TEST REPORT

of

FCC Part 15 Subpart E §15.407

FCC ID: TQ8- ACBB0B0AN

Equipment Under Test	:	DISPLAY CAR SYSTEM
Model Name	:	ACBB0B0AN
Variant Model Name	:	ACBB0A7AN, ACBB2B0AN
Applicant	:	Hyundai MOBIS Co., Ltd.
Manufacturer	:	Hyundai MOBIS Co., Ltd.
Date of Test(s)	:	2015.08.26 ~ 2015.09.07
Date of Issue	:	2015.09.07

In the configuration tested, the EUT complied with the standards specified above.

Tested By: **Youngmin Park** **Date:** **2015.09.07**

Approved By: **Hyunchae You** **Date:** **2015.09.07**

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1. General information

1.1. Testing laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)
-Wireless Div. 2FL, 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.
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1.2. Details of applicant

Applicant : Hyundai MOBIS Co., Ltd.
Address : 203, Teheran-ro, Gangnam-gu, Seoul, 06141, Korea
Contact Person : Choi, Seung-Hoon
Phone No. : +82 31 260 0098

1.3. Description of EUT

Kind of Product	DISPLAY CAR SYSTEM
Model Name	ACBB0B0AN
Variant Model Name	ACBB0A7AN, ACBB2B0AN
Power Supply	DC 14.4 V (Vehicle Battery)
Frequency Range	2 402 ㎒ ~ 2 480 ㎒ (BT), 2 412 ㎒ ~ 2 462 ㎒ (11b/g/n_HT20), 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), 5 180 ㎒ ~ 5 240 ㎒ (Band 1: 11a/n_HT20, 11ac_VHT20), 5 190 ㎒ ~ 5 230 ㎒ (Band 1: 11n_HT40, 11ac_VHT40), 5 210 ㎒ (Band 1: 11ac_VHT80), 5 260 ㎒ ~ 5 320 ㎒ (Band 2A: 11a/n_HT20, 11ac_VHT20), 5 270 ㎒ ~ 5 310 ㎒ (Band 2A: 11n_HT40, 11ac_VHT40), 5 290 ㎒ (Band 2A: 11ac_VHT80), 5 500 ㎒ ~ 5 700 ㎒ (Band 2C: 11a/n_HT20, 11ac_VHT20), 5 510 ㎒ ~ 5 670 ㎒ (Band 2C: 11n_HT40, 11ac_VHT40), 5 530 ㎒ (Band 2C: 11ac_VHT80)
Modulation Technique	DSSS, OFDM, GFSK, π/4DQPSK, 8DPSK
Number of Channels	79 channel (BT), 11 channel (11b/g/n_HT20), 5 channel (Band 3: 11a/n_HT20, 11ac_VHT20), 2 channel (Band 3: 11n_HT40, 11ac_VHT40), 1 channel (Band 3: 11ac_VHT80), 4 channel (Band 1: 11a/n_HT20, 11ac_VHT20), 2 channel (Band 1: 11n_HT40, 11ac_VHT40), 1 channel (Band 1: 11ac_VHT80), 4 channel (Band 2A: 11a/n_HT20, 11ac_VHT20), 2 channel (Band 2A: 11n_HT40, 11ac_VHT40), 1 channel (Band 2A: 11ac_VHT80), 8 channel (Band 2C: 11a/n_HT20, 11ac_VHT20), 3 channel (Band 2C: 11n_HT40, 11ac_VHT40), 1 channel (Band 2C: 11ac_VHT80)
Antenna Type	Internal type
Antenna Gain	2 402 ㎒ ~ 2 480 ㎒: 2.29 ㏈i, 2 412 ㎒ ~ 2 472 ㎒: -0.09 ㏈i, 5 180 ㎒ ~ 5 320 ㎒: 4.77 ㏈i, 5 500 ㎒ ~ 5 700 ㎒: 1.68 ㏈i, 5 745 ㎒ ~ 5 825 ㎒: 2.78 ㏈i

1.4. Declaration by the manufacturer

- Client without Radar Detection and TPC.
- EUT is not supported TDWR(5.6-5.65 ㎓) band.
- WLAN & BT do not transmit simultaneously.

1.5. Test equipment list

Equipment	Manufacturer	Model	S/N	Cal Date	Cal Interval	Cal Due.
Signal Generator	Agilent	E8257D	MY51501169	Jul. 13, 2015	Annual	Jul. 13, 2016
Spectrum Analyzer	Agilent	N9030A	US51350132	Sep. 24, 2014	Annual	Sep. 24, 2015
Spectrum Analyzer	R&S	FSV30	103100	Jun. 22, 2015	Annual	Jun. 22, 2016
Power Meter	Anritsu	ML2495A	1223004	Jun. 08, 2015	Annual	Jun. 08, 2016
Power Sensor	Anritsu	MA2411B	1207272	Jun. 08, 2015	Annual	Jun. 08, 2016
Attenuator	MCLI	FAS-23-20	25574	Jun. 29, 2015	Annual	Jun. 29, 2016
Low Pass Filter	Mini circuits	NLP-1200+	V 8979400903-2	Mar. 12, 2015	Annual	Mar. 12, 2016
Band Reject Filter	Wainwright	WRCJV5150/5350-5130/5370-50/16SS	1	Sep. 24, 2014	Annual	Sep. 24, 2015
Band Reject Filter	Wainwright	WRCJV5470/5725-5450/5745-50/20SS	1	Sep. 24, 2014	Annual	Sep. 24, 2015
High Pass Filter	Wainwright	WHNX7.5/26.5G-6SS	15	Jun. 08, 2015	Annual	Jun. 08, 2016
DC Power Supply	Agilent	U8002A	MY50060028	Mar. 23, 2015	Annual	Mar. 23, 2016
Preamplifier	H.P.	8447D	1726A01265	Sep. 18, 2014	Annual	Sep. 18, 2015
Preamplifier	R&S	SCU-18	10070	Apr. 10, 2015	Annual	Apr. 10, 2016
Preamplifier	MITEQ Inc.	JS44-18004000-35-8P	1546891	May 07, 2015	Annual	May 07, 2016
Test Receiver	R&S	ESU26	10117	Mar. 03, 2015	Annual	Mar. 03, 2016
Bilog Antenna	Schwarzbeck Mess-Elektronik	VULB9163	396	Jun. 18, 2015	Biennial	Jun. 18, 2017
Horn Antenna	R&S	HF906	100326	Dec. 10, 2013	Biennial	Dec. 10, 2015
Horn Antenna	SCHWARZBECK MESSELEKTRONIK	BBHA 9170	BBHA9170431	May 15, 2014	Biennial	May 15, 2016
Antenna Master	INN-CO	MM4000	N/A	N.C.R.	N/A	N.C.R.
Turn Table	INN-CO	DS 1200S	N/A	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.

▶ Support equipment

Description	Manufacturer	Model	Serial Number / FCC ID
N/A	-	-	-

1.6. Summary of test result

The EUT has been tested according to the following specifications:

APPLIED STANDARD : FCC Part 15 Subpart E		
Section in FCC 15	**Test Item**	**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 and Conducted spurious emission	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)	Output power	Complied
15.407(a)(1) 15.407(a)(2) 15.407(a)(3)	Peak power spectral density	Complied

1.7. Test Procedure(s)

The measurement procedures described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 ㎑ to 40 ㎓ (ANSI C63.4-2009) and the guidance provided in KDB 789033 D02 v01 were used in the measurement of the DUT.
The device was tested to the new UNII rules.

1.8. Sample calculation

Where relevant, the following sample calculation is provided:

1.8.1. Conducted test

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

1.8.2. Radiation test

Field strength level (㏈㎶/m) = Measured level (㏈㎶) + Antenna factor (㏈) + Cable loss (㏈) - amplifier (㏈)

1.9. Test report revision

Revision	Report number	Date of Issue	Description
0	F690501/RF-RTL009104	2015.09.07	Initial

1.10. Information of variant model

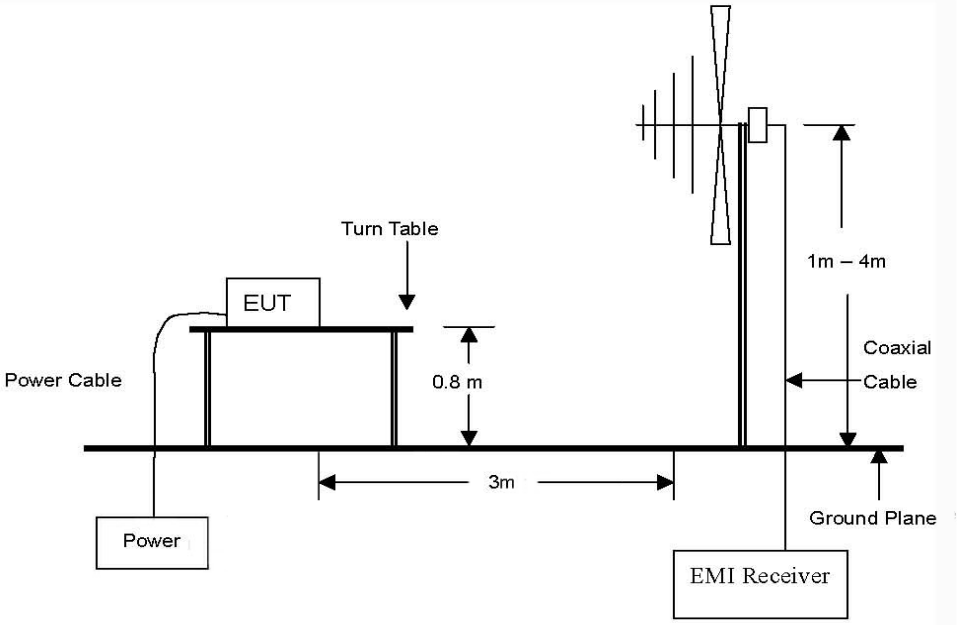
Model name	Information
ACBB0B0AN	- Basic model
ACBB0A7AN, ACBB2B0AN	- Same to basic model, but they are separated models only marketing purpose.

2. Transmitter radiated spurious emissions and conducted spurious emission

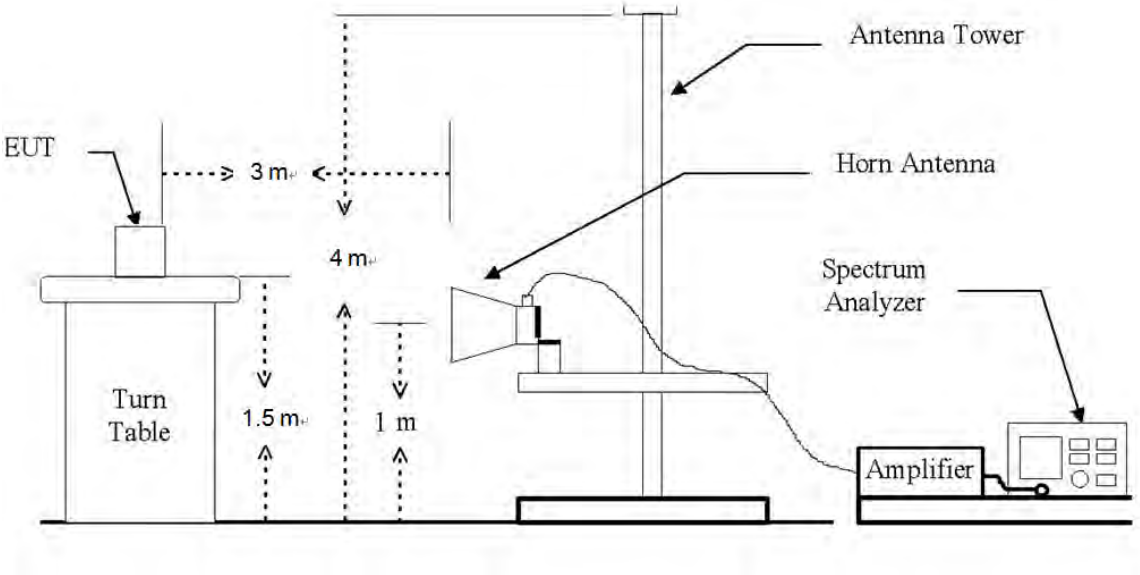
2.1. Test setup

2.1.1. Transmitter Radiated Spurious Emissions

The diagram below shows the test setup that is utilized to make the measurements for emission from 37.4 ㎒ 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

For transmitters operating in the 5.15 ~ 5.25 ㎓ band: all emissions outside of the 5.15 ~ 5.35 ㎓ band shall not exceed an EIRP of -27 ㏈m/㎒.

For transmitters operating in the 5.25 ~ 5.35 ㎓ band: all emissions outside of the 5.15 ~ 5.35 ㎓ band shall not exceed an EIRP of -27 ㏈m/㎒. Devices operating in the 5.25 ~ 5.35 ㎓ band that generate emissions in the 5.15 ~ 5.25 ㎓ band must meet all applicable technical requirements for operation in the 5.15 ~ 5.25 ㎓ band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 ㏈m/㎒ in the 5.15 ~ 5.25 ㎓ band.

For transmitters operating in the 5.47 ~ 5.725 ㎓ band: all emissions outside of the 5.47 ~ 5.725 ㎓ band shall not exceed an EIRP of -27 ㏈m/㎒.

For transmitters operating in the 5.725 ~ 5.85 ㎓ band: All emissions within the frequency range from the band edge to 10 ㎒ above or below the band edge shall not exceed an e.i.r.p. of -17 ㏈ m/㎒; for frequencies 10 ㎒ or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 ㏈m/㎒.

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 (㎒)	Distance (Meters)	Field Strength (㏈㎶/m)	Field Strength (㎶/m)
0.009 – 0.490	300	20 log (2 400/F(㎑))	2 400/F(㎑)
0.490 – 1.705	30	20 log (24 000/F(㎑))	24 000/F(㎑)
1.705 – 30.0	30	29.54	30
30 - 88	3	40.0	100**
88 – 216	3	43.5	150**
216 – 960	3	46.0	200**
Above 960	3	54.0	500

**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 v01 and ANSI C63.4-2009.

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

2.3.1. Test procedures for radiated spurious emissions

2.3.1.1. 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. 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.
6. If the emission level of the EUT in peak mode was 10 ㏈ lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 ㏈ margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE;

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

- The measurements for above 1 ㎓ II.G.5.
  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

- The measurements for above 1 ㎓ II.G.6.
  Average emission levels are measured by setting the analyzer as follows:
  Set to RBW = 1 ㎒, VBW ≥ 3 ㎒, Detector = RMS, Averaging type = power(i.e., RMS), Sweep time = auto, Trace mode= trace average of at least 100 traces. 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.
  If duty cycle < 98 percent, a correction factor shell be added to the measurement results.
  If power averaging (RMS) mode was used, then the applicable correction factor is 10 log (1/x), where x is the duty cycle.

- Definition of DUT Axis.
  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. Spurious radiated emission

The frequency spectrum from 37.4 ㎒ to 1 000 ㎒ was investigated. All reading values are applied for peak and average values.

Radiated Emissions			Ant.	Correction Factors		Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
52.23	43.80	Peak	V	14.15	-26.53	31.42	40.00	8.58
213.82	41.90	Peak	V	12.34	-24.64	29.60	43.50	13.90
339.59	38.90	Peak	V	16.15	-23.96	31.09	46.00	14.91
440.19	34.90	Peak	H	17.48	-24.28	28.10	46.00	17.90
Above 500.00	Not detected	-	-	-	-	-	-	-

Remark:
1. Spurious emissions for all channels and modes were investigated and almost the same below 1 ㎓.
2. Reported spurious emissions are in **11a / 6 Mbps / Middle channel** as worst case among other modes
3. According to § 15.31(o), the amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 ㏈ below the permissible value need not be reported unless specifically required elsewhere in this part.
4. Radiated spurious emission measurement as below
   (Actual = Reading + AF + AMP + CL)
5. The device has a reference clock operating 37.4 ㎒.

2.4.2. Spurious radiated emission for above 1 ㎓

802.11a (Band 1)_6 Mbps

A. Low Channel (5 180 ㎒)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*4 500.00	9.08	Peak	V	32.20	8.67	-	49.95	74.00	24.05
*4 500.00	-1.25	Average	V	32.20	8.67	0.38	40.00	54.00	14.00
*4 985.55	13.18	Peak	V	33.43	8.88	-	55.49	74.00	18.51
*4 985.55	1.32	Average	V	33.43	8.88	0.38	44.01	54.00	9.99
*5 150.00	10.39	Peak	V	33.43	9.32	-	53.14	74.00	20.86
*5 150.00	-0.48	Average	V	33.43	9.32	0.38	42.65	54.00	11.35

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

B. Middle Channel (5 220 ㎒)

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

C. High Channel (5 240 ㎒)

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

802.11a (Band 2A)_6 Mbps

A. Low Channel (5 260 ㎒)

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

B. Middle Channel (5 300 ㎒)

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

C. High Channel (5 320 ㎒)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*5 350.00	9.28	Peak	V	33.75	9.32	-	52.35	74.00	21.65
*5 350.00	-0.75	Average	V	33.75	9.32	0.38	42.70	54.00	11.30
*5 377.72	12.69	Peak	V	33.86	9.43	-	55.98	74.00	18.02
*5 377.72	0.91	Average	V	33.86	9.43	0.38	44.58	54.00	9.42
*5 460.00	10.96	Peak	V	34.29	9.12	-	54.37	74.00	19.63
*5 460.00	-0.54	Average	V	34.29	9.12	0.38	43.25	54.00	10.75

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

802.11a (Band 2C)_6 Mbps

A. Low Channel (5 500 ㎒)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*5 350.00	10.54	Peak	V	33.75	9.32	-	53.61	74.00	20.39
*5 350.00	0.09	Average	V	33.75	9.32	0.38	43.54	54.00	10.46
*5 449.11	13.56	Peak	V	34.20	9.07	-	56.83	74.00	17.17
*5 449.11	0.88	Average	V	34.20	9.07	0.38	44.53	54.00	9.47
*5 460.00	10.76	Peak	V	34.29	9.12	-	54.17	74.00	19.83
*5 460.00	-0.48	Average	V	34.29	9.12	0.38	43.31	54.00	10.69

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

B. Middle Channel (5 580 ㎒)

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

C. High Channel (5 700 ㎒)

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

802.11a (Band 3)_6 Mbps

A. Low Channel (5 745 ㎒)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 708.13	13.72	Peak	V	34.10	9.35	-	57.17	68.23	11.06
5 723.27	20.37	Peak	V	34.12	9.43	-	63.92	78.23	14.31

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (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	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (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	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 851.05	18.47	Peak	V	34.14	9.54	-	62.15	78.23	16.08
5 861.11	13.91	Peak	V	34.21	9.69	-	57.81	68.23	10.42

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

802.11n_HT20 (Band 1)_MCS0

A. Low Channel (5 180 ㎒)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*4 500.00	8.79	Peak	V	32.20	8.67	-	49.66	74.00	24.34
*4 500.00	-1.59	Average	V	32.20	8.67	0.35	39.63	54.00	14.37
*5 135.70	13.75	Peak	V	33.38	9.21	-	56.34	74.00	17.66
*5 135.70	1.38	Average	V	33.38	9.21	0.35	44.32	54.00	9.68
*5 150.00	10.09	Peak	V	33.43	9.32	-	52.84	74.00	21.16
*5 150.00	-0.48	Average	V	33.43	9.32	0.35	42.62	54.00	11.38

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

B. Middle Channel (5 220 ㎒)

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

C. High Channel (5 240 ㎒)

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

802.11n_HT20 (Band 2A)_MCS0

A. Low Channel (5 260 ㎒)

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

B. Middle Channel (5 300 ㎒)

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

C. High Channel (5 320 ㎒)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*5 350.00	9.27	Peak	V	33.75	9.32	-	52.34	74.00	21.66
*5 350.00	0.13	Average	V	33.75	9.32	0.35	43.55	54.00	10.45
*5 357.92	12.63	Peak	V	33.77	9.35	-	55.75	74.00	18.25
*5 357.92	1.02	Average	V	33.77	9.35	0.35	44.49	54.00	9.51
*5 460.00	11.07	Peak	V	34.29	9.12	-	54.48	74.00	19.52
*5 460.00	-0.23	Average	V	34.29	9.12	0.35	43.53	54.00	10.47

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

802.11n_HT20 (Band 2C)_MCS0

A. Low Channel (5 500 ㎒)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*5 350.00	9.45	Peak	V	33.75	9.32	-	52.52	74.00	21.48
*5 350.00	-0.83	Average	V	33.75	9.32	0.35	42.59	54.00	11.41
*5 380.03	12.22	Peak	V	33.87	9.43	-	55.52	74.00	18.48
*5 380.03	0.87	Average	V	33.87	9.43	0.35	44.52	54.00	9.48
*5 460.00	9.77	Peak	V	34.29	9.12	-	53.18	74.00	20.82
*5 460.00	-0.39	Average	V	34.29	9.12	0.35	43.37	54.00	10.63

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

B. Middle Channel (5 580 ㎒)

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

C. High Channel (5 700 ㎒)

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

802.11n_HT20 (Band 3)_MCS0

A. Low Channel (5 745 ㎒)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 713.77	16.42	Peak	V	34.11	9.38	-	59.91	68.23	8.32
5 724.36	25.96	Peak	V	34.13	9.44	-	69.53	78.23	8.70

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (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	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (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	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 854.40	20.45	Peak	V	34.17	9.59	-	64.21	78.23	14.02
5 861.48	14.90	Peak	V	34.21	9.69	-	58.80	68.23	9.43

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

802.11n_HT40 (Band 1)_MCS0

A. Low Channel (5 190 ㎒)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*4 500.00	9.68	Peak	V	32.20	8.67	-	50.55	74.00	23.45
*4 500.00	-1.27	Average	V	32.20	8.67	0.60	40.20	54.00	13.80
*5 145.45	13.10	Peak	V	33.42	9.29	-	55.81	74.00	18.19
*5 145.45	1.48	Average	V	33.42	9.29	0.60	44.79	54.00	9.21
*5 150.00	9.72	Peak	V	33.43	9.32	-	52.47	74.00	21.53
*5 150.00	-0.52	Average	V	33.43	9.32	0.60	42.83	54.00	11.17

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

B. High Channel (5 230 ㎒)

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

802. 11n_HT40 (Band 2A)_MCS0

A. Low Channel (5 270 ㎒)

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

B. High Channel (5 310 ㎒)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*5 350.00	9.94	Peak	V	33.75	9.32	-	53.01	74.00	20.99
*5 350.00	-0.26	Average	V	33.75	9.32	0.60	43.41	54.00	10.59
*5 353.41	13.03	Peak	V	33.76	9.33	-	56.12	74.00	17.88
*5 353.41	0.89	Average	V	33.76	9.33	0.60	44.58	54.00	9.42
*5 460.00	10.46	Peak	V	34.29	9.12	-	53.87	74.00	20.13
*5 460.00	0.14	Average	V	34.29	9.12	0.60	44.15	54.00	9.85

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

802. 11n_HT40 (Band 2C)_MCS0

A. Low Channel (5 510 ㎒)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*5 350.00	11.13	Peak	V	33.75	9.32	-	54.20	74.00	19.80
*5 350.00	-0.03	Average	V	33.75	9.32	0.60	43.64	54.00	10.36
*5 455.16	12.93	Peak	V	34.25	9.09	-	56.27	74.00	17.73
*5 455.16	0.81	Average	V	34.25	9.09	0.60	44.75	54.00	9.25
*5 460.00	10.40	Peak	V	34.29	9.12	-	53.81	74.00	20.19
*5 460.00	-0.37	Average	V	34.29	9.12	0.60	43.64	54.00	10.36

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

B. Middle Channel (5 550 ㎒)

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

C. High Channel (5 670 ㎒)

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

802.11n_HT40 (Band 3)_MCS0

A. Low Channel (5 755 ㎒)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 712.75	20.92	Peak	V	34.11	9.37	-	64.40	68.23	3.83
5 724.47	26.17	Peak	V	34.13	9.44	-	69.74	78.23	8.49

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (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	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 851.40	16.11	Peak	V	34.15	9.55	-	59.81	78.23	18.42
5 861.18	12.95	Peak	V	34.21	9.69	-	56.85	68.23	11.38

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

802.11ac_VHT80 (Band 1)_MCS0

A. Middle Channel (5 210 ㎒)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*4 500.00	9.90	Peak	V	32.20	8.67	-	50.77	74.00	23.23
*4 500.00	-1.77	Average	V	32.20	8.67	1.28	40.38	54.00	13.62
*5 142.85	14.58	Peak	V	33.42	9.27	-	57.27	74.00	16.73
*5 142.85	2.32	Average	V	33.42	9.27	1.28	46.29	54.00	7.71
*5 150.00	11.31	Peak	V	33.43	9.32	-	54.06	74.00	19.94
*5 150.00	-0.66	Average	V	33.43	9.32	1.28	43.37	54.00	10.63

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

802. 11ac_VHT80 (Band 2A)_MCS0

A. Middle Channel (5 290 ㎒)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*5 350.00	9.29	Peak	V	33.75	9.32	-	52.36	74.00	21.64
*5 350.00	-0.83	Average	V	33.75	9.32	1.28	43.52	54.00	10.48
*5 370.57	13.46	Peak	V	33.82	9.40	-	56.68	74.00	17.32
*5 370.57	0.98	Average	V	33.82	9.40	1.28	45.48	54.00	8.52
*5 460.00	9.43	Peak	V	34.29	9.12	-	52.84	74.00	21.16
*5 460.00	-0.22	Average	V	34.29	9.12	1.28	44.47	54.00	9.53

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

802. 11ac_VHT80 (Band 2C)_MCS0

A. Middle Channel (5 530 ㎒)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*5 350.00	9.93	Peak	V	33.75	9.32	-	53.00	74.00	21.00
*5 350.00	-0.17	Average	V	33.75	9.32	1.28	44.18	54.00	9.82
*5 413.14	12.45	Peak	V	34.03	9.39	-	55.87	74.00	18.13
*5 413.14	0.76	Average	V	34.03	9.39	1.28	45.46	54.00	8.54
*5 460.00	9.24	Peak	V	34.29	9.12	-	52.65	74.00	21.35
*5 460.00	-0.14	Average	V	34.29	9.12	1.28	44.55	54.00	9.45

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

802.11ac_VHT80 (Band 3)_MCS0

A. Low Channel (5 775 ㎒)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
5 710.83	17.98	Peak	V	34.11	9.36	-	61.45	68.23	6.78
5 715.71	20.97	Peak	V	34.11	9.39	-	64.47	78.23	13.76
5 851.99	17.86	Peak	V	34.15	9.56	-	61.57	78.23	16.66
5 860.44	15.10	Peak	V	34.21	9.68	-	58.99	68.23	9.24

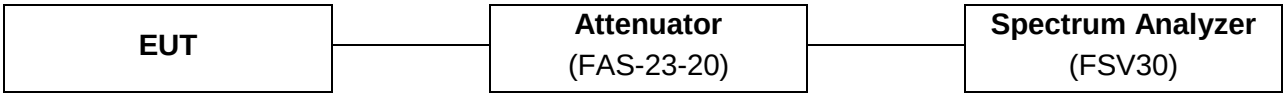
Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

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. Band edge measurement
   (Actual = Reading + AF + CL + Duty cycle)
4. Radiated spurious emission measurement
   (Actual = Reading + AF + AMP + CL + Duty cycle)
5. 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
6. In case of the frequency between 5 715 ㎒ ~ 5 725 ㎒ and 5 850 ㎒ ~ 5 860 ㎒ the limit is determined as 78.23 dB㎶/m.
   78.23 dB㎶/m = EIRP – 20 log(d) + 104.77 = -17 – 20 log (3) + 104.77
7. According to § 15.31(o), the amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

3. 26 ㏈ Bandwidth & 99 % Bandwidth

3.1. Test setup



3.2. Test procedure

3.2.1. 26 ㏈ Bandwidth

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.1 of KDB 789033 D02 v01.
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 %

3.2.2. 99 % Bandwidth

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW ≥ 3 · RBW
5. 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.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. 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 ㎒

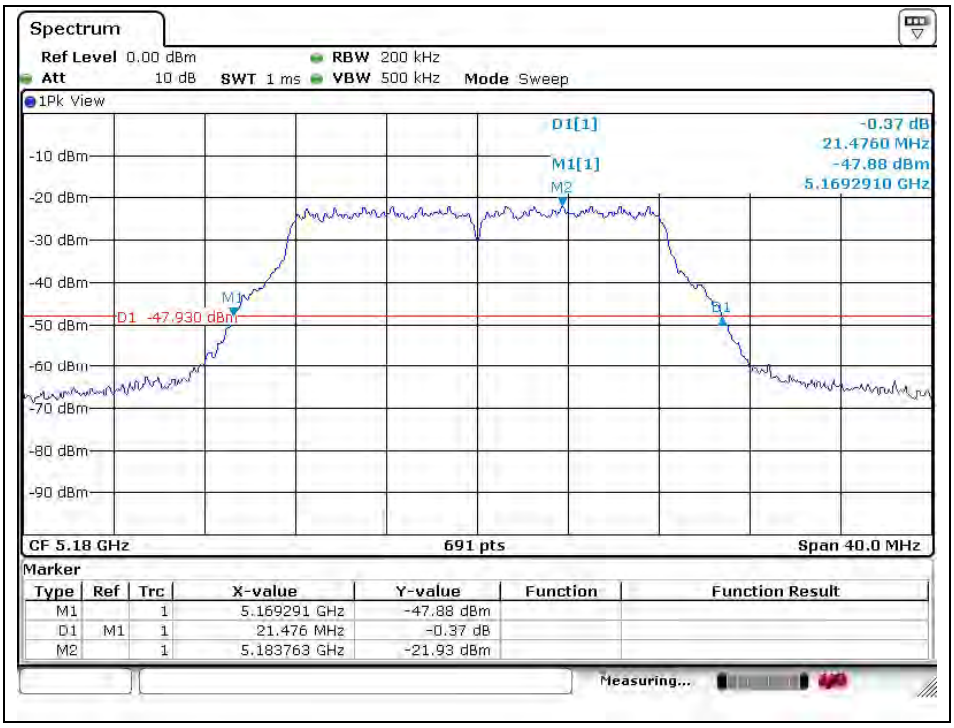
3.4. Test result

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

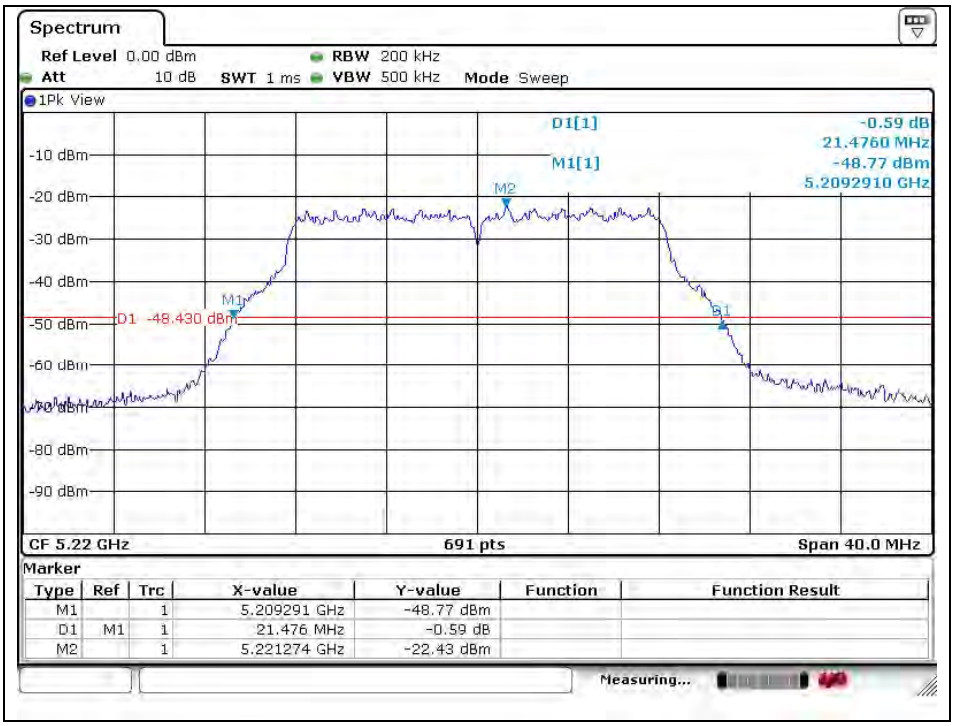
Band	Mode	Frequency (㎒)	Ch.	Data Rate (Mbps)	26 ㏈ Bandwidth (㎒)	99 % Bandwidth (㎒)
U-NII 1	11a	5 180	36	6	21.476	-
		5 220	44	6	21.476	-
		5 240	48	6	21.476	17.713
	11n_HT20	5 180	36	MCS0	21.650	-
		5 220	44	MCS0	21.534	-
		5 240	48	MCS0	21.766	18.640
	11n_HT40	5 190	38	MCS0	40.170	-
		5 230	46	MCS0	39.940	36.469
	11ac_VHT80	5 210	42	MCS0	82.660	76.179
U-NII 2A	11a	5 260	52	6	21.534	-
		5 300	60	6	21.592	-
		5 320	64	6	21.302	-
	11n_HT20	5 260	52	MCS0	21.708	-
		5 300	60	MCS0	21.650	-
		5 320	64	MCS0	21.418	-
	11n_HT40	5 270	54	MCS0	40.170	-
		5 310	62	MCS0	39.940	-
	11ac_VHT80	5 290	58	MCS0	83.130	-
U-NII 2C	11a	5 500	100	6	21.534	-
		5 580	116	6	21.360	-
		5 700	140	6	21.534	-
	11n_HT20	5 500	100	MCS0	21.476	-
		5 580	116	MCS0	21.302	-
		5 700	140	MCS0	21.708	-
	11n_HT40	5 510	102	MCS0	40.170	-
		5 550	110	MCS0	39.940	-
		5 670	134	MCS0	40.170	-
	11ac_VHT80	5 530	106	MCS0	82.890	-
U-NII 3	11a	5 745	149	6	21.534	-
		5 785	157	6	21.534	-
		5 825	165	6	21.592	-
	11n_HT20	5 745	149	MCS0	21.592	-
		5 785	157	MCS0	21.592	-
		5 825	165	MCS0	21.708	-
	11n_HT40	5 755	151	MCS0	40.060	-
		5 795	159	MCS0	39.940	-
	11ac_VHT80	5 775	155	MCS0	82.430	-

802.11a (Band 1)

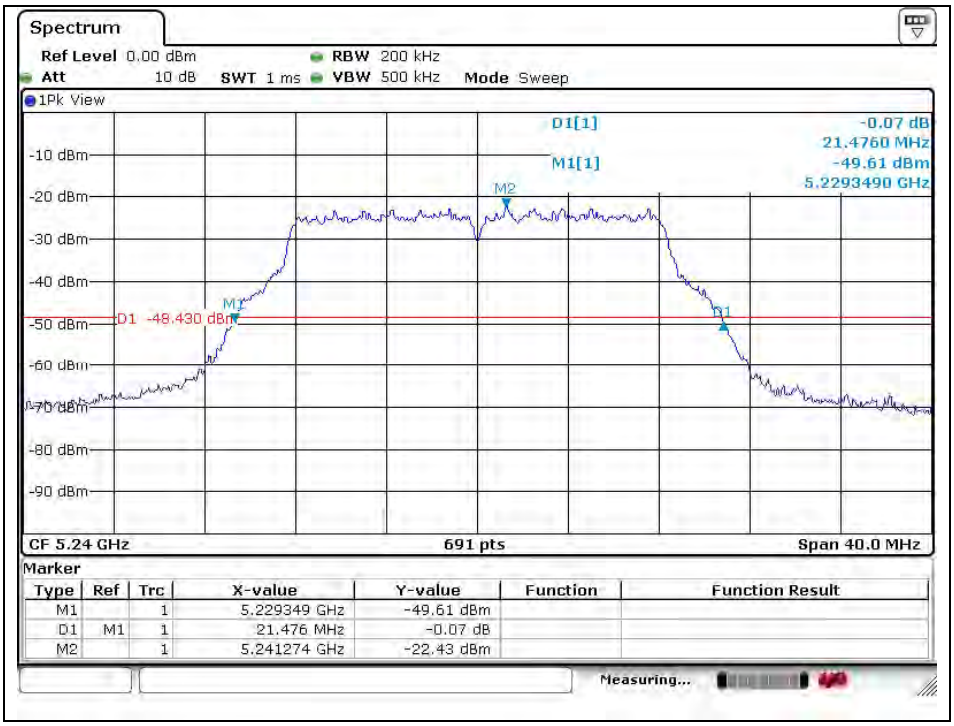
Low Channel (5 180 ㎒)



Middle Channel (5 220 ㎒)

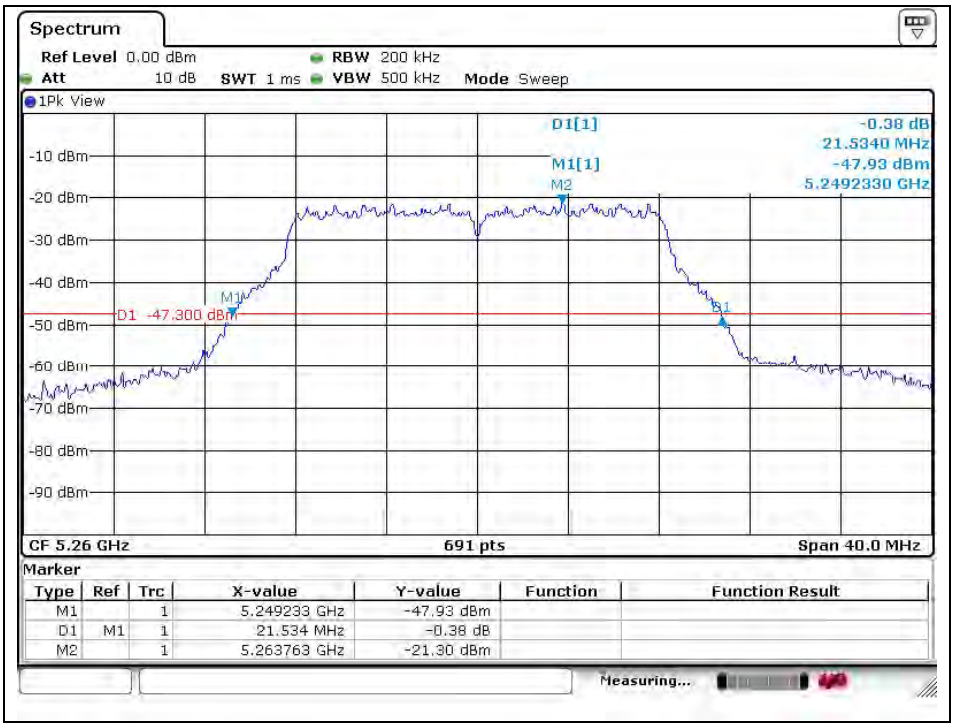


High Channel (5 240 ㎒)

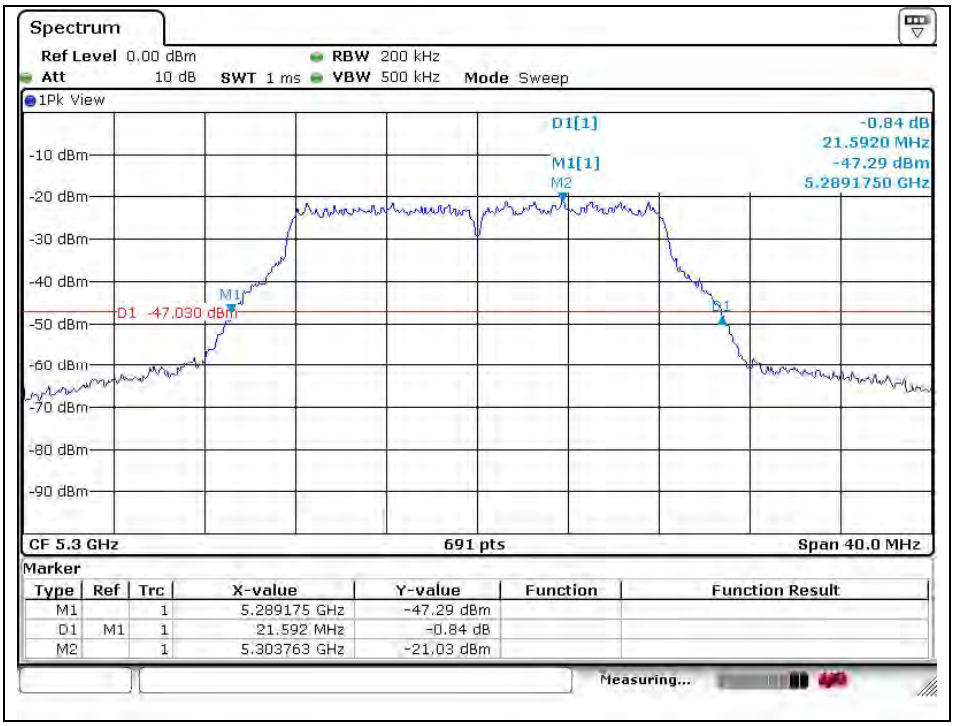


802.11a (Band 2A)

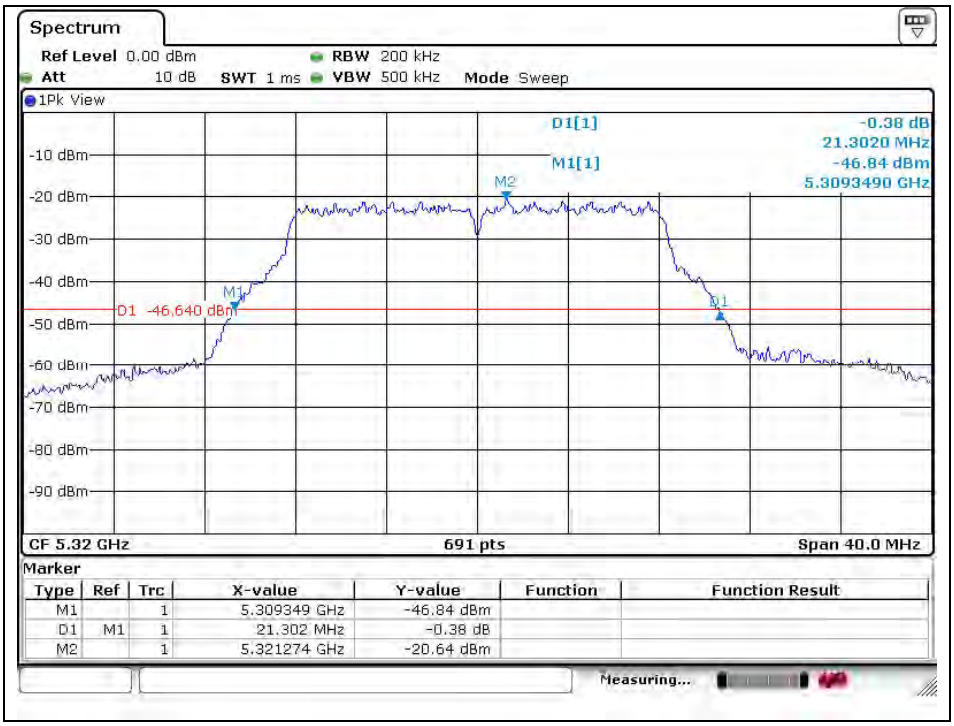
Low Channel (5 260 ㎒)



Middle Channel (5 300 ㎒)

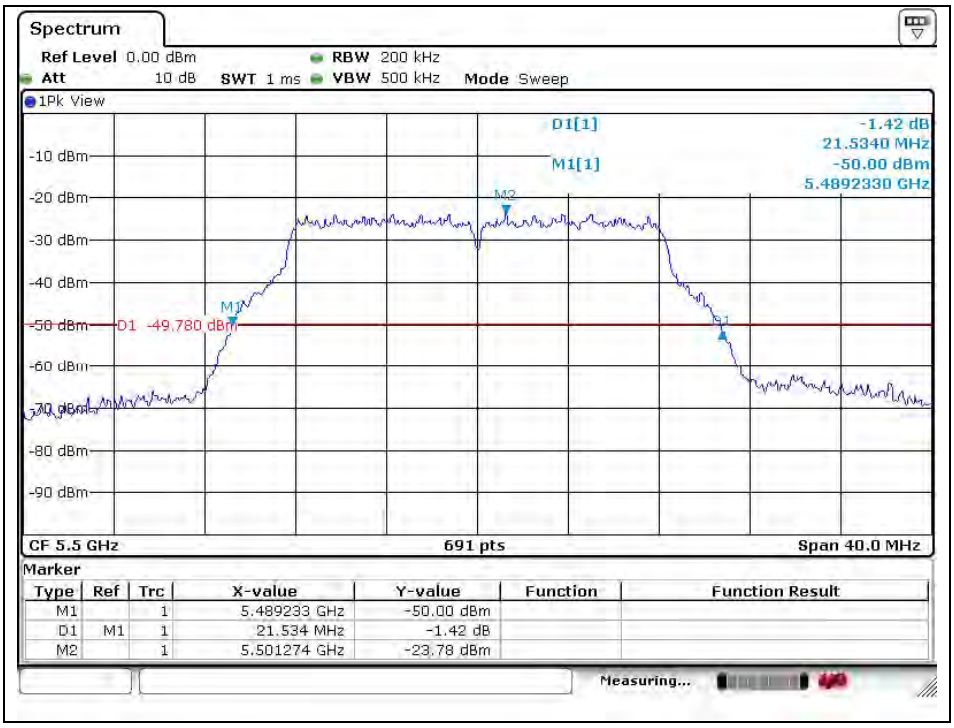


High Channel (5 320 ㎒)

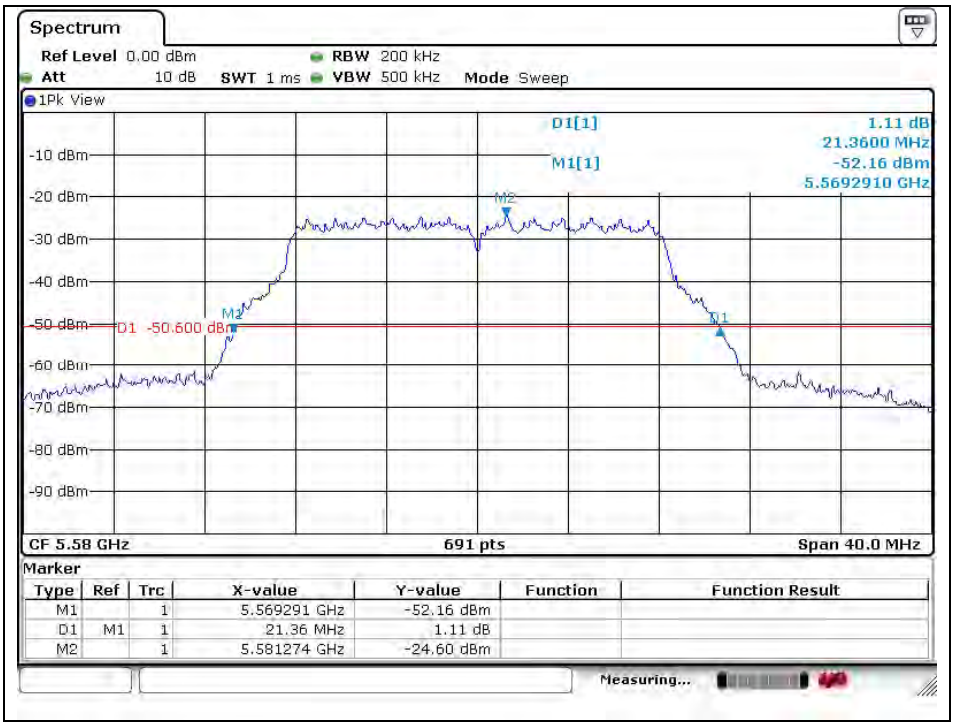


802.11a (Band 2C)

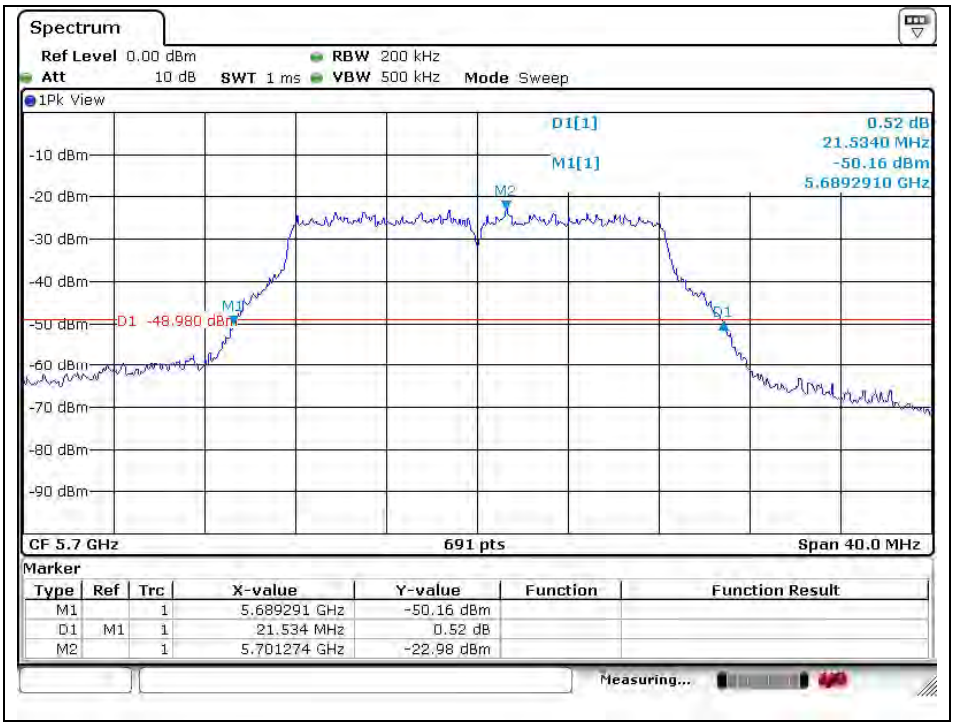
Low Channel (5 500 ㎒)



Middle Channel (5 580 ㎒)

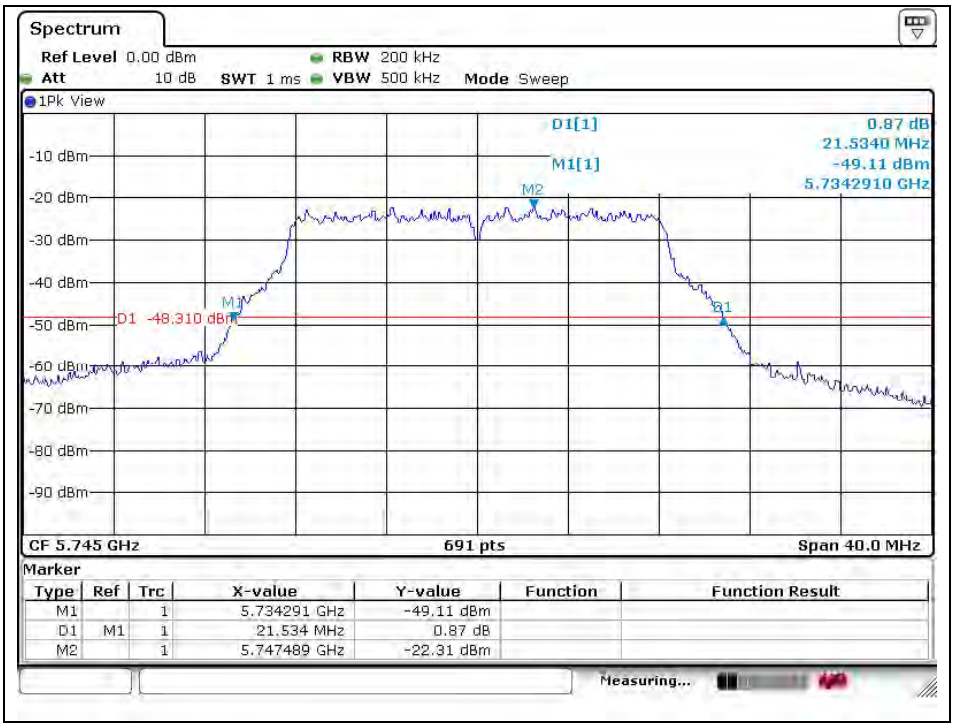


High Channel (5 700 ㎒)

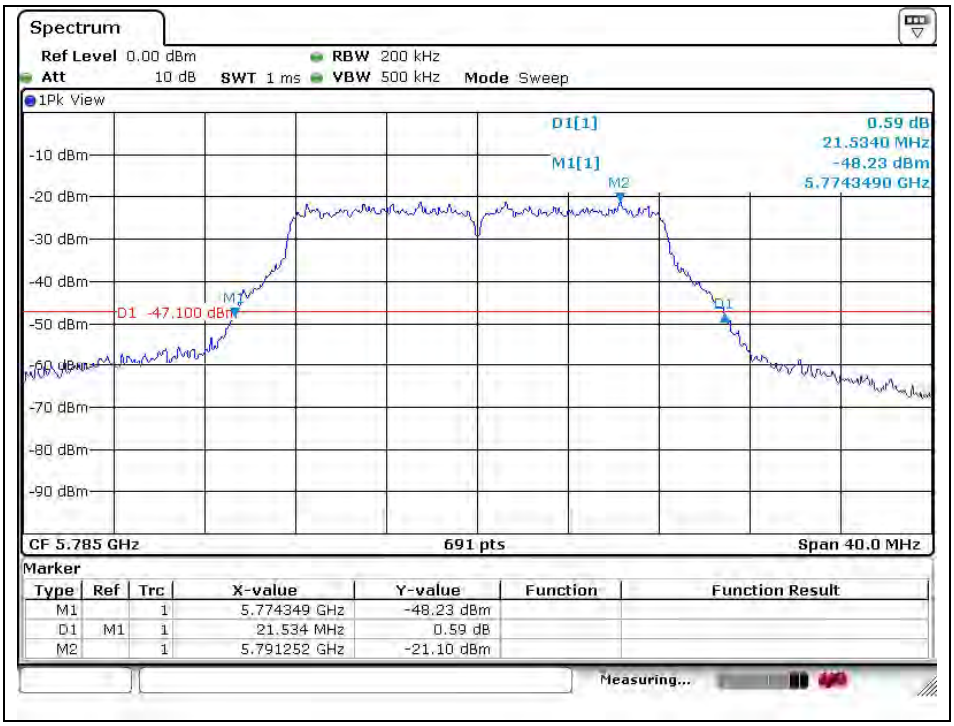


802.11a (Band 3)

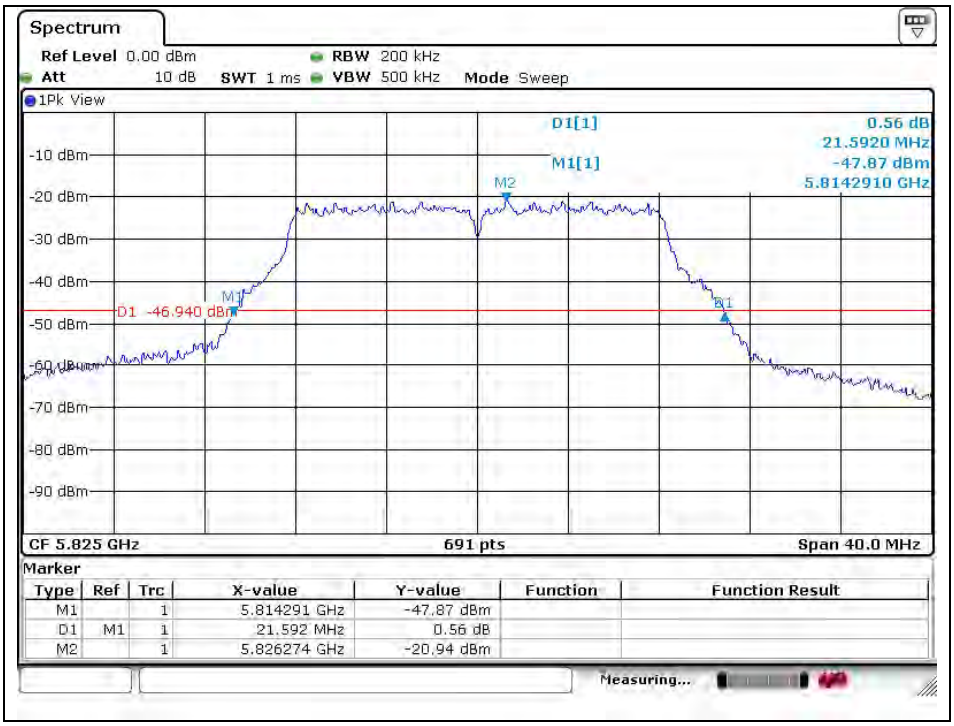
Low Channel (5 745 ㎒)



Middle Channel (5 785 ㎒)

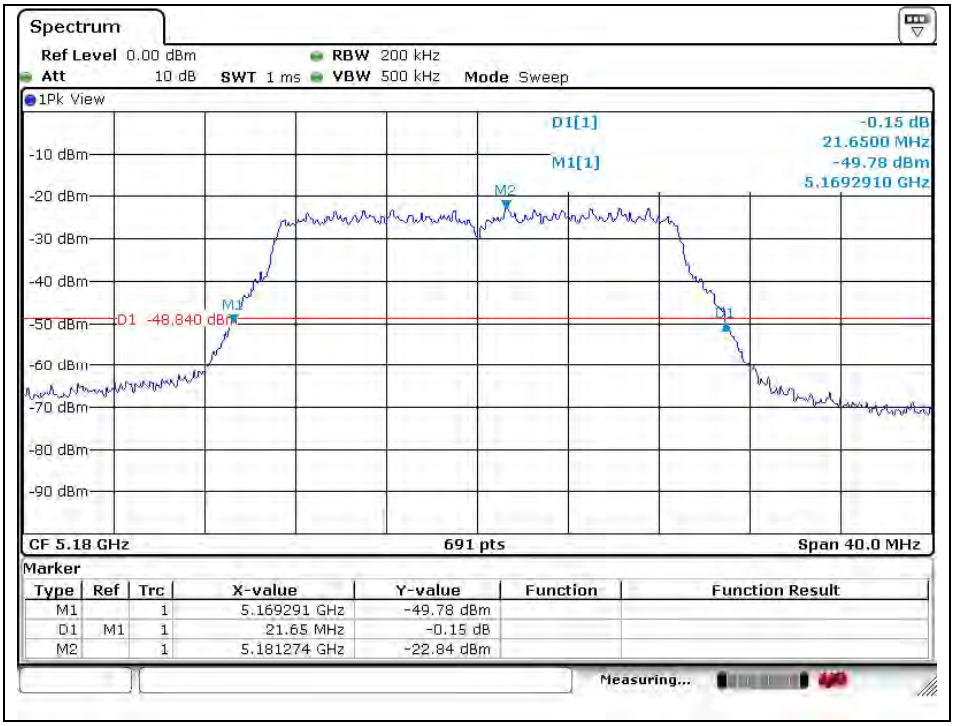


High Channel (5 825 ㎒)

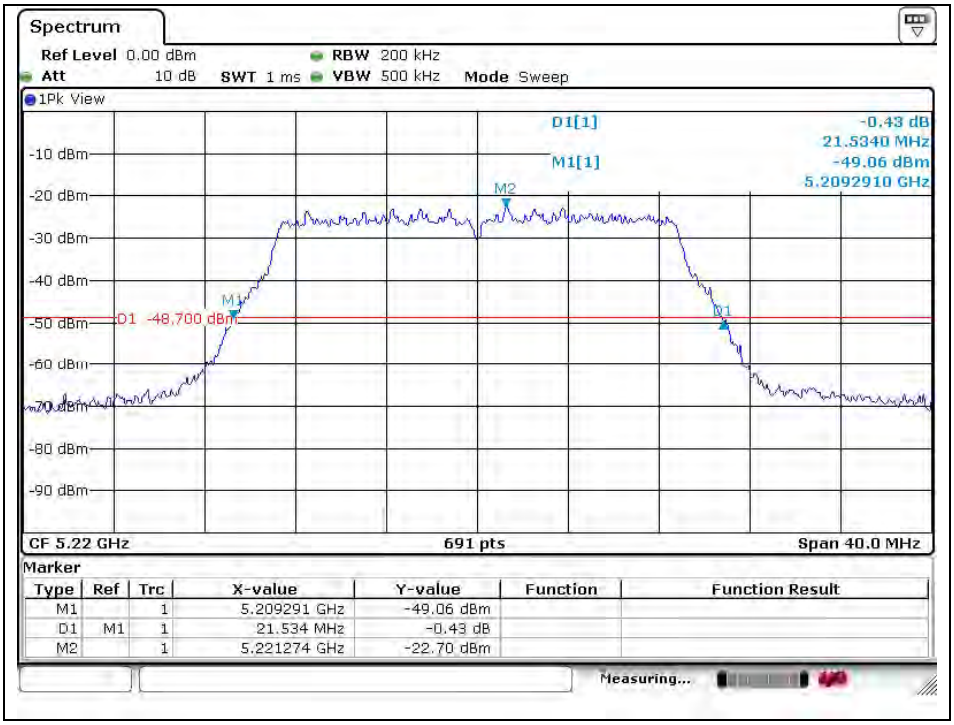


802.11n-HT20 (Band 1)

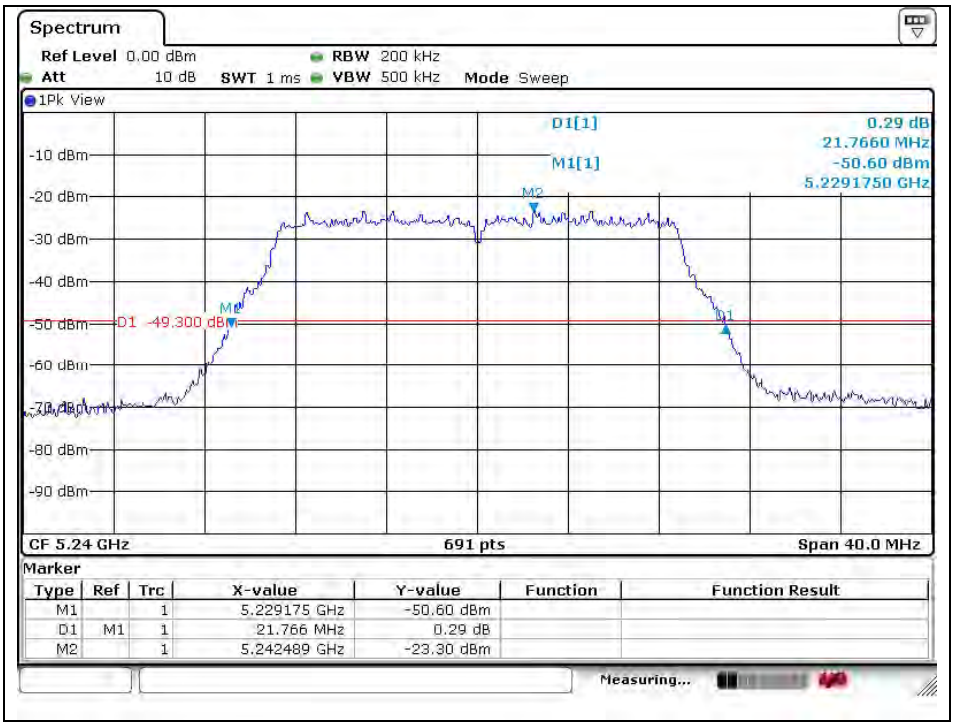
Low Channel (5 180 ㎒)



Middle Channel (5 220 ㎒)

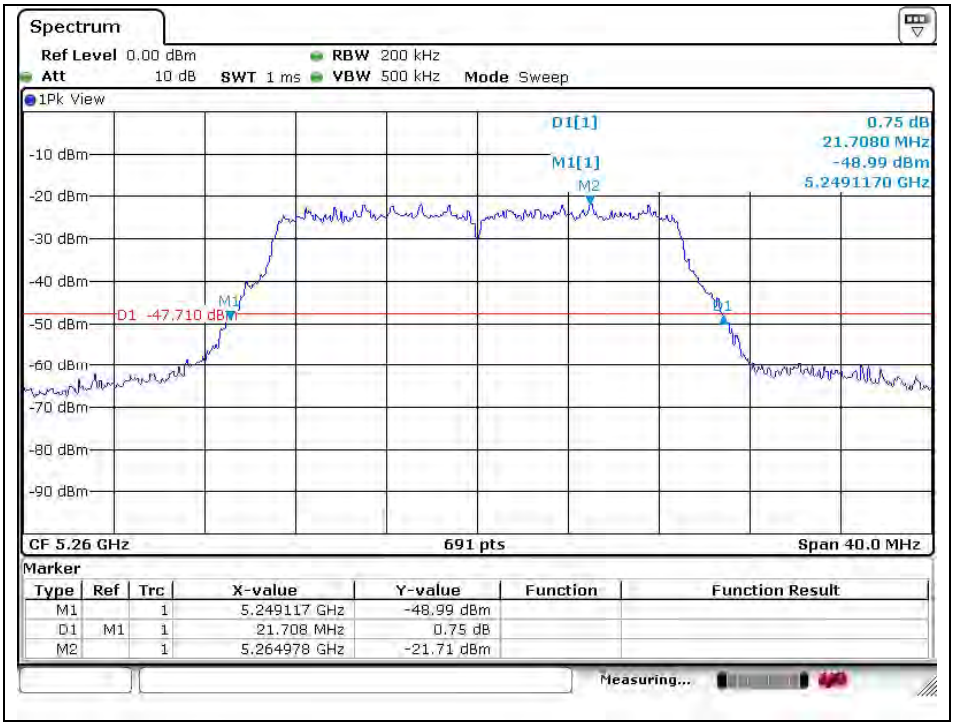


High Channel (5 240 ㎒)

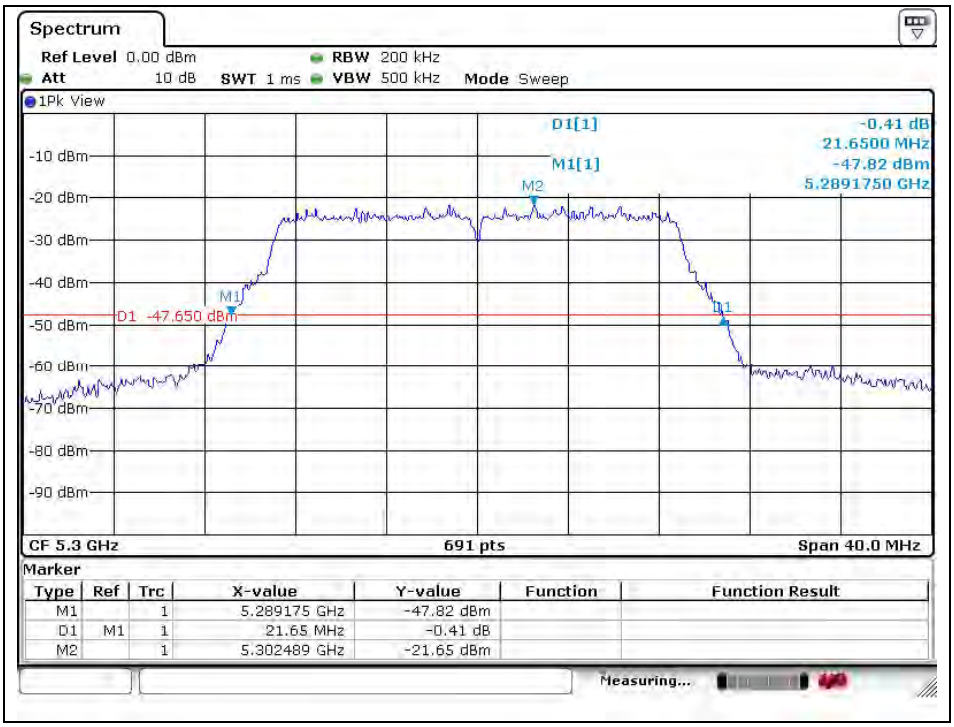


802.11n-HT20 (Band 2A)

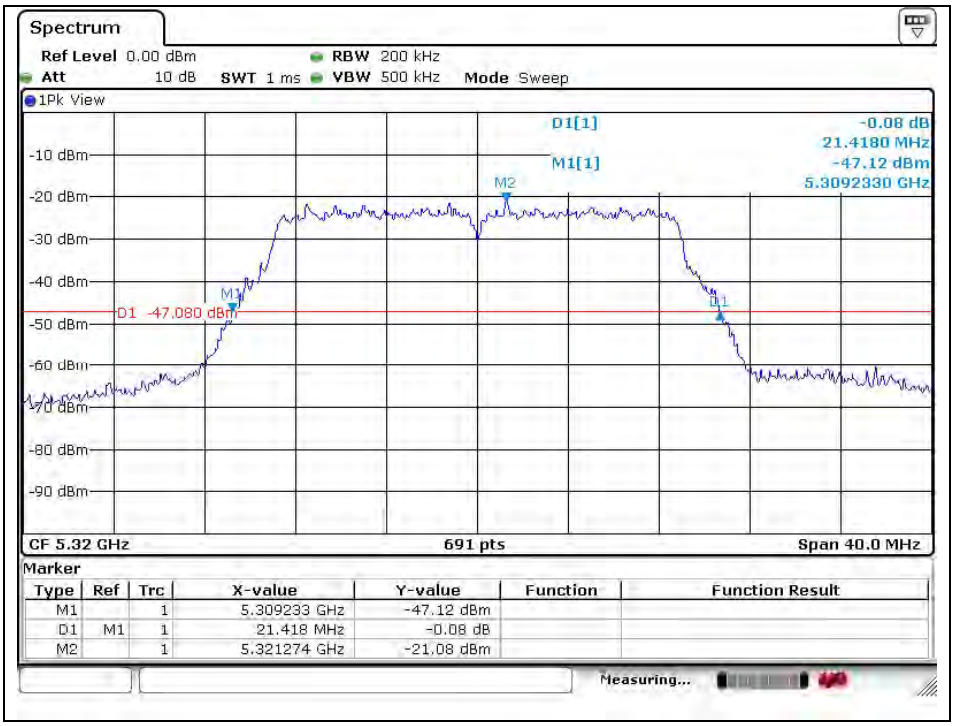
Low Channel (5 260 ㎒)



Middle Channel (5 300 ㎒)

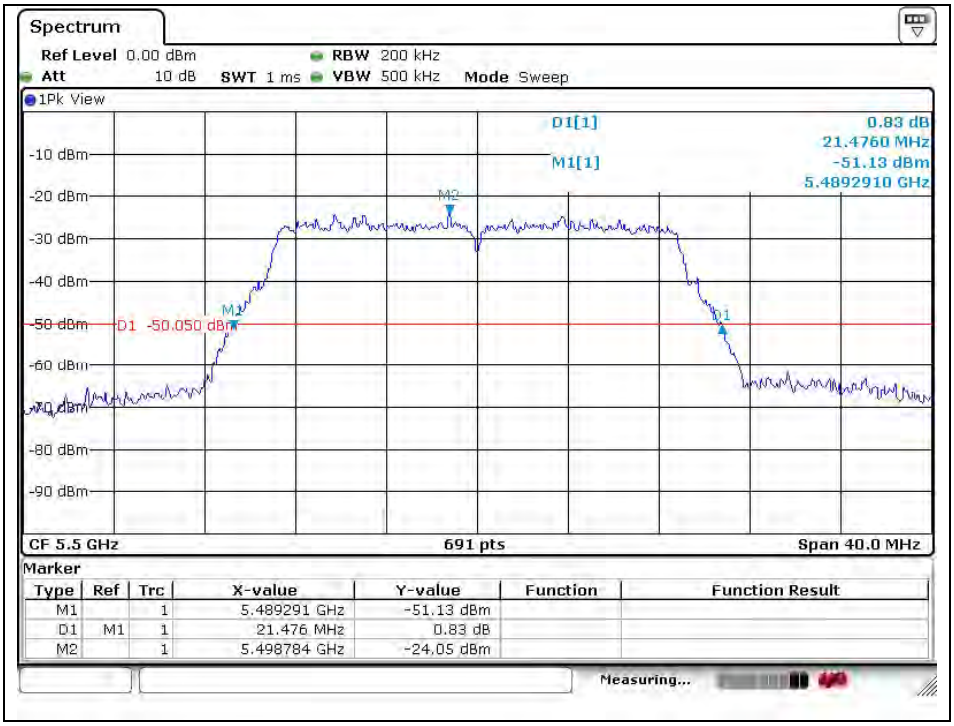


High Channel (5 320 ㎒)

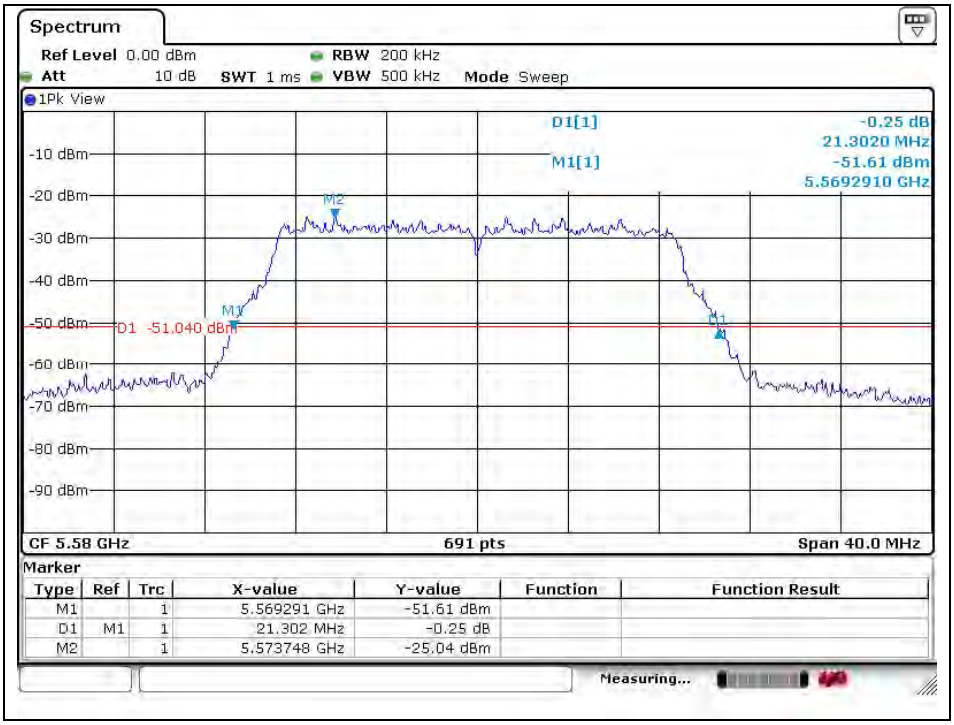


802.11n-HT20 (Band 2C)

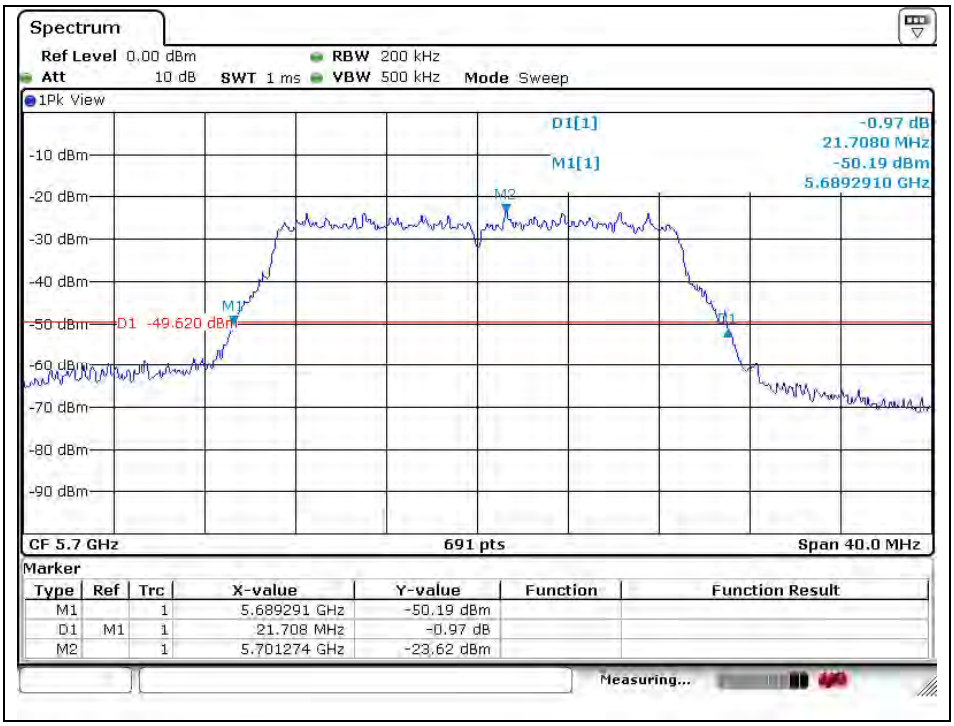
Low Channel (5 500 ㎒)



Middle Channel (5 580 ㎒)

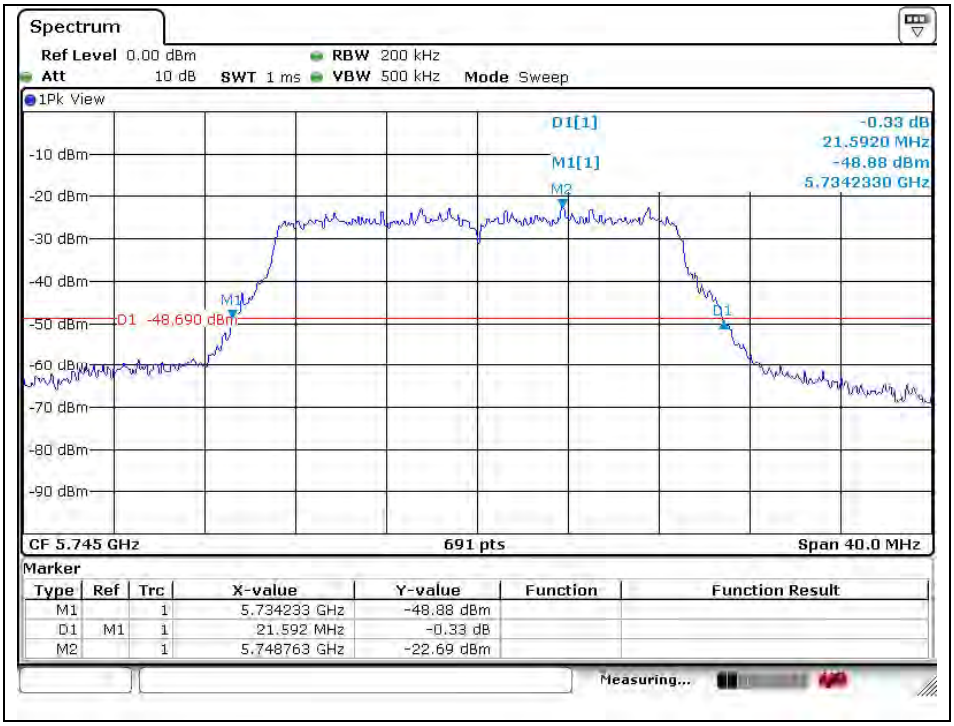


High Channel (5 700 ㎒)

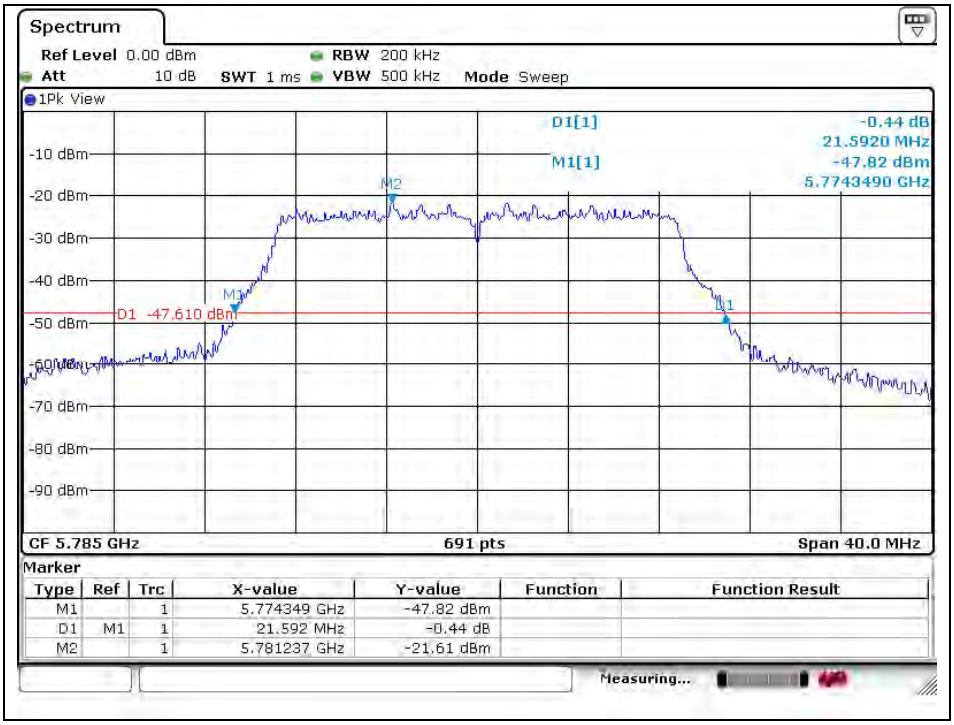


802.11n_HT20 (Band 3)

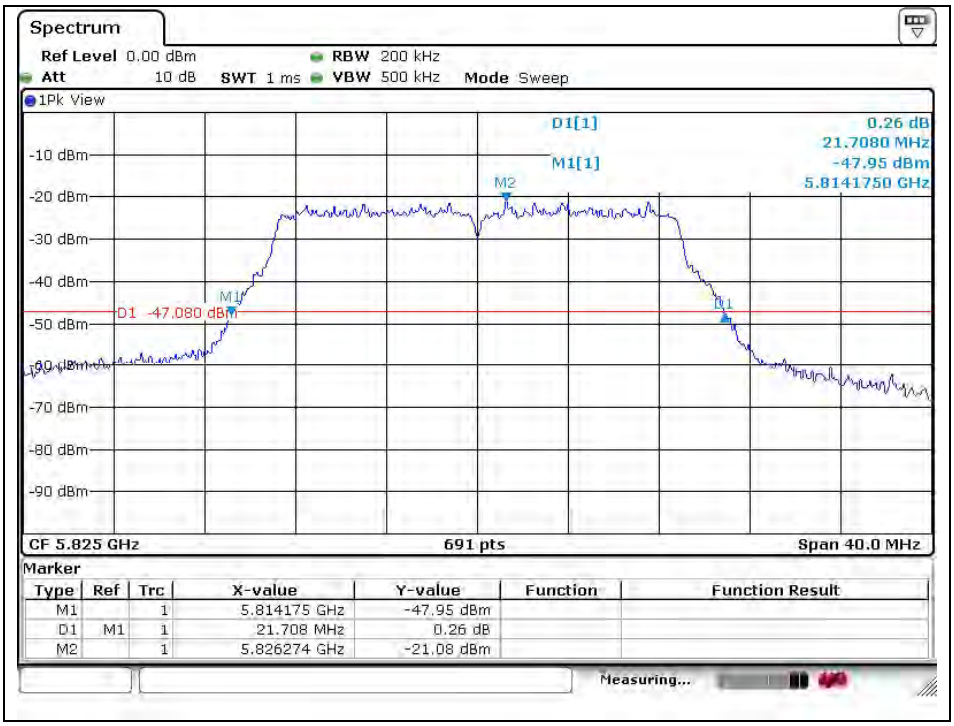
Low Channel (5 745 ㎒)



Middle Channel (5 785 ㎒)

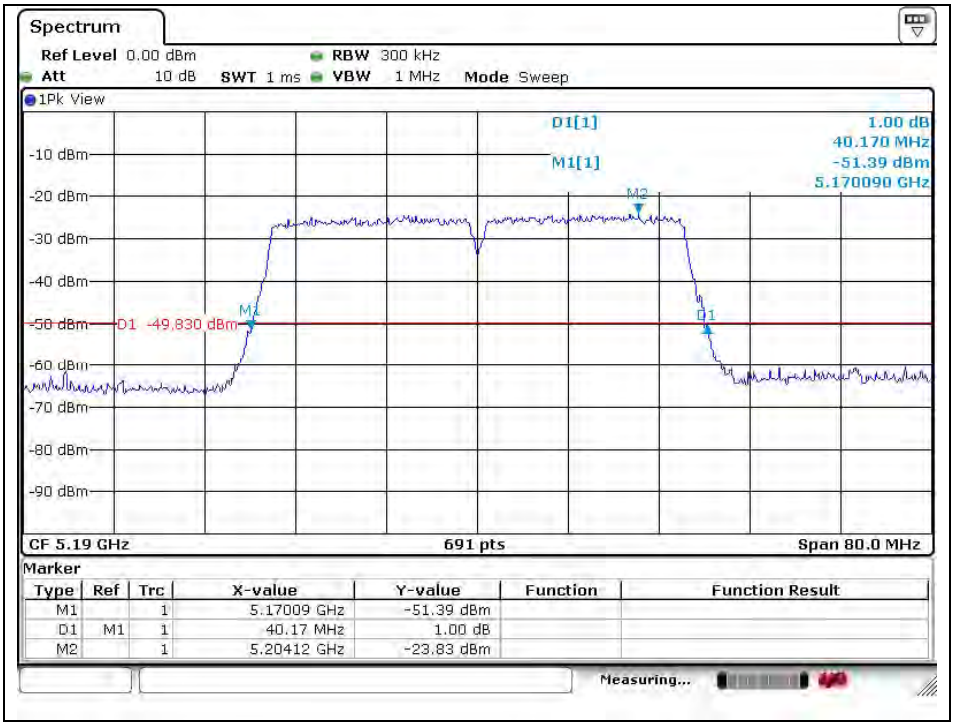


High Channel (5 825 ㎒)

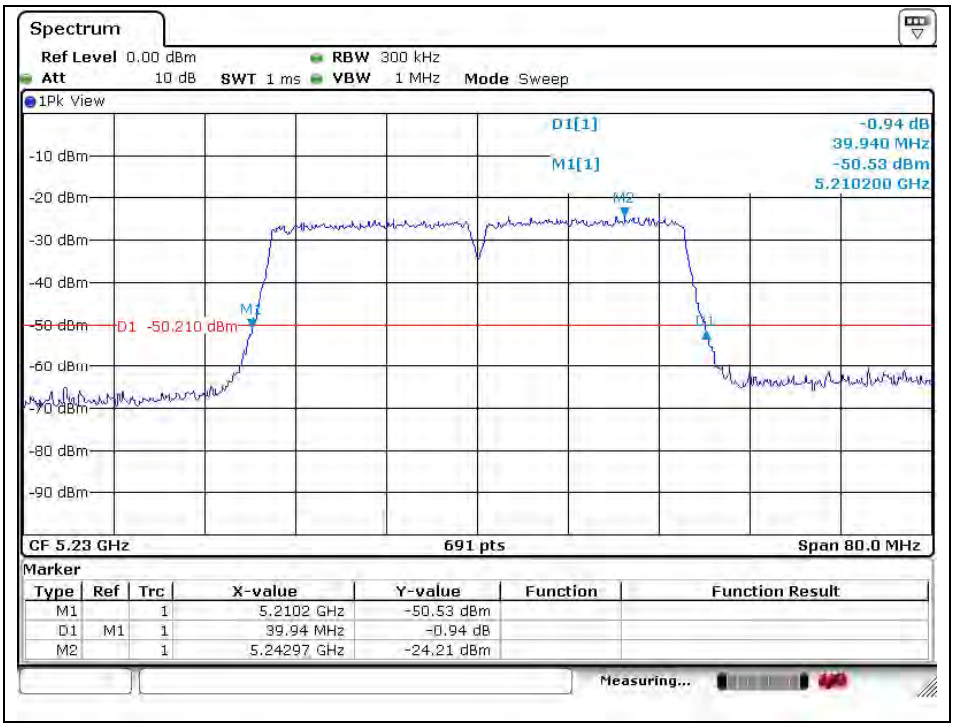


802.11n-HT40 (Band 1)

Low Channel (5 190 ㎒)

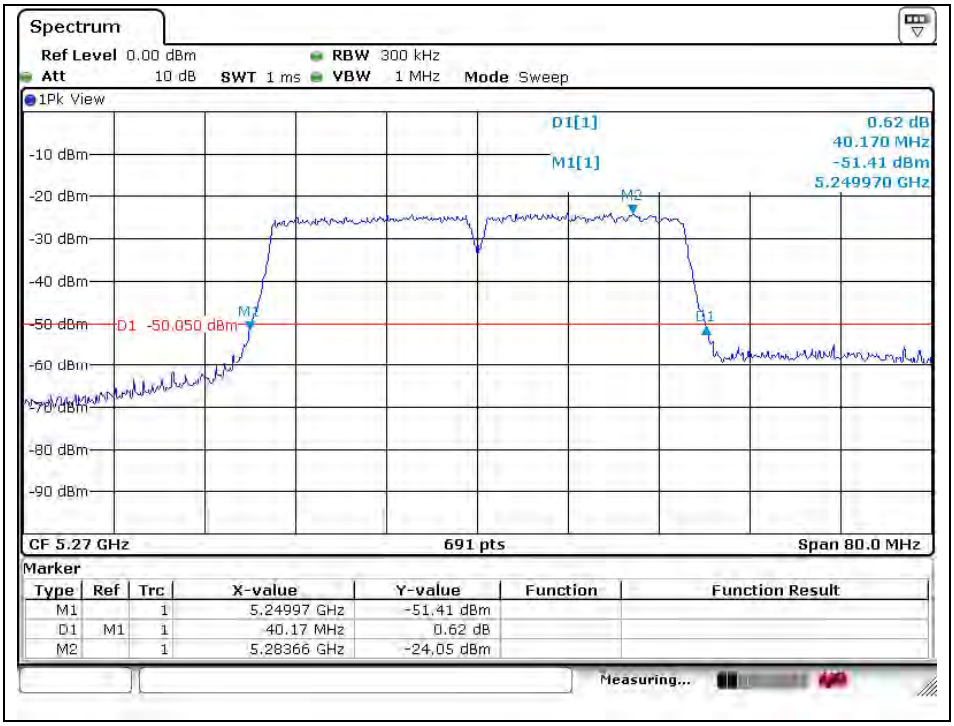


High Channel (5 230 ㎒)

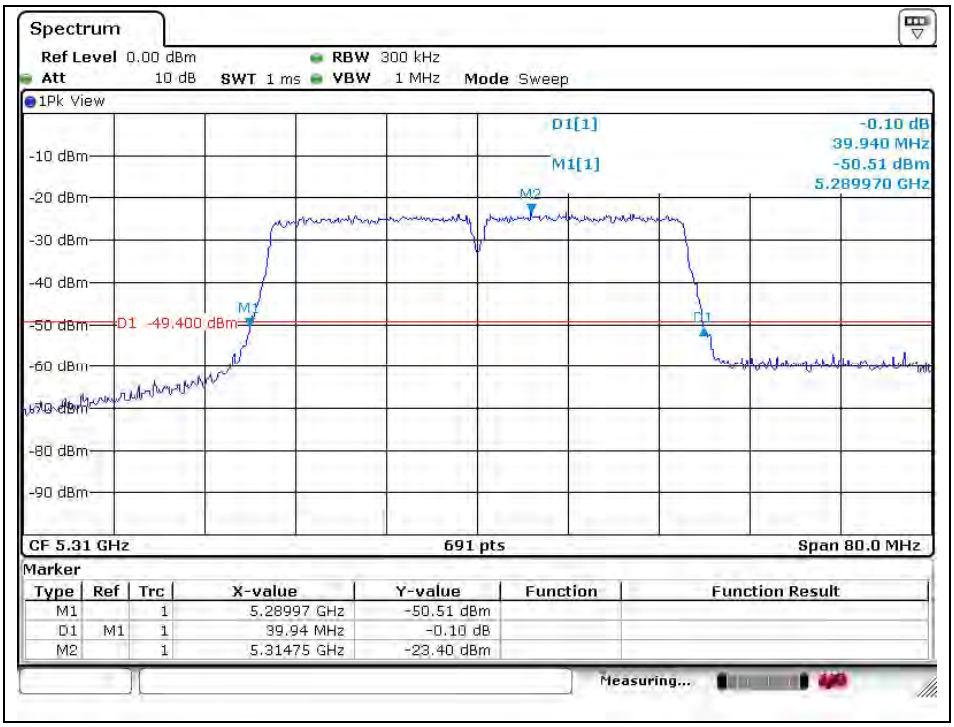


802.11n-HT40 (Band 2A)

Low Channel (5 270 ㎒)

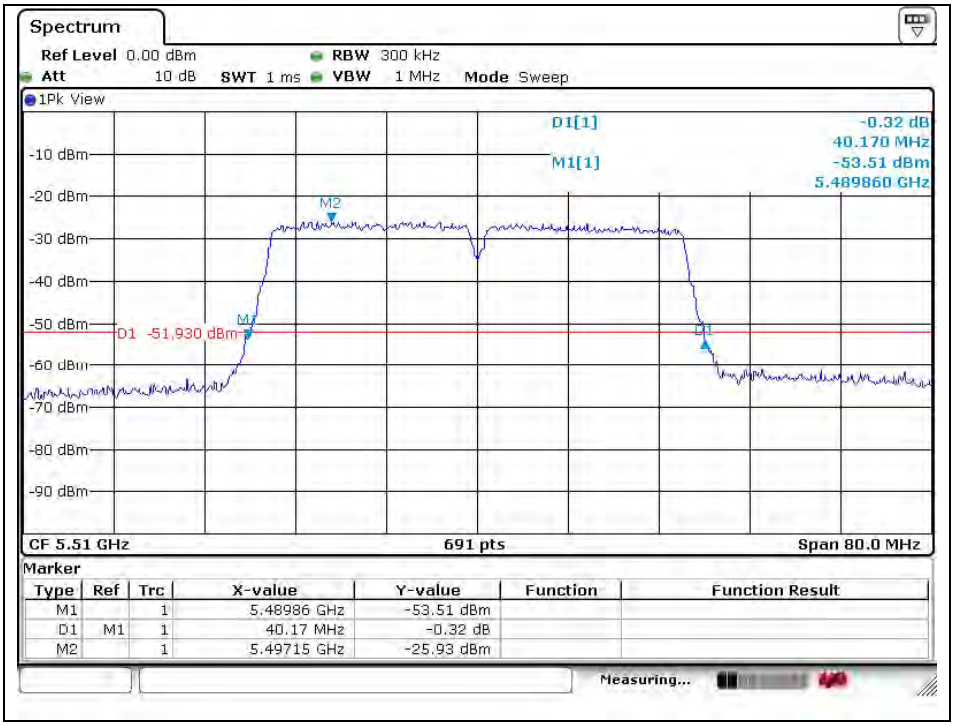


High Channel (5 310 ㎒)

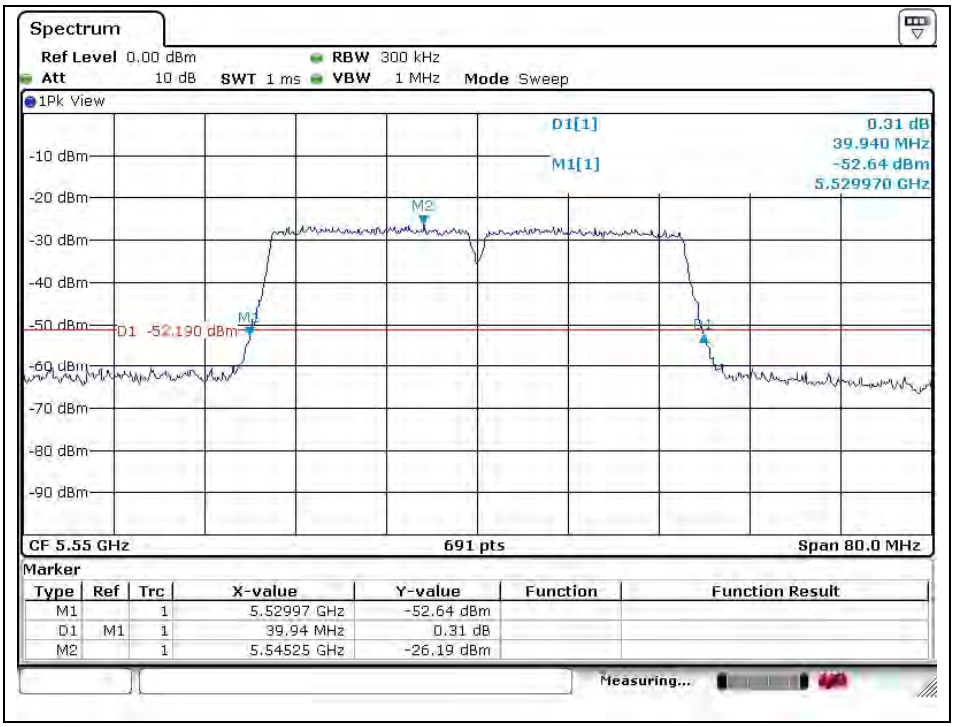


802.11n-HT40 (Band 2C)

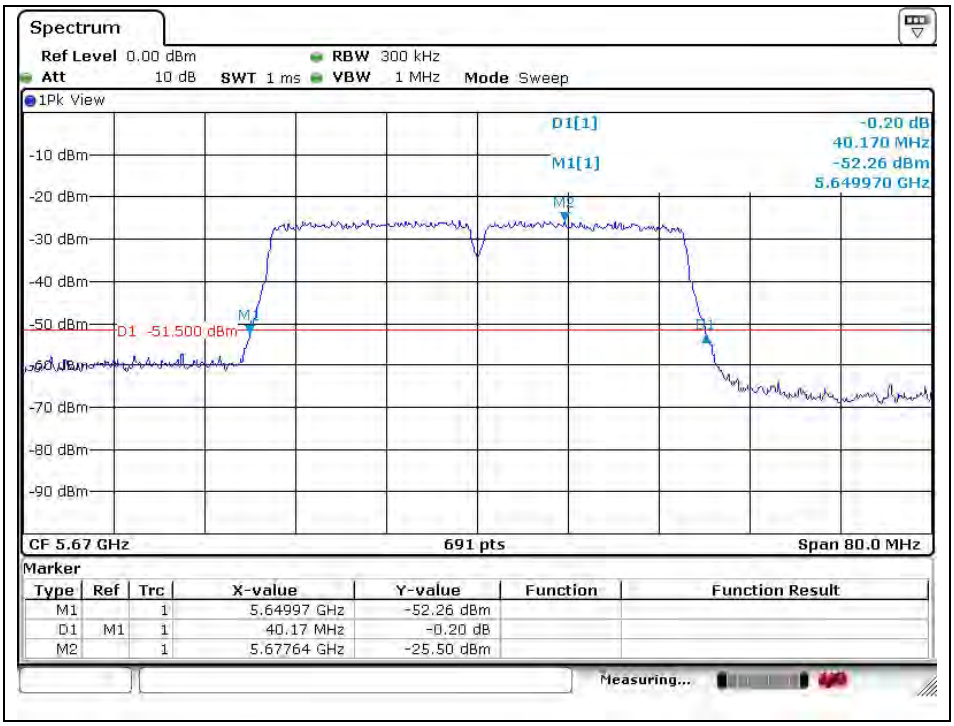
Low Channel (5 510 ㎒)



Middle Channel (5 550 ㎒)

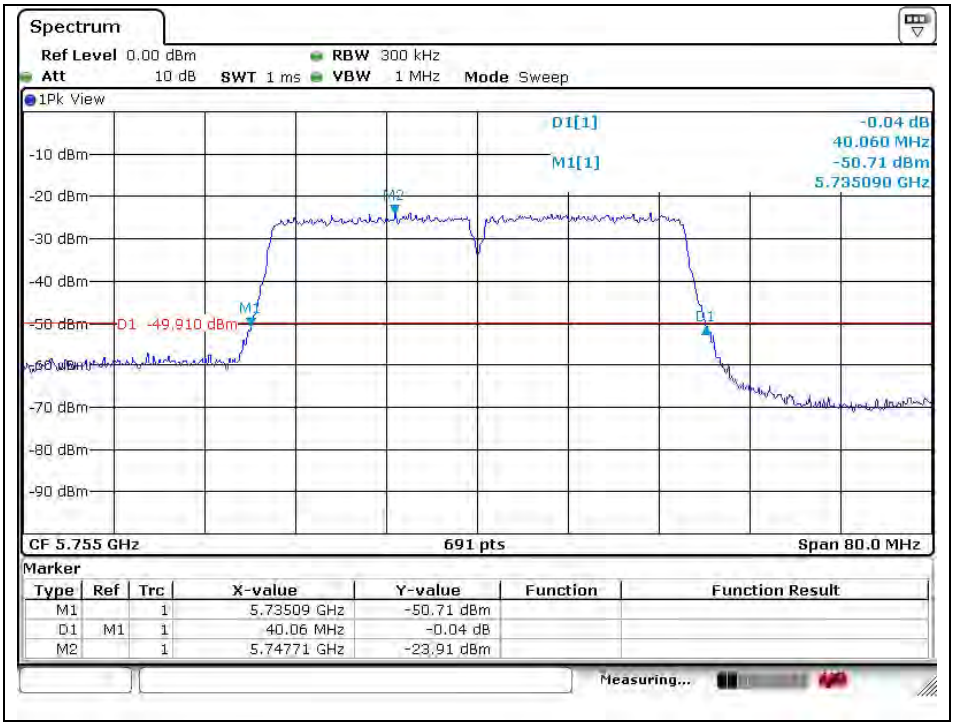


High Channel (5 670 ㎒)

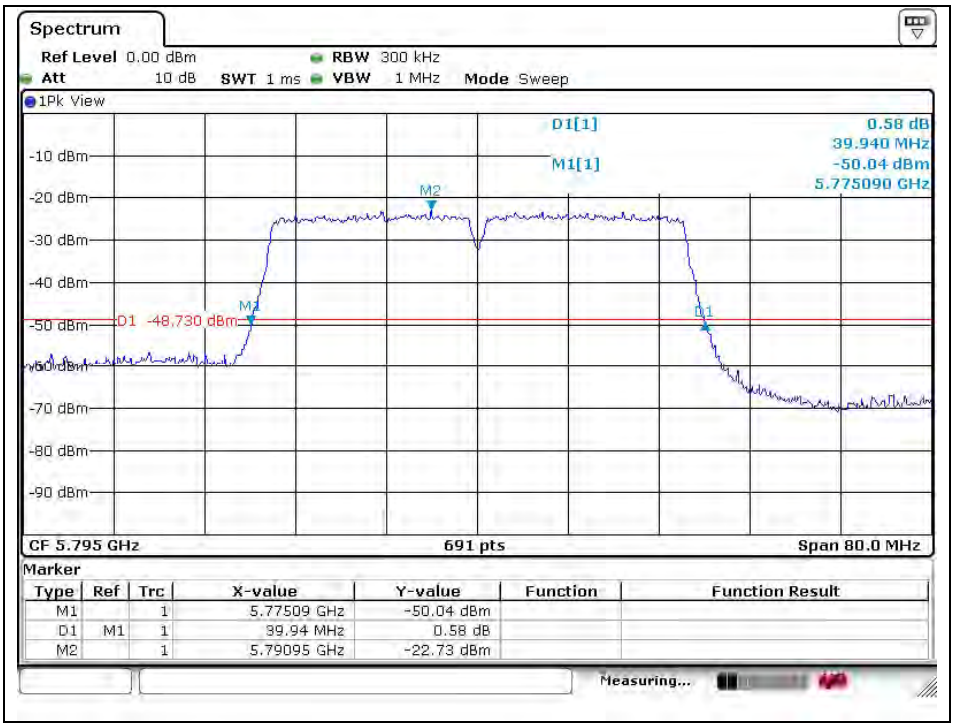


802.11n_HT40 (Band 3)

Low Channel (5 755 ㎒)

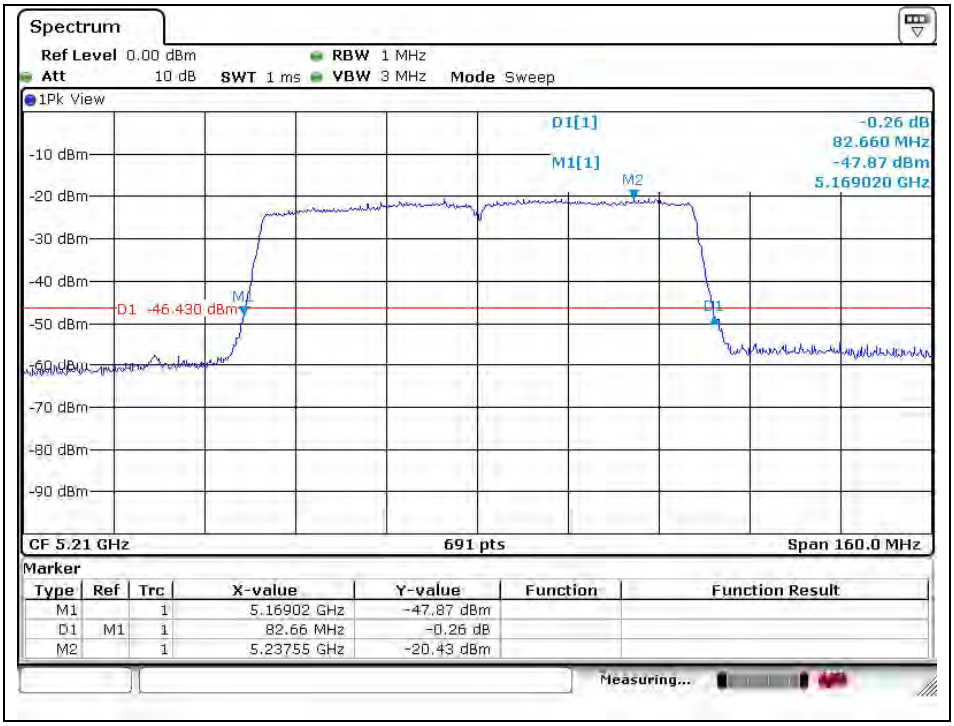


High Channel (5 795 ㎒)



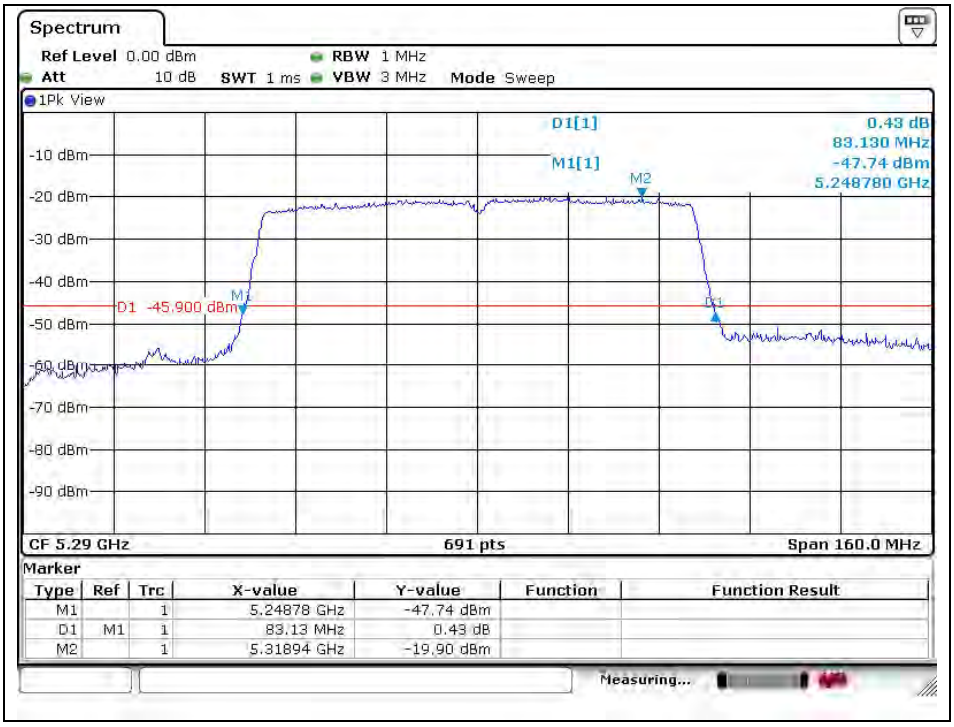
802.11ac_VHT80 (Band 1)

Middle Channel (5 210 ㎒)



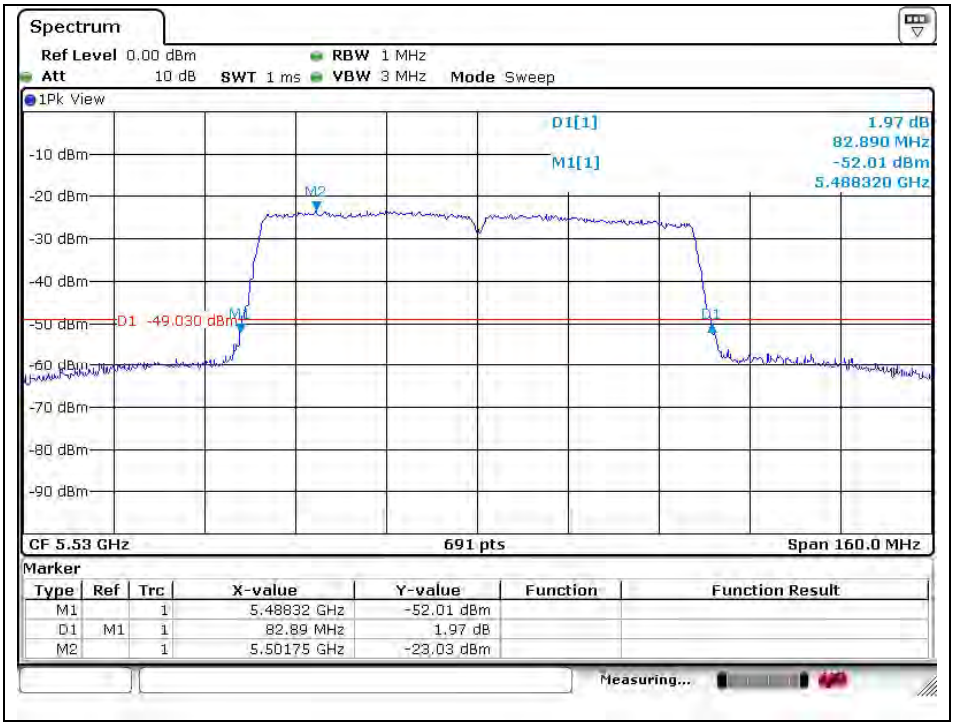
802. 11ac_VHT80 (Band 2A)

Middle Channel (5 290 ㎒)



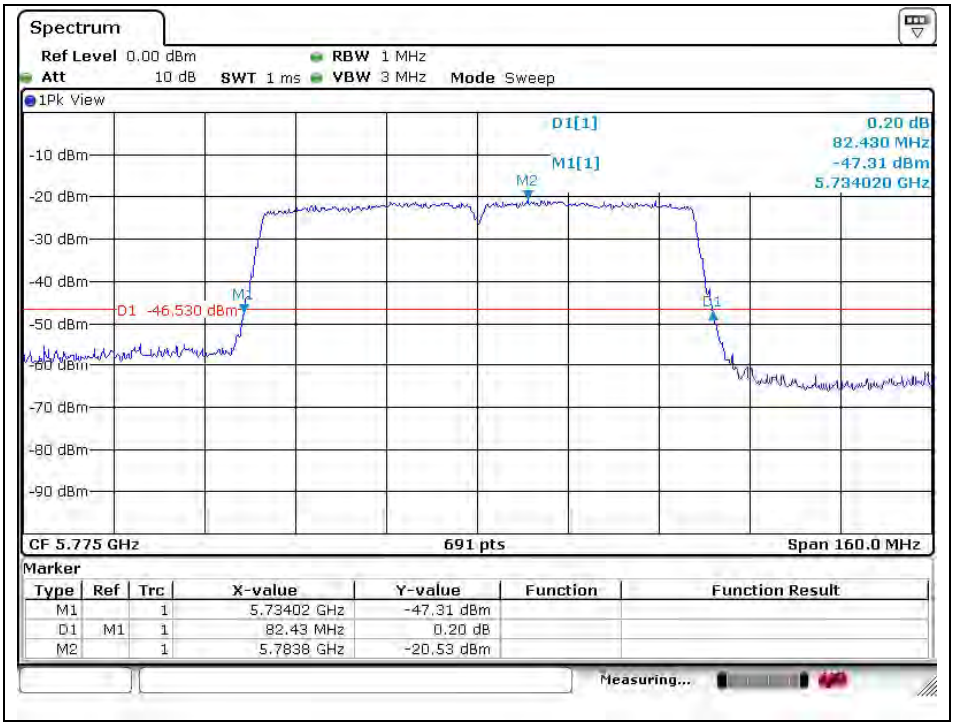
802. 11ac_VHT80 (Band 2C)

Middle Channel (5 530 ㎒)



802. 11ac_VHT80 (Band 3)

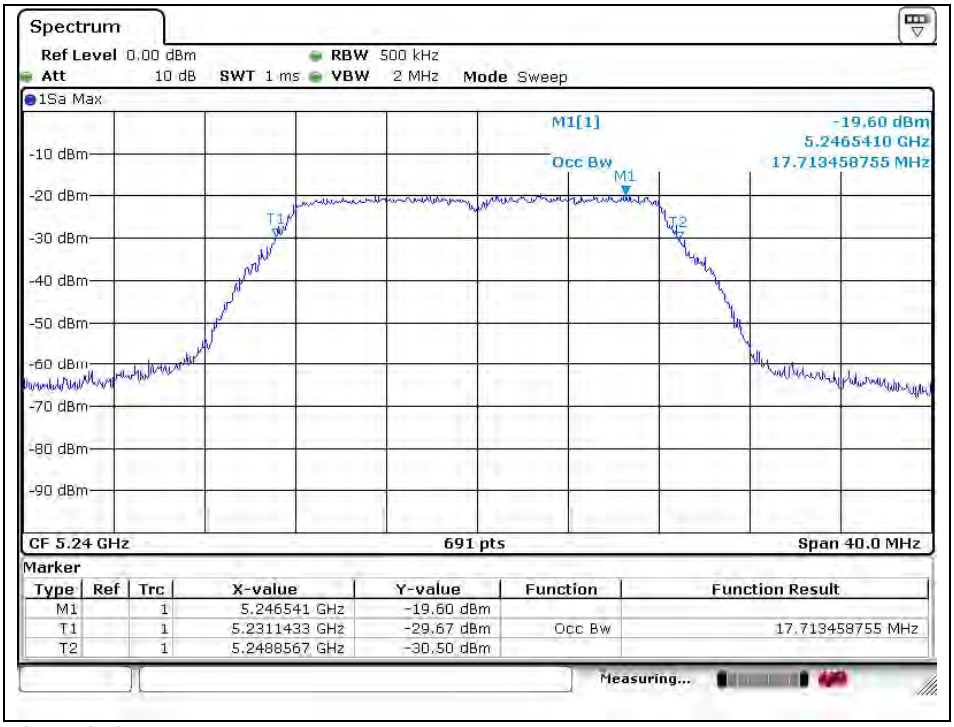
Middle Channel (5 775 ㎒)



99 % Bandwidth

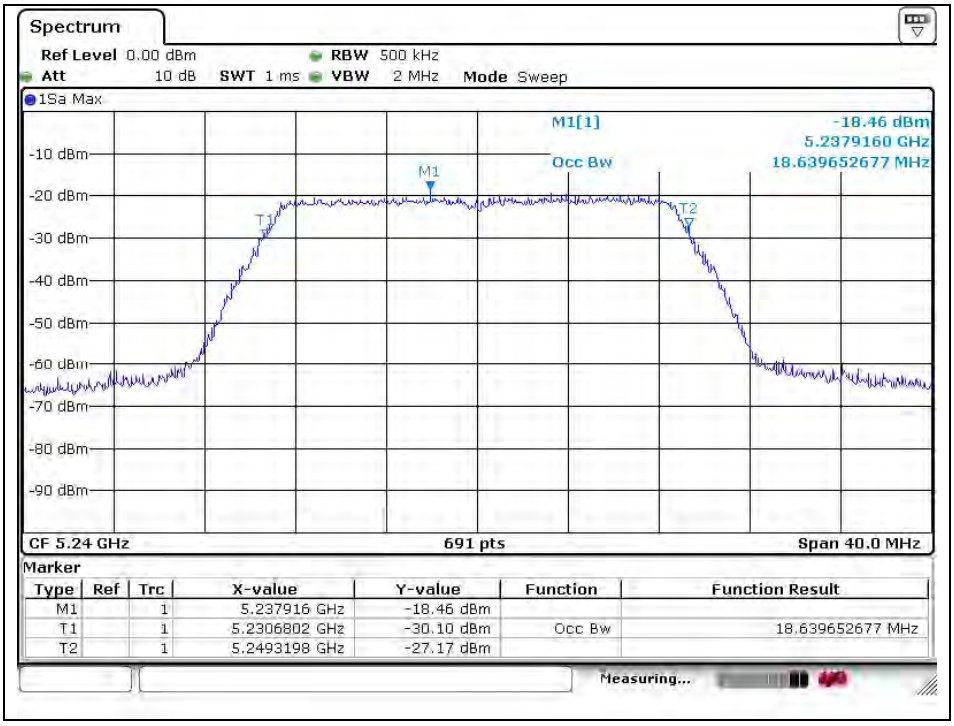
802.11a (Band 1)

High Channel (5 240 ㎒)



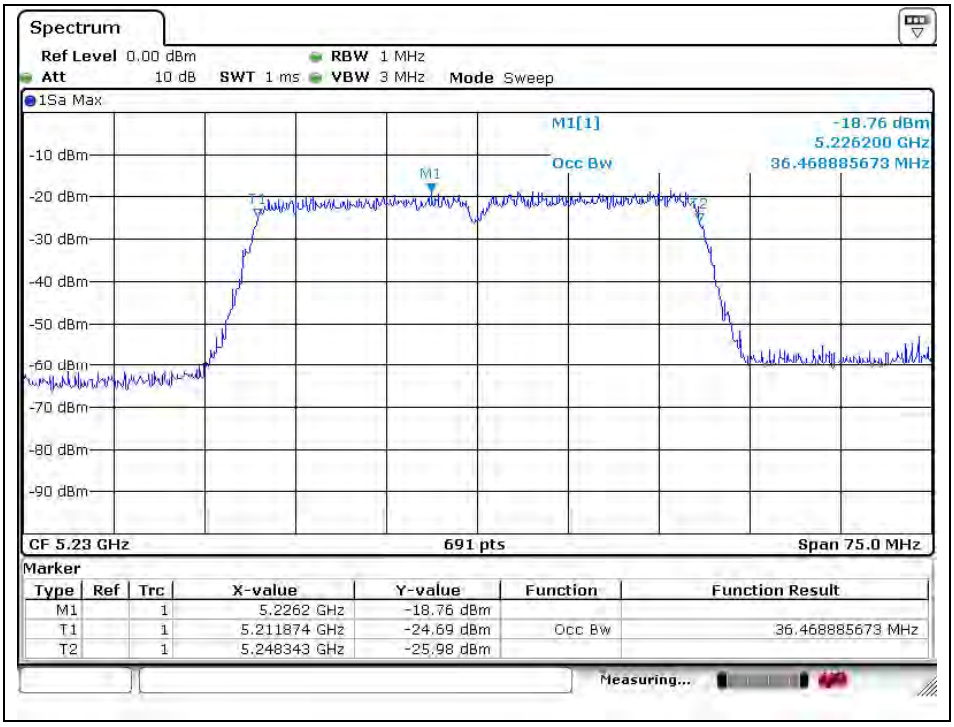
802.11n_HT20 (Band 1)

High Channel (5 240 ㎒)



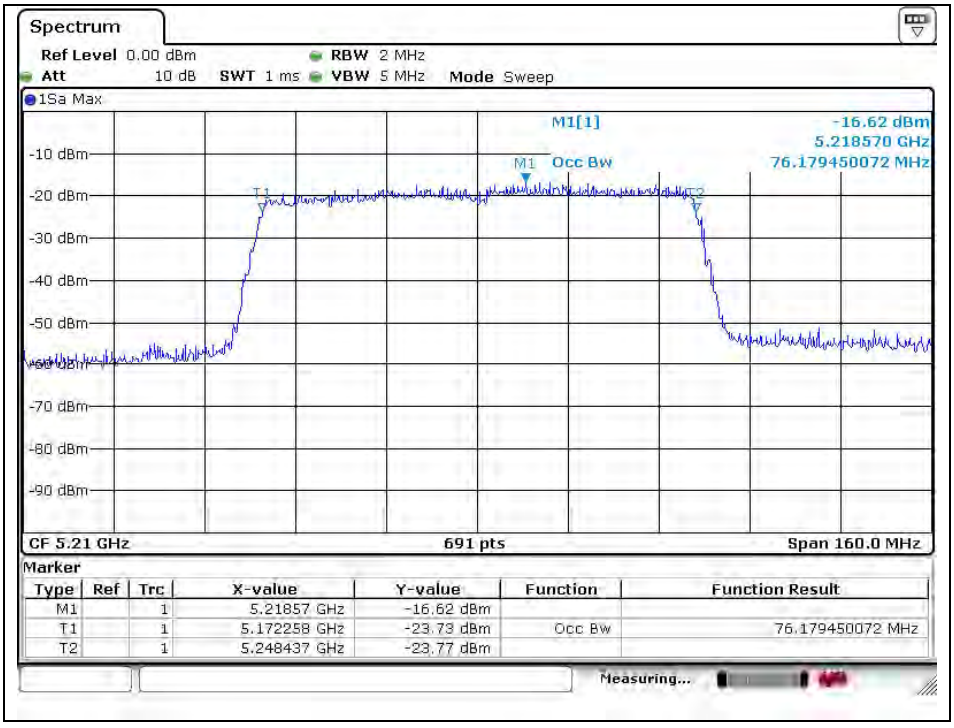
802.11n_HT40 (Band 1)

High Channel (5 230 ㎒)



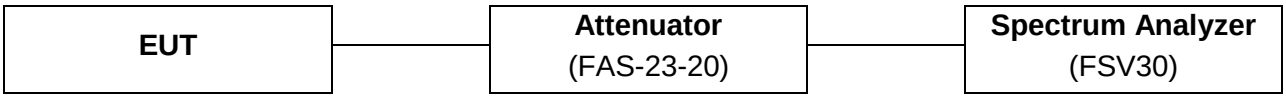
802.11ac_VHT80 (Band 1)

Middle Channel (5 210 ㎒)



4. 6 dB bandwidth

4.1. Test setup



4.2. Limit

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 C.2 of KDB 789033 D02 v01.
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.

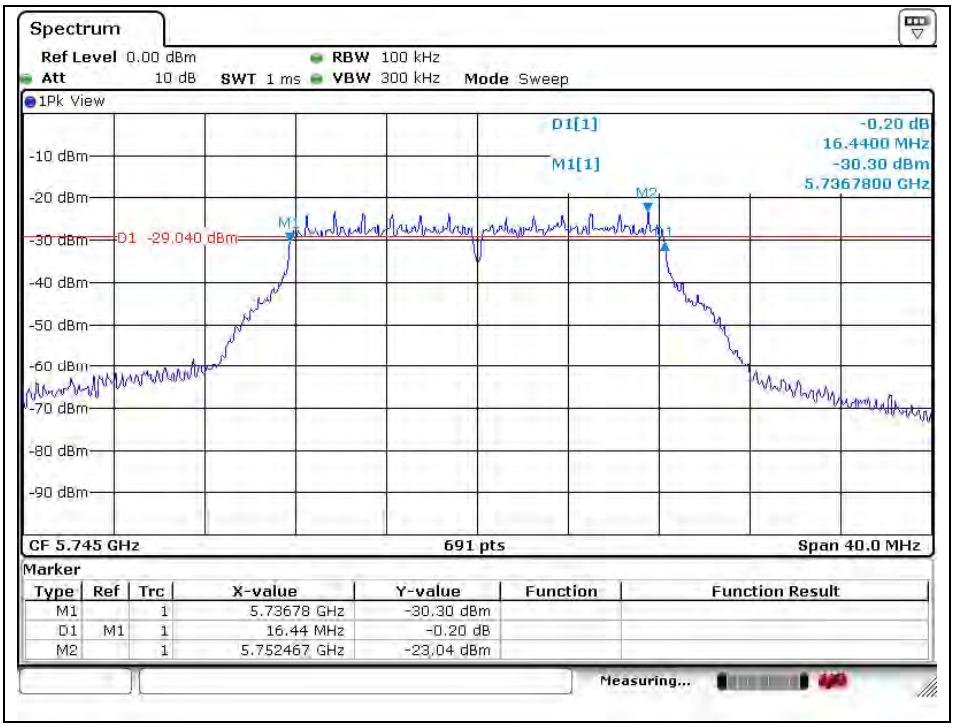
4.4. Test result

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

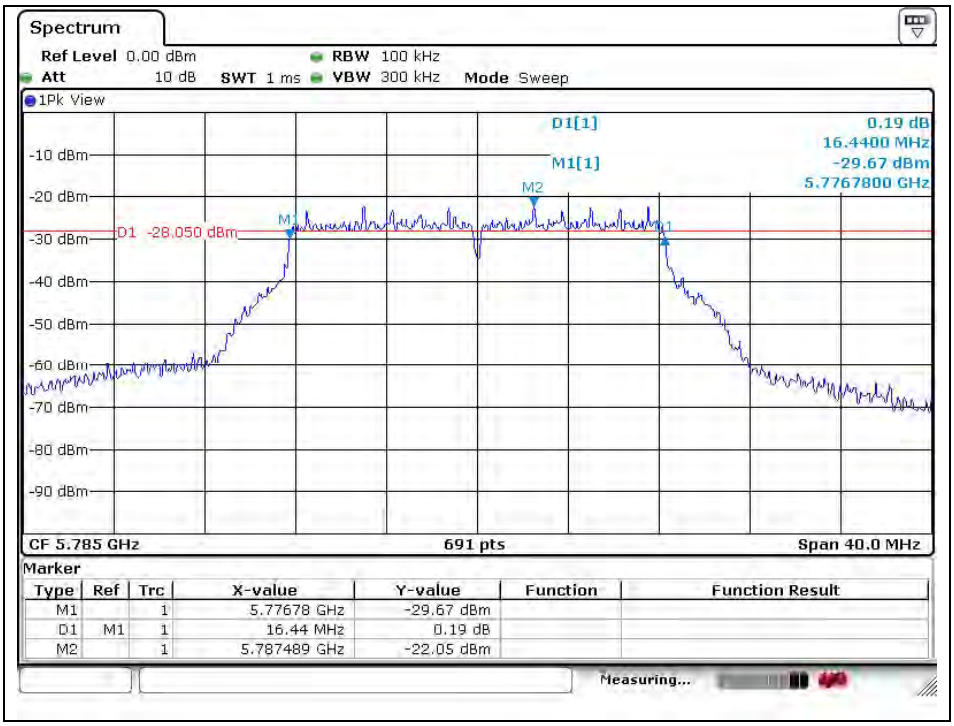
Band	Mode	Frequency (㎒)	Ch.	Data Rate (Mbps)	6 ㏈ Bandwidth (㎒)
U-NII 3	11a	5 745	149	6	16.44
		5 785	157	6	16.44
		5 825	165	6	16.44
	11n_HT20	5 745	149	MCS0	17.71
		5 785	157	MCS0	17.71
		5 825	165	MCS0	17.71
	11n_HT40	5 755	151	MCS0	36.47
		5 795	159	MCS0	36.58
	11ac_VHT80	5 775	155	MCS0	75.95

802.11a (Band 3)

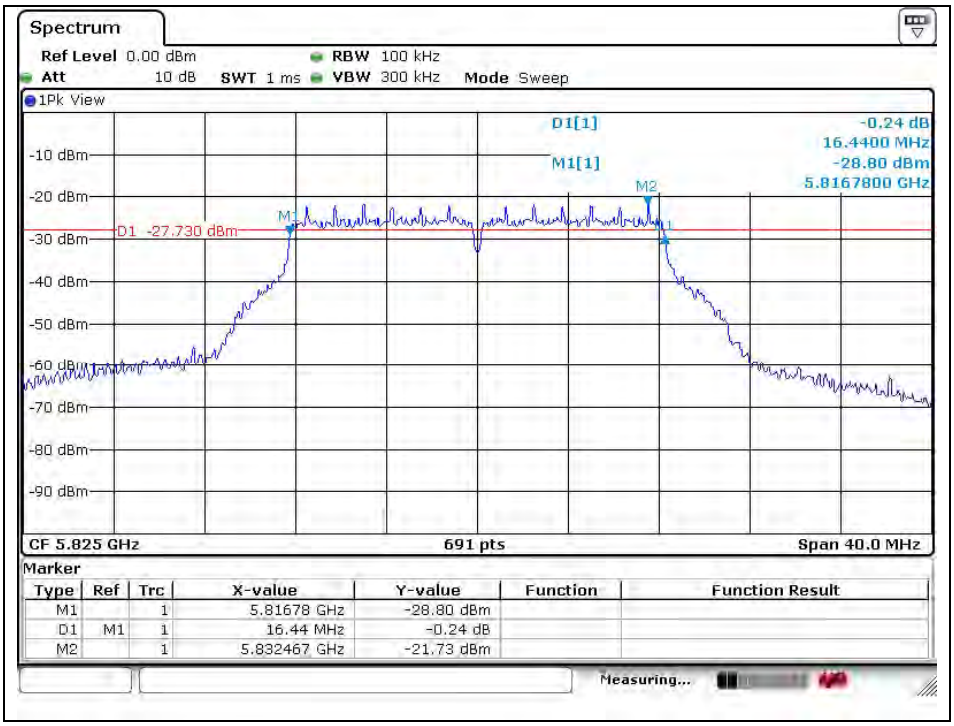
Low Channel (5 745 ㎒)



Middle Channel (5 785 ㎒)

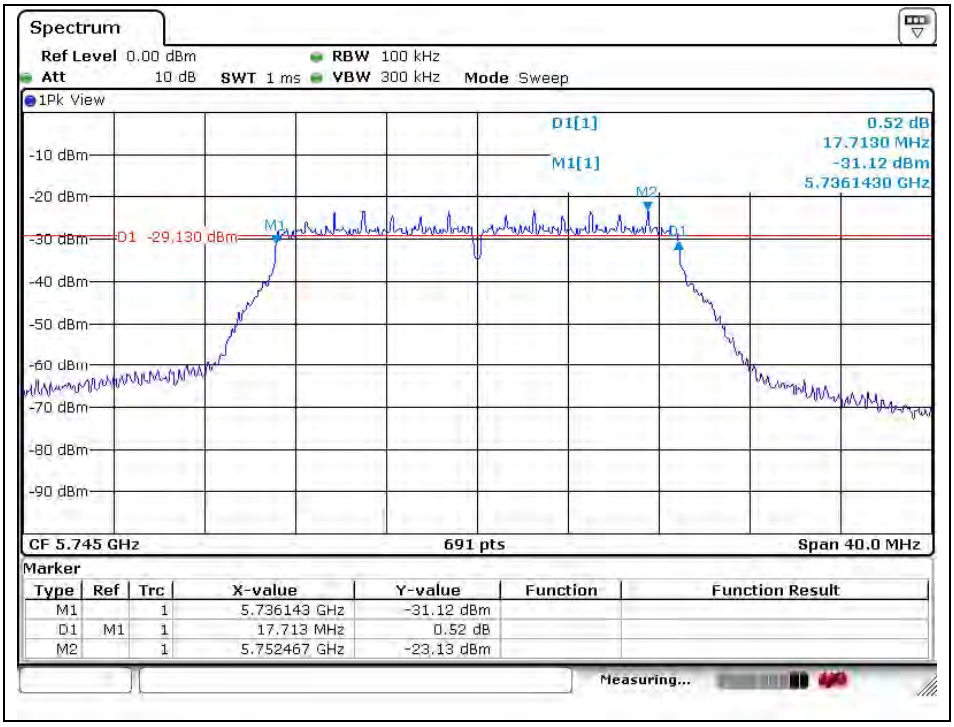


High Channel (5 825 ㎒)

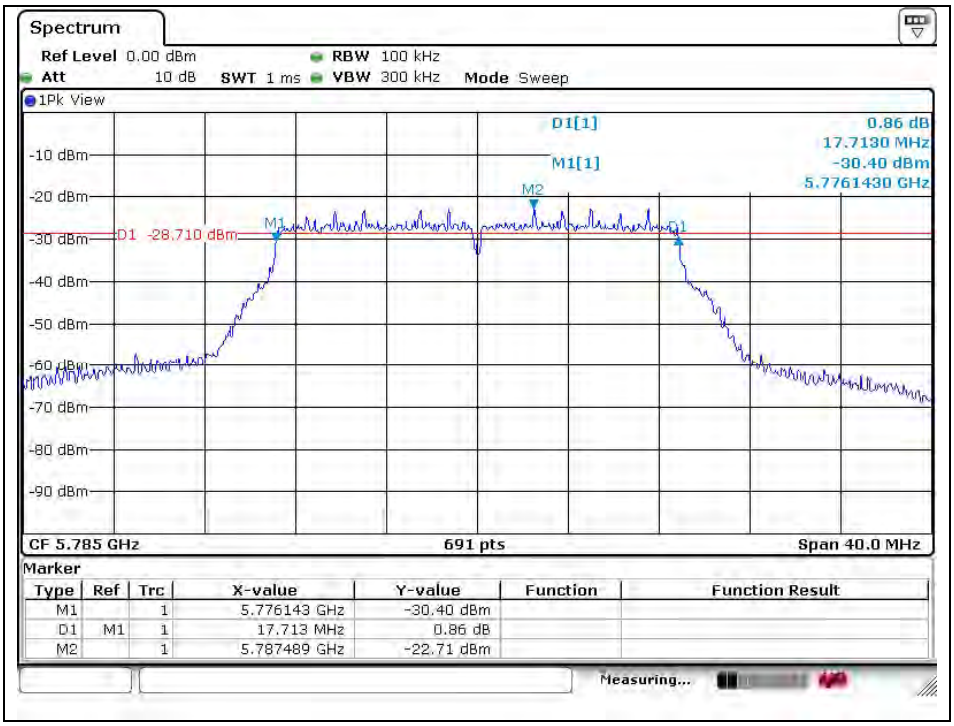


802.11n_HT20 (Band 3)

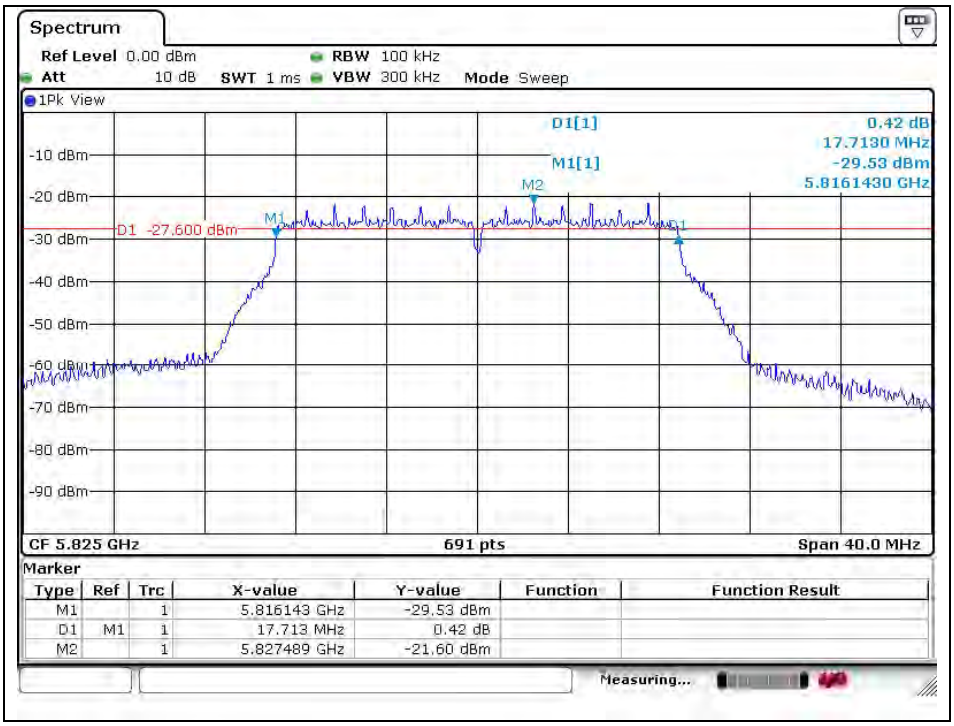
Low Channel (5 745 ㎒)



Middle Channel (5 785 ㎒)

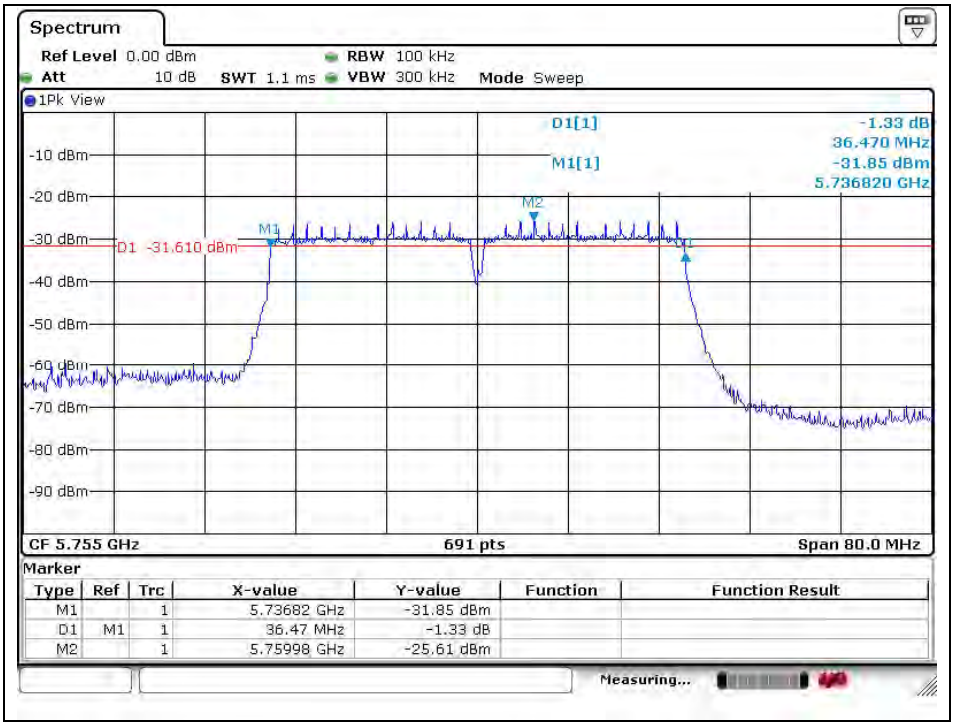


High Channel (5 825 ㎒)

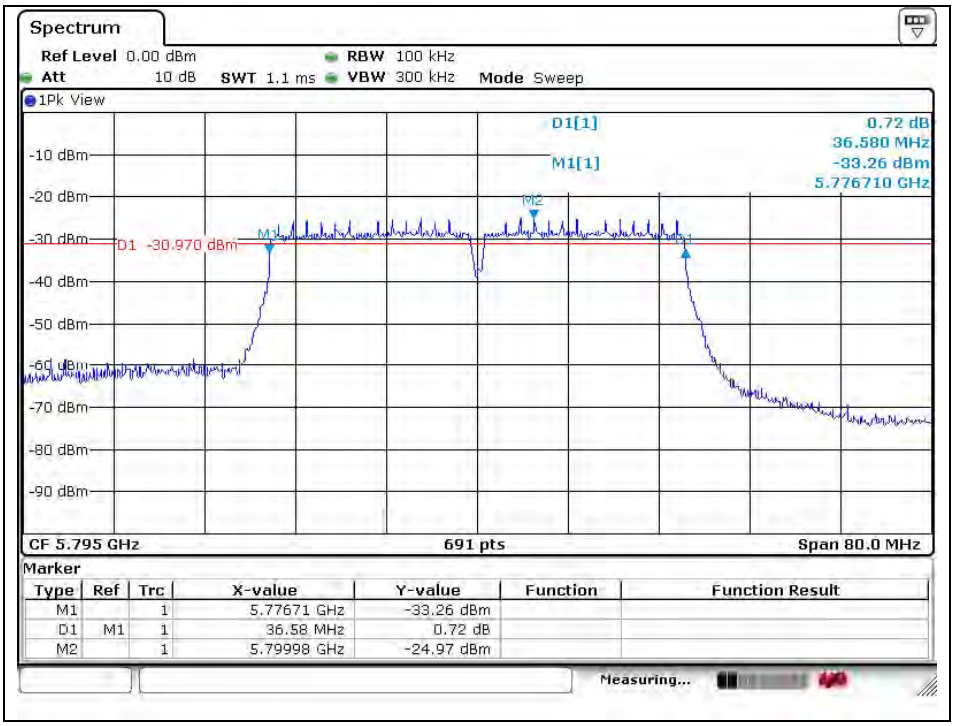


802.11n_HT40 (Band 3)

Low Channel (5 755 ㎒)

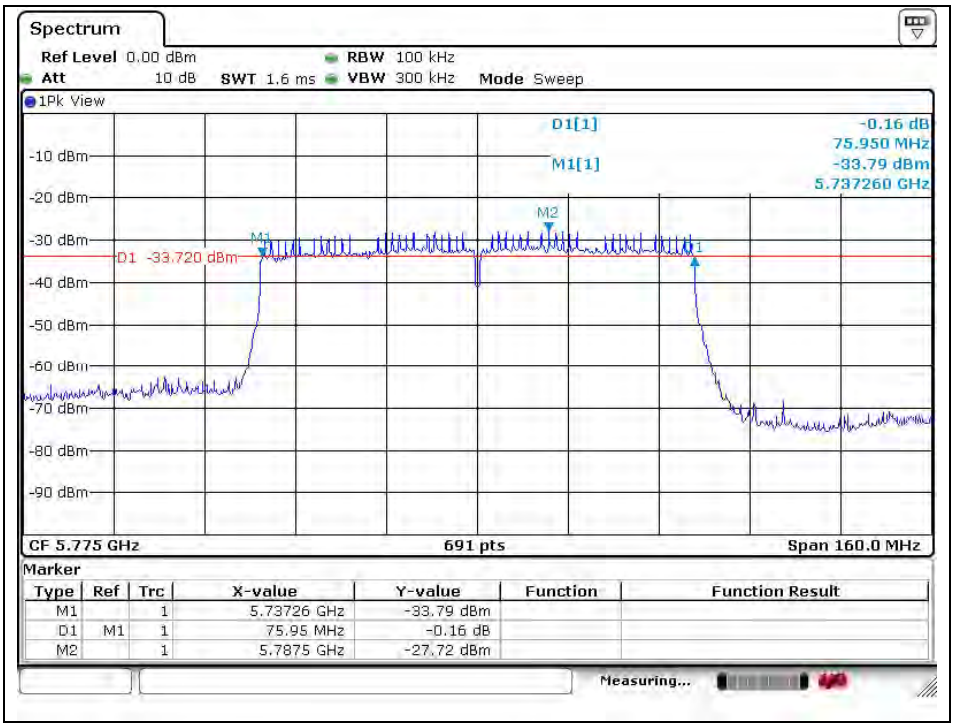


High Channel (5 795 ㎒)



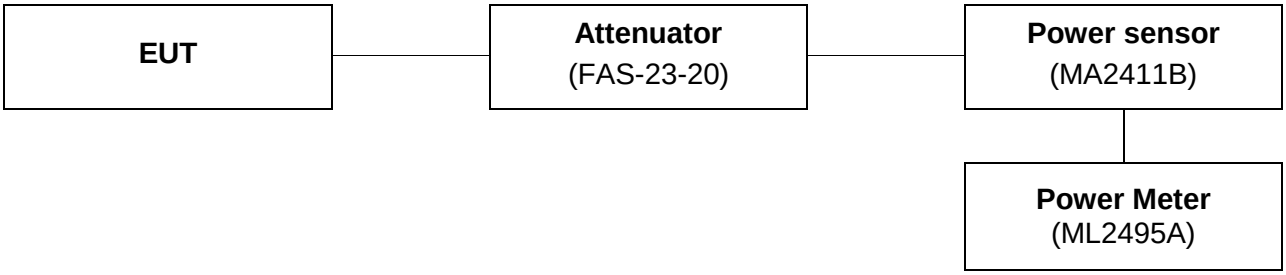
802.11ac_VHT80 (Band 3)

Middle Channel (5 775 ㎒)



5. Output power

5.1. Test setup



5.2. Limit

FCC 15.407 (a)(1)(iv)

For mobile and portable 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.

(a)(2)

For the 5.25 - 5.35 ㎓ and 5.47 - 5.725 ㎓ bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 ㎽ or 11 ㏈m 10 log B, where B is the 26 ㏈ emission bandwidth in megahertz. 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.

(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

1. This measurement settings are specified in clause 3) a) of section E of KDB 789033 D02 v01.
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 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 percent).

5.4. Test result

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

- 11a

Band	Power	Frequency (㎒)	Conducted Power (㏈m)							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
U-NII 1	Mea. average	5 180	11.28	11.07	11.02	10.82	10.76	10.30	10.13	9.98
	Result		11.66	11.59	11.70	11.72	11.92	11.88	12.11	12.15
	Mea. average	5 220	11.22	11.02	10.97	10.77	10.71	10.25	10.08	9.63
	Result		11.60	11.54	11.65	11.67	11.87	11.83	12.06	11.80
	Mea. average	5 240	11.12	10.92	10.87	10.67	10.61	10.15	9.98	9.74
	Result		11.50	11.44	11.55	11.57	11.77	11.73	11.96	11.91
U-NII 2A	Mea. average	5 260	12.59	12.39	12.34	12.14	12.08	11.62	11.45	10.97
	Result		12.97	12.91	13.02	13.04	13.24	13.20	13.43	13.14
	Mea. average	5 300	12.54	12.34	12.29	12.09	12.03	11.57	11.40	11.16
	Result		12.92	12.86	12.97	12.99	13.19	13.15	13.38	13.33
	Mea. average	5 320	12.79	12.59	12.54	12.34	12.28	11.82	11.65	11.21
	Result		13.17	13.11	13.22	13.24	13.44	13.40	13.63	13.38
U-NII 2C	Mea. average	5 500	9.55	9.39	9.34	9.14	9.08	8.62	8.45	8.02
	Result		9.93	9.91	10.02	10.04	10.24	10.20	10.43	10.19
	Mea. average	5 580	8.71	8.59	8.54	8.34	8.28	7.82	7.65	7.07
	Result		9.09	9.11	9.22	9.24	9.44	9.40	9.63	9.24
	Mea. average	5 700	9.90	9.79	9.74	9.54	9.48	9.02	8.85	8.39
	Result		10.28	10.31	10.42	10.44	10.64	10.60	10.83	10.56
U-NII 3	Mea. average	5 745	10.75	10.59	10.54	10.34	10.28	9.82	9.65	9.28
	Result		11.13	11.11	11.22	11.24	11.44	11.40	11.63	11.45
	Mea. average	5 785	11.53	11.29	11.24	11.04	10.98	10.52	10.35	10.03
	Result		11.91	11.81	11.92	11.94	12.14	12.10	12.33	12.20
	Mea. average	5 825	11.92	11.69	11.64	11.44	11.38	10.92	10.75	10.44
	Result		12.30	12.21	12.32	12.34	12.54	12.50	12.73	12.61

Band	Conducted Power Limit (㏈m)					
	Frequency (㎒)	Fixed Limit (㏈m)	26 ㏈ BW (㎒)	11+10LogB (㏈m)	Antenna gain (㏈i)	Limit (㏈m)
U-NII 1	5 180	24				
	5 220	24				
	5 240	24				
U-NII 2A	5 260	24	21.534	24.33	4.77	24
	5 300	24	21.592	24.34	4.77	24
	5 320	24	21.302	24.28	4.77	24
U-NII 2C	5 500	24	21.534	24.33	1.68	24
	5 580	24	21.360	24.30	1.68	24
	5 700	24	21.534	24.33	1.68	24
U-NII 3	5 745	30				
	5 785	30				
	5 825	30				

Mode	Duty cycle							
	Data Rate [Mbps]							
11a	6	9	12	18	24	36	48	54
Duty Cycle (%)	92	89	86	81	77	69	63	61
Correction factor (㏈)	0.38	0.52	0.68	0.90	1.16	1.58	1.98	2.17

Remark:

1. Result (㏈m) = Average (㏈m) + Correction factor (㏈)
2. Duty cycle (%) = (Tx on time / Tx on + off time) x 100
3. Correction factor (㏈) = 10 log (1/duty cycle (㎳))

- 11n_HT20

Band	Power	Frequency (㎒)	Conducted Power (㏈m)							
			Data Rate [MCS]							
			0	1	2	3	4	5	6	7
U-NII 1	Mea. average	5 180	11.27	11.09	10.68	10.78	10.23	9.94	9.85	9.66
	Result		11.62	11.81	11.61	11.94	11.81	11.92	11.92	11.93
	Mea. average	5 220	11.06	10.89	10.48	10.58	10.03	9.94	9.87	9.86
	Result		11.41	11.61	11.41	11.74	11.61	11.92	11.94	12.13
	Mea. average	5 240	11.03	10.86	10.45	10.55	10.00	9.91	9.84	9.78
	Result		11.38	11.58	11.38	11.71	11.58	11.89	11.91	12.05
U-NII 2A	Mea. average	5 260	12.73	12.36	11.95	12.05	11.50	11.41	11.34	11.02
	Result		13.08	13.08	12.88	13.21	13.08	13.39	13.41	13.29
	Mea. average	5 300	12.50	12.16	11.75	11.85	11.30	11.21	11.14	10.83
	Result		12.85	12.88	12.68	13.01	12.88	13.19	13.21	13.10
	Mea. average	5 320	12.71	12.36	11.95	12.05	11.50	11.41	11.34	11.08
	Result		13.06	13.08	12.88	13.21	13.08	13.39	13.41	13.35
U-NII 2C	Mea. average	5 500	9.35	9.06	8.65	8.75	8.20	8.11	8.04	7.87
	Result		9.70	9.78	9.58	9.91	9.78	10.09	10.11	10.14
	Mea. average	5 580	8.31	8.01	7.60	7.70	7.15	7.06	6.99	6.85
	Result		8.66	8.73	8.53	8.86	8.73	9.04	9.06	9.12
	Mea. average	5 700	9.65	9.36	8.95	9.05	8.50	8.41	8.34	8.25
	Result		10.00	10.08	9.88	10.21	10.08	10.39	10.41	10.52
U-NII 3	Mea. average	5 745	10.24	9.96	9.55	9.65	9.10	9.01	8.94	8.85
	Result		10.59	10.68	10.48	10.81	10.68	10.99	11.01	11.12
	Mea. average	5 785	11.28	11.01	10.60	10.70	10.15	10.06	9.99	9.85
	Result		11.63	11.73	11.53	11.86	11.73	12.04	12.06	12.12
	Mea. average	5 825	11.77	11.51	11.10	11.20	10.65	10.56	10.49	10.31
	Result		12.12	12.23	12.03	12.36	12.23	12.54	12.56	12.58

Band	Conducted Power Limit (㏈m)					
	Frequency (㎒)	Fixed Limit (㏈m)	26 ㏈ BW (㎒)	11+10LogB (㏈m)	Antenna gain (㏈i)	Limit (㏈m)
U-NII 1	5 180	24				
	5 220	24				
	5 240	24				
U-NII 2A	5 260	24	21.708	24.37	4.77	24
	5 300	24	21.650	24.35	4.77	24
	5 320	24	21.418	24.31	4.77	24
U-NII 2C	5 500	24	21.476	24.32	1.68	24
	5 580	24	21.302	24.28	1.68	24
	5 700	24	21.708	24.37	1.68	24
U-NII 3	5 745	30				
	5 785	30				
	5 825	30				

Mode	Duty cycle							
	Data Rate [MCS]							
11n_HT20	0	1	2	3	4	5	6	7
Duty Cycle (%)	92	85	81	77	69	63	62	59
Correction factor (㏈)	0.35	0.72	0.93	1.16	1.58	1.98	2.07	2.27

Remark:

1. Result (㏈ m) = Average (㏈ m) + Correction factor (㏈)
2. Duty cycle (%) = (Tx on time / Tx on + off time) x 100
3. Correction factor (㏈) = 10 log (1/duty cycle (㎳))

- 11n_HT40

Band	Power	Frequency (㎒)	Conducted Power (㏈m)							
			Data Rate [MCS]							
			0	1	2	3	4	5	6	7
U-NII 1	Mea. average	5 190	10.75	10.16	9.71	9.60	9.21	8.69	8.61	8.55
	Result		11.35	11.25	11.17	11.36	11.55	11.32	11.42	11.56
	Mea. average	5 230	10.66	9.26	8.81	8.70	8.61	8.59	8.51	8.47
	Result		11.26	10.35	10.27	10.46	10.95	11.22	11.32	11.48
U-NII 2A	Mea. average	5 270	11.73	10.36	9.91	9.80	9.71	9.69	9.61	9.36
	Result		12.33	11.45	11.37	11.56	12.05	12.32	12.42	12.37
	Mea. average	5 310	12.00	10.66	10.21	10.10	10.01	9.99	9.91	9.57
	Result		12.60	11.75	11.67	11.86	12.35	12.62	12.72	12.58
U-NII 2C	Mea. average	5 510	8.25	7.92	7.45	7.42	7.36	7.21	7.10	7.18
	Result		8.85	9.01	8.91	9.18	9.70	9.84	9.91	10.19
	Mea. average	5 550	8.24	7.86	7.41	7.30	7.21	7.19	7.11	7.08
	Result		8.84	8.95	8.87	9.06	9.55	9.82	9.92	10.09
	Mea. average	5 670	9.45	9.06	8.61	8.50	8.41	8.39	8.31	7.02
	Result		10.05	10.15	10.07	10.26	10.75	11.02	11.12	10.03
U-NII 3	Mea. average	5 755	10.58	10.21	9.76	9.65	9.56	9.54	9.46	8.20
	Result		11.18	11.30	11.22	11.41	11.90	12.17	12.27	11.21
	Mea. average	5 795	11.26	10.91	10.46	10.35	10.26	10.24	10.16	8.97
	Result		11.86	12.00	11.92	12.11	12.60	12.87	12.97	11.98

Band	Conducted Power Limit (㏈m)					
	Frequency (㎒)	Fixed Limit (㏈m)	26 ㏈ BW (㎒)	11+10LogB (㏈m)	Antenna gain (㏈i)	Limit (㏈m)
U-NII 1	5 190	24				
	5 230	24				
U-NII 2A	5 270	24	40.170	27.04	4.77	24
	5 310	24	39.940	27.01	4.77	24
U-NII 2C	5 510	24	40.170	27.04	1.68	24
	5 550	24	39.940	27.01	1.68	24
	5 670	24	40.170	27.04	1.68	24
U-NII 3	5 755	30				
	5 795	30				

Mode	Duty cycle							
	Data Rate [MCS]							
11n_HT40	0	1	2	3	4	5	6	7
Duty Cycle (%)	87	78	71	67	58	55	52	50
Correction factor (㏈)	0.60	1.09	1.46	1.76	2.34	2.63	2.81	3.01

Remark:

1. Result (㏈m) = Average (㏈m) + Correction factor (㏈)
2. Duty cycle (%) = (Tx on time / Tx on + off time) x 100
3. Correction factor (㏈) = 10 log (1/duty cycle (㎳))

- 11ac_VHT20

Band	Power	Frequency (㎒)	Conducted Power (㏈m)								
			Data Rate [MCS]								
			0	1	2	3	4	5	6	7	8
U-NII 1	Mea. average	5 180	10.99	10.68	10.39	10.59	10.23	9.94	9.87	9.48	9.30
	Result		11.34	11.39	11.30	11.63	11.64	11.70	11.71	11.49	11.52
	Mea. average	5 220	10.90	10.58	10.29	10.49	10.13	9.84	9.77	9.38	9.24
	Result		11.25	11.29	11.20	11.53	11.54	11.60	11.61	11.39	11.46
	Mea. average	5 240	11.04	10.73	10.44	10.64	10.28	9.99	9.92	9.53	9.47
	Result		11.39	11.44	11.35	11.68	11.69	11.75	11.76	11.54	11.69
U-NII 2A	Mea. average	5 260	12.29	11.93	11.64	11.84	11.48	11.19	11.12	10.73	10.73
	Result		12.64	12.64	12.55	12.88	12.89	12.95	12.96	12.74	12.95
	Mea. average	5 300	12.37	12.01	11.72	11.92	11.56	11.27	11.20	10.81	10.65
	Result		12.72	12.72	12.63	12.96	12.97	13.03	13.04	12.82	12.87
	Mea. average	5 320	12.52	12.16	11.87	12.07	11.71	11.42	11.35	10.96	11.09
	Result		12.87	12.87	12.78	13.11	13.12	13.18	13.19	12.97	13.31
U-NII 2C	Mea. average	5 500	9.33	8.96	8.67	8.87	8.51	8.22	8.15	7.76	7.59
	Result		9.68	9.67	9.58	9.91	9.92	9.98	9.99	9.77	9.81
	Mea. average	5 580	8.33	7.96	7.67	7.87	7.51	7.22	7.15	6.76	6.65
	Result		8.68	8.67	8.58	8.91	8.92	8.98	8.99	8.77	8.87
	Mea. average	5 700	9.53	9.09	8.80	8.76	8.64	8.35	8.28	8.15	8.09
	Result		9.88	9.80	9.71	9.80	10.05	10.11	10.12	10.16	10.31
U-NII 3	Mea. average	5 745	10.51	10.08	9.79	9.75	9.63	9.34	9.27	9.14	8.77
	Result		10.86	10.79	10.70	10.79	11.04	11.10	11.11	11.15	10.99
	Mea. average	5 785	11.24	10.80	10.51	10.47	10.35	10.06	9.99	9.86	9.62
	Result		11.59	11.51	11.42	11.51	11.76	11.82	11.83	11.87	11.84
	Mea. average	5 825	11.68	11.25	10.96	10.92	10.80	10.51	10.44	10.31	10.04
	Result		12.03	11.96	11.87	11.96	12.21	12.27	12.28	12.32	12.26

Band	Conducted Power Limit (㏈m)					
	Frequency (㎒)	Fixed Limit (㏈m)	26 ㏈ BW (㎒)	11+10LogB (㏈m)	Antenna gain (㏈i)	Limit (㏈m)
U-NII 1	5 180	24				
	5 220	24				
	5 240	24				
U-NII 2A	5 260	24	21.592	24.34	4.77	24
	5 300	24	21.708	24.37	4.77	24
	5 320	24	21.939	24.41	4.77	24
U-NII 2C	5 500	24	21.650	24.35	1.68	24
	5 580	24	21.766	24.38	1.68	24
	5 700	24	22.055	24.44	1.68	24
U-NII 3	5 745	30				
	5 785	30				
	5 825	30				

Mode	Duty cycle								
	Data Rate [MCS]								
11ac_VHT20	0	1	2	3	4	5	6	7	8
Duty Cycle (%)	92	85	81	79	72	67	66	63	60
Correction factor (㏈)	0.35	0.71	0.91	1.04	1.41	1.76	1.84	2.01	2.22

Remark:

1. Result (㏈ m) = Average (㏈ m) + Correction factor (㏈)
2. Duty cycle (%) = (Tx on time / Tx on + off time) x 100
3. Correction factor (㏈) = 10 log (1/duty cycle (㎳))

- 11ac_VHT40

Band	Power	Frequency (㎒)	Conducted Power (㏈m)									
			Data Rate [MCS]									
			0	1	2	3	4	5	6	7	8	9
U-NII 1	Mea. average	5 190	10.85	10.43	9.92	9.82	9.36	8.95	8.74	8.65	8.34	8.28
	Result		11.52	11.49	11.38	11.58	11.58	11.58	11.55	11.66	11.35	11.53
	Mea. average	5 230	10.94	10.52	10.01	9.91	9.45	9.04	8.83	8.74	8.43	8.26
	Result		11.61	11.58	11.47	11.67	11.67	11.67	11.64	11.75	11.44	11.51
U-NII 2A	Mea. average	5 270	11.88	11.47	10.96	10.86	10.40	9.99	9.78	9.69	9.38	9.26
	Result		12.55	12.53	12.42	12.62	12.62	12.62	12.59	12.70	12.39	12.51
	Mea. average	5 310	9.26	12.05	11.65	11.14	11.04	10.58	10.17	9.69	9.87	9.56
	Result		12.72	12.71	12.60	12.80	12.80	12.80	12.77	12.88	12.57	12.54
U-NII 2C	Mea. average	5 510	8.89	8.50	7.99	7.89	7.43	7.02	6.81	6.72	6.41	6.18
	Result		9.56	9.56	9.45	9.65	9.65	9.65	9.62	9.73	9.42	9.43
	Mea. average	5 550	8.33	7.95	7.44	7.34	6.88	6.47	6.26	6.17	5.86	5.57
	Result		9.00	9.01	8.90	9.10	9.10	9.10	9.07	9.18	8.87	8.82
	Mea. average	5 670	9.46	9.10	8.59	8.49	8.03	7.62	7.41	7.32	7.01	6.82
	Result		10.13	10.16	10.05	10.25	10.25	10.25	10.22	10.33	10.02	10.07
U-NII 3	Mea. average	5 755	10.61	10.26	9.75	9.65	9.19	8.78	8.57	8.48	8.17	7.82
	Result		11.28	11.32	11.21	11.41	11.41	11.41	11.38	11.49	11.18	11.07
	Mea. average	5 795	11.15	10.81	10.30	10.20	9.74	9.33	9.12	9.03	8.72	8.46
	Result		11.82	11.87	11.76	11.96	11.96	11.96	11.93	12.04	11.73	11.71

Band	Conducted Power Limit (㏈m)					
	Frequency (㎒)	Fixed Limit (㏈m)	26 ㏈ BW (㎒)	11+10LogB (㏈m)	Antenna gain (㏈i)	Limit (㏈m)
U-NII 1	5 190	24				
	5 230	24				
U-NII 2A	5 270	24	40.170	27.04	4.77	24
	5 310	24	40.170	27.04	4.77	24
U-NII 2C	5 510	24	40.060	27.03	1.68	24
	5 550	24	40.170	27.04	1.68	24
	5 670	24	40.520	27.08	1.68	24
U-NII 3	5 755	30				
	5 795	30				

Mode	Duty cycle									
	Data Rate [MCS]									
11ac_VHT40	0	1	2	3	4	5	6	7	8	9
Duty Cycle (%)	86	78	71	67	60	55	52	50	50	47
Correction factor (㏈)	0.67	1.06	1.46	1.76	2.22	2.63	2.81	3.01	3.01	3.25

Remark:

1. Result (㏈m) = Average (㏈m) + Correction factor (㏈)
2. Duty cycle (%) = (Tx on time / Tx on + off time) x 100
3. Correction factor (㏈) = 10 log (1/duty cycle (㎳))

- 11ac_VHT80

Band	Power	Frequency (㎒)	Conducted Power (㏈m)									
			Data Rate [MCS]									
			0	1	2	3	4	5	6	7	8	9
U-NII 1	Mea. Average	5 210	10.65	9.56	9.54	9.50	8.87	8.57	8.48	8.24	8.25	8.01
	Result		11.93	13.08	11.88	12.13	12.12	12.09	12.00	12.09	12.10	12.53
U-NII 2A	Mea. Average	5 290	11.34	10.27	10.25	10.21	9.58	9.28	9.19	8.95	8.96	8.60
	Result		12.62	13.79	12.59	12.84	12.83	12.80	12.71	12.80	12.81	13.12
U-NII 2C	Mea. Average	5 530	7.91	6.85	6.83	6.79	6.16	5.86	5.77	5.53	5.54	5.20
	Result		9.19	10.37	9.17	9.42	9.41	9.38	9.29	9.38	9.39	9.72
U-NII 3	Mea. Average	5 775	10.18	9.09	9.07	9.03	8.40	8.10	8.01	7.77	7.78	7.55
	Result		11.46	12.61	11.41	11.66	11.65	11.62	11.53	11.62	11.63	12.07

Band	Conducted Power Limit (㏈m)					
	Frequency (㎒)	Fixed Limit (㏈m)	26 ㏈ BW (㎒)	11+10LogB (㏈m)	Antenna gain (㏈i)	Limit (㏈m)
U-NII 1	5 210	24				
U-NII 2A	5 290	24	83.130	30.20	4.77	24
U-NII 2C	5 530	24	82.890	30.19	1.68	24
U-NII 3	5 775	30				

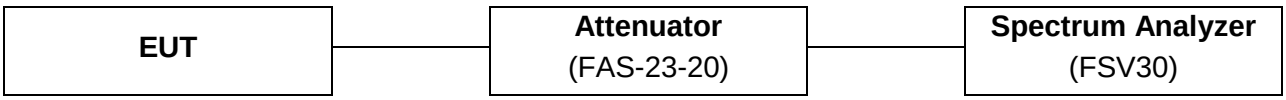
Mode	Duty cycle									
	Data Rate [MCS]									
11ac_VHT80	0	1	2	3	4	5	6	7	8	9
Duty Cycle (%)	74	44	58	55	47	44	44	41	41	35
Correction factor (dB)	1.28	3.52	2.34	2.63	3.25	3.52	3.52	3.85	3.85	4.52

Remark:

1. Result (㏈m) = Average (㏈m) + Correction factor (㏈)
2. Duty cycle (%) = (Tx on time / Tx on + off time) x 100
3. Correction factor (㏈) = 10 log (1/duty cycle (㎳))

6. Peak power spectral density

6.1. Test setup



6.2. Limit

FCC 15.407 (a)(1)(iv)

For mobile and portable 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.

(a)(2)

For the 5.25 - 5.35 ㎓ and 5.47 - 5.725 ㎓ bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 ㎽ or 11 ㏈m 10 log B, where B is the 26 ㏈ emission bandwidth in megahertz. 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.

(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 F of KDB 789033 D02 v01.

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.l.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.

Note: As a practical matter, it is recommended to use reduced RBW of 100 ㎑ for the sections 5.c) and 5.d) above, since RBW = 100 ㎑ is available on nearly all spectrum analyzers.

6.4. Test result

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

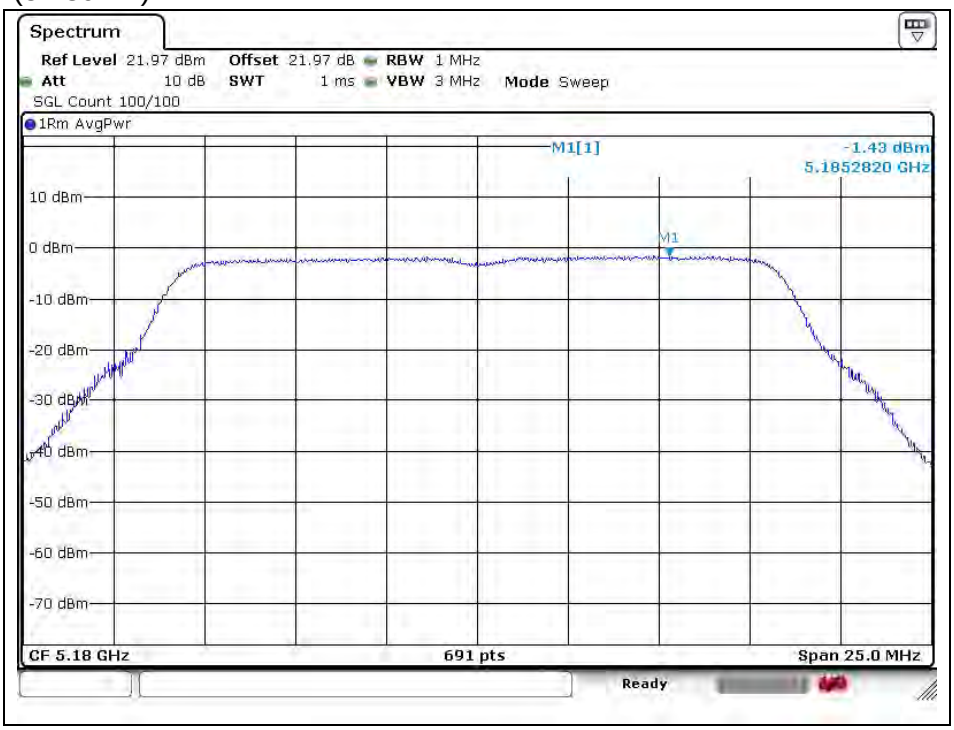
Band	Mode	Frequency (㎒)	Ch.	Data Rate (Mbps)	Measured PPSD (㏈m)	Duty Factor (㏈)	Final PPSD (㏈m)	Limit (㏈m/1 ㎒)
U-NII 1	11a	5 180	36	6	-1.43	0.38	-1.05	11
		5 220	44	6	-1.42	0.38	-1.04	11
		5 240	48	6	-1.59	0.38	-1.21	11
	11n_HT20	5 180	36	MCS0	-1.95	0.35	-1.60	11
		5 220	44	MCS0	-1.68	0.35	-1.33	11
		5 240	48	MCS0	-2.12	0.35	-1.77	11
	11n_HT40	5 190	38	MCS0	-4.84	0.60	-4.24	11
		5 230	46	MCS0	-4.56	0.60	-3.96	11
	11ac_VHT80	5 210	42	MCS0	-8.00	1.28	-6.72	11
U-NII 2A	11a	5 260	52	6	-0.44	0.38	-0.06	11
		5 300	60	6	0.13	0.38	0.51	11
		5 320	64	6	0.46	0.38	0.84	11
	11n_HT20	5 260	52	MCS0	-0.63	0.35	-0.28	11
		5 300	60	MCS0	0.10	0.35	0.45	11
		5 320	64	MCS0	-0.02	0.35	0.33	11
	11n_HT40	5 270	54	MCS0	-3.44	0.60	-2.84	11
		5 310	62	MCS0	-3.34	0.60	-2.74	11
	11ac_VHT80	5 290	58	MCS0	-7.02	1.28	-5.74	11
U-NII 2C	11a	5 500	134	6	-2.41	0.38	-2.03	11
		5 580	106	6	-3.65	0.38	-3.27	11
		5 700	140	6	-2.42	0.38	-2.04	11
	11n_HT20	5 500	100	MCS0	-2.67	0.35	-2.32	11
		5 580	116	MCS0	-3.73	0.35	-3.38	11
		5 700	140	MCS0	-2.71	0.35	-2.36	11
	11n_HT40	5 510	102	MCS0	-5.84	0.60	-5.24	11
		5 550	110	MCS0	-6.71	0.60	-6.11	11
		5 670	134	MCS0	-6.33	1.28	-5.05	11
	11ac_VHT80	5 530	106	MCS0	-9.80	0.38	-9.42	11

Band	Mode	Frequency (㎒)	Ch.	Data Rate	Measured PPSD (㏈m)	Duty Factor (㏈)	Final PPSD (㏈m)	Limit (㏈m/500 ㎑)
U-NII 3	11a	5 745	149	6	-4.35	0.38	-3.97	30
		5 785	157	6	-3.10	0.38	-2.72	30
		5 825	165	6	-2.73	0.38	-2.35	30
	11n_HT20	5 745	149	MCS0	-5.30	0.35	-4.95	30
		5 785	157	MCS0	-3.82	0.35	-3.47	30
		5 825	165	MCS0	-3.42	0.35	-3.07	30
	11n_HT40	5 755	151	MCS0	-7.78	0.60	-7.18	30
		5 795	159	MCS0	-6.64	0.60	-6.04	30
	11ac_VHT80	5 775	155	MCS0	-10.51	1.28	-9.23	30

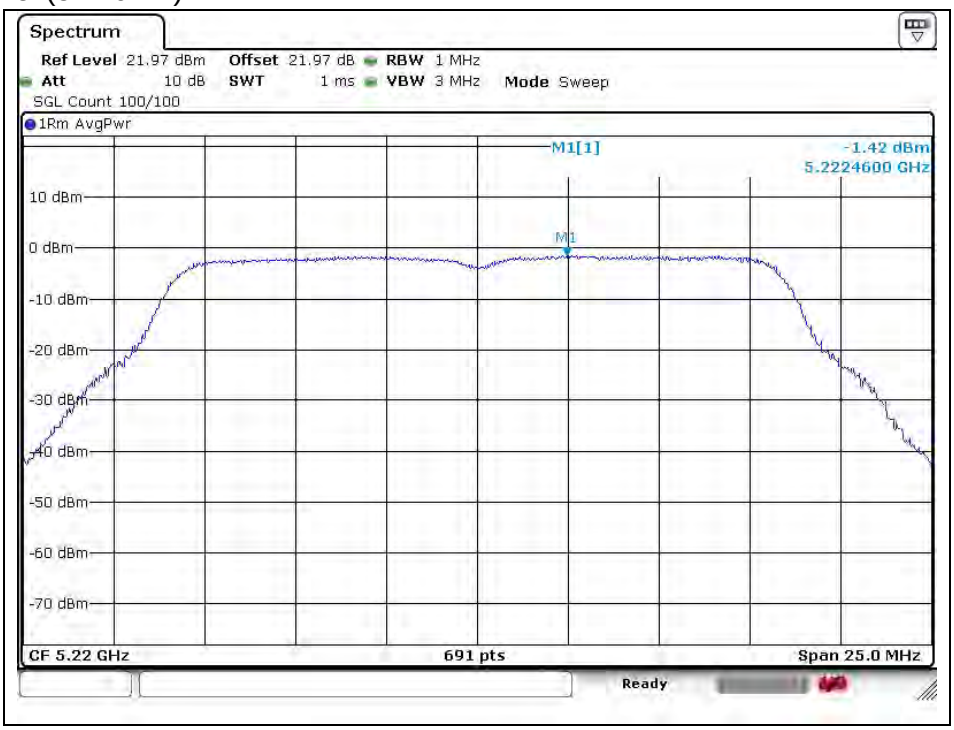
Note : Final PPSD = Measured PPSD + Duty Factor

802.11a (Band 1)

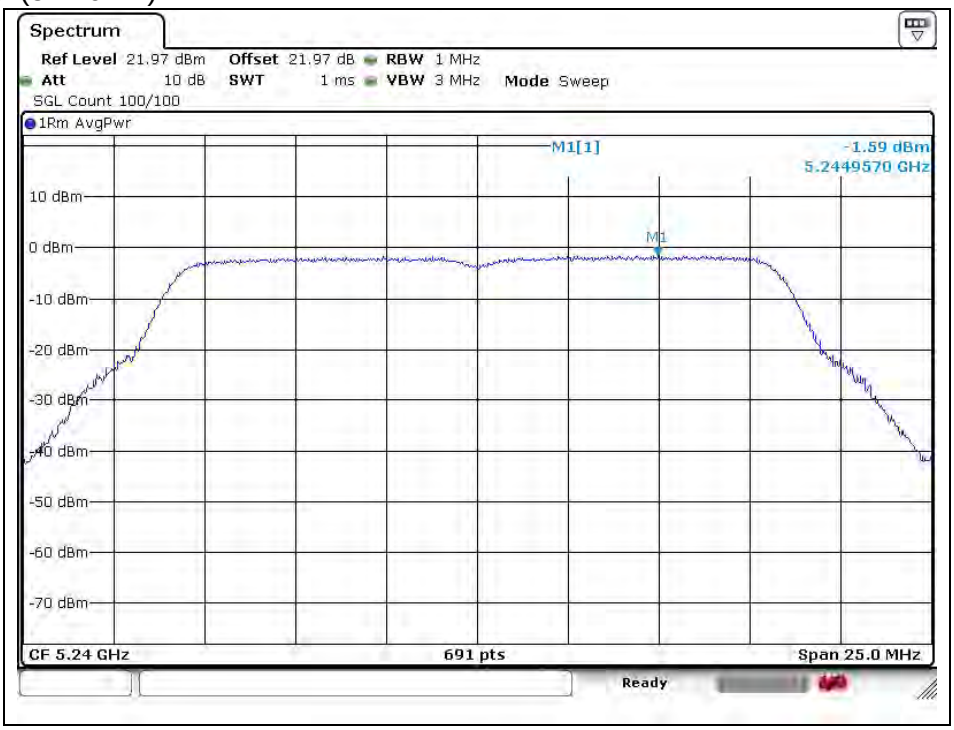
Low Channel (5 180 ㎒)



Middle Channel (5 220 ㎒)

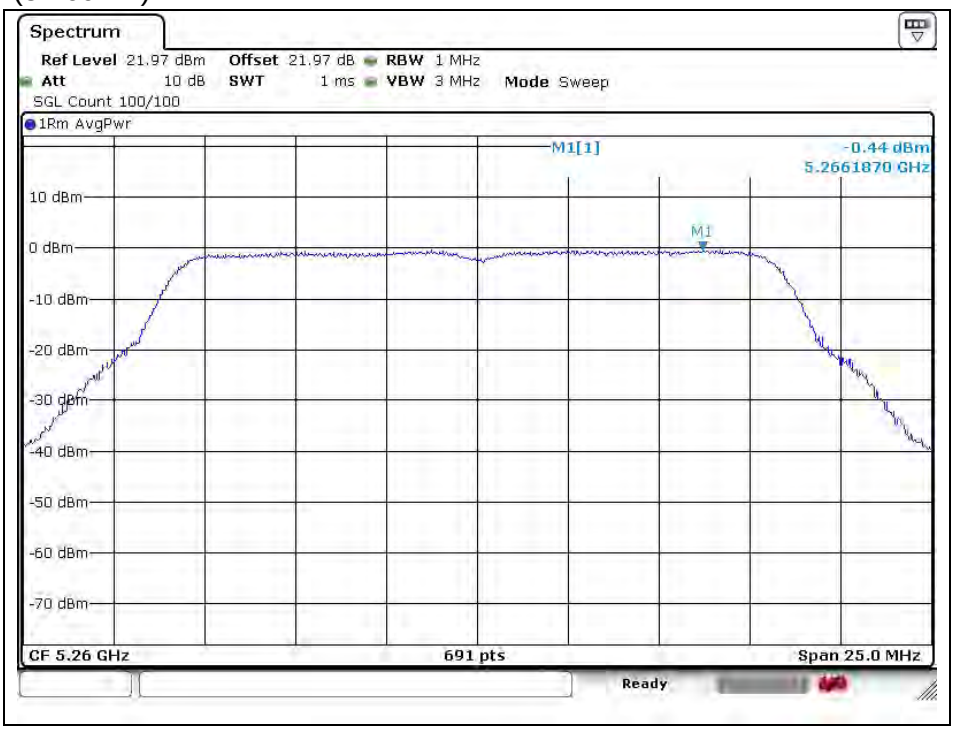


High Channel (5 240 ㎒)

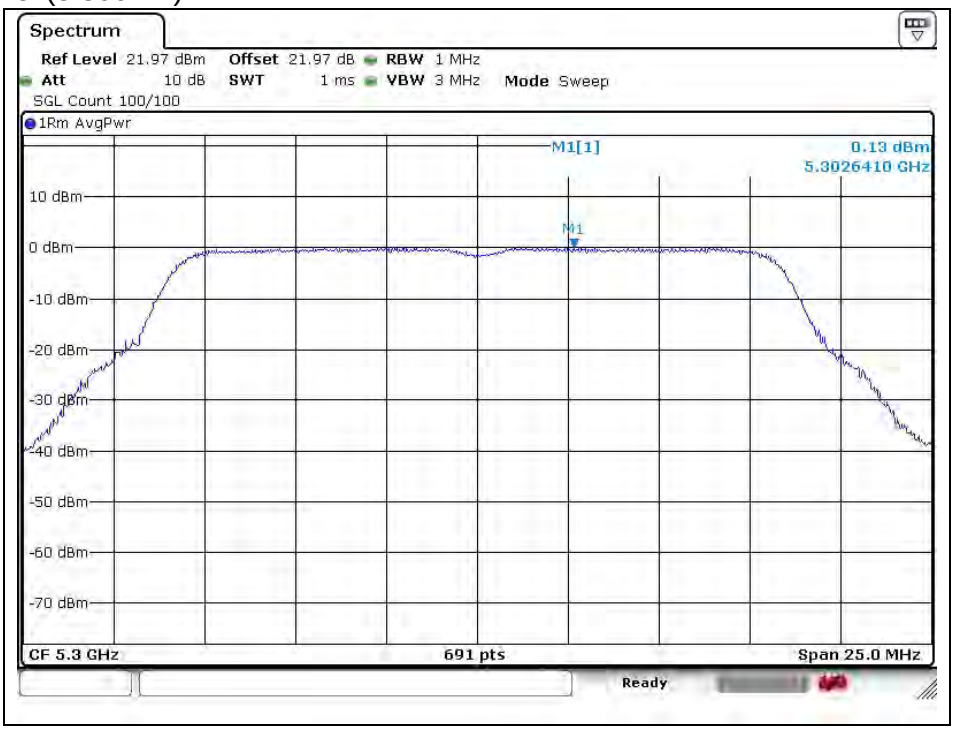


802.11a (Band 2A)

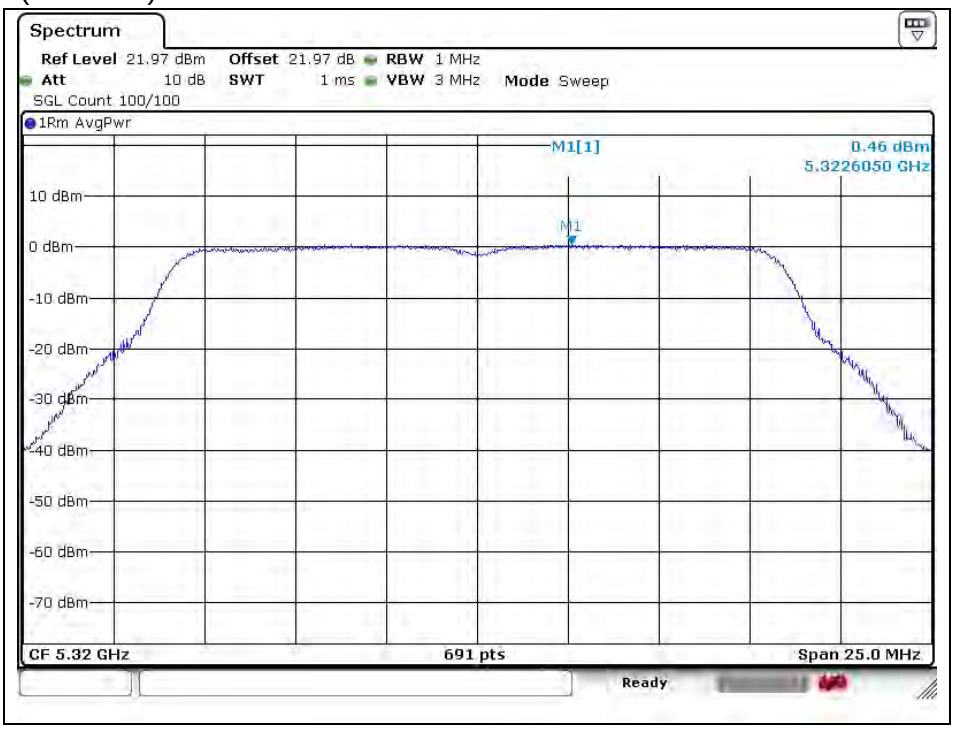
Low Channel (5 260 ㎒)



Middle Channel (5 300 ㎒)

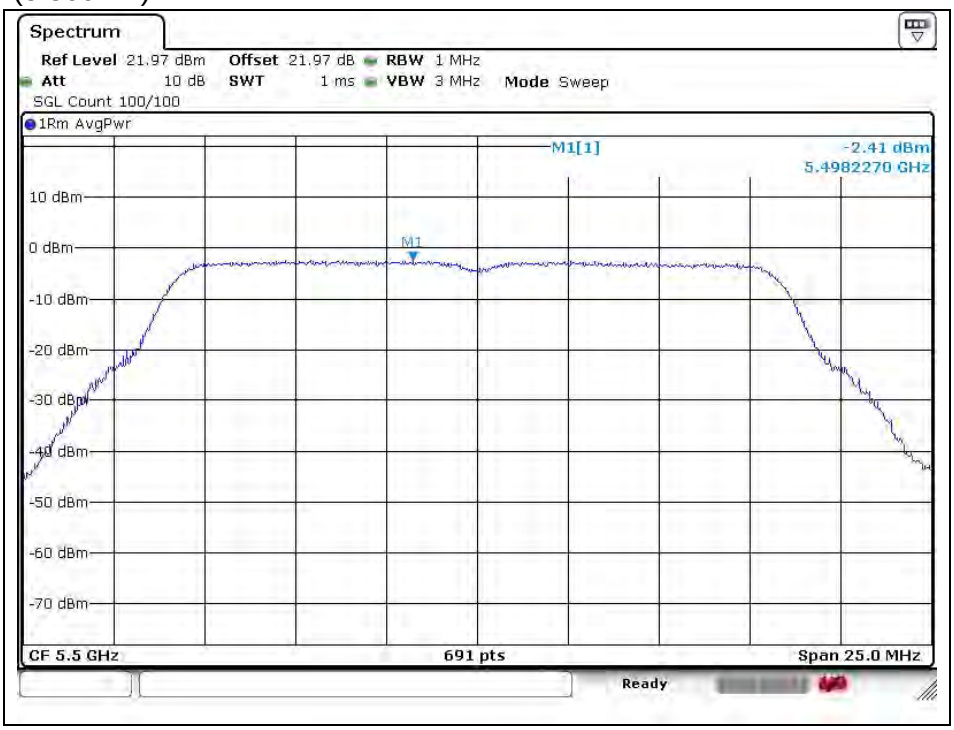


High Channel (5 320 ㎒)

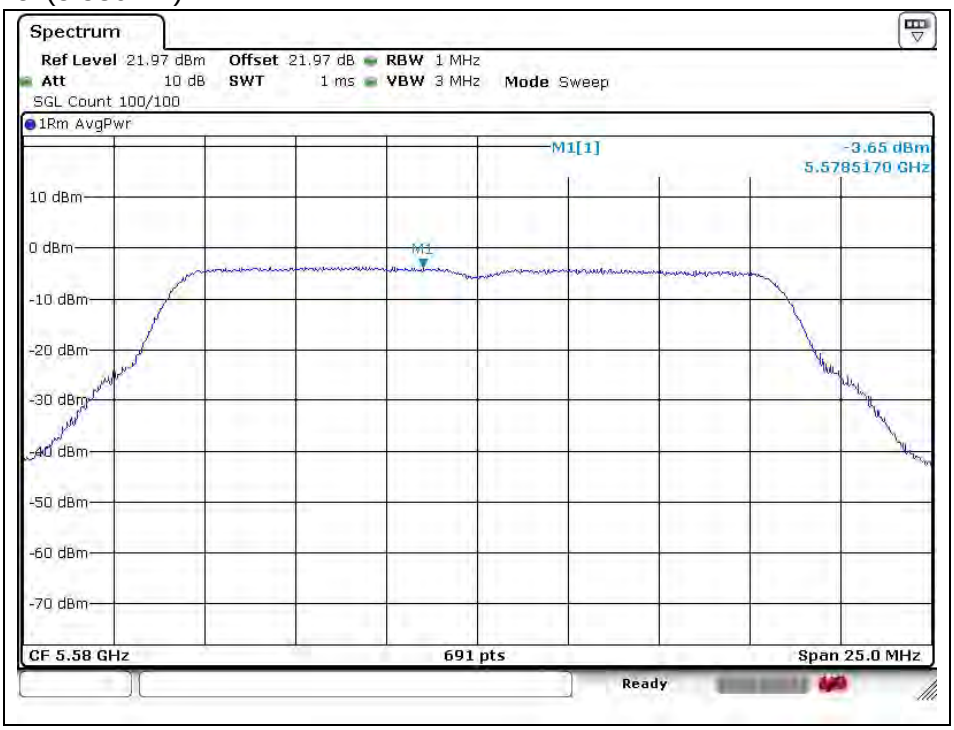


802.11a (Band 2C)

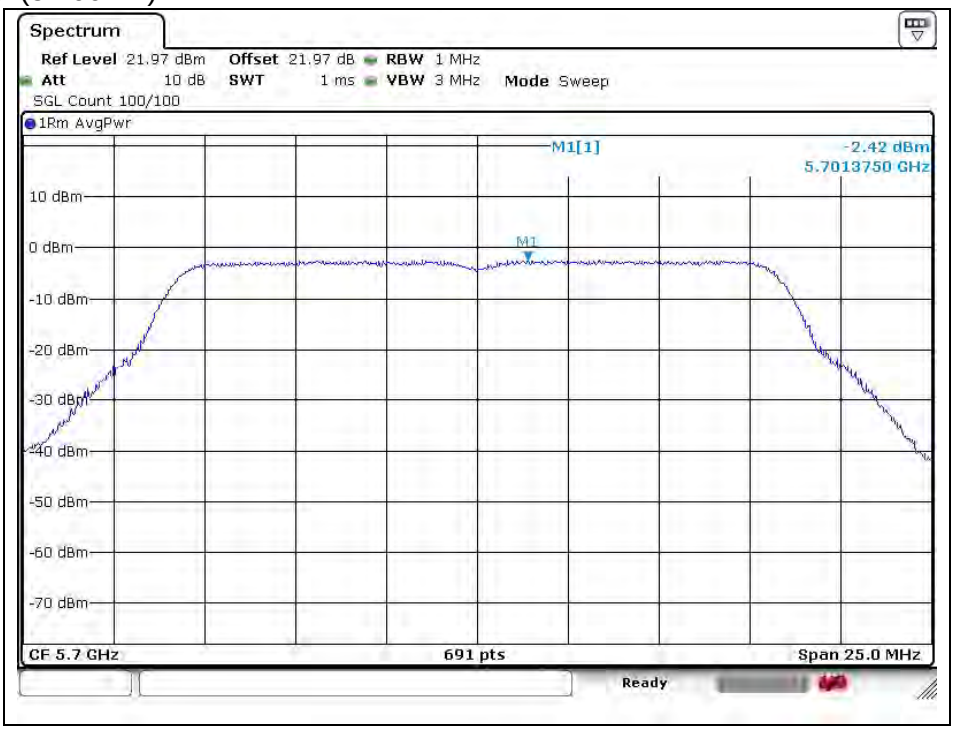
Low Channel (5 500 ㎒)



Middle Channel (5 580 ㎒)

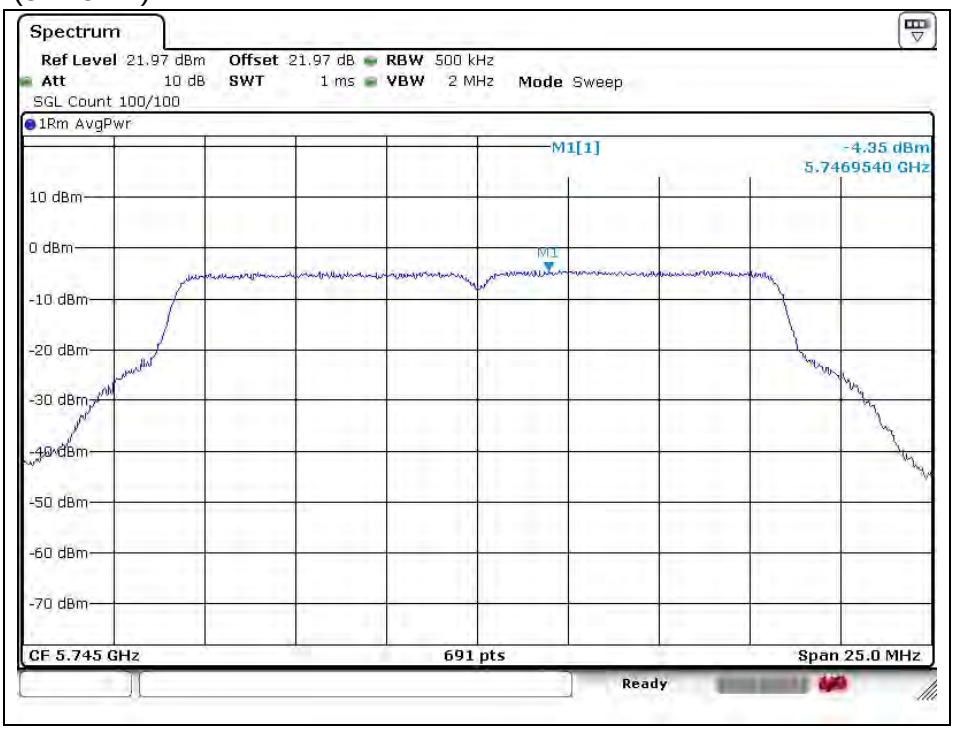


High Channel (5 700 ㎒)

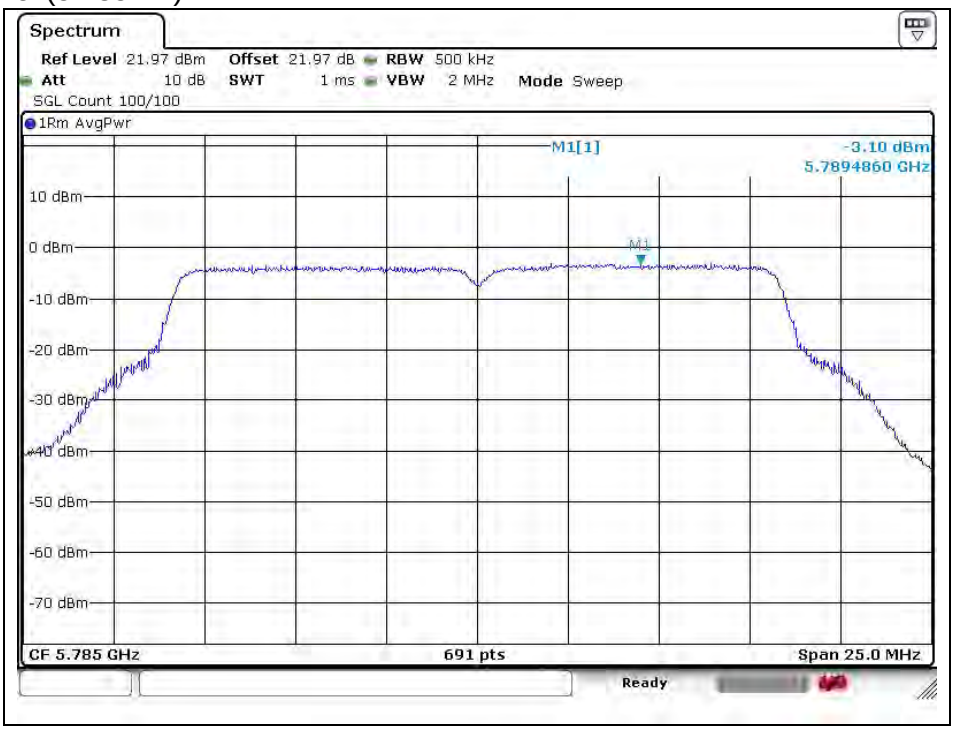


802.11a (Band 3)

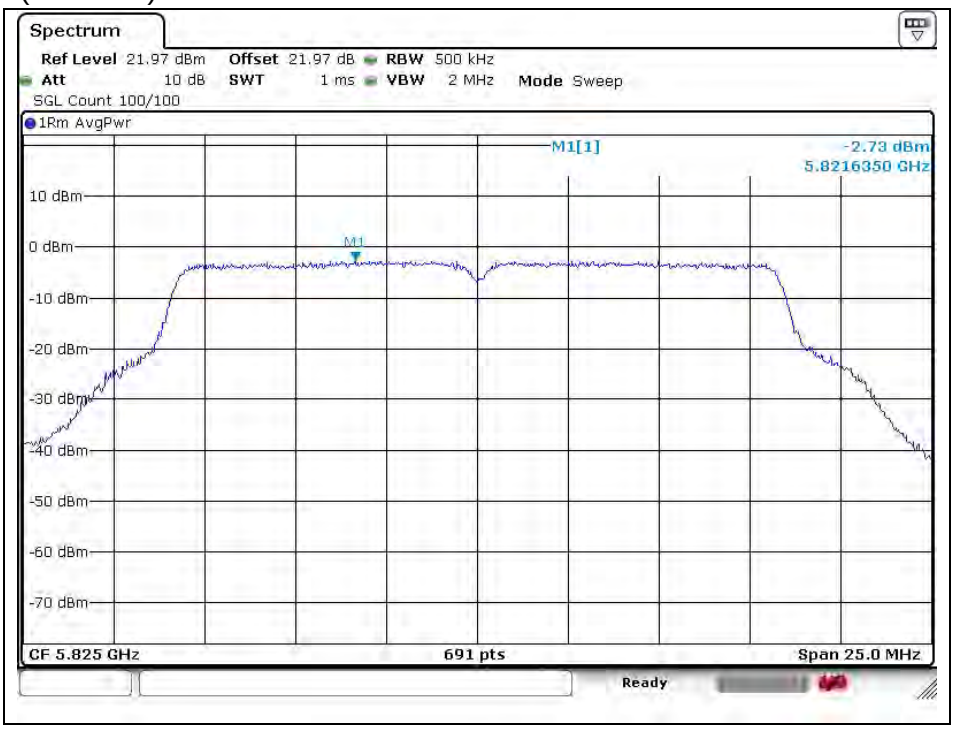
Low Channel (5 745 ㎒)



Middle Channel (5 785 ㎒)

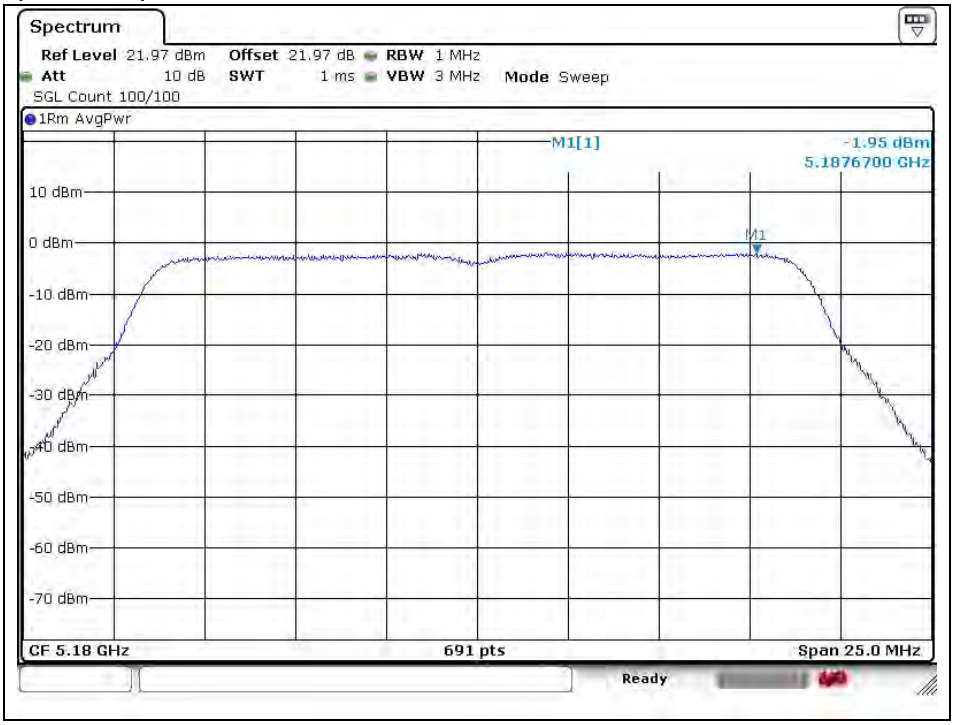


High Channel (5 825 ㎒)

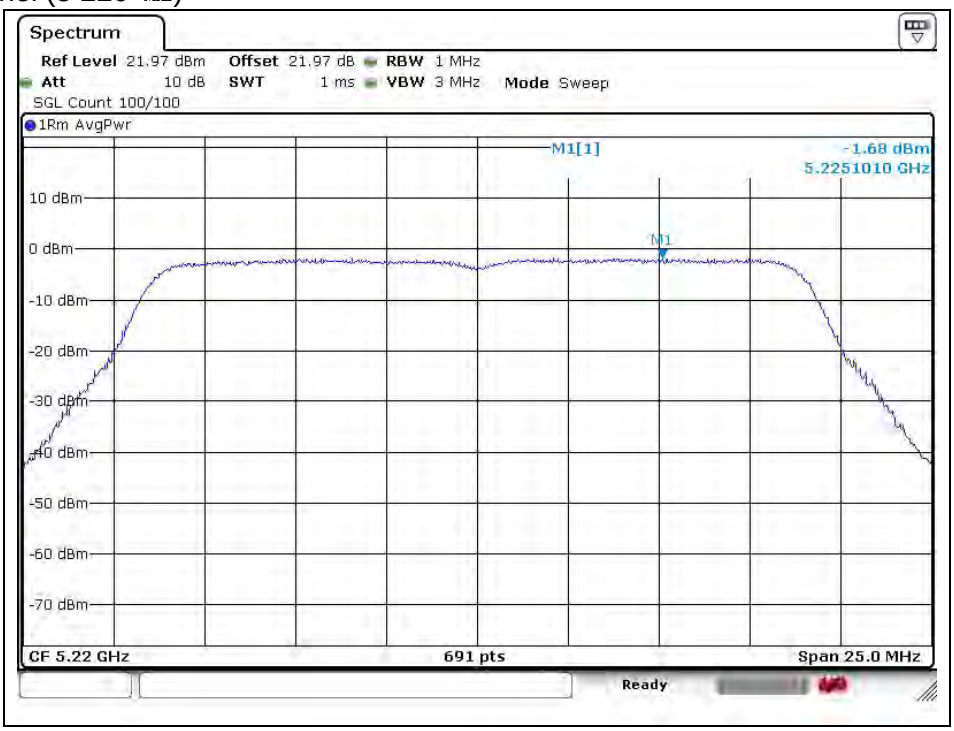


802.11n_HT20 (Band 1)

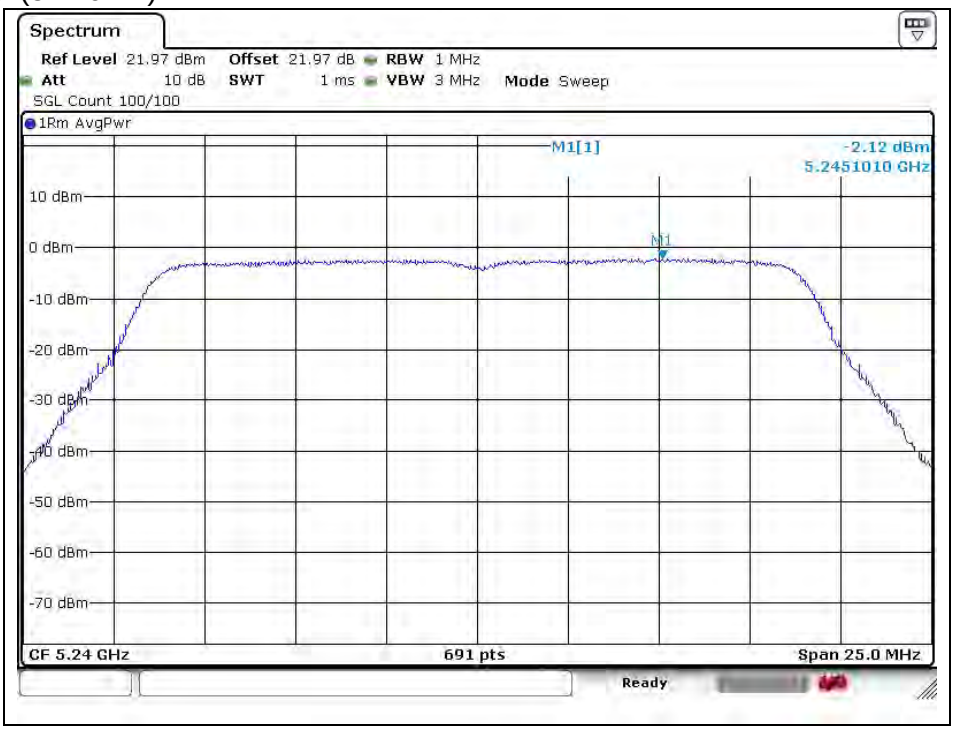
Low Channel (5 180 ㎒)



Middle Channel (5 220 ㎒)

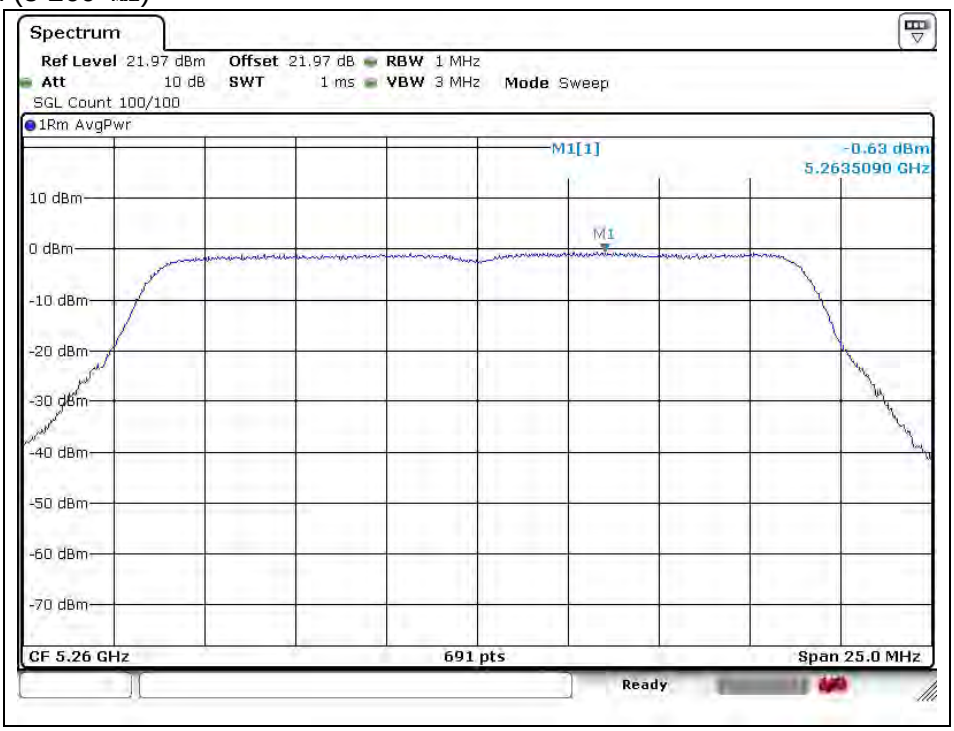


High Channel (5 240 ㎒)

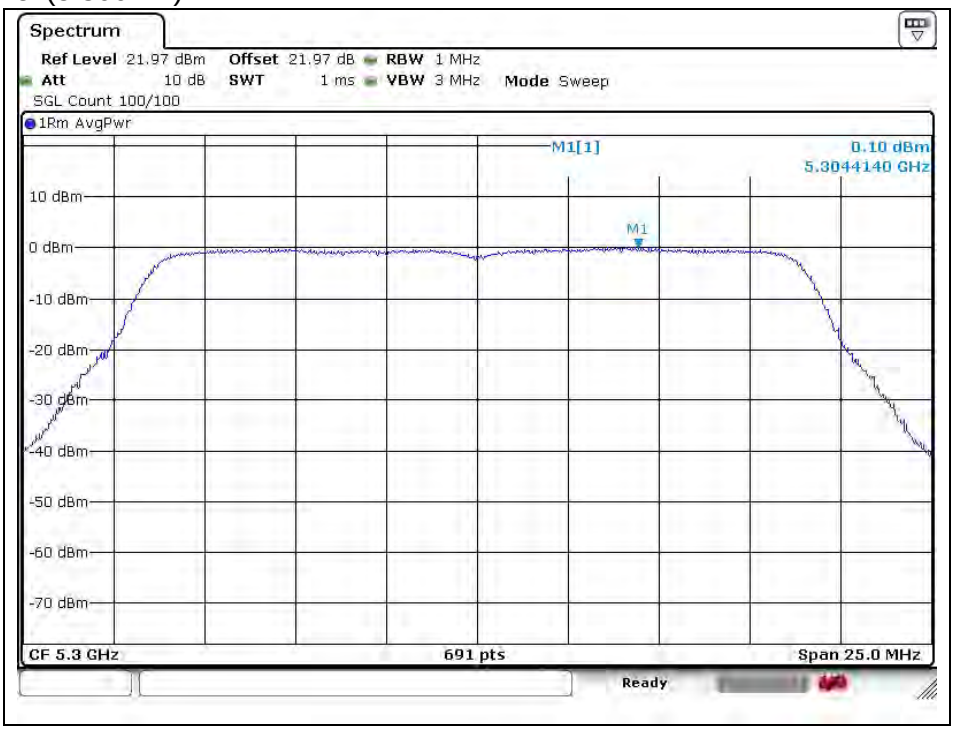


802.11n_HT20 (Band 2A)

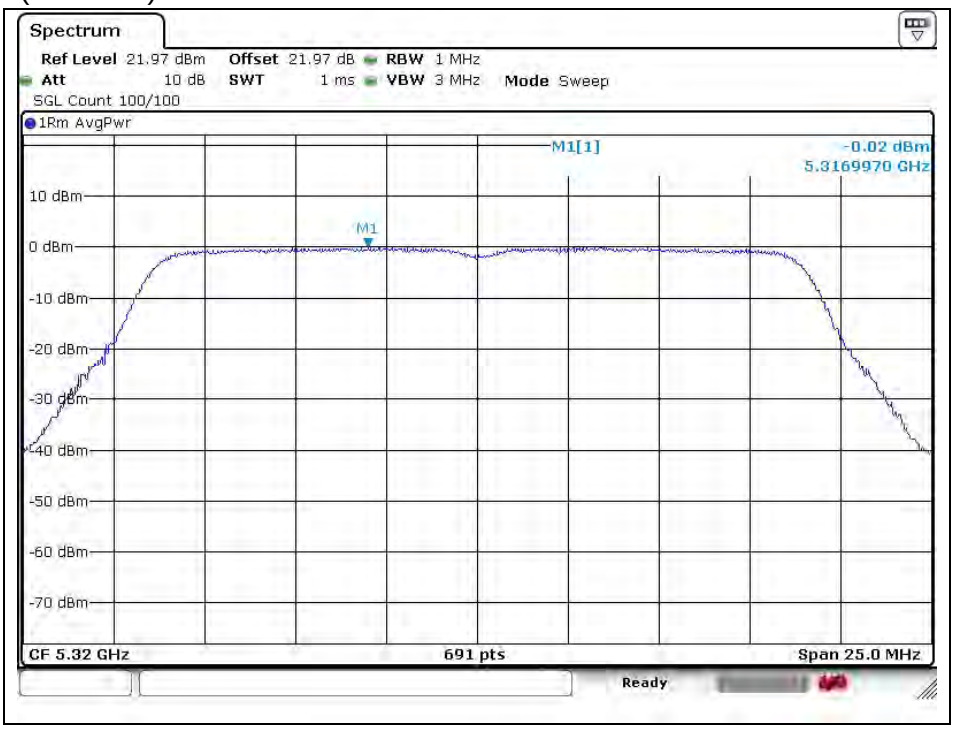
Low Channel (5 260 ㎒)



Middle Channel (5 300 ㎒)

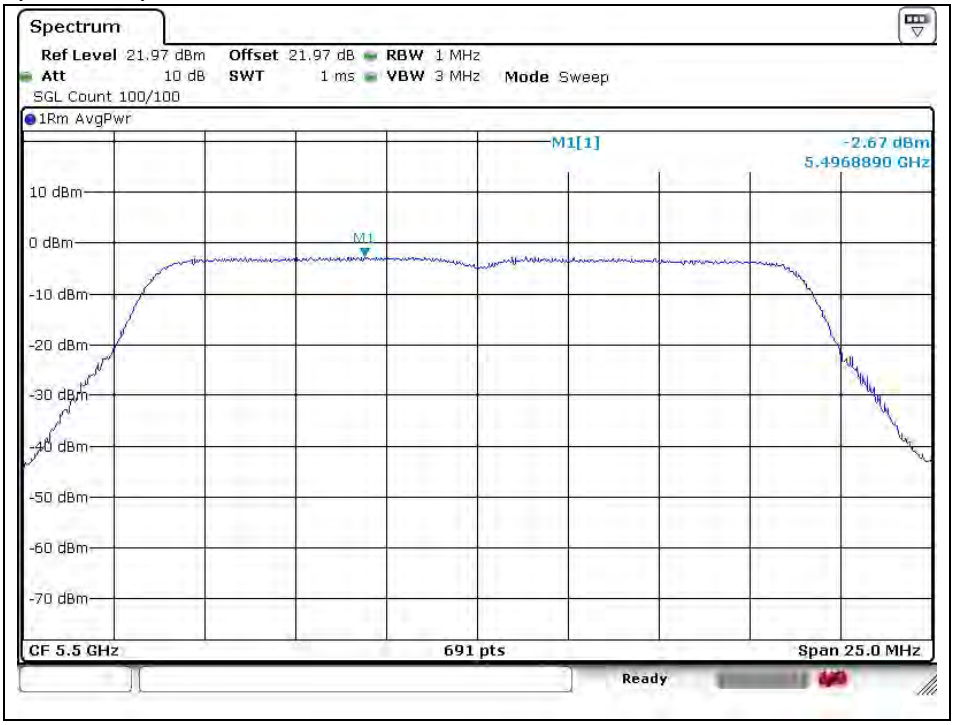


High Channel (5 320 ㎒)

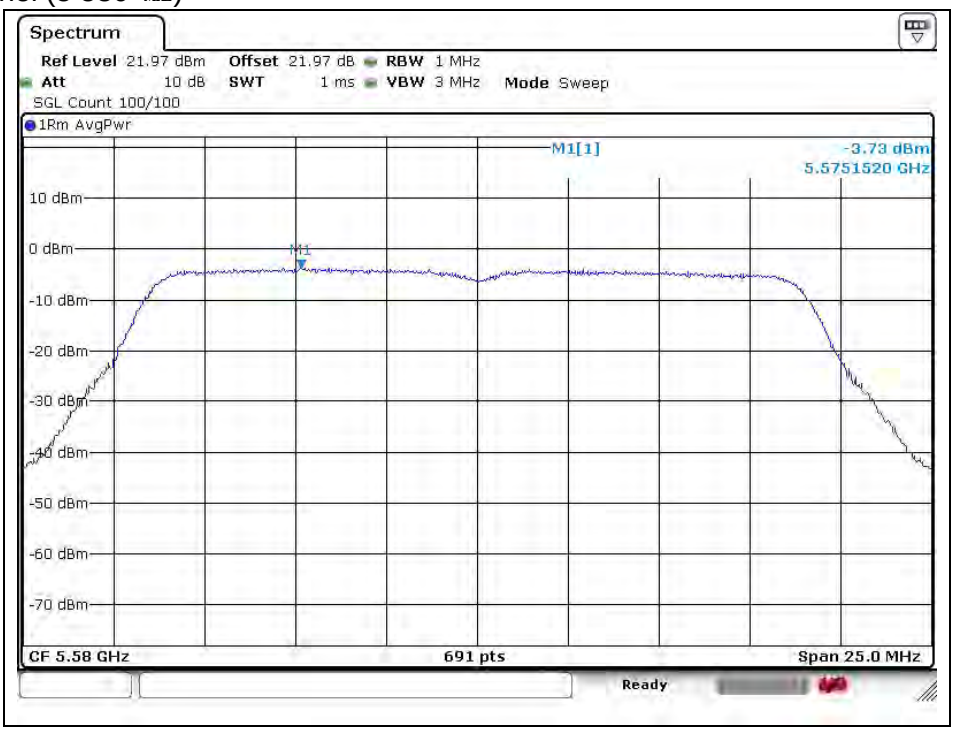


802.11n_HT20 (Band 2C)

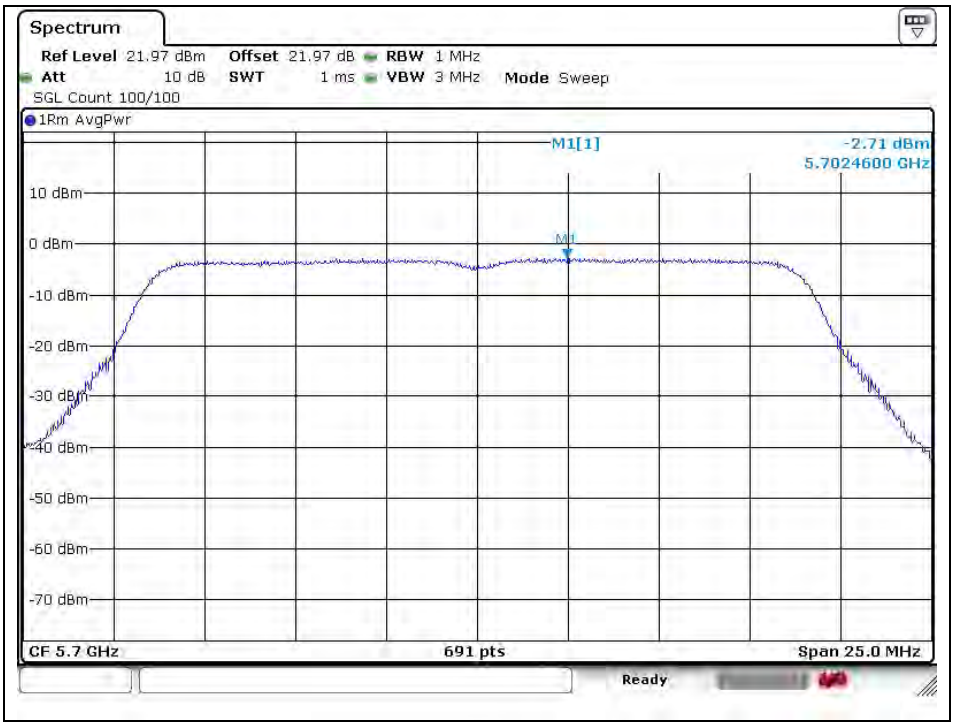
Low Channel (5 500 ㎒)



Middle Channel (5 580 ㎒)

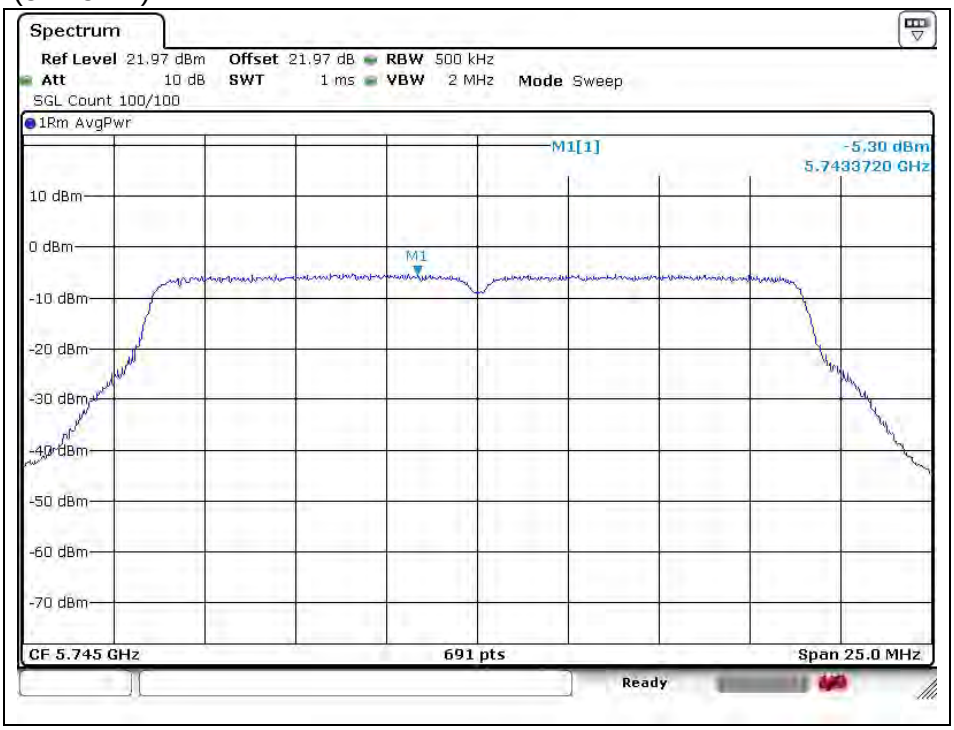


High Channel (5 700 ㎒)

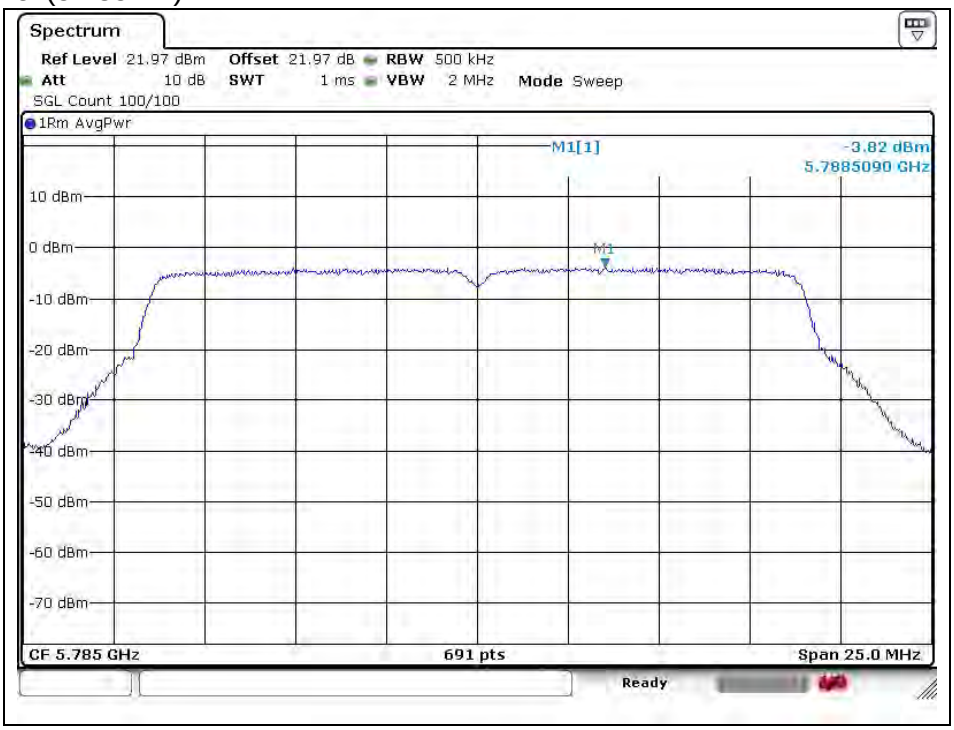


802.11n_HT20 (Band 3)

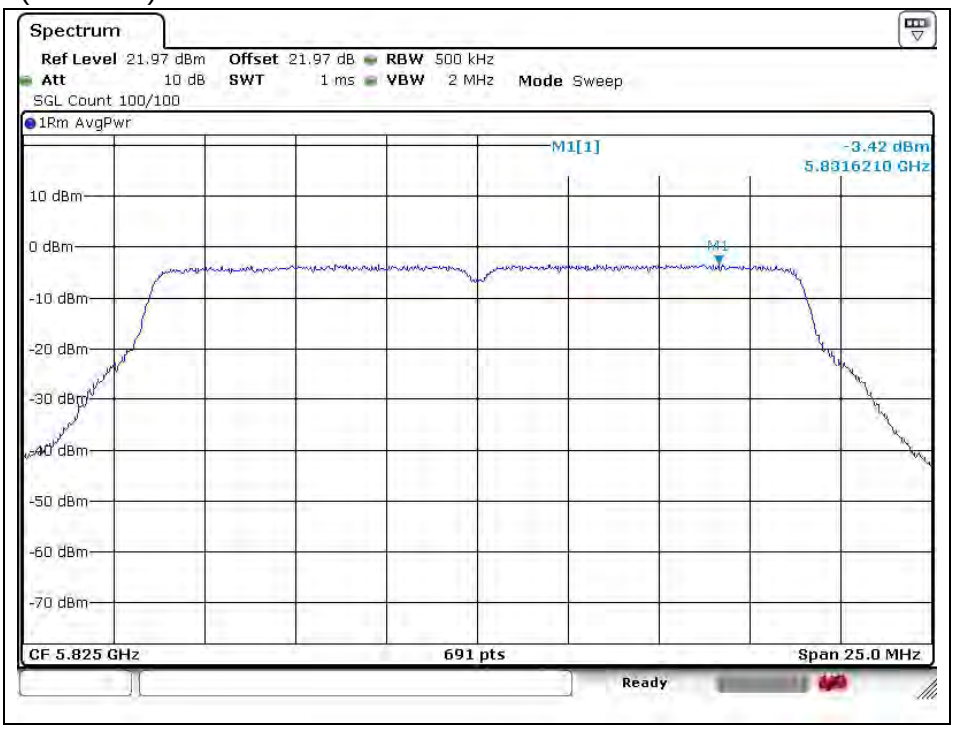
Low Channel (5 745 ㎒)



Middle Channel (5 785 ㎒)

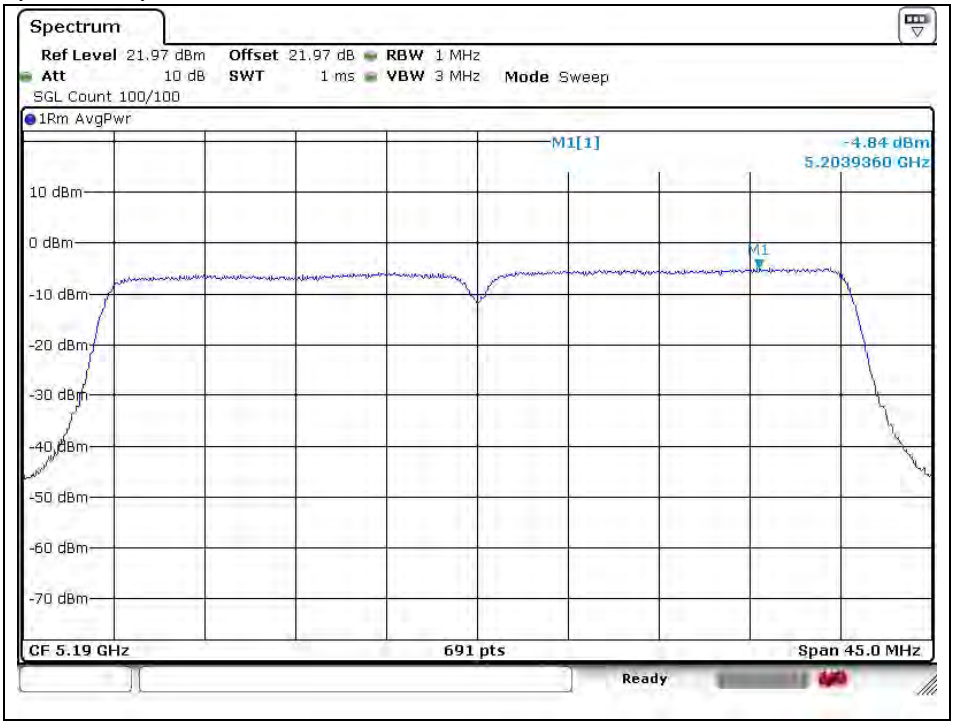


High Channel (5 825 ㎒)

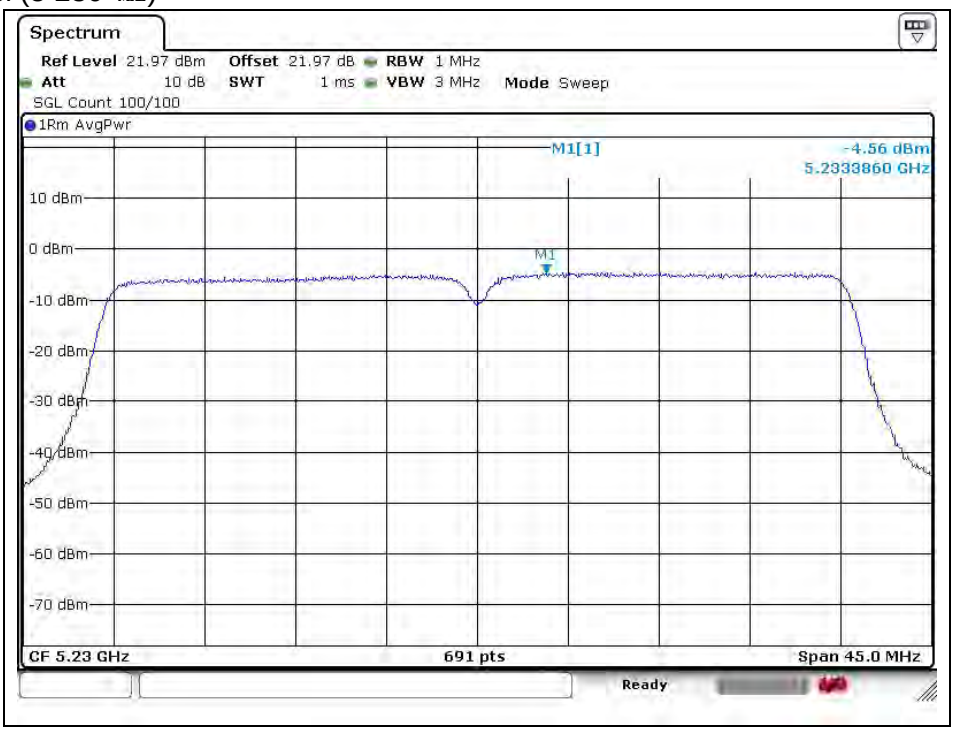


802.11n_HT40 (Band 1)

Low Channel (5 190 ㎒)

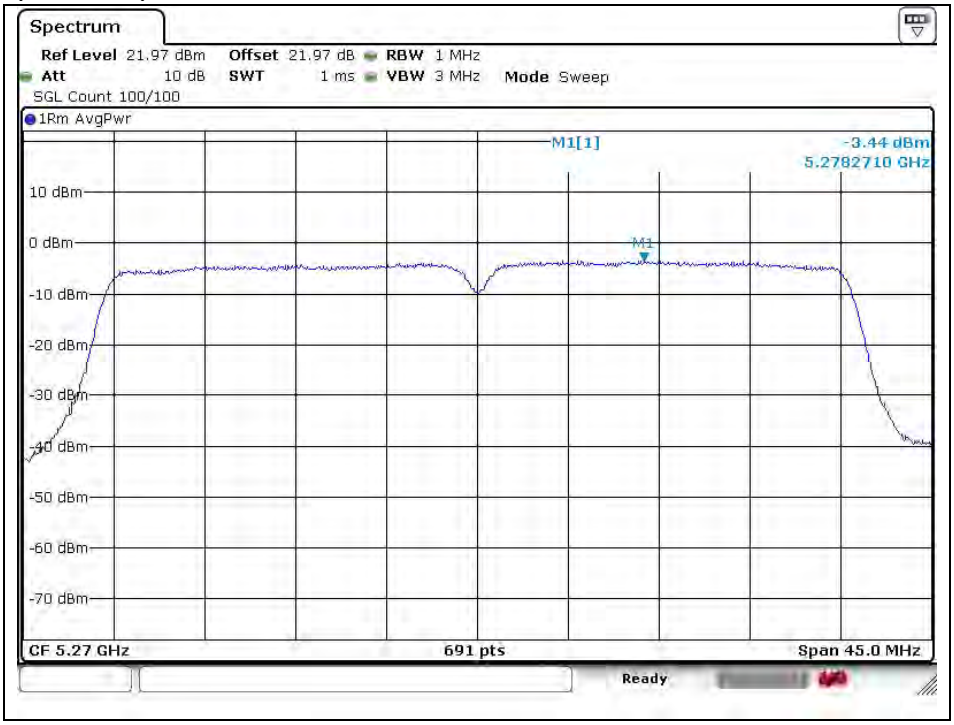


High Channel (5 230 ㎒)

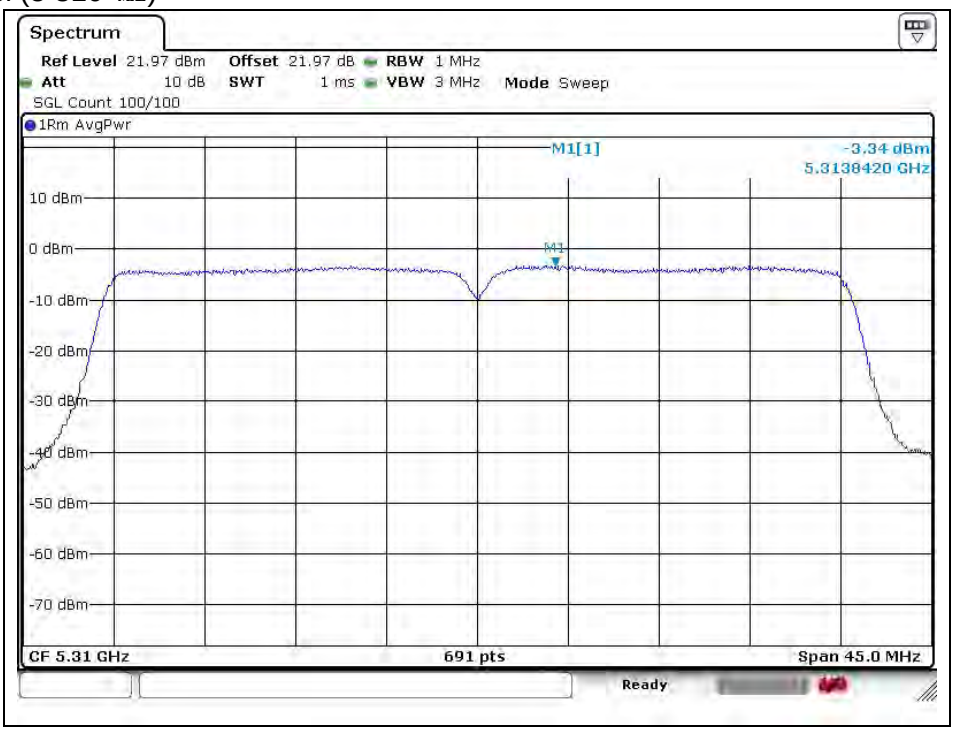


802.11n_HT40 (Band 2A)

Low Channel (5 270 ㎒)

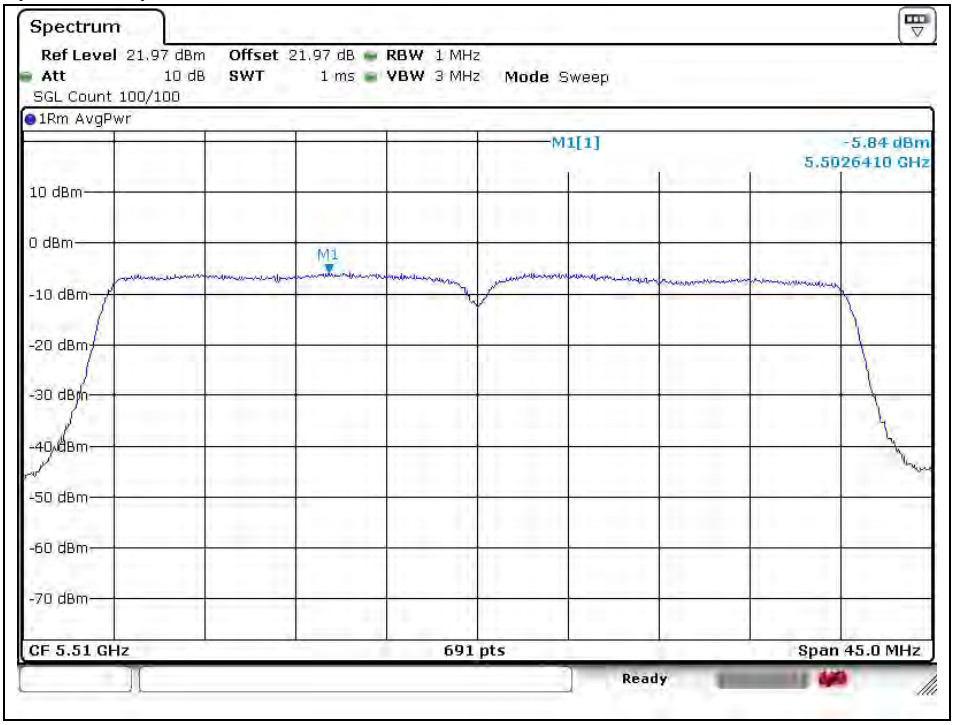


High Channel (5 310 ㎒)

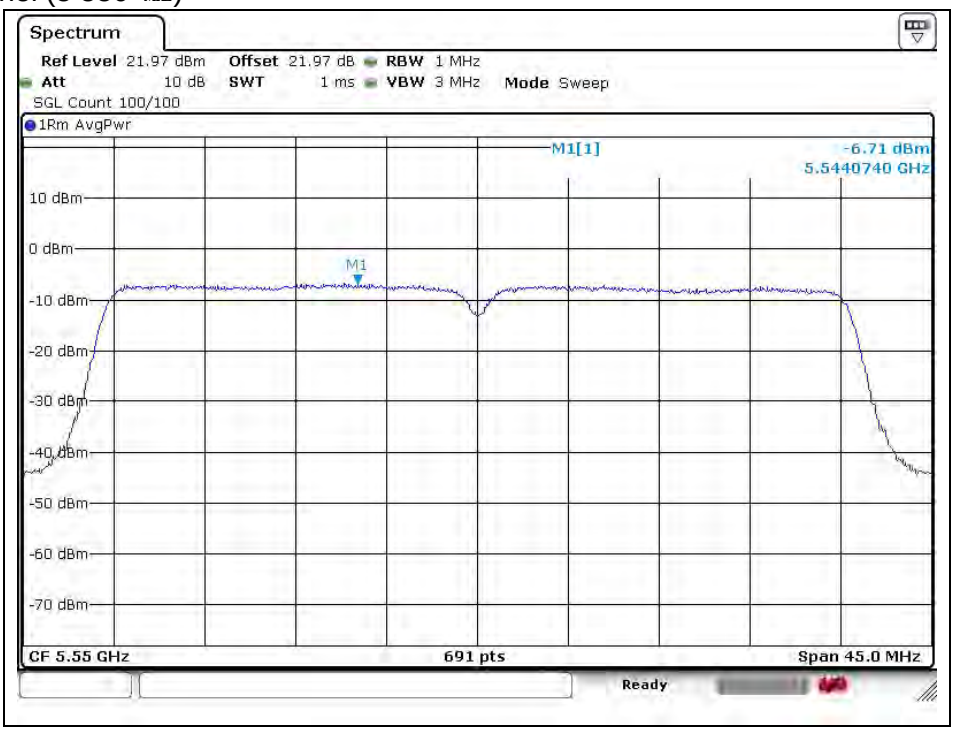


802.11n_HT40 (Band 2C)

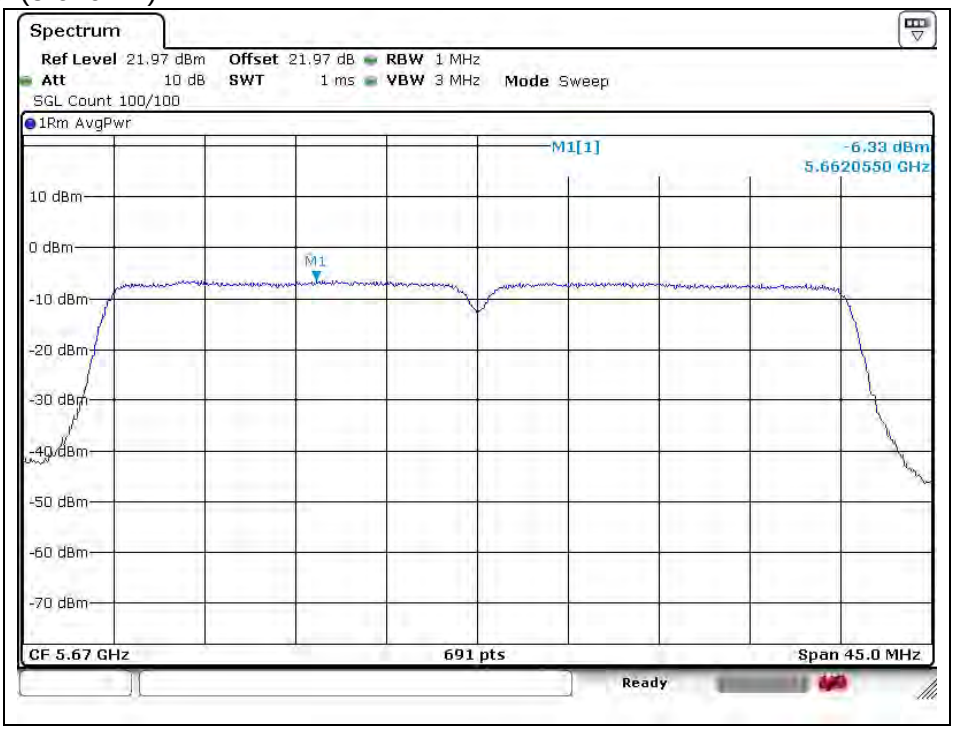
Low Channel (5 510 ㎒)



Middle Channel (5 550 ㎒)

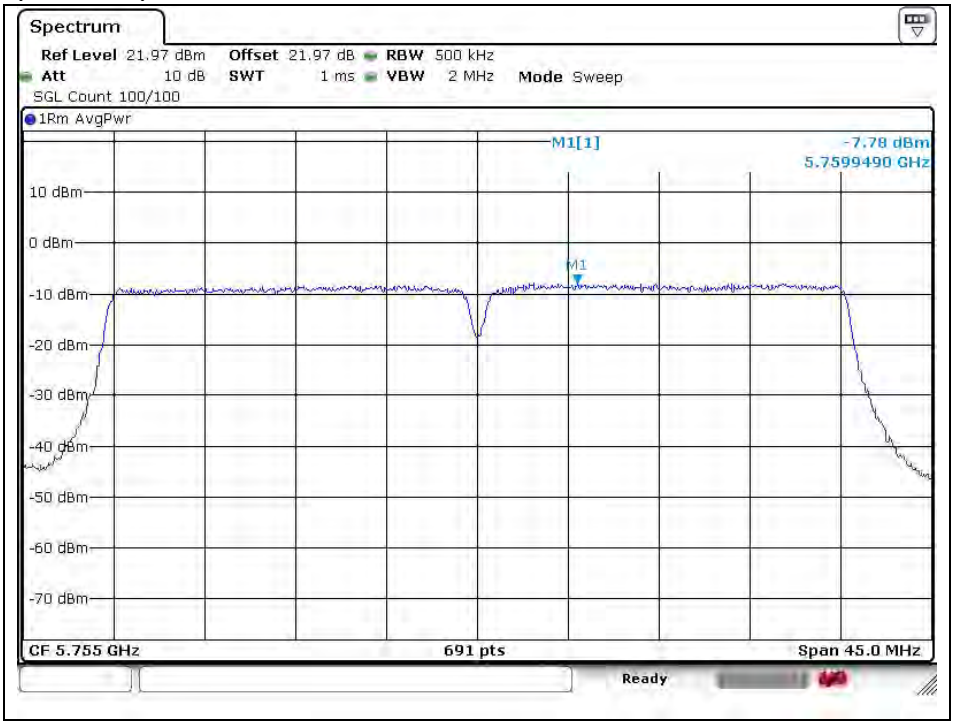


High Channel (5 670 ㎒)

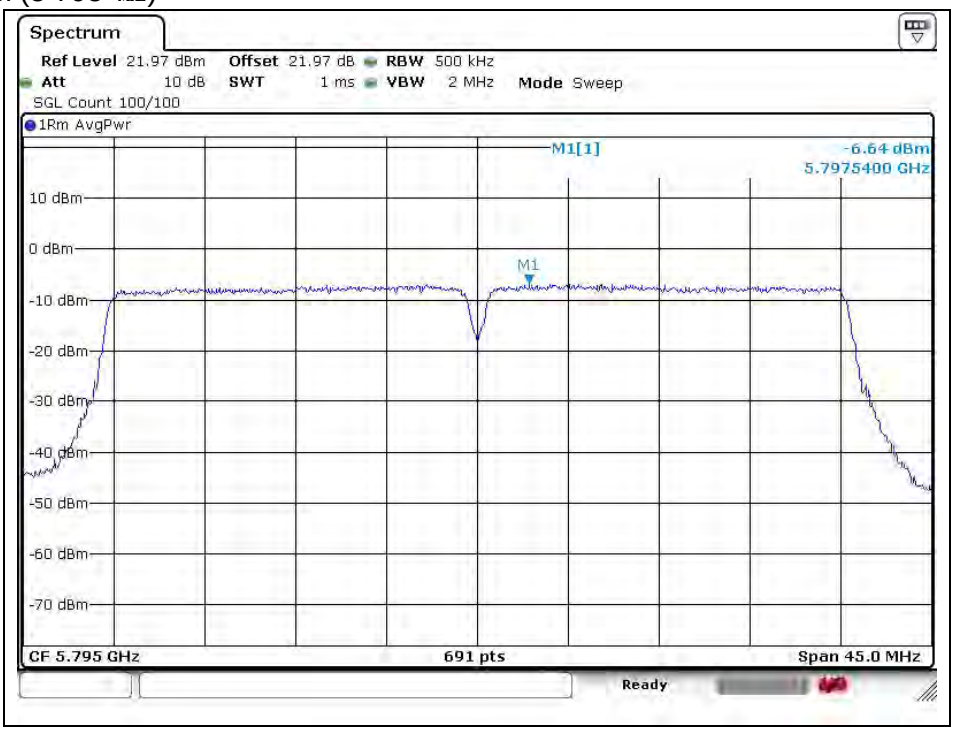


802.11n_HT40 (Band 3)

Low Channel (5 755 ㎒)

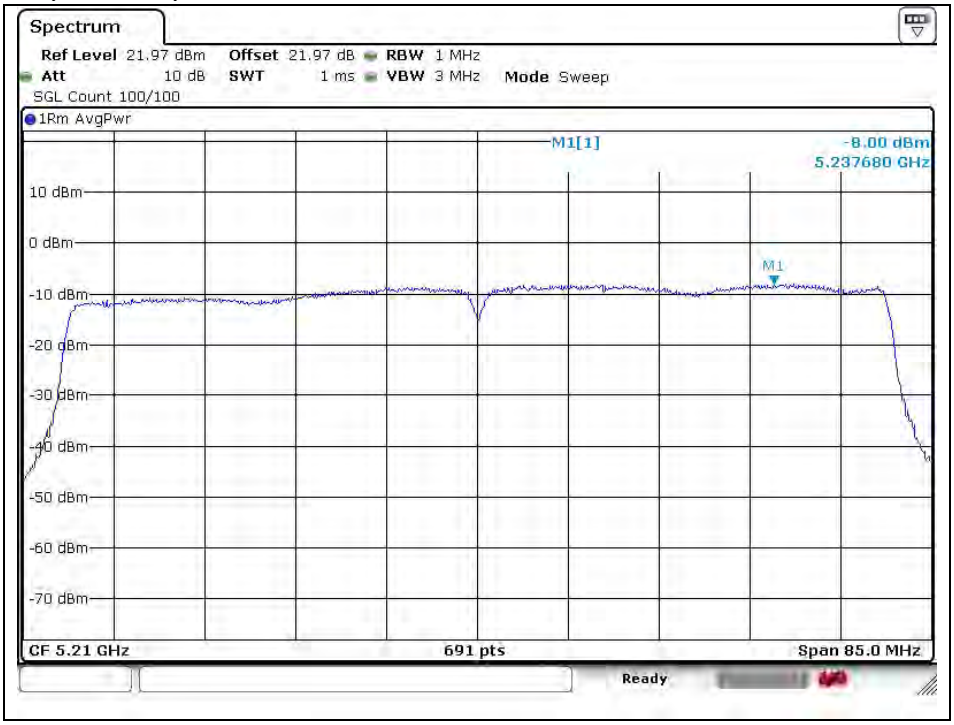


High Channel (5 795 ㎒)



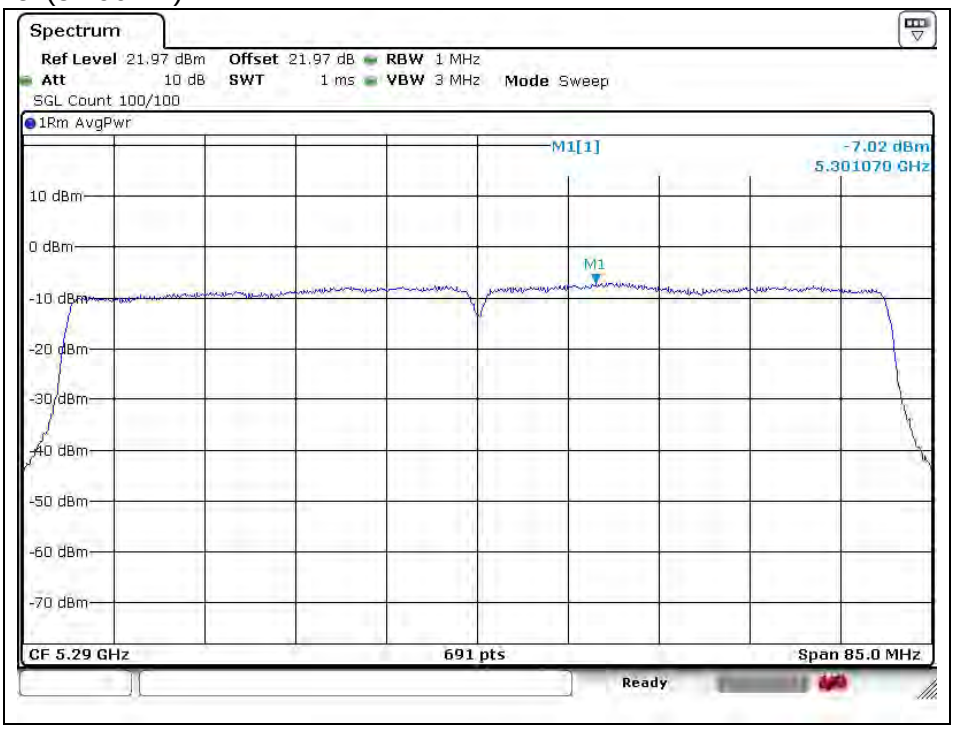
802.11ac_VHT80 (Band 1)

Middle Channel (5 210 ㎒)

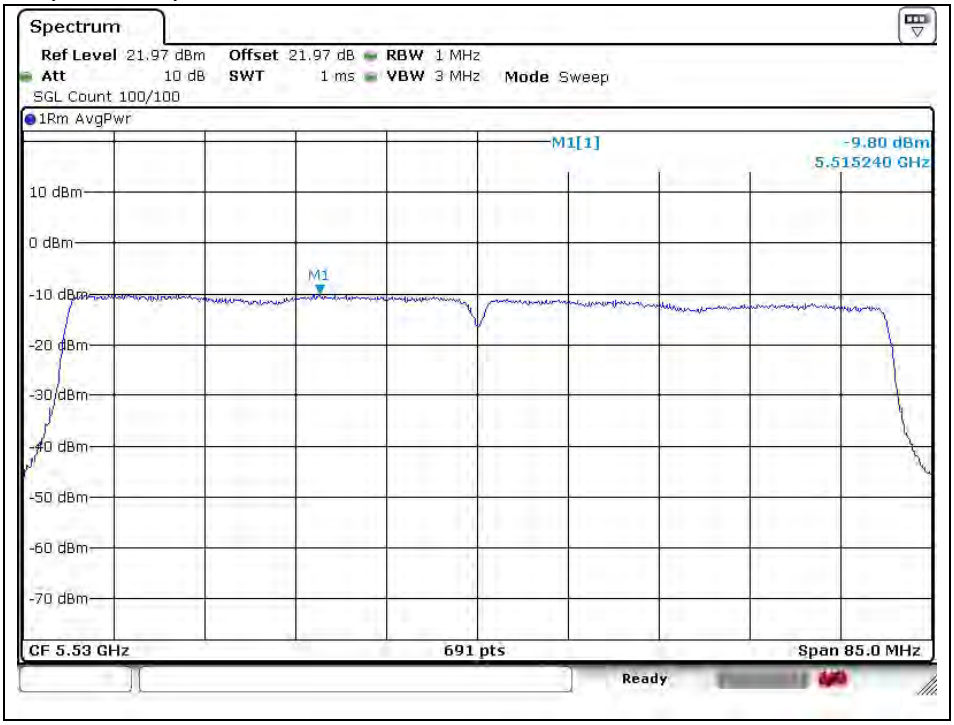


802.11ac_VHT80 (Band 2A)

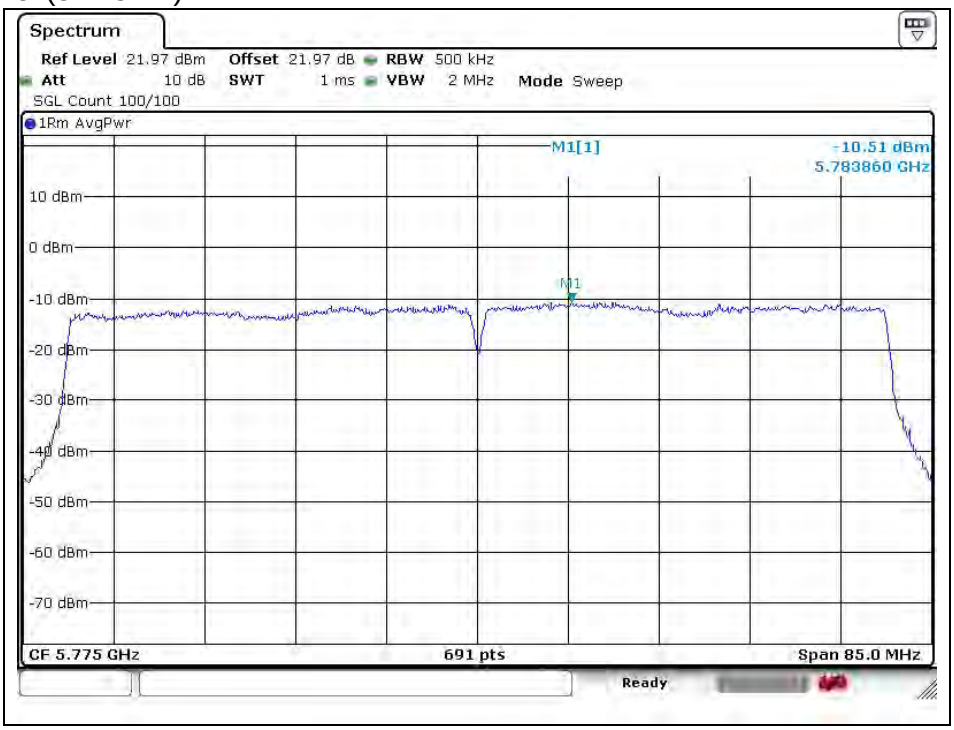
Middle Channel (5 290 ㎒)



802.11ac_VHT80 (Band 2C)
Middle Channel (5 530 ㎒)



802.11ac_VHT80 (Band 3)
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 Integral type and peak max gain of antenna as below.

Band	5 180 ㎒ – 5 320 ㎒	5 500 ㎒ – 5 700 ㎒	5 745 ㎒ – 5 825 ㎒
Mode	11a/n_HT20, HT40, 11ac_VHT20, VHT40, VHT80		
Gain	4.77 dBi	1.68 dBi	2.78 dBi