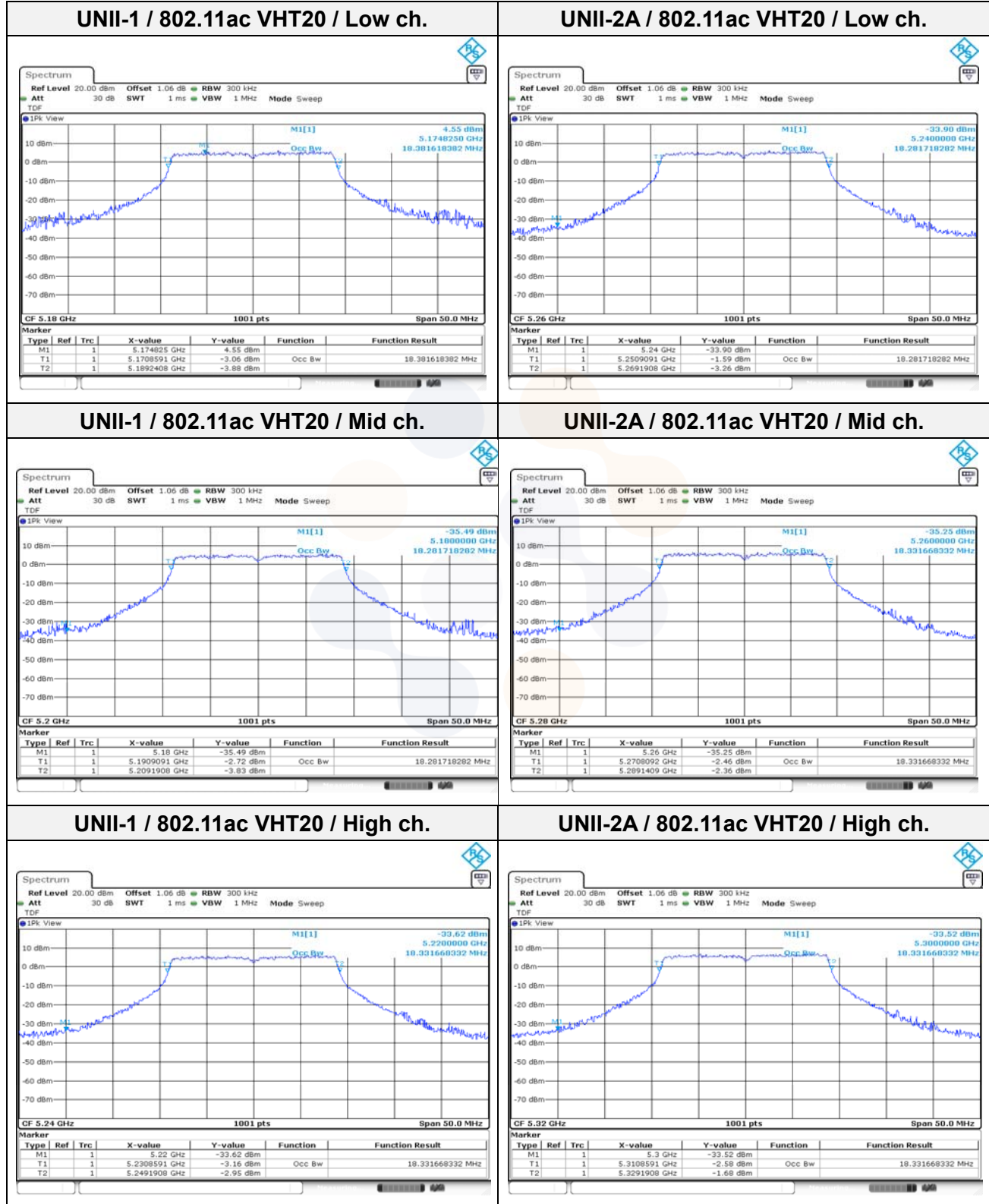
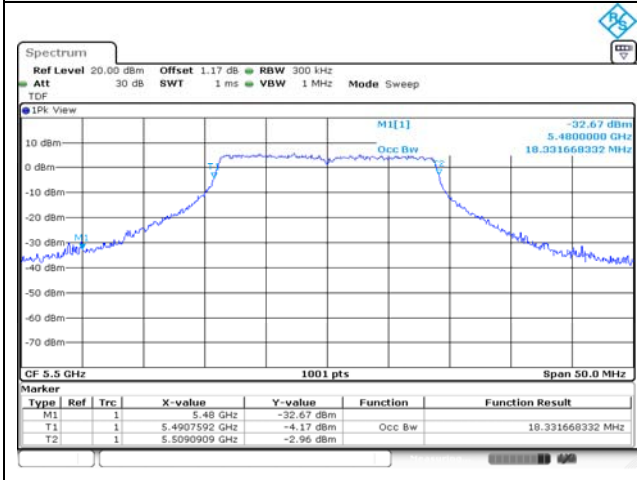


In order to simplify the report, only ANT 1 ac mode test plots are attached.

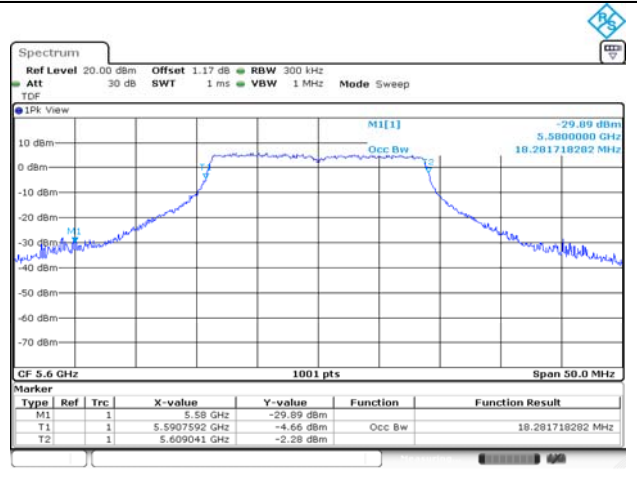
MIMO



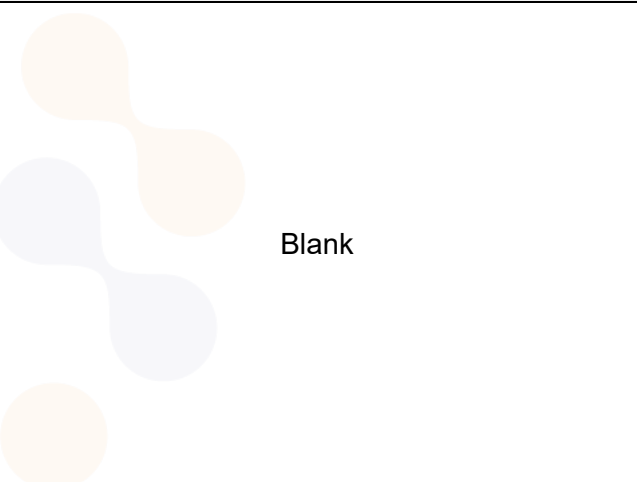
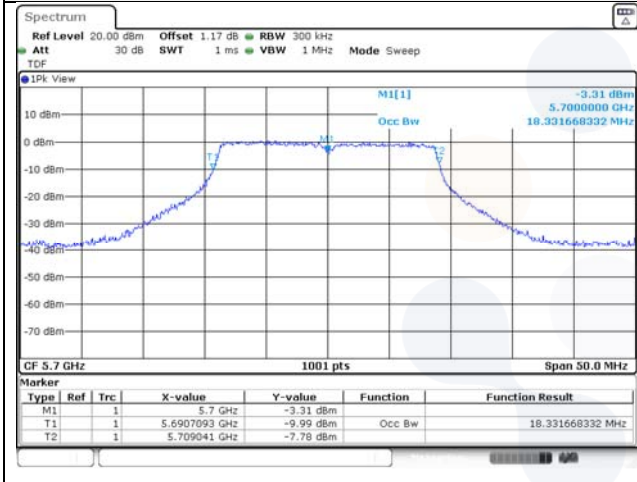
UNII-2C / 802.11ac VHT20 / Low ch.



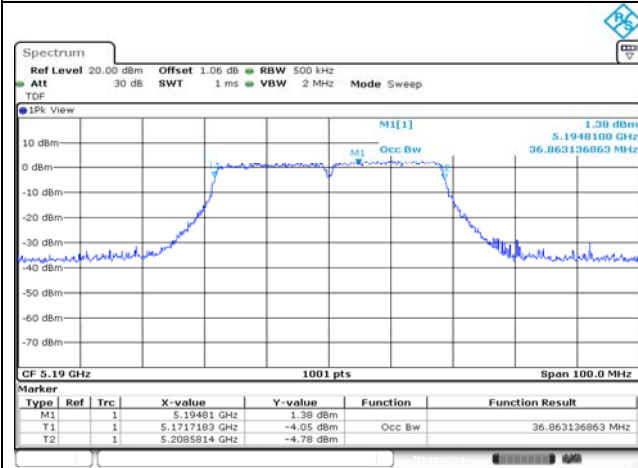
UNII-2C / 802.11ac VHT20 / Mid ch.



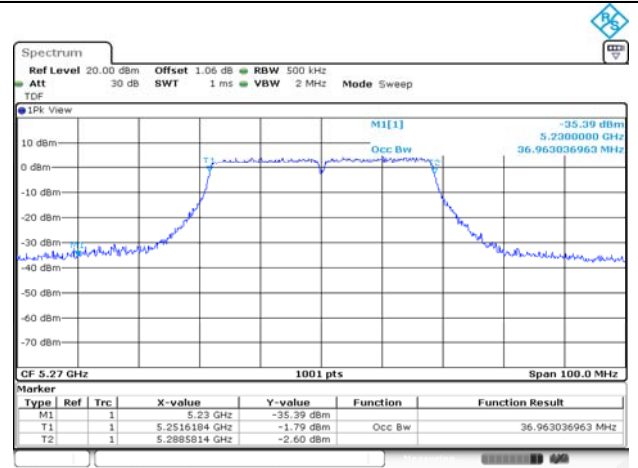
UNII-2C / 802.11ac VHT20 / High ch.



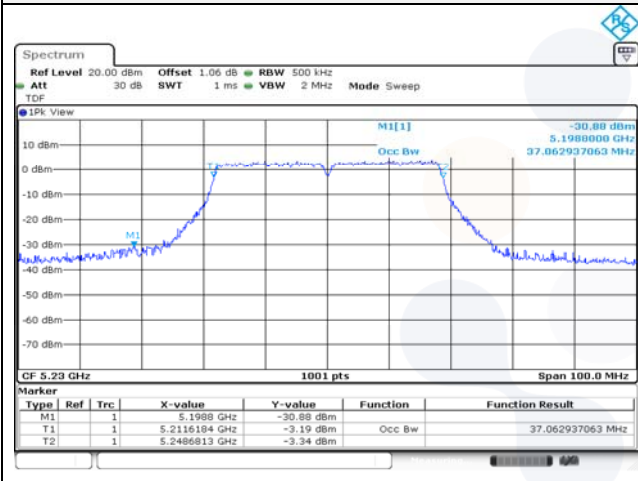
UNII-1 / 802.11ac VHT40 / Low ch.



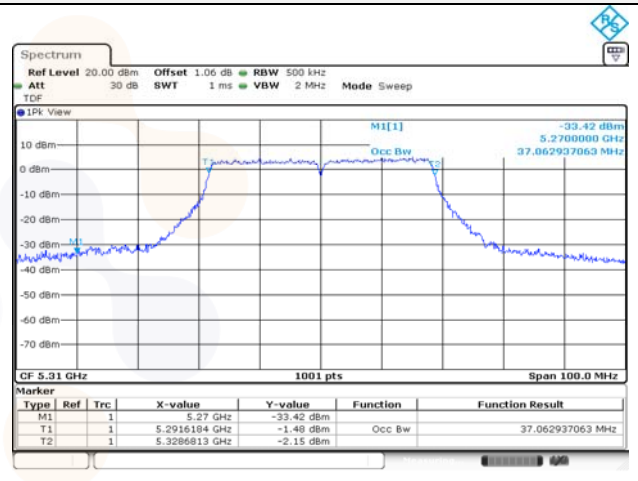
UNII-2A / 802.11ac VHT40 / Low ch.



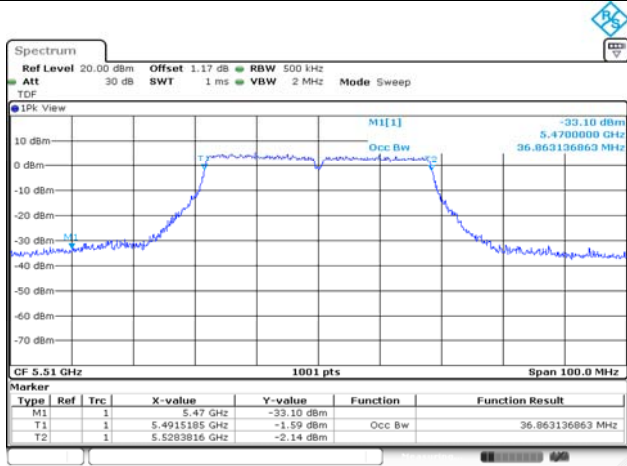
UNII-1 / 802.11ac VHT40 / High ch.



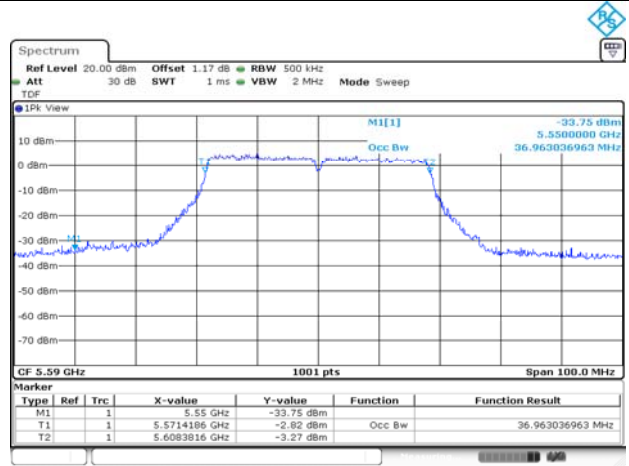
UNII-2A / 802.11ac VHT40 / High ch.



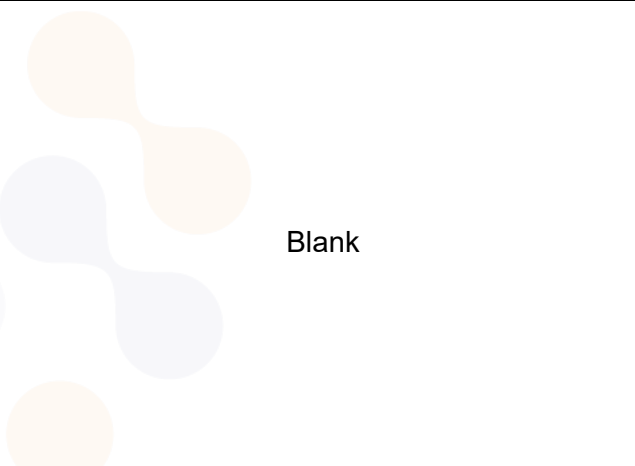
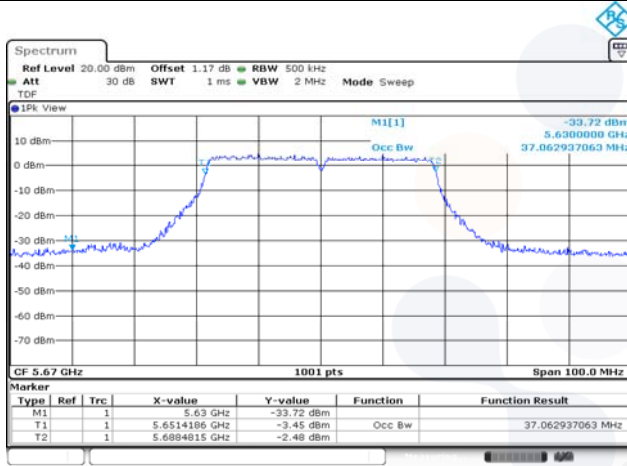
UNII-2C / 802.11ac VHT40 / Low ch.



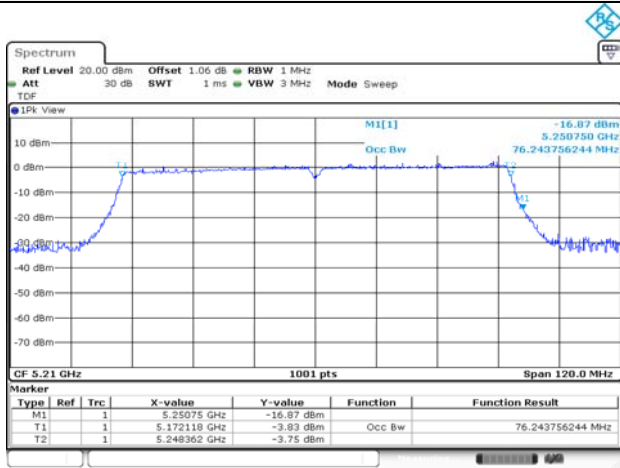
UNII-2C / 802.11ac VHT40 / Mid ch.



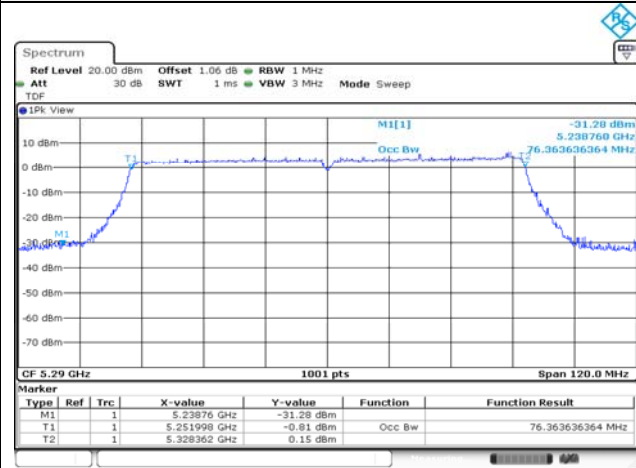
UNII-2C / 802.11ac VHT40 / High ch.



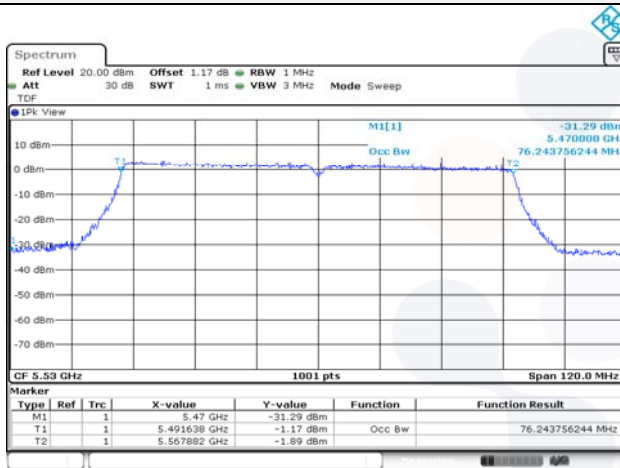
UNII-1 / 802.11ac VHT80 / Mid ch.



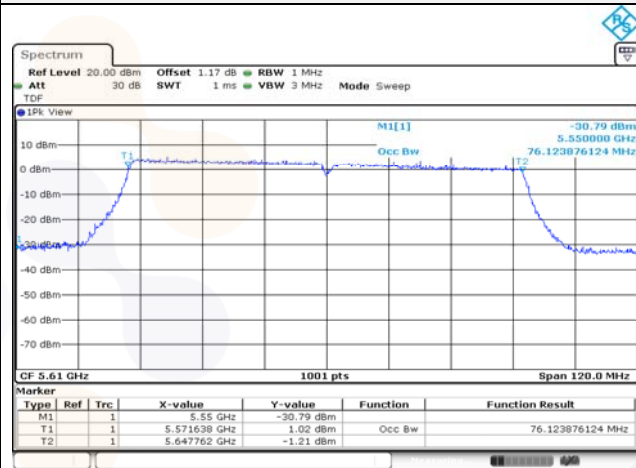
UNII-2A / 802.11ac VHT80 / Mid ch.



UNII-2C / 802.11ac VHT80 / Low ch.

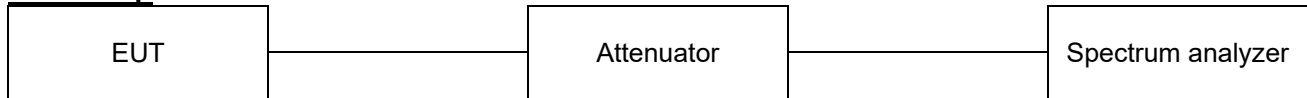


UNII-2C / 802.11ac VHT80 / High ch.



7.4. 6 dB Bandwidth & 99% Bandwidth

Test setup



Limit

According to §15.407(e), Within the 5.725-5.850 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500kHz.

Test procedure

ANSI C63.10-2013 Section 6.9.2
KDB 789033 D02 v02r01 - Section C.2

Test settings

Minimum Emission Bandwidth for the band 5.725–5.85 GHz.

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 kHz for the band 5.725–5.85 GHz band. The following procedure shall be used for measuring this Bandwidth:

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test results

SISO

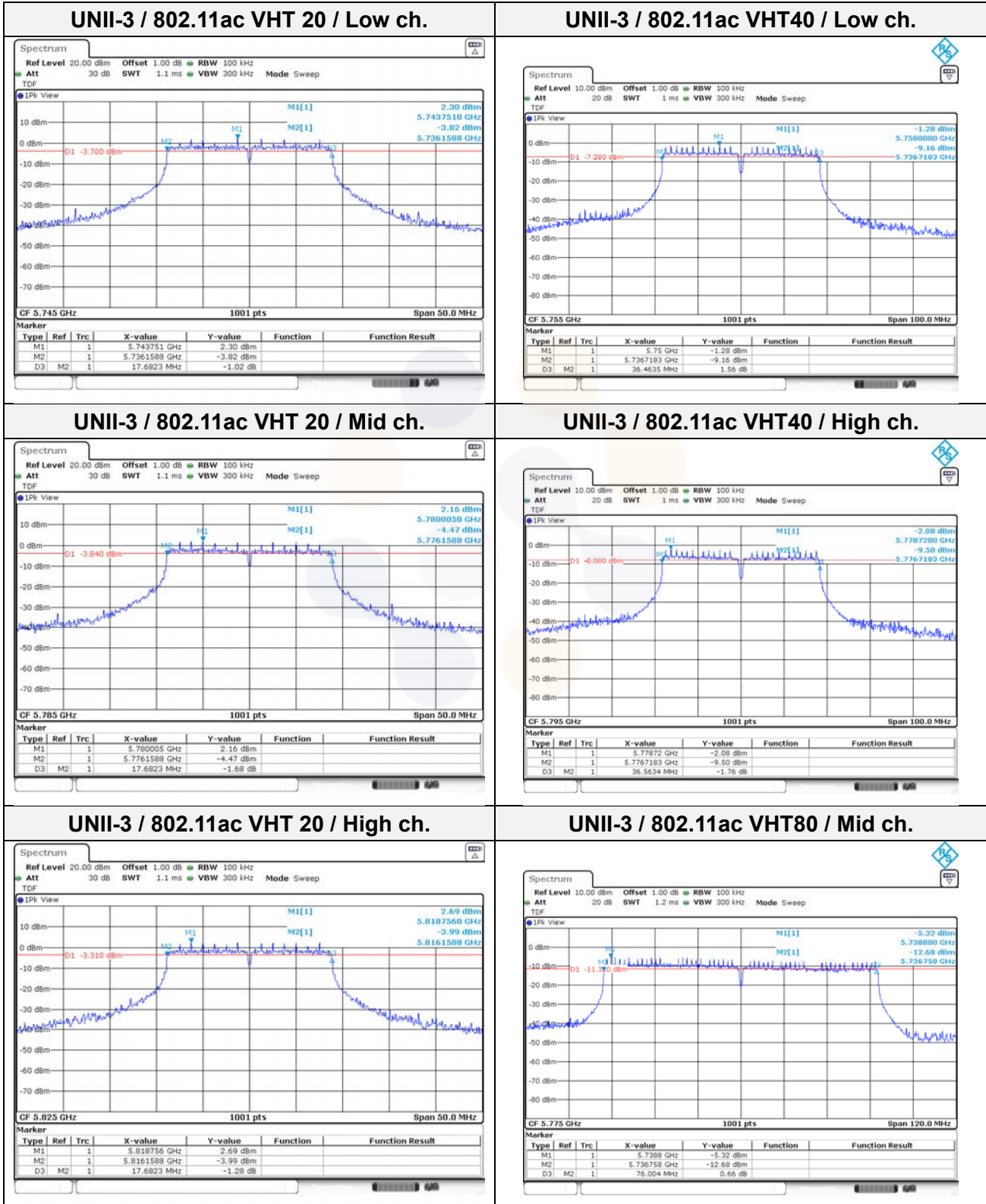
Test mode	Band	Frequency (MHz)	6dB bandwidth (MHz)		Limit (MHz)	99% bandwidth (MHz)	
			ANT2			ANT2	
802.11a	UNII-3	5 745	16.48		0.50	17.18	
		5 785	16.43		0.50	17.28	
		5 825	16.43		0.50	17.23	
802.11n HT20	UNII-3	5 745	17.73		0.50	18.38	
		5 785	17.68		0.50	18.53	
		5 825	17.68		0.50	18.33	
802.11n HT40	UNII-3	5 755	36.56		0.50	36.96	
		5 795	36.56		0.50	37.16	
802.11ac VHT20	UNII-3	5 745	17.68		0.50	18.38	
		5 785	17.68		0.50	18.48	
		5 825	17.68		0.50	18.43	
802.11ac VHT40	UNII-3	5 755	36.46		0.50	36.86	
		5 795	36.56		0.50	37.16	
802.11ac VHT80	UNII-3	5 775	76.00		0.50	76.60	

MIMO

Test mode	Band	Frequency (MHz)	6dB bandwidth (MHz)		Limit (MHz)	99% bandwidth (MHz)	
			ANT1	ANT2		ANT1	ANT2
802.11a	UNII-3	5 745	16.48	16.43	0.50	17.13	16.98
		5 785	16.43	16.43	0.50	17.28	17.03
		5 825	16.43	16.38	0.50	17.18	16.93
802.11n HT20	UNII-3	5 745	17.73	17.68	0.50	18.38	17.98
		5 785	17.68	17.68	0.50	18.38	18.08
		5 825	17.68	17.68	0.50	18.33	18.03
802.11n HT40	UNII-3	5 755	36.46	36.46	0.50	37.06	36.56
		5 795	36.56	36.56	0.50	36.96	36.76
802.11ac VHT20	UNII-3	5 745	17.73	17.68	0.50	18.38	17.98
		5 785	17.68	17.68	0.50	18.33	18.08
		5 825	17.68	17.68	0.50	18.33	17.98
802.11ac VHT40	UNII-3	5 755	36.46	36.46	0.50	37.06	36.46
		5 795	36.56	36.56	0.50	37.16	36.66
802.11ac VHT80	UNII-3	5 775	75.88	75.88	0.50	76.36	76.12

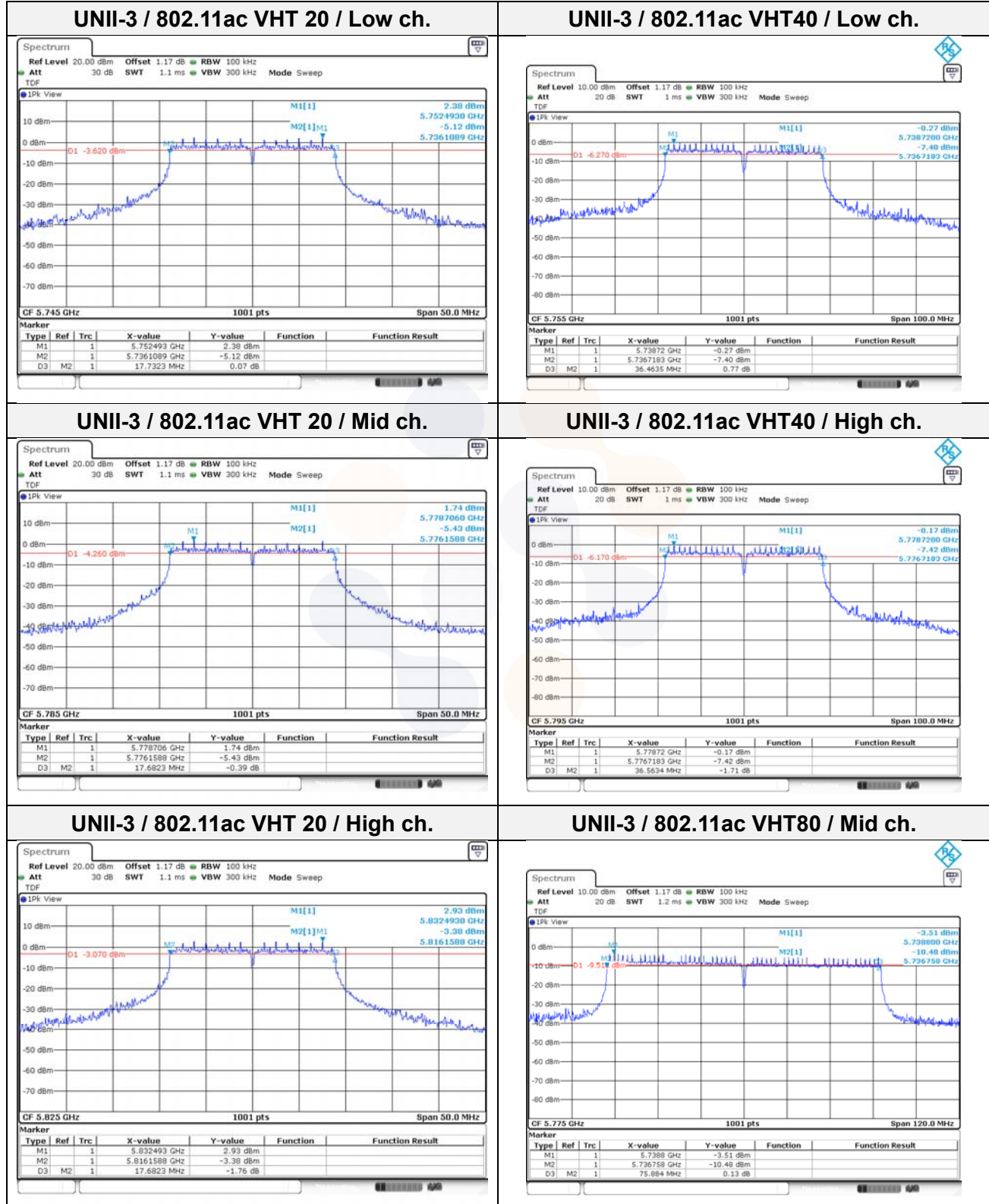
In order to simplify the report, only ac mode test plots are attached.

6 dB bandwidth
SISO



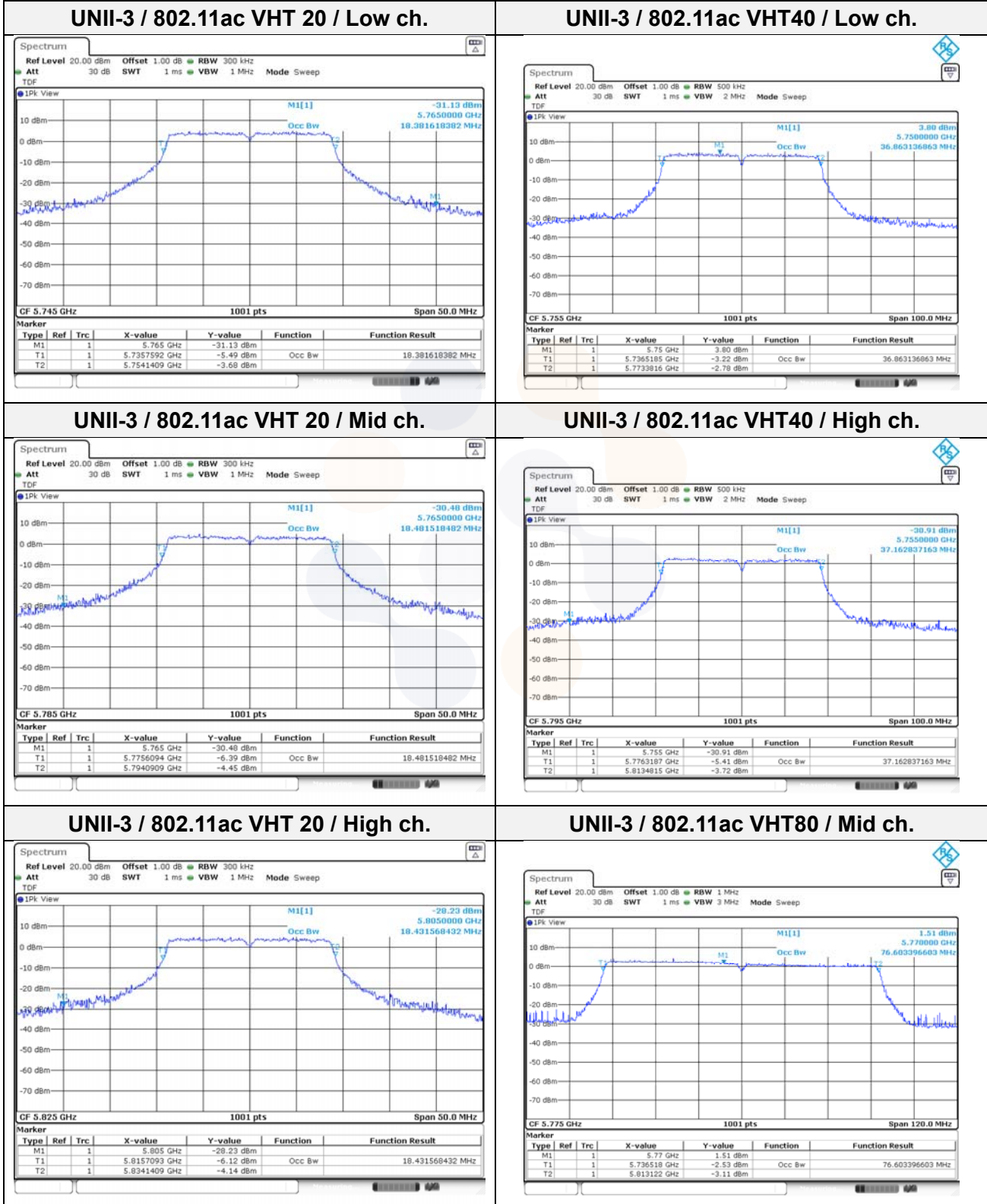
In order to simplify the report, only ANT 1 ac mode test plots are attached.

MIMO



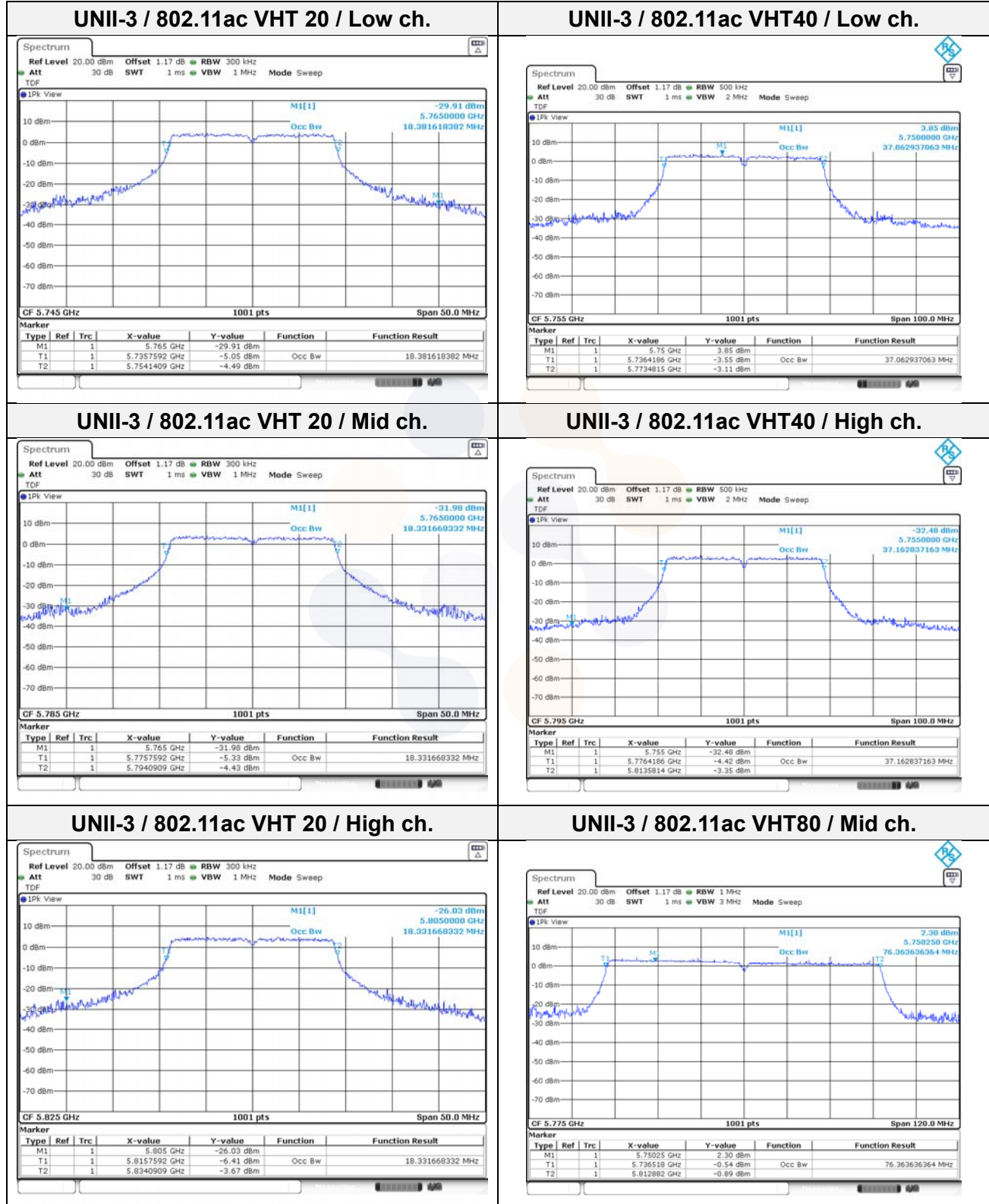
In order to simplify the report, only ac mode test plots are attached.

99% bandwidth
SISO



In order to simplify the report, only ANT 1 ac mode test plots are attached.

MIMO



7.5. Straddle channel

26dB bandwidth & 99% Bandwidth

SISO

Test mode	Band	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
			ANT2	ANT2
802.11a	UNII-2C	5 720	17.34	13.64
802.11n HT20			19.54	14.44
802.11ac VHT20			19.94	14.39
802.11a	UNII-3	5 720	7.24	3.54
802.11n HT20			8.04	4.14
802.11ac VHT20			8.14	4.14
802.11n HT40	UNII-2C	5 710	50.26	34.18
802.11ac VHT40			38.48	33.88
802.11n HT40	UNII-3	5 710	12.67	3.48
802.11ac VHT40			7.58	3.48
802.11ac VHT80	UNII-2C	5 690	94.94	73.36
	UNII-3	5 690	7.56	3.00

Notes:

- For 99% Bandwidth, measured 99% occupied bandwidth is separated as below.
 - For UNII band 2C = 5 725 MHz – T1 (Measured frequency on the marker table)
 - For UNII band 3 = T2 (Measured frequency on the marker table) – 5 725 MHz

MIMO

Test mode	Band	Frequency (MHz)	26dB Bandwidth (MHz)		99% Bandwidth (MHz)	
			ANT1	ANT2	ANT1	ANT2
802.11a	UNII-2C	5 720	17.24	17.29	13.64	13.49
802.11n HT20			18.79	17.64	14.29	14.09
802.11ac VHT20			18.49	17.59	14.29	14.09
802.11a	UNII-3	5 720	6.89	7.89	3.54	3.59
802.11n HT20			7.89	7.14	4.09	3.99
802.11ac VHT20			7.84	7.04	4.09	4.04
802.11n HT40	UNII-2C	5 710	38.68	37.08	33.58	33.38
802.11ac VHT40			38.68	37.88	33.68	33.48
802.11n HT40	UNII-3	5 710	7.48	6.88	3.38	3.28
802.11ac VHT40			7.78	7.18	3.38	3.28
802.11ac VHT80	UNII-2C	5 690	78.76	78.88	73.48	73.24
	UNII-3	5 690	6.96	7.44	2.76	2.76

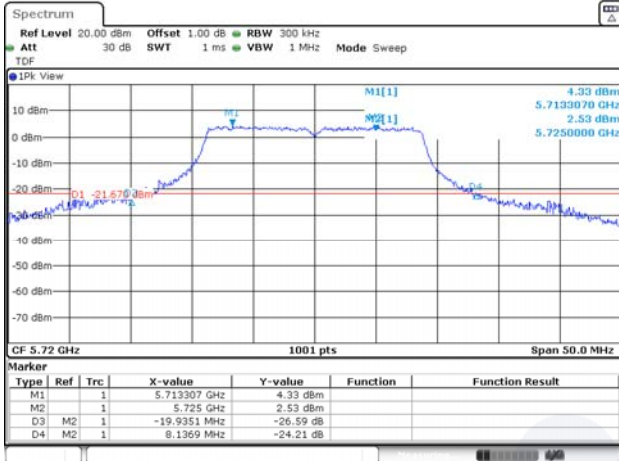
Notes:

- For 99% Bandwidth, measured 99% occupied bandwidth is separated as below.
 - For UNII band 2C = 5 725 MHz – T1 (Measured frequency on the marker table)
 - For UNII band 3 = T2 (Measured frequency on the marker table) – 5 725 MHz

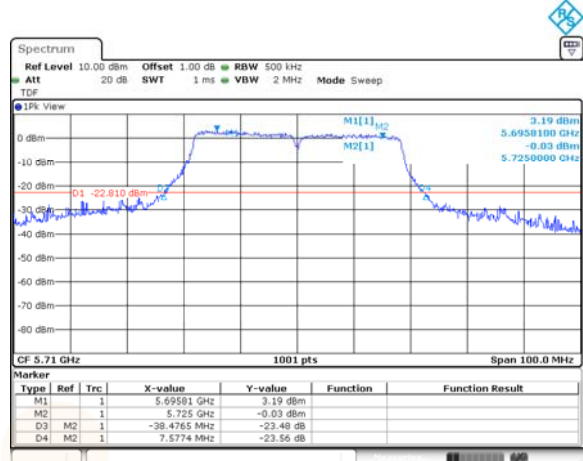
In order to simplify the report, only ac mode test plots are attached.

26dB bandwidth
SISO

802.11ac VHT20



802.11ac VHT40



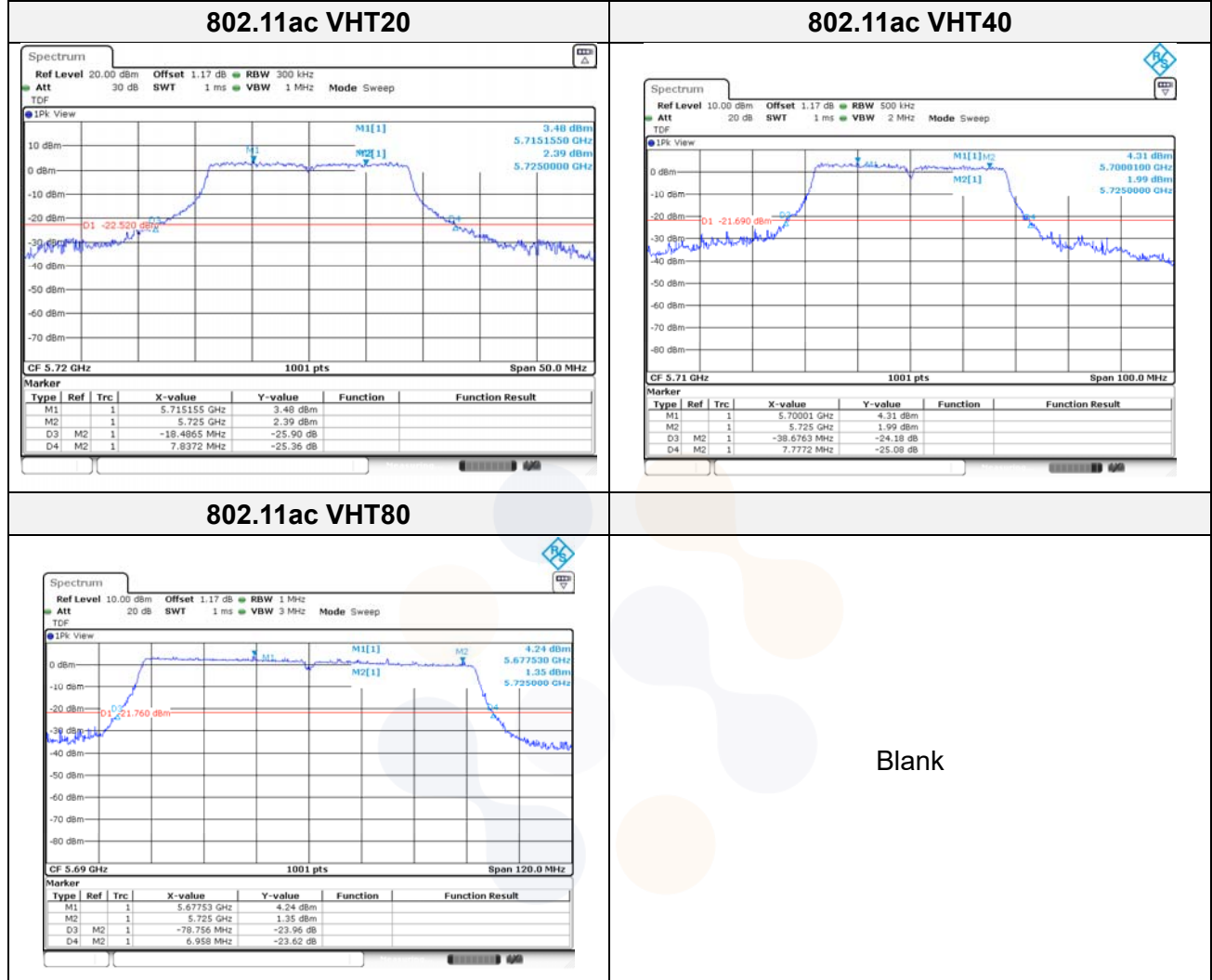
802.11ac VHT80



Blank

In order to simplify the report, only ANT1 ac mode test plots are attached.

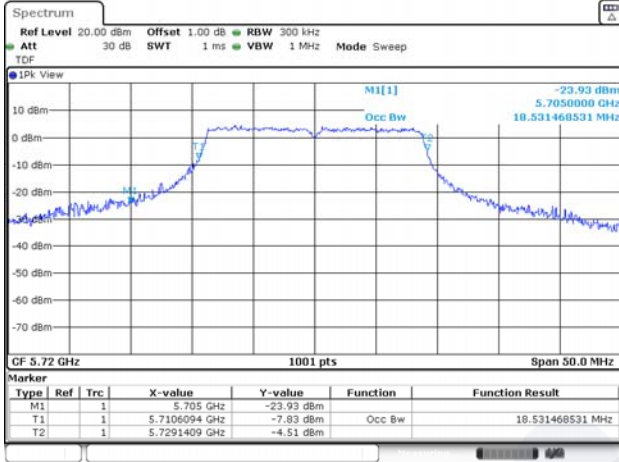
MIMO



In order to simplify the report, only 11ac mode test plots are attached.

99% bandwidth
SISO

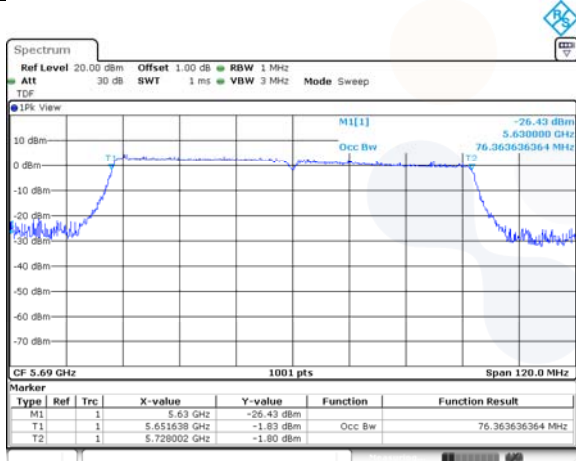
802.11ac VHT20



802.11ac VHT40



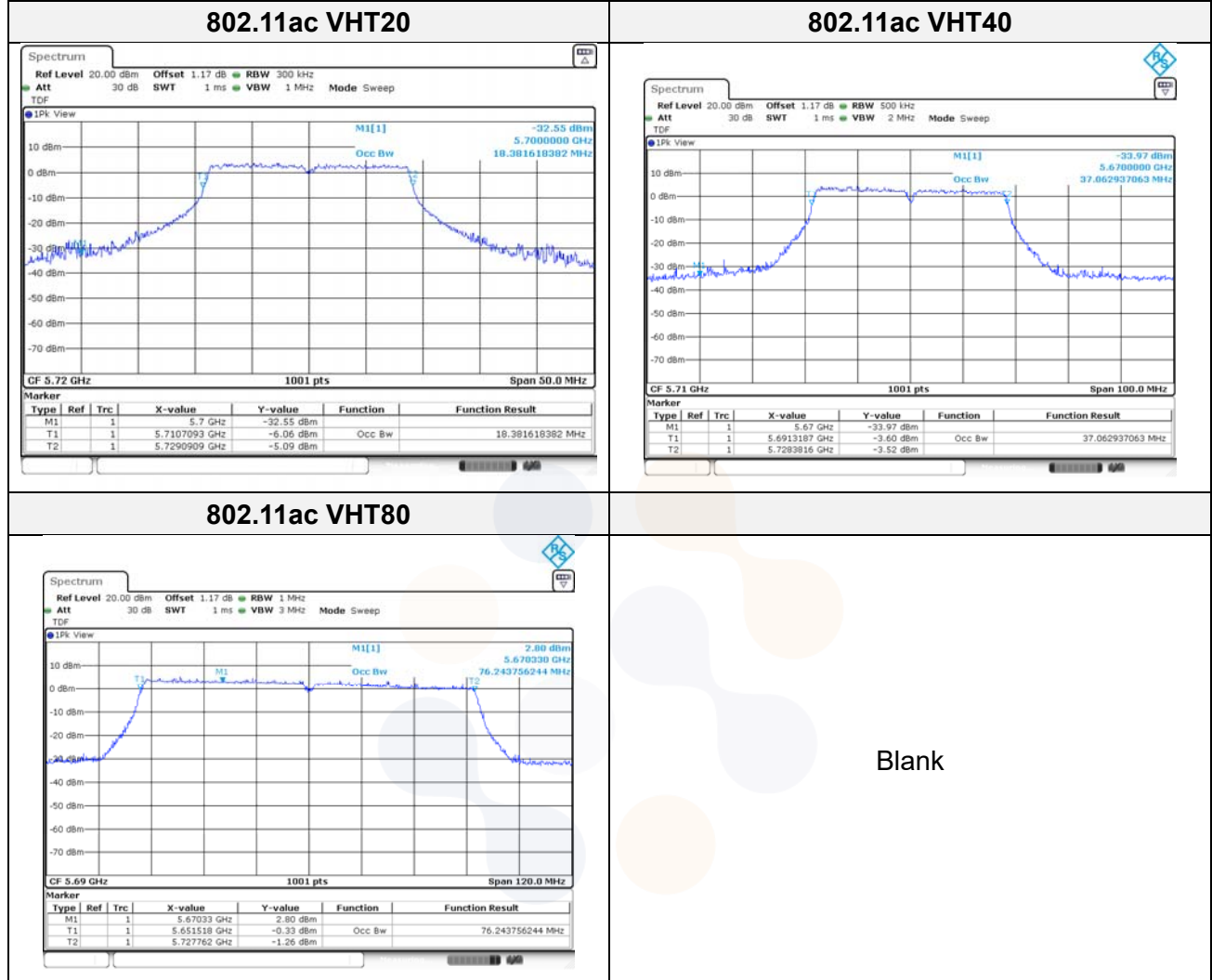
802.11ac VHT80



Blank

In order to simplify the report, only ANT1 ac mode test plots are attached.

MIMO



6dB bandwidth

SISO

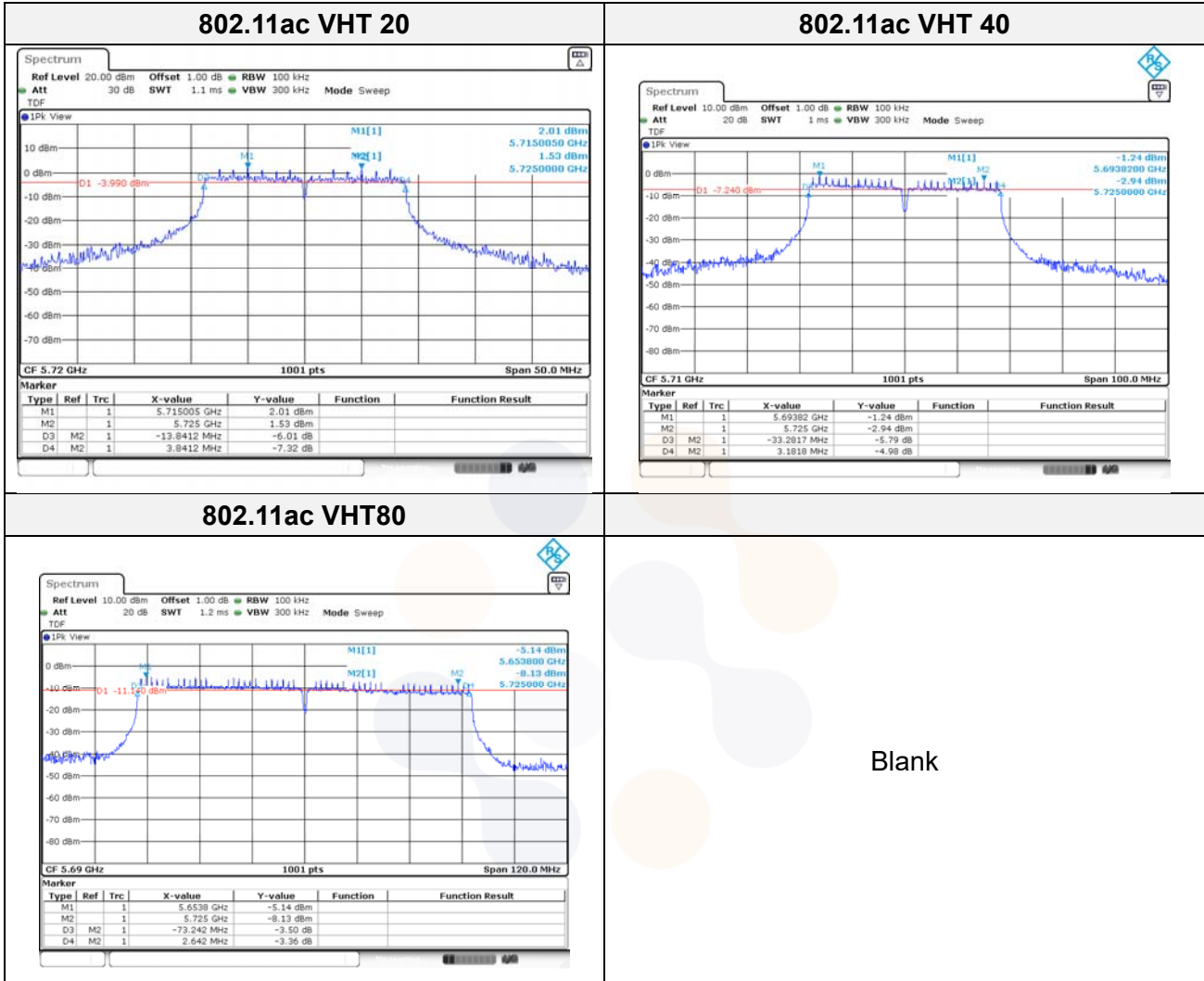
Test mode	Band	Frequency (MHz)	6dB Bandwidth (MHz)		Limit (MHz)
			ANT1	ANT2	
802.11a	UNII-3	5 720	3.24	3.24	0.50
802.11n HT20			3.84	3.84	0.50
802.11ac VHT20			3.84	3.84	0.50
802.11n HT40	UNII-3	5 710	2.98	2.98	0.50
802.11ac VHT40			3.18	3.18	0.50
802.11ac VHT80	UNII-3	5 690	2.64	2.64	0.50

MIMO

Test mode	Band	Frequency (MHz)	6dB Bandwidth (MHz)		Limit (MHz)
			ANT1	ANT2	
802.11a	UNII-3	5 720	3.19	3.24	0.50
802.11n HT20			3.84	3.84	0.50
802.11ac VHT20			3.84	3.84	0.50
802.11n HT40	UNII-3	5 710	3.18	3.18	0.50
802.11ac VHT40			3.18	3.18	0.50
802.11ac VHT80	UNII-3	5 690	2.64	2.64	0.50

In order to simplify the report, only ac mode test plots are attached.

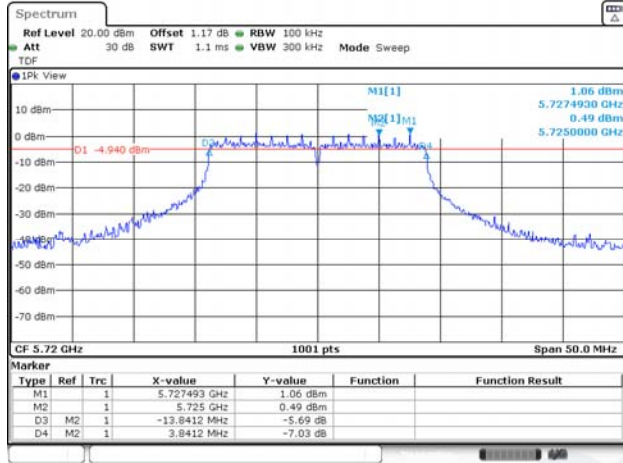
6dB bandwidth
SISO



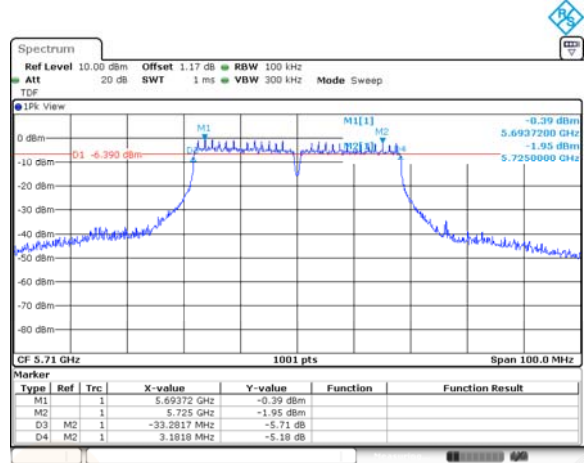
In order to simplify the report, only ANT1 ac mode test plots are attached.

MIMO

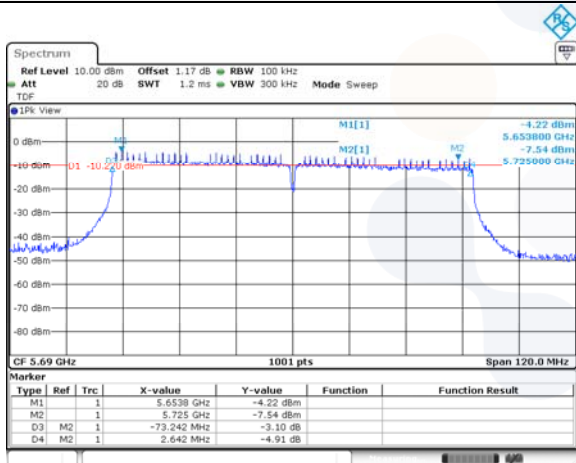
802.11ac VHT 20



802.11ac VHT 40



802.11ac VHT80



Blank

Conducted Output Power

SISO

Test mode	Band	Frequency (MHz)	Measured output power			FCC Limit (dBm)	IC Limit (dBm)
			Reading (dBm)	DCF (dB)	Result (dBm)		
			ANT2				
802.11a	UNII-2C	5 720	13.44	0.29	13.73	23.39	22.35
802.11n HT20			12.11	0.31	12.42	23.91	22.60
802.11ac VHT20			12.04	0.31	12.35	23.98	22.58
802.11a	UNII-3	5 720	7.40	0.29	7.69	30.00	30.00
802.11n HT20			6.37	0.31	6.68	30.00	30.00
802.11ac VHT20			6.38	0.31	6.69	30.00	30.00
802.11n HT40	UNII-2C	5 710	11.22	0.61	11.83	23.98	23.98
802.11ac VHT40			11.27	0.65	11.92	23.98	23.98
802.11n HT40	UNII-3	5 710	-0.27	0.61	0.34	30.00	30.00
802.11ac VHT40			0.12	0.65	0.77	30.00	30.00
802.11ac VHT80	UNII-2C	5 690	9.73	1.14	10.87	23.98	23.98
	UNII-3	5 690	-5.76	1.14	-4.62	30.00	30.00

Note:

1. Conducted Output power(dBm) = Average Reading (dBm) + DCF(dB)

E.I.R.P.

Test mode	Band	Frequency (MHz)	Measured output power			MAX e.i.r.p Limit (dBm)
			Conducted Output Power (dBm)	ANT gain (dB)	MAX e.i.r.p (dBm)	
			ANT2	ANT2	ANT2	
802.11a	UNII-2C	5 720	13.73	-5.00	8.73	28.35
802.11n HT20			12.42		7.42	28.60
802.11ac VHT20			12.35		7.35	28.58
802.11a	UNII-3	5 720	7.69	-4.40	3.29	30.00
802.11n HT20			6.68		2.28	30.00
802.11ac VHT20			6.69		2.29	30.00
802.11n HT40	UNII-2C	5 710	11.83	-5.00	6.83	30.00
802.11ac VHT40			11.92		6.92	30.00
802.11n HT40	UNII-3	5 710	0.34	-4.40	-4.06	30.00
802.11ac VHT40			0.77		-3.63	30.00
802.11ac VHT80	UNII-2C	5 690	10.87	-5.00	5.87	30.00
	UNII-3	5 690	-4.62	-4.40	-9.02	30.00

Notes:

1. E.I.R.P. Calculation: E.I.R.P. (dBm) = Conducted output power (dBm) + Antenna gain (dBi)

MIMO

Test mode	Band	Frequency (MHz)	Measured output power				FCC Limit (dBm)	IC Limit (dBm)
			Reading (dBm)		DCF (dB)	Result (dBm)		
			ANT1	ANT2				
802.11a	UNII-2C	5 720	12.41	13.99	0.27	16.55	23.36	22.30
802.11n HT20			11.03	12.40	0.58	15.36	23.46	22.49
802.11ac VHT20			10.99	12.39	0.58	15.34	23.45	22.49
802.11a	UNII-3	5 720	6.14	7.85	0.27	10.36	30.00	30.00
802.11n HT20			5.33	6.43	0.58	9.51	30.00	30.00
802.11ac VHT20			5.12	6.57	0.58	9.50	30.00	30.00
802.11n HT40	UNII-2C	5 710	11.59	10.82	1.07	15.30	23.98	23.98
802.11ac VHT40			11.73	10.91	0.97	15.32	23.98	23.98
802.11n HT40	UNII-3	5 710	1.07	0.02	1.07	4.66	30.00	30.00
802.11ac VHT40			0.66	0.40	0.97	4.51	30.00	30.00
802.11ac VHT80	UNII-2C	5 690	9.62	8.70	1.82	14.01	23.98	23.98
	UNII-3	5 690	-5.81	-6.43	1.82	-1.28	30.00	30.00

Note:

1. Conducted Output power(dB m) = 10log(10^(ANT 1/10) + 10^(ANT 2/10)) (dB m) + DCF(dB)

E.I.R.P.

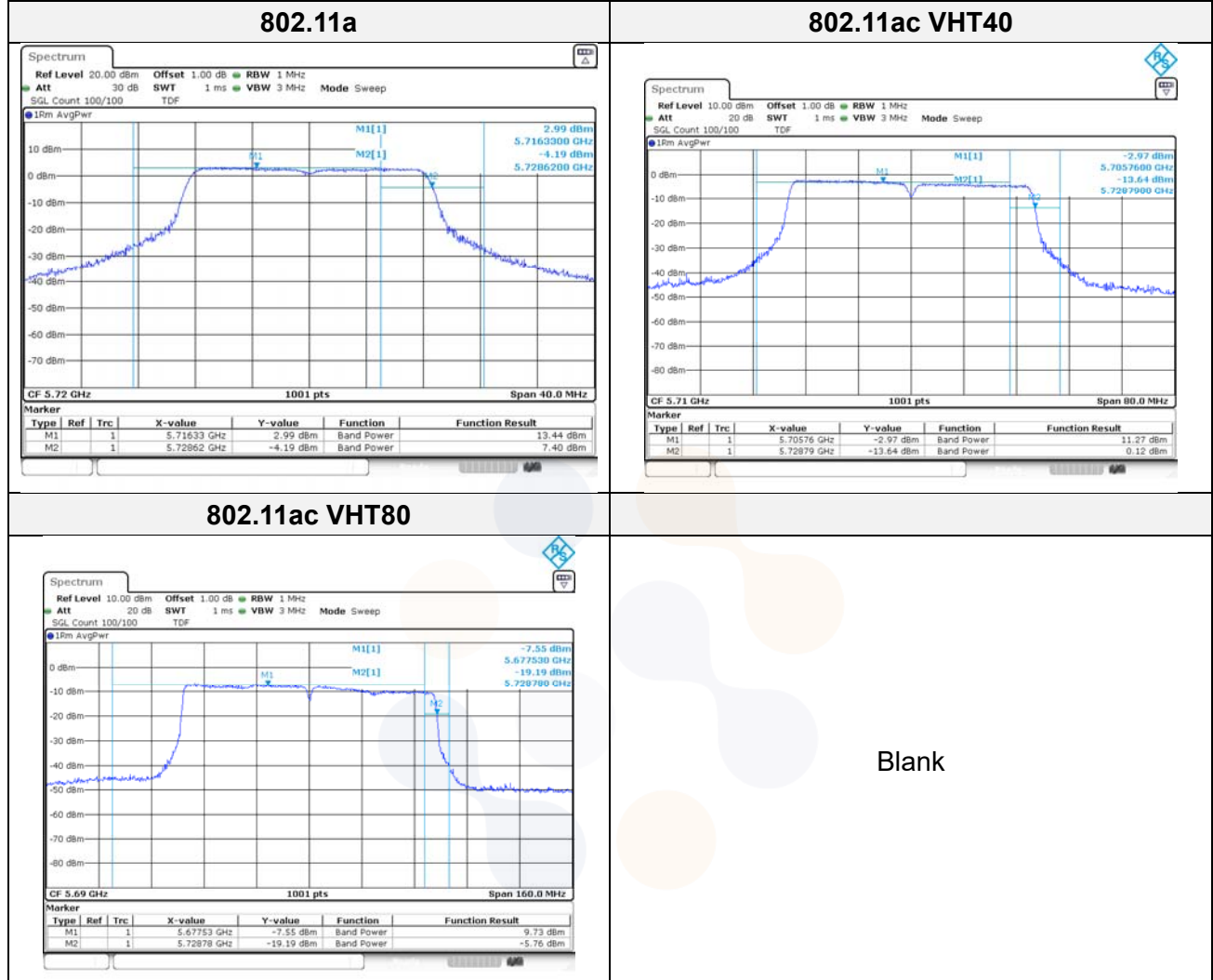
Test mode	Band	Frequency (MHz)	Measured output power			Limit (dBm)
			Conducted output Power (dBm)	ANT gain (dBi)	MAX e.i.r.p (dBm)	
802.11a	UNII-2C	5 720	16.55	-1.54	15.01	28.30
802.11n HT20			-4.55	15.36	10.81	28.49
802.11ac VHT20				15.34	10.79	28.49
802.11a	UNII-3	5 720	10.36	-2.06	8.30	30.00
802.11n HT20			-5.04	9.51	4.47	
802.11ac VHT20				9.50	4.46	
802.11n HT40	UNII-2C	5 710	15.30	-4.55	10.75	30.00
802.11ac VHT40			15.32		10.77	
802.11n HT40	UNII-3	5 710	4.66	-5.04	-0.38	30.00
802.11ac VHT40			4.51		-0.53	
802.11ac VHT80	UNII-2C	5 690	14.01	-4.55	9.46	30.00
	UNII-3	5 690	-1.28	-5.04	-6.32	30.00

Notes:

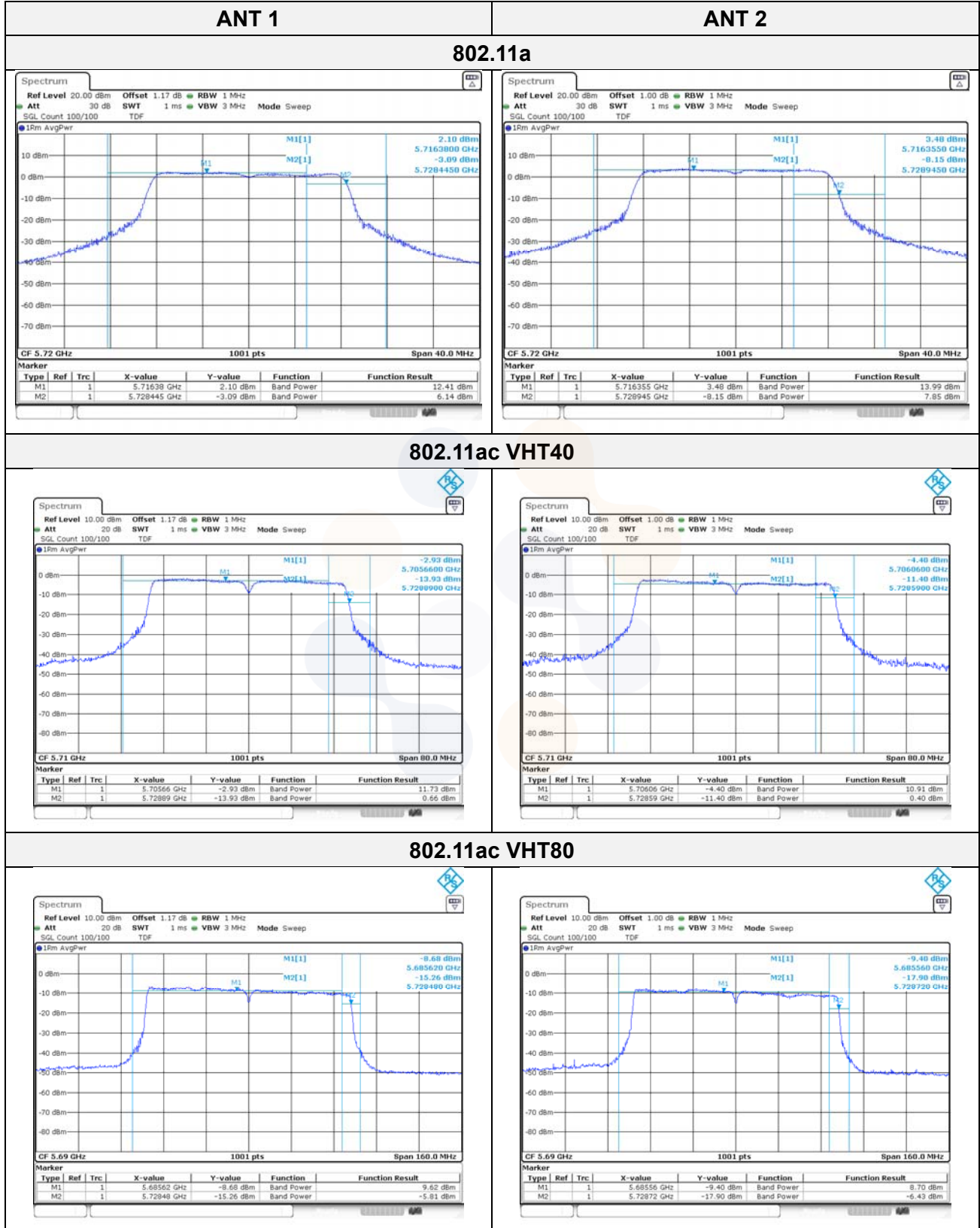
1. E.I.R.P. Calculation: E.I.R.P. (dBm) = Conducted output power (dBm) + Antenna gain (dBi)
2. The max e.i.r.p. limit has reported Ant1 or Ant2, whichever is less

In order to simplify the report, attached plots were the worst case per bandwidth

SISO



MIMO



Power Spectral Density

SISO

Test mode	Band	Frequency (MHz)	Measured PSD (dBm/MHz)	DCF (dB)	Maximum PSD (dB m/MHz)	Limit (dBm/MHz)
			ANT2			
802.11a	UNII-2C	5 720	3.18	0.29	3.47	11.00
802.11n HT20			1.74	0.31	2.05	
802.11ac VHT20			2.02	0.31	2.33	
802.11n HT40		5 710	-1.72	0.61	-1.11	
802.11ac VHT40			-1.60	0.65	-0.95	
802.11ac VHT80			5 690	-5.79	1.14	

Test mode	Band	Frequency (MHz)	Measured PSD (dBm/MHz)	DCF (dB)	Maximum PSD (dB m/MHz)	Limit (dBm/MHz)
			ANT2			
802.11a	UNII-3	5 720	-0.07	0.29	0.22	11.00
802.11n HT20			-1.26	0.31	-0.95	
802.11ac VHT20			-1.36	0.31	-1.05	
802.11n HT40		5 710	-6.46	0.61	-5.85	
802.11ac VHT40			-6.06	0.65	-5.41	
802.11ac VHT80			5 690	-11.57	1.14	

Note:

1. Maximum PSD(dB m/MHz) = Reading (dB m/MHz) + DCF(dB)
2. The Unit of UNII-2C is (dB m / MHz) and Unit of UNII-3 is (dB m / 500kHz)

MIMO

Test mode	Band	Frequency (MHz)	Measured PSD (dBm/MHz)		DCF (dB)	Maximum PSD (dB m/MHz)	Limit (dBm/MHz)
			ANT1	ANT2			
802.11a	UNII-2C	5 720	2.65	3.88	0.27	6.59	11.00
802.11n HT20			0.98	2.09	0.58	5.16	
802.11ac VHT20			1.27	2.56	0.58	5.55	
802.11n HT40		5 710	-0.52	-2.13	1.07	2.83	
802.11ac VHT40			-1.33	-2.76	0.97	1.99	
802.11ac VHT80		5 690	-5.77	-7.47	1.82	-1.71	

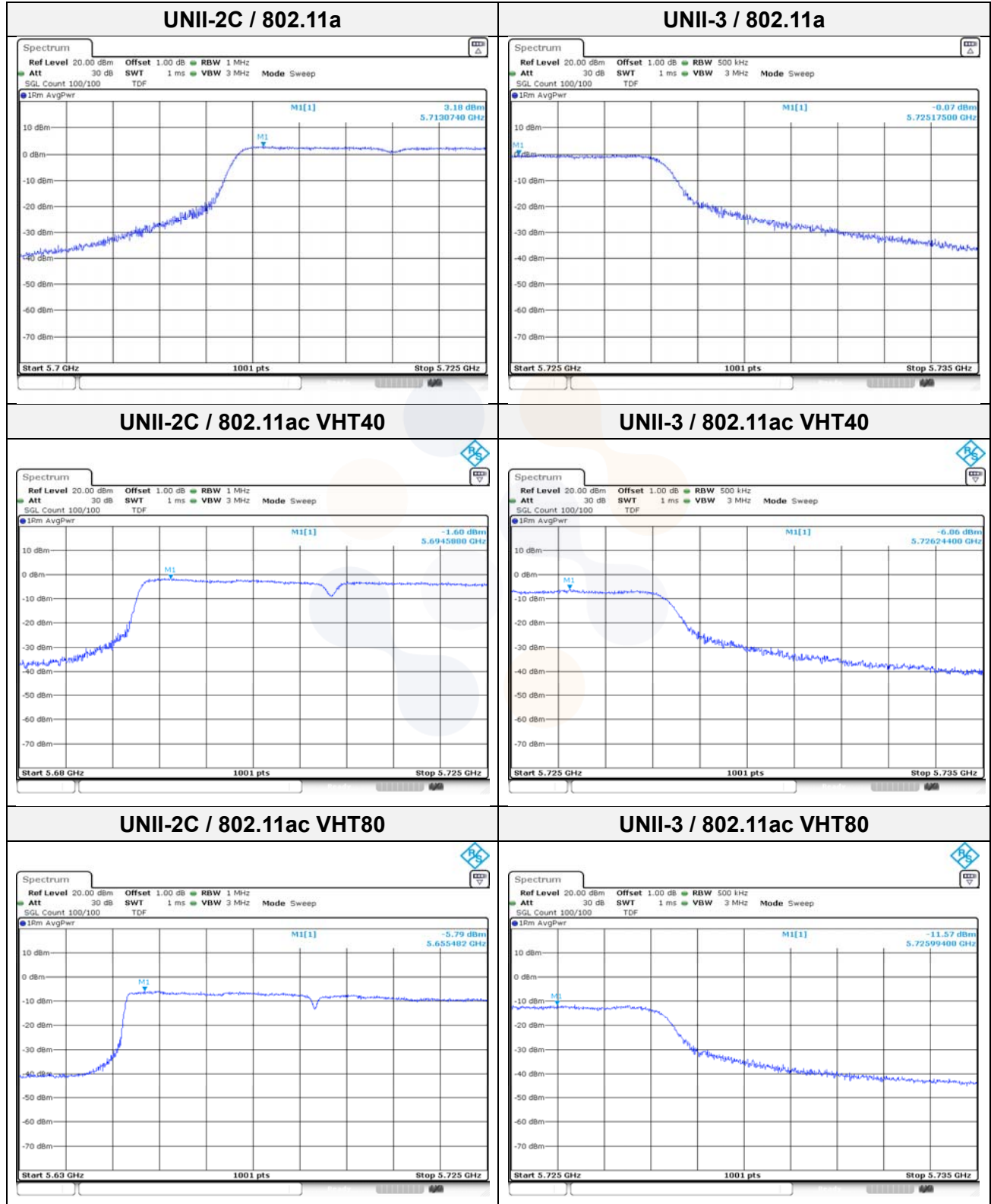
Test mode	Band	Frequency (MHz)	Measured PSD (dBm/MHz)		DCF (dB)	Maximum PSD (dB m/MHz)	Limit (dBm/MHz)
			ANT1	ANT2			
802.11a	UNII-3	5 720	-1.04	0.74	0.27	3.22	11.00
802.11n HT20			-2.40	-1.06	0.58	1.91	
802.11ac VHT20			-2.25	-0.80	0.58	2.13	
802.11n HT40		5 710	-5.19	-6.89	1.07	-1.88	
802.11ac VHT40			-5.83	-7.53	0.97	2.62	
802.11ac VHT80		5 690	-11.61	-12.87	1.82	-7.36	

Note:

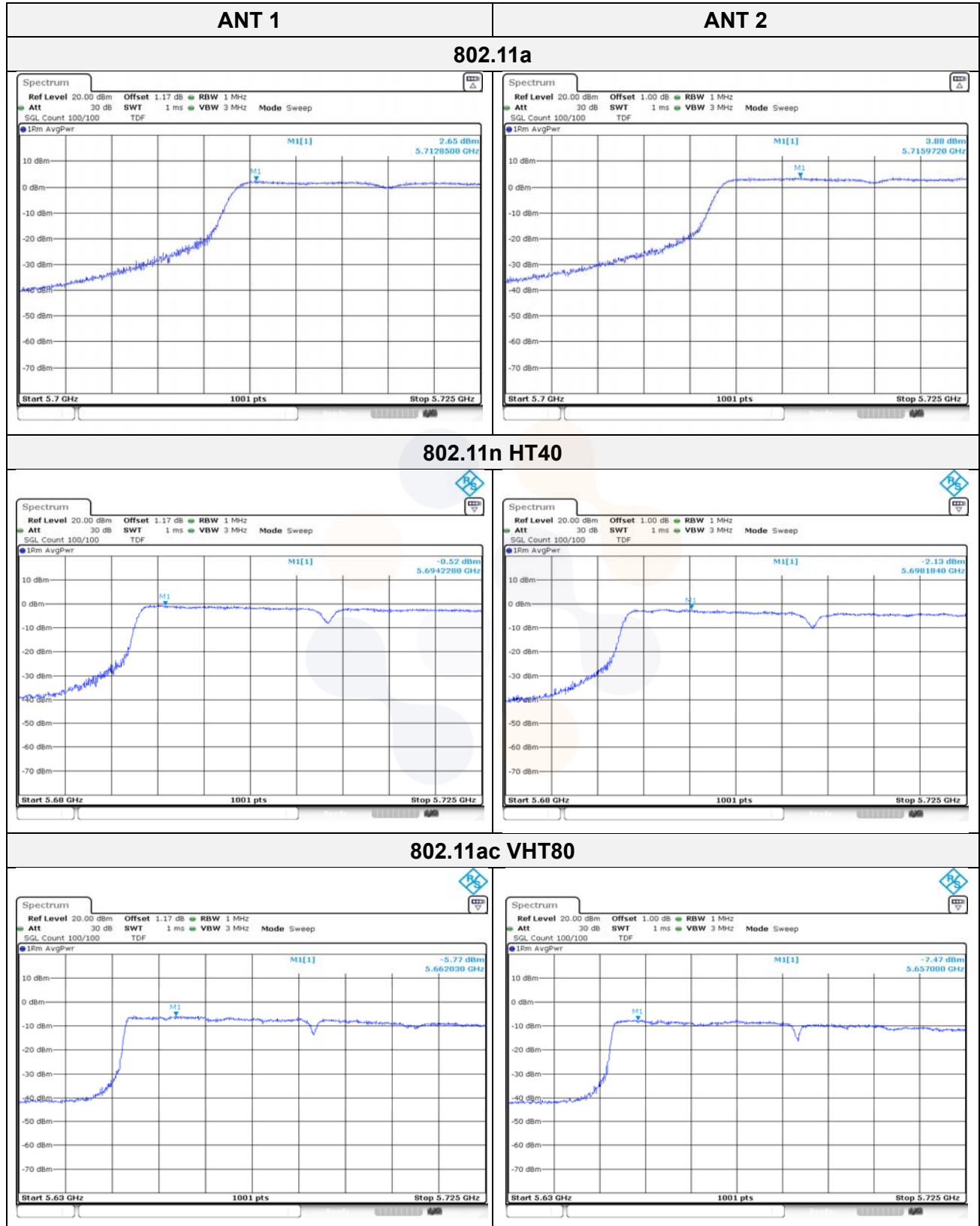
- Maximum PSD(dB m/MHz) = $10\log(10^{(ANT\ 1/10)} + 10^{(ANT\ 2/10)})$ (dB m/MHz) + DCF(dB)
- The Unit of UNII-2C is (dB m / MHz) and Unit of UNII-3 is (dB m / 500 kHz)

In order to simplify the report, attached plots were the worst case per bandwidth

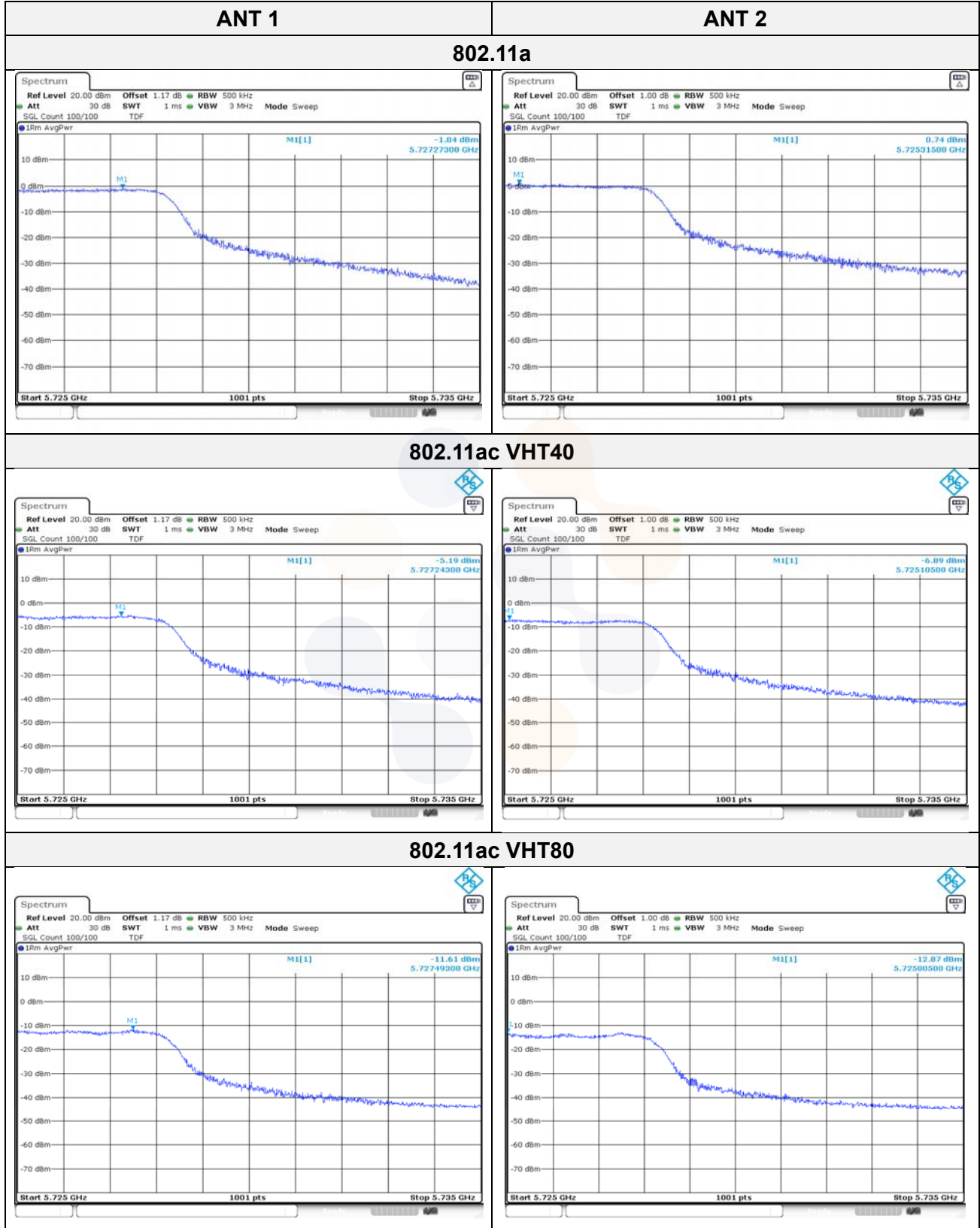
SISO



MIMO UNII-2C



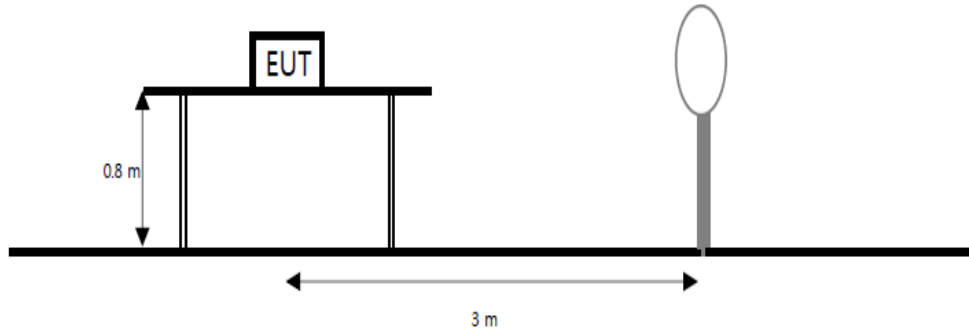
MIMO UNII-3



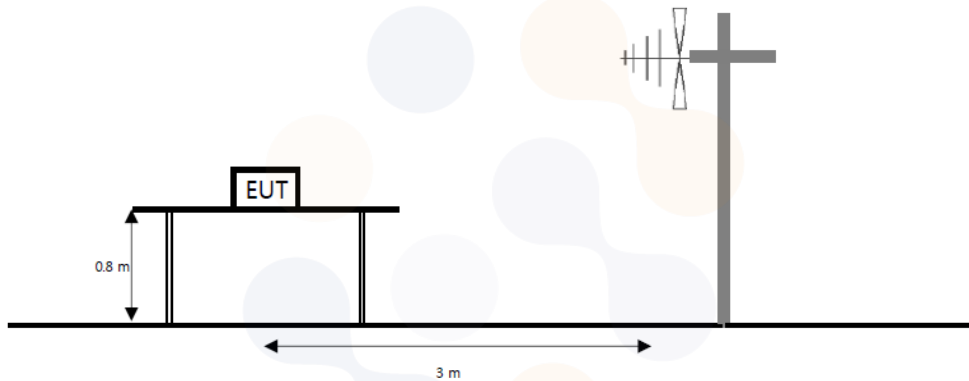
7.6. Spurious Emission, Band Edge and Restricted bands

Test setup

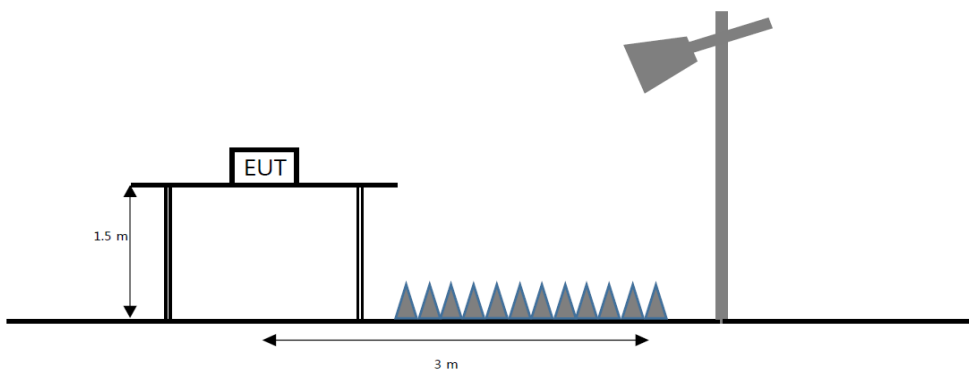
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz Emissions



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz emissions, whichever is lower.



Limit

FCC

According to section 15.209(a) except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:



Frequency (MHz)	Field strength ($\mu\text{V}/\text{m}$)	Measurement distance (m)
0.009 - 0.490	2 400/F(kHz)	300
0.490 - 1.705	24 000/F(kHz)	30
1.705 - 30	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

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

According to section 15.205(a) and (b) only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.009 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.694 75 - 16.695 25	608 - 614	5.35 - 5.46
2.173 5 - 2.190 5	16.804 25 - 16.804 75	960 - 1 240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1 300 - 1 427	8.025 - 8.5
4.177 25 - 4.177 75	37.5 - 38.25	1 435 - 1 626.5	9.0 - 9.2
4.207 25 - 4.207 75	73 - 74.6	1 645.5 - 1 646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1 660 - 1 710	10.6 - 12.7
6.267 75 - 6.268 25	108 - 121.94	1 718.8 - 1 722.2	13.25 - 13.4
6.311 75 - 6.312 25	123 - 138	2 200 - 2 300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2 310 - 2 390	15.35 - 16.2
8.362 - 8.366	156.524 75 - 156.525	2 483.5 - 2 500	17.7 - 21.4
8.376 25 - 8.386 75	25	2 690 - 2 900	22.01 - 23.12
8.414 25 - 8.414 75	156.7 - 156.9	3 260 - 3 267	23.6 - 24.0
12.29 - 12.293	162.012 5 - 167.17	3 332 - 3 339	31.2 - 31.8
12.519 75 - 12.520 25	167.72 - 173.2	3 345.8 - 3 358	36.43 - 36.5
12.576 75 - 12.577 25	240 - 285	3 600 - 4 400	Above 38.6
13.36 - 13.41	322 - 335.4		

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in section 15.209. At frequencies equal to or less than 1 000 MHz, compliance with the limits in section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1 000 MHz, compliance with the emission limits in section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in section 15.35 apply to these measurements.

<p>Eurofins KCTL Co.,Ltd. 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311 www.kctl.co.kr</p>	<p>Report No.: KR23-SRF0254 Page (104) of (213)</p>	<p> </p>
--	---	--

According to section 15.407(b), undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz

For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.



IC

According to RSS-247(5.5), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

According to RSS-Gen(8.9), Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in table 5 and table 6. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter's fundamental emission.

Table 5- General field strength limits at frequencies above 30 MHz

Frequency(MHz)	Field strength ($\mu\text{V}/\text{m}$ at 3 m)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

Table 6- General field strength limits at frequencies below 30 MHz

Frequency	Magnetic field strength (H-Field) ($\mu\text{A}/\text{m}$)	Measurement distance(m)
9 – 490 kHz ¹⁾	6.37/F (F in kHz)	300
490 – 1705 kHz	63.7/F (F in kHz)	30
1.705 - 30 MHz	0.08	30

According to RSS-Gen(8.10), Restricted frequency bands, identified in table 7, are designated primarily for safety-of-life services (distress calling and certain aeronautical activities), certain satellite downlinks, radio astronomy and some government uses. Except where otherwise indicated, the following conditions related to the restricted frequency bands apply:

- (a) The transmit frequency, including fundamental components of modulation, of licence-exempt radio apparatus shall not fall within the restricted frequency bands listed in table 7 except for apparatus compliant with RSS-287, Emergency Position Indicating Radio Beacons (EPIRB), Emergency Locator Transmitters (ELT), Personal Locator Beacons (PLB), and Maritime Survivor Locator Devices (MSLD).
- (b) Unwanted emissions that fall into restricted frequency bands listed in table 7 shall comply with the limits specified in table 5 and table 6.
- (c) Unwanted emissions that do not fall within the restricted frequency bands listed in table 7 shall comply either with the limits specified in the applicable RSS or with those specified in table 5 and table 6.

Table 7- Restricted frequency bands*

MHz	MHz	GHz
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	156.52475 - 156.52525	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.026	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 - 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.677 - 5.683	399.9 - 410	22.01 - 23.12
6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 36.5
8.291 - 8.294	1645.5 - 1646.5	Above 38.6
8.362 - 8.366	1660 - 1710	
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2655 - 2900	
13.36 - 13.41	3260 - 3267	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 - 8500	
108 - 138	--	

* Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

Test procedure

ANSI C63.10-2013 Section 12.7.7.2, 12.7.5, 12.7.6
 KDB 789033 D02 v02r01 – Section G

Test settings

Peak field strength measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in table
3. VBW ≥ (3×RBW)
4. Detector = peak
5. Sweep time = auto
6. Trace mode = max hold
7. Allow sweeps to continue until the trace stabilizes

Table. RBW as a function of frequency

Frequency	RBW
9 kHz to 150 kHz	200 Hz to 300 Hz
0.15 MHz to 30 MHz	9 kHz to 10 kHz
30 MHz to 1 000 MHz	100 kHz to 120 kHz
> 1 000 MHz	1 MHz

Average field strength measurements

Trace averaging with continuous EUT transmission at full power

If the EUT can be configured or modified to transmit continuously ($D \geq 98\%$), then the average emission levels shall be measured using the following method (with EUT transmitting continuously):

1. RBW = 1 MHz (unless otherwise specified).
2. VBW $\geq (3 \times \text{RBW})$.
3. Detector = RMS (power averaging), if $[\text{span} / (\# \text{ of points in sweep})] \leq (\text{RBW} / 2)$. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
4. Averaging type = power (i.e., rms):
 - 1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
 - 2) Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.
5. Sweep time = auto.
6. Perform a trace average of at least 100 traces.

Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction

If continuous transmission of the EUT ($D \geq 98\%$) cannot be achieved and the duty cycle is constant (duty cycle variations are less than $\pm 2\%$), then the following procedure shall be used:

1. The EUT shall be configured to operate at the maximum achievable duty cycle.
2. Measure the duty cycle D of the transmitter output signal as described in 11.6.
3. RBW = 1 MHz (unless otherwise specified).
4. VBW $\geq [3 \times \text{RBW}]$.
5. Detector = RMS (power averaging), if $[\text{span} / (\# \text{ of points in sweep})] \leq (\text{RBW} / 2)$. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
6. Averaging type = power (i.e., rms):
 - 1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
 - 2) Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.
7. Sweep time = auto.
8. Perform a trace average of at least 100 traces.
9. A correction factor shall be added to the measurement results prior to comparing with the emission limit to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:
 - 1) If power averaging (rms) mode was used in step f), then the applicable correction factor is $[10 \log (1 / D)]$, where D is the duty cycle.
 - 2) If linear voltage averaging mode was used in step f), then the applicable correction factor is $[20 \log (1 / D)]$, where D is the duty cycle.
 - 3) If a specific emission is demonstrated to be continuous ($D \geq 98\%$) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

Band edge measurements

Integration Method

For maximum emissions measurements, follow the procedures described in II.G.5., “Procedures for unwanted maximum Emissions Measurements above 1000 MHz. Except for the following changes:

1. Set RBW = 100 kHz
2. Set VBW $\geq 3 \times$ RBW
3. Perform a band-power integration across the 1 MHz bandwidth in which the band edge emission level is to be measured. CAUTION: you must ensure that the spectrum analyzer or EMI receiver is set for peak detection and max-hold for this measurement.

For average emissions measurements, follow the procedures described in II.G.6., “Procedures for average unwanted Emissions Measurements above 1000 MHz. Except for the following changes:

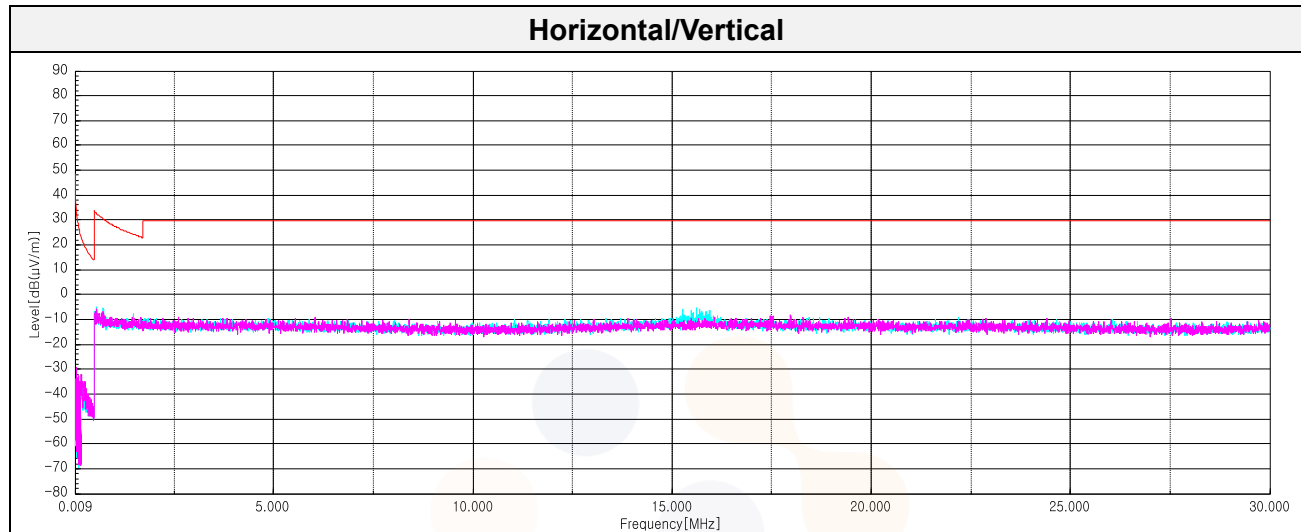
1. Set RBW = 100 kHz
2. Set VBW $\geq 3 \times$ RBW
3. Perform a band-power integration across the 1 MHz bandwidth in which the band edge emission level is to be measured.

Notes:

1. $f < 30$ MHz, extrapolation factor of 40 dB/decade of distance. $F_d = 40 \log(D_m/D_s)$
 $f \geq 30$ MHz, extrapolation factor of 20 dB/decade of distance. $F_d = 20 \log(D_m/D_s)$
Where:
 F_d = Distance factor in dB
 D_m = Measurement distance in meters
 D_s = Specification distance in meters
2. Factors(dB) = Antenna factor(dB/m) + Cable loss(dB) + or Amp. gain(dB) + or F_d (dB)
3. The worst-case emissions are reported however emissions whose levels were not within 20 dB of respective limits were not reported.
4. Average test would be performed if the peak result were greater than the average limit.
5. ¹⁾ means restricted band.
6. Above 1 GHz the worst results between two antenna polarizations (H and V) were documented in the test report.
7. Below 30 MHz frequency range, In order to search for the worst result, all orientations about parallel, perpendicular, and ground-parallel were investigated then reported. when the emission level was higher than 20 dB of the limit, then the following statement shall be made: “No spurious emissions were detected within 20 dB of the limit.”
8. For above 1 GHz pre-scan to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 kHz for peak measurements.
9. The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377Ω. For example, the measurement frequency X kHz resulted in a level of Y dBμV/m, which is equivalent to $Y - 51.5 = Z$ dBμA/m, which has the same margin, W dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit.

Test results (Below 30 MHz) – Worst case: 802.11a 2TX MIMO / UNII-1_5 200 MHz

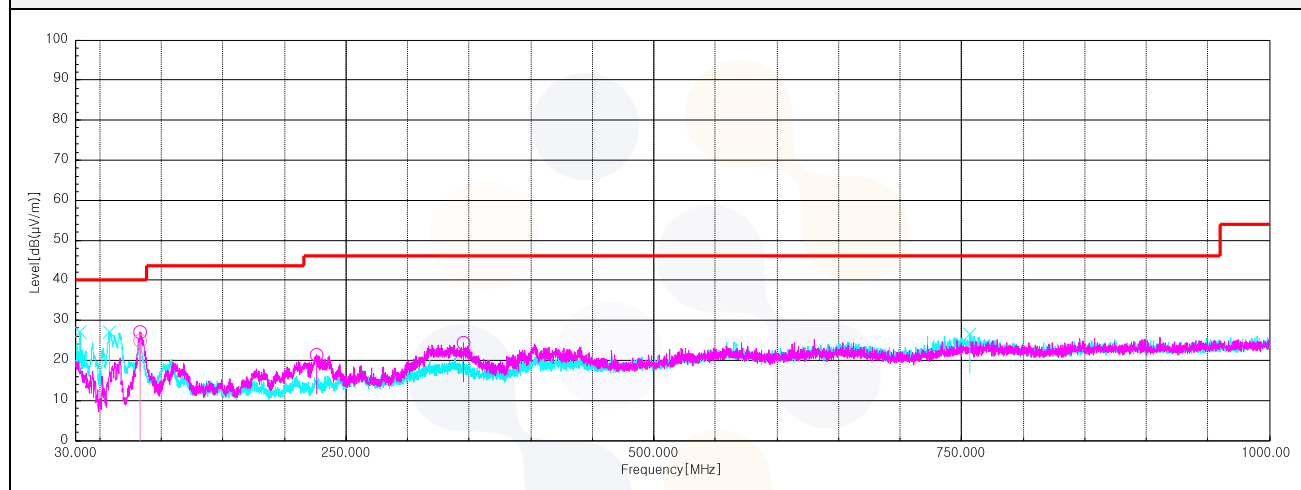
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Quasi peak data								
No spurious emissions were detected within 20 dB of the limit.								



Test results (Below 1 000 MHz) – Worst case: 802.11a 2TX MIMO / UNII-1_5 200 MHz

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Quasi peak data								
34.24	V	27.70	22.50	-32.32	-	17.88	40.00	22.12
58.01	V	45.80	12.20	-32.31	-	25.69	40.00	14.31
82.87	H	43.40	13.46	-32.23	-	24.63	40.00	15.37
226.18	H	31.20	15.59	-31.68	-	15.11	46.00	30.89
345.61	H	24.40	19.92	-31.55	-	12.77	46.00	33.23
756.89	V	24.40	25.60	-30.69	-	19.31	46.00	26.69

Horizontal/Vertical



Test results (Above 1 000 MHz)

UNII-1 SISO

802.11a_Lowest Channel (5 180 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
5 149.19 ¹⁾	H	62.20	32.90	-27.32	-	67.78	74.00	6.22
10 467.88	V	53.80	38.50	-42.64	-	49.66	68.20	18.54
15 515.23 ¹⁾	V	52.70	38.17	-40.27	-	50.60	74.00	23.40
Average Data								
5 149.19 ¹⁾	H	45.52	32.90	-27.32	0.29	51.39	54.00	2.61

802.11a_Middle Channel (5 200 MHz)

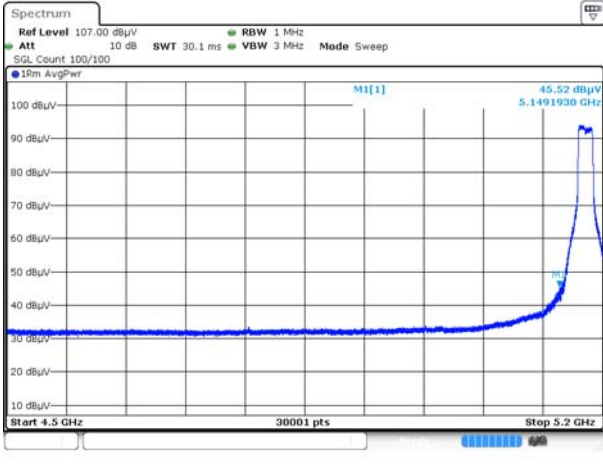
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
10 472.87	H	54.00	38.50	-42.64	-	49.86	68.20	18.34
15 612.09 ¹⁾	V	53.70	37.98	-39.93	-	51.75	74.00	22.25
Average Data								
15 612.09 ¹⁾	V	42.16	37.98	-39.93	0.29	40.50	54.00	13.50

802.11a_Highest Channel (5 240 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
10 413.83	V	54.00	38.50	-42.71	-	49.79	68.20	18.41
15 784.72 ¹⁾	H	52.20	38.10	-39.40	-	50.90	74.00	23.10
Average Data								
No spurious emissions were detected within 20 dB of the limit								

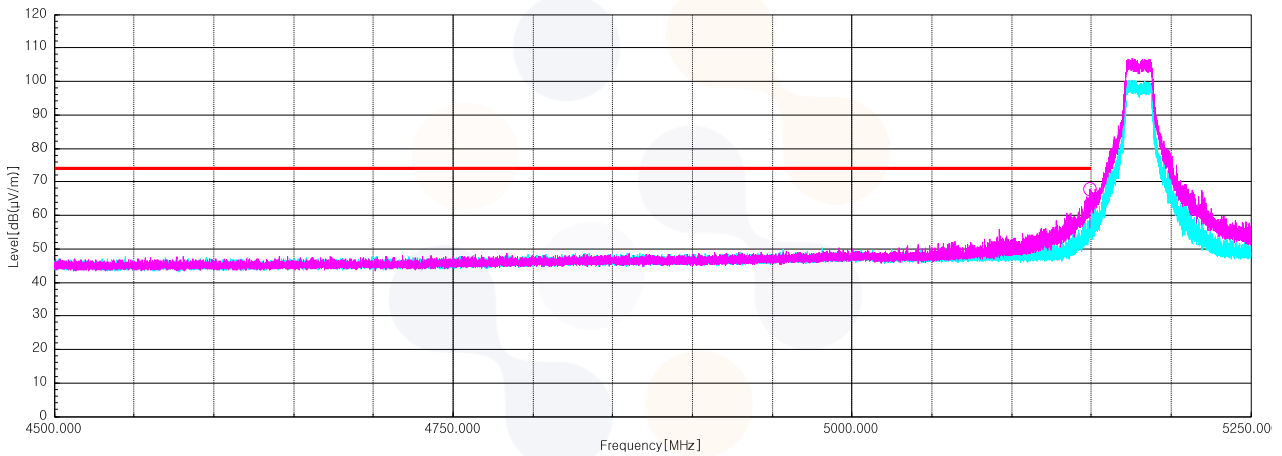
802.11a_Lowest Channel (5 180 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge



802.11n_HT20_Lowest Channel (5 180 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
5 149.61 ¹⁾	H	60.80	32.90	-27.32	-	66.38	74.00	7.62
10 423.42	V	53.90	38.50	-42.70	-	49.70	68.20	18.50
15 595.87 ¹⁾	H	53.10	38.01	-39.98	-	51.13	74.00	22.87
Average Data								
5 149.61 ¹⁾	H	43.07	32.90	-27.32	0.31	48.96	54.00	5.04
15 595.87 ¹⁾	H	42.53	38.01	-39.98	0.31	40.87	54.00	13.13

802.11n_HT20_Middle Channel (5 200 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
10 408.08	H	53.00	38.50	-42.72	-	48.78	68.20	19.42
15 656.46 ¹⁾	H	53.00	38.11	-39.77	-	51.34	74.00	22.66
Average Data								
15 656.46 ¹⁾	H	42.11	38.11	-39.77	0.31	40.76	54.00	13.24

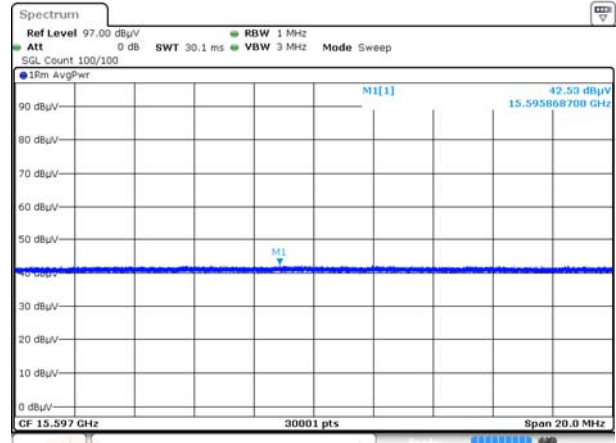
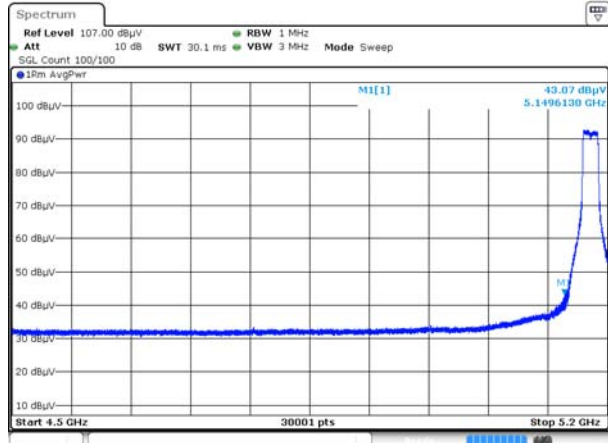
802.11n_HT20_Highest Channel (5 240 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
10 496.63	H	52.80	38.50	-42.60	-	48.70	68.20	19.50
15 795.45 ¹⁾	V	51.80	38.10	-39.39	-	50.51	74.00	23.49
Average Data								
No spurious emissions were detected within 20 dB of the limit								

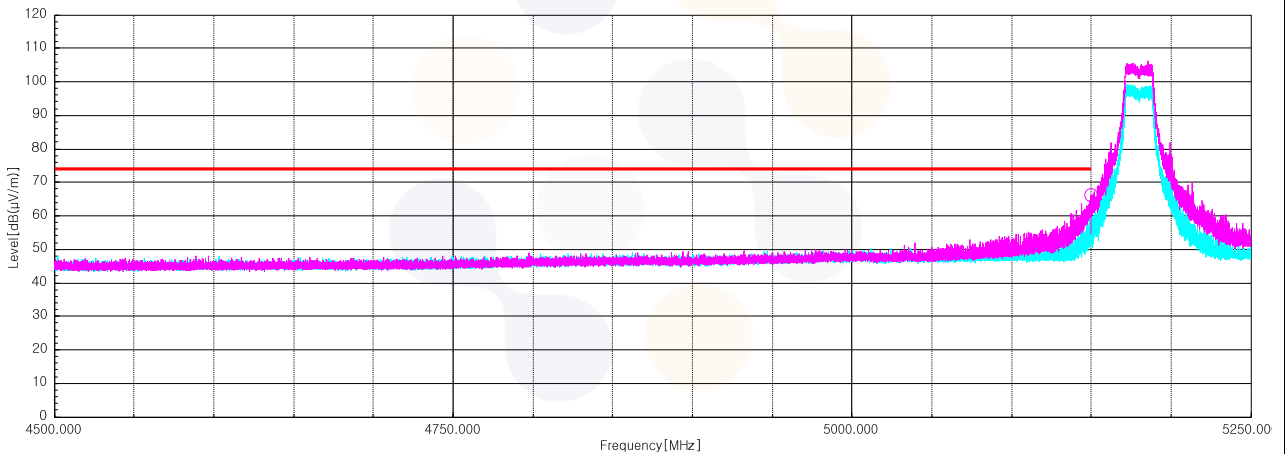
In order to simplify the report, attached plots were only the lowest margin condition

802.11n_HT20_Lowest Channel (5 180 MHz)

Average data



Horizontal/Vertical for Band-edge



802.11n_HT40_Lowest Channel (5 190 MHz)

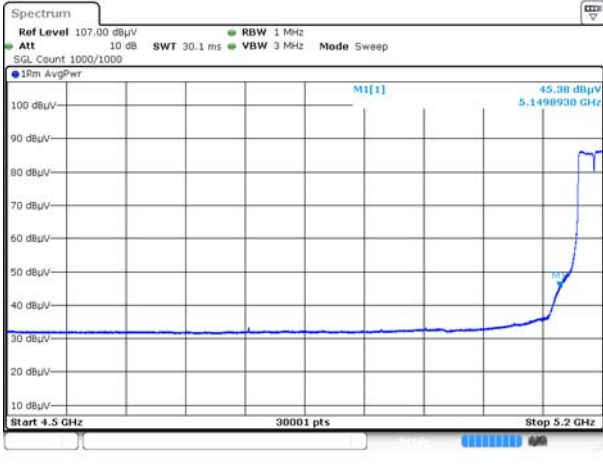
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB($\mu V/m$))	(dB($\mu V/m$))	(dB)
Peak data								
5 149.89 ¹⁾	H	64.20	32.90	-27.32	-	69.78	74.00	4.22
10 478.62	V	53.30	38.50	-42.63	-	49.17	68.20	19.03
15 550.88 ¹⁾	H	52.50	38.10	-40.14	-	50.46	74.00	23.54
Average Data								
5 149.89 ¹⁾	H	45.38	32.90	-27.32	0.61	51.57	54.00	2.43

802.11n_HT40_Highest Channel (5 230 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB($\mu V/m$))	(dB($\mu V/m$))	(dB)
Peak data								
10 433.00	H	53.40	38.50	-42.69	-	49.21	68.20	18.99
15 685.43 ¹⁾	V	51.70	38.17	-39.67	-	50.20	74.00	23.80
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

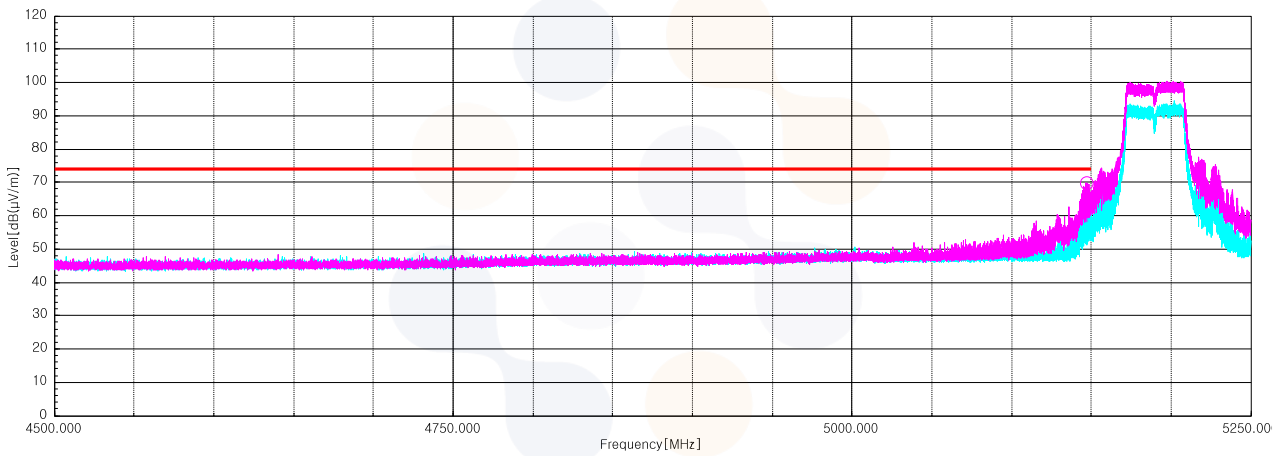
802.11n_HT40_Lowest Channel (5 190 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge



802.11ac_VHT20_Lowest Channel (5 180 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
5 149.78 ¹⁾	H	59.30	32.90	-27.32	-	64.88	74.00	9.12
10 307.65	V	53.20	38.58	-42.85	-	48.93	68.20	19.27
15 571.58 ¹⁾	H	52.10	38.06	-40.07	-	50.09	74.00	23.91
Average Data								
5 149.78 ¹⁾	H	42.93	32.90	-27.32	0.31	48.82	54.00	5.18

802.11ac_VHT20_Middle Channel (5 200 MHz)

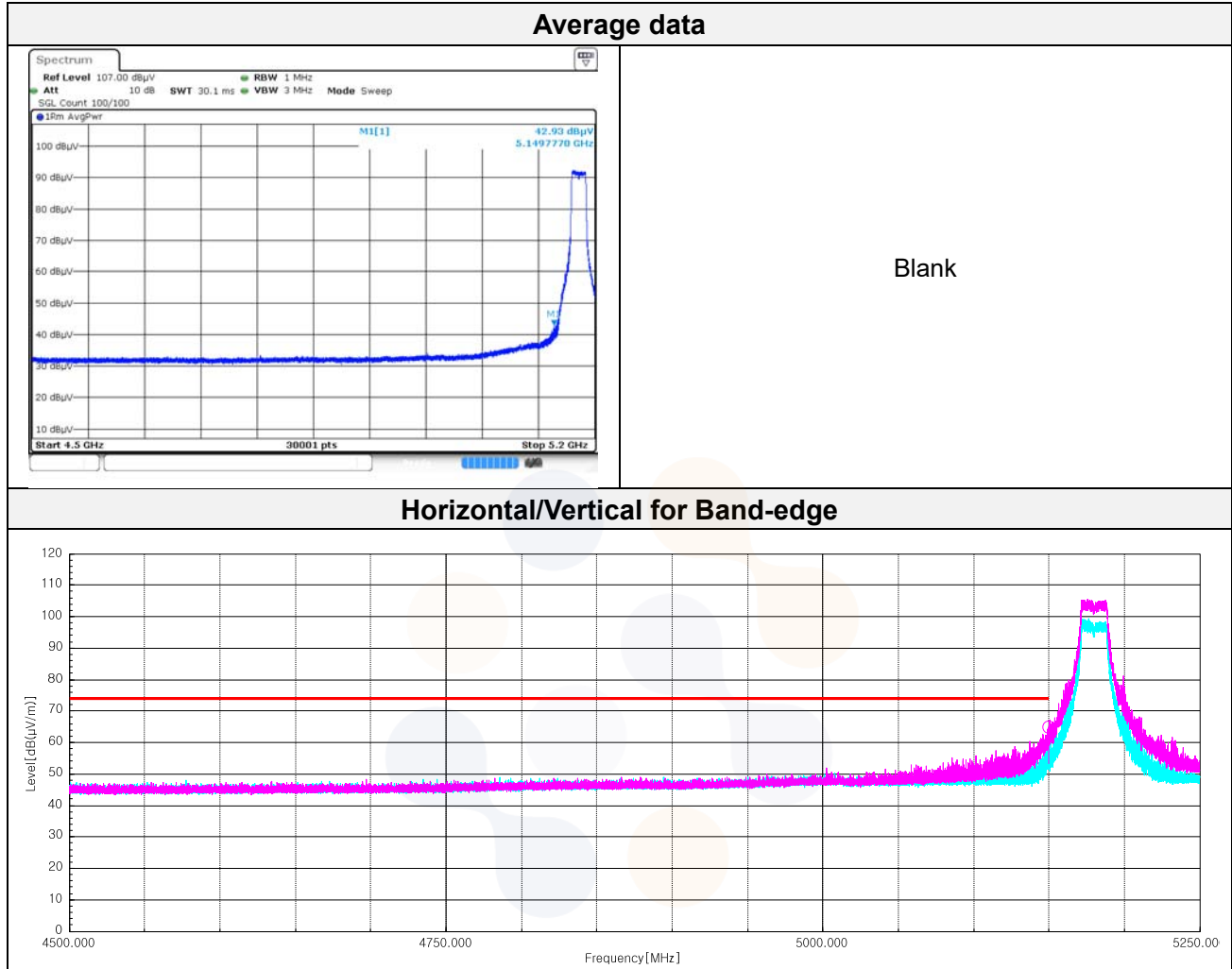
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
10 421.12	H	52.90	38.50	-42.70	-	48.70	68.20	19.50
15 576.57 ¹⁾	V	52.30	38.05	-40.05	-	50.30	74.00	23.70
Average Data								
No spurious emissions were detected within 20 dB of the limit								

802.11ac_VHT20_Highest Channel (5 240 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
10 524.62	V	53.40	38.50	-42.55	-	49.35	68.20	18.85
15 769.72 ¹⁾	H	52.90	38.10	-39.42	-	51.58	74.00	22.42
Average Data								
15 769.72 ¹⁾	H	42.22	38.10	-39.42	0.31	41.21	54.00	12.79

In order to simplify the report, attached plots were only the lowest margin condition

802.11ac_VHT20_Lowest Channel (5 180 MHz)



802.11ac_VHT40_Lowest Channel (5 190 MHz)

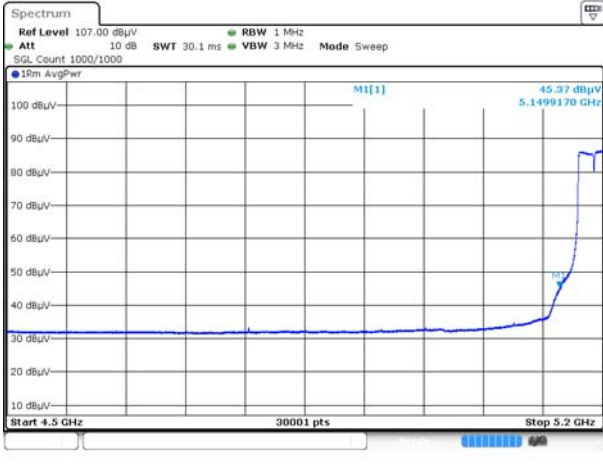
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB($\mu V/m$))	(dB($\mu V/m$))	(dB)
Peak data								
5 149.92 ¹⁾	H	63.50	32.90	-27.32	-	69.08	74.00	4.92
10 360.93	H	53.20	38.48	-42.78	-	48.90	68.20	19.30
15 578.10 ¹⁾	V	51.70	38.04	-40.05	-	49.69	74.00	24.31
Average Data								
5 149.92 ¹⁾	H	45.37	32.90	-27.32	0.65	51.60	54.00	2.40

802.11ac_VHT40_Highest Channel (5 240 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB($\mu V/m$))	(dB($\mu V/m$))	(dB)
Peak data								
10 440.67	V	53.50	38.50	-42.68	-	49.32	68.20	18.88
15 645.18 ¹⁾	V	52.80	37.91	-39.81	-	50.90	74.00	23.10
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

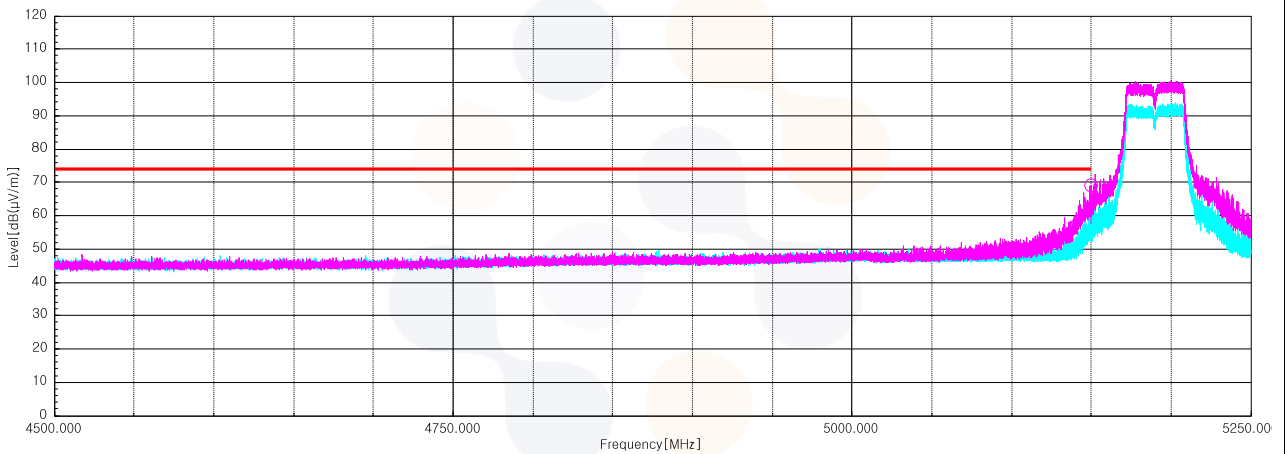
802.11ac_VHT40_Lowest Channel (5 190 MHz)

Average data



Blank

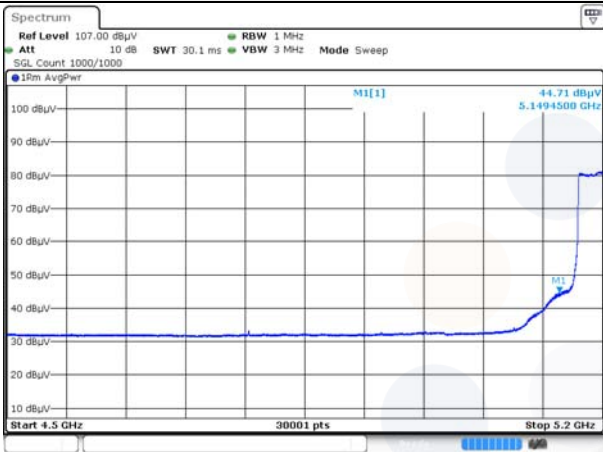
Horizontal/Vertical for Band-edge



802.11ac_VHT80_Middle Channel (5 210 MHz)

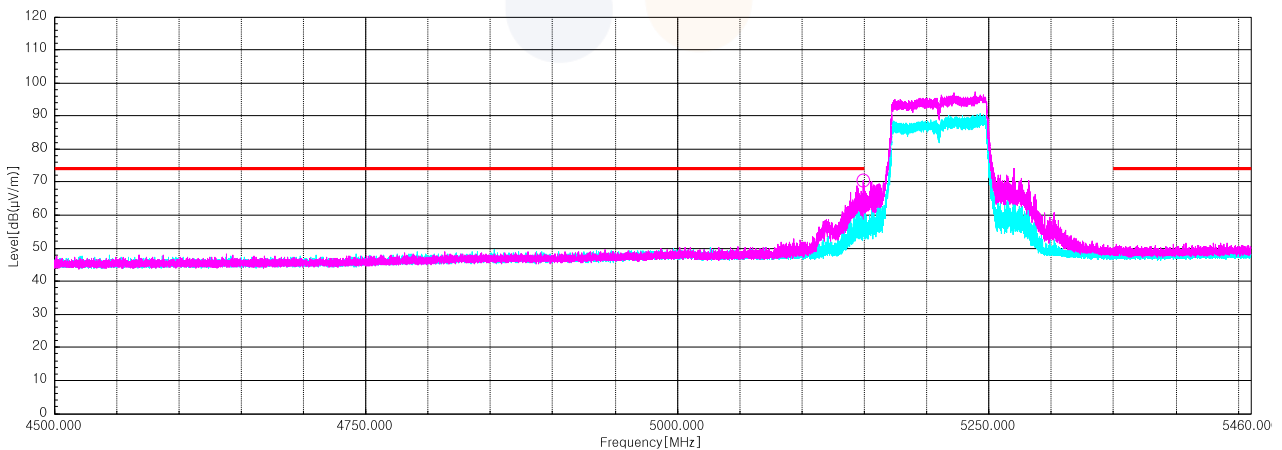
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
5 149.45 ¹⁾	H	64.90	32.90	-27.32	-	70.48	74.00	3.52
10 460.22	V	53.90	38.50	-42.65	-	49.75	68.20	18.45
15 528.27 ¹⁾	V	52.10	38.14	-40.22	-	50.02	74.00	23.98
Average Data								
5 149.45 ¹⁾	H	44.71	32.90	-27.32	1.14	51.43	54.00	2.57

Average data



Blank

Horizontal/Vertical for Band-edge



UNII-1 2TX MIMO

802.11a_Lowest Channel (5 180 MHz)

Frequency (MHz)	Pol. (V/H)	Reading (dB(μV))	Ant. Factor (dB)	Amp.+Cable (dB)	DCF (dB)	Result (dB(μV/m))	Limit (dB(μV/m))	Margin (dB)
Peak data								
5 149.99 ¹⁾	H	62.70	32.90	-27.32	-	68.28	74.00	5.72
10 301.52	H	53.90	38.60	-42.86	-	49.64	68.20	18.56
15 460.42 ¹⁾	V	52.10	38.28	-40.28	-	50.10	74.00	23.90
Average Data								
5 149.99 ¹⁾	H	45.82	32.90	-27.32	0.27	51.67	54.00	2.33

802.11a_Middle Channel (5 200 MHz)

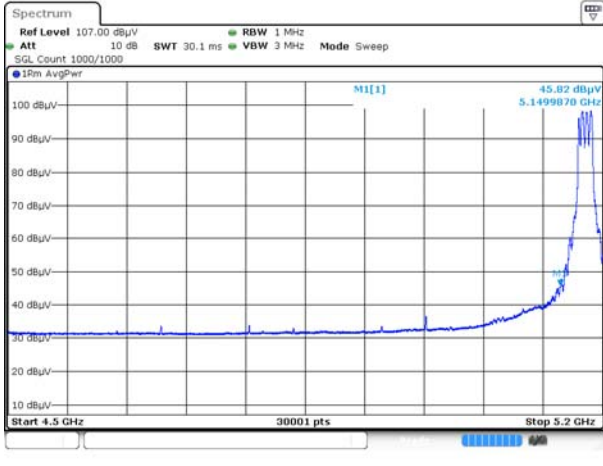
Frequency (MHz)	Pol. (V/H)	Reading (dB(μV))	Ant. Factor (dB)	Amp.+Cable (dB)	DCF (dB)	Result (dB(μV/m))	Limit (dB(μV/m))	Margin (dB)
Peak data								
10 410.77	H	52.40	38.50	-42.72	-	48.18	68.20	20.02
15 683.13 ¹⁾	H	52.00	38.17	-39.68	-	50.49	74.00	23.51
Average Data								
No spurious emissions were detected within 20 dB of the limit								

802.11a_Highest Channel (5 240 MHz)

Frequency (MHz)	Pol. (V/H)	Reading (dB(μV))	Ant. Factor (dB)	Amp.+Cable (dB)	DCF (dB)	Result (dB(μV/m))	Limit (dB(μV/m))	Margin (dB)
Peak data								
10 504.68	V	53.10	38.50	-42.59	-	49.01	68.20	19.19
15 794.30 ¹⁾	H	51.90	38.10	-39.39	-	50.61	74.00	23.39
Average Data								
No spurious emissions were detected within 20 dB of the limit								

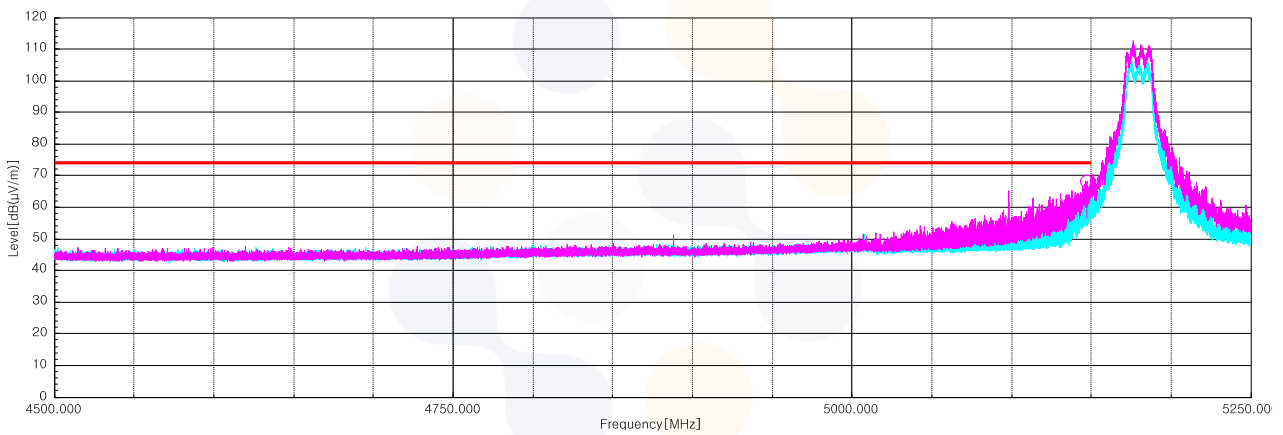
802.11a_Lowest Channel (5 180 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge



802.11n_HT20_Lowest Channel (5 180 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
5 148.40 ¹⁾	H	60.00	32.90	-27.33	-	65.57	74.00	8.43
10 313.78	V	53.40	38.57	-42.85	-	49.12	68.20	19.08
15 474.98 ¹⁾	V	52.90	38.25	-40.29	-	50.86	74.00	23.14
Average Data								
5 149.19 ¹⁾	H	44.93	32.90	-27.32	0.58	51.09	54.00	2.91

802.11n_HT20_Middle Channel (5 200 MHz)

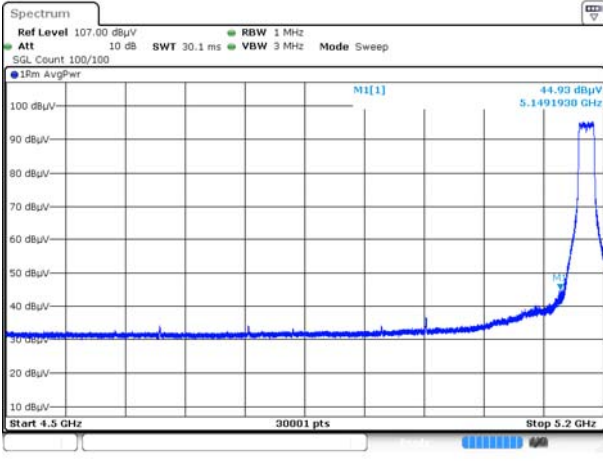
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
10 468.27	V	54.40	38.50	-42.64	-	50.26	68.20	17.94
15 642.88 ¹⁾	V	51.60	37.91	-39.82	-	49.69	74.00	24.31
Average Data								
No spurious emissions were detected within 20 dB of the limit								

802.11n_HT20_Highest Channel (5 240 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
10 532.28	H	53.00	38.50	-42.54	-	48.96	68.20	19.24
15 749.83 ¹⁾	H	52.00	38.10	-39.44	-	50.66	74.00	23.34
Average Data								
No spurious emissions were detected within 20 dB of the limit								

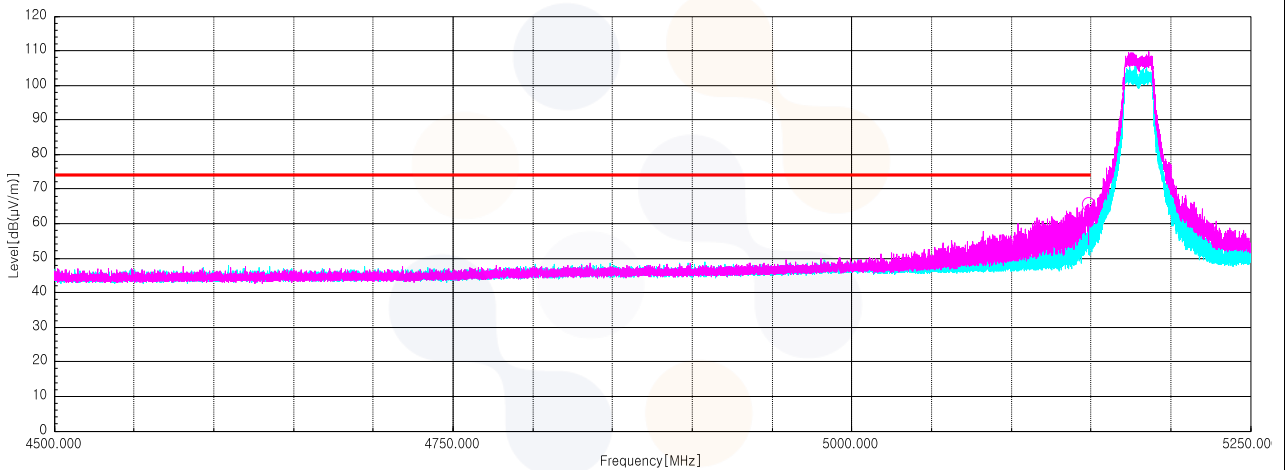
802.11n_HT20_Lowest Channel (5 180 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge



802.11n_HT40_Lowest Channel (5 190 MHz)

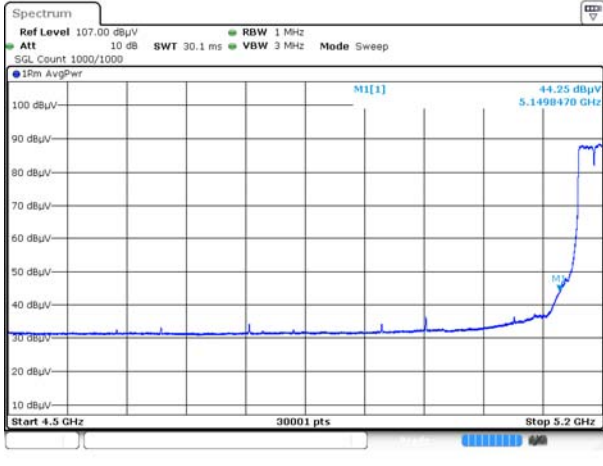
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB($\mu V/m$))	(dB($\mu V/m$))	(dB)
Peak data								
5 149.85 ¹⁾	H	58.00	32.90	-27.32	-	63.58	74.00	10.42
10 276.22	H	53.60	38.70	-42.90	-	49.40	68.20	18.80
15 498.37 ¹⁾	H	52.50	38.20	-40.32	-	50.38	74.00	23.62
Average Data								
5 149.85 ¹⁾	H	44.25	32.90	-27.32	1.07	50.90	54.00	3.10

802.11n_HT40_Highest Channel (5 230 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB($\mu V/m$))	(dB($\mu V/m$))	(dB)
Peak data								
10 488.58	H	54.10	38.50	-42.62	-	49.98	68.20	18.22
15 747.15 ¹⁾	H	51.80	38.10	-39.45	-	50.45	74.00	23.55
Average Data								
No spurious emissions were detected within 20 dB of the limit								

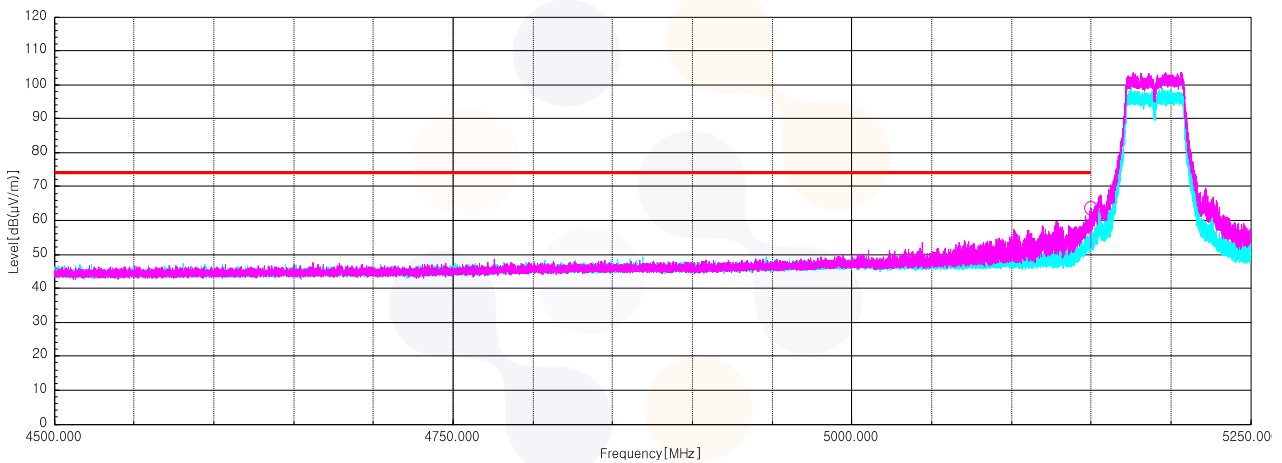
802.11n_HT40_Lowest Channel (5 190 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge



802.11ac_VHT20_Lowest Channel (5 180 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 149.68 ¹⁾	H	60.60	32.90	-27.32	-	66.18	74.00	7.82
10 313.40	H	52.80	38.57	-42.85	-	48.52	68.20	19.68
15 551.65 ¹⁾	V	52.40	38.10	-40.14	-	50.36	74.00	23.64
Average Data								
5 149.68 ¹⁾	H	44.91	32.90	-27.32	0.58	51.07	54.00	2.93

802.11ac_VHT20_Middle Channel (5 200 MHz)

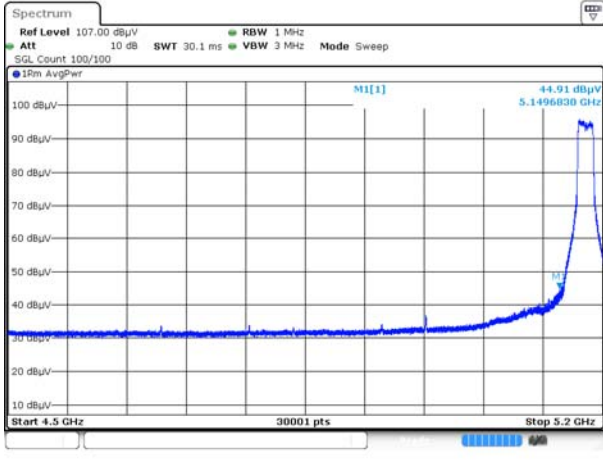
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 424.95	H	53.10	38.50	-42.70	-	48.90	68.20	19.30
15 536.70 ¹⁾	H	52.20	38.13	-40.19	-	50.14	74.00	23.86
Average Data								
No spurious emissions were detected within 20 dB of the limit								

802.11ac_VHT20_Highest Channel (5 240 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 566.02	H	53.40	38.63	-42.48	-	49.55	68.20	18.65
15 824.20 ¹⁾	V	52.00	38.25	-39.35	-	50.90	74.00	23.10
Average Data								
No spurious emissions were detected within 20 dB of the limit								

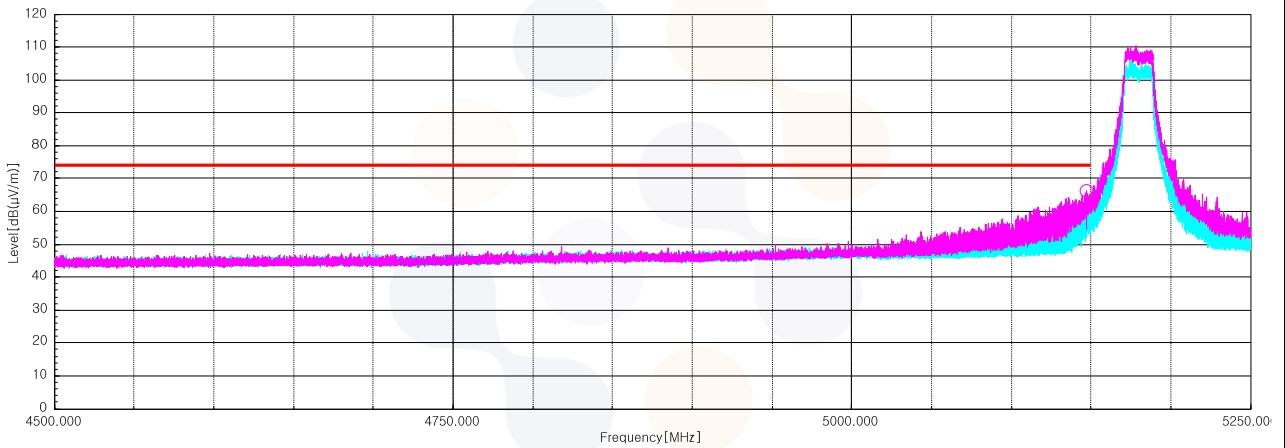
802.11ac_VHT20_Lowest Channel (5 180 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge



802.11ac_VHT40_Lowest Channel (5 190 MHz)

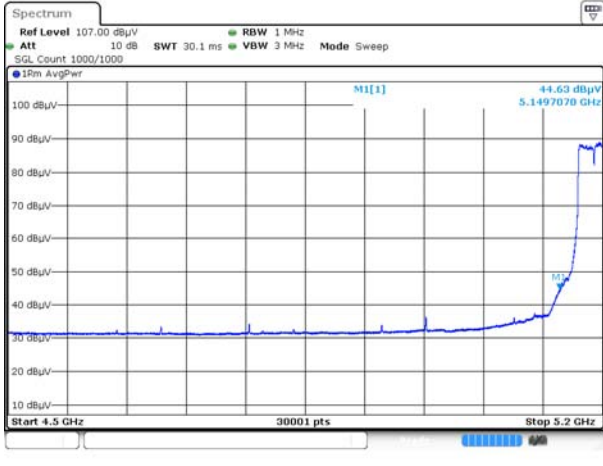
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB($\mu V/m$))	(dB($\mu V/m$))	(dB)
Peak data								
5 149.71 ¹⁾	H	59.60	32.90	-27.32	-	65.18	74.00	8.82
10 354.80	V	53.60	38.49	-42.79	-	49.30	68.20	18.90
15 589.22 ¹⁾	H	52.00	38.02	-40.01	-	50.01	74.00	23.99
Average Data								
5 149.71 ¹⁾	H	44.63	32.90	-27.32	0.97	51.18	54.00	2.82

802.11ac_VHT40_Highest Channel (5 230 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB($\mu V/m$))	(dB($\mu V/m$))	(dB)
Peak data								
10 511.20	V	52.90	38.50	-42.58	-	48.82	68.20	19.38
15 684.28 ¹⁾	V	52.30	38.17	-39.67	-	50.80	74.00	23.20
Average Data								
No spurious emissions were detected within 20 dB of the limit								

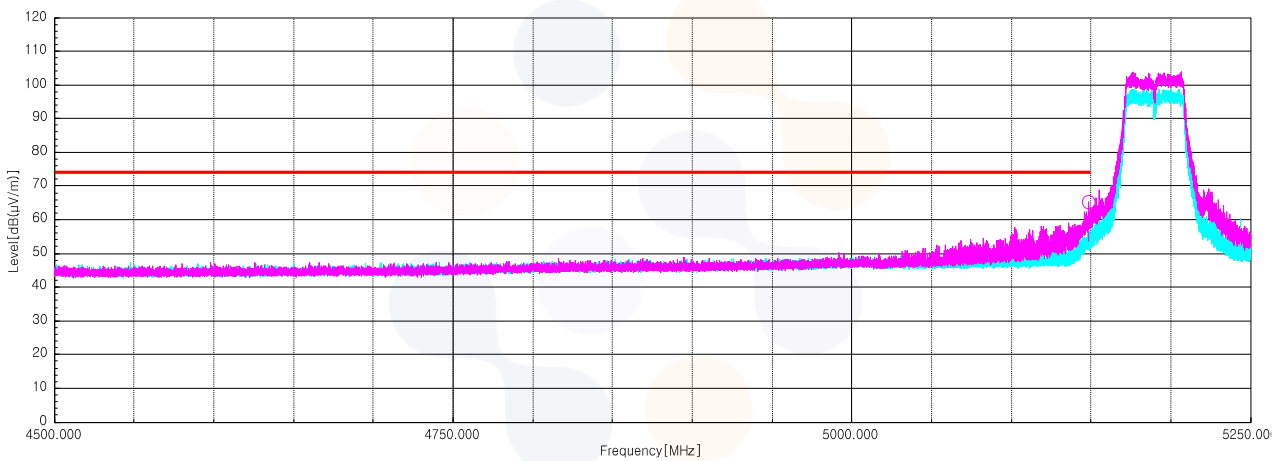
802.11ac_VHT40_Lowest Channel (5 190 MHz)

Average data



Blank

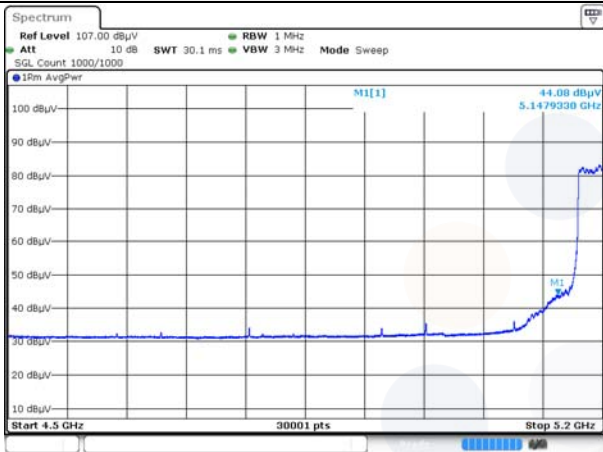
Horizontal/Vertical for Band-edge



802.11ac_VHT80_Middle Channel (5 210 MHz)

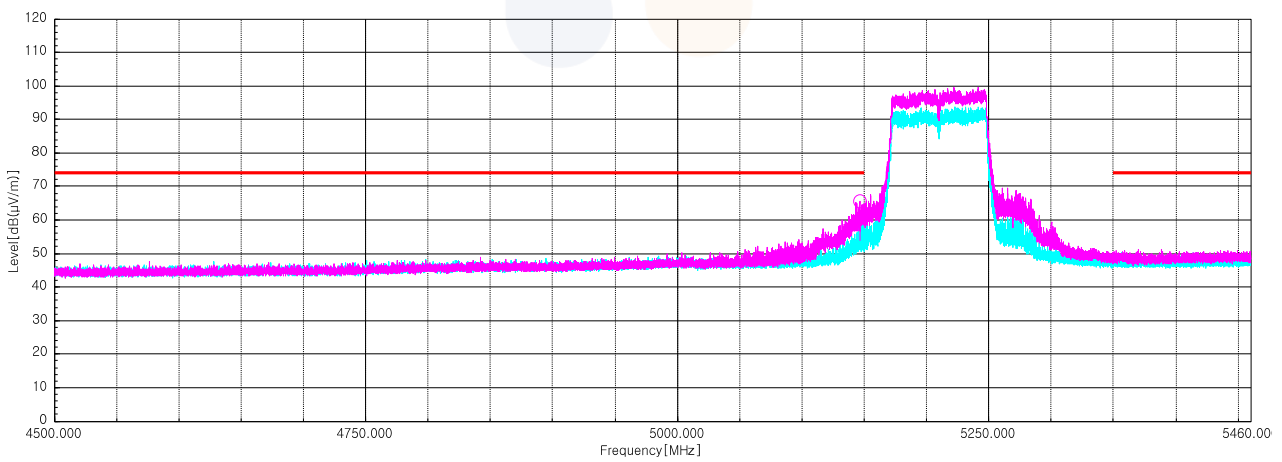
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 417.93 ¹⁾	H	60.10	32.60	-27.16	-	65.54	74.00	8.46
10 469.03	H	53.20	38.50	-42.64	-	49.06	68.20	19.14
15 616.05 ¹⁾	V	52.30	37.97	-39.91	-	50.36	74.00	23.64
Average Data								
5 417.93 ¹⁾	H	44.08	32.60	-27.16	1.82	51.34	54.00	2.66

Average data



Blank

Horizontal/Vertical for Band-edge

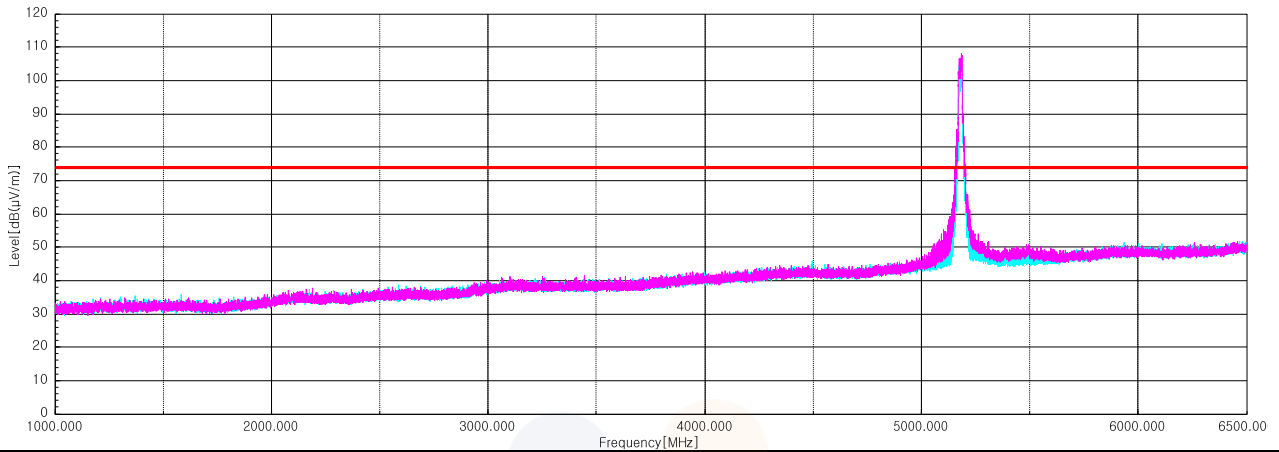


Plot of Harmonics and Spurious Emissions

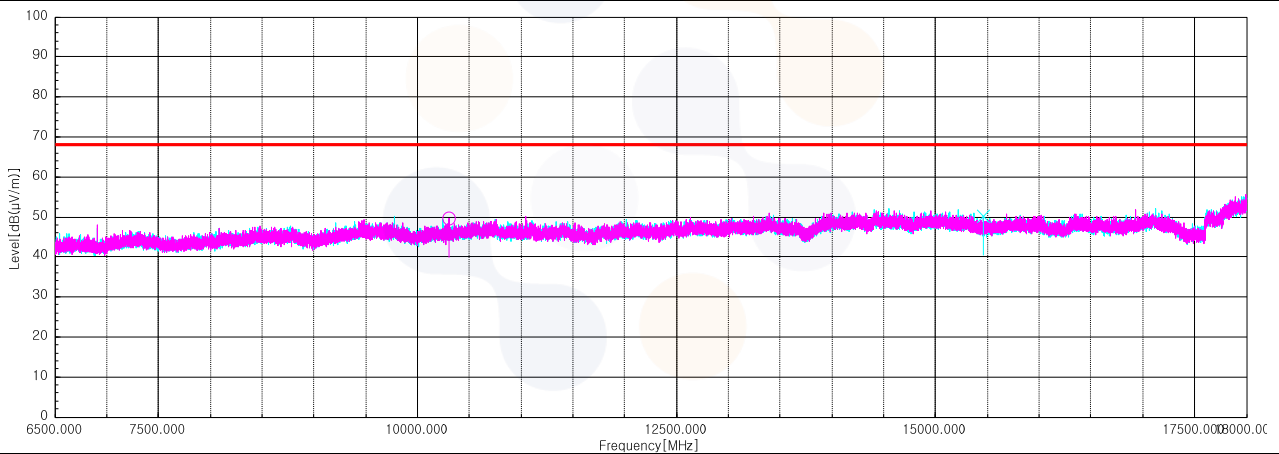
In order to simplify the report, attached plots were only the lowest margin condition

802.11a_UNII-1_2TX MIMO_ Lowest Channel (5 180 MHz)

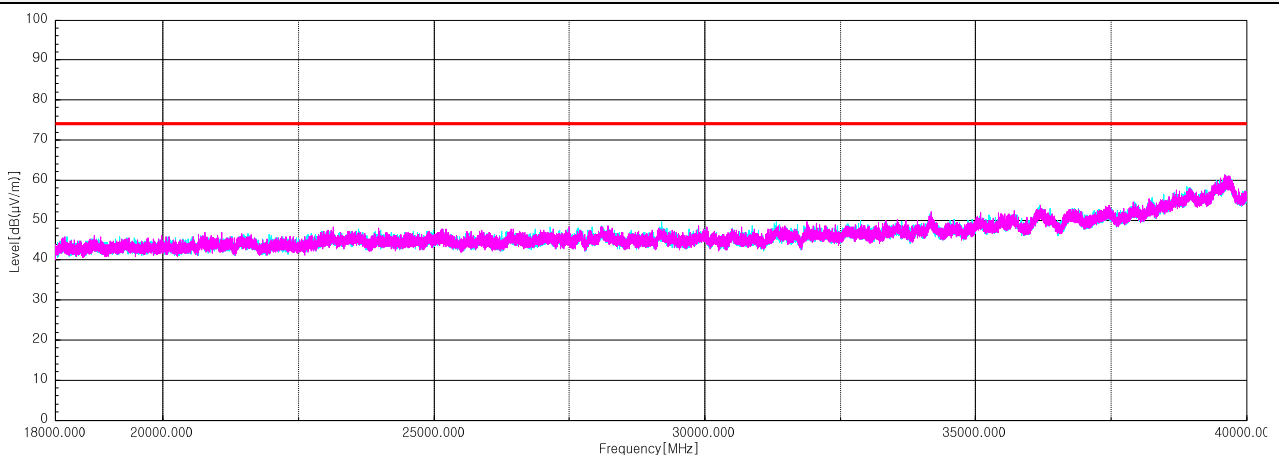
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



UNII-2A SISO

802.11a_Lowest Channel (5 260 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 560.27	V	53.70	38.62	-42.49	-	49.83	68.20	18.37
15 786.63 ¹⁾	H	51.60	38.10	-39.40	-	50.30	74.00	23.70
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11a_Middle Channel (5 280 MHz)

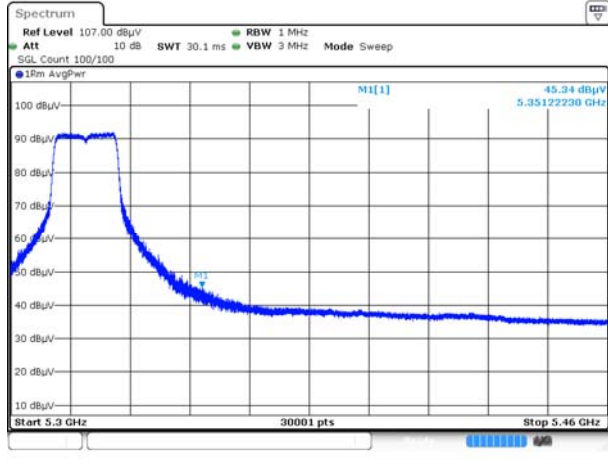
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 534.20	V	53.70	38.50	-42.54	-	49.66	68.20	18.54
15 863.30 ¹⁾	H	51.50	38.20	-39.31	-	50.39	74.00	23.61
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11a_Highest Channel (5 320 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 351.22 ¹⁾	H	62.10	32.60	-27.20	-	67.50	74.00	6.50
10 712.07 ¹⁾	V	53.20	38.70	-42.21	-	49.69	74.00	24.31
15 963.73 ¹⁾	V	51.60	38.33	-39.19	-	50.74	74.00	23.26
Average Data								
5 351.22 ¹⁾	H	45.34	32.60	-27.20	0.29	51.03	54.00	2.97

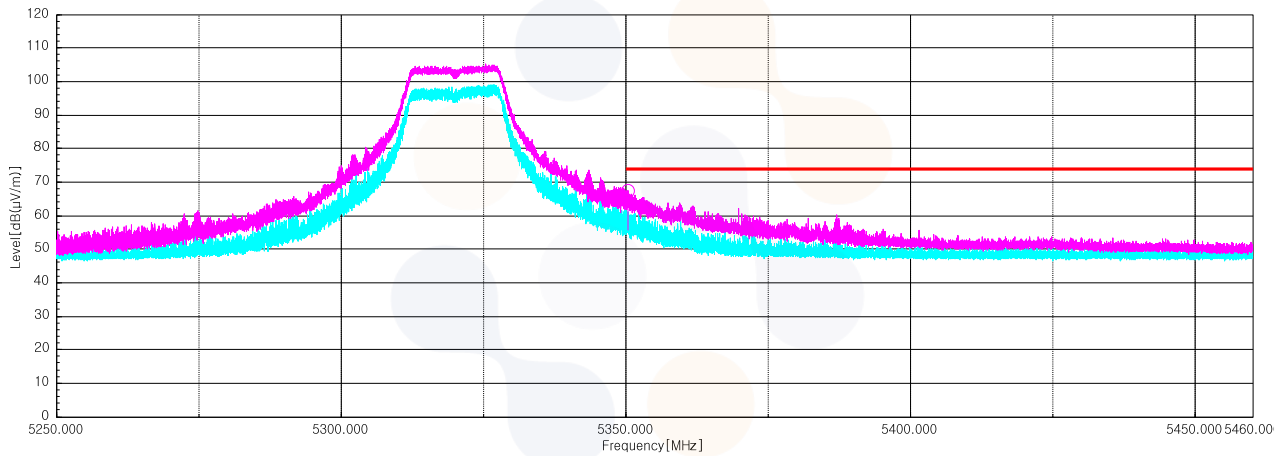
802.11a_Highest Channel (5 320 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge



802.11n_HT20_Lowest Channel (5 260 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB($\mu V/m$))	(dB($\mu V/m$))	(dB)
Peak data								
10 533.82	H	52.70	38.50	-42.54	-	48.66	68.20	19.54
15 859.49 ¹⁾	H	52.20	38.20	-39.31	-	51.09	74.00	22.91
Average Data								
15 859.49 ¹⁾	H	41.79	38.20	-39.31	0.31	40.99	54.00	13.01

802.11n_HT20_Middle Channel (5 280 MHz)

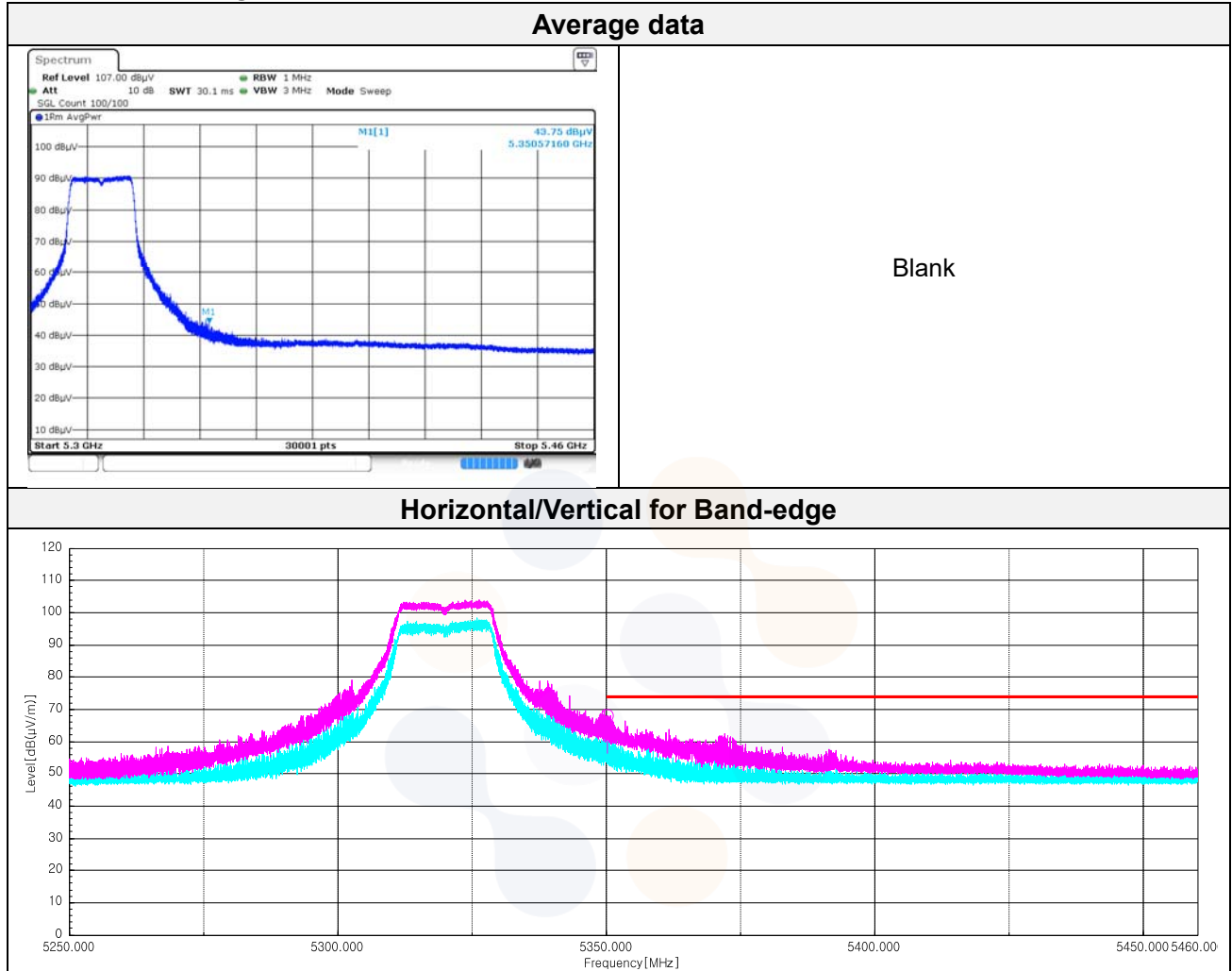
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB($\mu V/m$))	(dB($\mu V/m$))	(dB)
Peak data								
10 596.68	H	53.00	38.69	-42.42	-	49.27	68.20	18.93
15 836.72 ¹⁾	V	52.30	38.27	-39.34	-	51.23	74.00	22.77
Average Data								
15 836.72 ¹⁾	V	42.03	38.27	-39.34	0.31	41.27	54.00	12.73

802.11n_HT20_Highest Channel (5 320 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB($\mu V/m$))	(dB($\mu V/m$))	(dB)
Peak data								
5 350.57 ¹⁾	H	62.70	32.60	-27.20	-	68.10	74.00	5.90
10 697.12 ¹⁾	H	52.80	38.70	-42.24	-	49.26	74.00	24.74
16 014.72 ¹⁾	H	51.30	38.17	-39.11	-	50.36	74.00	23.64
Average Data								
5 350.57 ¹⁾	H	43.75	32.60	-27.20	0.31	49.46	54.00	4.54

In order to simplify the report, attached plots were only the lowest margin condition

802.11n_HT20_Highest Channel (5 320 MHz)



802.11n_HT40_Lowest Channel (5 270 MHz)

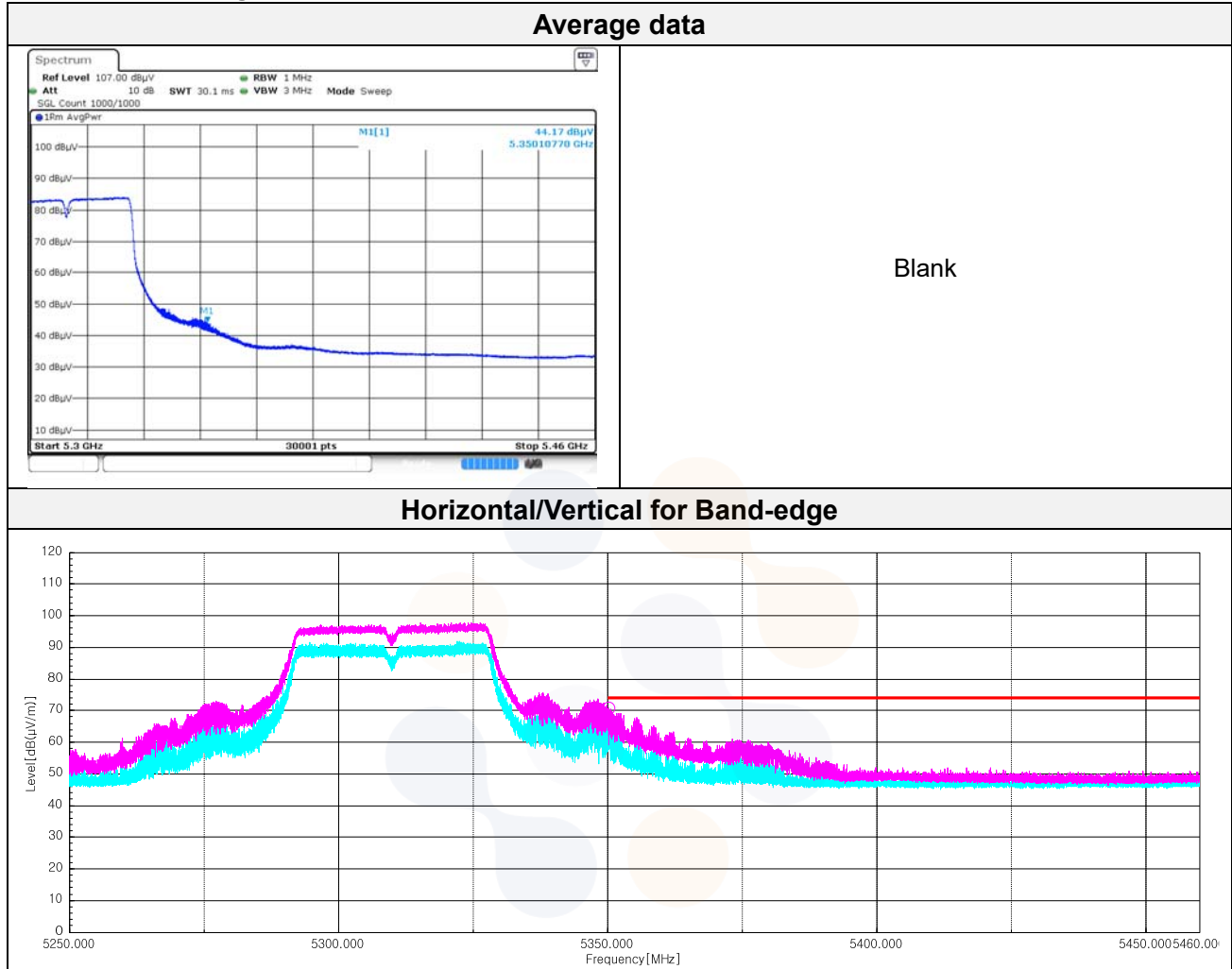
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 557.97	V	53.30	38.62	-42.49	-	49.43	68.20	18.77
15 833.89 ¹⁾	V	52.10	38.27	-39.34	-	51.03	74.00	22.97
Average Data								
15 833.89 ¹⁾	V	41.86	38.27	-39.34	0.61	41.40	54.00	12.60

802.11n_HT40_Highest Channel (5 310 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 350.11 ¹⁾	H	65.30	32.60	-27.20	-	70.70	74.00	3.30
10 667.98 ¹⁾	H	53.60	38.70	-42.29	-	50.01	74.00	23.99
15 978.68 ¹⁾	V	51.20	38.36	-39.17	-	50.39	74.00	23.61
Average Data								
5 350.11 ¹⁾	H	44.17	32.60	-27.20	0.61	50.18	54.00	3.82

In order to simplify the report, attached plots were only the lowest margin condition

802.11n_HT40_Highest Channel (5 310 MHz)



802.11ac_VHT20_Lowest Channel (5 260 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 544.55	H	52.80	38.50	-42.52	-	48.78	68.20	19.42
15 766.70 ¹⁾	H	51.50	38.10	-39.42	-	50.18	74.00	23.82
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11ac_VHT20_Middle Channel (5 280 MHz)

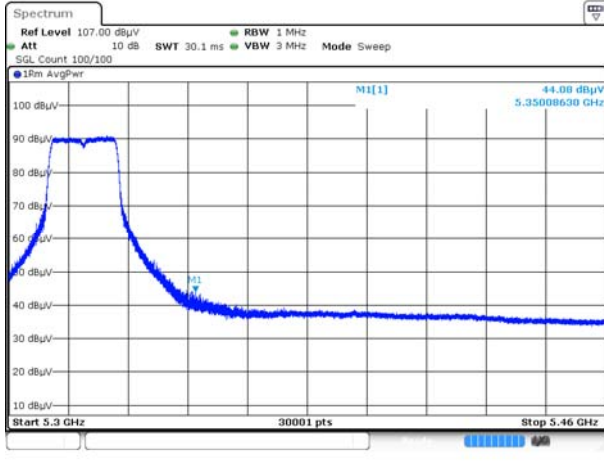
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 535.73	H	53.20	38.50	-42.53	-	49.17	68.20	19.03
15 879.02 ¹⁾	H	51.50	38.20	-39.29	-	50.41	74.00	23.59
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11ac_VHT20_Highest Channel (5 320 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 350.09 ¹⁾	H	62.40	32.60	-27.20	-	67.80	74.00	6.20
10 719.73 ¹⁾	H	53.30	38.70	-42.20	-	49.80	74.00	24.20
16 017.02 ¹⁾	H	51.90	38.17	-39.10	-	50.97	74.00	23.03
Average Data								
5 350.09 ¹⁾	H	44.08	32.60	-27.20	0.31	49.79	54.00	4.21

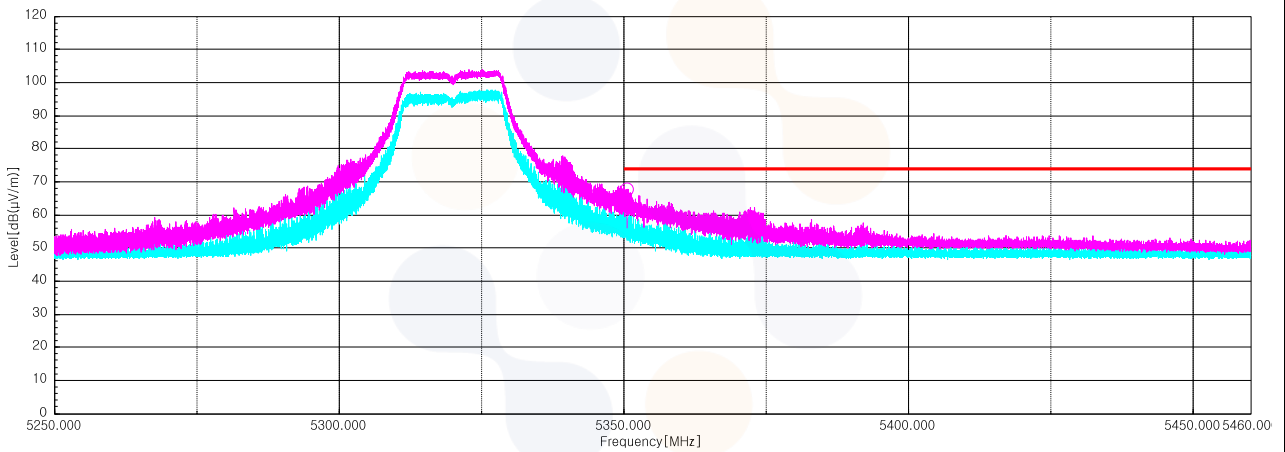
802.11ac_VHT20_Highest Channel (5 320 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge



802.11ac_VHT40_Lowest Channel (5 270 MHz)

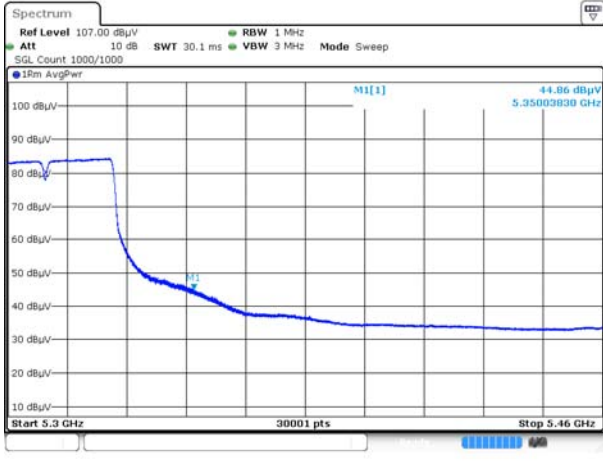
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
10 596.68	V	52.90	38.69	-42.42	-	49.17	68.20	19.03
15 858.70 ¹⁾	V	51.10	38.20	-39.31	-	49.99	74.00	24.01
Average Data								
No spurious emissions were detected within 20 dB of the limit								

802.11ac_VHT40_Highest Channel (5 310 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
5 350.04 ¹⁾	H	65.60	32.60	-27.20	-	71.00	74.00	3.00
10 705.55 ¹⁾	V	53.00	38.70	-42.22	-	49.48	74.00	24.52
15 989.80 ¹⁾	V	51.10	38.38	-39.16	-	50.32	74.00	23.68
Average Data								
5 350.04 ¹⁾	H	44.86	32.60	-27.20	0.65	50.91	54.00	3.09

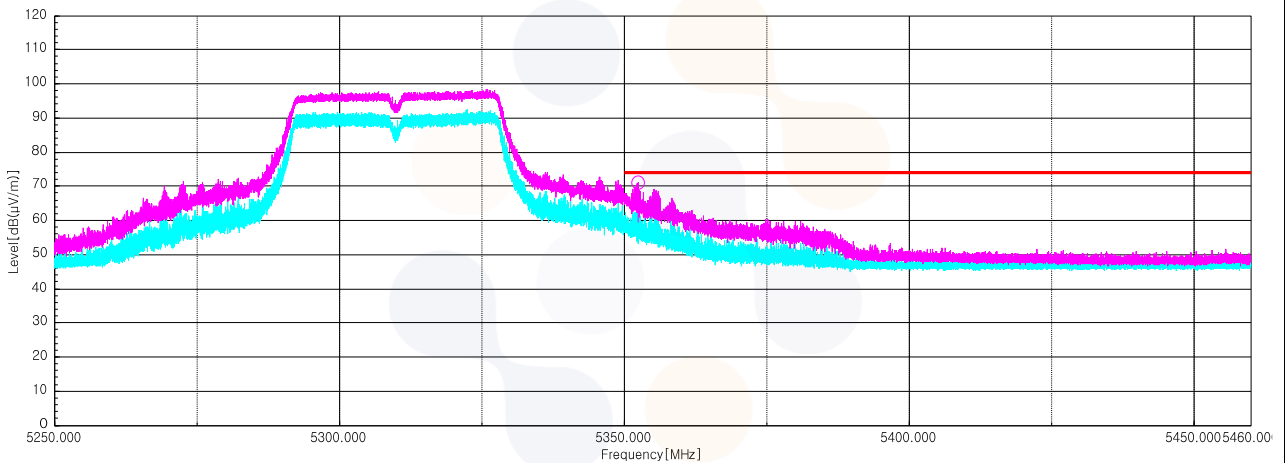
802.11ac_VHT40_Highest Channel (5 310 MHz)

Average data



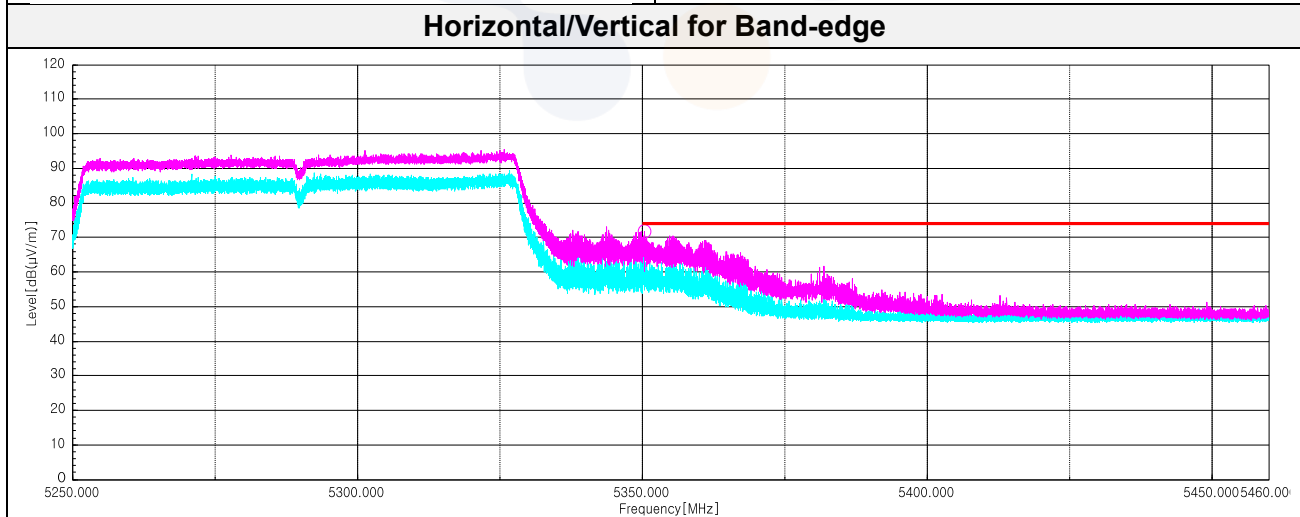
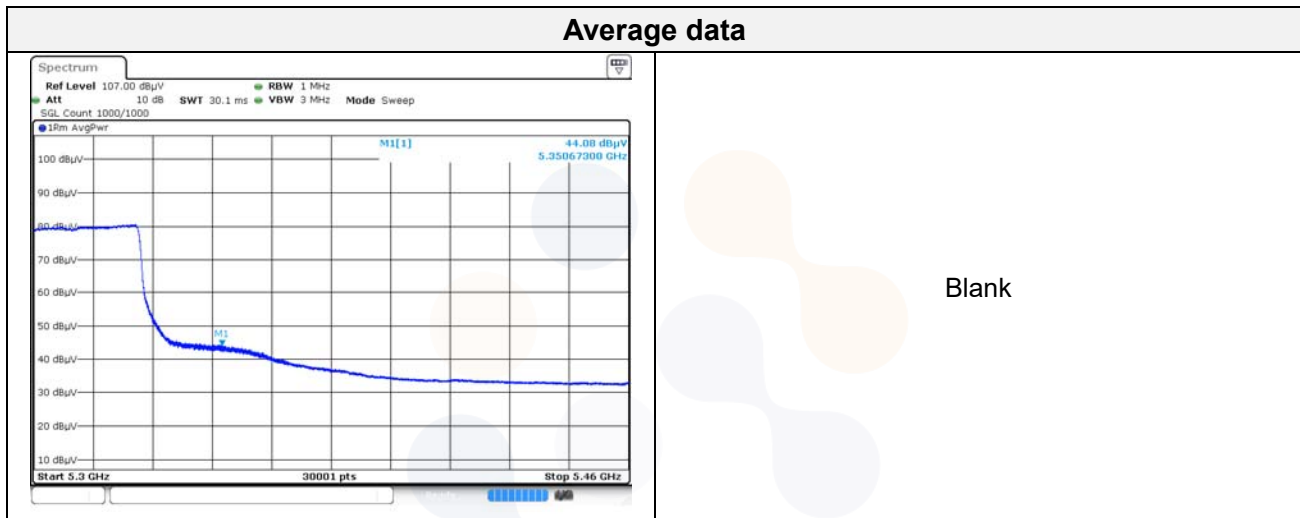
Blank

Horizontal/Vertical for Band-edge



802.11ac_VHT80_Middle Channel (5 290 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
5 350.67 ¹⁾	H	66.20	32.60	-27.20	-	71.60	74.00	2.40
10 543.78	H	52.90	38.50	-42.52	-	48.88	68.20	19.32
15 841.83 ¹⁾	H	51.80	38.28	-39.33	-	50.75	74.00	23.25
Average Data								
5 350.67 ¹⁾	H	44.08	32.60	-27.20	1.14	50.62	54.00	3.38



UNII-2A 2TX MIMO

802.11a_Lowest Channel (5 260 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 503.15	V	53.30	38.50	-42.59	-	49.21	68.20	18.99
15 812.70 ¹⁾	H	51.90	38.23	-39.37	-	50.76	74.00	23.24
Average Data								
No spurious emissions were detected within 20 dB of the limit								

802.11a_Middle Channel (5 280 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 545.32	V	53.00	38.50	-42.52	-	48.98	68.20	19.22
15 791.67 ¹⁾	V	52.60	38.10	-39.39	-	51.31	74.00	22.69
Average Data								
15 791.67 ¹⁾	V	42.12	38.10	-39.39	0.27	41.10	54.00	12.90

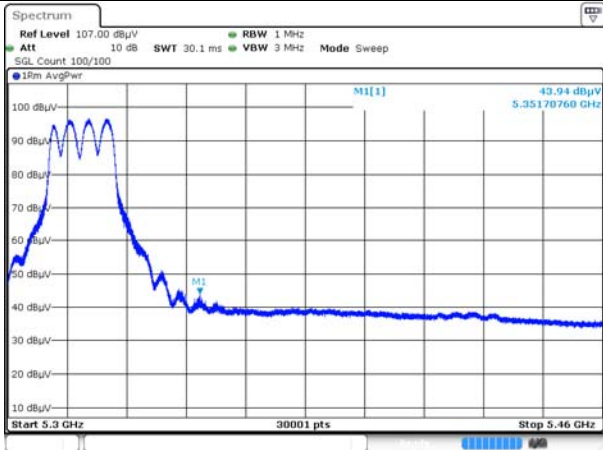
802.11a_Highest Channel (5 320 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 351.71 ¹⁾	H	62.00	32.60	-27.20	-	67.40	74.00	6.60
10 569.47	H	53.00	38.64	-42.47	-	49.17	68.20	19.03
15 907.00 ¹⁾	H	51.60	38.20	-39.26	-	50.54	74.00	23.46
Average Data								
5 351.71 ¹⁾	H	43.94	32.60	-27.20	0.27	49.61	54.00	4.39

In order to simplify the report, attached plots were only the lowest margin condition

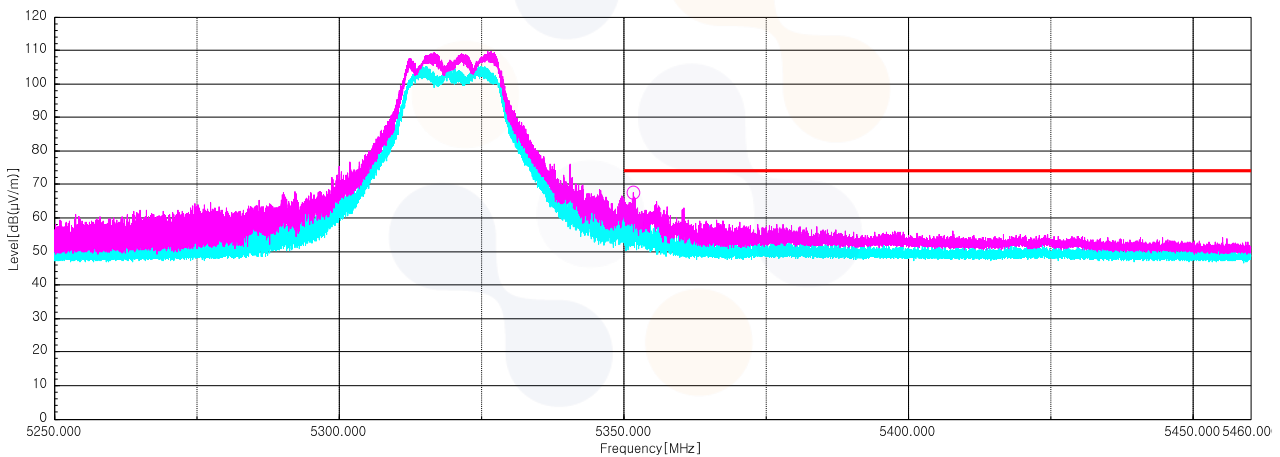
802.11a_Highest Channel (5 320 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge



802.11n_HT20_Lowest Channel (5 260 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 548.77	V	53.90	38.50	-42.51	-	49.89	68.20	18.31
15 840.30 ¹⁾	V	51.80	38.28	-39.34	-	50.74	74.00	23.26
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11n_HT20_Middle Channel (5 280 MHz)

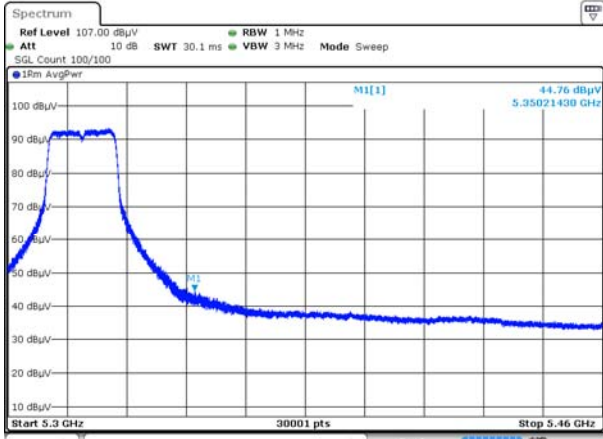
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
10 621.98 ¹⁾	V	53.00	38.74	-42.38	-	49.36	74.00	24.64
15 795.83 ¹⁾	H	52.60	38.10	-39.39	-	51.31	74.00	22.69
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11n_HT20_Highest Channel (5 320 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 350.21 ¹⁾	H	61.20	32.60	-27.20	-	66.60	74.00	7.40
10 638.85 ¹⁾	V	53.50	38.78	-42.34	-	49.94	74.00	24.06
15 907.00 ¹⁾	V	52.00	38.20	-39.26	-	50.94	74.00	23.06
Average Data								
5 350.21 ¹⁾	H	44.76	32.60	-27.20	0.58	50.74	54.00	3.26

802.11n_HT20_Highest Channel (5 320 MHz)

Average data



Blank

Horizontal/Vertical for Band-edge

