

TEST REPORT

Applicant: Franklin Technology
Address: 906 JEI Platz, 186, Gasan digital1-ro, Geumcheon-gu, Seoul 08502 Korea
Equipment Type: M2M Box
Model Name: RT410S
Brand Name: N/A
FCC ID: XHG-RT410S
Test Standard: 47 CFR Part 15 Subpart E
(refer to section 3.1)
Sample Arrival Date: Feb. 12, 2025
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ISSUED BY:

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Revision History

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Mar. 12, 2025</u>	<u>Initial Issue</u>

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1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shanghai Tejet Communications Technology Co., Ltd. Testing Center
Address	1st to 2nd floors, Building 1, No. 222 Xuanlan Road, Xuanqiao Town, Pudong New District, Shanghai

1.2 Test Location

Name	Shanghai Tejet Communications Technology Co., Ltd. Testing Center
Location	1st to 2nd floors, Building 1, No. 222 Xuanlan Road, Xuanqiao Town, Pudong New District, Shanghai
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1352.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Franklin Technology
Address	906 JEI Platz, 186, Gasan digital1-ro, Geumcheon-gu, Seoul 08502 Korea

2.2 Manufacturer Information

Manufacturer	Franklin Technology
Address	906 JEI Platz, 186, Gasan digital1-ro, Geumcheon-gu, Seoul 08502 Korea

2.3 General Description for Equipment under Test (EUT)

EUT Name	M2M Box
Model Name Under Test	RT410S
Series Model Name	N/A
Description of Model name differentiation	N/A
Sample Number	SC-SH2520006-S02 SC-SH2520006-S04
Hardware Version	P2
Software Version	RT41021.TO.3305
Dimensions (Approx.)	L:131.9mm* W:64mm* H:19.5mm*
Weight (Approx.)	N/A

2.4 Technical Information

Network and Wireless connectivity	3G Network WCDMA/HSDPA/HSUPA Band 2/4/5 4G Network LTE FDD Band 2/4/5/12/25/26/66 TDD Band 41 2.4G WIFI 802.11b, 802.11g, 802.11n(HT20) 5G WIFI 802.11n(HT20/40), 802.11ac(VHT20/40/80)
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The requirement for the following technical information of the EUT was tested in this report:

Frequency Range	U-NII-1: 5150 MHz to 5250 MHz, U-NII-3: 5725 MHz to 5850 MHz
Modulation technology	OFDM
Modulation Type	256QAM, 64QAM, 16QAM, BPSK
Transfer Rate (Mbps) (Single RF path)	802.11n: up to 150 Mbps 802.11ac: up to VHT-MCS9
Channel Bandwidth	802.11n: 20 MHz, 40 MHz 802.11ac: 20 MHz, 40 MHz, 80 MHz
Maximum Output Power	U-NII-1: 19.96 dBm U-NII-3: 18.68 dBm
Antenna System (eg., MIMO, Smart Antenna)	N/A
Categorization as Correlated or Completely Uncorrelated	N/A
Antenna Type	PCB Antenna
Antenna Gain	U-NII-1: 5150 MHz to 5250 MHz: -2.02 dBi U-NII-3: 5725 MHz to 5850 MHz: -2.31 dBi
About the Product	The equipment is M2M Box, intended for used with information technology equipment.

2.5 Channel List

20 MHz		40 MHz		80 MHz	
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
36	5180	38	5190	42	5210
40	5200	46	5230	155	5775
44	5220	151	5755		
48	5240	159	5795		
149	5745				
153	5765				
157	5785				
161	5805				
165	5825				

The Lowest frequency, the middle frequency and the highest frequency of channel were selected to perform the test, and the selected channel see below:

For 802.11n(HT20)/ac(VHT20)

U-NII-1 (5150 - 5250 MHz)			U-NII-3 (5725 - 5850 MHz)		
Channel Number	Channel	Frequency (MHz)	Channel Number	Channel	Frequency (MHz)
36	Low	5180	149	Low	5745
44	Mid	5220	157	Mid	5785
48	High	5240	165	High	5825

For 802.11n(HT40)/ac(VHT40)

U-NII-1 (5150 - 5250 MHz)			U-NII-3 (5725 - 5850 MHz)		
Channel Number	Channel	Frequency (MHz)	Channel Number	Channel	Frequency (MHz)
38	Low	5190	151	Low	5755
46	High	5230	159	High	5795

For 802.11ac(VHT80)

U-NII-1 (5150 - 5250 MHz)			U-NII-3 (5725 - 5850 MHz)		
Channel Number	Channel	Frequency (MHz)	Channel Number	Channel	Frequency (MHz)
42	Mid	5210	155	Mid	5775

Note: Preliminary tests were performed in different data rate in above table to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Modulation Type	U-NII-1	U-NII-3
				Channel	Channel
RF Output Power	11n(20 MHz)	6.5	BPSK	48/44/36	165/157/149
	11n(40 MHz)	13.5		46/38	159/151
	11ac(20 MHz)	6.5		48/44/36	165/157/149
	11ac(40 MHz)	13.5		46/38	159/151
	11ac(80 MHz)	29.3		42	155
Emission Bandwidth & 99% Occupied Bandwidth	11n(20 MHz)	6.5	BPSK	48/44/36	165/157/149
	11n(40 MHz)	13.5		46/38	159/151
	11ac(20 MHz)	6.5		48/44/36	165/157/149
	11ac(40 MHz)	13.5		46/38	159/151
	11ac(80 MHz)	29.3		42	155
6 dB bandwidth	11n(20 MHz)	6.5	BPSK	N/A	165/157/149
	11n(40 MHz)	13.5		N/A	159/151
	11ac(20 MHz)	6.5		N/A	165/157/149
	11ac(40 MHz)	13.5		N/A	159/151
	11ac(80 MHz)	29.3		N/A	155
Power Spectral Density	11n(20 MHz)	6.5	BPSK	48/44/36	165/157/149
	11n(40 MHz)	13.5		46/38	159/151
	11ac(20 MHz)	6.5		48/44/36	165/157/149
	11ac(40 MHz)	13.5		46/38	159/151
	11ac(80 MHz)	29.3		42	155
Radiated Spurious Emissions	11n(20 MHz)	6.5	BPSK	48/44/36	165/157/149
	11n(40 MHz)	13.5		46/38	159/151
	11ac(20 MHz)	6.5		48/44/36	165/157/149
	11ac(40 MHz)	13.5		46/38	159/151
	11ac(80 MHz)	29.3		42	155
Band Edge (Restricted-band)	11n(20 MHz)	6.5	BPSK	48/36	165/149
	11n(40 MHz)	13.5		46/38	159/151
	11ac(20 MHz)	6.5		48/36	165/149
	11ac(40 MHz)	13.5		46/38	159/151
	11ac(80 MHz)	29.3		42	155

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15 Subpart E	Unlicensed National Information Infrastructure Devices
2	KDB Publication 789033 D02v02r01	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E
3	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

3.2 Test Verdict

No.	Description	FCC Part No.	RSS Part No.	Test Result	Verdict
1	Antenna Requirement	15.203	RSS-247, 6.2	--	Pass ^{Note1}
2	RF Output Power	15.407(a)	RSS-247, 6.2	ANNEX A.1	Pass
3	Emission Bandwidth & 99% Occupied Bandwidth	15.407(a)	RSS-247, 6.2	ANNEX A.2	Pass
4	6 dB bandwidth	15.407(e)	RSS-247, 6.2	ANNEX A.3	Pass
5	Power Spectral Density	15.407(a)	RSS-247, 6.2	ANNEX A.4	Pass
6	Conducted Emission	15.207	RSS-GEN, 8.8	ANNEX A.5	Pass
7	Radiated Spurious Emissions and Band Edge (Restricted-band)	15.407(b)	RSS-247, 6.2	ANNEX A.6	Pass

Note ¹: The EUT has a permanently and irreplaceable attached antenna, which complies with the requirement FCC 15.203.

Note ²: Only radio communication receivers operating in stand-alone mode within the U-NII-30-960 MHz, as well as scanner receivers, are subject to Industry Canada requirements, so this test is not applicable.

Note ³: Under all normal operating conditions specified in the user manual, frequency stability can keep radiation within the operating frequency band.

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

During the measurement, the normal environmental conditions were within the listed ranges:

Relative Humidity	53% to 59%	
Atmospheric Pressure	101 kPa	
Temperature	NT (Normal Temperature)	+23.1°C to +23.9°C
Working Voltage of the EUT	NV (Normal Voltage)	5.0 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	KEYSIGHT	N9020A	MY54420147	2025.02.12	2026.02.11
Spectrum Analyzer	KEYSIGHT	N9010B	MY60240977	2025.02.12	2026.02.11
Signal Generator	Anritsu	MG3710E	6262063515	2025.02.12	2026.02.11
Wideband Radio Communication Tester	R&S	CMW500	168792	2025.02.11	2026.02.10
EMI Receiver	KEYSIGHT	N9038A	MY55330122	2024.07.09	2025.07.08
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-177	2024.03.11	2027.03.10
Test Antenna-Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	9163-1203	2024.03.11	2027.03.10
Test Antenna-Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	9120D-2134	2024.03.11	2027.03.10
Test Antenna-Horn (18-40 GHz)	A-INFO	LB-180400-KF	J211060307	2024.03.11	2027.03.10
Anechoic Chamber	YiHeng	9m*6m*6m	EMC001	2024.04.18	2027.04.17
EMI Receiver	KEYSIGHT	N9038A	MY55330115	2025.02.12	2026.02.11
LISN	SCHWARZBECK	NSLK 8127	8127-940	2025.02.11	2026.02.10
10dB Limiter	SCHWARZBECK	VTSD 9561-F	9561-F N00409	2025.02.11	2026.02.10
Shielded Room	YiHeng	5m*4m*3.2 m	EMC006	2024.02.22	2027.02.21

4.3 Test Software List

Description	Manufacturer	Software Version	Serial No.	Applicable Test Setup
BL410R	BALUN	V2.1.1.496	N/A	The section 4.6.1
BL410E	BALUN	V21.919	N/A	The section 4.6.2&4.6.3&4.6.4&4.6.5

4.4 Decision Rule

☐ No Need

☒ Use General conformity decision rule (Consider uncertainty or not ☒No ☐Yes)

☐ Use Special Conformity Decision Rule (Consider uncertainty or not ☐No ☐Yes)

4.5 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

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

Parameters	Uncertainty
Occupied Channel Bandwidth	2.4 %
RF output power, conducted	0.41 dB
Power Spectral Density, conducted	1.73 dB
Unwanted Emissions, conducted	1.73 dB
All emissions, radiated	4.57 dB
Temperature	0.82 °C
Humidity	4.1 %

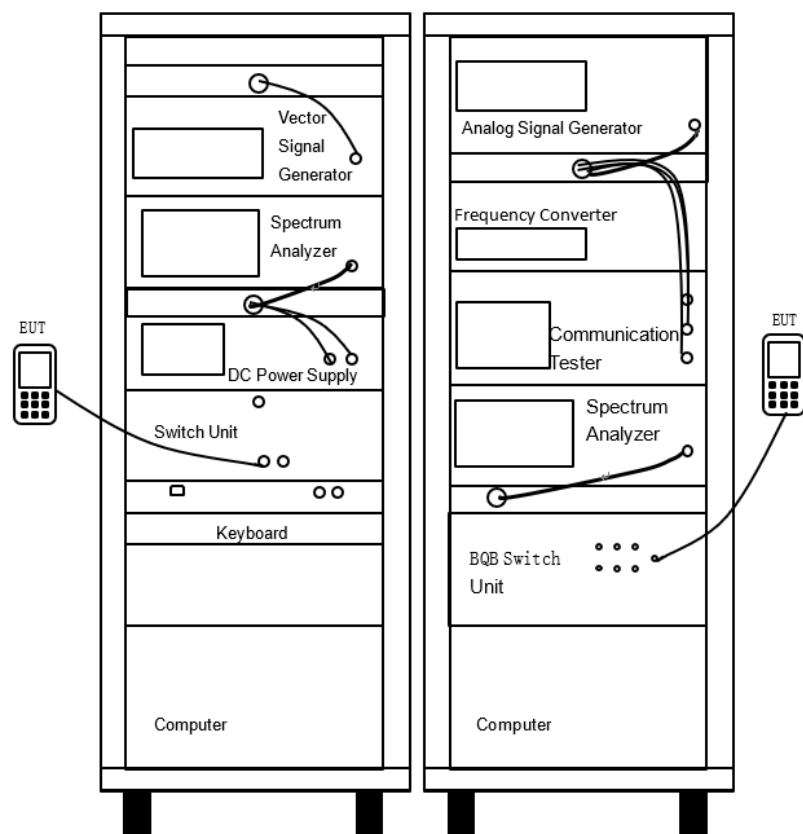
4.6 Description of Test Setup

4.6.1 For Antenna Port Test

Conducted value (dBm) = Measurement value (dBm) + cable loss (dB)

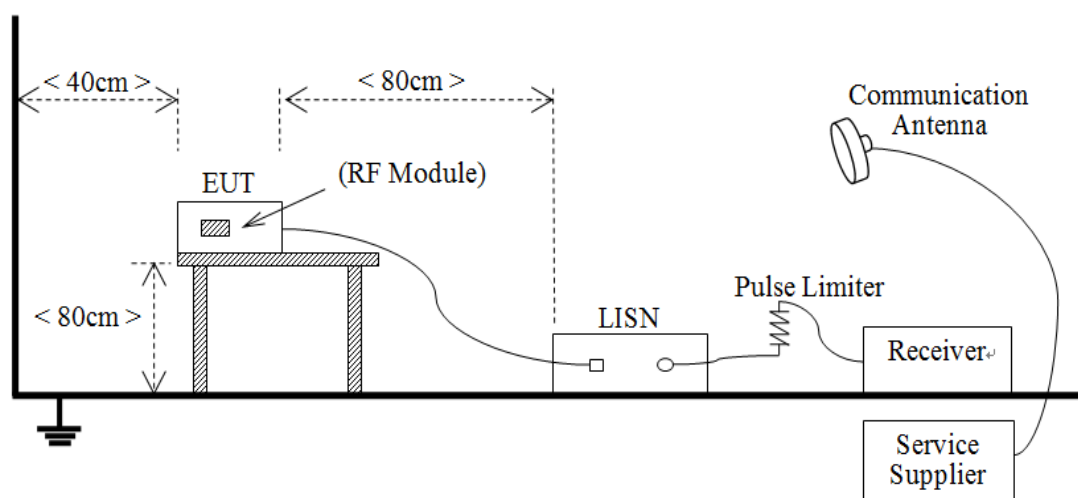
For example: the measurement value is 10 dBm and the cable 0.5 dB used, then the final result of EUT:

Conducted value (dBm) = 10 dBm + 0.5 dB = 10.5 dBm



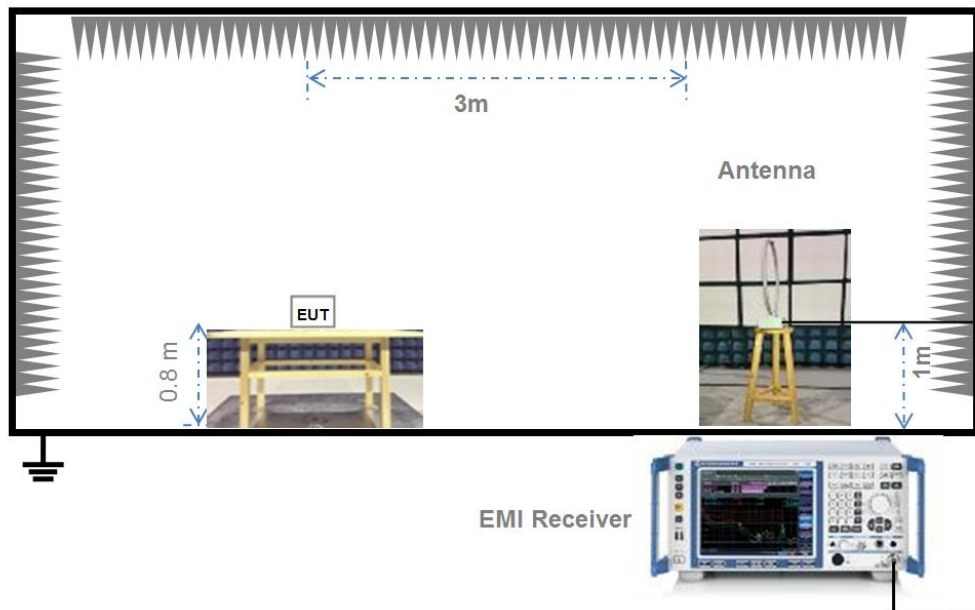
(Diagram 1)

4.6.2 For AC Power Supply Port Test



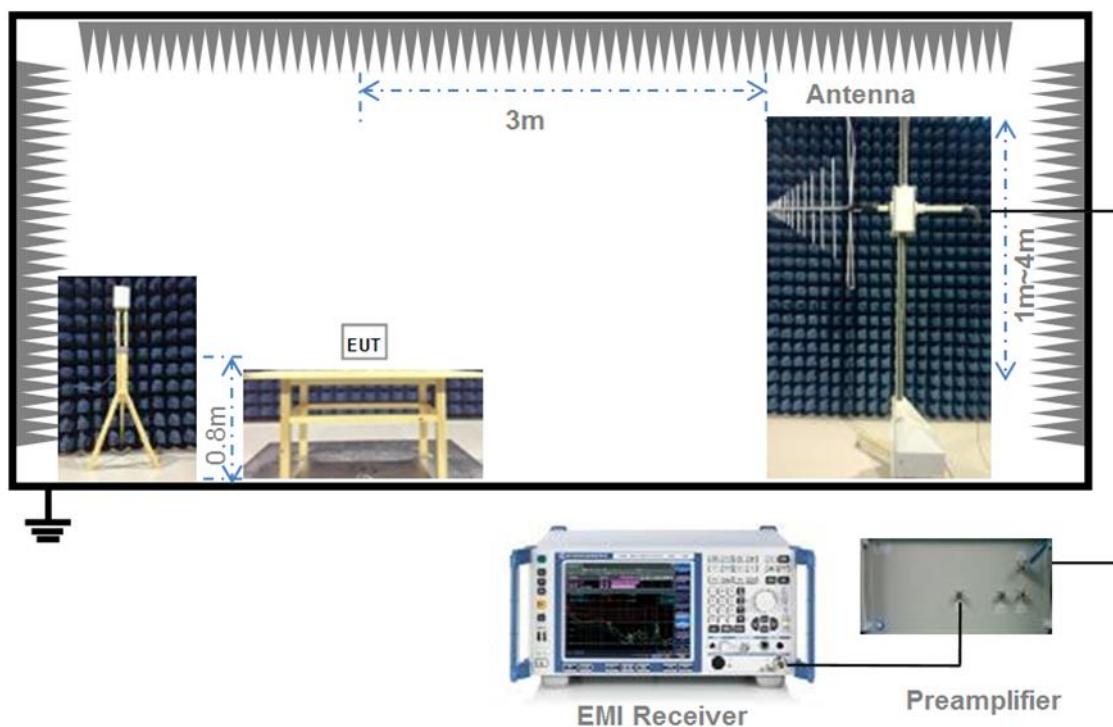
(Diagram 2)

4.6.3 For Radiated Test (Below 30 MHz)



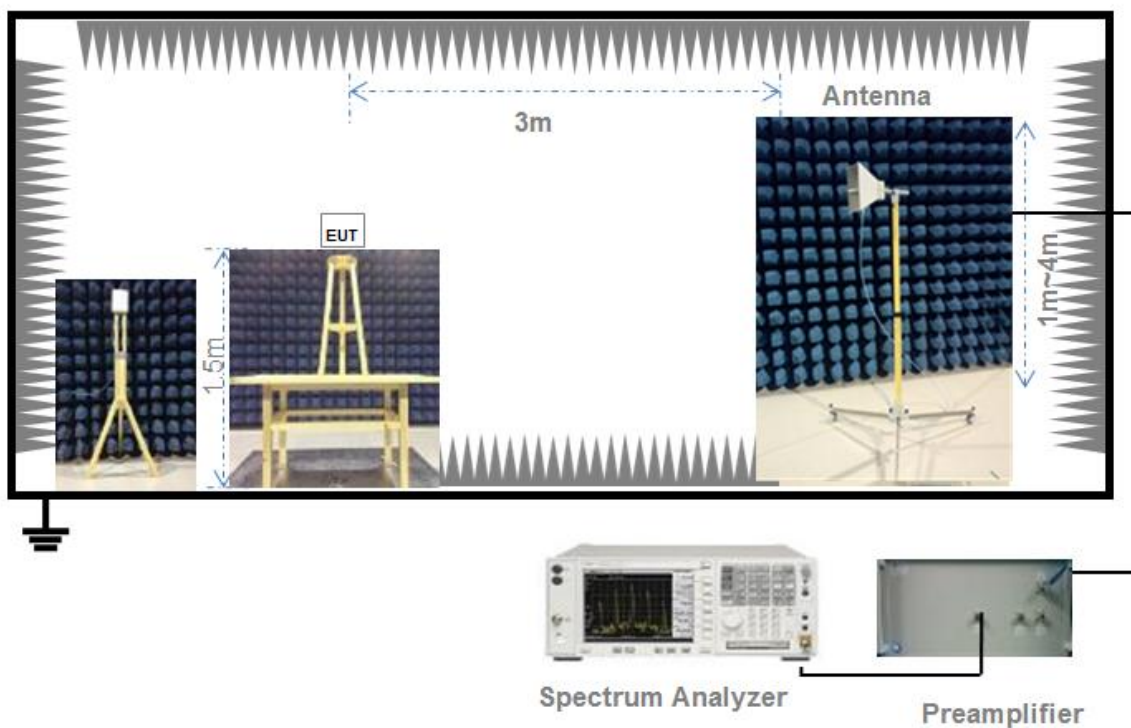
(Diagram 3)

4.6.4 For Radiated Test (30 MHz-1 GHz)



(Diagram 4)

4.6.5 For Radiated Test (Above 1 GHz)



(Diagram 5)

5 TEST ITEMS

5.1 RF Output Power

5.1.1 Test Limit

FCC §15.407(a)

The maximum conducted output power should not exceed:

Frequency Band (MHz)	Limit
5150-5250	250 mW
5250-5350	250 mW or 11 dBm + 10log B, whichever is less.
5470-5725	250 mW or 11 dBm + 10log B, whichever is less.
5725-5850	1 W
Note: Where "B" is the 26 dB emissions bandwidth in MHz.	

5.1.2 Test Setup

The section 4.6.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.1.3 Test Procedure

Maximum conducted (average) output power

a) 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.

- 1) The EUT is configured to transmit continuously or to transmit with a constant duty cycle.
- 2) At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.
- 3) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
- b) If the transmitter does not transmit continuously, measure the duty cycle (x) of the transmitter output signal.
- c) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
- d) Adjust the measurement in dBm by adding 10 log (1/x) where x is the duty cycle.

Measurements of duty cycle

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal.

Set the center frequency of the instrument to the center frequency of the transmission.

Set RBW $\geq$ OBW if possible; otherwise, set RBW to the largest available value.

Set VBW $\geq$ RBW. Set detector = peak or average.

The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

The E.I.R.P used radiated test method. At a test site that has been validated using the procedures of ANSI C63.4 or the latest CISPR 16-1-4 for measurements above 1 GHz, so as to simulate a near free-space

environment.

5.1.4 Test Result

Please refer to ANNEX A.1.

5.2 Emission Bandwidth and 6 dB Bandwidth

5.2.1 Limit

FCC §15.407(a)

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

5.2.2 Test Setup

The test setup photo please refer to 4.6.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.2.3 Test Procedure

Emission bandwidth

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set VBW $\geq 3 \times$ RBW,
3. Detector = Peak.
4. Trace mode = Max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission.

Occupied Bandwidth

1. Set Span = 1.5 times to 5.0 times the OBW
2. Set RBW = 1% to 5% of the OBW.
3. Set VBW $\geq 3 \times$ RBW,
4. Detector = Peak.
5. Trace mode = Max hold.
6. Use the 99% power bandwidth function of the instrument.

6 dB bandwidth

1. Set RBW = 100 kHz, VBW = 300 kHz.
2. Detector = Peak.
3. Trace mode = Max hold.
4. Allow the trace to stabilize.
5. 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.

5.2.4 Test Result

Please refer to ANNEX A.2 and ANNEX A.3.

5.3 Power Spectral density (PSD)

5.3.1 Limit

FCC §15.407(a)

The maximum power spectral density should not exceed:

Frequency Band (MHz)	Limit
5150-5250	11 dBm/MHz
5250-5350	11 dBm/MHz
5470-5725	11 dBm/MHz
5725-5850	30 dBm/500kHz

5.3.2 Test Setup

The section 4.6.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.3.3 Test Procedure

Set the spectrum analyzer or EMI receiver span to view the entire emission bandwidth.

1. Set RBW = 510 kHz/1 MHz, VBW $\geq 3 \times$ RBW, Sweep time = Auto, Detector = RMS.
2. Allow the sweeps to continue until the trace stabilizes.
3. Use the peak marker function to determine the maximum amplitude level.
4. The E.I.R.P spectral density used radiated test method. At a test site that has been validated using the procedures of ANSI C63.4 or the latest CISPR 16-1-4 for measurements above 1 GHz, so as to simulate a near free-space environment.

5.3.4 Test Result

Please refer to ANNEX A.4.

5.4 Conducted Emission

5.4.1 Limit

FCC §15.207

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the U-NII-150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
0.50 - 30	60	50

5.4.2 Test Setup

The section 4.6.2 (Diagram 2) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.4.3 Test Procedure

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

5.4.4 Test Result

Please refer to ANNEX A.5.

5.5 Radiated Spurious Emissions and Band Edge (Restricted-band)

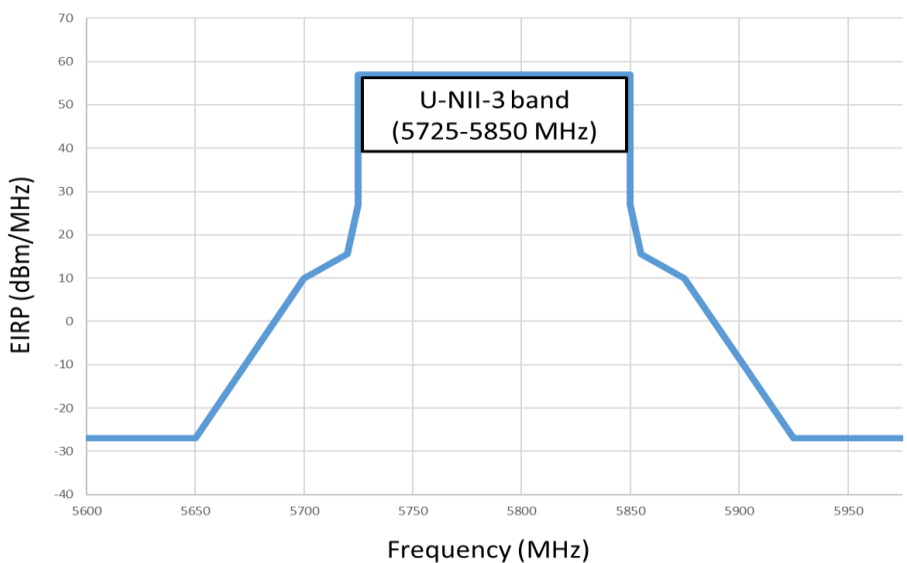
5.5.1 Limit

FCC §15.209 & 15.407(b)

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 - 0.490	$2400/F(\text{kHz})$	300
0.490 - 1.705	$24000/F(\text{kHz})$	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note ¹: The Limit for radiated test was performed according to FCC Part 15C

Note ²: The tighter limit applies at the band edge.

Un-restricted band emissions	
Out Operating Band (MHz)	Limit
5150 - 5250	e.i.r.p. -27 dBm (68.2 dBuV/m@3m)
5250 - 5350	e.i.r.p. -27 dBm (68.2 dBuV/m@3m)
5470 - 5725	e.i.r.p. -27 dBm (68.2 dBuV/m@3m)
5725 - 5850	All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. 

Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength.

5.5.2 Test Setup

The section 4.6.3-4.6.5 (Diagram 3 - Diagram 5) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.5.3 Test Procedure

Since the emission limits are specified in terms of radiated field strength levels, measurements performed to demonstrate compliance have traditionally relied on a radiated test configuration. Radiated measurements remain the principal method for demonstrating compliance to the specified limits; however antenna-port conducted measurements are also now acceptable to demonstrate compliance (see below for details). When radiated measurements are utilized, test site requirements and procedures for maximizing and measuring radiated emissions that are described in ANSI C63.10 shall be followed.

Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

General Procedure for conducted measurements in restricted bands

- a) Measure the conducted output power (in dBm) using the detector specified (see guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
- b) Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see guidance on determining the applicable antenna gain)
- c) Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).
- d) For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).
- e) Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:
$$E = \text{EIRP} - 20 \log D + 104.8$$
where:
E = electric field strength in dB μ V/m,
EIRP = equivalent isotropic radiated power in dBm
D = specified measurement distance in meters.
- f) Compare the resultant electric field strength level to the applicable limit.
- g) Perform radiated spurious emission test.

Quasi-Peak measurement procedure

The specifications for measurements using the CISPR quasi-peak detector can be found in Publication 16 of the International Special Committee on Radio Frequency Interference (CISPR) of the International Electrotechnical Commission.

As an alternative to CISPR quasi-peak measurement, compliance can be demonstrated to the applicable emission limits using a peak detector.

Peak power measurement procedure

Peak emission levels are measured by setting the instrument as follows:

- a) RBW = as specified in Table 1.
- b) VBW $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Sweep time = auto.
- e) Trace mode = max hold.
- f) Allow sweeps to continue until the trace stabilizes. (Note that the required measurement time may be longer for low duty cycle applications).

Table 1—RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

Trace averaging across on and off times of the EUT transmissions followed by duty cycle correction

If continuous transmission of the EUT (i.e., duty cycle ≥ 98 percent) cannot be achieved and the duty cycle is constant (i.e., duty cycle variations are less than ± 2 percent), then the following procedure shall be used:

- a) The EUT shall be configured to operate at the maximum achievable duty cycle.
- b) Measure the duty cycle, x , of the transmitter output signal as described in section 6.0.
- c) RBW = 1 MHz (unless otherwise specified).
- d) VBW $\geq 3 \times$ RBW.
- e) Detector = RMS, if $\text{span}/(\# \text{ of points in sweep}) \leq (\text{RBW}/2)$. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
- f) Averaging type = power (i.e., RMS).
 - 1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
 - 2) Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.
- g) Sweep time = auto.
- h) Perform a trace average of at least 100 traces.
- i) A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:
 - 1) If power averaging (RMS) mode was used in step f), then the applicable correction factor is $10 \log(1/x)$, where x is the duty cycle.
 - 2) If linear voltage averaging mode was used in step f), then the applicable correction factor is $20 \log(1/x)$, where x is the duty cycle.
 - 3) If a specific emission is demonstrated to be continuous (≥ 98 percent duty cycle) rather than turning on

and off with the transmit cycle, then no duty cycle correction is required for that emission.

NOTE: Reduction of the measured emission amplitude levels to account for operational duty factor is not permitted. Compliance is based on emission levels occurring during transmission - not on an average across on and off times of the transmitter.

Determining the applicable transmit antenna gain

A conducted power measurement will determine the maximum output power associated with a restricted band emission; however, in order to determine the associated EIRP level, the gain of the transmitting antenna (in dBi) must be added to the measured output power (in dBm).

Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.

See KDB 662911 for guidance on calculating the additional array gain term when determining the effective antenna gain for a EUT with multiple outputs occupying the same or overlapping frequency ranges in the same band.

Radiated spurious emission test

An additional consideration when performing conducted measurements of restricted band emissions is that unwanted emissions radiating from the EUT cabinet, control circuits, power leads, or intermediate circuit elements will likely go undetected in a conducted measurement configuration. To address this concern, a radiated test shall be performed to ensure that emissions emanating from the EUT cabinet (rather than the antenna port) also comply with the applicable limits.

For these cabinet radiated spurious emission measurements the EUT transmit antenna may be replaced with a termination matching the nominal impedance of the antenna. Procedures for performing radiated measurements are specified in ANSI C63.10. All detected emissions shall comply with the applicable limits.

The measurement frequency range is from 30 MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

5.5.4 Test Result

Please refer to ANNEX A.6.

ANNEX A TEST RESULT

A.1 RF Output Power

Note 1: For FCC standard, if transmitting antennas of directional gain greater than 6 dBi are used, all band maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note 2: All the configurations were tested, but only the worst data was shown in this report.

Note 3: The RF Output Power has considered the Duty Factor.

Duty Cycle

Test Mode	On Time (ms)	On+Off time (ms)	Duty Cycle
11n (HT20)	1.92	2.09	92.23%
11n (HT40)	0.93	1.04	90.22%
11ac (VHT20)	1.93	2.04	94.46%
11ac (VHT40)	0.95	1.10	86.40%
11ac (VHT80)	0.47	0.56	82.58%

Test Data

Conducted Power

U-NII-1 (5150 - 5250 MHz)					
Mode	Channel	Conducted Power (dBm)	Conducted Power (mW)	FCC Limit (mW)	Verdict
11n (HT20)	CH36	19.38	79.98	250	Pass
11n (HT20)	CH44	18.55	66.07	250	Pass
11n (HT20)	CH48	18.87	71.12	250	Pass
11n (HT40)	CH38	19.96	89.33	250	Pass
11n (HT40)	CH46	18.69	66.68	250	Pass
11ac (VHT20)	CH36	19.30	80.35	250	Pass
11ac (VHT20)	CH44	18.46	66.22	250	Pass
11ac (VHT20)	CH48	18.78	71.29	250	Pass
11ac (VHT40)	CH38	19.14	70.96	250	Pass
11ac (VHT40)	CH46	18.84	66.22	250	Pass
11ac (VHT80)	CH42	17.85	50.35	250	Pass

U-NII-3 (5725 - 5850 MHz)					
Mode	Channel	Conducted Power (dBm)	Conducted Power (mW)	FCC Limit (mW)	Verdict
11n (HT20)	CH149	17.91	57.02	1000	Pass
11n (HT20)	CH157	17.56	52.60	1000	Pass
11n (HT20)	CH165	17.25	48.98	1000	Pass
11n (HT40)	CH151	18.49	63.68	1000	Pass
11n (HT40)	CH159	17.96	56.36	1000	Pass
11ac (VHT20)	CH149	18.23	62.81	1000	Pass
11ac (VHT20)	CH157	17.54	53.58	1000	Pass
11ac (VHT20)	CH165	17.11	48.53	1000	Pass
11ac (VHT40)	CH151	18.68	63.83	1000	Pass
11ac (VHT40)	CH159	18.11	55.98	1000	Pass
11ac (VHT80)	CH155	17.63	47.86	1000	Pass

A.2 Emission Bandwidth & 99% Bandwidth

Note: Test plots please refer to the document "Annex No.: BL-SH2520085-602 Data Part 1.pdf".

Test Data

U-NII-1 (5150 - 5250 MHz)			
Mode	Channel	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
11n (HT20)	CH36	25.17	17.65
11n (HT20)	CH44	20.90	17.45
11n (HT20)	CH48	20.86	17.44
11n (HT40)	CH38	74.02	37.53
11n (HT40)	CH46	45.44	35.98
11ac (VHT20)	CH36	25.13	17.64
11ac (VHT20)	CH44	20.87	17.45
11ac (VHT20)	CH48	20.86	17.44
11ac (VHT40)	CH38	75.13	37.49
11ac (VHT40)	CH46	43.73	35.96
11ac (VHT80)	CH42	88.34	75.34

U-NII-3 (5725 - 5850 MHz)			
Mode	Channel	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
11n (HT20)	CH149	29.12	17.87
11n (HT20)	CH157	30.49	18.63
11n (HT20)	CH165	29.97	18.23
11n (HT40)	CH151	49.00	36.07
11n (HT40)	CH159	63.51	36.45
11ac (VHT20)	CH149	29.11	17.86
11ac (VHT20)	CH157	30.27	18.72
11ac (VHT20)	CH165	29.88	18.17
11ac (VHT40)	CH151	48.84	36.03
11ac (VHT40)	CH159	65.94	36.45
11ac (VHT80)	CH155	122.10	76.04

A.3 6 dB Bandwidth

Note: Test plots please refer to the document “Annex No.: BL-SH2520085-602 Data Part 2.pdf”.

Test Data

U-NII-3 (5725 - 5850 MHz)				
Mode	Channel	6 dB Bandwidth (MHz)	Limit (kHz)	Verdict
11n (HT20)	CH149	15.40	500.00	Pass
11n (HT20)	CH157	17.00	500.00	Pass
11n (HT20)	CH165	15.40	500.00	Pass
11n (HT40)	CH151	35.30	500.00	Pass
11n (HT40)	CH159	34.30	500.00	Pass
11ac (VHT20)	CH149	15.20	500.00	Pass
11ac (VHT20)	CH157	15.30	500.00	Pass
11ac (VHT20)	CH165	15.40	500.00	Pass
11ac (VHT40)	CH151	35.20	500.00	Pass
11ac (VHT40)	CH159	35.20	500.00	Pass
11ac (VHT80)	CH155	72.80	500.00	Pass

A.4 Power Spectral Density

Note ¹: Test plots please refer to the document “Annex No.: BL-SH2520085-602 Data Part 3.pdf”.

Note ²: The PSD has considered the Duty Factor.

Test Data

U-NII-1 (5150 - 5250 MHz)				
Mode	Channel	PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
11n (HT20)	CH36	7.98	11.00	Pass
11n (HT20)	CH44	7.62	11.00	Pass
11n (HT20)	CH48	7.70	11.00	Pass
11n (HT40)	CH38	5.83	11.00	Pass
11n (HT40)	CH46	4.73	11.00	Pass
11ac (VHT20)	CH36	8.03	11.00	Pass
11ac (VHT20)	CH44	7.53	11.00	Pass
11ac (VHT20)	CH48	7.72	11.00	Pass
11ac (VHT40)	CH38	4.77	11.00	Pass
11ac (VHT40)	CH46	4.74	11.00	Pass
11ac (VHT80)	CH42	0.60	11.00	Pass

U-NII-3 (5725 - 5850 MHz)				
Mode	Channel	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Verdict
11n (HT20)	CH149	3.71	30.00	Pass
11n (HT20)	CH157	2.91	30.00	Pass
11n (HT20)	CH165	3.27	30.00	Pass
11n (HT40)	CH151	1.81	30.00	Pass
11n (HT40)	CH159	0.91	30.00	Pass
11ac (VHT20)	CH149	3.48	30.00	Pass
11ac (VHT20)	CH157	3.18	30.00	Pass
11ac (VHT20)	CH165	2.62	30.00	Pass
11ac (VHT40)	CH151	2.14	30.00	Pass
11ac (VHT40)	CH159	1.22	30.00	Pass
11ac (VHT80)	CH155	-2.33	30.00	Pass

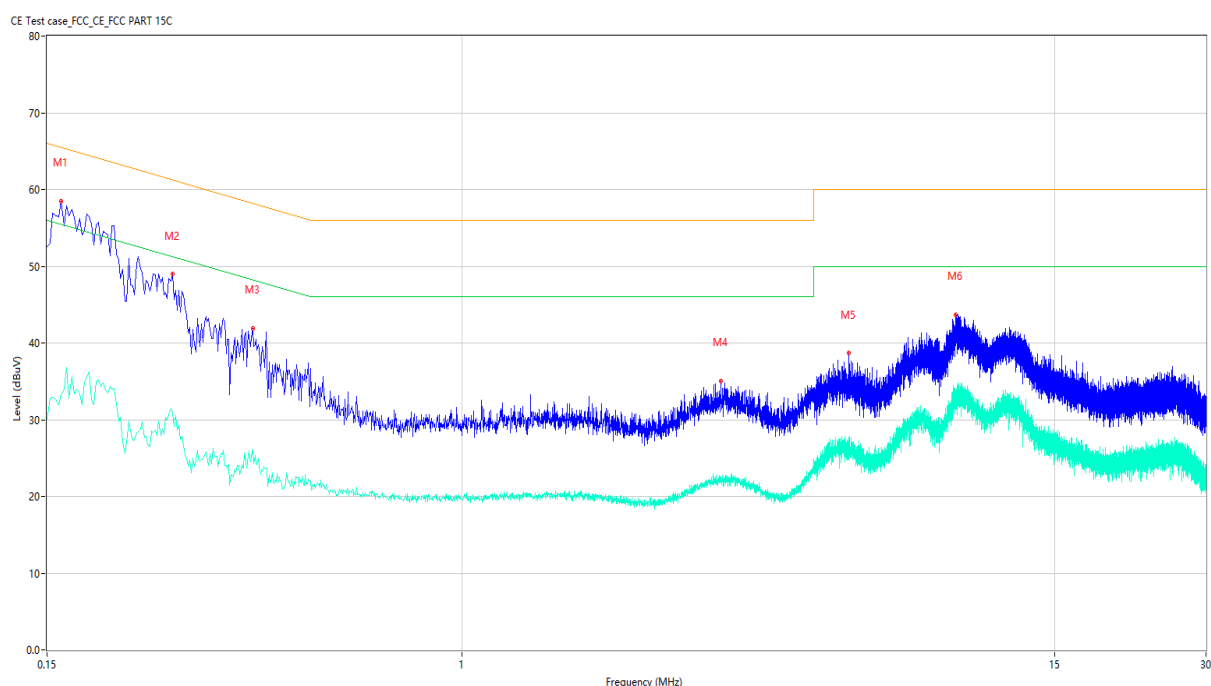
A.5 Conducted Emission

Note 1: The EUT is working in the Normal link mode. All modes have been tested and normal link mode is worst.

Note 2: Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 60 Hz and 240 VAC, 50 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration (120 VAC, 60 Hz) shown here.

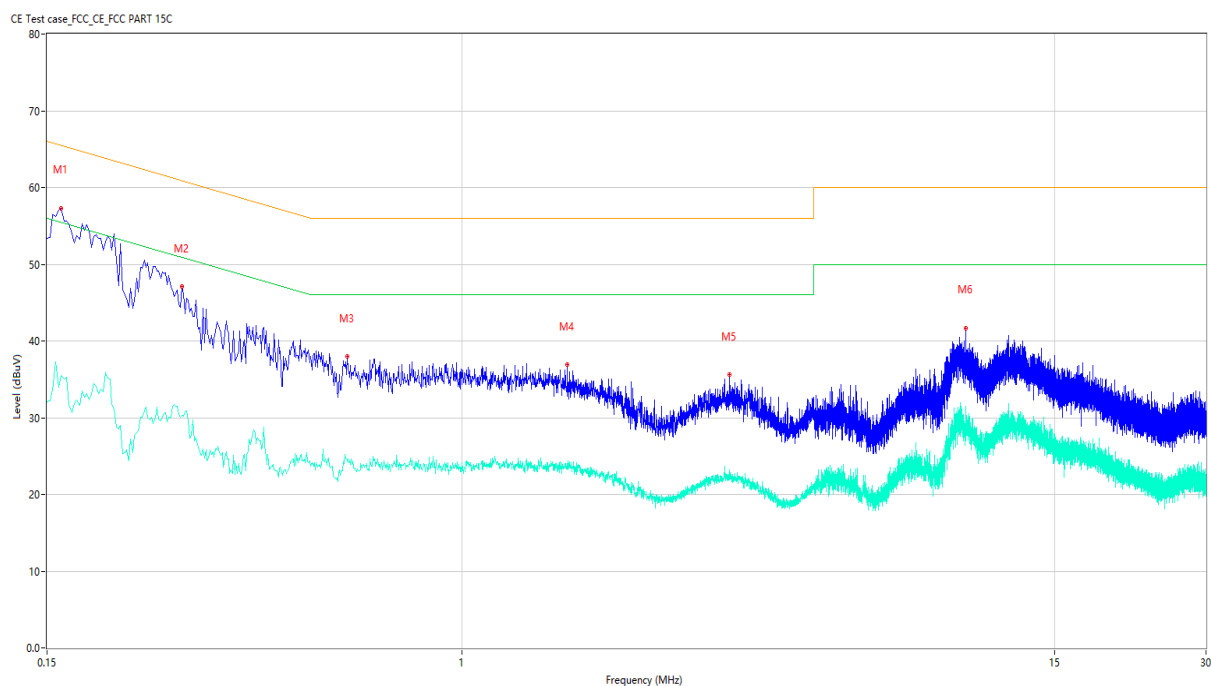
Test Data and Plots

PHASE L



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.160	58.52	9.75	65.46	6.94	Peak	L	Pass
1**	0.160	33.26	9.75	55.46	22.20	AV	L	Pass
2	0.266	49.00	9.74	61.24	12.24	Peak	L	Pass
2**	0.266	30.79	9.74	51.24	20.45	AV	L	Pass
3	0.384	41.95	9.74	58.19	16.24	Peak	L	Pass
3**	0.384	26.11	9.74	48.19	22.08	AV	L	Pass
4	3.260	35.08	9.66	56.00	20.92	Peak	L	Pass
4**	3.260	22.22	9.66	46.00	23.78	AV	L	Pass
5	5.866	38.71	9.61	60.00	21.29	Peak	L	Pass
5**	5.866	27.66	9.61	50.00	22.34	AV	L	Pass
6	9.538	43.72	9.49	60.00	16.28	Peak	L	Pass
6**	9.538	33.40	9.49	50.00	16.60	AV	L	Pass

PHASE N



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.160	57.31	9.71	65.46	8.15	Peak	N	Pass
1**	0.160	35.48	9.71	55.46	19.98	AV	N	Pass
2	0.278	47.13	9.76	60.88	13.75	Peak	N	Pass
2**	0.278	30.25	9.76	50.88	20.63	AV	N	Pass
3	0.592	38.03	9.84	56.00	17.97	Peak	N	Pass
3**	0.592	24.60	9.84	46.00	21.40	AV	N	Pass
4	1.618	36.92	9.86	56.00	19.08	Peak	N	Pass
4**	1.618	24.03	9.86	46.00	21.97	AV	N	Pass
5	3.396	35.63	9.84	56.00	20.37	Peak	N	Pass
5**	3.396	22.96	9.84	46.00	23.04	AV	N	Pass
6	9.994	41.71	9.73	60.00	18.29	Peak	N	Pass
6**	9.994	31.47	9.73	50.00	18.53	AV	N	Pass

A.6 Radiated Spurious Emissions and Band Edge (Restricted-band)

A.6.1 Radiated Spurious Emissions

Test Data

Note 1: The symbol of "--" in the table which means not application.

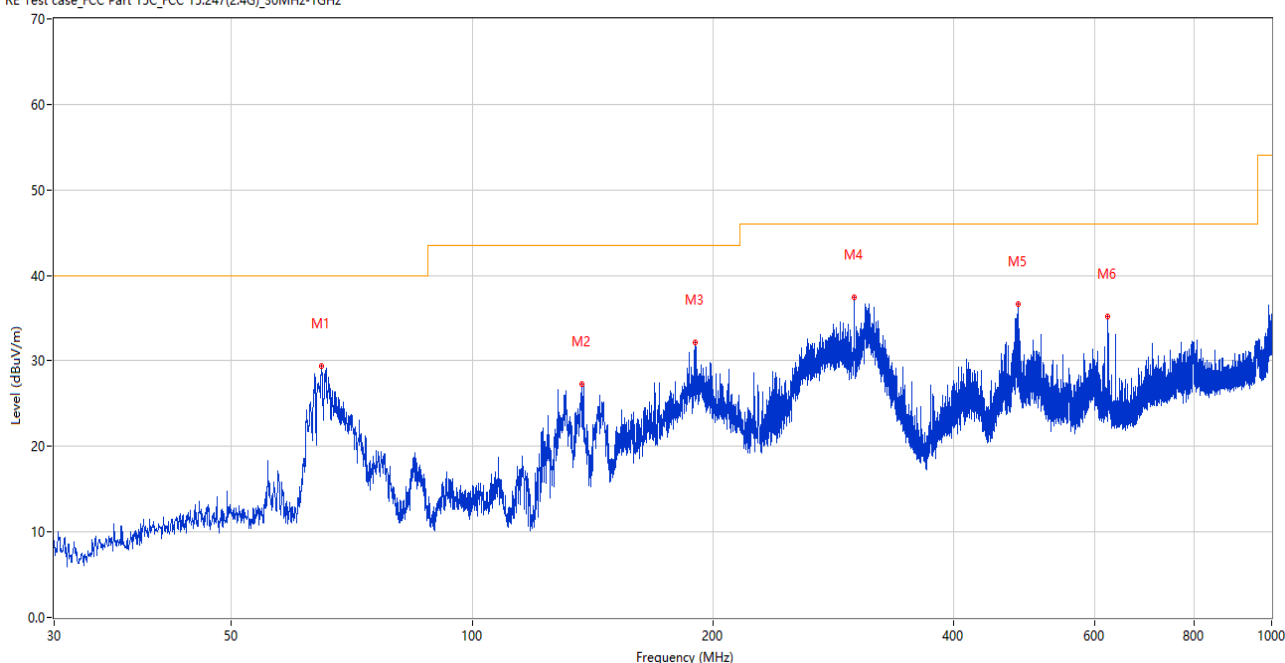
Note 2: For the test data above 1 GHz, According the ANSI C63.4, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

Note 3: The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

Note 4: The EUT is working in the Normal link mode below 1 GHz. All modes have been tested and normal link mode is worst.

30 MHz to 1 GHz, ANT H

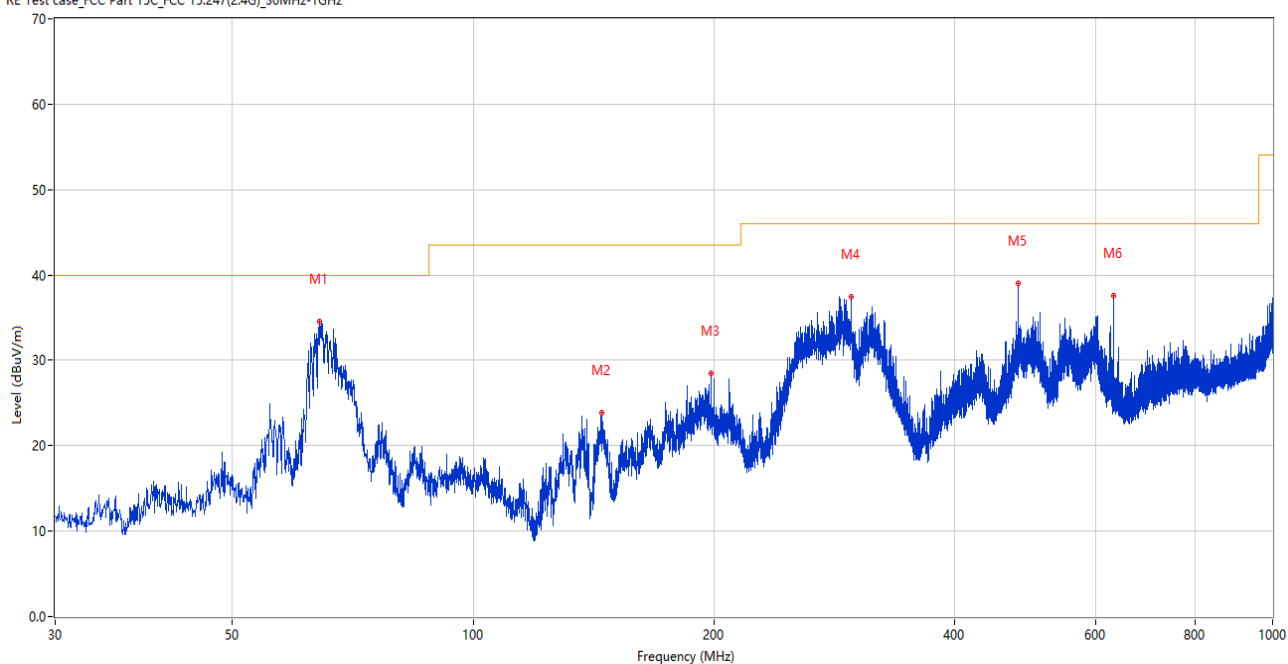
RE Test case_FCC Part 15C_FCC 15.247(2.4G)_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	64.774	29.46	-27.30	40.0	10.54	Peak	0.00	200	Horizontal	Pass
2	137.040	27.31	-29.41	43.5	16.19	Peak	147.00	100	Horizontal	Pass
3	190.341	32.15	-26.33	43.5	11.35	Peak	329.00	200	Horizontal	Pass
4	300.290	37.45	-23.22	46.0	8.55	Peak	360.00	100	Horizontal	Pass
5	482.166	36.68	-18.63	46.0	9.32	Peak	306.00	100	Horizontal	Pass
6	623.688	35.24	-14.53	46.0	10.76	Peak	360.00	100	Horizontal	Pass

30 MHz to 1 GHz, ANT V

RE Test case_FCC Part 15C_FCC 15.247(2.4G)_30MHz-1GHz

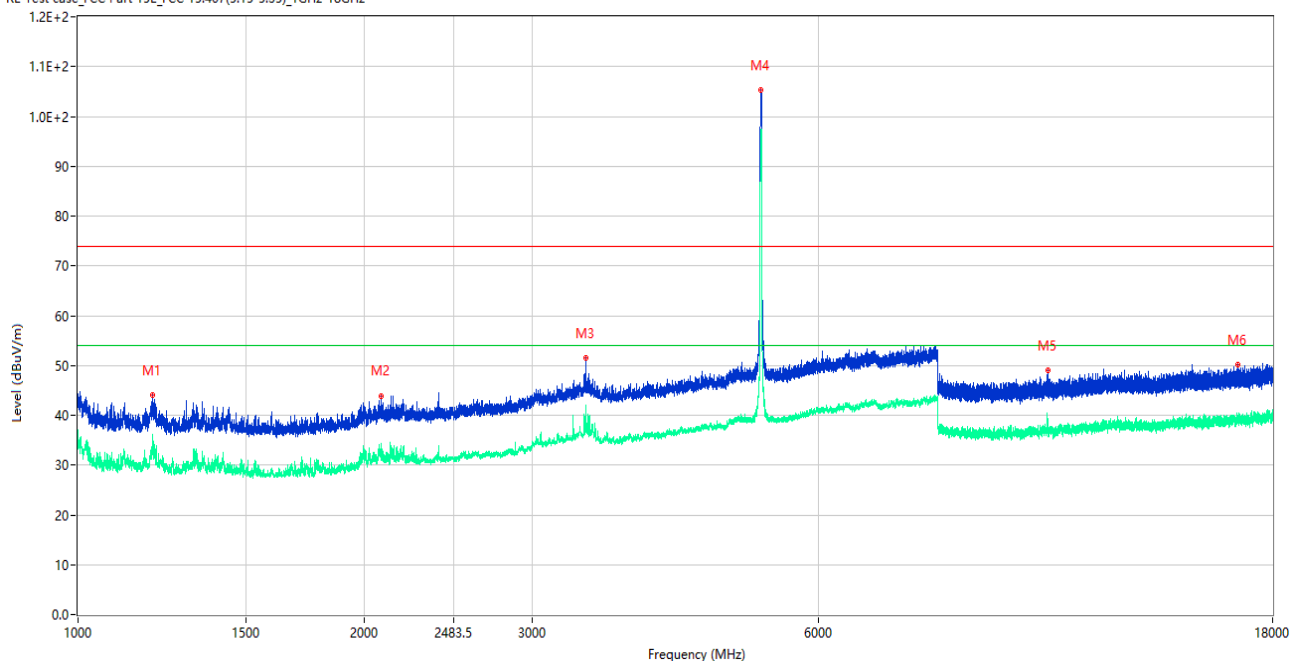


No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	64.241	34.54	-27.12	40.0	5.46	Peak	80.00	100	Vertical	Pass
2	144.800	23.91	-29.57	43.5	19.59	Peak	31.00	200	Vertical	Pass
3	198.635	28.49	-25.68	43.5	15.01	Peak	0.00	200	Vertical	Pass
4	296.992	37.48	-23.21	46.0	8.52	Peak	181.00	200	Vertical	Pass
5	480.031	39.00	-18.70	46.0	7.00	Peak	200.00	200	Vertical	Pass
6	632.710	37.52	-14.63	46.0	8.48	Peak	188.00	100	Vertical	Pass

Note: The spurious above 18G is noise only, do not show on the report.

11ac20, U-NII-1, 1 GHz to 18 GHz, Middle Channel, ANT H

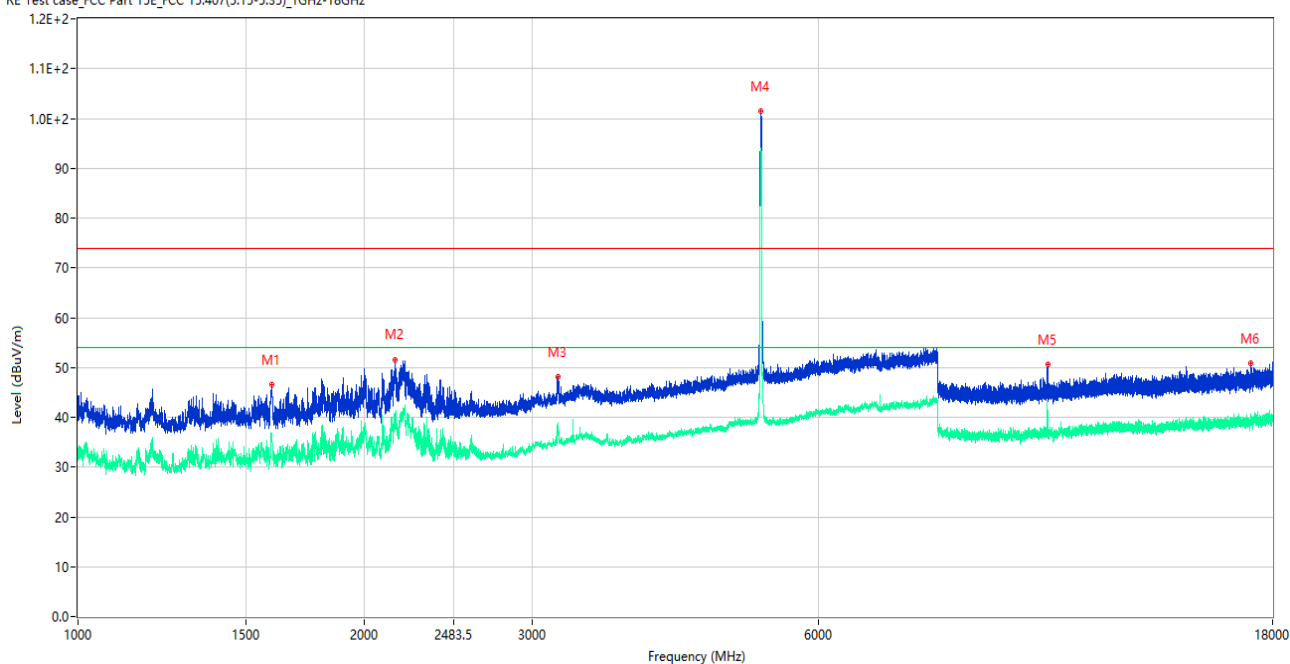
RE Test case_FCC Part 15E_FCC 15.407(5.15-5.35)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1197.250	44.11	-15.72	74.0	29.89	Peak	131.00	150	Horizontal	Pass
1**	1197.250	36.19	-15.72	54.0	17.81	AV	131.00	150	Horizontal	Pass
2	2081.500	43.95	-13.80	74.0	30.05	Peak	86.00	150	Horizontal	Pass
2**	2081.500	33.33	-13.80	54.0	20.67	AV	86.00	150	Horizontal	Pass
3	3413.500	51.55	-5.27	74.0	22.45	Peak	217.00	150	Horizontal	Pass
3**	3413.500	41.95	-5.27	54.0	12.05	AV	217.00	150	Horizontal	Pass
4	5221.500	105.22	-2.37	74.0	-31.22	Peak	50.00	150	Horizontal	N/A
4**	5221.500	97.14	-2.37	54.0	-43.14	AV	50.00	150	Horizontal	N/A
5	10443.638	49.07	-3.31	74.0	24.93	Peak	354.00	150	Horizontal	Pass
5**	10443.638	38.05	-3.31	54.0	15.95	AV	354.00	150	Horizontal	Pass
6	16531.050	50.20	-1.62	74.0	23.80	Peak	0.00	150	Horizontal	Pass
6**	16531.050	38.86	-1.62	54.0	15.14	AV	0.00	150	Horizontal	Pass

11ac20, U-NII-1, 1 GHz to 18 GHz, Middle Channel, ANT V

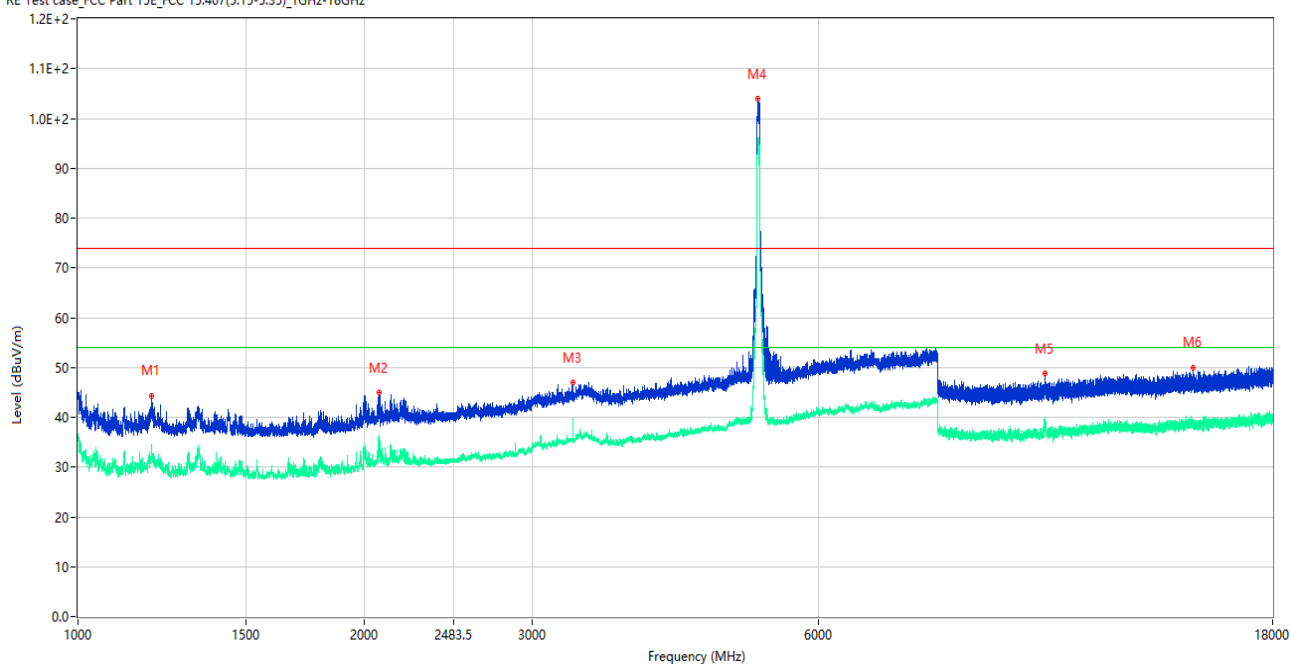
RE Test case_FCC Part 15E_FCC 15.407(5.15-5.35)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1598.750	46.55	-16.23	74.0	27.45	Peak	124.00	150	Vertical	Pass
1**	1598.750	36.46	-16.23	54.0	17.54	AV	124.00	150	Vertical	Pass
2	2151.500	51.63	-13.63	74.0	22.37	Peak	111.00	150	Vertical	Pass
2**	2151.500	39.39	-13.63	54.0	14.61	AV	111.00	150	Vertical	Pass
3	3193.000	48.10	-7.70	74.0	25.90	Peak	100.00	150	Vertical	Pass
3**	3193.000	37.54	-7.70	54.0	16.46	AV	100.00	150	Vertical	Pass
4	5223.000	101.54	-2.35	74.0	-27.54	Peak	150.00	150	Vertical	N/A
4**	5223.000	93.50	-2.35	54.0	-39.50	AV	150.00	150	Vertical	N/A
5	10443.162	50.57	-3.30	74.0	23.43	Peak	145.00	150	Vertical	Pass
5**	10443.162	39.29	-3.30	54.0	14.71	AV	145.00	150	Vertical	Pass
6	17089.125	50.88	-0.74	74.0	23.12	Peak	251.00	150	Vertical	Pass
6**	17089.125	39.68	-0.74	54.0	14.32	AV	251.00	150	Vertical	Pass

11ac40, U-NII-1, 1 GHz to 18 GHz, Low Channel, ANT H

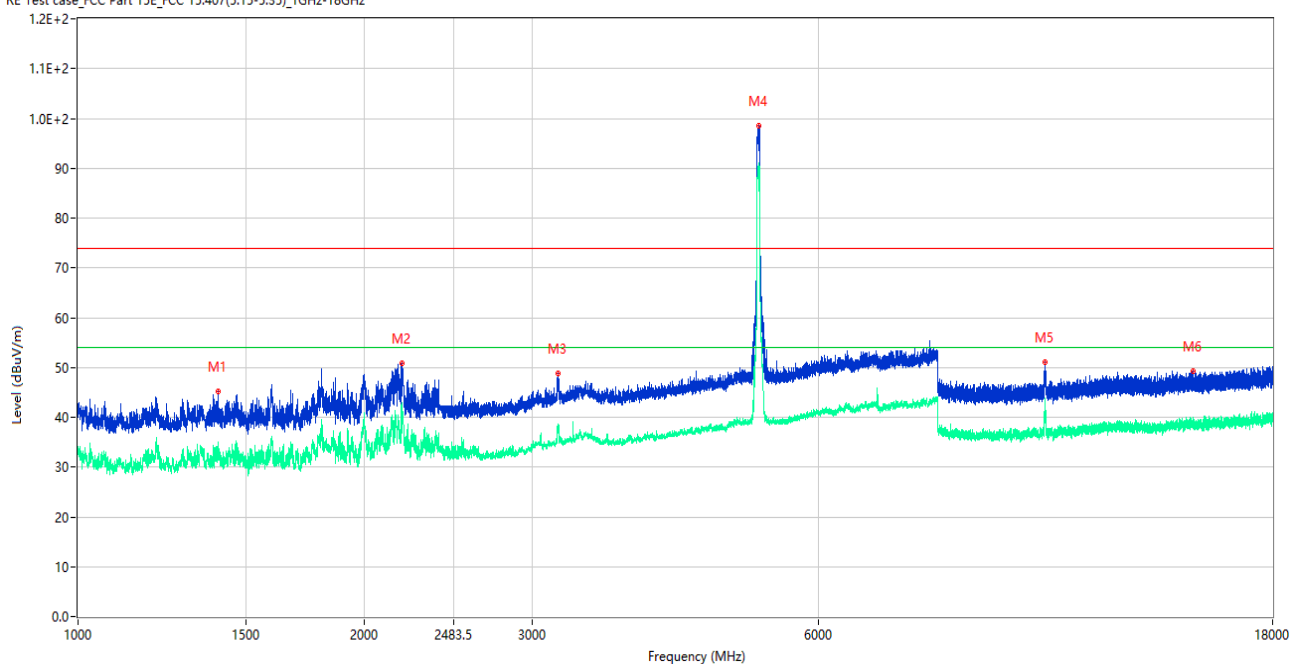
RE Test case_FCC Part 15E_FCC 15.407(5.15-5.35)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1193.750	44.39	-15.78	74.0	29.61	Peak	93.00	150	Horizontal	Pass
1**	1193.750	33.55	-15.78	54.0	20.45	AV	93.00	150	Horizontal	Pass
2	2070.000	45.05	-13.77	74.0	28.95	Peak	146.00	150	Horizontal	Pass
2**	2070.000	35.57	-13.77	54.0	18.43	AV	146.00	150	Horizontal	Pass
3	3312.500	47.05	-6.57	74.0	26.95	Peak	126.00	150	Horizontal	Pass
3**	3312.500	38.61	-6.57	54.0	15.39	AV	126.00	150	Horizontal	Pass
4	5185.000	103.92	-2.32	74.0	-29.92	Peak	47.00	150	Horizontal	N/A
4**	5185.000	95.66	-2.32	54.0	-41.66	AV	47.00	150	Horizontal	N/A
5	10379.513	48.77	-3.40	74.0	25.23	Peak	9.00	150	Horizontal	Pass
5**	10379.513	38.79	-3.40	54.0	15.21	AV	9.00	150	Horizontal	Pass
6	14839.238	50.04	-0.22	74.0	23.96	Peak	250.00	150	Horizontal	Pass
6**	14839.238	38.80	-0.22	54.0	15.20	AV	250.00	150	Horizontal	Pass

11ac40, U-NII-1, 1 GHz to 18 GHz, Low Channel, ANT V

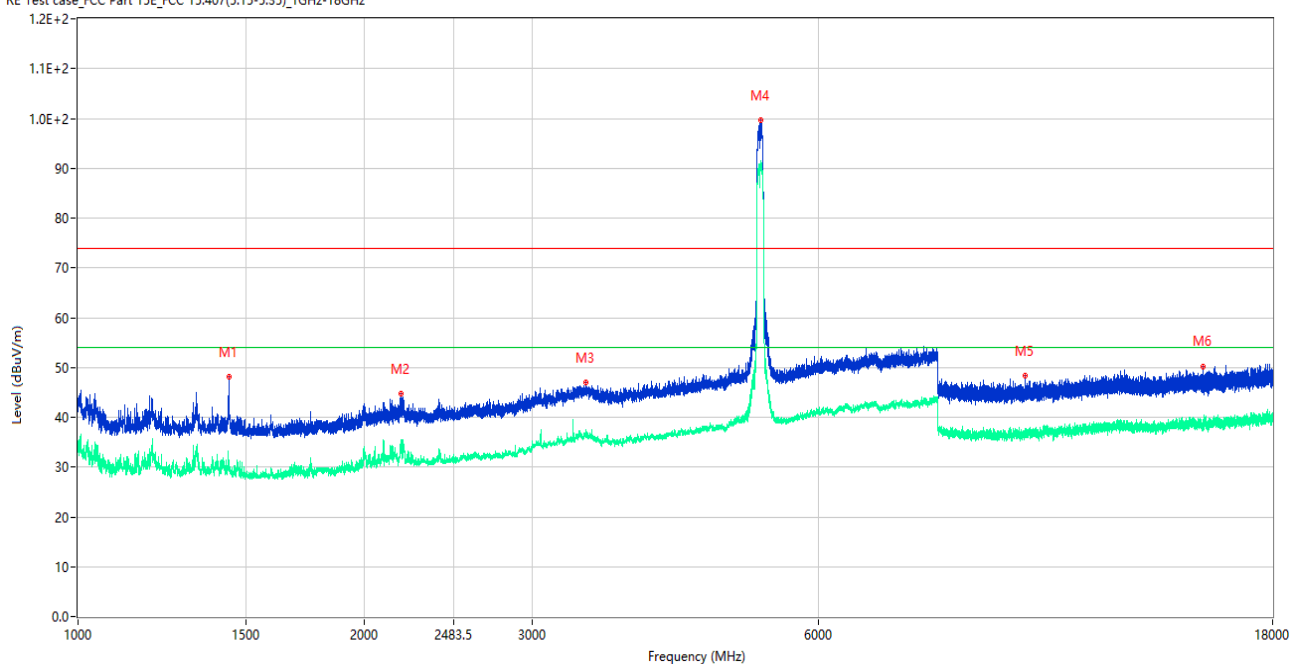
RE Test case_FCC Part 15E_FCC 15.407(5.15-5.35)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1402.750	45.24	-15.97	74.0	28.76	Peak	106.00	150	Vertical	Pass
1**	1402.750	31.42	-15.97	54.0	22.58	AV	106.00	150	Vertical	Pass
2	2188.250	50.87	-13.29	74.0	23.13	Peak	127.00	150	Vertical	Pass
2**	2188.250	40.85	-13.29	54.0	13.15	AV	127.00	150	Vertical	Pass
3	3192.000	48.86	-7.69	74.0	25.14	Peak	101.00	150	Vertical	Pass
3**	3192.000	37.73	-7.69	54.0	16.27	AV	101.00	150	Vertical	Pass
4	5196.000	98.59	-2.34	74.0	-24.59	Peak	149.00	150	Vertical	N/A
4**	5196.000	90.63	-2.34	54.0	-36.63	AV	149.00	150	Vertical	N/A
5	10380.701	51.15	-3.35	74.0	22.85	Peak	53.00	150	Vertical	Pass
5**	10380.701	41.35	-3.35	54.0	12.65	AV	53.00	150	Vertical	Pass
6	14846.325	49.24	-0.67	74.0	24.76	Peak	14.00	150	Vertical	Pass
6**	14846.325	39.19	-0.67	54.0	14.81	AV	14.00	150	Vertical	Pass

11ac80, U-NII-1, 1 GHz to 18 GHz, Middle Channel, ANT H

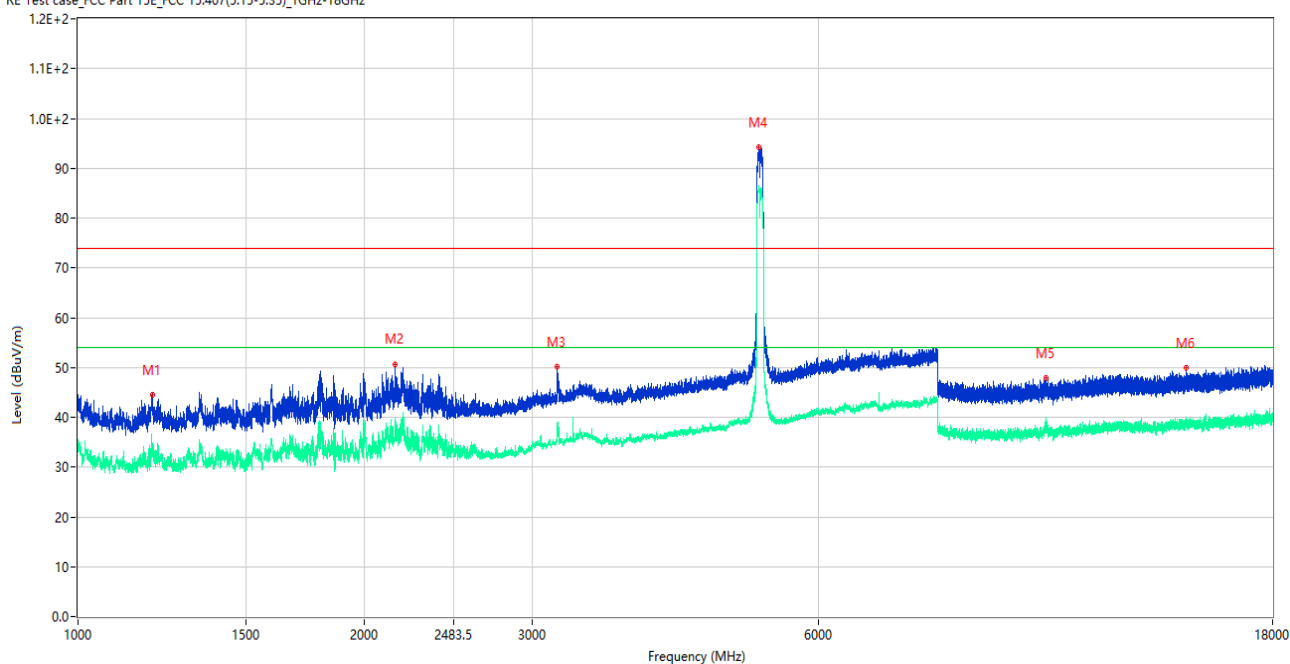
RE Test case_FCC Part 15E_FCC 15.407(5.15-5.35)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1439.750	48.07	-15.95	74.0	25.93	Peak	223.00	150	Horizontal	Pass
1**	1439.750	29.83	-15.95	54.0	24.17	AV	223.00	150	Horizontal	Pass
2	2182.750	44.78	-13.03	74.0	29.22	Peak	96.00	150	Horizontal	Pass
2**	2182.750	34.56	-13.03	54.0	19.44	AV	96.00	150	Horizontal	Pass
3	3415.500	46.94	-5.15	74.0	27.06	Peak	359.00	150	Horizontal	Pass
3**	3415.500	37.10	-5.15	54.0	16.90	AV	359.00	150	Horizontal	Pass
4	5213.000	99.72	-2.35	74.0	-25.72	Peak	127.00	150	Horizontal	N/A
4**	5213.000	90.86	-2.35	54.0	-36.86	AV	127.00	150	Horizontal	N/A
5	9890.737	48.30	-4.22	74.0	25.70	Peak	288.00	150	Horizontal	Pass
5**	9890.737	37.09	-4.22	54.0	16.91	AV	288.00	150	Horizontal	Pass
6	15221.437	50.26	-1.87	74.0	23.74	Peak	50.00	150	Horizontal	Pass
6**	15221.437	38.23	-1.87	54.0	15.77	AV	50.00	150	Horizontal	Pass

11ac80, U-NII-1, 1 GHz to 18 GHz, Middle Channel, ANT V

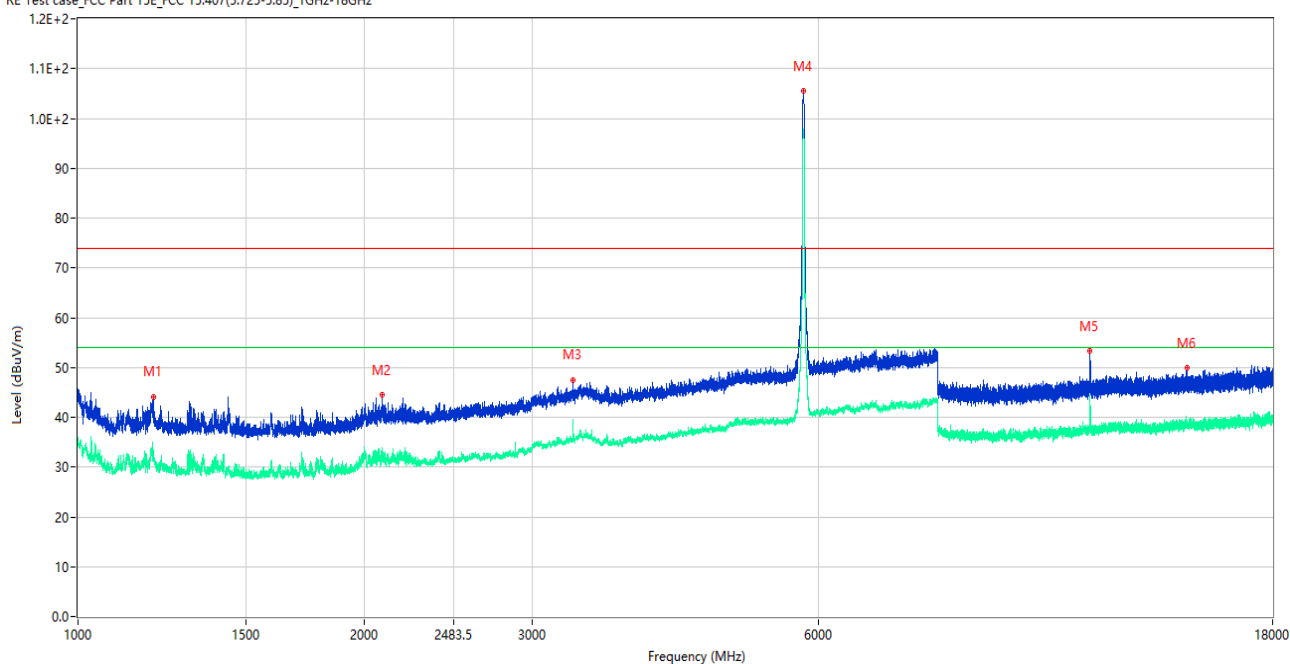
RE Test case_FCC Part 15E_FCC 15.407(5.15-5.35)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1196.250	44.46	-15.72	74.0	29.54	Peak	152.00	150	Vertical	Pass
1**	1196.250	33.40	-15.72	54.0	20.60	AV	152.00	150	Vertical	Pass
2	2155.250	50.72	-13.49	74.0	23.28	Peak	117.00	150	Vertical	Pass
2**	2155.250	38.32	-13.49	54.0	15.68	AV	117.00	150	Vertical	Pass
3	3190.500	50.11	-7.63	74.0	23.89	Peak	98.00	150	Vertical	Pass
3**	3190.500	38.53	-7.63	54.0	15.47	AV	98.00	150	Vertical	Pass
4	5190.500	94.28	-2.33	74.0	-20.28	Peak	157.00	150	Vertical	N/A
4**	5190.500	86.11	-2.33	54.0	-32.11	AV	157.00	150	Vertical	N/A
5	10400.650	47.95	-3.48	74.0	26.05	Peak	11.00	150	Vertical	Pass
5**	10400.650	37.12	-3.48	54.0	16.88	AV	11.00	150	Vertical	Pass
6	14588.026	49.86	-2.34	74.0	24.14	Peak	359.00	150	Vertical	Pass
6**	14588.026	38.80	-2.34	54.0	15.20	AV	359.00	150	Vertical	Pass

11ac20, U-NII-3, 1 GHz to 18 GHz, Middle Channel, ANT H

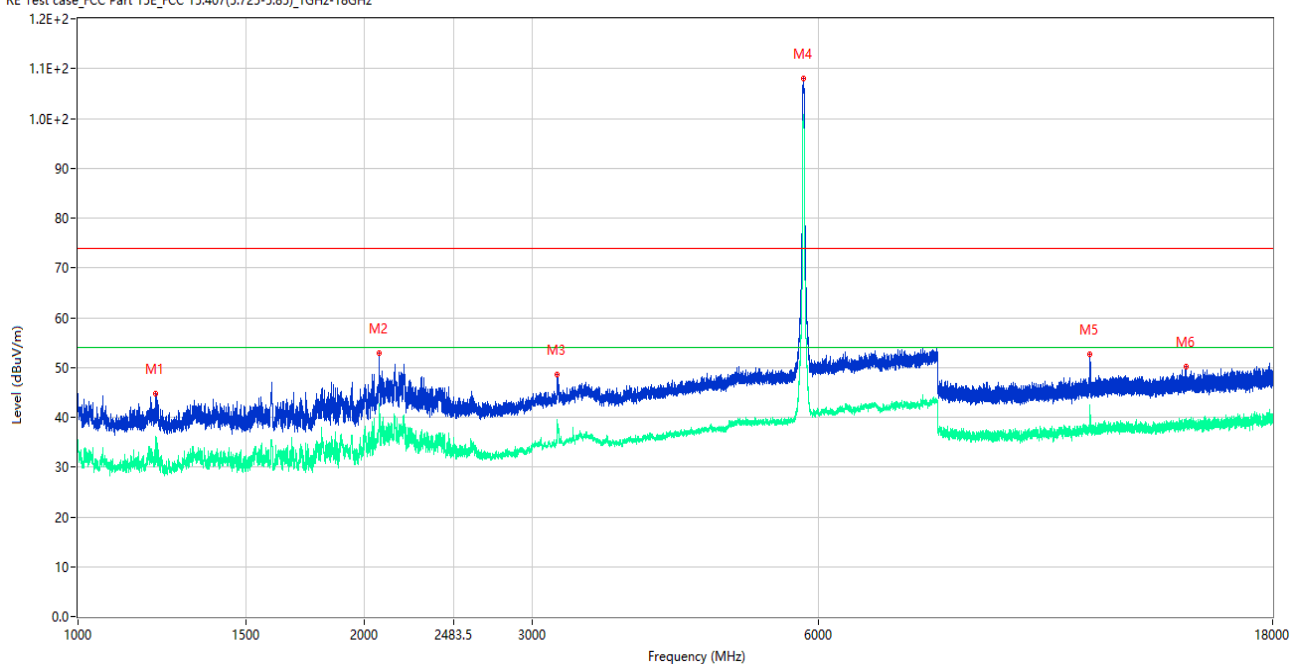
RE Test case_FCC Part 15E_FCC 15.407(5.725-5.85)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1199.250	44.15	-15.75	74.0	29.85	Peak	132.00	150	Horizontal	Pass
1**	1199.250	33.56	-15.75	54.0	20.44	AV	132.00	150	Horizontal	Pass
2	2088.500	44.52	-13.68	74.0	29.48	Peak	142.00	150	Horizontal	Pass
2**	2088.500	32.68	-13.68	54.0	21.32	AV	142.00	150	Horizontal	Pass
3	3312.500	47.55	-6.57	74.0	26.45	Peak	229.00	150	Horizontal	Pass
3**	3312.500	38.49	-6.57	54.0	15.51	AV	229.00	150	Horizontal	Pass
4	5788.500	105.43	-1.55	74.0	-31.43	Peak	359.00	150	Horizontal	N/A
4**	5788.500	97.77	-1.55	54.0	-43.77	AV	359.00	150	Horizontal	N/A
5	11564.401	53.34	-2.22	74.0	20.66	Peak	26.00	150	Horizontal	Pass
5**	11564.401	42.95	-2.22	54.0	11.05	AV	26.00	150	Horizontal	Pass
6	14633.437	49.94	-1.99	74.0	24.06	Peak	14.00	150	Horizontal	Pass
6**	14633.437	37.81	-1.99	54.0	16.19	AV	14.00	150	Horizontal	Pass

11ac20, U-NII-3, 1 GHz to 18 GHz, Middle Channel, ANT V

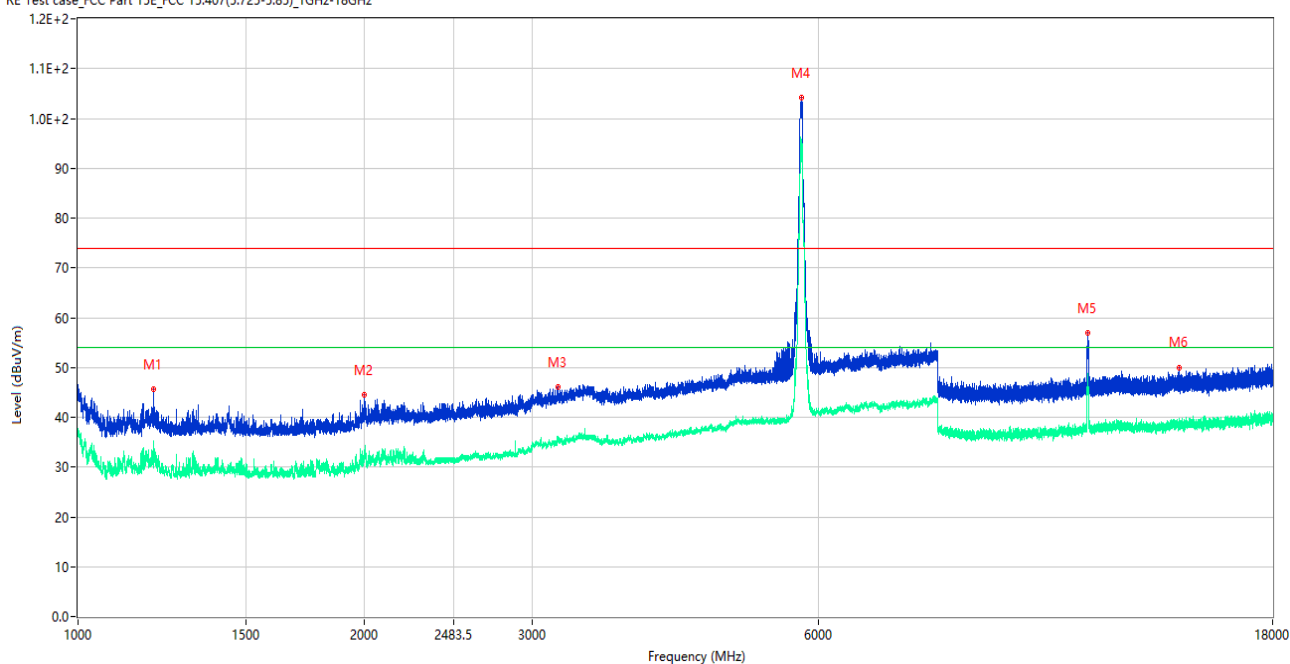
RE Test case_FCC Part 15E_FCC 15.407(5.725-5.85)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1207.250	44.86	-15.82	74.0	29.14	Peak	75.00	150	Vertical	Pass
1**	1207.250	32.67	-15.82	54.0	21.33	AV	75.00	150	Vertical	Pass
2	2072.000	52.88	-13.73	74.0	21.12	Peak	132.00	150	Vertical	Pass
2**	2072.000	41.48	-13.73	54.0	12.52	AV	132.00	150	Vertical	Pass
3	3189.500	48.56	-7.61	74.0	25.44	Peak	98.00	150	Vertical	Pass
3**	3189.500	37.95	-7.61	54.0	16.05	AV	98.00	150	Vertical	Pass
4	5783.500	108.07	-1.54	74.0	-34.07	Peak	20.00	150	Vertical	N/A
4**	5783.500	100.67	-1.54	54.0	-46.67	AV	20.00	150	Vertical	N/A
5	11564.401	52.59	-2.22	74.0	21.41	Peak	27.00	150	Vertical	Pass
5**	11564.401	40.67	-2.22	54.0	13.33	AV	27.00	150	Vertical	Pass
6	14593.013	50.17	-2.09	74.0	23.83	Peak	13.00	150	Vertical	Pass
6**	14593.013	39.47	-2.09	54.0	14.53	AV	13.00	150	Vertical	Pass

11ac40, U-NII-3, 1 GHz to 18 GHz, Low Channel, ANT H

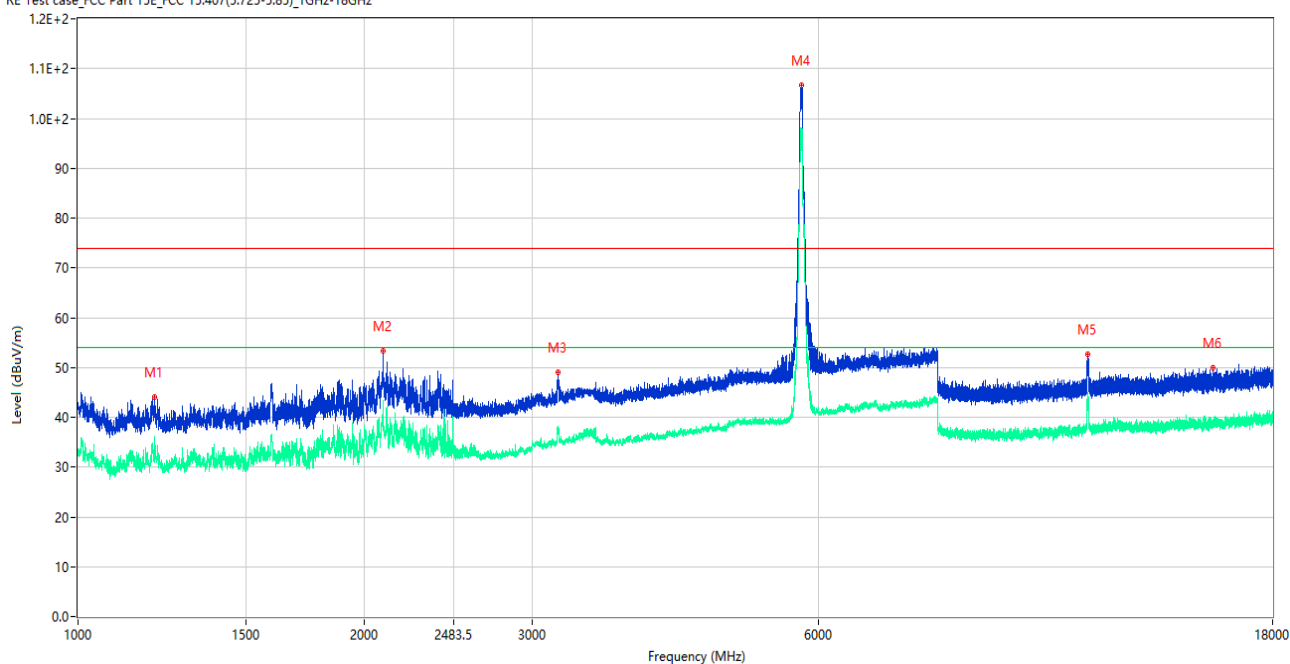
RE Test case_FCC Part 15E_FCC 15.407(5.725-5.85)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1201.250	45.65	-15.75	74.0	28.35	Peak	139.00	150	Horizontal	Pass
1**	1201.250	35.24	-15.75	54.0	18.76	AV	139.00	150	Horizontal	Pass
2	1998.500	44.51	-14.36	74.0	29.49	Peak	149.00	150	Horizontal	Pass
2**	1998.500	32.07	-14.36	54.0	21.93	AV	149.00	150	Horizontal	Pass
3	3194.500	46.21	-7.74	74.0	27.79	Peak	176.00	150	Horizontal	Pass
3**	3194.500	35.16	-7.74	54.0	18.84	AV	176.00	150	Horizontal	Pass
4	5760.000	104.23	-1.94	74.0	-30.23	Peak	359.00	150	Horizontal	N/A
4**	5760.000	95.29	-1.94	54.0	-41.29	AV	359.00	150	Horizontal	N/A
5	11509.537	56.91	-3.05	74.0	17.09	Peak	309.00	150	Horizontal	Pass
5**	11509.537	46.92	-3.05	54.0	7.08	AV	309.00	150	Horizontal	Pass
6	14362.800	50.03	-1.45	74.0	23.97	Peak	321.00	150	Horizontal	Pass
6**	14362.800	38.92	-1.45	54.0	15.08	AV	321.00	150	Horizontal	Pass

11ac40, U-NII-3, 1 GHz to 18 GHz, Low Channel, ANT V

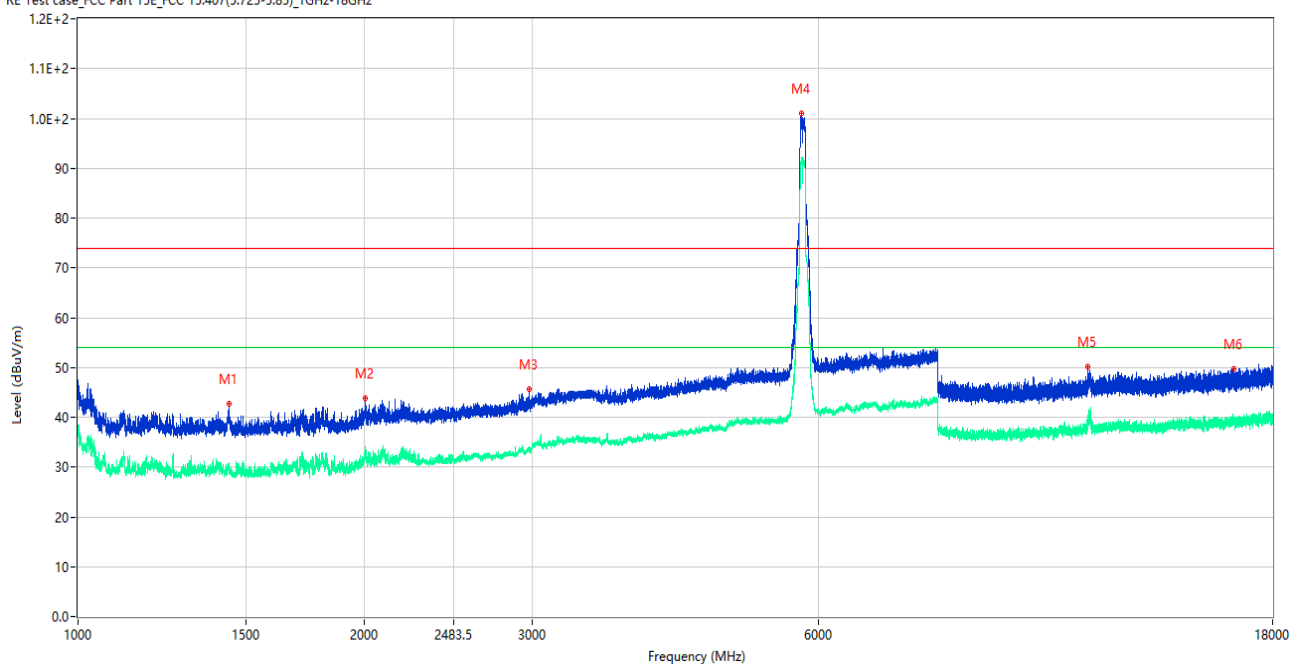
RE Test case_FCC Part 15E_FCC 15.407(5.725-5.85)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1204.250	43.98	-15.77	74.0	30.02	Peak	71.00	150	Vertical	Pass
1**	1204.250	33.43	-15.77	54.0	20.57	AV	71.00	150	Vertical	Pass
2	2092.250	53.33	-13.65	74.0	20.67	Peak	99.00	150	Vertical	Pass
2**	2092.250	42.52	-13.65	54.0	11.48	AV	99.00	150	Vertical	Pass
3	3196.500	49.12	-7.79	74.0	24.88	Peak	99.00	150	Vertical	Pass
3**	3196.500	36.85	-7.79	54.0	17.15	AV	99.00	150	Vertical	Pass
4	5764.000	106.64	-1.85	74.0	-32.64	Peak	21.00	150	Vertical	N/A
4**	5764.000	97.53	-1.85	54.0	-43.53	AV	21.00	150	Vertical	N/A
5	11506.688	52.56	-3.02	74.0	21.44	Peak	52.00	150	Vertical	Pass
5**	11506.688	43.66	-3.02	54.0	10.34	AV	52.00	150	Vertical	Pass
6	15581.850	49.85	-2.23	74.0	24.15	Peak	251.00	150	Vertical	Pass
6**	15581.850	38.82	-2.23	54.0	15.18	AV	251.00	150	Vertical	Pass

11ac80, U-NII-3, 1 GHz to 18 GHz, Middle Channel, ANT H

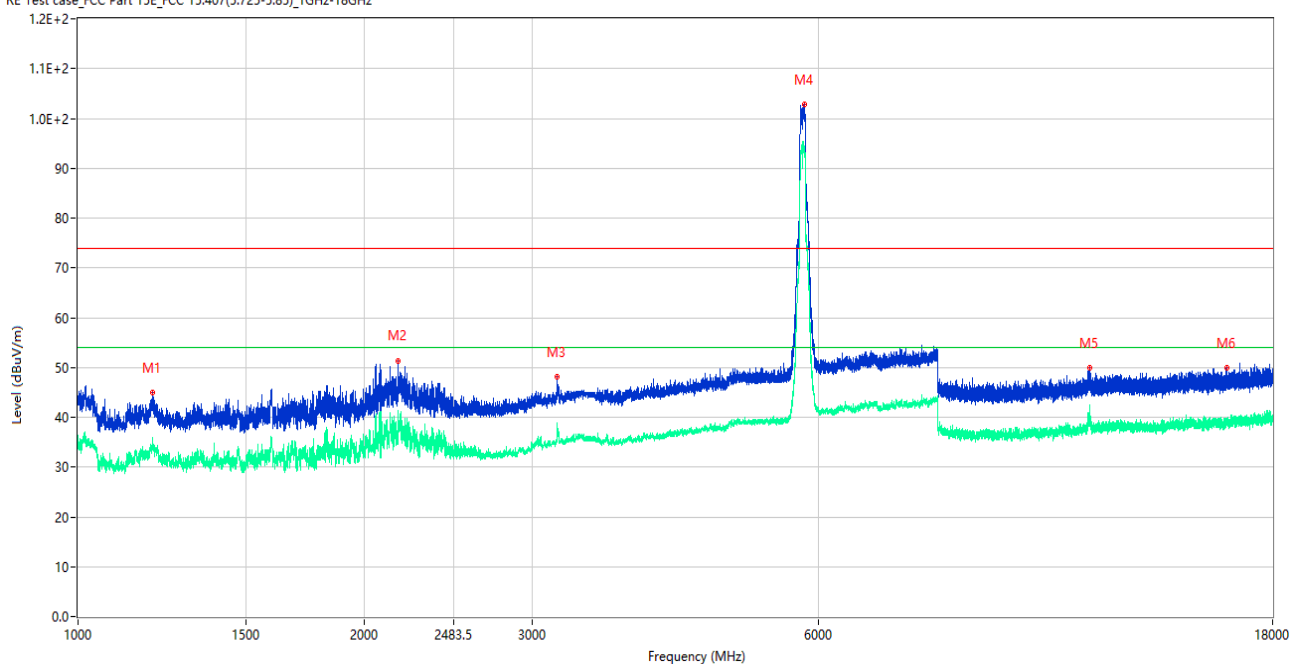
RE Test case_FCC Part 15E_FCC 15.407(5.725-5.85)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1440.250	42.75	-15.94	74.0	31.25	Peak	75.00	150	Horizontal	Pass
1**	1440.250	30.21	-15.94	54.0	23.79	AV	75.00	150	Horizontal	Pass
2	2003.000	43.91	-14.24	74.0	30.09	Peak	63.00	150	Horizontal	Pass
2**	2003.000	32.76	-14.24	54.0	21.24	AV	63.00	150	Horizontal	Pass
3	2979.000	45.73	-9.01	74.0	28.27	Peak	11.00	150	Horizontal	Pass
3**	2979.000	33.68	-9.01	54.0	20.32	AV	11.00	150	Horizontal	Pass
4	5756.000	101.08	-2.06	74.0	-27.08	Peak	0.00	150	Horizontal	N/A
4**	5756.000	92.21	-2.06	54.0	-38.21	AV	0.00	150	Horizontal	N/A
5	11515.713	50.14	-2.80	74.0	23.86	Peak	51.00	150	Horizontal	Pass
5**	11515.713	38.52	-2.80	54.0	15.48	AV	51.00	150	Horizontal	Pass
6	16402.426	49.67	-1.78	74.0	24.33	Peak	0.00	150	Horizontal	Pass
6**	16402.426	38.97	-1.78	54.0	15.03	AV	0.00	150	Horizontal	Pass

11ac80, U-NII-3, 1 GHz to 18 GHz, Middle Channel, ANT V

RE Test case_FCC Part 15E_FCC 15.407(5.725-5.85)_1GHz-18GHz



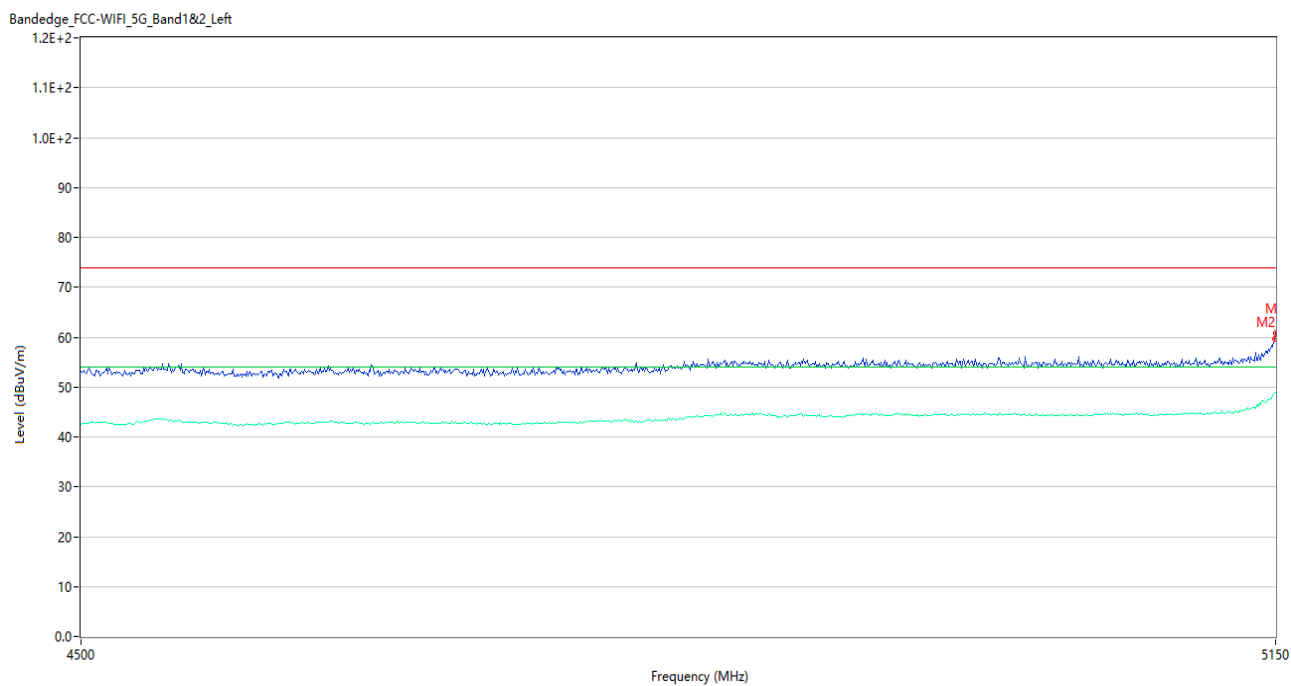
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1198.000	45.02	-15.73	74.0	28.98	Peak	77.00	150	Vertical	Pass
1**	1198.000	34.25	-15.73	54.0	19.75	AV	77.00	150	Vertical	Pass
2	2171.250	51.38	-13.00	74.0	22.62	Peak	106.00	150	Vertical	Pass
2**	2171.250	41.38	-13.00	54.0	12.62	AV	106.00	150	Vertical	Pass
3	3188.000	48.14	-7.58	74.0	25.86	Peak	98.00	150	Vertical	Pass
3**	3188.000	38.51	-7.58	54.0	15.49	AV	98.00	150	Vertical	Pass
4	5802.500	102.78	-1.38	74.0	-28.78	Peak	29.00	150	Vertical	N/A
4**	5802.500	93.48	-1.38	54.0	-39.48	AV	29.00	150	Vertical	N/A
5	11563.688	49.84	-2.25	74.0	24.16	Peak	29.00	150	Vertical	Pass
5**	11563.688	40.12	-2.25	54.0	13.88	AV	29.00	150	Vertical	Pass
6	16098.187	49.98	-1.39	74.0	24.02	Peak	216.00	150	Vertical	Pass
6**	16098.187	39.15	-1.39	54.0	14.85	AV	216.00	150	Vertical	Pass

A.6.2 Band Edge (Restricted-band)

Test Band	Mode	Channel	Verdict
U-NII-1	802.11n(HT20)	Low	Pass
		High	Pass
	802.11n(HT40)	Low	Pass
		High	Pass
	802.11ac(VHT20)	Low	Pass
		High	Pass
	802.11ac(VHT40)	Low	Pass
		High	Pass
	802.11ac(VHT80)	Middle	Pass
U-NII-3	802.11n(HT20)	Low	Pass
		High	Pass
	802.11n(HT40)	Low	Pass
		High	Pass
	802.11ac(VHT20)	Low	Pass
		High	Pass
	802.11ac(VHT40)	Low	Pass
		High	Pass
	802.11ac(VHT80)	Middle	Pass

Test Data and Plots

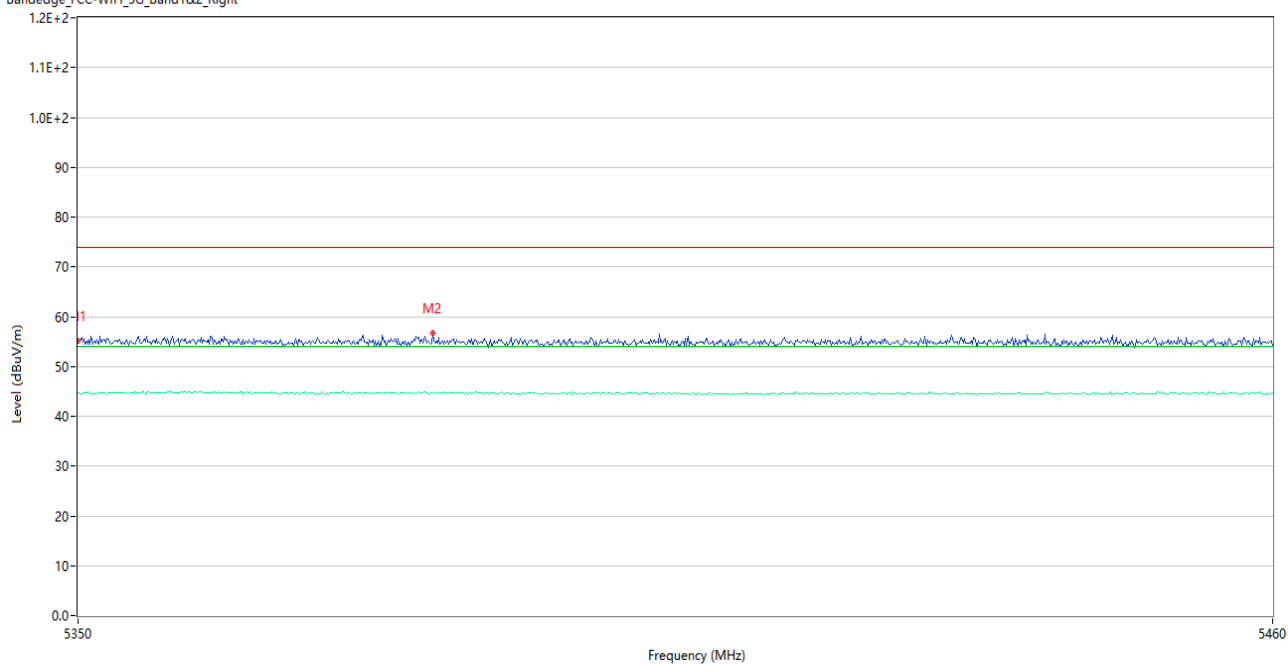
U-NII-1 11ac20 CH36



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5150.000	60.70	3.82	74.0	13.30	Peak	44.00	150	Horizontal	Pass
1**	5150.000	48.82	3.82	54.0	5.18	AV	44.00	150	Horizontal	Pass
2	5149.350	59.66	3.84	74.0	14.34	Peak	56.00	150	Horizontal	Pass
2**	5149.350	48.92	3.84	54.0	5.08	AV	56.00	150	Horizontal	Pass

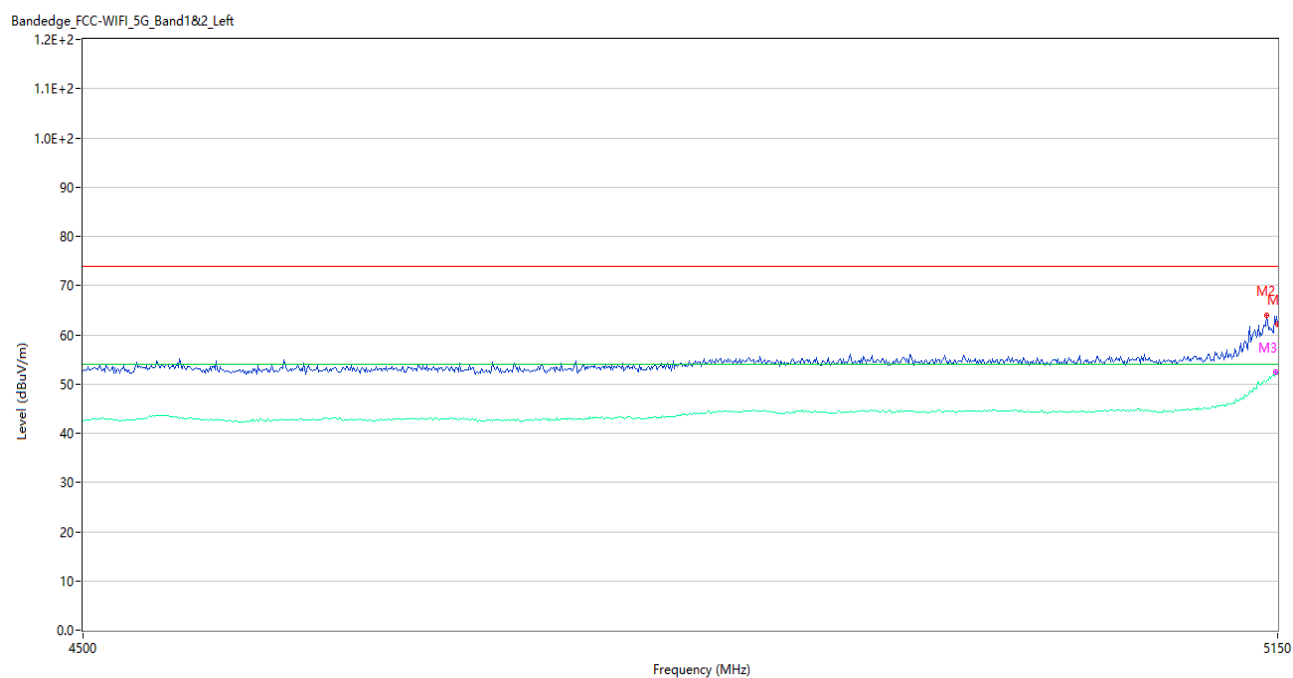
U-NII-1 11ac20 CH48

Bandedge_FCC-WIFI_5G_Band1&2_Right



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5350.000	55.03	4.04	74.0	18.97	Peak	128.00	150	Horizontal	Pass
1**	5350.000	44.73	4.04	54.0	9.27	AV	128.00	150	Horizontal	Pass
2	5382.450	56.63	4.05	74.0	17.37	Peak	78.00	150	Horizontal	Pass
2**	5382.450	44.60	4.05	54.0	9.40	AV	78.00	150	Horizontal	Pass

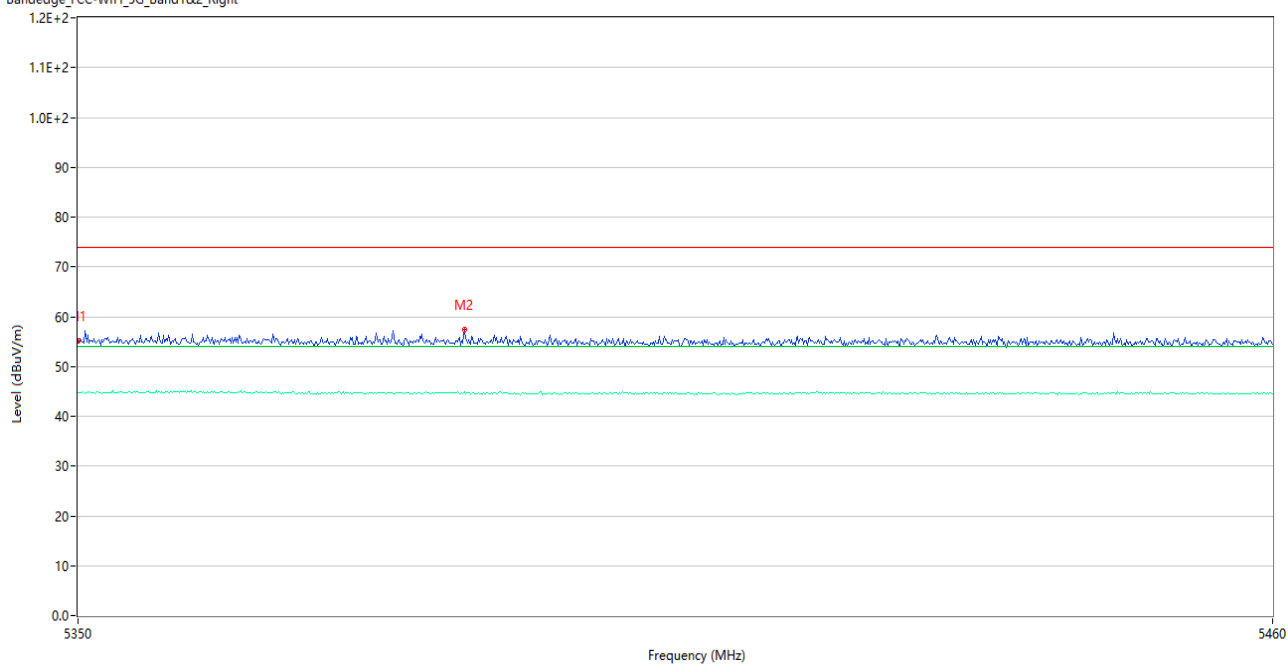
U-NII-1 11ac40 CH38



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5150.000	62.05	3.82	74.0	11.95	Peak	53.00	150	Horizontal	Pass
1**	5150.000	52.00	3.82	54.0	2.00	AV	53.00	150	Horizontal	Pass
2	5143.500	63.94	4.01	74.0	10.06	Peak	44.00	150	Horizontal	Pass
2**	5143.500	50.65	4.01	54.0	3.35	AV	44.00	150	Horizontal	Pass
3	5148.700	62.29	3.85	74.0	11.71	Peak	125.00	150	Horizontal	Pass
3**	5148.700	52.32	3.85	54.0	1.68	AV	125.00	150	Horizontal	Pass

U-NII-1 11ac40 CH46

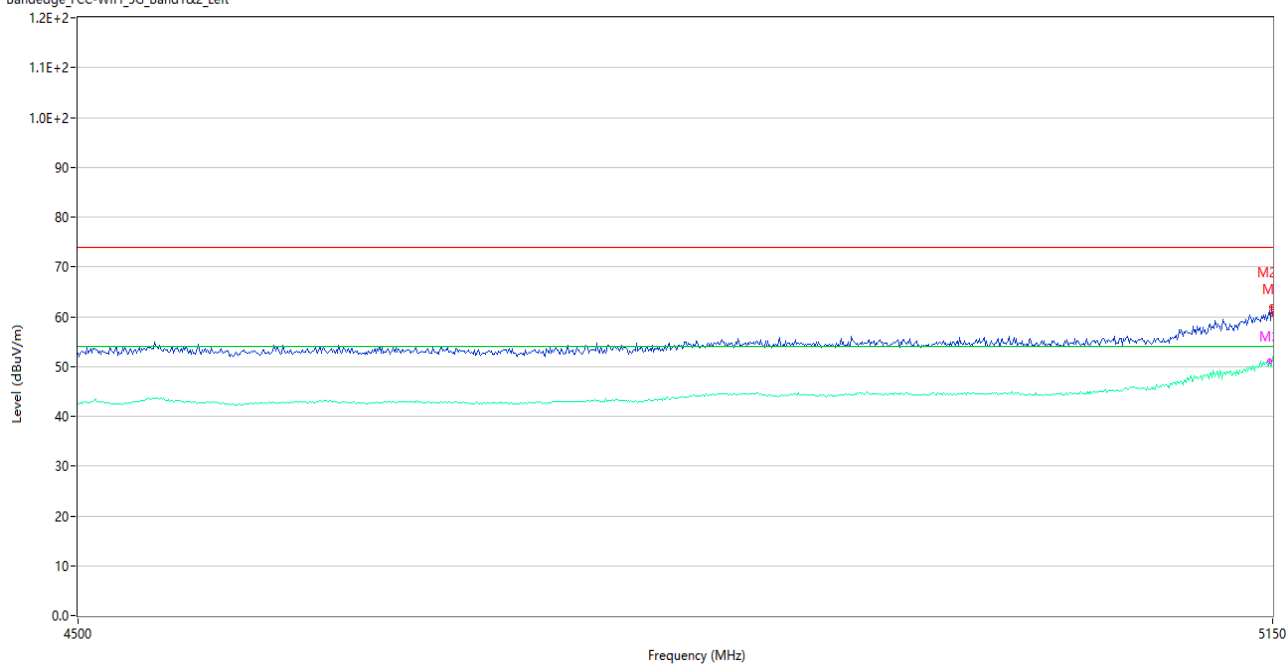
Bandedge_FCC-WIFI_5G_Band1&2_Right



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5350.000	55.10	4.04	74.0	18.90	Peak	359.00	150	Horizontal	Pass
1**	5350.000	44.78	4.04	54.0	9.22	AV	359.00	150	Horizontal	Pass
2	5385.310	57.36	4.06	74.0	16.64	Peak	118.00	150	Horizontal	Pass
2**	5385.310	44.96	4.06	54.0	9.04	AV	118.00	150	Horizontal	Pass

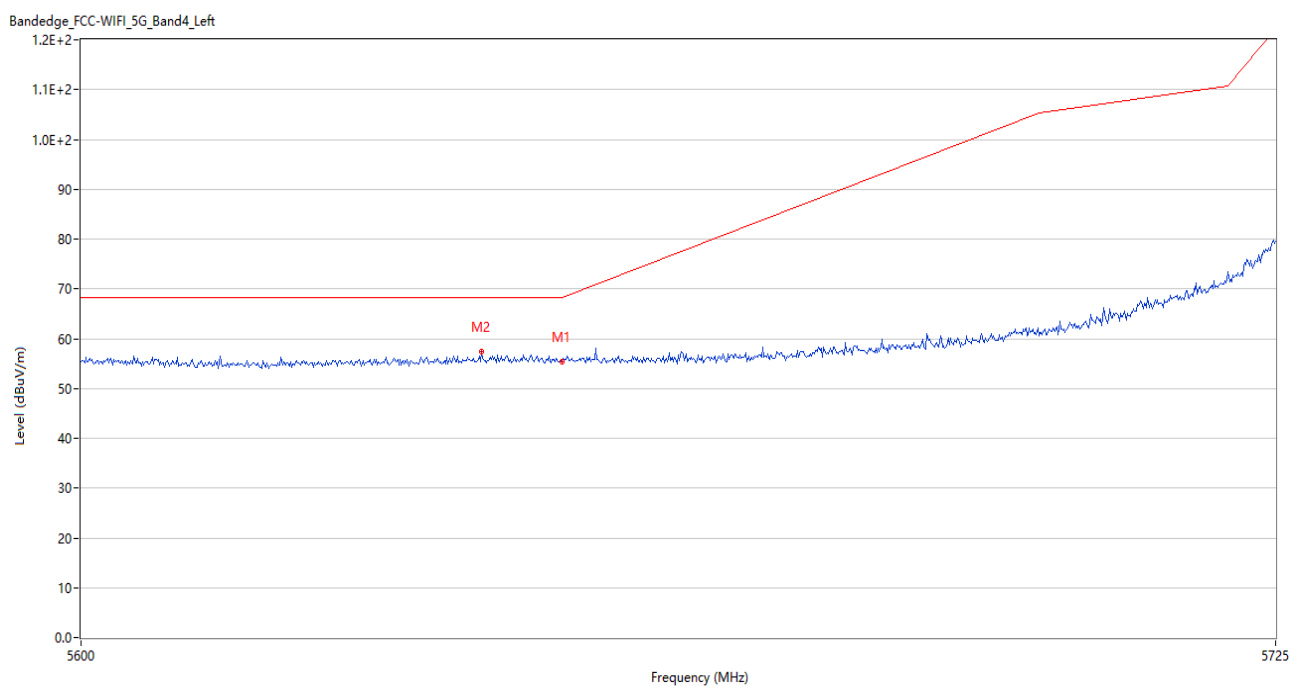
U-NII-1 11ac80 CH42

Bandedge_FCC-WIFI_5G_Band1&2_Left



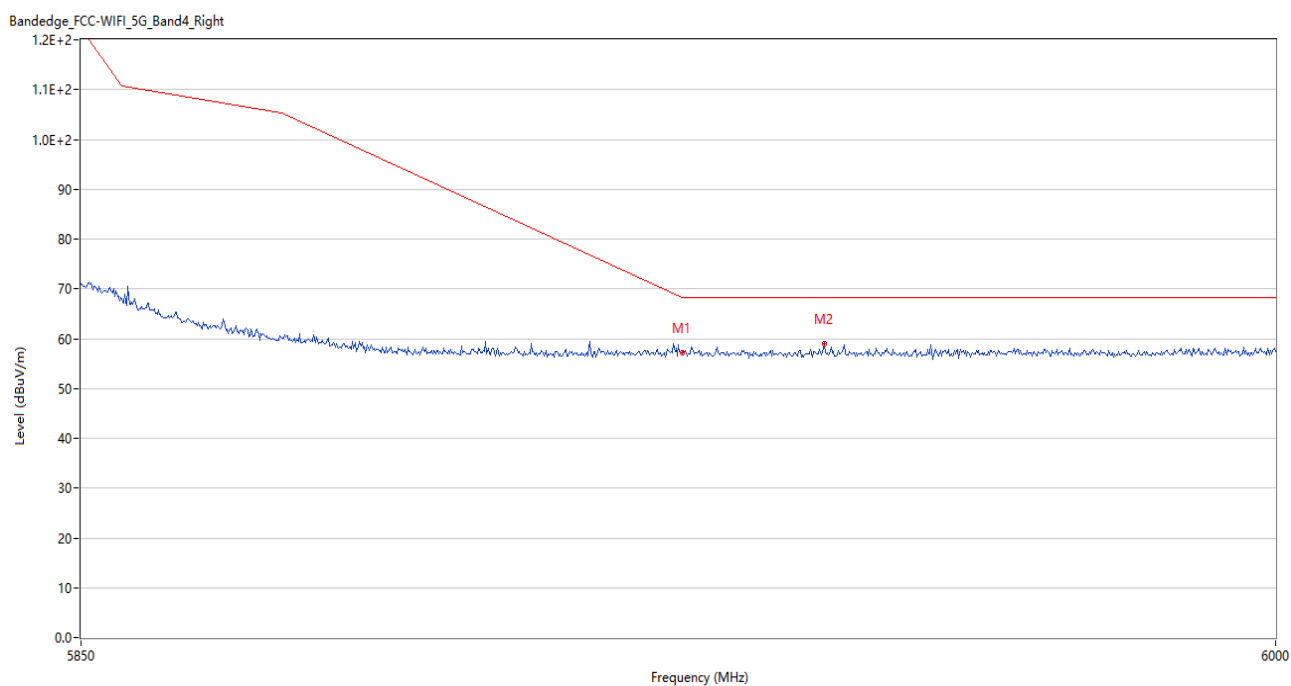
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5150.000	60.53	3.82	74.0	13.47	Peak	60.00	150	Horizontal	Pass
1**	5150.000	51.87	3.82	54.0	2.13	AV	60.00	150	Horizontal	Pass
2	5149.350	61.88	3.84	74.0	12.12	Peak	46.00	150	Horizontal	Pass
2**	5149.350	49.92	3.84	54.0	4.08	AV	46.00	150	Horizontal	Pass
3	5148.050	61.24	3.87	74.0	12.76	Peak	48.00	150	Horizontal	Pass
3**	5148.050	51.11	3.87	54.0	2.89	AV	48.00	150	Horizontal	Pass

U-NII-3 11ac20 CH149



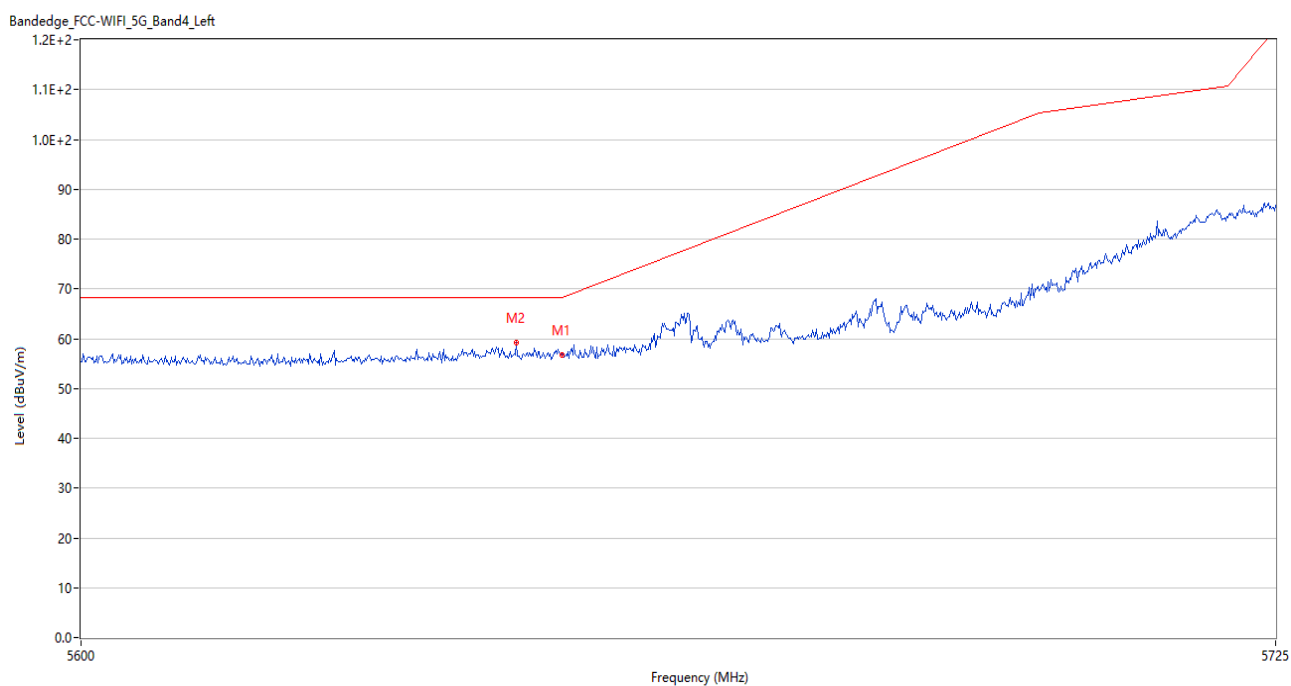
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5650.000	55.40	3.81	68.2	12.80	Peak	306.88	150	Vertical	Pass
2	5641.625	57.36	3.74	68.2	10.84	Peak	31.00	150	Vertical	Pass

U-NII-3 11ac20 CH165



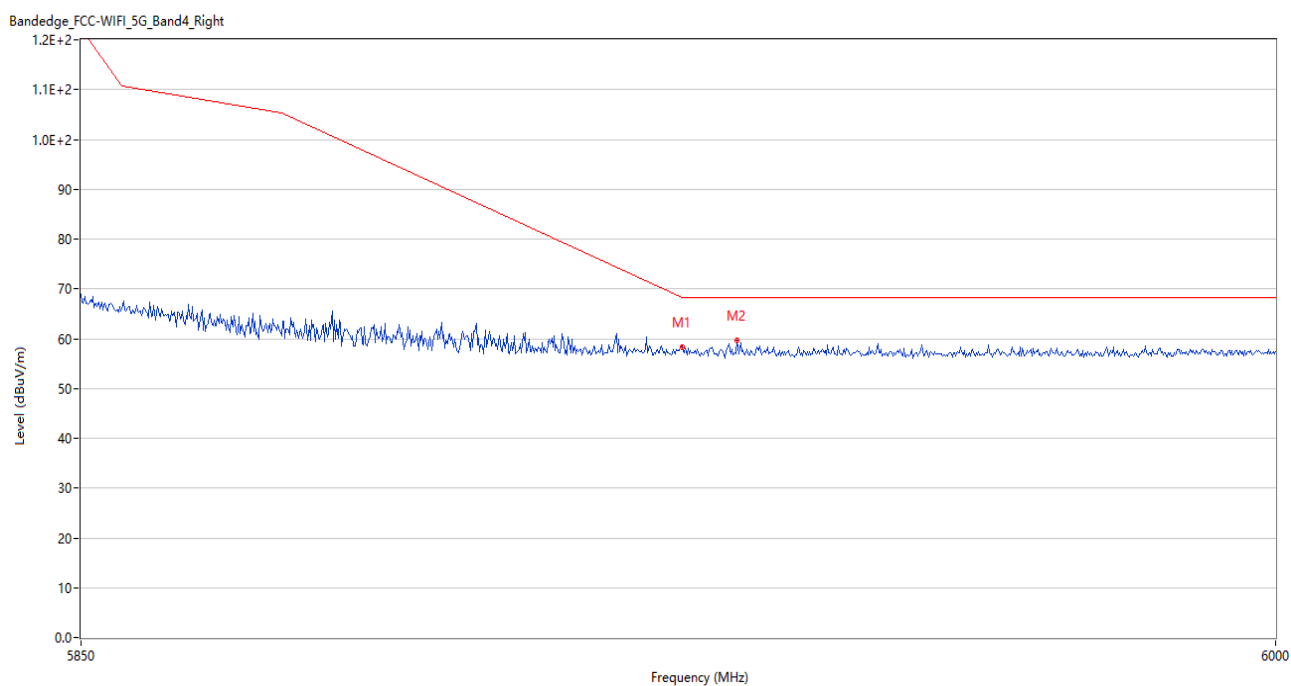
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5925.000	57.07	6.44	68.2	11.13	Peak	102.12	150	Horizontal	Pass
2	5942.850	59.06	6.10	68.2	9.14	Peak	102.00	150	Horizontal	Pass

U-NII-3 11ac40 CH151



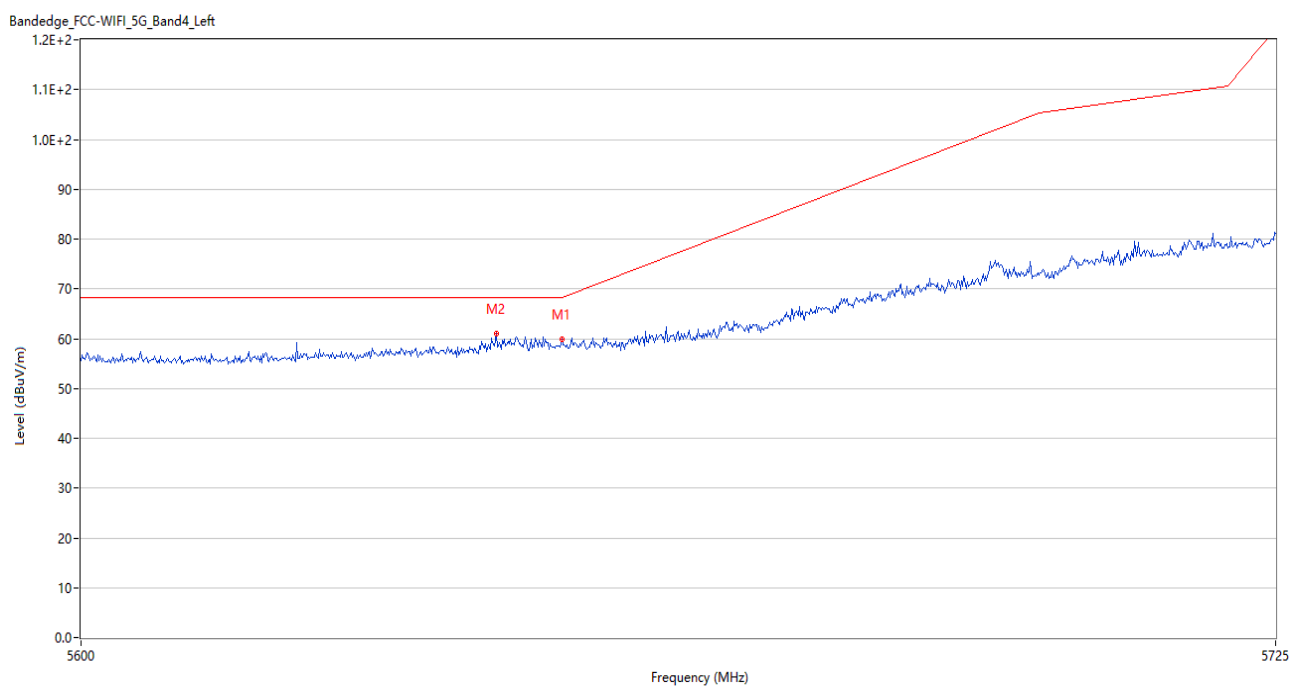
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5650.000	56.62	3.81	68.2	11.58	Peak	9.99	150	Horizontal	Pass
2	5645.250	59.27	3.77	68.2	8.93	Peak	16.00	150	Horizontal	Pass

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No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5925.000	58.37	6.44	68.2	9.83	Peak	21.97	150	Vertical	Pass
2	5931.900	59.55	6.28	68.2	8.65	Peak	0.00	150	Vertical	Pass

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No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5650.000	59.78	3.81	68.2	8.42	Peak	17.00	150	Horizontal	Pass
2	5643.125	61.06	3.75	68.2	7.14	Peak	19.00	150	Horizontal	Pass

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SH2520085-AR-1.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SH2520085-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SH2520085-AI.PDF”.

Statement

1. The Testing Center guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
2. For the report with Accreditation Symbol, the items marked with "☆" are not within the accredited scope.
3. This report is invalid if it is altered, without the signature of the testing and approval personnel, or without the test report stamp.
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