

Rate vs Range Test

Thu Oct 10 08:31:27 PDT 2024



Test Setup Information	
Device Under Test	QCA chipset tri-band 6E capable

Objective

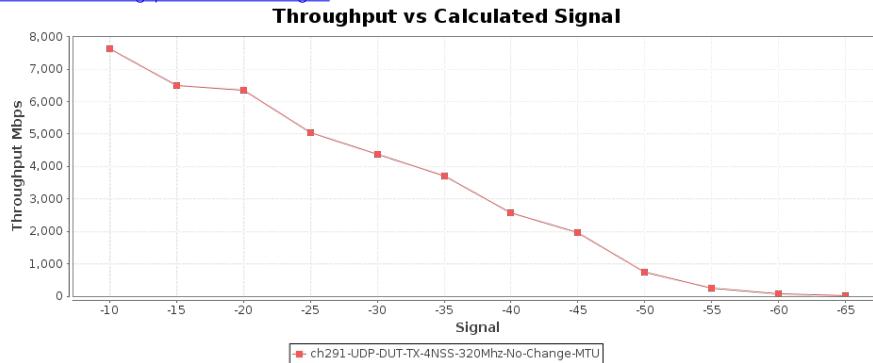
This test measures the performance over distance of the Device Under Test. Distance is emulated using programmable attenuation and a throughput test is run at each distance/RSSI step and plotted on a chart. The test allows the user to plot RSSI curves both upstream and downstream for different types of traffic and different station types.

Rate vs Range Results

Type	Result	Notes
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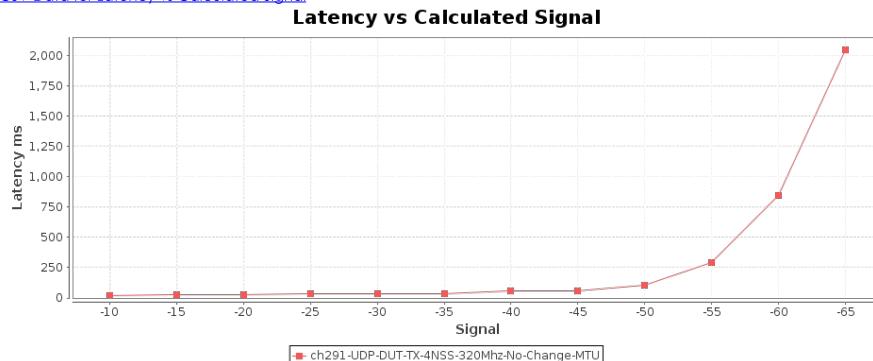
Throughput vs calculated RF Signal for each different traffic type. The signal is calculated based on the configured path-loss, transmit power, and attenuation.

[CSV Data for Throughput vs Calculated Signal](#)



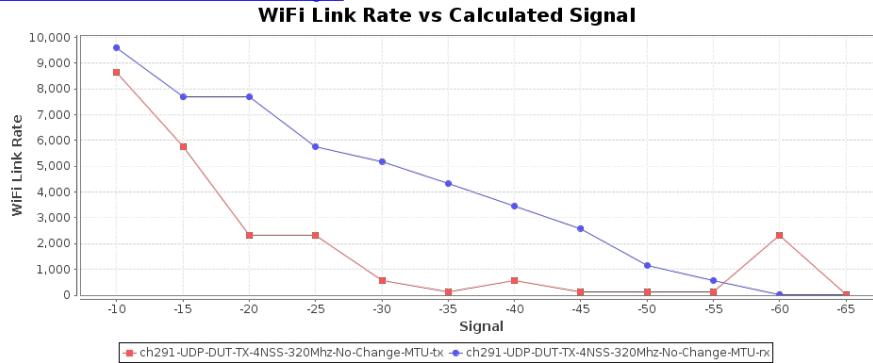
Latency vs calculated RF Signal for each different traffic type. The signal is calculated based on the configured path-loss, transmit power, and attenuation. Latency will be round-trip if bi-directional traffic flow is used (some opposite-speed). If using TCP, then MTU means 64k byte writes, so you may wish to use smaller sized PDU size for TCP if you are interested in Latency results. Smaller PDU can decrease total throughput.

[CSV Data for Latency vs Calculated Signal](#)



WiFi Link Rate (Phy Rate) vs calculated RF Signal for each different traffic type. The signal is calculated based on the configured path-loss, transmit power, and attenuation.

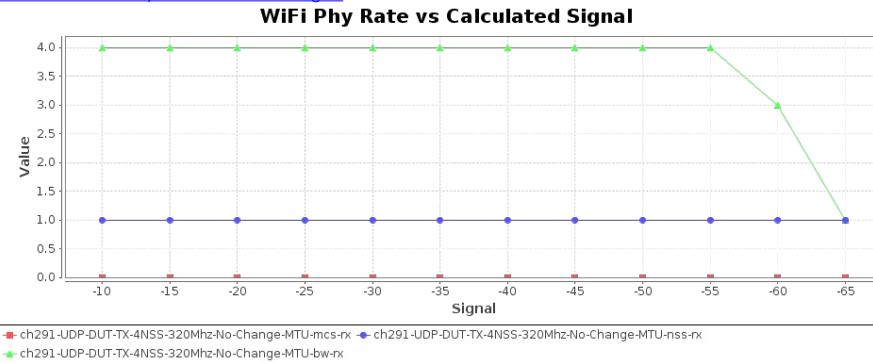
[CSV Data for WiFi Link Rate vs Calculated Signal](#)



WiFi Phy Rate information vs reported calculated RF Signal for each different traffic type. To allow this to scale nicely on one graph, the Bandwidth values are converted from Mhz to an index:

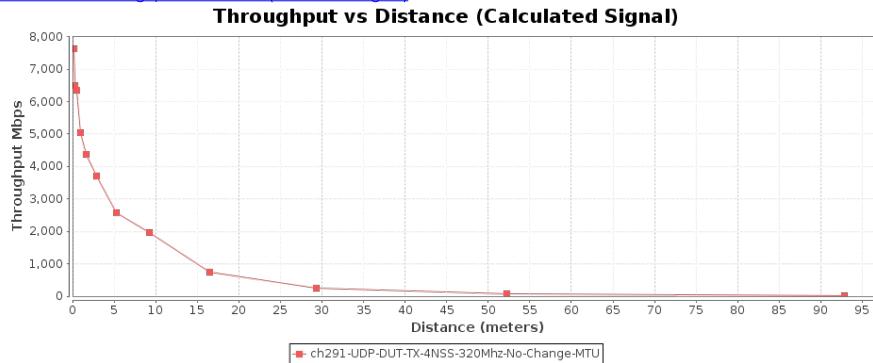
20Mhz: 0 40Mhz: 1 80Mhz: 2 160Mhz: 3 320Mhz: 4 The signal is calculated based on the configured path-loss, transmit power, and attenuation.

[CSV Data for WiFi Phy Rate vs Calculated Signal](#)



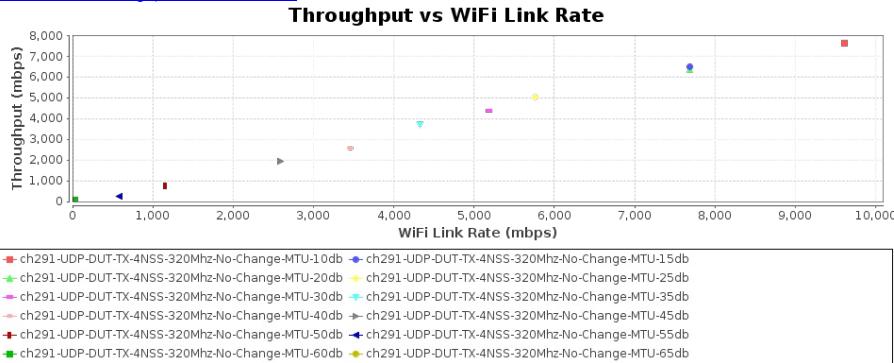
Throughput vs Distance for each different traffic type. Calculated using free space path loss, based on the calculated signal strength. The signal is based on the configured path-loss, transmit power, and attenuation.

[CSV Data for Throughput vs Distance \(Calculated Signal\)](#)



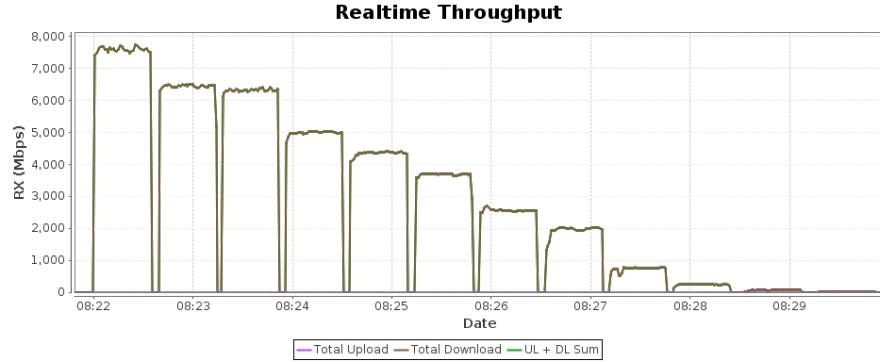
Throughput vs WiFi Link Rate (Phy Rate) for each different traffic type.

[CSV Data for Throughput vs WiFi Link Rate](#)



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](#)

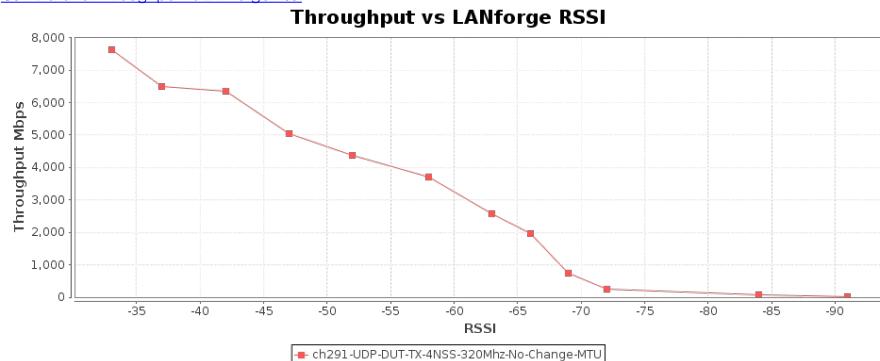


Test Information

Message
Starting Rate vs Range test with: 12 iterations.

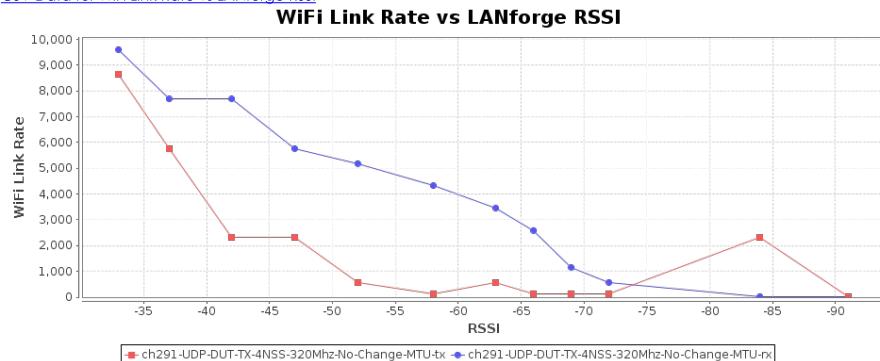
Throughput vs reported RSSI for each different traffic type. Please note that the LANforge RSSI may be similar to the remote Device Under Test RSSI but there is no guarantee of this. Differences in tx-power and RF splitter/combiners can cause different RSSI as reported by LANforge and the remote peer device.

[CSV Data for Throughput vs LANforge RSSI](#)



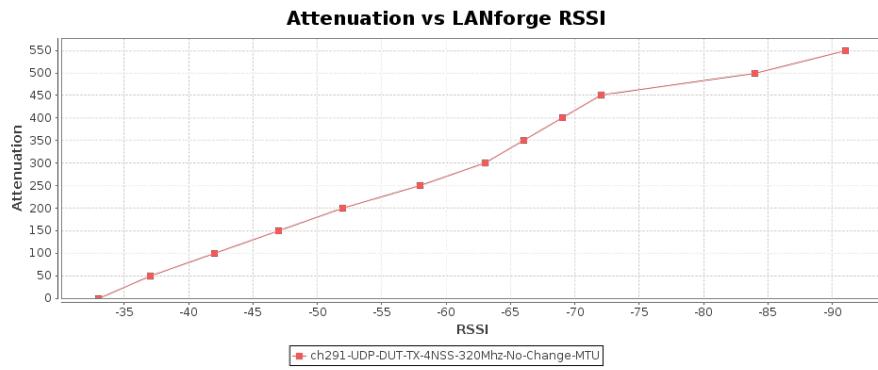
WiFi MCS Link Rate (Phy Rate) vs reported RSSI for each different traffic type. Please note that the LANforge RSSI may be similar to the remote Device Under Test RSSI but there is no guarantee of this. Differences in tx-power and RF splitter/combiners can cause different RSSI as reported by LANforge and the remote peer device.

[CSV Data for WiFi Link Rate vs LANforge RSSI](#)



Set attenuation vs reported RSSI for each different traffic type. Please note that the LANforge RSSI may be similar to the remote Device Under Test RSSI but there is no guarantee of this. Differences in tx-power and RF splitter/combiners can cause different RSSI as reported by LANforge and the remote peer device.

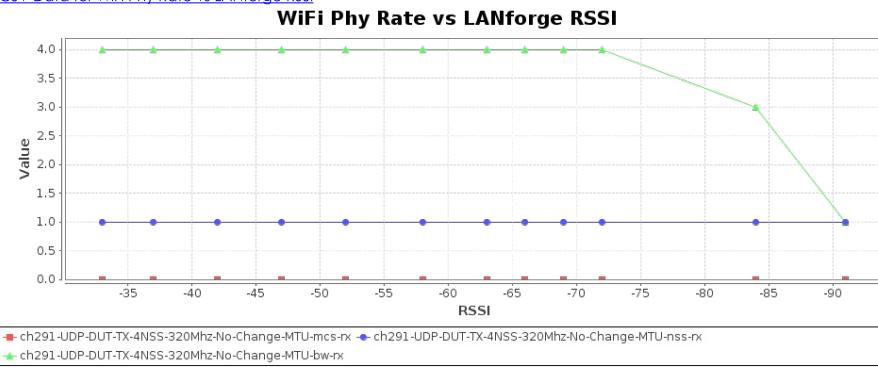
[CSV Data for Attenuation vs LANforge RSSI](#)



WiFi Phy Rate information vs reported RSSI for each different traffic type. To allow this to scale nicely on one graph, the Bandwidth values are converted from Mhz to an index:

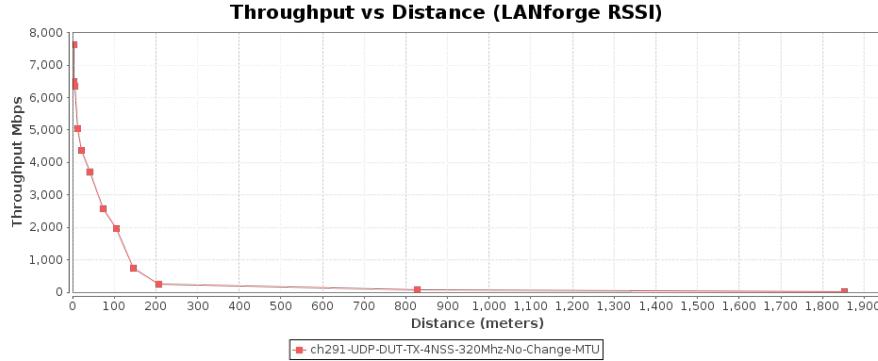
20Mhz: 0 40Mhz: 1 80Mhz: 2 160Mhz: 3 320Mhz: 4 Please note that the LANforge RSSI may be similar to the remote Device Under Test RSSI but there is no guarantee of this. Differences in tx-power and RF splitter/combiners can cause different RSSI as reported by LANforge and the remote peer device.

[CSV Data for WiFi Phy Rate vs LANforge RSSI](#)



Throughput vs Distance for each different traffic type. Calculated using free space path loss, based on the reported RSSI. Please note that the LANforge RSSI may be similar to the remote Device Under Test RSSI but there is no guarantee of this. Differences in tx-power and RF splitter/combiners can cause different RSSI as reported by LANforge and the remote peer device.

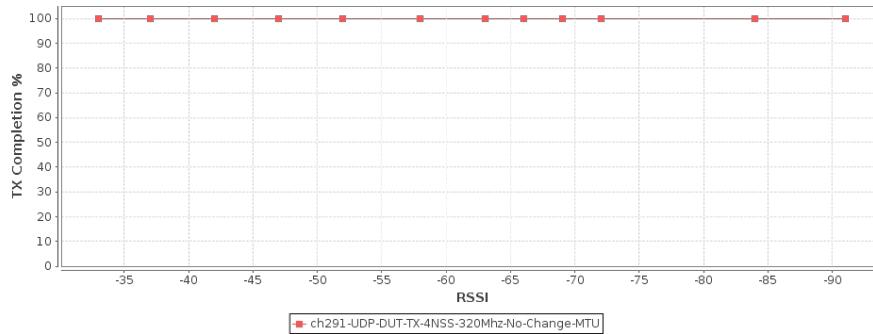
[CSV Data for Throughput vs Distance \(LANforge RSSI\)](#)



TX Completion vs LANforge RSSI for each MCS Encoding Rate. Please note that the LANforge RSSI may be similar to the remote Device Under Test RSSI but there is no guarantee of this. Differences in tx-power and RF splitter/combiners can cause different RSSI as reported by LANforge and the remote peer device.

[CSV Data for TX Completion vs LANforge RSSI](#)

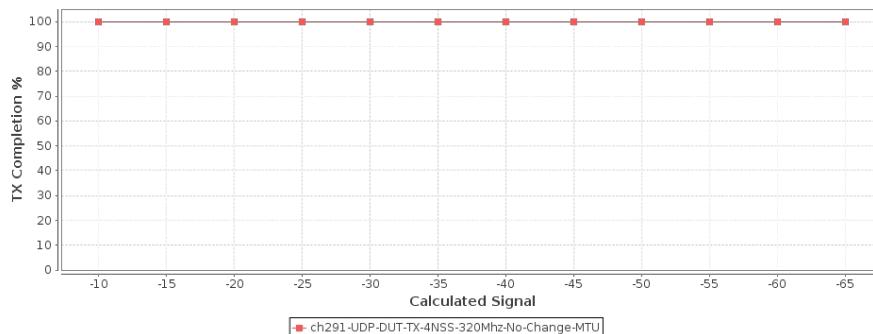
TX Completion vs LANforge RSSI



TX Completion vs Calculated Signal Power for each MCS Encoding Rate.

[CSV Data for TX Completion vs Calculated Signal:](#)

TX Completion vs Calculated Signal;



Constant values related to the table below.

Iteration-Duration	30s
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CSV data focused 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. The Rx-Bps column shows the throughput average of the entire test duration. The Rx-Bps-1m/LL/3s and related columns show the throughput average from the previous report interval of the test, 1-minute for -1m and -LL, 3-seconds for -3s. Rpt-Mode is negotiated mode, not necessarily Phy Rate mode.

Channel	Frequency	Security	NSS	Cfg-Mode	Bandwidth	Pkt	Traffic-type	Direction	Atten	Rotation	Tilt	Offered-1m	Rx-Bps	Rx-Bps-1m	Rx-Bps-LL	Rx-Bps-3s	Rx-Bps-1m-DL	Rx-Bps-1m-UL	Rx-Bps-LL-DL	Rx-Bps-LL-UL	Rx-Bps-3s-DL	Rx-Bps-3s-UL	RSSI	Tx-Failed	Tx-Failed%	Tx-Rate	Rx-Rate	Rpt-Mode	Rpt-Mode-Brief
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	0	NA	NA	9.598 Gbps	7.598 Gbps	7.637 Gbps	7.855 Gbps	7.532 Gbps	7.637 Gbps	0 bps	7.855 Gbps	0 bps	7.532 Gbps	0 bps	-33	0 / 28509203	0	8645.3 Mbps	9.408 Gbps	802.11o-BE	802.11be
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	5.0	NA	NA	9.594 Gbps	6.462 Gbps	6.486 Gbps	6.671 Gbps	6.485 Gbps	6.486 Gbps	0 bps	6.671 Gbps	0 bps	6.485 Gbps	0 bps	-37	0 / 28461924	0	5765.2 Mbps	7.686 Gbps	802.11o-BE	802.11be
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	10.0	NA	NA	9.575 Gbps	6.331 Gbps	6.344 Gbps	6.525 Gbps	6.356 Gbps	6.344 Gbps	0 bps	6.525 Gbps	0 bps	6.356 Gbps	0 bps	-42	0 / 28468677	0	2305.9 Mbps	7.686 Gbps	802.11o-BE	802.11be
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	15.0	NA	NA	9.633 Gbps	4.997 Gbps	5.033 Gbps	5.176 Gbps	5.001 Gbps	5.033 Gbps	0 bps	5.176 Gbps	0 bps	5.001 Gbps	0 bps	-47	0 / 28469512	0	2305.9 Mbps	5.765 Gbps	802.11o-BE	802.11be
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	20.0	NA	NA	9.61 Gbps	4.364 Gbps	4.387 Gbps	4.512 Gbps	4.382 Gbps	4.387 Gbps	0 bps	4.512 Gbps	0 bps	4.382 Gbps	0 bps	-52	0 / 28458285	0	576.4 Mbps	5.189 Gbps	802.11o-BE	802.11be
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	25.0	NA	NA	9.593 Gbps	3.689 Gbps	3.7 Gbps	3.806 Gbps	3.678 Gbps	3.7 Gbps	0 bps	3.806 Gbps	0 bps	3.678 Gbps	0 bps	-58	0 / 28468507	0	144.1 Mbps	4.324 Gbps	802.11o-BE	802.11be
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	30.0	NA	NA	9.585 Gbps	2.566 Gbps	2.572 Gbps	2.646 Gbps	2.549 Gbps	2.572 Gbps	0 bps	2.646 Gbps	0 bps	2.549 Gbps	0 bps	-63	0 / 28466962	0	576.4 Mbps	3.458 Gbps	802.11o-BE	802.11be
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	35.0	NA	NA	9.61 Gbps	1.943 Gbps	1.952 Gbps	2.008 Gbps	1.943 Gbps	1.952 Gbps	0 bps	2.008 Gbps	0 bps	1.943 Gbps	0 bps	-66	0 / 28670693	0	144.1 Mbps	2.594 Gbps	802.11o-BE	802.11be
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	40.0	NA	NA	9.617 Gbps	736.734 Mbps	740.417 Mbps	761.543 Mbps	763.31 Mbps	740.417 Mbps	0 bps	761.543 Mbps	0 bps	763.31 Mbps	0 bps	-69	0 / 28490386	0	144.1 Mbps	1.153 Gbps	802.11o-BE	802.11be
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	45.0	NA	NA	9.606 Gbps	238.103 Mbps	239.072 Mbps	245.893 Mbps	238.015 Mbps	239.072 Mbps	0 bps	245.893 Mbps	0 bps	238.015 Mbps	0 bps	-72	0 / 28479321	0	144.1 Mbps	576.4 Mbps	802.11o-BE	802.11be
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	50.0	NA	NA	9.587 Gbps	59.112 Mbps	59.24 Mbps	60.93 Mbps	61.764 Mbps	59.24 Mbps	0 bps	60.93 Mbps	0 bps	61.764 Mbps	0 bps	-84	0 / 28478358	0	2305.9 Mbps	30.6 Mbps	802.11o-BE	802.11be
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	55.0	NA	NA	9.623 Gbps	24.676 Mbps	24.818 Mbps	25.526 Mbps	25.259 Mbps	24.818 Mbps	0 bps	25.526 Mbps	0 bps	25.259 Mbps	0 bps	-91	0 / 28484696	0	6 Mbps	17.2 Mbps	802.11o-BE	802.11be

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	Atten	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
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	0	OFDM	1	0	320	OFDM	1	0	320	-33 [-33]	8645.3 MBit/s 320MHz EHT- MCS 11 EHT- NSS 4 EHT-GI 0	9607.7 MBit/s 320MHz EHT- MCS 11 EHT- NSS 4 EHT-GI 0
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	5.0	OFDM	1	0	320	OFDM	1	0	320	-37 [-37]	5765.2 MBit/s 320MHz EHT- MCS 7 EHT- NSS 4 EHT-GI 0	7686.2 MBit/s 320MHz EHT- MCS 9 EHT- NSS 4 EHT-GI 0
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	10.0	OFDM	1	0	320	OFDM	1	0	320	-43 [-43]	2305.9 MBit/s 320MHz EHT- MCS 3 EHT- NSS 4 EHT-GI 0	7686.2 MBit/s 320MHz EHT- MCS 9 EHT- NSS 4 EHT-GI 0
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	15.0	OFDM	1	0	320	OFDM	1	0	320	-49 [-49]	2305.9 MBit/s 320MHz EHT- MCS 3 EHT- NSS 4 EHT-GI 0	5765.2 MBit/s 320MHz EHT- MCS 7 EHT- NSS 4 EHT-GI 0
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	20.0	OFDM	1	0	320	OFDM	1	0	320	-54 [-54]	576.4 MBit/s 320MHz EHT- MCS 0 EHT- NSS 4 EHT-GI 0	5189.0 MBit/s 320MHz EHT- MCS 8 EHT- NSS 3 EHT-GI 0
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	25.0	OFDM	1	0	320	OFDM	1	0	320	-60 [-60]	144.1 MBit/s 320MHz EHT- MCS 0 EHT- NSS 1 EHT-GI 0	4323.9 MBit/s 320MHz EHT- MCS 7 EHT- NSS 3 EHT-GI 0
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	30.0	OFDM	1	0	320	OFDM	1	0	320	-65 [-65]	576.4 MBit/s 320MHz EHT- MCS 0 EHT- NSS 4 EHT-GI 0	3458.5 MBit/s 320MHz EHT- MCS 5 EHT- NSS 3 EHT-GI 0
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	35.0	OFDM	1	0	320	OFDM	1	0	320	-70 [-70]	144.1 MBit/s 320MHz EHT- MCS 0 EHT- NSS 1 EHT-GI 0	2594.0 MBit/s 320MHz EHT- MCS 4 EHT- NSS 3 EHT-GI 0
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	40.0	OFDM	1	0	320	OFDM	1	0	320	-74 [-74]	144.1 MBit/s 320MHz EHT- MCS 0 EHT- NSS 1 EHT-GI 0	1152.9 MBit/s 320MHz EHT- MCS 1 EHT- NSS 4 EHT-GI 0
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	45.0	OFDM	1	0	320	OFDM	1	0	320	-77 [-77]	144.1 MBit/s 320MHz EHT- MCS 0 EHT- NSS 1 EHT-GI 0	576.4 MBit/s 320MHz EHT- MCS 0 EHT- NSS 4 EHT-GI 0
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	50.0	OFDM	1	0	320	OFDM	1	0	160	-81 [-82, -86]	864.6 MBit/s 320MHz EHT- MCS 2 EHT- NSS 2 EHT-GI 0	144.1 MBit/s 160MHz EHT- MCS 0 EHT- NSS 2 EHT-GI 0
291	6455	WPA3	4	No-Change	320	MTU	UDP	DUT-TX	55.0	OFDM	1	0	20	OFDM	1	0	40	-85 [-85]	8.6 MBit/s EHT- MCS 0 EHT- NSS 1 EHT-GI 0	17.2 MBit/s 40MHz EHT- MCS 0 EHT- NSS 1 EHT-GI 0

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

Step Index	Position [Deg]	Tilt [Deg]	Attenuation [dB]	Throughput [Mbps]	Beacon RSSI [dBm]	Data RSSI [dBm]
0	NA	NA	0	7,597.81	-32	-33
1	NA	NA	5.00	6,461.96	-37	-37

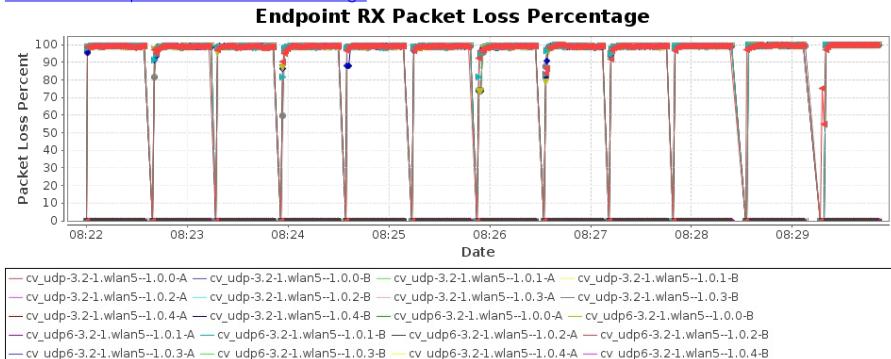
2	NA	NA	10.00	6,331.49	-43	-42
3	NA	NA	15.00	4,996.50	-49	-47
4	NA	NA	20.00	4,363.88	-54	-52
5	NA	NA	25.00	3,688.78	-61	-58
6	NA	NA	30.00	2,566.27	-65	-63
7	NA	NA	35.00	1,942.90	-70	-66
8	NA	NA	40.00	736.73	-74	-69
9	NA	NA	45.00	238.10	-77	-72
10	NA	NA	50.00	59.11	-89	-84
11	NA	NA	55.00	24.68	-84	-91

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

Loop Iteration	Attenuation [dB]	Minimum Tput [Mbps]	Avg Throughput [Mbps]	Maximum Tput [Mbps]
0	0	7,597.81	7,597.81	7,597.81
0	5	6,461.96	6,461.96	6,461.96
0	10	6,331.49	6,331.49	6,331.49
0	15	4,996.50	4,996.50	4,996.50
0	20	4,363.88	4,363.88	4,363.88
0	25	3,688.78	3,688.78	3,688.78
0	30	2,566.27	2,566.27	2,566.27
0	35	1,942.90	1,942.90	1,942.90
0	40	736.73	736.73	736.73
0	45	238.10	238.10	238.10
0	50	59.11	59.11	59.11
0	55	24.68	24.68	24.68

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 protocol will retransmit any lost frames.

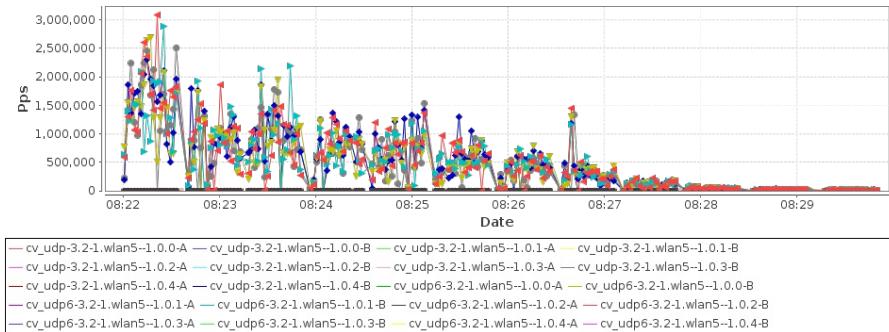
[CSV Data for Endpoint RX Packet Loss Percentage](#)



Loss Graph shows occurrences 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.

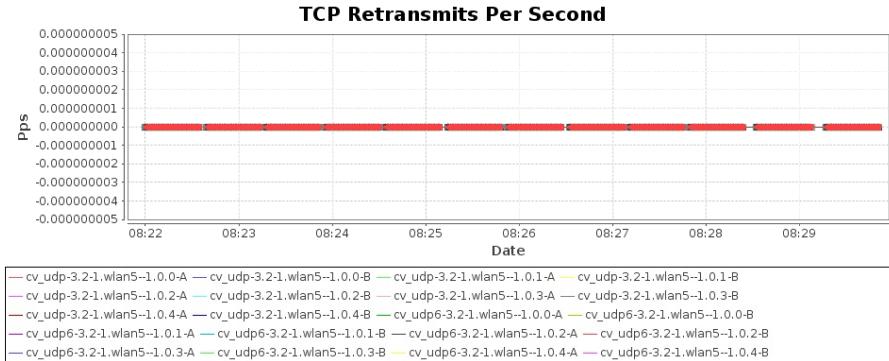
[CSV Data for Endpoint RX Packet Loss Per Second](#)

Endpoint RX Packet Loss Per Second



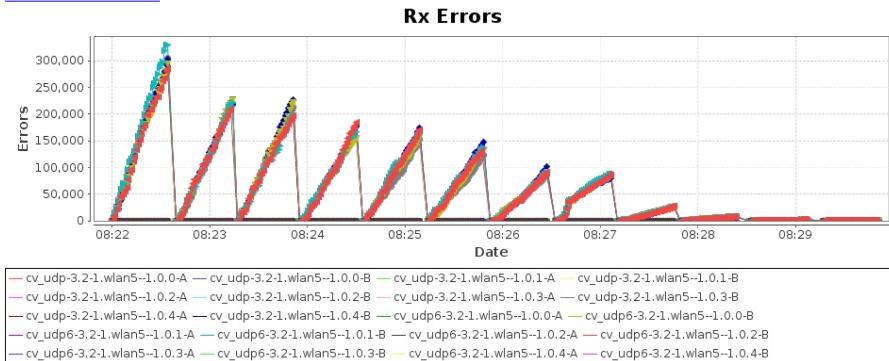
Retransmit Graph shows occurrences of retransmitted packets.

[CSV Data for TCP Retransmits Per Second](#)



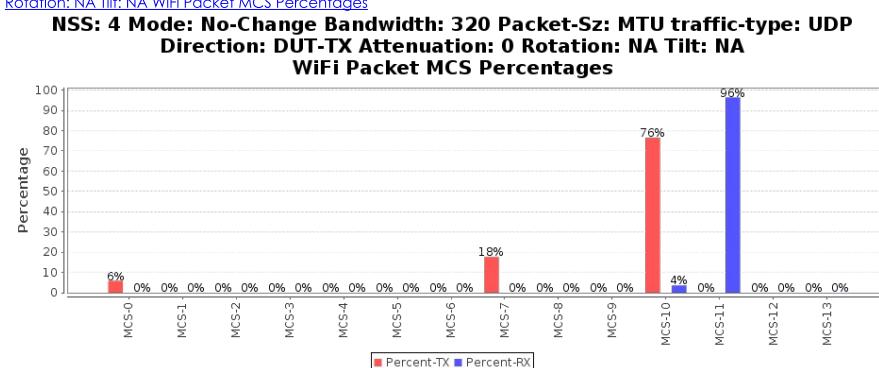
Error Graph shows occurrences of packet errors.

[CSV Data for Rx Errors](#)



Histogram for WiFi MCS for packets sent and received by the wifi radios in the test.

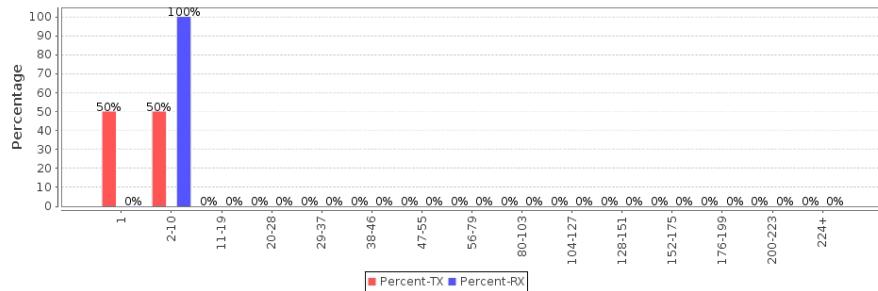
[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 0 Rotation: NA Tilt: NA WiFi Packet MCS Percentages](#)



Block-Ack allows a series of frames to be sent in one transmit opportunity. This series of packets is known as a series of AMPDU frames. Having more frames in each AMPDU series normally improves throughput, but may increase latency or decrease airtime fairness. This histogram provides some visibility into the AMPDU chain length used in this test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 0 Rotation: NA Tilt: NA WiFi Packet AMPDU Length Percentages](#)

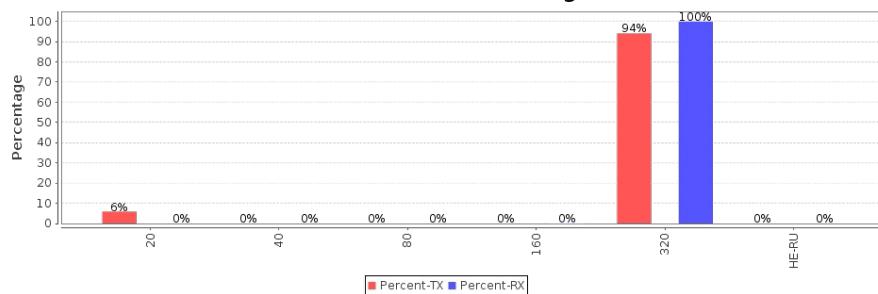
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 0 Rotation: NA Tilt: NA
WiFi Packet AMPDU Length Percentages**



Histogram for WiFi bandwidths for packets sent and received by the wifi radios in the test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 0 Rotation: NA Tilt: NA WiFi Bandwidth Percentages](#)

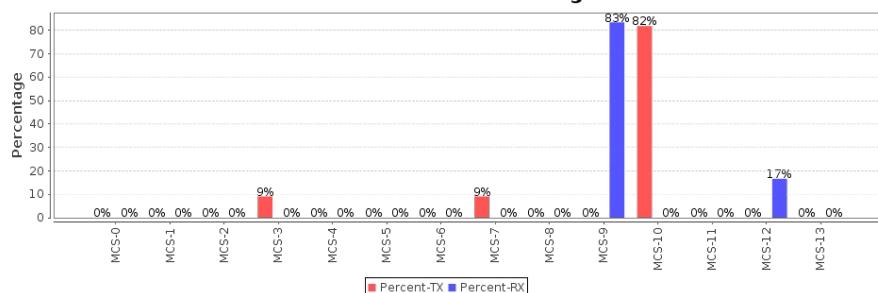
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 0 Rotation: NA Tilt: NA
WiFi Bandwidth Percentages**



Histogram for WiFi MCS for packets sent and received by the wifi radios in the test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 50 Rotation: NA Tilt: NA WiFi Packet MCS Percentages](#)

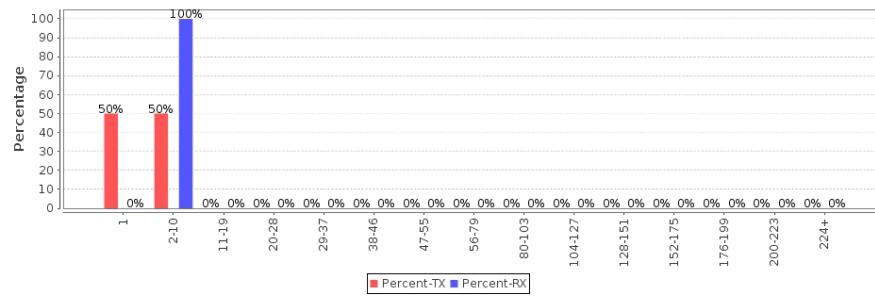
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 50 Rotation: NA Tilt: NA
WiFi Packet MCS Percentages**



Block-Ack allows a series of frames to be sent in one transmit opportunity. This series of packets is known as a series of AMPDU frames. Having more frames in each AMPDU series normally improves throughput, but may increase latency or decrease airtime fairness. This histogram provides some visibility into the AMPDU chain length used in this test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 50 Rotation: NA Tilt: NA WiFi Packet AMPDU Length Percentages](#)

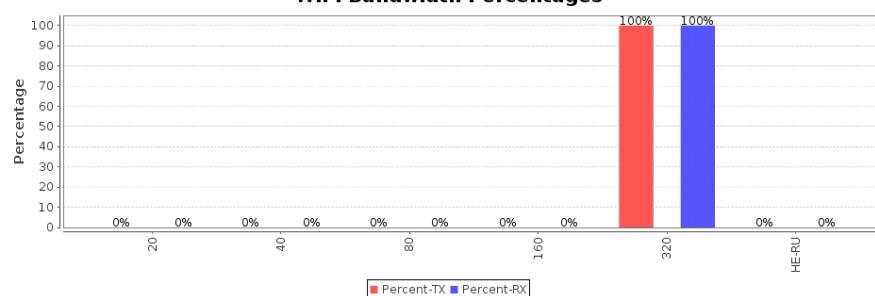
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 50 Rotation: NA Tilt: NA
WiFi Packet AMPDU Length Percentages**



Histogram for WiFi bandwidths for packets sent and received by the wifi radios in the test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 50 Rotation: NA Tilt: NA WiFi Bandwidth Percentages](#)

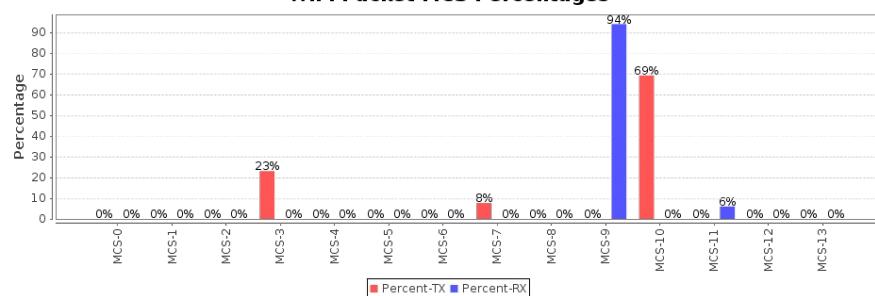
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 50 Rotation: NA Tilt: NA
WiFi Bandwidth Percentages**



Histogram for WiFi MCS for packets sent and received by the wifi radios in the test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 100 Rotation: NA Tilt: NA WiFi Packet MCS Percentages](#)

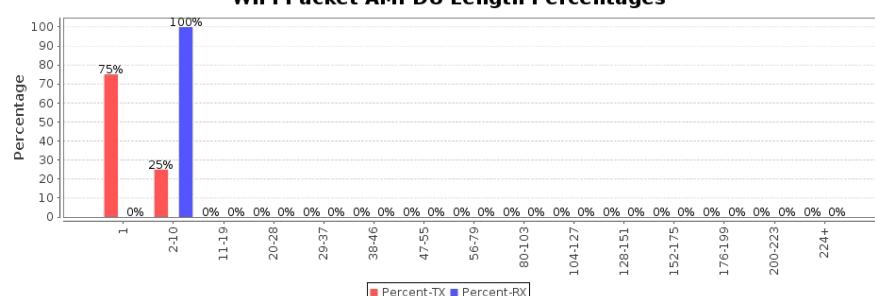
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 100 Rotation: NA Tilt: NA
WiFi Packet MCS Percentages**



Block-Ack allows a series of frames to be sent in one transmit opportunity. This series of packets is known as a series of AMPDU frames. Having more frames in each AMPDU series normally improves throughput, but may increase latency or decrease airtime fairness. This histogram provides some visibility into the AMPDU chain length used in this test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 100 Rotation: NA Tilt: NA WiFi Packet AMPDU Length Percentages](#)

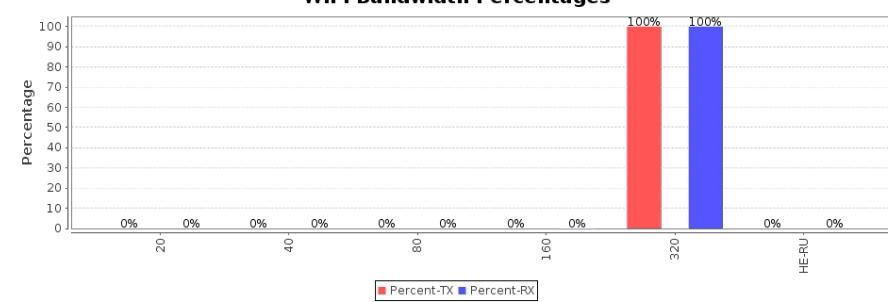
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 100 Rotation: NA Tilt: NA
WiFi Packet AMPDU Length Percentages**



Histogram for WiFi bandwidths for packets sent and received by the wifi radios in the test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 100 Rotation: NA Tilt: NA WiFi Bandwidth Percentages](#)

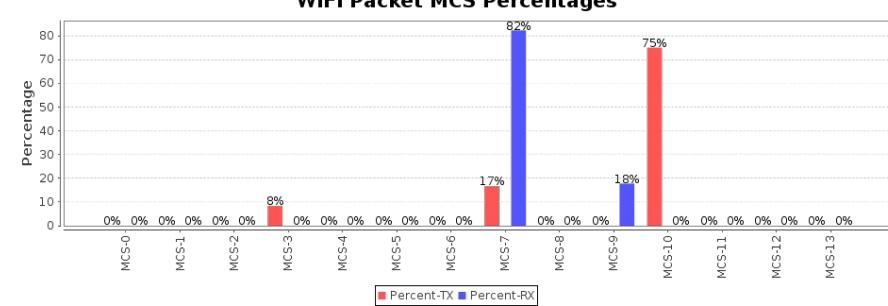
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 100 Rotation: NA Tilt: NA WiFi Bandwidth Percentages**



Histogram for WiFi MCS for packets sent and received by the wifi radios in the test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 150 Rotation: NA Tilt: NA WiFi Packet MCS Percentages](#)

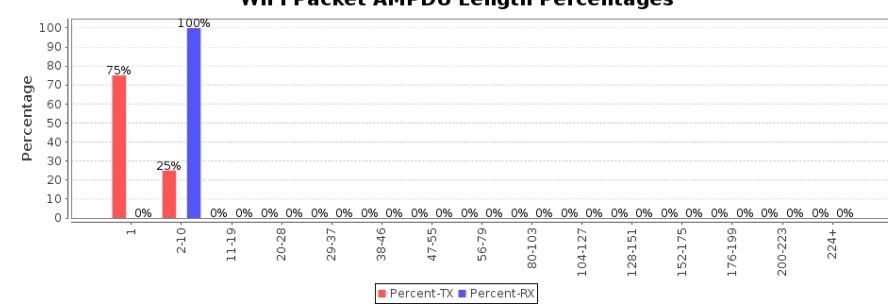
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 150 Rotation: NA Tilt: NA WiFi Packet MCS Percentages**



Block-Ack allows a series of frames to be sent in one transmit opportunity. This series of packets is known as a series of AMPDU frames. Having more frames in each AMPDU series normally improves throughput, but may increase latency or decrease airtime fairness. This histogram provides some visibility into the AMPDU chain length used in this test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 150 Rotation: NA Tilt: NA WiFi Packet AMPDU Length Percentages](#)

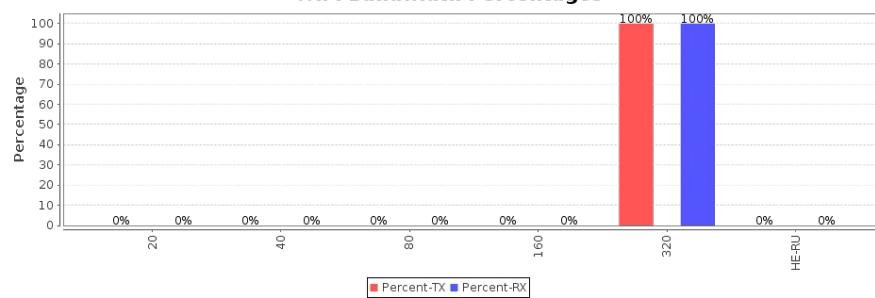
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 150 Rotation: NA Tilt: NA WiFi Packet AMPDU Length Percentages**



Histogram for WiFi bandwidths for packets sent and received by the wifi radios in the test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 150 Rotation: NA Tilt: NA WiFi Bandwidth Percentages](#)

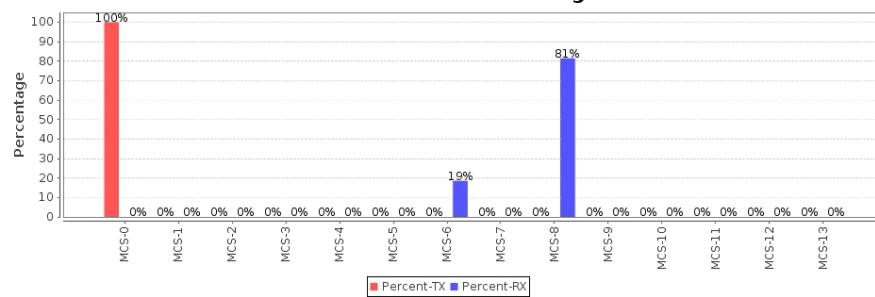
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 150 Rotation: NA Tilt: NA**



Histogram for WiFi MCS for packets sent and received by the wifi radios in the test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 200 Rotation: NA Tilt: NA WiFi Packet MCS Percentages](#)

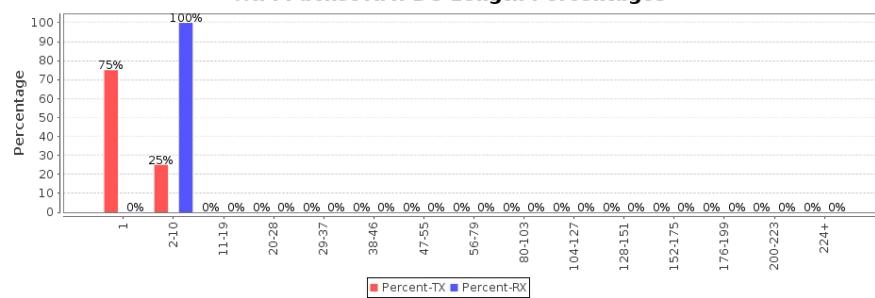
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 200 Rotation: NA Tilt: NA**



Block-Ack allows a series of frames to be sent in one transmit opportunity. This series of packets is known as a series of AMPDU frames. Having more frames in each AMPDU series normally improves throughput, but may increase latency or decrease airtime fairness. This histogram provides some visibility into the AMPDU chain length used in this test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 200 Rotation: NA Tilt: NA WiFi Packet AMPDU Length Percentages](#)

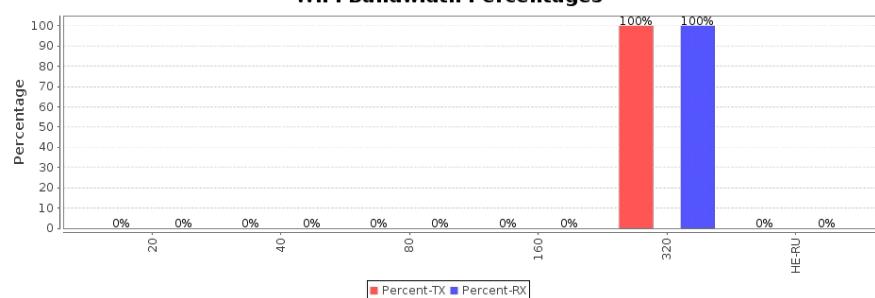
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 200 Rotation: NA Tilt: NA**



Histogram for WiFi bandwidths for packets sent and received by the wifi radios in the test.

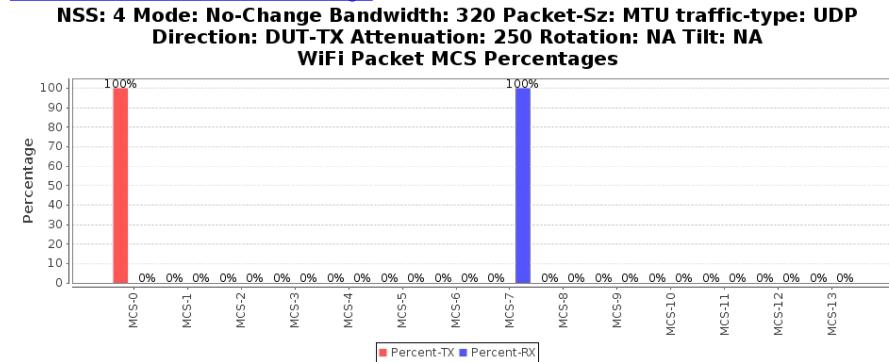
[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 200 Rotation: NA Tilt: NA WiFi Bandwidth Percentages](#)

**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 200 Rotation: NA Tilt: NA**



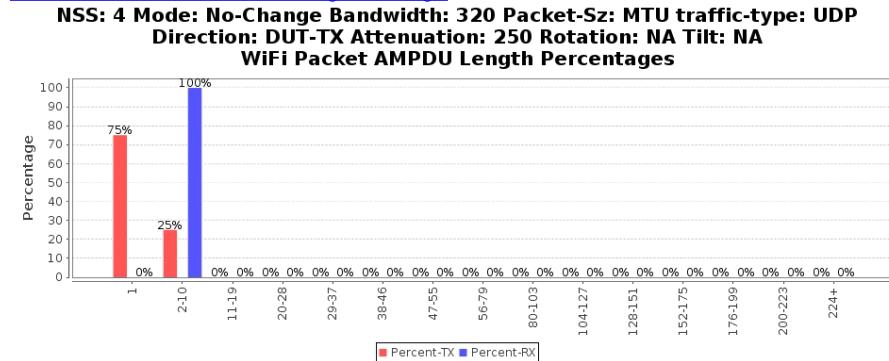
Histogram for WiFi MCS for packets sent and received by the wifi radios in the test.

CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 250 Rotation: NA Tilt: NA WiFi Packet MCS Percentages



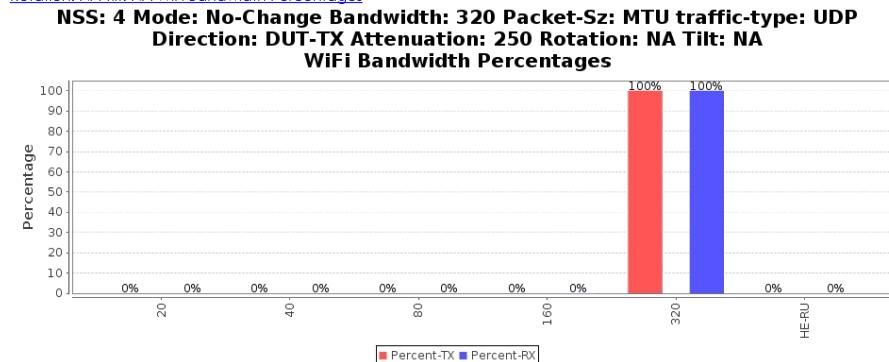
Block-Ack allows a series of frames to be sent in one transmit opportunity. This series of packets is known as a series of AMPDU frames. Having more frames in each AMPDU series normally improves throughput, but may increase latency or decrease airtime fairness. This histogram provides some visibility into the AMPDU chain length used in this test.

CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 250 Rotation: NA Tilt: NA WiFi Packet AMPDU Length Percentages



Histogram for WiFi bandwidths for packets sent and received by the wifi radios in the test.

CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 250 Rotation: NA Tilt: NA WiFi Bandwidth Percentages



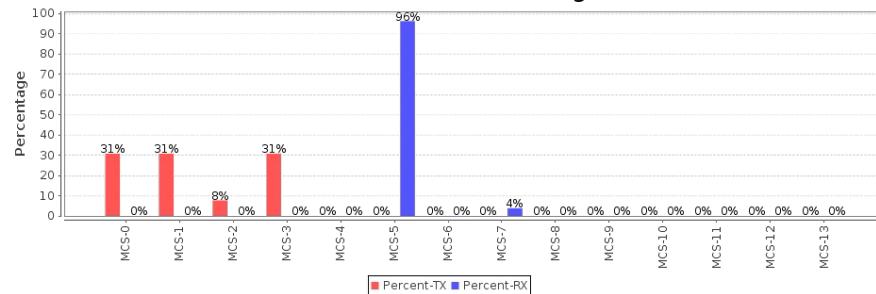
Histogram for WiFi MCS for packets sent and received by the wifi radios in the test.

CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 300 Rotation: NA Tilt: NA WiFi Packet MCS Percentages

NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP

Direction: DUT-TX Attenuation: 300 Rotation: NA Tilt: NA

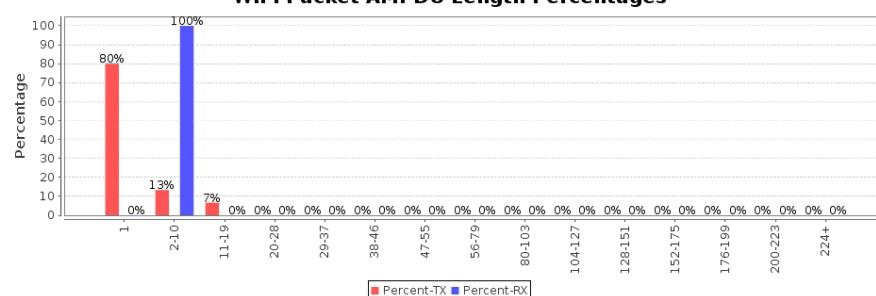
WiFi Packet MCS Percentages



Block-Ack allows a series of frames to be sent in one transmit opportunity. This series of packets is known as a series of AMPDU frames. Having more frames in each AMPDU series normally improves throughput, but may increase latency or decrease airtime fairness. This histogram provides some visibility into the AMPDU chain length used in this test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 300 Rotation: NA Tilt: NA WiFi Packet AMPDU Length Percentages](#)

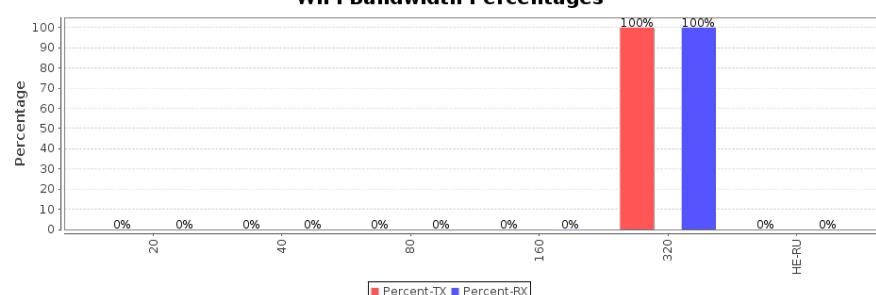
WiFi Packet AMPDU Length Percentages



Histogram for WiFi bandwidths for packets sent and received by the wifi radios in the test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 300 Rotation: NA Tilt: NA WiFi Bandwidth Percentages](#)

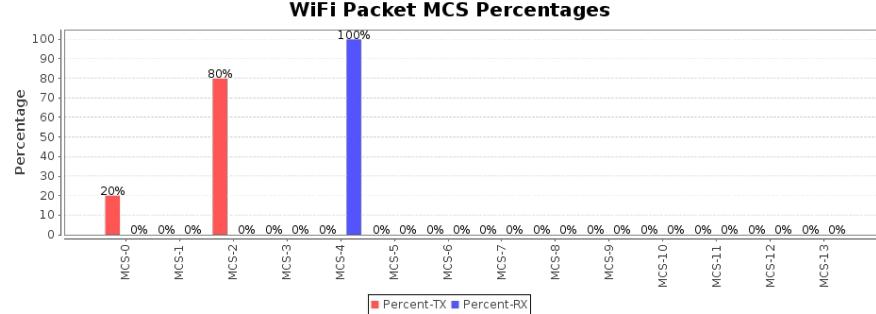
WiFi Bandwidth Percentages



Histogram for WiFi MCS for packets sent and received by the wifi radios in the test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 350 Rotation: NA Tilt: NA WiFi Packet MCS Percentages](#)

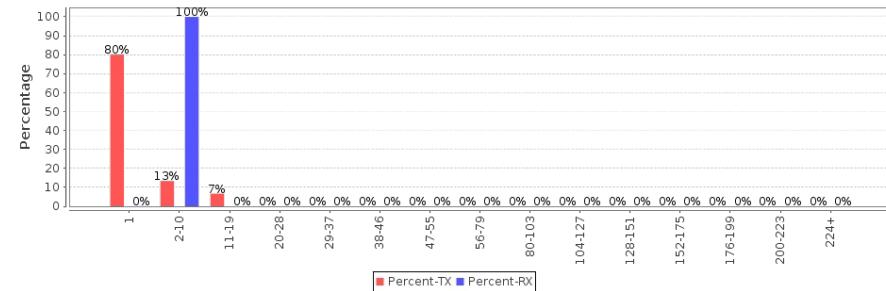
WiFi Packet MCS Percentages



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[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 350 Rotation: NA Tilt: NA WiFi Packet AMPDU Length Percentages](#)

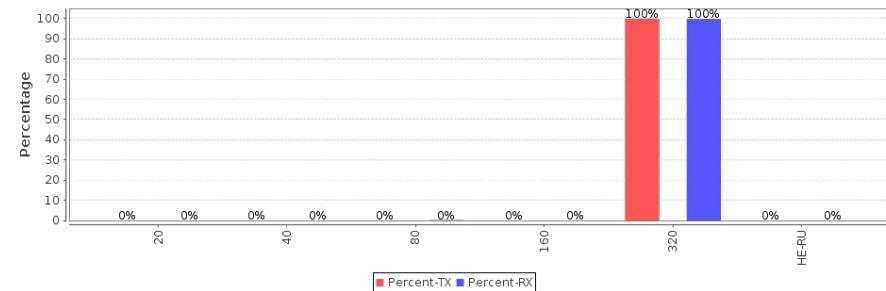
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 350 Rotation: NA Tilt: NA
WiFi Packet AMPDU Length Percentages**



Histogram for WiFi bandwidths for packets sent and received by the wifi radios in the test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 350 Rotation: NA Tilt: NA WiFi Bandwidth Percentages](#)

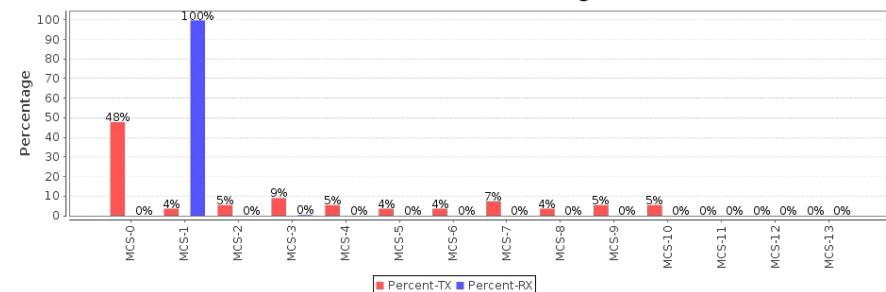
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 350 Rotation: NA Tilt: NA
WiFi Bandwidth Percentages**



Histogram for WiFi MCS for packets sent and received by the wifi radios in the test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 400 Rotation: NA Tilt: NA WiFi Packet MCS Percentages](#)

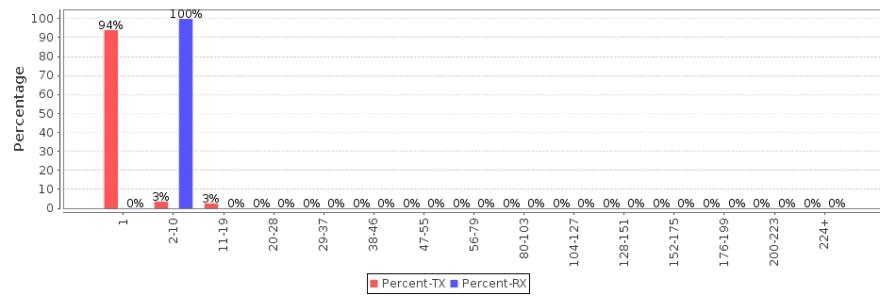
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 400 Rotation: NA Tilt: NA
WiFi Packet MCS Percentages**



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[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 400 Rotation: NA Tilt: NA WiFi Packet AMPDU Length Percentages](#)

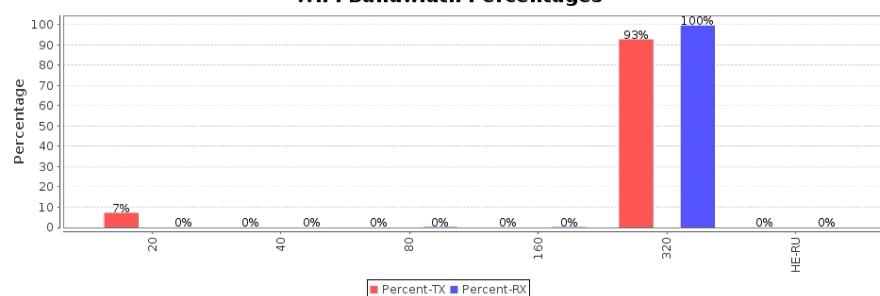
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 400 Rotation: NA Tilt: NA
WiFi Packet AMPDU Length Percentages**



Histogram for WiFi bandwidths for packets sent and received by the wifi radios in the test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 400 Rotation: NA Tilt: NA WiFi Bandwidth Percentages](#)

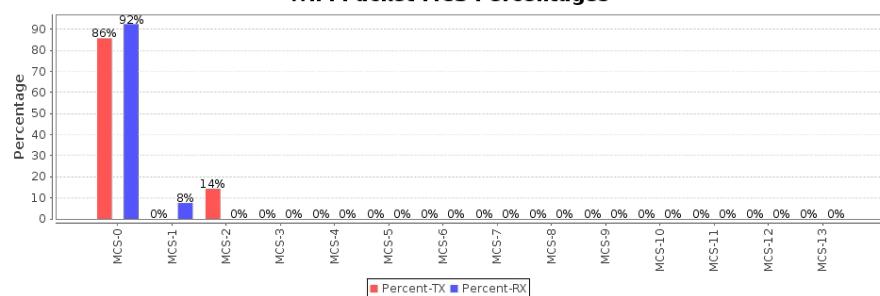
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 400 Rotation: NA Tilt: NA
WiFi Bandwidth Percentages**



Histogram for WiFi MCS for packets sent and received by the wifi radios in the test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 450 Rotation: NA Tilt: NA WiFi Packet MCS Percentages](#)

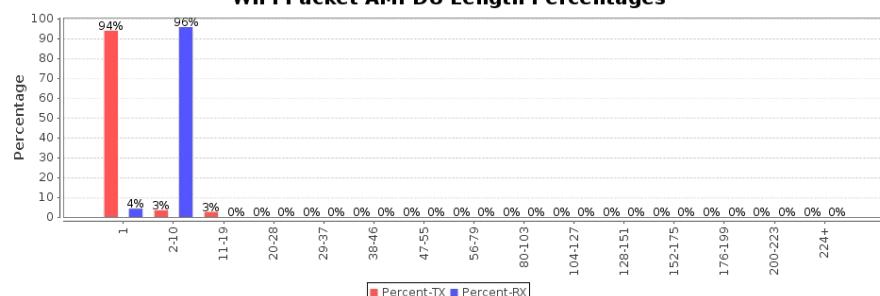
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 450 Rotation: NA Tilt: NA
WiFi Packet MCS Percentages**



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[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 450 Rotation: NA Tilt: NA WiFi Packet AMPDU Length Percentages](#)

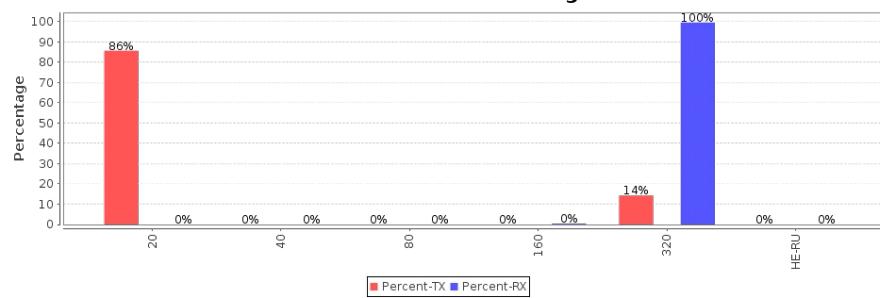
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 450 Rotation: NA Tilt: NA
WiFi Packet AMPDU Length Percentages**



Histogram for WiFi bandwidths for packets sent and received by the wifi radios in the test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 450 Rotation: NA Tilt: NA WiFi Bandwidth Percentages](#)

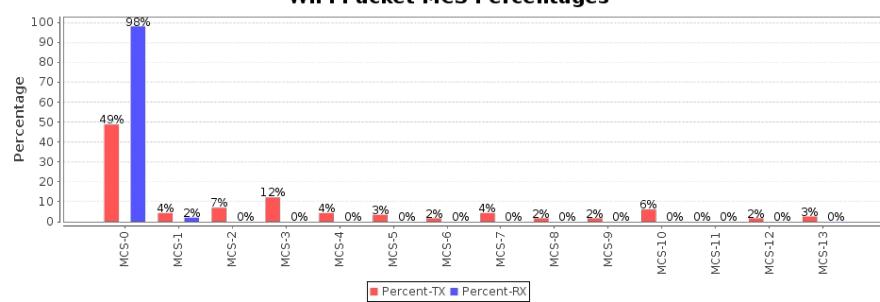
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 450 Rotation: NA Tilt: NA WiFi Bandwidth Percentages**



Histogram for WiFi MCS for packets sent and received by the wifi radios in the test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 500 Rotation: NA Tilt: NA WiFi Packet MCS Percentages](#)

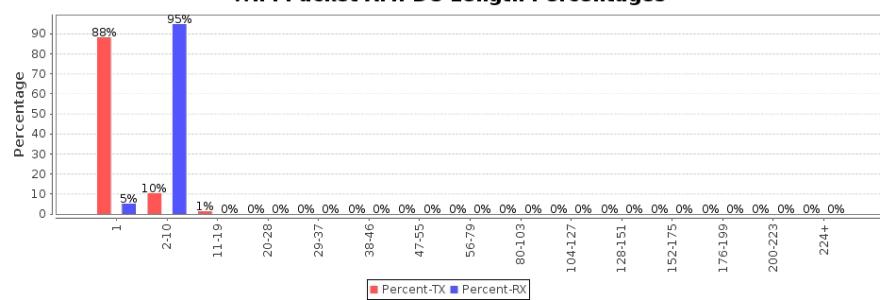
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 500 Rotation: NA Tilt: NA WiFi Packet MCS Percentages**



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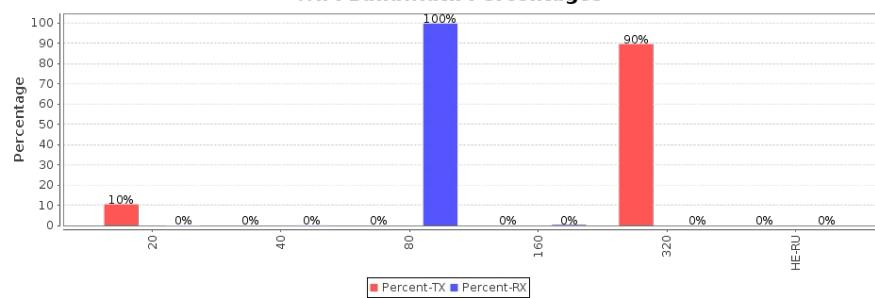
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 500 Rotation: NA Tilt: NA WiFi Packet AMPDU Length Percentages**



Histogram for WiFi bandwidths for packets sent and received by the wifi radios in the test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 500 Rotation: NA Tilt: NA WiFi Bandwidth Percentages](#)

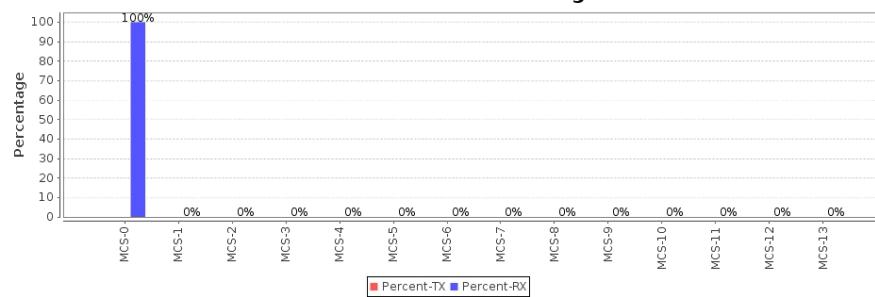
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 500 Rotation: NA Tilt: NA**



Histogram for WiFi MCS for packets sent and received by the wifi radios in the test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 550 Rotation: NA Tilt: NA WiFi Packet MCS Percentages](#)

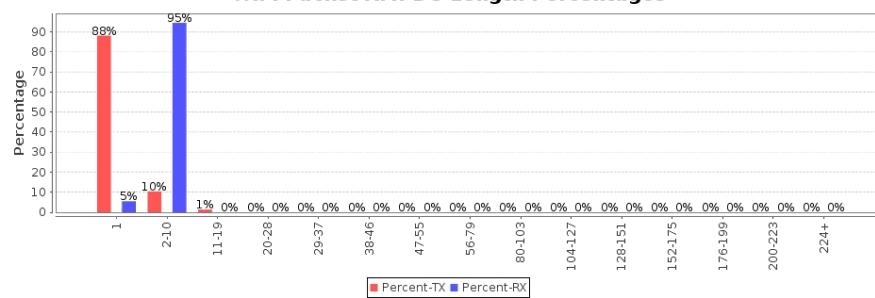
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 550 Rotation: NA Tilt: NA**



Block-Ack allows a series of frames to be sent in one transmit opportunity. This series of packets is known as a series of AMPDU frames. Having more frames in each AMPDU series normally improves throughput, but may increase latency or decrease airtime fairness. This histogram provides some visibility into the AMPDU chain length used in this test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 550 Rotation: NA Tilt: NA WiFi Packet AMPDU Length Percentages](#)

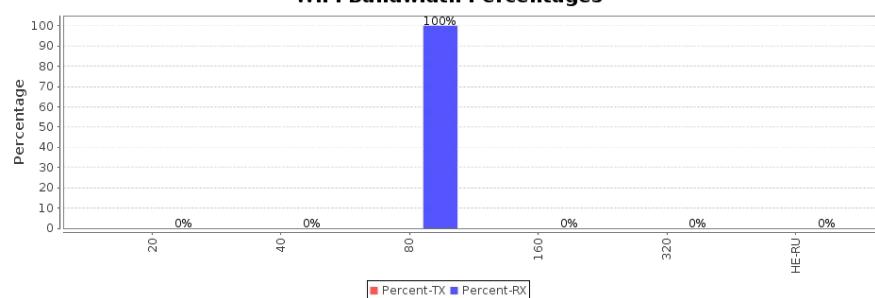
**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 550 Rotation: NA Tilt: NA**



Histogram for WiFi bandwidths for packets sent and received by the wifi radios in the test.

[CSV Data for NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP Direction: DUT-TX Attenuation: 550 Rotation: NA Tilt: NA WiFi Bandwidth Percentages](#)

**NSS: 4 Mode: No-Change Bandwidth: 320 Packet-Sz: MTU traffic-type: UDP
Direction: DUT-TX Attenuation: 550 Rotation: NA Tilt: NA**



[Key Performance Indicators CSV](#)

Test configuration and LANforge software version	
AP Tx Power:	0
Path Loss	10
Requested Speed	100%
Requested Opposite Speed	0Kbps
Multi-Conn	10
Multi-Cx	5
Armageddon Multi-Pkt	1000
ToS	0
Station Bringup Wait:	15 sec (15 s)
First Byte Wait:	10 sec (10 s)
Duration:	30 sec (30 s)
Settle Time:	0 (0 ms)
Send Buffer Size:	OS Default
Receive Buffer Size:	OS Default
RvR Helper Script:	
Channels	AUTO
Spatial Streams	AUTO
Bandwidth	AUTO
Attenuator-1	1.1.3102
Attenuation-1	0..+50..550
Attenuator-2	1.1.3099
Attenuation-2	0..+50..550
Turntable Chamber	0
Turntable Angles	0..+30..359
Modes	No-Change
Packet Size	MTU
Custom Packet Size	1400
Security	AUTO
Traffic Type	UDP
Direction	DUT Transmit
Upstream Port	1.3.2 eth2 Firmware: 0x80000aef, 1.1876.0 Resource: 204-tr398-r3
WiFi Port	1.1.21 wlan5 Resource: 204-tr398-mgr
Continuous Traffic	false
Maximize Unused Attenuators	false
Admin Down Other Ports	true
Admin Down Test Ports	true
UDP-Burst	true
UDP-GRO	false
Modify Interop WiFi	false
Outer Loop is Attenuation	false
Show Events	true
Auto Save Report	false
Ignore Upstream RSSI	false
Pass-Fail Tput Criteria	<pre>atten=0 tput=950mbps rxmcs=1.2Gbps dl=1 atten=0 tput=950mbps txmcs=1.2Gbps dl=0</pre> <pre>atten=50 tput=40Mbps rxmcs=70Mbps dl=1 atten=50 tput=40Mbps txmcs=70Mbps dl=0</pre>

Build Date	Mon 07 Oct 2024 10:29:38 AM PDT
Build Version	5.4.9
Git Version	fdbf86d4628b6218ae8ceaf8e77c03280e0fc94

[META Information for Rate vs Range Test](#)

Generated by Candela Technologies LANforge network testing tool.
www.candlatech.com

