

FCC PART 15C TEST REPORT FOR CERTIFICATION

On Behalf of

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

Wi-Fi Module

U9W44

FCC ID: 2AU3BU9W44

Prepared for : Funai Electric R & D (Shenzhen) Co., Ltd
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Date of Report : Dec.08, 2023

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TEST REPORT

Applicant : Funai Electric R & D (Shenzhen) Co., Ltd
 Manufacturer : Funai Electric R & D (Shenzhen) Co., Ltd
 Product : Wi-Fi Module
 FCC ID : 2AU3BU9W44
 (A) Model No. : U9W44
 (B) Test Voltage : DC 3.3V From PC Input AC 120V/60Hz

Tested for comply with:

FCC CFR47 Part 15 Subpart C
 Test procedure used: ANSI C63.10: 2020;
 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 single evaluation of one sample of above mentioned product and 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 U.S. Government.

Date of Test : Nov.13~21, 2023 Report of date: Dec.08, 2023

Prepared by : Dora Yang Reviewed by : Thomas Chen
 Dora Yang / Assistant Thomas Chen / Assistant Manager

Approved & Authorized Signer : Signature: Sunny Lu
 Sunny Lu / Manager

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 :2020	PASS
Radiated Emission Test	FCC Part 15: 15.209 FCC Part 15: 15.205 FCC Part 15: 15.247(d) ANSI C63.10 : 2020	PASS
Conducted Spurious Emissions	FCC Part 15: 15.247(d) ANSI C63.10 : 2020	PASS
Carrier Frequency Separation Test	FCC Part 15: 15.247(a)(1) ANSI C63.10 : 2020	N/A
6dB Bandwidth Test	FCC Part 15: 15.247(a)(2) ANSI C63.10 : 2020	PASS
Maximum Peak Output Power Test	FCC Part 15: 15.247(b)(1) ANSI C63.10 : 2020	PASS
Band Edge Compliance Test	FCC Part 15: 15.247(d) ANSI C63.10 : 2020	PASS
Power Spectral Density Test	FCC Part 15: 15.247(e) ANSI C63.10 :2020	PASS
Antenna requirement	FCC Part 15: 15.203	PASS
N/A is an abbreviation for Not Applicable.		
Note: Measurement uncertainty affection to the result is not considered, the EUT is technically compliant with standard requirements.		

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	Wi-Fi Module
Model No.	U9W44
FCC ID	2AU3BU9W44
USB A-C Cable	Unshielded, Detachable,30cm
Sample Type	Prototype production
Date of Receipt	Nov.06, 2023
Date of Test	Nov.13~21, 2023
Remark: This report only for BLE.	

2.2.Feature of Equipment Under Test

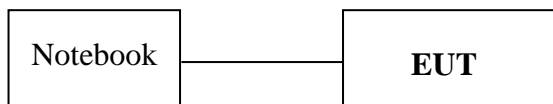
Product Feature & Specification		
Product	Wi-Fi Module	
Model No.	U9W44	
Radio	IEEE802.11 a/b/g/n/ac	
Power Source	<input type="checkbox"/> Commercial Power	AC 100~240 V
	<input checked="" type="checkbox"/> External Power Source	DC 3.3V
	<input type="checkbox"/> Li-ion Battery	DC V
	<input type="checkbox"/> UM battery	DC V
Bluetooth		
Radio	BDR +EDR; BLE	
Frequency Range	2402-2480MHz	
Type of Modulation	GFSK, $\pi/4$ DQPSK, 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 & Antenna Peak Gain	Bluetooth (2.402-2.480GHz) Antenna Antenna Type : External PCB Antenna Antenna Gain: -0.42dBi max Wi-Fi 2.4GHz Antenna Antenna Type : Embedded Pattern Antennas (Antenna A/B) Antenna Gain: -3.77dBi max (Antenna A) -1.15dBi max (Antenna B) Wi-Fi U-NII-1 Band (5.15-5.25GHz) Antenna Antenna Type : Embedded Pattern Antennas(Antenna A/B) Antenna Gain: 1.91dBi max (Antenna A) -2.55dBi max (Antenna B) Wi-Fi U-NII-3 Band (5.725-5.85GHz) Antenna Antenna Type : PCB Antennas (Antenna A/B) Antenna Gain: 3.12dBi max (Antenna A) 0.38dBi max (Antenna B)

2.3. Tested Supporting System Details

No.	Description	ACS No.	Manufacturer	Model	Serial Number
1.	Notebook	N/A	ACER	ZOW	N/A
		Power Cord(3C): Unshielded, Detachable, 1.8m Power Adaptor: Manufacturer: Lite-On, M/N: PA-1900-32 Cable: Unshielded, Undetectable, 4.0m(Bond one ferrite core)			

2.4. Block Diagram of connection between EUT and simulators



(EUT: Wi-Fi Module)

2.5. Test information

A special software (QATool_Dbg.exe) was used to control EUT work in 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	1,2	Low :CH0	2402
	1,2	Middle: CH19	2440
	1,2	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.

: Certificated by ISED, Canada
 Company Number: 5183A
 CAB identifier: CN0034
 Valid Date: Mar.31, 2024

Certificated by FCC, USA
 Designation No.: CN5022
 Valid Date: Mar.31, 2024

Accredited by NVLAP, USA
 NVLAP Code: 200372-0
 Valid Date: Mar.31, 2024

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

Test Item	Uncertainty
Uncertainty for Conduction emission test in No. 1 Conduction	$\pm 2.6\text{dB}(150\text{KHz to } 30\text{MHz})$
Uncertainty for Radiation Emission test in 3m chamber	$\pm 3.8\text{dB}(30\sim 200\text{MHz, Polarization: H})$
	$\pm 3.8\text{dB}(30\sim 200\text{MHz, Polarization: V})$
	$\pm 4.0\text{dB}(200\text{M}\sim 1\text{GHz, Polarization: H})$
	$\pm 4.0\text{dB}(200\text{M}\sim 1\text{GHz, Polarization: V})$
Uncertainty for Radiation Emission test in 3m chamber(1GHz-18GHz)	$\pm 4.0\text{dB}(1\sim 6\text{GHz, Distance: } 3\text{m})$
	$\pm 4.0\text{dB}(6\sim 18\text{GHz, Distance: } 3\text{m})$
Uncertainty for Radiated Spurious Emission test in RF chamber	$\pm 3.7\text{dB}(30\text{MHz}\sim 1000\text{MHz})$
	$\pm 3.3\text{dB}(1\sim 26.5\text{GHz})$
Uncertainty for Conduction Spurious emission test	$\pm 2.0\text{dB}$
Uncertainty for Output power test	$\pm 0.8\text{dB}$
Uncertainty for Bandwidth test	$\pm 4.6\%$
Uncertainty for DC power test	$\pm 0.1\%$
Uncertainty for test site temperature and humidity	$\pm 0.6^\circ\text{C}$
	$\pm 3\%$

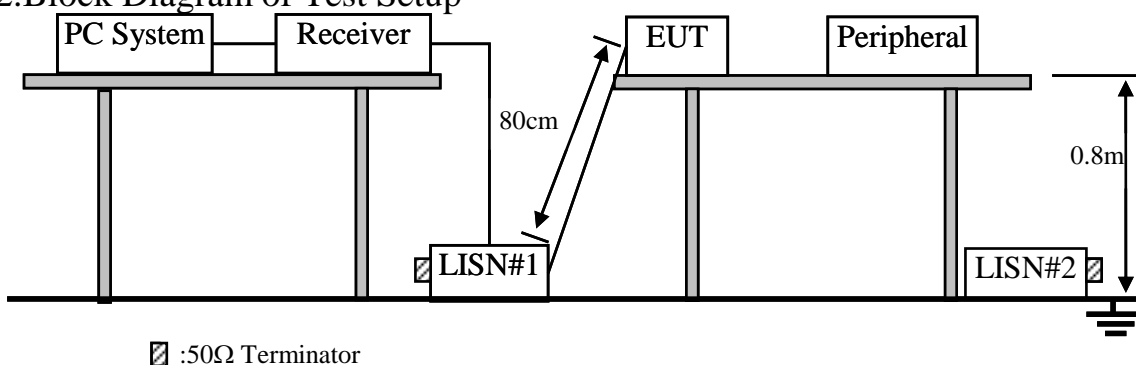
3. POWER LINE CONDUCTED EMISSION TEST

3.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	1# Shielding Room	AUDIX	N/A	N/A	Nov.09,22	3 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100842	Apr.01,23	1 Year
3.	L.I.S.N.#1	Rohde & Schwarz	ENV216	102160	Jun.25,23	1 Year
4.	RF Cable	Eastsheep	RG223	190424	Sep.15,23	1Year
5.	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 limits shall apply at the transition frequencies.
 3. Emission Level (dBμV) = Factor (L.I.S.N.) (dB) + Cable Loss (dB)+Reading (Receiver) (dBμV)

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. Wi-Fi Module (EUT)

Model No. : U9W44
 Serial No. : N/A

3.4.2. Support Equipment: As Tested Supporting System Details, in Section 2.3.

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 Adaptor 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 on Conducted Emission Test.

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

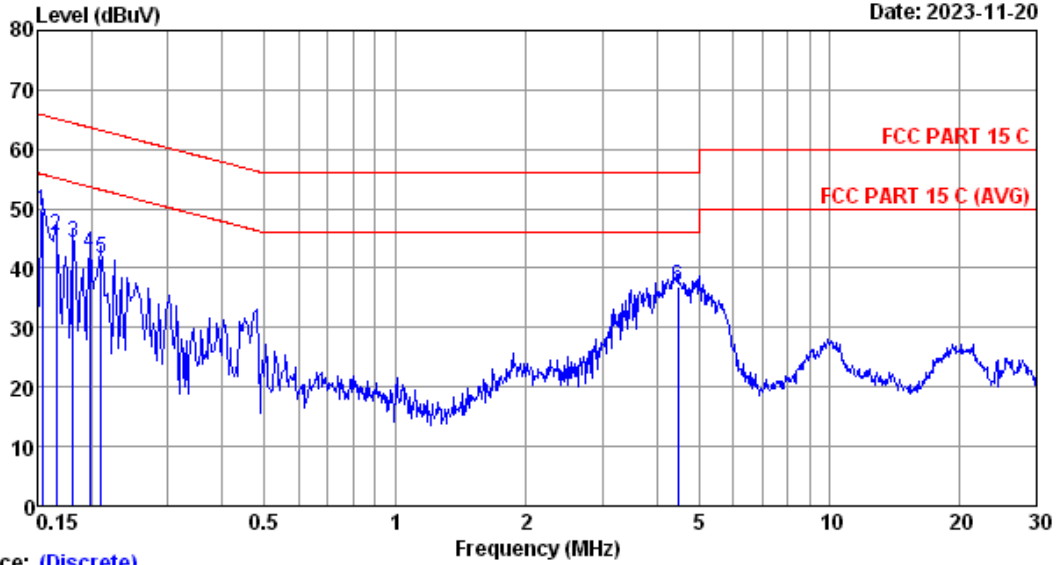
The frequency range from 150kHz to 30MHz is checked.

3.7. Power Line Conducted Emission Test Results

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

BLE-1Mbps:

Data: 3 File: E:\1#CE\2023 Report Data\C\RF\A1Z2310028-RF\A1Z2310028-FCC.EM6 (10) Date: 2023-11-20



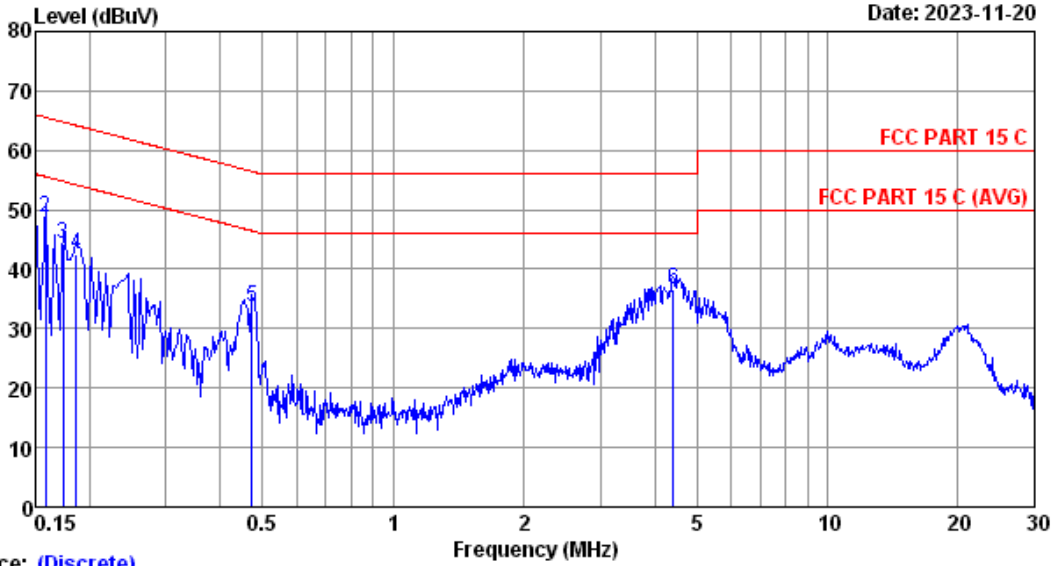
Trace: (Discrete)

Site no :1# CE Data No :3
 Dis./Lien :2023 ENV216-N
 Limit :FCC PART 15 C
 Env./Ins. :21.6*C/52.3% Engineer :Sucy
 Power Rating :AC 120V/60Hz
 Test Mode :BLE1M TX Mode

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.154	9.69	0.01	39.93	49.63	65.78	16.15	QP
2	0.166	9.69	0.01	35.68	45.38	65.16	19.78	QP
3	0.182	9.70	0.01	34.66	44.37	64.42	20.05	QP
4	0.198	9.70	0.01	32.80	42.51	63.71	21.20	QP
5	0.211	9.70	0.01	31.90	41.61	63.18	21.57	QP
6	4.478	9.20	0.06	27.77	37.03	56.00	18.97	QP

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.

Data: 4 File: E:\1#CE\2023 Report Data\CIR\A1Z2310028-RF\A1Z2310028-FCC.EM6 (10) Date: 2023-11-20



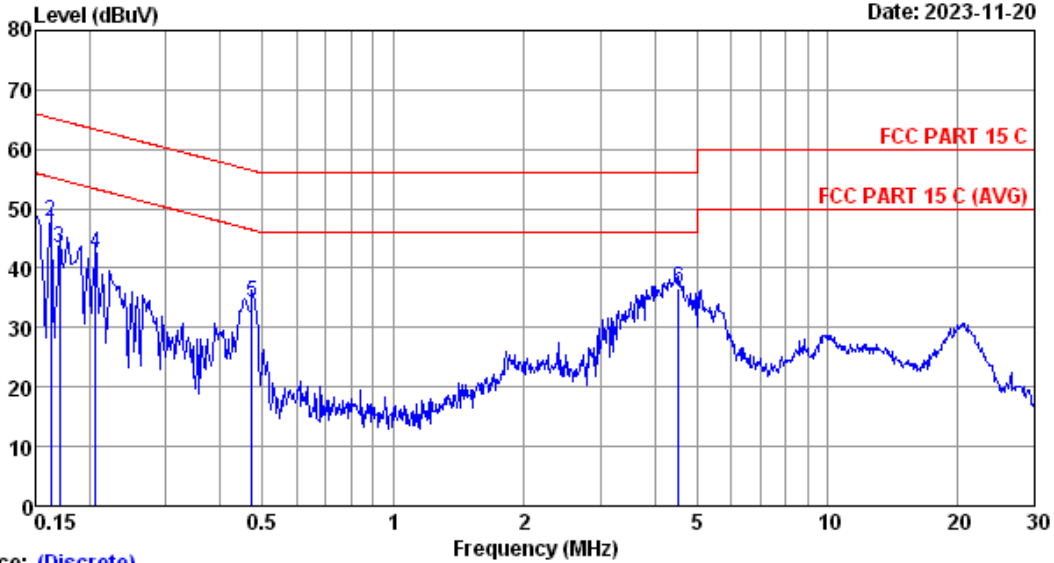
Trace: (Discrete)
 Site no :1# CE Data No :4
 Dis./Lisn :2023 ENV216-L
 Limit :FCC PART 15 C
 Env./Ins. :21.6°C/52.3% Engineer :Sucy
 Power Rating :AC 120V/60Hz
 Test Mode :BLE1M TX Mode

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.150	9.69	0.01	37.59	47.29	66.00	18.71	QP
2	0.158	9.69	0.01	38.89	48.59	65.56	16.97	QP
3	0.174	9.69	0.01	34.55	44.25	64.77	20.52	QP
4	0.186	9.70	0.01	32.92	42.63	64.20	21.57	QP
5	0.474	9.73	0.02	23.96	33.71	56.45	22.74	QP
6	4.407	9.21	0.06	27.36	36.63	56.00	19.37	QP

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.

BLE-2Mbps:

Data: 5 File: E:\1#CE\2023 Report Data\CIRF\A1Z2310028-RF\A1Z2310028-FCC.EM6 (10) Date: 2023-11-20

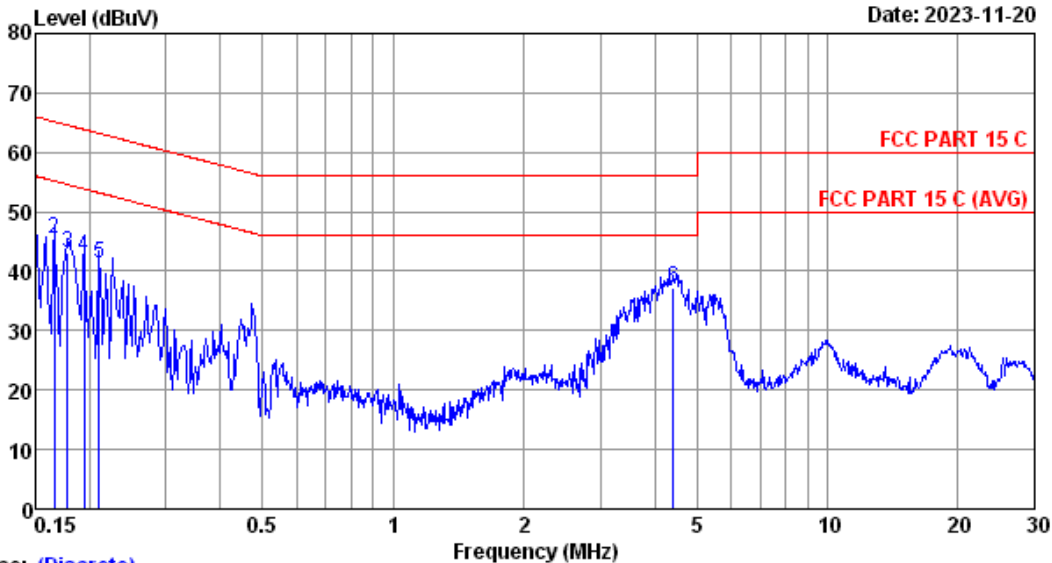


Trace: (Discrete)
 Site no :1# CE Data No :5
 Dis./Lisn :2023 ENV216-N
 Limit :FCC PART 15 C
 Env./Ins. :21.6°C/52.3% Engineer :Sucy
 Power Rating :AC 120V/60Hz
 Test Mode :BLE2M TX Mode

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.150	9.69	0.01	37.45	47.15	66.00	18.85	QP
2	0.162	9.69	0.01	37.98	47.68	65.34	17.66	QP
3	0.170	9.69	0.01	33.67	43.37	64.94	21.57	QP
4	0.206	9.70	0.01	32.72	42.43	63.36	20.93	QP
5	0.474	9.73	0.02	24.62	34.37	56.45	22.08	QP
6	4.549	9.20	0.06	27.36	36.62	56.00	19.38	QP

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.

Data: 6 File: E:\1#CE\2023 Report Data\CIR\A1Z2310028-RF\A1Z2310028-FCC.EM6 (10) Date: 2023-11-20



Trace: (Discrete)
 Site no :1# CE Data No :6
 Dis./Lisn :2023 ENV216-L
 Limit :FCC PART 15 C
 Env./Ins. :21.6°C/52.3% Engineer :Sucy
 Power Rating :AC 120V/60Hz
 Test Mode :BLE2M TX Mode

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.150	9.62	0.01	35.89	45.52	66.00	20.48	QP
2	0.166	9.62	0.01	35.76	45.39	65.16	19.77	QP
3	0.178	9.62	0.01	33.59	43.22	64.59	21.37	QP
4	0.194	9.62	0.01	32.92	42.55	63.84	21.29	QP
5	0.211	9.62	0.01	31.74	41.37	63.18	21.81	QP
6	4.407	9.79	0.06	27.36	37.21	56.00	18.79	QP

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 Equipments

Frequency range: 30~1000MHz

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	3m Chamber(NSA)	AUDIX	N/A	N/A	Aug.11,22	3Year
2.	3m Chamber(SE)	AUDIX	N/A	N/A	Sep.16,22	3 Year
3.	Signal Analyzer	Rohde & Schwarz	FSV30	103670	Jun.25,23	1 Year
4.	Tri-log-Broadband Antenna	SCHWARZBECK	VULB 9168	429	Oct.10,23	1 Year
5.	NSA Cable	HUBER+SUHNER	CFD400NL-LW	No.3+190411	Sep.20,23	1 Year
6.	Coaxial Switch	Anritsu	MP59B	6201397223	Apr.02,23	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESR3	101931	Apr.01,23	1 Year
8.	Broadband Amplifier	SCHWARZBECK	BBV9744	00259	Jun.25,23	1 Year
9.	Test Software	AUDIX	e3	6.100913a	N/A	N/A

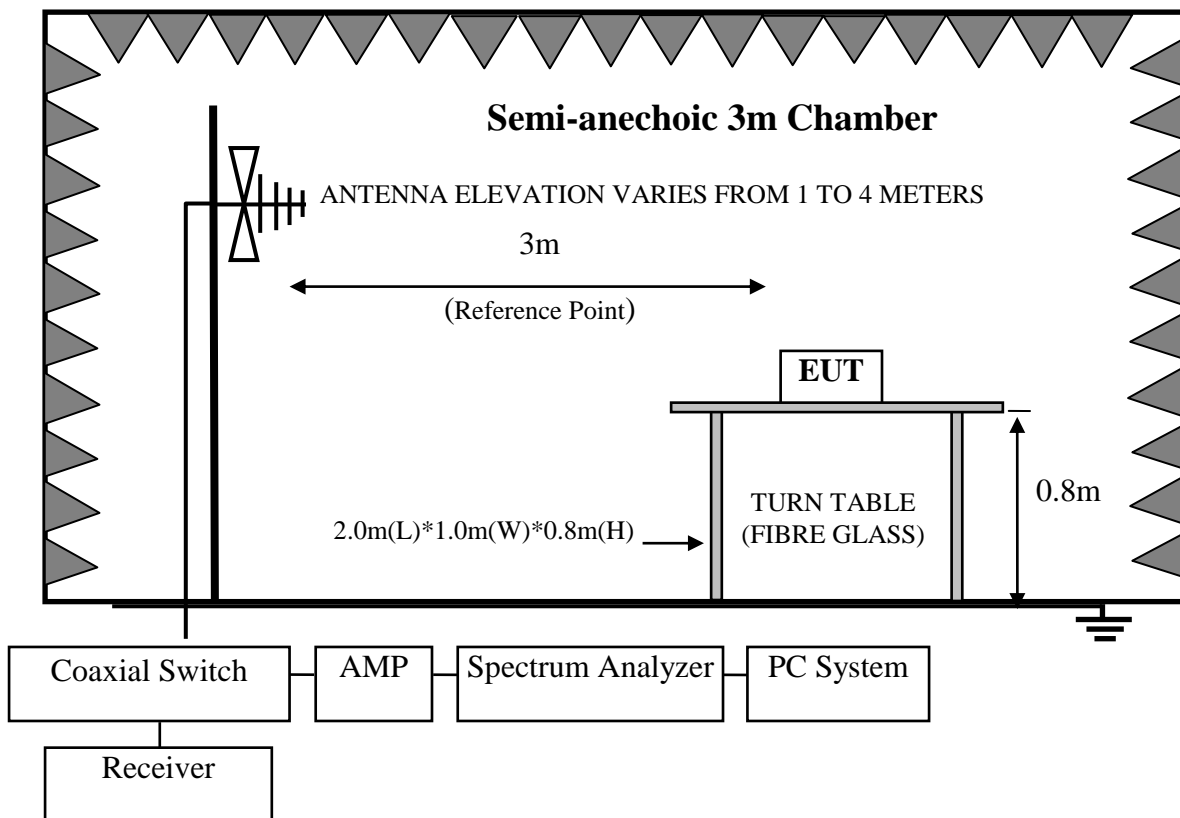
Note: N/A means Not applicable.

Frequency range: above 1000MHz

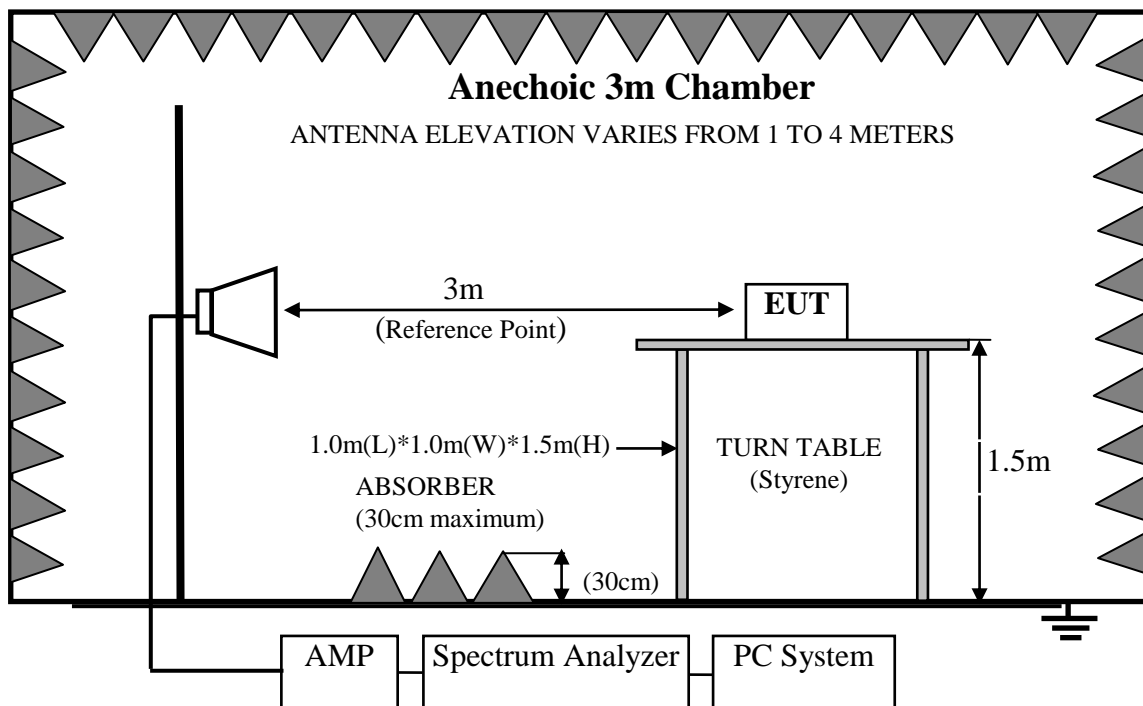
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	3mChamber(Svswr)	AUDIX	N/A	N/A	Aug.09,22	3Year
2.	3mChamber(SE)	AUDIX	N/A	N/A	Sep.16,22	3Year
3.	Signal Analyzer	Rohde & Schwarz	FSV30	104050	Apr.01,23	1 Year
4.	Amplifier	Agilent	83017A	MY53270084	Sep.20,23	1 Year
5.	RF Cable	EMCI	EMC104-SM-S M-15000	190407	Jun.25,23	1 Year
6.	Test Software	AUDIX	e3	6.100913a	N/A	N/A
7.	Horn Antenna	ETC	MCTD 1209	DRH15F03006	Aug.23,23	1 Year

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 Limits 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/m) = Reading (Receiver) (dBμV) + Antenna Factor (dB/m) + Cable Loss (dB)
Emission Level (dBμV/m) = Reading (Spectrum) (dBμV) + Antenna Factor (dB/m) – Amp Factor (dB) + Cable Loss (dB)(above 1000MHz)
 - (2) The smaller limits 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. Wi-Fi Module (EUT)

Model Number : U9W44
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 regulation.

Frequency Above 30MHz:

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 Horn 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 on radiated emission Test.

This test was performed with EUT in X, Y, Z position, and the worse case was found reported in report.

The bandwidth of the EMI test receiver (R&S ESR3) 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

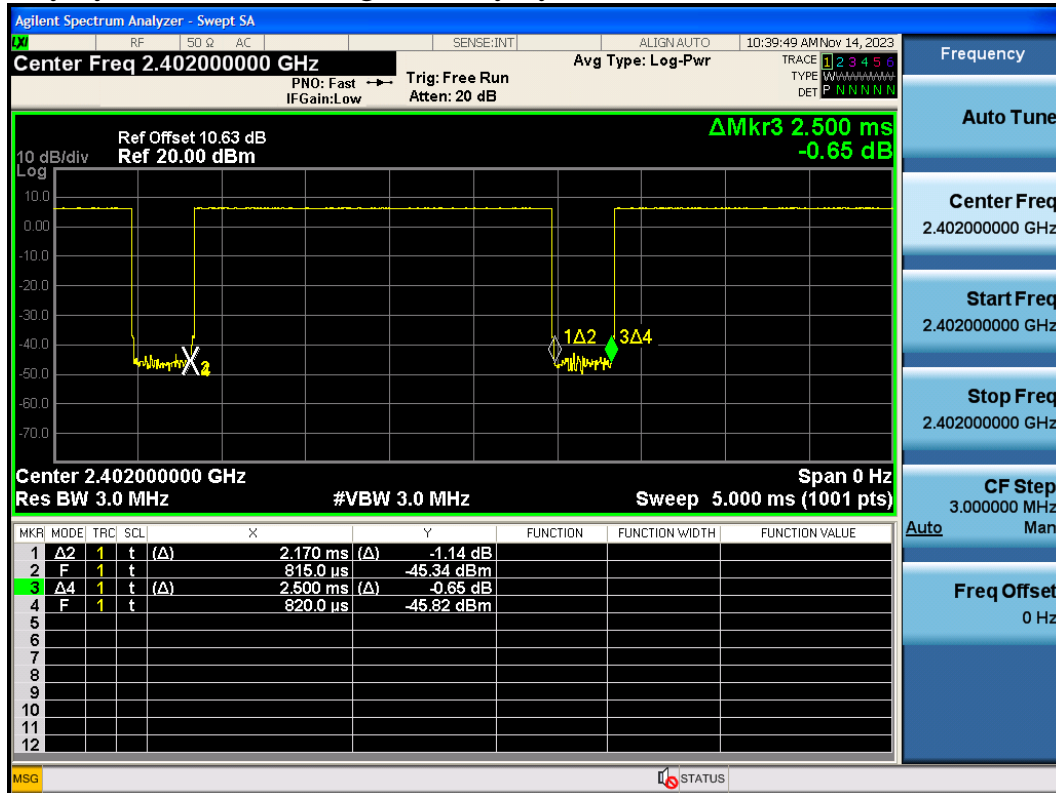
PASS.

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

Note: The duty cycle factor for calculate average level is BLE-1Mbps: -1.230dB; BLE-2Mbps: -2.937dB for BLE, 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.

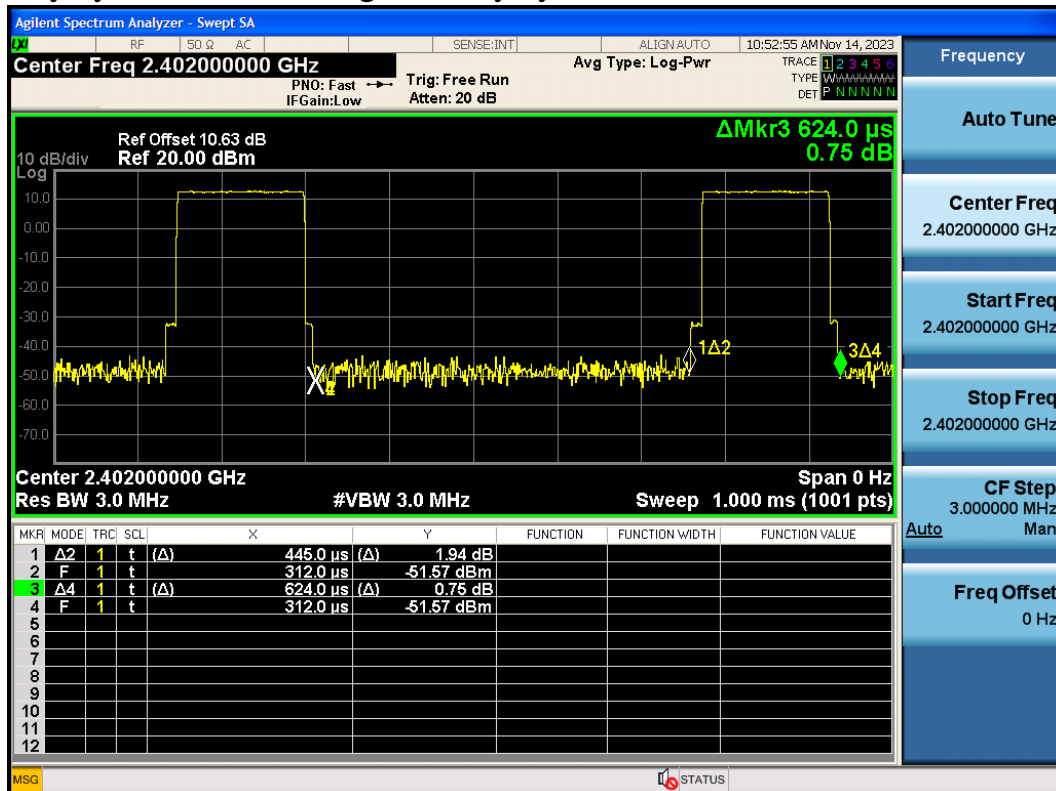
BLE-1Mbps:

Duty cycle factor = $20\log(1/\text{duty cycle}) = -1.230\text{dB}$

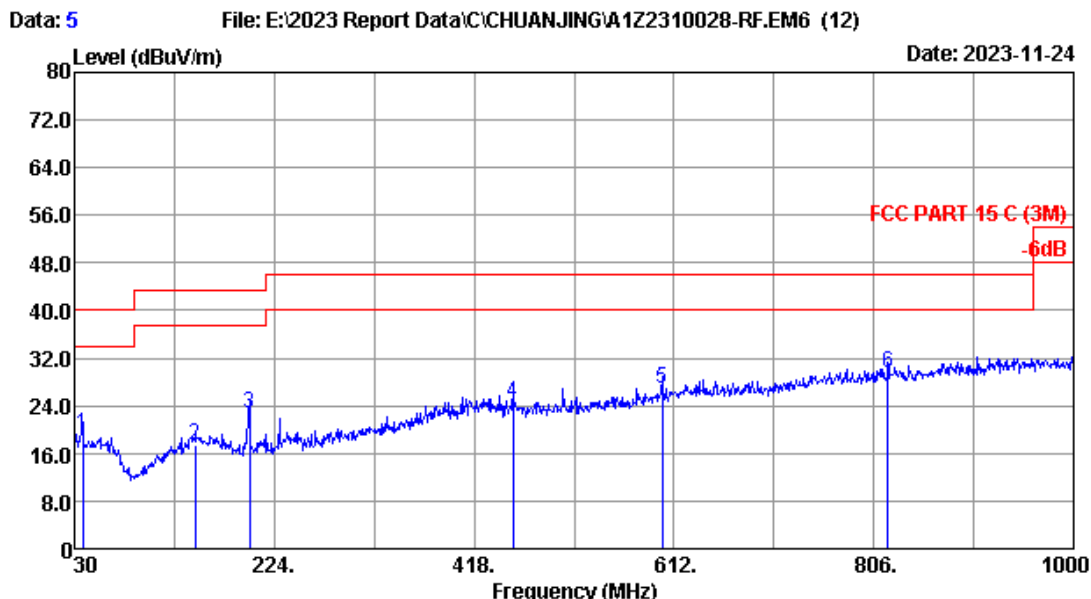


BLE-2Mbps:

Duty cycle factor = $20\log(1/\text{duty cycle}) = -2.937\text{dB}$



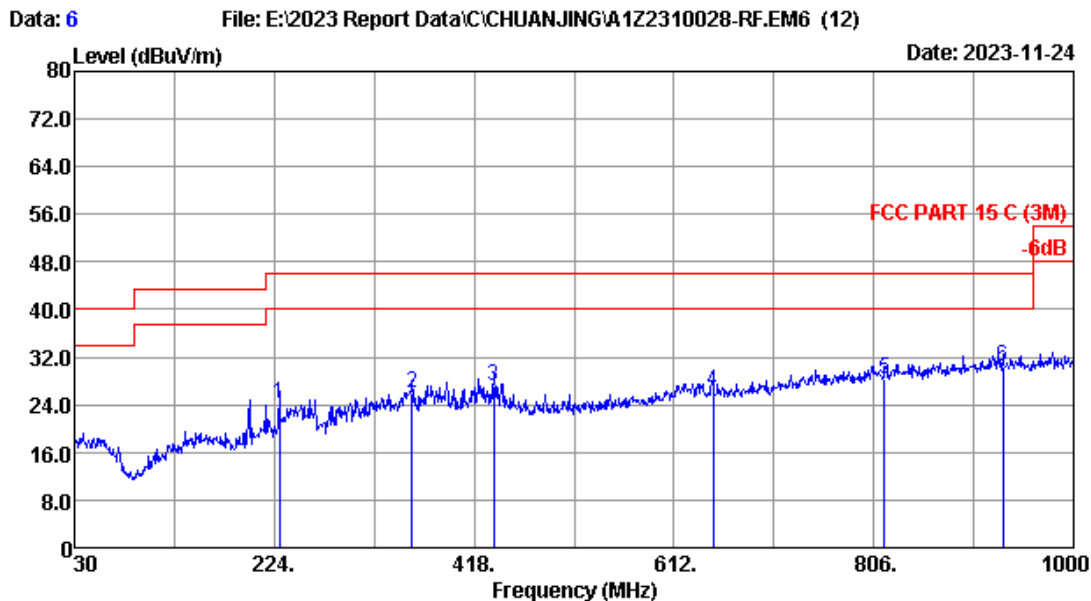
Frequency: 30MHz~1GHz
BLE-1Mbps:



Site no. : 3m Chamber Data no. : 5
 Dis. / Ant. : 3m 2023 VULB 9168-429 Ant. pol. : VERTICAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 23.6*CS5% Engineer : Abel
 Test Mode : BLE1M 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	37.760	19.18	0.55	-0.41	19.32	40.00	20.68	QP
2	147.370	19.30	1.01	-3.02	17.29	43.50	26.21	QP
3	199.750	16.02	1.16	5.60	22.78	43.50	20.72	QP
4	455.830	23.20	1.74	-0.52	24.42	46.00	21.58	QP
5	600.360	25.81	2.05	-1.00	26.86	46.00	19.14	QP
6	819.580	28.61	2.43	-1.65	29.39	46.00	16.61	QP

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

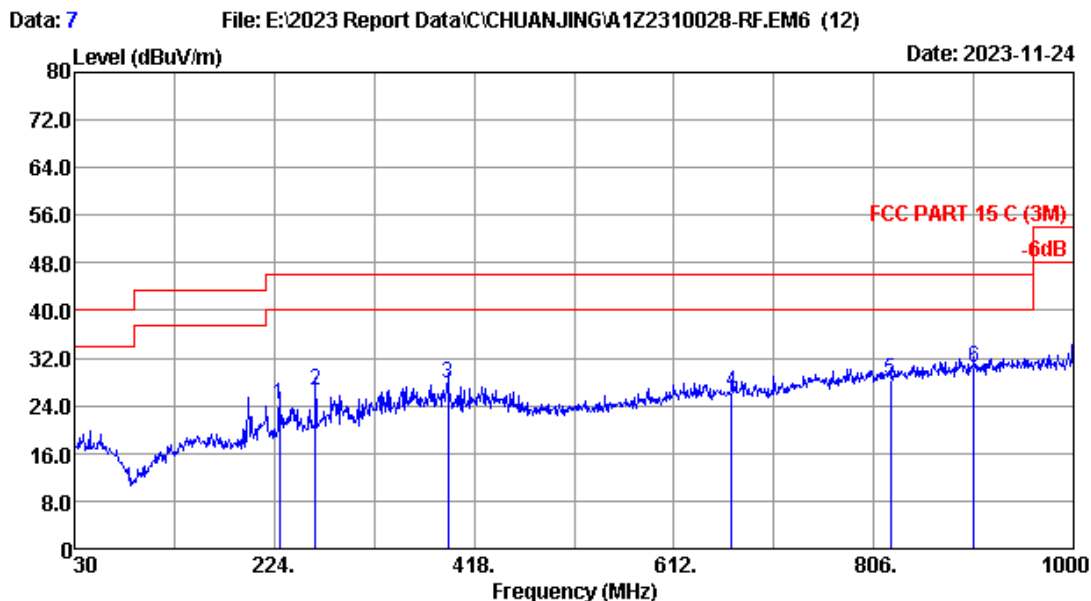


Site no. : 3m Chamber Data no. : 6
 Dis. / Ant. : 3m 2023 VULB 9168-429 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 23.6°C55% Engineer : Abel
 Test Mode : BLE1M TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	228.850	16.26	1.29	6.63	24.18	46.00	21.82	QP
2	357.860	20.57	1.54	3.82	25.93	46.00	20.07	QP
3	437.400	22.80	1.70	2.58	27.08	46.00	18.92	QP
4	649.830	26.40	2.16	-2.33	26.23	46.00	19.77	QP
5	816.670	28.67	2.42	-2.70	28.39	46.00	17.61	QP
6	931.130	29.92	2.70	-2.15	30.47	46.00	15.53	QP

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

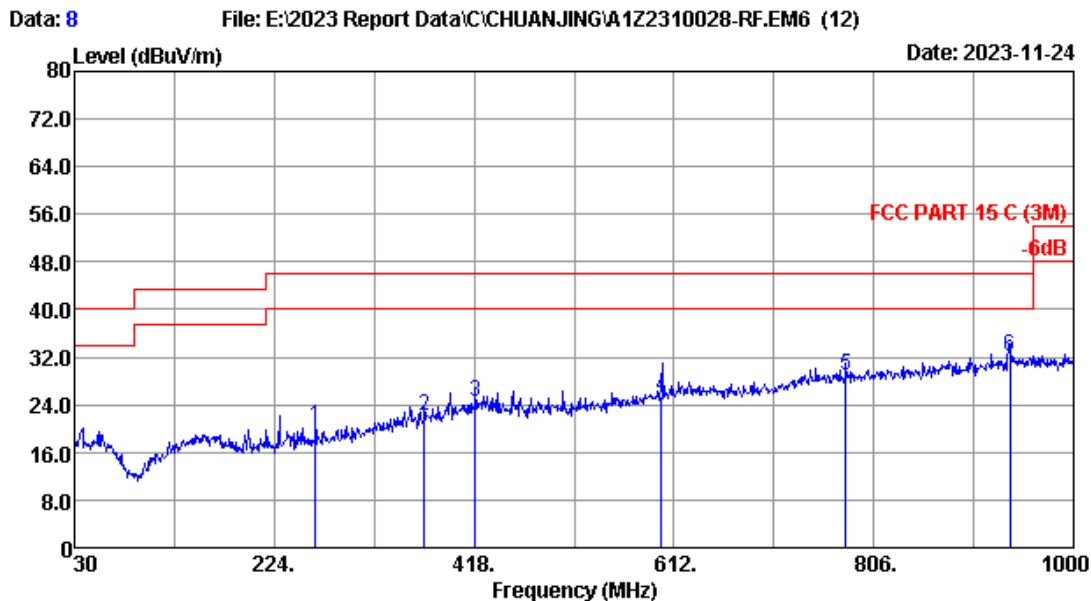
BLE-2Mbps:



Site no.	: 3m Chamber	Data no.	: 7
Dis. / Ant.	: 3m 2023 VULB 9168-429	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15 C (3M)		
Env. / Ins.	: 23.6°C55%	Engineer	: Abel
Test Mode	: BLE2M 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	228.850	16.26	1.29	6.65	24.20	46.00	21.80	QP
2	263.770	18.23	1.35	6.94	26.52	46.00	19.48	QP
3	392.780	21.40	1.61	4.64	27.65	46.00	18.35	QP
4	668.260	26.40	2.18	-2.34	26.24	46.00	19.76	QP
5	822.490	28.60	2.44	-2.65	28.39	46.00	17.61	QP
6	903.000	29.30	2.65	-1.67	30.28	46.00	15.72	QP

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

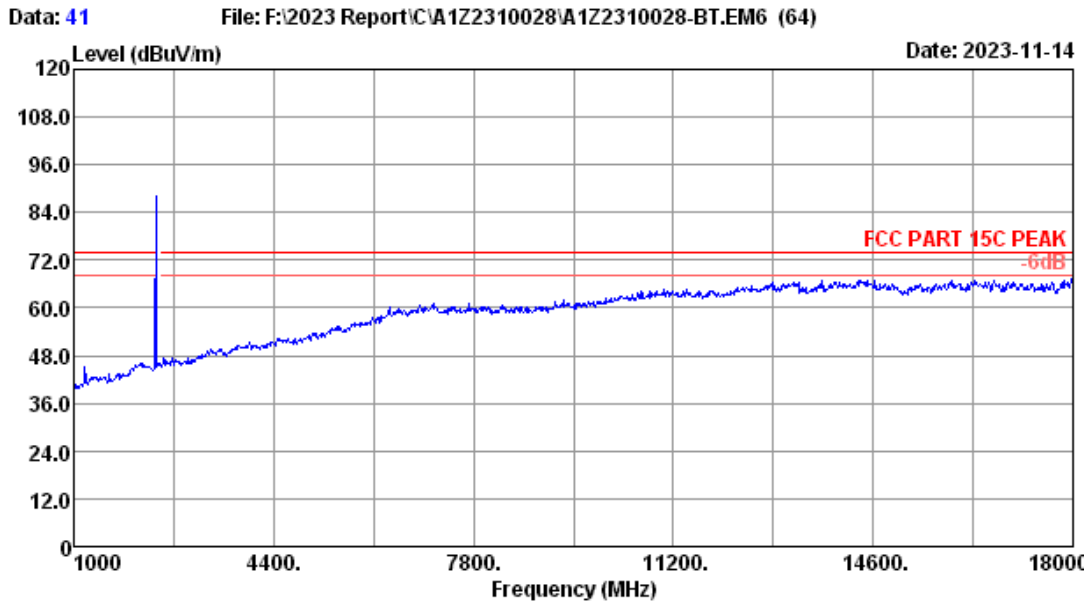


Site no. : 3m Chamber Data no. : 8
 Dis. / Ant. : 3m 2023 VULB 9168-429 Ant. pol. : VERTICAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 23.6°C55% Engineer : Abel
 Test Mode : BLE2M TX Mode

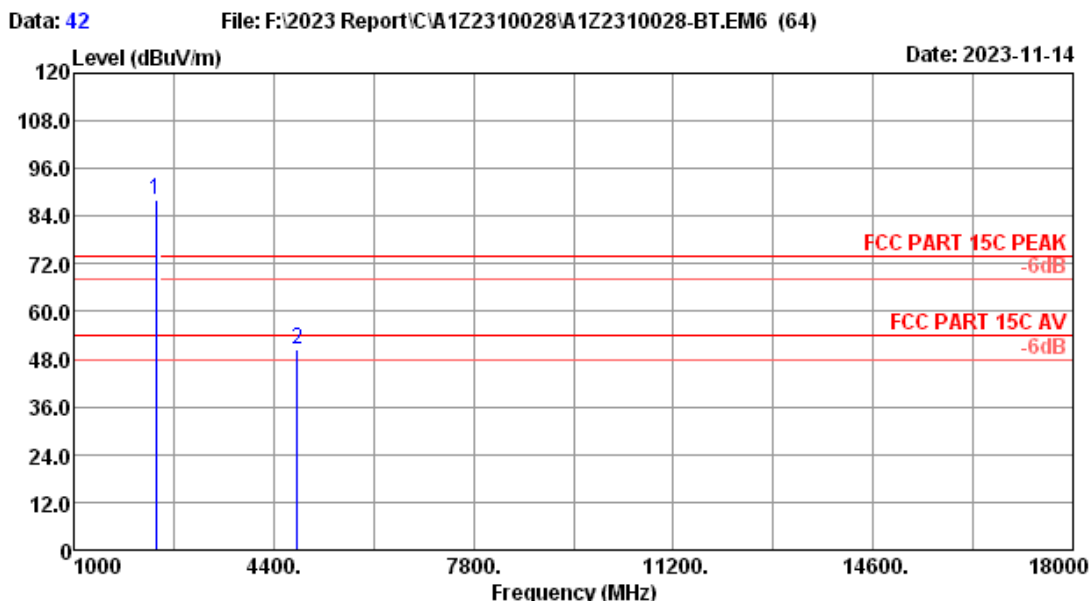
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	263.770	18.23	1.35	0.72	20.30	46.00	25.70	QP
2	369.500	20.98	1.57	-0.55	22.00	46.00	24.00	QP
3	418.970	22.26	1.67	0.52	24.45	46.00	21.55	QP
4	599.390	25.76	2.05	-2.33	25.48	46.00	20.52	QP
5	778.840	28.18	2.35	-1.66	28.87	46.00	17.13	QP
6	937.920	30.06	2.71	-0.61	32.16	46.00	13.84	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
BLE-1Mbps:



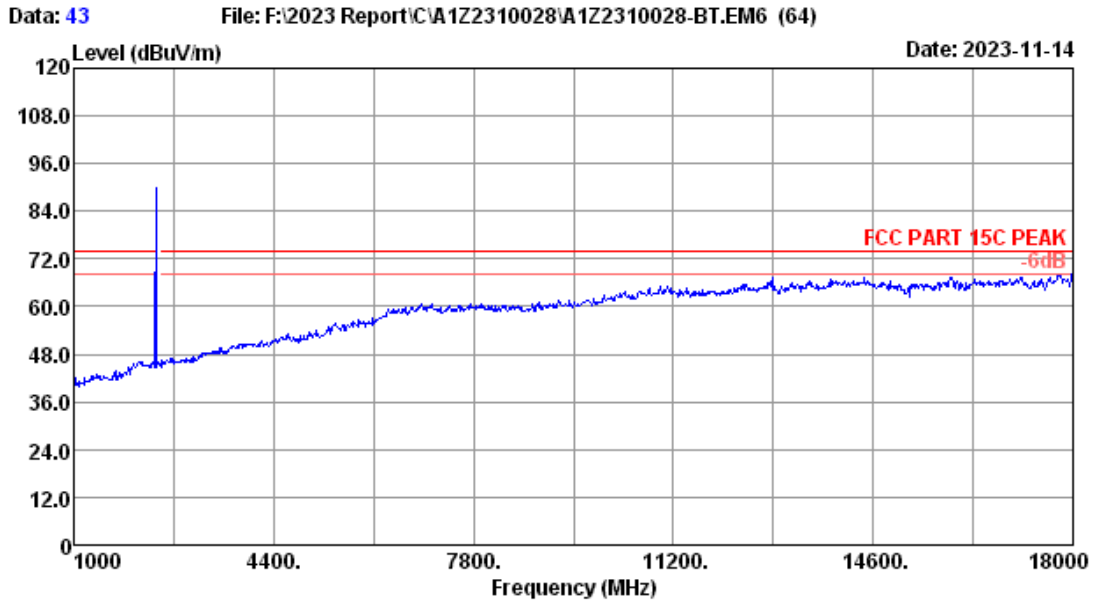
Site no.	: 3m Chamber	Data no.	: 41
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.2°C/51.3%	Engineer	: nier
Test Mode	: BLE1M 2402MHz TX		



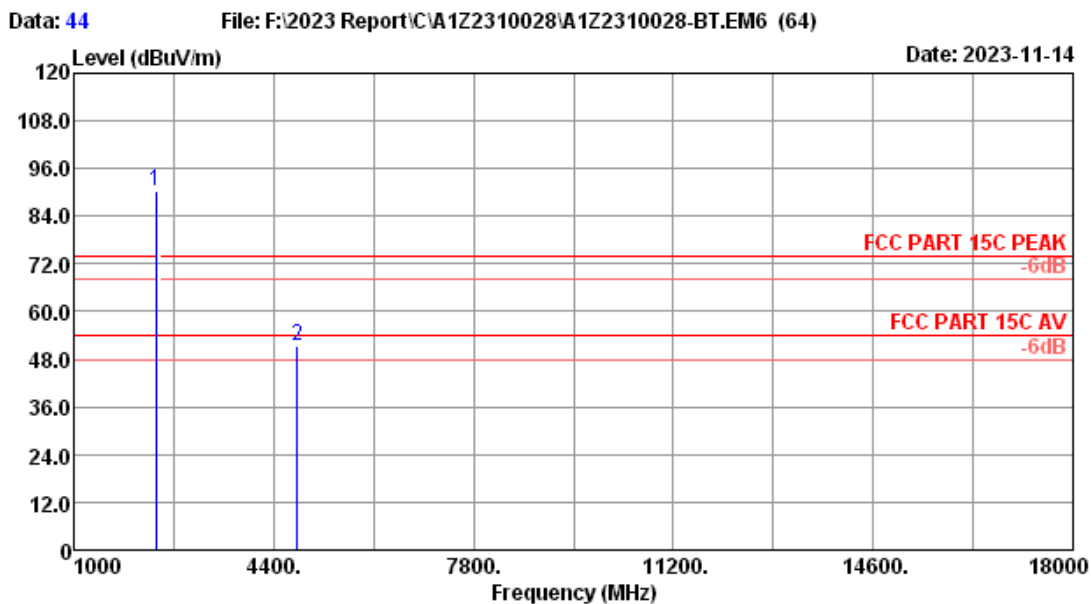
Site no. : 3m Chamber Data no. : 42
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.2°C/51.3% Engineer : nier
 Test Mode : BLE1M 2402MHz TX

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	2402.00	27.61	2.84	90.00	32.22	88.23	-----	-----	Peak
2	4804.00	31.20	3.95	46.54	31.08	50.61	74.00	23.39	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading - Amp factor.



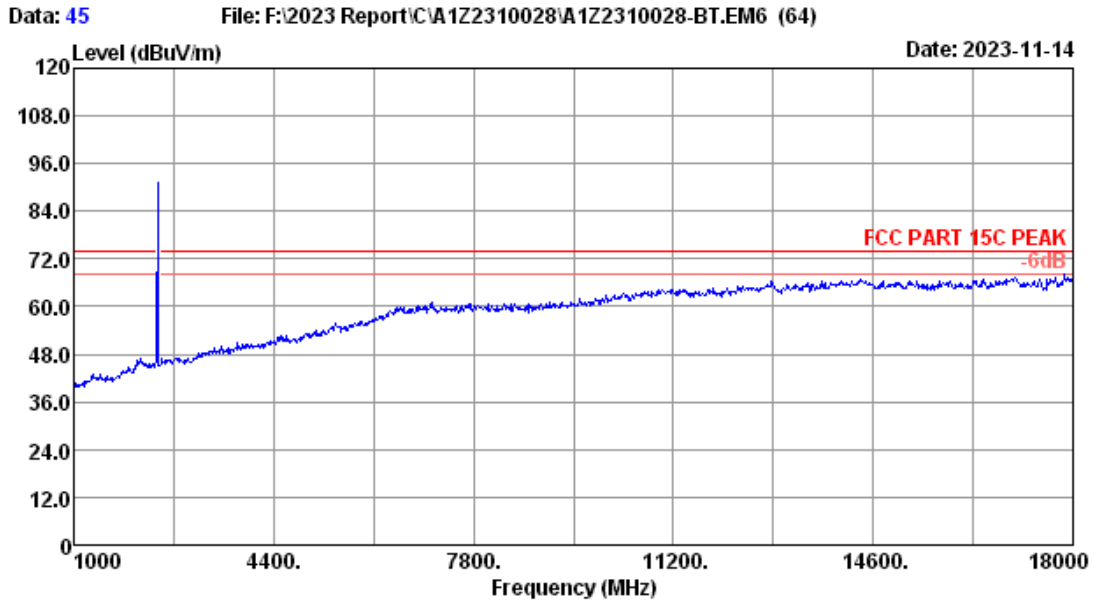
Site no.	: 3m Chamber	Data no.	: 43
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.2°C/51.3%	Engineer	: nier
Test Mode	: BLE1M 2402MHz TX		



Site no. : 3m Chamber Data no. : 44
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.2°C/51.3% Engineer : nier
 Test Mode : BLE1M 2402MHz TX

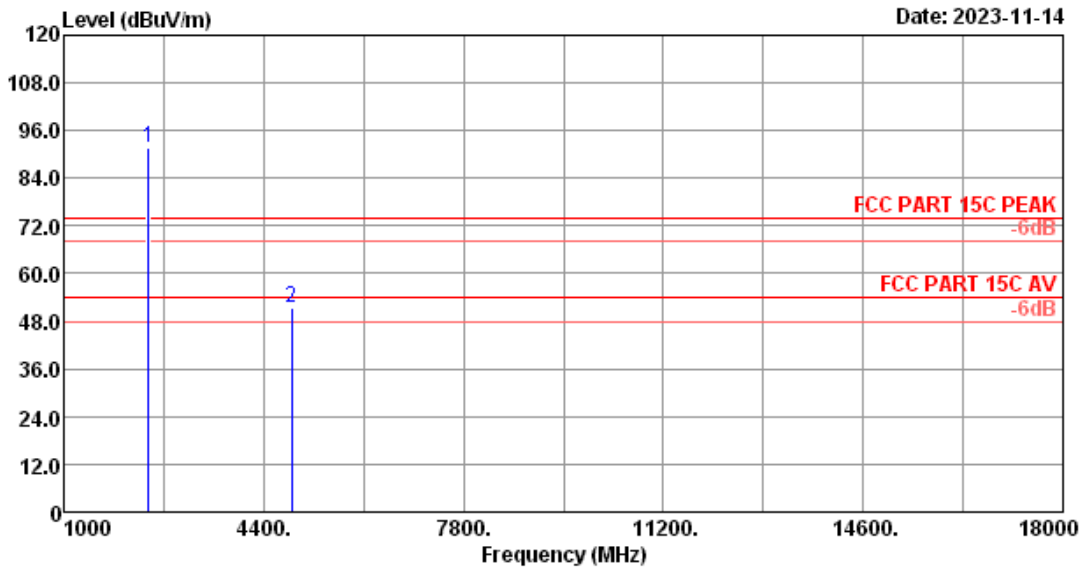
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.61	2.84	92.03	32.22	90.26	-----	-----	Peak
2	4804.00	31.20	3.95	47.48	31.08	51.55	74.00	22.45	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.



Site no.	: 3m Chamber	Data no.	: 45
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.2°C/51.3%	Engineer	: nier
Test Mode	: BLE1M 2440MHz TX		

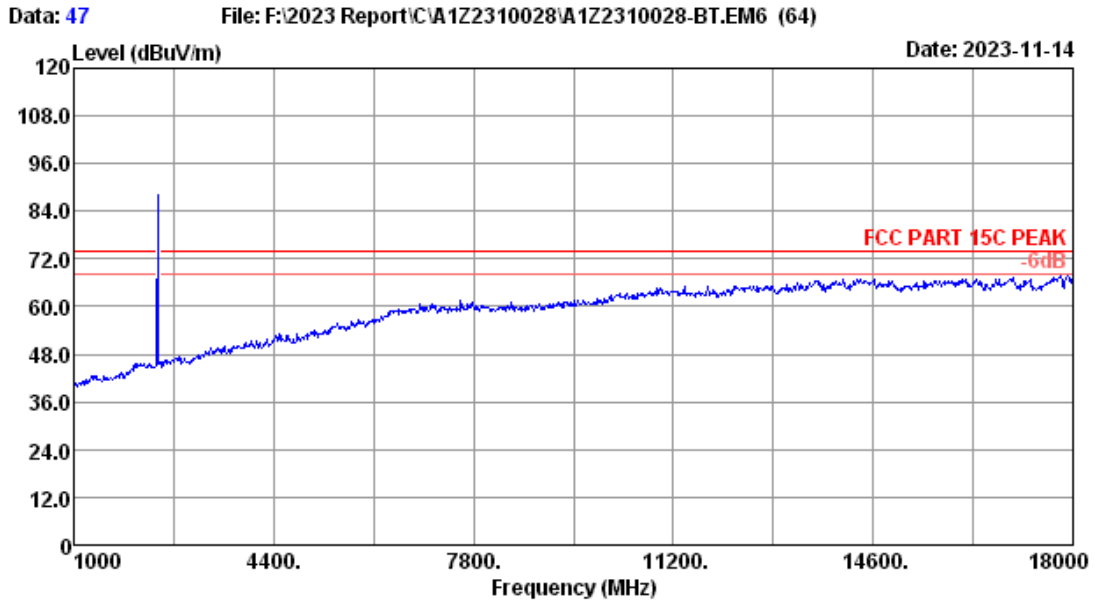
Data: 46 File: F:\2023 Report\C\A1Z2310028\A1Z2310028-BT.EM6 (64) Date: 2023-11-14



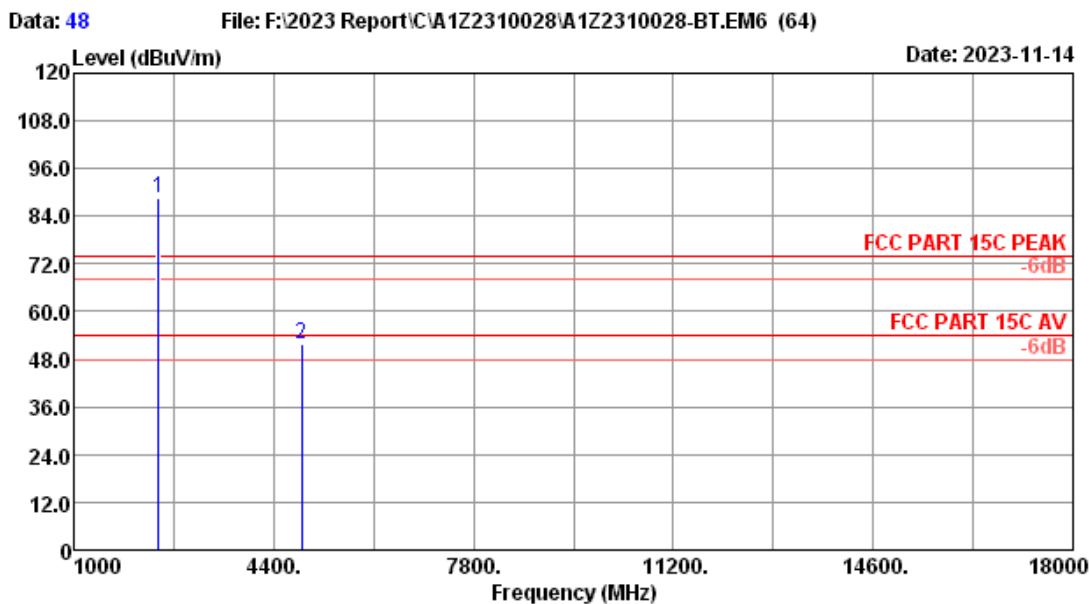
Site no. : 3m Chamber Data no. : 46
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.2*C/51.3% Engineer : nier
 Test Mode : BLE1M 2440MHz TX

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	2440.00	27.76	2.86	93.25	32.19	91.68	-----	-----	Peak
2	4880.00	31.44	3.98	47.14	31.05	51.51	74.00	22.49	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.



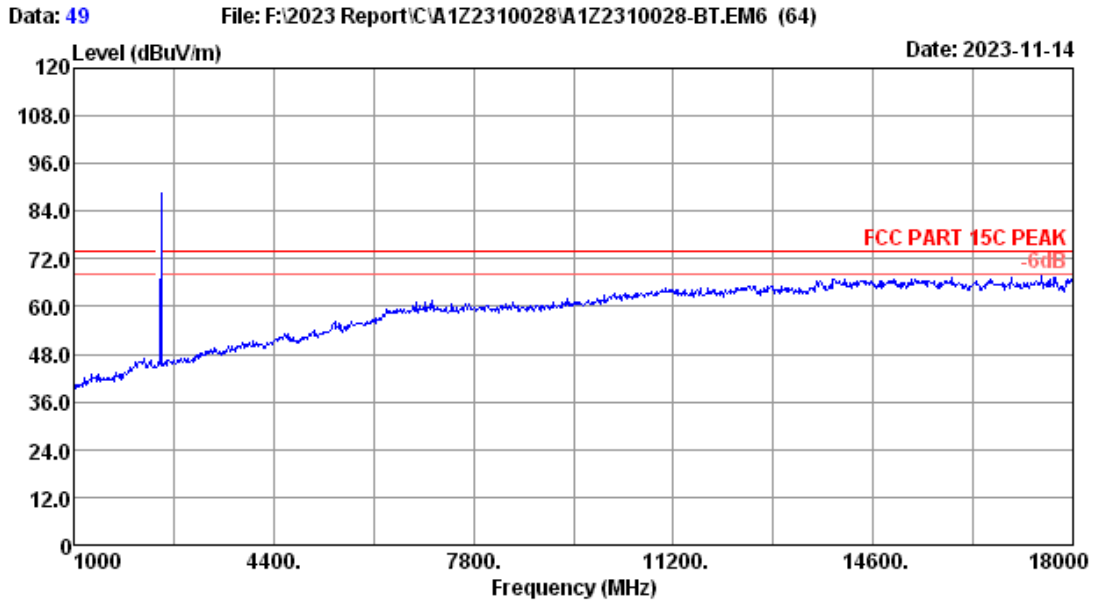
Site no. : 3m Chamber	Data no. : 47
Dis. / Ant. : 3m 2023 MCTD1209-3006	Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK	
Env. / Ins. : 21.2°C/51.3%	Engineer : nier
Test Mode : BLE1M 2440MHz TX	



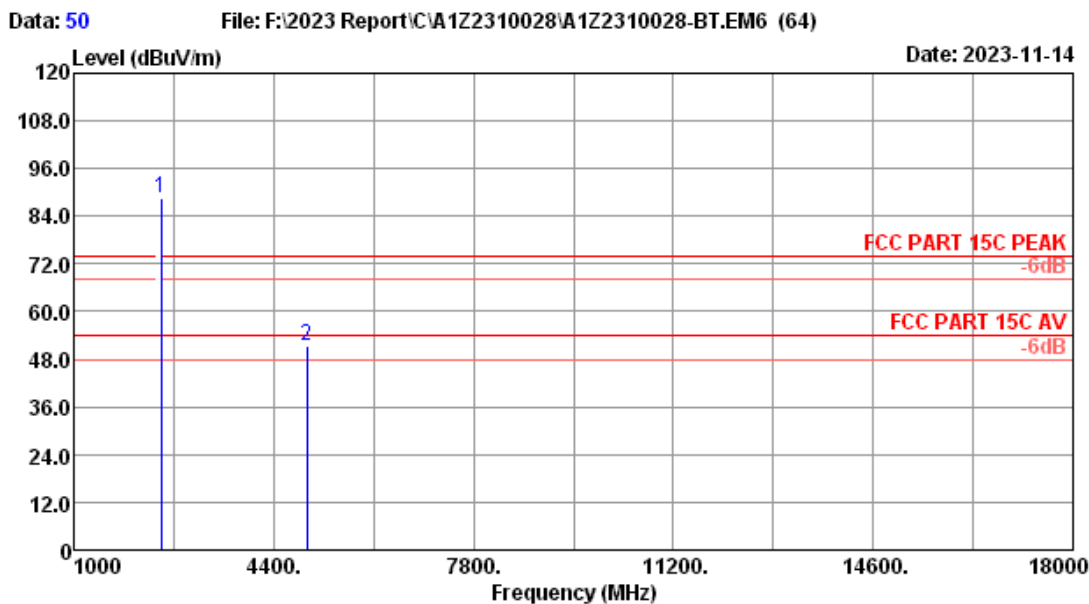
Site no. : 3m Chamber Data no. : 48
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.2°C/51.3% Engineer : nier
 Test Mode : BLE1M 2440MHz TX

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	2440.00	27.76	2.86	89.95	32.19	88.38	-----	-----	Peak
2	4880.00	31.44	3.98	47.53	31.05	51.90	74.00	22.10	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.



Site no.	: 3m Chamber	Data no.	: 49
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.2°C/51.3%	Engineer	: nier
Test Mode	: BLE1M 2480MHz TX		

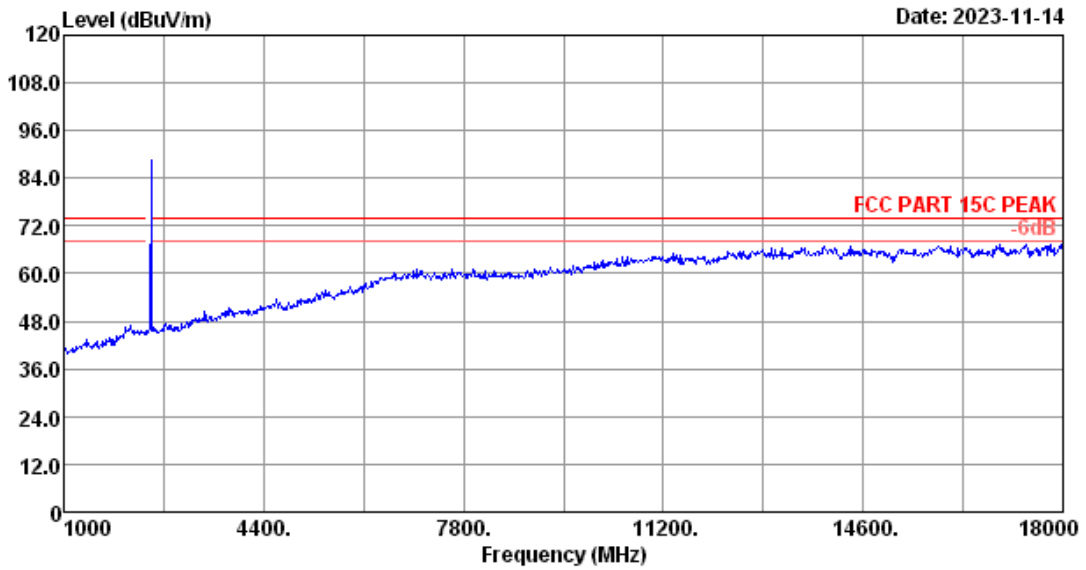


Site no. : 3m Chamber Data no. : 50
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.2°C/51.3% Engineer : nier
 Test Mode : BLE1M 2480MHz TX

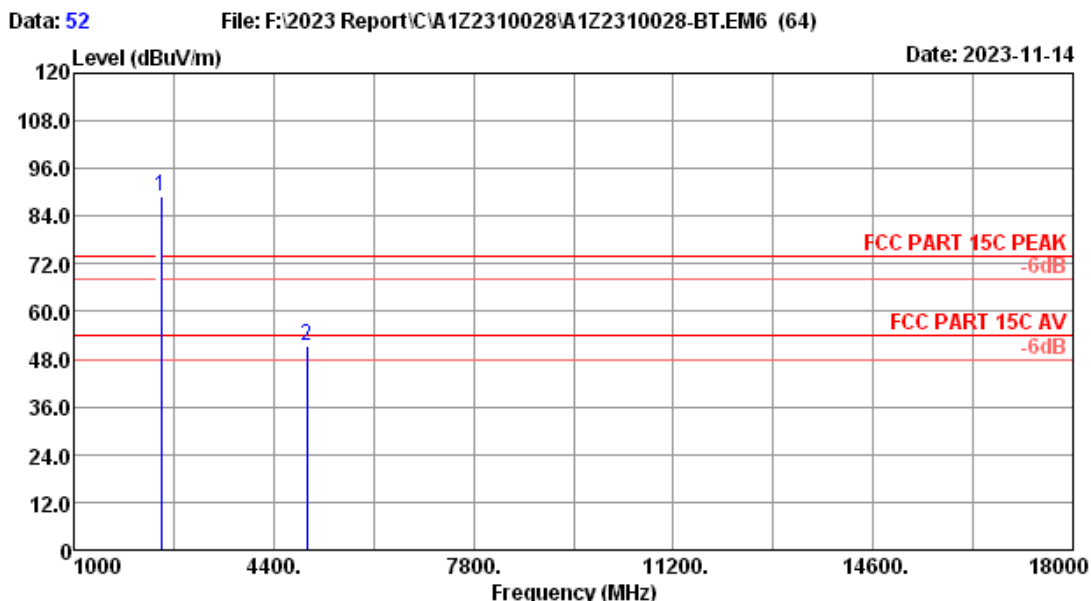
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	27.80	2.88	90.16	32.16	88.68	-----	-----	Peak
2	4960.00	31.98	4.01	46.51	31.02	51.48	74.00	22.52	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading - Amp factor.

Data: 51 File: F:\2023 Report\C\A1Z2310028\A1Z2310028-BT.EM6 (64) Date: 2023-11-14



Site no.	: 3m Chamber	Data no.	: 51
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK	Engineer	: nier
Env. / Ins.	: 21.2°C/51.3%		
Test Mode	: BLE1M 2480MHz TX		

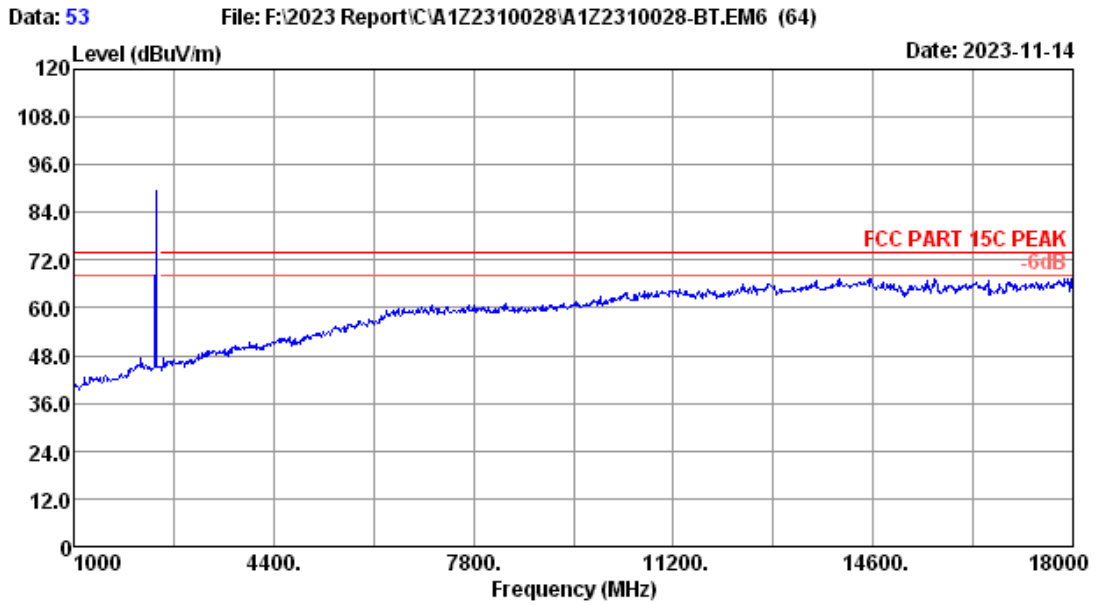


Site no. : 3m Chamber Data no. : 52
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.2°C/51.3% Engineer : nier
 Test Mode : BLE1M 2480MHz TX

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	2480.00	27.80	2.88	90.43	32.16	88.95	-----	-----	Peak
2	4960.00	31.98	4.01	46.56	31.02	51.53	74.00	22.47	Peak

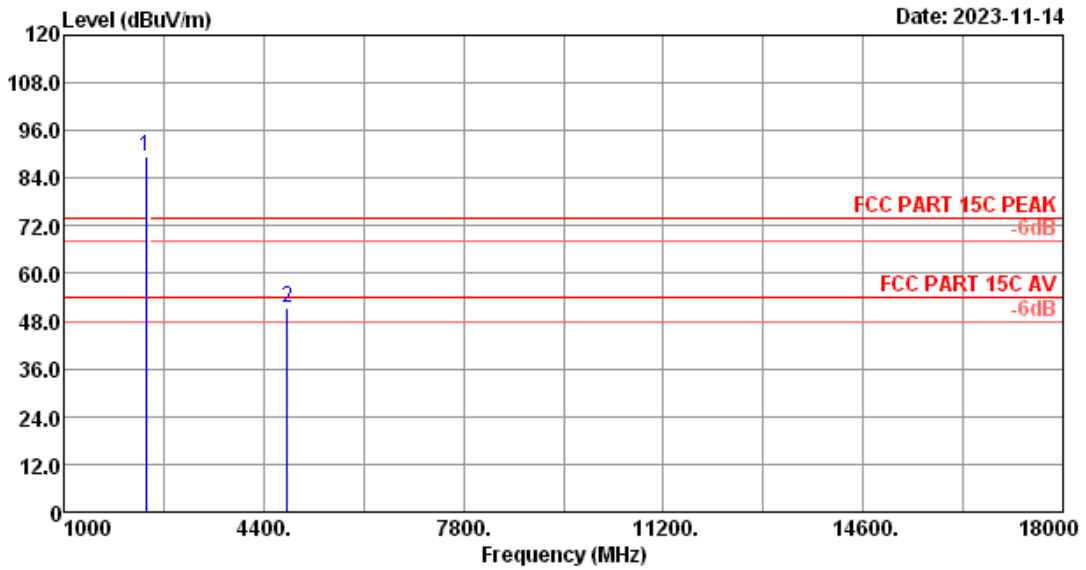
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.

BLE-2Mbps:



Site no.	: 3m Chamber	Data no.	: 53
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.2°C/51.3%	Engineer	: nier
Test Mode	: BLE2M 2402MHz TX		

Data: 54 File: F:\2023 Report\C\A1Z2310028\A1Z2310028-BT.EM6 (64) Date: 2023-11-14

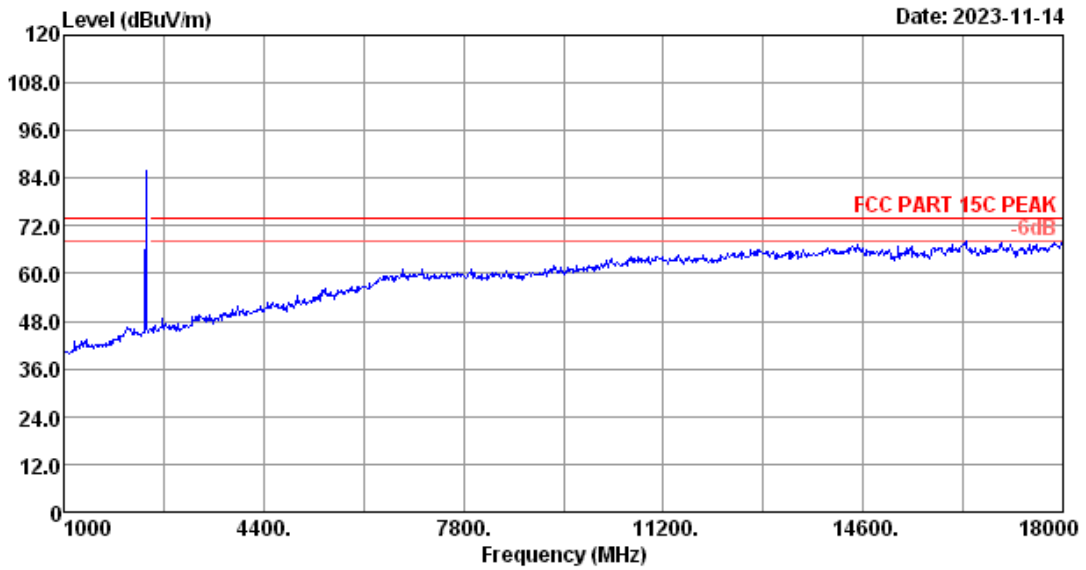


Site no. : 3m Chamber Data no. : 54
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.2°C/51.3% Engineer : nier
 Test Mode : BLE2M 2402MHz TX

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	2402.00	27.61	2.84	91.30	32.22	89.53	-----	-----	Peak
2	4804.00	31.20	3.95	47.09	31.08	51.16	74.00	22.84	Peak

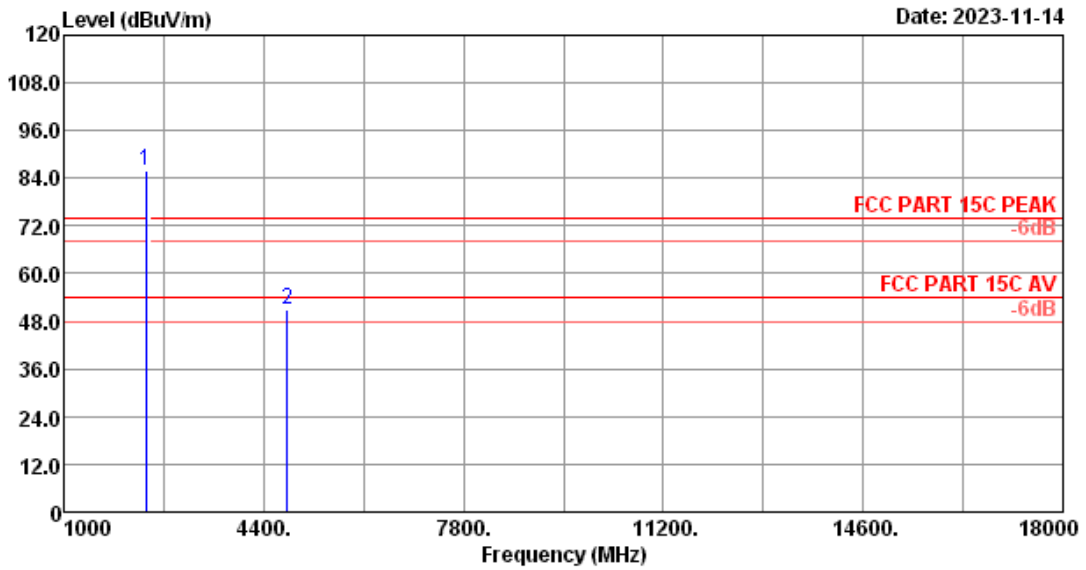
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.

Data: 55 File: F:\2023 Report\C\A1Z2310028\A1Z2310028-BT.EM6 (64) Date: 2023-11-14



Site no.	: 3m Chamber	Data no.	: 55
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.2°C/51.3%	Engineer	: nier
Test Mode	: BLE2M 2402MHz TX		

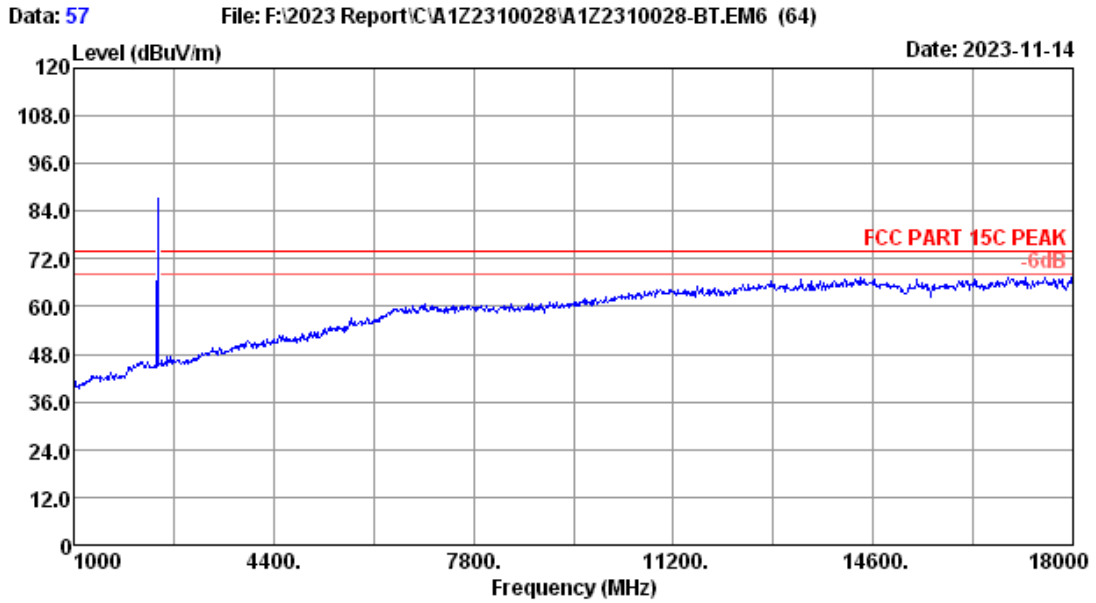
Data: 56 File: F:\2023 Report\C\A1Z2310028\A1Z2310028-BT.EM6 (64) Date: 2023-11-14



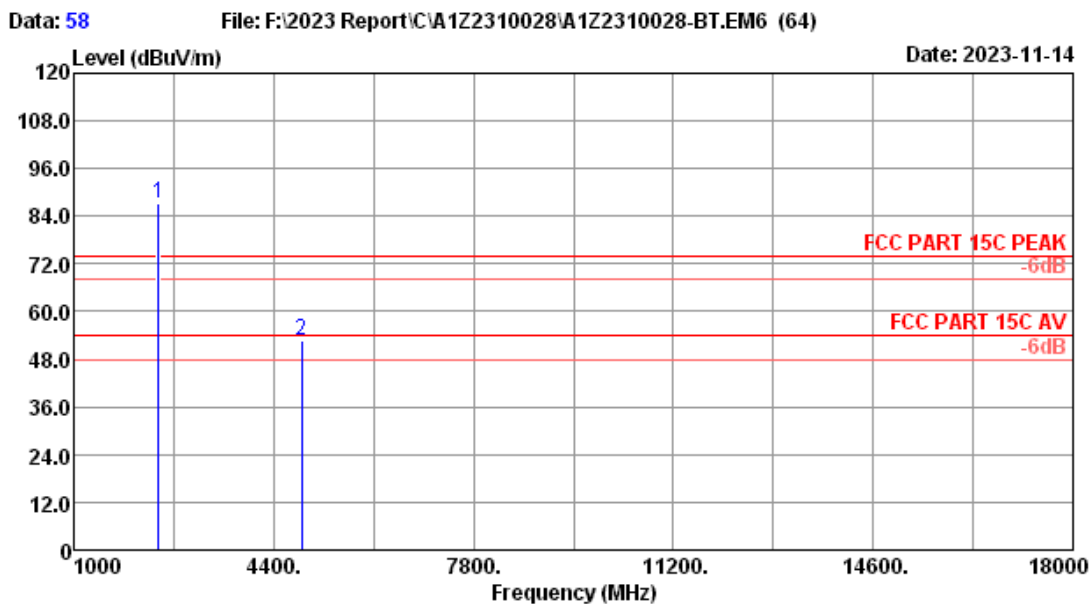
Site no. : 3m Chamber Data no. : 56
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.2°C/51.3% Engineer : nier
 Test Mode : BLE2M 2402MHz TX

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	2402.00	27.61	2.84	87.79	32.22	86.02	-----	-----	Peak
2	4804.00	31.20	3.95	47.04	31.08	51.11	74.00	22.89	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.



Site no.	: 3m Chamber	Data no.	: 57
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Engineer	: nier
Env. / Ins.	: 21.2°C/51.3%		
Test Mode	: BLE2M 2440MHz TX		

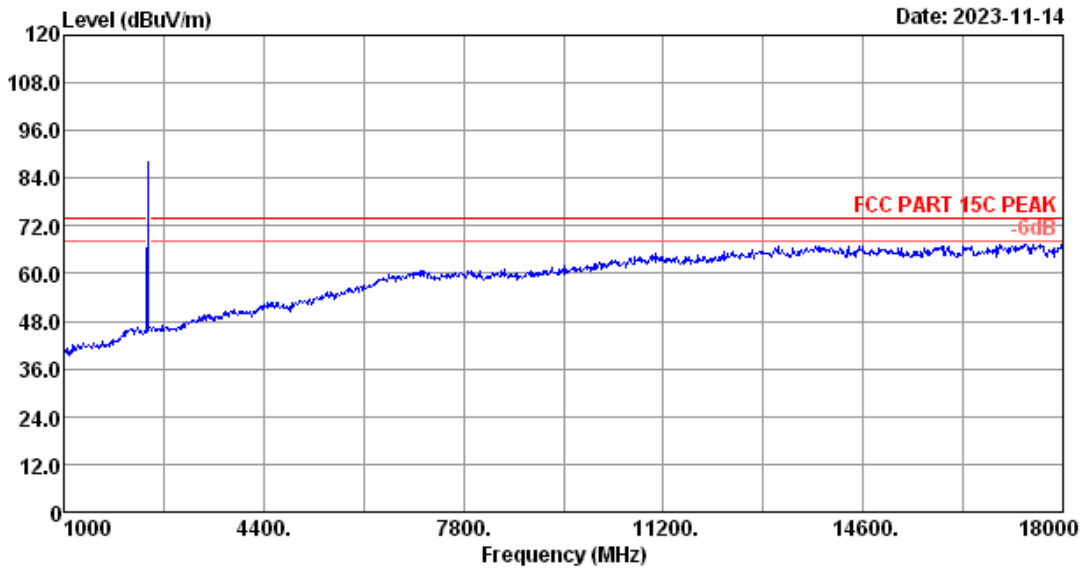


Site no. : 3m Chamber Data no. : 58
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.2°C/51.3% Engineer : nier
 Test Mode : BLE2M 2440MHz TX

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	2440.00	27.76	2.86	88.89	32.19	87.32	-----	-----	Peak
2	4880.00	31.44	3.98	48.33	31.05	52.70	74.00	21.30	Peak

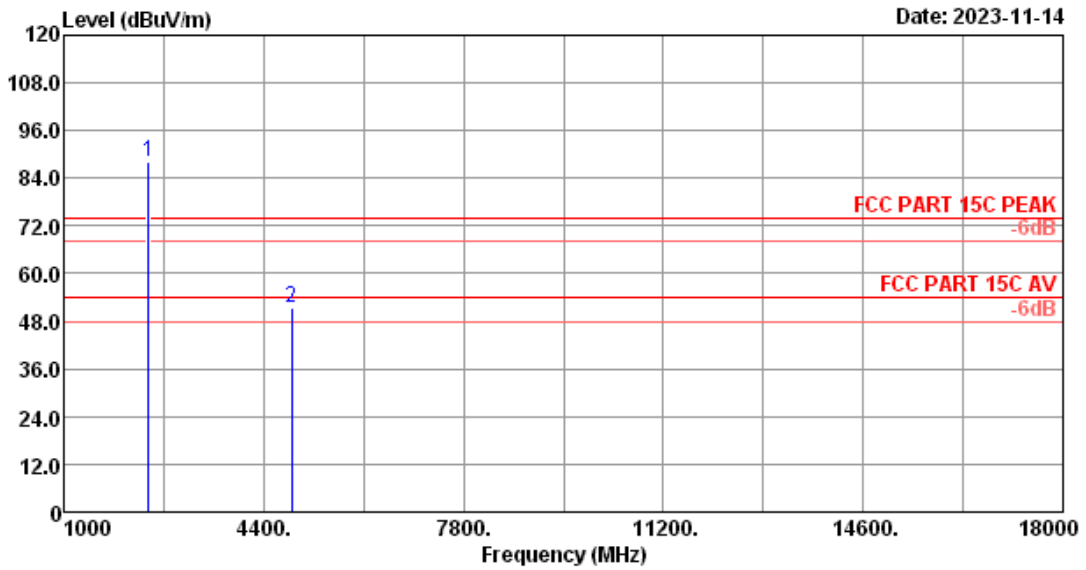
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.

Data: 59 File: F:\2023 Report\C\A1Z2310028\A1Z2310028-BT.EM6 (64) Date: 2023-11-14



Site no.	: 3m Chamber	Data no.	: 59
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK	Engineer	: nier
Env. / Ins.	: 21.2°C/51.3%		
Test Mode	: BLE2M 2440MHz TX		

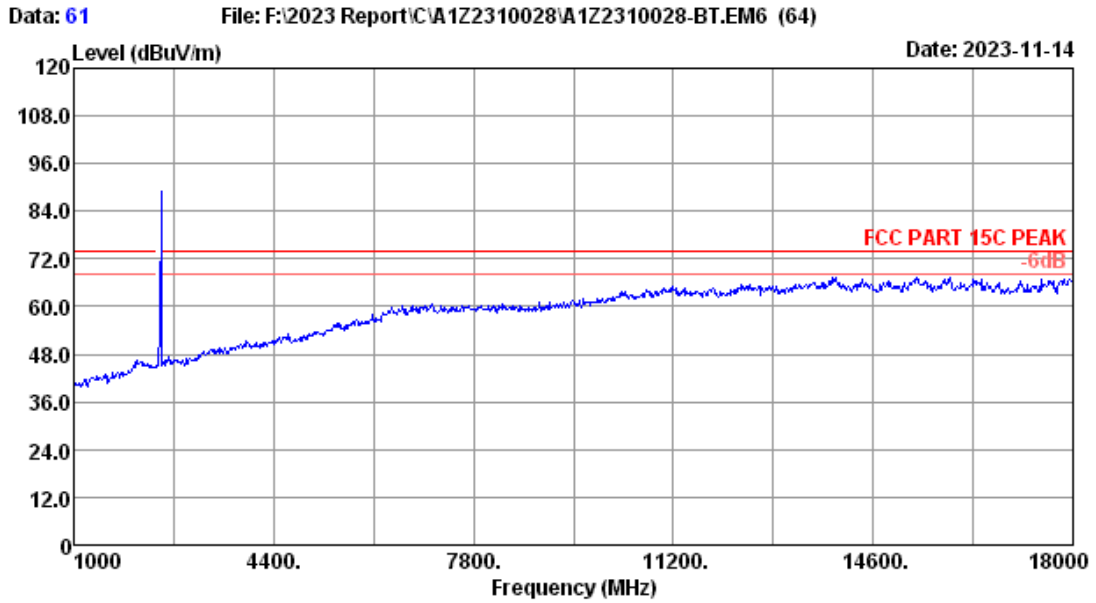
Data: 60 File: F:\2023 Report\C\A1Z2310028\A1Z2310028-BT.EM6 (64) Date: 2023-11-14



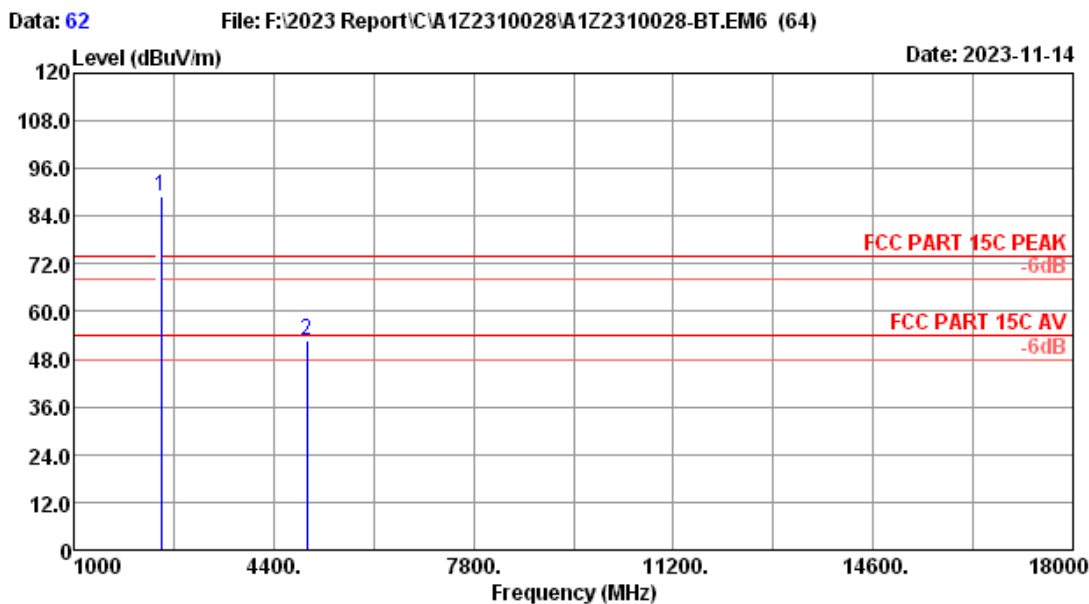
Site no. : 3m Chamber Data no. : 60
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.2*C/51.3% Engineer : nier
 Test Mode : BLE2M 2440MHz TX

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	2440.00	27.76	2.86	89.76	32.19	88.19	-----	-----	Peak
2	4880.00	31.44	3.98	46.98	31.05	51.35	74.00	22.65	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.



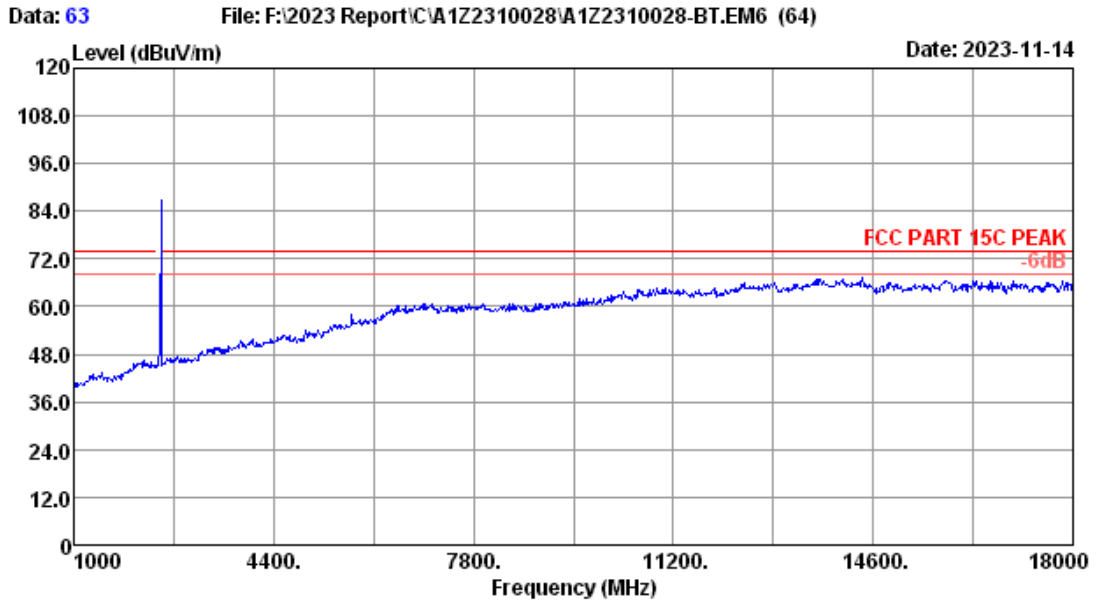
Site no.	: 3m Chamber	Data no.	: 61
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.2°C/51.3%	Engineer	: nier
Test Mode	: BLE2M 2480MHz TX		



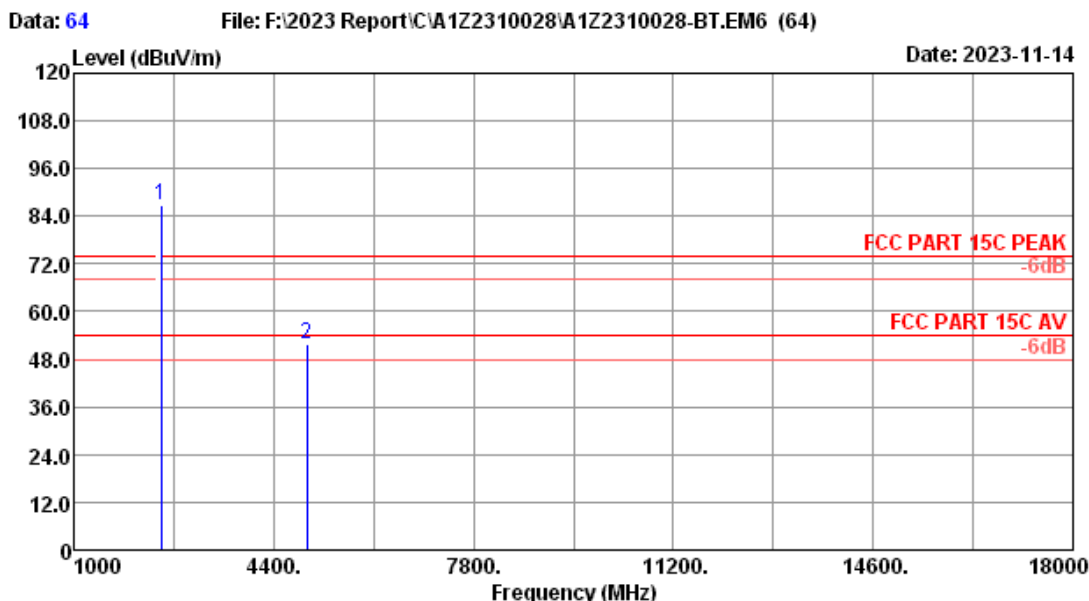
Site no. : 3m Chamber Data no. : 62
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.2°C/51.3% Engineer : nier
 Test Mode : BLE2M 2480MHz TX

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	2480.00	27.80	2.88	90.61	32.16	89.13	-----	-----	Peak
2	4960.00	31.98	4.01	47.52	31.02	52.49	74.00	21.51	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading - Amp factor.



Site no.	: 3m Chamber	Data no.	: 63
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.2°C/51.3%	Engineer	: nier
Test Mode	: BLE2M 2480MHz TX		



Site no. : 3m Chamber Data no. : 64
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.2°C/51.3% Engineer : nier
 Test Mode : BLE2M 2480MHz TX

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	2480.00	27.80	2.88	88.31	32.16	86.83	-----	-----	Peak
2	4960.00	31.98	4.01	46.99	31.02	51.96	74.00	22.04	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.

5. CONDUCTED SPURIOUS EMISSIONS

5.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.01,23	1 Year
2.	RF Cable	HUBER+SUHNER	SUCOFLEX-106	505238/6	Apr.02,23	1 Year
3.	Attenuator(10dB)	eastsheep	2W-SMA-JK-6G-10dB	No. 4	Sep.19,23	1 Year

5.2. Limit

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30dB instead of 20dB.

5.3. Test Procedure

Use the test method described in ANSI C63.10:

The transmitter output was connected to a spectrum analyzer, The resolution bandwidth is set to 100 kHz, The video bandwidth is set to 300 kHz and measure all the emissions With peak detector.

5.4. Test result

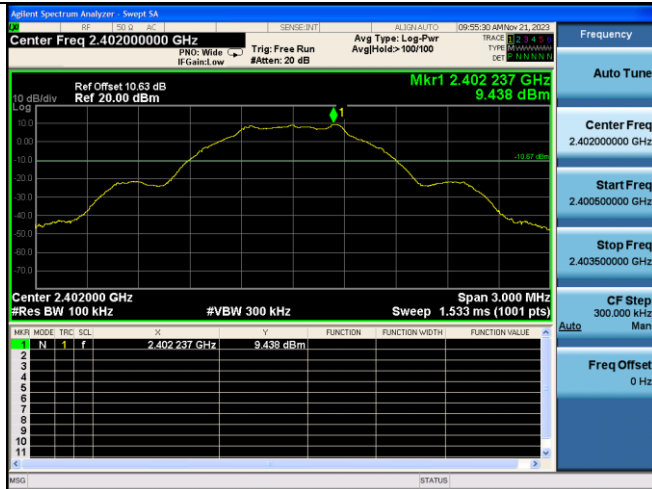
PASS (The testing data was attached in the next pages.)

EUT: Wi-Fi Module		
M/N: U9W44		
Test date: 2023-11-21	Pressure: 102.4±1.0 kpa	Humidity: 54.7±3.0%
Tested by: Lili	Test site: RF site	Temperature:23.6±0.6 °C

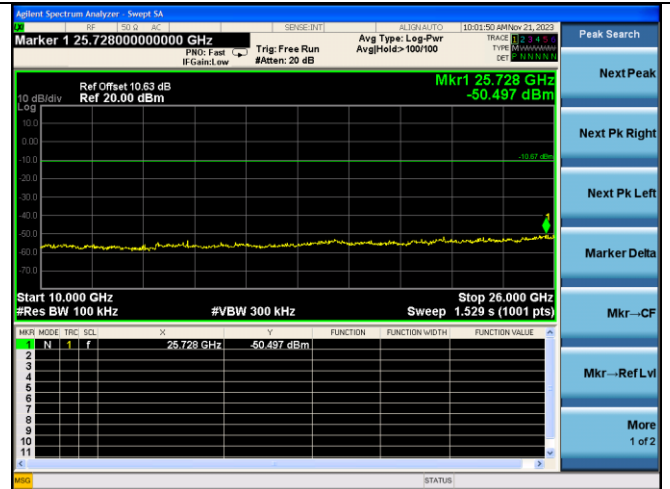
BLE-1Mbps:

GFSK

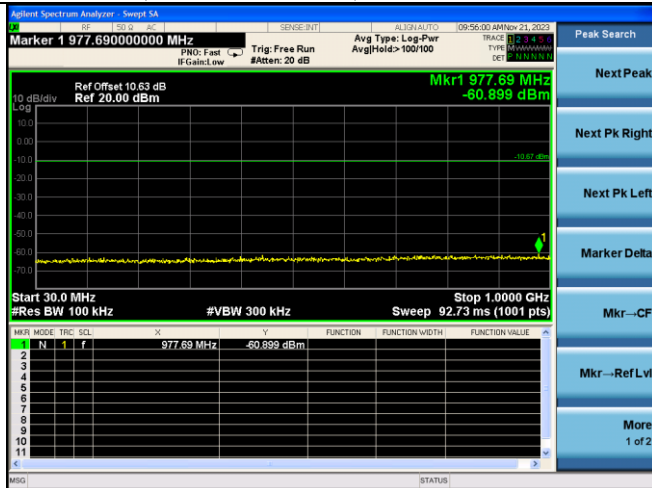
2402MHz



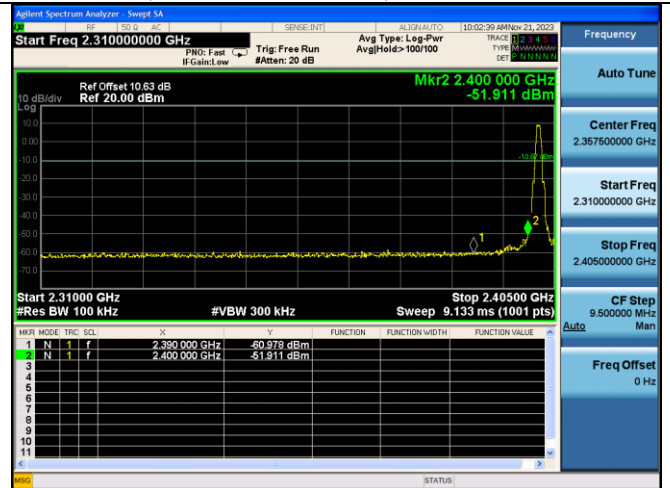
2402MHz(10GHz – 26GHz)



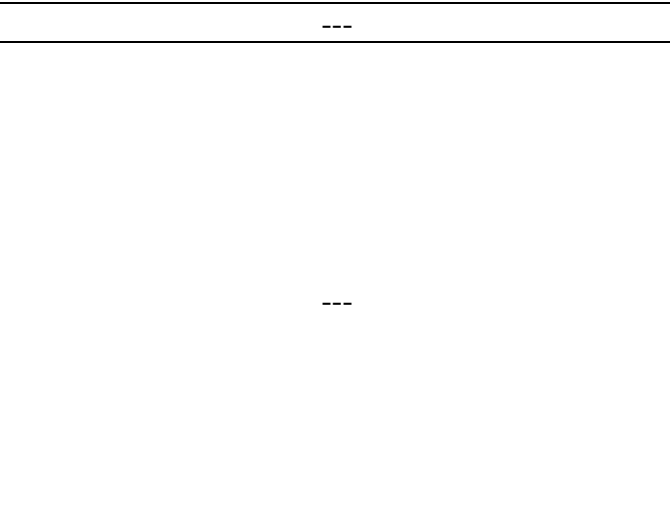
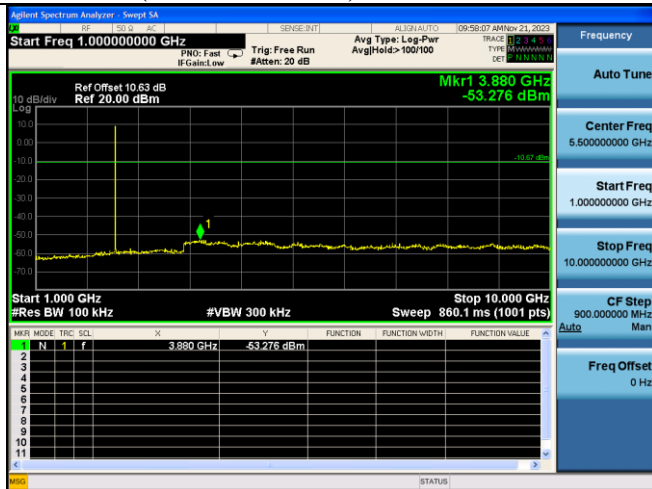
2402MHz(30MHz – 1GHz)



2402MHz(2.3GHz – 2.4GHz)



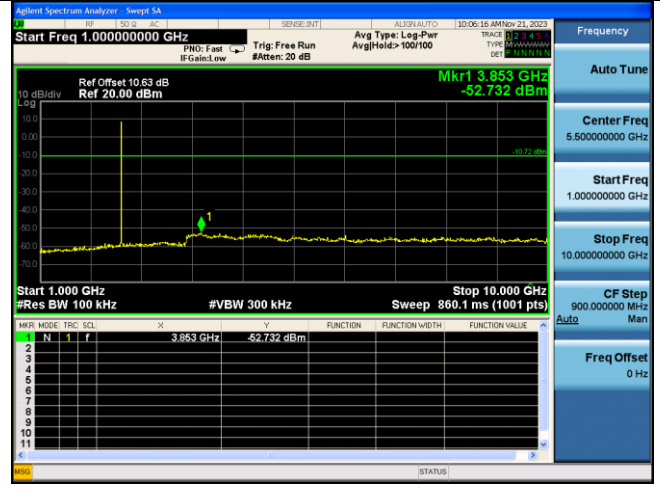
2402MHz(1GHz – 10GHz)



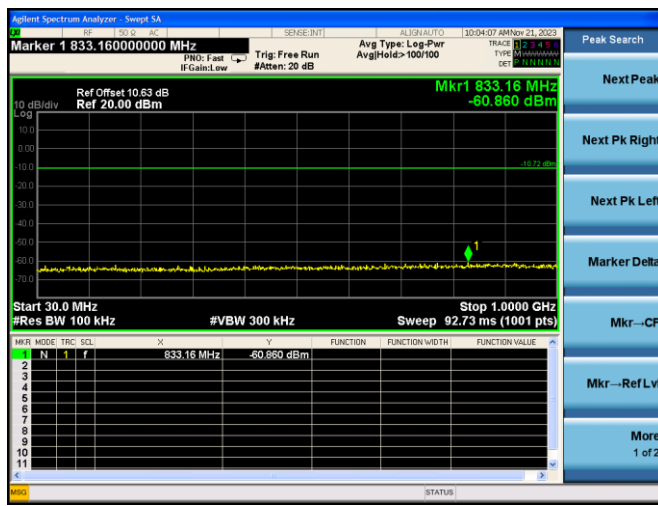
2440MHz



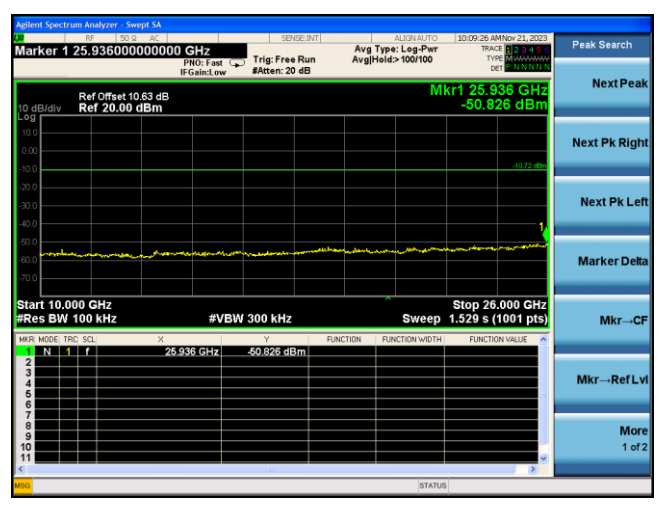
2440MHz(1GHz – 10GHz)



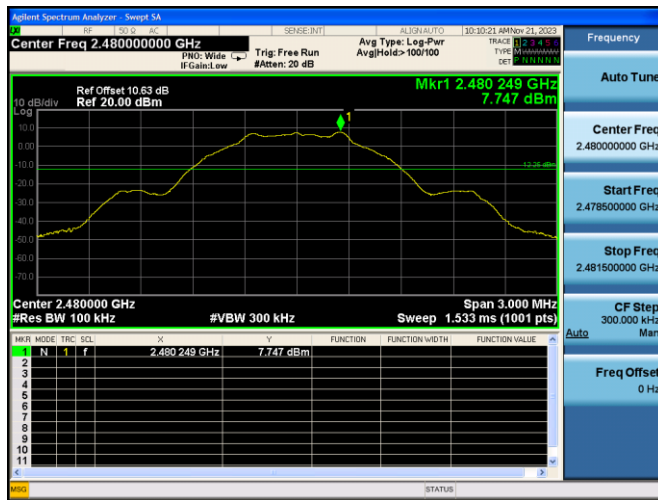
2440MHz(30MHz – 1GHz)



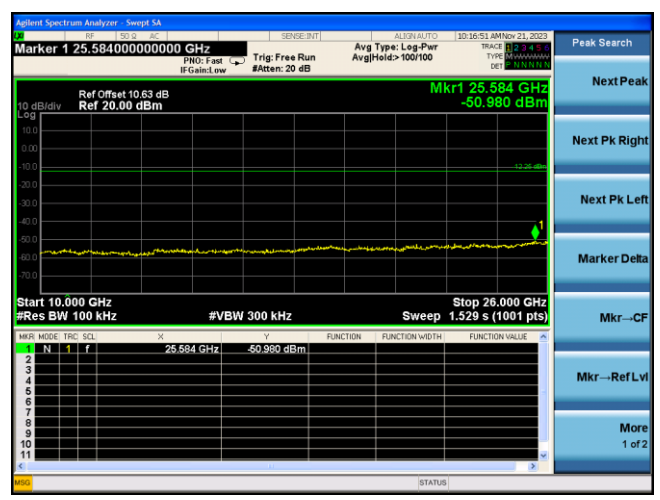
2440MHz(10GHz – 26GHz)



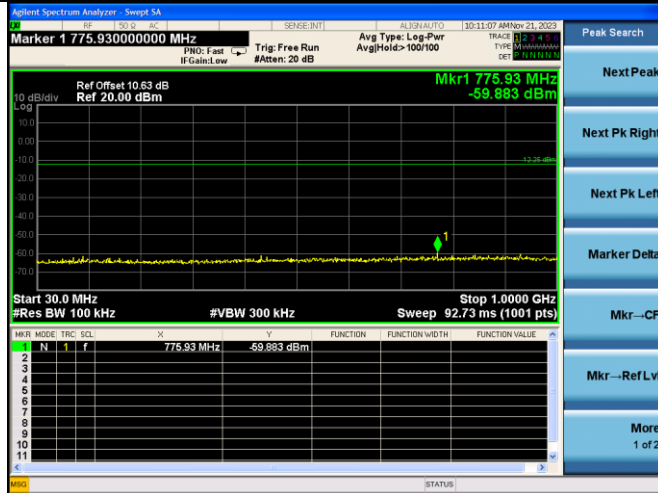
2480MHz



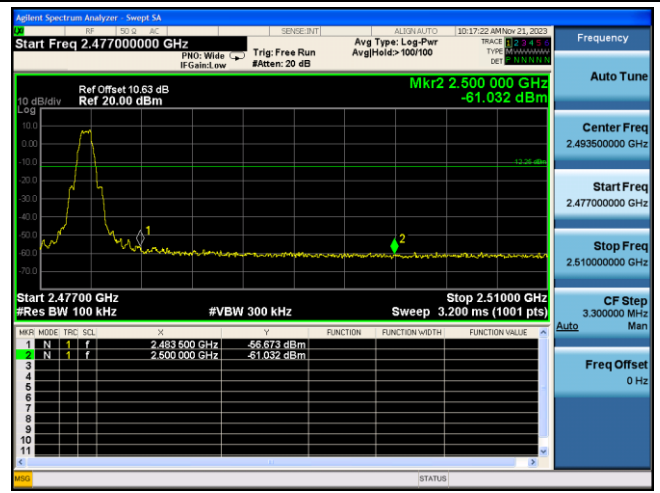
2480MHz(10GHz – 26GHz)



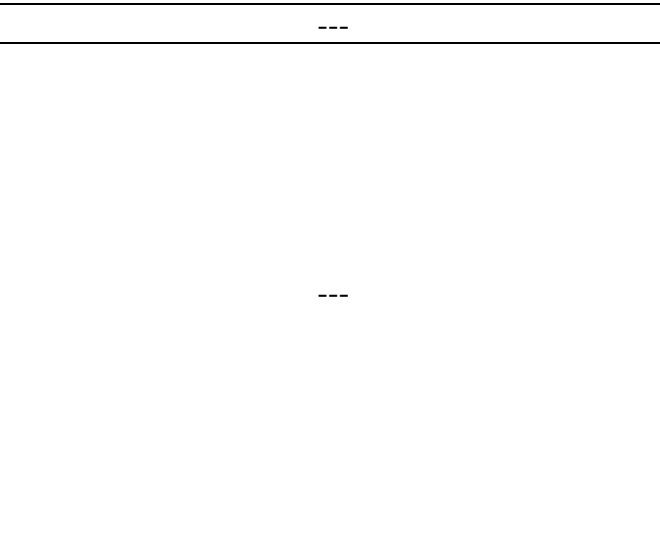
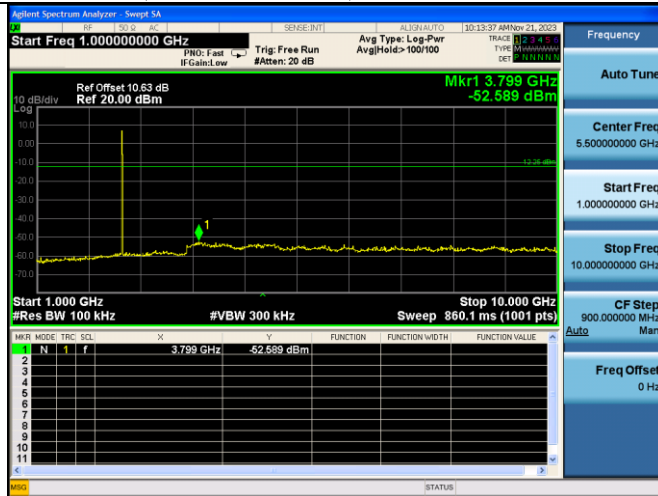
2480MHz(30MHz – 1GHz)



2480MHz(2.4GHz – 2.5GHz)



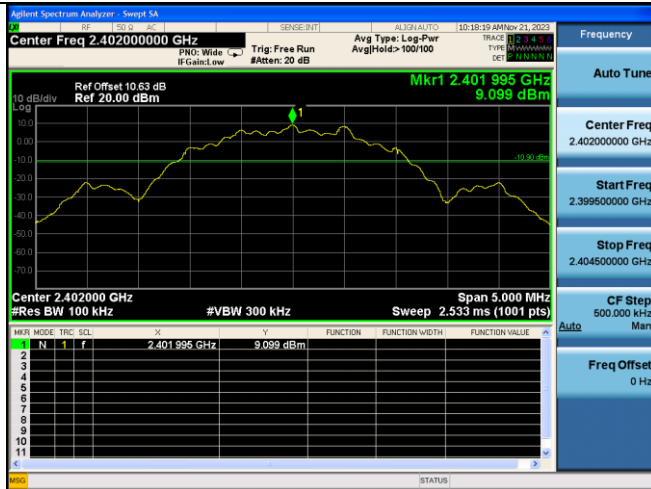
2480MHz(1GHz – 10GHz)



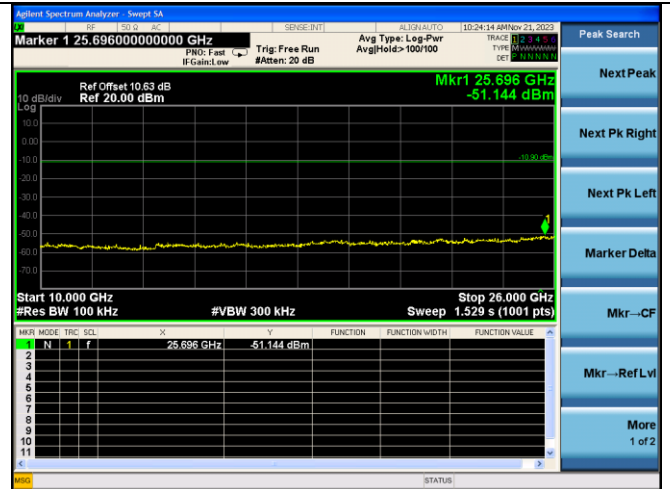
BLE-2Mbps:

GFSK

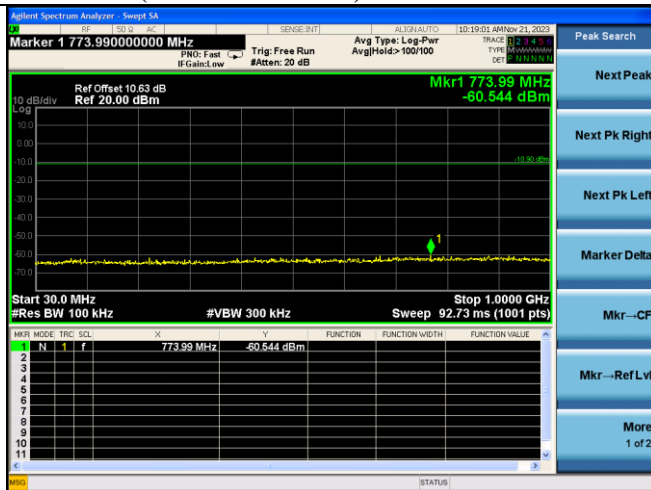
2402MHz



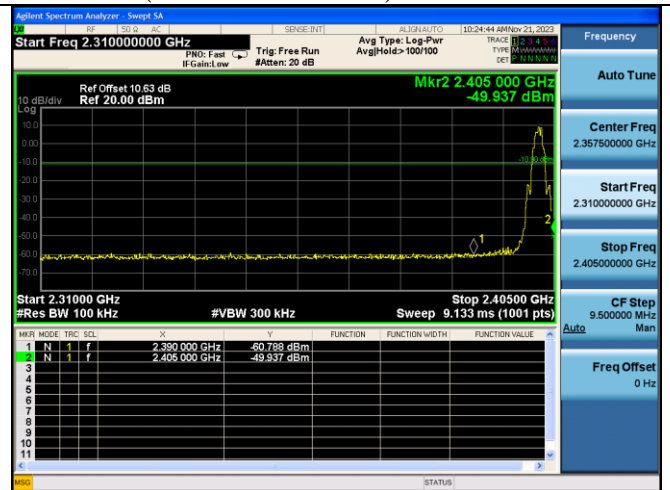
2402MHz(10GHz – 26GHz)



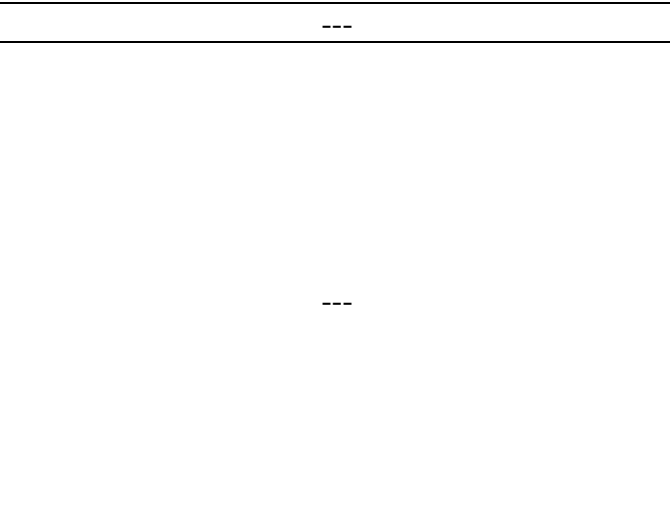
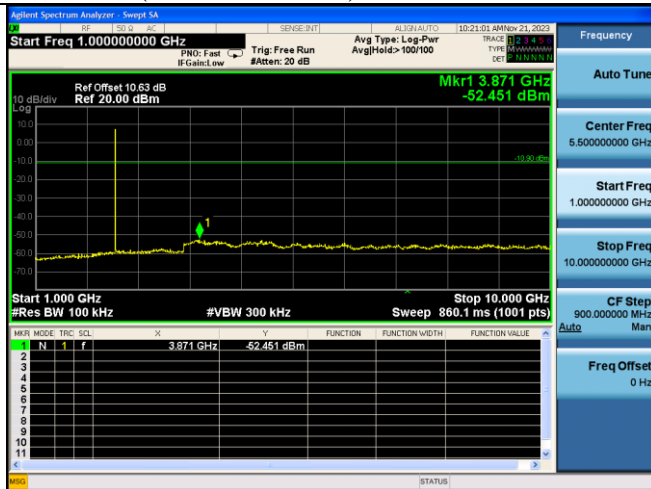
2402MHz(30MHz – 1GHz)



2402MHz(2.3GHz – 2.4GHz)



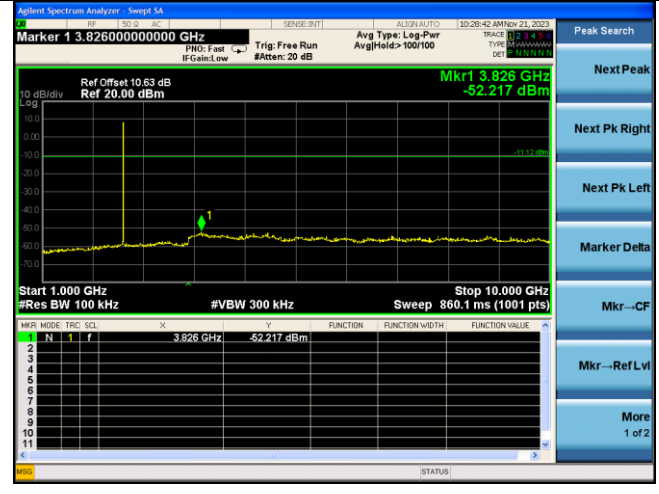
2402MHz(1GHz – 10GHz)



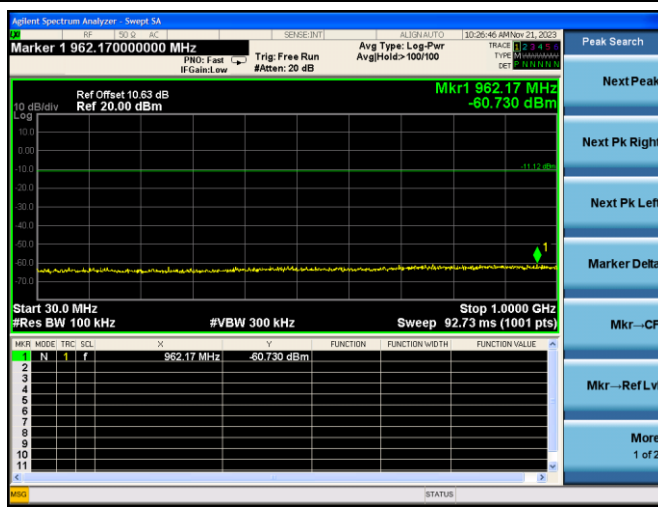
2440MHz



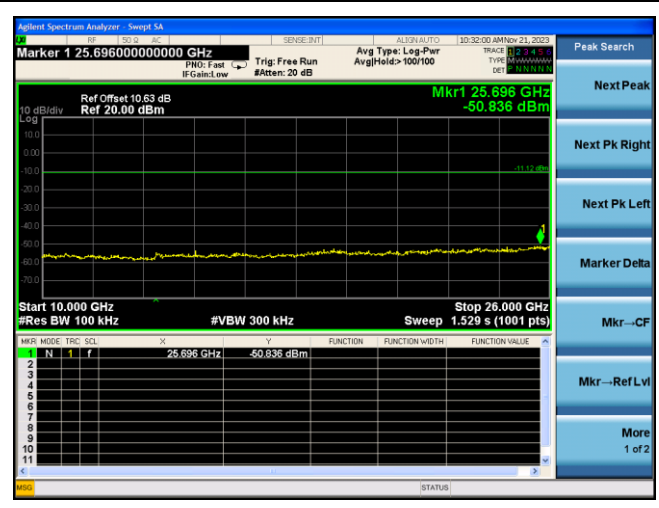
2440MHz(1GHz – 10GHz)



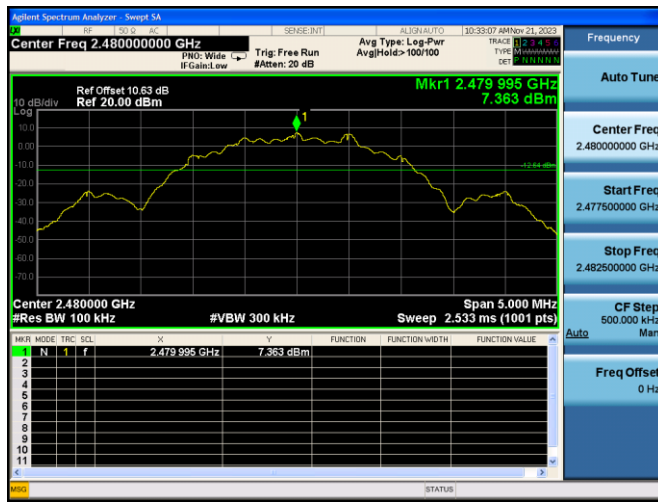
2440MHz(30MHz – 1GHz)



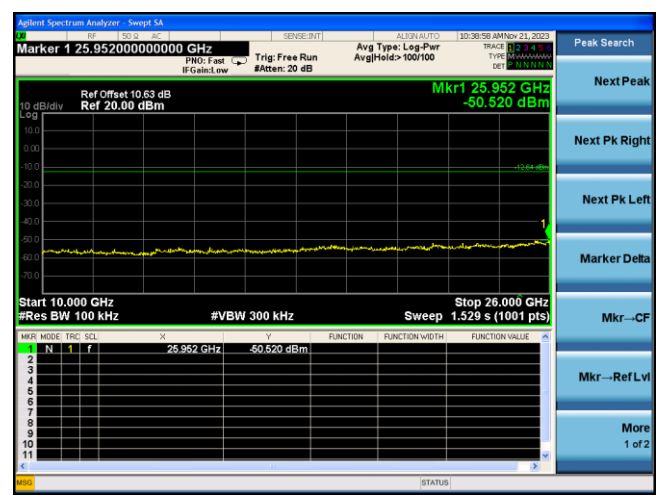
2440MHz(10GHz – 26GHz)



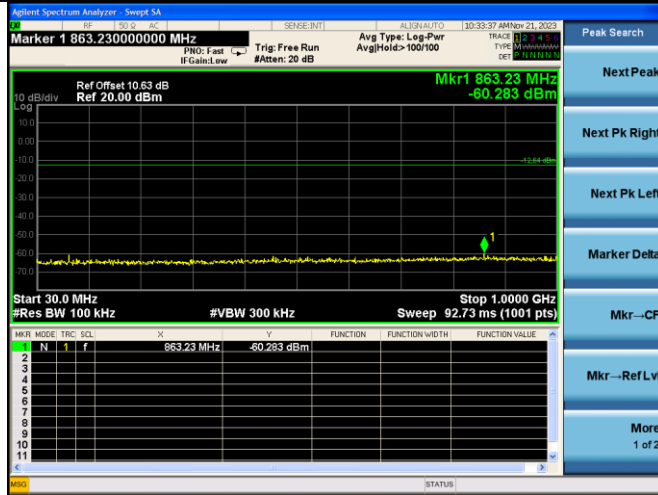
2480MHz



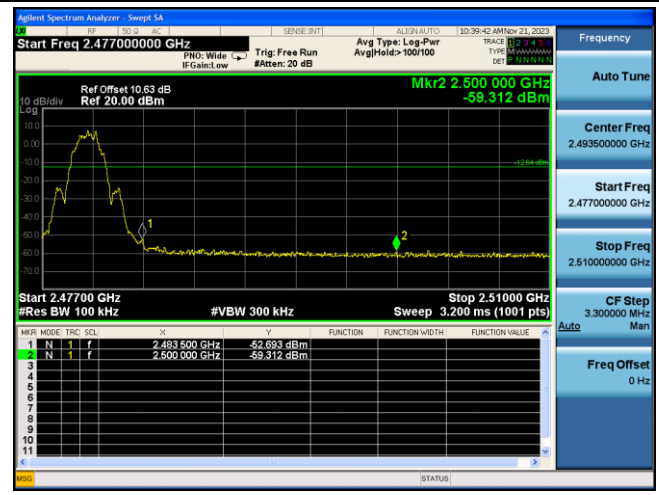
2480MHz(10GHz – 26GHz)



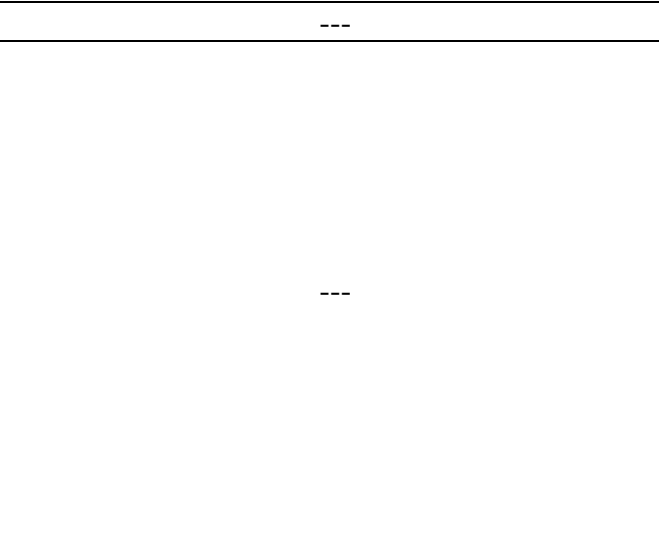
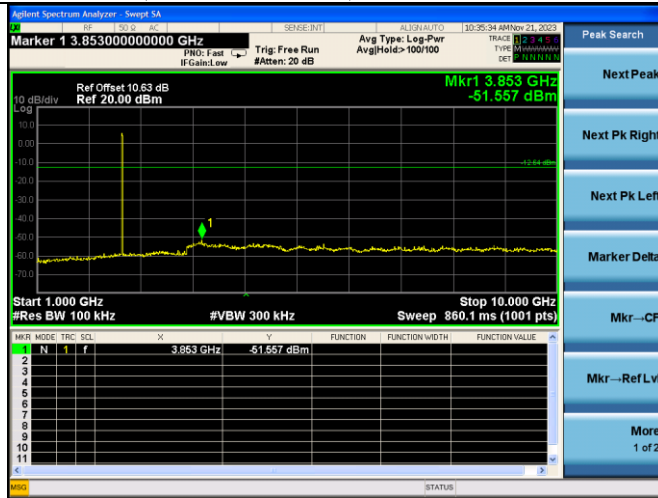
2480MHz(30MHz – 1GHz)



2480MHz(2.4GHz – 2.5GHz)



2480MHz(1GHz – 10GHz)



6. 6DB & 99% BANDWIDTH TEST

6.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.01,23	1 Year
2.	RF Cable	HUBER+SUHNER	SUCOFLE X-106	505238/6	Apr.02,23	1 Year
3.	Attenuator(10dB)	eastsheep	2W-SMA-J K-6G-10dB	No. 4	Sep.19,23	1 Year

6.2. Limit

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

6.3. Test Procedure

Use the test method described in ANSI C63.10 clause 11.8.2:

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described in 11.8.1 (i.e., $RBW = 100 \text{ kHz}$, $VBW \geq 3 \times RBW$, and peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be $\geq 6 \text{ dB}$.

Use the test method described in ANSI C63.10 clause 6.9.2:

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth:

- a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.
- c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than $[10 \log (OBW/RBW)]$ below the reference level. Specific guidance is given in 4.1.5.2.
- d) Step a) through step c) might require iteration to adjust within the specified range.
- e) 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.
- f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.

- g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. 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% power bandwidth is the difference between these two frequencies.
- h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

6.4. Test Results

BLE-1Mbps:

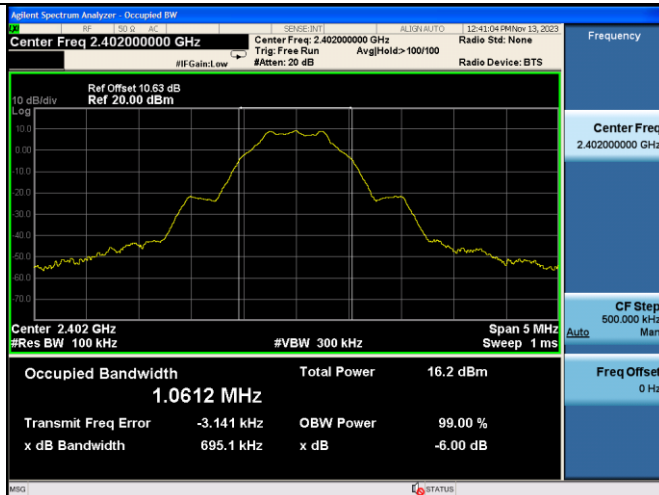
EUT: Wi-Fi Module		
M/N: U9W44		
Test date: 2023-11-13	Pressure: 101.3±1.0 kpa	Humidity: 52.4±3.0%
Tested by: Lili	Test site: RF site	Temperature: 23.1±0.6°C

Test Mode	Frequency (MHz)	-6dB Bandwidth (KHz)	Limit (KHz)
GFSK	2402	695.1	≥500
	2440	699.2	≥500
	2480	687.1	≥500

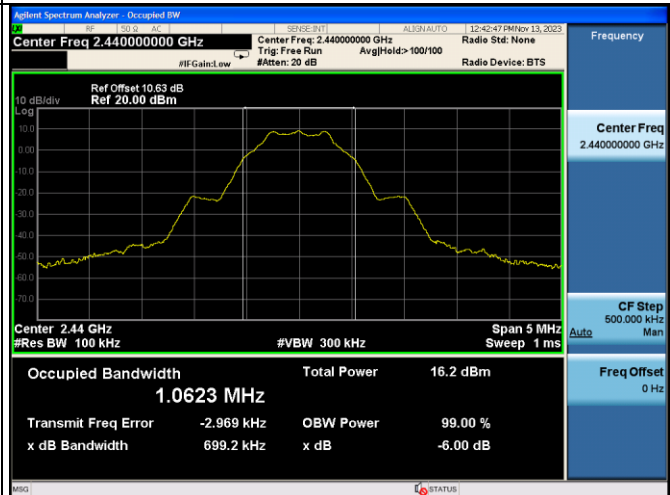
Conclusion : PASS

GFSK

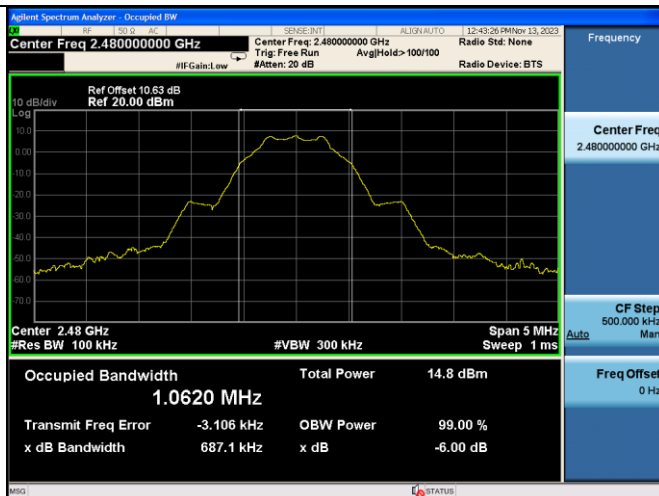
2402MHz



2440MHz



2480MHz



BLE-1Mbps:

EUT: Wi-Fi Module		
M/N: U9W44		
Test date: 2023-11-13	Pressure: 101.3±1.0 kpa	Humidity: 52.4±3.0%
Tested by: Lili	Test site: RF site	Temperature: 23.1±0.6°C

Test Mode	CH	99% Bandwidth (MHz)	Limit (MHz)
GFSK	2402	1.0387	N/A
	2440	1.0384	
	2480	1.0393	

Conclusion: Pass

GFSK	
<p>2402MHz</p> <p>Center Freq 2.40200000 GHz Occupied Bandwidth 1.0387 MHz Total Power 16.1 dBm Transmit Freq Error 5.119 kHz x dB Bandwidth 1.267 MHz</p>	<p>2440MHz</p> <p>Center Freq 2.44000000 GHz Occupied Bandwidth 1.0384 MHz Total Power 16.0 dBm Transmit Freq Error 5.209 kHz x dB Bandwidth 1.267 MHz</p>
<p>2480MHz</p> <p>Center Freq 2.48000000 GHz Occupied Bandwidth 1.0393 MHz Total Power 14.7 dBm Transmit Freq Error 4.987 kHz x dB Bandwidth 1.267 MHz</p>	<p>---</p>

BLE-2Mbps:

EUT: Wi-Fi Module		
M/N: U9W44		
Test date: 2023-11-13	Pressure: 101.3±1.0 kpa	Humidity: 52.4±3.0%
Tested by: Lili	Test site: RF site	Temperature: 23.1±0.6°C

Test Mode	Frequency (MHz)	-6dB Bandwidth (KHz)	Limit (KHz)
GFSK	2402	1178	≥ 500
	2440	1168	≥ 500
	2480	1180	≥ 500

Conclusion : PASS

GFSK	
<p>2402MHz</p> <p>Center Freq 2.40200000 GHz Occupied Bandwidth: 2.0748 MHz Total Power: 17.0 dBm Transmit Freq Error: 601 Hz x dB Bandwidth: 1.178 MHz</p>	<p>2440MHz</p> <p>Center Freq 2.44000000 GHz Occupied Bandwidth: 2.0736 MHz Total Power: 16.8 dBm Transmit Freq Error: -2.069 kHz x dB Bandwidth: 1.168 MHz</p>
<p>2480MHz</p> <p>Center Freq 2.48000000 GHz Occupied Bandwidth: 2.0738 MHz Total Power: 15.6 dBm Transmit Freq Error: -1.210 kHz x dB Bandwidth: 1.180 MHz</p>	<p>---</p>

BLE-2Mbps:

Test Mode	CH	99% Bandwidth (MHz)	Limit (MHz)
GFSK	2402	2.0717	N/A
	2440	2.0726	
	2480	2.0741	
Conclusion: Pass			

GFSK	
<p>2402MHz</p> <p>Center Freq: 2.402 GHz Occupied Bandwidth: 2.0717 MHz Total Power: 16.4 dBm Transmit Freq Error: 8.708 kHz x dB Bandwidth: 2.511 MHz</p>	<p>2440MHz</p> <p>Center Freq: 2.44 GHz Occupied Bandwidth: 2.0726 MHz Total Power: 16.3 dBm Transmit Freq Error: 8.254 kHz x dB Bandwidth: 2.512 MHz</p>
<p>2480MHz</p> <p>Center Freq: 2.48 GHz Occupied Bandwidth: 2.0741 MHz Total Power: 15.0 dBm Transmit Freq Error: 7.609 kHz x dB Bandwidth: 2.514 MHz</p>	<p>---</p>

7. MAXIMUM PEAK OUTPUT POWER TEST

7.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.01,23	1 Year
2.	Power meter	Anritsu	ML2487A	6K00002472	Jun.26,23	1 Year
3.	Power sensor	Anritsu	MA2491A	032516	Jun.26,23	1 Year
4.	RF Cable	HUBER+SUHNER	SUCOFLE X-106	505238/6	Apr.02,23	1 Year
5.	Attenuator(10dB)	eastsheep	2W-SMA-J K-6G-10dB	No. 4	Sep.19,23	1 Year

7.2. Limit

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

7.3. Test Procedure

Use the test method descried in ANSI C63.10 clause 11.9.1.3:

For Peak output power: Connected the EUT's Antenna port to PXA signal analyzer;

For Average power: Connected the EUT's Antenna port to Power sensor and power meter;

7.4. Test Results

EUT: Wi-Fi Module		
M/N: U9W44		
Test date: 2023-11-13	Pressure: 102.4±2.0 kpa	Humidity: 54.7±3.0%
Tested by: Lili	Test site: RF site	Temperature: 23.6±0.6°C

BLE-1Mbps:

Test Mode	Frequency (MHz)	Power Setting	Peak output Power (dBm)	Limit (dBm)
GFSK	2402	7	9.813	30
	2440	7	9.661	30
	2480	7	8.352	30
Conclusion: PASS				

BLE-2Mbps:

Test Mode	Frequency (MHz)	Power Setting	Peak output Power (dBm)	Limit (dBm)
GFSK	2402	7	9.758	30
	2440	7	9.659	30
	2780	7	8.345	30
Conclusion: PASS				