Dataplane Test

Thu Feb 17 02:38:26 PST 2022

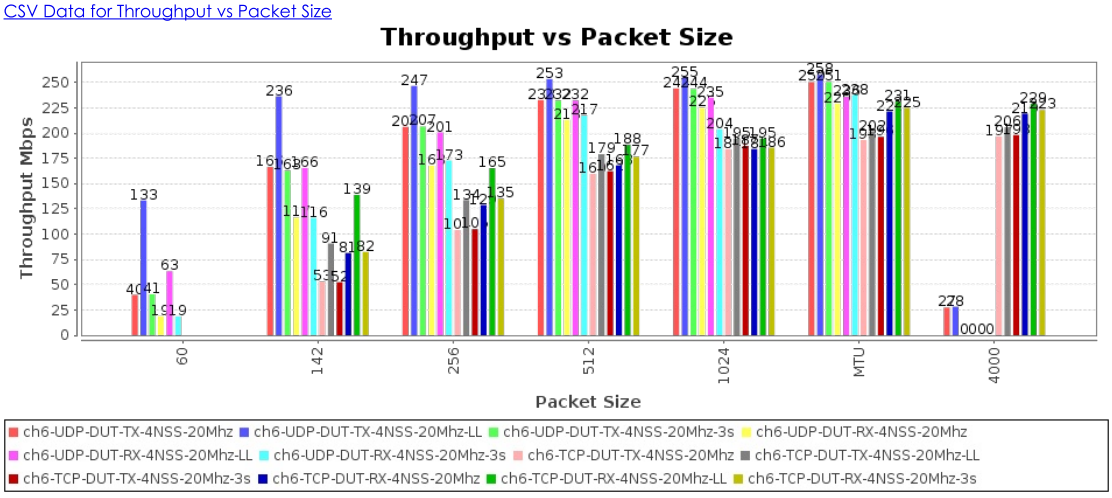
Test Setup Information				
Device Under Test	Name	cisco9130axe		
	Software Version	17.7.1.11	Hardware Version	cisco9130axe
	Model Number	cisco9130axe	Serial Number	FJC2428146G
	SSIDs	ssid_wpa2_2g ssid_wpa2_5g		
	Passwords	something something		
	BSSIDs			
	Notes	[BLANK]		

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.

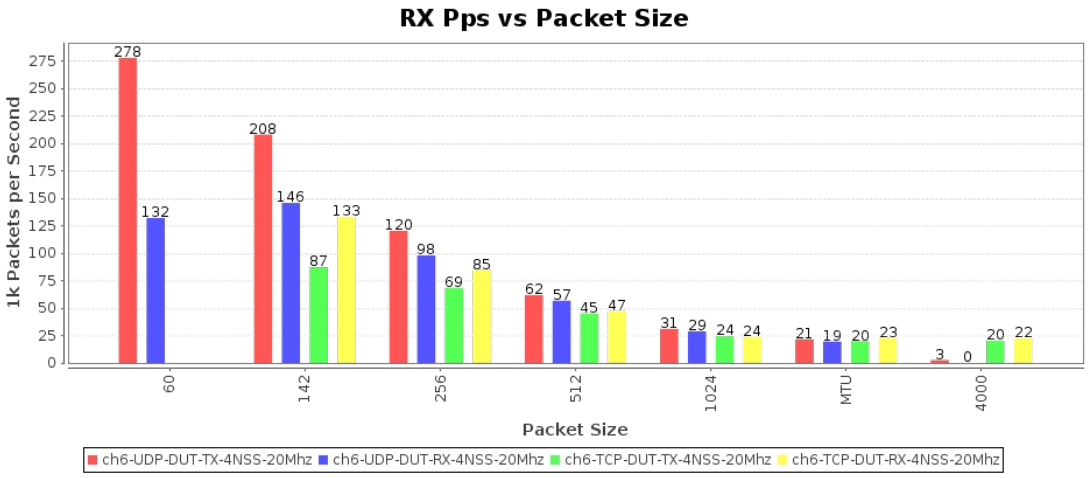
Throughput for each different traffic type. Datasets with names ending in '-LL' will include the IP, TCP, UDP and Ethernet header bytes in their calculation. For Armageddon traffic only, low-level throughput includes the Ethernet FCS and preamble. Other datasets report 'goodput' for the protocol.

CSV Data for Throughput vs Packet Size



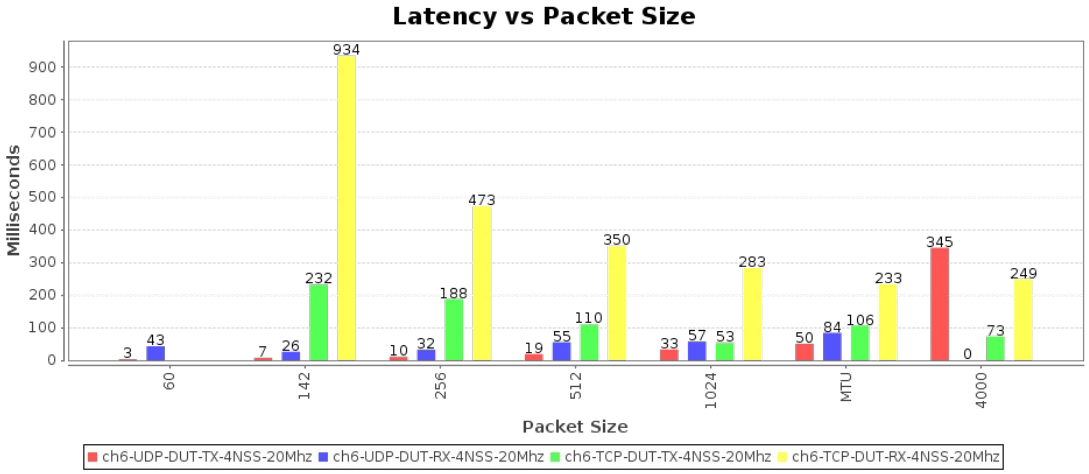
Pps throughput for each different traffic type. The values are estimated packets-per-second over the DUT, but some protocols such as TCP make this difficult to know for certain, so the value is extrapolated.

CSV Data for RX Pps vs Packet Size



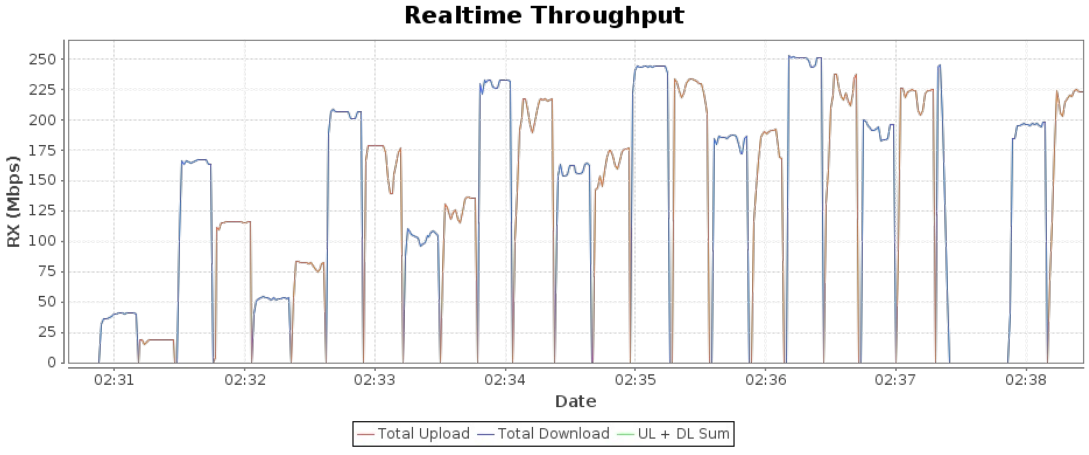
Latency for each different traffic type. If opposite-direction traffic is non-zero, then round-trip time will be reported. Otherwise, one-way latency will be reported.

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
6	2437	WPA2	4	AUTO	20	60	UDP	DUT-TX	NA	NA	92.31 Mbps	39.866 Mbps	39.996 Mbps	133.32 Mbps	40.529 Mbps	-42	0 / 9104725	0	57.8 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	60	UDP	DUT-RX	NA	NA	19.066 Mbps	18.966 Mbps	19.011 Mbps	63.371 Mbps	18.696 Mbps	-34	192 / 1986342	0.01	260 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	142	UDP	DUT-TX	NA	NA	328.967 Mbps	165.605 Mbps	166.412 Mbps	236.305 Mbps	163.011 Mbps	-42	0 / 6537427	0	260 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	142	UDP	DUT-RX	NA	NA	116.565 Mbps	115.954 Mbps	116.556 Mbps	165.51 Mbps	116.181 Mbps	-35	0 / 2473996	0	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	142	TCP	DUT-TX	NA	NA	53.824 Mbps	52.842 Mbps	53.08 Mbps	90.768 Mbps	52.476 Mbps	-42	0 / 1279064	0	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	142	TCP	DUT-RX	NA	NA	81.328 Mbps	80.864 Mbps	81.344 Mbps	138.836 Mbps	82.392 Mbps	-42	192 / 2005243	0.01	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	256	UDP	DUT-TX	NA	NA	328.493 Mbps	205.106 Mbps	206.144 Mbps	246.602 Mbps	206.573 Mbps	-43	0 / 2993587	0	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	256	UDP	DUT-RX	NA	NA	167.835 Mbps	166.922 Mbps	167.774 Mbps	200.702 Mbps	172.929 Mbps	-35	192 / 1470246	0.013	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	256	TCP	DUT-TX	NA	NA	105.292 Mbps	103.558 Mbps	104.062 Mbps	133.658 Mbps	104.978 Mbps	-42	0 / 1036474	0	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	256	TCP	DUT-RX	NA	NA	132.98 Mbps	127.925 Mbps	128.744 Mbps	165.324 Mbps	135.201 Mbps	-43	192 / 1273994	0.015	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	512	UDP	DUT-TX	NA	NA	329.832 Mbps	230.838 Mbps	232.571 Mbps	253.354 Mbps	232.354 Mbps	-43	0 / 1347097	0	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	512	UDP	DUT-RX	NA	NA	215.044 Mbps	211.476 Mbps	213.218 Mbps	232.271 Mbps	217.332 Mbps	-35	120 / 960591	0.012	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	512	TCP	DUT-TX	NA	NA	160.934 Mbps	159.637 Mbps	159.717 Mbps	179.204 Mbps	162.25 Mbps	-42	0 / 637352	0	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	512	TCP	DUT-RX	NA	NA	168.037 Mbps	167.77 Mbps	168.025 Mbps	188.448 Mbps	176.684 Mbps	-43	120 / 802905	0.015	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	1024	UDP	DUT-TX	NA	NA	327.932 Mbps	243.503 Mbps	244.154 Mbps	254.597 Mbps	243.757 Mbps	-43	0 / 640671	0	260 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	1024	UDP	DUT-RX	NA	NA	229.023 Mbps	224.873 Mbps	225.341 Mbps	234.978 Mbps	203.816 Mbps	-35	60 / 488847	0.012	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	1024	TCP	DUT-TX	NA	NA	184.531 Mbps	183.529 Mbps	184.032 Mbps	194.605 Mbps	187.318 Mbps	-43	0 / 404774	0	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	1024	TCP	DUT-RX	NA	NA	187.745 Mbps	183.527 Mbps	184.15 Mbps	194.502 Mbps	185.668 Mbps	-43	60 / 362115	0.017	260 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	MTU	UDP	DUT-TX	NA	NA	328.848 Mbps	249.389 Mbps	250.5 Mbps	257.647 Mbps	250.781 Mbps	-43	0 / 421076	0	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	MTU	UDP	DUT-RX	NA	NA	234.382 Mbps	228.19 Mbps	229.303 Mbps	235.846 Mbps	237.639 Mbps	-35	42 / 292954	0.014	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	MTU	TCP	DUT-TX	NA	NA	194.329 Mbps	192.161 Mbps	193.156 Mbps	201.728 Mbps	196.279 Mbps	-43	0 / 281933	0	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	MTU	TCP	DUT-RX	NA	NA	222.062 Mbps	220.298 Mbps	221.338 Mbps	231.162 Mbps	225.038 Mbps	-42	48 / 337956	0.014	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	4000	UDP	DUT-TX	NA	NA	328.767 Mbps	27.221 Mbps	27.365 Mbps	28.237 Mbps	0 bps	-43	0 / 481893	0	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	4000	UDP	DUT-RX	NA	NA	189.432 Mbps	0 bps	0 bps	0 bps	0 bps	-35	47 / 287957	0.016	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	4000	TCP	DUT-TX	NA	NA	196.866 Mbps	195.858 Mbps	196.737 Mbps	205.547 Mbps	197.991 Mbps	-42	0 / 303703	0	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n
6	2437	WPA2	4	AUTO	20	4000	TCP	DUT-RX	NA	NA	220.567 Mbps	218.291 Mbps	219.229 Mbps	228.935 Mbps	222.956 Mbps	-42	48 / 343381	0.014	288.9 Mbps	288.9 Mbps	802.11bgn	802.11n

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
6	2437	WPA2	4	AUTO	20	60	UDP	DUT-TX	HT	3	1	20	3	HT	1	20	-43 [-50, -53, -46, -43]	57.8 MBit/s MCS 25 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	60	UDP	DUT-RX	HT	3	6	20	3	HT	6	20	-34 [-51, -54, -47, -43]	260.0 MBit/s MCS 30 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	142	UDP	DUT-TX	HT	3	6	20	3	HT	6	20	-43 [-51, -53, -47, -43]	260.0 MBit/s MCS 30 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	142	UDP	DUT-RX	HT	3	7	20	3	HT	7	20	-35 [-50, -53, -47, -44]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	142	TCP	DUT-TX	HT	3	7	20	3	HT	7	20	-44 [-51, -54, -47, -44]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	142	TCP	DUT-RX	HT	3	7	20	3	HT	7	20	-35 [-51, -54, -47, -43]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	256	UDP	DUT-TX	HT	3	7	20	3	HT	7	20	-44 [-51, -54, -47, -44]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	256	UDP	DUT-RX	HT	3	7	20	3	HT	7	20	-36 [-50, -52, -47, -44]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	256	TCP	DUT-TX	HT	3	7	20	3	HT	7	20	-43 [-51, -54, -46, -43]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI

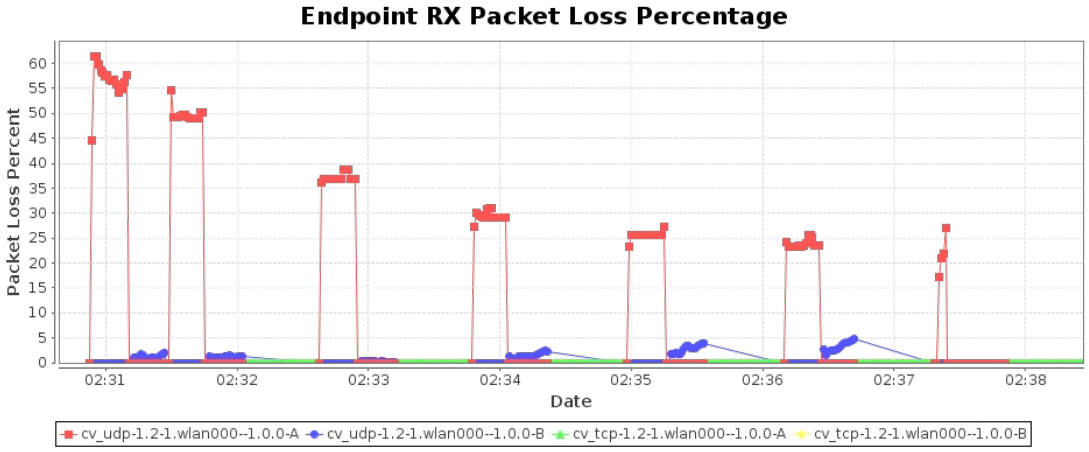
6	2437	WPA2	4	AUTO	20	256	TCP	DUT-RX	HT	3	6	20	3	HT	6	20	-42 [-51, -54, -46, -42]	260.0 MBit/s MCS 30 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	512	UDP	DUT-TX	HT	3	7	20	3	HT	7	20	-44 [-51, -54, -47, -44]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	512	UDP	DUT-RX	HT	3	7	20	3	HT	7	20	-35 [-51, -54, -47, -44]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	512	TCP	DUT-TX	HT	3	7	20	3	HT	7	20	-43 [-51, -53, -47, -43]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	512	TCP	DUT-RX	HT	3	6	20	3	HT	6	20	-42 [-51, -53, -46, -42]	260.0 MBit/s MCS 30 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	1024	UDP	DUT-TX	HT	3	7	20	3	HT	7	20	-43 [-51, -54, -46, -44]	260.0 MBit/s MCS 31	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	1024	UDP	DUT-RX	HT	3	7	20	3	HT	7	20	-35 [-51, -55, -47, -44]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	1024	TCP	DUT-TX	HT	3	7	20	3	HT	7	20	-41 [-49, -52, -44, -42]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	1024	TCP	DUT-RX	HT	3	7	20	3	HT	7	20	-44 [-51, -55, -47, -44]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	MTU	UDP	DUT-TX	HT	3	7	20	3	HT	7	20	-43 [-51, -54, -47, -43]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	MTU	UDP	DUT-RX	HT	3	7	20	3	HT	7	20	-35 [-49, -51, -46, -42]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	MTU	TCP	DUT-TX	HT	3	7	20	3	HT	7	20	-42 [-50, -52, -46, -42]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	MTU	TCP	DUT-RX	HT	3	7	20	3	HT	7	20	-44 [-52, -55, -47, -44]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	4000	UDP	DUT-TX	HT	3	7	20	3	HT	7	20	-43 [-51, -53, -47, -43]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	4000	UDP	DUT-RX	HT	3	7	20	3	HT	7	20	-35 [-50, -52, -47, -43]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	4000	TCP	DUT-TX	HT	3	7	20	3	HT	7	20	-43 [-51, -53, -46, -43]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI
6	2437	WPA2	4	AUTO	20	4000	TCP	DUT-RX	HT	3	7	20	3	HT	7	20	-43 [-50, -52, -47, -43]	288.9 MBit/s MCS 31 short GI	288.9 MBit/s MCS 31 short GI

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	39.87	-35	-42
1	NA	0	18.97	-34	-34
2	NA	0	165.61	-35	-42
3	NA	0	115.95	-35	-35
4	NA	0	52.84	-35	-42
5	NA	0	80.86	-35	-42
6	NA	0	205.11	-34	-43
7	NA	0	166.92	-35	-35
8	NA	0	103.56	-35	-42
9	NA	0	127.92	-35	-43
10	NA	0	230.84	-35	-43
11	NA	0	211.48	-34	-35
12	NA	0	159.64	-35	-42
13	NA	0	167.77	-34	-43
14	NA	0	243.50	-34	-43
15	NA	0	224.87	-35	-35
16	NA	0	183.53	-35	-43
17	NA	0	183.53	-35	-43
18	NA	0	249.39	-35	-43
19	NA	0	228.19	-35	-35
20	NA	0	192.16	-35	-43
21	NA	0	220.30	-35	-42
22	NA	0	27.22	-35	-43
23	NA	0	0	-35	-35
24	NA	0	195.86	-35	-42
25	NA	0	218.29	-35	-42

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.wlan000 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
