TR-398 Issue 4

WiFi Performance Test Plan

Fri Dec 29 08:31:11 PST 2023

Test Setup Information		
Device Under Test	Name	be800
	SSIDs	be800_2g be800_5g be800_6g TP-Link_F5F0_MLO
	Passwords	lanforge lanforge lanforge 91912022
	BSSIDs	40:ed:00:14:f5:f2 40:ed:00:14:f5:f3 52:ed:00:14:f5:f4
	Notes	[BLANK]
Operator	Ben Greear	
Estimated Run Time	24 m	
Actual Run Time	19.564 m	

Objective

The TR-398 Issue 4 WiFi Performance test plan by the Broadband forum provides a comprehensive set of tests to qualify the performance of WiFi access points (APs) designed for residential and small office environments. Radio performance, Throughput, Connection Stability, Airtime Fairness, AP Co-existence, Mu_MIMO Performance, Spatial Consistency, Long-term Stability and Mesh performance are some of the test areas covered in this test plan. The test plan is designed for service providers deploying in home WiFi APs to qualify the APs in the lab before deployment and for equipment makers to test during the development of the APs. Candela Technologies offers a fully automated TR-398 test system. The user can select from the list of tests available. Most tests can run fully automated, though some require user interaction. Measurements are made and compared to the specified PASS/FAIL criteria in the TR-398 test plan and this report will show the summary PASS/FAIL results followed by more detailed results for each test.

Add your notes below:

40Mhz step on 2.4 was executed at 20Mhz due to AP not being re-configured during this test.

Summary Results

Test	Result	Candela Score	Elapsed	Info
6.3.3 Peak Performance TCP Throughput Test	2.4Ghz PASS 5Ghz PASS 6Ghz PASS	119	17.992 m	Throughput AX 6Ghz-2x2-160Mhz UL 180.44% DL 175.12% Throughput AX 2.4Ghz-2x2-20Mhz UL 89.53% DL 103.33% Throughput AX 5Ghz-2x2-80Mhz UL 122.45% DL 84.08% Throughput AX BE 2.4Ghz-2x2-40Mhz UL 41.89% DL 48.83% Throughput AX BE 5Ghz-2x2-160Mhz UL 142.19% DL 105.88% Throughput AX BE 6Ghz-2x2-320Mhz UL

				174.14% DL 162.91%

6.3.3 Peak Performance TCP Throughput Test

Summary

The Peak Performance throughput test intends to measure the maximum throughput performance of the DUT with a single station active. The AP should be configured for 160Mhz on 5 and 6Ghz and 40Mhz on 2.4G bands. The test uses TCP connections and the attenuation is adjusted to emulate a distance of 2 meters. The 2.4Ghz station should use 40Mhz bandwidth and the 5 and 6Ghz station is configured for 160Mhz bandwidth.

Test Procedure

These steps are done for 2.4, 5, and 6Ghz bands.

1. Establish the LAN connection, create 1 station and allow the station to associate with the DUT.
2. Measure the downlink TCP throughput, using a test time of 120 seconds.
3. Measure the uplink TCP throughput, using a test time of 120 seconds.

Pass/Fail Criteria

1. If the AP supports only 1Gbps, then the maximum metric is 925.00 Mbps, overriding the metrics below.
2. For AX 2.4Ghz 40Mhz 2x2, upload/download rate must be >= 300Mbps
3. For AX 5Ghz 160Mhz 2x2, upload/download rate must be >= 1.1Gbps
4. For AX 5Ghz 160Mhz 4x4, upload/download rate must be >= 2.4Gbps
5. For AX 5Ghz 160Mhz 8x8, upload/download rate must be >= 4.8Gbps
6. For AX 6Ghz 160Mhz 2x2, upload/download rate must be >= 1.1Gbps

Candela Score

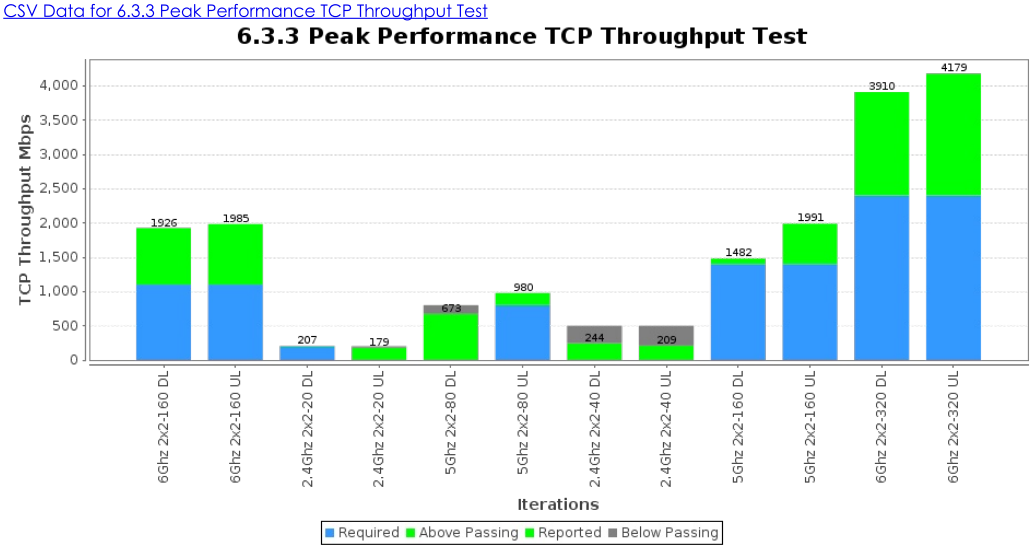
The Candela Score for Max Throughput Test is calculated as the percentage of the actual throughput vs the required throughput.

6.3.3 Peak Performance TCP Throughput Test Results

Type	Result	Value	P/F Value	Notes
Configuration NOTE	INFO			Pass/fail is adjusted, requested 5Ghz AX 4x4 rate is: 1,100.00 Mbps instead of 2.4Gbps.
Total AXe 6Ghz 2x2-160 DL throughput	PASS	1,926	1,100	Sum-total DL: 1,926.28 Mbps Requires: 1,100.00 Mbps STA-RSSI Data/Beacon: -36/-43 Rx-Rate: 2.402G Tx-Rate: 2.402G 802.11a-AX-160-2x2
Total AXe 6Ghz 2x2-160 UL throughput	PASS	1,985	1,100	Sum-total UL: 1,984.86 Mbps Requires: 1,100.00 Mbps STA-RSSI Data/Beacon: -36/-43 Rx-Rate: 2.402G Tx-Rate: 2.402G 802.11a-AX-160-2x2
Total AX 2.4Ghz 2x2-20 DL throughput	PASS	207	200	Sum-total DL: 206.65 Mbps Requires: 200.00 Mbps STA-RSSI Data/Beacon: -21/-16 Rx-Rate: 286.7M Tx-Rate: 286.7M 802.11bgn-AX-20-2x2
Total AX 2.4Ghz 2x2-20 UL throughput	FAIL	179	200	Total AX UL: 179.07 Mbps must be at least 200.00 Mbps on 2.4Ghz at NSS: 2. STA-RSSI Data/Beacon: -21/-15 Rx-Rate: 286.7M Tx-Rate: 286.7M 802.11bgn-AX-20-2x2
Total AX 5Ghz 2x2-80 DL throughput	FAIL	673	800	Total AX DL: 672.64 Mbps must be at least 800.00 Mbps on 5Ghz at NSS: 2. STA-RSSI Data/Beacon: -36/-32 Rx-Rate: 960.7M Tx-Rate: 1.201G 802.11an-AX-80-2x2

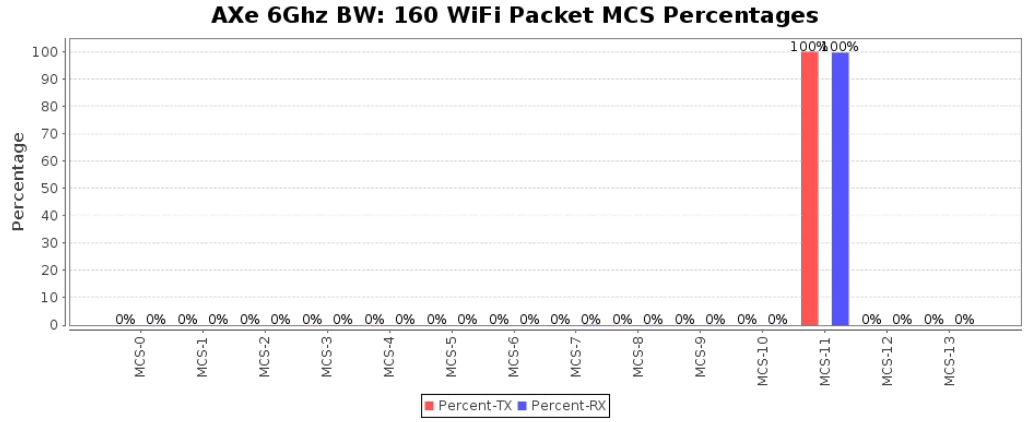
Total AX 5Ghz 2x2-80 UL throughput	PASS	980	800	Sum-total UL: 979.60 Mbps Requires: 800.00 Mbps STA-RSSI Data/Beacon: -37/-32 Rx-Rate: 960.7M Tx-Rate: 1.201G 802.11an-AX-80-2x2
Total AX 2.4Ghz 2x2-40 DL throughput	FAIL	244	500	Total BE DL: 244.15 Mbps must be at least 500.00 Mbps on 2.4Ghz at NSS: 2. STA-RSSI Data/Beacon: -22/-16 Rx-Rate: 344.1M Tx-Rate: 344.1M 802.11bgn-BE-20-2x2
Total AX 2.4Ghz 2x2-40 UL throughput	FAIL	209	500	Total BE UL: 209.46 Mbps must be at least 500.00 Mbps on 2.4Ghz at NSS: 2. STA-RSSI Data/Beacon: -21/-15 Rx-Rate: 344.1M Tx-Rate: 344.1M 802.11bgn-BE-20-2x2
Total BE 5Ghz 2x2-160 DL throughput	PASS	1,482	1,400	Sum-total DL: 1,482.29 Mbps Requires: 1,400.00 Mbps STA-RSSI Data/Beacon: -36/-34 Rx-Rate: 1.921G Tx-Rate: 2.594G 802.11an-BE-160-2x2
Total BE 5Ghz 2x2-160 UL throughput	PASS	1,991	1,400	Sum-total UL: 1,990.63 Mbps Requires: 1,400.00 Mbps STA-RSSI Data/Beacon: -36/-34 Rx-Rate: 1.73G Tx-Rate: 2.594G 802.11an-BE-160-2x2
Total BE 6Ghz 2x2-320 DL throughput	PASS	3,910	2,400	Sum-total DL: 3,909.90 Mbps Requires: 2,400.00 Mbps STA-RSSI Data/Beacon: -36/-43 Rx-Rate: 5.187G Tx-Rate: 5.765G 802.11a-BE-320-2x2
Total BE 6Ghz 2x2-320 UL throughput	PASS	4,179	2,400	Sum-total UL: 4,179.41 Mbps Requires: 2,400.00 Mbps STA-RSSI Data/Beacon: -36/-43 Rx-Rate: 5.187G Tx-Rate: 5.187G 802.11a-BE-320-2x2

CSV Data for 6.3.3 Peak Performance TCP Throughput Test



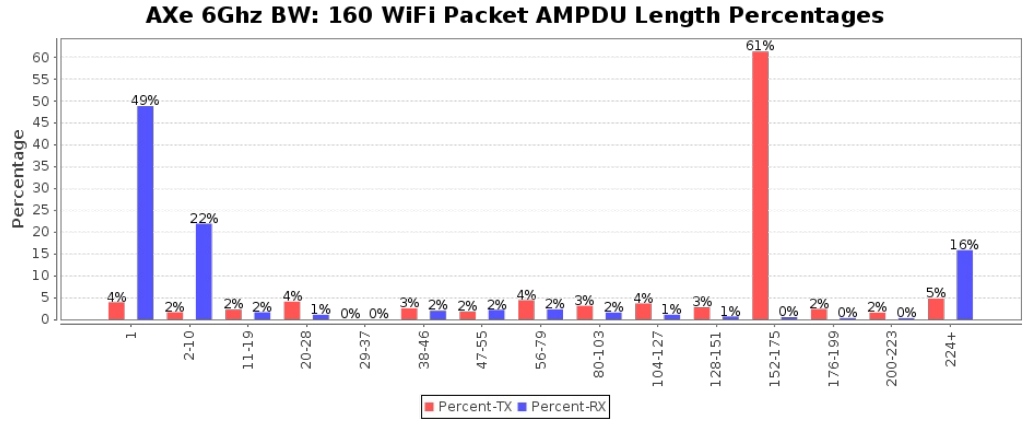
Histogram for WiFi MCS for packets sent and received by the wifi radios in the test.

CSV Data for AXe 6Ghz BW: 160 WiFi Packet MCS Percentages



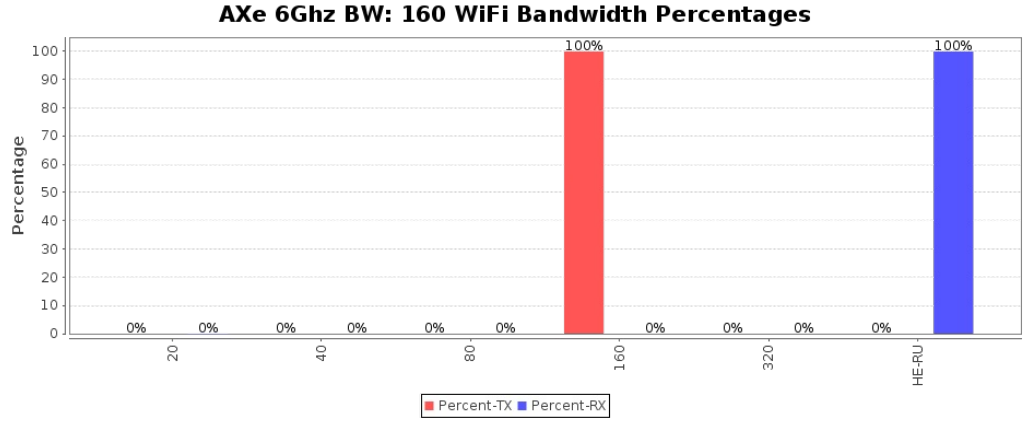
Block-Ack allows a series of frames to be sent in one transmit opportunity. This series of packets is known as a series of AMPDU frames. Having more frames in each AMPDU series normally improves throughput, but may increase latency or decrease airtime fairness. This histogram provides some visibility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

CSV Data for AXe 6Ghz BW: 160 WiFi Packet AMPDU Length Percentages



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

CSV Data for AXe 6Ghz BW: 160 WiFi Bandwidth Percentages



Collected CSV Data: CSV: 6.3.3 Peak Performance TCP Throughput Test 6Ghz AXe NSS: 2 DL

AXe 6Ghz NSS: 2 BW: 160 DL Snapshot

Port	Tx-Bps 1m	Rx-Bps 1m	Tx-Fail %	Tx Link-Rate	Rx Link-Rate	Mode	Channel	Last CX-Time (ms)	RSSI (dBm)	AP	IP	MAC
1.4.14 wlan0	3.642 Mbps	1.541 Gbps	0.01	2401.9 Mbps	2.402 Gbps	802.11a-AX 160 2x2	259	86	-36	52:ED:00:14:F5:F4	192.168.0.104	e4:60:17:65:83:8f

Port	Tx-Bps 1m	Rx-Bps 1m	Link-Rate	IP	MAC
1.3.2 eth2	1.916 Gbps	3.673 Mbps	10 Gbps	192.168.0.56	9c:69:b4:63:76:c4

Endpoint	Tx-Bps 1m	Rx-Bps 1m	TxPkts	RxPkts	RX Latency (ms)	Round-Trip Latency (ms)	Jitter	Rx Packet Loss %	Rx OOO %
cv_tcp-3.2-4.wlan0--1.0.0-A	0 bps	998.335 Mbps	0	114705	705	705	239	0	0
cv_tcp-3.2-4.wlan0--1.0.0-B	998.552 Mbps	0 bps	114490	0	0	705	0	0	0
cv_tcp-3.2-4.wlan0--1.0.1-A	0 bps	928.517 Mbps	0	106525	327	327	107	0	0
cv_tcp-3.2-4.wlan0--1.0.1-B	929.435 Mbps	0 bps	106150	0	0	327	0	0	0

Collected CSV Data: CSV: 6.3.3 Peak Performance TCP Throughput Test 6Ghz AXe NSS: 2 UL

AXe 6Ghz NSS: 2 BW: 160 UL Snapshot

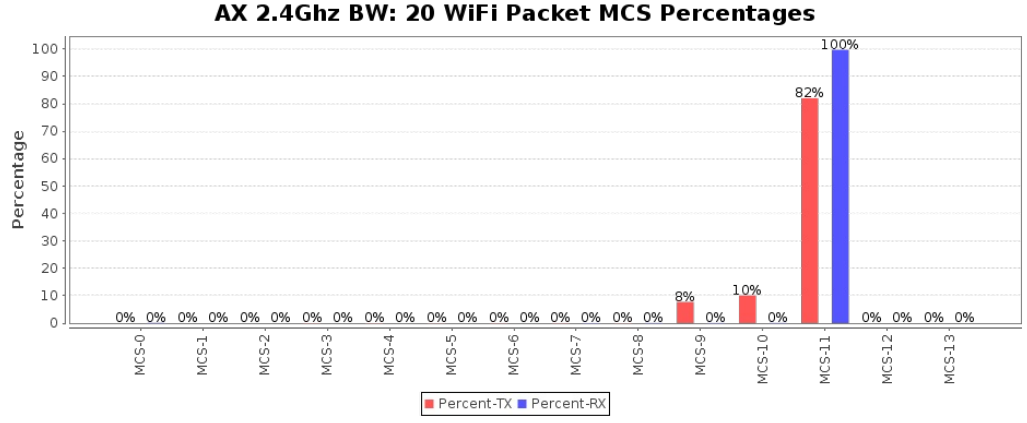
Port	Tx-Bps 1m	Rx-Bps 1m	Tx-Fail %	Tx Link-Rate	Rx Link-Rate	Mode	Channel	Last CX-Time (ms)	RSSI (dBm)	AP	IP	MAC
1.4.14 wlan0	1.543 Gbps	444.383 Mbps	0.867	2401.9 Mbps	2.402 Gbps	802.11a-AX 160 2x2	259	86	-36	52:ED:00:14:F5:F4	192.168.0.104	e4:60:17:65:83:8f

Port	Tx-Bps 1m	Rx-Bps 1m	Link-Rate	IP	MAC
1.3.2 eth2	192.218 Mbps	1.87 Gbps	10 Gbps	192.168.0.56	9c:69:b4:63:76:c4

Endpoint	Tx-Bps 1m	Rx-Bps 1m	TxPkts	RxPkts	RX Latency (ms)	Round-Trip Latency (ms)	Jitter	Rx Packet Loss %	Rx OOO %
cv_tcp-3.2-4.wlan0--1.0.0-A	990.159 Mbps	0 bps	113695	0	0	911	0	0	0
cv_tcp-3.2-4.wlan0--1.0.0-B	0 bps	992.962 Mbps	0	112921	911	911	112	0	0
cv_tcp-3.2-4.wlan0--1.0.1-A	994.385 Mbps	0 bps	114610	0	0	811	0	0	0
cv_tcp-3.2-4.wlan0--1.0.1-B	0 bps	996.418 Mbps	0	112881	811	811	97	0	0

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

CSV Data for AX 2.4Ghz BW: 20 WiFi Packet MCS Percentages



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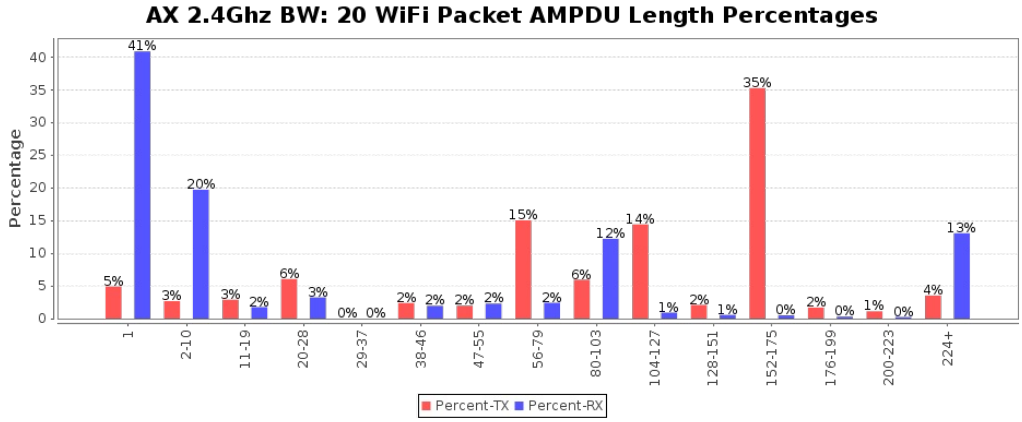
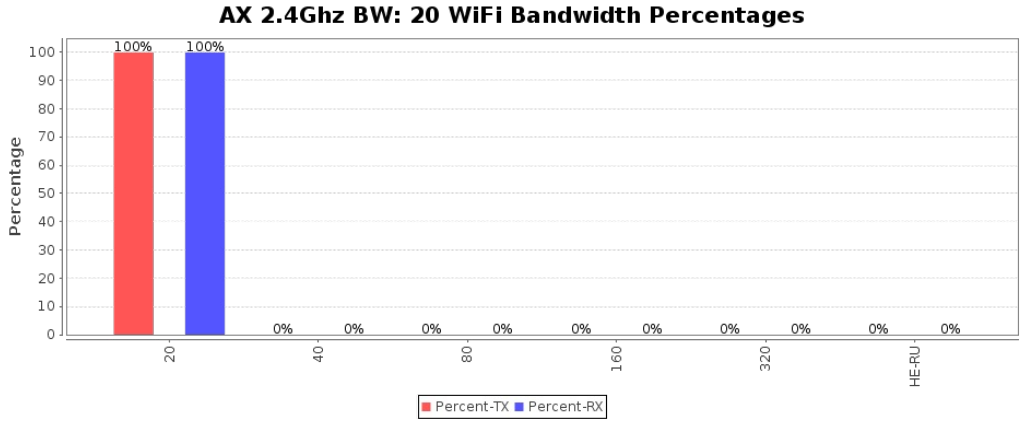
CSV Data for AX 2.4Ghz BW: 20 WiFi Packet AMPDU Length Percentages



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

CSV Data for AX 2.4Ghz BW: 20 WiFi Bandwidth Percentages



Collected CSV Data: CSV: 6.3.3 Peak Performance TCP Throughput Test 2.4Ghz AX NSS: 2 DL

AX 2.4Ghz NSS: 2 BW: 20 DL Snapshot

Port	Tx-Bps 1m	Rx-Bps 1m	Tx-Fail %	Tx Link-Rate	Rx Link-Rate	Mode	Channel	Last CX-Time (ms)	RSSI (dBm)	AP	IP	MAC
1.4.14 wlan0	1.427 Mbps	178.092 Mbps	9.433	286.7 Mbps	286.7 Mbps	802.11bgn-AX 20 2x2	6	84	-21	40:ED:00:14:F5:F2	192.168.0.104	e4:60:17:65:83:8f

Port	Tx-Bps 1m	Rx-Bps 1m	Link-Rate	IP	MAC
1.3.2 eth2	158.634 Mbps	222.677 Mbps	10 Gbps	192.168.0.56	9c:69:b4:63:76:c4

Endpoint	Tx-Bps 1m	Rx-Bps 1m	TxPkts	RxPkts	RX Latency (ms)	Round-Trip Latency (ms)	Jitter	Rx Packet Loss %	Rx OOO %
cv_tcp-3.2-4.wlan0--1.0.0-A	0 bps	128.394 Mbps	0	14745	4,403	4,403	2,007	0	0
cv_tcp-3.2-4.wlan0--1.0.0-B	128.393 Mbps	0 bps	14790	0	0	4,403	0	0	0
cv_tcp-3.2-4.wlan0--1.0.1-A	0 bps	78.233 Mbps	0	8956	1,235	1,235	329	0	0
cv_tcp-3.2-4.wlan0--1.0.1-B	79.132 Mbps	0 bps	8923	0	0	1,235	0	0	0

Collected CSV Data: CSV: 6.3.3 Peak Performance TCP Throughput Test 2.4Ghz AX NSS: 2 UL

AX 2.4Ghz NSS: 2 BW: 20 UL Snapshot

Port	Tx-Bps 1m	Rx-Bps 1m	Tx-Fail %	Tx Link-Rate	Rx Link-Rate	Mode	Channel	Last CX-Time (ms)	RSSI (dBm)	AP	IP	MAC
1.4.14 wlan0	140.518 Mbps	50.19 Mbps	34.491	286.7 Mbps	286.7 Mbps	802.11bgn-AX 20 2x2	6	84	-21	40:ED:00:14:F5:F2	192.168.0.104	e4:60:17:65:83:8f

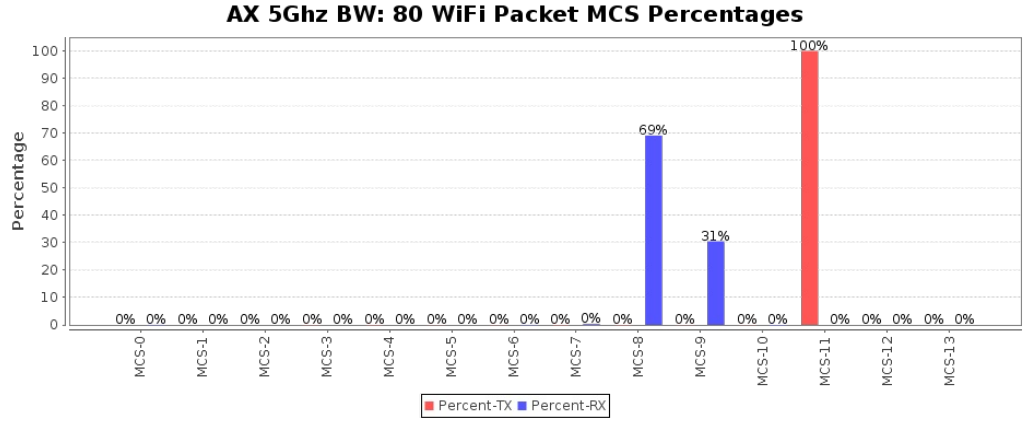
Port	Tx-Bps 1m	Rx-Bps 1m	Link-Rate	IP	MAC

1.3.2 eth2	65.477 Mbps	132.16 Mbps	10 Gbps	192.168.0.56	9c:69:b4:63:76:c4

Endpoint	Tx-Bps 1m	Rx-Bps 1m	TxPkts	RxPkts	RX Latency (ms)	Round-Trip Latency (ms)	Jitter	Rx Packet Loss %	Rx OOO %
cv_tcp-3.2-4.wlan0--1.0.0-A	89.713 Mbps	0 bps	10310	0	0	3,402	0	0	0
cv_tcp-3.2-4.wlan0--1.0.0-B	0 bps	90.22 Mbps	0	10211	3,402	3,402	539	0	0
cv_tcp-3.2-4.wlan0--1.0.1-A	89.423 Mbps	0 bps	10300	0	0	1,709	0	0	0
cv_tcp-3.2-4.wlan0--1.0.1-B	0 bps	89.573 Mbps	0	10199	1,709	1,709	366	0	0

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

CSV Data for AX 5Ghz BW: 80 WiFi Packet MCS Percentages



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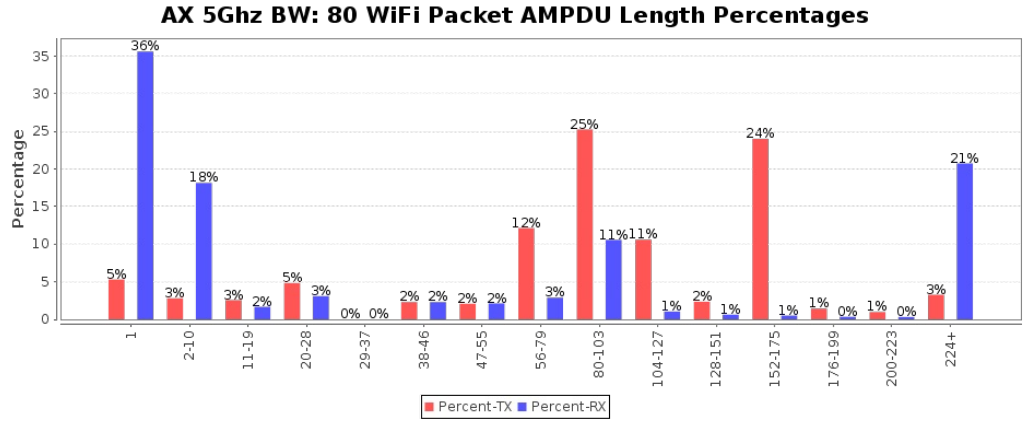
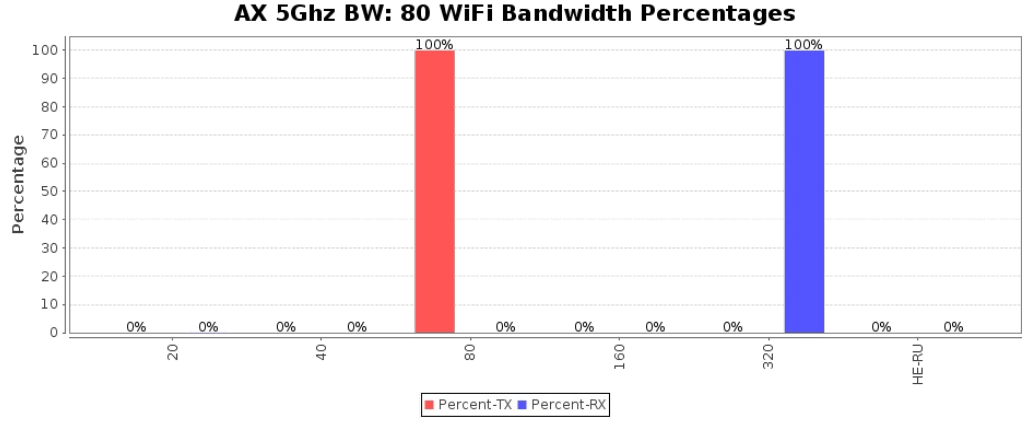
CSV Data for AX 5Ghz BW: 80 WiFi Packet AMPDU Length Percentages



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

CSV Data for AX 5Ghz BW: 80 WiFi Bandwidth Percentages



Collected CSV Data: CSV: 6.3.3 Peak Performance TCP Throughput Test 5Ghz AX NSS: 2 DL

AX 5Ghz NSS: 2 BW: 80 DL Snapshot

Port	Tx-Bps 1m	Rx-Bps 1m	Tx-Fail %	Tx Link-Rate	Rx Link-Rate	Mode	Channel	Last CX-Time (ms)	RSSI (dBm)	AP	IP	MAC
1.4.14 wlan0	2.907 Mbps	582.596 Mbps	3.977	1200.9 Mbps	960.7 Mbps	802.11an-AX 80 2x2	36	88	-36	40:ED:00:14:F5:F3	192.168.0.104	e4:60:17:65:83:8f

Port	Tx-Bps 1m	Rx-Bps 1m	Link-Rate	IP	MAC
1.3.2 eth2	408.121 Mbps	55.247 Mbps	10 Gbps	192.168.0.56	9c:69:b4:63:76:c4

Endpoint	Tx-Bps 1m	Rx-Bps 1m	TxPkts	RxPkts	RX Latency (ms)	Round-Trip Latency (ms)	Jitter	Rx Packet Loss %	Rx OOO %
cv_tcp-3.2-4.wlan0--1.0.0-A	0 bps	322.21 Mbps	0	37065	2,148	2,148	2,390	0	0
cv_tcp-3.2-4.wlan0--1.0.0-B	322.696 Mbps	0 bps	37180	0	0	2,148	0	0	0
cv_tcp-3.2-4.wlan0--1.0.1-A	0 bps	349.627 Mbps	0	40165	1,000	1,000	1,629	0	0
cv_tcp-3.2-4.wlan0--1.0.1-B	352.778 Mbps	0 bps	39995	0	0	1,000	0	0	0

Collected CSV Data: CSV: 6.3.3 Peak Performance TCP Throughput Test 5Ghz AX NSS: 2 UL

AX 5Ghz NSS: 2 BW: 80 UL Snapshot

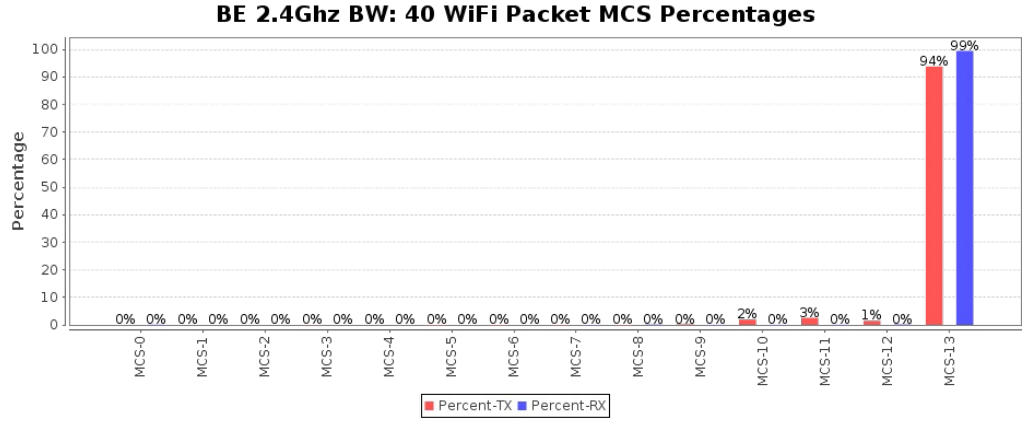
Port	Tx-Bps 1m	Rx-Bps 1m	Tx-Fail %	Tx Link-Rate	Rx Link-Rate	Mode	Channel	Last CX-Time (ms)	RSSI (dBm)	AP	IP	MAC
1.4.14 wlan0	759.031 Mbps	161.938 Mbps	3.572	1200.9 Mbps	960.7 Mbps	802.11an-AX 80 2x2	36	88	-37	40:ED:00:14:F5:F3	192.168.0.104	e4:60:17:65:83:8f

Port	Tx-Bps 1m	Rx-Bps 1m	Link-Rate	IP	MAC
1.3.2 eth2	305.631 Mbps	578.273 Mbps	10 Gbps	192.168.0.56	9c:69:b4:63:76:c4

Endpoint	Tx-Bps 1m	Rx-Bps 1m	TxPkts	RxPkts	RX Latency (ms)	Round-Trip Latency (ms)	Jitter	Rx Packet Loss %	Rx OOO %
cv_tcp-3.2-4.wlan0--1.0.0-A	488.086 Mbps	0 bps	55970	0	0	2,281	0	0	0
cv_tcp-3.2-4.wlan0--1.0.0-B	0 bps	491.672 Mbps	0	55124	2,281	2,281	453	0	0
cv_tcp-3.2-4.wlan0--1.0.1-A	491.347 Mbps	0 bps	56570	0	0	1,111	0	0	0
cv_tcp-3.2-4.wlan0--1.0.1-B	0 bps	495.156 Mbps	0	55656	1,111	1,111	223	0	0

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

CSV Data for BE 2.4Ghz BW: 40 WiFi Packet MCS Percentages



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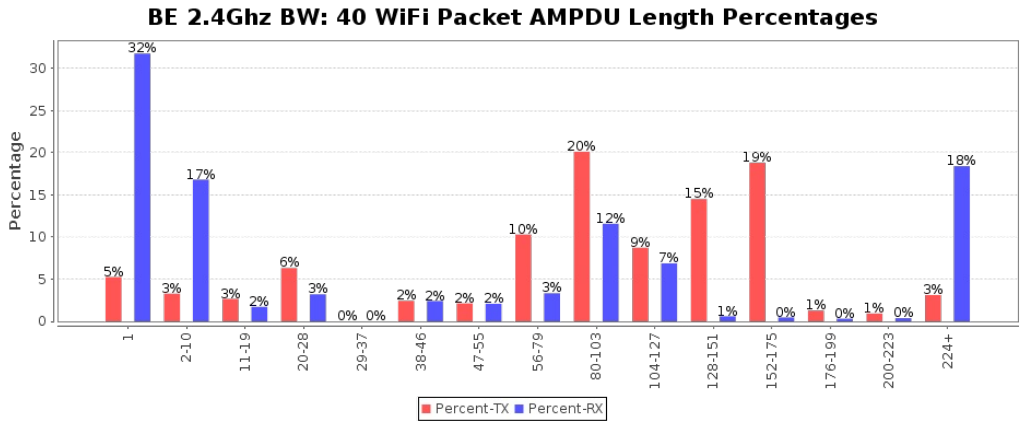
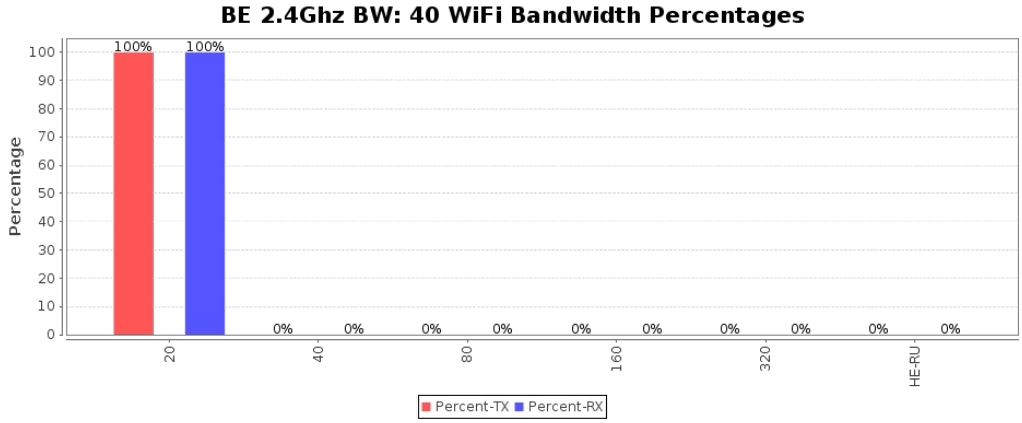


Histogram for WiFi bandwidths for packets sent and received by the wifi radios in the test.

CSV Data for BE 2.4Ghz BW: 40 WiFi Bandwidth Percentages



Collected CSV Data: CSV: 6.3.3 Peak Performance TCP Throughput Test 2.4Ghz BE NSS: 2 DL

BE 2.4Ghz NSS: 2 BW: 40 DL Snapshot

Port	Tx-Bps 1m	Rx-Bps 1m	Tx-Fail %	Tx Link-Rate	Rx Link-Rate	Mode	Channel	Last CX-Time (ms)	RSSI (dBm)	AP	IP	MAC
1.4.14 wlan0	1.829 Mbps	224.214 Mbps	11.172	344.1 Mbps	344.1 Mbps	802.11bgn-BE 20 2x2	6	87	-22	40:ED:00:14:F5:F2	192.168.0.104	e4:60:17:65:83:8f

Port	Tx-Bps 1m	Rx-Bps 1m	Link-Rate	IP	MAC
1.3.2 eth2	242.816 Mbps	1.584 Mbps	10 Gbps	192.168.0.56	9c:69:b4:63:76:c4

Endpoint	Tx-Bps 1m	Rx-Bps 1m	TxPkts	RxPkts	RX Latency (ms)	Round-Trip Latency (ms)	Jitter	Rx Packet Loss %	Rx OOO %
cv_tcp-3.2-4.wlan0--1.0.0-A	0 bps	197.249 Mbps	0	22635	4,972	4,972	3,349	0	0
cv_tcp-3.2-4.wlan0--1.0.0-B	197.407 Mbps	0 bps	22375	0	0	4,972	0	0	0
cv_tcp-3.2-4.wlan0--1.0.1-A	0 bps	46.867 Mbps	0	5381	2,130	2,130	396	0	0
cv_tcp-3.2-4.wlan0--1.0.1-B	46.716 Mbps	0 bps	5295	0	0	2,130	0	0	0

Collected CSV Data: CSV: 6.3.3 Peak Performance TCP Throughput Test 2.4Ghz BE NSS: 2 UL

BE 2.4Ghz NSS: 2 BW: 40 UL Snapshot

Port	Tx-Bps 1m	Rx-Bps 1m	Tx-Fail %	Tx Link-Rate	Rx Link-Rate	Mode	Channel	Last CX-Time (ms)	RSSI (dBm)	AP	IP	MAC
1.4.14 wlan0	179.395 Mbps	40.993 Mbps	30.193	344.1 Mbps	344.1 Mbps	802.11bgn-BE 20 2x2	6	87	-21	40:ED:00:14:F5:F2	192.168.0.104	e4:60:17:65:83:8f

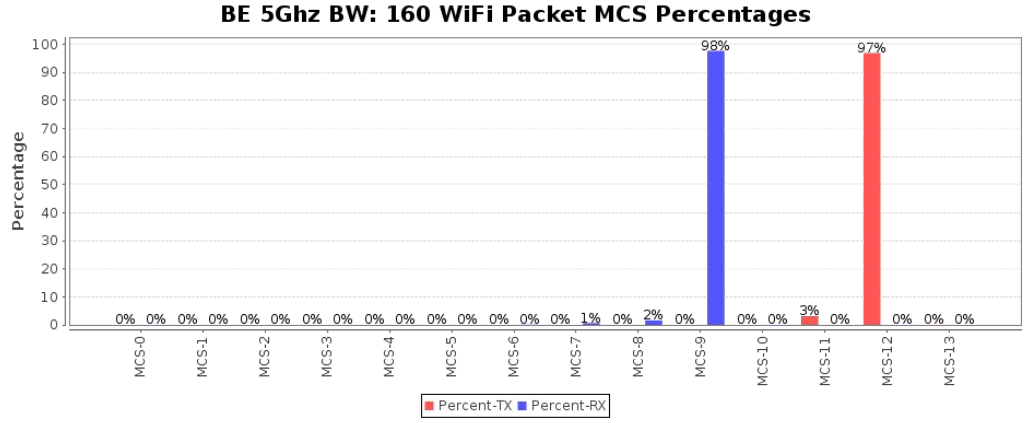
Port	Tx-Bps 1m	Rx-Bps 1m	Link-Rate	IP	MAC

1.3.2 eth2	28.233 Mbps	195.786 Mbps	10 Gbps	192.168.0.56	9c:69:b4:63:76:c4

Endpoint	Tx-Bps 1m	Rx-Bps 1m	TxPkts	RxPkts	RX Latency (ms)	Round-Trip Latency (ms)	Jitter	Rx Packet Loss %	Rx OOO %
cv_tcp-3.2-4.wlan0--1.0.0-A	104.559 Mbps	0 bps	12025	0	0	3,216	0	0	0
cv_tcp-3.2-4.wlan0--1.0.0-B	0 bps	104.891 Mbps	0	11925	3,216	3,216	520	0	0
cv_tcp-3.2-4.wlan0--1.0.1-A	104.975 Mbps	0 bps	12060	0	0	1,357	0	0	0
cv_tcp-3.2-4.wlan0--1.0.1-B	0 bps	105.148 Mbps	0	11957	1,357	1,357	399	0	0

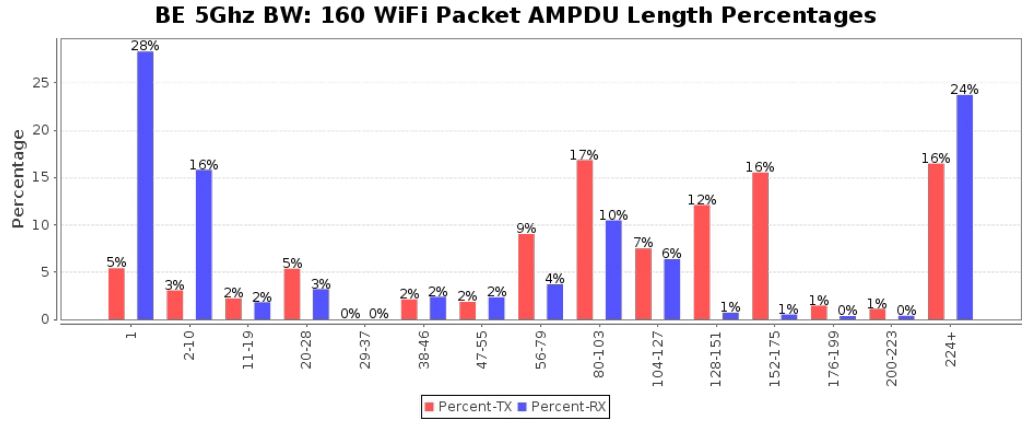
Histogram for WiFi MCS for packets sent and received by the wifi radios in the test.

CSV Data for BE 5Ghz BW: 160 WiFi Packet MCS Percentages



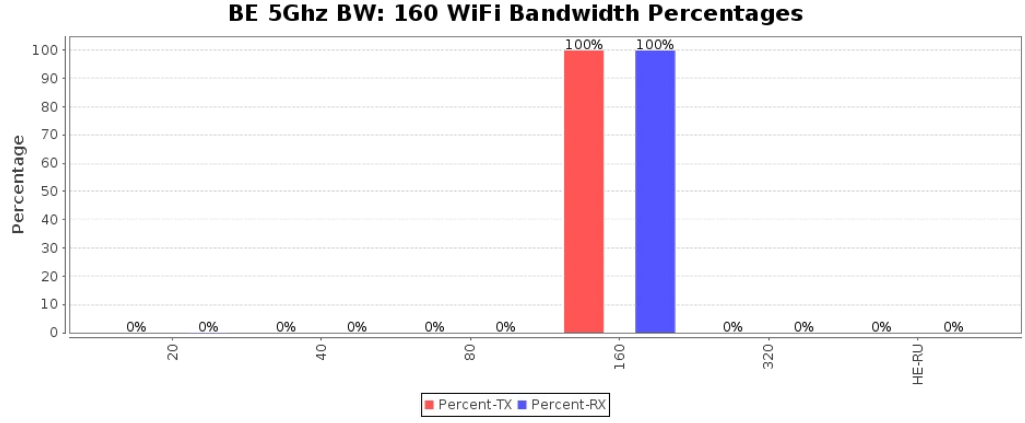
Block-Ack allows a series of frames to be sent in one transmit opportunity. This series of packets is known as a series of AMPDU frames. Having more frames in each AMPDU series normally improves throughput, but may increase latency or decrease airtime fairness. This histogram provides some visibility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

CSV Data for BE 5Ghz BW: 160 WiFi Packet AMPDU Length Percentages



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

CSV Data for BE 5Ghz BW: 160 WiFi Bandwidth Percentages



Collected CSV Data: CSV: 6.3.3 Peak Performance TCP Throughput Test 5Ghz BE NSS: 2 DL

BE 5Ghz NSS: 2 BW: 160 DL Snapshot

Port	Tx-Bps 1m	Rx-Bps 1m	Tx-Fail %	Tx Link-Rate	Rx Link-Rate	Mode	Channel	Last CX-Time (ms)	RSSI (dBm)	AP	IP	MAC
1.4.14 wlan0	4.696 Mbps	1.275 Gbps	9.547	2593.5 Mbps	1.921 Gbps	802.11an-BE 160 2x2	36	88	-36	40:ED:00:14:F5:F3	192.168.0.104	e4:60:17:65:83:8f

Port	Tx-Bps 1m	Rx-Bps 1m	Link-Rate	IP	MAC
1.3.2 eth2	1.103 Gbps	29.696 Mbps	10 Gbps	192.168.0.56	9c:69:b4:63:76:c4

Endpoint	Tx-Bps 1m	Rx-Bps 1m	TxPkts	RxPkts	RX Latency (ms)	Round-Trip Latency (ms)	Jitter	Rx Packet Loss %	Rx OOO %
cv_tcp-3.2-4.wlan0--1.0.0-A	0 bps	731.04 Mbps	0	83882	1,061	1,061	322	0	0
cv_tcp-3.2-4.wlan0--1.0.0-B	735.344 Mbps	0 bps	83000	0	0	1,061	0	0	0
cv_tcp-3.2-4.wlan0--1.0.1-A	0 bps	751.293 Mbps	0	86188	778	778	512	0	0
cv_tcp-3.2-4.wlan0--1.0.1-B	754.221 Mbps	0 bps	85145	0	0	778	0	0	0

Collected CSV Data: CSV: 6.3.3 Peak Performance TCP Throughput Test 5Ghz BE NSS: 2 UL

BE 5Ghz NSS: 2 BW: 160 UL Snapshot

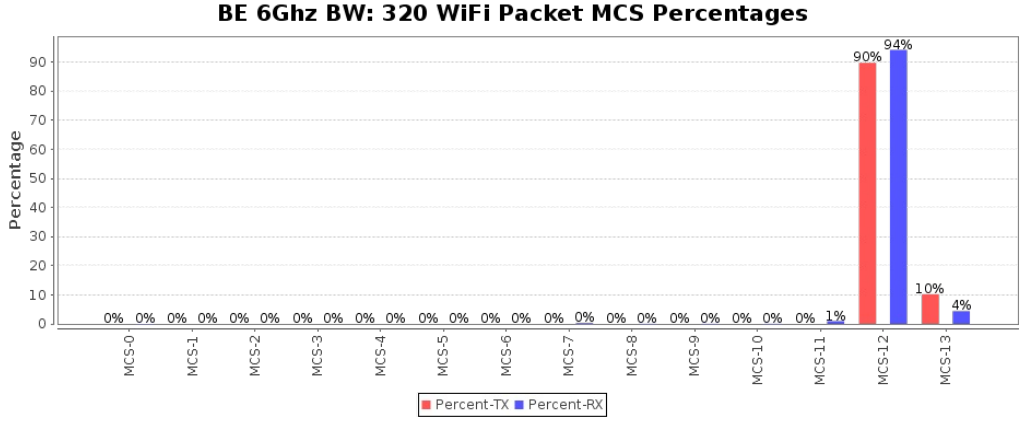
Port	Tx-Bps 1m	Rx-Bps 1m	Tx-Fail %	Tx Link-Rate	Rx Link-Rate	Mode	Channel	Last CX-Time (ms)	RSSI (dBm)	AP	IP	MAC
1.4.14 wlan0	1.543 Gbps	351.9 Mbps	46.124	2593.5 Mbps	1.73 Gbps	802.11an-BE 160 2x2	36	88	-36	40:ED:00:14:F5:F3	192.168.0.104	e4:60:17:65:83:8f

Port	Tx-Bps 1m	Rx-Bps 1m	Link-Rate	IP	MAC
1.3.2 eth2	485.361 Mbps	1.434 Gbps	10 Gbps	192.168.0.56	9c:69:b4:63:76:c4

Endpoint	Tx-Bps 1m	Rx-Bps 1m	TxPkts	RxPkts	RX Latency (ms)	Round-Trip Latency (ms)	Jitter	Rx Packet Loss %	Rx OOO %
cv_tcp-3.2-4.wlan0--1.0.0-A	995.763 Mbps	0 bps	114120	0	0	793	0	0	0
cv_tcp-3.2-4.wlan0--1.0.0-B	0 bps	999.196 Mbps	0	112634	793	793	97	0	0
cv_tcp-3.2-4.wlan0--1.0.1-A	995.269 Mbps	0 bps	114230	0	0	1,415	0	0	0
cv_tcp-3.2-4.wlan0--1.0.1-B	0 bps	998.583 Mbps	0	112565	1,415	1,415	205	0	0

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

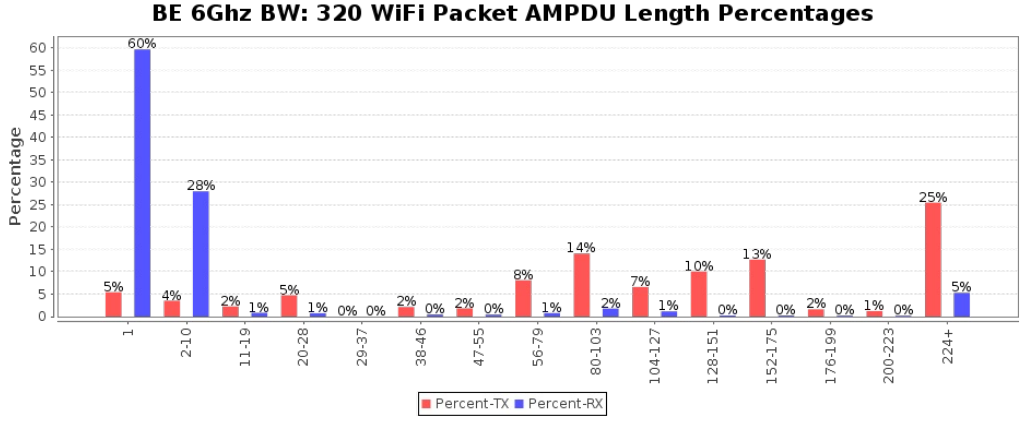
CSV Data for BE 6Ghz BW: 320 WiFi Packet MCS Percentages



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

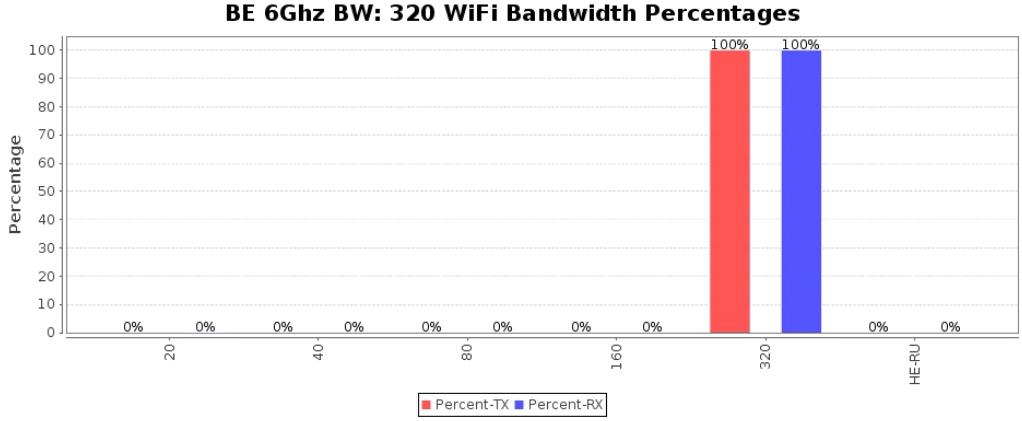
chain length used in this test.

CSV Data for BE 6Ghz BW: 320 WiFi Packet AMPDU Length Percentages



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

CSV Data for BE 6Ghz BW: 320 WiFi Bandwidth Percentages



Collected CSV Data: CSV: 6.3.3 Peak Performance TCP Throughput Test 6Ghz BE NSS: 2 DL

BE 6Ghz NSS: 2 BW: 320 DL Snapshot

Port	Tx-Bps 1m	Rx-Bps 1m	Tx-Fail %	Tx Link-Rate	Rx Link-Rate	Mode	Channel	Last CX-Time (ms)	RSSI (dBm)	AP	IP	MAC
1.4.14 wlan0	5.371 Mbps	3.003 Gbps	3.242	5764.6 Mbps	5.187 Gbps	802.11a-BE 320 2x2	259	63	-36	52:ED:00:14:F5:F4	192.168.0.104	e4:60:17:65:83:8f

Port	Tx-Bps 1m	Rx-Bps 1m	Link-Rate	IP	MAC
1.3.2 eth2	2.144 Gbps	568.516 Mbps	10 Gbps	192.168.0.56	9c:69:b4:63:76:c4

Endpoint	Tx-Bps 1m	Rx-Bps 1m	TxPkts	RxPkts	RX Latency (ms)	Round-Trip Latency (ms)	Jitter	Rx Packet Loss %	Rx OOO %
cv_tcp-3.2-4.wlan0--1.0.0-A	0 bps	2.004 Gbps	0	230159	957	957	709	0	0
cv_tcp-3.2-4.wlan0--1.0.0-B	2.004 Gbps	0 bps	230365	0	0	957	0	0	0
cv_tcp-3.2-4.wlan0--1.0.1-A	0 bps	1.906 Gbps	0	218606	341	341	355	0.246	0
cv_tcp-3.2-4.wlan0--1.0.1-B	1.91 Gbps	0 bps	219145	0	0	341	0	0	0

Collected CSV Data: CSV: 6.3.3 Peak Performance TCP Throughput Test 6Ghz BE NSS: 2 UL

BE 6Ghz NSS: 2 BW: 320 UL Snapshot

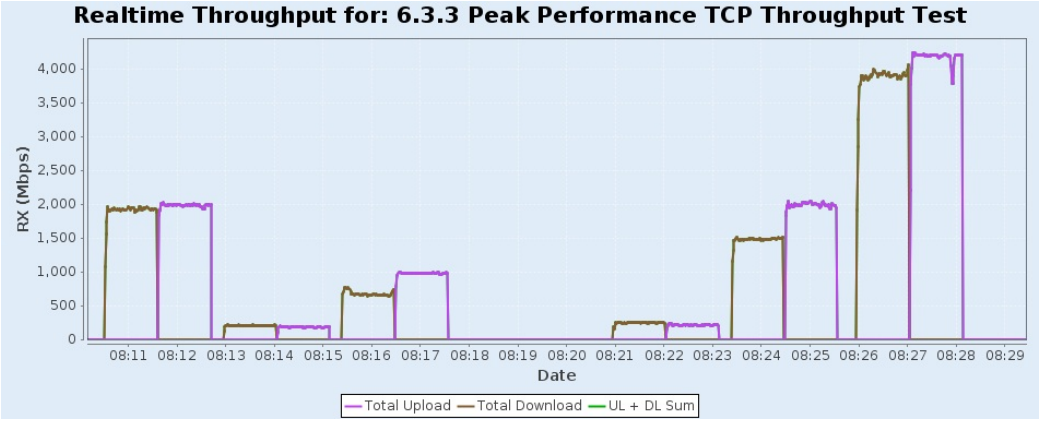
Port	Tx-Bps 1m	Rx-Bps 1m	Tx-Fail %	Tx Link-Rate	Rx Link-Rate	Mode	Channel	Last CX-Time (ms)	RSSI (dBm)	AP	IP	MAC

1.4.14 wlan0	2.977 Gbps	1.172 Gbps	4.035	5187.1 Mbps	5.187 Gbps	802.11a-BE 320 2x2	259	63	-36	52:ED:00:14:F5:F4	192.168.0.104	e4:60:17:65:83:8f

Port	Tx-Bps 1m	Rx-Bps 1m	Link-Rate	IP	MAC
1.3.2 eth2	1.982 Gbps	2.259 Gbps	10 Gbps	192.168.0.56	9c:69:b4:63:76:c4

Endpoint	Tx-Bps 1m	Rx-Bps 1m	TxPkts	RxPkts	RX Latency (ms)	Round-Trip Latency (ms)	Jitter	Rx Packet Loss %	Rx OOO %
cv_tcp-3.2-4.wlan0--1.0.0-A	2.098 Gbps	0 bps	240615	0	0	1,183	0	0	0
cv_tcp-3.2-4.wlan0--1.0.0-B	0 bps	2.09 Gbps	0	239359	1,183	1,183	27	0	0
cv_tcp-3.2-4.wlan0--1.0.1-A	2.099 Gbps	0 bps	241350	0	0	1,182	0	0	0
cv_tcp-3.2-4.wlan0--1.0.1-B	0 bps	2.1 Gbps	0	237973	1,182	1,182	30	0	0

Realtime Throughput for: 6.3.3 Peak Performance TCP Throughput Test



Key Performance Indicators CSV

Test configuration and LANforge software version	
Auto-Helper	true
Allow-11w (MFP/PMF)	false
SAE-PWE	2
Disable-MLO	true
Extra TxStatus	false
Extra RxStatus	false
TXS All	false
Skip 2.4Ghz Tests	false
Skip 5Ghz Tests	false
Duration-120	20
Duration-60	20
Channel 2Ghz	6
Channel 5Ghz	36
Calibrate against LANforge AP	true
Adjust UL Atten with DUT TxPower	false
Adjust UL Atten with STA TxPower	false
Attenuation Adjustment	0
Extra Download Path-loss	0

TX Power	20
DUT TX Power 2.4G	30
DUT TX Power 5G	30
LANforge Calibration TxPower-2.4G	20
LANforge Calibration TxPower-5G	20
Multi-Conn	10
UDP-Burst	false
UDP-GRO	true
Multiple Endpoints:	2
ToS	0
Pld Pattern	RANDOM_FIXED
UDP Send Buffer Size:	0
UDP Receive Buffer Size:	0
TCP Send Buffer Size:	0
TCP Receive Buffer Size:	0
Upstream Port	1.3.2 eth2 Firmware: 0x80000aef, 1.1876.0 Resource: ct523c-2103
Alien Upstream Port	1.1.2 eth2 Firmware: 0x80000c67, 1.1276.0 Resource: ct523c-0b0b
Turn-Table Chamber	840B-Default-Chamber
Configured 2m 2.4Ghz RSSI	-25
Configured 2m 5Ghz RSSI	-30
Use Virtual AX Stations	false
Use AX Radios for AC tests	true
Virt-Sta Rotation 2.4Ghz	0
Virt-Sta Rotation 5Ghz	0
AX Rotation 2.4Ghz	125
AX Rotation 5Ghz	125
Opposite-Speed:	20000
1Gbps Throughput Limit:	925000000
Skip 4x4 5Ghz test	false
Throughput AX 2Ghz rate:	300000000
Throughput AX 2x2 5Ghz rate:	1100000000
Throughput AX 4x4 5Ghz rate:	1100000000
Background Scan Module	simple
Background Short Interval	30
Background Long Interval	300
Background RSSI Threshold	-65
Mesh Settle Time:	60
Starting Low Atten:	30
Starting Max Atten:	70
Virt-Sta Radio 1	1.4.wiphy0 Firmware: 86.fb5c9aeb.0 gl-c0-fm-c0-86.uc Resource: ct523c-ccbc

AX Radio 0	1.4.wiphy0 Firmware: 86.fb5c9aeb.0 gl-c0-fm-c0-86.uc Resource: ct523c-ccbc
Attenuator 0	rssi-0-2.4Ghz: -26 rssi-0-5Ghz: -47 atten: 1.2.3343.0
Attenuator 1	rssi-0-2.4Ghz: -26 rssi-0-5Ghz: -47 atten: 1.2.3343.1
Attenuator 4	rssi-0-2.4Ghz: -19 rssi-0-5Ghz: -36 atten: 1.2.3342.0
Attenuator 5	rssi-0-2.4Ghz: -19 rssi-0-5Ghz: -36 atten: 1.2.3342.1
Attenuator 8	rssi-0-2.4Ghz: -23 rssi-0-5Ghz: -33 atten: 1.2.3340.0
Attenuator 9	rssi-0-2.4Ghz: -23 rssi-0-5Ghz: -33 atten: 1.2.3340.1
AX Attenuator 0	AX rssi-0-2.4Ghz: -29 rssi-0-5Ghz: -36 atten: 1.2.7.2
AX Attenuator 1	AX rssi-0-2.4Ghz: -29 rssi-0-5Ghz: -36 atten: 1.2.7.3
AX Attenuator 4	AX rssi-0-2.4Ghz: -31 rssi-0-5Ghz: -37 atten: 1.2.3300.2
AX Attenuator 5	AX rssi-0-2.4Ghz: -31 rssi-0-5Ghz: -37 atten: 1.2.3300.3
AX Attenuator 8	AX rssi-0-2.4Ghz: -29 rssi-0-5Ghz: -38 atten: 1.2.7.0
AX Attenuator 9	AX rssi-0-2.4Ghz: -29 rssi-0-5Ghz: -38 atten: 1.2.7.1
AX Attenuator 12	AX rssi-0-2.4Ghz: -35 rssi-0-5Ghz: -46 atten: 1.2.3300.0
AX Attenuator 14	AX rssi-0-2.4Ghz: -35 rssi-0-5Ghz: -46 atten: 1.2.3300.1
AX Attenuator 16	AX rssi-0-2.4Ghz: -35 rssi-0-5Ghz: -46 atten: 1.2.3300.0
AX Attenuator 18	AX rssi-0-2.4Ghz: 5 rssi-0-5Ghz: -46 atten: 1.2.3300.1
AX Attenuator 20	AX rssi-0-2.4Ghz: -35 rssi-0-5Ghz: -46 atten: 1.2.3300.0
AX Attenuator 22	AX rssi-0-2.4Ghz: -35 rssi-0-5Ghz: -46 atten: 1.2.3300.1
AX Attenuator 24	AX rssi-0-2.4Ghz: -31 rssi-0-5Ghz: -43 atten: 1.2.3348.0
AX Attenuator 26	AX rssi-0-2.4Ghz: -31 rssi-0-5Ghz: -43 atten: 1.2.3348.1
AX Attenuator 28	AX rssi-0-2.4Ghz: -26 rssi-0-5Ghz: -27 atten: 1.2.3348.2
AX Attenuator 30	AX rssi-0-2.4Ghz: -26 rssi-0-5Ghz: -27 atten: 1.2.3348.2
Mesh Attenuator 0	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten: 1.2.3340.0
Mesh Attenuator 1	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten: 1.2.3340.1
Mesh Attenuator 2	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten: 1.2.3340.2
Mesh Attenuator 3	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten: 1.2.3340.3
Mesh Attenuator 4	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:
Mesh Attenuator 5	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:
Mesh Attenuator 6	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:
Mesh Attenuator 7	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:
Mesh Attenuator 8	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:
Mesh Attenuator 9	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:
Mesh Attenuator 10	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:
Mesh Attenuator 11	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:
Mesh Attenuator 12	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:
Mesh Attenuator 13	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:
Mesh Attenuator 14	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:
Mesh Attenuator 15	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:
Mesh Attenuator 16	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:
Mesh Attenuator 17	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:

Mesh Attenuator 18	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:
Mesh Attenuator 19	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:
Mesh Attenuator 20	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:
Mesh Attenuator 21	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:
Mesh Attenuator 22	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:
Mesh Attenuator 23	Mesh rssi-0-2.4Ghz: -25 rssi-0-5Ghz: -30 atten:
Details for Resource: 1.1	Hostname: ct523c-0b0b LANforge ver: 5.4.7 64bit Kernel-Version: 6.7.0-rc7+
Details for Resource: 1.3	Hostname: ct523c-2103 LANforge ver: 5.4.7 64bit Kernel-Version: 6.7.0-rc7+
Details for Resource: 1.4	Hostname: ct523c-ccbc LANforge ver: 5.4.7 64bit Kernel-Version: 6.7.0-rc7+
Show Events	true
Build Date	Thu 28 Dec 2023 12:37:01 PM PST
Git Version	3bfac91788cd971ee42c71cbe5c3926201aa5ba5

CSV Data

META Information for TR-398 Issue 4