

FCC RADIO TEST REPORT

FCC ID: 2BK8UCB20RDNAR1

Product: ConBox2020RD

Trade Mark: Lear

Model No.: CB20RDNAR1

Family Model: N/A

Report No.: S24080903001003

Issue Date: Sep. 21, 2024

Prepared for

Lear Corporation Engineering GmbH

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Prepared by

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TEST RESULT CERTIFICATION

Applicant's name : Lear Corporation Engineering GmbH
Address : Industriestrasse 48, Kronach, Germany, 96317
Manufacturer's Name : Lear Corporation Engineering GmbH
Address : Industriestrasse 48, Kronach, Germany, 96317

Product description

Product name : ConBox2020RD

Trade Mark : Lear

Model and/or type reference : CB20RDNAR1

Family Model : N/A

Test Sample Number S240809030001

Standards : FCC Part 15.407

Test procedure ANSI C63.10-2013
 KDB 789033 D02 General UNII Test Procedures New Rules v02r01

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test

Date (s) of performance of tests Aug. 11, 2024 ~ Sep. 05, 2024

Date of Issue Sep. 05, 2024

Test Result **Pass**

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Table of Contents

	Page
1 . SUMMARY OF TEST RESULTS	6
1.1 FACILITIES AND ACCREDITATIONS	7
1.2 MEASUREMENT UNCERTAINTY	7
2 . GENERAL INFORMATION	8
2.1 GENERAL DESCRIPTION OF EUT	8
2.2 DESCRIPTION OF TEST MODES	10
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	12
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	13
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	14
3 . EMC EMISSION TEST	15
3.1 CONDUCTED EMISSION MEASUREMENT	15
3.1.1 APPLICABLE STANDARD	15
3.1.2 CONFORMANCE LIMIT	15
3.1.3 TEST CONFIGURATION	15
3.1.4 TEST PROCEDURE	15
3.2 RADIATED EMISSION MEASUREMENT	17
3.2.1 APPLICABLE STANDARD	17
3.2.2 CONFORMANCE LIMIT	17
3.2.3 MEASURING INSTRUMENTS	17
3.2.4 TEST CONFIGURATION	18
3.2.5 TEST PROCEDURE	19
3.2.6 TEST RESULTS (9KHZ – 30 MHZ)	20
3.2.7 TEST RESULTS (30MHZ – 1GHZ)	21
3.2.8 TEST RESULTS (1GHZ-18GHZ)	23
3.2.9 TEST RESULTS (18GHZ-40GHZ)	59
4 . POWER SPECTRAL DENSITY TEST	89
4.1 APPLIED PROCEDURES / LIMIT	89
4.2 TEST PROCEDURE	90
4.3 DEVIATION FROM STANDARD	90
4.4 TEST SETUP	90
4.5 EUT OPERATION CONDITIONS	90
4.6 TEST RESULTS	91
5 . 26DB & 99% EMISSION BANDWIDTH	92
5.1 APPLIED PROCEDURES / LIMIT	92
5.2 TEST PROCEDURE	92
5.3 EUT OPERATION CONDITIONS	93
5.4 TEST RESULTS	93

Table of Contents

	Page
6 . MINIMUM 6 DB BANDWIDTH	94
6.1 APPLIED PROCEDURES / LIMIT	94
6.2 TEST PROCEDURE	94
6.3 DEVIATION FROM STANDARD	94
6.4 TEST SETUP	94
6.5 EUT OPERATION CONDITIONS	94
6.6 TEST RESULTS	95
7 . MAXIMUM CONDUCTED OUTPUT POWER	96
7.1 PPLIED PROCEDURES / LIMIT	96
7.2 TEST PROCEDURE	96
7.3 DEVIATION FROM STANDARD	97
7.4 TEST SETUP	97
7.5 EUT OPERATION CONDITIONS	97
7.6 TEST RESULTS	98
8 . OUT OF BAND EMISSIONS	99
8.1 APPLICABLE STANDARD	99
8.2 TEST PROCEDURE	99
8.3 DEVIATION FROM STANDARD	100
8.4 TEST SETUP	100
8.5 EUT OPERATION CONDITIONS	100
8.6 TEST RESULTS	101
9 . FREQUENCY STABILITY MEASUREMENT	102
9.1 LIMIT	102
9.2 TEST PROCEDURES	102
9.3 TEST SETUP LAYOUT	102
9.4 EUT OPERATION DURING TEST	102
9.5 TEST RESULTS	103
10 . ANTENNA REQUIREMENT	104
10.1 STANDARD REQUIREMENT	104
10.2 EUT ANTENNA	104

Revision History

Report No.	Version	Description	Issued Date
S24080903001003	Rev.01	Initial issue of report	Sep. 21, 2024

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart E			
Standard Section	Test Item	Judgment	Remark
15.207	AC Power Line Conducted Emissions	N/A	
15.209(a), 15.407 (b)(1) 15.407 (b)(4) 15.407(b)(8)(9)	Spurious Radiated Emissions	PASS	
15.407 (a)	26 dB and 99% Emission Bandwidth	**PASS	
15.407(e)	Minimum 6 dB bandwidth	**PASS	
15.407 (a)	Maximum Conducted Output Power	**PASS	
15.407 (b)(1) 15.407 (b)(4)	Band Edge	**PASS	
15.407 (a)	Power Spectral Density	**PASS	
15.407(b)	Spurious Emissions at Antenna Terminals	**PASS	
15.407(g)	Frequency Stability Measurement	**PASS	
15.407(h)	Dynamic Frequency Selection(DFS)	N/A	
15.203	Antenna Requirement	PASS	
15.407(c)	Automatically discontinue transmission	**PASS	(Note 3)

NOTE:

- (1)" N/A" denotes test is not applicable in this Test Report
- (2) This device operates with a duty cycle greater than 99%
- (3) The product is a client device, and the data transmission is limited by the AP. When the information to be sent is missing or the operation fails, the device will automatically stop sending and directly connect to the AP correctly again.
- (4) ** The maximum conducted power is verified to be the same. The conducted signal test data may be re-used. Please check FCC ID: XPYJODYW374 (Report No.: MDE_UBLOX_2220_FCC_02)

1.1 FACILITIES AND ACCREDITATIONS

FACILITIES

All measurement facilities used to collect the measurement data are located at
1/F, Building E, Fenda Science Park Sanwei, Xixiang, Bao'an District Shenzhen, Guangdong, China
The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.10 and
CISPR Publication 22.

LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

CNAS-Lab. : The Certificate Registration Number is L5516.

IC-Registration : The Certificate Registration Number is 9270A.
CAB identifier:CN0074

FCC- Accredited : Test Firm Registration Number: 463705.
Designation Number: CN1184

A2LA-Lab. : The Certificate Registration Number is 4298.01

Name of Firm : Shenzhen NTEK Testing Technology Co., Ltd.

Site Location : 1/F, Building E, Fenda Science Park Sanwei, Xixiang, Bao'an District
Shenzhen, Guangdong, China

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 3.1\text{dB}$
2	RF power, conducted	$\pm 0.9\text{dB}$
3	Spurious emissions, conducted	$\pm 2.2\text{dB}$
4	All emissions, radiated(<1G)	$\pm 5.2\text{dB}$
5	All emissions, radiated(>1G)	$\pm 5.1\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$
8	Occupied bandwidth	$\pm 3.7\%$

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	ConBox2020RD		
Trade Mark	Lear		
Model Name	CB20RDNAR1		
Family Model	N/A		
Model Difference	N/A		
FCC ID	2BK8UCB20RDNAR1		
Product Description	Mode Supported	802.11a/ n(HT20)/ n(HT40)/ ac(VHT20)/ ac(VHT40)/ ac(VHT80)/ ax(HE20)/ ax(HE40)/ ax(HE80)	
	Data Rate	802.11a: 6,9,12,18,24,36,48,54Mbps; 802.11n(HT20/HT40):MCS0-MCS15; 802.11ac(VHT20)/ax(HE20): NSS1, MCS0-MCS8 802.11ac(VHT40/VHT80)/ax(HE40/HE80): NSS1, MCS0-MCS9	
	Modulation	OFDM	
	Operating Frequency Range	☒ U-NII-1: 5150 MHz ~5250MHz ☒ U-NII-3: 5725 MHz ~5850 MHz	
	Function:	☐ Outdoor AP ☐ Indoor AP ☐ Fixed P2P ☒ Client	
	Smart system	☒ SISO for 802.11a/n/ac/ax ☒ MIMO for 802.11n/ac/ax	
	Antenna Type	Ant1: External Antenna (4N0.035.500) Ant2: External Antenna (5B4.035.510)	
	Antenna Gain	Ant1: 2.38dBi Ant2: 5dBi	
	Based on the application, features, or specification exhibited in User's Manual, More details of EUT technical specification, please refer to the User's Manual.		
	Adapter	N/A	
Battery	Typical Capacity: DC 3.2V, 1.1Ah, 3.52Wh Rated Capacity: DC 3.6V, 1.05Ah, 3.36Wh		
Power supply	DC 12V		
Connecting I/O Port(s)	Please refer to the User's Manual		
Hardware version	H04		
Software version	0340		

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. Frequency and Channel list:

Band	20MHz		40MHz		80MHz	
	Channel	Frequency	Channel	Frequency	Channel	Frequency
U-NII-1	36	5180 MHz	38	5190 MHz	42	5210 MHz
	40	5200 MHz	46	5230 MHz	-	-
	44	5220 MHz				
	48	5240 MHz				
U-NII-3	149	5745 MHz	151	5755 MHz	155	5775 MHz
	153	5765 MHz	159	5795 MHz		
	157	5785 MHz				
	161	5805 MHz				
	165	5825 MHz				

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11 a / n20/ ac20/ax20 CH36/ CH40/ CH48/ CH149/ CH157/CH165
Mode 2	802.11 n40/ac40/ax40 CH38/CH46/CH151/CH159
Mode 3	802.11ac80/ax80 CH42/CH155

For Conducted Emission	
Final Test Mode	Description
Mode 1	802.11 a / n20/ ac20/ax20 CH36/ CH40/ CH48/ CH149/ CH157/CH165
Mode 2	802.11 n40/ac40/ax40 CH38/CH46/CH151/CH159
Mode 3	802.11ac80/ax80 CH42/CH155

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported
- (3) In ax mode, RU allocation is not supported and it is a full carrier. Only the HE SU PPDU format operational mode.
- (4) The EUT support MIMO modes, transmit mode what describe as following:

Mode	Tx / Rx
802.11a/n20/n40/ac20/ac40/ac80/ax20/ax40/ax80	1TX, 1RX
802.11n20/n40/ac20/ac40/ac80/ax20/ax40/ax80	2TX, 2RX

For 5GHz band, 802.11n20/n40/ac20/ac40/ac80/ax20/ax40/ax80 has MIMO mode, Antenna 1,2 are simultaneous transmissions.

$$\text{Directional gain} = G_{\text{ANT MAX}} + 10\log(N_{\text{ANT}}/N_{\text{SS}})\text{dBi} = 5 + 3.01 \text{ dBi} = 8.01\text{dBi}$$

where NSS = the number of independent spatial streams of data and GANT MAX is the gain of the antenna having the highest gain (in dBi).

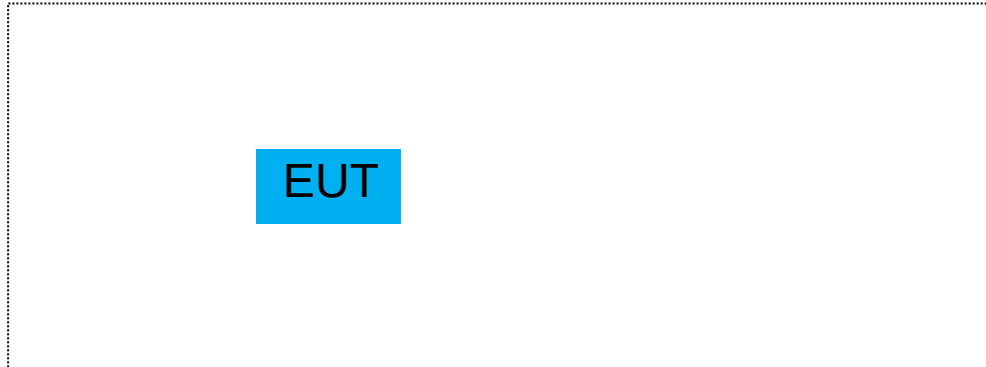
Note: Most devices can operate with one spatial stream (NSS = 1, where NSS is the number of spatial streams) even if they also are capable of more spatial streams. The worst case directional gain will occur when NSS = 1; therefore, it is especially important to ensure that the device complies with all emission limits for the case of NSS = 1 (or with the lowest possible value of NSS, if the device always uses spatial multiplexing).

Power setting

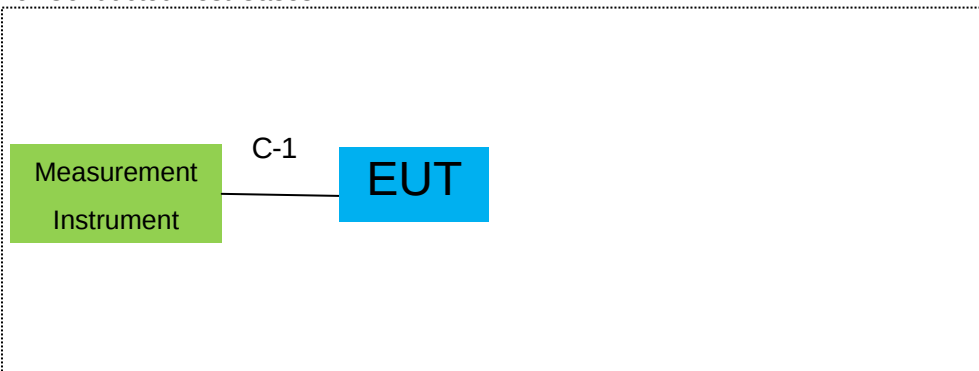
Mode	CH36 (5180MHz)	CH40 (5200MHz)	CH48 (5240MHz)	CH149 (5745MHz)	CH157 (5785MHz)	CH165 (5825MHz)	CH38 (5190MHz)	CH46 (5230MHz)	CH151 (5755MHz)	CH159 (5795MHz)	CH42 (5210MHz)	CH155 (5775MHz)
802.11a	16	17	17	18	18	18	-	-	-	-	-	-
802.11n(HT20) SISO	14	17	17	17	17	17	-	-	-	-	-	-
802.11n(HT20) MIMO	14	15	15	17	17	17	-	-	-	-	-	-
802.11n(HT40) SISO	-	-	-	-	-	-	13	16	16	16	-	-
802.11n(HT40) MIMO	-	-	-	-	-	-	12	15	16	16	-	-
802.11ac(VHT20) SISO	14	17	17	17	17	17	-	-	-	-	-	-
802.11ac(VHT20) MIMO	14	15	15	17	17	17	-	-	-	-	-	-
802.11ac(VHT40) SISO	-	-	-	-	-	-	13	16	16	16	-	-
802.11ac(VHT40) MIMO	-	-	-	-	-	-	12	15	16	16	-	-
802.11ac(VHT80) SISO	-	-	-	-	-	-	-	-	-	-	12	16
802.11ac(VHT80) MIMO	-	-	-	-	-	-	-	-	-	-	11	16
802.11ax(HE20) SISO	14	15	15	15	15	15	-	-	-	-	-	-
802.11ax(HE20) MIMO	14	14	14	15	15	15	-	-	-	-	-	-
802.11ax(HE40) SISO	-	-	-	-	-	-	13	15	15	15	-	-
802.11ax(HE40) MIMO	-	-	-	-	-	-	12	14	15	15	-	-
802.11ax(HE80) SISO	-	-	-	-	-	-	-	-	-	-	12	15
802.11ax(HE80) MIMO	-	-	-	-	-	-	-	-	-	-	11	15

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

For Radiated Test Cases



For Conducted Test Cases



2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Model/Type No.	Series No.	Note
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

Item	Cable Type	Shielded Type	Ferrite Core	Length
C-1	RF Cable***	YES	NO	54cm
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.
- (4) “***” RF Cable is between the module and the antenna, that’s part of the EUT. Provided by the applicant.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation& Conducted Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	N9020A	MY53280244	2024.04.26	2025.04.25	1 year
2	Spectrum Analyzer	R&S	FSV40	101417	2024.04.26	2025.04.25	1 year
3	Test Receiver	R&S	ESPI7	101318	2024.03.12	2025.03.11	1 year
4	Active Loop Antenna	SCHWARZBECK	FMZB 1519 B	055	2024.05.17	2027.05.16	3 year
5	Log-Periodic Antenna	SCHWARZBECK	VULB 9162	586	2024.05.12	2025.05.11	1 year
6	Broadband Horn Antenna	SCHWARZBECK	BBHA 9120 D	2816	2024.05.18	2027.05.17	3 year
7	Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	803	2024.05.12	2027.05.11	3 year
8	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2024.04.26	2027.04.25	3 year
9	Pre-Amplifier	EMC	EMC051835 SE	980246	2024.01.23	2025.01.22	1 year
10	Low Noise Amplifier	B&Z	BZ-P540-550 850-452727	16476-11729	2024.02.03	2025.02.02	1 year
11	Pre-Amplifier	Sonoma	310N	186604	2024.04.25	2025.04.24	1 year
12	Power sensor	MWRFtest	MW100-PD	MW2021043	2023.12.19	2024.12.18	1 year
13	Filter	Micro-Tronics	BRM50716	G224	2024.04.26	2027.04.25	3 year
14	RF Control Unit	MWRFtest	MW100-RFC B	MW230608N TEK-43	N/A	N/A	N/A

Note: Each piece of equipment is scheduled for calibration once a year except the Aux Equipment & Test Cable which is scheduled for calibration every 2 or 3 years.

Measurement Software

Item	Manufacturer	Software Name	Software Version	Description
1	MWRFtest	MTS 8310 2.4GHz/5GHz	2.0	RF Conducted Test
2	Farad	EZ-EMC_RE	AIT-03A	Radiated Test
3	raditeq	RadiMation	2023.1.3	Radiated Test

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 APPLICABLE STANDARD

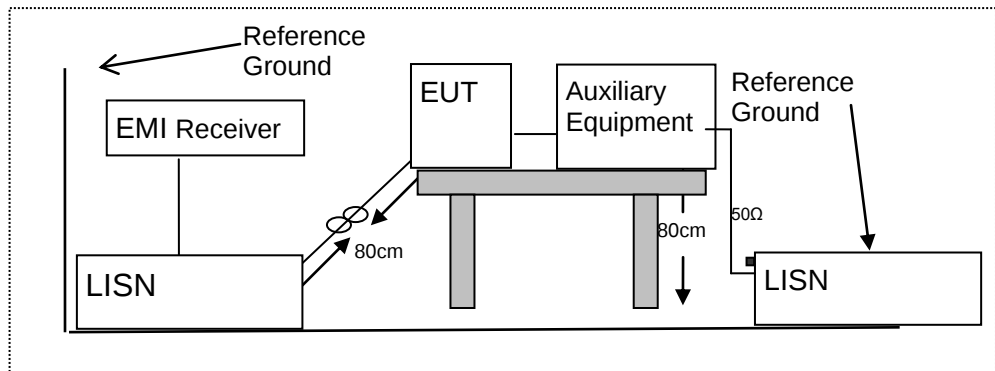
According to FCC Part 15.207(a)

3.1.2 CONFORMANCE LIMIT

Frequency(MHz)	Conducted Emission Limit	
	Quasi-peak	Average
0.15-0.5	66-56*	56-46*
0.5-5.0	56	46
5.0-30.0	60	50

Note: 1. *Decreases with the logarithm of the frequency
2. The lower limit shall apply at the transition frequencies
3. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3.1.3 TEST CONFIGURATION



3.1.4 TEST PROCEDURE

According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room.
2. The EUT was placed on a table which is 0.8m above ground plane.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
4. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40cm long.
5. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
6. LISN at least 80 cm from nearest part of EUT chassis.
7. The frequency range from 150KHz to 30MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth(IF bandwidth=9KHz) with Maximum Hold Mode
9. For the actual test configuration, please refer to the related Item –EUT Test Photos.

EUT :	ConBox2020RD	Model Name. :	CB20RDNAR1
Temperature :	N/A	Relative Humidity :	N/A
Pressure :	N/A	Phase :	L
Test Voltage :	N/A	Test Mode :	N/A

Not Applicable

EUT :	ConBox2020RD	Model Name. :	CB20RDNAR1
Temperature :	N/A	Relative Humidity :	N/A
Pressure :	N/A	Phase :	N
Test Voltage :	N/A	Test Mode :	N/A

Not Applicable

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 APPLICABLE STANDARD

According to FCC Part 15.407(b) and 15.209

3.2.2 CONFORMANCE LIMIT

According to FCC Part 15.407 (b) (9) (10) : radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
According to FCC Part15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	13.36-13.41	322-335.4	3.6-4.4
0.495-0.505	16.42-16.423	399.9-410	4.5-5.15
2.1735-2.1905	16.69475-16.69525	608-614	5.35-5.46
4.125-4.128	16.80425-16.80475	960-1240	7.25-7.75
4.17725-4.17775	25.5-25.67	1300-1427	8.025-8.5
4.20725-4.20775	37.5-38.25	1435-1626.5	9.0-9.2
6.215-6.218	73-74.6	1645.5-1646.5	9.3-9.5
6.26775-6.26825	74.8-75.2	1660-1710	10.6-12.7
6.31175-6.31225	108-121.94	1718.8-1722.2	13.25-13.4
8.291-8.294	123-138	2200-2300	14.47-14.5
8.362-8.366	149.9-150.05	2310-2390	15.35-16.2
8.37625-8.38675	156.52475-156.52525	2483.5-2500	17.7-21.4
8.41425-8.41475	156.7-156.9	2690-2900	22.01-23.12
12.29-12.293	162.0125-167.17	3260-3267	23.6-24.0
12.51975-12.52025	167.72-173.2	3332-3339	31.2-31.8
12.57675-12.57725	240-285	3345.8-3358	36.43-36.5
			(2)

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009~0.490	2400/F(KHz)	20 log (uV/m)	300
0.490~1.705	24000/F(KHz)	20 log (uV/m)	30
1.705~30.0	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Limits of Radiated Emission Measurement(Above 1000MHz)

Frequency(MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Remark :1. Emission level in dBuV/m=20 log (uV/m)

2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

3. For Frequency 9kHz~30MHz:

Distance extrapolation factor =40log(Specific distance/ test distance)(dB);

Limit line=Specific limits(dBuV) + distance extrapolation factor.

For Frequency above 30MHz:

Distance extrapolation factor =20log(Specific distance/ test distance)(dB);

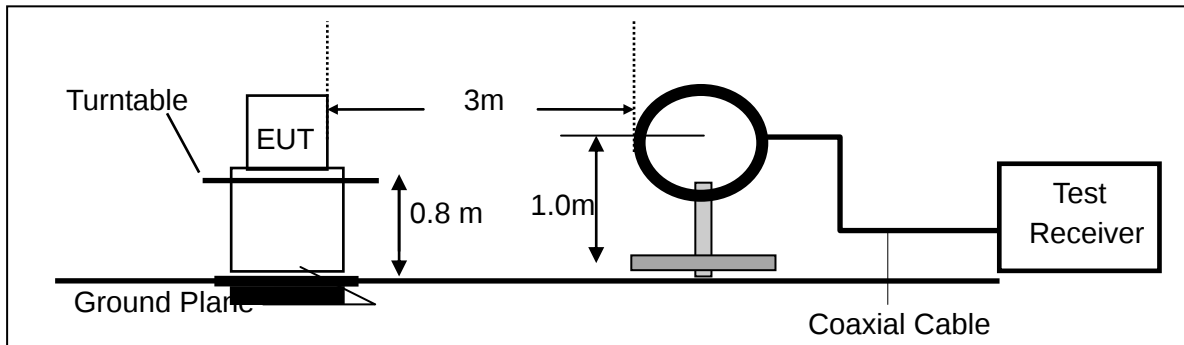
Limit line=Specific limits(dBuV) + distance extrapolation factor.

3.2.3 MEASURING INSTRUMENTS

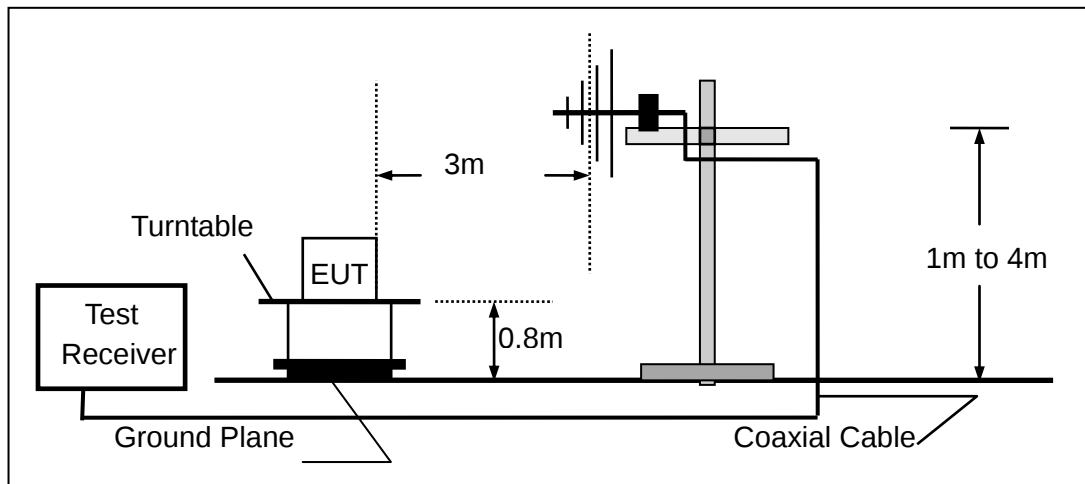
The Measuring equipment is listed in the section 2.2 of this test report.

3.2.4 TEST CONFIGURATION

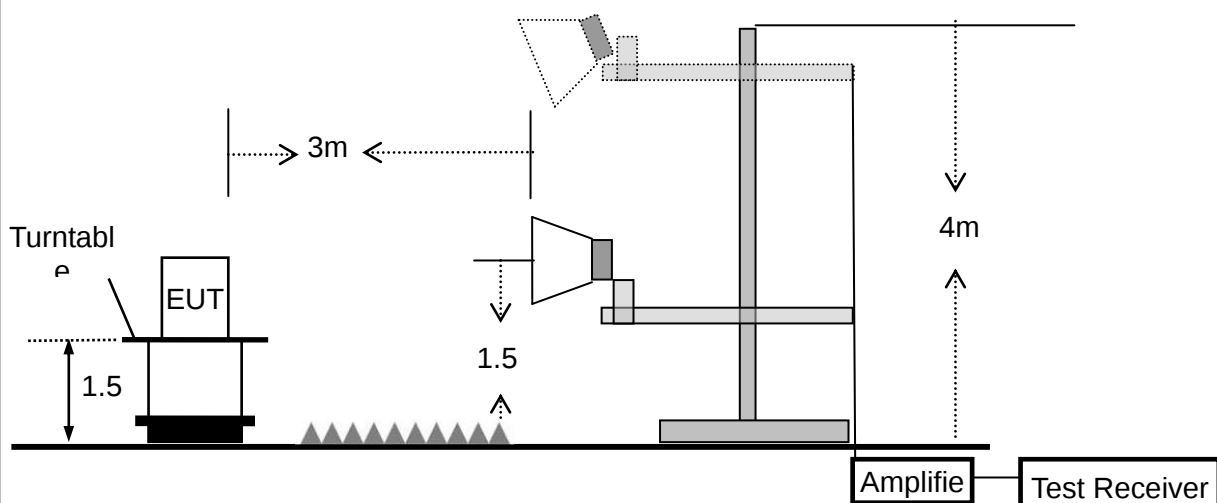
(a) For radiated emissions below 30MHz



(b) For radiated emissions from 30MHz to 1000MHz



(c) For radiated emissions above 1000MHz



3.2.5 TEST PROCEDURE

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10-2013. The test distance is 3m. The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT.

Use the following spectrum analyzer settings:

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 3 MHz for Peak, 1 MHz / 3MHz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 m for below 1GHz and 1.5m for above 1GHz the ground at a 3 meter. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m for below 1GHz and 1.5m for above 1GHz; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
	Average	1 MHz	3 MHz

Note: for the frequency ranges below 30 MHz, a narrower RBW is used for these ranges but the measured value should add a RBW correction factor (RBWCF) where $RBWCF [dB] = 10 \cdot \lg(100 [kHz] / \text{narrower RBW} [kHz])$. , the narrower RBW is 1 kHz and RBWCF is 20 dB for the frequency 9 kHz to 150 kHz, and the narrower RBW is 10 kHz and RBWCF is 10 dB for the frequency 150 kHz to 30 MHz.

3.2.6 TEST RESULTS (9KHZ – 30 MHZ)

EUT :	ConBox2020RD	Model Name :	CB20RDNAR1
Temperature :	26 °C	Relative Humidity :	54%
Pressure:	1010 hPa	Test Voltage :	DC 12V
Test Mode :	Mode 1/2/3	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	N/A
--	--	--	--	N/A

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

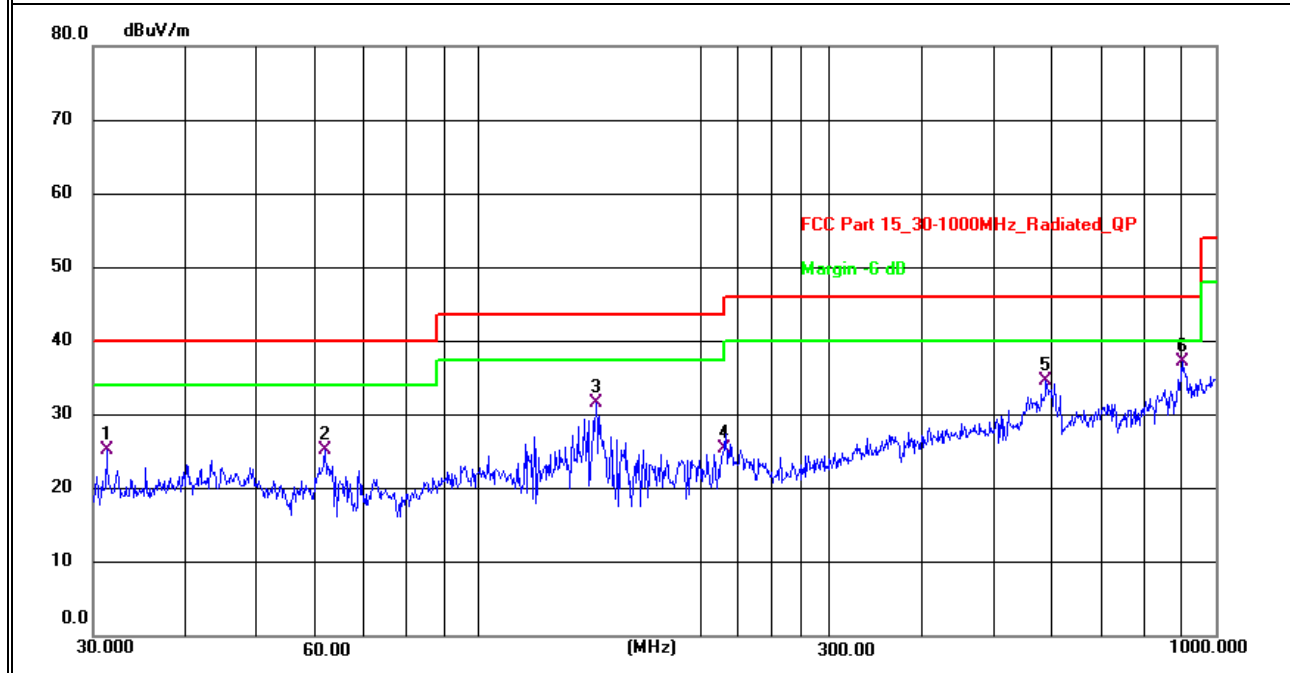
3.2.7 TEST RESULTS (30MHZ – 1GHZ)

EUT :	ConBox2020RD	Model Name :	CB20RDNAR1
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Voltage :	DC 12V
Test Mode :	Mode 1/2/3		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	31.2892	8.66	16.61	25.27	40.00	-14.73	QP
V	61.9950	6.96	18.32	25.28	40.00	-14.72	QP
V	144.3343	17.49	14.10	31.59	43.50	-11.91	QP
V	215.2675	7.58	17.88	25.46	43.50	-18.04	QP
V	588.9050	9.03	25.54	34.57	46.00	-11.43	QP
V	900.1471	6.87	30.39	37.26	46.00	-8.74	QP

Remark:

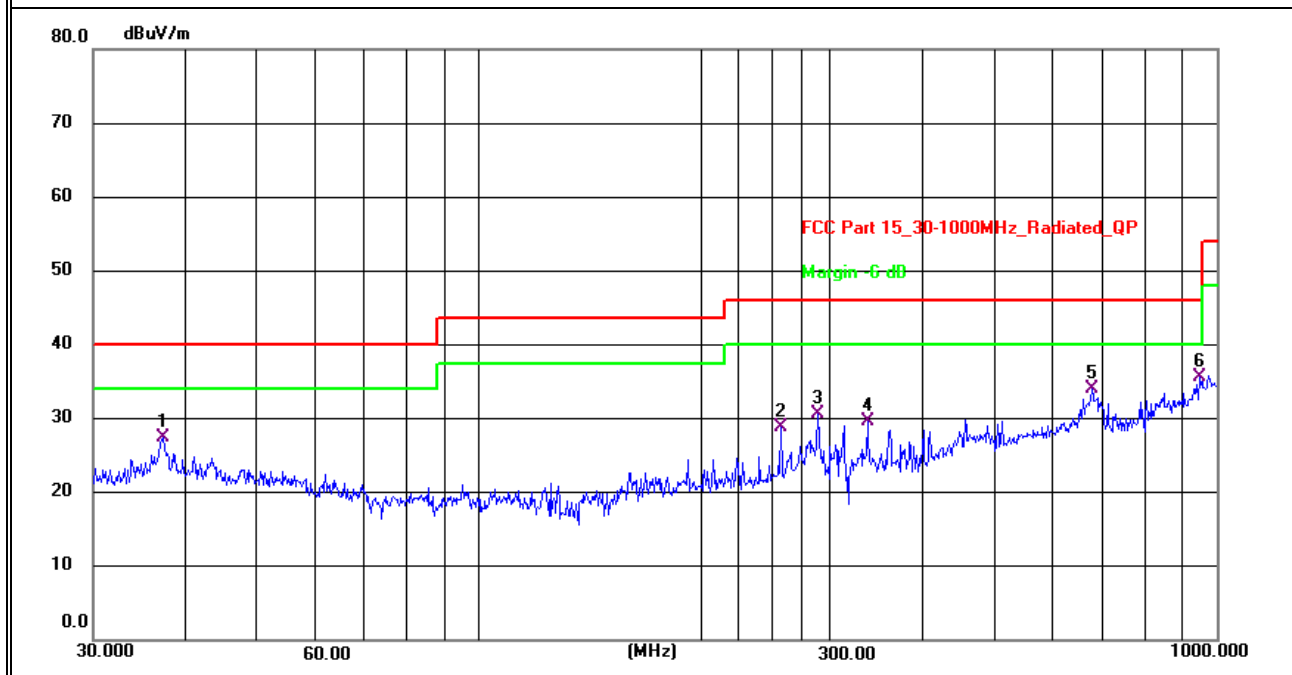
Emission Level= ReadingLevel+ Factor, Margin= Emission Level - Limit



Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	37.2854	9.80	17.71	27.51	40.00	-12.49	QP
H	256.5210	10.08	18.71	28.79	46.00	-17.21	QP
H	287.9904	10.67	19.94	30.61	46.00	-15.39	QP
H	336.0350	8.40	21.18	29.58	46.00	-16.42	QP
H	677.5797	6.73	27.19	33.92	46.00	-12.08	QP
H	948.7608	5.06	30.63	35.69	46.00	-10.31	QP

Remark:

Emission Level= ReadingLevel+ Factor, Margin= Emission Level - Limit



Note: All modes have been tested, just the worst mode has been recorded in the report.
 "802.11n20 5200MHz" mode is the worst mode. When PK value is lower than the Average value limit, average don't record.

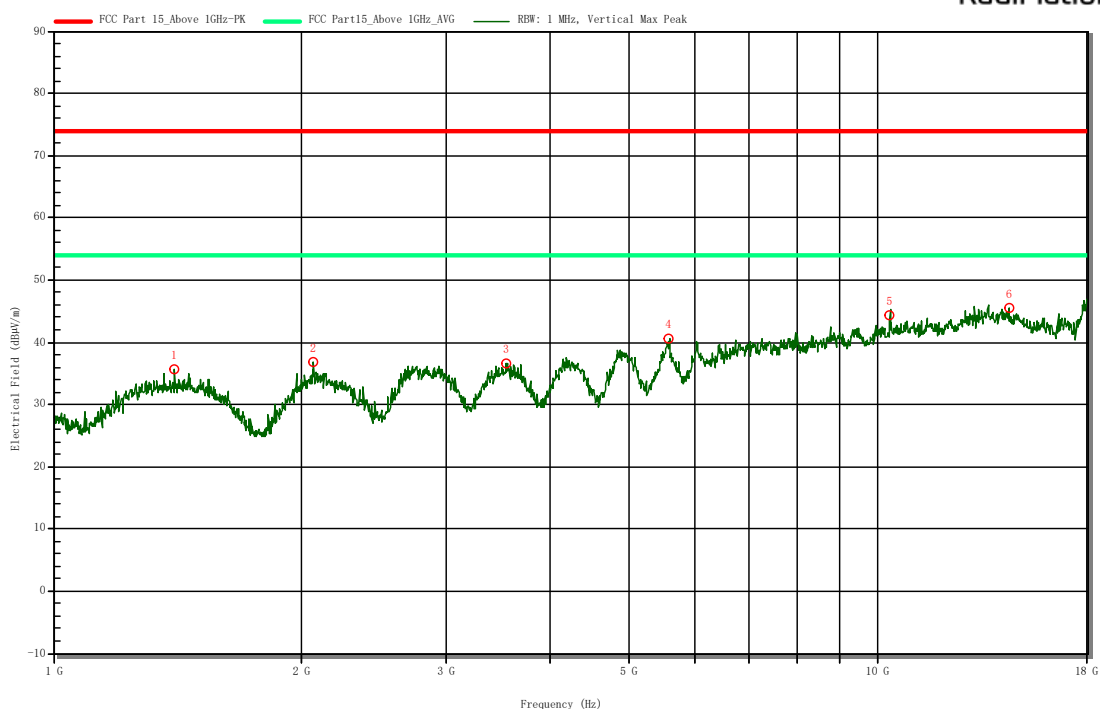
3.2.8 TEST RESULTS (1GHz-18GHz)

EUT :	ConBox2020RD	Model Name. :	CB20RDNAR1
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 12V
Test Mode :	Mode 1/2/3		

[1 GHz-18 GHz]/Vertical RSE WLAN 5G Ant1 802.11a 5180MHz

Start Frequency	Stop Frequency	Step Width	Meas. Time	IF Bandwidth	Detectors
1 GHz	18 GHz	Fixed step count: 40001 steps per Band	Auto [120 ms]	1 MHz	PK, AV

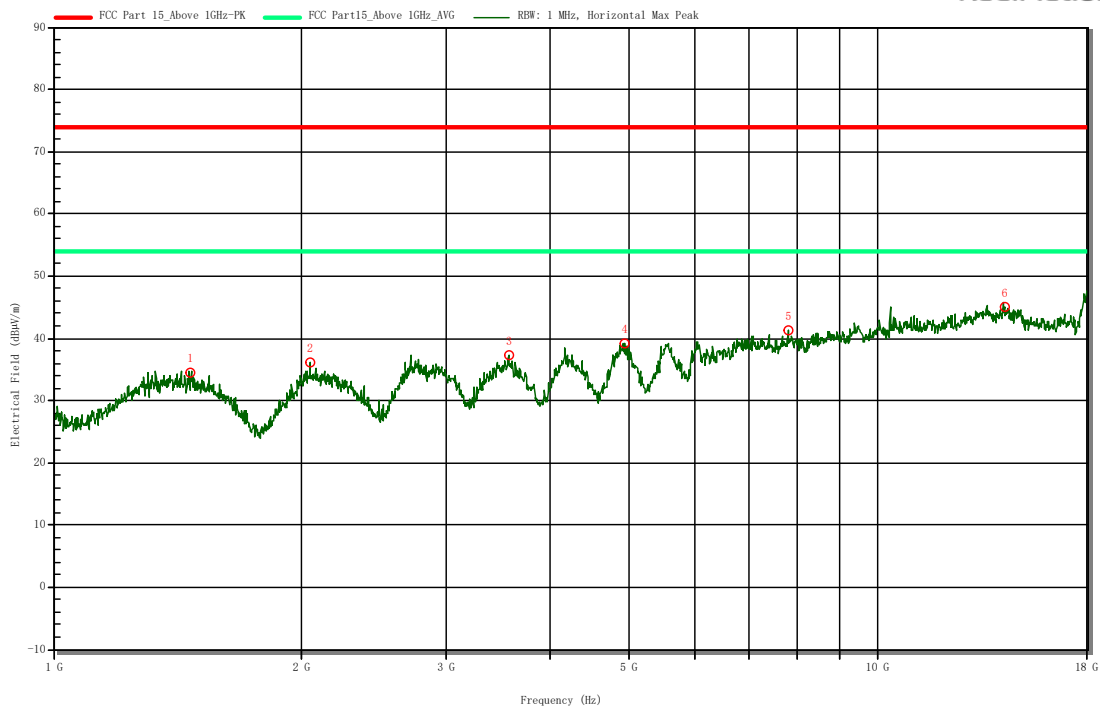
RadiMation



Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1402.9	35.7	74	-38.3	Pass
2068.875	36.7	68.2	-31.5	Pass
3549.15	36.6	68.2	-31.6	Pass
5585.75	40.7	68.2	-27.5	Pass
10362.75	44.4	68.2	-23.8	Pass
14436.375	45.4	68.2	-22.8	Pass

[1 GHz-18 GHz]/Horizontal RSE WLAN 5G Ant1 802.11a 5180MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

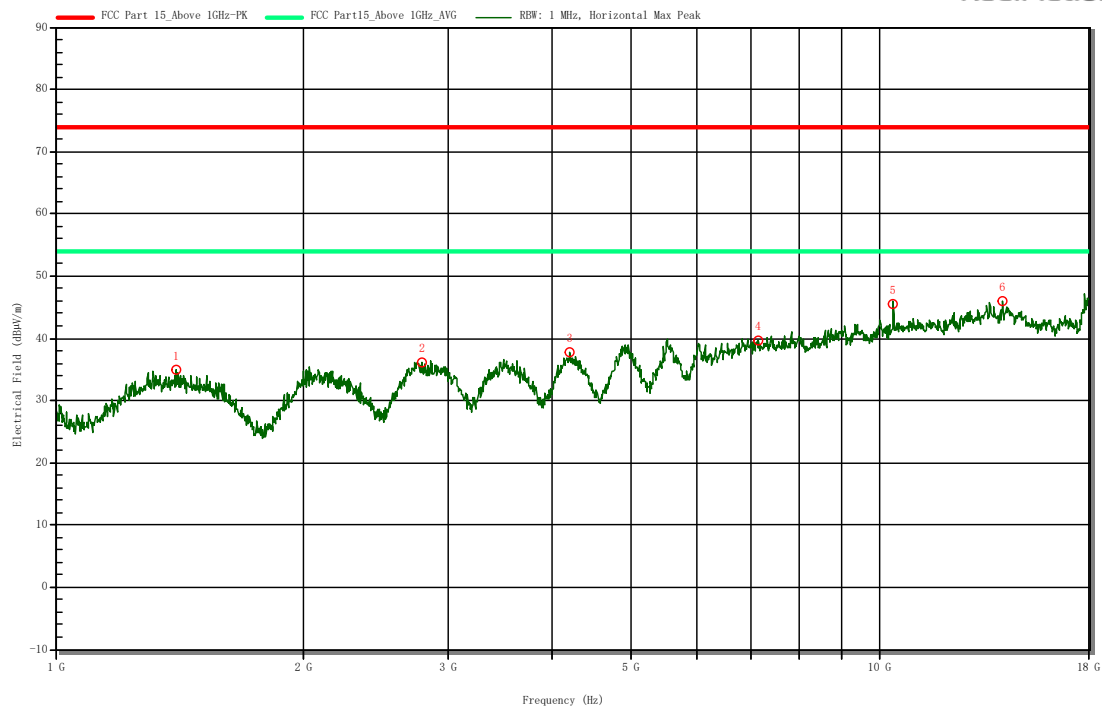
RadiMation

Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1468.35	34.6	74.0	-39.4	Pass
2048.05	36	68.2	-32.2	Pass
3568.275	37.3	68.2	-30.9	Pass
4934.65	39.3	74.0	-34.7	Pass
7801.7	41.2	68.2	-27.0	Pass
14263.825	45.1	68.2	-23.1	Pass

[1 GHz-18 GHz]/Horizontal RSE WLAN 5G Ant1 802.11a 5200MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

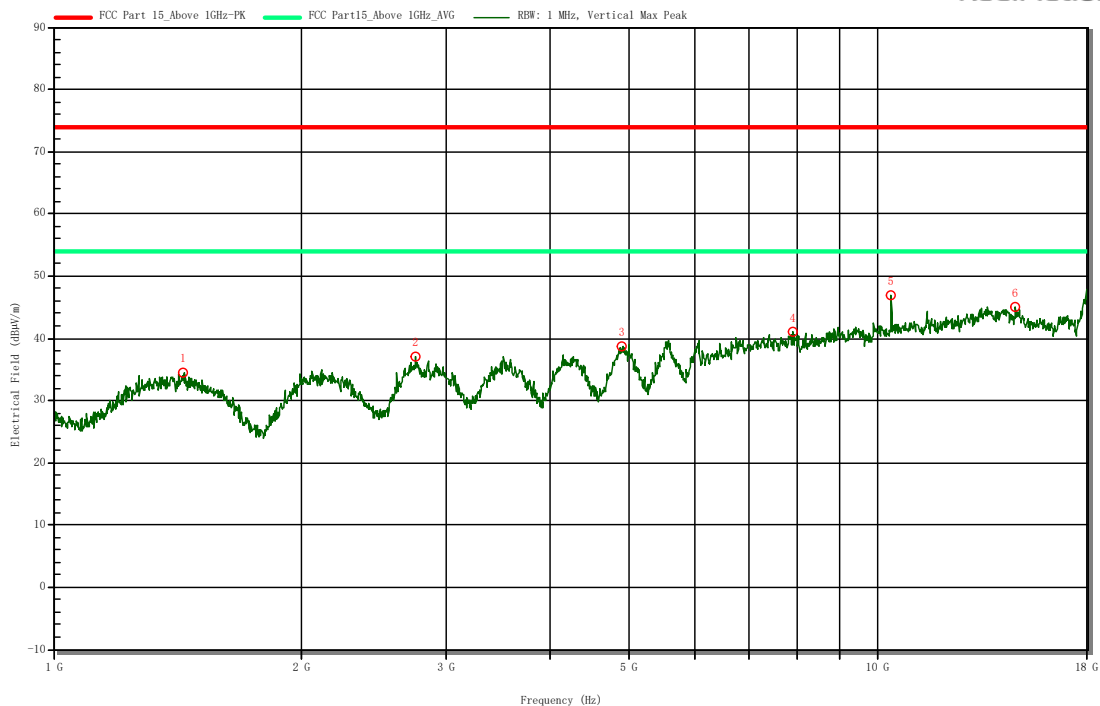


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1399.925	34.6	74.0	-39.4	Pass
2783.725	36	74.0	-38.0	Pass
4209.175	37.3	74.0	-36.7	Pass
7138.275	39.3	68.2	-28.9	Pass
10403.125	41.2	68.2	-27.0	Pass
14121.025	45.1	68.2	-23.1	Pass

[1 GHz-18 GHz]/Vertical RSE WLAN 5G Ant1 802.11a 5200MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV

RadiMation

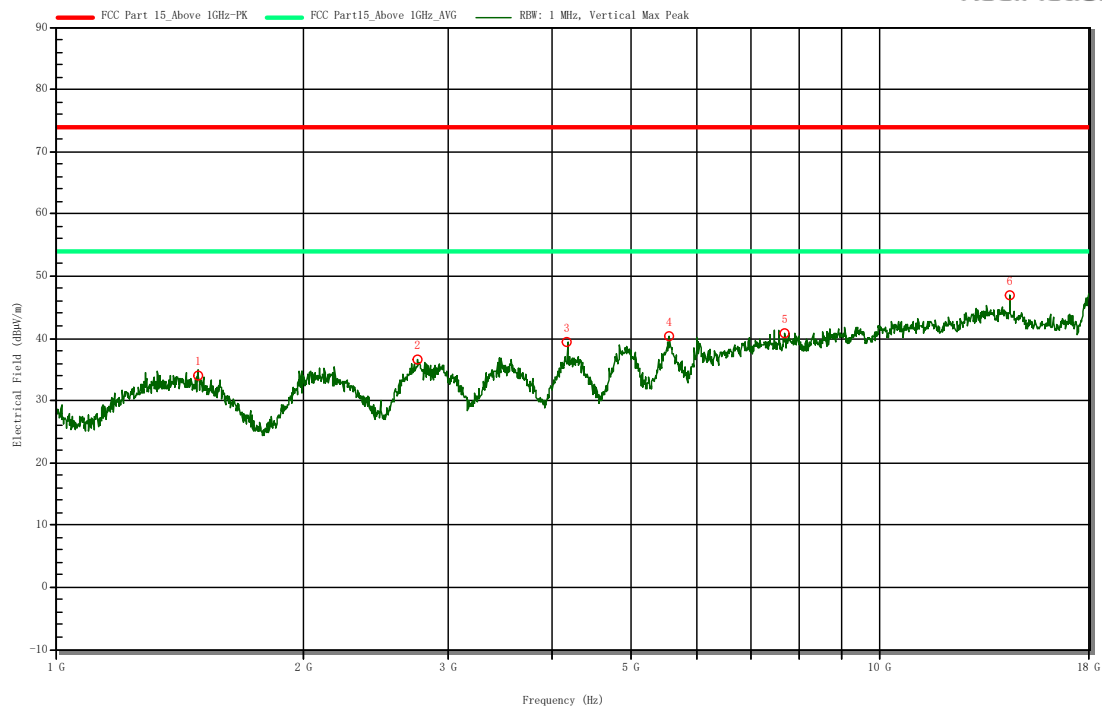


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1438.6	34.4	74.0	-39.6	Pass
2750.15	37.1	74.0	-36.9	Pass
4904.475	38.8	74.0	-35.2	Pass
7885.85	41	68.2	-27.2	Pass
10401	46.9	68.2	-21.3	Pass
14698.6	45	68.2	-23.2	Pass

[1 GHz-18 GHz]/Vertical RSE WLAN 5G Ant1 802.11a 5240MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

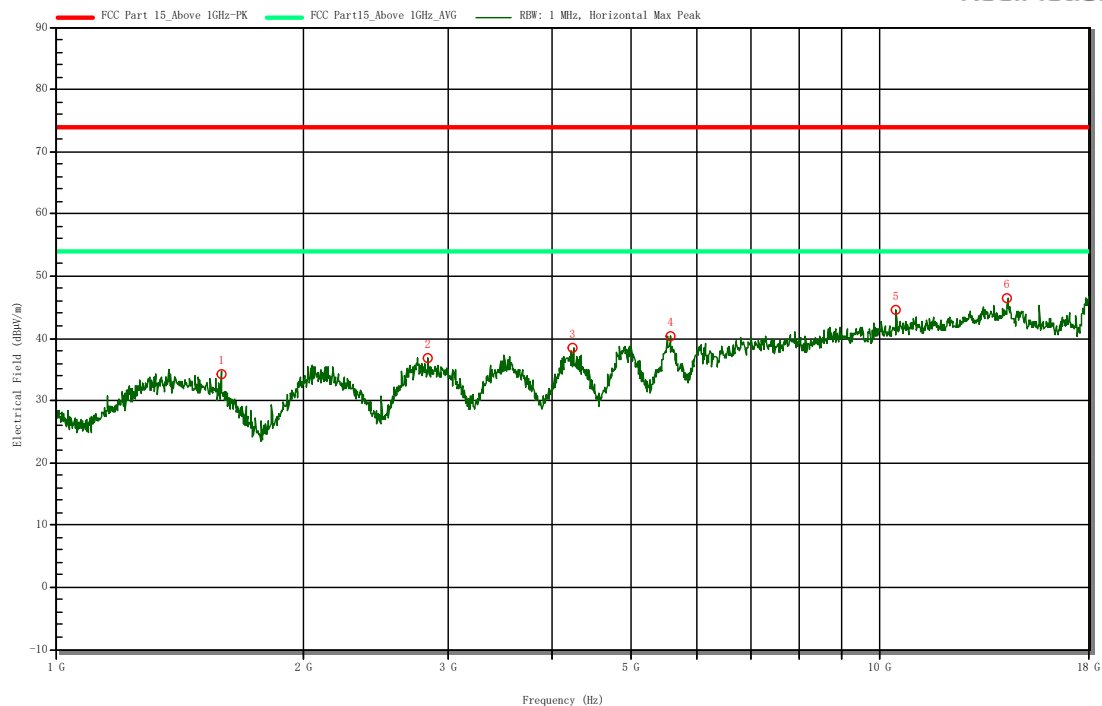


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1488.325	34	74.0	-40.0	Pass
2749.3	36.6	74.0	-37.4	Pass
4179	39.5	74.0	-34.5	Pass
5559.4	40.3	68.2	-27.9	Pass
7676.325	40.9	74.0	-33.1	Pass
14388.35	46.9	68.2	-21.3	Pass

[1 GHz-18 GHz]/Horizontal RSE WLAN 5G Ant1 802.11a 5240MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

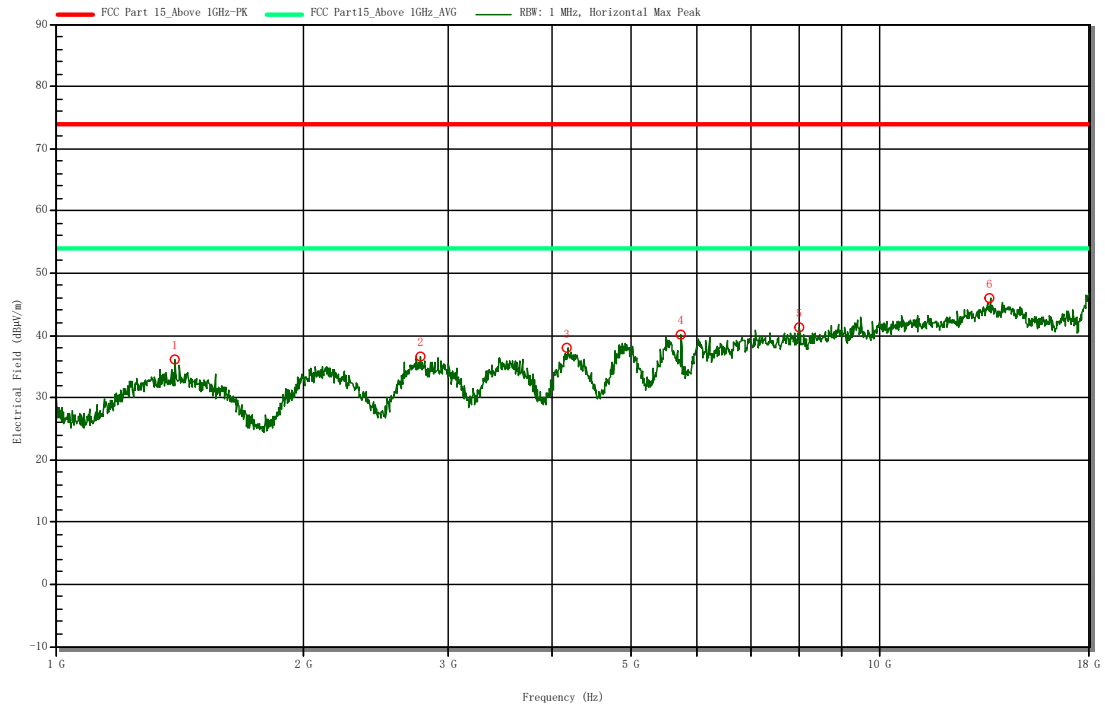


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1587.35	34.3	74.0	-39.7	Pass
2828.775	36.8	74.0	-37.2	Pass
4249.55	38.4	74.0	-35.6	Pass
5572.575	40.5	68.2	-27.7	Pass
10478.35	44.6	68.2	-23.6	Pass
14307.175	46.5	68.2	-21.7	Pass

[1 GHz-18 GHz]/Horizontal RSE WLAN 5G Ant1 802.11a 5745MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

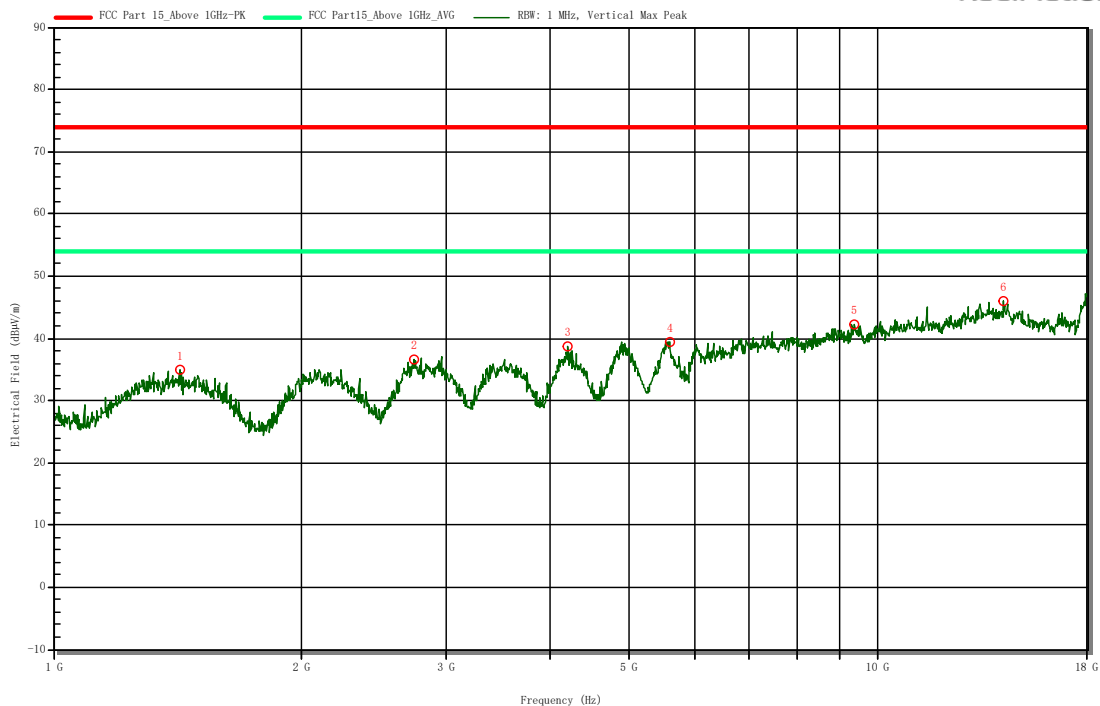


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1396.1	36.1	74.0	-37.9	Pass
2770.55	36.7	74.0	-37.3	Pass
4179	38.1	74.0	-35.9	Pass
5742.15	40	68.2	-28.2	Pass
7998.05	41.4	68.2	-26.8	Pass
13625.9	46	68.2	-22.2	Pass

[1 GHz-18 GHz]/Vertical RSE WLAN 5G Ant1 802.11a 5745MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

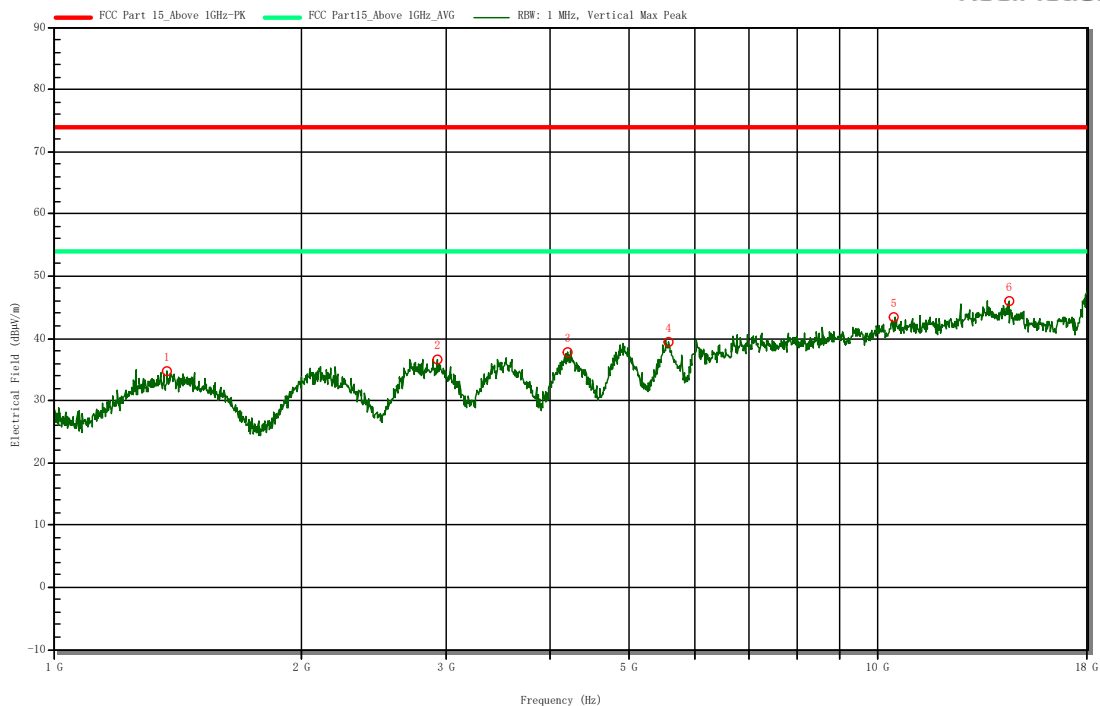


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1422.45	34.8	74.0	-39.2	Pass
2735.275	36.6	74.0	-37.4	Pass
4207.9	38.7	74.0	-35.3	Pass
5592.125	39.5	68.2	-28.7	Pass
9380.575	42.1	74.0	-31.9	Pass
14227.7	46	68.2	-22.2	Pass

[1 GHz-18 GHz]/Vertical RSE WLAN 5G Ant1 802.11a 5785MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 steps per Band Auto [120 ms] 1 MHz PK, AV

RadiMation

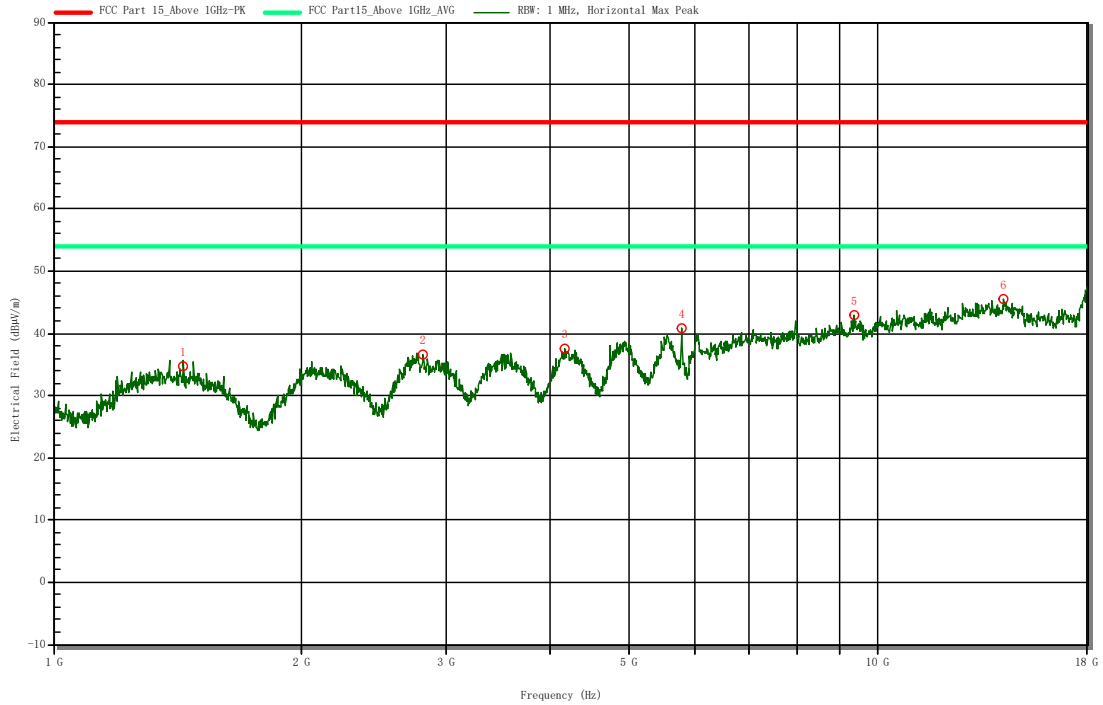


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1371.875	34.6	74.0	-39.4	Pass
2921.85	36.6	68.2	-31.6	Pass
4204.5	37.7	74.0	-36.3	Pass
5570.025	39.4	68.2	-28.8	Pass
10486.425	43.4	68.2	-24.8	Pass
14440.625	46	68.2	-22.2	Pass

[1 GHz-18 GHz]/Horizontal RSE WLAN 5G Ant1 802.11a 5785MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

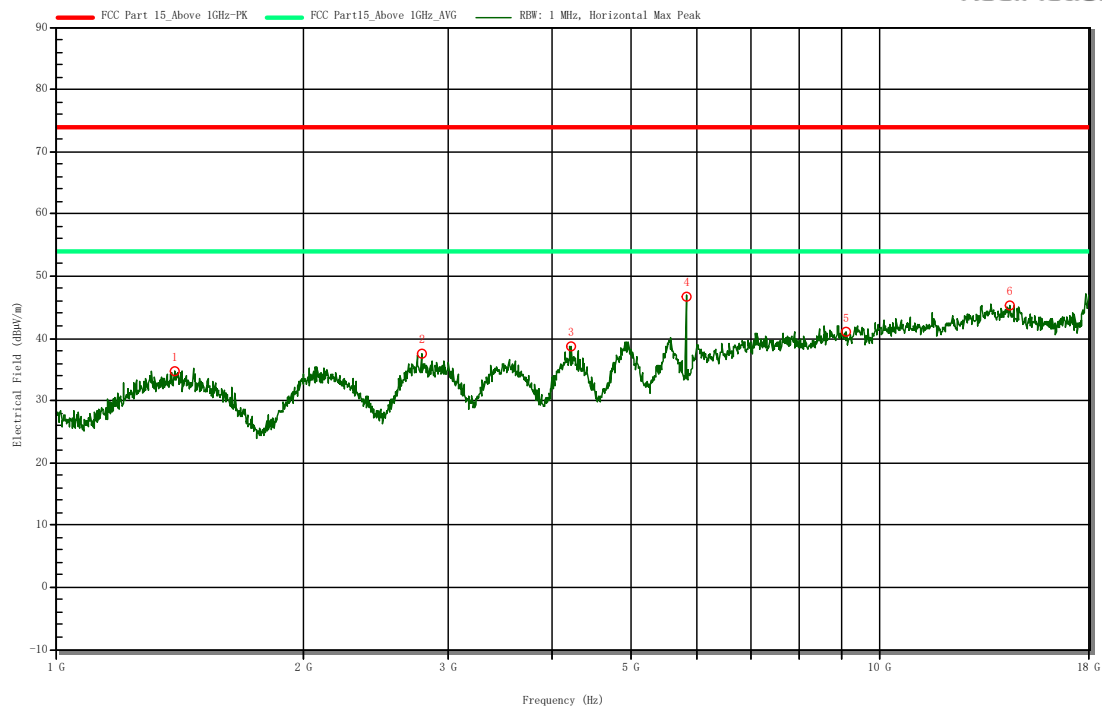


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1436.475	34.8	74.0	-39.2	Pass
2806.25	36.6	74.0	-37.4	Pass
4174.325	37.6	74.0	-36.4	Pass
5783.375	40.9	68.2	-27.3	Pass
9372.075	42.9	74.0	-31.1	Pass
14246.825	45.6	68.2	-22.6	Pass

[1 GHz-18 GHz]/Horizontal RSE WLAN 5G Ant1 802.11a 5825MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

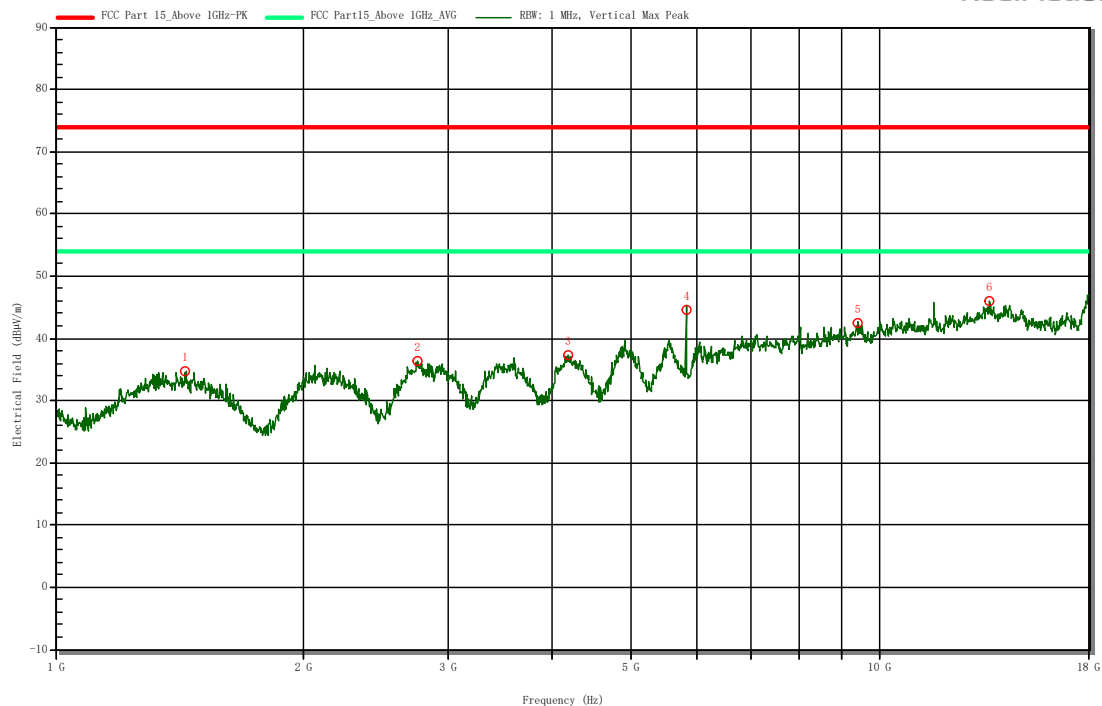


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1394.825	34.7	74.0	-39.3	Pass
2780.325	37.5	74.0	-36.5	Pass
4230.85	38.7	74.0	-35.3	Pass
5830.975	46.7	68.2	-21.5	Pass
9113.675	41	74.0	-33.0	Pass
14382.4	45.3	68.2	-22.9	Pass

[1 GHz-18 GHz]/Vertical RSE WLAN 5G Ant1 802.11a 5825MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

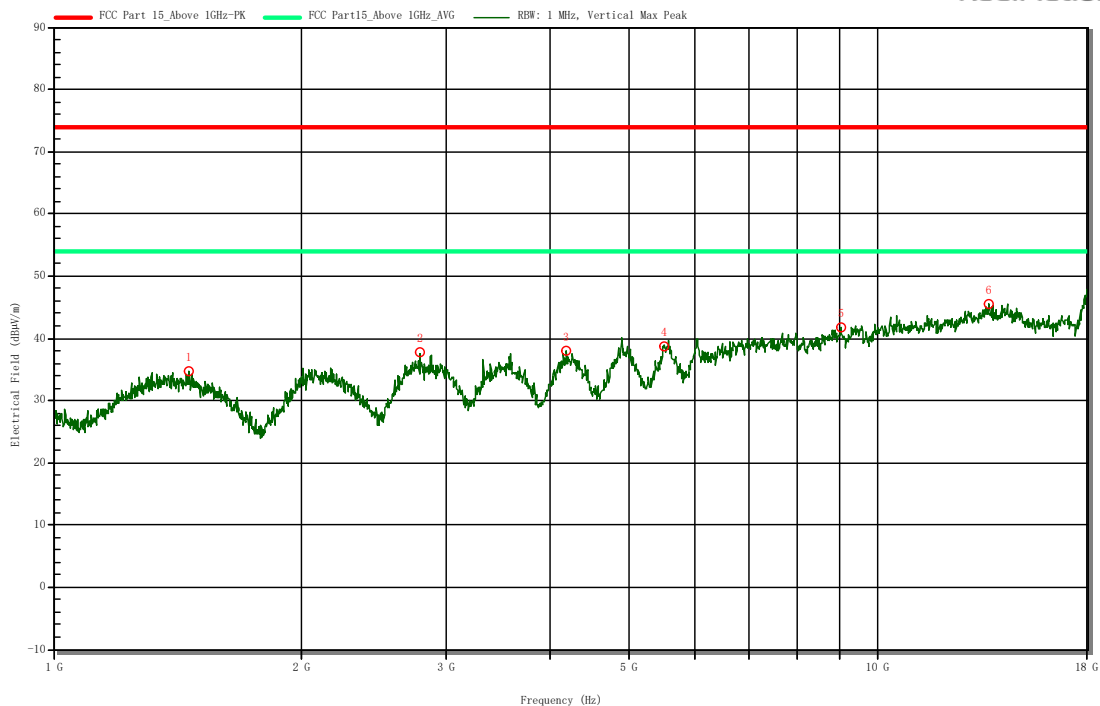


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1437.75	34.7	74.0	-39.3	Pass
2753.125	36.4	74.0	-37.6	Pass
4190.475	37.3	74.0	-36.7	Pass
5827.575	44.5	68.2	-23.7	Pass
9429.025	42.5	74.0	-31.5	Pass
13603.8	45.9	68.2	-22.3	Pass

[1 GHz-18 GHz]/Vertical RSE WLAN 5G Ant2 802.11a 5180MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

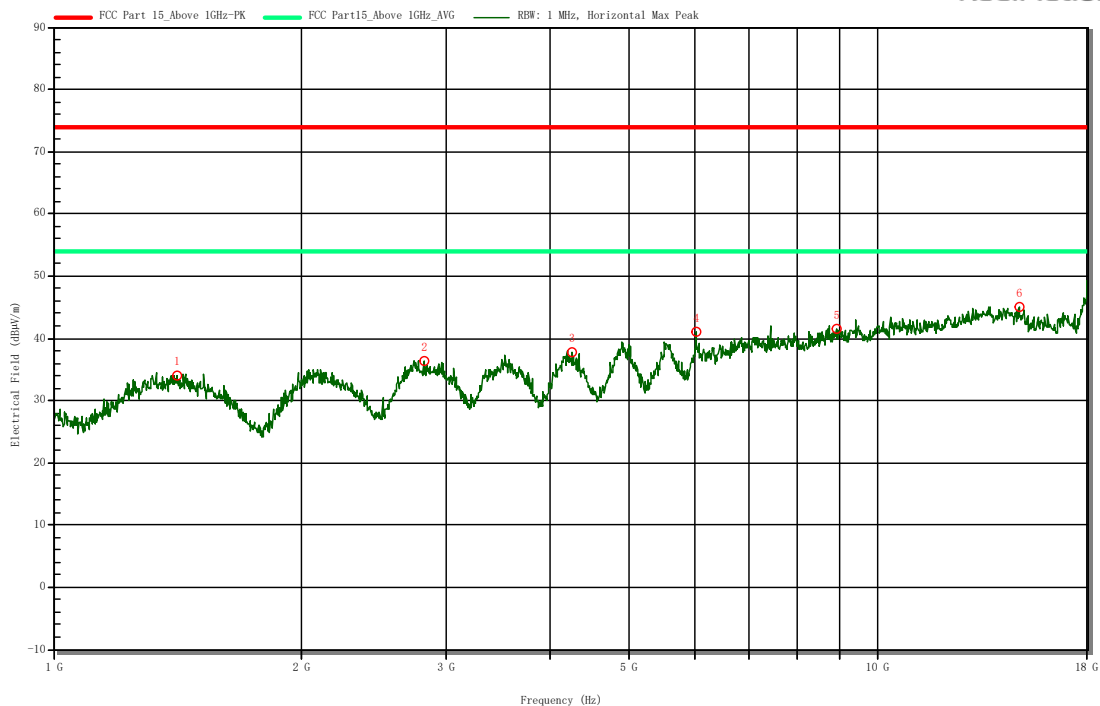


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1461.125	34.7	74.0	-39.3	Pass
2781.6	37.7	74.0	-36.3	Pass
4193.025	38.1	74.0	-35.9	Pass
5511.8	38.8	68.2	-29.4	Pass
9020.175	41.9	74.0	-32.1	Pass
13655.65	45.6	68.2	-22.6	Pass

[1 GHz-18 GHz]/Horizontal RSE WLAN 5G Ant2 802.11a 5180MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

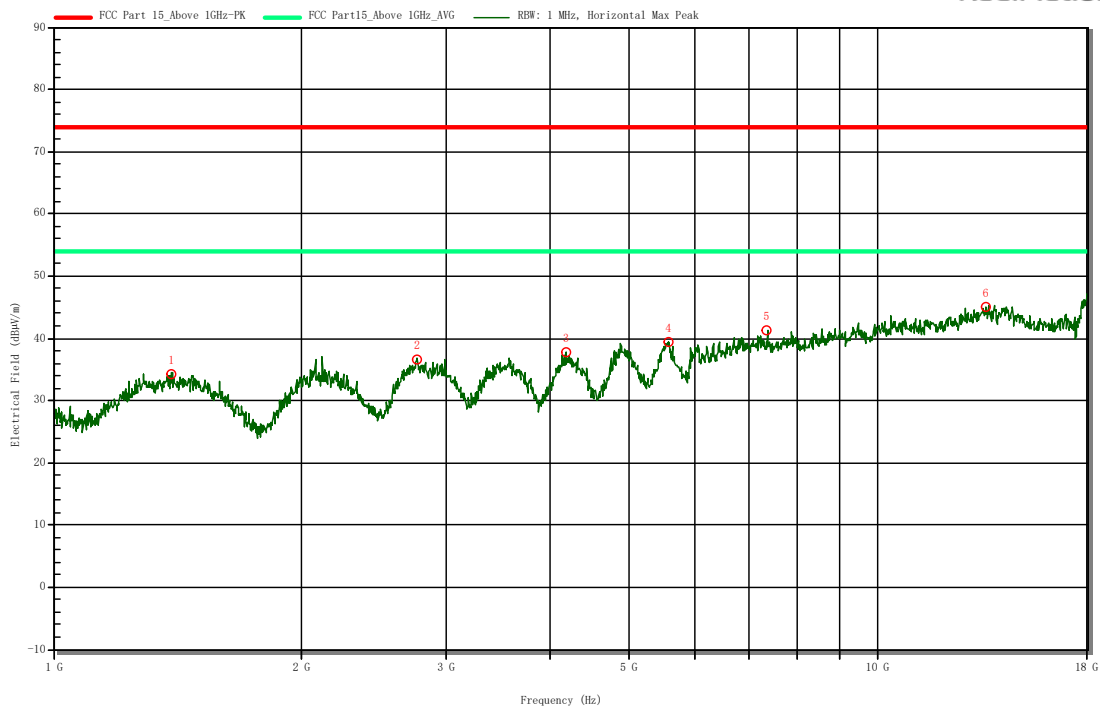


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1411.4	34	74.0	-40.0	Pass
2813.475	36.4	74.0	-37.6	Pass
4264.425	37.9	74.0	-36.1	Pass
6018.4	41	68.2	-27.2	Pass
8910.95	41.4	68.2	-26.8	Pass
14860.525	45.1	68.2	-23.1	Pass

[1 GHz-18 GHz]/Horizontal RSE WLAN 5G Ant2 802.11a 5200MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

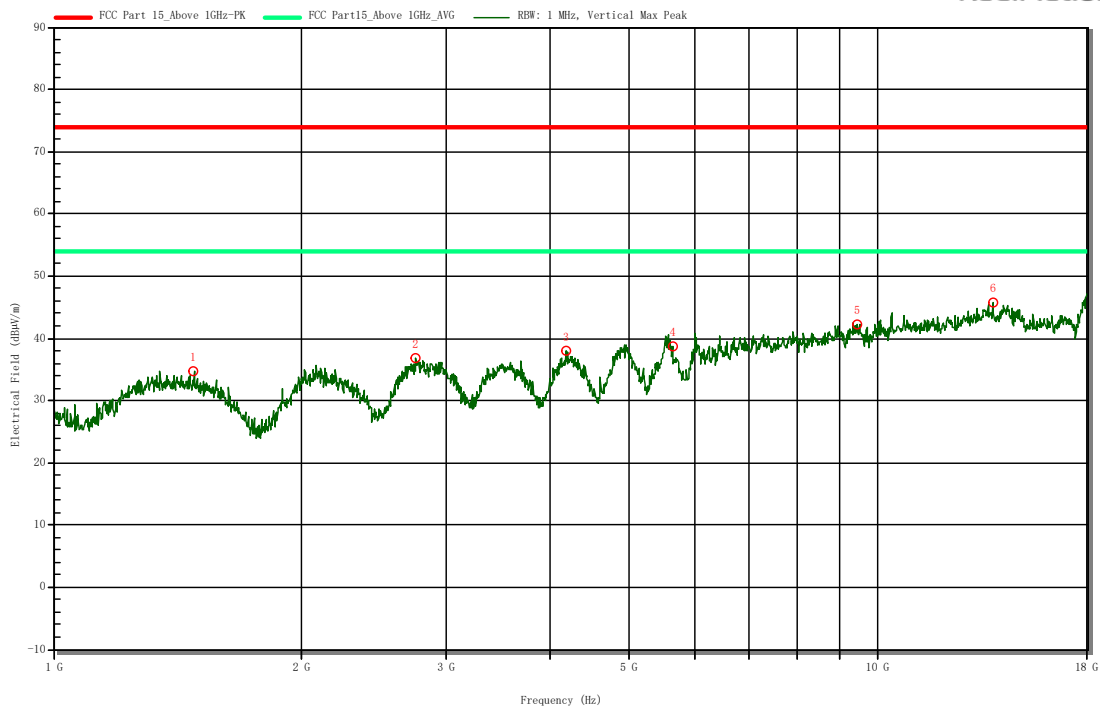


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1391.85	34.2	74.0	-39.8	Pass
2756.95	36.6	74.0	-37.4	Pass
4186.225	37.7	74.0	-36.3	Pass
5582.775	39.5	68.2	-28.7	Pass
7349.5	41.2	74.0	-32.8	Pass
13555.775	45	68.2	-23.2	Pass

[1 GHz-18 GHz]/Vertical RSE WLAN 5G Ant2 802.11a 5200MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

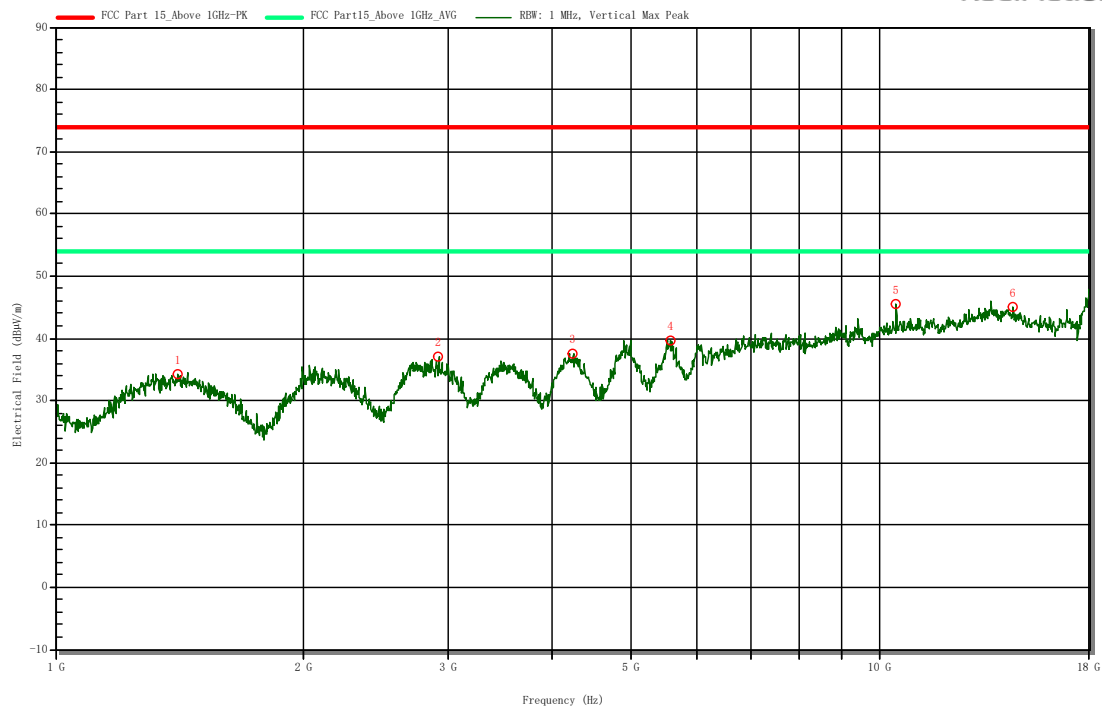


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1480.25	34.7	74.0	-39.3	Pass
2754.825	36.8	74.0	-37.2	Pass
4188.775	38	74.0	-36.0	Pass
5640.15	38.8	68.2	-29.4	Pass
9437.525	42.2	74.0	-31.8	Pass
13800.575	45.7	68.2	-22.5	Pass

[1 GHz-18 GHz]/Vertical RSE WLAN 5G Ant2 802.11a 5240MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

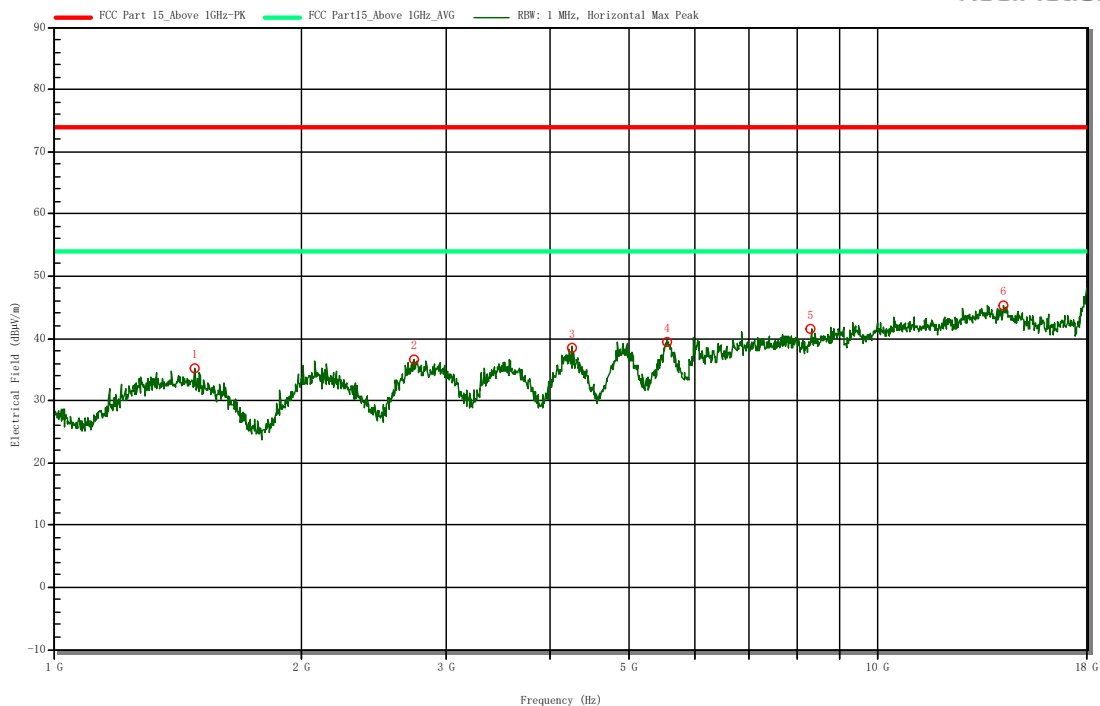


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1407.575	34.2	74.0	-39.8	Pass
2918.45	37	68.2	-31.2	Pass
4246.575	37.6	74.0	-36.4	Pass
5571.725	39.7	68.2	-28.5	Pass
10469.85	45.6	68.2	-22.6	Pass
14530.3	45	68.2	-23.2	Pass

[1 GHz-18 GHz]/Horizontal RSE WLAN 5G Ant2 802.11a 5240MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

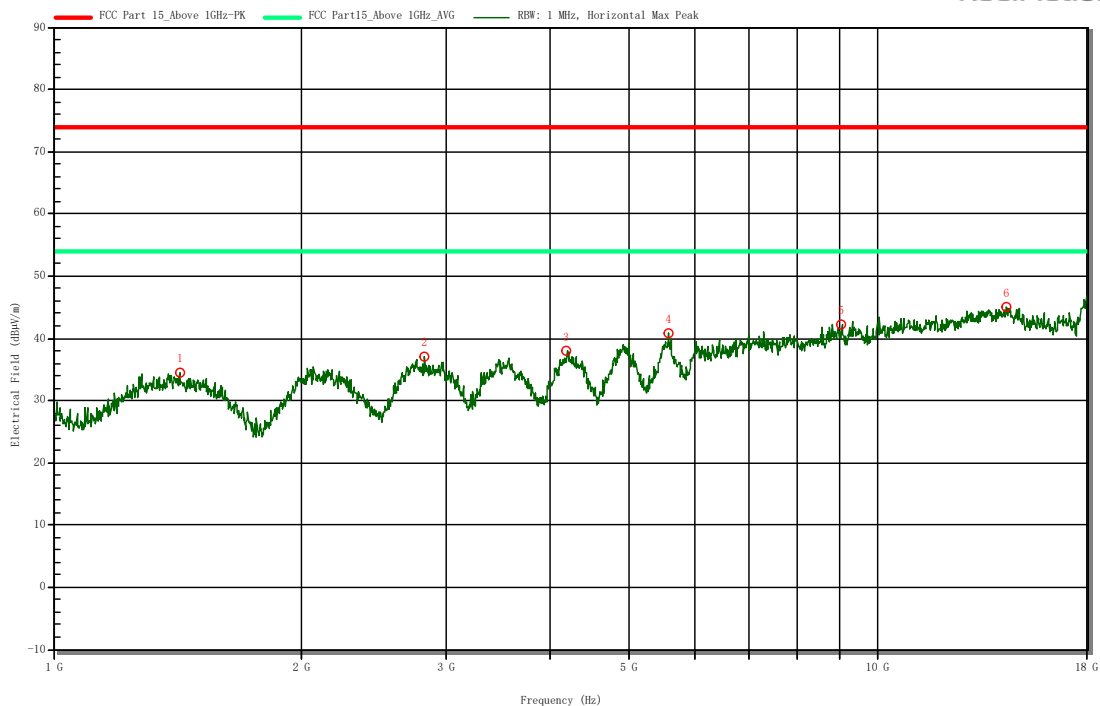


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1485.35	35.3	74.0	-38.7	Pass
2735.275	36.6	74.0	-37.4	Pass
4255.5	38.5	74.0	-35.5	Pass
5564.075	39.3	68.2	-28.9	Pass
8311.7	41.6	74.0	-32.4	Pass
14234.5	45.3	68.2	-22.9	Pass

[1 GHz-18 GHz]/Horizontal RSE WLAN 5G Ant2 802.11a 5745MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

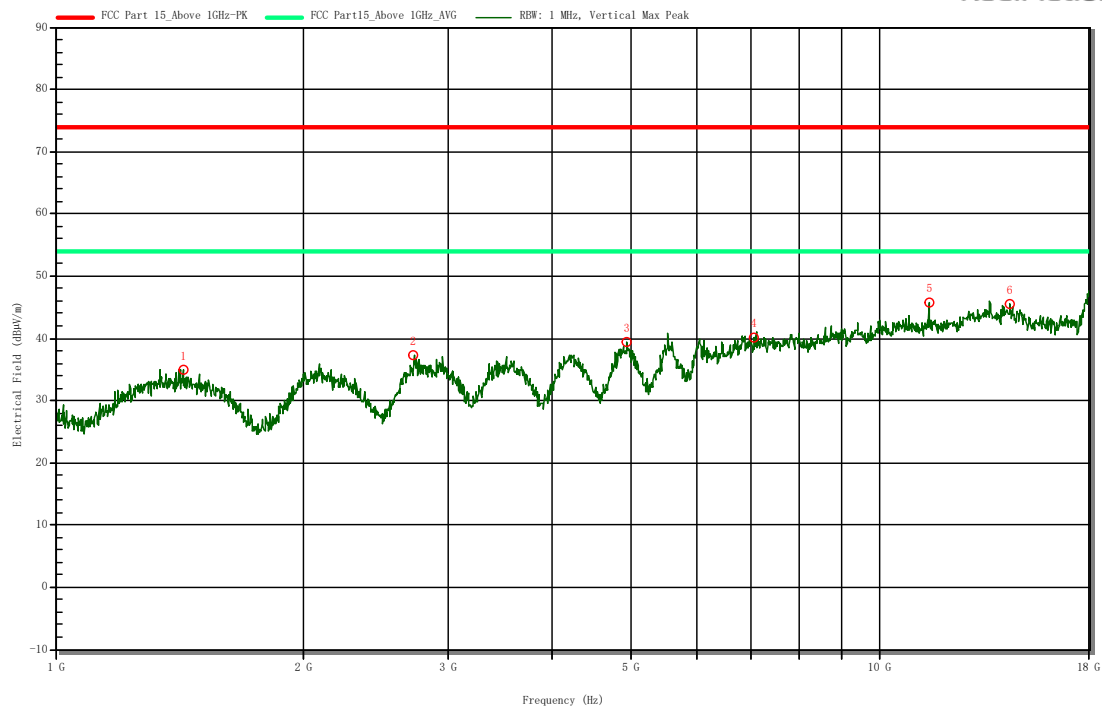


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1422.025	35.3	74.0	-38.7	Pass
2820.275	36.6	74.0	-37.4	Pass
4199.4	38.5	74.0	-35.5	Pass
5572.575	39.3	68.2	-28.9	Pass
9055.45	41.6	74.0	-32.4	Pass
14339.9	45.3	68.2	-22.9	Pass

[1 GHz-18 GHz]/Vertical RSE WLAN 5G Ant2 802.11a 5745MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

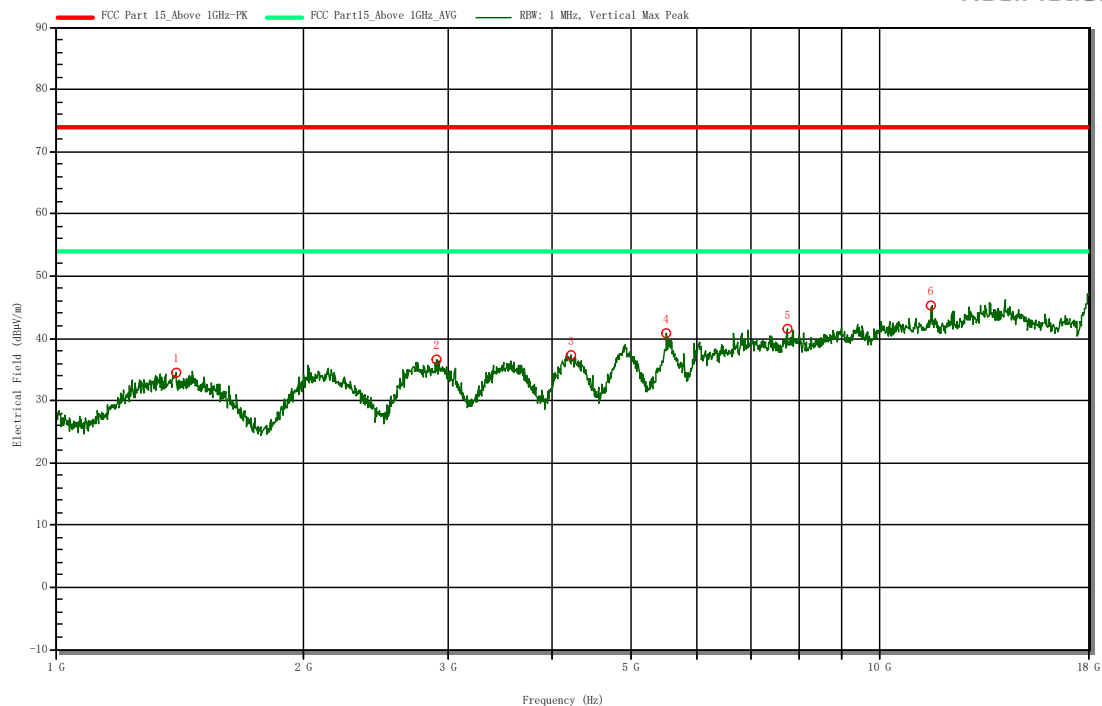


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1427.975	35	68.2	-33.2	Pass
2721.675	37.3	74.0	-36.7	Pass
4940.175	39.5	74.0	-34.5	Pass
7052	40.2	68.2	-28.0	Pass
11488.15	45.8	74.0	-28.2	Pass
14398.125	45.5	68.2	-22.7	Pass

[1 GHz-18 GHz]/Vertical RSE WLAN 5G Ant2 802.11a 5785MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

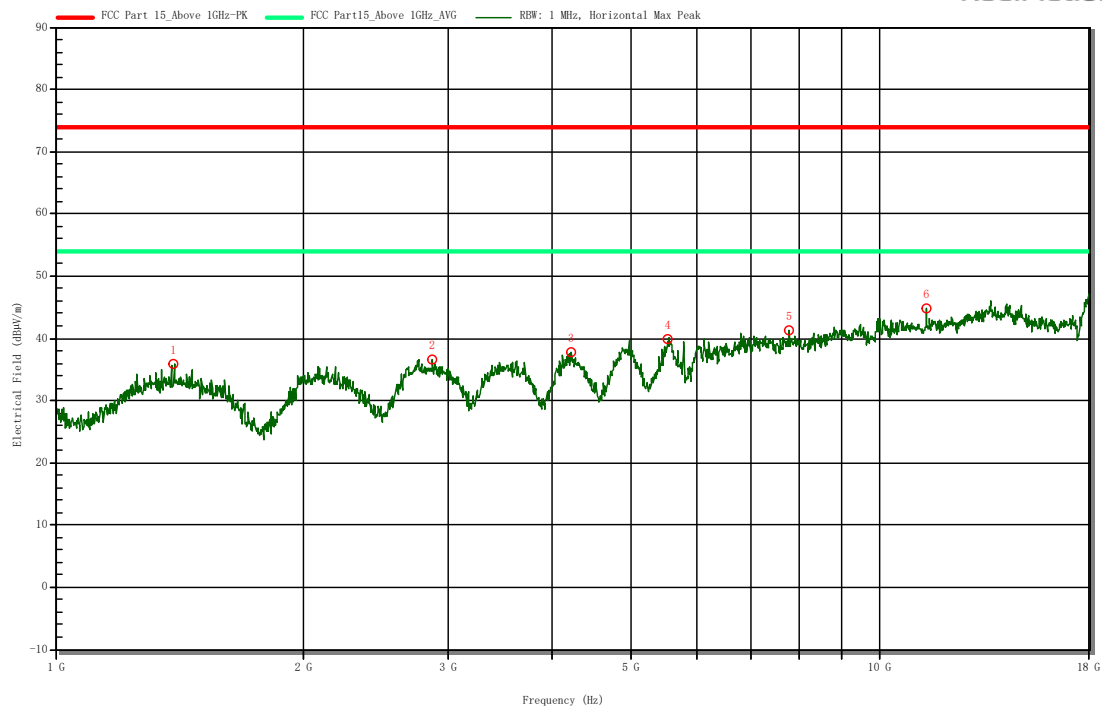


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1399.925	34.6	74.0	-39.4	Pass
2901.45	36.6	68.2	-31.6	Pass
4222.35	37.4	74.0	-36.6	Pass
5510.525	40.7	68.2	-27.5	Pass
7723.5	41.5	74.0	-32.5	Pass
11569.75	45.4	74.0	-28.6	Pass

[1 GHz-18 GHz]/Horizontal RSE WLAN 5G Ant2 802.11a 5785MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

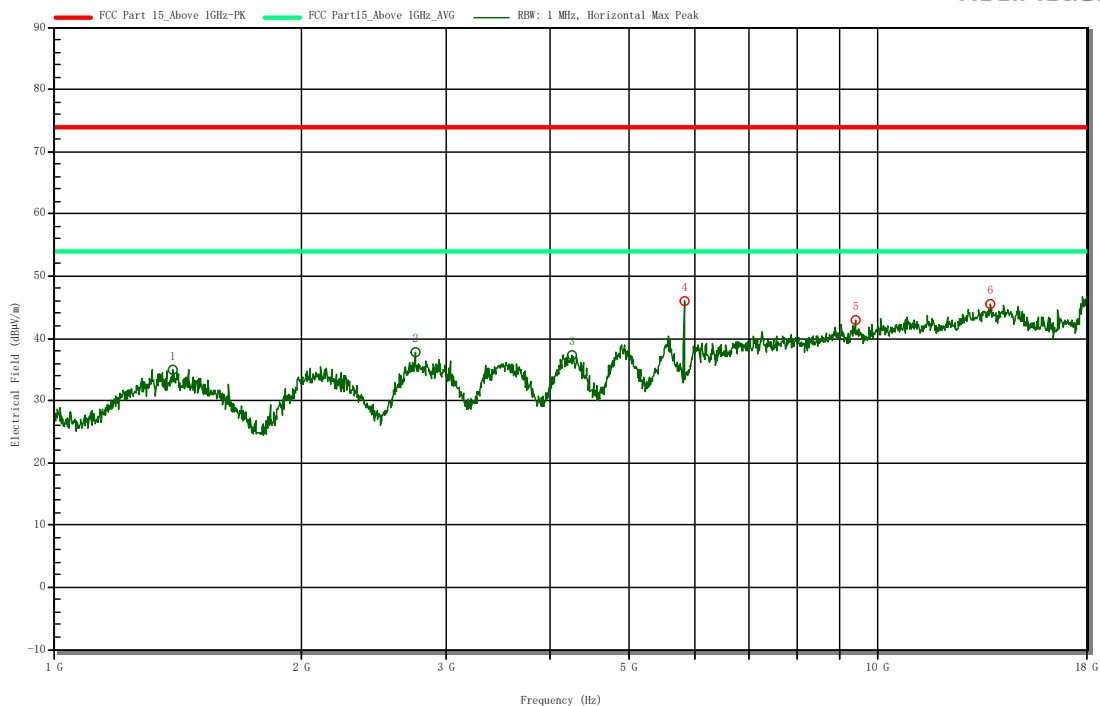


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1391	35.8	74.0	-38.2	Pass
2867.025	36.5	74.0	-37.5	Pass
4228.3	37.7	74.0	-36.3	Pass
5543.25	40	68.2	-28.2	Pass
7776.2	41.3	68.2	-26.9	Pass
11401.025	44.8	74.0	-29.2	Pass

[1 GHz-18 GHz]/Horizontal RSE WLAN 5G Ant2 802.11a 5825MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

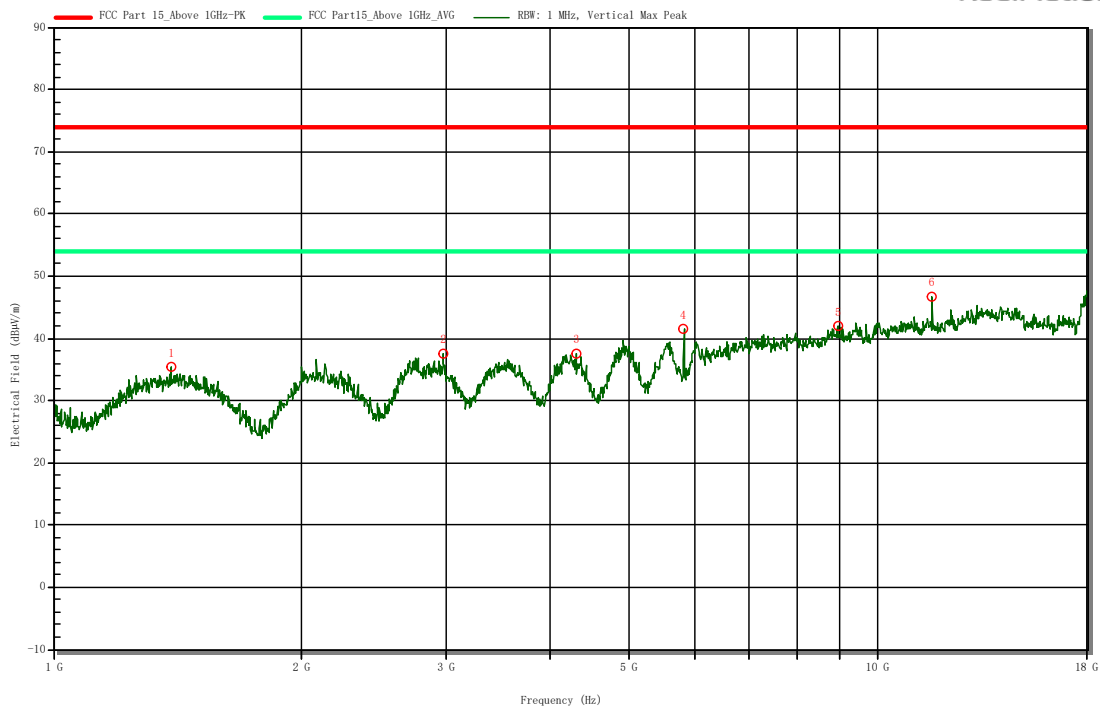


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1396.525	35	74.0	-39.0	Pass
2747.175	37.7	74.0	-36.3	Pass
4251.675	37.2	74.0	-36.8	Pass
5828.425	46	68.2	-22.2	Pass
9399.7	42.9	74.0	-31.1	Pass
13718.125	45.5	68.2	-22.7	Pass

[1 GHz-18 GHz]/Vertical RSE WLAN 5G Ant2 802.11a 5825MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

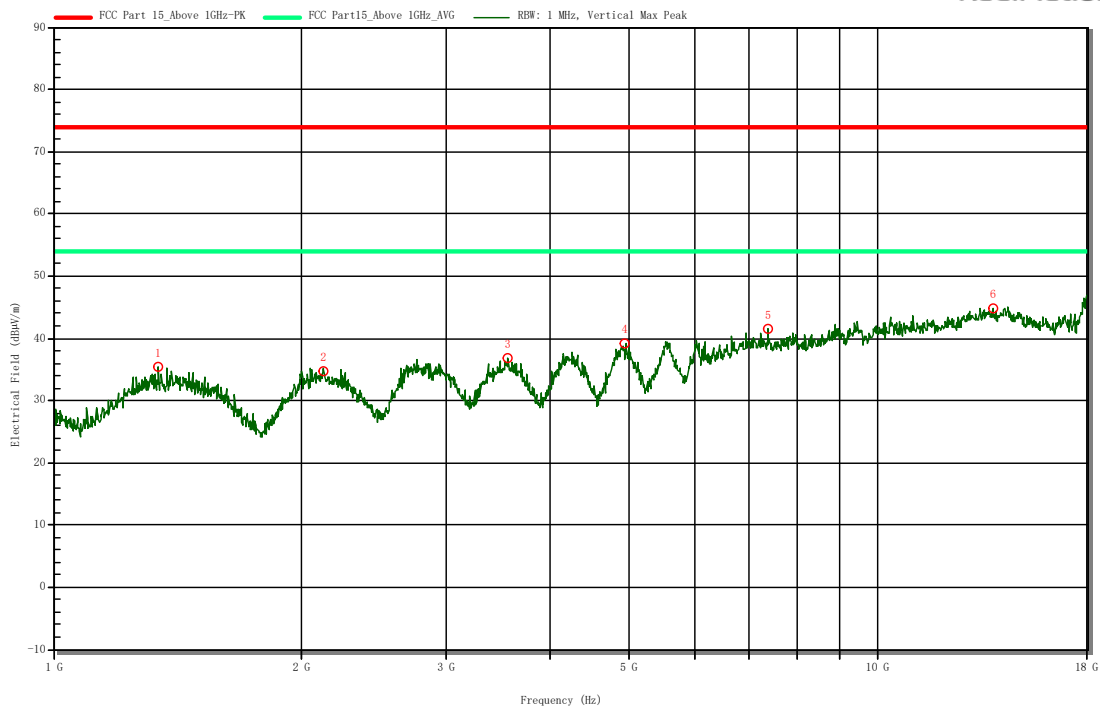


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1388.025	35.4	74.0	-38.6	Pass
2969.875	37.5	68.2	-30.7	Pass
4306.5	37.5	74.0	-36.5	Pass
5823.325	41.4	68.2	-26.8	Pass
8948.35	42	68.2	-26.2	Pass
11647.95	46.7	74.0	-27.3	Pass

[1 GHz-18 GHz]/Vertical RSE WLAN 5G MIMO 802.11HT20 5180MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

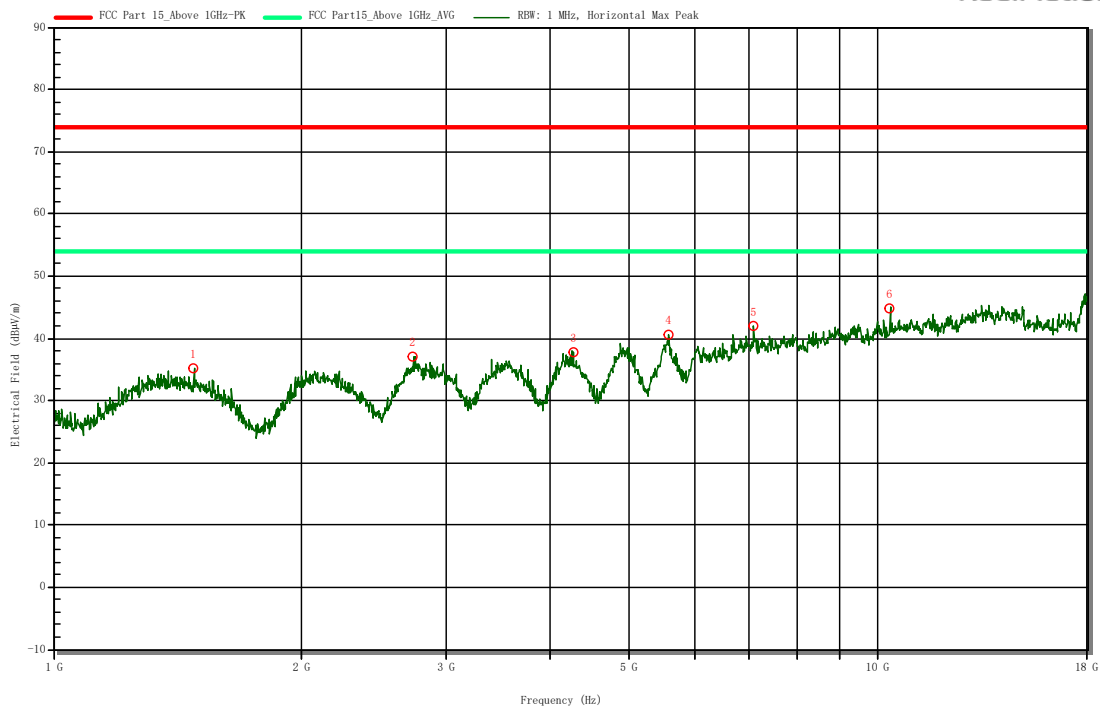


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1340.425	35.4	74.0	-38.6	Pass
2126.675	34.7	68.2	-33.5	Pass
3556.8	36.9	68.2	-31.3	Pass
4945.275	39.1	74.0	-34.9	Pass
7364.375	41.5	74.0	-32.5	Pass
13806.525	44.8	68.2	-23.4	Pass

[1 GHz-18 GHz]/Horizontal RSE WLAN 5G MIMO 802.11HT20 5180MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

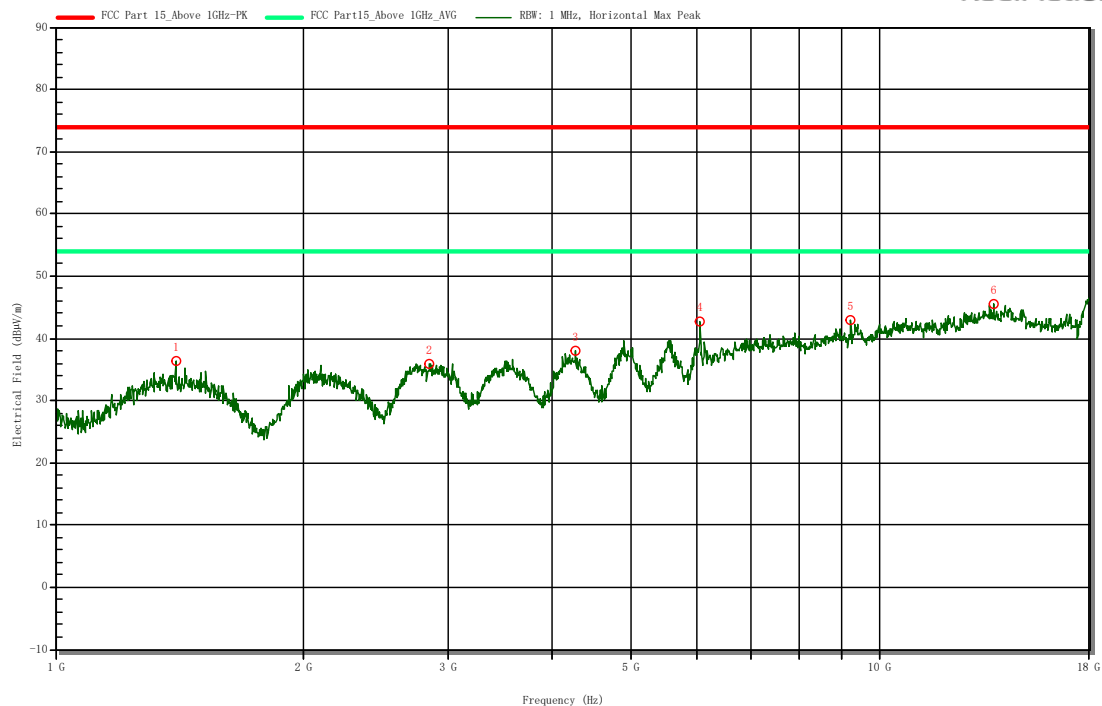


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1479.4	35.3	74.0	-38.7	Pass
2733.575	37.1	74.0	-36.9	Pass
4275.475	37.8	74.0	-36.2	Pass
5578.95	40.5	68.2	-27.7	Pass
7084.3	41.9	68.2	-26.3	Pass
10361.475	44.9	68.2	-23.3	Pass

[1 GHz-18 GHz]/Horizontal RSE WLAN 5G MIMO 802.11HT20 5200MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

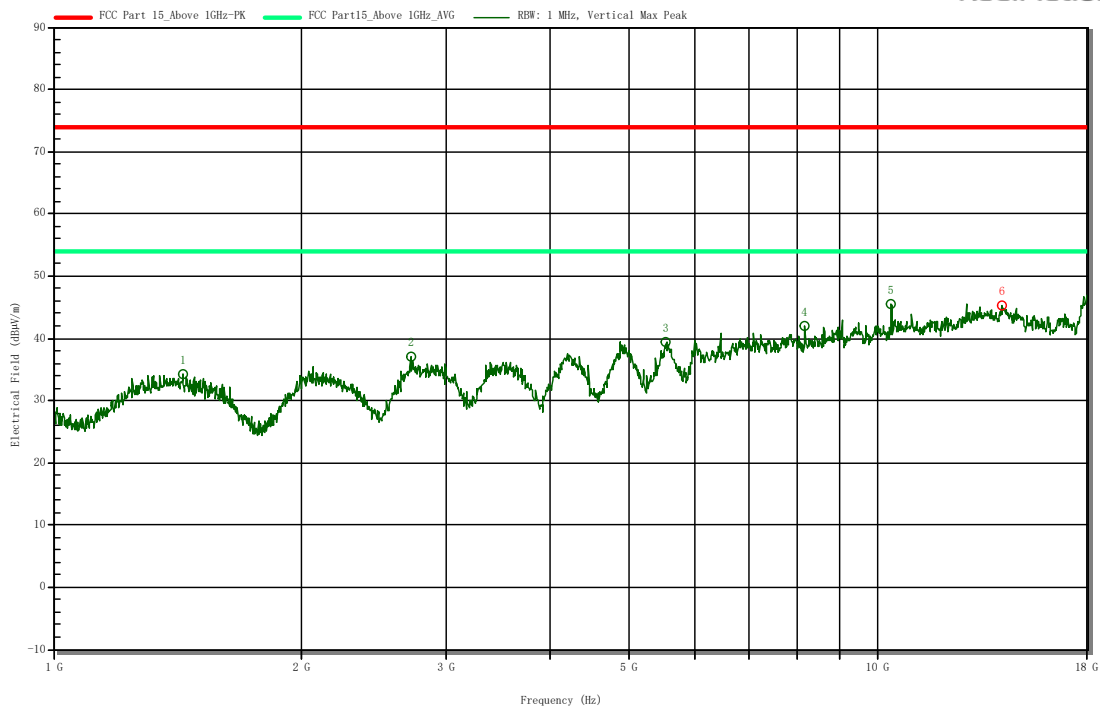


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1398.65	36.3	74.0	-37.7	Pass
2845.35	36	74.0	-38.0	Pass
4271.65	37.9	74.0	-36.1	Pass
6049.425	42.7	68.2	-25.5	Pass
9227.15	42.8	68.2	-25.4	Pass
13752.55	45.5	68.2	-22.7	Pass

[1 GHz-18 GHz]/Vertical RSE WLAN 5G MIMO 802.11HT20 5200MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

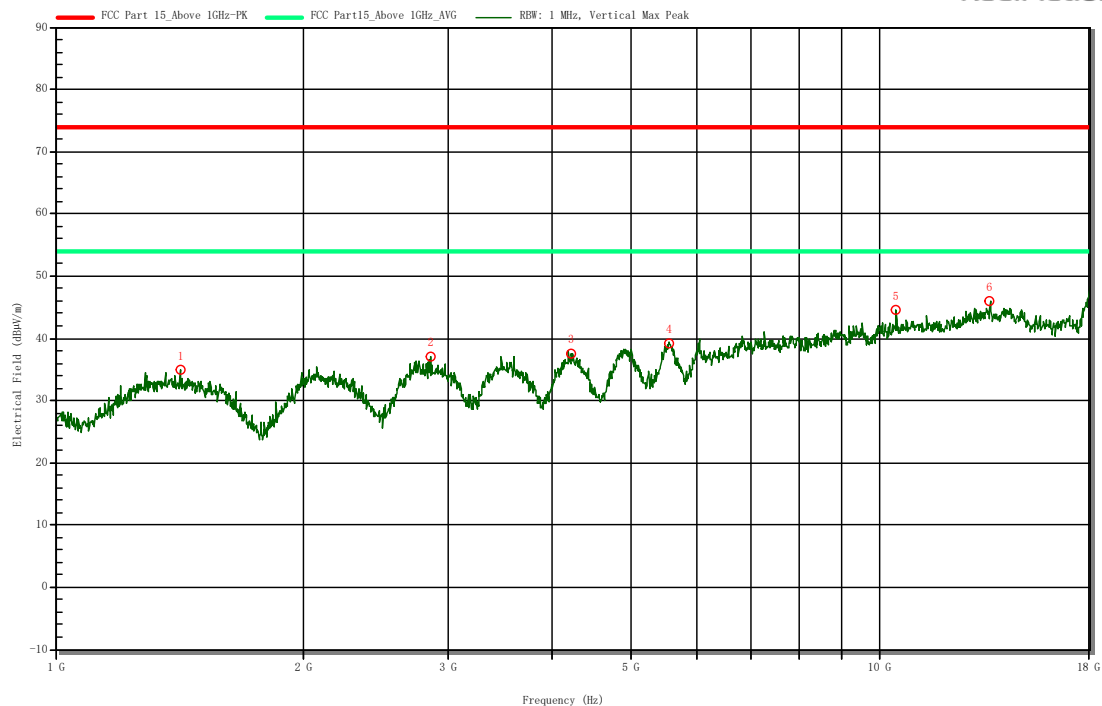


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1435.2	34.3	74.0	-39.7	Pass
2712.325	37	74.0	-37.0	Pass
5543.25	39.4	68.2	-28.8	Pass
8169.325	42	74.0	-32.0	Pass
10401.425	45.6	68.2	-22.6	Pass
14143.55	45.3	68.2	-22.9	Pass

[1 GHz-18 GHz]/Vertical RSE WLAN 5G MIMO 802.11HT20 5240MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

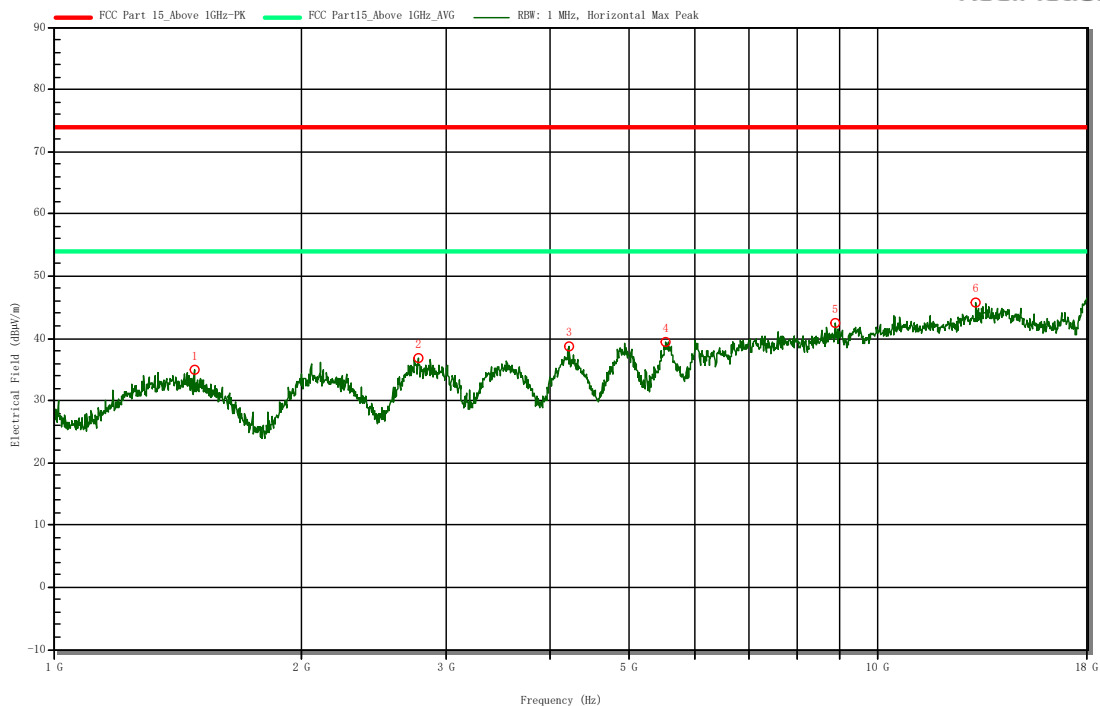


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1415.65	34.8	74.0	-39.2	Pass
2849.175	37.1	74.0	-36.9	Pass
4229.15	37.5	74.0	-36.5	Pass
5554.3	39.1	68.2	-29.1	Pass
10481.325	44.6	68.2	-23.6	Pass
13627.6	46	68.2	-22.2	Pass

[1 GHz-18 GHz]/Horizontal RSE WLAN 5G MIMO 802.11HT20 5240MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

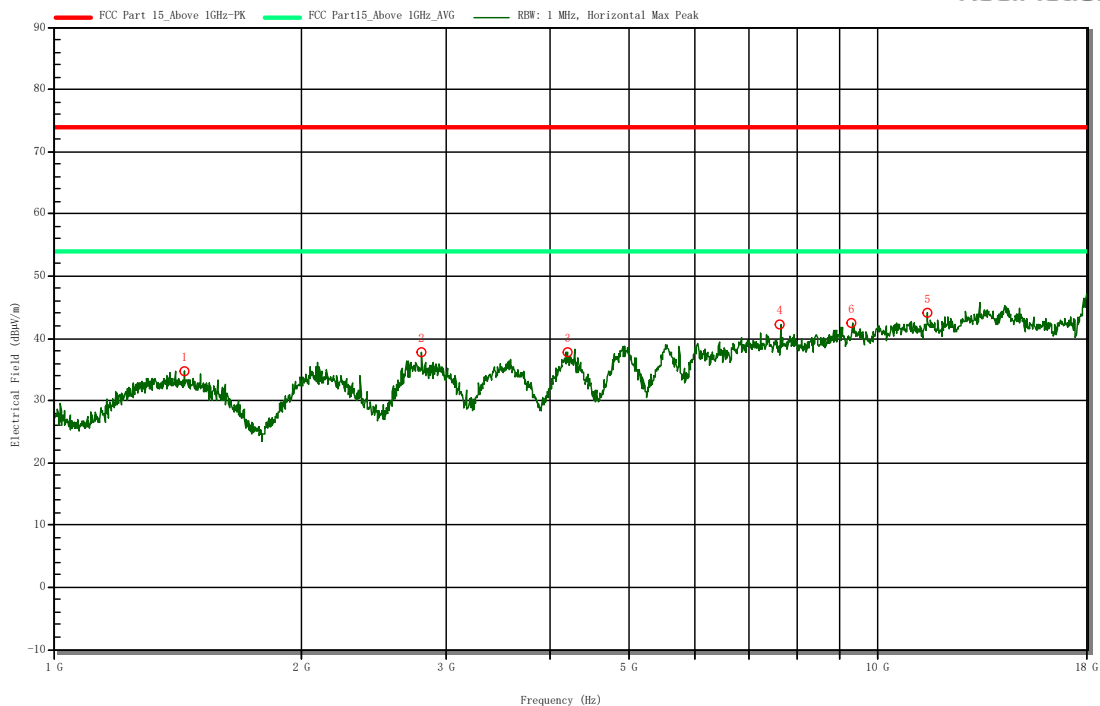
RadiMation



Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1481.525	34.9	74.0	-39.1	Pass
2767.575	36.8	74.0	-37.2	Pass
4218.1	38.8	74.0	-35.2	Pass
5541.975	39.5	68.2	-28.7	Pass
8902.875	42.5	68.2	-25.7	Pass
13162.225	45.8	68.2	-22.4	Pass

[1 GHz-18 GHz]/Horizontal RSE WLAN 5G MIMO 802.11HT20 5745MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

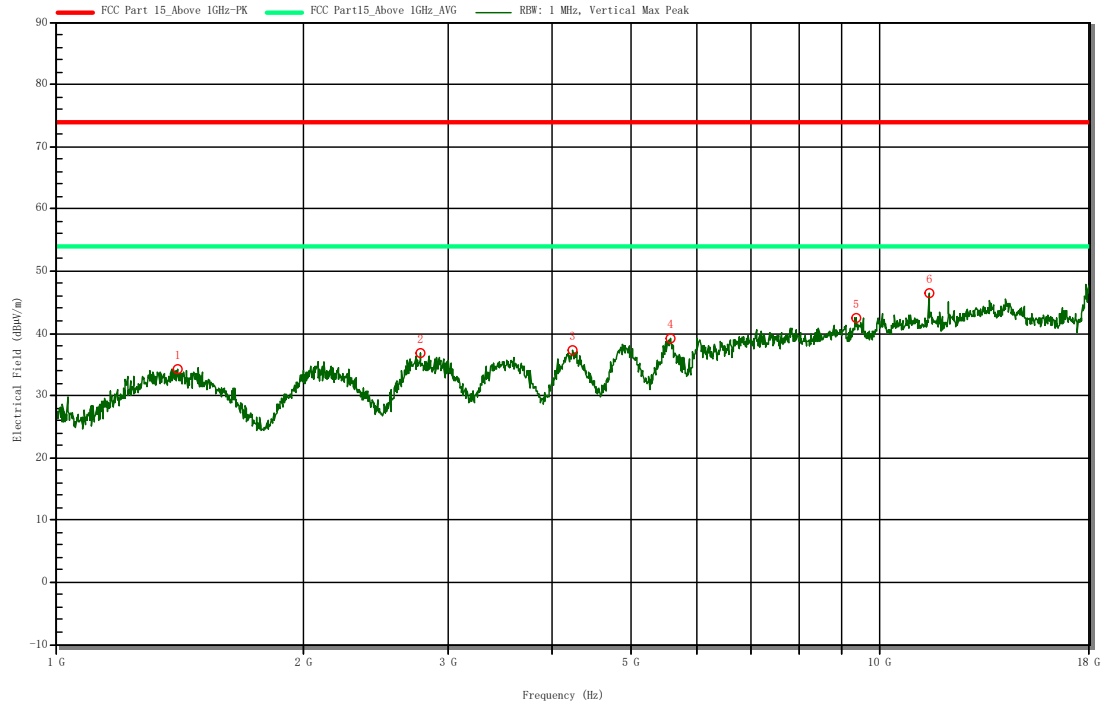
RadiMation

Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1440.3	34.8	74.0	-39.2	Pass
2797.325	37.8	74.0	-36.2	Pass
4200.25	37.9	74.0	-36.1	Pass
7626.6	42.3	74.0	-31.7	Pass
11497.5	44.1	74.0	-29.9	Pass
9312.15	42.5	74.0	-31.5	Pass

[1 GHz-18 GHz]/Vertical RSE WLAN 5G MIMO 802.11HT20 5745MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

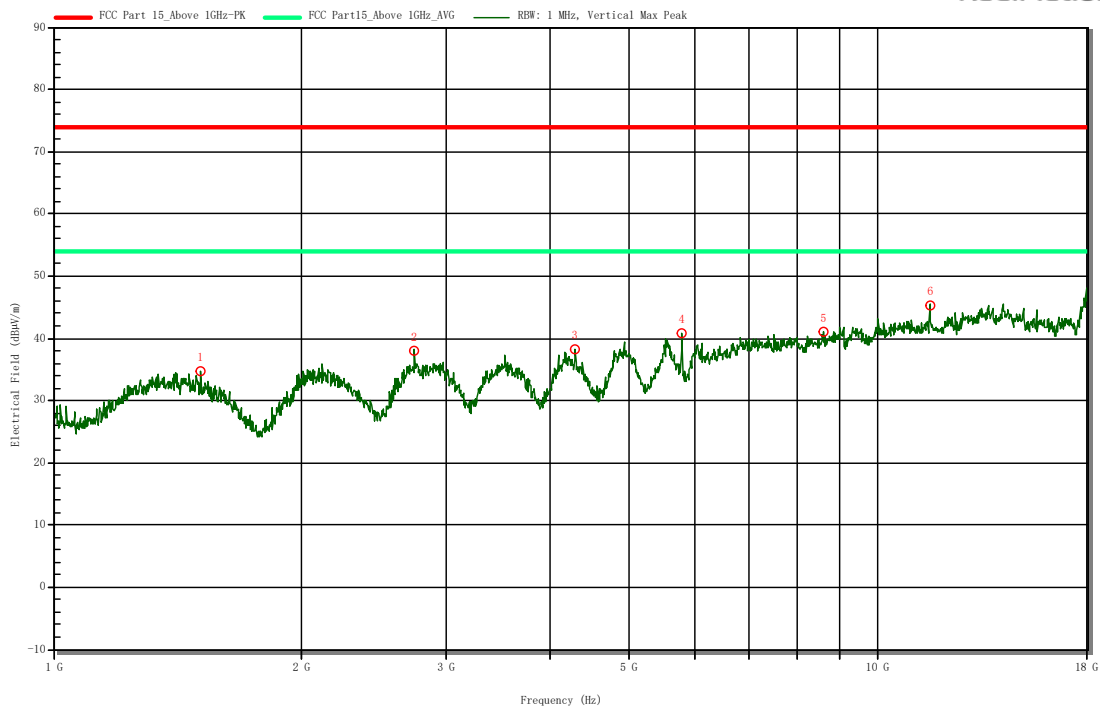


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1405.025	34.3	74.0	-39.7	Pass
2769.275	36.8	74.0	-37.2	Pass
4240.625	37.3	74.0	-36.7	Pass
5569.6	39.2	68.2	-29.0	Pass
9375.9	42.5	74.0	-31.5	Pass
11486.45	46.4	74.0	-27.6	Pass

[1 GHz-18 GHz]/Vertical RSE WLAN 5G MIMO 802.11HT20 5785MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

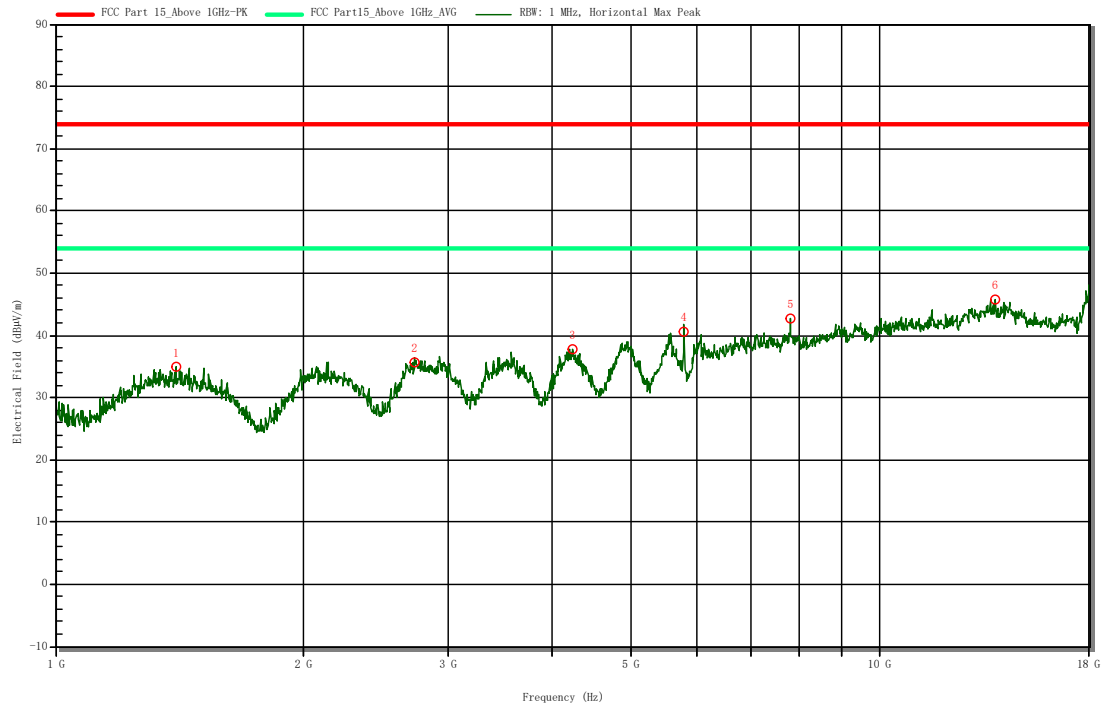


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1510.85	34.7	74.0	-39.3	Pass
2741.225	38.1	74.0	-35.9	Pass
4292.9	38.3	74.0	-35.7	Pass
5791.45	40.8	68.2	-27.4	Pass
8598.575	41.1	68.2	-27.1	Pass
11576.55	45.2	74.0	-28.8	Pass

[1 GHz-18 GHz]/Horizontal RSE WLAN 5G MIMO 802.11HT20 5785MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

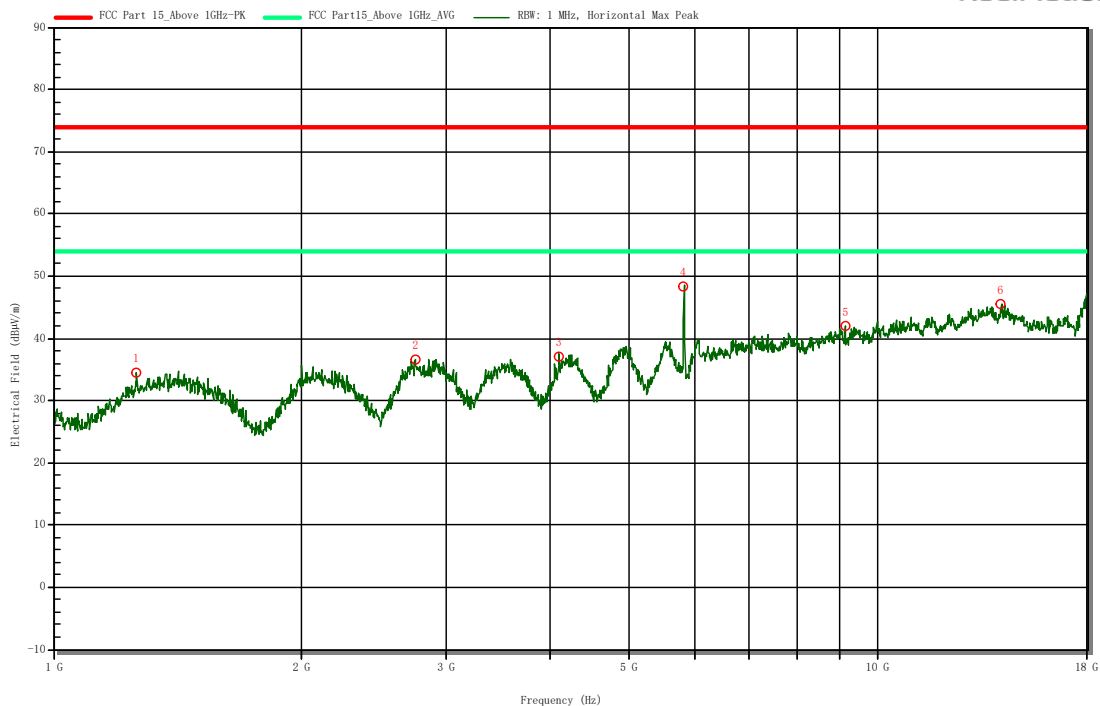


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1400.775	34.9	74.0	-39.1	Pass
2723.375	35.8	74.0	-38.2	Pass
4243.6	37.7	74.0	-36.3	Pass
5792.3	40.6	68.2	-27.6	Pass
7798.3	42.6	68.2	-25.6	Pass
13843.925	45.8	68.2	-22.4	Pass

[1 GHz-18 GHz]/Horizontal RSE WLAN 5G MIMO 802.11HT20 5825MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

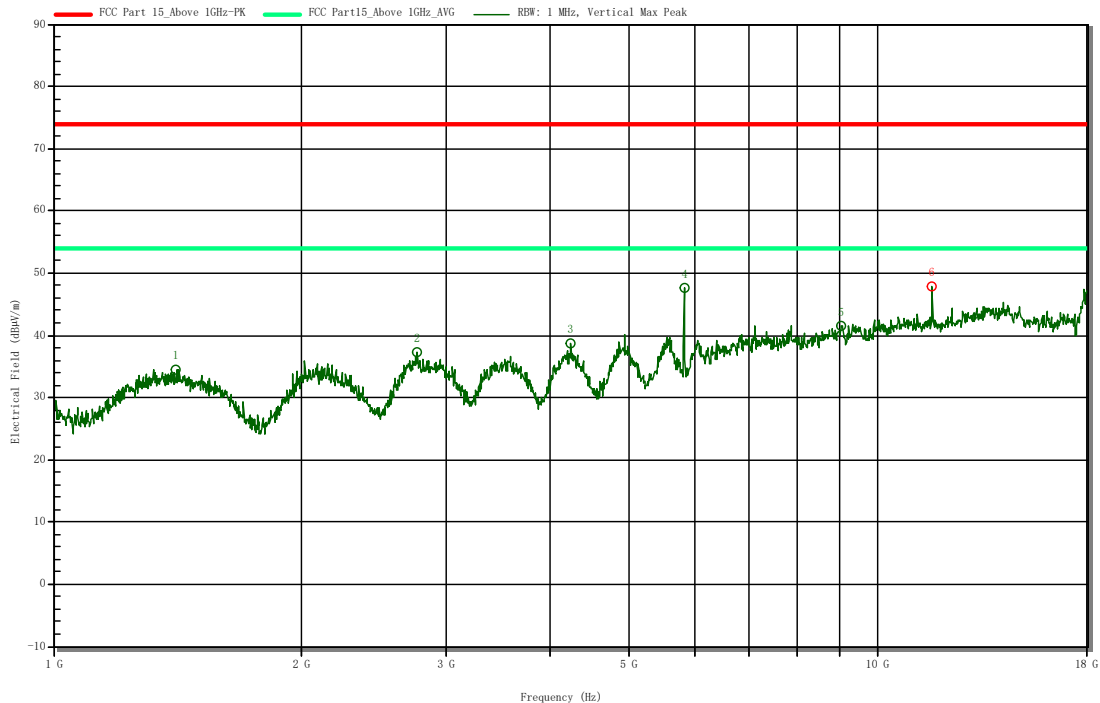


Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1260.95	34.5	68.2	-33.7	Pass
2745.475	36.5	74.0	-37.5	Pass
4112.275	37.1	74.0	-36.9	Pass
5823.75	48.5	68.2	-19.7	Pass
9137.475	41.9	74.0	-32.1	Pass
14135.475	45.5	68.2	-22.7	Pass

[1 GHz-18 GHz]/Vertical RSE WLAN 5G MIMO 802.11HT20 5825MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
1 GHz 18 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation



Frequency (MHz)	Peak (dBμV/m)	Peak Limit (dBμV/m)	Peak Difference (dB)	Status
1408.425	34.4	74.0	-39.6	Pass
2760.775	37.2	74.0	-36.8	Pass
4242.75	38.7	74.0	-35.3	Pass
5832.675	47.7	68.2	-20.5	Pass
9056.725	41.5	74.0	-32.5	Pass
11650.925	47.8	74.0	-26.2	Pass

Note: "SISO 802.11a and MIMO 802.11n20" mode is the worst mode. PK value is lower than the Average value limit, So average didn't record.

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

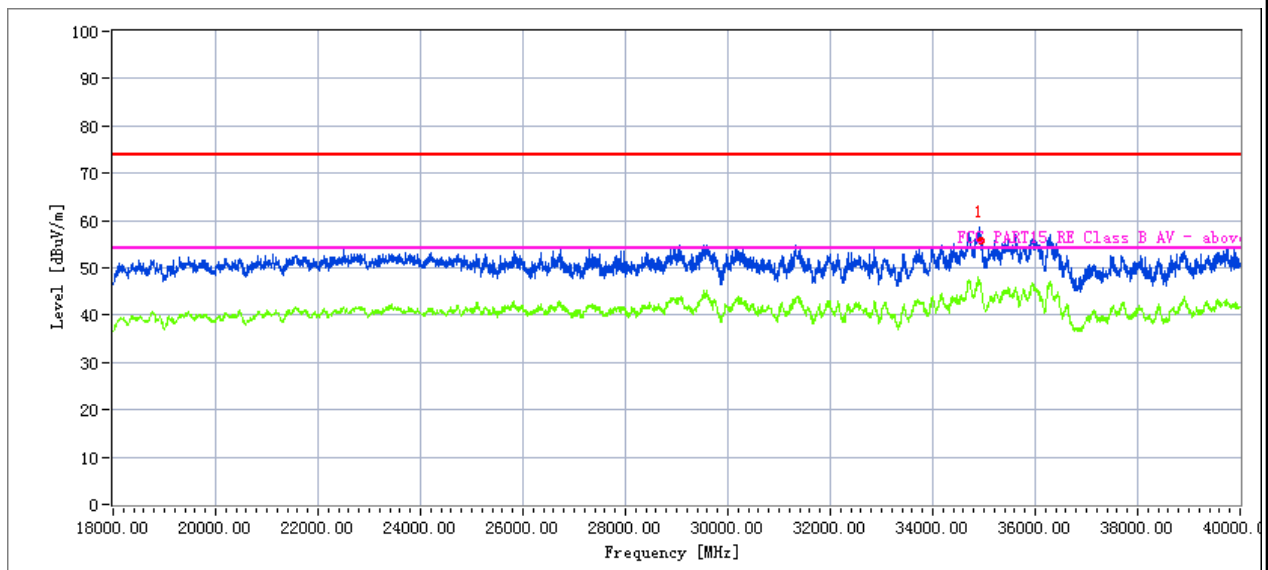
3.2.9 TEST RESULTS (18GHz-40GHz)

EUT :	ConBox2020RD	Model Name. :	CB20RDNAR1
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 12V
Test Mode :	Mode 1/2/3		

All the modulation modes have been tested, and the worst-case (802.11n20 MIMO mode) result was report as below:

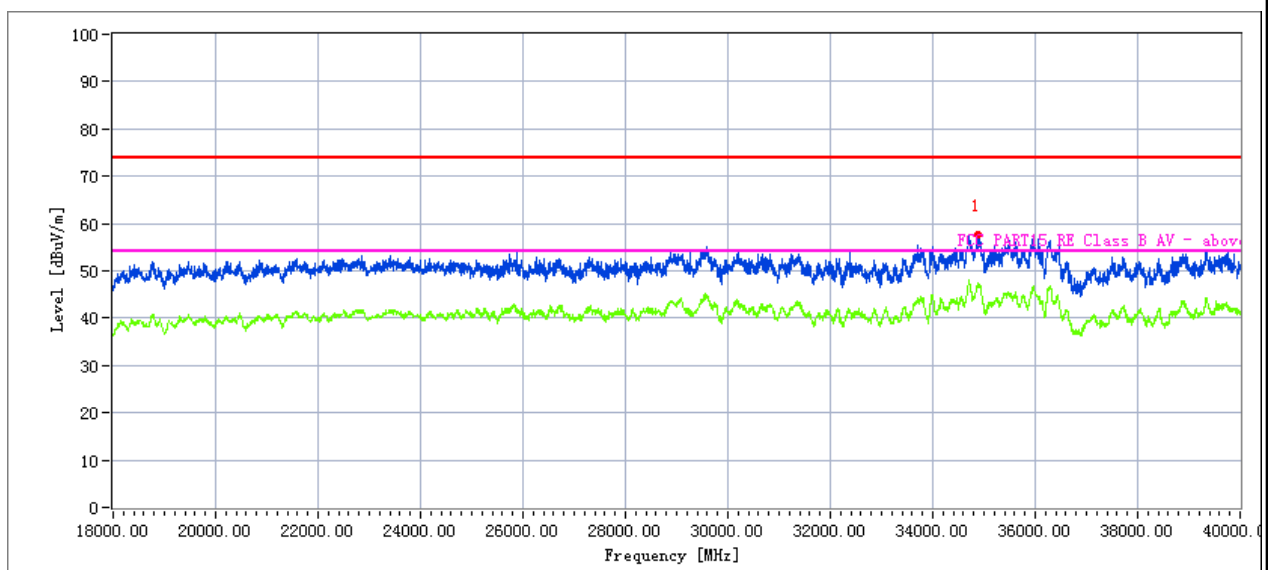
Low Channel (5180 MHz)-Above 1G

Horizontal



Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamp Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
34933.316	38.48	20.09	44.07	43.48	59.16	68.20	9.04	Peak

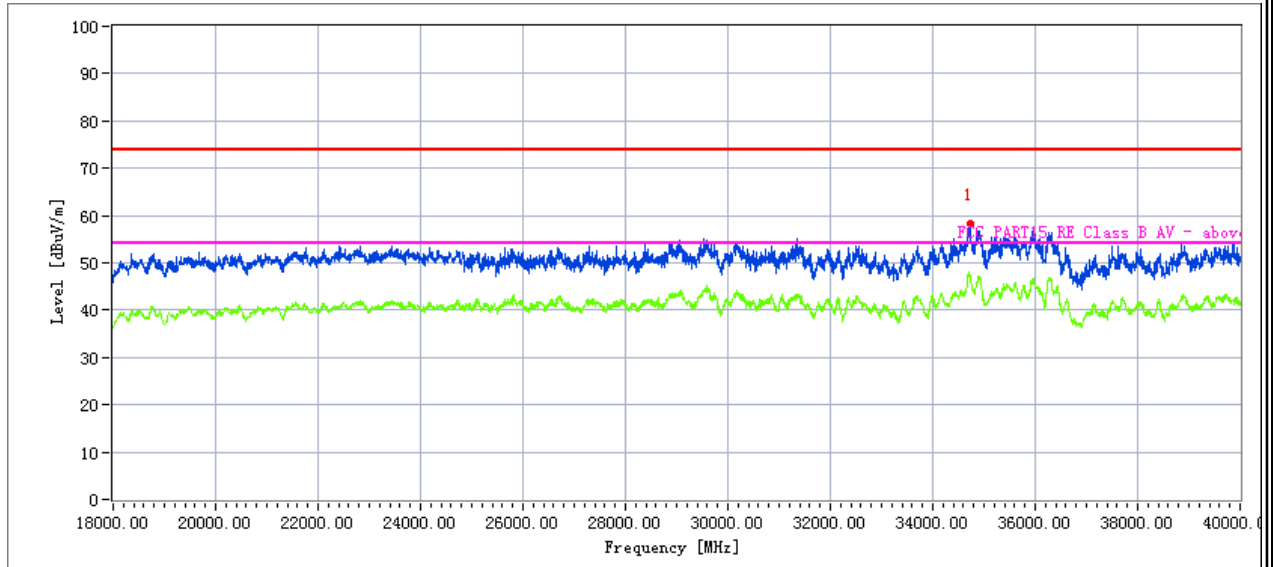
Vertical



Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamp Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
34897.974	41.67	19.11	42.73	44.61	58.90	68.20	9.30	Peak

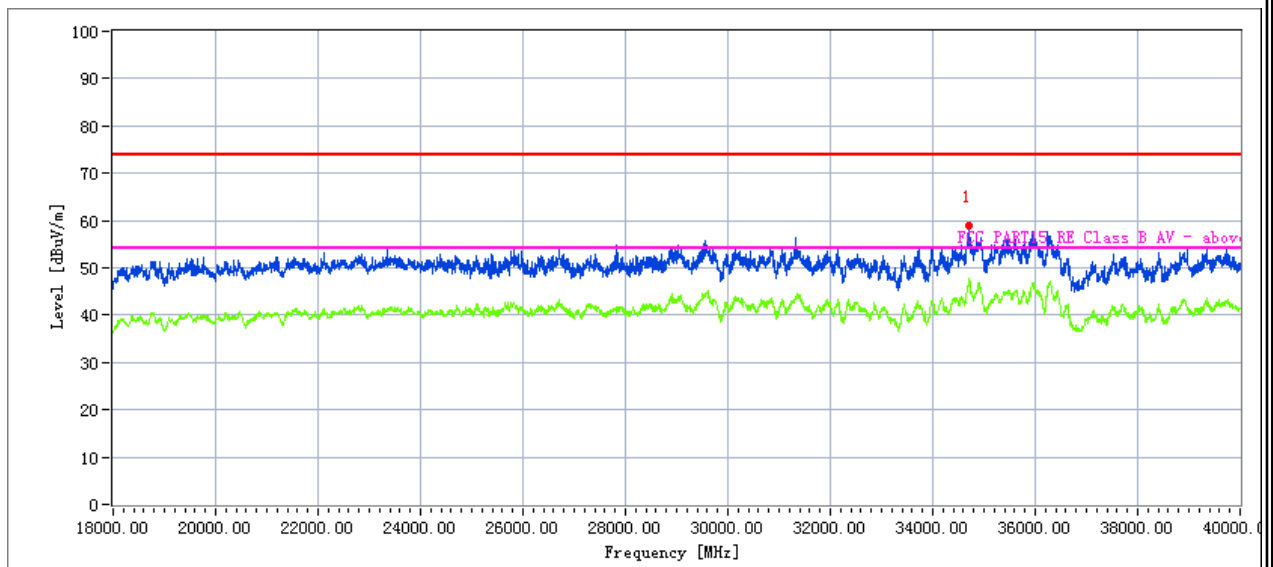
Mid Channel (5200 MHz)-Above 1G

Horizontal



Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamplifier Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
34723.421	38.21	20.09	44.07	43.48	58.89	68.20	9.31	Peak

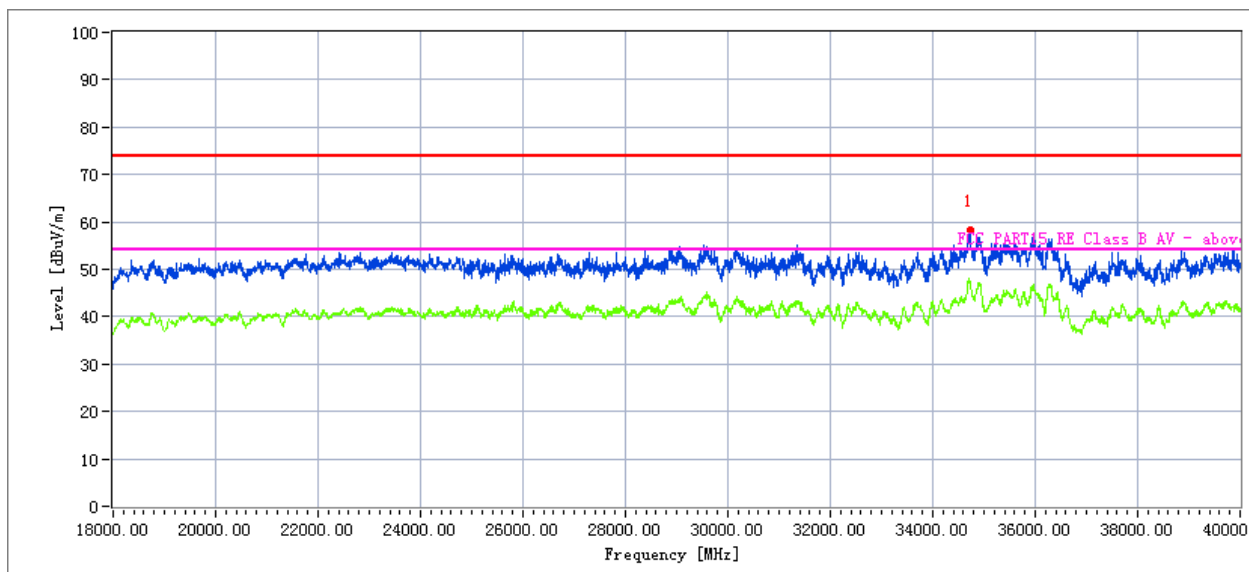
Vertical



Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamplifier Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
34707.047	38.33	20.09	44.07	43.48	59.01	68.20	9.19	Peak

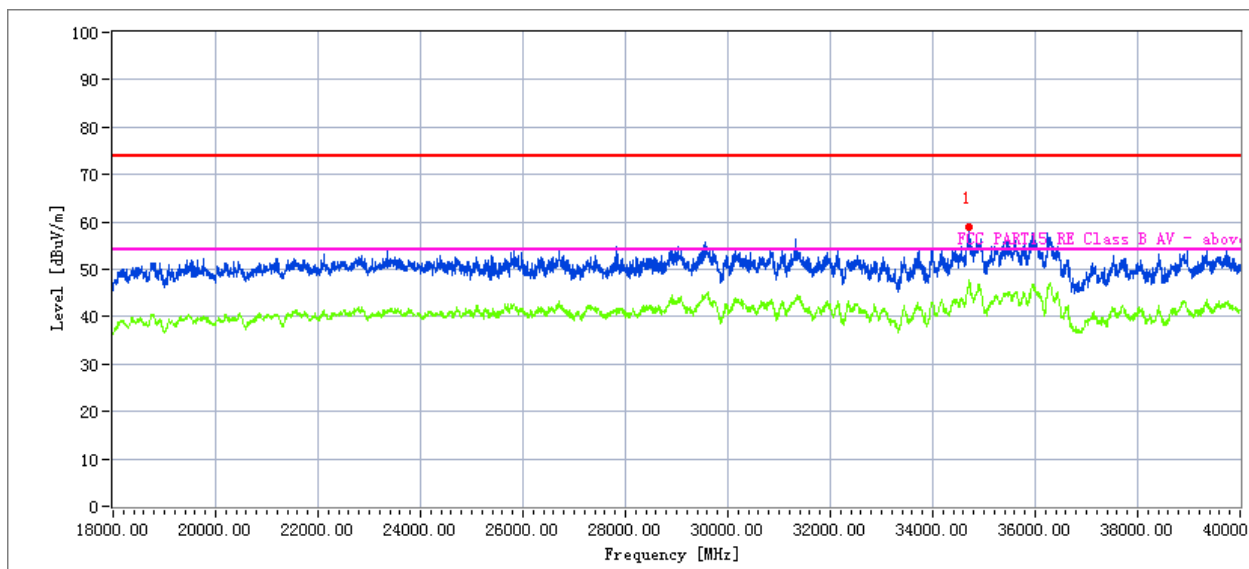
High Channel (5240 MHz)-Above 1G

Horizontal



Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamp Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
34723.208	38.38	20.09	44.07	43.48	59.06	68.20	9.14	Peak

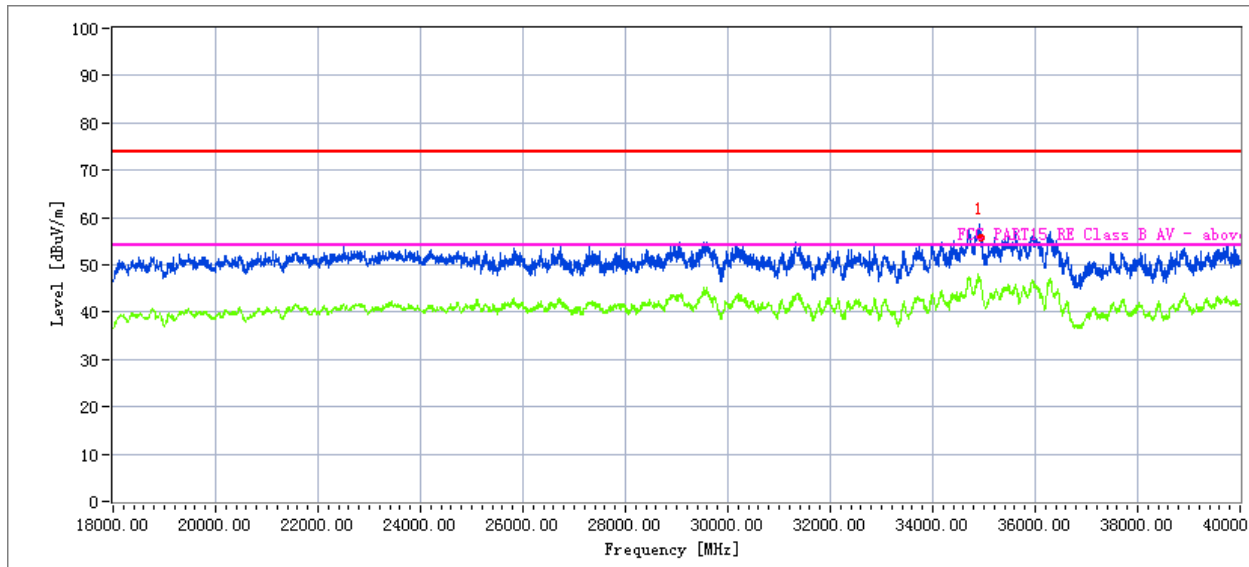
Vertical



Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamp Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
34706.941	38.90	20.09	44.07	43.48	59.58	68.20	8.62	Peak

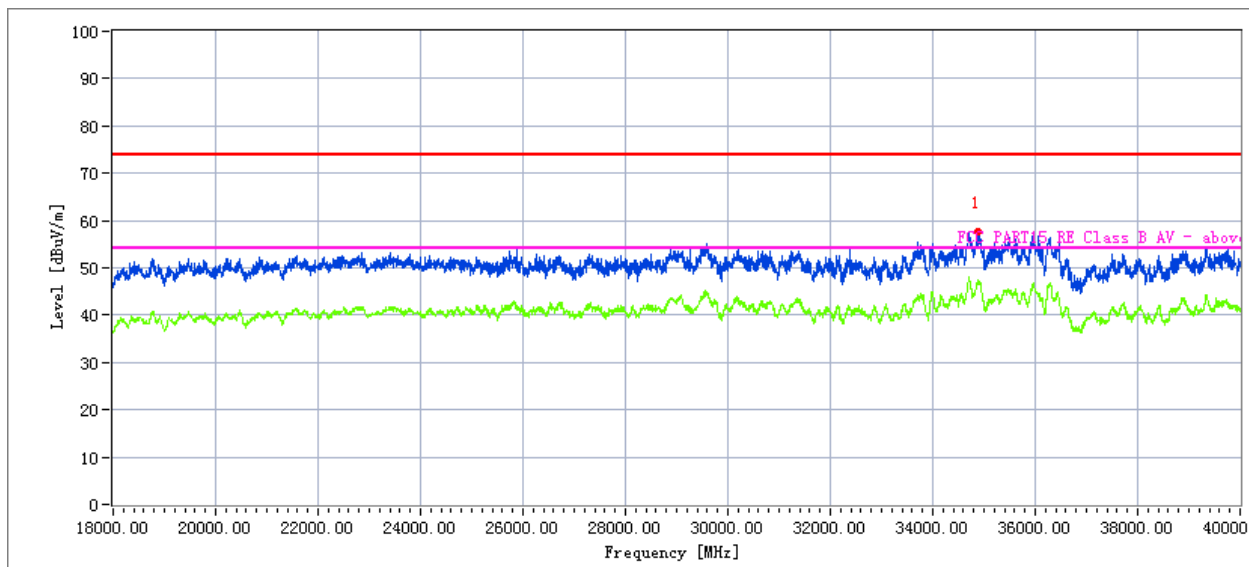
Low Channel (5745 MHz)-Above 1G

Horizontal



Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamplifier Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
34933.306	37.99	20.09	44.07	43.48	58.67	68.20	9.53	Peak

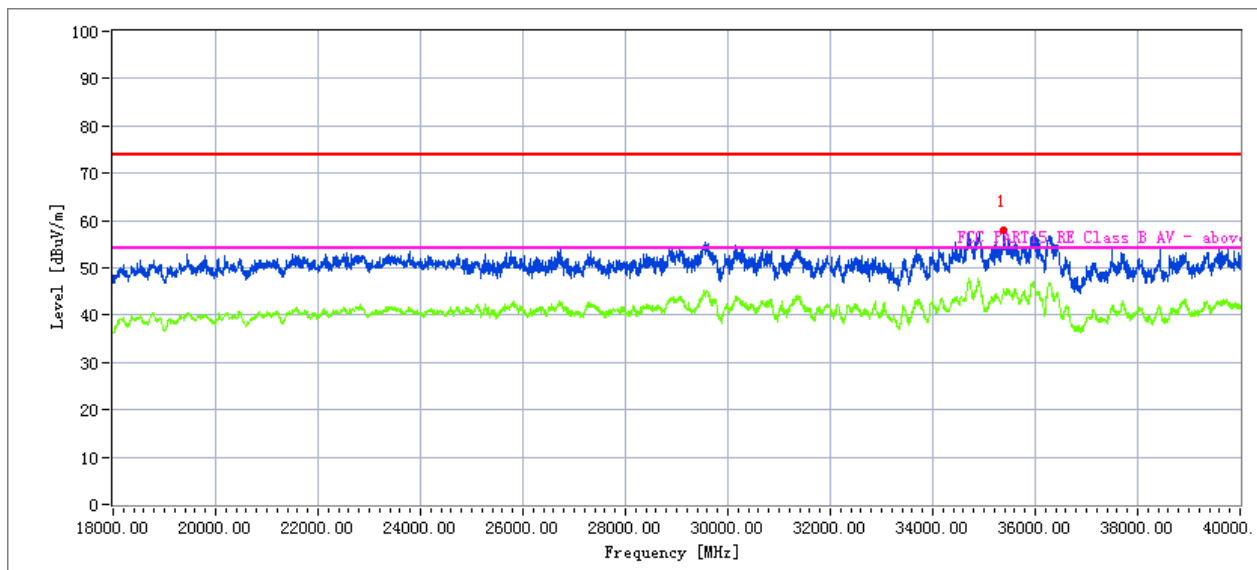
Vertical



Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamplifier Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
34897.932	41.15	19.11	42.73	44.61	58.38	68.20	9.82	Peak

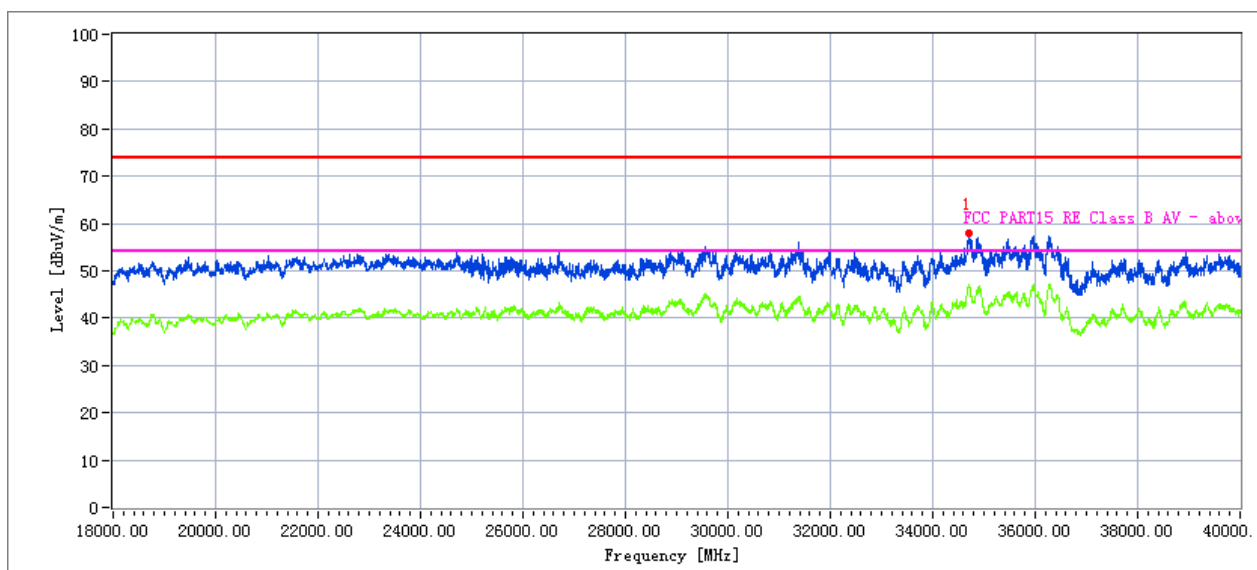
Mid Channel (5785 MHz)-Above 1G

Horizontal



Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamp Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
35382.360	38.70	20.09	44.16	43.48	59.47	68.20	8.73	Peak

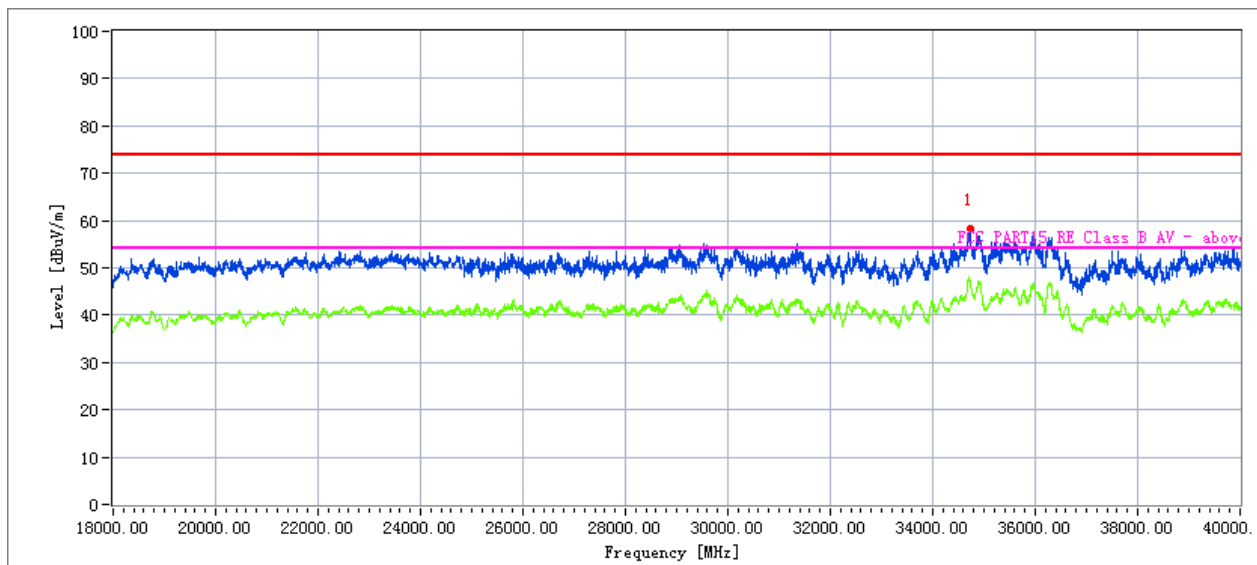
Vertical



Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamp Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
34716.868	41.00	19.11	42.63	43.48	59.26	68.20	8.94	Peak

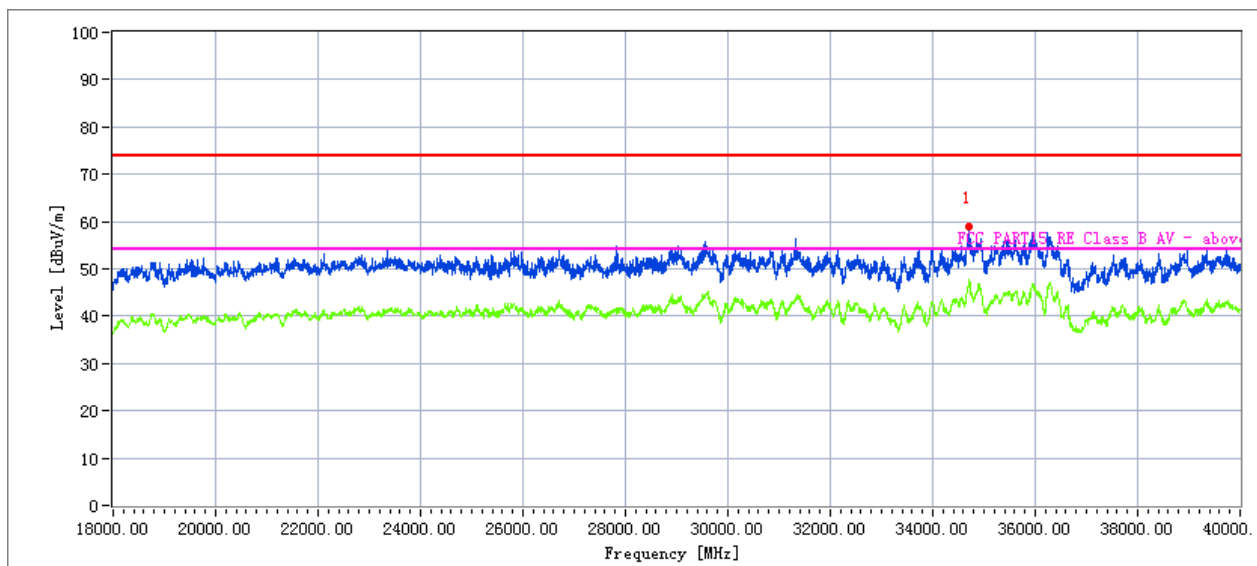
High Channel (5825 MHz)-Above 1G

Horizontal



Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Remark
(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
34702.402	38.30	20.06	44.07	43.21	59.22	68.20	8.98	Peak

Vertical



Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Remark
(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
34702.271	38.49	20.06	44.07	43.21	59.41	68.20	8.79	Peak

3.2.10 Spurious Emission in Restricted Band 4.5GHz~5.150 GHz & 5.350GHz~5460GHz

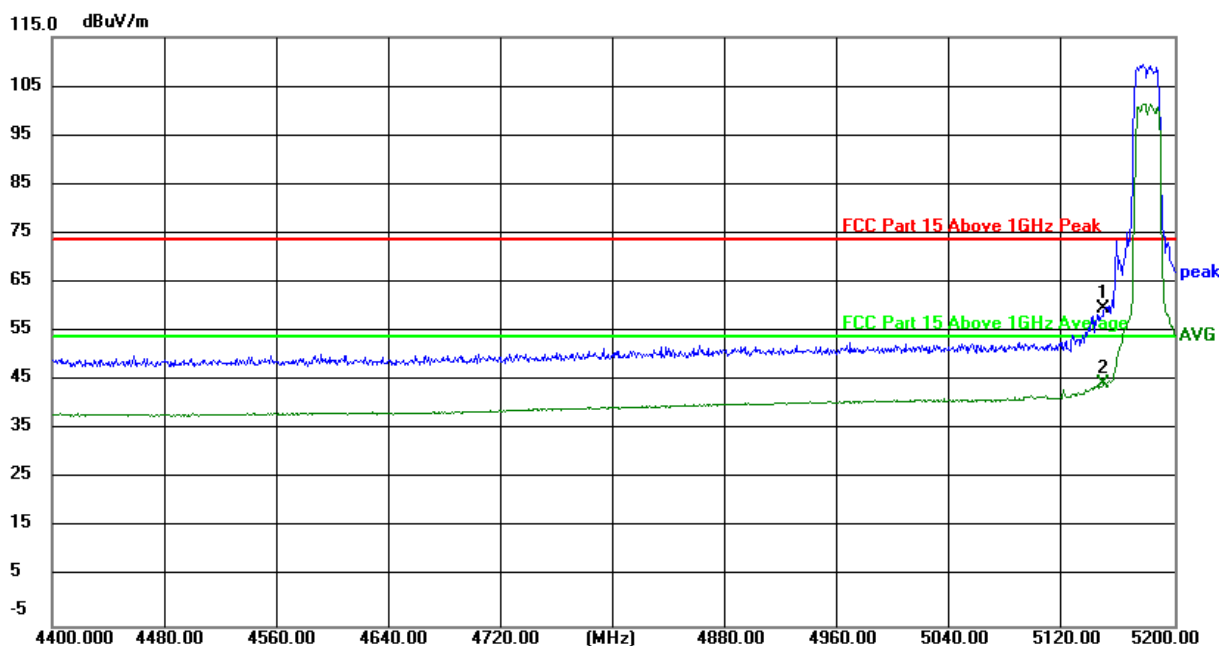
EUT :	ConBox2020RD	Model Name. :	CB20RDNAR1
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 12V
Test Mode :	Mode 1/2/3		

All the modulation modes have been tested, the report just record the worst data mode.

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	5150.000	57.45	2.22	59.67	74.00	-14.33	peak
H	5150.000	42.37	2.22	44.59	54.00	-9.41	AVG

Remark:

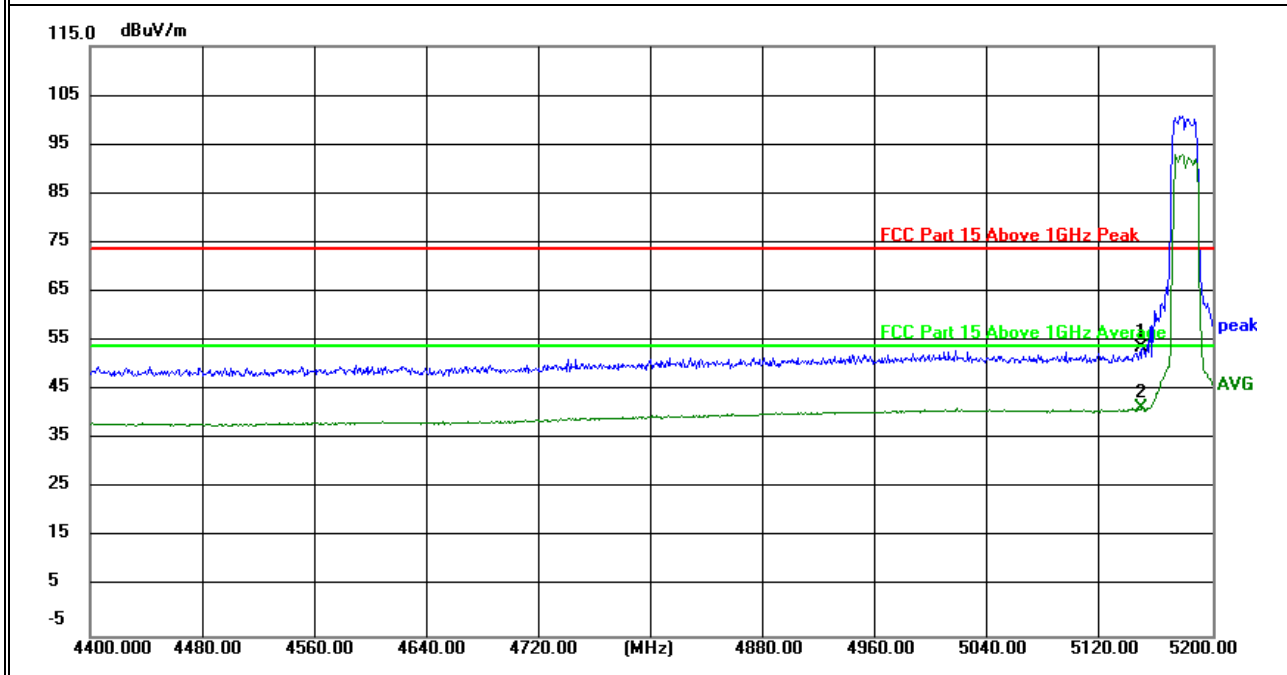
Emission Level= ReadingLevel+ Factor, Margin= Emission Level - Limit



Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	5150.000	51.57	2.22	53.79	74.00	-20.21	peak
V	5150.000	39.37	2.22	41.59	54.00	-12.41	AVG

Remark:

Emission Level= ReadingLevel+ Factor, Margin= Emission Level - Limit

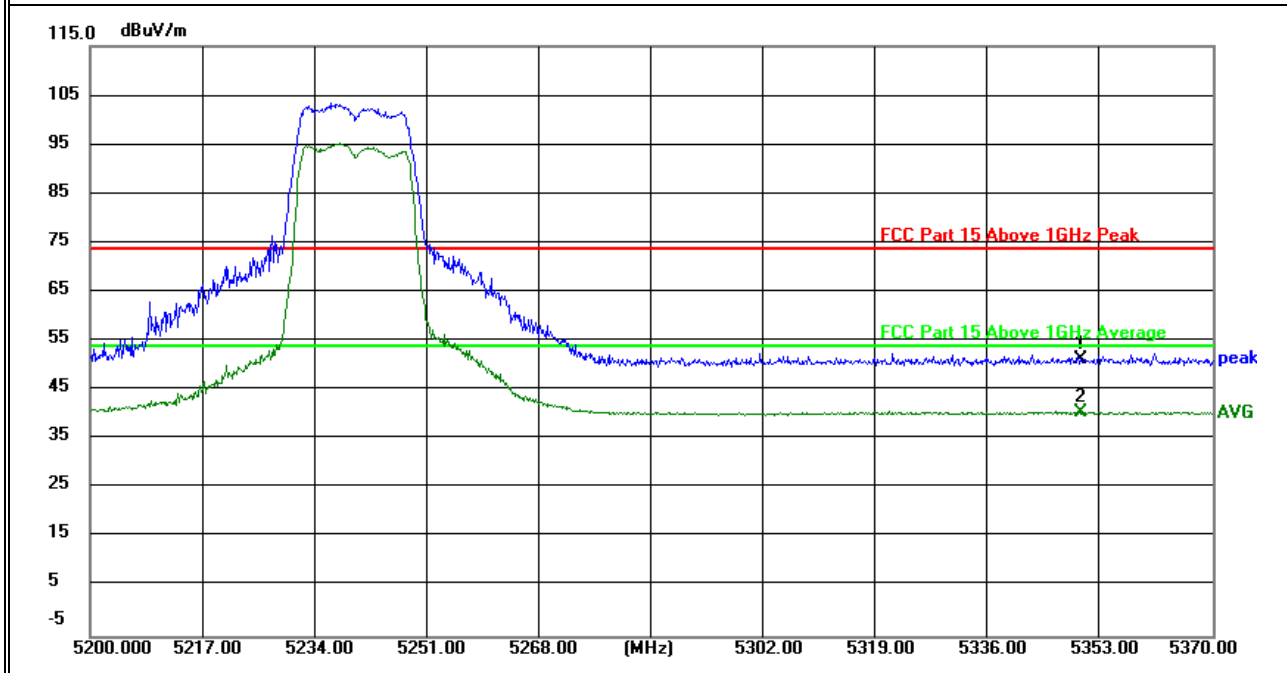


Note: (1) "802.11a Ant1 5180MHz " mode is the worst mode.

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	5350.000	49.10	2.21	51.31	74.00	-22.69	peak
V	5350.000	38.38	2.21	40.59	54.00	-13.41	AVG

Remark:

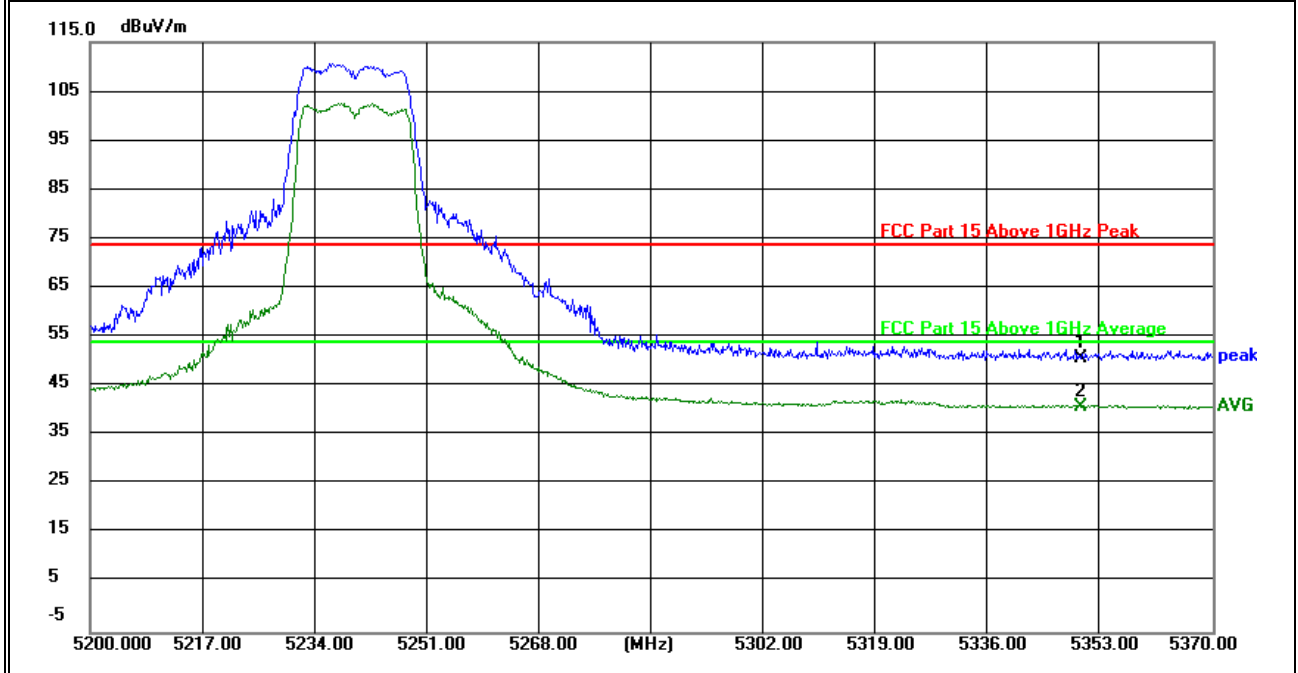
Emission Level= ReadingLevel+ Factor, Margin= Emission Level - Limit



Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	5350.000	48.62	2.21	50.83	74.00	-23.17	peak
H	5350.000	38.63	2.21	40.84	54.00	-13.16	AVG

Remark:

Emission Level= ReadingLevel+ Factor, Margin= Emission Level - Limit

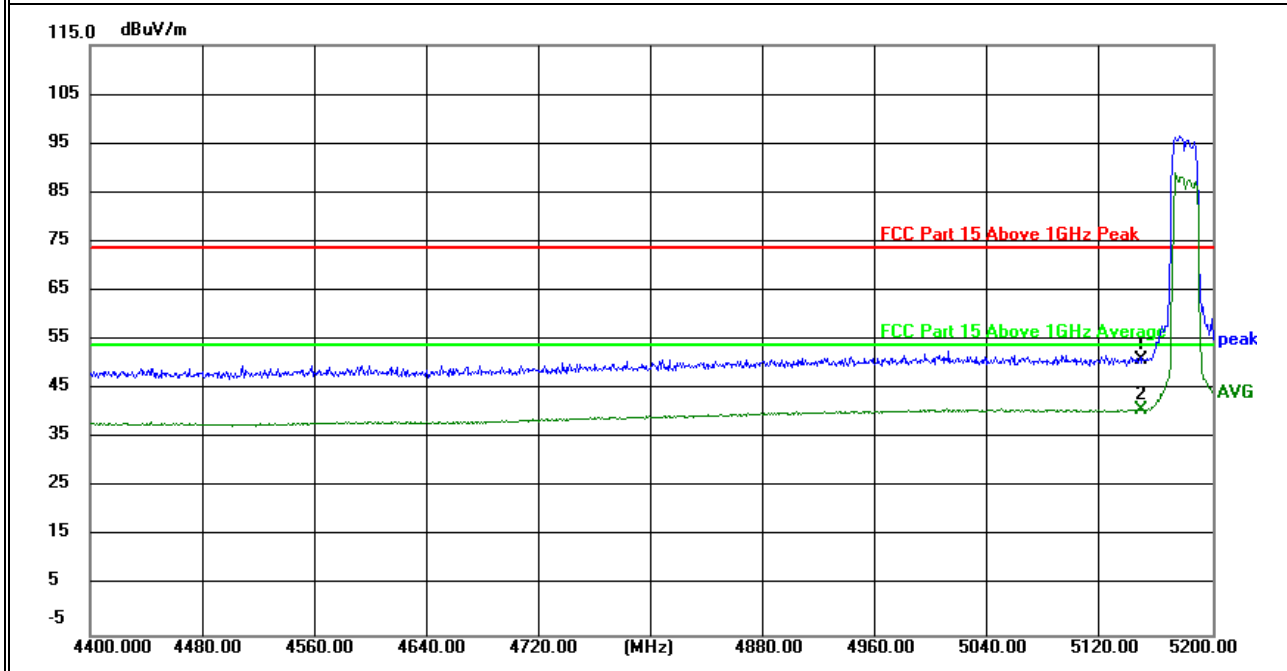


Note: (1) "802.11a Ant1 5240MHz " mode is the worst mode.

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	5150.000	48.87	2.22	51.09	74.00	-22.91	peak
V	5150.000	38.77	2.22	40.99	54.00	-13.01	AVG

Remark:

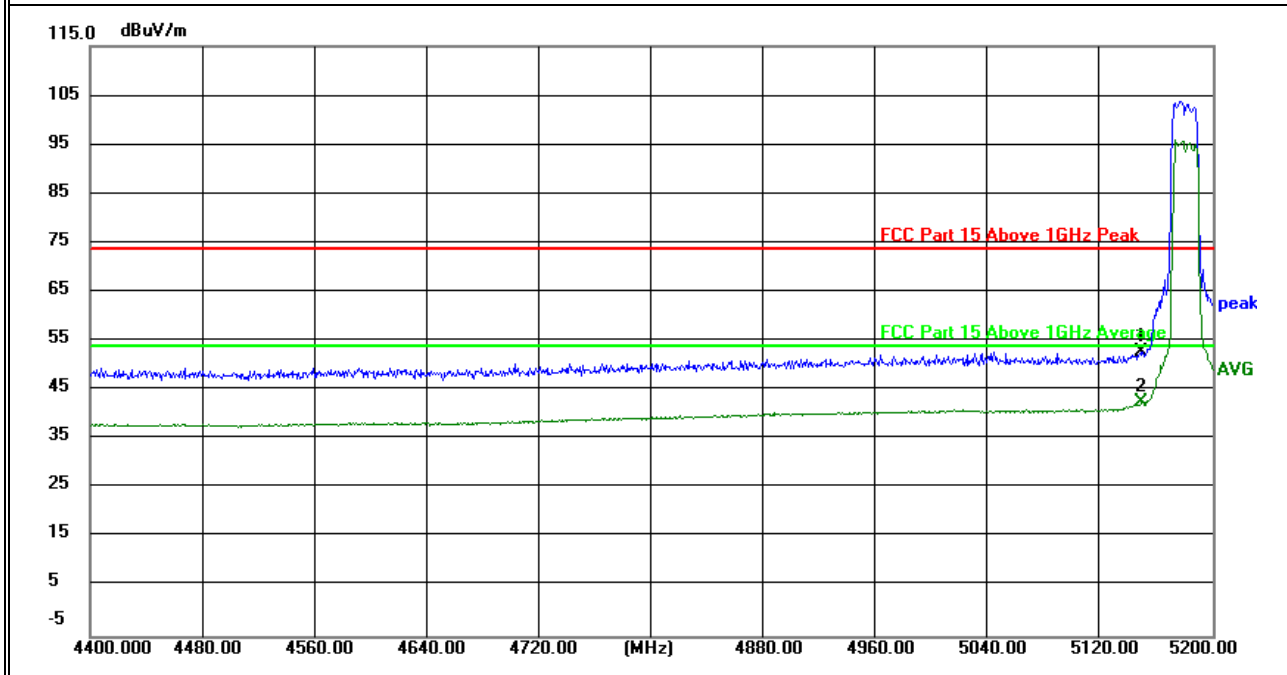
Emission Level= ReadingLevel+ Factor, Margin= Emission Level - Limit



Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	5150.000	50.59	2.22	52.81	74.00	-21.19	peak
H	5150.000	40.53	2.22	42.75	54.00	-11.25	AVG

Remark:

Emission Level= ReadingLevel+ Factor, Margin= Emission Level - Limit

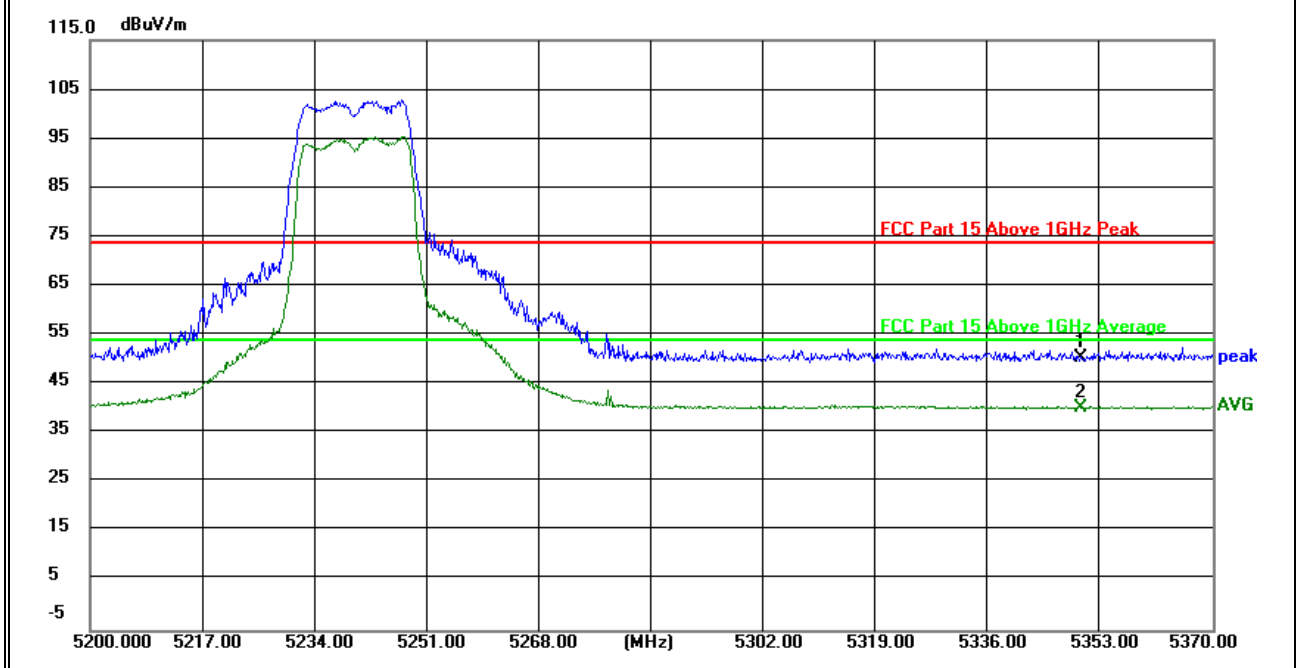


Note: (1) "802.11a Ant2 5180MHz " mode is the worst mode.

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	5350.000	48.22	2.21	50.43	74.00	-23.57	peak
H	5350.000	38.25	2.21	40.46	54.00	-13.54	AVG

Remark:

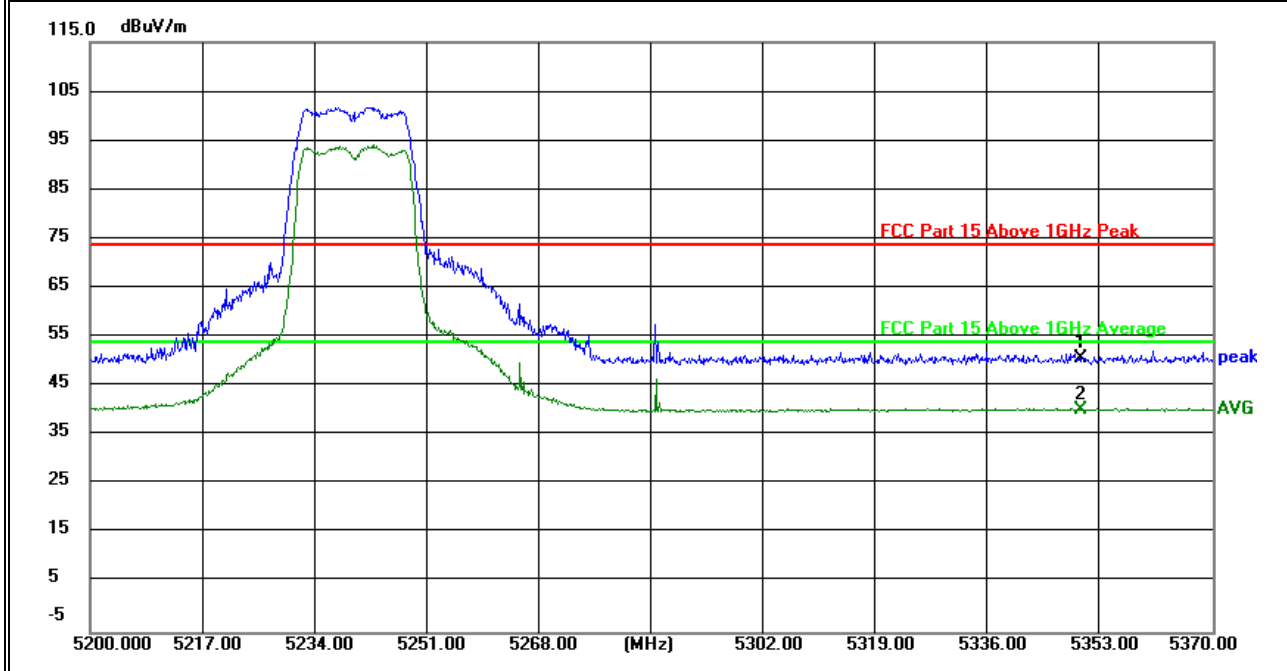
Emission Level= ReadingLevel+ Factor, Margin= Emission Level - Limit



Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	5350.000	48.52	2.21	50.73	74.00	-23.27	peak
H	5350.000	38.02	2.21	40.23	54.00	-13.77	AVG

Remark:

Emission Level= ReadingLevel+ Factor, Margin= Emission Level - Limit

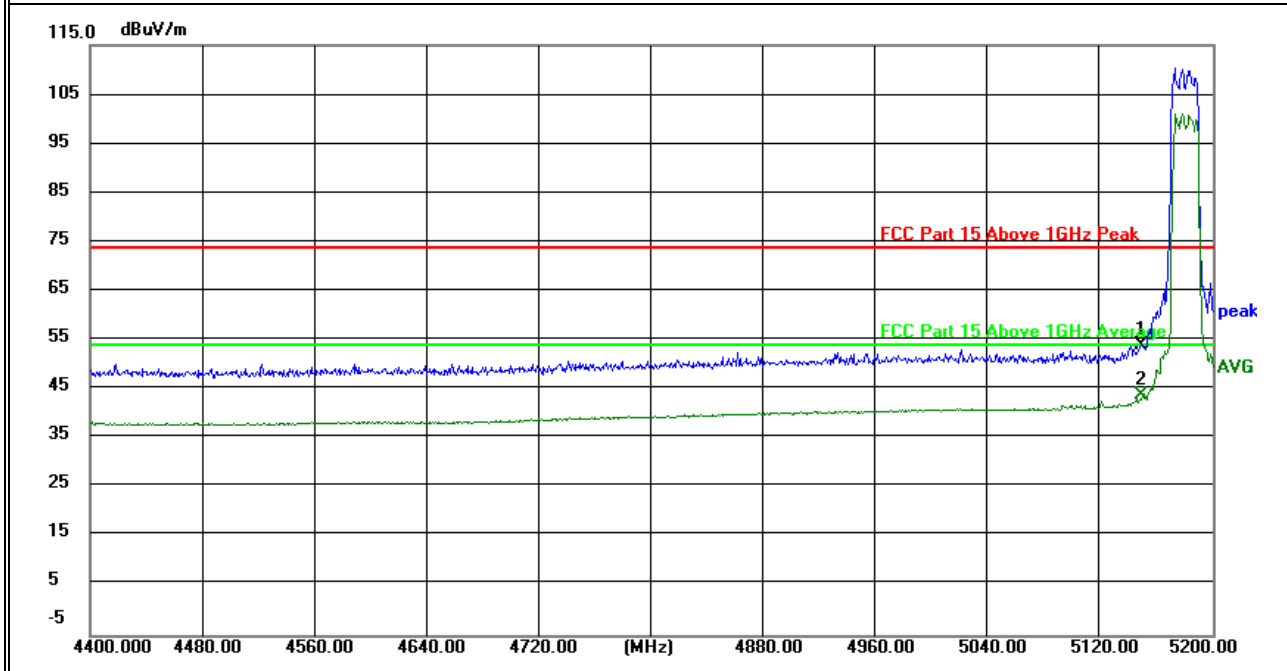


Note: (1) "802.11a Ant2 5240MHz " mode is the worst mode.

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	5150.000	51.85	2.22	54.07	74.00	-19.93	peak
H	5150.000	41.71	2.22	43.93	54.00	-10.07	AVG

Remark:

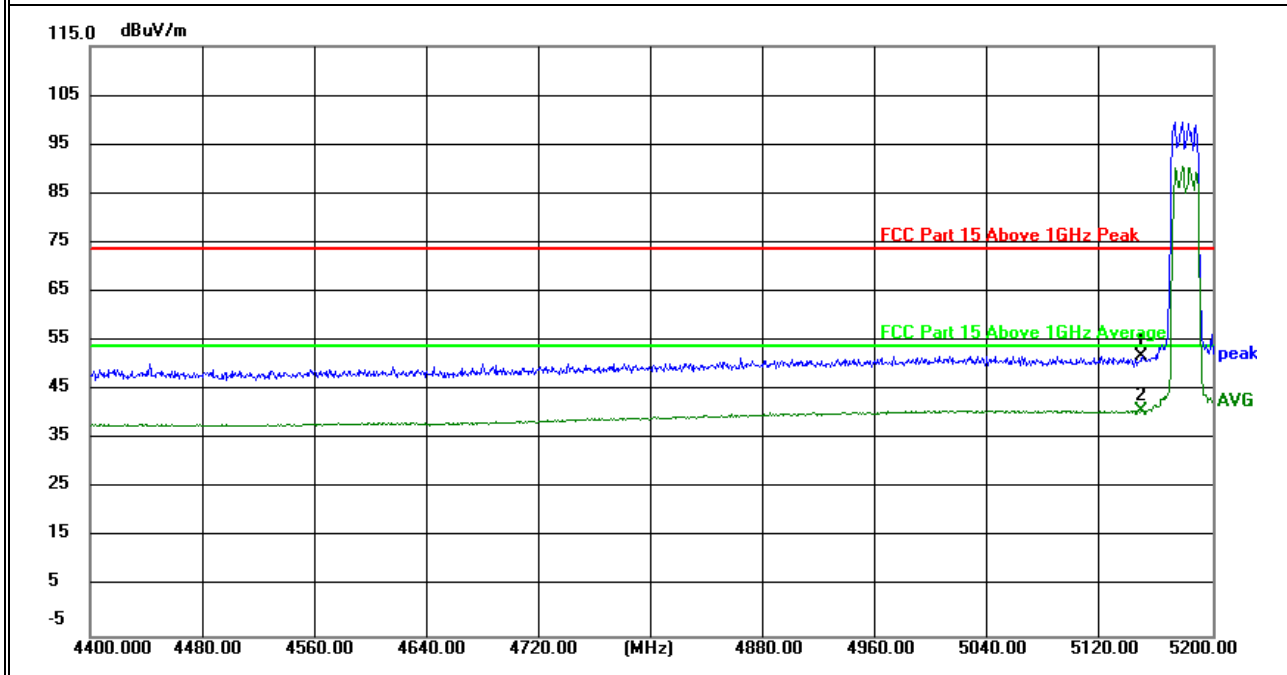
Emission Level= ReadingLevel+ Factor, Margin= Emission Level - Limit



Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	5150.000	49.69	2.22	51.91	74.00	-22.09	peak
H	5150.000	38.67	2.22	40.89	54.00	-13.11	AVG

Remark:

Emission Level= ReadingLevel+ Factor, Margin= Emission Level - Limit

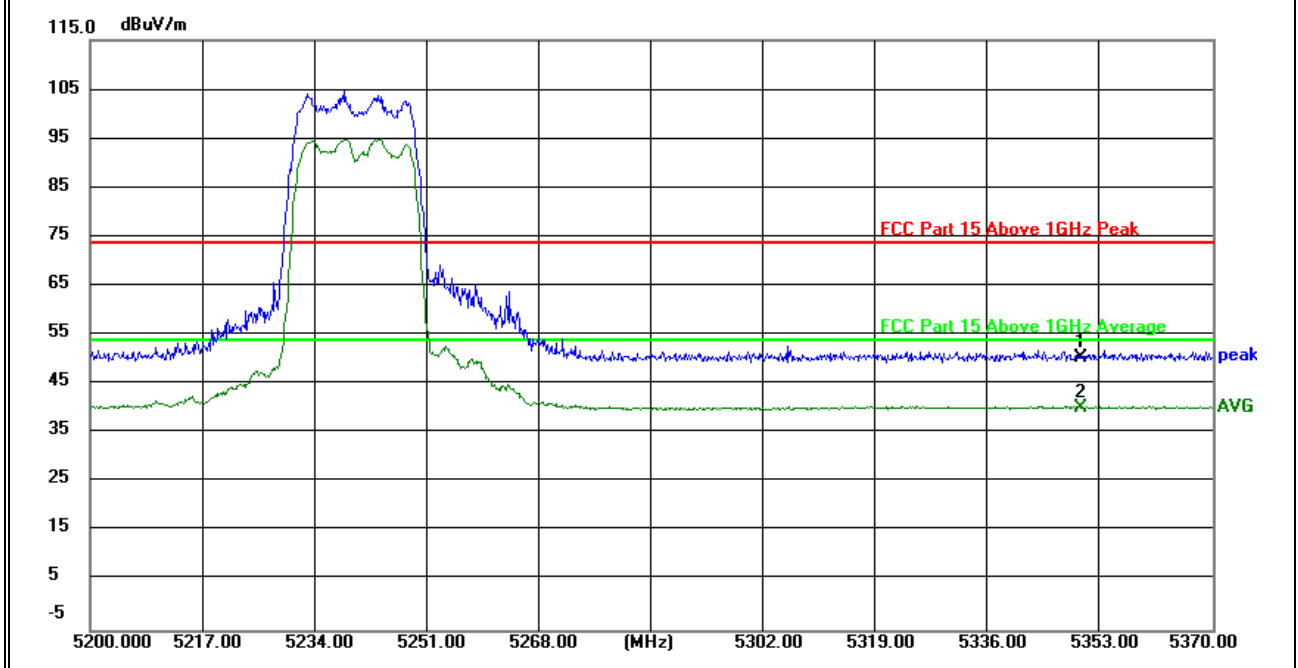


Note: (1) "802.11n20 MIMO 5180MHz " mode is the worst mode.

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	5350.000	48.36	2.21	50.57	74.00	-23.43	peak
V	5350.000	38.17	2.21	40.38	54.00	-13.62	AVG

Remark:

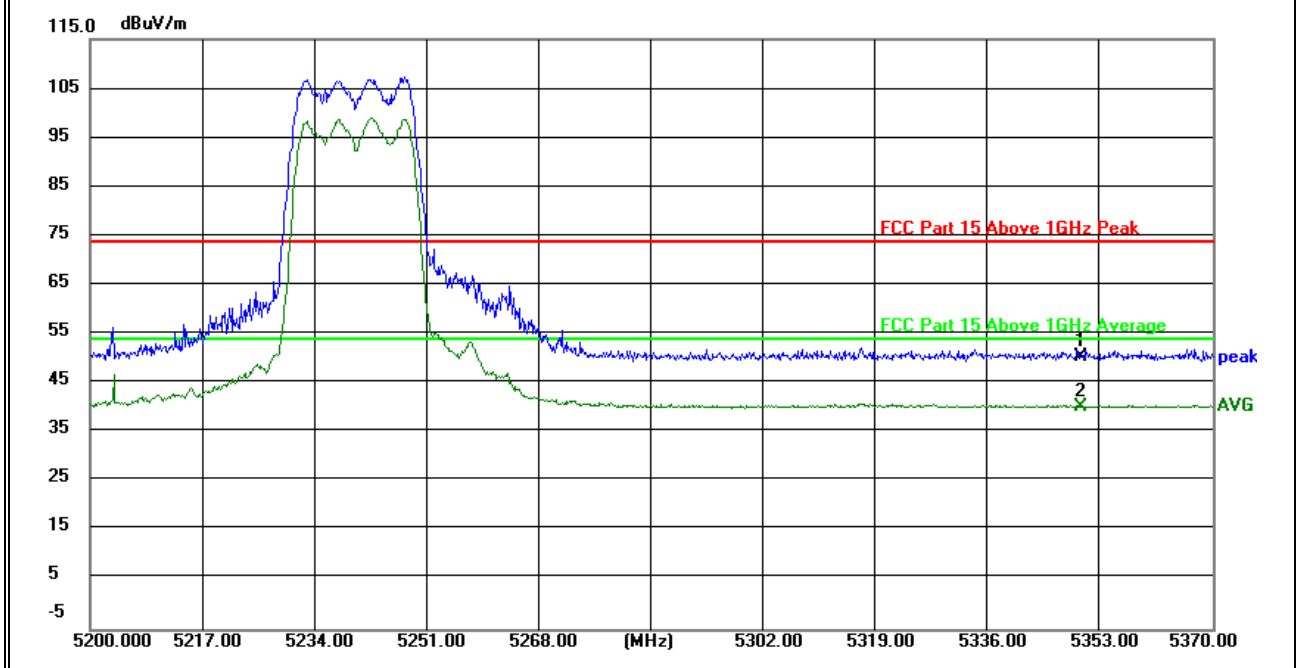
Emission Level= ReadingLevel+ Factor, Margin= Emission Level - Limit



Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	5350.000	48.19	2.21	50.40	74.00	-23.60	peak
H	5350.000	38.24	2.21	40.45	54.00	-13.55	AVG

Remark:

Emission Level= ReadingLevel+ Factor, Margin= Emission Level - Limit



Note: (1) "802.11n20 MIMO 5240MHz " mode is the worst mode.

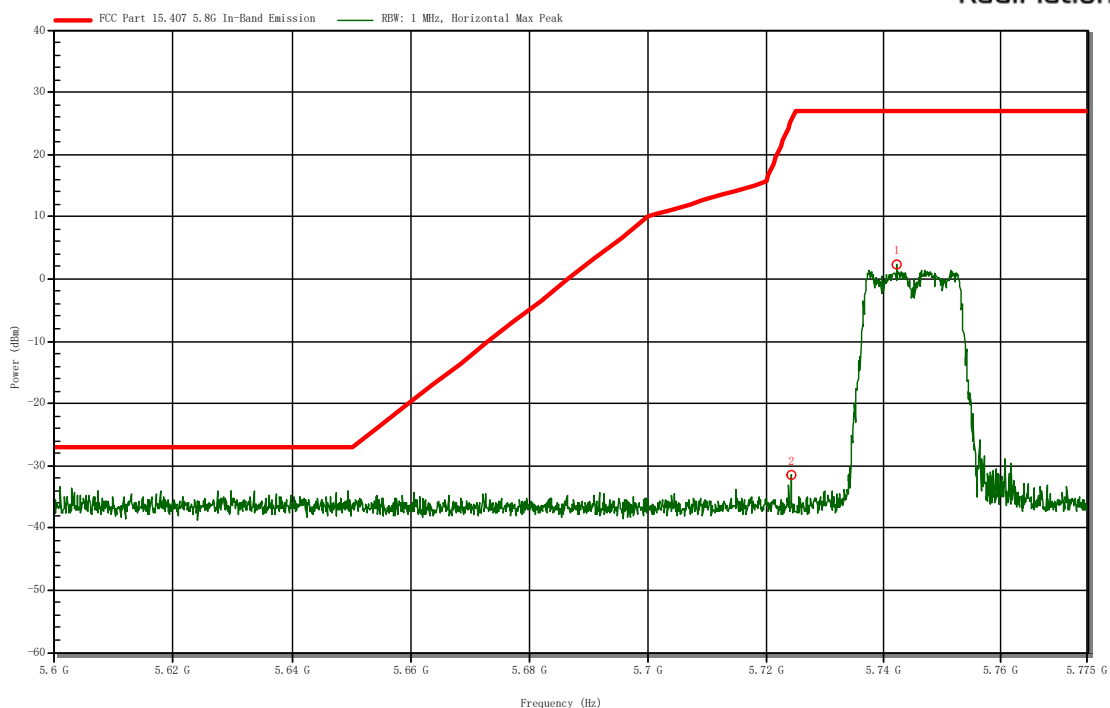
3.2.11 Spurious Emission in-Band 5.725GHz~5.850 GHz

EUT :	ConBox2020RD	Model Name. :	CB20RDNAR1
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 12V
Test Mode :	Mode 1/2/3		

[5.6 GHz-5.775 GHz]/Horizontal RSE WLAN 5G Ant1 802.11a 5745MHz

Start Frequency	Stop Frequency	Step Width	Meas. Time	IF Bandwidth	Detectors
5.6 GHz	5.775 GHz	Fixed step count: 40001 steps per Band	Auto [120 ms]	1 MHz	PK, AV

RadiMation

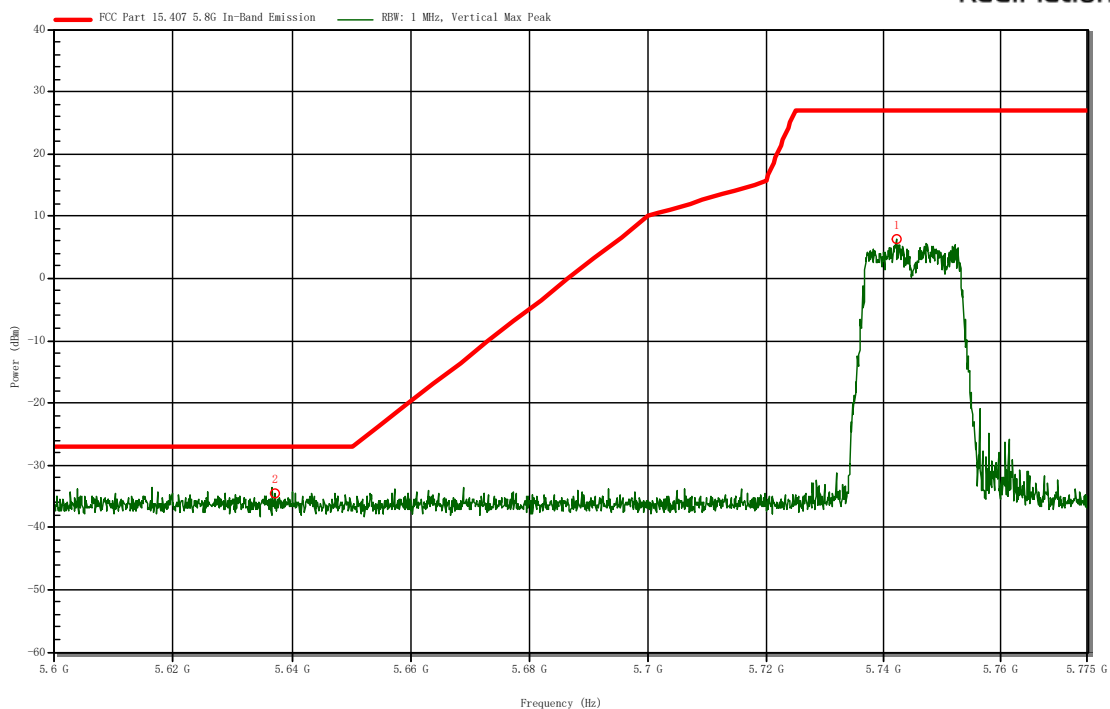


Frequency (MHz)	Peak (dBm)	Peak Limit (dBm)	Peak Difference (dB)	Status
5742.262	2.4	27.0	-24.6	Pass
5724.285	-31.4	25.4	-56.8	Pass

[5.6 GHz-5.775 GHz]/Vertical RSE WLAN 5G Ant1 802.11a 5745MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
5.6 GHz 5.775 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation



Frequency (MHz)	Peak (dBm)	Peak Limit (dBm)	Peak Difference (dB)	Status
5742.214	6.3	27.0	-20.7	Pass
5637.069	-34.6	-27.0	-7.6	Pass

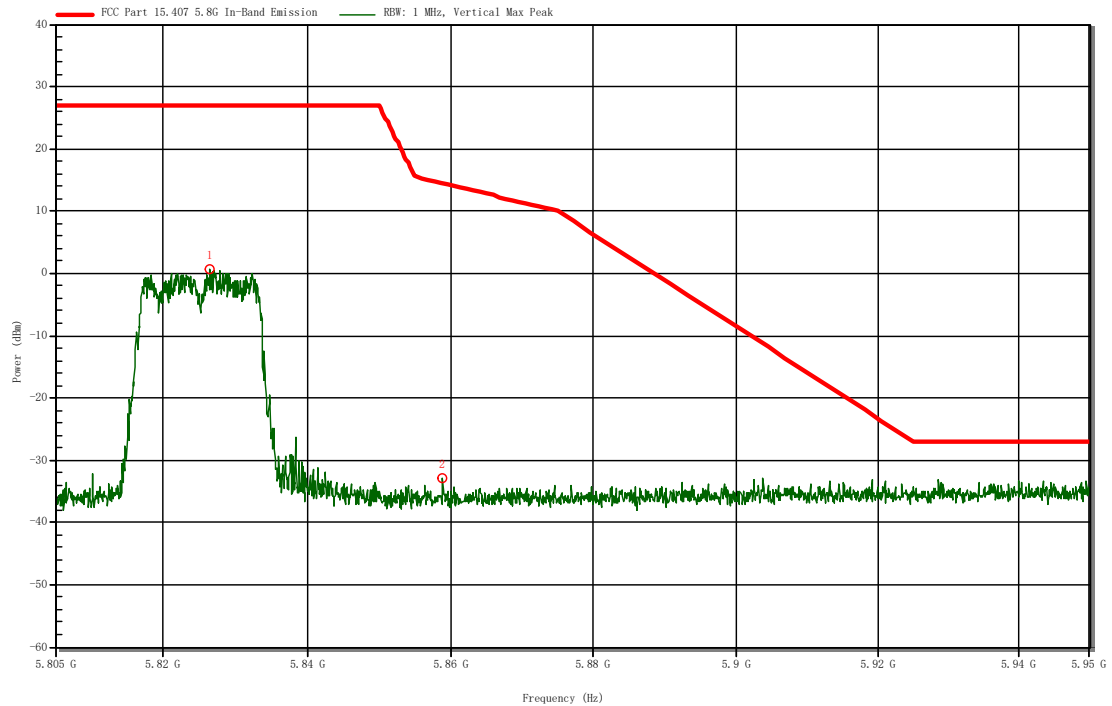
Note: (1) Emission Level= Antenna Factor + Cable Loss + Read Level - 95.2

(2) "802.11a Ant1 5745MHz " mode is the worst mode.

[5.805 GHz-5.95 GHz]/Vertical RSE WLAN 5G Ant1 802.11a 5825MHz

Start Frequency 5.805 GHz Stop Frequency 5.95 GHz Step Width Fixed step count: 40001 steps per Band Meas. Time Auto [120 ms] IF Bandwidth 1 MHz Detectors PK, AV

RadiMation

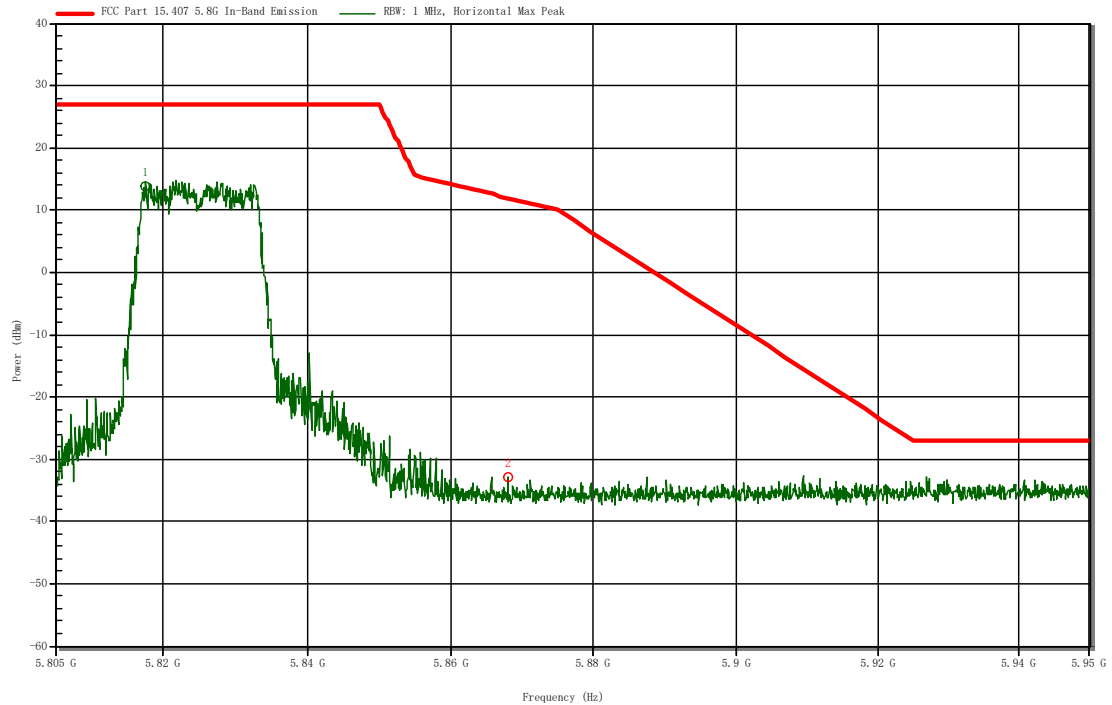


Frequency (MHz)	Peak (dBm)	Peak Limit (dBm)	Peak Difference (dB)	Status
5826.427	0.8	27.0	-26.2	Pass
5858.893	-32.9	14.5	-47.4	Pass

[5.805 GHz-5.95 GHz]/Horizontal RSE WLAN 5G Ant1 802.11a 5825MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
5.805 GHz 5.95 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation



Frequency (MHz)	Peak (dBm)	Peak Limit (dBm)	Peak Difference (dB)	Status
5817.524	13.7	27.0	-13.3	Pass
5867.966	-32.8	12.0	-44.8	Pass

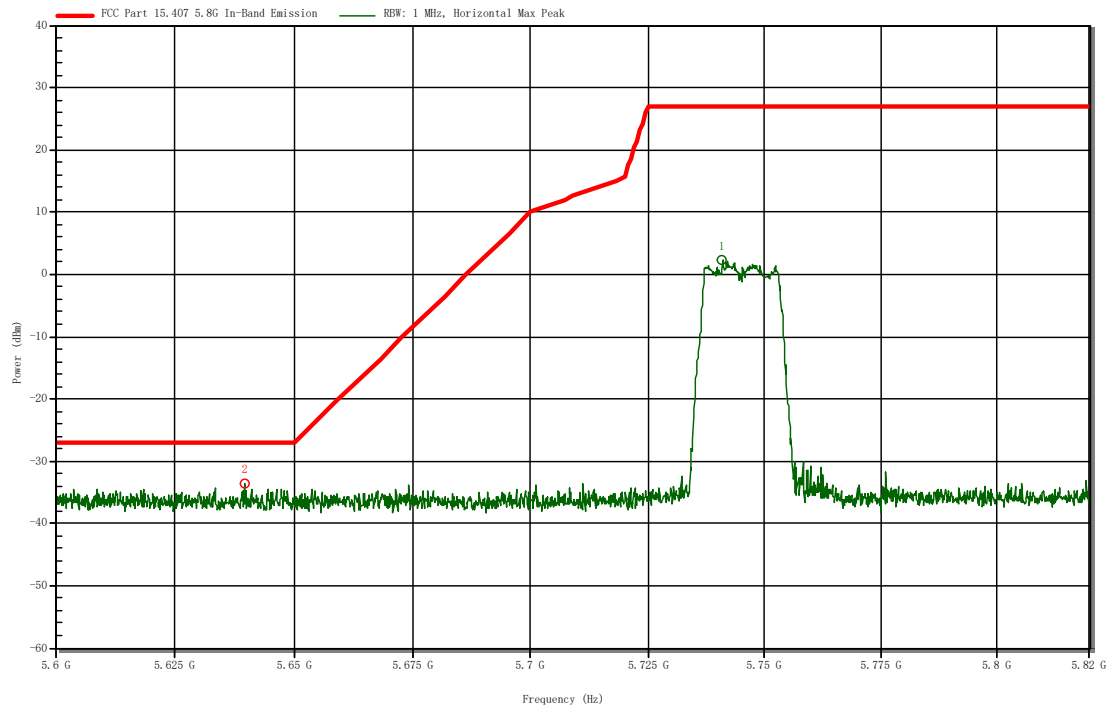
Note: (1) Emission Level= Antenna Factor + Cable Loss + Read Level - 95.2

(2) "802.11a Ant1 5825MHz " mode is the worst mode.

[5.6 GHz-5.82 GHz]/Horizontal RSE WLAN 5G Ant2 802.11a 5745MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
5.6 GHz 5.82 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

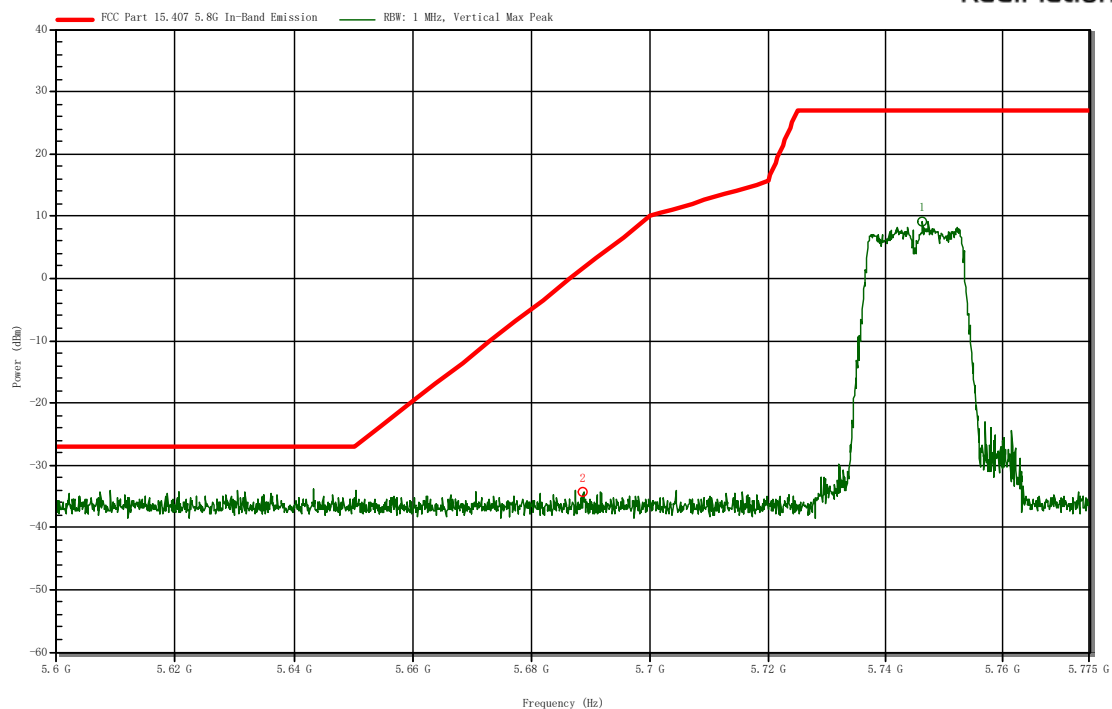


Frequency (MHz)	Peak (dBm)	Peak Limit (dBm)	Peak Difference (dB)	Status
5740.888	2.4	27.0	-24.6	Pass
5639.603	-33.6	-27.0	-6.6	Pass

[5.6 GHz-5.775 GHz]/Vertical RSE WLAN 5G Ant2 802.11a 5745MHz

Start Frequency 5.6 GHz Stop Frequency 5.775 GHz Step Width Fixed step count: 40001 Meas. Time Auto [120 ms] IF Bandwidth 1 MHz Detectors PK, AV

RadiMation



Frequency (MHz)	Peak (dBm)	Peak Limit (dBm)	Peak Difference (dB)	Status
5746.28	9.2	27.0	-17.8	Pass
5688.633	-34.4	1.6	-35.9	Pass

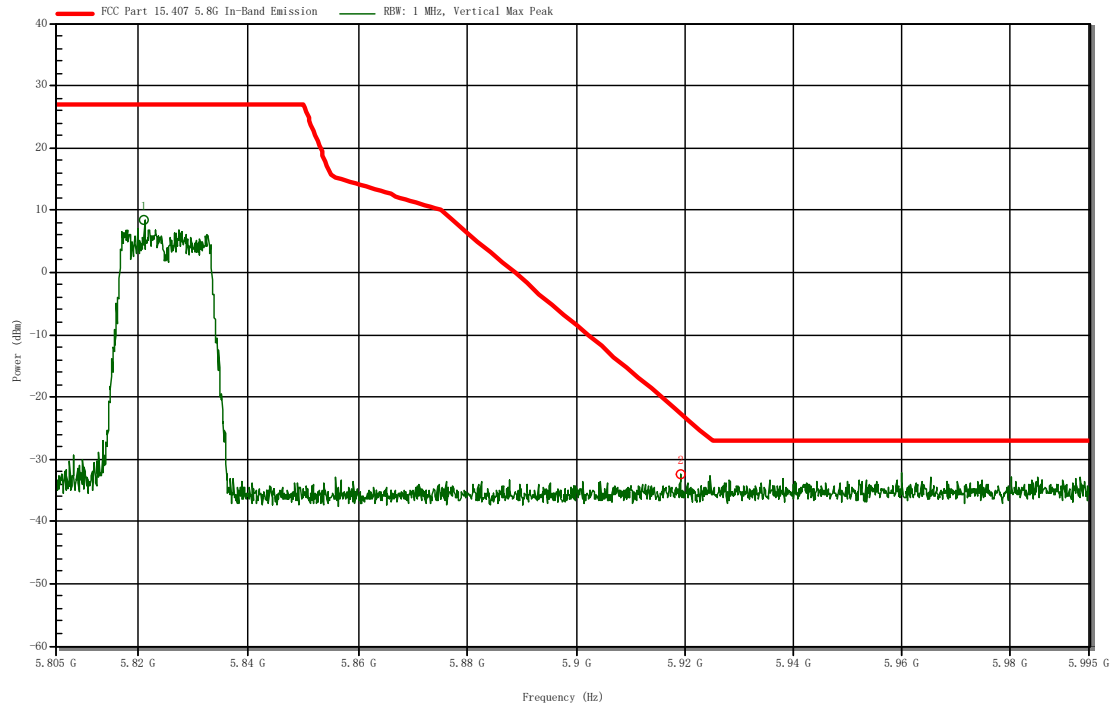
Note: (1) Emission Level= Antenna Factor + Cable Loss + Read Level - 95.2

(2) "802.11a Ant2 5745MHz " mode is the worst mode.

[5.805 GHz-5.995 GHz]/Vertical RSE WLAN 5G Ant2 802.11a 5825MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
5.805 GHz 5.995 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

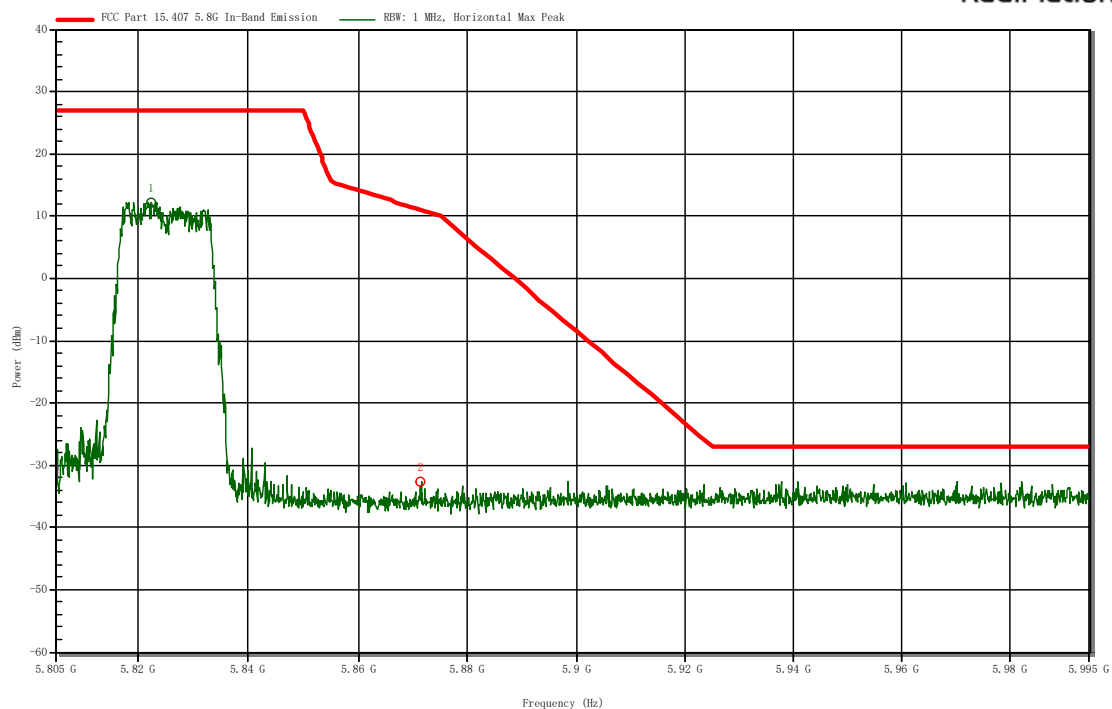


Frequency (MHz)	Peak (dBm)	Peak Limit (dBm)	Peak Difference (dB)	Status
5821.145	8.3	27.0	-18.7	Pass
5919.038	-32.5	-22.6	-9.9	Pass

[5.805 GHz-5.995 GHz]/Horizontal RSE WLAN 5G Ant2 802.11a 5825MHz

Start Frequency 5.805 GHz Stop Frequency 5.995 GHz Step Width Fixed step count: 40001 steps per Band Meas. Time Auto [120 ms] IF Bandwidth 1 MHz Detectors PK, AV

RadiMation



Frequency (MHz)	Peak (dBm)	Peak Limit (dBm)	Peak Difference (dB)	Status
5822.452	12.3	27.0	-14.7	Pass
5871.448	-32.6	11.0	-43.6	Pass

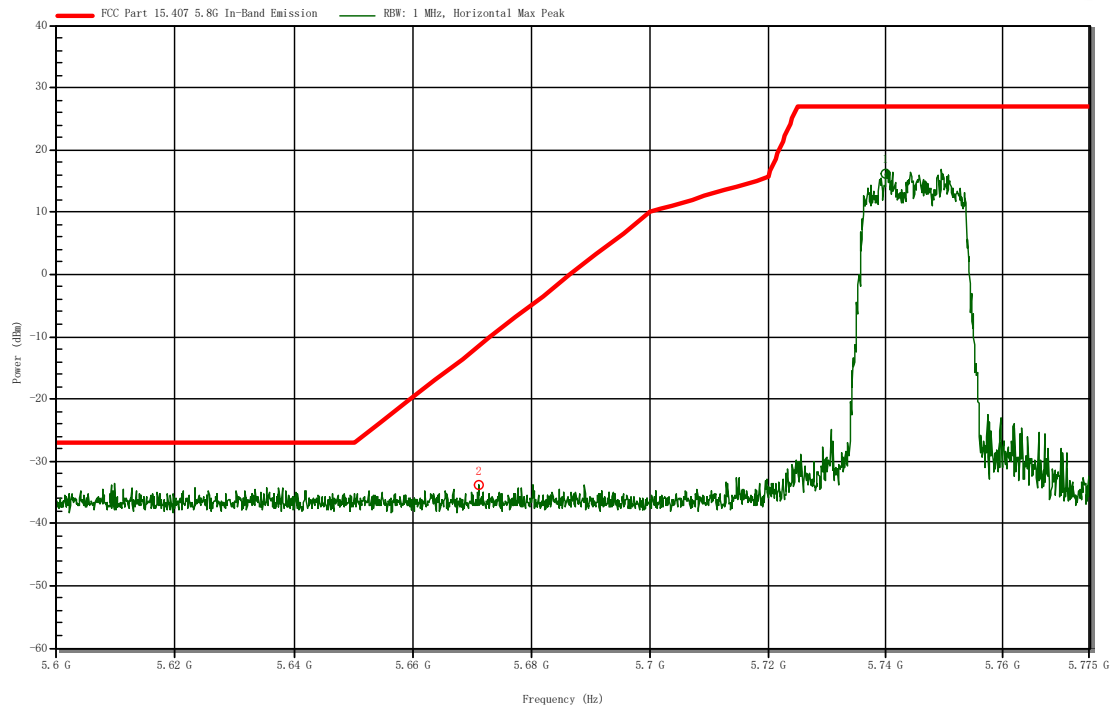
Note: (1) Emission Level= Antenna Factor + Cable Loss + Read Level - 95.2

(2) "802.11a Ant2 5825MHz " mode is the worst mode.

[5.6 GHz-5.775 GHz]/Horizontal RSE WLAN 5G MIMO 802.11n20 5745MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
5.6 GHz 5.775 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

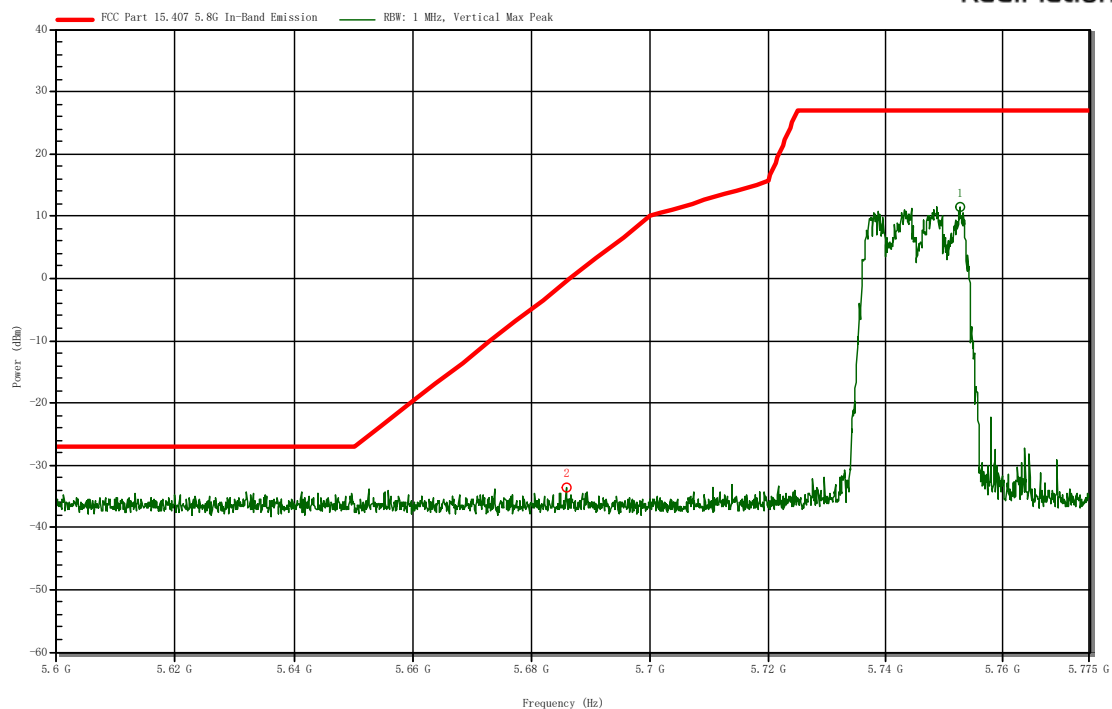


Frequency (MHz)	Peak (dBm)	Peak Limit (dBm)	Peak Difference (dB)	Status
5740.009	16.2	27.0	-10.8	Pass
5670.984	-33.8	-11.5	-22.3	Pass

[5.6 GHz-5.775 GHz]/Vertical RSE WLAN 5G MIMO 802.11n20 5745MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
5.6 GHz 5.775 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation



Frequency (MHz)	Peak (dBm)	Peak Limit (dBm)	Peak Difference (dB)	Status
5752.674	11.5	27.0	-15.5	Pass
5685.733	-33.5	-0.6	-32.9	Pass

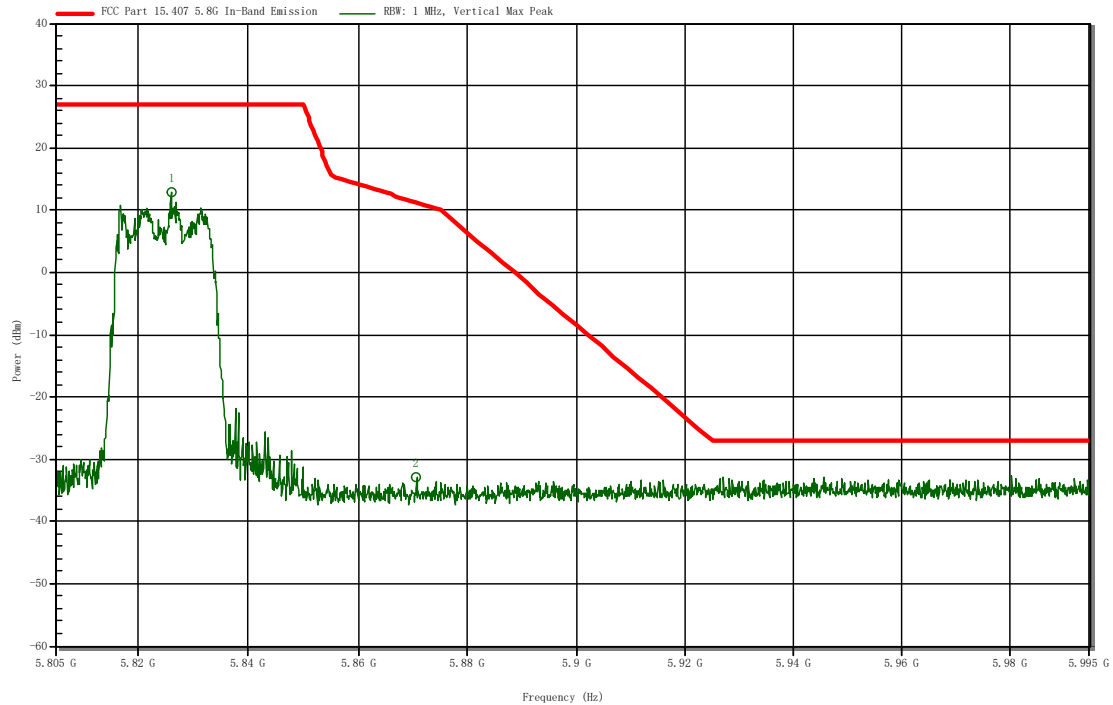
Note: (1) Emission Level= Antenna Factor + Cable Loss + Read Level - 95.2

(2) "802.11a MIMO 5745MHz " mode is the worst mode.

[5.805 GHz-5.995 GHz]/Vertical RSE WLAN 5G MIMO 802.11n20 5825MHz

Start Frequency Stop Frequency Step Width Meas. Time IF Bandwidth Detectors
5.805 GHz 5.995 GHz Fixed step count: 40001 Auto [120 ms] 1 MHz PK, AV
steps per Band

RadiMation

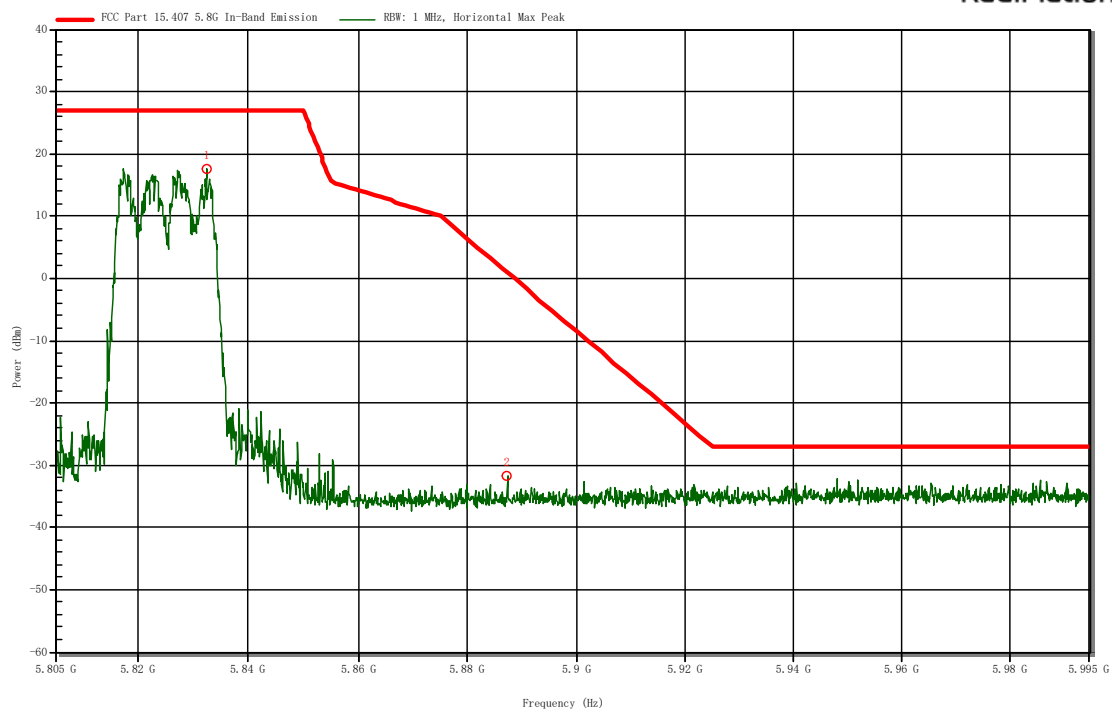


Frequency (MHz)	Peak (dBm)	Peak Limit (dBm)	Peak Difference (dB)	Status
5825.952	13.0	27.0	-14.0	Pass
5870.65	-32.9	11.2	-44.1	Pass

[5.805 GHz-5.995 GHz]/Horizontal RSE WLAN 5G MIMO 802.11n20 5825MHz

Start Frequency 5.805 GHz Stop Frequency 5.995 GHz Step Width Fixed step count: 40001 steps per Band Meas. Time Auto [120 ms] IF Bandwidth 1 MHz Detectors PK, AV

RadiMation



Frequency (MHz)	Peak (dBm)	Peak Limit (dBm)	Peak Difference (dB)	Status
5832.431	17.6	27.0	-9.4	Pass
5887.237	-31.7	0.9	-32.7	Pass

Note: (1) Emission Level= Antenna Factor + Cable Loss + Read Level - 95.2

(2) "802.11a MIMO 5825MHz " mode is the worst mode.

4. POWER SPECTRAL DENSITY TEST

4.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(a)

For the band 5.15-5.25 GHz,

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

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

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

For the band 5.725-5.85 GHz

(3) For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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4.2 TEST PROCEDURE

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:

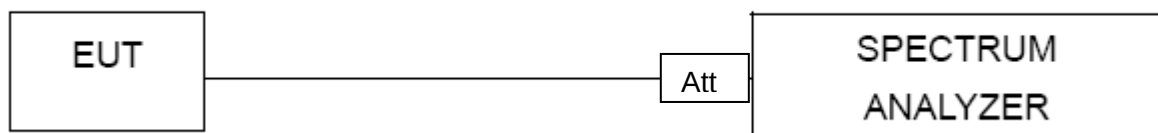
- a) Set $RBW \geq 1/T$, where T is defined in section II.B.I.a).
- b) Set $VBW \geq 3$ RBW.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10\log(500\text{kHz}/RBW)$ to the measured result, whereas $RBW (< 500 \text{ KHz})$ is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
- d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add $10\log(1\text{MHz}/RBW)$ to the measured result, whereas $RBW (< 1 \text{ MHz})$ is the reduced resolution bandwidth of spectrum analyzer set during measurement.
- e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 KHz for the sections 5.c) and 5.d) above, since $RBW=100 \text{ KHz}$ is available on nearly all spectrum analyzers.

4.3 DEVIATION FROM STANDARD

No deviation.

4.4 TEST SETUP



4.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

4.6 TEST RESULTS

EUT :	ConBox2020RD	Model Name :	CB20RDNAR1
Temperature :	N/A	Relative Humidity :	N/A
Pressure :	N/A	Test Voltage :	N/A
Test Mode :	N/A		

Please check FCC ID: XPYJODYW374 (Report No.: MDE_UBLOX_2220_FCC_02)

5. 26DB & 99% EMISSION BANDWIDTH

5.1 APPLIED PROCEDURES / LIMIT

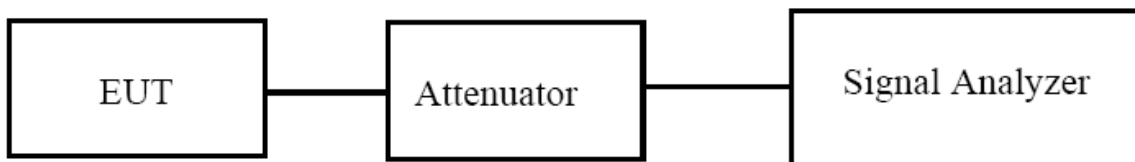
The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

5.2 TEST PROCEDURE

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

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

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW $\geq 3 \cdot$ RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.



5.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.4 TEST RESULTS

EUT :	ConBox2020RD	Model Name :	CB20RDNAR1
Temperature :	N/A	Relative Humidity :	N/A
Pressure :	N/A	Test Voltage :	N/A
Test Mode :	N/A		

Please check FCC ID: XPYJODYW374 (Report No.: MDE_UBLOX_2220_FCC_02)

6. MINIMUM 6 DB BANDWIDTH

6.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(e)

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

6.2 TEST PROCEDURE

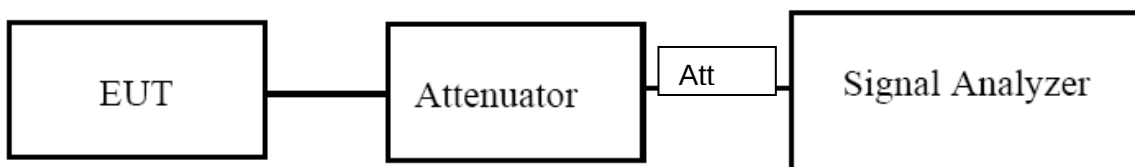
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.6 TEST RESULTS

EUT :	ConBox2020RD	Model Name :	CB20RDNAR1
Temperature :	N/A	Relative Humidity :	N/A
Pressure :	N/A	Test Voltage :	N/A
Test Mode :	N/A		

Please check FCC ID: XPYJODYW374 (Report No.: MDE_UBLOX_2220_FCC_02)

7. MAXIMUM CONDUCTED OUTPUT POWER

7.1 PPLIED PROCEDURES / LIMIT

According to FCC §15.407

The maximum conducted output power should not exceed:

Frequency Band(MHz)	Limit
5150~5250	250mW
5250~5350	250 mW or 11 dBm + 10 log B Note: The limit is the smaller of the two, "B" represents -26dB bandwidth.
5470~5725	250 mW or 11 dBm + 10 log B Note: The limit is the smaller of the two, "B" represents -26dB bandwidth.
5725~5850	1W

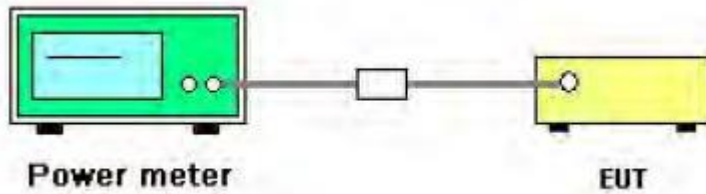
7.2 TEST PROCEDURE

- Method PM is Measurement using an RF average power meter. The procedure for this method is as follows:
 - a) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the following conditions 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 D of the transmitter output signal as described in 12.2.
 - 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 $[10 \log (1 / D)]$, where D is the duty cycle {e.g., $[10 \log (1 / 0.25)]$, if the duty cycle is 25%}.

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

7.6 TEST RESULTS

EUT :	ConBox2020RD	Model Name :	CB20RDNAR1
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 12V
Test Mode :	Mode 1/2/3		

Refer to section 2.2 of this report:

For 5.2G band, 802.11n/ac/ax has MIMO mode. Directional gain=8.01dBi

8.01dBi > 6dBi, so power limit=21.99dBm;

For 5.8G band, 802.11n/ac/ax has MIMO mode. Directional gain=8.01dBi

8.01dBi > 6dBi, so power limit=27.99dBm;

Condition	Mode	Frequency (MHz)	Antenna	Verified Host Conducted Power (dBm)	Original Module Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	a	5200	Ant1	15.26	18.2	24	Pass
NVNT	a	5200	Ant2	15.04	18.2	24	Pass

Condition	Mode	Frequency (MHz)	Antenna	Verified Host Conducted Power (dBm)	Original Module Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	a	5785	Ant1	16.78	17.0	30	Pass
NVNT	a	5785	Ant2	14.33	17.0	30	Pass

Condition	Mode	Frequency (MHz)	Antenna	Verified Host Conducted Power (dBm)	Original Module Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	n20	5200	Ant1	13.1	-	-	Pass
NVNT	n20	5200	Ant2	12.93	-	-	Pass
NVNT	n20	5200	Sum	16.03	18.7	21.99	Pass

Condition	Mode	Frequency (MHz)	Antenna	Verified Host Conducted Power (dBm)	Original Module Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	n20	5785	Ant1	15.59	-	-	Pass
NVNT	n20	5785	Ant2	13.37	-	-	Pass
NVNT	n20	5785	Sum	17.63	19.2	27.99	Pass

The maximum conducted power is verified to be the same. The conducted signal test data may be re-used.
Please check FCC ID: XPYJODYW374 (Report No.: MDE_UBLOX_2220_FCC_02)

8. OUT OF BAND EMISSIONS

8.1 APPLICABLE STANDARD

According to FCC §15.407(b)

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

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band:
 - (i) 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.
 - (ii) Devices certified before March 2, 2017 with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.

8.2 TEST PROCEDURE

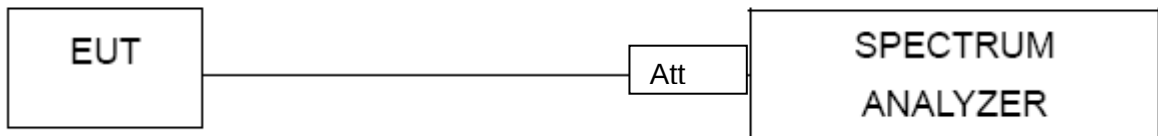
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.

3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

8.6 TEST RESULTS

EUT :	ConBox2020RD	Model Name :	CB20RDNAR1
Temperature :	N/A	Relative Humidity :	N/A
Pressure :	N/A	Test Voltage :	N/A

Please check FCC ID: XPYJODYW374 (Report No.: MDE_UBLOX_2220_FCC_02)

9. Frequency Stability Measurement

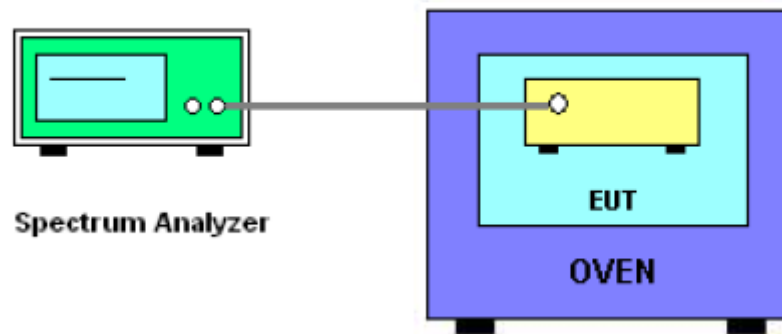
9.1 LIMIT

Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

9.2 TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f)/f_c \times 10^6$ ppm and the limit is less than ± 20 ppm (IEEE 802.11n specification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature is $-20^{\circ}\text{C} \sim 70^{\circ}\text{C}$.

9.3 TEST SETUP LAYOUT



9.4 EUT OPERATION DURING TEST

1. The EUT was programmed to be in continuously un-modulation transmitting mode.
2. The module has two antennas, and the worst data is Antenna 1, only shown Antenna 1 Plot.

9.5 TEST RESULTS

EUT :	ConBox2020RD	Model Name. :	CB20RDNAR1
Temperature :	N/A	Relative Humidity :	N/A
Pressure :	N/A	Test Voltage :	N/A
Test Mode :	N/A		

Please check FCC ID: XPYJODYW374 (Report No.: MDE_UBLOX_2220_FCC_02)

10. ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

10.2 EUT ANTENNA

The EUT antenna is permanent attached External Antenna (Ant1: Gain: 2.38dBi; Ant2: Gain: 5dBi). It comply with the standard requirement.

END OF REPORT