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Guangdong Meijiaxin Innovative Technology Co., Ltd.

RF TEST REPORT

Report Type:
FCC Part 15.407 RF report

Model:
MEW4-1

REPORT NUMBER:
191201777SHA-002

ISSUE DATE:
December 30, 2019

DOCUMENT CONTROL NUMBER:
TTRF15.407_V1 © 2018 Intertek

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Report no:191201777SHA-002

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TEST REPORT

Applicant:	Guangdong Meijiaxin Innovative Technology Co., Ltd. Xingye South Road, Laimei Industrial Park, Chenghai, Shantou, Guangdong, China
Manufacturer:	Guangdong Meijiaxin Innovative Technology Co., Ltd. Xingye South Road, Laimei Industrial Park, Chenghai, Shantou, Guangdong, China
Product Name:	R/C drone
Type/Model:	MEW4-1
FCC ID:	2AHV3KK20

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:

47CFR Part 15 (2018): Radio Frequency Devices (Subpart E)

ANSI C63.10 (2013): American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

PREPARED BY:	**REVIEWED BY:**
Wade zhang	Daniel
Project Engineer Wade Zhang	Reviewer Daniel Zhao

Content

Revision History

Report No.	Version	Description	Issued Date
191201777SHA-002	Rev. 01	Initial issue of report	December 30, 2019

Measurement result summary

TEST ITEM	FCC REFERANCE	RESULT
26 dB Bandwidth & 99% Occupied Bandwidth	15.407(a)	Pass
Minimum 6dB Bandwidth	15.407(e)	Pass
Maximum Conducted Output Power	15.407(a)	Pass
Power spectral density	15.407(a)	Pass
Radiated emission	15.407(b) 15.205 15.209	Pass
Power line conducted emission	15.407(b) 15.207	NA (See note1,4)
Antenna requirement	15.203	Pass

Notes: 1: NA =Not Applicable
2. Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.
3. Additions, Deviations and Exclusions from Standards: None.
4. The battery needs to be removed from the EUT when charging, so there is no transmitting when charging

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	R/C drone
Type/Model:	MEW4-1
Trade Mark	
Add Model:	B3, B3pro, B7, B9, B10, BX, B12, B14, B16, B18, B19, B20, B22, B23, B25 B2M, B2Pro, B2SE, B3P, B4W, B5W, X103W, X104G, MEW4-1, MEW4-2, MEW4-3, MEW4-4, V6, V7, V8, V9, M2, M3, M4, NY-BG57, V-6, E32HW, HS700D, HS720, DRC-LSX10, SP700 (Refer to Declaration of Difference for more details.)
Description of EUT:	The EUT is an aircraft with general 2.4G and 5G WiFi (11a/11n) technology.
Rating:	DC 7.6V (Powered by a 7.6V Battery)
Sample received date:	December 10, 2019
Date of test:	December 10, 2019 ~ December 21, 2019

1.2 Technical Specification

Frequency Range:	5180MHz ,5745MHz
Support Standards:	802.11a, 802.11n (HT20)
Type of Modulation:	OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Channel Number:	For 5150MHz band: Channel 36 For 5745 ~ 5850MHz band: Channel 149

Antenna	Model	Antenna type	Antenna Gain	Note
1	/	Internal antenna	2.0 dBi,	/

Mode	Tx/Rx Function	Beamforming function	CDD function
802.11a	2Tx/2Rx	NO	NO
802.11n	2Tx/2Rx	NO	NO

1.3 Description of Test Facility

Name:	Intertek Testing Services Shanghai
Address:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone:	86 21 61278200
Telefax:	86 21 54262353

The test facility is recognized, certified, or accredited by these organizations:	CNAS Accreditation Lab Registration No. CNAS L0139
	FCC Accredited Lab Designation Number: CN1175
	IC Registration Lab Registration code No.: 2042B-1
	VCCI Registration Lab Registration No.: R-4243, G-845, C-4723, T-2252
	A2LA Accreditation Lab Certificate Number: 3309.02

Tests were sub-contracted.

Name:	Shenzhen UnionTrust Quality and Technology Co., Ltd.
Address:	16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China
Telephone:	+86 (0) 755 2823 0888
Telefax:	+86 (0) 755 2823 0886

The test facility is recognized, certified, or accredited by these organizations:	Shenzhen UnionTrust Quality and Technology Co., Ltd. CNAS Accreditation Lab
	Registration No. CNAS L9069

2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2018)
ANSI C63.10 (2013)
KDB 789033 D02 v02r01

2.2 Mode of operation during the test

While testing transmitting mode of EUT, the continuously transmission was applied by following software.

Software name	Manufacturer	Version	Supplied by
ETF_GUI_A40.00.0007	-	A40.00.0007	Client

The frequence was tested as representatives.

Frequency Band	Mode	Frequence (MHz)	Power Setting
5150~5250	802.11a_MIMO	5180	15
	802.11n20_MIMO	5180	11
5725~5850	802.11a_MIMO	5745	18
	802.11n20_MIMO	5745	18

After this pre-scan with the RF power, the following data rata was chosen to do the test as the worst case.

Frequency (MHz)	Mode	Worst case data rate
5180	802.11a	6Mbps
	802.11n20	MCS0
5745	802.11a	6Mbps
	802.11n20	MCS0

There have the following test mode:

Radiated test mode:
Mode 1: EUT transmitted signal with internal antenna;

Conducted test mode:
Mode 2: EUT transmitted signal from PCBA RF port connected to SPA directly;

We have verified all test modes and choose the worst mode 1 for radiated test and mode 2 for conducted test as representatively to list the results in this report

2.3 Test peripherals list

Item No.	Name	Band and Model	Description
1	NoteBook	Lenovo, E450	AC 120V 60Hz
Note: The NoteBook only used for control RF setting, not used during the test.			

2.4 Test environment condition:

Test items	Temperature	Humidity
26 dB Bandwidth & 99% Occupied Bandwidth	23°C	52% RH
Minimum 6dB Bandwidth		
Maximum Conducted Output Power		
Power spectral density		
Radiated Emissions in restricted frequency	25°C	48% RH

2.5 Instrument list

Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	N/A	Dec. 03, 2021
☒	Receiver	R&S	ESIB26	UTTL-E026	Nov. 23, 2020
☒	Loop Antenna	ETS-LINDGREN	6502	UTTL-E013	Nov. 15, 2020
☒	Broadband Antenna	ETS-LINDGREN	3142E	UTTL-E014	Nov. 15, 2020
☒	6dB Attenuator	Talent	RA6A5-N-18	UTTL-E057	Nov. 23, 2020
☒	Preamplifier	HP	8447F	UTTL-E043	Nov. 23, 2020
☒	Horn Antenna	ETS-LINDGREN	3117	UTTL-E016	Nov. 15, 2020
☒	Multi device Controller	ETS-LINDGREN	7006-001	N/A	N/A

Test software	Manufacturer	Version
e3	Audix	Software Version:

RF test					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☐	Temp & Humidity chamber	Votisch	VT4002	UTTL-E054	June 05, 2020
☒	EXA Spectrum Analyzer	KEYSIGHT	N9010A	UTTL-E032	Nov. 23, 2020
☐	Receiver	R&S	ESR7	UTTL-E005	Nov. 23, 2020
☒	USB Wideband Power Sensor	KEYSIGHT	U2021XA	UTTL-E033	Nov. 23, 2020
☐	EXG-B RF Analog Signal Generator	KEYSIGHT	N5171B	UTTL-E030	Nov. 23, 2020
☐	MXG X-Series RF Vector Signal Generator	KEYSIGHT	N5182B	UTTL-E031	Nov. 23, 2020
☐	Wideband Radio Communication Tester	R&S	CMW500	UTTL-E049	July 19, 2020

2.6 Measurement uncertainty

The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Test item	Measurement uncertainty
Conducted emission 9KHz-150KHz	±3.8 dB
Conducted emission 150KHz-30MHz	±3.4 dB
Radiated emission 9KHz-30MHz	±4.9 dB
Radiated emission 30MHz-1GHz	±4.7 dB
Radiated emission 1GHz-18GHz	±5.1 dB
Radiated emission 18GHz-26GHz	±5.2 dB
Radiated emission 26GHz-40GHz	±5.2 dB

3 26 dB Bandwidth

Test result: Pass

3.1 Limit

None

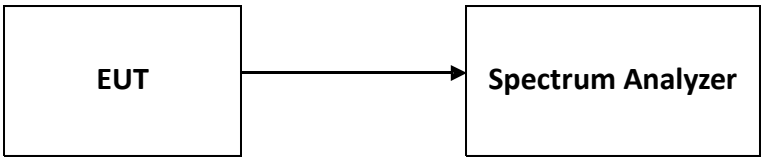
3.2 Measurement Procedure

The EUT was tested according to test procedure of "KDB789033 D02 General UNII Test Procedures New Rules"

26 dB Bandwidth

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%.

3.3 Test Configuration



3.4 The results of 26 dB Bandwidth

Test Data

Mode	Channel	26 dB Bandwidth (MHz)	
		ANT 0	ANT 1
IEEE 802.11a	36 (5180)	20.14	19.88
IEEE 802.11n-HT20	36 (5180)	20.73	20.57

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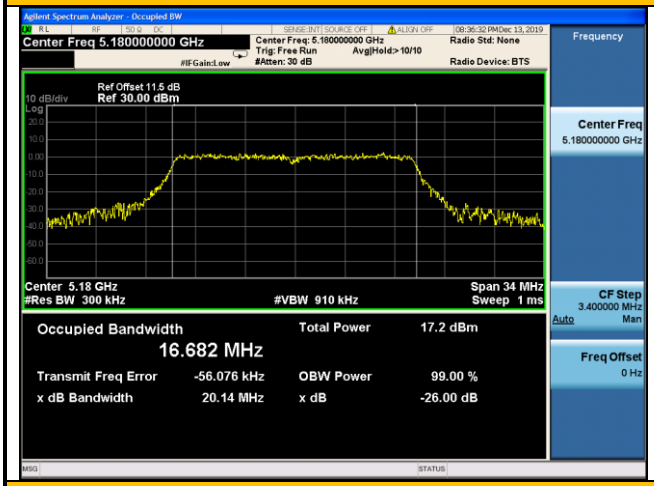
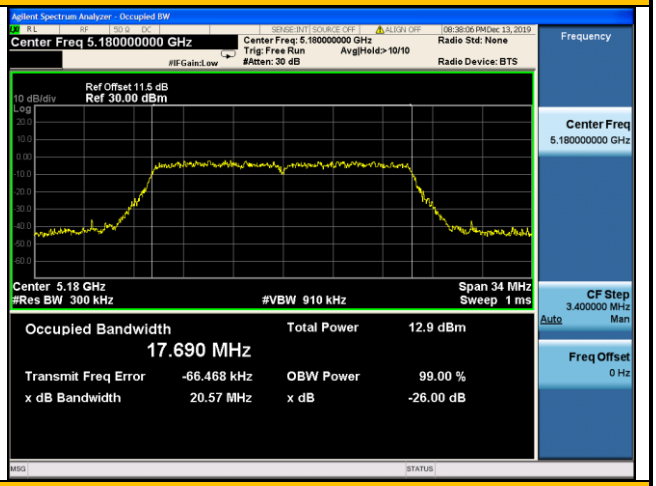
Test Plot

IEEE 802.11a	IEEE 802.11n-HT20
Channel 36	
	
ANT 0	
	
ANT 1	

4 Minimum 6dB Bandwidth

Test result: Pass

4.1 Limit

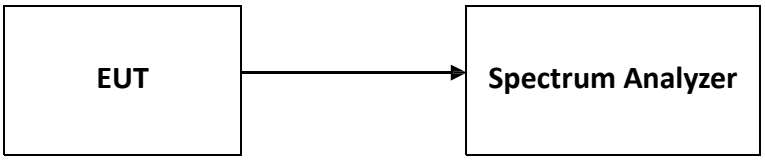
For systems using digital modulation techniques that may operate in the 5725 - 5850 MHz band, the minimum 6 dB bandwidth shall be at least 500 kHz.

4.2 Measurement Procedure

The EUT was tested according to test procedure of "KDB789033 D02 General UNII Test Procedures New Rules"

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 x 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.

4.3 Test Configuration

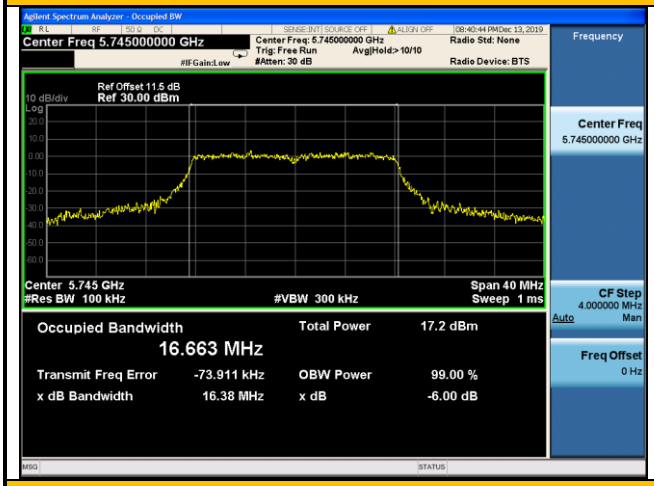
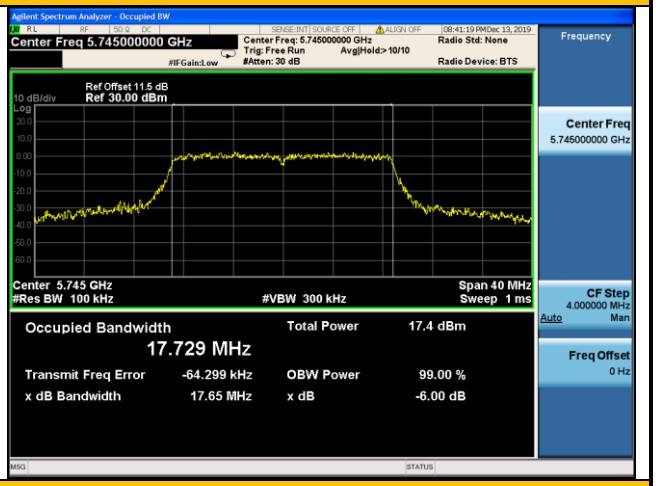
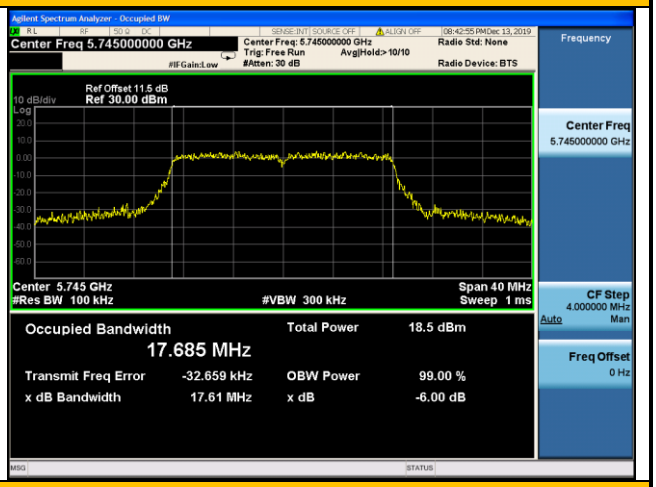


4.4 The results of Minimum 6dB Bandwidth

Test Data

Mode	Channel	6 dB Bandwidth (MHz)	
		ANT 0	ANT 1
IEEE 802.11a	149 (5745)	16.38	16.40
IEEE 802.11n-HT20	149 (5745)	17.65	17.61

Test Plot

IEEE 802.11a	IEEE 802.11n-HT20
Channel 149	
	
ANT 0	
	
ANT 1	

5 Maximum conducted output power and e.i.r.p.

Test result: Pass

5.1 Limit

☐ For an outdoor access point operating in the band 5.15-5.25GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1W provided the maximum antenna gain does not exceed 6dBi.
The maximum e.i.r.p. at any elevation angle above 30 degrees from the horizon must not exceed 125mW (21 dBm).

☐ For an indoor access point operating in the band 5.15-5.25GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6dBi.

☐ For fixed point-to-point access points operating in the band 5.15-5.25GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1W.

☒ For client devices in the 5.15-5.25GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250mW provided the maximum antenna gain does not exceed 6dBi.

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

☒ For the band 5.725-5.85GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1W.

If transmitting antennas of directional gain greater than 6dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

5.2 Measurement Procedure

The EUT was tested according to test procedure of "KDB789033 D02 General UNII Test Procedures New Rules"

For 802.11a and 802.11n(HT20) mode:

(i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.
The EUT is configured to transmit continuously or to transmit with a constant duty cycle.
At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.

(ii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in II.B.

(iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.

(iv) Adjust the measurement in dBm by adding 10 log (1/x) where x is the duty cycle (e.g., 10 log (1/0.25) if the duty cycle is 25%).

For 802.11n(HT40) and 802.11ac(VHT80):

(i) Measure the duty cycle, x, of the transmitter output signal as described in II.B.

(ii) Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(iii) Set RBW = 1 MHz.

(iv) Set VBW ≥ 3 MHz.

(v) 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.)

(vi) Sweep time = auto.

(vii) Detector = power averaging (rms), if available. Otherwise, use sample detector mode.

(viii) Do not use sweep triggering. Allow the sweep to "free run."

(ix) Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter.

(x) 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 signal.

(xi) Add 10 log (1/x), where x is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add 10 log (1/0.25) = 6 dB if the duty cycle is 25%.

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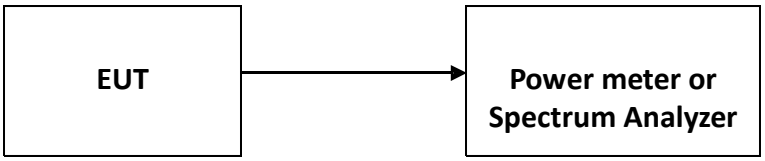
5.3 Test Configuration



5.4 Test Results of Maximum conducted output power and e.i.r.p.

5.4.1 Duty cycle

Mode	Data rates (Mbps)	On Time (msec)	Period (msec)	Duty Cycle (linear)	Duty Cycle (%)	Duty Cycle Factor (dB)	1/ T Minimum VBW (kHz)	Average Factor (dB)
IEEE 802.11a	6	0.680	0.955	0.71	71.20	1.47	1.47	-2.95
IEEE 802.11n-HT20	MCS0	0.655	0.930	0.70	70.43	1.52	1.53	-3.04

The test plots as follows

IEEE 802.11a

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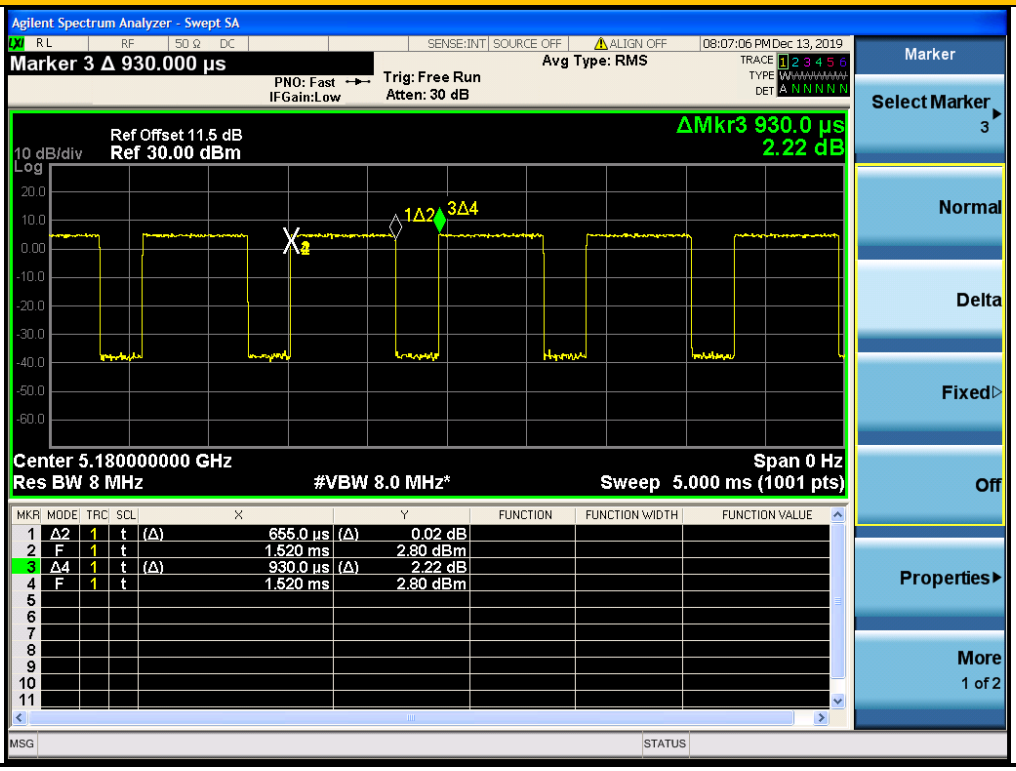
IEEE 802.11n-HT20



5.4.2 Conducted Output Power

Mode	Channel/ Frequency (MHz)	Maximum Conducted Output Power (dBm)						
		MIMO				Total Power MIMO_ Chain 0+1	Limits (dBm)	Pass / Fail
		Chain 0		Chain 1				
		Meas Power	Corr'd Power	Meas Power	Corr'd Power			
IEEE 802.11a	36 (5180)	10.04	11.51	10.69	12.21	14.88	24	Pass
	149 (5745)	10.23	11.7	12.23	13.75	15.86	30	Pass
IEEE 802.11n-HT20	36 (5180)	5.75	7.22	6.49	8.01	10.64	24	Pass
	149 (5745)	10.11	11.58	12.06	13.58	15.70	30	Pass

Remark:

1. Corr'd Power = Meas Power + Duty Cycle Factor
2. Total (Chain 0+1) = 10*log [(10Chain 0/10) + (10Chain 1/10)]

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6 Power spectrum density

Test result: **Pass**

6.1 Limit

☐ For an outdoor access point operating in the band 5.15-5.25GHz, the maximum power spectral density shall not exceed 17dBm in any 1 megahertz band.

☐ For an indoor access point operating in the band 5.15-5.25GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.

☒ For client devices in the 5.15-5.25GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

☐ F or the 5.25-5.35 GHz and 5.47-5.725GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

☒ For the band 5.725-5.85GHz, the maximum power spectral density shall not exceed 30dBm in any 500kHz band.

If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. If there have a beam forming type, the limit should be the less of original and original + (6 - antenna gain - beamforming gain).

6.2 Measurement Procedure

The EUT was tested according to test procedure of "KDB789033 D02 General UNII Test Procedures New Rules"

1. Create an average power spectrum for the EUT operating mode being tested by following the instructions in II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power…." (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)
2. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
3. Make the following adjustments to the peak value of the spectrum, if applicable:
   a) If Method SA-2 or SA-2 Alternative was used, add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum.
   b) If Method SA-3 Alternative was used and the linear mode was used in step II.E.2.g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.
4. The result is the Maximum PSD over 1 MHz reference bandwidth.
5. 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 Section 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 II.B.l.a).
   b) Set VBW ≥ 3 RBW.
   c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10 log (500 kHz/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 10 log (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 steps 5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.

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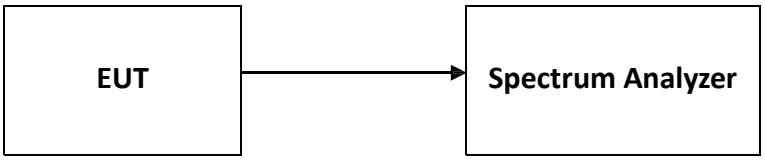
6.3 Test Configuration



6.4 Test Results of Power spectrum density

Mode	Channel/ Frequency (MHz)	Maximum Power Spectral Density						
		MIMO				Total Power MIMO_ Chain 0+1	Limits (dBm)	Pass / Fail
		Chain 0		Chain 1				
		Meas Power	Corr'd Power	Meas Power	Corr'd Power			
IEEE 802.11a	36 (5180)	-0.917	0.553	-0.055	1.475	4.05	11	Pass
	149 (5745)	-3.313	-1.843	-0.954	0.576	2.54	30	Pass
IEEE 802.11n-HT20	36 (5180)	-5.347	-3.877	-4.495	-2.965	-0.39	11	Pass
	149 (5745)	-3.68	-2.21	-1.508	0.022	2.06	30	Pass

Remark:

1. Corr'd Power = Meas Power + Duty Cycle Factor
2. Total (Chain 0+1) = 10*log[(10Chain 0/10)+(10Chain 1/10)]

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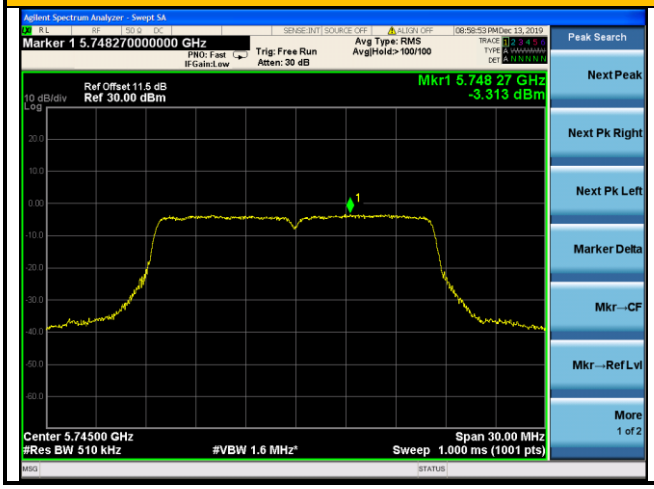
The test plots as follows:

IEEE 802.11a	
Chain 0	**Chain 1**
Channel 36	
	
Channel 149	
	

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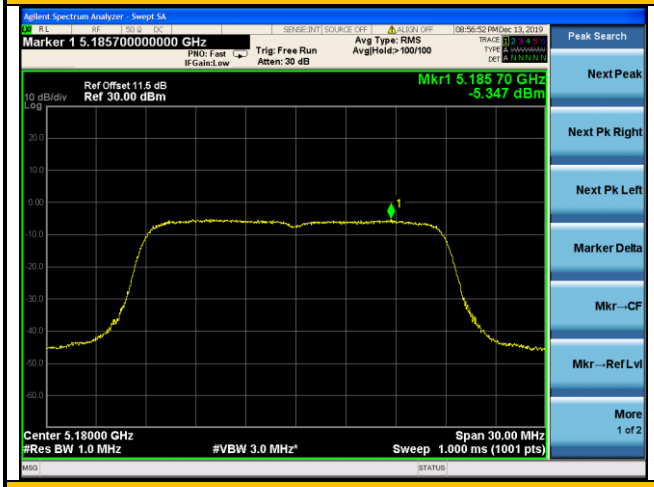
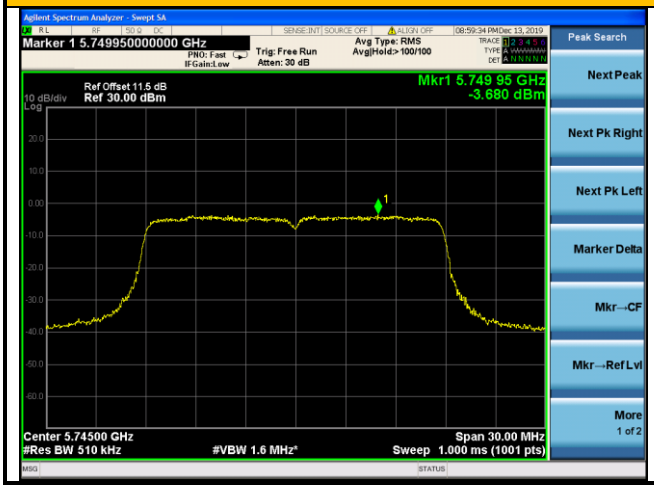
IEEE 802.11n20	
Chain 0	Chain 1
Channel 36	
	
Channel 149	
	

7 Radiated Emissions

Test result: Pass

7.1 Limit

The radiated emissions which fall in the restricted bands, and the radiated emissions below 1GHz, must comply with the radiated emission limits specified showed as below:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

The radiated emissions which fall outside the restrict bands, should comply with the EIRP limit as

below: For transmitters operating in the 5.15 - 5.25 / 5.25 - 5.35 / 5.47 - 5.725GHz band:

Frequency (MHz)	EIRP Limit (dBm)	Equivalent Field Strength (3m) (dBµV/m)
<5150	-27	68.20
>5350		
<5470		
>5725		

For transmitters operating in the 5.725 - 5.85GHz band:

Frequency (MHz)	EIRP Limit (dBm/MHz)	Equivalent Field Strength (3m) (dBµV/m)
<5650	-27	68.20
5650 ~ 5700	-27 ~ 10	68.20 ~ 105.20
5700 ~ 5720	10 ~ 15.6	105.20 ~ 110.80
5720 ~ 5725	15.6 ~ 27	110.80 ~ 122.20
5850 ~ 5855	27 ~ 15.6	122.20 ~ 110.80
5855 ~ 5875	15.6 ~ 10	110.80 ~ 105.20
5875 ~ 5925	10 ~ -27	105.20 ~ 68.20
>5925	-27	68.20

7.2 Measurement Procedure

For Radiated emission below 30MHz:

a) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c) Both X and Y axes of the antenna are set to make the measurement.
d) For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e) The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz:

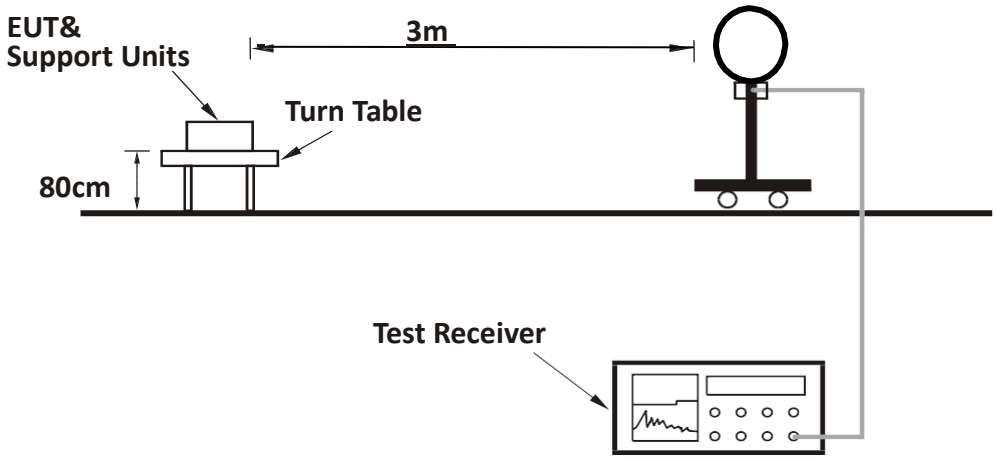
a) The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c) The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
f) The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

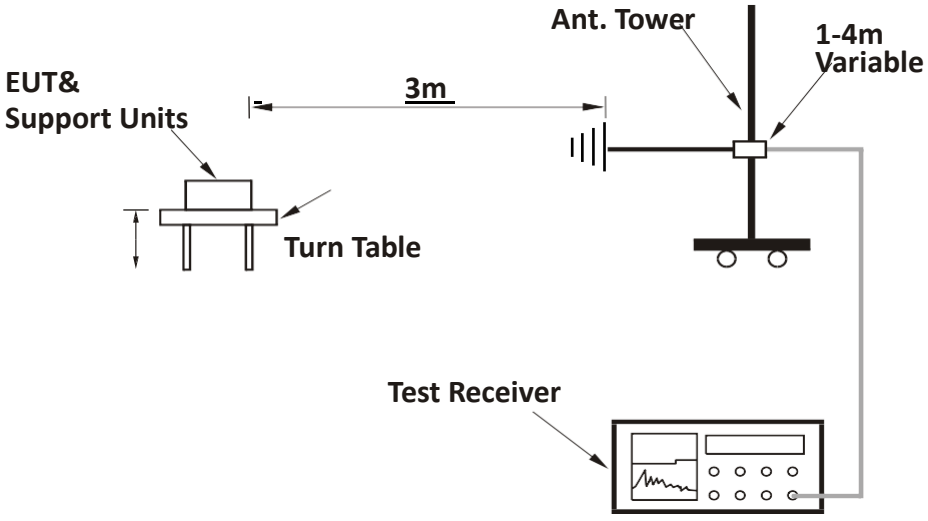
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 3 x RBW (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported

7.3 Test Configuration

For Radiated emission below 30MHz:

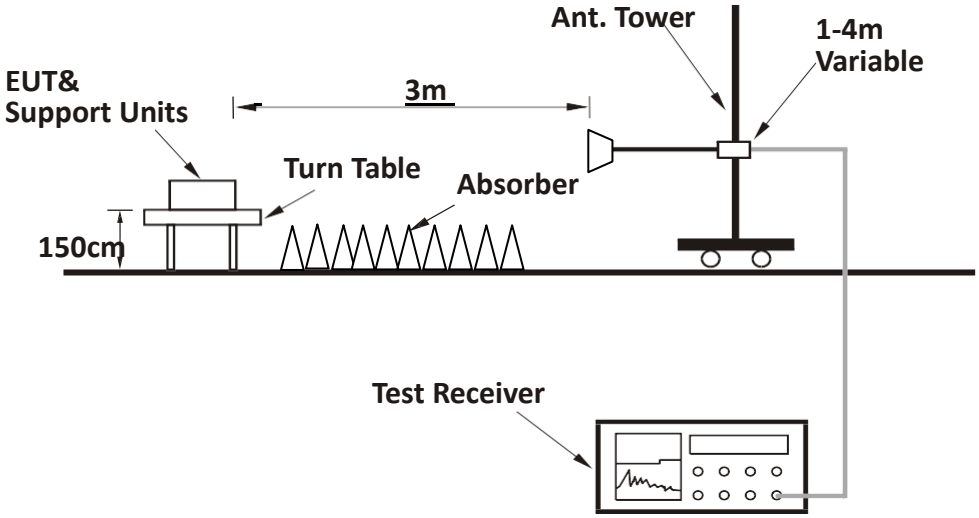


For Radiated emission 30MHz to 1GHz:



TEST REPORT

For Radiated emission above 1GHz:

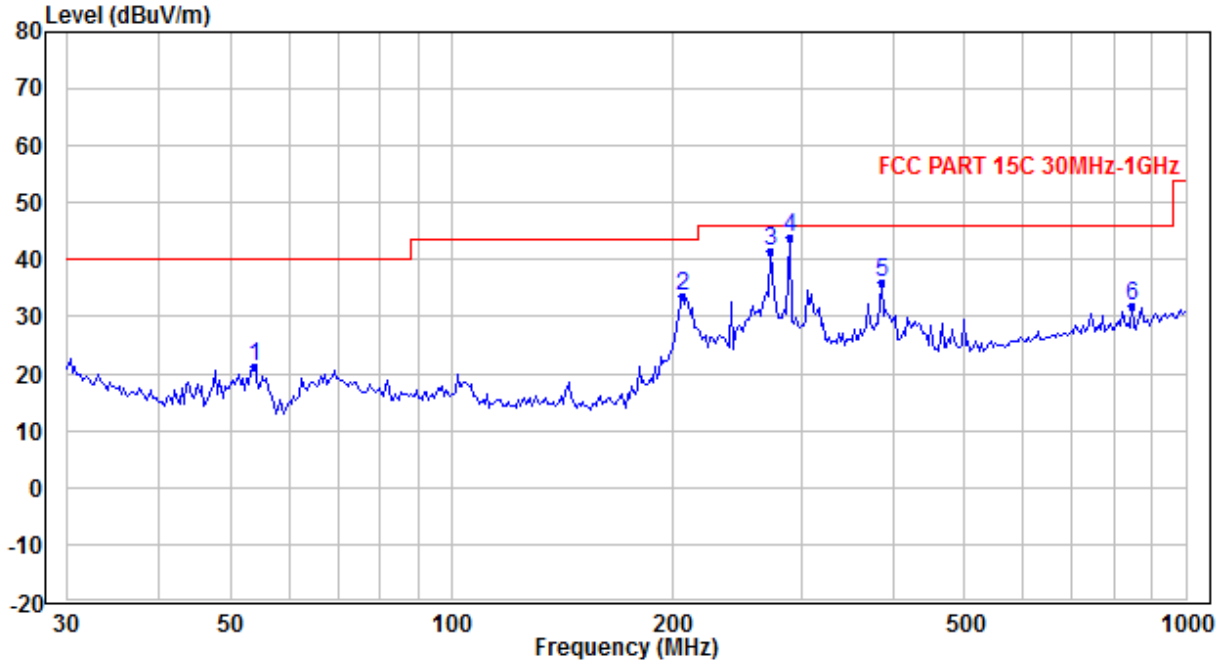


TEST REPORT

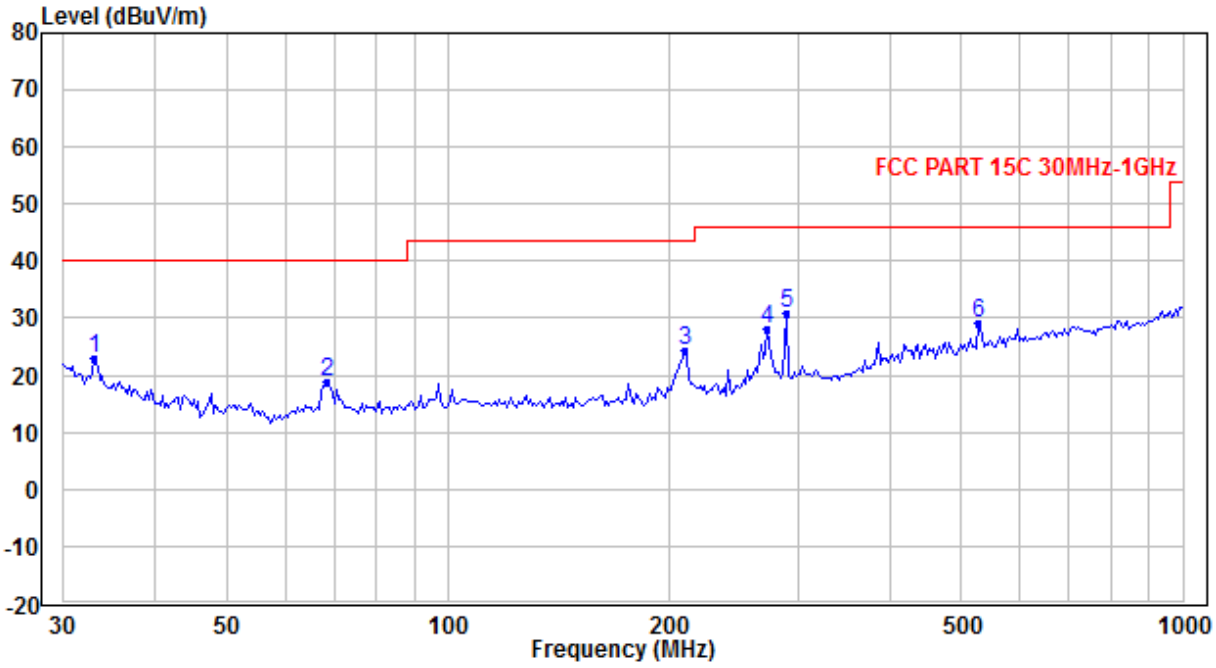
7.4 Test Results of Radiated Emissions

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

The worst waveform from 30MHz to 1000MHz is listed as below:



Horizontal



Vertical

TEST REPORT

Test data below 1GHz

Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	53.756	21.07	-15.38	40.00	18.93	PK
H	205.746	33.49	-10.19	43.50	10.01	PK
H	272.525	41.67	-6.91	46.00	4.33	PK
H	288.284	43.79	-6.57	46.00	2.21	PK
H	384.545	36.18	-4.60	46.00	9.82	PK
H	844.803	31.94	3.17	46.00	14.06	PK
V	33.101	22.80	-8.38	40.00	17.20	PK
V	68.264	18.94	-13.66	40.00	21.06	PK
V	210.129	24.38	-10.58	43.50	19.12	PK
V	272.525	28.15	-6.91	46.00	17.85	PK
V	288.284	30.93	-6.57	46.00	15.07	PK
V	527.571	28.98	-1.27	46.00	17.02	PK

Test result above 1GHz:

The emission was conducted from 1GHz to 40GHz

MIMO_ Chain 0+1_IEEE 802.11a_Channel 36						
Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	10360.00	51.99	11.11	74.00	22.01	PK
H	15540.00	51.69	10.76	74.00	22.31	PK
V	10360.00	53.86	9.39	74.00	20.14	PK
V	15540.00	52.59	11.59	74.00	21.41	PK

MIMO_ Chain 0+1_IEEE 802.11a_Channel 149						
Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	11490.00	51.77	9.78	74.00	22.23	PK
H	17235.00	54.22	13.98	74.00	19.78	PK
H	17235.00	41.80	13.98	54.00	12.20	AV
V	11490.00	51.38	8.27	74.00	22.62	PK
V	17235.00	53.39	13.24	74.00	20.61	PK

MIMO_ Chain 0+1_IEEE 802.11n-HT20_Channel 36						
Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	10360.00	51.77	9.39	74.00	22.23	PK
H	15540.00	49.05	11.59	74.00	24.95	PK
V	10360.00	46.59	9.39	74.00	27.41	PK
V	15540.00	50.04	11.59	74.00	23.96	PK

MIMO_ Chain 0+1_IEEE 802.11 n-HT20_Channel 149						
Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	11490.00	51.62	11.11	74.00	22.38	PK
H	17235.00	53.28	10.76	74.00	20.72	PK
V	11490.00	49.05	8.27	74.00	24.95	PK
V	17235.00	53.28	13.24	74.00	20.72	PK

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.
2. Corrected Reading = Original Receiver Reading + Correct Factor
3. Margin = Limit - Corrected Reading
4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

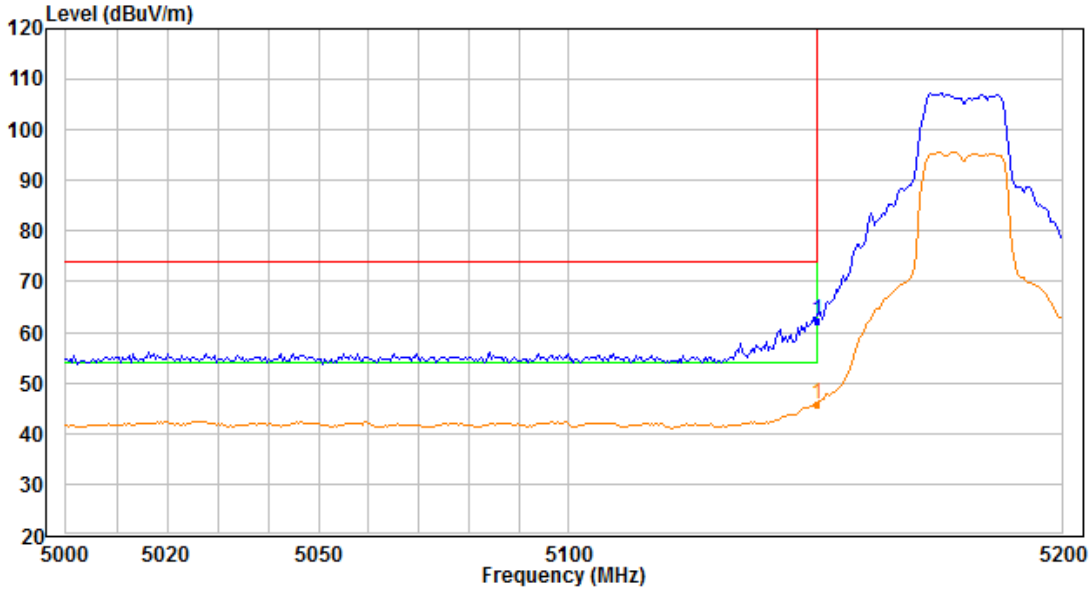
Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV,
Limit = 40.00dBuV/m.
Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;
Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m;
Margin = 40.00dBuV/m - 10.20dBuV/m = 29.80dB.

TEST REPORT

Band Edge Measurements (Radiated)

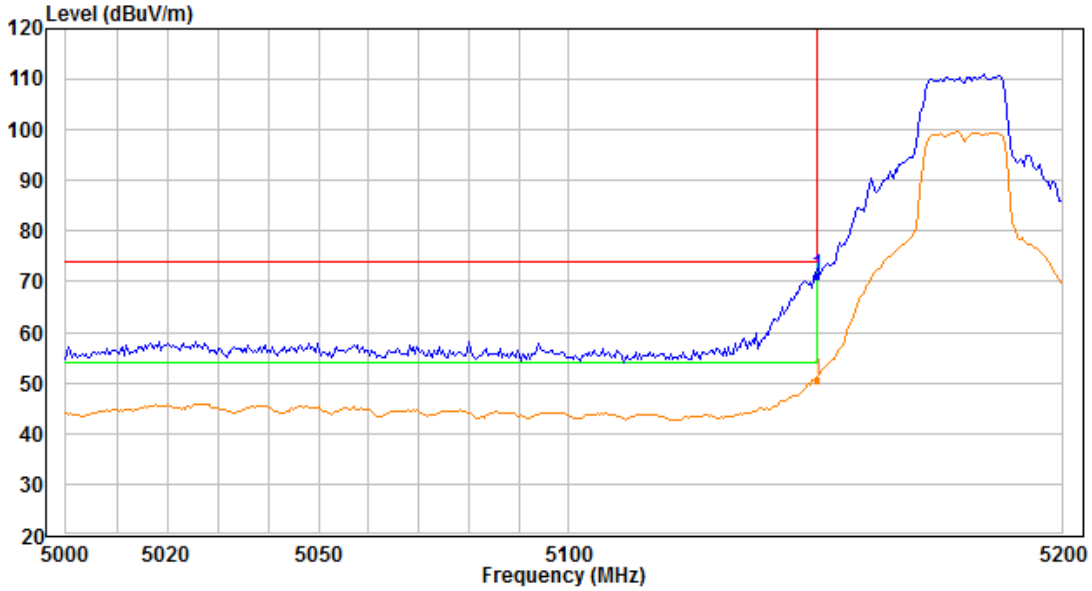
MIMO_IEEE 802.11a

Test Channel:	Channel 36	Ant. Polar. :	Horizontal



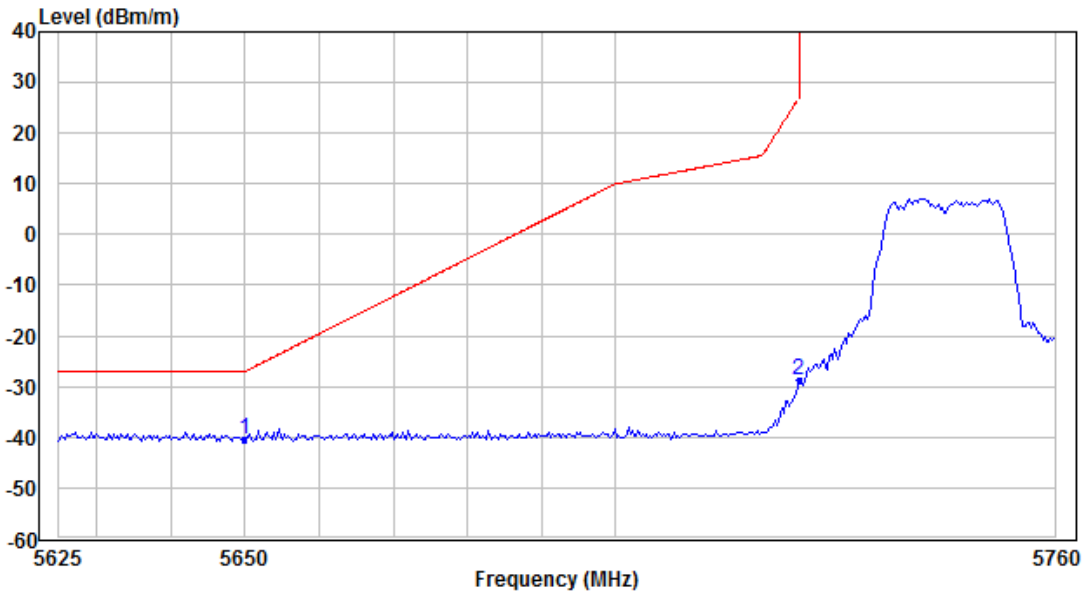
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5150.0000	62.28	74.00	45.84	54.00	Pass

Test Channel:	Channel 36	Ant. Polar. :	Vertical



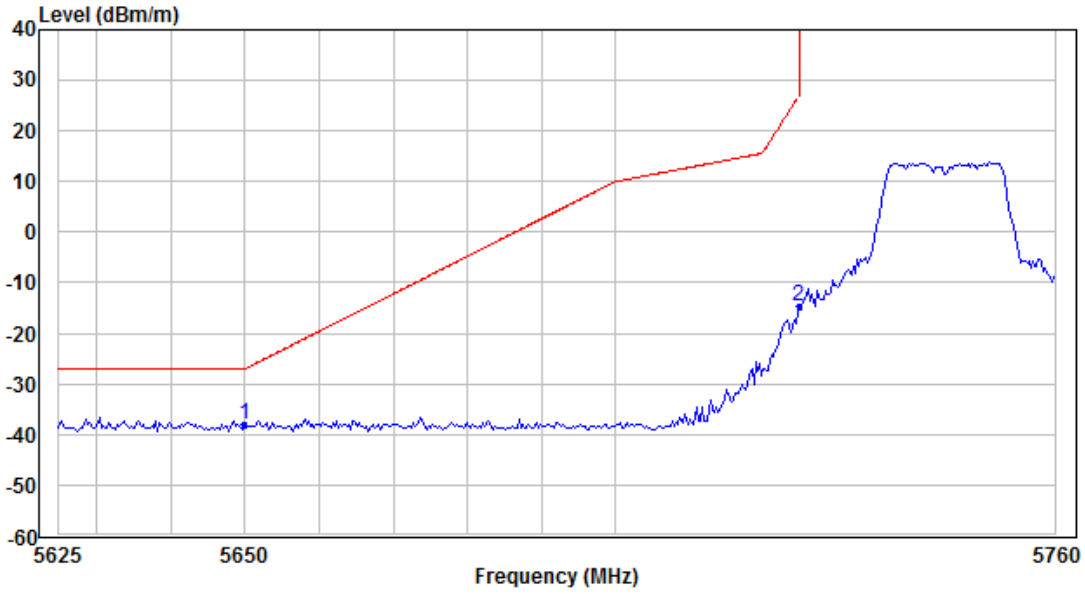
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5150.0000	71.31	74.00	50.75	54.00	Pass

Test Channel:	Channel 149	Ant. Polar. :	Horizontal



Frequency (MHz)	Peak level (dBm)	Peak Limit (dBm)	Conclusion
5650.0000	-40.51	-27.00	Pass
5725.0000	-28..84	26.97	Pass

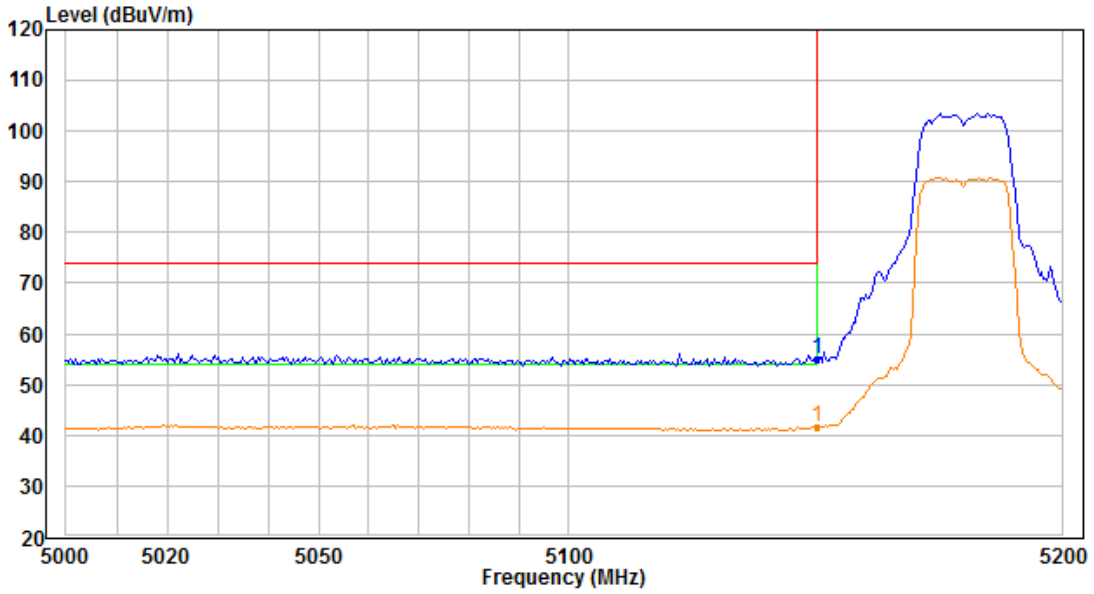
Test Channel:	Channel 149	Ant. Polar. :	Vertical



Frequency (MHz)	Peak level (dBm)	Peak Limit (dBm)	Conclusion
5650.0000	-38.02	-27.00	Pass
5725.0000	-14.81	26.97	Pass

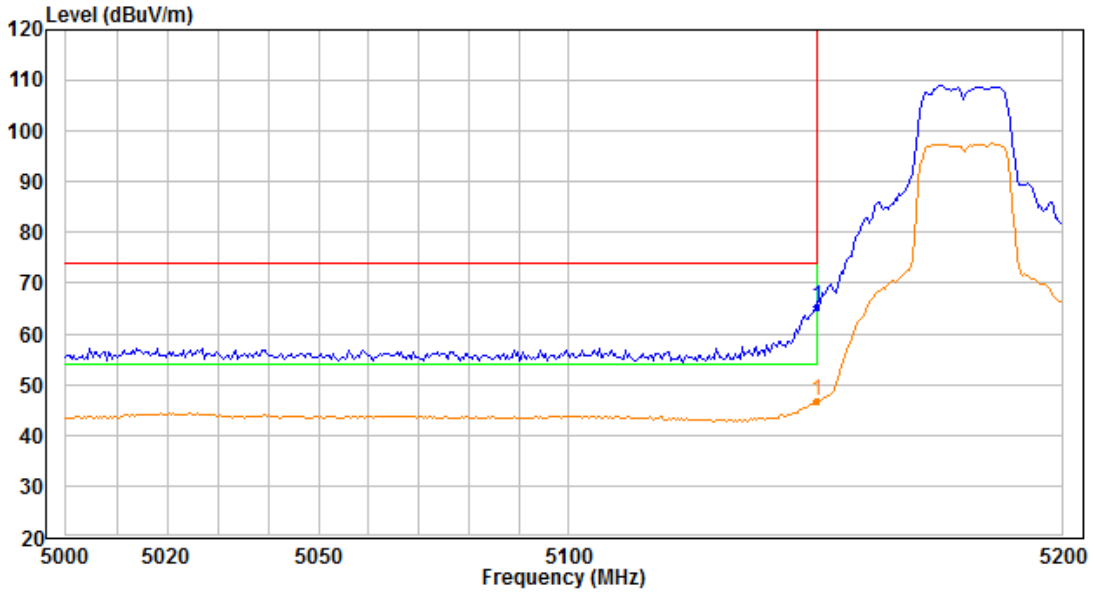
MIMO_IEEE 802.11n-HT20

Test Channel:	Channel 36	Ant. Polar. :	Horizontal



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5150.0000	54.92	74.00	41.51	54.00	Pass

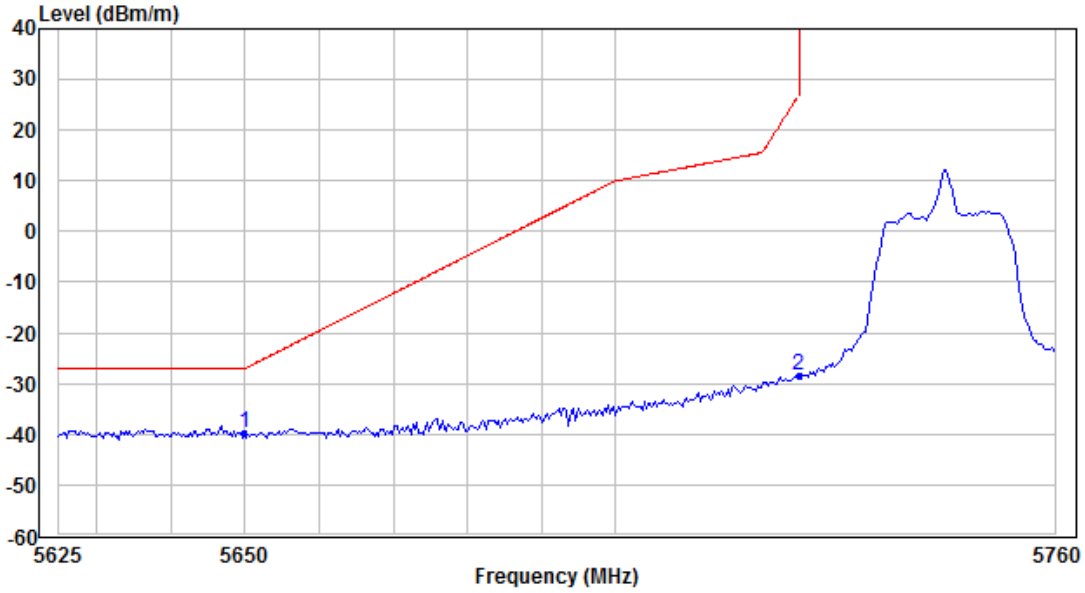
Test Channel:	Channel 36	Ant. Polar. :	Vertical



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5150.0000	65.30	74.00	46.88	54.00	Pass

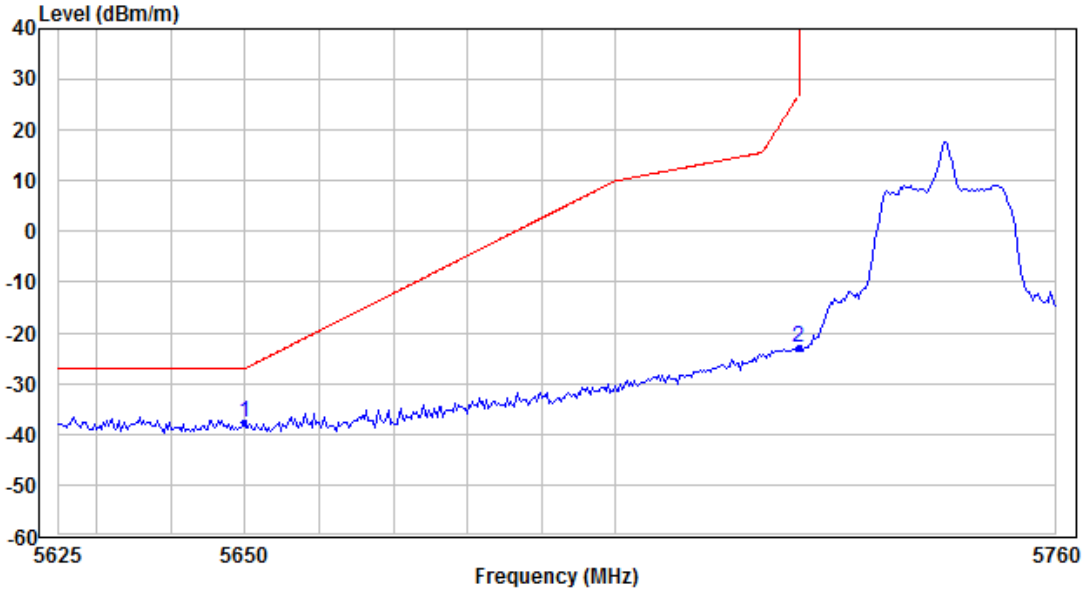
TEST REPORT

Test Channel:	Channel 149	Ant. Polar. :	Horizontal



Frequency (MHz)	Peak level (dBm)	Peak Limit (dBm)	Conclusion
5650.0000	-39.69	-27.00	Pass
5725.0000	-28.32	26.97	Pass

Test Channel:	Channel 149	Ant. Polar. :	Vertical



Frequency (MHz)	Peak level (dBm)	Peak Limit (dBm)	Conclusion
5650.0000	-37.81	-27.00	Pass
5725.0000	-23.05	26.97	Pass

8 Antenna requirement

Requirement:
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.

Result:
EUT uses used a permanently attached antenna to the intentional radiator, so it can comply with the provisions of this section.

Appendix I: Photograph of test setup

Refer to Appendix for Photograph of test setup

Appendix II: Photograph of equipment under test

Refer to Appendix for EUT external and internal photographs.

********** END **********