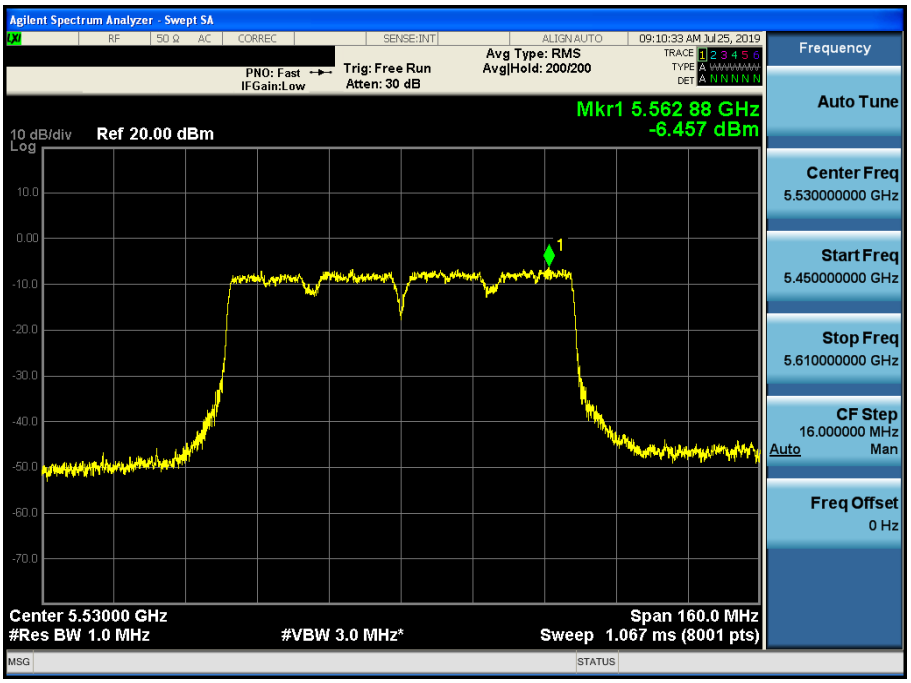
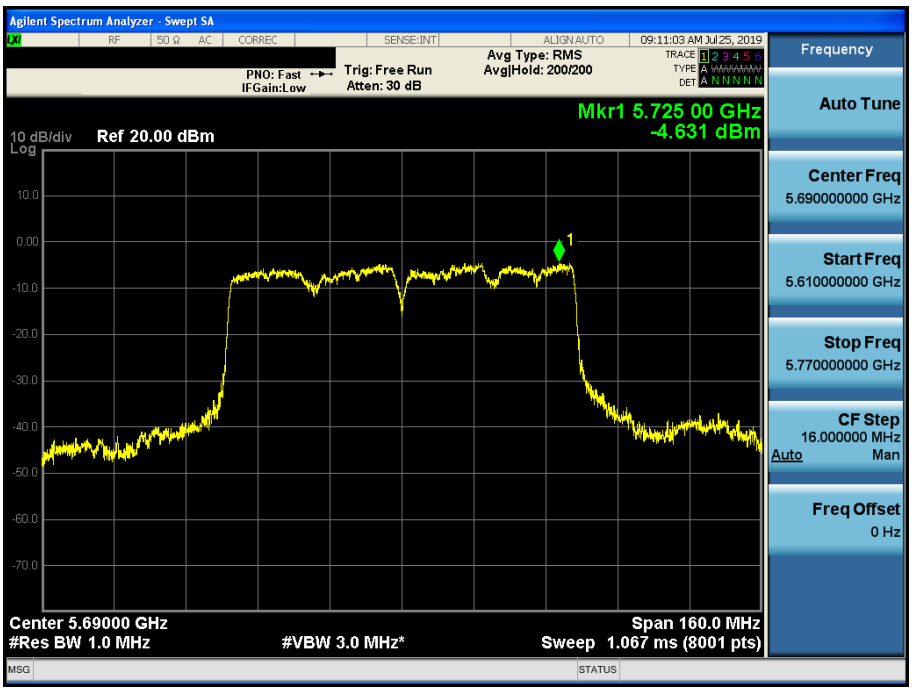
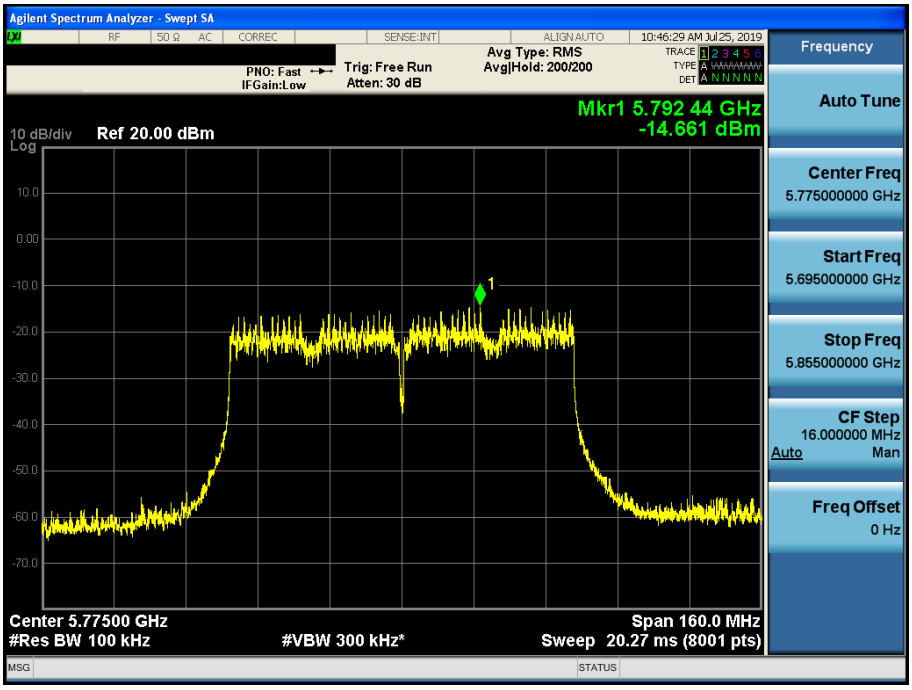
Maximum Power Spectral Density Test Mode: 802.11ac VHT80 & ANT 2 & Ch.106



Maximum Power Spectral Density Test Mode: 802.11ac VHT80 & ANT 2 & Ch.138



Maximum Power Spectral Density Test Mode: 802.11ac VHT80 & ANT 2 & Ch.155



8.5 Radiated Spurious Emission Measurements

▣ Test Requirements

▪ **FCC Part 15.209(a) and (b)**

Frequency (MHz)	Limit (uV/m)	Measurement Distance (meter)
0.009 – 0.490	2400/F(KHz)	300
0.490 – 1.705	24000/F(KHz)	30
1.705 – 30.0	30	30
30 ~ 88	100 **	3
88 ~ 216	150 **	3
216 ~ 960	200 **	3
Above 960	500	3

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

▪ **FCC Part 15.205 (a):** Only spurious emissions are permitted in any of the frequency bands listed below:

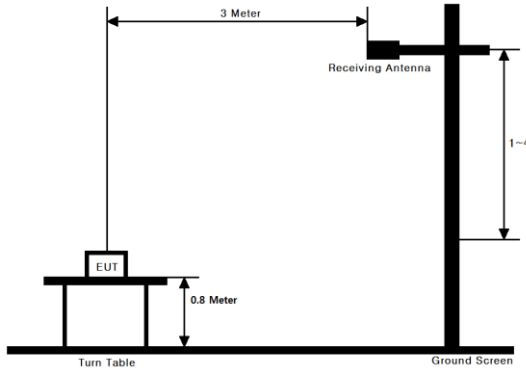
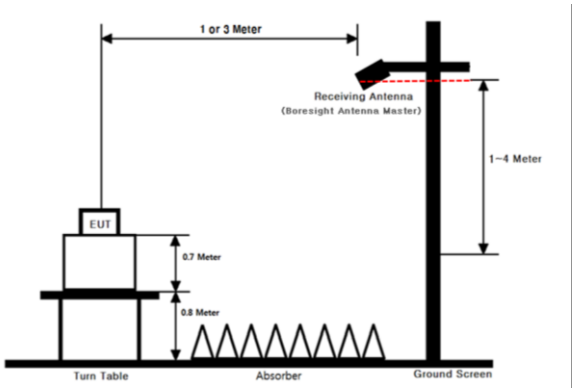
MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	4.5 ~ 5.15	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	5.35 ~ 5.46	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~ 12.52025	149.9 ~ 150.05	1645.5 ~ 1646.5	7.25 ~ 7.75	17.7 ~ 21.4
4.125 ~ 4.128	12.57675 ~ 12.57725	160.52475 ~ 160.52525	1660 ~ 1710	8.025 ~ 8.5	22.01 ~ 23.12
4.17725 ~ 4.17775	13.36 ~ 13.41	160.7 ~ 160.9	1718.8 ~ 1722.2	9.0 ~ 9.2	23.6 ~ 24.0
4.20725 ~ 4.20775	16.42 ~ 16.423	162.0125 ~ 167.17	2200 ~ 2300	9.3 ~ 9.5	31.2 ~ 31.8
6.215 ~ 6.218	16.69475 ~ 16.69525	167.72 ~ 173.2	2310 ~ 2390	10.6 ~ 12.7	36.43 ~ 36.5
6.26775 ~ 6.26825	16.80425 ~ 16.80475	240 ~ 285	2483.5 ~ 2500	13.25 ~ 13.4	Above 38.6
6.31175 ~ 6.31225	25.5 ~ 25.67	322 ~ 335.4	2655 ~ 2900		
8.291 ~ 8.294	37.5 ~ 38.25	399.90 ~ 410	3260 ~ 3267		
8.362 ~ 8.366	73 ~ 74.6	608 ~ 614	3332 ~ 3339		
8.37625 ~ 8.38675	74.8 ~ 75.2	960 ~ 1240	3345.8 ~ 3358		
			3600 ~ 4000		

▪ **FCC Part 15.205(b):** The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

▪ **FCC Part 15.407 (b):** Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the **5.15-5.25 GHz band**: all emissions outside of the **5.15-5.35 GHz band** shall not exceed an **EIRP of -27 dBm/MHz**.
(2) For transmitters operating in the **5.25-5.35 GHz band**: all emissions outside of the **5.15-5.35 GHz band** shall not exceed an **EIRP of -27 dBm/MHz**.
(3) For transmitters operating in the **5.47-5.725 GHz band**: all emissions outside of the **5.47-5.725 GHz band** shall not exceed an **EIRP of -27 dBm/MHz.**
(4) For transmitters operating in the **5.725-5.85 GHz band**: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
(6) Unwanted emissions **below 1 GHz** must comply with the general field strength limits set forth in **Section 15.209**. Further, any U-NII devices using an **AC power line** are required to comply also with the conducted limits set forth in **Section 15.207**.
(7) The provisions of §15.205 apply to intentional radiators operating under this section
(8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

▣ Test Configuration

Below 1GHz	Above 1GHz
	

▣ Test Procedure

1. The EUT is placed on a non-conductive table. For emission measurements at or below 1 GHz, the table height is 80 cm. For emission measurements above 1 GHz, the table height is 1.5 m.
2. The turn table shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 1m or 3 m away from the receiving antenna, which is varied from 1m to 4 m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

Radiated spurious emission measured using following Measurement Procedure **of KDB789033 D02v02r01**

► General Requirements for Unwanted Emissions Measurements

The following requirements apply to all unwanted emissions measurements, both in and outside of the restricted bands:

- EUT Duty Cycle

(1) The EUT shall be configured or modified to **transmit continuously** except as stated in (ii), below. The intent is to test at 100 percent duty cycle; however a small reduction in duty cycle (**to no lower than 98 percent**) is permitted if required by the EUT for amplitude control purposes. Manufacturers are expected to provide software to the test lab to permit such continuous operation.

(2) If **continuous transmission (or at least 98 percent duty cycle) cannot be achieved** due to hardware limitations of the EUT (e.g., overheating), the following additions to the measurement and reporting procedures are required:

- The EUT shall be configured to operate at the maximum achievable duty cycle.
- Measure the duty cycle, x, of the transmitter output signal.
- Adjustments to measurement procedures (e.g., increasing test time and number of traces averaged) shall be performed as described in the procedures below.
- The test report shall include the following additional information:
  - The reason for the duty cycle limitation.
  - The duty cycle achieved for testing and the associated transmit duration and interval between transmissions.
  - The sweep time and the amount of time used for trace stabilization during max-hold measurements for peak emission measurements.

(3) Reduction of the measured emission amplitude levels to account for operational duty factor is not permitted. Compliance is based on emission levels occurring during transmission - not on an average across on and off times of the transmitter.

► **Measurements below 1000 MHz**

a) Follow the requirements in section II.G.3, "General Requirements for Unwanted Emissions Measurements".

b) Compliance shall be demonstrated using **CISPR quasi-peak detection**; however, **peak detection** is permitted as an alternative to quasi-peak detection.

► Measurements Above 1000 MHz (Peak)

a) Follow the requirements in section II.G.3, "General Requirements for Unwanted Emissions Measurements".

b) Peak emission levels are measured by setting the analyzer as follows:

(i) **RBW = 1 MHz.**

(ii) **VBW ≥ 3 MHz.**

(iii) **Detector = Peak.**

(iv) Sweep time = Auto.

(v) Trace mode = Max hold.

(vi) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately 1/x, where x is the duty cycle. For example, at 50 percent duty cycle, the measurement time will increase by a factor of two relative to measurement time for continuous transmission.

► **Measurements Above 1000 MHz (Method VB)**

(i) **RBW = 1 MHz.**

(ii) **VBW**.

• If the EUT is configured to transmit with duty cycle ≥ 98%, set VBW ≤ RBW/100 (i.e.,10 kHz) but not less than 10 Hz.

• If the EUT duty cycle is < 98%, set VBW ≥ 1/T, (T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation).

(iii) Video bandwidth mode or display mode

• The instrument shall be set to ensure that video filtering is applied in the power domain. Typically, this requires setting the detector mode to rms and setting the Average-VBW Type to power averaging (rms).

• As an alternative, the analyzer may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some analyzers require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to "Voltage" regardless of the display mode.

(iv) Detector = Peak.

(v) Sweep time = auto.

(vi) Trace mode = max hold.

(vii) Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98% duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of 1/x, where x is the duty cycle. For example, use at least 200 traces if the duty cycle is 25%. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—rather than turning on and off with the transmit cycle, at least 50 traces shall be averaged.)

Note: Please refer to Appendix II for actual VBW setting according to method VB.

▣ Test Results

Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : *MIMO(CDD) & 802.11a_Normal*

Band	Tested Channel	Freq. (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
U-NII 1	36 (5180 MHz)	5149.54	V	Y	PK	59.70	2.63	N/A	N/A	62.33	74.00	11.67
		5149.79	V	Y	AV	48.23	2.63	0.64	N/A	51.50	54.00	2.50
		10360.39	H	Y	PK	50.36	6.32	N/A	N/A	56.68	68.20	11.52
	40 (5200 MHz)	10400.41	H	Y	PK	51.45	6.40	N/A	N/A	57.85	68.20	10.35
	48 (5240 MHz)	10480.05	H	Y	PK	50.38	6.55	N/A	N/A	56.93	68.20	11.27
U-NII 2A	52 (5260 MHz)	10519.86	H	Y	PK	49.35	6.62	N/A	N/A	55.97	68.20	12.23
	60 (5300 MHz)	10600.08	H	Y	PK	47.69	6.75	N/A	N/A	54.44	74.00	19.56
		10600.07	H	Y	AV	36.54	6.75	0.64	N/A	43.93	54.00	10.07
	64 (5320 MHz)	5350.81	V	Y	PK	55.37	3.45	N/A	N/A	58.82	74.00	15.18
		5350.35	V	Y	AV	43.73	3.45	0.64	N/A	47.82	54.00	6.18
		10640.49	H	Y	PK	47.55	6.82	N/A	N/A	54.37	74.00	19.63
		10640.32	H	Y	AV	35.10	6.82	0.64	N/A	42.56	54.00	11.44
U-NII 2C	100 (5500 MHz)	5459.68	V	Y	PK	57.63	3.59	N/A	N/A	61.22	74.00	12.78
		5459.43	V	Y	AV	41.16	3.59	0.64	N/A	45.39	54.00	8.61
		5468.42	V	Y	PK	56.61	3.61	N/A	N/A	60.22	68.20	7.98
		11000.40	H	Y	PK	46.24	7.42	N/A	N/A	53.66	74.00	20.34
		10999.53	H	Y	AV	35.87	7.42	0.64	N/A	43.93	54.00	10.07
	116 (5580 MHz)	11160.14	H	Y	PK	46.17	7.84	N/A	N/A	54.01	74.00	19.99
		11159.48	H	Y	AV	35.47	7.84	0.64	N/A	43.95	54.00	10.05
	144 (5720 MHz)	11440.38	H	Y	PK	45.72	8.57	N/A	N/A	54.29	74.00	19.71
		11440.20	H	Y	AV	35.35	8.57	0.64	N/A	44.56	54.00	9.44
U-NII 3	149 (5745 MHz)	5713.90	V	Y	PK	58.54	4.57	N/A	N/A	63.11	68.20	5.09
		5722.86	V	Y	PK	59.62	4.45	N/A	N/A	64.07	78.20	14.13
		11489.85	H	Y	PK	46.85	8.70	N/A	N/A	55.55	74.00	18.45
		11489.84	H	Y	AV	35.50	8.70	0.64	N/A	44.84	54.00	9.16
	157 (5785 MHz)	11569.53	H	Y	PK	45.85	8.74	N/A	N/A	54.59	74.00	19.41
		11570.41	H	Y	AV	35.38	8.74	0.64	N/A	44.76	54.00	9.24
	165 (5825 MHz)	5850.36	V	Y	PK	53.66	6.07	N/A	N/A	59.73	78.20	18.47
		5860.78	V	Y	PK	51.49	6.27	N/A	N/A	57.76	68.20	10.44
		11649.99	H	Y	PK	45.46	8.74	N/A	N/A	54.20	74.00	19.80
		11649.83	H	Y	AV	35.28	8.74	0.64	N/A	44.66	54.00	9.34

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Information of Distance Factor
   For finding emissions, the test distance might be reduced from 3m to 1m. In this case, the distance factor(-9.54dB) is applied to the result.
   - Calculation of distance factor = 20 log(applied distance / required distance) = 20 log(1 m / 3 m) = -9.54 dB
   When distance factor is "N/A", the distance is 3 m and distance factor is not applied.
4. The limit is converted to field strength.
   E[dBuV/m] = EIRP[dBm] + 95.2 dB = -27 dBm + 95.2 = 68.2 dBuV/m

Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : *MIMO(CDD) & 802.11ac(VHT20) Normal*

Band	Tested Channel	Freq. (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
U-NII 1	36 (5180 MHz)	5149.38	V	Y	PK	58.88	2.63	N/A	N/A	61.51	74.00	12.49
		5149.87	V	Y	AV	47.51	2.63	0.66	N/A	50.80	54.00	3.20
		10360.13	H	Y	PK	49.63	6.32	N/A	N/A	55.95	68.20	12.25
	40 (5200 MHz)	10399.74	H	Y	PK	51.00	6.40	N/A	N/A	57.40	68.20	10.80
	48 (5240 MHz)	10480.12	H	Y	PK	49.76	6.55	N/A	N/A	56.31	68.20	11.89
U-NII 2A	52 (5260 MHz)	10520.01	H	Y	PK	47.84	6.62	N/A	N/A	54.46	68.20	13.74
	60 (5300 MHz)	10600.33	H	Y	PK	47.59	6.75	N/A	N/A	54.34	74.00	19.66
		10600.08	H	Y	AV	36.32	6.75	0.66	N/A	43.73	54.00	10.27
	64 (5320 MHz)	5351.12	V	Y	PK	57.48	3.45	N/A	N/A	60.93	74.00	13.07
		5351.26	V	Y	AV	41.32	3.45	0.66	N/A	45.43	54.00	8.57
		10639.82	H	Y	PK	45.93	6.82	N/A	N/A	52.75	74.00	21.25
		10640.01	H	Y	AV	35.07	6.82	0.66	N/A	42.55	54.00	11.45
U-NII 2C	100 (5500 MHz)	5458.63	V	Y	PK	52.16	3.59	N/A	N/A	55.75	74.00	18.25
		5458.42	V	Y	AV	41.21	3.59	0.66	N/A	45.46	54.00	8.54
		5466.74	V	Y	PK	55.35	3.60	N/A	N/A	58.95	68.20	9.25
		11000.17	H	Y	PK	46.91	7.42	N/A	N/A	54.33	74.00	19.67
		11000.02	H	Y	AV	35.57	7.42	0.66	N/A	43.65	54.00	10.35
	116 (5580 MHz)	11160.43	H	Y	PK	46.20	7.84	N/A	N/A	54.04	74.00	19.96
		11160.22	H	Y	AV	35.59	7.84	0.66	N/A	44.09	54.00	9.91
	144 (5720 MHz)	11440.42	H	Y	PK	46.37	8.57	N/A	N/A	54.94	74.00	19.06
		11439.87	H	Y	AV	35.15	8.57	0.66	N/A	44.38	54.00	9.62
U-NII 3	149 (5745 MHz)	5714.15	V	Y	PK	55.65	4.57	N/A	N/A	60.22	68.20	7.98
		5724.77	V	Y	PK	57.94	4.45	N/A	N/A	62.39	78.20	15.81
		11490.46	H	Y	PK	46.61	8.71	N/A	N/A	55.32	74.00	18.68
		11489.61	H	Y	AV	35.28	8.70	0.66	N/A	44.64	54.00	9.36
	157 (5785 MHz)	11569.54	H	Y	PK	46.18	8.74	N/A	N/A	54.92	74.00	19.08
		11569.53	H	Y	AV	35.19	8.74	0.66	N/A	44.59	54.00	9.41
	165 (5825 MHz)	5850.66	V	Y	PK	50.75	6.08	N/A	N/A	56.83	78.20	21.37
		5862.94	V	Y	PK	51.92	6.48	N/A	N/A	58.40	68.20	9.80
		11649.93	H	Y	PK	46.52	8.74	N/A	N/A	55.26	74.00	18.74
		11649.98	H	Y	AV	35.60	8.74	0.66	N/A	45.00	54.00	9.00

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Information of Distance Factor
   For finding emissions, the test distance might be reduced from 3m to 1m. In this case, the distance factor(-9.54dB) is applied to the result.
   - Calculation of distance factor = 20 log(applied distance / required distance) = 20 log(1 m / 3 m) = -9.54 dB
   When distance factor is “N/A”, the distance is 3 m and distance factor is not applied.
4. The limit is converted to field strength.
   E[dBuV/m] = EIRP[dBm] + 95.2 dB = -27 dBm + 95.2 = 68.2 dBuV/m

Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : *MIMO(CDD) & 802.11ac(VHT40) Normal*

Band	Tested Channel	Freq. (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
U-NII 1	38 (5190 MHz)	5149.68	V	Y	PK	58.07	2.63	N/A	N/A	60.70	74.00	13.30
		5149.90	V	Y	AV	47.67	2.63	0.40	N/A	50.70	54.00	3.30
		10379.84	H	Y	PK	48.62	6.36	N/A	N/A	54.98	68.20	13.22
	46 (5230 MHz)	10459.68	H	Y	PK	49.22	6.51	N/A	N/A	55.73	68.20	12.47
U-NII 2A	54 (5270 MHz)	10540.04	H	Y	PK	47.43	6.65	N/A	N/A	54.08	68.20	14.12
	62 (5310 MHz)	5350.91	V	Y	PK	55.82	3.45	N/A	N/A	59.27	74.00	14.73
		5350.06	V	Y	AV	46.99	3.45	0.40	N/A	50.84	54.00	3.16
		10619.72	H	Y	PK	45.80	6.78	N/A	N/A	52.58	74.00	21.42
		10619.62	H	Y	AV	35.45	6.78	0.40	N/A	42.63	54.00	11.37
U-NII 2C	102 (5510 MHz)	5459.55	V	Y	PK	57.32	3.59	N/A	N/A	60.91	74.00	13.09
		5459.73	V	Y	AV	43.69	3.59	0.40	N/A	47.68	54.00	6.32
		5467.80	V	Y	PK	62.13	3.61	N/A	N/A	65.74	68.20	2.46
		11019.53	H	Y	PK	46.21	7.47	N/A	N/A	53.68	74.00	20.32
		11019.65	H	Y	AV	35.51	7.47	0.40	N/A	43.38	54.00	10.62
	110 (5550 MHz)	11099.51	H	Y	PK	45.40	7.68	N/A	N/A	53.08	74.00	20.92
		11099.84	H	Y	AV	35.48	7.68	0.40	N/A	43.56	54.00	10.44
	142 (5710 MHz)	11420.34	H	Y	PK	46.17	8.52	N/A	N/A	54.69	74.00	19.31
		11419.71	H	Y	AV	35.48	8.52	0.40	N/A	44.40	54.00	9.60
U-NII 3	151 (5755 MHz)	5714.66	V	Y	PK	58.33	4.58	N/A	N/A	62.91	68.20	5.29
		5724.27	V	Y	PK	65.83	4.43	N/A	N/A	70.26	78.20	7.94
		11509.59	H	Y	PK	45.95	8.73	N/A	N/A	54.68	74.00	19.32
		11509.86	H	Y	AV	35.29	8.73	0.40	N/A	44.42	54.00	9.58
	159 (5795 MHz)	5854.04	V	Y	PK	56.40	6.12	N/A	N/A	62.52	78.20	15.68
		5861.42	V	Y	PK	55.08	6.33	N/A	N/A	61.41	68.20	6.79
		11590.36	H	Y	PK	45.94	8.74	N/A	N/A	54.68	74.00	19.32
		11590.36	H	Y	AV	35.12	8.74	0.40	N/A	44.26	54.00	9.74

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Information of Distance Factor
   For finding emissions, the test distance might be reduced from 3m to 1m. In this case, the distance factor(-9.54dB) is applied to the result.
   - Calculation of distance factor = 20 log(applied distance / required distance) = 20 log(1 m / 3 m) = -9.54 dB
   When distance factor is “N/A”, the distance is 3 m and distance factor is not applied.
4. The limit is converted to field strength.
   E[dBuV/m] = EIRP[dBm] + 95.2 dB = -27 dBm + 95.2 = 68.2 dBuV/m

Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : *MIMO(CDD) & 802.11ac(VHT80) Normal*

Band	Tested Channel	Freq. (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
U-NII 1	42 (5210 MHz)	5149.43	H	Z	PK	58.93	2.63	N/A	N/A	61.56	74.00	12.44
		5149.52	H	Z	AV	44.59	2.63	3.24	N/A	50.46	54.00	3.54
		10419.50	H	Y	PK	46.84	6.43	N/A	N/A	53.27	68.20	14.93
U-NII 2A	58 (5290 MHz)	5355.94	H	Z	PK	59.06	3.45	N/A	N/A	62.51	74.00	11.49
		5356.40	H	Z	AV	43.81	3.45	3.24	N/A	50.50	54.00	3.50
		10580.26	H	Y	PK	46.01	6.72	N/A	N/A	52.73	68.20	15.47
U-NII 2C	106 (5530 MHz)	5453.89	H	Z	PK	55.01	3.59	N/A	N/A	58.60	74.00	15.40
		5453.65	H	Z	AV	42.54	3.59	3.24	N/A	49.37	54.00	4.63
		5468.99	H	Z	PK	59.49	3.61	N/A	N/A	63.10	68.20	5.10
		11060.14	H	Y	PK	46.55	7.58	N/A	N/A	54.13	74.00	19.87
		11060.43	H	Y	AV	35.63	7.58	3.24	N/A	46.45	54.00	7.55
	138 (5690 MHz)	11380.45	H	Y	PK	45.26	8.42	N/A	N/A	53.68	74.00	20.32
		11380.00	H	Y	AV	34.71	8.42	3.24	N/A	46.37	54.00	7.63
U-NII 3	155 (5775 MHz)	5713.98	H	Z	PK	52.39	4.57	N/A	N/A	56.96	68.20	11.24
		5719.04	H	Z	PK	55.63	4.52	N/A	N/A	60.15	78.20	18.05
		5855.98	H	Z	PK	57.83	6.15	N/A	N/A	63.98	78.20	14.22
		5870.50	H	Z	PK	57.68	7.16	N/A	N/A	64.84	68.20	3.36
		11549.54	H	Y	PK	45.80	8.73	N/A	N/A	54.53	74.00	19.47
		11550.16	H	Y	AV	35.55	8.74	3.24	N/A	47.53	54.00	6.47

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Information of Distance Factor
   For finding emissions, the test distance might be reduced from 3m to 1m. In this case, the distance factor(-9.54dB) is applied to the result.
   - Calculation of distance factor = 20 log(applied distance / required distance) = 20 log(1 m / 3 m) = -9.54 dB
   When distance factor is “N/A”, the distance is 3 m and distance factor is not applied.
4. The limit is converted to field strength.
   E[dBuV/m] = EIRP[dBm] + 95.2 dB = -27 dBm + 95.2 = 68.2 dBuV/m

Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : *MIMO(SDM) & 802.11ac(VHT20)*

Band	Tested Channel	Freq. (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
U-NII 1	36 (5180 MHz)	5148.52	V	Z	PK	60.53	2.63	N/A	N/A	63.16	74.00	10.84
		5148.40	V	Z	AV	43.68	2.63	1.14	N/A	47.45	54.00	6.55
		10360.27	H	Y	PK	49.42	6.32	N/A	N/A	55.74	68.20	12.46
	40 (5200 MHz)	10400.36	H	Y	PK	50.35	6.40	N/A	N/A	56.75	68.20	11.45
	48 (5240 MHz)	10479.77	H	Y	PK	49.60	6.55	N/A	N/A	56.15	68.20	12.05
U-NII 2A	52 (5260 MHz)	10520.33	H	Y	PK	48.60	6.62	N/A	N/A	55.22	68.20	12.98
	60 (5300 MHz)	10600.11	H	Y	PK	48.86	6.75	N/A	N/A	55.61	74.00	18.39
		10600.04	H	Y	AV	36.90	6.75	1.14	N/A	44.79	54.00	9.21
	64 (5320 MHz)	5351.04	V	Z	PK	52.94	3.45	N/A	N/A	56.39	74.00	17.61
		5351.12	V	Z	AV	41.30	3.45	1.14	N/A	45.89	54.00	8.11
		10639.78	H	Y	PK	46.38	6.82	N/A	N/A	53.20	74.00	20.80
		10639.57	H	Y	AV	35.61	6.82	1.14	N/A	43.57	54.00	10.43
U-NII 2C	100 (5500 MHz)	5458.97	V	Z	PK	55.28	3.59	N/A	N/A	58.87	74.00	15.13
		5459.42	V	Z	AV	41.47	3.59	1.14	N/A	46.20	54.00	7.80
		5469.09	V	Z	PK	54.17	3.61	N/A	N/A	57.78	68.20	10.42
		11000.06	H	Y	PK	46.40	7.42	N/A	N/A	53.82	74.00	20.18
		10999.84	H	Y	AV	35.45	7.42	1.14	N/A	44.01	54.00	9.99
	116 (5580 MHz)	11159.61	H	Y	PK	46.21	7.84	N/A	N/A	54.05	74.00	19.95
		11159.73	H	Y	AV	35.34	7.84	1.14	N/A	44.32	54.00	9.68
	144 (5720 MHz)	11440.53	H	Y	PK	46.67	8.57	N/A	N/A	55.24	74.00	18.76
		11439.75	H	Y	AV	35.26	8.57	1.14	N/A	44.97	54.00	9.03
U-NII 3	149 (5745 MHz)	5714.54	V	Y	PK	56.44	4.58	N/A	N/A	61.02	68.20	7.18
		5723.96	V	Y	PK	62.93	4.44	N/A	N/A	67.37	78.20	10.83
		11489.99	H	Y	PK	46.50	8.70	N/A	N/A	55.20	74.00	18.80
		11489.37	H	Y	AV	35.73	8.70	1.14	N/A	45.57	54.00	8.43
	157 (5785 MHz)	11569.64	H	Y	PK	46.41	8.74	N/A	N/A	55.15	74.00	18.85
		11569.68	H	Y	AV	35.41	8.74	1.14	N/A	45.29	54.00	8.71
	165 (5825 MHz)	5850.78	V	Z	PK	52.23	6.08	N/A	N/A	58.31	78.20	19.89
		5860.20	V	Z	PK	50.47	6.22	N/A	N/A	56.69	68.20	11.51
		11650.23	H	Y	PK	46.69	8.75	N/A	N/A	55.44	74.00	18.56
		11650.15	H	Y	AV	35.76	8.75	1.14	N/A	45.65	54.00	8.35

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Information of Distance Factor
   For finding emissions, the test distance might be reduced from 3m to 1m. In this case, the distance factor(-9.54dB) is applied to the result.
   - Calculation of distance factor = 20 log(applied distance / required distance) = 20 log(1 m / 3 m) = -9.54 dB
   When distance factor is “N/A”, the distance is 3 m and distance factor is not applied.
4. The limit is converted to field strength.
   E[dBuV/m] = EIRP[dBm] + 95.2 dB = -27 dBm + 95.2 = 68.2 dBuV/m

Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : *MIMO(SDM) & 802.11n(HT40)*

Band	Tested Channel	Freq. (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
U-NII 1	38 (5190 MHz)	5149.99	H	Z	PK	59.65	2.63	N/A	N/A	62.28	74.00	11.72
		5149.54	H	Z	AV	47.43	2.63	0.67	N/A	50.73	54.00	3.27
		10380.41	H	Y	PK	46.53	6.36	N/A	N/A	52.89	68.20	15.31
	46 (5230 MHz)	10460.46	H	Y	PK	46.20	6.51	N/A	N/A	52.71	68.20	15.49
U-NII 2A	54 (5270 MHz)	10540.36	H	Y	PK	46.35	6.65	N/A	N/A	53.00	68.20	15.20
	62 (5310 MHz)	5350.45	H	Z	PK	56.94	3.45	N/A	N/A	60.39	74.00	13.61
		5350.03	H	Z	AV	45.73	3.45	0.67	N/A	49.85	54.00	4.15
		10620.15	H	Y	PK	46.15	6.79	N/A	N/A	52.94	74.00	21.06
		10620.10	H	Y	AV	35.51	6.79	0.67	N/A	42.97	54.00	11.03
U-NII 2C	102 (5510 MHz)	5459.90	H	Z	PK	52.03	3.59	N/A	N/A	55.62	74.00	18.38
		5459.78	H	Z	AV	41.75	3.59	0.67	N/A	46.01	54.00	7.99
		5465.44	H	Z	PK	58.26	3.60	N/A	N/A	61.86	68.20	6.34
		11020.22	H	Y	PK	46.19	7.47	N/A	N/A	53.66	74.00	20.34
		11019.66	H	Y	AV	35.64	7.47	0.67	N/A	43.78	54.00	10.22
	110 (5550 MHz)	11099.75	H	Y	PK	46.31	7.68	N/A	N/A	53.99	74.00	20.01
		11099.50	H	Y	AV	35.55	7.68	0.67	N/A	43.90	54.00	10.10
	142 (5710 MHz)	11420.08	H	Y	PK	46.08	8.52	N/A	N/A	54.60	74.00	19.40
		11419.82	H	Y	AV	35.52	8.52	0.67	N/A	44.71	54.00	9.29
U-NII 3	151 (5755 MHz)	5713.91	H	Z	PK	57.34	4.57	N/A	N/A	61.91	68.20	6.29
		5724.36	H	Z	PK	58.16	4.43	N/A	N/A	62.59	78.20	15.61
		11510.17	H	Y	PK	46.25	8.73	N/A	N/A	54.98	74.00	19.02
		11510.22	H	Y	AV	35.29	8.73	0.67	N/A	44.69	54.00	9.31
	159 (5795 MHz)	5850.04	H	Z	PK	55.89	6.07	N/A	N/A	61.96	78.20	16.24
		5860.88	H	Z	PK	54.67	6.28	N/A	N/A	60.95	68.20	7.25
		11589.81	H	Y	PK	45.80	8.74	N/A	N/A	54.54	74.00	19.46
		11589.61	H	Y	AV	35.24	8.74	0.67	N/A	44.65	54.00	9.35

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Information of Distance Factor
   For finding emissions, the test distance might be reduced from 3m to 1m. In this case, the distance factor(-9.54dB) is applied to the result.
   - Calculation of distance factor = 20 log(applied distance / required distance) = 20 log(1 m / 3 m) = -9.54 dB
   When distance factor is “N/A”, the distance is 3 m and distance factor is not applied.
4. The limit is converted to field strength.
   E[dBuV/m] = EIRP[dBm] + 95.2 dB = -27 dBm + 95.2 = 68.2 dBuV/m

Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : *MIMO(SDM) & 802.11ac(VHT80)*

Band	Tested Channel	Freq. (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
U-NII 1	42 (5210 MHz)	5146.56	H	Z	PK	58.26	2.62	N/A	N/A	60.88	74.00	13.12
		5146.49	H	Z	AV	44.26	2.62	3.33	N/A	50.21	54.00	3.79
		10419.71	H	Y	PK	45.95	6.43	N/A	N/A	52.38	68.20	15.82
U-NII 2A	58 (5290 MHz)	5354.23	H	Z	PK	58.68	3.45	N/A	N/A	62.13	74.00	11.87
		5354.27	H	Z	AV	44.25	3.45	3.33	N/A	51.03	54.00	2.97
		10580.39	H	Y	PK	46.23	6.72	N/A	N/A	52.95	68.20	15.25
U-NII 2C	106 (5530 MHz)	5458.13	H	Z	PK	56.11	3.59	N/A	N/A	59.70	74.00	14.30
		5459.08	H	Z	AV	43.36	3.59	3.33	N/A	50.28	54.00	3.72
		5469.26	H	Z	PK	56.51	3.61	N/A	N/A	60.12	68.20	8.08
		11059.58	H	Y	PK	45.98	7.58	N/A	N/A	53.56	74.00	20.44
		11060.35	H	Y	AV	36.07	7.58	3.33	N/A	46.98	54.00	7.02
	138 (5690 MHz)	11379.48	H	Z	PK	45.69	8.41	N/A	N/A	54.10	74.00	19.90
		11379.65	H	Z	AV	34.71	8.41	3.33	N/A	46.45	54.00	7.55
U-NII 3	155 (5775 MHz)	5714.79	H	Z	PK	52.89	4.58	N/A	N/A	57.47	68.20	10.73
		5724.72	H	Z	PK	58.58	4.42	N/A	N/A	63.00	78.20	15.20
		5852.32	H	Z	PK	56.49	6.10	N/A	N/A	62.59	78.20	15.61
		5861.82	H	Z	PK	58.06	6.37	N/A	N/A	64.43	68.20	3.77
		11549.51	H	Y	PK	46.08	8.73	N/A	N/A	54.81	74.00	19.19
		11549.78	H	Y	AV	35.49	8.73	3.33	N/A	47.55	54.00	6.45

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Information of Distance Factor
   For finding emissions, the test distance might be reduced from 3m to 1m. In this case, the distance factor(-9.54dB) is applied to the result.
   - Calculation of distance factor = 20 log(applied distance / required distance) = 20 log(1 m / 3 m) = -9.54 dB
   When distance factor is “N/A”, the distance is 3 m and distance factor is not applied.
4. The limit is converted to field strength.
   E[dBuV/m] = EIRP[dBm] + 95.2 dB = -27 dBm + 95.2 = 68.2 dBuV/m

8.6 AC Conducted Emissions

▣ Test Requirements and limit, §15.207

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

▣ Test Configuration

See test photographs for the actual connections between EUT and support equipment.

▣ Test Procedure

Conducted emissions from the EUT were measured according to the ANSI C63.10-2013.

1. The test procedure is performed in a 6.5 m × 3.5 m × 3.5 m (L × W × H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W) × 1.5 m (L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
3. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.
4. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

▣ Test Results: Comply

Note 1: See next pages for actual measured spectrum plots and data for worst case result.

AC Line Conducted Emissions (Graph)

Test Mode: U-NII 1 & 802.11a & MIMO(CDD) & 5240 MHz

Results of Conducted Emission

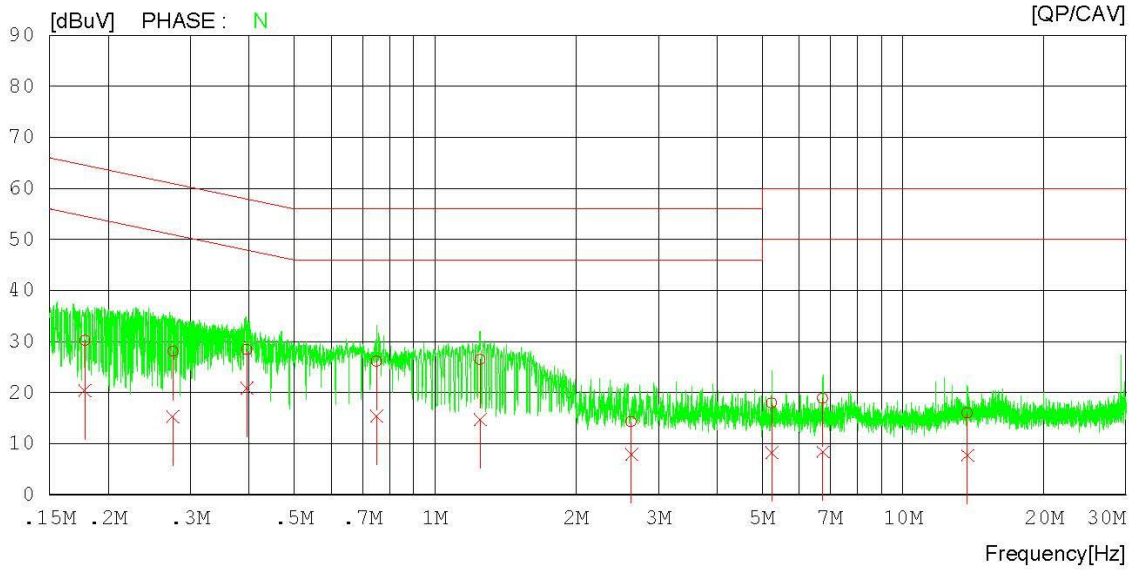
DTNC

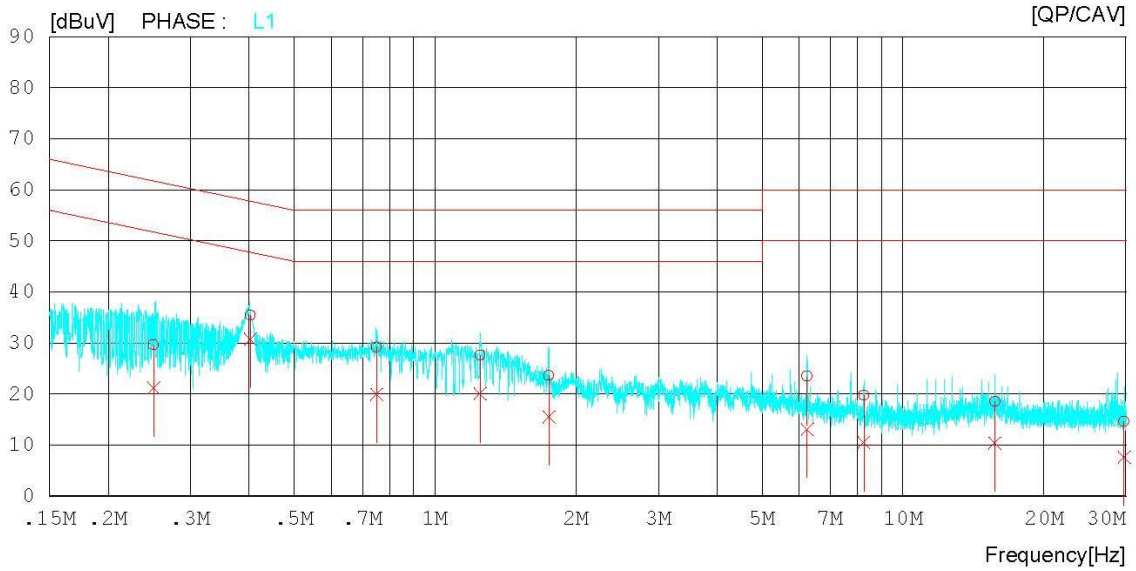
Date 2019-07-05

Order No.		Referrence No.	
Model No.	PM90W	Power Supply	120 V, 60 Hz
Serial No.		Temp/Humi.	23 'C / 35 %
Test Condition	5.1GHz	Operator	JaeJin Lee

Memo

LIMIT : FCC P15.207 QP
FCC P15.207 AV





AC Line Conducted Emissions (Data List)

Test Mode: U-NII 1 & 802.11a & MIMO(CDD) & 5240 MHz

Results of Conducted Emission

DTNC

Date 2019-07-05

Order No.		Referrence No.	
Model No.	PM90W	Power Supply	120 V, 60 Hz
Serial No.		Temp/Humi.	23 'C / 35 %
Test Condition	5.1GHz	Operator	JaeJin Lee

Memo

LIMIT : FCC P15.207 QP
FCC P15.207 AV

NO	FREQ [MHz]	READING QP [dBuV]	READING CAV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT CAV [dBuV]	LIMIT QP [dBuV]	LIMIT CAV [dBuV]	MARGIN QP [dBuV]	MARGIN CAV [dBuV]	PHASE
1	0.17850	20.33	10.47	9.94	30.27	20.41	64.56	54.56	34.29	34.15	N
2	0.27521	18.11	5.35	9.94	28.05	15.29	60.96	50.96	32.91	35.67	N
3	0.39609	18.48	10.90	9.95	28.43	20.85	57.93	47.93	29.50	27.08	N
4	0.74975	16.17	5.41	9.97	26.14	15.38	56.00	46.00	29.86	30.62	N
5	1.24760	16.52	4.74	9.99	26.51	14.73	56.00	46.00	29.49	31.27	N
6	2.62520	4.29	-2.18	10.05	14.34	7.87	56.00	46.00	41.66	38.13	N
7	5.24520	7.76	-1.93	10.16	17.92	8.23	60.00	50.00	42.08	41.77	N
8	6.74240	8.63	-1.81	10.22	18.85	8.41	60.00	50.00	41.15	41.59	N
9	13.73280	5.58	-2.71	10.44	16.02	7.73	60.00	50.00	43.98	42.27	N
10	0.25025	19.65	11.22	9.94	29.59	21.16	61.75	51.75	32.16	30.59	L1
11	0.40293	25.43	20.78	9.95	35.38	30.73	57.79	47.79	22.41	17.06	L1
12	0.74957	19.21	9.98	9.96	29.17	19.94	56.00	46.00	26.83	26.06	L1
13	1.24840	17.64	9.99	9.98	27.62	19.97	56.00	46.00	28.38	26.03	L1
14	1.75000	13.54	5.39	10.02	23.56	15.41	56.00	46.00	32.44	30.59	L1
15	6.24060	13.24	2.88	10.20	23.44	13.08	60.00	50.00	36.56	36.92	L1
16	8.23780	9.49	0.17	10.26	19.75	10.43	60.00	50.00	40.25	39.57	L1
17	15.72520	8.00	-0.14	10.47	18.47	10.33	60.00	50.00	41.53	39.67	L1
18	29.69860	3.93	-3.06	10.72	14.65	7.66	60.00	50.00	45.35	42.34	L1

AC Line Conducted Emissions (Graph)

Test Mode: U-NII 2A & 802.11a & MIMO(CDD) & 5320 MHz

Results of Conducted Emission

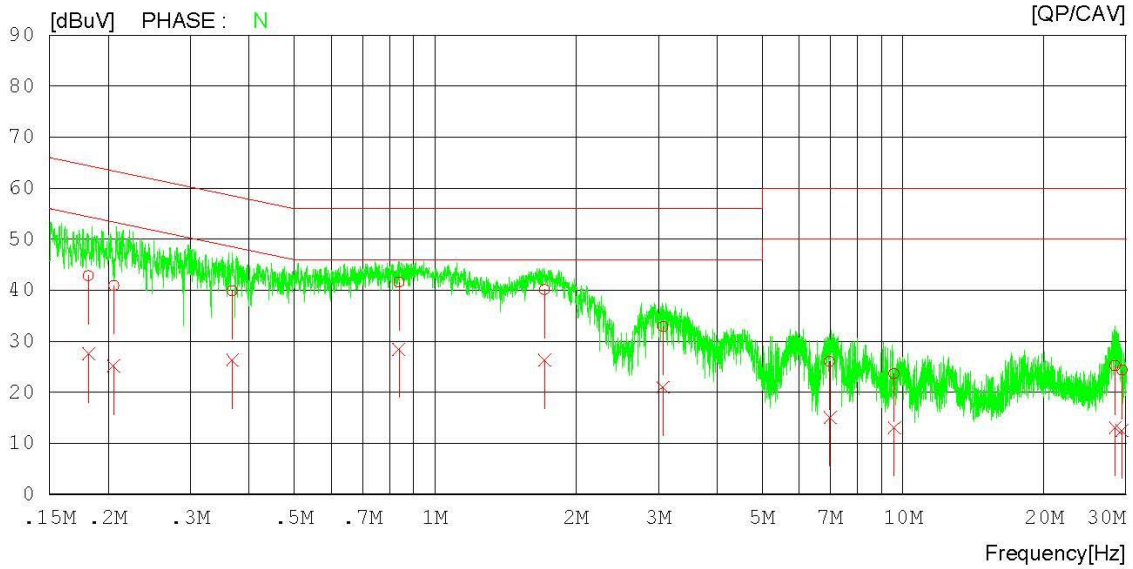
DTNC

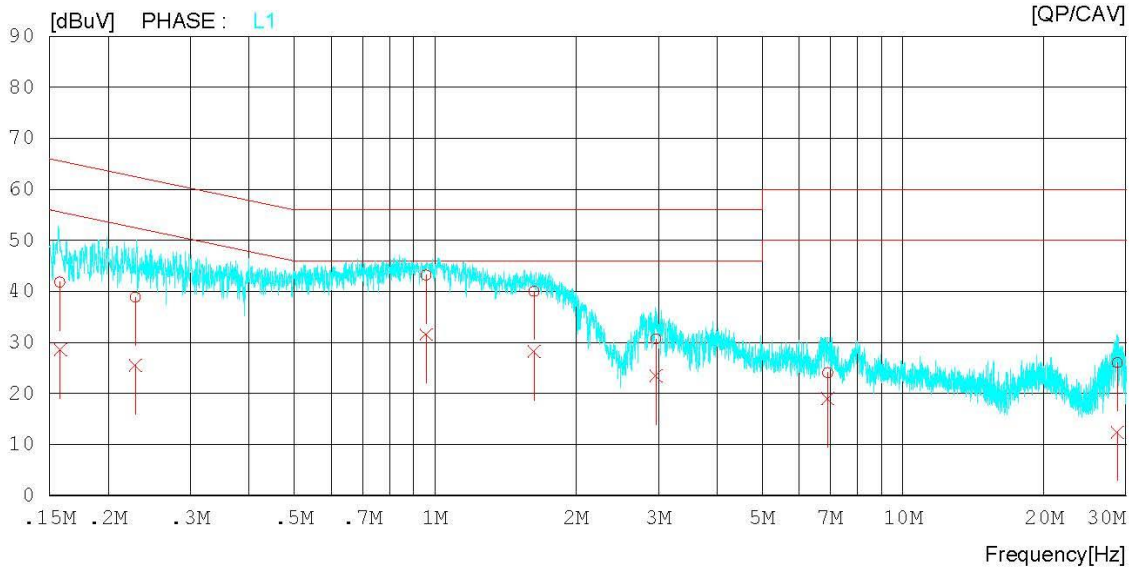
Date 2019-07-05

Order No.		Referrence No.	
Model No.	PM90W	Power Supply	120 V, 60 Hz
Serial No.		Temp/Humi.	23 'C / 35 %
Test Condition	5.3GHz	Operator	JaeJin Lee

Memo

LIMIT : FCC P15.207 QP
FCC P15.207 AV





AC Line Conducted Emissions (Data List)

Test Mode: U-NII 2A & 802.11a & MIMO(CDD) & 5320 MHz

Results of Conducted Emission

DTNC

Date 2019-07-05

Order No.		Referrence No.	
Model No.	PM90W	Power Supply	120 V, 60 Hz
Serial No.		Temp/Humi.	23 'C / 35 %
Test Condition	5.3GHz	Operator	JaeJin Lee

Memo

LIMIT : FCC P15.207 QP
FCC P15.207 AV

NO	FREQ [MHz]	READING QP [dBuV]	READING CAV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT CAV [dBuV]	LIMIT QP [dBuV]	LIMIT CAV [dBuV]	MARGIN QP [dBuV]	MARGIN CAV [dBuV]	PHASE
1	0.18182	32.94	17.64	9.94	42.88	27.58	64.40	54.40	21.52	26.82	N
2	0.20573	31.00	15.23	9.94	40.94	25.17	63.38	53.38	22.44	28.21	N
3	0.36894	29.98	16.36	9.95	39.93	26.31	58.52	48.52	18.59	22.21	N
4	0.83679	31.67	18.53	9.97	41.64	28.50	56.00	46.00	14.36	17.50	N
5	1.71560	30.06	16.26	10.01	40.07	26.27	56.00	46.00	15.93	19.73	N
6	3.06800	22.80	10.97	10.07	32.87	21.04	56.00	46.00	23.13	24.96	N
7	6.97440	15.83	4.87	10.22	26.05	15.09	60.00	50.00	33.95	34.91	N
8	9.57400	13.34	2.75	10.32	23.66	13.07	60.00	50.00	36.34	36.93	N
9	28.41540	14.49	2.36	10.72	25.21	13.08	60.00	50.00	34.79	36.92	N
10	29.37020	13.54	1.88	10.73	24.27	12.61	60.00	50.00	35.73	37.39	N
11	0.15810	31.89	18.61	9.94	41.83	28.55	65.56	55.56	23.73	27.01	L1
12	0.22872	28.92	15.52	9.94	38.86	25.46	62.50	52.50	23.64	27.04	L1
13	0.95660	33.15	21.57	9.97	43.12	31.54	56.00	46.00	12.88	14.46	L1
14	1.62760	29.93	18.14	10.01	39.94	28.15	56.00	46.00	16.06	17.85	L1
15	2.96600	20.53	13.36	10.06	30.59	23.42	56.00	46.00	25.41	22.58	L1
16	6.90480	13.87	8.74	10.22	24.09	18.96	60.00	50.00	35.91	31.04	L1
17	28.73180	15.30	1.74	10.70	26.00	12.44	60.00	50.00	34.00	37.56	L1

AC Line Conducted Emissions (Graph)

Test Mode: U-NII 2C & 802.11a & MIMO(CDD) & 5500 MHz

Results of Conducted Emission

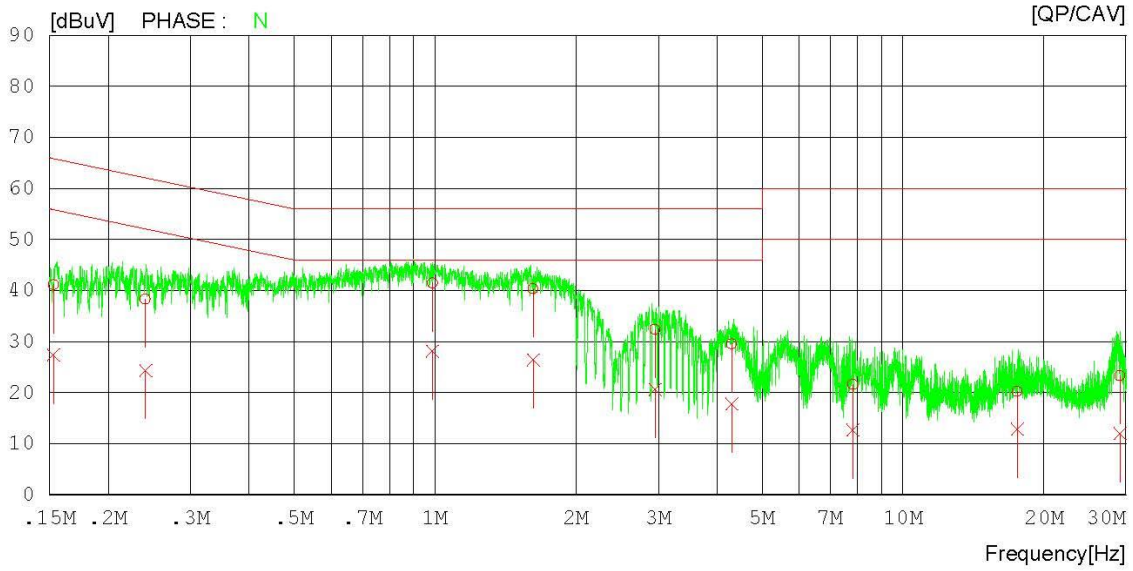
DTNC

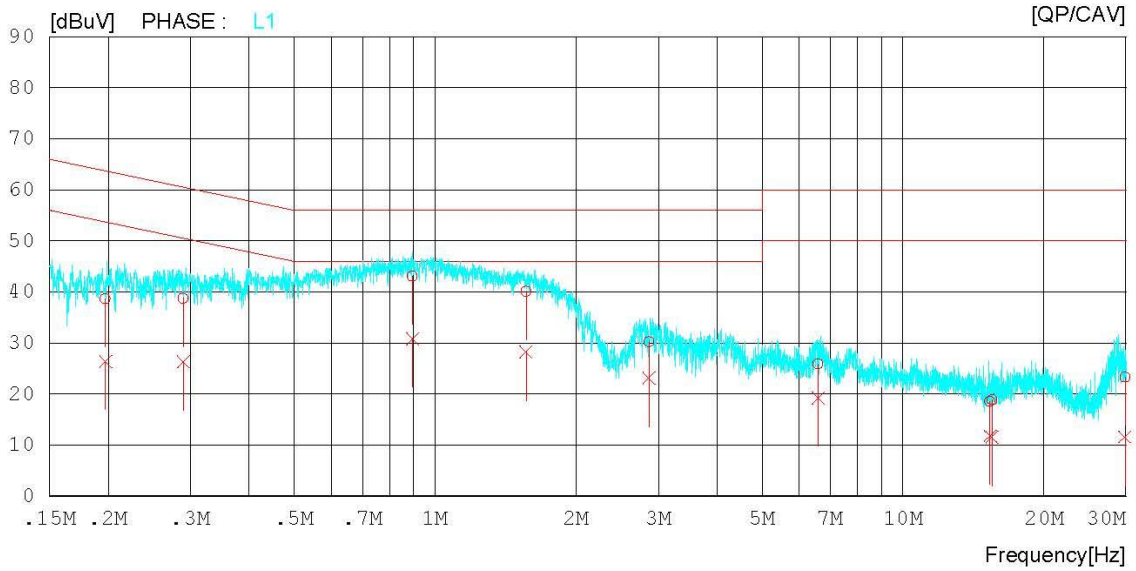
Date 2019-07-05

Order No.		Referrence No.	
Model No.	PM90W	Power Supply	120 V, 60 Hz
Serial No.		Temp/Humi.	23 'C / 35 %
Test Condition	5.5GHz	Operator	JaeJin Lee

Memo

LIMIT : FCC P15.207 QP
FCC P15.207 AV





AC Line Conducted Emissions (Data List)

Test Mode: U-NII 2C & 802.11a & MIMO(CDD) & 5500 MHz

Results of Conducted Emission

DTNC

Date 2019-07-05

Order No.		Referrence No.	
Model No.	PM90W	Power Supply	120 V, 60 Hz
Serial No.		Temp/Humi.	23 'C / 35 %
Test Condition	5.5GHz	Operator	JaeJin Lee

Memo

LIMIT : FCC P15.207 QP
FCC P15.207 AV

NO	FREQ	READING		C.FACTOR	RESULT		LIMIT		MARGIN		PHASE
		QP	CAV		QP	CAV	QP	CAV	QP	CAV	
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.15301	31.25	17.42	9.94	41.19	27.36	65.83	55.83	24.64	28.47	N
2	0.24053	28.39	14.40	9.94	38.33	24.34	62.08	52.08	23.75	27.74	N
3	0.98660	31.47	18.15	9.97	41.44	28.12	56.00	46.00	14.56	17.88	N
4	1.61980	30.32	16.37	10.01	40.33	26.38	56.00	46.00	15.67	19.62	N
5	2.95120	22.38	10.55	10.07	32.45	20.62	56.00	46.00	23.55	25.38	N
6	4.30420	19.38	7.69	10.13	29.51	17.82	56.00	46.00	26.49	28.18	N
7	7.81560	11.38	2.43	10.25	21.63	12.68	60.00	50.00	38.37	37.32	N
8	17.54760	9.69	2.38	10.53	20.22	12.91	60.00	50.00	39.78	37.09	N
9	29.09340	12.62	1.25	10.73	23.35	11.98	60.00	50.00	36.65	38.02	N
10	0.19760	28.69	16.41	9.94	38.63	26.35	63.71	53.71	25.08	27.36	L1
11	0.28974	28.74	16.29	9.94	38.68	26.23	60.53	50.53	21.85	24.30	L1
12	0.89522	33.06	20.85	9.97	43.03	30.82	56.00	46.00	12.97	15.18	L1
13	1.56340	30.06	18.22	10.01	40.07	28.23	56.00	46.00	15.93	17.77	L1
14	2.86240	20.14	12.98	10.06	30.20	23.04	56.00	46.00	25.80	22.96	L1
15	6.58740	15.60	9.02	10.20	25.80	19.22	60.00	50.00	34.20	30.78	L1
16	15.34320	7.99	1.31	10.46	18.45	11.77	60.00	50.00	41.55	38.23	L1
17	15.49560	8.38	1.04	10.46	18.84	11.50	60.00	50.00	41.16	38.50	L1
18	29.78440	12.50	0.81	10.72	23.22	11.53	60.00	50.00	36.78	38.47	L1

AC Line Conducted Emissions (Graph)

Test Mode: U-NII 2C & 802.11a & MIMO(CDD) & 5785 MHz

Results of Conducted Emission

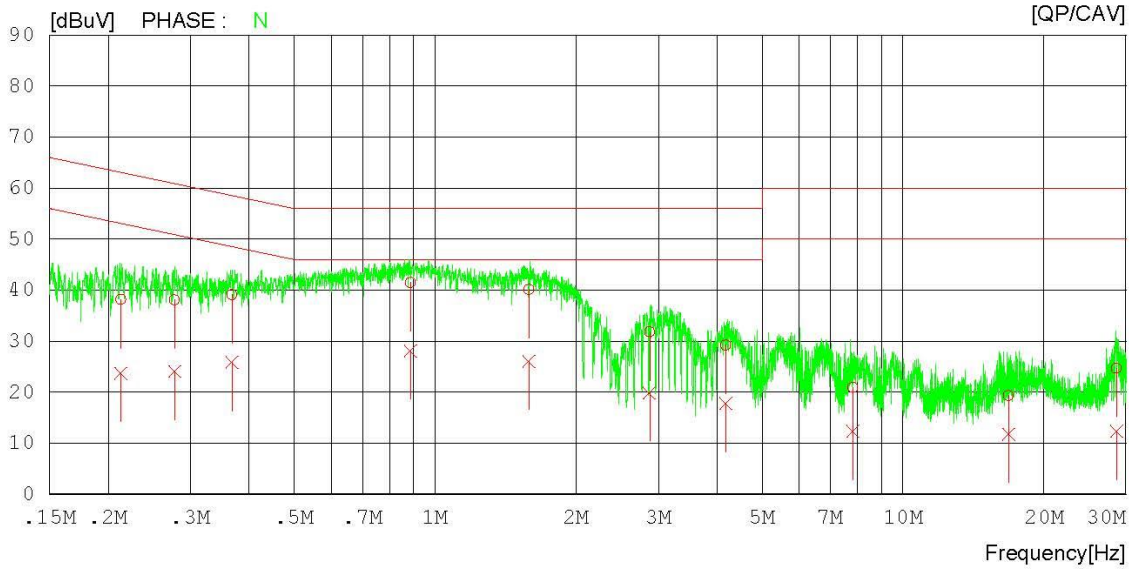
DTNC

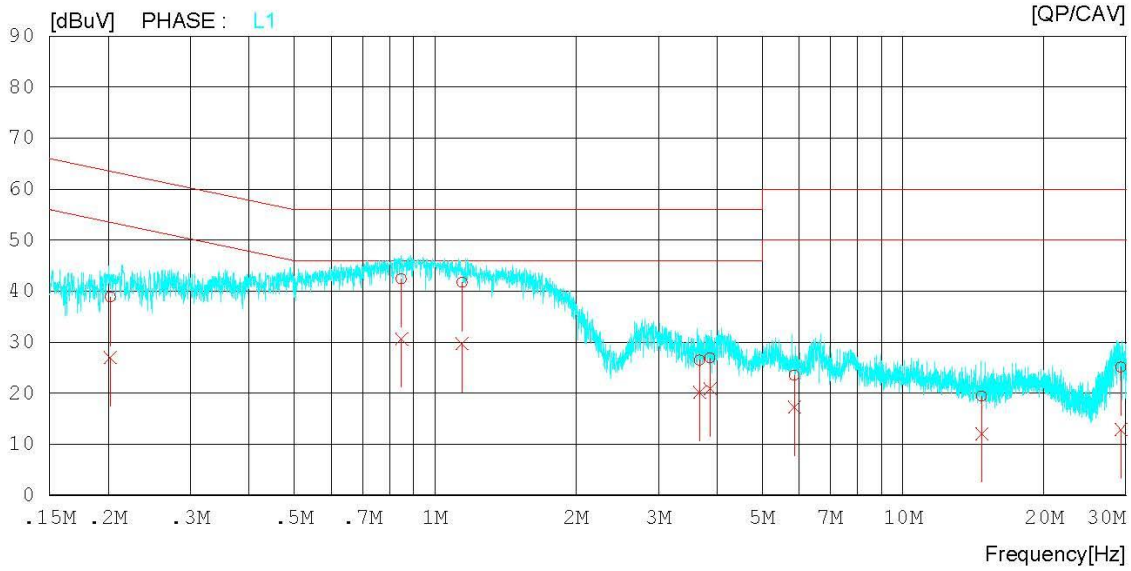
Date 2019-07-05

Order No.		Referrence No.	
Model No.	PM90W	Power Supply	120 V, 60 Hz
Serial No.		Temp/Humi.	23 'C / 35 %
Test Condition	5.7GHz	Operator	JaeJin Lee

Memo

LIMIT : FCC P15.207 QP
FCC P15.207 AV





AC Line Conducted Emissions (Data List)

Test Mode: U-NII 2C & 802.11a & MIMO(CDD) & 5785 MHz

Results of Conducted Emission

DTNC

Date 2019-07-05

Order No.		Referrence No.	
Model No.	PM90W	Power Supply	120 V, 60 Hz
Serial No.		Temp/Humi.	23 'C / 35 %
Test Condition	5.7GHz	Operator	JaeJin Lee

Memo

LIMIT : FCC P15.207 QP
FCC P15.207 AV

NO	FREQ [MHz]	READING QP [dBuV]	READING CAV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT CAV [dBuV]	LIMIT QP [dBuV]	LIMIT CAV [dBuV]	MARGIN QP [dBuV]	MARGIN CAV [dBuV]	PHASE
1	0.21293	28.22	13.72	9.94	38.16	23.66	63.09	53.09	24.93	29.43	N
2	0.27729	28.13	14.16	9.94	38.07	24.10	60.90	50.90	22.83	26.80	N
3	0.36786	29.20	15.86	9.95	39.15	25.81	58.55	48.55	19.40	22.74	N
4	0.88534	31.58	18.19	9.97	41.55	28.16	56.00	46.00	14.45	17.84	N
5	1.58640	30.12	16.06	10.01	40.13	26.07	56.00	46.00	15.87	19.93	N
6	2.87360	21.72	9.81	10.07	31.79	19.88	56.00	46.00	24.21	26.12	N
7	4.17520	19.03	7.63	10.12	29.15	17.75	56.00	46.00	26.85	28.25	N
8	7.80300	10.68	2.06	10.25	20.93	12.31	60.00	50.00	39.07	37.69	N
9	16.81020	8.82	1.25	10.51	19.33	11.76	60.00	50.00	40.67	38.24	N
10	28.59700	13.93	1.63	10.73	24.66	12.36	60.00	50.00	35.34	37.64	N
11	0.20221	28.85	17.00	9.94	38.79	26.94	63.52	53.52	24.73	26.58	L1
12	0.84812	32.42	20.65	9.96	42.38	30.61	56.00	46.00	13.62	15.39	L1
13	1.14180	31.66	19.72	9.97	41.63	29.69	56.00	46.00	14.37	16.31	L1
14	3.68160	16.30	10.01	10.09	26.39	20.10	56.00	46.00	29.61	25.90	L1
15	3.87360	16.74	10.77	10.11	26.85	20.88	56.00	46.00	29.15	25.12	L1
16	5.86180	13.31	7.10	10.18	23.49	17.28	60.00	50.00	36.51	32.72	L1
17	14.75100	8.89	1.61	10.46	19.35	12.07	60.00	50.00	40.65	37.93	L1
18	29.23640	14.35	2.15	10.70	25.05	12.85	60.00	50.00	34.95	37.15	L1

8.7 Occupied Bandwidth (99%)

▣ Test Requirements

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured

▣ Test Configuration

Refer to the APPENDIX I.

▣ Test Procedure

RSS-Gen[6.7]

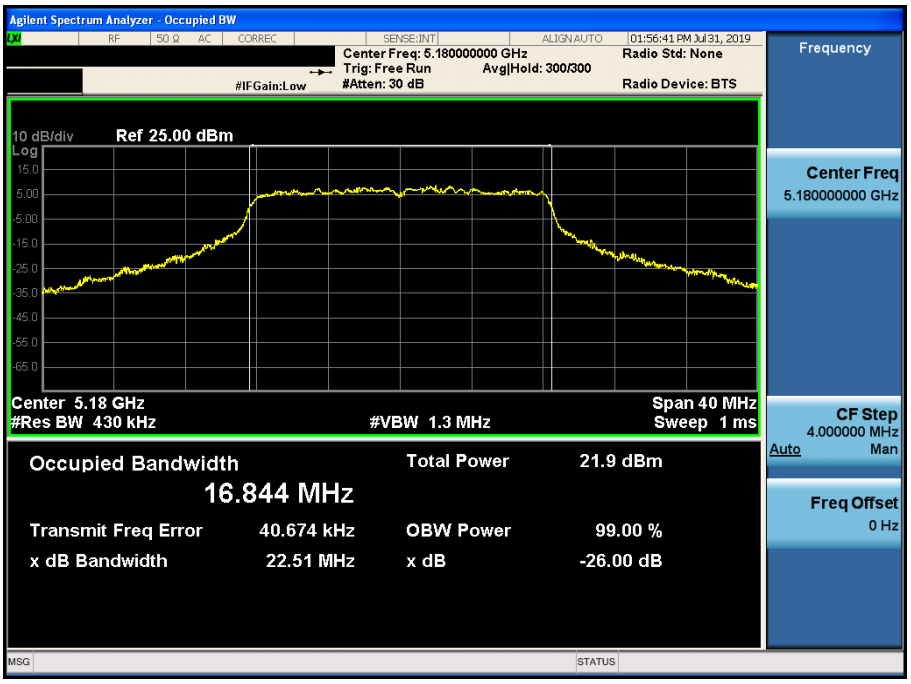
- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

▣ **Test Results : Comply**

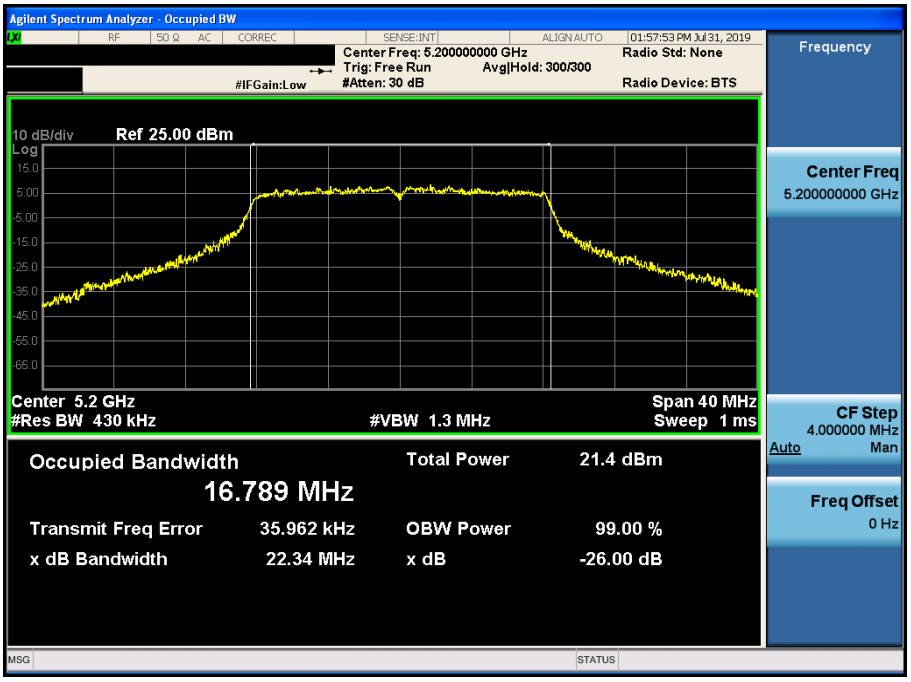
Mode	Bands	Channel	Frequency [MHz]	Test Result[MHz]	
				ANT1	ANT2
802.11a	U-NII 1	36	5180	16.84	16.82
		40	5200	16.79	16.82
		48	5240	16.76	16.82
	U-NII 2A	52	5260	16.77	16.81
		60	5300	16.73	16.81
		64	5320	16.73	16.80
	U-NII 2C	100	5500	16.75	16.82
		116	5580	16.78	16.84
		144	5720	16.76	16.81
	U-NII 3	149	5745	16.75	16.82
		157	5785	16.74	16.84
		165	5825	16.77	16.82
802.11n(HT20)	U-NII 1	36	5180	17.91	17.93
		40	5200	17.91	17.90
		48	5240	17.89	17.93
	U-NII 2A	52	5260	17.91	17.96
		60	5300	17.88	17.90
		64	5320	17.90	17.94
	U-NII 2C	100	5500	17.91	17.93
		116	5580	17.94	17.92
		144	5720	17.95	17.90
	U-NII 3	149	5745	17.92	17.95
		157	5785	17.89	17.91
		165	5825	17.85	17.92
802.11n(HT40)	U-NII 1	38	5190	36.34	36.34
		46	5230	36.38	36.31
	U-NII 2A	54	5270	36.36	36.33
		62	5310	36.37	36.29
	U-NII 2C	102	5510	36.34	36.31
		110	5550	36.39	36.35
		142	5710	36.28	36.37
	U-NII 3	151	5755	36.36	36.29
		159	5795	36.43	36.32
802.11ac(VHT80)	U-NII 1	42	5210	77.43	77.56
	U-NII 2A	58	5290	77.34	77.38
	U-NII 2C	106	5530	77.34	77.36
		138	5690	77.33	77.62
	U-NII 3	155	5775	77.29	77.22

▣ Result Plots

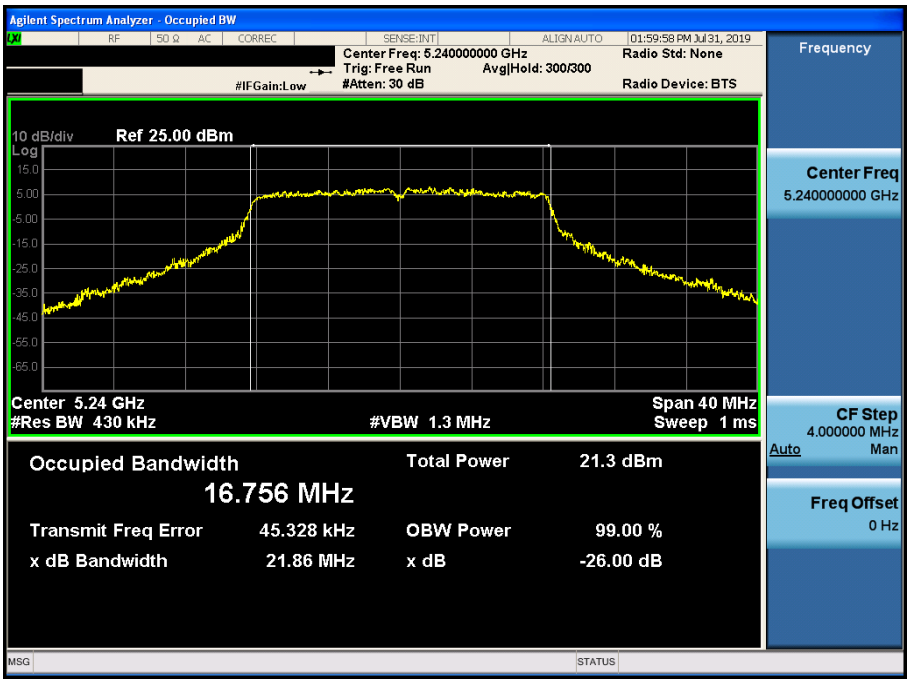
Occupied Bandwidth 99% Test Mode: 802.11a & ANT 1 & Ch.36



Occupied Bandwidth 99% Test Mode: 802.11a & ANT 1 & Ch.40



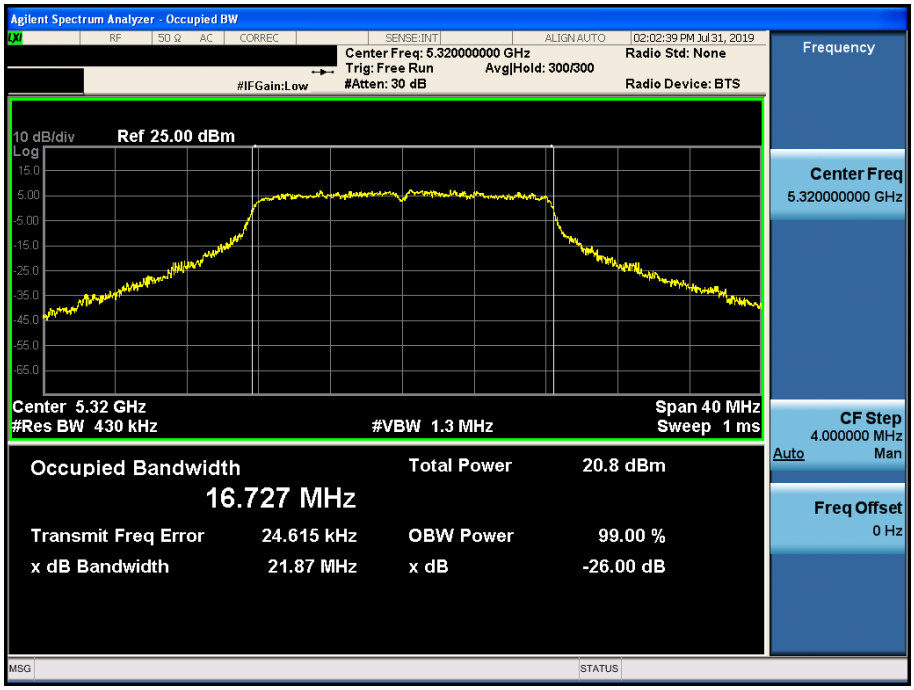
Occupied Bandwidth 99% Test Mode: 802.11a & ANT 1 & Ch.48



Occupied Bandwidth 99% Test Mode: 802.11a & ANT 1 & Ch.52

Occupied Bandwidth 99% Test Mode: 802.11a & ANT 1 & Ch.60

Occupied Bandwidth 99% Test Mode: 802.11a & ANT 1 & Ch.64

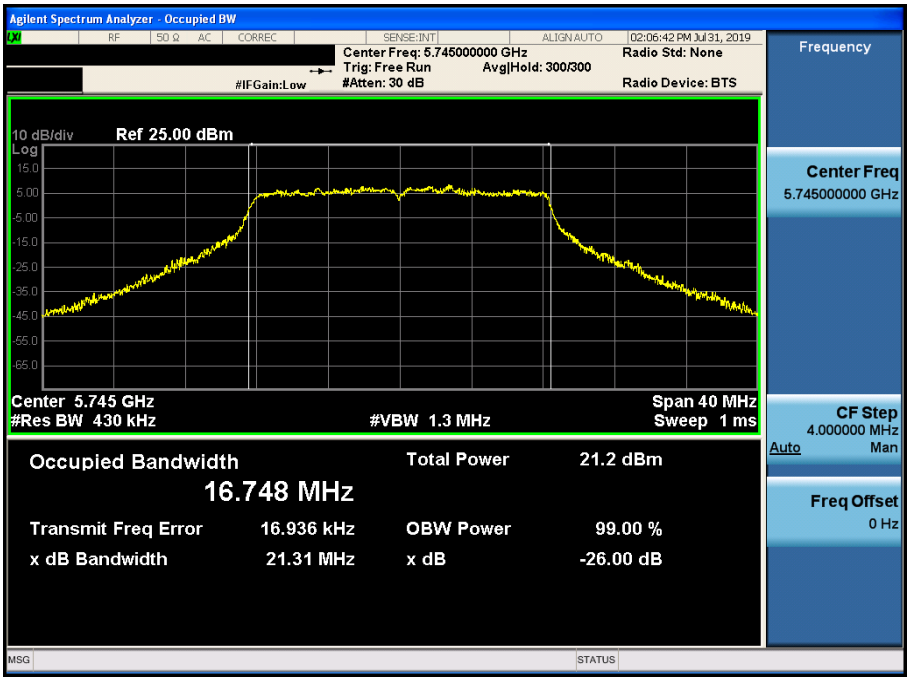


Occupied Bandwidth 99% Test Mode: 802.11a & ANT 1 & Ch.100

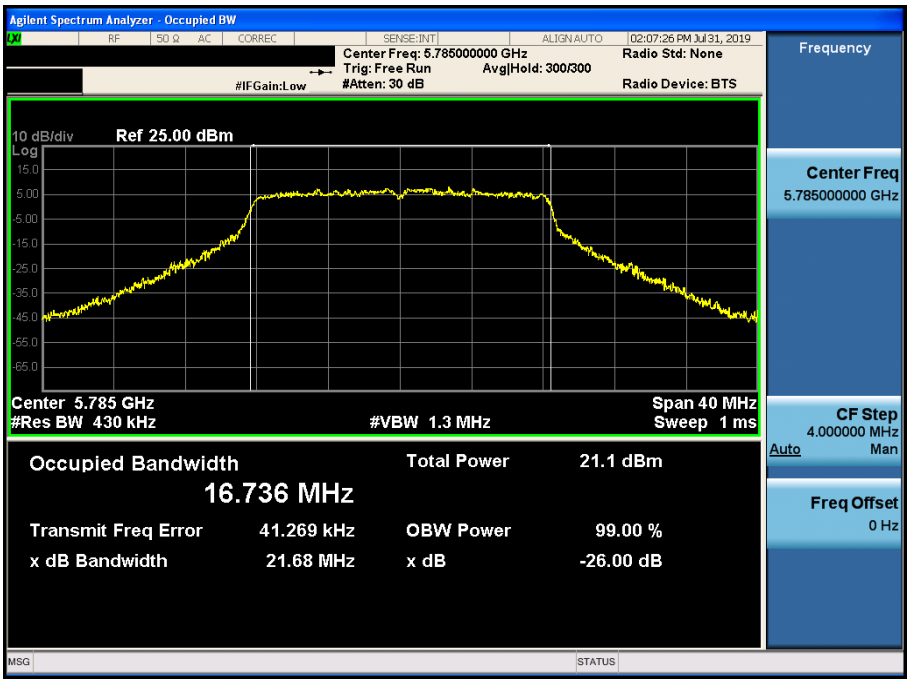
Occupied Bandwidth 99% Test Mode: 802.11a & ANT 1 & Ch.116

Occupied Bandwidth 99% Test Mode: 802.11a & ANT 1 & Ch.144

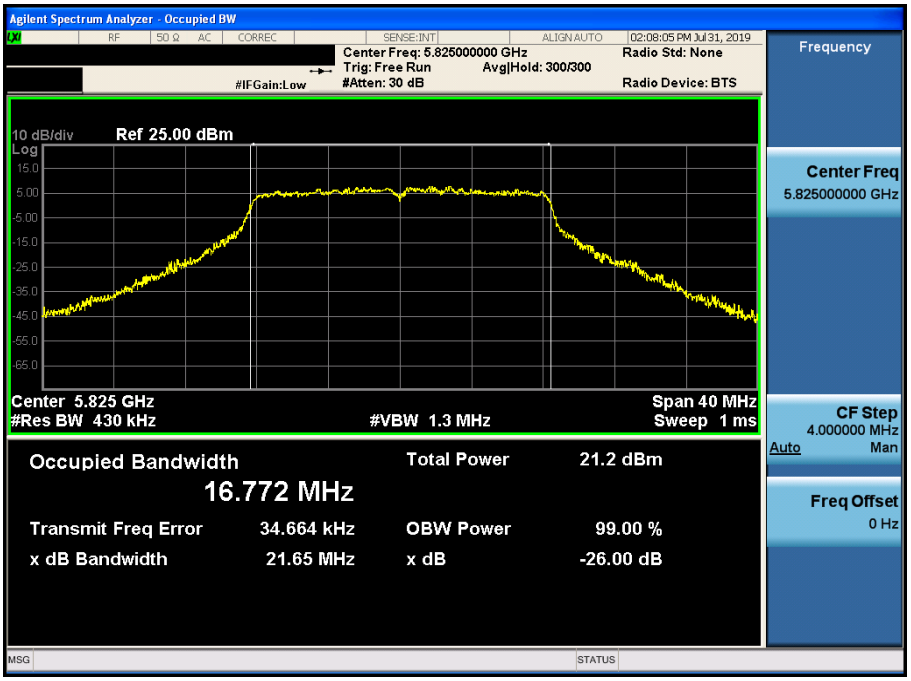
Occupied Bandwidth 99% Test Mode: 802.11a & ANT 1 & Ch.149



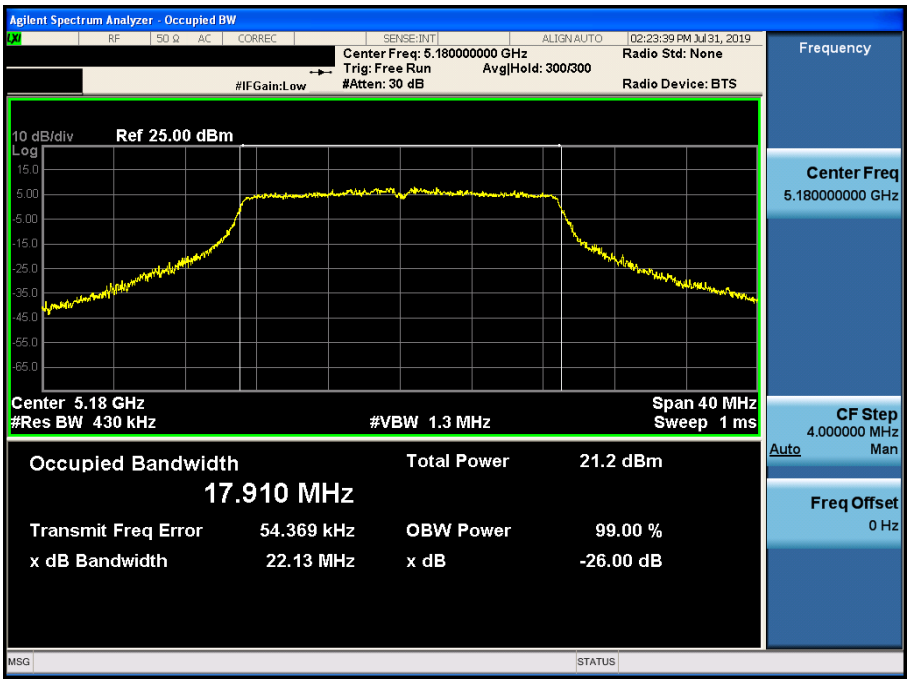
Occupied Bandwidth 99% Test Mode: 802.11a & ANT 1 & Ch.157



Occupied Bandwidth 99% Test Mode: 802.11a & ANT 1 & Ch.165



Occupied Bandwidth 99% Test Mode: 802.11ac VHT20 & ANT 1 & Ch.36



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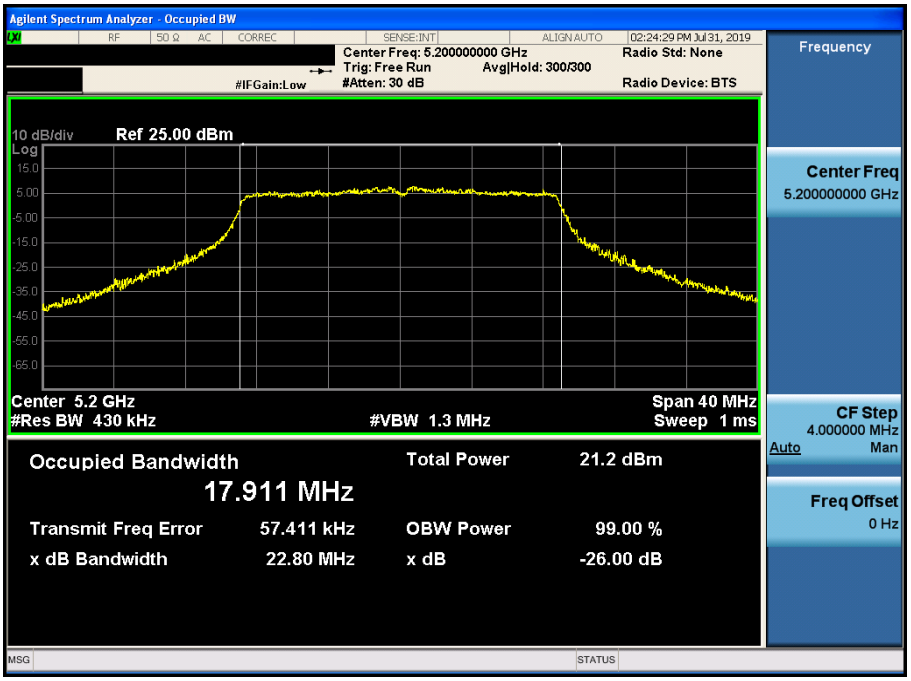
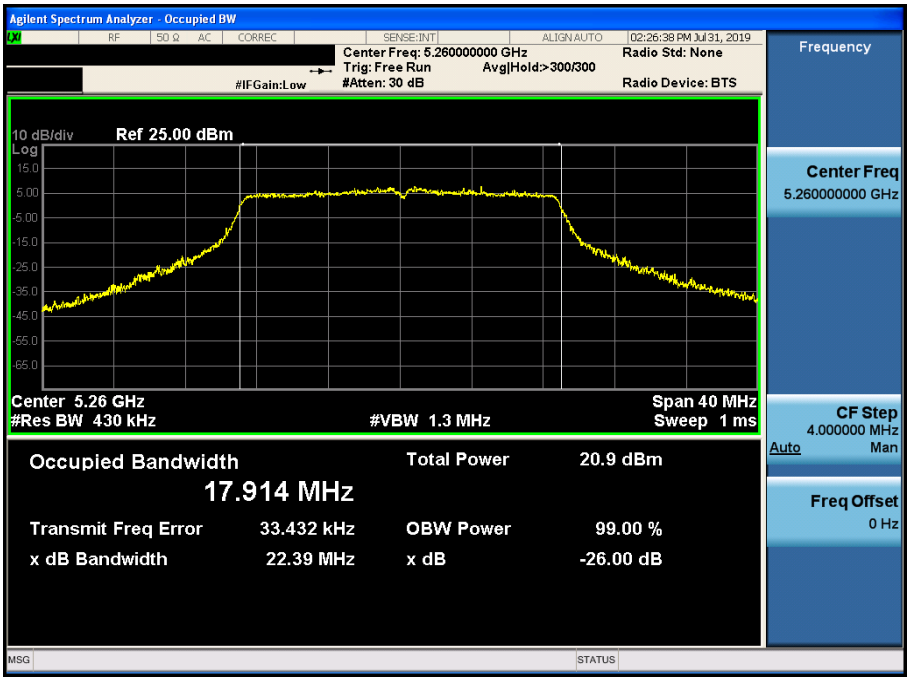
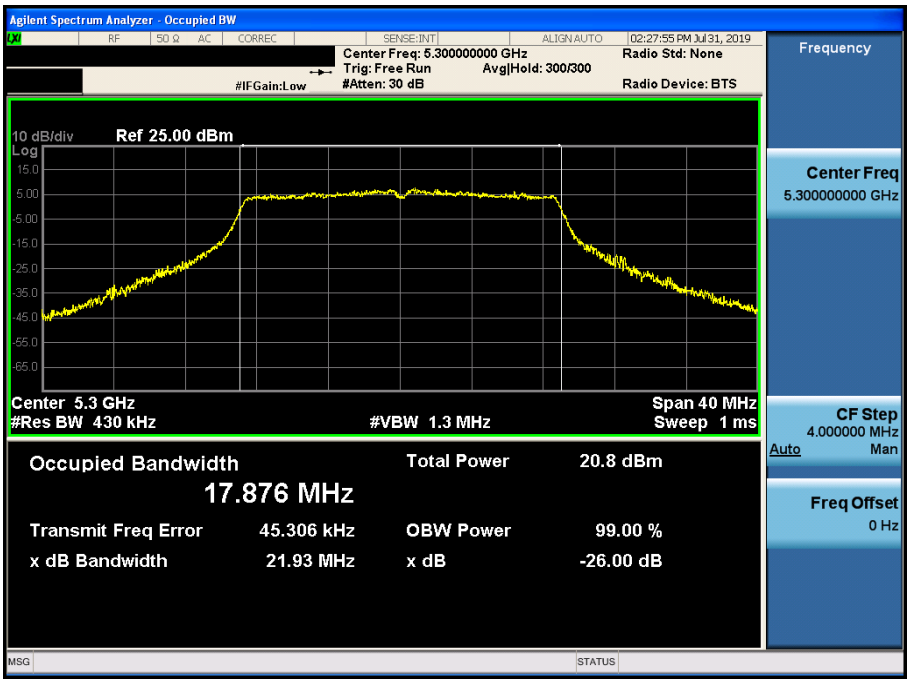


Occupied Bandwidth 99% Test Mode: 802.11ac VHT20 & ANT 1 & Ch.48

Occupied Bandwidth 99% Test Mode: 802.11ac VHT20 & ANT 1 & Ch.52

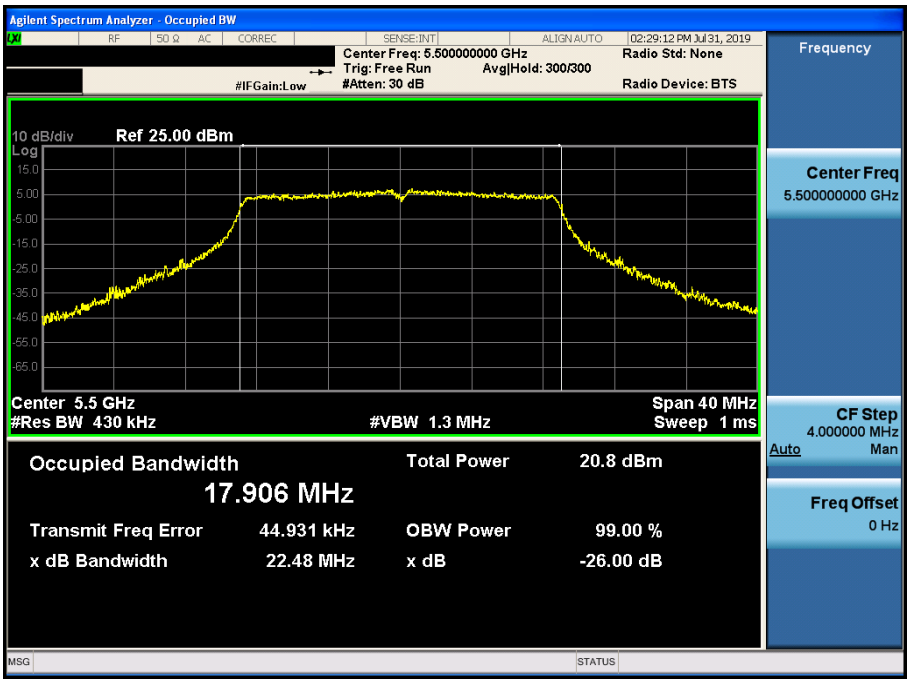


Occupied Bandwidth 99% Test Mode: 802.11ac VHT20 & ANT 1 & Ch.60

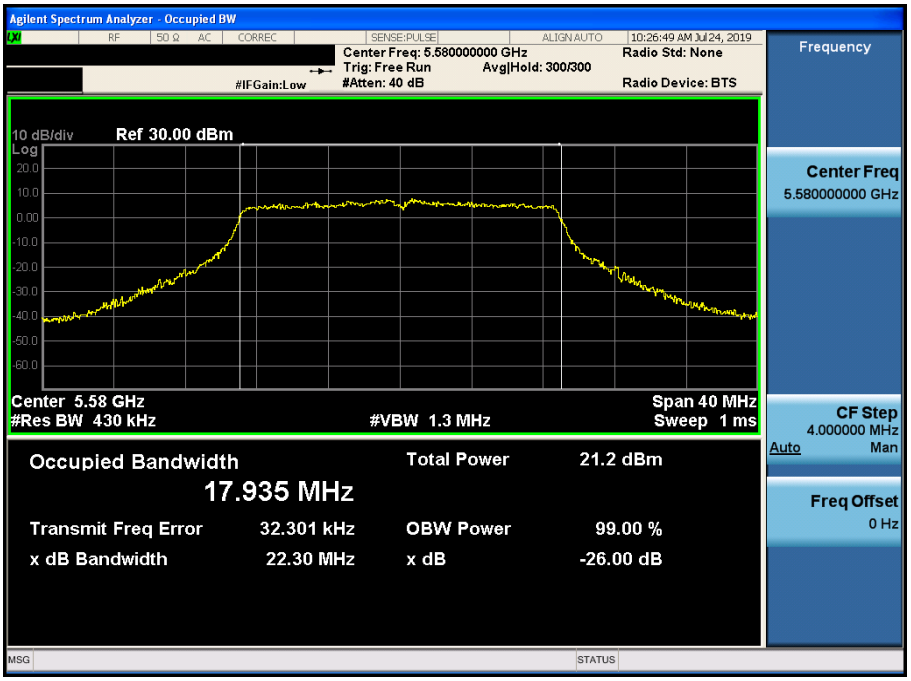


Occupied Bandwidth 99% Test Mode: 802.11ac VHT20 & ANT 1 & Ch.64

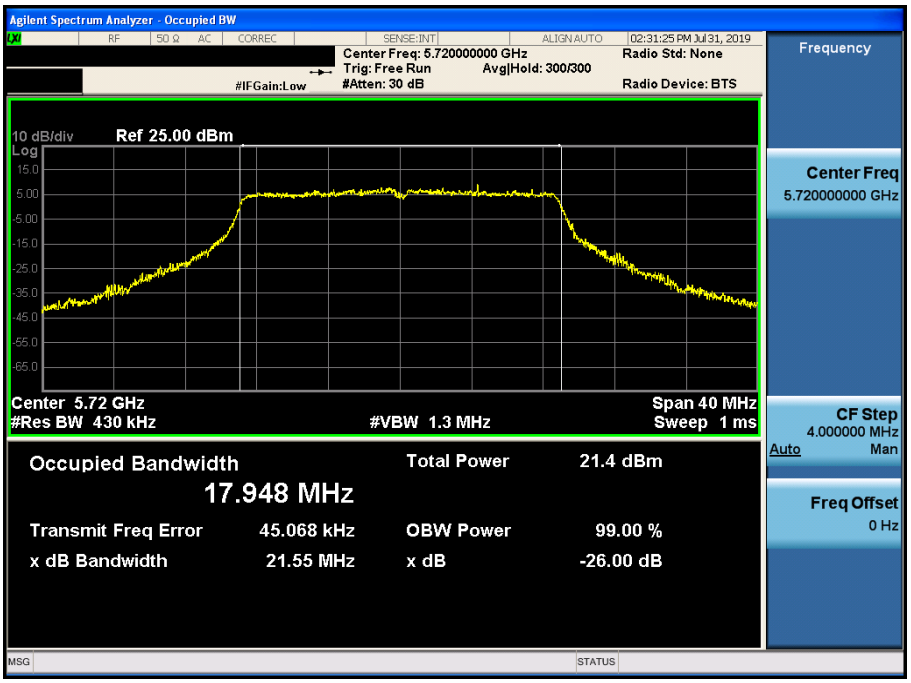
Occupied Bandwidth 99% Test Mode: 802.11ac VHT20 & ANT 1 & Ch.100



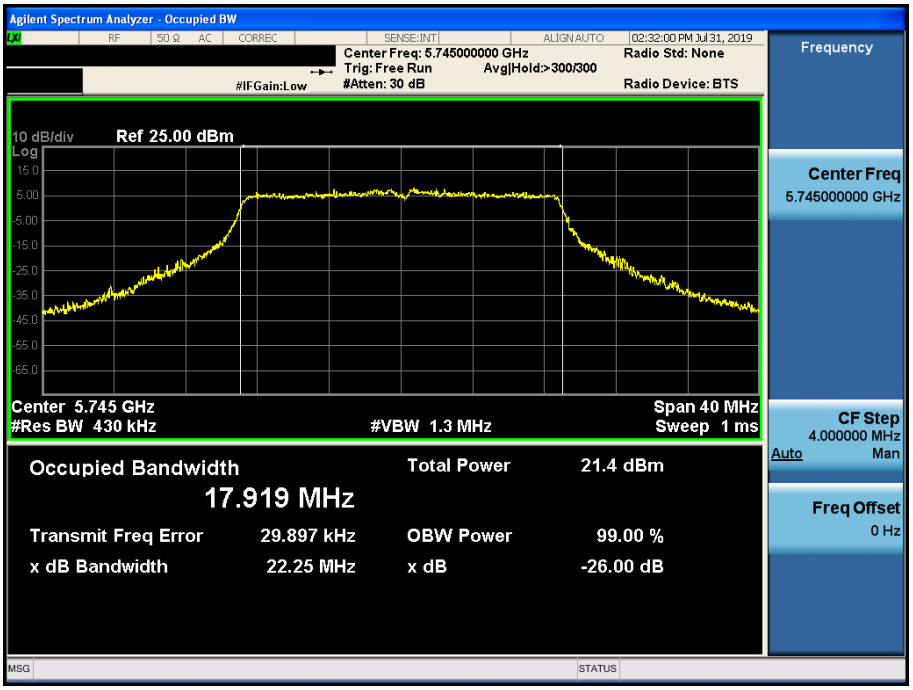
Occupied Bandwidth 99% Test Mode: 802.11ac VHT20 & ANT 1 & Ch.116



Occupied Bandwidth 99% Test Mode: 802.11ac VHT20 & ANT 1 & Ch.144



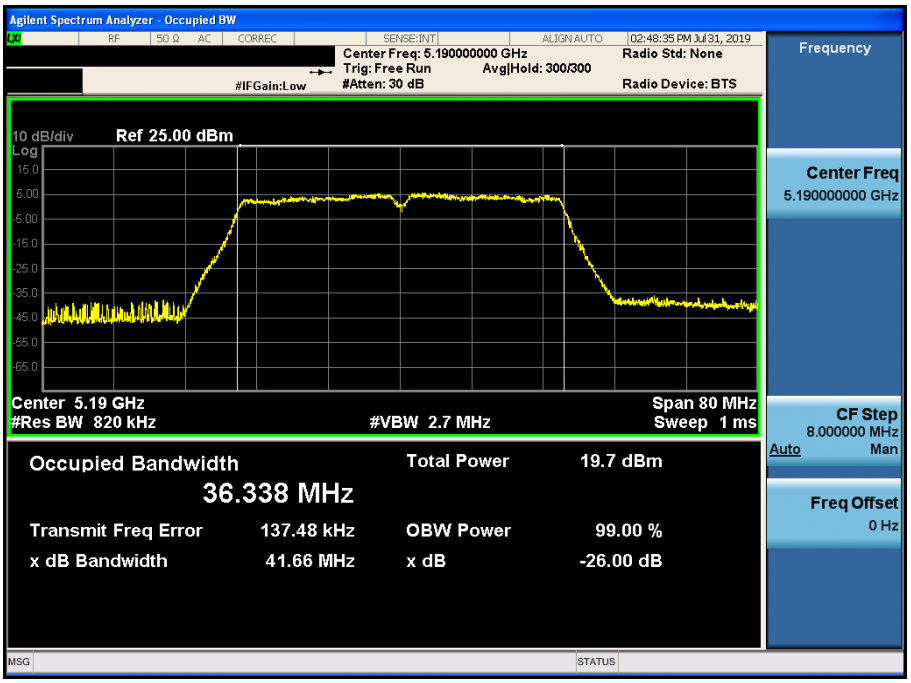
Occupied Bandwidth 99% Test Mode: 802.11ac VHT20 & ANT 1 & Ch.149



Occupied Bandwidth 99% Test Mode: 802.11ac VHT20 & ANT 1 & Ch.157

Occupied Bandwidth 99% Test Mode: 802.11ac VHT20 & ANT 1 & Ch.165

Occupied Bandwidth 99% Test Mode: 802.11ac VHT40 & ANT 1 & Ch.38



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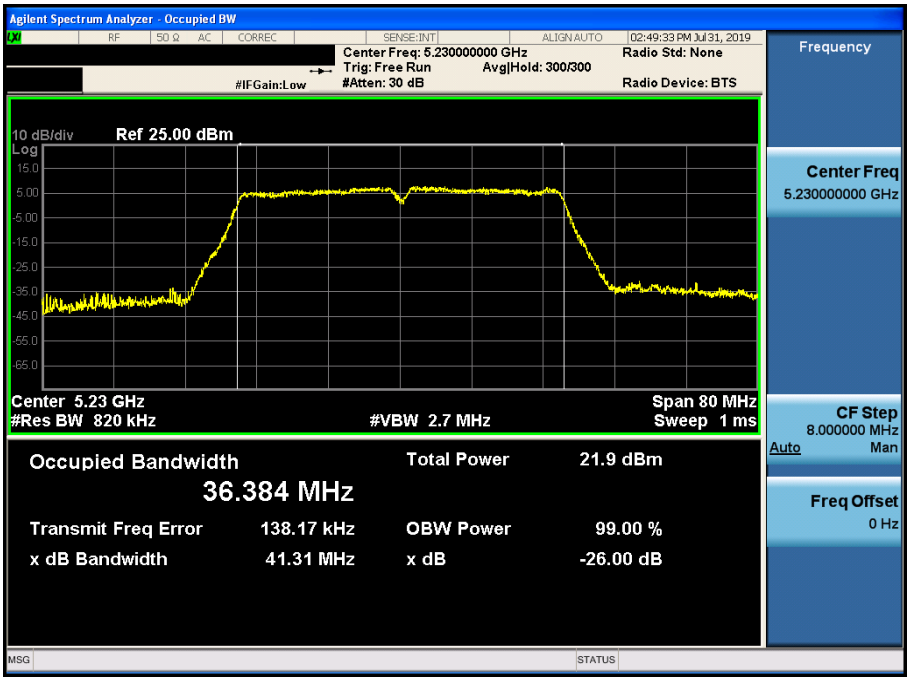
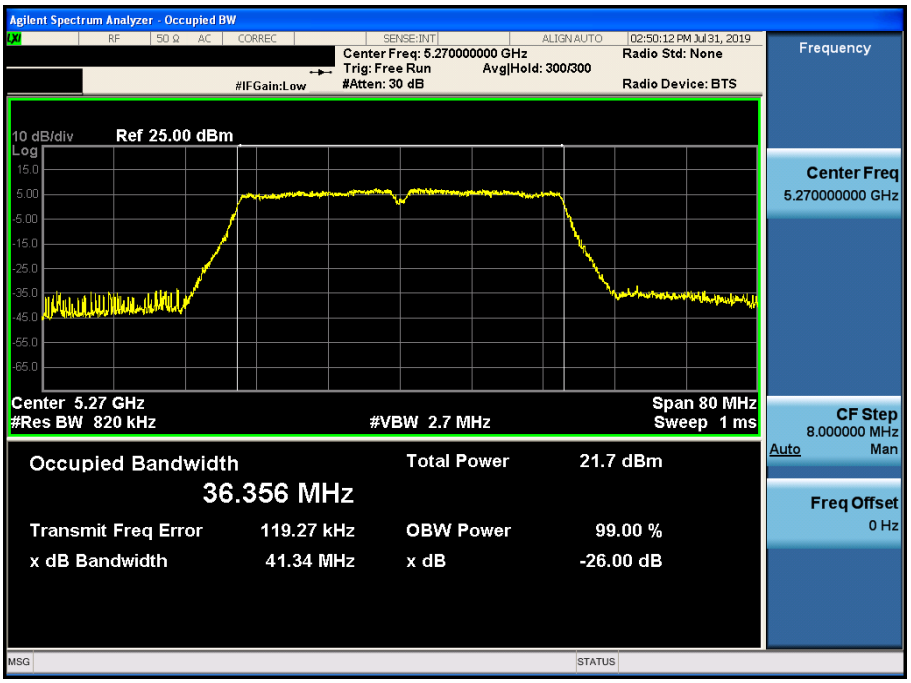


Occupied Bandwidth 99% Test Mode: 802.11ac VHT40 & ANT 1 & Ch.54



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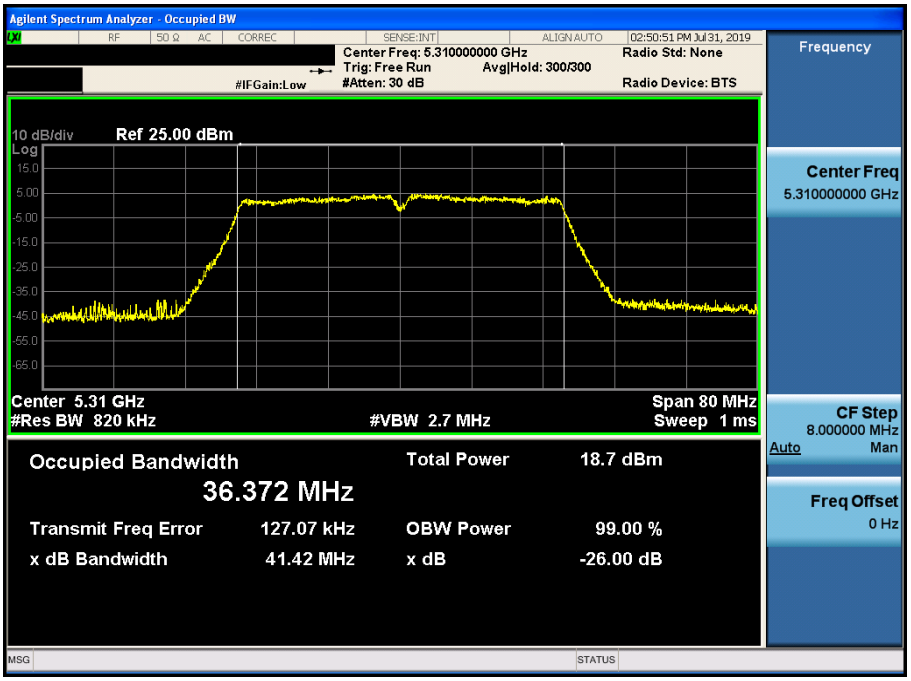
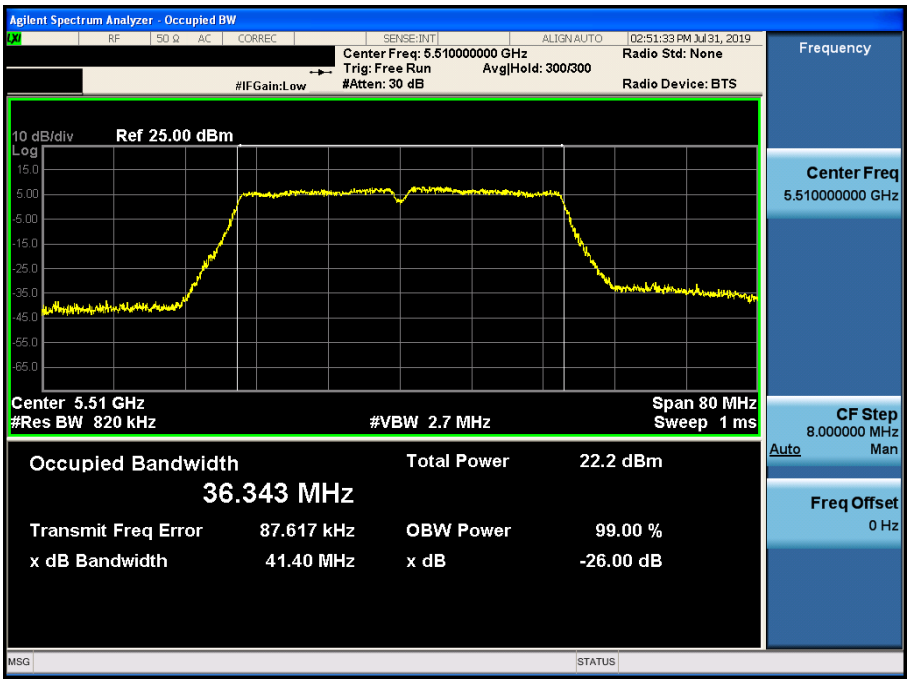
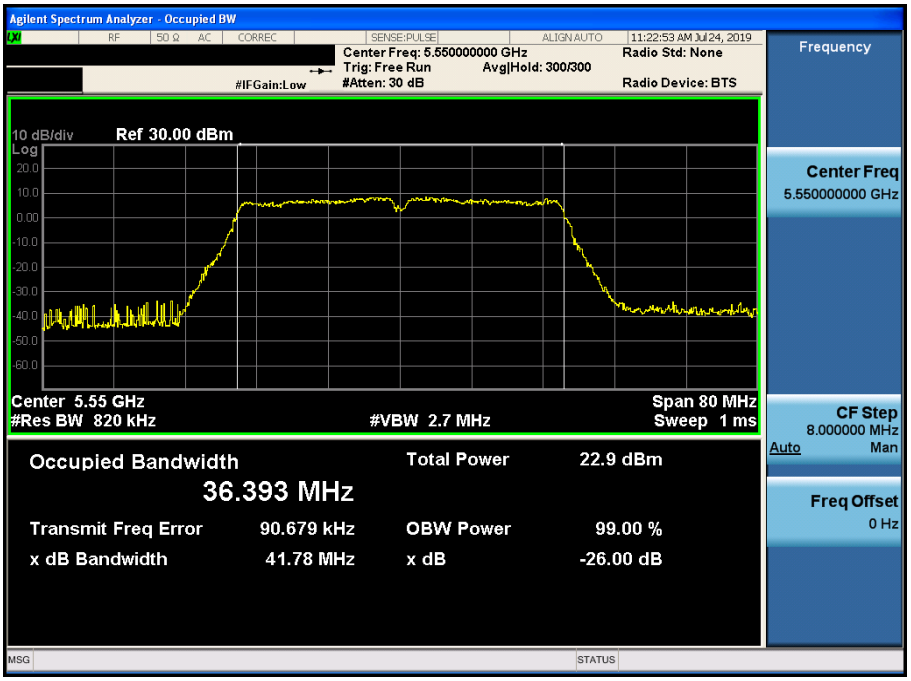


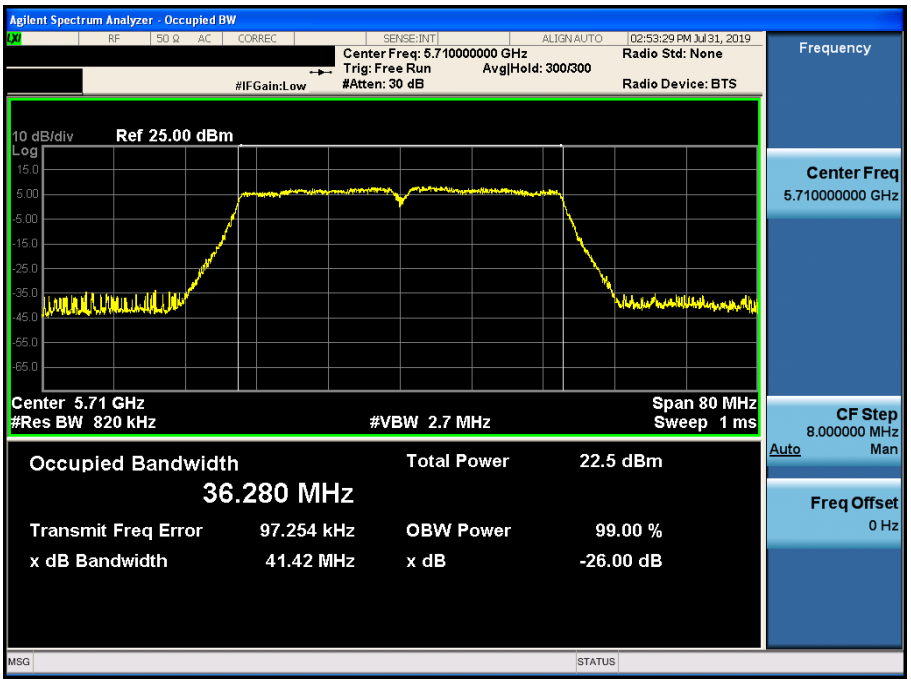
Occupied Bandwidth 99% Test Mode: 802.11ac VHT40 & ANT 1 & Ch.102



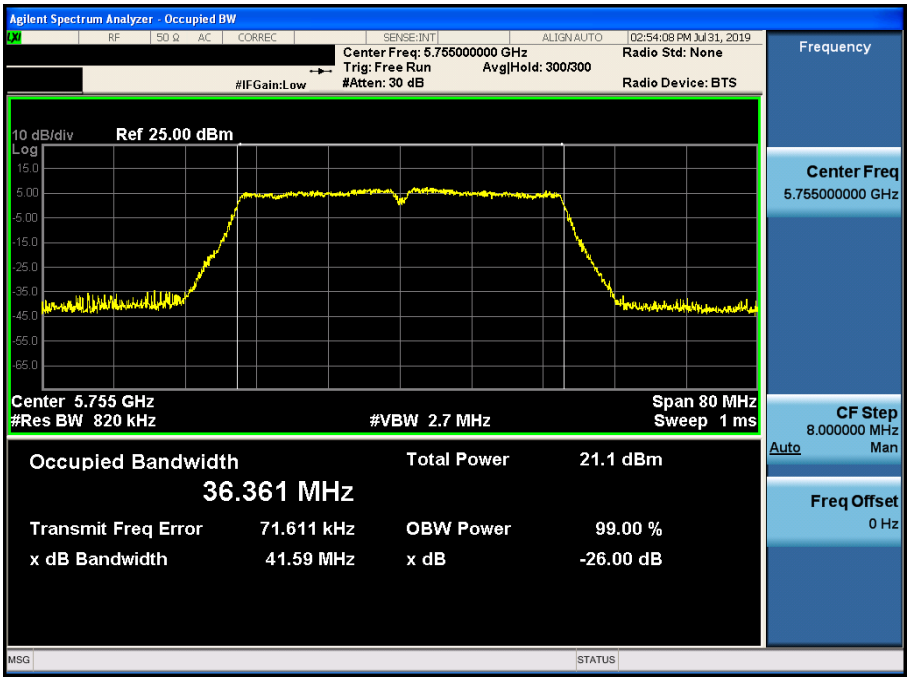
Occupied Bandwidth 99% Test Mode: 802.11ac VHT40 & ANT 1 & Ch.110



Occupied Bandwidth 99% Test Mode: 802.11ac VHT40 & ANT 1 & Ch.142



Occupied Bandwidth 99% Test Mode: 802.11ac VHT40 & ANT 1 & Ch.151



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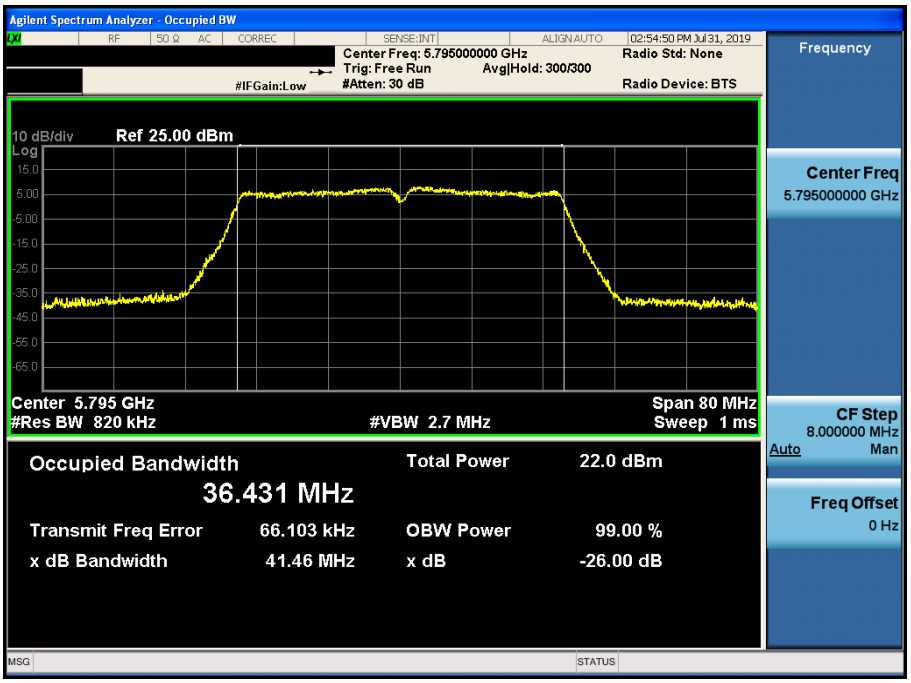

Occupied Bandwidth 99% Test Mode: 802.11ac VHT80 & ANT 1 & Ch.42

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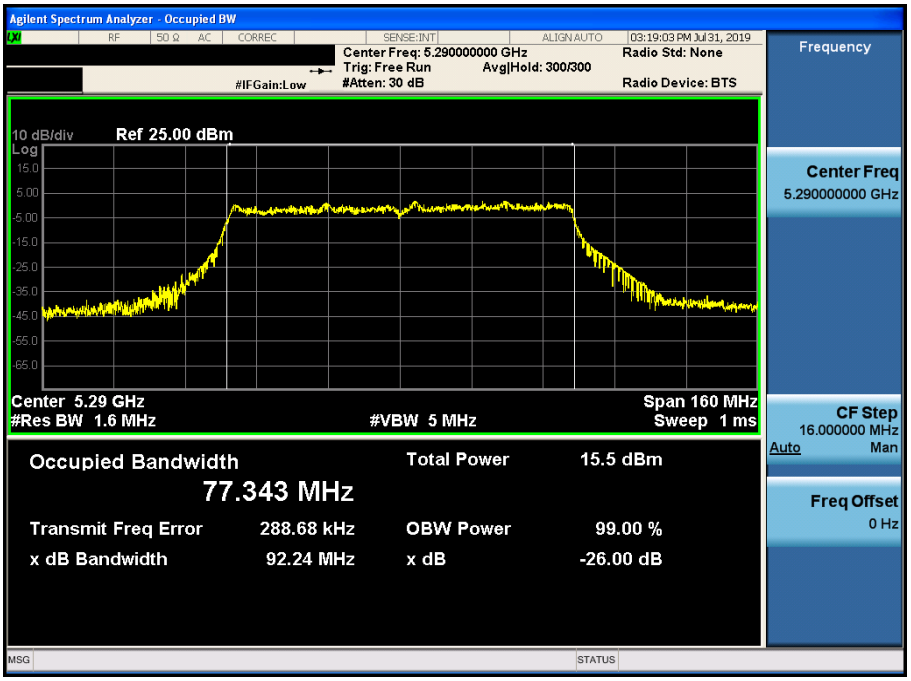

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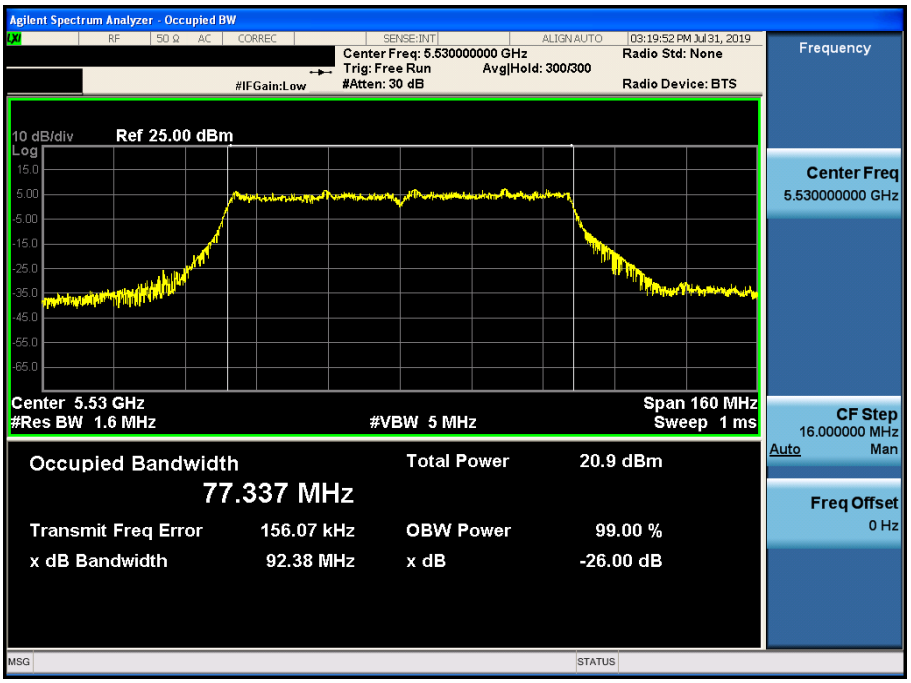
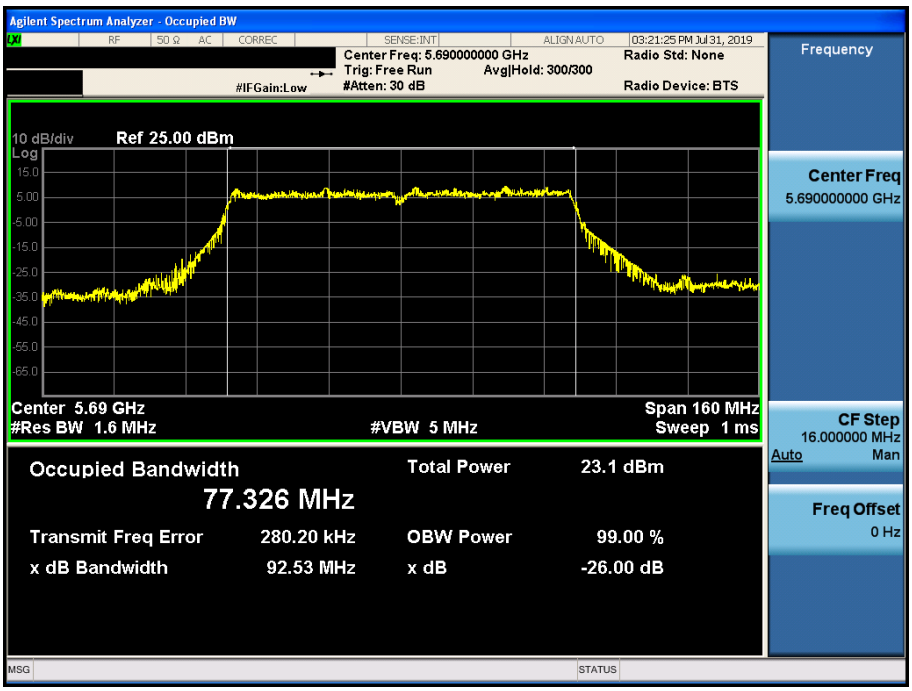
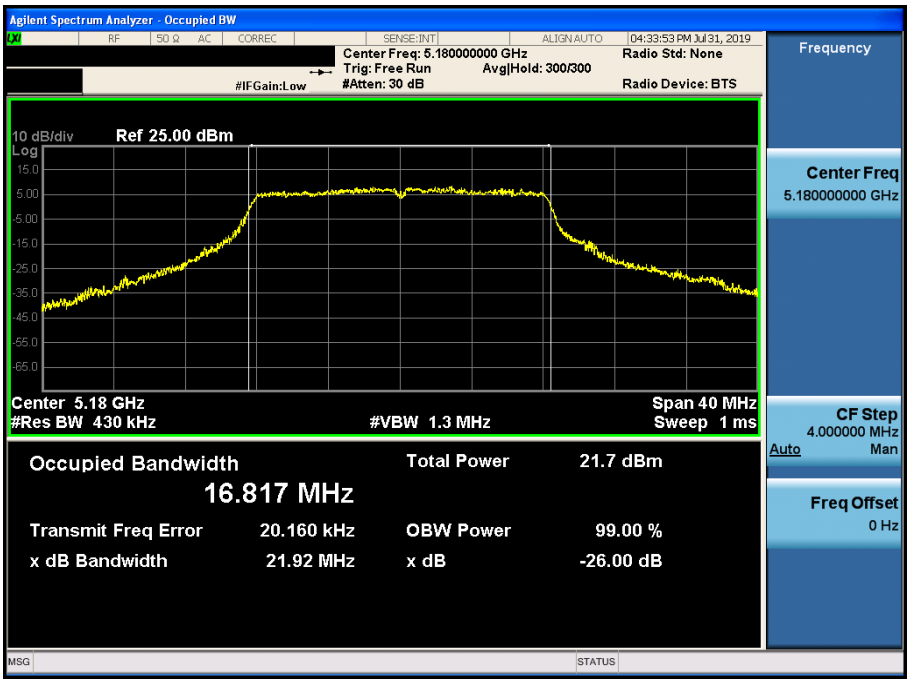


Occupied Bandwidth 99% Test Mode: 802.11ac VHT80 & ANT 1 & Ch.138



Occupied Bandwidth 99% Test Mode: 802.11ac VHT80 & ANT 1 & Ch.155

Occupied Bandwidth 99% Test Mode: 802.11a & ANT 2 & Ch.36



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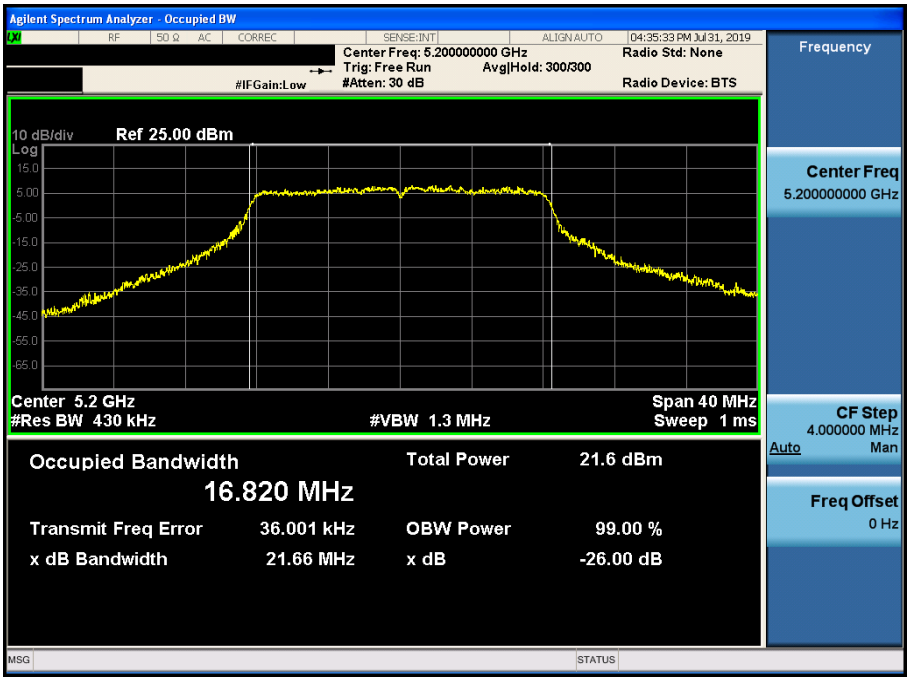
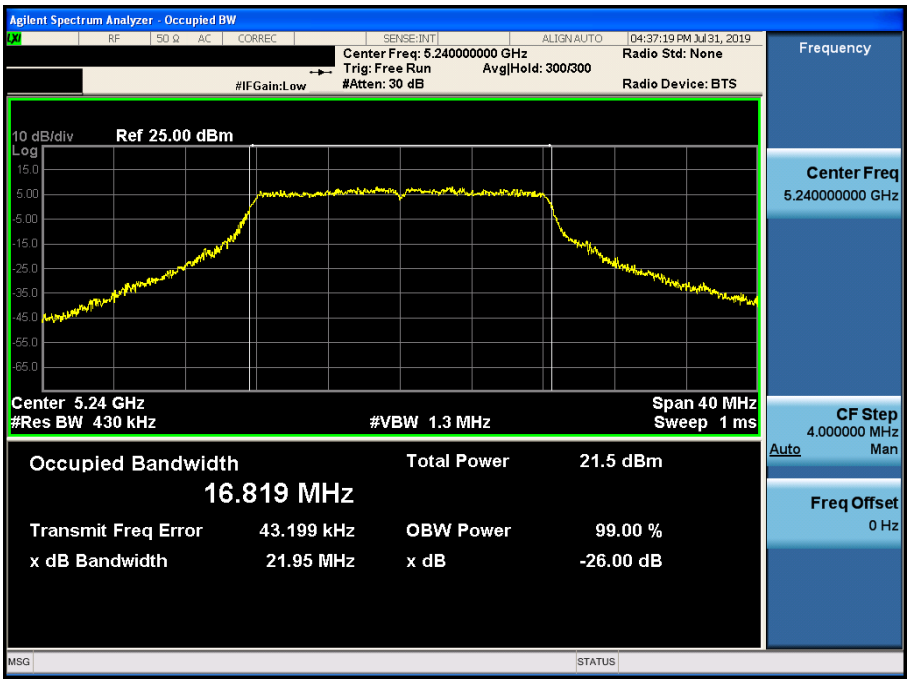
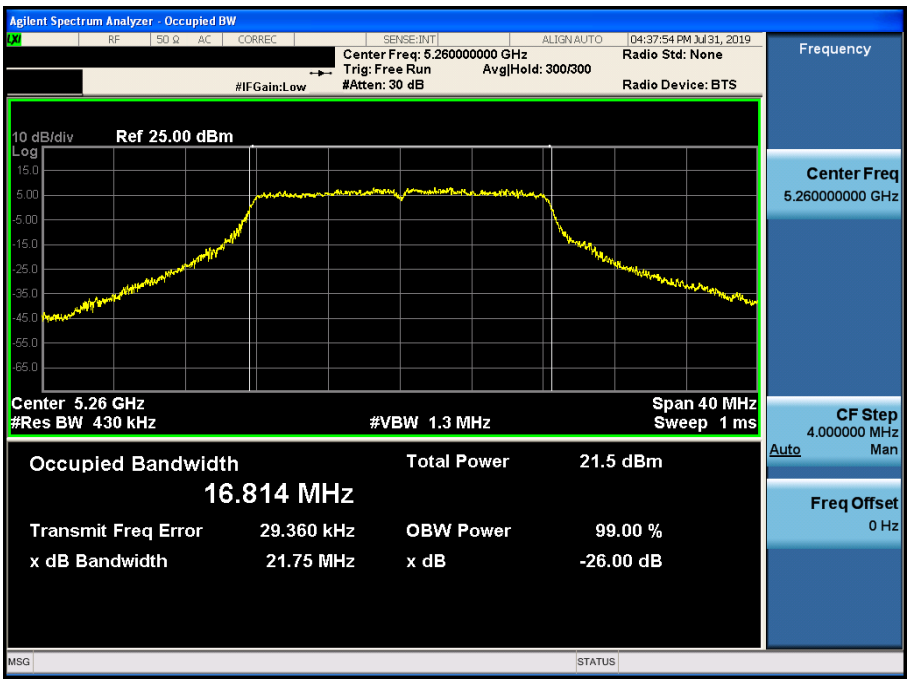


Occupied Bandwidth 99% Test Mode: 802.11a & ANT 2 & Ch.48



Occupied Bandwidth 99% Test Mode: 802.11a & ANT 2 & Ch.52



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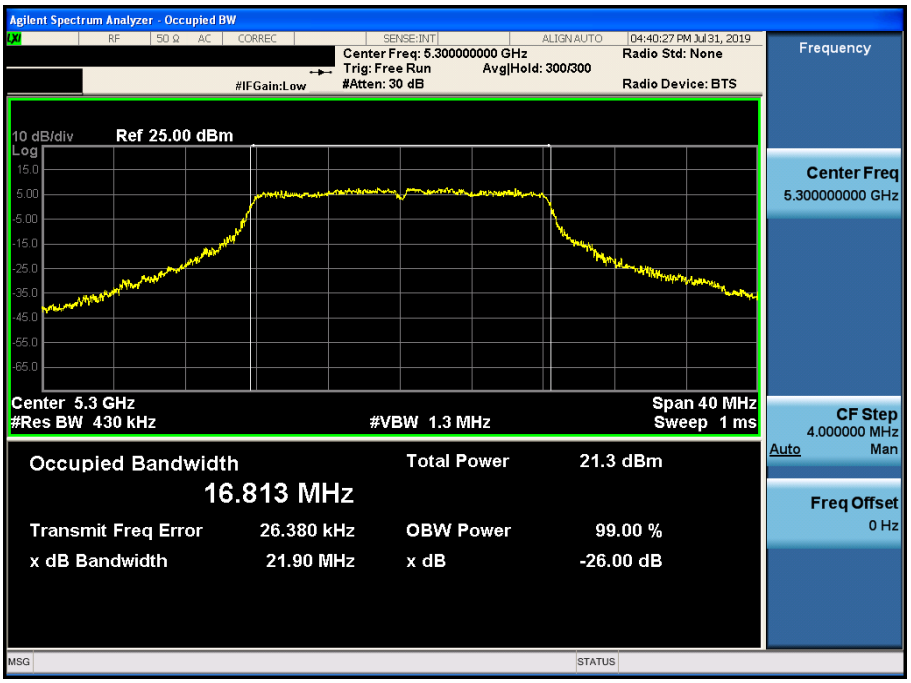
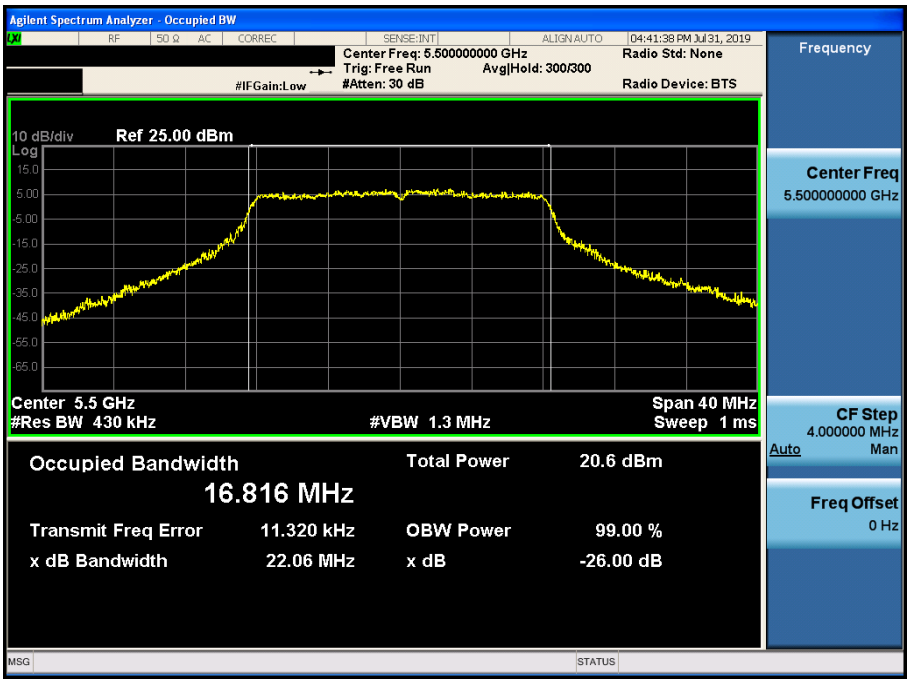


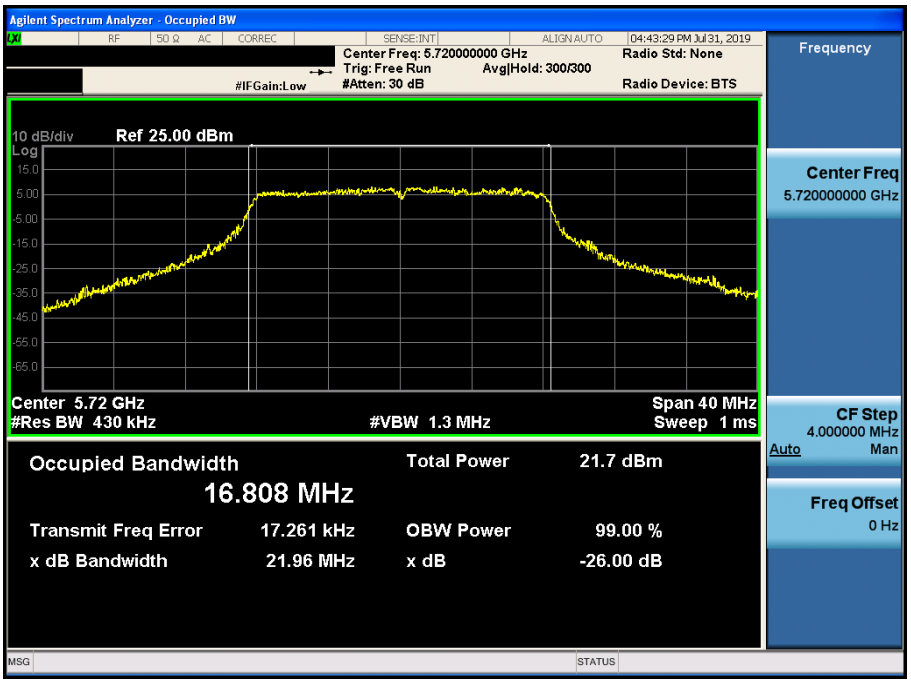
Occupied Bandwidth 99% Test Mode: 802.11a & ANT 2 & Ch.64

Occupied Bandwidth 99% Test Mode: 802.11a & ANT 2 & Ch.100

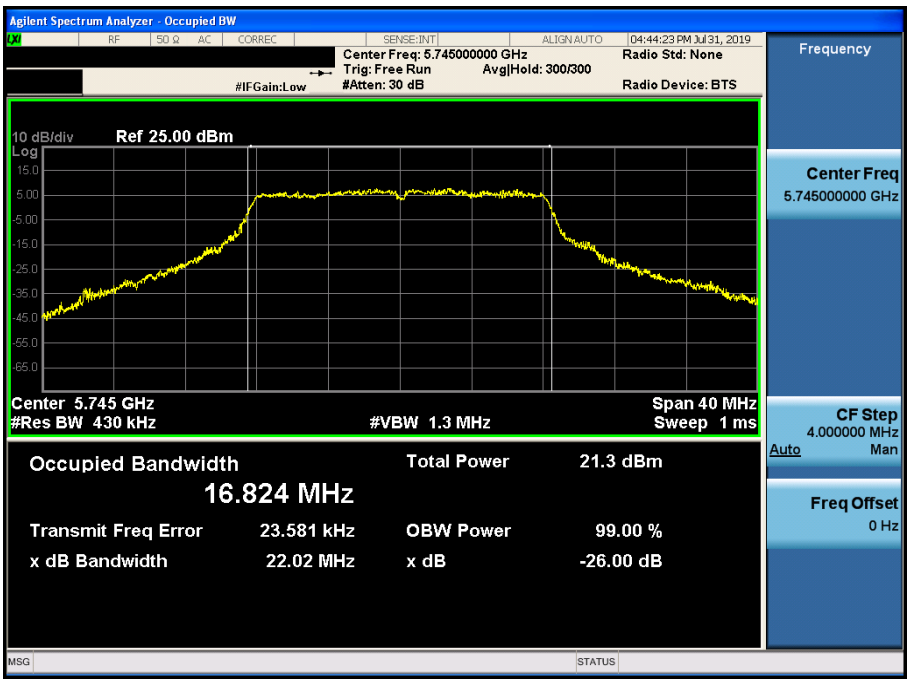


Occupied Bandwidth 99% Test Mode: 802.11a & ANT 2 & Ch.116

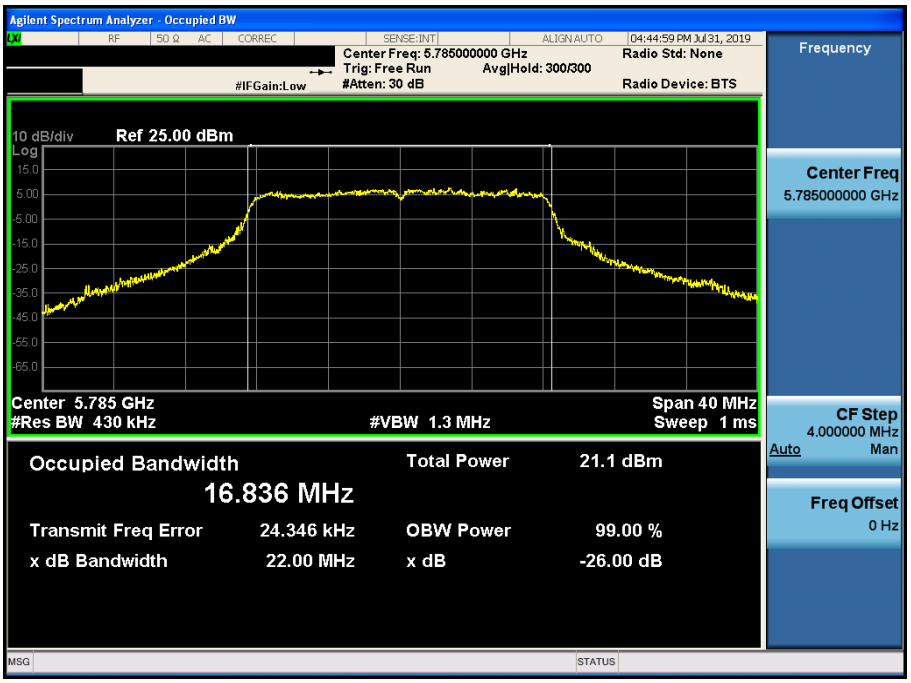
Occupied Bandwidth 99% Test Mode: 802.11a & ANT 2 & Ch.144



Occupied Bandwidth 99% Test Mode: 802.11a & ANT 2 & Ch.149



Occupied Bandwidth 99% Test Mode: 802.11a & ANT 2 & Ch.157



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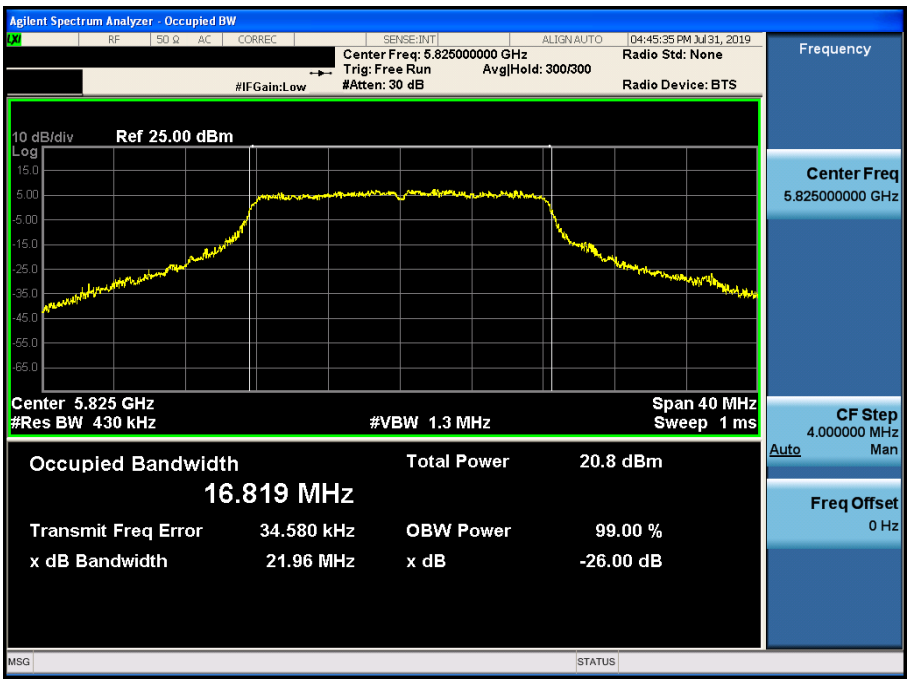
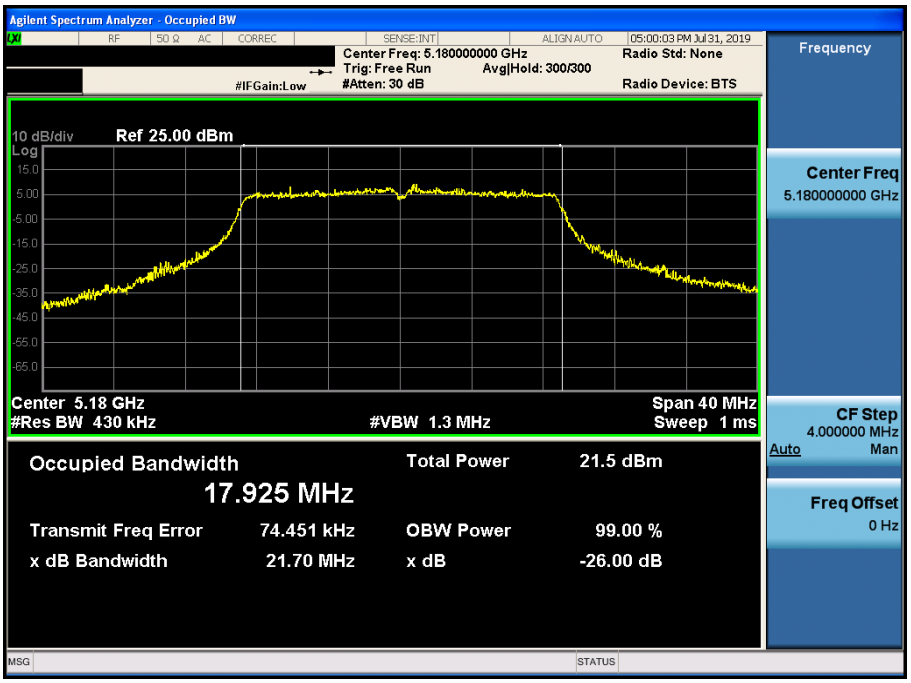


Occupied Bandwidth 99% Test Mode: 802.11ac VHT20 & ANT 2 & Ch.36



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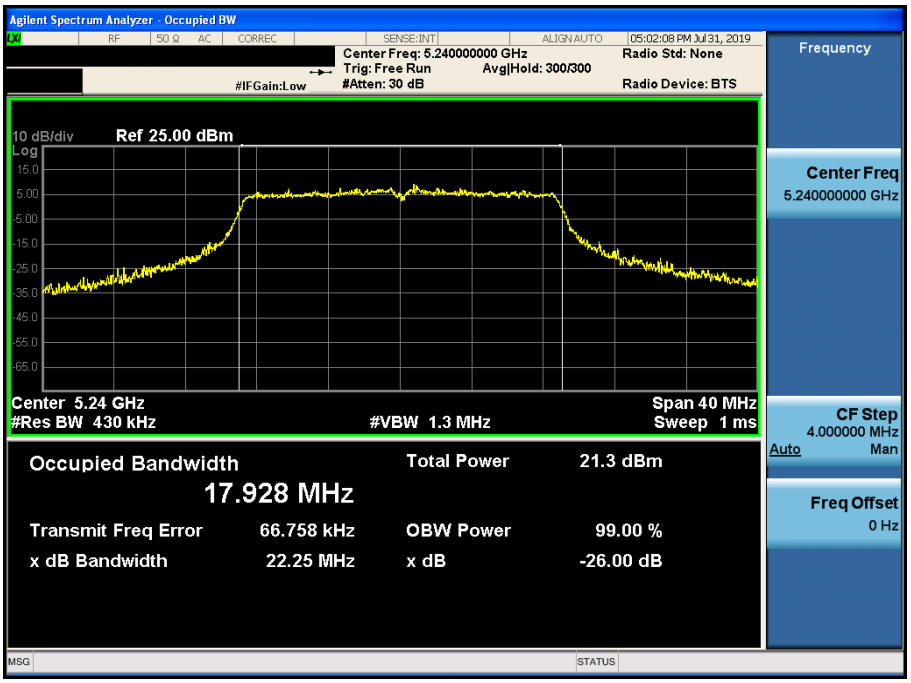

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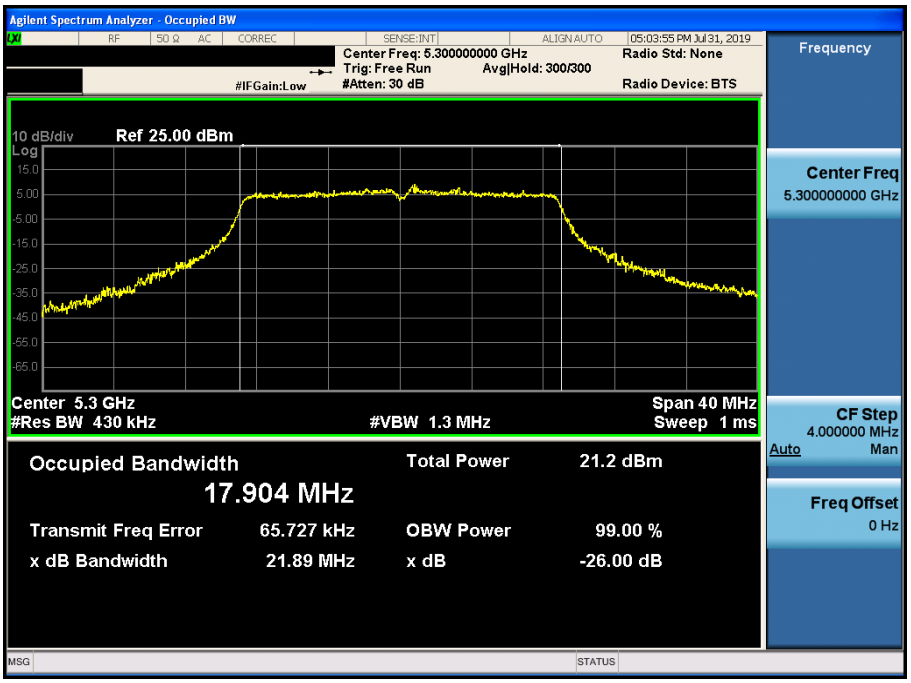
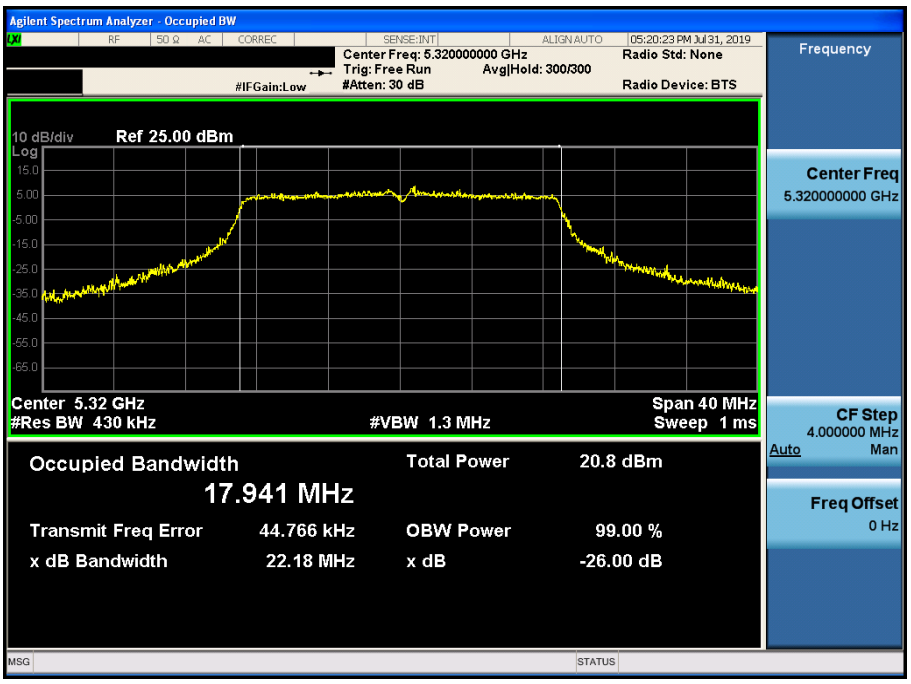
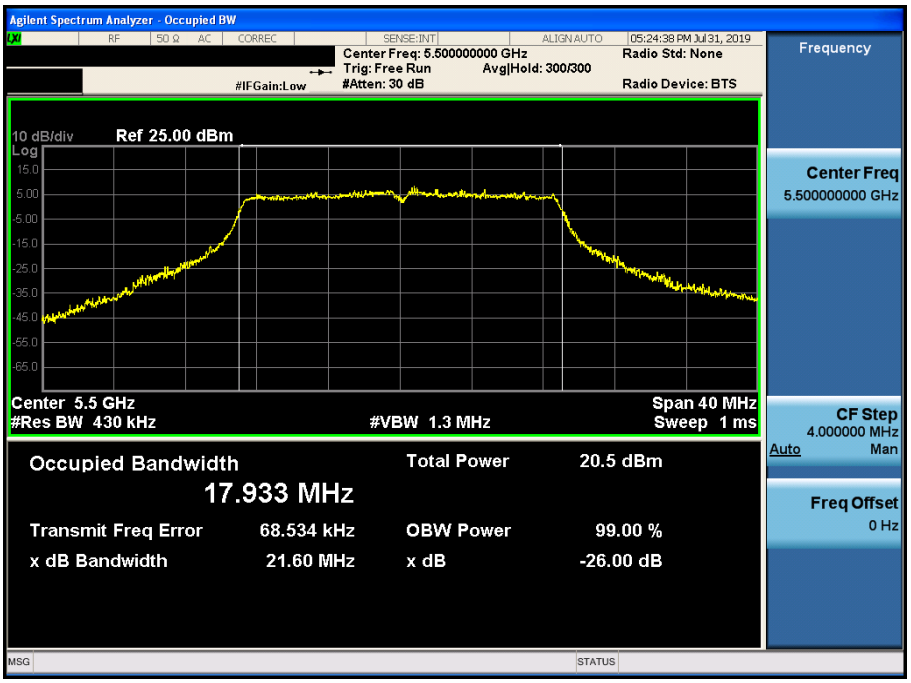
Occupied Bandwidth 99% Test Mode: 802.11ac VHT20 & ANT 2 & Ch.60



Occupied Bandwidth 99% Test Mode: 802.11ac VHT20 & ANT 2 & Ch.64

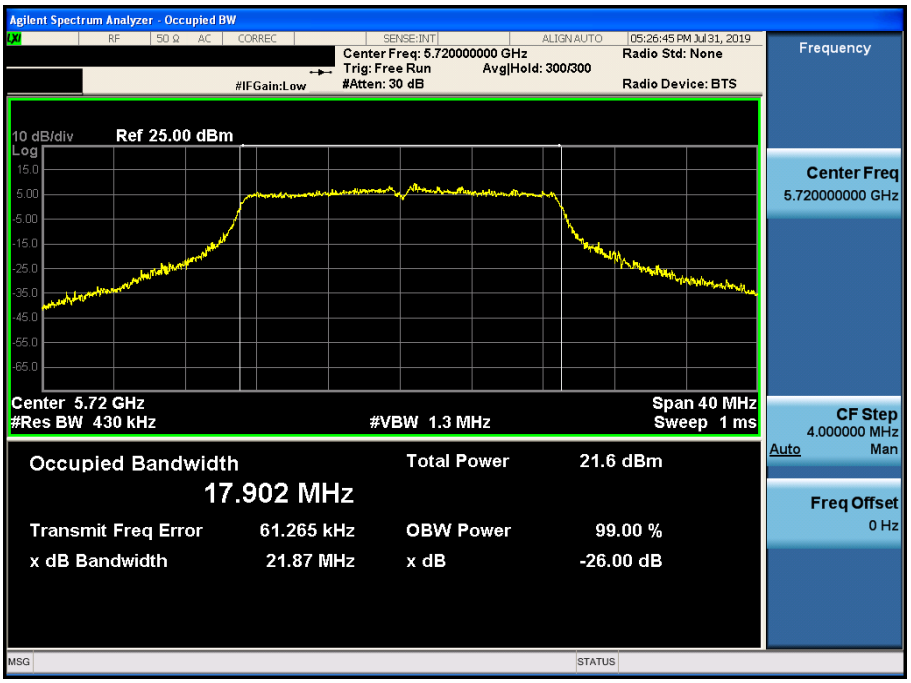


Occupied Bandwidth 99% Test Mode: 802.11ac VHT20 & ANT 2 & Ch.100

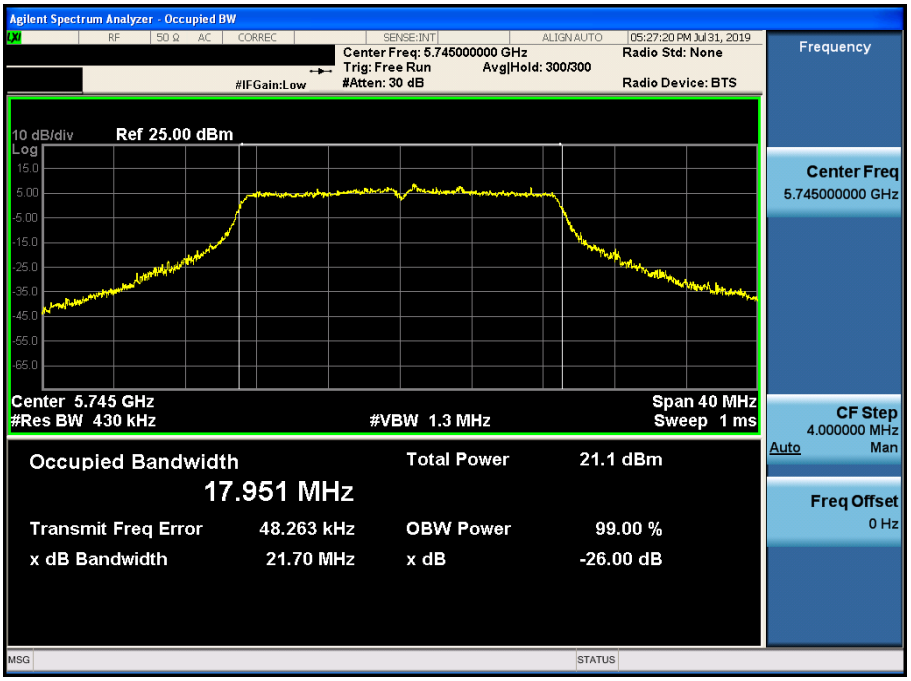


Occupied Bandwidth 99% Test Mode: 802.11ac VHT20 & ANT 2 & Ch.116

Occupied Bandwidth 99% Test Mode: 802.11ac VHT20 & ANT 2 & Ch.144



Occupied Bandwidth 99% Test Mode: 802.11ac VHT20 & ANT 2 & Ch.149



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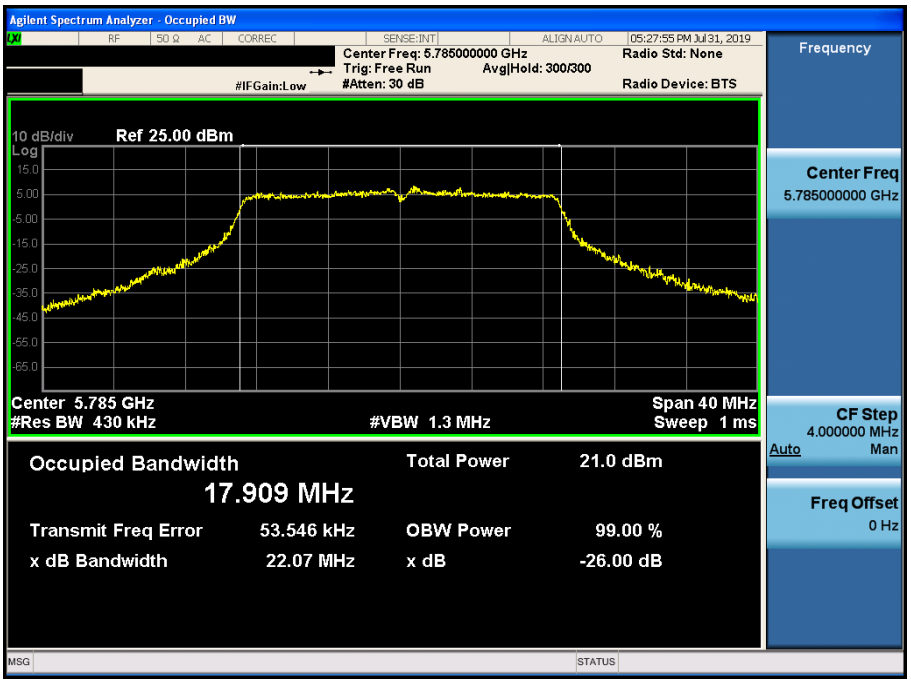

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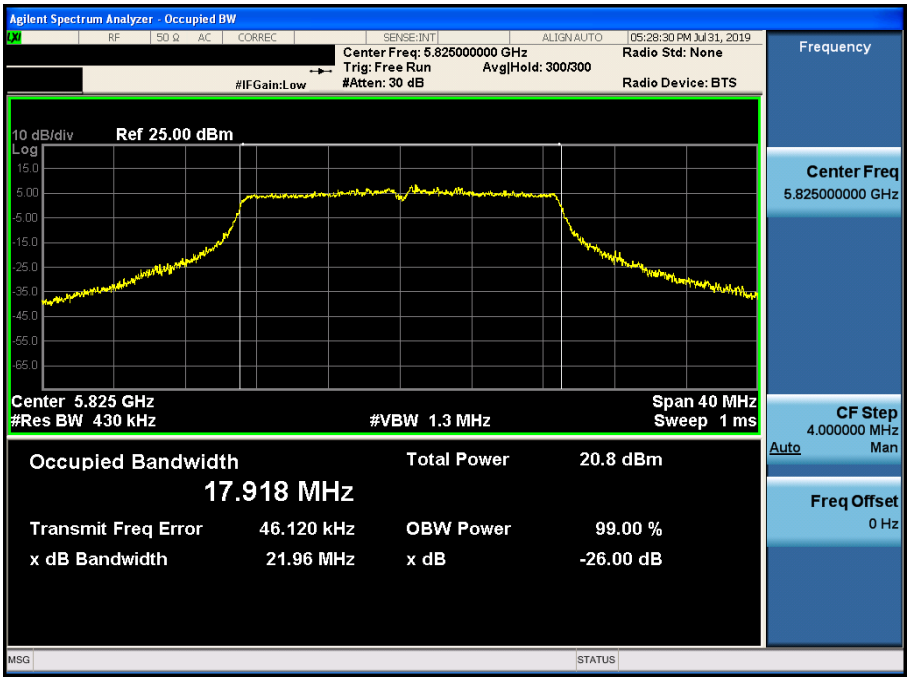

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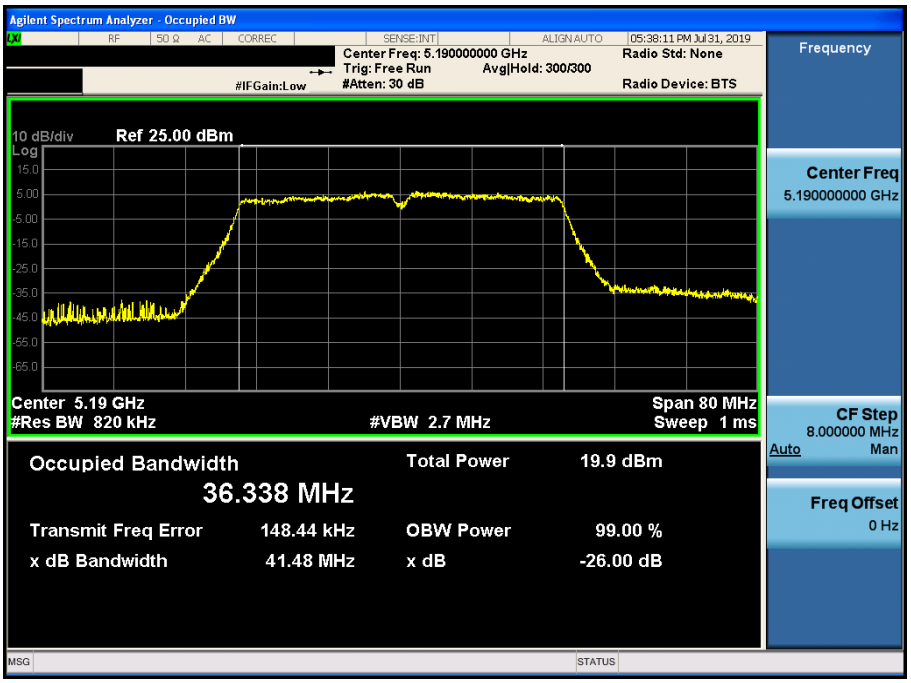

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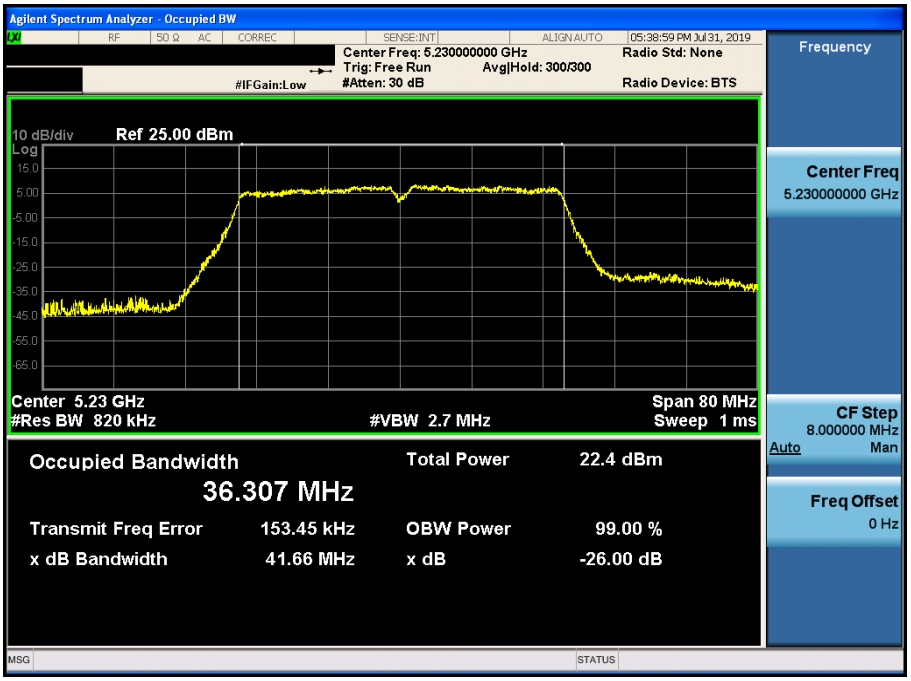

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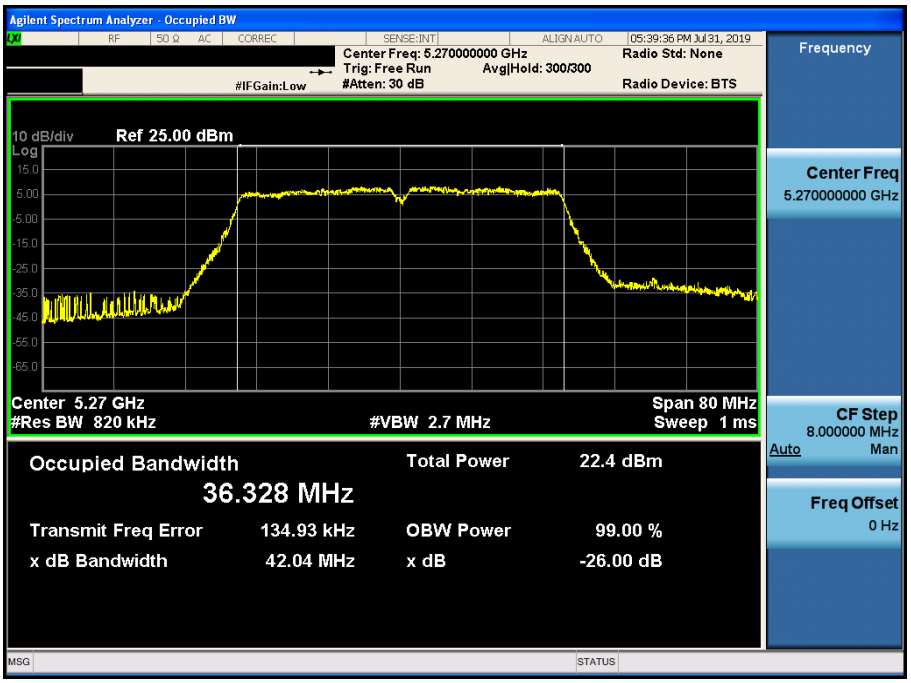

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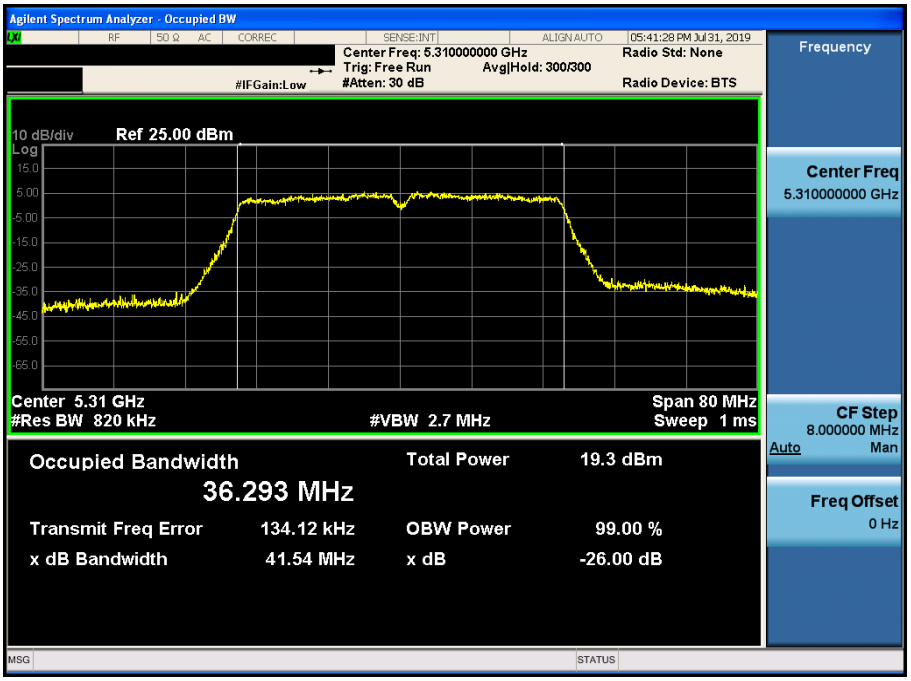

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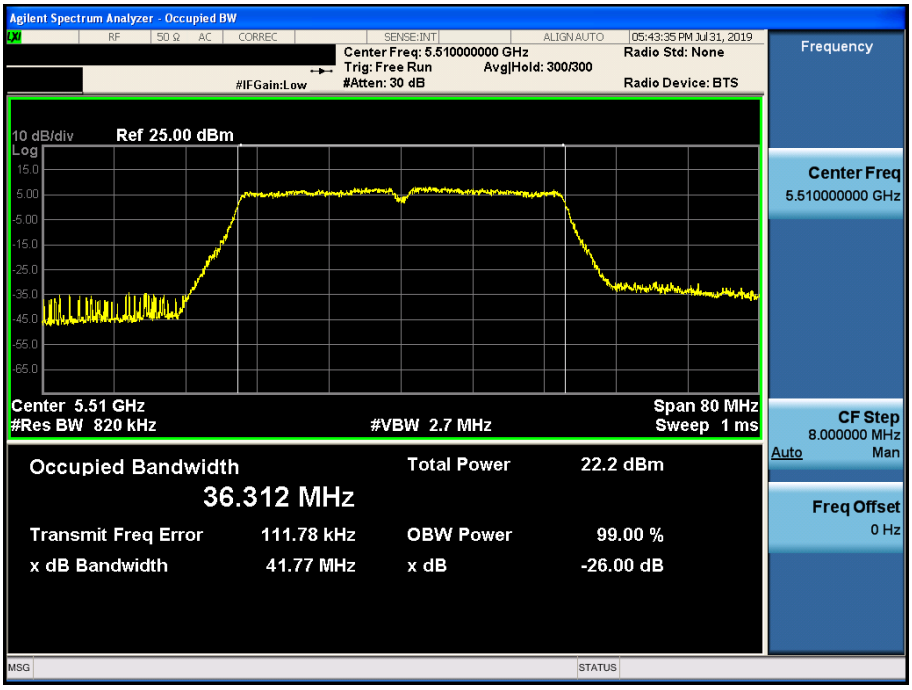
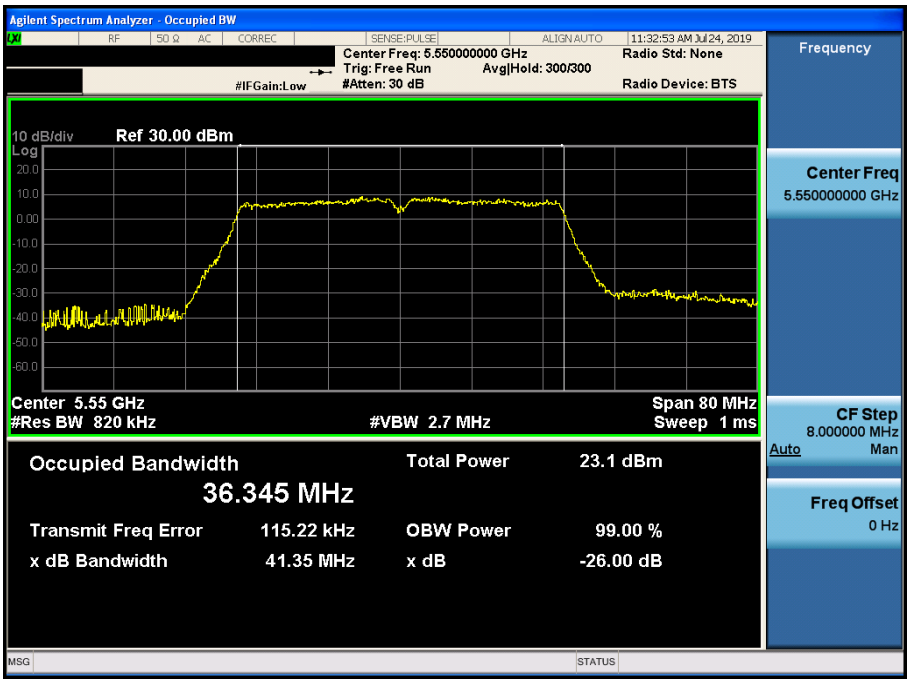


Occupied Bandwidth 99% Test Mode: 802.11ac VHT40 & ANT 2 & Ch.110



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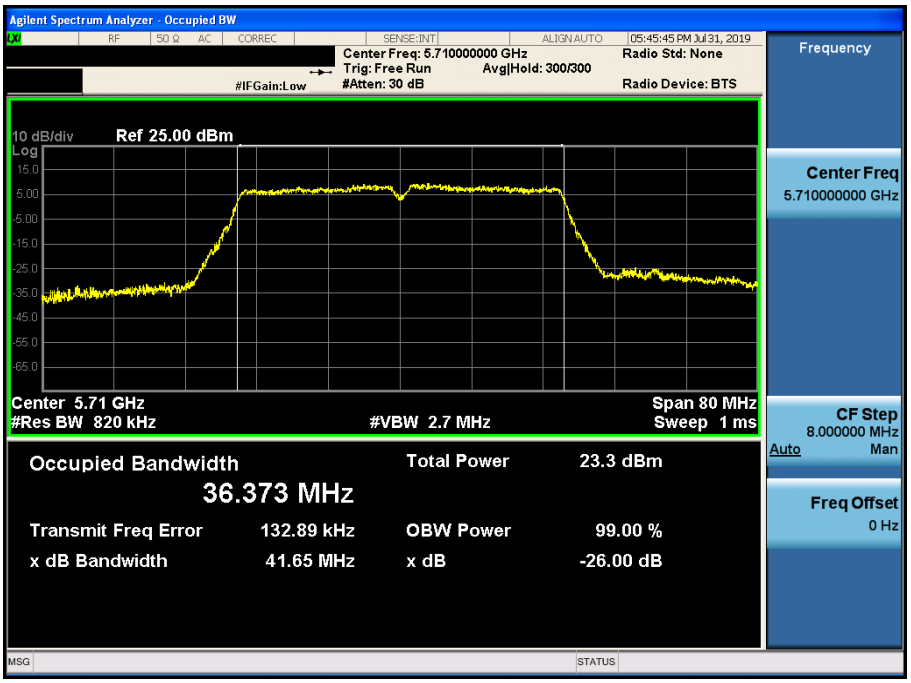

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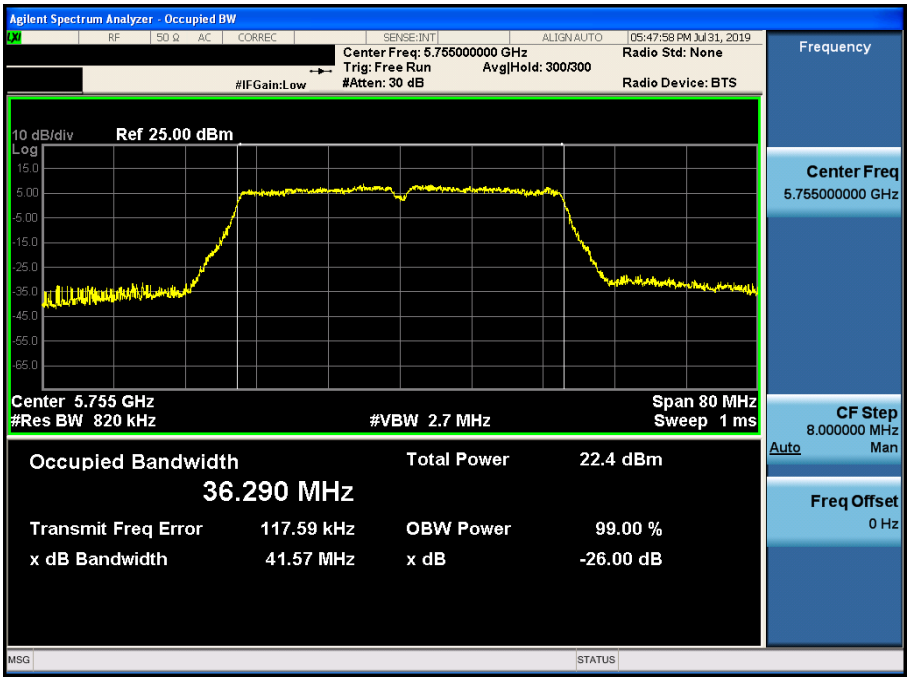

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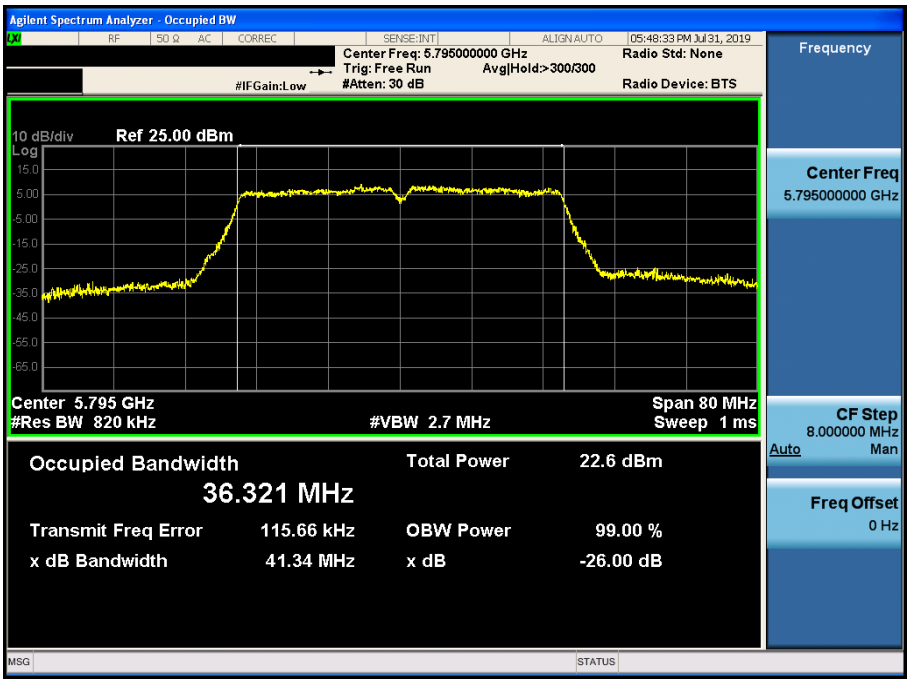

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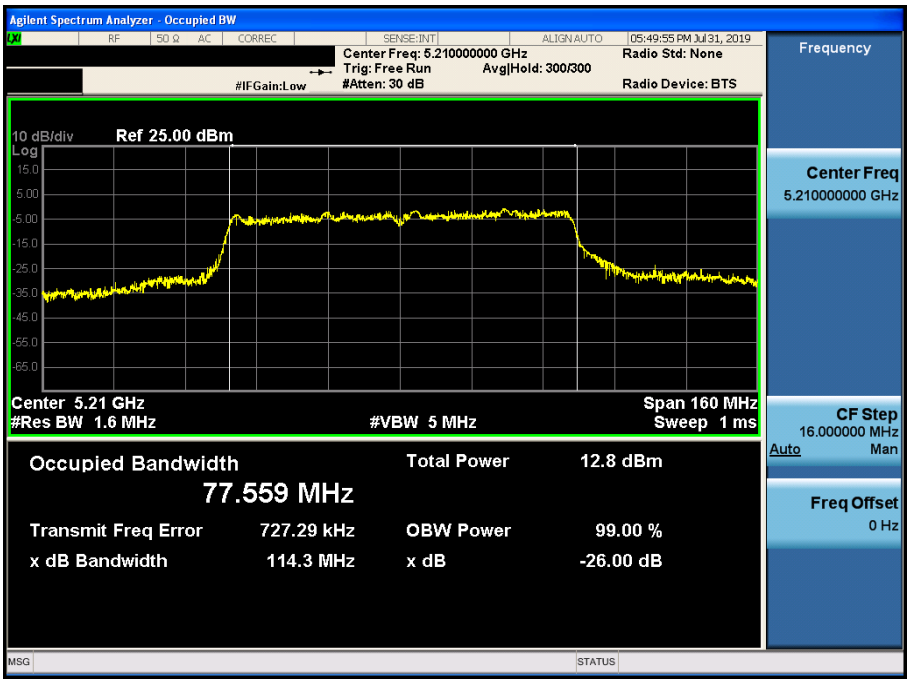

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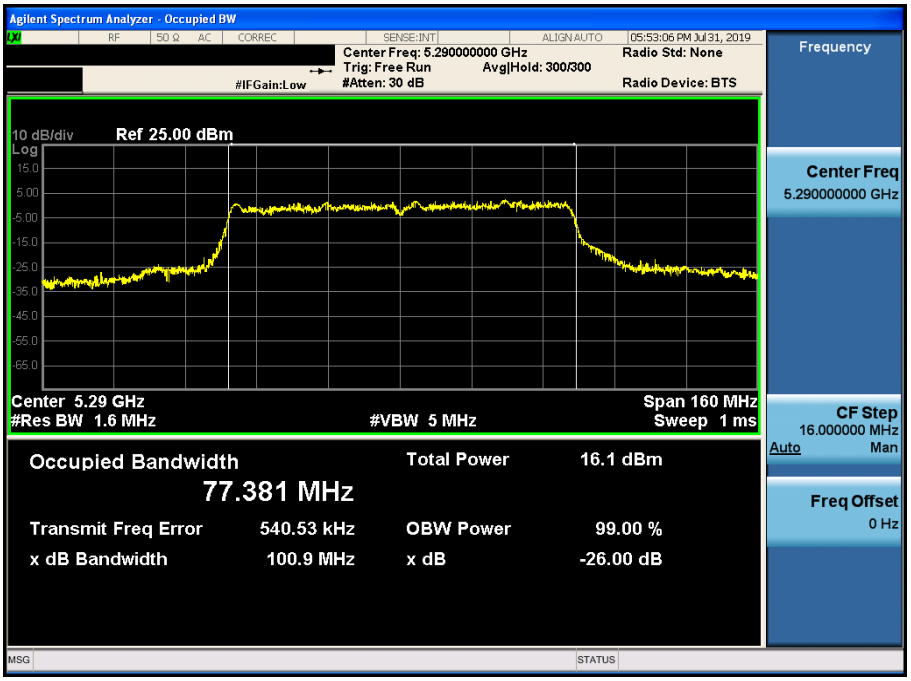

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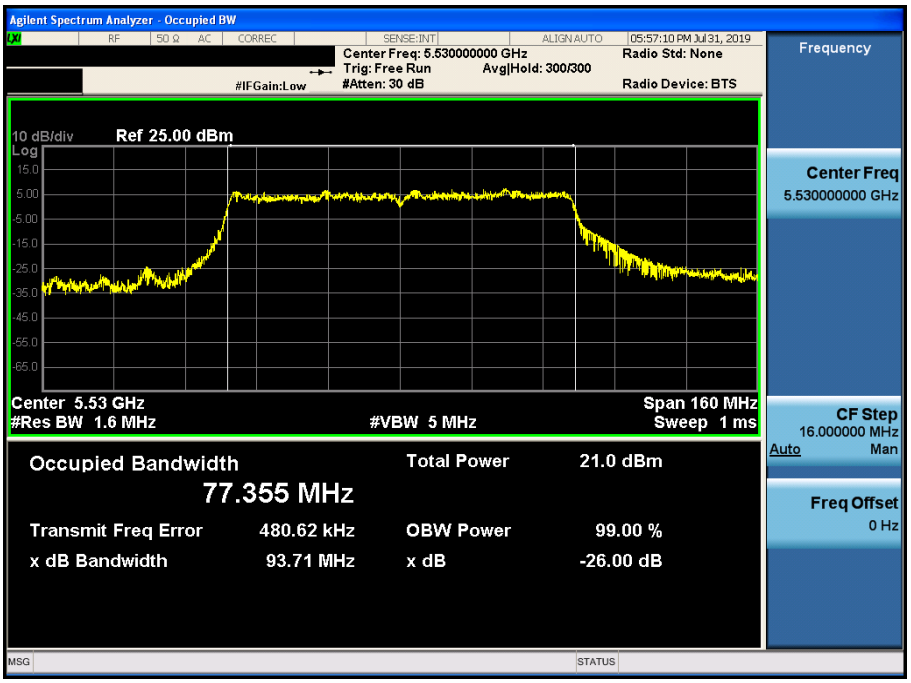
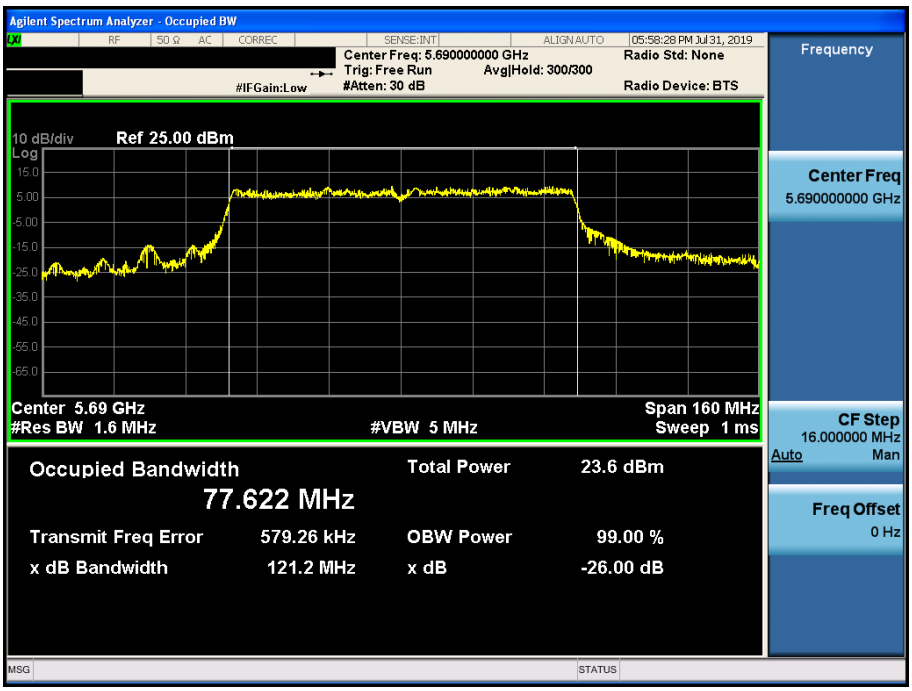
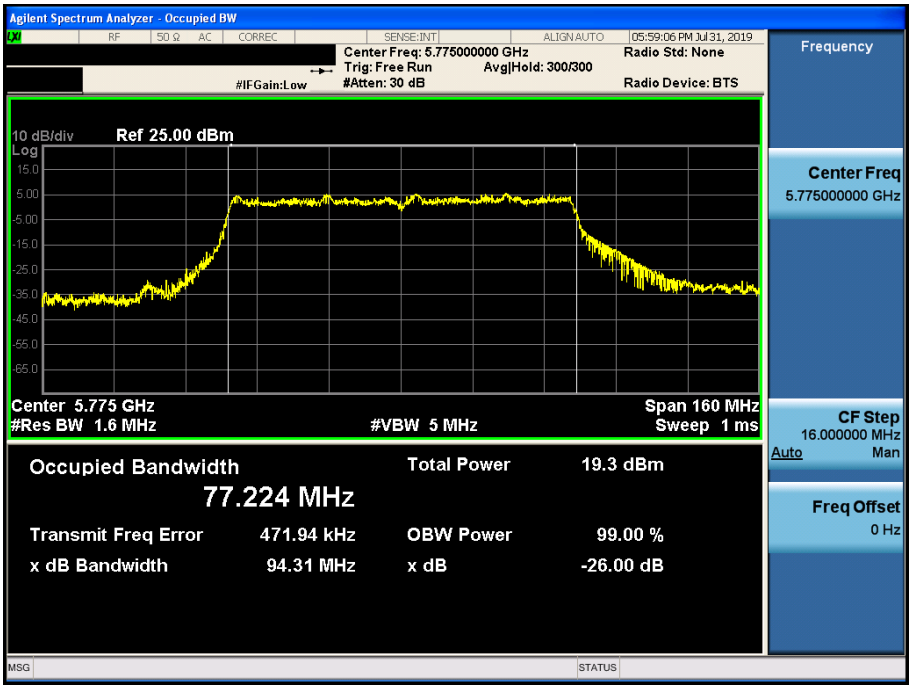


Occupied Bandwidth 99% Test Mode: 802.11ac VHT80 & ANT 2 & Ch.138



Occupied Bandwidth 99% Test Mode: 802.11ac VHT80 & ANT 2 & Ch.155