FCC Part 15E
Measurement and Test Report

For

SUNVALLEYTEK INTERNATIONAL, INC.

46724 Lakeview Blvd, Fremont, CA 94538-6529

FCC ID: 2AFDGRP-WD007

FCC Rule(s):	FCC Part 15E
Product Description:	FileHub
Tested Model:	RP-WD007
Report No.:	STR18018127I-1
Sample Receipt Date:	2018-01-10
Tested Date:	2018-01-11 to 2018-01-26
Issued Date:	2018-01-26
Tested By:	Mike Shi / Engineer
Reviewed By:	Silin Chen / EMC Manager
Approved & Authorized By:	Jandy So / PSQ Manager

Prepared By:

Shenzhen SEM Test Technology Co., Ltd.
1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road,
Bao'an District, Shenzhen, P.R.C.（518101）
Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	SUNVALLEYTEK INTERNATIONAL, INC.
Address of applicant:	46724 Lakeview Blvd, Fremont, CA 94538-6529
Manufacturer:	Shenzhen NearbyExpress Technology Development Company Limited
Address of manufacturer:	333 Bulong Road, Jialianda Industrial Park, Building 1, Bantian, Longgang District, Shenzhen, China, 518129

General Description of EUT	
Product Name:	FileHub
Trade Name:	RAVPOWER
Model No.:	RP-WD007
Adding Model:	/
Rated Voltage:	Battery DC 3.7V
Battery capacity:	5200mAh
Power Adapter Model:	/
Software Version:	2.000.004
Hardware Version:	V1.1
Note: The test data is gathered from a production sample provided by the manufacturer.	

Technical Characteristics of EUT	
Support Standards:	802.11a, 802.11n(HT20/40), 802.11ac-HT80
Frequency Range:	5150-5250MHz, 5725-5850MHz
RF Output Power:	14.70dBm(Conducted)
Type of Modulation:	OFDM, 64-QAM,16-QAM, QPSK, BPSK, 256-QAM
Data Rate:	6-54Mbps, up to 433Mbps
Quantity of Channels:	8 for 5150-5250MHz; 5 for 5725-5850MHz
Channel Separation:	20MHz
Type of Antenna:	Integral Antenna
Antenna Gain:	3.0dBi
Lowest Internal Frequency	12MHz

1.2 Test Standards

The following report is prepared on behalf of the SUNVALLEYTEK INTERNATIONAL, INC. in accordance with FCC Part 15, Subpart C&E, and section 15.203, 15.205, 15.207, 15.209 and 15.407 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C&E, and section 15.203, 15.205, 15.207, 15.209 and 15.407 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. The measurement guide KDB 789033 D02 v02r01 for Unlicensed National Information Infrastructure (U-NII) Devices and KDB 662911 D01 Multiple Transmitter Output v02r01 shall be performed also.

1.4 Table for parameters of Test Software setting

The test utility software used during testing was “MT76xxE_AP.exe”. During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Mode	Test Frequency (MHz)												
	NCB: 20MHz												
	5180	5200	5240	5260	5300	5320	5500	5580	5700	5720	5745	5785	5825
802.11a 6Mbps	14	14	14								14	14	14
802.11n-HT20 MCS0	14	14	14								14	14	14
Mode	NCB: 40MHz									
	5190	5230	5270	5310	5510	5550	5670	5710	5755	5795
802.11n-HT40 MCS0	14	14							14	14
Mode	NCB: 80MHz					
	5210		5290	5530	5610	5690	5775
802.11ac-HT80 MCS0/Nss2	14						14

1.5 EUT Operating during test

EUT was programmed to be in continuously transmitting mode. During the test, EUT operation to normal function and programs under WIN 7were executed.

1.6 Test Facility

FCC – Registration No.: 125990

Shenzhen SEM Test Technology Co., Ltd. Laboratory has been recognized to perform compliance testing on equipment subject to the Commissions Declaration Of Conformity (DOC). The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

1.7 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	802.11a	5180MHz,5200MHz,5240MHz, 5745MHz,5785MHz,5825MHz
TM2	802.11n-HT20	5180MHz,5200MHz,5240MHz, 5745MHz,5785MHz,5825MHz
TM3	802.11n-HT40	5190MHz,5230MHz, 5755MHz,5795MHz
TM4	802.11ac-HT80	5210MHz, 5775MHz
Note: All test modes (different data rate and different modulation) are performed, but only the worst case is recorded in this report.		

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Core
Type-C Cable	0.43	Shielded	Without Core

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
Network cable1	4.0	Shielded	Without Core
Network cable2	1.5	Unshielded	Without Core
Network cable3	1.0	Unshielded	Without Core

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Adapter	Dell lnc.	PSAI10R-050Q	/

1.8 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	±0.42dB
Occupied Bandwidth	Conducted	±1.5%
Power Spectral Density	Conducted	±1.8dB
Conducted Spurious Emission	Conducted	±2.17dB
Conducted Emissions	Conducted	9-150kHz ±3.74dB
		0.15-30MHz ±3.34dB
Transmitter Spurious Emissions	Radiated	30-200MHz ±4.52dB
		0.2-1GHz ±5.56dB
		1-6GHz ±3.84dB
		6-18GHz ±3.92dB

1.9 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2017-06-12	2018-06-11
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2017-06-12	2018-06-11
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2017-06-12	2018-06-11
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2017-06-12	2018-06-11
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2017-06-12	2018-06-11
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2017-06-08	2018-06-07
SEMT-1042	Horn Antenna	ETS	3117	00086197	2017-06-08	2018-06-07
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2017-06-08	2018-06-07
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2017-06-08	2018-06-07
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2017-06-12	2018-06-11
SEMT-1003	L.I.S.N	Schwarz beck	NSLK8126	8126-224	2017-06-12	2018-06-11
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2017-06-12	2018-06-11
SEMT-1168	Pre-amplifier	Direction Systems Inc.	PAP-0126	14141-12838	2017-08-15	2018-08-14
SEMT-1169	Pre-amplifier	Direction Systems Inc.	PAP-2640	14145-14153	2017-08-15	2018-08-14
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2017-06-12	2018-06-11
SEMT-1170	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2017-03-09	2018-03-08

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 15.203; § 15.405	Antenna Requirement	Compliant
§ 15.207; § 15.407(b)(6)	Conducted Emission	Compliant
§ 15.407(a)(1),(2)	Power Spectral Density	Compliant
§ 15.407(e)	Emission Bandwidth and Occupied Bandwidth	Compliant
§ 15.407(a)(1),(2)	Maximum Conducted Output Power	Compliant
§ 15.407(b)(1),(2),(3)	Conducted Spurious Emission	Compliant
§ 15.205; § 15.407(b)(1),(2),(3)	Radiated Emission	Compliant
§ 15.407(g)	Frequency Stability	Compliant
§ 15.407(h)	Dynamic Frequency Selection (DFS)	N/A

N/A: not applicable

3. RF Exposure

3.1 Standard Applicable

According to § 1.1307 and § 2.1093, the portable transmitter must comply the RF exposure requirements.

3.2 Test Result

This product complied with the requirement of the RF exposure, please see the SAR Report.

4. Antenna Requirement

4.1 Standard Applicable

According to FCC Part 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

4.2 Evaluation Information

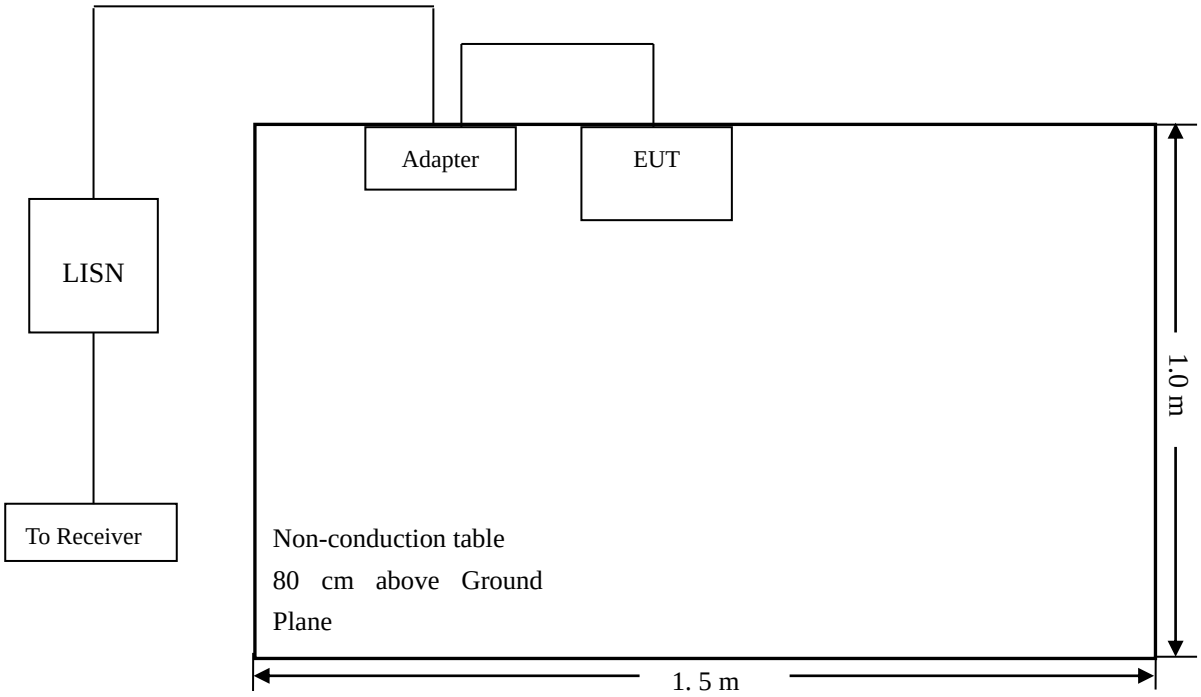
This product has an integral antenna, fulfill the requirement of this section.

5. Conducted Emissions

5.1 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.207 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.
The spacing between the peripherals was 10 cm.

5.3 Basic Test Setup Block Diagram



5.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

5.5 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency ..... 150 kHz
Stop Frequency ..... 30 MHz
Sweep Speed ..... Auto
IF Bandwidth..... 10 kHz
Quasi-Peak Adapter Bandwidth ..... 9 kHz
Quasi-Peak Adapter Mode ..... Normal

5.6 Summary of Test Results/Plots

According to the data in section 5.7, the EUT complied with the FCC Part 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

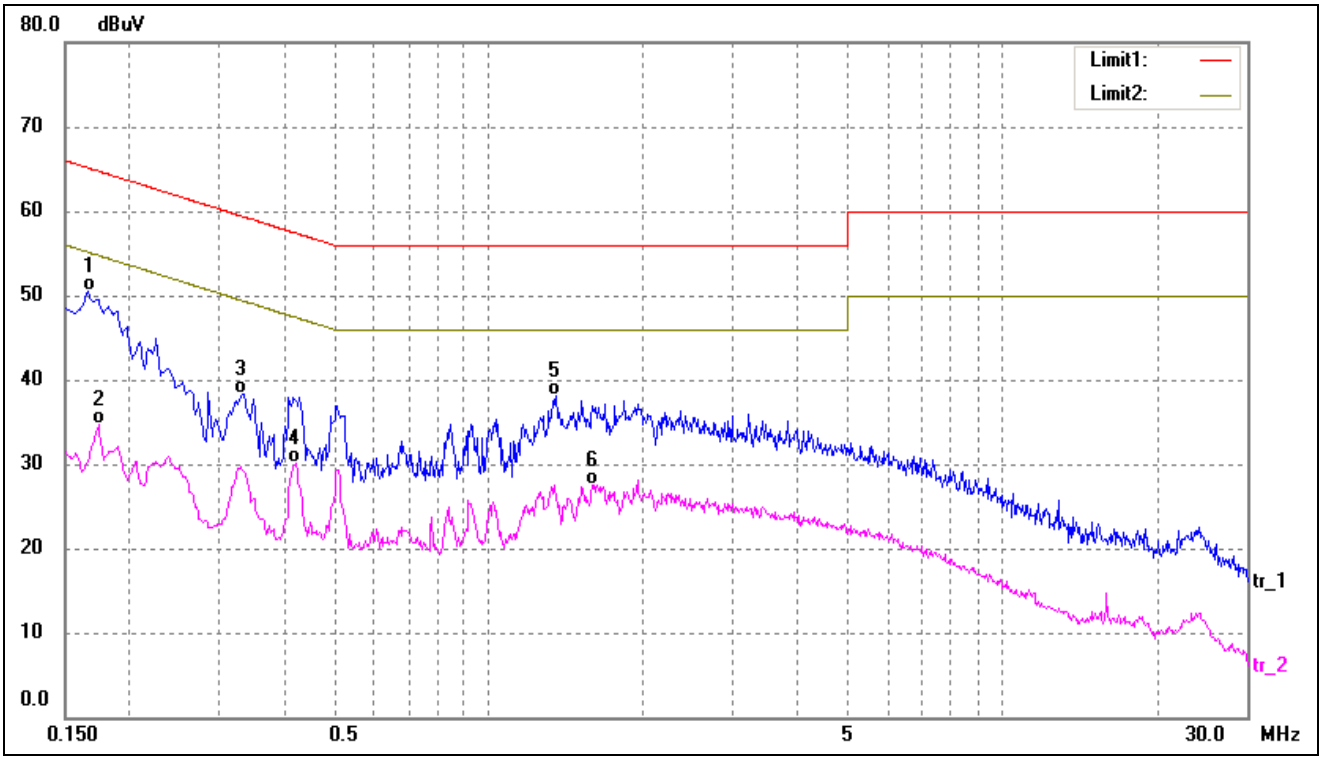
-10.20 dB at **0.4180 MHz** in the **Line**, **AVG** detector, 0.15-30MHz

5.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

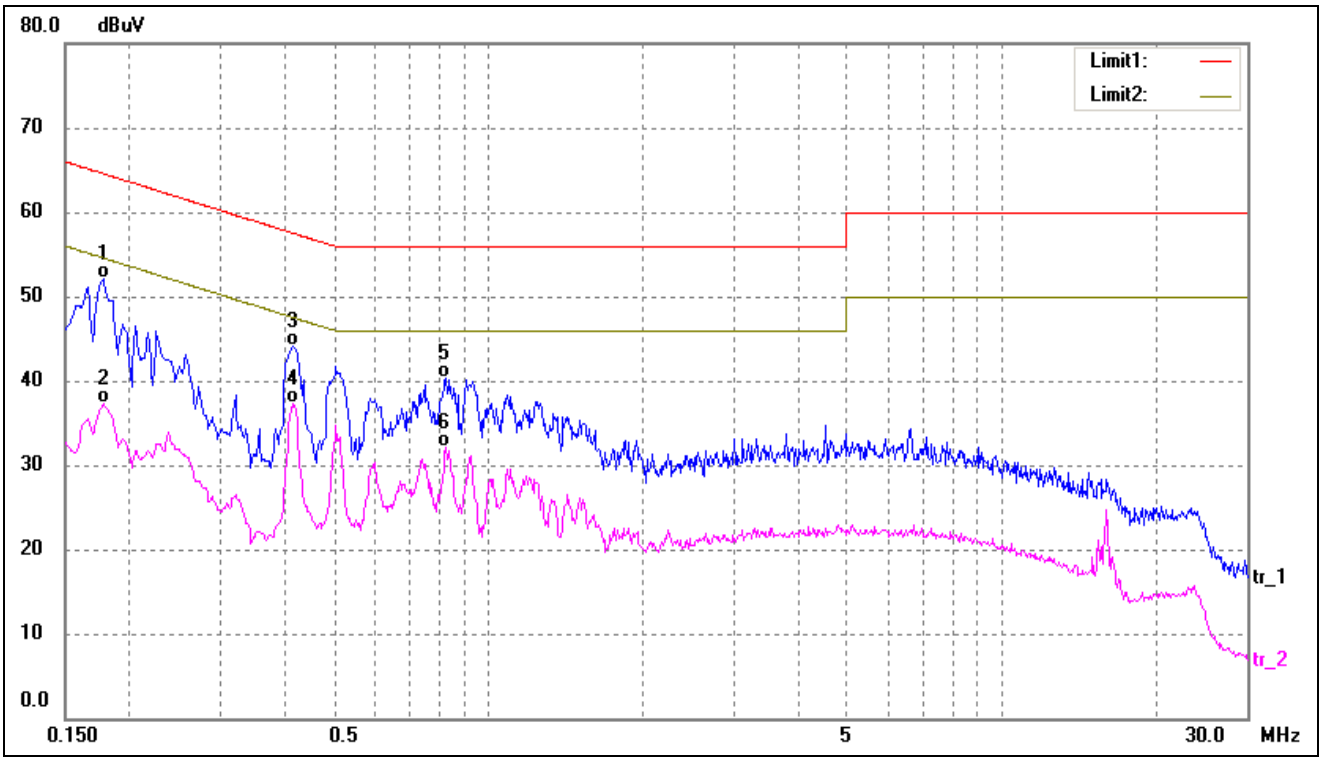
EUT: *FileHub*
Tested Model: *RP-WD007*
Operating Condition: *Transmitting*
Comment: *AC 120V/60Hz*

Test Specification: *Neutral*



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.1660	40.61	9.83	50.44	65.16	-14.72	QP
2	0.1740	24.79	9.83	34.62	54.77	-20.15	AVG
3	0.3340	28.58	9.80	38.38	59.35	-20.97	QP
4	0.4220	20.21	9.80	30.01	47.41	-17.40	AVG
5	1.3540	28.29	9.75	38.04	56.00	-17.96	QP
6	1.6060	17.85	9.74	27.59	46.00	-18.41	AVG

Test Specification: *Line*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.1780	42.28	9.82	52.10	64.58	-12.48	QP
2	0.1780	27.43	9.82	37.25	54.58	-17.33	AVG
3	0.4180	34.39	9.80	44.19	57.49	-13.30	QP
4*	0.4180	27.49	9.80	37.29	47.49	-10.20	AVG
5	0.8300	30.48	9.77	40.25	56.00	-15.75	QP
6	0.8300	22.35	9.77	32.12	46.00	-13.88	AVG

6. Power Spectral Density

6.1 Standard Applicable

Section 15.407(a) Power limits:

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

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

6.2 Test Procedure

According to 789033 D02 General UNII Test Procedures New Rules v02r01, the following is the measurement procedure.
For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “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 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz 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 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) 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 KHz for the sections 5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.

6.3 Environmental Conditions

Temperature:	20° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

6.4 Summary of Test Results/Plots

5150-5250MHz

Operating mode	Test Channel	Power Spectral Density dBm/MHz	Limit * (dBm/MHz)
802.11a	5180	6.545	11
	5200	5.159	11
	5240	4.294	11
802.11n-HT20	5180	3.422	11
	5200	3.573	11
	5240	3.708	11
802.11n-HT40	5190	-0.142	11
	5230	-0.722	11
802.11ac-HT80	5210	-6.699	11

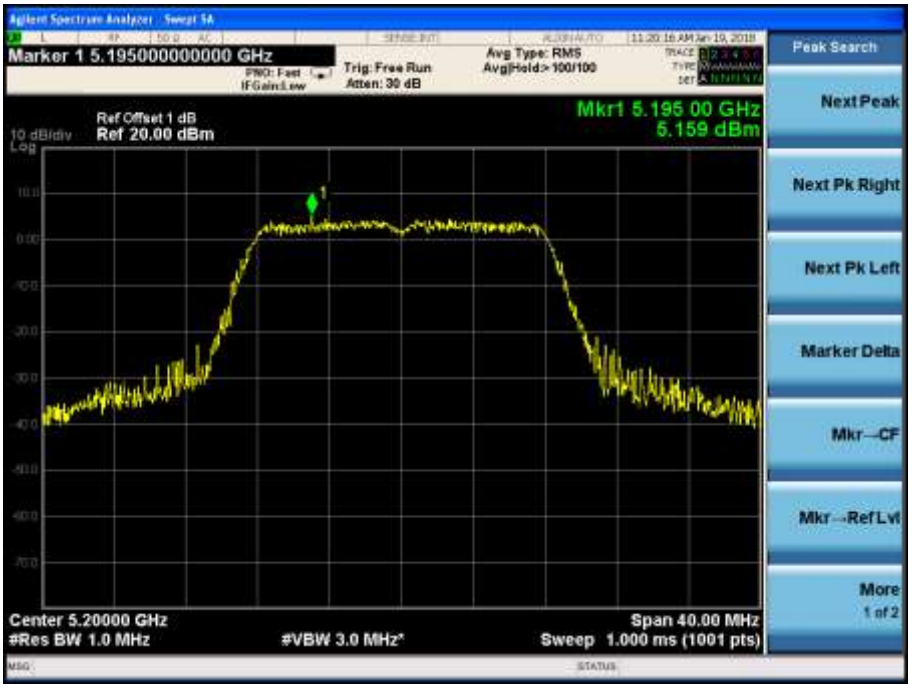
5725-5850MHz

Operating mode	Test Channel	Power Spectral Density dBm/500kHz	Limit * dBm/500kHz
802.11a	5745	-2.312	30
	5785	1.293	30
	5825	1.375	30
802.11n-HT20	5745	1.176	30
	5785	1.138	30
	5825	0.768	30
802.11n-HT40	5755	-1.957	30
	5795	-1.903	30
802.11ac-HT80	5775	-5.451	30

Test Mode: 802.11a

5180MHz

5200MHz



5240MHz

5745MHz

5785MHz

5805MHz

Test Mode: 802.11n-HT20

5180MHz

5200MHz

5240MHz

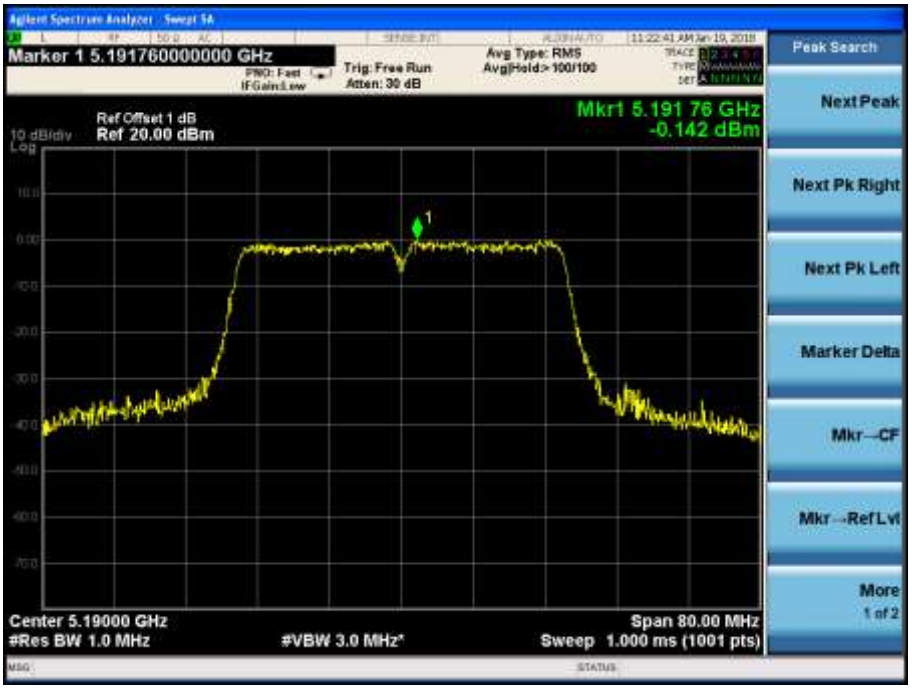
5745MHz

5785MHz

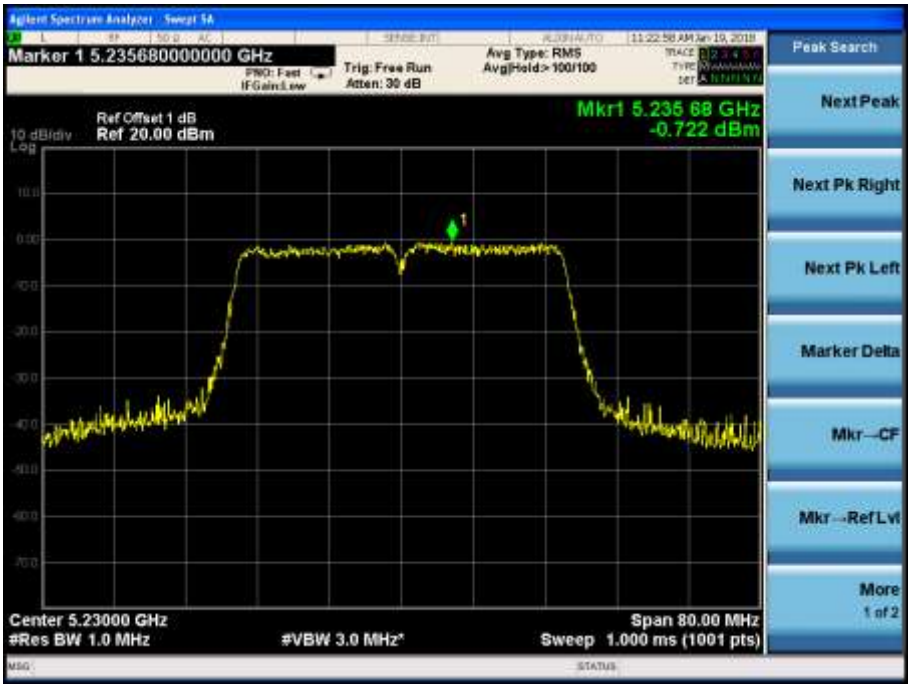
5805MHz

Test Mode: 802.11n-HT40

5190MHz



5230MHz



5755MHz

5795MHz

Test Mode: 802.11ac-HT80

5210MHz

5755MHz

7. Emission Bandwidth and Occupied Bandwidth

7.1 Standard Applicable

According to 15.407 (a) and (e)

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

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi 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.

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

7.2 Test Procedure

According to 789033 D02 v02r01 section C&D, the following is the measurement procedure.

1. Emission Bandwidth (EBW)
a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum 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%.

2. Minimum Emission Bandwidth for the band 5.725-5.85 GHz
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) 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.
Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

D. 99 Percent Occupied Bandwidth
The 99-percent occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 % of the total mean power of the given emission. Measurement of the 99-percent occupied bandwidth is required only as a condition for using the optional band-edge measurement techniques described in section II.G.3.d). Measurements of 99-percent occupied bandwidth may also optionally be used in lieu of the EBW to 789033 D02 v01r02 General UNII Test Procedures New Rules v01 define the minimum frequency range over which the spectrum is integrated when measuring maximum conducted output power as described in section II.E. However, the EBW must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with 15.407(a).

The following procedure shall be used for measuring (99 %) power 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.

7.3 Environmental Conditions

Temperature:	24° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

7.4 Summary of Test Results/Plots

5150-5250MHz

Test Mode	Test Channel MHz	26 dB Bandwidth MHz	99% Bandwidth MHz	Result
802.11a	5180	20.42	16.706	Pass
	5200	22.19	16.722	Pass
	5240	19.77	16.718	Pass
802.11n-HT20	5180	20.39	17.570	Pass
	5200	20.37	17.588	Pass
	5240	20.37	17.584	Pass
802.11n-HT40	5190	41.64	36.586	Pass
	5230	41.54	36.553	Pass
802.11ac-HT80	5210	81.79	76.021	Pass

5725-5850MHz

Test Mode	Test Channel MHz	6 dB Bandwidth MHz	99% Bandwidth MHz	Limit kHz
802.11a	5745	16.39	16.676	≥500
	5785	16.41	16.734	≥500
	5825	16.50	16.547	≥500
802.11n-HT20	5745	17.53	17.560	≥500
	5785	17.53	17.570	≥500
	5825	17.42	17.582	≥500
802.11n-HT40	5755	36.43	36.306	≥500
	5795	36.34	36.213	≥500
802.11ac-HT80	5775	75.88	75.591	≥500

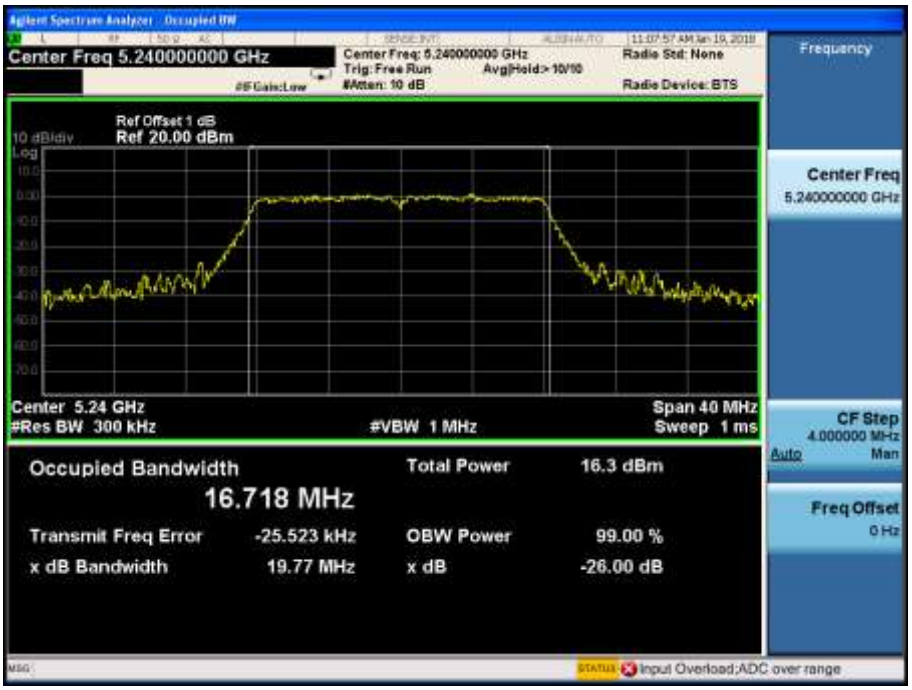
5150-5250MHz

Test mode：802.11a

5180MHz

5200MHz

5240MHz



Test mode：802.11n-HT20

5180MHz

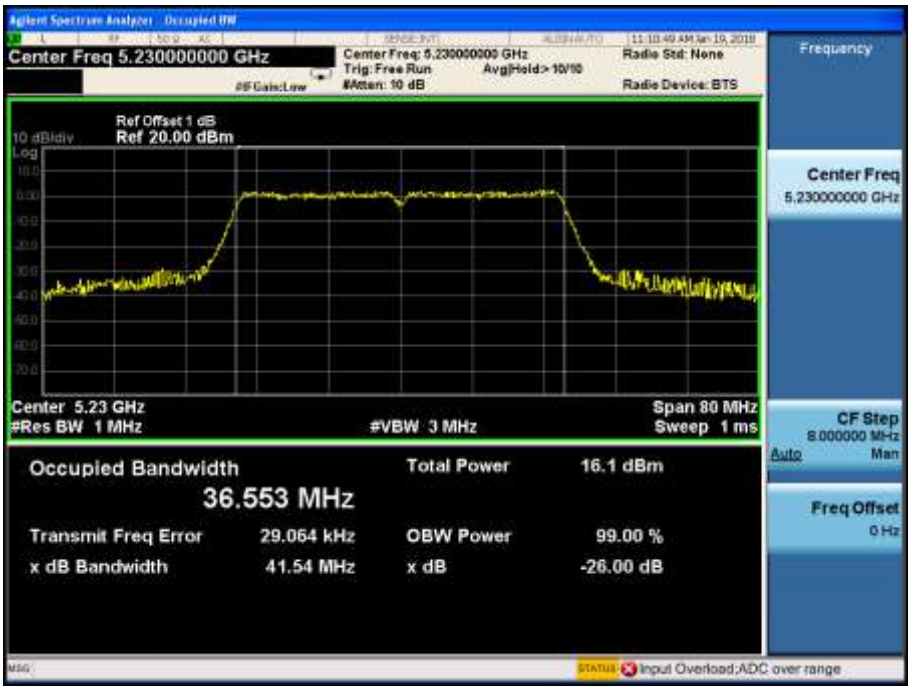
5200MHz

5240MHz

Test mode：802.11n-HT40

5190MHz

5230MHz



Test mode：802.11ac-HT80

5210MHz

5725-5850MHz

Test mode：802.11a

5745MHz

5785MHz

5805MHz

Test mode：802.11-HT20

5745MHz

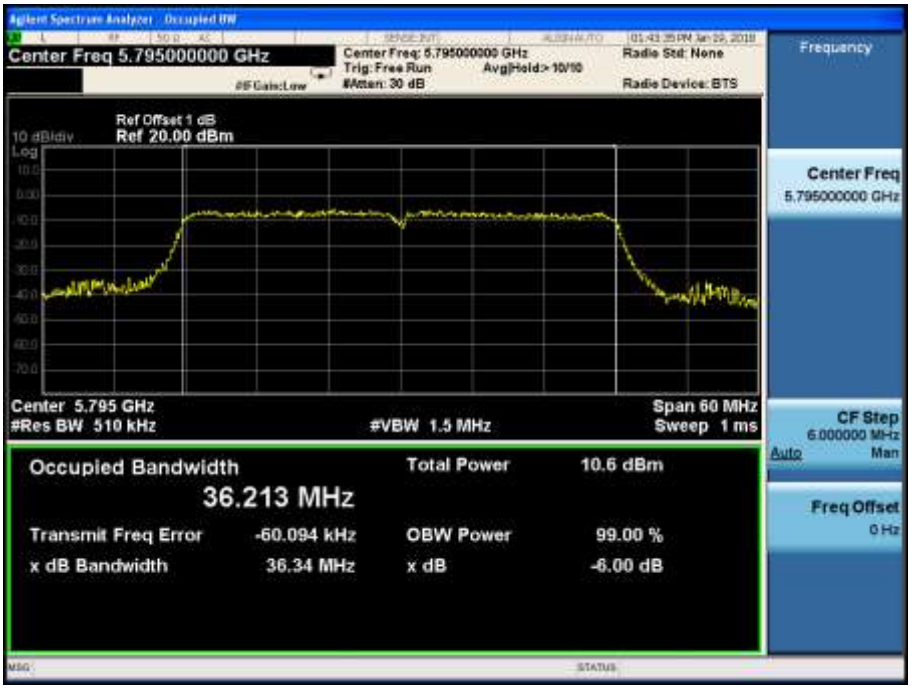
5785MHz

5805MHz

Test mode：802.11n-HT40

5755MHz

5795MHz



Test mode：802.11ac-HT80

5775MHz

8. Maximum Conducted Output Power

8.1 Standard Applicable

Section 15.407(a) Power limits:

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

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi 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.

8.2 Test Procedure

According to KDB789033 D02 v02r01 section E, the following is the measurement procedure.

(i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.
(ii) Set RBW = 1 MHz.
(iii) Set VBW ≥ 3 MHz.
(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
(v) Sweep time = auto.

(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.

(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".

(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

8.3 Environmental Conditions

Temperature:	26° C
Relative Humidity:	65%
ATM Pressure:	1011 mbar

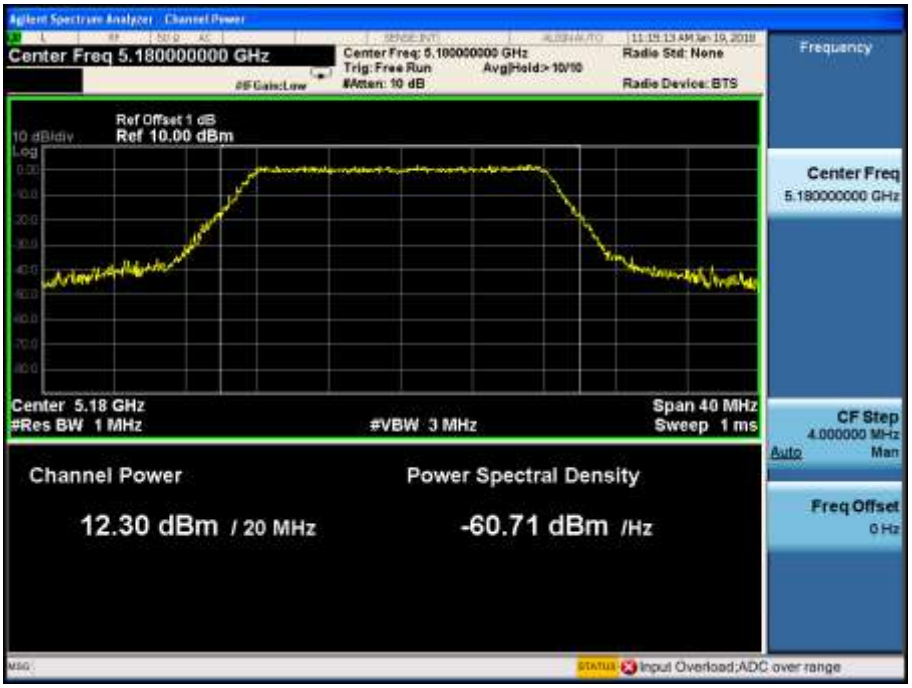
8.4 Summary of Test Results/Plots

For the frequency band 5.15-5.25GHz, 5725-5850GHz

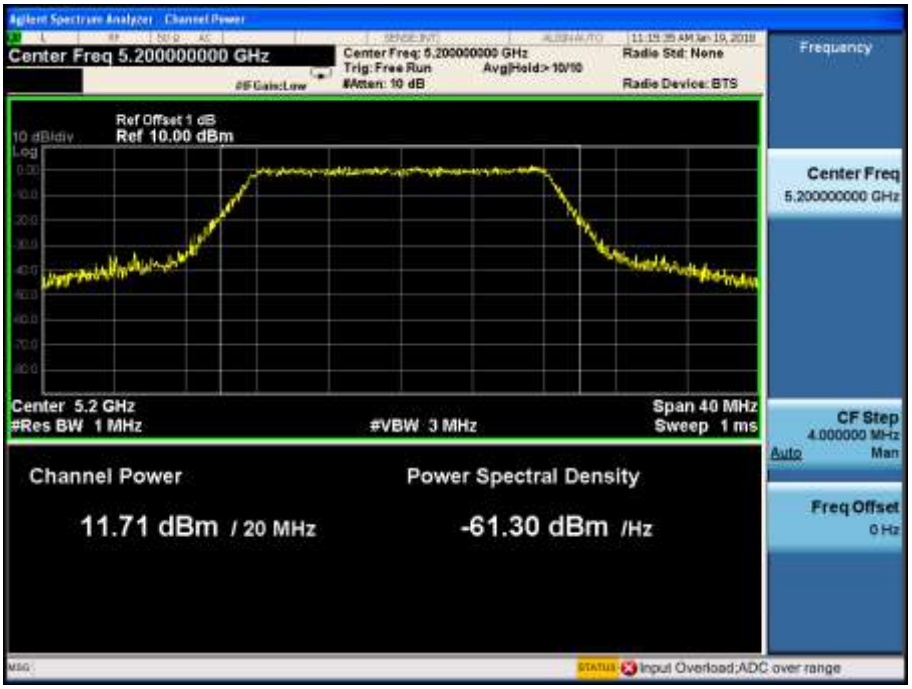
Test mode	Frequency MHz	Output Power dBm	Output Power mW	Limit mW
802.11a	5180	12.30	16.98	250
	5200	11.71	14.83	250
	5240	11.70	14.79	250
	5745	10.00	10.00	1000
	5785	9.19	8.30	1000
	5825	8.53	7.13	1000
802.11n-HT20	5180	11.93	15.60	250
	5200	12.10	16.22	250
	5240	11.98	15.78	250
	5745	9.43	8.77	1000
	5785	9.08	8.09	1000
	5825	9.00	7.94	1000
802.11n-HT40	5190	13.80	23.99	250
	5230	14.70	29.51	250
	5755	9.62	9.16	1000
	5795	9.21	8.34	1000
802.11ac-HT80	5210	9.58	9.08	250
	5775	9.10	8.13	1000

Test Mode: 802.11a

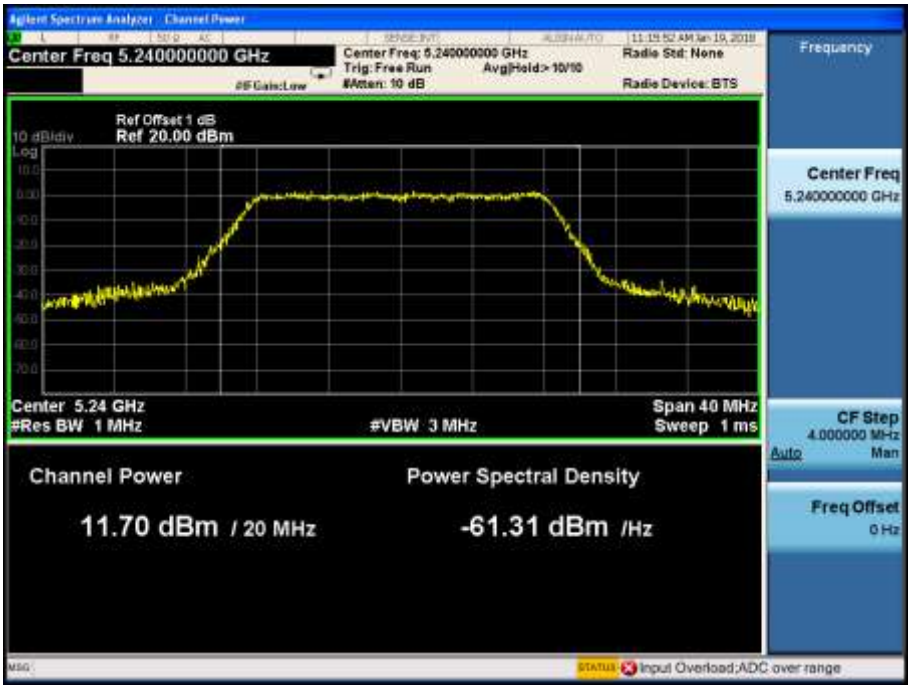
5180MHz



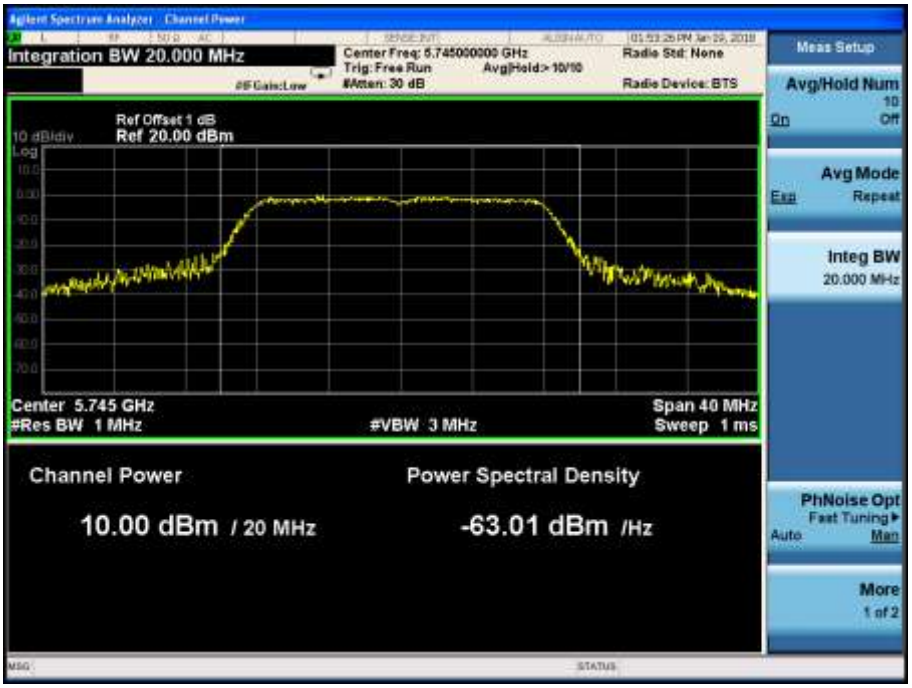
5200MHz



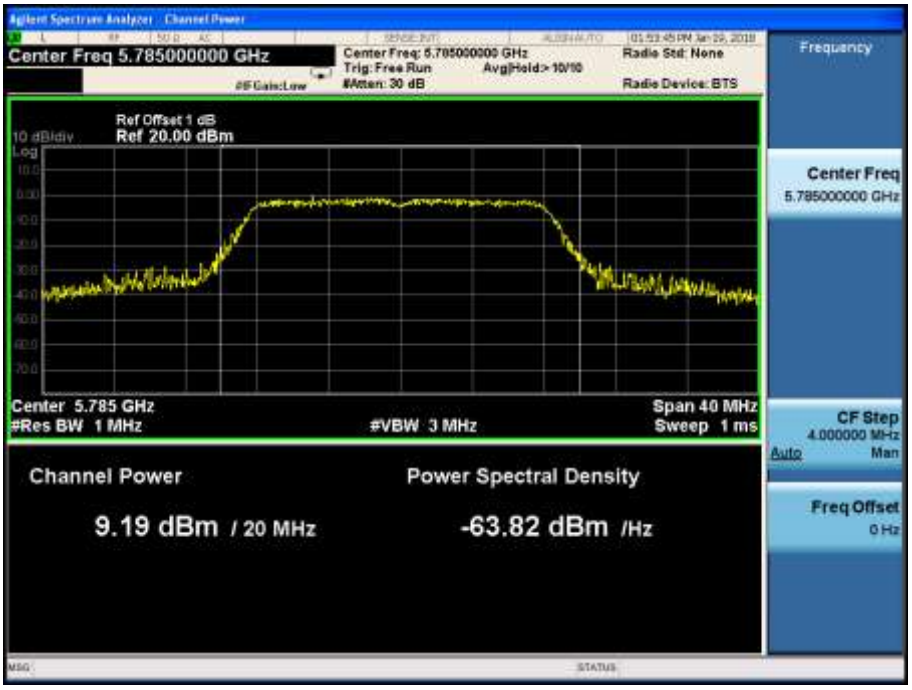
5240MHz



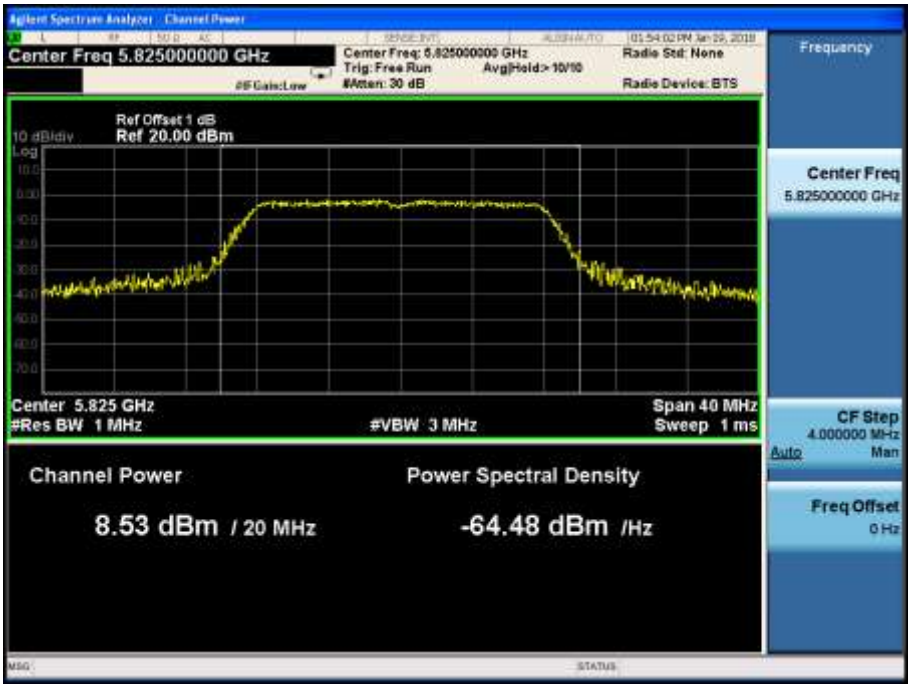
5745MHz



5785MHz

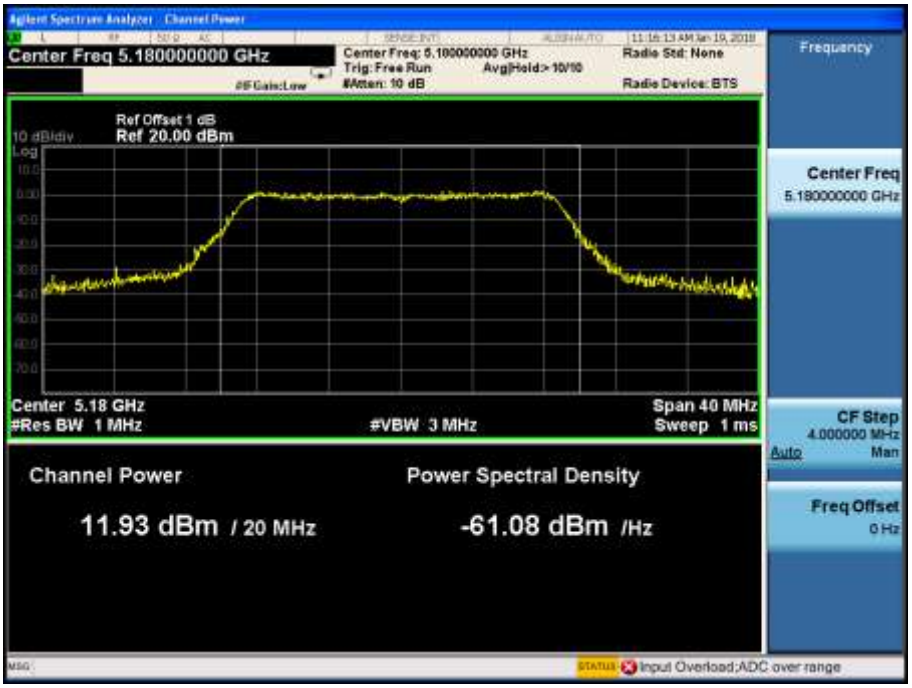


5805MHz

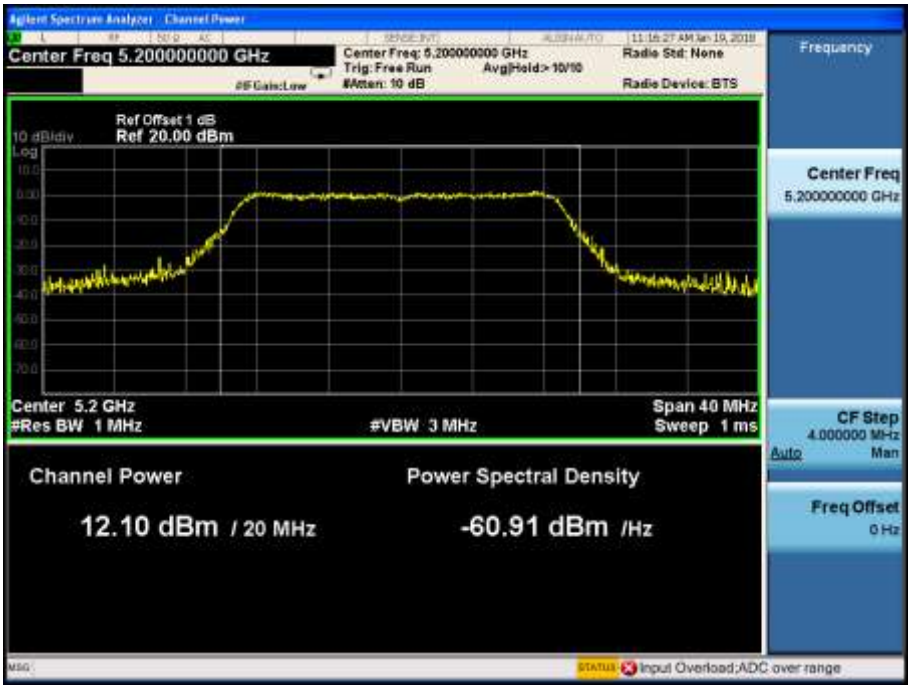


Test Mode: 802.11n-HT20

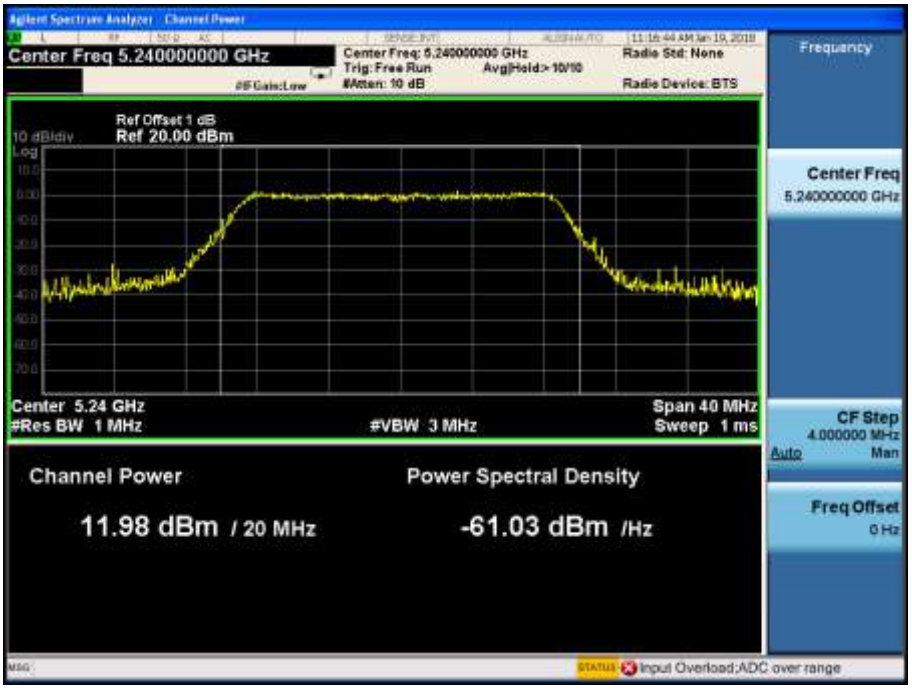
5180MHz



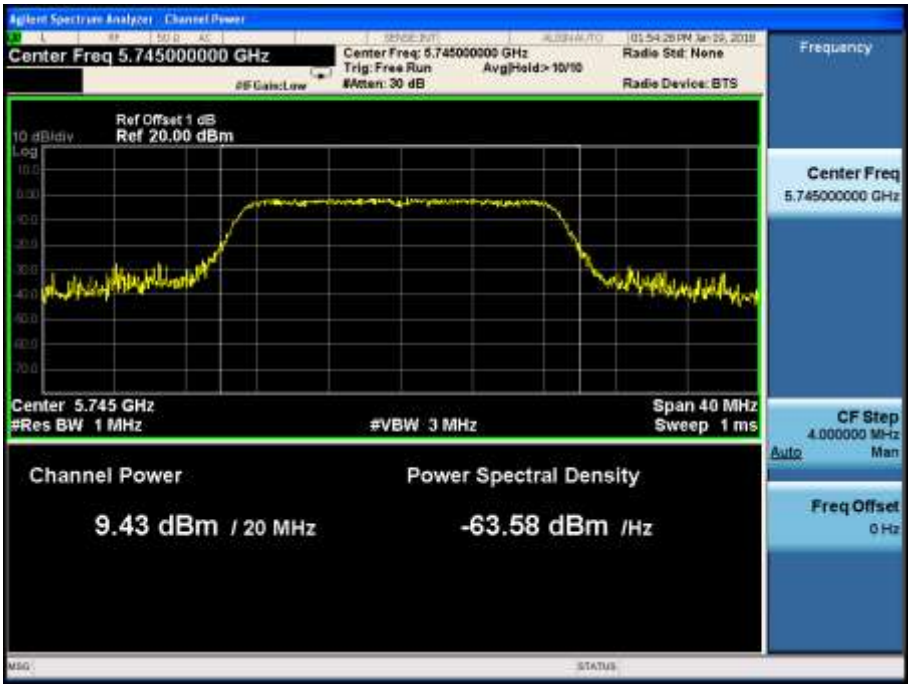
5200MHz



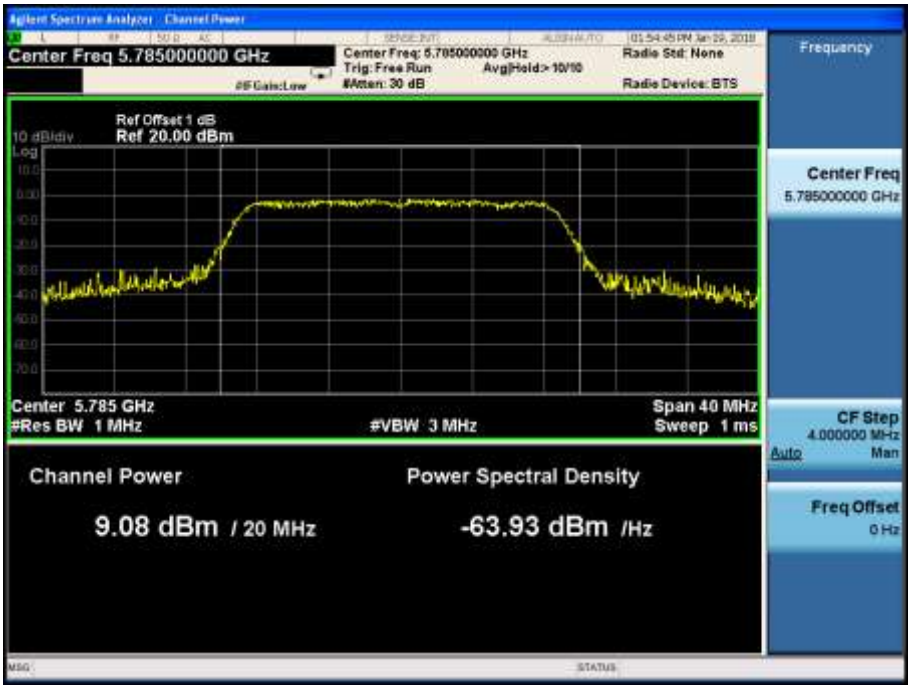
5240MHz



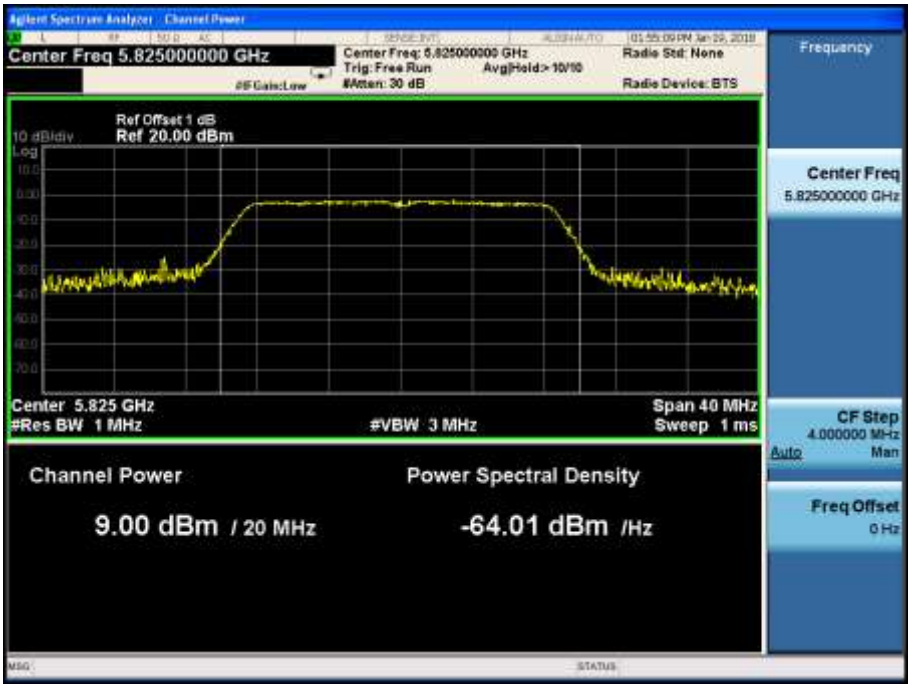
5745MHz



5785MHz



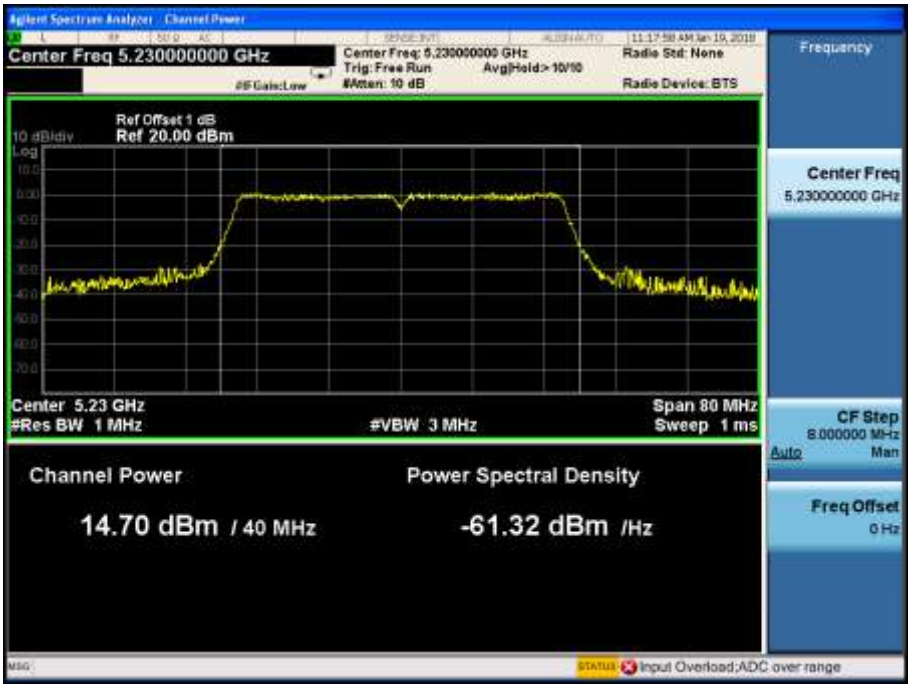
5825MHz



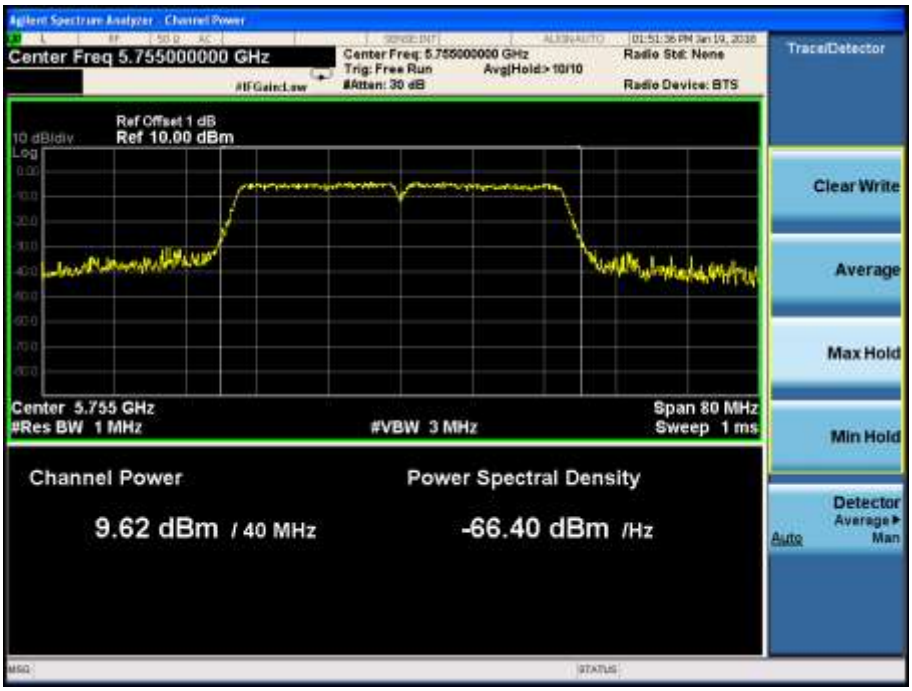
Test Mode: 802.11n-HT40

5190MHz

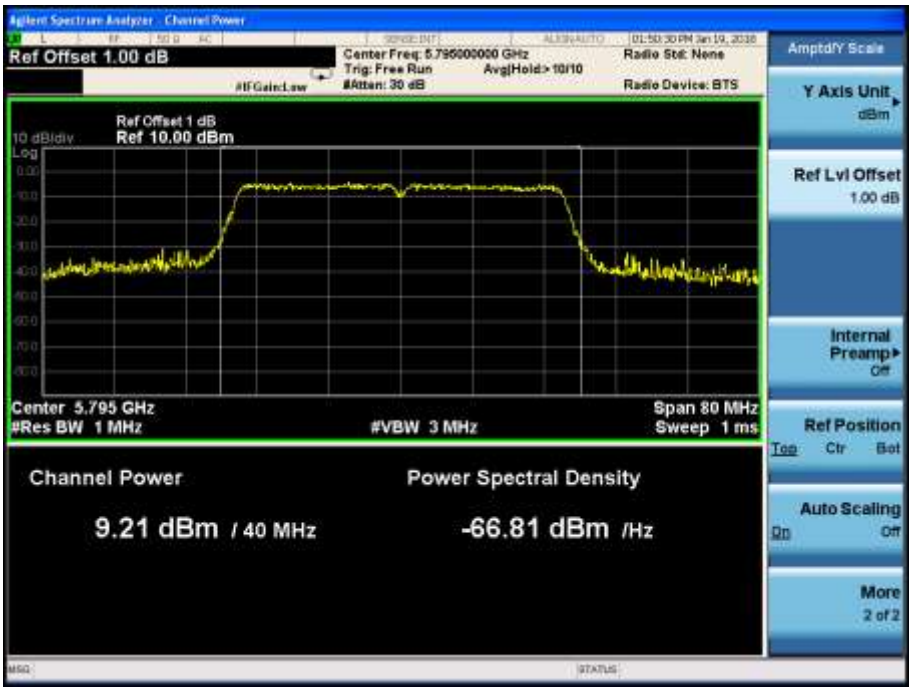
5230MHz



5755MHz

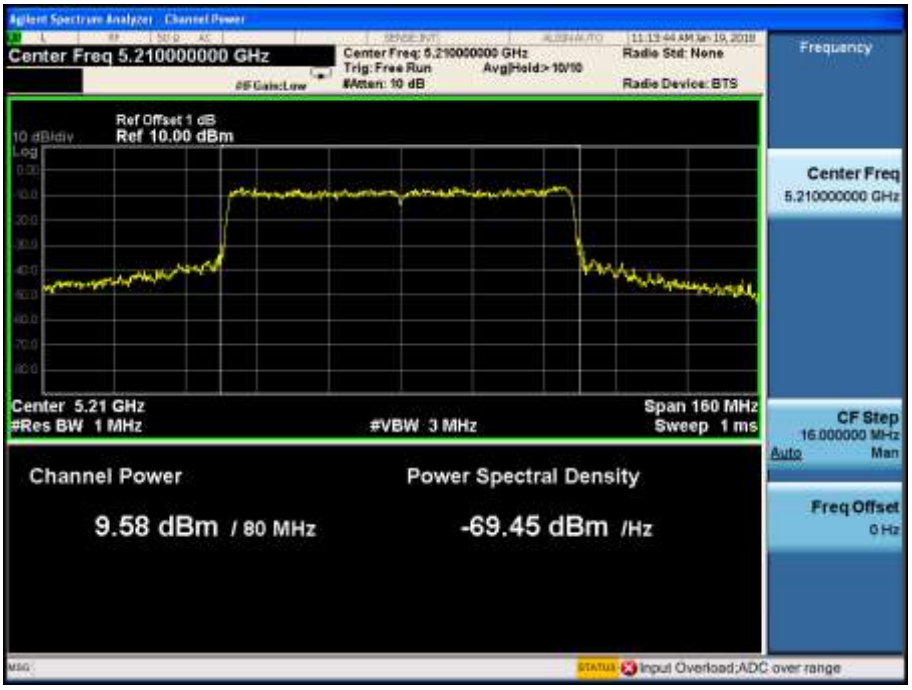


5795MHz

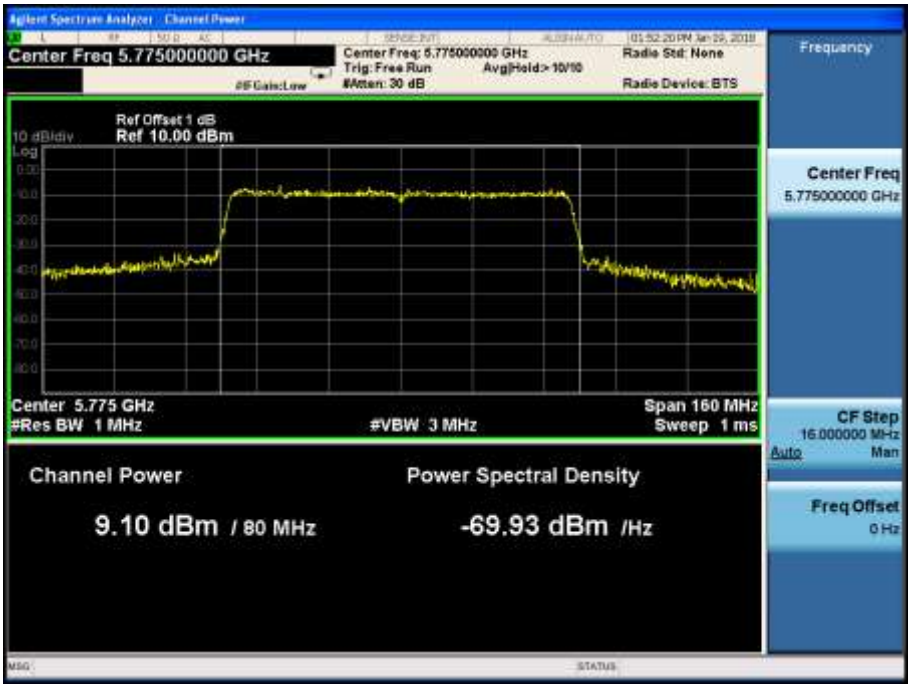


Test Mode: 802.11ac-HT80

5210MHz



5755MHz



9. Radiated Spurious Emissions

9.1 Standard Applicable

According to §15.407 (b) (b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

According to §15.407(b)(6), Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Section 15.209.
According to §15.407(b)(7),The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.
789033 D02 v01r02 General UNII Test Procedures New Rules v01
If radiated measurements are performed, field strength is then converted to EIRP as follows:

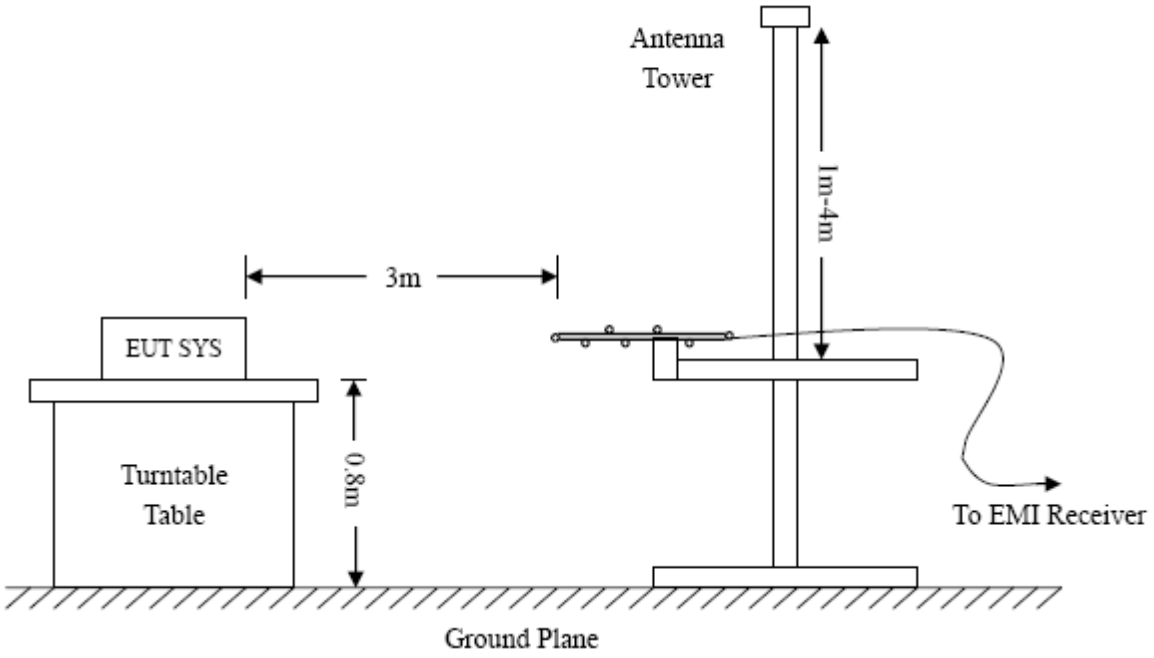
EIRP = ((E*d)^2) / 30

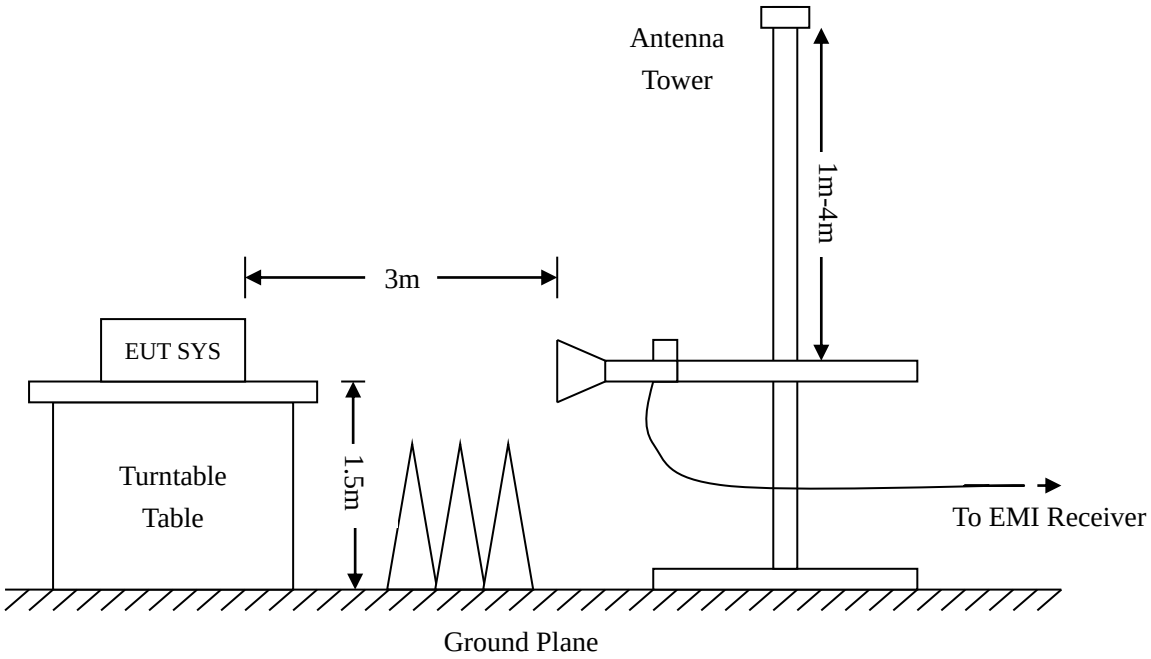
where:

- E is the field strength in V/m;
- d is the measurement distance in meters;
- EIRP is the equivalent isotropically radiated power in watts.

9.2 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.407(b)(6) and FCC Part 15.209 Limit..
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.
The spacing between the peripherals was 10 cm.


Antenna
Tower
1m-4m
3m
EUT SYS
Turntable
Table
0.8m
To EMI Receiver
Ground Plane


Antenna
Tower
1m-4m
3m
EUT SYS
Turntable
Table
1.5m
To EMI Receiver
Ground Plane

9.3 Test Receiver Setup

During the radiated emission test for above 1GHz, the test receiver was set with the following configurations:

For peak detector:
RBW = 1000kHz, VBW = 3000kHz, Sweep Time = Auto

For average detector:
RBW = 1000kHz, VBW = 10Hz, Sweep Time = Auto

9.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Ant. Factor + Cable Loss – Ampl. Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Part 15 Limit

9.5 Environmental Conditions

Temperature:	22° C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

9.6 Summary of Test Results/Plots

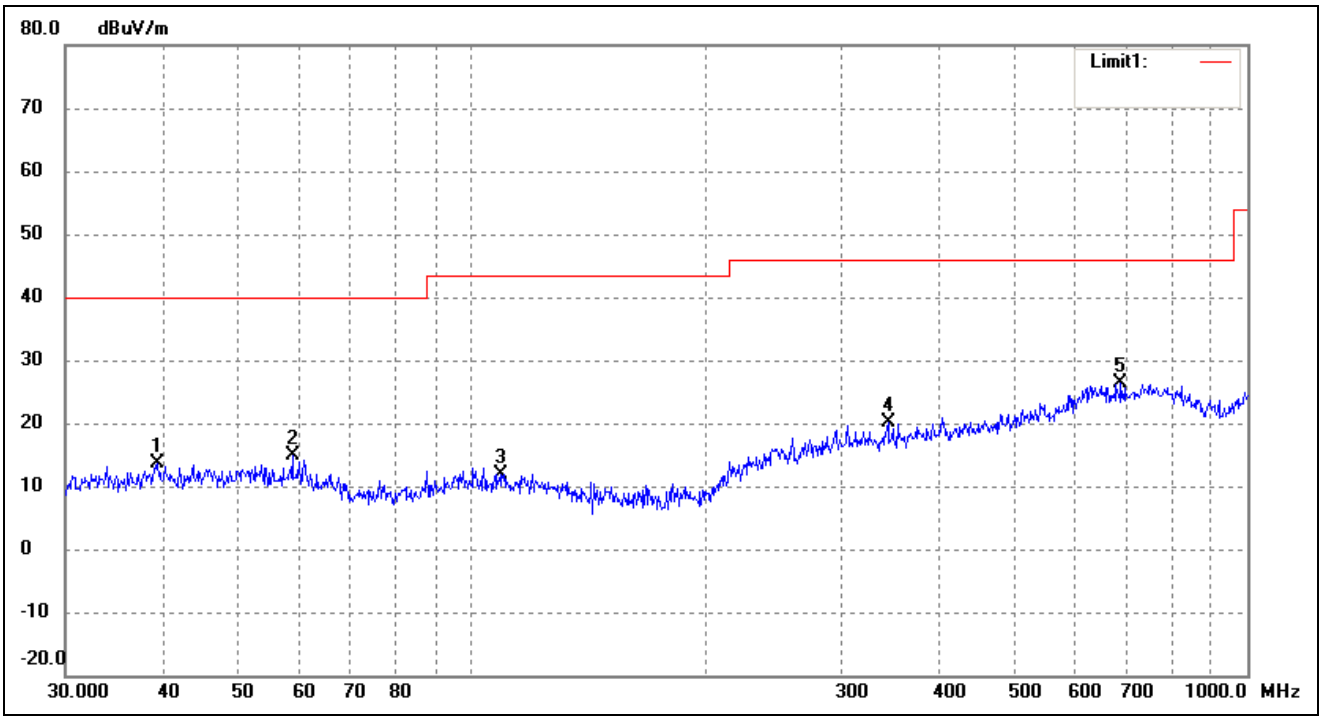
According to the data below, the FCC Part 15.205, 15.209 and 15.407(b)(6) standards, and had the worst margin of:

Note: *this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*

For 802.11a (worse case)

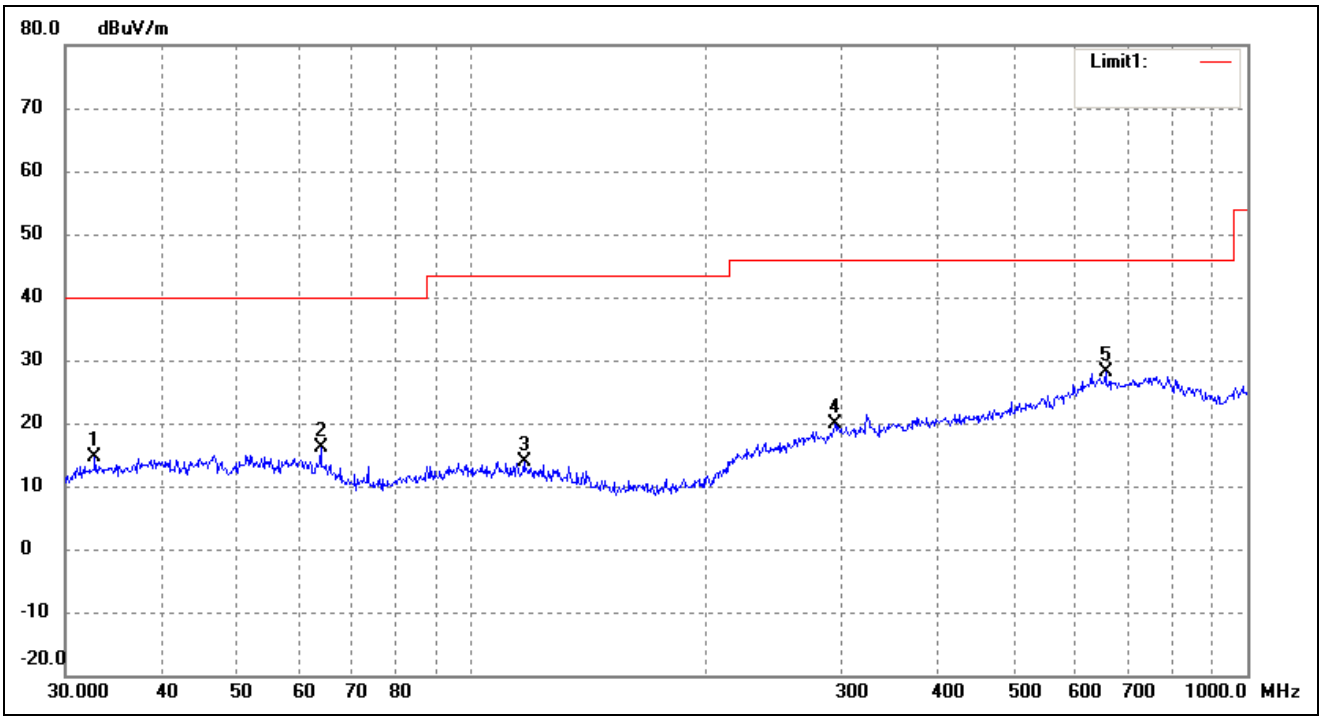
Spurious Emission From 30 MHz to 1 GHz

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	39.4372	30.20	-16.62	13.58	40.00	-26.42	324	100	peak
2	58.8185	31.44	-16.53	14.91	40.00	-25.09	90	100	peak
3	109.4116	28.57	-16.62	11.95	43.50	-31.55	352	100	peak
4	344.3855	29.64	-9.50	20.14	46.00	-25.86	98	100	peak
5	687.1507	27.31	-0.89	26.42	46.00	-19.58	318	100	peak

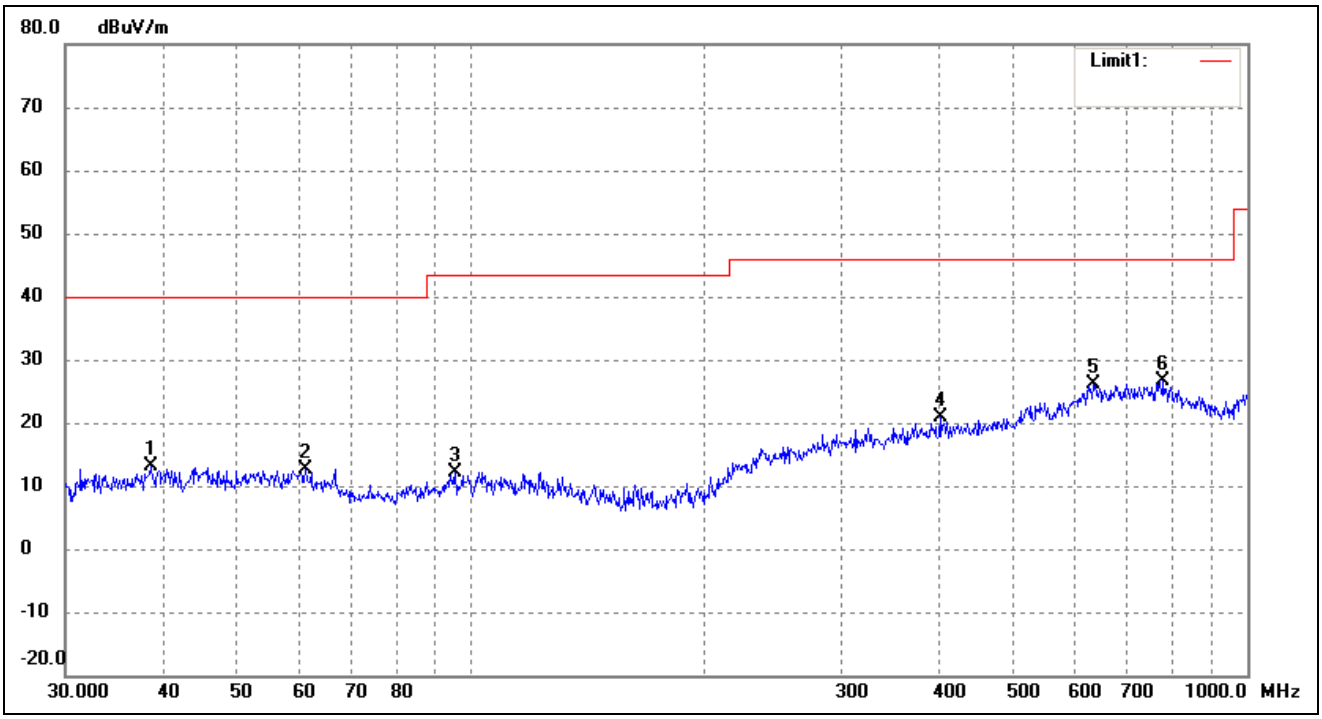
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	32.7486	32.44	-17.70	14.74	40.00	-25.26	223	100	peak
2	63.9828	33.53	-17.35	16.18	40.00	-23.82	95	100	peak
3	116.9495	30.58	-16.66	13.92	43.50	-29.58	218	100	peak
4	294.1137	29.71	-9.79	19.92	46.00	-26.08	121	100	peak
5	656.5300	29.45	-1.41	28.04	46.00	-17.96	116	100	peak

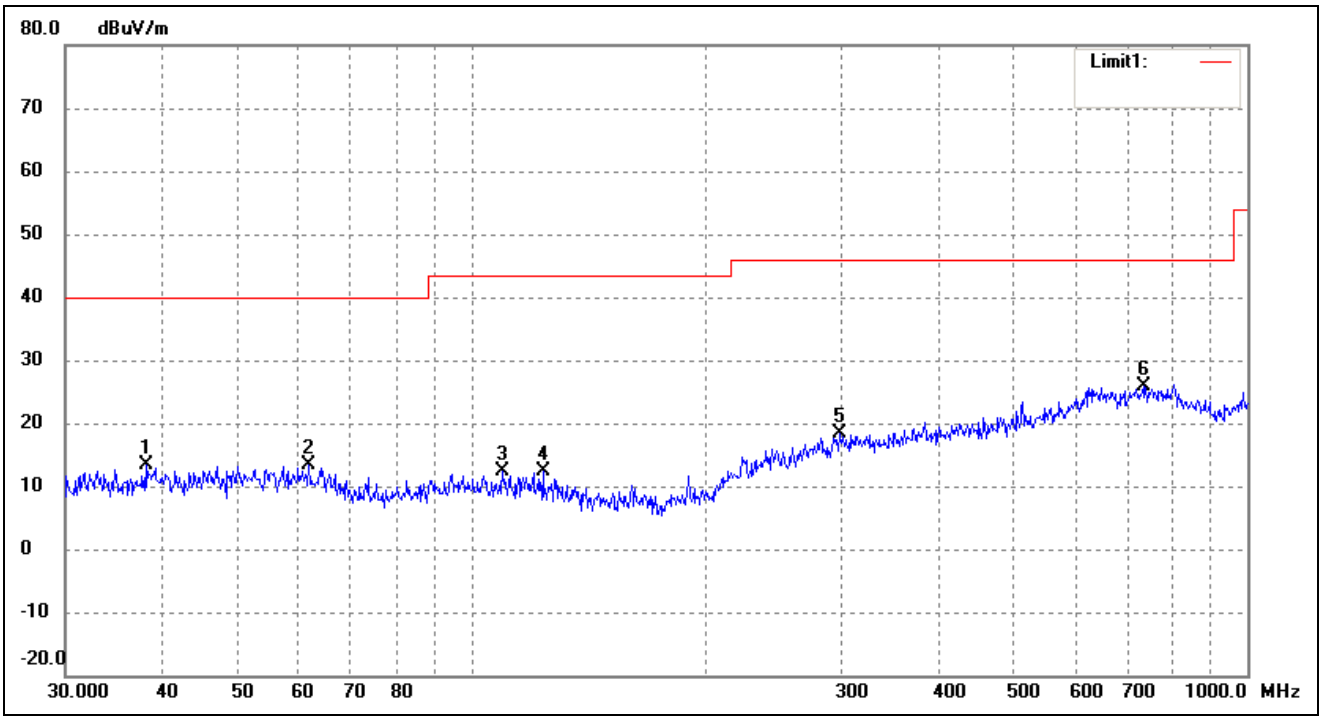
For 802.11n-HT20 (worse case)

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	38.6161	29.82	-16.75	13.07	40.00	-26.93	101	100	peak
2	61.1316	29.40	-16.75	12.65	40.00	-27.35	243	100	peak
3	95.4270	29.47	-17.23	12.24	43.50	-31.26	66	100	peak
4	401.8385	28.82	-7.85	20.97	46.00	-25.03	124	100	peak
5	633.9073	27.44	-1.21	26.23	46.00	-19.77	138	100	peak
6	779.6068	28.44	-1.84	26.60	46.00	-19.40	216	100	peak

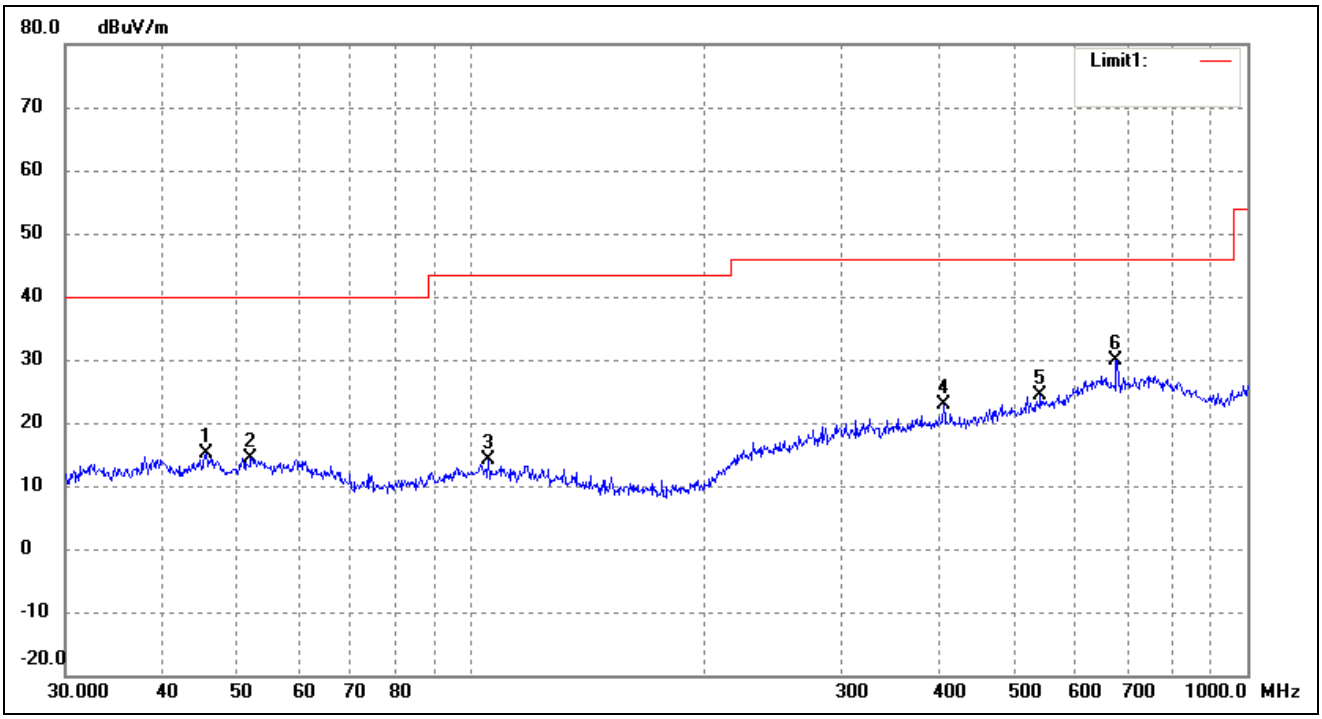
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	38.0783	30.33	-16.84	13.49	40.00	-26.51	157	100	peak
2	61.7781	30.27	-16.88	13.39	40.00	-26.61	207	100	peak
3	109.7960	29.00	-16.62	12.38	43.50	-31.12	75	100	peak
4	123.6985	29.26	-16.97	12.29	43.50	-31.21	285	100	peak
5	298.2681	27.94	-9.65	18.29	46.00	-27.71	154	100	peak
6	734.4913	26.09	-0.18	25.91	46.00	-20.09	148	100	peak

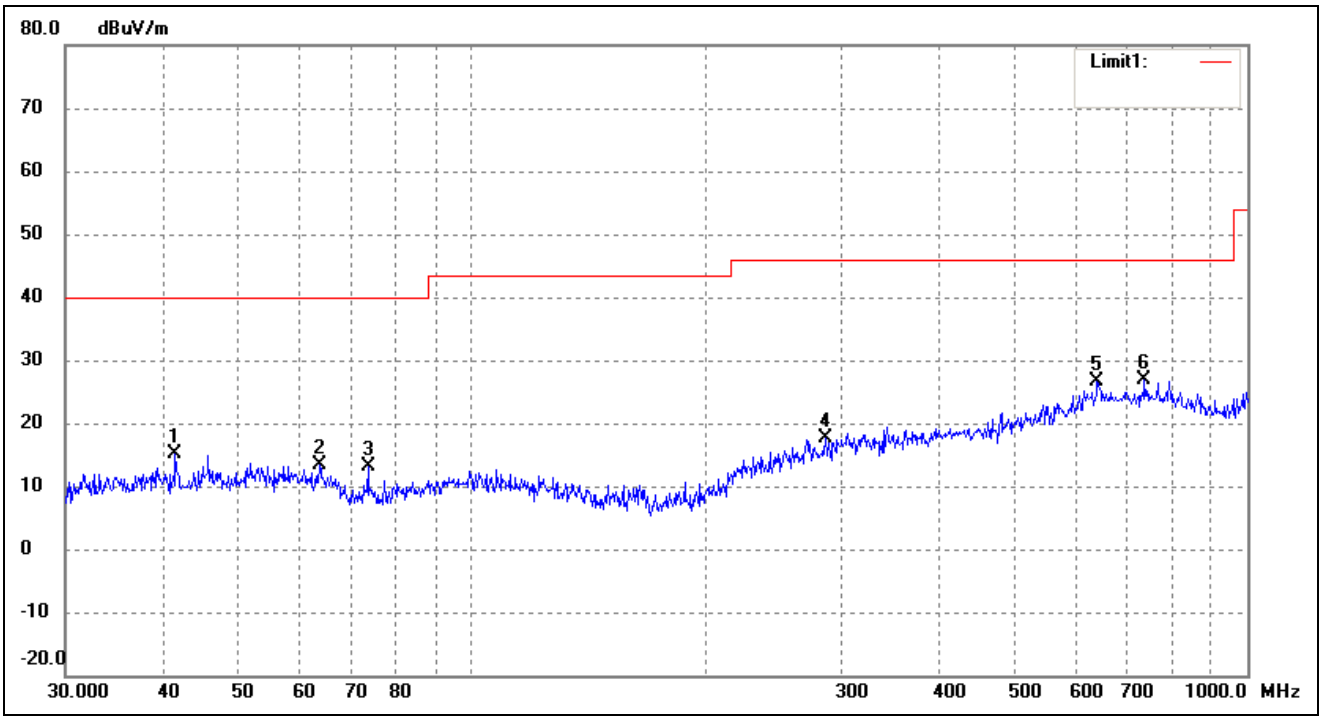
For 802.11n-HT40 (worse case)

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	45.5348	31.67	-16.49	15.18	40.00	-24.82	117	100	peak
2	52.0251	30.94	-16.50	14.44	40.00	-25.56	106	100	peak
3	105.2718	30.74	-16.60	14.14	43.50	-29.36	104	100	peak
4	406.0880	30.72	-7.95	22.77	46.00	-23.23	106	100	peak
5	541.3725	29.65	-5.20	24.45	46.00	-21.55	202	100	peak
6	677.5798	30.36	-0.50	29.86	46.00	-16.14	332	100	peak

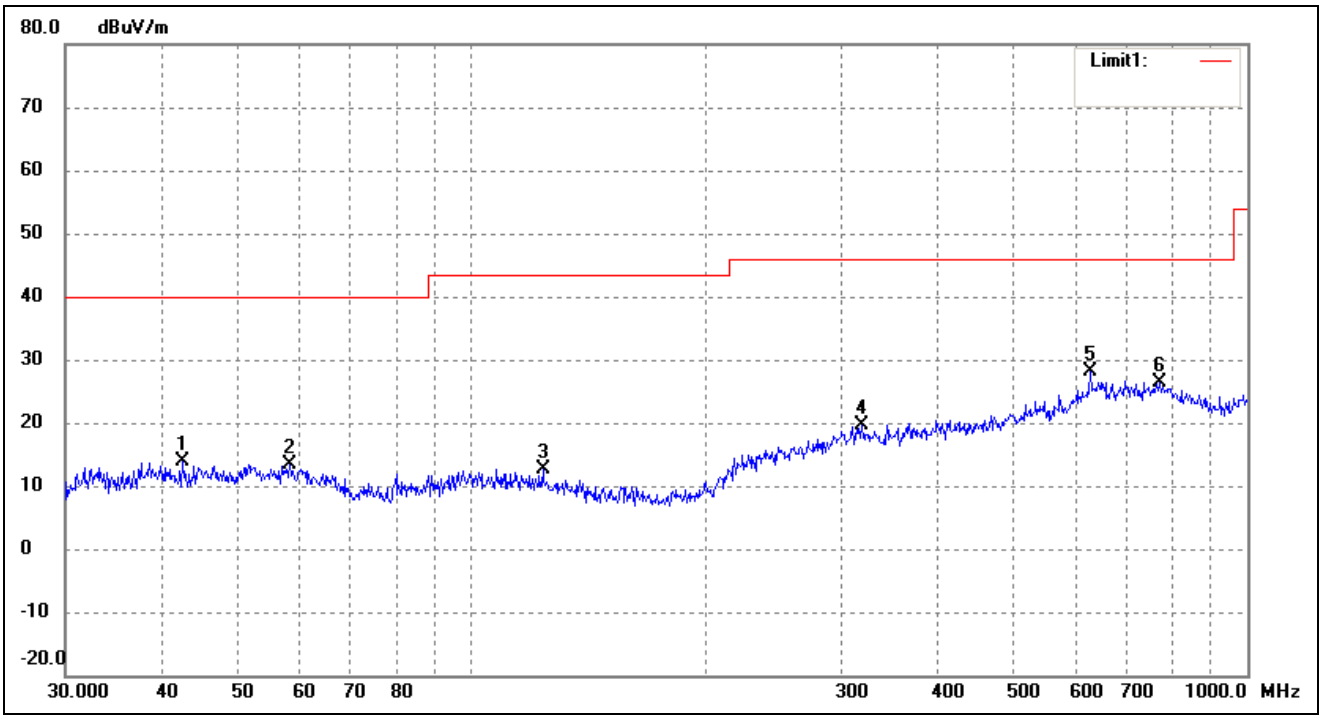
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	41.5670	31.53	-16.52	15.01	40.00	-24.99	75	100	peak
2	63.7588	30.62	-17.30	13.32	40.00	-26.68	167	100	peak
3	73.6170	32.35	-19.13	13.22	40.00	-26.78	73	100	peak
4	285.9778	27.81	-10.13	17.68	46.00	-28.32	139	100	peak
5	640.6110	27.62	-1.03	26.59	46.00	-19.41	228	100	peak
6	737.0714	26.88	-0.02	26.86	46.00	-19.14	221	100	peak

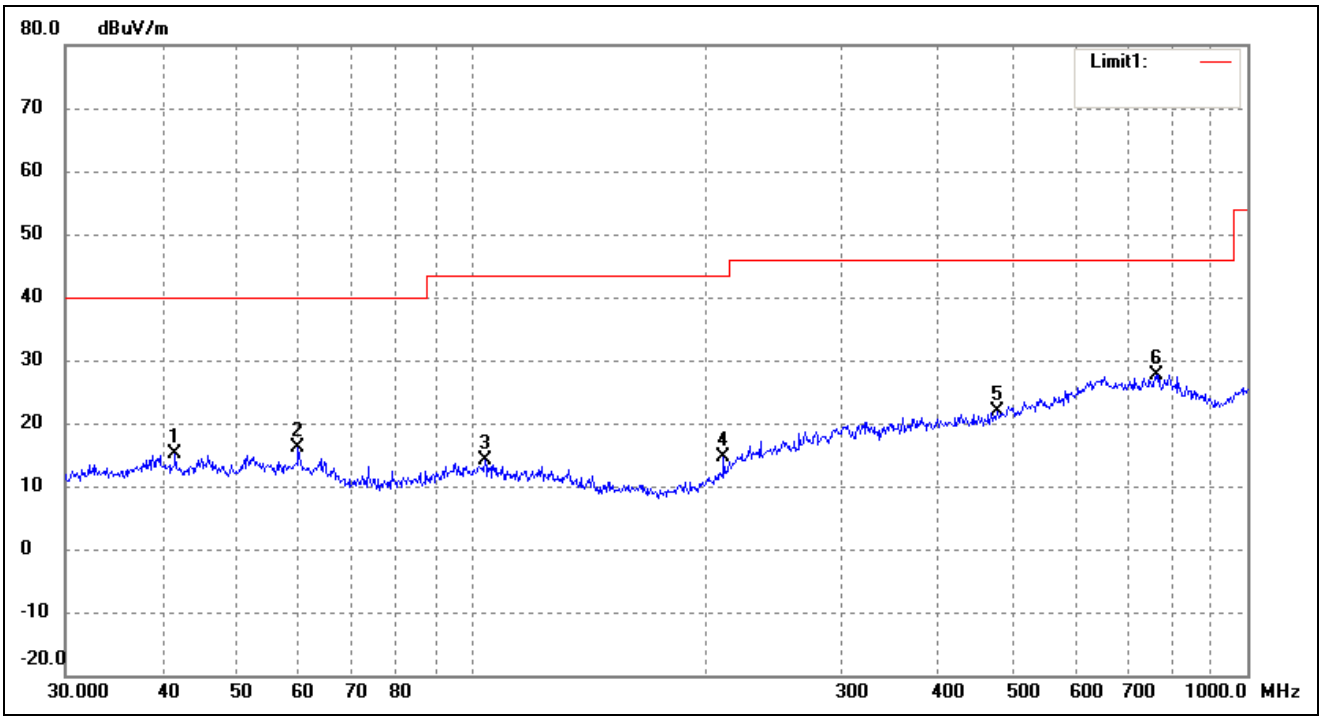
For 802.11ac-HT80 (worse case)

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	42.4508	30.34	-16.50	13.84	40.00	-26.16	351	100	peak
2	58.4074	30.01	-16.54	13.47	40.00	-26.53	92	100	peak
3	123.6985	29.59	-16.97	12.62	43.50	-30.88	294	100	peak
4	318.8170	28.97	-9.35	19.62	46.00	-26.38	110	100	peak
5	627.2738	29.59	-1.45	28.14	46.00	-17.86	57	100	peak
6	771.4486	27.68	-1.29	26.39	46.00	-19.61	259	100	peak

Test Specification: *Vertical*



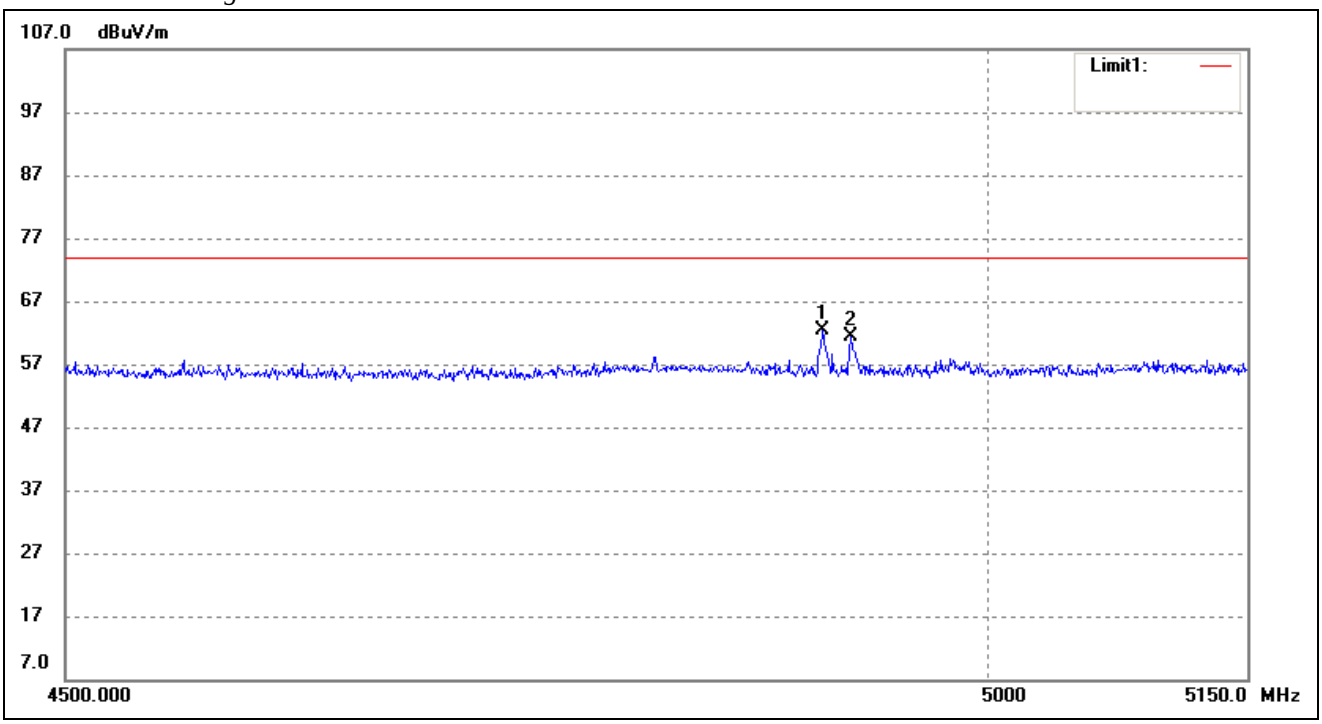
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	41.5670	31.53	-16.52	15.01	40.00	-24.99	207	100	peak
2	59.8588	32.54	-16.51	16.03	40.00	-23.97	97	100	peak
3	104.1701	30.84	-16.60	14.24	43.50	-29.26	211	100	peak
4	211.5265	30.26	-15.68	14.58	43.50	-28.92	105	100	peak
5	475.4991	28.64	-6.83	21.81	46.00	-24.19	82	100	peak
6	763.3757	28.43	-0.78	27.65	46.00	-18.35	112	100	peak

For 802.11a

Spurious Emission above 1GHz

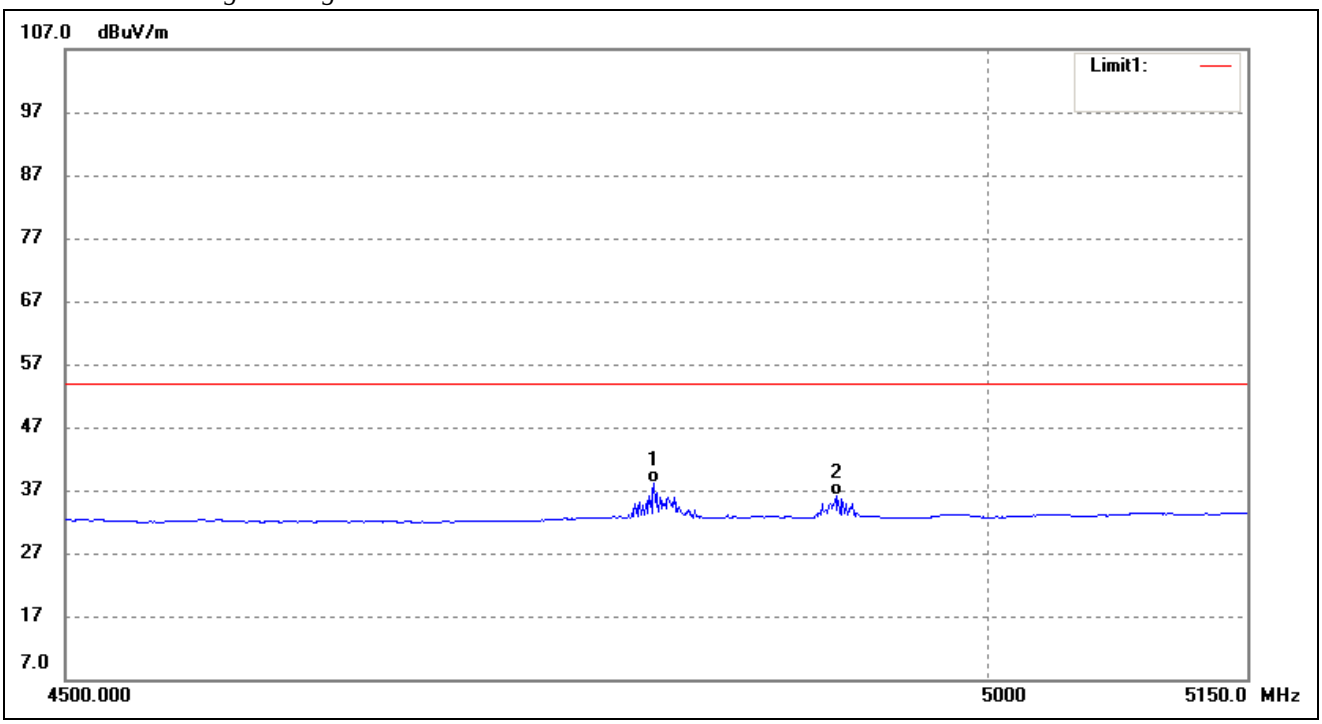
For the frequency band 5.15-5.25GHz

Restricted Bandedge Peak



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	4906.499	68.22	-5.84	62.38	74.00	-11.62	168	100	peak
2	4922.412	67.12	-5.80	61.32	74.00	-12.68	70	100	peak

Restricted Bandedge Average



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	4812.743	44.20	-6.11	38.09	54.00	-15.91	126	100	AVG
2	4913.786	41.86	-5.83	36.03	54.00	-17.97	156	100	AVG

Note: this EUT was tested in the low, high channel and the worst case position data was reported.

For the frequency band 5.150-5.250GHz (802.11a)

Harmonics And Spurious Emissions

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (5180MHz)										
15540	PK	51.3	360	V	40.7	10.9	39.6	64.2	74	-9.8
15540	PK	50.5	360	H	40.7	10.9	39.6	61.7	74	-12.3
15540	AV	36.0	360	V	40.7	10.9	39.6	49.2	54	-4.8
15540	AV	35.5	360	H	40.7	10.9	39.6	48.4	54	-5.6
High Channel (5240MHz)										
15720	PK	52.3	360	V	40.7	10.9	39.6	62.8	74	-11.2
15720	PK	51.1	360	H	40.7	10.9	39.6	62.0	74	-12.0
15720	AV	35.2	360	V	40.7	10.9	39.6	47.5	54	-6.5
15720	AV	34.0	360	H	40.7	10.9	39.6	46.5	54	-7.5

Out of Band edge

Test CH.	**Test Segment**	**Result**	**Limit**
	MHz	**dBm/MHz**	**dBm/MHz**
Lowest	Below 5150	-45.92	-27
Highest	Above 5350	-42.60	-27
Note: the data just list the worst cases			

For the frequency band 5.725-5.850GHz (802.11a)

Harmonics And Spurious Emissions

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (5725MHz)										
11490	PK	55.2	360	V	38.9	9.8	40.1	64.9	74	-9.1
11490	PK	56.0	360	H	38.9	9.8	40.1	65.2	74	-8.8
11490	AV	36.5	360	V	38.9	9.8	40.1	46.5	54	-7.5
11490	AV	36.9	360	H	38.9	9.8	40.1	46.9	54	-7.1
High Channel (5825MHz)										
11610	PK	56.4	360	V	38.9	9.8	40.1	63.9	74	-10.1
11610	PK	54.3	360	H	38.9	9.8	40.1	63.8	74	-10.2
11610	AV	38.6	360	V	38.9	9.8	40.1	48.4	54	-5.6
11610	AV	37.2	360	H	38.9	9.8	40.1	45.5	54	-8.5

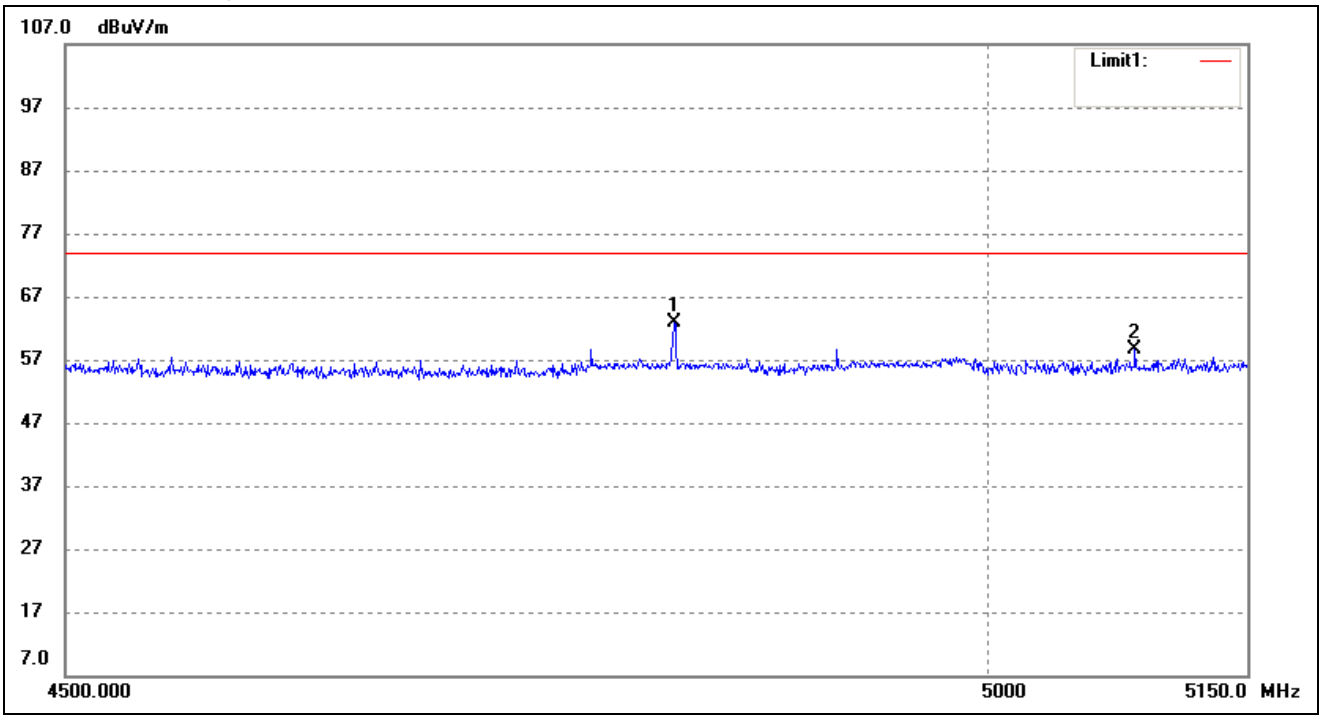
Out of Band edge

Test CH.	**Test Segment**	**Result**	**Limit**
	MHz	**dBm/MHz**	**dBm/MHz**
Lowest	Below 5715	-38.99	-27
	5715 to 5725	-27.86	-17
Highest	5850 to 5860	-28.95	-17
	Above 5860	-34.52	-27
Note: the data just list the worst cases			

802.11n HT20

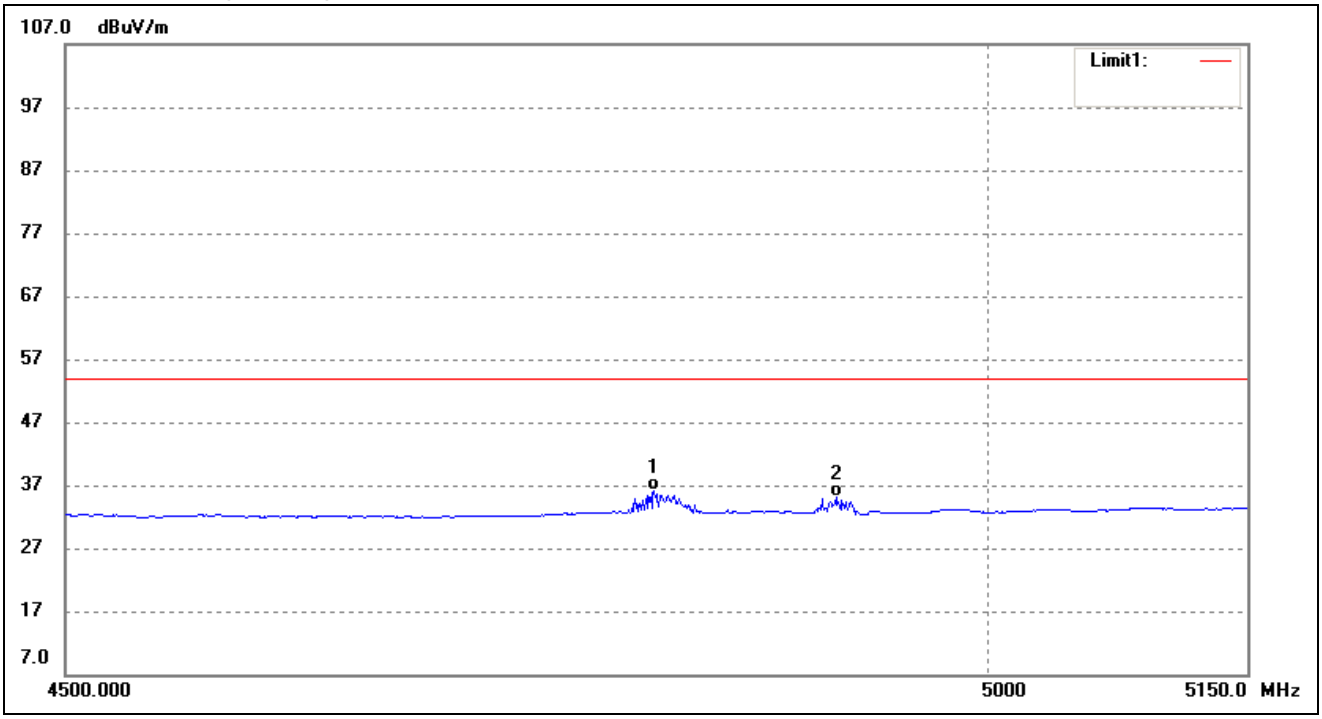
For the frequency band 5.15-5.25GHz

Restricted Bandedge Peak



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	4823.794	68.85	-6.08	62.77	74.00	-11.23	302	100	peak
2	5084.412	63.95	-5.38	58.57	74.00	-15.43	282	100	peak

Restricted Bandedge Average



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	4812.743	42.20	-6.11	36.09	54.00	-17.91	92	100	AVG
2	4913.786	40.86	-5.83	35.03	54.00	-18.97	252	100	AVG

Note: this EUT was tested in the low, high channel and the worst case position data was reported.

For the frequency band 5.150-5.250GHz (802.11n20)

Harmonics And Spurious Emissions

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (5180MHz)										
15540	PK	51.0	360	V	40.7	10.9	39.6	63.9	74	-10.1
15540	PK	50.6	360	H	40.7	10.9	39.6	63.7	74	-10.3
15540	AV	36.7	360	V	40.7	10.9	39.6	48.0	54	-6.0
15540	AV	35.8	360	H	40.7	10.9	39.6	47.2	54	-6.8
High Channel (5240MHz)										
15720	PK	52.1	360	V	40.7	10.9	39.6	64.8	74	-9.2
15720	PK	51.1	360	H	40.7	10.9	39.6	63.2	74	-10.8
15720	AV	36.5	360	V	40.7	10.9	39.6	49.0	54	-5.0
15720	AV	34.4	360	H	40.7	10.9	39.6	47.5	54	-6.5

Out of Band edge

Test CH.	**Test Segment**	**Result**	**Limit**
	MHz	**dBm/MHz**	**dBm/MHz**
Lowest	Below 5150	-45.45	-27
Highest	Above 5350	-42.51	-27
Note: the data just list the worst cases			

For the frequency band 5.725-5.850GHz (802.11HT20)

Harmonics And Spurious Emissions

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (5725MHz)										
11490	PK	55.1	360	V	38.9	9.8	40.1	64.0	74	-10.0
11490	PK	55.6	360	H	38.9	9.8	40.1	63.5	74	-10.5
11490	AV	37.4	360	V	38.9	9.8	40.1	45.4	54	-8.6
11490	AV	37.1	360	H	38.9	9.8	40.1	46.6	54	-7.4
High Channel (5825MHz)										
11610	PK	55.1	360	V	38.9	9.8	40.1	63.2	74	-10.8
11610	PK	55.2	360	H	38.9	9.8	40.1	62.7	74	-11.3
11610	AV	38.9	360	V	38.9	9.8	40.1	47.0	54	-7.0
11610	AV	37.3	360	H	38.9	9.8	40.1	46.3	54	-7.7

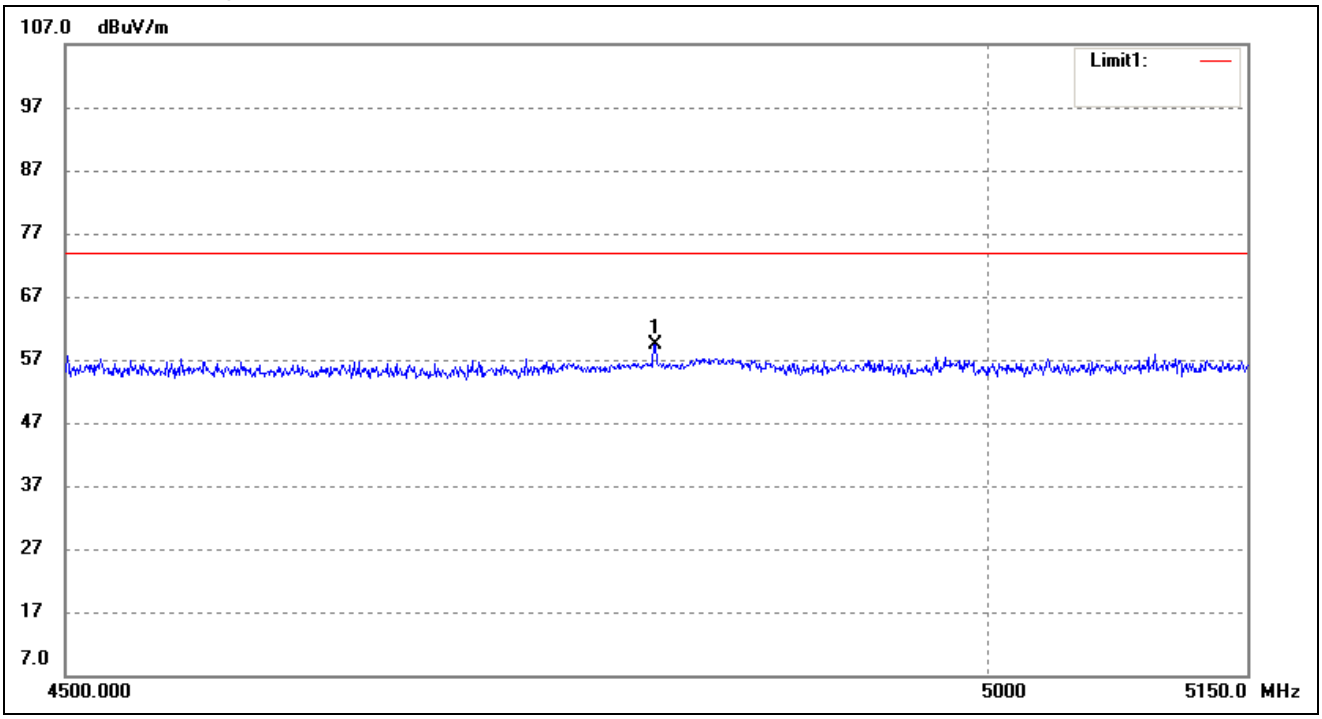
Out of Band edge

Test CH.	**Test Segment**	**Result**	**Limit**
	MHz	**dBm/MHz**	**dBm/MHz**
Lowest	Below 5715	-39.97	-27
	5715 to 5725	-27.62	-17
Highest	5850 to 5860	-27.85	-17
	Above 5860	-36.32	-27
Note: the data just list the worst cases			

802.11n HT40

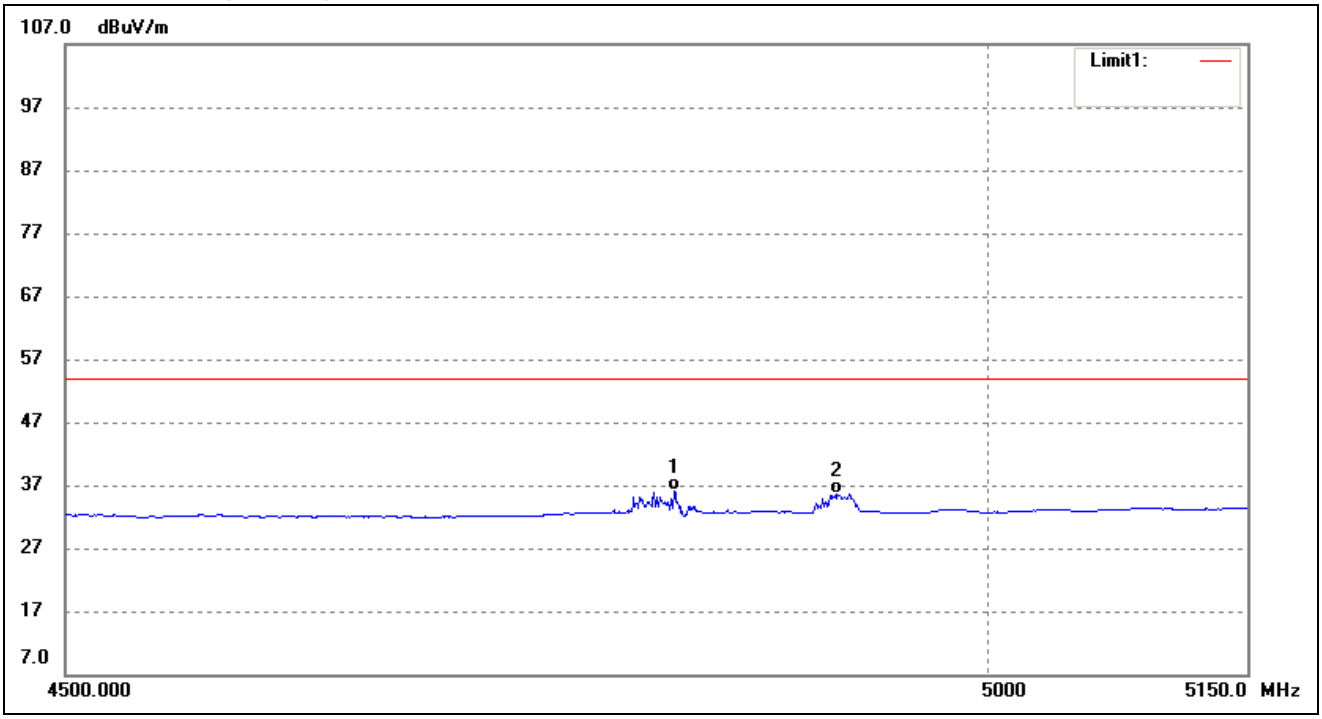
For the frequency band 5.15-5.25GHz

Restricted Bandedge Peak



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	4813.392	65.60	-6.11	59.49	74.00	-14.51	165	100	peak

Restricted Bandedge Average



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	4823.794	42.21	-6.08	36.13	54.00	-17.87	90	100	AVG
2	4914.449	41.46	-5.83	35.63	54.00	-18.37	113	100	AVG

Note: this EUT was tested in the low, high channel and the worst case position data was reported.

For the frequency band 5.150-5.250GHz (802.11n40)

Harmonics And Spurious Emissions

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (5190MHz)										
15570	PK	50.5	360	V	40.7	10.9	39.6	62.6	74	-11.4
15570	PK	49.5	360	H	40.7	10.9	39.6	60.5	74	-13.5
15570	AV	35.2	360	V	40.7	10.9	39.6	47.8	54	-6.2
15570	AV	34.2	360	H	40.7	10.9	39.6	47.5	54	-6.5
High Channel (5230MHz)										
15690	PK	51.7	360	V	40.7	10.9	39.6	62.3	74	-11.7
15690	PK	49.9	360	H	40.7	10.9	39.6	60.8	74	-13.2
15690	AV	35.0	360	V	40.7	10.9	39.6	46.7	54	-7.3
15690	AV	34.9	360	H	40.7	10.9	39.6	46.2	54	-7.8

Out of Band edge

Test CH.	**Test Segment**	**Result**	**Limit**
	MHz	**dBm/MHz**	**dBm/MHz**
Lowest	Below 5150	-46.56	-27
Highest	Above 5350	-43.50	-27
Note: the data just list the worst cases			

For the frequency band 5.725-5.850GHz (802.11HT40)

Harmonics And Spurious Emissions

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (5755MHz)										
11510	PK	49.2	155	V	38.9	9.8	40.1	58.2	74	-15.8
11510	PK	51.1	171	H	38.9	9.8	40.1	60.6	74	-13.4
11510	AV	37.1	151	V	38.9	9.8	40.1	45.2	54	-8.8
11510	AV	38.8	216	H	38.9	9.8	40.1	48.2	54	-5.8
High Channel (5795MHz)										
11590	PK	48.8	158	V	38.9	9.8	40.1	56.4	74	-17.6
11590	PK	48.9	308	H	38.9	9.8	40.1	58.9	74	-15.1
11590	AV	36.2	285	V	38.9	9.8	40.1	46.3	54	-7.7
11590	AV	38.7	246	H	38.9	9.8	40.1	47.0	54	-7.0

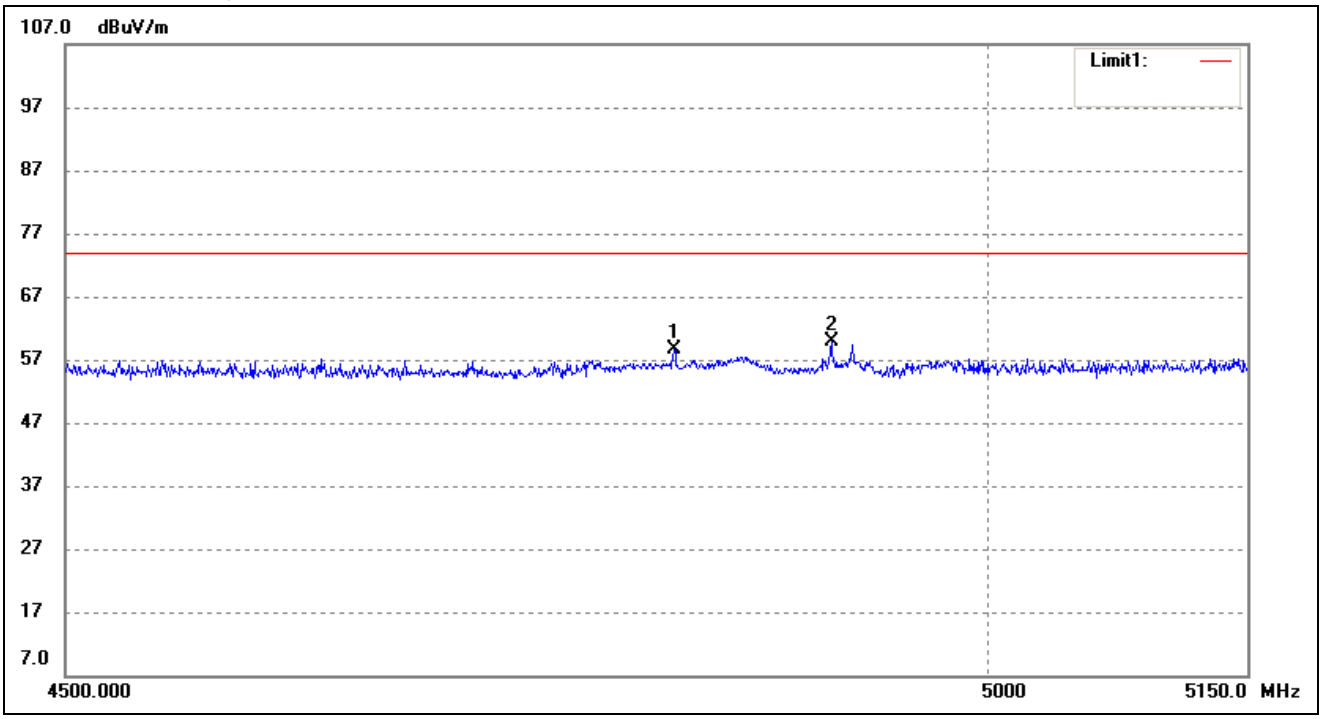
Out of Band edge

Test CH.	**Test Segment**	**Result**	**Limit**
	MHz	**dBm/MHz**	**dBm/MHz**
Lowest	Below 5715	-38.24	-27
	5715 to 5725	-28.27	-17
Highest	5850 to 5860	-26.80	-17
	Above 5860	-34.13	-27
Note: the data just list the worst cases			

802.11ac-HT80

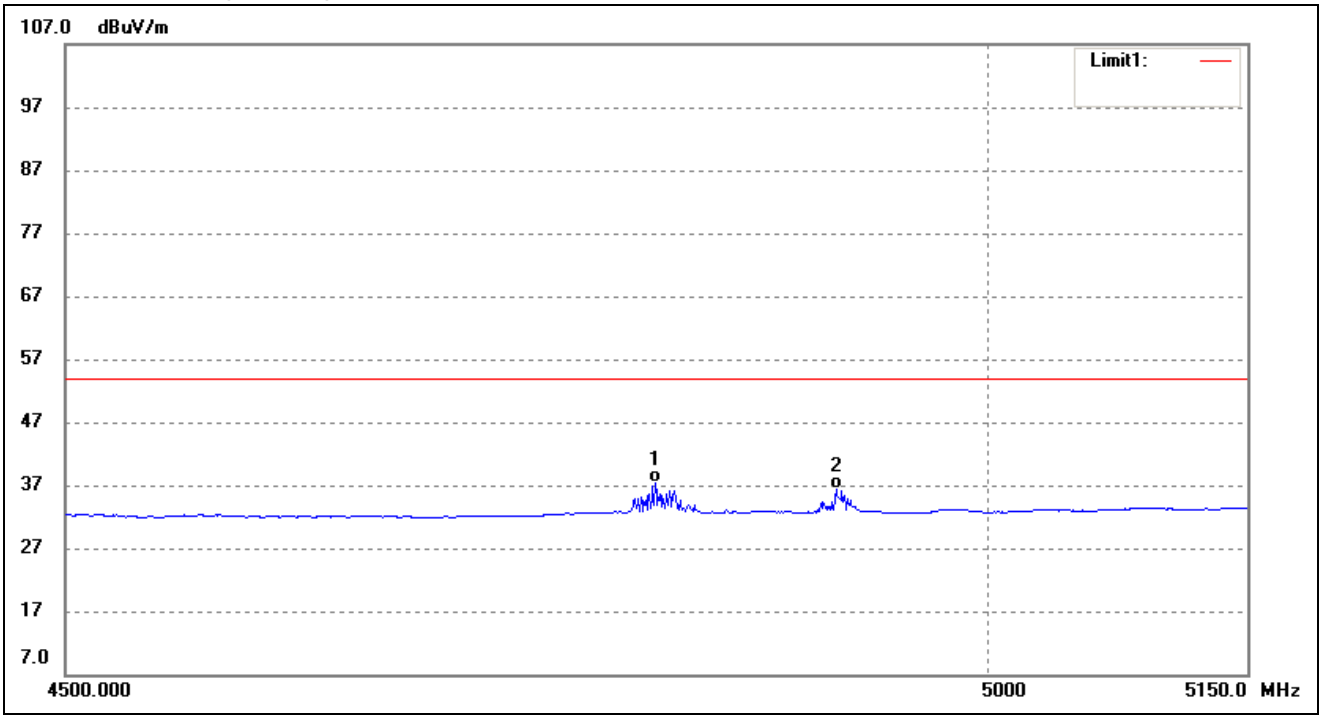
For the frequency band 5.15-5.25GHz

Restricted Bandedge Peak



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	4823.794	64.66	-6.08	58.58	74.00	-15.42	296	100	peak
2	4911.135	65.69	-5.83	59.86	74.00	-14.14	326	100	peak

Restricted Bandedge Average



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	4813.392	43.60	-6.11	37.49	54.00	-16.51	71	100	AVG
2	4913.786	42.12	-5.83	36.29	54.00	-17.71	161	100	AVG

Note: this EUT was tested in the low, high channel and the worst case position data was reported.

For the frequency band 5.150-5.250GHz (802.11ac)

Harmonics And Spurious Emissions

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Channel (5210MHz)										
15630	PK	51.1	360	V	40.7	10.9	39.6	64.4	74	-9.6
15630	PK	49.6	360	H	40.7	10.9	39.6	60.1	74	-13.9
15630	AV	32.7	360	V	40.7	10.9	39.6	44.1	54	-9.9
15630	AV	36.5	360	H	40.7	10.9	39.6	47.4	54	-6.6

Out of Band edge

Test CH.	**Test Segment**	**Result**	**Limit**
	MHz	**dBm/MHz**	**dBm/MHz**
Lowest	Below 5150	-44.01	-27
Highest	Above 5350	-43.48	-27
Note: the data just list the worst cases			

For the frequency band 5.725-5.850GHz (802.11ac)

Harmonics And Spurious Emissions

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Channel (5775MHz)										
11550	PK	50.2	155	V	38.9	9.8	40.1	57.6	74	-16.4
11550	PK	49.3	171	H	38.9	9.8	40.1	59.1	74	-14.9
11550	AV	36.4	151	V	38.9	9.8	40.1	45.6	54	-8.4
11550	AV	38.5	216	H	38.9	9.8	40.1	48.2	54	-5.8

Out of Band edge

Test CH.	**Test Segment**	**Result**	**Limit**
	MHz	**dBm/MHz**	**dBm/MHz**
Lowest	Below 5715	-38.80	-27
	5715 to 5725	-29.18	-17
Highest	5850 to 5860	-27.67	-17
	Above 5860	-35.53	-27
Note: the data just list the worst cases			

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

10. Frequency Stability

10.1 Standard Applicable

According to §15.407(g), Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

10.2 Test Procedure

According to §2.1055, the following test procedure was performed.
The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.
The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode

Temperature:	Supply Voltage
20°C	85-115% of declared nominal voltage
-30°C to +50°C	Normal

10.3 Environmental Conditions

Temperature:	20°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

10.4 Summary of Test Results/Plots

5150-5250MHz

802.11a

Reference Frequency(Middle Channel): 5210MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	129	0.0248
40	3.7	98	0.0189
30	3.7	74	0.0142
20	3.7	101	0.0194
10	3.7	168	0.0323
0	3.7	147	0.0283
-10	3.7	157	0.0301
-20	3.7	97	0.0187
-30	3.7	119	0.0228

802.11n_HT20

Reference Frequency(Middle Channel): 5210 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	158	0.0302
40	3.7	142	0.0272
30	3.7	144	0.0277
20	3.7	134	0.0257
10	3.7	102	0.0196
0	3.7	111	0.0213
-10	3.7	155	0.0298
-20	3.7	90	0.0173
-30	3.7	183	0.0351

802.11n_HT40

Reference Frequency(Middle Channel): 5210MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	155	0.0298
40	3.7	129	0.0247
30	3.7	117	0.0225
20	3.7	135	0.0259
10	3.7	178	0.0341
0	3.7	142	0.0273
-10	3.7	123	0.0236
-20	3.7	163	0.0312
-30	3.7	124	0.0239

802.11ac

Reference Frequency(Middle Channel): 5210MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	169	0.0324
40	3.7	128	0.0245
30	3.7	116	0.0222
20	3.7	140	0.0268
10	3.7	170	0.0326
0	3.7	139	0.0267
-10	3.7	131	0.0252
-20	3.7	174	0.0334
-30	3.7	123	0.0235

5725-5850MHz

802.11a

Reference Frequency(Middle Channel): 5775MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	121	0.0209
40	3.7	96	0.0166
30	3.7	76	0.0132
20	3.7	96	0.0166
10	3.7	160	0.0278
0	3.7	130	0.0226
-10	3.7	159	0.0275
-20	3.7	83	0.0143
-30	3.7	123	0.0214

802.11n_HT20

Reference Frequency(Middle Channel): 5775 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	149	0.0257
40	3.7	136	0.0236
30	3.7	146	0.0253
20	3.7	143	0.0248
10	3.7	108	0.0188
0	3.7	103	0.0179
-10	3.7	142	0.0245
-20	3.7	95	0.0165
-30	3.7	173	0.0300

802.11n_HT40

Reference Frequency(Middle Channel): 5775MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	163	0.0282
40	3.7	121	0.0210
30	3.7	110	0.0190
20	3.7	131	0.0227
10	3.7	177	0.0307
0	3.7	132	0.0229
-10	3.7	138	0.0238
-20	3.7	173	0.0299
-30	3.7	127	0.0220

802.11ac

Reference Frequency(Middle Channel): 5775MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	154	0.0267
40	3.7	110	0.0191
30	3.7	116	0.0201
20	3.7	122	0.0212
10	3.7	186	0.0322
0	3.7	137	0.0238
-10	3.7	142	0.0245
-20	3.7	173	0.0300
-30	3.7	128	0.0221

So, Frequency Stability Versus Input Voltage is:

5150-5250MHz

802.11a

Reference Frequency(Middle Channel): 5210 MHz			
Environment Temperature (℃)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.5	164	0.0314
	3.7	101	0.0194
	4.2	158	0.0303

802.11n_HT20

Reference Frequency(Middle Channel): 5210 MHz			
Environment Temperature (℃)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.5	176	0.0338
	3.7	134	0.0257
	4.2	173	0.0332

802.11n_HT40

Reference Frequency(Middle Channel): 5210 MHz			
Environment Temperature (℃)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.5	157	0.0301
	3.7	135	0.0259
	4.2	160	0.0306

802.11ac

Reference Frequency(Middle Channel): 5210 MHz			
Environment Temperature (℃)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.5	151	0.0291
	3.7	140	0.0268
	4.2	166	0.0318

5725-5850MHz

802.11a

Reference Frequency(Middle Channel): 5775 MHz			
Environment Temperature (℃)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.5	164	0.0284
	3.7	96	0.0166
	4.2	153	0.0265

802.11n_HT20

Reference Frequency(Middle Channel): 5775 MHz			
Environment Temperature (℃)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.5	165	0.0285
	3.7	143	0.0248
	4.2	179	0.0311

802.11n_HT40

Reference Frequency(Middle Channel): 5775 MHz			
Environment Temperature (℃)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.5	164	0.0283
	3.7	131	0.0227
	4.2	164	0.0285

802.11ac

Reference Frequency(Middle Channel): 5775 MHz			
Environment Temperature (℃)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.5	155	0.0269
	3.7	122	0.0212
	4.2	158	0.0274

******* END OF REPORT *******