FCC PART 15C TEST REPORT FOR CERTIFICATION

On Behalf of

Funai Electric R & D (Shenzhen) Co., Ltd.

WiFi module

U9W42 Y

FCC ID: 2AU3BU9W42

Prepared for : Funai Electric R & D (Shenzhen) Co., Ltd.
B303 Technology Building II, 1057 Nanhai Road, Nanshan District, Shenzhen, China 518067

Prepared By : Audix Technology (Shenzhen) Co., Ltd.
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Report Number	:	ACS-F20002-1
Date of Test	:	Nov.27~Dec.06,2020
Date of Report	:	Jan.15,2021

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TEST REPORT CERTIFICATION

Applicant	:	Funai Electric R & D (Shenzhen) Co., Ltd.
Manufacturer	:	Funai Electric R & D (Shenzhen) Co., Ltd.
Product	:	WiFi module
FCC ID	:	2AU3BU9W42
		(A) Model No. : U9W42 Y
		(B) Test Voltage : DC 3.3V

Tested for comply with:

FCC CFR47 Part 15 Subpart C
Test procedure used: ANSI C63.10: 2013;
KDB 558074 D01v05r02

The device described above is tested by AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. to confirm comply with all the FCC Part 15 Subpart C requirements. The test results are contained in this test report and AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. is assumed full responsibility for the accuracy and completeness of these tests. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements. This report contains data that are not covered by the NVLAP accreditation.

This Report is made under FCC Part 2.1074. No modifications were required during testing to bring this product into compliance.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Date of Test : Nov.27~Dec.06,2020 Report of date: Jan.15,2021

Prepared by : Brave Zhang / Assistant

Reviewed by : Sunny Lu/ Deputy Manager

AUDIX 信華科技（深圳）有限公司
Audix Technology (Shenzhen) Co., Ltd.
EMC 部門報告專用章
Stamp only for EMC Dept. Report
Signature: David Jin

Approved & Authorized Signer : David Jin / Deputy General Manager

REPORT REVISION HISTORY

Edition No.	Revision	Issue Data	Report No.
Original	Initial issue of report	Mar.31,2020	ACS-F20002
Rev.01	1. Change internal SMT antenna(Bluetooth Antenna) to external antenna; 2. Change the model no. from U9W42 to U9W42 Y.	Jan.15,2021	ACS-F20002-1

1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT has been tested according to the applicable standards as referenced below.

EMISSION		
Description of Test Item	**Standard**	**Results**
Power Line Conducted Emission Test	FCC Part 15: 15.207 ANSI C63.10 :2013	PASS
Radiated Emission Test	FCC Part 15: 15.209 FCC Part 15: 15.205 FCC Part 15: 15.247(d) ANSI C63.10 : 2013	PASS
Conducted Spurious Emissions	FCC Part 15: 15.247(d) ANSI C63.10 : 2013	N/A
Carrier Frequency Separation Test	FCC Part 15: 15.247(a)(2) ANSI C63.10 : 2013	N/A
6dB Bandwidth Test	FCC Part 15: 15.247(b)(3) ANSI C63.10 : 2013	N/A
Maximum Peak Output Power Test	FCC Part 15: 15.247(d) ANSI C63.10 : 2013	PASS
Band Edge Compliance Test	FCC Part 15: 15.247(e) ANSI C63.10 : 2013	PASS
Power Spectral Density Test	FCC Part 15: 15.207 ANSI C63.10 :2013	N/A
Antenna requirement	FCC Part 15: 15.203	PASS
Note: N/A means that the change of the Bluetooth antenna has no effect on the test item and does not need to be retested.		

2. GENERAL INFORMATION

2.1.Description of Equipment Under Test

Applicant	Funai Electric R & D (Shenzhen) Co., Ltd.
Applicant Address	B303 Technology Building II, 1057 Nanhai Road, Nanshan District, Shenzhen, China 518067
Manufacturer	Funai Electric R & D (Shenzhen) Co., Ltd.
Manufacturer Address	B303 Technology Building II, 1057 Nanhai Road, Nanshan District, Shenzhen, China 518067
Factory	Funai (Thailand) Company Limited
Factory Address	835 Moo18, Pakchong-Lumsompung Road, Tambon, Chantuek, Amphur Pakchong, Nakhon Ratchasima 30130, Thailand
Product	WiFi module
Model No.	U9W42 Y
FCC ID	2AU3BU9W42
Sample Type	Prototype production
Date of Receipt	Nov.18,2019
Date of Test	Nov.27~Dec.06,2020
Remark: This report only for Bluetooth V5.0.	

2.2.Feature of Equipment Under Test

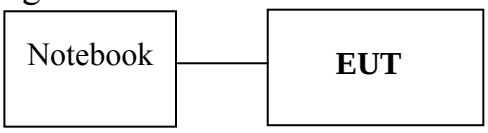
Product Feature & Specification		
Product	WiFi module	
Model No.	U9W42 Y	
Radio	IEEE802.11 a/b/g/n/ac; Bluetooth V3.0+EDR; Bluetooth V5.0	
Power Source	☐ Commercial Power	AC 100 ~ 240V
	☒ External Power Source	DC 3.3V
	☐ Lithium battery	DC V, mAh
	☐ UM battery	DC V
Bluetooth		
Bluetooth Version	V5.0 dual mode	
Frequency Range	2402-2480MHz	
Type of Modulation	GFSK, π/4DQPSK, 8DPSK	
Data Rate	1Mbps, 2Mbps, 3Mbps	
Quantity of Channels	79/40	
Channel Separation	1MHz/2MHz	
2.4GHz Wi-Fi		
Support Modes	802.11b/g/n20/n40	
Frequency Range	2412-2462MHz	
Type of Modulation	802.11b(DSSS): CCK, QPSK, BPSK; 802.11g/n(OFDM): 64QAM,16QAM, QPSK, BPSK	
Data Rate	802.11b: 1/2/5.5/11 Mbps; 802.11g: 6/9/12/18/24/36/48/54 Mbps; 802.11n: up to 300Mbps	
Channel Separation	5MHz	
5GHz Wi-Fi		
Support Modes	802.11a/n20/n40/ac20/ac40/ac80	
Frequency Range	5180-5240MHz, 5745-5825MHz	
Type of Modulation	802.11a/n (OFDM): QPSK, BPSK, 16QAM, 64QAM 802.11ac (OFDM): QPSK, BPSK, 16QAM, 64QAM,256QAM	
Data Rate	802.11a: 6/9/12/18/24/36/48/54 Mbps; 802.11n: up to 300Mbps; 802.11ac: up to 867Mbps	
Channel Separation	5MHz	

Antenna System	
Type of Antenna	Bluetooth: Multilayer Ceramic Antenna WIFI: PCB Antenna
Antenna Peak Gain	Bluetooth Peak Gain: -0.42dBi DTS Band (2400-2483.5MHz) Peak Gain: ANT A: -2.3dBi; ANT B: -1dBi. U-NII-1 Band(5150-5250MHz) Peak Gain: ANT A: 2.9dBi; ANT B: -3.8dBi. U-NII-3 Band (5725-5850MHz) Peak Gain: ANT A: -1.9dBi; ANT B: -4.5dBi.

2.3. Tested Supporting System Details

No.	Description	ACS No.	Manufacturer	Model	Serial Number
1.	Notebook	N/A	acer	ZOW	NVX7C
		USB Cable: Shielded, Detachable, 1.0m			

2.4. Block Diagram of connection between EUT and simulators



(EUT: WiFi module)

2.5. Test information

A special software (WCN_Combo_Tool) was used to control EUT work in Continuous TX mode (GFSK modulation), and select test channel.

Tested mode, channel, and data rate information			
Mode	data rate (Mbps)	Channel	Frequency (MHz)
Tx Mode GFSK modulation	1	Low :CH 0	2402
	1	Middle: CH19	2440
	1	High: CH39	2480
	2	Low :CH 0	2402
	2	Middle: CH19	2440
	2	High: CH39	2480

2.6. Test Facility

Site Description

Name of Firm : Audix Technology (Shenzhen) Co., Ltd.
No. 6, Kefeng Road, Science & Technology Park,
Nanshan District , Shenzhen, Guangdong, China

EMC Lab. : Accredited by Industry Canada
Registration Number: IC 5183A-1
Valid Date: Mar.31, 2021

: Accredited by DAkkS, Germany
Registration No: D-PL-12151-01-00
Valid Date: Dec.07, 2021

: Accredited by NVLAP, USA
NVLAP Code: 200372-0
Valid Date: Mar.31, 2021

: Certificated by FCC USA.
Designation No.: CN5022
Valid Date: Mar.31, 2021

2.7. Measurement Uncertainty (95% confidence levels, k=2)

Test Item	Uncertainty
Uncertainty for Conduction emission test in No. 1 Conduction	2.6dB(150KHz to 30MHz)
Uncertainty for Radiation Emission test in 3m chamber	3.6dB(30~200MHz, Polarization: H)
	4.0dB(30~200MHz, Polarization: V)
	3.6dB(200M~1GHz, Polarization: H)
	3.8dB(200M~1GHz, Polarization: V)
Uncertainty for Radiation Emission test in 3m chamber(1GHz-25GHz)	4.6dB(1~6GHz, Distance: 3m)
	4.6dB(6~25GHz, Distance: 3m)
Uncertainty for Radiated Spurious Emission test in RF chamber	3.7dB(30MHz~1000MHz)
	3.3dB(1~26.5GHz)
Uncertainty for Conduction Spurious emission test	2.0dB
Uncertainty for Output power test	0.8dB
Uncertainty for Bandwidth test	83kHz
Uncertainty for DC power test	1.9%
Uncertainty for test site temperature and humidity	0.6℃
	3%

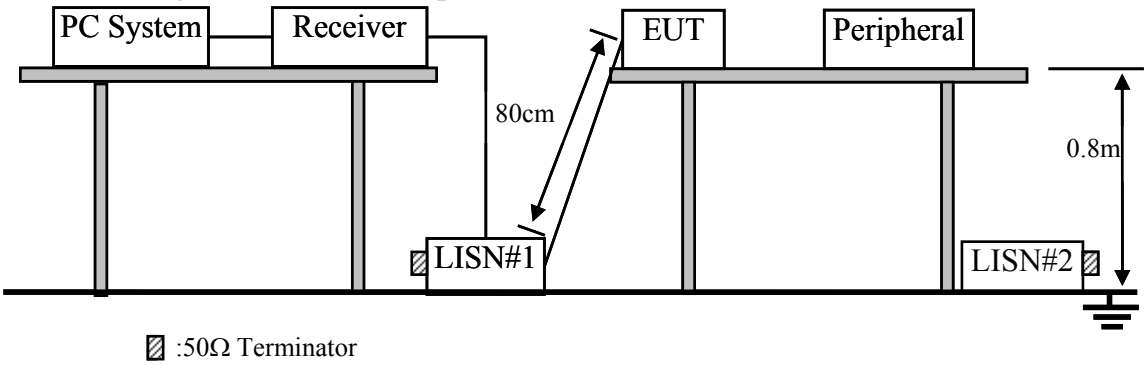
Note: EMI uncertainty is evaluated by CISPR16-4-2.
The value of measurement uncertainty of EMI is less than U_{CISPR}.
The value is not calculated in the test results.

3. POWER LINE CONDUCTED EMISSION TEST

3.1.Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	1# Shielding Room	AUDIX	N/A	N/A	May.17,18	3 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100842	Apr.12,20	1 Year
3.	L.I.S.N.#1	Rohde & Schwarz	ENV216	102160	Oct.11,20	1 Year
4.	L.I.S.N.#2	Kyoritsu	KNW-407	8-1636-1	Apr.12,20	1 Year
5.	Terminator	Hubersuhner	50Ω	No.1	Apr.12,20	1 Year
6.	Terminator	Hubersuhner	50Ω	No.2	Apr.12,20	1 Year
7.	RF Cable	EMCI	EMCCFD300-BM-NM-2000	190422	Apr.12,20	1 Year
8.	Test Software	AUDIX	e3	6.100913a	N/A	N/A
Note: N/A means Not applicable.						

3.2.Block Diagram of Test Setup



3.3.Power Line Conducted Emission Test Limits

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

3.4.Configuration of EUT on Test

The following equipment are installed on Power Line Conducted Emission Test to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

3.4.1. WiFi module (EUT)

Model No. : U9W42 Y
Serial No. : N/A

3.4.2. Support Equipment: As Tested Supporting System Details, in Section 2.2.

3.5. Operating Condition of EUT

3.5.1. Setup the EUT as shown as Section 3.2.

3.5.2. Turn on the power of EUT.

3.5.3. PC run test software to control EUT work in Tx mode.

3.6. Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power Via AC unit connected to the power mains through a line impedance stabilization network (L.I.S.N. #1). This provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs). The AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2013 on Conducted Emission Test.

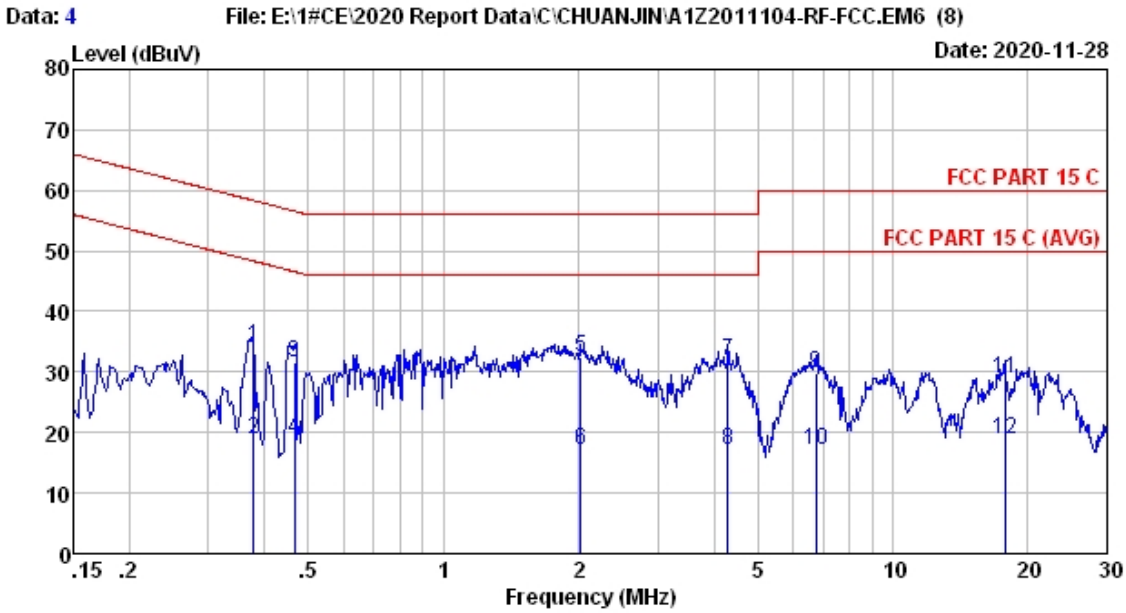
The bandwidth of test receiver (R & S ESCI) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

3.7. Power Line Conducted Emission Test Results

PASS. **(**All emissions not reported below are too low against the prescribed limits.)

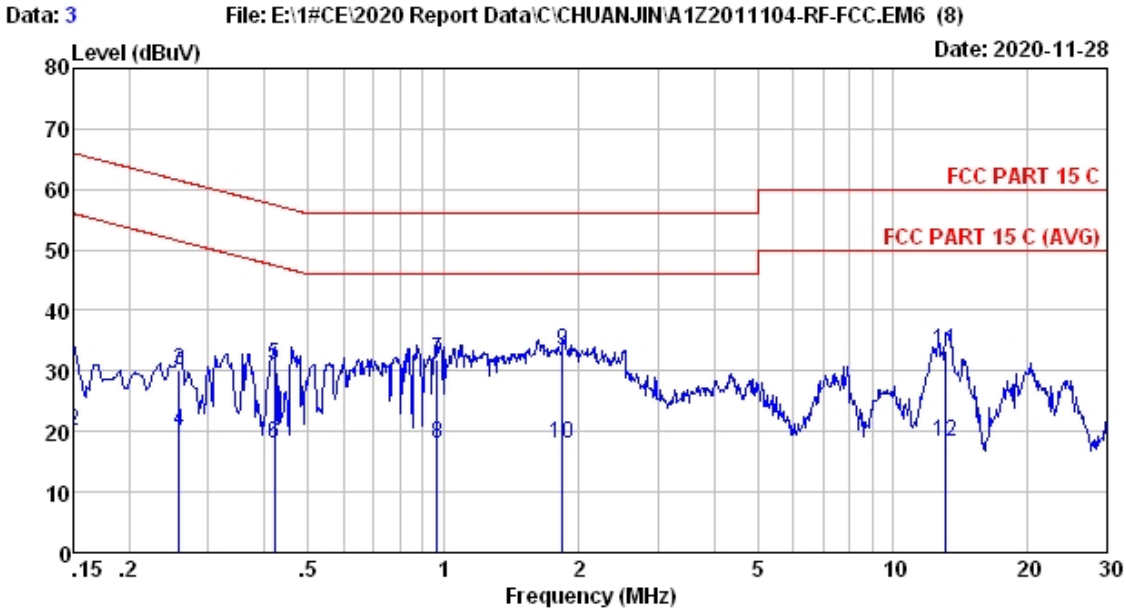
Bluetooth V4.0(1Mbps):



Site no :1# Conduction Data No :4
Dis./Lisn :2020 ENV216-L LISN phase:
Limit :FCC PART 15 C
Env./Ins. :Temp:23.9*C Humi:46% Engineer :Evan
EUT :
Power Rating :DC 5V From Notebook Input AC 120V/60Hz
Test Mode :BLE Mode

No	Freq (MHz)	LISN Factor (dB)	Cable loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.377	9.70	0.01	24.45	34.16	58.34	24.18	QP
2	0.377	9.70	0.01	9.27	18.98	48.34	29.36	Average
3	0.466	9.70	0.01	21.74	31.45	56.58	25.13	QP
4	0.466	9.70	0.01	9.27	18.98	46.58	27.60	Average
5	2.023	9.70	0.03	22.87	32.60	56.00	23.40	QP
6	2.023	9.70	0.03	7.26	16.99	46.00	29.01	Average
7	4.292	9.70	0.04	22.20	31.94	56.00	24.06	QP
8	4.292	9.70	0.04	7.30	17.04	46.00	28.96	Average
9	6.733	9.70	0.05	20.15	29.90	60.00	30.10	QP
10	6.733	9.70	0.05	7.30	17.05	50.00	32.95	Average
11	17.755	9.86	0.09	18.86	28.81	60.00	31.19	QP
12	17.755	9.86	0.09	8.99	18.94	50.00	31.06	Average

Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.
2.If the average limit is met when using a quasi-peak detector. the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

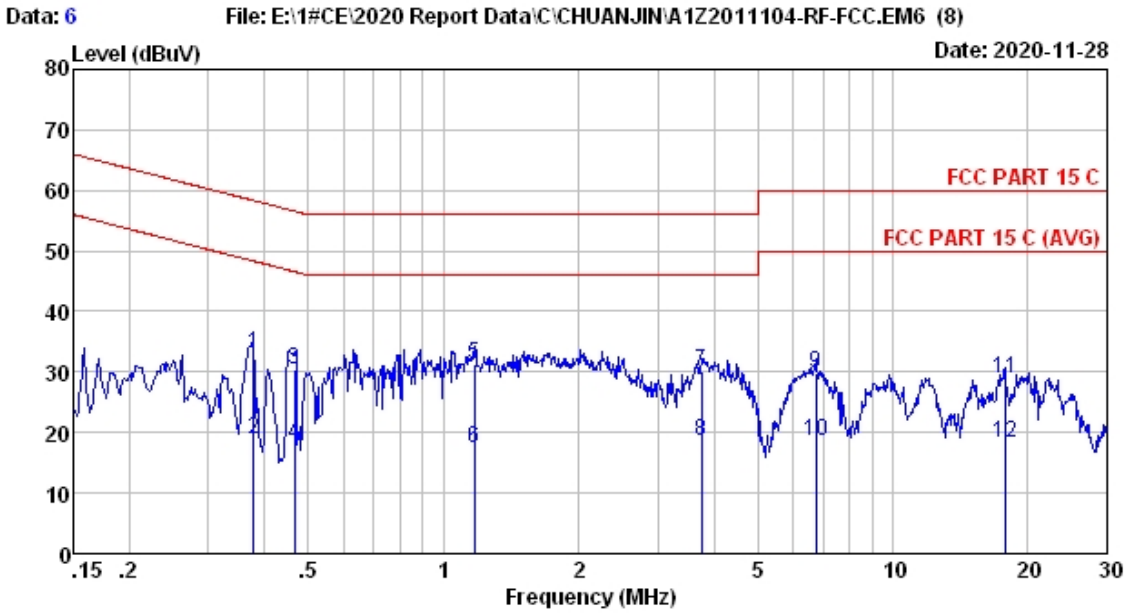


Site no :1# Conduction Data No :3
Dis./Lisn :2020 ENV216-N LISN phase:
Limit :FCC PART 15 C
Env./Ins. :Temp:23.9*C Humi:46% Engineer :Evan
EUT :
Power Rating :DC 5V From Notebook Input AC 120V/60Hz
Test Mode :BLE Mode

No	Freq (MHz)	LISN Factor (dB)	Cable loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.150	9.70	0.01	22.70	32.41	66.00	33.59	QP
2	0.150	9.70	0.01	10.26	19.97	56.00	36.03	Average
3	0.258	9.70	0.01	20.44	30.15	61.51	31.36	QP
4	0.258	9.70	0.01	10.27	19.98	51.51	31.53	Average
5	0.421	9.70	0.01	21.22	30.93	57.42	26.49	QP
6	0.421	9.70	0.01	8.30	18.01	47.42	29.41	Average
7	0.968	9.70	0.02	22.17	31.89	56.00	24.11	QP
8	0.968	9.70	0.02	8.30	18.02	46.00	27.98	Average
9	1.839	9.70	0.03	23.49	33.22	56.00	22.78	QP
10	1.839	9.70	0.03	8.30	18.03	46.00	27.97	Average
11	13.127	9.80	0.07	23.50	33.37	60.00	26.63	QP
12	13.127	9.80	0.07	8.30	18.17	50.00	31.83	Average

Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.
2.If the average limit is met when using a quasi-peak detector. the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

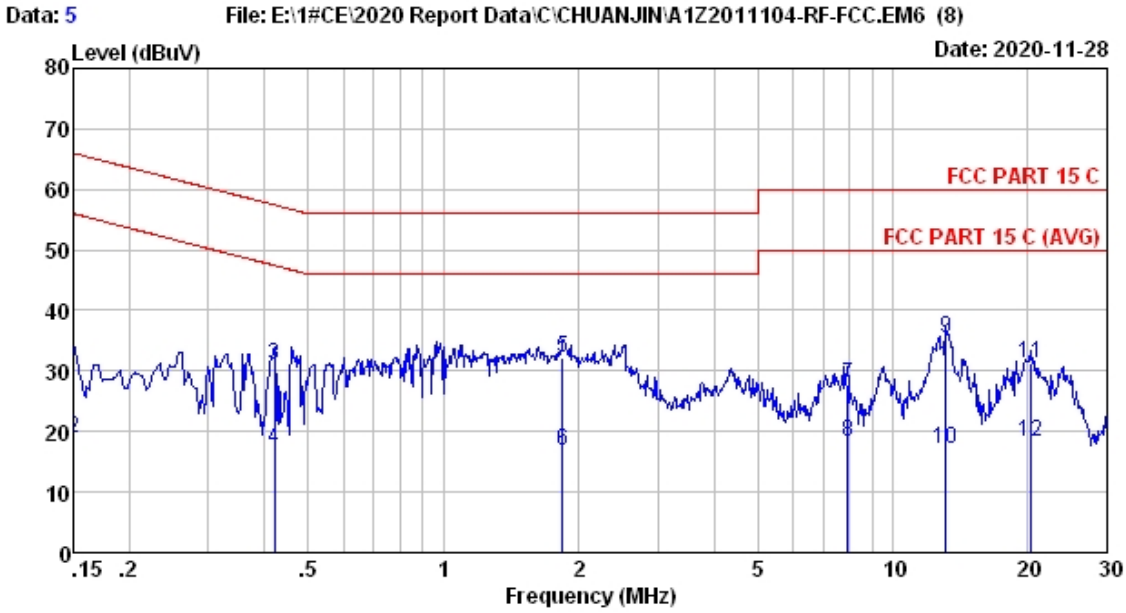
Bluetooth V5.0(2Mbps):



Site no :1# Conduction Data No :6
Dis./Lisn :2020 ENV216-L LISN phase:
Limit :FCC PART 15 C
Env./Ins. :Temp:23.9*C Humi:46% Engineer :Evan
EUT :
Power Rating :DC 5V From Notebook Input AC 120V/60Hz
Test Mode :BLE-2M Mode

No	Freq (MHz)	LISN Factor (dB)	Cable loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.377	9.70	0.01	23.45	33.16	58.34	25.18	QP
2	0.377	9.70	0.01	9.26	18.97	48.34	29.37	Average
3	0.466	9.70	0.01	20.74	30.45	56.58	26.13	QP
4	0.466	9.70	0.01	8.30	18.01	46.58	28.57	Average
5	1.172	9.70	0.02	21.48	31.20	56.00	24.80	QP
6	1.172	9.70	0.02	7.57	17.29	46.00	28.71	Average
7	3.759	9.70	0.04	20.38	30.12	56.00	25.88	QP
8	3.759	9.70	0.04	8.88	18.62	46.00	27.38	Average
9	6.733	9.70	0.05	20.15	29.90	60.00	30.10	QP
10	6.733	9.70	0.05	8.97	18.72	50.00	31.28	Average
11	17.755	9.86	0.09	18.86	28.81	60.00	31.19	QP
12	17.755	9.86	0.09	8.29	18.24	50.00	31.76	Average

Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.
2.If the average limit is met when using a quasi-peak detector. the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.



Site no :1# Conduction Data No :5
Dis./Lisn :2020 ENV216-N LISN phase:
Limit :FCC PART 15 C
Env./Ins. :Temp:23.9*C Humi:46% Engineer :Evan
EUT :
Power Rating :DC 5V From Notebook Input AC 120V/60Hz
Test Mode :BLE-2M Mode

No	Freq (MHz)	LISN Factor (dB)	Cable loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.150	9.70	0.01	22.70	32.41	66.00	33.59	QP
2	0.150	9.70	0.01	9.23	18.94	56.00	37.06	Average
3	0.421	9.70	0.01	21.22	30.93	57.42	26.49	QP
4	0.421	9.70	0.01	7.30	17.01	47.42	30.41	Average
5	1.839	9.70	0.03	22.49	32.22	56.00	23.78	QP
6	1.839	9.70	0.03	7.13	16.86	46.00	29.14	Average
7	7.935	9.73	0.05	18.05	27.83	60.00	32.17	QP
8	7.935	9.73	0.05	8.60	18.38	50.00	31.62	Average
9	13.127	9.80	0.07	25.50	35.37	60.00	24.63	QP
10	13.127	9.80	0.07	7.27	17.14	50.00	32.86	Average
11	20.270	9.90	0.10	21.22	31.22	60.00	28.78	QP
12	20.270	9.90	0.10	8.30	18.30	50.00	31.70	Average

Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.
2.If the average limit is met when using a quasi-peak detector. the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

4. RADIATED EMISSION MEASUREMENT

4.1. Test Equipment

Frequency range: 30~1000MHz

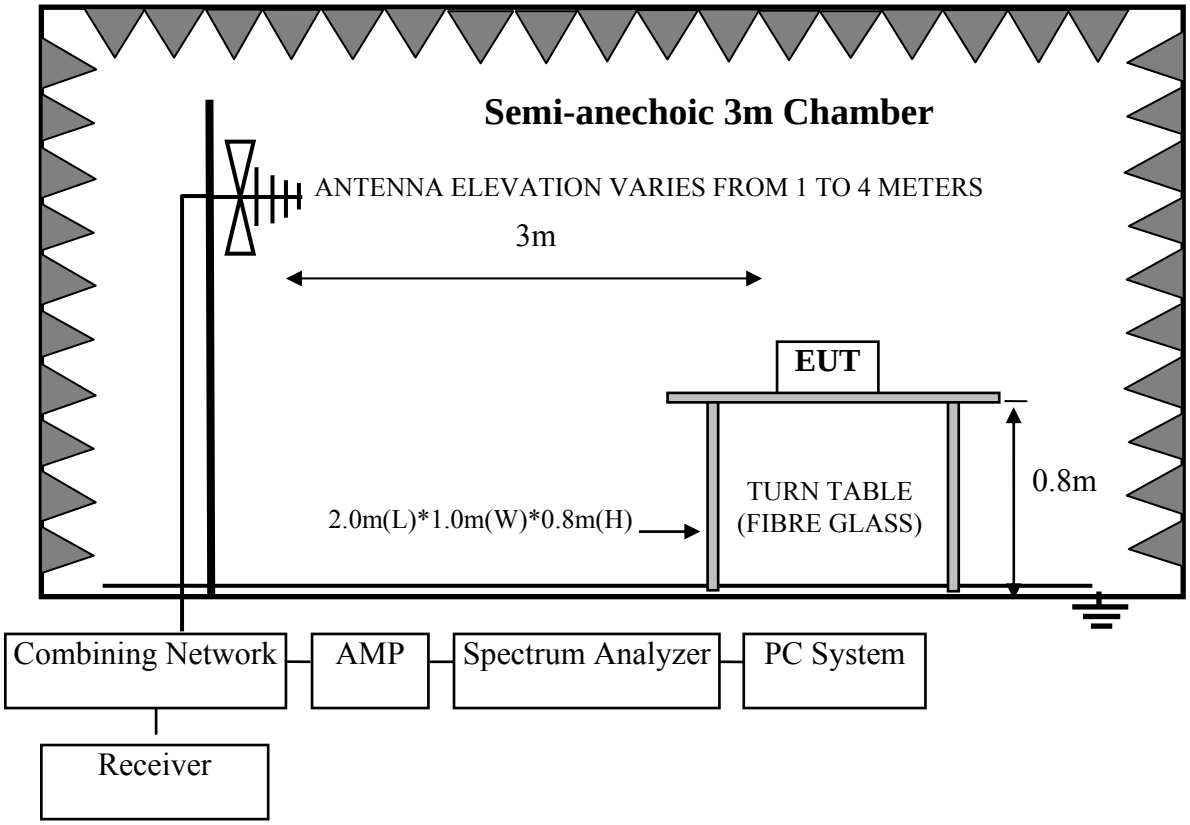
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	3#Chamber(NSA)	AUDIX	N/A	N/A	May.03,20	1 Year
2.	3#Chamber(SE)	AUDIX	N/A	N/A	May.17,18	3 Year
3.	Signal Analyzer	Rohde & Schwarz	FSV30	104050	Apr.11,20	1 Year
4.	EMI Test Receiver	Rohde & Schwarz	ESR7	101547	Apr.12,20	1 Year
5.	Amplifier	HP	8447D	2648A04738	Apr.11,20	1 Year
6.	Tri-log-Broadband Antenna	SCHWARZBECK	VULB 9168	710	Oct.19,20	1 Year
7.	NSA Cable	HUBER+SUHNER	CFD400NL-LW	No.3	Oct.11,20	1 Year
8.	Coaxial Switch	Anritsu	MP59B	6201397222	Apr.11,20	1 Year
9.	Test Software	AUDIX	e3	6.2009-5-21a(n)	N/A	N/A
Note: N/A means Not applicable.						

Frequency range: above 1000MHz

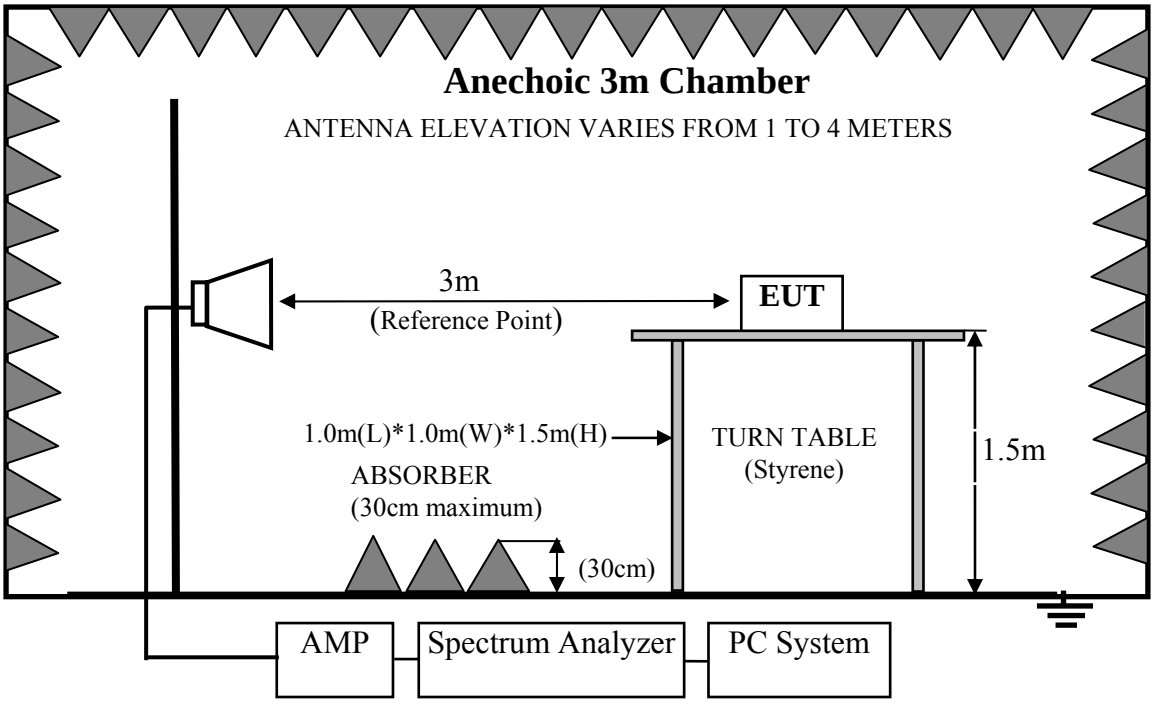
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	3#Chamber(Svswr)	AUDIX	N/A	N/A	Apr.15,20	1 Year
2.	3#Chamber(SE)	AUDIX	N/A	N/A	May.17,18	3 Year
3.	Signal Analyzer	Rohde & Schwarz	FSV30	104050	Apr.11,20	1 Year
4.	Horn Antenna	ETC	MCTD 1209	DRH15F03006	Jul.30,20	1 Year
5.	Horn Antenna	ETS	3116	00062639	Aug.06,20	1 Year
6.	Amplifier	Agilent	83017A	MY53270084	Oct.11,20	1 Year
7.	RF Cable	Hubersuhner	SUCOFLEX-106	505238/6	Apr.11,20	1 Year
8.	Test Software	AUDIX	e3	6.2009-5-21a(n)	N/A	N/A
Note: N/A means Not applicable.						

4.2. Block Diagram of Test Setup

For frequency range 30MHz-1000MHz



For frequency range 1GHz-25GHz



4.3. Radiated Emission Limit Standard:

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000MHz	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

Remark： (1) Emission level dBμV = 20 log Emission level μV/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

(4) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

4.4. EUT Configuration on Test

The following equipment are installed on Radiated Emission Test to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

4.4.1. WiFi module (EUT)

Model Number : U9W42 Y
Serial Number : N/A

4.5. Operating Condition of EUT

4.5.1. Setup the EUT and simulator as shown as Section 4.2.

4.5.2. Turn on the power of all equipments.

4.5.3. Let EUT work in BLE Tx mode.

4.6. Test Procedure

Frequency below 30MHz:

The EUT setup on the turn table which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna fixed to 1 m to find the maximum emission level. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground for frequency 30MHz~1000MHz, 1.5 meter high above ground for frequency above 1GHz and put the absorbing with 2.4m(L)*2.4m(W)*0.3m(H) on the ground . The turn table can rotate 360 degrees to determine the position of the maximum emission level. Power on the EUT and let it working in test mode, then test it.EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna for frequency 30MHz~1000MHz, and the Horm antenna is used as receiving antenna for frequency above 1GHz. Both horizontal and vertical polarization of the antenna is set on Test. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.10-2013 on radiated emission Test.

This test was performed with EUT in X, Y, Z position, and the worse case was found when EUT in X position as the test photo indicated.

The bandwidth of the EMI test receiver (R&S ESR7) is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's RBW is set at 1MHz and VBW is set at 3MHz for peak emissions measurement above 1GHz.

This device is pulse Modulated, a duty cycle factor was used to calculated average level based measured peak level.

The frequency range from 30MHz to 10th harmonic (25GHz) are checked. and no any emissions were found from 18GHz to 25 GHz, So the radiated emissions from 18GHz to 25GHz were not record.

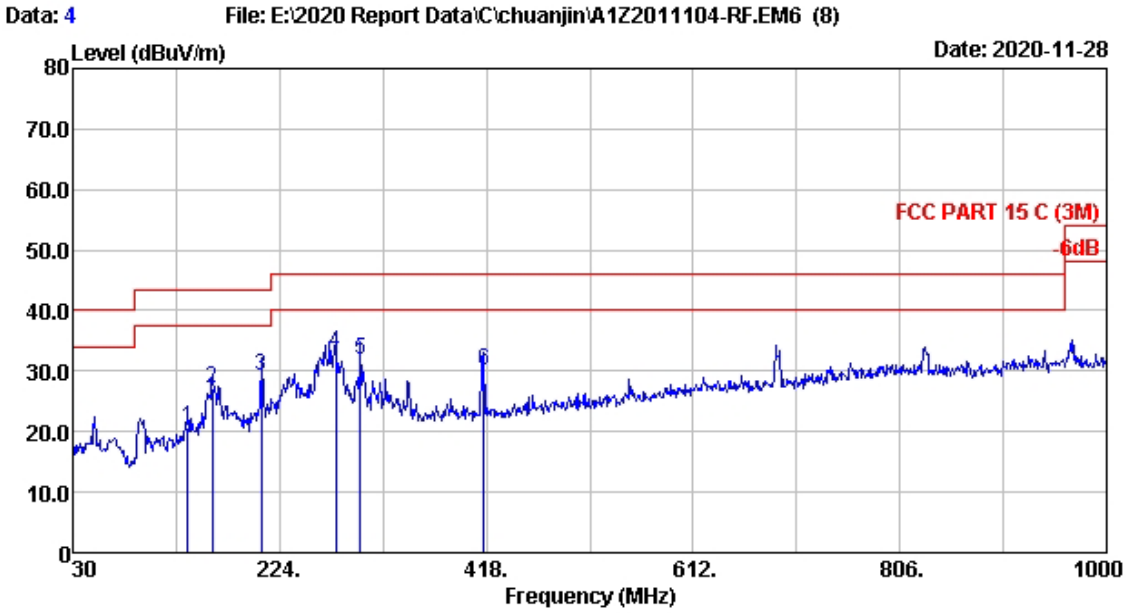
4.7. Radiated Emission Test Results

PASS.

All the emissions from 30MHz to 25GHz were complying with the 15.209 Limit.

Note: The duty cycle factor for calculate average level is -1.229dB for Bluetooth V4.0, The duty cycle factor for calculate average level is -4.554dB for Bluetooth V5.0, and average limit is 20dB below peak limit, so if peak measured level comply with average limit, the average level was deemed to comply with average limit.

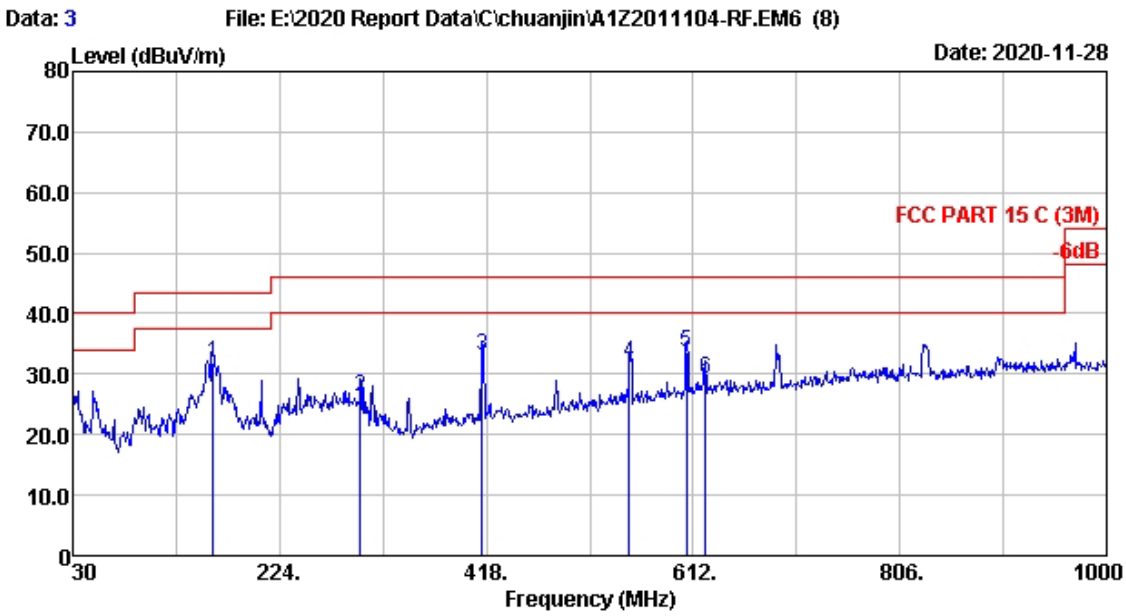
Frequency: 30MHz~1GHz
Bluetooth V4.0(1Mbps):



Site no. : 3m Chamber Data no. : 4
Dis. / Ant. : 3m 2020 VULB9168-710 Ant. pol. : HORIZONTAL
Limit : FCC PART 15 C (3M)
Env. / Ins. : 23.8*C/57% Engineer : The Shine
EUT :
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	137.670	18.60	1.18	0.76	20.54	43.50	22.96	QP
2	160.950	19.10	1.29	6.73	27.12	43.50	16.38	QP
3	206.540	15.50	1.49	12.25	29.24	43.50	14.26	QP
4	276.380	18.44	1.66	13.06	33.16	46.00	12.84	QP
5	299.660	19.10	1.74	11.05	31.89	46.00	14.11	QP
6	416.060	21.54	2.08	6.49	30.11	46.00	15.89	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

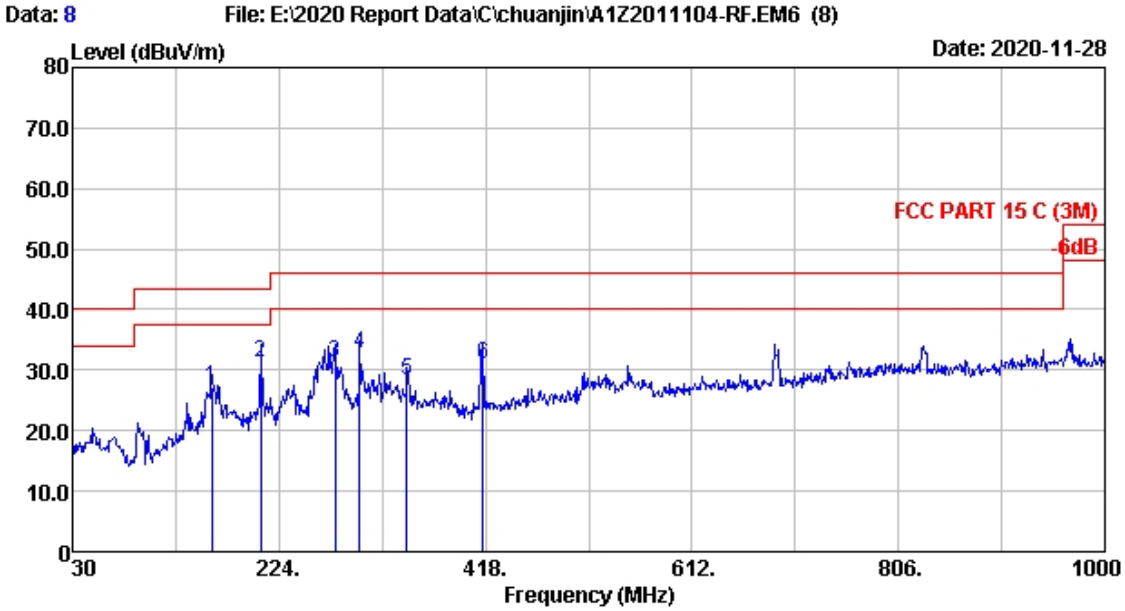


Site no. : 3m Chamber Data no. : 3
Dis. / Ant. : 3m 2020 VULB9168-710 Ant. pol. : VERTICAL
Limit : FCC PART 15 C (3M)
Env. / Ins. : 23.8*C/57% Engineer : The Shine
EUT :
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	161.920	19.10	1.29	11.47	31.86	43.50	11.64	QP
2	299.660	19.10	1.74	5.42	26.26	46.00	19.74	QP
3	414.120	21.48	2.07	9.47	33.02	46.00	12.98	QP
4	551.860	24.14	2.46	5.19	31.79	46.00	14.21	QP
5	606.180	25.36	2.58	5.59	33.53	46.00	12.47	QP
6	623.640	25.64	2.63	0.91	29.18	46.00	16.82	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

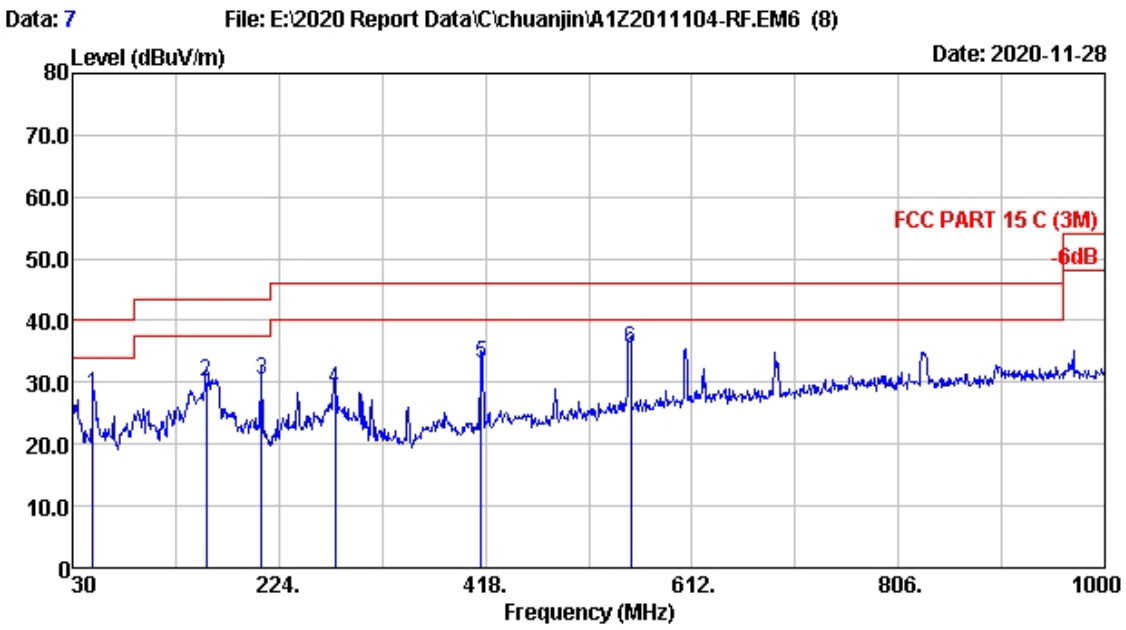
Bluetooth V5.0(2Mbps):



Site no. : 3m Chamber Data no. : 8
Dis. / Ant. : 3m 2020 VULB9168-710 Ant. pol. : HORIZONTAL
Limit : FCC PART 15 C (3M)
Env. / Ins. : 23.8*C/57% Engineer : The Shine
EUT :
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE-2M TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	160.950	19.10	1.29	6.73	27.12	43.50	16.38	QP
2	206.540	15.50	1.49	14.25	31.24	43.50	12.26	QP
3	276.380	18.44	1.66	11.06	31.16	46.00	14.84	QP
4	299.660	19.10	1.74	12.05	32.89	46.00	13.11	QP
5	344.280	19.90	1.87	6.54	28.31	46.00	17.69	QP
6	416.060	21.54	2.08	7.49	31.11	46.00	14.89	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

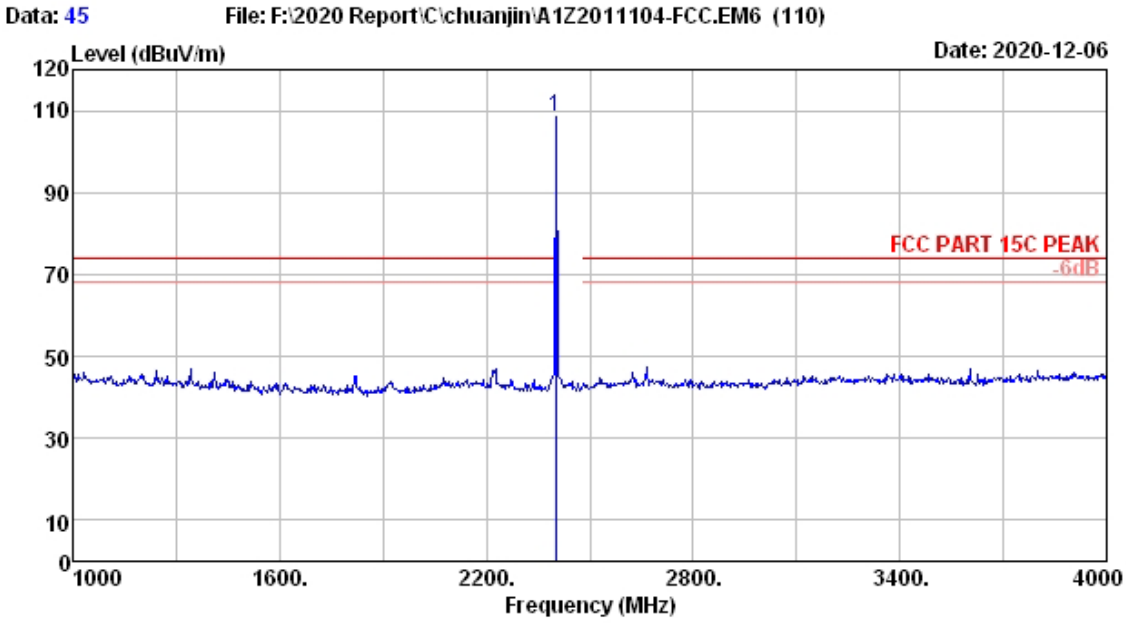


Site no. : 3m Chamber Data no. : 7
Dis. / Ant. : 3m 2020 VULB9168-710 Ant. pol. : VERTICAL
Limit : FCC PART 15 C (3M)
Env. / Ins. : 23.8*C/57% Engineer : The Shine
EUT :
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE-2M TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	49.400	19.70	0.74	7.61	28.05	40.00	11.95	QP
2	156.100	19.20	1.26	9.76	30.22	43.50	13.28	QP
3	207.510	15.50	1.50	13.36	30.36	43.50	13.14	QP
4	276.380	18.44	1.66	8.83	28.93	46.00	17.07	QP
5	414.120	21.48	2.07	9.47	33.02	46.00	12.98	QP
6	554.770	24.20	2.47	8.82	35.49	46.00	10.51	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

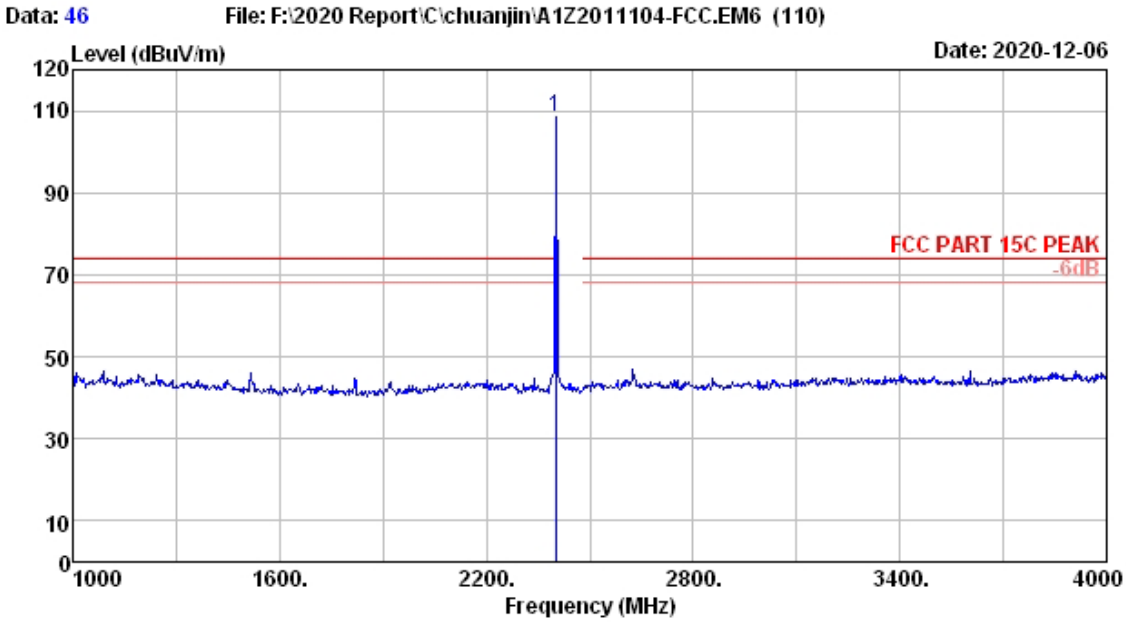
Frequency: 1GHz~18GHz
Bluetooth V4.0(1Mbps):



Site no. : 3m Chamber Data no. : 45
Dis. / Ant. : 3m 2020 MCTD1209-3006 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2402MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.000	28.01	0.92	113.06	33.48	108.51	------	------	Peak

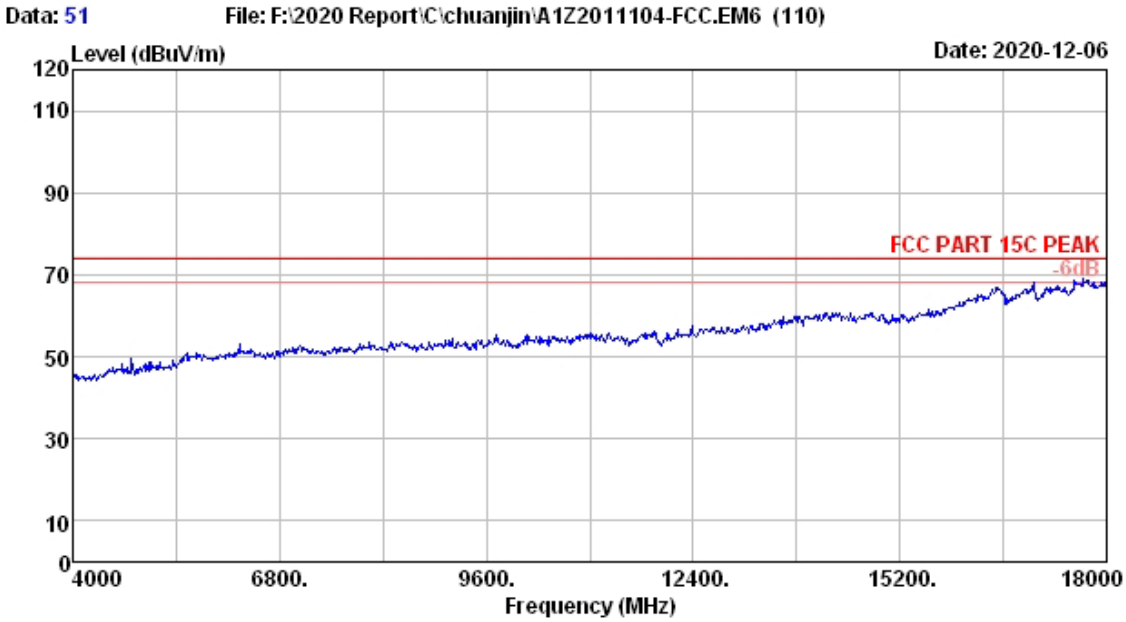
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



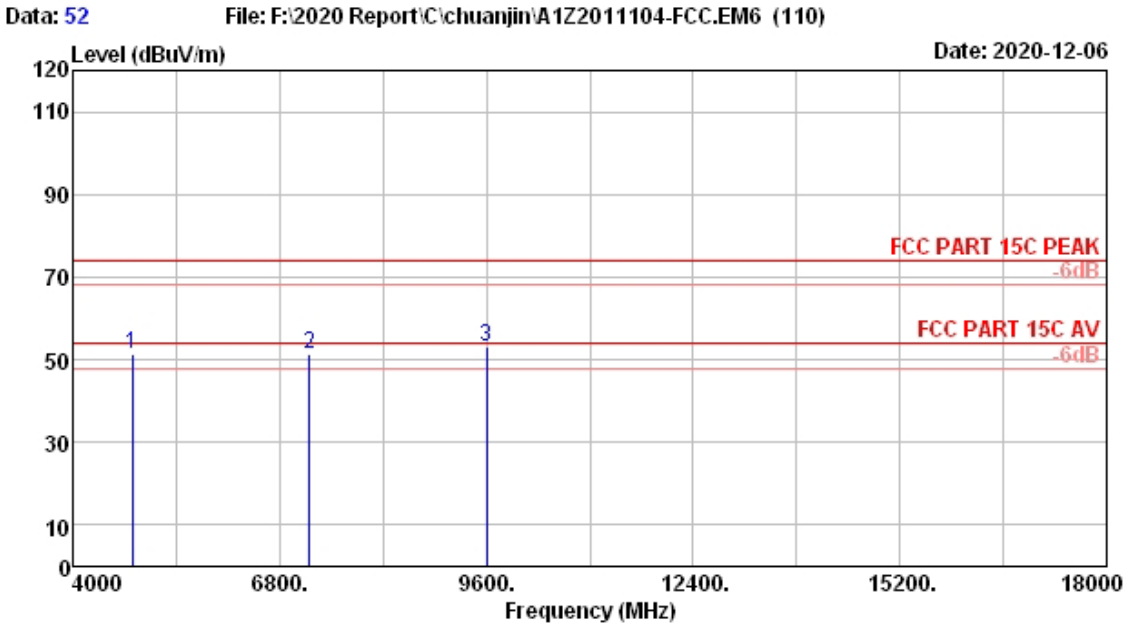
Site no. : 3m Chamber Data no. : 46
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2402MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.000	27.70	0.92	113.39	33.48	108.53	------	------	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



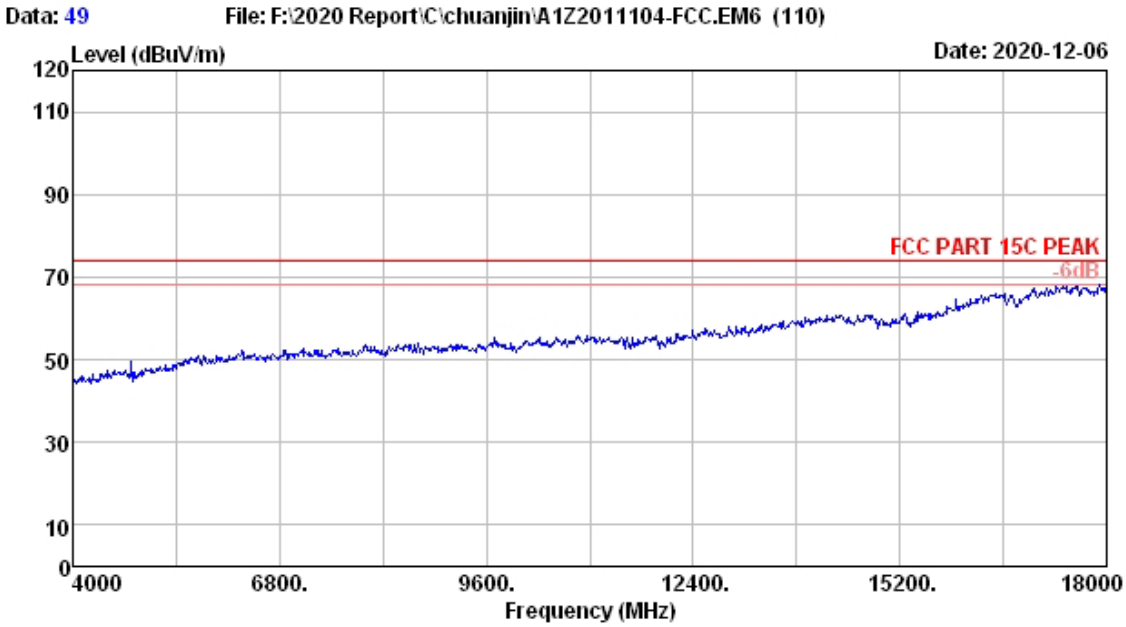
Site no.	: 3m Chamber	Data no.	: 51
Dis. / Ant.	: 3m 2019 MCTD1209-3007	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.4*C/52.9%	Engineer	: Lynn
Power rating	: DC 5V From Notebook Input AC 120V/60Hz		
Test Mode	: BLE 2402MHz Tx Mode		



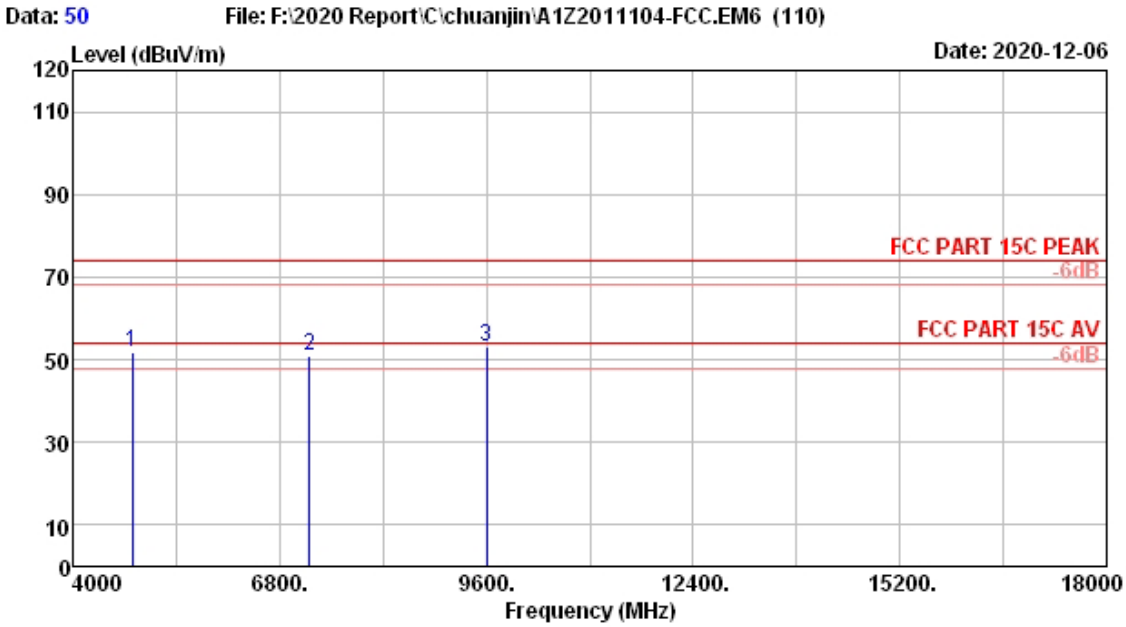
Site no. : 3m Chamber Data no. : 52
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2402MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	4804.000	31.70	1.38	51.62	33.18	51.52	74.00	22.48	Peak
2	7206.000	36.20	1.92	46.28	33.02	51.38	74.00	22.62	Peak
3	9608.000	37.70	2.16	46.76	33.52	53.10	74.00	20.90	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



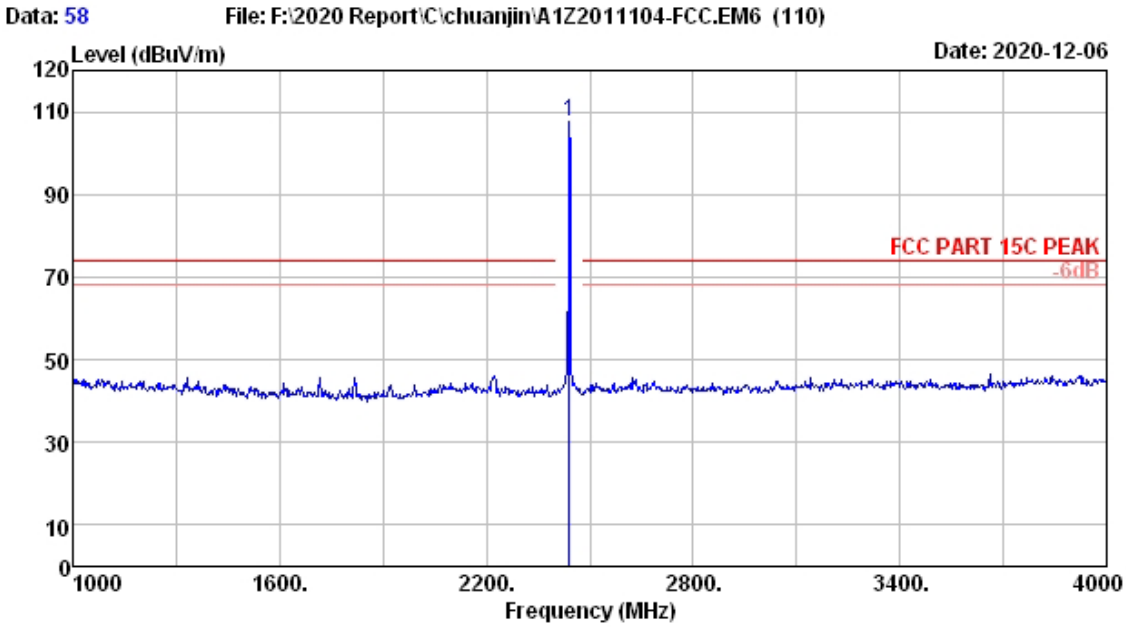

```
Site no.      : 3m Chamber                    Data no.   : 49
Dis. / Ant.   : 3m   2019 MCTD1209-3007       Ant. pol.  : VERTICAL
Limit         : FCC PART 15C PEAK
Env. / Ins.   : 23.4*C/52.9%                  Engineer   : Lynn
Power rating  : DC 5V From Notebook Input AC 120V/60Hz
Test Mode     : BLE 2402MHz Tx Mode
```



Site no. : 3m Chamber Data no. : 50
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2402MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	4804.000	31.70	1.38	51.73	33.18	51.63	74.00	22.37	Peak
2	7206.000	36.20	1.92	45.92	33.02	51.02	74.00	22.98	Peak
3	9608.000	37.70	2.16	46.93	33.52	53.27	74.00	20.73	Peak

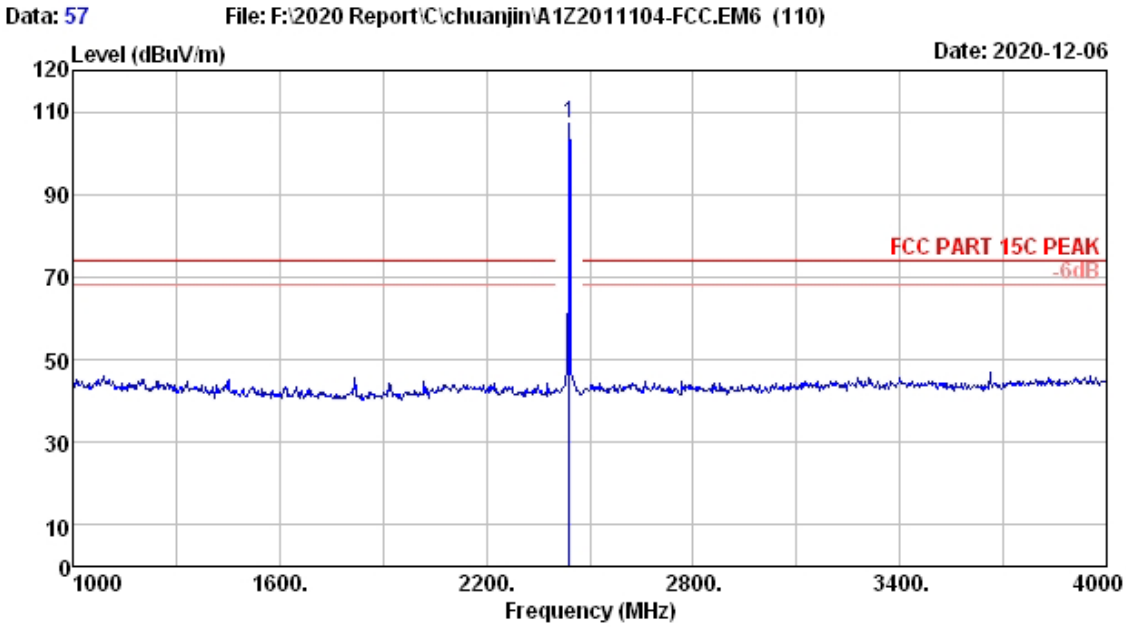
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 58
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2440MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2440.000	27.90	0.93	112.13	33.47	107.49	------	------	Peak

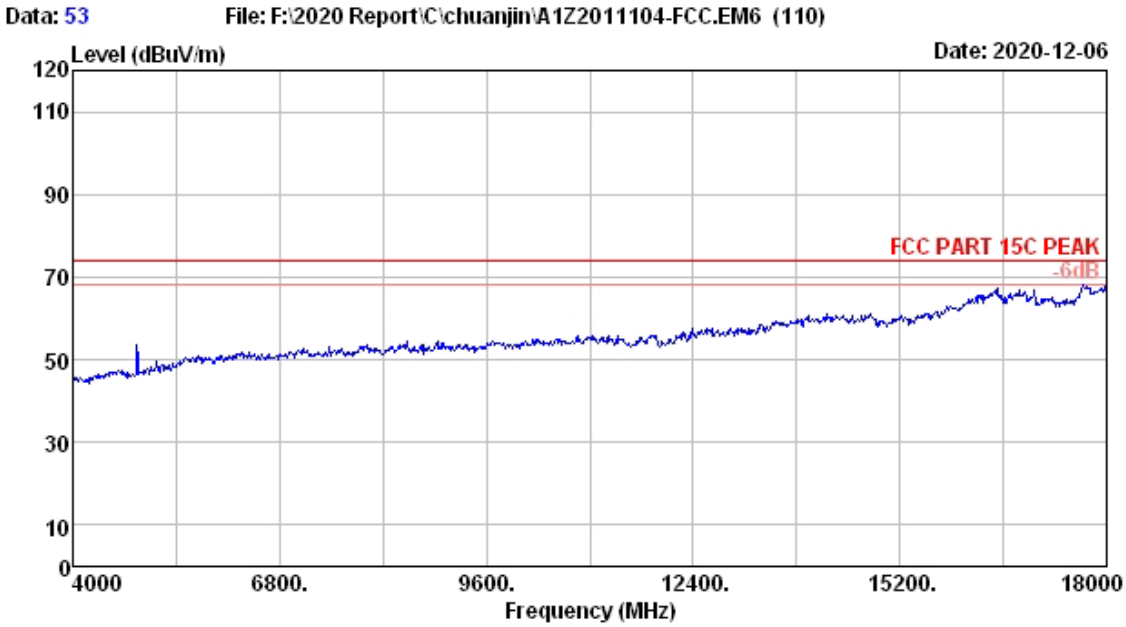
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



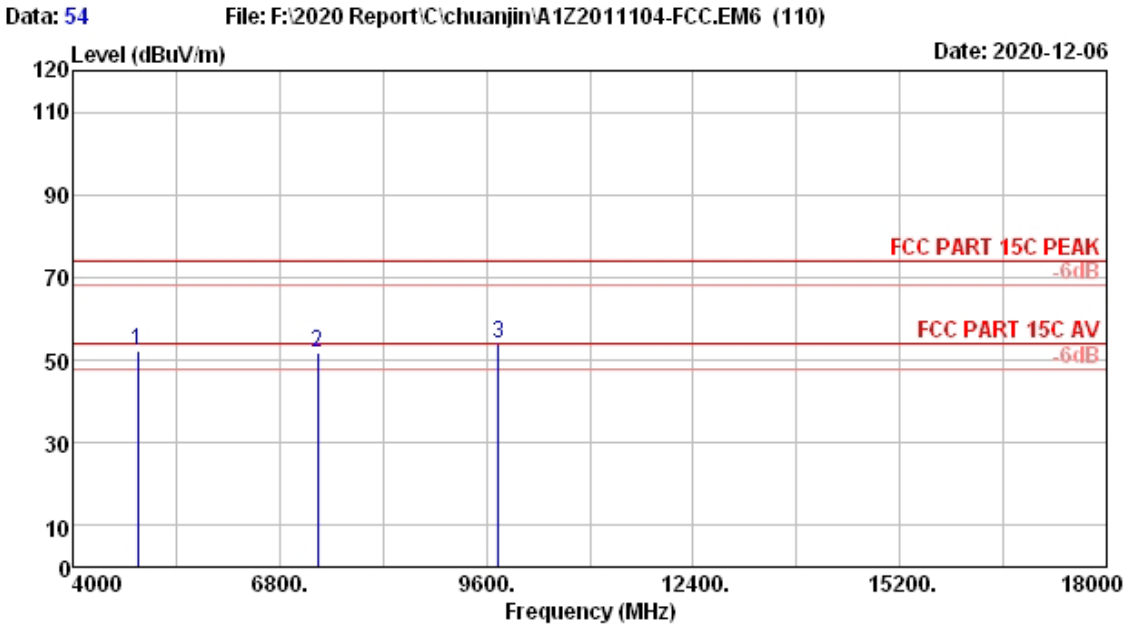
Site no. : 3m Chamber Data no. : 57
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2440MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2440.000	27.90	0.93	112.02	33.47	107.38	------	------	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



Site no.	: 3m Chamber	Data no.	: 53
Dis. / Ant.	: 3m 2019 MCTD1209-3007	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.4*C/52.9%	Engineer	: Lynn
Power rating	: DC 5V From Notebook Input AC 120V/60Hz		
Test Mode	: BLE 2440MHz Tx Mode		

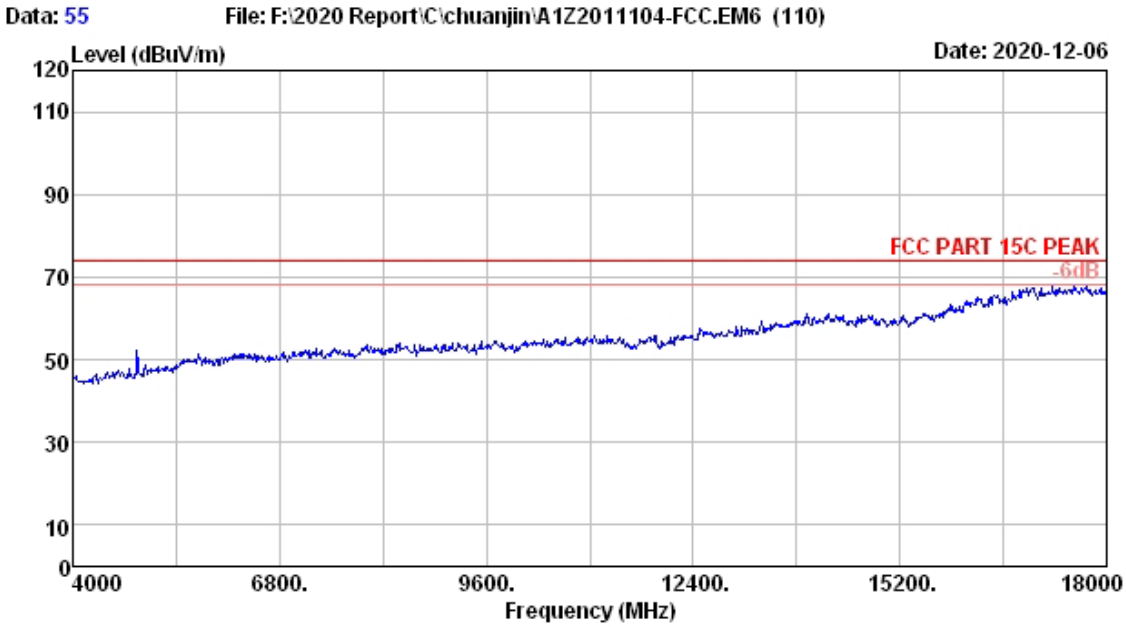


Site no. : 3m Chamber Data no. : 54
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2440MHz Tx Mode

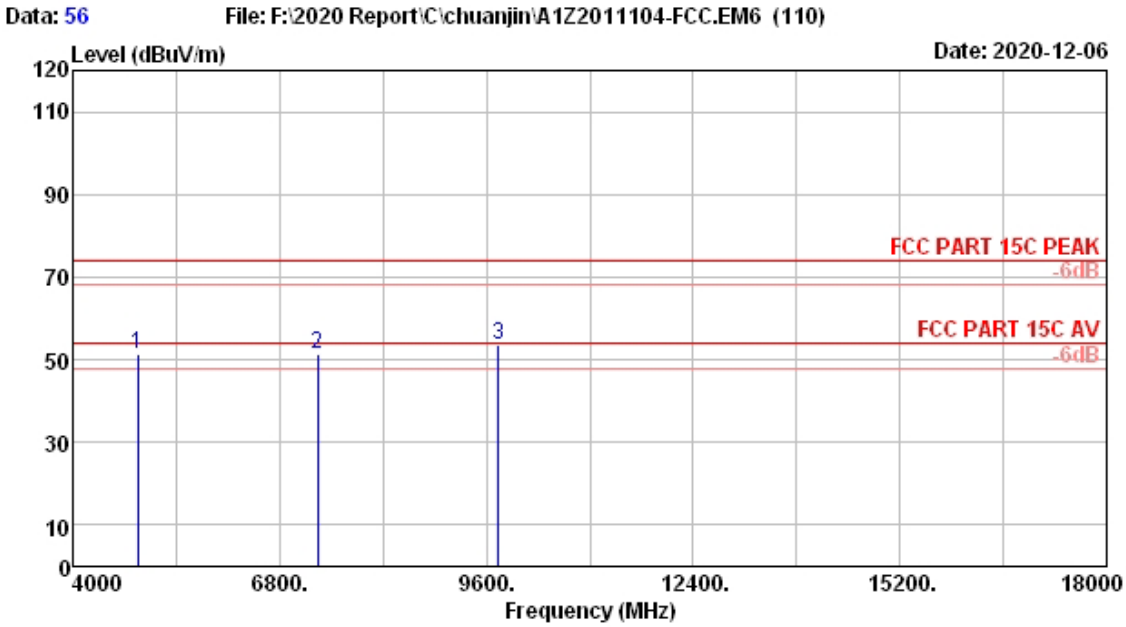
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	4880.000	32.02	1.39	51.84	33.19	52.06	74.00	21.94	Peak
2	7320.000	36.28	1.93	46.74	33.03	51.92	74.00	22.08	Peak
3	9760.000	37.80	2.18	47.67	33.55	54.10	74.00	19.90	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.

Frequency（MHz）	Peak level（dBuv/m）	Duty cycle factor (dB)	AV level (dBuv/m)	Limit(dBuv/m)	Conclusion
9760.000	54.10	-1.229	52.871	54	Pass
Note: The Duty cycle factor refer to the original report ACS-F20002.					



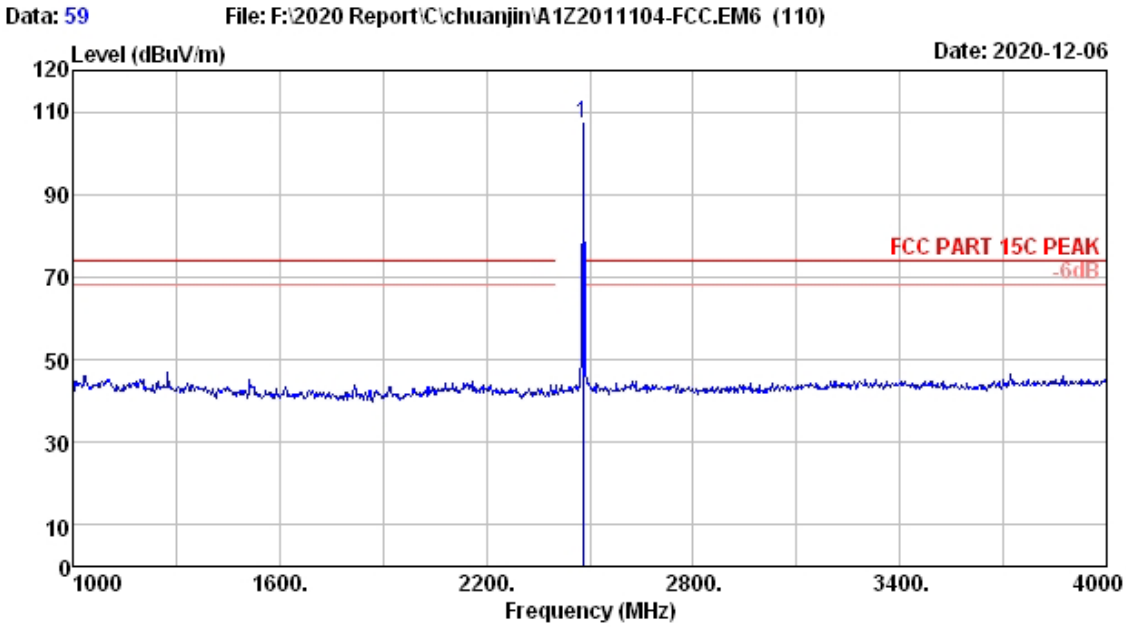
Site no.	: 3m Chamber	Data no.	: 55
Dis. / Ant.	: 3m 2019 MCTD1209-3007	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.4*C/52.9%	Engineer	: Lynn
Power rating	: DC 5V From Notebook Input AC 120V/60Hz		
Test Mode	: BLE 2440MHz Tx Mode		



Site no. : 3m Chamber Data no. : 56
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2440MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	4880.000	32.02	1.39	50.96	33.19	51.18	74.00	22.82	Peak
2	7320.000	36.28	1.93	46.04	33.03	51.22	74.00	22.78	Peak
3	9760.000	37.80	2.18	47.14	33.55	53.57	74.00	20.43	Peak

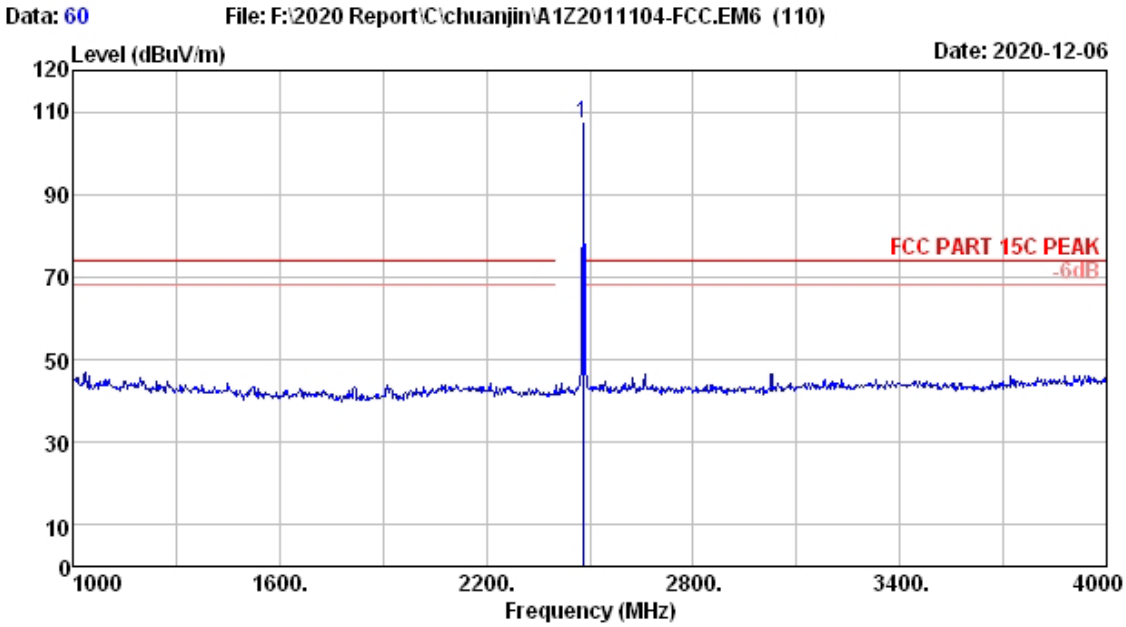
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 59
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2480MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.000	28.03	0.94	111.72	33.46	107.23	------	------	Peak

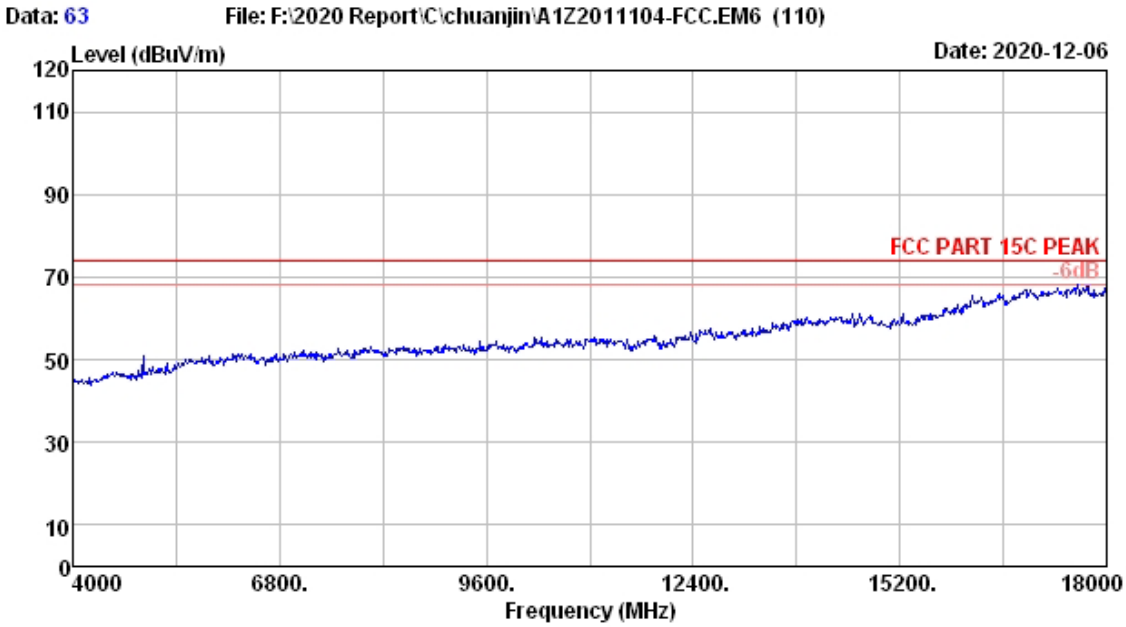
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



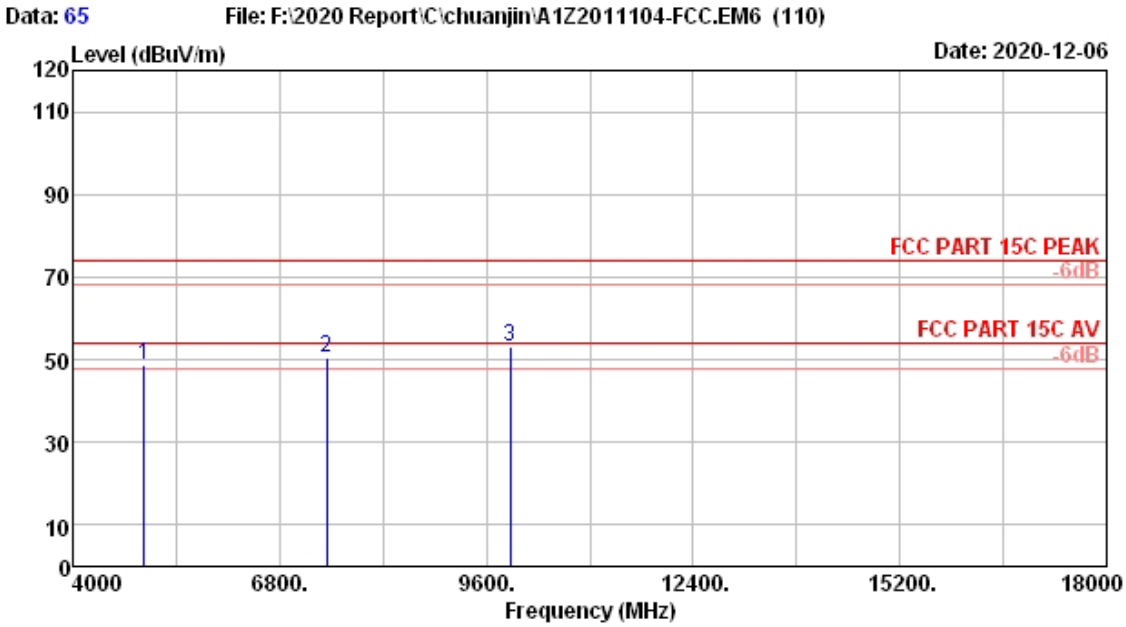
Site no. : 3m Chamber Data no. : 60
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2480MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.000	28.03	0.94	111.72	33.46	107.23	------	------	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



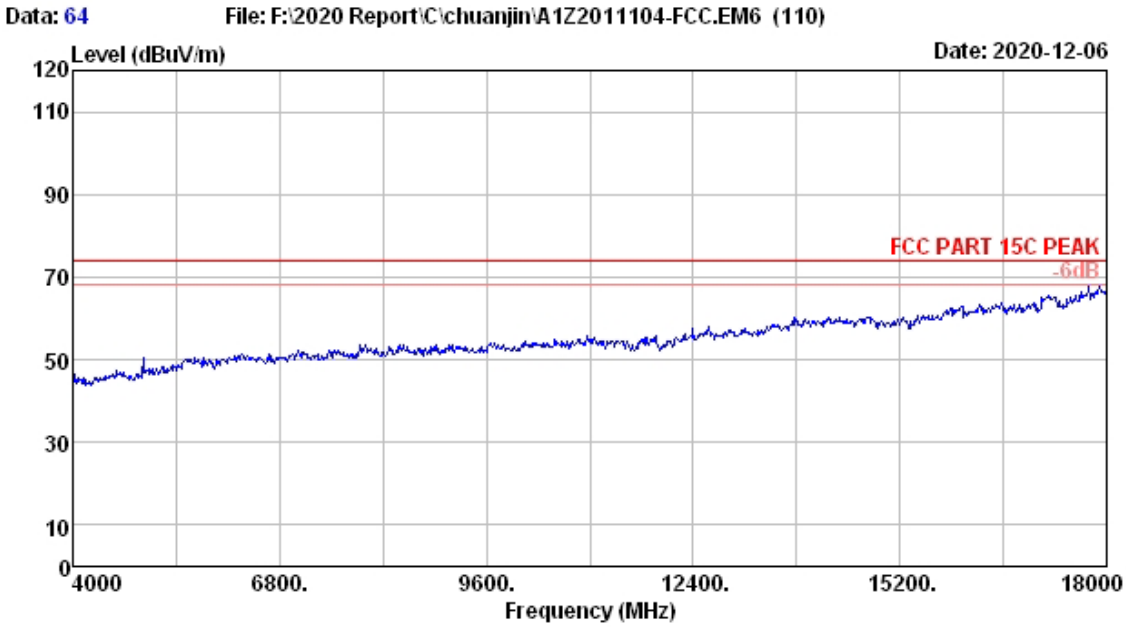
Site no.	: 3m Chamber	Data no.	: 63
Dis. / Ant.	: 3m 2019 MCTD1209-3007	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.4*C/52.9%	Engineer	: Lynn
Power rating	: DC 5V From Notebook Input AC 120V/60Hz		
Test Mode	: BLE 2480MHz Tx Mode		



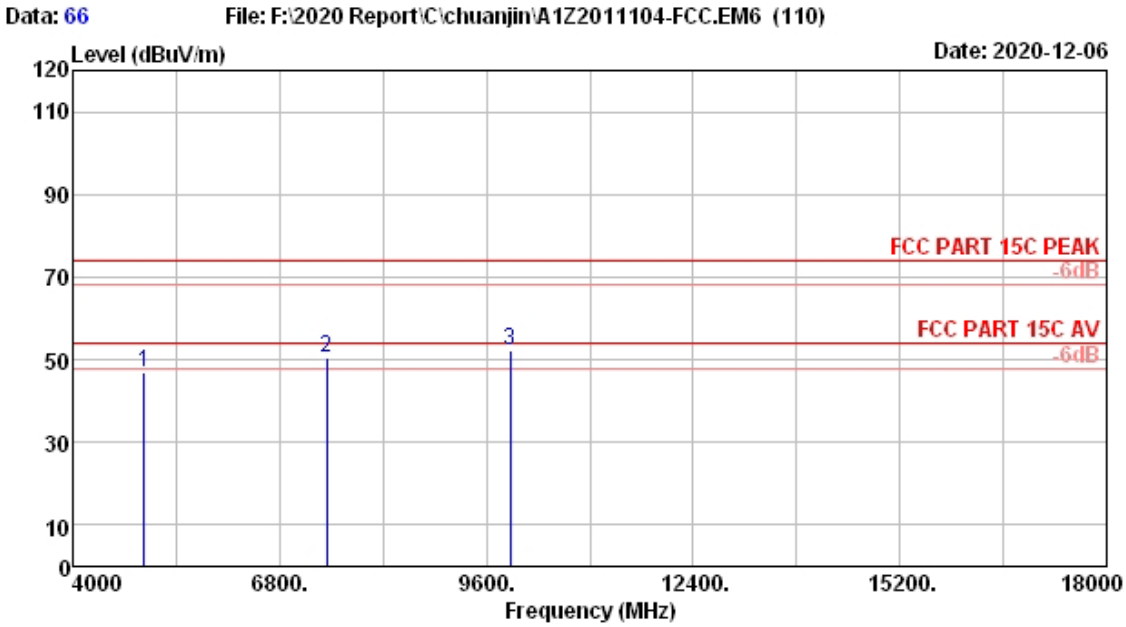
Site no. : 3m Chamber Data no. : 65
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2480MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	4960.000	32.70	1.39	47.81	33.20	48.70	74.00	25.30	Peak
2	7440.000	36.20	1.94	45.48	33.04	50.58	74.00	23.42	Peak
3	9920.000	37.70	2.19	46.75	33.59	53.05	74.00	20.95	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



Site no.	: 3m Chamber	Data no.	: 64
Dis. / Ant.	: 3m 2019 MCTD1209-3007	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.4*C/52.9%	Engineer	: Lynn
Power rating	: DC 5V From Notebook Input AC 120V/60Hz		
Test Mode	: BLE 2480MHz Tx Mode		

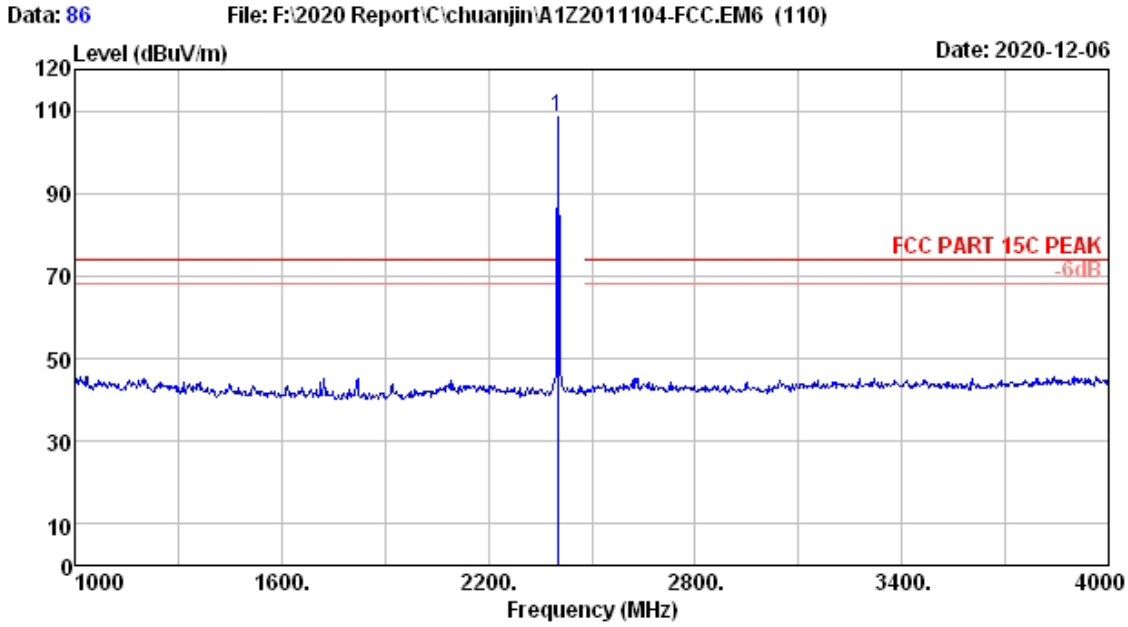


Site no. : 3m Chamber Data no. : 66
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2480MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	4960.000	32.70	1.39	46.18	33.20	47.07	74.00	26.93	Peak
2	7440.000	36.20	1.94	45.35	33.04	50.45	74.00	23.55	Peak
3	9920.000	37.70	2.19	45.96	33.59	52.26	74.00	21.74	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.

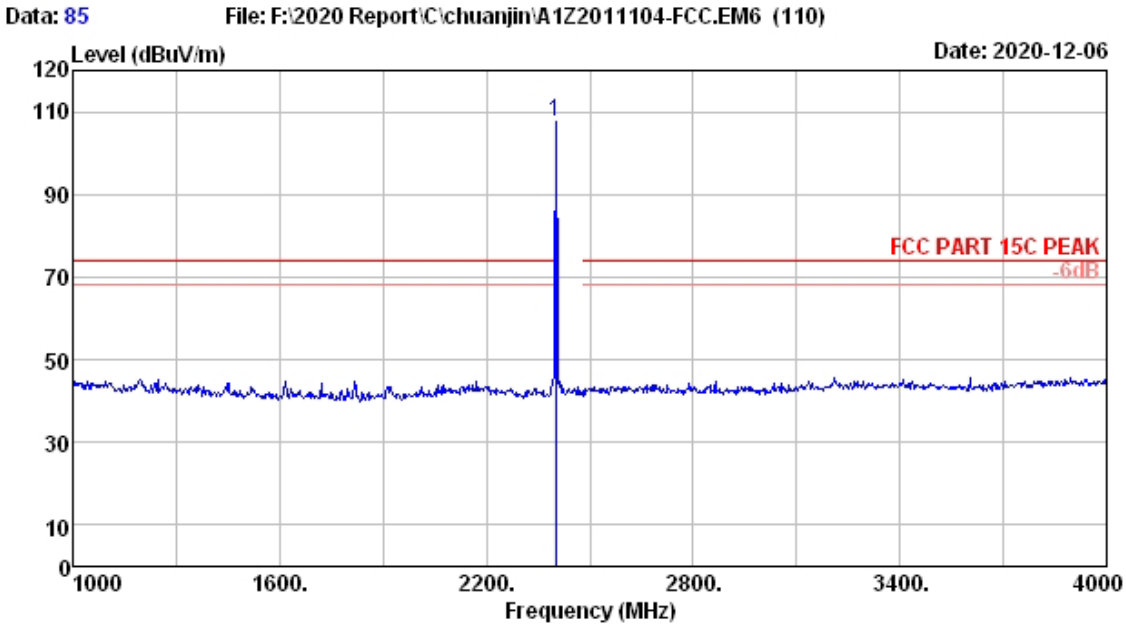
Bluetooth V5.0(2Mbps):



Site no. : 3m Chamber Data no. : 86
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2M 2402MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.000	27.70	0.92	113.27	33.48	108.41	------	------	Peak

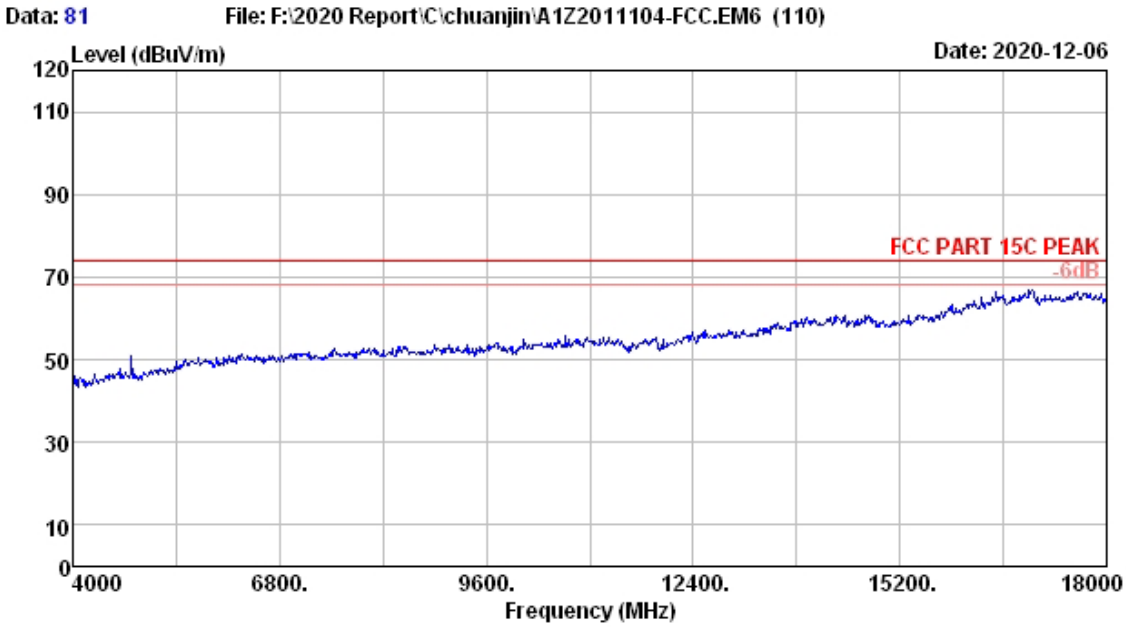
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



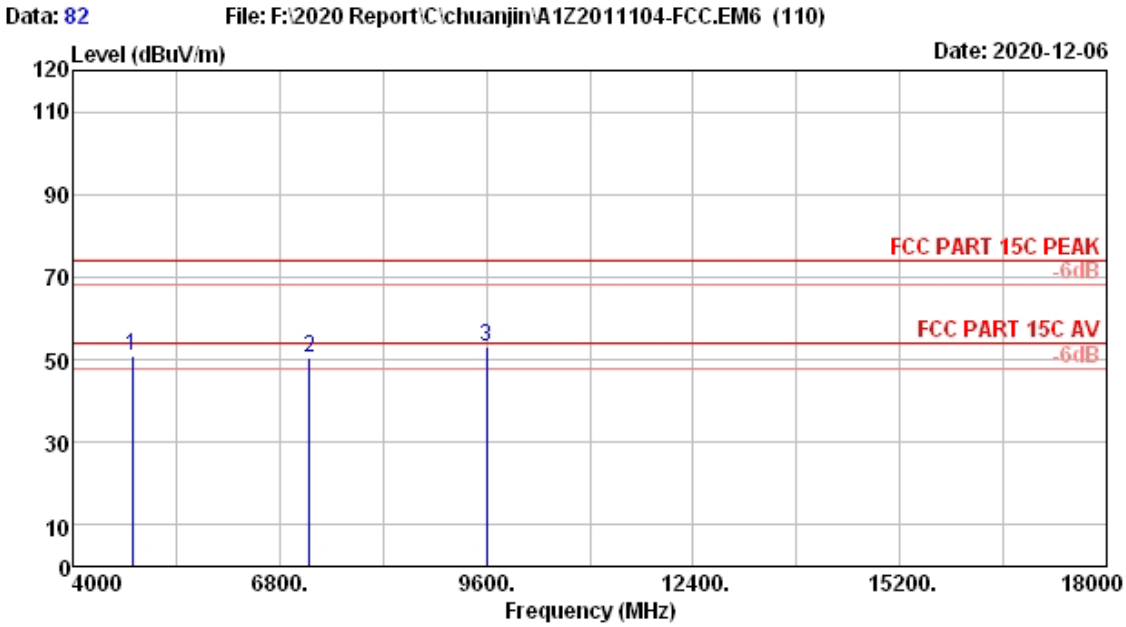
Site no. : 3m Chamber Data no. : 85
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2M 2402MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.000	27.70	0.92	112.44	33.48	107.58	------	------	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



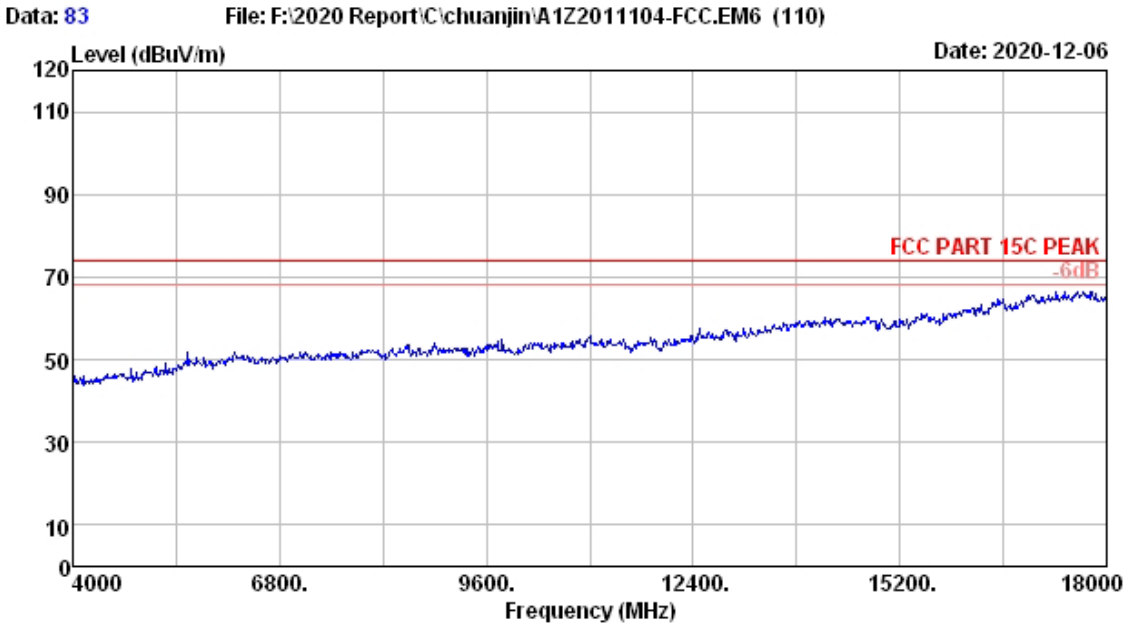
Site no.	: 3m Chamber	Data no.	: 81
Dis. / Ant.	: 3m 2019 MCTD1209-3007	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.4*C/52.9%	Engineer	: Lynn
Power rating	: DC 5V From Notebook Input AC 120V/60Hz		
Test Mode	: BLE 2M 2402MHz Tx Mode		



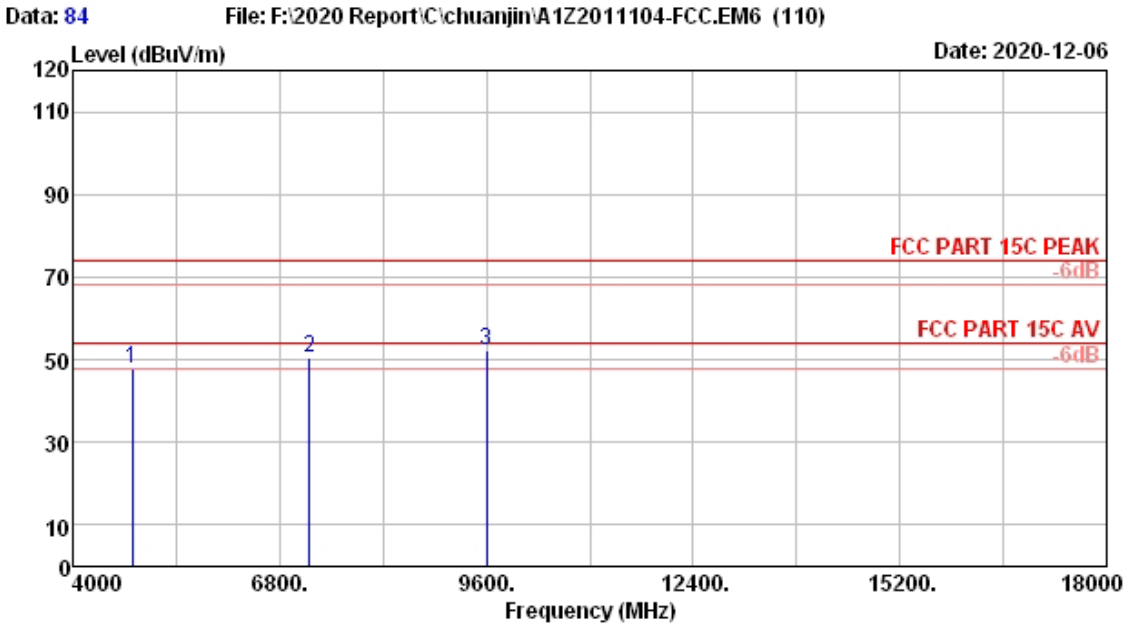
Site no. : 3m Chamber Data no. : 82
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2M 2402MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	4804.000	31.70	1.38	51.08	33.18	50.98	74.00	23.02	Peak
2	7206.000	36.20	1.92	45.30	33.02	50.40	74.00	23.60	Peak
3	9608.000	37.70	2.16	46.93	33.52	53.27	74.00	20.73	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



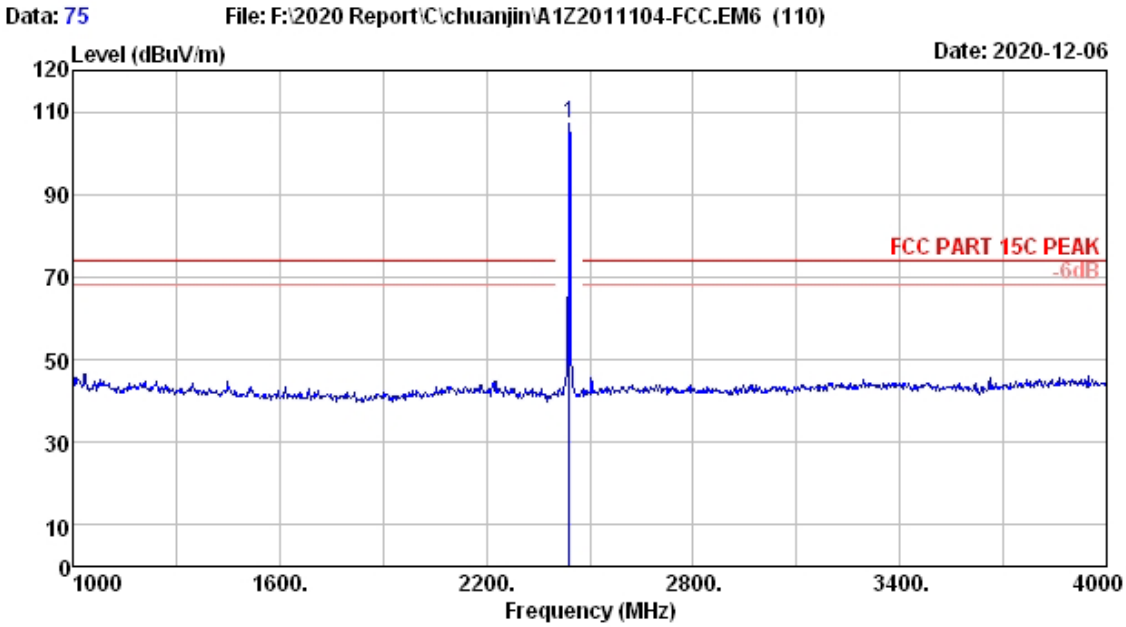
Site no.	: 3m Chamber	Data no.	: 83
Dis. / Ant.	: 3m 2019 MCTD1209-3007	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.4*C/52.9%	Engineer	: Lynn
Power rating	: DC 5V From Notebook Input AC 120V/60Hz		
Test Mode	: BLE 2M 2402MHz Tx Mode		



Site no. : 3m Chamber Data no. : 84
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2M 2402MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	4804.000	31.70	1.38	47.87	33.18	47.77	74.00	26.23	Peak
2	7206.000	36.20	1.92	45.26	33.02	50.36	74.00	23.64	Peak
3	9608.000	37.70	2.16	45.74	33.52	52.08	74.00	21.92	Peak

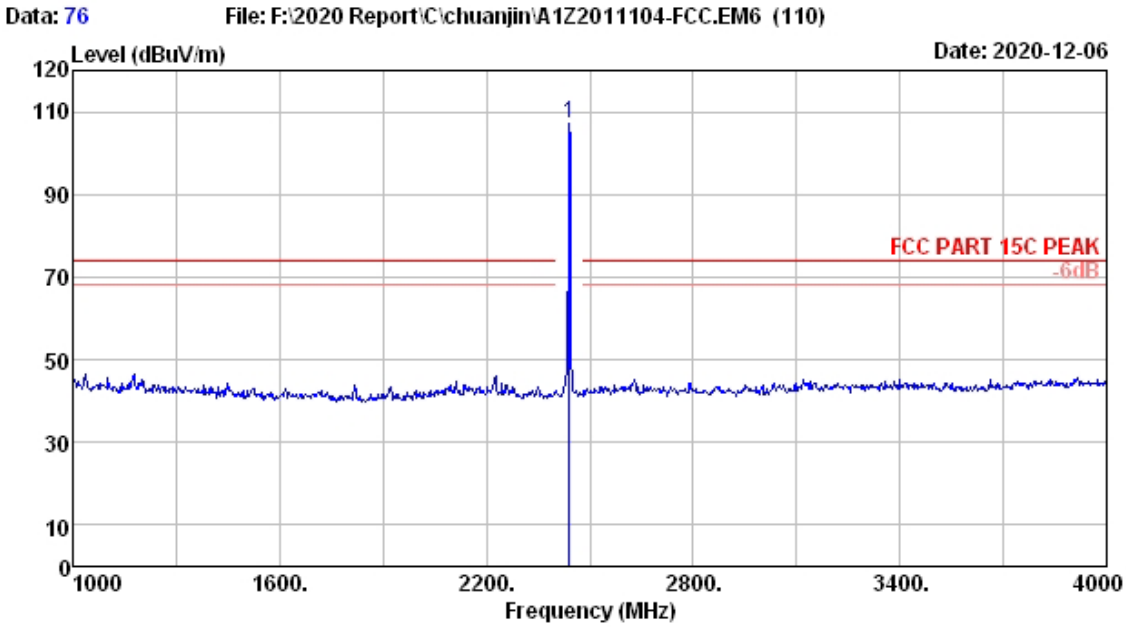
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 75
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2M 2440MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2440.000	27.90	0.93	111.80	33.47	107.16	------	------	Peak

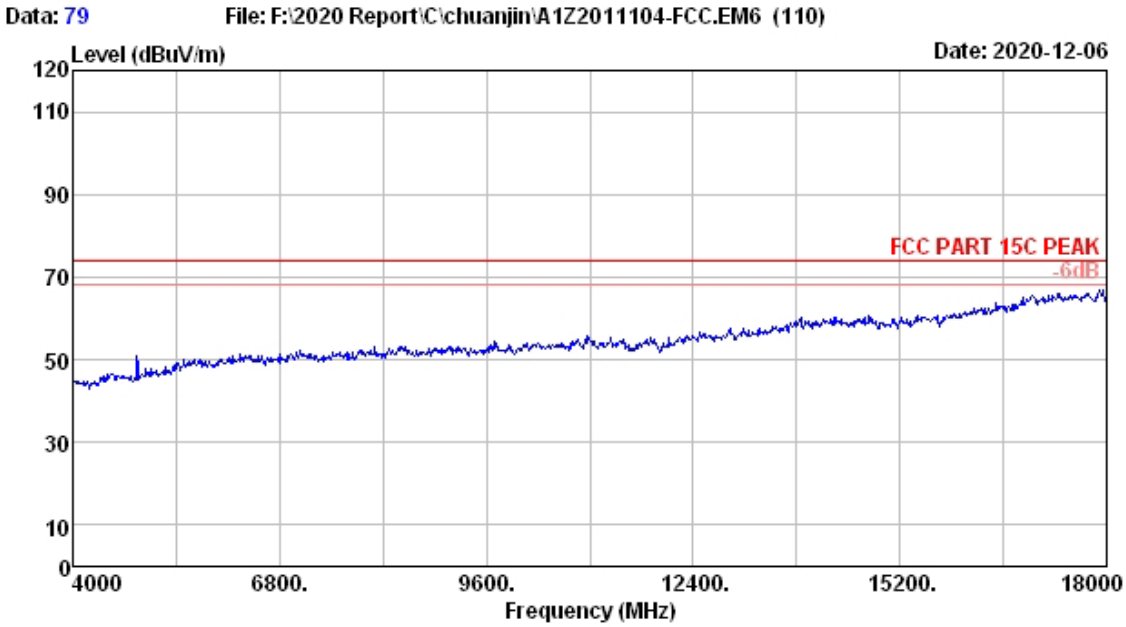
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



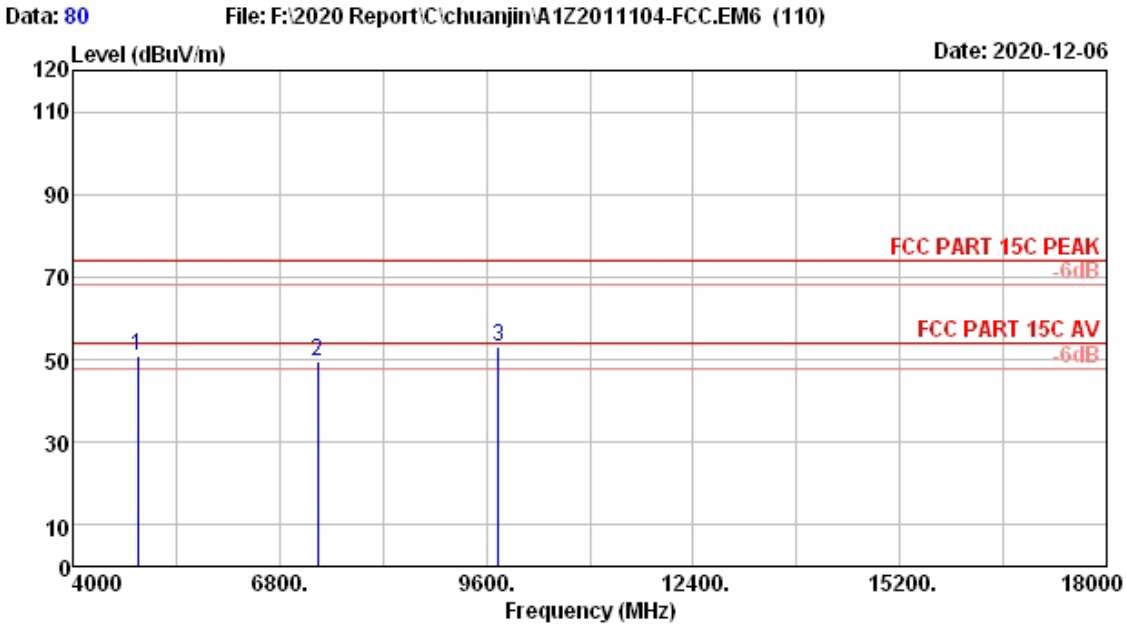
Site no. : 3m Chamber Data no. : 76
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2M 2440MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2440.000	27.90	0.93	111.69	33.47	107.05	------	------	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



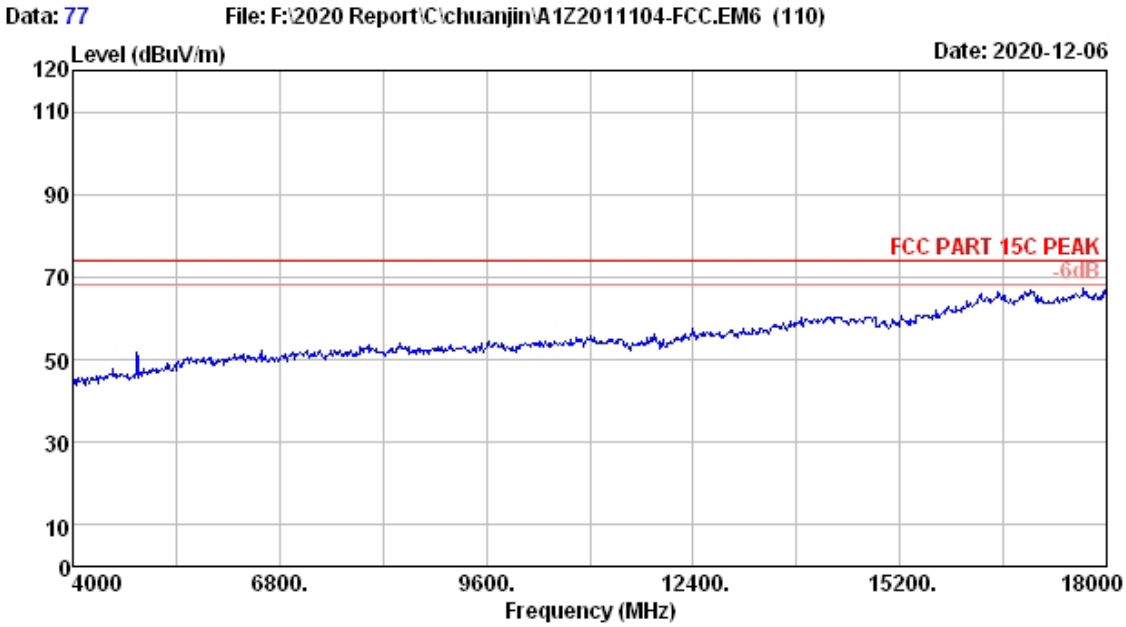
Site no.	: 3m Chamber	Data no.	: 79
Dis. / Ant.	: 3m 2019 MCTD1209-3007	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.4*C/52.9%	Engineer	: Lynn
Power rating	: DC 5V From Notebook Input AC 120V/60Hz		
Test Mode	: BLE 2M 2440MHz Tx Mode		



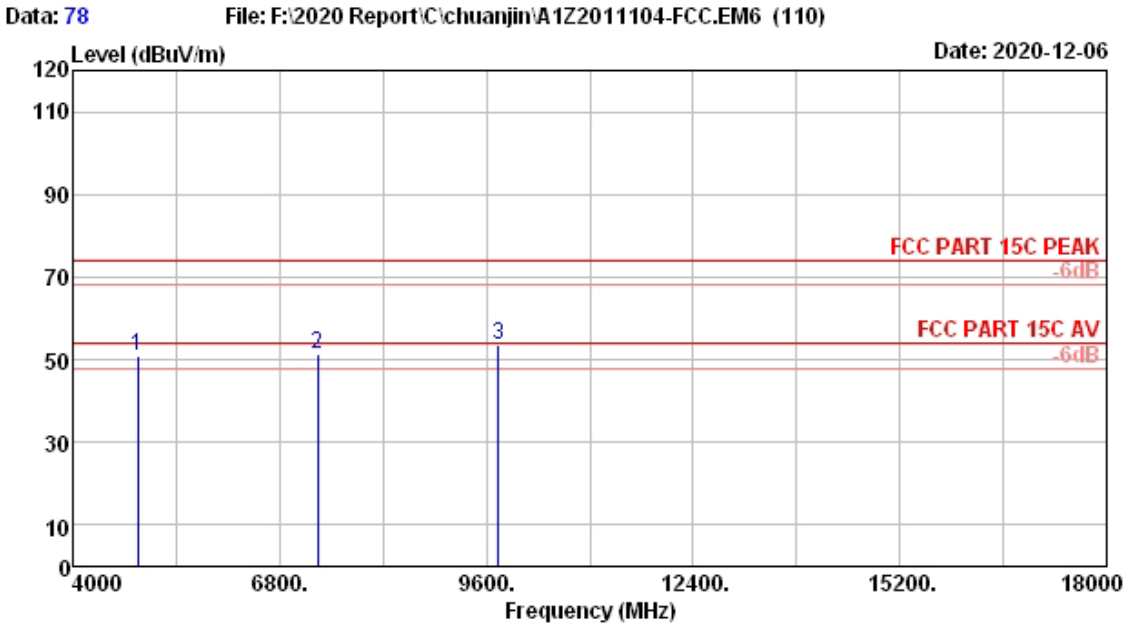
Site no. : 3m Chamber Data no. : 80
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2M 2440MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	4880.000	32.02	1.39	50.68	33.19	50.90	74.00	23.10	Peak
2	7320.000	36.28	1.93	44.63	33.03	49.81	74.00	24.19	Peak
3	9760.000	37.80	2.18	46.56	33.55	52.99	74.00	21.01	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



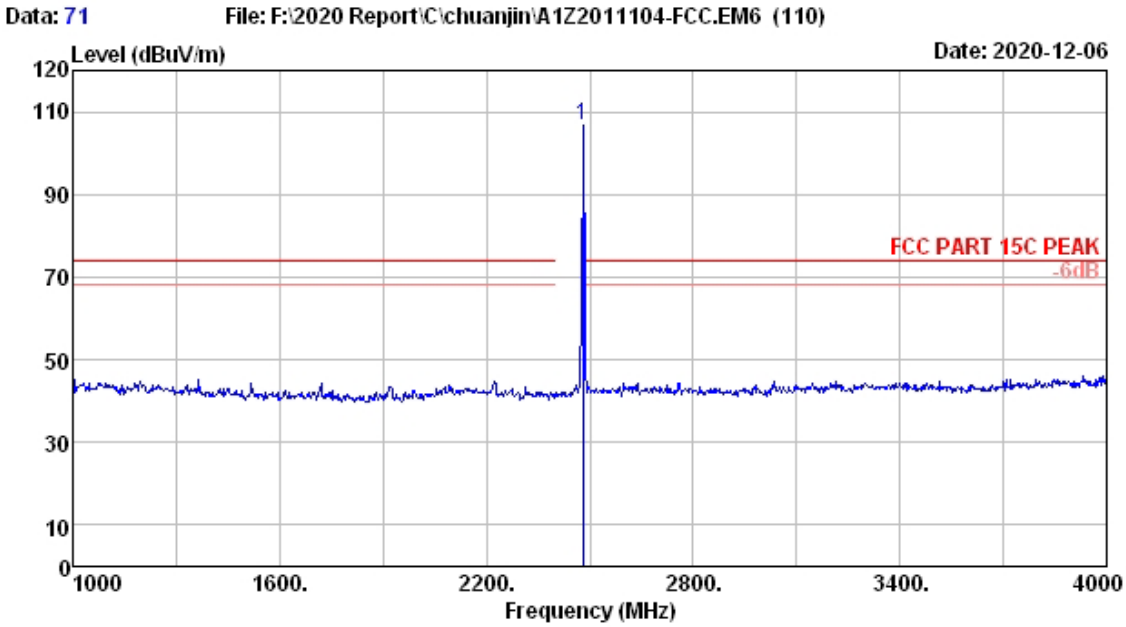
Site no.	: 3m Chamber	Data no.	: 77
Dis. / Ant.	: 3m 2019 MCTD1209-3007	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.4*C/52.9%	Engineer	: Lynn
Power rating	: DC 5V From Notebook Input AC 120V/60Hz		
Test Mode	: BLE 2M 2440MHz Tx Mode		



Site no. : 3m Chamber Data no. : 78
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2M 2440MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	4880.000	32.02	1.39	50.58	33.19	50.80	74.00	23.20	Peak
2	7320.000	36.28	1.93	46.15	33.03	51.33	74.00	22.67	Peak
3	9760.000	37.80	2.18	47.17	33.55	53.60	74.00	20.40	Peak

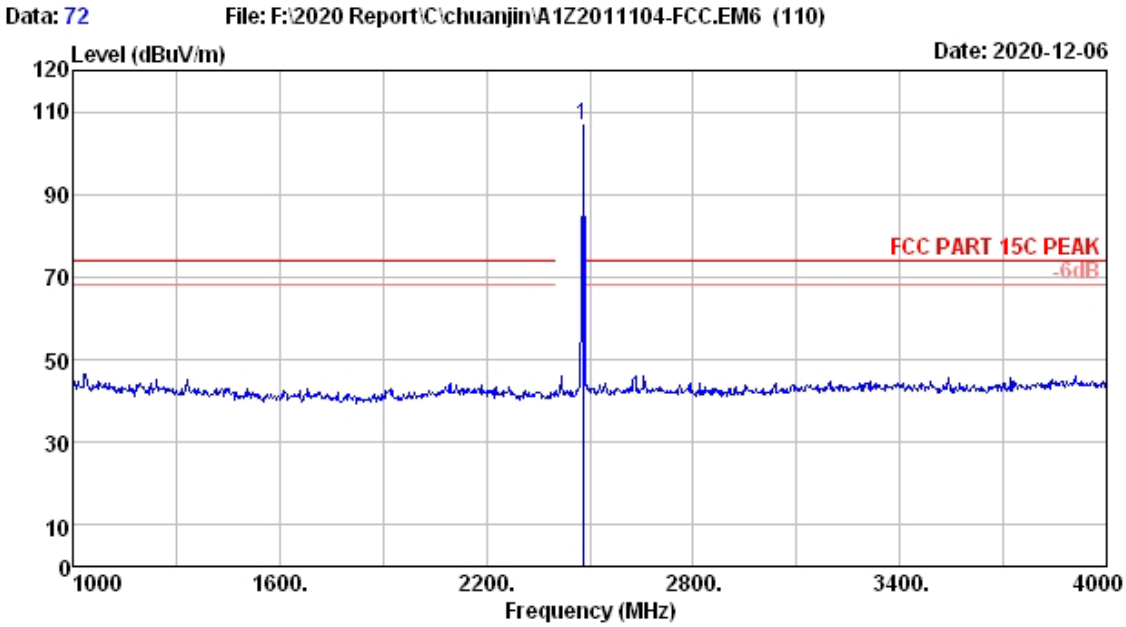
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 71
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2M 2480MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.000	28.03	0.94	111.34	33.46	106.85	------	------	Peak

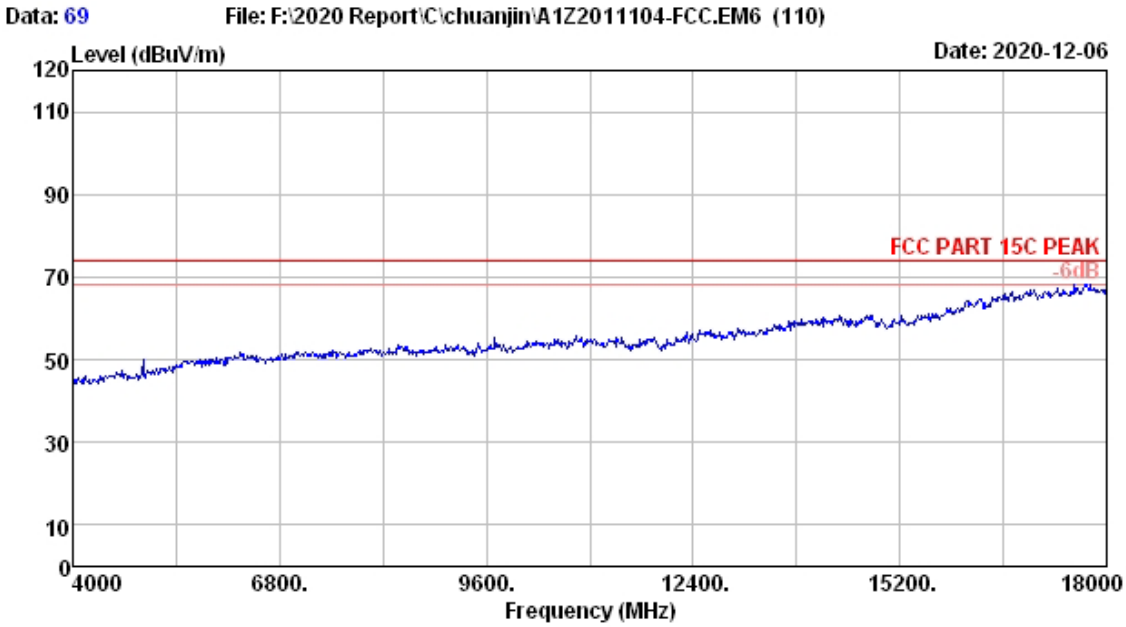
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



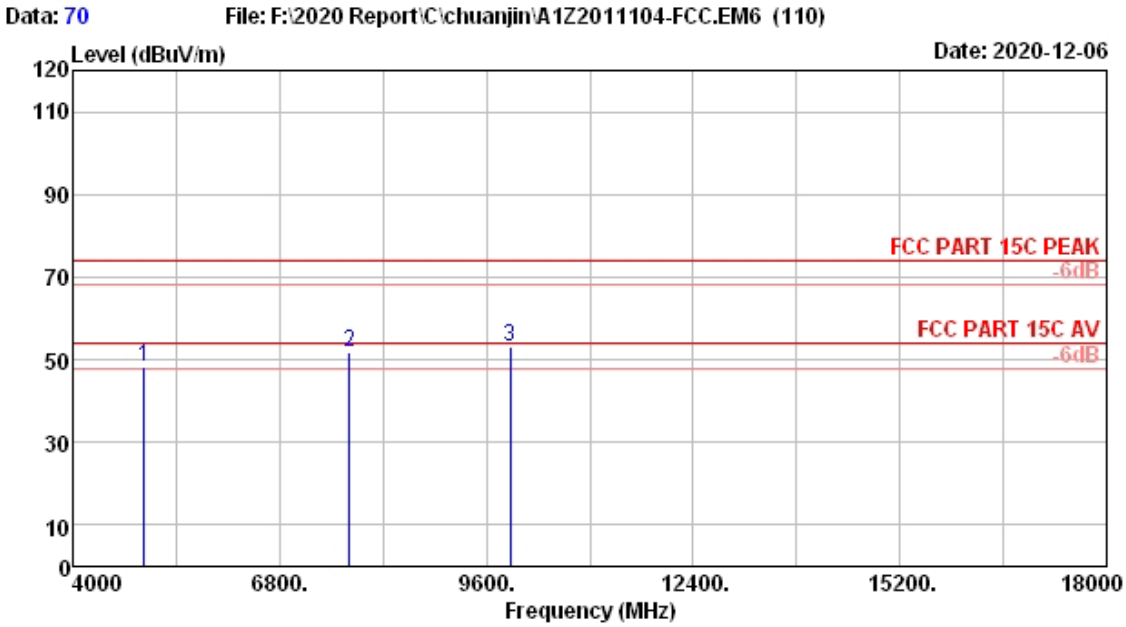
Site no. : 3m Chamber Data no. : 72
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2M 2480MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.000	28.03	0.94	111.17	33.46	106.68	------	------	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



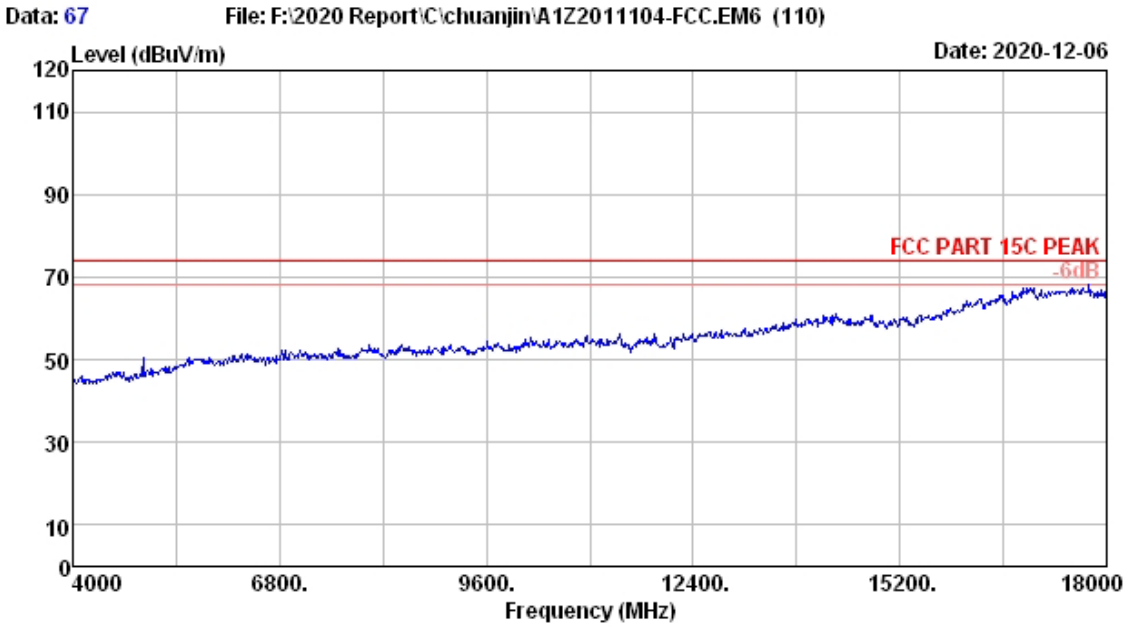
Site no.	: 3m Chamber	Data no.	: 69
Dis. / Ant.	: 3m 2019 MCTD1209-3007	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.4*C/52.9%	Engineer	: Lynn
Power rating	: DC 5V From Notebook Input AC 120V/60Hz		
Test Mode	: BLE 2M 2480MHz Tx Mode		



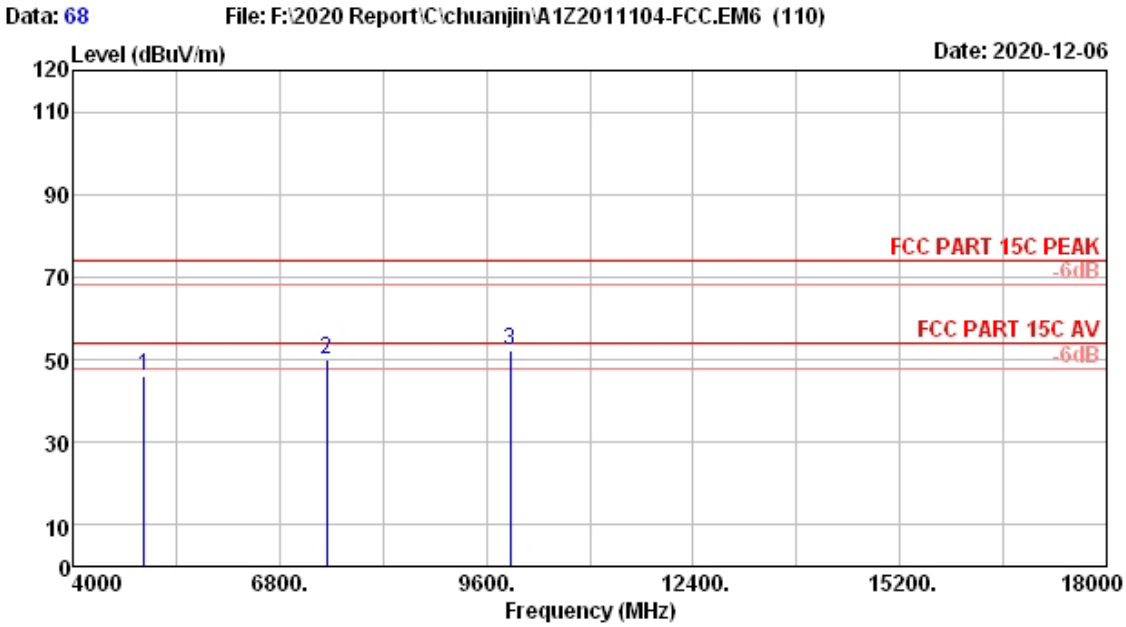
Site no. : 3m Chamber Data no. : 70
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2M 2480MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	4960.000	32.70	1.39	47.37	33.20	48.26	74.00	25.74	Peak
2	7740.000	36.70	1.98	46.19	33.07	51.80	74.00	22.20	Peak
3	9920.000	37.70	2.19	46.63	33.59	52.93	74.00	21.07	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.




```
Site no.      : 3m Chamber                    Data no.   : 67
Dis. / Ant.   : 3m   2019 MCTD1209-3007       Ant. pol.  : VERTICAL
Limit         : FCC PART 15C PEAK
Env. / Ins.   : 23.4*C/52.9%                  Engineer   : Lynn
Power rating  : DC 5V From Notebook Input AC 120V/60Hz
Test Mode     : BLE 2M 2480MHz Tx Mode
```



Site no. : 3m Chamber Data no. : 68
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2M 2480MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	4960.000	32.70	1.39	45.30	33.20	46.19	74.00	27.81	Peak
2	7440.000	36.20	1.94	45.03	33.04	50.13	74.00	23.87	Peak
3	9920.000	37.70	2.19	45.83	33.59	52.13	74.00	21.87	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.

5. MAXIMUM PEAK OUTPUT POWER TEST

5.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.12,20	1 Year
2.	Power meter	HP	436A	2016A07891	Apr 11,20	1 Year
3.	Power Sensor	Agilent	8482B	MY41090514	Apr.11,20	1 Year
4.	Amplifier	HP	8449B	3008A00836	Apr.11,20	1 Year
5.	RF Cable	EMCI	EMC102-KM-KM 3500	170702	Apr.12,20	1 Year

5.2. Limit

For systems using digital modulation in the 2400—2483.5MHz, The Peak out put Power shall not exceed 1W(30dBm).

5.3. Test Procedure

Use the test method descried in ANSI C63.10 clause 11.9.1.3:
Connected the EUT's antenna port to Power Sensor, and use power meter to test peak output power.

5.4. Test Results

EUT: WiFi module		
M/N: U9W42 Y		
Test date: 2020-11-27	Pressure: 102.3±1.0 kpa	Humidity: 53.6±3.0%
Tested by: Leo	Test site: RF site	Temperature: 25.5±0.6℃

Bluetooth V4.0(1Mbps):

Test Mode	Frequency (MHz)	Peak output Power (dBm)	Limit (dBm)
GFSK	2402	10.201	30
	2440	10.293	30
	2480	9.858	30
Conclusion: PASS			

Bluetooth V5.0(2Mbps):

Test Mode	Frequency (MHz)	Peak output Power (dBm)	Limit (dBm)
GFSK	2402	10.138	30
	2440	10.245	30
	2480	9.787	30
Conclusion: PASS			

6. BAND EDGE COMPLIANCE TEST

6.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.12,20	1 Year
2.	Amplifier	Agilent	8449B	3008A02495	Apr.11,20	1 Year
3.	Horn Antenna	ETC	MCTD 1209	DRH15F03006	Jul.30,20	3 Year
4.	RF Cable	EMCI	EMC102-KM-KM 3500	170702	Apr.12,20	1 Year

6.2. Limit

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

6.3. Test Produce

Use the test method descried in ANSI C63.10 clause 6.10:

For upper band emissions that are up to two bandwidths(2MHz) away (2483.5MHz to 2485.5MHz）from the band-edge use below produce:

1. Choose a spectrum analyzer span that encompasses both the peak of the fundamental emission and the band-edge emission under investigation. Set the analyzer RBW to 100KHz and with a video bandwidth 300KHz. Record the peak levels of the fundamental emission and the relevant band-edge emission, Observe the stored trace and measure the amplitude delta between the peak of the fundamental and the peak of the band-edge emission. This is not a field strength measurement, it is only a relative measurement to determine the amount by which the emission drops at the band edge relative to the highest fundamental emission level.
2. Subtract the delta measured in step (1) from the maximum field strengths measured in clause 4 .The resultant field strengths are then used to determine band-edge compliance as required by Section 15.205

   For emissions above two bandwidths away from the band-edge use below produce:

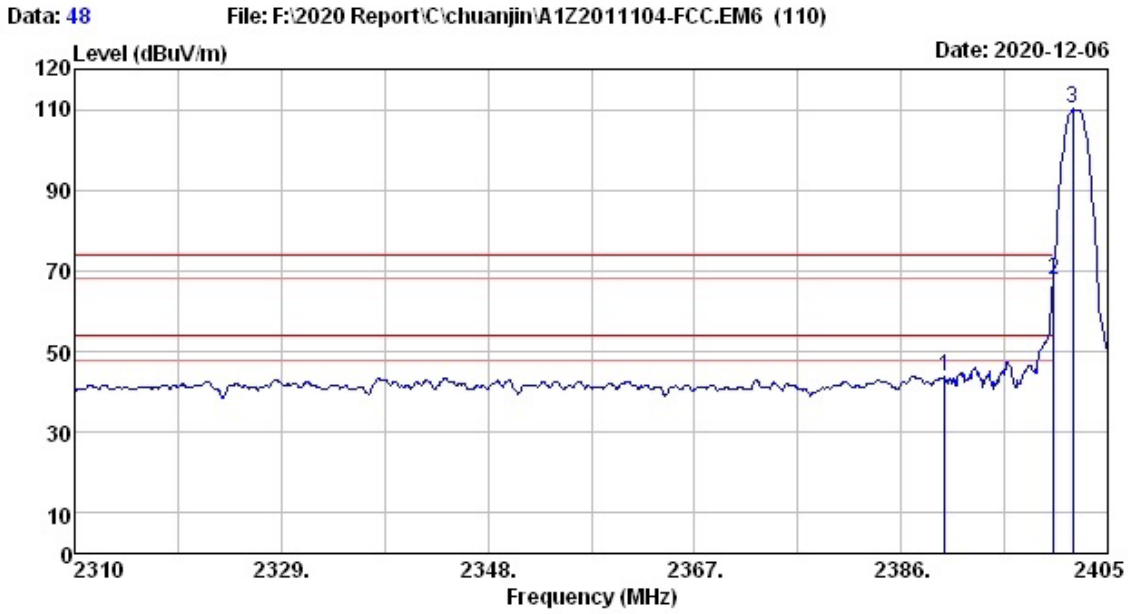
   1. The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.
   2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
   3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
   4. Set the spectrum analyzer in the following setting in order to capture the lower and upperband-edges of the emission:
      (a) PEAK: RBW=1MHz ;VBW=3MHz, PK detector, Sweep=AUTO
      (b) This is pulse Modulation device a duty cycle factor was used to calculate average level based measured peak level.

6.4. Test Results

Pass (The testing data was attached in the next pages.)

Note: If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

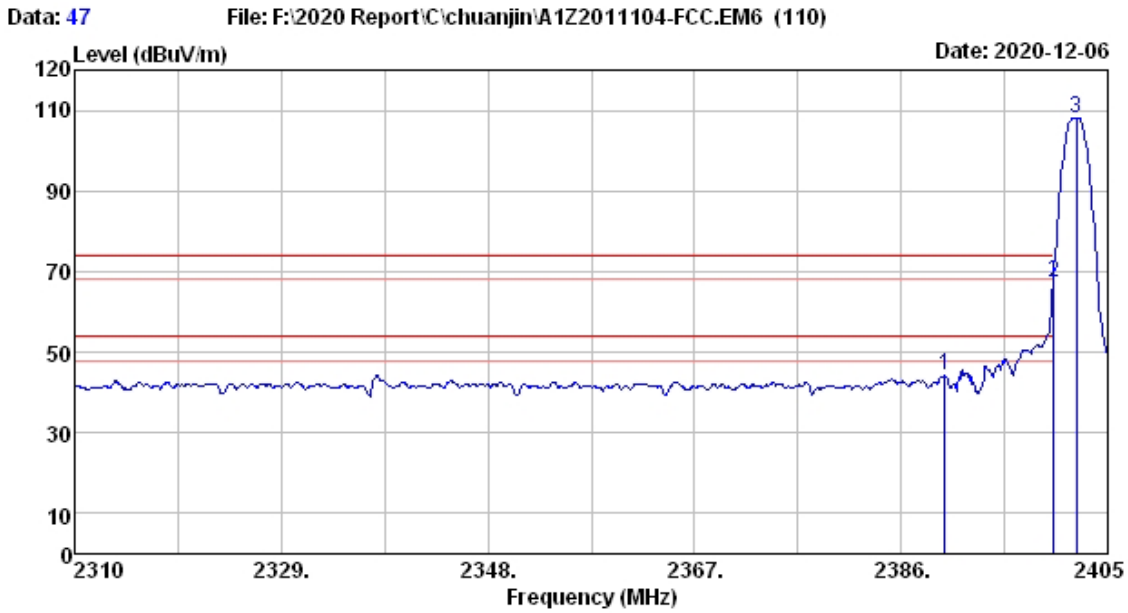
Bluetooth V4.0(1Mbps):



Site no. : 3m Chamber Data no. : 48
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2402MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	27.70	0.92	48.50	33.48	43.64	74.00	30.36	Peak
2	2400.000	27.70	0.92	72.56	33.48	67.70	74.00	6.30	Peak
3	2401.770	27.70	0.92	114.98	33.48	110.12	------	------	Peak

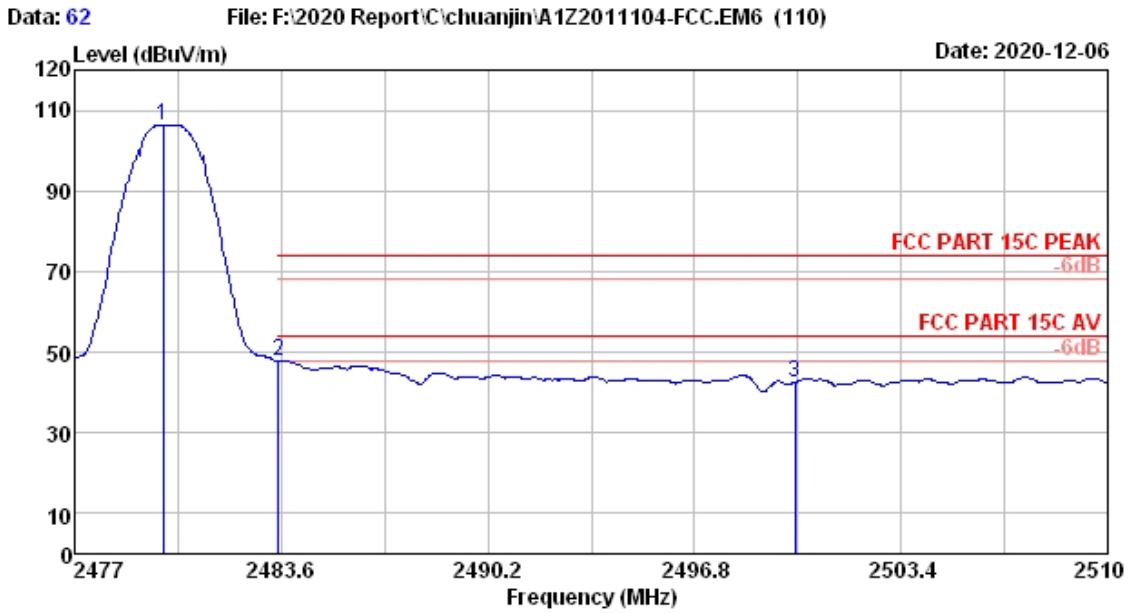
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 47
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2402MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	27.70	0.92	48.92	33.48	44.06	74.00	29.94	Peak
2	2400.000	27.70	0.92	71.95	33.48	67.09	74.00	6.91	Peak
3	2402.150	27.70	0.92	113.05	33.48	108.19	------	------	Peak

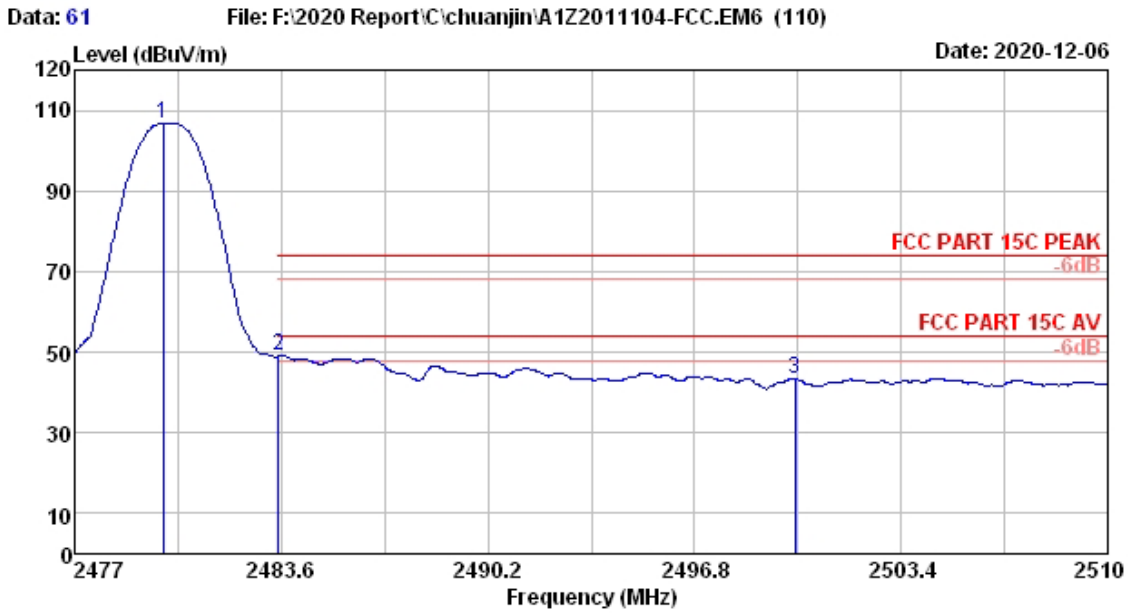
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 62
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2480MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2479.838	28.03	0.94	110.98	33.46	106.49	------	------	Peak
2	2483.500	28.03	0.94	52.23	33.46	47.74	74.00	26.26	Peak
3	2500.000	28.10	0.95	46.86	33.45	42.46	74.00	31.54	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.

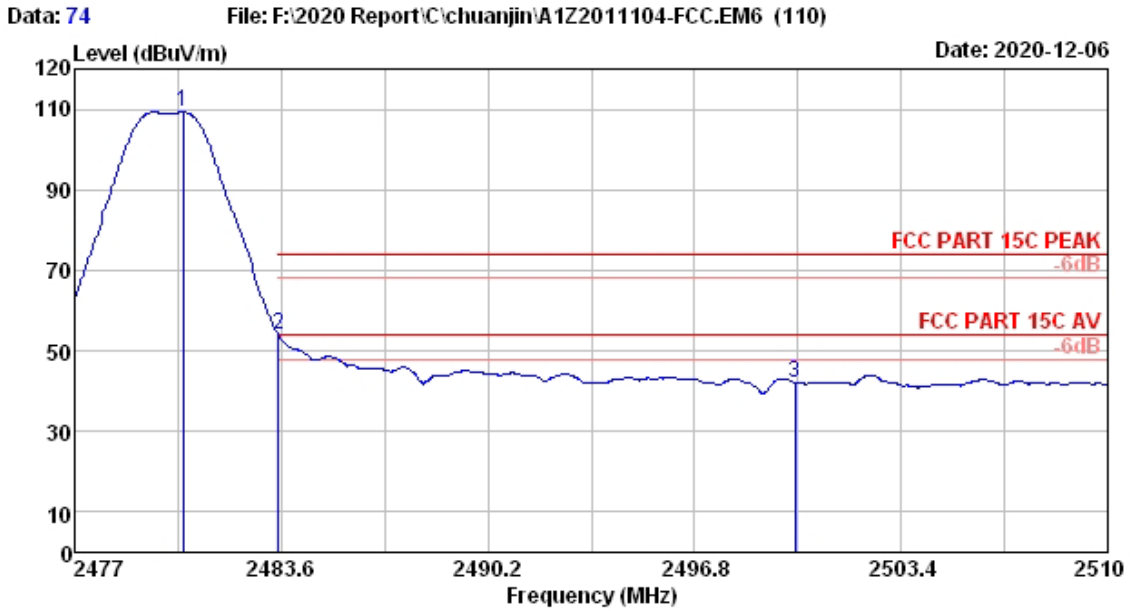


Site no. : 3m Chamber Data no. : 61
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2480MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2479.838	28.03	0.94	111.21	33.46	106.72	------	------	Peak
2	2483.500	28.03	0.94	53.55	33.46	49.06	74.00	24.94	Peak
3	2500.000	28.10	0.95	47.76	33.45	43.36	74.00	30.64	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.

Bluetooth V5.0(2Mbps):

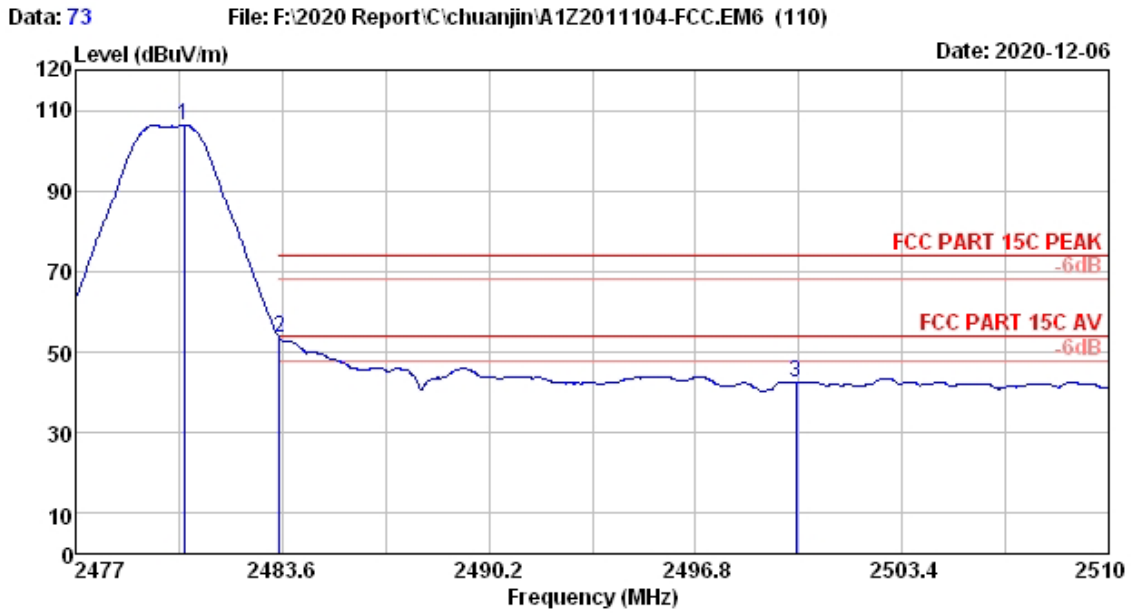



```
Site no.      : 3m Chamber                    Data no.   : 74
Dis. / Ant.   : 3m   2019 MCTD1209-3007       Ant. pol.  : HORIZONTAL
Limit         : FCC PART 15C PEAK
Env. / Ins.   : 23.4*C/52.9%                  Engineer   : Lynn
Power rating  : DC 5V From Notebook Input AC 120V/60Hz
Test Mode     : BLE 2M 2480MHz Tx Mode
```

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.465	28.03	0.94	113.83	33.46	109.34	------	------	Peak
2	2483.500	28.03	0.94	58.56	33.46	54.07	74.00	19.93	Peak
3	2500.000	28.10	0.95	46.65	33.45	42.25	74.00	31.75	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.

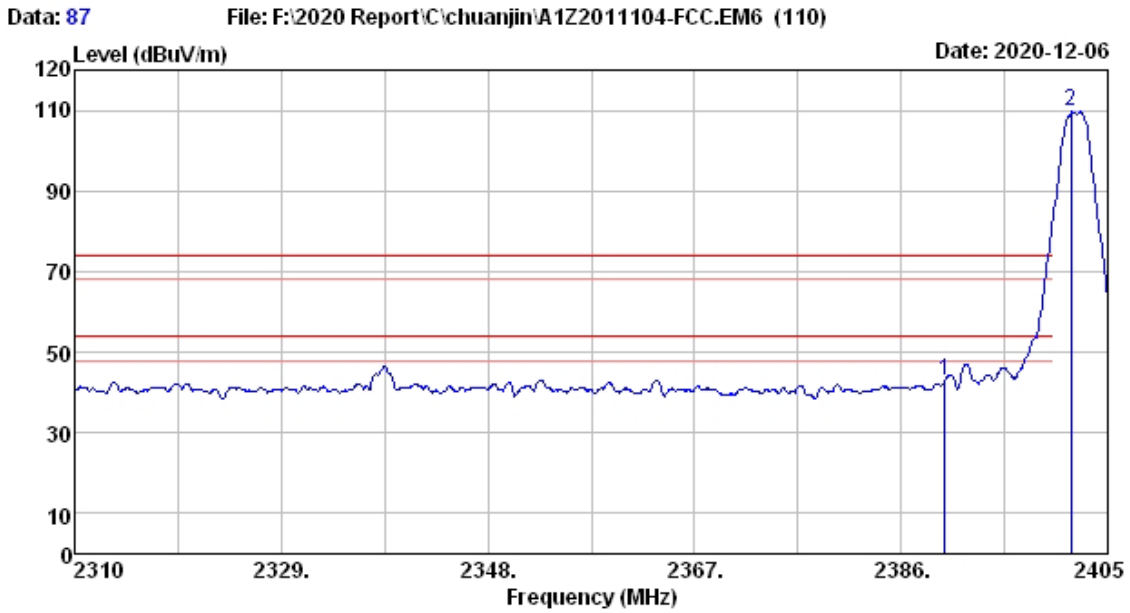
Frequency（MHz）	Peak level（dBuv/m）	Duty cycle factor (dB)	AV level (dBuv/m)	Limit(dBuv/m)	Conclusion
2483.500	54.07	-4.554	49.516	54	Pass
Note: The Duty cycle factor refer to the original report ACS-F20002.					



Site no. : 3m Chamber Data no. : 73
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2M 2480MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.465	28.03	0.94	110.81	33.46	106.32	------	------	Peak
2	2483.500	28.03	0.94	58.14	33.46	53.65	74.00	20.35	Peak
3	2500.000	28.10	0.95	46.95	33.45	42.55	74.00	31.45	Peak

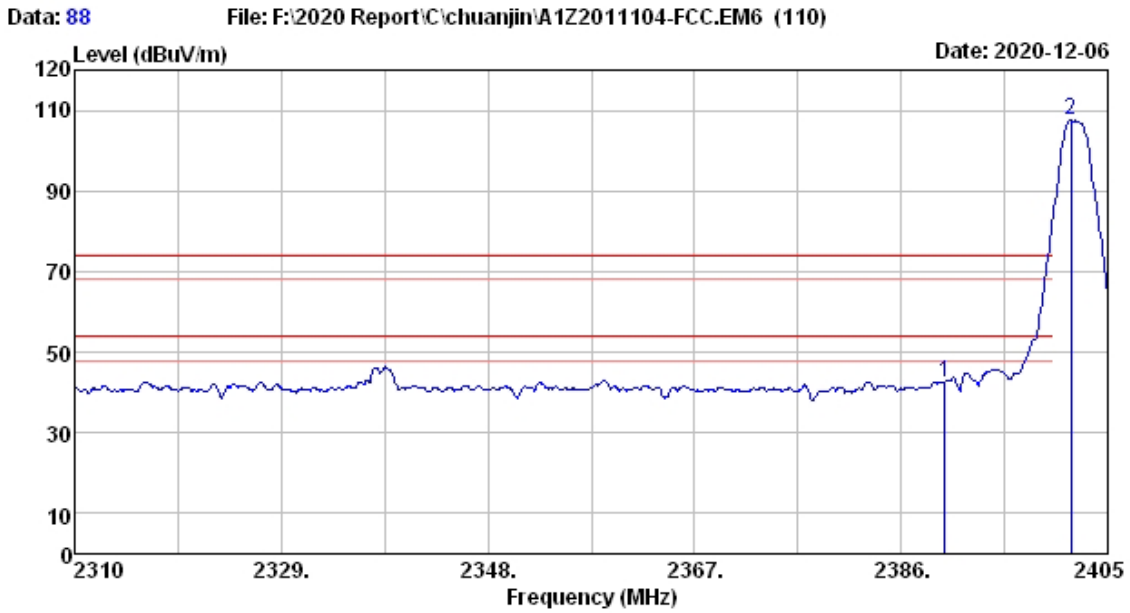
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 87
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2M 2402MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	27.70	0.92	48.00	33.48	43.14	74.00	30.86	Peak
2	2401.580	27.70	0.92	114.56	33.48	109.70	------	------	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 88
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Lynn
Power rating : DC 5V From Notebook Input AC 120V/60Hz
Test Mode : BLE 2M 2402MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	27.70	0.92	47.44	33.48	42.58	74.00	31.42	Peak
2	2401.580	27.70	0.92	112.44	33.48	107.58	------	------	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.

7. ANTENNA REQUIREMENT

7.1. STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

7.2. ANTENNA CONNECTED CONSTRUCTION

The antennas used for this product are Multilayer Ceramic Antenna that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is -0.42dBi.

8. DEVIATION TO TEST SPECIFICATIONS

[NONE]

THE END