TEST REPORT

Applicant:	Franklin Technology Inc.
Address:	906 JEI Platz, 186, Gasan digital 1-ro, Geumcheon-gu, Seoul 08502 Korea
Equipment Type:	Mobile Hotspot
Model Name:	RG2100
Brand Name:	N/A
FCC ID:	XHG-RG2100
Test Standard:	47 CFR Part 15 Subpart E (refer to section 3.1)
Sample Arrival Date:	Nov. 14, 2023
Test Date:	Nov. 15, 2023 - Nov. 20, 2023
Date of Issue:	Nov. 29, 2023

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Julie Zhu **Checked by:** Ye Hongji **Approved by:** Liao Jianming (Technical Director)

Revision History

Version	Issue Date	Revisions
Rev. 01	Nov. 29, 2023	Initial Issue

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1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	☑ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☐ 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Franklin Technology Inc.
Address	906 JEI Platz, 186, Gasan digital 1-ro, Geumcheon-gu, Seoul 08502 Korea

2.2 Manufacturer Information

Manufacturer	Franklin Technology Inc.
Address	906 JEI Platz, 186, Gasan digital 1-ro, Geumcheon-gu, Seoul 08502 Korea

2.3 General Description for Equipment under Test (EUT)

EUT Name	Mobile Hotspot
Model Name Under Test	RG2100
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	P1
Software Version	RG2100.TM.1639
Dimensions (Approx.)	130.0x84.0x18.9(mm)
Weight (Approx.)	235g

2.4 Technical Information

Network and Wireless connectivity	WIFI 802.11a, 802.11b, 802.11g, 802.11n, 802.11ac and 802.11ax U-NII-1/3

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
Product Type		☐ Mobile ☒ Portable ☐ Fix Location
Modulation technology		OFDM, OFDMA
Modulation Type		1024QAM, 256QAM, 64QAM, 16QAM, BPSK, QPSK
Transfer Rate (Mbps) (Single RF path)		802.11a: 54/ 48/ 36/ 24/ 18/ 12/ 9/ 6 Mbps 802.11n: up to 150 Mbps 802.11ac: up to VHT-MCS9 802.11ax up to 1201 Mbps
Channel Bandwidth		802.11a: 20 MHz 802.11n: 20 MHz, 40 MHz 802.11ac: 20 MHz, 40 MHz, 80 MHz 802.11ax: 20 MHz, 40 MHz, 80 MHz
Maximum Output Power		U-NII-1: 41.13 mW U-NII-3: 39.14 mW
Antenna System (eg., MIMO, Smart Antenna)		Cyclic Delay Diversity (CDD) for 802.11a Multi Input Multi Output (MIMO) for 802.11n/ac/ax
Categorization as Correlated or Completely Uncorrelated		Categorization as Correlated for 802.11a Categorization as Uncorrelated for 802.11n/ac/ax
Antenna Type		PIFA Antenna
Antenna Gain	SISO-1	U-NII-1: 5150 MHz to 5250 MHz: -3.00 dBi U-NII-3: 5725 MHz to 5850 MHz: -3.00 dBi
	SISO -2	U-NII-1: 5150 MHz to 5250 MHz: -2.84 dBi U-NII-3: 5725 MHz to 5850 MHz: -2.84 dBi
Total directional gain	For power spectral density(PSD) measurements	Correlated: U-NII-1: 5150 MHz to 5250 MHz: 0.09 dBi U-NII-3: 5725 MHz to 5850 MHz: 0.09 dBi Formulas: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2$ /NANT] dBi Uncorrelated: U-NII-1: 5150 MHz to 5250 MHz: -2.92 dBi U-NII-3: 5725 MHz to 5850 MHz: -2.92 dBi Formulas: Directional gain = 10 log[$(10^{G1/10} + 10^{G2/10} + \ldots + 10^{GN/10})$/NANT] dBi
	For power measurement	Correlated:

	s	U-NII-1: 5150 MHz to 5250 MHz: 0.09 dBi U-NII-3: 5725 MHz to 5850 MHz: 0.09 dBi Formulas: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2$ /NANT] dBi Uncorrelated: U-NII-1: 5150 MHz to 5250 MHz: -2.92 dBi U-NII-3: 5725 MHz to 5850 MHz: -2.92 dBi Formulas: Directional gain = 10 log[$(10^{G1/10} + 10^{G2/10} + \ldots + 10^{GN/10})$/NANT] dBi
About the Product		The equipment is Mobile Hotspot, intended for used with information technology equipment.

Mode	Antenna		
	SISO-1	SISO-2	MIMO
802.11a	√	√	--
802.11n20	√	√	√
802.11n40	√	√	√
802.11ac20	√	√	√
802.11ac40	√	√	√
802.11ac80	√	√	√
802.11ax20	√	√	√
802.11ax40	√	√	√
802.11ax80	√	√	√
Note: All the configurations were tested, but only the worst data was shown in this report.			

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**
44	**5220**	**46**	**5230**	**155**	**5775**
48	**5240**	**151**	**5755**		
149	**5745**	**159**	**5795**		
157	**5785**				
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 802.11/n(HT20)/ac(VHT20)/ax(HE20)

U-NII-1 (5150 - 5250 MHz)			U-NII-2A (5250 - 5350 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)/ax(HE40)

U-NII-1 (5150 - 5250 MHz)			U-NII-2A (5250 - 5350 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)/ax(HE80)

U-NII-1 (5150 - 5250 MHz)			U-NII-2A (5250 - 5350 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	11a	6	BPSK	48/44/36	165/157/149
	11n(20 MHz)	6.5		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
	11ax(20 MHz)	4		48/44/36	165/157/149
	11ax(40 MHz)	8		46/38	159/151
	11ax(80 MHz)	17		42	155
Emission Bandwidth & 99% Occupied	11a	6	BPSK	48/44/36	165/157/149
	11n(20 MHz)	6.5		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

Bandwidth	11ac(40 MHz)	13.5		46/38	159/151
	11ac(80 MHz)	29.3		42	155
	11ax(20 MHz)	4		48/44/36	165/157/149
	11ax(40 MHz)	8		46/38	159/151
	11ax(80 MHz)	17		42	155
6 dB bandwidth	11a	6	BPSK	N/A	165/157/149
	11n(20 MHz)	6.5		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
	11ax(20 MHz)	4		N/A	165/157/149
	11ax(40 MHz)	8		N/A	159/151
	11ax(80 MHz)	17		N/A	155
Power Spectral Density	11a	6	BPSK	48/44/36	165/157/149
	11n(20 MHz)	6.5		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
	11ax(20 MHz)	4		48/44/36	165/157/149
	11ax(40 MHz)	8		46/38	159/151
	11ax(80 MHz)	17		42	155
Radiated Spurious Emissions	11a	6	BPSK	48/44/36	165/157/149
	11n(20 MHz)	6.5		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
	11ax(20 MHz)	4		48/44/36	165/157/149
	11ax(40 MHz)	8		46/38	159/151
	11ax(80 MHz)	17		42	155
Band Edge (Restricted-band)	11a	6	BPSK	48/36	165/149
	11n(20 MHz)	6.5		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
	11ax(20 MHz)	4		48/36	165/149
	11ax(40 MHz)	8		46/38	159/151
	11ax(80 MHz)	17		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	KDB Publication 662911 D01v02r01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band (e.g., MIMO, Smart Antenna, etc)
4	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

3.2 Test Verdict

No.	Description	FCC Part No.	Test Result	Verdict
1	Antenna Requirement	15.203	--	Pass[Note1]
2	RF Output Power	15.407(a)	ANNEX A.1	Pass
3	Emission Bandwidth & 99% Occupied Bandwidth	15.407(a)	ANNEX A.2	Pass
4	6 dB bandwidth	15.407(e)	ANNEX A.3	Pass
5	Power Spectral Density	15.407(a)	ANNEX A.4	Pass
6	Conducted Emission	15.207	ANNEX A.5	Pass
7	Radiated Spurious Emissions and Band Edge (Restricted-band)	15.407(b)	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: Under all normal operating conditions specified in the user manual, frequency stability can keep radiation within the operating frequency band.

Note 3: Compared with the EUT of test report FR262007-01B, the changes of the EUT of this report as below:

1. Changed the supplier of 2.4G and 5G WIFI FEM.

Other hardware circuit and software are the same as EUT referred in test report FR262007-01B. Therefore, only the 2 test items, which include RF Output Power, Radiated Spurious Emissions and Band Edge (Restricted-band), were tested in this report, others test data please refer report FR262007-01B, which was issued by Sporton International Inc. (Kunshan) on Sep. 09, 2022.

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

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

Relative Humidity	48% to 68%	
Atmospheric Pressure	100 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	+21.6℃ to +23.6℃
Working Voltage of the EUT	NV (Normal Voltage)	3.8 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	KEYSIGHT	N9020A	MY50330200	2023.05.16	2024.05.15
Power Sensor	KEYSIGHT	U2063XA	MY58000251	2023.07.12	2024.07.11
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-40	101544	2022.12.28	2023.12.27
Spectrum Analyzer	KEYSIGHT	N9020A	MY52510065	2023.09.05	2024.09.04
Signaling Unit	ROHDE&SCHWARZ	CMW500	171150	2023.06.19	2024.06.18
Test Antenna-Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	01631	2022.02.03	2025.02.02
Test Antenna-Horn (18-40 GHz)	A-INFO	LB-180400KF	J211060273	2021.07.02	2024.07.01
Anechoic Chamber	RAINFORD	9m*6m*6m	144	2022.02.19	2024.09.03
Amplifier	COM-MV	ZT30-1000M	18110850	2023.09.05	2024.09.04
Amplifier	COM-MV	LSCX_LNA 1-12G-01	180602	2023.09.05	2024.09.04
Amplifier	COM-MV	XKu_LNA7-18G-01	180601	2023.09.05	2024.09.04
Amplifier	COM-MV	KA LNA18 40G-01	18050001	2022.12.07	2023.12.06

4.3 Test Software List

Description	Manufacturer	Software Version	Serial No.	Applicable test Setup
BL410R	BALUN	V2.1.1.488	N/A	The section 4.5.1
BL410E	BALUN	V22.930	N/A	The section 4.5.2&4.5.3&4.5.4&4.5.5

4.4 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.

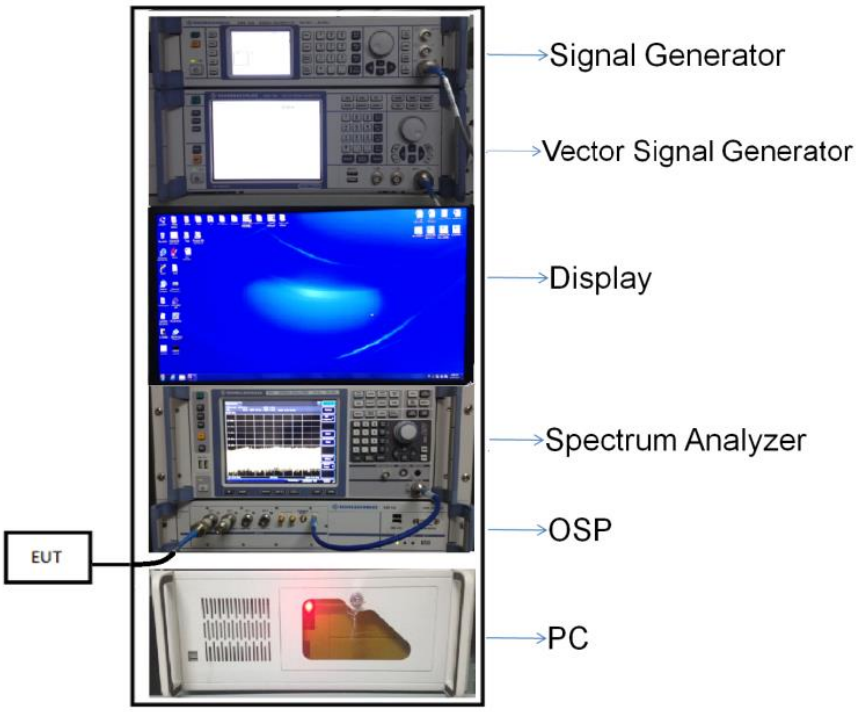
Parameters	Uncertainty
Occupied Channel Bandwidth	2.8%
RF output power, conducted	1.28 dB
Power Spectral Density, conducted	1.30 dB
Unwanted Emissions, conducted	1.84 dB
All emissions, radiated	5.36 dB
Temperature	0.8°C
Humidity	4%

4.5 Description of Test Setup

4.5.1 For Antenna Port Test

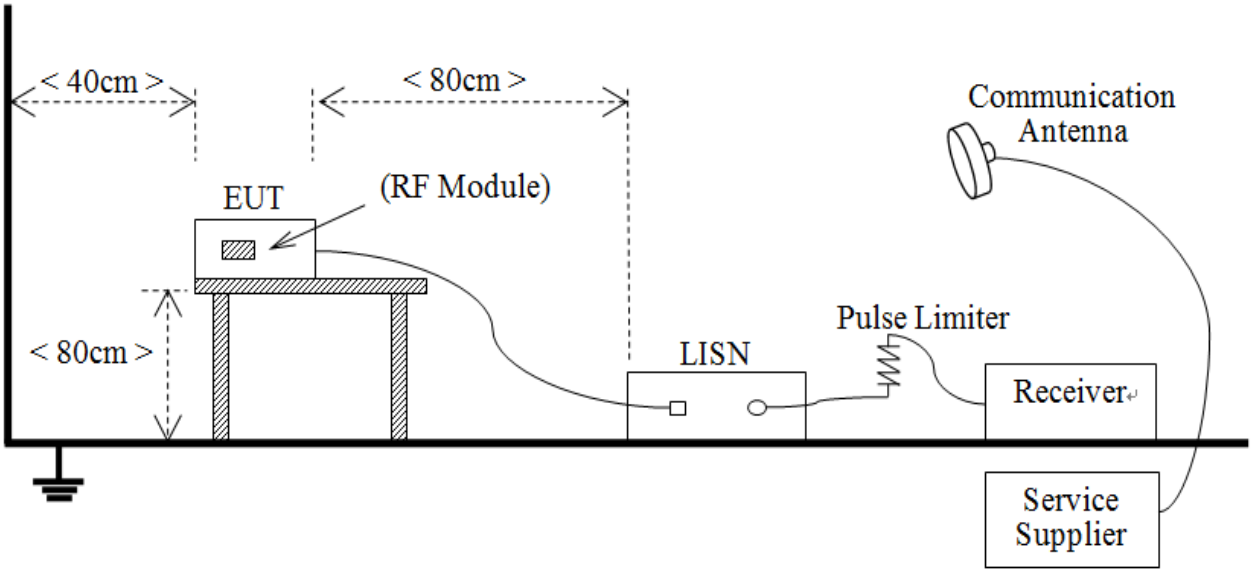
Conducted value (dBm) = Measurement value (dBm) + cable loss (dB)

For example: the measurement value is 10 dBm and the cable 0.5dBm used, then the final result of EUT:
Conducted value (dBm) = 10 dBm + 0.5 dB = 10.5 dBm



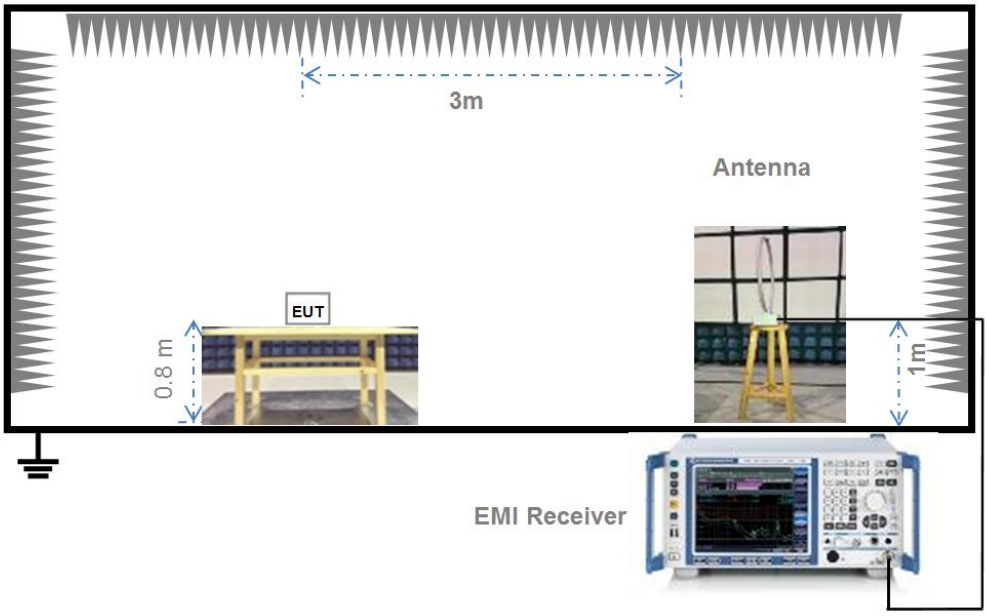
(Diagram 1)

4.5.2 For AC Power Supply Port Test



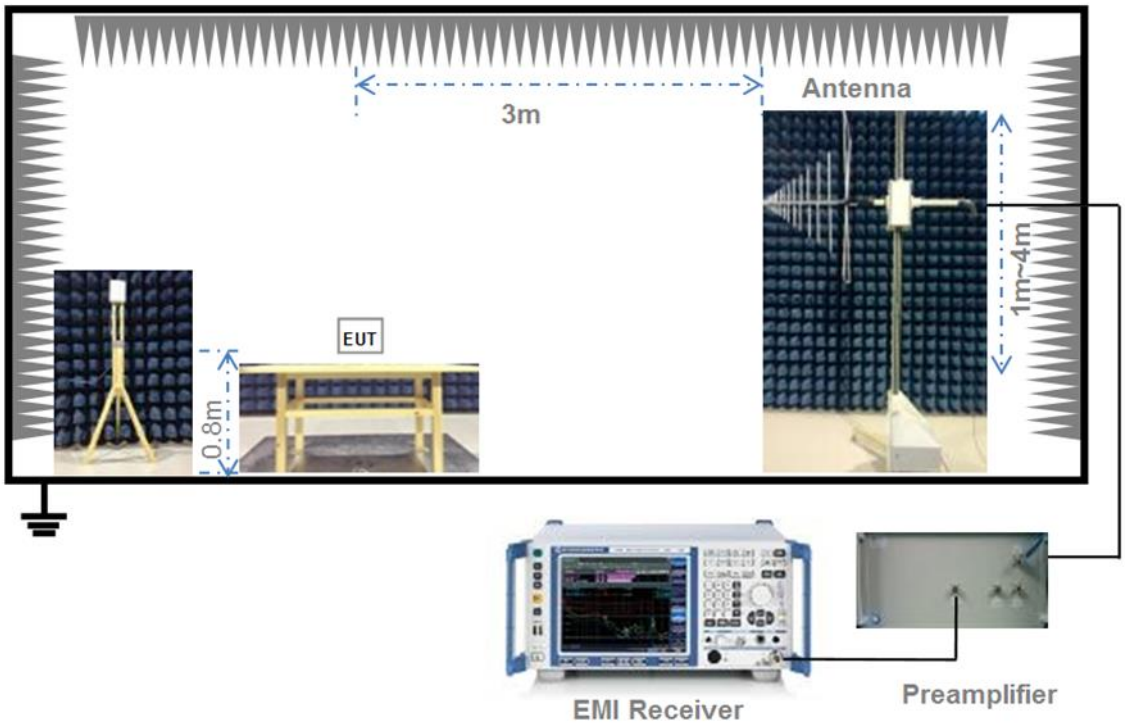
(Diagram 2)

4.5.3 For Radiated Test (Below 30 MHz)



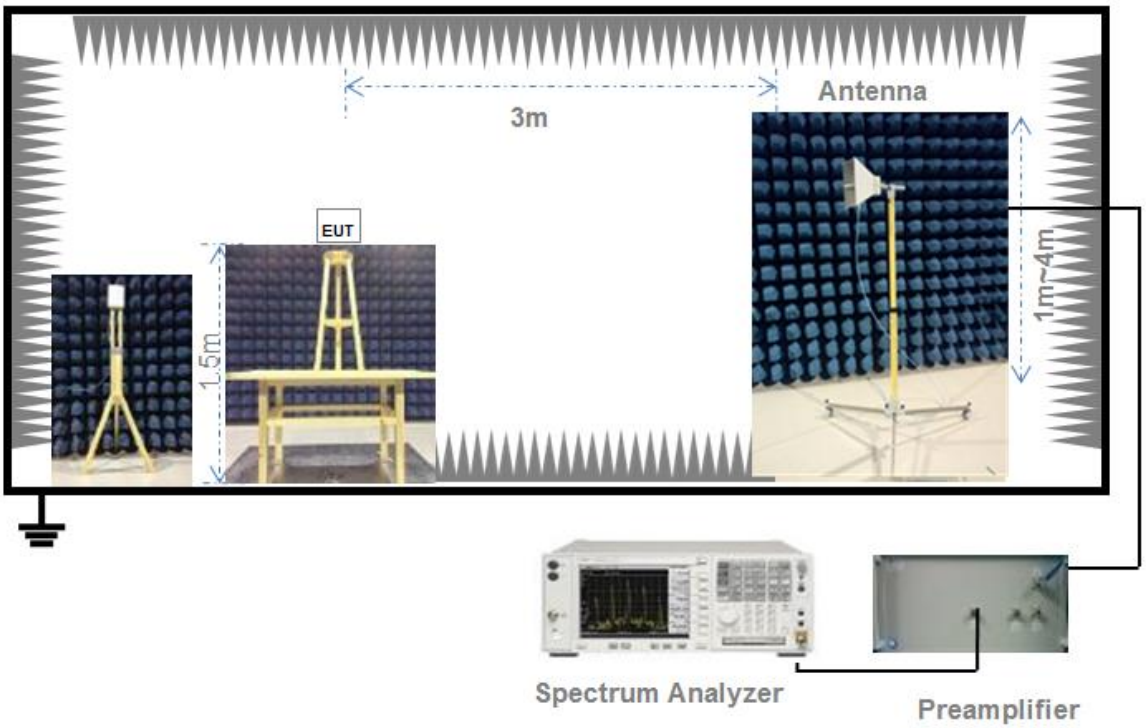
(Diagram 3)

4.5.4 For Radiated Test (30 MHz-1 GHz)



(Diagram 4)

4.5.5 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 4.5.1 (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

The maximum peak conducted output power may be measured using a broadband Average RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the emission bandwidth and utilize a fast-responding diode detector.

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 4.5.1 (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 ≥ 3*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 ≥ 3*RBW, Detector = Peak.

4. Trace mode = Max hold.

5. Use the 99% power bandwidth function of the instrument.

6 dB bandwidth

1. Set RBW = 100 kHz, VBW = 300 kHz.

2. Detector = Peak.Trace mode = Max hold.

3. Allow the trace to stabilize.

4. 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 4.5.1 (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 ≥ 3*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 50μH/50Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dBμV)	
	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 4.5.2 (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.

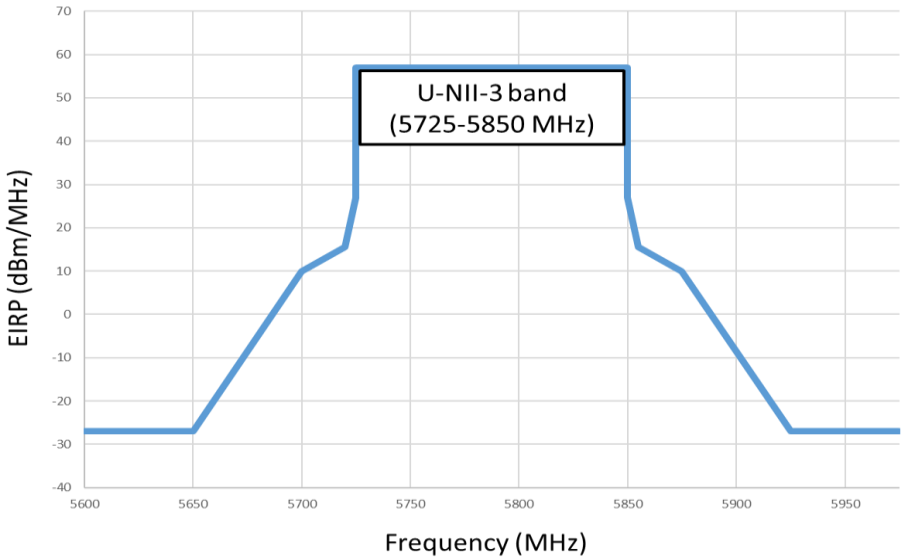
5.5 Radiated Spurious Emissions and Band Edge (Restricted-band)

5.5.1 Limit

FCC §15.209 & 15.407(b)

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
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

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 4.5.3-4.5.5 (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 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).

c) 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).

d) Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:

$E = EIRP – 20\log D + 104.8$

where:

E = electric field strength in dBμV/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

e) Compare the resultant electric field strength level to the applicable limit.

f) 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 ≥ 3 x 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 ≥ 3 x RBW.

e) Detector = RMS, if span/(# of points in sweep) ≤ (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 ≥ 1 GHz, 100 kHz for f < 1 GHz
VBW ≥ 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.

Duty Cycle

Test Mode	On Time (ms)	On+Off time (ms)	Duty Cycle
11n (HT20)/11ac (VHT20)	5.36	5.38	99.61%
11n (HT40)/11ac (VHT40)	4.69	4.70	99.66%
11ac (VHT80)	2.44	2.45	99.39%
802.11ax20	5.42	5.43	99.72%
802.11ax40	4.10	4.12	99.59%
802.11ax80	2.21	2.23	99.19%

Test Data

Conducted Power

MIMO-1

U-NII-1 (5150 - 5250 MHz)					
Mode	Channel	Conducted Power (dBm)	Conducted Power (mW)	FCC Limit (mW)	Verdict
11n (HT20)	CH36	13.02	20.04	250	Pass
11n (HT20)	CH44	12.74	18.79	250	Pass
11n (HT20)	CH48	12.75	18.84	250	Pass
11n (HT40)	CH38	11.56	14.32	250	Pass
11n (HT40)	CH46	12.89	19.45	250	Pass
11ac (VHT20)	CH36	12.46	17.62	250	Pass
11ac (VHT20)	CH44	12.21	16.63	250	Pass
11ac (VHT20)	CH48	11.78	15.07	250	Pass
11ac (VHT40)	CH38	11.12	12.94	250	Pass
11ac (VHT40)	CH46	10.86	12.19	250	Pass
11ac (VHT80)	CH42	11.77	15.03	250	Pass
11ax (HE20) (SU)	CH36	12.85	19.28	250	Pass
11ax (HE20) (SU)	CH44	12.74	18.79	250	Pass
11ax (HE20) (SU)	CH48	12.76	18.88	250	Pass
11ax (HE40) (SU)	CH38	11.15	13.03	250	Pass
11ax (HE40) (SU)	CH46	12.44	17.54	250	Pass
11ax (HE80) (SU)	CH42	11.85	15.31	250	Pass

U-NII-3 (5725 - 5850 MHz)					
Mode	Channel	Conducted Power (dBm)	Conducted Power (mW)	FCC Limit (mW)	Verdict
11n (HT20)	CH149	13.04	20.14	1000	Pass
11n (HT20)	CH157	12.97	19.82	1000	Pass
11n (HT20)	CH165	13.12	20.51	1000	Pass
11n (HT40)	CH151	13.02	20.04	1000	Pass
11n (HT40)	CH159	13.07	20.28	1000	Pass
11ac (VHT20)	CH149	12.14	16.37	1000	Pass
11ac (VHT20)	CH157	11.98	15.78	1000	Pass
11ac (VHT20)	CH165	12.12	16.29	1000	Pass
11ac (VHT40)	CH151	10.56	11.38	1000	Pass
11ac (VHT40)	CH159	11.02	12.65	1000	Pass
11ac (VHT80)	CH155	11.41	13.84	1000	Pass
11ax (HE20) (SU)	CH149	13.02	20.04	1000	Pass
11ax (HE20) (SU)	CH157	12.78	18.97	1000	Pass
11ax (HE20) (SU)	CH165	12.74	18.79	1000	Pass
11ax (HE40) (SU)	CH151	12.54	17.95	1000	Pass
11ax (HE40) (SU)	CH159	12.57	18.07	1000	Pass
11ax (HE80) (SU)	CH155	12.85	19.28	1000	Pass

MIMO-2

U-NII-1 (5150 - 5250 MHz)					
Mode	Channel	Conducted Power (dBm)	Conducted Power (mW)	FCC Limit (mW)	Verdict
11n (HT20)	CH36	12.89	19.45	250	Pass
11n (HT20)	CH44	13.20	20.89	250	Pass
11n (HT20)	CH48	12.81	19.10	250	Pass
11n (HT40)	CH38	11.34	13.61	250	Pass
11n (HT40)	CH46	13.02	20.04	250	Pass
11ac (VHT20)	CH36	12.32	17.06	250	Pass
11ac (VHT20)	CH44	12.13	16.33	250	Pass
11ac (VHT20)	CH48	11.85	15.31	250	Pass
11ac (VHT40)	CH38	10.84	12.13	250	Pass
11ac (VHT40)	CH46	11.02	12.65	250	Pass
11ac (VHT80)	CH42	11.25	13.34	250	Pass
11ax (HE20) (SU)	CH36	13.24	21.09	250	Pass
11ax (HE20) (SU)	CH44	13.12	20.51	250	Pass
11ax (HE20) (SU)	CH48	12.86	19.32	250	Pass
11ax (HE40) (SU)	CH38	11.25	13.34	250	Pass
11ax (HE40) (SU)	CH46	12.96	19.77	250	Pass
11ax (HE80) (SU)	CH42	12.34	17.14	250	Pass

U-NII-3 (5725 - 5850 MHz)					
Mode	Channel	Conducted Power (dBm)	Conducted Power (mW)	FCC Limit (mW)	Verdict
11n (HT20)	CH149	12.84	19.23	1000	Pass
11n (HT20)	CH157	12.64	18.37	1000	Pass
11n (HT20)	CH165	12.27	16.87	1000	Pass
11n (HT40)	CH151	12.40	17.38	1000	Pass
11n (HT40)	CH159	12.81	19.10	1000	Pass
11ac (VHT20)	CH149	11.34	13.61	1000	Pass
11ac (VHT20)	CH157	11.52	14.19	1000	Pass
11ac (VHT20)	CH165	11.23	13.27	1000	Pass
11ac (VHT40)	CH151	10.75	11.89	1000	Pass
11ac (VHT40)	CH159	10.86	12.19	1000	Pass
11ac (VHT80)	CH155	11.41	13.84	1000	Pass
11ax (HE20) (SU)	CH149	12.25	16.79	1000	Pass
11ax (HE20) (SU)	CH157	12.03	15.96	1000	Pass
11ax (HE20) (SU)	CH165	12.01	15.89	1000	Pass
11ax (HE40) (SU)	CH151	11.84	15.28	1000	Pass
11ax (HE40) (SU)	CH159	11.81	15.17	1000	Pass
11ax (HE80) (SU)	CH155	12.43	17.50	1000	Pass

MIMO

U-NII-1 (5150 - 5250 MHz)					
Mode	Channel	Conducted Power (dBm)	Conducted Power (mW)	FCC Limit (mW)	Verdict
11n (HT20)	CH36	15.97	39.50	250	Pass
11n (HT20)	CH44	15.99	39.69	250	Pass
11n (HT20)	CH48	15.79	37.94	250	Pass
11n (HT40)	CH38	14.46	27.94	250	Pass
11n (HT40)	CH46	15.97	39.50	250	Pass
11ac (VHT20)	CH36	15.40	34.68	250	Pass
11ac (VHT20)	CH44	15.18	32.96	250	Pass
11ac (VHT20)	CH48	14.83	30.38	250	Pass
11ac (VHT40)	CH38	13.99	25.08	250	Pass
11ac (VHT40)	CH46	13.95	24.84	250	Pass
11ac (VHT80)	CH42	14.53	28.37	250	Pass
11ax (HE20) (SU)	CH36	16.06	40.36	250	Pass
11ax (HE20) (SU)	CH44	15.94	39.30	250	Pass
11ax (HE20) (SU)	CH48	15.82	38.20	250	Pass
11ax (HE40) (SU)	CH38	14.21	26.37	250	Pass
11ax (HE40) (SU)	CH46	15.72	37.31	250	Pass
11ax (HE80) (SU)	CH42	15.11	32.45	250	Pass

U-NII-3 (5725 - 5850 MHz)					
Mode	Channel	Conducted Power (dBm)	Conducted Power (mW)	FCC Limit (mW)	Verdict
11n (HT20)	CH149	15.95	39.37	1000	Pass
11n (HT20)	CH157	15.82	38.18	1000	Pass
11n (HT20)	CH165	15.73	37.38	1000	Pass
11n (HT40)	CH151	15.73	37.42	1000	Pass
11n (HT40)	CH159	15.95	39.38	1000	Pass
11ac (VHT20)	CH149	14.77	29.98	1000	Pass
11ac (VHT20)	CH157	14.77	29.97	1000	Pass
11ac (VHT20)	CH165	14.71	29.57	1000	Pass
11ac (VHT40)	CH151	13.67	23.26	1000	Pass
11ac (VHT40)	CH159	13.95	24.84	1000	Pass
11ac (VHT80)	CH155	14.42	27.67	1000	Pass
11ax (HE20) (SU)	CH149	15.66	36.83	1000	Pass
11ax (HE20) (SU)	CH157	15.43	34.93	1000	Pass
11ax (HE20) (SU)	CH165	15.40	34.68	1000	Pass
11ax (HE40) (SU)	CH151	15.21	33.22	1000	Pass
11ax (HE40) (SU)	CH159	15.22	33.24	1000	Pass
11ax (HE80) (SU)	CH155	15.66	36.77	1000	Pass

A.2 Emission Bandwidth & 99% Bandwidth

Note: The Emission Bandwidth & 99% Bandwidth please refer to the Report No. FR262007-01B, which issued by Sporton International Inc. (Kunshan) on Sep. 09, 2022, Section **APPENDIX A. CONDUCTED TEST RESULTS**.

A.3 6 dB Bandwidth

Note: The 6 dB Bandwidth please refer to the Report No. FR262007-01B, which issued by Sporton International Inc. (Kunshan) on Sep. 09, 2022, Section **APPENDIX A. CONDUCTED TEST RESULTS**.

A.4 Power Spectral Density

Note: The Power Spectral Density please refer to the Report No. FR262007-01B, which issued by Sporton International Inc. (Kunshan) on Sep. 09, 2022, Section **APPENDIX A. CONDUCTED TEST RESULTS**.

A.5 Conducted Emissions

Note: The Conducted Emissions please refer to the Report No. FR262007-01B, which issued by Sporton International Inc. (Kunshan) on Sep. 09, 2022, Section **APPENDIX A. CONDUCTED TEST RESULTS**.

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

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 below 1 GHz please refer to the Report No. FR262007-01A, which issued by Sporton International Inc. (Kunshan) on Sep. 09, 2022, Section **Appendix A. Radiated Emission**

Note [5]: For Multiple transmitter output, the quantity *10 log (NANT)* dB is added to each spectrum value before comparing to the emission limit. When testing out-of-band and spurious emissions against relative emission limits, tests may be performed on each output individually without summing or adding *10 log(NANT)* if the measurements are made relative to the in-band emissions on the individual outputs.

Test Data and Plots

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

MIMO

11n20, U-NII-1, 1 GHz to 18 GHz, Middle Channel, ANT H

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1553.400	38.84	-17.32	74.0	35.16	Peak	290.00	400	Horizontal	Pass
1**	1553.400	29.16	-17.32	54.0	24.84	AV	290.00	400	Horizontal	Pass
2	4344.200	49.76	-4.19	74.0	24.24	Peak	6.00	300	Horizontal	Pass
2**	4344.200	39.29	-4.19	54.0	14.71	AV	6.00	300	Horizontal	Pass
3	5226.600	110.05	-2.54	--	--	Peak	103.00	100	Horizontal	N/A
3**	5226.600	100.89	-2.54	--	--	AV	103.00	100	Horizontal	N/A
4	7684.537	50.01	-2.31	74.0	23.99	Peak	220.00	400	Horizontal	Pass
4**	7684.537	40.65	-2.31	54.0	13.35	AV	220.00	400	Horizontal	Pass
5	12298.912	53.64	1.50	74.0	20.36	Peak	204.00	100	Horizontal	Pass
5**	12298.912	43.54	1.50	54.0	10.46	AV	204.00	100	Horizontal	Pass
6	15614.662	55.84	1.47	74.0	18.16	Peak	161.00	400	Horizontal	Pass
6**	15614.662	46.47	1.47	54.0	7.53	AV	161.00	400	Horizontal	Pass

11n20, U-NII-1, 1 GHz to 18 GHz, Middle Channel, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1494.000	40.82	-17.64	74.0	33.18	Peak	118.00	300	Vertical	Pass
1**	1494.000	33.52	-17.64	54.0	20.48	AV	118.00	300	Vertical	Pass
2	4349.000	50.00	-3.81	74.0	24.00	Peak	140.00	100	Vertical	Pass
2**	4349.000	41.15	-3.81	54.0	12.85	AV	140.00	100	Vertical	Pass
3	5223.000	106.86	-2.67	--	--	Peak	243.00	200	Vertical	N/A
3**	5223.000	99.89	-2.67	--	--	AV	243.00	200	Vertical	N/A
4	7568.388	49.53	-3.11	74.0	24.47	Peak	45.00	300	Vertical	Pass
4**	7568.388	39.19	-3.11	54.0	14.81	AV	45.00	300	Vertical	Pass
5	12275.049	53.25	1.62	74.0	20.75	Peak	45.00	200	Vertical	Pass
5**	12275.049	43.96	1.62	54.0	10.04	AV	45.00	200	Vertical	Pass
6	15855.638	56.10	1.16	74.0	17.90	Peak	236.00	200	Vertical	Pass
6**	15855.638	46.72	1.16	54.0	7.28	AV	236.00	200	Vertical	Pass

11n20, U-NII-3, 1 GHz to 18 GHz, Middle Channel, ANT H

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1615.400	38.27	-17.79	74.0	35.73	Peak	240.00	200	Horizontal	Pass
1**	1615.400	28.28	-17.79	54.0	25.72	AV	240.00	200	Horizontal	Pass
2	4378.800	49.43	-4.54	74.0	24.57	Peak	360.00	200	Horizontal	Pass
2**	4378.800	40.33	-4.54	54.0	13.67	AV	360.00	200	Horizontal	Pass
3	5824.000	110.82	-2.19	--	--	Peak	108.00	150	Horizontal	N/A
3**	5824.000	103.42	-2.19	--	--	AV	108.00	150	Horizontal	N/A
4	7348.163	49.90	-3.15	74.0	24.10	Peak	348.00	300	Horizontal	Pass
4**	7348.163	41.02	-3.15	54.0	12.98	AV	348.00	300	Horizontal	Pass
5	12273.037	53.63	1.55	74.0	20.37	Peak	205.00	100	Horizontal	Pass
5**	12273.037	43.43	1.55	54.0	10.57	AV	205.00	100	Horizontal	Pass
6	15622.275	56.27	1.67	74.0	17.73	Peak	106.00	200	Horizontal	Pass
6**	15622.275	46.05	1.67	54.0	7.95	AV	106.00	200	Horizontal	Pass

11n20, U-NII-3, 1 GHz to 18 GHz, Middle Channel, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1499.300	40.68	-17.52	74.0	33.32	Peak	114.00	400	Vertical	Pass
1**	1499.300	31.01	-17.52	54.0	22.99	AV	114.00	400	Vertical	Pass
2	4250.800	49.84	-5.18	74.0	24.16	Peak	181.00	200	Vertical	Pass
2**	4250.800	39.78	-5.18	54.0	14.22	AV	181.00	200	Vertical	Pass
3	5831.800	107.50	-2.04	--	--	Peak	222.00	100	Vertical	N/A
3**	5831.800	99.64	-2.04	--	--	AV	222.00	100	Vertical	N/A
4	7676.487	49.50	-2.40	74.0	24.50	Peak	172.00	400	Vertical	Pass
4**	7676.487	40.27	-2.40	54.0	13.73	AV	172.00	400	Vertical	Pass
5	12420.813	53.04	1.40	74.0	20.96	Peak	219.00	100	Vertical	Pass
5**	12420.813	43.48	1.40	54.0	10.52	AV	219.00	100	Vertical	Pass
6	15830.963	55.53	1.49	74.0	18.47	Peak	33.00	400	Vertical	Pass
6**	15830.963	46.89	1.49	54.0	7.11	AV	33.00	400	Vertical	Pass

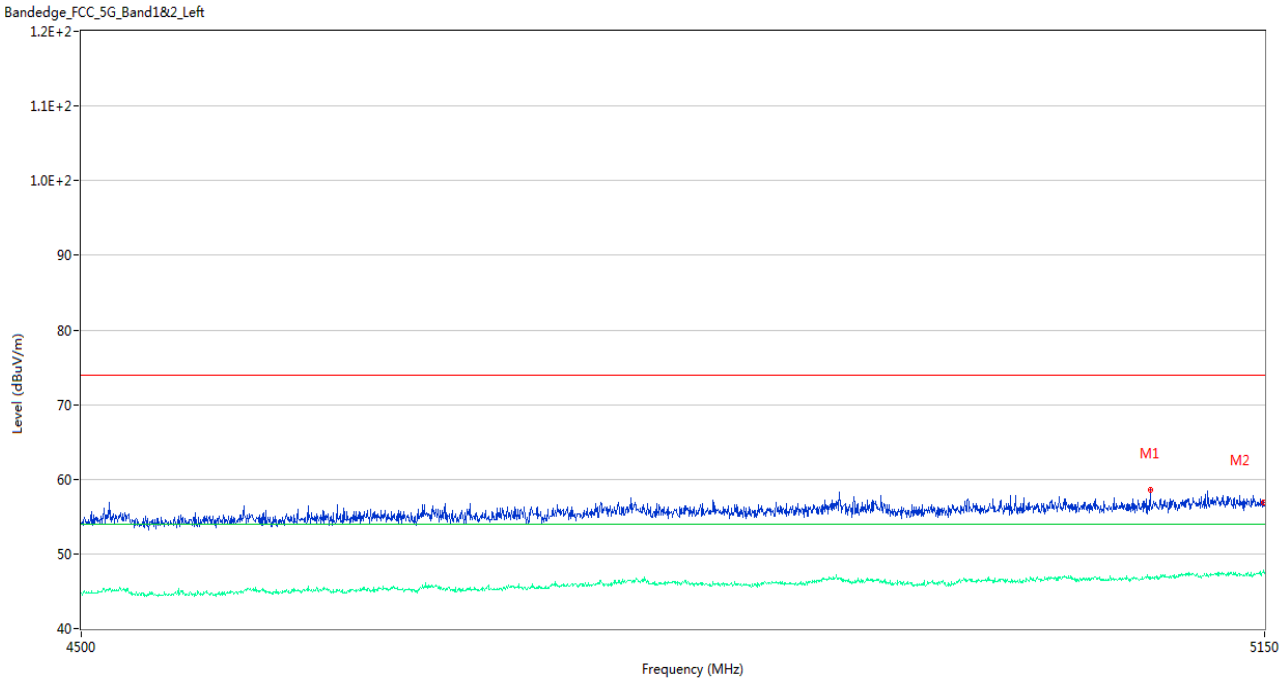
A.6.2 Band Edge (Restricted-band)

Test Band	Mode	Channel	Verdict
U-NII-1	802.11a	Low	Pass
		High	Pass
	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
	802.11ax(HE20) (SU)	Low	Pass
		High	Pass
	802.11ax(HE40) (SU)	Low	Pass
		High	Pass
	802.11ax(HE80) (SU)	Middle	Pass
U-NII-3	802.11a	Low	Pass
		High	Pass
	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
	802.11ax(HE20) (SU)	Low	Pass
		High	Pass
	802.11ax(HE40) (SU)	Low	Pass
		High	Pass
	802.11ax(HE80) (SU)	Middle	Pass

Test Data and Plots

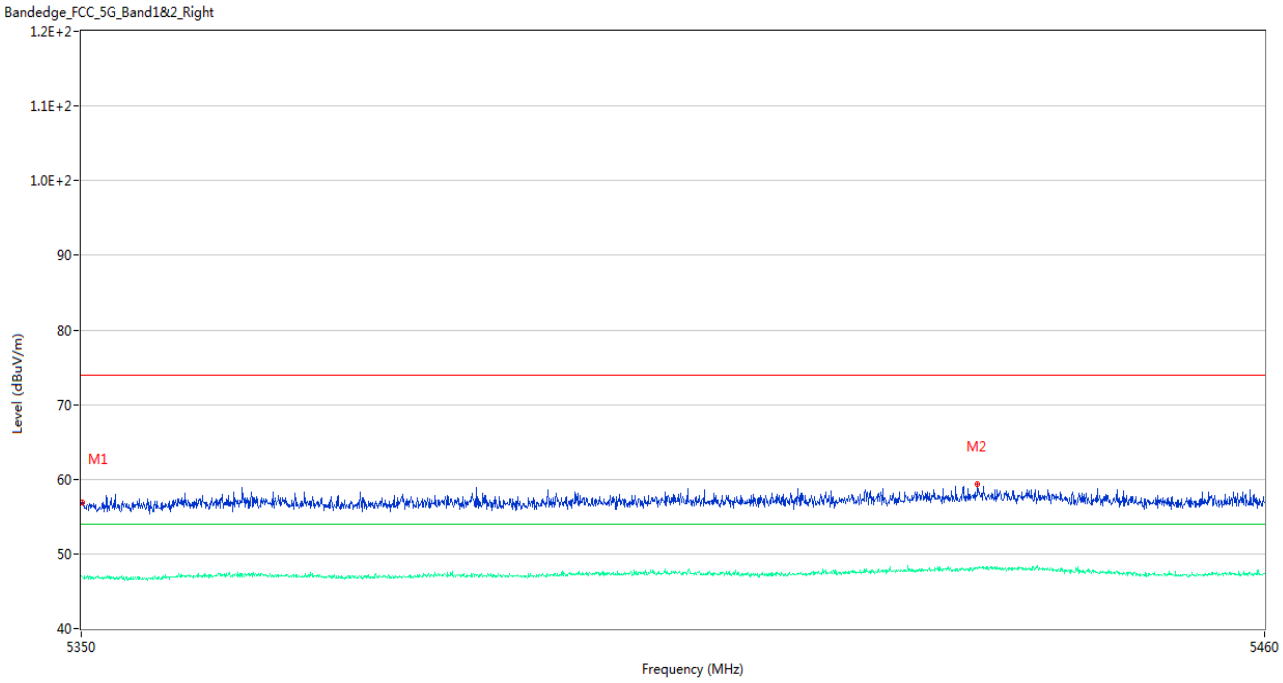
MIMO

U-NII-1 11n20 Low Channel



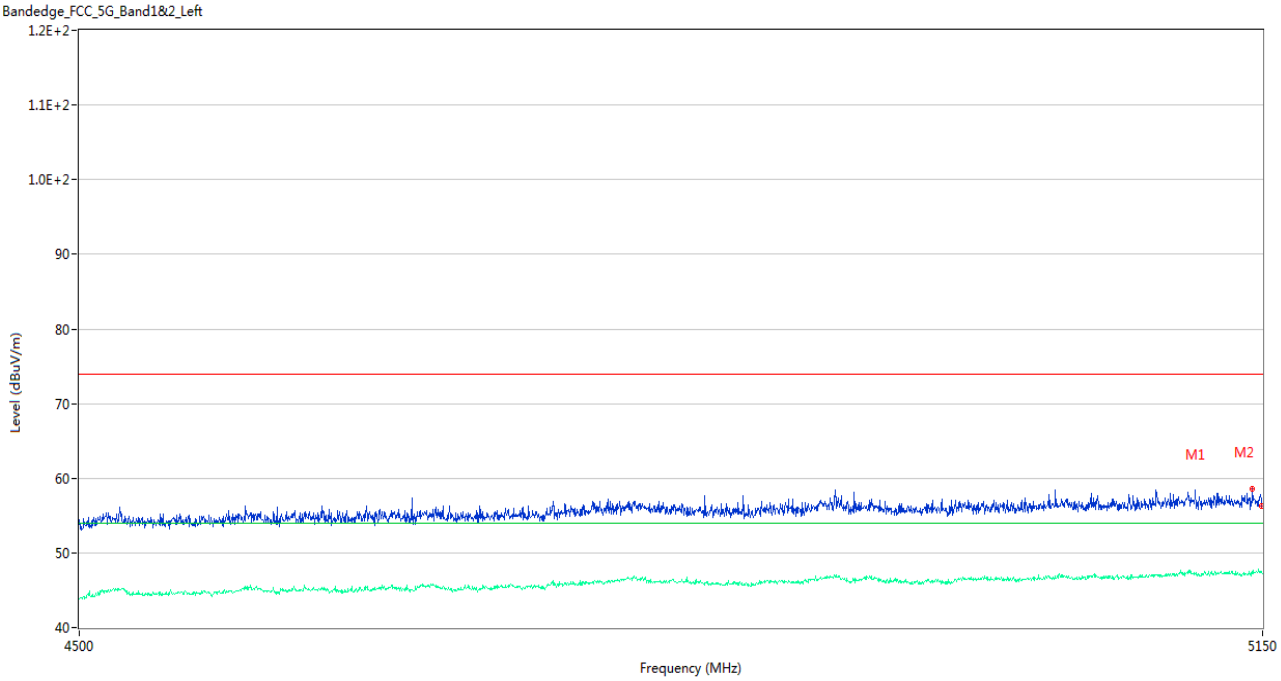
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5083.375	58.53	3.33	74.0	15.47	Peak	333.00	150	Horizontal	Pass
1**	5083.375	46.85	3.33	54.0	7.15	AV	333.00	150	Horizontal	Pass
2	5149.675	56.91	3.43	74.0	17.09	Peak	23.00	100	Horizontal	Pass
2**	5149.675	47.77	3.43	54.0	6.23	AV	23.00	100	Horizontal	Pass

U-NII-1 11n20 High Channel



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5350.055	56.95	3.25	74.0	17.05	Peak	156.00	150	Horizontal	Pass
1**	5350.055	46.94	3.25	54.0	7.06	AV	156.00	150	Horizontal	Pass
2	5433.105	59.42	4.39	74.0	14.58	Peak	123.00	150	Horizontal	Pass
2**	5433.105	48.20	4.39	54.0	5.80	AV	123.00	150	Horizontal	Pass

U-NII-1 11n40 Low Channel

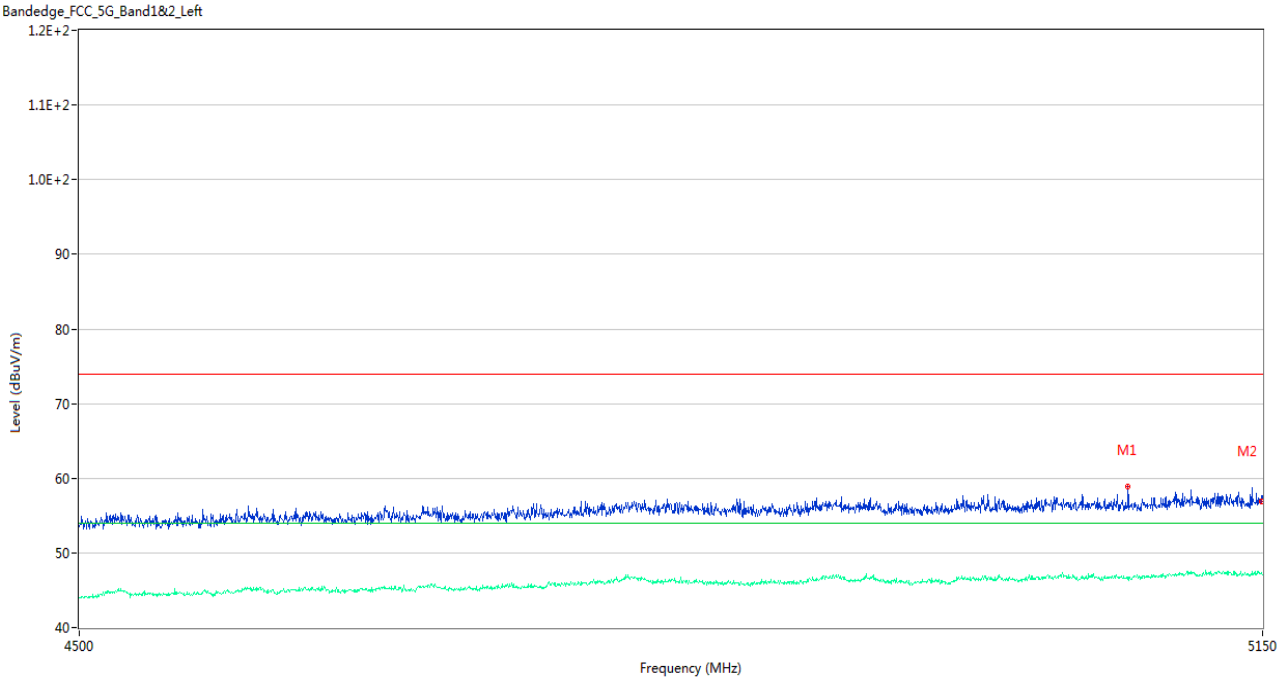


No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5144.150	58.52	3.66	74.0	15.48	Peak	120.00	200	Horizontal	Pass
1**	5144.150	47.56	3.66	54.0	6.44	AV	120.00	200	Horizontal	Pass
2	5149.675	56.30	3.43	74.0	17.70	Peak	68.00	200	Horizontal	Pass
2**	5149.675	47.50	3.43	54.0	6.50	AV	68.00	200	Horizontal	Pass

U-NII-1 11n40 High Channel

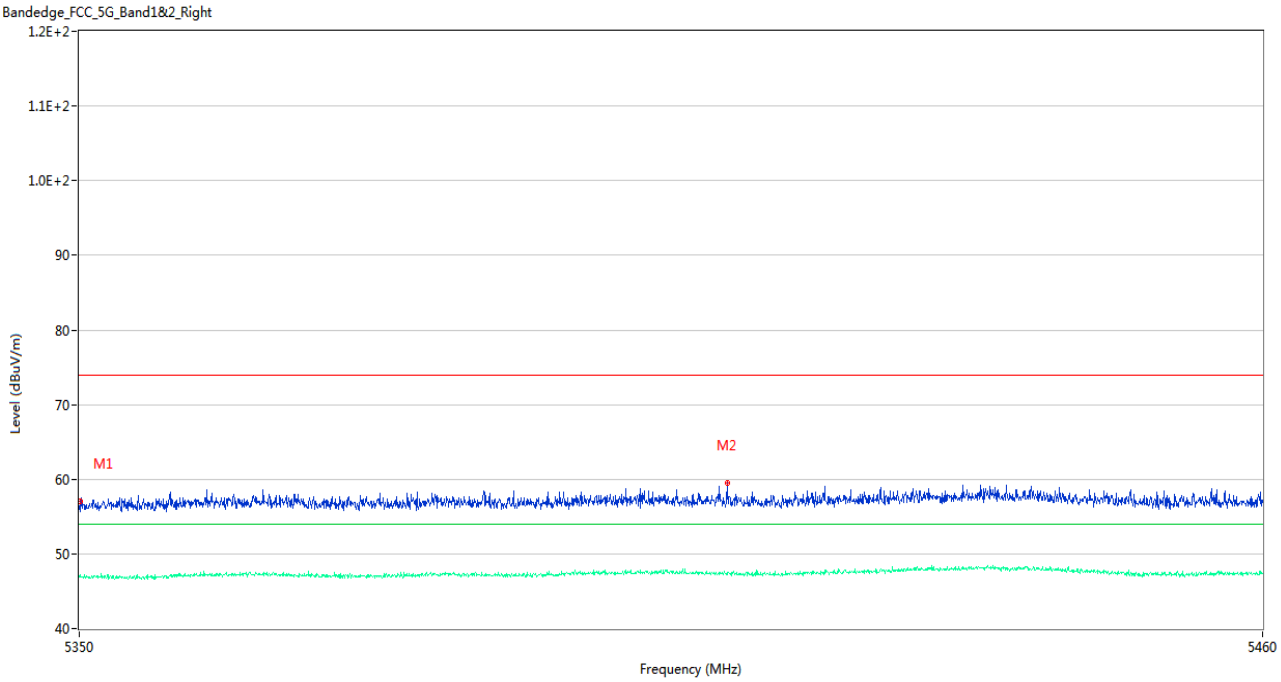
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5350.055	58.29	3.25	74.0	15.71	Peak	245.00	100	Horizontal	Pass
1**	5350.055	46.95	3.25	54.0	7.05	AV	245.00	100	Horizontal	Pass
2	5432.280	59.11	4.27	74.0	14.89	Peak	159.00	150	Horizontal	Pass
2**	5432.280	47.92	4.27	54.0	6.08	AV	159.00	150	Horizontal	Pass

U-NII-1 11ac20 Low Channel



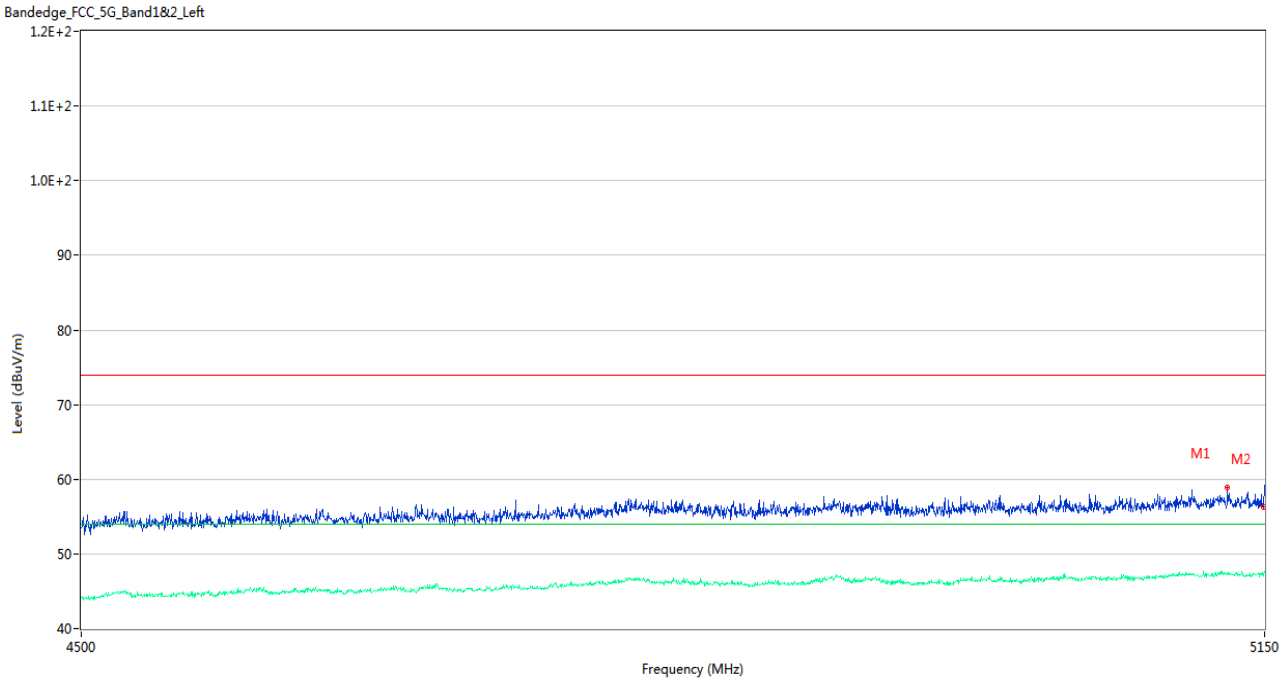
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5071.675	58.83	3.24	74.0	15.17	Peak	242.00	150	Horizontal	Pass
1**	5071.675	46.61	3.24	54.0	7.39	AV	242.00	150	Horizontal	Pass
2	5149.675	56.87	3.43	74.0	17.13	Peak	191.00	200	Horizontal	Pass
2**	5149.675	47.31	3.43	54.0	6.69	AV	191.00	200	Horizontal	Pass

U-NII-1 11ac20 High Channel



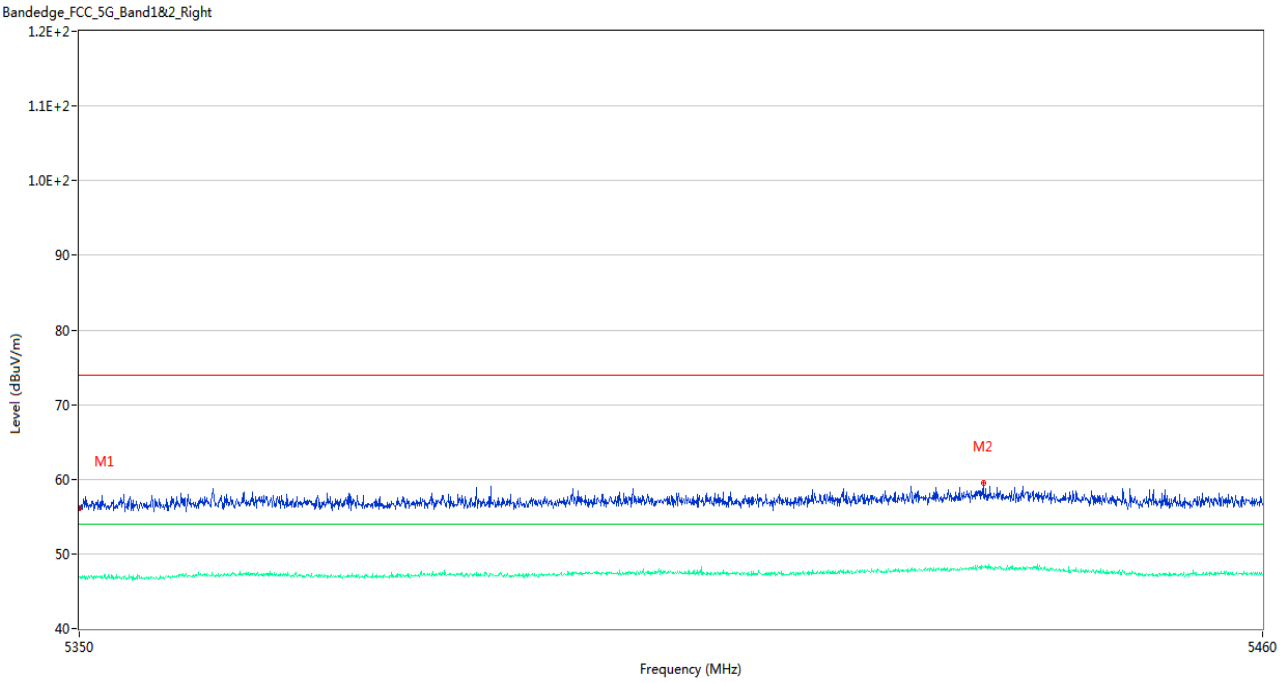
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5350.055	57.07	3.25	74.0	16.93	Peak	84.00	200	Horizontal	Pass
1**	5350.055	47.15	3.25	54.0	6.85	AV	84.00	200	Horizontal	Pass
2	5409.950	59.54	3.78	74.0	14.46	Peak	12.00	150	Horizontal	Pass
2**	5409.950	47.29	3.78	54.0	6.71	AV	12.00	150	Horizontal	Pass

U-NII-1 11ac40 Low Channel



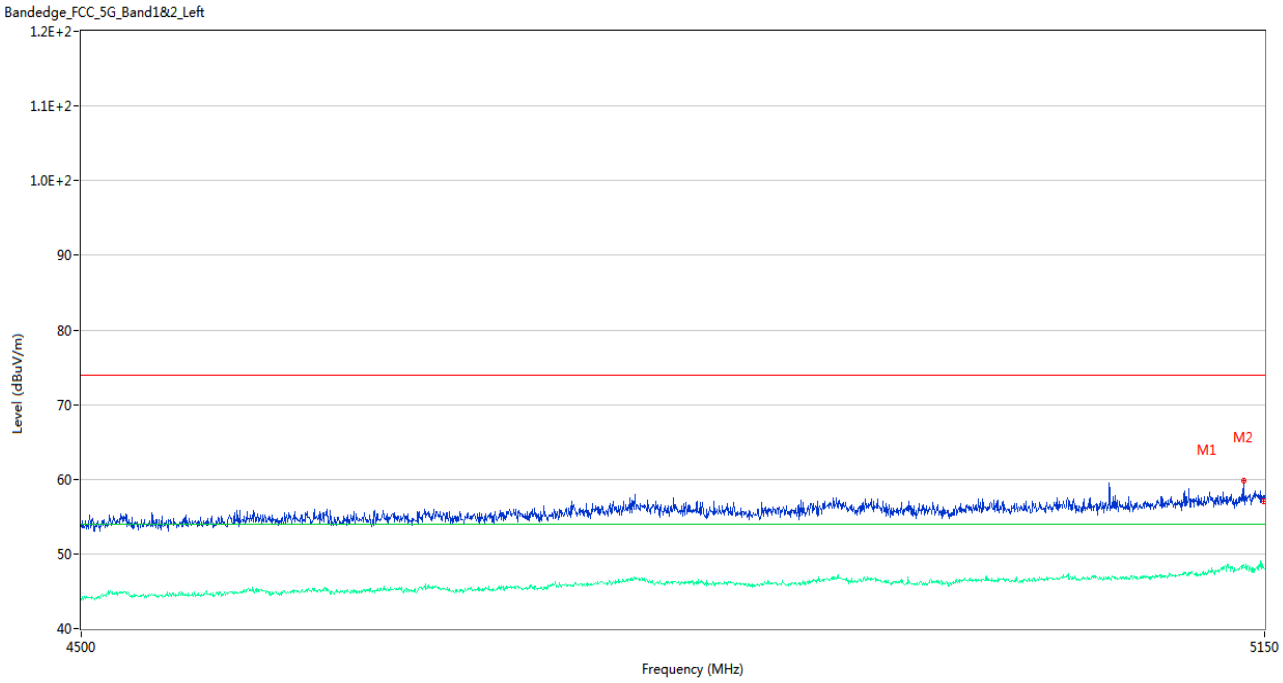
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5128.225	58.84	4.07	74.0	15.16	Peak	249.00	150	Horizontal	Pass
1**	5128.225	47.37	4.07	54.0	6.63	AV	249.00	150	Horizontal	Pass
2	5149.675	56.26	3.43	74.0	17.74	Peak	96.00	150	Horizontal	Pass
2**	5149.675	47.13	3.43	54.0	6.87	AV	96.00	150	Horizontal	Pass

U-NII-1 11ac40 High Channel



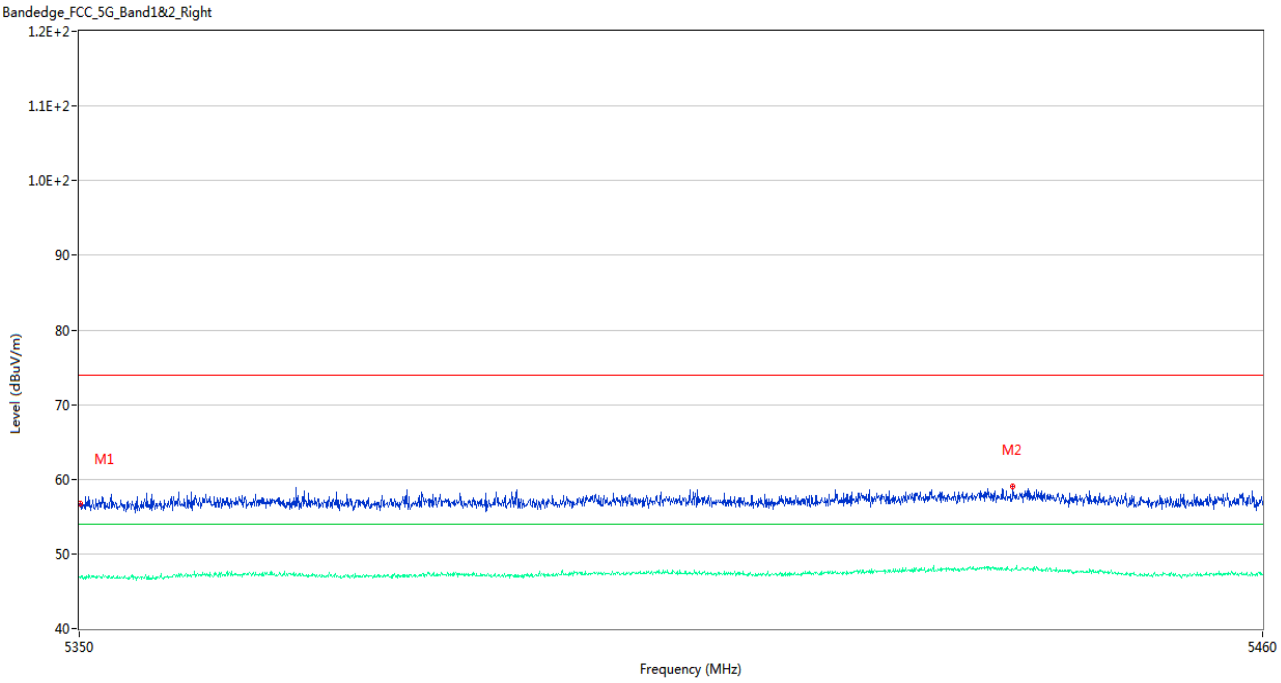
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5350.000	56.18	3.26	74.0	17.82	Peak	26.00	200	Horizontal	Pass
1**	5350.000	46.86	3.26	54.0	7.14	AV	26.00	200	Horizontal	Pass
2	5433.820	59.45	4.48	74.0	14.55	Peak	9.00	200	Horizontal	Pass
2**	5433.820	48.19	4.48	54.0	5.81	AV	9.00	200	Horizontal	Pass

U-NII-1 11ac80 Middle Channel



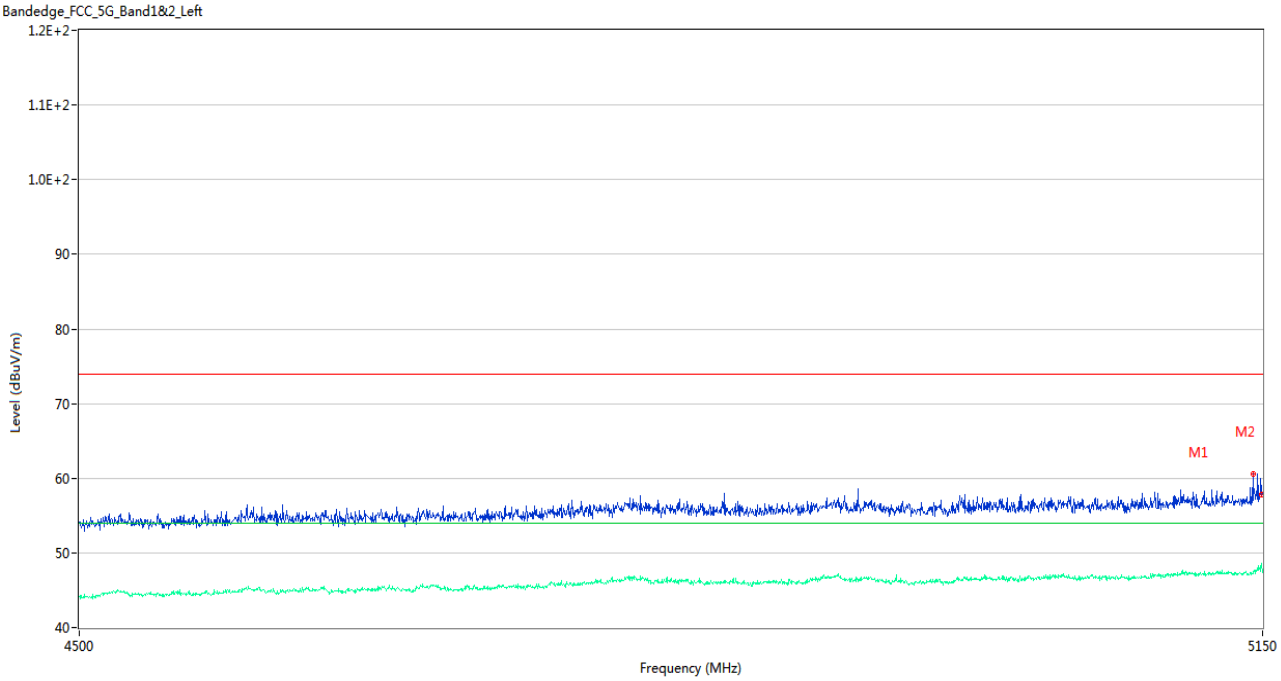
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5137.650	59.82	3.76	74.0	14.18	Peak	106.00	200	Horizontal	Pass
1**	5137.650	48.66	3.76	54.0	5.34	AV	106.00	200	Horizontal	Pass
2	5149.675	57.10	3.43	74.0	16.90	Peak	199.00	150	Horizontal	Pass
2**	5149.675	48.10	3.43	54.0	5.90	AV	199.00	150	Horizontal	Pass

U-NII-1 11ac80 Middle Channel



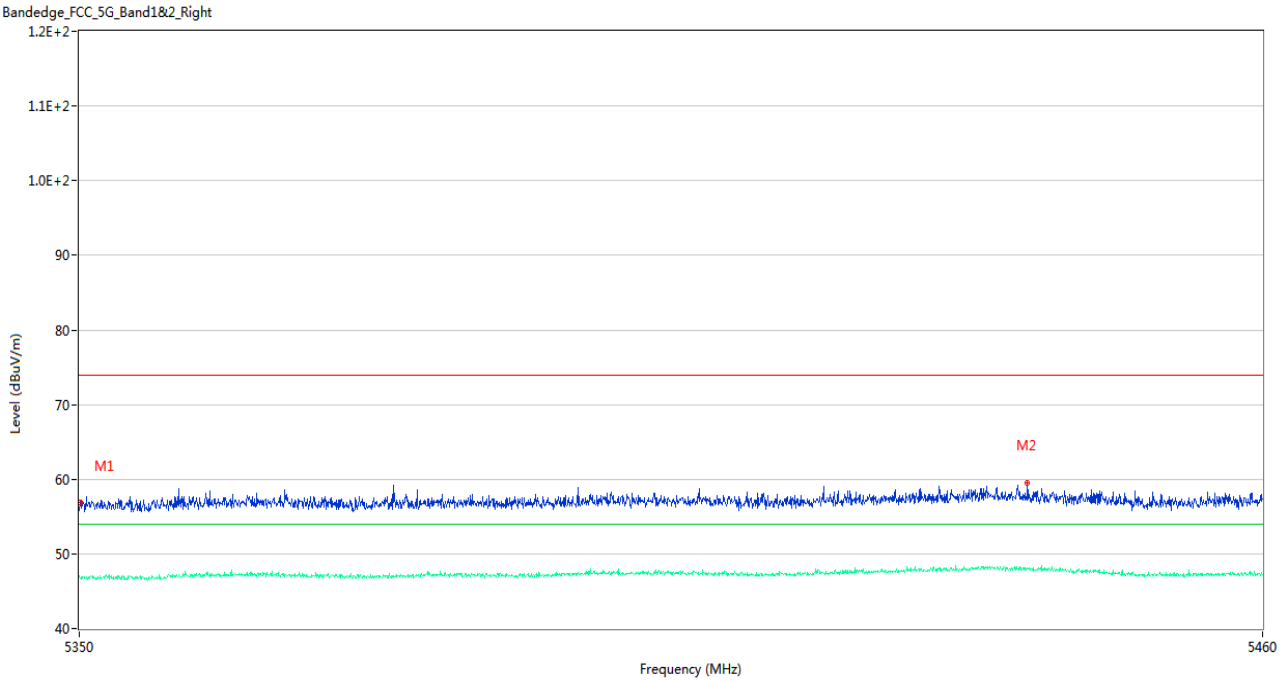
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5350.055	56.70	3.25	74.0	17.30	Peak	104.00	100	Horizontal	Pass
1**	5350.055	46.82	3.25	54.0	7.18	AV	104.00	100	Horizontal	Pass
2	5436.625	59.01	4.39	74.0	14.99	Peak	0.00	150	Horizontal	Pass
2**	5436.625	48.02	4.39	54.0	5.98	AV	0.00	150	Horizontal	Pass

U-NII-1 11ax20 (SU) Low Channel



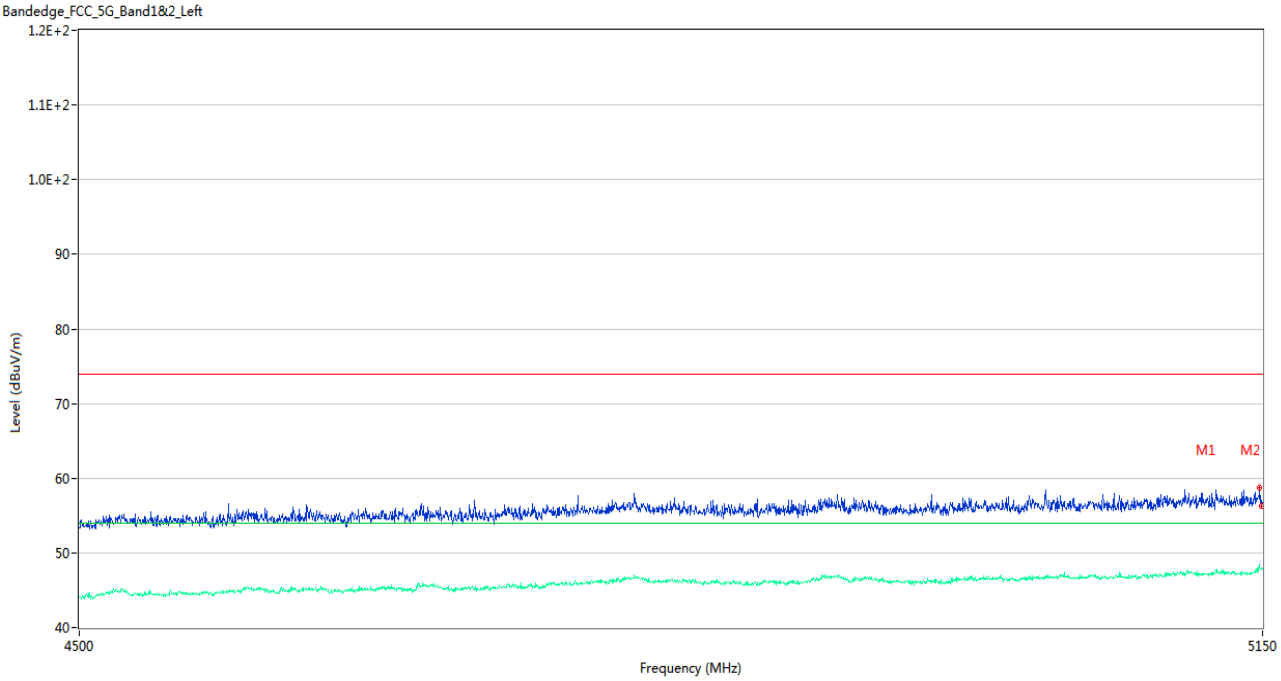
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5144.475	60.52	3.68	74.0	13.48	Peak	112.00	150	Horizontal	Pass
1**	5144.475	47.28	3.68	54.0	6.72	AV	112.00	150	Horizontal	Pass
2	5149.675	57.88	3.43	74.0	16.12	Peak	248.00	200	Horizontal	Pass
2**	5149.675	48.67	3.43	54.0	5.33	AV	248.00	200	Horizontal	Pass

U-NII-1 11ax20 (SU) High Channel



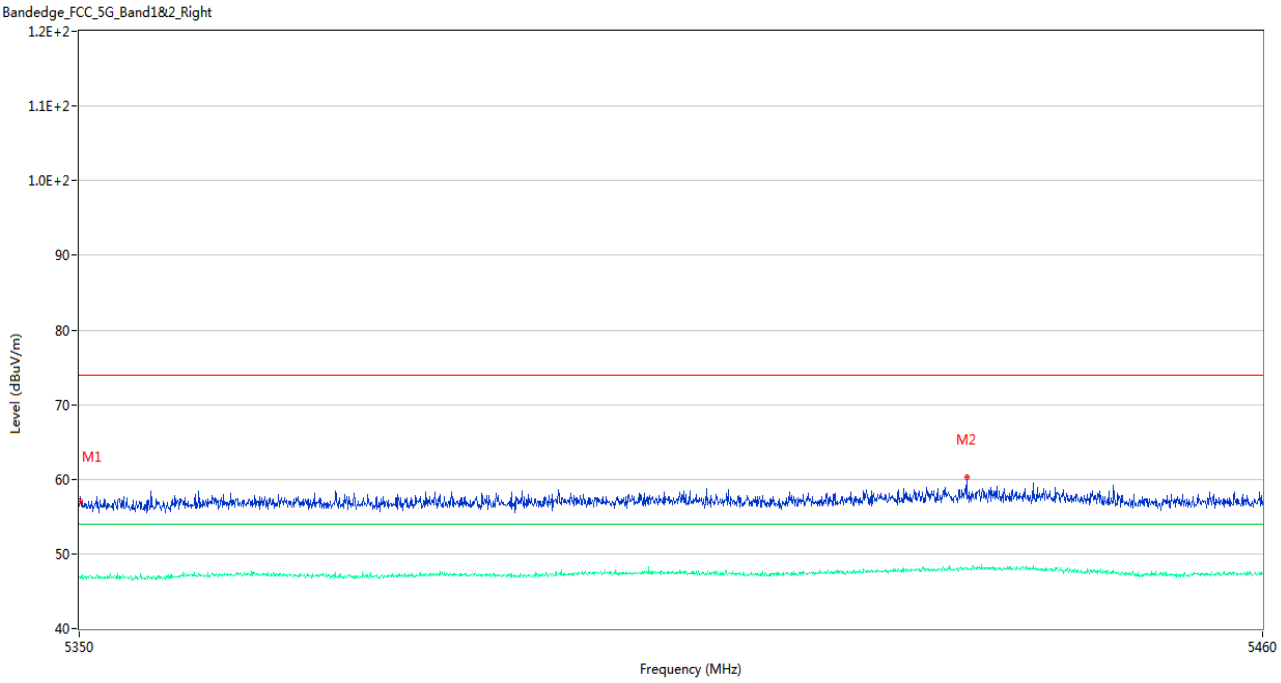
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5350.055	56.91	3.25	74.0	17.09	Peak	159.00	150	Horizontal	Pass
1**	5350.055	46.83	3.25	54.0	7.17	AV	159.00	150	Horizontal	Pass
2	5437.945	59.51	4.46	74.0	14.49	Peak	19.00	200	Horizontal	Pass
2**	5437.945	47.97	4.46	54.0	6.03	AV	19.00	200	Horizontal	Pass

U-NII-1 11ax40 (SU) Low Channel



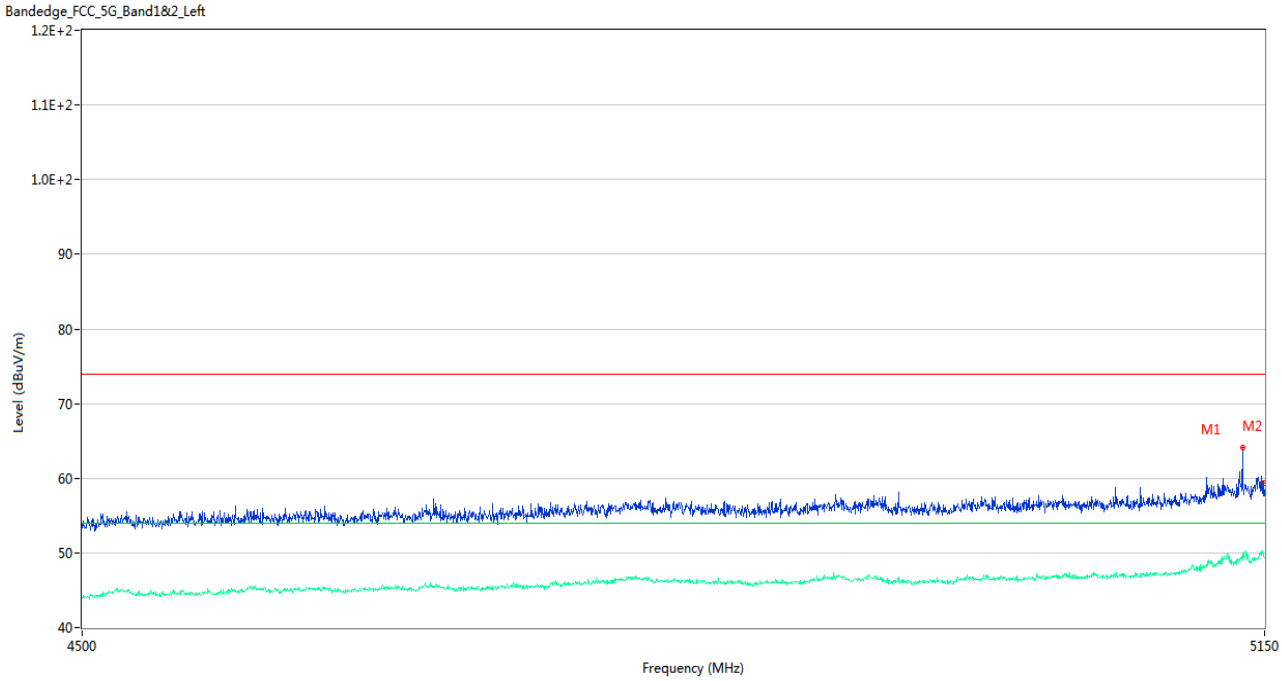
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5148.375	58.81	3.50	74.0	15.19	Peak	105.00	100	Horizontal	Pass
1**	5148.375	48.04	3.50	54.0	5.96	AV	105.00	100	Horizontal	Pass
2	5149.675	56.35	3.43	74.0	17.65	Peak	352.00	100	Horizontal	Pass
2**	5149.675	47.99	3.43	54.0	6.01	AV	352.00	100	Horizontal	Pass

U-NII-1 11ax40 (SU) High Channel



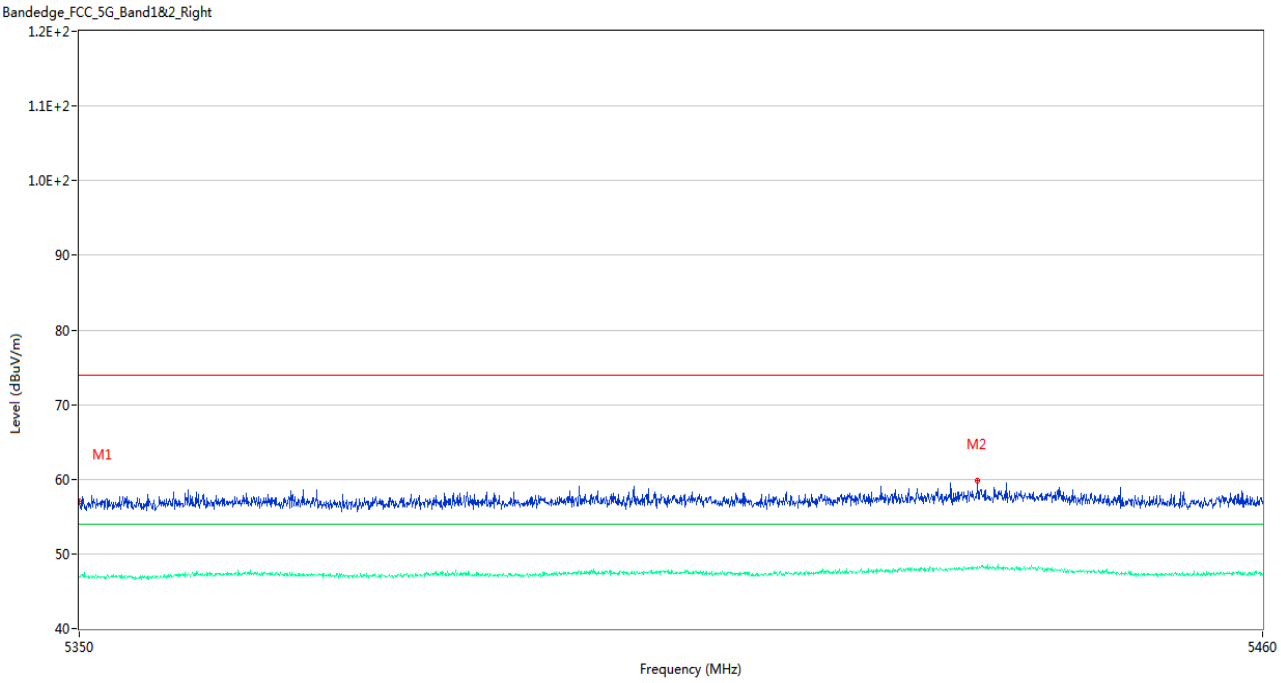
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5350.055	57.12	3.25	74.0	16.88	Peak	298.00	100	Horizontal	Pass
1**	5350.055	46.73	3.25	54.0	7.27	AV	298.00	100	Horizontal	Pass
2	5432.280	60.34	4.27	74.0	13.66	Peak	360.00	150	Horizontal	Pass
2**	5432.280	48.18	4.27	54.0	5.82	AV	360.00	150	Horizontal	Pass

U-NII-1 11ax80 (SU) Middle Channel



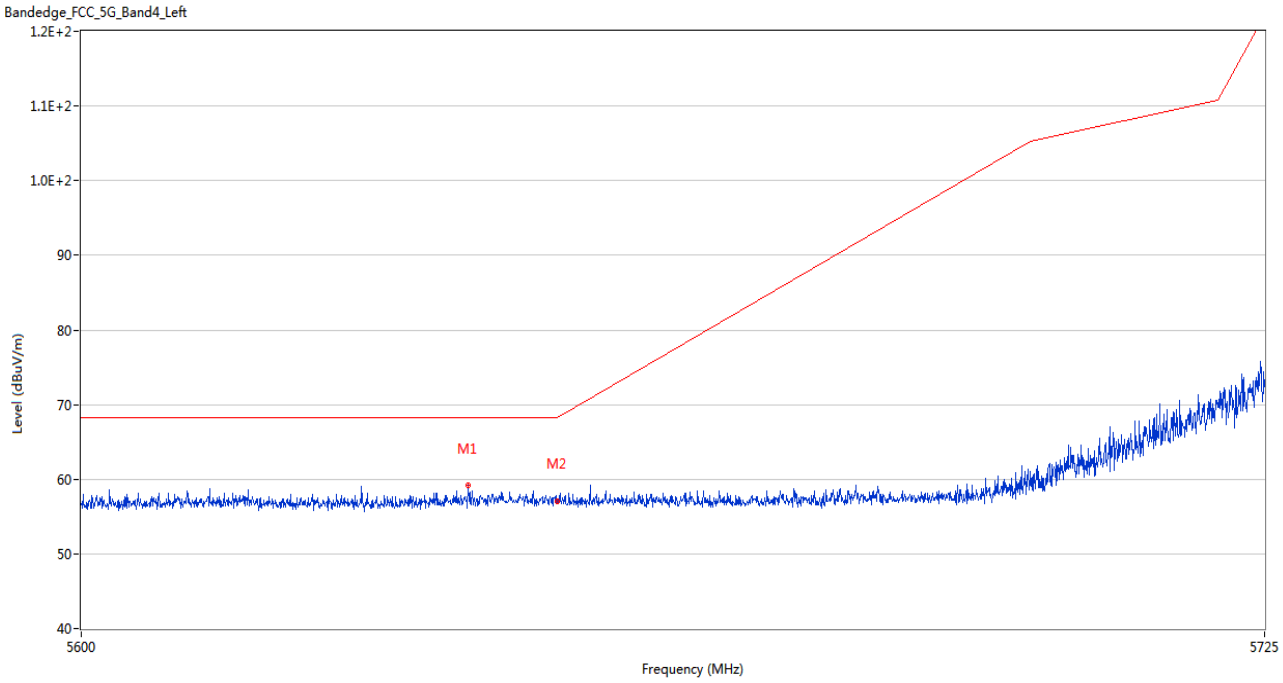
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5137.000	64.18	3.80	74.0	9.82	Peak	105.00	150	Horizontal	Pass
1**	5137.000	49.22	3.80	54.0	4.78	AV	105.00	150	Horizontal	Pass
2	5149.675	59.42	3.43	74.0	14.58	Peak	103.00	150	Horizontal	Pass
2**	5149.675	49.64	3.43	54.0	4.36	AV	103.00	150	Horizontal	Pass

U-NII-1 11ax80 (SU) Middle Channel



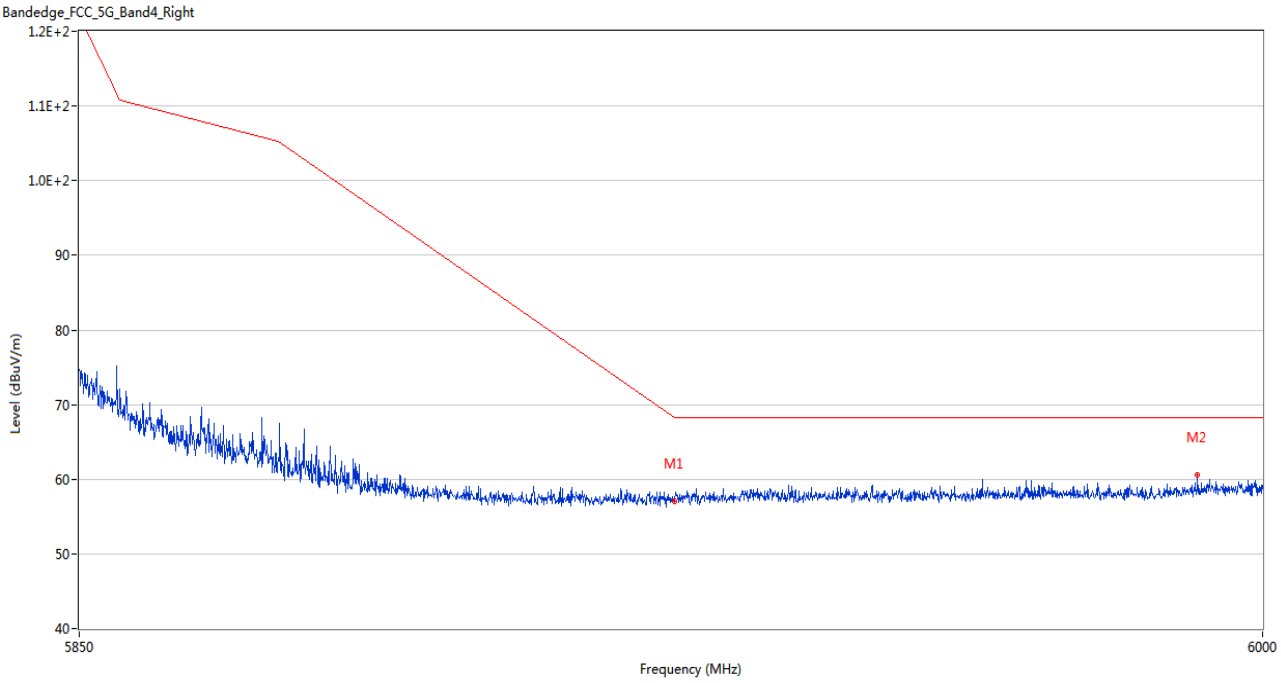
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5350.000	56.98	3.26	74.0	17.02	Peak	83.00	150	Horizontal	Pass
1**	5350.000	46.84	3.26	54.0	7.16	AV	83.00	150	Horizontal	Pass
2	5433.325	59.74	4.42	74.0	14.26	Peak	295.00	100	Horizontal	Pass
2**	5433.325	48.27	4.42	54.0	5.73	AV	295.00	100	Horizontal	Pass

U-NII-3 11n20 Low Channel



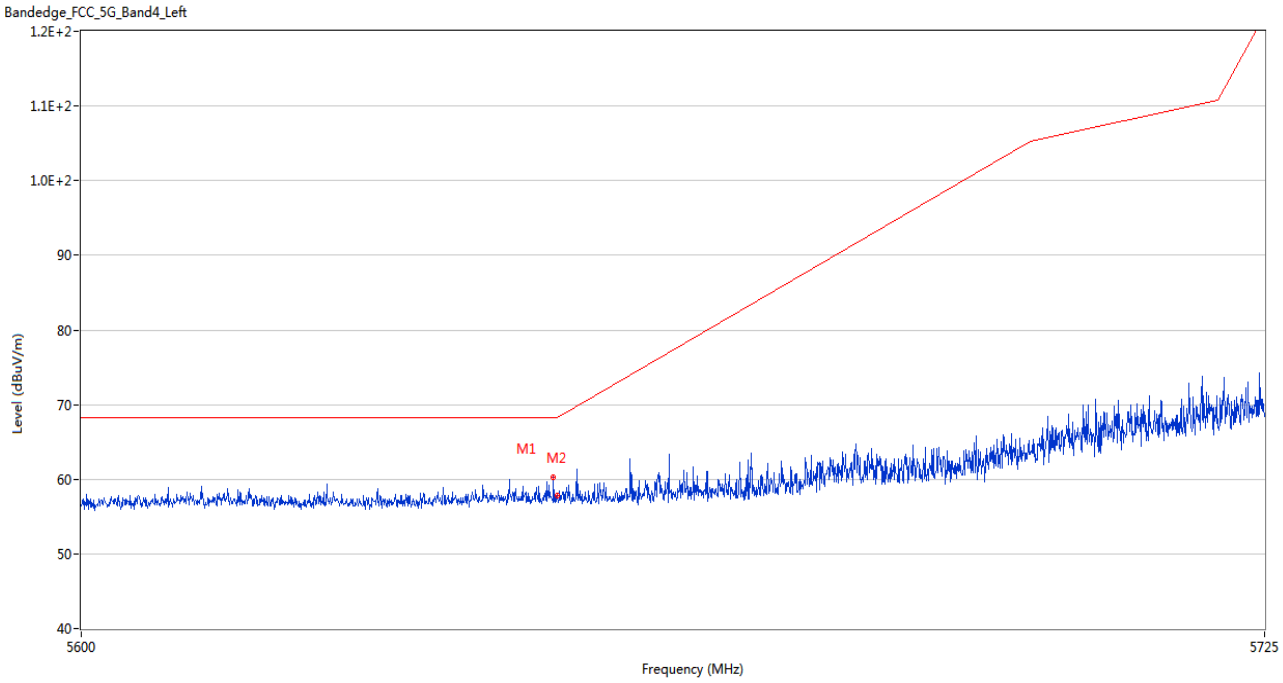
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5640.563	59.16	3.78	68.2	9.04	Peak	343.00	200	Horizontal	Pass
2	5650.000	57.09	3.83	68.2	11.11	Peak	2.00	200	Horizontal	Pass

U-NII-3 11n20 High Channel



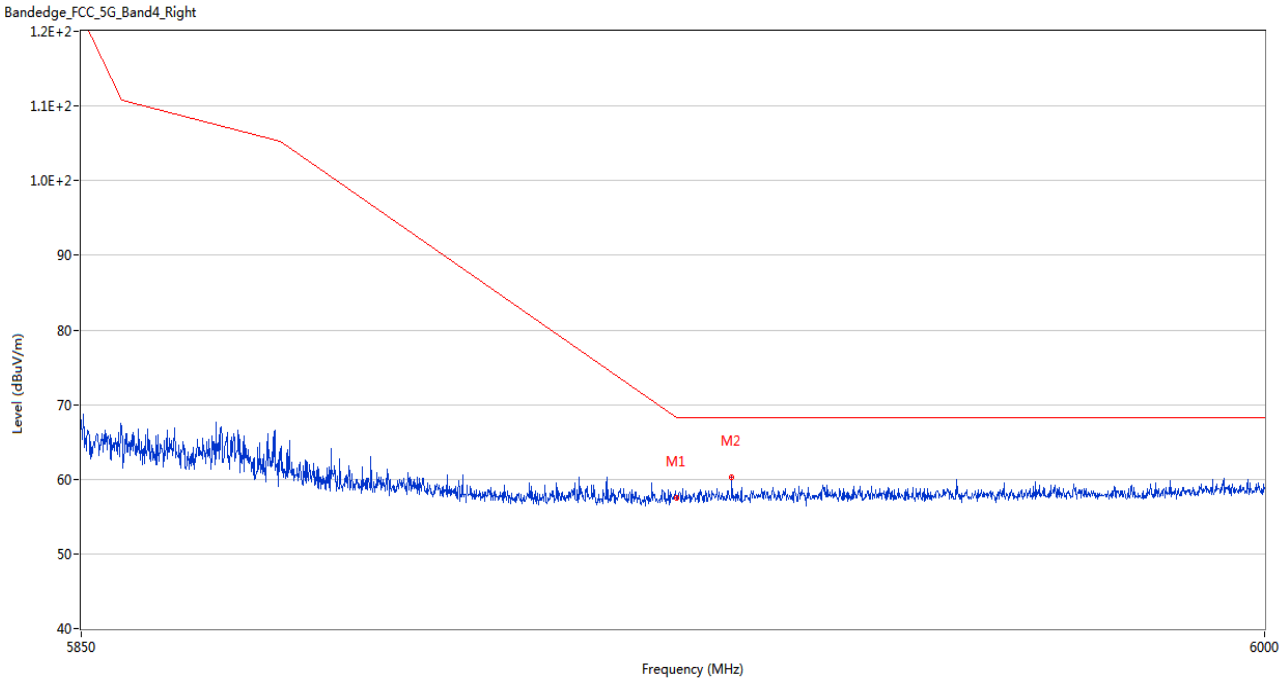
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5924.925	57.10	3.64	68.3	11.20	Peak	38.00	200	Horizontal	Pass
2	5991.675	60.63	5.22	68.2	7.57	Peak	214.00	200	Horizontal	Pass

U-NII-3 11n40 Low Channel



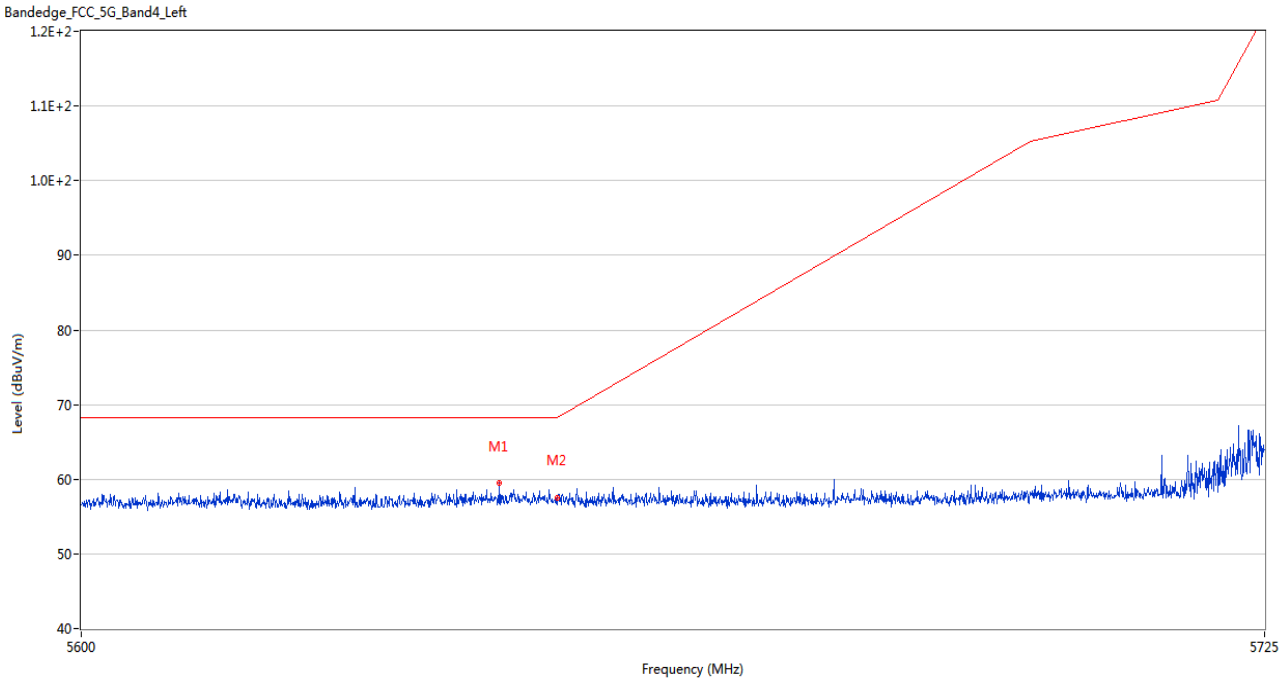
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5649.563	60.26	3.82	68.2	7.94	Peak	148.00	200	Horizontal	Pass
2	5650.000	57.81	3.83	68.2	10.39	Peak	192.00	200	Horizontal	Pass

U-NII-3 11n40 High Channel



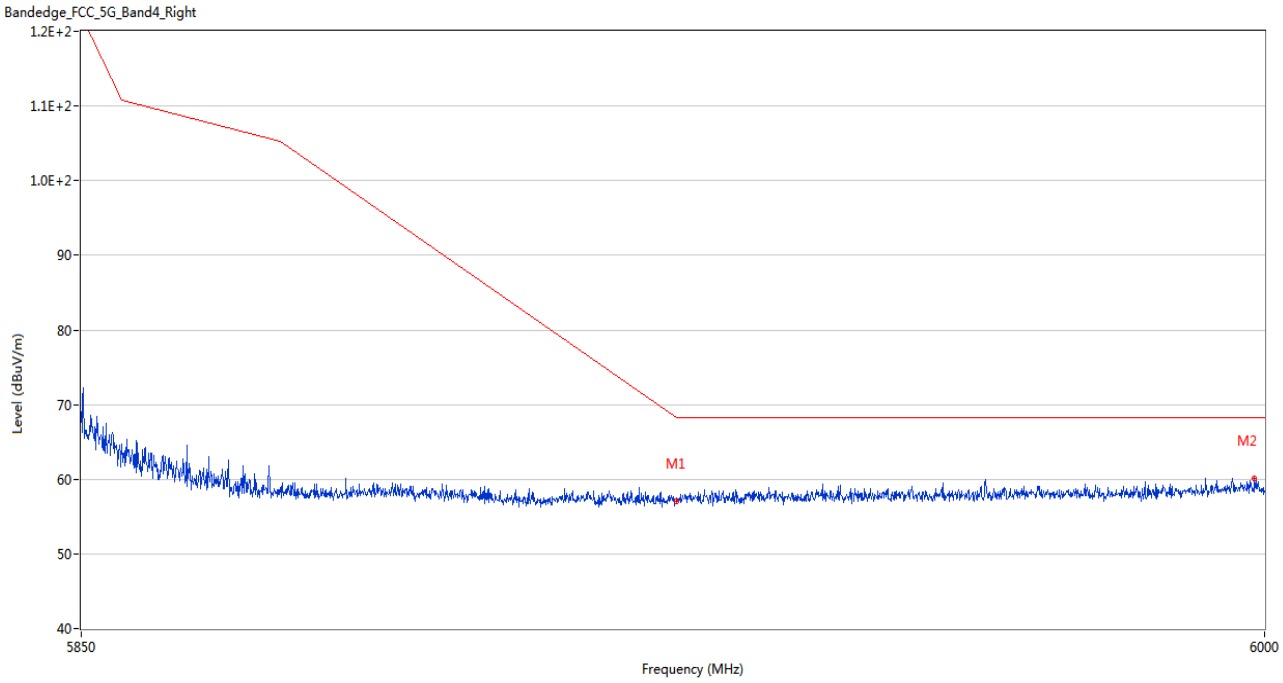
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5924.925	57.46	3.64	68.3	10.84	Peak	341.00	100	Horizontal	Pass
2	5931.975	60.23	3.69	68.2	7.97	Peak	67.00	150	Horizontal	Pass

U-NII-3 11ac20 Low Channel



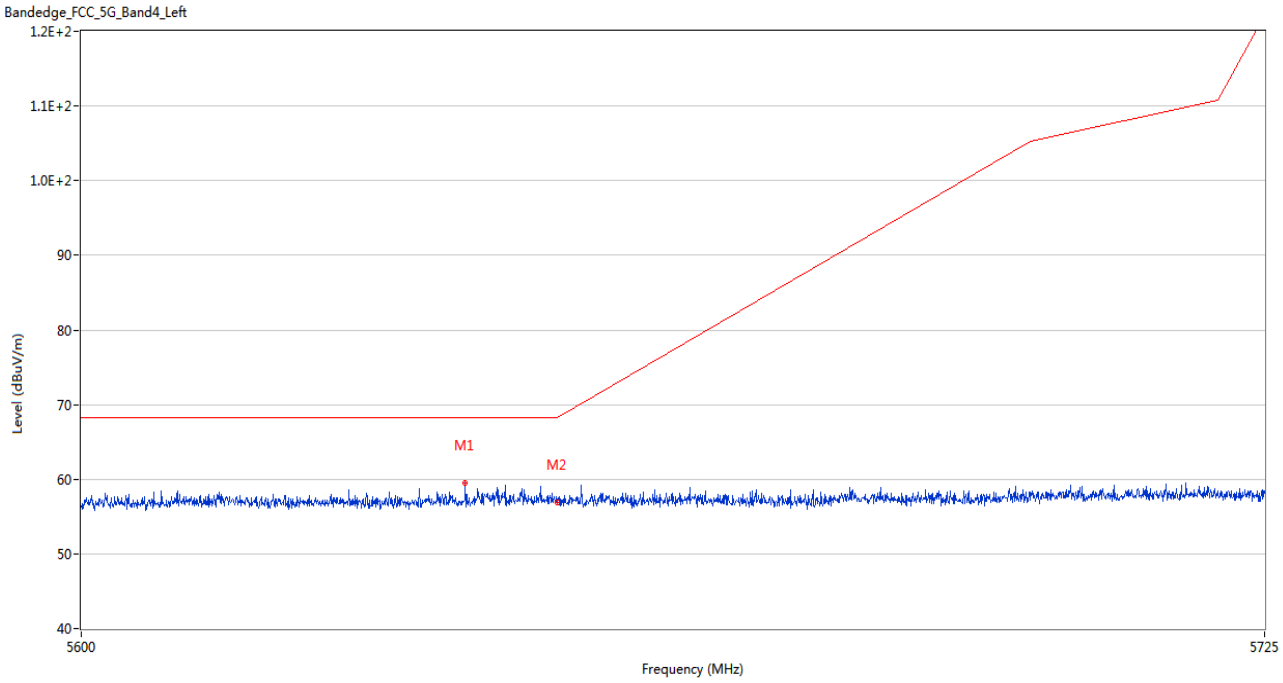
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5643.875	59.43	3.84	68.2	8.77	Peak	127.00	150	Horizontal	Pass
2	5650.000	57.51	3.83	68.2	10.69	Peak	15.00	200	Horizontal	Pass

U-NII-3 11ac20 High Channel



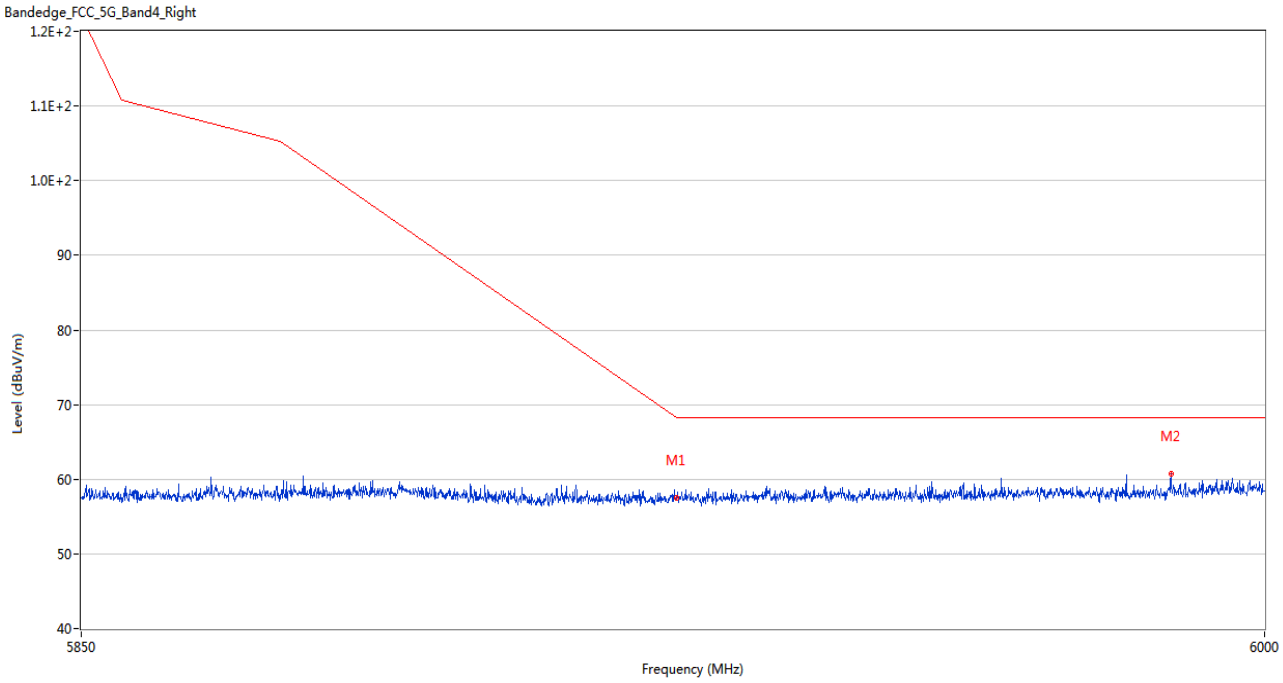
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5924.925	57.04	3.64	68.3	11.26	Peak	149.00	100	Horizontal	Pass
2	5998.725	60.18	5.81	68.2	8.02	Peak	232.00	200	Horizontal	Pass

U-NII-3 11ac40 Low Channel



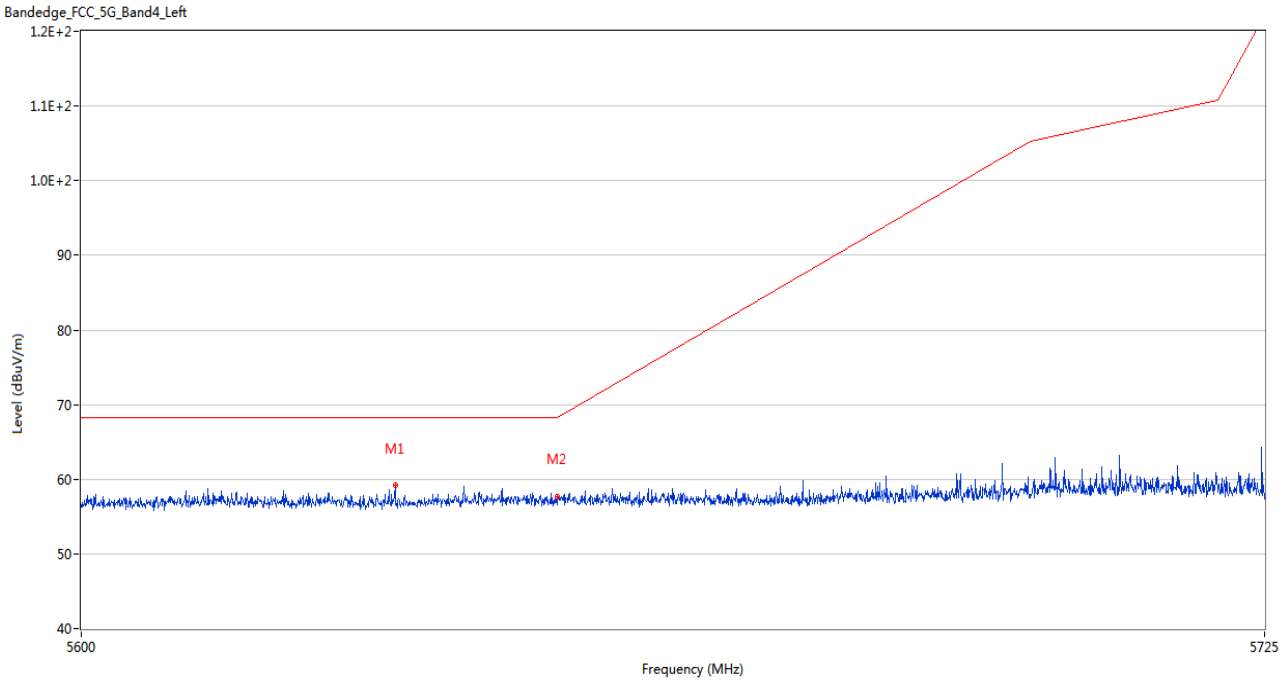
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5640.250	59.55	3.74	68.2	8.65	Peak	92.00	200	Horizontal	Pass
2	5650.000	56.95	3.83	68.2	11.25	Peak	163.00	150	Horizontal	Pass

U-NII-3 11ac40 High Channel



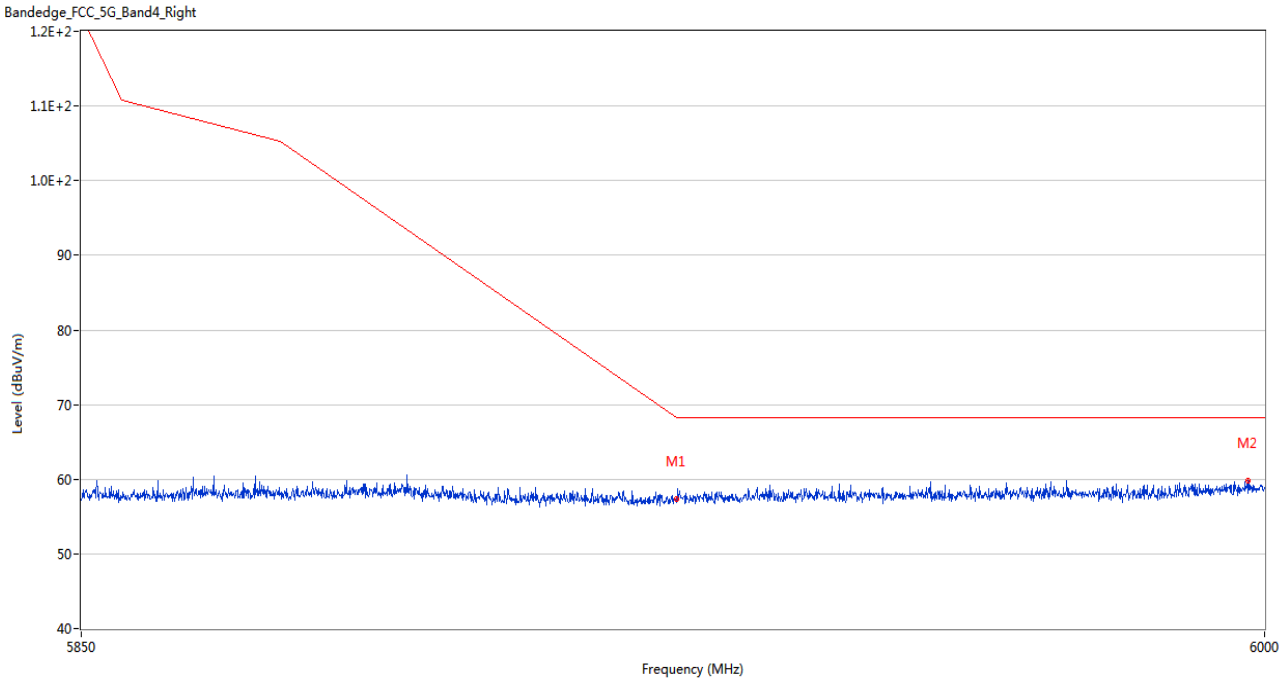
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5924.925	57.51	3.64	68.3	10.79	Peak	78.00	100	Horizontal	Pass
2	5988.000	60.80	4.98	68.2	7.40	Peak	269.00	100	Horizontal	Pass

U-NII-3 11ac80 Middle Channel



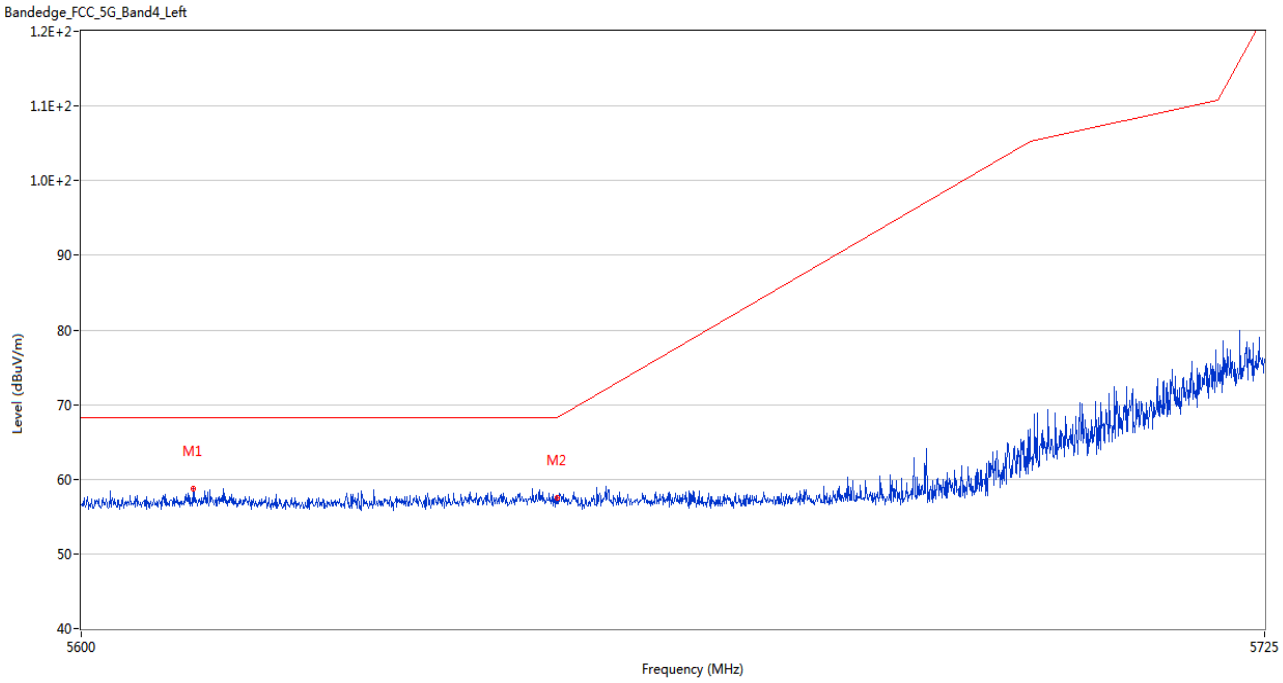
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5632.875	59.16	3.50	68.2	9.04	Peak	45.00	200	Horizontal	Pass
2	5650.000	57.71	3.83	68.2	10.49	Peak	360.00	100	Horizontal	Pass

U-NII-3 11ac80 Middle Channel



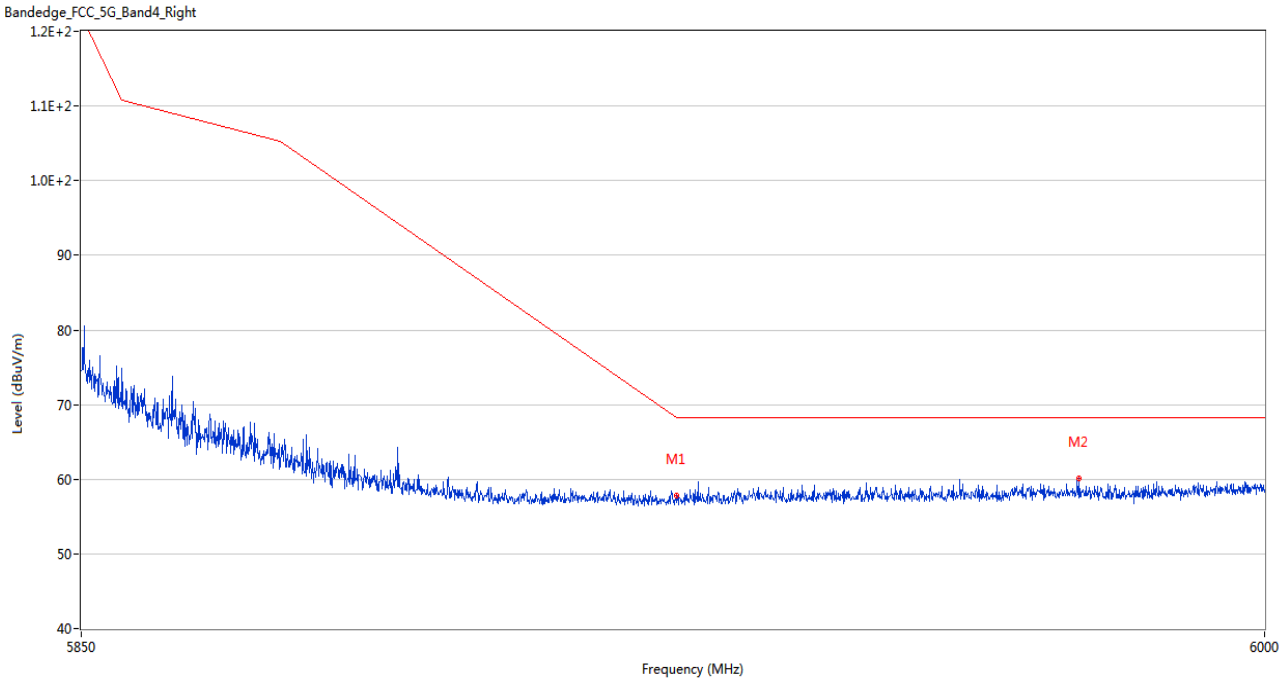
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5924.925	57.38	3.64	68.3	10.92	Peak	342.00	150	Horizontal	Pass
2	5997.825	59.80	5.74	68.2	8.40	Peak	176.00	200	Horizontal	Pass

U-NII-3 11ax20 (SU) Low Channel



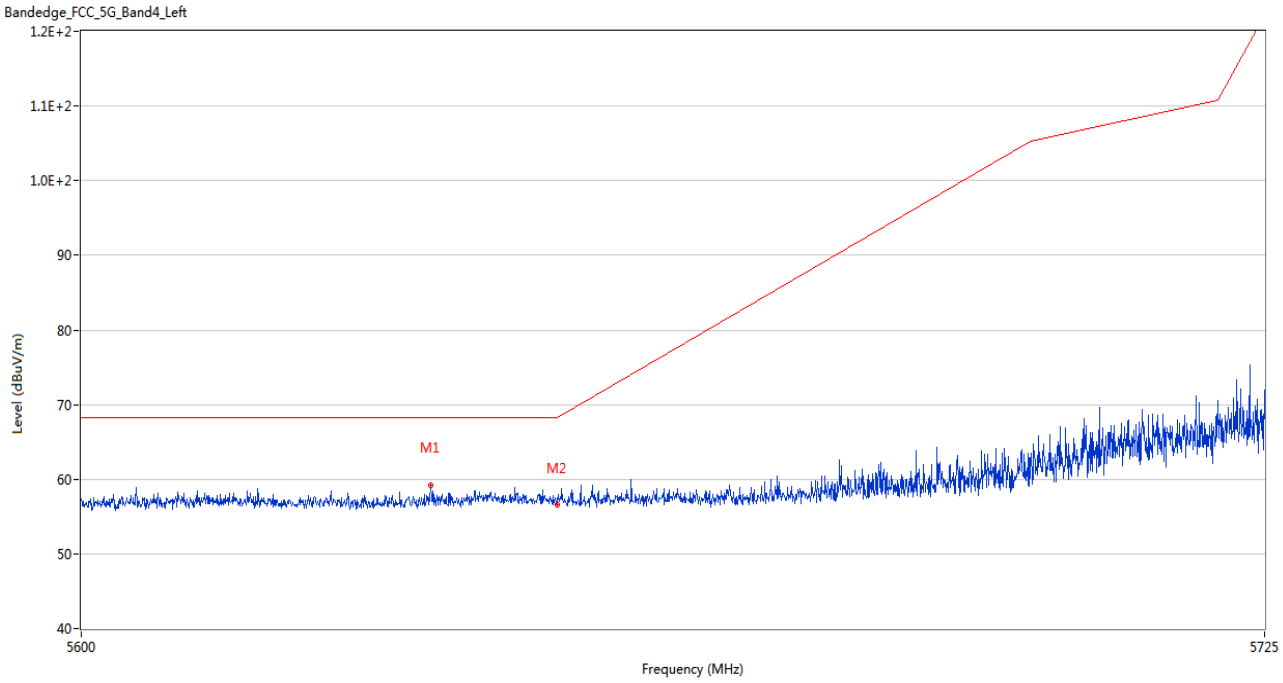
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5611.750	58.76	3.73	68.2	9.44	Peak	0.00	100	Horizontal	Pass
2	5650.000	57.58	3.83	68.2	10.62	Peak	300.00	200	Horizontal	Pass

U-NII-3 11ax20 (SU) High Channel



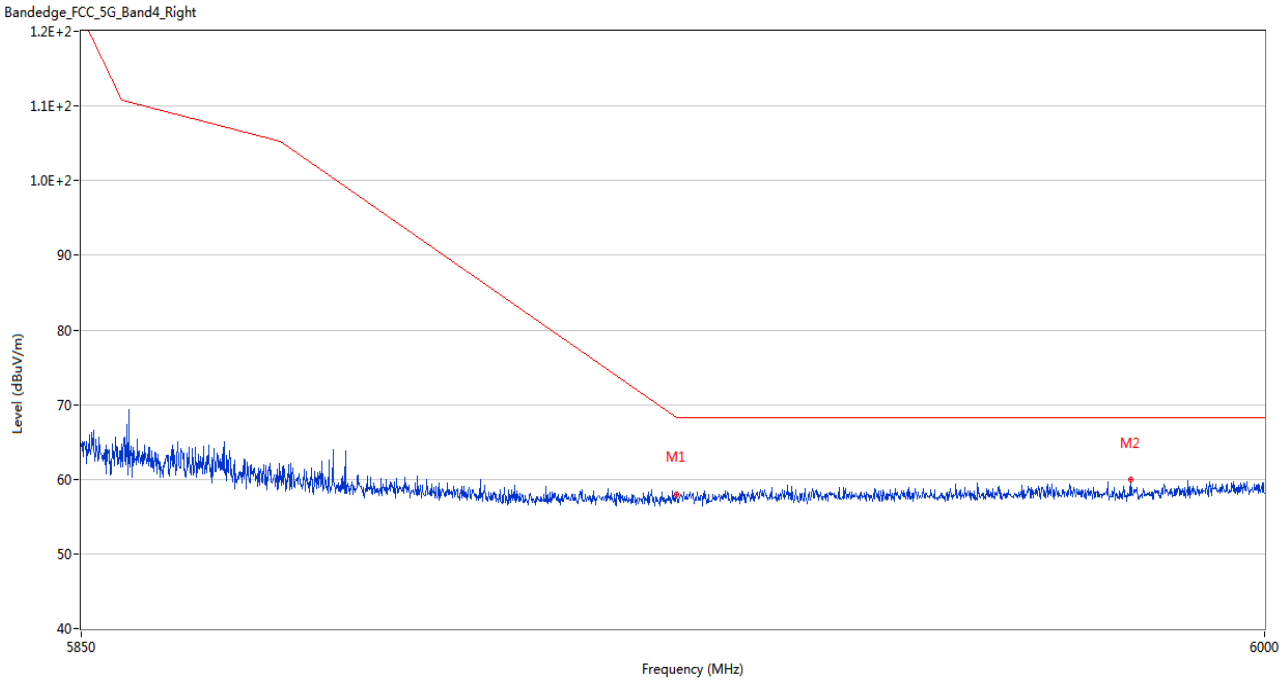
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5924.925	57.74	3.64	68.3	10.56	Peak	126.00	200	Horizontal	Pass
2	5976.225	60.04	4.92	68.2	8.16	Peak	77.00	100	Horizontal	Pass

U-NII-3 11ax40 (SU) Low Channel



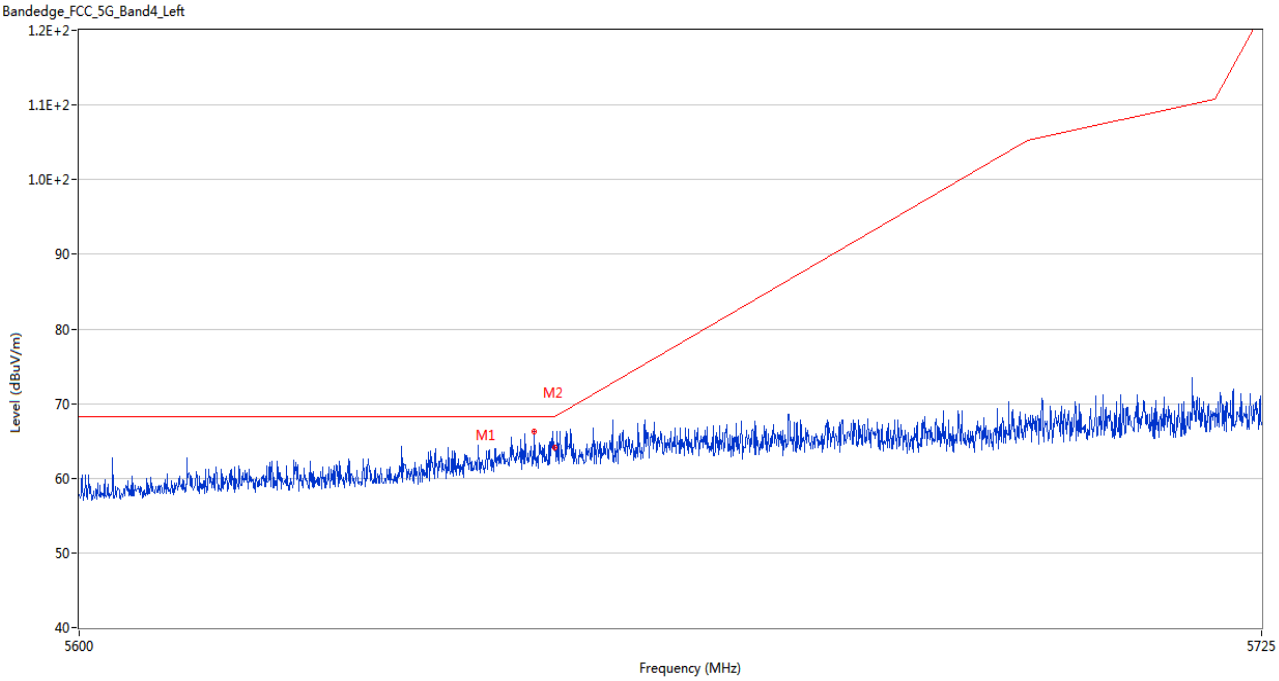
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5636.625	59.20	3.62	68.2	9.00	Peak	178.00	150	Horizontal	Pass
2	5650.000	56.56	3.83	68.2	11.64	Peak	13.00	150	Horizontal	Pass

U-NII-3 11ax40 (SU) High Channel



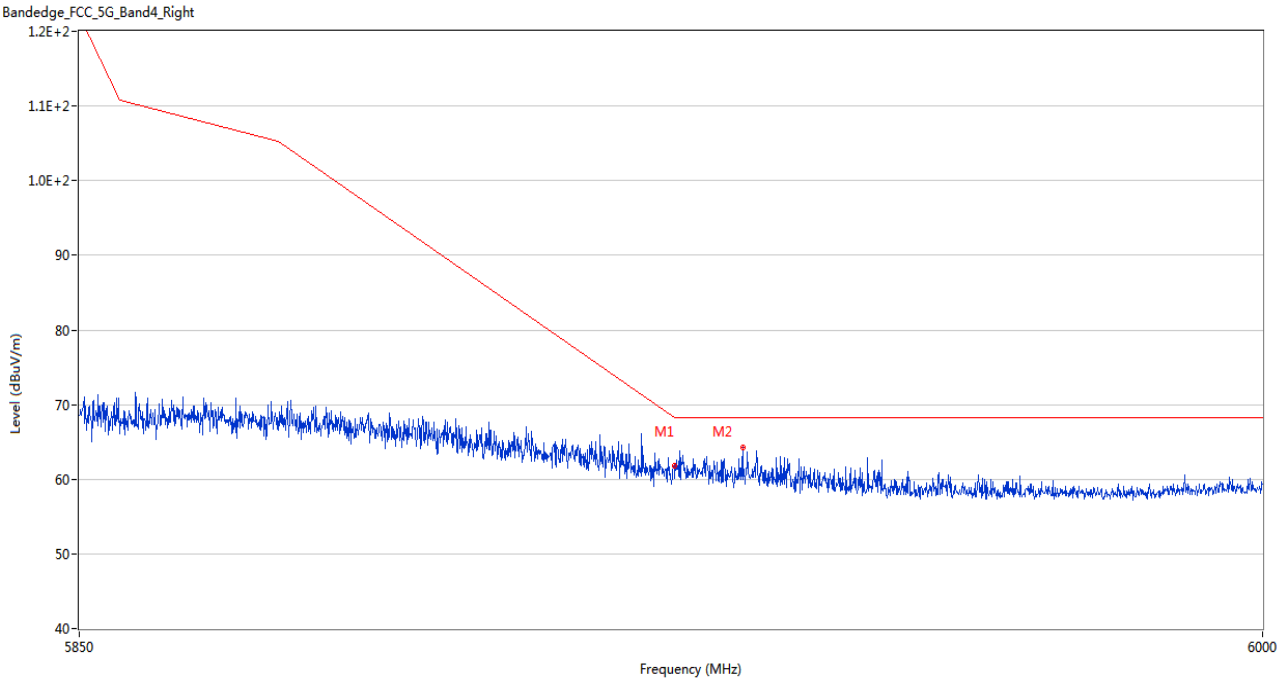
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5924.925	58.02	3.64	68.3	10.28	Peak	129.00	200	Horizontal	Pass
2	5982.900	59.92	4.67	68.2	8.28	Peak	239.00	100	Horizontal	Pass

U-NII-3 11ax80 (SU) Middle Channel



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5647.125	66.26	3.89	68.2	1.94	Peak	115.00	200	Horizontal	Pass
2	5650.000	64.01	3.83	68.2	4.19	Peak	99.00	100	Horizontal	Pass

U-NII-3 11ax80 (SU) Middle Channel



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5924.925	61.87	3.64	68.3	6.43	Peak	76.00	200	Horizontal	Pass
2	5933.625	64.28	3.71	68.2	3.92	Peak	90.00	150	Horizontal	Pass

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ23B0635-AR.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ23B0635-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ23B0635-AI.PDF”.

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