

4.4 POWER SPECTRAL DENSITY

4.4.1 Test Limit

According to §15.407 (a)(1), 15.407(a)(2) and 15.407(a)(3) and RSS-247 section 6.2.1(1), section 6.2.2(1), section 6.2.3(1) and section 6.2.4(1)

UNII-1 :

FCC: The maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

IC: The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

UNII-2a and 2c:

The maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

UNII-3:

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.i.

UNII-1 Limit	<input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 11 dBm (EIRP : 10 dBm) <input type="checkbox"/> Antenna with DG greater than 6 dBi : [Limit = 17 – (DG – 6)]
UNII-2a/2c Limit	<input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 11 dBm <input type="checkbox"/> Antenna with DG greater than 6 dBi : [Limit = 17 – (DG – 6)]
UNII-3 Limit	<input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 30 dBm <input type="checkbox"/> Antenna with DG greater than 6 dBi : [Limit = 30 – (DG – 6)]

4.4.2 Test Procedure

Test method Refer as KDB 789033 D02 v01r03, Section F

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. UNII-1, UNII-2a and UNII-2c, SA set RBW = 1MHz, VBW = 3MHz and Detector = RMS, to measurement Power Density.
4. UNII-3, SA set RBW = 500kHz, VBW = 2MHz and Detector = RMS, to measurement Power Density
5. The path loss and Duty Factor were compensated to the results for each measurement by SA.
6. Mark the maximum level.
7. Measure and record the result of power spectral density. in the test report.

4.4.3 Test Setup



4.4.4 Test Result

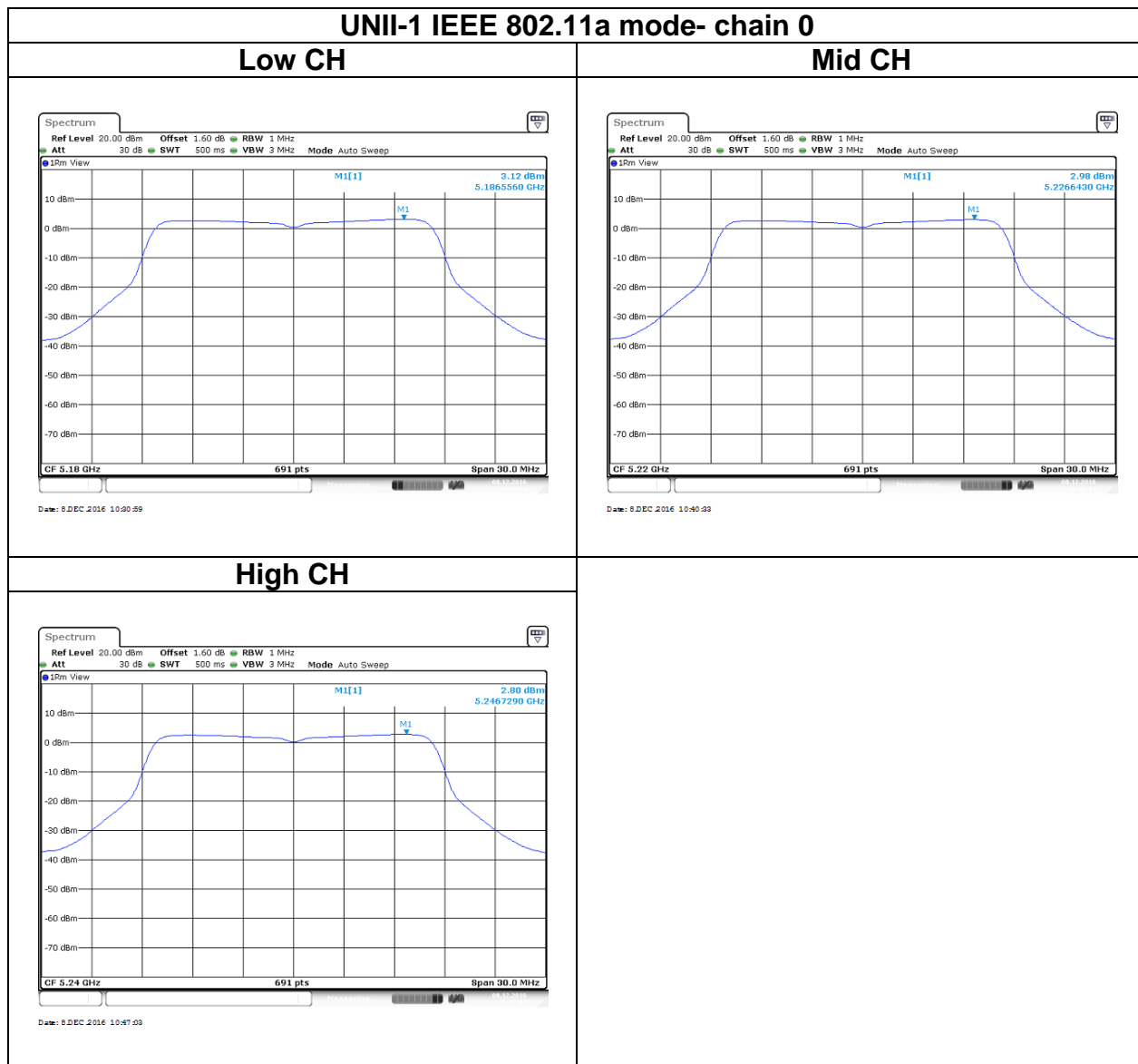
UNII-1 5150-5250 MHz							
Test mode: IEEE 802.11a mode							
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	EIRP Total PSSD (dBm)	Limit (dBm)	EIRP Limit (dBm)
Low	5180	3.12	-	3.12	6.83	11	10
Mid	5220	2.98	-	2.98	6.69		
High	5240	2.80	-	2.80	6.51		
Test mode: IEEE 802.11n HT20 mode							
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	EIRP Total PSSD (dBm)	Limit (dBm)	EIRP Limit (dBm)
Low	5180	-0.06	-0.11	2.93	6.64	11	10
Mid	5220	0.10	0.07	3.10	6.81		
High	5240	0.11	-0.42	2.86	6.57		
Test mode: IEEE 802.11n HT40 mode							
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	EIRP Total PSSD (dBm)	Limit (dBm)	EIRP Limit (dBm)
Low	5190	-0.62	0.19	2.81	6.52	11	10
High	5230	-0.82	-0.39	2.41	6.12		
Test mode: IEEE 802.11ac VHT80 mode							
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	EIRP Total PSSD (dBm)	Limit (dBm)	EIRP Limit (dBm)
Mid	5210	-1.71	-1.71	1.30	5.01	11	10

UNII-2a 5250-5350 MHz					
Test mode: IEEE 802.11a mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	Limit (dBm)
Low	5260	2.86	-	2.86	11
Mid	5280	2.98	-	2.98	
High	5320	2.89	-	2.89	
Test mode: IEEE 802.11n HT20 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	Limit (dBm)
Low	5260	1.01	3.03	5.15	11
Mid	5280	2.60	1.05	4.90	
High	5320	2.62	0.90	4.85	
Test mode: IEEE 802.11n HT40 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	Limit (dBm)
Low	5270	-1.93	-1.11	1.51	11
High	5310	-0.38	-1.31	2.19	
Test mode: IEEE 802.11ac VHT80 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	Limit (dBm)
Mid	5290	-3.41	-2.53	0.06	11

UNII-2c 5470-5725 MHz					
Test mode: IEEE 802.11a mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	Limit (dBm)
Low	5500	4.18	-	4.18	11
Mid	5580	3.12	-	3.12	
High	5700	4.03	-	4.03	
Cross	5720	2.41	-	2.41	
Test mode: IEEE 802.11n HT20 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	Limit (dBm)
Low	5500	1.68	0.29	4.05	11
Mid	5580	3.00	3.71	6.38	
High	5700	2.76	3.77	6.30	
Cross	5720	0.44	2.56	4.64	
Test mode: IEEE 802.11n HT40 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	Limit (dBm)
Low	5510	-1.19	-1.14	1.85	11
High	5670	-1.10	-0.10	2.44	
Cross	5710	-3.53	-1.52	0.60	
Test mode: IEEE 802.11ac VHT80 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	Limit (dBm)
Mid	5530	-4.55	-2.14	-0.17	11
Cross	5690	-4.86	-3.61	-1.18	

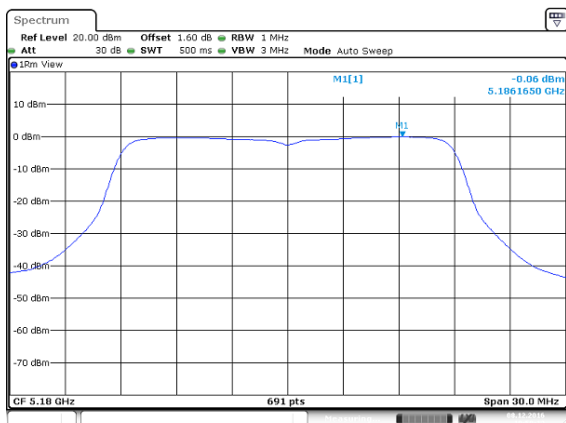
UNII-3 5725-5825 MHz					
Test mode: IEEE 802.11a mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	Limit (dBm)
Low	5745	-3.64	-	-3.64	30
Mid	5785	-2.99	-	-2.99	
High	5825	-2.07	-	-2.07	
Cross	5720	-0.39	-	-0.39	
Test mode: IEEE 802.11n HT20 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	Limit (dBm)
Low	5745	-0.97	-3.98	0.79	30
Mid	5785	-0.99	-2.49	1.33	
High	5825	-1.33	-1.90	1.40	
Cross	5720	-3.03	-1.06	1.08	
Test mode: IEEE 802.11n HT40 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	Limit (dBm)
Low	5755	-5.93	-7.76	-3.74	30
High	5795	-5.55	-7.03	-3.22	
Cross	5710	-6.95	-5.12	-2.93	
Test mode: IEEE 802.11ac VHT80 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	Limit (dBm)
Mid	5690	-10.73	-8.94	-6.73	30
Mid	5775	-7.20	-9.16	-5.06	

Test Data

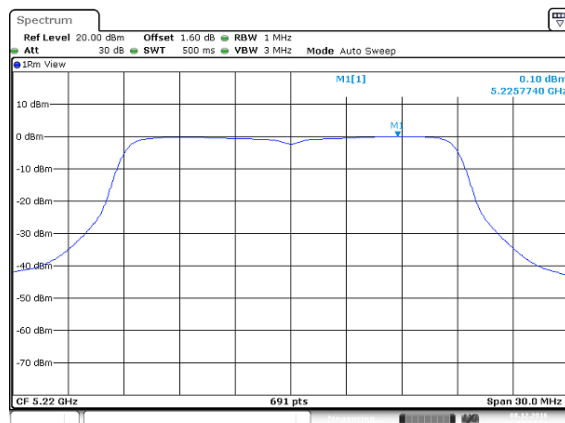


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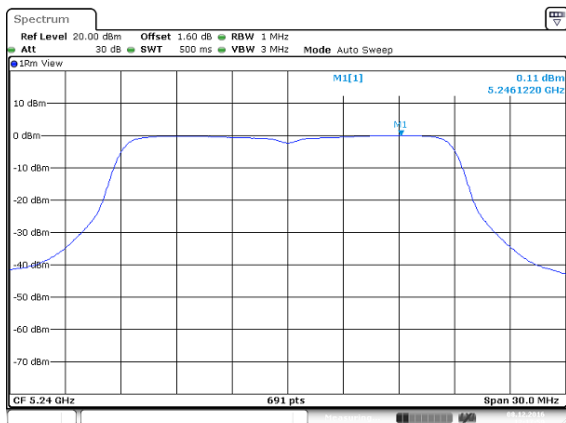
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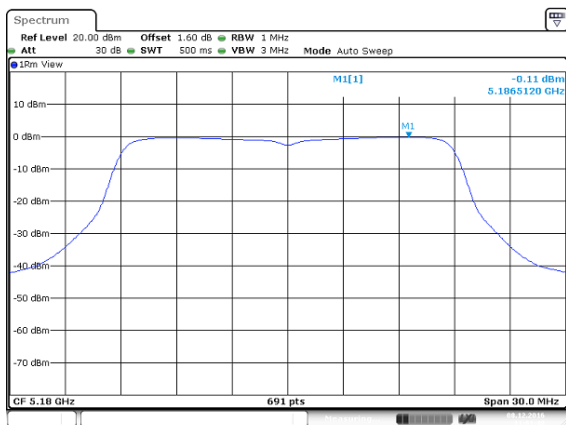


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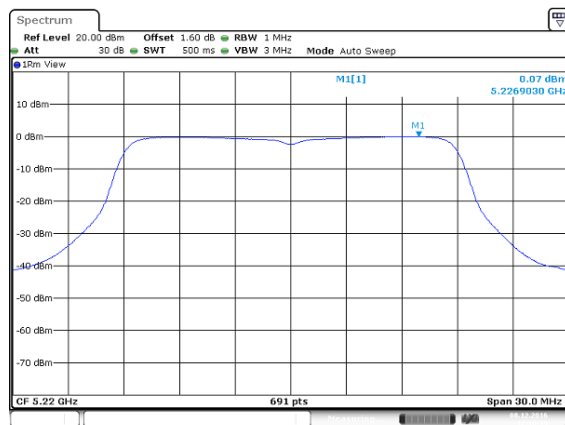


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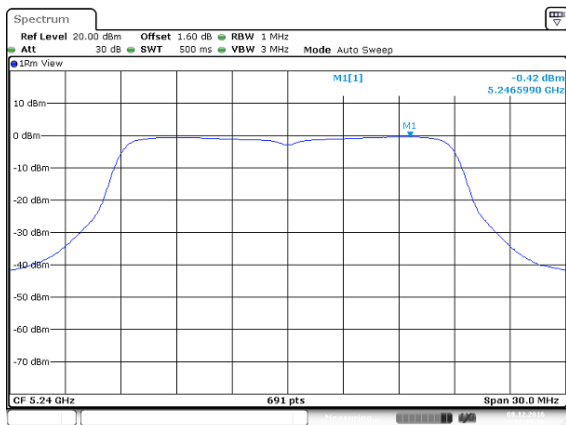
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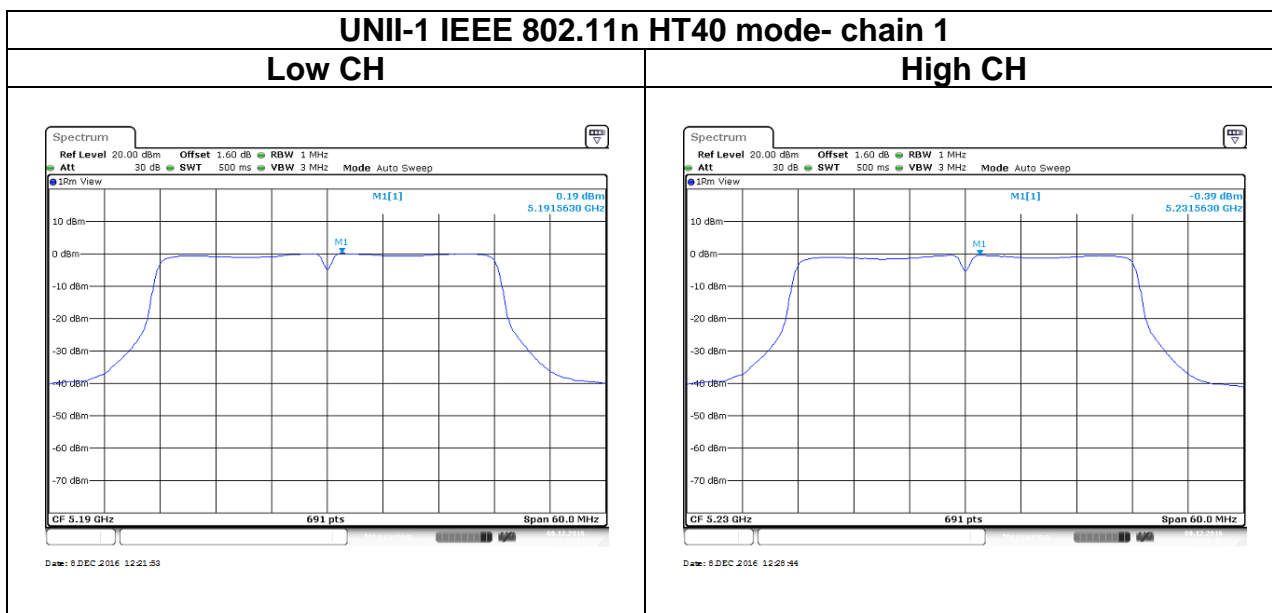
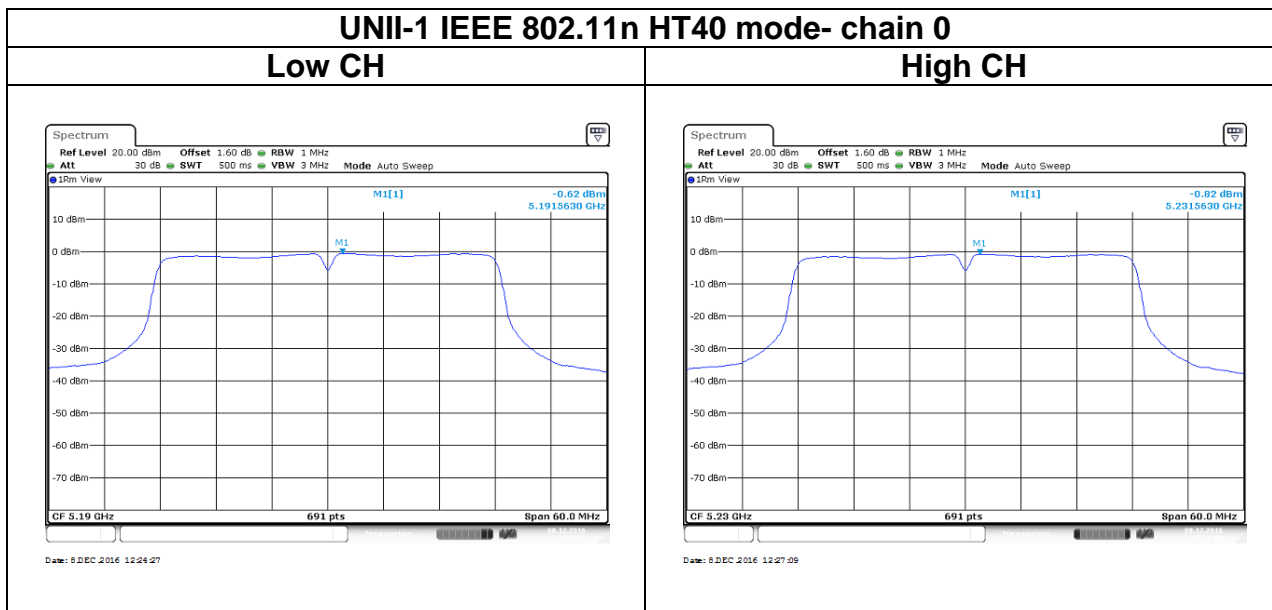


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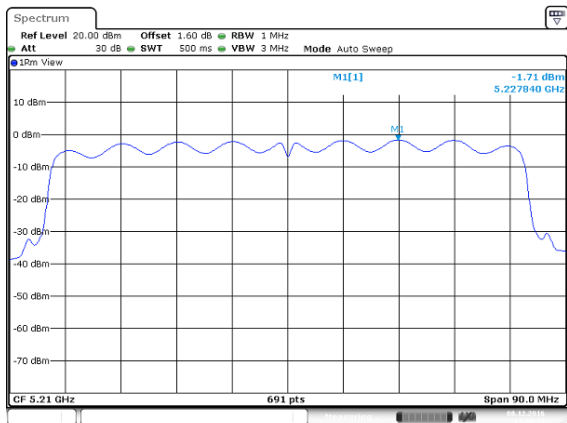
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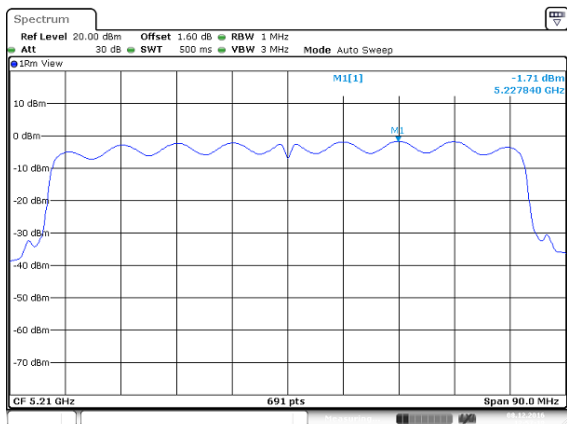
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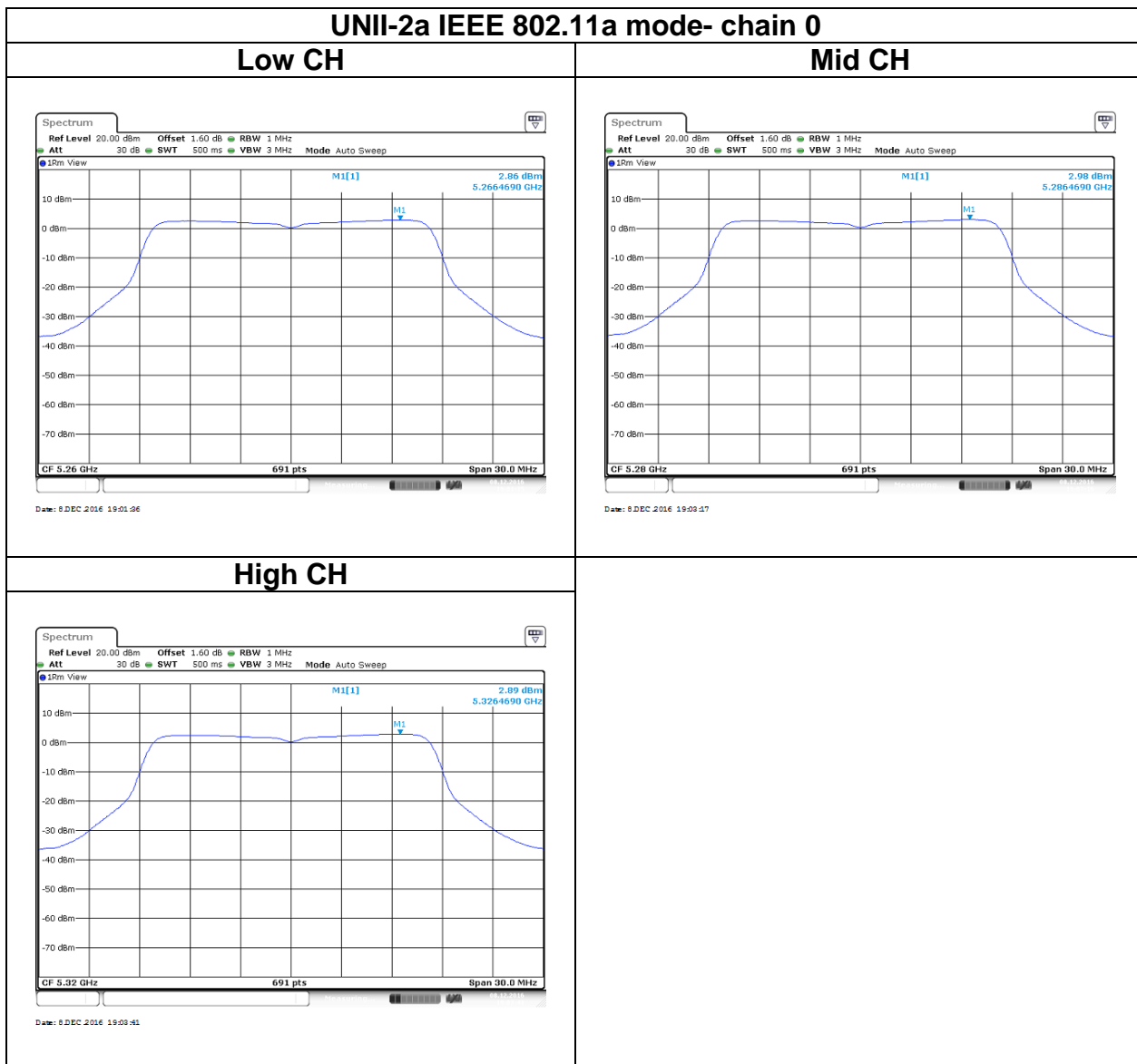


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Mid CH

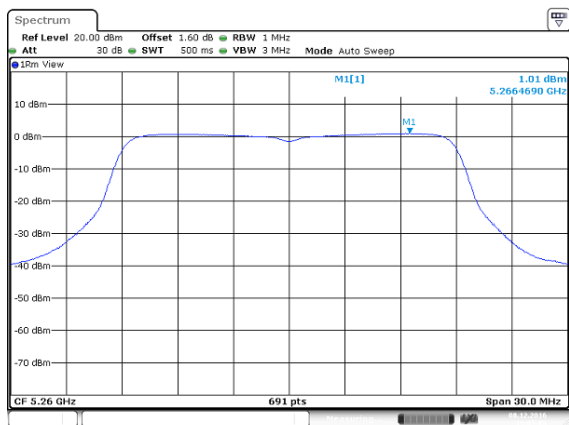


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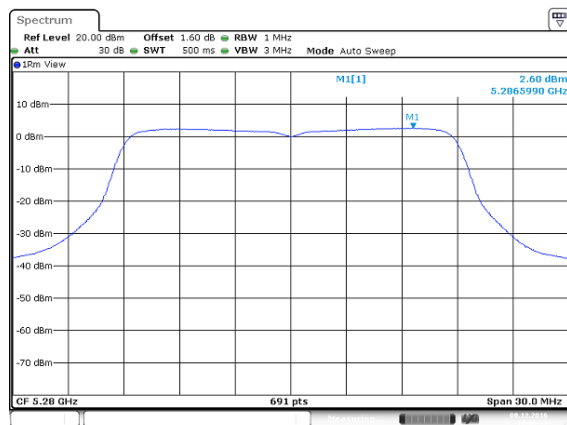
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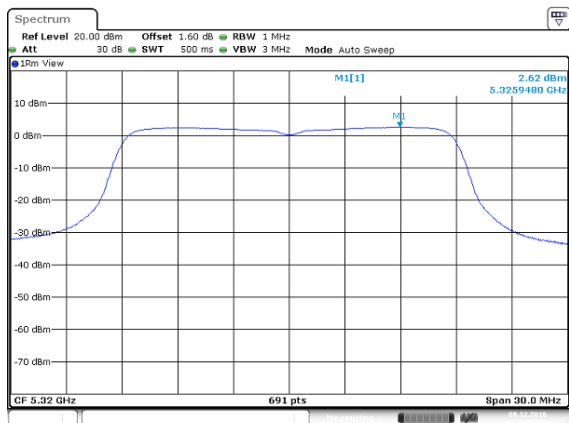
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Mid CH



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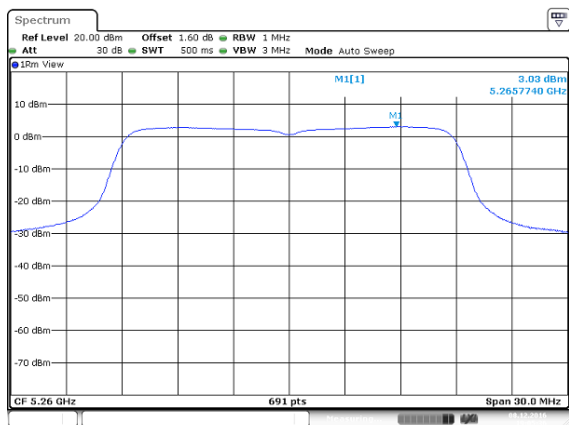
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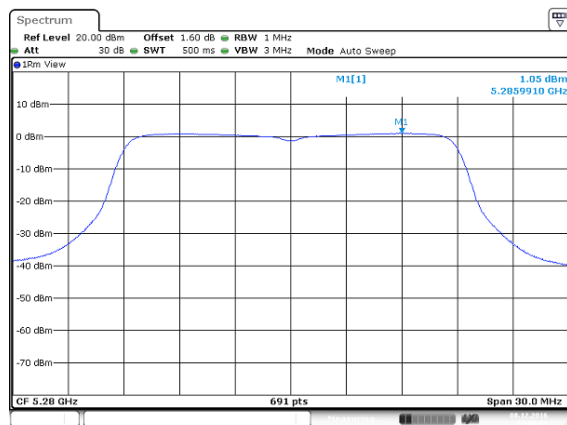
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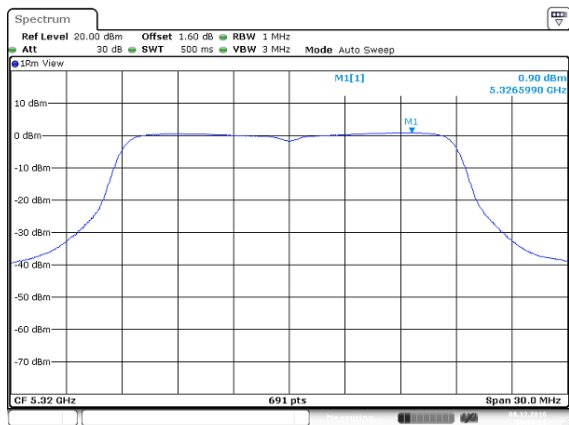
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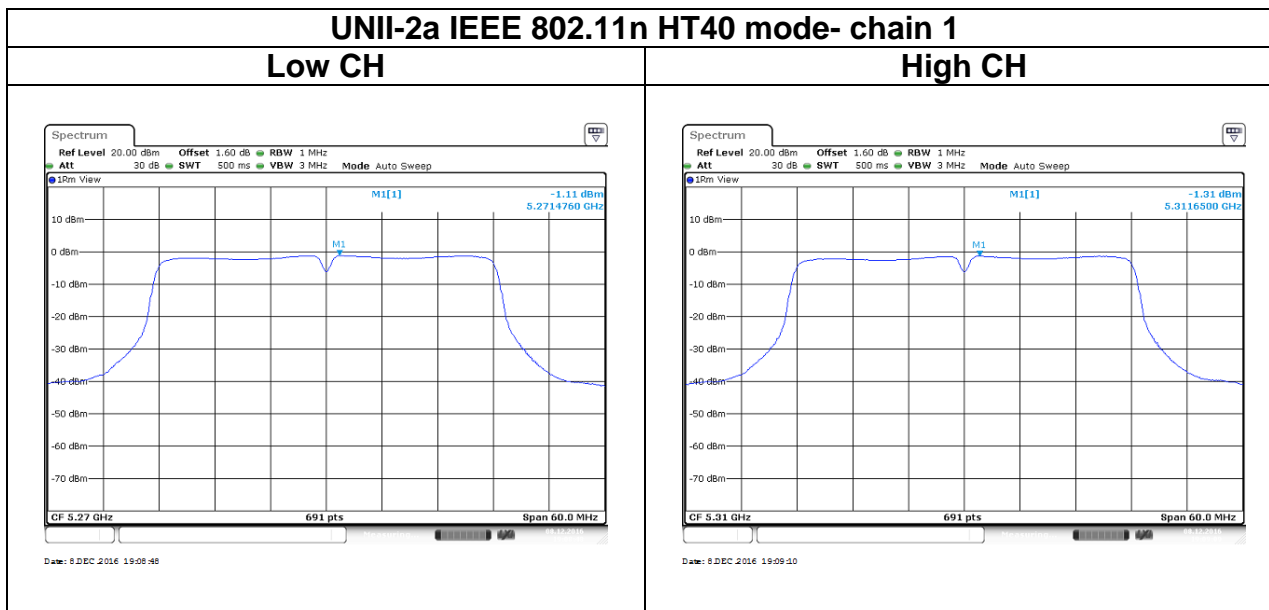
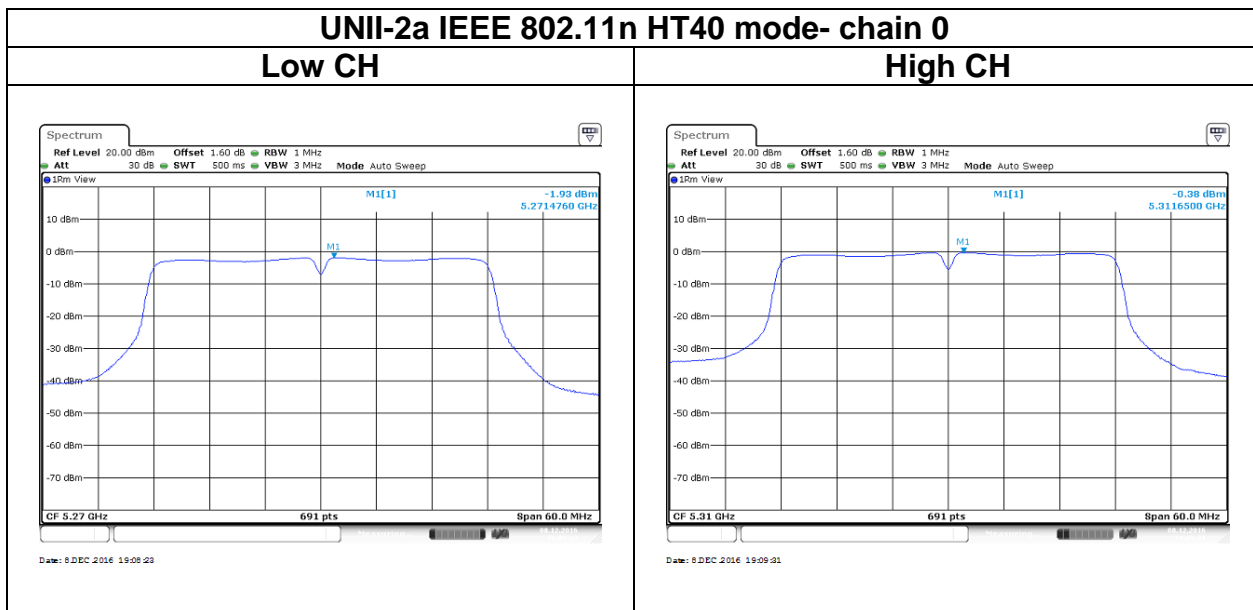


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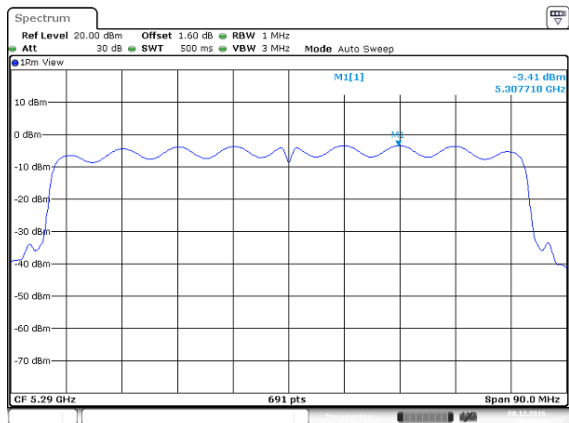
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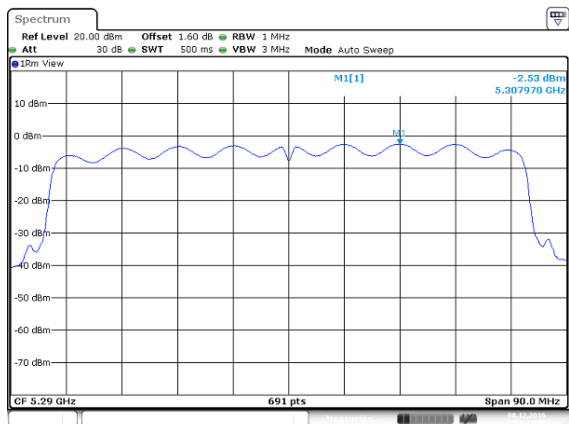
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Mid CH

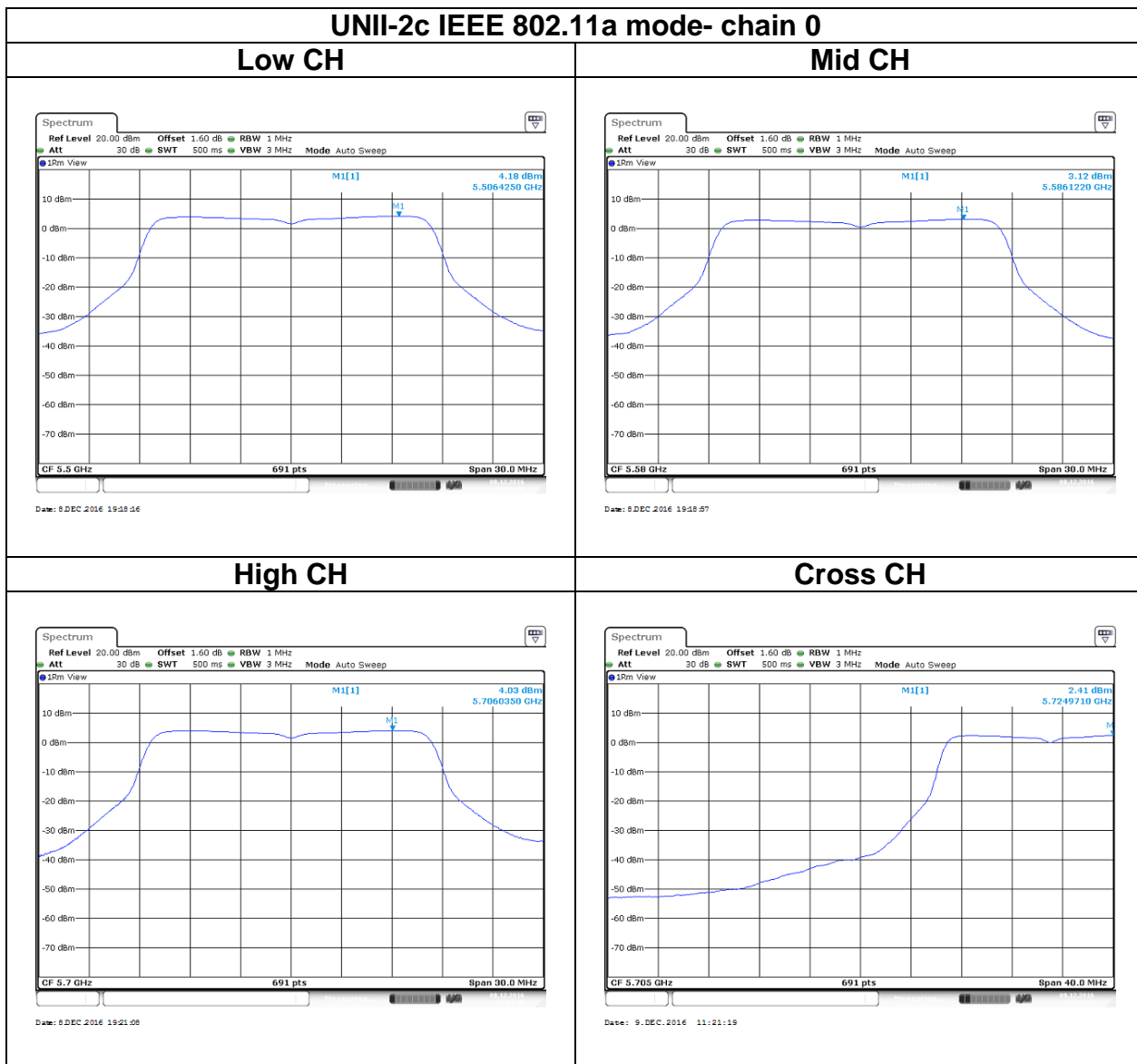


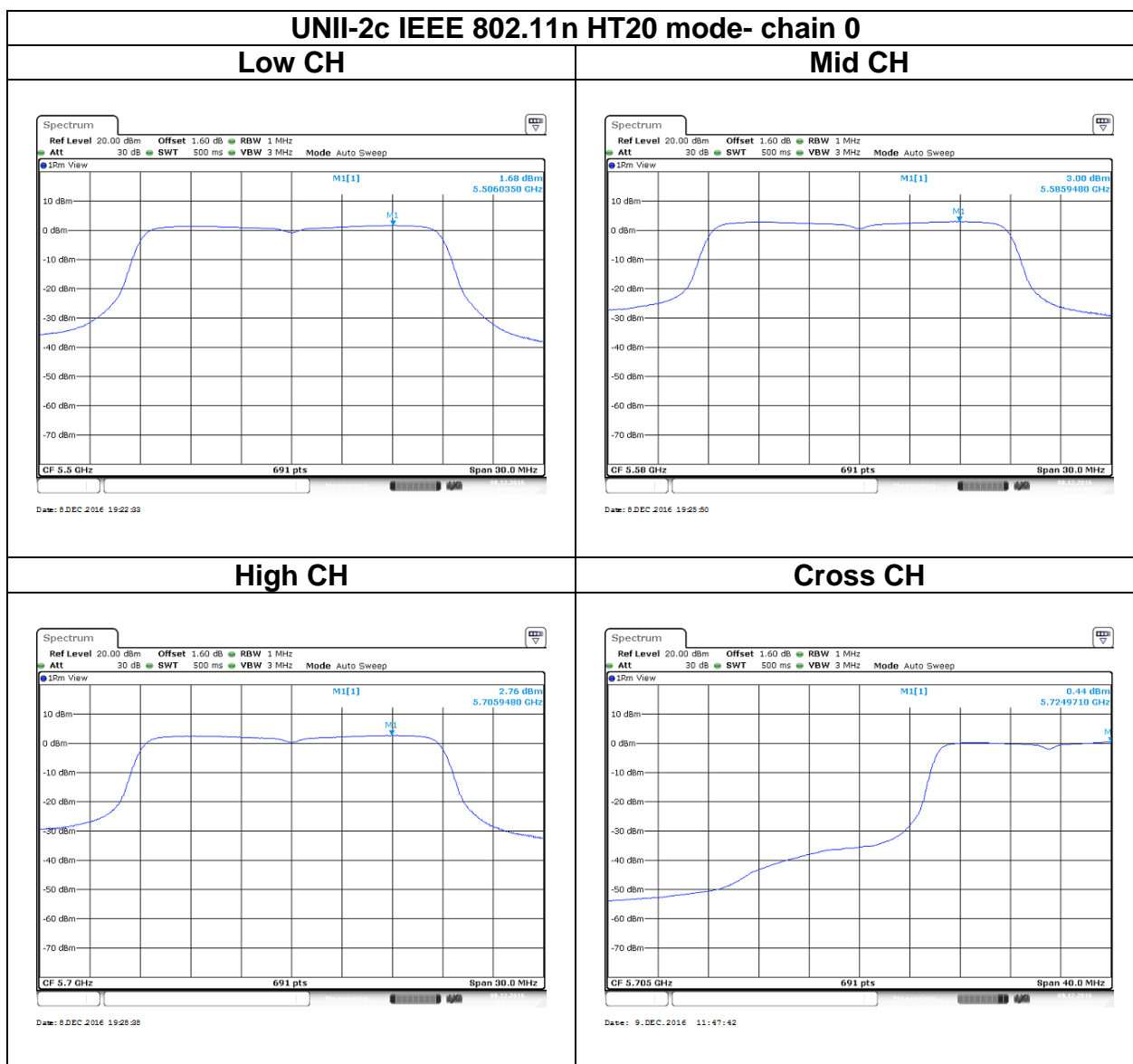
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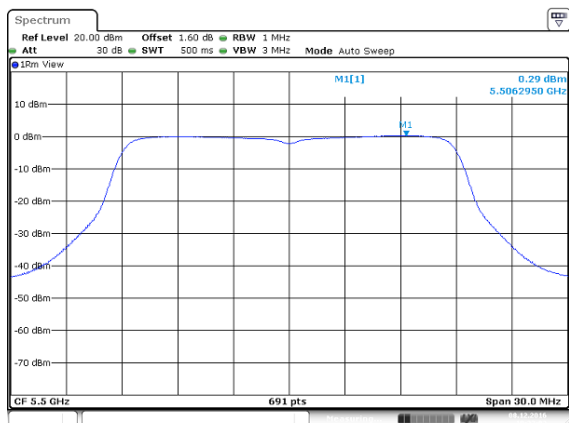
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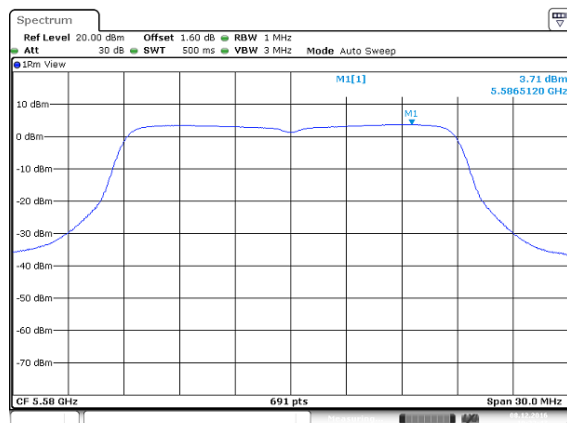


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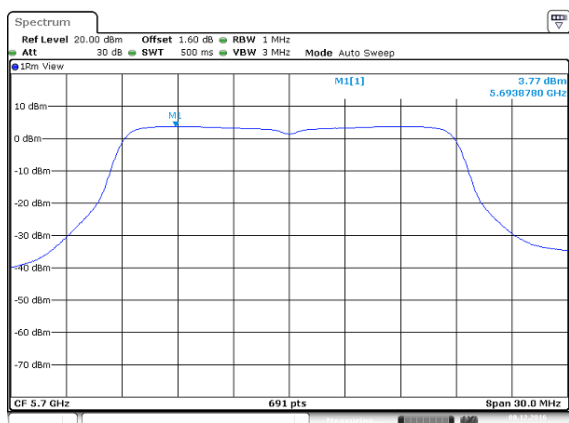
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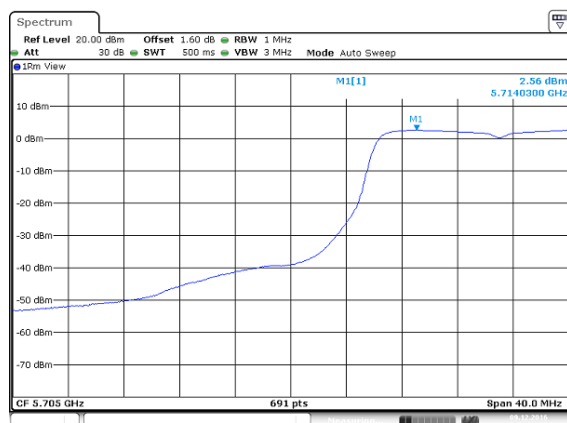
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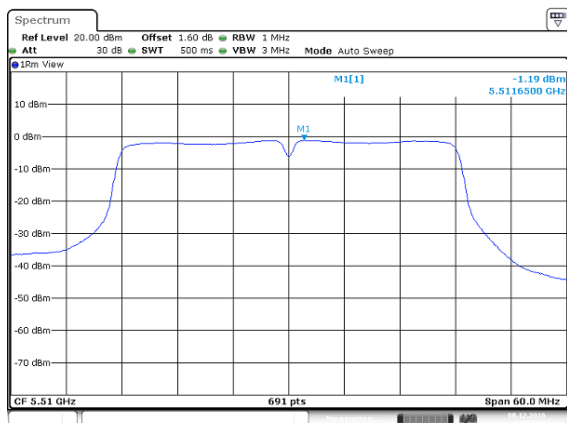


Cross CH

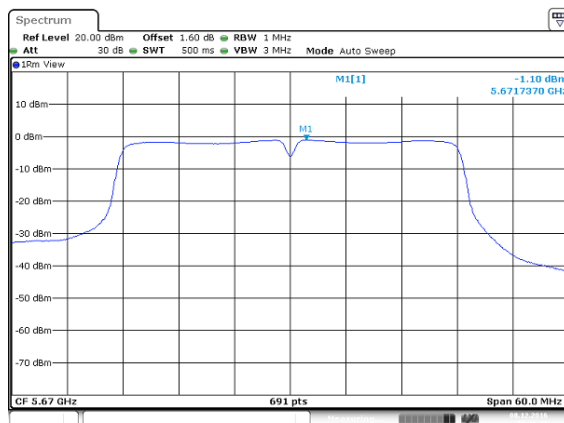


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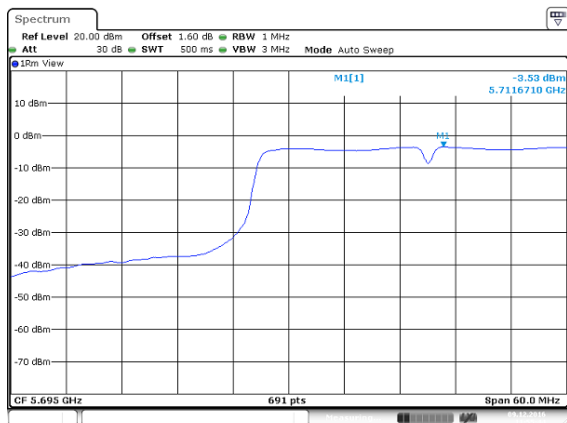
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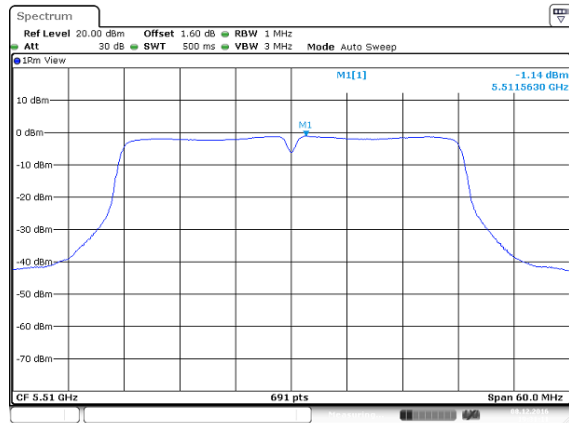


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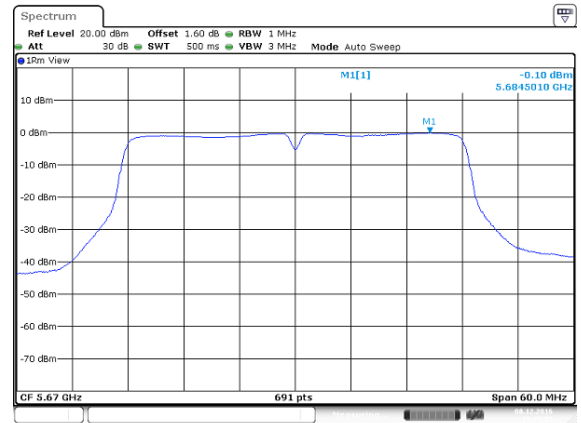
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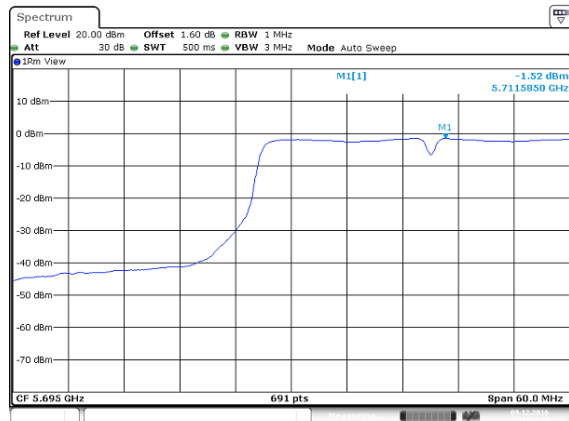
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High CH



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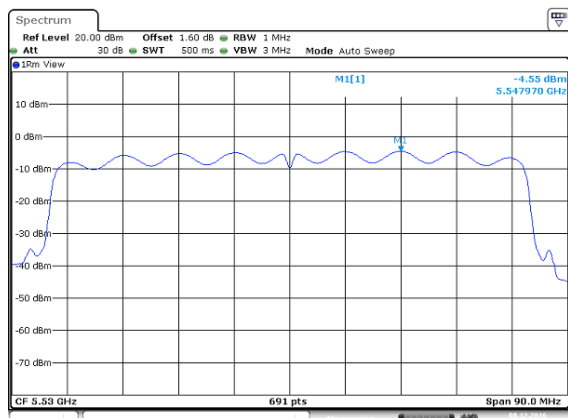
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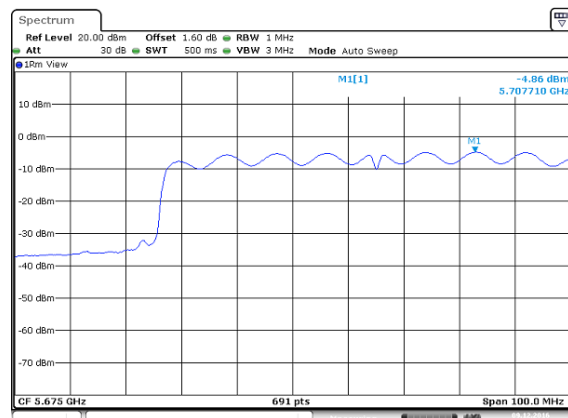
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Mid CH

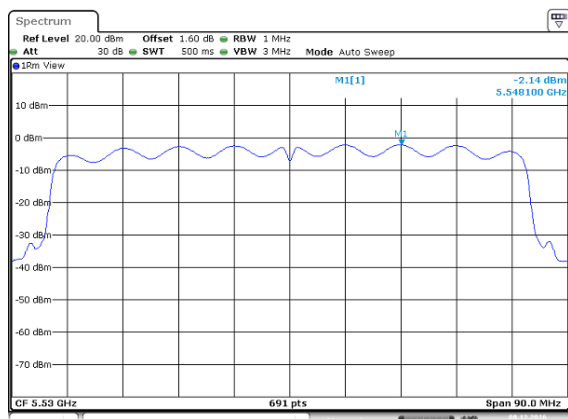


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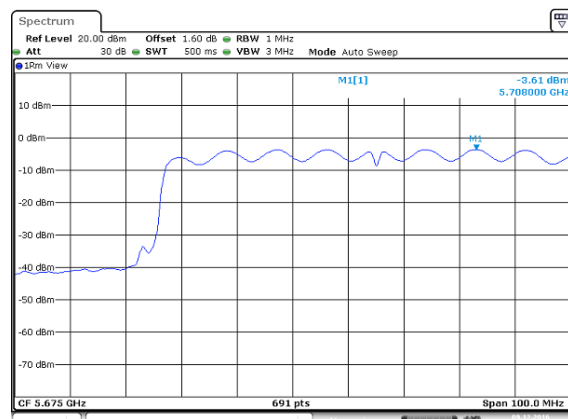


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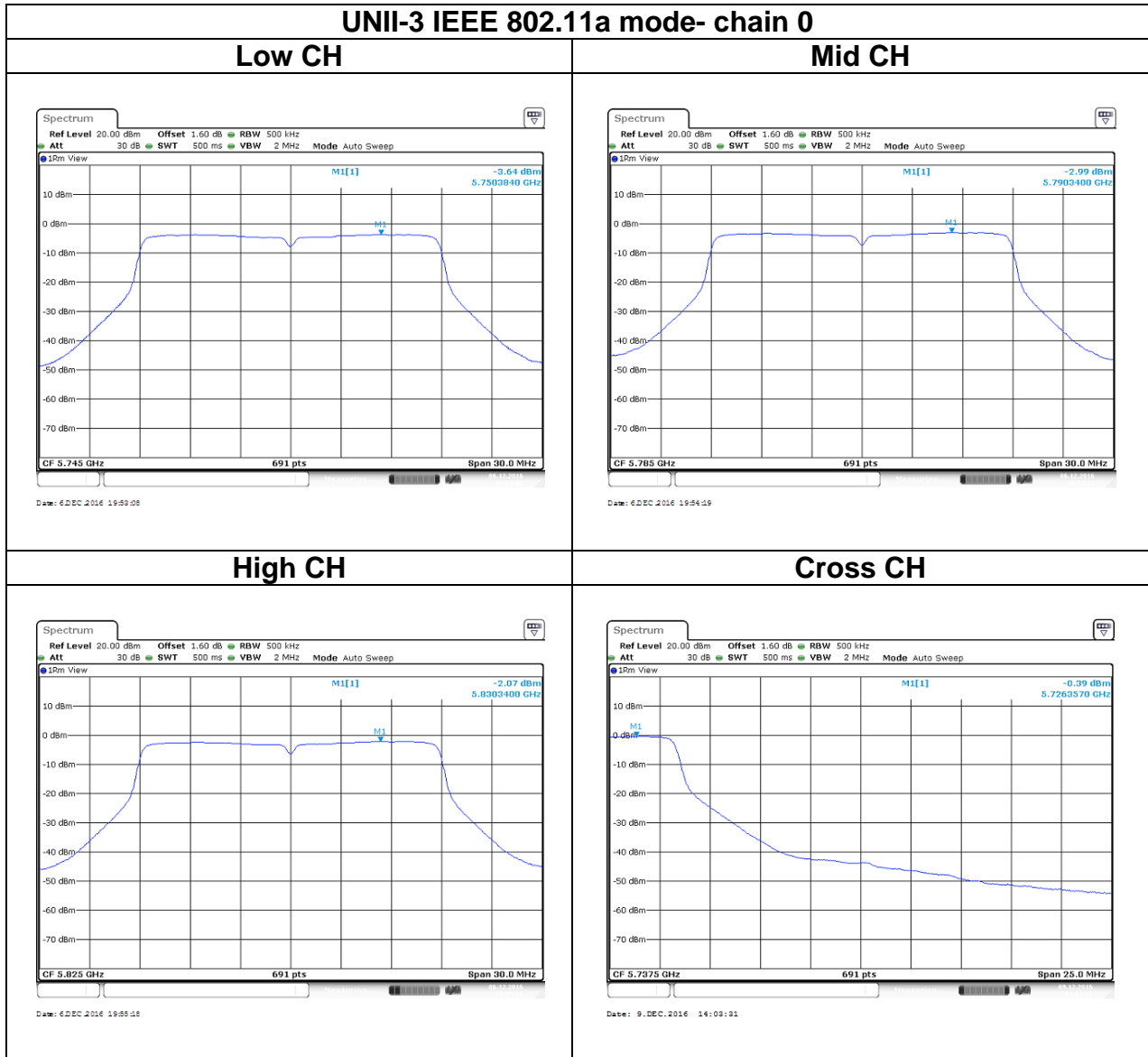
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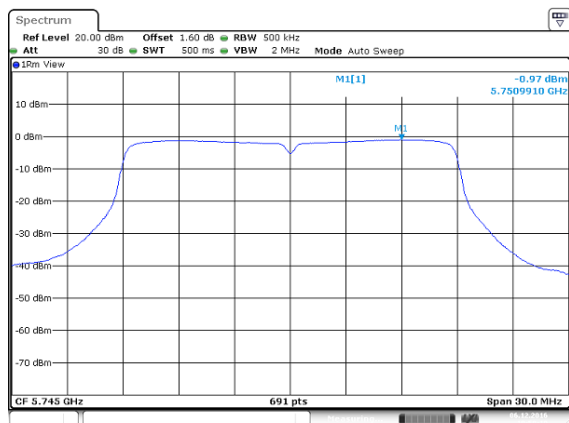


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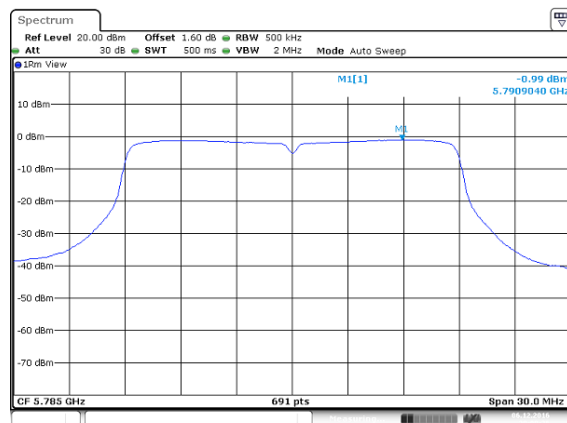


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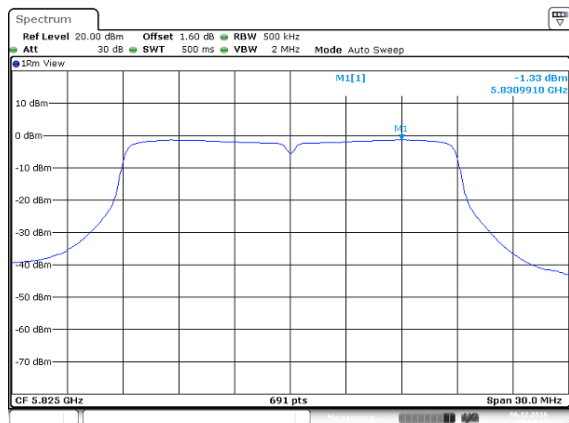
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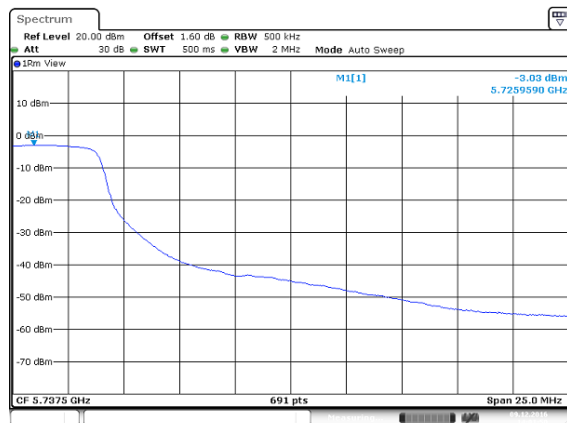
Mid CH



High CH

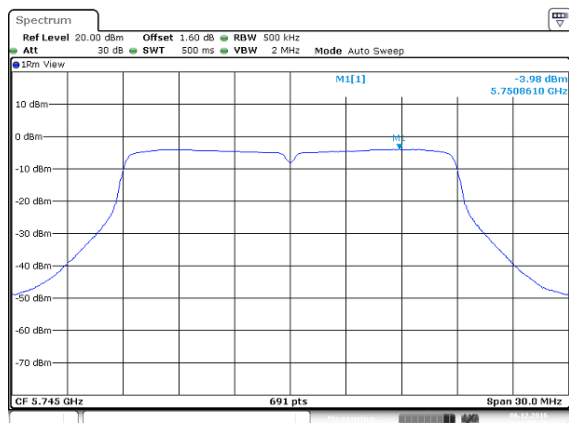


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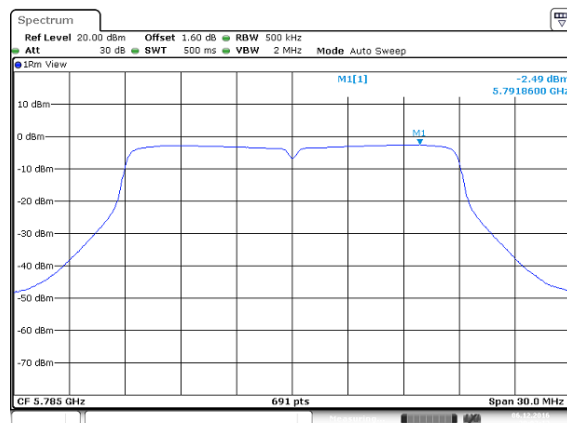
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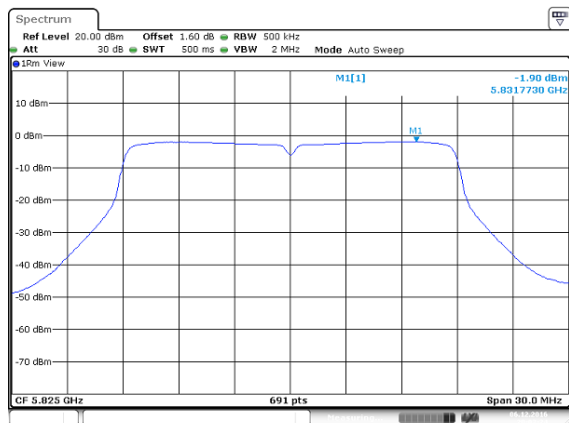
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Mid CH



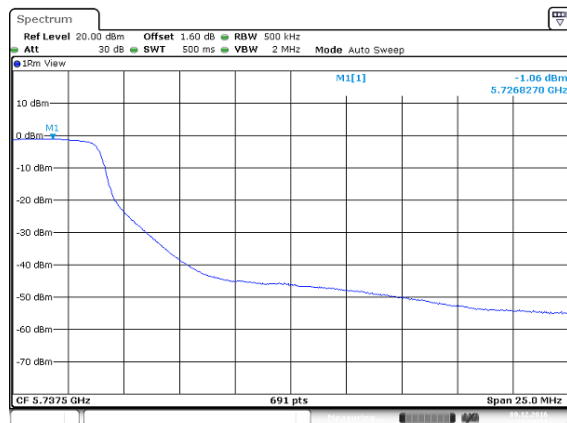
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High CH



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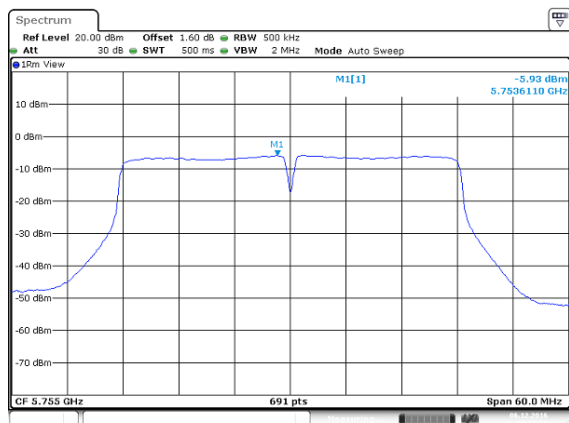
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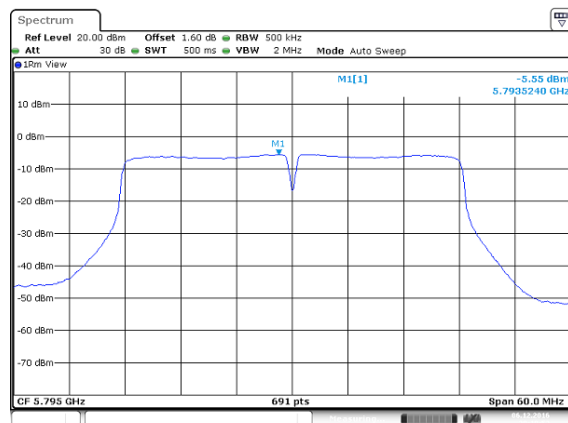
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UNII-3 IEEE 802.11n HT40 mode- chain 0

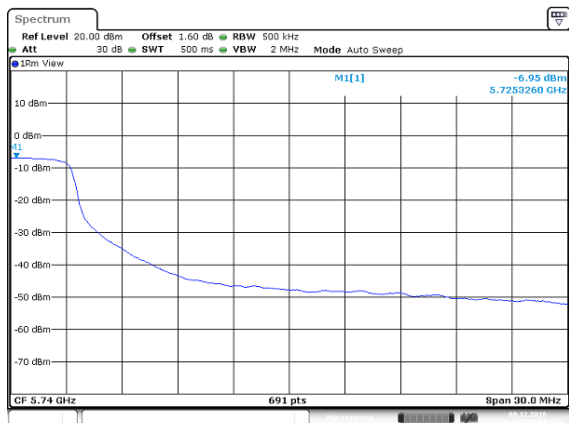
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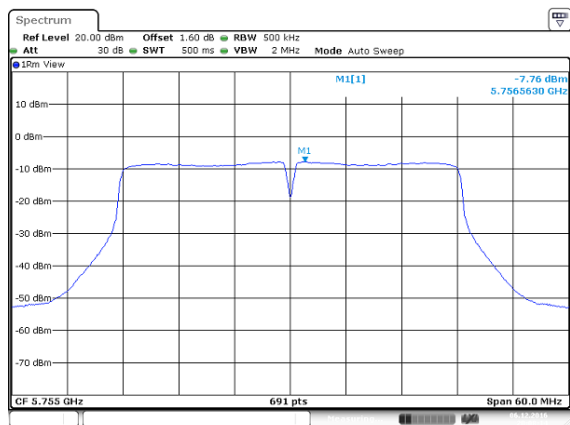


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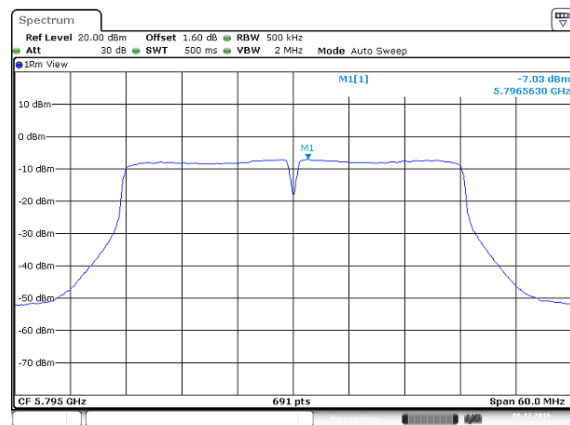


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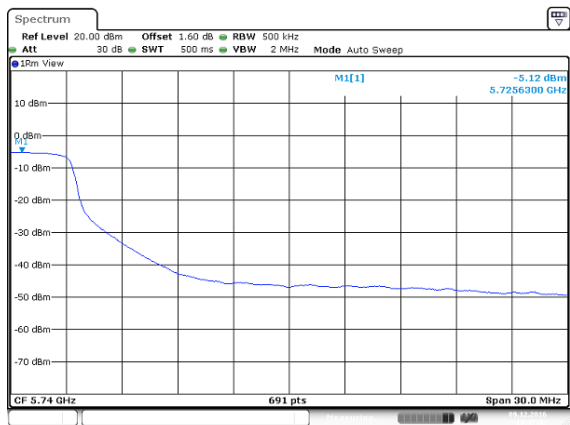
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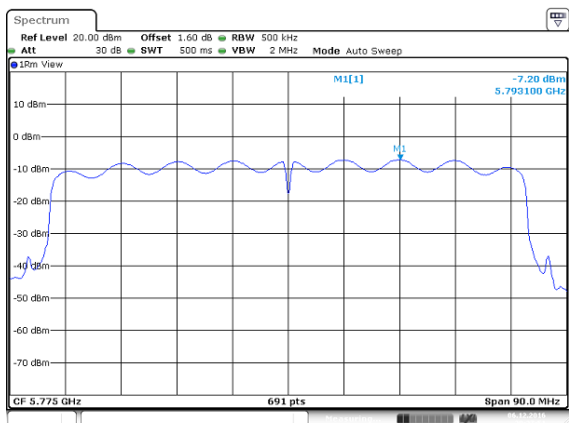


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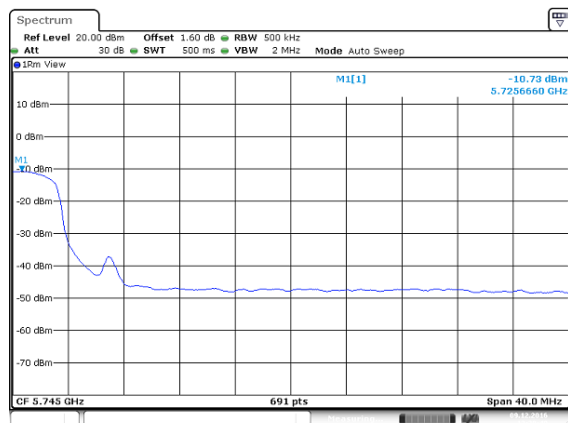
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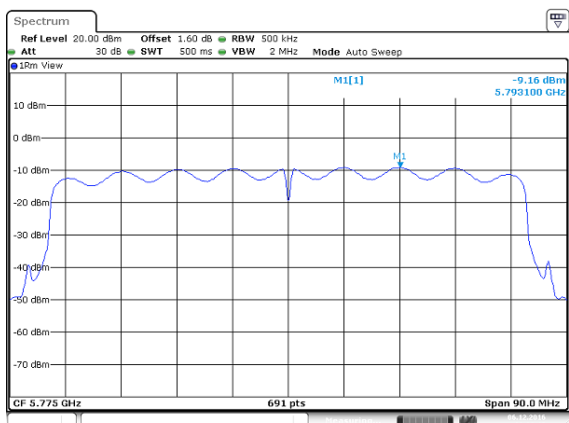
Cross CH



Date: 9 DEC 2016 13:28:46

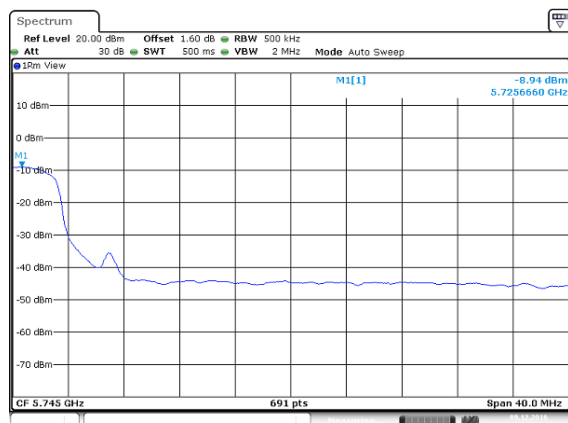
UNII-3 IEEE 802.11ac VHT80 mode- chain 1

Mid CH



Date: 6 DEC 2016 20:26:56

Cross CH



Date: 9 DEC 2016 13:27:02

4.5 RADIATION BANDEGE AND SPURIOUS EMISSION

4.5.1 Test Limit

FCC according to §15.407, §15.209 and §15.205,

Below 30 MHz

Frequency	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/F (F in kHz)	30
1.705-30 MHz	30	N/A	30

Above 30 MHz

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

IC according to RSS-247 section 6.2.1(2), section 6.2.2(2), section 6.2.3(2) and section 6.2.4(2)

UNII-1 :

For transmitters operating in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. However, any unwanted emissions that fall into the band 5250-5350 MHz must be 26 dBc, when measured using a resolution bandwidth between 1 and 5% of the occupied bandwidth, above 5.25 GHz. Otherwise, the transmission is considered as intentional and the devices shall implement dynamic frequency selection (DFS) and transmitter power control (TPC) as per the requirements for the band 5250-5350 MHz

UNII-2a and 2c :

For devices with operating frequencies in the band 5250-5350 MHz but having a channel bandwidth that overlaps the band 5150-5250 MHz, the devices' unwanted emission shall not exceed -27 dBm/MHz e.i.r.p. outside the band 5150-5350 MHz and its power shall comply with the spectral power density for operation within the band 5150-5250 MHz. The device shall be labelled "for indoor use only." Emissions outside the band 5470-5725 MHz shall not exceed -27 dBm/MHz e.i.r.p.

UNII-3:

For the band 5725-5850 MHz, emissions at frequencies from the band edges to 10 MHz above or below the band edges shall not exceed -17 dBm/MHz e.i.r.p.

For emissions at frequencies more than 10 MHz above or below the band edges, the emissions power shall not exceed -27 dBm/MHz

4.5.2 Test Procedure

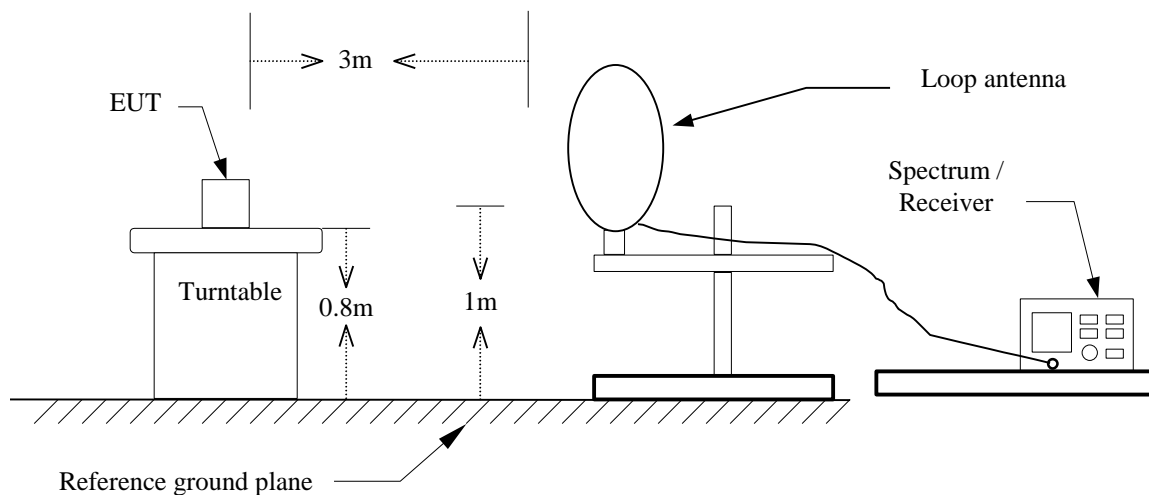
Test method Refer as KDB 789033 D02 v01r03, Section G.3, G.4, G.5, and G.6,.

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m and below 1 GHz is 0.8m above ground plane. The EUT Configured un accordance with ANSI C63.10, and the EUT set in a continuous mode.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. And EUT is set 3m away from the receiving antenna, which is scanned from 1m to 4m above the ground plane to find out the highest emissions. Measurement are made polarized in both the vertical and the horizontal positions with antenna.
3. Span shall wide enough to full capture the emission measured. The SA from 30MHz to 26.5GHz set to the low, Mid and High channels with the EUT transmit.
5. The SA setting following :
 - (1) Below 1G : RBW = 100kHz, VBW \geq 3*RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
 - (2) Above 1G :
 - (2.1) For Peak measurement : RBW = 1MHz, VBW \geq 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
 - (2.2) For Average measurement : RBW = 1MHz, VBW
 - If Duty Cycle \geq 98%, VBW=10Hz.
 - If Duty Cycle < 98%, VBW=1/T.

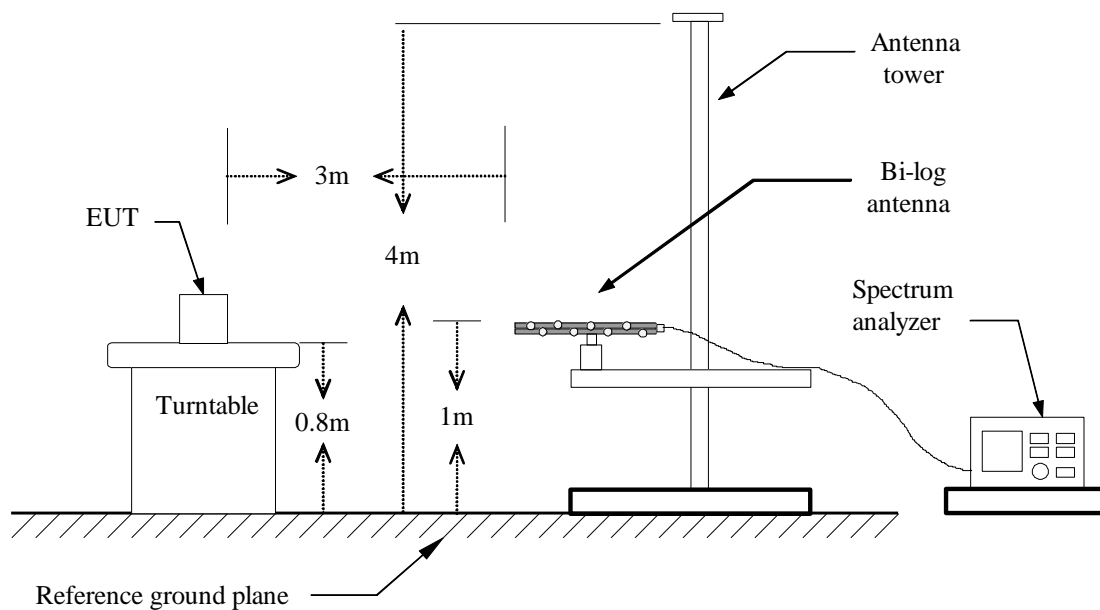
Configuration	Duty Cycle (%)	VBW
802.11a	100%	10Hz
802.11n HT20	100%	10Hz
802.11n HT40	100%	10Hz
802.11ac VHT80	100%	10Hz

4.5.3 Test Setup

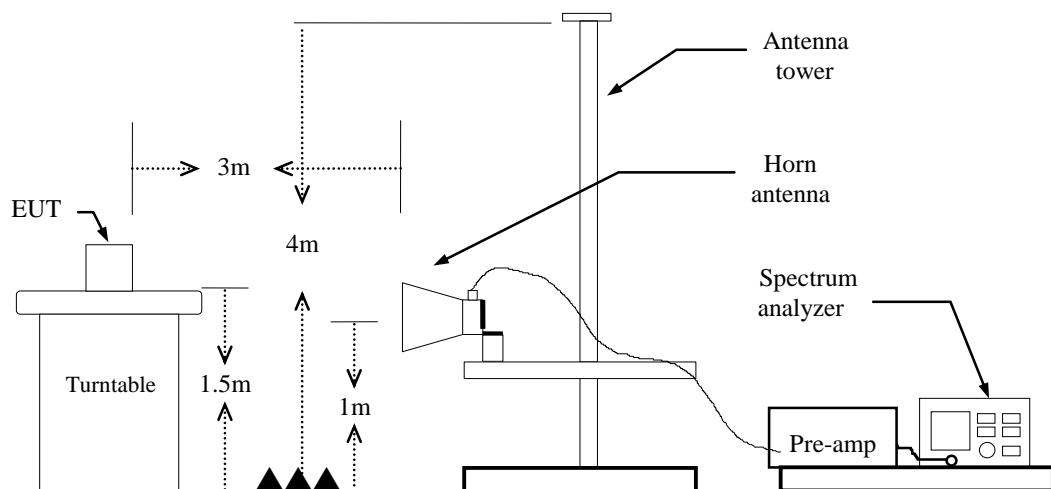
9kHz ~ 30MHz



30MHz ~ 1GHz



Above 1 GHz

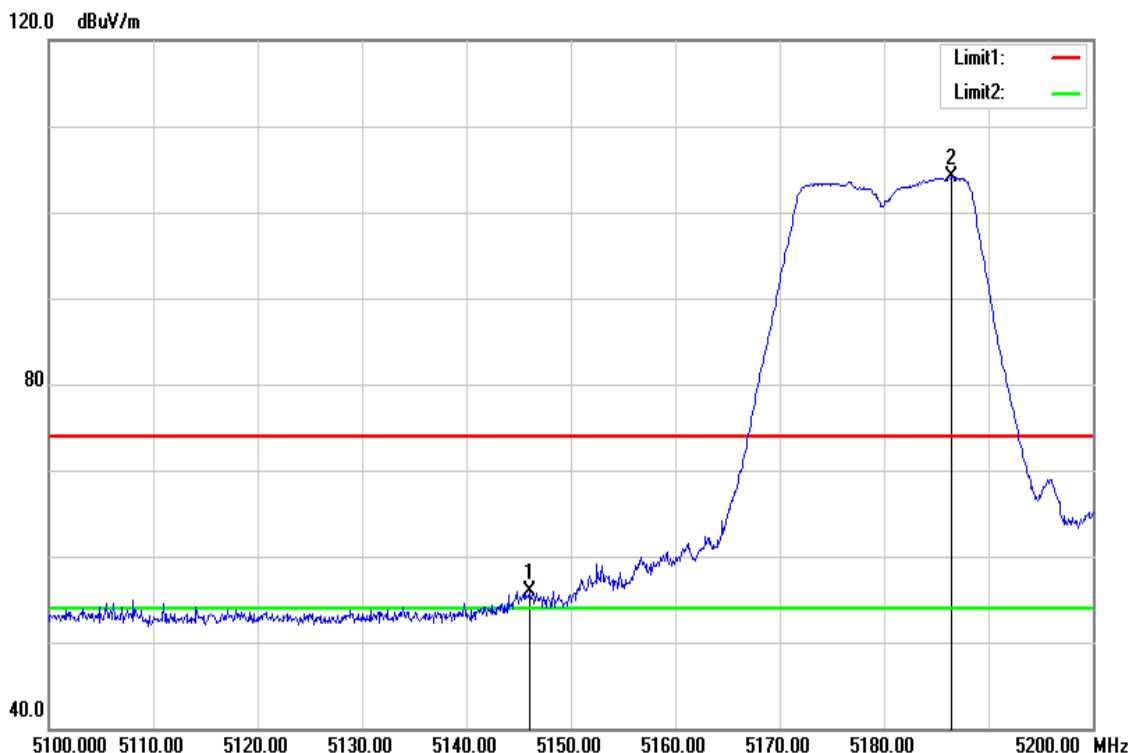


4.5.4 Test Result

Test Data

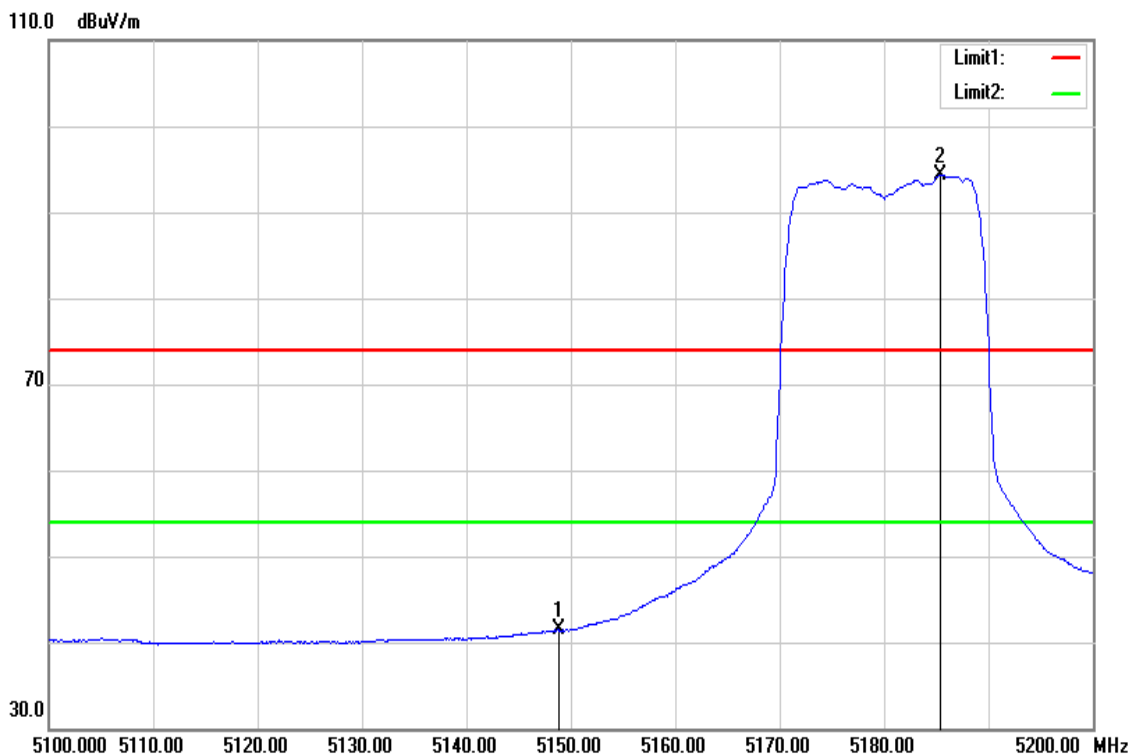
Band Edge Test Data for UNII-1

Test Mode	IEEE 802.11a Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 12, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



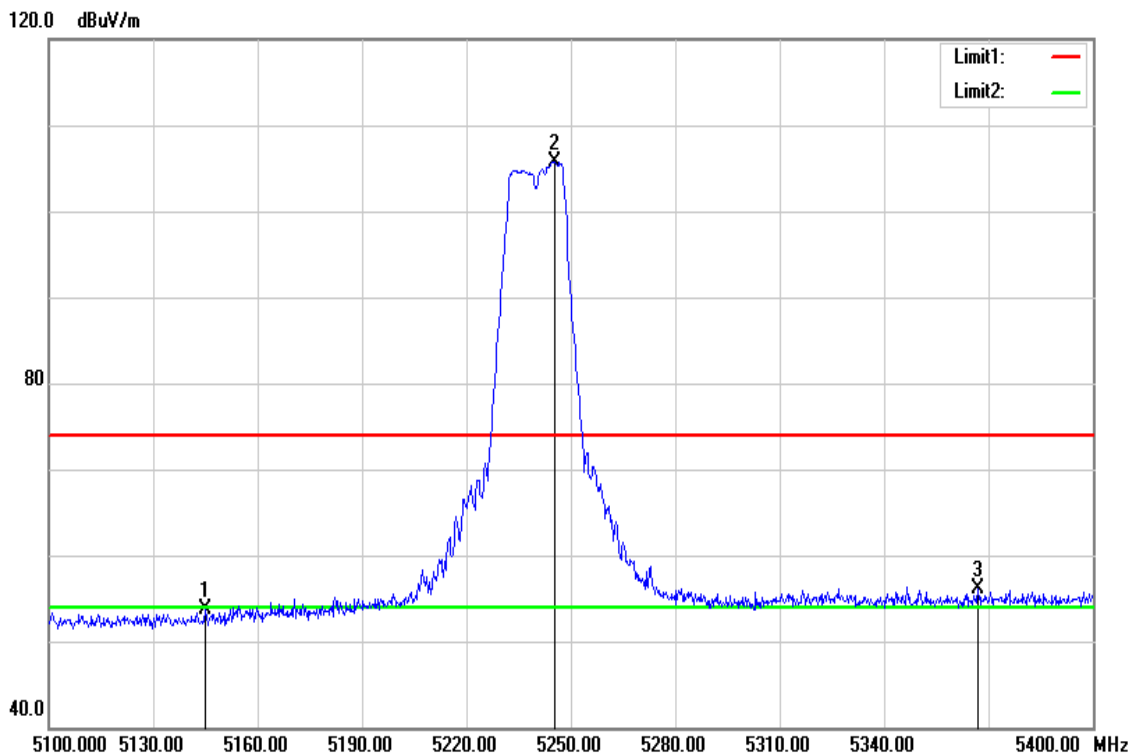
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5146.000	52.96	3.01	55.97	74.00	-18.03	Peak
5186.500	100.00	4.10	104.10	-	-	Peak

Test Mode	IEEE 802.11a Low CH	Temperature	27(°C) / 53%RH
Test Item	Band Edge	Test Date	Dec 12, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



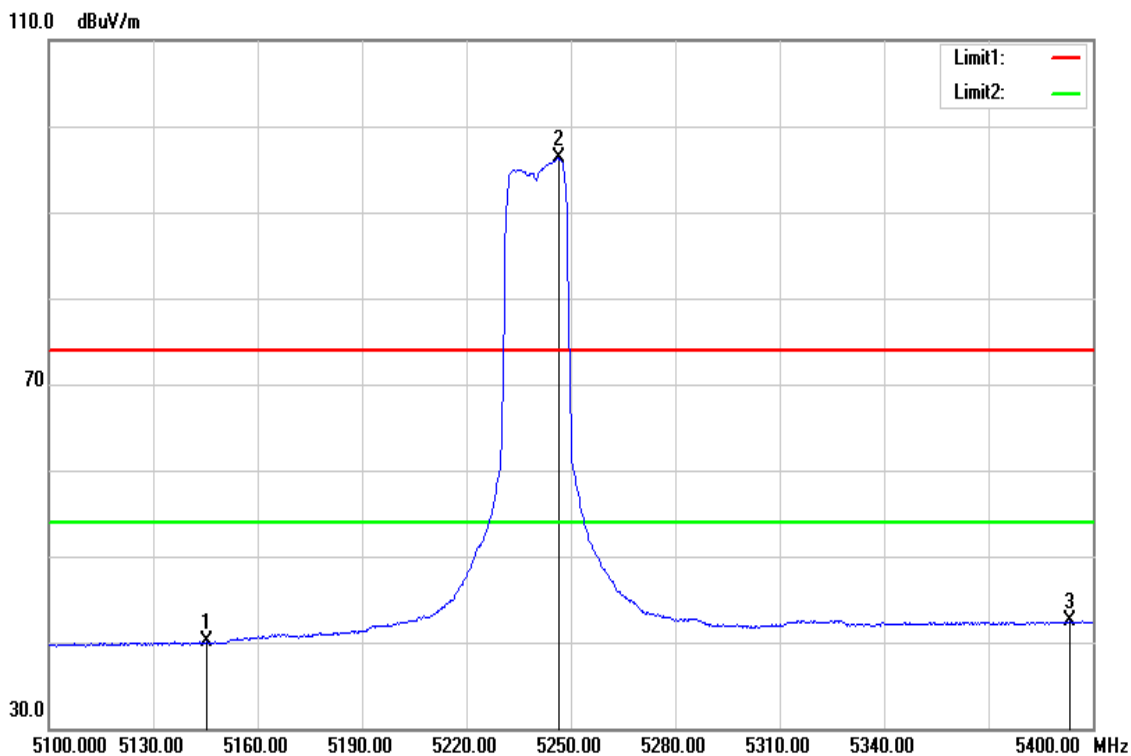
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5148.800	38.42	3.03	41.45	54.00	-12.55	AVG
5185.400	90.24	4.07	94.31	-	-	AVG

Test Mode	IEEE 802.11a High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 12, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



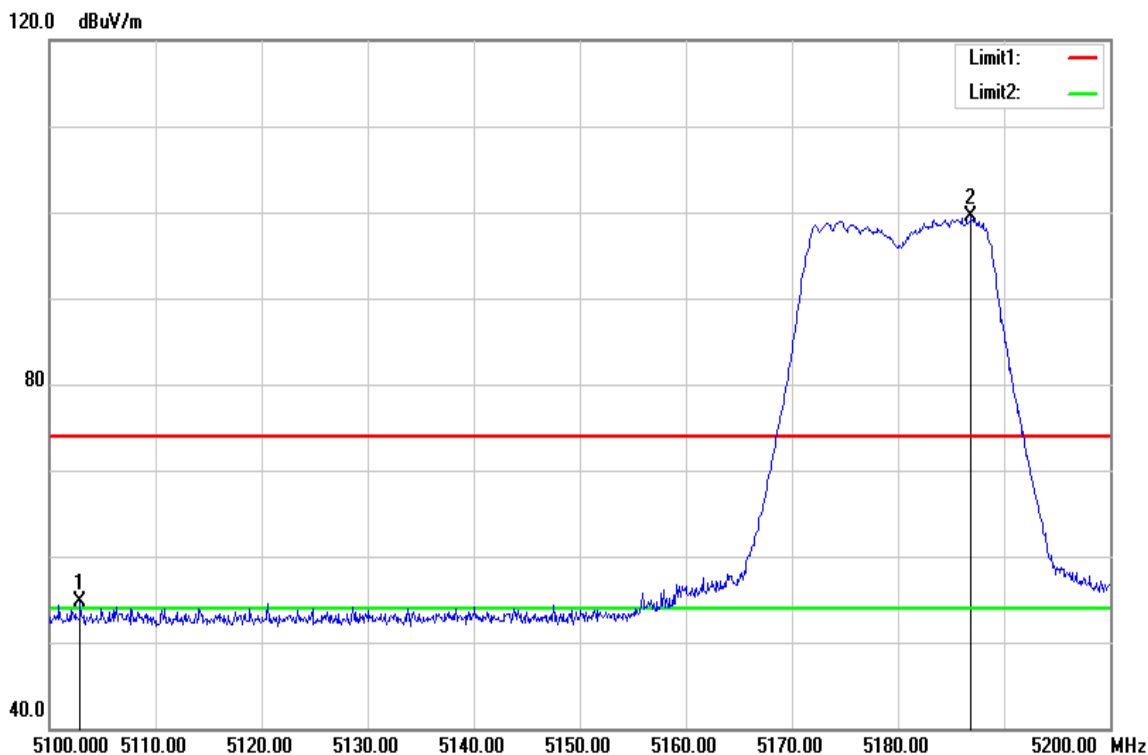
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5145.000	50.76	3.01	53.77	74.00	-20.23	Peak
5245.500	101.10	4.64	105.74	-	-	Peak
5367.000	50.71	5.45	56.16	74.00	-17.84	Peak

Test Mode	IEEE 802.11a High CH	Temperature	27(°C) / 53%RH
Test Item	Band Edge	Test Date	Dec 12, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



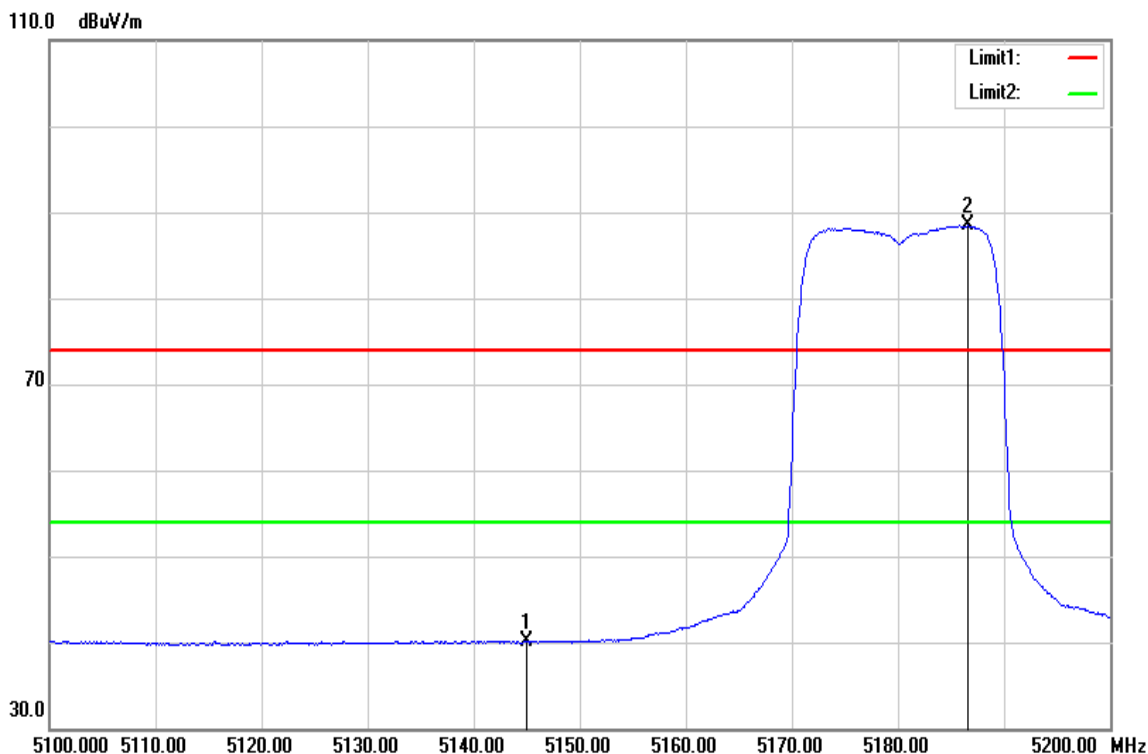
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5145.300	37.08	3.01	40.09	54.00	-13.91	AVG
5246.400	91.59	4.65	96.24	-	-	AVG
5393.400	36.74	5.67	42.41	54.00	-11.59	AVG

Test Mode	IEEE 802.11n HT20 Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 12, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



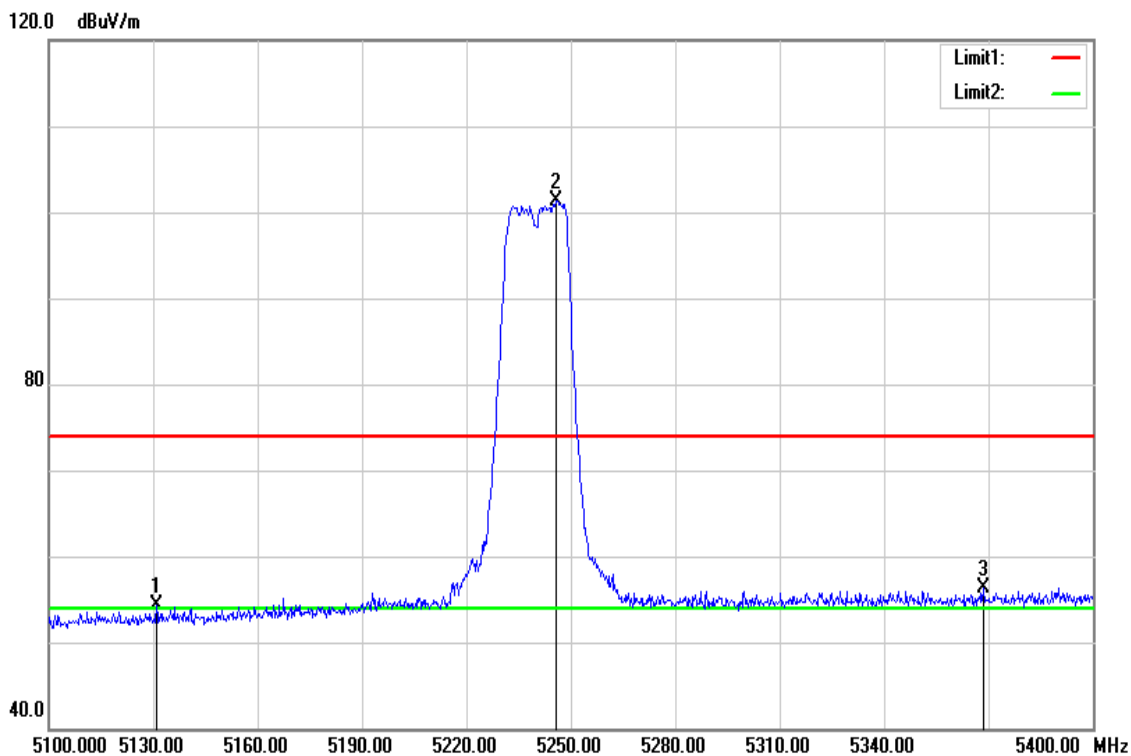
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5102.900	52.00	2.72	54.72	74.00	-19.28	Peak
5186.900	95.33	4.11	-	-	25.44	Peak

Test Mode	IEEE 802.11n HT20 Low CH	Temperature	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 12, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



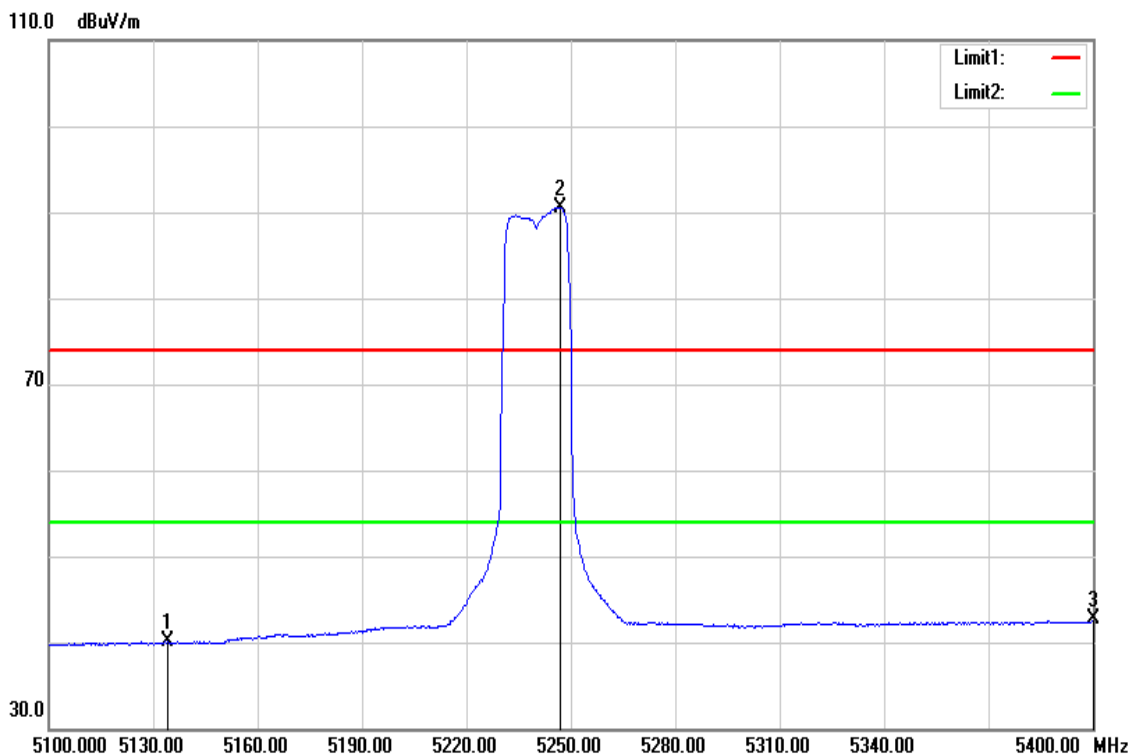
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5145.000	37.18	3.01	40.19	54.00	-13.81	AVG
5186.600	84.36	4.10	-	-	34.46	AVG

Test Mode	IEEE 802.11n HT20 High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 12, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



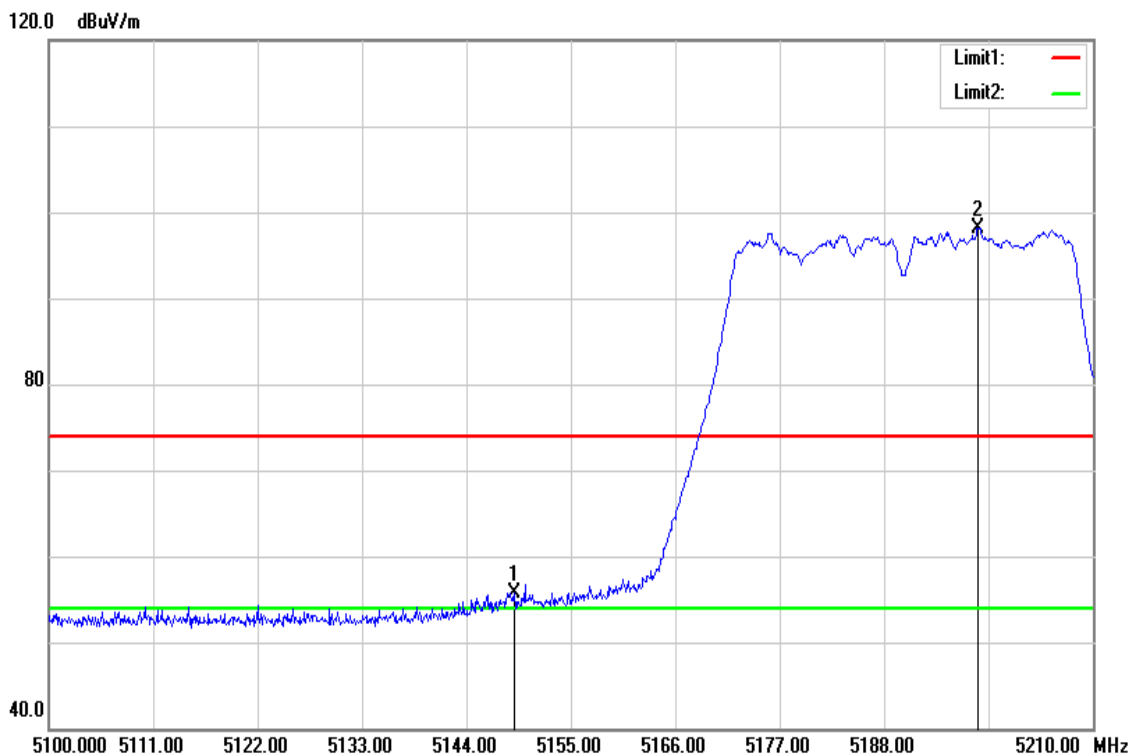
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5130.900	51.32	2.91	54.23	74.00	-19.77	Peak
5245.800	96.70	4.65	101.35	-	-	Peak
5368.500	50.87	5.46	56.33	74.00	-17.67	Peak

Test Mode	IEEE 802.11n HT20 High CH	Temperature	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 12, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



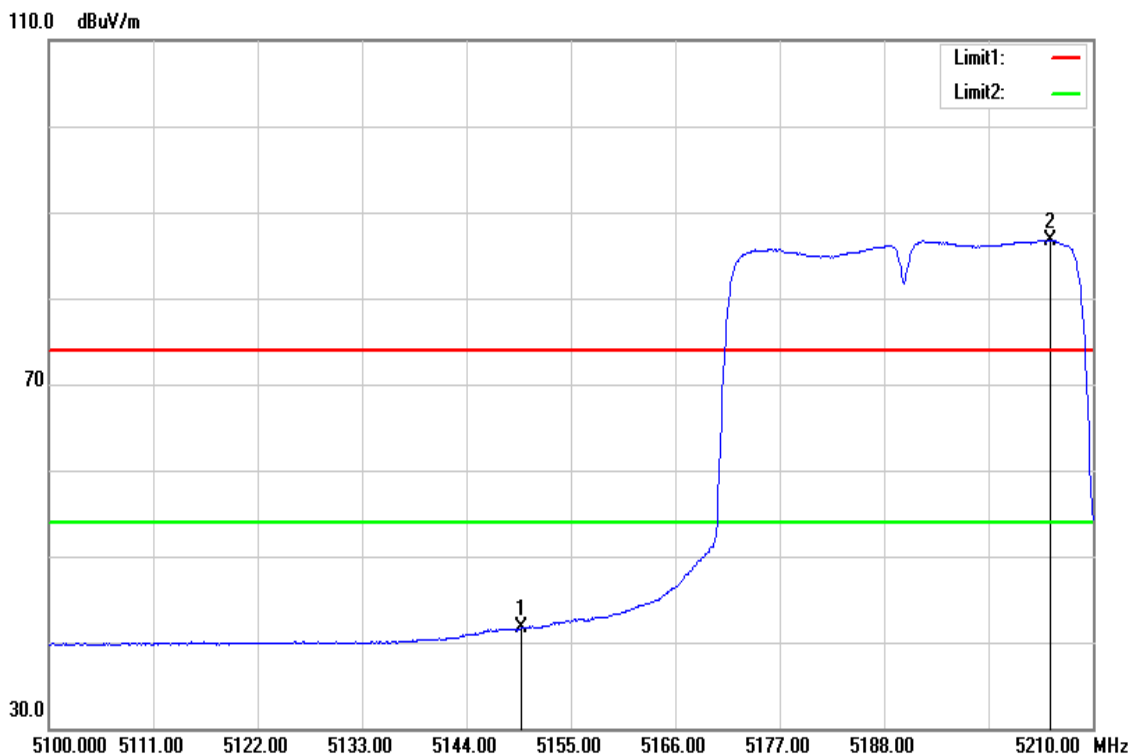
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5134.200	37.17	2.93	40.10	54.00	-13.90	AVG
5247.000	85.86	4.65	90.51	-	-	AVG
5400.000	36.91	5.72	42.63	54.00	-11.37	AVG

Test Mode	IEEE 802.11n HT40 Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 12, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



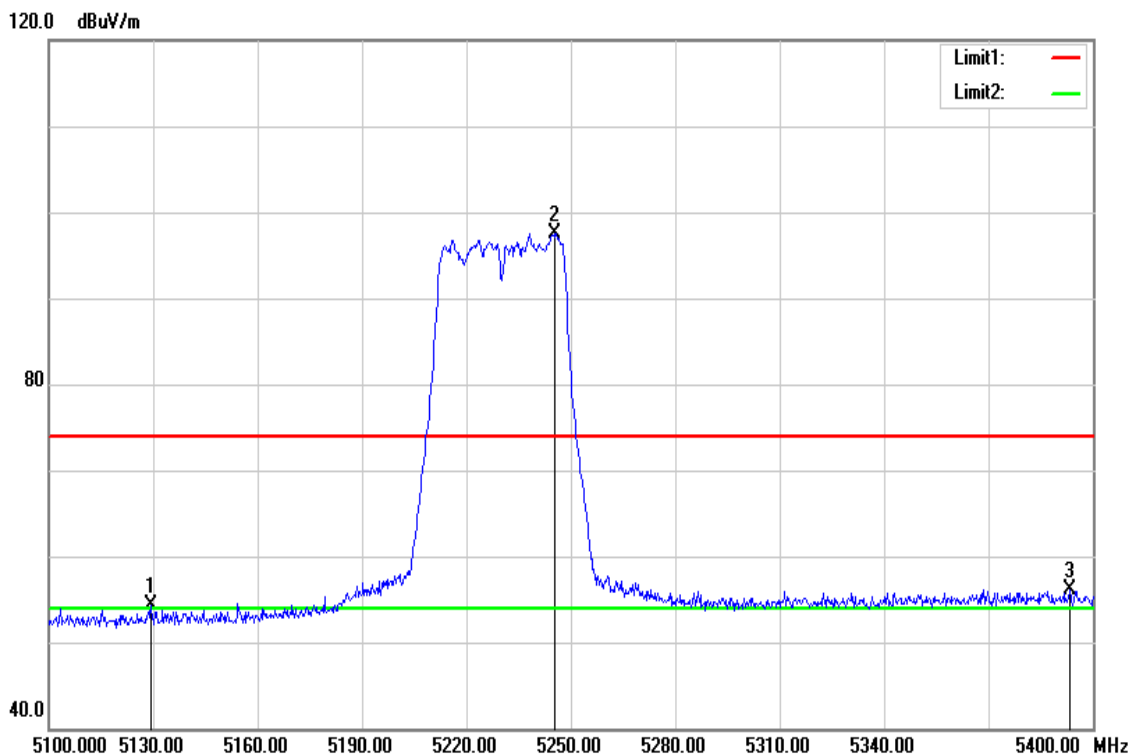
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5149.060	52.70	3.03	55.73	74.00	-18.27	Peak
5197.900	93.76	4.43	98.19	-	-	Peak

Test Mode	IEEE 802.11n HT40 Low CH	Temperature	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 12, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



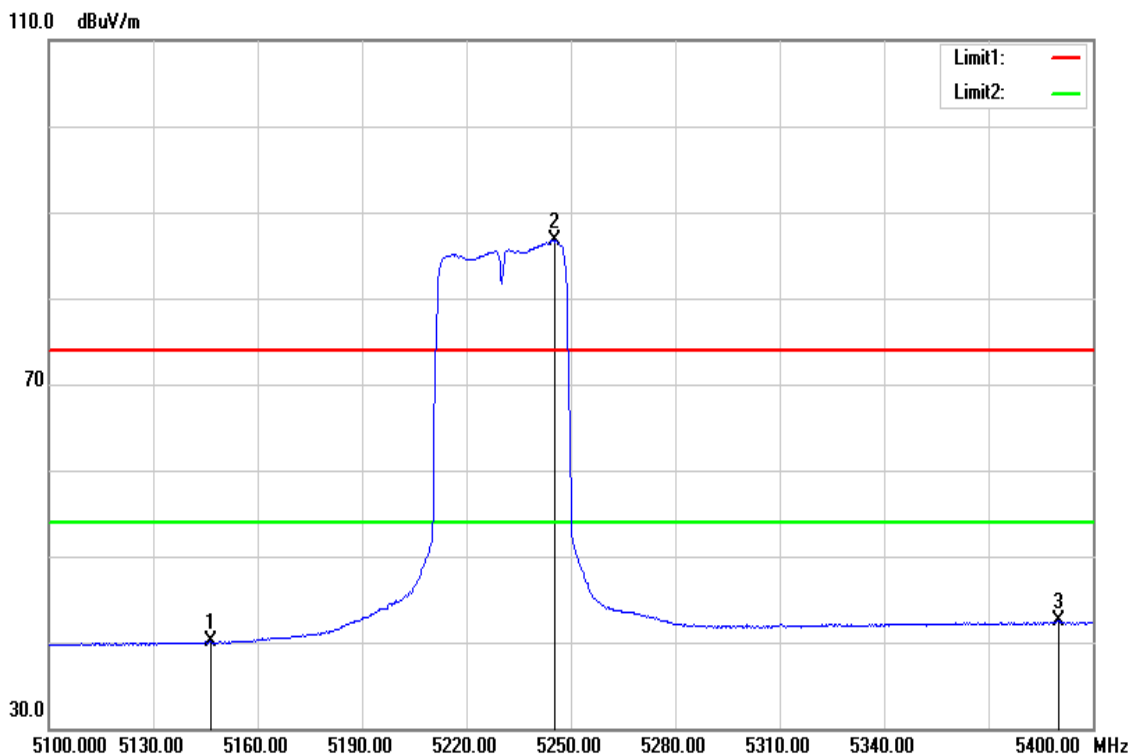
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5149.720	38.67	3.04	41.71	54.00	-12.29	AVG
5205.490	82.18	4.51	86.69	-	-	AVG

Test Mode	IEEE 802.11n HT40 High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 12, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



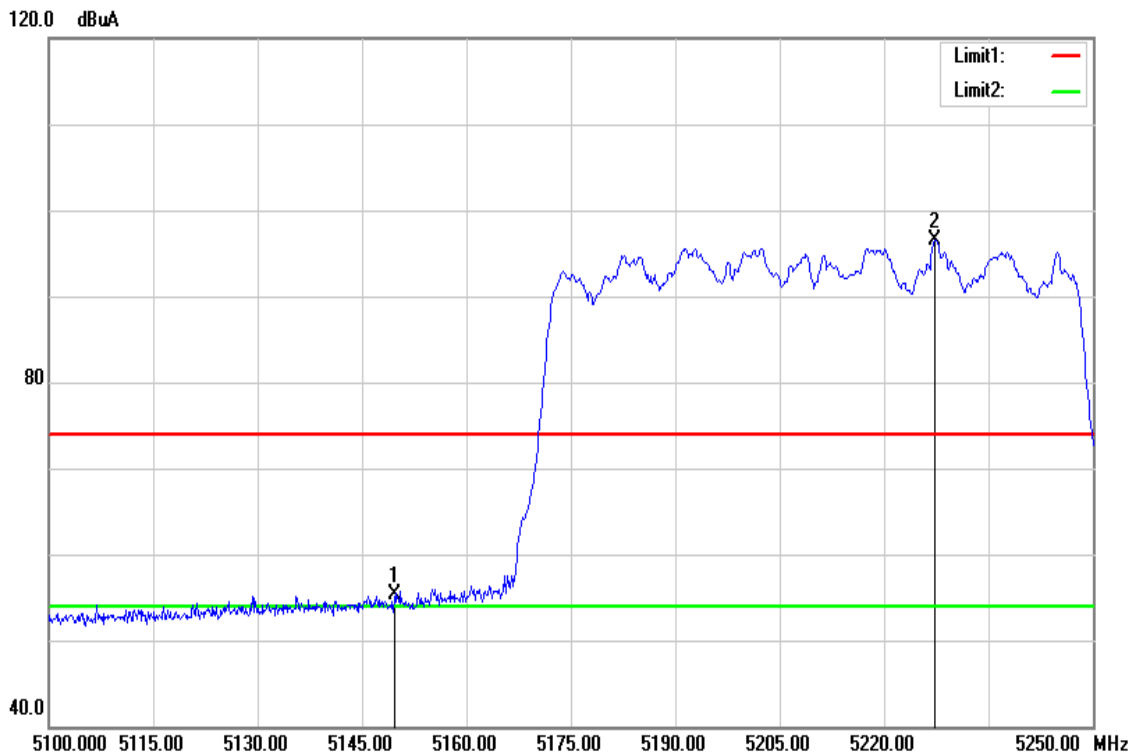
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5129.400	51.34	2.90	54.24	74.00	-19.76	Peak
5245.500	92.91	4.64	97.55	-	-	Peak
5393.400	50.50	5.67	56.17	74.00	-17.83	Peak

Test Mode	IEEE 802.11n HT40 High CH	Temperature	27(°C) / 53%RH
Test Item	Band Edge	Test Date	Dec 12, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



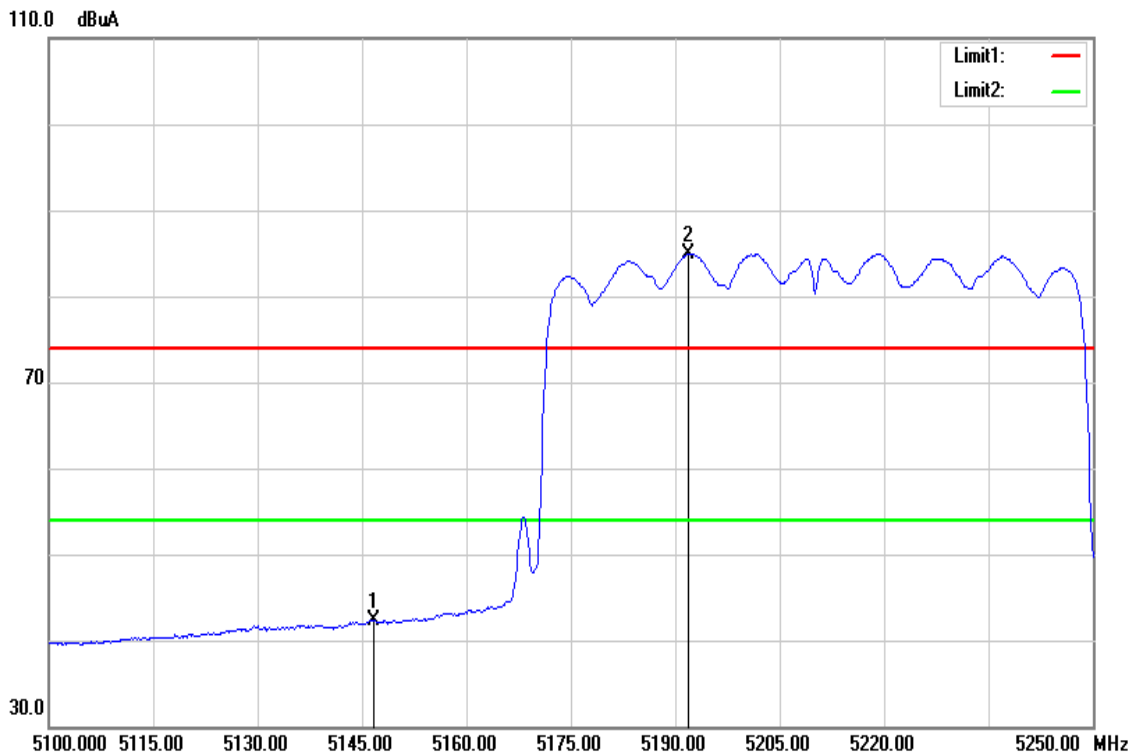
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5146.500	37.03	3.02	40.05	54.00	-13.95	AVG
5245.500	82.04	4.64	86.68	-	-	AVG
5390.100	36.92	5.64	42.56	54.00	-11.44	AVG

Test Mode	IEEE 802.11ac VHT80 Mid CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 12, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5149.650	52.16	3.04	55.20	74.00	-18.80	Peak
5227.350	91.98	4.58	96.56	74.00	22.56	Peak

Test Mode	IEEE 802.11ac VHT80 Mid CH	Temperature	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 12, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz

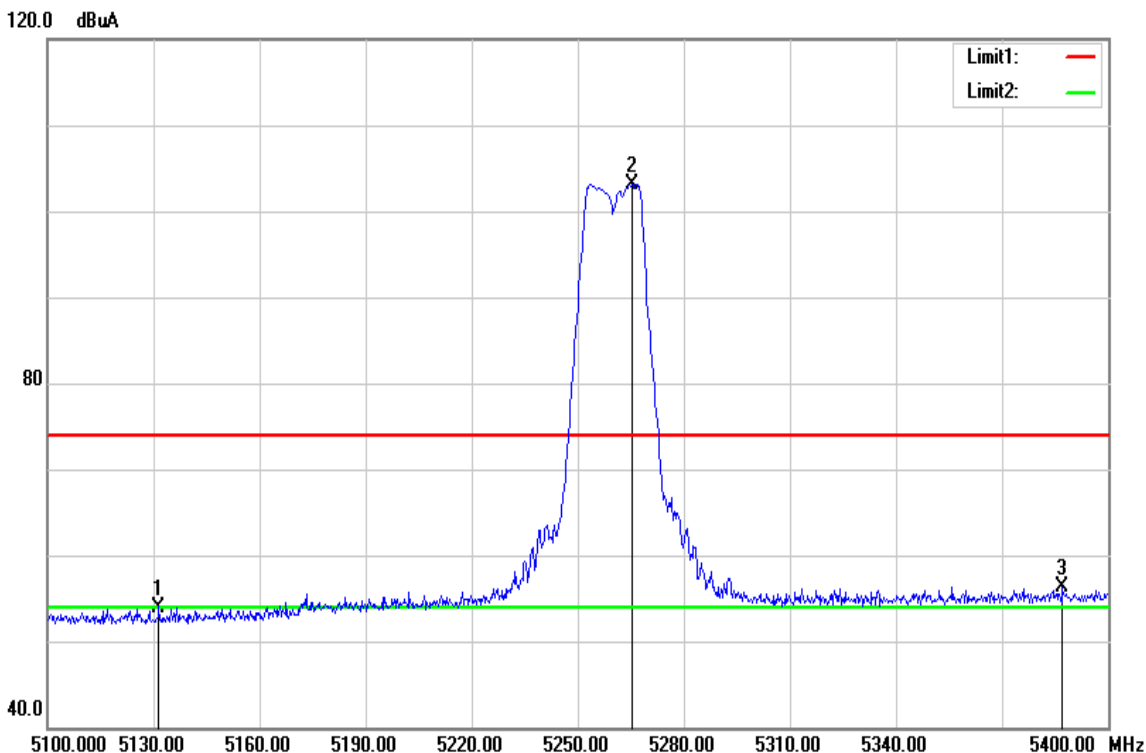


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5146.650	39.30	3.02	42.32	54.00	-11.68	AVG
5191.950	80.71	4.26	84.97	-	-	AVG

Test Data

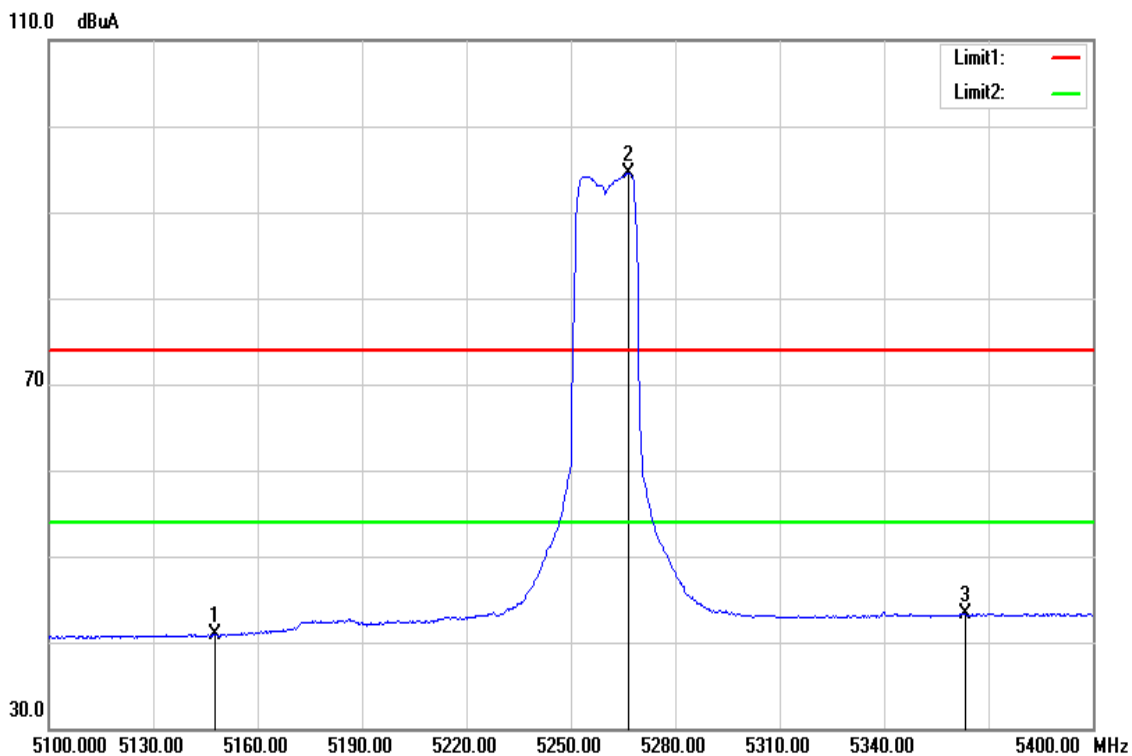
Band Edge Test Data for UNII-2a

Test Mode	IEEE 802.11a Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 13, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



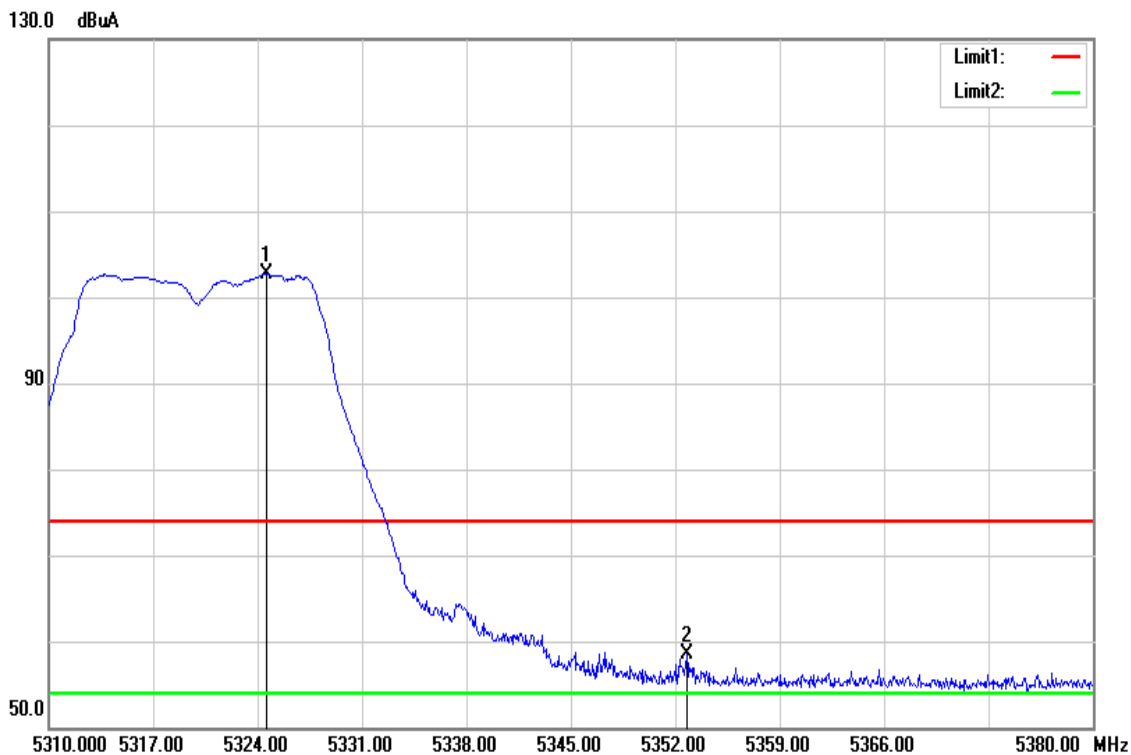
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5131.500	51.09	2.91	54.00	74.00	-20.00	Peak
5265.300	98.48	4.71	103.19	-	-	Peak
5387.100	50.79	5.61	56.40	74.00	-17.60	Peak

Test Mode	IEEE 802.11a Low CH	Temperature	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 13, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



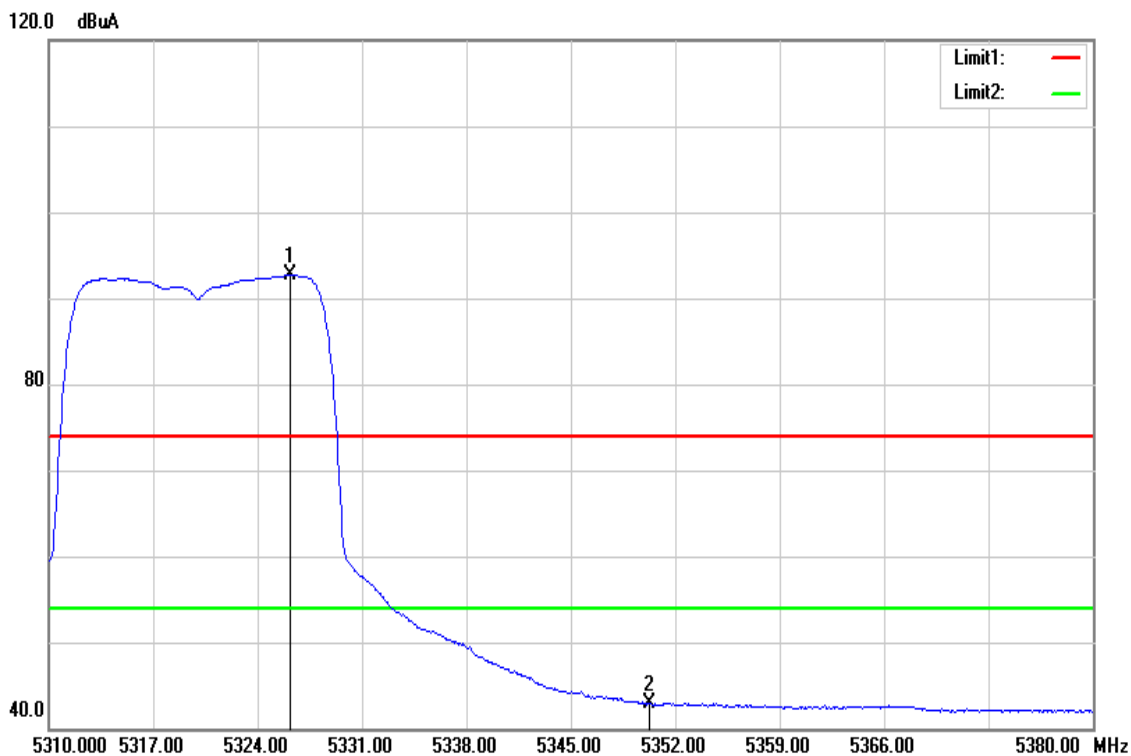
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5147.700	37.88	3.02	40.90	54.00	-13.10	AVG
5266.500	89.83	4.72	94.55	-	-	AVG
5363.400	37.92	5.42	43.34	54.00	-10.66	AVG

Test Mode	IEEE 802.11a High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 13, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



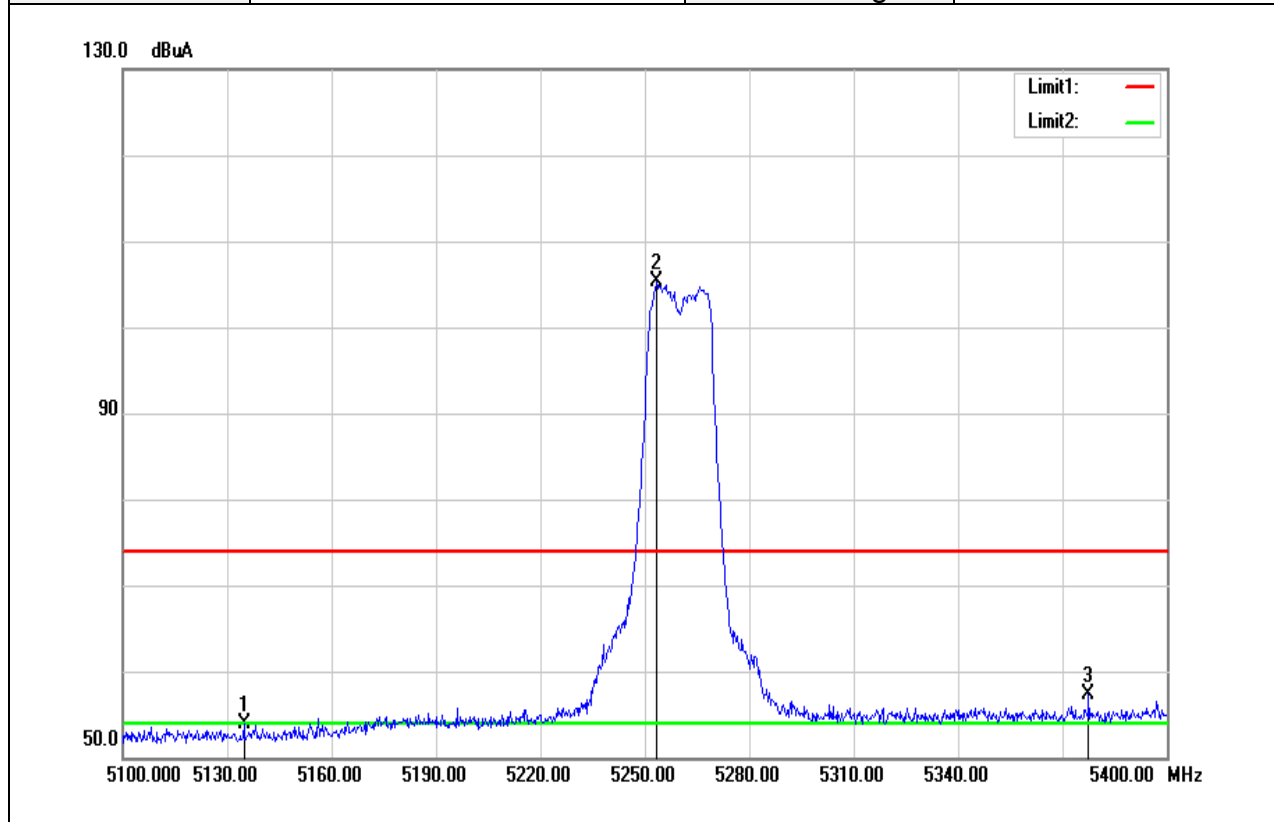
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5324.630	97.60	5.07	102.67	-	-	Peak
5352.770	53.09	5.33	58.42	74.00	-15.58	Peak

Test Mode	IEEE 802.11a High CH	Temperature	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 13, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



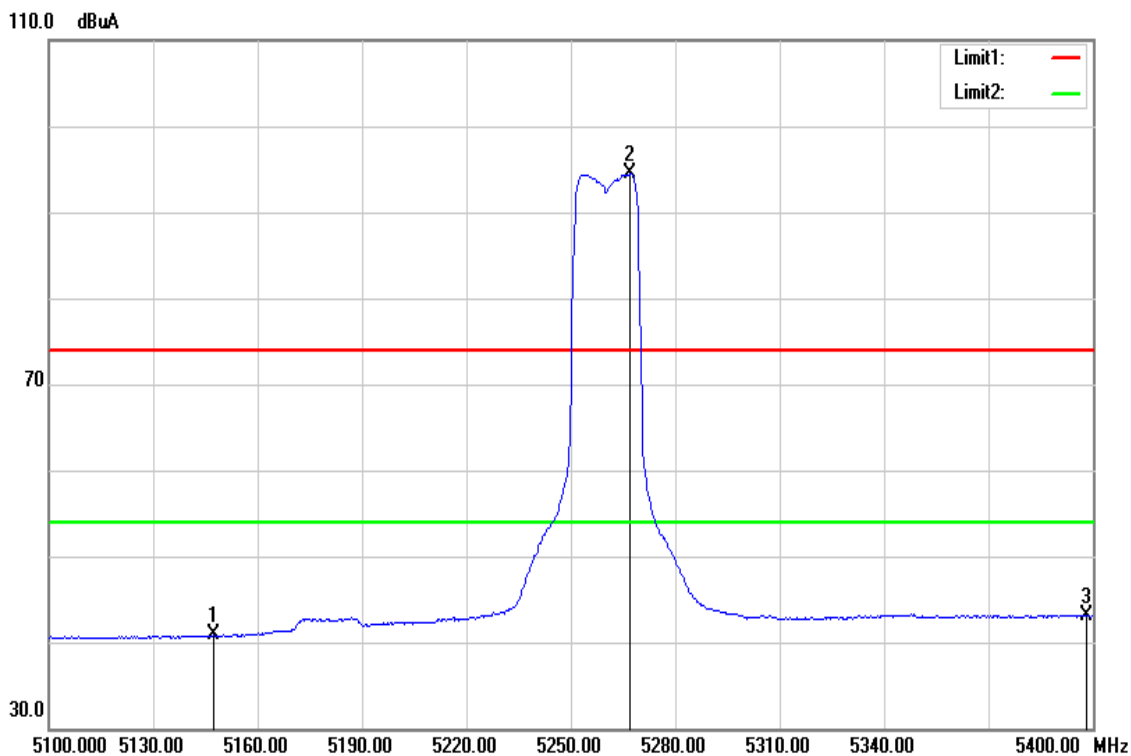
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5326.170	87.68	5.08	92.76	-	-	AVG
5350.250	37.66	5.31	42.97	54.00	-11.03	AVG

Test Mode	IEEE 802.11n HT20 Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 13, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



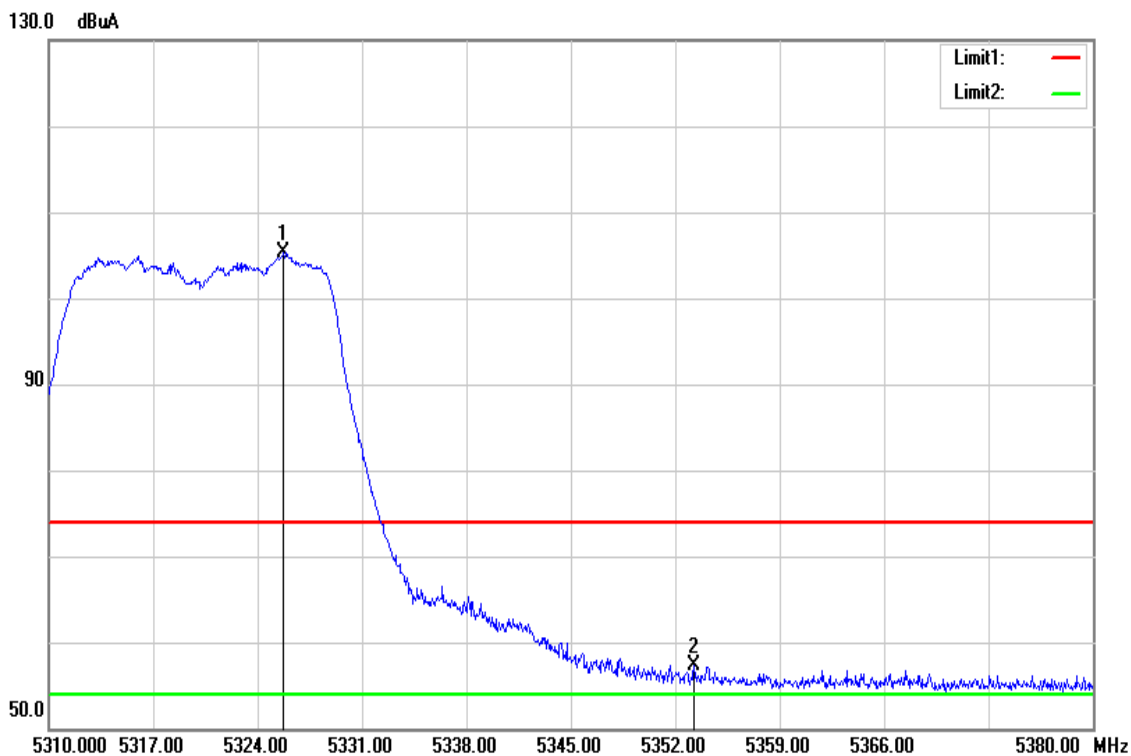
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5134.800	50.91	2.94	53.85	74.00	-20.15	Peak
5253.300	100.59	4.67	105.26	-	-	Peak
5377.500	51.72	5.54	57.26	74.00	-16.74	Peak

Test Mode	IEEE 802.11n HT20 Low CH	Temperature	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 13, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



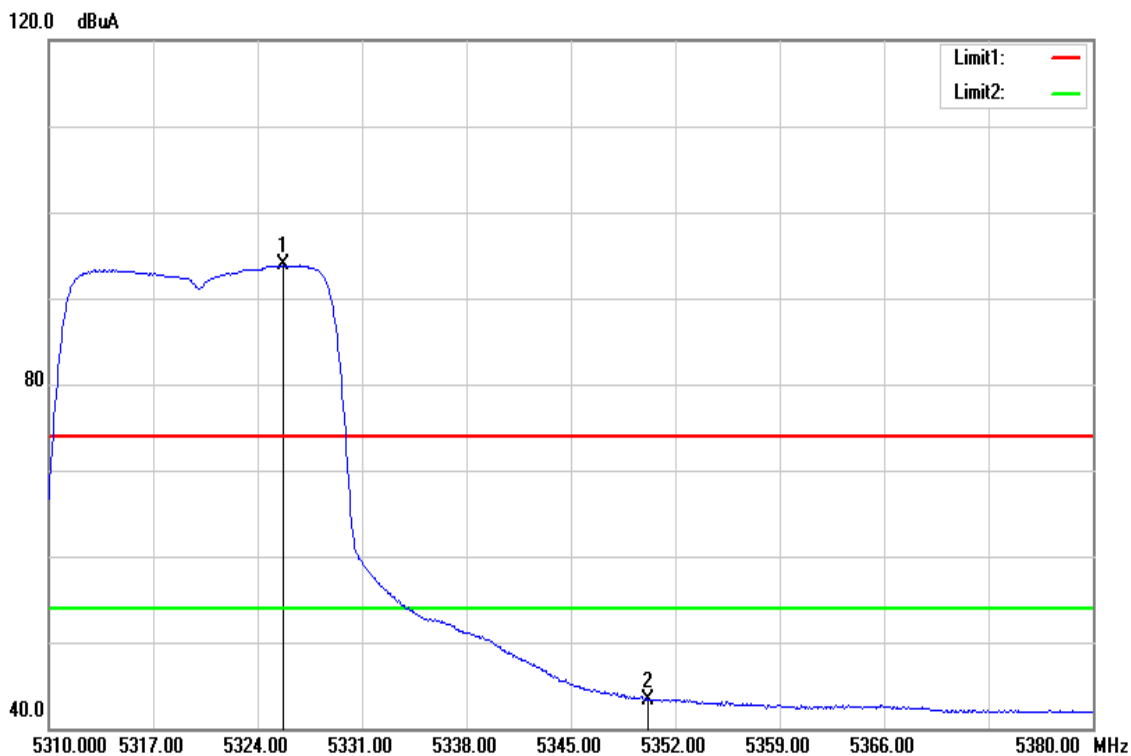
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5147.400	37.87	3.02	40.89	54.00	-13.11	AVG
5267.100	89.75	4.72	94.47	-	-	AVG
5398.200	37.48	5.71	43.19	54.00	-10.81	AVG

Test Mode	IEEE 802.11n HT20 High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 13, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



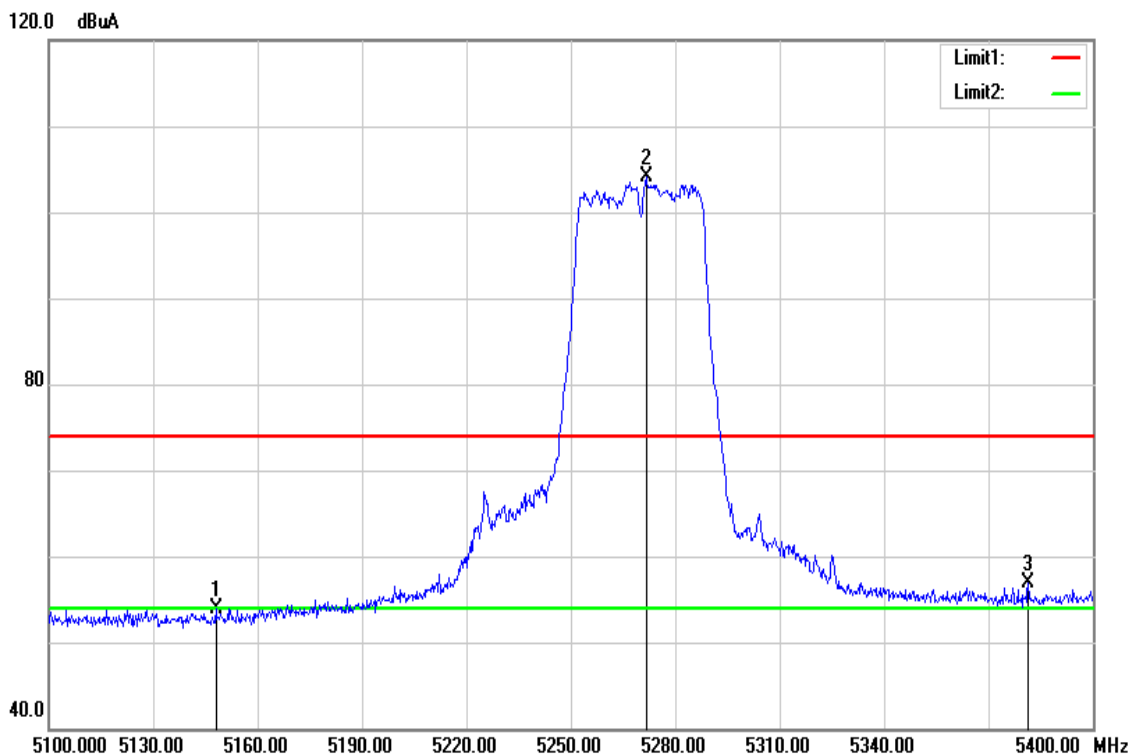
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5325.750	100.22	5.08	105.30	-	-	Peak
5353.260	51.91	5.34	57.25	74.00	-16.75	Peak

Test Mode	IEEE 802.11n HT20 High CH	Temperature	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 13, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



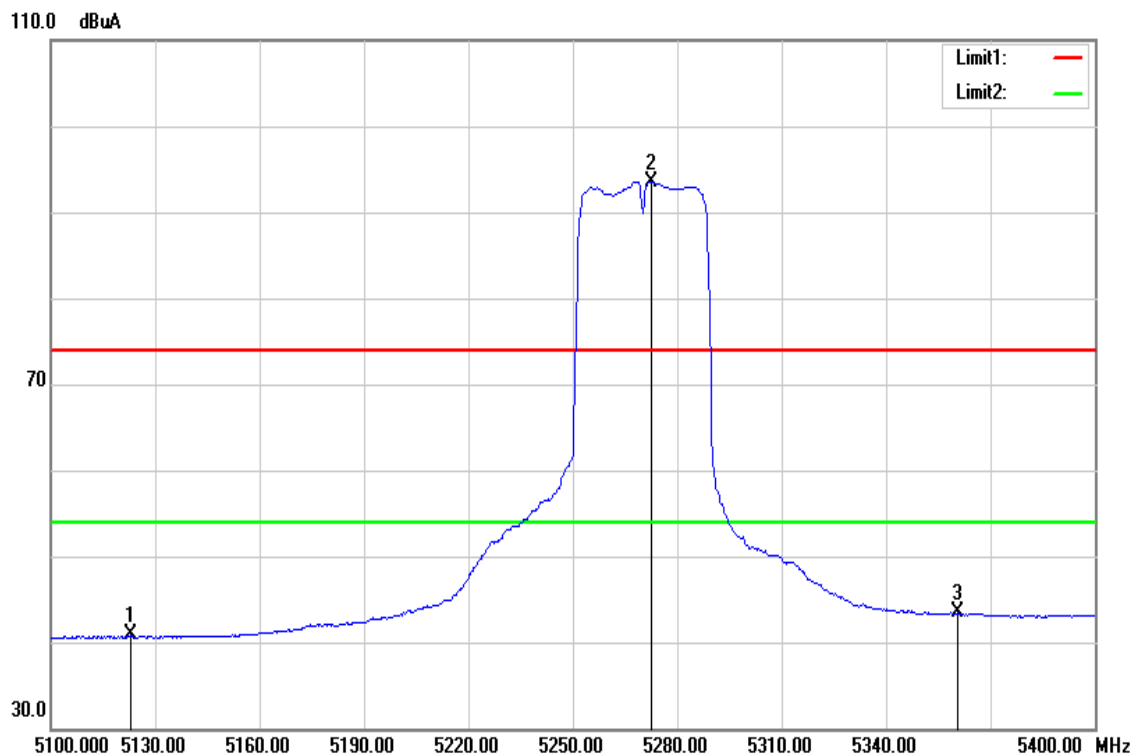
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5325.680	88.74	5.08	93.82	-	-	AVG
5350.180	38.08	5.31	43.39	54.00	-10.61	AVG

Test Mode	IEEE 802.11n HT40 Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 13, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



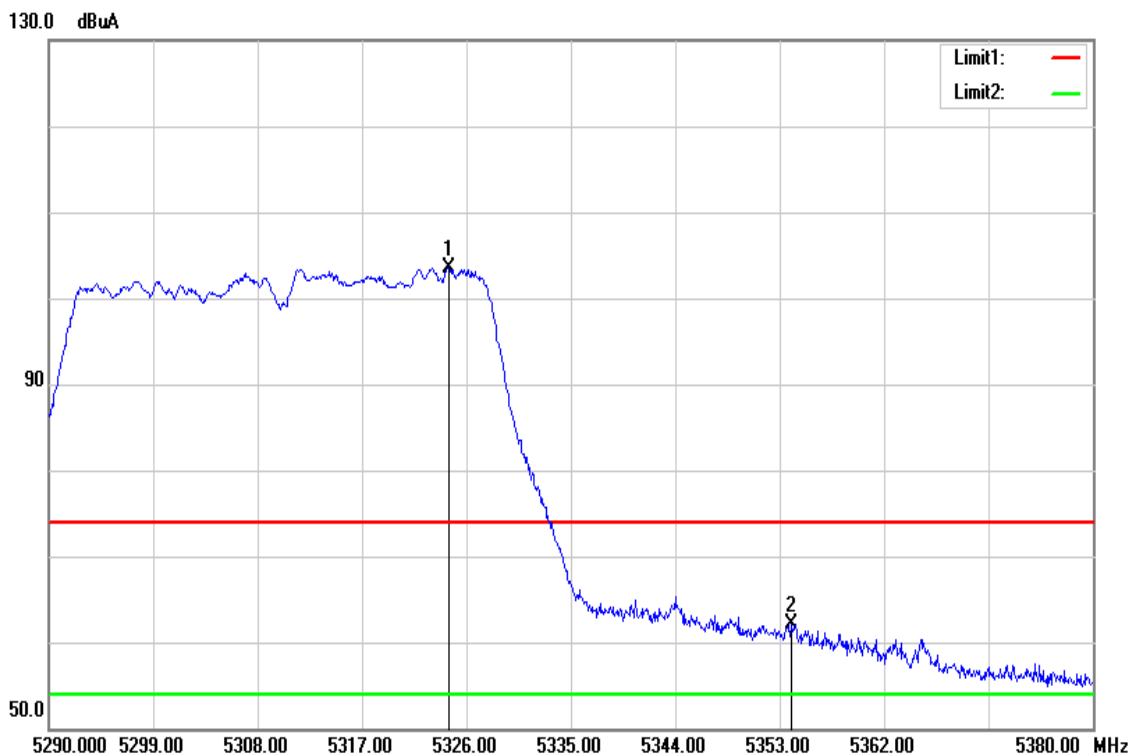
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5148.000	50.92	3.03	53.95	74.00	-20.05	Peak
5271.600	99.30	4.73	104.03	-	-	Peak
5381.400	51.32	5.57	56.89	74.00	-17.11	Peak

Test Mode	IEEE 802.11n HT40 Low CH	Temperature	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 13, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



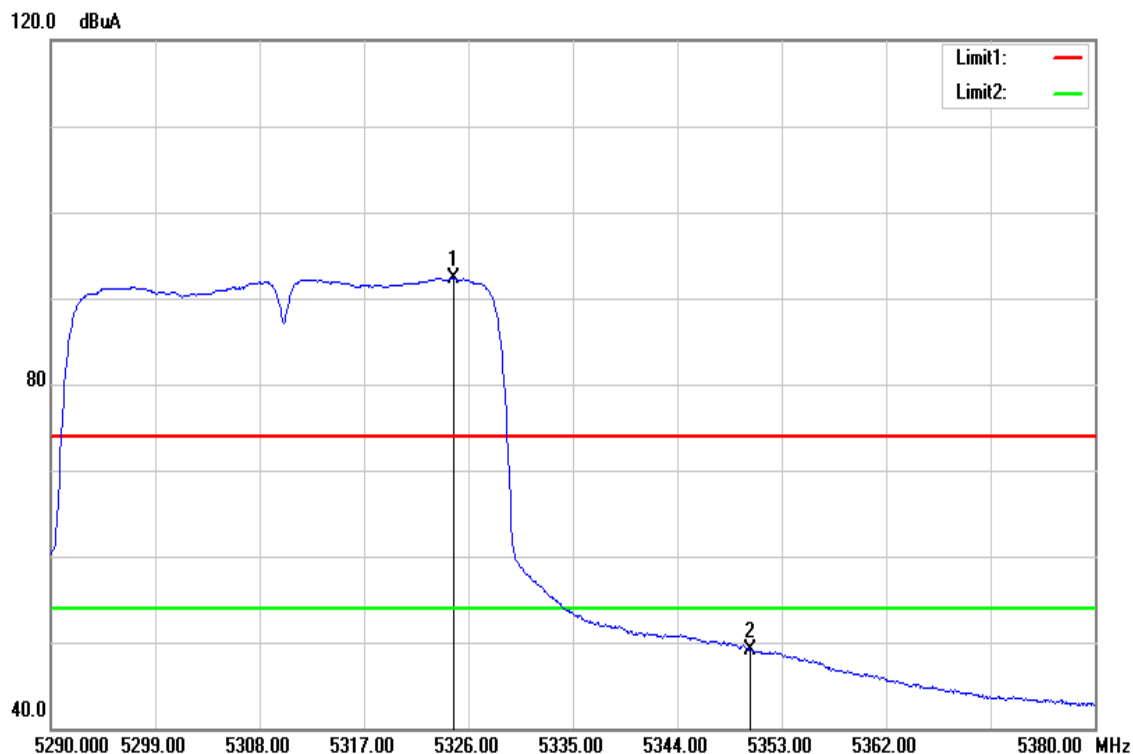
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5122.800	38.02	2.86	40.88	54.00	-13.12	AVG
5272.500	88.82	4.74	93.56	-	-	AVG
5360.400	38.05	5.40	43.45	54.00	-10.55	AVG

Test Mode	IEEE 802.11n HT40 High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 13, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



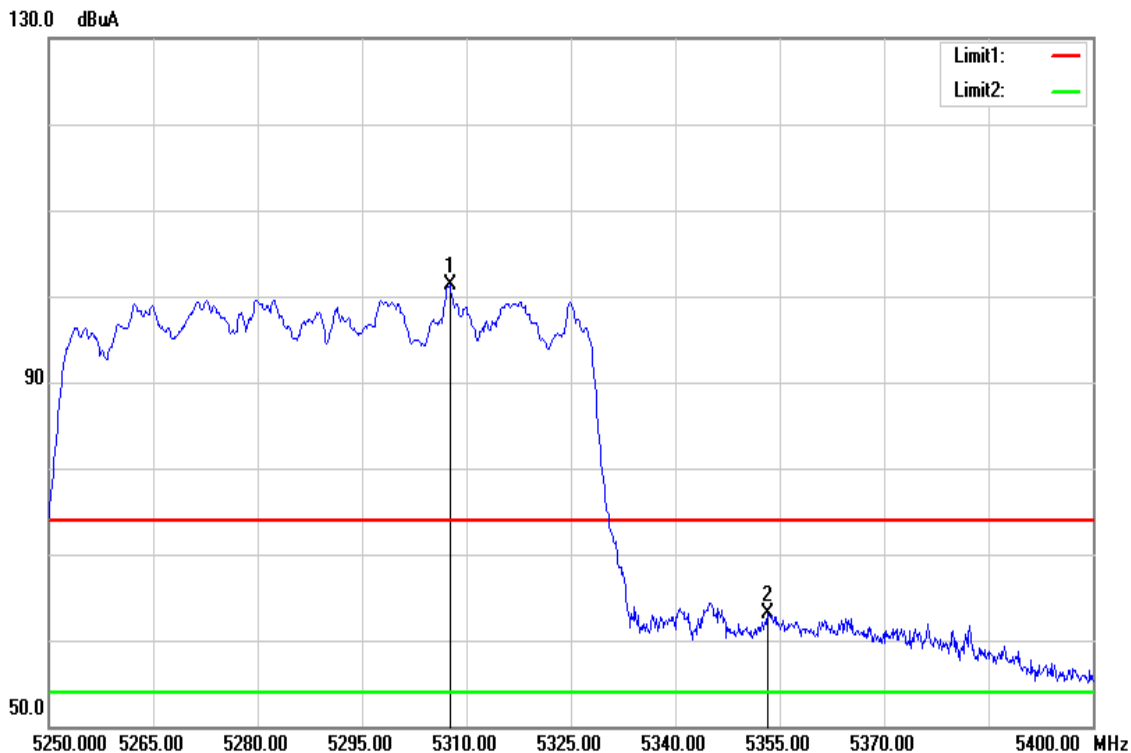
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5324.470	98.50	5.06	103.56	-	-	Peak
5353.990	56.74	5.34	62.08	74.00	-11.92	Peak

Test Mode	IEEE 802.11n HT40 High CH	Temperature	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 13, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



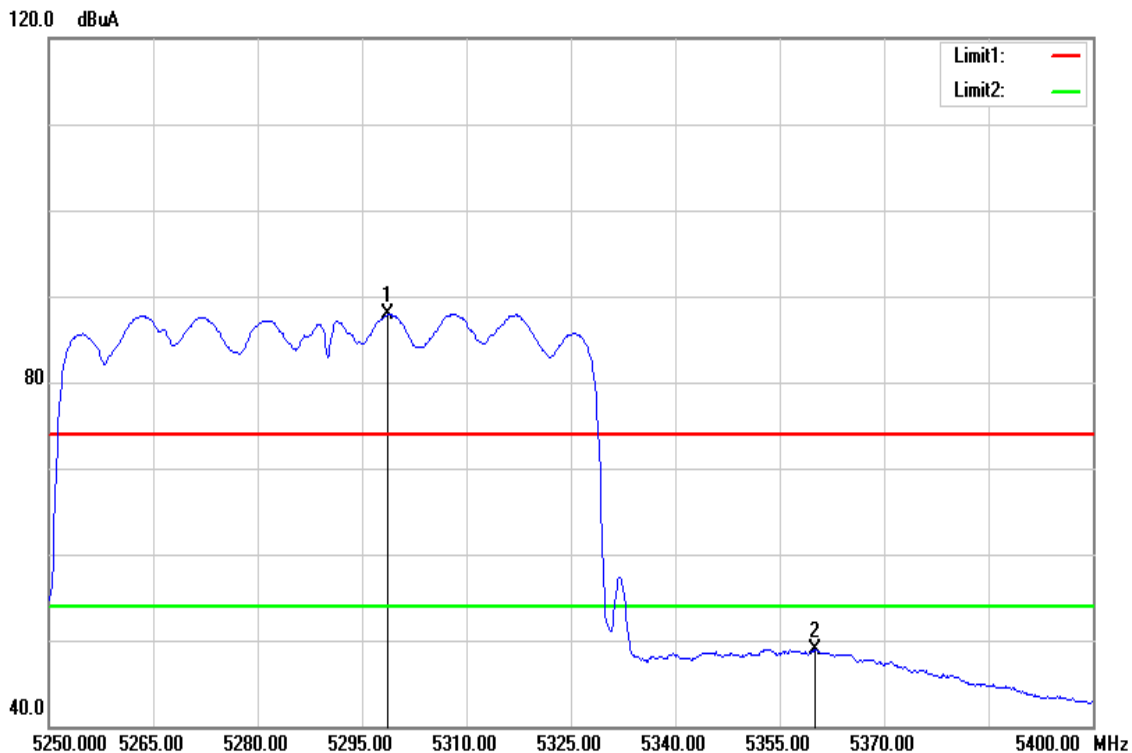
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5324.740	87.20	5.07	92.27	-	-	AVG
5350.300	43.81	5.31	49.12	54.00	-4.88	AVG

Test Mode	IEEE 802.11ac VHT80 Mid CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 13, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5307.600	96.43	4.90	101.33	-	-	Peak
5353.200	57.83	5.34	63.17	74.00	-10.83	Peak

Test Mode	IEEE 802.11ac VHT80 Mid CH	Temperature	27(°C) / 53%RH
Test Item	Band Edge	Test Date	Dec 13, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz

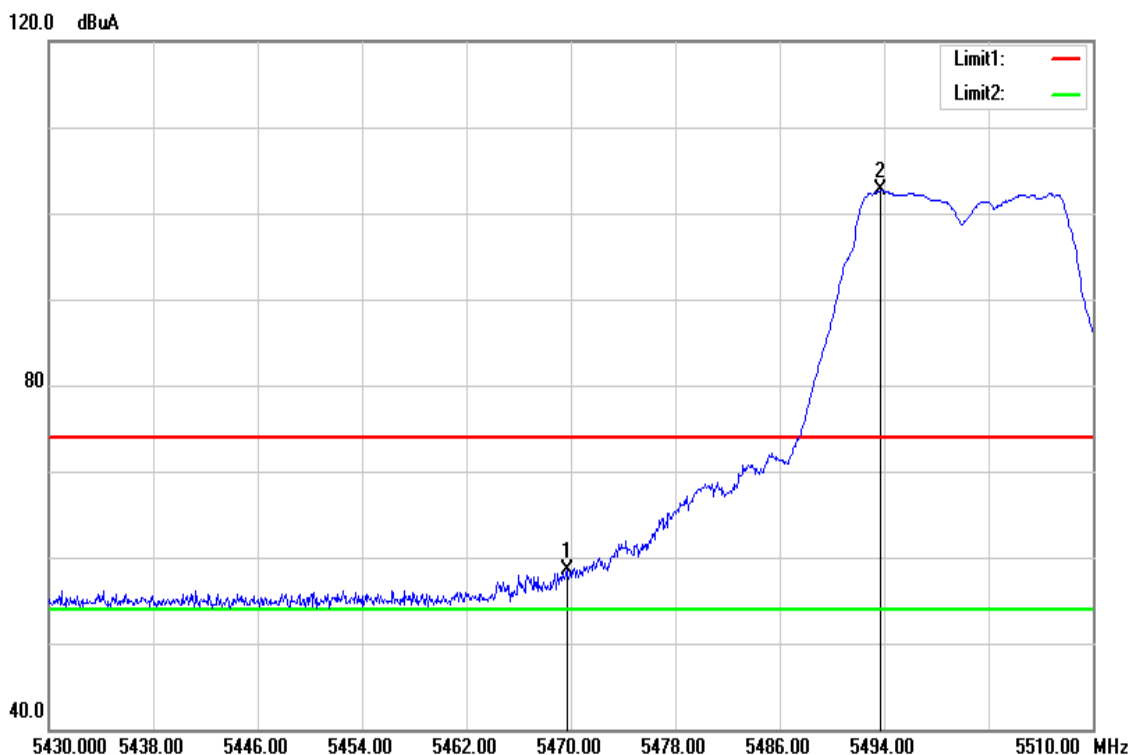


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5298.750	83.10	4.83	87.93	-	-	AVG
5360.100	43.58	5.39	48.97	54.00	-5.03	AVG

Test Data

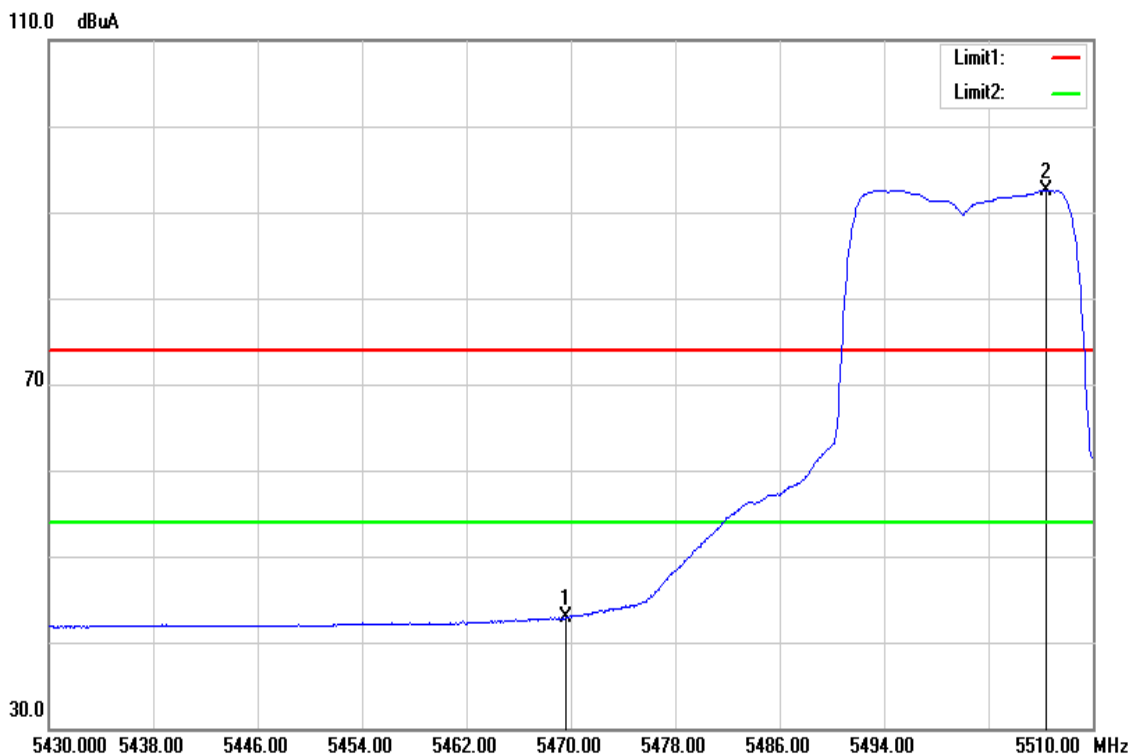
Band Edge Test Data for UNII-2c

Test Mode	IEEE 802.11a Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



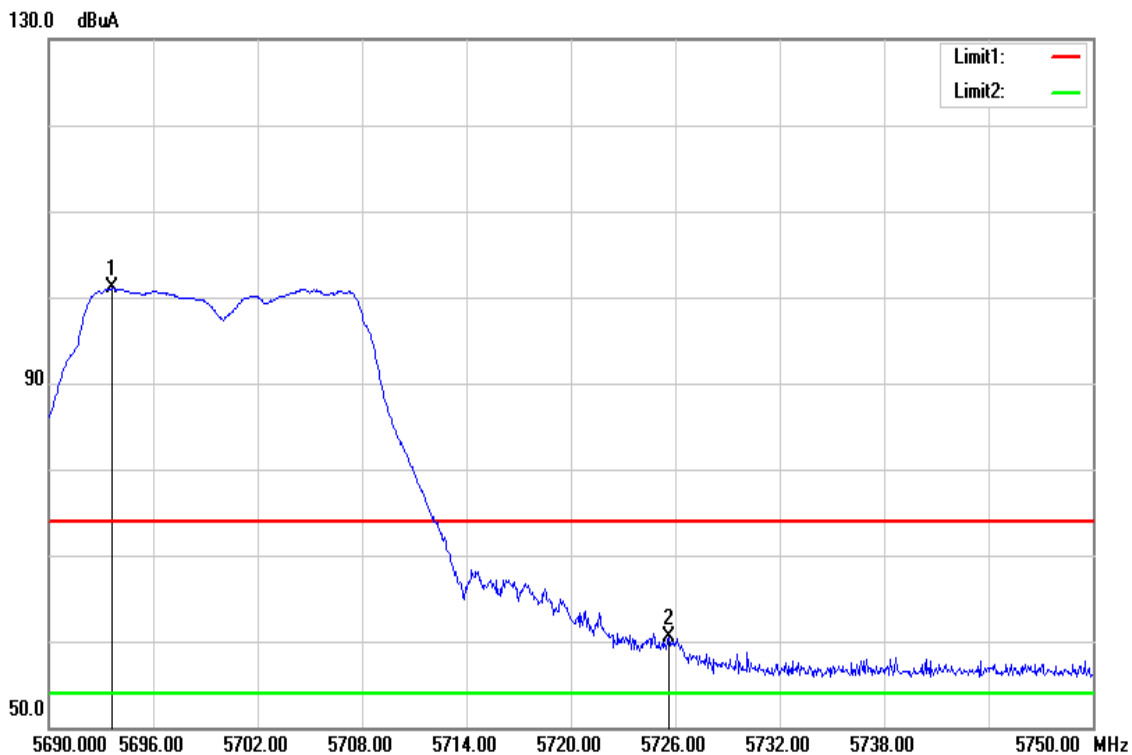
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5469.680	53.06	5.39	58.45	74.00	-15.55	Peak
5493.760	97.36	5.28	102.64	-	-	Peak

Test Mode	IEEE 802.11a Low CH	Temperature	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



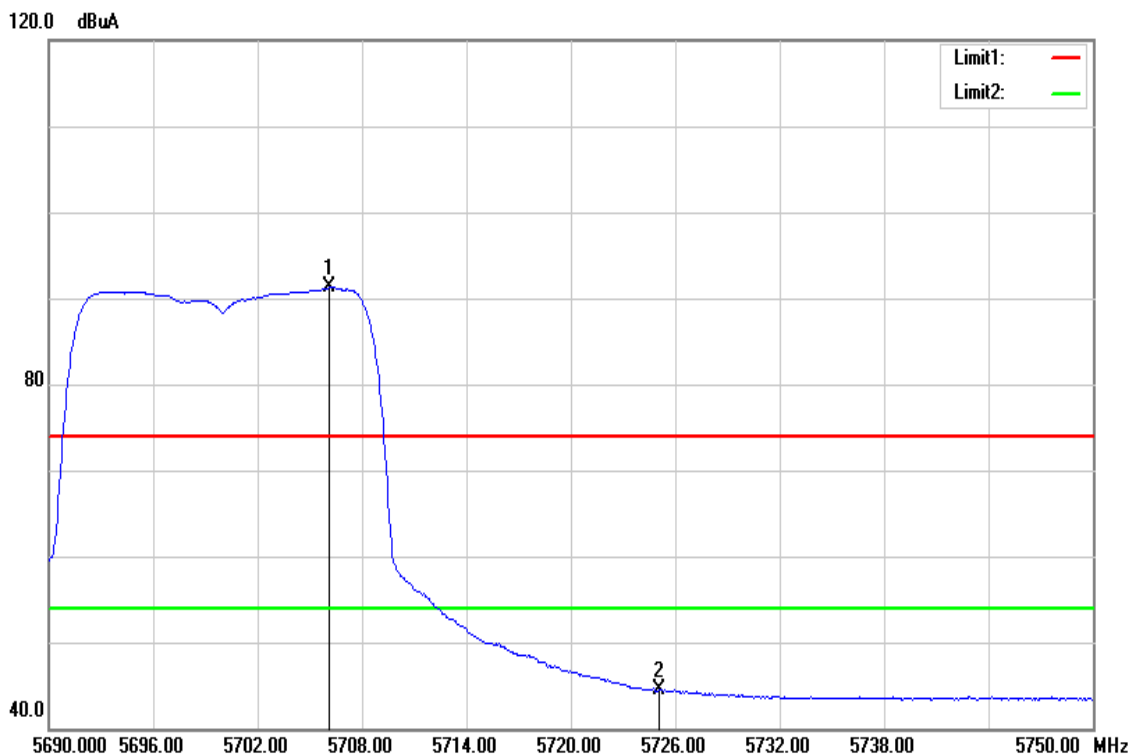
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5469.600	37.55	5.39	42.94	54.00	-11.06	AVG
5506.400	87.31	5.28	92.59	-	-	AVG

Test Mode	IEEE 802.11a High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



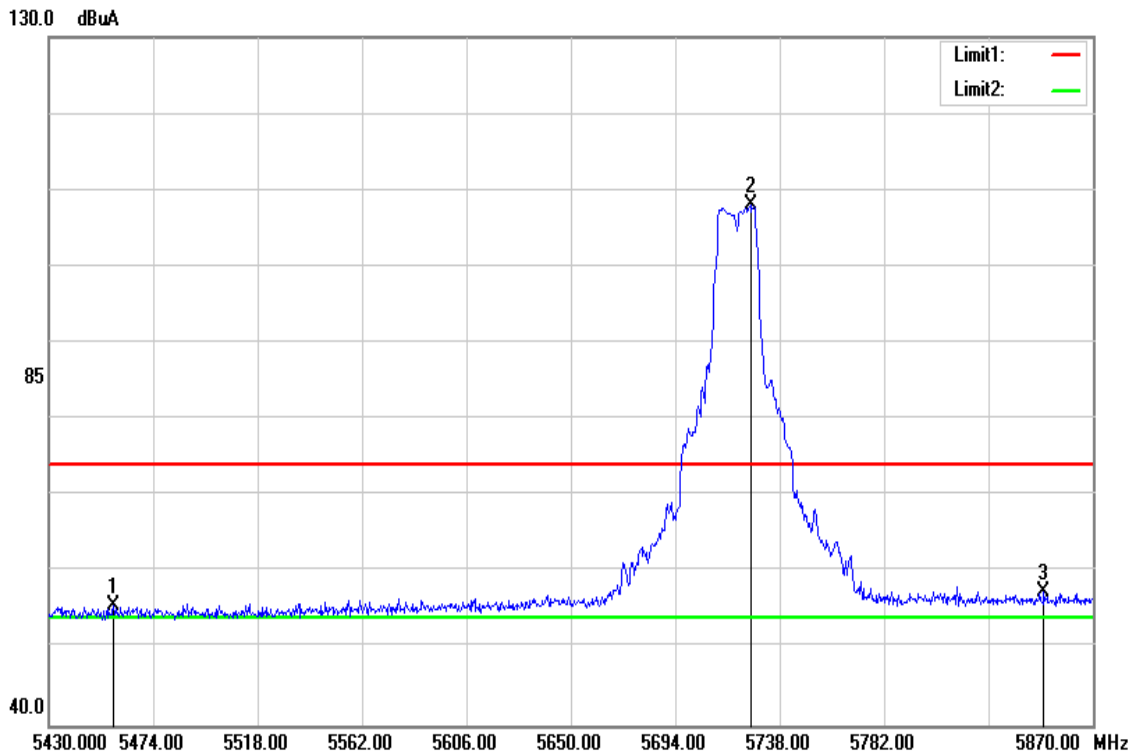
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5693.660	94.95	6.07	101.02	-	-	Peak
5725.640	54.20	6.21	60.41	74.00	-13.59	Peak

Test Mode	IEEE 802.11a High CH	Temperature	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



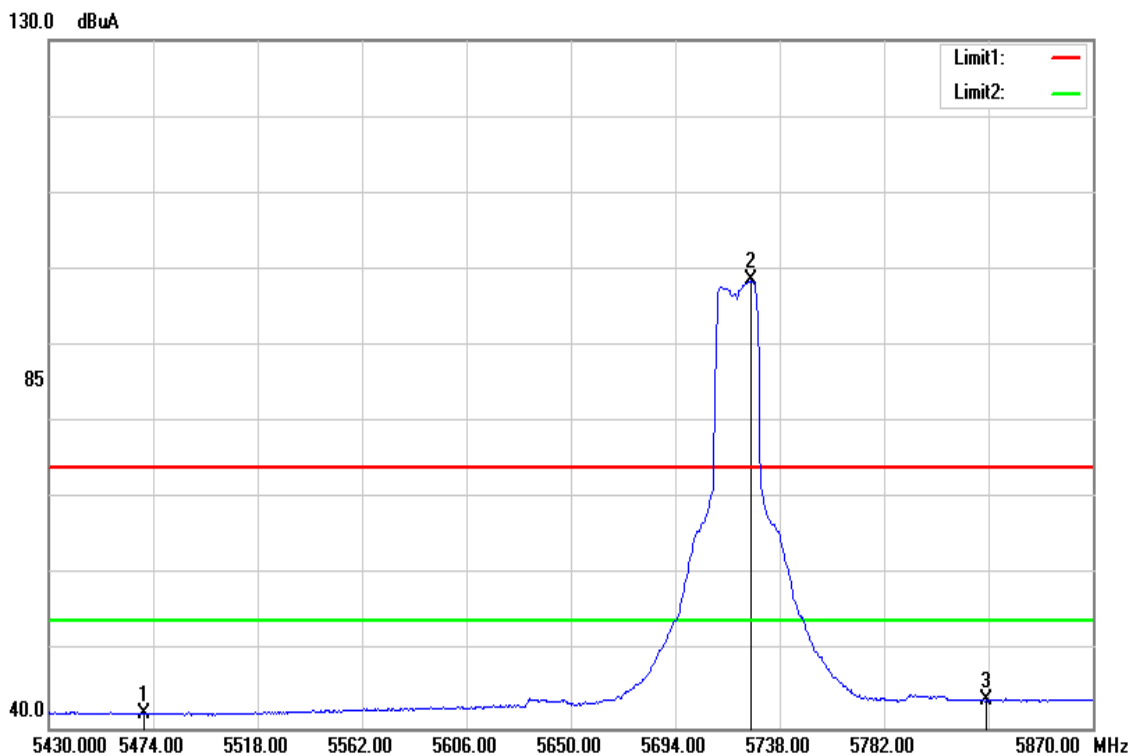
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5706.140	85.12	6.13	91.25	-	-	AVG
5725.100	38.28	6.21	44.49	54.00	-9.51	AVG

Test Mode	IEEE 802.11a Cross CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



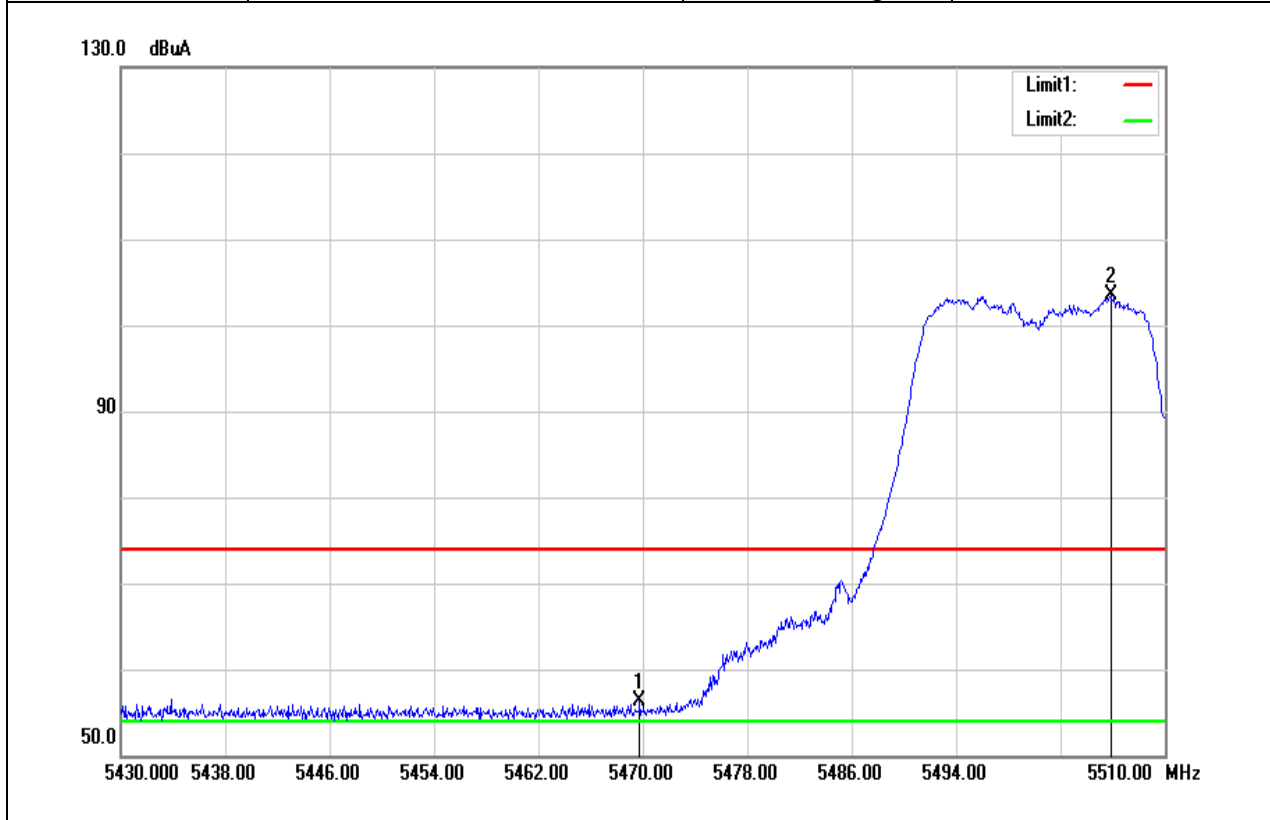
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5457.280	50.13	5.45	55.58	74.00	-18.42	Peak
5725.680	101.78	6.21	107.99	-	-	Peak
5849.320	50.81	6.74	57.55	74.00	-16.45	Peak

Test Mode	IEEE 802.11a Cross CH	Temperature	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



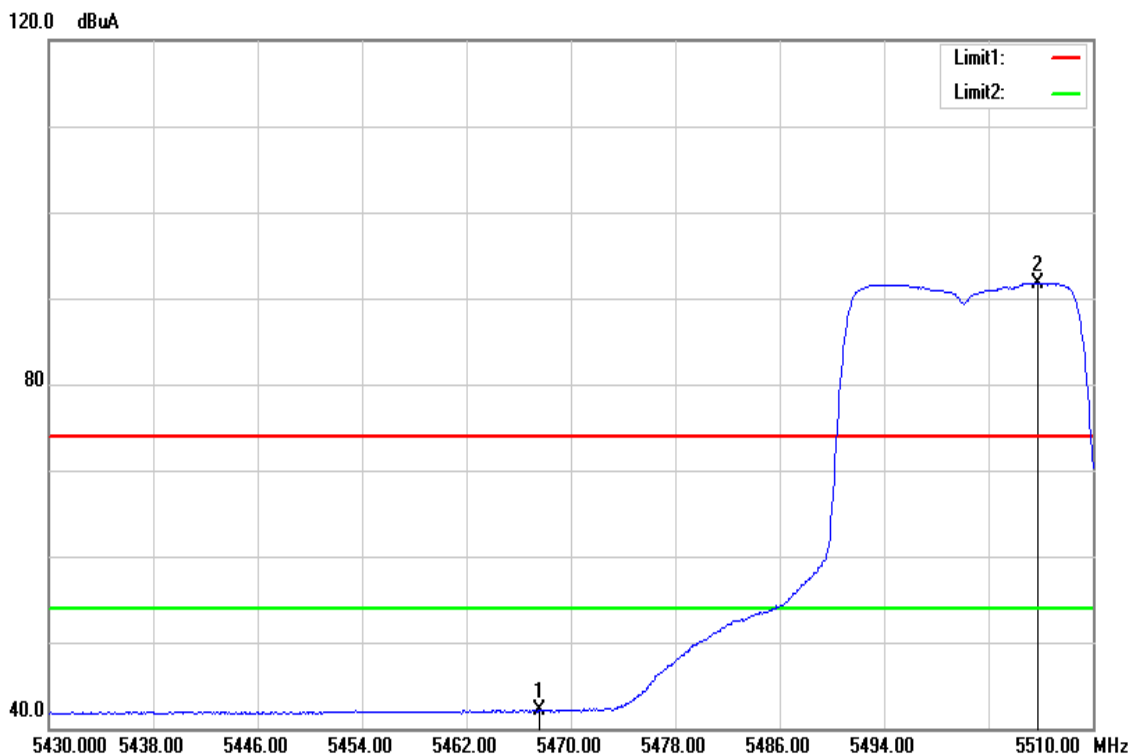
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5470.000	36.52	5.39	41.91	54.00	-12.09	AVG
5726.120	92.31	6.21	98.52	-	-	AVG
5825.000	37.08	6.63	43.71	54.00	-10.29	AVG

Test Mode	IEEE 802.11n HT20 Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



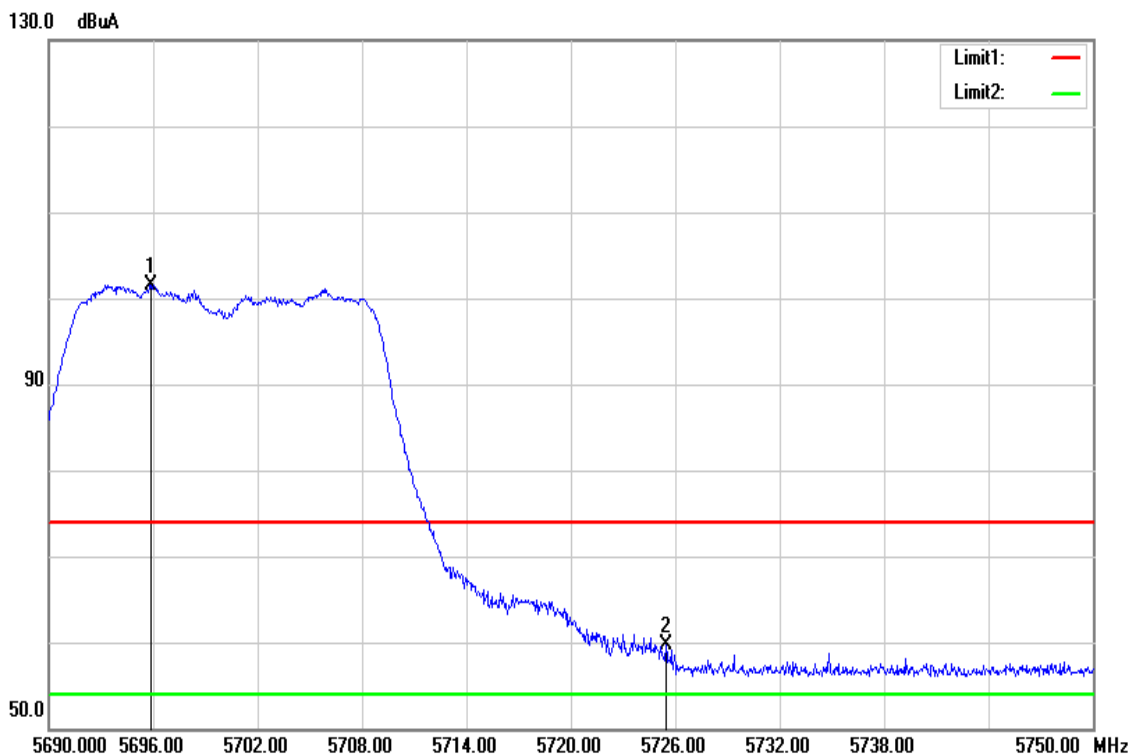
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5469.760	50.87	5.39	56.26	74.00	-17.74	Peak
5505.840	98.19	5.27	103.46	-	-	Peak

Test Mode	IEEE 802.11n HT20 Low CH	Temperature	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



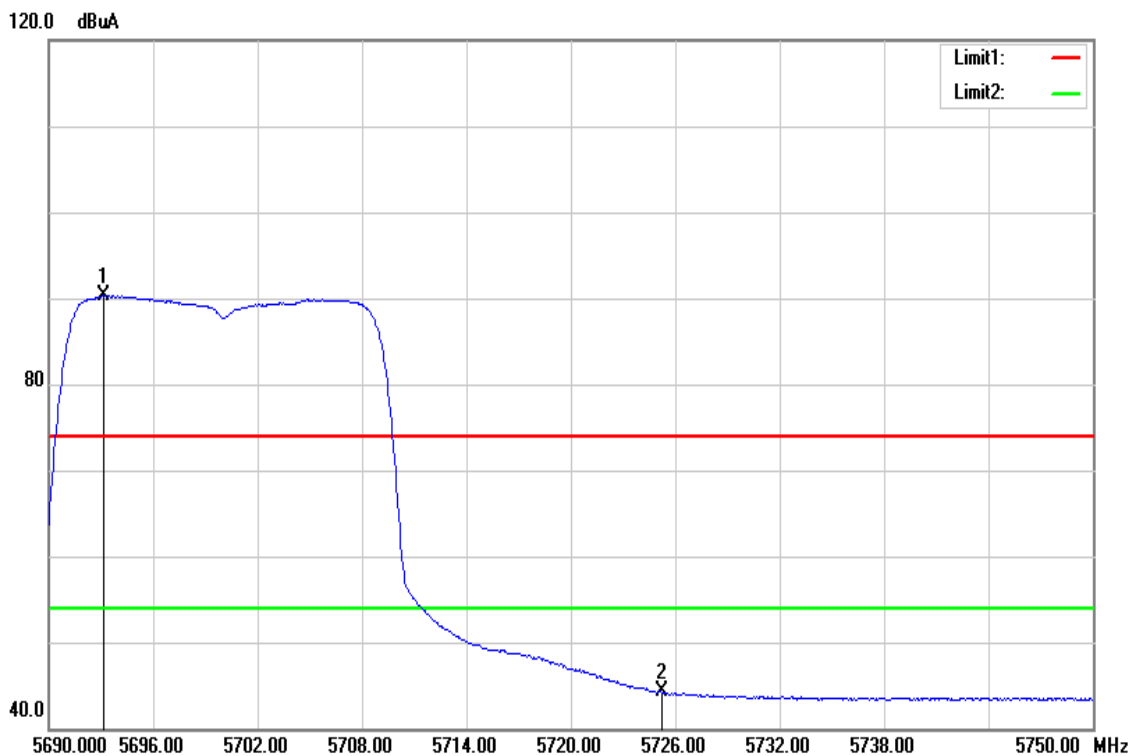
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5467.600	36.78	5.40	42.18	54.00	-11.82	AVG
5505.760	86.48	5.27	91.75	-	-	AVG

Test Mode	IEEE 802.11n HT20 High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



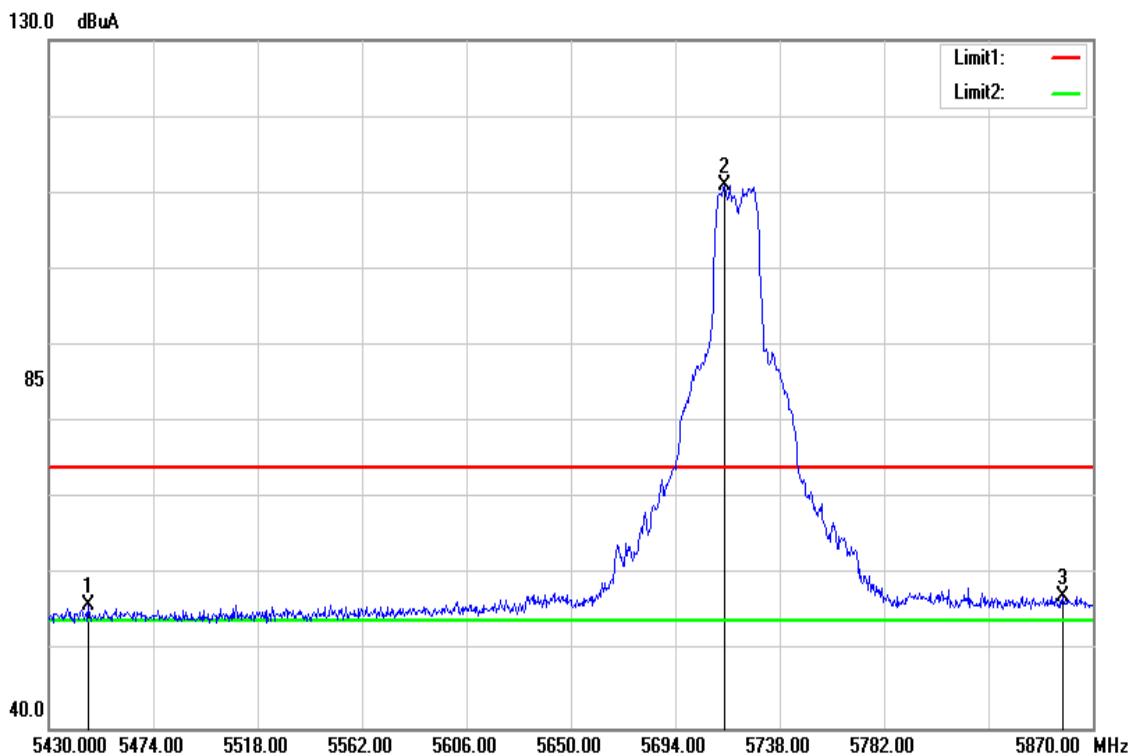
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5695.880	95.52	6.08	101.60	-	-	Peak
5725.460	53.39	6.21	59.60	74.00	-14.40	Peak

Test Mode	IEEE 802.11n HT20 High CH	Temperature	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



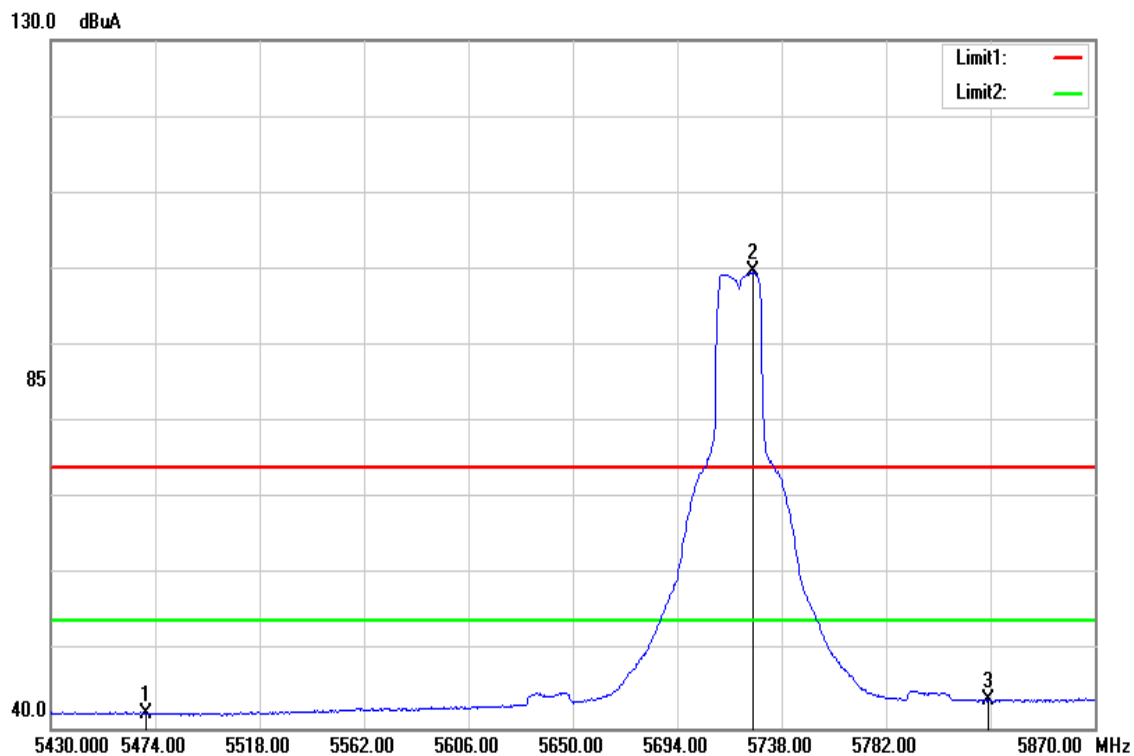
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5693.180	84.23	6.07	90.30	-	-	AVG
5725.220	37.99	6.21	44.20	54.00	-9.80	AVG

Test Mode	IEEE 802.11n HT20 Cross CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



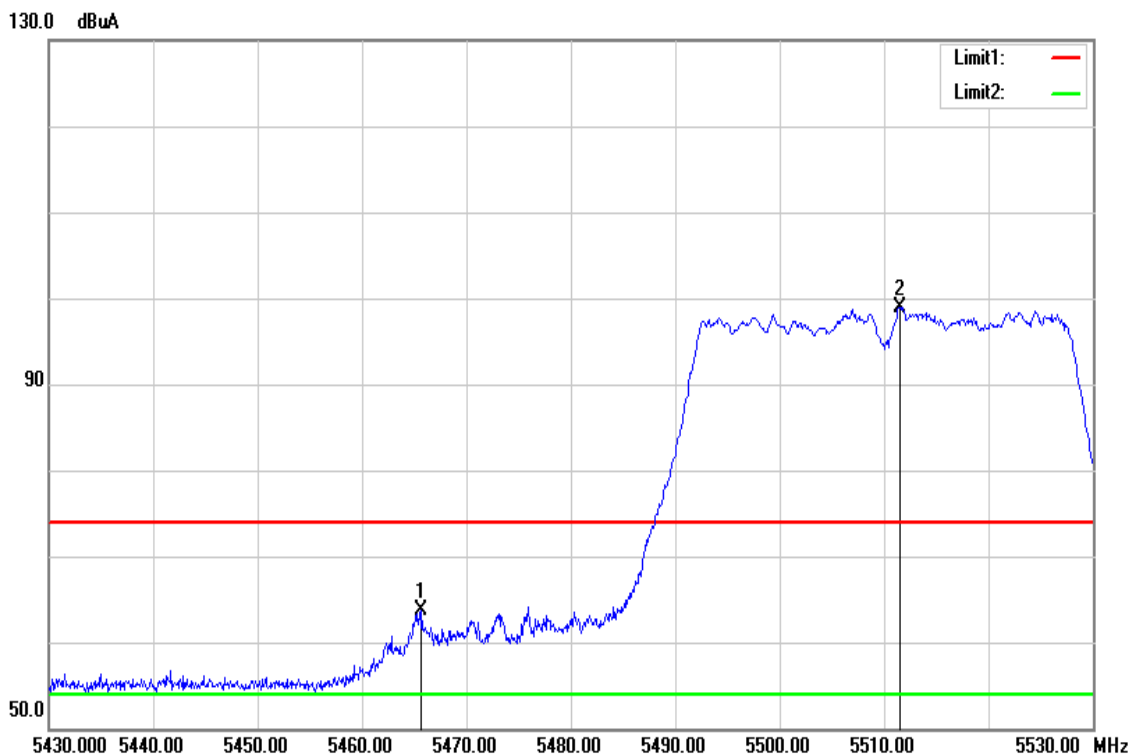
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5446.720	50.50	5.50	56.00	74.00	-18.00	Peak
5714.680	104.83	6.16	110.99	-	-	Peak
5857.240	50.53	6.77	57.30	74.00	-16.70	Peak

Test Mode	IEEE 802.11n HT20 Cross CH	Temperature	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



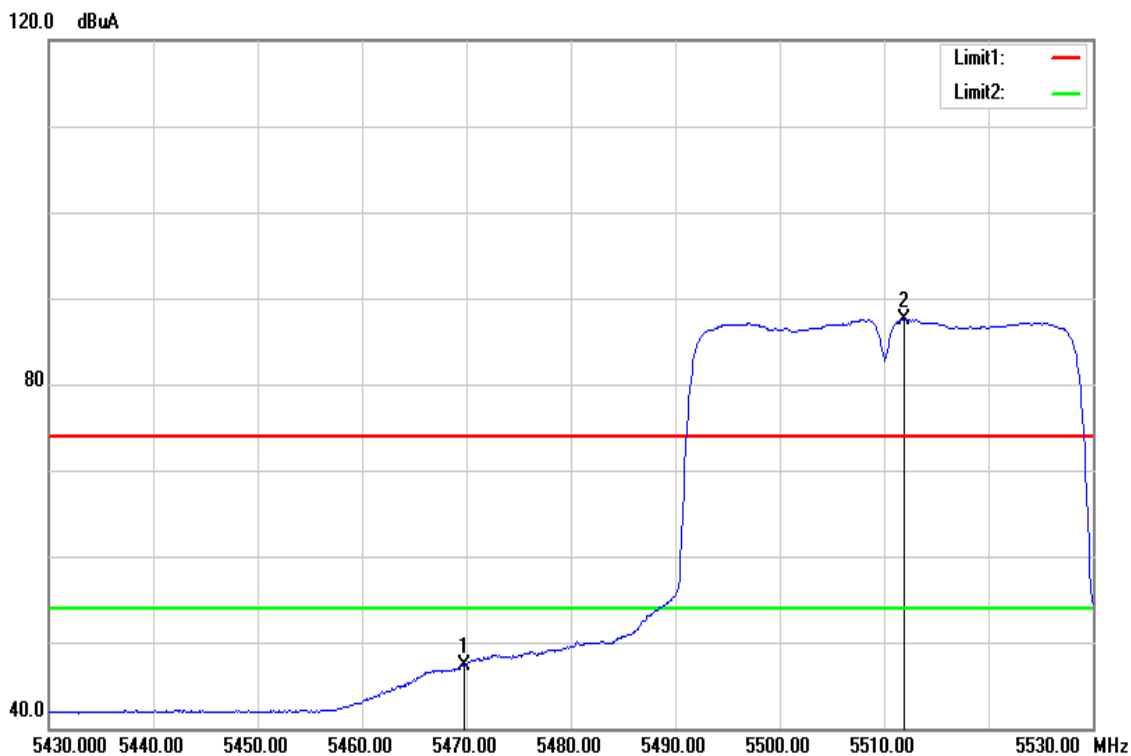
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5470.000	36.62	5.39	42.01	54.00	-11.99	AVG
5725.680	93.42	6.21	99.63	-	-	AVG
5825.000	37.01	6.63	43.64	54.00	-10.36	AVG

Test Mode	IEEE 802.11n HT40 Low CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



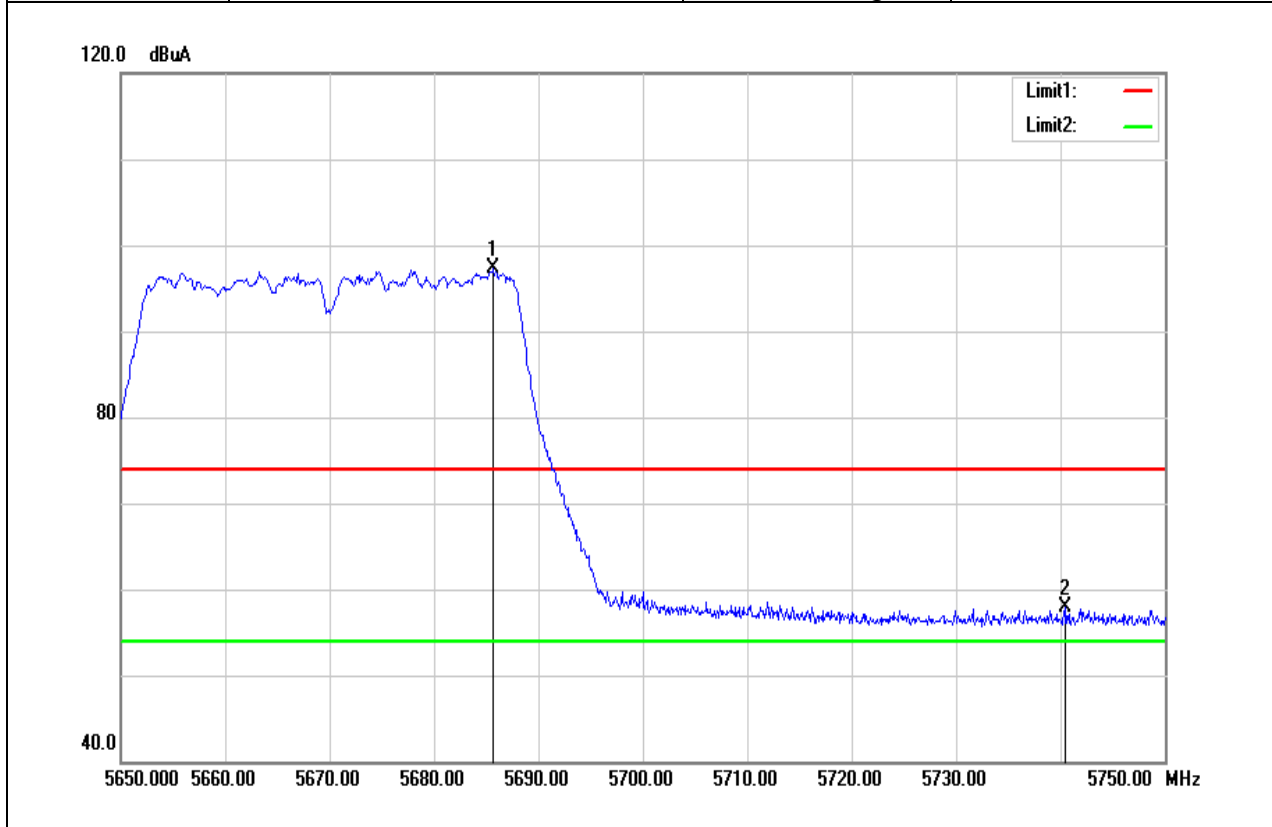
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5465.700	58.25	5.41	63.66	74.00	-10.34	Peak
5511.500	93.69	5.30	98.99	-	-	Peak

Test Mode	IEEE 802.11n HT40 Low CH	Temperature	27(°C) / 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



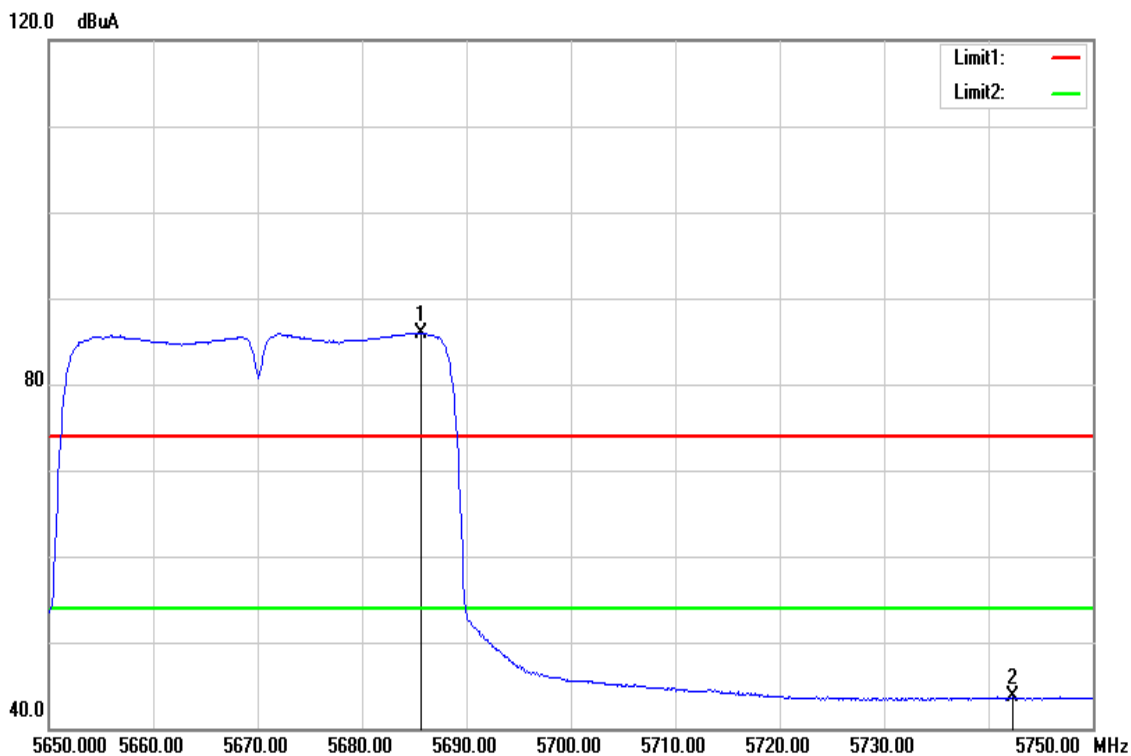
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5469.800	41.89	5.39	47.28	54.00	-6.72	AVG
5511.900	82.26	5.30	87.56	-	-	AVG

Test Mode	IEEE 802.11n HT40 High CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



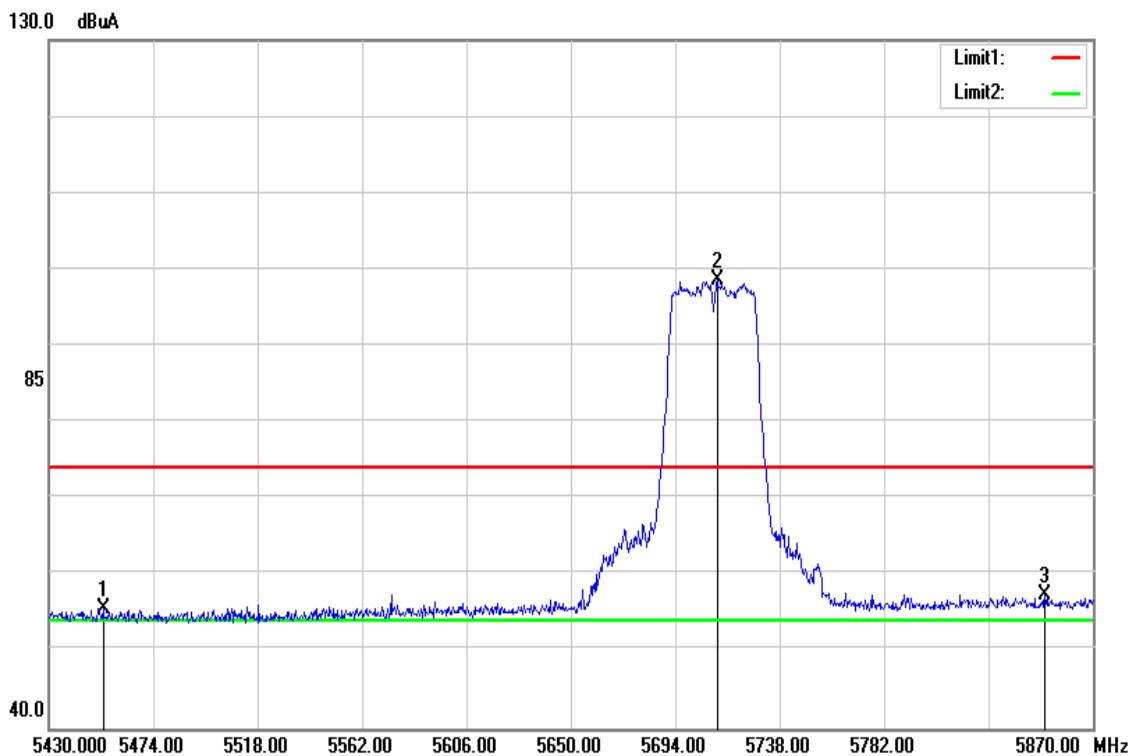
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5685.700	91.32	6.04	97.36	-	-	Peak
5740.500	51.59	6.27	57.86	74.00	-16.14	Peak

Test Mode	IEEE 802.11n HT40 High CH	Temperature	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



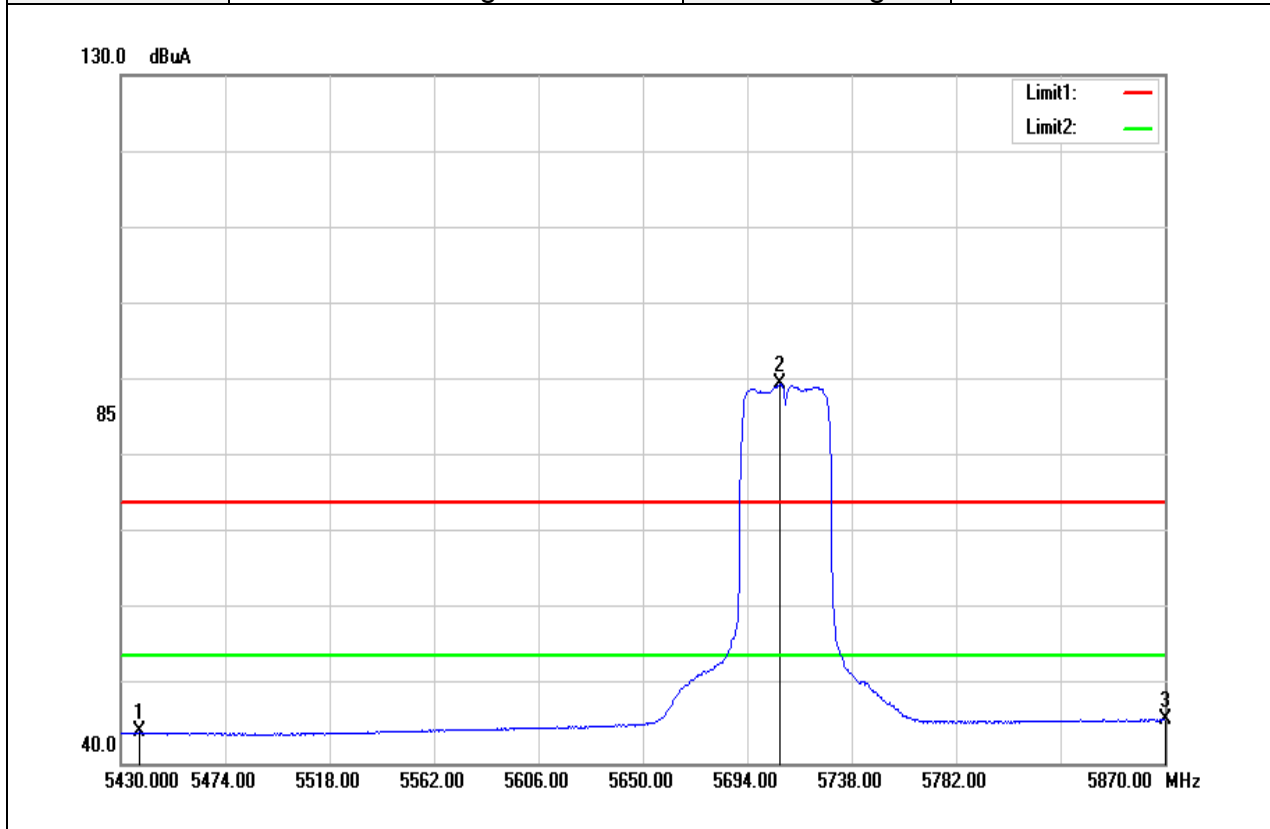
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5685.700	79.95	6.04	85.99	-	-	AVG
5742.300	37.37	6.28	43.65	54.00	-10.35	AVG

Test Mode	IEEE 802.11n HT40 Cross CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



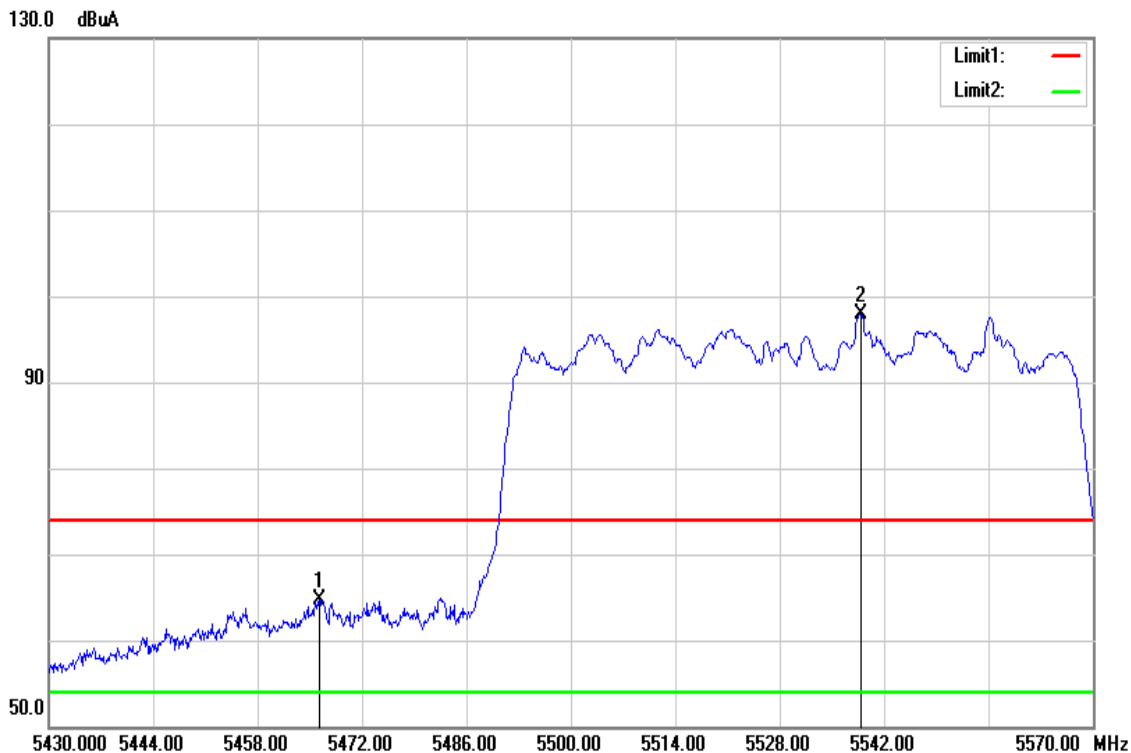
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5452.880	50.27	5.47	55.74	74.00	-18.26	Peak
5711.600	92.47	6.15	98.62	-	-	Peak
5849.760	50.69	6.74	57.43	74.00	-16.57	Peak

Test Mode	IEEE 802.11n HT40 Cross CH	Temperature	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



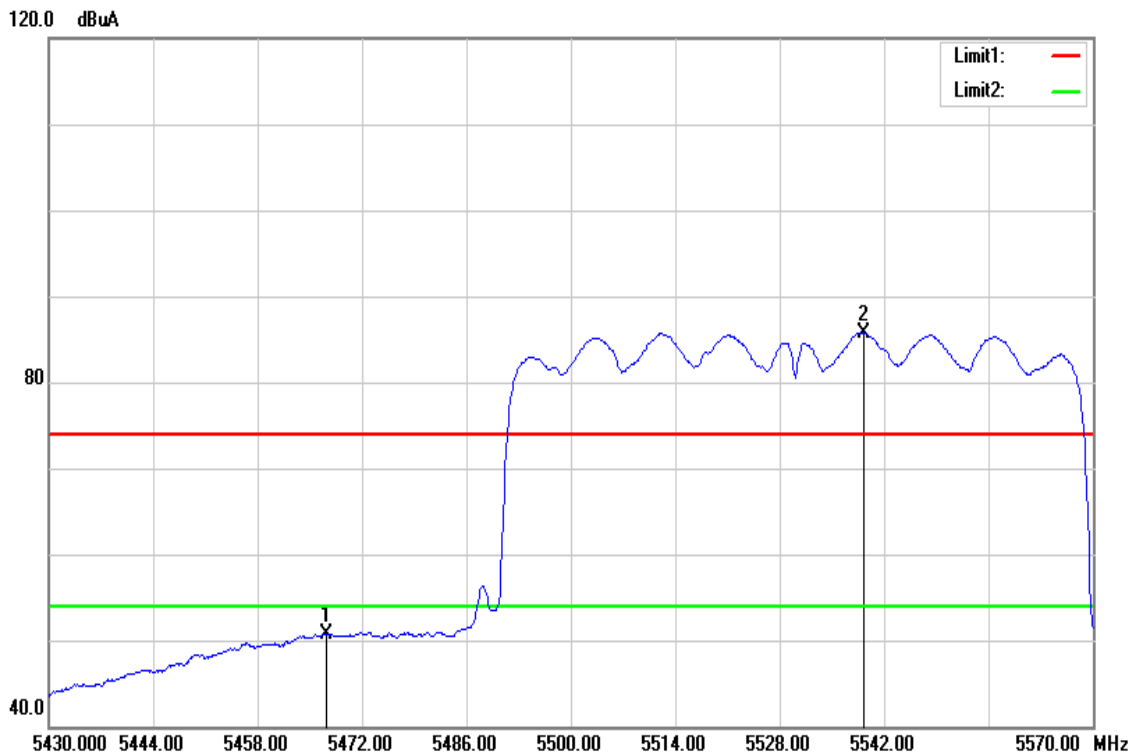
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5437.920	38.52	5.54	44.06	54.00	-9.94	AVG
5707.640	83.38	6.13	89.51	-	-	AVG
5870.000	38.98	6.83	45.81	54.00	-8.19	AVG

Test Mode	IEEE 802.11ac VHT80 Mid CH	Temp/Hum	27(°C)/ 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5466.260	59.34	5.41	64.75	74.00	-9.25	Peak
5538.920	92.56	5.42	97.98	-	-	Peak

Test Mode	IEEE 802.11ac VHT80 Mid CH	Temperature	27(°C) / 53%RH
Test Item	Band Edge	Test Date	Dec 14, 2016
Polarize	Vertical	Test Engineer	ED Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5467.240	45.33	5.40	50.73	54.00	-3.27	AVG
5539.200	80.30	5.42	85.72	-	-	AVG