

FCC PART 15C TEST REPORT FOR CERTIFICATION

On Behalf of

Shenzhen Horn Audio Co., Ltd.

DELL Wireless Headset

Brand: DELL

Model: HS2403

FCC ID: 2BA5W-HS2403

Prepared for : Shenzhen Horn Audio Co., Ltd.

No. 6,4th Guihua Road, Pingshan New District, Shenzhen City,
Guangdong Province, P.R. China

Prepared By : Audix Technology (Shenzhen) Co., Ltd.

No. 6, Kefeng Road, Science & Technology Park,
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Report Number : ACS-F23093

Date of Test : Apr.28~Jun.01, 2023

Date of Report : Jun.14, 2023

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Appendix A. Photograph of Test

Appendix B. Photo of the EUT

TEST REPORT

Applicant : Shenzhen Horn Audio Co., Ltd.
Product : DELL Wireless Headset
FCC ID : 2BA5W-HS2403
(A) Model No. : HS2403
(B) Brand : DELL
(C) Test Voltage : DC 5V 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 federal government.

Date of Test : Apr.28~Jun.01, 2023 Report of date: Jun.14, 2023

Prepared by : Crush Liu Reviewed by : Thomas Chen
Crush Liu / Assistant Thomas Chen / Assistant Manager



Approved & Authorized Signer : 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
6dB Bandwidth Test	FCC Part 15: 15.247(b)(3) ANSI C63.10 : 2020	PASS
Maximum Peak Output Power Test	FCC Part 15: 15.247(d) ANSI C63.10 : 2020	PASS
Band Edge Compliance Test	FCC Part 15: 15.247(e) ANSI C63.10 : 2020	PASS
Power Spectral Density Test	FCC Part 15: 15.207 ANSI C63.10 :2020	PASS
Antenna requirement	FCC Part 15: 15.203	PASS
Note: Measurement uncertainty affection to the result is considered, the EUT is technically compliant with standard requirements.		

2. GENERAL INFORMATION

2.1. Description of Equipment Under Test

Applicant	Shenzhen Horn Audio Co., Ltd.
Applicant Address	No. 6,4th Guihua Road, Pingshan New District, Shenzhen City, Guangdong Province, P.R. China
Manufacturer	Shenzhen Horn Audio Co., Ltd.
Manufacturer Address	No. 6,4th Guihua Road, Pingshan New District, Shenzhen City, Guangdong Province, P.R. China
Factory#1	Shenzhen Horn Audio Co., Ltd.
Factory Address#1	No. 6,4th Guihua Road, Pingshan New District, Shenzhen City, Guangdong Province, P.R. China
Factory#2	HORN (VIETNAM) COMPANY LIMITED
Factory Address#2	No.2, No.6 and No.8 Standard Factory, land Lot CN1, An Duong Industrial Zone, Hong Phong Commune, An Duong District, Hai Phong City, Vietnam.
Product	DELL Wireless Headset
Model No.	HS2403
Brand	DELL
Type-C Cable	Shielded; Detachable; 1.5m
FCC ID	2BA5W-HS2403
Sample Type	Prototype production
Date of Receipt	Apr.23, 2023
Date of Test	Apr.28~Jun.01, 2023
Remark: This report only for BLE.	

2.2.Feature of Equipment Under Test

Product Feature & Specification	
Product	DELL Wireless Headset
Test Model	HS2403
Power Source	DC 3.7V
Bluetooth	
Radio	BDR +EDR; BLE
Frequency Range	2400-2483.5MHz
Type of Modulation	GFSK, $\pi/4$ DQPSK, 8DPSK
Data Rate	1Mbps, 2Mbps, 3Mbps
Quantity of Channels	79/40
Channel Separation	1MHz/2MHz

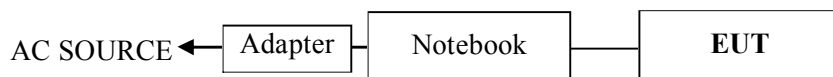
Antenna System	
Type of Antenna	Dipole Antenna
Antenna Peak Gain	Bluetooth Peak Gain: 2.87dBi

2.3. Tested Supporting System Details

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

2.4. Block Diagram of connection between EUT and simulators

For power line conducted emission and radiated emission test:



(EUT: DELL Wireless Headset)

2.5. Test information

A special software (AB1565/68 Lab Test Tool-3.2.2) 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
Note: use the data rate which has the maximum power for the test.			

Tested mode, channel, and data rate information			
Mode	data rate (Mbps)	Channel	Frequency (MHz)
Tx Mode GFSK modulation	2	Low :CH 1	2404
	2	Middle: CH19	2440
	2	High: CH38	2478
Note: use the data rate which has the maximum power for the test.			

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

: Certificated by TAF, Taiwan
Registration No: 1418
Valid Date: Nov.08, 2023

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

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

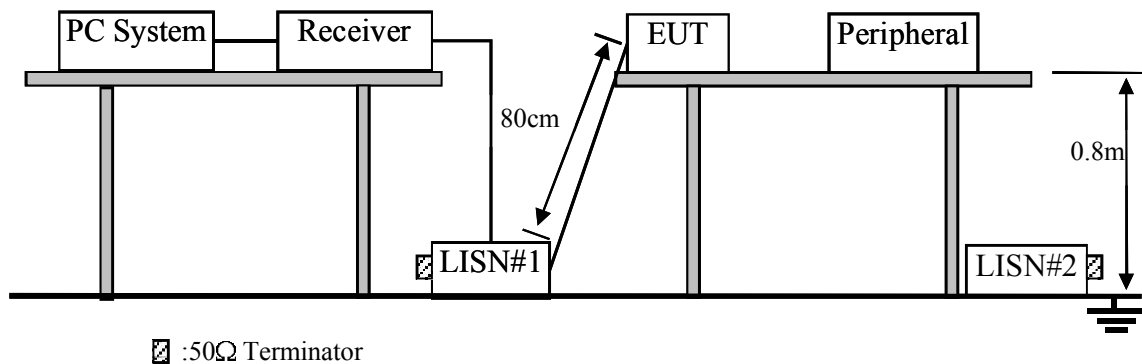
Test Item	Uncertainty
Uncertainty for Conduction emission test in No. 1 Conduction	$\pm 2.6\text{dB}(150\text{kHz to } 30\text{MHz})$
Uncertainty for Radiation Emission test in 3m chamber	$\pm 3.8\text{dB}(30\sim 200\text{MHz, Polarization: H})$
	$\pm 3.8\text{dB}(30\sim 200\text{MHz, Polarization: V})$
	$\pm 4.0\text{dB}(200\text{M}\sim 1\text{GHz, Polarization: H})$
	$\pm 4.0\text{dB}(200\text{M}\sim 1\text{GHz, Polarization: V})$
Uncertainty for Radiation Emission test in 3m chamber(1GHz-25GHz)	$\pm 4.0\text{dB}(1\sim 6\text{GHz, Distance: } 3\text{m})$
	$\pm 4.0\text{dB}(6\sim 25\text{GHz, Distance: } 3\text{m})$
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	5 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100842	Apr.01,23	1 Year
3.	L.I.S.N.#1	Rohde & Schwarz	ENV216	102160	Oct.08,22	1 Year
4.	L.I.S.N.#2	Kyoritsu	KNW-407	8-1628-5	Apr.01,23	1 Year
5.	RF Cable	Eastsheep	RG223	190424	Oct.08,22	1 Year
6.	Terminator	Hubersuhner	50Ω	No.1	Apr.02,23	1 Year
7.	Test Software	AUDIX	e3	6.100913a	N/A	N/A

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. DELL Wireless Headset (EUT)

Model No. : HS2403

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 PC 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 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

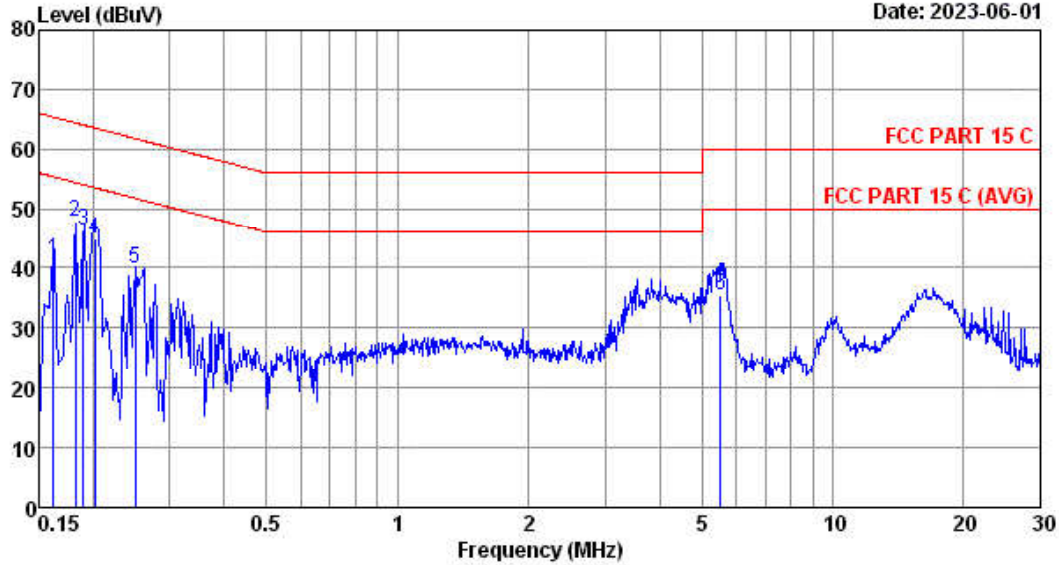
PASS. (All emissions not reported below are too low against the prescribed limits.)

BLE-1Mbps:

Data: 3

File: E:\1#CE\2023 Report Data\1#DONGSHENG\ACS-PE-2304048.EM6 (6)

Date: 2023-06-01

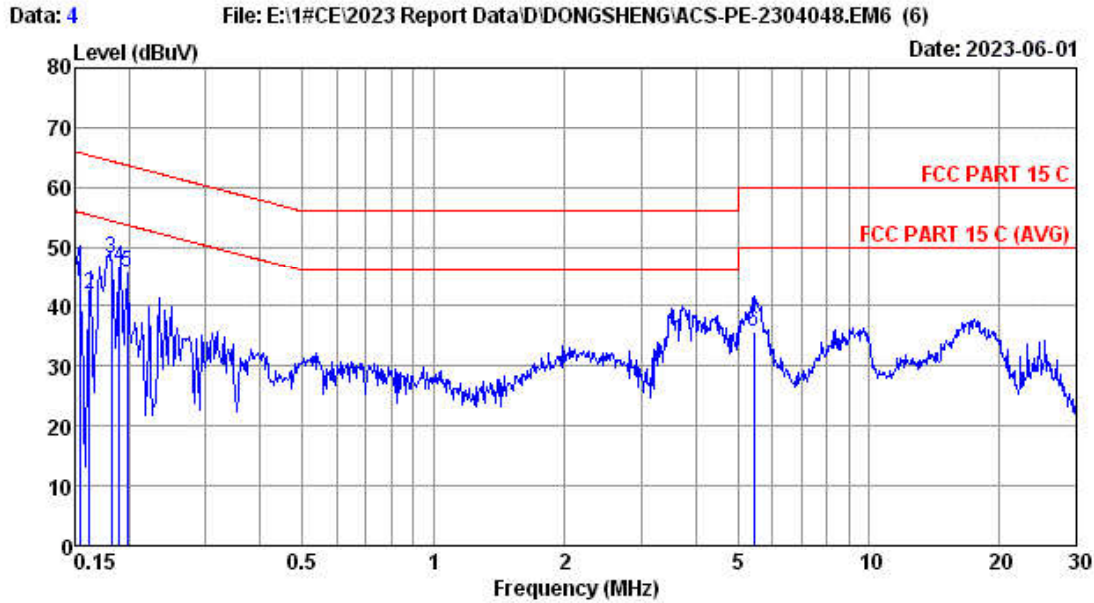


Site no :1# CE
Dis./Lisn :2022 ENV216-N
Limit :FCC PART 15 C
Env./Ins. :25.1*C/59%
Power Rating :DC 5V
Test Mode :BLE1M

Data No :3
Engineer :Evan

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.162	9.60	0.01	31.80	41.41	65.36	23.95	QP
2	0.182	9.60	0.01	38.20	47.81	64.39	16.58	QP
3	0.190	9.60	0.01	36.60	46.21	64.04	17.83	QP
4	0.202	9.60	0.01	35.20	44.81	63.53	18.72	QP
5	0.250	9.60	0.01	30.30	39.91	61.76	21.85	QP
6	5.510	9.40	0.04	26.10	35.54	60.00	24.46	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.



Site no :1# CE Data No :4
 Dis./Lisn :2022 ENV216-L
 Limit :FCC PART 15 C
 Env./Ins. :25.1°C/59% Engineer :Evan
 Power Rating :DC 5V
 Test Mode :BLE1M

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.154	9.60	0.01	34.30	43.91	65.78	21.87	QP
2	0.162	9.60	0.01	32.20	41.81	65.36	23.55	QP
3	0.182	9.60	0.01	38.50	48.11	64.39	16.28	QP
4	0.190	9.60	0.01	36.90	46.51	64.04	17.53	QP
5	0.198	9.60	0.01	36.10	45.71	63.69	17.98	QP
6	5.458	9.20	0.04	26.40	35.64	60.00	24.36	QP

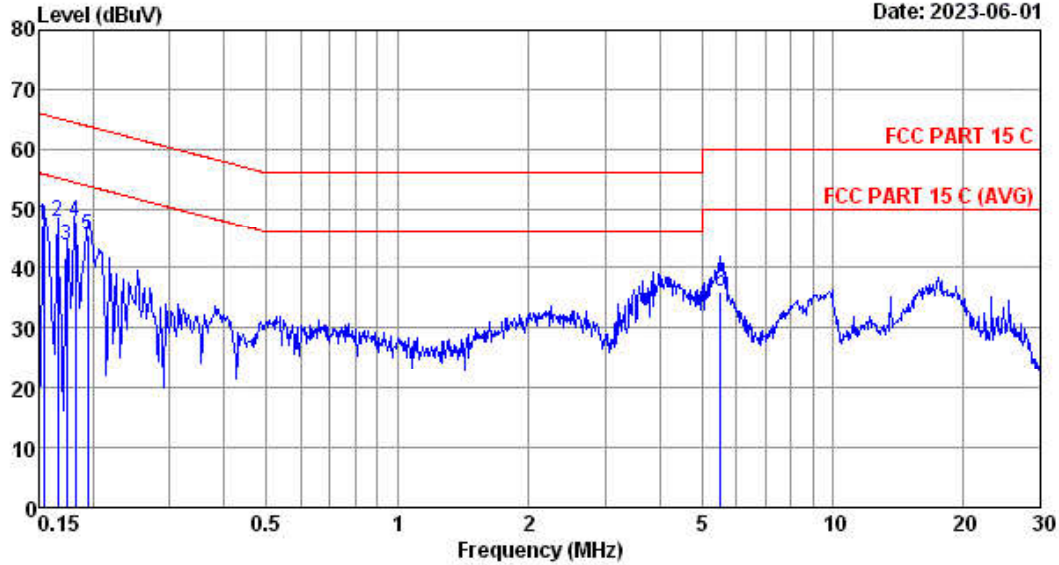
Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.
 2.If the average limit is met when using a quasi-peak detector.
 the EUT shall be deemed to meet both limits and measurement
 with average detector is unnecessary.

BLE-2Mbps:

Data: 5

File: E:\1#CE\2023 Report Data\1#DONGSHENG\ACS-PE-2304048.EM6 (6)

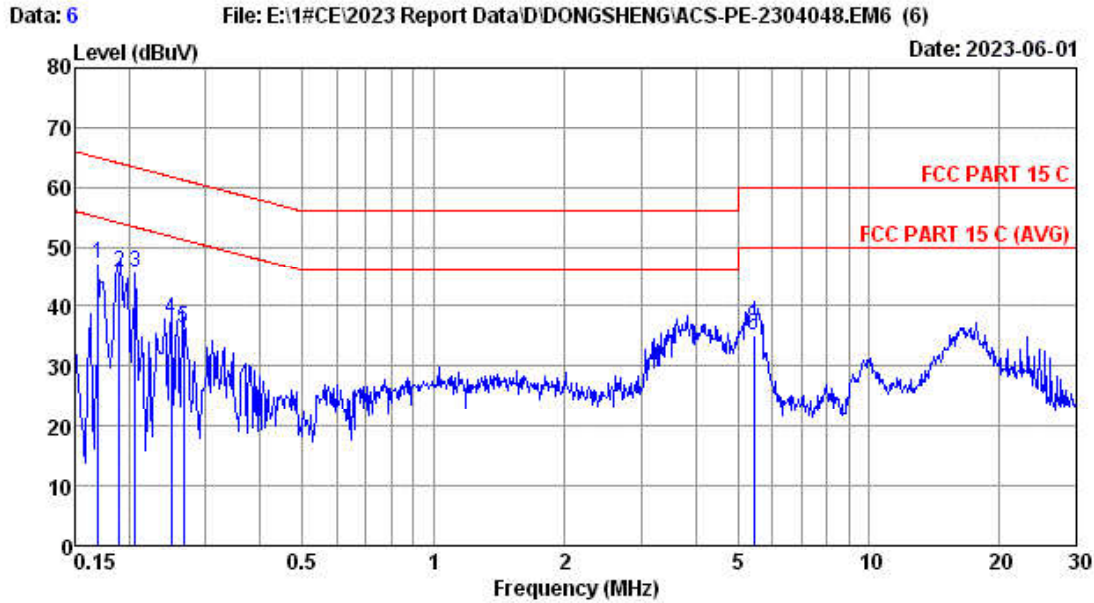
Date: 2023-06-01



Site no :1# CE Data No :5
 Dis./Lisn :2022 ENV216-L
 Limit :FCC PART 15 C
 Env./Ins. :25.1°C/59% Engineer :Evan
 Power Rating :DC 5V
 Test Mode :BLE2M

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.154	9.60	0.01	37.60	47.21	65.78	18.57	QP
2	0.166	9.60	0.01	38.30	47.91	65.16	17.25	QP
3	0.174	9.60	0.01	34.00	43.61	64.77	21.16	QP
4	0.182	9.60	0.01	38.10	47.71	64.39	16.68	QP
5	0.194	9.60	0.01	35.90	45.51	63.86	18.35	QP
6	5.510	9.20	0.04	26.70	35.94	60.00	24.06	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.



Site no :1# CE Data No :6
 Dis./Lisn :2022 ENV216-N
 Limit :FCC PART 15 C
 Env./Ins. :25.1°C/59% Engineer :Evan
 Power Rating :DC 5V
 Test Mode :BLE2M

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.170	9.60	0.01	37.50	47.11	64.96	17.85	QP
2	0.190	9.60	0.01	36.20	45.81	64.04	18.23	QP
3	0.206	9.60	0.01	36.20	45.81	63.37	17.56	QP
4	0.250	9.60	0.01	28.30	37.91	61.76	23.85	QP
5	0.266	9.60	0.01	26.80	36.41	61.24	24.83	QP
6	5.446	9.40	0.04	25.60	35.04	60.00	24.96	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	5 Year
2.	3m Chamber(SE)	AUDIX	N/A	N/A	Sep.16,22	5 Year
3.	Signal Analyzer	Rohde & Schwarz	FSV30	104050	Apr.01,23	1 Year
4.	Tri-log-Broadband Antenna	SCHWARZBECK	VULB 9168	01317	Oct.28,22	1 Year
5.	NSA Cable	HUBER+SUHNER	CFD400NL-LW	No.3	Oct.09,22	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.	Amplifier	HP	8447D	2944A11159	Apr.02,23	1 Year
9.	Test Software	AUDIX	e3	6.100913a	N/A	N/A

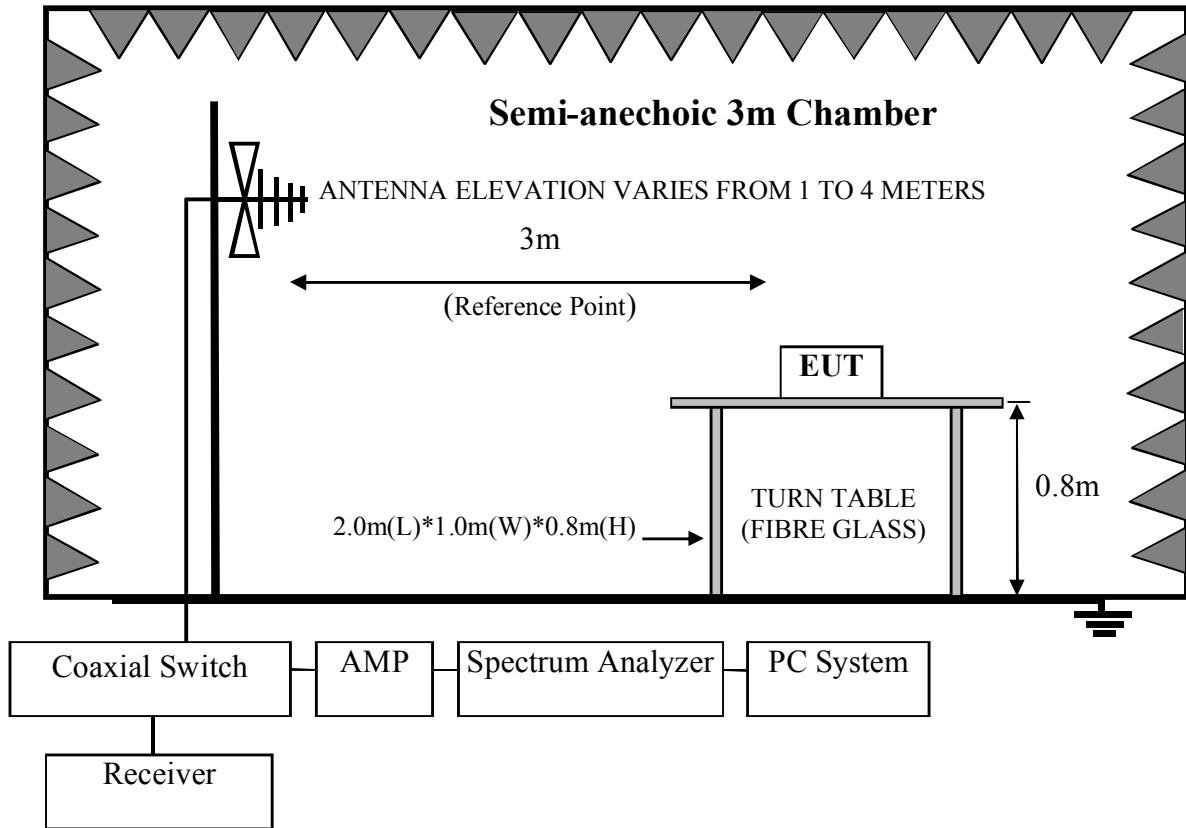
Note: N/A means Not applicable.

Frequency range: above 1000MHz

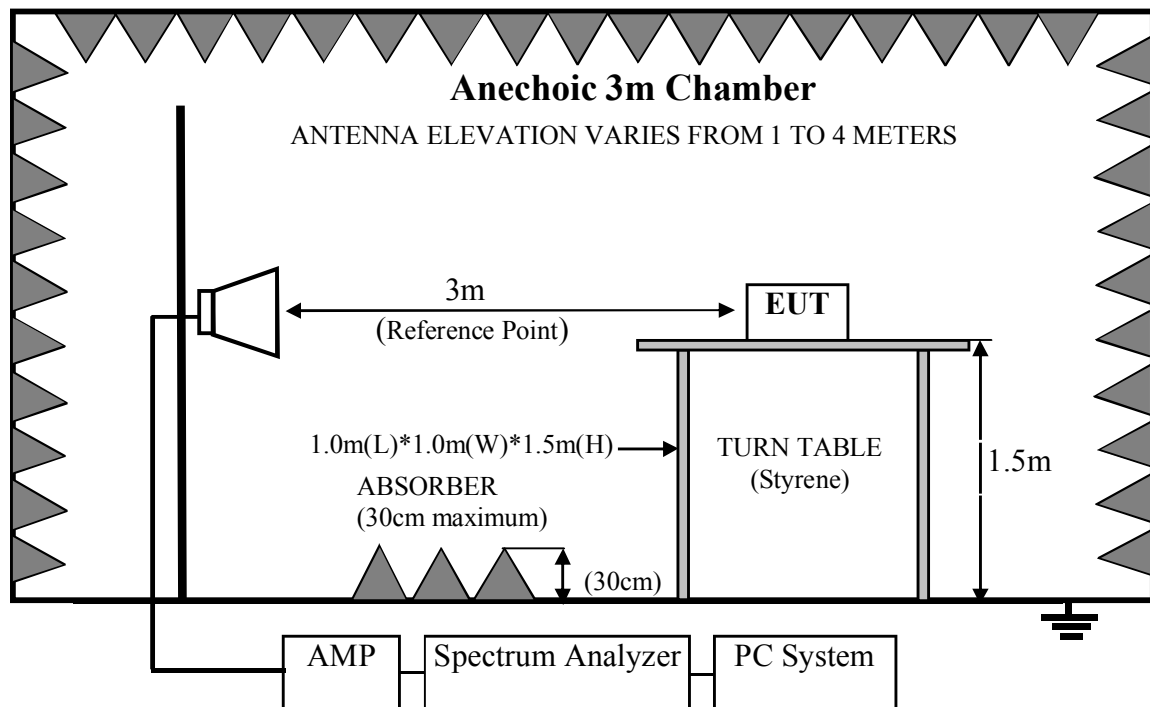
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	3mChamber(Svswr)	AUDIX	N/A	N/A	Aug.09,22	5 Year
2.	3mChamber(SE)	AUDIX	N/A	N/A	Sep.16,22	5 Year
3.	Signal Analyzer	Rohde & Schwarz	FSV30	104050	Apr.01,23	1 Year
4.	Amplifier	Agilent	83017A	MY53270084	Oct.09,22	1 Year
5.	RF Cable	EMCI	EMC104-SM-S M-15000	190407	Jul.01,22	1 Year
6.	Test Software	AUDIX	e3	6.100913a	N/A	N/A
7.	Horn Antenna	ETC	MCTD 1209	DRH15F03006	Aug.12,22	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	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V})/\text{m}$
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 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

- Remark : (1) Emission Level ($\text{dB}\mu\text{V/m}$) = Reading (Receiver) ($\text{dB}\mu\text{V}$) + Antenna Factor (dB/m) + Cable Loss (dB)
Emission Level ($\text{dB}\mu\text{V/m}$) = Reading (Spectrum) ($\text{dB}\mu\text{V}$) + 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. DELL Wireless Headset (EUT)

Model Number : HS2403
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.

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 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

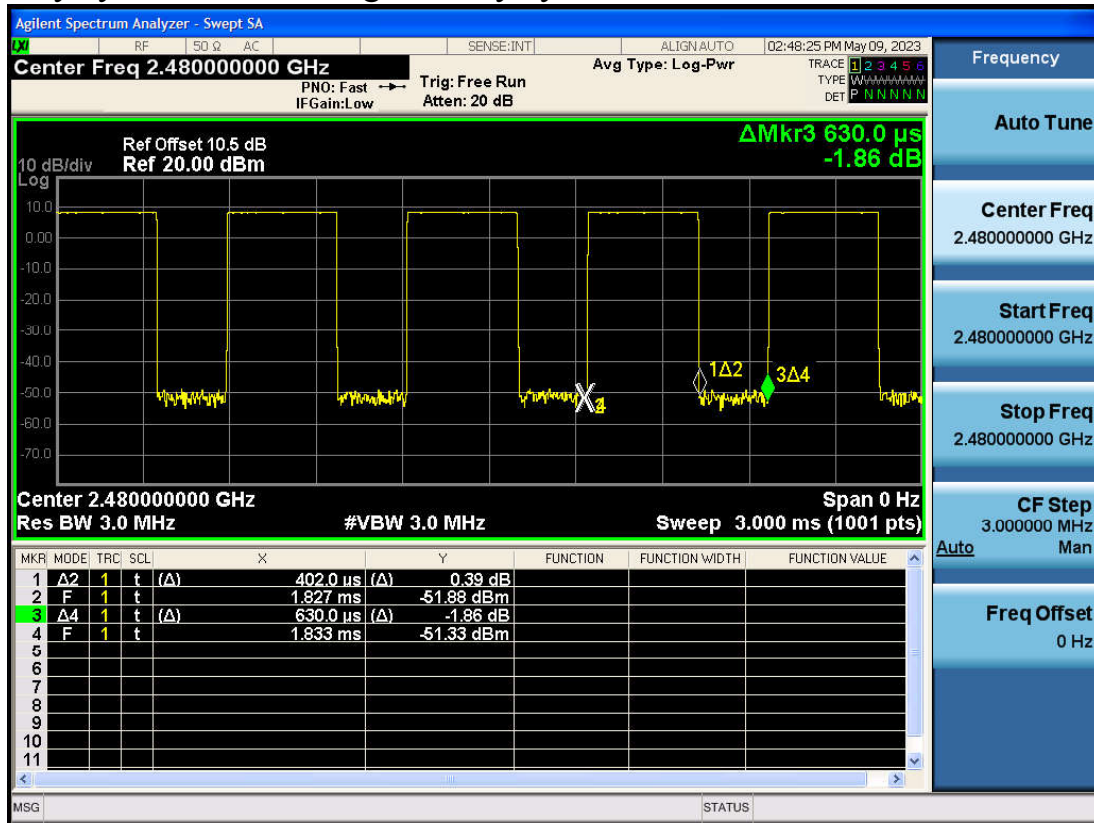
PASS.

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

Note: The duty cycle factor for calculate average level is 1Mbps -3.90dB for BLE, 2Mbps -9.54dB 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.

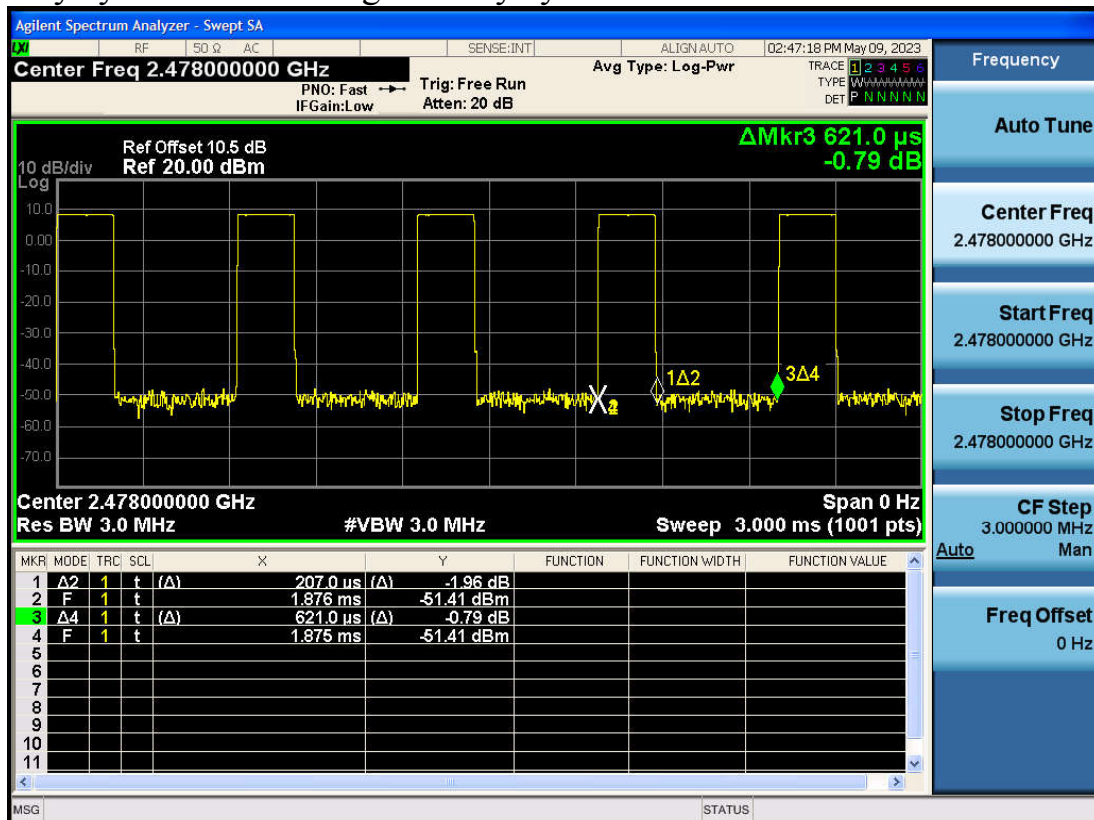
1Mbps:

$$\text{Duty cycle factor} = 20\log (1/\text{duty cycle}) = -3.90\text{dB}$$

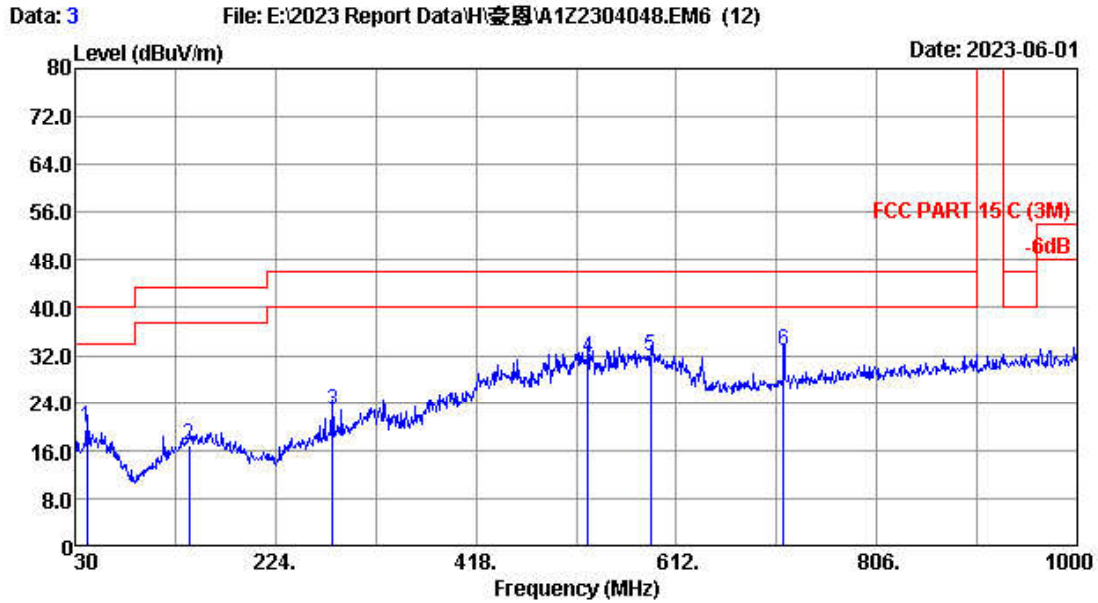


2Mbps:

$$\text{Duty cycle factor} = 20\log (1/\text{duty cycle}) = -9.54\text{dB}$$



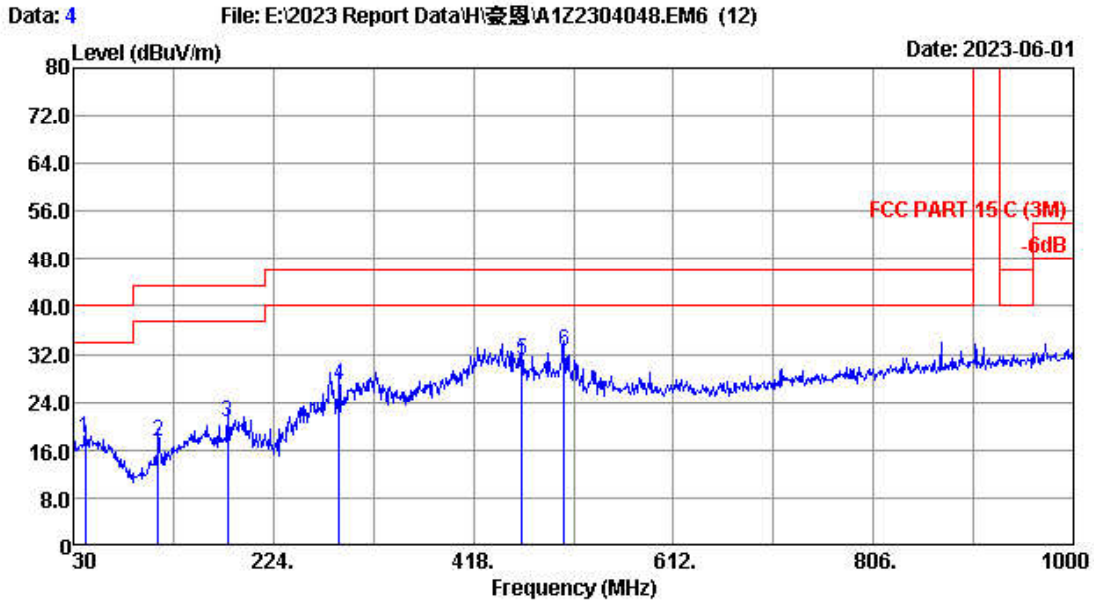
Frequency: 30MHz~1GHz
1Mbps:



Site no.	: 3m Chamber	Data no.	: 3
Dis. / Ant.	: 3m 2022 VULB 9168-01317	Ant. pol.	: VERTICAL
Limit	: FCC PART 15 C (3M)		
Env. / Ins.	: 22.5°C/50%	Engineer	: Abel
Test Mode	: BLE 1M TX Mode		

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Emission		Limits (dBUV/m)	Margin (dB)	Remark
				Reading (dBUV)	Level (dBUV/m)			
1	41.640	19.50	0.64	-0.25	19.89	40.00	20.11	QP
2	140.580	19.00	1.19	-3.39	16.80	43.50	26.70	QP
3	279.290	18.96	1.71	1.92	22.59	46.00	23.41	QP
4	526.640	23.94	2.45	5.27	31.66	46.00	14.34	QP
5	586.780	25.08	2.62	4.04	31.74	46.00	14.26	QP
6	715.790	27.24	2.92	2.53	32.69	46.00	13.31	QP

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

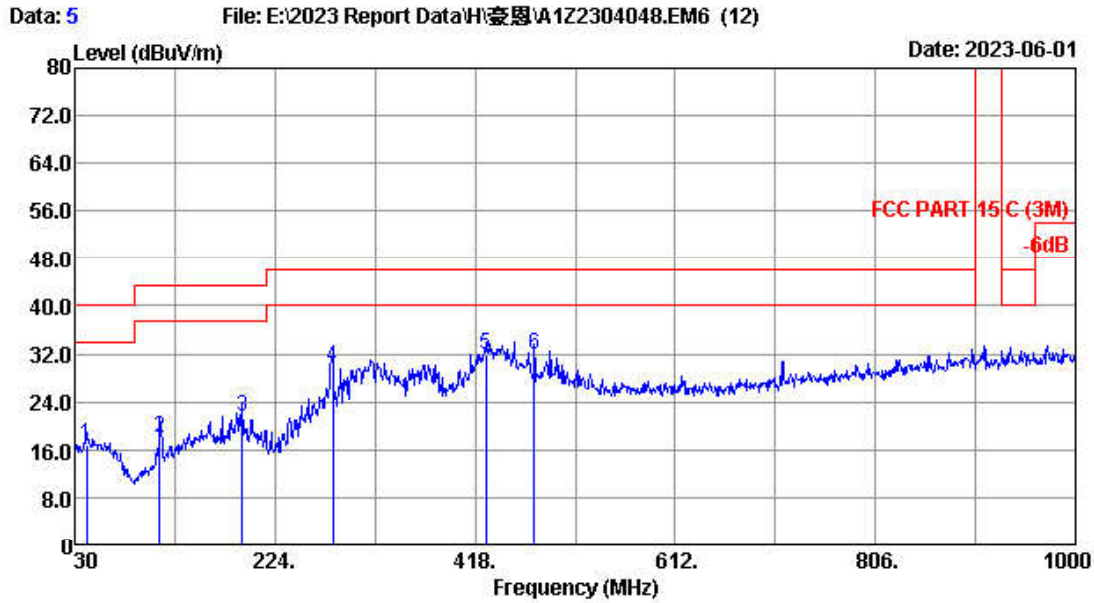


Site no. : 3m Chamber Data no. : 4
 Dis. / Ant. : 3m 2022 VULB 9168-01317 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 22.5°C/50% Engineer : Abel
 Test Mode : BLE 1M TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	41.640	19.50	0.64	-2.00	18.14	40.00	21.86	QP
2	112.450	16.10	1.07	0.19	17.36	43.50	26.14	QP
3	179.380	17.60	1.34	1.83	20.77	43.50	22.73	QP
4	288.020	19.16	1.75	6.00	26.91	46.00	19.09	QP
5	465.530	23.10	2.27	5.60	30.97	46.00	15.03	QP
6	506.270	23.72	2.40	6.24	32.36	46.00	13.64	QP

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

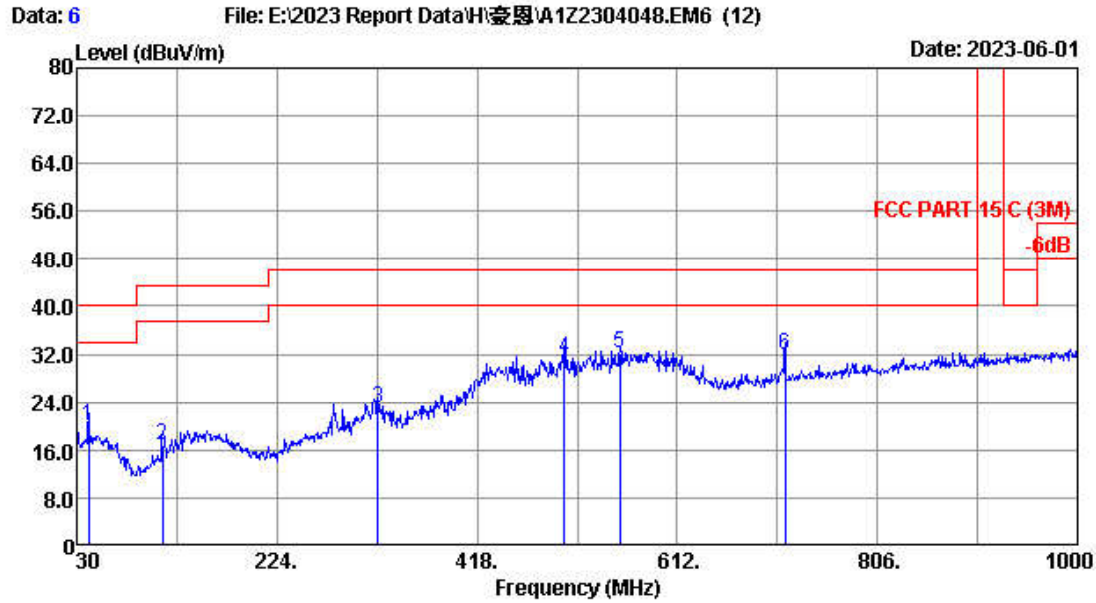
2Mbps:



Site no. : 3m Chamber Data no. : 5
 Dis. / Ant. : 3m 2022 VULB 9168-01317 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 22.5°C/50% Engineer : Abel
 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	41.640	19.50	0.64	-3.17	16.97	40.00	23.03	QP
2	112.450	16.10	1.07	0.94	18.11	43.50	25.39	QP
3	191.990	16.50	1.39	3.62	21.51	43.50	21.99	QP
4	280.260	19.00	1.71	9.19	29.90	46.00	16.10	QP
5	428.670	22.46	2.15	7.28	31.89	46.00	14.11	QP
6	475.230	23.10	2.30	6.34	31.74	46.00	14.26	QP

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

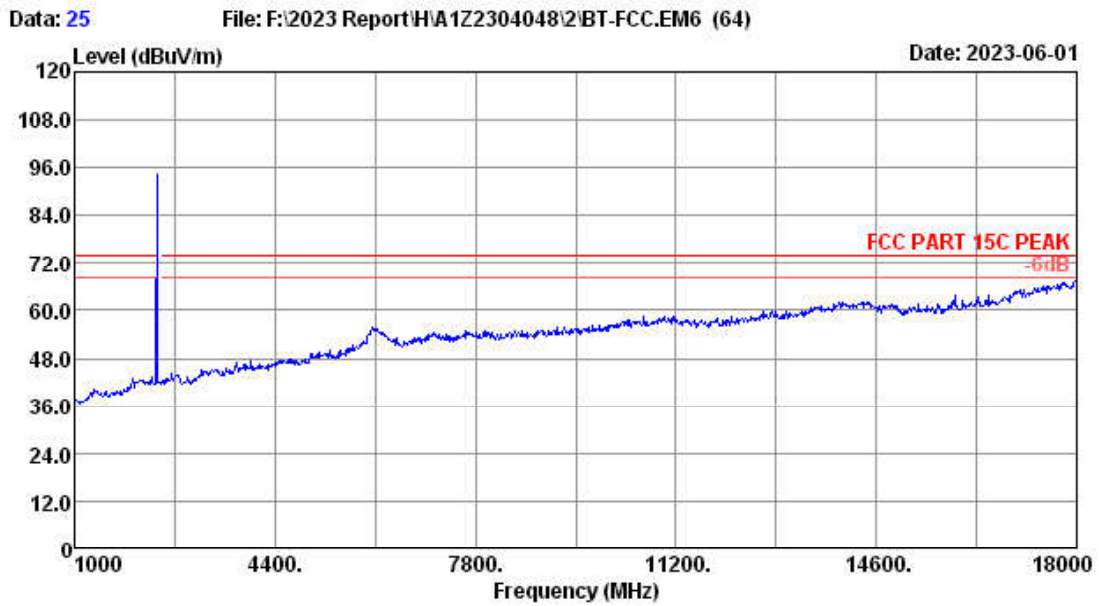


Site no. : 3m Chamber Data no. : 6
 Dis. / Ant. : 3m 2022 VULB 9168-01317 Ant. pol. : VERTICAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 22.5°C/50% Engineer : Abel
 Test Mode : BLE 2M TX Mode

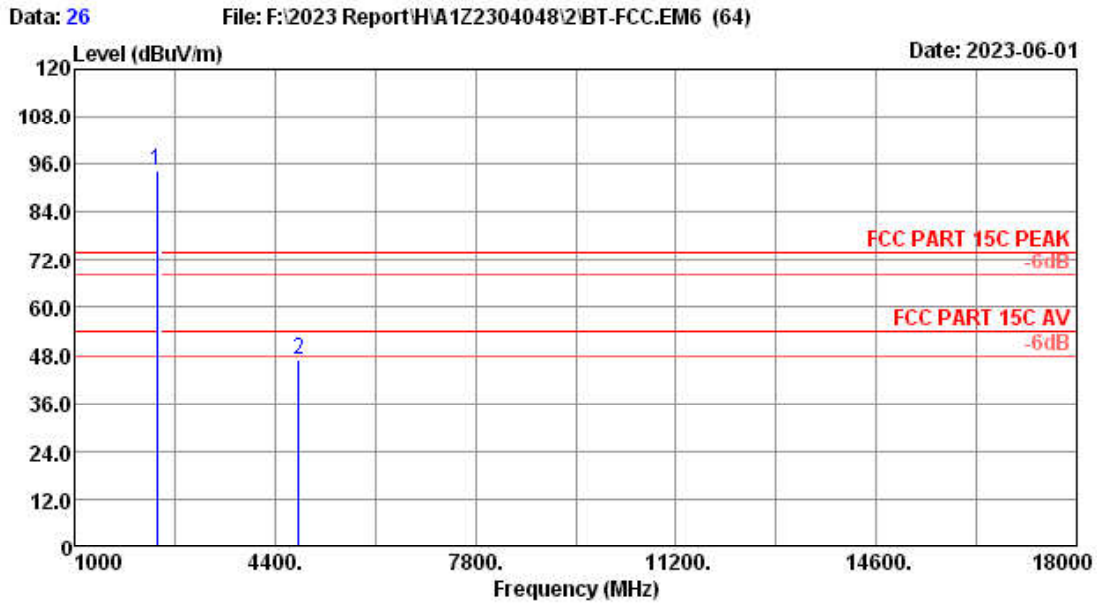
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	41.640	19.50	0.64	0.07	20.21	40.00	19.79	QP
2	113.420	16.20	1.07	-0.57	16.70	43.50	26.80	QP
3	321.970	20.14	1.85	0.90	22.89	46.00	23.11	QP
4	502.390	23.70	2.39	5.34	31.43	46.00	14.57	QP
5	556.710	24.46	2.54	5.24	32.24	46.00	13.76	QP
6	716.760	27.28	2.92	1.70	31.90	46.00	14.10	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
1Mbps:



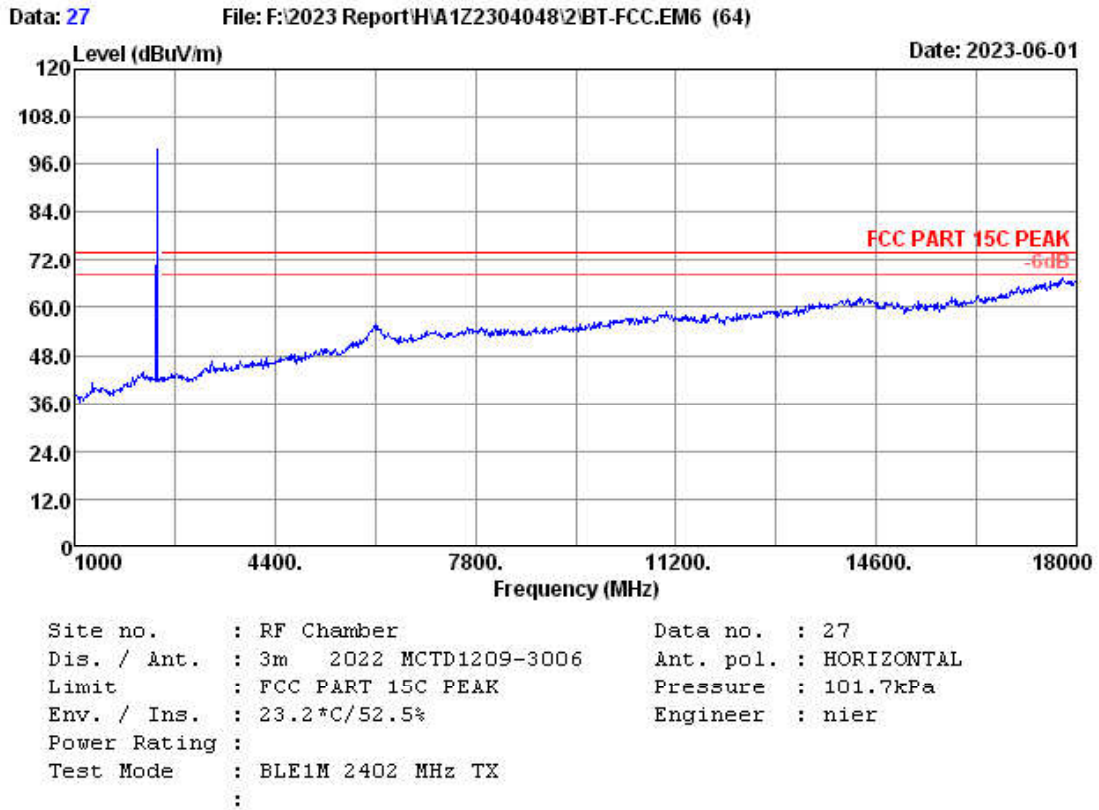
Site no.	: RF Chamber	Data no.	: 25
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BLE1M 2402 MHz TX		
	:		

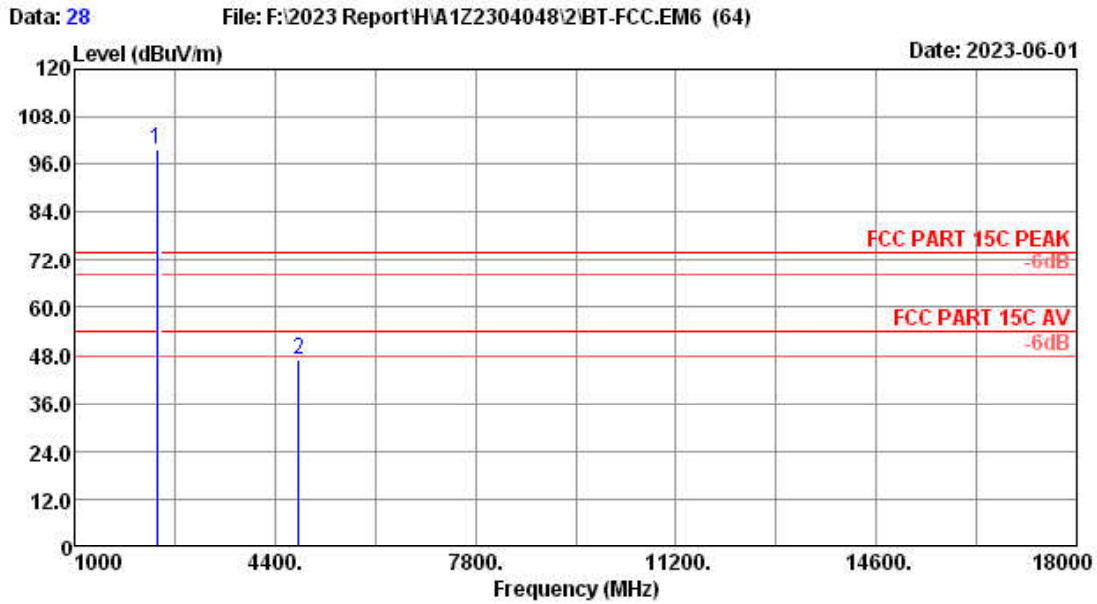


Site no.	: RF Chamber	Data no.	: 26
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BLE1M 2402 MHz TX		
	:		

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	27.70	2.29	98.63	34.36	94.26	-----	-----	Peak
2	4804.00	31.20	3.33	45.88	33.68	46.73	74.00	27.27	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.

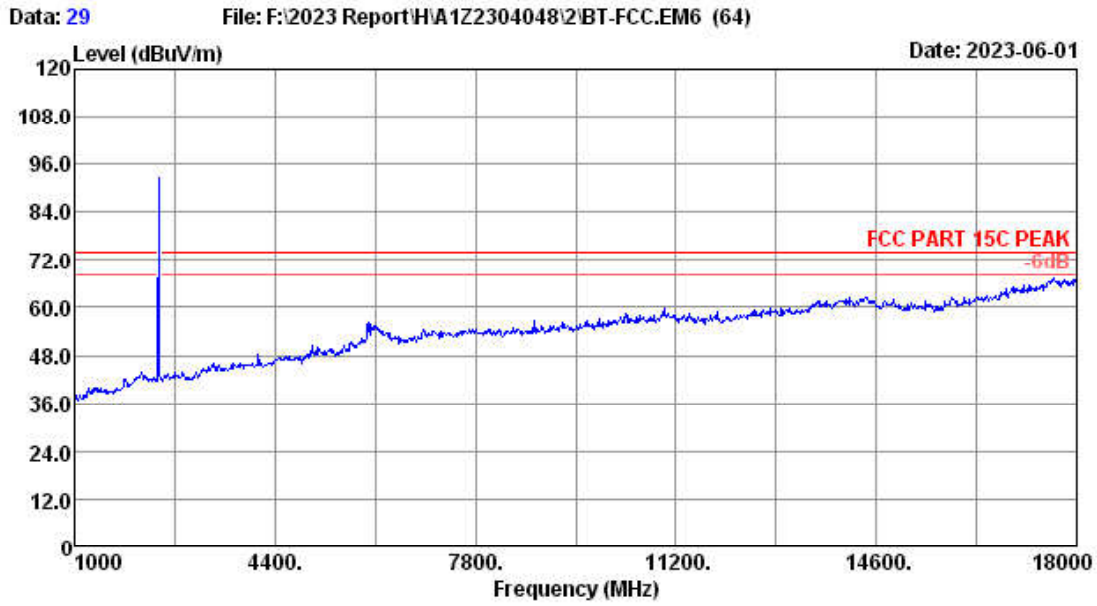




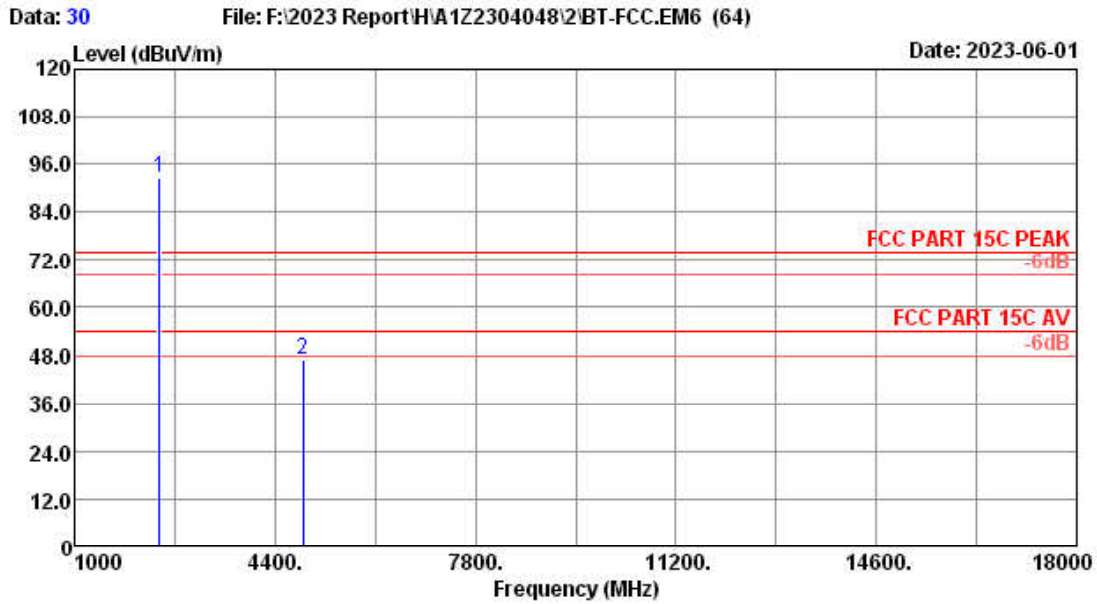
Site no. : RF Chamber Data no. : 28
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK Pressure : 101.7kPa
 Env. / Ins. : 23.2°C/52.5% Engineer : nier
 Power Rating :
 Test Mode : BLE1M 2402 MHz TX

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	27.70	2.29	104.08	34.36	99.71	-----	-----	Peak
2	4804.00	31.20	3.33	46.03	33.68	46.88	74.00	27.12	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.



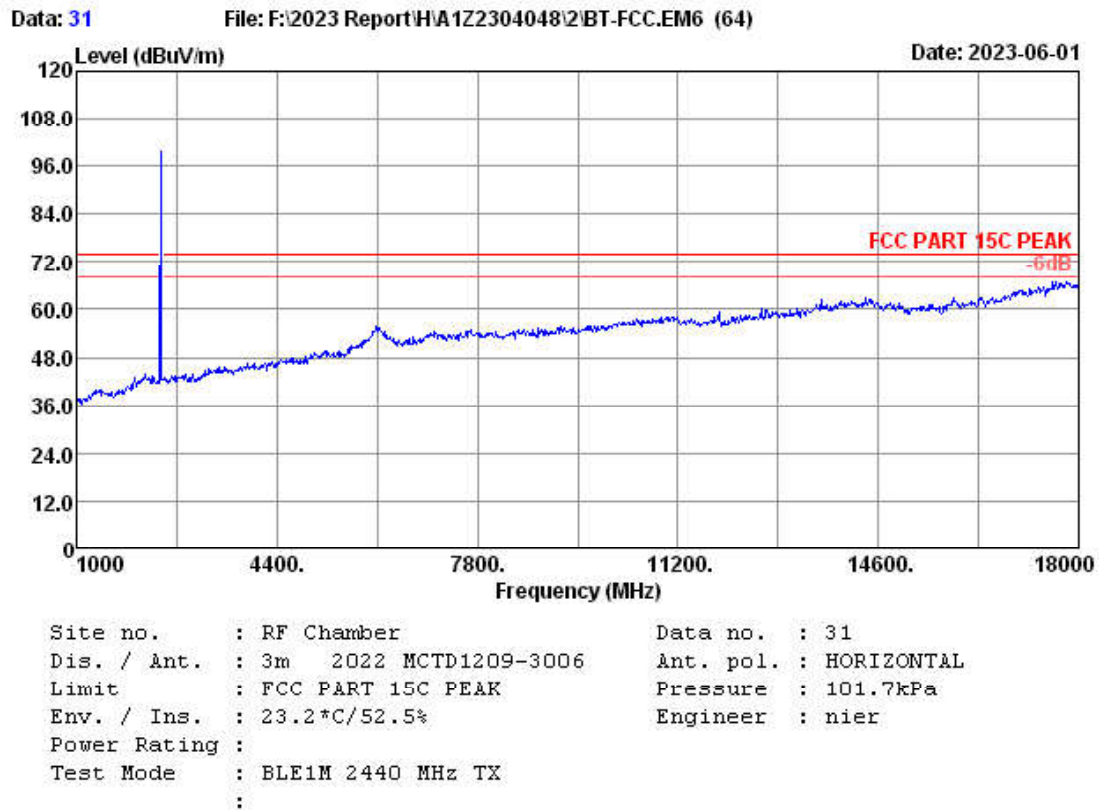
Site no.	: RF Chamber	Data no.	: 29
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BLE1M 2440 MHz TX		
	:		

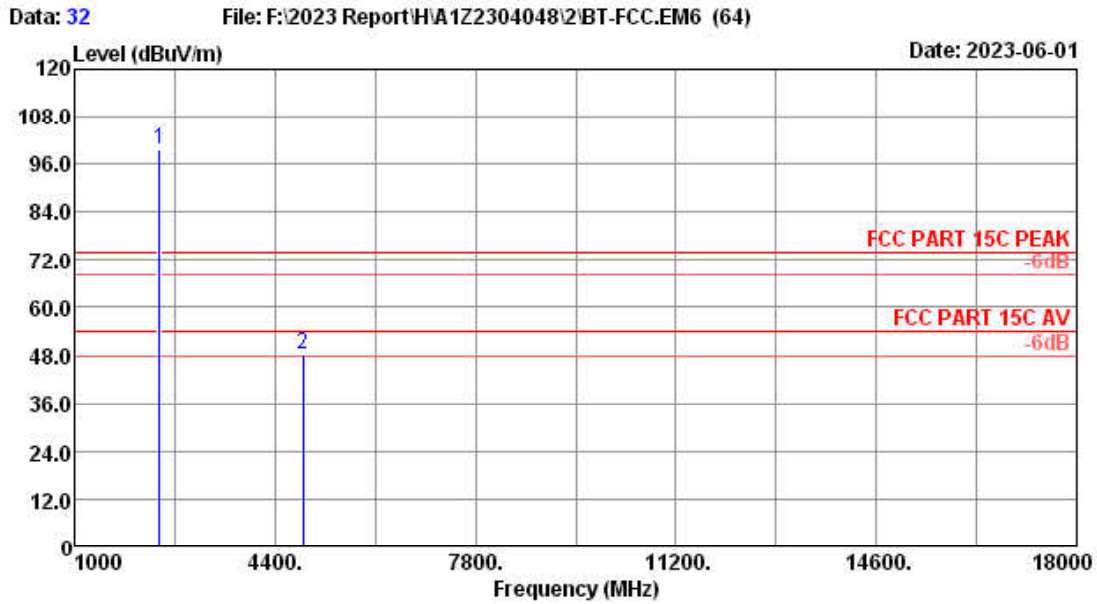


Site no.	: RF Chamber	Data no.	: 30
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BLE1M 2440 MHz TX		
	:		

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	27.80	2.32	96.72	34.36	92.48	-----	-----	Peak
2	4880.00	31.43	3.35	45.82	33.69	46.91	74.00	27.09	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.

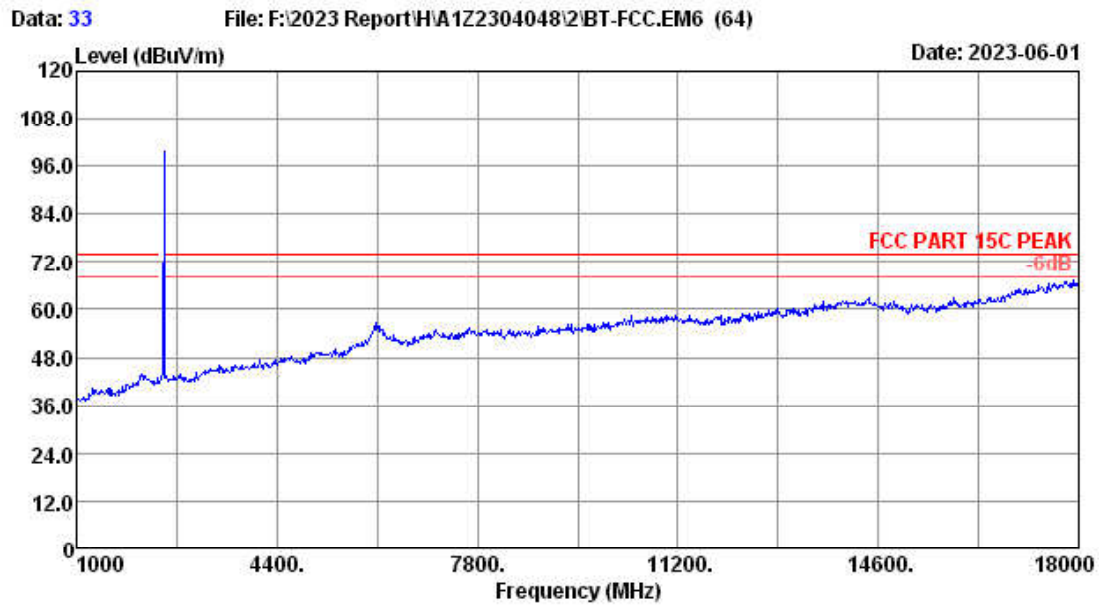




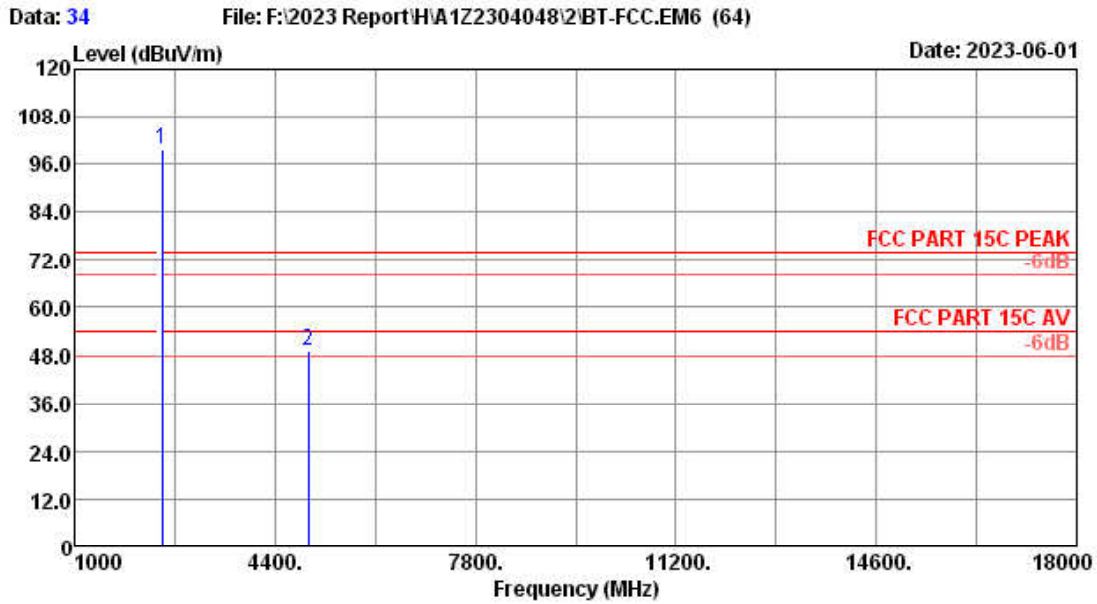
Site no. : RF Chamber Data no. : 32
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK Pressure : 101.7kPa
 Env. / Ins. : 23.2°C/52.5% Engineer : nier
 Power Rating :
 Test Mode : BLE1M 2440 MHz TX

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	27.80	2.32	103.72	34.36	99.48	-----	-----	Peak
2	4880.00	31.43	3.35	47.38	33.69	48.47	74.00	25.53	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.



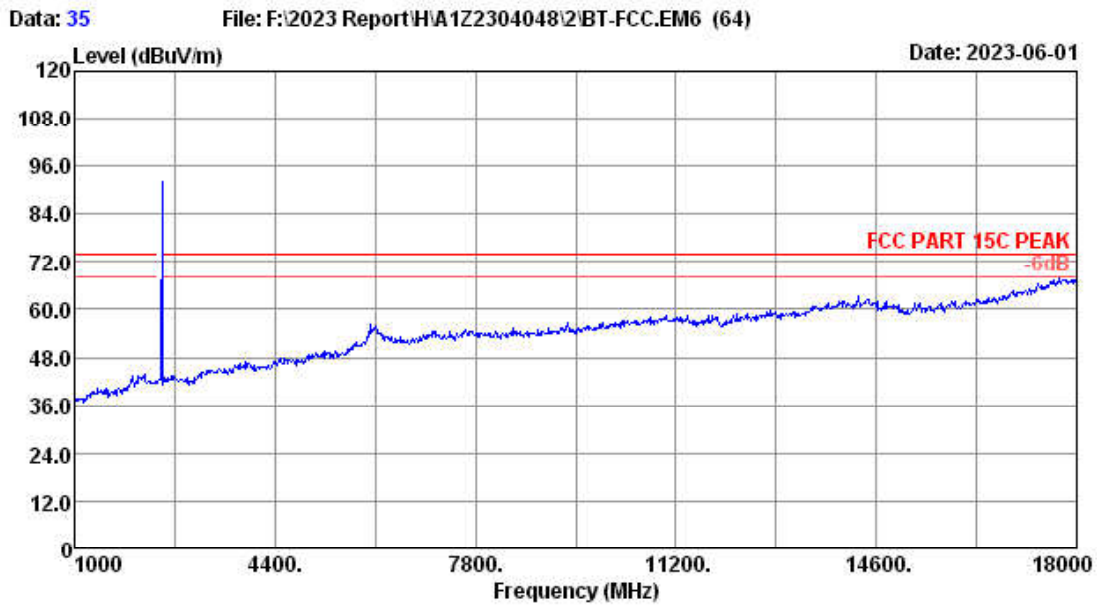
Site no.	: RF Chamber	Data no.	: 33
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BLE1M 2480 MHz TX		
	:		



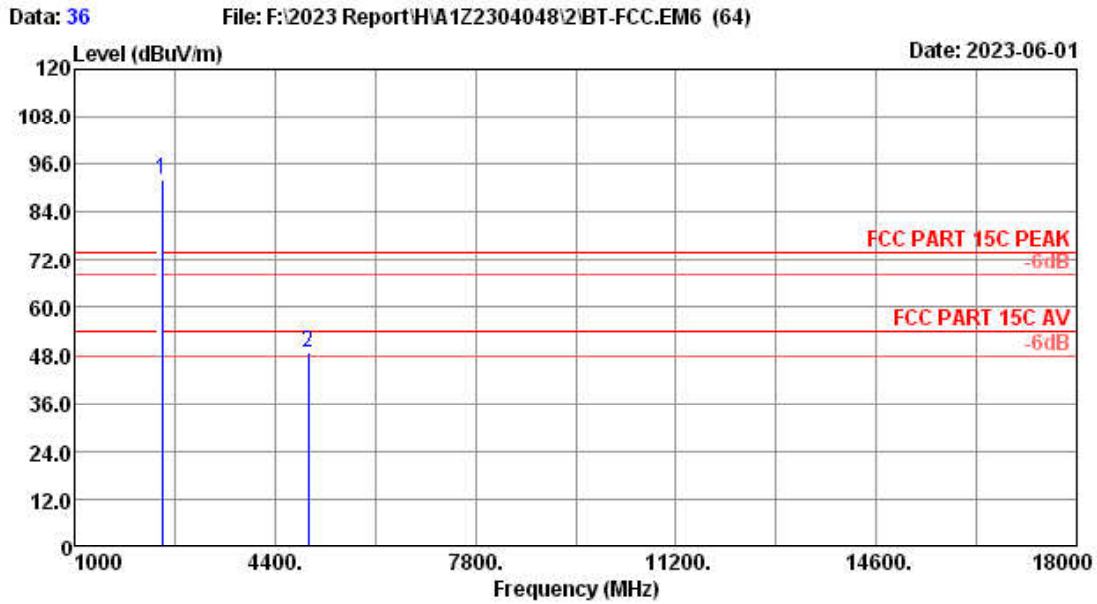
Site no.	: RF Chamber	Data no.	: 34
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BLE1M 2480 MHz TX		
	:		

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	2.34	103.98	34.35	99.77	-----	-----	Peak
2	4960.00	32.03	3.39	47.55	33.69	49.28	74.00	24.72	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.	: RF Chamber	Data no.	: 35
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BLE1M 2480 MHz TX		
	:		

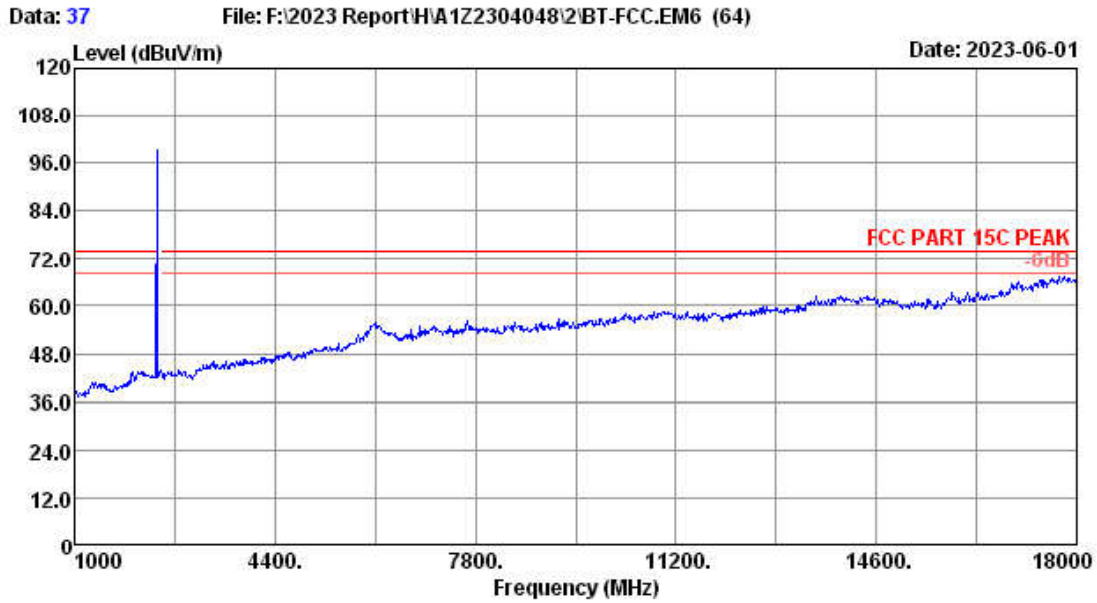


Site no. : RF Chamber Data no. : 36
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK Pressure : 101.7kPa
 Env. / Ins. : 23.2°C/52.5% Engineer : nier
 Power Rating :
 Test Mode : BLE1M 2480 MHz TX

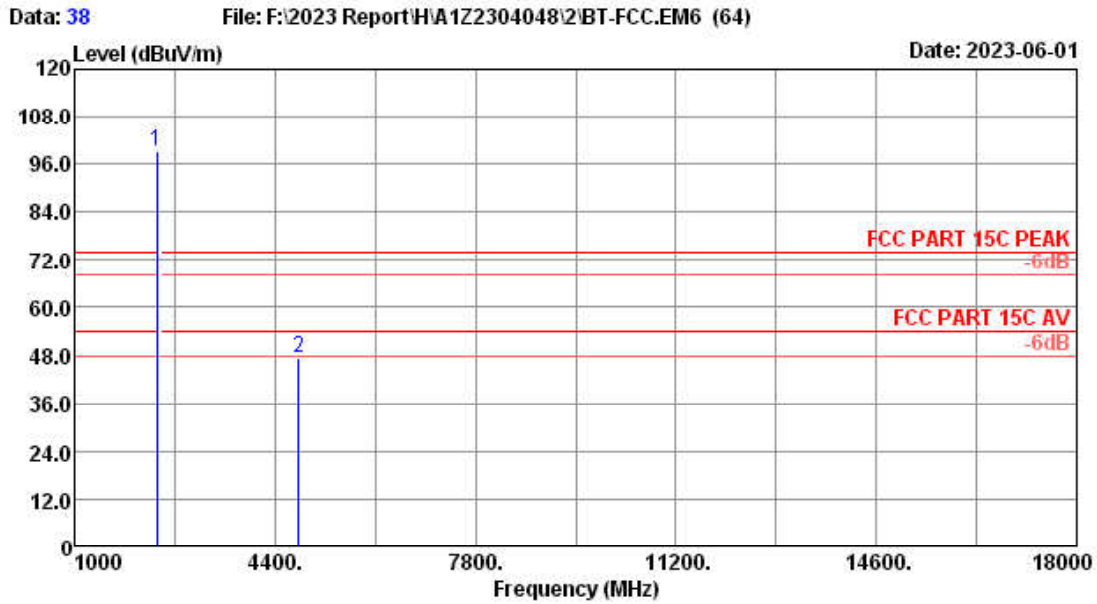
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	27.80	2.34	96.45	34.35	92.24	-----	-----	Peak
2	4960.00	32.03	3.39	47.09	33.69	48.82	74.00	25.18	Peak

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.

2Mbps:



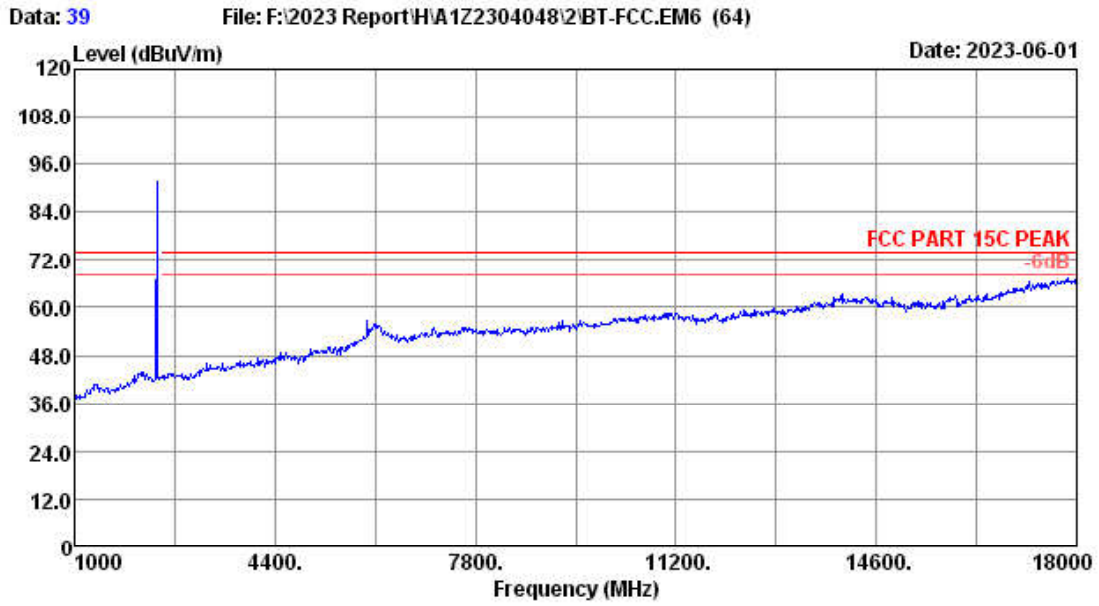
Site no.	: RF Chamber	Data no.	: 37
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BLE2M 2404 MHz TX		
	:		



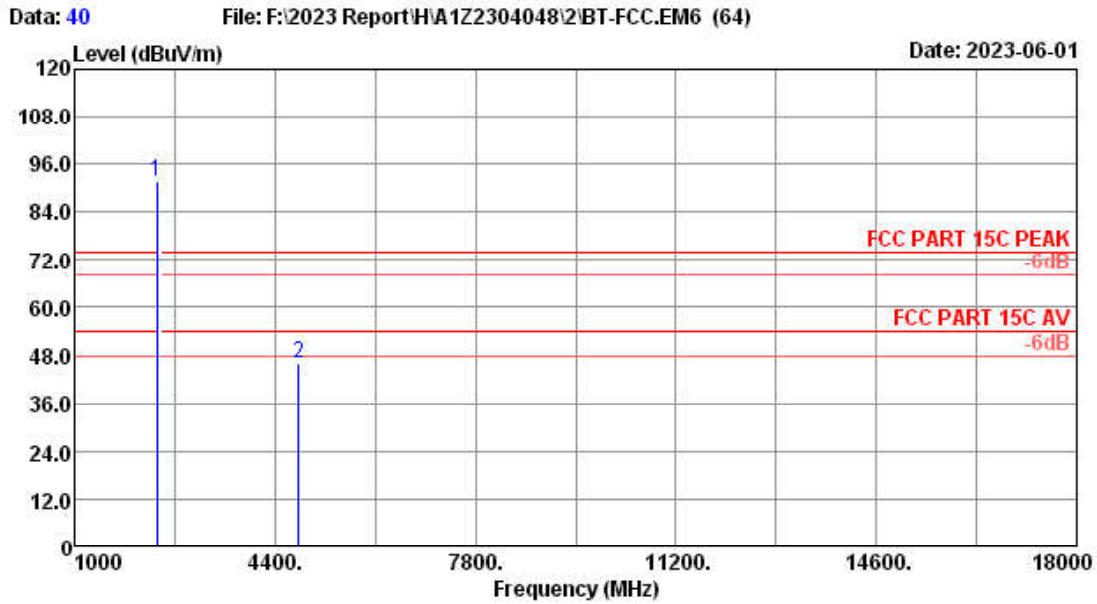
Site no.	: RF Chamber	Data no.	: 38
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BLE2M 2404 MHz TX		
	:		

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	2404.00	27.73	2.30	103.52	34.36	99.19	-----	-----	Peak
2	4808.00	31.20	3.33	46.70	33.68	47.55	74.00	26.45	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.



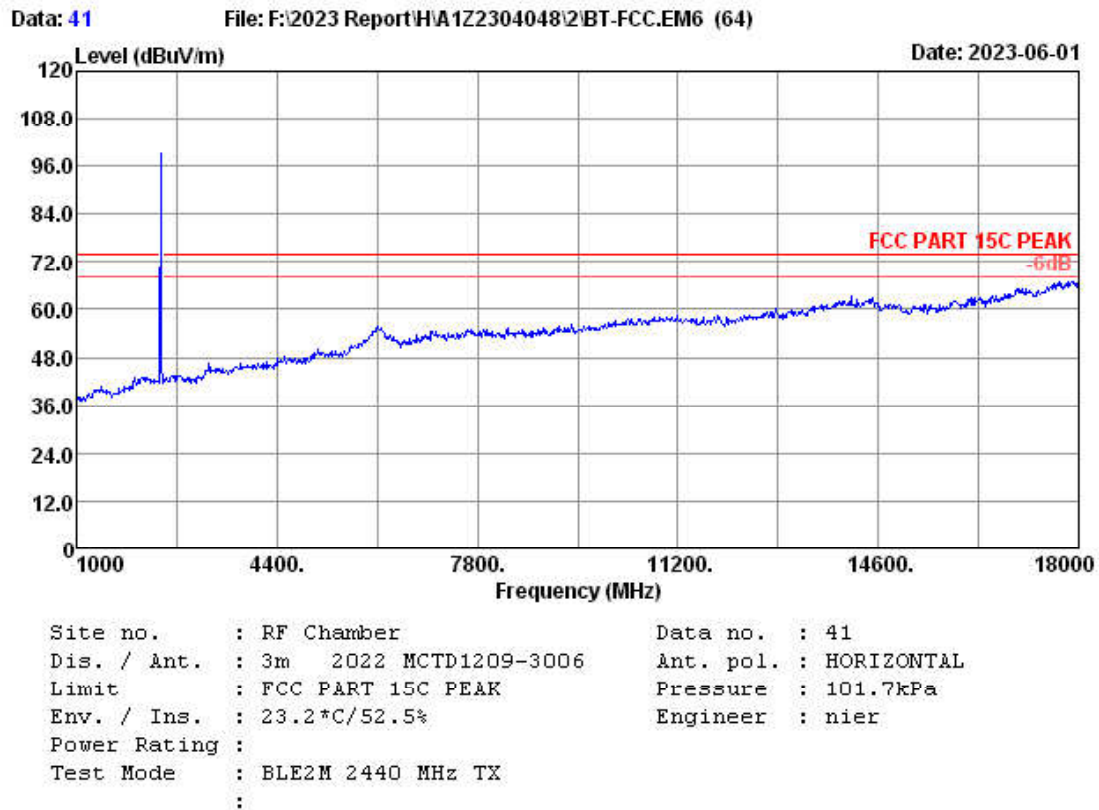
Site no.	: RF Chamber	Data no.	: 39
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BLE2M 2404 MHz TX		
	:		

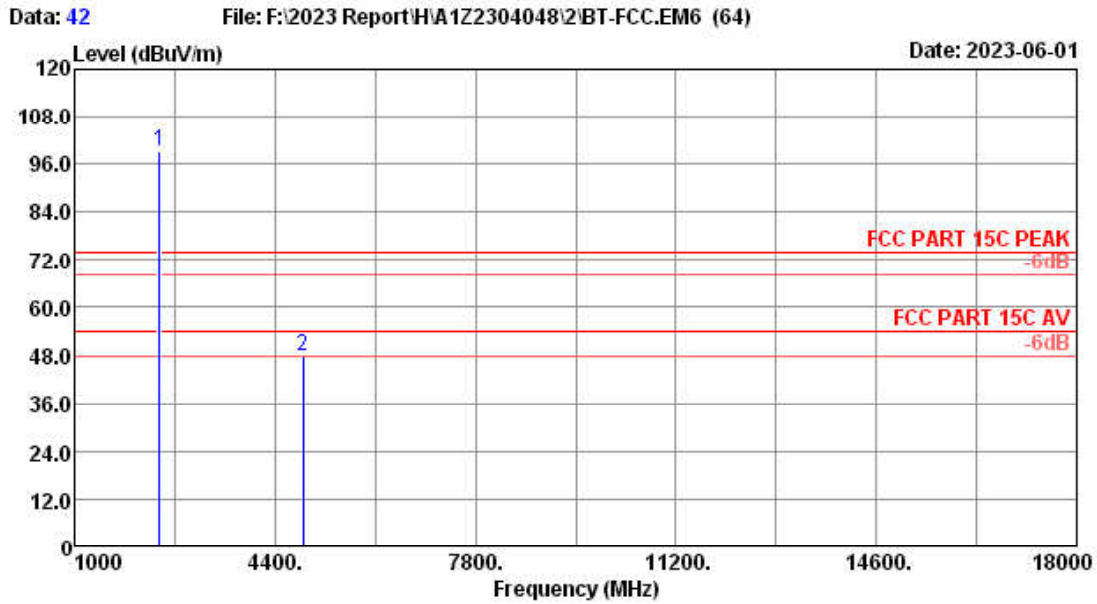


Site no.	: RF Chamber	Data no.	: 40
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BLE2M 2404 MHz TX		
	:		

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	2404.00	27.73	2.30	96.19	34.36	91.86	-----	-----	Peak
2	4808.00	31.20	3.33	45.33	33.68	46.18	74.00	27.82	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.

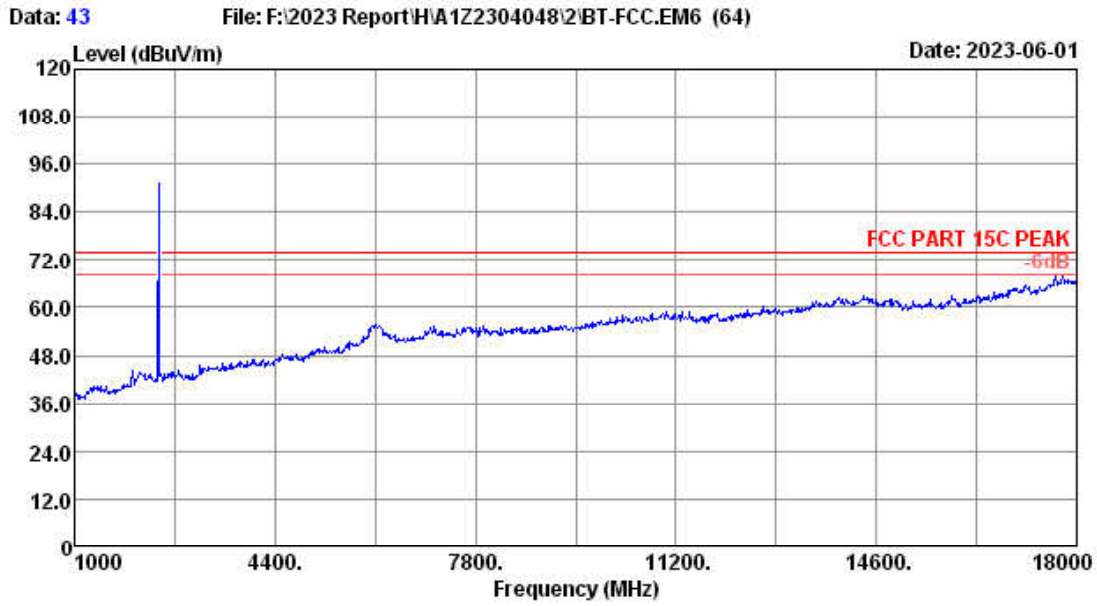




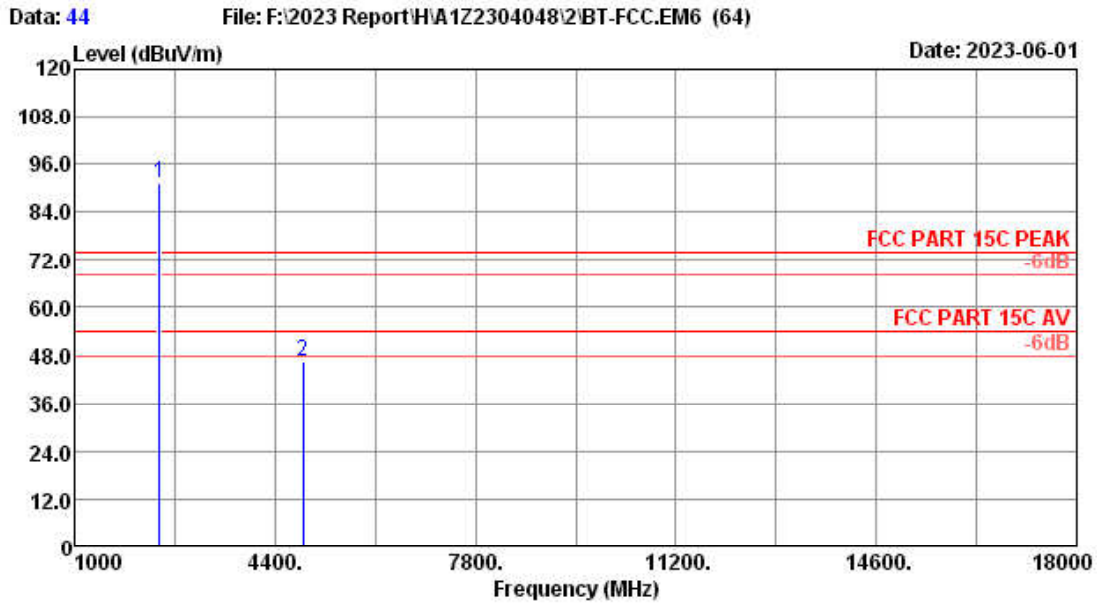
Site no.	: RF Chamber	Data no.	: 42
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BLE2M 2440 MHz TX		
	:		

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	27.80	2.32	103.53	34.36	99.29	-----	-----	Peak
2	4880.00	31.43	3.35	46.81	33.69	47.90	74.00	26.10	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.



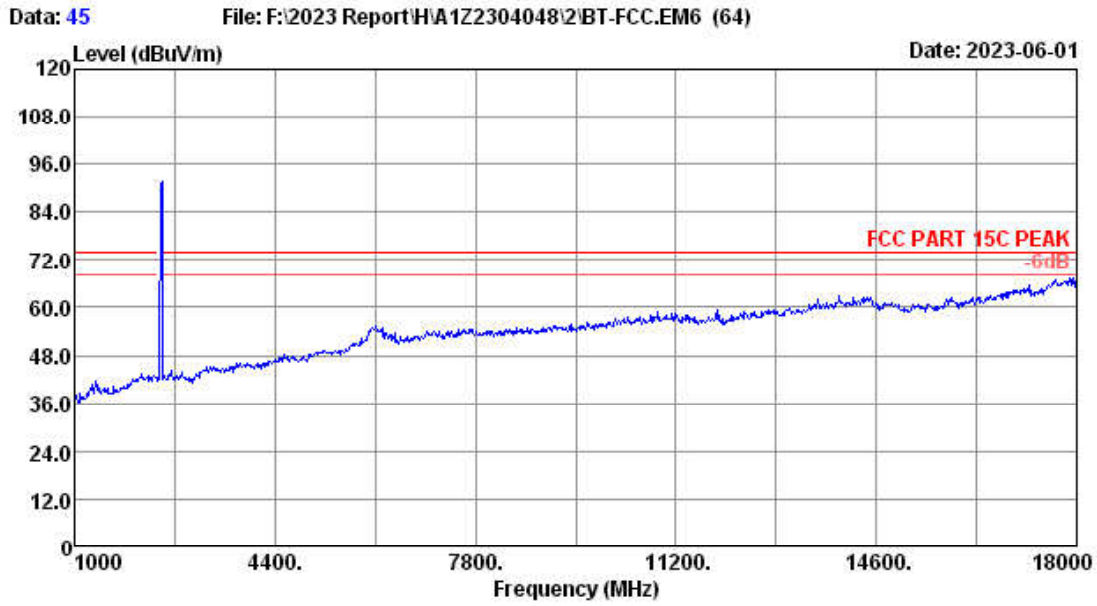
Site no.	: RF Chamber	Data no.	: 43
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BLE2M 2440 MHz TX		
	:		



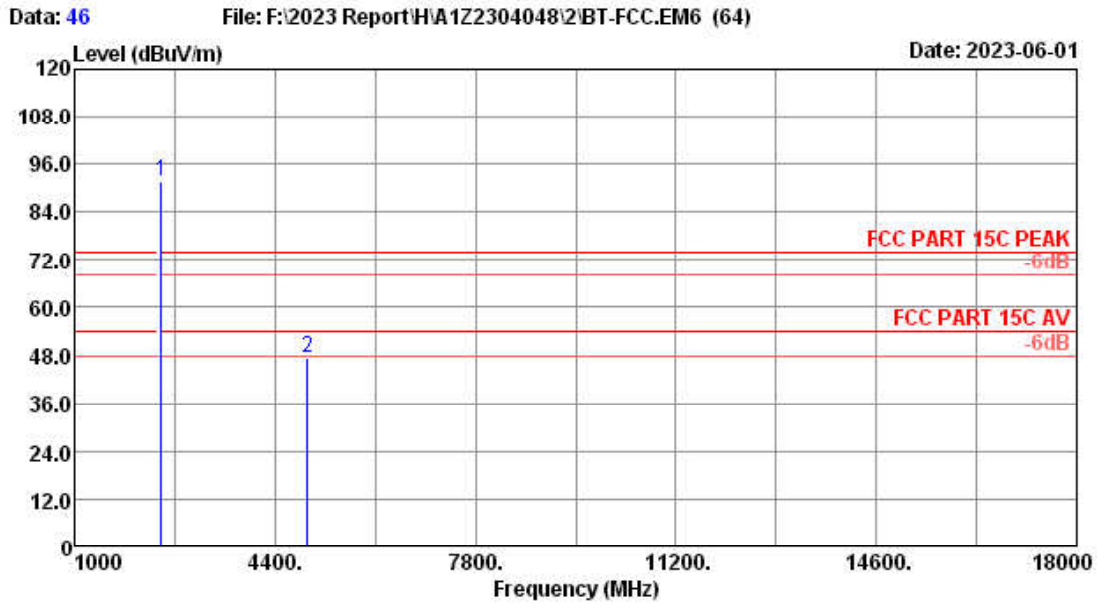
Site no.	: RF Chamber	Data no.	: 44
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BLE2M 2440 MHz TX		
	:		

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	27.80	2.32	95.24	34.36	91.00	-----	-----	Peak
2	4880.00	31.43	3.35	45.61	33.69	46.70	74.00	27.30	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.



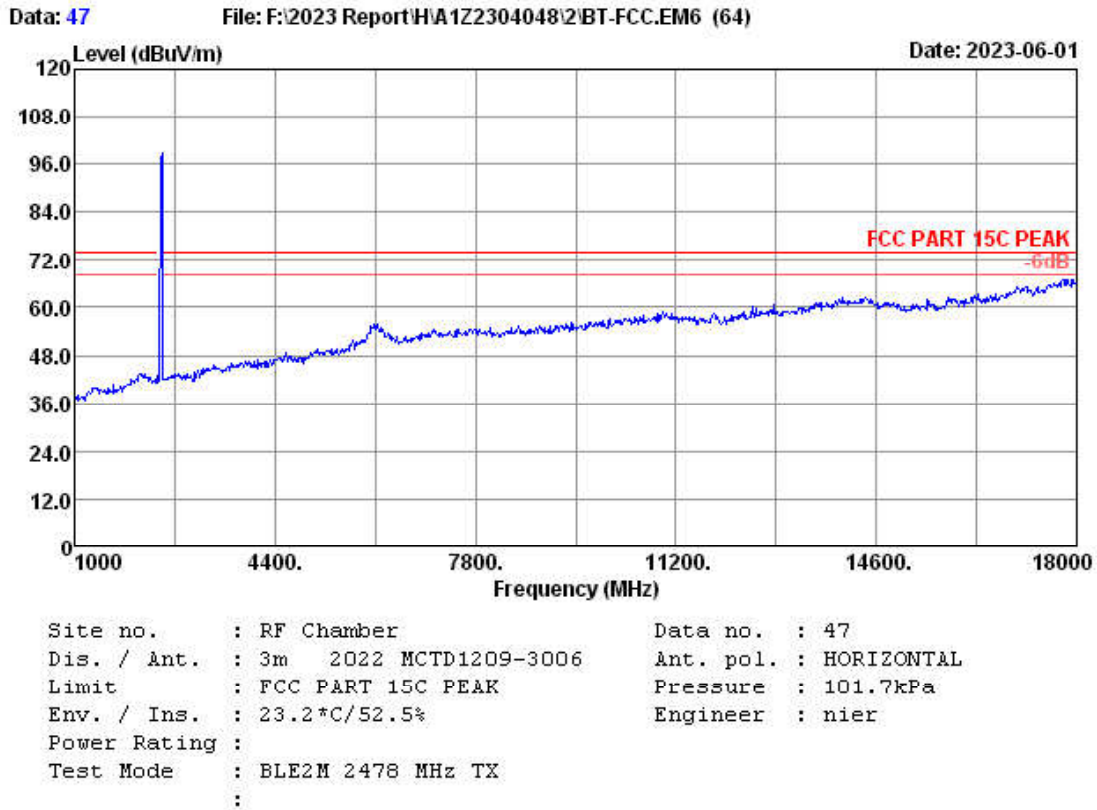
Site no.	: RF Chamber	Data no.	: 45
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BLE2M 2478 MHz TX		
	:		

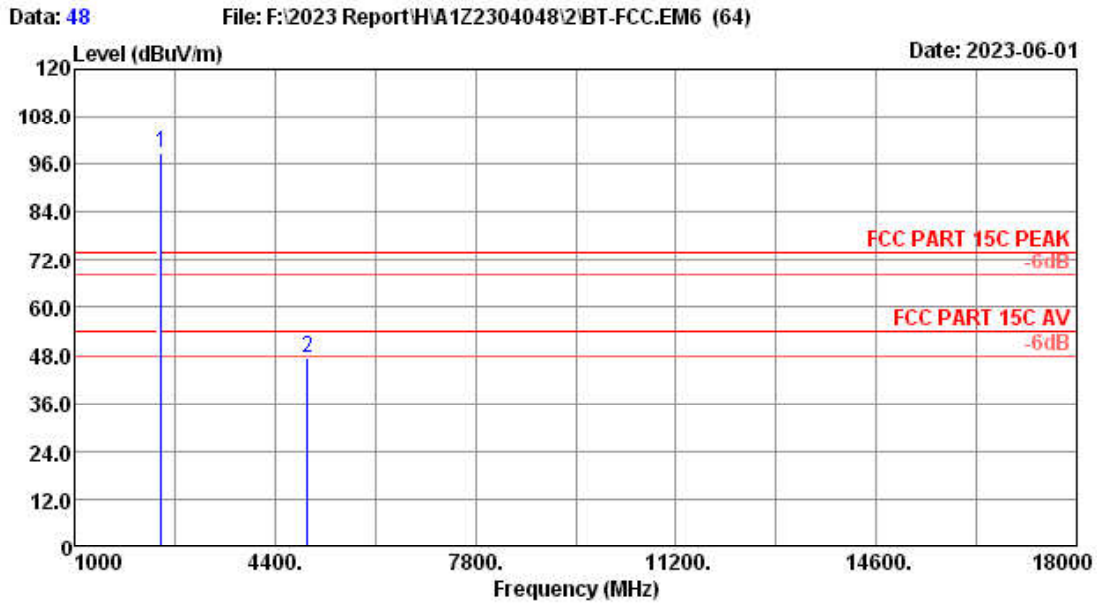


Site no.	: RF Chamber	Data no.	: 46
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BLE2M 2478 MHz TX		
	:		

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	2478.00	27.80	2.34	95.82	34.35	91.61	-----	-----	Peak
2	4956.00	32.03	3.39	45.80	33.69	47.53	74.00	26.47	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.	: RF Chamber	Data no.	: 48
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BLE2M 2478 MHz 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	2478.00	27.80	2.34	102.88	34.35	98.67	-----	-----	Peak
2	4956.00	32.03	3.39	45.60	33.69	47.33	74.00	26.67	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.