4.5 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 15.205:2017, 15.209:2017, 15.407(b:2017), RSS 247 Sect. 6:2017, RSS GEN Sect.8.9 and 8.10:2014

4.5.1 Test Methodology

4.5.1.1 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 and 802.11n (HT20).

4.5.1.2 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.

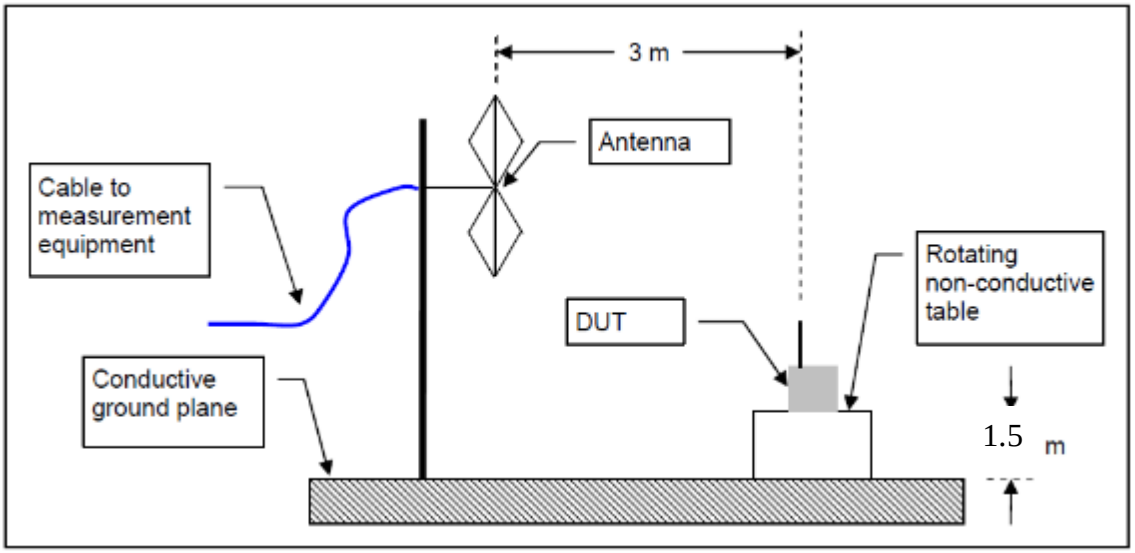
Final results are:

802.11a at 6 Mbps and 802.11n (HT20) at 6.5 Mbps on upright position.

4.5.1.3 Deviations

None.

Test Setup:



4.5.2 Transmitter Spurious Emission Limit

The spurious emissions of the transmitter shall not exceed the values in CFR47 Part 15.205, 15.209, RSS 247 Sect. 6, RSS GEN Sect. 8.9 and 8.10

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

According to CFR47 15.407 (b) and RSS 247 Sect. 6.2, all harmonics and spurious emissions which are outside the 5150 MHz - 5250 MHz, 5250 MHz – 5350 MHz, or 5470 MHz – 5725 MHz shall not exceed -27 dBm/MHz. This is equivalent to 68.2 dBuV/m at 3 meter distance.

4.5.3 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 9: Transmit Spurious Emission at Band-Edge Requirements

Test Conditions: Radiated Measurement, Normal Temperature and Voltage only	**Date:** June 13, 2017
Antenna Type: Chip	**Power Setting:** See test plan
Max. Gain: + 4.9 dBi	**Signal State:** Modulated at 100%.
Ambient Temp.: 19° C	**Relative Humidity:**39%

Band-Edge Results for 5150 MHz to 5350MHz

Freq. (MHz)	Level (dBuV/m)	Pol. (H/V)	Limit (dBuV/m)	Margin (dB)	Det.	Table Deg.	Tower (cm)	Note
5150.00	50.57	V	74.00	−23.43	Pk	263	184	11a−5180MHz−6Mbps
5150.00	39.37	V	54.00	−14.63	Ave	263	184	11a−5180MHz−6Mbps
5150.00	51.34	H	74.00	−22.66	Pk	236	174	11a−5180MHz−6Mbps
5150.00	39.85	H	54.00	−14.15	Ave	236	174	11a−5180MHz−6Mbps
5150.00	50.49	H	74.00	−23.51	Pk	232	219	HT20−5180MHz−6.5Mbps
5150.00	39.59	H	54.00	−14.41	Ave	232	219	HT20−5180MHz−6.5Mbps
5150.00	52.33	V	74.00	−21.67	Pk	15	210	HT20−5180MHz−6.5Mbps
5150.00	39.44	V	54.00	−14.56	Ave	15	210	HT20−5180MHz−6.5Mbps
5350.00	52.25	V	74.00	−21.75	Pk	347	246	11a−5320MHz−6Mbps
5350.00	40.65	V	54.00	−13.35	Ave	347	246	11a−5320MHz−6Mbps
5350.00	52.70	H	74.00	−21.30	Pk	234	246	11a−5320MHz−6Mbps
5350.00	40.78	H	54.00	−13.22	Ave	234	246	11a−5320MHz−6Mbps
5350.00	52.61	H	74.00	−21.39	Pk	234	265	HT20−5320MHz−6.5Mbps
5350.00	41.01	H	54.00	−12.99	Ave	234	265	HT20−5320MHz−6.5Mbps
5350.00	51.93	V	74.00	−22.07	Pk	306	261	HT20−5320MHz−6.5Mbps
5350.00	42.96	V	54.00	−11.04	Ave	306	261	HT20−5320MHz−6.5Mbps

Note: 1. Band-edge frequencies were taken at 5150 MHz and 5350 MHz since these band-edges are adjacent to the restricted bands.

2. All the band-edge measurements met the restricted band requirements of CFR47 15.205.

3. For 5250 MHz In-band-edge, refer to Section 4.4.2.

4. Since the band-edge measurements have double digit margins below the CFR47 15.205 limit in the presence of in-band leakage, the band-edge plots captured with spectrum analyzer's span wider than 2 MHz; showing any additional out of band leakage.

Table 10: Transmit Spurious Emission at Band-Edge Requirements Continued

Test Conditions: Radiated Measurement, Normal Temperature and Voltage only	**Date:** June 13, 2017
Antenna Type: Chip	**Power Setting:** See test plan
Max. Gain: + 4.9 dBi	**Signal State:** Modulated at 100%.
Ambient Temp.: 23° C	**Relative Humidity:**39%

Band-Edge Results for 5470 MHz to 5725MHz

Freq. (MHz)	Level (dBuV/m)	Pol. (H/V)	Limit (dBuV/m)	Margin (dB)	Det.	Table Deg.	Tower (cm)	Note
5470.00	63.71	V	74.00	−10.29	Pk	42	217	11a−5500MHz−6Mbps
5470.00	41.31	V	54.00	−12.69	Ave	42	217	11a−5500MHz−6Mbps
5470.00	52.43	H	74.00	−21.57	Pk	224	217	11a−5500MHz−6Mbps
5470.00	40.70	H	54.00	−13.30	Ave	224	217	11a−5500MHz−6Mbps
5725.00	53.42	H	74.00	−20.58	Pk	226	233	11a−5700MHz−6Mbps
5725.00	40.27	H	54.00	−13.73	Ave	226	233	11a−5700MHz−6Mbps
5725.00	52.33	V	74.00	−21.67	Pk	27	217	11a−5700MHz−6Mbps
5725.00	40.27	V	54.00	−13.73	Ave	27	217	11a−5700MHz−6Mbps
5470.00	58.67	V	74.00	−15.33	Pk	29	217	HT20−5500MHz−6.5Mbps
5470.00	42.22	V	54.00	−11.78	Ave	29	217	HT20−5500MHz−6.5Mbps
5470.00	54.27	H	74.00	−19.73	Pk	223	214	HT20−5500MHz−6.5Mbps
5470.00	41.14	H	54.00	−12.86	Ave	223	214	HT20−5500MHz−6.5Mbps
5725.00	52.41	H	74.00	−21.59	Pk	225	244	HT20−5700MHz−6.5Mbps
5725.00	40.39	H	54.00	−13.61	Ave	225	244	HT20−5700MHz−6.5Mbps
5725.00	53.04	V	74.00	−20.96	Pk	21	198	HT20−5700MHz−6.5Mbps
5725.00	40.50	V	54.00	−13.50	Ave	21	198	HT20−5700MHz−6.5Mbps

Note: 1. Band-edge frequencies were evaluated at 5470 MHz and 5725 MHz.

2. All the band-edge measurements met the restricted band requirements of CFR47 15.205.

3. Refer to Section 4.4.2. for additional undesired emissions at the band-edge.

4. Since the band-edge measurements have double digit margins in the presence of in-band leakage, the band-edge plots captured with spectrum analyzer's span wider than 2 MHz; showing any additional out of band emission.

Table 11: Transmit Spurious Emission at Band-Edge Requirements Continued

Test Conditions: Radiated Measurement, Normal Temperature and Voltage only	**Date:** June 13, 2017
Antenna Type: Chip	**Power Setting:** See test plan
Max. Gain: + 4.9 dBi	**Signal State:** Modulated at 100%.
Ambient Temp.: 23° C	**Relative Humidity:**39%

Band-Edge Results for 5725 MHz to 5850 MHz

Freq. (MHz)	Level (dBuV/m)	Pol. (H/V)	Limit (dBuV/m)	Margin (dB)	Det.	Table Deg.	Tower (cm)	Note
5936.82	65.73	V	74.00	-8.27	Pk	21	244	11a-5745MHz-6Mbps
5927.71	65.87	H	74.00	-8.13	Pk	222	224	11a-5745MHz-6Mbps
5931.06	65.60	H	74.00	-8.40	Pk	219	231	11a-5825MHz-6Mbps
5926.85	65.08	V	74.00	-8.92	Pk	17	212	11a-5825MHz-6Mbps
5926.85	65.76	V	74.00	-8.24	Pk	17	258	HT20-5745MHz-6.5Mbps
5926.15	65.81	H	74.00	-8.19	Pk	215	219	HT20-5745MHz-6.5Mbps
5926.15	64.75	H	74.00	-9.25	Pk	216	235	HT20-5825MHz-6.5Mbps
5930.36	65.85	V	74.00	-8.15	Pk	12	236	HT20-5825MHz-6.5Mbps

Note: 1. The spectrum mask was evaluated at band-edge frequencies for the lowest and highest operating channels.
2. All the band-edge measurements met the undesired emission limit, where 27dBm eirp is 68.3 dBuV/m at 3m.
3. Refer to Section 4.4.2. for additional undesired emissions at the band-edge.
4. Fig. 157 to Fig. 164 show the full spectrum mask for above configurations.

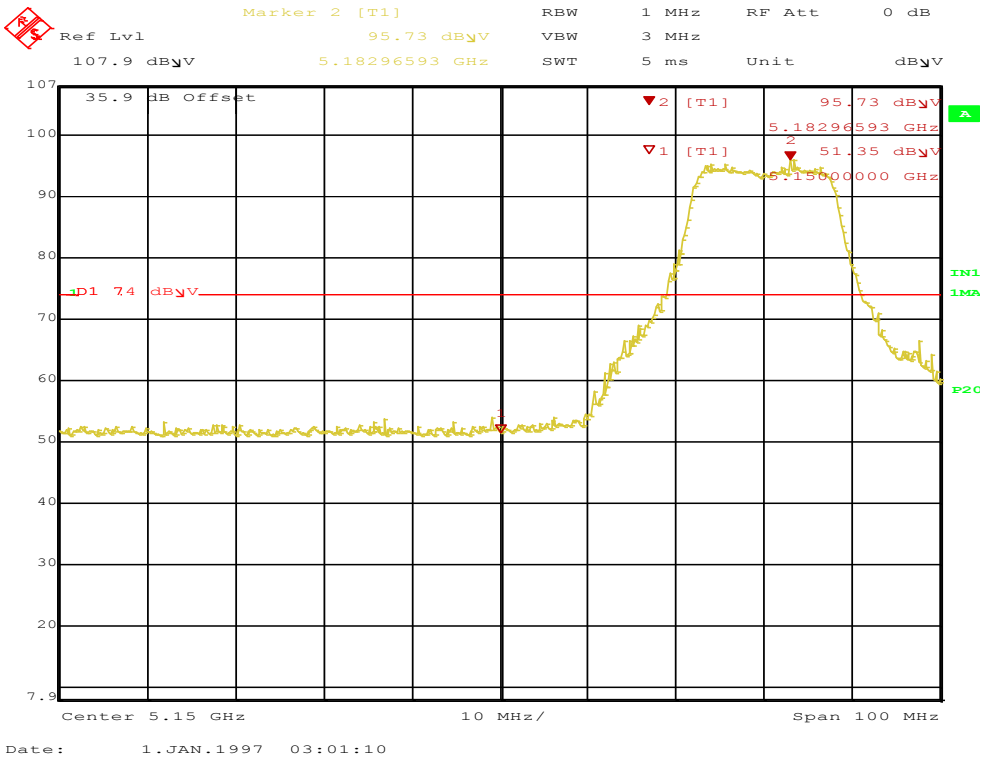


Figure 125: Radiated Emission 5150.0 MHz Edge for 11a 5180 MHz – Horz. (Pk)

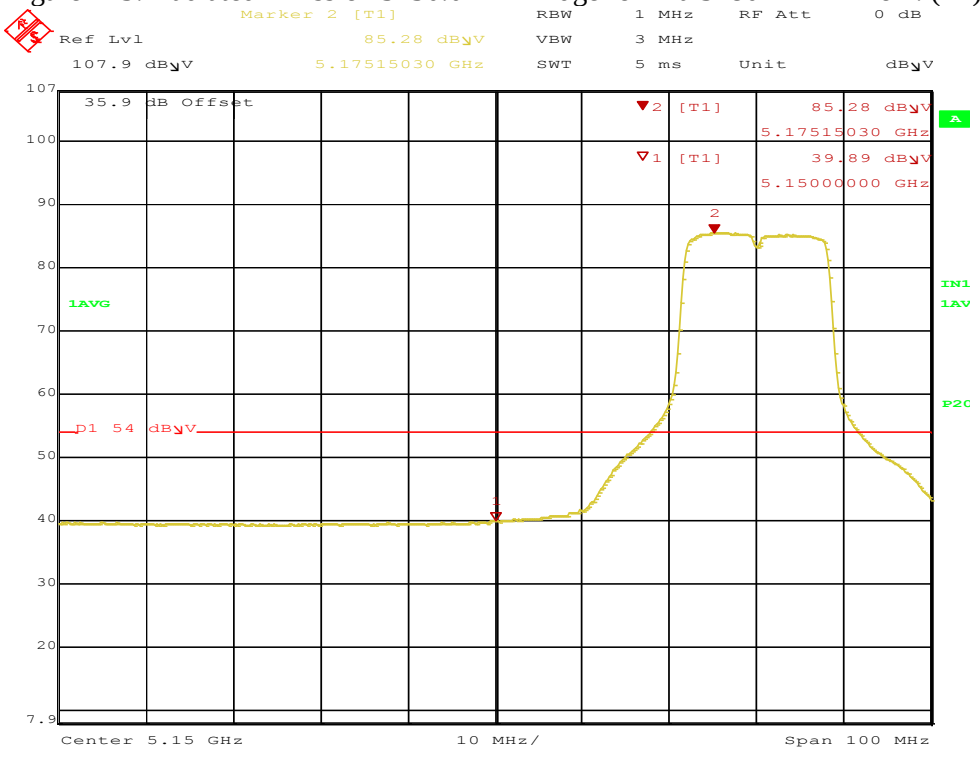


Figure 126: Radiated Emission 5150.0 MHz Edge for 11a 5180 MHz – Horz. (Ave)

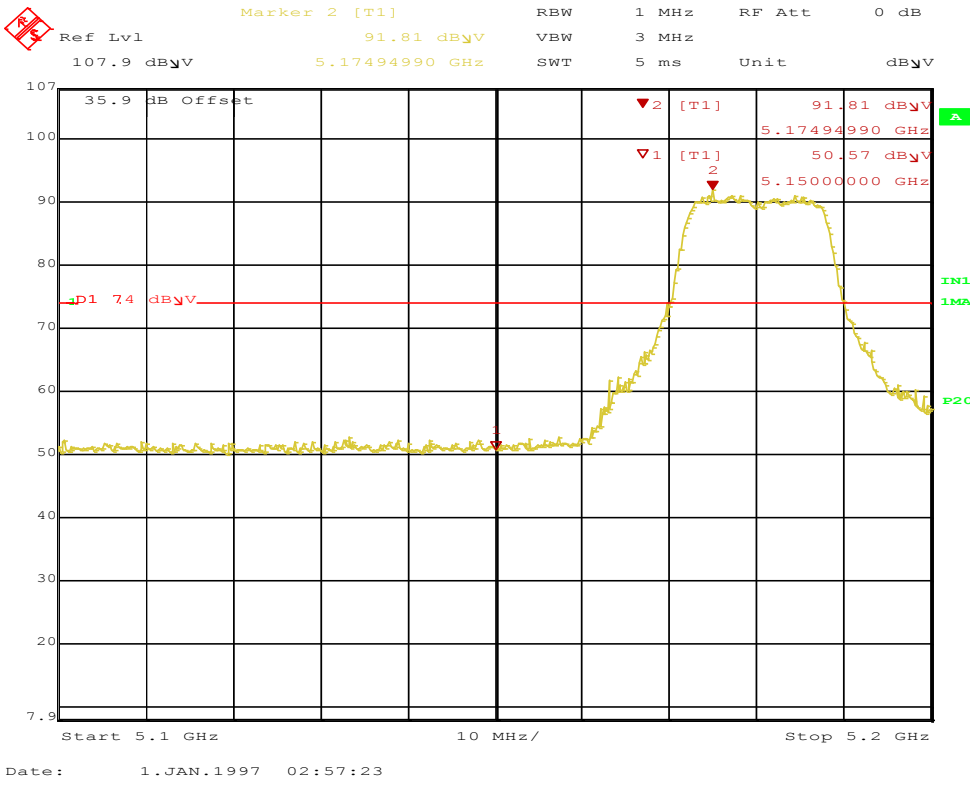


Figure 127: Radiated Emission 5150.0 MHz Edge for 11a 5180 MHz – Vert. (Pk)

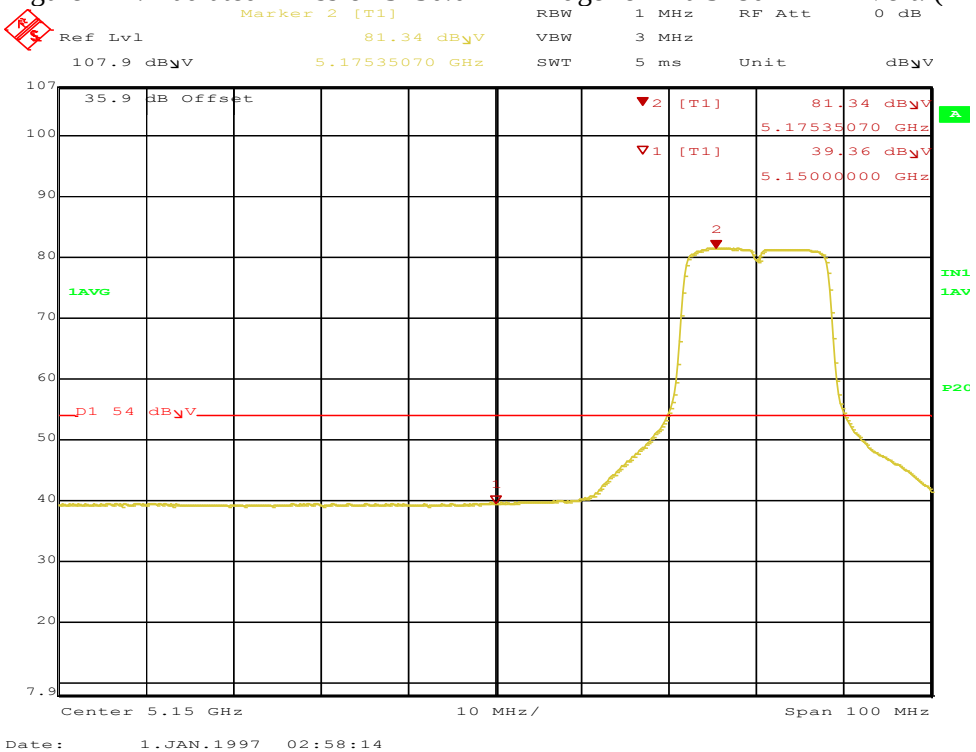


Figure 128: Radiated Emission 5150.0 MHz Edge for 11a 5180 MHz – Vert. (Ave)

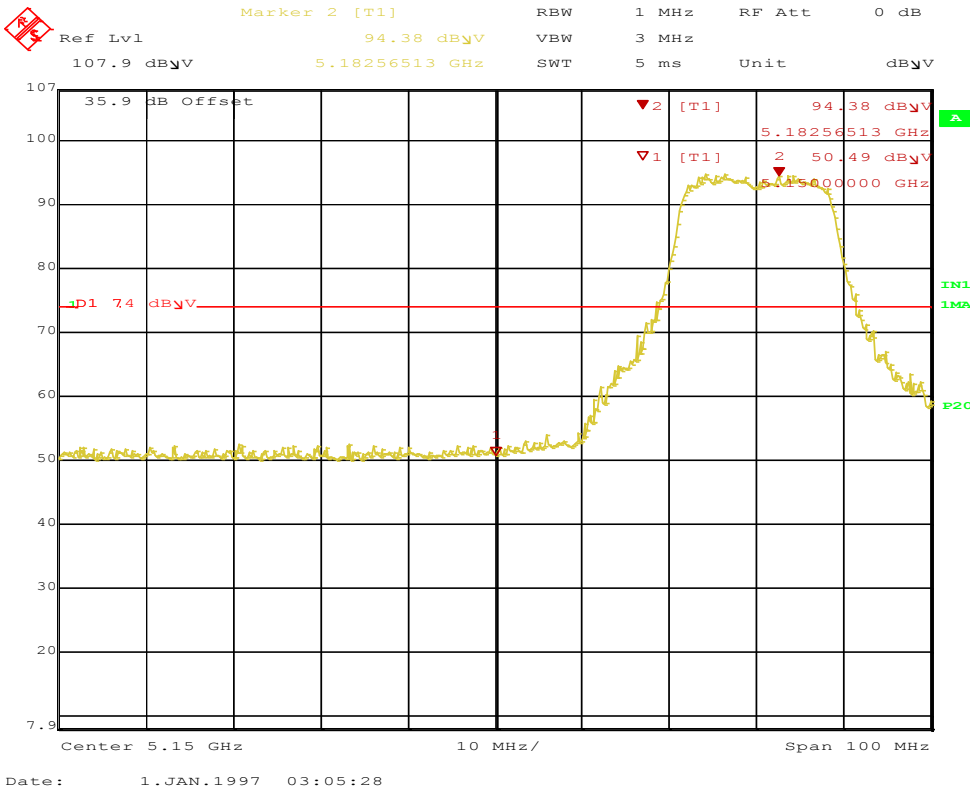


Figure 129: Radiated Emission 5150.0 MHz Edge for HT20 5180 MHz – Horz. (Pk)

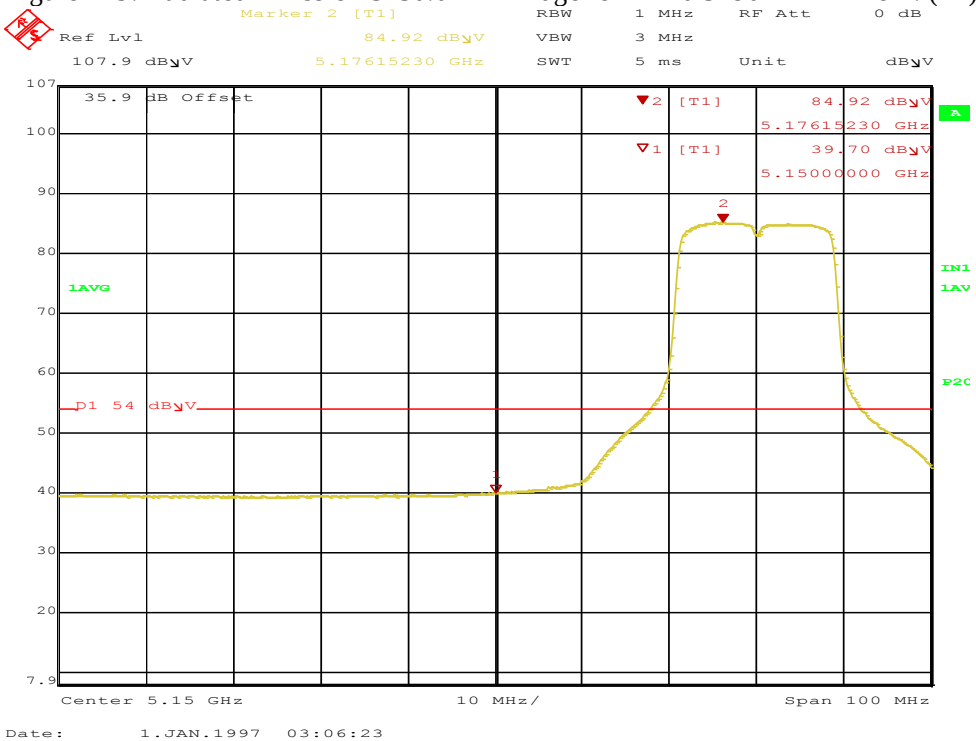


Figure 130: Radiated Emission 5150.0 MHz Edge for HT20 5180 MHz – Horz. (Ave)

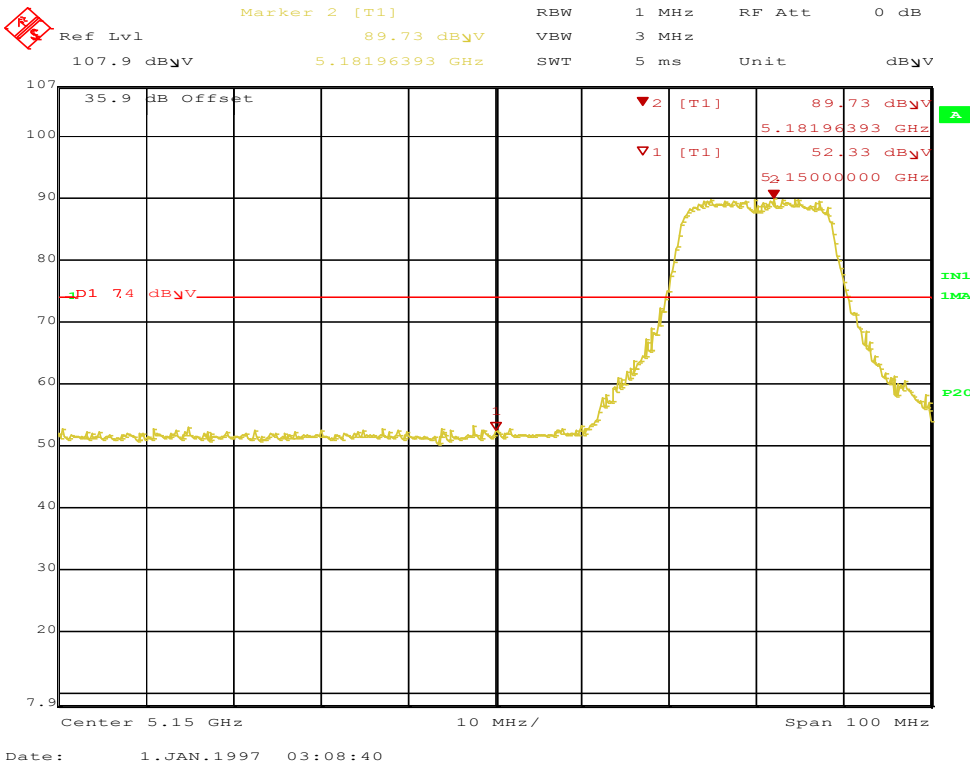


Figure 131: Radiated Emission 5150.0 MHz Edge for HT20 5180 MHz – Vert. (Pk)

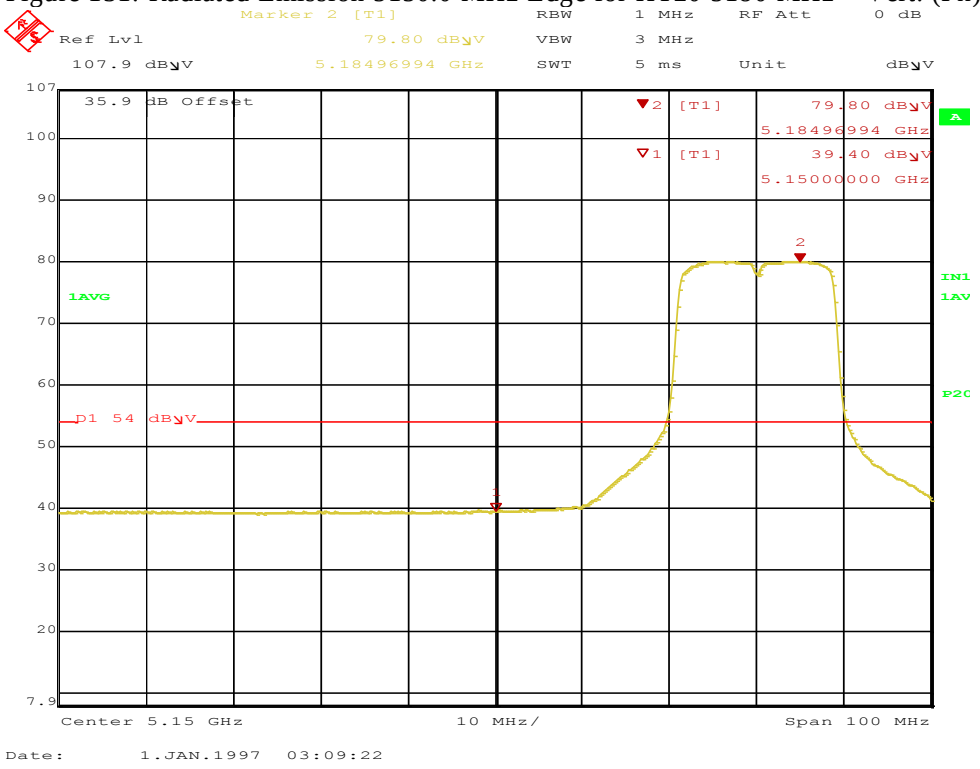


Figure 132: Radiated Emission 5150.0 MHz Edge for HT20 5180 MHz – Vert. (Ave)

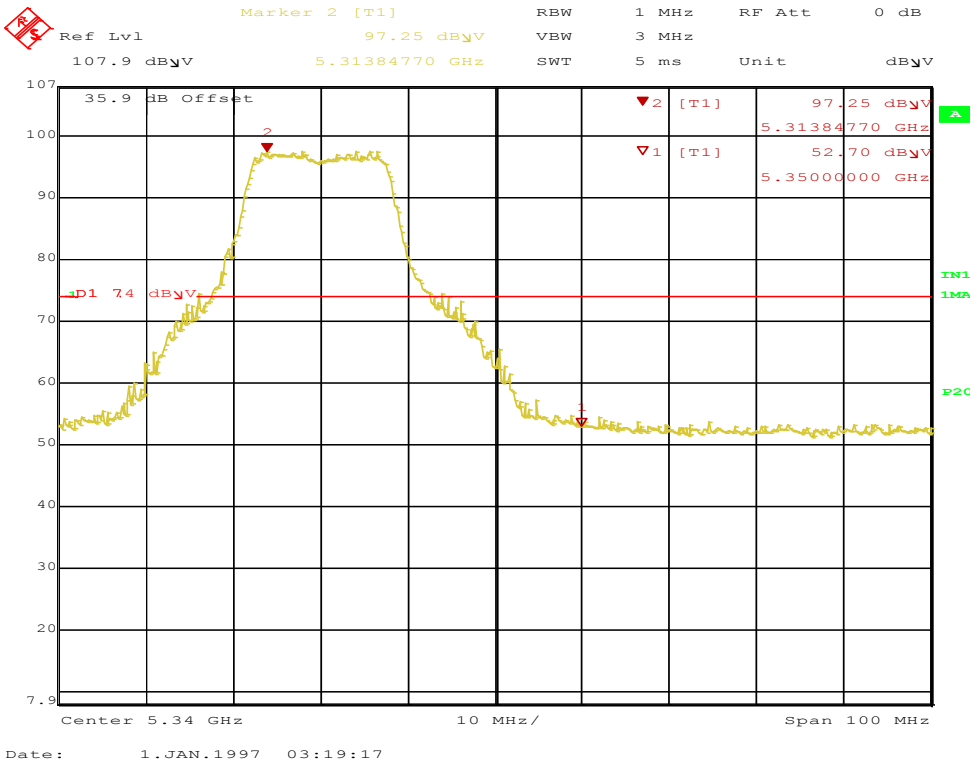


Figure 133: Radiated Emission 5350.0 MHz Edge for 11a 5320 MHz – Horz. (Pk)

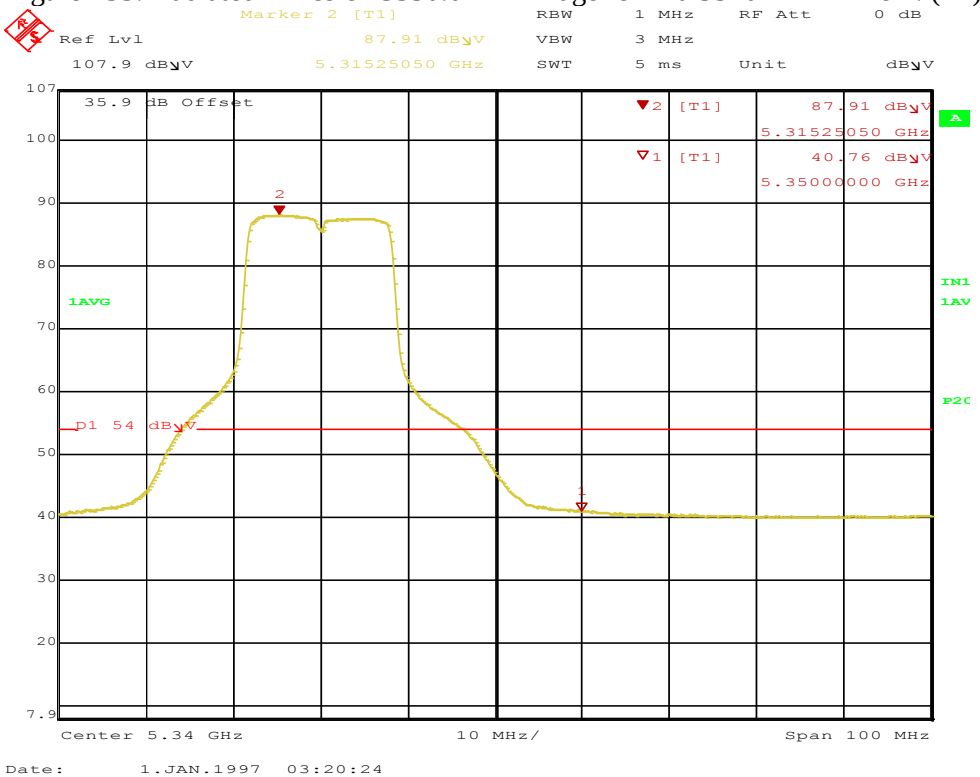


Figure 134: Radiated Emission 5350.0 MHz Edge for 11a 5320 MHz – Horz. (Ave)

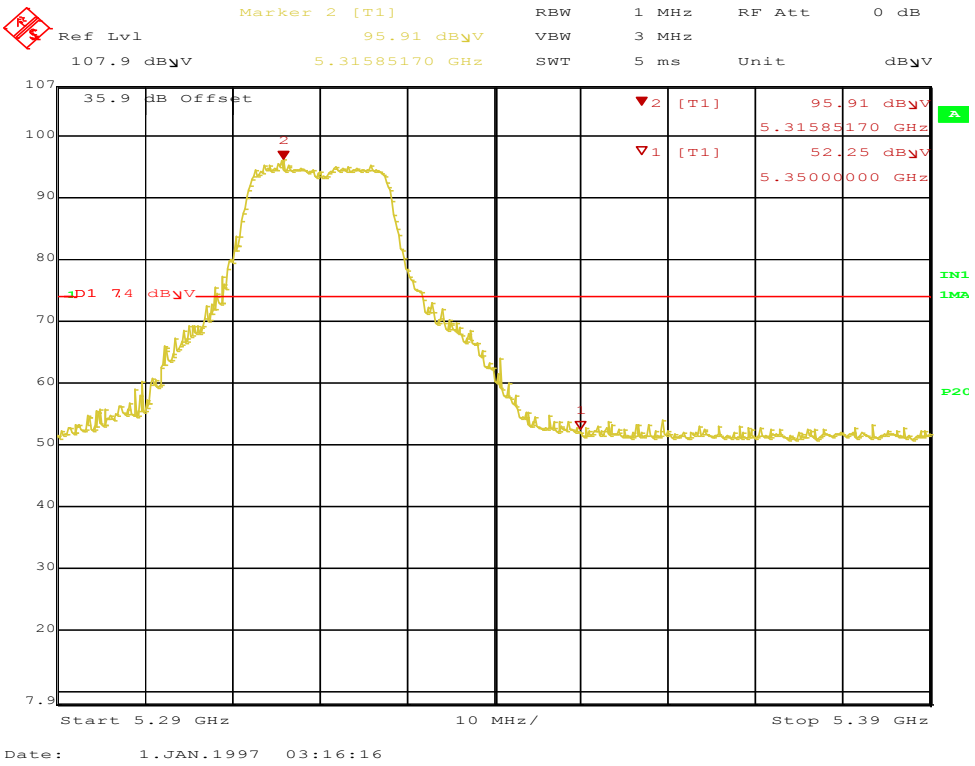


Figure 135: Radiated Emission 5350.0 MHz Edge for 11a 5320 MHz – Vert. (Pk)

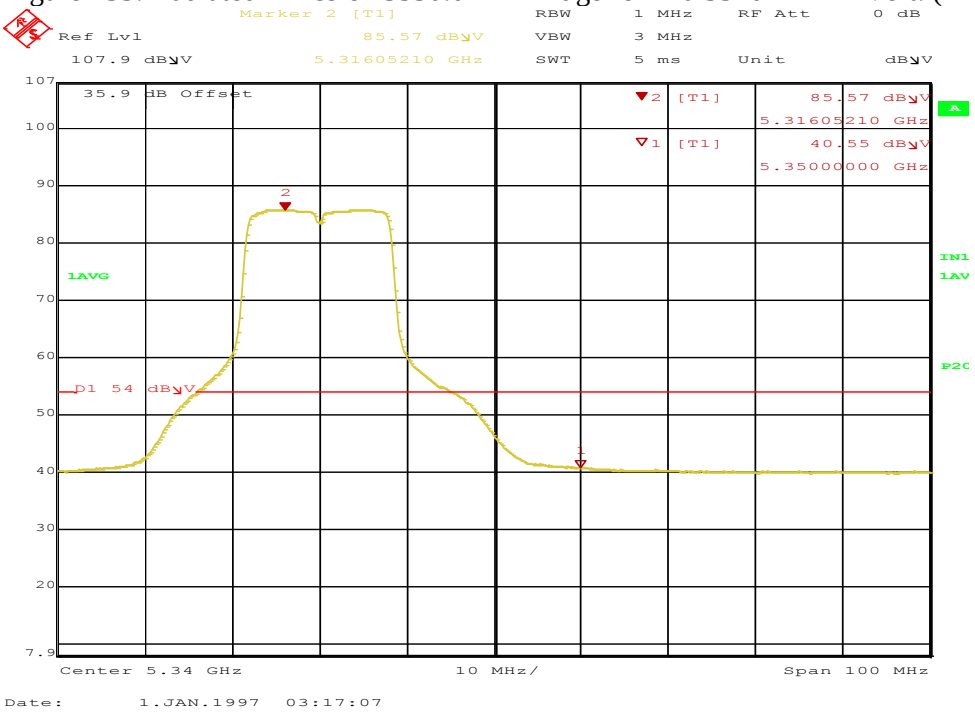


Figure 136: Radiated Emission 5350.0 MHz Edge for 11a 5320 MHz – Vert. (Ave)

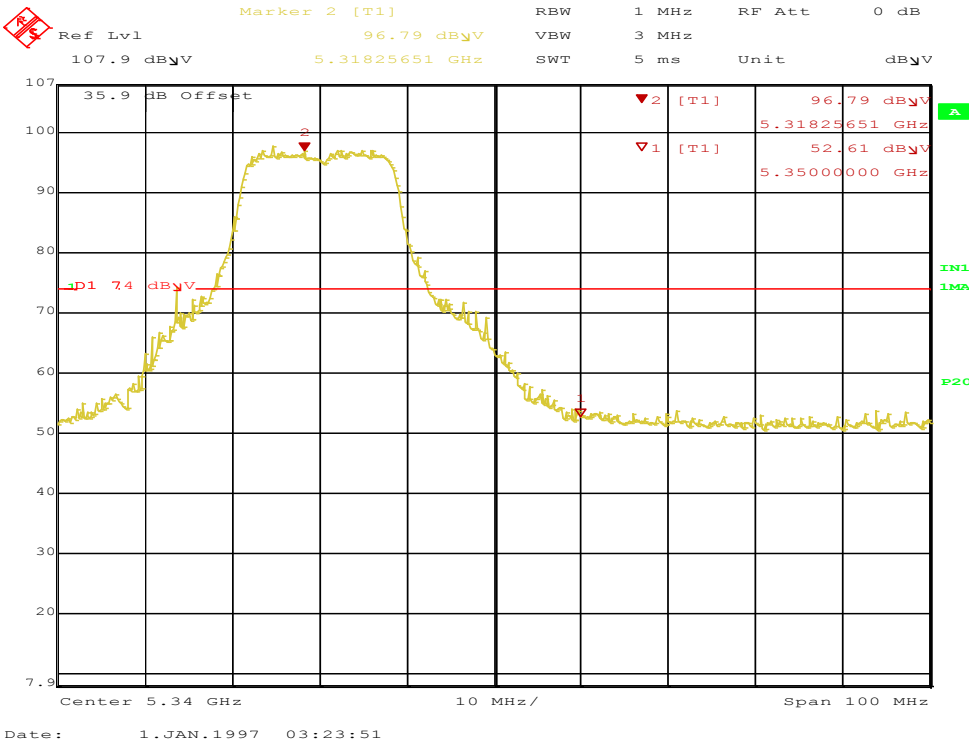


Figure 137: Radiated Emission 5350.0 MHz Edge for HT20 5320 MHz – Horz. (Pk)

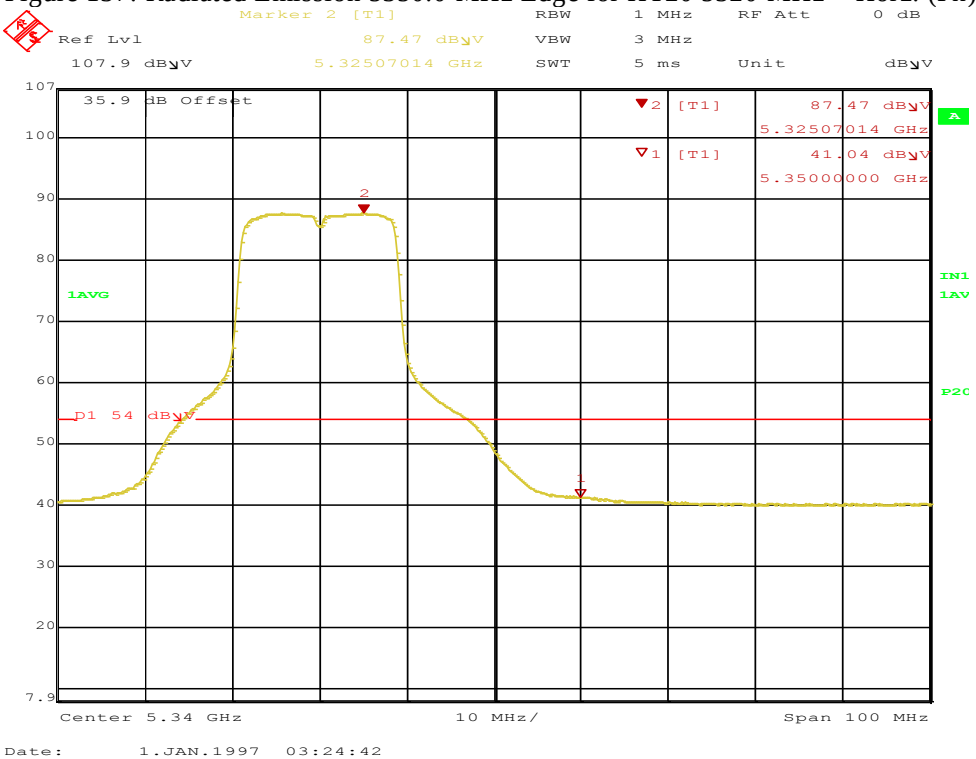


Figure 138: Radiated Emission 5350.0 MHz Edge for HT20 5320 MHz – Horz. (Ave)

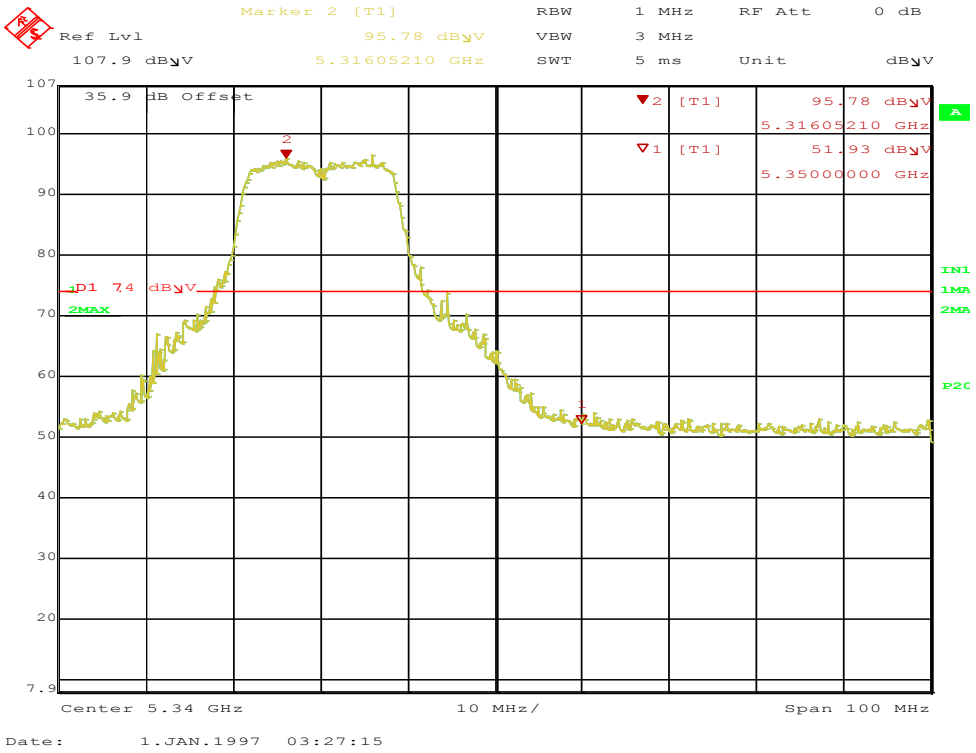


Figure 139: Radiated Emission 5350.0 MHz Edge for HT20 5320 MHz – Vert. (Pk)

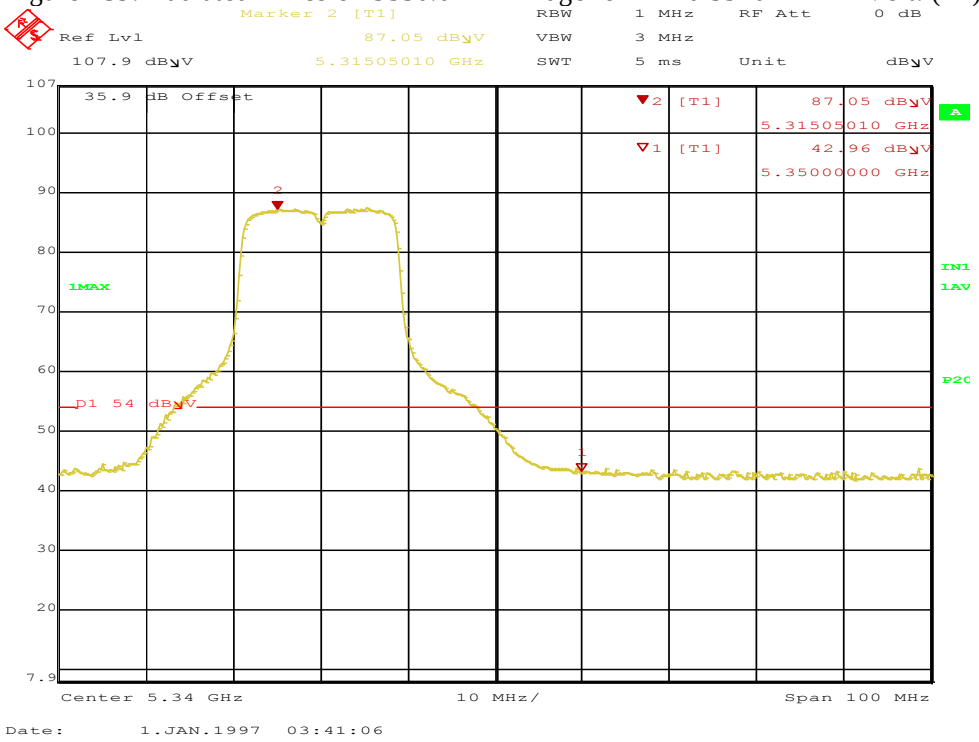


Figure 140: Radiated Emission 5350.0 MHz Edge for HT20 5320 MHz – Vert. (Ave)

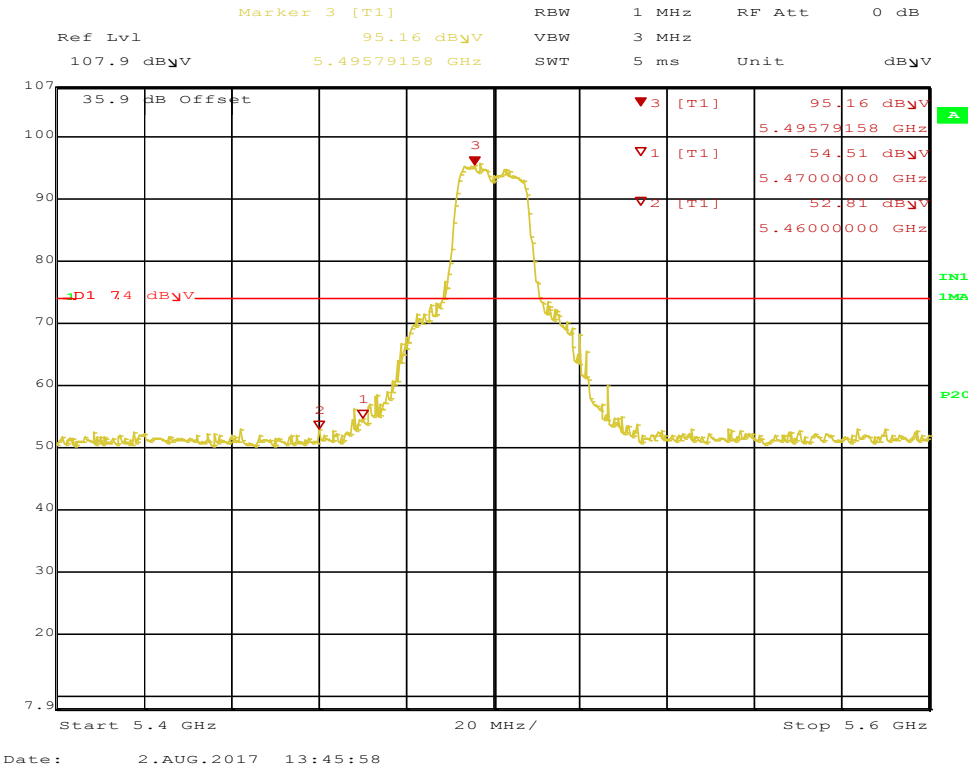


Figure 141: Radiated Emission 5470.0 MHz Edge for 11a 5500 MHz – Horz. (Pk)

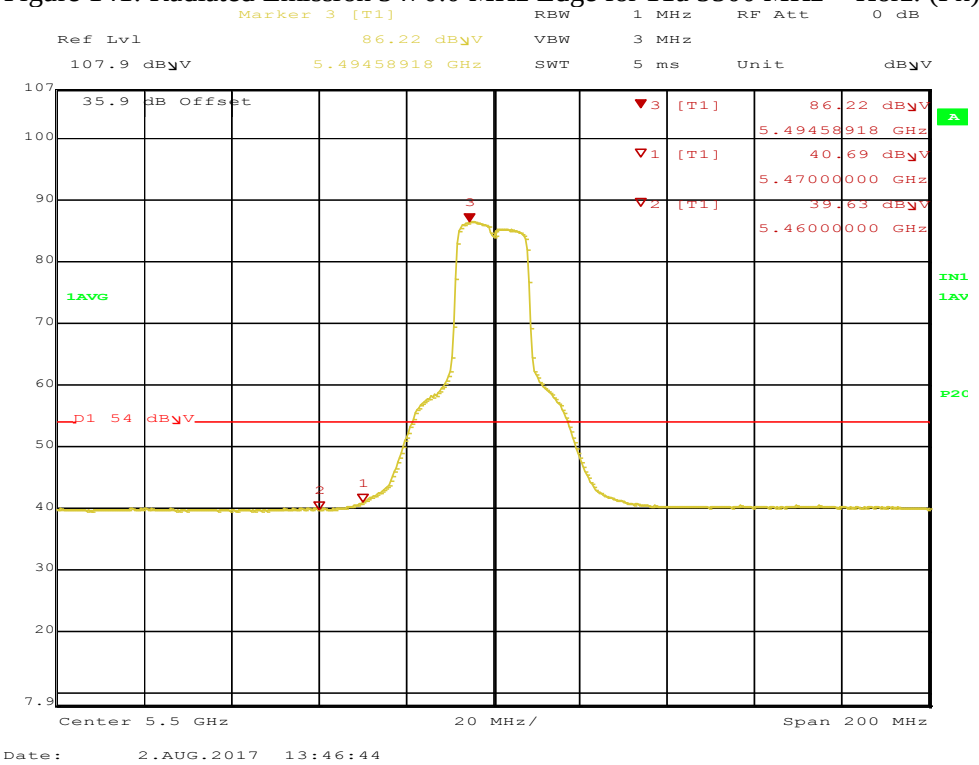


Figure 142: Radiated Emission 5470.0 MHz Edge for 11a 5500 MHz – Horz. (Ave)

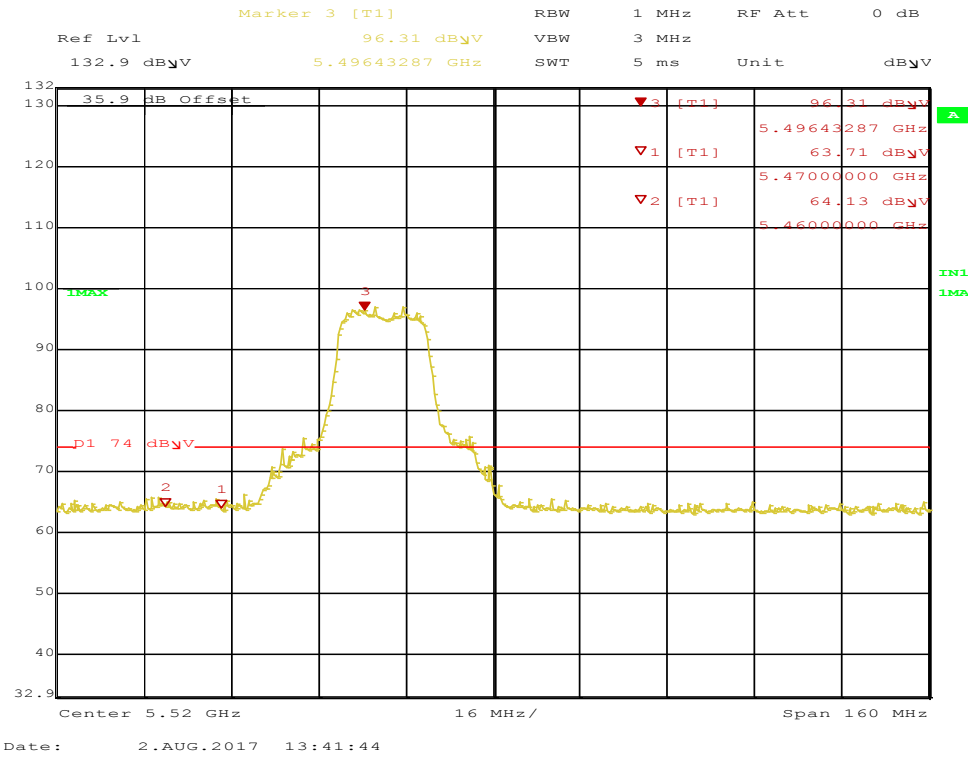


Figure 143: Radiated Emission 5470.0 MHz Edge for 11a 5500 MHz – Vert. (Pk)

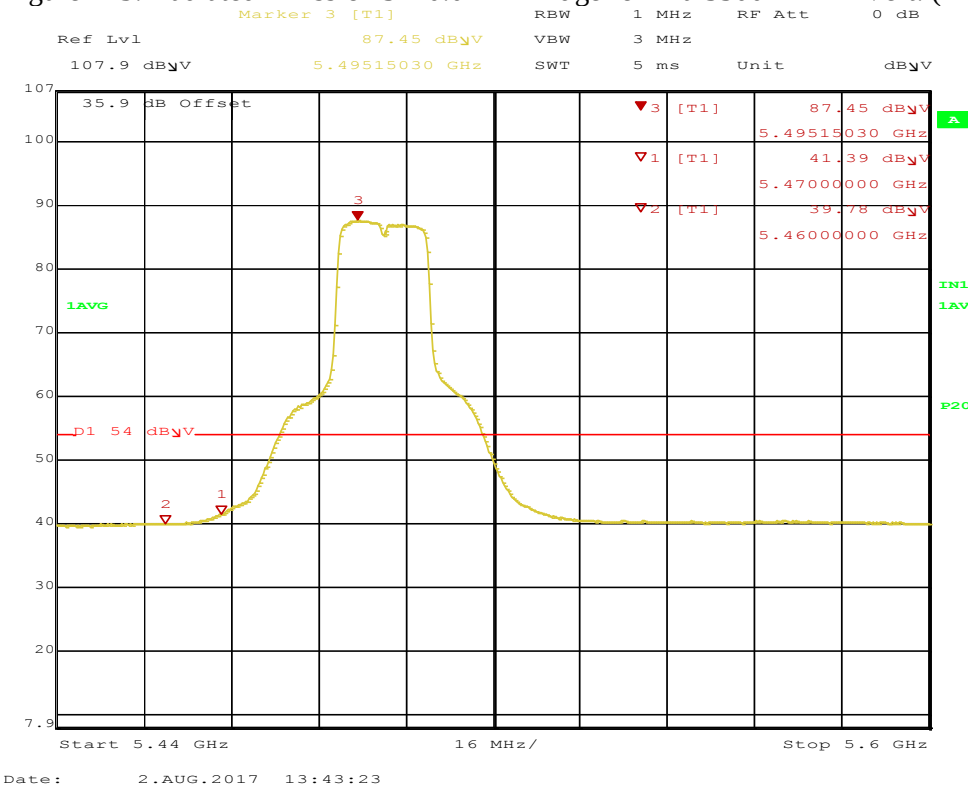


Figure 144: Radiated Emission 5470.0 MHz Edge for 11a 5500 MHz – Vert. (Ave)

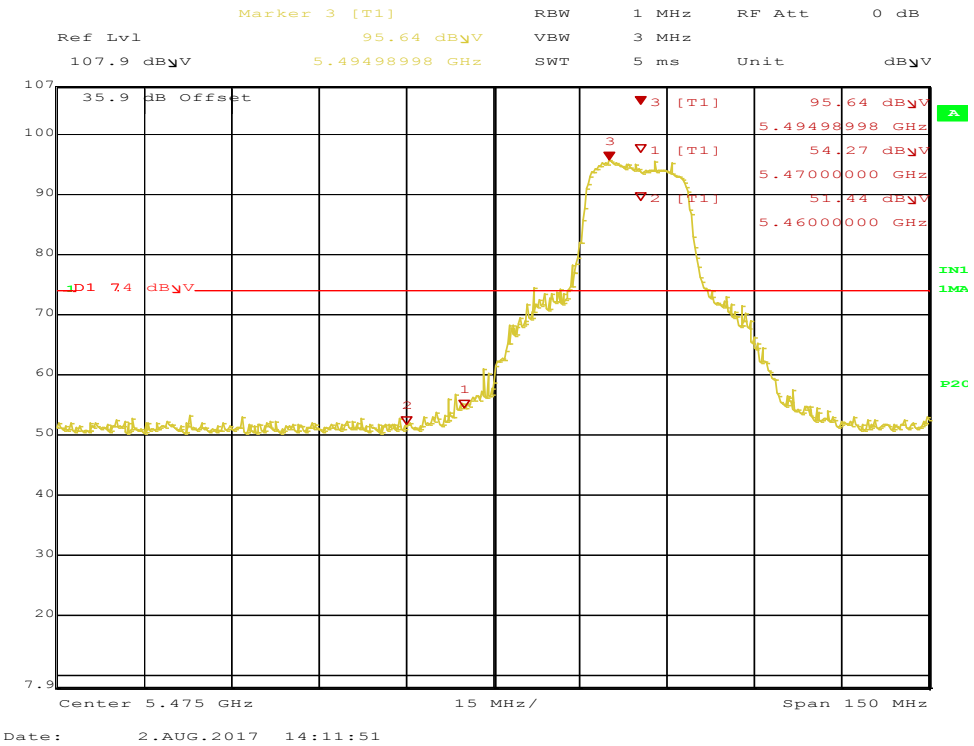


Figure 145: Radiated Emission 5470.0 MHz Edge for HT20 5500 MHz – Horz. (Pk)

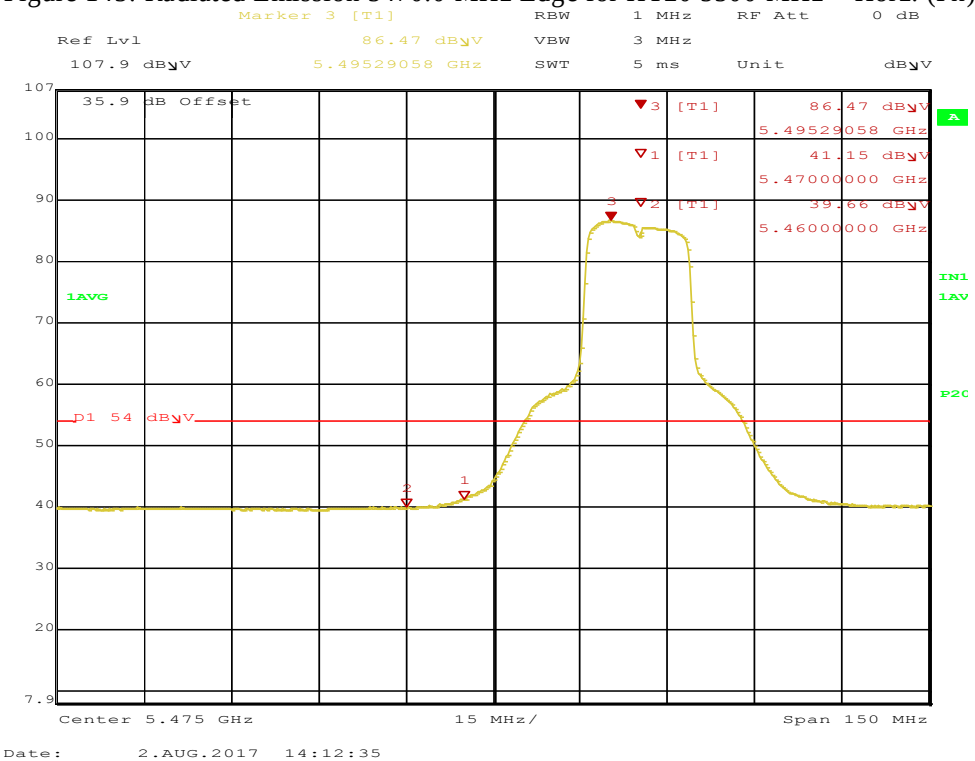


Figure 146: Radiated Emission 5470.0 MHz Edge for HT20 5500 MHz – Horz. (Ave)

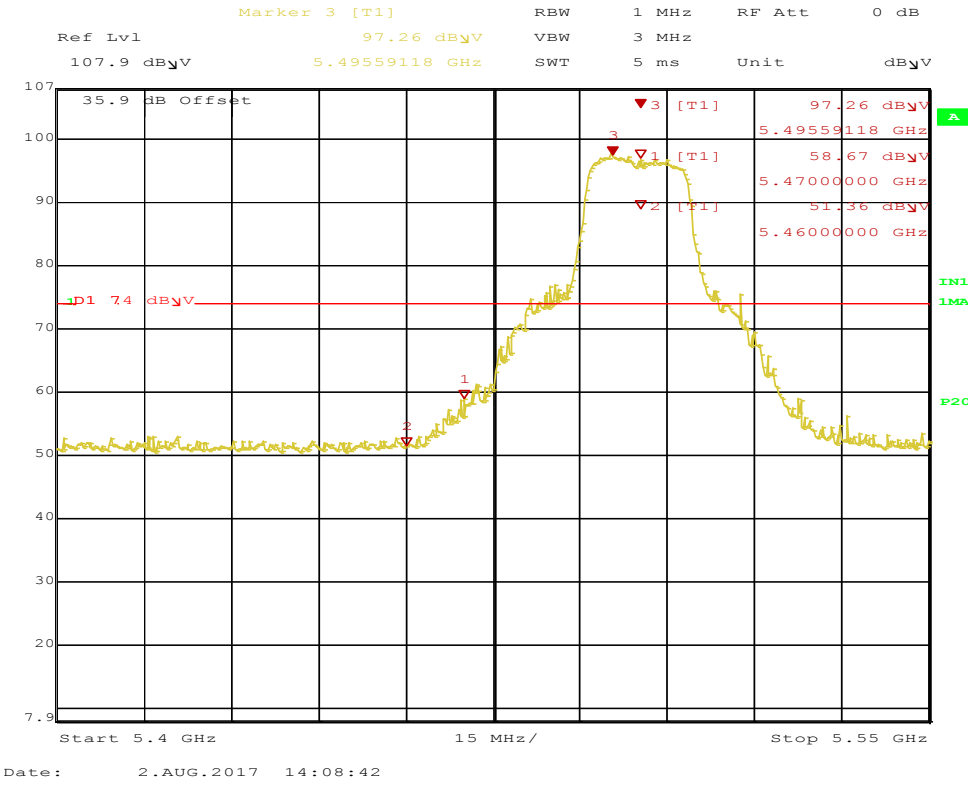


Figure 147: Radiated Emission 5470.0 MHz Edge for HT20 5500 MHz – Vert. (Pk)

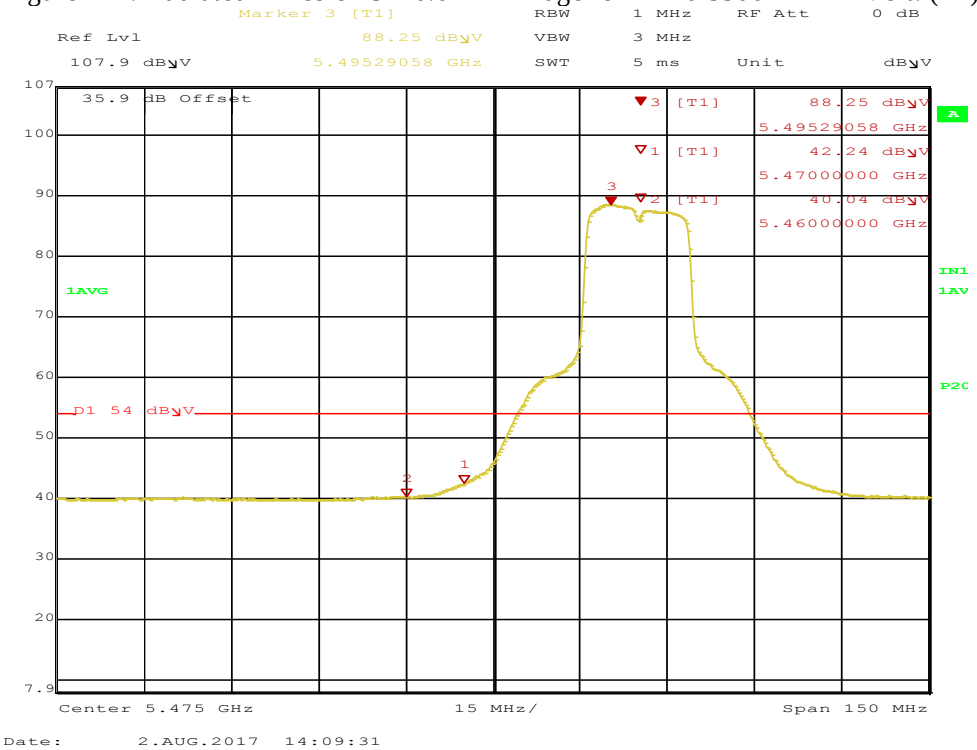


Figure 148: Radiated Emission 5470.0 MHz Edge for HT20 5500 MHz – Vert. (Ave)

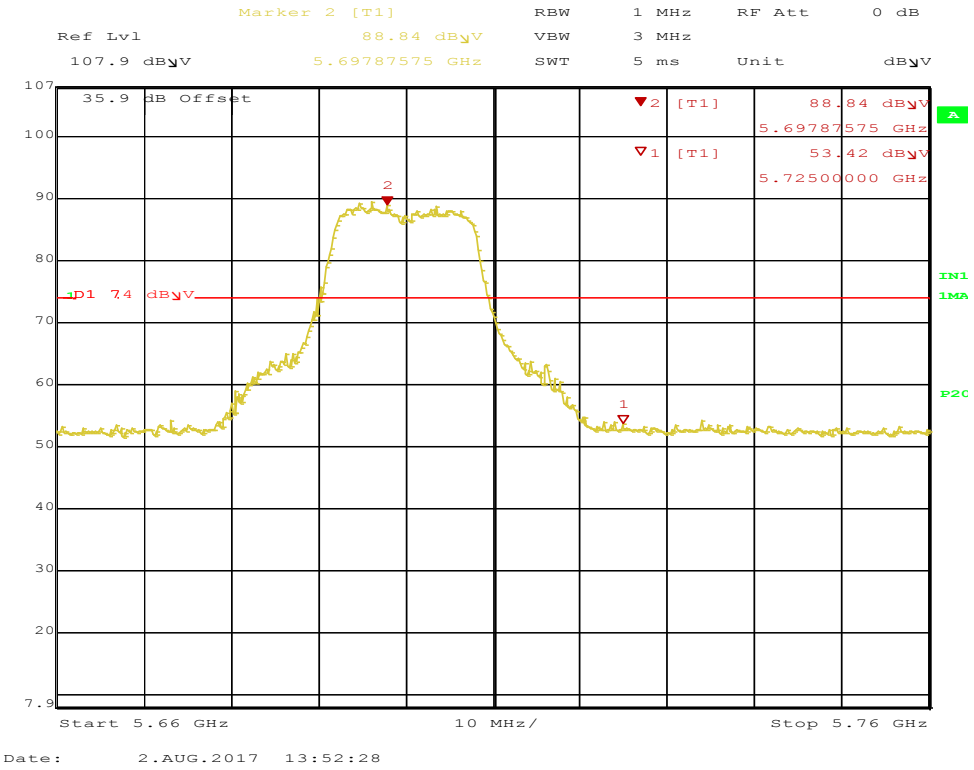


Figure 149: Radiated Emission 5725.0 MHz Edge for 11a 5700 MHz – Horz. (Pk)

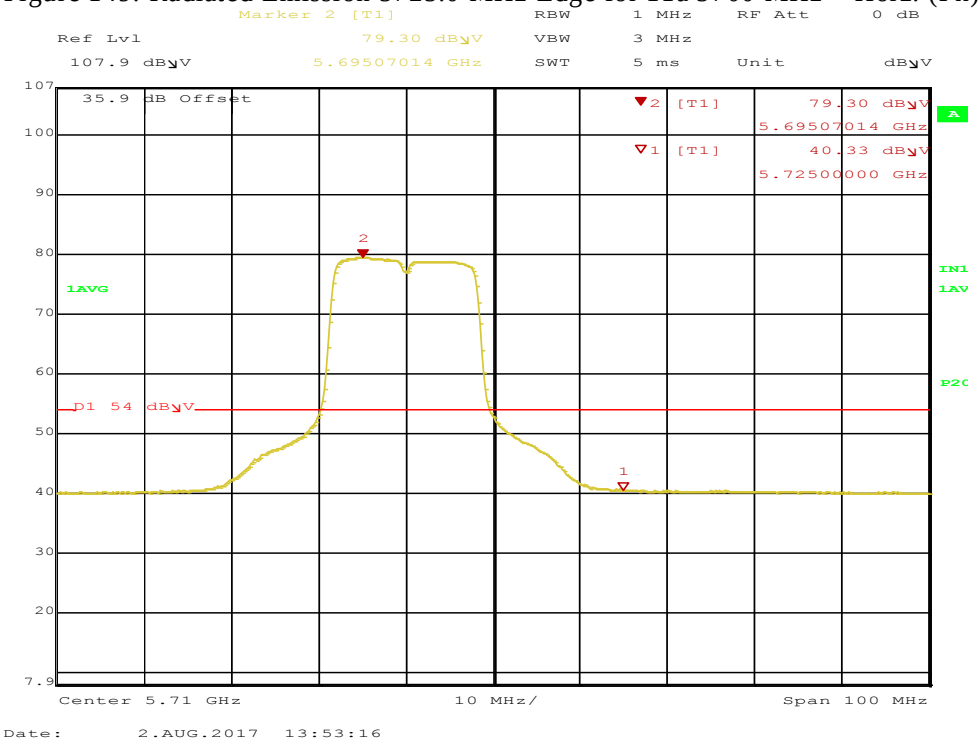


Figure 150: Radiated Emission 5725.0 MHz Edge for 11a 5700 MHz – Horz. (Ave)

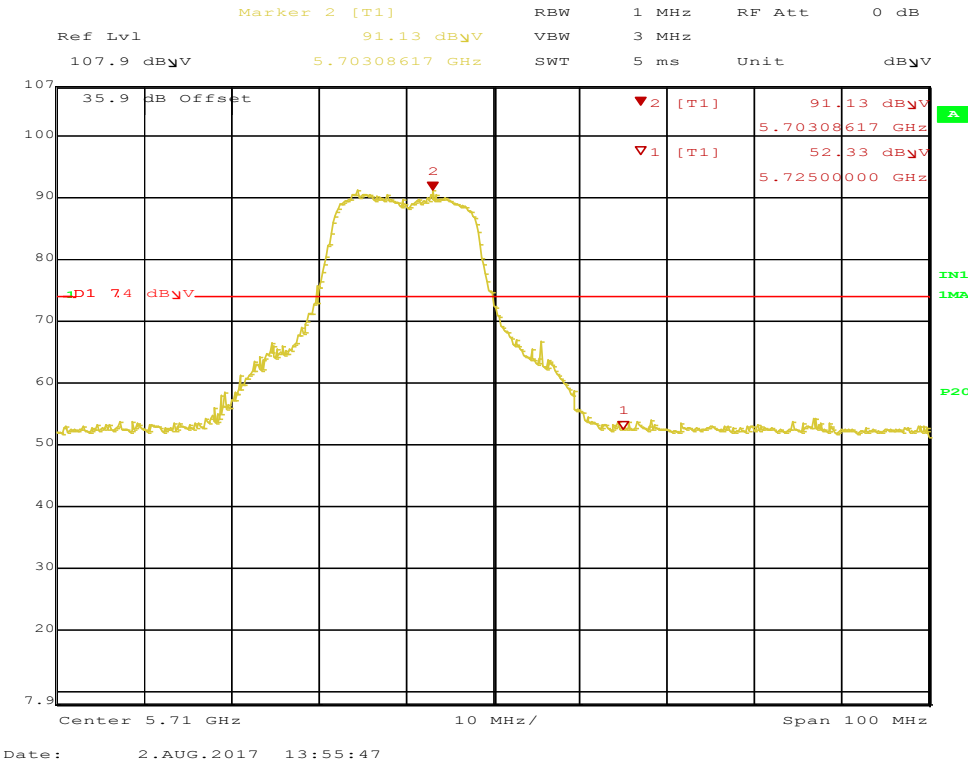


Figure 151: Radiated Emission 5725.0 MHz Edge for 11a 5700 MHz – Vert. (Pk)

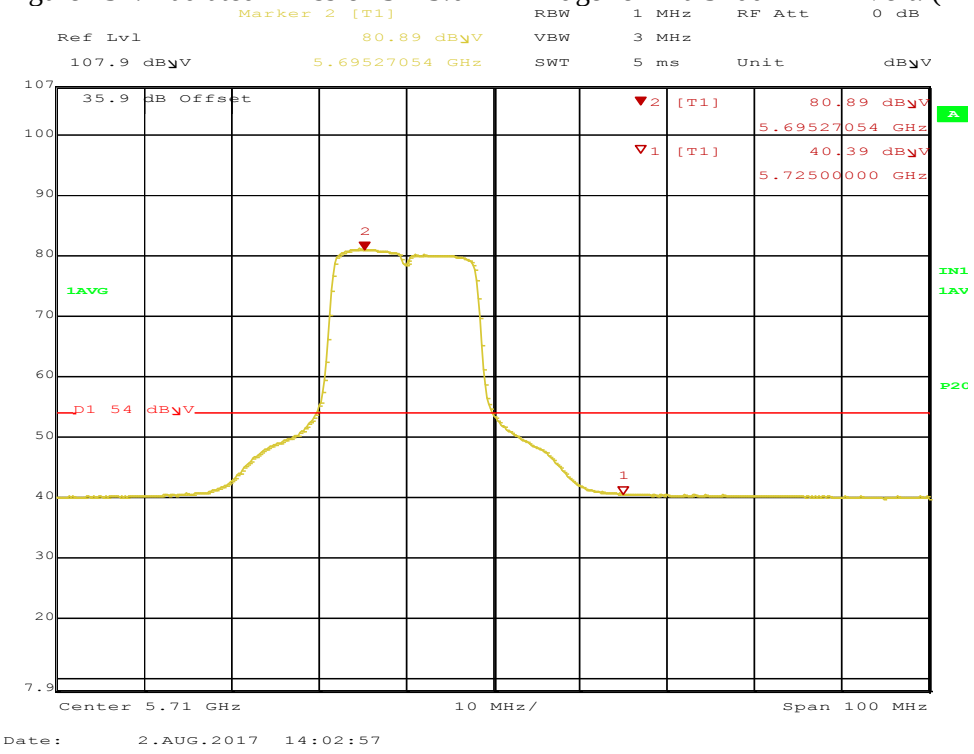


Figure 152: Radiated Emission 5725.0 MHz Edge for 11a 5700 MHz – Vert. (Ave)

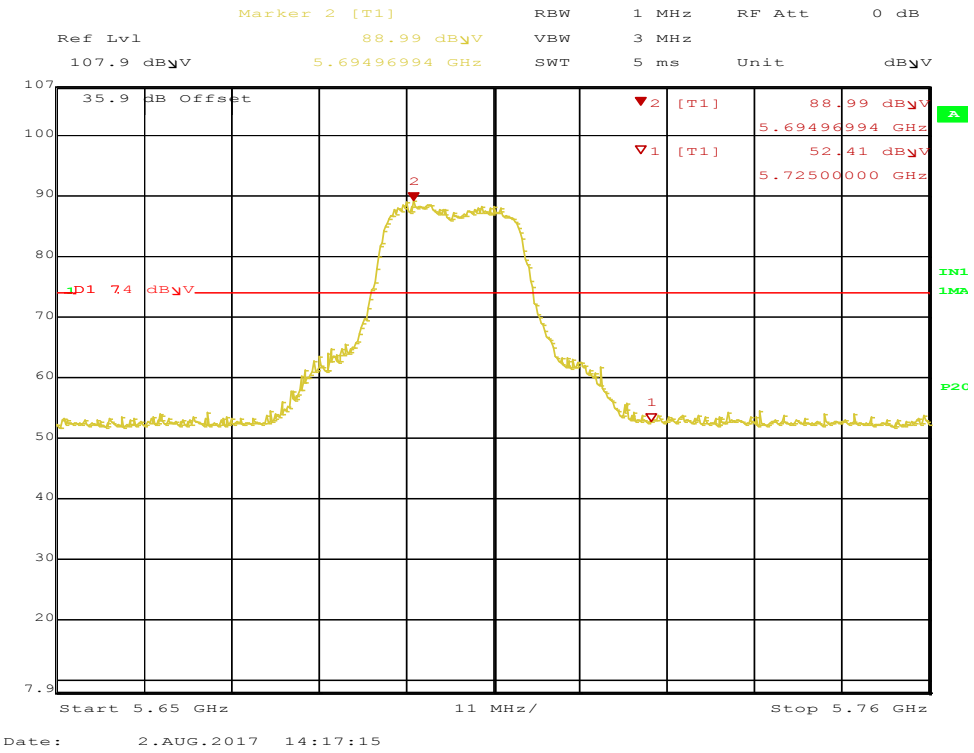


Figure 153: Radiated Emission 5725.0 MHz Edge for HT20 5700 MHz – Horz. (Pk)

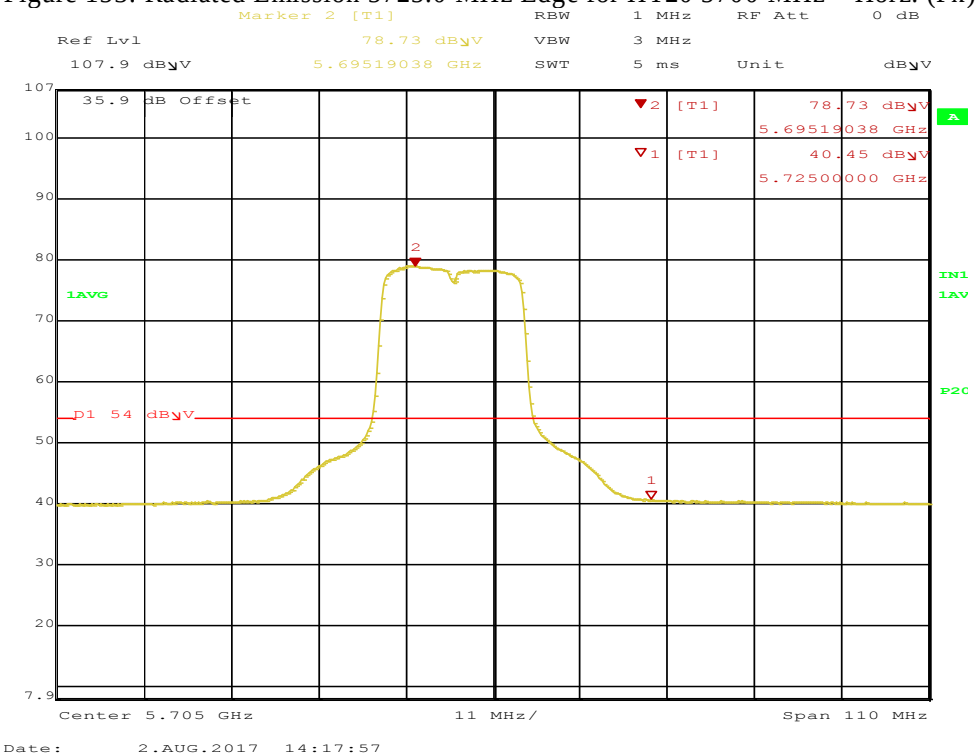


Figure 154: Radiated Emission 5725.0 MHz Edge for HT20 5700 MHz – Horz. (Ave)

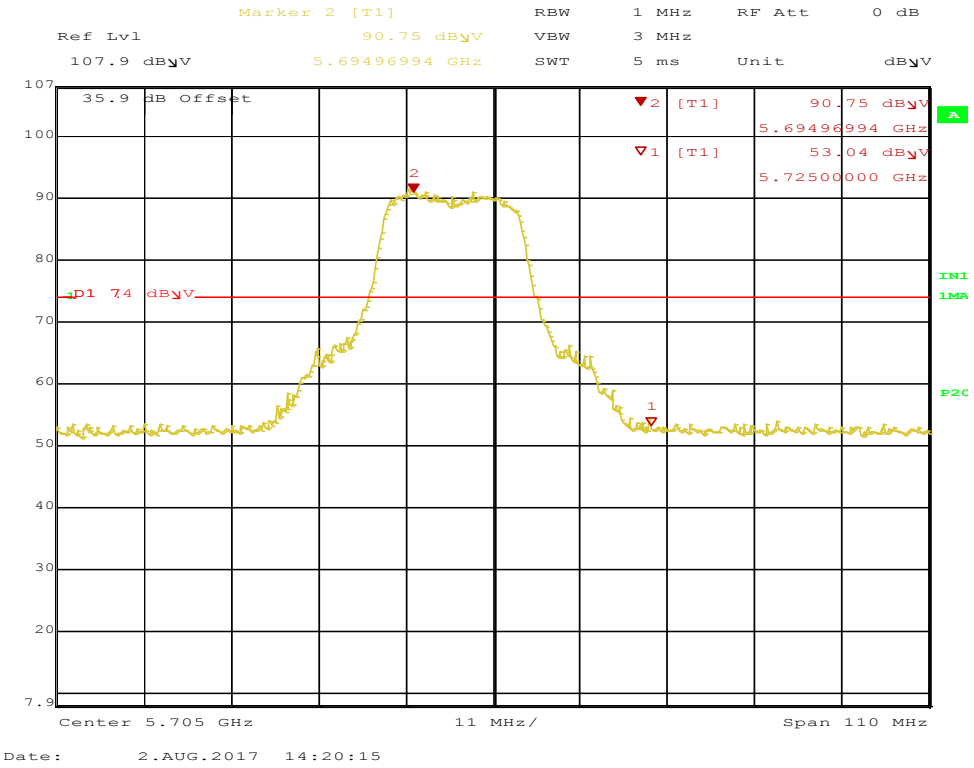


Figure 155: Radiated Emission 5725.0 MHz Edge for HT20 5700 MHz – Vert. (Pk)

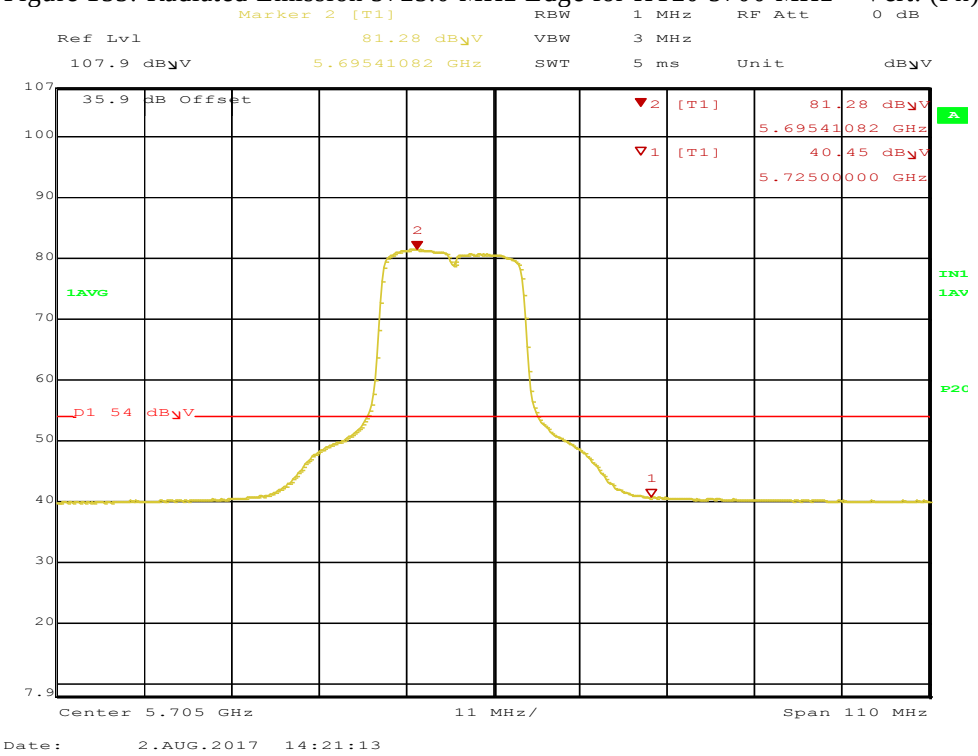


Figure 156: Radiated Emission 5725.0 MHz Edge for HT20 5700 MHz – Vert. (Ave)

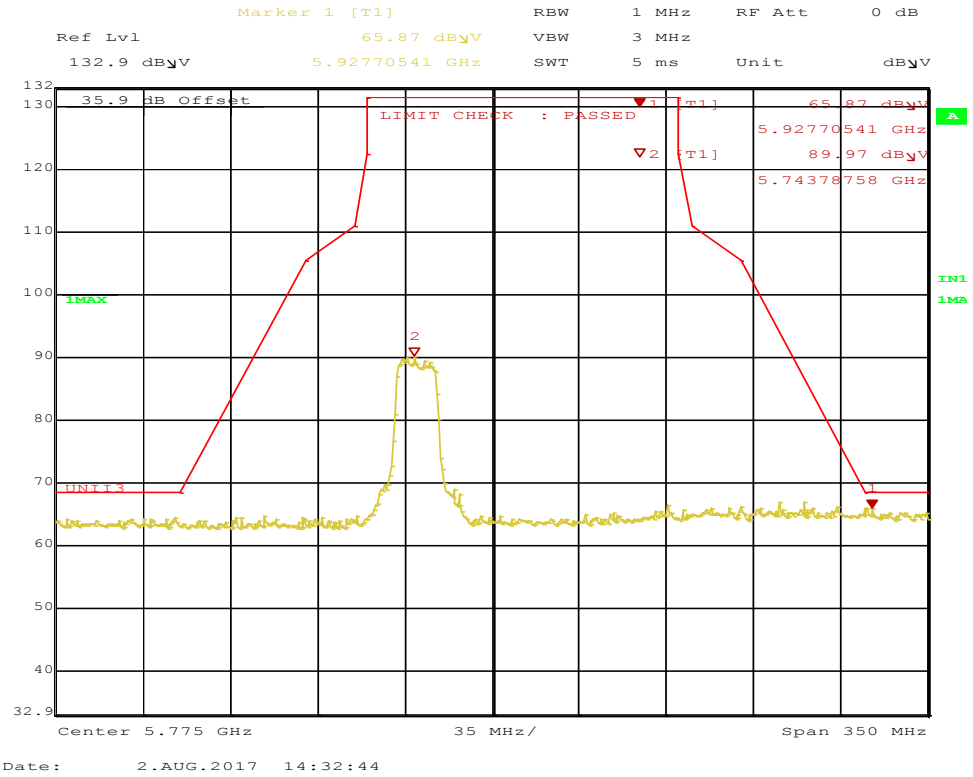


Figure 157: Radiated Emission Mask for 11a 5745 MHz – Horz. (Pk)

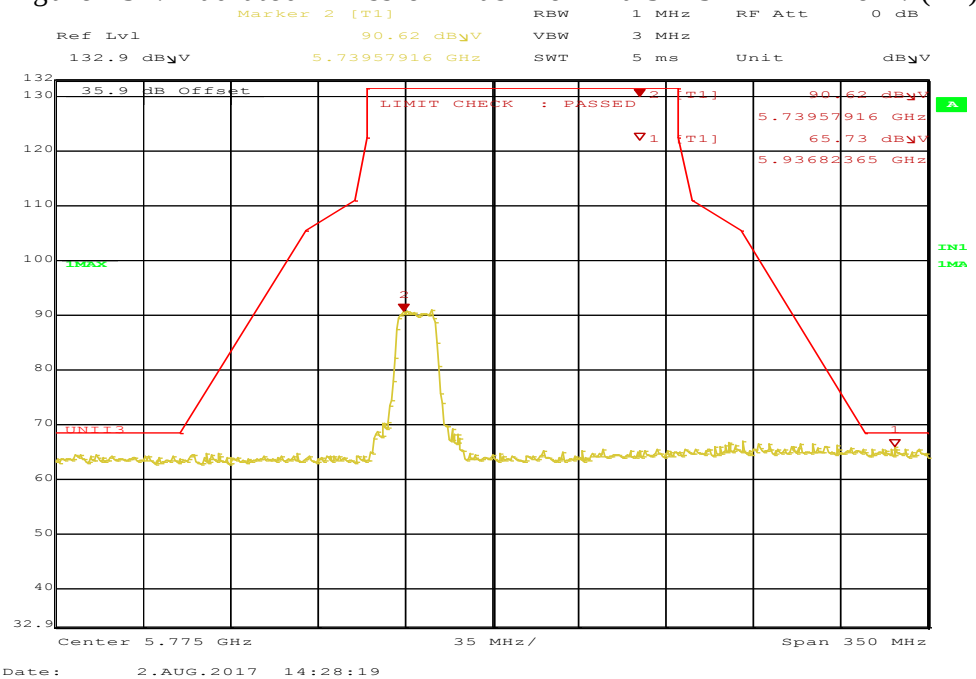


Figure 158: Radiated Emission Mask for 11a 5745 MHz – Vert (Pk)

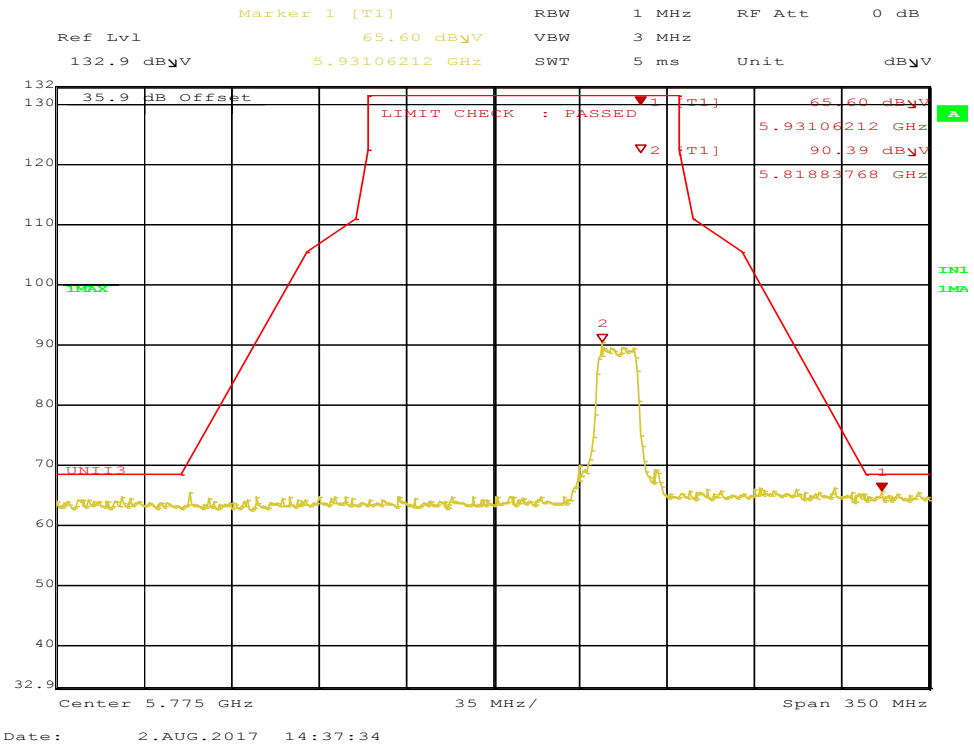


Figure 159: Radiated Emission Mask for 11a 5825 MHz – Horz. (Pk)

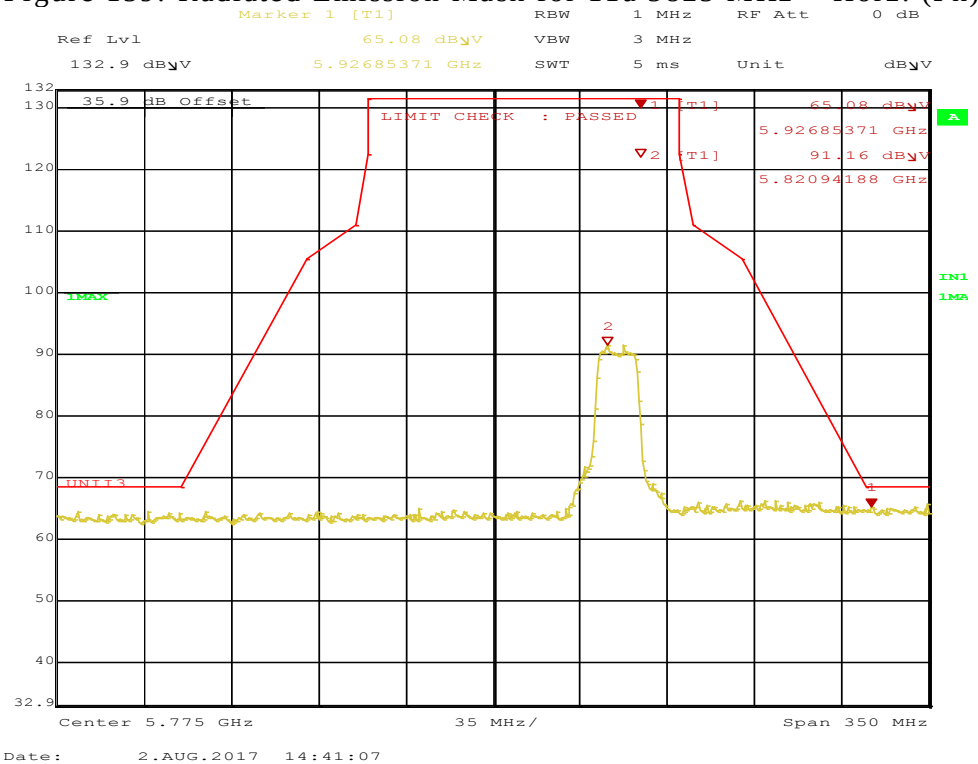


Figure 160: Radiated Emission Mask for 11a 5825 MHz – Vert. (Pk)

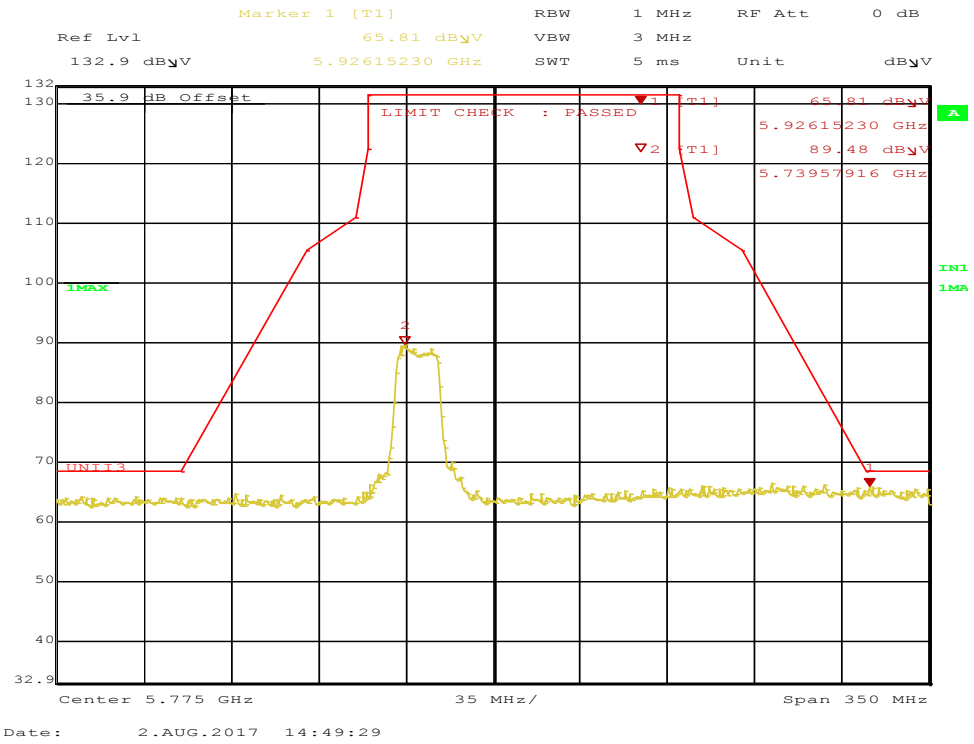


Figure 161: Radiated Emission Mask for HT20 5745 MHz – Horz. (Pk)

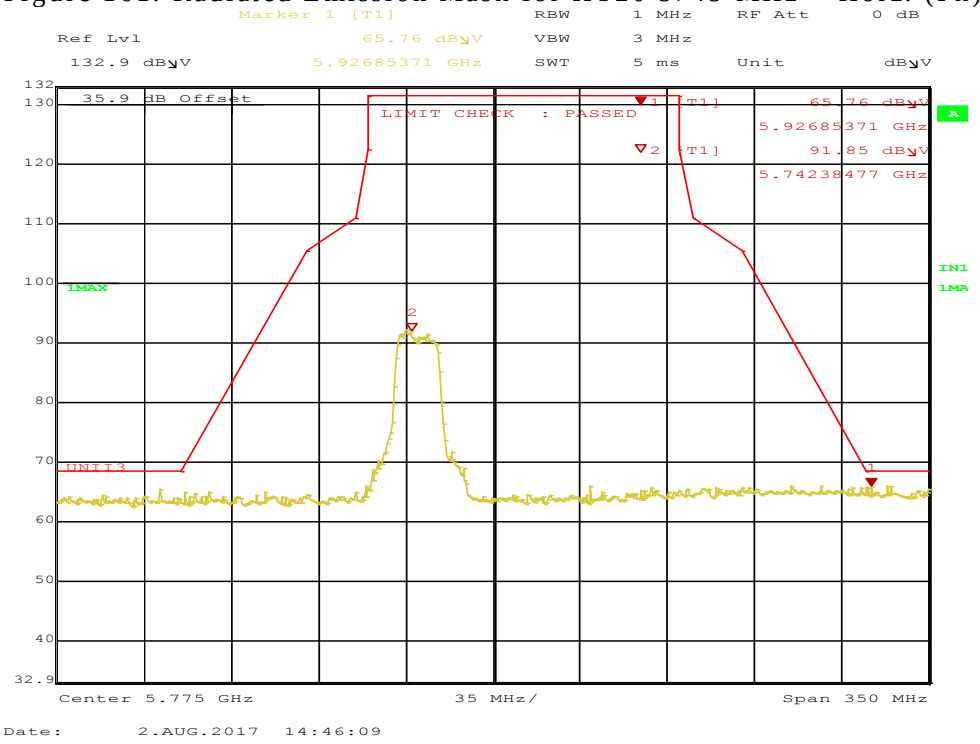


Figure 162: Radiated Emission Mask for HT20 5745 MHz – Vert. (Pk)

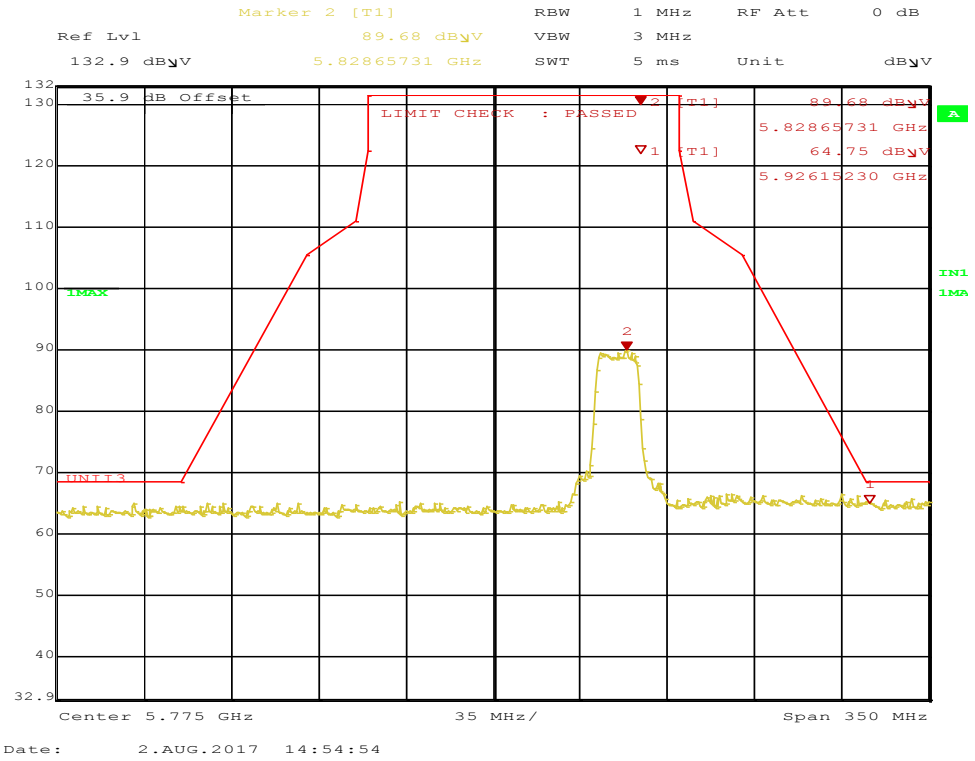


Figure 163: Radiated Emission Mask for HT20 5825 MHz – Horz. (Pk)

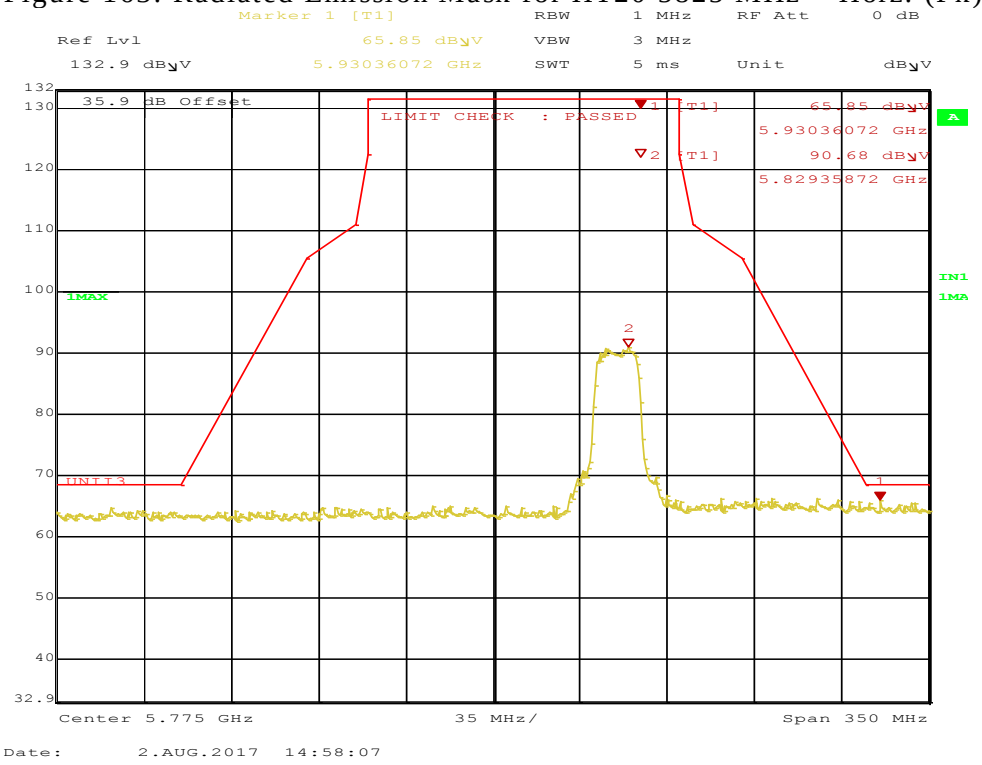


Figure 164: Radiated Emission Mask for HT20 5825 MHz – Vert. (Pk)

SOP 1 Radiated Emissions		Tracking # 31763105.001 Page 1 of 34	
EUT Name	Wireless Audio Headset	**Date**	June 27, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 38%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a mode at 6 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	120 kHz/ 300 kHz
Dist/Ant Used	3m / JB3	**Performed by**	Jeremy Luong

9 kHz – 1 GHz Transmit at 5300 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
30.12	21.86	2.56	-7.51	16.91	QP	V	111	178	40.00	-23.09
51.48	23.07	2.74	-20.17	5.64	QP	V	171	0	40.00	-34.36
98.12	27.88	3.05	-18.64	12.29	QP	V	137	0	43.50	-31.21

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. Modes tested were 802.11a and HT20, (low, mid & high channel).
2. Worst case emission was observed on 802.11a at 6 Mbps, 5300 MHz mode for 20 MHz channel BW.
3. No significant emission was observed below 30 MHz

SOP 1 Radiated Emissions

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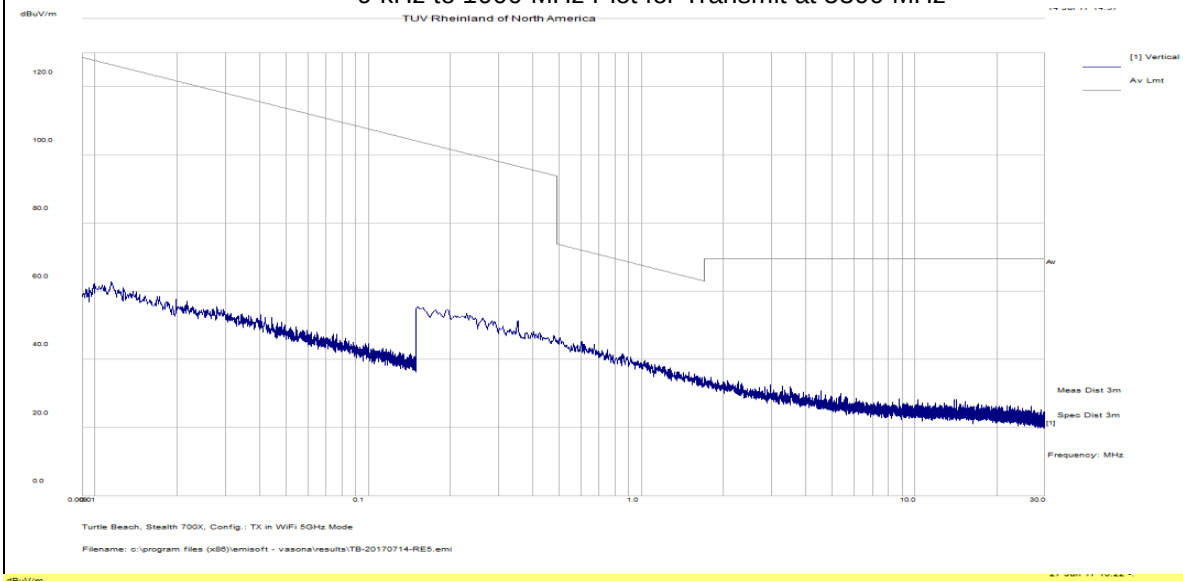
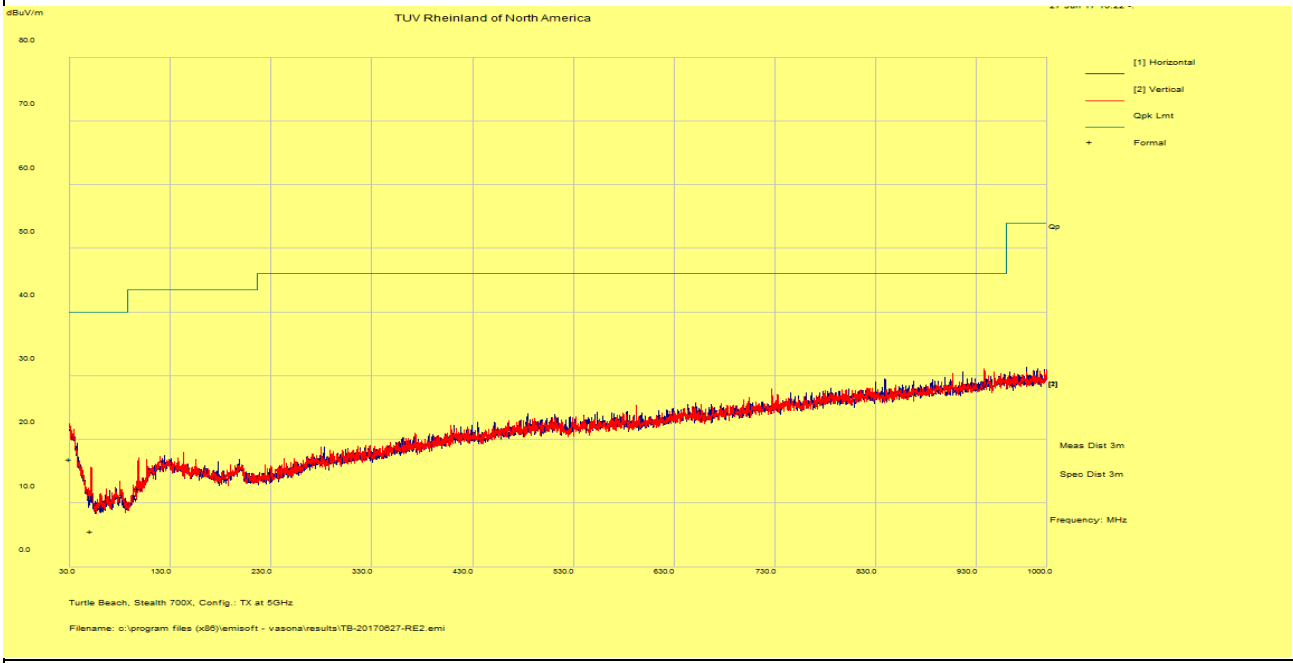
EUT Name	Wireless Audio Headset	**Date**	June 27, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 38%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a mode at 6 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	120 kHz/ 300 kHz
Dist/Ant Used	3m / JB3 & 6505	**Date**	Jeremy Luong

9 kHz to 1000 MHz Plot for Transmit at 5300 MHz





Notes: None.

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EUT Name	Wireless Audio Headset	**Date**	July 24, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	21° C / 40%rh
EUT Serial	PP#2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a mode at 6 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m – AHA-840	**Performed by**	Jeremy Luong

1 – 40 GHz Transmit at 5180 MHz (Low Channel)

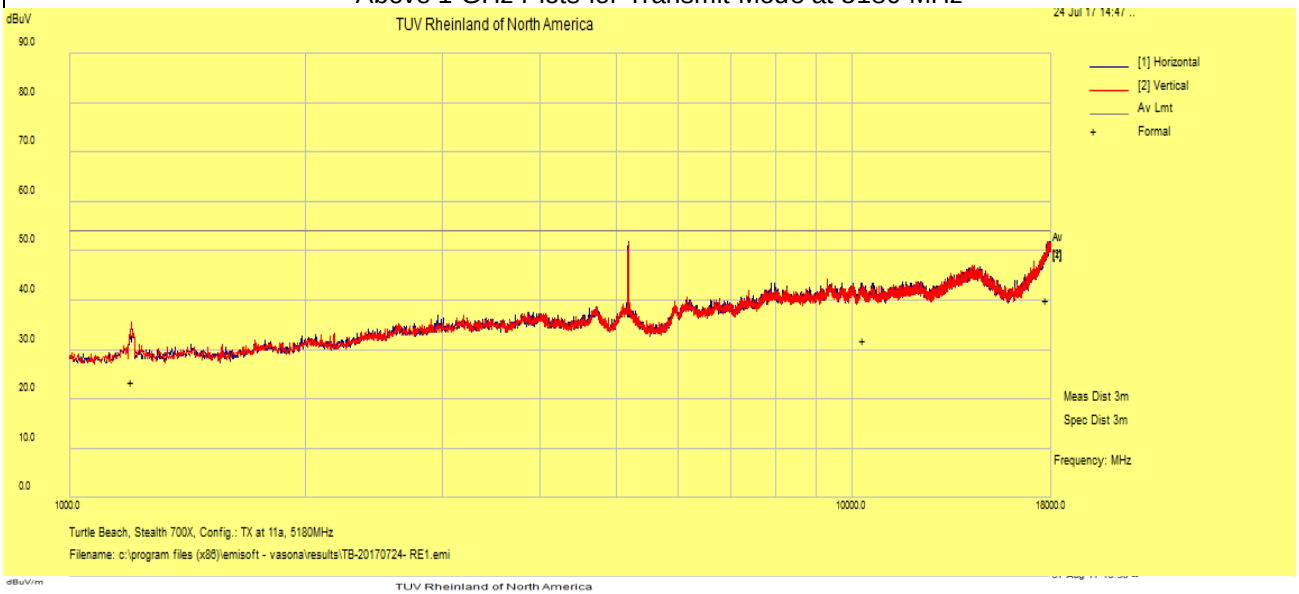
Frequency	Raw	Cable Loss	AF	Level	Detector	Polarity	Height	Azimuth	Limit	Margin
MHz	dBuV/m	dB	dB	dBuV/m		H/V	cm	deg	dBuV/m	dB
10366.93	36.99	3.07	-8.15	31.91	Ave	H	112	222	54.00	-22.09
1200.06	48.22	0.90	-25.55	23.57	Ave	V	130	126	54.00	-30.43
17789.41	35.96	4.28	-0.26	39.98	Ave	V	129	242	54.00	-14.02
1 – 40 GHz Transmit at 5200 MHz (Middle Channel)										
1753.34	43.15	1.10	-23.97	20.27	Ave	H	176	78	54.00	-33.73
10376.03	36.47	3.09	-8.19	31.37	Ave	H	116	242	54.00	-22.63
17999.19	35.82	4.20	0.44	40.46	Ave	H	217	38	54.00	-13.54
1207.58	46.82	0.90	-25.55	22.17	Ave	V	169	208	54.00	-31.83
1 – 40 GHz Transmit at 5240 MHz (High Channel)										
1194.82	46.18	0.90	-25.56	21.52	Ave	H	167	176	54.00	-32.48
10481.09	37.95	3.00	-8.63	32.32	Ave	H	107	212	54.00	-21.68
14320.25	39.10	3.42	-7.37	35.16	Ave	H	214	4	54.00	-18.85
17921.99	36.52	4.20	0.29	41.01	Ave	V	232	318	54.00	-12.99

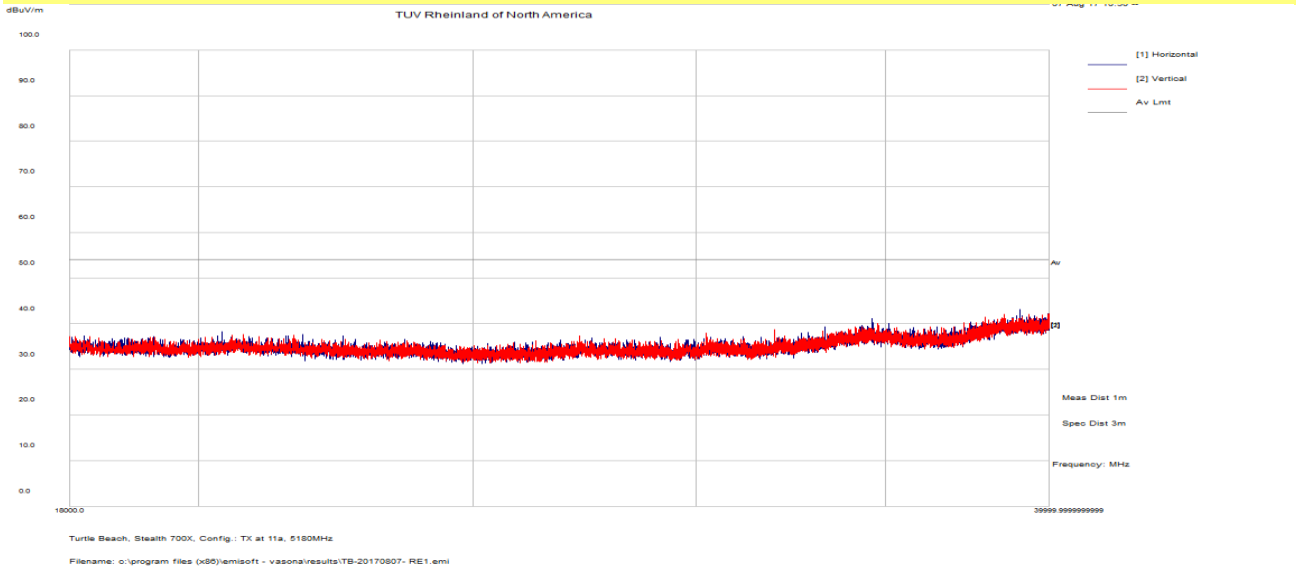
Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: Worst case emission was observed at 6 Mbps for 802.11a mode.
Headset intended to transmit less than 8 dBm.

SOP 1 Radiated Emissions		Tracking # 31763105.001 Page 4 of 34	
EUT Name	Wireless Audio Headset	**Date**	July 24, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	21° C / 40%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a mode at 6 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5180 MHz

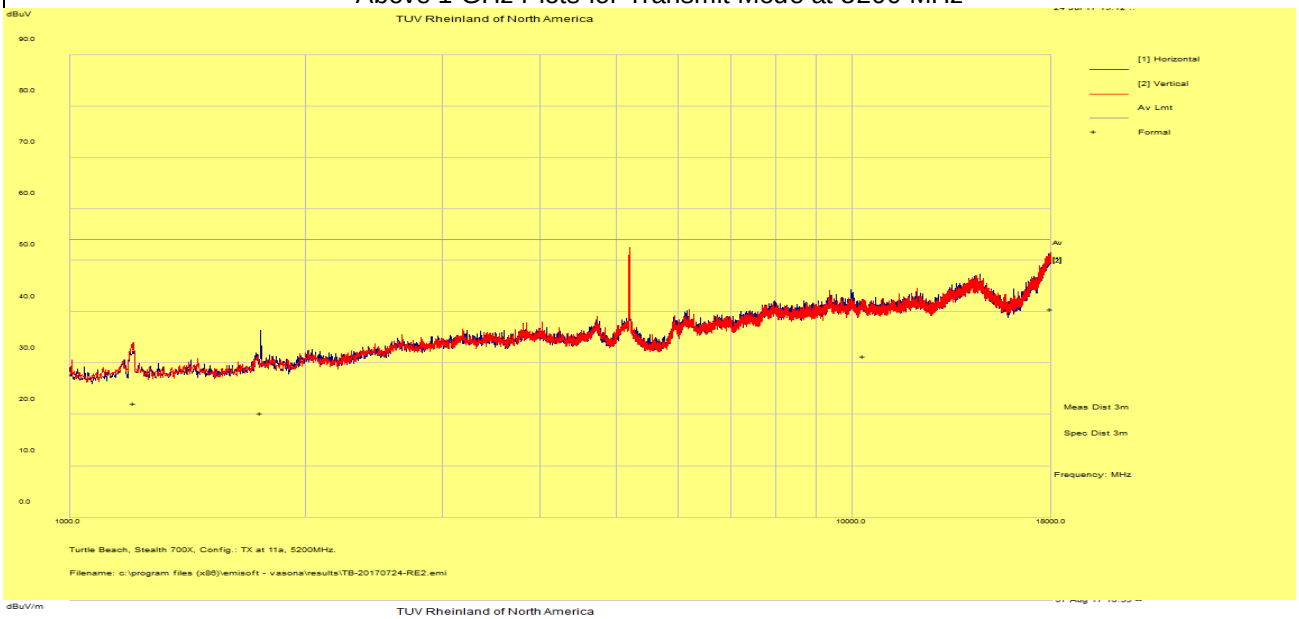


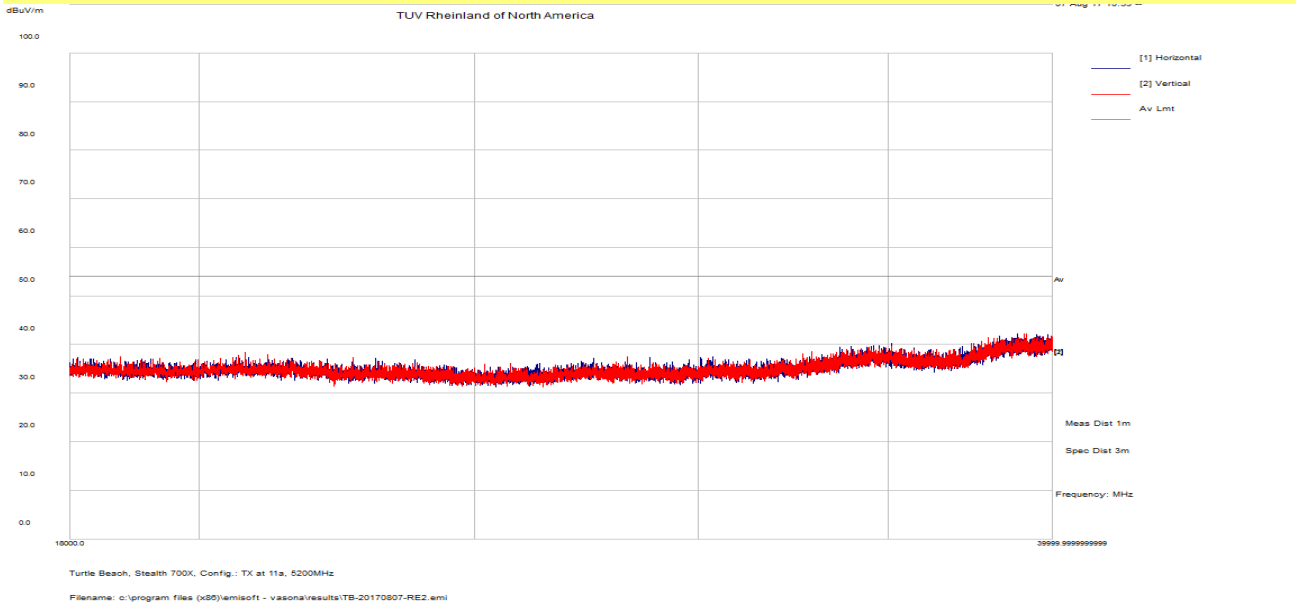


Notes: No significant emission observed from 18 - 40 GHz.

SOP 1 Radiated Emissions		Tracking # 31763105.001 Page 5 of 34	
EUT Name	Wireless Audio Headset	**Date**	July 24, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	21° C / 40%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a mode at 6 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5200 MHz





Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions

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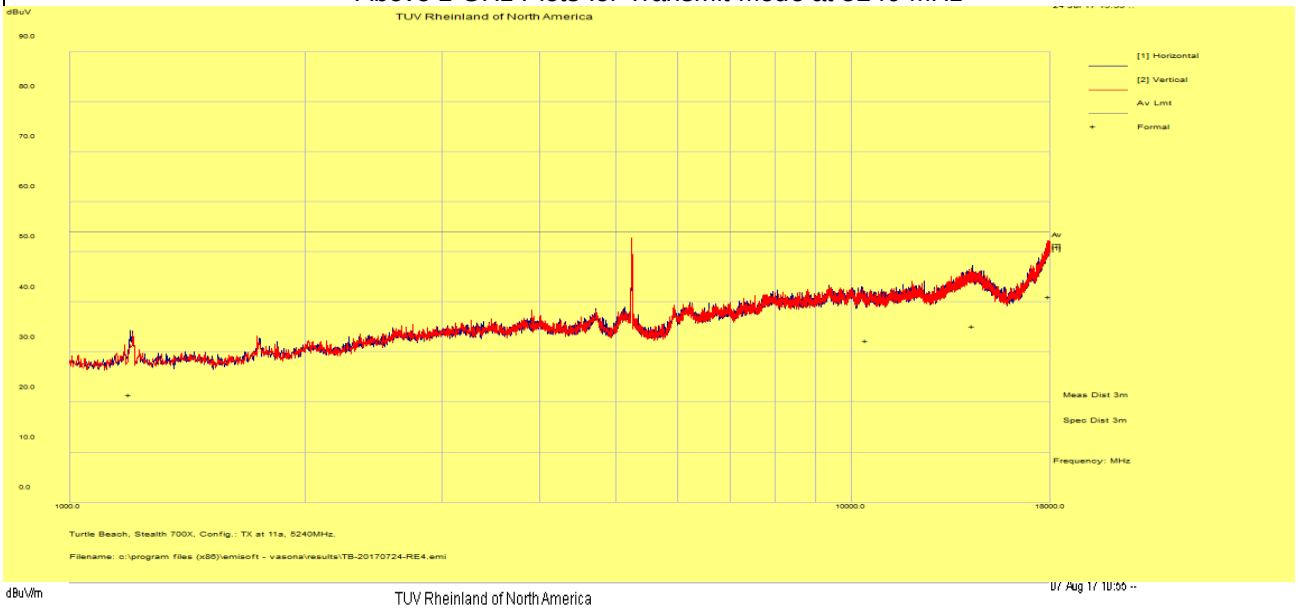
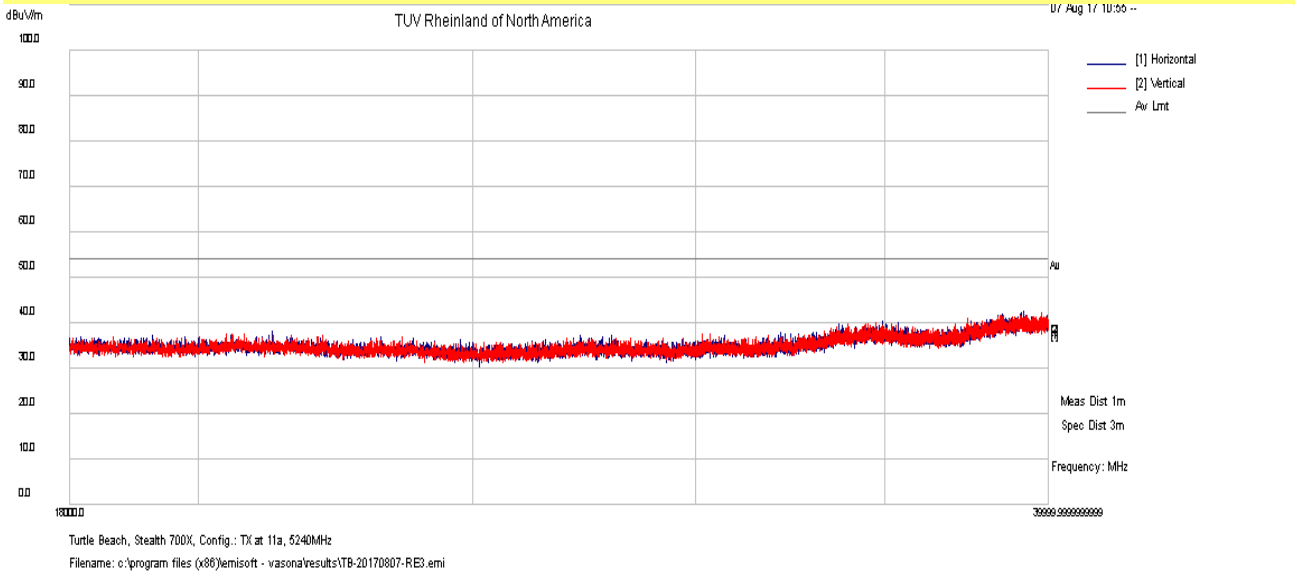
EUT Name	Wireless Audio Headset	**Date**	July 24, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	21° C / 40%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a mode at 6 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5240 MHz





Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions		Tracking # 31763105.001 Page 7 of 34	
EUT Name	Wireless Audio Headset	**Date**	July 25, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 35%rh
EUT Serial	PP#2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 mode 6.5 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m – AHA-840	**Performed by**	Jeremy Luong

1 – 40 GHz Transmit at 5180 MHz (Low Channel)

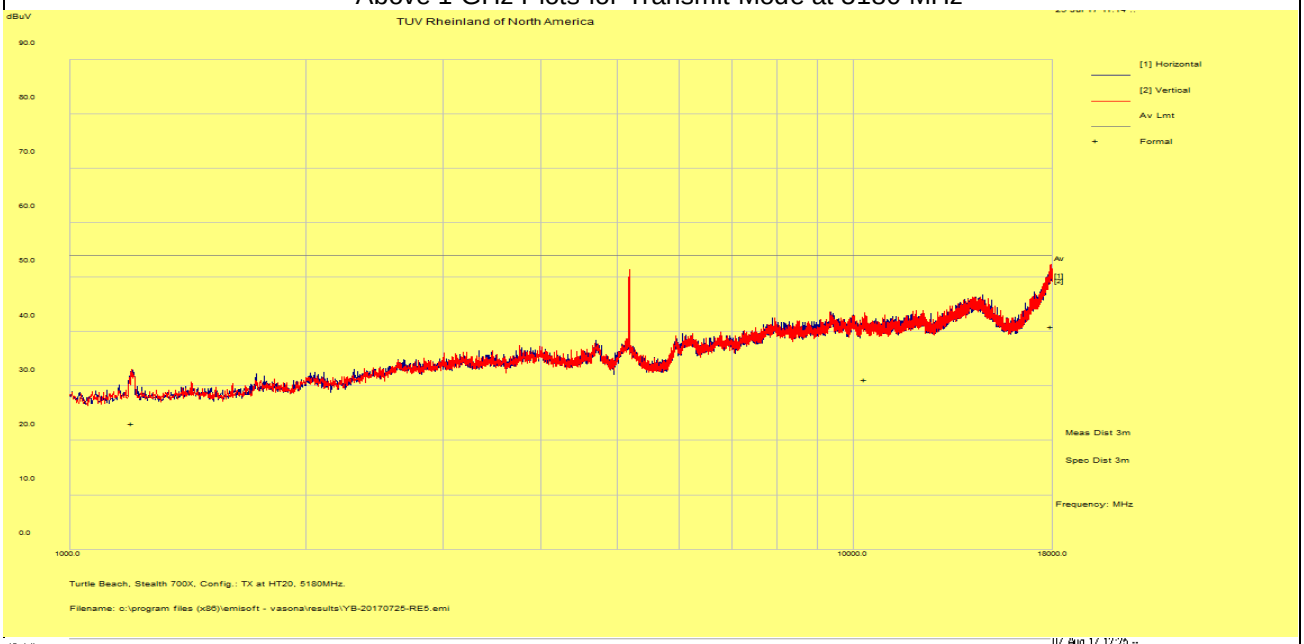
Frequency	Raw	Cable Loss	AF	Level	Detector	Polarity	Height	Azimuth	Limit	Margin
MHz	dBuV/m	dB	dB	dBuV/m		H/V	cm	deg	dBuV/m	dB
1201.76	47.78	0.90	-25.55	23.14	Ave	H	161	196	54.00	-30.87
10370.04	36.34	3.08	-8.16	31.26	Ave	H	148	82	54.00	-22.74
17913.60	36.42	4.20	0.27	40.88	Ave	V	186	152	54.00	-13.12
1 – 40 GHz Transmit at 5200 MHz (Middle Channel)										
1200.12	48.50	0.90	-25.55	23.85	Ave	H	225	128	54.00	-30.15
10403.53	36.33	3.05	-8.30	31.09	Ave	H	141	36	54.00	-22.91
17805.05	36.37	4.25	-0.14	40.48	Ave	V	182	12	54.00	-13.52
1 – 40 GHz Transmit at 5240 MHz (High Channel)										
1198.02	46.96	0.90	-25.55	22.31	Ave	H	144	228	54.00	-31.69
10474.65	36.51	3.00	-8.61	30.90	Ave	H	205	238	54.00	-23.10
17931.30	36.55	4.20	0.32	41.07	Ave	V	241	224	54.00	-12.93

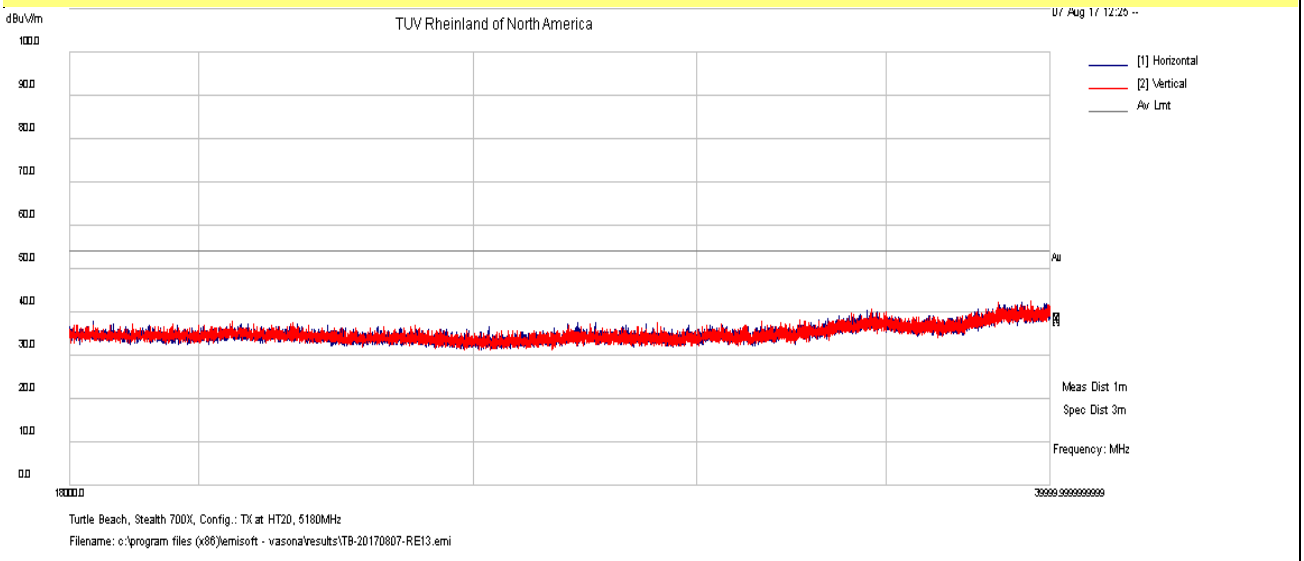
Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: Worst case emission was observed at 6.5 Mbps for 802.1n HT20 mode.
Headset intended to transmit less than 8 dBm.

SOP 1 Radiated Emissions		Tracking # 31763105.001 Page 8 of 34	
EUT Name	Wireless Audio Headset	**Date**	July 25, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 38%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 mode 6.5 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5180 MHz

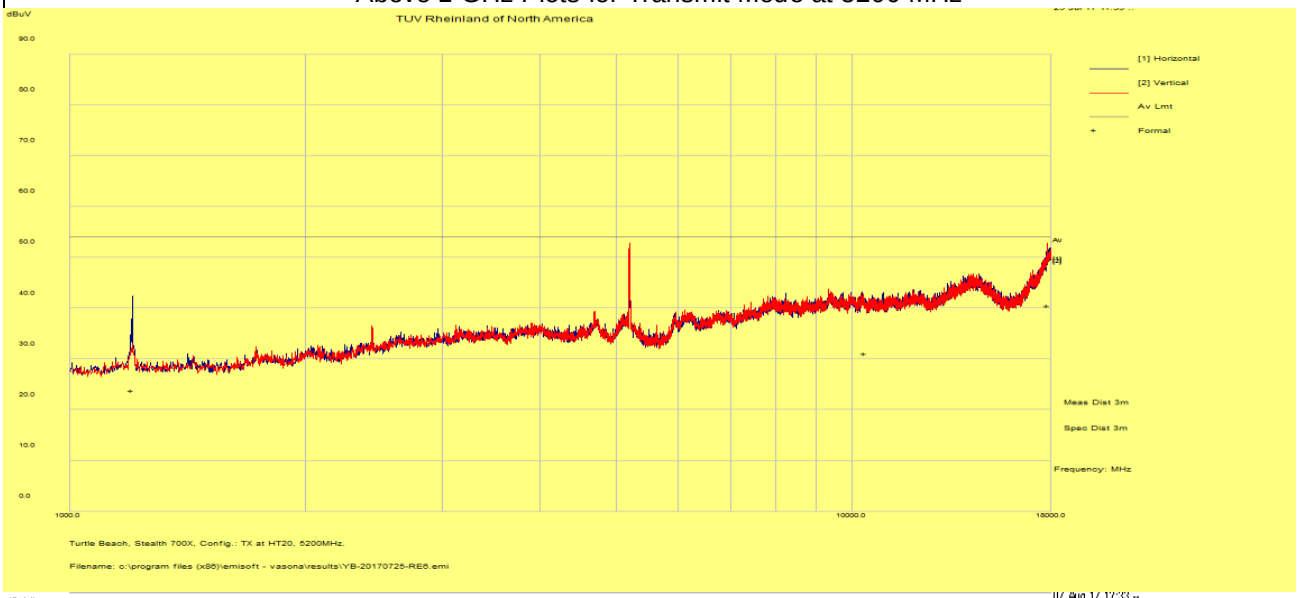


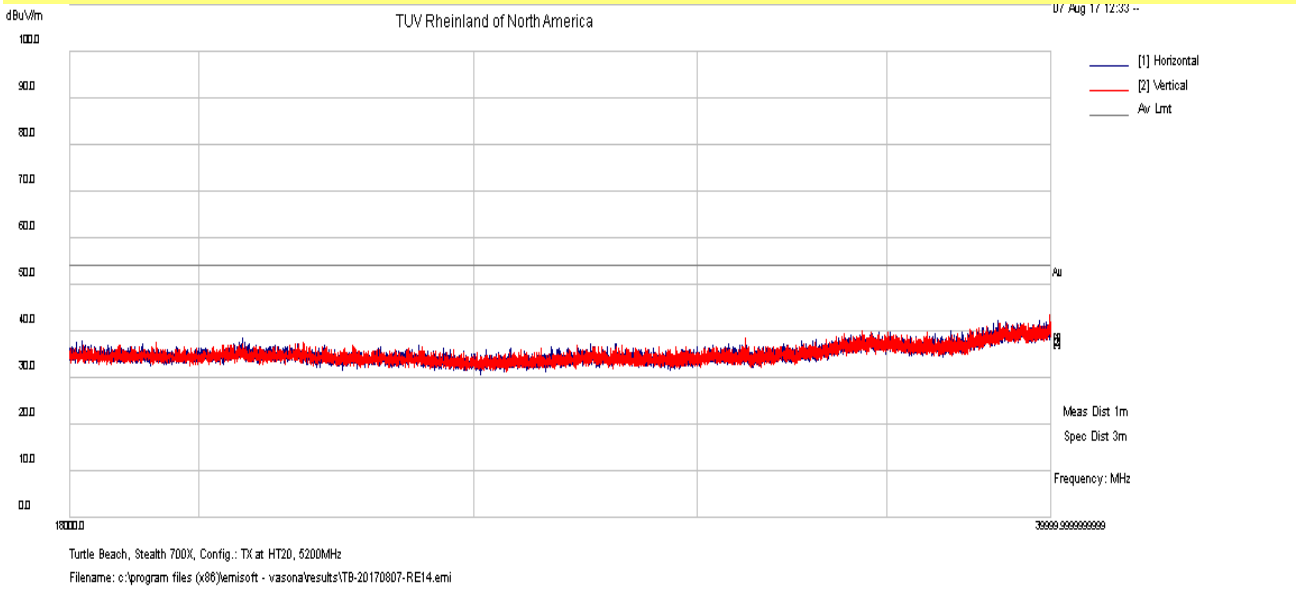


Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions		Tracking # 31763105.001 Page 9 of 34	
EUT Name	Wireless Audio Headset	**Date**	July 25, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 38%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 mode 6.5 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5200 MHz





Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions

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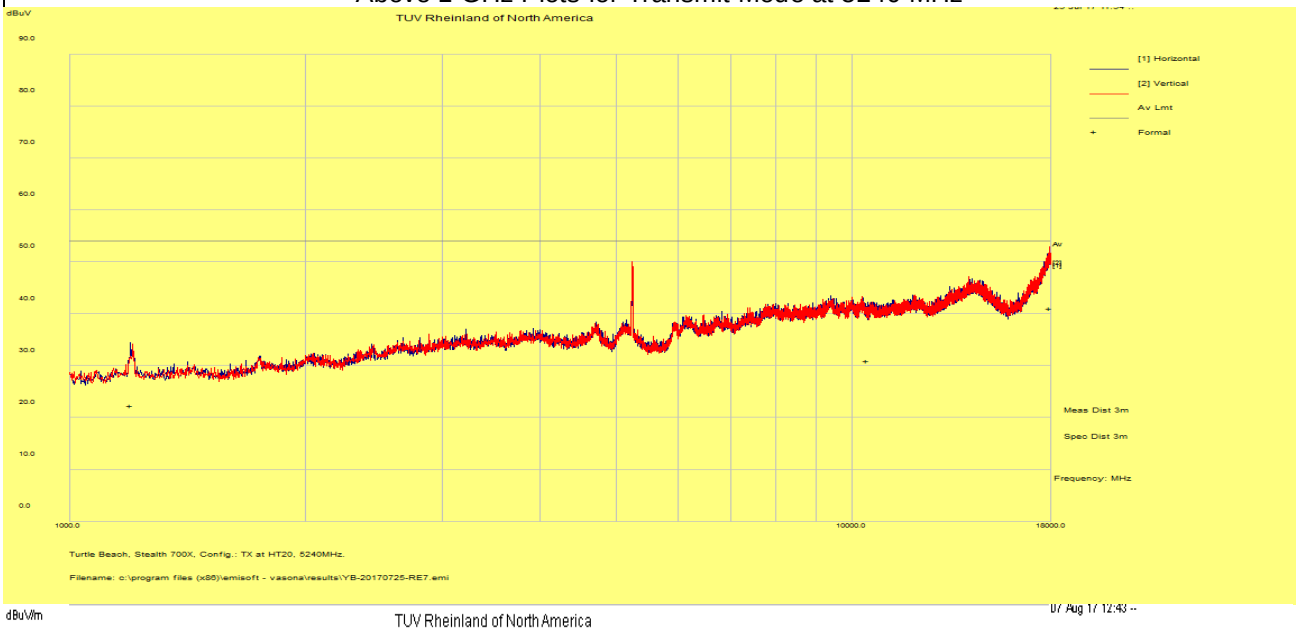
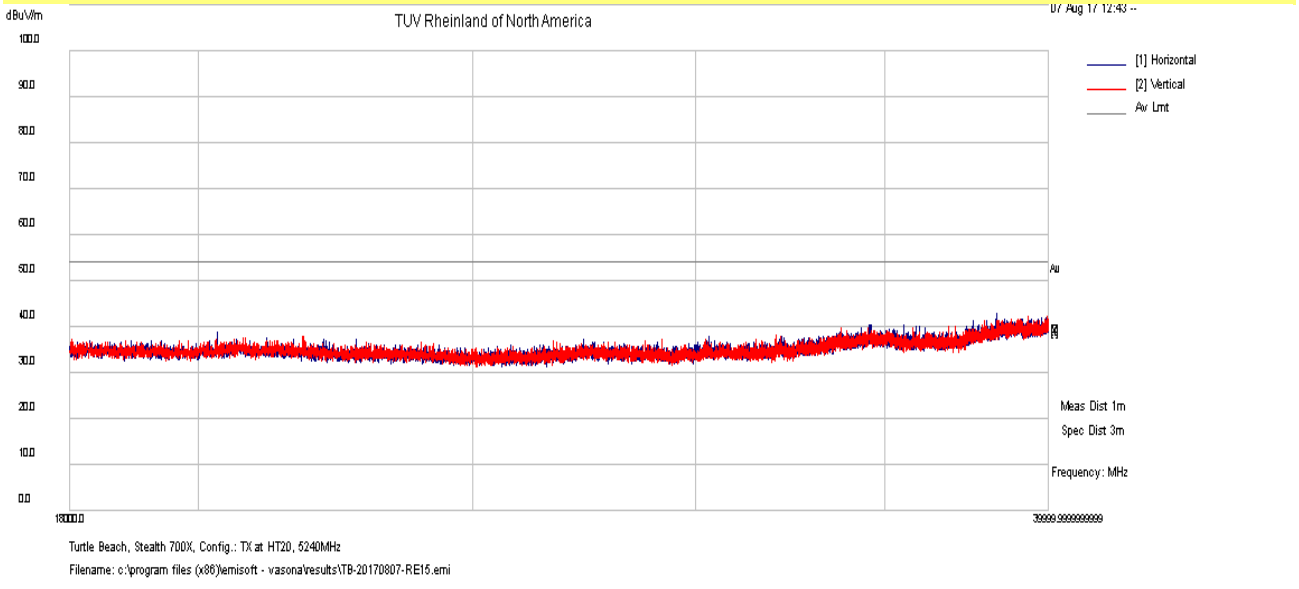
EUT Name	Wireless Audio Headset	**Date**	July 25, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 38%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 mode 6.5 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5240 MHz





Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions		Tracking # 31763105.001 Page 11 of 34	
EUT Name	Wireless Audio Headset	**Date**	July 24, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	21° C / 38%rh
EUT Serial	PP#2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a mode at 6 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m – AHA-840	**Performed by**	Jeremy Luong

1 – 40 GHz Transmit at 5260 MHz (Low Channel)

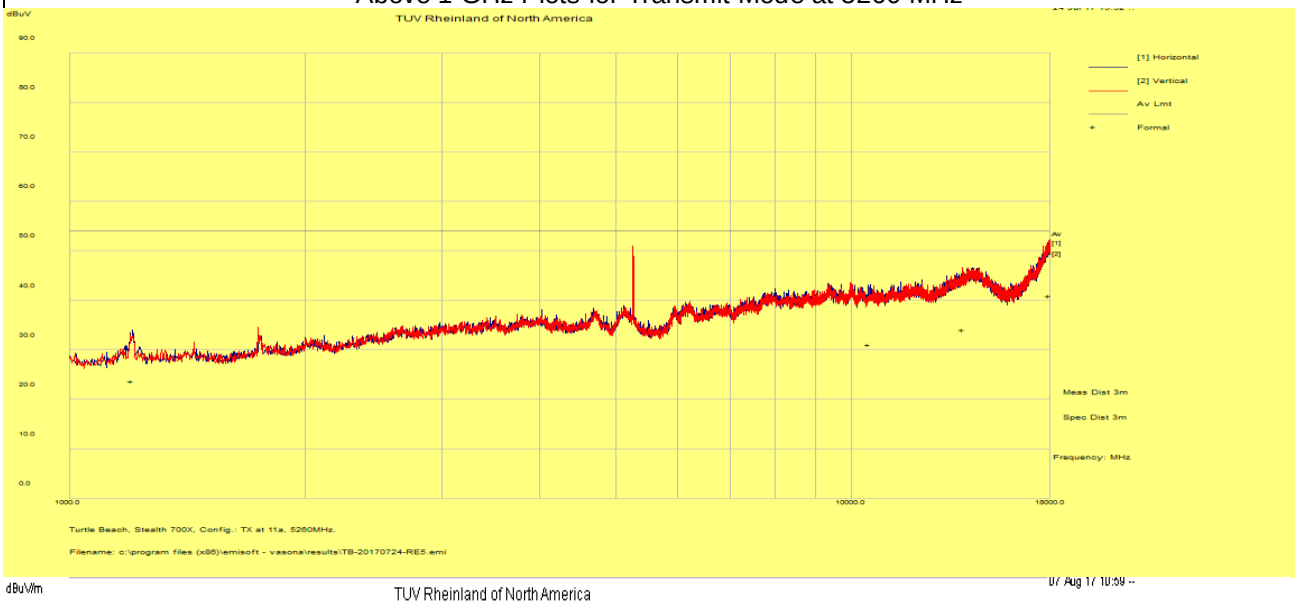
Frequency	Raw	Cable Loss	AF	Level	Detector	Polarity	Height	Azimuth	Limit	Margin
MHz	dBuV/m	dB	dB	dBuV/m		H/V	cm	deg	dBuV/m	dB
1202.69	48.31	0.90	-25.55	23.66	Ave	H	168	198	54.00	-30.34
10518.64	36.85	3.00	-8.77	31.08	Ave	H	112	184	54.00	-22.92
13898.38	39.29	3.46	-8.68	34.07	Ave	V	103	18	54.00	-19.93
17953.03	36.31	4.20	0.36	40.88	Ave	V	143	154	54.00	-13.12
1 – 40 GHz Transmit at 5300 MHz (Middle Channel)										
1205.49	49.25	0.90	-25.55	24.60	Ave	H	171	30	54.00	-29.40
1771.23	48.32	1.10	-23.84	25.58	Ave	H	219	242	54.00	-28.42
2440.82	42.55	1.30	-21.30	22.56	Ave	V	117	88	54.00	-31.44
10602.20	37.10	3.00	-8.88	31.22	Ave	V	188	100	54.00	-22.78
17853.22	36.28	4.20	0.06	40.54	Ave	V	232	354	54.00	-13.46
1 – 40 GHz Transmit at 5320 MHz (High Channel)										
1205.39	49.16	0.90	-25.55	24.51	Ave	H	114	222	54.00	-29.49
10603.74	37.10	3.00	-8.88	31.22	Ave	H	225	152	54.00	-22.78
13377.74	40.11	3.30	-10.26	33.16	Ave	H	238	191	54.00	-20.84
17965.63	36.08	4.20	0.38	40.66	Ave	H	238	270	54.00	-13.34
1679.77	43.05	1.10	-24.60	19.55	Ave	V	160	81	54.00	-34.45

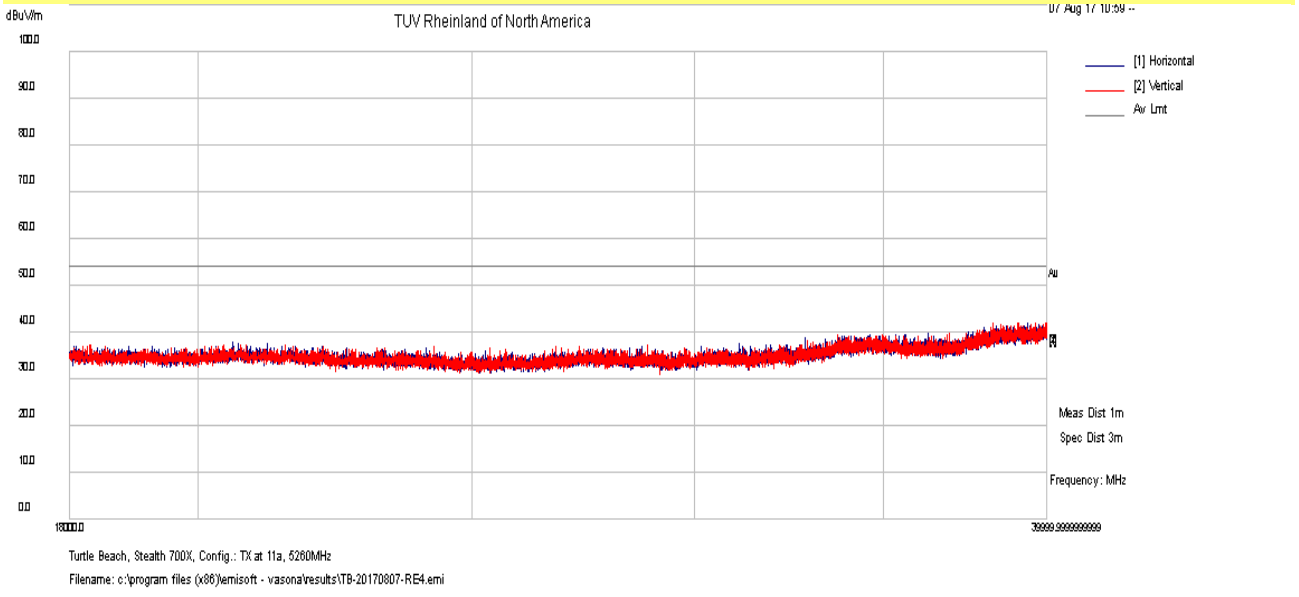
Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: Worst case emission was observed at 6 Mbps for 802.11a mode.
Headset intended to transmit less than 8 dBm.

SOP 1 Radiated Emissions		Tracking # 31763105.001 Page 12 of 34	
EUT Name	Wireless Audio Headset	**Date**	July 24, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	21° C / 38%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a mode at 6 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5260 MHz





Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions

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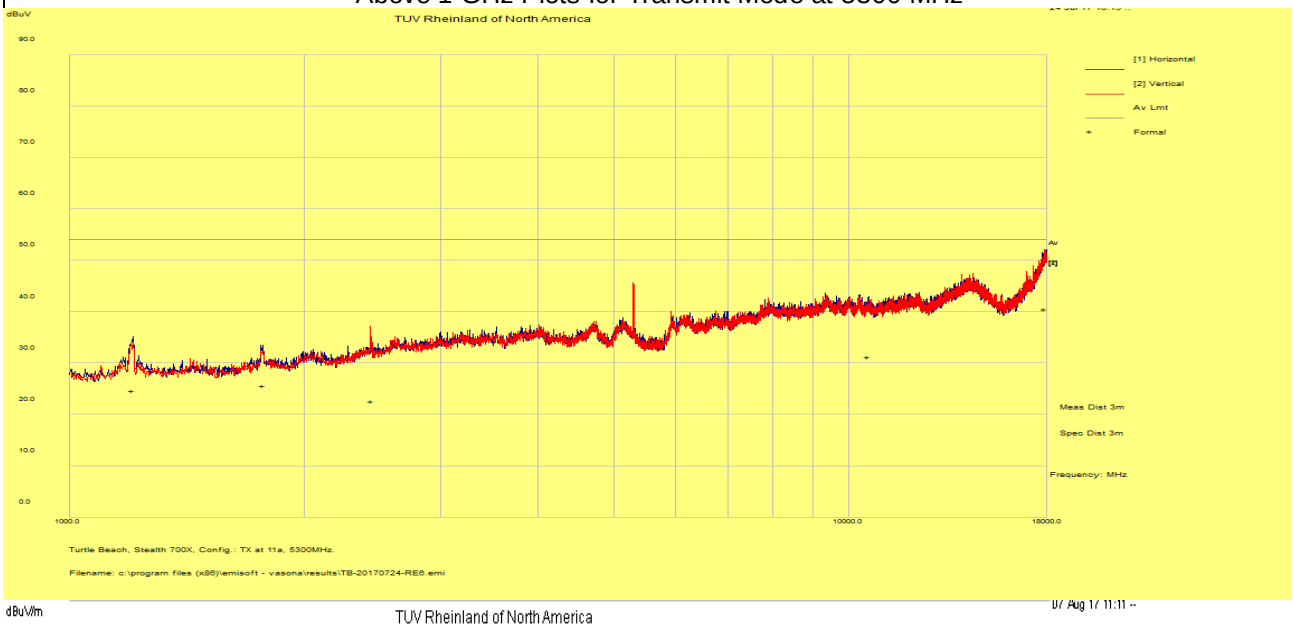
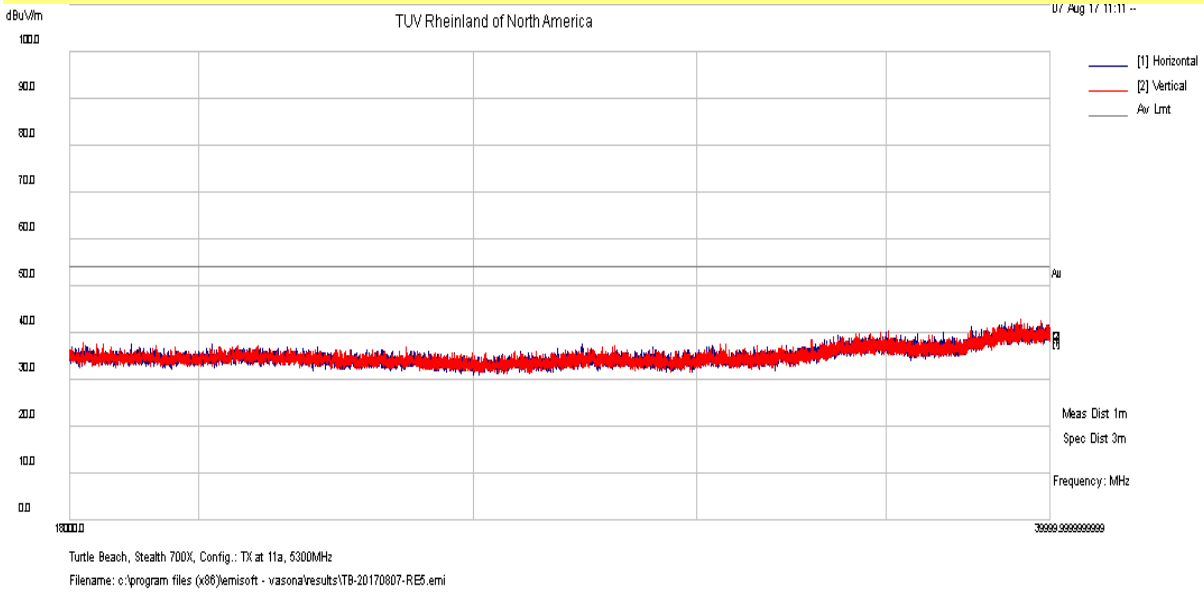
EUT Name	Wireless Audio Headset	**Date**	July 24, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	21° C / 38%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a mode at 6 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5300 MHz





Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions

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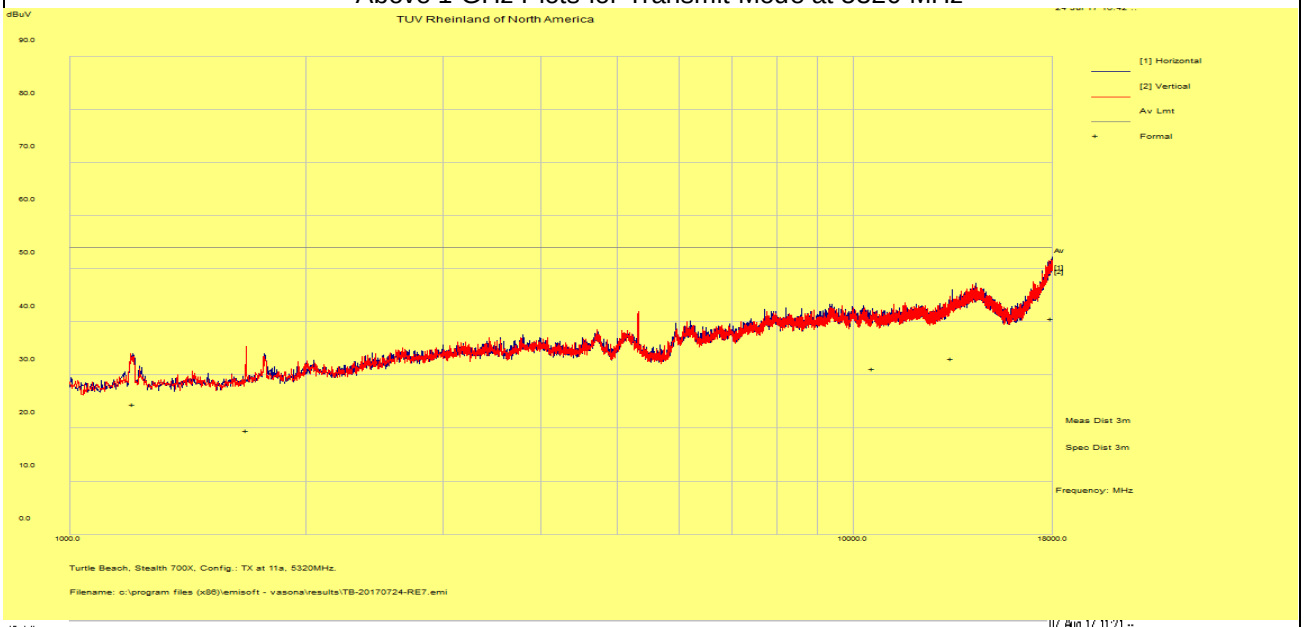
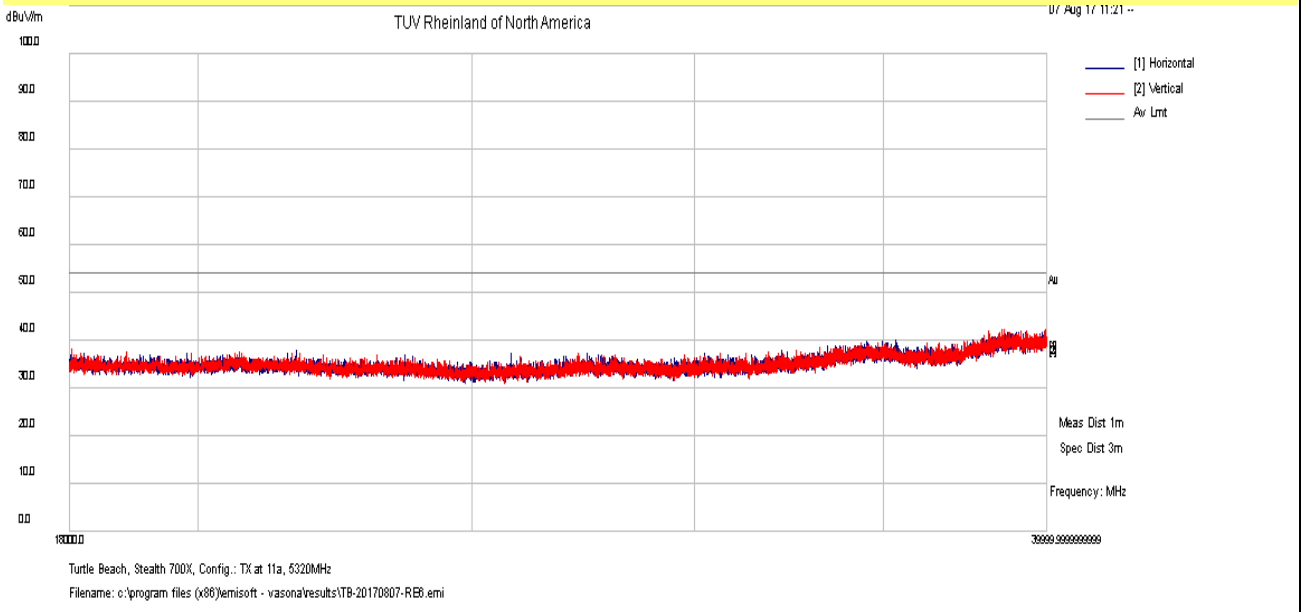
EUT Name	Wireless Audio Headset	**Date**	July 24, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	21° C / 38%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a mode at 6 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5320 MHz





Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions		Tracking # 31763105.001 Page 15 of 34	
EUT Name	Wireless Audio Headset	**Date**	July 25, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 40%rh
EUT Serial	PP#2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 mode 6.5 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m – AHA-840	**Performed by**	Jeremy Luong

1 – 40 GHz Transmit at 5260 MHz (Low Channel)

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
1200.40	49.28	0.90	-25.55	24.64	Ave	H	210	0	54.00	-29.36
2436.46	42.86	1.30	-21.30	22.85	Ave	H	103	82	54.00	-31.15
17848.90	36.12	4.20	0.05	40.37	Ave	H	189	114	54.00	-13.63
10521.22	36.46	3.00	-8.78	30.68	Ave	V	180	360	54.00	-23.32
1 – 40 GHz Transmit at 5300 MHz (Middle Channel)										
1200.18	50.17	0.90	-25.55	25.53	Ave	H	222	22	54.00	-28.48
14235.50	39.45	3.41	-7.35	35.51	Ave	H	238	192	54.00	-18.50
10620.78	37.16	3.00	-8.90	31.26	Ave	V	215	176	54.00	-22.74
17911.35	36.43	4.20	0.26	40.89	Ave	V	199	226	54.00	-13.11
1 – 40 GHz Transmit at 5320 MHz (High Channel)										
1775.08	46.79	1.10	-23.81	24.09	Ave	H	180	206	54.00	-29.91
2436.02	42.53	1.30	-21.30	22.53	Ave	H	167	336	54.00	-31.47
10643.85	37.27	2.97	-8.93	31.31	Ave	H	122	84	54.00	-22.69
17829.61	36.22	4.20	-0.01	40.41	Ave	V	173	360	54.00	-13.59

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

Note: Worst case emission was observed at 6.5 Mbps for 802.11n HT20 mode.
Headset intended to transmit less than 8 dBm.

SOP 1 Radiated Emissions

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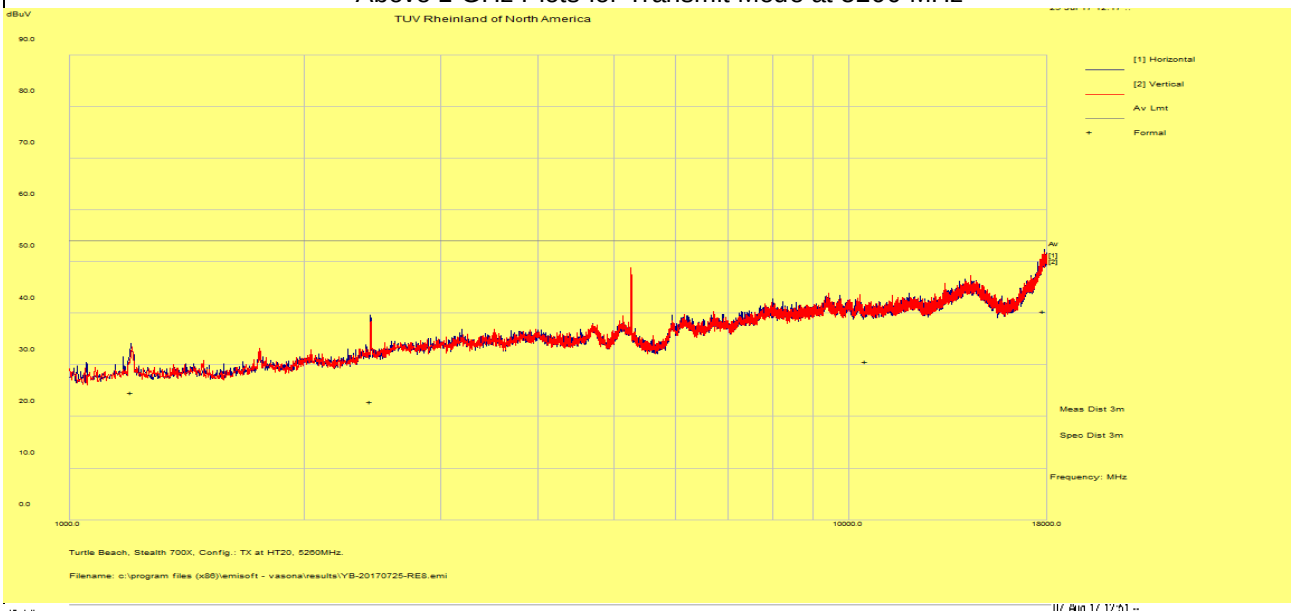
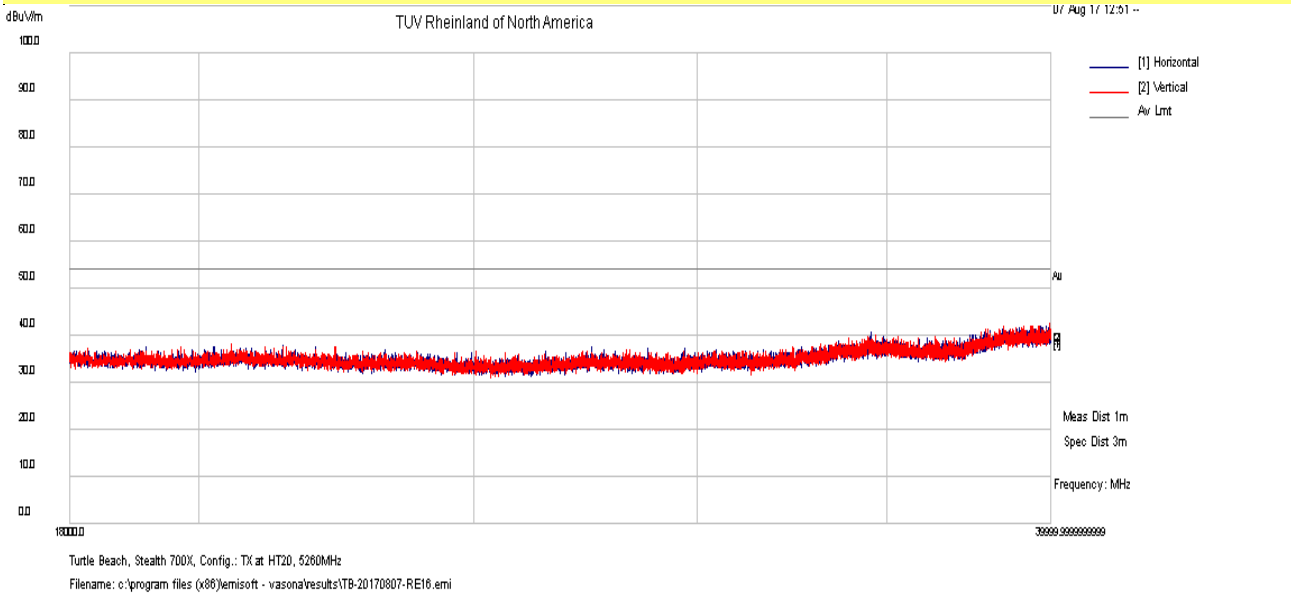
EUT Name	Wireless Audio Headset	**Date**	July 25, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 40%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 mode 6.5 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5260 MHz

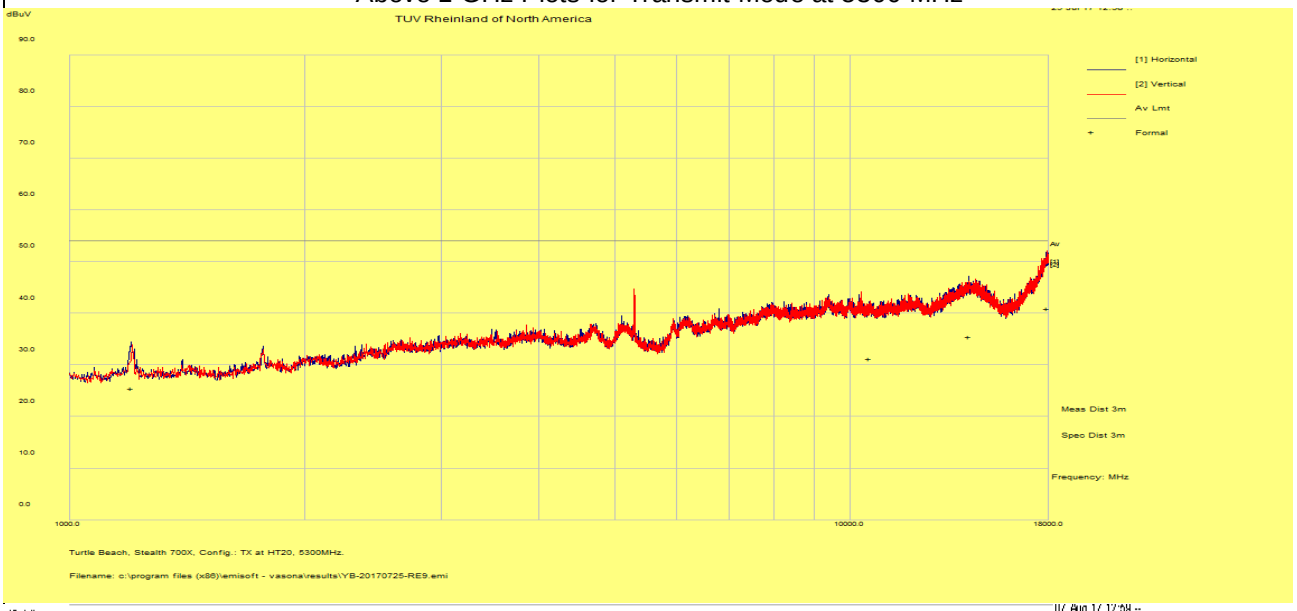


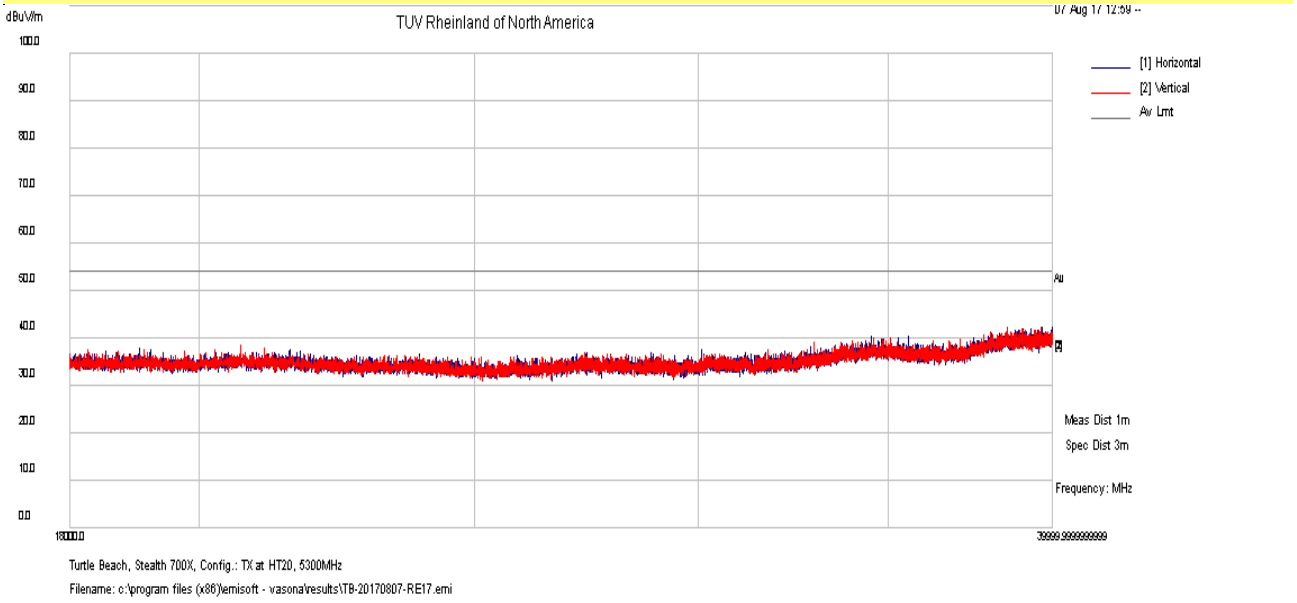


Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions		Tracking # 31763105.001 Page 17 of 34	
EUT Name	Wireless Audio Headset	**Date**	July 25, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 40%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 mode 6.5 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5300 MHz





Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions

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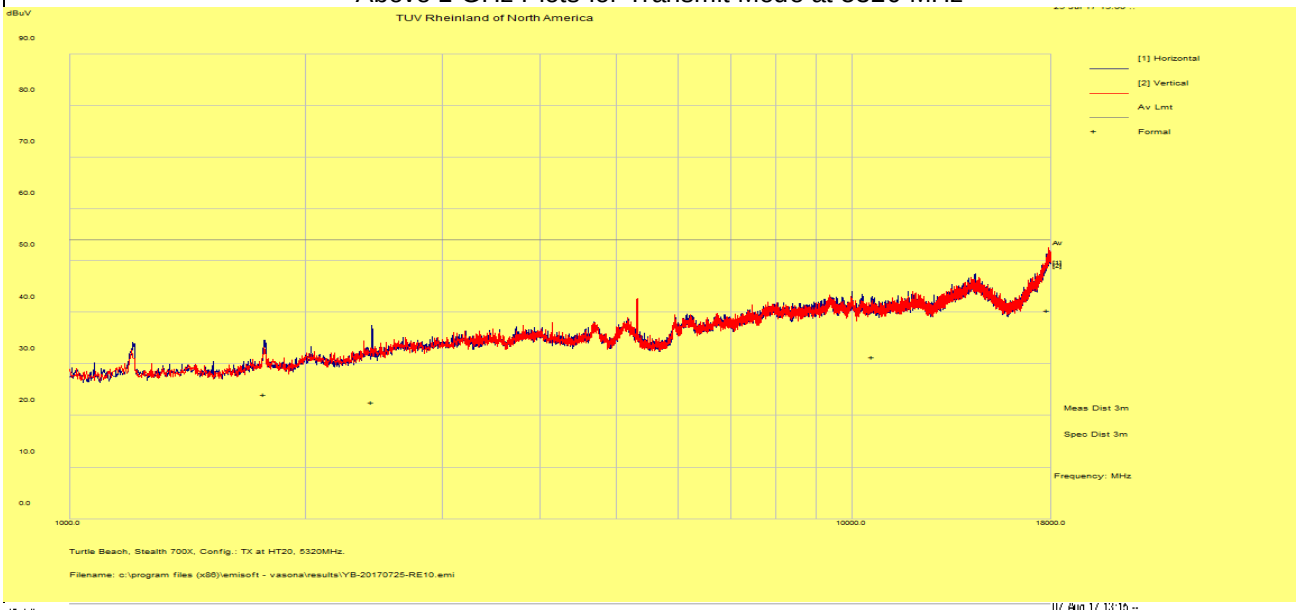
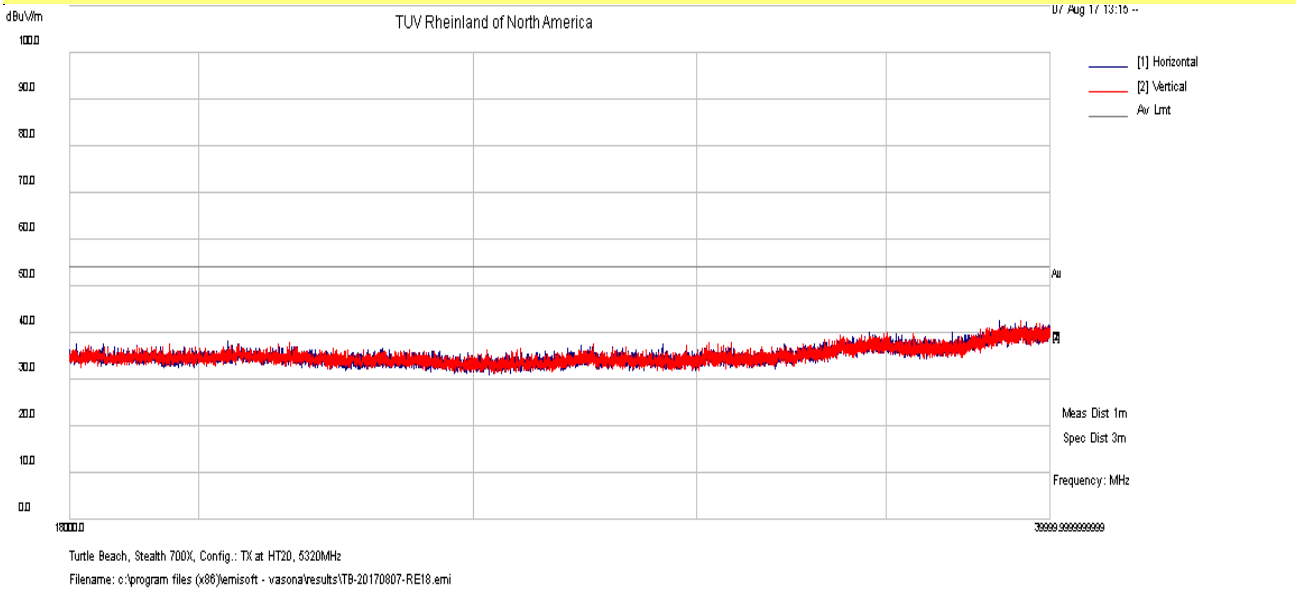
EUT Name	Wireless Audio Headset	**Date**	July 25, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 40%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 mode 6.5 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5320 MHz





Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions		Tracking # 31763105.001 Page 19 of 34	
EUT Name	Wireless Audio Headset	**Date**	July 24, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	21° C / 38%rh
EUT Serial	PP#2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a mode at 6 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m – AHA-840	**Performed by**	Jeremy Luong

1 – 40 GHz Transmit at 5500 MHz (Low Channel)

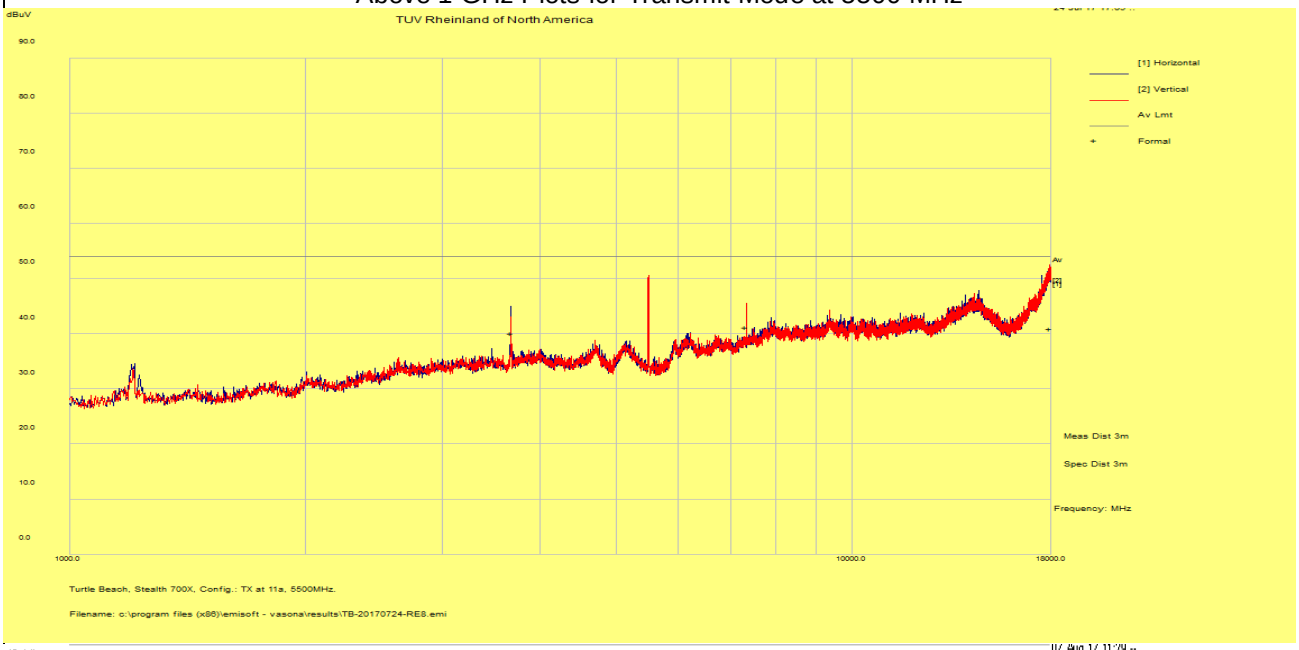
Frequency	Raw	Cable Loss	AF	Level	Detector	Polarity	Height	Azimuth	Limit	Margin
MHz	dBuV/m	dB	dB	dBuV/m		H/V	cm	deg	dBuV/m	dB
3666.84	56.16	1.60	-17.66	40.10	Ave	H	162	251	54.00	-13.90
7333.19	49.67	2.31	-10.79	41.19	Ave	V	104	316	54.00	-12.81
17924.01	36.45	4.20	0.30	40.95	Ave	V	187	222	54.00	-13.05
1 – 40 GHz Transmit at 5580 MHz (Middle Channel)										
3719.86	59.46	1.60	-17.32	43.74	Ave	H	126	266	54.00	-10.26
3753.04	41.93	1.65	-17.07	26.51	Ave	H	234	190	54.00	-27.50
4664.25	44.94	1.87	-16.67	30.14	Ave	H	172	90	54.00	-23.86
11165.02	38.91	3.17	-10.58	31.50	Ave	H	165	0	54.00	-22.50
7439.95	51.88	2.40	-10.63	43.65	Ave	V	241	320	54.00	-10.35
17975.39	36.06	4.20	0.40	40.67	Ave	V	185	0	54.00	-13.33
1 – 40 GHz Transmit at 5700 MHz (High Channel)										
3830.10	43.63	1.54	-20.47	24.70	Ave	V	103	248	54.00	-29.30
4762.89	42.60	1.73	-20.28	24.06	Ave	V	185	336	54.00	-29.94
11398.00	39.18	2.77	-12.20	29.75	Ave	V	109	312	54.00	-24.25
17967.16	40.49	3.77	-3.03	41.23	Ave	V	130	10	54.00	-12.77

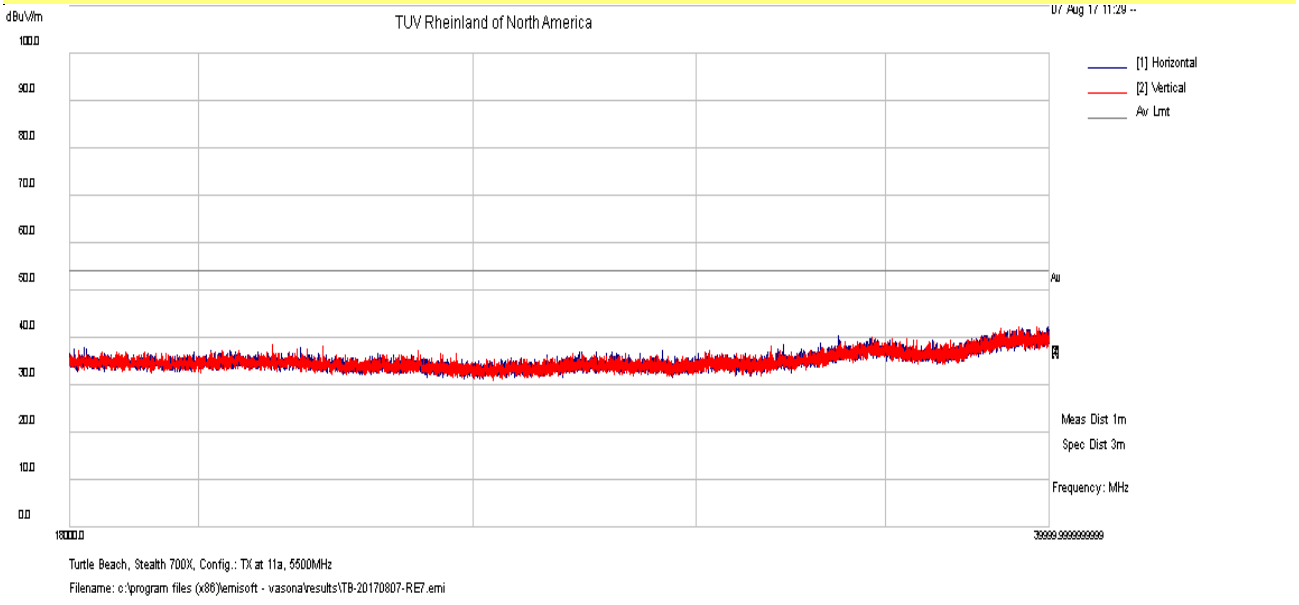
Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: Worst case emission was observed at 6 Mbps for 802.11a mode.
Headset intended to transmit less than 8 dBm.

SOP 1 Radiated Emissions		Tracking # 31763105.001 Page 20 of 34	
EUT Name	Wireless Audio Headset	**Date**	July 24, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	21° C / 38%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a mode at 6 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5500 MHz

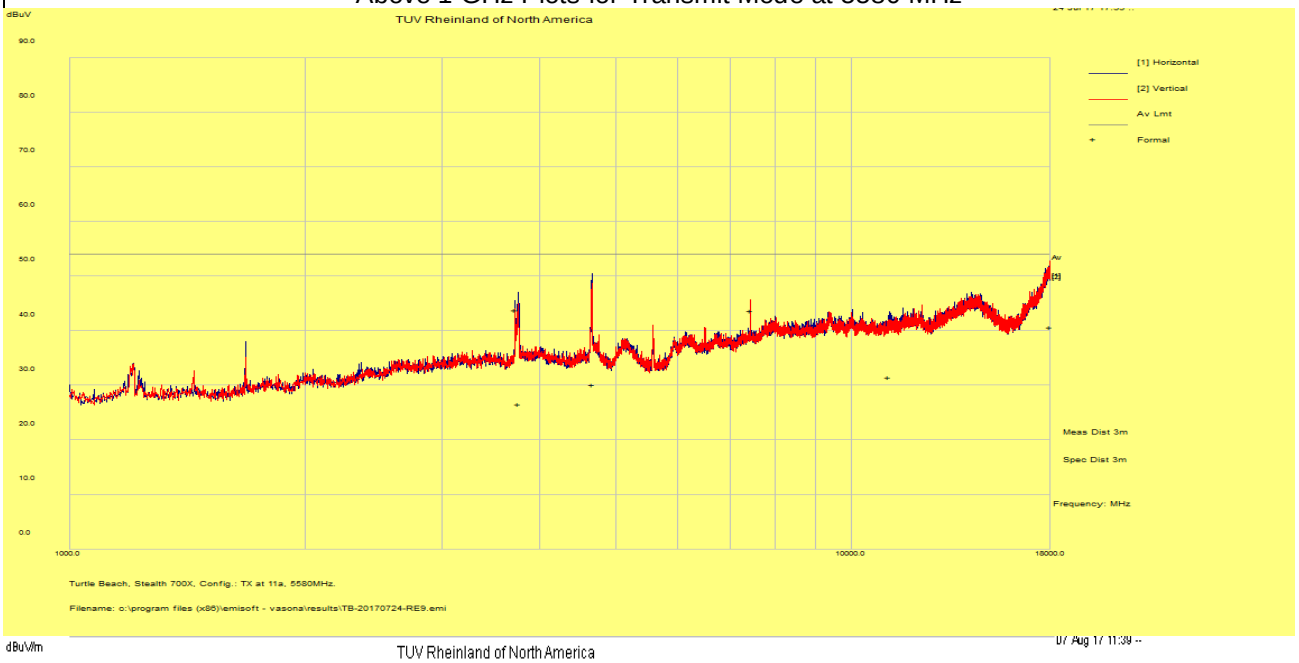


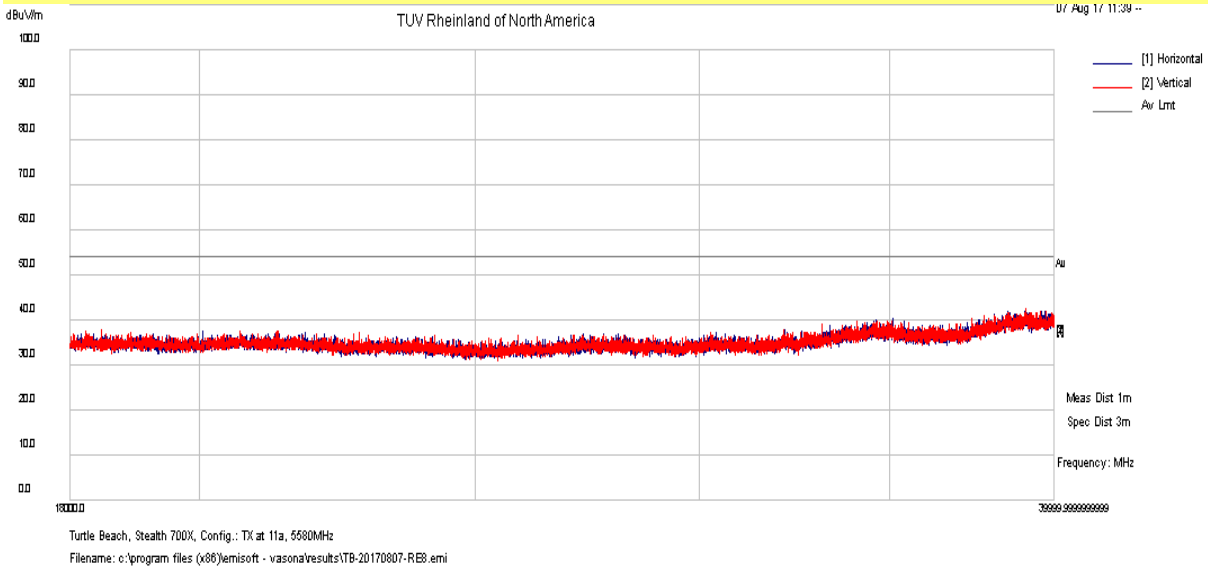


Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions		Tracking # 31763105.001 Page 21 of 34	
EUT Name	Wireless Audio Headset	**Date**	July 24, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	21° C / 38%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a mode at 6 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5580 MHz



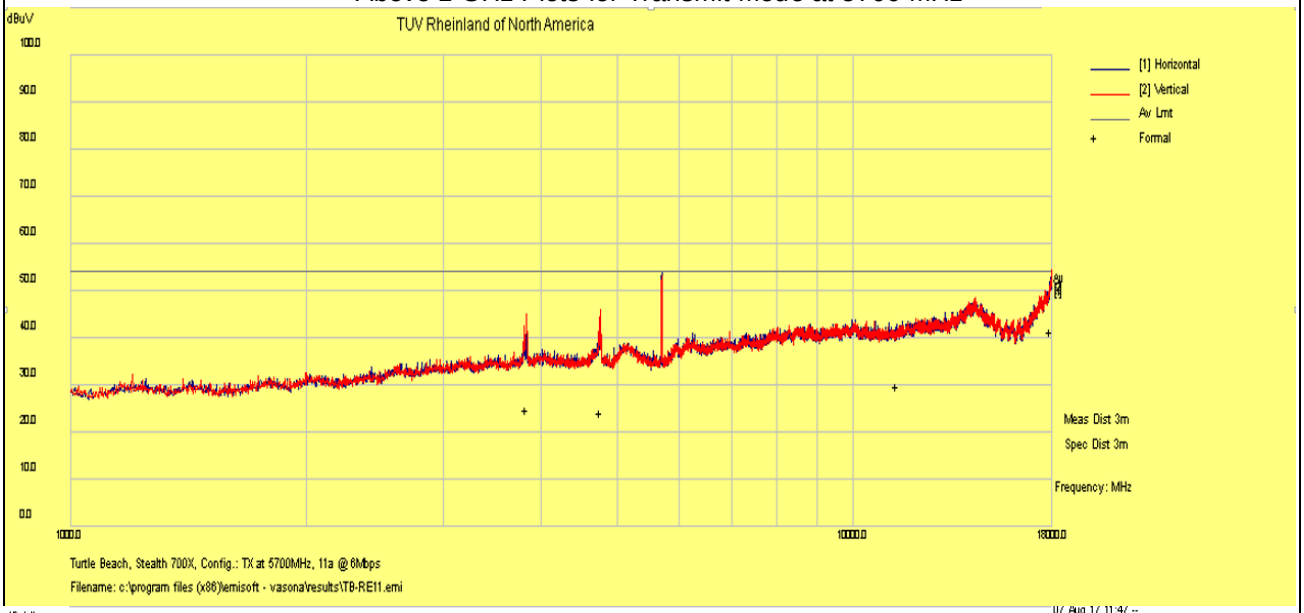


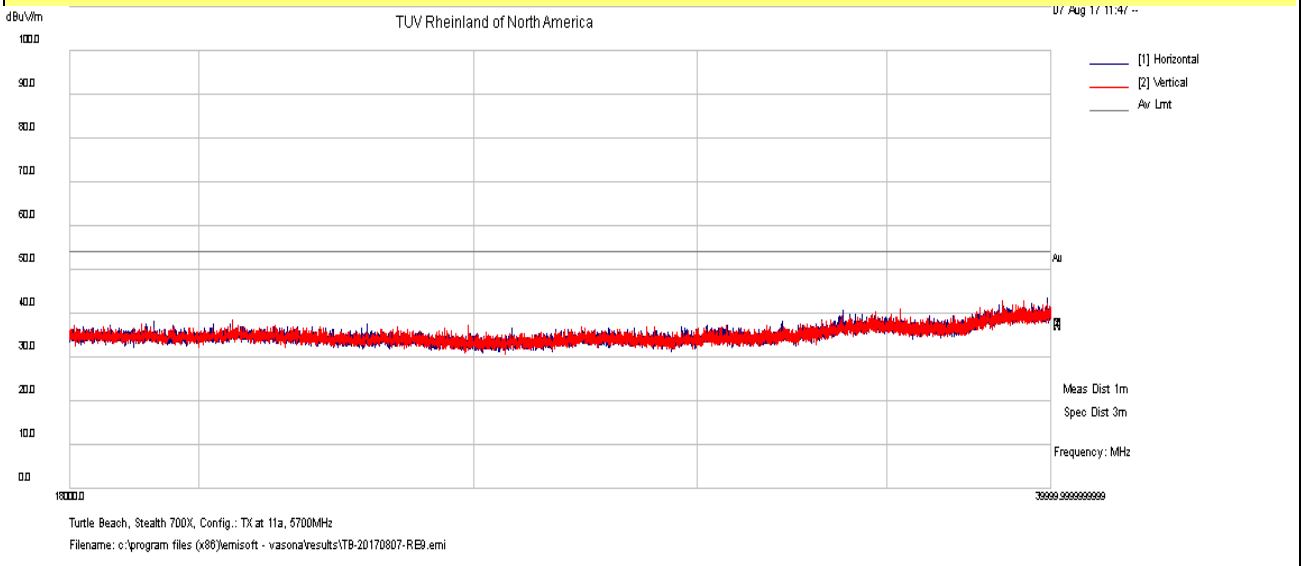
Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions

EUT Name	Wireless Audio Headset	**Date**	July 24, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	21° C / 38%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a mode at 6 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5700 MHz





Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions		Tracking # 31763105.001 Page 23 of 34	
EUT Name	Wireless Audio Headset	**Date**	July 25, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 40%rh
EUT Serial	PP#2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 mode 6.5 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m – AHA-840	**Performed by**	Jeremy Luong

1 – 40 GHz Transmit at 5500 MHz (Low Channel)

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
1200.06	50.20	0.90	-25.55	25.55	Ave	H	223	32	54.00	-28.45
3666.64	56.17	1.60	-17.66	40.11	Ave	H	167	262	54.00	-13.90
7333.45	50.33	2.31	-10.79	41.85	Ave	V	103	274	54.00	-12.15
1 – 40 GHz Transmit at 5580 MHz (Middle Channel)										
3720.23	56.62	1.60	-17.32	40.91	Ave	H	167	86	54.00	-13.09
4662.30	46.82	1.86	-16.68	32.01	Ave	H	241	245	54.00	-22.00
3747.37	41.72	1.63	-17.11	26.24	Ave	V	192	152	54.00	-27.76
6497.28	40.41	2.30	-14.77	27.94	Ave	V	128	286	54.00	-26.07
7439.95	51.99	2.40	-10.63	43.76	Ave	V	228	314	54.00	-10.24
17907.35	36.46	4.20	0.25	40.91	Ave	V	184	54	54.00	-13.09
1 – 40 GHz Transmit at 5700 MHz (High Channel)										
3799.44	55.32	1.70	-16.81	40.21	Ave	H	167	198	54.00	-13.79
4746.61	41.28	1.90	-16.46	26.72	Ave	V	166	4	54.00	-27.28
7600.17	52.83	2.50	-10.48	44.85	Ave	V	205	310	54.00	-9.15

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

Note: Worst case emission was observed at 6.5 Mbps for 802.1n HT20 mode.
Headset intended to transmit less than 8 dBm.

SOP 1 Radiated Emissions

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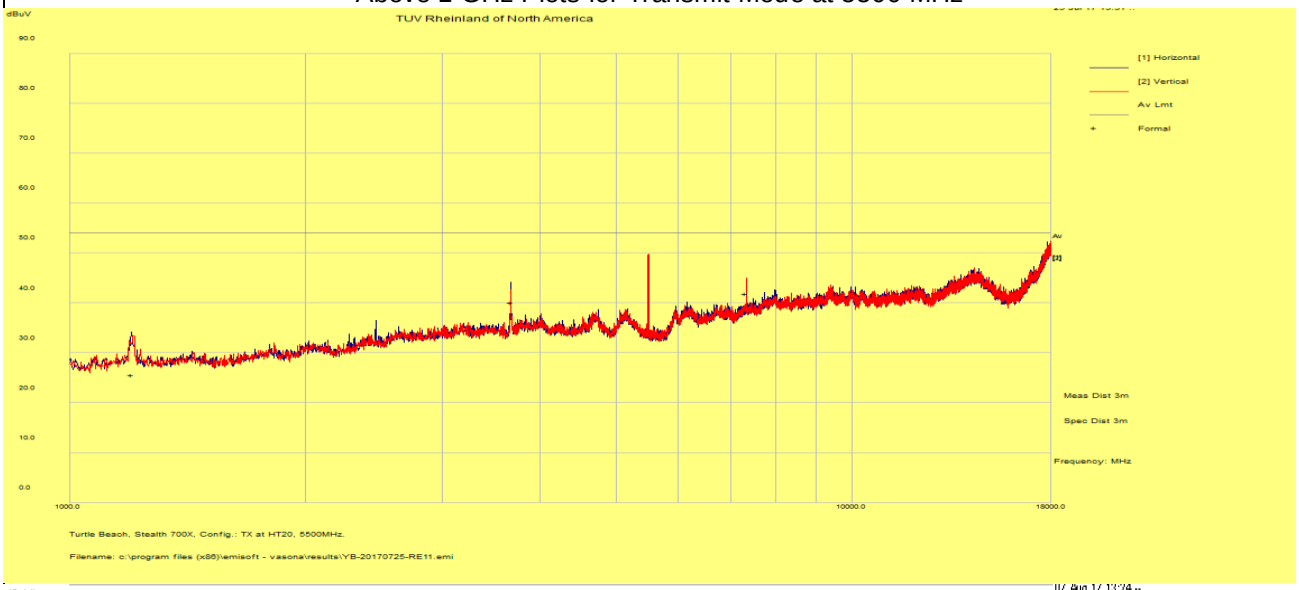
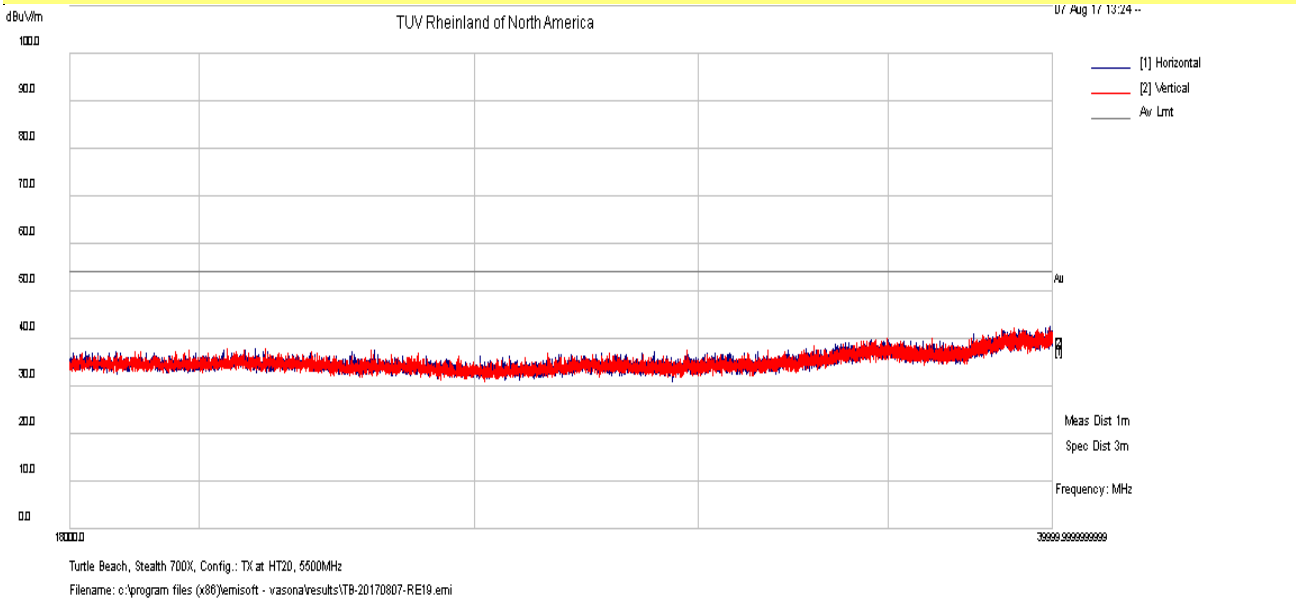
EUT Name	Wireless Audio Headset	**Date**	July 25, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 40%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 mode 6.5 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5500 MHz

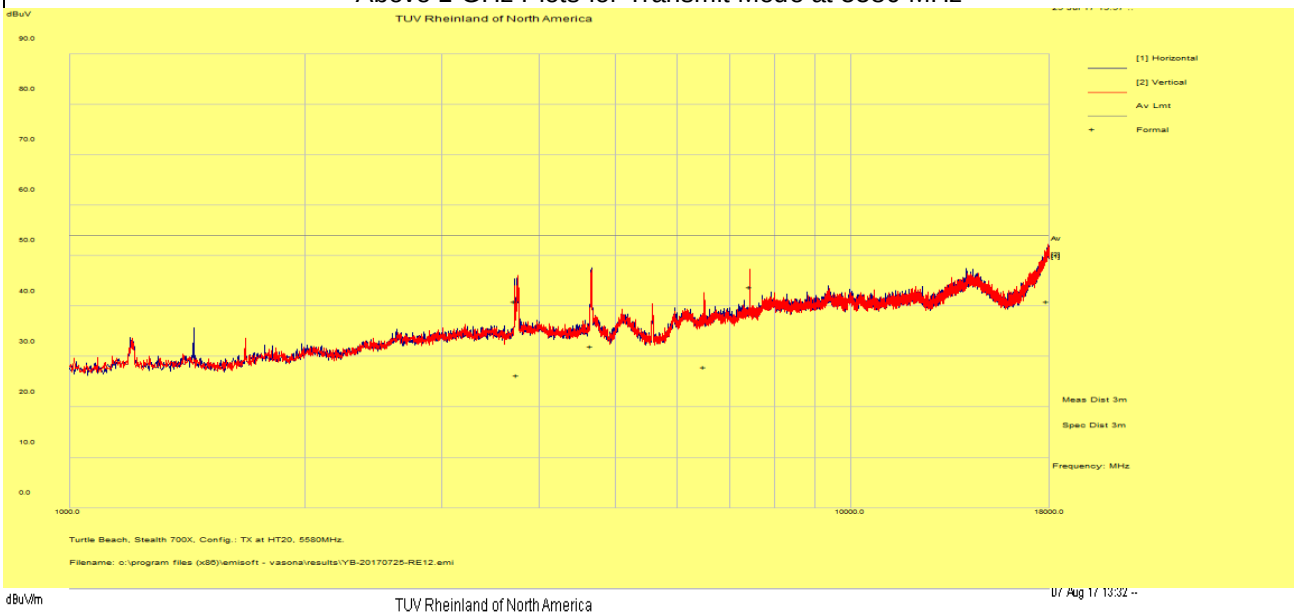


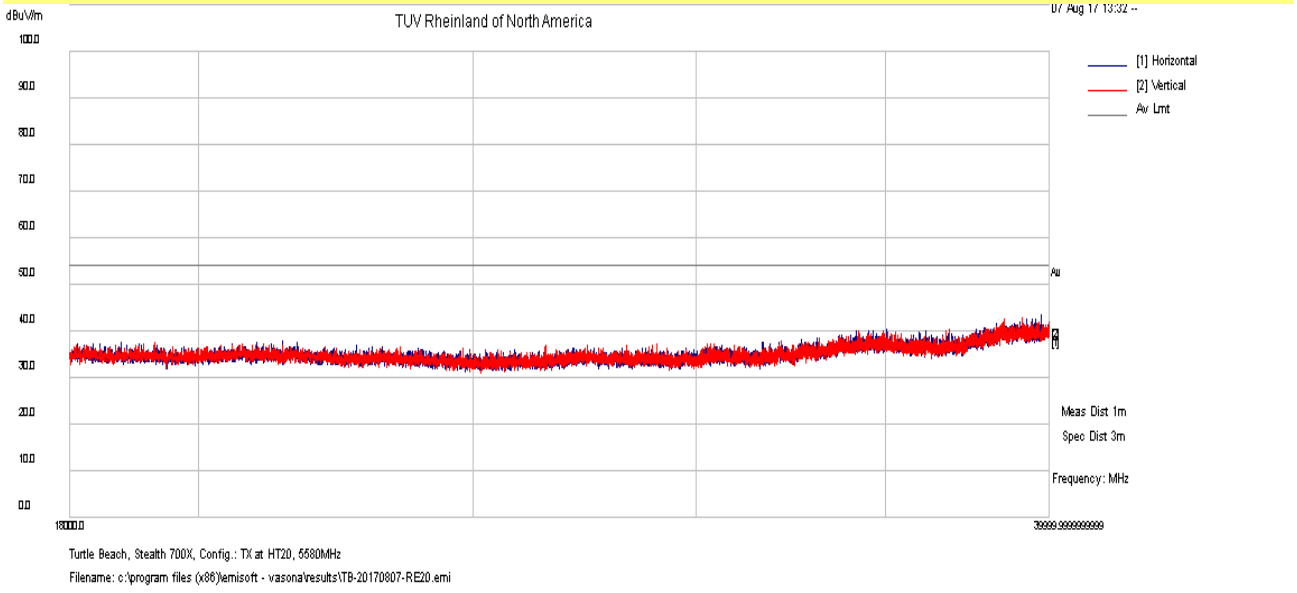


Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions		Tracking # 31763105.001 Page 25 of 34	
EUT Name	Wireless Audio Headset	**Date**	July 25, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 40%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 mode 6.5 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5580 MHz



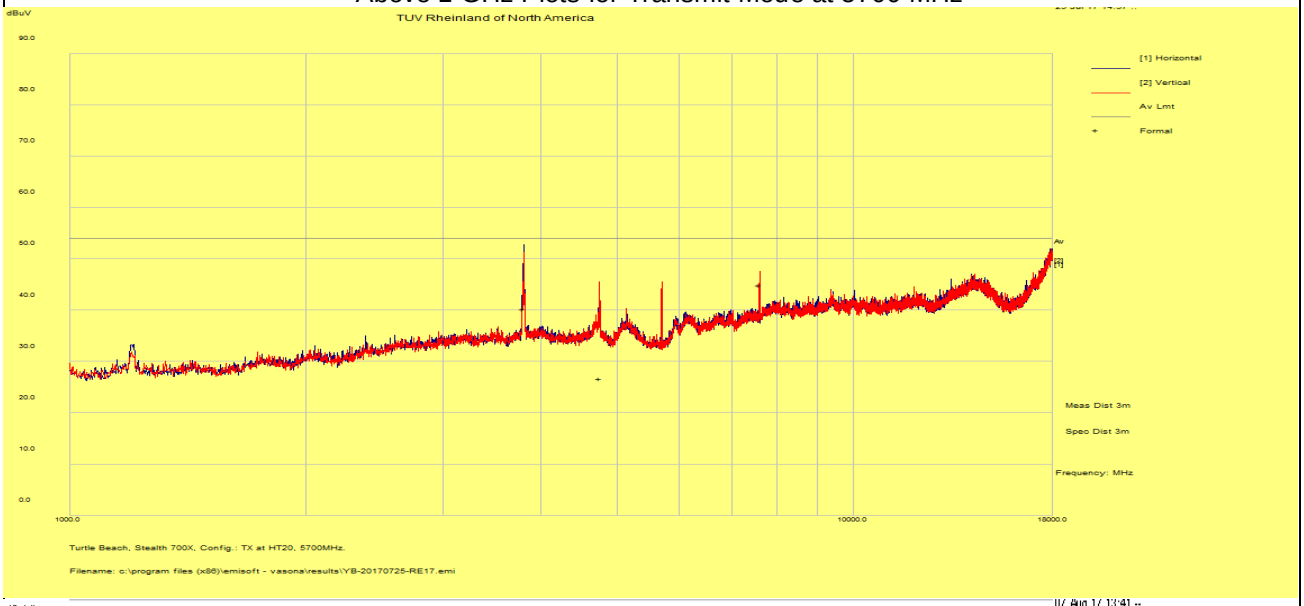


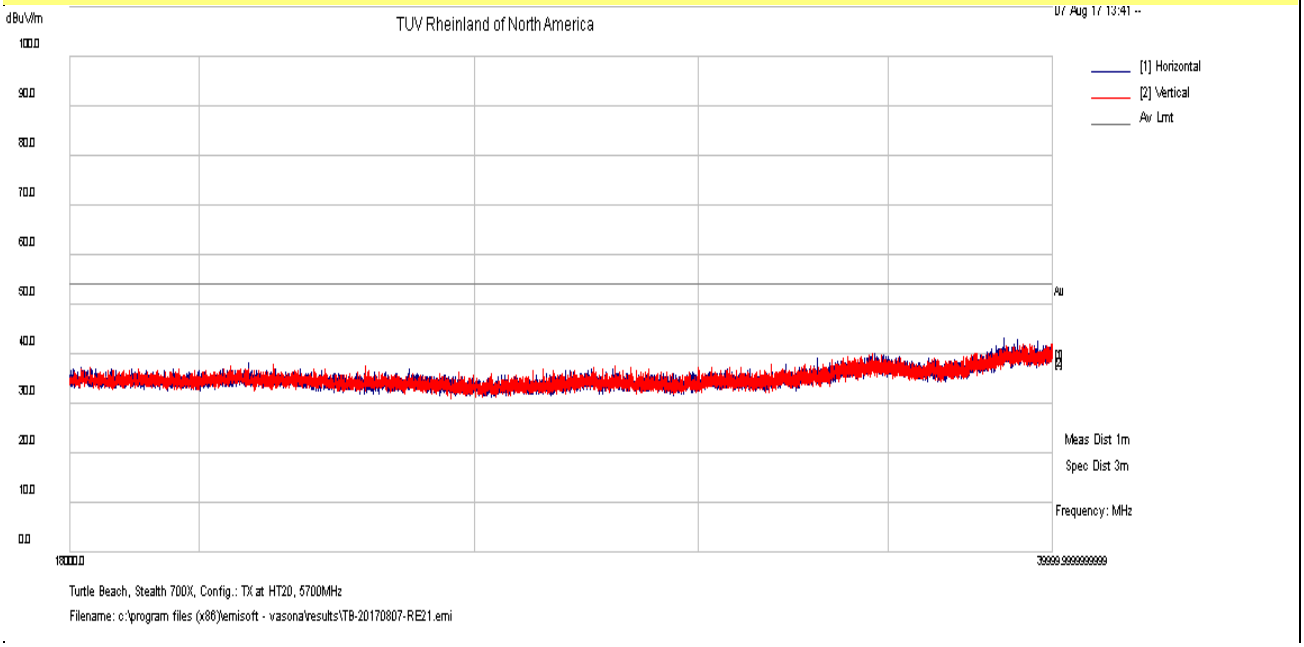
Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions

EUT Name	Wireless Audio Headset	**Date**	July 25, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 40%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 mode 6.5 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5700 MHz





Notes: No significant emission observed above 18 GHz.

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EUT Name	Wireless Audio Headset	**Date**	July 25, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 40%rh
EUT Serial	PP#2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a mode at 6 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m – AHA-840	**Performed by**	Jeremy Luong

1 – 40 GHz Transmit at 5745 MHz (Low Channel)

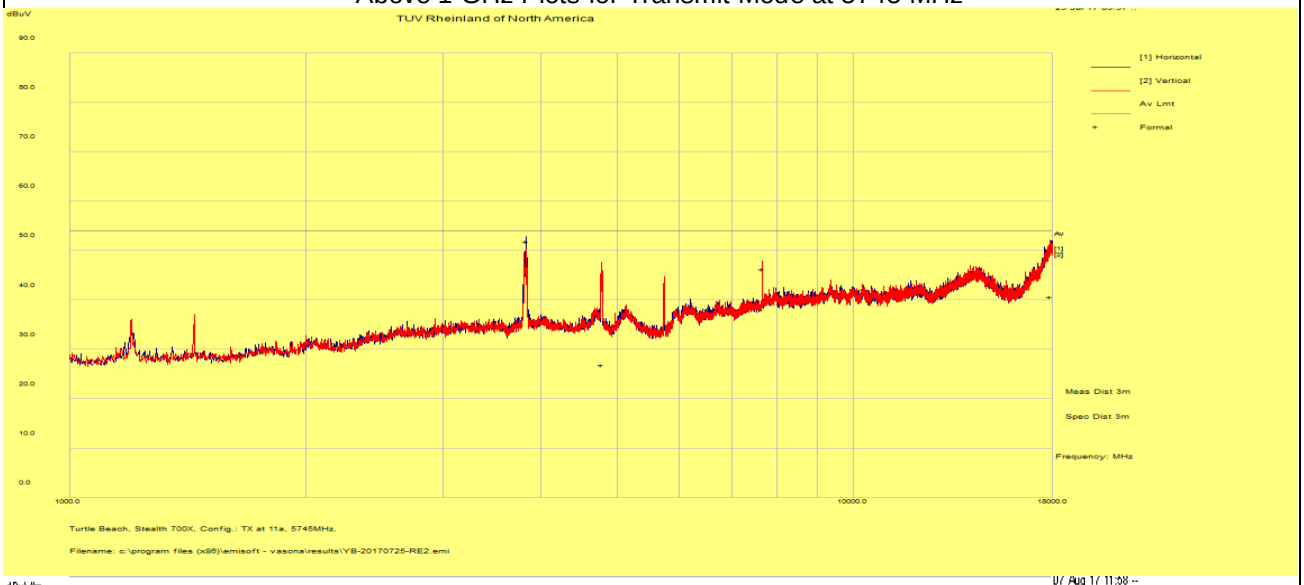
Frequency	Raw	Cable Loss	AF	Level	Detector	Polarity	Height	Azimuth	Limit	Margin
MHz	dBuV/m	dB	dB	dBuV/m		H/V	cm	deg	dBuV/m	dB
3829.97	66.73	1.70	-16.61	51.83	Ave	H	160	266	54.00	-2.18
4782.08	41.29	1.90	-16.38	26.81	Ave	V	135	190	54.00	-27.19
7659.88	54.07	2.50	-10.37	46.20	Ave	V	174	306	54.00	-7.80
17883.15	36.34	4.20	0.17	40.70	Ave	V	167	236	54.00	-13.30
1 – 40 GHz Transmit at 5785 MHz (Middle Channel)										
3823.95	42.18	1.70	-16.65	27.24	Ave	H	222	266	54.00	-26.76
3856.59	65.34	1.70	-16.54	50.50	Ave	H	165	118	54.00	-3.50
17351.09	36.75	4.04	-3.28	37.51	Ave	H	141	320	54.00	-16.49
4802.09	40.87	1.90	-16.34	26.43	Ave	V	209	210	54.00	-27.58
7713.40	51.37	2.50	-10.18	43.68	Ave	V	212	310	54.00	-10.32
17813.08	36.20	4.23	-0.10	40.33	Ave	V	117	224	54.00	-13.67
1 – 40 GHz Transmit at 5825 MHz (High Channel)										
3883.45	66.95	1.71	-16.57	52.09	Ave	H	173	266	54.00	-1.91
4831.67	45.98	1.90	-16.41	31.47	Ave	H	232	40	54.00	-22.53
11656.44	40.35	3.11	-11.23	32.23	Ave	H	173	252	54.00	-21.77
7766.47	48.45	2.50	-10.03	40.92	Ave	V	173	294	54.00	-13.08
17929.57	36.57	4.20	0.31	41.09	Ave	V	182	276	54.00	-12.91

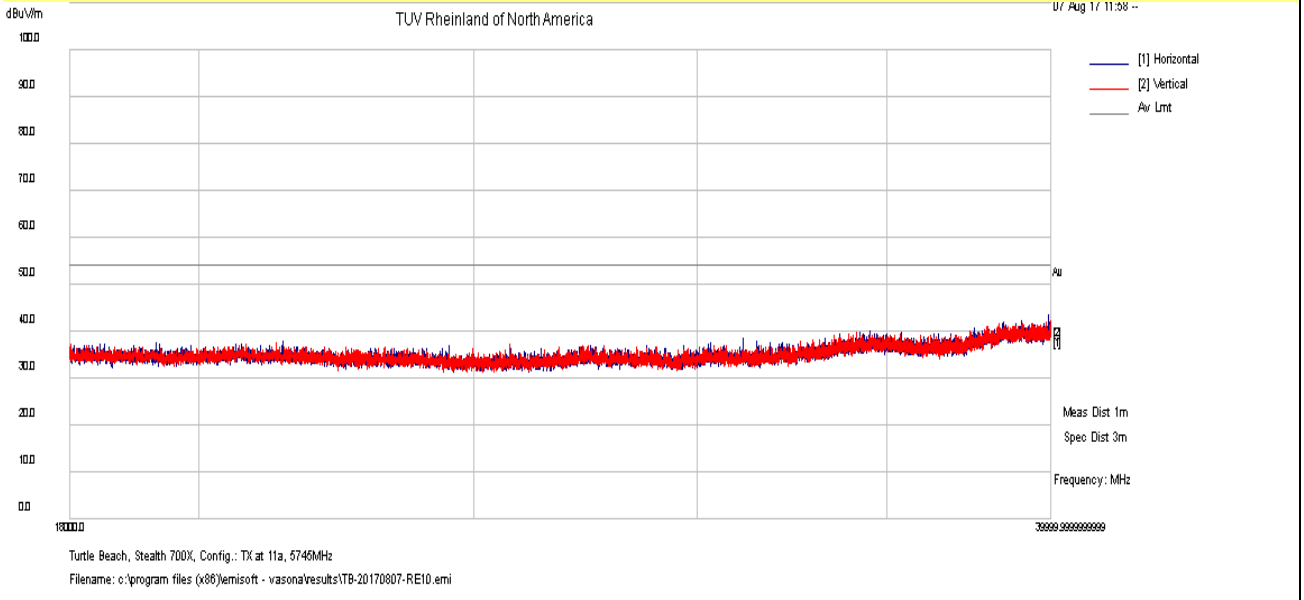
Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: Worst case emission was observed at 6 Mbps for 802.11a mode.
Headset intended to transmit less than 8dBm.

SOP 1 Radiated Emissions		Tracking # 31763105.001 Page 28 of 34	
EUT Name	Wireless Audio Headset	**Date**	July 24, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	21° C / 38%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a mode at 6 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5745 MHz

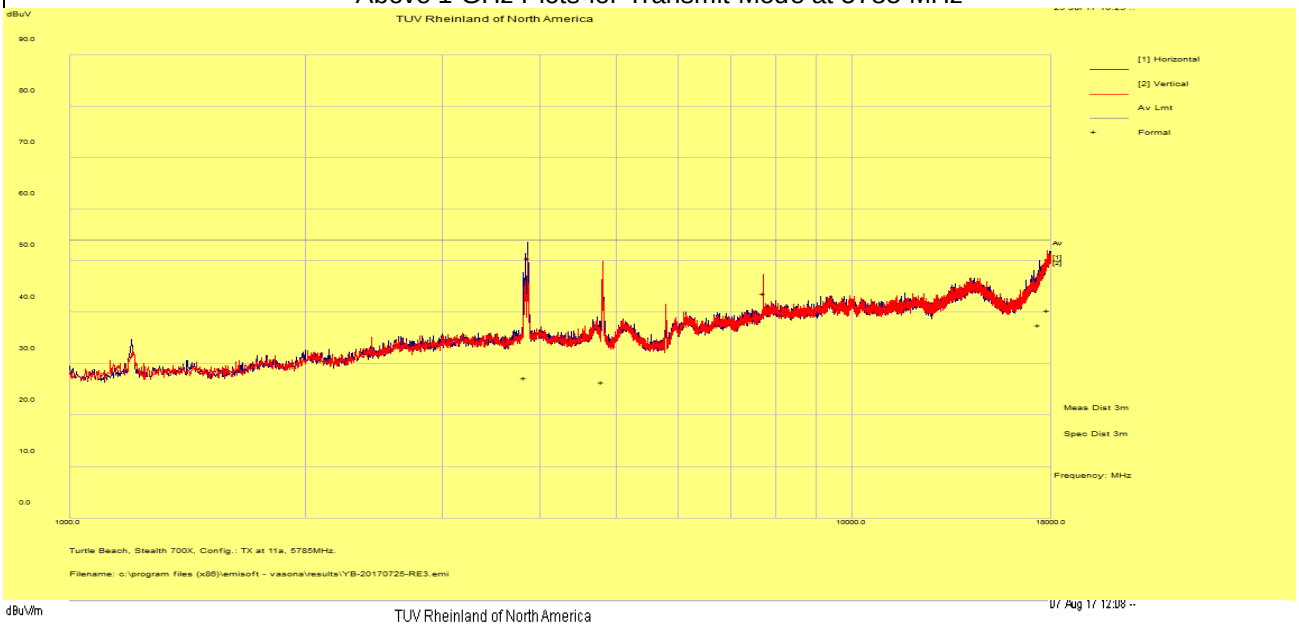


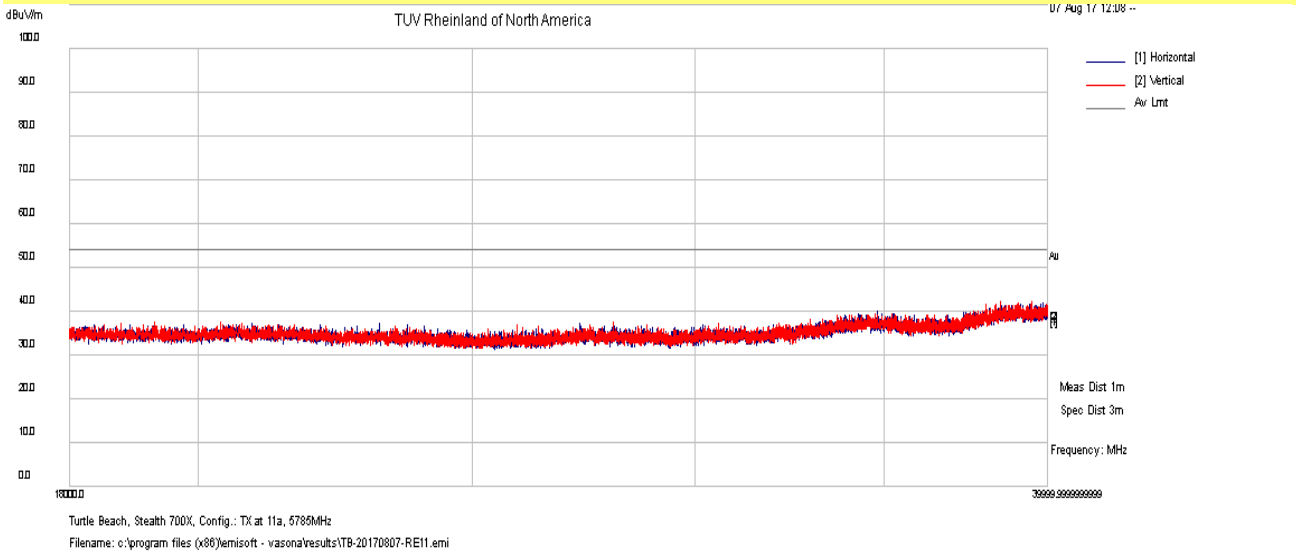


Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions		Tracking # 31763105.001 Page 29 of 34	
EUT Name	Wireless Audio Headset	**Date**	July 25, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 40%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a mode at 6 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5785 MHz





Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions

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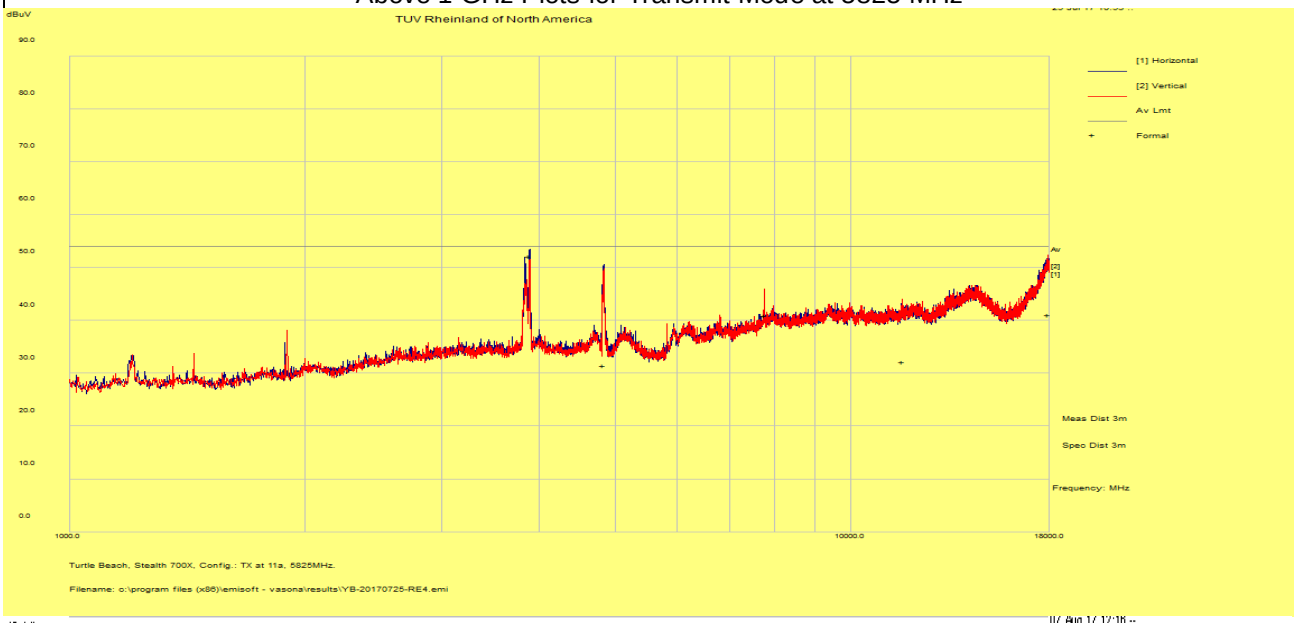
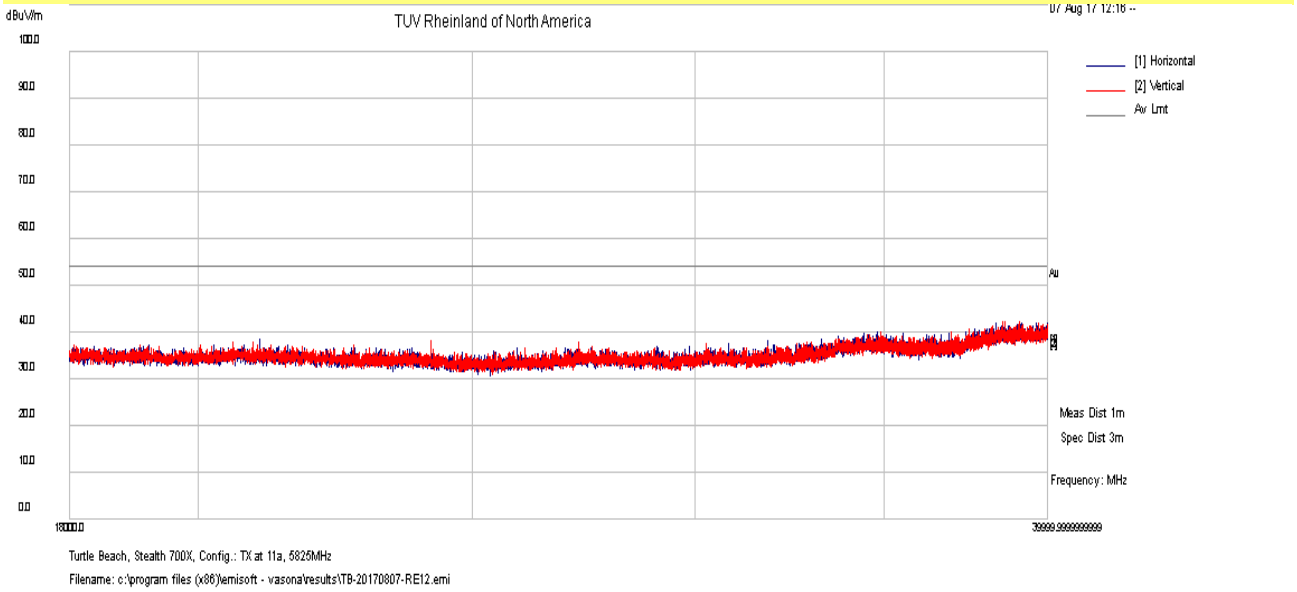
EUT Name	Wireless Audio Headset	**Date**	July 25, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 40%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a mode at 6 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5825 MHz





Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions		Tracking # 31763105.001 Page 31 of 34	
EUT Name	Wireless Audio Headset	**Date**	July 25, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 40%rh
EUT Serial	PP#2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 mode 6.5 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m – AHA-840	**Performed by**	Jeremy Luong

1 – 40 GHz Transmit at 5745 MHz (Low Channel)

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
3830.02	66.57	1.70	-16.61	51.67	Ave	H	161	98	54.00	-2.33
4772.08	42.25	1.90	-16.41	27.75	Ave	H	170	232	54.00	-26.25
7659.95	53.09	2.50	-10.37	45.23	Ave	V	180	310	54.00	-8.77
17966.31	36.24	4.20	0.39	40.82	Ave	V	221	318	54.00	-13.18
1 – 40 GHz Transmit at 5785 MHz (Middle Channel)										
3856.89	63.56	1.70	-16.54	48.72	Ave	H	177	90	54.00	-5.29
17975.17	36.08	4.20	0.40	40.68	Ave	H	161	134	54.00	-13.32
4810.20	40.94	1.90	-16.36	26.48	Ave	V	138	150	54.00	-27.52
7713.27	51.39	2.50	-10.18	43.71	Ave	V	167	312	54.00	-10.29
10038.67	35.60	3.10	-7.51	31.19	Ave	V	225	166	54.00	-22.81
1 – 40 GHz Transmit at 5825 MHz (High Channel)										
3846.47	44.27	1.70	-16.55	29.42	Ave	H	206	260	54.00	-24.58
3883.41	67.65	1.71	-16.57	52.79	Ave	H	225	250	54.00	-1.21
4831.82	45.64	1.90	-16.41	31.13	Ave	H	250	212	54.00	-22.87
7766.62	48.55	2.50	-10.03	41.03	Ave	V	189	314	54.00	-12.97
17907.78	36.46	4.20	0.25	40.91	Ave	V	169	32	54.00	-13.09

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

Note: Worst case emission was observed at 6.5 Mbps for 802.11n HT20 mode.
Headset intended to transmit less than 8 dBm.

SOP 1 Radiated Emissions

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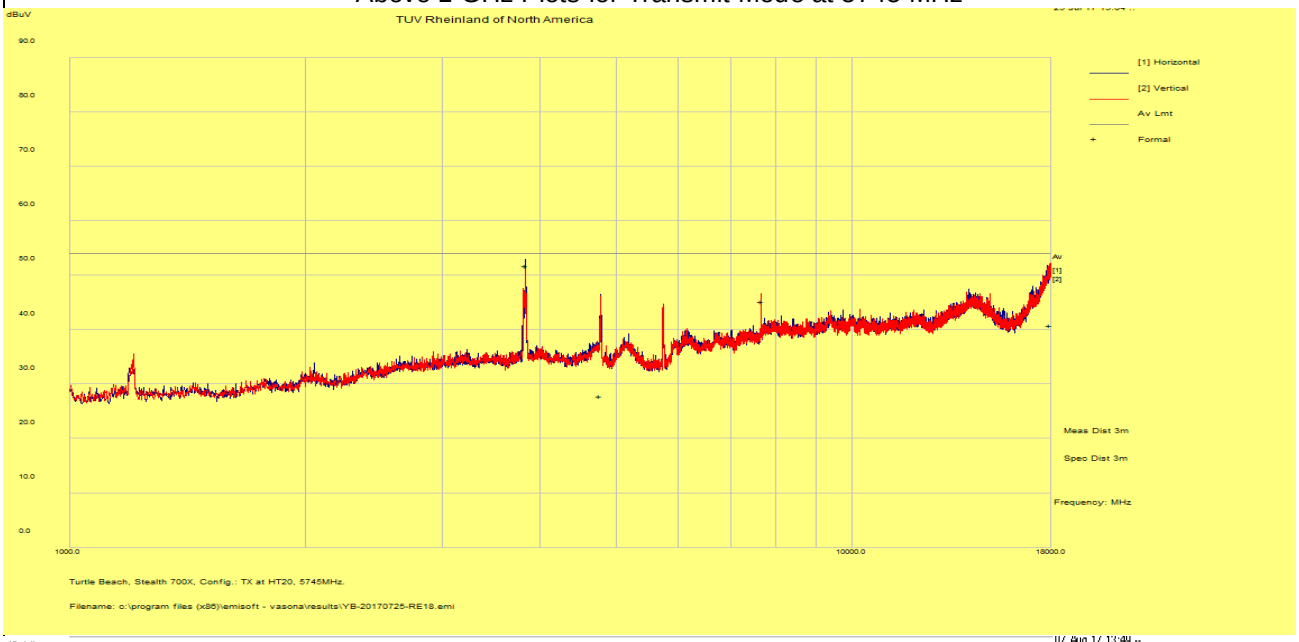
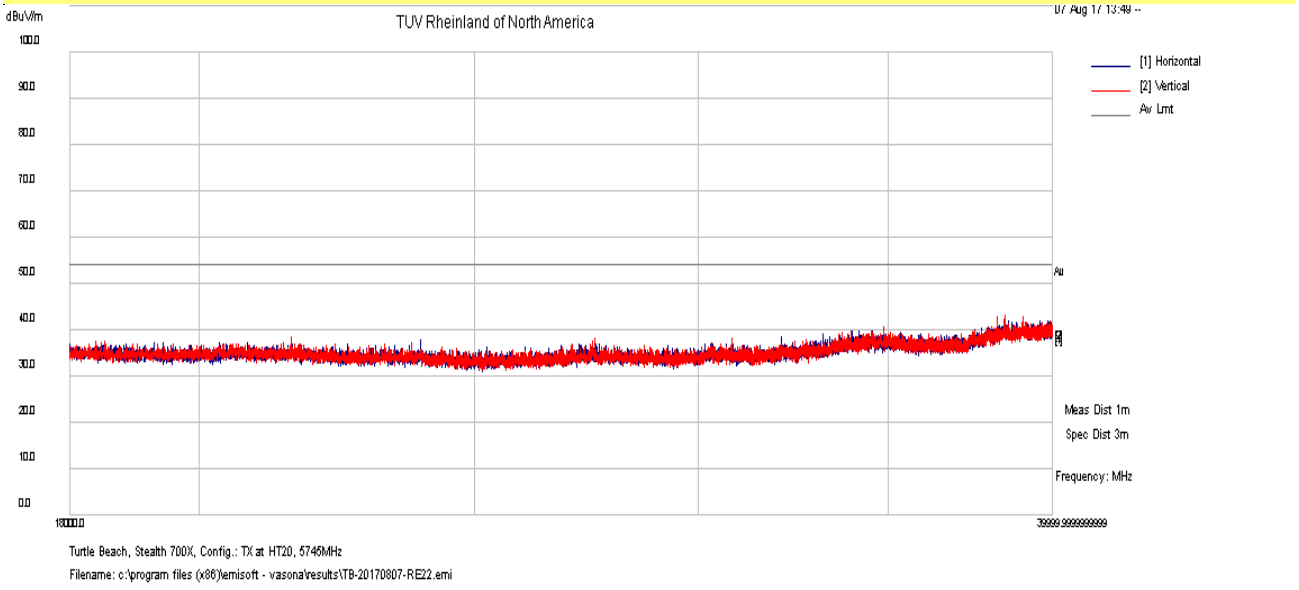
EUT Name	Wireless Audio Headset	**Date**	July 25, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 40%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 mode 6.5 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5745 MHz





Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions

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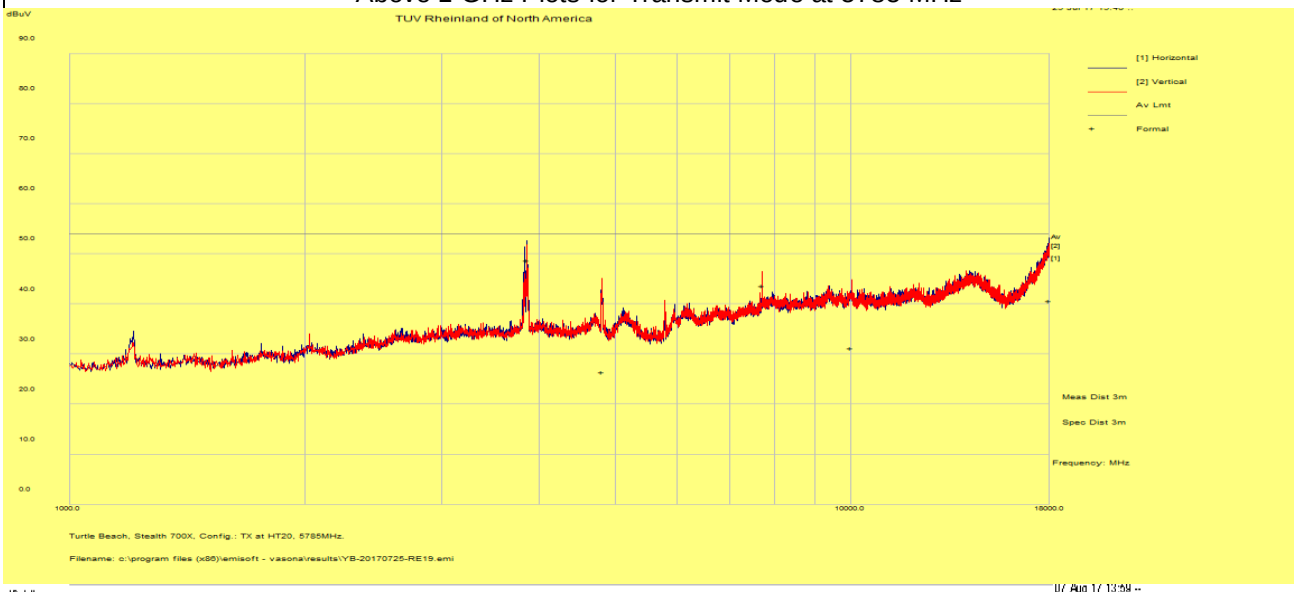
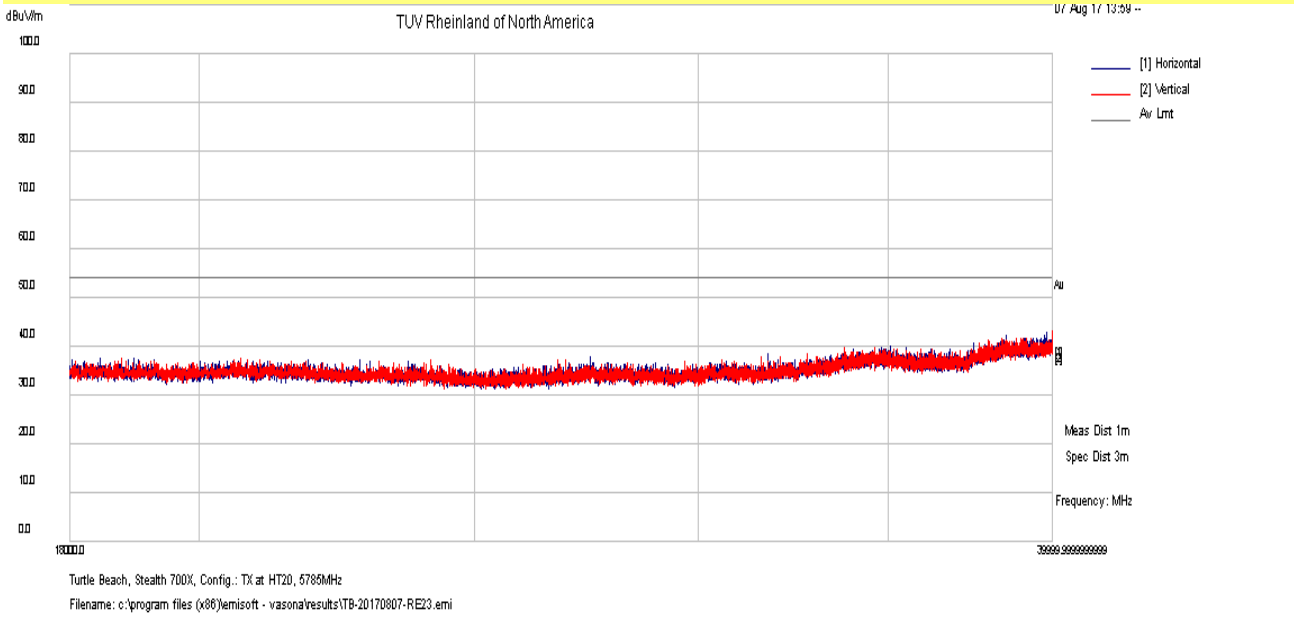
EUT Name	Wireless Audio Headset	**Date**	July 25, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 40%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 mode 6.5 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5785 MHz





Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions

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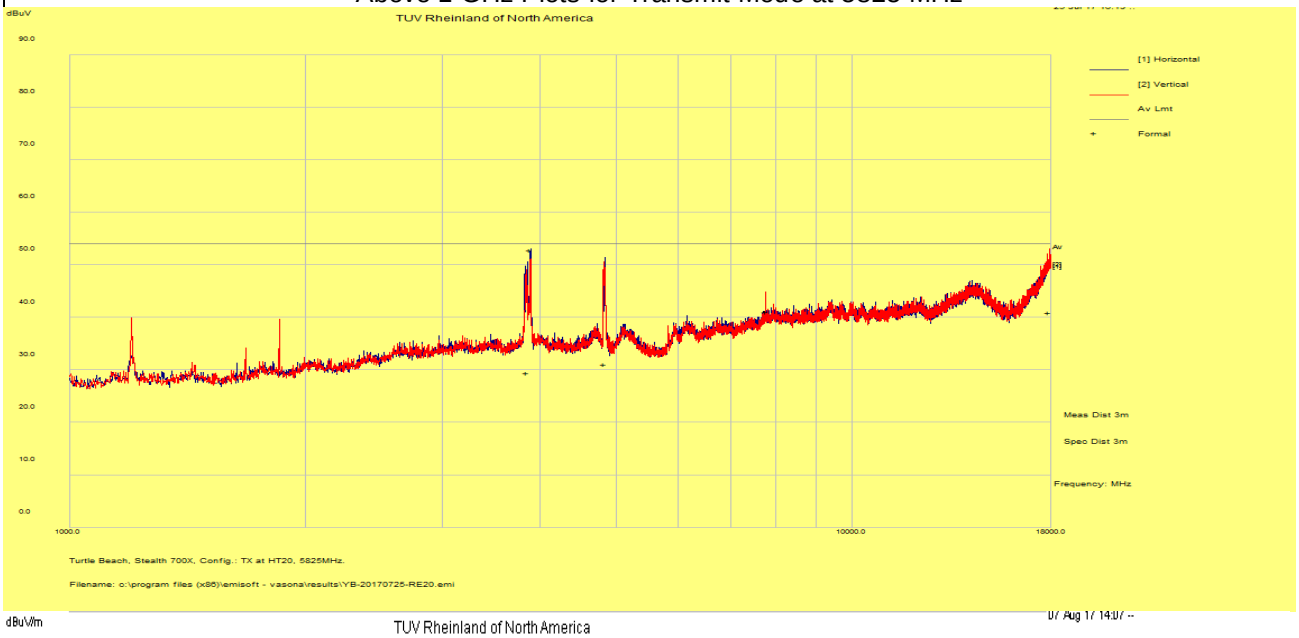
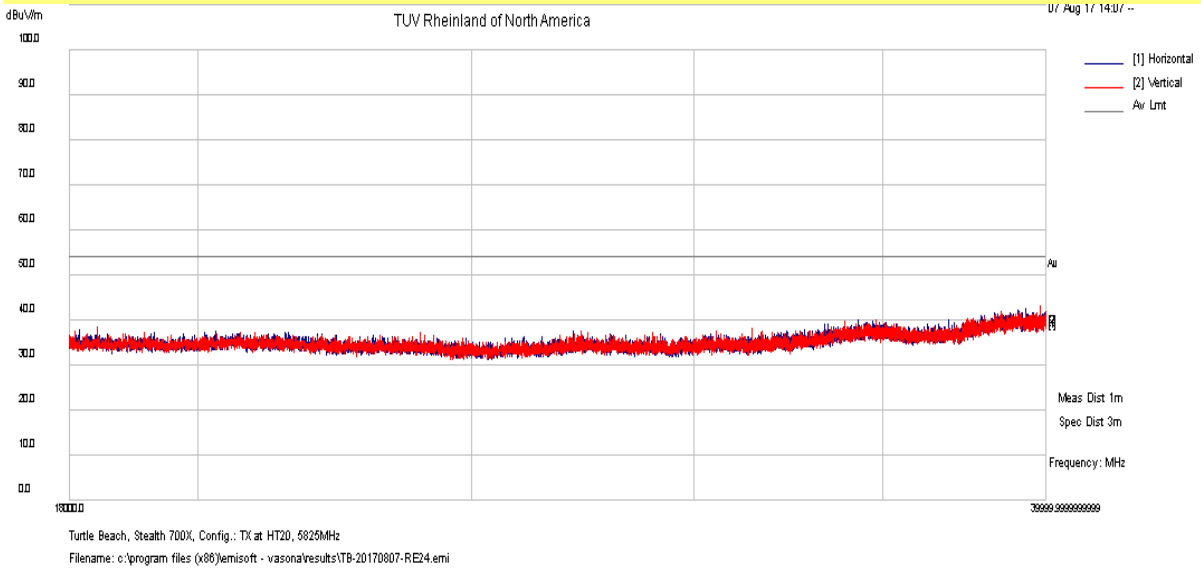
EUT Name	Wireless Audio Headset	**Date**	July 25, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 40%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 mode 6.5 Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5825 MHz



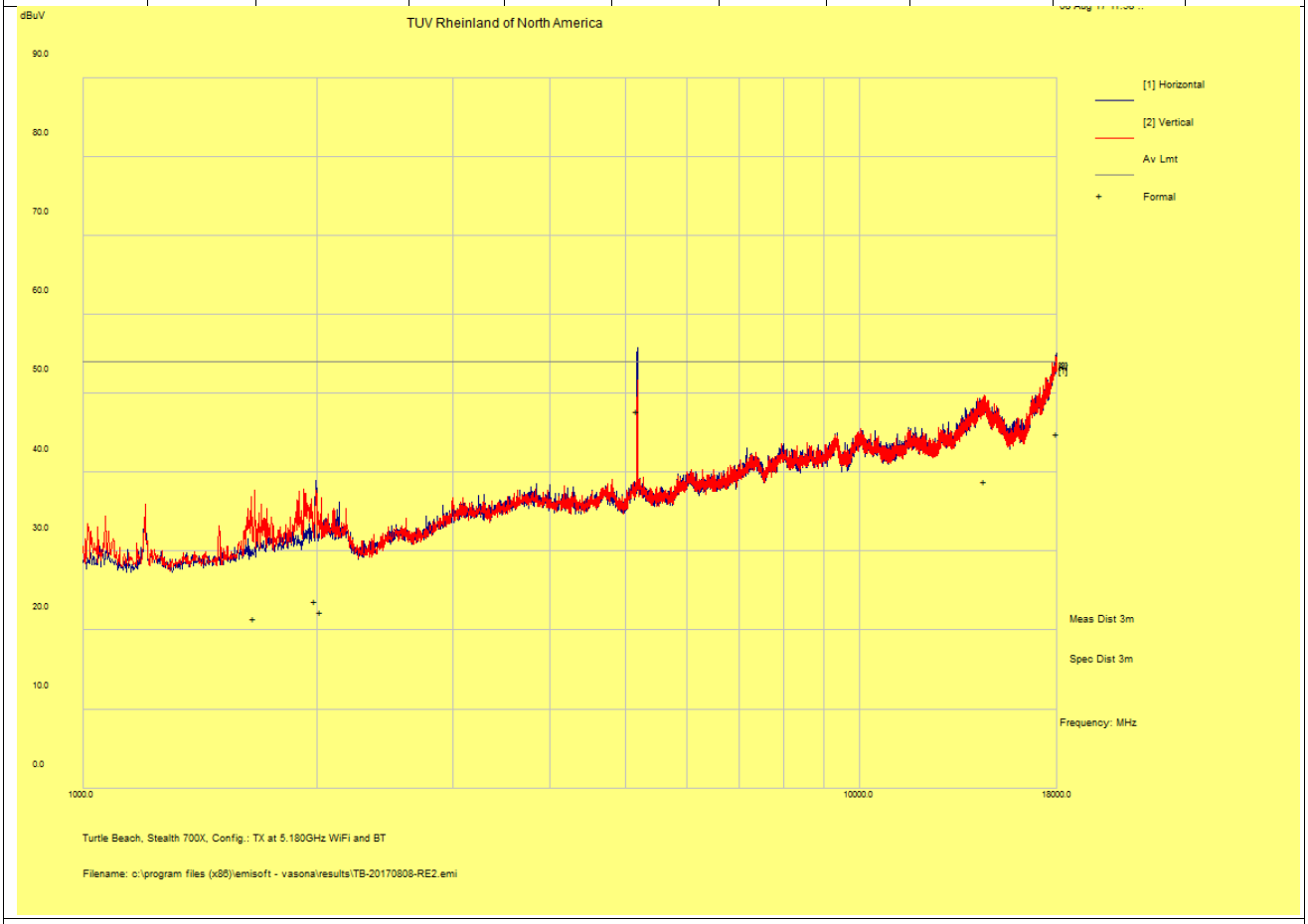


Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions, Collocation		Tracking # 31763105.001 Page 1 of 4	
EUT Name	Wireless Audio Headset	**Date**	August 8, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 33%rh
EUT Serial	PP#7	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a, 5180 MHz & BT	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m – AHA-840	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit at 802.11a 6 Mbps, 5180 MHz and Bluetooth 3-DH1, 2402 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
1994.20	29.39	1.20	-6.88	23.72	Ave	H	206	302	54.00	-30.28
14521.71	23.64	3.58	11.69	38.92	Ave	H	110	136	54.00	-15.09
17995.52	24.54	4.20	16.11	44.84	Ave	H	230	300	54.00	-9.16
1662.44	29.04	1.10	-8.62	21.53	Ave	V	172	166	54.00	-32.47
2024.91	27.79	1.20	-6.70	22.29	Ave	V	180	0	54.00	-31.71



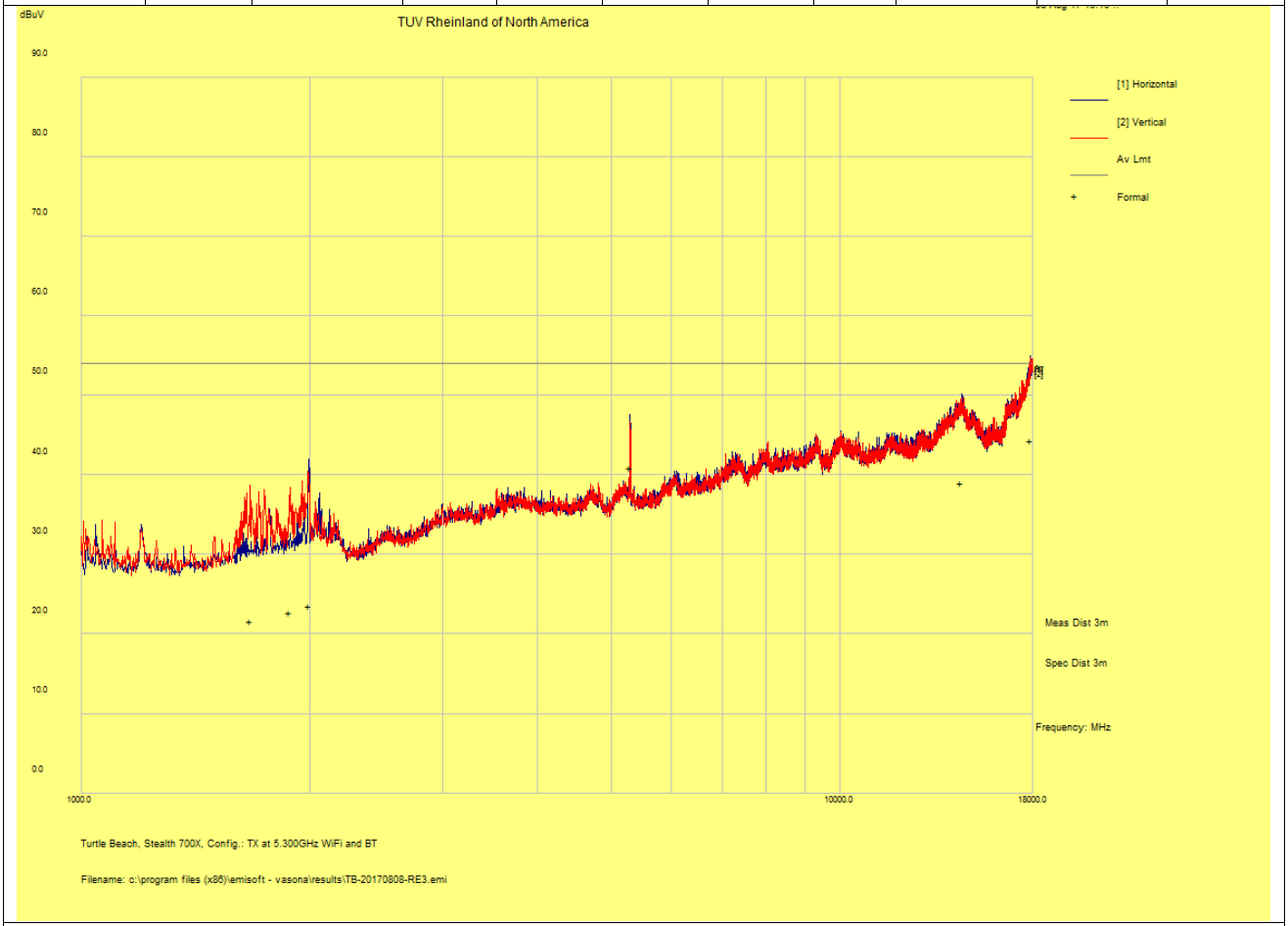
Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: No significant emission observed above 18 GHz for simultaneous transmissions.

SOP 1 Radiated Emissions, Collocation		Tracking # 31763105.001 Page 2 of 4	
EUT Name	Wireless Audio Headset	**Date**	August 8, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 33%rh
EUT Serial	PP#7	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a, 5300 MHz & BT	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m – AHA-840	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit at 802.11a 6 Mbps, 5300 MHz and Bluetooth 3-DH1, 2402 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
1995.29	29.15	1.20	-6.86	23.48	Ave	H	249	308	54.00	-30.52
14483.88	23.73	3.51	11.74	38.98	Ave	H	213	172	54.00	-15.02
17868.84	24.59	4.20	15.51	44.30	Ave	H	246	198	54.00	-9.70
1669.26	29.12	1.10	-8.56	21.66	Ave	V	177	156	54.00	-32.34
1885.35	29.02	1.20	-7.48	22.75	Ave	V	248	196	54.00	-31.25



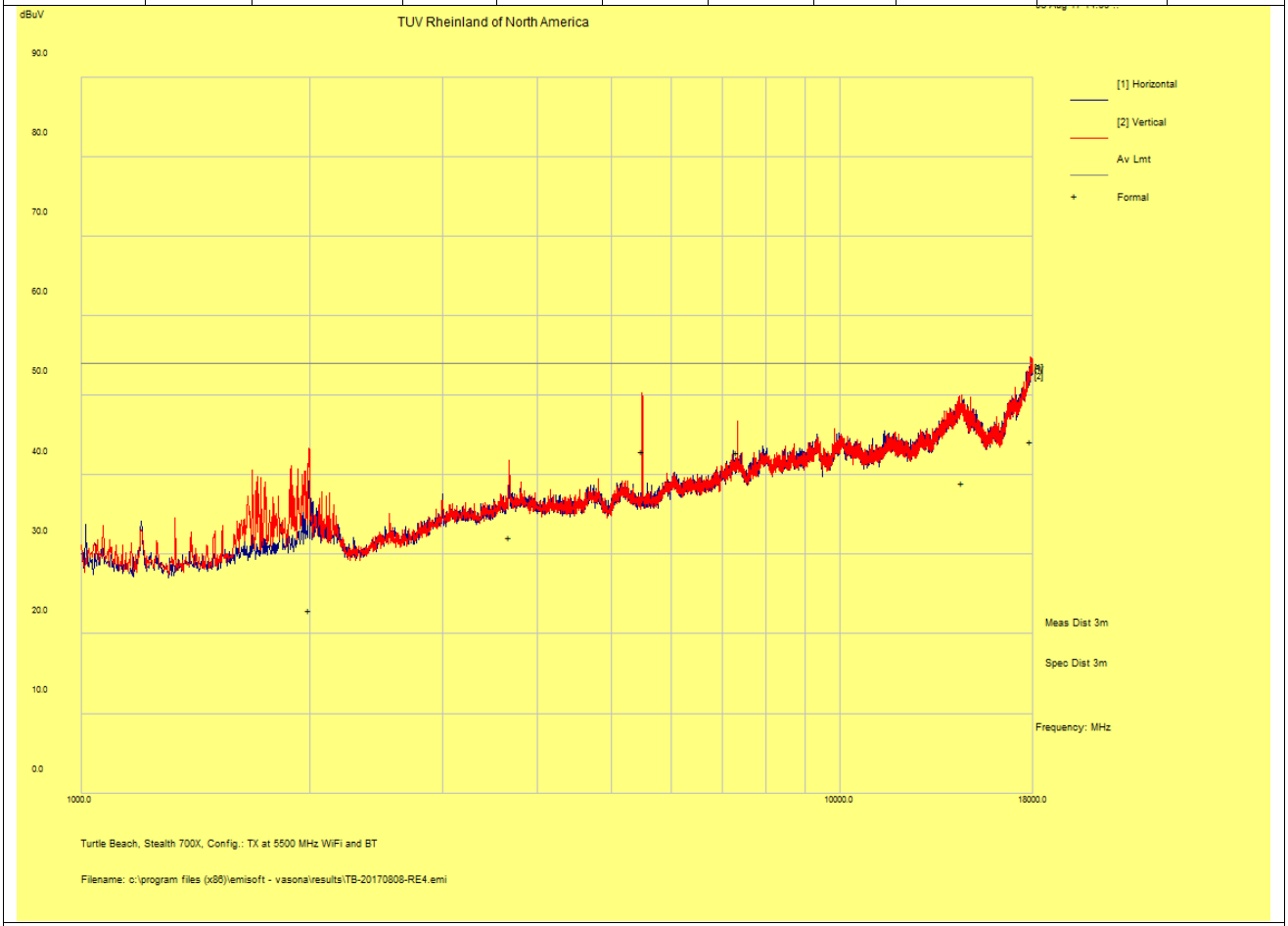
Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: No significant emission observed above 18 GHz for simultaneous transmissions.

SOP 1 Radiated Emissions, Collocation		Tracking # 31763105.001 Page 3 of 4	
EUT Name	Wireless Audio Headset	**Date**	August 8, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 33%rh
EUT Serial	PP#7	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a, 5500 MHz & BT	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m – AHA-840	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit at 802.11a 6 Mbps, 5500 MHz and Bluetooth 3-DH1, 2402 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
1995.50	28.70	1.20	-6.86	23.04	Ave	V	117	144	54.00	-30.96
3666.72	32.56	1.60	-2.04	32.11	Ave	V	228	196	54.00	-21.89
7333.22	36.95	2.31	3.64	42.89	Ave	V	162	118	54.00	-11.11
14510.90	23.60	3.56	11.84	39.00	Ave	V	244	50	54.00	-15.00
17859.65	24.56	4.20	15.42	44.18	Ave	V	114	302	54.00	-9.82



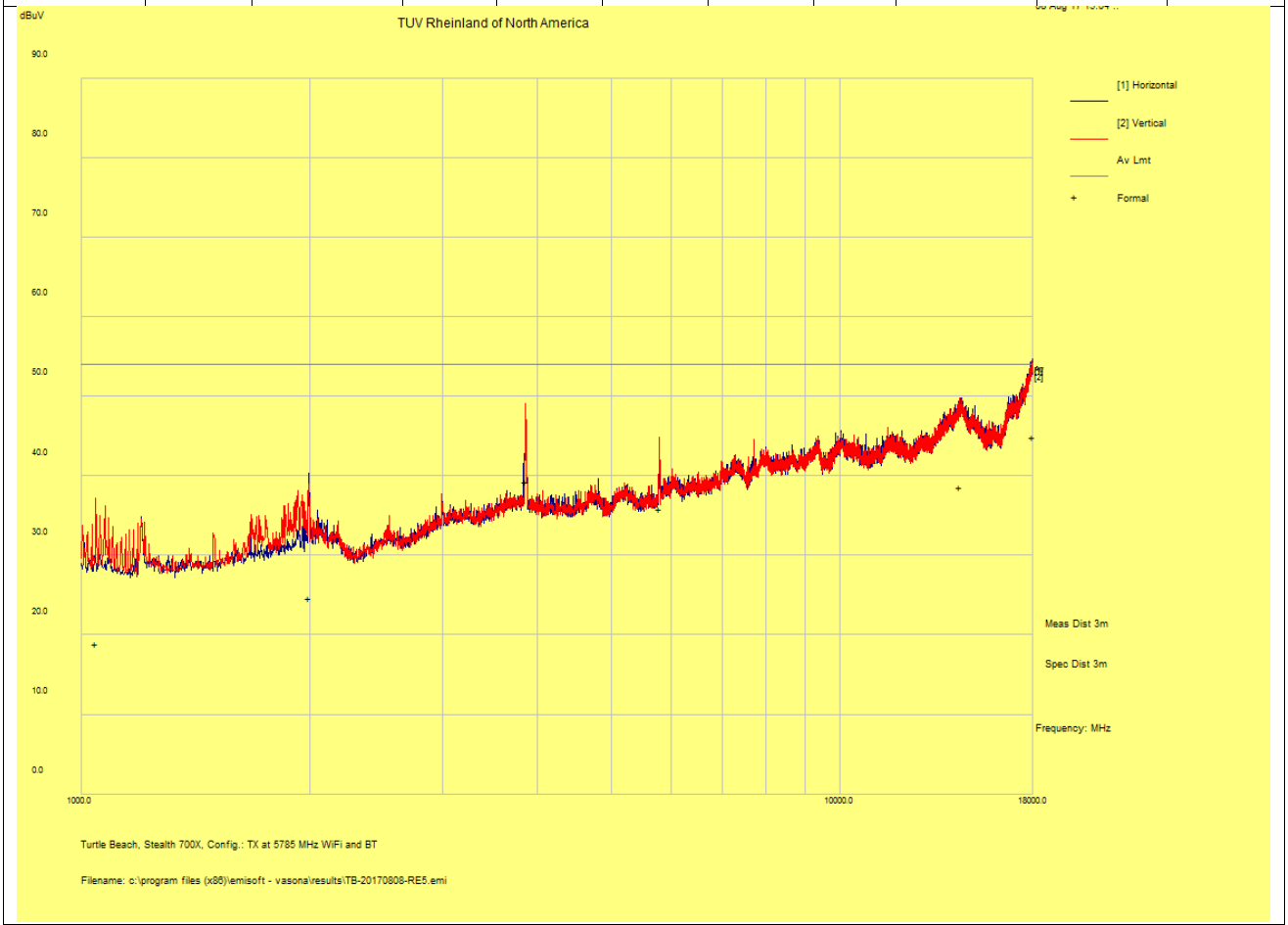
Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: No significant emission observed above 18 GHz for simultaneous transmissions.

SOP 1 Radiated Emissions, Collocation		Tracking # 31763105.001 Page 4 of 4	
EUT Name	Wireless Audio Headset	**Date**	August 8, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	23° C / 33%rh
EUT Serial	PP#7	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11a, 5785 MHz & BT	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m – AHA-840	**Performed by**	Jeremy Luong

Above 1 GHz Plots for Transmit at 802.11a 6 Mbps, 5785 MHz and Bluetooth 3-DH1, 2402 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
1995.60	30.33	1.20	-6.86	24.67	Ave	H	178	260	54.00	-29.33
17994.11	24.55	4.20	16.10	44.85	Ave	H	245	248	54.00	-9.15
1043.81	27.99	0.83	-9.94	18.88	Ave	V	108	338	54.00	-35.12
3856.72	38.94	1.70	-1.34	39.31	Ave	V	170	230	54.00	-14.69
14412.20	23.58	3.44	11.55	38.56	Ave	V	244	0	54.00	-15.44



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

Note: No significant emission observed above 18 GHz for simultaneous transmissions.

4.6 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: 2017 and RSS GEN: 2014.

4.6.1 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.

4.6.1.1 Deviations

There were no deviations from this test methodology.

4.6.2 Test Results

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

Table 12: AC Conducted Emissions – Test Results

Test Conditions: Conducted Measurement at Normal Conditions only	Date: July 24, 2017
Antenna Type: Chip	**Power Level:** See Test Plan
AC Power: 110 Vac/60 Hz at host device	**Configuration:** Tabletop
Ambient Temperature: 23° C	**Relative Humidity:** 38% 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

Tracking # 31763105.001 Page 1 of 4

EUT Name	Wireless Audio Headset	**Date**	July 24, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	22° C / 38% rh
EUT Serial	PP#2	**Temp / Hum out**	N/A
EUT Config.	TX mode: 802.11a mode at 6 Mbps, 5500 MHz	**Line AC / Freq**	110Vac / 60Hz (host)
Standard	CFR47 Part 15.207 and RSS Gen	**RBW / VBW**	9 kHz / 30 kHz
Lab/LISN	Lab #5 /Com-Power, Line 1	**Performed by**	Jeremy Luong

Frequency	Raw	Limiter	Ins. Loss	Level	Detector	Line	Limit	Margin	Result
MHz	dBuV	dB	dB	dBuV			dBuV	dB	
0.163	38.62	9.82	0.05	48.49	QP	Live	65.31	-16.82	Pass
0.163	23.31	9.82	0.05	33.18	Ave	Live	55.31	-22.12	Pass
0.172	35.94	9.82	0.05	45.82	QP	Live	64.84	-19.03	Pass
0.172	17.51	9.82	0.05	27.38	Ave	Live	54.84	-27.46	Pass
0.186	35.84	9.82	0.04	45.71	QP	Live	64.23	-18.52	Pass
0.186	19.57	9.82	0.04	29.44	Ave	Live	54.23	-24.79	Pass
0.272	36.35	9.83	0.04	46.22	QP	Live	61.07	-14.85	Pass
0.272	30.32	9.83	0.04	40.18	Ave	Live	51.07	-10.89	Pass
0.303	25.10	9.83	0.03	34.96	QP	Live	60.15	-25.19	Pass
0.303	16.82	9.83	0.03	26.68	Ave	Live	50.15	-23.47	Pass
0.567	24.78	9.85	0.03	34.65	QP	Live	56.00	-21.35	Pass
0.567	17.86	9.85	0.03	27.74	Ave	Live	46.00	-18.26	Pass
25.878	24.83	10.09	-0.06	34.86	QP	Live	60.00	-25.14	Pass
25.878	23.06	10.09	-0.06	33.09	Ave	Live	50.00	-16.91	Pass

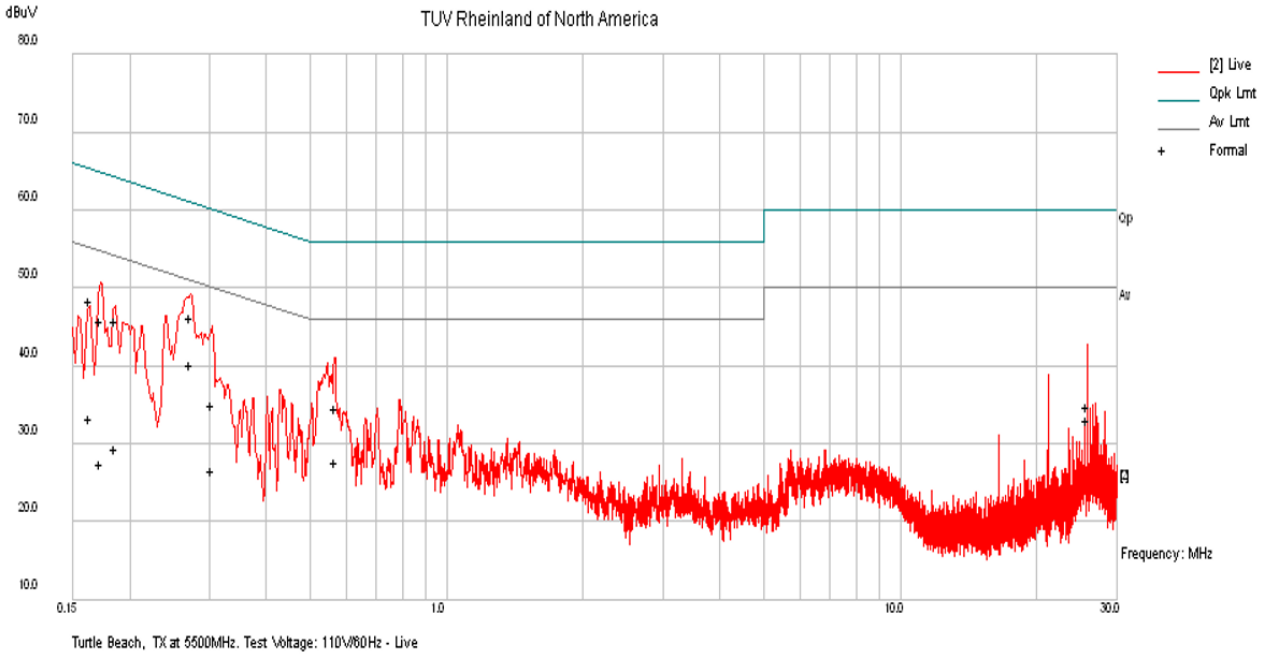
Spec Margin = QP./Ave. - Limit, ± Uncertainty

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

Notes: EUT was setup as table top equipment and transmitted at 5500 MHz in 802.11a mode at 6 Mbps (worse case condition).

SOP 2 Conducted Emissions		Tracking # 31763105.001 Page 2 of 4	
EUT Name	Wireless Audio Headset	**Date**	July 24, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	22° C / 38% rh
EUT Serial	PP#2	**Temp / Hum out**	N/A
EUT Config.	TX mode: 802.11a mode at 6 Mbps, 5500 MHz	**Line AC**	110Vac / 60Hz (host)
Standard	CFR47 Part 15.207 and RSS Gen	**RBW / VBW**	9 kHz / 30 kHz
Lab/LISN	Lab #5 /Com-Power, Line 1	**Performed by**	Jeremy Luong

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



Note: Met FCC Class B limit.

SOP 2 Conducted Emissions

Tracking # 31763105.001 Page 3 of 4

EUT Name	Wireless Audio Headset	**Date**	July 24, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	22° C / 38% rh
EUT Serial	PP#2	**Temp / Hum out**	N/A
EUT Config.	TX mode: 802.11a mode at 6 Mbps, 5500 MHz	**Line AC / Freq**	110Vac / 60Hz (host)
Standard	CFR47 Part 15.207 and RSS Gen	**RBW / VBW**	9 kHz / 30 kHz
Lab/LISN	Lab #5 /Com-Power, Line 2	**Performed by**	Jeremy Luong

Frequency	Raw	Limiter	Ins. Loss	Level	Detector	Line	Limit	Margin	Result
MHz	dBuV	dB	dB	dBuV			dBuV	dB	
0.161	34.44	9.82	0.05	44.31	QP	Neutral	65.40	-21.09	Pass
0.161	22.56	9.82	0.05	32.43	Ave	Neutral	55.40	-22.97	Pass
0.208	31.23	9.83	0.04	41.10	QP	Neutral	63.29	-22.19	Pass
0.208	17.01	9.83	0.04	26.88	Ave	Neutral	53.29	-26.41	Pass
0.268	36.09	9.83	0.04	45.95	QP	Neutral	61.19	-15.23	Pass
0.268	33.08	9.83	0.04	42.94	Ave	Neutral	51.19	-8.24	Pass
0.296	32.39	9.83	0.03	42.25	QP	Neutral	60.36	-18.10	Pass
0.296	26.90	9.83	0.03	36.76	Ave	Neutral	50.36	-13.60	Pass
0.438	23.77	9.84	0.03	33.64	QP	Neutral	57.10	-23.46	Pass
0.438	24.24	9.84	0.03	34.11	Ave	Neutral	47.10	-13.00	Pass
0.455	21.15	9.84	0.03	31.02	QP	Neutral	56.79	-25.76	Pass
0.455	13.26	9.84	0.03	23.13	Ave	Neutral	46.79	-23.66	Pass
0.569	26.78	9.85	0.03	36.65	QP	Neutral	56.00	-19.35	Pass
0.569	19.17	9.85	0.03	29.05	Ave	Neutral	46.00	-16.95	Pass

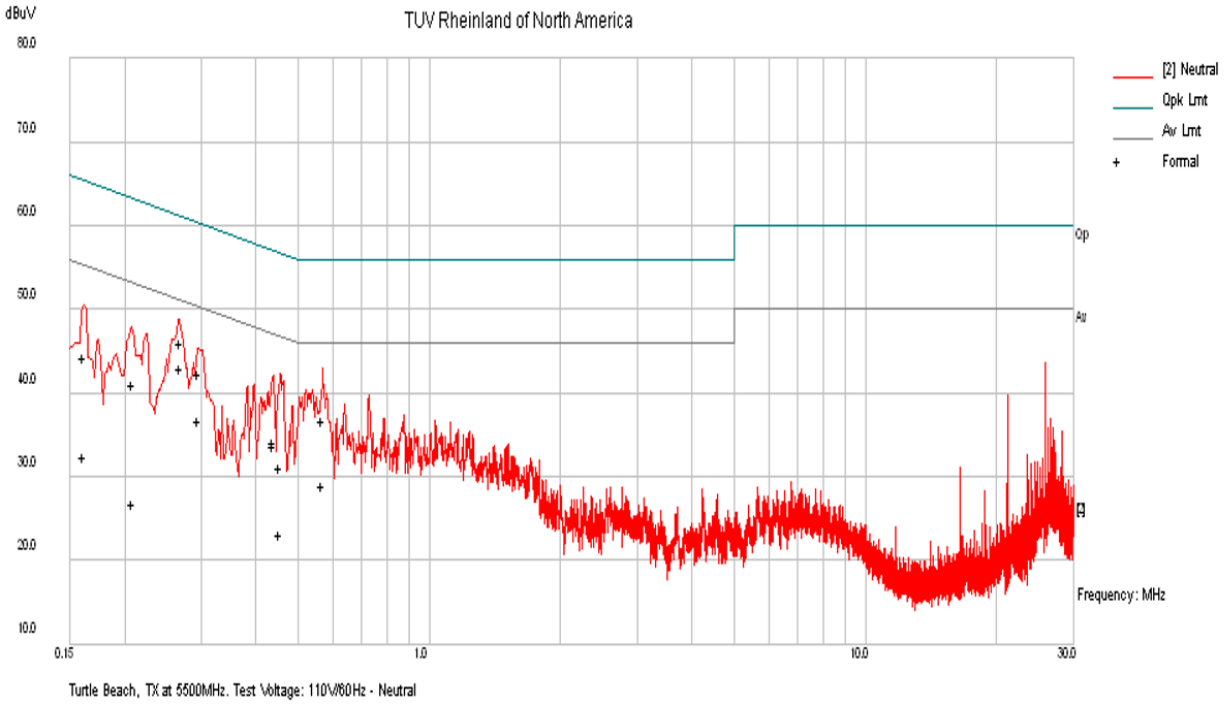
Spec Margin = QP./Ave. - Limit, ± Uncertainty

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

Notes: EUT was setup as table top equipment and transmitted at 5500 MHz in 802.11a mode at 6 Mbps (worse case condition).

SOP 2 Conducted Emissions		Tracking # 31763105.001 Page 4 of 4	
EUT Name	Wireless Audio Headset	**Date**	July 24, 2017
EUT Model	Ear Force Stealth 700X	**Temp / Hum in**	22° C / 38% rh
EUT Serial	PP#2	**Temp / Hum out**	N/A
EUT Config.	TX mode: 802.11a mode at 6 Mbps, 5500 MHz	**Line AC**	110Vac / 60Hz (host)
Standard	CFR47 Part 15.207 and RSS Gen	**RBW / VBW**	9 kHz / 30 kHz
Lab/LISN	Lab #5 /Com-Power, Line 2	**Performed by**	Jeremy Luong

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



Note: Met FCC Class B Limit.

4.7 Frequency Stability

In accordance with 47 CFR Part 15.407(g) and RSS GEN Sect. 6.11 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. The Manufacturer calls out operating temperature ranges of +0º to +50º C

4.7.1 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

4.7.2 Manufacturer Declaration

The frequency stability of the reference oscillator sets the frequency stability of the RF transceiver signals. Therefore all of the RF signal should have ±20 ppm stability.

This stability accounts for room temp tolerance of the crystal oscillator circuit, frequency variation across temperature, and crystal ageing.

Worst case:
5.30 GHz ±20 ppm/106 kHz

±20 ppm at 5.30 GHz translates to a maximum frequency shift of ±106 kHz. As the edge of the channels are at least one MHz from either of the band edges, ±106 kHz is more than sufficient to guarantee that the intentional emission will remain in the band over the entire operating range of the radio.

4.7.3 Limit

CFR47 Part 15.407(g) and RSS GEN Sect. 6.11 - Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

4.7.4 Test results:

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s) since the maximum frequency drift was 7.89 ppm.

Table 13: Frequency Stability – Test Results

Temperature	Time	PPM
0° C	Start	0.07
	2 Min.	0.50
	5 Min	0.67
	10 min	1.10
10° C	Start	1.20
	2 Min.	1.24
	5 Min	1.20
	10 min	2.62
20° C	Start	4.53
	2 Min.	4.46
	5 Min	4.46
	10 min	4.46
30° C	Start	4.92
	2 Min.	5.27
	5 Min	5.48
	10 min	5.66
40° C	Start	7.18
	2 Min.	7.15
	5 Min	7.29
	10 min	7.39
50° C	Start	7.68
	2 Min.	7.64
	5 Min	7.89
	10 min	7.78
Note: All frequency drifts were less than ±20 ppm. The worst frequency drift was 7.89 ppm		

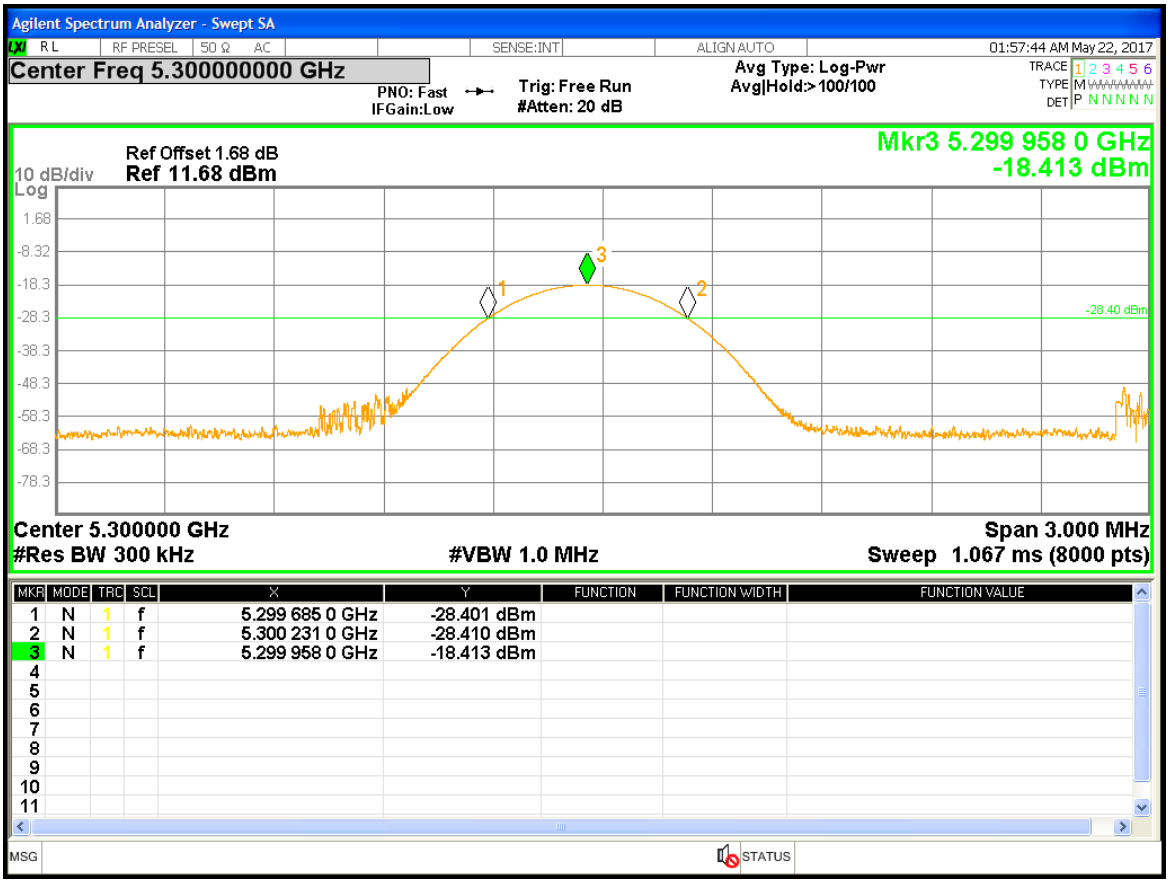


Figure 165: Frequency Stability – Worst Case

4.8 Voltage Variation

In accordance with 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.

4.8.1 Test Methodology

The supply voltage was varied between 85% and 115% of the nominal rated supply voltage. The fundamental frequency was observed during the variation. The EUT was powered 3.7 Vdc by programmable power supply. The voltage was varied from 3.3 Vdc to 4.07 Vdc mean while the fundamental frequencies were observed and record for the maximum drift in ppm; part per millions.

4.8.2 Test results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s). The fundamental frequencies drifted less than ±20 ppm.

Table 14: Voltage Variation – Test Results

Frequency	**Nominal (3.7 Vdc)**	**Lo Voltage (3.3Vdc)**	**Hi Voltage (4.07Vdc)**	**Max Drift**
MHz	MHz	MHz	MHz	ppm
5300	2.83	2.26	3.40	3.40
Note: EUT has operating voltage of 3.3 Vdc to 4.07 Vdc.				

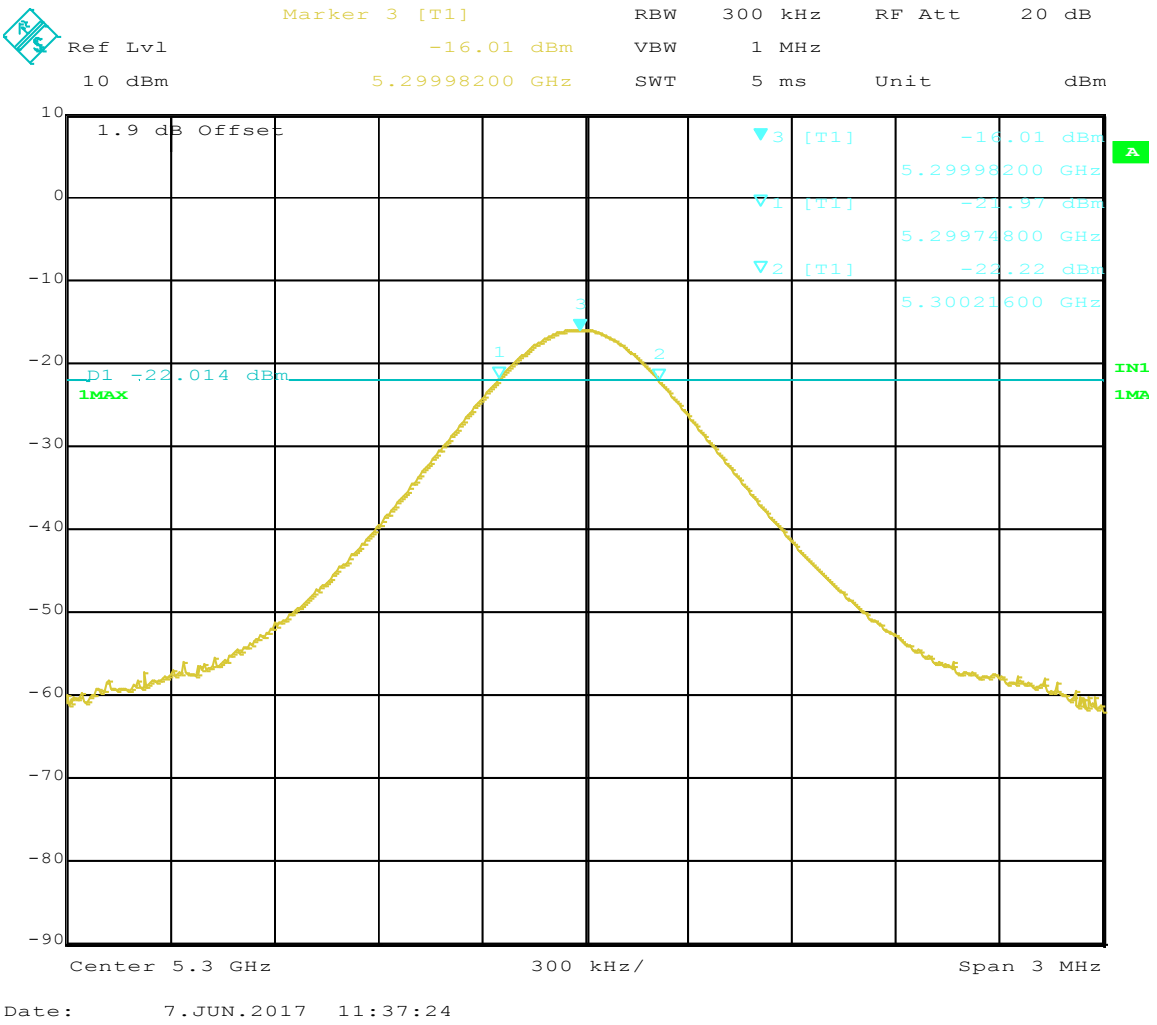


Figure 166: Voltage Variation – Worst Case Condition

5 Test Equipment List

5.1 Equipment List

Equipment	Manufacturer	Model #	Serial/Inst #	Last Cal mm/dd/yyyy	Next Cal mm/dd/yyyy
Bilog Antenna	Sunol Sciences	JB3	A102606	06/15/2016	06/15/2018
Horn Antenna	Sunol Sciences	3115	9710-5301	10/08/2015	10/08/2017
Antenna (18-40 GHz)	Com-Power	AHA-840	105005	05/26/2017	05/26/2019
Loop Antenna	ETS-Lindgren	6502	62531	06/08/2017	06/08/2018
Spectrum Analyzer	Rohde & Schwarz	FSL6	100169	01/13/2017	01/13/2018
Spectrum Analyzer	Agilent	N9038A	MY552260210	01/16/2017	01/16/2018
Spectrum Analyzer	Agilent	N9030A	US51350291	01/08/2017	01/08/2018
Spectrum Analyzer	Rohde Schwarz	ESIB40	832427/002	01/16/2017	01/16/2018
Spectrum Analyzer	Rohde Schwarz	FSV40	1321.3008K40	09/19/2017	09/19/2018
Amplifier	Sonoma Instruments	310	165516	01/19/2017	01/19/2018
Amplifier	Miteq	TTA1800-30-HG	2020728	11/12/2016	11/12/2017
Amplifier	Rohde & Schwarz	TS-PR26	100011	11/04/2017	11/04/2018
Amplifier	Rohde & Schwarz	TS-PR40	100012	08/02/2017	08/02/2018
Power Meter	Agilent	E4418B	MY45103902	01/11/2017	01/11/2018
Power Sensor	Hewlett Packard	8482A	1925A04647	01/01/2017	01/01/2018
Thermometer	Fluke	52II	88650033	11/04/2016	11/04/2017
Thermo Chamber	Espec	BTZ-133	0613436	NCR	NCR
Multimeter	Fluke	177	92780312	01/11/2017	01/11/2018
DC Power Supply	Agilent	E3634A	MY400004331	01/12/2017	01/12/2018
Notch Filter	Micro-Tronics	BRM50716	003	01/18/2017	01/18/2018
Signal Generator	Anritsu	MG3694A	42803	01/13/2017	01/13/2018
Signal Generator	Rohde & Schwarz	SMF100A	1167.0000K02	09/19/2017	09/19/2018
Signal Generator	Rohde & Schwarz	SMBV100A	1407.6004K02	09/19/2017	09/19/2018
Power Sensors	Rohde & Schwarz	OSP120	1520.9010.02	09/19/2017	09/19/2018

* 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 15: Customer Information

Company Name	Voyetra Turtle Beach, Inc.
Address	100 Summit Lake Drive, Suite 100
City, State, Zip	Valhalla, New York 10595 USA
Country	USA
Phone	(530) 277-3482

Table 16: Technical Contact Information

Name	Tim Blaney
E-mail	tim@commcepts.net
Phone	(530) 277-3482

6.3 Equipment Under Test (EUT)

Table 17: EUT Specifications

EUT Specifications	
Dimensions	225mm (8.9”) x 252mm (9.9”) x 115mm (4.5”)
DC Input	Headset Input Voltage: 3.7 Vdc (battery)
Environment	Indoor
Operating Temperature Range:	0 to 50 degrees C
Multiple Feeds:	☐ Yes and how many ☒ No
Product Marketing Name (PMN)	Ear Force Stealth 700X
Hardware Version Identification Number (HVIN)	Stealth 700X
Firmware Version Identification Number (FVIN)	0.1.7
802.11-radio modules	
Operating Mode	802.11a, b, g, 802.11n HT20
Transmitter Frequency Band	2.4 GHz – 2.4835 GHz, 5.15 GHz – 5.25 GHz, 5.25 GHz – 5.35 GHz, 5.47 GHz – 5.7 GHz, and 5.725 GHz – 5.85 GHz
Max. Rated Power Output	7.95 dBm
Power Setting @ Operating Channel	See Channel Planning Table.
Antenna Type	PCB Chip
Max. Peak Antenna Gain	+1.8 dBi at 2.4GHz. +4.9 dBi at 5 GHz
Modulation Type	☐ Thread (Zigbee) ☐ BLE ☒ DSSS ☒ OFDM ☒ Other describe: 16QAM
Data Rate	802.11b: 1, 2, 5.5, and 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n HT20: 6.5, 13, 19.5, 26, 39, 52, 58.5, 65 Mbps
TX/RX Chain (s)	1
Directional Gain Type	☐ Correlated ☐ Beam-Forming ☒ Other describe: No beam-forming or correlated.
Type of Equipment	☐ Table Top ☐ Wall-mount ☐ Floor standing cabinet ☒ Other: Head wear device.
Note: The Wi-Fi radio can only operate in one band and on one channel at a time. This report is for operation in the 5.0 GHz bands only.	

Table 18: Antenna Information

Number	Antenna Type	Description	Max Gain (dBi)
Antenna 1	Chip	Max. peak gain at 2.4 GHz	+1.8
		Max. peak gain at 5 GHz	+4.9

Table 19: EUT Channel Power Specifications

No.	Frequency (MHz)	Target Power Level in ART2					
		802.11b	802.11g	802.11a	802.11n HT20	802.11n HT40	
1	2412	6.0	6.0		5.5		
2	2417						
3	2422						
4	2427						
5	2432						
6	2437	5.5	5.5		5.5		
7	2442						
8	2447						
9	2452						
10	2457						
11	2462	5.5	5.5		5.5		
36	5180			6.5	6.0		
40	5200			6.5	6.0		
44	5220						
48	5240			6.5	6.5		
52	5260			6.5	6.5		
56	5280						
60	5300			6.5	6.0		
64	5320			6.5	6.0		
100	5500			5.5	5.5		
104	5520						
108	5540						
112	5560						
116	5580			4.5	4.5		
120	5600						
124	5620						
128	5640						
132	5660						
136	5680						
140	5700			6.0	6.0		
144	5720						
149	5745			6.0	6.0		
153	5765						
157	5785			6.0	6.0		
161	5805						
165	5825			6.5	6.5		

Note: 2.4GHz and UNII band power outputs are set using TX power in the ART2 software.

Table 20: 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?
USB	Laptop	☒ Yes	☒ Metric:3m	☒ M

Table 21: Supported Equipment

Equipment	Manufacturer	Model	Serial	Used for
Laptop	Dell	Latitude	35521341769	Setup EUT operating channel
Note: None.				

Table 22: Description of Sample used for Testing

Device	Serial	RF Connection	CFR47 Part 15.407
Ear Force Stealth 700X	PP#2	Radiated Sample	TX Emissions, AC Conducted Emission*
	PP#7	Radiated Sample	TX Emissions, Collocation
	PP#1	Conducted Sample	Output Power, Power Spectral Density, Occupied Bandwidth Band-Edge Out-of-Band Emission Frequency Stability* Voltage Variation*
Note: (*) Performed on Model Stealth 600X; similar model Both Stealth 600X and Stealth 700X utilize the same Wi-Fi RF chipset and they both have the same design, layout and RF filtering for the 2.4 and 5.0 GHz Wi-Fi section.			

Table 23: Description of Test Configuration used for Radiated Measurement.

Device	Antenna	Mode	Setup Photo (X-Axis)	Setup Photo (Y-Axis)	Setup Photo (Z-Axis)
Ear Force Stealth 700X	Chip (FR05-S1-NO-1-004)	Transmit	EUT laid flat	Normal usage. Up right.	On the side
Note: The Y-Axis setup configuration used for final testing.					

6.4 Test Specifications

Testing requirements

Table 24: Test Specifications

Emissions and Immunity	
Standard	**Requirement**
CFR 47 Part 15.407: 2017	All
RSS 247 Issue 2, 2017	All

END OF REPORT