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TEST REPORT

of

FCC Part 15 Subpart E §15.407

FCC ID: BEJGEN5WIDEPD

1. Equipment Under Test	:	Car Navigation System
2. Model Name	:	GEN5 WIDE PD
3. Variant Model Name(s)	:	-
4. Applicant	:	LG Electronics USA
5. Manufacturer	:	LG Electronics Inc.
6. Date of Receipt	:	2020.03.13
7. Date of Test(s)	:	2020.05.11 ~ 2020.06.05
8. Date of Issue	:	2020.06.10

In the configuration tested, the EUT complied with the standards specified above. This test report does not assure KOLAS accreditation.

1) The results of this test report are effective only to the items tested.
2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.

Tested by: **Murphy Kim**

Technical Manager: **Jungmin Yang**

SGS Korea Co., Ltd. Gunpo Laboratory

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1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)
- 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
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- Designation number: KR0150

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1.2. Details of Applicant

Applicant : LG Electronics USA
Address : 1000 Sylvan Avenue, Englewood Cliffs, New Jersey, United States, 07632
Contact Person : Han, Kyung-su
Phone No. : +1 201 472 2623

1.3. Details of Manufacturer

Company : Same as applicant
Address : Same as applicant

1.4. Description of EUT

Kind of Product		Car Navigation System
Model Name		GEN5 WIDE PD
Power Supply		DC 12 V
Frequency Range		5 745 ㎒ ~ 5 825 ㎒ (Band 3: 11a/n_HT20, 11ac_VHT20) 5 755 ㎒ ~ 5 795 ㎒ (Band 3: 11n_HT40, 11ac_VHT40) 5 775 ㎒ (Band 3: 11ac_VHT80)
Modulation Technique		OFDM
Number of Channels		5 channels (Band 3: 11a/n_HT20, 11ac_VHT20) 2 channels (Band 3: 11n_HT40, 11ac_VHT40) 1 channel (Band 3: 11ac_VHT80)
Antenna Type		PCB & Cable Assembly antenna
Antenna Gain	**ANT 1**	4.70 ㏈i
	ANT 2	3.80 ㏈i

1.5. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due
Signal Generator	Agilent	E8257D	MY51501169	Nov. 21, 2019	Annual	Nov. 21, 2020
Signal Generator	R&S	SMBV100A	255834	Jun. 10, 2019	Annual	Jun. 10, 2020
Spectrum Analyzer	R&S	FSV30	100768	Mar. 04, 2020	Annual	Mar. 04, 2021
Spectrum Analyzer	Agilent	N9030A	US51350132	Nov. 15, 2019	Annual	Nov. 15, 2020
Power Meter	Anritsu	ML2495A	1223004	Jun. 01, 2020	Annual	Jun. 01, 2021
Power Sensor	R&S	NRP-Z81	100669	May 08, 2020	Annual	May 08, 2021
Attenuator	AEROFLEX / INMET	40AH2W-10	40G-3	Jun. 20, 2019	Annual	Jun. 20, 2020
Low Pass Filter	Mini-Circuits	NLP-1200+	V 9500401023-3	Jun. 01, 2020	Annual	Jun. 01, 2021
High Pass Filter	Wainwright Instrument GmbH	WHKX6.0/18G-10SS	51	Jun. 07, 2020	Annual	Jun. 07, 2021
High Pass Filter	Wainwright Instrument GmbH	WHNX7.5/26.5G-6SS	11	May 18, 2020	Annual	May 18, 2021
DC Power Supply	Agilent	U8002A	MY53150029	Jun. 10, 2019	Annual	Jun. 10, 2020
Preamplifier	H.P.	8447F	2944A03909	Aug. 07, 2019	Annual	Aug. 07, 2020
Signal Conditioning Unit	R&S	SCU-18	10117	Jun. 12, 2019	Annual	Jun. 12, 2020
Preamplifier	MITEQ Inc.	JS44-18004000-35-8P	1546891	May 08, 2020	Annual	May 08, 2021
Loop Antenna	Schwarzbeck Mess-Elektronik	FMZB 1519	1519-039	Aug. 22, 2019	Biennial	Aug. 22, 2021
Bilog Antenna	Schwarzbeck Mess-Elektronik	VULB 9163	396	Mar. 21, 2019	Biennial	Mar. 21, 2021
Horn Antenna	R&S	HF906	100326	Feb. 14, 2020	Annual	Feb. 14, 2021
Horn Antenna	Schwarzbeck Mess-Elektronik	BBHA 9170	BBHA9170431	Sep. 10, 2018	Biennial	Sep. 10, 2020
Test Receiver	R&S	ESU26	100109	Feb. 19, 2020	Annual	Feb. 19, 2021
Turn Table	Innco systems GmbH	DS 1200 S	N/A	N.C.R.	N/A	N.C.R.
Controller	Innco systems GmbH	CONTROLLER CO3000-4P	CO3000/963/383 30516/L	N.C.R.	N/A	N.C.R.
Antenna Mast	Innco systems GmbH	MA4640-XP-ET	MA4640/536/383 30516/L	N.C.R.	N/A	N.C.R.
Anechoic Chamber	SY Corporation	L × W × H (9.6 m × 6.4 m × 6.6 m)	N/A	N.C.R.	N/A	N.C.R.
Coaxial Cable	RFONE	PL520-NMNM-4M (4 m)	20200324001	May 06, 2020	Semi-annual	Nov. 06, 2020
Coaxial Cable	RFONE	PL520-NMNM-10M (10 m)	20200324001	May 06, 2020	Semi-annual	Nov. 06, 2020
Coaxial Cable	Rosenberger	LA1-C006-1500	131014 07/20	Feb. 13, 2020	Semi-annual	Aug. 13, 2020

1.6. Summary of Test Result

The EUT has been tested according to the following specifications:

APPLIED STANDARD: Part 15 Subpart E		
Section	**Test Item(s)**	**Result**
15.205(a) 15.209(a) 15.407(b)(1) 15.407(b)(2) 15.407(b)(3) 15.407(b)(4)	Transmitter Radiated Spurious Emissions	Complied
15.407(a)	26 ㏈ Bandwidth	Complied
15.407(e)	6 ㏈ Bandwidth	Complied
15.407(a)(1) 15.407(a)(2) 15.407(a)(3)	Maximum Conducted Output Power	Complied
15.407(a)(1) 15.407(a)(2) 15.407(a)(3)	Peak Power Spectral Density	Complied
15.207	AC Power Line Conducted Emission	N/A[1)]

Note;

1) The AC power line test was not performed because the EUT use battery power for operation and which do not operate from the AC power lines.

1.7. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL000758	2020.06.10	Initial

1.8. Test Procedure(s)

The measurement procedures described in the American National Standard of Procedures for Compliance Testing of unlicensed Wireless Devices (ANSI C63.10-2013) and the guidance provided in KDB 789033 D02 General UNII Test Procedures New Rules v02r01 were used in the measurement of the DUT.

1.9. Sample Calculation

Where relevant, the following sample calculation is provided:

1.9.1. Conducted Test

Offset value (㏈) = Attenuator (㏈) + Cable loss (㏈)

1.9.2. Radiation Test

Field strength level (㏈㎶/m) = Measured level (㏈㎶) + Antenna factor (㏈) + Cable loss (㏈) - Amplifier gain (㏈) + Duty Factor (㏈)

1.10. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
RF Output Power	± 0.34 ㏈
Occupied Bandwidth	± 9.66 ㎑
Power Spectral Density	± 0.61 ㏈
Radiated Emission, 9 ㎑ to 30 ㎒	± 3.59 ㏈
Radiated Emission, below 1 ㎓	± 5.88 ㏈
Radiated Emission, above 1 ㎓	± 5.94 ㏈

Uncertainty figures are valid to a confidence level of 95 %.

1.11. Duty Cycle of EUT

Regarding to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, Ⅱ.B, the maximum duty cycles of all modes were investigated and set the spectrum analyzer as below.
Set RBW ≥ EBW if possible; otherwise, set RBW to the largest available value, Set VBW ≥ RBW.
Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100.

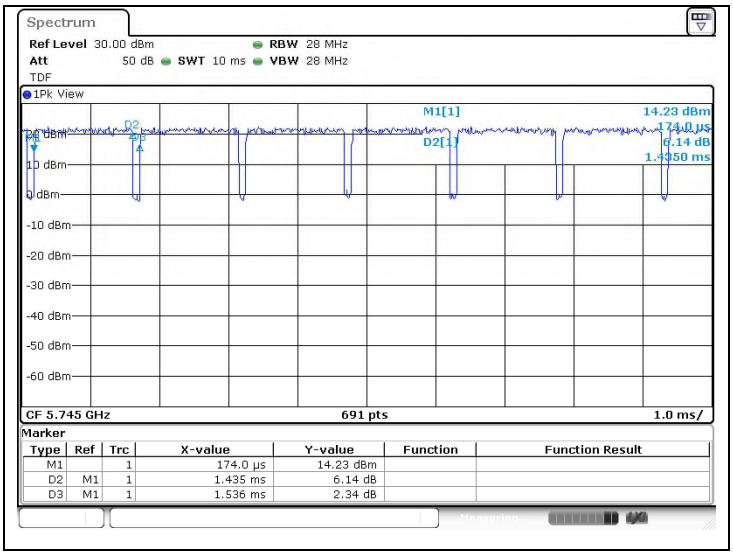
Mode	Data Rate (Mbps)	Duty Cycle (%)	Correction Factor (dB)
11a	6	93.42	0.30
11n_HT20	MCS8	87.33	0.59
11n_HT40	MCS8	86.60	0.62
11ac_VHT80	MCS0	65.19	1.86

Remark;

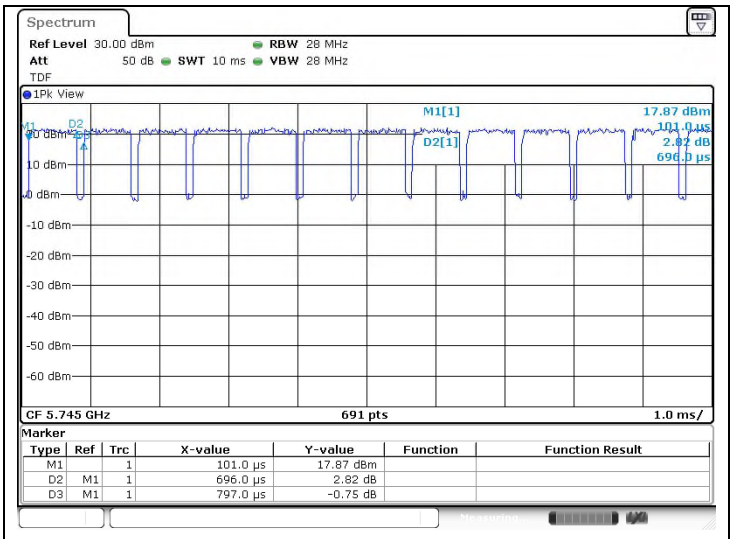
1. As measured duty cycles of EUT, all of mode and data rate keep constant period and are converted to log scale (power averaging) to compensate correction factor to result of average test items.
2. Duty Cycle (%) = (Tx on time / Tx on + off time) x 100
3. Correction Factor (dB) = 10 log (1 / Duty Cycle)

- Test plots

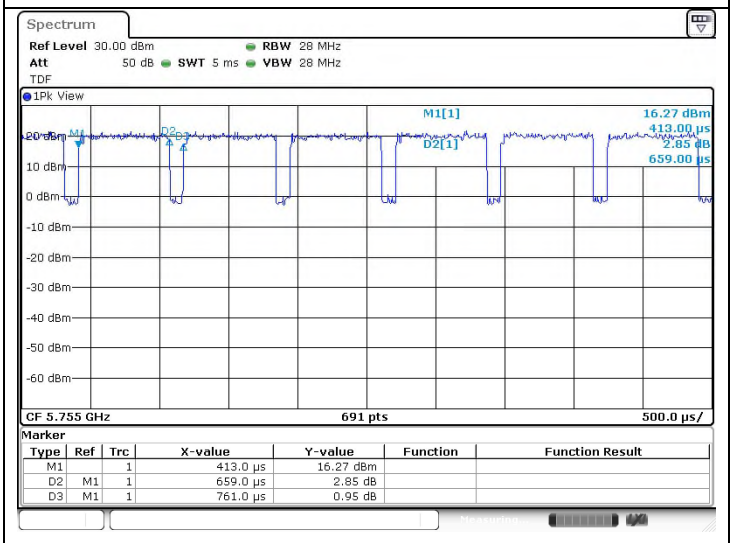
802.11a



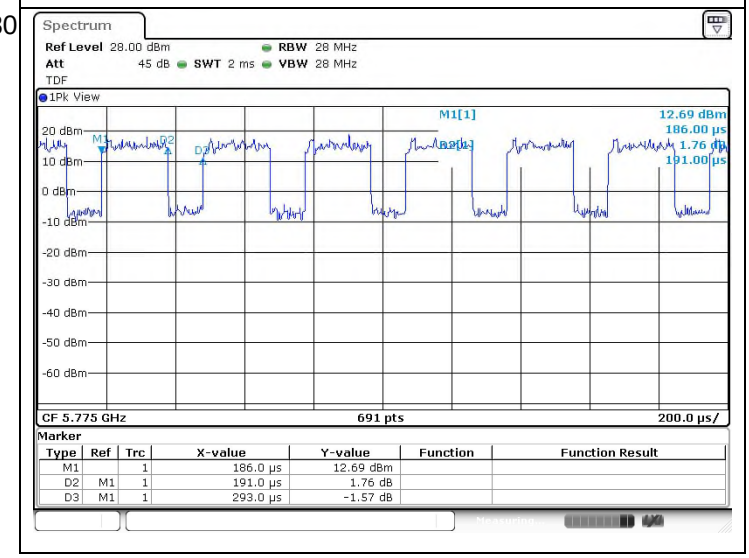
802.11n_HT20



802.11n_HT40



802.11ac_VHT80

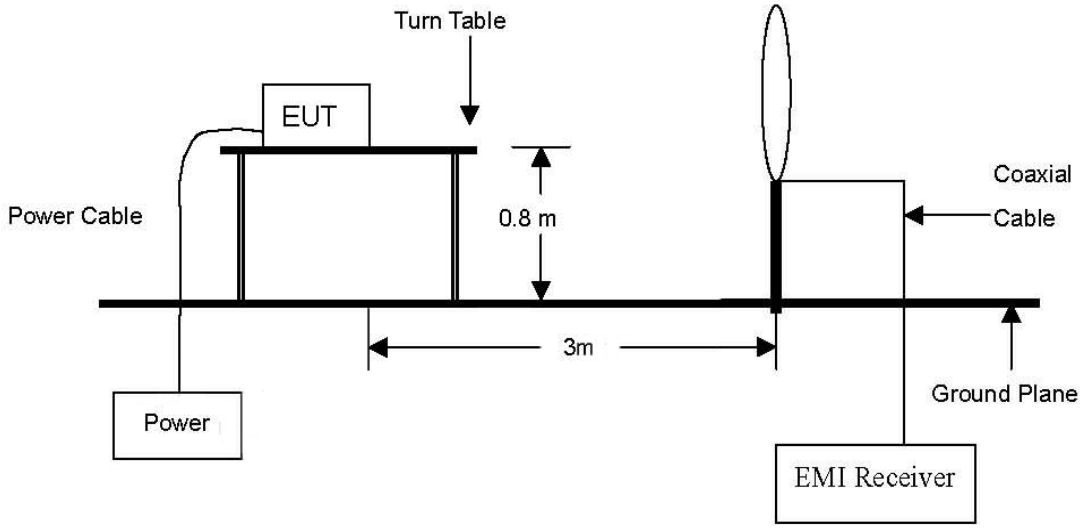


2. Transmitter Radiated Spurious Emissions

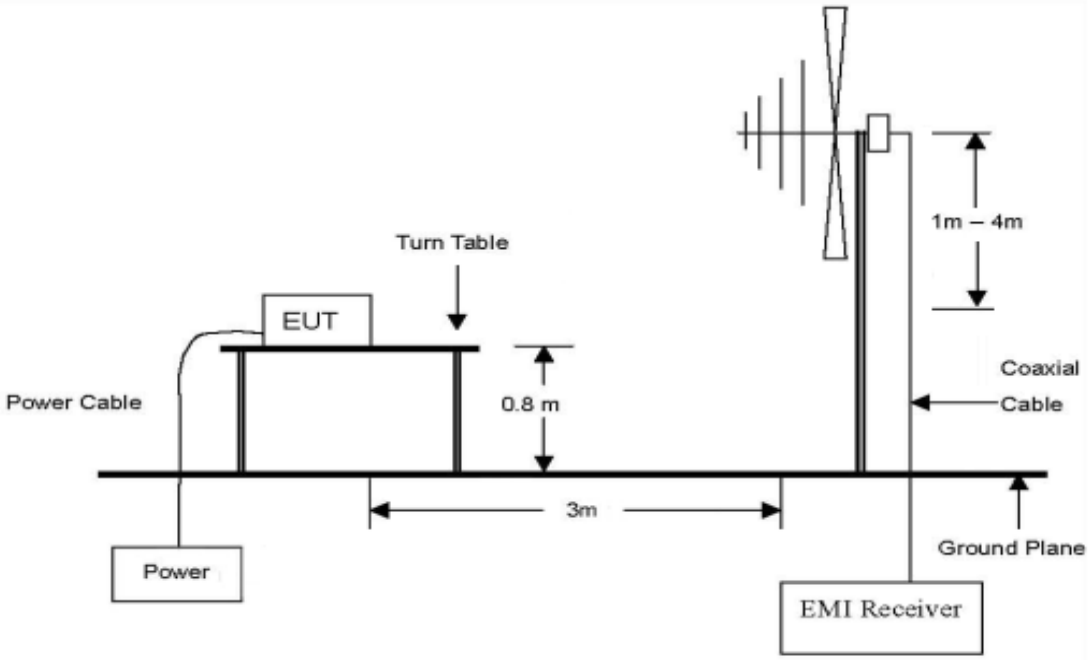
2.1. Test Setup

2.1.1. Transmitter Radiated Spurious Emissions

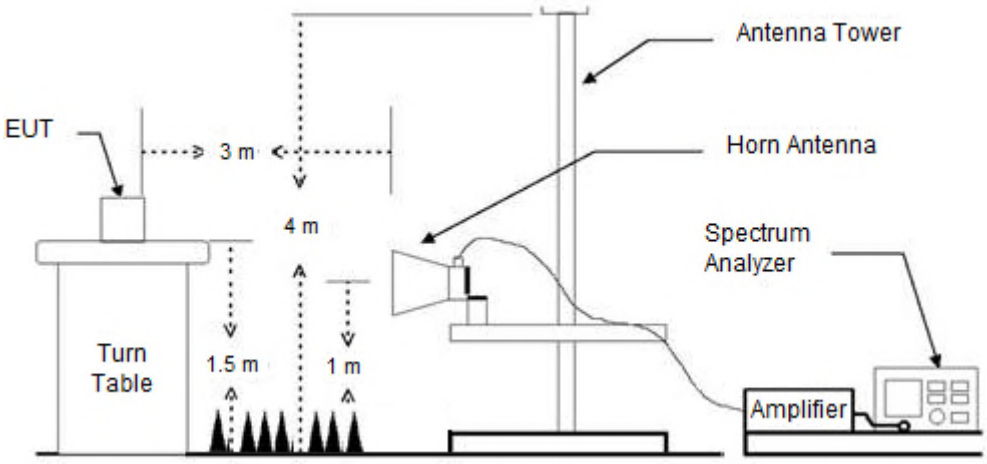
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 ㎑ to 30 ㎒ emissions.



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



The diagram below shows the test setup that is utilized to make the measurements for emission. The spurious emissions were investigated form 1 ㎓ to the 10th harmonic of the highest fundamental frequency or 40 ㎓, whichever is lower.



2.2. Limit

According to § 15.407(b)
(4) For transmitters operating in the 5.725-5.85 ㎓ band:
(i) All emissions shall be limited to a level of -27 ㏈m/㎒ at 75 ㎒ or more above or below the band edge increasing linearly to 10 ㏈m/㎒ at 25 ㎒ above or below the band edge, and from 25 ㎒ above or below the band edge increasing linearly to a level of 15.6 ㏈m/㎒ at 5 ㎒ above or below the band edge, and from 5 ㎒ above or below the band edge increasing linearly to a level of 27 ㏈m/㎒ at the band edge.

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

Frequency (㎒)	Field Strength (㎶/m)	Measurement Distance (Meters)
0.009-0.490	2 400/F(㎑)	300
0.490-1.705	24 000/F(㎑)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

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

2.3. Test Procedures

Radiated spurious emissions from the EUT were measured according to the dictates in section G of KDB 789033 D02 General UNII Test Procedures New Rules v02r01 and ANSI C63.10-2013.

2.3.1. Test Procedures for emission below 30 ㎒

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.
3. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
4. The test-receiver system was set to average or quasi peak detect function and Specified Bandwidth with Maximum Hold Mode.

2.3.2. Test Procedures for emission from above 30 ㎒

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site below 1 ㎓ and 1.5 meter above the ground at a 3 meter anechoic chamber test site above 1 ㎓. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 ㎓, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 ㎓, the EUT was set 3 meter away from the interference-receiving antenna.
3. The antenna is a bi-log antenna, a horn antenna and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note;

All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

- II.G.4. Unwanted emissions measurements below 1 ㎓.
Compliance shall be demonstrated using CISPR quasi-peak detection; however, peak detection is permitted as an alternative to quasi-peak detection.

- II.G.5. Unwanted maximum emissions measurements above 1 ㎓.
Peak emission levels are measured by setting the analyzer as follows:
Set to RBW = 1 ㎒, VBW ≥ 3 ㎒, Detector = Peak, Sweep time = auto, Trace mode= Max hold.

- II.G.6. Average unwanted emissions measurements above 1 ㎓.
Set to RBW = 1 ㎒, VBW ≥ 3 ㎒, Detector = power averaging (rms), Averaging type = power averaging (rms), Sweep time = auto, Perform a trace average of at least 100 traces If the transmission is continuous, If the transmission is not continuous, the number of traces shall be increased by a factor of 1/x, where x is the duty cycle. For example, with 50 % duty cycle, at least 200 traces shall be averaged.

If tests are performed with the EUT transmitting at a duty cycle less than 98 %, a correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 % duty cycle. The correction factor is computed as follows:

- If power averaging (rms) mode was used in II.G.6.c)(iv), the correction factor is 10 log (1/x), where x is the duty cycle. For example, if the transmit duty cycle was 50 %, then 3 ㏈ must be added to the measured emission levels.

- Definition of the test orthogonal plan for EUT was described in the test setup photo.
The test orthogonal plan of EUT is **X – axis** during radiation test.

2.4. Test Result

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

2.4.1. Radiated Spurious Emission below 1 000 ㎒

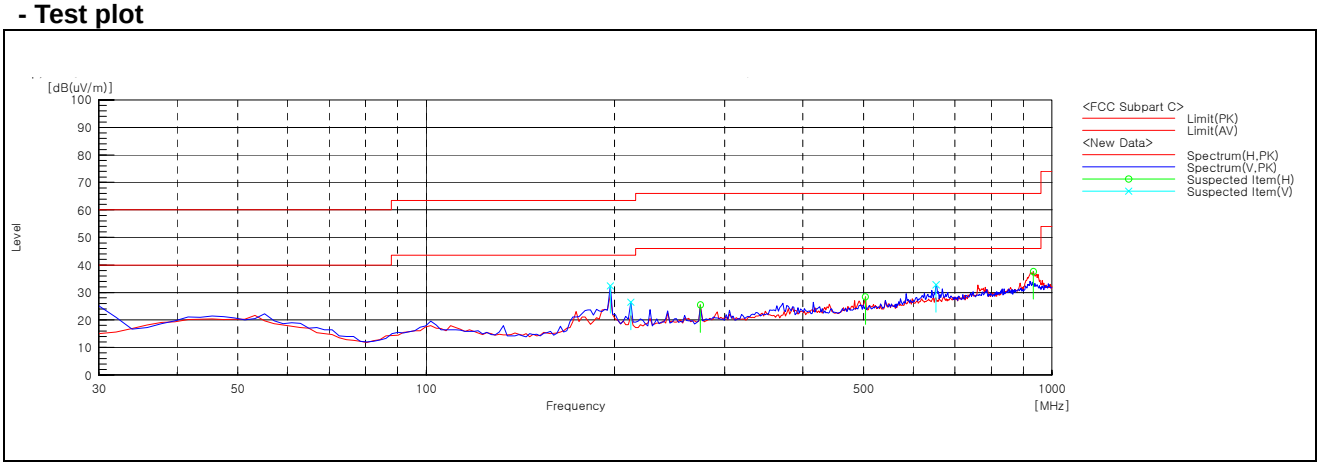
The frequency spectrum from 9 ㎑ to 1 000 ㎒ was investigated. All reading values are peak values.

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
196.84	41.30	Peak	V	17.18	-26.53	31.95	43.50	11.55
212.36	35.40	Peak	V	16.84	-26.27	25.97	43.50	17.53
503.36	31.70	Peak	H	23.07	-26.40	28.37	46.00	17.63
652.74	33.70	Peak	V	25.25	-25.72	33.23	46.00	12.77
934.04	34.10	Peak	H	28.12	-24.32	**37.90**	46.00	8.10

Remark;

1. Spurious emissions for all channels and modes were investigated and almost the same below 1 ㎓.
2. Reported spurious emissions are in **11n HT20 ANT 1+ANT2 (Band 3) / MCS8 / High channel** as worst case among other modes.
3. Radiated spurious emission measurement as below.
   (Actual = Reading + AF + AMP + CL)
4. According to §15.31(o), emission levels are not report much lower than the limits by over 20 ㏈.

- Test plot



2.4.2. Radiated Spurious Emission above 1 000 ㎒

OFDM: 802.11a (6 Mbps) Band 3_ANT 1

A. Low Channel (5 745 ㎒)

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 636.56	51.63	Peak	H	34.00	-35.22	**50.41**	68.23	17.82
5 697.79	55.76	Peak	H	34.10	-35.21	54.65	103.59	48.94
5 719.50	64.91	Peak	H	34.06	-35.17	63.80	110.69	46.89
5 724.41	72.04	Peak	H	34.05	-35.15	70.94	120.88	49.94

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 785 ㎒)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

C. High Channel (5 825 ㎒)

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 850.81	65.00	Peak	H	34.30	-34.83	64.47	120.38	55.91
5 855.17	61.05	Peak	H	34.31	-34.84	60.52	110.78	50.26
5 875.39	55.53	Peak	H	34.35	-34.87	55.01	104.94	49.93
5 935.82	47.09	Peak	H	34.54	-34.78	46.85	68.23	21.38

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

OFDM: 802.11a (6 Mbps) Band 3_ANT 2

A. Low Channel (5 745 ㎒)

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 648.64	50.32	Peak	H	34.00	-35.22	**49.10**	68.23	19.13
5 699.02	60.51	Peak	H	34.10	-35.21	59.40	104.50	45.10
5 719.50	70.76	Peak	H	34.06	-35.17	69.65	110.69	41.04
5 725.00	77.25	Peak	H	34.05	-35.15	76.15	122.23	46.08

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 785 ㎒)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

C. High Channel (5 825 ㎒)

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 850.00	73.75	Peak	H	34.30	-34.83	73.22	122.23	49.01
5 855.17	69.55	Peak	H	34.31	-34.84	69.02	110.78	41.76
5 875.00	59.07	Peak	H	34.35	-34.86	58.56	105.23	46.67
5 947.54	47.80	Peak	H	34.59	-34.75	47.64	68.23	20.59

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

OFDM: 802.11n_HT20 (MCS8) Band 3_ANT 1 + ANT 2

A. Low Channel (5 745 ㎒)

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 641.06	52.78	Peak	H	34.00	-35.23	51.55	68.23	16.68
5 696.56	55.90	Peak	H	34.09	-35.21	54.78	102.68	47.90
5 720.00	67.51	Peak	H	34.06	-35.16	66.41	110.83	44.42
5 725.00	76.42	Peak	H	34.05	-35.15	75.32	122.23	46.91

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 785 ㎒)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

C. High Channel (5 825 ㎒)

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 853.80	76.13	Peak	H	34.31	-34.83	75.61	113.56	37.95
5 855.40	73.86	Peak	H	34.31	-34.84	73.33	110.72	37.39
5 875.00	62.97	Peak	H	34.35	-34.86	62.46	105.23	42.77
5 931.00	51.90	Peak	H	34.52	-34.80	51.62	68.23	16.61

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

OFDM: 802.11n_HT40 (MCS8) Band 3_ANT 1 + ANT 2

A. Low Channel (5 755 ㎒)

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 648.84	55.87	Peak	H	34.00	-35.22	**54.65**	68.23	13.58
5 699.02	71.55	Peak	H	34.10	-35.21	70.44	104.50	34.06
5 718.68	84.40	Peak	H	34.06	-35.17	83.29	110.46	27.17
5 724.21	85.93	Peak	H	34.05	-35.15	84.83	120.43	35.60

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

B. High Channel (5 795 ㎒)

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 850.00	75.86	Peak	H	34.30	-34.83	75.33	122.23	46.90
5 871.03	68.32	Peak	H	34.34	-34.86	67.80	106.34	38.54
5 876.54	60.60	Peak	H	34.35	-34.87	60.08	104.09	44.01
5 971.90	52.82	Peak	H	34.60	-34.68	52.74	68.48	15.74

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

OFDM: 802.11ac_VHT80 (MCS0) Band 3_ANT 1 + ANT 2

A. Middle Channel (5 775 ㎒)

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 648.23	62.14	Peak	H	34.00	-35.22	**60.92**	68.23	7.31
5 691.65	77.05	Peak	H	34.08	-35.22	75.91	99.05	23.14
5 715.81	79.98	Peak	H	34.07	-35.18	78.87	109.65	30.78
5 723.59	82.66	Peak	H	34.05	-35.15	81.56	119.01	37.45
5 852.88	76.22	Peak	H	34.31	-34.83	75.70	115.66	39.96
5 871.49	74.92	Peak	H	34.34	-34.86	74.40	106.21	31.81
5 877.69	70.82	Peak	H	34.36	-34.87	70.31	103.24	32.93
5 926.17	57.00	Peak	H	34.50	-34.82	56.68	68.23	11.55

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

Remark;

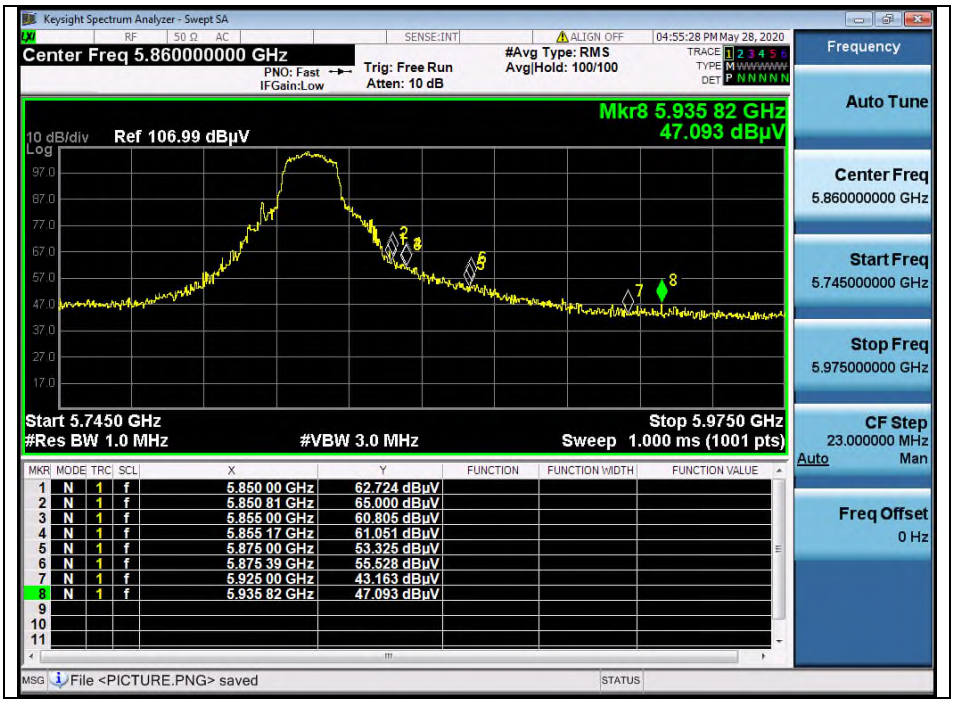
1. "*" means the restricted band.
2. Radiated emissions measured in frequency above 1 000 ㎒ were made with an instrument using Peak / average detector mode if frequency was in restricted band. Otherwise the frequency was out of restricted band, only peak detector should be used.
3. Actual = Reading + AF + AMP + CL
4. If frequency was out of restricted band, the calculation method for peak limit is same as below.
   68.23 dB㎶/m = EIRP - 20 log (d) + 104.77 = -27 - 20 log (3) + 104.77
5. In case of the emissions within ±75 ㎒ from band edge of band 3, limit should be adjusted to emission mask of 15.407(4)(i).
6. According to § 15.31(o), emission levels are not reported much lower than the limits by over 20 dB.
7. The maximized peak measured value complies with the average limit, to perform an average measurement is unnecessary.

- Test plots

OFDM: 802.11a (6 Mbps)_ANT 1

Low channel Band edge (Peak) - Band 3

High channel Band edge (Peak) - Band 3



OFDM: 802.11a (6 Mbps)_ANT 2

Low channel Band edge (Peak) - Band 3

High channel Band edge (Peak) - Band 3

OFDM: 802.11n_HT20 (MCS8)_ANT 1 + ANT 2

Low channel Band edge (Peak) - Band 3

High channel Band edge (Peak) - Band 3

OFDM: 802.11n_HT40 (MCS8)_ANT 1 + ANT 2

Low channel Band edge (Peak) - Band 3

High channel Band edge (Peak) - Band 3

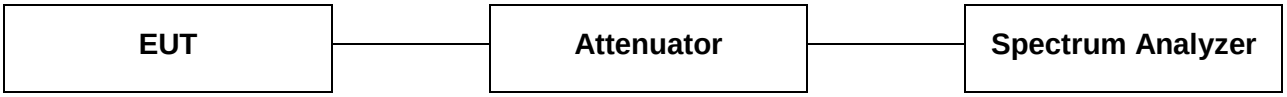
OFDM: 802.11ac_VHT80 (MCS0)_ANT 1 + ANT 2

Middle channel Band edge (Peak) - Band 3

Middle channel Band edge (Peak) - Band 3

3. 26 dB 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.

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 %.

3.4. Test Result

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

Test mode: 11a

Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)	
				ANT 1	ANT 2
U-NII 3	5 745	149	6	21.939	21.534
	5 785	157		21.766	21.129
	5 825	165		21.418	21.303

Test mode: 11n_HT20

Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)	
				ANT 1	ANT 2
U-NII 3	5 745	149	MCS8	26.223	24.949
	5 785	157		24.139	21.245
	5 825	165		26.049	22.692

Test mode: 11n_HT40

Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)	
				ANT 1	ANT 2
U-NII 3	5 755	151	MCS8	46.310	40.058
	5 795	159		47.815	39.480

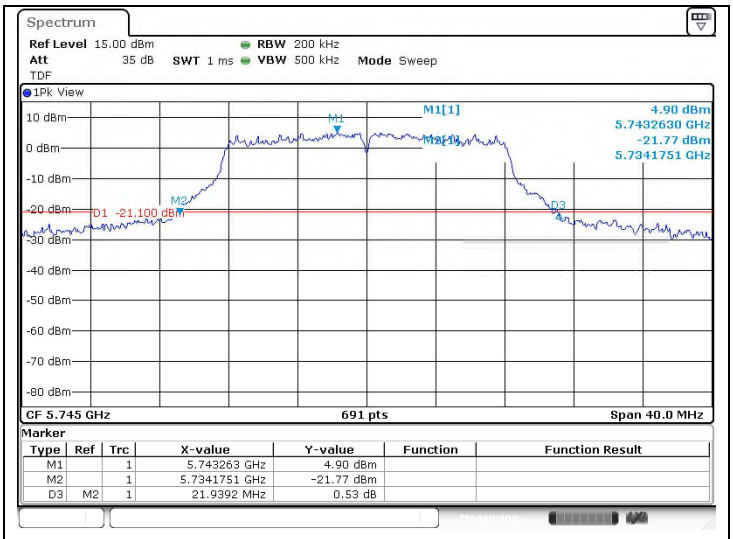
Test mode: 11ac_VHT80

Band	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)	
				ANT 1	ANT 2
U-NII 3	5 775	155	MCS0	82.000	81.968

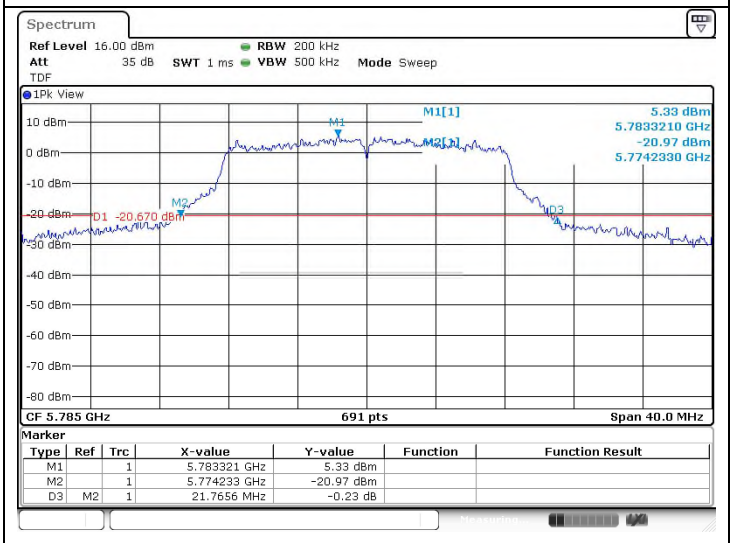
- Test plots

802.11a (Band 3)_ANT 1

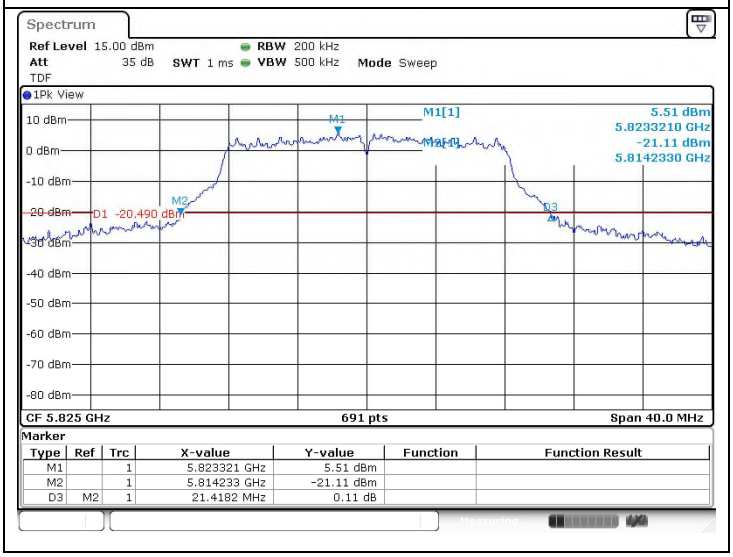
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

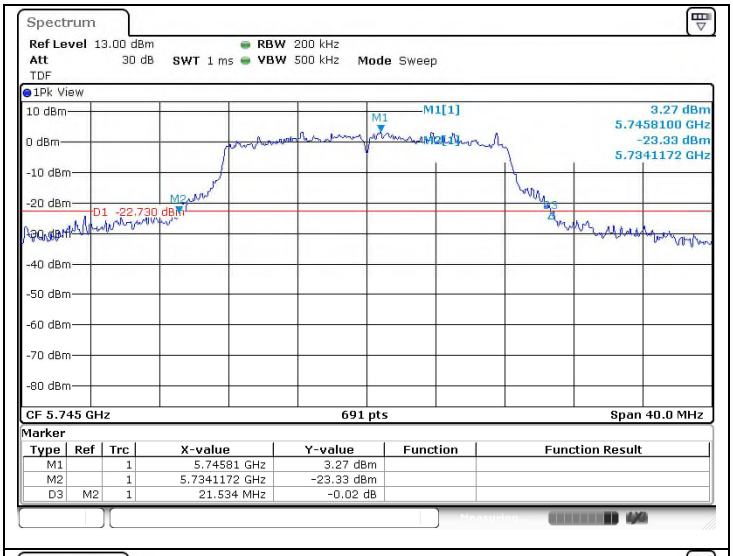


High Channel
(5 825 ㎒)

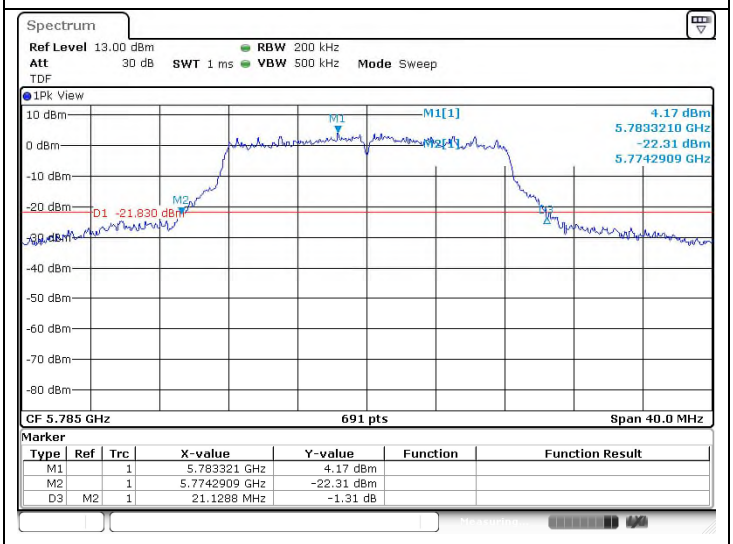


802.11a (Band 3)_ANT 2

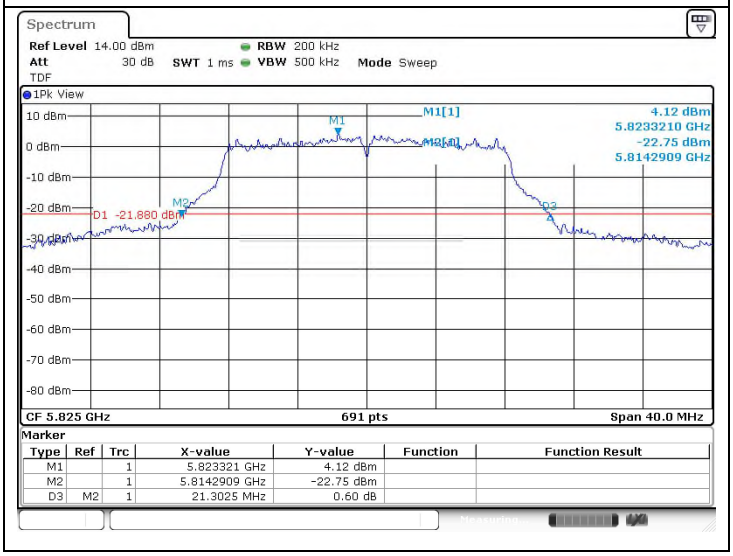
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

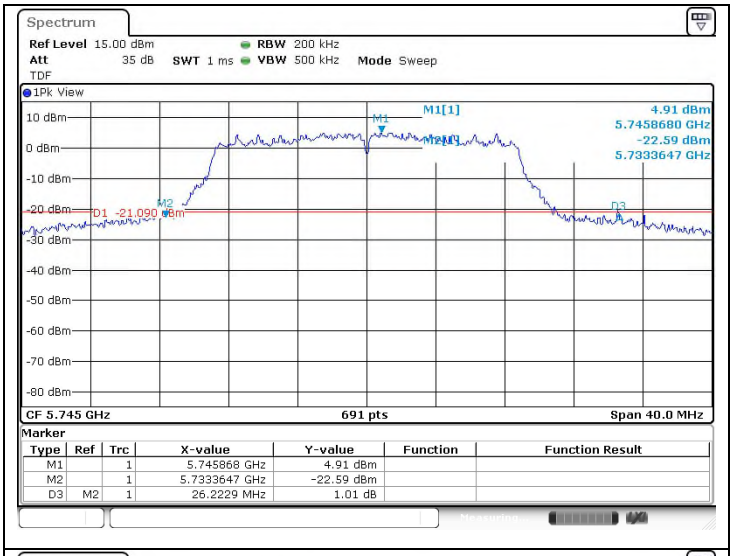


High Channel
(5 825 ㎒)

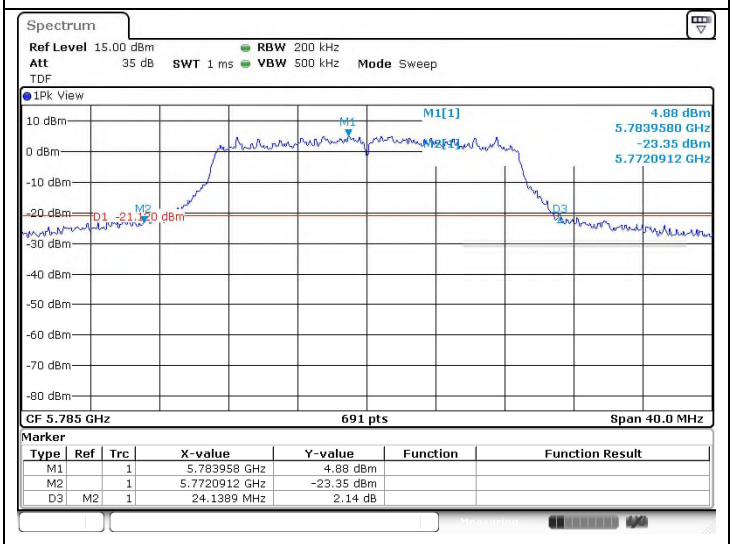


802.11n_HT20 (Band 3)_ANT 1

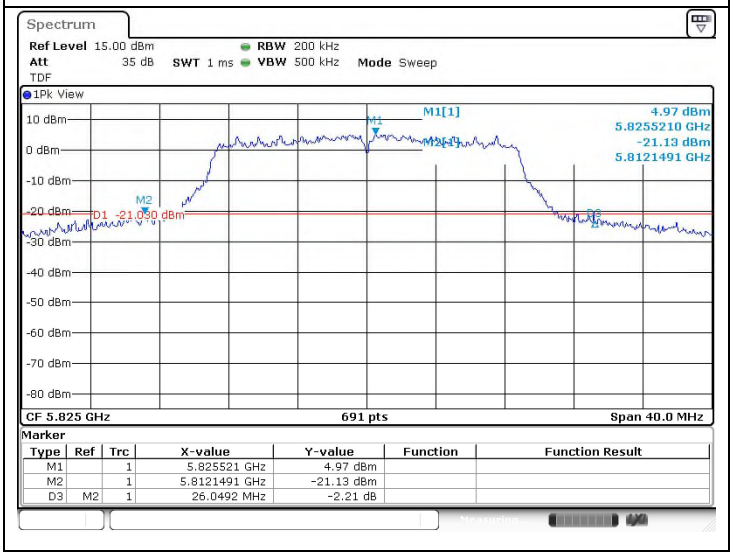
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

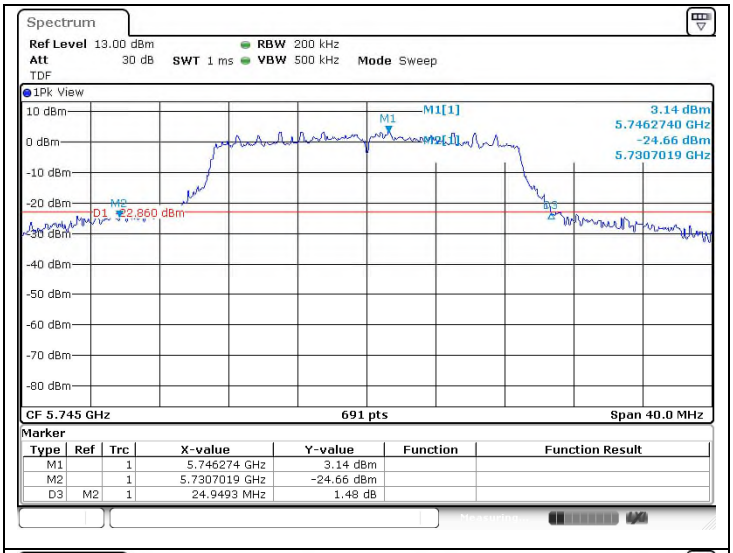


High Channel
(5 825 ㎒)

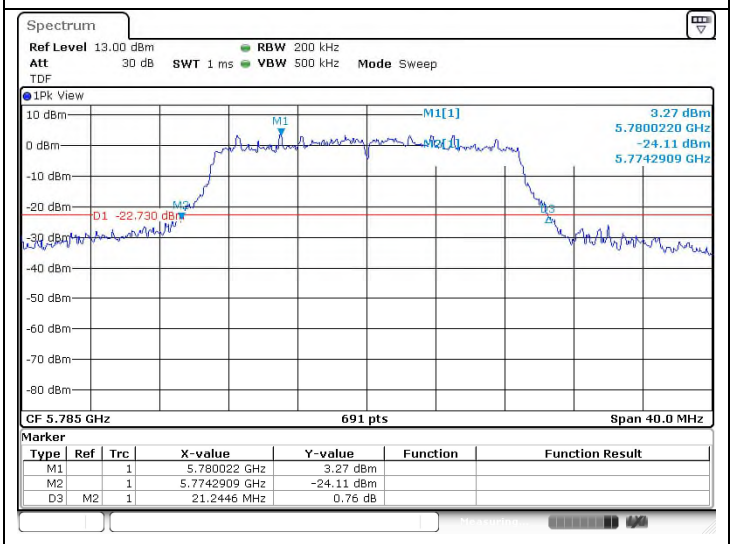


802.11n_HT20 (Band 3)_ANT 2

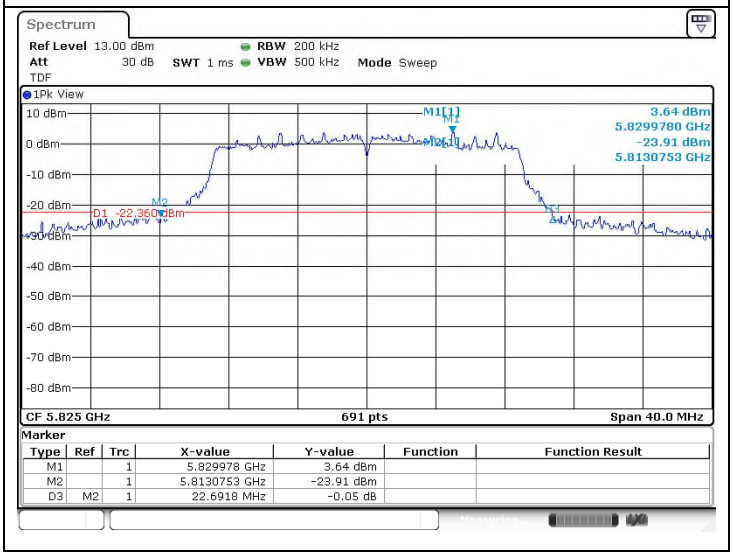
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

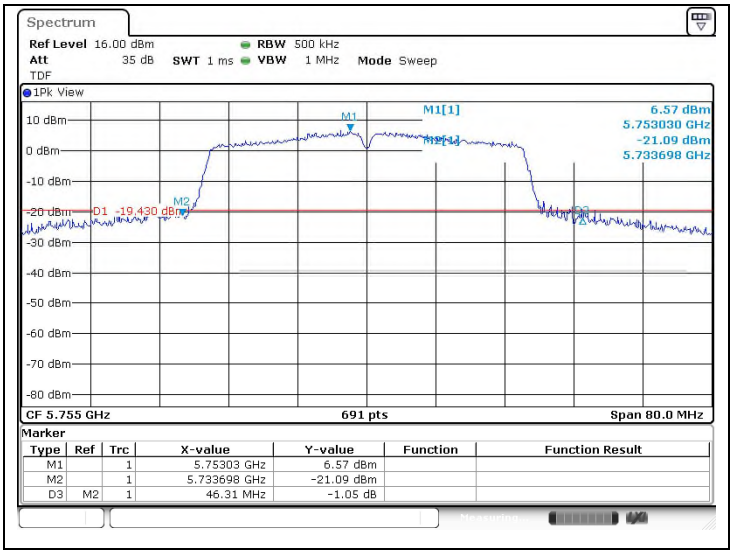


High Channel
(5 825 ㎒)

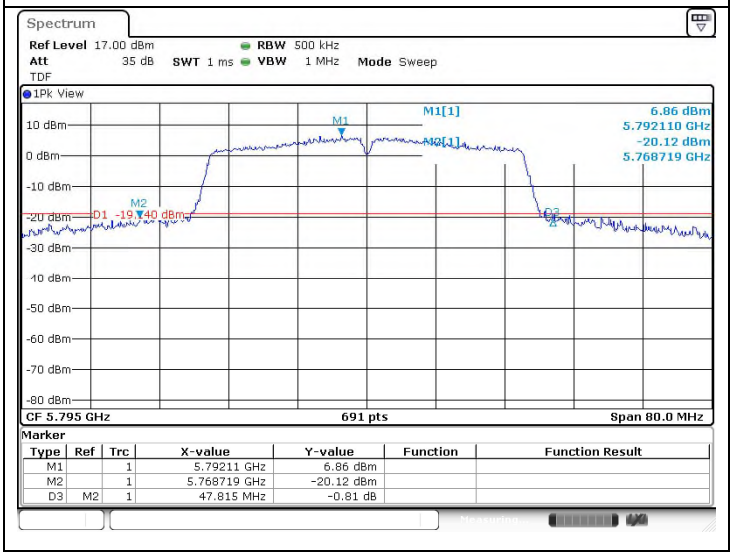


802.11n_HT40 (Band 3)_ANT 1

Low Channel
(5 755 ㎒)

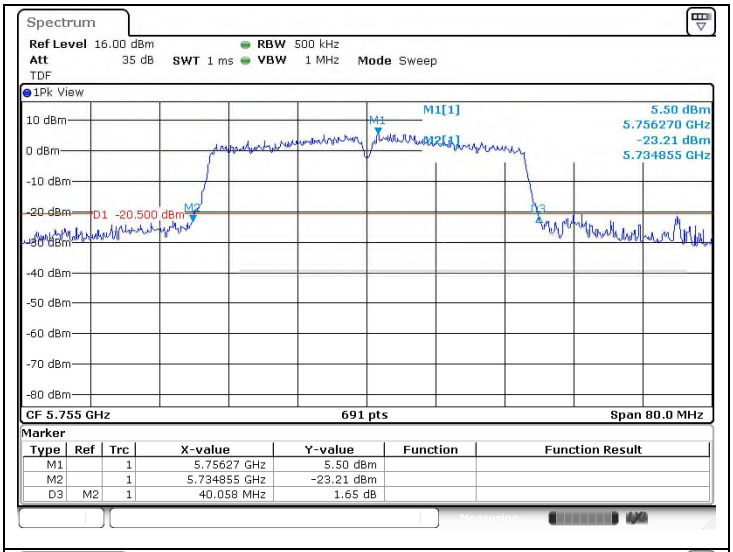


High Channel
(5 795 ㎒)

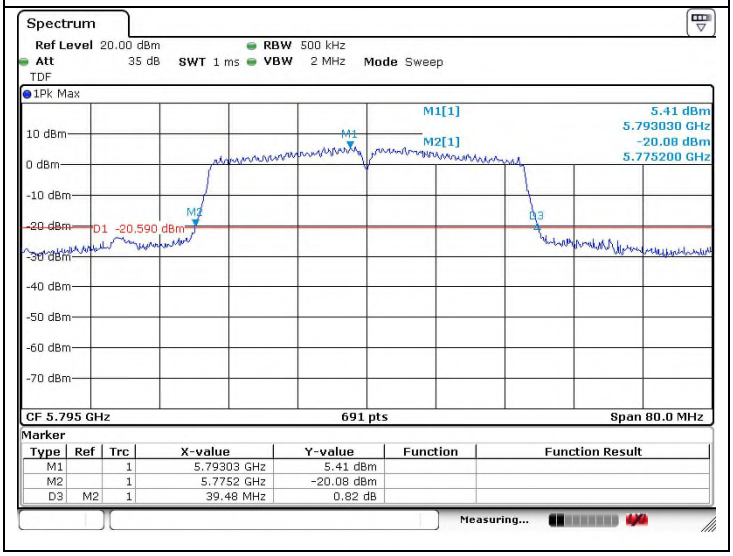


802.11n_HT40 (Band 3)_ANT 2

Low Channel
(5 755 ㎒)

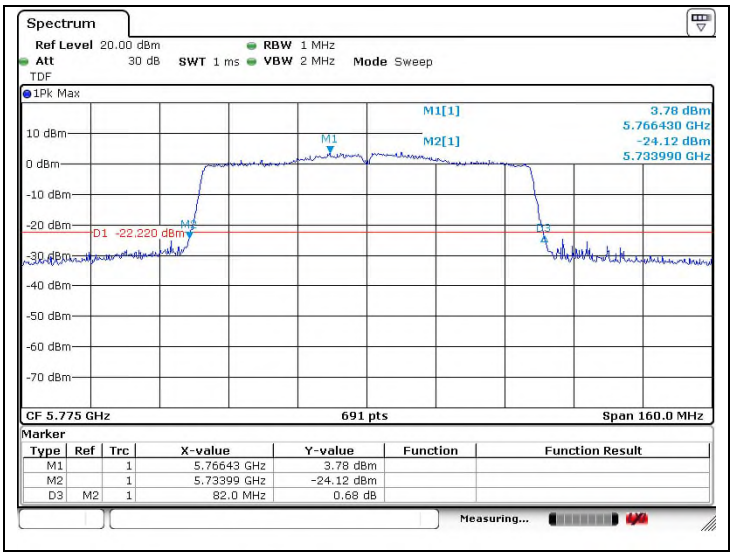


High Channel
(5 795 ㎒)



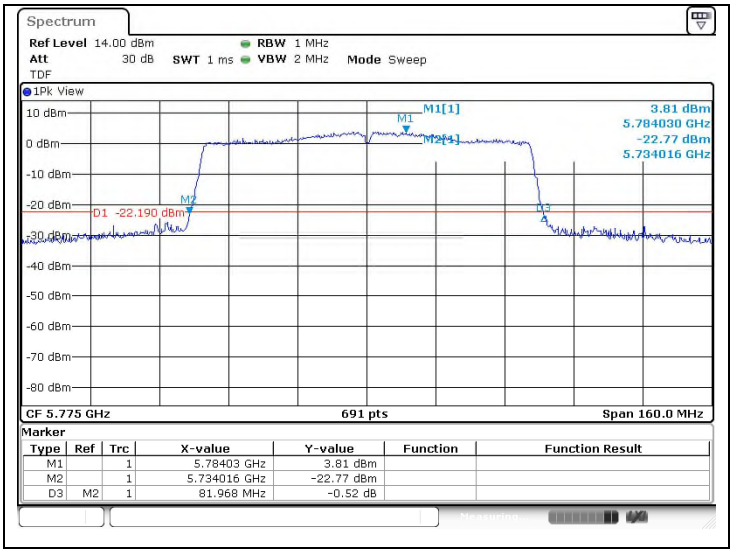
802.11ac_VHT80 (Band 3)_ANT 1

Middle Channel
(5 775 ㎒)



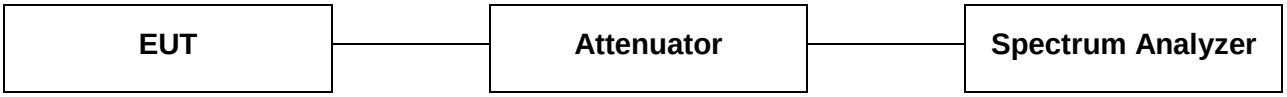
802.11ac_VHT80 (Band 3)_ANT 2

Middle Channel
(5 775 ㎒)



4. 6 dB Bandwidth

4.1. Test Setup



4.2. Limit

According to §15.407(e), within the 5.725-5.85 ㎓ band, the minimum 6 dB bandwidth of U-NII devices 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 Ⅱ.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 dB relative to the maximum level measured in the fundamental emission.

4.4. Test Result

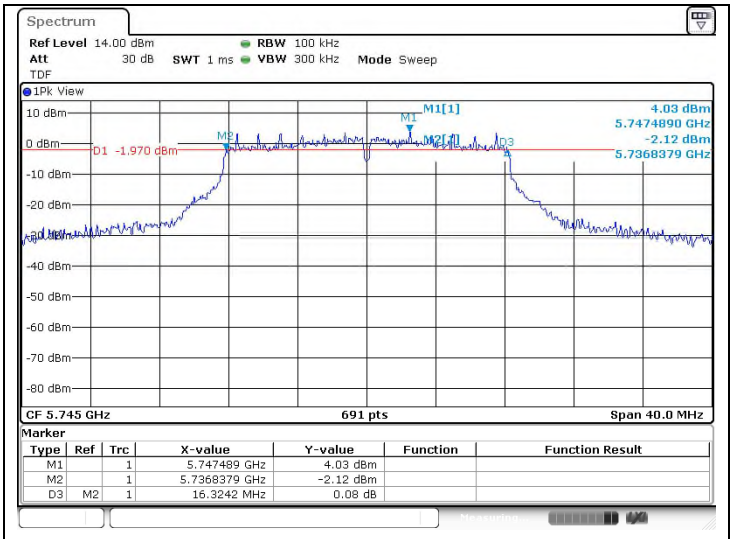
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Band	Mode	Frequency (㎒)	Ch.	Data Rate (Mbps)	6 ㏈ Bandwidth (㎒)		Minimum Bandwidth (㎑)
					ANT 1	ANT 2	
U-NII 3	11a	5 745	149	6	16.324	16.440	500
		5 785	157		16.382	16.382	
		5 825	165		16.382	16.440	
	11n_HT20	5 745	149	MCS8	17.656	17.656	
		5 785	157		17.656	17.714	
		5 825	165		17.656	17.424	
	11n_HT40	5 755	151	MCS8	36.006	36.585	
		5 795	159		35.427	35.427	
	11ac_VHT80	5 775	155	MCS0	75.485	75.485	

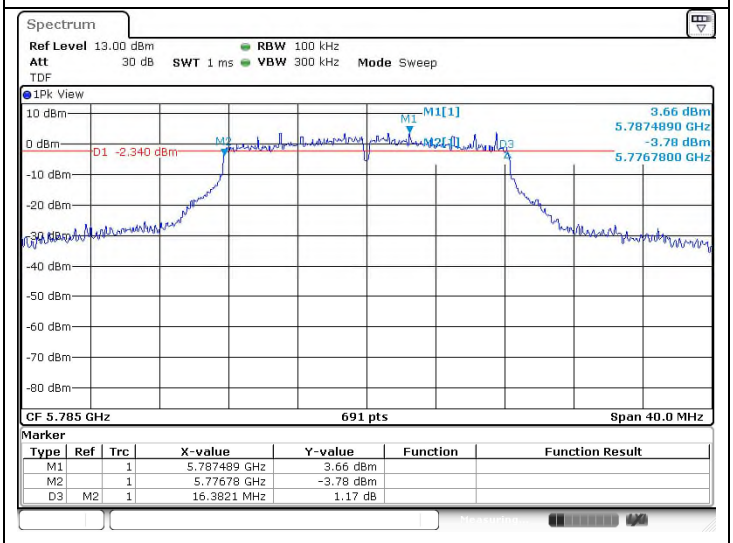
- Test plots

802.11a (Band 3)_ANT 1

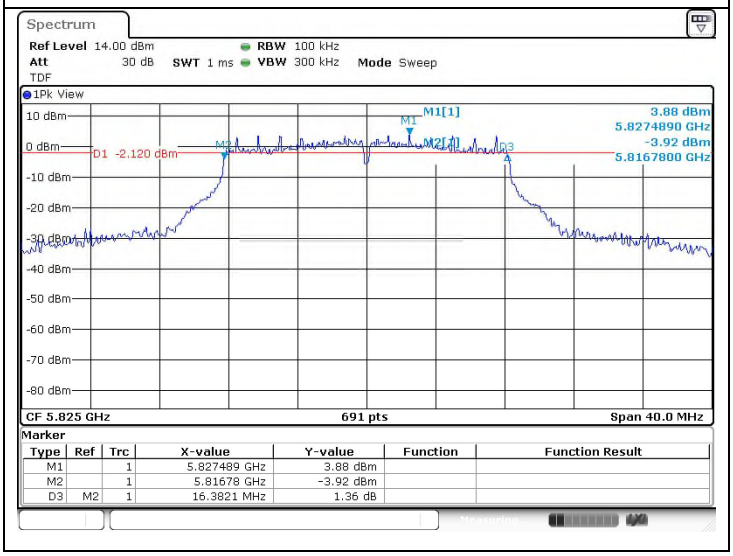
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

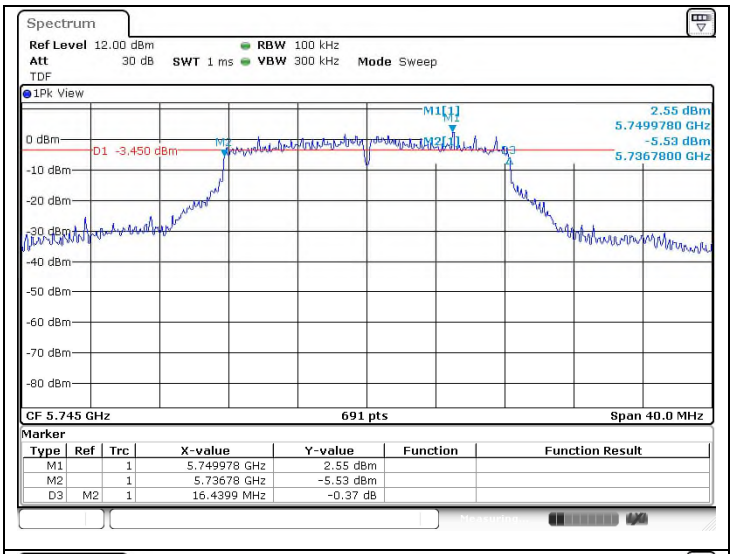


High Channel
(5 825 ㎒)

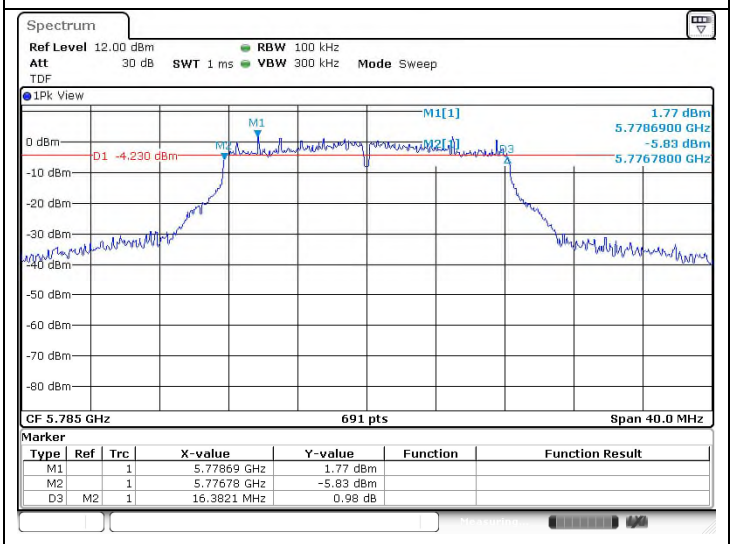


802.11a (Band 3)_ANT 2

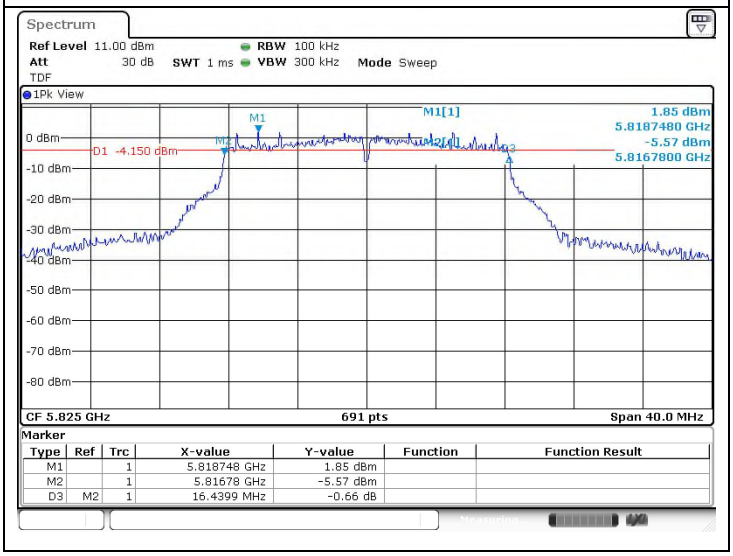
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

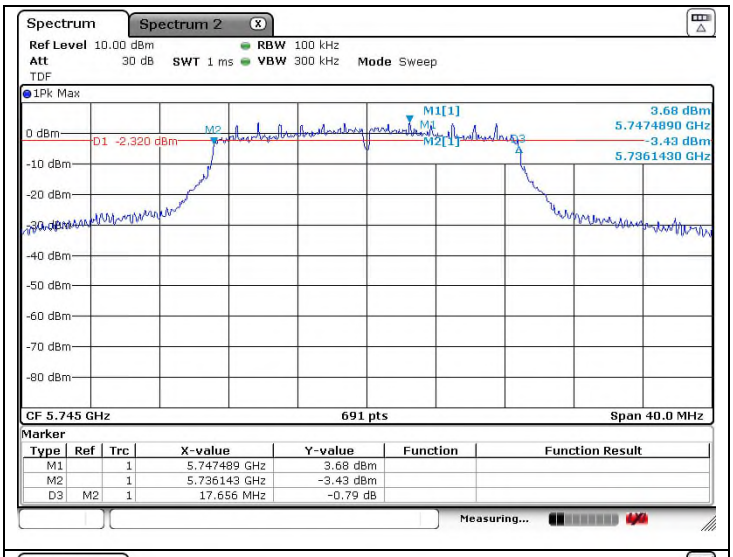


High Channel
(5 825 ㎒)

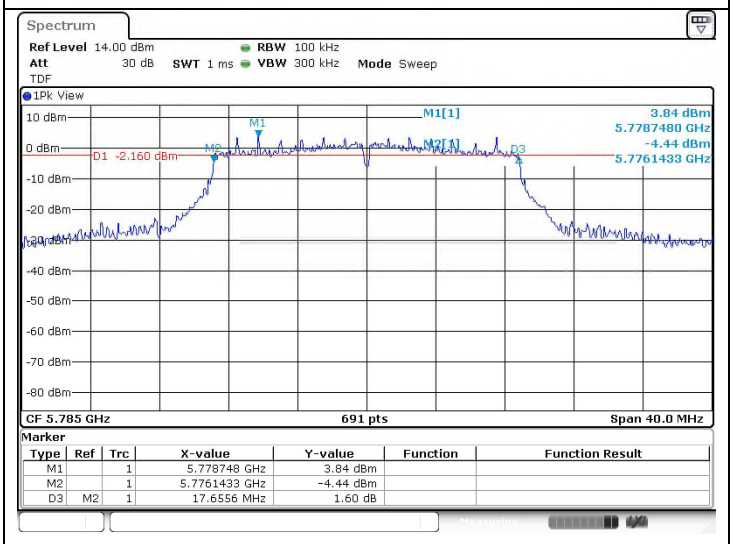


802.11n_HT20 (Band 3)_ANT 1

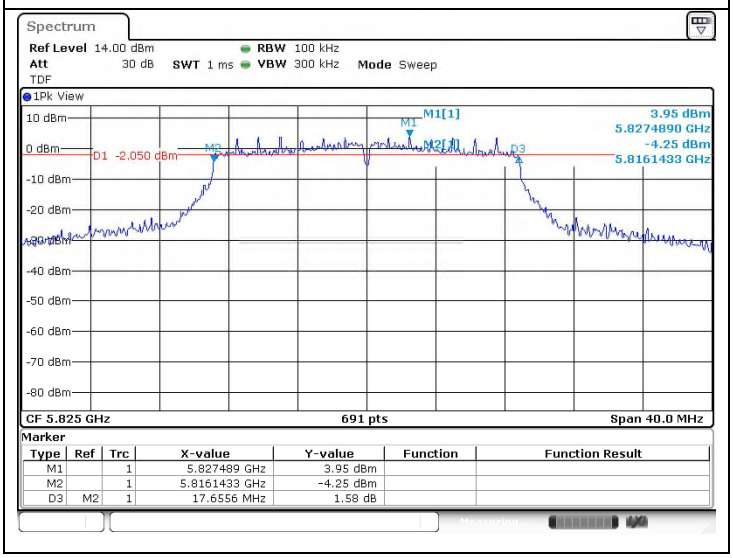
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

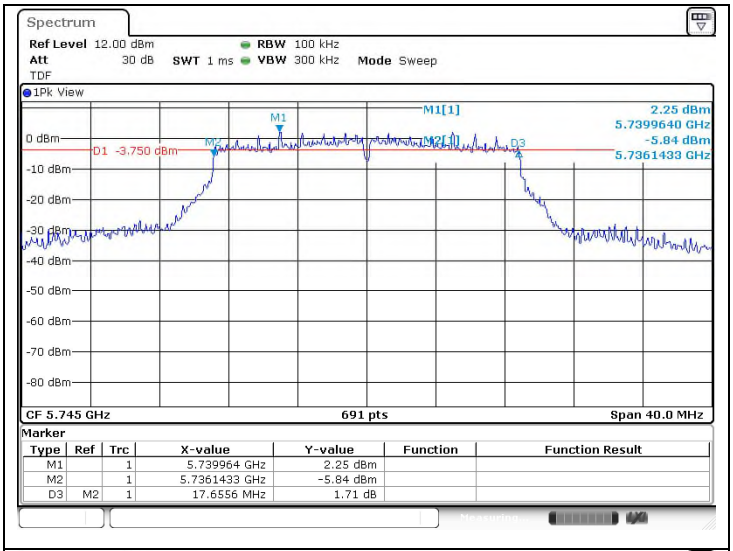


High Channel
(5 825 ㎒)

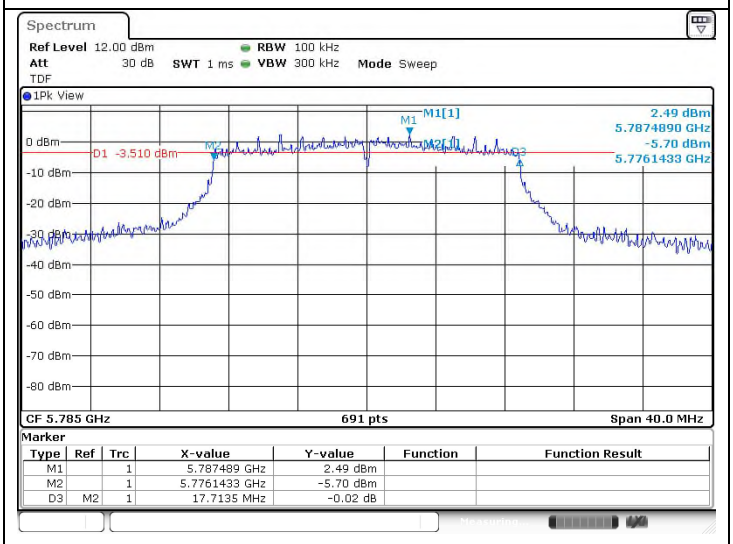


802.11n_HT20 (Band 3)_ANT 2

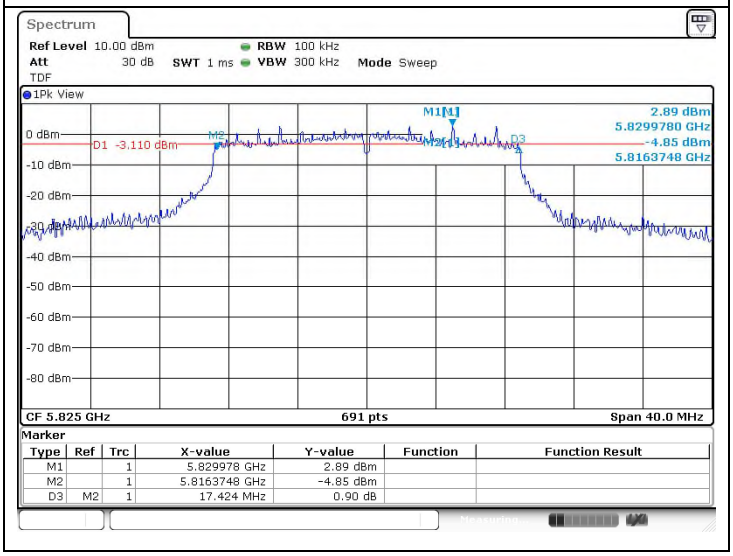
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

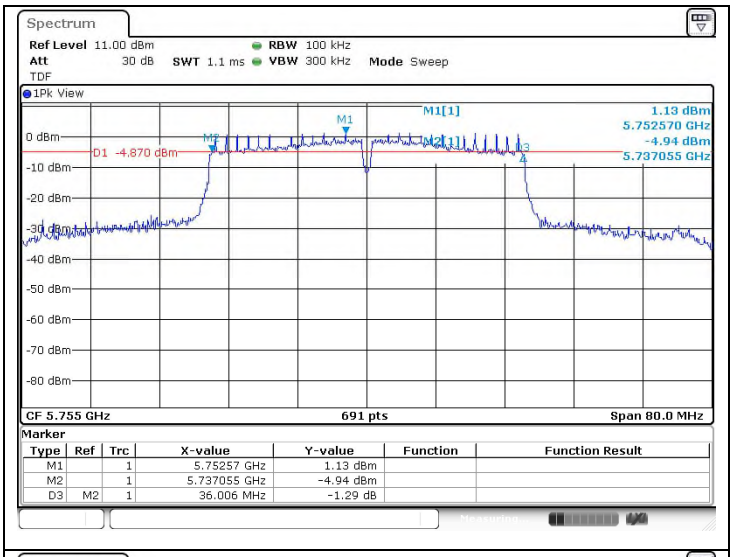


High Channel
(5 825 ㎒)

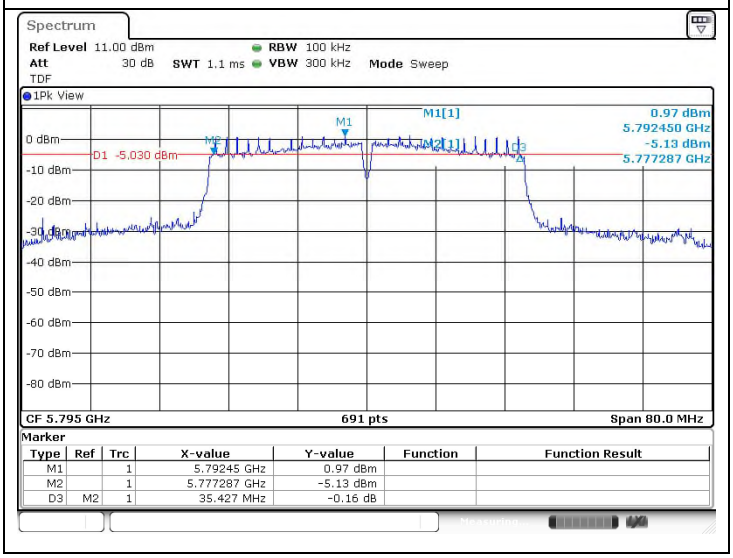


802.11n_HT40 (Band 3)_ANT 1

Low Channel
(5 755 ㎒)

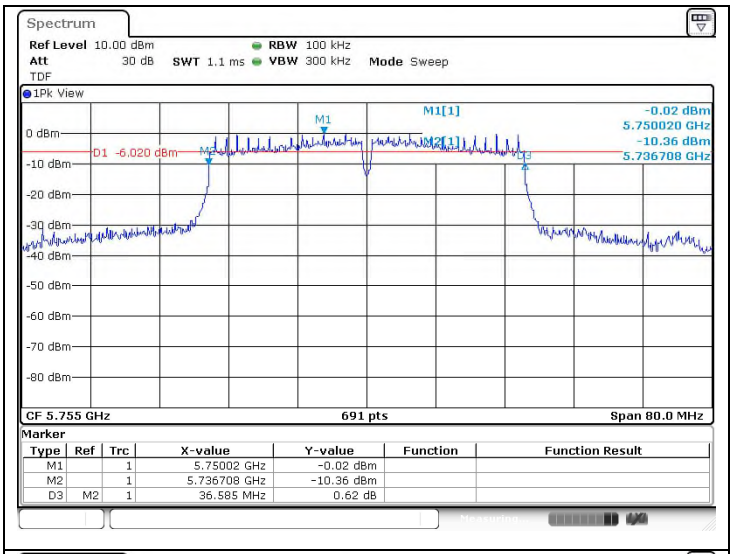


High Channel
(5 795 ㎒)

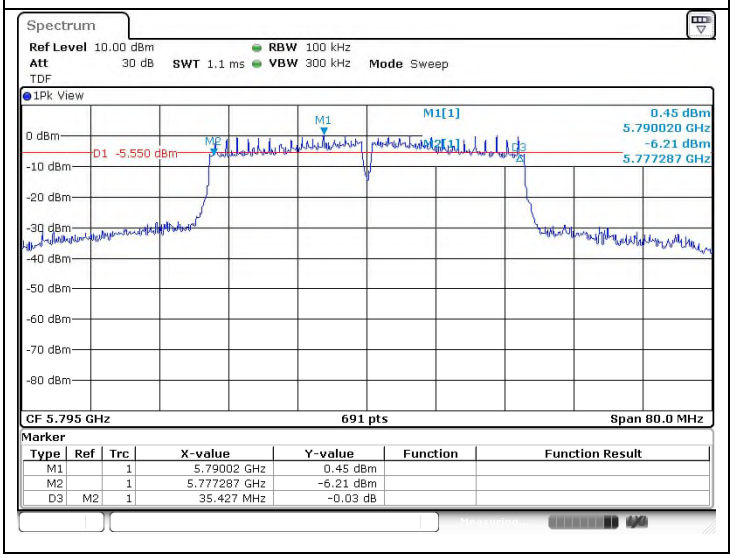


802.11n_HT40 (Band 3)_ANT 2

Low Channel
(5 755 ㎒)

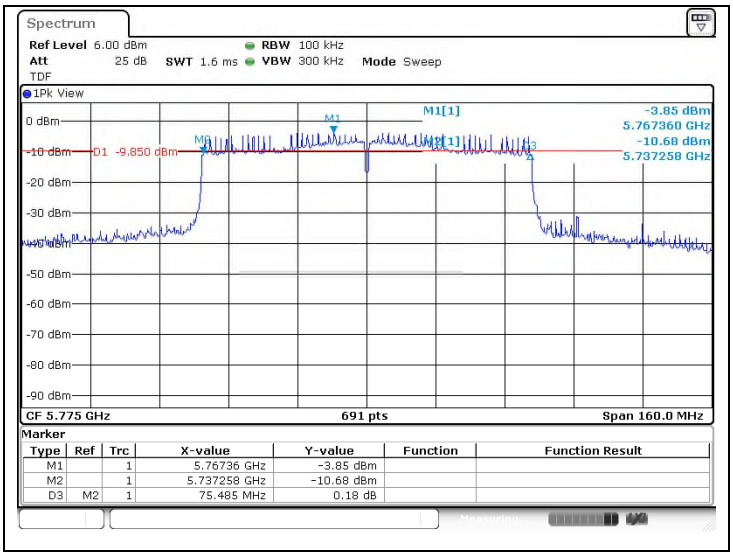


High Channel
(5 795 ㎒)



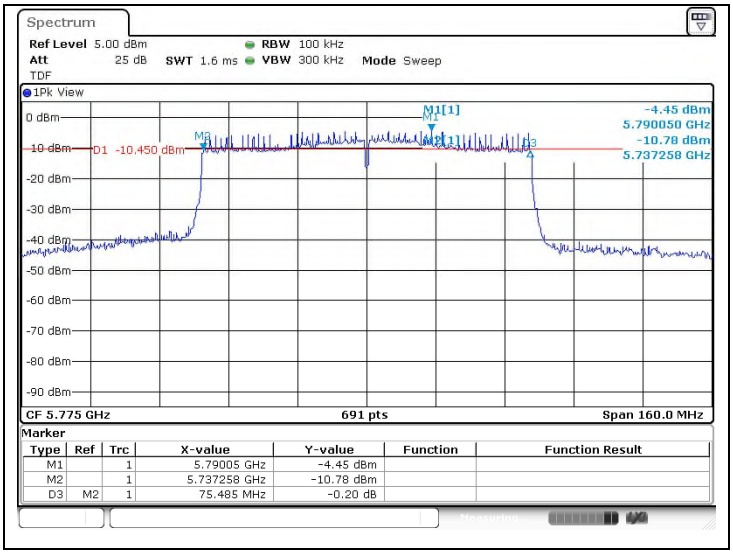
802.11ac_VHT80 (Band 3)_ANT 1

Middle Channel
(5 775 ㎒)



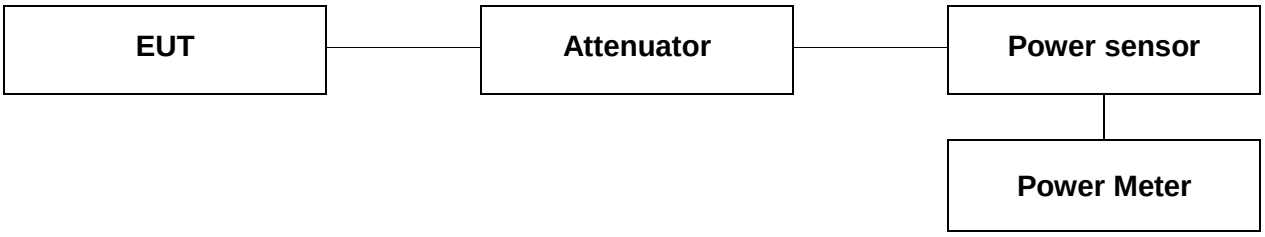
802.11ac_VHT80 (Band 3)_ANT 2

Middle Channel
(5 775 ㎒)



5. Maximum Conducted Output Power

5.1. Test Setup



5.2. Limit

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.

5.3. 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 Ⅱ.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 ㏈m 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_ANT 1

Band	Frequency (㎒)	Data Rate (Mbps)	Average Power (dB m)	Duty Cycle Correction Factor (dB)	Average Power Result (dB m)	Limit (dB m)
U-NII 3	5 745	6	13.70	0.30	14.00	30
	5 785		14.00		14.30	
	5 825		13.51		13.81	

Test mode: 11a_ANT 2

Band	Frequency (㎒)	Data Rate (Mbps)	Average Power (dB m)	Duty Cycle Correction Factor (dB)	Average Power Result (dB m)	Limit (dB m)
U-NII 3	5 745	6	13.19	0.30	13.49	30
	5 785		12.46		12.76	
	5 825		12.49		12.79	

Test mode: 11n_HT20_ANT 1 + ANT 2

Band	Frequency (㎒)	Data Rate (Mbps)	Average Power (dB m)		
			ANT 1	ANT 2	ANT 1 + ANT 2
U-NII 3	5 745	MCS8	13.52	13.01	16.28
	5 785		13.85	13.04	16.47
	5 825		13.94	12.99	16.50

Band	Frequency (㎒)	Data Rate (Mbps)	Average Power (dB m)	Duty Cycle Correction Factor (dB)	Average Power Result (dB m)	Limit (dB m)
			ANT 1 + ANT 2		ANT 1 + ANT 2	
U-NII 3	5 745	MCS8	16.28	0.59	16.87	28.73
	5 785		16.47		17.06	
	5 825		16.50		17.09	

Test mode: 11n_HT40_ANT 1 + ANT 2

Band	Frequency (㎒)	Data Rate (Mbps)	Average Power (dB m)		
			ANT 1	ANT 2	ANT 1 + ANT 2
U-NII 3	5 755	MCS8	13.27	12.21	15.78
	5 795		13.04	11.64	15.41

Band	Frequency (㎒)	Data Rate (Mbps)	Average Power (dB m)	Duty Cycle Correction Factor (dB)	Average Power Result (dB m)	Limit (dB m)
			ANT 1 + ANT 2		ANT 1 + ANT 2	
U-NII 3	5 755	MCS8	15.78	0.62	16.40	28.73
	5 795		15.41		16.03	

Test mode: 11ac_VHT80_ANT 1 + ANT 2

Band	Frequency (㎒)	Data Rate (Mbps)	Average Power (㏈m)		
			ANT 1	ANT 2	ANT 1 + ANT 2
U-NII 3	5 775	MCS0	10.95	9.56	13.32

Band	Frequency (㎒)	Data Rate (Mbps)	Average Power (㏈m)	Duty Cycle Correction Factor (㏈)	Average Power Result (㏈m)	Limit (㏈m)
			ANT 1 + ANT 2		ANT 1 + ANT 2	
U-NII 3	5 775	MCS0	13.32	1.86	15.18	28.73

Remark;

1. 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)}

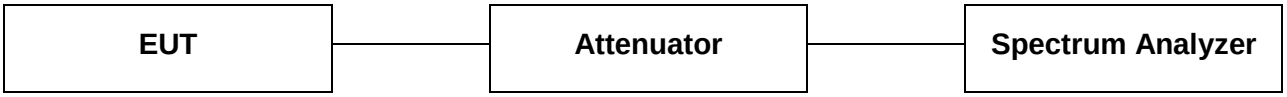
Average Power Result (㏈m) = Average Power (㏈m) + Duty Cycle Correction Factor (㏈)

2. According to 15.407(a), reduced limit if directional gain exceed 6 ㏈i are used.

ANT 1 + ANT 2 Gain= 7.27 ㏈i
Amount in ㏈ that the directional gain of the antenna exceeds 6 ㏈i: 6 ㏈i - 7.27 ㏈i = -1.27 ㏈i.
Therefore, the limit is 28.73, which is reduced from 30 to 1.27.

6. Peak Power Spectral Density

6.1. Test Setup



6.2. Limit

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.

6.3. 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 Ⅱ.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 10 log(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 10 log(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.

6.4. Test Result

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

Test mode: 11a_ANT 1

Band	Frequency (㎒)	Data Rate (Mbps)	PPSD (dB m)	Duty Cycle Correction Factor (dB)	Final PPSD (dB m)	Limit (dB m/500 ㎑)
U-NII 3	5 745	6	2.13	0.30	2.43	30
	5 785		2.26		2.56	
	5 825		2.28		2.58	

Test mode: 11a_ANT 2

Band	Frequency (㎒)	Data Rate (Mbps)	PPSD (dB m)	Duty Cycle Correction Factor (dB)	Final PPSD (dB m)	Limit (dB m/500 ㎑)
U-NII 3	5 745	6	-0.27	0.30	0.03	30
	5 785		-0.39		-0.09	
	5 825		-0.17		0.13	

Test mode: 11n_HT20_ANT 1 + ANT 2

Band	Frequency (㎒)	Data Rate (Mbps)	PPSD (dB m)		
			ANT 1	ANT 2	ANT 1 + ANT 2
U-NII 3	5 745	MCS8	1.88	-0.45	3.88
	5 785		1.00	-0.89	3.17
	5 825		1.72	-0.94	3.60

Band	Frequency (㎒)	Data Rate (Mbps)	PPSD (dB m)	Duty Cycle Correction Factor (dB)	Final PPSD (dB m)	Limit (dB m/500 ㎑)
			ANT 1 + ANT 2		ANT 1 + ANT 2	
U-NII 3	5 745	MCS8	3.88	0.59	4.47	28.73
	5 785		3.17		3.76	
	5 825		3.60		4.19	

Test mode: 11n_HT40_ANT 1 + ANT 2

Band	Frequency (㎒)	Data Rate (Mbps)	PPSD (dB m)		
			ANT 1	ANT 2	ANT 1 + ANT 2
U-NII 3	5 755	MCS8	-1.61	-4.39	0.23
	5 795		-1.89	-4.16	0.13

Band	Frequency (㎒)	Data Rate (Mbps)	PPSD (dB m)	Duty Cycle Correction Factor (dB)	Final PPSD (dB m)	Limit (dB m/500 ㎑)
			ANT 1 + ANT 2		ANT 1 + ANT 2	
U-NII 3	5 755	MCS8	0.23	0.62	0.85	28.73
	5 795		0.13		0.75	

Test mode: 11ac_VHT80_ANT 1 + ANT 2

Band	Frequency (㎒)	Data Rate (Mbps)	PPSD (dB m)		
			ANT 1	ANT 2	ANT 1 + ANT 2
U-NII 3	5 775	MCS0	-7.54	-9.79	-5.51

Band	Frequency (㎒)	Data Rate (Mbps)	PPSD (dB m)	Duty Cycle Correction Factor (dB)	Final PPSD (dB m)	Limit (dB m/500 ㎑)
			ANT 1 + ANT 2		ANT 1 + ANT 2	
U-NII 3	5 775	MCS0	-5.51	1.86	-3.65	28.73

Remark;

1. 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)}

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

2. According to 15.407(a), reduced limit if directional gain exceed 6 dB i are used

ANT 1 + ANT 2 Gain= 7.27 dB i

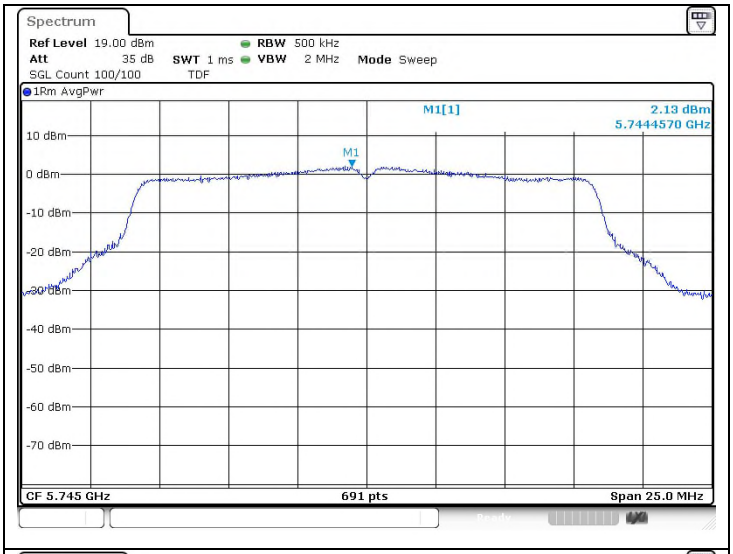
Amount in dB that the directional gain of the antenna exceeds 6 dB i: 6 dB i - 7.27 dB i = -1.27 dB i.

Therefore, the limit is 28.73, which is reduced from 30 to 1.27.

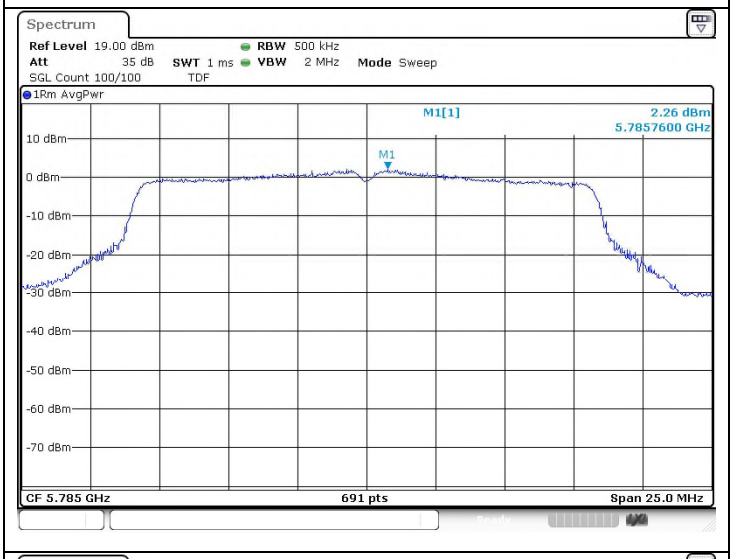
- Test plots

OFDM: 802.11a (Band 3)_ANT 1

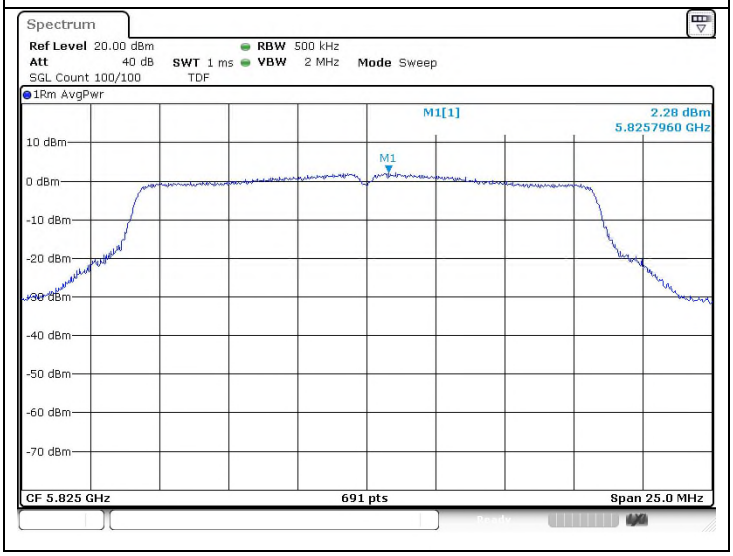
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

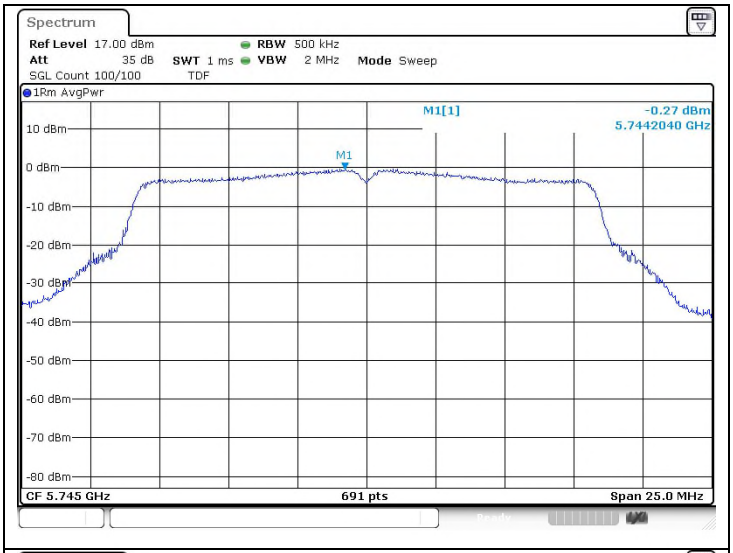


High Channel
(5 825 ㎒)

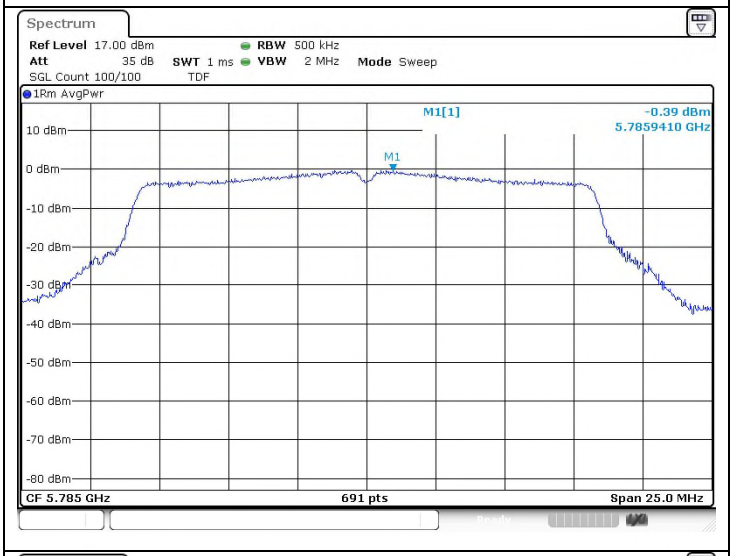


OFDM: 802.11a (Band 3)_ANT 2

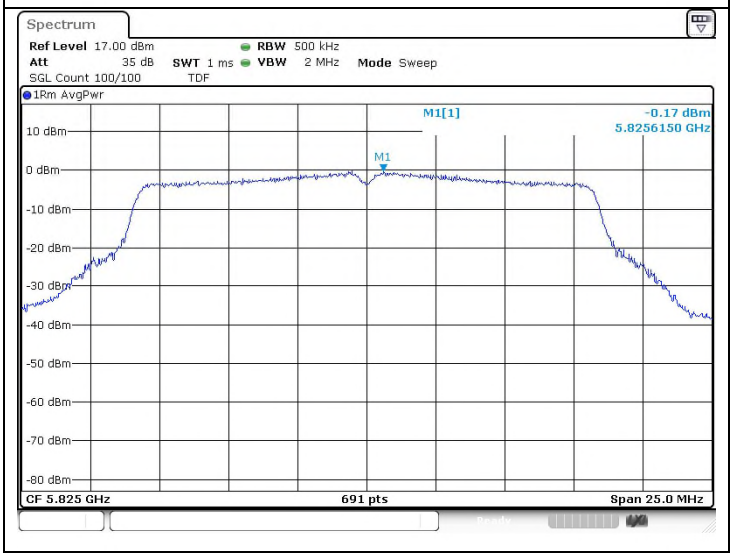
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

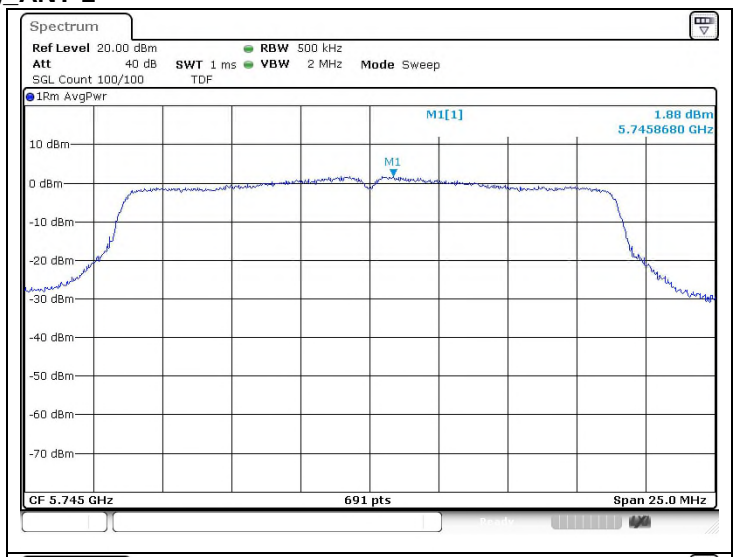


High Channel
(5 825 ㎒)

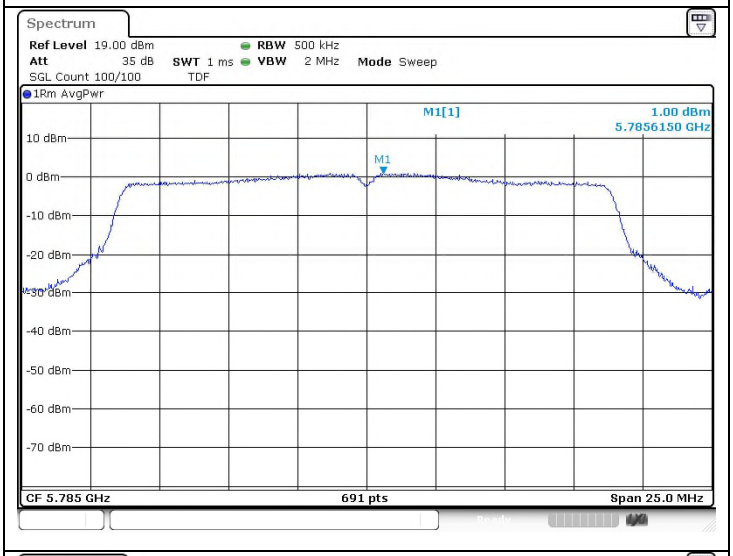


OFDM: 802.11n_HT20 (Band 3)_ANT 1

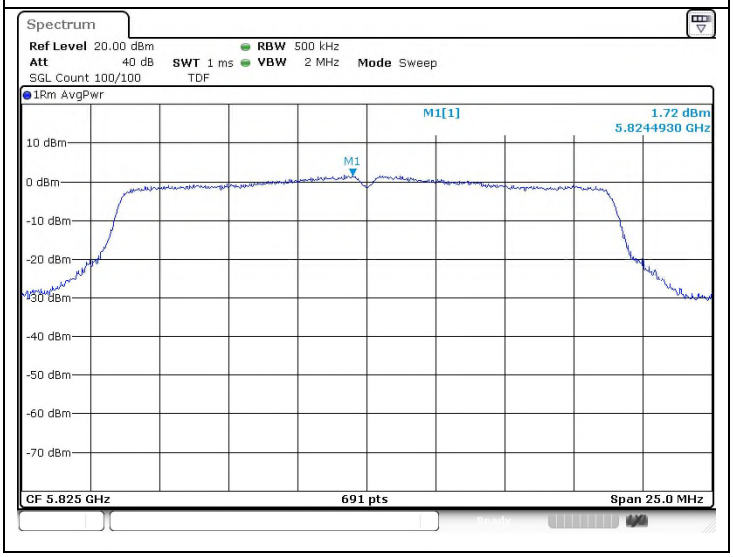
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

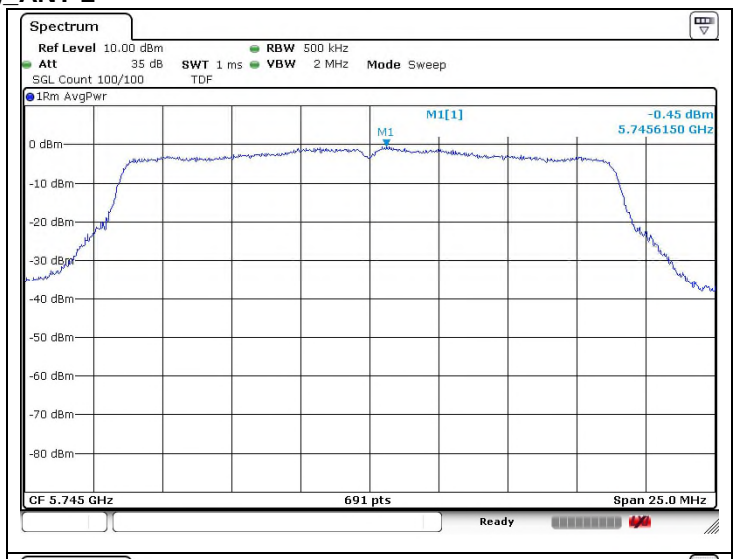


High Channel
(5 825 ㎒)

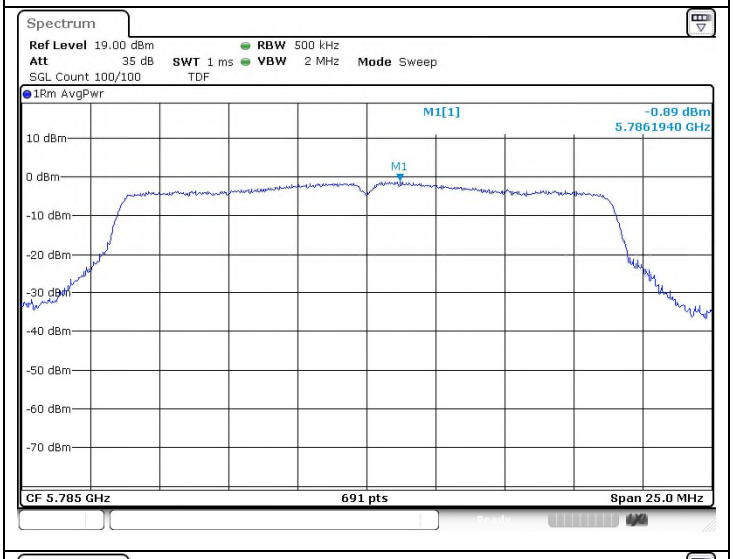


OFDM: 802.11n_HT20 (Band 3)_ANT 2

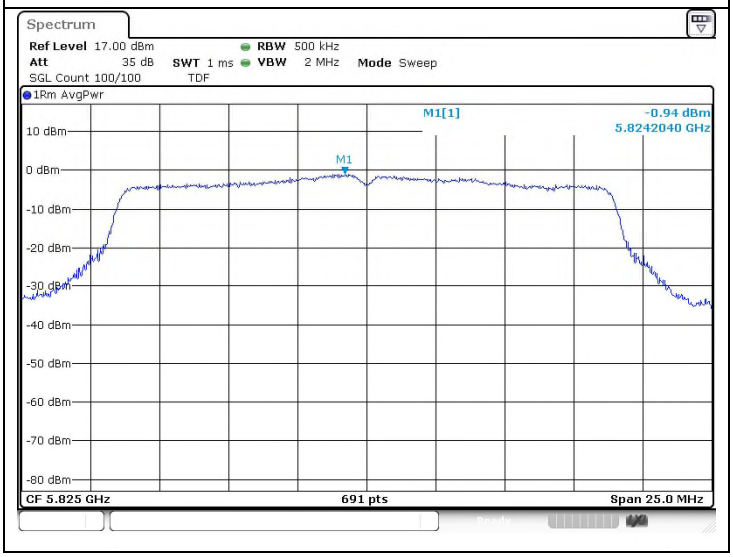
Low Channel
(5 745 ㎒)



Middle Channel
(5 785 ㎒)

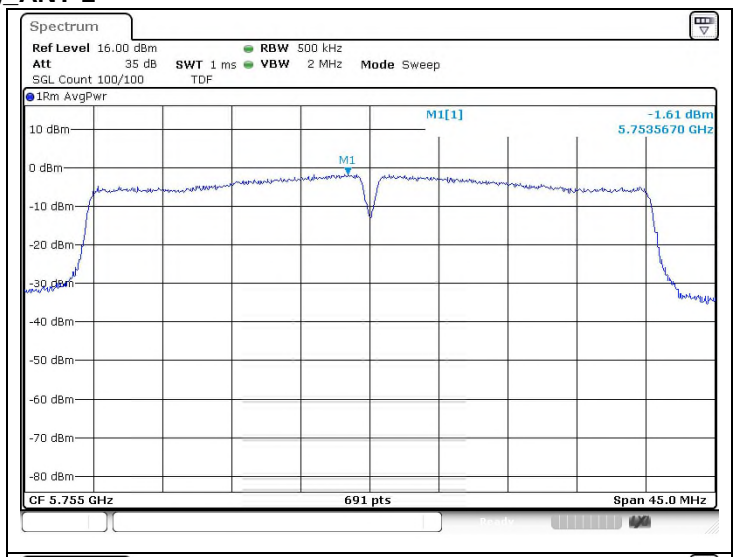


High Channel
(5 825 ㎒)

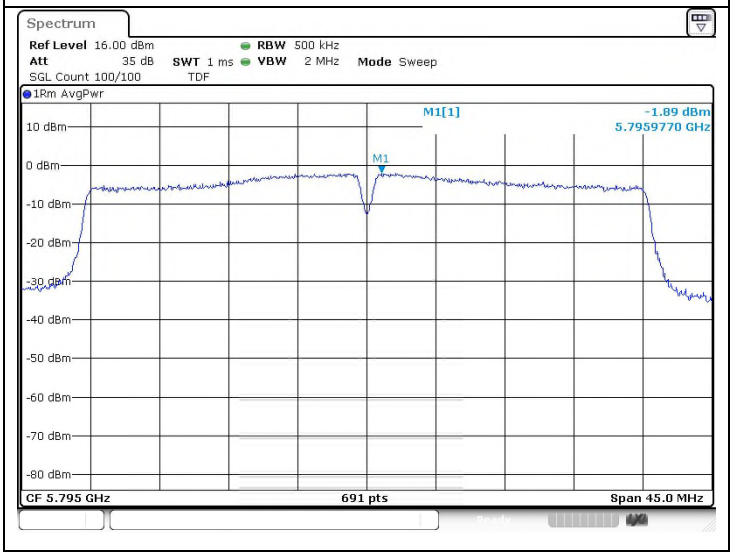


OFDM: 802.11n_HT40 (Band 3)_ANT 1

Low Channel
(5 755 ㎒)

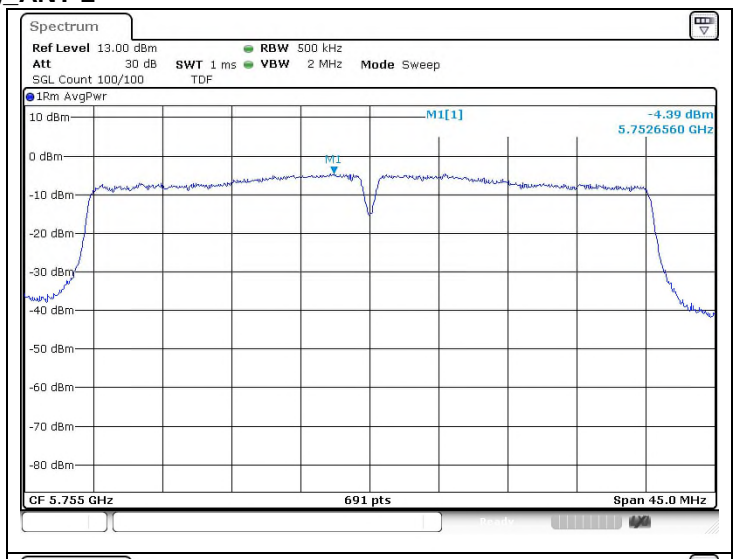


High Channel
(5 795 ㎒)

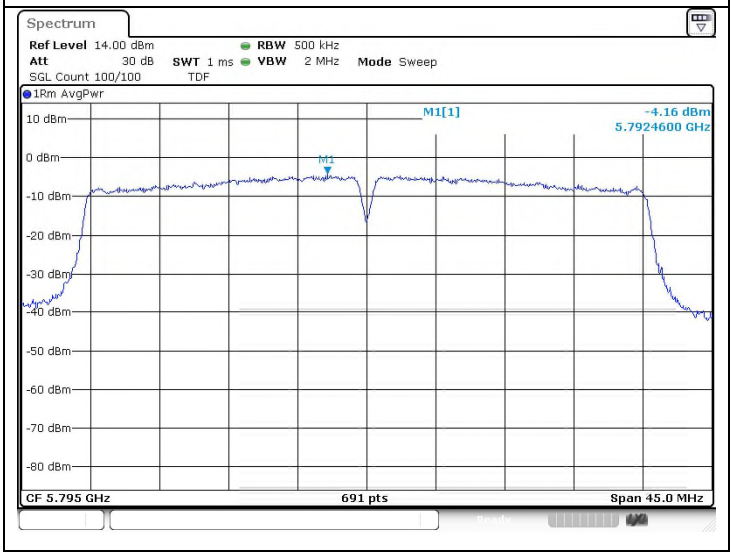


OFDM: 802.11n_HT40 (Band 3)_ANT 2

Low Channel
(5 755 ㎒)

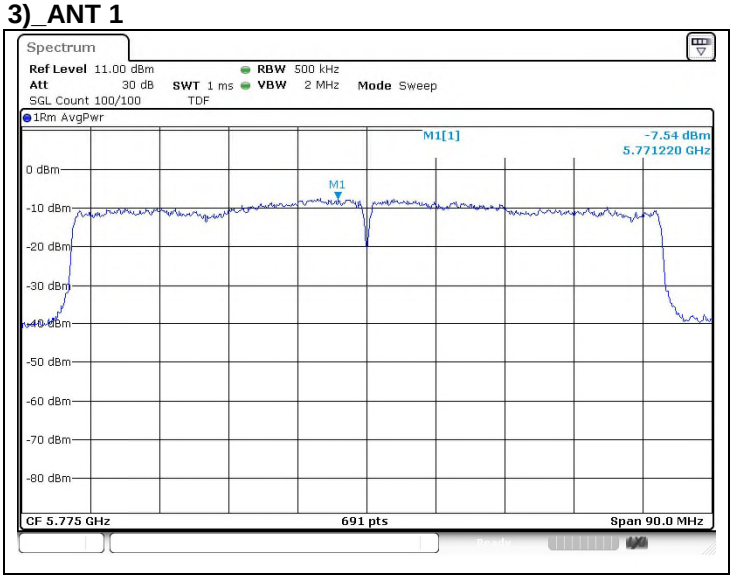


High Channel
(5 795 ㎒)



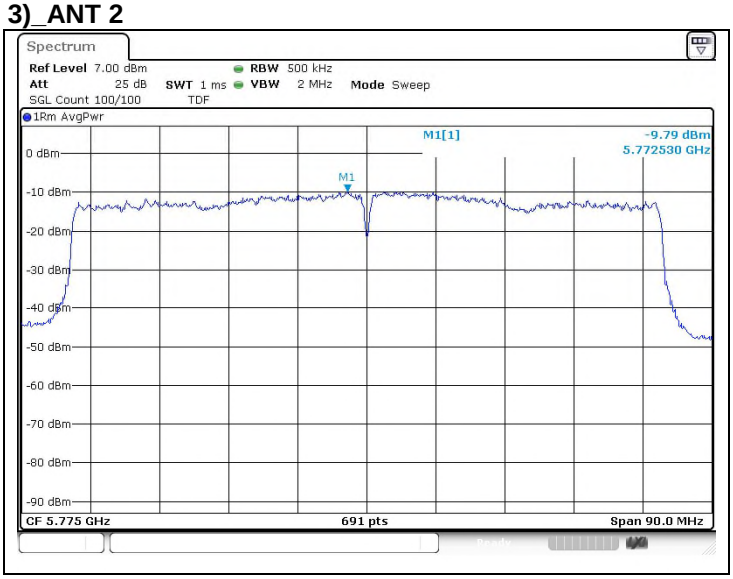
OFDM: 802.11ac_VHT80 (Band 3)_ANT 1

Middle Channel
(5 775 ㎒)



OFDM: 802.11ac_VHT80 (Band 3)_ANT 2

Middle Channel
(5 775 ㎒)



7. Antenna Requirement

7.1. 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.

7.2. Antenna Connected Construction

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

Band	5 725 ㎒ ~ 5 850 ㎒
Mode	11a/n_HT20, HT40, 11ac_VHT20, VHT40, VHT80
ANT 1 Gain	4.70 dBi
ANT 2 Gain	3.80 dBi
ANT 1 + ANT 2 Gain	7.27 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[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/N_{ANT}$] 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 -