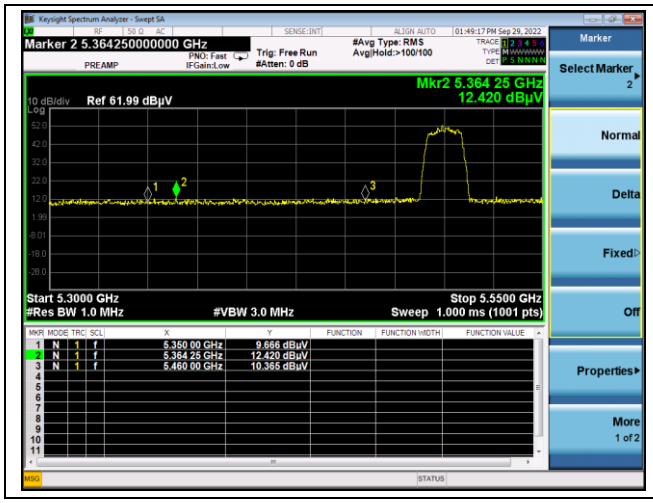
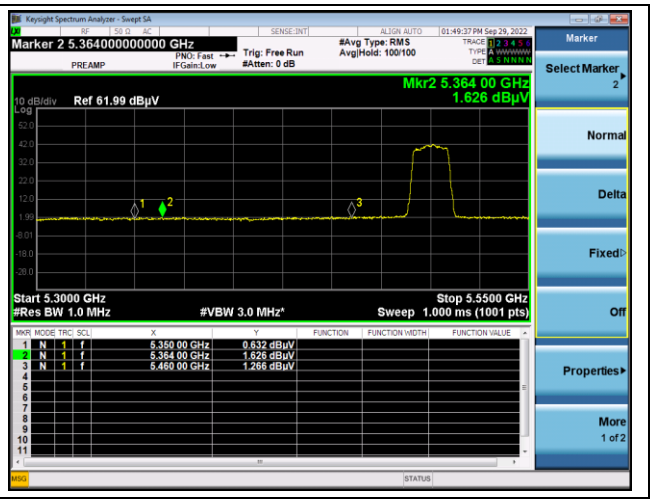
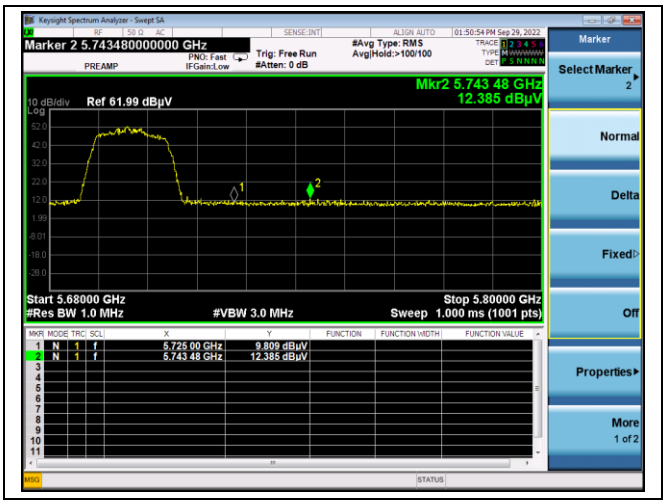
Low channel Band edge (Peak) - Band 2C



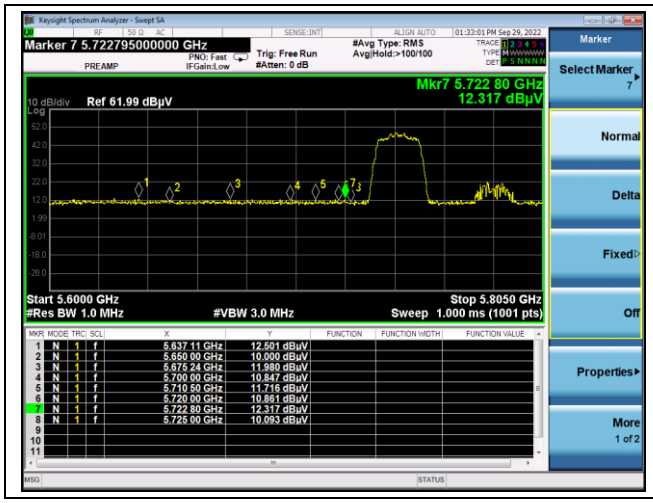
Low channel Band edge (Average) - Band 2C



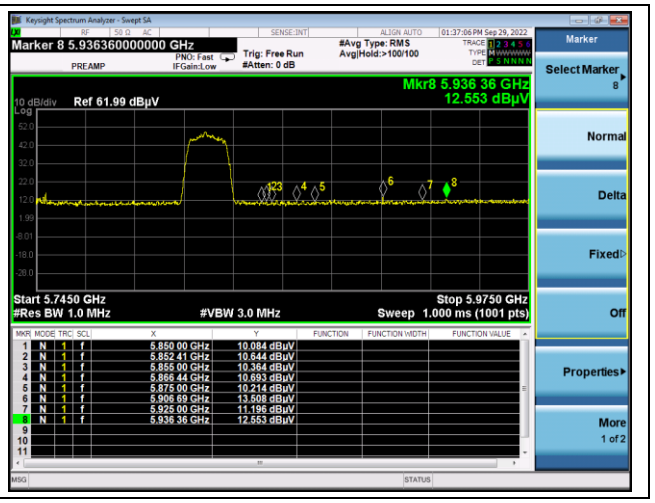
High channel Band edge (Peak) - Band 2C



Low channel Band edge (Peak) - Band 3

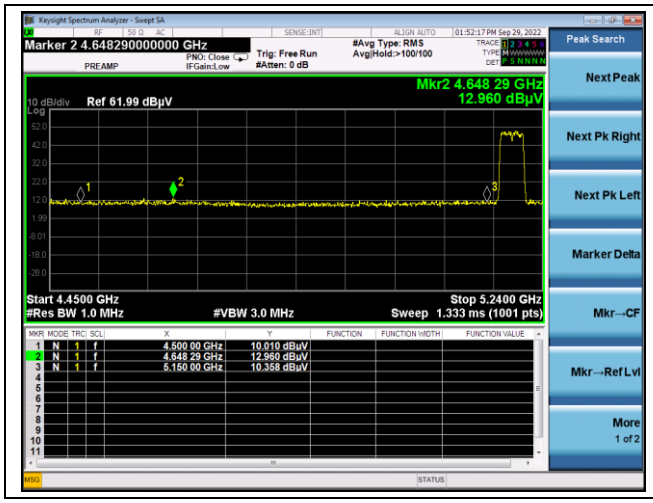


High channel Band edge (Peak) - Band 3

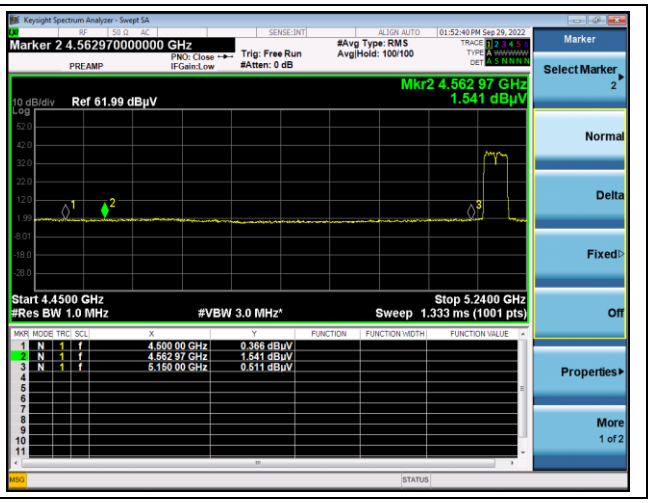


802.11n_HT40

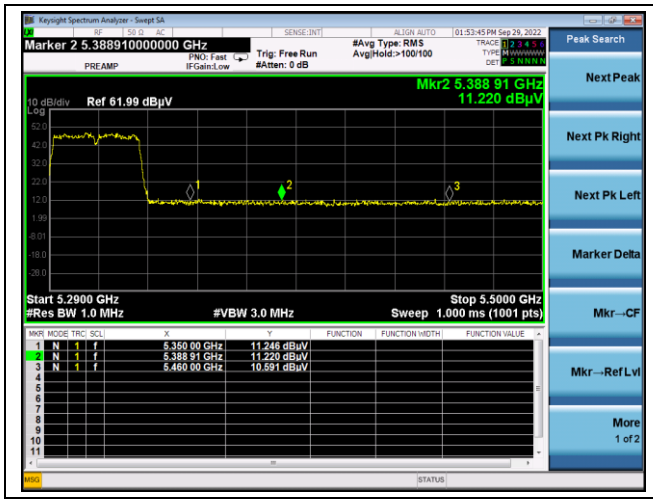
Low channel Band edge (Peak) - Band 1



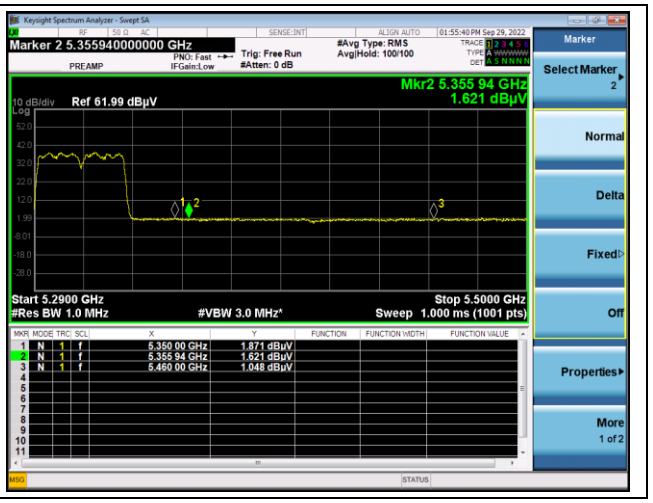
Low channel Band edge (Average) - Band 1



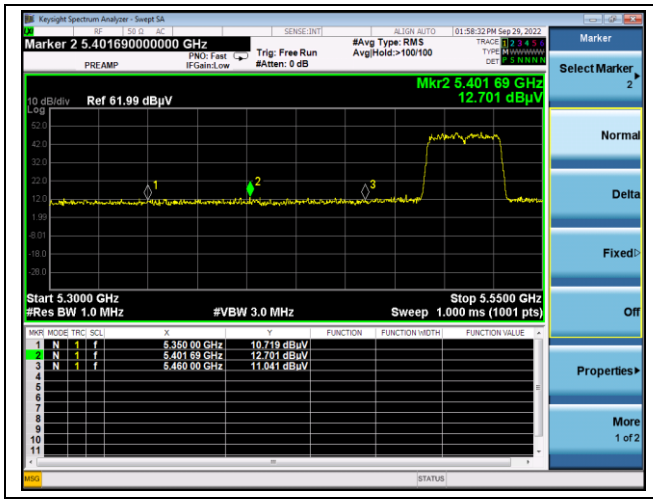
High channel Band edge (Peak) - Band 2A



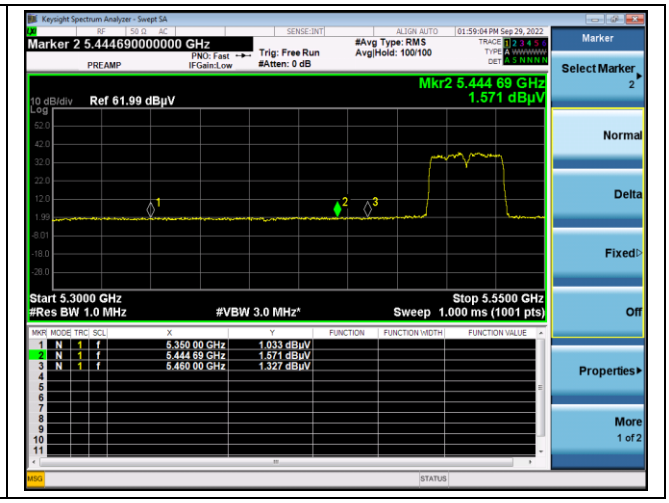
High channel Band edge (Average) - Band 2A



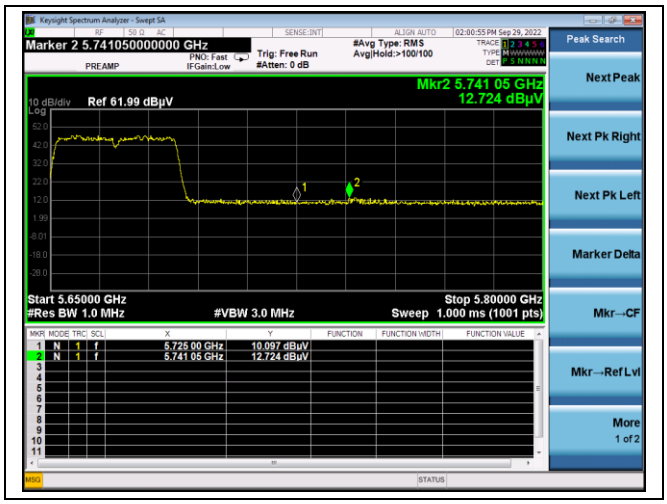
Low channel Band edge (Peak) - Band 2C



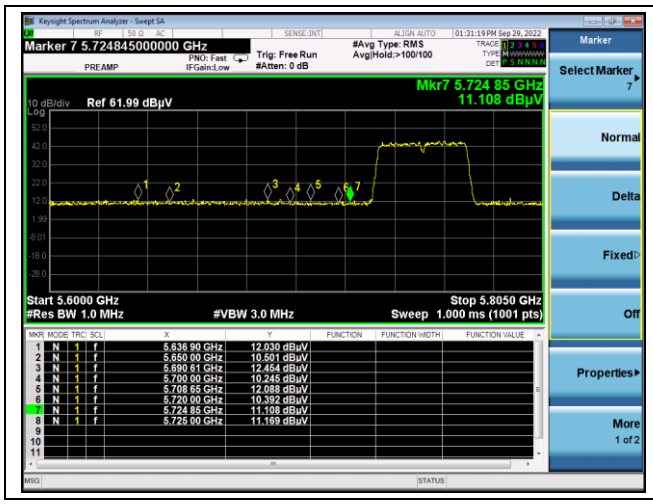
Low channel Band edge (Average) - Band 2C



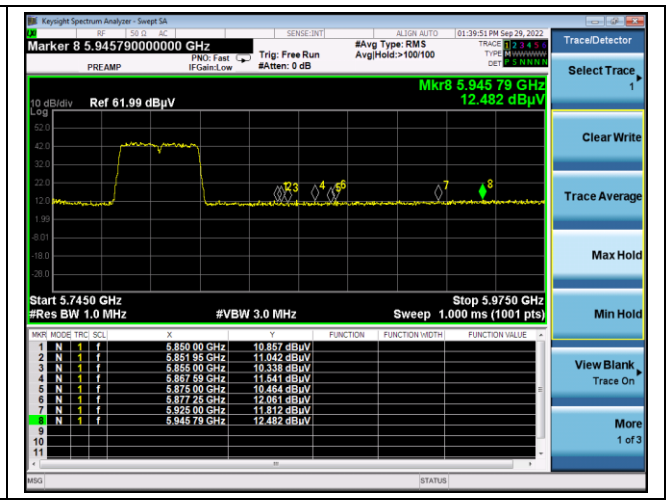
High channel Band edge (Peak) - Band 2C



Low channel Band edge (Peak) - Band 3

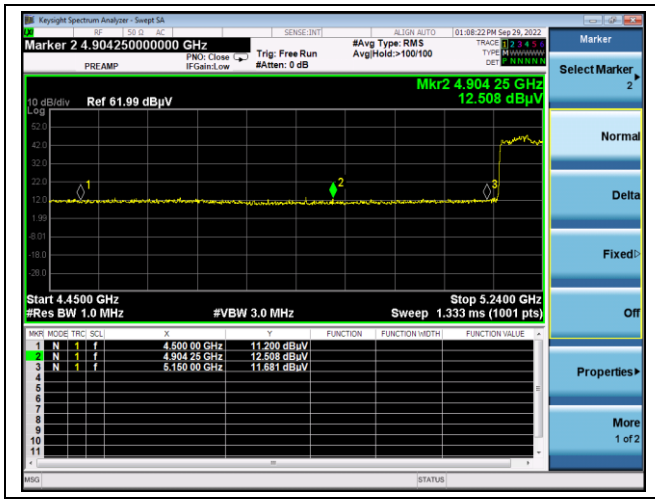


High channel Band edge (Peak) - Band 3

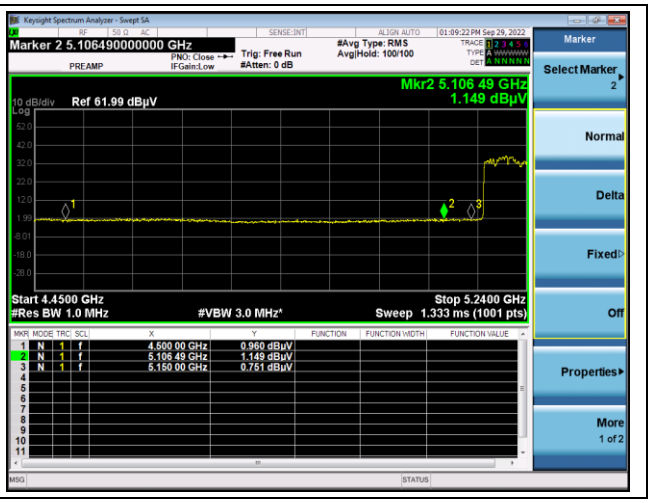


802.11ac_VHT80

Middle channel Band edge (Peak) - Band 1

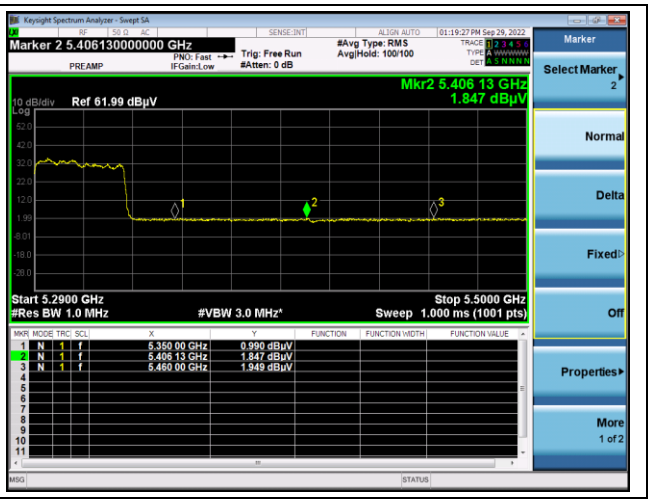


Middle channel Band edge (Average) - Band 1

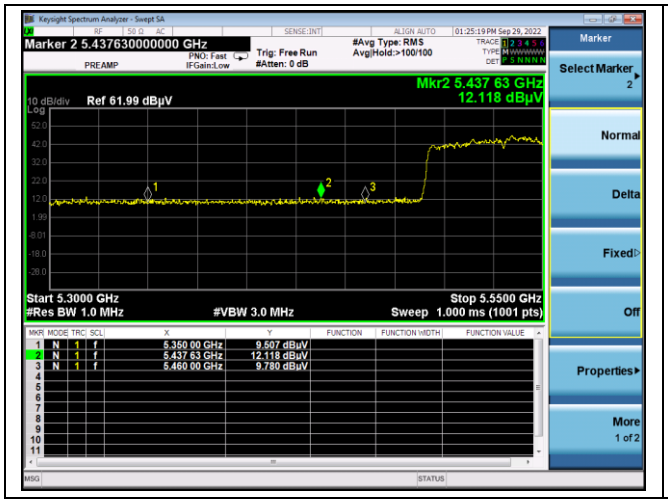


Middle channel Band edge (Peak) - Band 2A

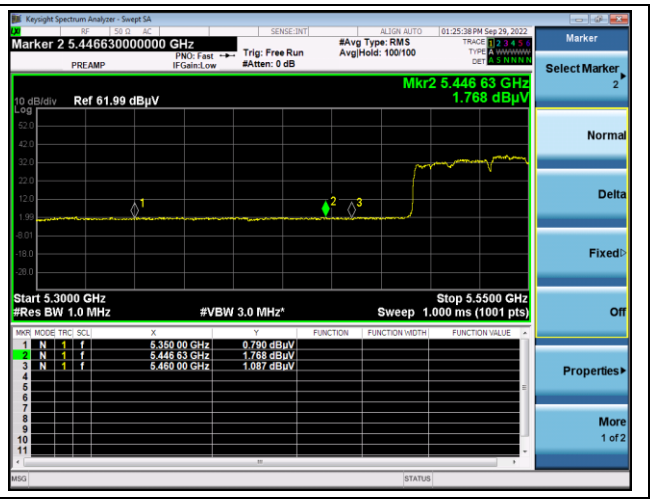
Middle channel Band edge (Average) - Band 2A



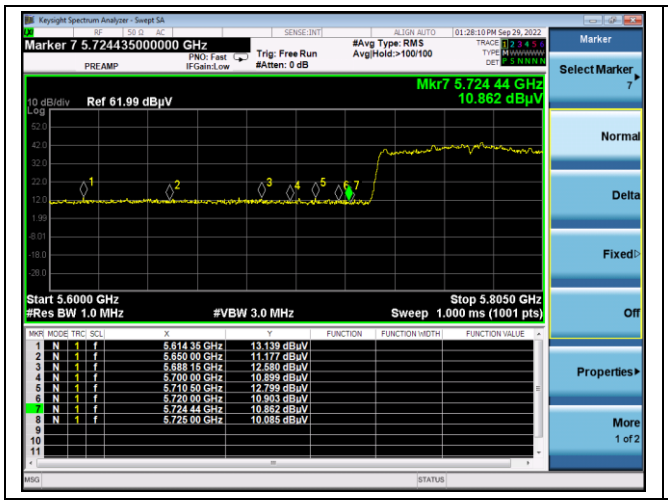
Low channel Band edge (Peak) - Band 2C



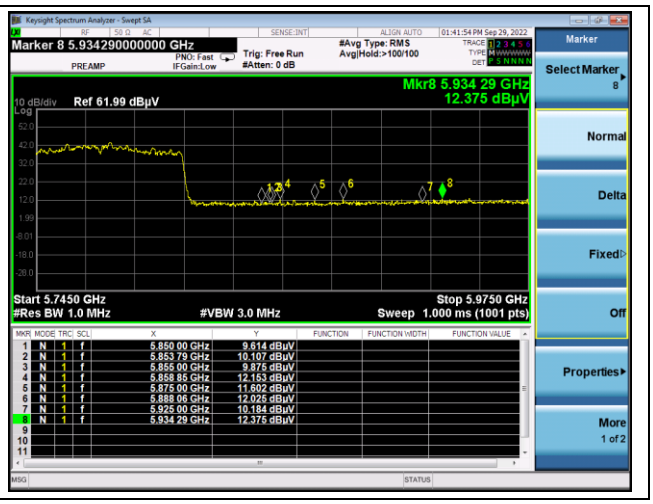
Low channel Band edge (Average) - Band 2C



Middle channel Band edge (Peak) - Band 3

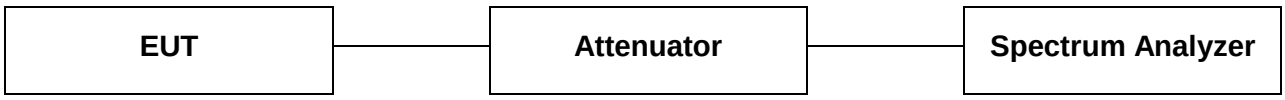


Middle channel Band edge (Peak) - Band 3



3. 26 dB Bandwidth & 99 % Bandwidth

3.1. Test Setup



3.2. Limit

None; for reporting purpose only.

3.3. Test Procedure

3.3.1. 26 dB Bandwidth

1. This measurement settings are specified in section Ⅱ.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 dB 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 %.

Remark;

In case of band crossing channels 138, 142 and 144, the measurement is complied with section Ⅲ.A of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

3.3.2. 99 % Bandwidth

3.3.2.1 FCC

1. This measurement settings are specified in section Ⅱ.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 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.

- SISO_Ant.1

Test mode: 11a

Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)	99 % Bandwidth (㎒)
U-NII 1	5 180	36	12	21.303	16.903
	5 220	44		21.071	16.903
	5 240	48		21.245	16.903
U-NII 2A	5 260	52		21.187	16.903
	5 300	60		21.303	16.903
	5 320	64		21.187	16.903
U-NII 2C	5 500	100		21.187	16.903
	5 580	116		21.187	16.903
	5 700	140		21.071	16.903
U-NII 3	5 745	149		21.187	16.903
	5 785	157		21.187	16.903
	5 825	165		21.187	16.903

Test mode: 11n_HT20

Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)	99 % Bandwidth (㎒)
U-NII 1	5 180	36	MCS0	21.476	18.061
	5 220	44		21.418	18.177
	5 240	48		21.360	18.119
U-NII 2A	5 260	52		21.303	18.119
	5 300	60		21.360	18.119
	5 320	64		21.476	18.119
U-NII 2C	5 500	100		21.418	18.177
	5 580	116		21.534	18.119
	5 700	140		21.303	18.119
U-NII 3	5 745	149		21.418	18.177
	5 785	157		21.534	18.177
	5 825	165		21.476	18.119

Test mode: 11ac_VHT40

Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)	99 % Bandwidth (㎒)
U-NII 1	5 190	38	MCS0	40.174	36.237
	5 230	46		40.058	36.237
U-NII 2A	5 270	54		40.174	36.237
	5 310	62		40.289	36.237
U-NII 2C	5 510	102		40.174	36.237
	5 550	110		40.405	36.237
	5 670	134		40.174	36.237
U-NII 3	5 755	151		40.289	36.237
	5 795	159		40.521	36.237

Test mode: 11ac_VHT80

Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)	99 % Bandwidth (㎒)
U-NII 1	5 210	42	MCS0	81.968	75.716
U-NII 2A	5 290	58		82.663	75.716
U-NII 2C	5 530	106		82.200	75.716
U-NII 3	5 775	155		82.894	75.948

Band-crossing channel

Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)
11a	5 720	144	12	15.536
11n_HT20	5 720	144	MCS0	15.593
11ac_VHT40	5 710	142	MCS0	35.145
11ac_VHT80	5 690	138	MCS0	75.753

- SISO_Ant.2

Test mode: 11a

Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)	99 % Bandwidth (㎒)
U-NII 1	5 180	36	12	21.187	16.903
	5 220	44		21.187	16.903
	5 240	48		21.187	16.845
U-NII 2A	5 260	52		21.245	16.903
	5 300	60		21.187	16.903
	5 320	64		21.129	16.845
U-NII 2C	5 500	100		21.187	16.903
	5 580	116		21.245	16.903
	5 700	140		21.129	16.903
U-NII 3	5 745	149		21.129	16.903
	5 785	157		21.129	16.903
	5 825	165		21.187	16.903

Test mode: 11ac_VHT20

Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)	99 % Bandwidth (㎒)
U-NII 1	5 180	36	MCS0	21.360	18.061
	5 220	44		21.476	18.119
	5 240	48		21.418	18.061
U-NII 2A	5 260	52		21.418	18.119
	5 300	60		21.418	18.119
	5 320	64		21.360	18.119
U-NII 2C	5 500	100		21.418	18.119
	5 580	116		21.534	18.119
	5 700	140		21.534	18.177
U-NII 3	5 745	149		21.360	18.119
	5 785	157		21.303	18.119
	5 825	165		21.592	18.119

Test mode: 11n_HT40

Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)	99 % Bandwidth (㎒)
U-NII 1	5 190	38	MCS0	39.826	36.469
	5 230	46		40.174	36.469
U-NII 2A	5 270	54		40.058	36.469
	5 310	62		40.058	36.469
U-NII 2C	5 510	102		40.289	36.469
	5 550	110		40.058	36.469
	5 670	134		40.289	36.469
U-NII 3	5 755	151		40.174	36.469
	5 795	159		40.058	36.469

Test mode: 11ac_VHT80

Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)	99 % Bandwidth (㎒)
U-NII 1	5 210	42	MCS0	81.737	75.716
U-NII 2A	5 290	58		81.505	75.716
U-NII 2C	5 530	106		81.968	75.948
U-NII 3	5 775	155		81.968	75.948

Band-crossing channel

Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)
11a	5 720	144	12	15.651
11ac_VHT20	5 720	144	MCS0	15.709
11n_HT40	5 710	142	MCS0	35.029
11ac_VHT80	5 690	138	MCS0	75.753

- MIMO

Test mode: 11ac_VHT20

Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)		99 % Bandwidth (㎒)	
				ANT 1	ANT 2	ANT 1	ANT 2
U-NII 1	5 180	36	MCS1	21.303	21.360	17.945	17.945
	5 220	44		21.360	21.187	17.945	18.003
	5 240	48		21.592	21.071	18.003	17.945
U-NII 2A	5 260	52		21.418	21.303	17.887	18.003
	5 300	60		21.187	21.303	18.003	17.945
	5 320	64		21.245	21.360	17.945	17.945
U-NII 2C	5 500	100		21.187	21.245	17.945	18.003
	5 580	116		21.303	21.245	18.003	18.003
	5 700	140		21.418	21.303	18.003	18.003
U-NII 3	5 745	149		21.303	21.245	18.003	18.003
	5 785	157		21.360	21.245	18.003	18.003
	5 825	165		21.418	21.476	18.003	18.003

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	40.521	40.521	36.469	36.585
	5 230	46		40.289	40.058	36.469	36.469
U-NII 2A	5 270	54		40.289	40.405	36.469	36.469
	5 310	62		40.174	40.289	36.585	36.469
U-NII 2C	5 510	102		40.174	40.174	36.700	36.469
	5 550	110		40.521	40.405	36.585	36.585
	5 670	134		40.289	40.174	36.585	36.585
U-NII 3	5 755	151		40.405	40.174	36.469	36.585
	5 795	159		40.405	40.174	36.585	36.469

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	82.663	81.737	76.179	75.716
U-NII 2A	5 290	58		82.663	81.505	76.179	75.948
U-NII 2C	5 530	106		82.431	81.274	75.948	75.716
U-NII 3	5 775	155		82.431	81.505	75.948	75.716

Band-crossing channel

Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)	
				ANT 1	ANT 2
11ac_VHT20	5 720	144	MCS1	15.593	15.651
11n_HT40	5 710	142	MCS8	35.260	35.029
11ac_VHT80	5 690	138	MCS0	76.216	76.679

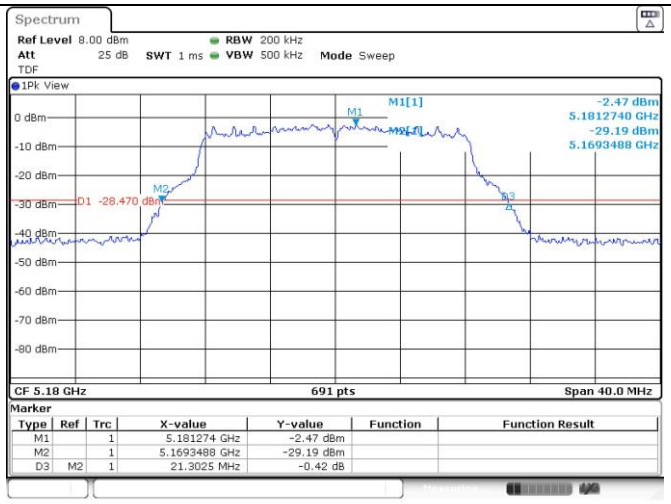
- Test plots

- SISO_Ant.1

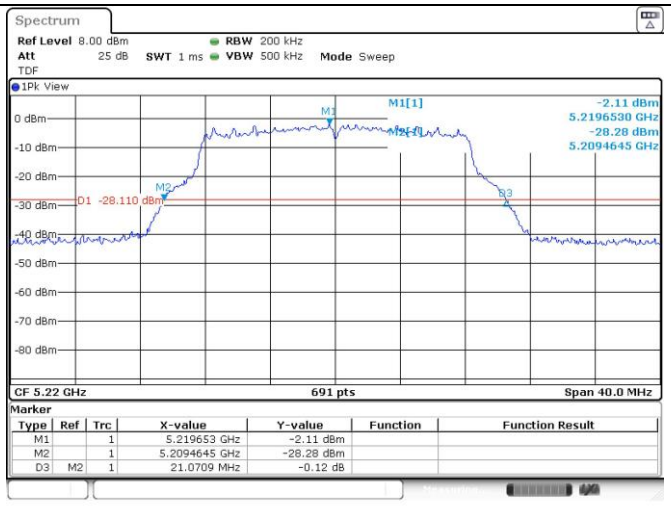
26 dB Bandwidth

802.11a (Band 1)

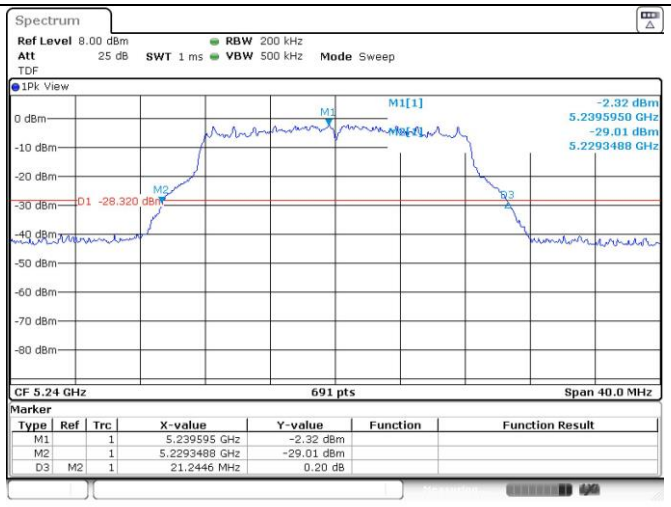
Low Channel
(5 180 ㎒)



Middle Channel
(5 220 ㎒)

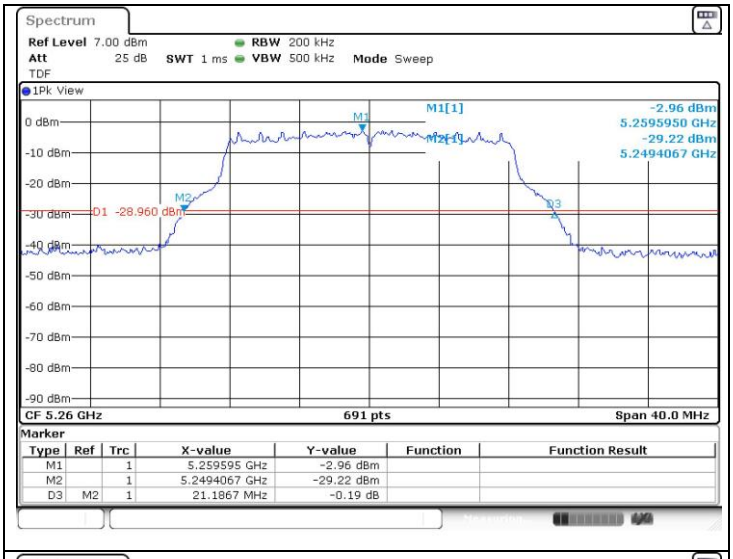


High Channel
(5 240 ㎒)

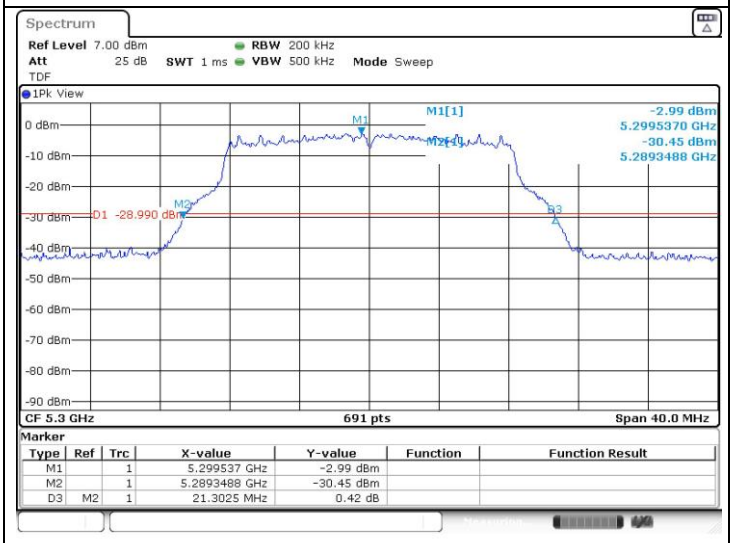


802.11a (Band 2A)

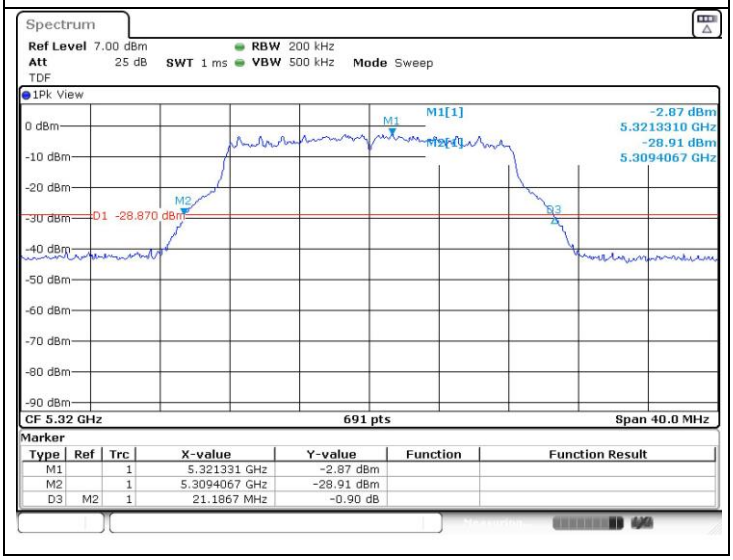
Low Channel
(5 260 ㎒)



Middle Channel
(5 300 ㎒)

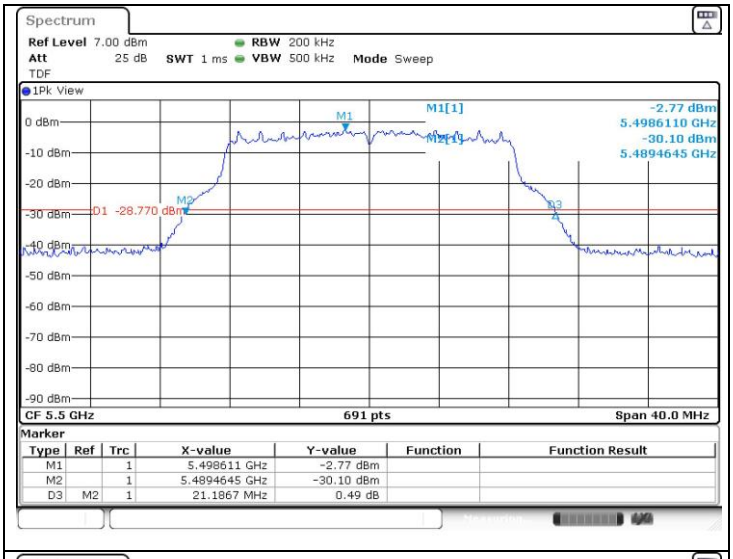


High Channel
(5 320 ㎒)

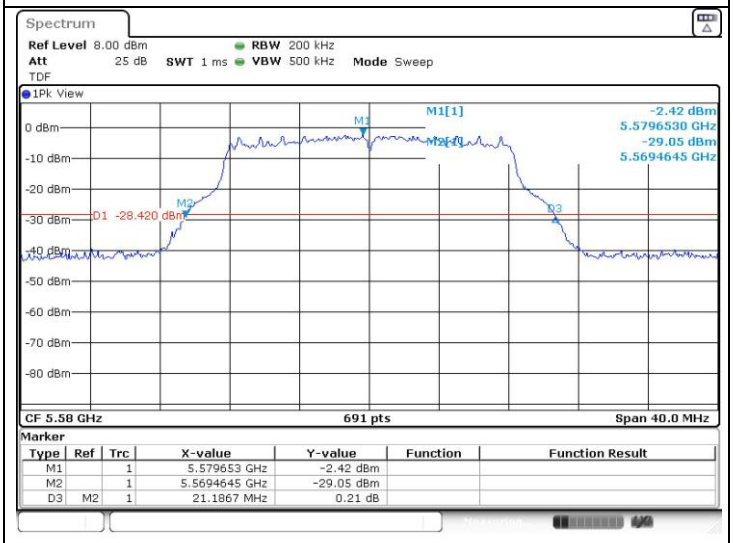


802.11a (Band 2C)

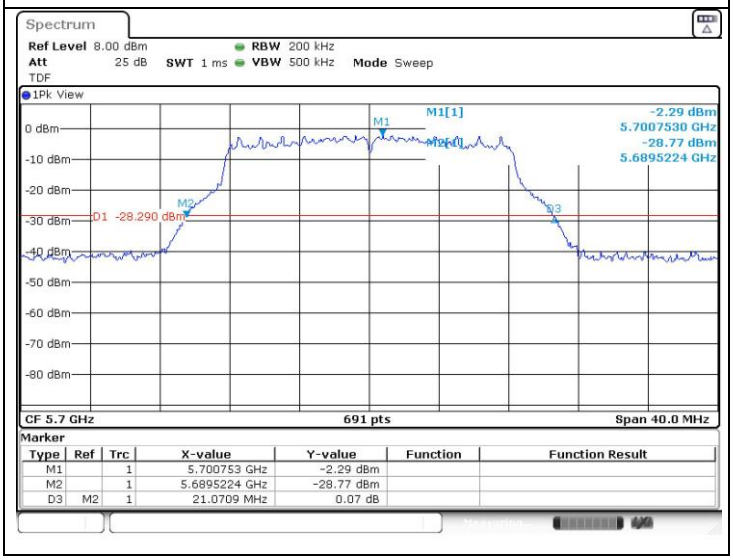
Low Channel
(5 500 ㎒)



Middle Channel
(5 580 ㎒)

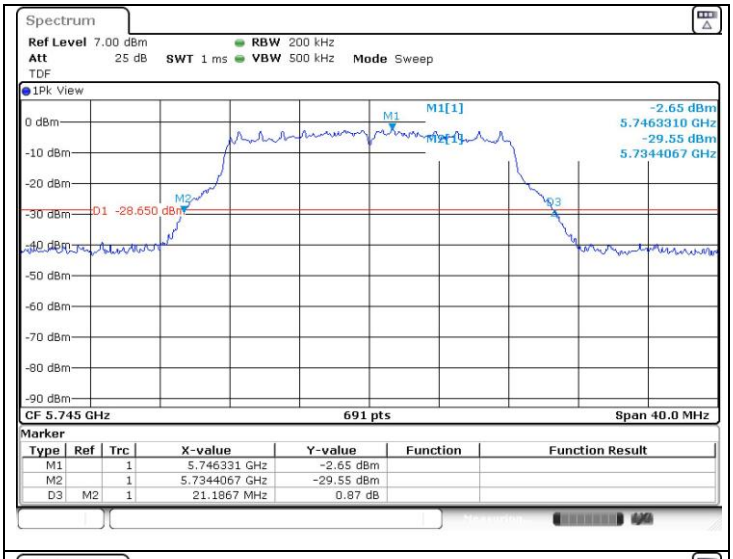


High Channel
(5 700 ㎒)

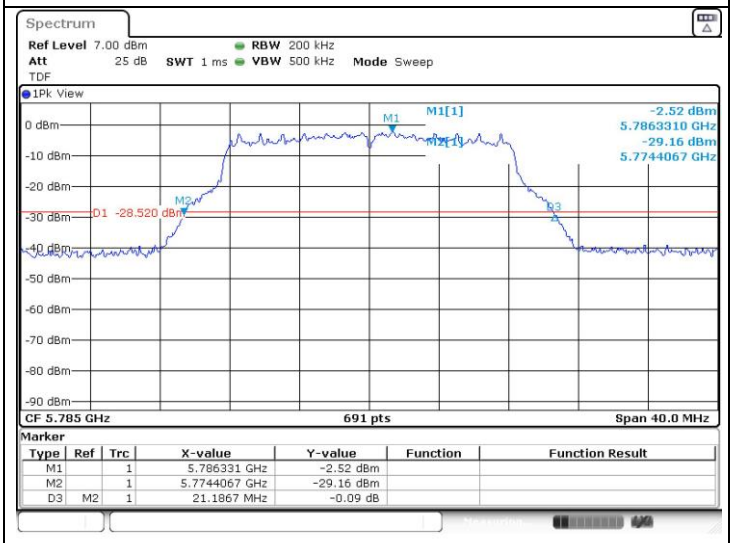


802.11a (Band 3)

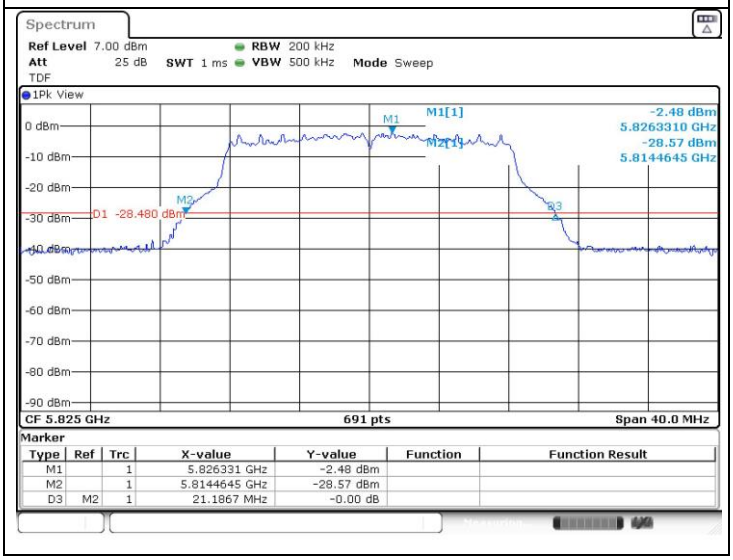
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

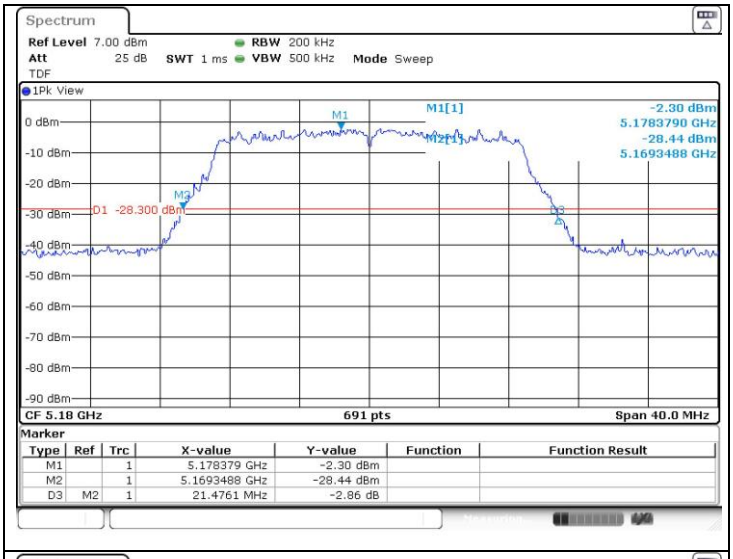


High Channel
(5 825 ㎒)

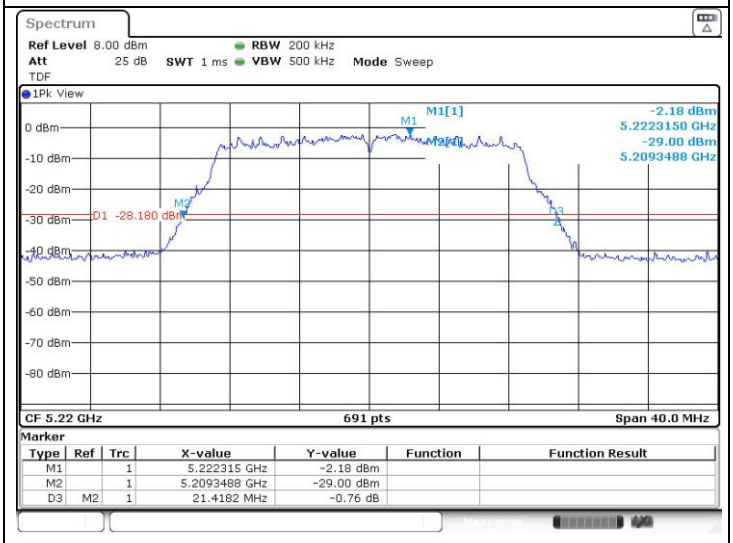


802.11n_HT20 (Band 1)

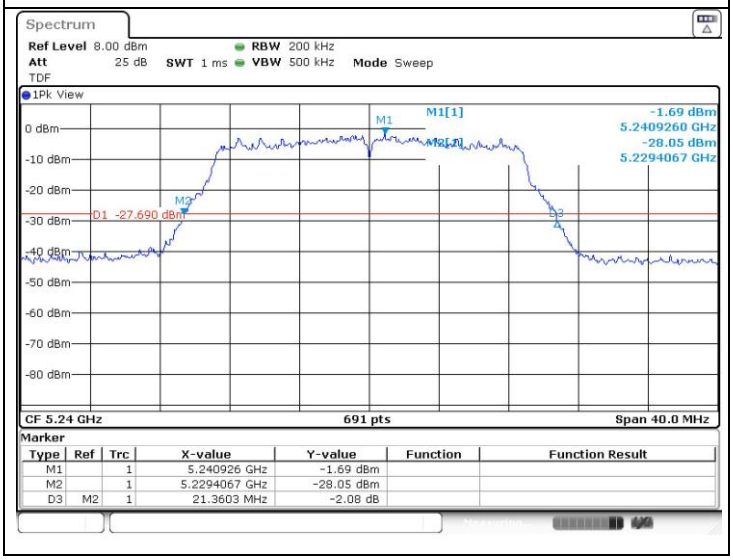
Low Channel
(5 180 ㎒)



Middle Channel
(5 220 ㎒)

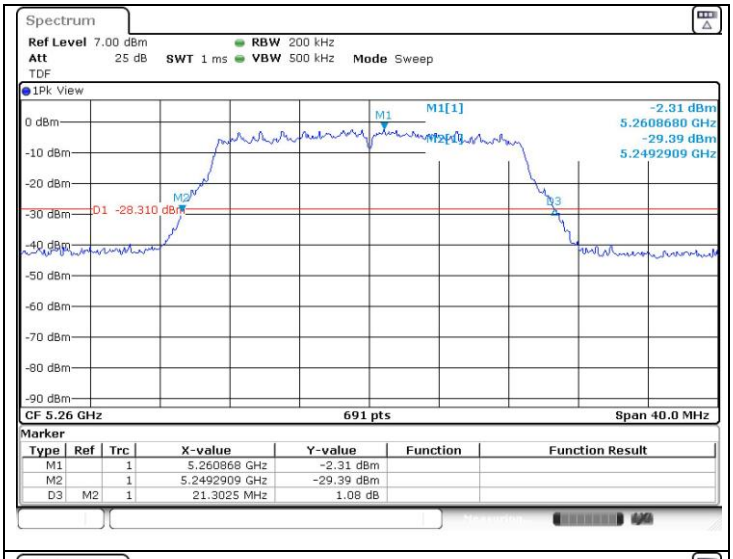


High Channel
(5 240 ㎒)

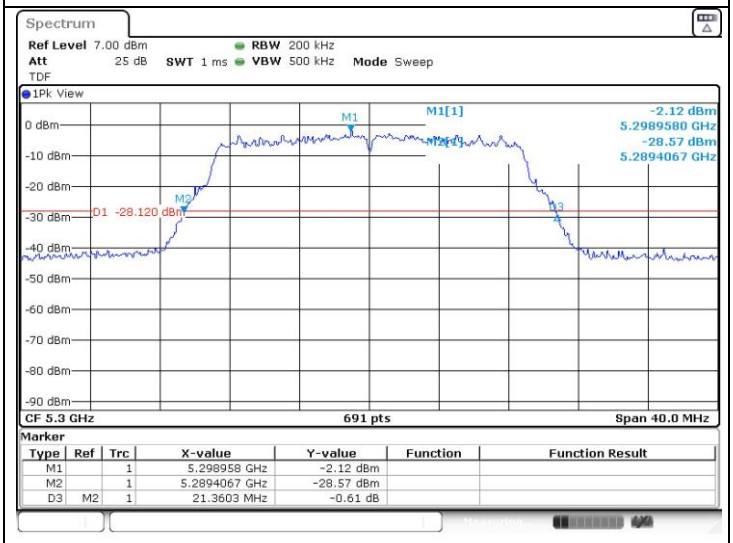


802.11n_HT20 (Band 2A)

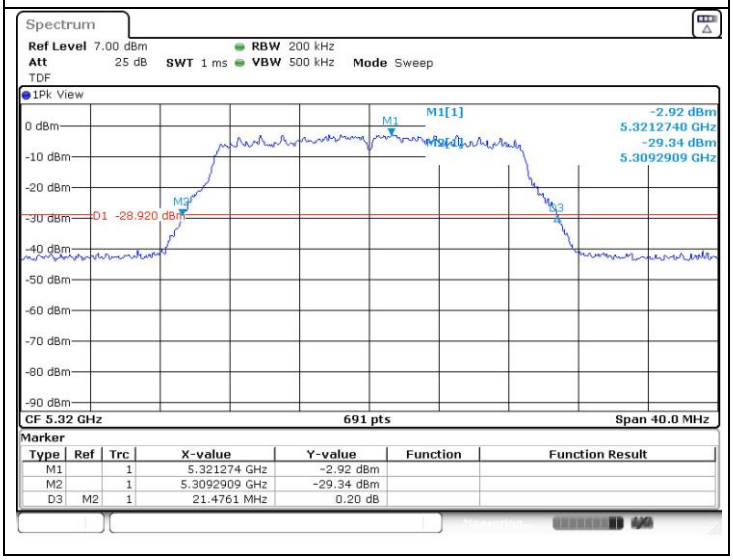
Low Channel
(5 260 ㎒)



Middle Channel
(5 300 ㎒)

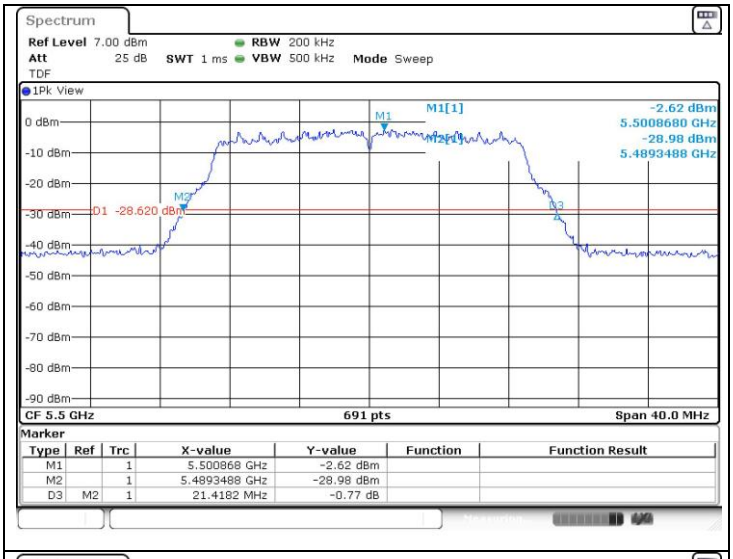


High Channel
(5 320 ㎒)

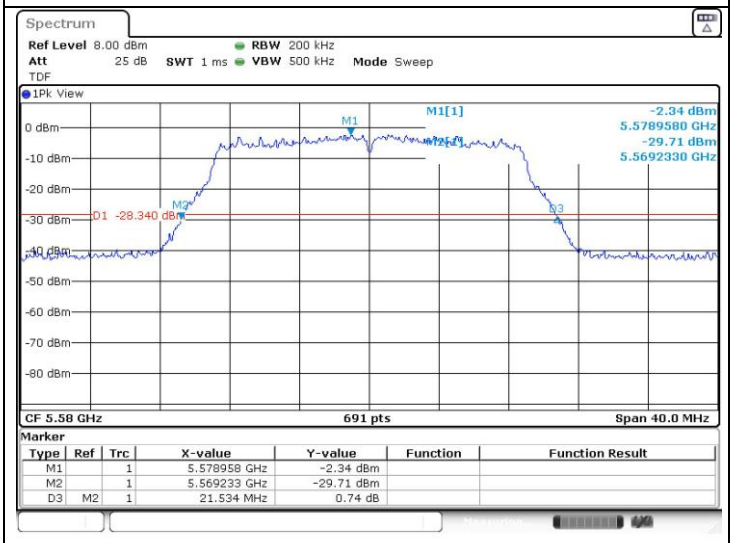


802.11n_HT20 (Band 2C)

Low Channel
(5 500 ㎒)



Middle Channel
(5 580 ㎒)



High Channel
(5 700 ㎒)