Mbps	312 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	4000	UDP	DUT-TX	NA	NA	329.168 Mbps	20.712 Mbps	20.858 Mbps	21.522 Mbps	0 bps	-66	0 / 471316	0	346.7 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	4000	UDP	DUT-RX	NA	NA	279.804 Mbps	36.316 Mbps	36.543 Mbps	37.706 Mbps	182.705 Mbps	-61	384 / 391407	0.098	346.7 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	4000	TCP	DUT-TX	NA	NA	195.428 Mbps	193.358 Mbps	194.584 Mbps	203.224 Mbps	206.59 Mbps	-64	0 / 295435	0	346.7 Mbps	346.7 Mbps	802.11an-AC	802.11ac
40	5200	WPA2	4	AUTO	20	4000	TCP	DUT-RX	NA	NA	265.064 Mbps	256.397 Mbps	258.174 Mbps	269.603 Mbps	259.156 Mbps	-64	384 / 391639	0.098	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	-64 [-69, -77, -69, -64]	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	4	VHT	8	20	-61 [-72, -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	142	UDP	DUT-TX	VHT	4	8	20	4	VHT	8	20	-68 [-71, -77, -72, -70]	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	4	7	20	4	VHT	7	20	-61 [-70, -78, -74, -66]	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	142	TCP	DUT-TX	VHT	4	8	20	3	VHT	8	20	-67 [-70, -78, -71, -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	142	TCP	DUT-RX	VHT	4	8	20	3	VHT	8	20	-66 [-72, -78, -69, -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	256	UDP	DUT-TX	VHT	4	8	20	4	VHT	8	20	-66 [-70, -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	256	UDP	DUT-RX	VHT	4	6	20	4	VHT	6	20	-60 [-70, -76, -73, -64]	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	256	TCP	DUT-TX	VHT	4	8	20	3	VHT	8	20	-67 [-73, -77, -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

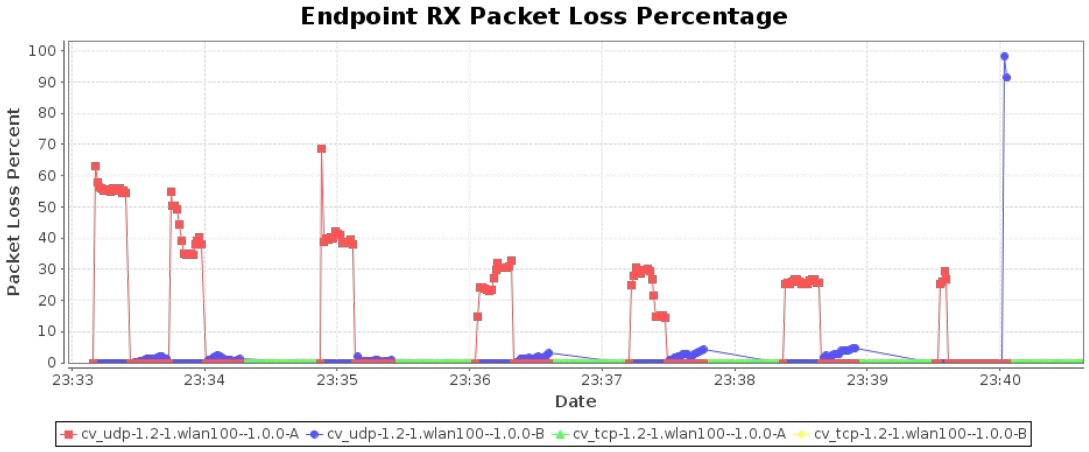
40	5200	WPA2	4	AUTO	20	256	TCP	DUT-RX	VHT	4	8	20	4	VHT	8	20	-66 [-71, -77, -69, -67]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	288.9 MBit/s VHT-MCS 7 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	512	UDP	DUT-TX	VHT	4	8	20	4	VHT	8	20	-67 [-70, -76, -70, -67]	346.7 MBit/s VHT-MCS 8 short GI VHT-NSS 4	288.9 MBit/s VHT-MCS 7 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	512	UDP	DUT-RX	VHT	4	8	20	4	VHT	8	20	-61 [-72, -76, -69, -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	TCP	DUT-TX	VHT	4	8	20	3	VHT	8	20	-66 [-71, -78, -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	512	TCP	DUT-RX	VHT	4	8	20	3	VHT	8	20	-67 [-70, -77, -71, -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	1024	UDP	DUT-TX	VHT	4	8	20	4	VHT	8	20	-66 [-69, -77, -73, -68]	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	1024	UDP	DUT-RX	VHT	4	7	20	4	VHT	7	20	-61 [-71, -79, -71, -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	1024	TCP	DUT-TX	VHT	4	7	20	4	VHT	7	20	-65 [-73, -79, -69, -65]	288.9 MBit/s VHT-MCS 7 short GI VHT-NSS 4	288.9 MBit/s VHT-MCS 7 short GI VHT-NSS 4
40	5200	WPA2	4	AUTO	20	1024	TCP	DUT-RX	VHT	3	8	20	4	VHT	8	20	-65 [-68, -77, -69, -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	MTU	UDP	DUT-TX	VHT	3	8	20	3	VHT	8	20	-65 [-68, -77, -69, -67]	260.0 MBit/s VHT-MCS 8 short GI VHT-NSS 3	289.0 MBit/s VHT-MCS 9 short GI VHT-NSS 3
40	5200	WPA2	4	AUTO	20	MTU	UDP	DUT-RX	VHT	4	7	20	3	VHT	7	20	-61 [-70, -78, -70, -68]	288.9 MBit/s VHT-MCS 7 short GI VHT-NSS 4	289.0 MBit/s VHT-MCS 9 short GI VHT-NSS 3
40	5200	WPA2	4	AUTO	20	MTU	TCP	DUT-TX	VHT	4	8	20	4	VHT	8	20	-66 [-73, -79, -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	4	8	20	3	VHT	8	20	-67 [-70, -77, -71, -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	UDP	DUT-TX	VHT	4	8	20	4	VHT	8	20	-67 [-72, -77, -70, -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	4000	UDP	DUT-RX	VHT	4	8	20	4	VHT	8	20	-61 [-71, -79, -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	4000	TCP	DUT-TX	VHT	3	9	20	3	VHT	9	20	-68 [-73, -81, -71, -68]	260.1 MBit/s VHT-MCS 9 VHT-NSS 3	289.0 MBit/s VHT-MCS 9 short GI VHT-NSS 3
40	5200	WPA2	4	AUTO	20	4000	TCP	DUT-RX	VHT	4	8	20	4	VHT	8	20	-65 [-68, -77, -68, -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

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	40.45	-59	-64
1	NA	0	18.77	-61	-61
2	NA	0	198.03	-61	-67
3	NA	0	110.65	-61	-61
4	NA	0	53.61	-59	-66
5	NA	0	76.42	-60	-66
6	NA	0	199.00	-60	-65
7	NA	0	183.00	-60	-60
8	NA	0	102.42	-60	-66
9	NA	0	155.30	-61	-65
10	NA	0	234.76	-60	-66
11	NA	0	240.78	-60	-60
12	NA	0	165.62	-59	-64
13	NA	0	198.96	-60	-67
14	NA	0	250.87	-60	-66
15	NA	0	253.32	-60	-60
16	NA	0	181.37	-59	-66
17	NA	0	211.78	-59	-65
18	NA	0	242.33	-59	-64
19	NA	0	245.36	-60	-60
20	NA	0	189.33	-60	-65
21	NA	0	246.55	-60	-67
22	NA	0	20.71	-60	-66
23	NA	0	36.32	-61	-61
24	NA	0	193.36	-60	-64
25	NA	0	256.40	-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
