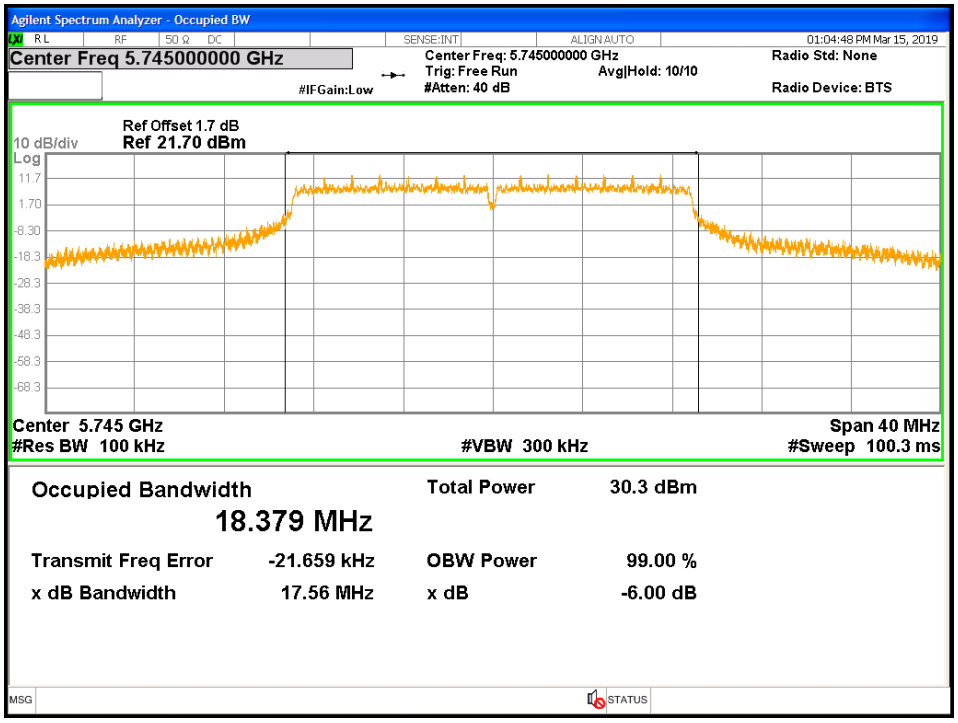


Figure 101: FCC 6dB and 99% OBW 5745MHz HT20-1x4-q96-Ch0

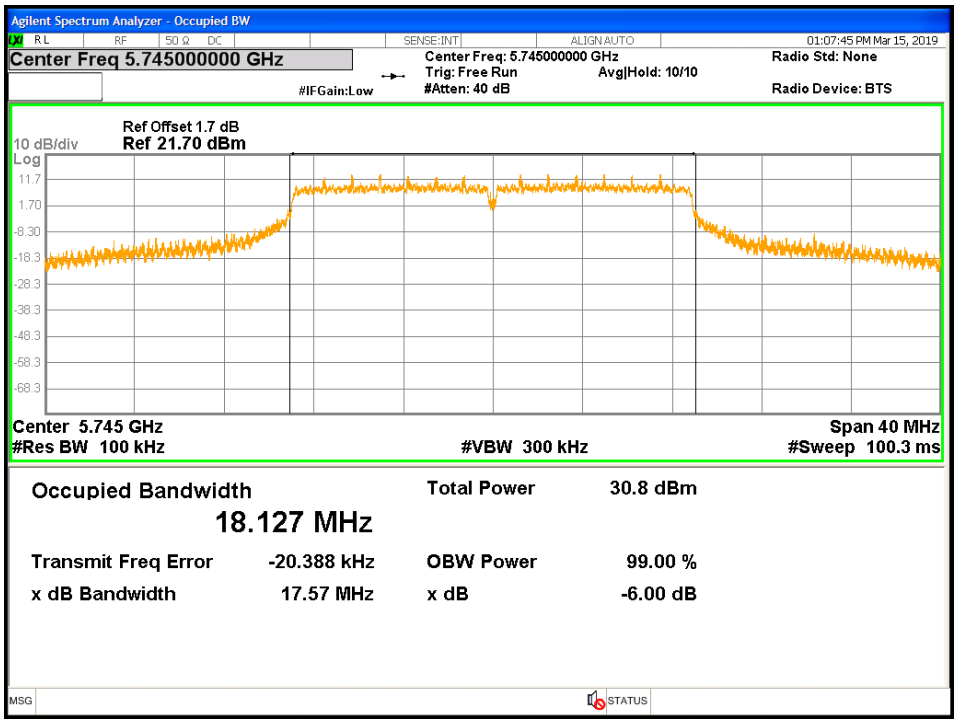


Figure 102: FCC 6dB and 99% OBW 5745MHz HT20-1x4-q96-Ch1

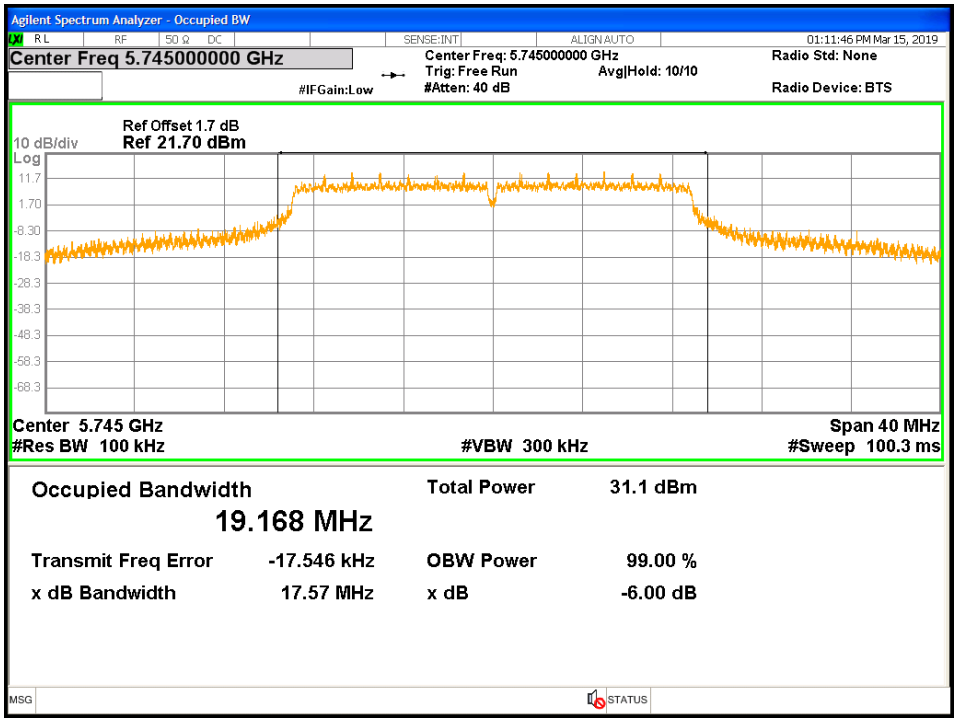


Figure 103: FCC 6dB and 99% OBW 5745MHz HT20-1x4-q96-Ch2

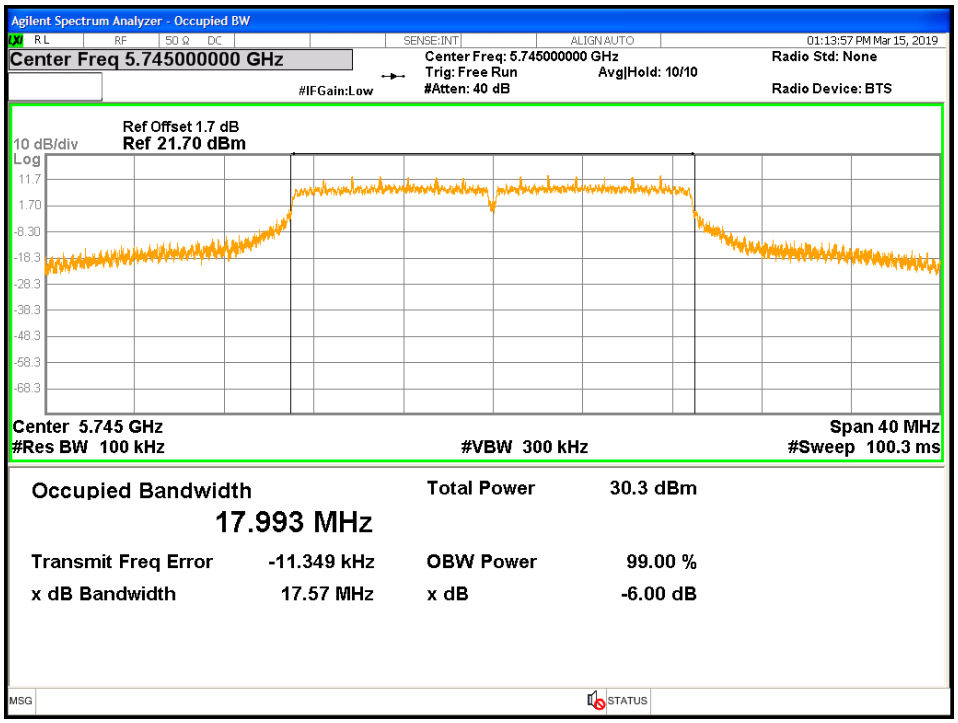


Figure 104: FCC 6dB and 99% OBW 5745MHz HT20-1x4-q96-Ch3

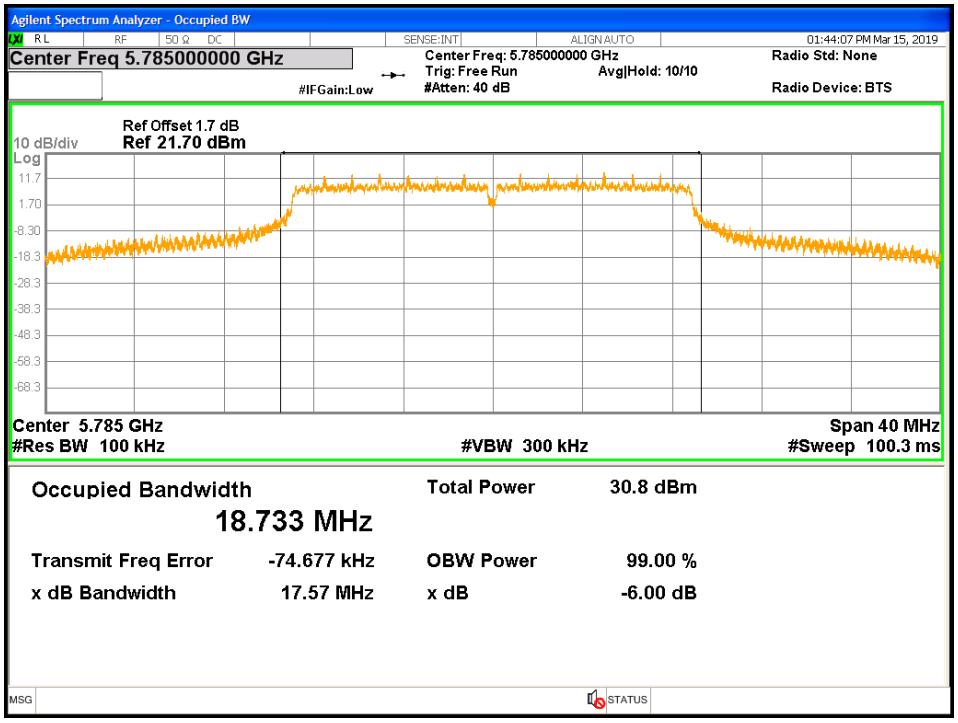


Figure 105: FCC 6dB and 99% OBW 5785MHz HT20-1x4-q97-Ch0

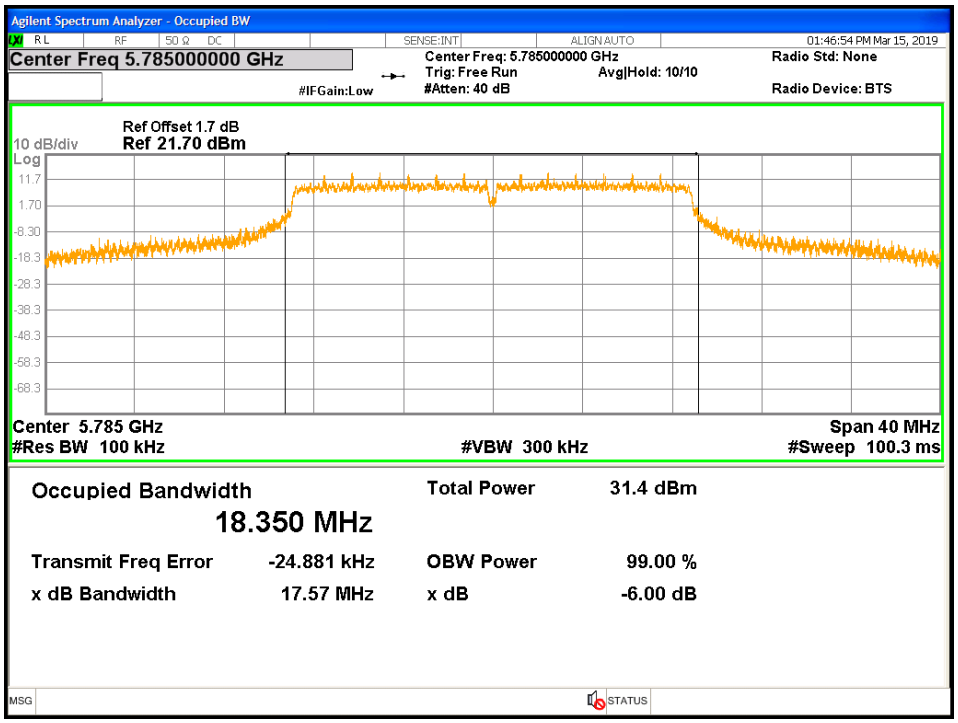


Figure 106: FCC 6dB and 99% OBW 5785MHz HT20-1x4-q97-Ch1

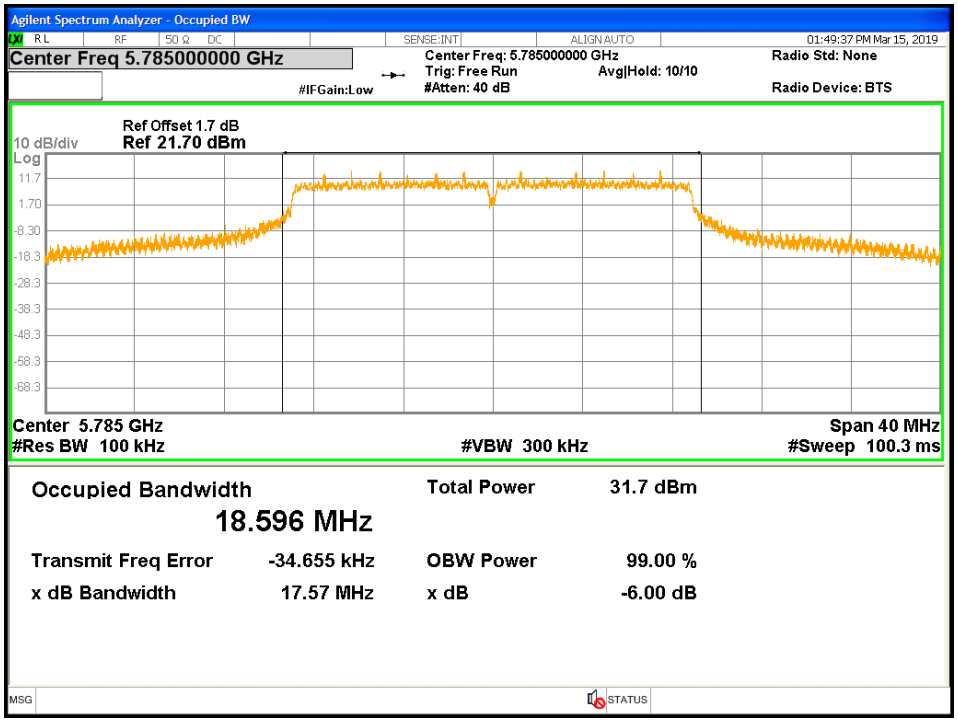


Figure 107: FCC 6dB and 99% OBW 5785MHz HT20-1x4-q97-Ch2

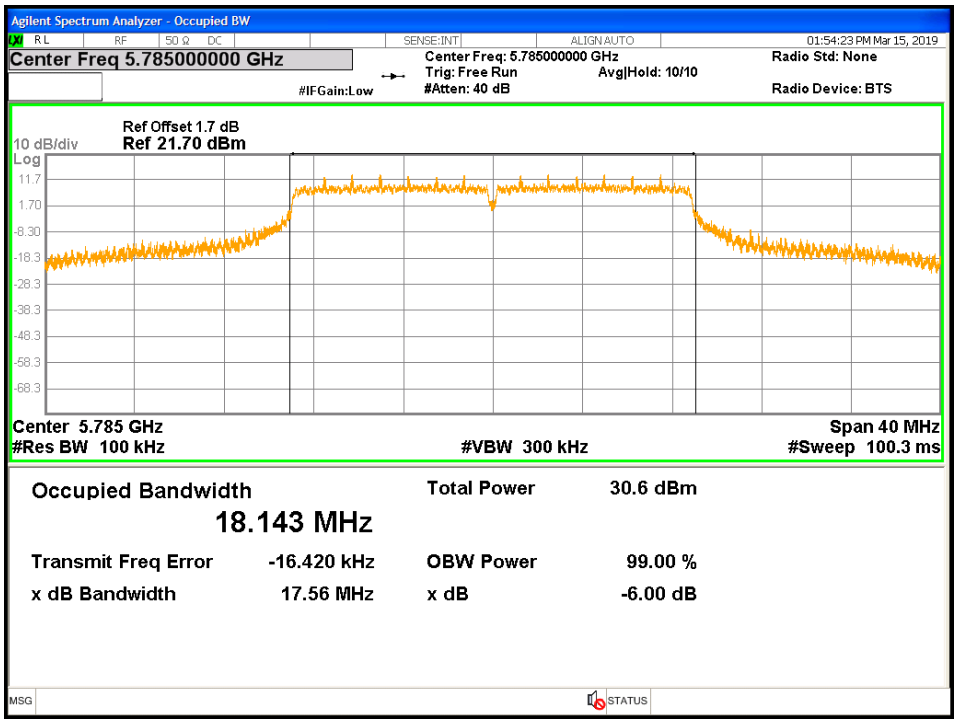


Figure 108: FCC 6dB and 99% OBW 5785MHz HT20-1x4-q97-Ch3

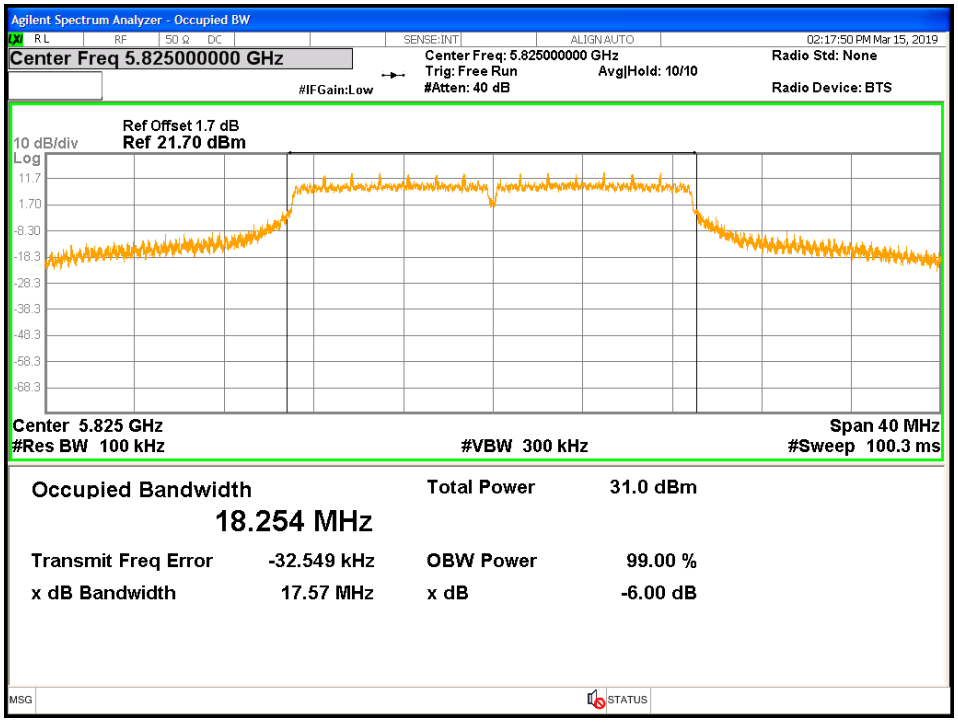


Figure 109: FCC 6dB and 99% OBW 5825MHz HT20-1x4-q96-Ch0

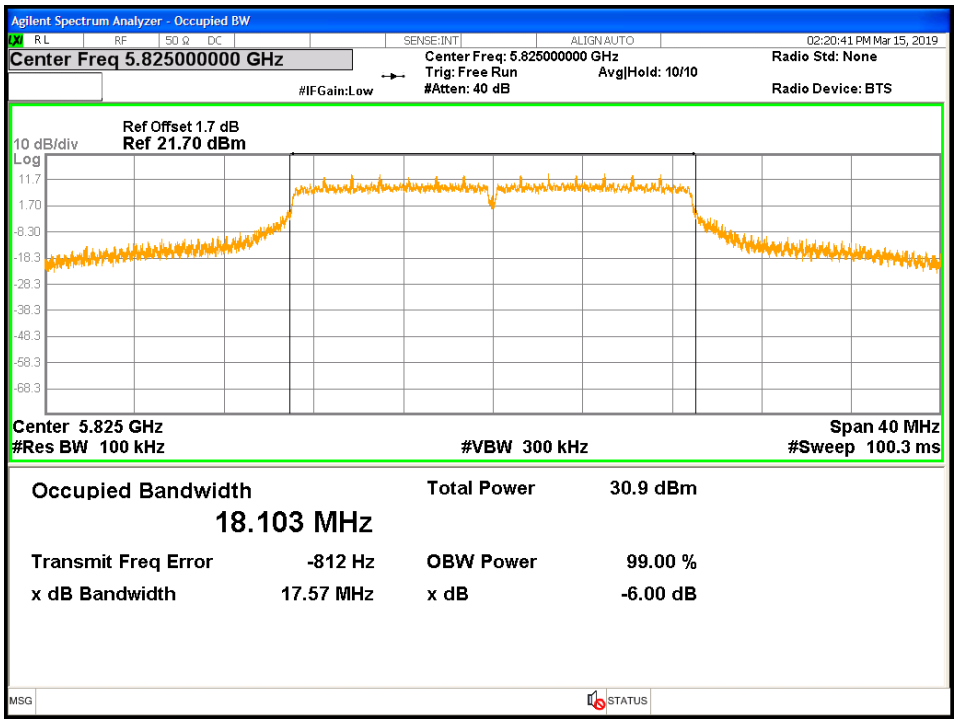


Figure 110: FCC 6dB and 99% OBW 5825MHz HT20-1x4-q96-Ch1

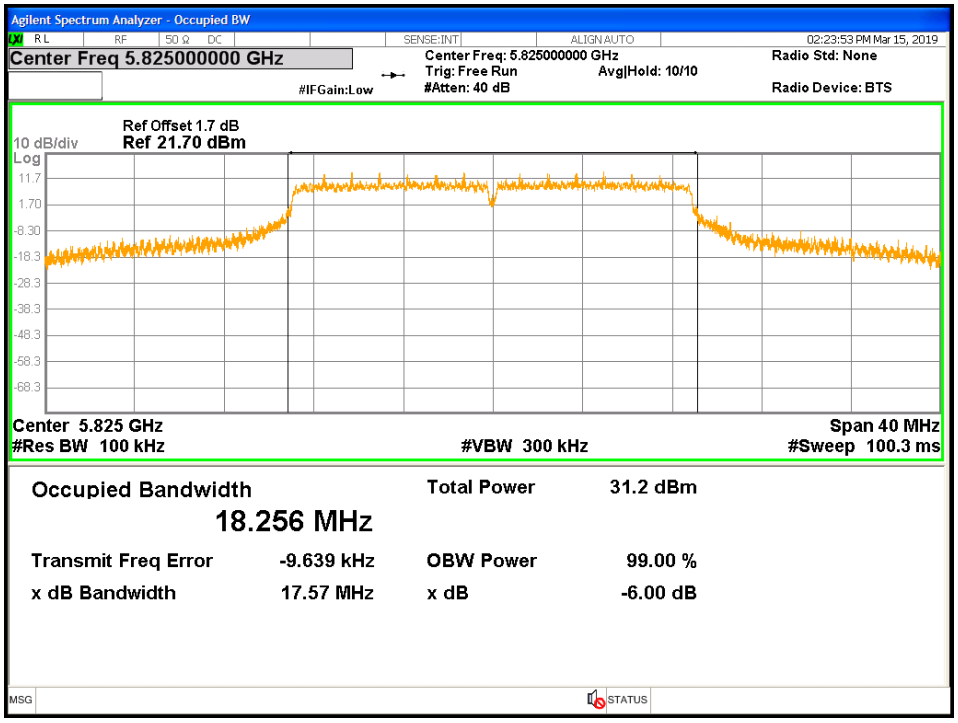


Figure 111: FCC 6dB and 99% OBW 5825MHz HT20-1x4-q96-Ch2

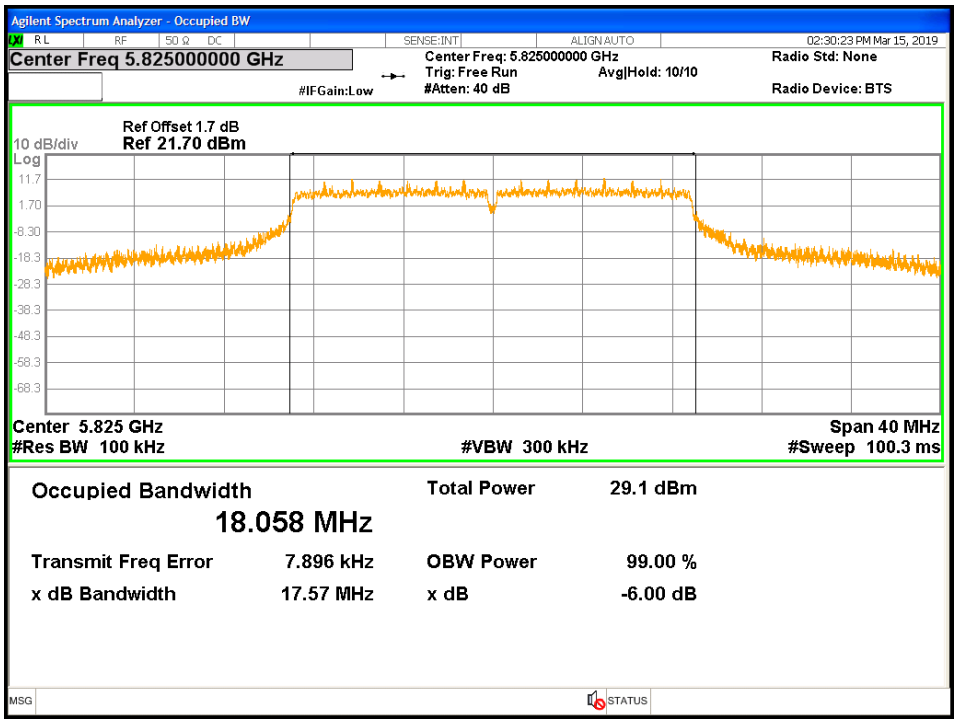


Figure 112: FCC 6dB and 99% OBW 5825MHz HT20-1x4-q96-Ch3

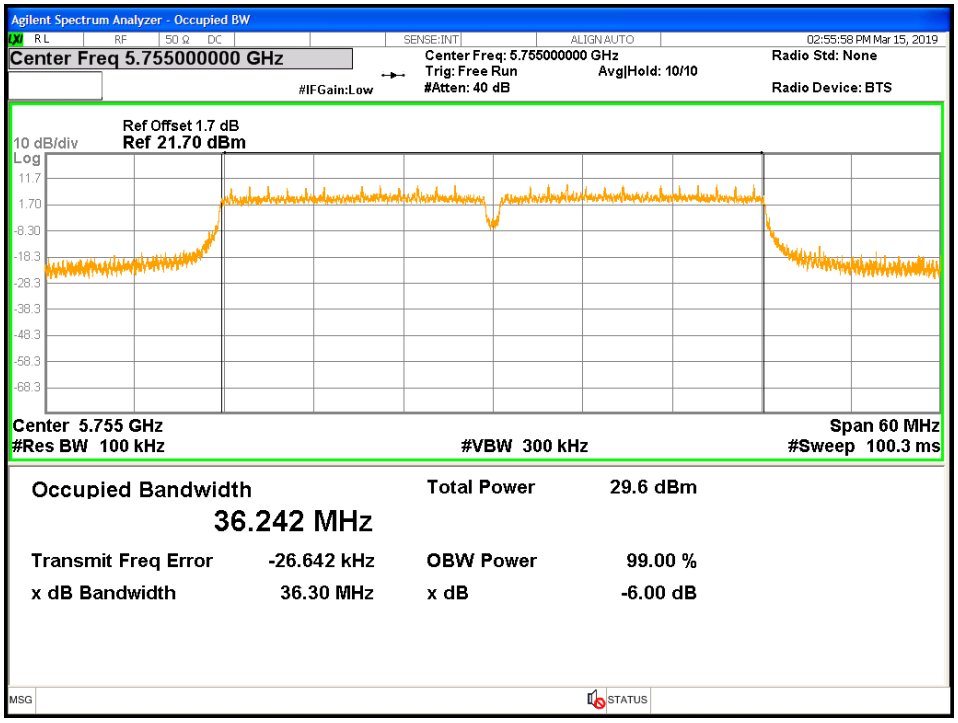


Figure 113: FCC 6dB and 99% OBW 5755MHz HT40-1x4-q90-Ch0

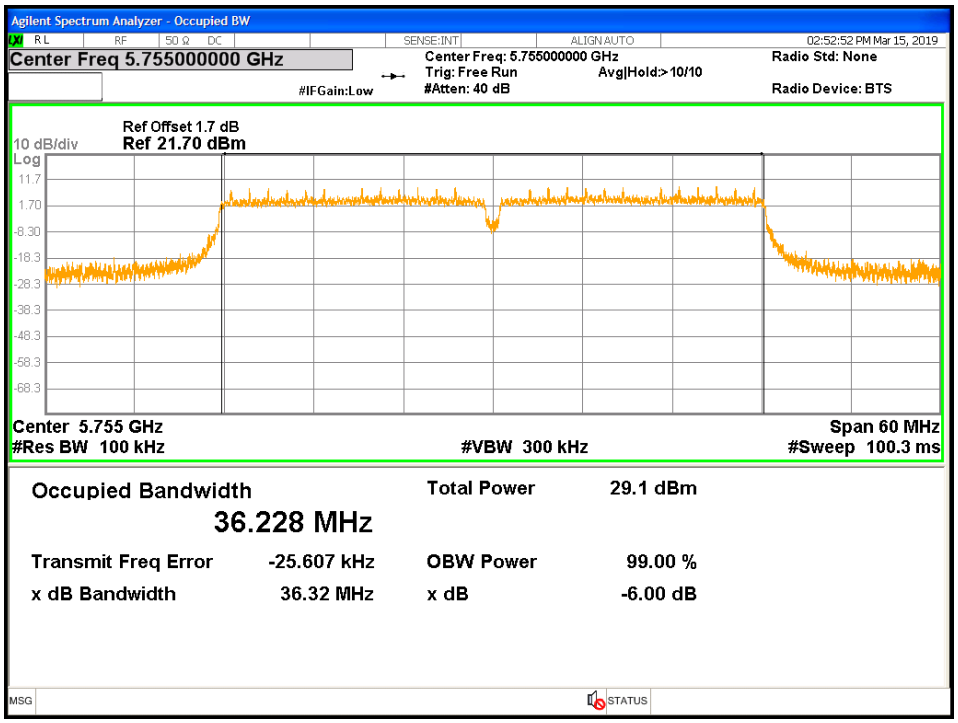


Figure 114: FCC 6dB and 99% OBW 5755MHz HT40-1x4-q90-Ch1

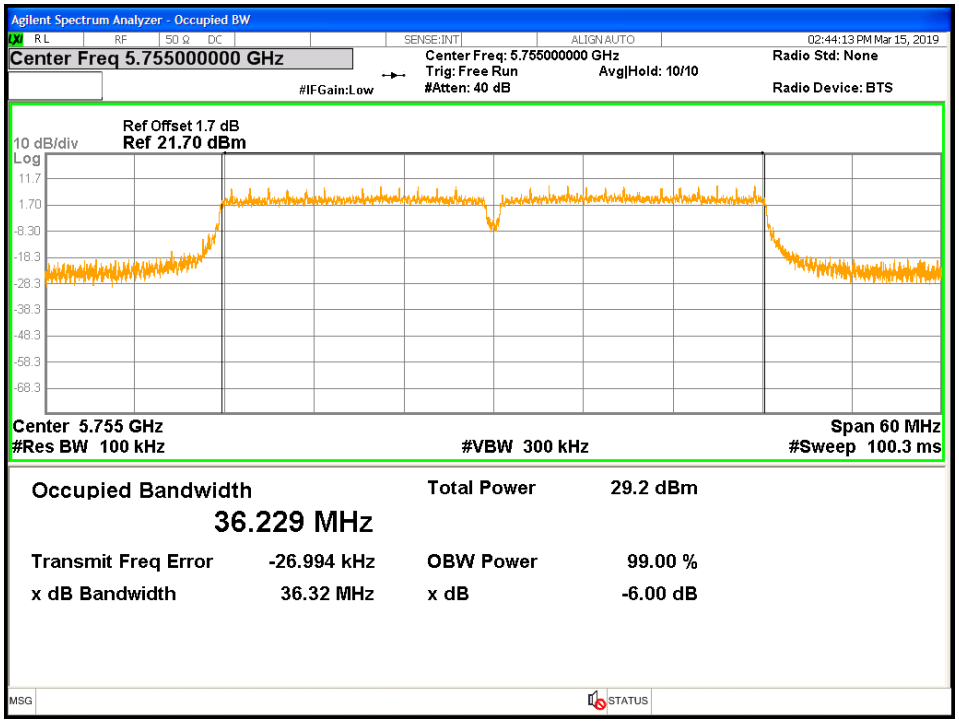


Figure 115: FCC 6dB and 99% OBW 5755MHz HT40-1x4-q90-Ch2

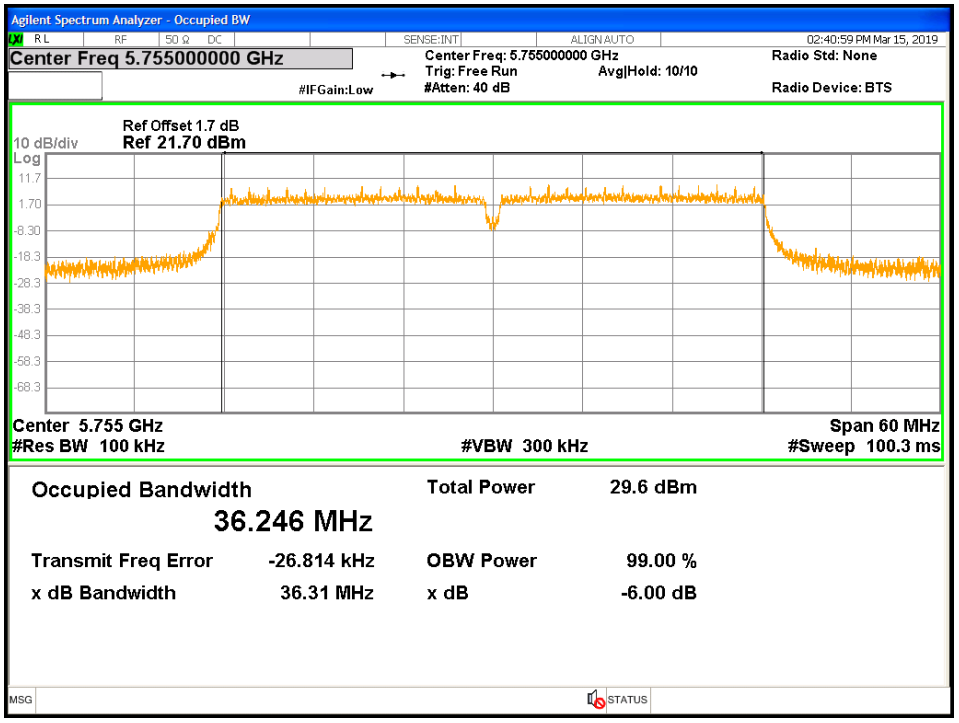


Figure 116: FCC 6dB and 99% OBW 5755MHz HT40-1x4-q90-Ch3

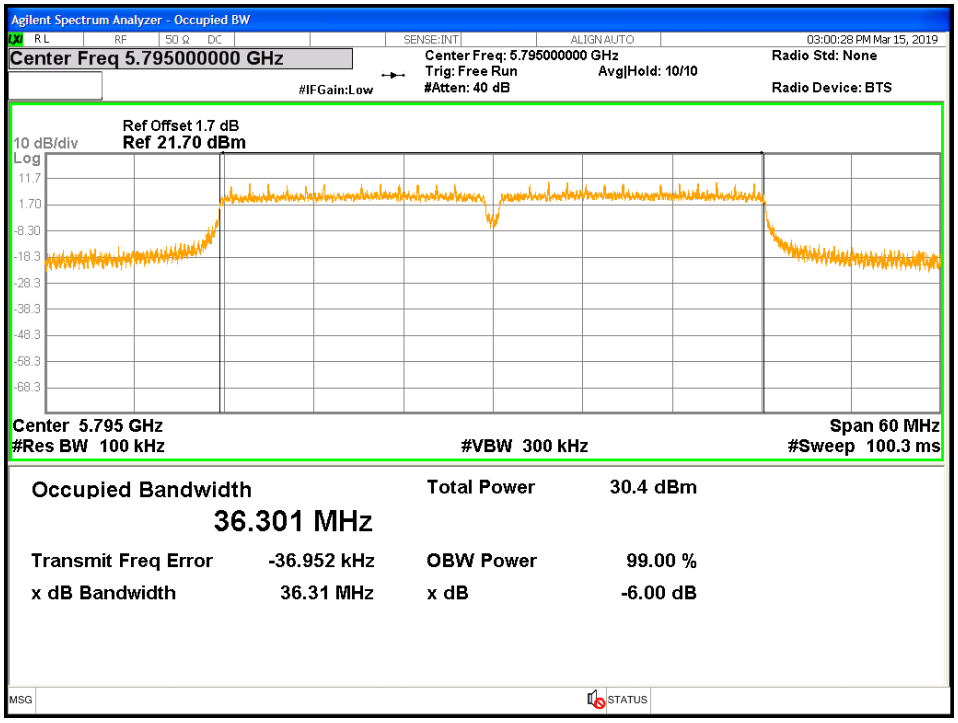


Figure 117: FCC 6dB and 99% OBW 5795MHz HT40-1x4-q94-Ch0

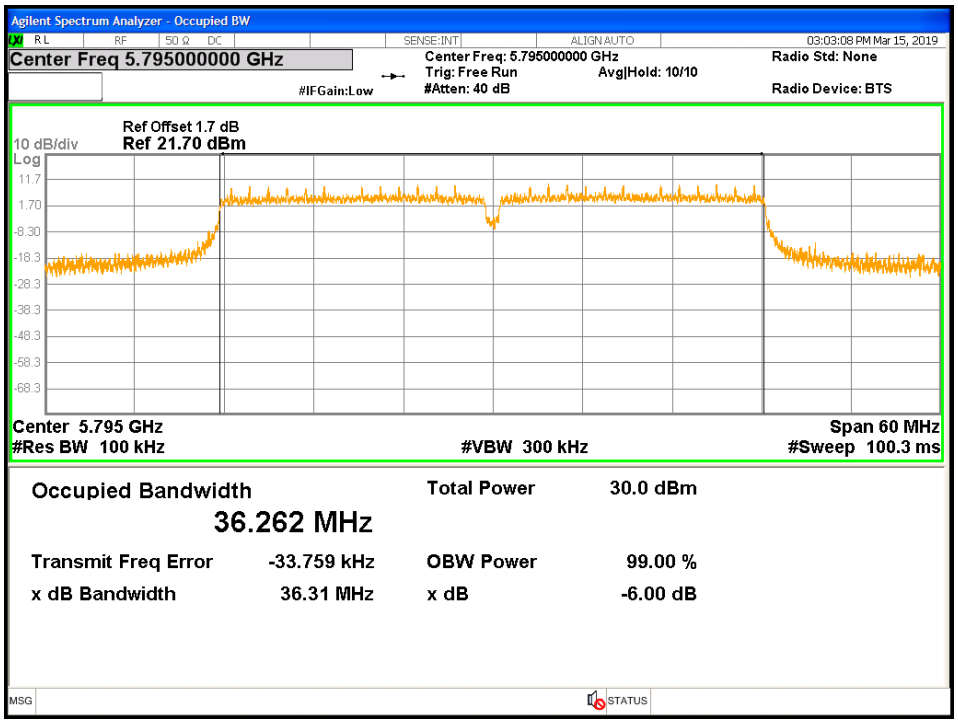


Figure 118: FCC 6dB and 99% OBW 5795MHz HT40-1x4-q94-Ch1

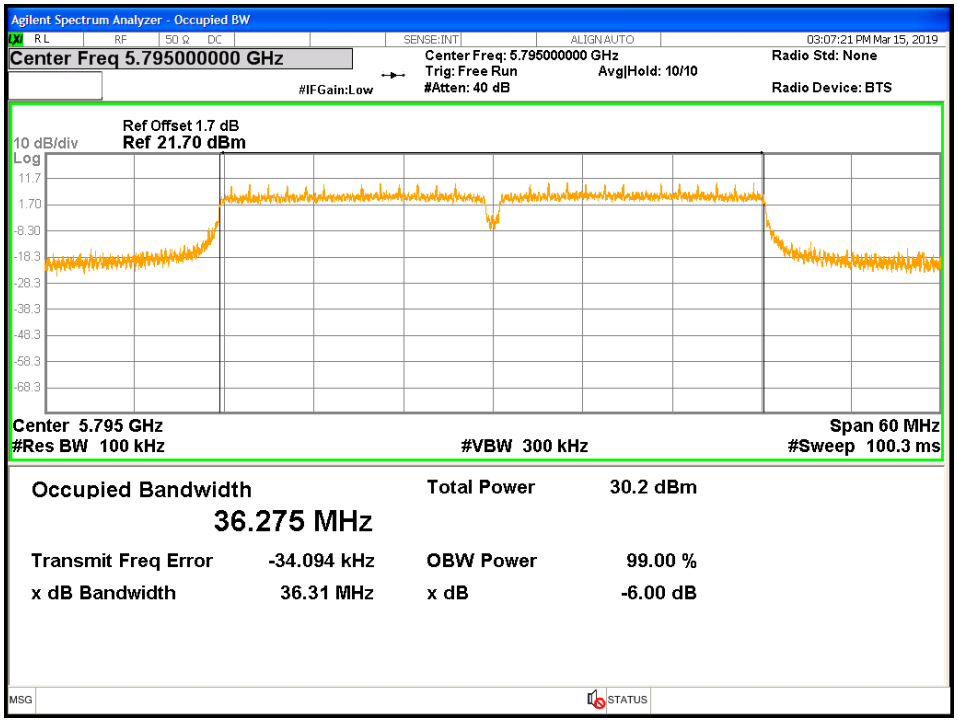


Figure 119: FCC 6dB and 99% OBW 5795MHz HT40-1x4-q94-Ch2

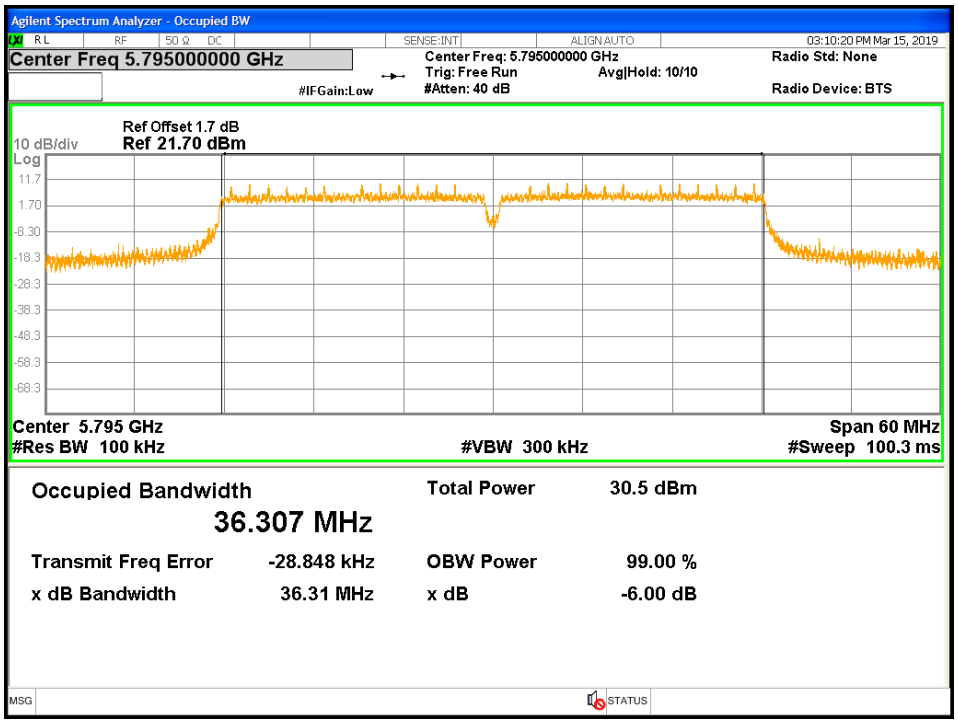


Figure 120: FCC 6dB and 99% OBW 5795MHz HT40-1x4-q94-Ch3

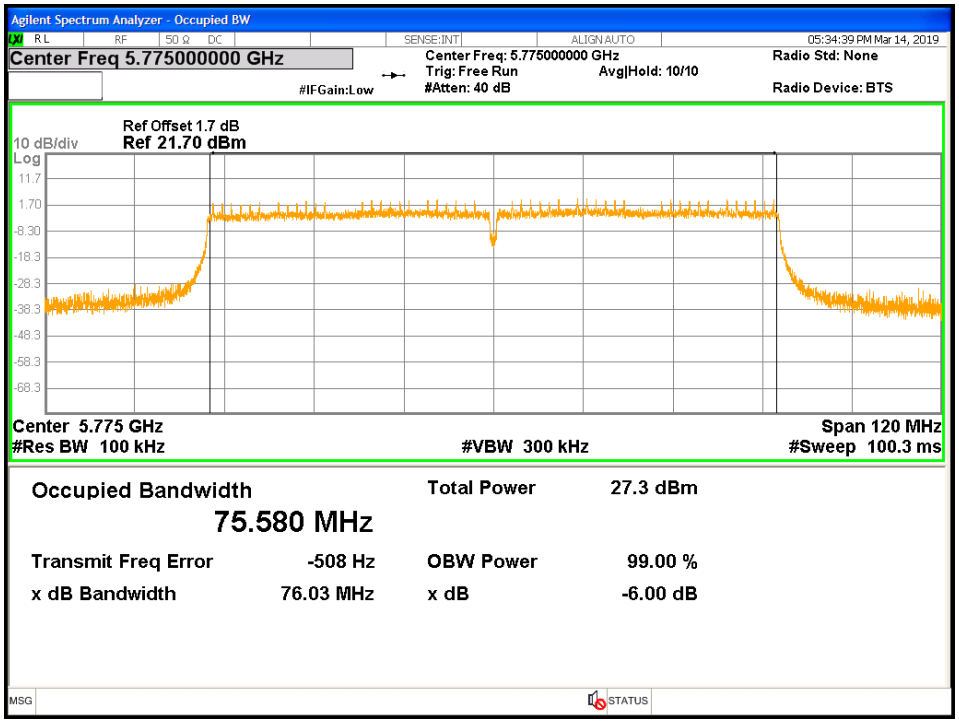


Figure 121: FCC 6dB and 99% OBW 5775MHz VHT80-1x4-q80-Ch0

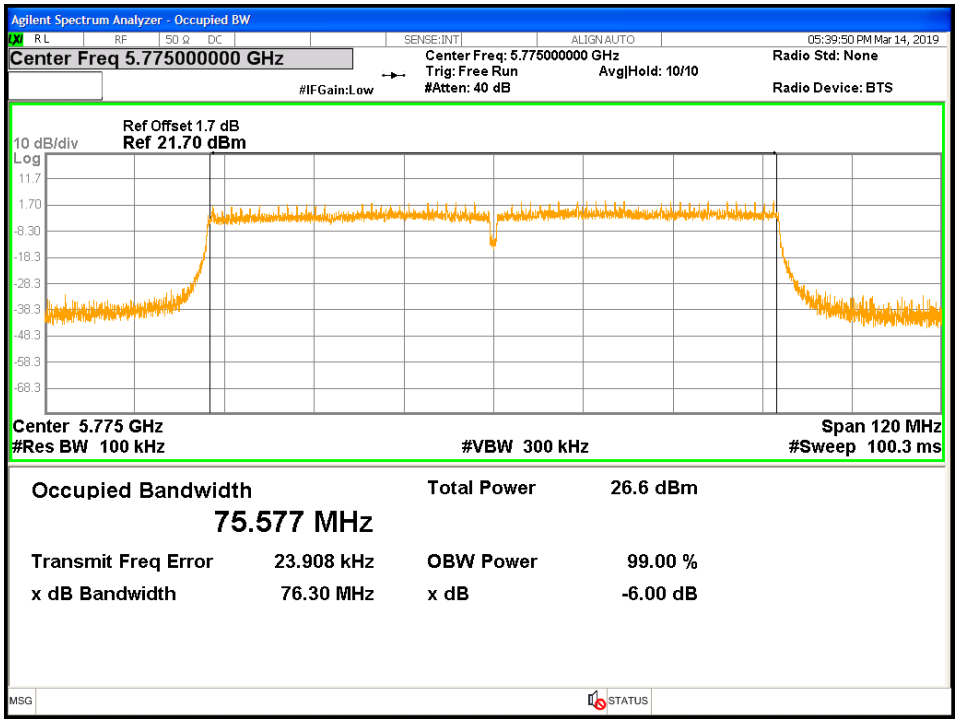


Figure 122: FCC 6dB and 99% OBW 5775MHz VHT80-1x4-q80-Ch1

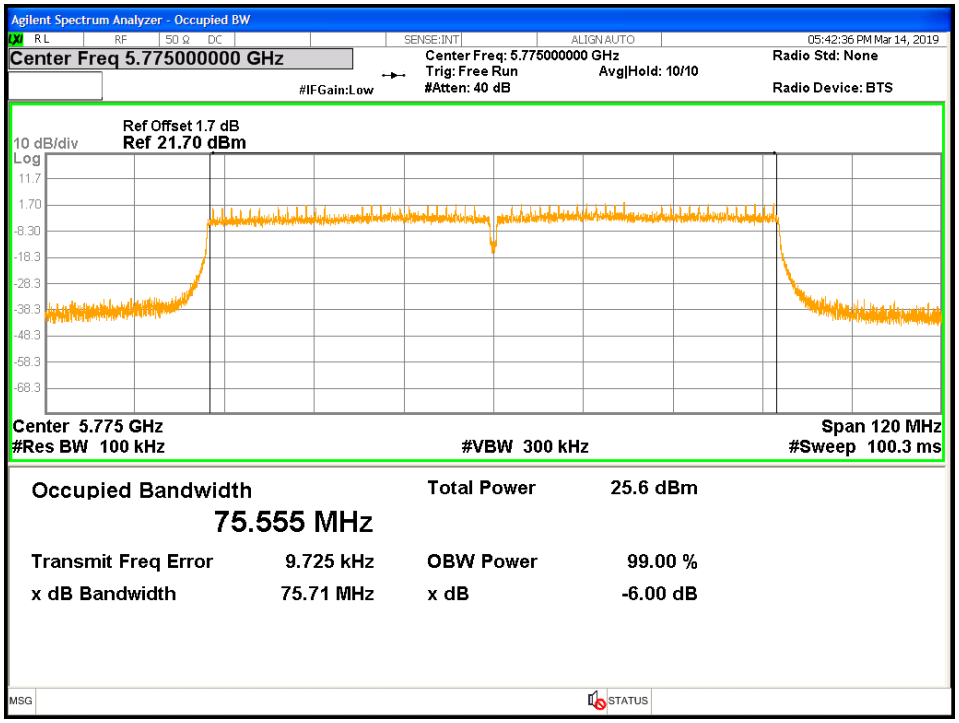


Figure 123: FCC 6dB and 99% OBW 5775MHz VHT80-1x4-q80-Ch2

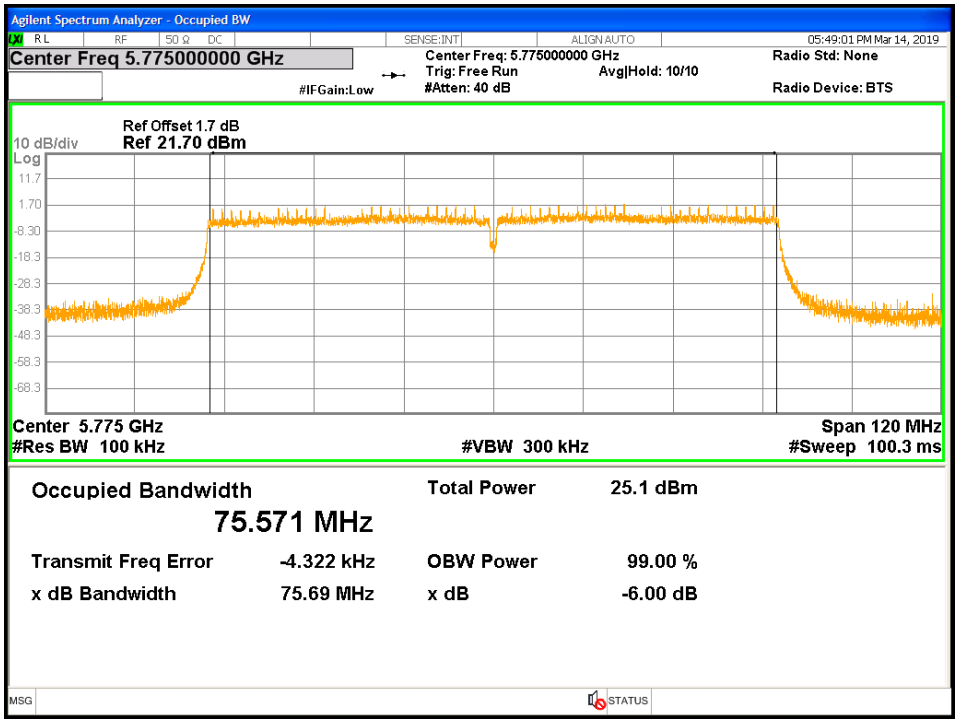


Figure 124: FCC 6dB and 99% OBW 5775MHz VHT80-1x4-q80-Ch3

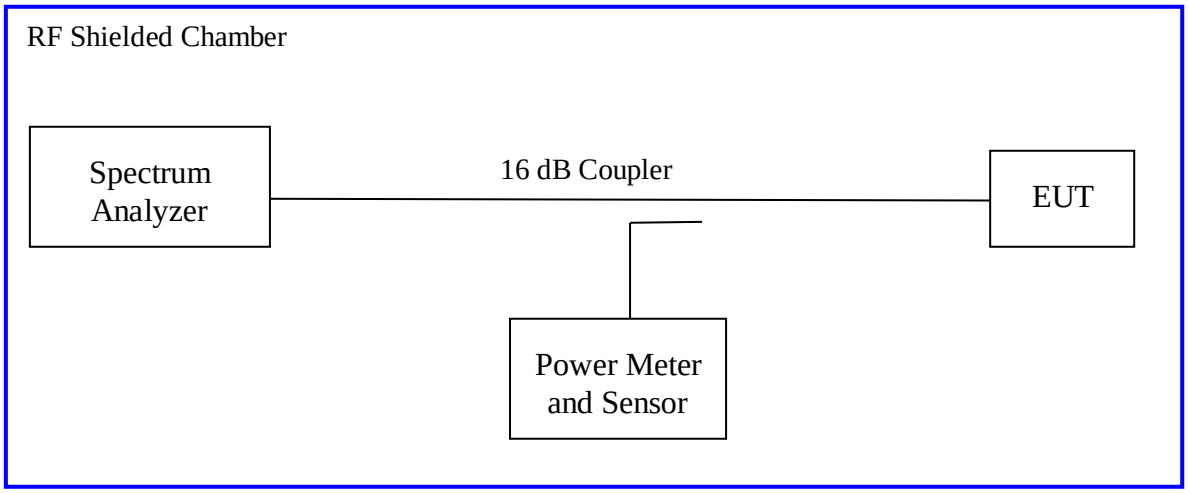
4.3 Peak Power Spectral Density

According to the CFR47 Part 15.407 (a) and RSS 247 Sect.6.2.4.1, in the 5.725 – 5.85 GHz band, the maximum power spectral density shall not exceed 30 dBm in any 500kHz band.during any time interval of continuous transmission.

4.3.1 Test Method

The conducted method was used to measure the channel power output per ANSI C63.10-2013 Section 6.11.2. The measurement was performed with modulation per CFR47 Part 15.407 (a) and RSS 247 Sect.6.2.4.1. The pre-evaluation was performed to find the worst modes. The worst findings were conducted on 3 channels in each operating frequency range of 5725 MHz to 5850 MHz. The worst sample result indicated below.

Test Setup:



4.3.2 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 5: Peak Power Spectral Density – Test Results – Non Beamforming

Test Date: March 13, 2019	**Test By:** Kerwinn Corpus
Test Method: Conducted Measurements	**Power Setting:** See test plan
Antenna Type: PCB	**Max. Antenna Gain:** + 4.6 dBi
Operating Mode: Non Beamforming & Uncorrelated	**Signal State**: Modulated
Ambient Temp.: 22 °C	**Relative Humidity:**48%

802.11a, 1x4

Freq. (MHz)	Ch0 [dBm]	Ch1 [dBm]	Ch2 [dBm]	Ch3 [dBm]	CF [dB]	Max. RMS [dBm]	Limit [dBm]	Margin [dB]
5745	10.83	11.53	11.10	10.28	0.00	11.53	30.00	-18.47
5765	10.94	11.60	10.57	10.53	0.00	11.60	30.00	-18.40
5785	11.34	10.63	10.30	9.61	0.00	11.34	30.00	-18.66
5805	10.93	10.15	10.36	10.95	0.00	10.95	30.00	-19.05
5825	10.56	11.46	11.06	10.76	0.00	11.46	30.00	-18.54

Note: 1. The highest peak power spectral density was observed at 6Mbps 1 data stream.
2. Plots for all the measurements stated above were taken, to reduce complexity and bulkiness of the report highlighted plots are placed in the report.

802.11n HT20, 1x4

Freq. (MHz)	Ch0 [dBm]	Ch1 [dBm]	Ch2 [dBm]	Ch3 [dBm]	CF [dB]	Max. RMS [dBm]	Limit [dBm]	Margin [dB]
5745	10.97	11.09	11.29	11.01	0.00	11.29	30.00	-18.71
5765	11.17	11.77	12.02	10.98	0.00	12.02	30.00	-17.98
5785	10.83	11.53	11.82	10.89	0.00	11.82	30.00	-18.18
5805	11.53	11.38	11.72	10.54	0.00	11.72	30.00	-18.28
5825	11.28	11.21	11.47	10.62	0.00	11.47	30.00	-18.53

Note: 1. The highest peak power spectral density was observed at MCS0 1 data stream.
2. Plots for all the measurements stated above were taken, to reduce complexity and bulkiness of the report highlighted plots are placed in the report.

Table 6: Peak Power Spectral Density – Test Results – Non Beamforming - Continued

Test Date: March 13, 2019	**Test By:** Kerwinn Corpus
Test Method: Conducted Measurements	**Power Setting:** See test plan
Antenna Type: PCB	**Max. Antenna Gain:** + 4.6 dBi
Operating Mode: Non Beamforming & Uncorrelated	**Signal State**: Modulated
Ambient Temp.: 22 °C	**Relative Humidity:**48%

802.11n HT40, 1x4

Freq. (MHz)	Ch0 [dBm]	Ch1 [dBm]	Ch2 [dBm]	Ch3 [dBm]	CF [dB]	Max. RMS [dBm]	Limit [dBm]	Margin [dB]
5755	6.78	6.70	6.74	6.76	0.16	6.78	30.00	-23.06
5795	7.61	7.11	7.51	7.65	0.16	7.65	30.00	-22.19

Note: 1. The highest peak power spectral density was observed at MCS0 1 data stream.
2. Plots for all the measurements stated above were taken, to reduce complexity and bulkiness of the report highlighted plots are placed in the report.

802.11ac VHT80, 1x4

Freq. (MHz)	Ch0 [dBm]	Ch1 [dBm]	Ch2 [dBm]	Ch3 [dBm]	CF [dB]	Max. RMS [dBm]	Limit [dBm]	Margin [dB]
5775	1.16	0.38	0.12	0.36	0.20	1.16	30.00	-28.64

Note: 1. The highest peak power spectral density was observed at MCS0 1 data stream.
2. Plots for all the measurements stated above were taken, to reduce complexity and bulkiness of the report highlighted plots are placed in the report.

Table 7: Peak Power Spectral Density – Test Results – Beamforming

Test Date: March 13, 2019	**Test By:** Kerwinn Corpus
Test Method: Conducted Measurements	**Power Setting:** See test plan
Antenna Type: PCB	**Max. Antenna Gain:** + 8.8 dBi
Operating Mode: Beamforming & Correlated	**Signal State**: Modulated
Ambient Temp.: 22 °C	**Relative Humidity:**48%

802.11n HT20, 4x4

Freq. (MHz)	Ch0 [dBm]	Ch1 [dBm]	Ch2 [dBm]	Ch3 [dBm]	CF [dB]	Total RMS [dBm]	Limit [dBm]	Margin [dB]
5745	7.42	7.30	7.02	7.83	0.00	13.42	27.20	-13.78
5765	7.56	7.40	7.19	7.71	0.00	13.49	27.20	-13.71
5785	7.66	7.14	6.62	6.90	0.00	13.12	27.20	-14.08
5805	7.46	7.46	6.35	7.75	0.00	13.31	27.20	-13.89
5825	7.42	6.98	7.66	6.63	0.00	13.21	27.20	-13.99

Note: 1. The highest peak power spectral density was observed at MCS0 4 data stream.
2. Plots for all the measurements stated above were taken, to reduce complexity and bulkiness of the report highlighted plots are placed in the report.

802.11n HT40, 4x4

Freq. (MHz)	Ch0 [dBm]	Ch1 [dBm]	Ch2 [dBm]	Ch3 [dBm]	CF [dB]	Total RMS [dBm]	Limit [dBm]	Margin [dB]
5755	4.61	4.10	4.90	4.50	0.16	10.56	27.20	-16.48
5795	4.19	4.50	4.36	3.69	0.16	10.22	27.20	-16.82

Note: 1. The highest peak power spectral density was observed at MCS0 4 data stream.
2. Plots for all the measurements stated above were taken, to reduce complexity and bulkiness of the report highlighted plots are placed in the report.

802.11ac VHT80, 4x4

Freq. (MHz)	Ch0 [dBm]	Ch1 [dBm]	Ch2 [dBm]	Ch3 [dBm]	CF [dB]	Total RMS [dBm]	Limit [dBm]	Margin [dB]
5775	1.16	0.38	0.12	0.36	0.20	6.54	27.20	-20.46

Note: 1. The highest peak power spectral density was observed at MCS0 4 data stream.
2. Plots for all the measurements stated above were taken, to reduce complexity and bulkiness of the report highlighted plots are placed in the report.

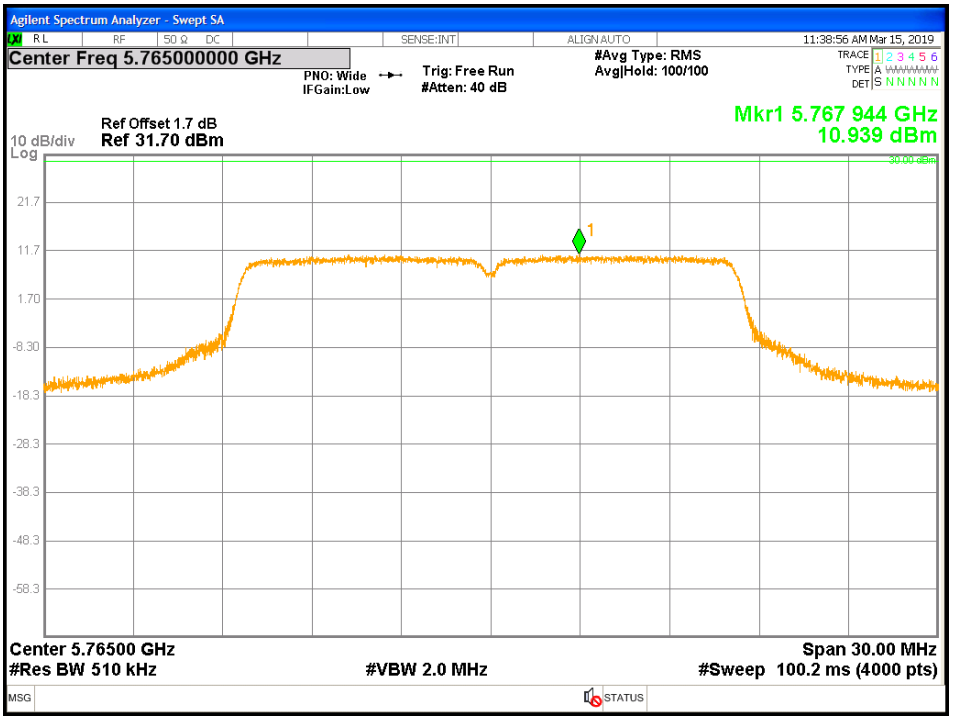


Figure 125: FCC-PPSD-5765MHz-11a-1x4-q96-Ch0

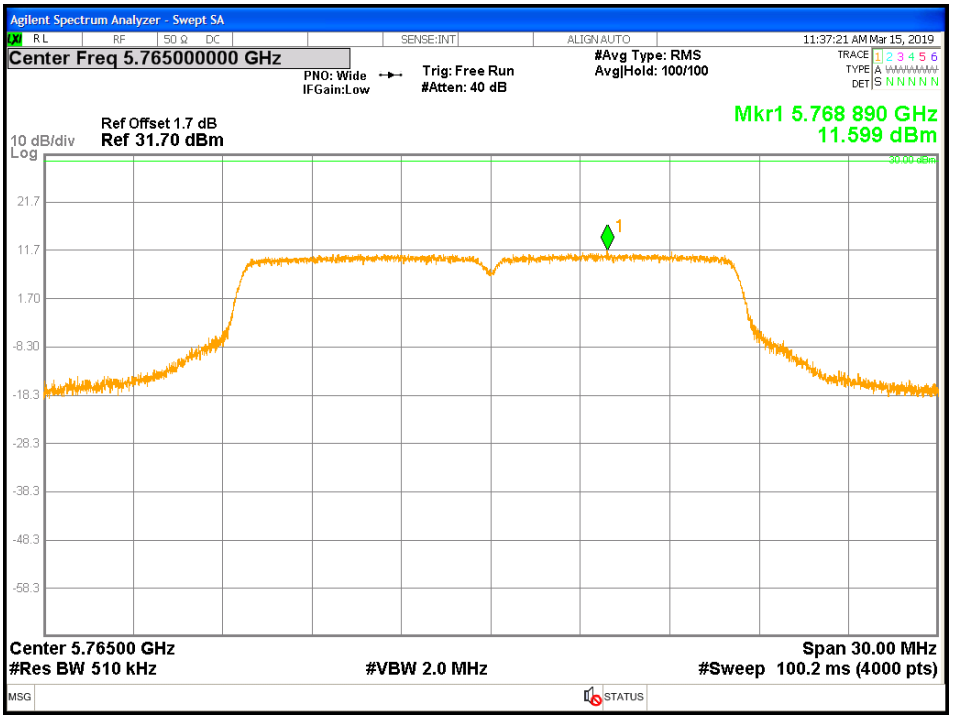


Figure 126: PPSD-5765MHz-11a-1x4-q96-Ch1

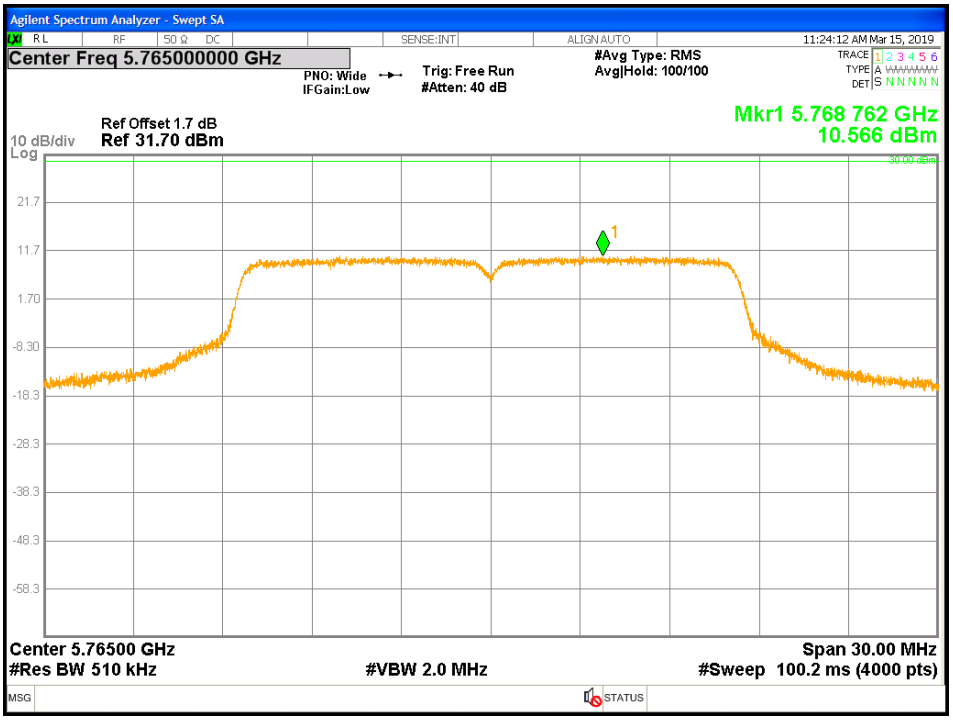


Figure 127: PPSD-5765MHz-11a-1x4-q96-Ch2

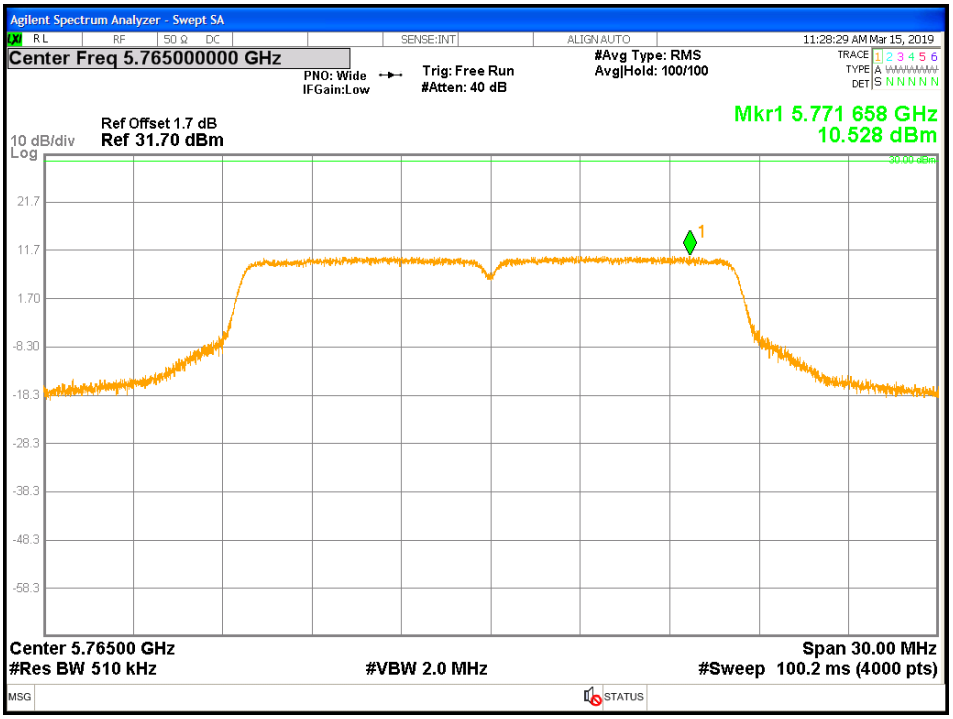


Figure 128: PPSD-5765MHz-11a-1x4-q96-Ch3

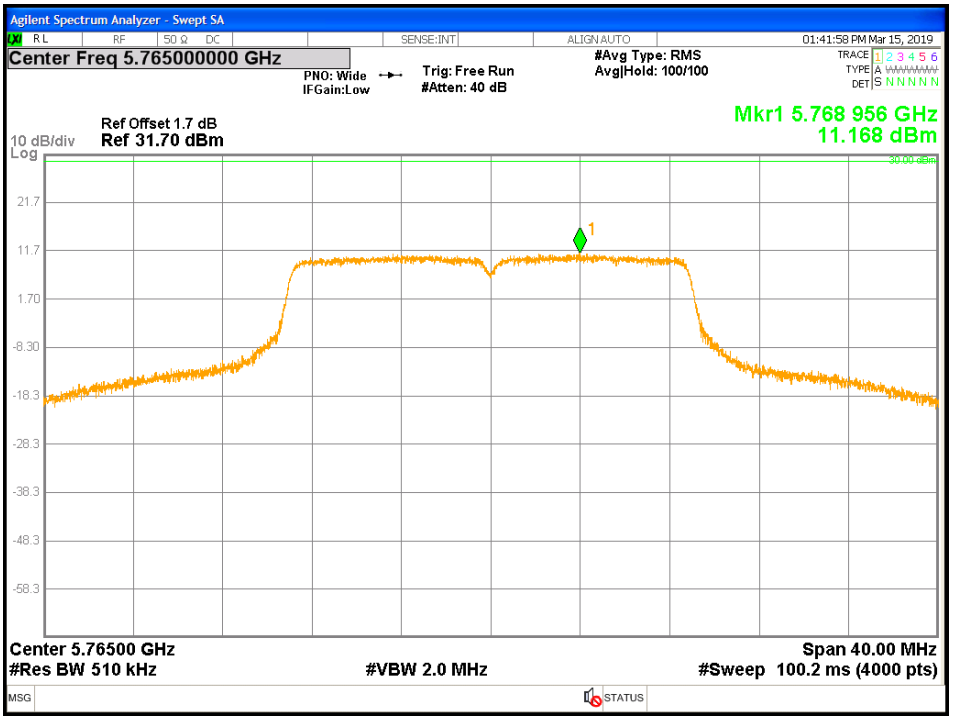


Figure 129: PPSD-5765MHz-HT20-1x4-q97-Ch0

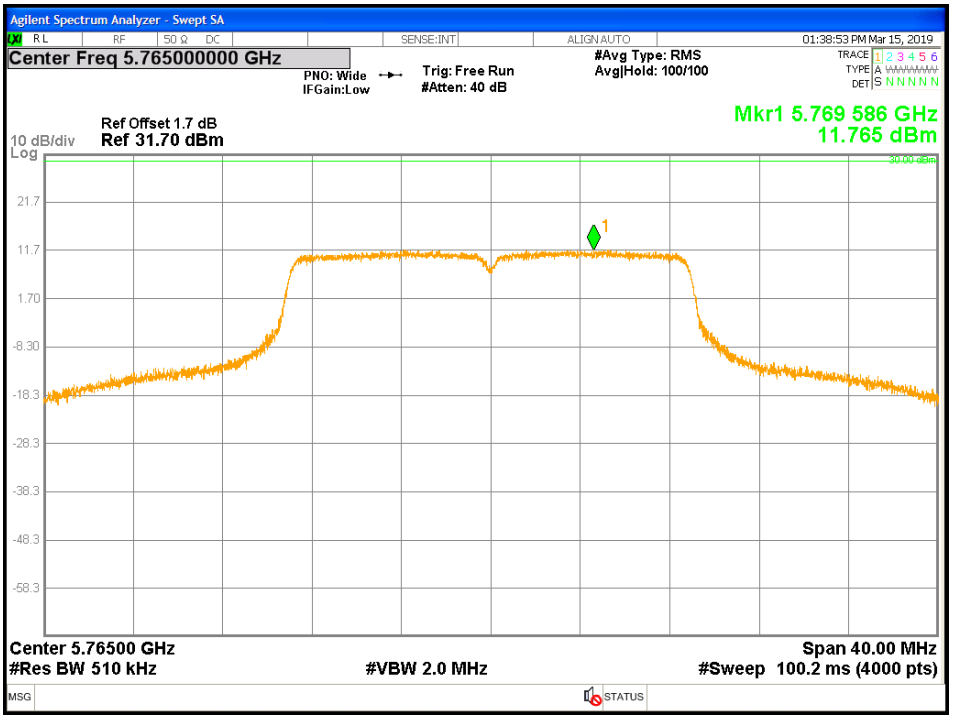


Figure 130: PPSD-5765MHz-HT20-1x4-q97-Ch1

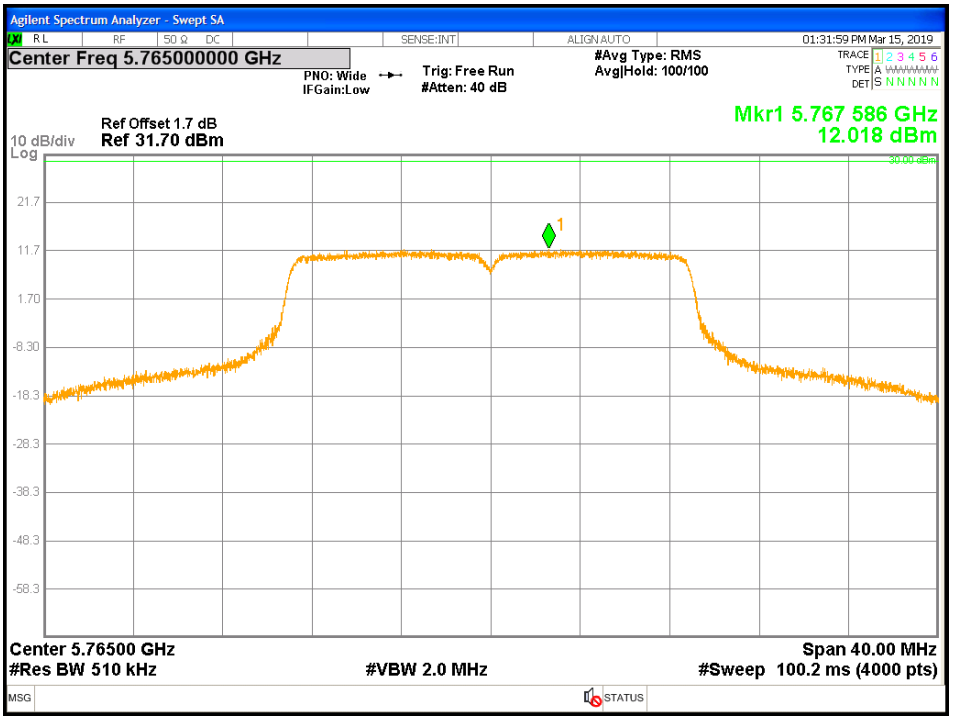


Figure 131: PPSD-5765MHz-HT20-1x4-q97-Ch2

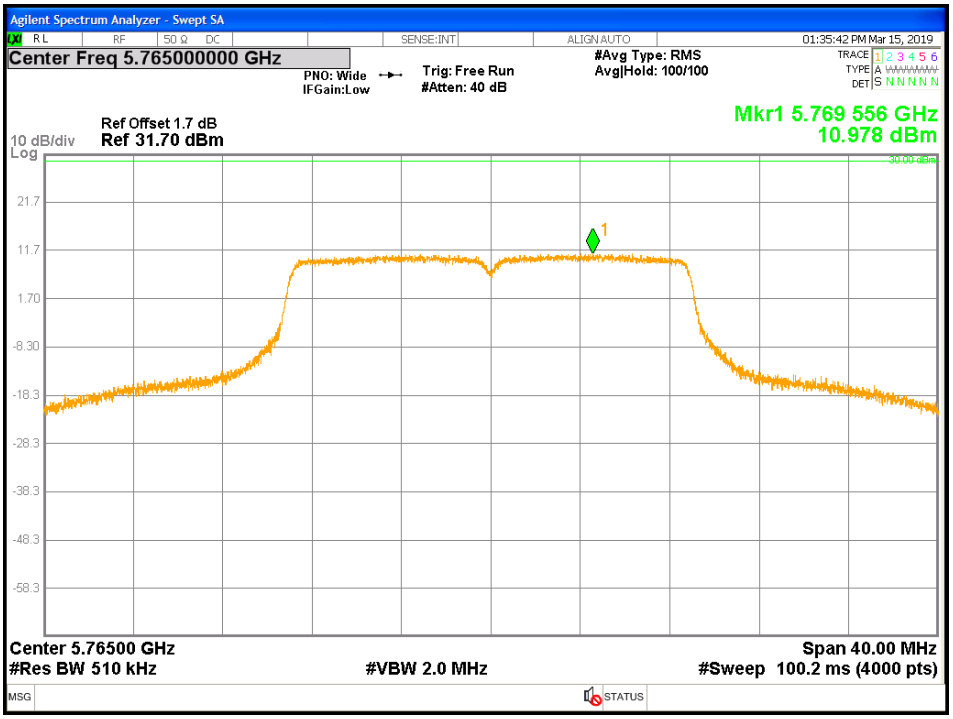


Figure 132: PPSD-5765MHz-HT20-1x4-q97-Ch3

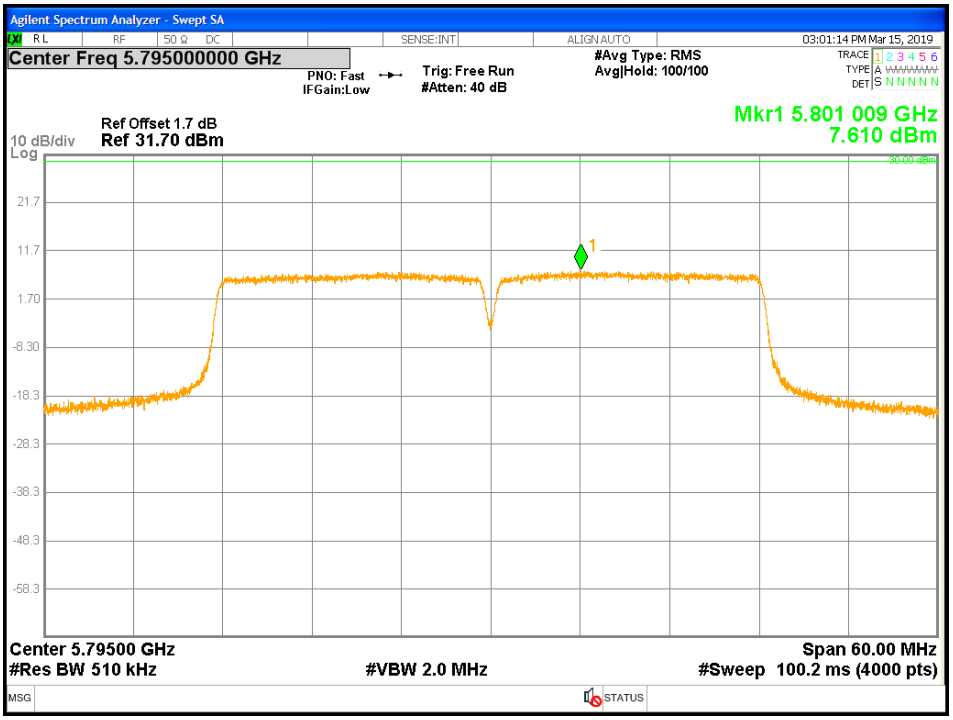


Figure 133: PPSD-5795MHz-HT40-1x4-q94-Ch0

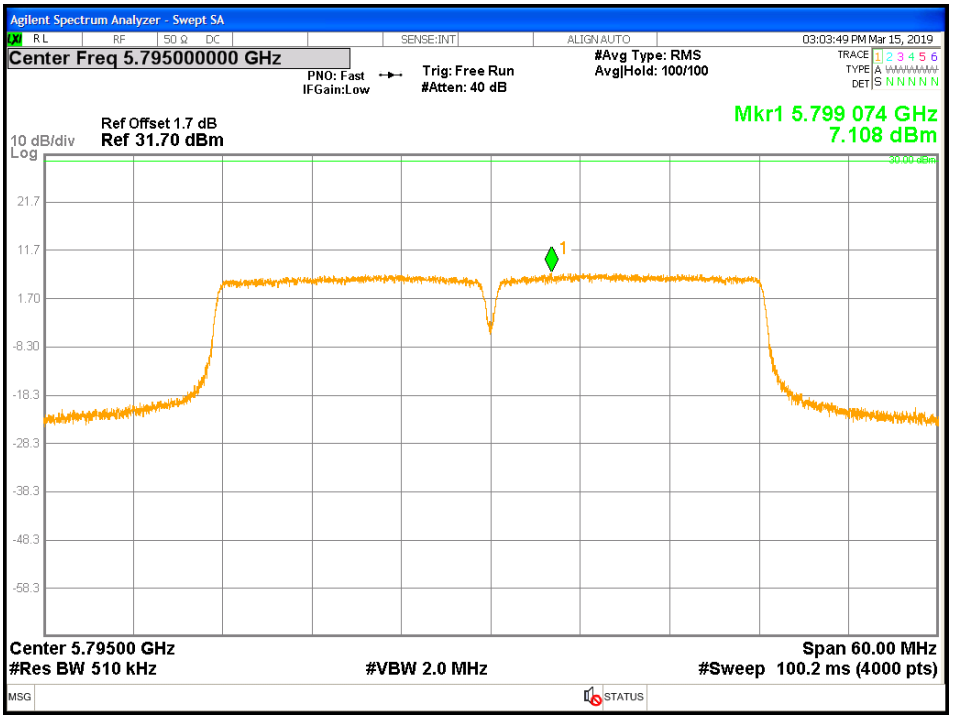


Figure 134: PPSD-5795MHz-HT40-1x4-q94-Ch1

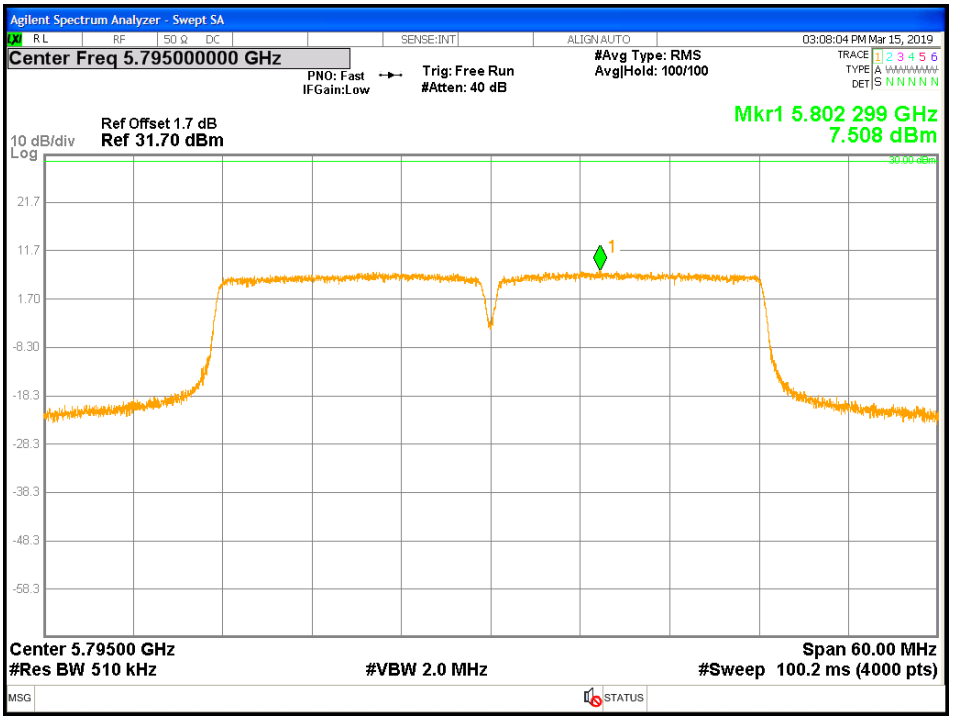


Figure 135: PPSD-5795MHz-HT40-1x4-q94-Ch2

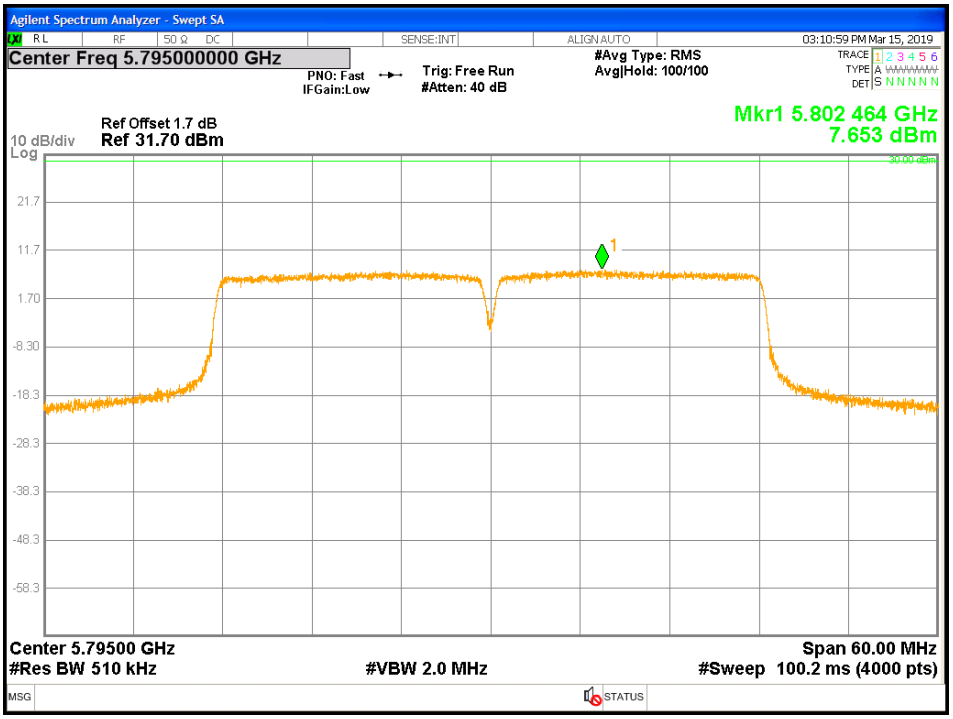


Figure 136: PPSD-5795MHz-HT40-1x4-q94-Ch3

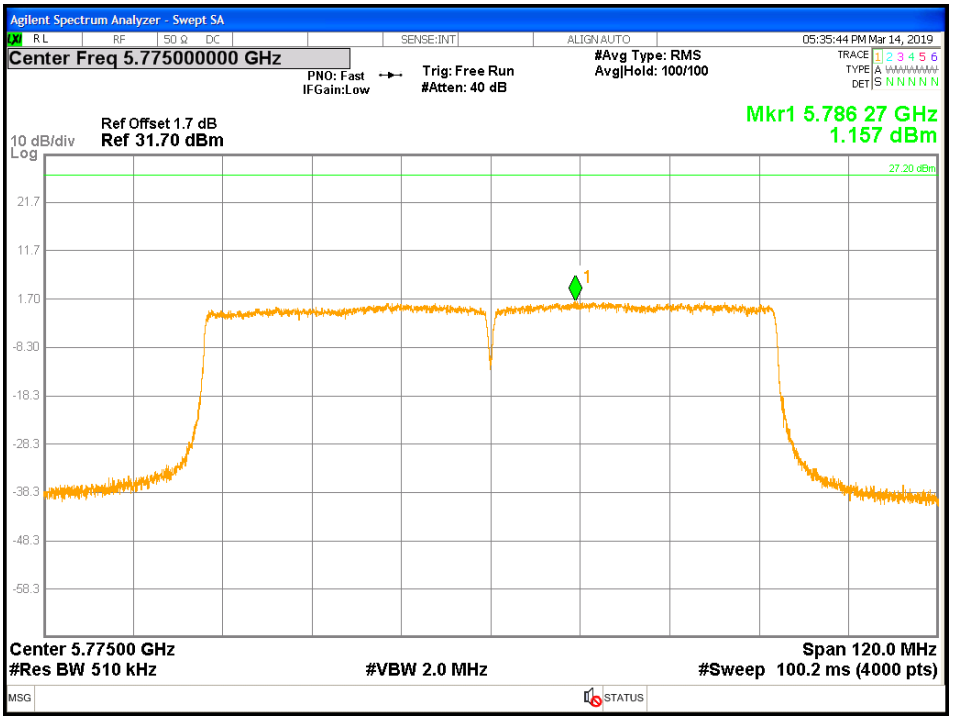


Figure 137: PPSD-5775MHz-VHT80-1x4-q80-Ch0

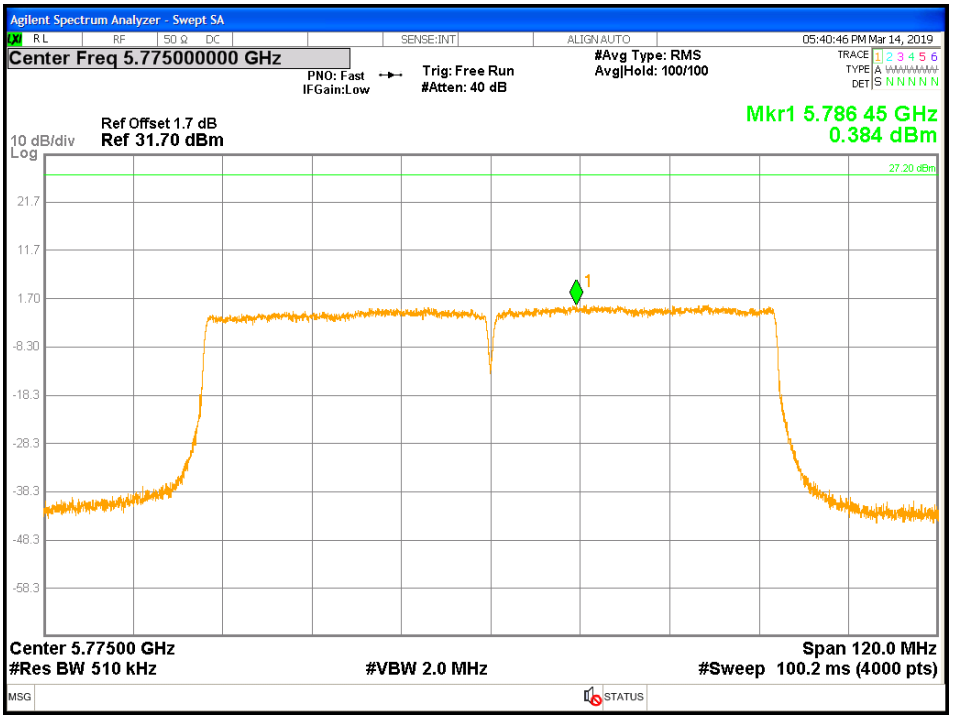


Figure 138: PPSD-5775MHz-VHT80-1x4-q80-Ch1

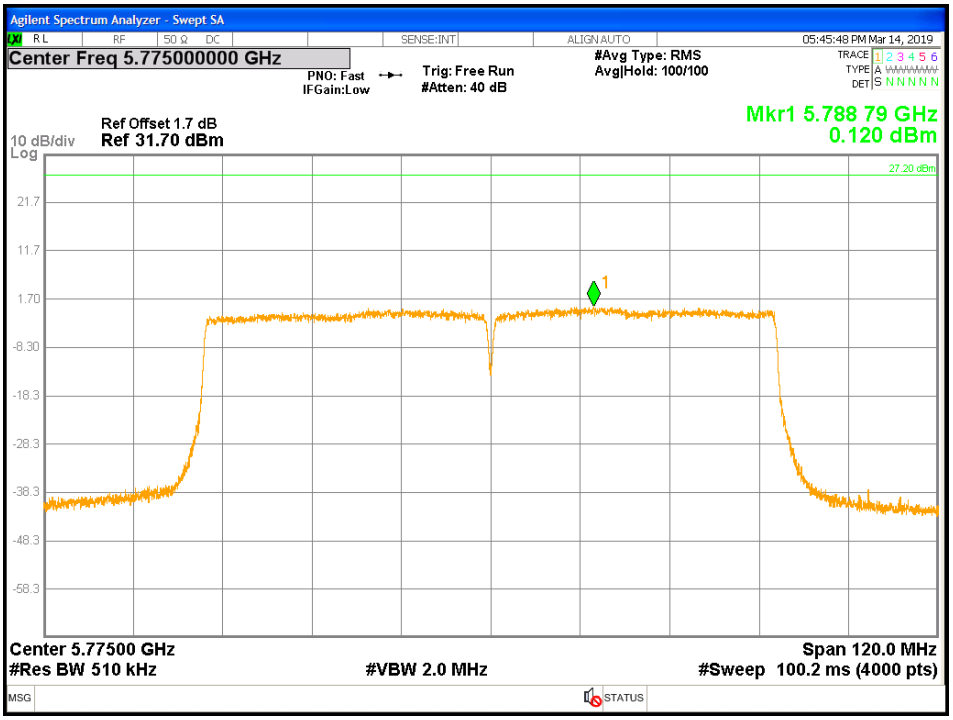


Figure 139: PPSD-5775MHz-VHT80-1x4-q80-Ch2

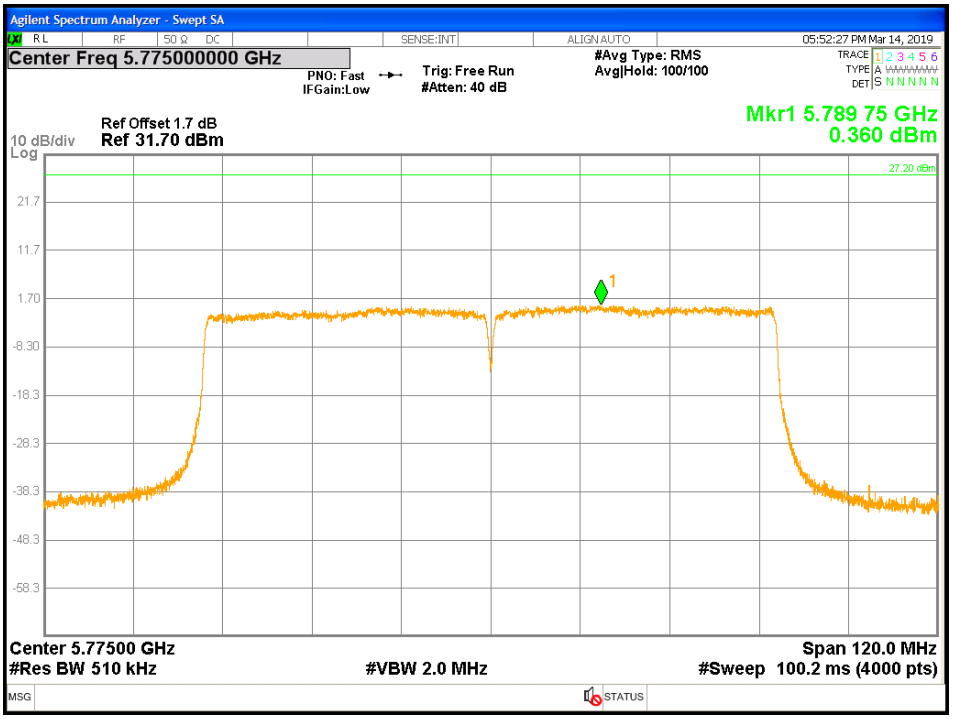


Figure 140: PPSD-5775MHz-VHT80-1x4-q80-Ch3

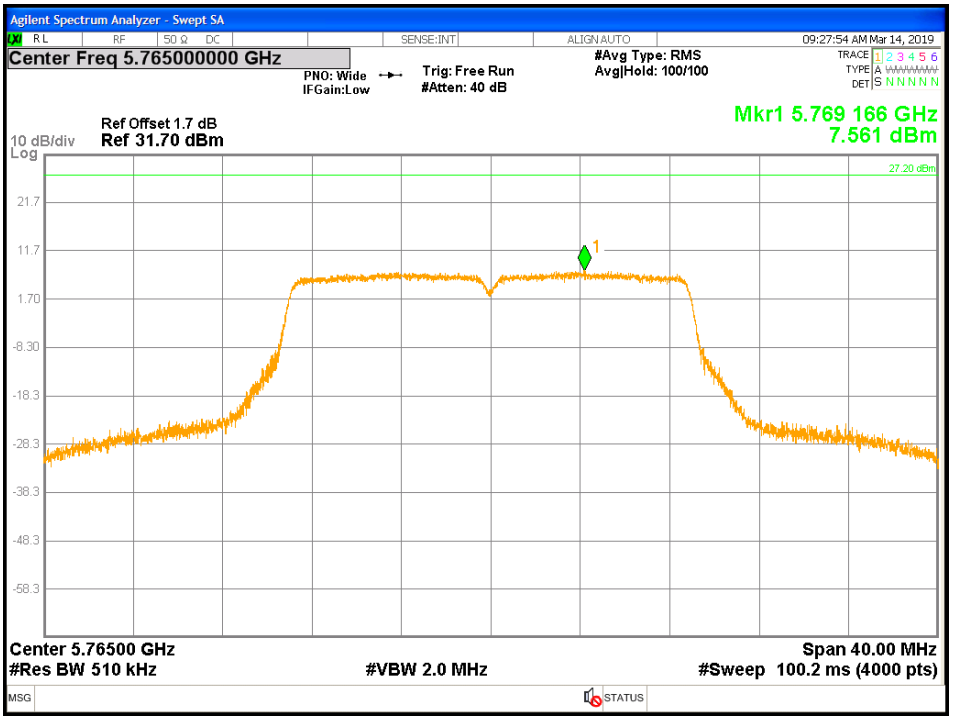


Figure 141: PPSD-5765MHz-HT20-4x4-q88-Ch0

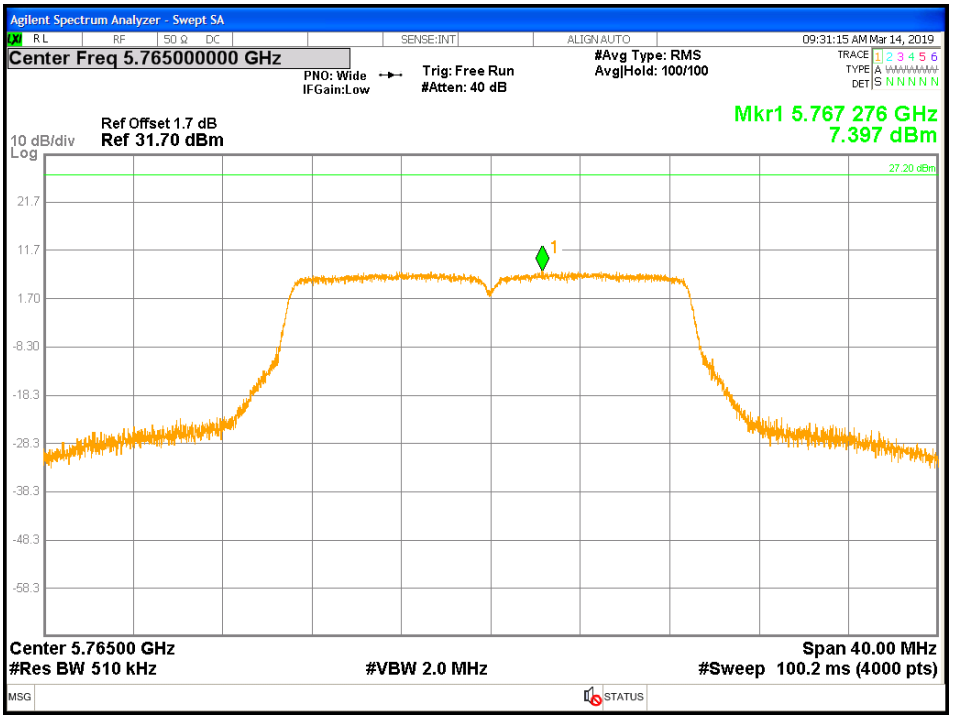


Figure 142: PPSD-5765MHz-HT20-4x4-q88-Ch1

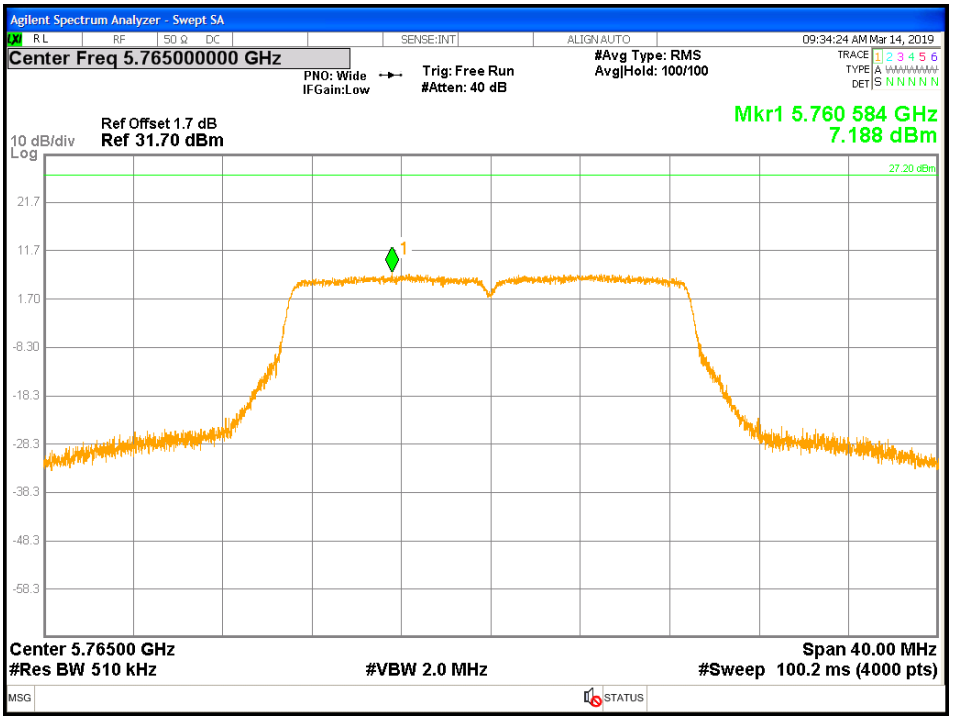


Figure 143: PPSD--5765MHz-HT20-4x4-q88-Ch2

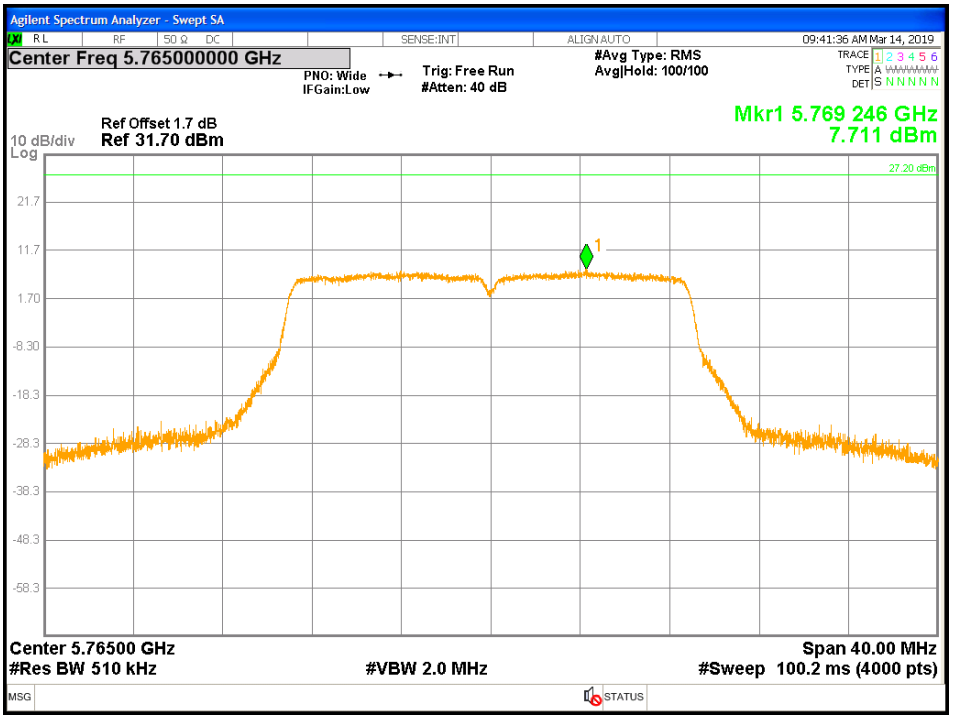


Figure 144: PPSD-5765MHz-HT20-4x4-q88-Ch3

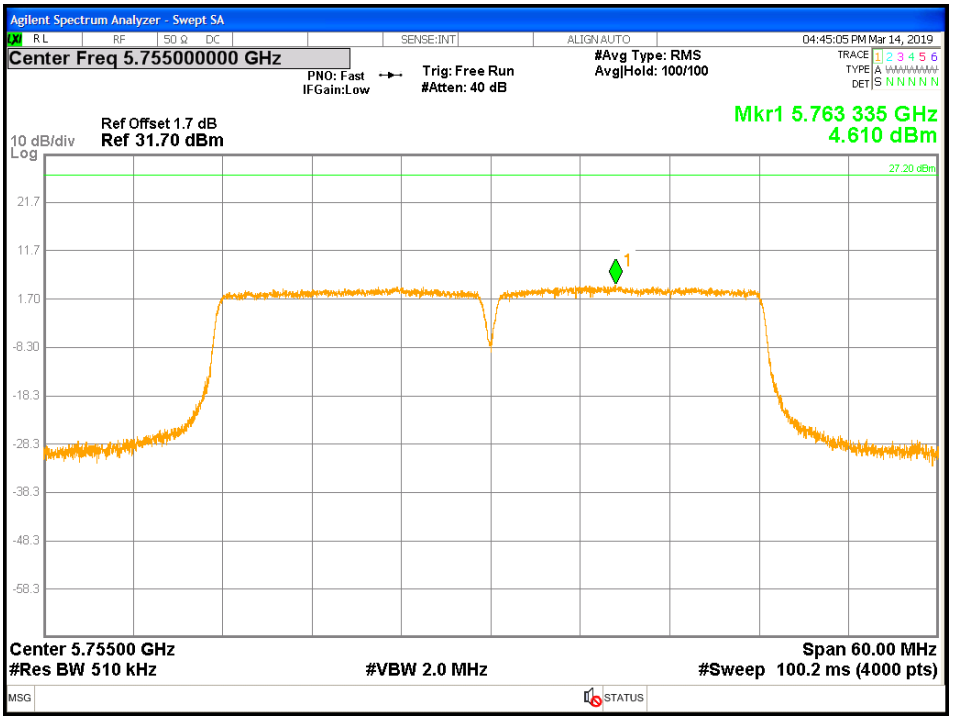


Figure 145: PPSD-5755MHz-HT40-4x4-q86-Ch0

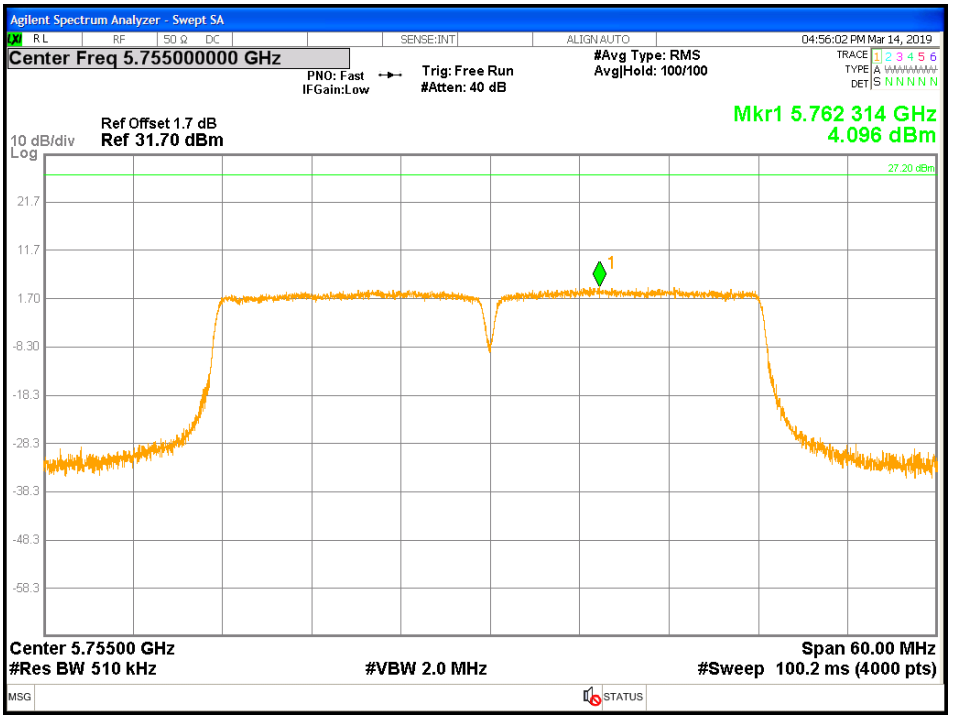


Figure 146: PPSD-5755MHz-HT40-4x4-q86-Ch1

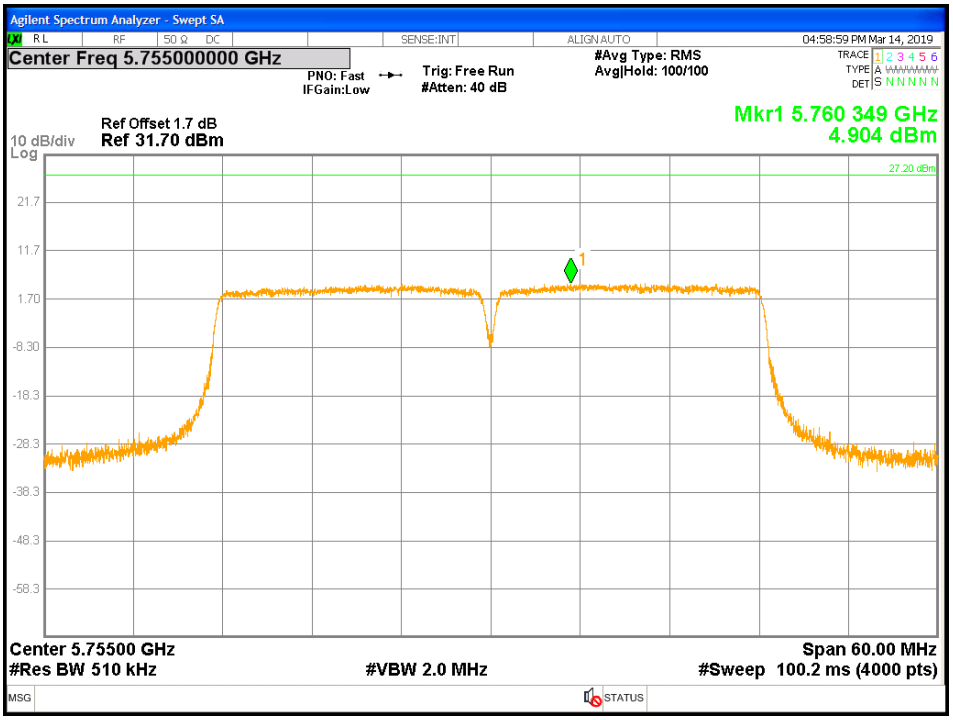


Figure 147: PPSD-5755MHz-HT40-4x4-q86-Ch2

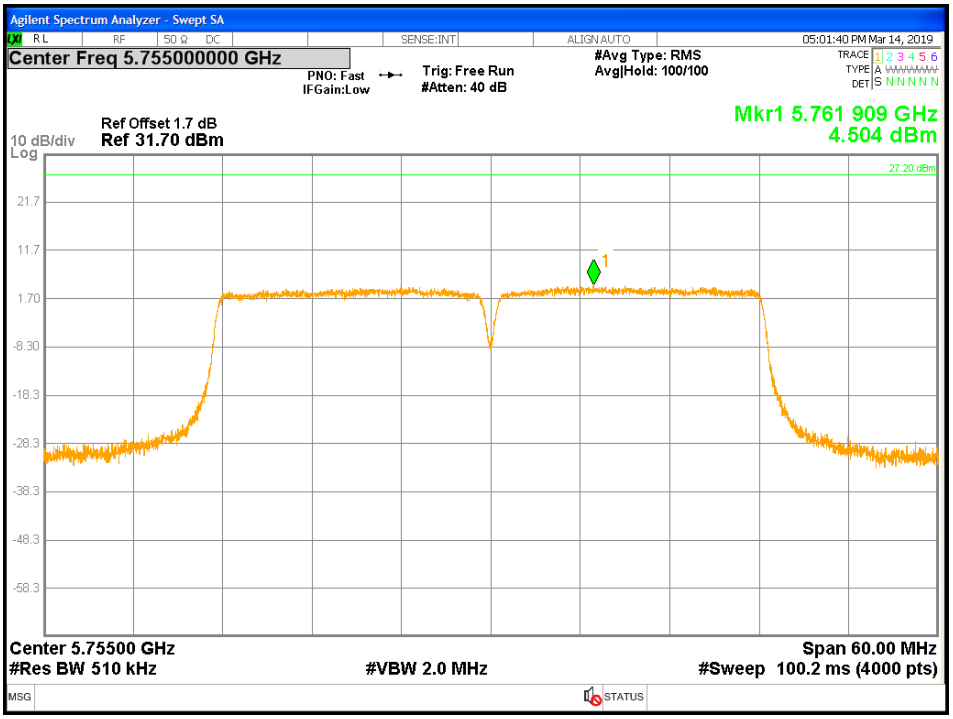


Figure 148: PPSD-5755MHz-HT40-4x4-q86-Ch3

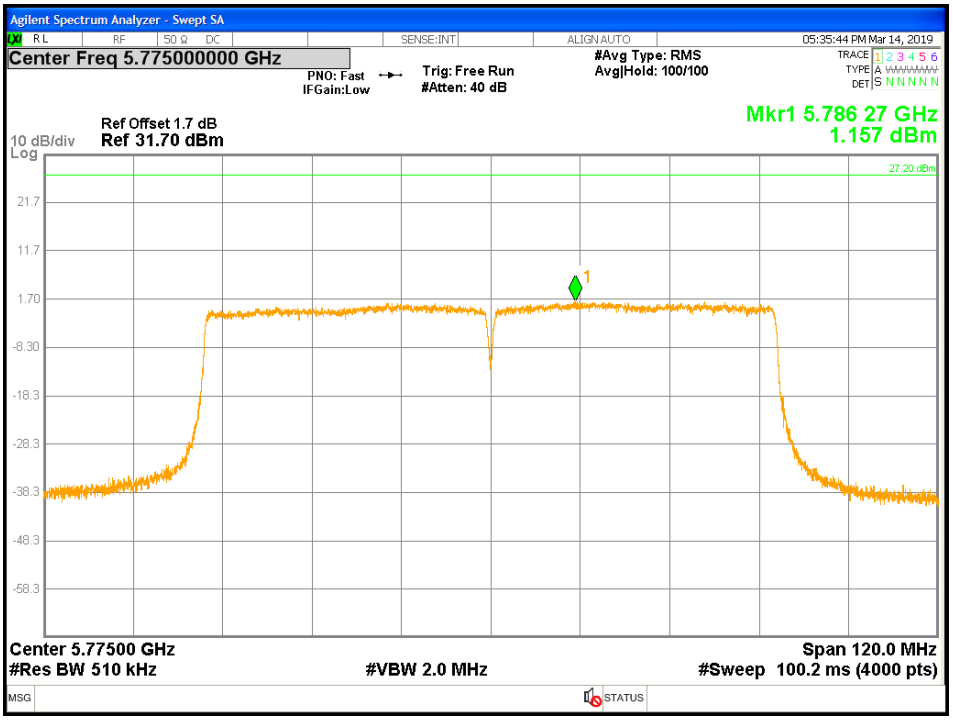


Figure 149: PPSD-5775MHz-VHT80-4x4-q80-Ch0

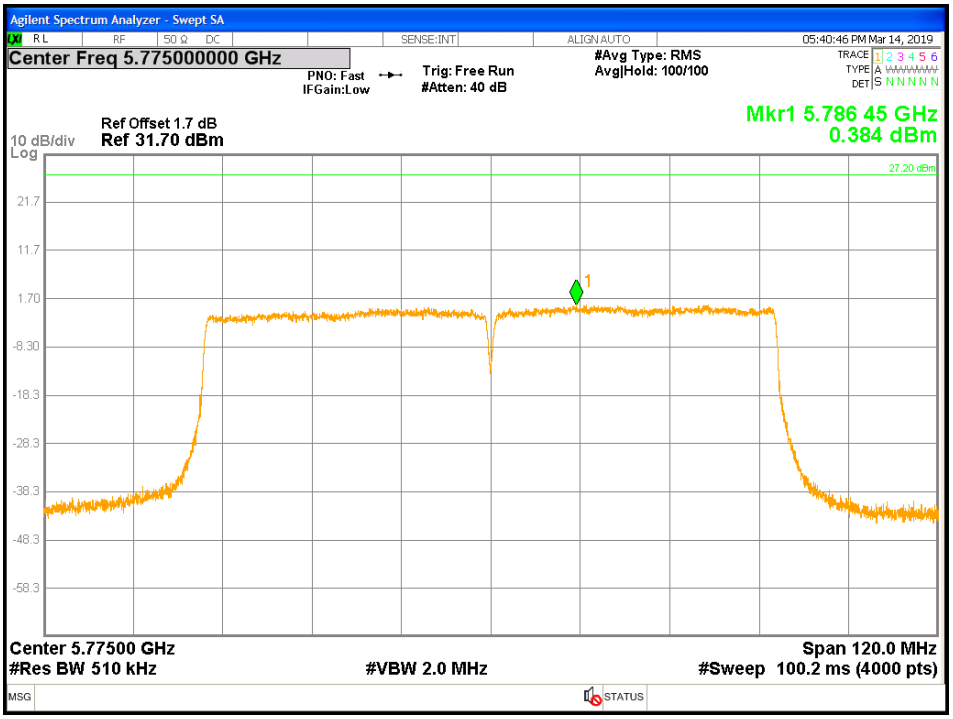


Figure 150: PPSD-5775MHz-VHT80-4x4-q80-Ch1

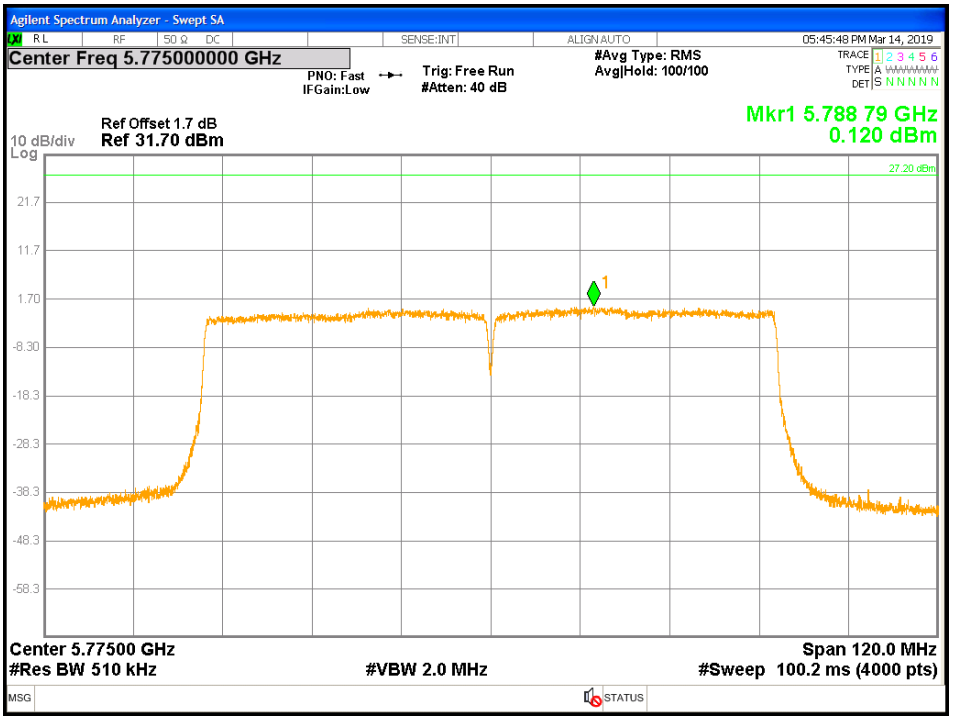


Figure 151: PPSD-5775MHz-VHT80-4x4-q80-Ch2

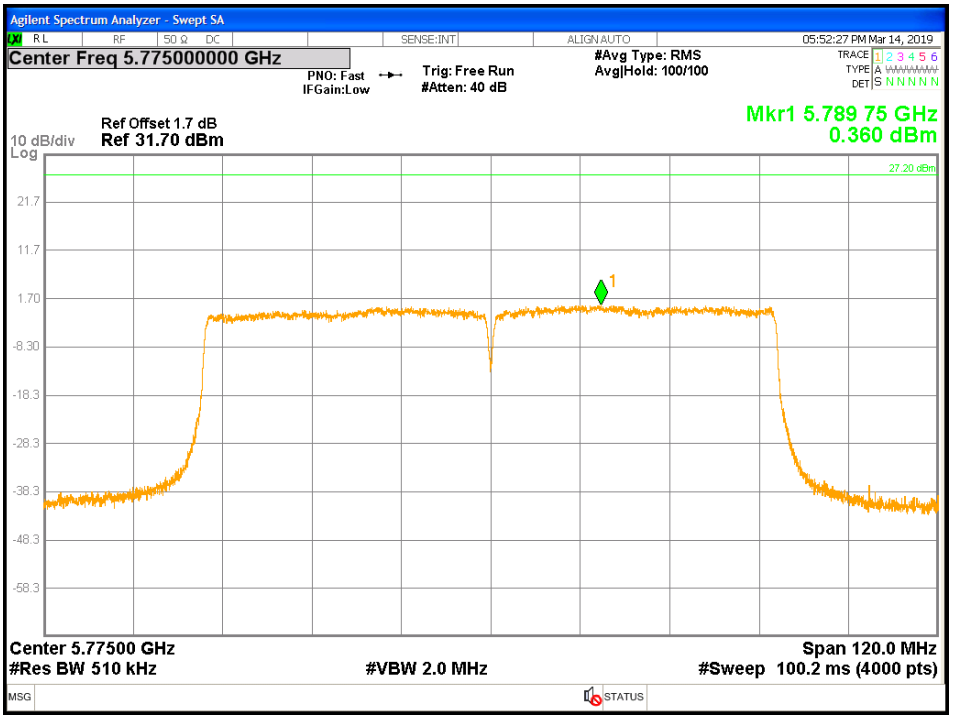


Figure 152: PPSD-5775MHz-VHT80-4x4-q80-Ch3

4.4 Transmitter Spurious Emissions

Transmitter spurious emissions are emissions outside the frequency range of the equipment when the equipment is in transmit mode; per requirement of CFR47 15.205, 15.209, 15.407(b), RSS 247 Sect. 6.2.4.2

4.4.1 Test Methodology

4.4.1.1 Preliminary Test

A test program that controls instrumentation and data logging was used to automate the preliminary RF emission test procedure. The frequency range of interest was divided into sub-ranges to yield a frequency resolution of approximately 120 kHz and provide a reading at each frequency for no more than 12° of turntable rotation. For each frequency sub-range the turntable was rotated 360° while peak emission data was recorded and plotted over the frequency range of interest in horizontal and vertical antenna polarization's.

Preliminary emission profile testing was performed inside the anechoic chamber. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm (<1 GHz) and 150cm (>1 GHz) above the floor. The EUT was positioned as shown in the setup photographs. The receiving antenna was placed at a distance of 3m at a fixed height of 1m. Measurement equipment was located outside of the chamber. A video camera was placed inside the chamber to view the EUT.

Pres-scans were performed to determine the worst data rate / chains for 802.11a, 802.11n (HT20 and HT40), 802.11ac (VHT80).

4.4.1.2 Final Test

For each frequency measured, the peak emission was maximized by manipulating the receiving antenna from 1 to 4 meters above the ground plane and placing it at the position that produced the maximum signal strength reading. The turntable was then rotated through 360° while observing the peak signal and placing the EUT at the position that produced maximum radiation. The six highest emissions relative to the limit were measured unless such emissions were more than 20 dB below the limit. If less than six emissions are within 20 dB of the limit, than the noise level of the receiver is measured at frequencies where emissions are expected. Multiples of all oscillator and microprocessor frequencies were also checked.

Final testing was performed on an NSA compliant test site. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm (<1 GHz) and 150cm (>1 GHz) above the ground plane. The placement of EUT and cables were the same as for preliminary testing and is shown in the setup photographs.

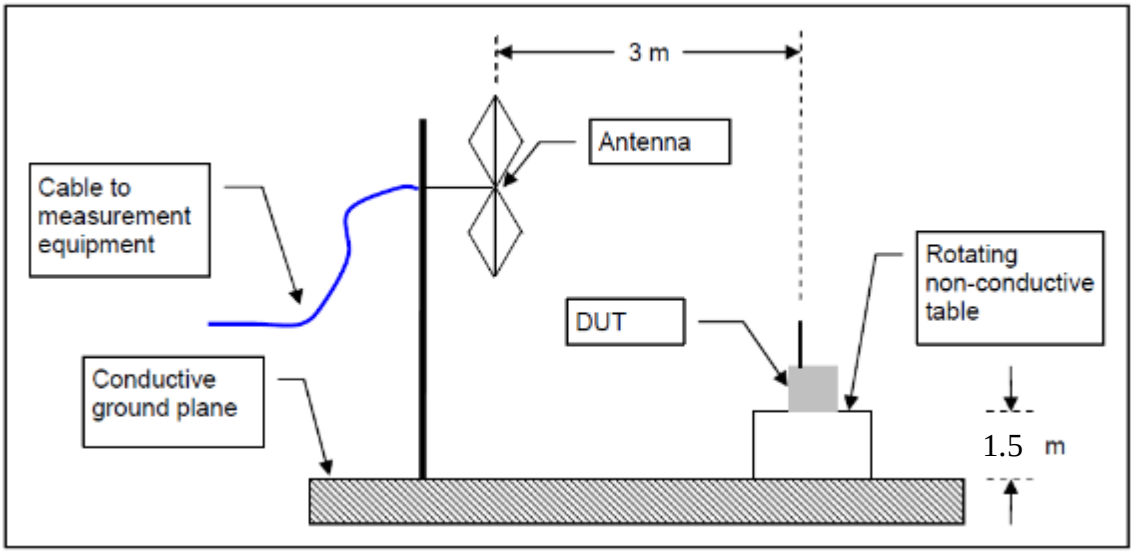
Final results are:

1. 802.11n HT20 at MCS0 with 4 Chains – Beamforming (covering 802.11a & VHT20)
2. HT40 at MCS0 with 4 Chains – Beamforming (covering VHT40)
3. VHT80 at MCS0 with 4 Chains – Beamforming

4.4.1.3 Deviations

None.

Test Setup:



4.4.2 Transmitter Spurious Emission Limit

The spurious emissions of the transmitter shall not exceed the values in CFR47 Part 15.205, 15.209: and RSS 247 Sect. 6.2.4.2.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
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

In the 5725 MHz – 5850 MHz band, all emissions shall be limited to a level of:

a) 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges;
b) 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;
c) 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and
d) -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

4.4.3 Test Results

The final measurement data was taken under the worst case operating modes, configurations, and/or cable positions. It also reflects the results including any modifications and/or special accessories listed in Sections 1.4 and test plan.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 8: Transmit Spurious Emission at Band-Edge Requirements

Test Date: February 20, 2019	**Test By:** Kerwinn Corpus
Test Method: Conducted Measurements	**Power Setting:** See test plan
Antenna Type: PCB	**Signal State**: Modulated
Directional Antenna Gain: + 8.8 dBi	**Max Antenna Gain:** + 4.6 dBi
Ambient Temp.: 22 °C	**Relative Humidity:**46%

Band-Edge Results

Freq. (MHz)	Level (dBuV/m)	Duty Cycle (dB)	Limit (dBuV/m)	Margin (dB)	Pol. (V/H)	Det.	Table Deg.	Tower (cm)	Note
5933.17	67.75	0.00	68.23	-0.48	V	Pk	225	230	Fig. 153: HT20-MCS0-5745MHz-q96
5933.87	67.36	0.00	68.23	-0.87	H	Pk	242	108	Fig. 154: HT20-MCS0-5745MHz-q96
5945.09	67.97	0.00	68.23	-0.26	V	Pk	196	224	Fig. 155: HT20-MCS0-5825MHz-q96
5642.79	67.45	0.00	68.23	-0.78	H	Pk	243	103	Fig. 156: HT20-MCS0-5825MHz-q96
5927.56	67.68	0.16	68.23	-0.39	V	Pk	203	227	Fig. 157: HT40-MCS0-5755MHz-q90
5937.37	67.12	0.16	68.23	-0.95	H	Pk	247	118	Fig. 158: HT40-MCS0-5755MHz-q90
5931.76	67.91	0.16	68.23	-0.16	V	Pk	194	202	Fig. 159: HT40-MCS0-5795MHz-q94
5943.69	67.65	0.16	68.23	-0.42	H	Pk	119	136	Fig. 160: HT40-MCS0-5795MHz-q94
5930.36	67.61	0.20	68.23	-0.42	V	Pk	199	214	Fig. 161: VHT80-MCS0-5775MHz-q80
5938.08	67.49	0.20	68.23	-0.54	H	Pk	248	115	Fig. 162: VHT80-MCS0-5775MHz-q80

Note: 1. Band-edge frequencies for UNII Band 3 are not a restricted band.
2. Above results are worst case. HT20 covers 802.11a since both uses the same power level setting.

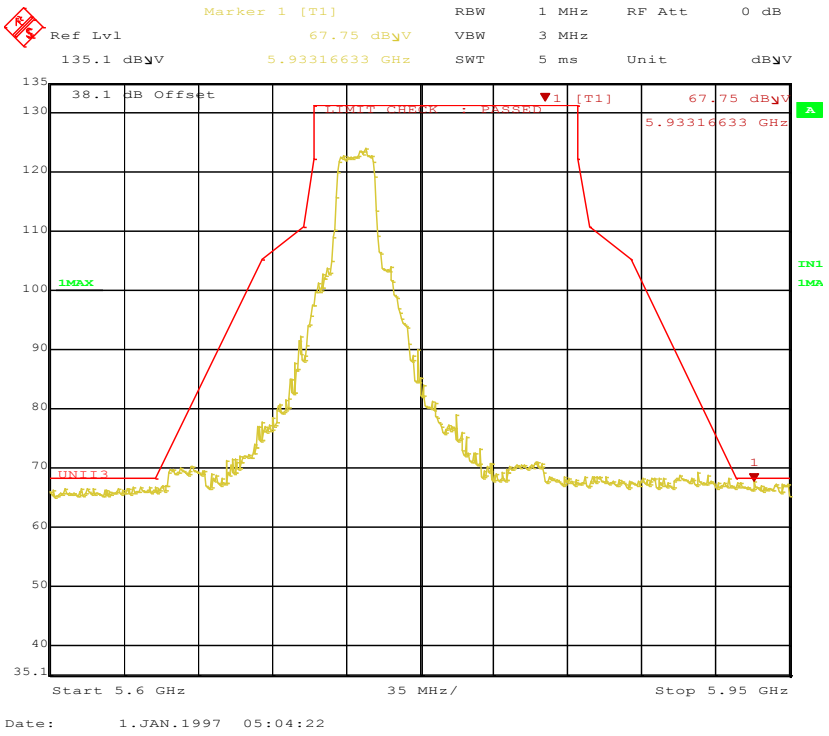


Figure 153: HT20-MCS0-5745MHz-q96-Vert-PK

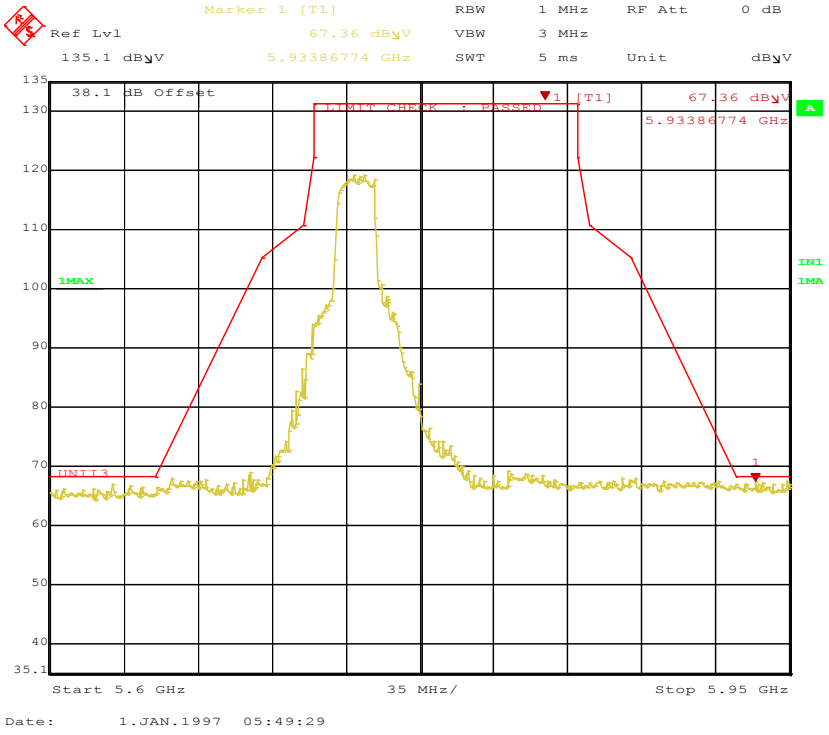


Figure 154: HT20-MCS0-5745MHz-q96-Horz-PK

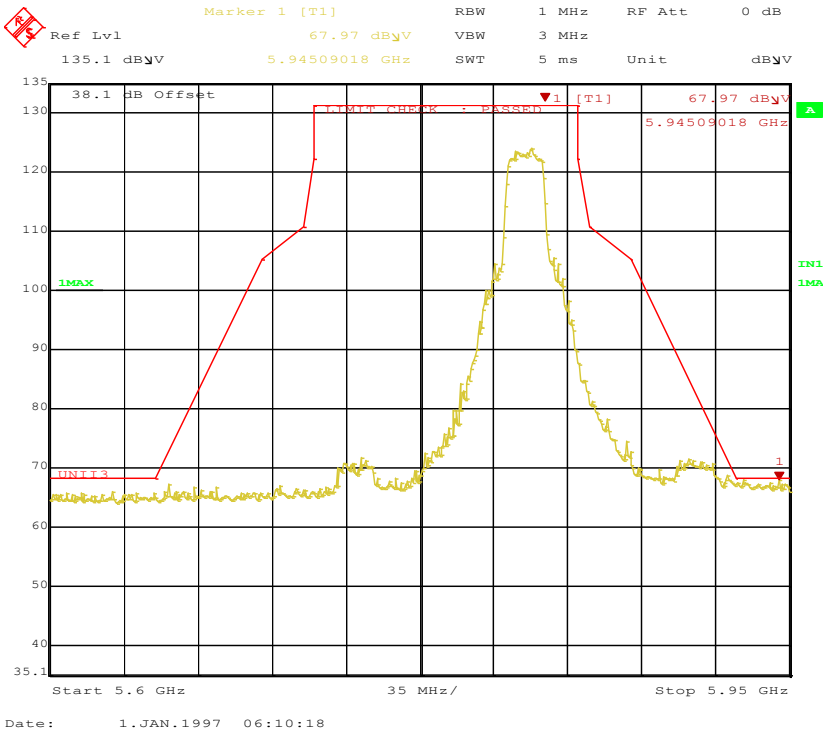


Figure 155: HT20-MCS0-5825MHz-q96-Vert-PK

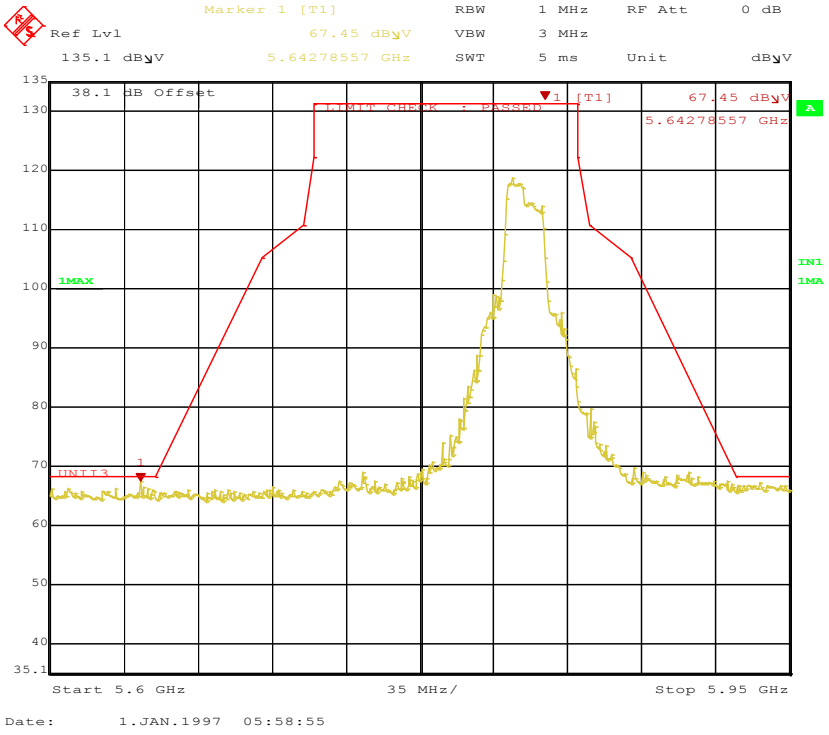


Figure 156: HT20-MCS0-5825MHz-q96-Horz-PK

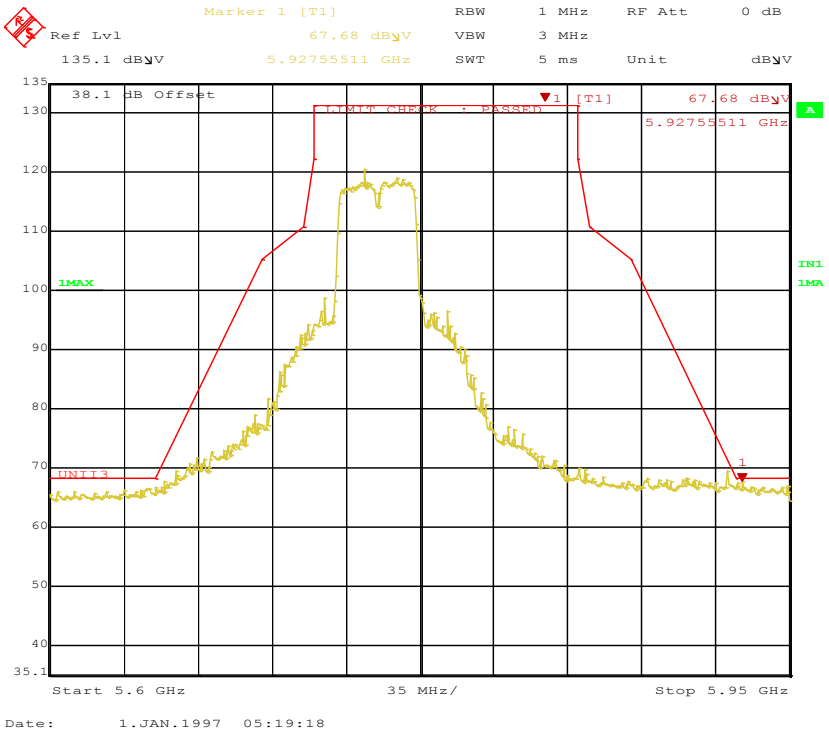


Figure 157: HT40-MCS0-5755MHz-q90-Vert-PK

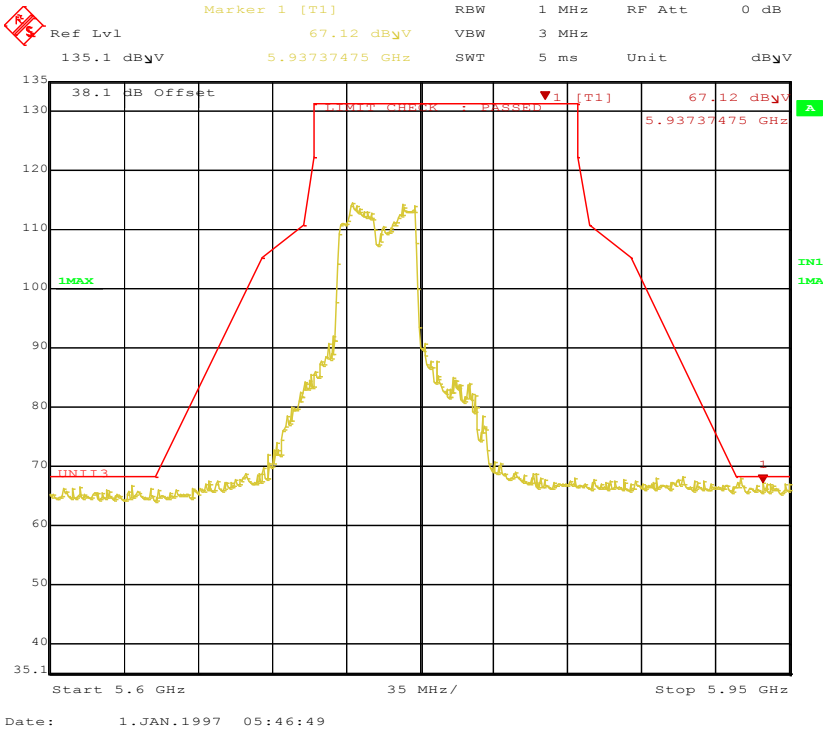


Figure 158: HT40-MCS0-5755MHz-q90-Horz-PK

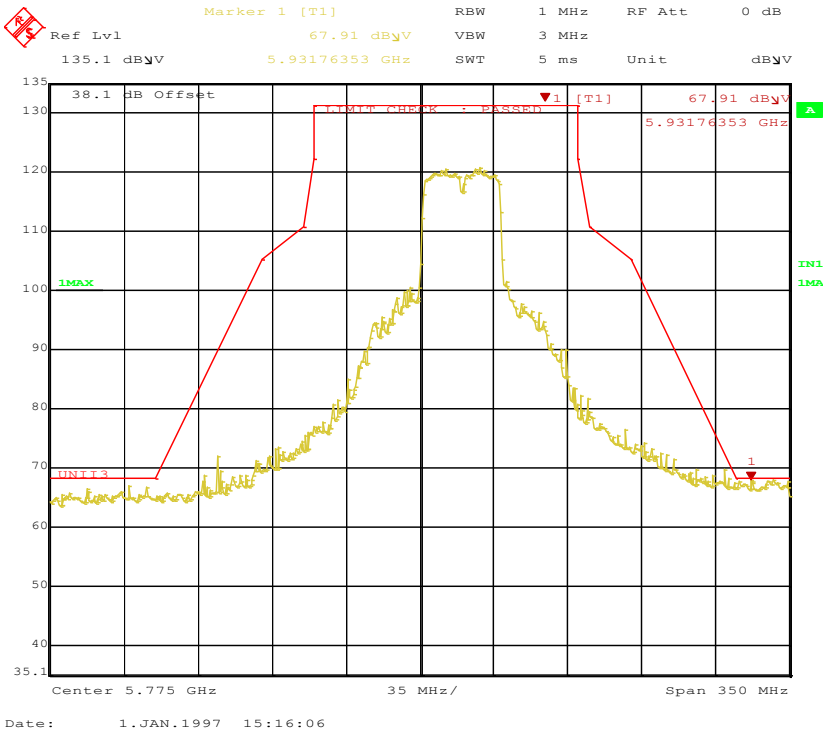


Figure 159: HT40-MCS0-5795MHz-q94-Vert-PK

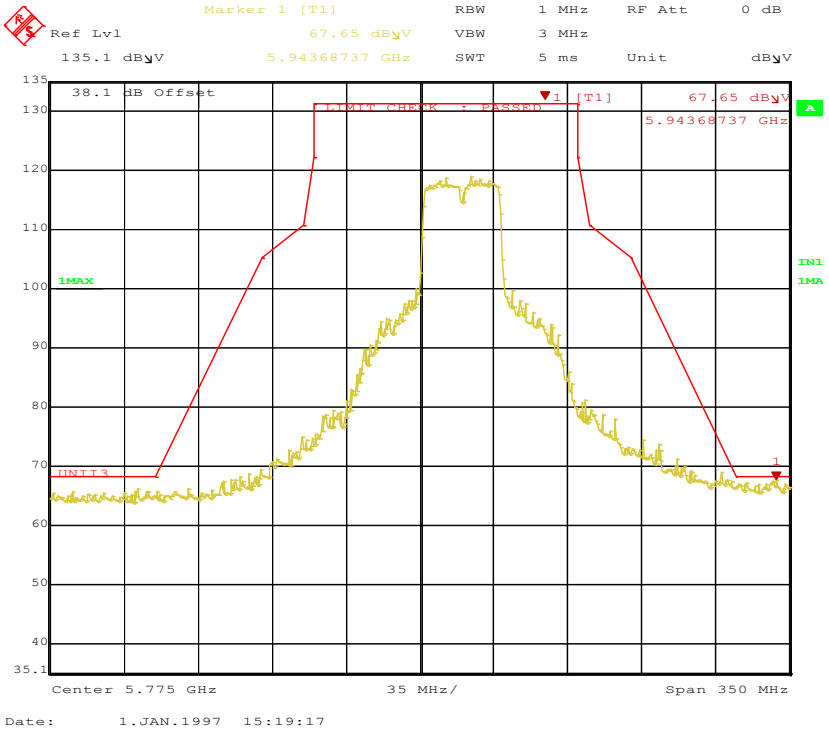


Figure 160: HT40-MCS0-5795MHz-q94-Horz-PK

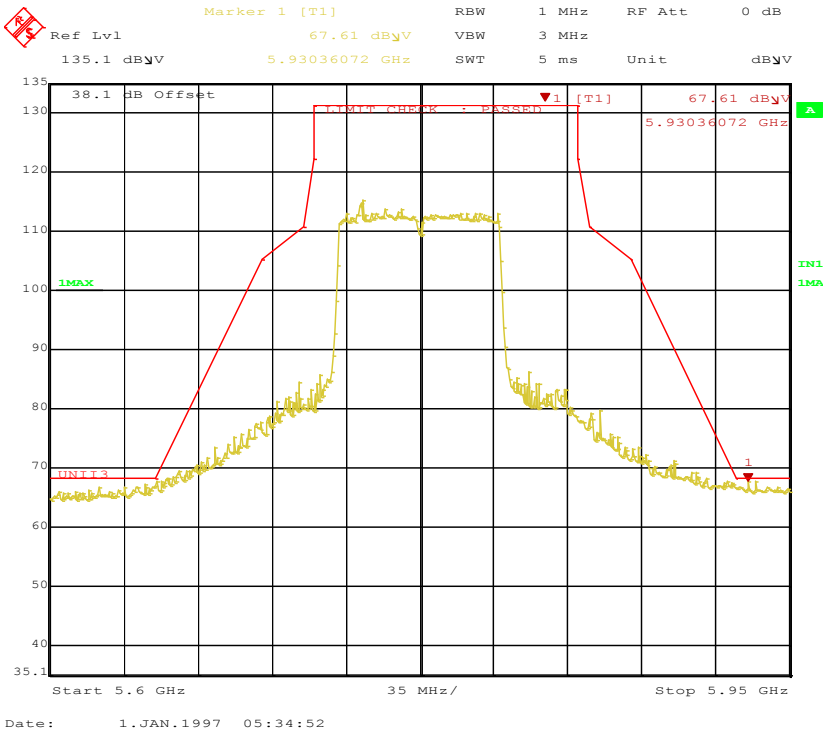


Figure 161: VHT80-MCS0-5775MHz-q80-Vert-PK

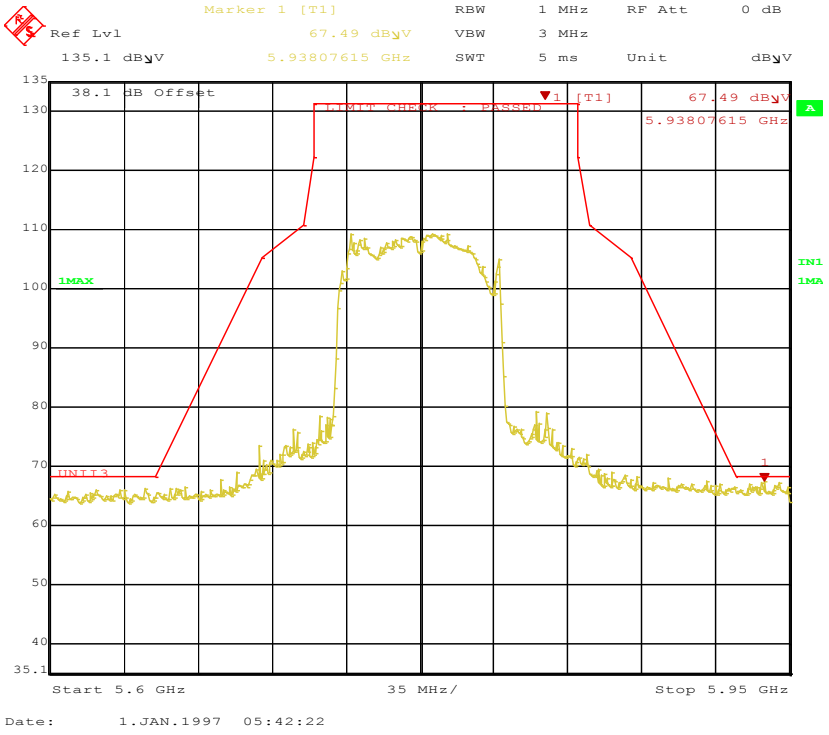
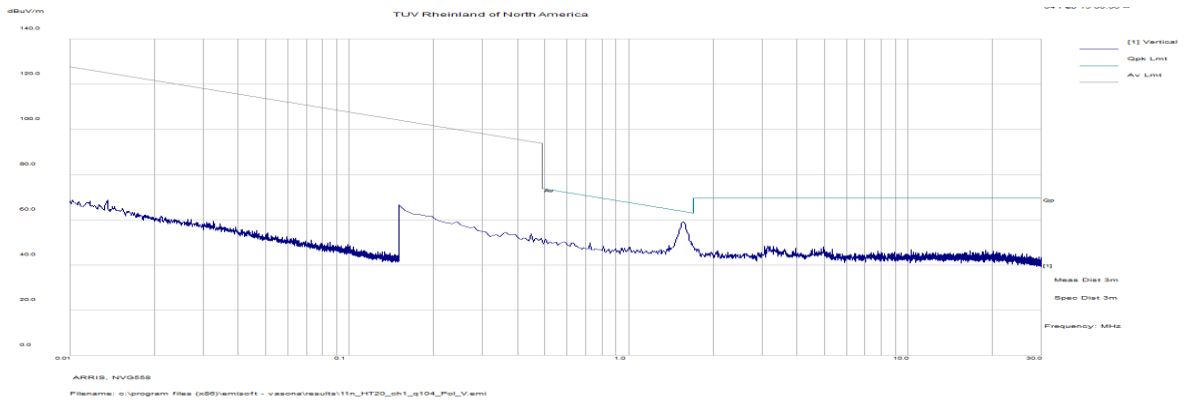


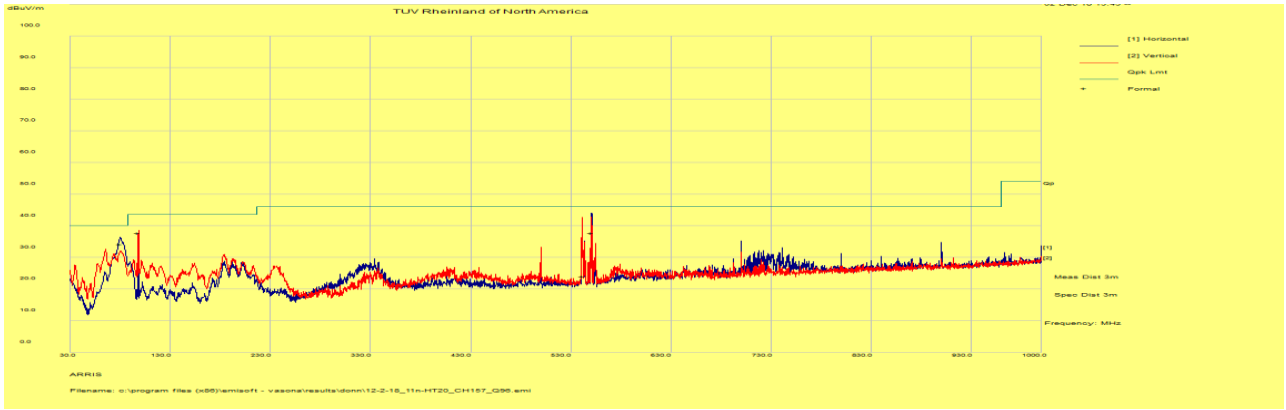
Figure 162: VHT80-MCS0-5775MHz-q80-Horz-PK

SOP 1 Radiated Emissions		Tracking # 31962244.001 Page 1 of 15	
EUT Name	Wi-Fi Module	**Date**	December 2, 2018
EUT Model	NVG5X8AC	**Temp / Hum in**	22° C / 38%rh
EUT Serial	M11839QW0022	**Temp / Hum out**	N/A
EUT Config.	802.11n HT20 at MCS0	**Line AC / Freq**	120 Vac / 60 Hz
Standard	CFR47 Part 15 Subpart E, RSS-247, RSS-GEN	**RBW / VBW**	120 kHz/ 300 kHz
Dist/Ant Used	3m / JB3 /EMCO 6502	**Performed by**	Abraham Avalos

9 kHz – 1 GHz Transmit at 5785 MHz

Frequency	Raw	Cable Loss	AF	Level	Detector	Polarity	Height	Azimuth	Limit	Margin
MHz	dBuV/m	dB	dB	dBuV/m		H/V	cm	deg	dBuV/m	dB
1.57	43.11	2.32	10.60	56.03	QP	V	134	239	63.68	-7.65
80.11	51.93	2.78	-20.45	34.26	QP	H	260	194	40.00	-5.74
550.87	42.99	4.24	-9.44	37.79	QP	H	154	212	46.00	-8.21
98.14	53.30	2.87	-18.50	37.67	QP	V	123	196	43.50	-5.83
541.31	29.40	4.23	-9.54	24.09	QP	V	132	346	46.00	-21.91





Spec Margin = E-Field QP - Limit, E-Field QP = FIM QP+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: 1. Worst case was observed on mid channel of 802.11n HT20, MCS0, 1x4 mode.
2. Modes tested are 802.11a, 802.11n (HT20 & HT40), 802.11ac VHT80, non-beamforming & beamforming.
3. All emissions are less than 68.23 dBuV/m (−27 dBm/MHz e.i.r.p. per CFR47 15.407 (b) & RSS 247 Sect.6.2.4.2)
4. To reduce complexity and bulkiness of the report worst case plots are placed in the report.

SOP 1 Radiated Emissions — Tracking # 31962244.001 Page 2 of 15

EUT Name	Wi-Fi Module	**Date**	Apr 12, 2019
EUT Model	NVG5X8AC	**Temp / Hum in**	22° C / 40%rh
EUT Serial	M11839QW0022	**Temp / Hum out**	N/A
EUT Config.	802.11a at 6Mbps	**Line AC / Freq**	120 Vac / 60 Hz
Standard	CFR47 Part 15 Subpart E, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m – EMCO3115 / 1m – AHA-840	**Performed by**	Abraham Avalos & Colton Aliff

1 – 40 GHz Transmit at 5745 MHz (Low Channel); 4x4 non-Beamforming

Frequency	Raw	Cable Loss	AF	Level	Detector	Polarity	Height	Azimuth	Limit	Margin
MHz	dBuV/m	dB	dB	dBuV/m		H/V	cm	deg	dBuV/m	dB
*5990.21	73.55	3.90	-21.82	55.63	Pk	H	150	80	68.23	-12.60
11492.12	57.55	5.50	-17.30	45.75	Average	H	108	140	54.00	-8.25
17229.57	48.59	6.76	-12.53	42.83	Average	H	163	360	54.00	-11.18
23000.58	49.00	7.60	-10.90	45.7	Average	V	182	94	54.00	-8.3
28729.22	54.50	8.72	-14.07	49.15	Average	V	194	116	54.00	-4.85
39375.31	49.83	10.79	-13.39	47.22	Average	V	165	304	54.00	-6.78

1 – 40 GHz Transmit at 5785 MHz (Mid Channel); 4x4 non-Beamforming

Frequency	Raw	Cable Loss	AF	Level	Detector	Polarity	Height	Azimuth	Limit	Margin
MHz	dBuV/m	dB	dB	dBuV/m		H/V	cm	deg	dBuV/m	dB
*6018.54	76.48	3.90	-21.69	58.69	Pk	H	100	99	68.23	-9.54
11566.54	53.42	5.53	-17.59	41.37	Average	H	237	158	54.00	-12.63
17362.98	50.46	6.67	-11.58	45.55	Average	H	108	170	54.00	-8.45
23178.32	51.69	7.75	-11.18	48.26	Average	V	163	126	54.00	-5.74
28919.60	50.10	8.70	-14.10	44.7	Average	V	164	46	54.00	-9.3
39141.41	49.87	10.68	-13.01	47.54	Average	H	118	356	54.00	-6.46

1 – 40 GHz Transmit at 5825 MHz (High Channel); 4x4 non-Beamforming

Frequency	Raw	Cable Loss	AF	Level	Detector	Polarity	Height	Azimuth	Limit	Margin
MHz	dBuV/m	dB	dB	dBuV/m		H/V	cm	deg	dBuV/m	dB
*6075.21	79.08	3.90	-21.63	61.35	Pk	H	150	80	68.23	-6.88
11651.92	60.84	5.60	-17.31	49.13	Average	H	116	154	54.00	-4.87
17470.74	52.33	6.78	-10.65	48.47	Average	H	131	146	54.00	-5.53
23319.63	47.50	7.70	-11.40	43.8	Average	H	158	134.00	54.00	-10.2
29125.35	49.80	8.80	-14.10	44.5	Average	V	194	78.00	54.00	-9.5
38491.77	49.23	10.32	-11.88	47.67	Average	H	151	156.00	54.00	-6.33

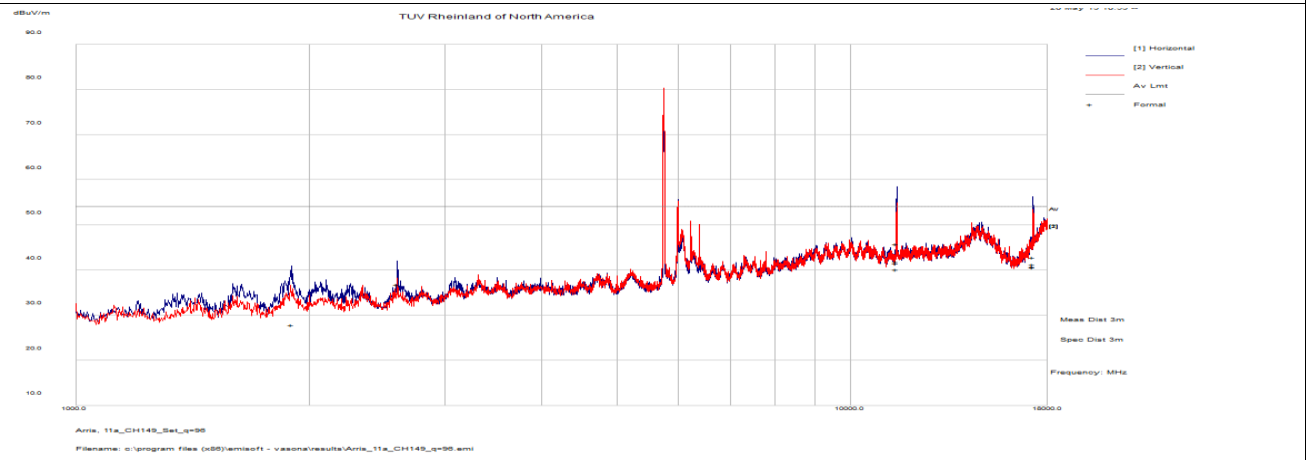
Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: 1. Evaluated 1x4 and 4x4 mode. Worst case was observed on 802.11a, 6Mbps, 4x4 mode.
2. Modes covered are HT20 and VHT20, non-Beamforming and Beamforming.
3. * = non-restricted emissions. Limit = 68.23 dBuV/m (-27 dBm/MHz; E.I.R.P.)

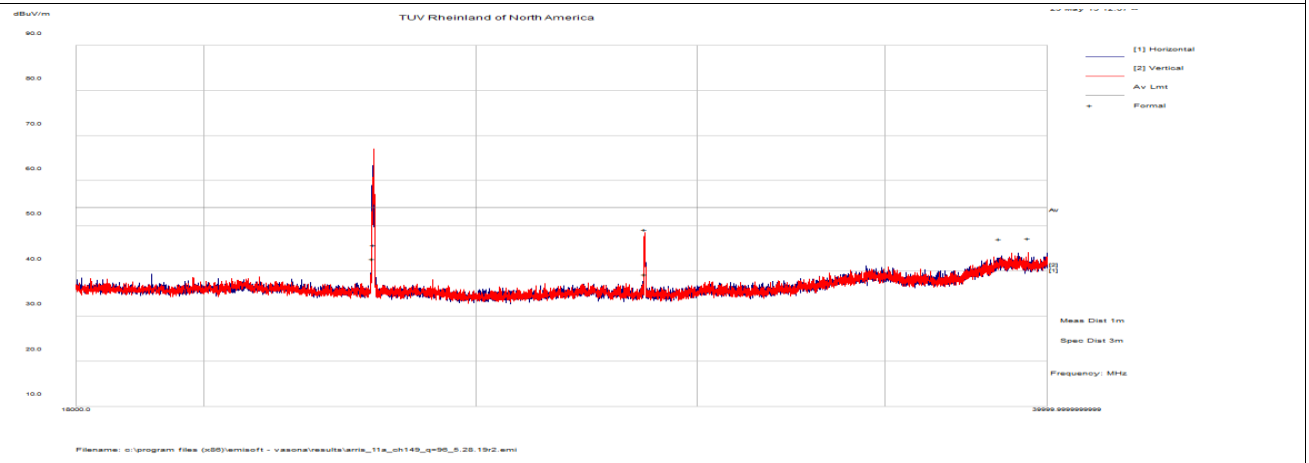
SOP 1 Radiated Emissions		Tracking # 31962244.001 Page 3 of 15	
EUT Name	Wi-Fi Module	**Date**	Apr 12, 2019
EUT Model	NVG5X8AC	**Temp / Hum in**	22° C / 40%rh
EUT Serial	M11839QW0022	**Temp / Hum out**	N/A
EUT Config.	802.11a at 6Mbps	**Line AC / Freq**	120 Vac / 60 Hz
Standard	CFR47 Part 15 Subpart E, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m – EMCO3115 / 1m – AHA-840	**Performed by**	Abraham Avalos & Colton Aliff

1 – 40 GHz Transmit at 5745 MHz (Low Channel)); 4x4 non-Beamforming

1 – 18 GHz Plot



18 – 40 GHz Plot



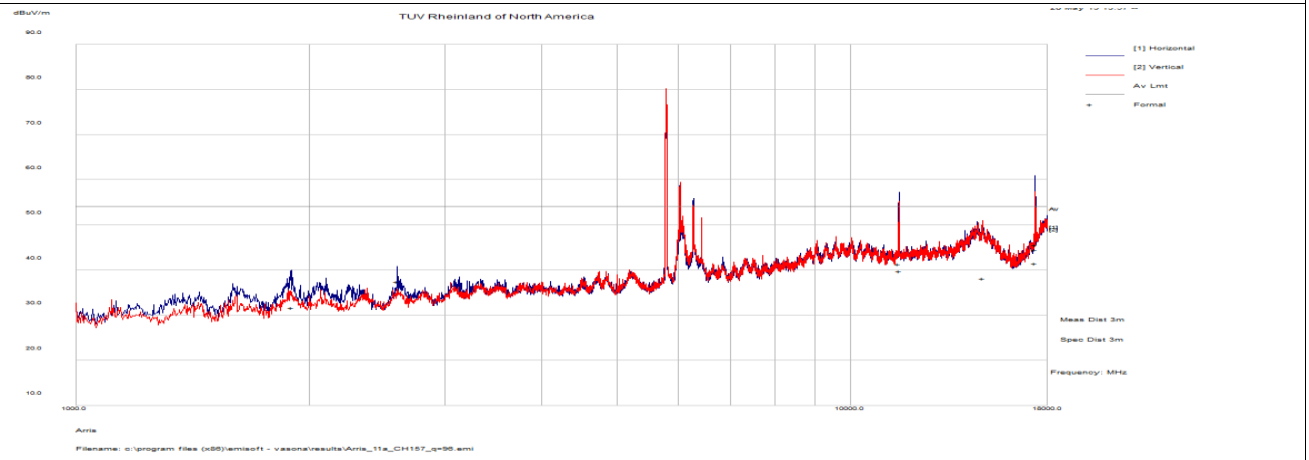
Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: 1. Worst case was observed on 802.11a, 6Mbps mode.
2. Modes covered are HT20 and VHT20, non-Beamforming and Beamforming.
3. 1-18 GHz range, emission 20 dB above the limit is the fundamental frequency.
4. To reduce complexity and bulkiness of the report Worst case Plots are placed in the report.

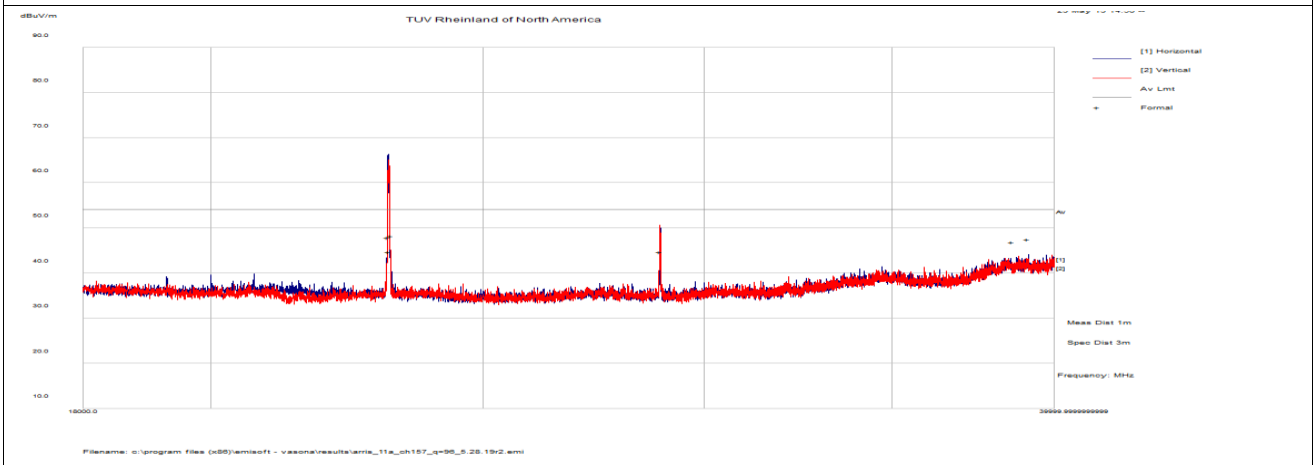
SOP 1 Radiated Emissions		Tracking # 31962244.001 Page 4 of 15	
EUT Name	Wi-Fi Module	**Date**	Apr 12, 2019
EUT Model	NVG5X8AC	**Temp / Hum in**	22° C / 40%rh
EUT Serial	M11839QW0022	**Temp / Hum out**	N/A
EUT Config.	802.11a at 6Mbps	**Line AC / Freq**	120 Vac / 60 Hz
Standard	CFR47 Part 15 Subpart E, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m – EMCO3115 / 1m – AHA-840	**Performed by**	Abraham Avalos & Colton Aliff

1 – 40 GHz Transmit at 5785 MHz (Mid Channel)); 4x4 non-Beamforming

1 – 18 GHz Plot



18 – 40 GHz Plot



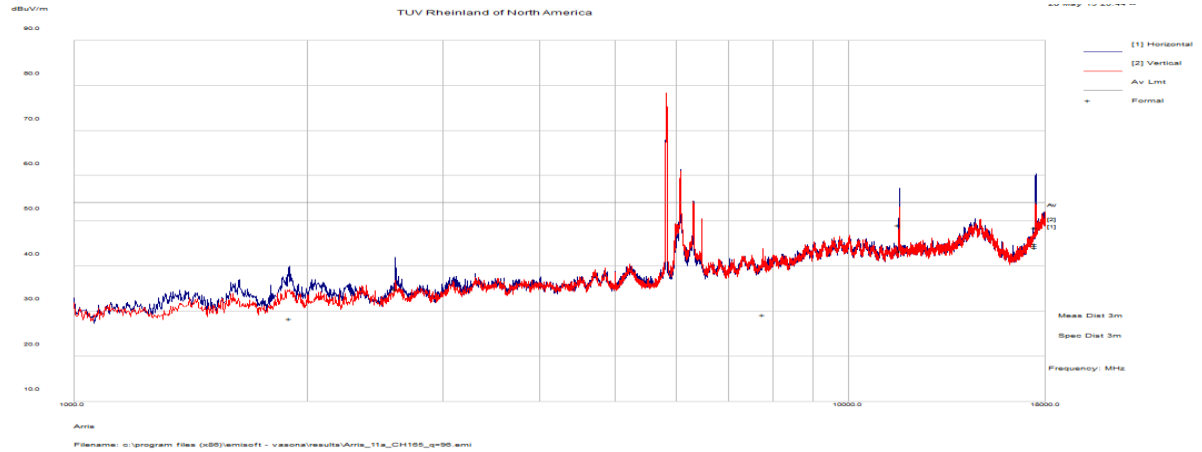
Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: 1. Worst case was observed on 802.11a, 6Mbps mode.
2. Modes covered are HT20 and VHT20, non-Beamforming and Beamforming.
3. 1-18 GHz range, emission 20 dB above the limit is the fundamental frequency.
4. To reduce complexity and bulkiness of the report Worst case Plots are placed in the report.

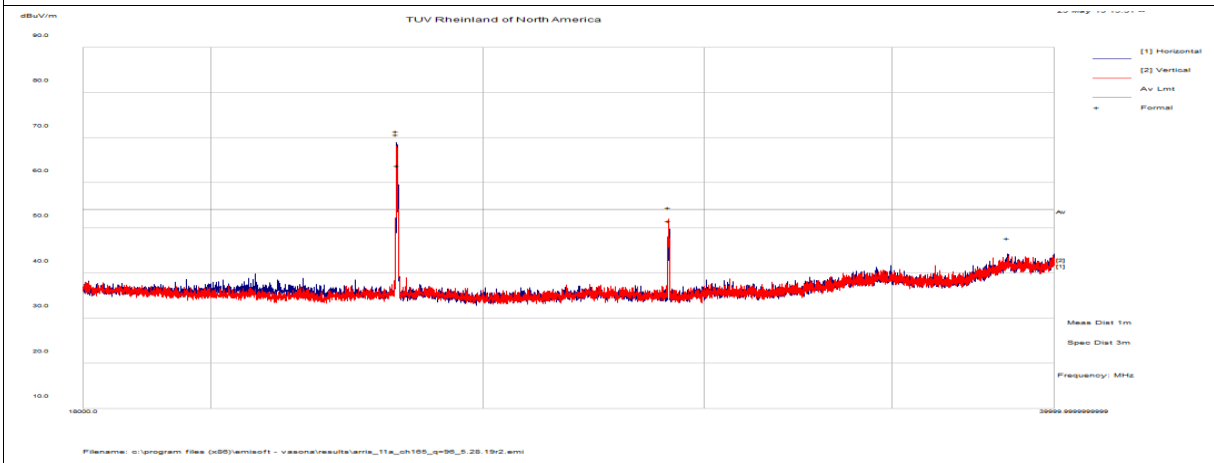
SOP 1 Radiated Emissions		Tracking # 31962244.001 Page 5 of 15	
EUT Name	Wi-Fi Module	**Date**	Apr 12, 2019
EUT Model	NVG5X8AC	**Temp / Hum in**	22° C / 40%rh
EUT Serial	M11839QW0022	**Temp / Hum out**	N/A
EUT Config.	802.11a at 6Mbps	**Line AC / Freq**	120 Vac / 60 Hz
Standard	CFR47 Part 15 Subpart E, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m – EMCO3115 / 1m – AHA-840	**Performed by**	Abraham Avalos & Colton Aliff

1 – 40 GHz Transmit at 5825 MHz (High Channel)); 4x4 non-Beamforming

1 – 18 GHz Plot



18 – 40 GHz Plot



Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: 1. Worst case was observed on 802.11a, 6Mbps mode.
2. Modes covered are HT20 and VHT20, non-Beamforming and Beamforming.
3. 1-18 GHz range, emission 20 dB above the limit is the fundamental frequency.
4. To reduce complexity and bulkiness of the report Worst case Plots are placed in the report.

SOP 1 Radiated Emissions

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EUT Name	Wi-Fi Module	**Date**	Apr 12, 2019
EUT Model	NVG5X8AC	**Temp / Hum in**	22° C / 40%rh
EUT Serial	M11839QW0022	**Temp / Hum out**	N/A
EUT Config.	802.11n HT40 at MCS0	**Line AC / Freq**	120 Vac / 60 Hz
Standard	CFR47 Part 15 Subpart E, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m – EMCO3115 / 1m – AHA-840	**Performed by**	Abraham Avalos & Colton Aliff

1 – 40 GHz Transmit at 5755 MHz (Low Channel); 4x4 non-Beamforming

Frequency	Raw	Cable Loss	AF	Level	Detector	Polarity	Height	Azimuth	Limit	Margin
MHz	dBuV/m	dB	dB	dBuV/m		H/V	cm	deg	dBuV/m	dB
*6393.96	75.49	4.00	-21.78	57.72	Pk	V	100	202	68.23	-10.51
11515.14	50.41	5.50	-17.19	38.72	Average	H	244	122	54.00	-15.28
17876.03	40.43	6.80	-7.74	39.49	Average	H	204	352	54.00	-14.52
22979.21	51.30	7.60	-10.90	48	Average	H	146	332.00	54.00	-6
38604.84	48.53	10.49	-12.07	46.95	Average	V	101	322.00	54.00	-7.06

1 – 40 GHz Transmit at 5795 MHz (High Channel); 4x4 non-Beamforming

Frequency	Raw	Cable Loss	AF	Level	Detector	Polarity	Height	Azimuth	Limit	Margin
MHz	dBuV/m	dB	dB	dBuV/m		H/V	cm	deg	dBuV/m	dB
*6440.00	75.40	4.00	-21.75	57.65	Pk	V	200	233	68.23	-10.58
11612.31	54.70	5.60	-17.51	42.79	Average	H	171	86	54.00	-11.21
17910.47	40.53	6.84	-7.93	39.44	Average	H	230	26	54.00	-14.56
*23181.20	62.22	7.76	-11.18	58.80	Average	V	174	312	68.23	-9.43
28960.45	51.69	8.76	-14.08	46.37	Average	H	168	0	54.00	-7.63
39458.35	49.50	10.84	-13.53	46.82	Average	V	170	0	54.00	-7.18

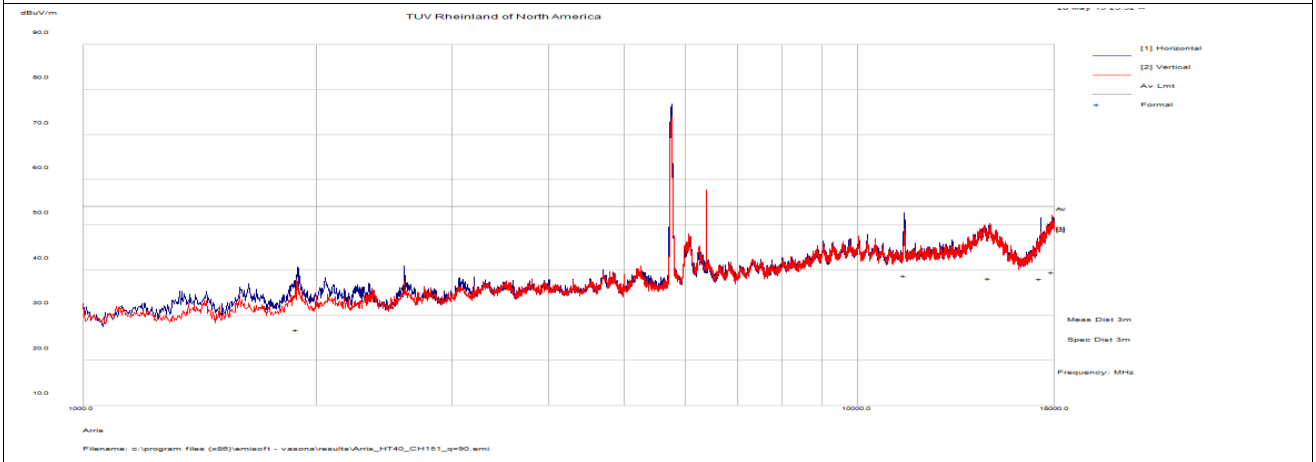
Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: 1. Evaluated 1x4 and 4x4 mode (non-Beamforming & Beamforming). Worst case was observed on 802.11n HT40, MCS0, 4x4 non-Beamforming mode.
2. Mode covered is VHT40, non-Beamforming and Beamforming.
3. * = non-restricted emissions. Limit = 68.23 dBuV/m (-27 dBm/MHz; E.I.R.P.)

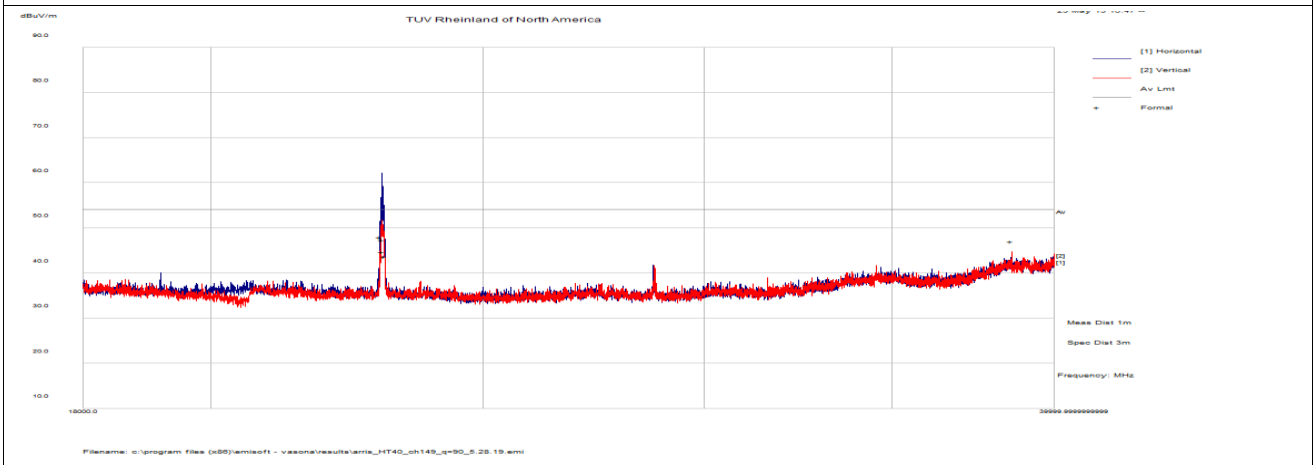
SOP 1 Radiated Emissions		Tracking # 31962244.001 Page 5 of 15	
EUT Name	Wi-Fi Module	**Date**	Apr 12, 2019
EUT Model	NVG5X8AC	**Temp / Hum in**	22° C / 40%rh
EUT Serial	M11839QW0022	**Temp / Hum out**	N/A
EUT Config.	802.11n HT40 at MCS0	**Line AC / Freq**	120 Vac / 60 Hz
Standard	CFR47 Part 15 Subpart E, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m – EMCO3115 / 1m – AHA-840	**Performed by**	Abraham Avalos & Colton Aliff

1 – 40 GHz Transmit at 5755 MHz (Low Channel)); 4x4 non-Beamforming

1 – 18 GHz Plot



18 – 40 GHz Plot



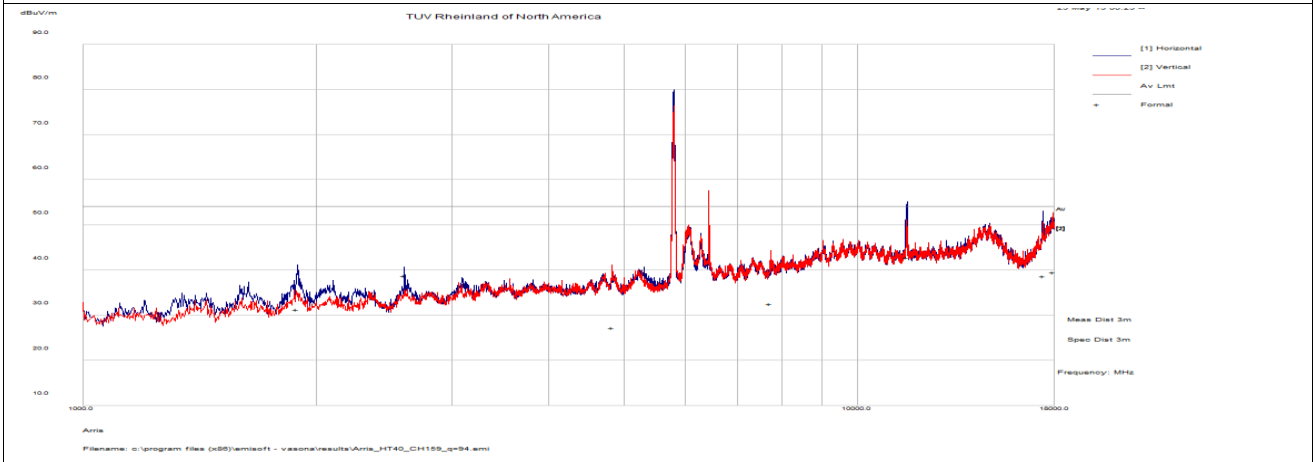
Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: 1. Evaluated 1x4 and 4x4 mode (non-Beamforming & Beamforming). Worst case was observed on 802.11n HT40, MCS0, 4x4 non-Beamforming mode.
2. Mode covered is VHT40, non-Beamforming and Beamforming.
3. 1-18 GHz range, emission 20 dB above the limit is the fundamental frequency.
4. To reduce complexity and bulkiness of the report Worst case Plots are placed in the report.

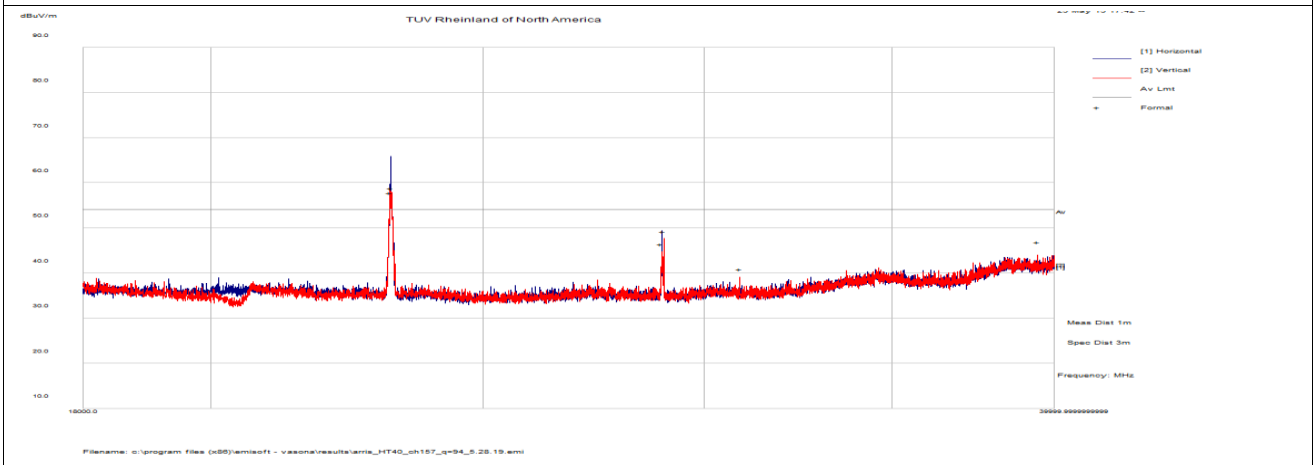
SOP 1 Radiated Emissions		Tracking # 31962244.001 Page 5 of 15	
EUT Name	Wi-Fi Module	**Date**	Apr 12, 2019
EUT Model	NVG5X8AC	**Temp / Hum in**	22° C / 40%rh
EUT Serial	M11839QW0022	**Temp / Hum out**	N/A
EUT Config.	802.11n HT40 at MCS0	**Line AC / Freq**	120 Vac / 60 Hz
Standard	CFR47 Part 15 Subpart E, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m – EMCO3115 / 1m – AHA-840	**Performed by**	Abraham Avalos & Colton Aliff

1 – 40 GHz Transmit at 5795 MHz (High Channel)); 4x4 non-Beamforming

1 – 18 GHz Plot



18 – 40 GHz Plot



Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: 1. Evaluated 1x4 and 4x4 mode (non-Beamforming & Beamforming). Worst case was observed on 802.11n HT40, MCS0, 4x4 non-Beamforming mode.
2. Mode covered is VHT40, non-Beamforming and Beamforming.
3. 1-18 GHz range, emission 20 dB above the limit is the fundamental frequency.
4. To reduce complexity and bulkiness of the report Worst case Plots are placed in the report.

SOP 1 Radiated Emissions

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EUT Name	Wi-Fi Module	**Date**	Apr 12, 2019
EUT Model	NVG5X8AC	**Temp / Hum in**	22° C / 40%rh
EUT Serial	M11839QW0022	**Temp / Hum out**	N/A
EUT Config.	802.11ac VHT80 at MCS0	**Line AC / Freq**	120 Vac / 60 Hz
Standard	CFR47 Part 15 Subpart E, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m – EMCO3115 / 1m – AHA-840	**Performed by**	Abraham Avalos & Colton Aliff

1 – 40 GHz Transmit at 5775 MHz (Mid Channel); 4x4 non-Beamforming

Frequency	Raw	Cable Loss	AF	Level	Detector	Polarity	Height	Azimuth	Limit	Margin
MHz	dBuV/m	dB	dB	dBuV/m		H/V	cm	deg	dBuV/m	dB
6416.70	66.57	4.00	-21.74	48.83	Average	H	227	92	54.00	-5.17
11550.13	50.58	5.50	-17.39	38.69	Average	H	120	148	54.00	-15.31
14619.26	44.65	6.14	-12.95	37.84	Average	H	224	36	54.00	-16.16
17904.09	40.55	6.82	-7.90	39.46	Average	H	109	214	54.00	-14.54
19249.68	49.66	7.20	-8.99	47.88	Average	H	149	6	54.00	-6.13
23100.07	53.48	7.70	-11.08	50.11	Average	H	162	134	54.00	-3.89
38503.66	49.86	10.32	-11.89	48.29	Average	H	184	80	54.00	-5.71

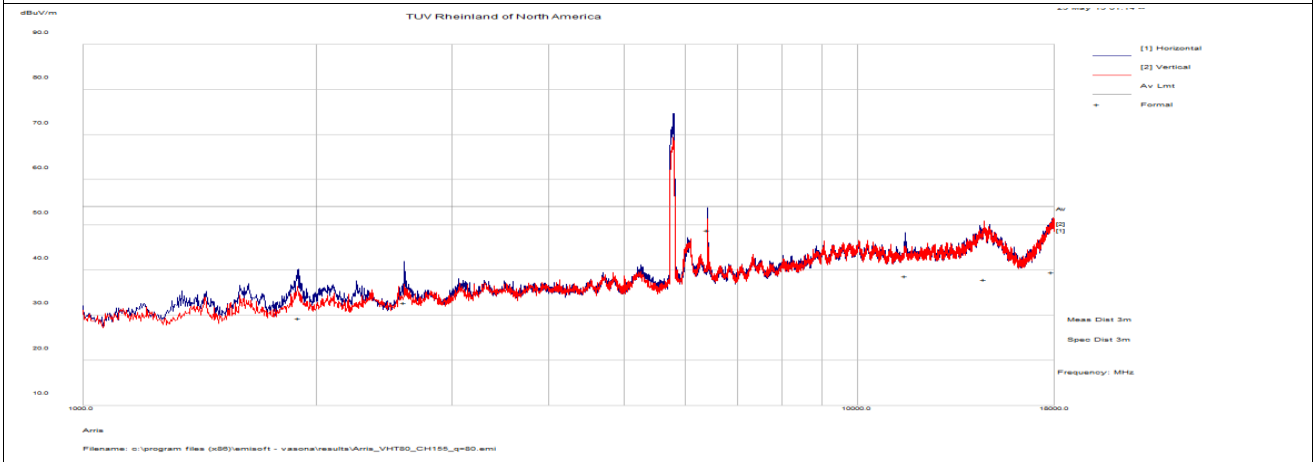
Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: Evaluated 1x4 and 4x4 mode (non-Beamforming & Beamforming). Worst case was observed on 4x4 non-Beamforming mode.

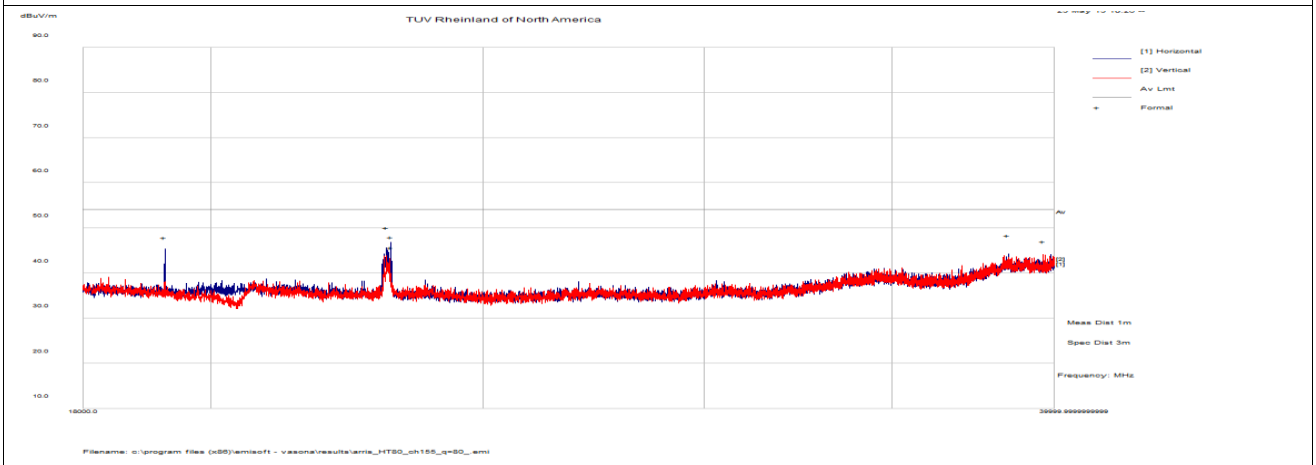
SOP 1 Radiated Emissions		Tracking # 31962244.001 Page 5 of 15	
EUT Name	Wi-Fi Module	**Date**	Apr 12, 2019
EUT Model	NVG5X8AC	**Temp / Hum in**	22° C / 40%rh
EUT Serial	M11839QW0022	**Temp / Hum out**	N/A
EUT Config.	802.11ac VHT80 at MCS0	**Line AC / Freq**	120 Vac / 60 Hz
Standard	CFR47 Part 15 Subpart E, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m – EMCO3115 / 1m – AHA-840	**Performed by**	Abraham Avalos & Colton Aliff

1 – 40 GHz Transmit at 5775 MHz (Mid Channel)); 4x4 non-Beamforming

1 – 18 GHz Plot



18 – 40 GHz Plot



Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: 1. Evaluated 1x4 and 4x4 mode (non-Beamforming & Beamforming). Worst case was observed on 4x4 non-Beamforming mode.
2. 1-18 GHz range, emission 20 dB above the limit is the fundamental frequency.
3. To reduce complexity and bulkiness of the report Worst case Plots are placed in the report.

4.5 AC Conducted Emissions

Testing was performed in accordance with ANSI C63.4: 2014. These test methods are listed under the laboratory's A2LA Scope of Accreditation.

This test measures the levels emanating from the EUT's AC input port, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

The AC conducted emissions of equipment under test shall not exceed the values in CFR47 Part 15.207 and RSS GEN Sect. 8.8.

4.5.1 Test Methodology

A test program that controls instrumentation and data logging was used to automate the AC Power Line Conducted emission test procedure. The frequency range of interest was divided into sub-ranges such as to yield a frequency resolution of 9 kHz. Each phase and neutral of the AC power line were measured with respect to ground. Measurements were performed using a set of 50μH / 50Ω LISNs.

Testing is performed in Lab 5. The setup photographs clearly identify which site was used. The vertical ground plane used in the semi-anechoic chamber is a 2m x 2m solid aluminum frame and panel, and it is bonded to the horizontal ground plane.

In the case of tabletop equipment, the EUT is placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane and 40cm from a vertical ground reference plane. The rear of the EUT was positioned flush with the backside of the table and directly over the LISNs. The power and I/O cables were routed over the edge of the table and bundled approximately 40cm from the ground plane. Support equipment was powered from a separate LISN.

4.5.1.1 Deviations

There were no deviations from this test methodology.

4.5.2 Test Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Test data were extracted from Report Number 31962243.001 (UNII 1) as UNII-1 and UNII-3 band uses the same RF chip.

Table 9: AC Conducted Emissions – Test Results

Test Conditions: Conducted Measurement at Normal Conditions only		
Antenna Type: PCB	**Power Level:** See Test Plan	
AC Power: 120 Vac/60 Hz	**Configuration:** Tabletop	
Ambient Temperature: 22° C	**Relative Humidity:** 41% RH	
Configuration	**Frequency Range**	**Test Result**
Line 1 (Hot)	0.15 to 30 MHz	Pass
Line 2 (Neutral)	0.15 to 30 MHz	Pass

SOP 2 Conducted Emissions

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EUT Name	Wi-Fi Module	**Date**	December 10, 2018
EUT Model	NVG5X8AC	**Temp / Hum in**	22° C / 41% rh
EUT Serial	M11839QW0022	**Temp / Hum out**	N/A
EUT Config.	802.11a TX	**Line AC / Freq**	120Vac/60Hz
Standard	CFR47 Part 15.207 and RSS Gen	**RBW / VBW**	9 kHz / 30 kHz
Lab/LISN	Lab #5 /Com-Power, Line 1	**Performed by**	Abraham Avalos

Frequency	Raw	Limiter	Ins. Loss	Level	Detector	Line	Limit	Margin	Result
MHz	dBuV	dB	dB	dBuV			dBuV	dB	
0.174	35.21	9.82	0.05	45.08	QP	Live	64.75	-19.67	Pass
0.174	19.47	9.82	0.05	29.34	Ave	Live	54.75	-25.41	Pass
0.204	25.95	9.83	0.04	35.82	QP	Live	63.44	-27.62	Pass
0.204	11.97	9.83	0.04	21.84	Ave	Live	53.44	-31.60	Pass
0.303	19.03	9.83	0.03	28.89	QP	Live	60.15	-31.26	Pass
0.303	7.14	9.83	0.03	17.00	Ave	Live	50.15	-33.15	Pass
0.315	17.52	9.83	0.03	27.38	QP	Live	59.85	-32.47	Pass
0.315	6.07	9.83	0.03	15.93	Ave	Live	49.85	-33.92	Pass
0.376	6.06	9.84	0.03	15.93	QP	Live	58.36	-42.43	Pass
0.376	6.72	9.84	0.03	16.59	Ave	Live	48.36	-31.77	Pass
0.445	11.24	9.84	0.03	21.11	QP	Live	56.96	-35.85	Pass
0.445	4.29	9.84	0.03	14.16	Ave	Live	46.96	-32.80	Pass

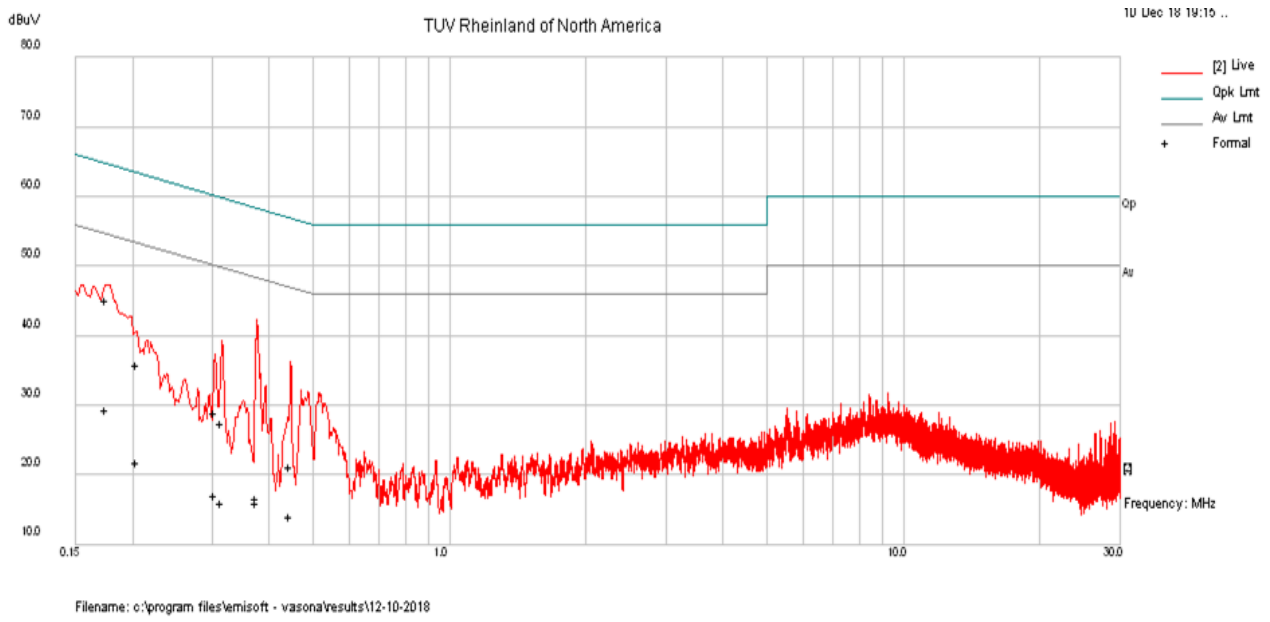
Spec Margin = QP./Ave. - Limit, ± Uncertainty

Combined Standard Uncertainty $u_c(y)$ = ± 1.2 dB Expanded Uncertainty $U = ku_c(y)$ k = 2 for 95% confidence

Notes: The EUT was set as the tabletop equipment.

SOP 2 Conducted Emissions		Tracking # 31962243.001 Page 2 of 4	
EUT Name	Wi-Fi Module	**Date**	December 10, 2018
EUT Model	NVG5X8AC	**Temp / Hum in**	22° C / 41% rh
EUT Serial	M11839QW0022	**Temp / Hum out**	N/A
EUT Config.	802.11a TX	**Line AC / Freq**	120Vac/60Hz
Standard	CFR47 Part 15.207 and RSS Gen	**RBW / VBW**	9 kHz / 30 kHz
Lab/LISN	Lab #5 /Com-Power, Line 1	**Performed by**	Abraham Avalos

150 kHz to 30 MHz Plot for Line 1 (Hot)



Note: Met FCC Class B limit.

SOP 2 Conducted Emissions

Tracking # 31962243.001 Page 3 of 4

EUT Name	Wi-Fi Module	**Date**	December 10, 2018
EUT Model	NVG5X8AC	**Temp / Hum in**	22° C / 41% rh
EUT Serial	M11839QW0022	**Temp / Hum out**	N/A
EUT Config.	802.11a TX	**Line AC / Freq**	120Vac/60Hz
Standard	CFR47 Part 15.207 and RSS Gen	**RBW / VBW**	9 kHz / 30 kHz
Lab/LISN	Lab #5 /Com-Power, Line 1	**Performed by**	Abraham Avalos

Frequency	Raw	Limiter	Ins. Loss	Level	Detector	Line	Limit	Margin	Result
MHz	dBuV	dB	dB	dBuV			dBuV	dB	
0.159	36.16	9.82	0.05	46.03	QP	Neutral	65.50	-19.47	Pass
0.159	18.33	9.82	0.05	28.20	Ave	Neutral	55.50	-27.30	Pass
0.197	29.74	9.83	0.04	39.60	QP	Neutral	63.75	-24.14	Pass
0.197	17.45	9.83	0.04	27.32	Ave	Neutral	53.75	-26.43	Pass
0.236	23.35	9.83	0.04	33.22	QP	Neutral	62.24	-29.02	Pass
0.236	8.27	9.83	0.04	18.14	Ave	Neutral	52.24	-34.10	Pass
0.440	18.71	9.84	0.03	28.58	QP	Neutral	57.07	-28.49	Pass
0.440	10.72	9.84	0.03	20.59	Ave	Neutral	47.07	-26.47	Pass
0.483	19.76	9.84	0.03	29.63	QP	Neutral	56.29	-26.66	Pass
0.483	11.85	9.84	0.03	21.72	Ave	Neutral	46.29	-24.57	Pass
0.518	20.13	9.84	0.03	30.00	QP	Neutral	56.00	-26.00	Pass
0.518	13.74	9.84	0.03	23.61	Ave	Neutral	46.00	-22.39	Pass

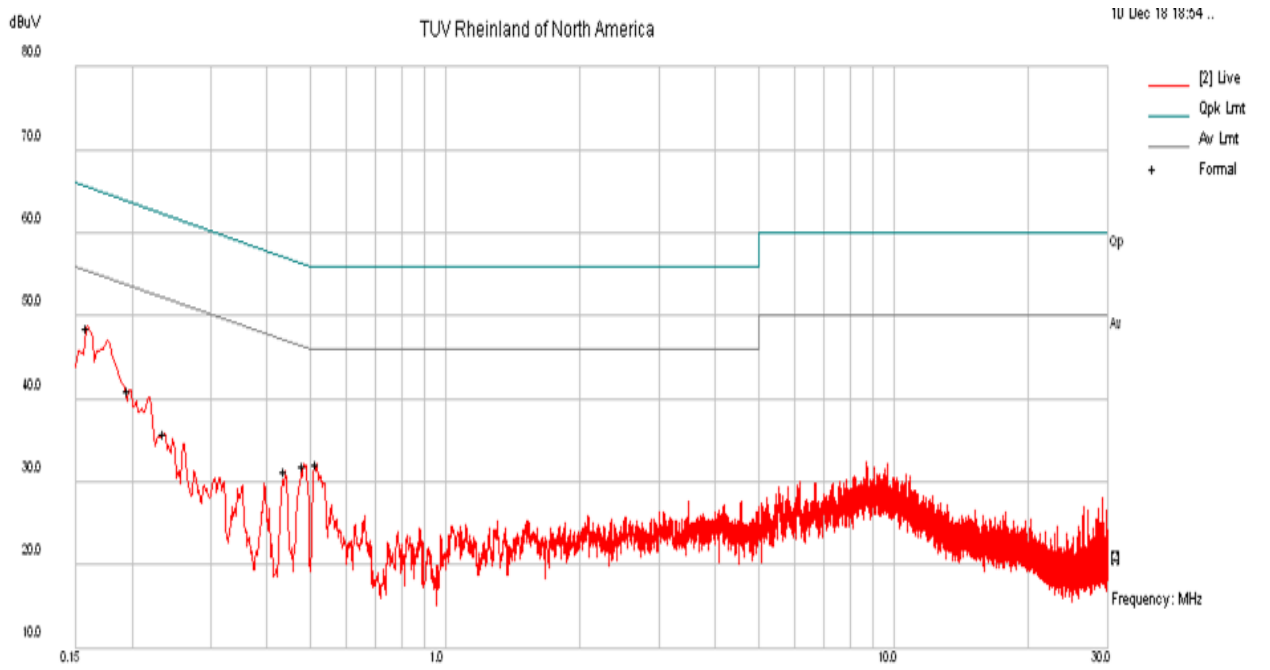
Spec Margin = QP./Ave. - Limit, ± Uncertainty

Combined Standard Uncertainty $u_c(y)$ = ± 1.2 dB Expanded Uncertainty $U = ku_c(y)$ k = 2 for 95% confidence

Notes: The EUT was set as the tabletop equipment.

SOP 2 Conducted Emissions		Tracking # 31962243.001 Page 4 of 4	
EUT Name	Wi-Fi Module	**Date**	December 10, 2018
EUT Model	NVG5X8AC	**Temp / Hum in**	22° C / 41% rh
EUT Serial	P M11839QW0022	**Temp / Hum out**	N/A
EUT Config.	802.11a TX	**Line AC / Freq**	120Vac/60Hz
Standard	CFR47 Part 15.207 and RSS Gen	**RBW / VBW**	9 kHz / 30 kHz
Lab/LISN	Lab #5 /Com-Power, Line 1	**Performed by**	Abraham Avalos

150 kHz to 30 MHz Plot for Line 2 (Neutral)



Note: Met FCC Class B Limit.

4.6 Frequency Stability

In accordance with 47 CFR Part 15.407(g) the frequency stability of U-NII devices must be such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

Per 47 CFR Part 15.31 (e) intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

4.6.1 Test Methodology

The manufacturer of the equipment is responsible for ensuring that the frequency stability is such that emissions are always maintained within the band of operation under all conditions. This test performs according to ANSI C63.10-2013 Section 6.8

4.6.2 Manufacturer Declaration

Arris International declares that the NVG5X8AC WiFi Module is compliant to CFR47 Part 15.31(e), 15.407(g) and RSS GEN Sect. 6.11 requirements. The NVG5X8AC maintains the fundamental emission within the bands of operation under all conditions of normal operation as specified in the user's manual.

5 Test Equipment List

5.1 Equipment List

Equipment	Manufacturer	Model #	Serial/Inst #	Last Cal mm/dd/yyyy	Next Cal mm/dd/yyyy
Loop Antenna	EMCO	6502	9110-2683	07/20/2017	07/20/2019
Bilog Antenna	Sunol Sciences	JB3	A020502	03/27/2018	03/27/2020
Horn Antenna	Sunol Sciences	3115	9211-3969	05/16/2017	05/16/2019
Antenna (18-40 GHz)	Com-Power	AHA-840	105005	05/26/2017	05/26/2019
Spectrum Analyzer	Rohde & Schwarz	FSL6	100169	02/16/2019	02/16/2020
Receiver	Agilent	N9038A	MY52260210	01/16/2019	01/16/2020
Spectrum Analyzer	Agilent	N9030A	MY52350885	10/26/2018	10/26/2019
EMI Receiver	Rohde & Schwarz	ESIB40	100180	09/20/2018	09/20/2019
Spectrum Analyzer	Rohde Schwarz	FSW67	104088	06/11/2018	06/11/2019
Amplifier	Sonoma Instruments	310	185516	01/15/2019	01/15/2020
Amplifier	Miteq	TTA1800-30-HG	184252	01/15/2019	01/15/2020
Power Meter	Agilent	E4418B	MY45103902	01/17/2019	01/17/2020
Power Sensor	Hewlett Packard	8482A	US37292296	01/16/2019	01/16/2020
High Pass Filter	Wainwright	WHJE5-915.4-995-4000-6055	001	01/15/2019	01/15/2020
Notch Filter	Micro-Tronics	BRM50703	011	01/15/2019	01/15/2020
Notch Filter	Micro-Tronics	BRM50716	003	01/15/2019	01/15/2020
Signal Generator	Anritsu	MG3694A	42803	03/20/2018	03/20/2020
Signal Generator	Rohde & Schwarz	SMF100A	1167.0000K02	07/10/2018	07/10/2020
Signal Generator	Rohde & Schwarz	SMBV100A	1407.6004K02	07/10/2018	07/10/2020
Power Sensors	Rohde & Schwarz	OSP120	1520.9010.02	01/18/2018	01/18/2020

* Calibration of equipment past due for re-calibration will be performed expeditiously. If any equipment is found to be out of tolerance at that time, affected customers will be notified accordingly.

6 EMC Test Plan

6.1 Introduction

This section provides a description of the Equipment Under Test (EUT), configurations, operating conditions, and performance acceptance criteria. It is an overview of information provided by the manufacturer so that the test laboratory may perform the requested testing.

6.2 Customer

Table 10: Customer Information

Company Name	ARRIS International plc
Address	310 Province Mine Road, Ste. 200
City, State, Zip	Nevada City, CA 95959
Country	USA
Phone	(530) 274-5440
Fax	(530) 273-6340

Table 11: Technical Contact Information

Name	Mark Rieger
E-mail	mark.rieger@commscope.com
Phone	(530) 274-5440
Fax	(530) 273-6340

6.3 Equipment Under Test (EUT)

Table 12: EUT Specifications

EUT Specifications	
Dimensions	W: 2.875in (73mm) x D: 4.750in (121mm) x H: 1.188in (30mm)
AC Input	100-240V AC, 50 – 60 Hz
Environment	Indoor
Operating Temperature Range:	0 to 35 degrees C
Multiple Feeds:	☐ Yes and how many ☒ No
Product Marketing Name (PMN)	WiFi Module
Hardware Version Identification Number (HVIN)	NVG5X8AC
Firmware Version Identification Number (FVIN)	
802.11-radio module	
Operating Mode	802.11a, 802.11n (HT20, HT40), 802.11ac (VHT20, VHT40,VHT80)
Transmitter Frequency Band	5.150 GHz – 5.250 GHz, U-NII-1 band
Max. Rated Power Output	See Channel Planning Table.
Power Setting @ Operating Channel	See Channel Planning Table.
Antenna Type	Qty 8. 4 PCB antennas at 5.18-5.24GHz. See Table 30 for details
Antenna Gain	See Section 3.4.1
Modulation Type	☐ AM ☐ FM ☒ DSSS ☒ OFDM ☐ Other describe:
Data Rate	802.11a: 4 Spatial Streams: 6, 9,12, 18, 24, 36, 48, 54 Mbps 802.11n HT20: 4 Spatial Streams: 26, 52, 78, 104, 156, 208, 234, 260 Mbps 802.11n HT40: 4 Spatial Streams: 54, 108, 162, 216, 324, 432, 486, 540 Mbps 802.11ac VHT20: 4 Spatial Streams: 26, 52, 78, 104, 156, 208, 234, 260, 312 Mbps 802.11ac VHT40: 4 Spatial Streams: 54, 108, 162, 216, 324, 432, 486, 540, 648, 720 Mbps 802.11ac VHT80: 4 Spatial Streams: 117, 234, 351, 468, 702, 936, 1053, 1170, 1404, 1560 Mbps

EUT Specifications	
TX/RX Chain (s)	MIMO (4x4)
Directional Gain Type	☒ Correlated ☒ Beam-Forming ☐ Other describe:
Type of Equipment	☒ Table Top ☐ Wall-mount ☐ Floor standing cabinet ☐ Other:
Note: 1. All four chains will be on / transmitted at all time. 2.This report only documents the radio characteristics for 5180 – 5240 MHz; UNII1 band.	

Table 13: EUT Channel Power Specifications

No.	Freq. (MHz)	Target Power Value dBm										
		Non-Beamforming Mode						Beamforming Mode				
		802.11a	802.11n HT20	802.11n HT40	802.11ac VHT20	802.11ac VHT40	802.11ac VHT80	802.11n HT20	802.11n HT40	802.11ac VHT20	802.11ac VHT40	802.11ac VHT80
		Power Setting (q)										
149	5745	96	96		96			88		88		
151	5755			90		90			86		86	
153	5765	96	97		97			88		88		
155	5775						80					80
157	5785	96	97		97			88		88		
159	5795			94		94			86		86	
161	5805	96	97		97			88		88		
165	5825	96	96		96			88		88		
Note: The adjusted power target values are updated at the evaluated frequencies.												

Table 14: Interface Specifications

Interface Type	Cabled with what type of cable?	Is the cable shielded?	Maximum potential length of the cable?	Metallic (M), Coax (C), Fiber (F), or Not Applicable?
Ethernet	RJ45	☒ No	☒ Metric: 2 m	☐ N/A

Table 15: Supported Equipment

Equipment	Manufacturer	Model	Serial	Used for
Laptop	Dell	Latitude	CN-0C4708-48643-62C-1856	Setup EUT operating channel
WiFi Router	Arris	NVG568	M91846P10031	Used as station for beamforming mode.
Note: None.				

Table 16: Description of Sample used for Testing

Device	Serial	RF Connection	CFR47 Part 15.407
Wi-Fi Module	M11839QW0022	PCB Antenna	TX Emission, Radiated Band-Edge Out-of-Band Emission AC Conducted Emission
	M11839QW0031	Direct Connection	Max. RMS Power, Power Spectral Density, Occupied Bandwidth Out-of-Band Emission

Table 17: Description of Test Configuration used for Radiated Measurement.

Device	Antenna	Mode	Setup Photo (X-Axis)	Setup Photo (Y-Axis)	Setup Photo (Z-Axis)
Wi-Fi Router	FPCB	Transmit	N/A	EUT standing up	N/A
Note: EUT designed to operate on the upright (Y-Axis) position.					

6.4 Test Specifications

Testing requirements

Table 18: Test Specifications

Emissions and Immunity	
Rules & Regulations / Standard	**Requirement**
CFR 47 Part 15.407: 2018	All
RSS 247 Issue 2, 2017	All

END OF REPORT