FCC Part 15E
Measurement and Test Report

For

SHENZHEN MINE TECHNOLOGY CO ., LTD

Room 601, 6/F, Block 9, Minle Industrial Park, Mingzhi Street, Minle Community, Longhua District, Shenzhen City, China

FCC ID: 2AUL3-MINE-M4

FCC Rule(s):	FCC Part 15E
Product Description:	Bonding Router
Tested Model:	MINE-M4
Report No.:	BSL190611235202RF
Tested Date:	2019-09-12 to 2019-09-17
Issued Date:	2019-09-17
Tested By:	Cindy Zheng/ Engineer
Reviewed By:	Haley Wen / EMC Manager
Approved & Authorized By:	Mike Mo / PSQ Manager

Prepared By:

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	SHENZHEN MINE TECHNOLOGY CO ., LTD
Address of applicant:	Room 601, 6/F, Block 9, Minle Industrial Park, Mingzhi Street, Minle Community, Longhua District, Shenzhen City, China
Manufacturer:	SHENZHEN MINE TECHNOLOGY CO ., LTD
Address of manufacturer:	Room 601, 6/F, Block 9, Minle Industrial Park, Mingzhi Street, Minle Community, Longhua District, Shenzhen City, China

General Description of EUT	
Product Name:	Bonding Router
Trade Name:	
Model No.:	MINE-M4
Adding Model:	MINE-Q8,MINE-R8,MINE-X5,MINE-M3,MINE-M4 PRO, MINE-M4 MINI,MINE-M416,MINE-M5,MINE-M6
Hardware Version:	V1.0
Software Version:	V1.0
IMEI:	20190308159
Rated Voltage:	DC 12V3A
Battery capacity:	9000mAh
Power Adapter Model:	DC-816-1203000 Input: AC 100-240V 50/60Hz; Output: DC 12V/3A
Note: The test data is gathered from a production sample provided by the manufacturer.	

Technical Characteristics of EUT	
Support Standards:	802.11a,802.11ac20
Frequency Range:	5150-5250MHz, 5725-5850MHz
RF Output Power:	13.52dBm (Conducted)
Type of Modulation:	QPSK, 16QAM, 64QAM
Data Rate:	6-54Mbps, up to 150Mbps
Quantity of Channels:	15
Channel Separation:	20MHz
Type of Antenna:	PR-SAM
Antenna Gain:	0dBi
Lowest Internal Frequency	12MHz

1.2 Test Standards

The following report is prepared on behalf of the SHENZHEN MINE TECHNOLOGY CO ., LTD 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 v01r02 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 “Wave-2 802.11ac SoC.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.

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 XP were executed.

1.6 Test Facility

BSL Testing Co.,LTD.
NO. 24, ZH Park, Nantou, Shenzhen, 518000 China
Designation Number : CN1217
Test Firm Registration Number: 866035
Tel: 86- 755-26508703
Fax: 86- 755-26508703

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	
TM1	802.11ac-HT20	
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
Adapter Cable	1.45	Shielded	Without Core

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
USB cable	1.0	Unshielded	Without Ferrite

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Notebook	Lenovo	E10	/
Earphone	Sony	/	/
TF card	Kingston	/	/
Display	Dell	/	/
HDMI cable	/	/	/

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	±2.88dB
Transmitter Spurious Emissions	Radiated	±5.1dB

1.9 Test Equipment List and Details

Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
Spectrum Analyzer	Agilent	E4407B	MY41440400	2019-06-04	2020-06-03
Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2019-06-04	2020-06-03
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2019-06-04	2020-06-03
Amplifier	Agilent	8447F	3113A06717	2019-06-04	2020-06-03
Amplifier	C&D	PAP-1G18	2002	2019-06-04	2020-06-03
Broadband Antenna	Schwarz beck	VULB9163	9163-333	2019-06-04	2020-06-03
Horn Antenna	ETS	3117	00086197	2019-06-04	2020-06-03
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2019-06-04	2020-06-03
Loop Antenna	Schwarz beck	FMZB 1516	9773	2019-06-04	2020-06-03
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2019-06-04	2020-06-03
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2019-06-04	2020-06-03
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2019-06-04	2020-06-03
power meter	DARE	RPR3006W	15I00041SNO03	2018-10-21	2019-10-20
EZ	EMC test software	/	/	/	/

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§2.1091, 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 RF exposure report MPE 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

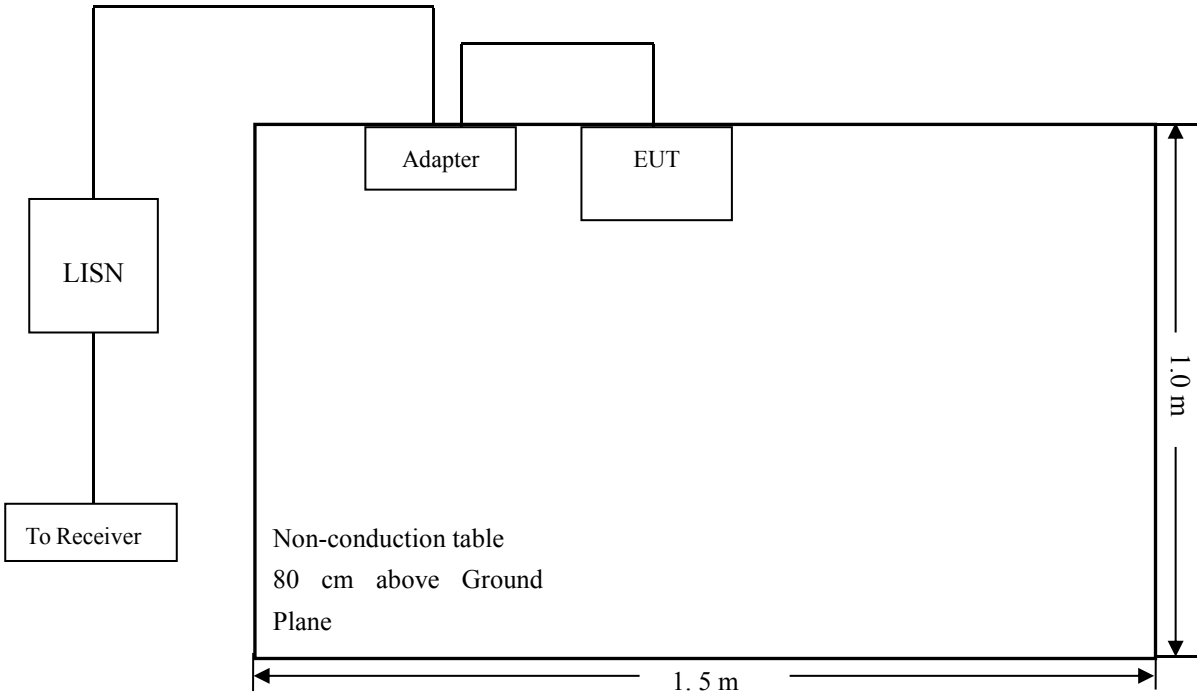
This product has an PR-SAM, fulfill the requirement of this section.

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 3.8, the EUT complied with the FCC Part 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

-2.19 dB at **0.4420 MHz** in the **Neutral**, **Peak** detector, 0.15-30MHz

5.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

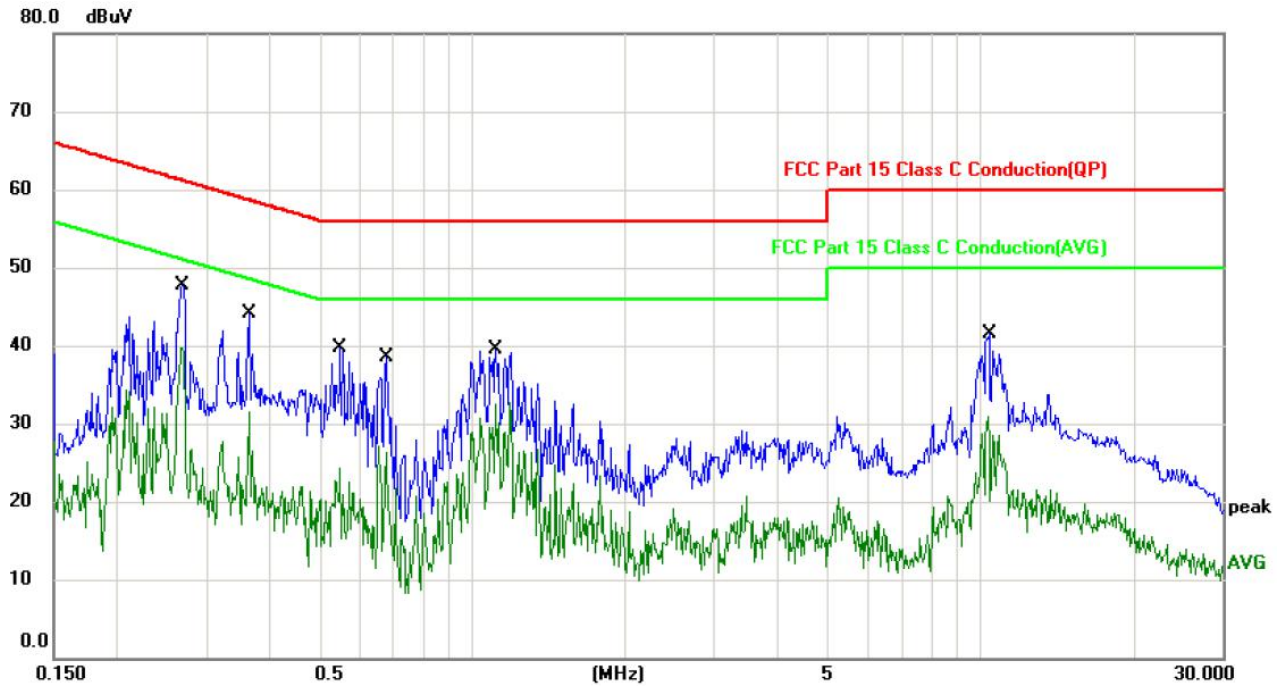
EUT: *Bonding Router*

Tested Model: *MINE-M4*

Operating Condition: *Transmiting*

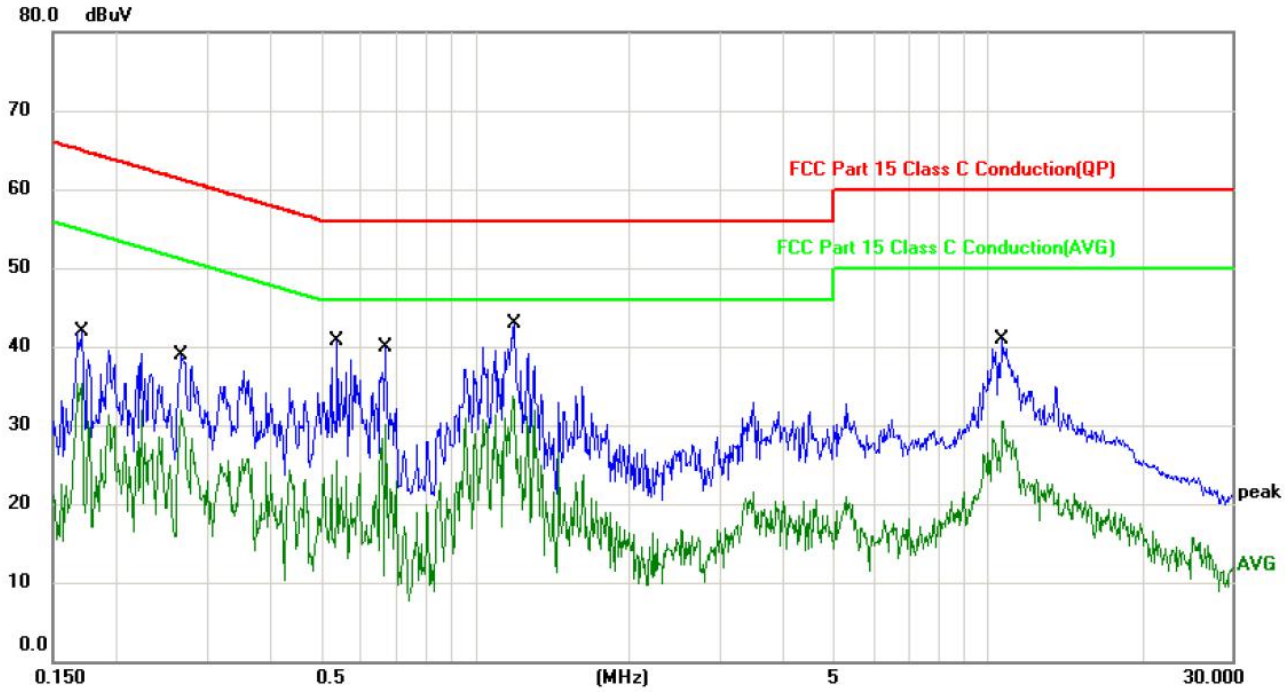
Comment: *AC 120V/60Hz; Adapter DC 12V/3A*

Test Specification: *Neutral*



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2686	47.44	0.32	47.76	61.16	-13.40	QP	
2	*	0.2686	39.45	0.32	39.77	51.16	-11.39	AVG	
3		0.3634	43.67	0.37	44.04	58.65	-14.61	QP	
4		0.3634	32.15	0.37	32.52	48.65	-16.13	AVG	
5		0.5493	39.24	0.45	39.69	56.00	-16.31	QP	
6		0.5493	24.58	0.45	25.03	46.00	-20.97	AVG	
7		0.6753	38.02	0.53	38.55	56.00	-17.45	QP	
8		0.6753	27.03	0.53	27.56	46.00	-18.44	AVG	
9		1.1112	38.76	0.69	39.45	56.00	-16.55	QP	
10		1.1112	32.10	0.69	32.79	46.00	-13.21	AVG	
11		10.3971	40.34	1.08	41.42	60.00	-18.58	QP	
12		10.3971	31.79	1.08	32.87	50.00	-17.13	AVG	

Test Specification: *Line*



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1711	41.55	0.26	41.81	64.90	-23.09	QP	
2		0.1711	35.66	0.26	35.92	54.90	-18.98	AVG	
3		0.2671	38.65	0.32	38.97	61.20	-22.23	QP	
4		0.2671	32.15	0.32	32.47	51.20	-18.73	AVG	
5		0.5376	40.31	0.44	40.75	56.00	-15.25	QP	
6		0.5376	24.88	0.44	25.32	46.00	-20.68	AVG	
7		0.6683	39.37	0.52	39.89	56.00	-16.11	QP	
8		0.6683	29.57	0.52	30.09	46.00	-15.91	AVG	
9		1.1907	42.14	0.71	42.85	56.00	-13.15	QP	
10	*	1.1907	32.43	0.71	33.14	46.00	-12.86	AVG	
11		10.6760	39.88	1.09	40.97	60.00	-19.03	QP	
12		10.6760	30.19	1.09	31.28	50.00	-18.72	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 v01, 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

802.11a

5150-5250MHz

Operating mode	Test Channel	Power Spectral Density dBm/MHz	Limit (dBm/MHz)
802.11a	5180	3.88	11
	5200	8.65	11
	5240	8.03	11

5725-5850MHz

Operating mode	Test Channel	Power Spectral Density dBm/500kHz	Limit (dBm/500kHz)
802.11a	5745	0.74	30
	5785	1.14	30
	5825	5.10	30

802.11ac-HT20

5150-5250MHz

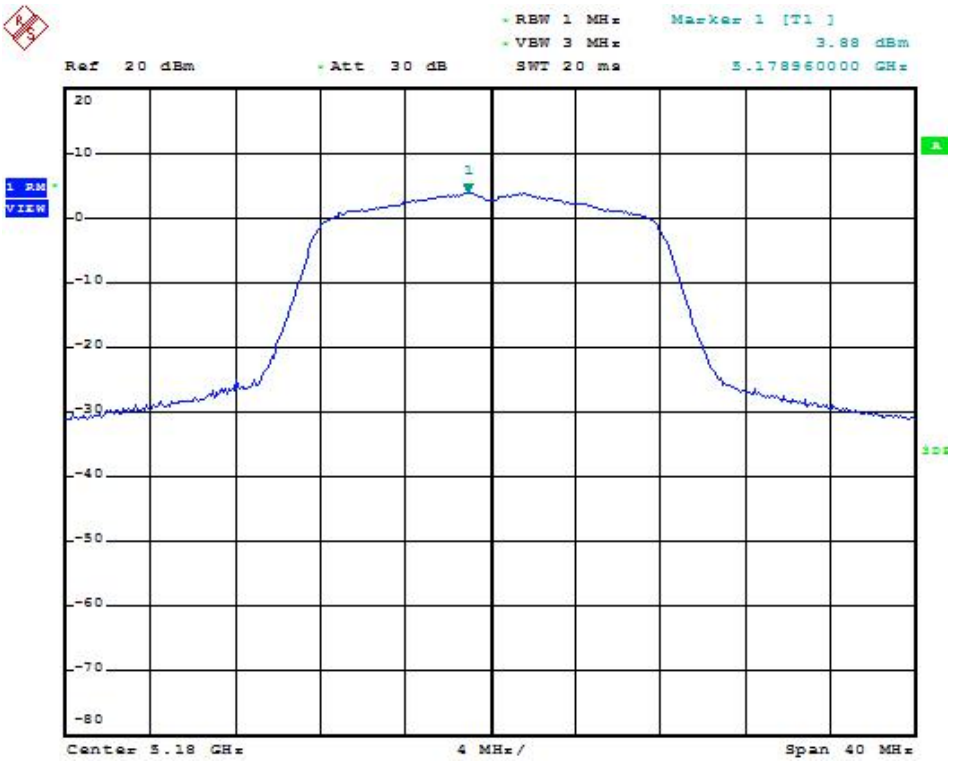
Operating mode	Test Channel	Power Spectral Density dBm/MHz	Limit (dBm/MHz)
802.11a	5180	3.25	11
	5200	2.75	11
	5240	4.08	11

5725-5850MHz

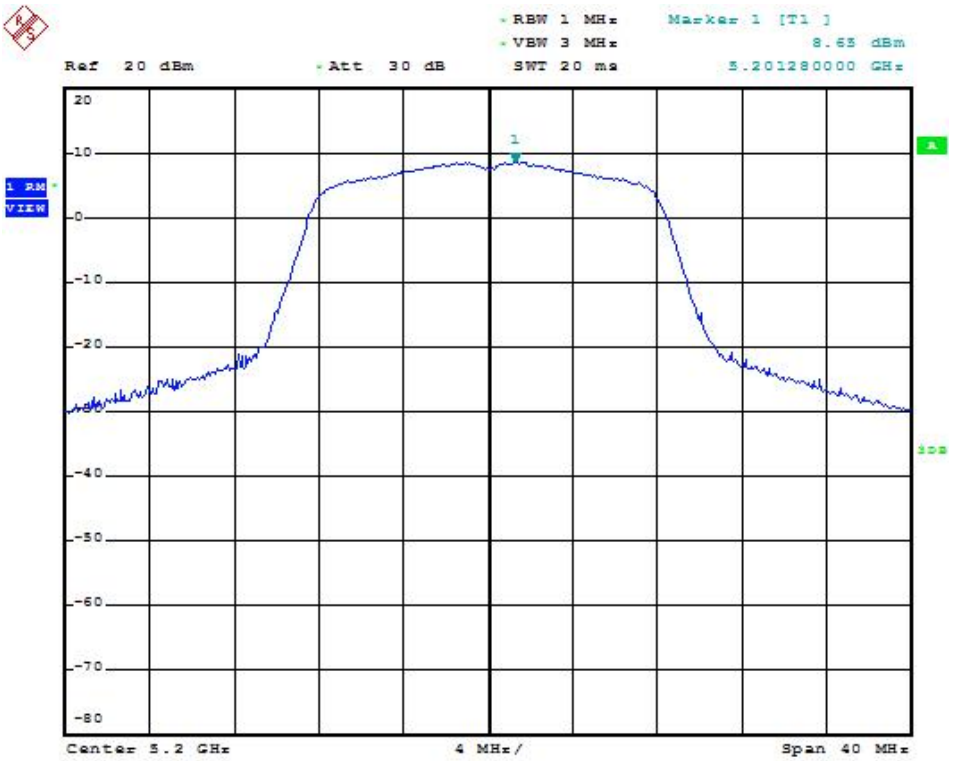
Operating mode	Test Channel	Power Spectral Density dBm/500kHz	Limit (dBm/500kHz)
802.11a	5745	-1.08	30
	5785	-0.49	30
	5825	1.49	30

Test Mode: 802.11a

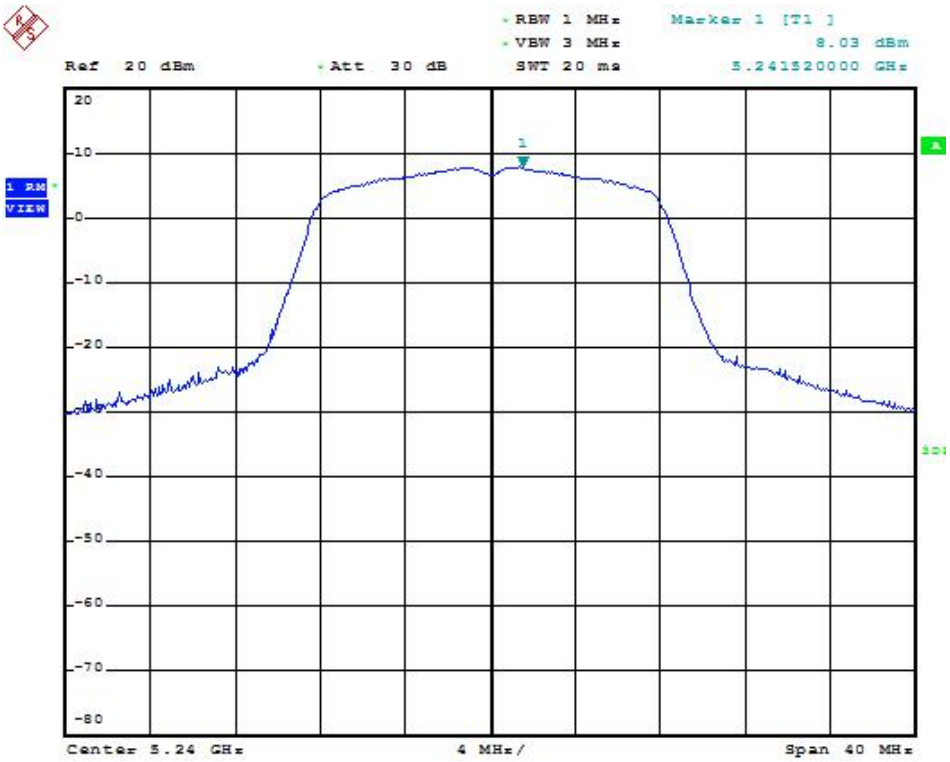
5180MHz



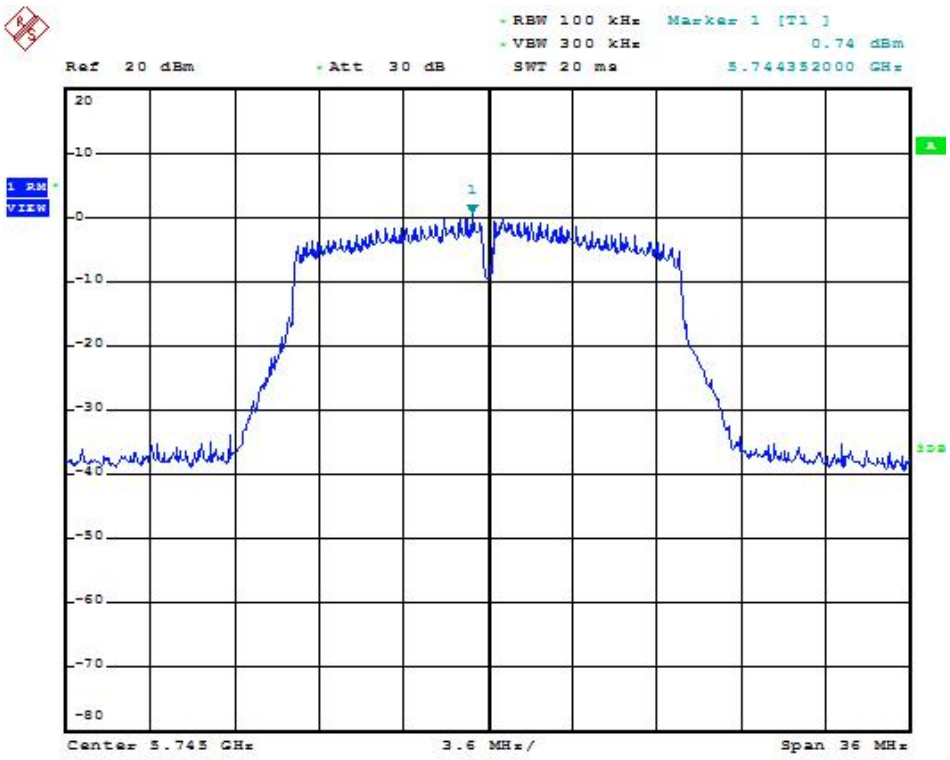
5200MHz



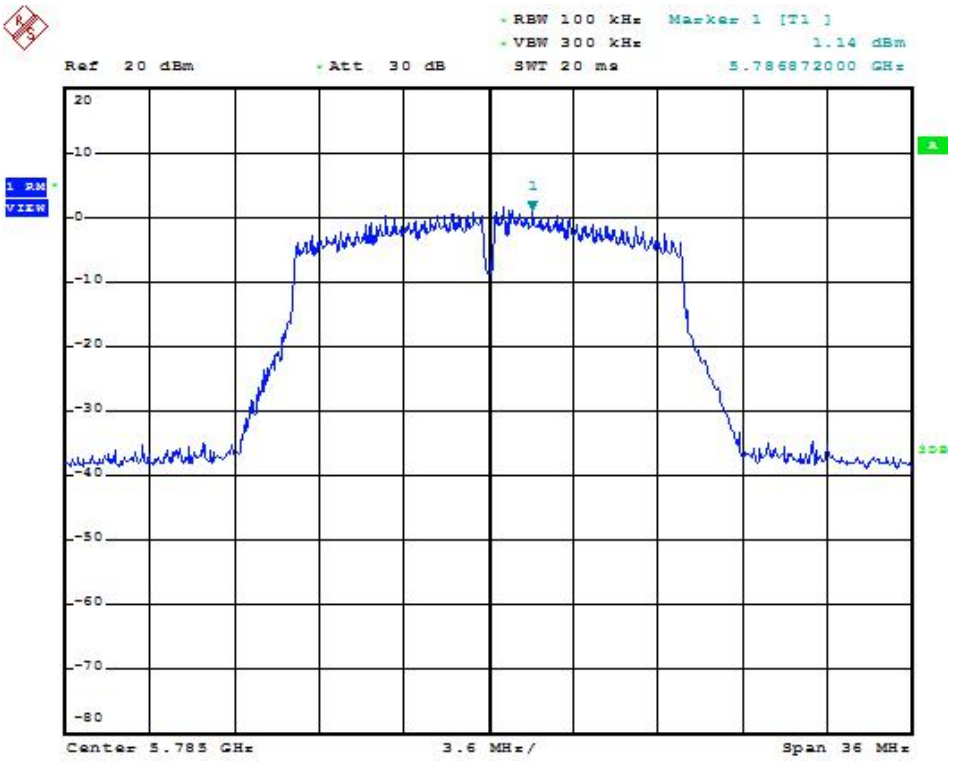
5240MHz



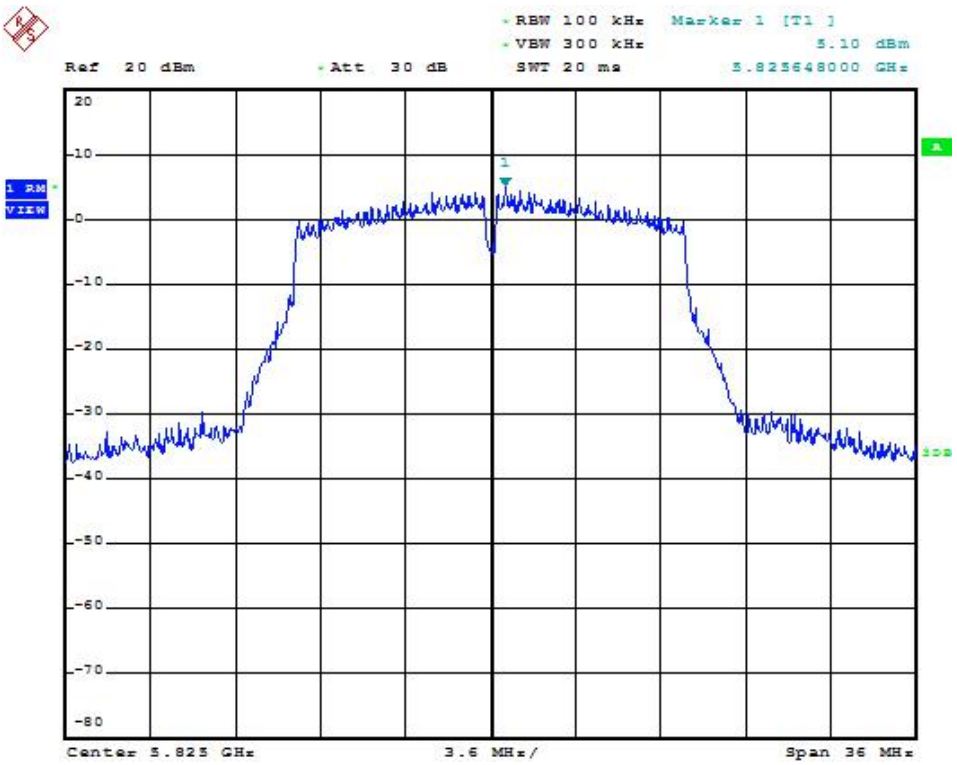
5745MHz



5785MHz

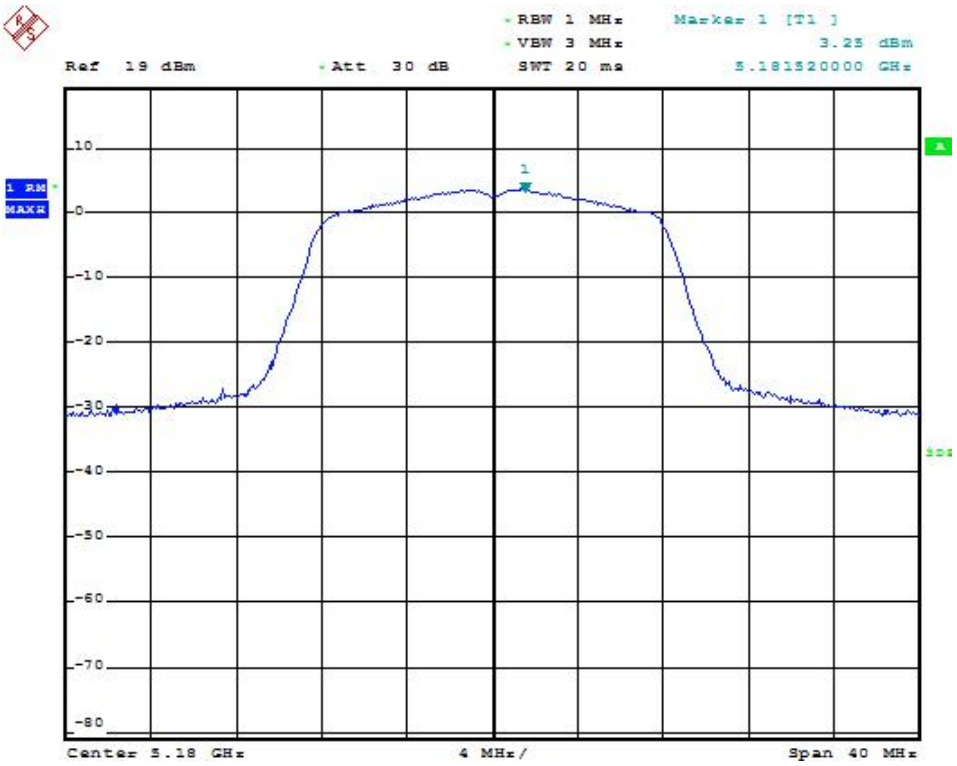


5825MHz

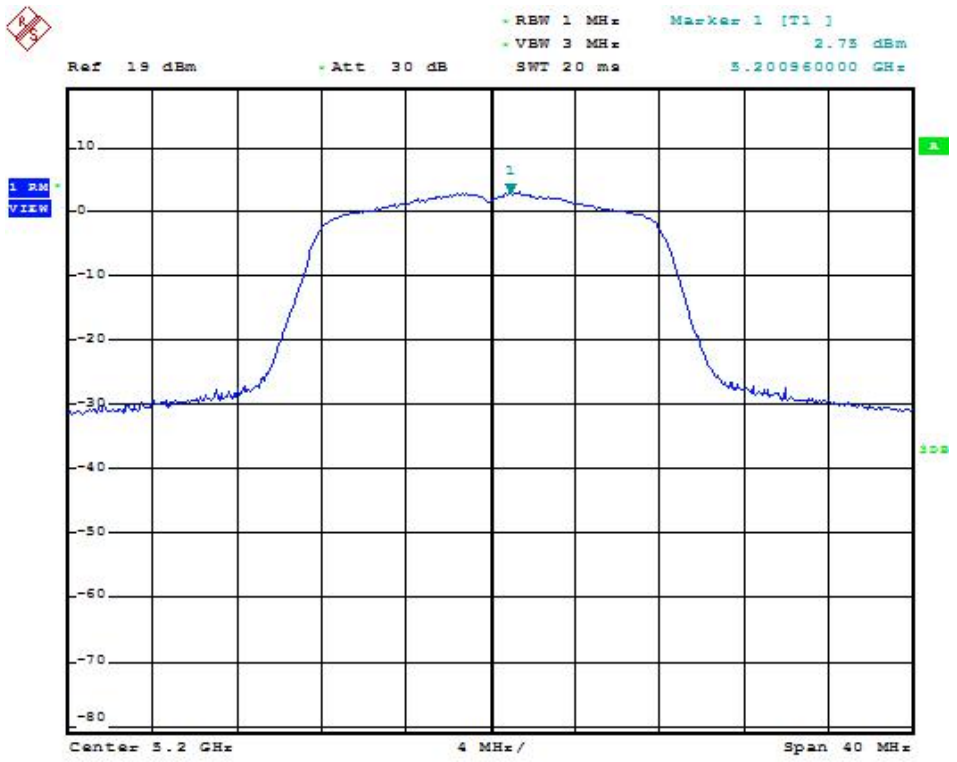


802.11ac-HT20

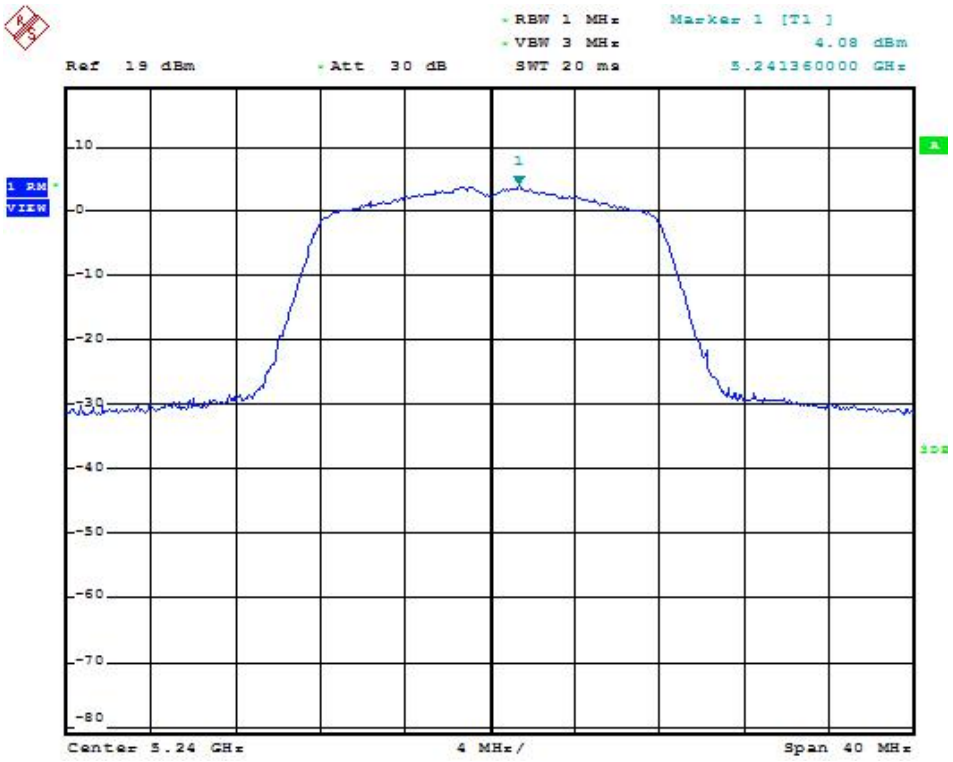
5180MHz



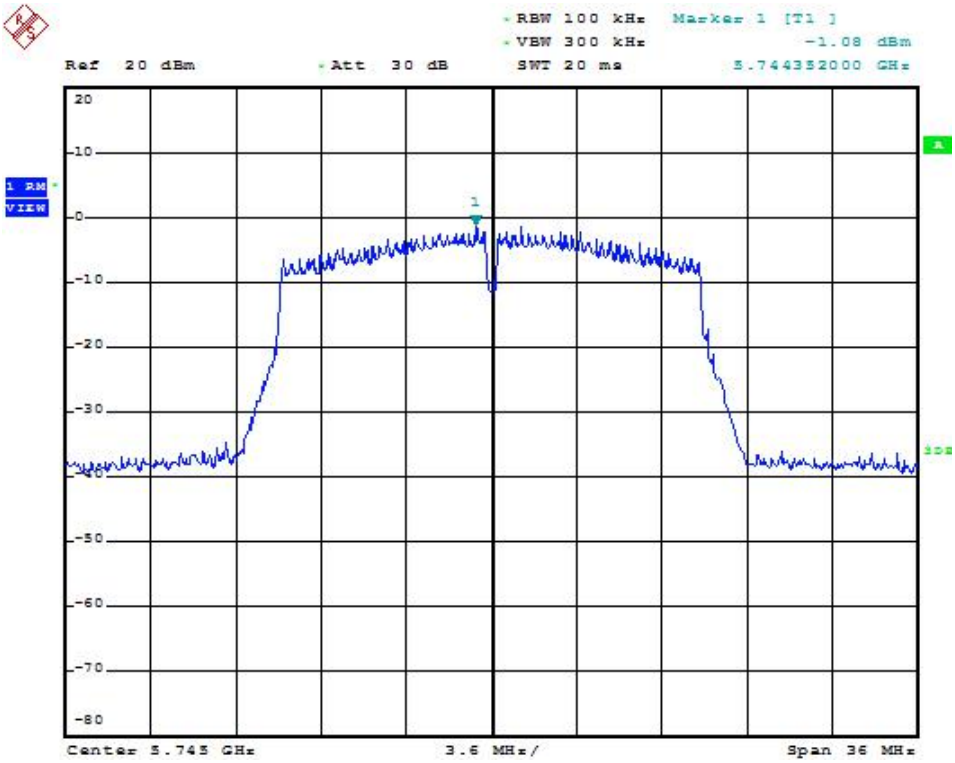
5200MHz



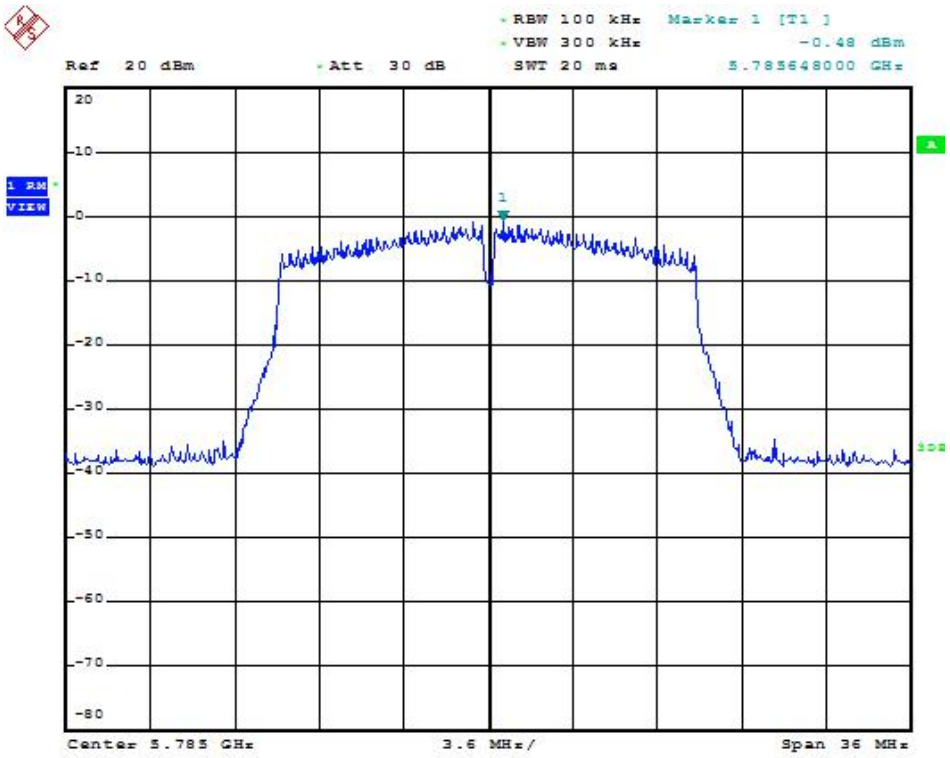
5240MHz



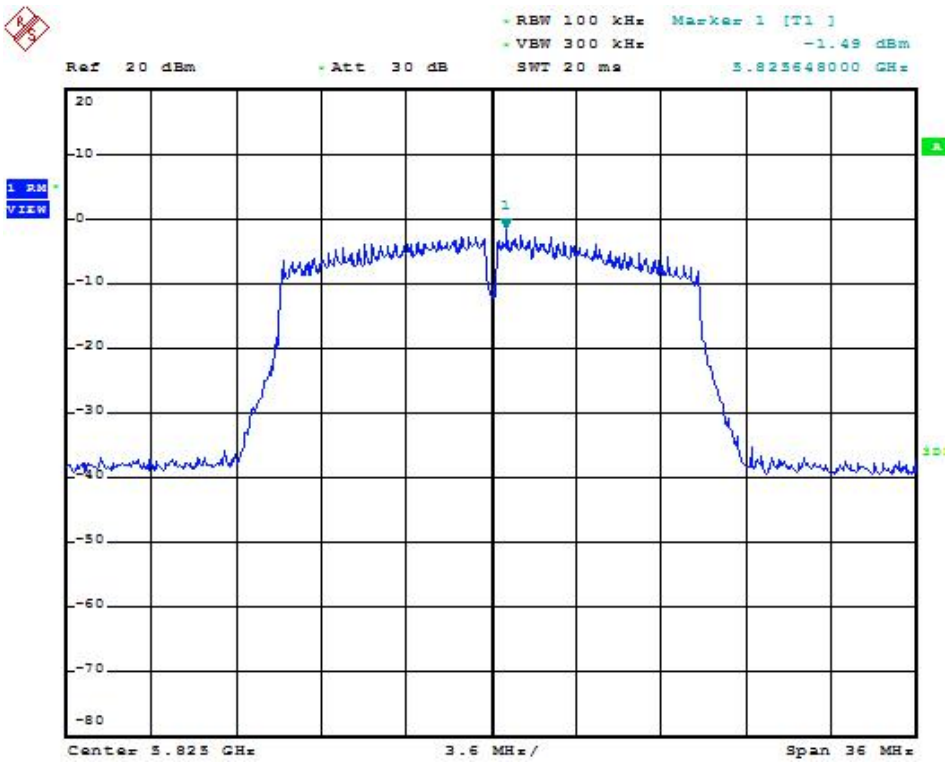
5745MHz



5785MHz



5825MHz



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 v01r02 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

802.11a

5150-5250MHz

Test Mode	Test Channel MHz	26 dB Bandwidth MHz	99% Bandwidth MHz	Limit MHz
802.11a	5180	20.448	16.704	Pass
	5200	20.392	16.848	Pass
	5240	20.376	16.632	Pass

5725-5850MHz

Test Mode	Test Channel MHz	26 dB Bandwidth MHz	6 dB Bandwidth MHz	99% Bandwidth MHz	Limit MHz
802.11a	5745	20.216	16.34	16.796	≥500
	5785	20.292	16.34	16.720	≥500
	5825	20.292	16.34	16.796	≥500

802.11ac-HT20

5150-5250MHz

Test Mode	Test Channel MHz	26 dB Bandwidth MHz	99% Bandwidth MHz	Limit MHz
802.11a	5180	20.824	17.708	Pass
	5200	20.596	17.784	Pass
	5240	20.444	17.708	Pass

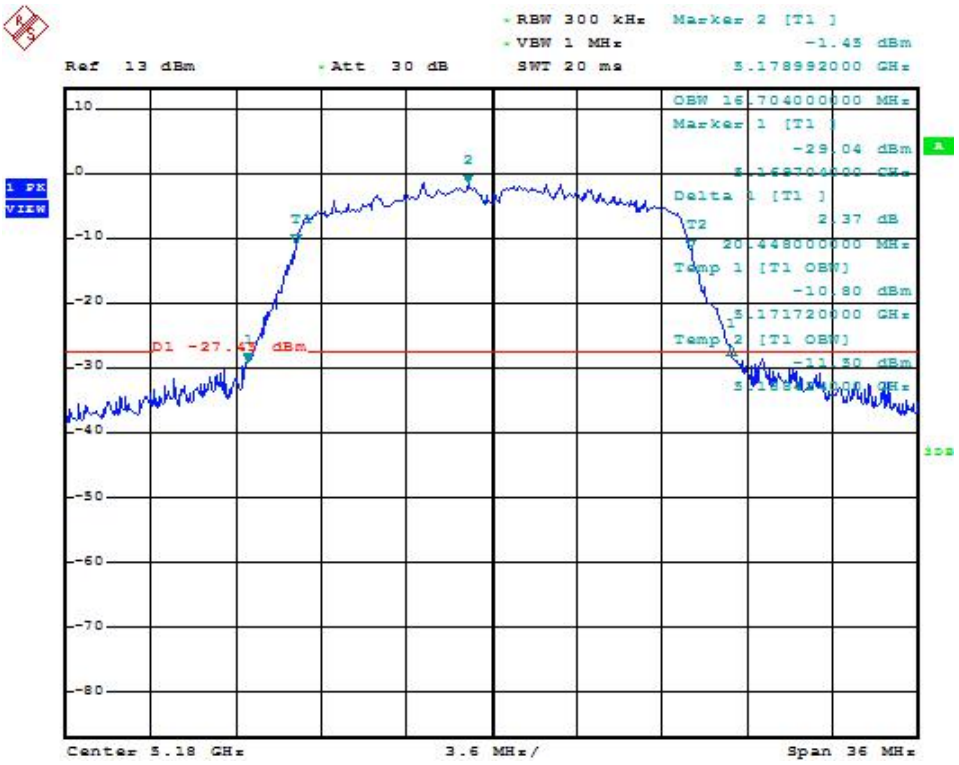
5725-5850MHz

Test Mode	Test Channel MHz	26 dB Bandwidth MHz	6 dB Bandwidth MHz	99% Bandwidth MHz	Limit MHz
802.11a	5745	20.596	17.708	17.708	≥500
	5785	20.520	17.784	17.556	≥500
	5825	20.520	17.708	17.632	≥500

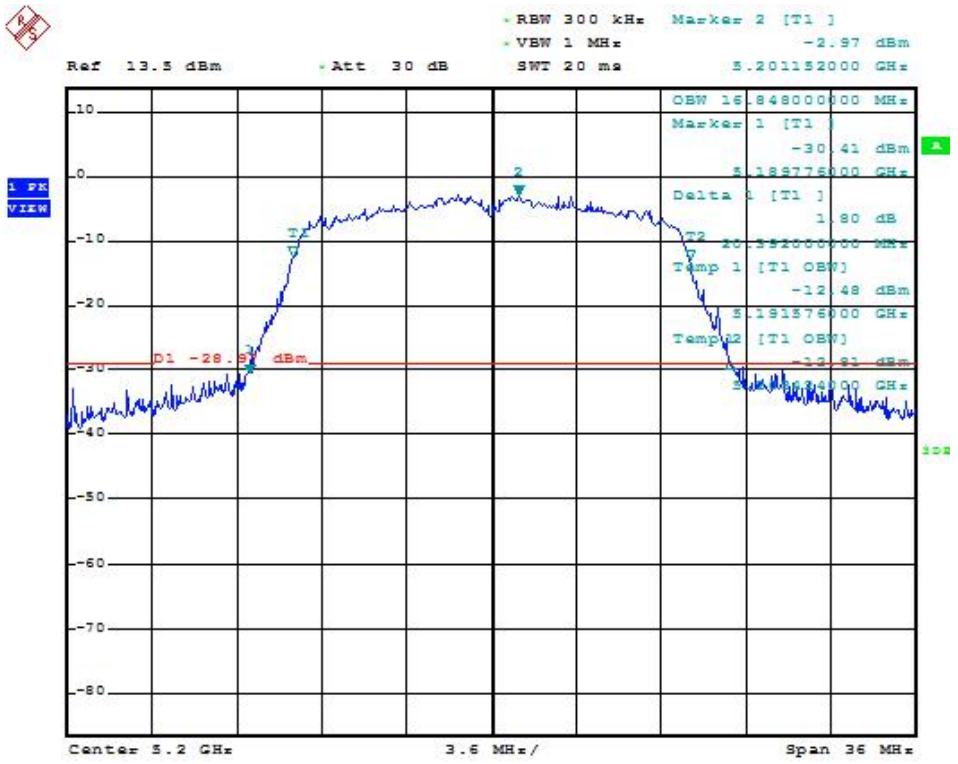
Test mode：802.11a

5150-5250MHz

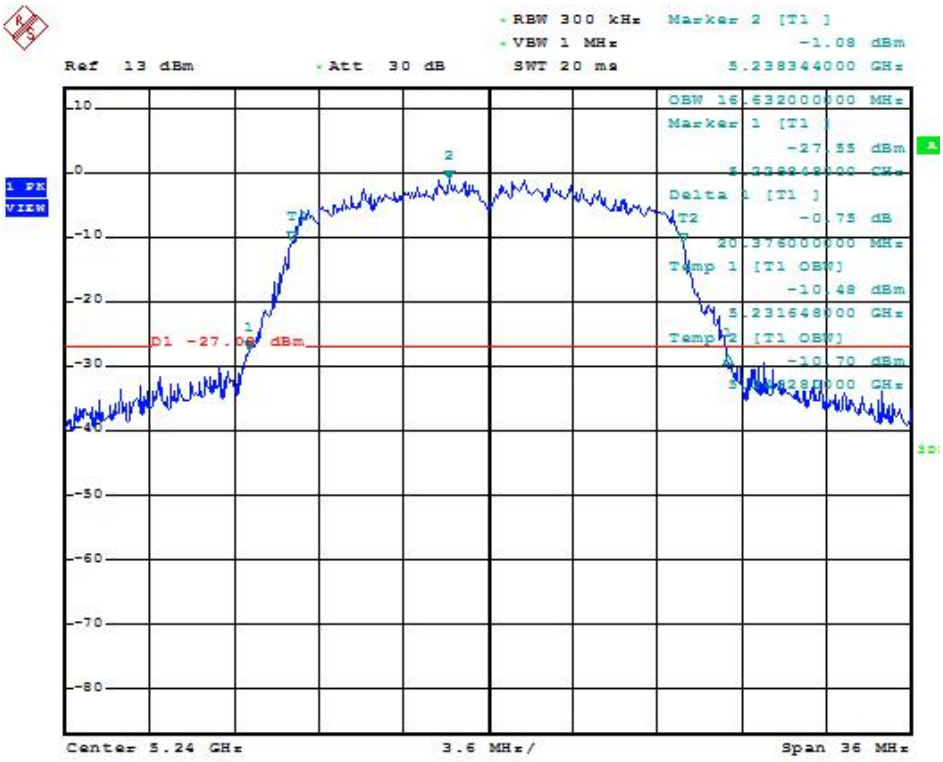
5180MHz



5200MHz



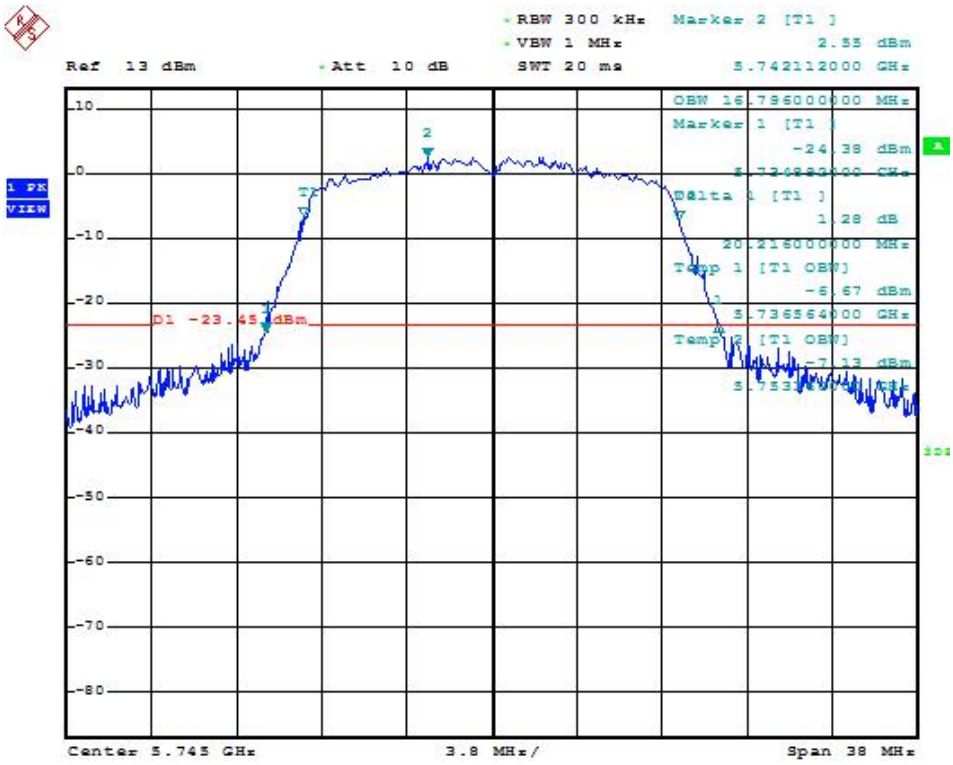
5240MHz

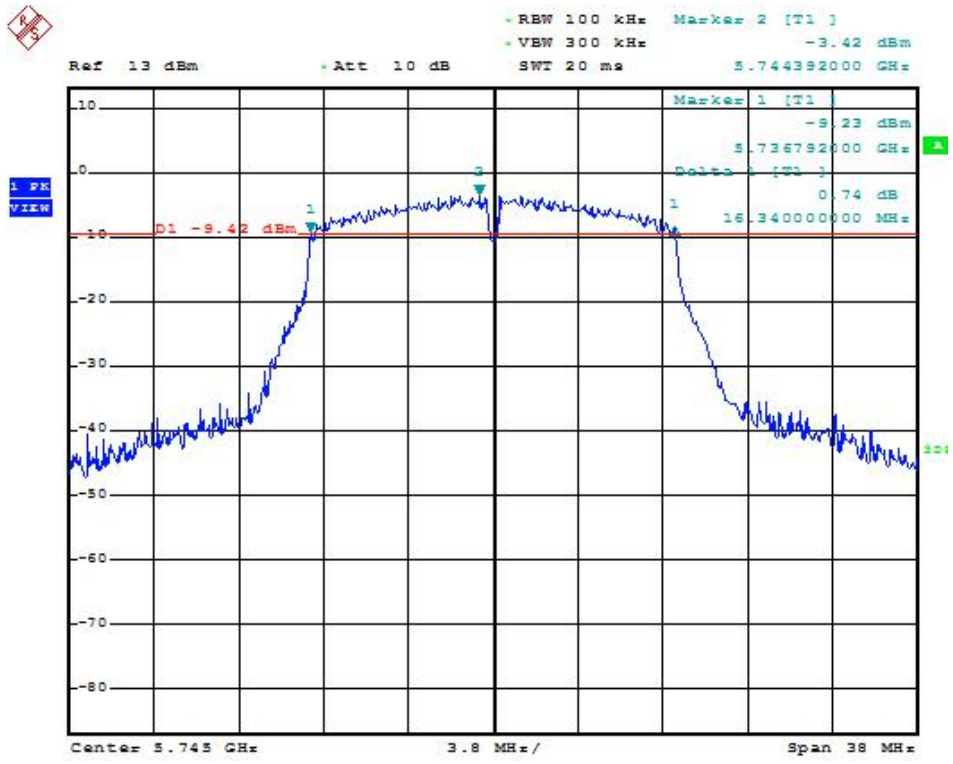

RBW 300 kHz
VBW 1 MHz
SWT 20 ms
Marker 2 [T1]
-1.08 dBm
5.238344000 GHz
Ref 13 dBm
Att 30 dB
OBW 16.632000000 MHz
Marker 1 [T1]
-27.55 dBm
Delta 1 [T1]
T2 -0.75 dB
20.376000000 MHz
Temp 1 [T1 OBW]
-10.48 dBm
Temp 2 [T1 OBW]
-10.70 dBm
D1 -27.00 dBm
1 PK
VIEW
Center 5.24 GHz
3.6 MHz/
Span 36 MHz

Test mode：802.11a

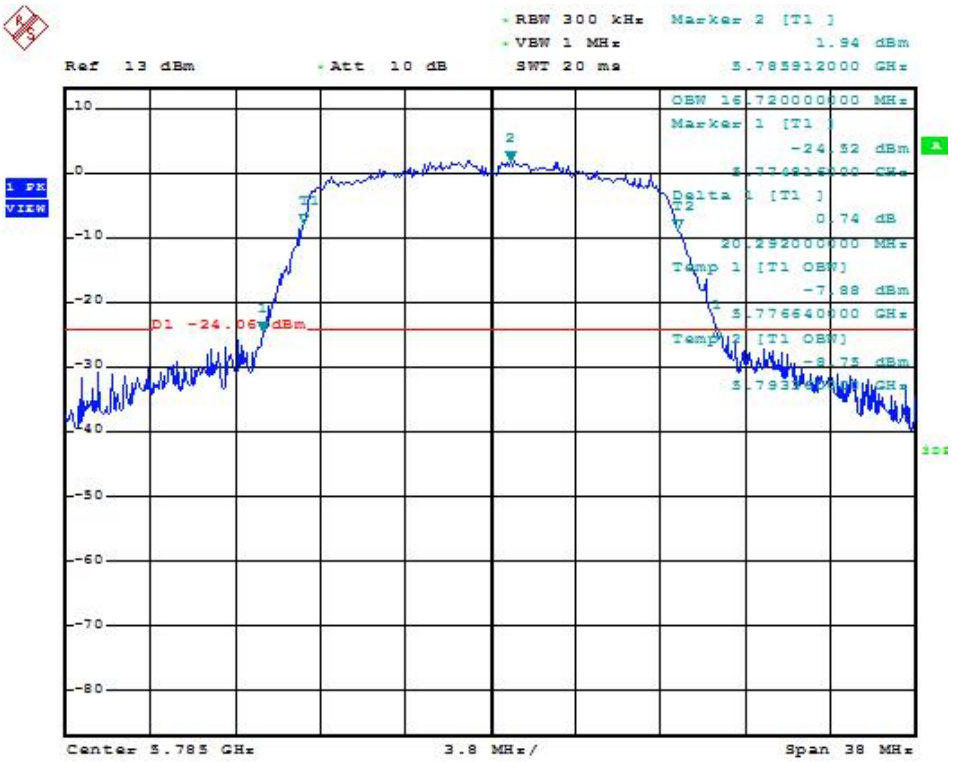
5725-5850MHz

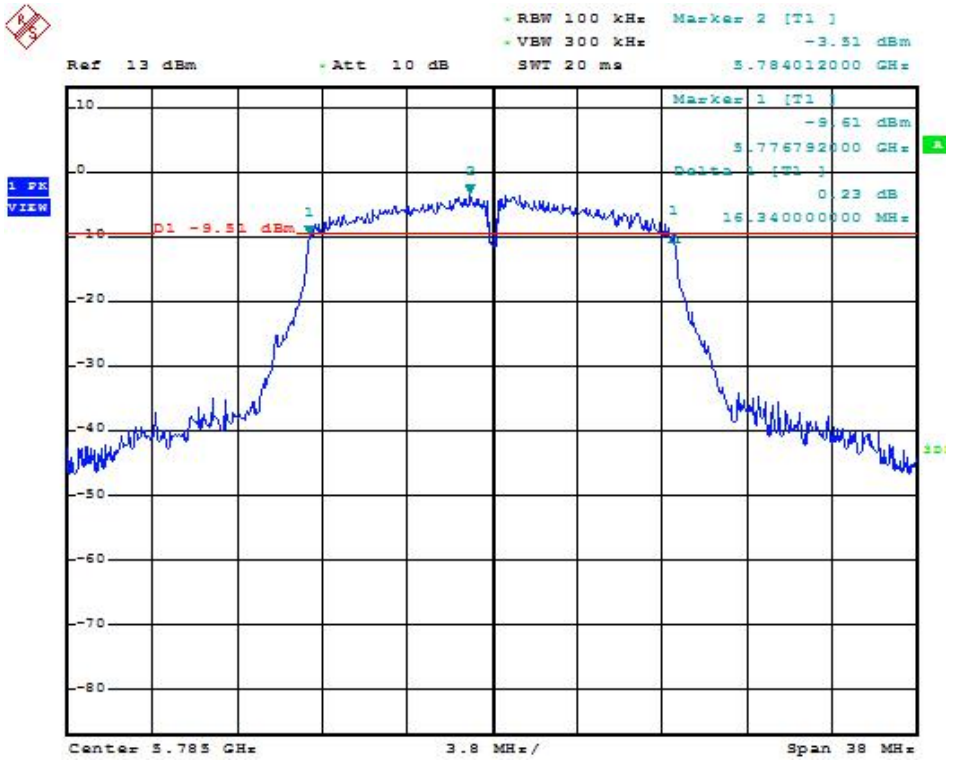
5745MHz



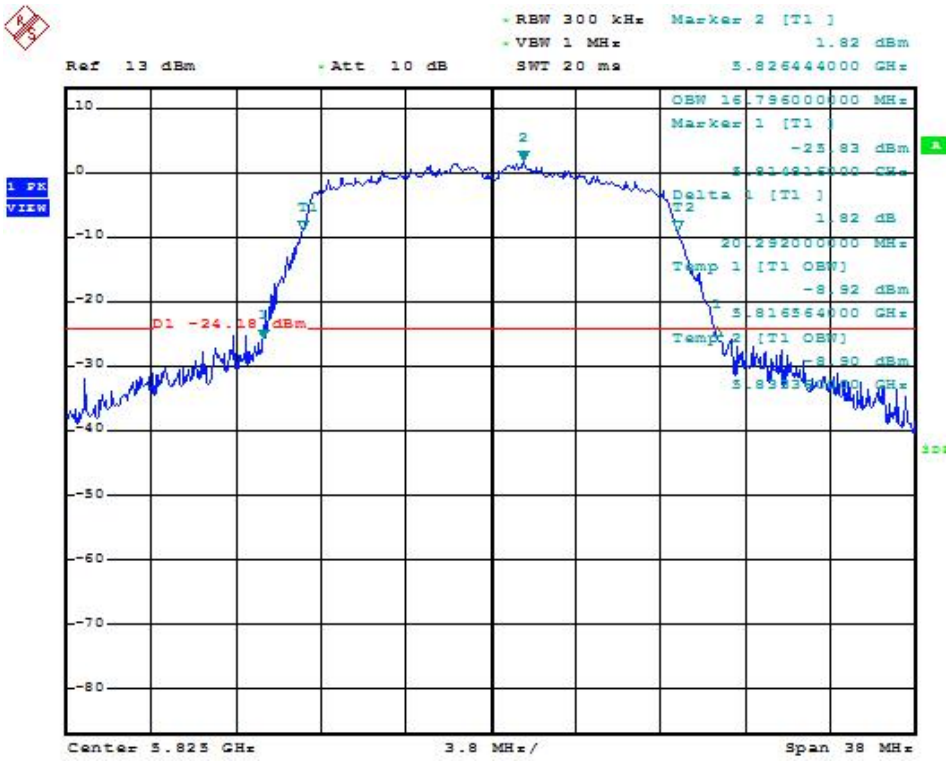


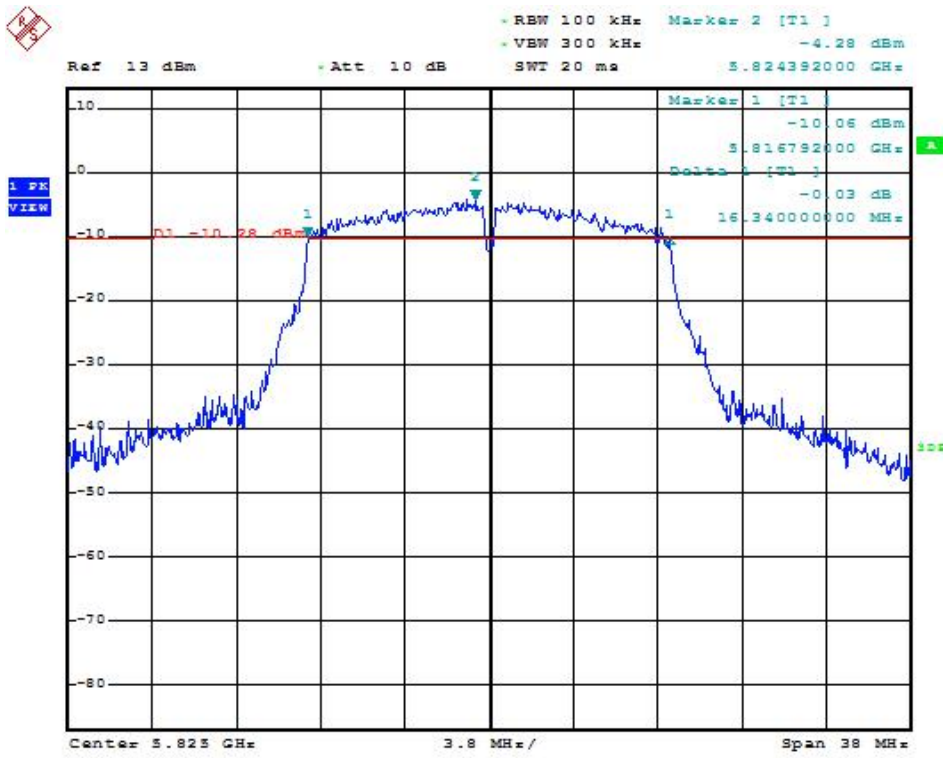
5785MHz


RBW 300 kHz
VBW 1 MHz
SWT 20 ms
Marker 2 [T1]
1.94 dBm
5.785912000 GHz
Ref 13 dBm
Att 10 dB
OBW 16.720000000 MHz
Marker 1 [T1]
-24.52 dBm
Delta 1 [T1]
0.74 dB
20.292000000 MHz
Temp 1 [T1 OBW]
-7.88 dBm
5.776640000 GHz
Temp 2 [T1 OBW]
D1 -24.06 dBm
1 PK VIEW
Center 5.785 GHz
3.8 MHz/
Span 38 MHz


RBW 100 kHz
VBW 300 kHz
SWT 20 ms
Marker 2 [T1]
-3.51 dBm
5.784012000 GHz
Ref 13 dBm
Att 10 dB
Marker 1 [T1]
-9.61 dBm
5.776792000 GHz
Delta 2 [T1]
0.23 dB
16.340000000 MHz
D1 -9.51 dBm
1 PK VIEW
Center 5.785 GHz
3.8 MHz/
Span 38 MHz

5825MHz

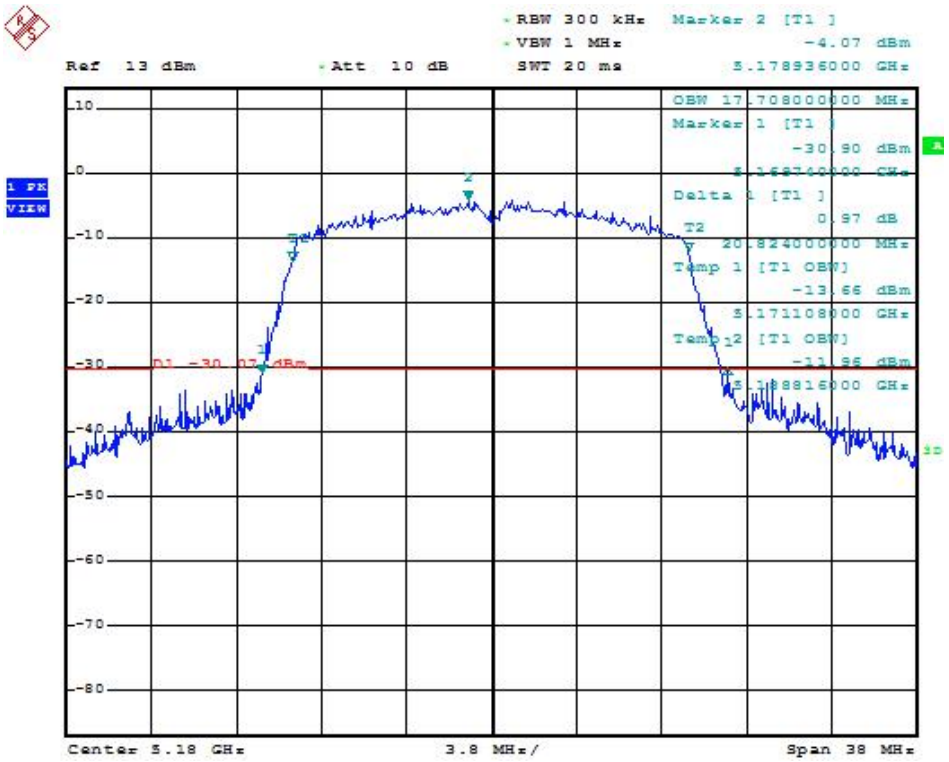

RBW 300 kHz
VBW 1 MHz
SWT 20 ms
Marker 2 [T1]
1.82 dBm
5.826444000 GHz
Ref 13 dBm
Att 10 dB
OBW 16.796000000 MHz
Marker 1 [T1]
-25.83 dBm
Delta 1 [T1]
1.82 dB
20.292000000 MHz
Temp 1 [T1 OBW]
-8.92 dBm
Temp 2 [T1 OBW]
D1 -24.18 dBm
1 PK VIEW
Center 5.825 GHz
3.8 MHz/
Span 38 MHz


RBW 100 kHz
VBW 300 kHz
SWT 20 ms
Marker 2 [T1]
-4.28 dBm
5.824392000 GHz
Ref 13 dBm
Att 10 dB
Marker 1 [T1]
-10.06 dBm
5.816792000 GHz
Delta 1 [T1]
-0.03 dB
16.340000000 MHz
D1 -10.28 dBm
1 PK VIEW
Center 5.825 GHz
3.8 MHz/
Span 38 MHz

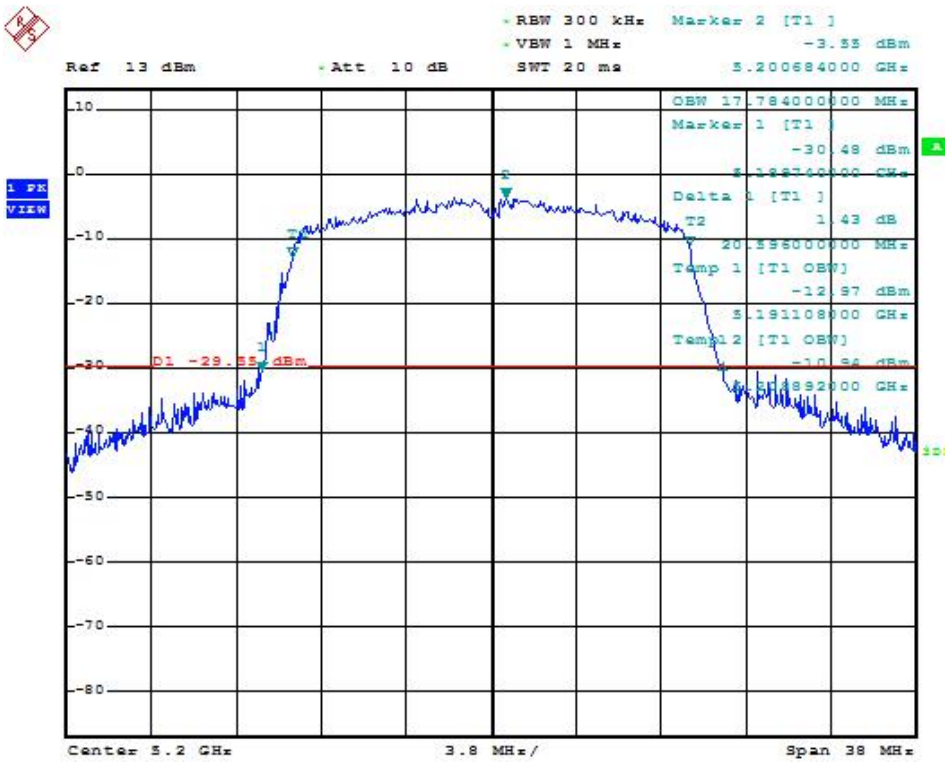
Test mode：802.11ac-HT20

5150-5250MHz

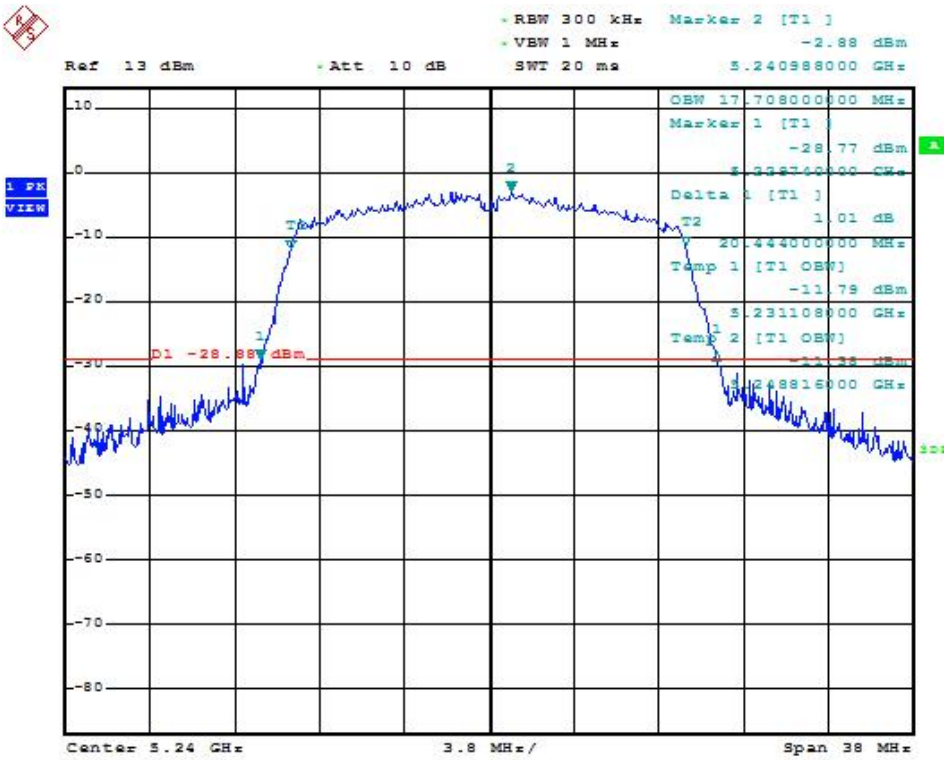
5180MHz



5200MHz



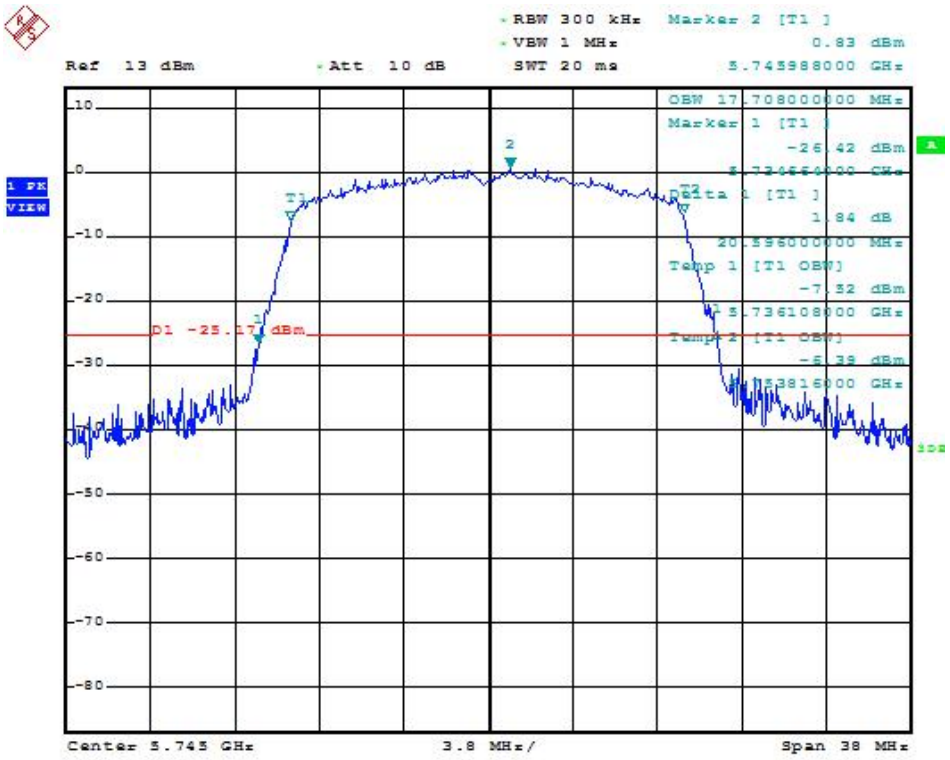
5240MHz

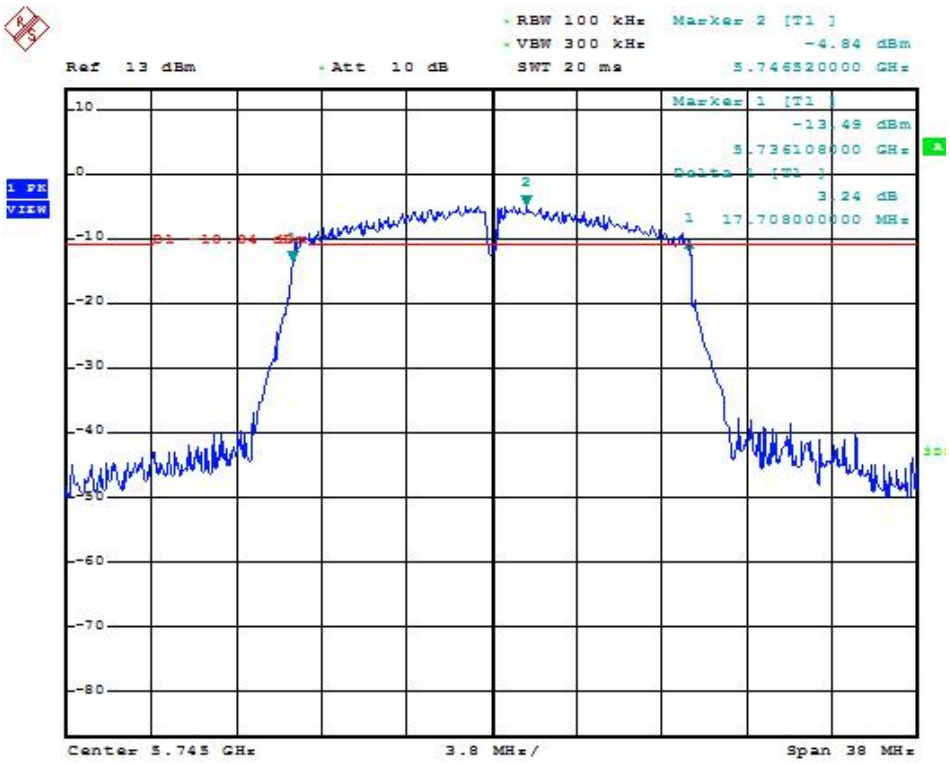

RBW 300 kHz
VBW 1 MHz
SWT 20 ms
Marker 2 [T1]
-2.88 dBm
5.240988000 GHz
Ref 13 dBm
Att 10 dB
OBW 17.708000000 MHz
Marker 1 [T1]
-28.77 dBm
Delta 1 [T1]
T2
1.01 dB
20.444000000 MHz
Temp 1 [T1 OBW]
-11.79 dBm
Temp 2 [T1 OBW]
D1 -28.88 dBm
Center 5.24 GHz
3.8 MHz/
Span 38 MHz

Test mode：802.11ac-HT20

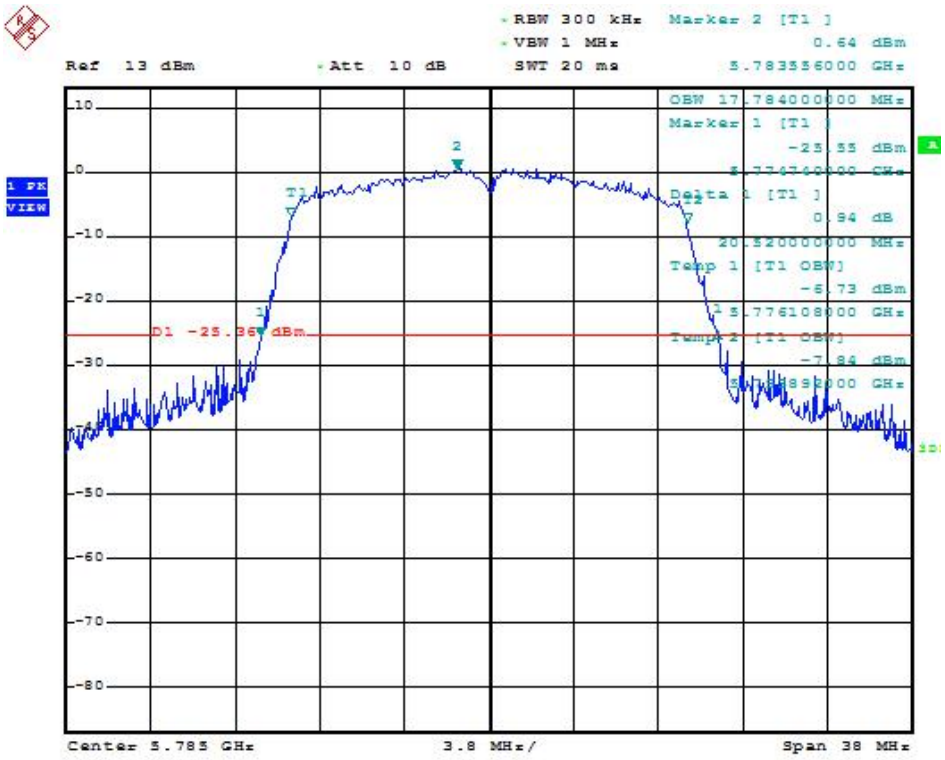
5725-5850MHz

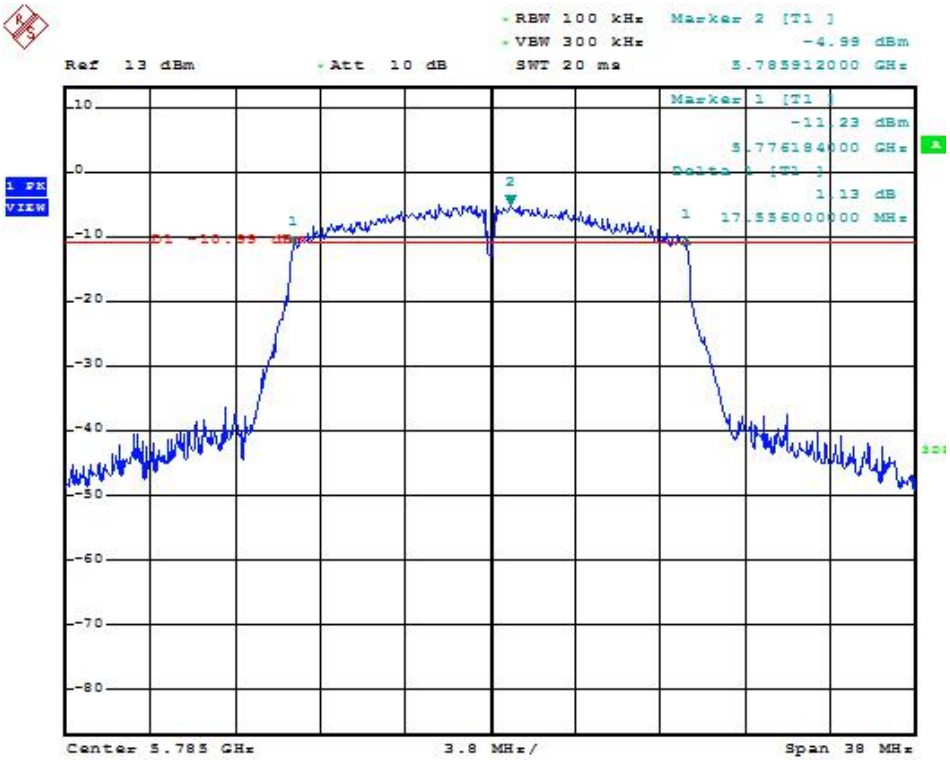
5745MHz



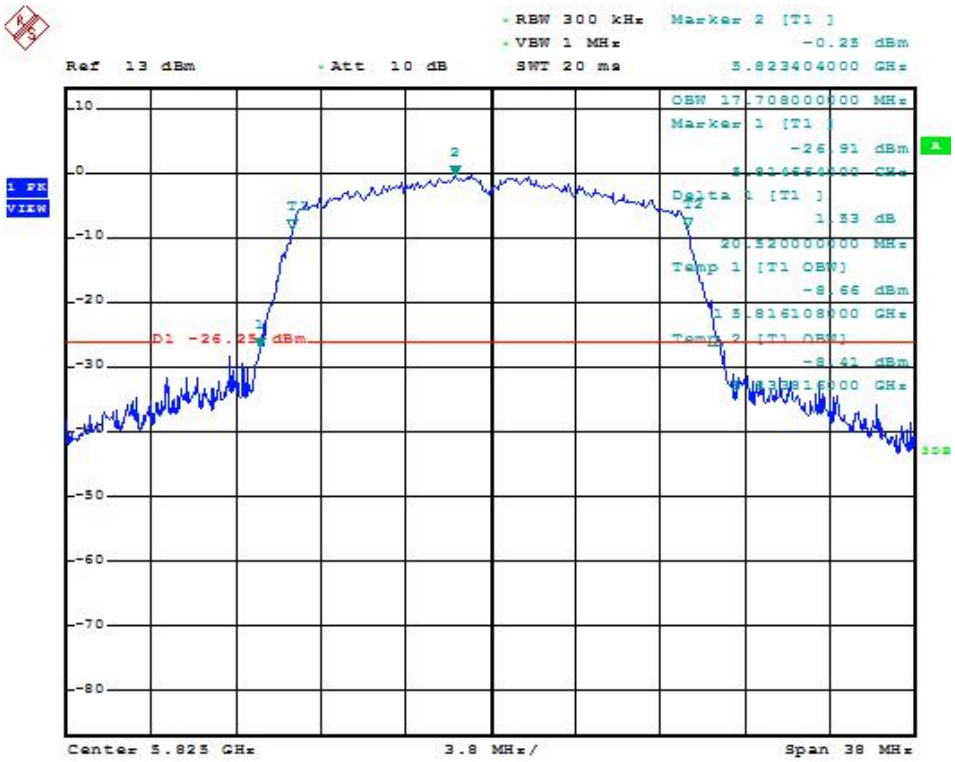


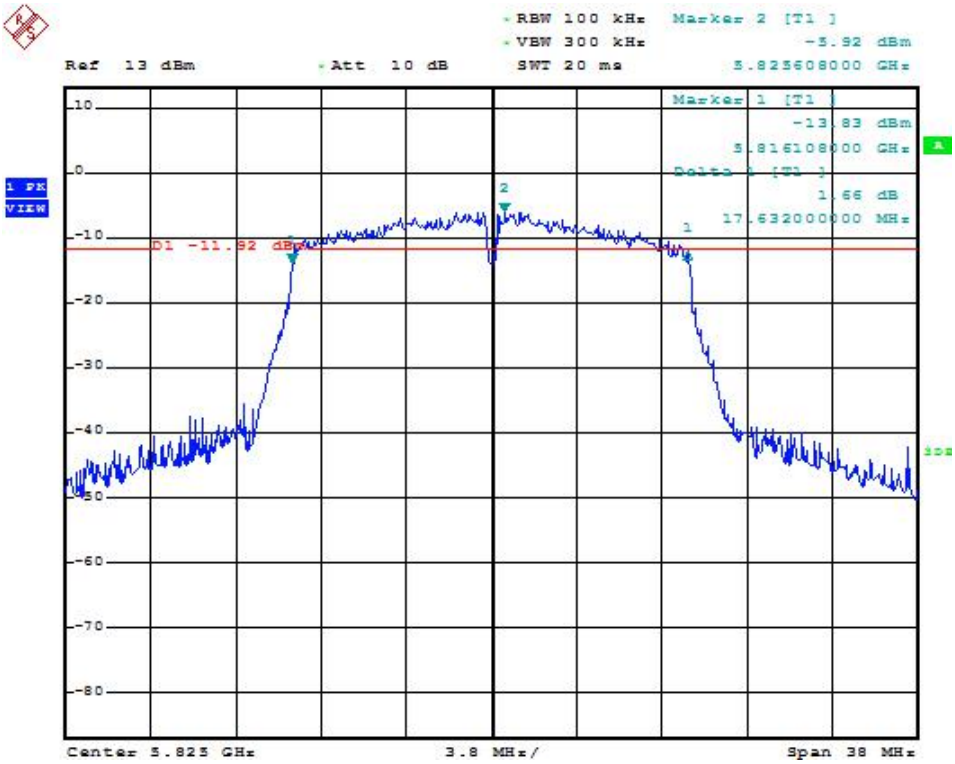
5785MHz


RBW 300 kHz
VBW 1 MHz
SWT 20 ms
Marker 2 [T1]
0.64 dBm
5.783556000 GHz
Ref 13 dBm
Att 10 dB
OBW 17.784000000 MHz
Marker 1 [T1]
-25.55 dBm
Delta 1 [T1]
0.94 dB
20.520000000 MHz
Temp 1 [T1 OBW]
-6.73 dBm
Temp 2 [T1 OBW]
-7.84 dBm
D1 -25.36 dBm
1 PK
VIEW
Center 5.785 GHz
3.8 MHz/
Span 38 MHz


RBW 100 kHz
VBW 300 kHz
SWT 20 ms
Marker 2 [T1]
-4.99 dBm
5.785912000 GHz
Ref 13 dBm
Att 10 dB
Marker 1 [T1]
-11.23 dBm
5.776184000 GHz
Delta 1 [T1]
1.13 dB
17.536000000 MHz
D1 -10.99 dBm
1 PK
VIEW
Center 5.785 GHz
3.8 MHz/
Span 38 MHz

5825MHz


RBW 300 kHz
VBW 1 MHz
SWT 20 ms
Marker 2 [T1]
-0.25 dBm
5.823404000 GHz
Ref 13 dBm
Att 10 dB
OBW 17.708000000 MHz
Marker 1 [T1]
-26.91 dBm
Delta 1 [T1]
1.33 dB
20.520000000 MHz
Temp 1 [T1 OBW]
-8.66 dBm
Temp 2 [T1 OBW]
-8.41 dBm
D1 -26.25 dBm
1 PK
VIEW
Center 5.825 GHz
3.8 MHz/
Span 38 MHz


RBW 100 kHz
VBW 300 kHz
SWT 20 ms
Marker 2 [T1]
-5.92 dBm
5.825608000 GHz
Ref 13 dBm
Att 10 dB
Marker 1 [T1]
-13.83 dBm
Delta 1 [T1]
1.66 dB
17.632000000 MHz
D1 -11.92 dBm
1 PK
VIEW
Center 5.825 GHz
3.8 MHz/
Span 38 MHz

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 v01r02 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, 5.725-5.850GHz

Test mode	Frequency MHz	Output Power dBm	Output Power mW	Limit mW
802.11a	5180	12.83	19.1867	250
	5200	11.35	13.6458	250
	5240	11.16	13.0617	250
	5745	13.49	22.3357	1000
	5785	13.37	21.7270	1000
	5825	13.08	20.3236	1000
802.11ac-HT20	5180	12.74	18.7932	250
	5200	10.98	12.5314	250
	5240	11.34	13.6144	250
	5745	13.19	20.8449	1000
	5785	13.37	21.7270	1000
	5825	13.52	22.4905	1000

9. Conducted 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.

9.2 Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer via a RF combiner.
2. Set the spectrum analyzer as RBW = 100kHz/1MHz, VBW=300kHz/3MHz, Sweep = auto
3. Set the Lowest, Middle and Highest Transmitting Channel, observed the outside band of 30MHz to 40GHz, then mark the higher-level emission for comparing with the FCC rules.

9.3 Environmental Conditions

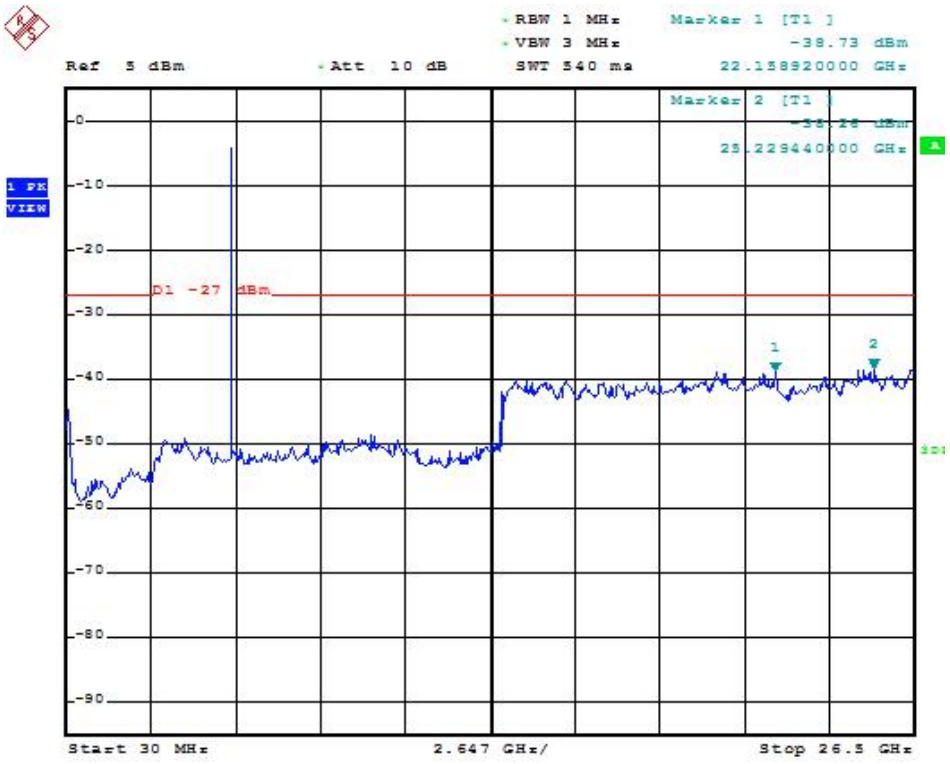
Temperature:	21° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

10.4 Summary of Test Results/Plots

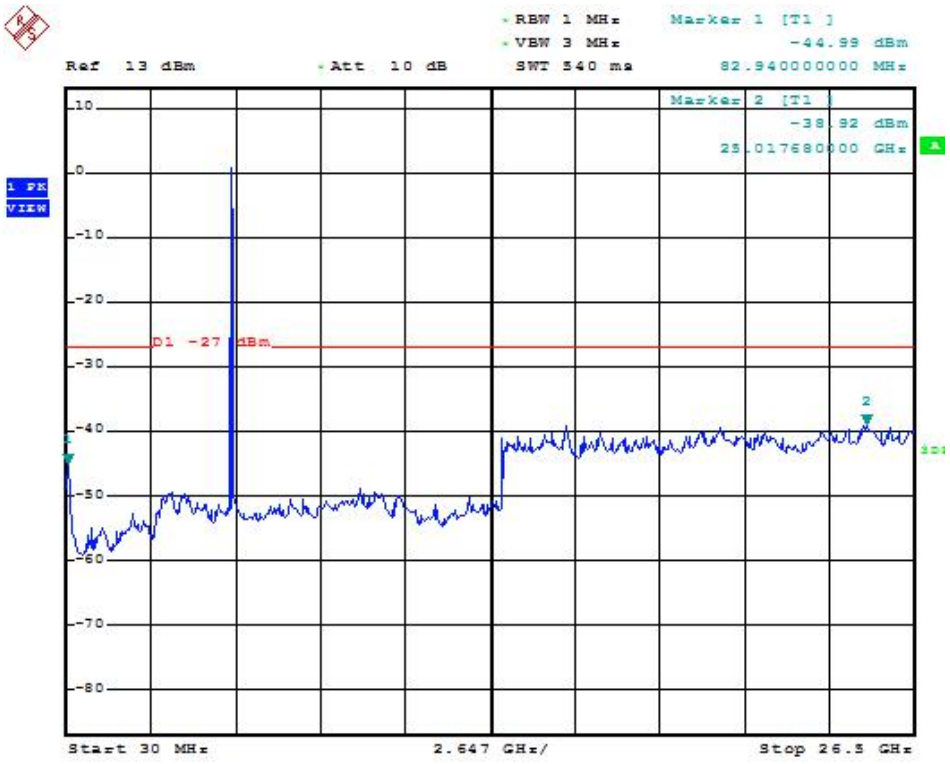
Emissions above 26.5GHz are attenuated more than 20dB below the permissible limits and test data are not reported.

802.11a

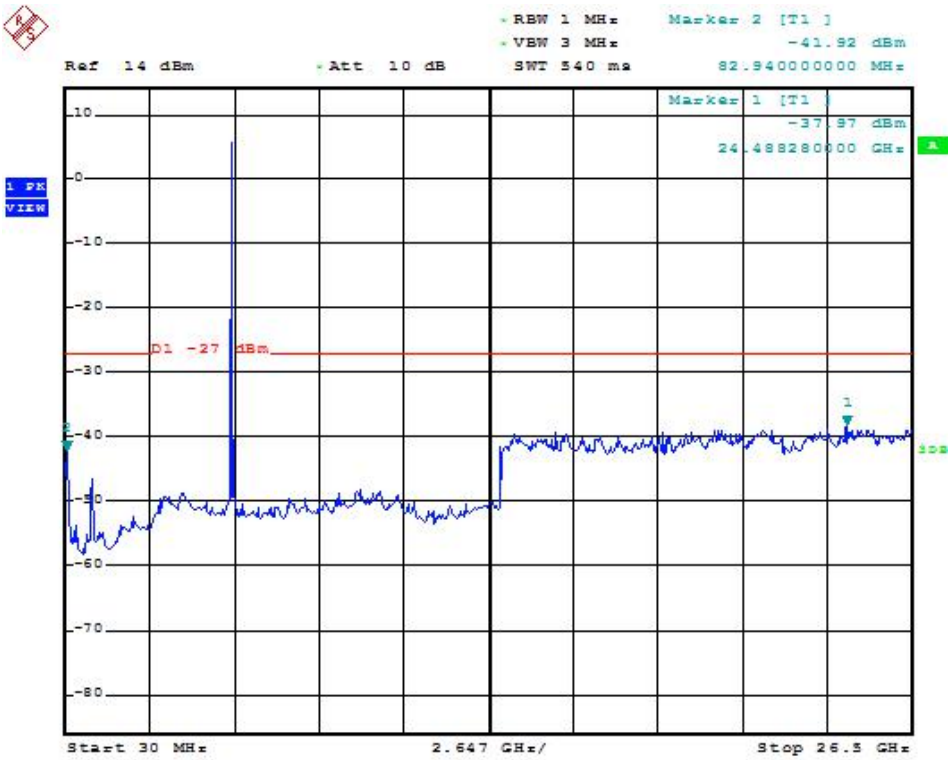
5180MHz



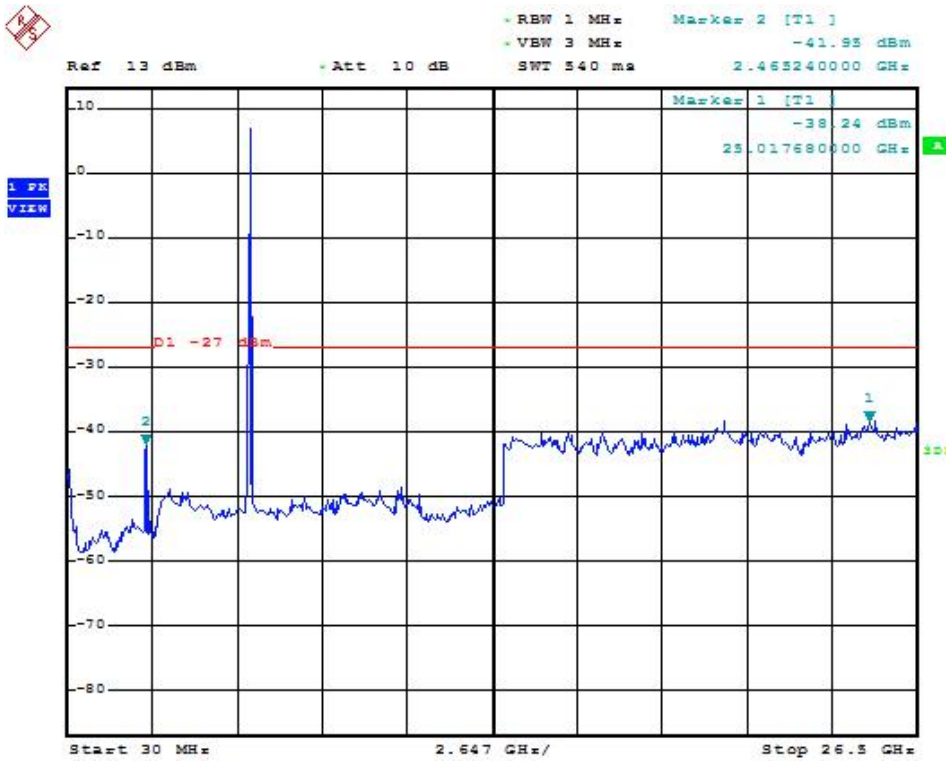
5200MHz



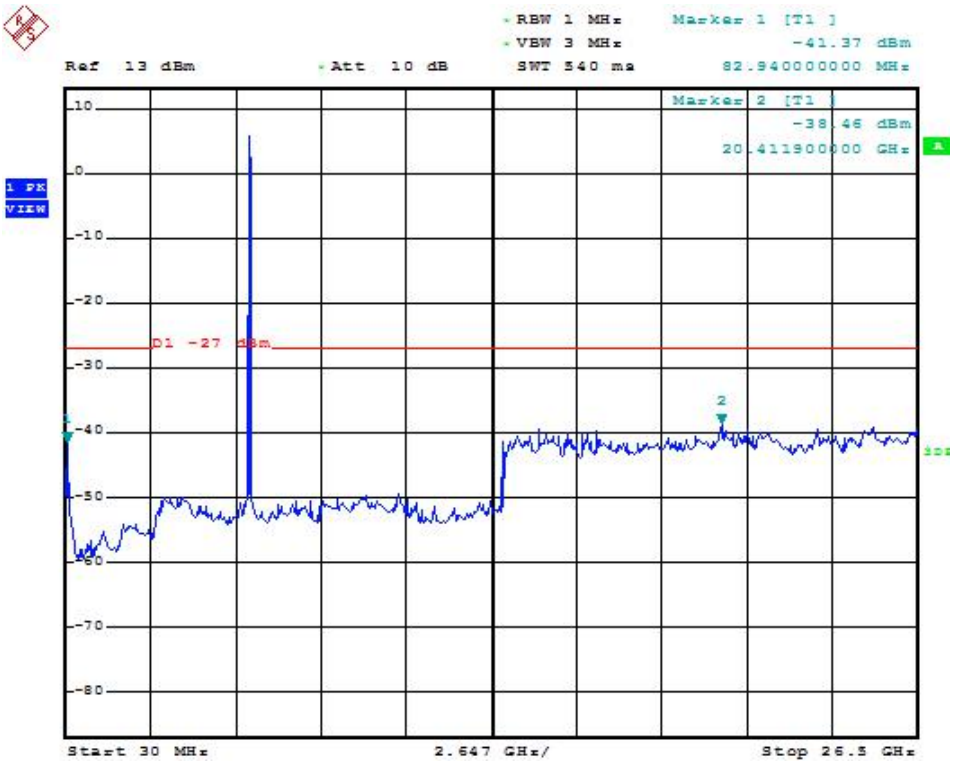
5240MHz



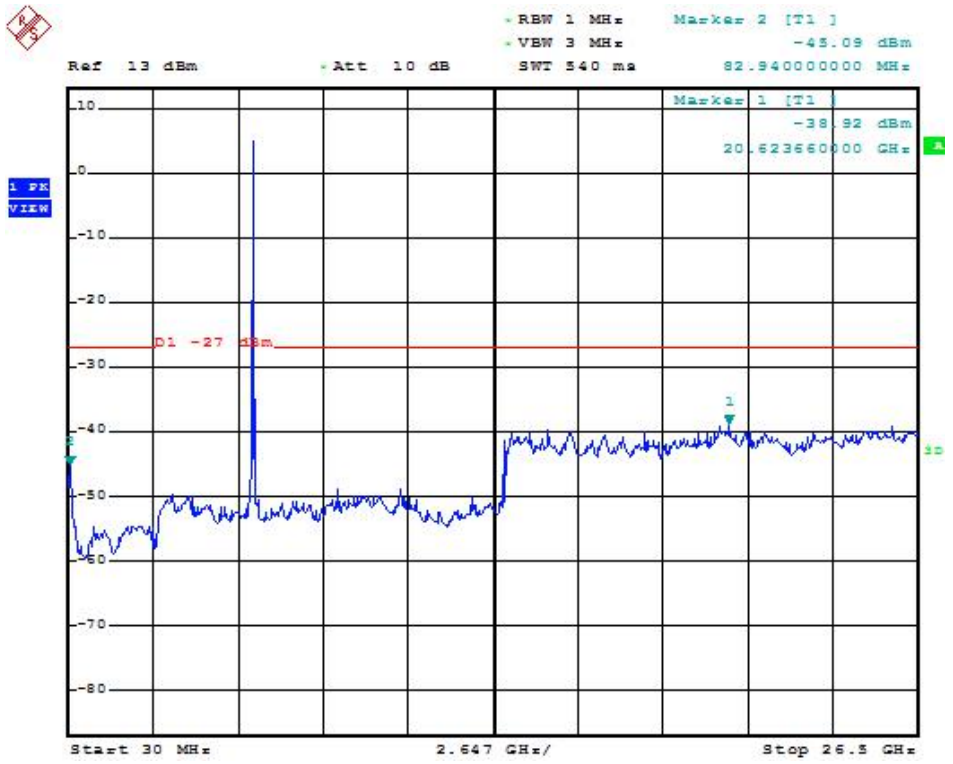
5745MHz



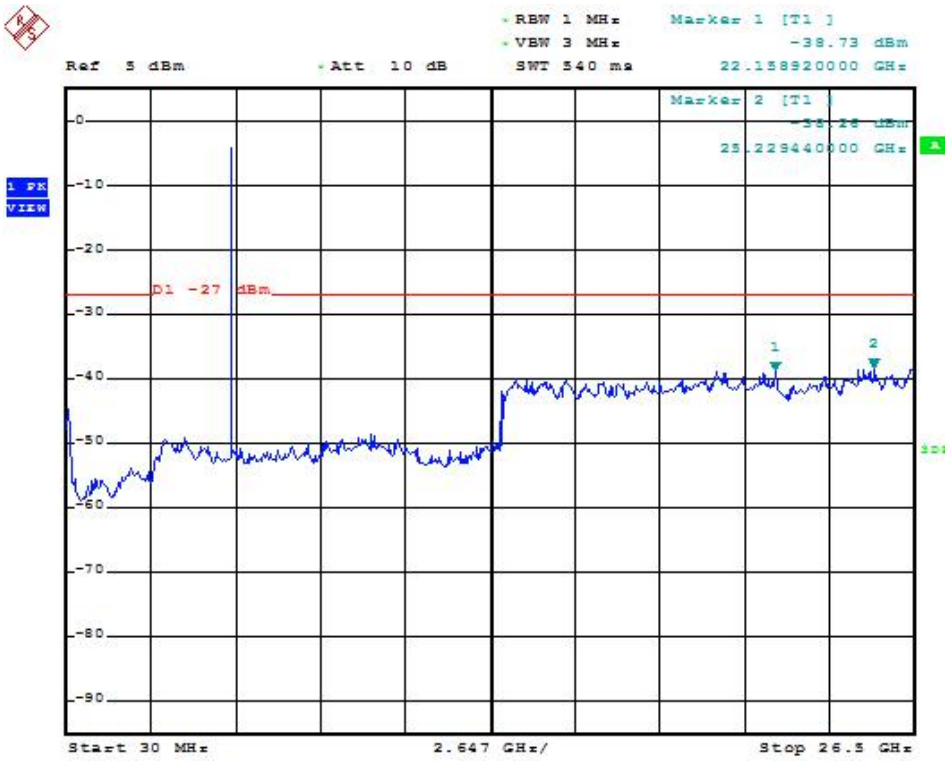
5785MHz



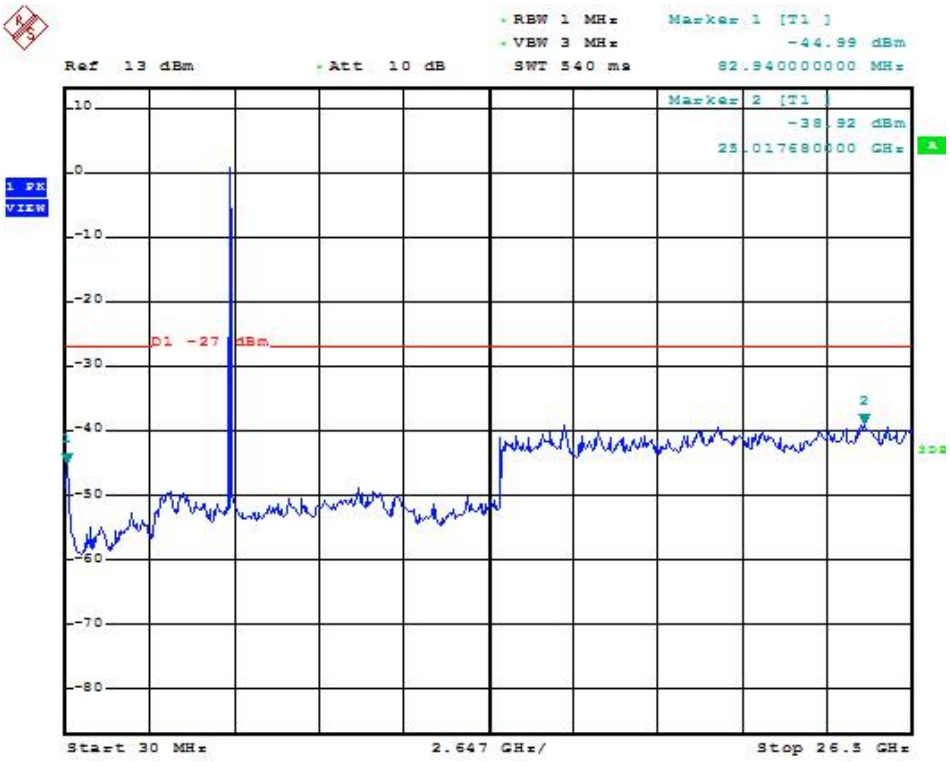
5825MHz



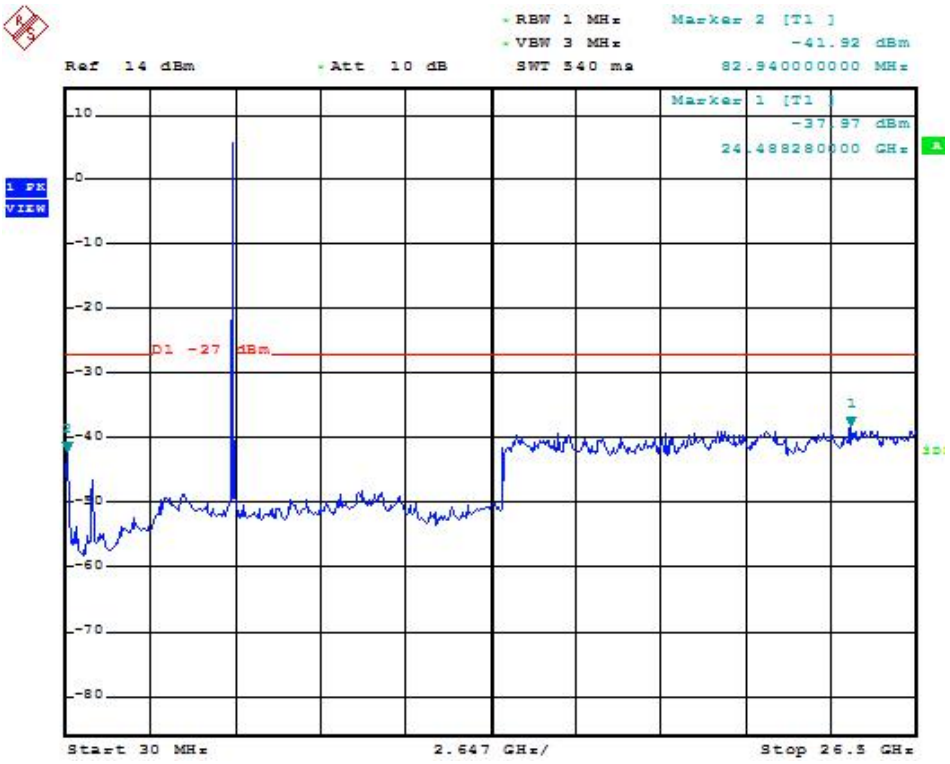
802.11ac-HT20
5180MHz



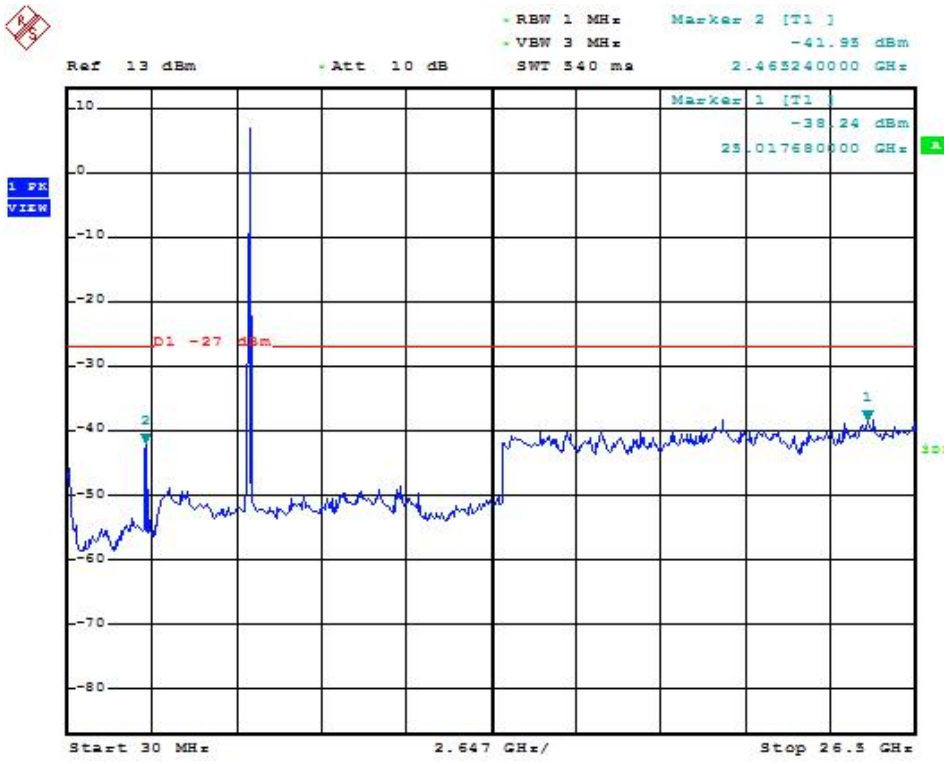
5200MHz



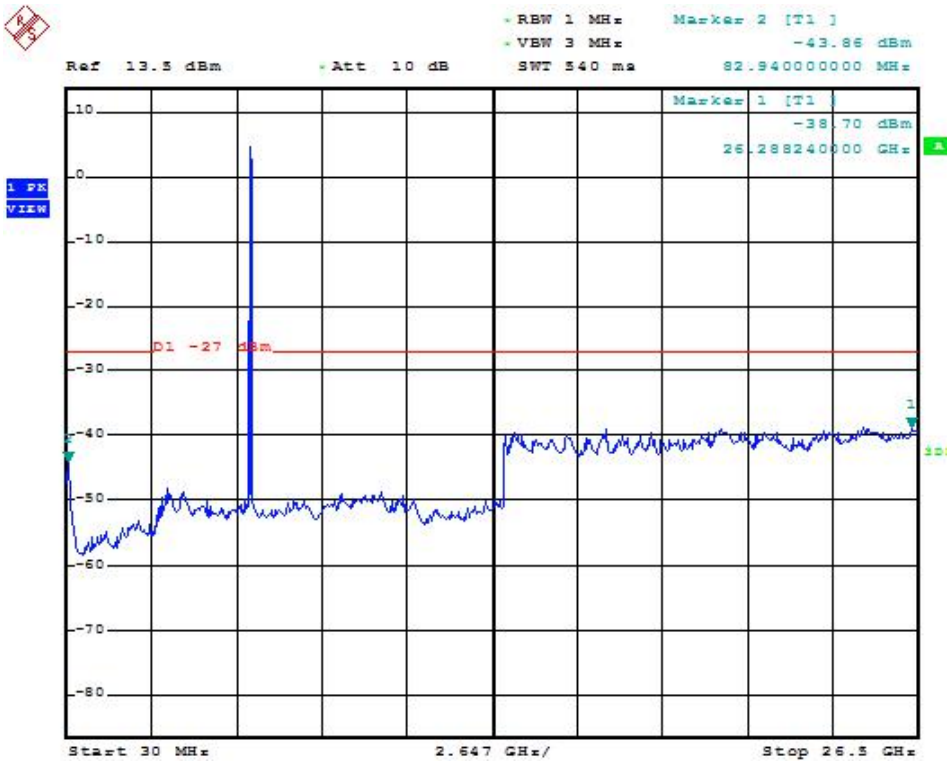
5240MHz



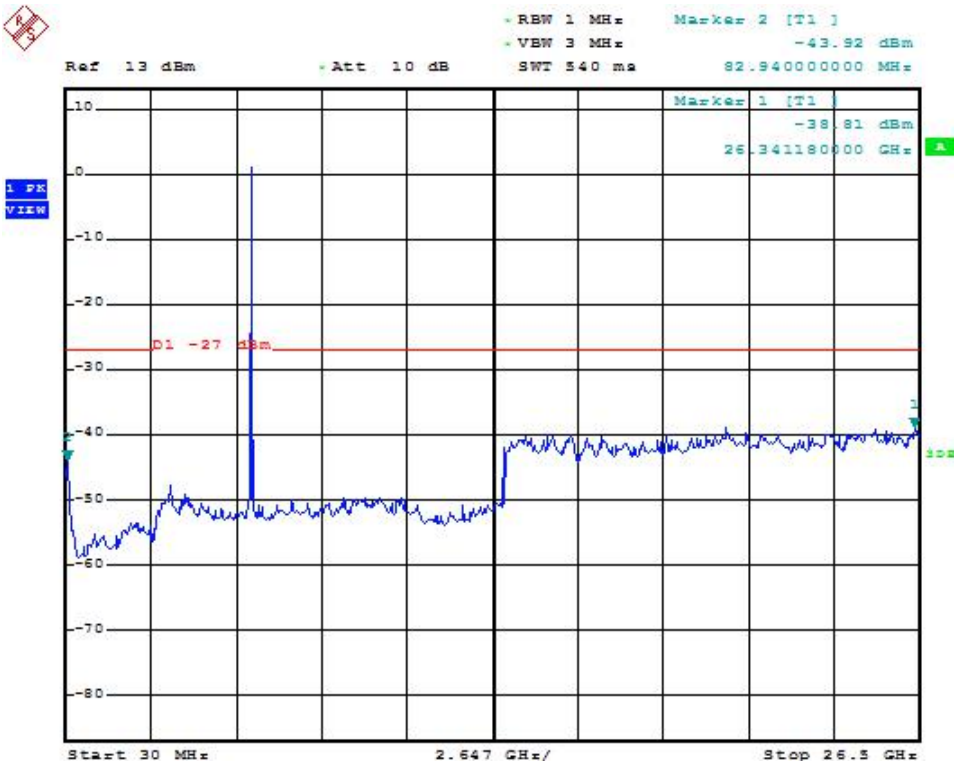
5745MHz



5785MHz



5825MHz



11. Radiated Spurious Emissions

11.1 Standard Applicable

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:

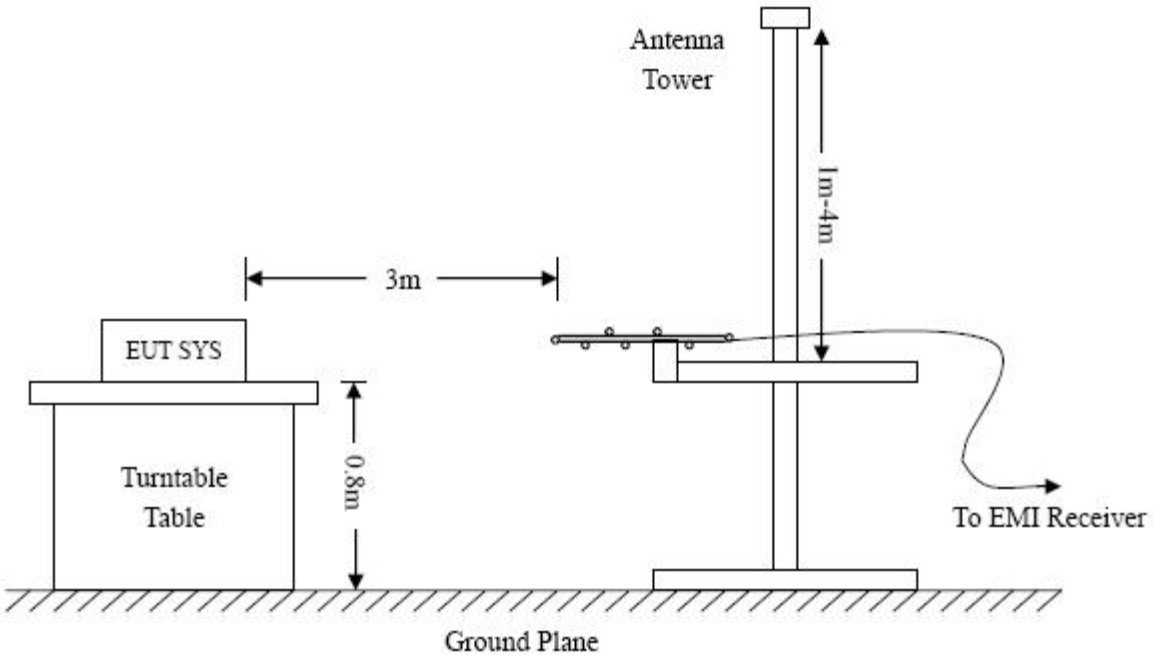
EIRP = ((E*d)^2) / 30

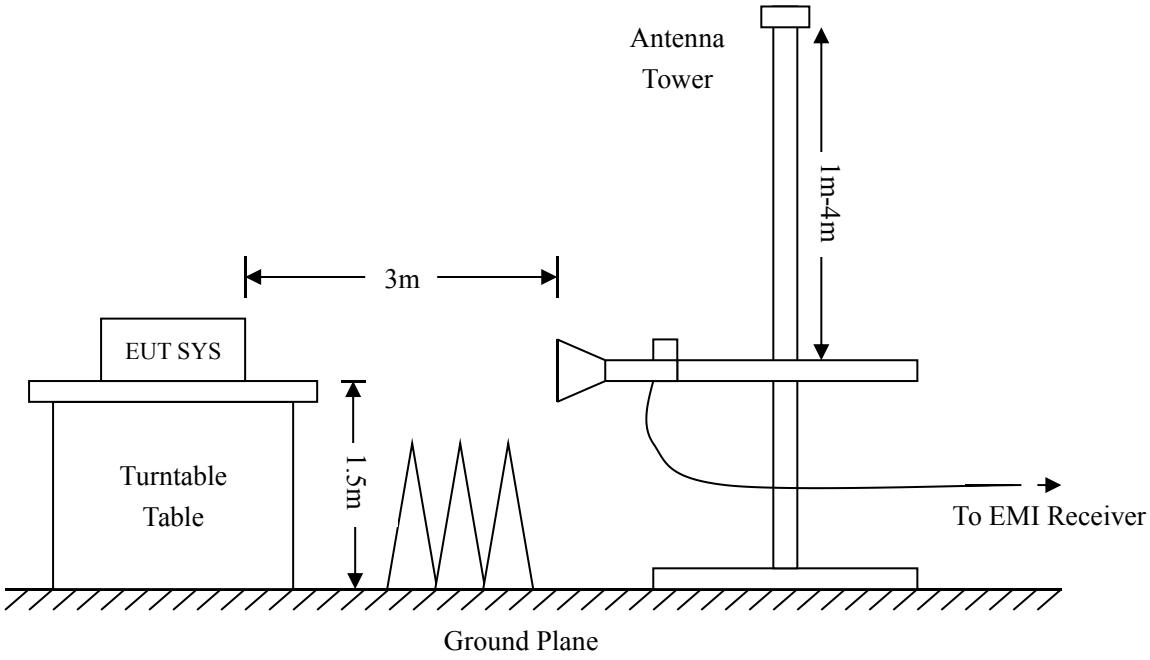
where:

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

11.2 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.





11.3 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

11.4 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

11.5 Environmental Conditions

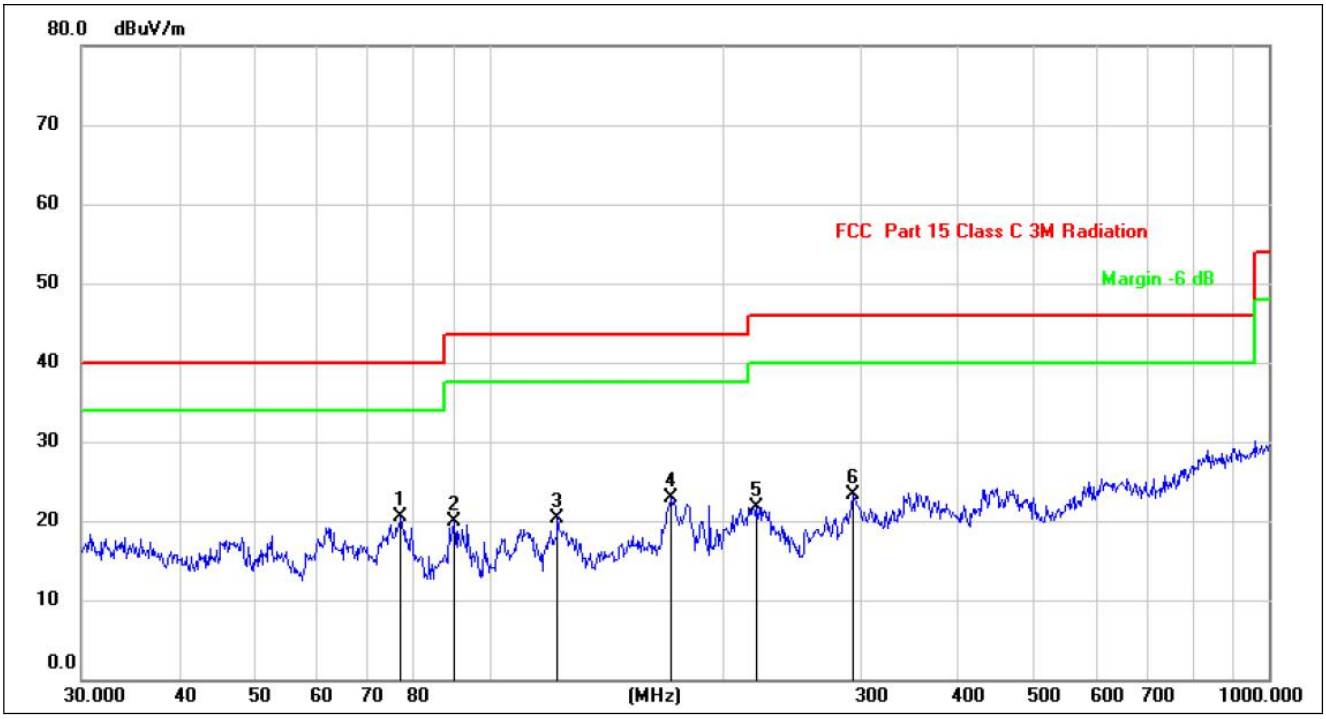
Temperature:	22° C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

11.6 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:

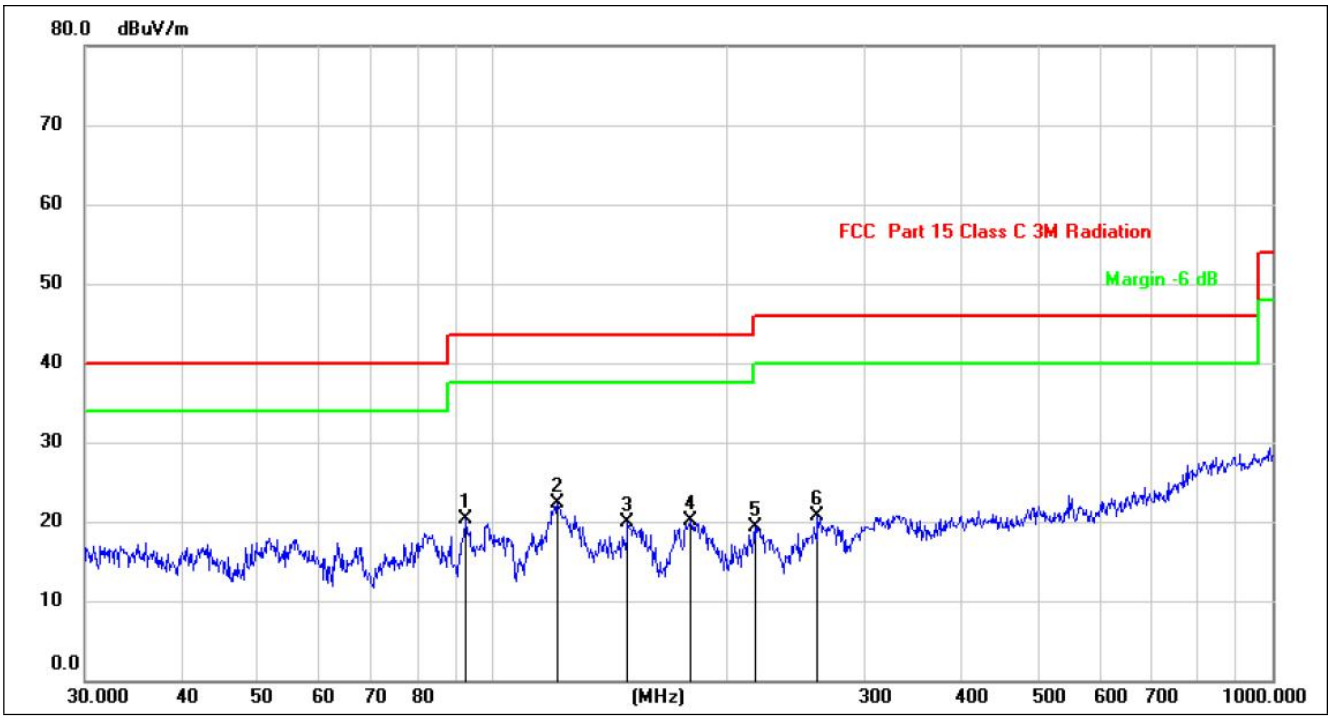
Note: *this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*

For 802.11a
Spurious Emission From 30 MHz to 1 GHz
Test mode: Transmitting Channel 5180MHz
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	77.0503	20.55	-0.06	20.49	40.00	-19.51	QP	
2		90.2205	20.43	-0.48	19.95	43.50	-23.55	QP	
3		122.4038	17.97	2.43	20.40	43.50	-23.10	QP	
4		170.7923	22.28	0.62	22.90	43.50	-20.60	QP	
5		220.6169	20.25	1.50	21.75	46.00	-24.25	QP	
6		293.0842	19.31	4.07	23.38	46.00	-22.62	QP	

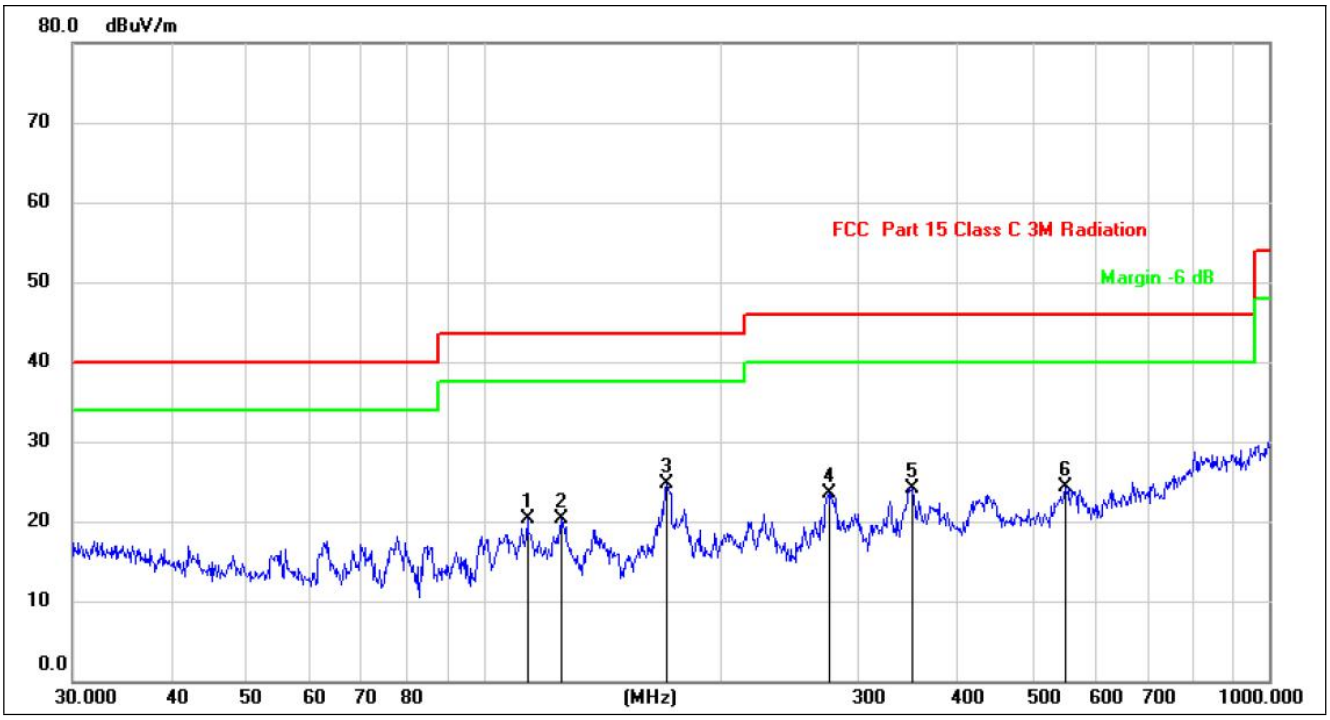
Test Specification: *Vertical*



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		92.4624	20.62	-0.30	20.32	43.50	-23.18	QP	
2	*	121.1230	19.80	2.52	22.32	43.50	-21.18	QP	
3		148.9625	18.57	1.24	19.81	43.50	-23.69	QP	
4		179.3863	19.33	0.79	20.12	43.50	-23.38	QP	
5		216.7828	17.81	1.50	19.31	46.00	-26.69	QP	
6		261.0582	17.91	2.70	20.61	46.00	-25.39	QP	

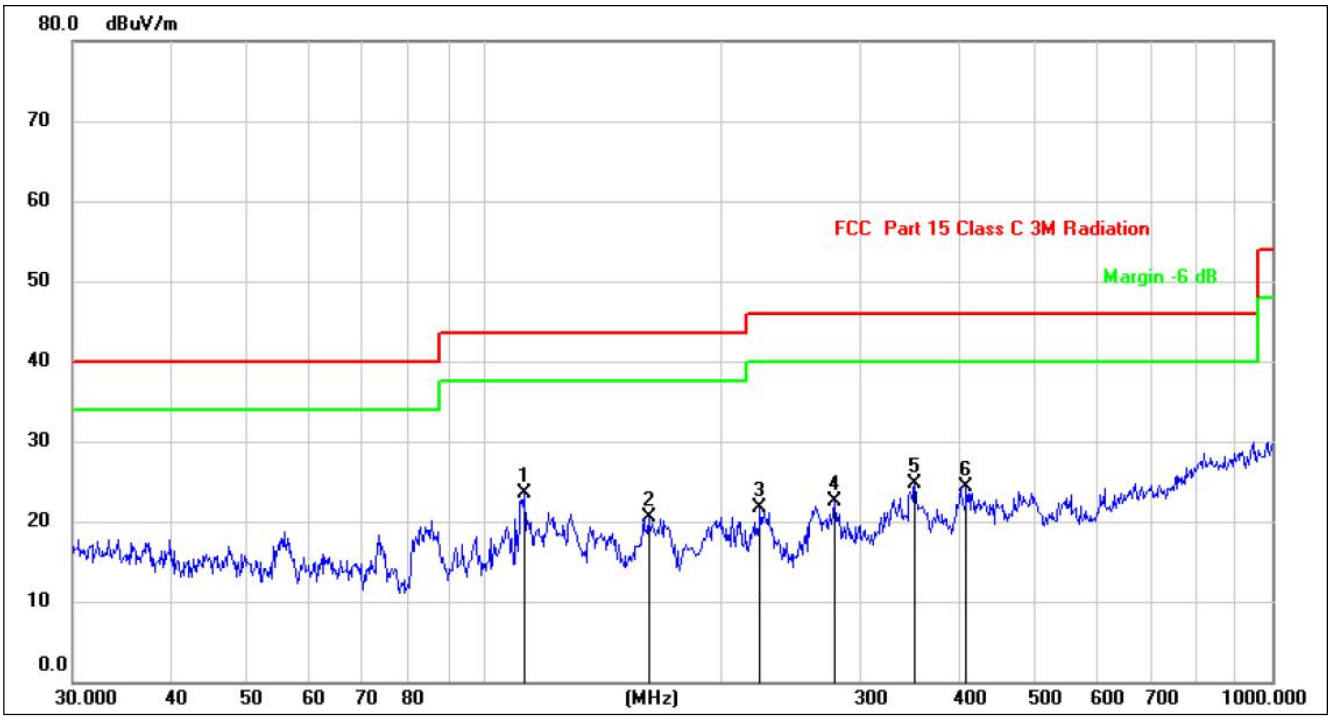
Test mode: Transmitting Channel 5200MHz

Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		113.7142	18.55	1.85	20.40	43.50	-23.10	QP	
2		125.8863	18.02	2.19	20.21	43.50	-23.29	QP	
3	*	171.3925	24.16	0.63	24.79	43.50	-18.71	QP	
4		275.1569	20.28	3.21	23.49	46.00	-22.51	QP	
5		351.7078	18.62	5.50	24.12	46.00	-21.88	QP	
6		550.9479	16.04	8.17	24.21	46.00	-21.79	QP	

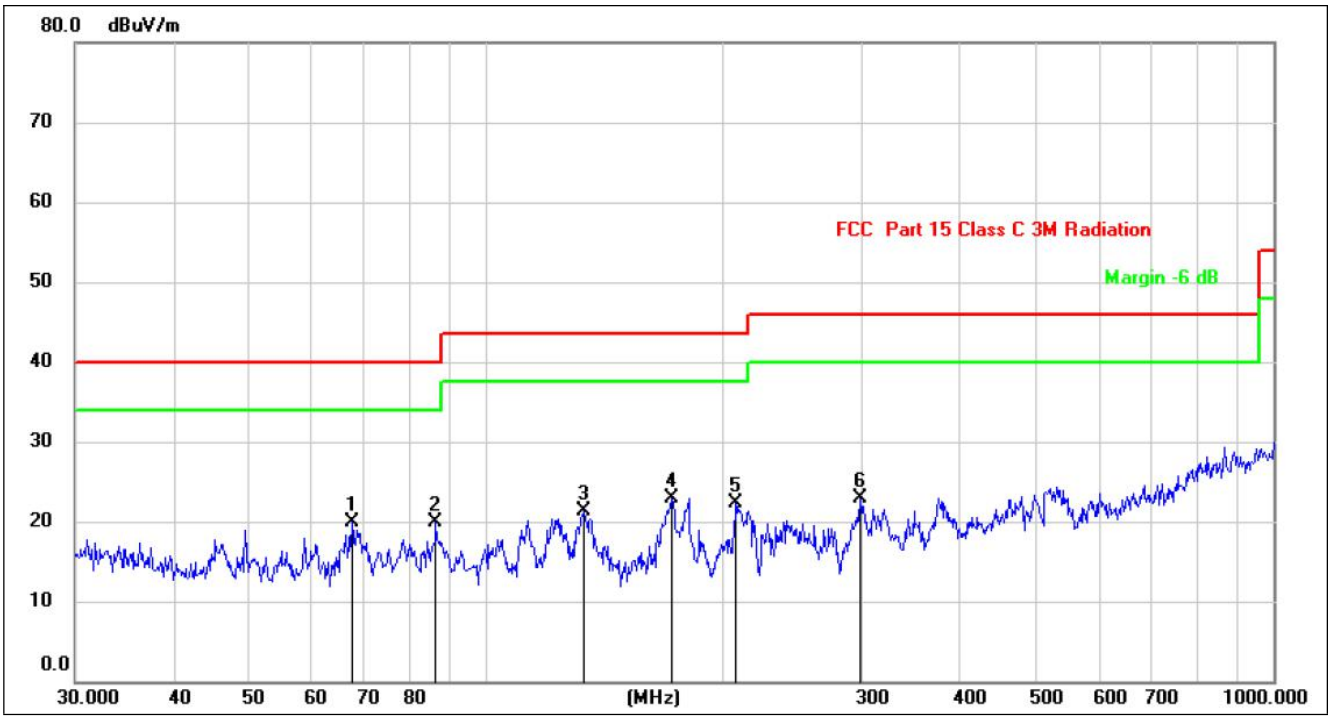
Test Specification: *Vertical*



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	112.5243	21.85	1.70	23.55	43.50	-19.95	QP	
2		161.4740	19.85	0.60	20.45	43.50	-23.05	QP	
3		223.7333	20.23	1.50	21.73	46.00	-24.27	QP	
4		278.0668	19.14	3.35	22.49	46.00	-23.51	QP	
5		351.7078	19.11	5.50	24.61	46.00	-21.39	QP	
6		408.9460	17.69	6.59	24.28	46.00	-21.72	QP	

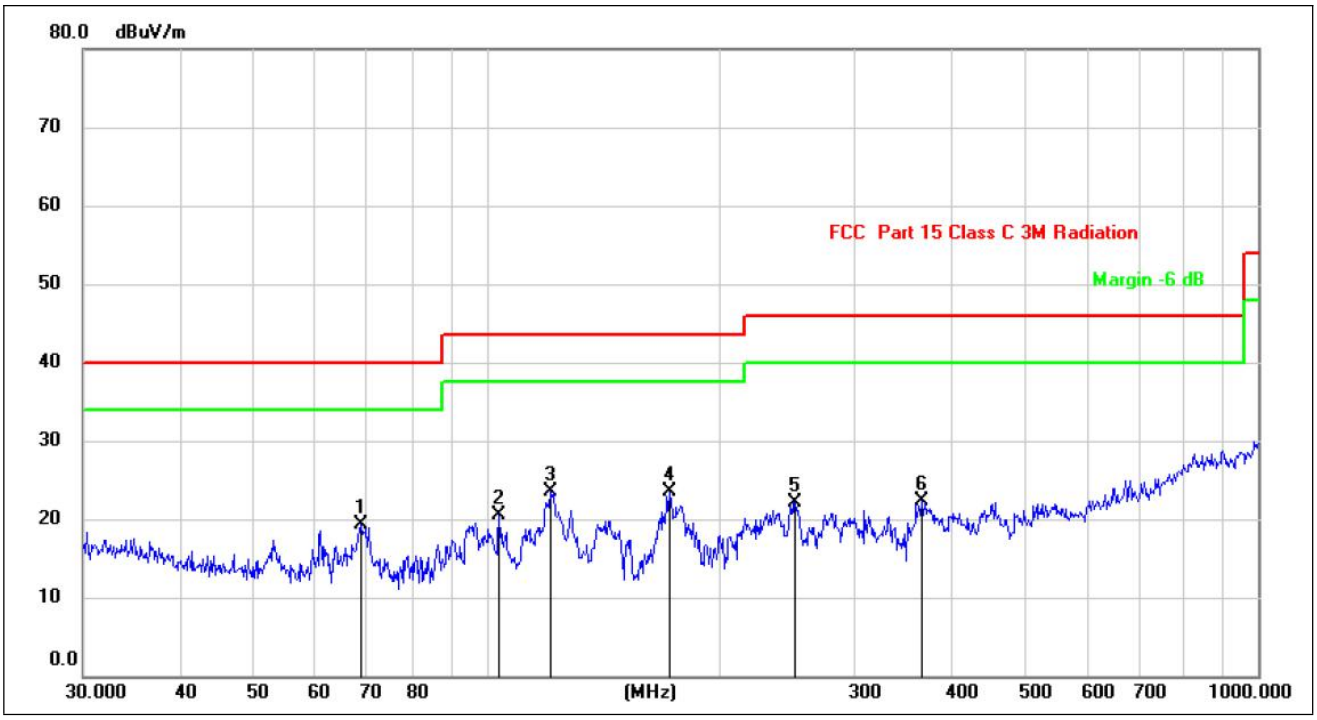
Test mode: Transmitting Channel 5240MHz

Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		67.4381	19.94	-0.02	19.92	40.00	-20.08	QP	
2	*	86.2001	20.27	-0.31	19.96	40.00	-20.04	QP	
3		133.1511	19.50	1.81	21.31	43.50	-22.19	QP	
4		171.9945	22.23	0.64	22.87	43.50	-20.63	QP	
5		207.1226	20.89	1.50	22.39	43.50	-21.11	QP	
6		298.2681	18.50	4.32	22.82	46.00	-23.18	QP	

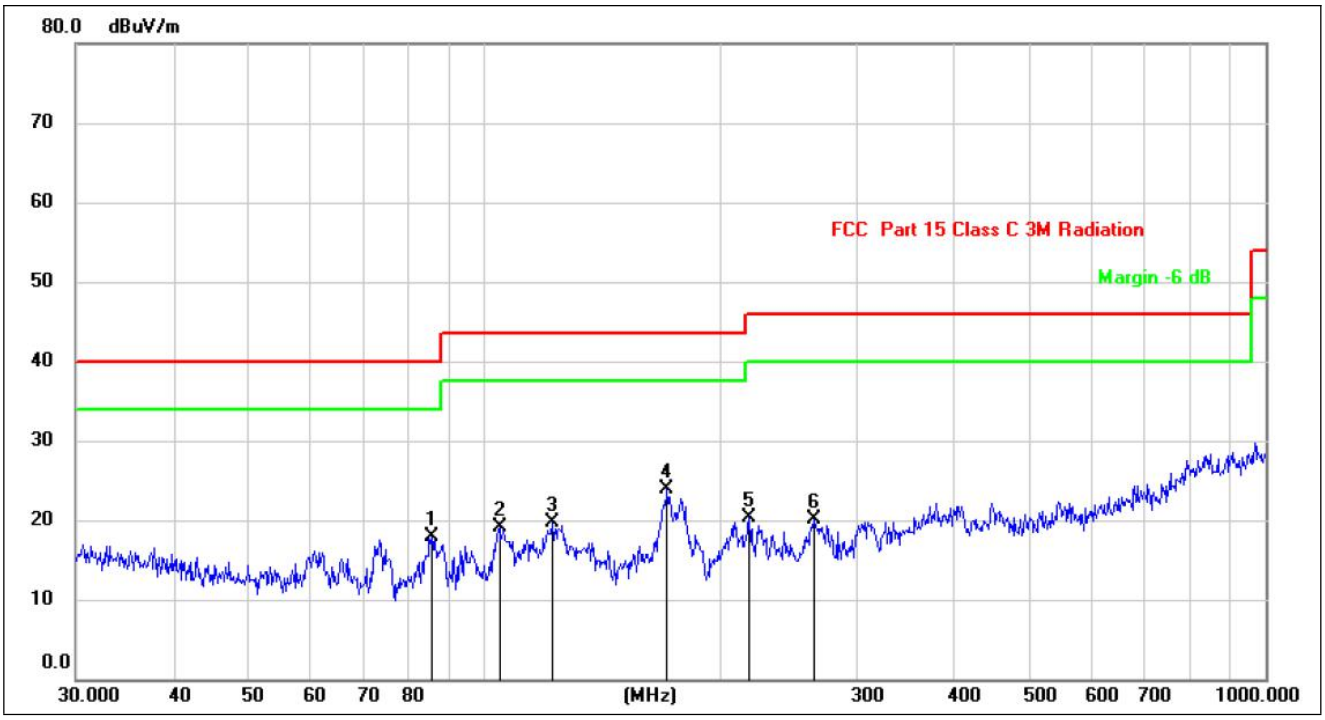
Test Specification: *Vertical*



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		68.8721	19.50	-0.12	19.38	40.00	-20.62	QP	
2		103.8054	19.79	0.72	20.51	43.50	-22.99	QP	
3	*	121.1230	21.00	2.52	23.52	43.50	-19.98	QP	
4		172.5988	22.82	0.65	23.47	43.50	-20.03	QP	
5		251.1803	19.85	2.34	22.19	46.00	-23.81	QP	
6		366.8231	16.00	6.34	22.34	46.00	-23.66	QP	

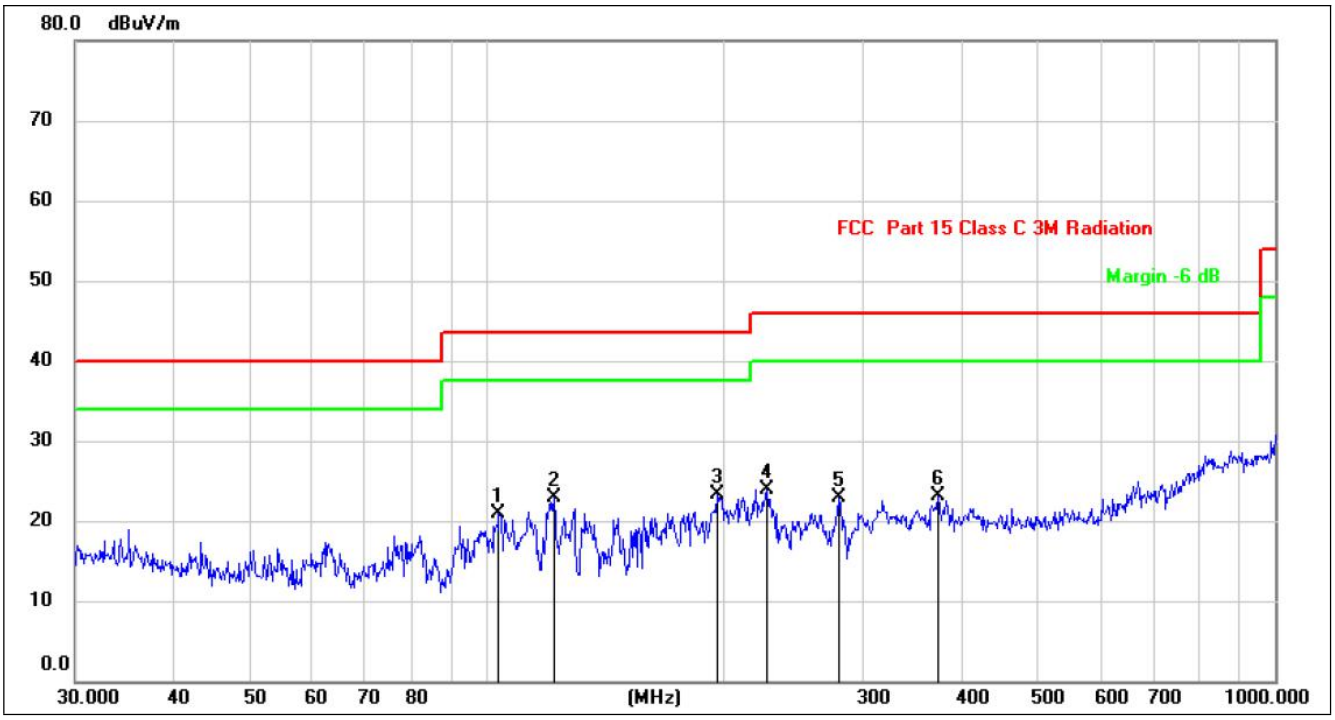
Test mode: Transmitting Channel 5745MHz

Horizontal



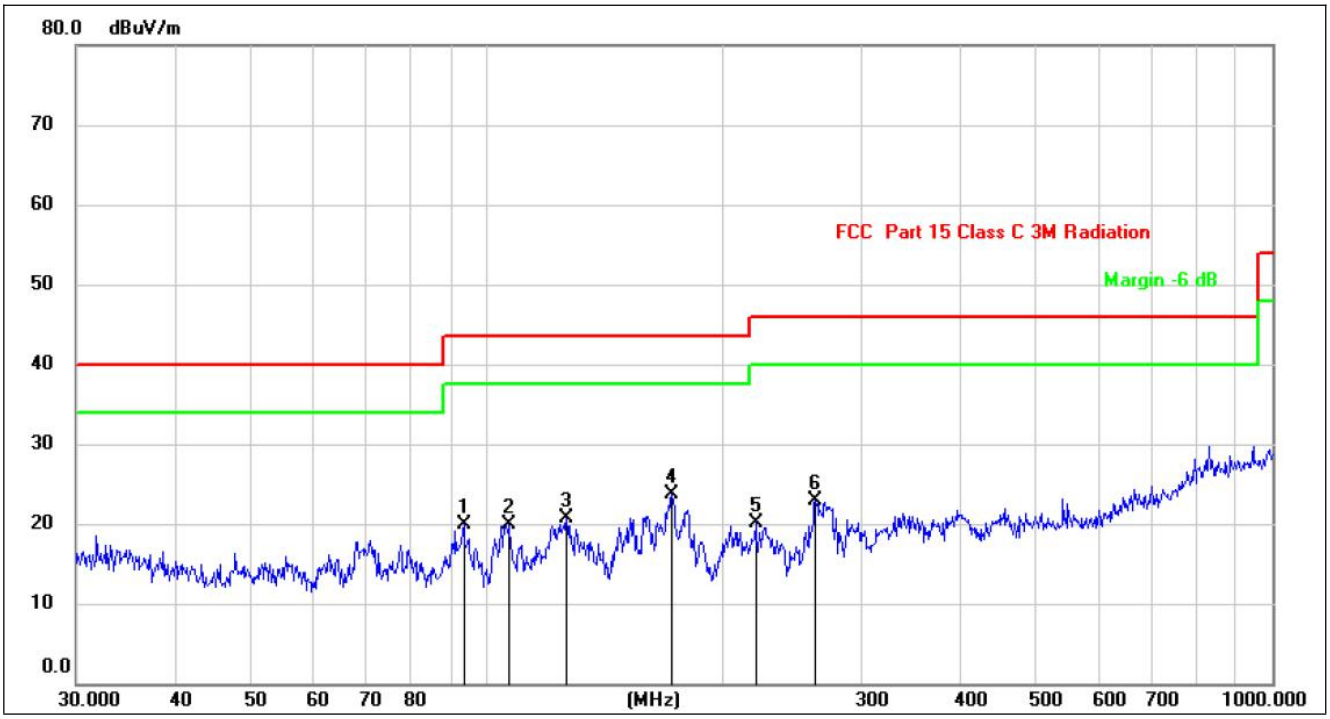
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		85.5977	18.24	-0.28	17.96	40.00	-22.04	QP	
2		104.5361	18.32	0.80	19.12	43.50	-24.38	QP	
3		122.4038	17.34	2.43	19.77	43.50	-23.73	QP	
4	*	171.3925	23.20	0.63	23.83	43.50	-19.67	QP	
5		218.3085	18.78	1.50	20.28	46.00	-25.72	QP	
6		263.8190	17.25	2.80	20.05	46.00	-25.95	QP	

Test Specification: *Vertical*



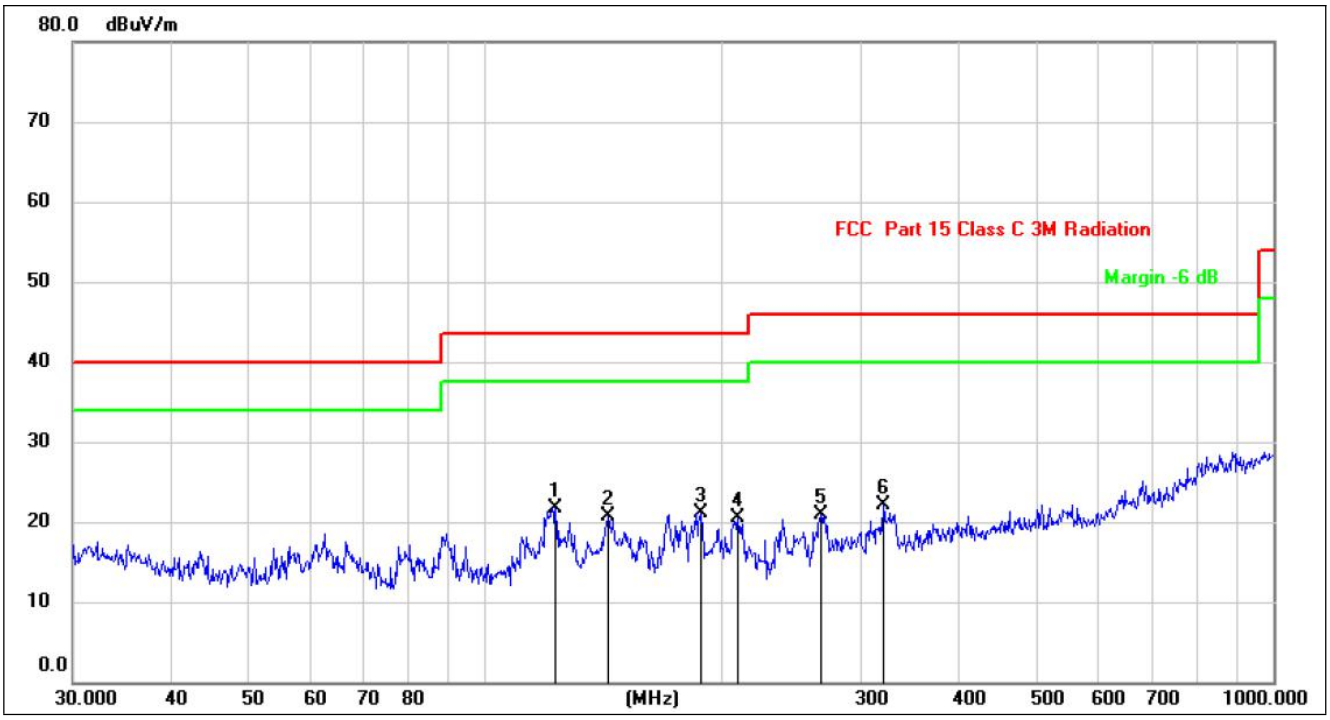
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		103.4419	20.30	0.68	20.98	43.50	-22.52	QP	
2		121.5485	20.41	2.49	22.90	43.50	-20.60	QP	
3	*	195.8220	22.51	0.79	23.30	43.50	-20.20	QP	
4		226.8935	22.30	1.56	23.86	46.00	-22.14	QP	
5		279.0436	19.42	3.39	22.81	46.00	-23.19	QP	
6		373.3110	16.39	6.71	23.10	46.00	-22.90	QP	

Test mode: Transmitting Channel 5785MHz
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		93.4402	20.15	-0.22	19.93	43.50	-23.57	QP	
2		106.7587	18.78	1.04	19.82	43.50	-23.68	QP	
3		126.3285	18.56	2.16	20.72	43.50	-22.78	QP	
4	*	171.9944	23.02	0.64	23.66	43.50	-19.84	QP	
5		219.8447	18.54	1.50	20.04	46.00	-25.96	QP	
6		261.9753	20.24	2.73	22.97	46.00	-23.03	QP	

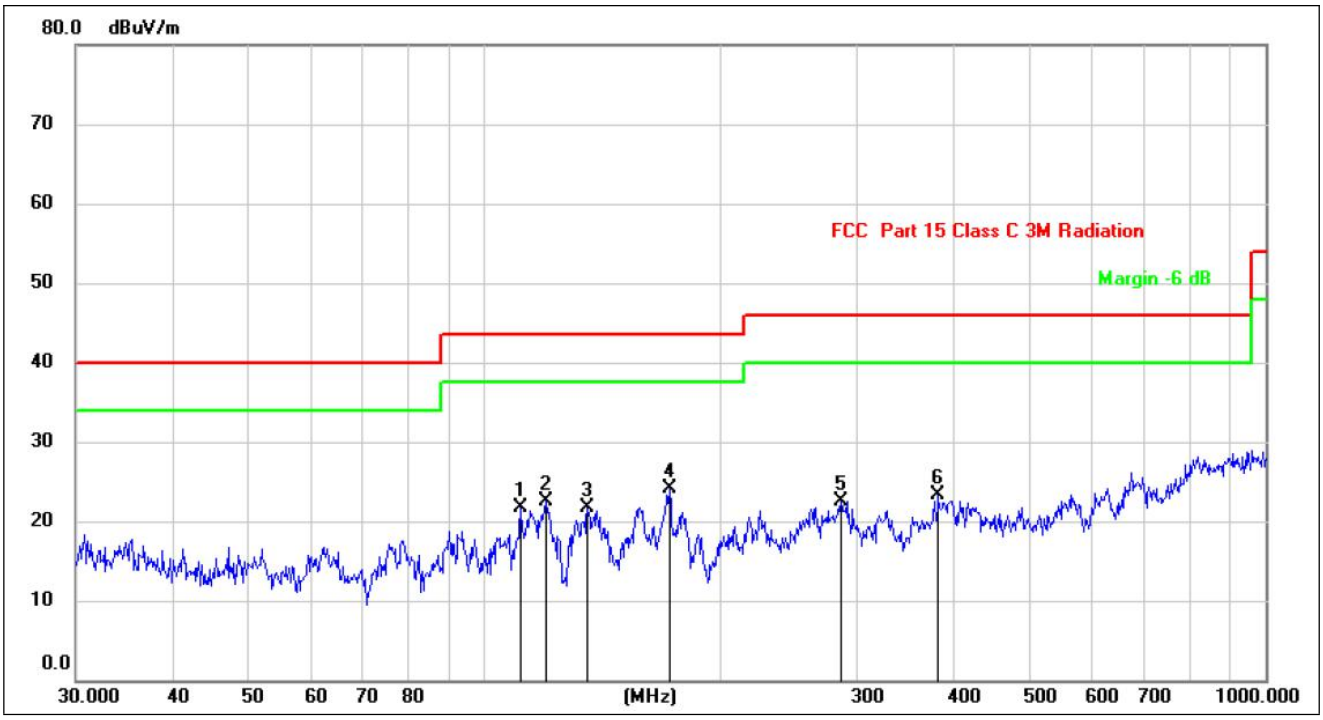
Test Specification: *Vertical*



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	122.8340	19.40	2.40	21.80	43.50	-21.70	QP	
2		143.3260	19.26	1.47	20.73	43.50	-22.77	QP	
3		187.7529	21.07	0.02	21.09	43.50	-22.41	QP	
4		209.3129	19.06	1.50	20.56	43.50	-22.94	QP	
5		266.6089	18.08	2.90	20.98	46.00	-25.02	QP	
6		319.9370	17.07	5.04	22.11	46.00	-23.89	QP	

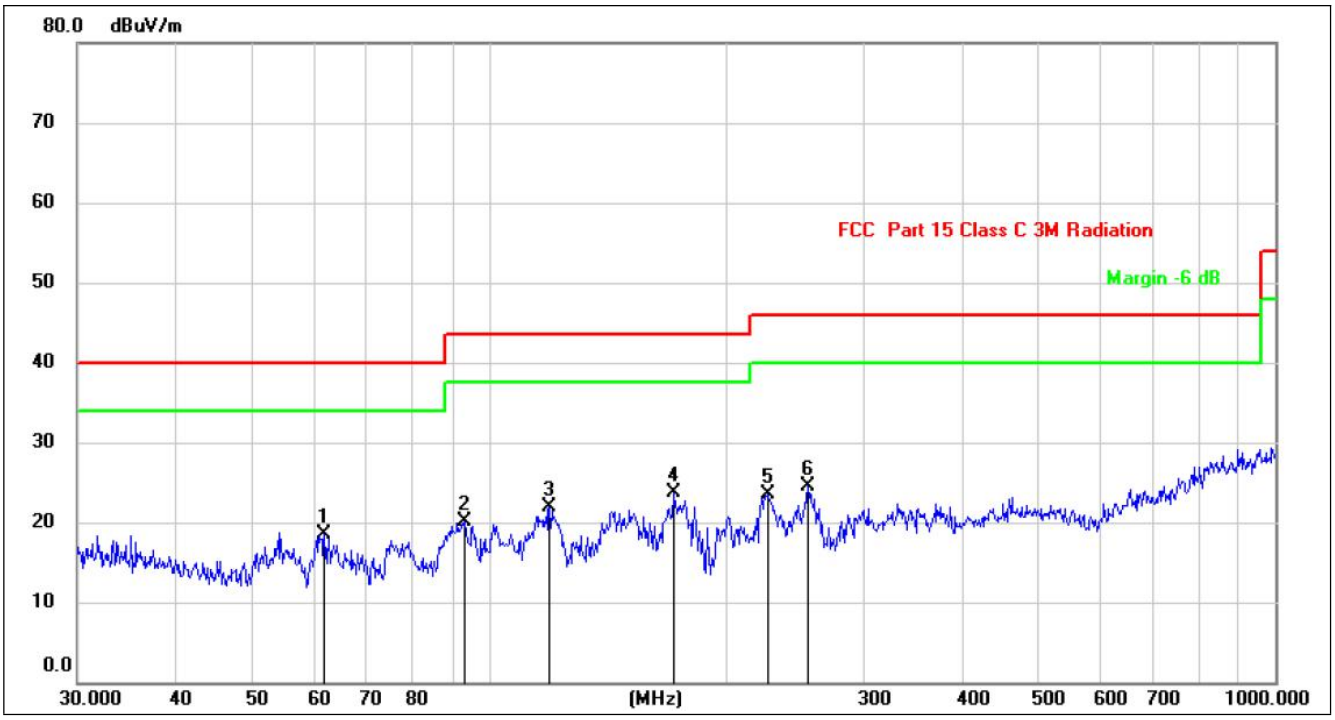
Test mode: Transmitting Channel 5825MHz

Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		111.3468	20.12	1.56	21.68	43.50	-21.82	QP	
2		119.8555	19.90	2.58	22.48	43.50	-21.02	QP	
3		135.5062	19.98	1.73	21.71	43.50	-21.79	QP	
4	*	172.5988	23.40	0.65	24.05	43.50	-19.45	QP	
5		285.9778	18.80	3.73	22.53	46.00	-23.47	QP	
6		381.2485	16.60	6.77	23.37	46.00	-22.63	QP	

Test Specification: *Vertical*



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		61.7781	18.16	0.38	18.54	40.00	-21.46	QP	
2		93.1132	20.40	-0.25	20.15	43.50	-23.35	QP	
3		119.4360	19.37	2.53	21.90	43.50	-21.60	QP	
4	*	171.9945	23.05	0.64	23.69	43.50	-19.81	QP	
5		226.0994	22.00	1.54	23.54	46.00	-22.46	QP	
6		254.7283	22.03	2.47	24.50	46.00	-21.50	QP	

Hormonics 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	51.1	360	V	40.7	10.9	39.6	63.1	74	-10.9
15540	PK	49.7	360	H	40.7	10.9	39.6	61.7	74	-12.3
15540	AV	36.4	360	V	40.7	10.9	39.6	48.4	54	-5.6
15540	AV	34.2	360	H	40.7	10.9	39.6	46.2	54	-7.8
High Channel (5240MHz)										
15720	PK	51.8	360	V	40.7	10.9	39.6	63.9	74	-10.1
15720	PK	50.1	360	H	40.7	10.9	39.6	62.1	74	-11.9
15720	AV	36.3	360	V	40.7	10.9	39.6	48.3	54	-5.7
15720	AV	34.5	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	-46.13	-27
Highest	Above 5350	-43.56	-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 (5745MHz)										
11490	PK	55.1	360	V	38.9	9.8	40.1	63.7	74	-10.3
11490	PK	53.7	360	H	38.9	9.8	40.1	62.3	74	-11.7
11490	AV	36.3	360	V	38.9	9.8	40.1	44.9	54	-9.1
11490	AV	35.5	360	H	38.9	9.8	40.1	44.1	54	-9.9
High Channel (5825MHz)										
11610	PK	55.3	360	V	38.9	9.8	40.1	63.9	74	-10.1
11610	PK	53.6	360	H	38.9	9.8	40.1	62.2	74	-11.8
11610	AV	37.7	360	V	38.9	9.8	40.1	46.3	54	-7.7
11610	AV	36.4	360	H	38.9	9.8	40.1	45.0	54	-9.0

Out of Band edge

Test CH.	**Test Segment**	**Result**	**Limit**
	MHz	**dBm/MHz**	**dBm/MHz**
Lowest	Below 5715	-48.63	-27
	5715 to 5725	-44.79	-17
Highest	5850 to 5860	-45.66	-17
	Above 5860	-47.52	-27
Note: the data just list the worst cases			

12. Frequency Stability

12.1 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.

12.2 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

12.3 Environmental Conditions

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

12.4 Summary of Test Results/Plots

802.11a

5150-5250MHz

Reference Frequency(Middle Channel): 5200 MHz			
Environment Temperature (°C)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	120	123	0.0236
40	120	119	0.0229
30	120	115	0.0221
20	120	121	0.0233
10	120	137	0.0263
0	120	139	0.0267
-10	120	135	0.0259
-20	120	129	0.0248
-30	120	141	0.0271

5725-5850MHz

Reference Frequency(Middle Channel): 5785 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	120	120	0.0207
40	120	128	0.0221
30	120	133	0.0230
20	120	127	0.0220
10	120	115	0.0199
0	120	143	0.0247
-10	120	151	0.0261
-20	120	187	0.0323
-30	120	162	0.0280

802.11ac-HT20

5150-5250MHz

Reference Frequency(Middle Channel): 5200 MHz			
Environment Temperature (°C)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	120	128	0.0246
40	120	125	0.0240
30	120	117	0.0225
20	120	126	0.0242
10	120	135	0.0260
0	120	144	0.0277
-10	120	129	0.0248
-20	120	135	0.0260
-30	120	147	0.0283

5725-5850MHz

Reference Frequency(Middle Channel): 5785 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	120	114	0.0197
40	120	131	0.0226
30	120	128	0.0221
20	120	132	0.0226
10	120	119	0.0205
0	120	151	0.0261
-10	120	147	0.0254
-20	120	178	0.0307
-30	120	155	0.0268

So, Frequency Stability Versus Input Voltage is:

802.11a

5150-5250MHz

Reference Frequency(Middle Channel): 5200 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	108	136	0.0261
	120	139	0.0267
	132	135	0.0260

5725-5850MHz

Reference Frequency(Middle Channel): 5785 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	108	144	0.0249
	120	153	0.0264
	132	188	0.0325

802.11ac-HT20

5150-5250MHz

Reference Frequency(Middle Channel): 5200 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	108	131	0.0252
	120	135	0.0260
	132	138	0.0265

5725-5850MHz

Reference Frequency(Middle Channel): 5785 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	108	141	0.0244
	120	161	0.0278
	132	179	0.0309

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