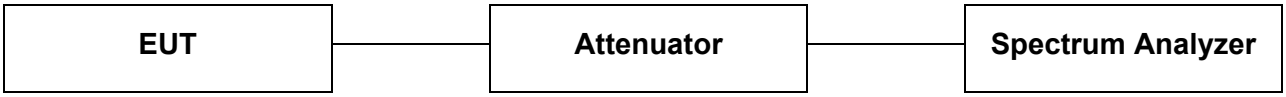
3. 26 ㏈ Bandwidth & 99 % Bandwidth

3.1. Test Setup



3.2. Limit

None; for reporting purpose only.

3.3. Test Procedure

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.

3.3.1. 26 ㏈ Bandwidth

1. This measurement settings are specified in section C.1 of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Set RBW: approximately 1 % of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Measure the maximum width of the emission that is 26 ㏈ down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1 %.

3.3.2. 99 % Bandwidth

3.3.2.1 FCC

1. This measurement settings are specified in section D of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Set center frequency to the nominal EUT channel center frequency.
3. Set span = 1.5 times to 5.0 times the OBW.
4. Set RBW = 1 % to 5 % of the OBW.
5. Set VBW ≥ 3 x RBW.
6. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
7. Use the 99 % power bandwidth function of the instrument (if available).
8. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99 % occupied bandwidth is the difference between these two frequencies.

In the result,
- DFS requirements are not applicable in the 5 150 ㎒ ~ 5 250 ㎒.

3.3.2.2 IC

The following conditions shall be observed for measuring the occupied bandwidth and x ㏈ bandwidth:

● The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

● The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.

● The detector of the spectrum analyzer shall be set to “Sample”. However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or “Max Hold”) may be necessary to determine the occupied / x ㏈ bandwidth if the device is not transmitting continuously.

● The resolution bandwidth (RBW) shall be in the range of 1 % to 5 % of the actual occupied / x ㏈ bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

For the 99 % emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99 % emission bandwidth).

3.4. Test result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Test mode: 11a

Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)		99 % Bandwidth (㎒)	
				ANT 1	ANT 2	ANT 1	ANT 2
U-NII 1	5 180	36	6	21.129	21.129	17.019	17.019
	5 220	44		21.129	20.955	17.077	17.077
	5 240	48		21.071	21.303	17.077	17.077
U-NII 3	5 745	149		20.955	21.187	17.077	17.135
	5 785	157		21.071	20.839	17.135	17.135
	5 825	165		21.303	21.129	17.077	17.077

Test mode: 11n_HT20

Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)		99 % Bandwidth (㎒)	
				ANT 1	ANT 2	ANT 1	ANT 2
U-NII 1	5 180	36	MCS8	21.476	21.418	18.119	17.887
	5 220	44		21.418	21.360	18.061	17.829
	5 240	48		21.650	21.303	18.119	17.829
U-NII 3	5 745	149		21.360	21.476	18.119	17.829
	5 785	157		21.360	21.245	18.119	17.829
	5 825	165		21.360	21.534	18.061	17.829

Test mode: 11n_HT40

Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)		99 % Bandwidth (㎒)	
				ANT 1	ANT 2	ANT 1	ANT 2
U-NII 1	5 190	38	MCS8	40.174	39.479	36.237	36.237
	5 230	46		39.942	39.363	36.237	36.122
U-NII 3	5 755	151		40.058	39.595	36.237	36.122
	5 795	159		40.174	39.711	36.353	36.122

Test mode: 11ac_VHT80

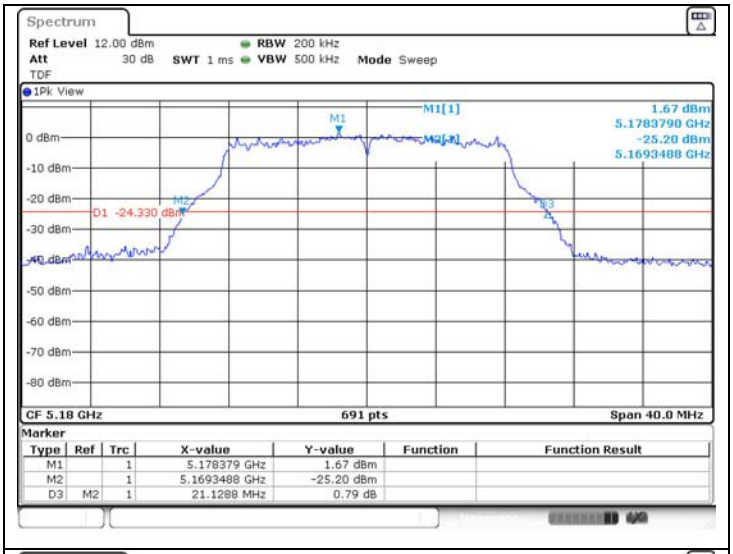
Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)		99 % Bandwidth (㎒)	
				ANT 1	ANT 2	ANT 1	ANT 2
U-NII 1	5 210	42	MCS0	82.200	81.737	75.716	75.485
U-NII 3	5 775	155		81.968	81.968	75.716	75.485

- Test plots

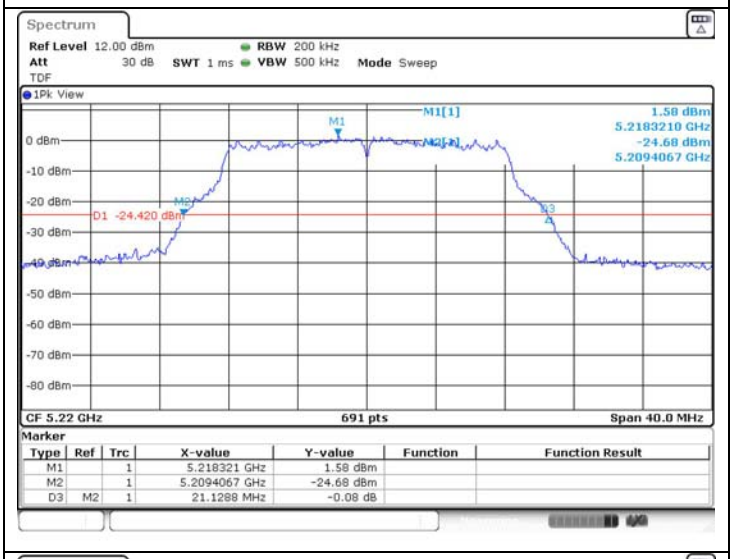
26 dB Bandwidth

802.11a (Band 1)_ANT 1

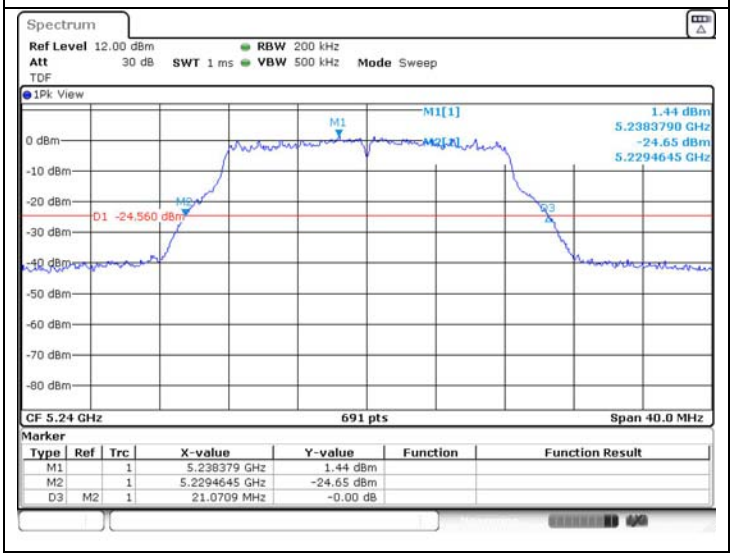
Low Channel
(5 180 MHz)



Middle Channel
(5 220 MHz)

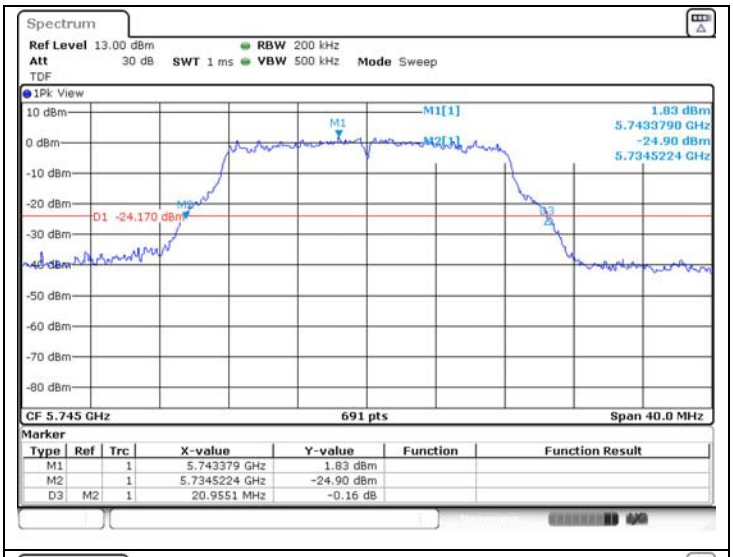


High Channel
(5 240 MHz)

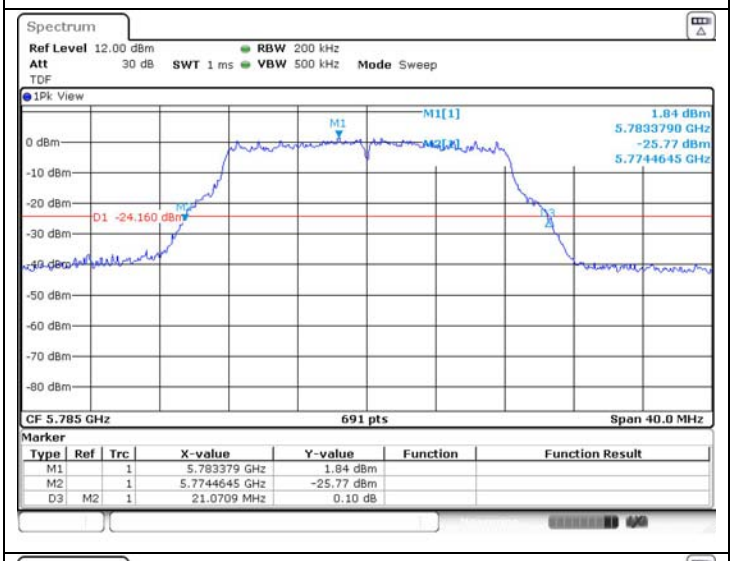


802.11a (Band 3)_ANT 1

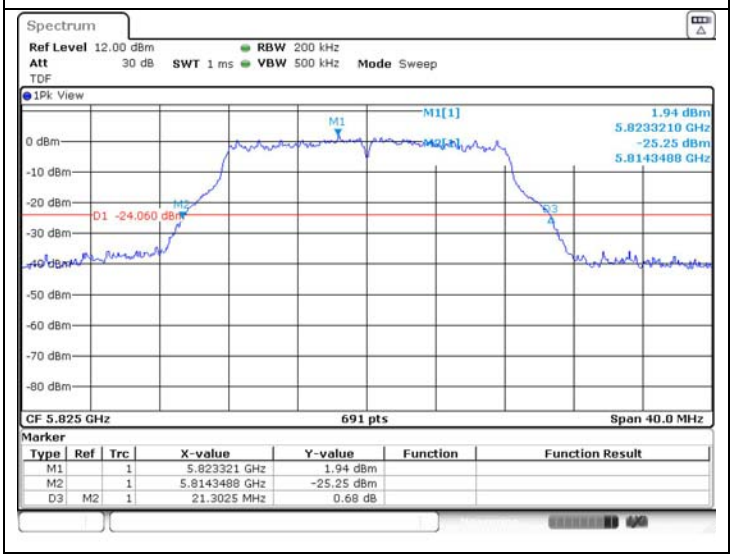
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

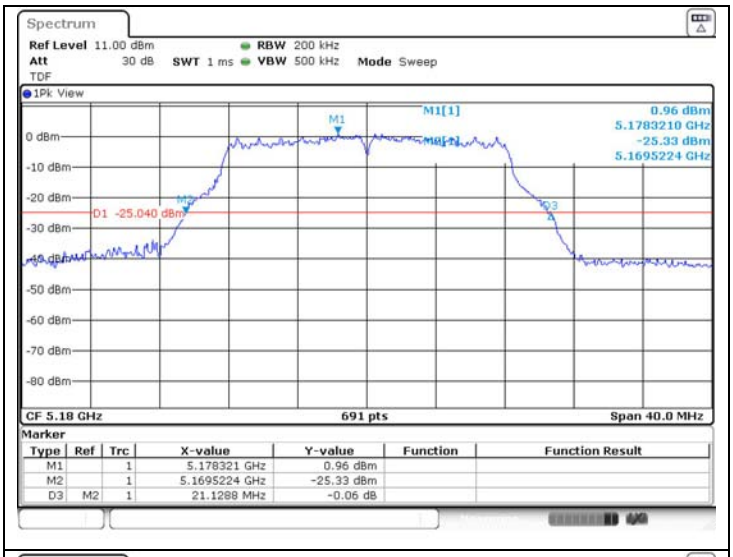


High Channel
(5 825 ㎒)

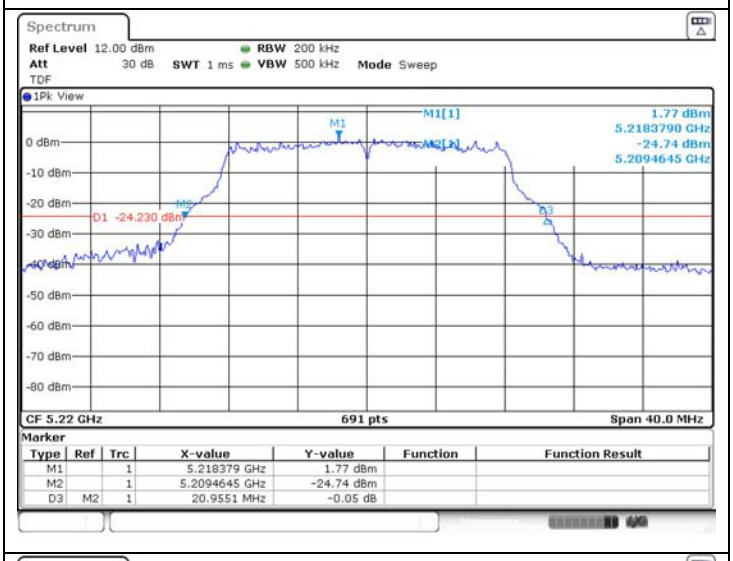


802.11a (Band 1)_ANT 2

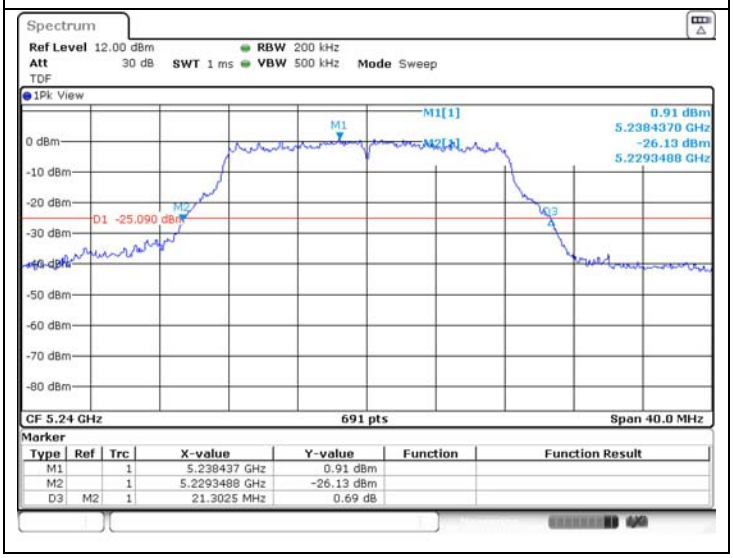
Low Channel
(5 180 ㎒)



Middle Channel
(5 220 ㎒)

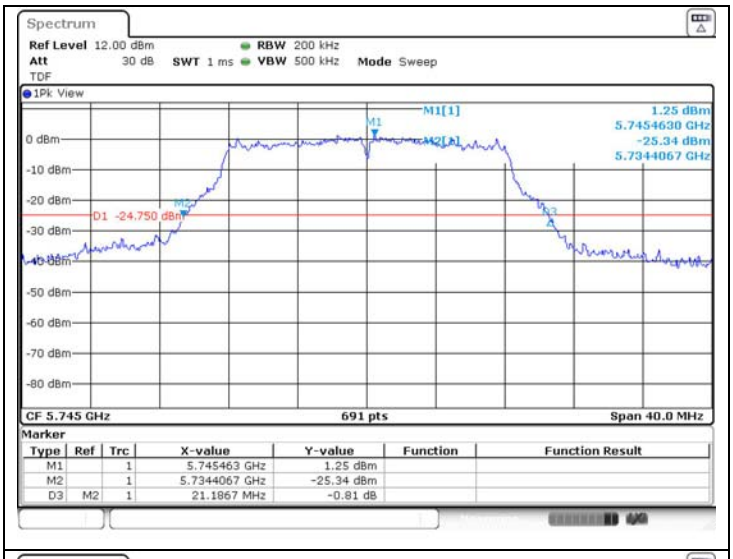


High Channel
(5 240 ㎒)

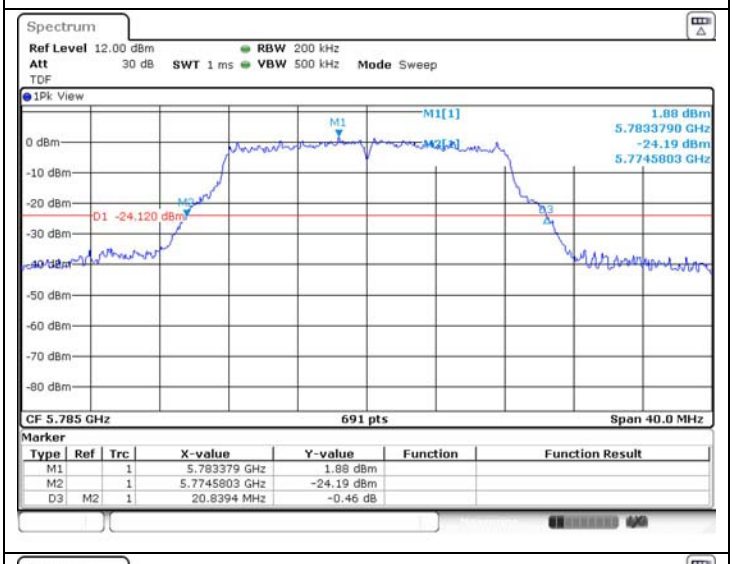


802.11a (Band 3)_ANT 2

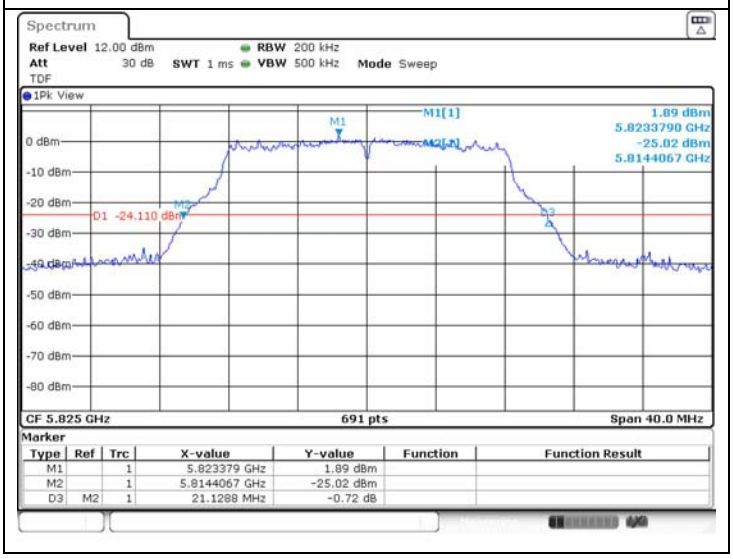
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

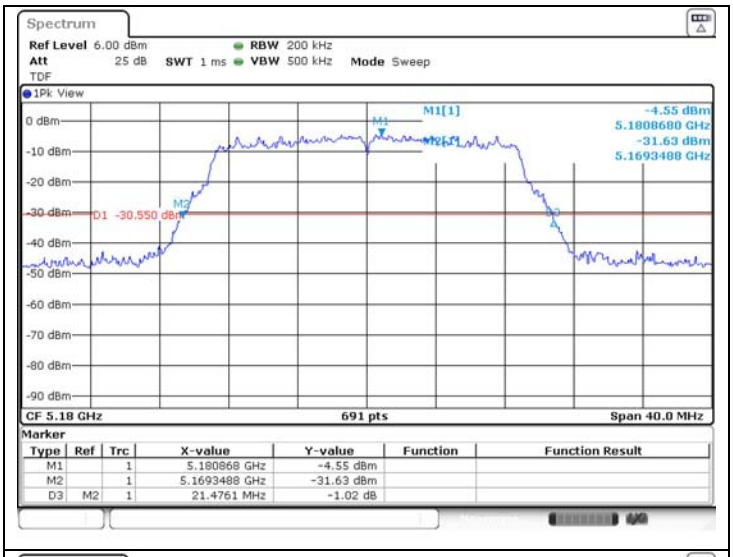


High Channel
(5 825 ㎒)

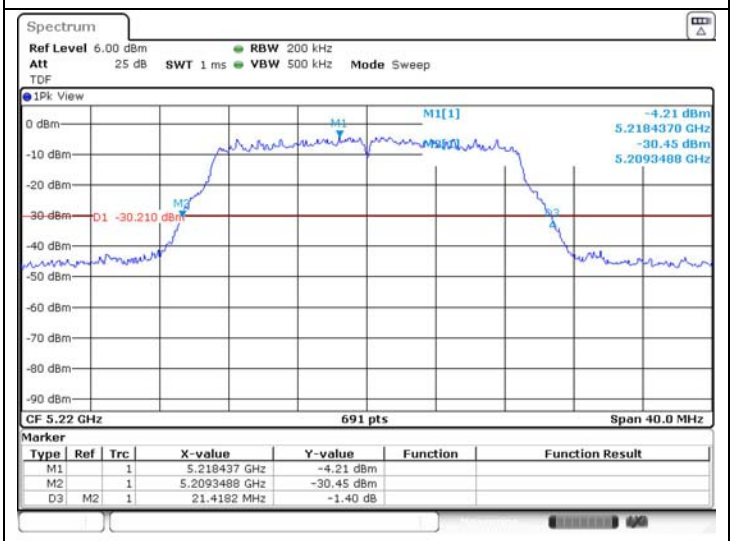


802.11n_HT20 (Band 1)_ANT 1

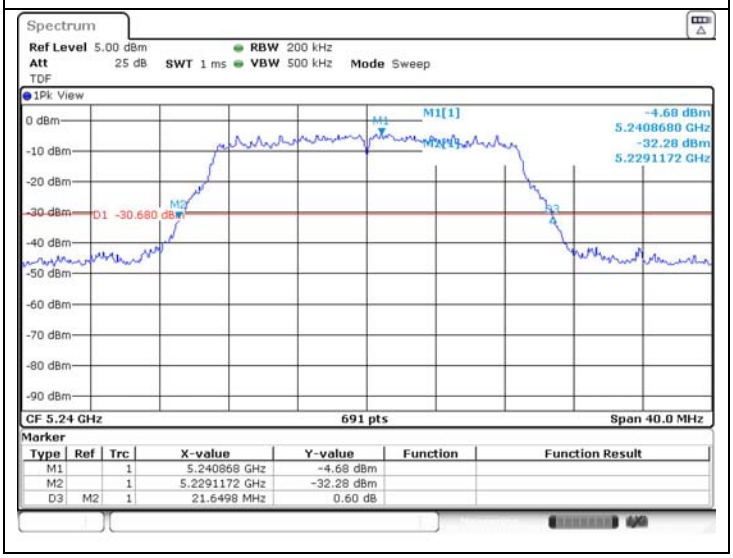
Low Channel
(5 180 ㎒)



Middle Channel
(5 220 ㎒)

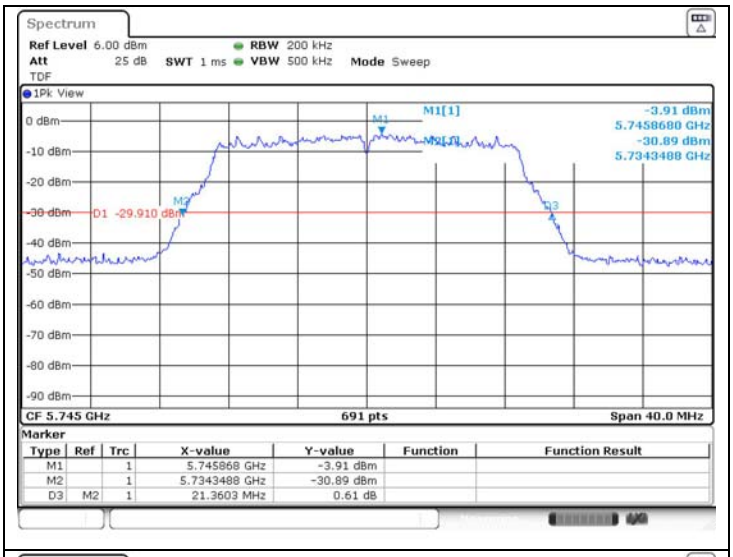


High Channel
(5 240 ㎒)

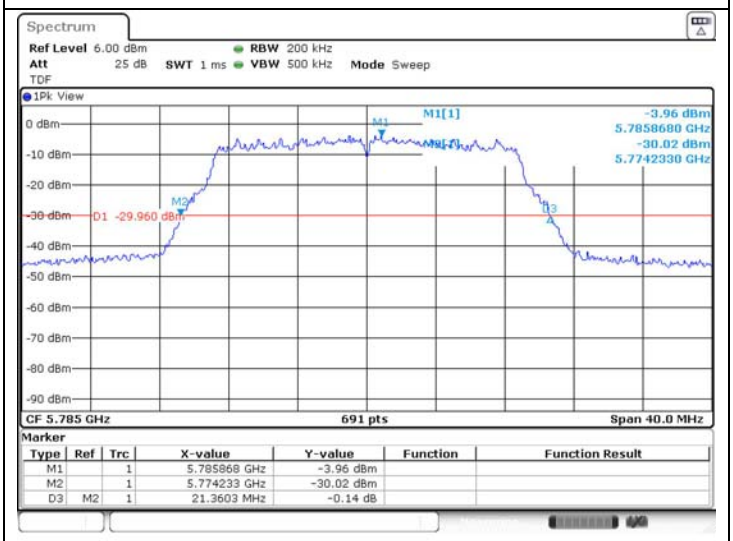


802.11n_HT20 (Band 3)_ANT 1

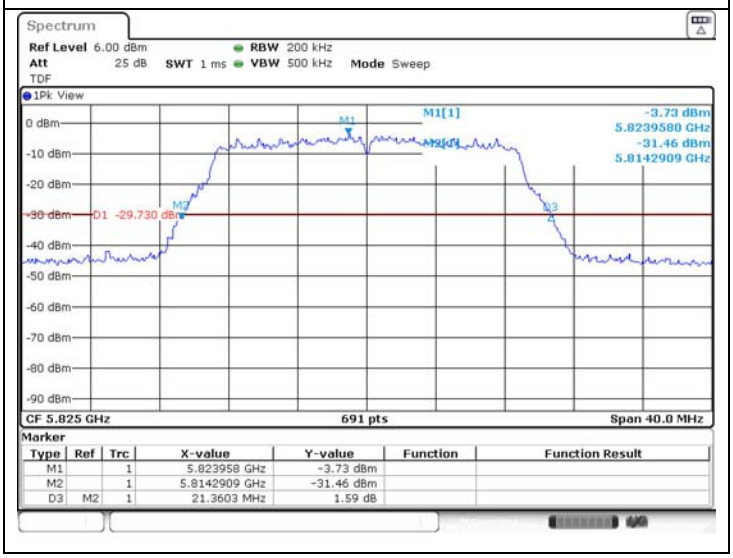
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

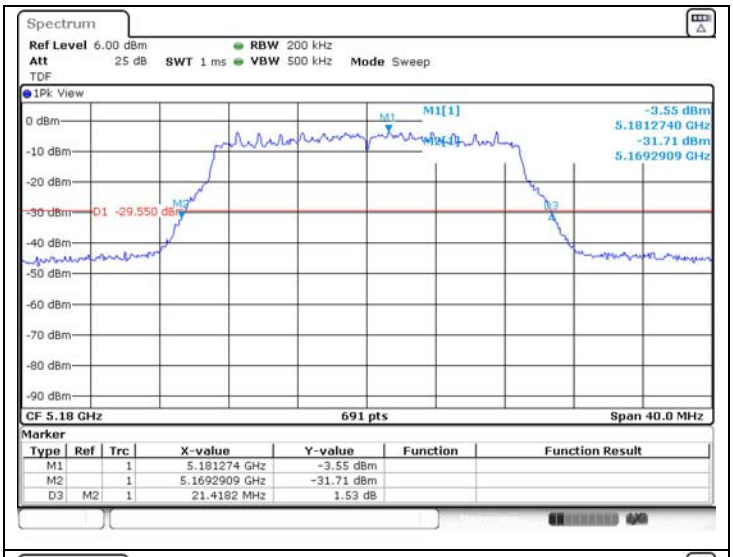


High Channel
(5 825 ㎒)

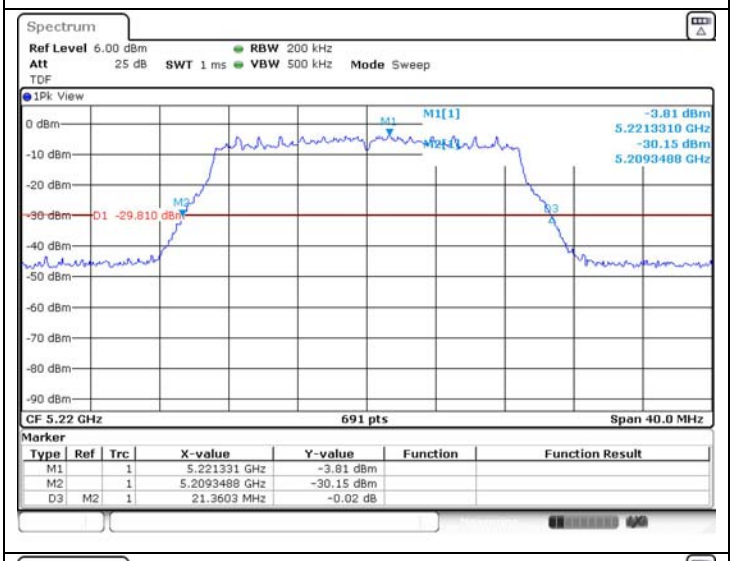


802.11n_HT20 (Band 1)_ANT 2

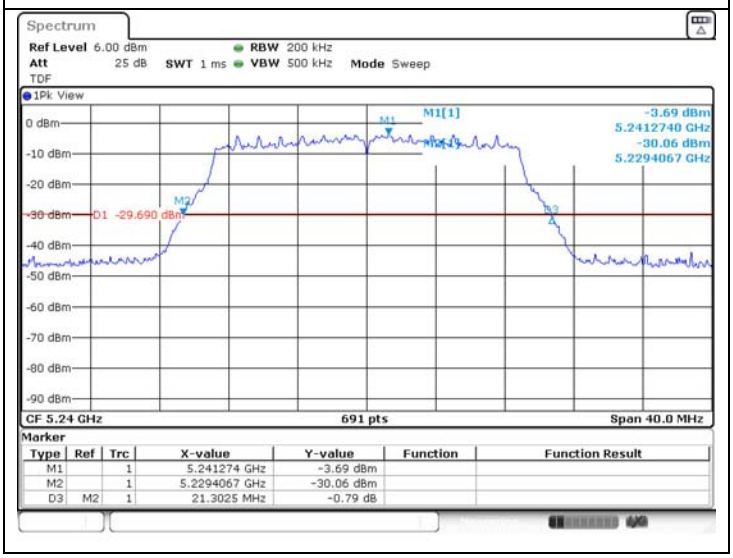
Low Channel
(5 180 ㎒)



Middle Channel
(5 220 ㎒)

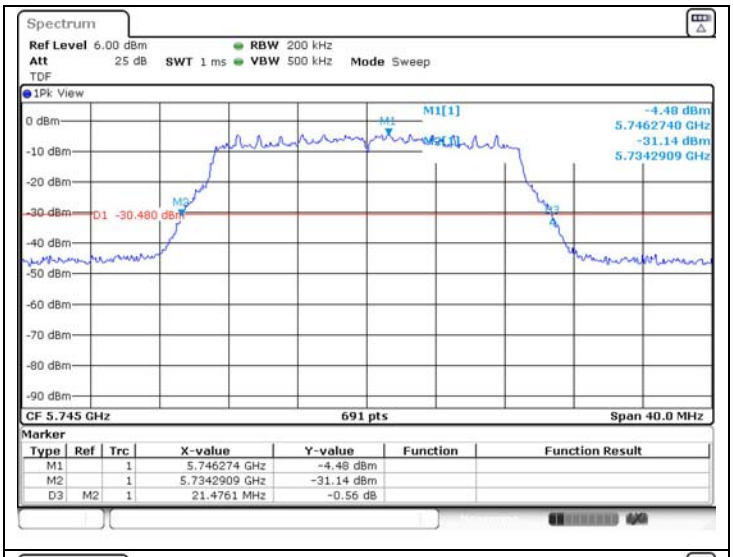


High Channel
(5 240 ㎒)

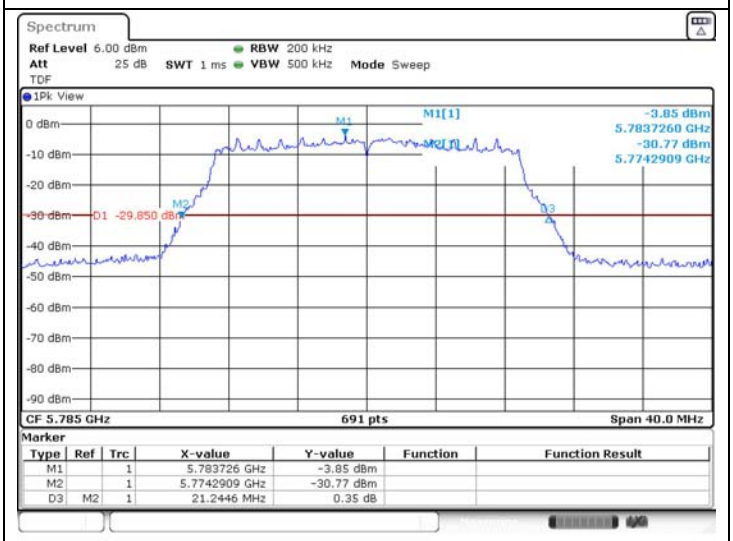


802.11n_HT20 (Band 3)_ANT 2

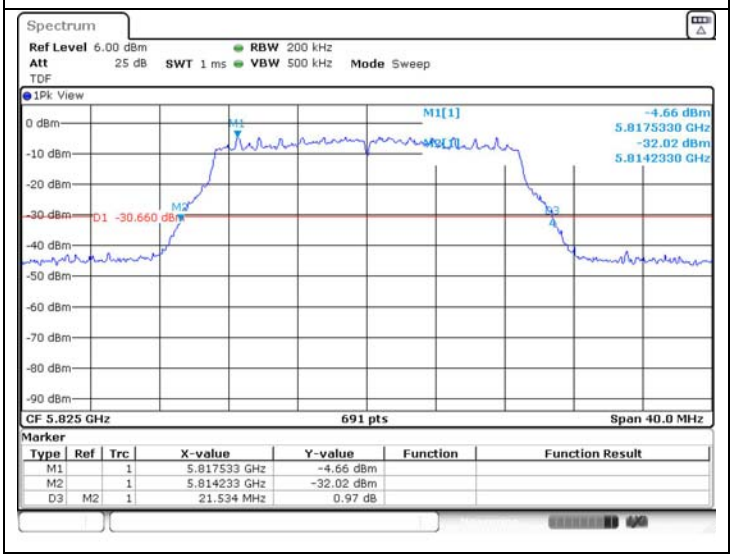
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

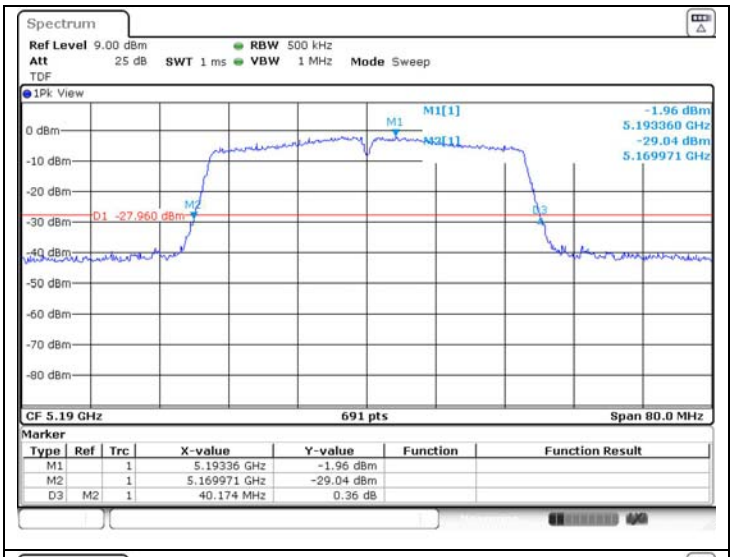


High Channel
(5 825 ㎒)

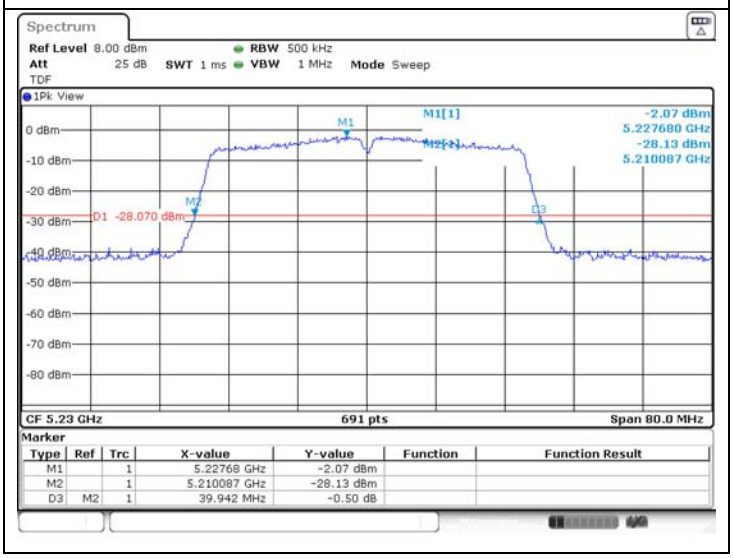


802.11n_HT40 (Band 1)_ANT 1

Low Channel
(5 190 ㎒)

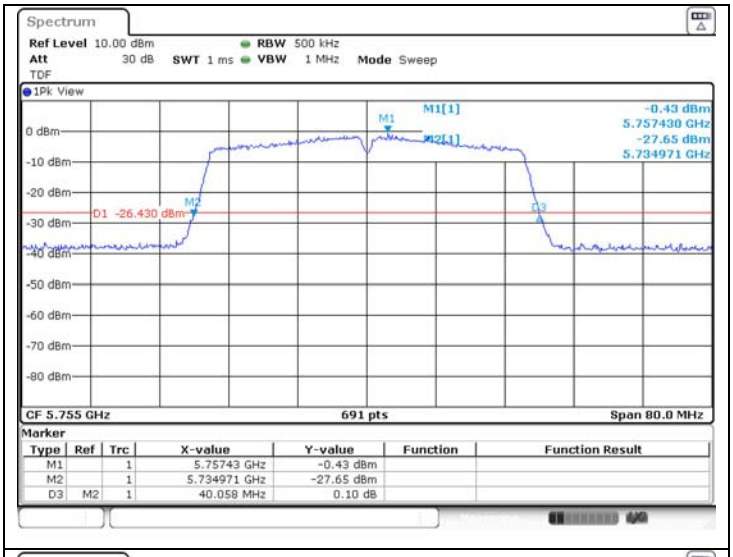


High Channel
(5 230 ㎒)

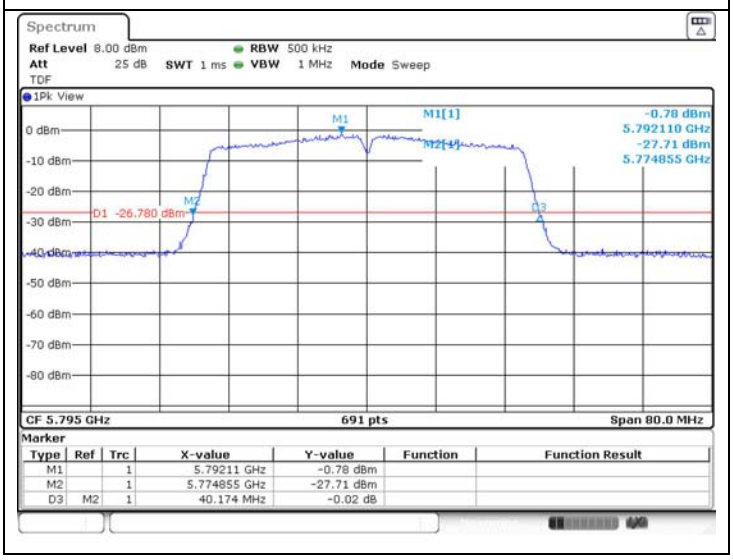


802.11n_HT40 (Band 3)_ANT 1

Low Channel
(5 755 ㎒)

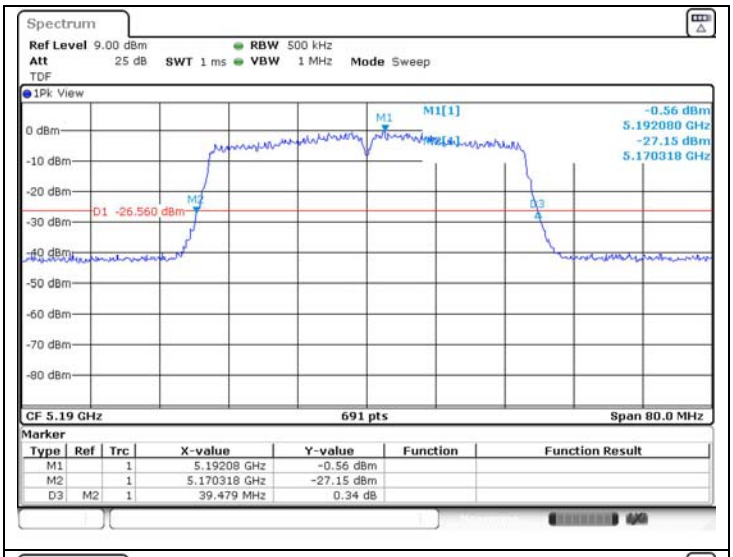


High Channel
(5 795 ㎒)

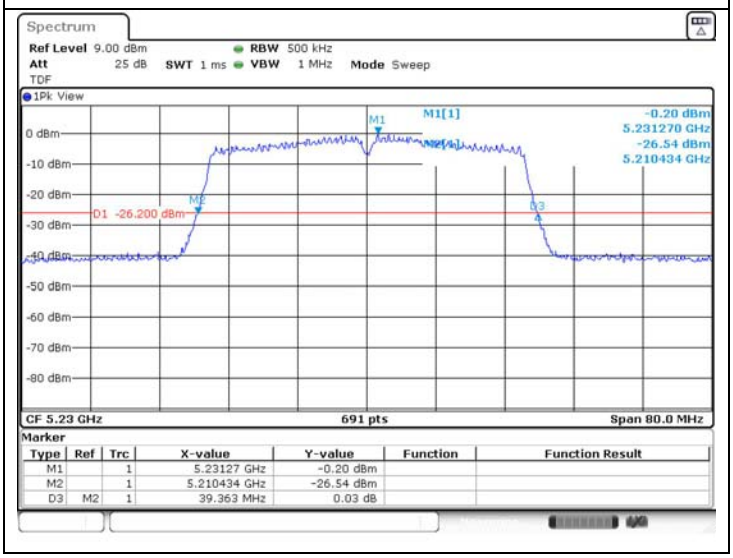


802.11n_HT40 (Band 1)_ANT 2

Low Channel
(5 190 ㎒)

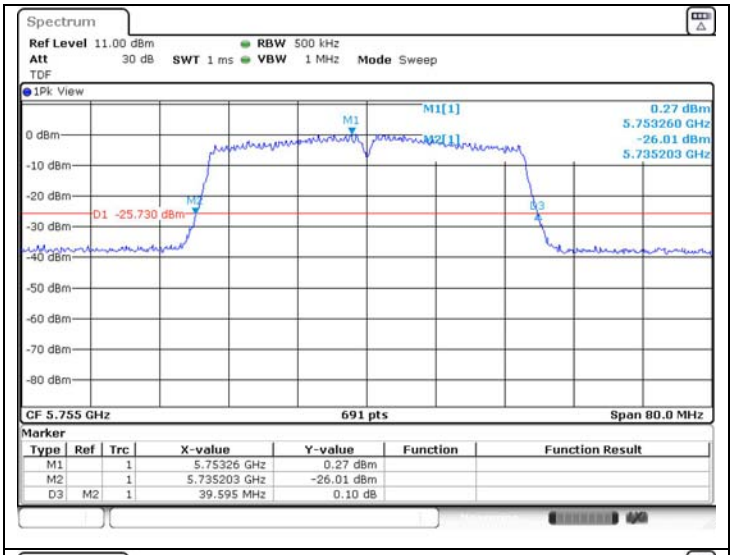


High Channel
(5 230 ㎒)

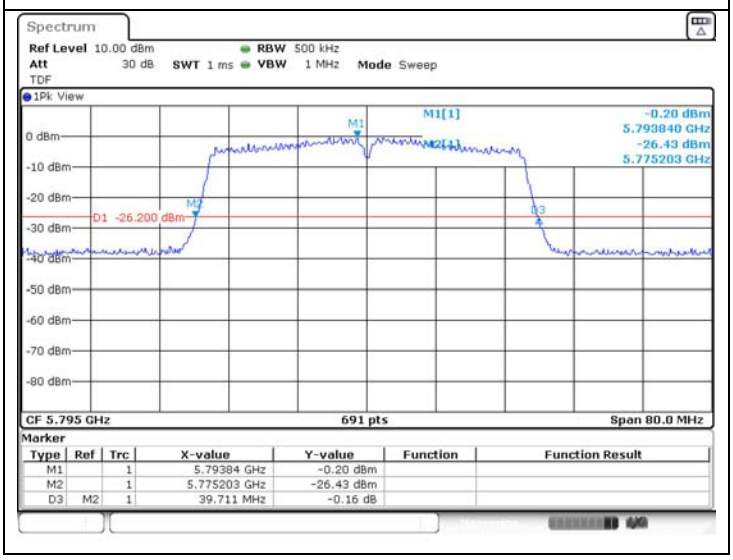


802.11n_HT40 (Band 3)_ANT 2

Low Channel
(5 755 ㎒)

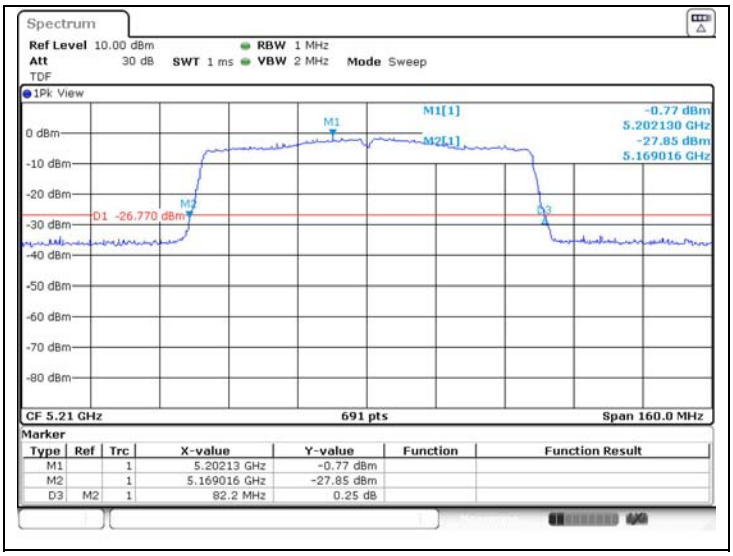


High Channel
(5 795 ㎒)



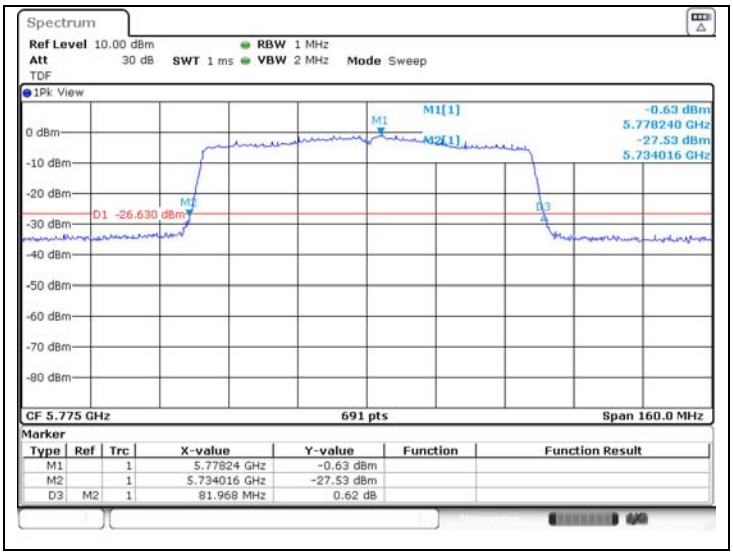
802.11ac_VHT80 (Band 1)_ANT 1

Middle Channel
(5 210 ㎒)



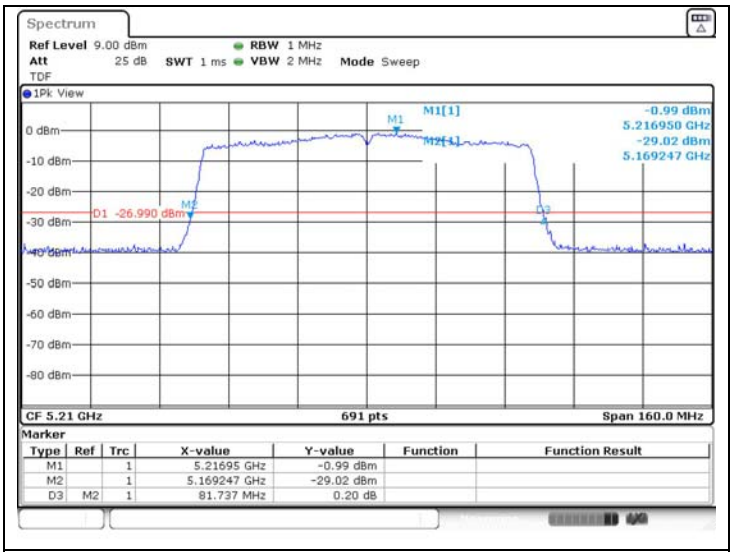
802.11ac_VHT80 (Band 3)_ANT 1

Middle Channel
(5 775 ㎒)



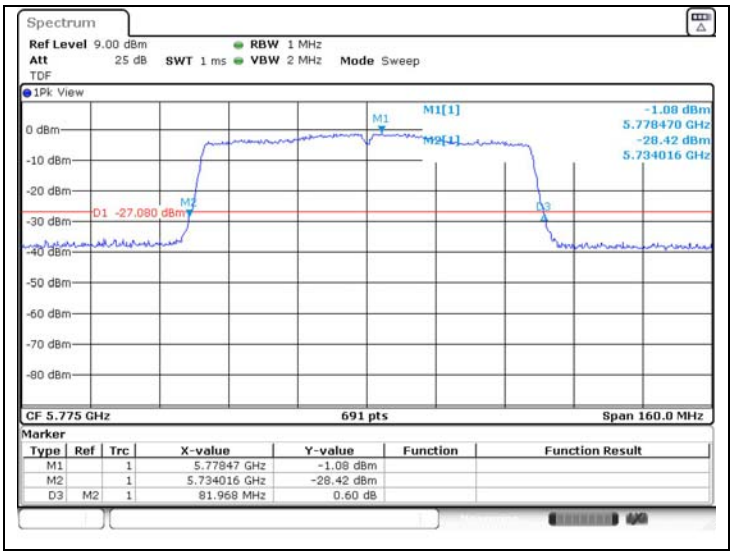
802.11ac_VHT80 (Band 1)_ANT 2

Middle Channel
(5 210 ㎒)



802.11ac_VHT80 (Band 3)_ANT 2

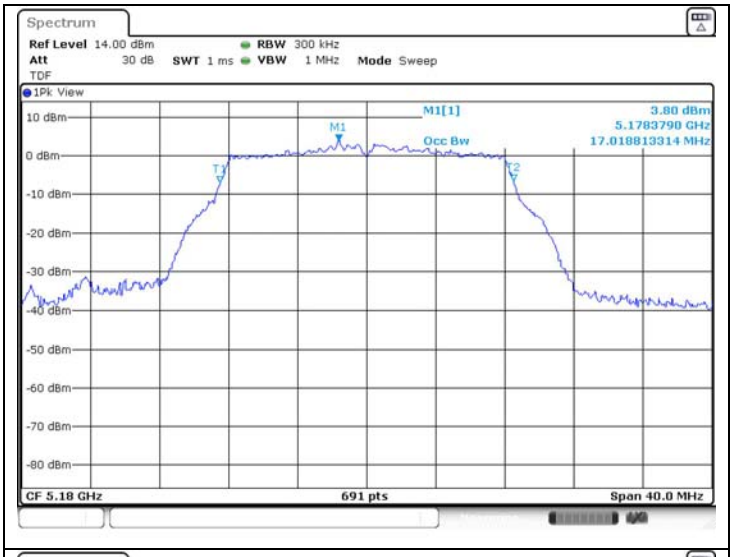
Middle Channel
(5 775 ㎒)



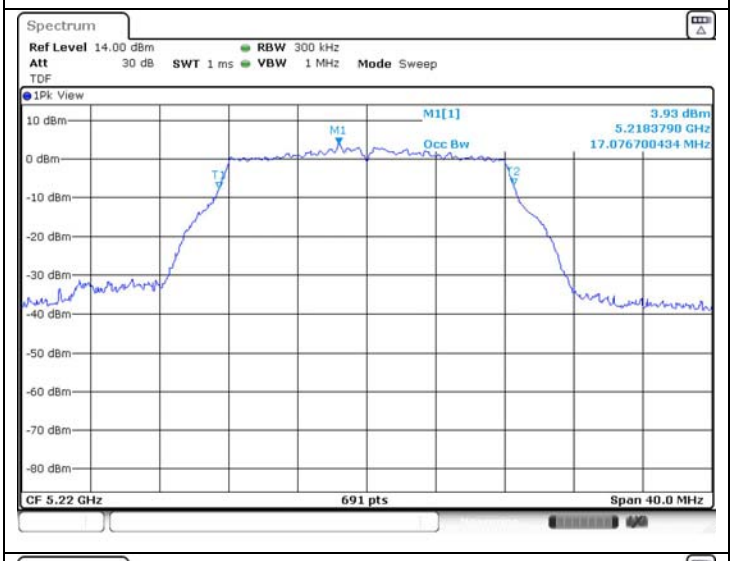
99 % Bandwidth

802.11a (Band 1)_ANT 1

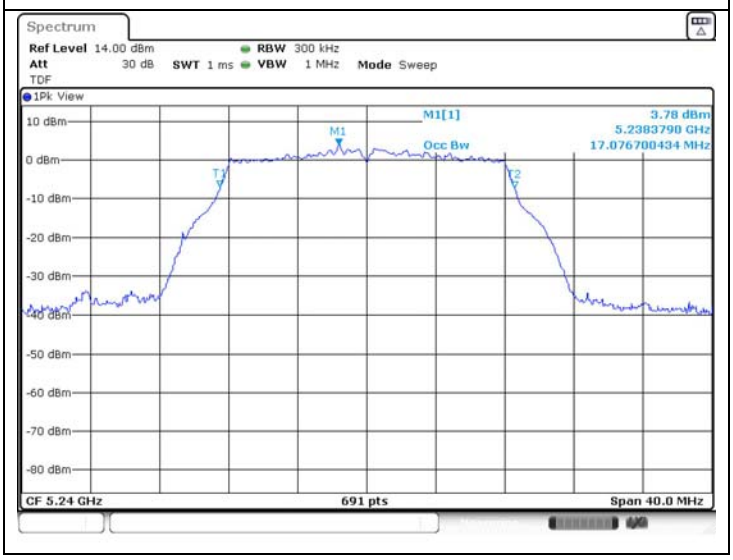
Low Channel
(5 180 ㎒)



Middle Channel
(5 220 ㎒)

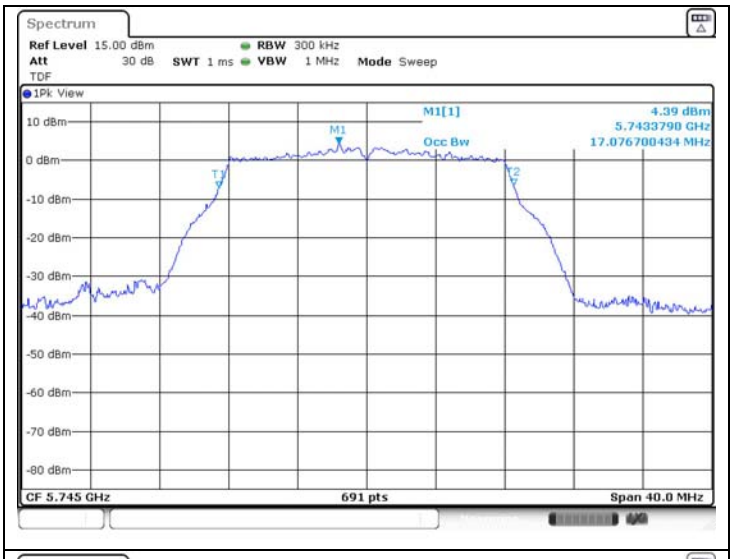


High Channel
(5 240 ㎒)

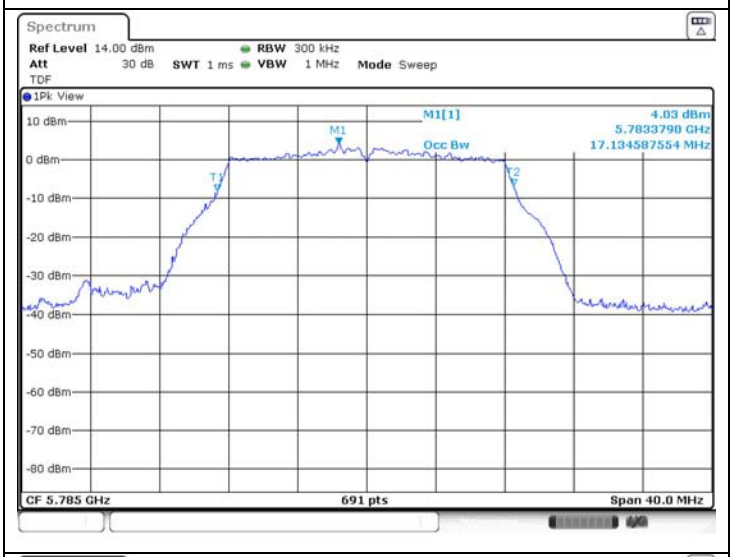


802.11a (Band 3)_ANT 1

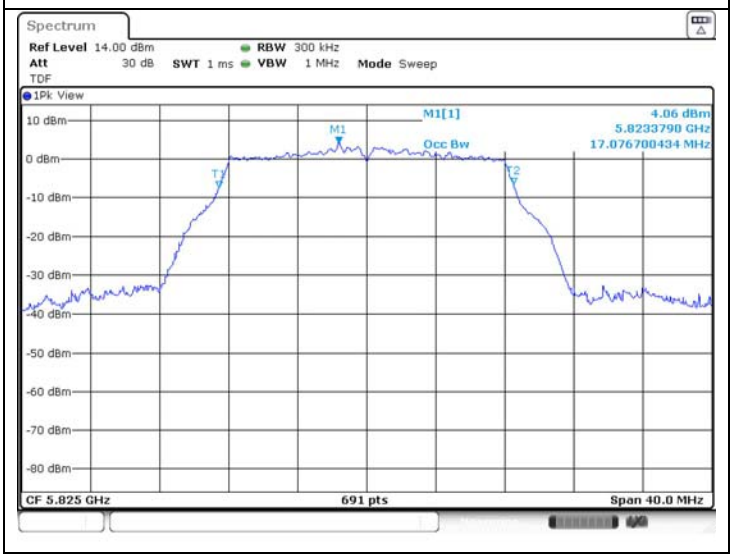
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

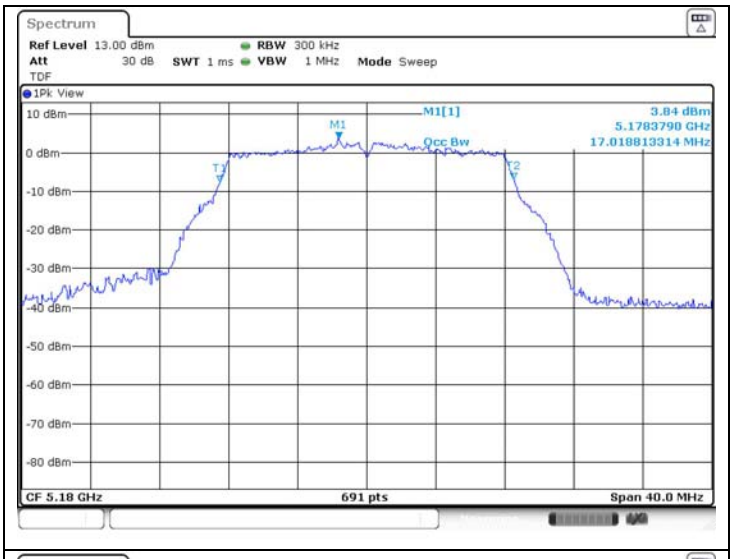


High Channel
(5 825 ㎒)

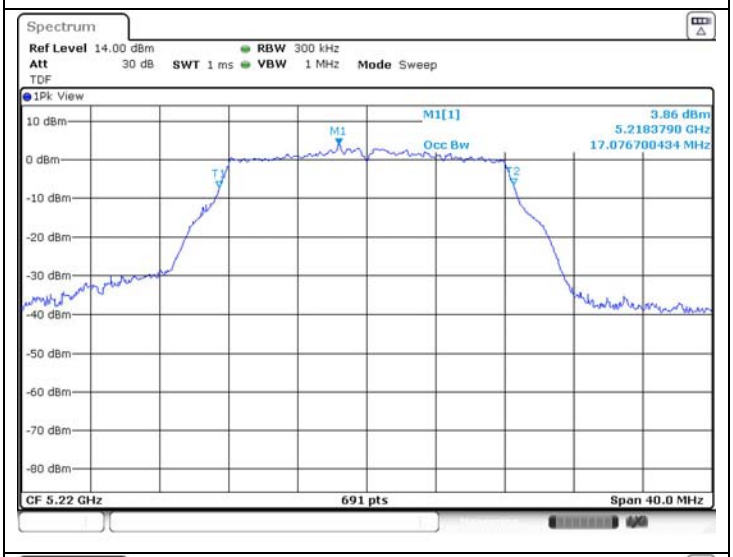


802.11a (Band 1)_ANT 2

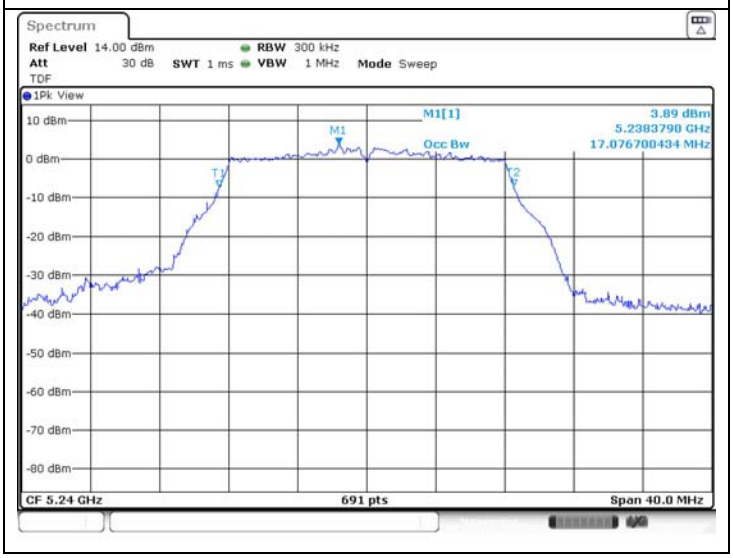
Low Channel
(5 180 ㎒)



Middle Channel
(5 220 ㎒)

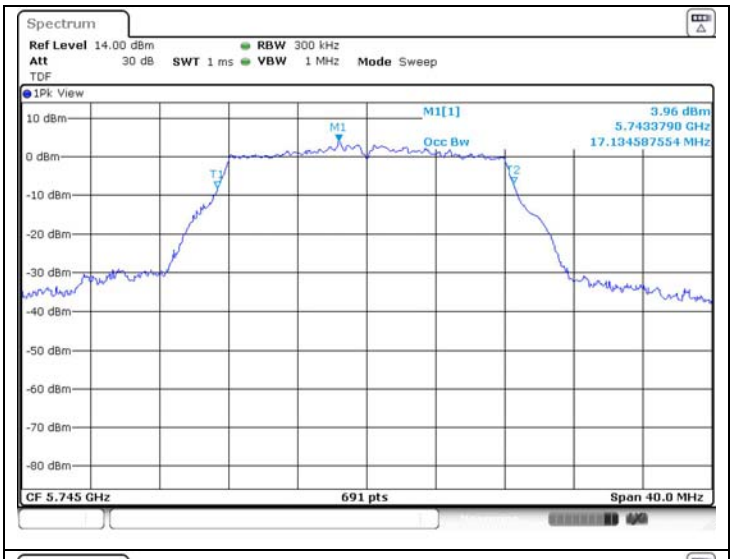


High Channel
(5 240 ㎒)

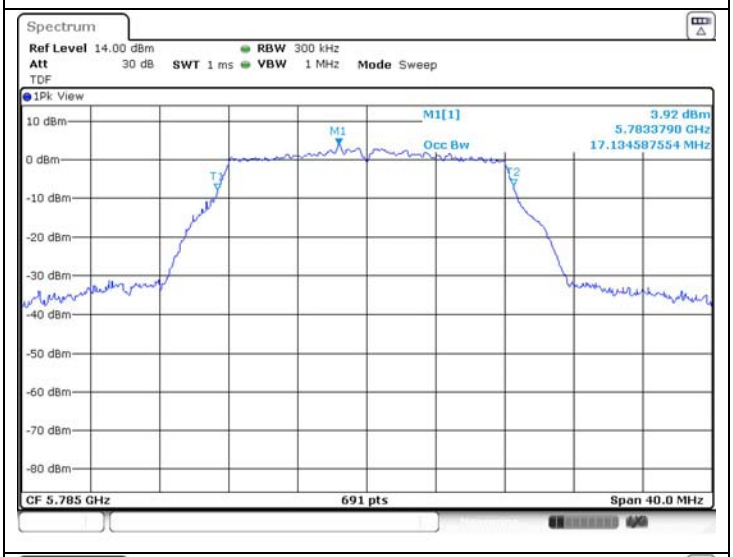


802.11a (Band 3)_ANT 2

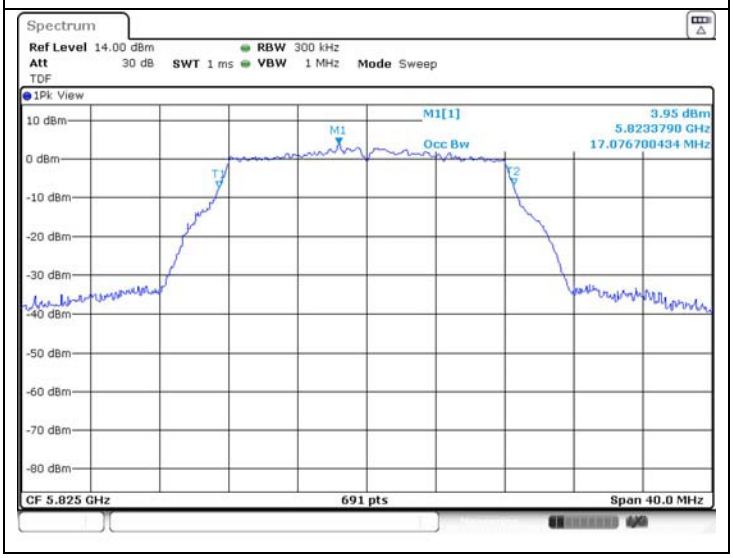
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

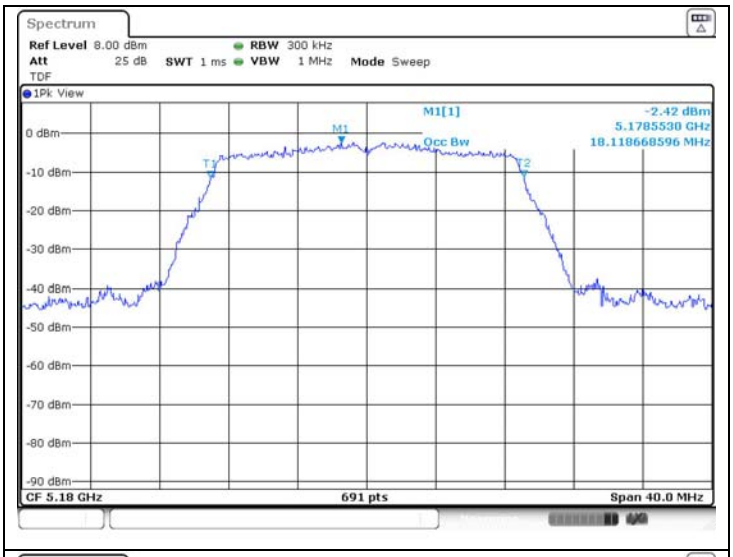


High Channel
(5 825 ㎒)

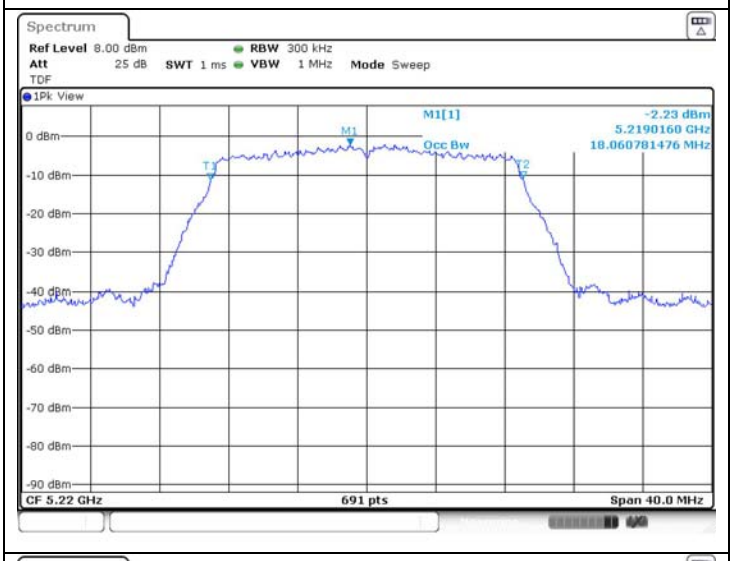


802.11n_HT20 (Band 1)_ANT 1

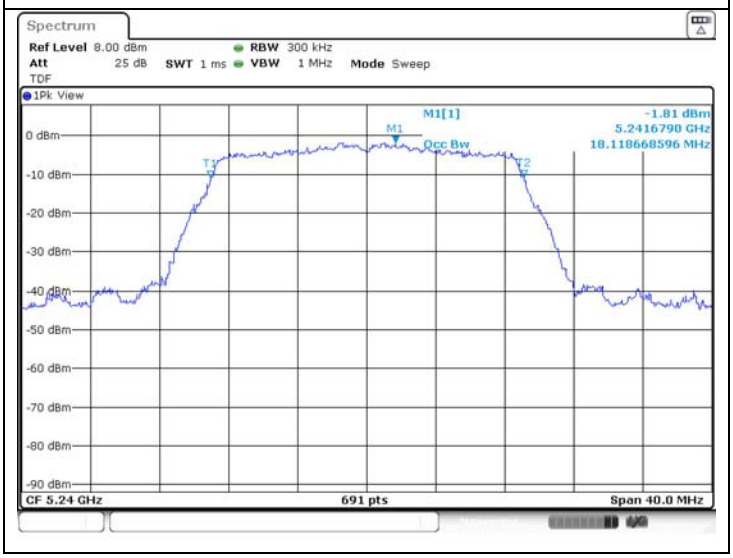
Low Channel
(5 180 ㎒)



Middle Channel
(5 220 ㎒)

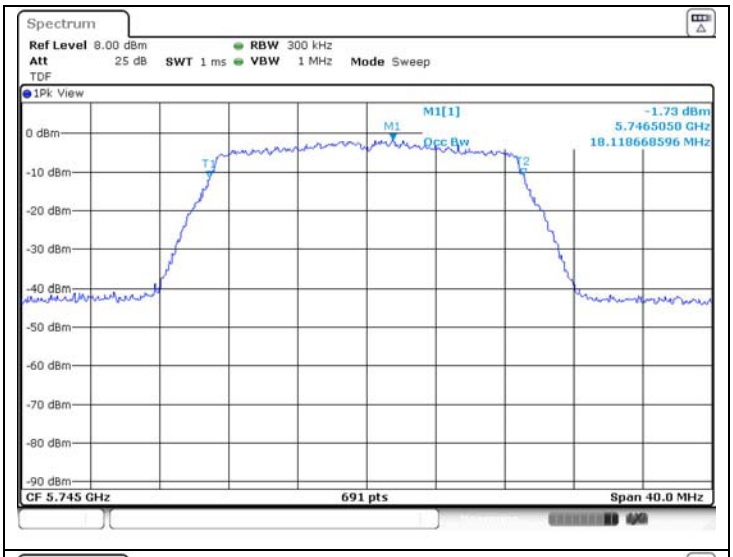


High Channel
(5 240 ㎒)

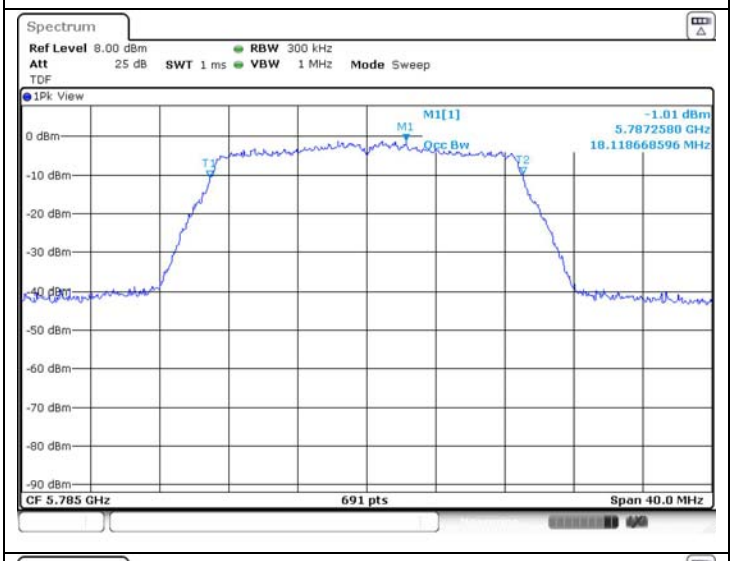


802.11n_HT20 (Band 3)_ANT 1

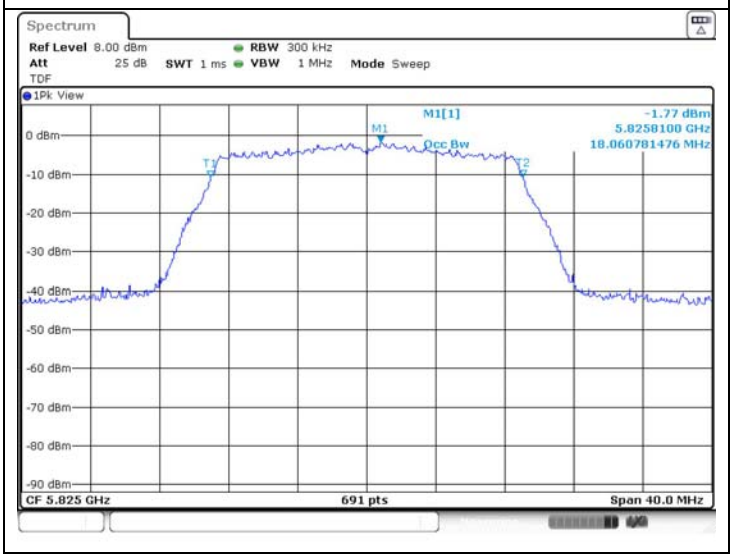
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

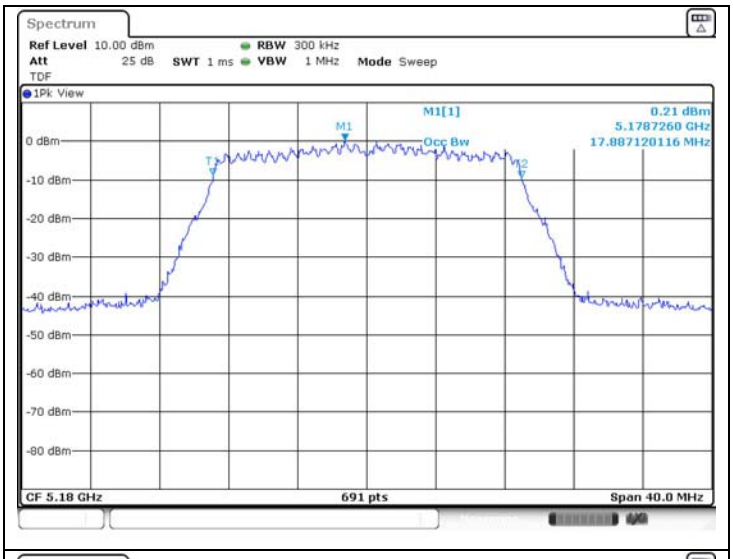


High Channel
(5 825 ㎒)

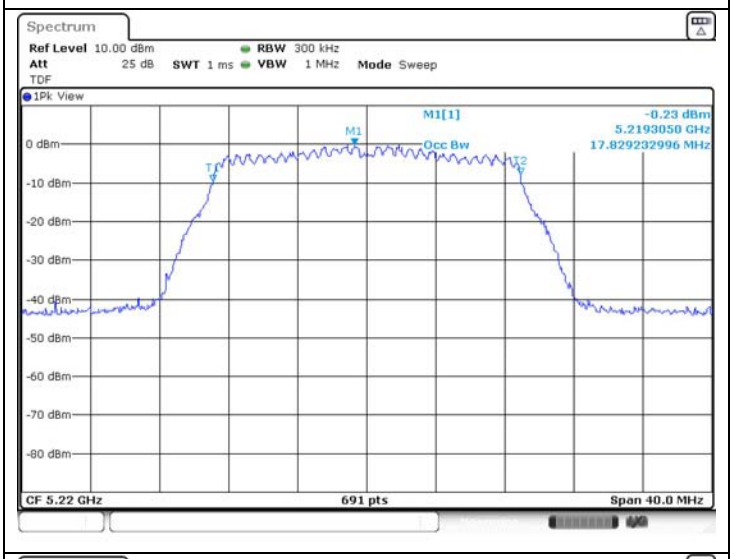


802.11n_HT20 (Band 1)_ANT 2

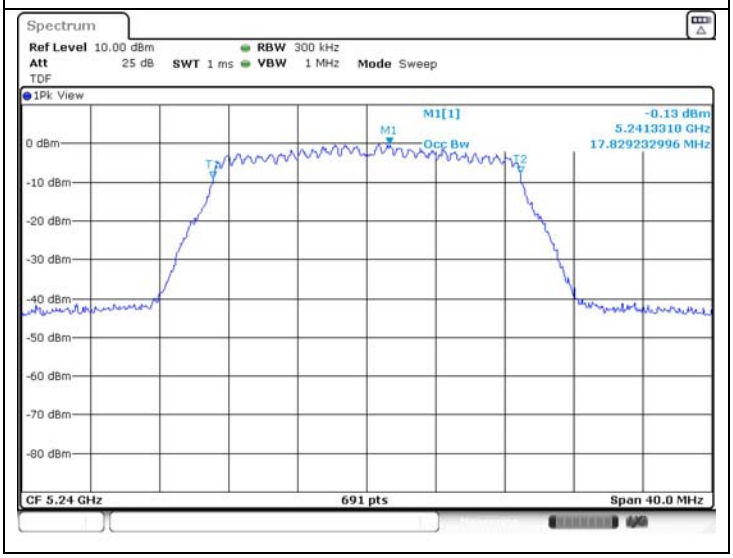
Low Channel
(5 180 ㎒)



Middle Channel
(5 220 ㎒)

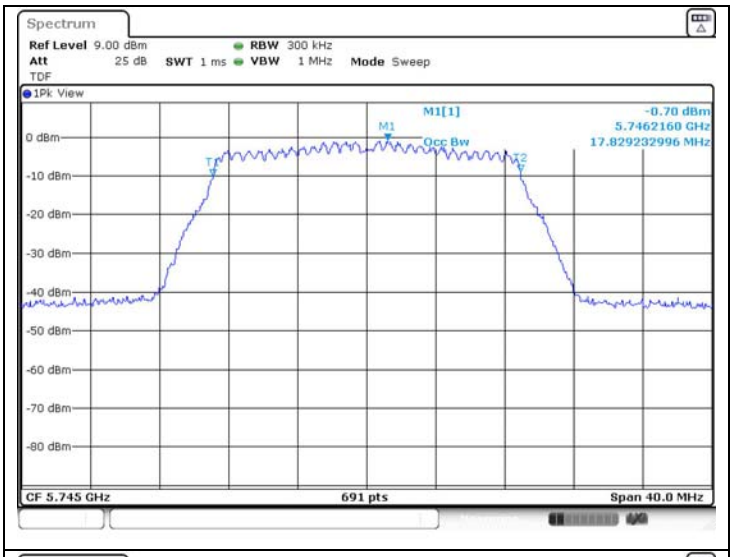


High Channel
(5 240 ㎒)

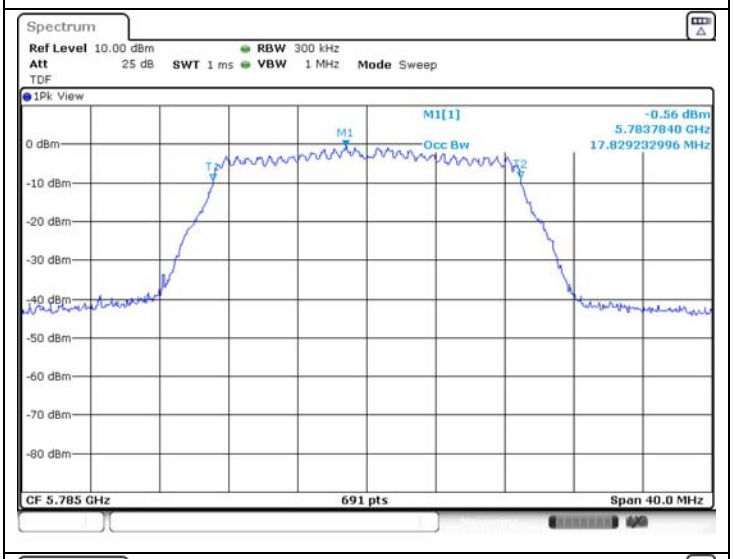


802.11n_HT20 (Band 3)_ANT 2

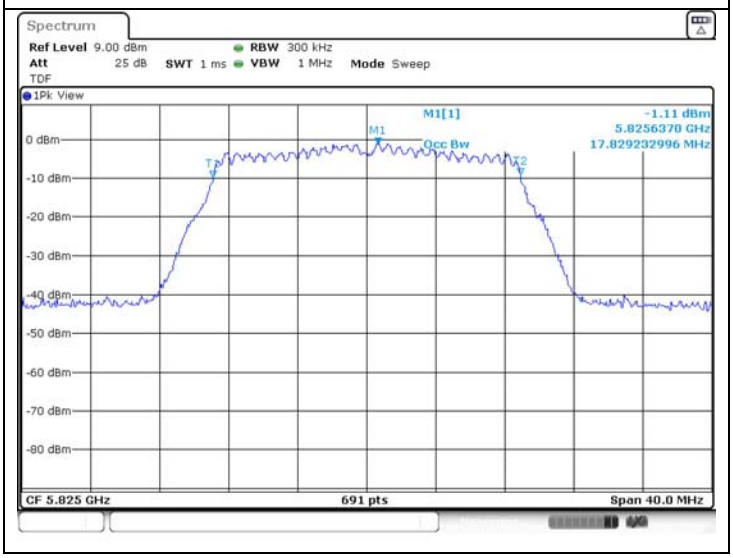
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

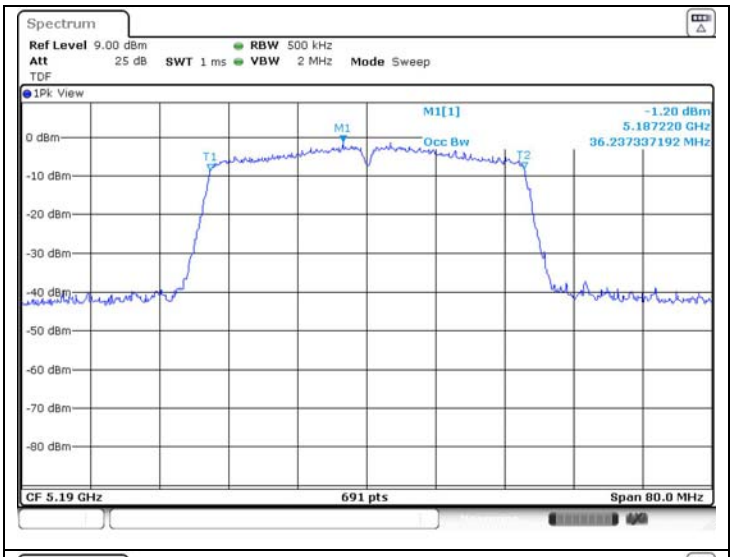


High Channel
(5 825 ㎒)

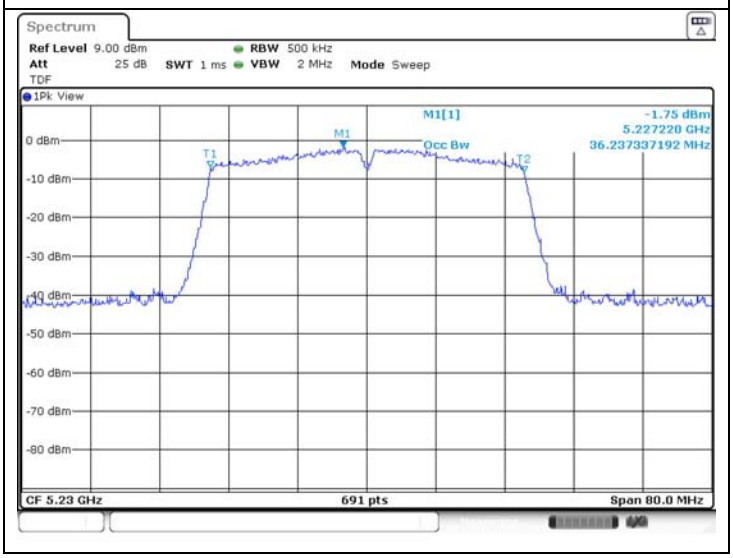


802.11n_HT40 (Band 1)_ANT 1

Low Channel
(5 190 ㎒)

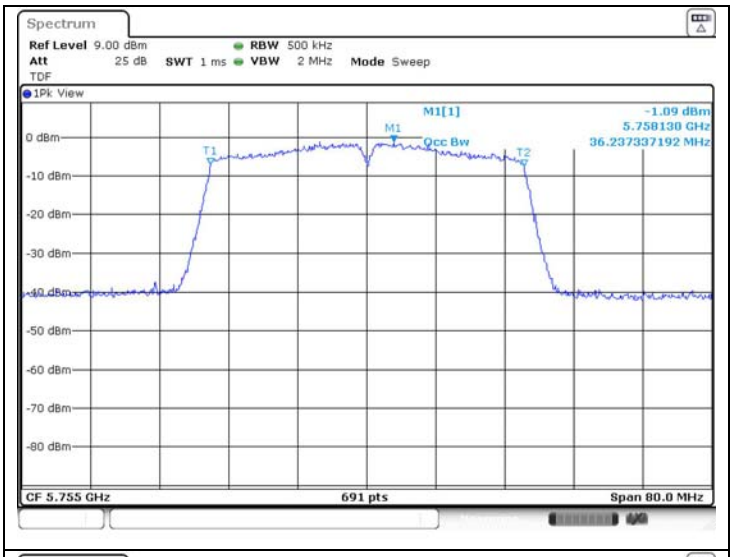


High Channel
(5 230 ㎒)

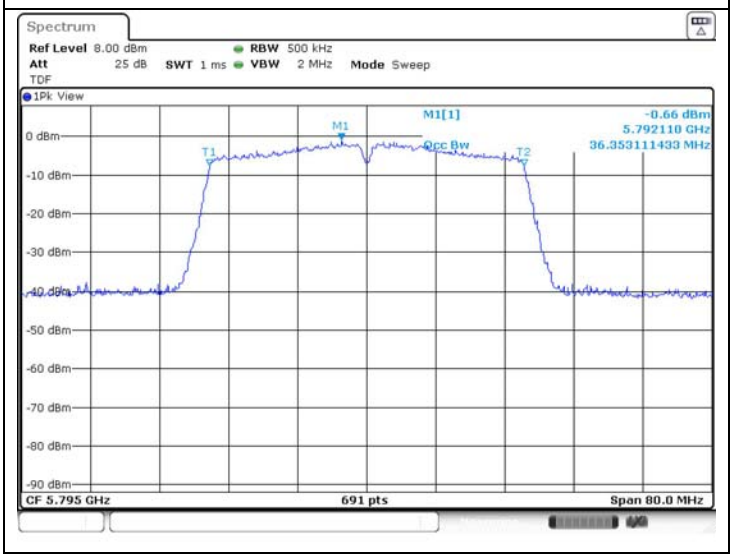


802.11n_HT40 (Band 3)_ANT 1

Low Channel
(5 755 ㎒)

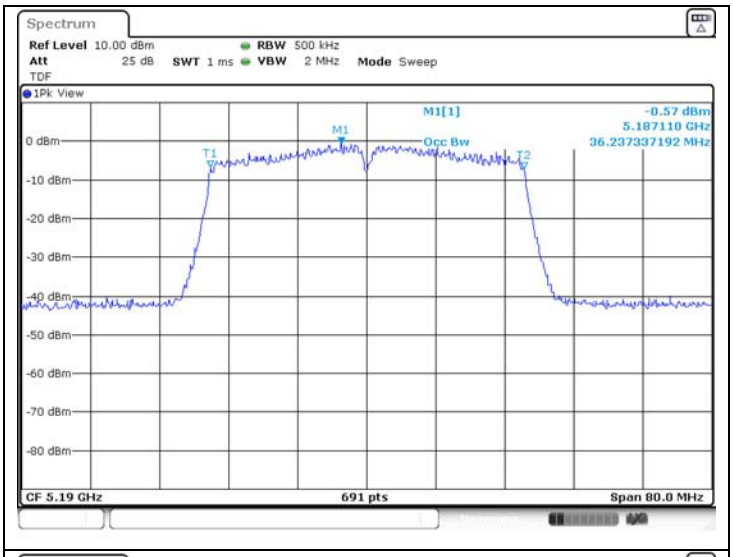


High Channel
(5 795 ㎒)

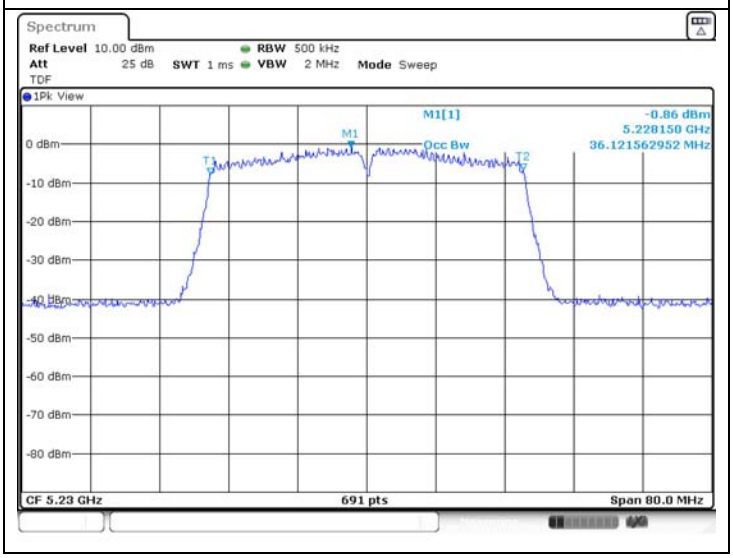


802.11n_HT40 (Band 1)_ANT 2

Low Channel
(5 190 ㎒)

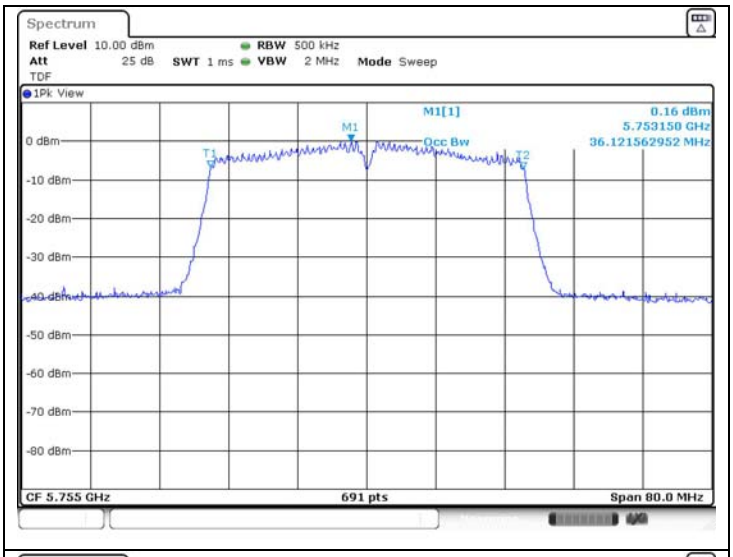


High Channel
(5 230 ㎒)

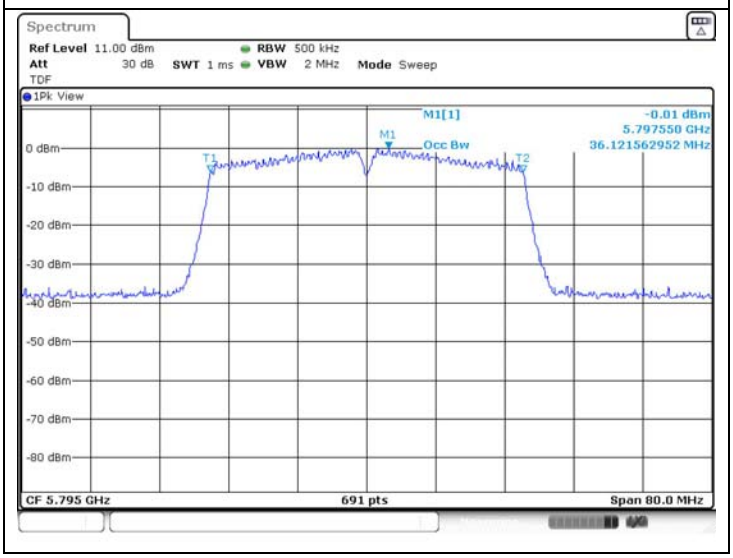


802.11n_HT40 (Band 3)_ANT 2

Low Channel
(5 755 ㎒)

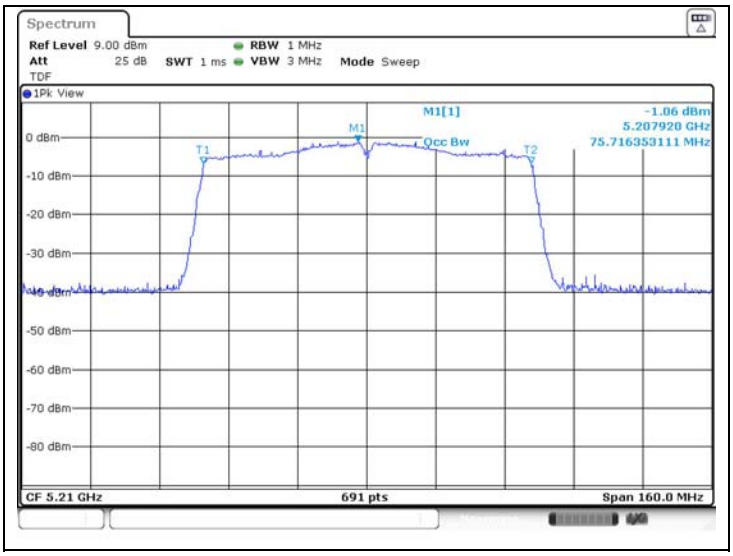


High Channel
(5 795 ㎒)



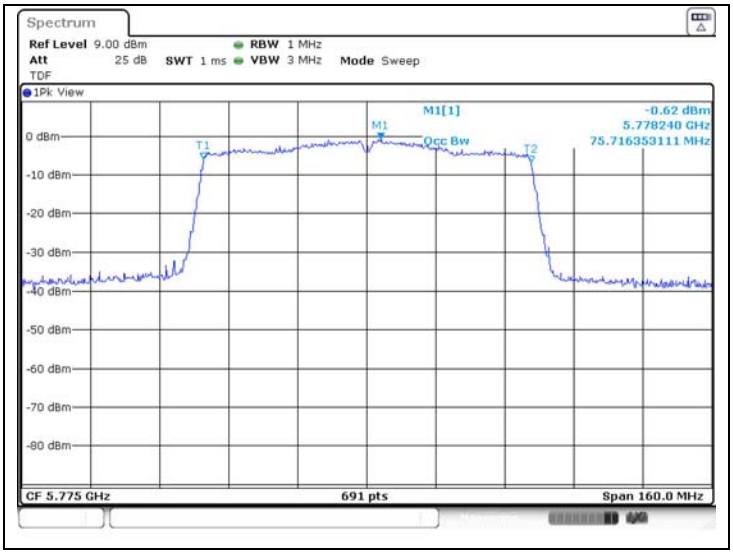
802.11ac_VHT80 (Band 1)_ANT 1

Middle Channel
(5 210 ㎒)



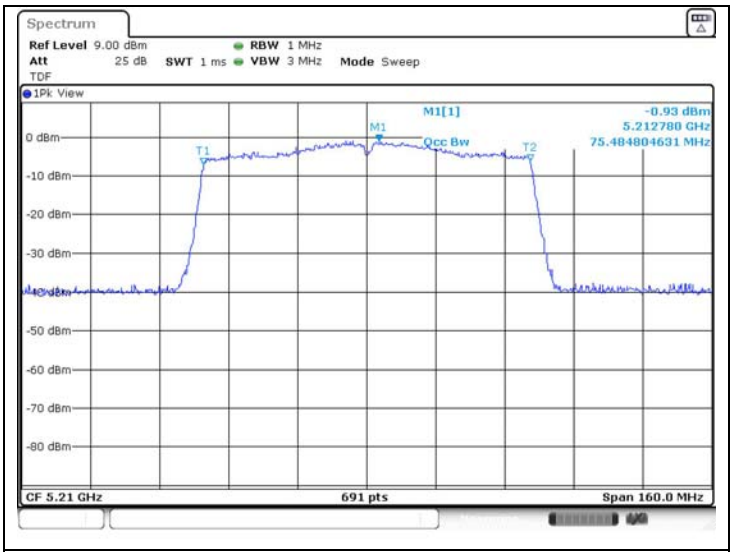
802.11ac_VHT80 (Band 3)_ANT 1

Middle Channel
(5 775 ㎒)



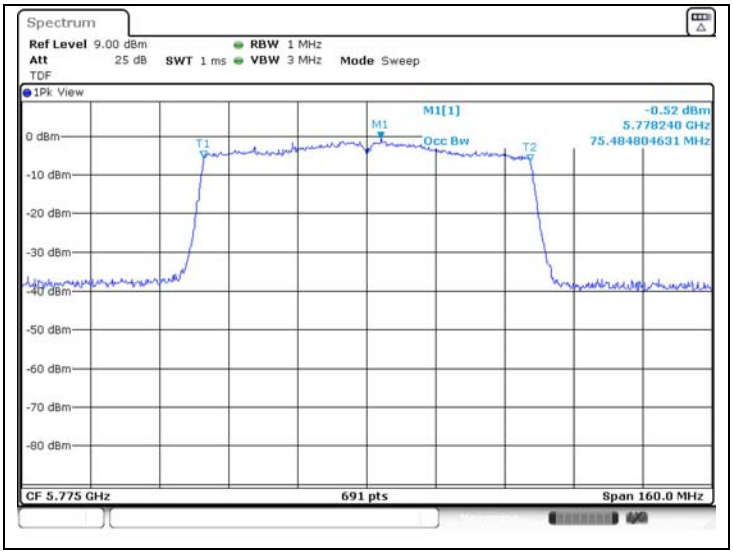
802.11ac_VHT80 (Band 1)_ANT 2

Middle Channel
(5 210 ㎒)



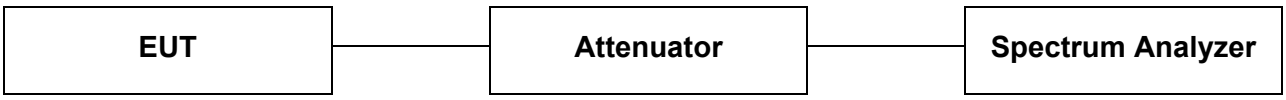
802.11ac_VHT80 (Band 3)_ANT 2

Middle Channel
(5 775 ㎒)



4. 6 ㏈ Bandwidth

4.1. Test Setup



4.2. Limit

4.2.1. FCC

According to §15.407(e), within the 5.725-5.85 ㎓ band, the minimum 6 ㏈ bandwidth of U-NII devices shall be at least 500 ㎑.

4.2.2. IC

According to RSS-247 Issue 2, 6.2.4.1, the minimum -6 ㏈ Bandwidth shall be at least 500 ㎑.

4.3. Test Procedure

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.

1. This measurement settings are specified in section C.2 of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Set RBW = 100 ㎑.
3. Set the video bandwidth (VBW) ≥ 3 x RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. 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 ㏈ relative to the maximum level measured in the fundamental emission.

4.4. Test result

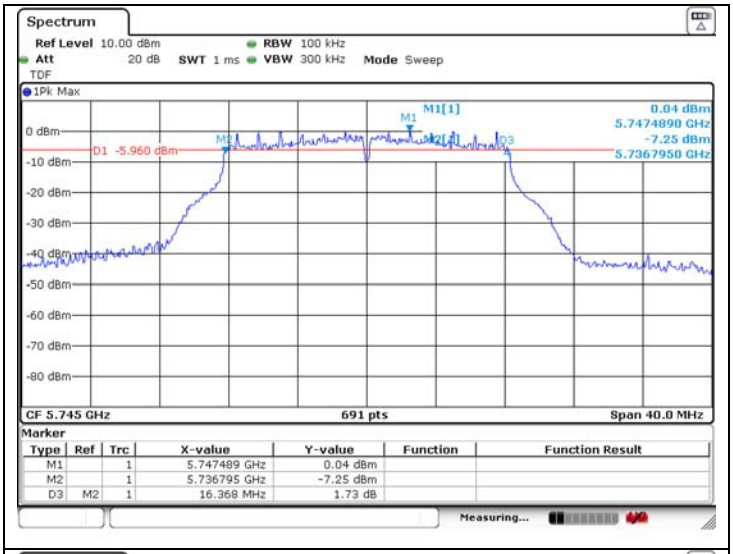
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Band	Mode	Frequency (㎒)	Ch.	Data Rate (Mbps)	6 ㏈ Bandwidth (㎒)		Minimum Bandwidth (㎑)
					ANT 1	ANT 2	
U-NII 3	11a	5 745	149	6	16.368	16.440	500
		5 785	157		16.324	16.440	
		5 825	165		16.382	16.440	
	11n_HT20	5 745	149	MCS8	17.598	17.714	
		5 785	157		17.540	17.714	
		5 825	165		17.598	17.714	
	11n_HT40	5 755	151	MCS8	35.890	36.006	
		5 795	159		35.770	36.006	
	11ac_VHT80	5 775	155	MCS0	75.716	75.445	

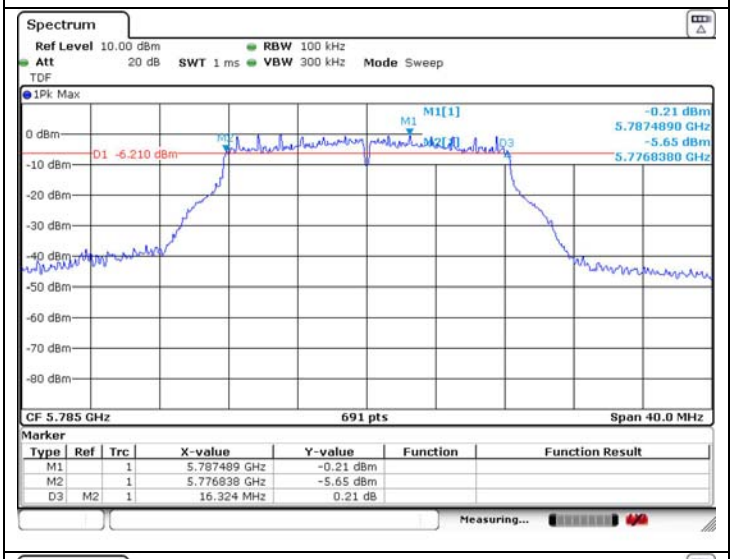
- Test plots

802.11a (Band 3)_ANT 1

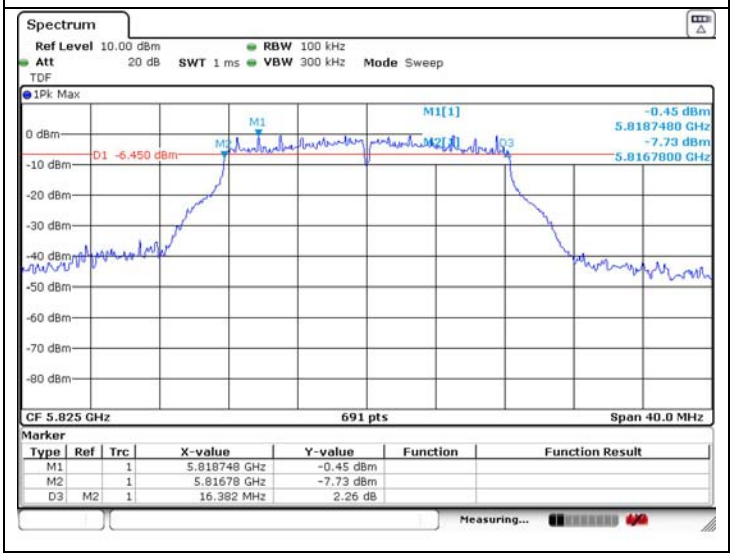
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

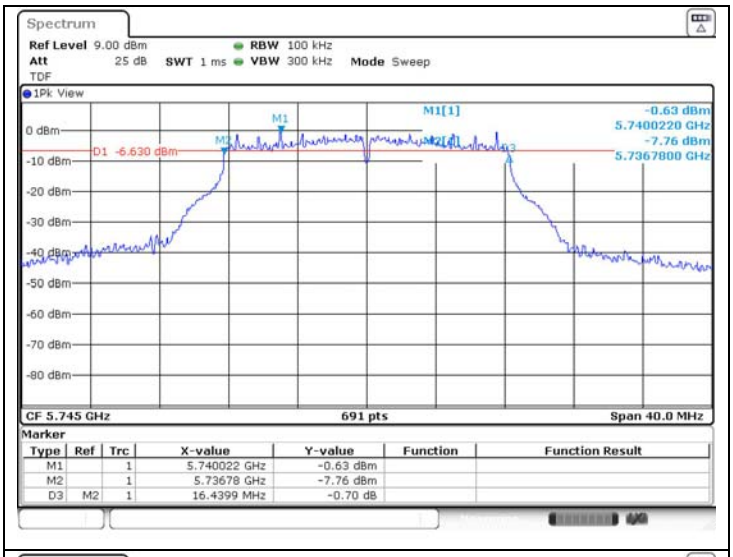


High Channel
(5 825 ㎒)

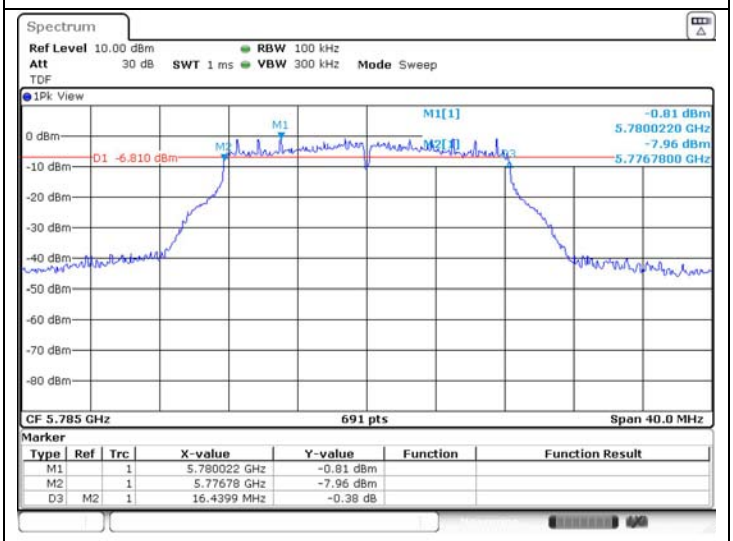


802.11a (Band 3)_ANT 2

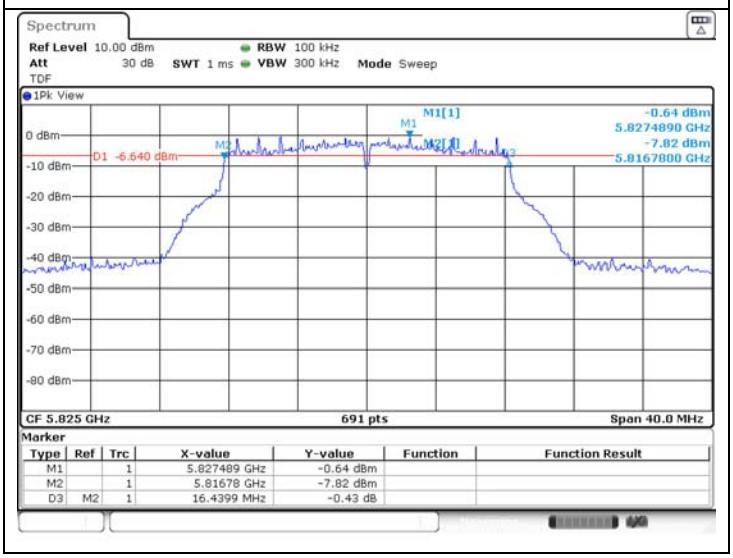
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

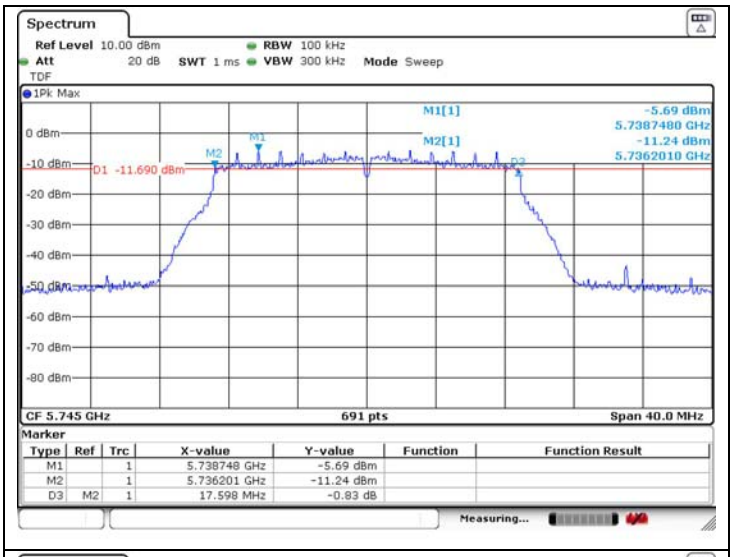


High Channel
(5 825 ㎒)

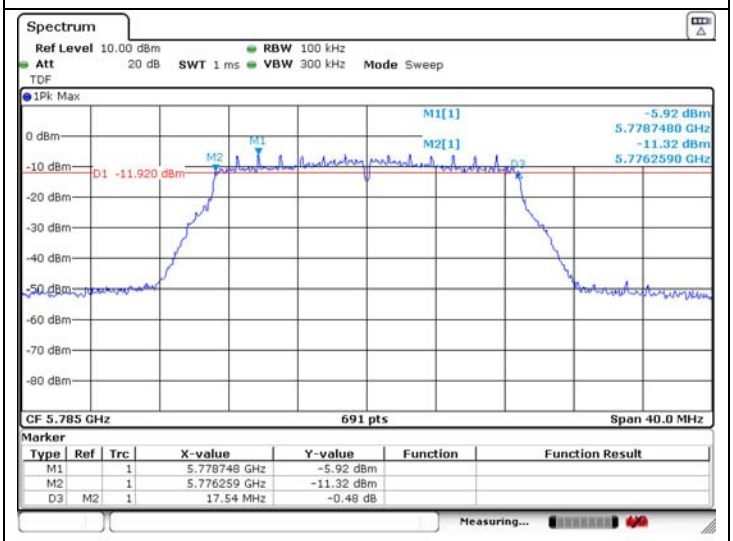


802.11n_HT20 (Band 3)_ANT 1

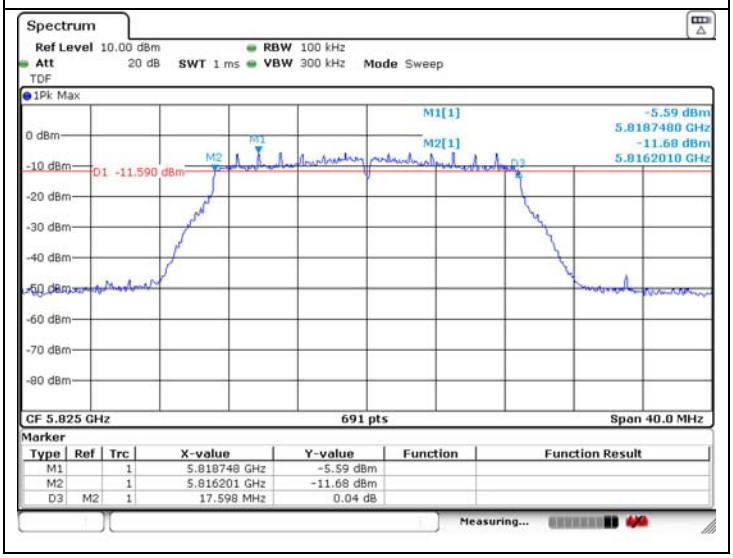
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

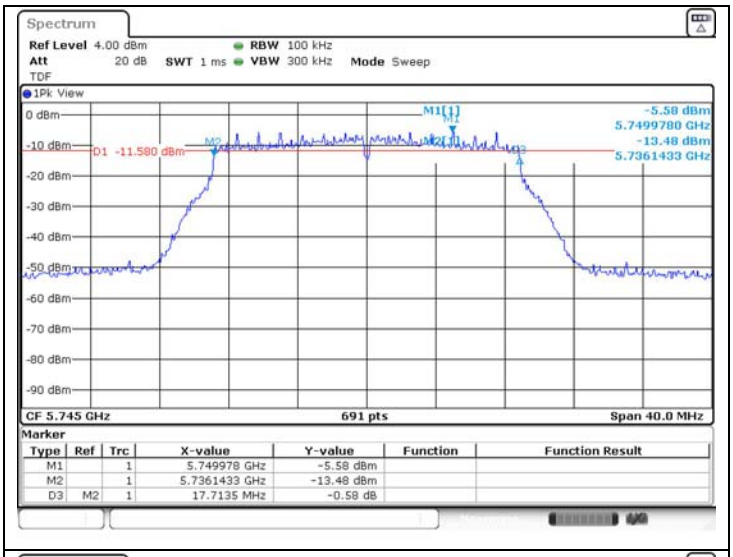


High Channel
(5 825 ㎒)

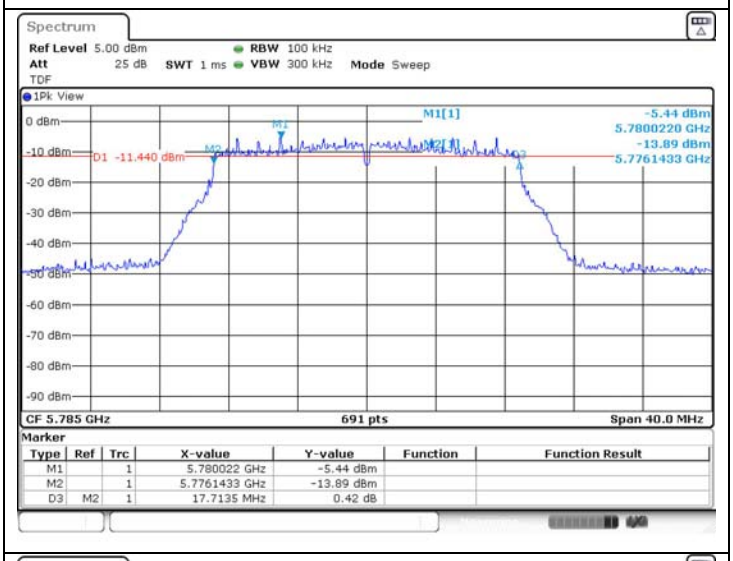


802.11n_HT20 (Band 3)_ANT 2

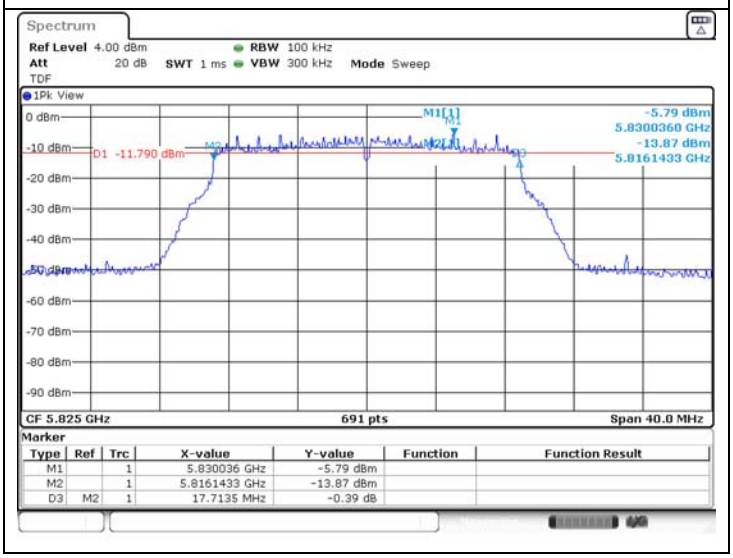
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

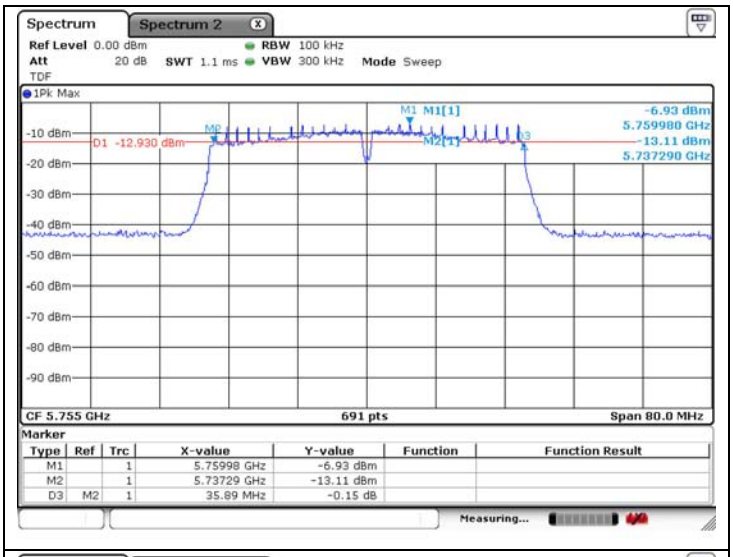


High Channel
(5 825 ㎒)

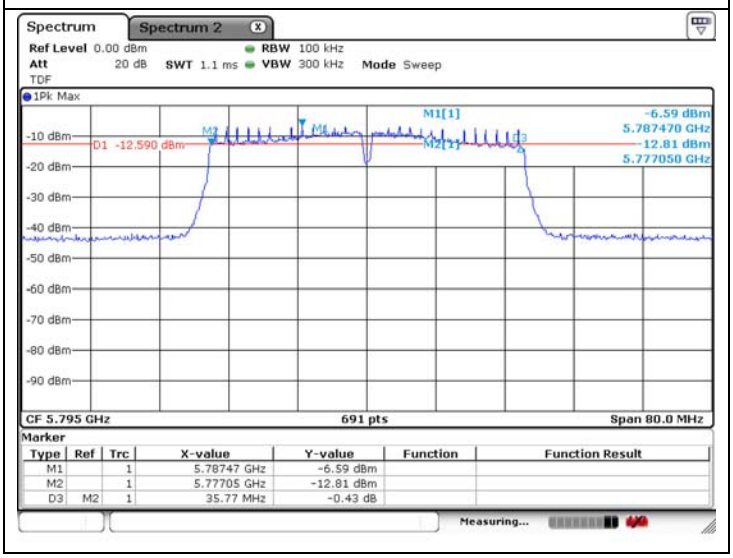


802.11n_HT40 (Band 3)_ANT 1

Low Channel
(5 755 ㎒)

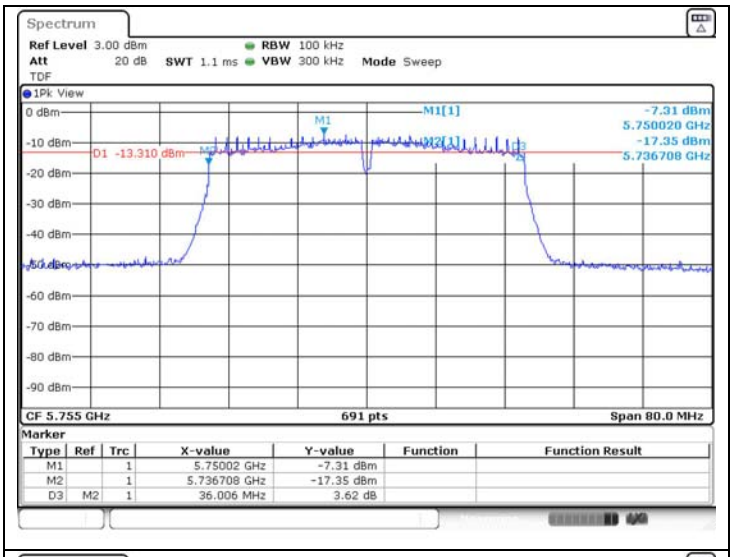


High Channel
(5 795 ㎒)

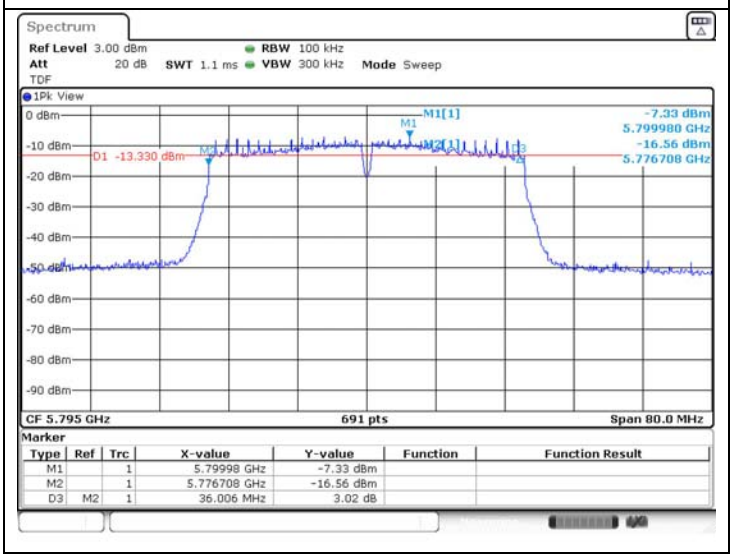


802.11n_HT40 (Band 3)_ANT 2

Low Channel
(5 755 ㎒)

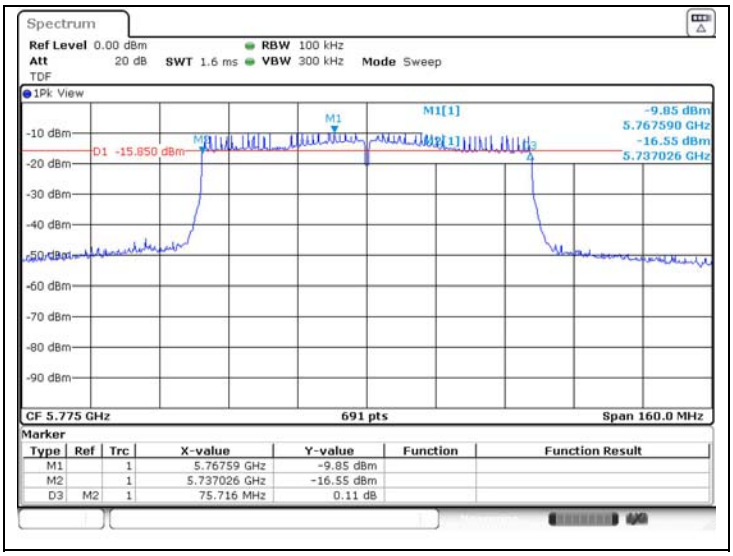


High Channel
(5 795 ㎒)



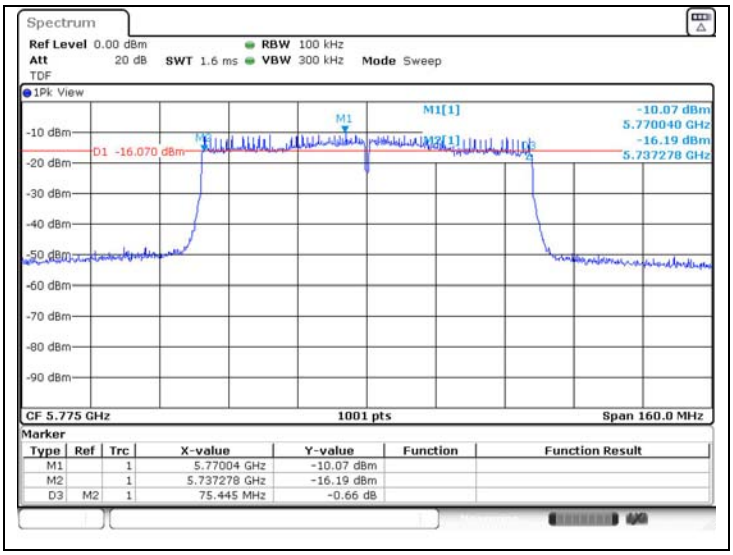
802.11ac_VHT80 (Band 3)_ANT 1

Middle Channel
(5 775 ㎒)



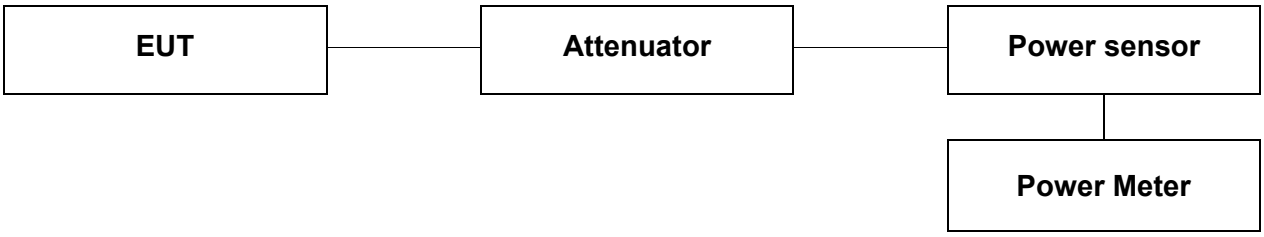
802.11ac_VHT80 (Band 3)_ANT 2

Middle Channel
(5 775 ㎒)



5. Maximum Conducted Output Power

5.1. Test Setup



5.2. Limit

5.2.1. FCC

According to 15.407(a)(1)(iv)

For client devices in the 5.15-5.25 ㎓ band, the maximum conducted output power over the frequency band of operation shall not exceed 250 ㎽ provided the maximum antenna gain does not exceed 6 ㏈ i. In addition, the maximum power spectral density shall not exceed 11 ㏈ m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i.

According to 15.407(a)(3)

For the band 5.725-5.85 ㎓, 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 ㏈m in any 500-㎑ band. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i. However, fixed point-to point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 ㏈ i without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

5.2.2. IC

According to RSS-247 Issue 2,

6.2.1.1 Frequency band 5 150-5 250 ㎒

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 ㎽ or 1.76 + 10 $\log_{10}$B, ㏈m, whichever is less. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 ㏈ below the maximum permitted e.i.r.p. of 30 ㎽.

For other devices, the maximum e.i.r.p. shall not exceed 200 ㎽ or 10 + 10 $\log_{10}$B, ㏈m, whichever power is less. B is the 99 % emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 ㏈m in any 1.0 ㎒ band.

6.2.4.1 Frequency band 5 725-5 850 ㎒

For equipment operating in the band 5 725-5 850 ㎒, the minimum 6 ㏈ bandwidth shall be at least 500 ㎑. The maximum conducted output power shall not exceed 1 W. The output power spectral density shall not exceed 30 ㏈m in any 500 ㎑ band. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the output power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 ㏈i without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipoint[3] systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

5.3. Test Procedure

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.

1. This measurement settings are specified in section E.3.a of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied:
   - The EUT is configured to transmit continuously or to transmit with a consistent duty cycle.
   - At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
   - The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
3. If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section II.B.
4. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
5. Adjust the measurement in dBm by adding 10 log (1/x) where x is the duty cycle (e.g., 10 log (1/0.25) if the duty cycle is 25 %).

5.4. Test result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Test mode: 11a_ANT1

Band	Frequency (㎒)	Data Rate (Mbps)	Average Power (dB m)	Duty Cycle Correction Factor (dB)	Average Power Result (dB m)
U-NII 1	5 180	6	9.22	0.28	9.50
	5 220		8.93		9.21
	5 240		8.84		9.12
U-NII 3	5 745		11.21		11.49
	5 785		11.06		11.34
	5 825		11.01		11.29

Band	Frequency (㎒)	Data Rate (Mbps)	Average Power Result (dB m)	Antenna Gain (dB i)	E.I.R.P. (dB m)
U-NII 1	5 180	6	9.50	2.84	12.34
	5 220		9.21		12.05
	5 240		9.12		11.96

Band	FCC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	26 dB BW (㎒)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 180	23.98			2.84	23.98
	5 220					
	5 240					
U-NII 3	5 745	30			2.73	30
	5 785					
	5 825					

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	99 % BW (㎒)	1.76+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 180	14.77	17.019	14.07	2.84	14.07
	5 220		17.077	14.08		14.08
	5 240		17.077	14.08		14.08

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	99 % BW (㎒)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 3	5 745	30			2.73	30
	5 785					
	5 825					

Test mode: 11a_ANT2

Band	Frequency (㎒)	Data Rate (Mbps)	Average Power (dB m)	Duty Cycle Correction Factor (dB)	Average Power Result (dB m)
U-NII 1	5 180	6	9.13	0.28	9.41
	5 220		8.15		8.43
	5 240		8.82		9.10
U-NII 3	5 745		10.87		11.15
	5 785		10.96		11.24
	5 825		10.72		11.00

Band	Frequency (㎒)	Data Rate (Mbps)	Average Power Result (dB m)	Antenna Gain (dB i)	E.I.R.P. (dB m)
U-NII 1	5 180	6	9.41	2.54	11.95
	5 220		8.43		10.97
	5 240		9.10		11.64

Band	FCC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	26 dB BW (㎒)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 180	23.98			2.54	23.98
	5 220					
	5 240					
U-NII 3	5 745	30			2.45	30
	5 785					
	5 825					

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	99 % BW (㎒)	1.76+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 180	14.77	17.019	14.07	2.54	14.07
	5 220		17.077	14.08		14.08
	5 240		17.077	14.08		14.08

Band	IC Limit					
	Frequency (㎒)	Fixed Limit (dB m)	99 % BW (㎒)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 3	5 745	30			2.45	30
	5 785					
	5 825					

Test mode: 11n_HT20

Band	Frequency (MHz)	Data Rate (Mbps)	ANT 1 Average Power (dB m)	ANT 2 Average Power (dB m)	ANT 1+ANT 2 Average Power (dB m)
U-NII 1	5 180	MCS8	1.35	2.66	5.06
	5 220		1.80	1.84	4.83
	5 240		2.09	2.18	5.15
U-NII 3	5 745		4.93	5.22	8.09
	5 785		5.01	5.05	8.04
	5 825		5.28	4.98	8.14

Band	Frequency (MHz)	Data Rate (Mbps)	ANT 1+ANT 2 Average Power (dB m)	Duty Cycle Correction Factor (dB)	ANT 1 + ANT 2 Average Power Result (dB m)
U-NII 1	5 180	MCS8	5.06	0.61	5.67
	5 220		4.83		5.44
	5 240		5.15		5.76
U-NII 3	5 745		8.09		8.70
	5 785		8.04		8.65
	5 825		8.14		8.75

Band	Frequency (MHz)	Data Rate (Mbps)	ANT 1 + ANT 2 Average Power Result (dB m)	Antenna Gain (dB i)	ANT 1 + ANT 2 E.I.R.P. (dB m)
U-NII 1	5 180	MCS8	5.67	5.70	11.37
	5 220		5.44		11.14
	5 240		5.76		11.46

Band	FCC Limit					
	Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 180	23.98			5.70	23.98
	5 220					
	5 240					
U-NII 3	5 745	30			5.60	30
	5 785					
	5 825					

Band	IC Limit					
	Frequency (MHz)	Fixed Limit (dB m)	99 % BW (MHz)	1.76+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 180	14.77	17.887	14.29	5.70	14.29
	5 220		17.829	14.27		14.27
	5 240		17.829	14.27		14.27

Band	IC Limit					
	Frequency (MHz)	Fixed Limit (dB m)	99 % BW (MHz)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 3	5 745	30			5.60	30
	5 785					
	5 825					

Test mode: 11n_HT40

Band	Frequency (MHz)	Data Rate (Mbps)	ANT 1 Average Power (dB m)	ANT 2 Average Power (dB m)	ANT 1+ANT 2 Average Power (dB m)
U-NII 1	5 190	MCS8	3.30	3.21	6.27
	5 230		3.77	3.17	6.49
U-NII 3	5 755		5.53	5.18	8.37
	5 795		5.53	5.26	8.41

Band	Frequency (MHz)	Data Rate (Mbps)	ANT 1+ANT 2 Average Power (dB m)	Duty Cycle Correction Factor (dB)	ANT 1 + ANT 2 Average Power Result (dB m)
U-NII 1	5 190	MCS8	6.27	1.08	7.35
	5 230		6.49		7.57
U-NII 3	5 755		8.37		9.45
	5 795		8.41		9.49

Band	Frequency (MHz)	Data Rate (Mbps)	ANT 1 + ANT 2 Average Power Result (dB m)	Antenna Gain (dB i)	ANT 1 + ANT 2 E.I.R.P. (dB m)
U-NII 1	5 190	MCS8	7.35	5.70	13.05
	5 230		7.57		13.27

Band	FCC Limit					
	Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 190	23.98			5.70	23.98
	5 230					
U-NII 3	5 755	30			5.60	30
	5 795					

Band	IC Limit					
	Frequency (MHz)	Fixed Limit (dB m)	99 % BW (MHz)	1.76+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 755	14.77	36.237	17.35	5.70	14.77
	5 795		36.122	17.34		14.77

Band	IC Limit					
	Frequency (MHz)	Fixed Limit (dB m)	99 % BW (MHz)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 3	5 755	30			5.60	30
	5 795					

Test mode: 11ac_VHT80

Band	Frequency (MHz)	Data Rate (Mbps)	ANT 1 Average Power (dBm)	ANT 2 Average Power (dBm)	ANT 1+ANT 2 Average Power (dBm)
U-NII 1	5 210	MCS0	3.83	3.35	6.61
U-NII 3	5 775		5.29	4.75	8.04

Band	Frequency (MHz)	Data Rate (Mbps)	ANT 1+ANT 2 Average Power (dBm)	Duty Cycle Correction Factor (dB)	ANT 1 + ANT 2 Average Power Result (dBm)
U-NII 1	5 210	MCS0	6.61	1.16	7.77
U-NII 3	5 775		8.04		9.20

Band	Frequency (MHz)	Data Rate (Mbps)	ANT 1 + ANT 2 Average Power Result (dBm)	Antenna Gain (dBi)	ANT 1 + ANT 2 E.I.R.P. (dBm)
U-NII 1	5 210	MCS0	7.77	5.70	13.47

Band	FCC Limit					
	Frequency (MHz)	Fixed Limit (dBm)	26 dB BW (MHz)	11+10LogB (dBm)	Antenna Gain (dBi)	Limit (dBm)
U-NII 1	5 210	23.98			5.70	23.98
U-NII 3	5 775	30			5.60	30

Band	IC Limit					
	Frequency (MHz)	Fixed Limit (dBm)	99 % BW (MHz)	1.76+10LogB (dBm)	Antenna Gain (dBi)	Limit (dBm)
U-NII 1	5 775	14.77	75.485	20.54	5.70	14.77
Band	IC Limit					
	Frequency (MHz)	Fixed Limit (dBm)	99 % BW (MHz)	11+10LogB (dBm)	Antenna Gain (dBi)	Limit (dBm)
U-NII 3	5 775	30			5.60	30

Remark;

Attenuator and cable offset was compensated in test program (R&S Power Viewer) before measuring.

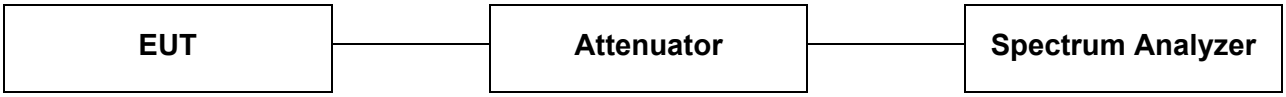
According to KDB 662911 D01 v02r01, average power of each port (ANT 1+ANT 2) and antenna gain was combined by using below calculation.

Average power: 10 log {10^(ANT 1 power / 10)+10^(ANT 2 power / 10)}
Antenna gain: 10 log [{10^(ANT 1 gain / 20)+10^(ANT 2 gain / 20)}^2 / 2]

Average Power Result (dBm) = Average Power (dBm) + Duty Cycle Correction Factor (dB)

6. Peak Power Spectral Density

6.1. Test Setup



6.2. Limit

6.2.1. FCC

According to 15.407(a)(1)(iv)

For client devices in the 5.15-5.25 ㎓ band, the maximum conducted output power over the frequency band of operation shall not exceed 250 ㎽ provided the maximum antenna gain does not exceed 6 ㏈ i. In addition, the maximum power spectral density shall not exceed 11 ㏈ m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i.

According to 15.407(a)(3)

For the band 5.725-5.85 ㎓, 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 ㏈m in any 500-㎑ band. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i. However, fixed point-to point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 ㏈ i without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

6.2.2. IC

According to RSS-247 Issue 2,

6.2.1.1 Frequency band 5 150-5 250 ㎒

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 ㎽ or 1.76 + 10 $\log_{10}$B, ㏈m, whichever is less. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 ㏈ below the maximum permitted e.i.r.p. of 30 ㎽.

For other devices, the maximum e.i.r.p. shall not exceed 200 ㎽ or 10 + 10 $\log_{10}$B, ㏈m, whichever power is less. B is the 99 % emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 ㏈m in any 1.0 ㎒ band.

6.2.4.1 Frequency band 5 725-5 850 ㎒

For equipment operating in the band 5 725-5 850 ㎒, the minimum 6 ㏈ bandwidth shall be at least 500 ㎑. The maximum conducted output power shall not exceed 1 W. The output power spectral density shall not exceed 30 ㏈m in any 500 ㎑ band. If transmitting antennas of directional gain greater than 6 ㏈i are used, both the maximum conducted output power and the output power spectral density shall be reduced by the amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 ㏈i without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipoint[3] systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

6.3. Test Procedure

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.

1. This measurement settings are specified in section F of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

2. Create an average power spectrum for the EUT operating mode being tested by following the instructions in section II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, “Compute power…”. (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)

3. Use the peak search function on the instrument to find the peak of the spectrum and record its value.

4. Make the following adjustments to the peak value of the spectrum, if applicable:

   a) **If Method SA-2 or SA-2 Alternative was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum.**
   b) If Method SA-3 Alternative was used and the linear mode was used in step II.E.2.g)(viii), add 1 ㎧ to the final result to compensate for the difference between linear averaging and power averaging.

5. The result is the Maximum PSD over 1 ㎒ reference bandwidth.

6. For devices operating in the bands 5.15-5.25 ㎓, 5.25-5.35 ㎓, and 5.47-5.725 ㎓, the above procedures make use of 1 ㎒ RBW to satisfy directly the 1 ㎒ reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 ㎓, the rules specify a measurement bandwidth of 500 ㎑. Many spectrum analyzers do not have 500 ㎑ RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 ㎒, or 500 ㎑, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (*i.e.,* 1 ㎒, or 500 ㎑). If measurements are performed using a reduced resolution bandwidth (< 1 ㎒, or < 500 ㎑) and integrated over 1 ㎒, or 500 ㎑ bandwidth, the following adjustments to the procedures apply:

   a) Set RBW ≥ 1/*T*, where *T* is defined in section II.B.1.a).
   b) Set VBW ≥ 3 RBW.
   c) If measurement bandwidth of Maximum PSD is specified in 500 ㎑, add 10log(500 ㎑/RBW) to the measured result, whereas RBW (< 500 ㎑) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
   d) If measurement bandwidth of Maximum PSD is specified in 1 ㎒, add 10log(1 ㎒/RBW) to the measured result, whereas RBW (< 1 ㎒) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
   e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

7. TDF function

- Attenuator and cable offset was compensated before measuring.

6.4. Test result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Test mode: 11a_ANT1

Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	Measured PPSD (dB m)	Duty Cycle Correction Factor (dB)	Final PPSD (dB m)	Limit (dB m/1 MHz)
U-NII 1	5 180	36	6	-1.75	0.28	-1.47	11
	5 220	44		-1.53		-1.25	
	5 240	48		-1.71		-1.43	
Band	**Frequency (MHz)**	**Ch.**	**Data Rate (Mbps)**	**Measured PPSD (dB m)**	**Duty Cycle Correction Factor (dB)**	**Final PPSD (dB m)**	**Limit (dB m/500 kHz)**
U-NII 3	5 745	149	6	-1.54	0.28	-1.26	30
	5 785	157		-1.90		-1.62	
	5 825	165		-1.83		-1.55	

Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	Final PPSD (dB m)	Antenna Gain (dB i)	E.I.R.P. PPSD (dB m)	IC Limit (dB m/1 MHz)
U-NII 1	5 180	36	6	-1.47	2.84	1.37	10
	5 220	44		-1.25		1.59	
	5 240	48		-1.43		1.41	

Test mode: 11a_ANT2

Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	Measured PPSD (dB m)	Duty Cycle Correction Factor (dB)	Final PPSD (dB m)	Limit (dB m/1 MHz)
U-NII 1	5 180	36	6	-2.23	0.28	-1.95	11
	5 220	44		-2.17		-1.89	
	5 240	48		-1.93		-1.65	
Band	**Frequency (MHz)**	**Ch.**	**Data Rate (Mbps)**	**Measured PPSD (dB m)**	**Duty Cycle Correction Factor (dB)**	**Final PPSD (dB m)**	**Limit (dB m/500 kHz)**
U-NII 3	5 745	149	6	-1.96	0.28	-1.68	30
	5 785	157		-1.90		-1.62	
	5 825	165		-2.06		-1.78	

Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	Final PPSD (dB m)	Antenna Gain (dB i)	E.I.R.P. PPSD (dB m)	IC Limit (dB m/1 MHz)
U-NII 1	5 180	36	6	-1.95	2.54	0.59	10
	5 220	44		-1.89		0.65	
	5 240	48		-1.65		0.89	

Test mode: 11n_HT20

Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	ANT 1 Measured PPSD (dB m)	ANT 2 Measured PPSD (dB m)	ANT 1+ANT 2 PPSD (dB m)
U-NII 1	5 180	36	MCS8	-8.20	-6.97	-4.53
	5 220	44		-8.31	-7.07	-4.64
	5 240	48		-8.31	-7.32	-4.78
U-NII 3	5 745	149		-7.48	-7.84	-4.65
	5 785	157		-7.82	-8.09	-4.94
	5 825	165		-8.25	-7.86	-5.04

Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	ANT 1+ANT 2 PPSD (dB m)	Duty Cycle Correction Factor (dB)	ANT 1+ANT 2 Final PPSD (dB m)	Limit (dB m/1 MHz)
U-NII 1	5 180	36	MCS8	-4.53	0.61	-3.92	11
	5 220	44		-4.64		-4.03	
	5 240	48		-4.78		-4.17	
Band	**Frequency (MHz)**	**Ch.**	**Data Rate (Mbps)**	**ANT 1+ANT 2 PPSD (dB m)**	**Duty Cycle Correction Factor (dB)**	**ANT 1+ANT 2 Final PPSD (dB m)**	**Limit (dB m/500 kHz)**
U-NII 3	5 745	149	MCS8	-4.65	0.61	-4.04	30
	5 785	157		-4.94		-4.33	
	5 825	165		-5.04		-4.43	

Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	ANT 1+ANT 2 Final PPSD (dB m)	Antenna Gain (dB i)	ANT 1+ANT 2 E.I.R.P. PPSD (dB m)	IC Limit (dB m/1 MHz)
U-NII 1	5 180	36	MCS8	-3.92	5.70	1.78	10
	5 220	44		-4.03		1.67	
	5 240	48		-4.17		1.53	

Test mode: 11n_HT40

Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	ANT 1 Measured PPSD (dB m)	ANT 2 Measured PPSD (dB m)	ANT 1+ANT 2 PPSD (dB m)
U-NII 1	5 190	38	MCS8	-7.81	-8.05	-4.92
	5 230	46		-7.68	-8.49	-5.06
U-NII 3	5 755	151		-7.28	-11.39	-5.86
	5 795	159		-7.44	-11.31	-5.95

Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	ANT 1+ANT 2 PPSD (dB m)	Duty Cycle Correction Factor (dB)	ANT 1+ANT 2 Final PPSD (dB m)	Limit (dB m/1 MHz)
U-NII 1	5 190	38	MCS8	-4.92	1.08	-3.84	11
	5 230	46		-5.06		-3.98	
Band	**Frequency (MHz)**	**Ch.**	**Data Rate (Mbps)**	**ANT 1+ANT 2 PPSD (dB m)**	**Duty Cycle Correction Factor (dB)**	**ANT 1+ANT 2 Final PPSD (dB m)**	**Limit (dB m/500 kHz)**
U-NII 3	5 755	151	MCS8	-5.86	1.08	-4.78	30
	5 795	159		-5.95		-4.87	

Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	ANT 1+ANT 2 Final PPSD (dB m)	Antenna Gain (dB i)	ANT 1+ANT 2 E.I.R.P. PPSD (dB m)	IC Limit (dB m/1 MHz)
U-NII 1	5 190	38	MCS8	-3.84	5.70	1.86	10
	5 230	46		-3.98		1.72	

Test mode: 11ac_VHT80

Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	ANT 1 Measured PPSD (dB m)	ANT 2 Measured PPSD (dB m)	ANT 1+ANT 2 PPSD (dB m)
U-NII 1	5 210	42	MCS0	-14.02	-14.84	-11.40
U-NII 3	5 775	155		-13.57	-14.44	-10.97

Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	ANT 1+ANT 2 PPSD (dB m)	Duty Cycle Correction Factor (dB)	ANT 1+ANT 2 Final PPSD (dB m)	Limit (dB m/1 MHz)
U-NII 1	5 210	42	MCS0	-11.40	1.16	-10.24	11
Band	**Frequency (MHz)**	**Ch.**	**Data Rate (Mbps)**	**ANT 1+ANT 2 PPSD (dB m)**	**Duty Cycle Correction Factor (dB)**	**ANT 1+ANT 2 Final PPSD (dB m)**	**Limit (dB m/500 kHz)**
U-NII 3	5 775	155	MCS0	-10.97	1.16	-9.81	30

Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	ANT 1+ANT 2 Final PPSD (dB m)	Antenna Gain (dB i)	ANT 1+ANT 2 E.I.R.P. PPSD (dB m)	IC Limit (dB m/1 MHz)
U-NII 1	5 210	42	MCS0	-10.24	5.70	-4.54	10

Remark;

According to KDB 662911 D01 v02r01, power spectral density of each port (ANT 1+ANT 2) was combined by using below calculation.

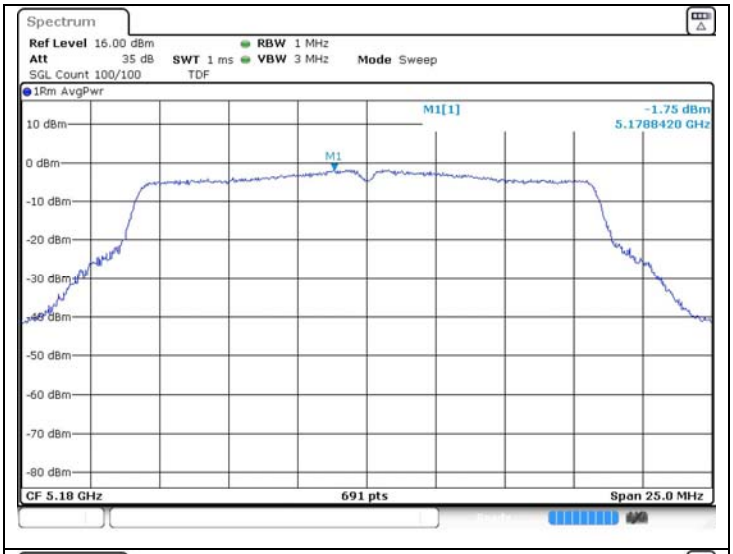
PPSD: 10 log {10^(ANT 1 PSD / 10)+10^(ANT 2 PSD / 10)}
Antenna Gain: 10 log [{10^(ANT 1 gain / 20)+10^(ANT 2 gain / 20)}^2 / 2]

Final PPSD (dB m) = PPSD (dB m) + Duty Correction Correction Factor (dB)

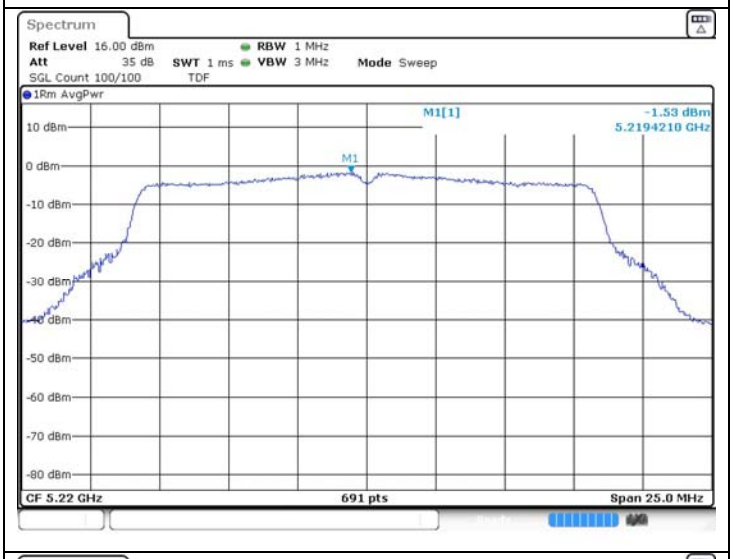
- Test plots

OFDM: 802.11a (Band 1)_ANT 1

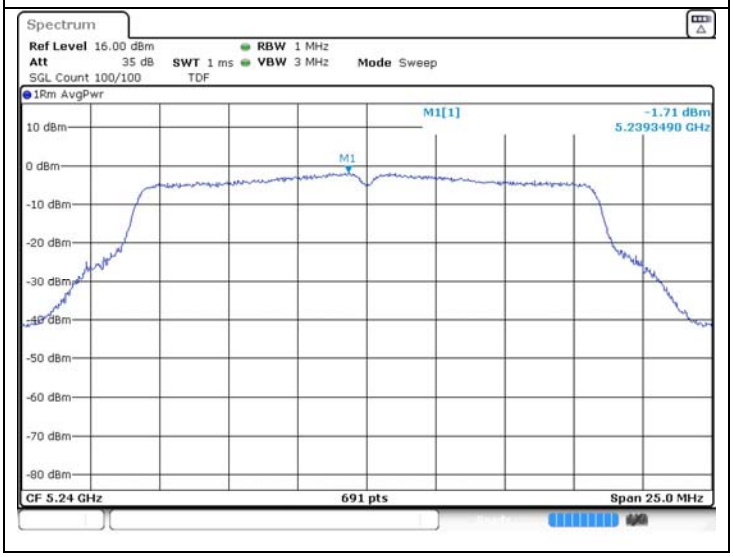
Low Channel
(5 180 ㎒)



Middle Channel
(5 220 ㎒)

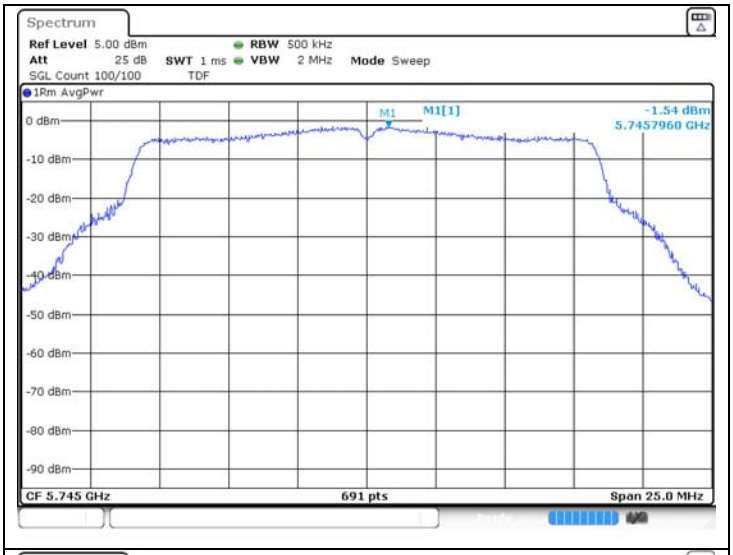


High Channel
(5 240 ㎒)

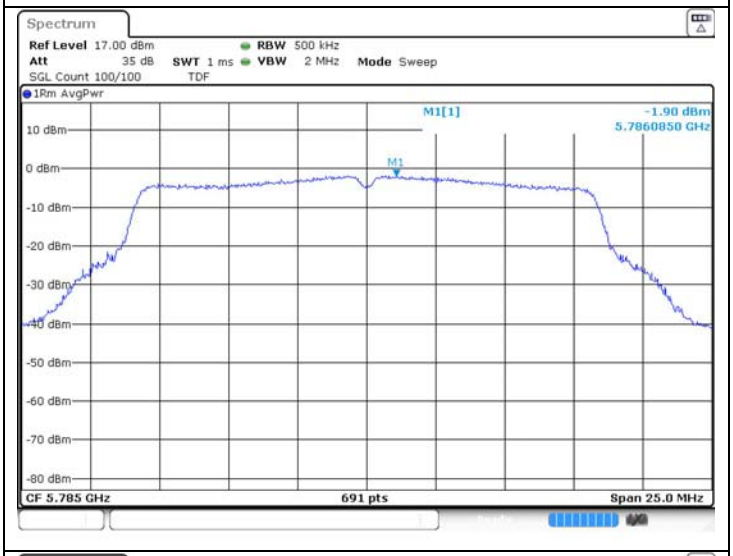


OFDM: 802.11a (Band 3)_ANT 1

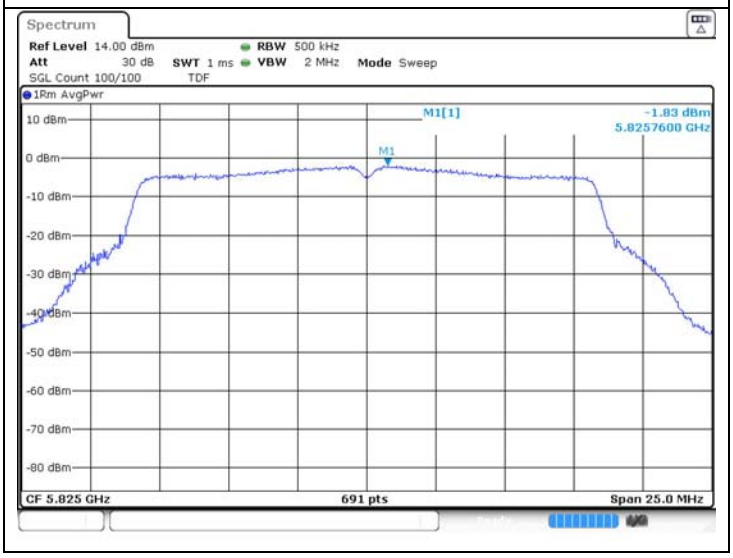
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)



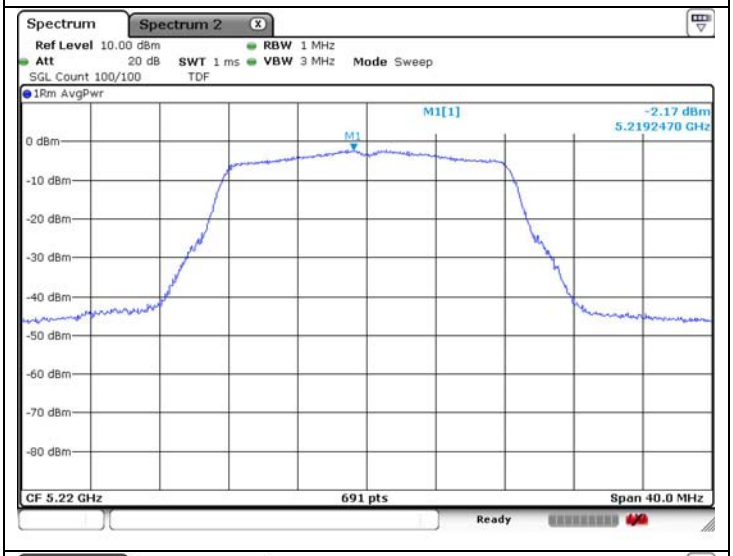
High Channel
(5 825 ㎒)



OFDM: 802.11a (Band 1)_ANT 2

Low Channel
(5 180 ㎒)

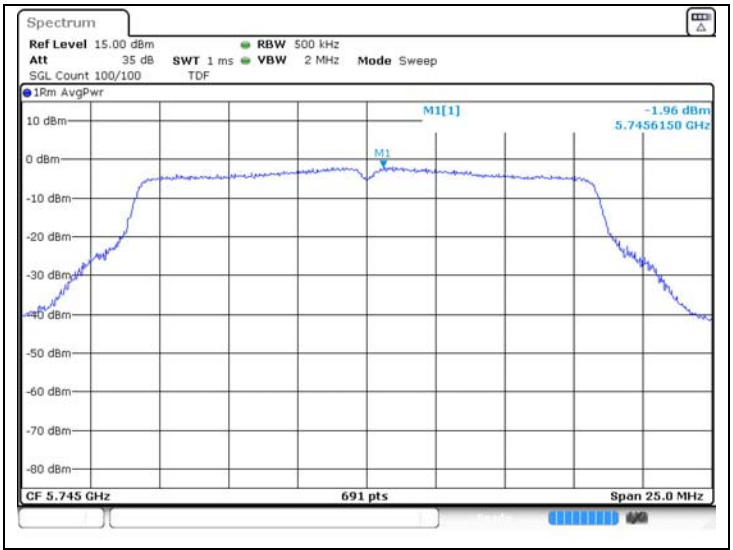
Middle Channel
(5 220 ㎒)



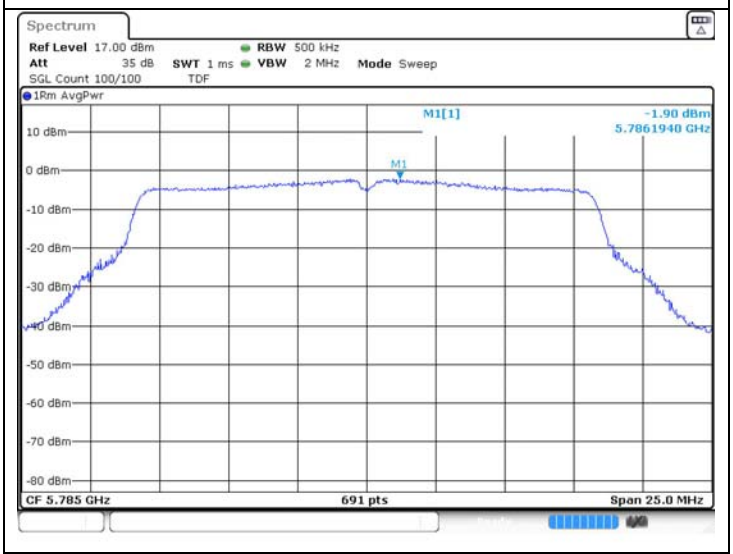
High Channel
(5 240 ㎒)

OFDM: 802.11a (Band 3)_ANT 2

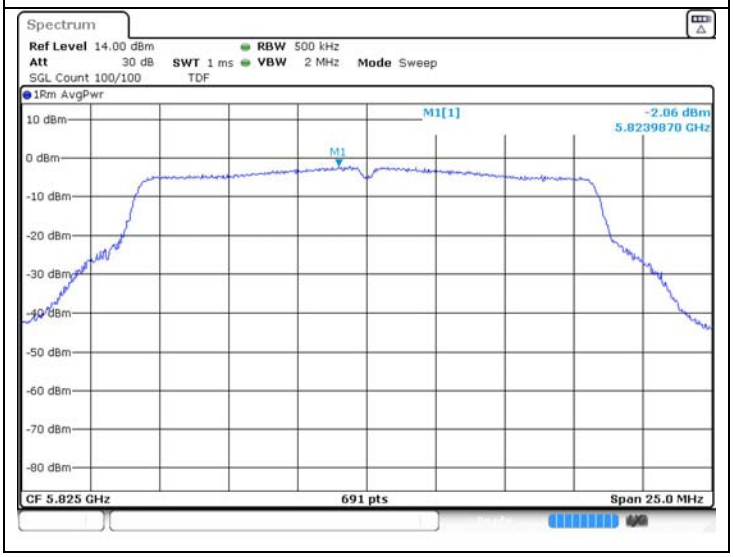
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

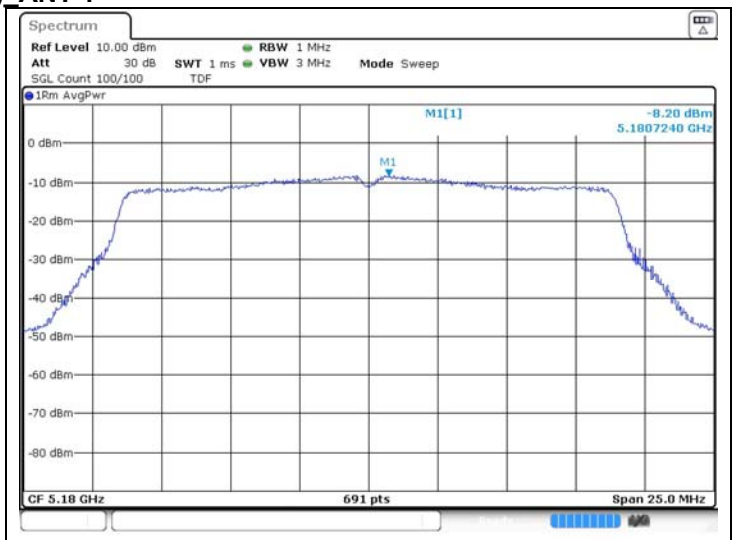


High Channel
(5 825 ㎒)

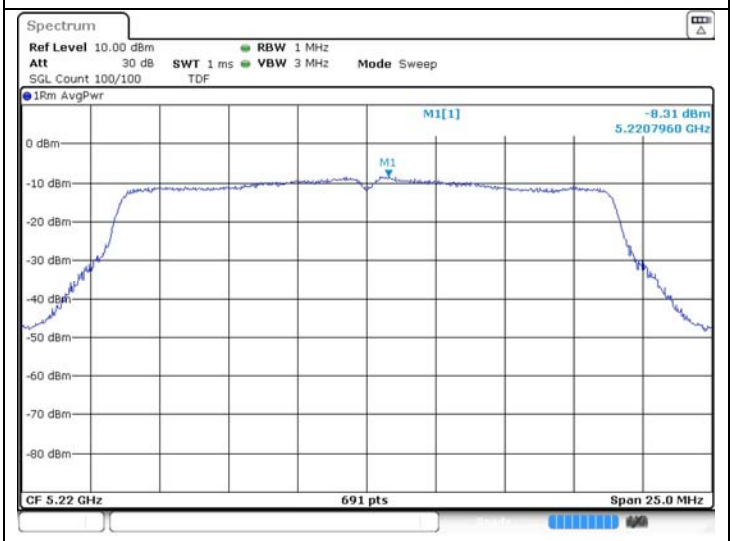


OFDM: 802.11n_HT20 (Band 1)_ANT 1

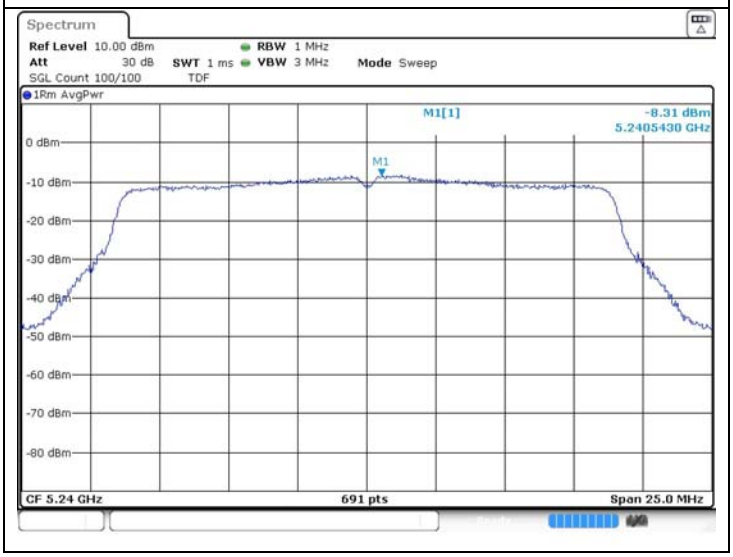
Low Channel
(5 180 ㎒)



Middle Channel
(5 220 ㎒)

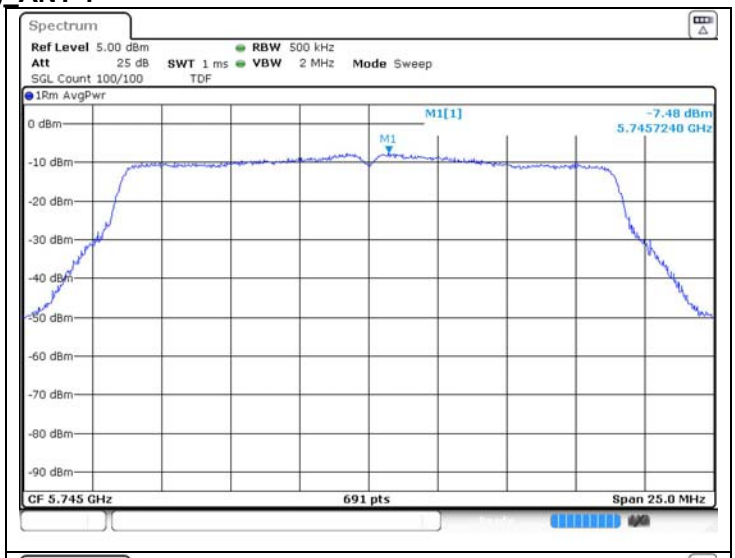


High Channel
(5 240 ㎒)

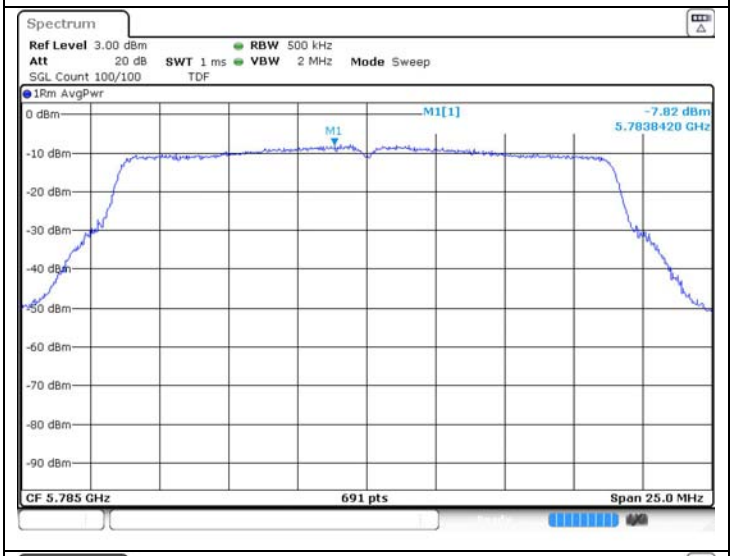


OFDM: 802.11n_HT20 (Band 3)_ANT 1

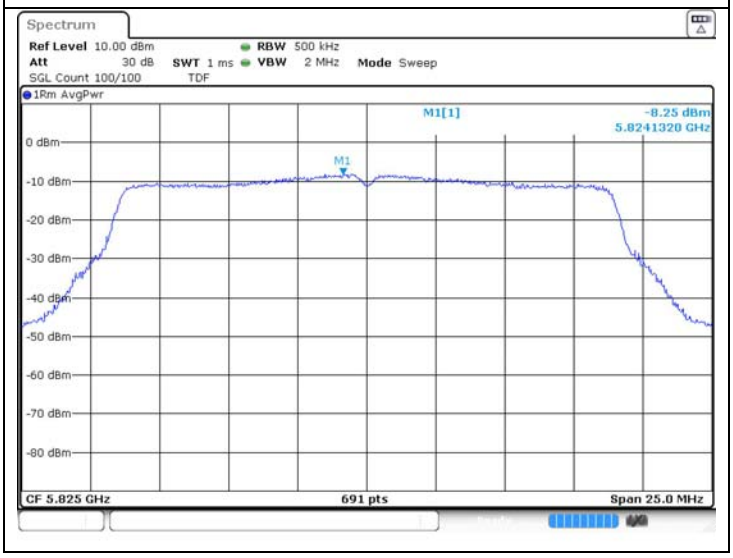
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

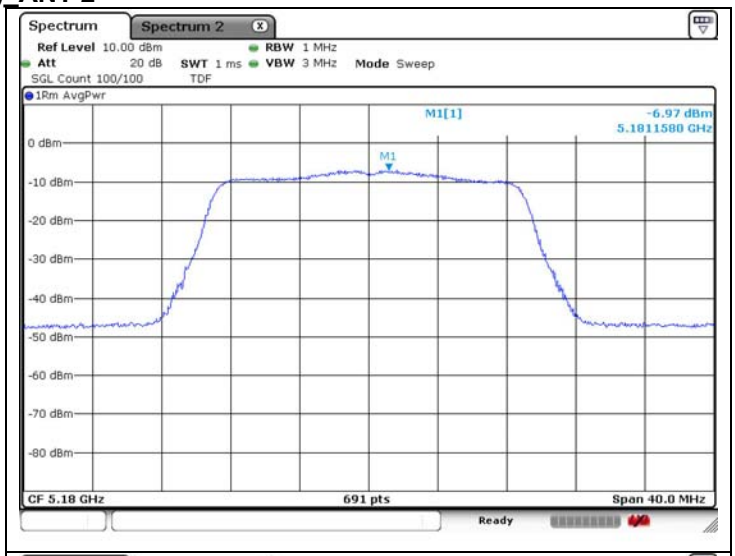


High Channel
(5 825 ㎒)



OFDM: 802.11n_HT20 (Band 1)_ANT 2

Low Channel
(5 180 ㎒)

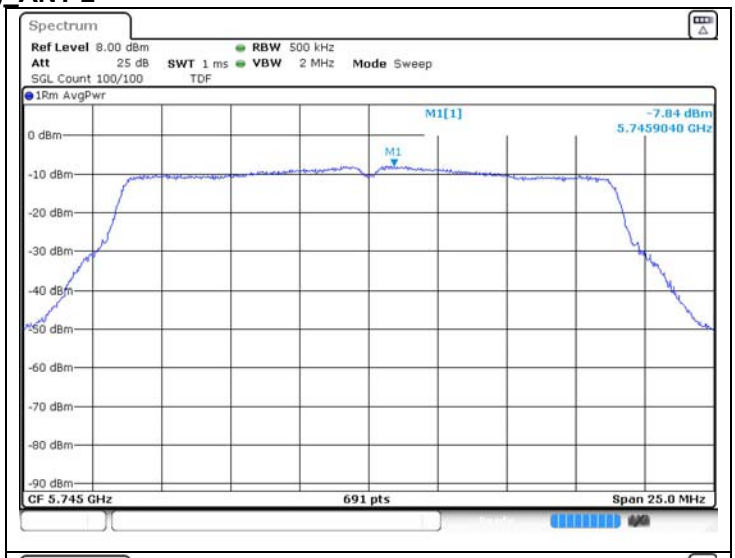


Middle Channel
(5 220 ㎒)

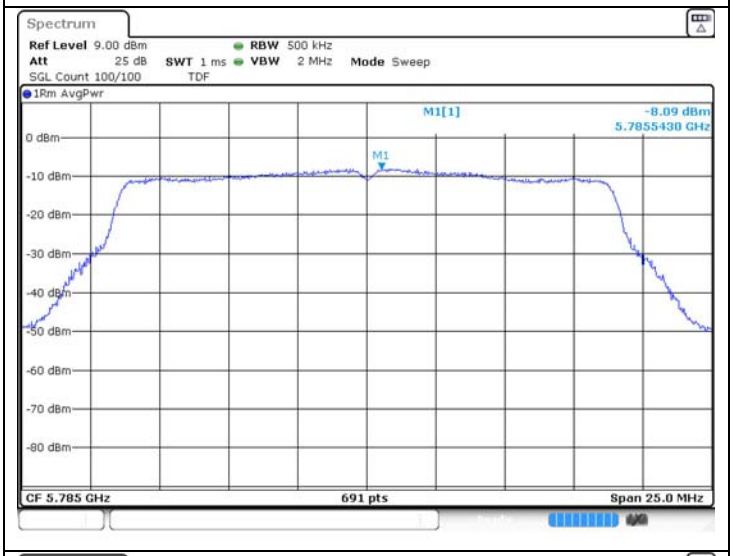
High Channel
(5 240 ㎒)

OFDM: 802.11n_HT20 (Band 3)_ANT 2

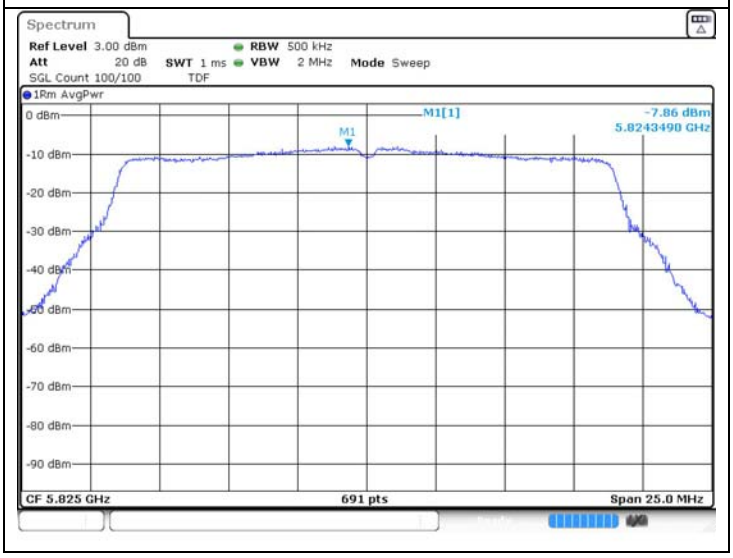
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

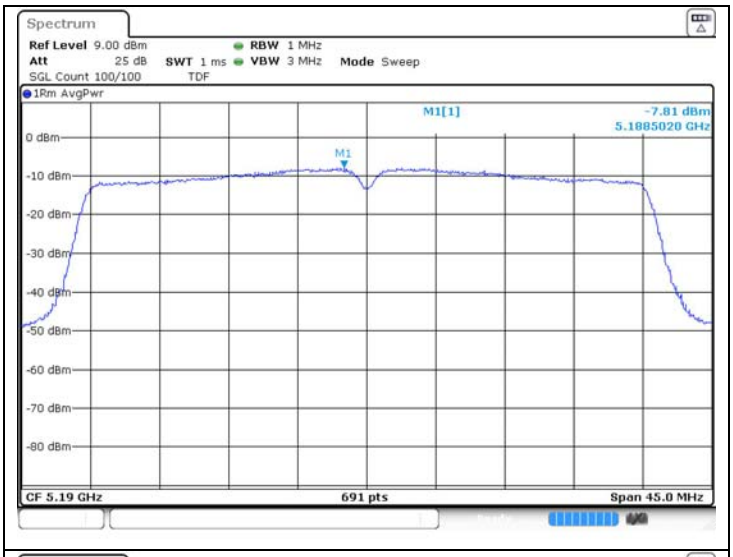


High Channel
(5 825 ㎒)

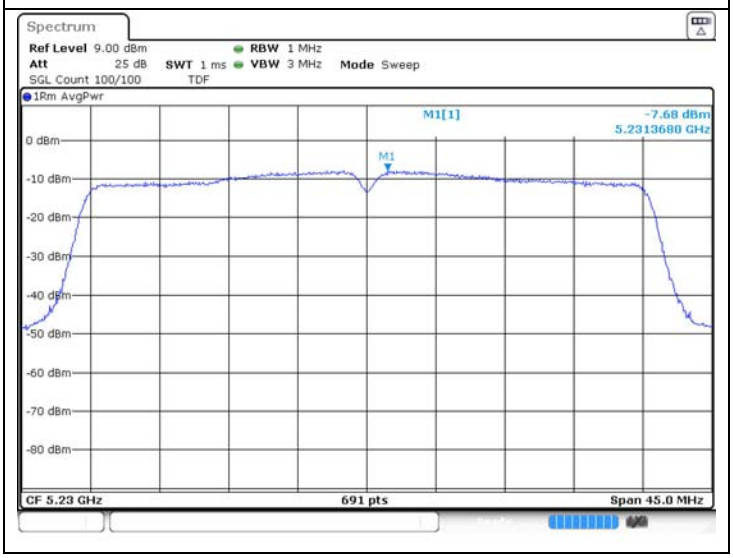


OFDM: 802.11n_HT40 (Band 1)_ANT 1

Low Channel
(5 190 ㎒)

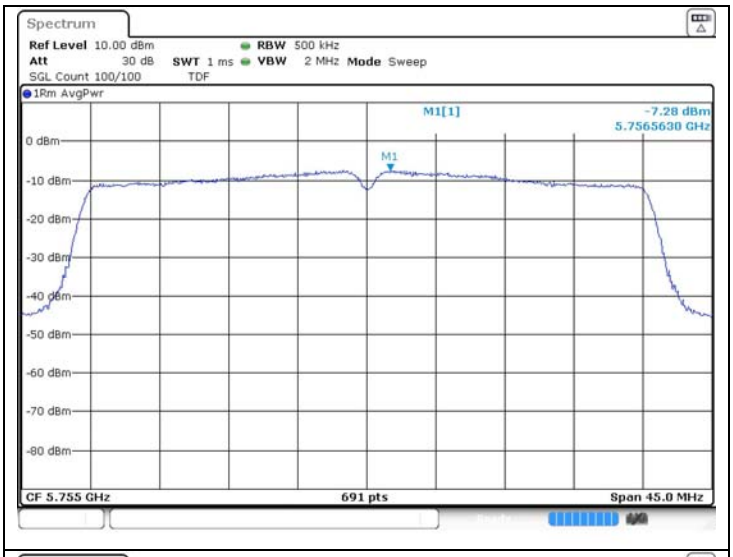


High Channel
(5 230 ㎒)

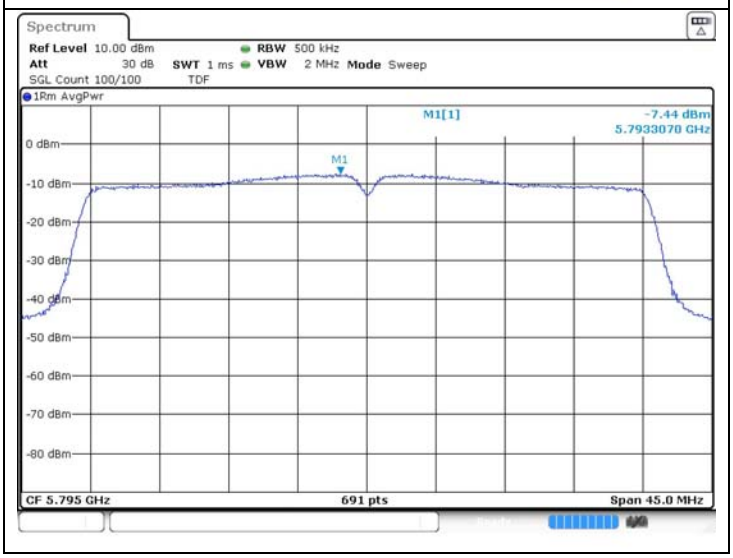


OFDM: 802.11n_HT40 (Band 3)_ANT 1

Low Channel
(5 755 ㎒)

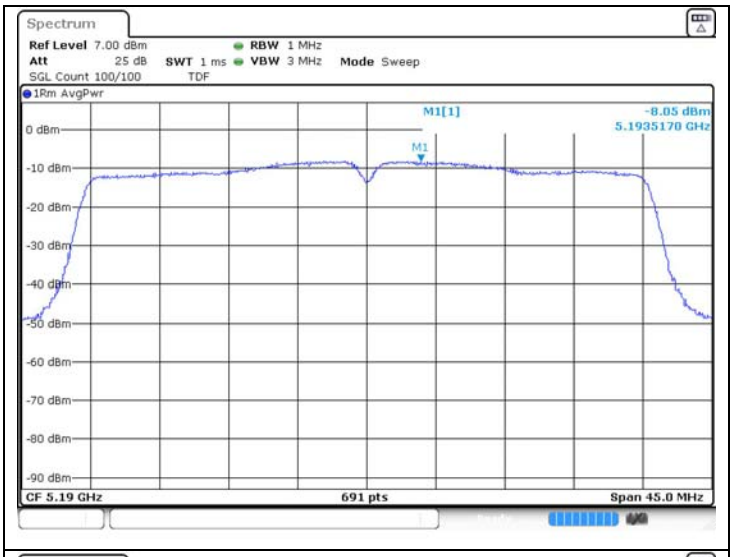


High Channel
(5 795 ㎒)

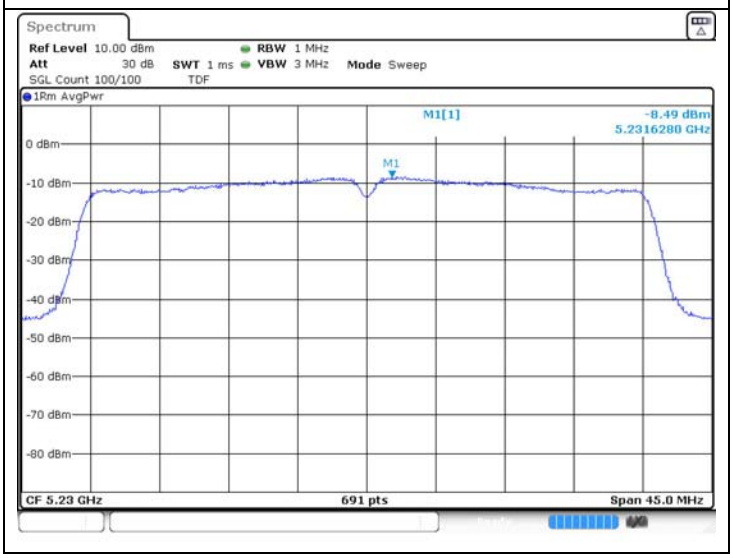


OFDM: 802.11n_HT40 (Band 1)_ANT 2

Low Channel
(5 190 ㎒)

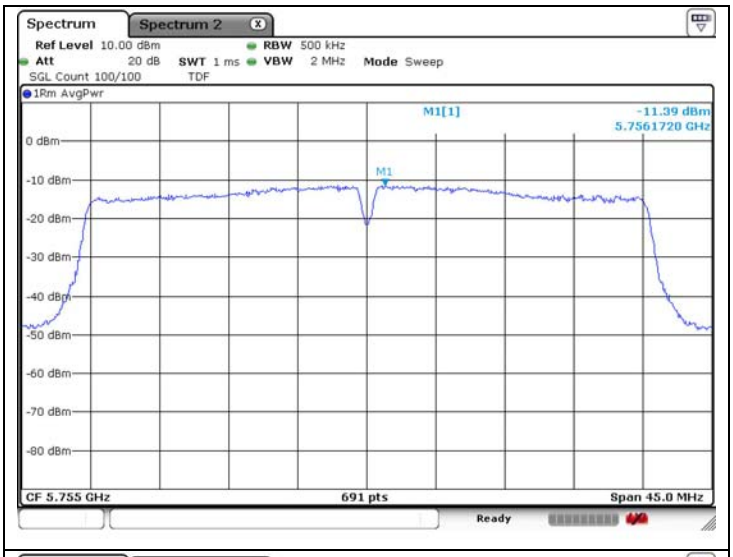


High Channel
(5 230 ㎒)

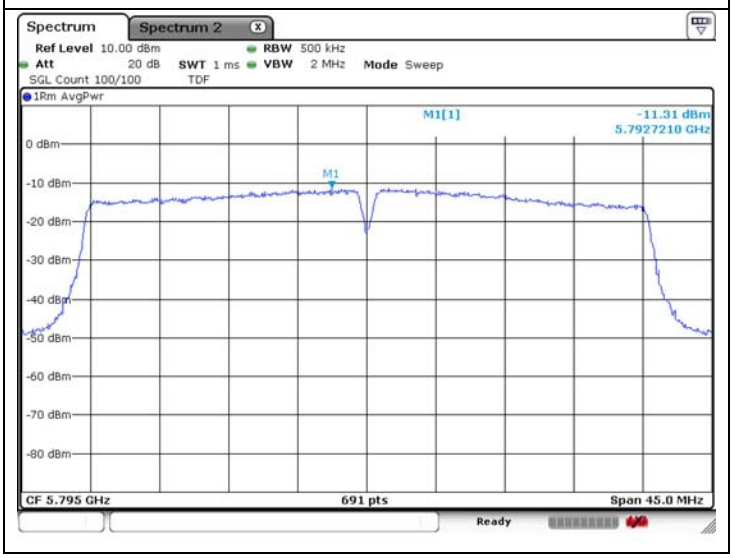


OFDM: 802.11n_HT40 (Band 3)_ANT 2

Low Channel
(5 755 ㎒)

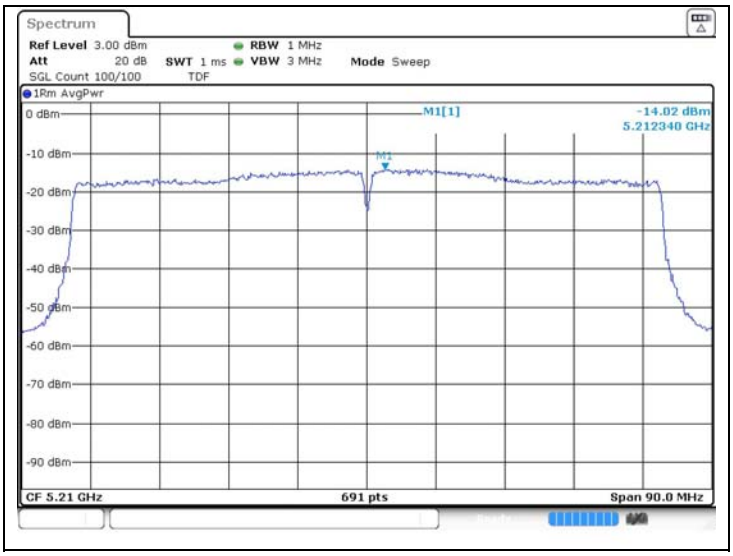


High Channel
(5 795 ㎒)



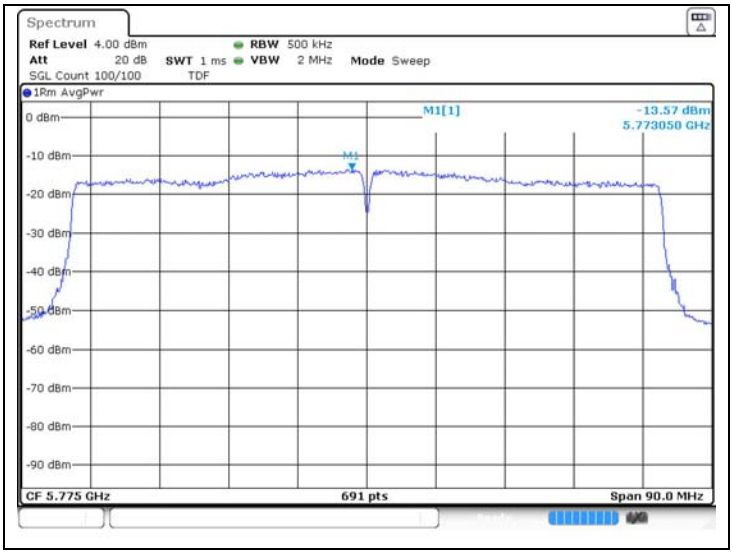
OFDM: 802.11ac_VHT80 (Band 1)_ANT 1

Middle Channel
(5 210 ㎒)



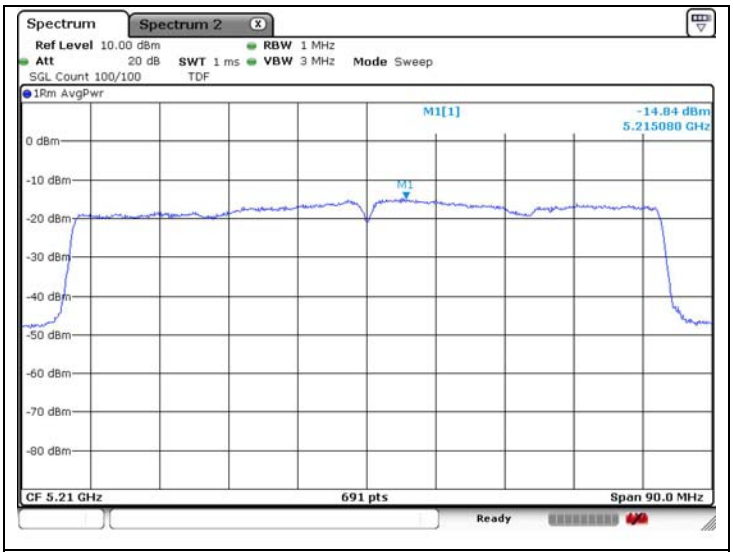
OFDM: 802.11ac_VHT80 (Band 3)_ANT 1

Middle Channel
(5 290 ㎒)



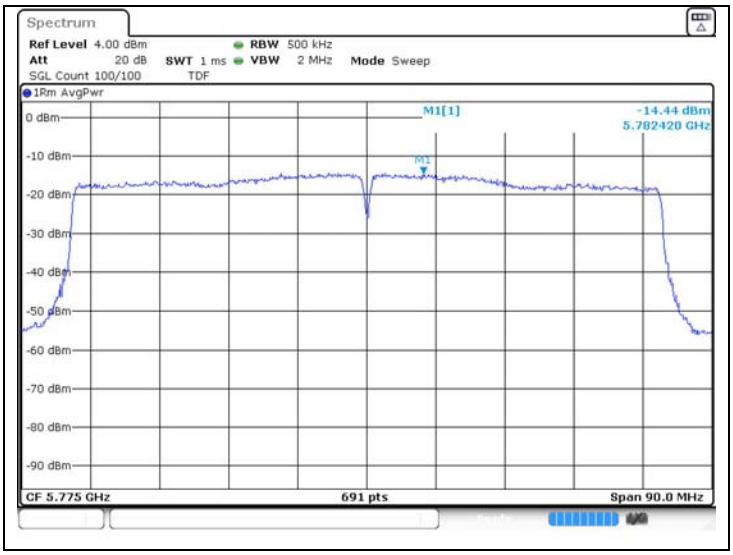
OFDM: 802.11ac_VHT80 (Band 1)_ANT 2

Middle Channel
(5 210 ㎒)



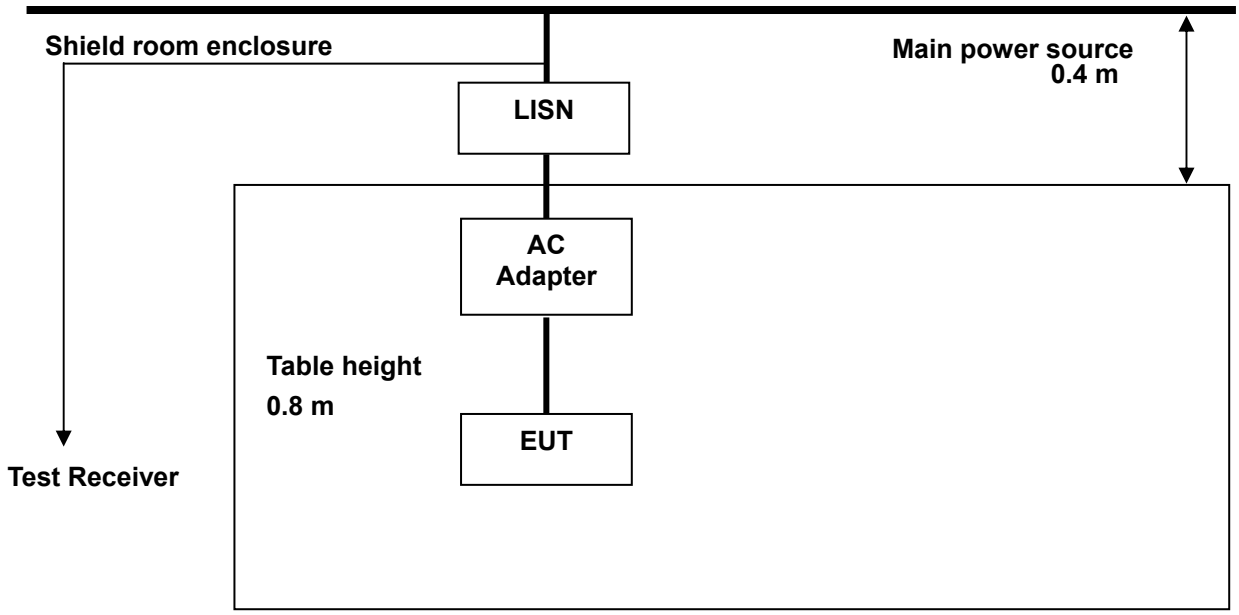
OFDM: 802.11ac_VHT80 (Band 3)_ANT 2

Middle Channel
(5 290 ㎒)



7. AC Power Line Conducted Emission

7.1. Test Setup



7.2. Limit

7.2.1. FCC

According to §15.207(a), for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 ㎑ to 30 ㎒, shall not exceed the limits in the following table, as measured using a 50 μH /50 ohms line impedance stabilization network (LISN).

Compliance with the provision of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (㎒)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

7.2.2. IC

RSS-Gen Issue 5, 8.8, Unless stated otherwise in the applicable RSS, for radio apparatus that are designed to be connected to the public utility AC power network, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the range 150 ㎑ to 30 ㎒ shall not exceed the limits in table 4, as measured using a 50 μH / 50 Ω line impedance stabilization network. This requirement applies for the radio frequency voltage measured between each power line and the ground terminal of each AC power-line mains cable of the EUT.

For an EUT that connects to the AC power lines indirectly, through another device, the requirement for compliance with the limits in table 4 shall apply at the terminals of the AC power-line mains cable of a representative support device, while it provides power to the EUT. The lower limit applies at the boundary between the frequency ranges. The device used to power the EUT shall be representative of typical applications.

Table 4 - AC power-line conducted emissions limits

Frequency (㎒)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56[1]	56 to 46[1]
0.5-5	56	46
5-30	60	50

Note 1: The level decreases linearly with the logarithm of the frequency.

For an EUT with a permanent or detachable antenna operating between 150 ㎑ and 30 ㎒, the AC power-line conducted emissions must be measured using the following configurations:

(a) Perform the AC power-line conducted emissions test with the antenna connected to determine compliance with the limits of table 4 outside the transmitter's fundamental emission band.

(b) Retest with a dummy load instead of the antenna to determine compliance with the limits of table 4 within the transmitter's fundamental emission band. For a detachable antenna, remove the antenna and connect a suitable dummy load to the antenna connector. For a permanent antenna, remove the antenna and terminate the RF output with a dummy load or network that simulates the antenna in the fundamental frequency band.

7.3. Test Procedures

AC conducted emissions from the EUT were measured according to the dictates of ANSI C63.10-2013

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

7.4. Test Results

The following table shows the highest levels of conducted emissions on both phase of Hot and Neutral line.

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Frequency range : 0.15 ㎒ - 30 ㎒
Measured Bandwidth : 9 ㎑

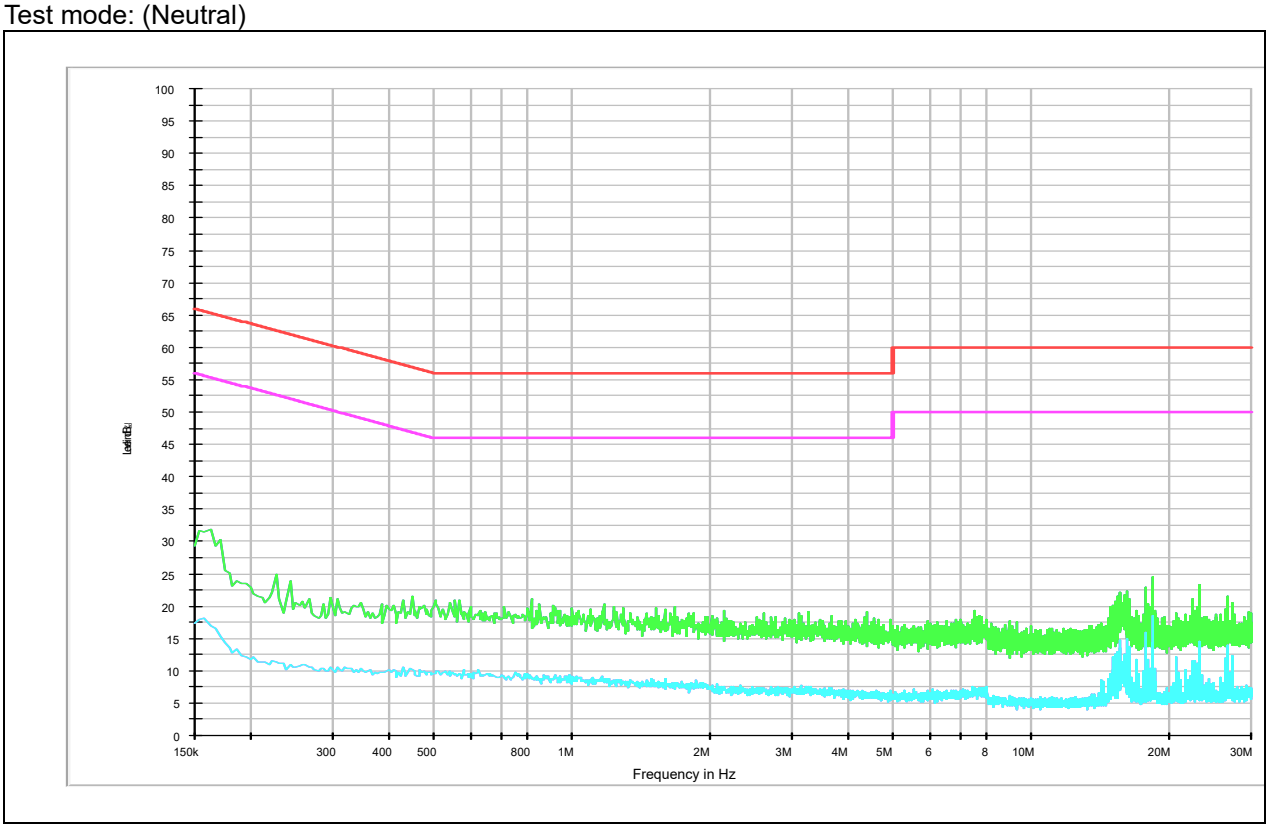
FREQ.	LEVEL (dBμV)		LINE	LIMIT (dBμV)		MARGIN (dB)	
(㎒)	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.16	24.50	17.30	N	65.46	55.46	40.96	38.16
0.23	16.80	11.20	N	62.45	52.45	45.65	41.25
0.81	14.70	9.20	N	56.00	46.00	41.30	36.80
15.56	19.10	13.50	N	60.00	50.00	40.90	36.50
18.24	22.40	18.00	N	60.00	50.00	37.60	32.00
23.13	20.60	16.10	N	60.00	50.00	39.40	33.90
0.16	25.00	17.70	H	65.46	55.46	40.46	37.76
0.19	19.00	12.90	H	64.04	54.04	45.04	41.14
0.24	16.60	10.70	H	62.10	52.10	45.50	41.40
15.62	21.40	16.40	H	60.00	50.00	38.60	33.60
18.30	19.70	15.20	H	60.00	50.00	40.30	34.80
26.61	20.40	15.50	H	60.00	50.00	39.60	34.50

Remark;

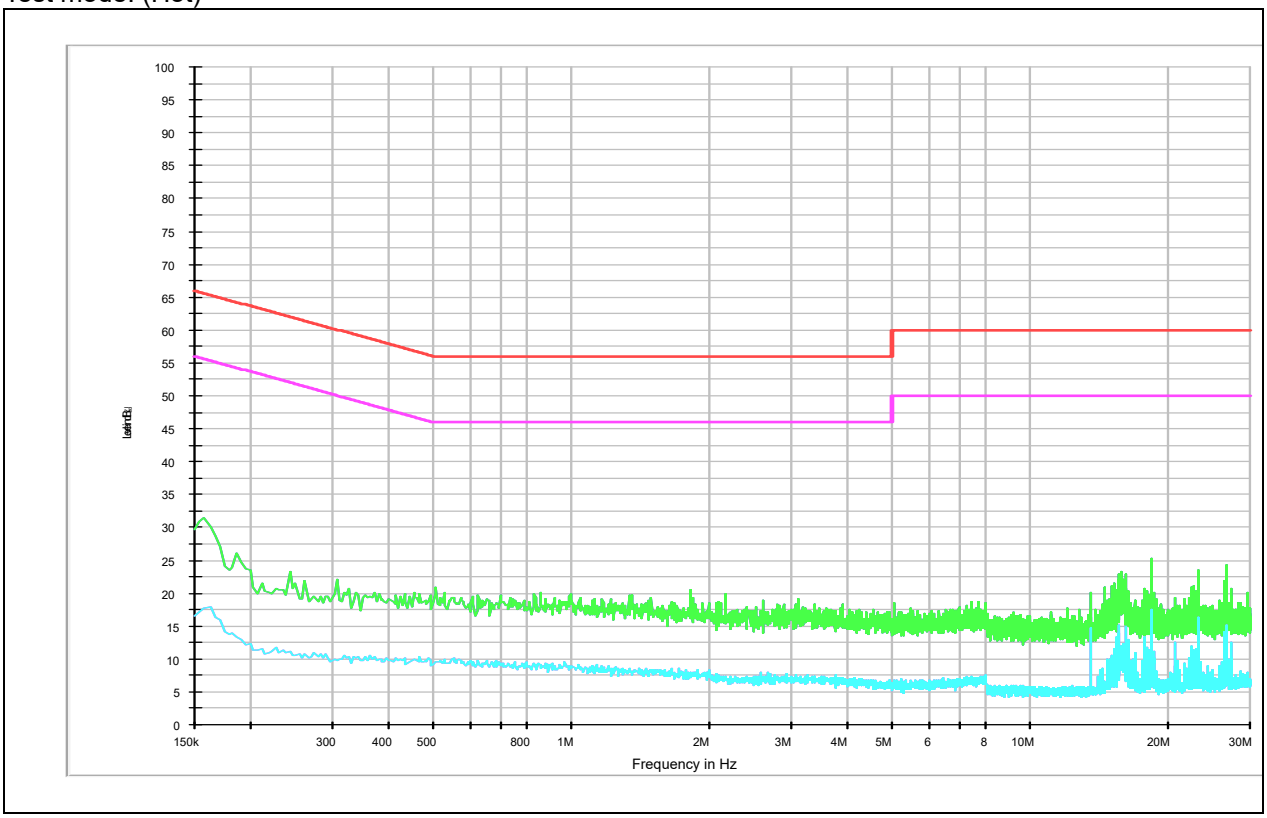
1. Line (H): Hot, Line (N): Neutral.
2. All modes of operation were investigated and the worst-case emissions were reported using **11a_ANT1 (Band 3) / 6 Mbps / Low channel.**
3. The limit for Class B device(s) from 150 ㎑ to 30 ㎒ are specified in Section of the Title 47 CFR.
4. Traces shown in plot were made by using a peak detector and average detector.
5. Deviations to the Specifications: None.

- Test plots

Test mode: (Neutral)



Test mode: (Hot)



8. Antenna Requirement

8.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section §15.407 (a) if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the gain of the antenna exceeds 6 dBi.

8.2. Antenna Connected Construction

Antenna used in this product is PCB & Cable Assembly antenna and peak max gain of antenna as below.

Band	5 150 MHz – 5 250 MHz	5 725 MHz – 5 850 MHz
Mode	11a/n_HT20, HT40, 11ac_VHT20, VHT40, VHT80	
ANT1 Gain	2.84 dBi	2.73 dBi
ANT2 Gain	2.54 dBi	2.45 dBi
ANT1+ANT2 Gain	5.70 dBi	5.60 dBi

Unequal antenna gains, with equal transmit powers. For antenna gains given by G_1, G_2, …, G_N dBi

(i) If transmit signals are correlated, then

Directional gain = $10 \log[(10^{G_1/20} + 10^{G_2/20} + \ldots + 10^{G_N/20})^2/N_{ANT}]$ dBi [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

- End of the Test Report -