

FCC PART 15C TEST REPORT FOR CERTIFICATION

On Behalf of

Shenzhen Jiteng Network Technology Co.,Ltd

Mini PC

A Series; A 5; A 6; A 7; A x (x=0-9)

FCC ID: 2AY4C-GM06

GEEKOM

Prepared for : Shenzhen Jiteng Network Technology Co.,Ltd
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Report Number : ACS-F23070

Date of Test : Mar.23~May.16, 2023

Date of Report : Jun.07, 2023

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Appendix A. Photograph of Test

Appendix B. Photo of the EUT

TEST REPORT

Applicant : Shenzhen Jiteng Network Technology Co.,Ltd
Manufacturer : Shenzhen Jiteng Network Technology Co.,Ltd
Product : Mini PC
FCC ID : 2AY4C-GM06
(A) Model No. : A Series; A 5; A 6; A 7; A x (x=0-9)
(B) Brand : GEEKOM
(C) Test Voltage : DC 19V From Adapter 100V/50Hz

Tested for comply with:
FCC CFR47 Part 15 Subpart C

Test procedure used:
ANSI C63.10: 2020

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 : Mar.23~May.16, 2023 Report of date: Jun.07, 2023

Prepared by : Jasmine Ning Reviewed by : Thomas Chen
Jasmine Ning / Assistant Thomas Chen / Assistant Manager

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

Approved & Authorized Signer : Sunny Lu

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	PASS
20dB & 99% Bandwidth Test	FCC Part 15: 15.215 ANSI C63.10: 2020	PASS
Number Of Hopping Frequency Test	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.10: 2020	PASS
Dwell Time Test	FCC Part 15: 15.247(a)(1)(iii) 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
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 Jiteng Network Technology Co.,Ltd
Applicant Address	No.1202,Bitian Pavilion,Bizhong Garden,No.10 Bibo First Street,Bibo Community, Huangbei Street,Luohu District,Shenzhen City, China
Manufacturer	Shenzhen Jiteng Network Technology Co.,Ltd
Manufacturer Address	No.1202,Bitian Pavilion,Bizhong Garden,No.10 Bibo First Street,Bibo Community, Huangbei Street,Luohu District,Shenzhen City, China
Product	Mini PC
Model No.	A Series; A 5; A 6; A 7; A x (x=0-9) Model differences (Declared by the Applicant): Some component part difference, As for Radio part: these model's RF module are the same.
Test Model	A Series
Brand	GEEKOM
Power supply#1	Manufacturer: SHENZHEN XINSPower TECHNOLOGY CO., LTD M/N:A1001-1904740DI INPUT:100-240V~50/60Hz 2.5A OUTPUT:19.0V; 4.74A 90.0W DC Cable: Shielded, Undetachable, 1.5m
Power supply#2	Manufacturer: MOSO POWER SUPPLY TECHNOLOGY CO., LTD M/N: MS-Z6320R190-120D0-E INPUT:100-240V~50/60Hz 2.0A OUTPUT:19.0V; 6.32A 120.0W DC Cable: Shielded, Undetachable, 1.5m
Power supply#3	Manufacturer: Shenzhen Honor Electronic Co.,Ltd. M/N: ADS-110CL-19-3 190090G INPUT: AC 100-240V~50/60Hz 1.5A max OUTPUT:19.0V; 4.74A 90.06W DC Cable: Shielded, Undetachable, 1.5m
Power Cable	Unshielded, Detachable, 1.3m (3C)
FCC ID	2AY4C-GM06
Sample Type	Prototype production
Date of Receipt	Mar.13, 2023
Date of Test	Mar.23~May.16, 2023
Remark: This report only for BDR+EDR.	

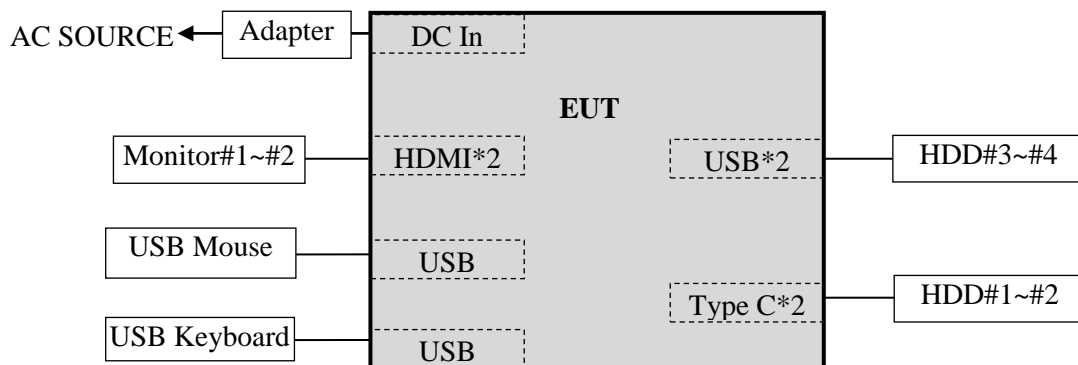
2.2. Feature of Equipment Under Test

Product Feature & Specification		
Product	Mini PC	
Test Model	A Series	
Power Source	<input checked="" type="checkbox"/> Commercial Power	100-240V~50/60Hz
	<input checked="" type="checkbox"/> External Power Source	DC 19.0V
	<input type="checkbox"/> Lithium battery	DC V, mAh
	<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/ax20/ax40/ n40(RU is not support for 802.11ax mode)	
Frequency Range	2412-2462MHz	
Type of Modulation	802.11b(DSSS): CCK, QPSK, BPSK; 802.11g/n(OFDM): 64QAM,16QAM, QPSK, BPSK 802.11ax(OFDM): 64QAM,16QAM, QPSK, BPSK, 1024QAM	
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 802.11ax: up to 574Mbps	
Channel Separation	5MHz	
5GHz Wi-Fi		
Support Modes	802.11a/n20/n40/ac20/ac40/ac80 /ax20/ax40/ax80 (RU is not support for 802.11ax mode)	
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 802.11ax (OFDM): QPSK, BPSK, 16QAM, 64QAM,256QAM, 1024QAM	
Data Rate	802.11a: 6/9/12/18/24/36/48/54 Mbps; 802.11n: up to 300Mbps; 802.11ac: up to 867Mbps; 802.11ax: up to 1201Mbps	
Channel Separation	20MHz	
Antenna System		
Type of Antenna	PIFA	
Antenna Peak Gain (NUCBC02)	Bluetooth Peak Gain: 0.54dBi 2.4GHz Peak Gain: ANT 0(MAIN): 0.44dBi; ANT 1(AUX): 0.54dBi Band 1 Peak Gain: ANT 0(MAIN): 2.47dBi; ANT 1(AUX): -0.7dBi Band 4 Peak Gain: ANT 0(MAIN): 2.09dBi; ANT 1(AUX): 0.03dBi	
Antenna Peak Gain (NUCAL02)	Bluetooth Peak Gain: 1.47dBi 2.4GHz Peak Gain: ANT 0(MAIN): 1.23dBi; ANT 1(AUX): 1.47dBi Band 1 Peak Gain: ANT 0(MAIN): 3.28dBi; ANT 1(AUX): 4.39dBi Band 4 Peak Gain: ANT 0(MAIN): 7.53dBi; ANT 1(AUX): 5.95dBi	

2.3. Tested Supporting System Details

No.	Description	ACS No.	Manufacturer	Model	Serial Number
1.	Monitor#1	---	Lenovo	---	--
		Power Cord(3C): Unshielded, Detachable, 1.8m HDMI Cable: Shielded, Detachable, 1.8m			
2.	Monitor#2	---	DELL	P2421	--
		Power Cord(3C): Unshielded, Detachable, 1.8m HDMI Cable: Shielded, Detachable, 1.8m			
3.	USB Keyboard	ACS-EMC-K03R	DELL	SK-8120	CN-ODJ365-71616-2 BE-0DCE-A00
		USB Cable: Shielded, Undetachable, 2.0m			
4.	USB Mouse	ACS-EMC-M03R	DELL	M0C5UO	512023253
		USB Cable: Shielded, Undetachable, 1.8m			
5.	HDD#1	---	WD	WDBC3C0010BSL	WX51A794028Y
		Data Cable: Shielded, Detachable, 0.4m			
6.	HDD#2	---	WD	WDBC3C0020BSL	WXF1A19JNX5E
		Date Cable: Shielded, Detachable, 0.4m			
7.	HDD#3	ACS-EMC-HDD34	WD	WD My Book Studio	WCAV4302542
		Data Cable: Shielded, Detachable, 0.4m			
8.	HDD#4	ACS-EMC-HDD35	WD	WD My Book Studio	WCAV5D02502
		Date Cable: Shielded, Detachable, 0.4m			

2.4. Block diagram of connection between EUT and simulators for power line conducted emission and radiated emission test:



(EUT: Mini PC)

2.5. Test information

A special software (Mass Production Kit V1.0.48) was used to control EUT work in continuous TX mode

Tested mode, Packet Type, peak output power information			
Mode	Packet Type	Output power(dBm) P max	Output Power(dBm) P low
GFSK	DH1	3.467	3.236
	DH3		
	DH5		
$\pi/4$ DQPSK	2-DH1	4.756	4.437
	2-DH3		
	2-DH5		
8DPSK	3-DH1	6.809	6.606
	3-DH3		
	3-DH5		

$\pi/4$ DQPSK mode has been verified to have the lowest power, so the final test were performed with GFSK and 8DPSK mode, the worse-case packet type were:

GFSK Mode: DH5

8DPSK Mode: 3DH5

Item		Modulation	Data Rate	Test Channel
Radiated Test Case	Radiated Band Edge	GFSK	1Mbps	00/78
		8-DPSK	3Mbps	00/78
	Radiated Spurious Emission	GFSK	1Mbps	00/39/78
		8-DPSK	3Mbps	00/39/78
Conducted Test Case	20dB Bandwidth	GFSK	1Mbps	00/39/78
		8-DPSK	3Mbps	00/39/78
	Carrier Frequency Separation	GFSK	1Mbps	39
		8-DPSK	3Mbps	39
	Time of Occupancy	GFSK	1Mbps	39
		8-DPSK	3Mbps	39
	Number of Hopping Channels	GFSK	1Mbps	00
		8-DPSK	3Mbps	78
	Maximum Peak Output Power	GFSK	1Mbps	00/39/78
		8-DPSK	3Mbps	00/39/78
	Band Edges	GFSK	1Mbps	00/78
		8-DPSK	3Mbps	00/78
Spurious Emission	GFSK	1Mbps	00/39/78	
	8-DPSK	3Mbps	00/39/78	

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)

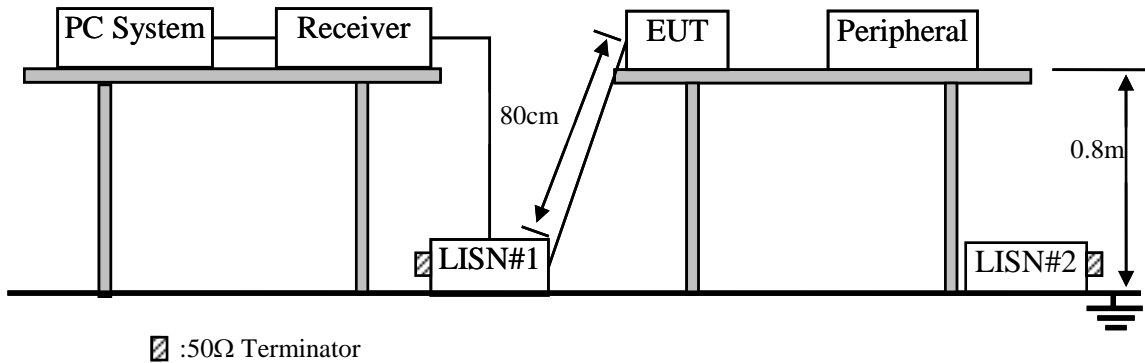
Test Item	Uncertainty
Uncertainty for Conduction emission test in No. 1 Conduction	$\pm 2.6\text{dB}(150\text{kHz to } 30\text{MHz})$
Uncertainty for Radiation Emission test in 3m chamber	$\pm 3.8\text{dB}(30\sim 200\text{MHz, Polarization: H})$
	$\pm 3.8\text{dB}(30\sim 200\text{MHz, Polarization: V})$
	$\pm 4.0\text{dB}(200\text{M}\sim 1\text{GHz, Polarization: H})$
	$\pm 4.0\text{dB}(200\text{M}\sim 1\text{GHz, Polarization: V})$
Uncertainty for Radiation Emission test in 3m chamber(1GHz-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.

Mini PC (EUT)

Model No. : A Series

Serial No. : N/A

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

3.5. Operating Condition of EUT

Setup the EUT as shown as Section 3.2.

Turn on the power of EUT.

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

3.6. Test Procedure

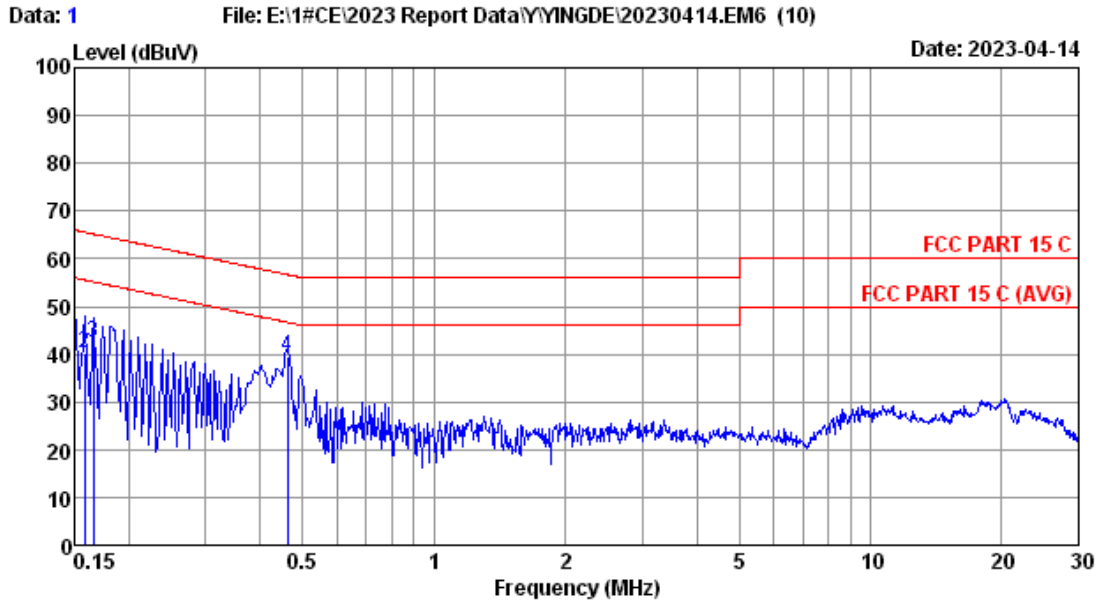
The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power Via AC unit connected to the power mains through a line impedance stabilization network (L.I.S.N. #1). This provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs).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

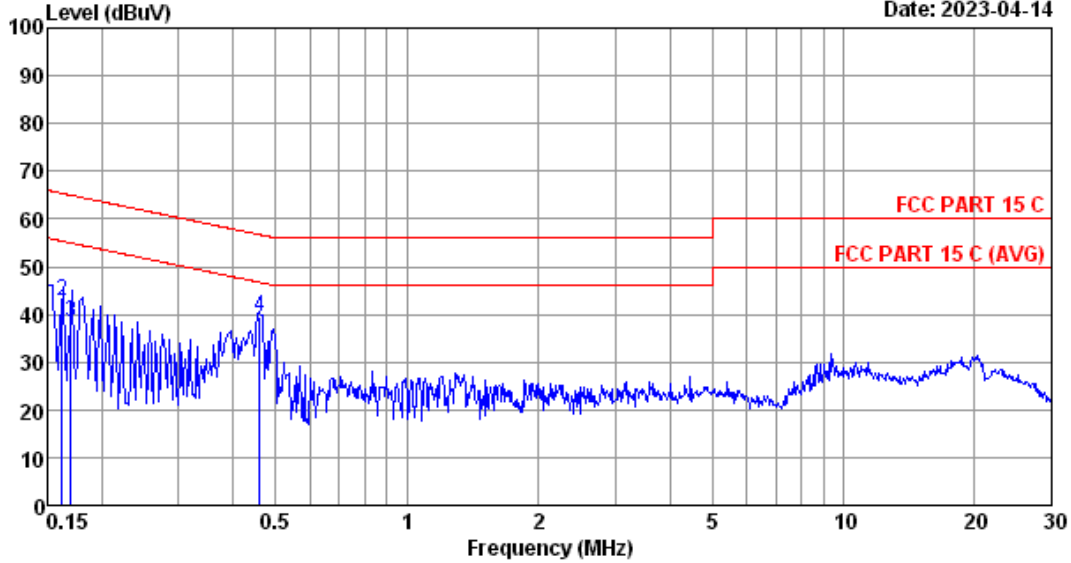


Site no :1# CE Data No :1
 Dis./Lisn :2022 ENV216-L
 Limit :FCC PART 15 C
 Env./Ins. :23.5*C/52% Engineer :Sucy
 Power Rating :AC 120V/60Hz
 Test Mode :BT3.0 TX Mode

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBUV)	Emission Level (dBUV)	Limits (dBUV)	Margin (dB)	Remark
1	0.150	9.60	0.01	34.90	44.51	66.00	21.49	QP
2	0.158	9.60	0.01	30.70	40.31	65.57	25.26	QP
3	0.166	9.60	0.01	33.00	42.61	65.16	22.55	QP
4	0.461	9.60	0.01	30.00	39.61	56.67	17.06	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.

Data: 2 File: E:\1#CE\2023 Report Data\YYINGDE\20230414.EM6 (10) Date: 2023-04-14



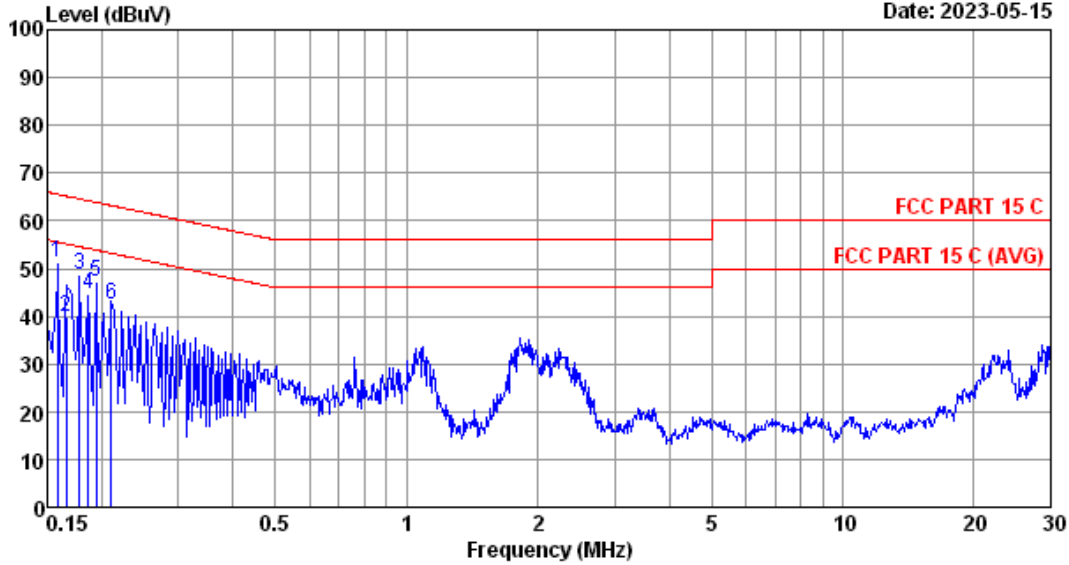
Site no :1# CE Data No :2
 Dis./Lisn :2022 ENV216-N
 Limit :FCC PART 15 C
 Env./Ins. :23.5°C/52% Engineer :Sucy
 Power Rating :AC 120V/60Hz
 Test Mode :BT3.0 TX Mode

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.150	9.60	0.01	33.30	42.91	66.00	23.09	QP
2	0.162	9.60	0.01	33.30	42.91	65.36	22.45	QP
3	0.170	9.60	0.01	28.70	38.31	64.96	26.65	QP
4	0.459	9.60	0.01	30.00	39.61	56.71	17.10	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 for metal appearance:

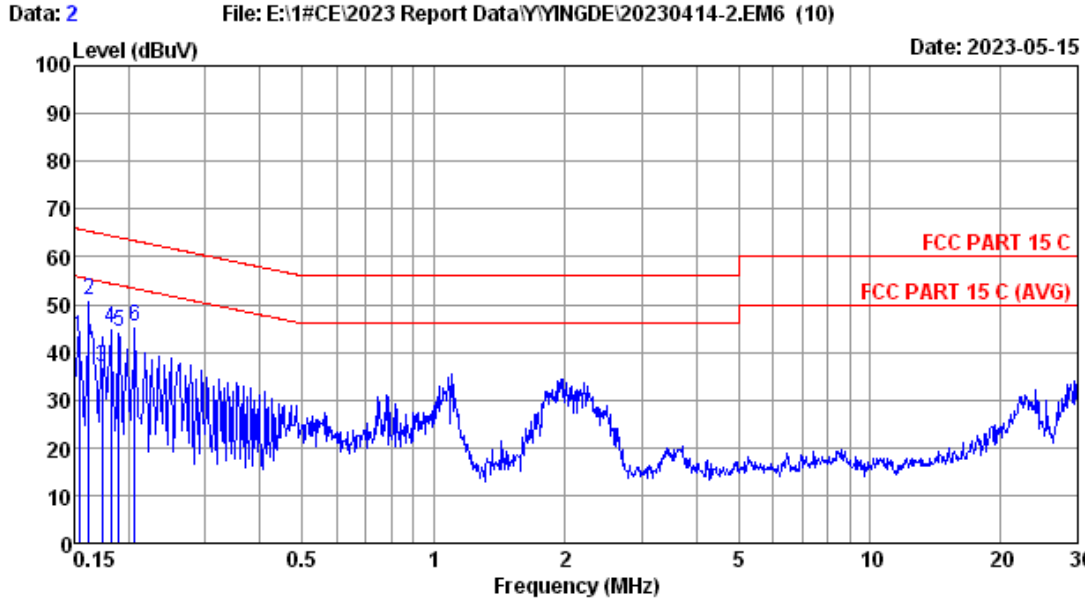
Data: 1 File: E:\1#CE\2023 Report Data\YYINGDE\20230414-2.EM6 (10) Date: 2023-05-15



Site no :1# CE Data No :1
 Dis./Lisn :2022 ENV216-N
 Limit :FCC PART 15 C
 Env./Ins. :23.5°C/52% Engineer :Sucy
 Power Rating :AC 120V/60Hz
 Test Mode :BT3.0 TX Mode

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.158	9.60	0.01	41.70	51.31	65.57	14.26	QP
2	0.166	9.60	0.01	30.30	39.91	65.16	25.25	QP
3	0.178	9.60	0.01	39.20	48.81	64.58	15.77	QP
4	0.186	9.60	0.01	35.20	44.81	64.21	19.40	QP
5	0.194	9.60	0.01	37.80	47.41	63.86	16.45	QP
6	0.210	9.60	0.01	32.90	42.51	63.21	20.70	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 :2
 Dis./Lisn :2022 ENV216-N
 Limit :FCC PART 15 C
 Env./Ins. :23.5°C/52% Engineer :Sucy
 Power Rating :AC 120V/60Hz
 Test Mode :BT3.0 TX Mode

No	Freq (MHz)	LISN		Cable Loss (dB)	Reading (dBuV)	Emission		Margin (dB)	Remark
		Factor (dB)				Level (dBuV)	Limits (dBuV)		
1	0.154	9.60		0.01	33.60	43.21	65.78	22.57	QP
2	0.162	9.60		0.01	41.20	50.81	65.36	14.55	QP
3	0.174	9.60		0.01	27.20	36.81	64.77	27.96	QP
4	0.182	9.60		0.01	35.30	44.91	64.39	19.48	QP
5	0.190	9.60		0.01	34.80	44.41	64.04	19.63	QP
6	0.206	9.60		0.01	35.90	45.51	63.37	17.86	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 TEST

4.1. Test Equipments

Frequency range below 30MHz

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	10m Chamber(NSA)	AUDIX	N/A	N/A	Aug.12,22	5 Year
2.	10m Chamber(SE)	AUDIX	N/A	N/A	Sep.16,22	5 Year
3.	Loop Antenna	Schwarzbeck	FMZB 1513-60B	1513-60B015	Feb.08,23	1 Year
4.	EMI Test Receiver	Rohde & Schwarz	ESR3	102891	Oct.10,22	1 Year
5.	RF Cable	SPUMA	CFD400NL-LW	NO.4	Apr.02,23	1 Year
6.	Amplifier	EMCI	EMC9135	980348	Feb.23,23	1 Year
7.	Signal Analyzer	Rohde & Schwarz	FSV30	103669	Oct.09,22	1 Year
8.	Coaxial Switch	Anritsu	MP59B	6201397221	Apr.02,23	1 Year
9.	Coaxial Switch	Anritsu	MP59B	6201397220	Apr.02,23	1 Year
10.	Test Software	AUDIX	e3	6.100913a	N/A	N/A

Note: N/A means Not applicable.

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.06,22	1 Year
4.	Signal Analyzer	Rohde & Schwarz	FSV30	103670	Apr.01,23	1 Year
5.	Tri-log-Broadband Antenna	SCHWARZBECK	VULB 9168	01317	Oct.28,22	1 Year
6.	NSA Cable	HUBER+SUHNER	CFD400NL-LW	No.3	Oct.09,22	1 Year
7.	Coaxial Switch	Anritsu	MP59B	6201397223	Apr.06,22	1 Year
8.	EMI Test Receiver	Rohde & Schwarz	ESR3	101931	Apr.06,22	1 Year
9.	Amplifier	HP	8447D	2944A11159	Apr.06,22	1 Year
10.	Coaxial Switch	Anritsu	MP59B	6201397223	Apr.02,23	1 Year
11.	EMI Test Receiver	Rohde & Schwarz	ESR3	101931	Apr.01,23	1 Year
12.	Amplifier	HP	8447D	2944A11159	Apr.02,23	1 Year
13.	Test Software	AUDIX	e3	6.100913a	N/A	N/A

Note: N/A means Not applicable.

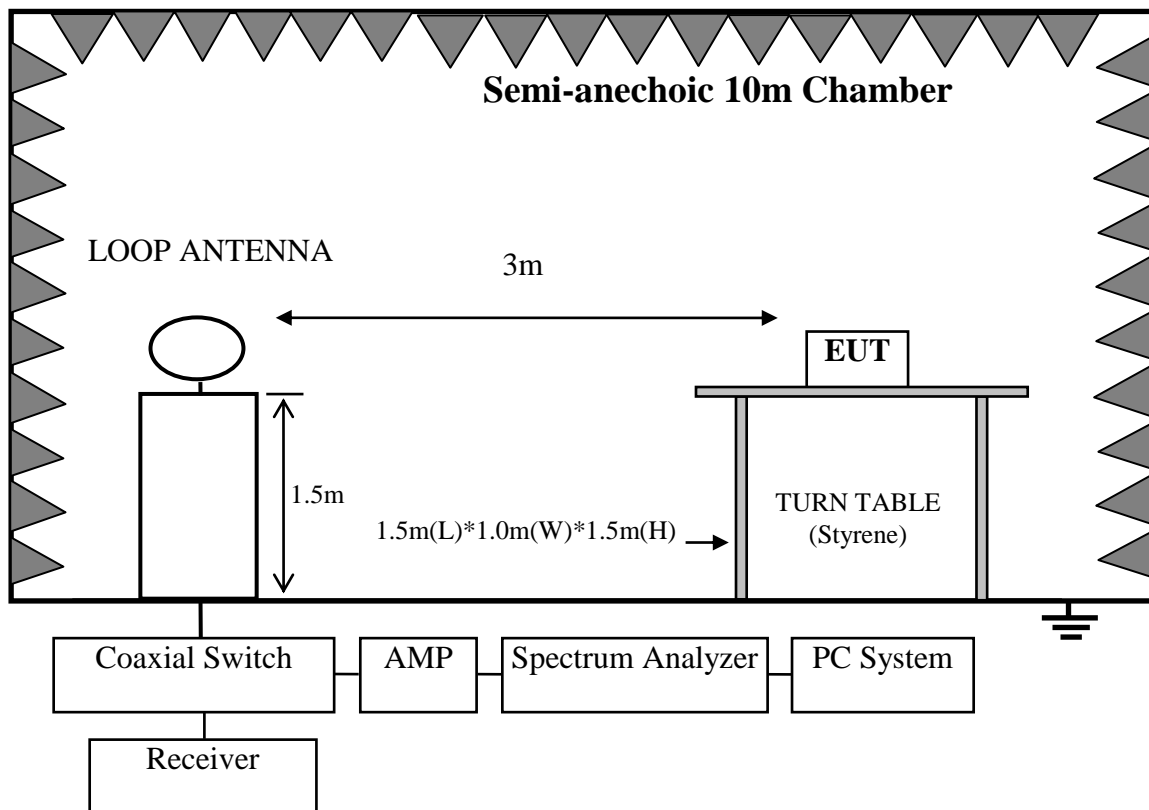
Frequency range: above 1000MHz

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.06,22	1 Year
4.	Signal Analyzer	Rohde & Schwarz	FSV30	104050	Apr.01,23	1 Year
5.	Amplifier	Agilent	83017A	MY53270084	Oct.09,22	1 Year
6.	RF Cable	EMCI	EMC104-SM-S M-15000	190407	Jul.01,22	1 Year
7.	Test Software	AUDIX	e3	6.100913a	N/A	N/A
8.	Horn Antenna	ETC	MCTD 1209	DRH15F03006	Aug.12,22	1 Year

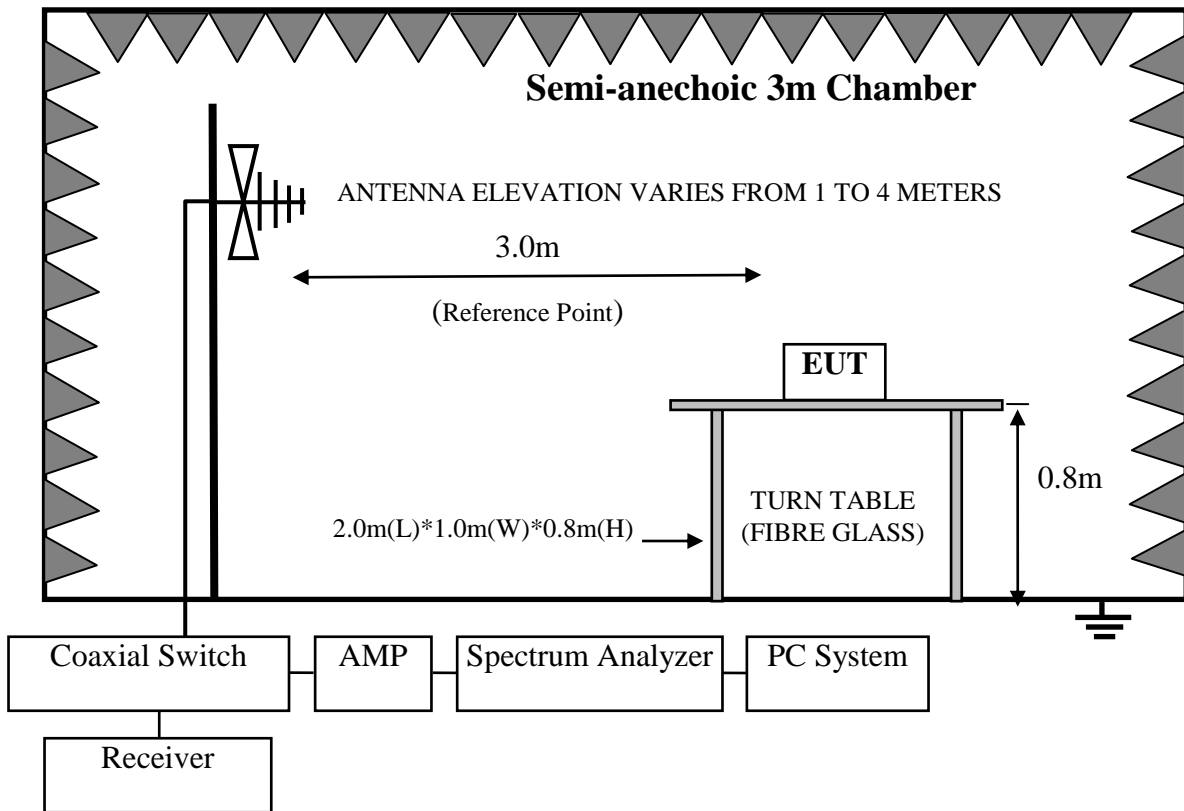
Note: N/A means Not applicable.

4.2. Block Diagram of Test Setup

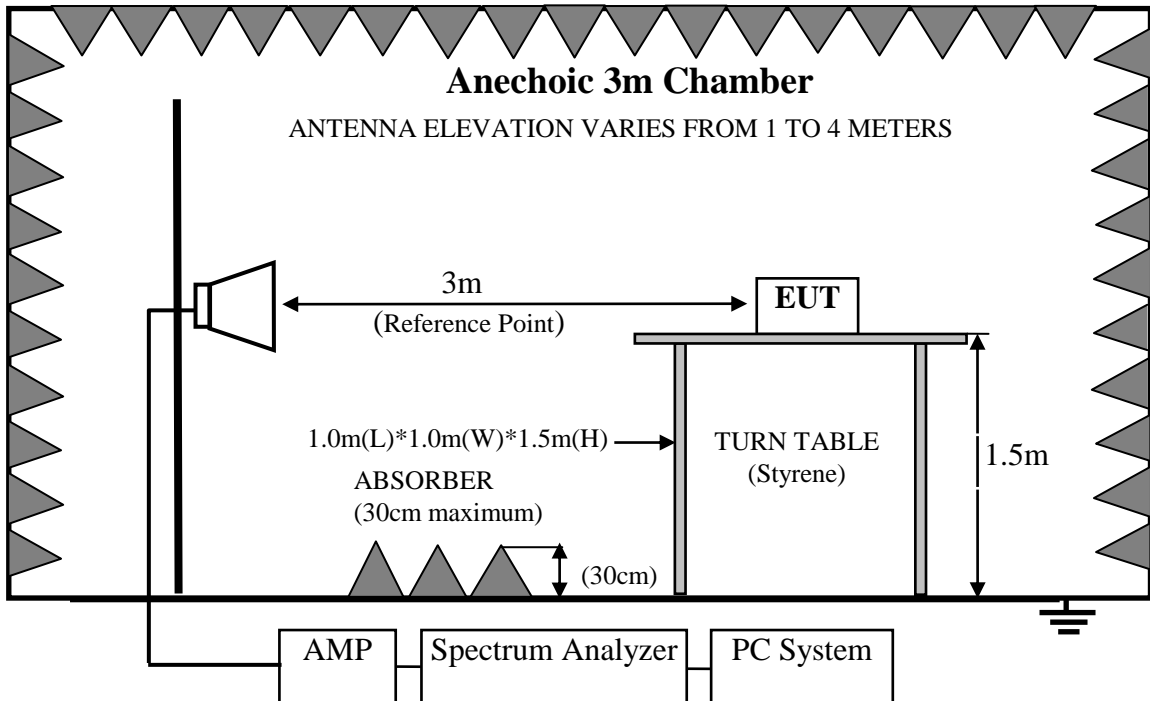
For frequency range below 30MHz



For frequency range 30MHz-1000MHz



For frequency range above 1GHz



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 limit shall apply at the cross point between two frequency bands.
 - (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.
 - (4) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. 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.

Mini PC (EUT)

Model Number : A Series
Serial Number : N/A

4.5.Operating Condition of EUT

Setup the EUT and simulator as shown as Section 4.2.

Turn on the power of all equipments.

Let EUT work in 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: 2020 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: 2020 on radiated emission Test
This test was performed with EUT in X, Y, Z position, and the worse case was found and 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.

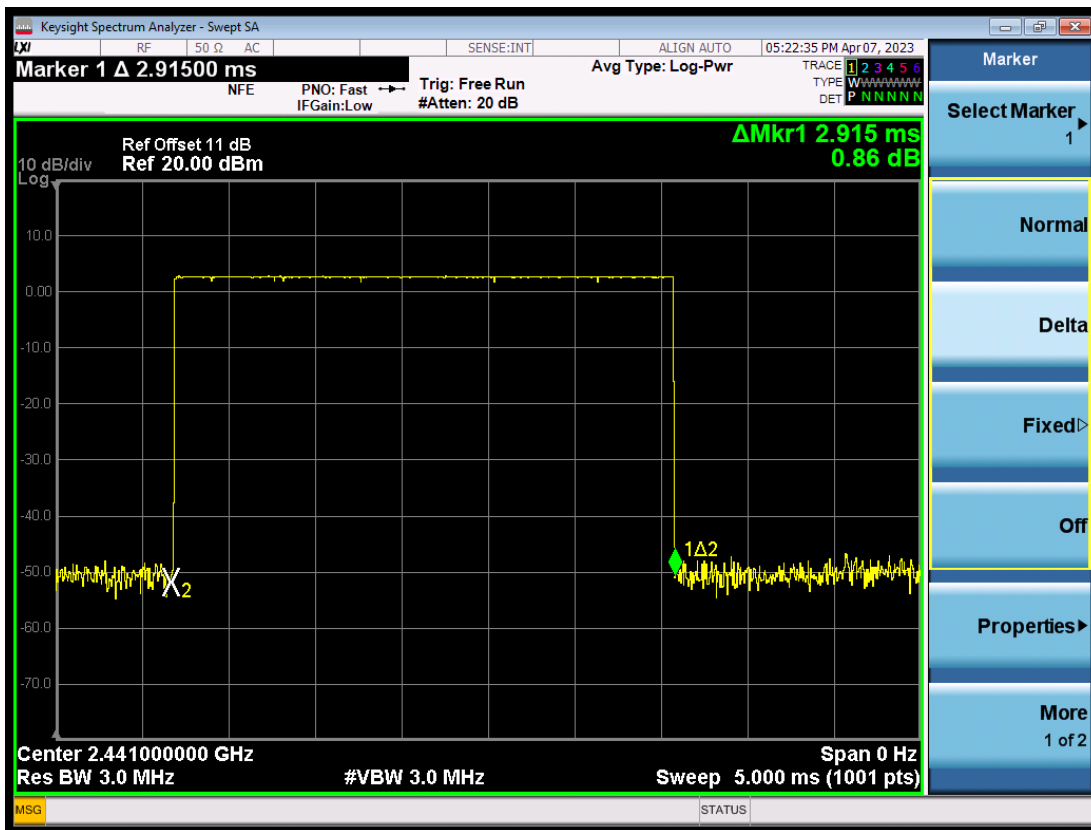
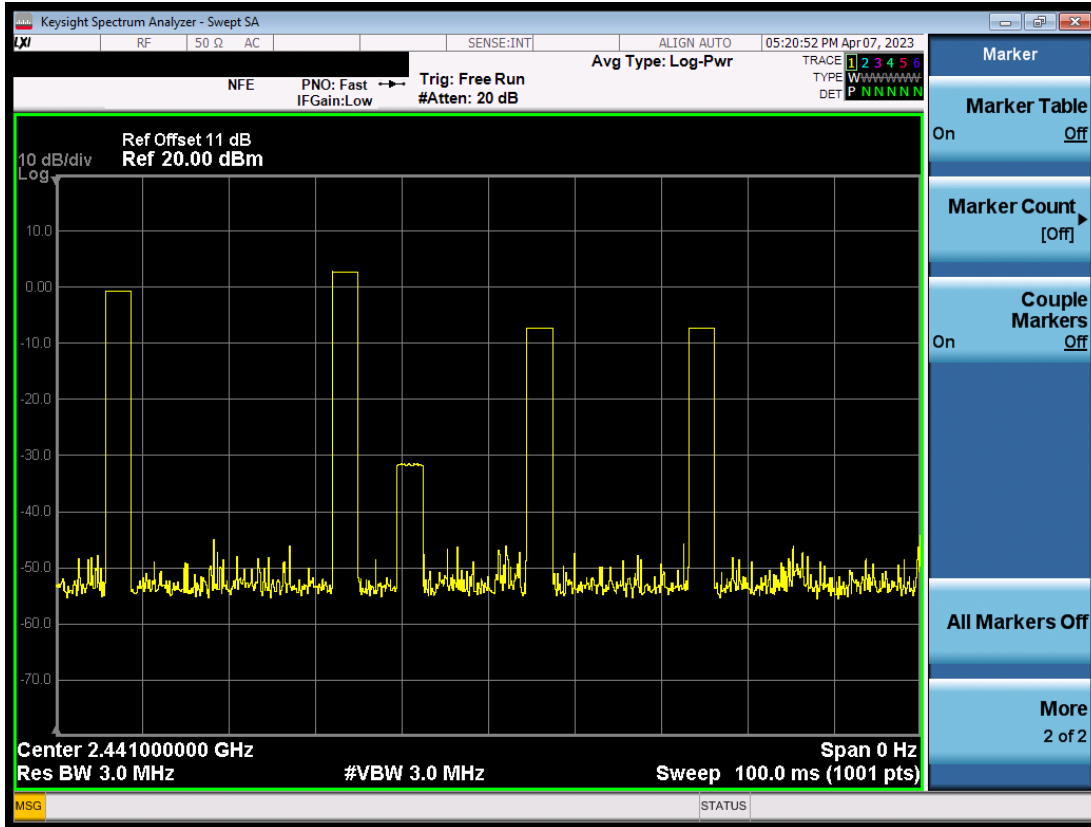
All the emissions from 30MHz to 25GHz were comply with the 15.209 Limit.

Note 1: The duty cycle factor for calculate average level is -30.707dB, 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.

Note 2: The emissions (9kHz~30MHz) not reported for there is no emission be found.

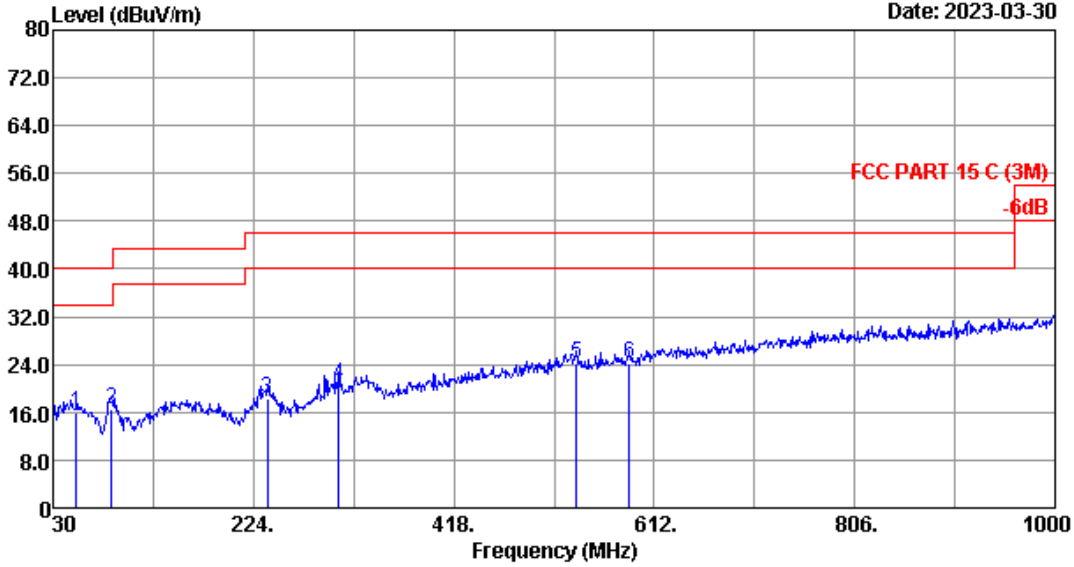
Duty cycle factor = $20\log(\text{Dwell time}/100\text{ms}) = -30.707\text{dB}$

Dwell Time = $2.915 * 1\text{ms}$



Frequency: 30MHz~1GHz

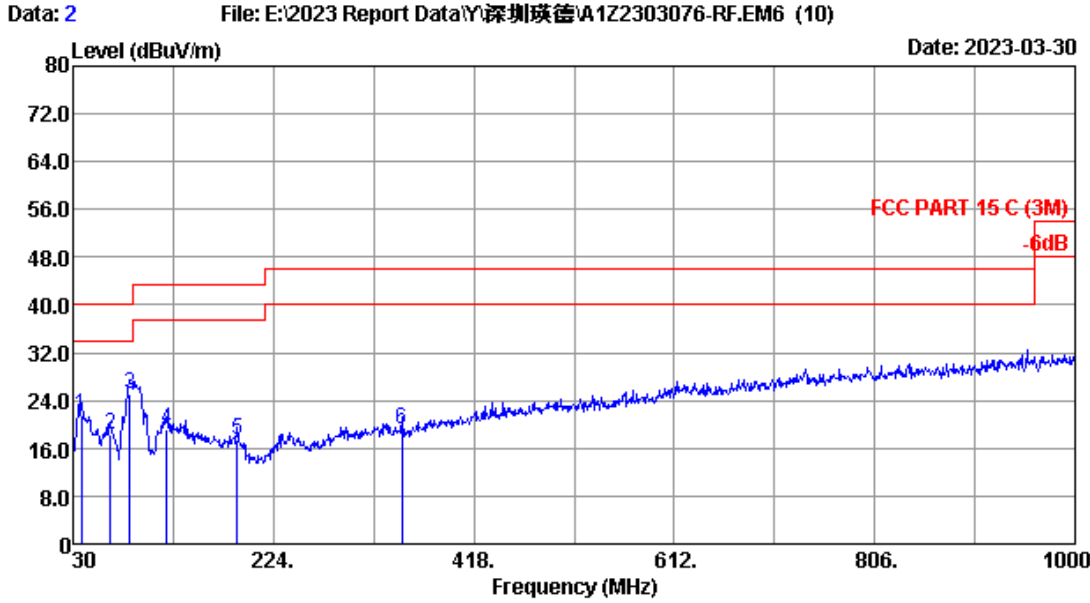
Data: 1 File: E:\2023 Report Data\深圳瑞德\122303076-RF.EM6 (10) Date: 2023-03-30



Site no. : 3m Chamber Data no. : 1
 Dis. / Ant. : 3m 2022 VULB 9168-01317 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 23.4°C/53% Engineer : Abel
 Test Mode : BT 3.0 TX

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	52.310	19.70	0.72	-4.41	16.01	40.00	23.99	QP
2	86.260	13.80	0.95	1.92	16.67	40.00	23.33	QP
3	237.580	17.40	1.55	-0.60	18.35	46.00	27.65	QP
4	306.450	19.44	1.81	-0.63	20.62	46.00	25.38	QP
5	536.340	24.04	2.48	-2.21	24.31	46.00	21.69	QP
6	587.750	25.12	2.62	-3.45	24.29	46.00	21.71	QP

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

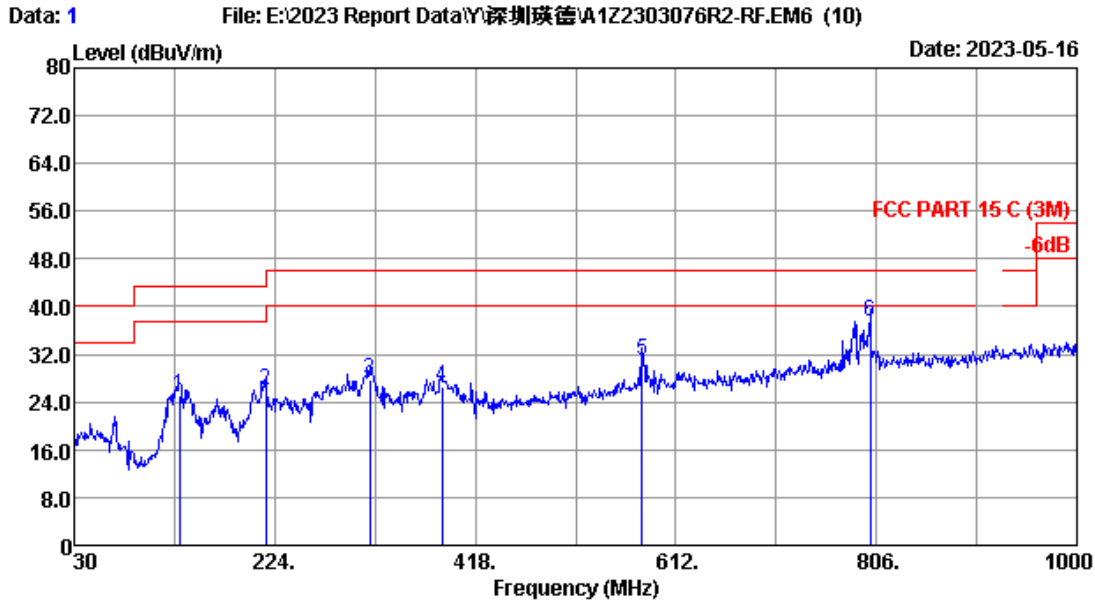


Site no. : 3m Chamber Data no. : 2
 Dis. / Ant. : 3m 2022 VULB 9168-01317 Ant. pol. : VERTICAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 23.4°C/53% Engineer : Abel
 Test Mode : BT 3.0 TX

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Emission				Remark
				Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	
1	37.760	19.20	0.61	1.79	21.60	40.00	18.40	QP
2	65.890	18.40	0.82	-0.92	18.30	40.00	21.70	QP
3	85.290	13.90	0.94	10.38	25.22	40.00	14.78	QP
4	121.180	16.80	1.10	1.22	19.12	43.50	24.38	QP
5	189.080	16.70	1.38	-0.55	17.53	43.50	25.97	QP
6	348.160	20.20	1.92	-2.87	19.25	46.00	26.75	QP

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

Data for metal appearance:

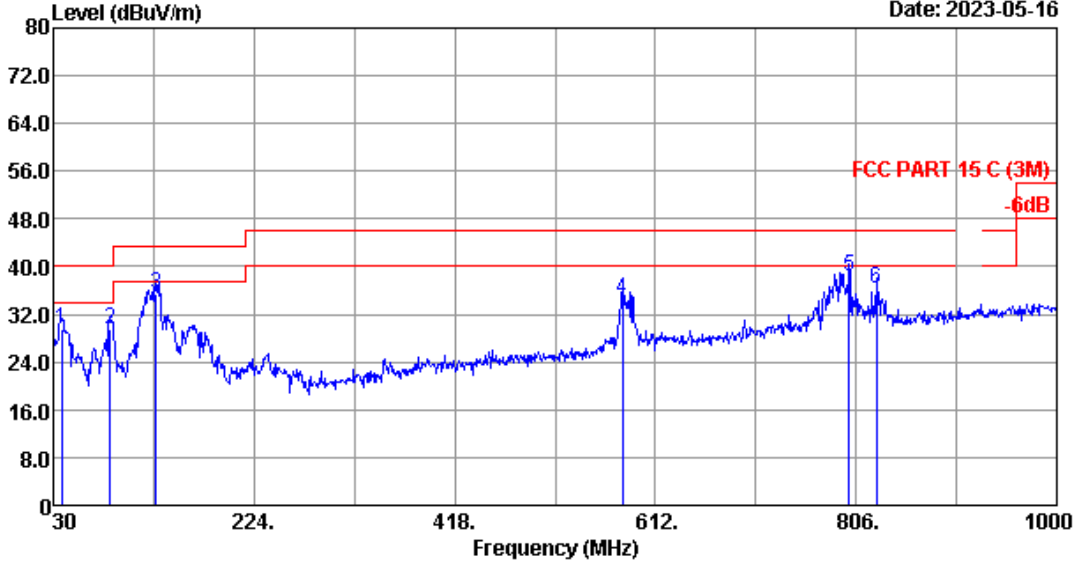


Site no. : 3m Chamber Data no. : 1
 Dis. / Ant. : 3m 2022 VULB 9168-01317 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 26.4*C/58% Engineer : Abel
 Test Mode : BT 3.0 TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	131.850	18.10	1.15	5.91	25.16	43.50	18.34	QP
2	215.270	15.80	1.47	8.62	25.89	43.50	17.61	QP
3	316.150	19.94	1.83	5.99	27.76	46.00	18.24	QP
4	385.990	21.32	2.02	3.10	26.44	46.00	19.56	QP
5	579.020	24.88	2.60	3.52	31.00	46.00	15.00	QP
6	800.180	28.30	3.20	6.11	37.61	46.00	8.39	QP

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

Data: 2 File: E:\2023 Report Data\Y\深圳瑞德\A1Z2303076R2-RF.EM6 (10) Date: 2023-05-16

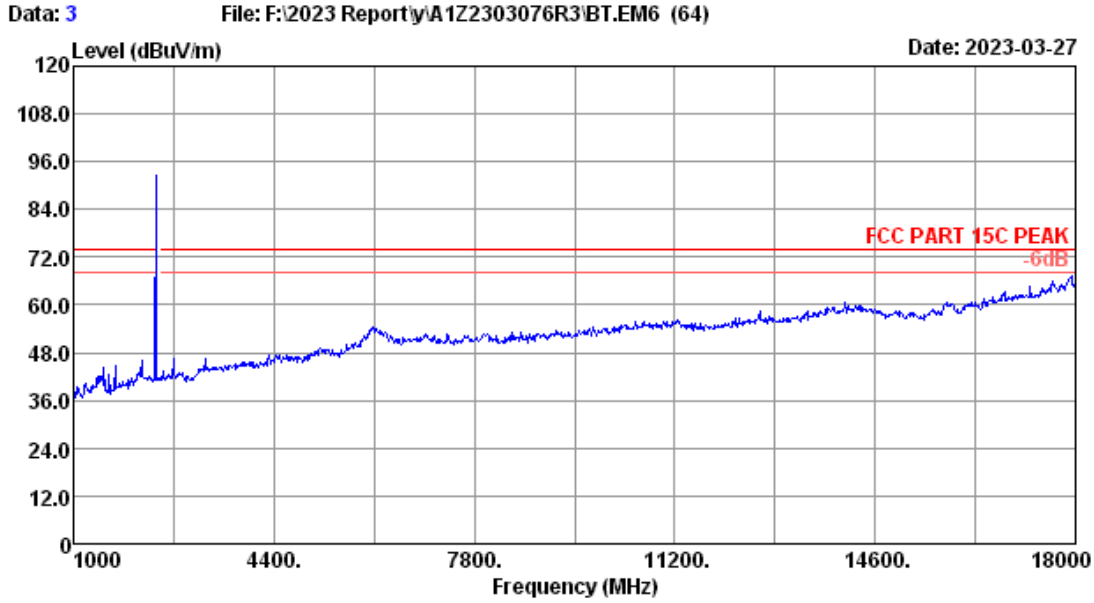


Site no. : 3m Chamber Data no. : 2
 Dis. / Ant. : 3m 2022 VULB 9168-01317 Ant. pol. : VERTICAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 26.4°C/58% Engineer : Abel
 Test Mode : BT 3.0 TX Mode

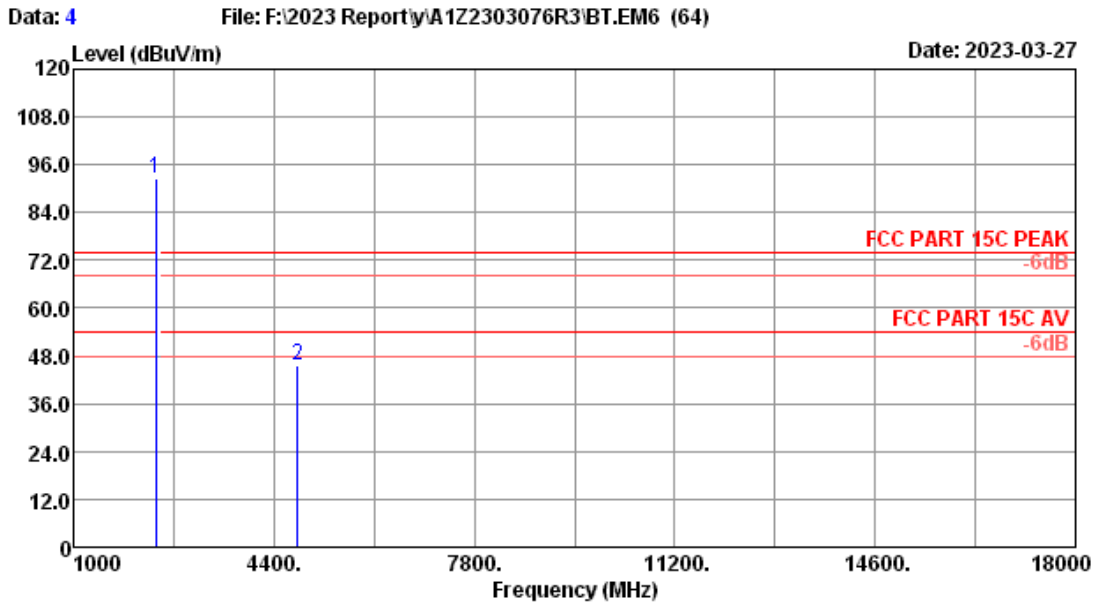
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Emission				Remark
				Reading (dBUV)	Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	
1	37.760	19.20	0.61	9.62	29.43	40.00	10.57	QP
2	85.290	13.90	0.94	14.73	29.57	40.00	10.43	QP
3	128.940	17.70	1.14	16.47	35.31	43.50	8.19	QP
4	579.990	24.90	2.60	7.05	34.55	46.00	11.45	QP
5	799.210	28.26	3.20	7.01	38.47	46.00	7.53	QP
6	825.400	28.40	3.25	4.52	36.17	46.00	9.83	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



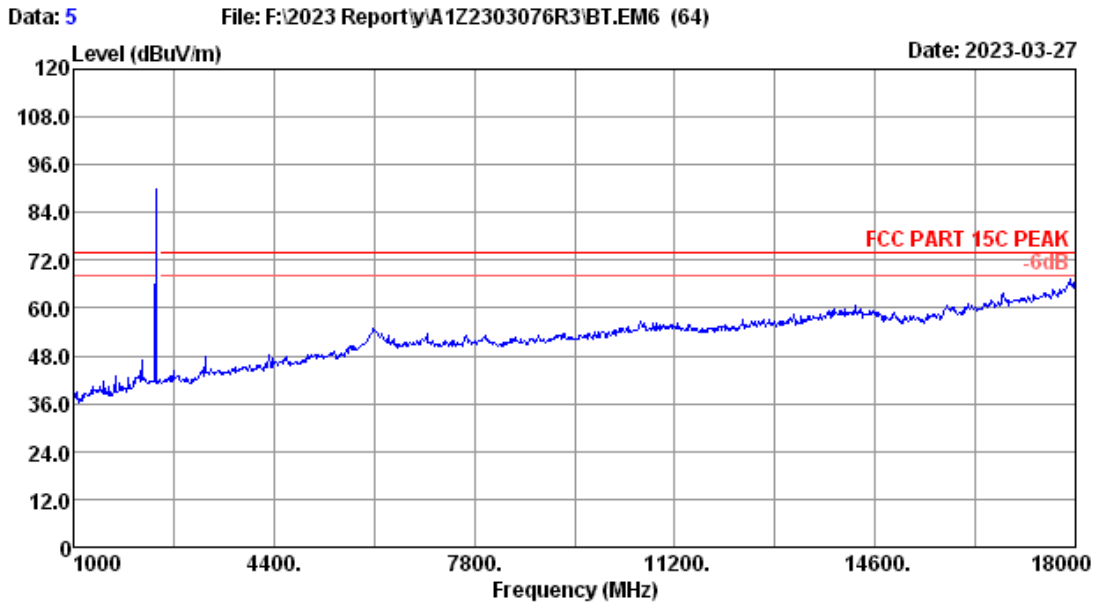
Site no.	: 3m Chamber	Data no.	: 3
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2*C/52.5%	Engineer	: nier
Test Mode	: BT3.0 GFSK 2402 MHz TX		



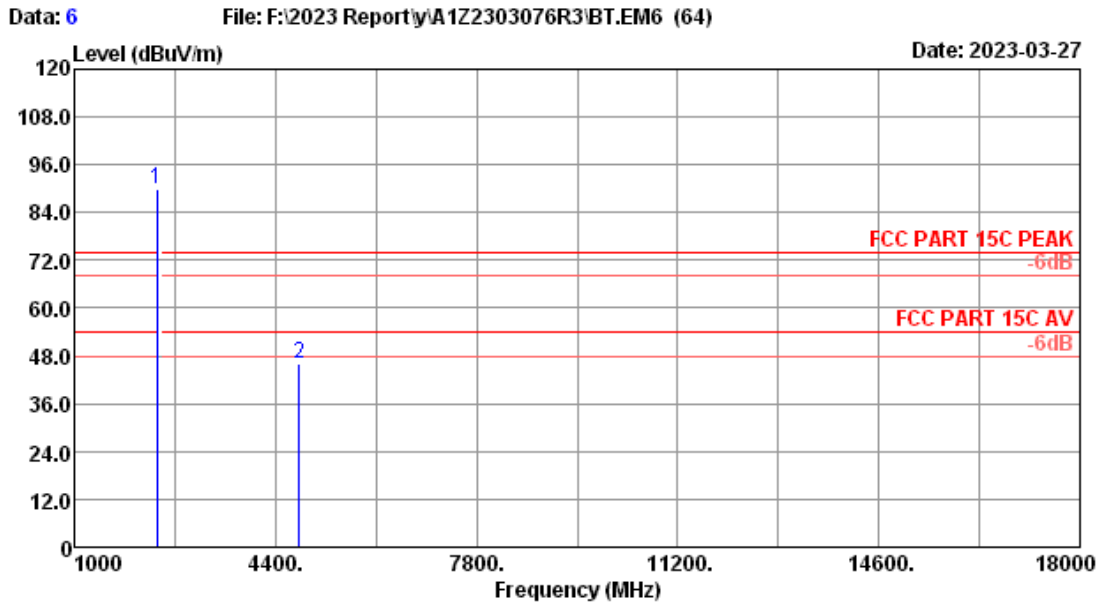
Site no. : 3m Chamber Data no. : 4
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2°C/52.5% Engineer : nier
 Test Mode : BT3.0 GFSK 2402 MHz TX

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	97.00	34.36	92.63	-----	-----	Peak
2	4804.00	31.20	3.33	44.67	33.68	45.52	74.00	28.48	Peak

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



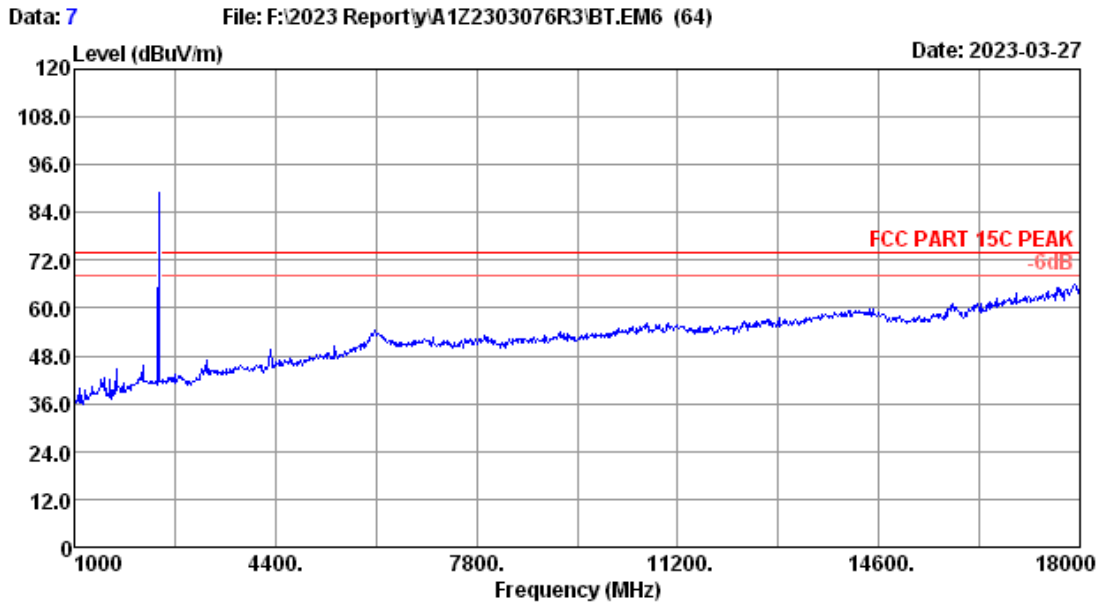
Site no.	: 3m Chamber	Data no.	: 5
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Test Mode	: BT3.0 GFSK 2402 MHz TX		



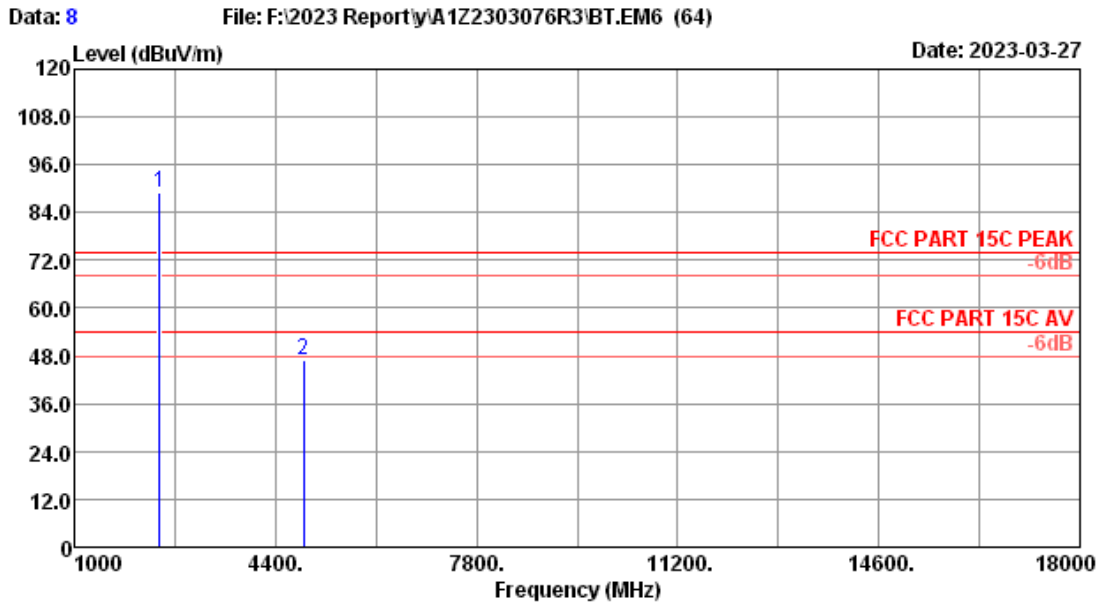
Site no. : 3m Chamber Data no. : 6
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : BT3.0 GFSK 2402 MHz TX

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	94.34	34.36	89.97	-----	-----	Peak
2	4804.00	31.20	3.33	45.16	33.68	46.01	74.00	27.99	Peak

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



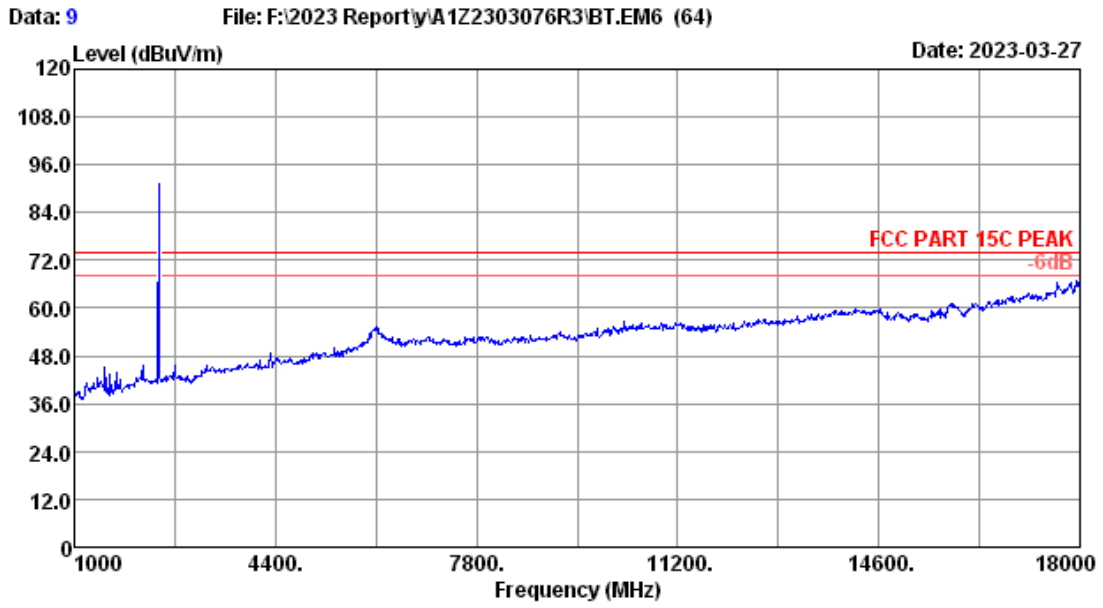
Site no.	: 3m Chamber	Data no.	: 7
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Test Mode	: BT3.0 GFSK 2441MHz TX		



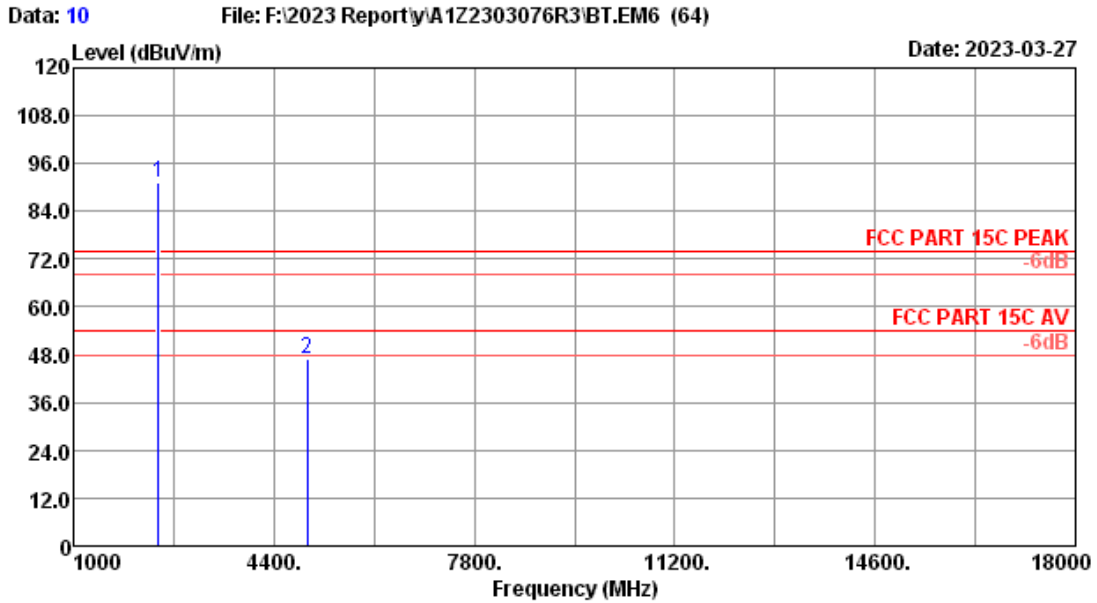
Site no. : 3m Chamber Data no. : 8
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : BT3.0 GFSK 2441MHz TX

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	2441.00	27.80	2.32	93.26	34.35	89.03	-----	-----	Peak
2	4882.00	31.43	3.35	45.68	33.69	46.77	74.00	27.23	Peak

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



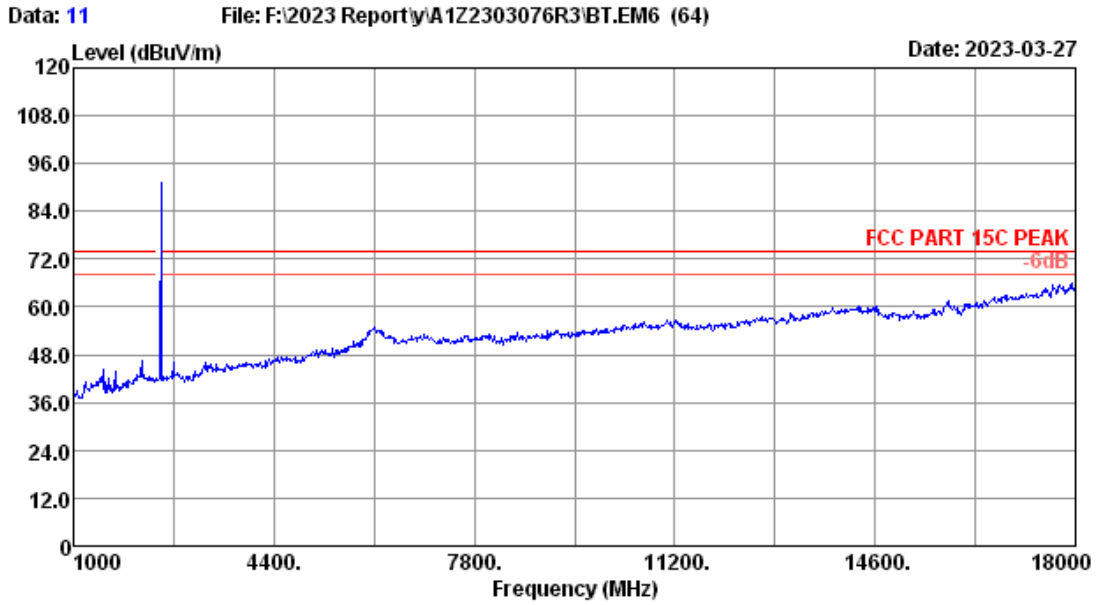
Site no.	: 3m Chamber	Data no.	: 9
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2*C/52.5%	Engineer	: nier
Test Mode	: BT3.0 GFSK 2441MHz TX		



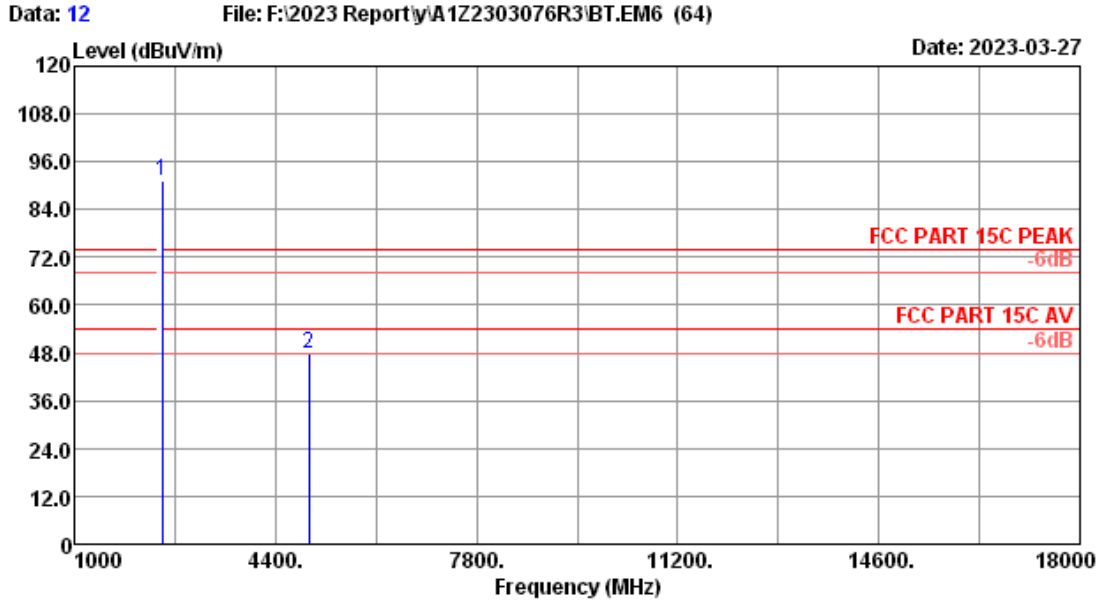
Site no. : 3m Chamber Data no. : 10
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : BT3.0 GFSK 2441MHz TX

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	2441.00	27.80	2.32	95.55	34.35	91.32	-----	-----	Peak
2	4960.00	32.03	3.39	45.35	33.69	47.08	74.00	26.92	Peak

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



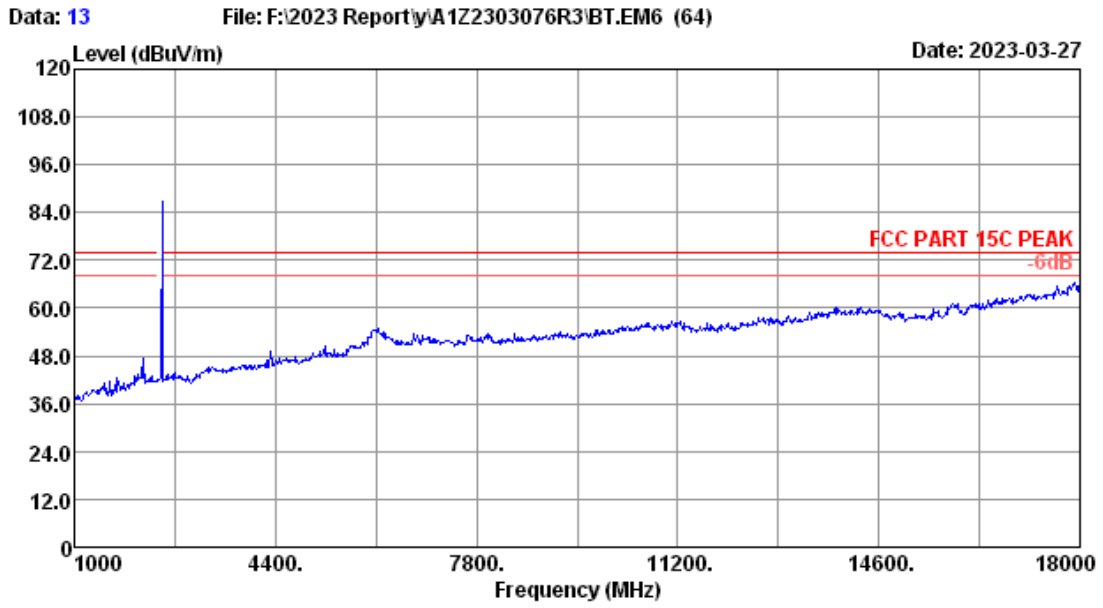
Site no.	: 3m Chamber	Data no.	: 11
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2*C/52.5%	Engineer	: nier
Test Mode	: BT3.0 GFSK 2480MHz TX		



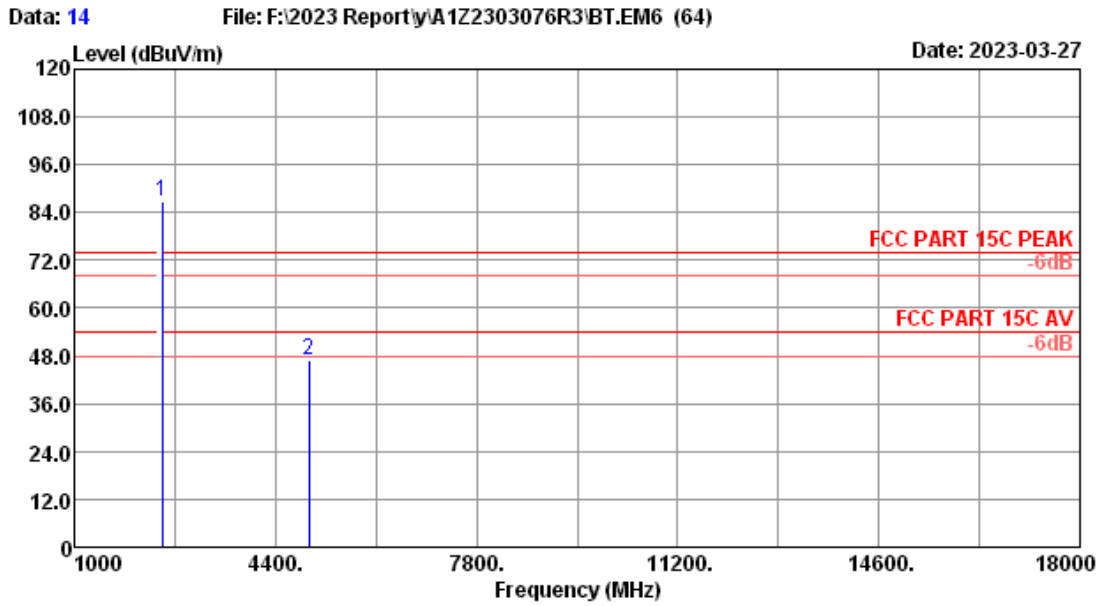
Site no. : 3m Chamber Data no. : 12
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : BT3.0 GFSK 2480MHz TX

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	2.34	95.47	34.35	91.26	74.00	17.26	Peak
2	4960.00	32.03	3.39	46.01	33.69	47.74	48.00	-26.26	Peak

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



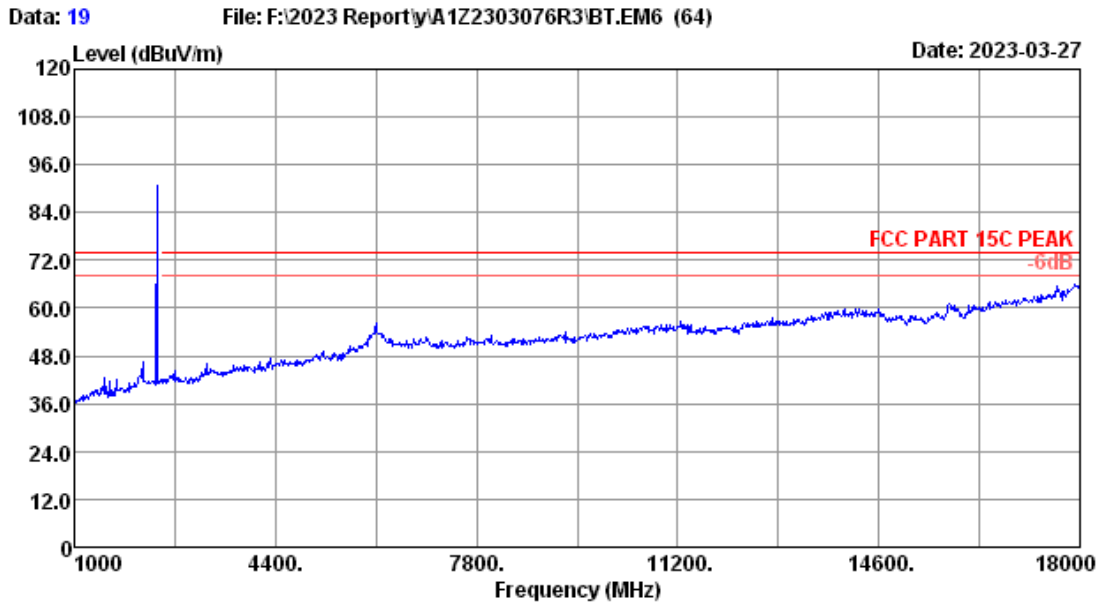
Site no.	: 3m Chamber	Data no.	: 13
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Test Mode	: BT3.0 GFSK 2480MHz TX		



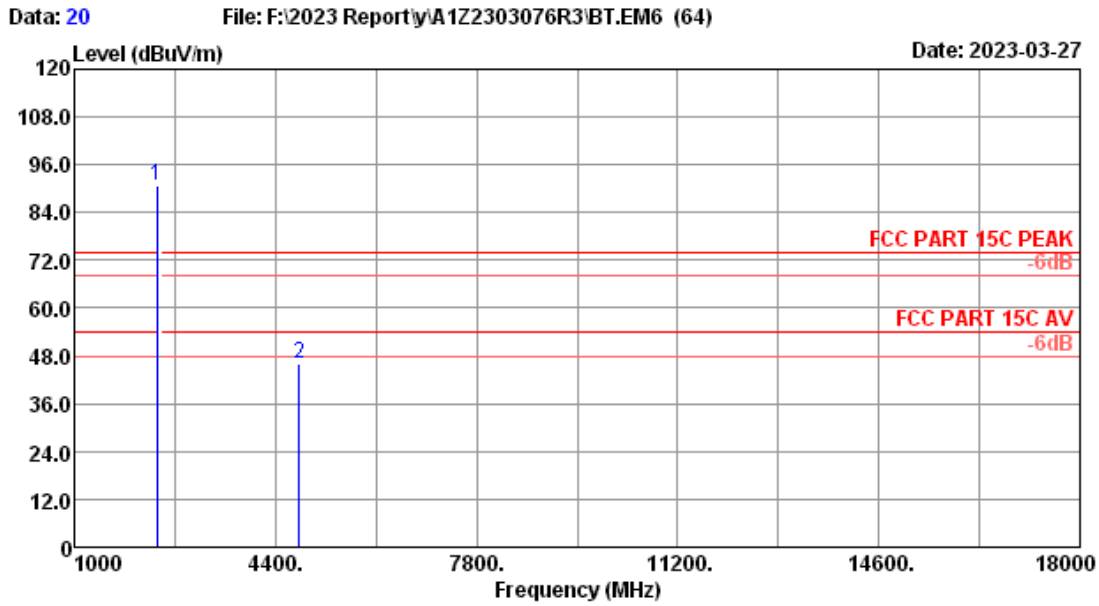
Site no. : 3m Chamber Data no. : 14
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : BT3.0 GFSK 2480MHz TX

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	2.34	90.83	34.35	86.62	-----	-----	Peak
2	4960.00	32.03	3.39	45.35	33.69	47.08	74.00	26.92	Peak

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



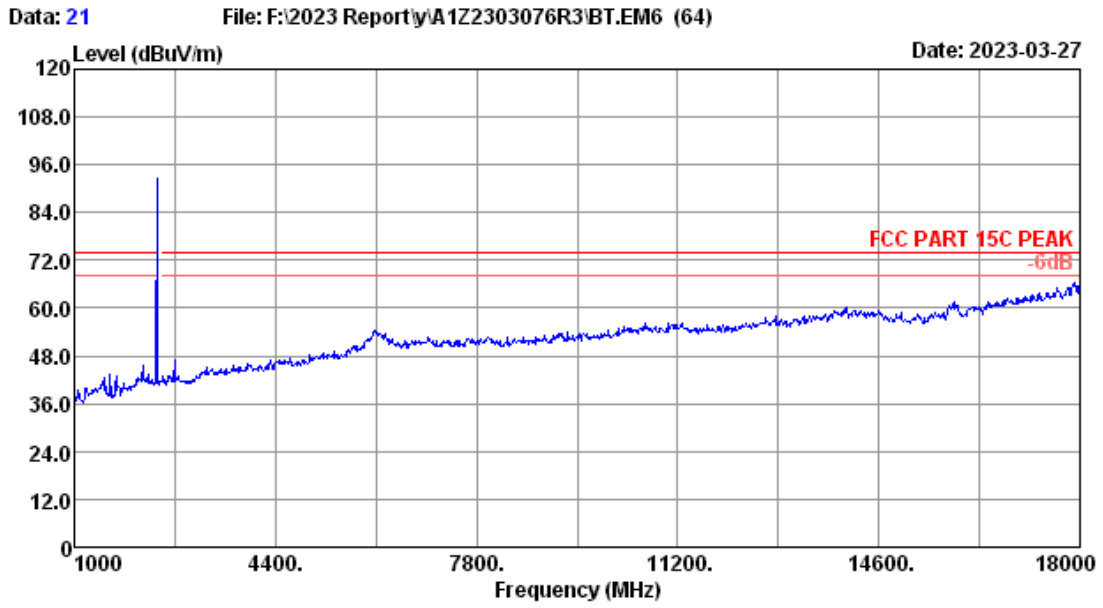
Site no.	: 3m Chamber	Data no.	: 19
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Test Mode	: BT3.0 8-DPSK 2402MHz TX		



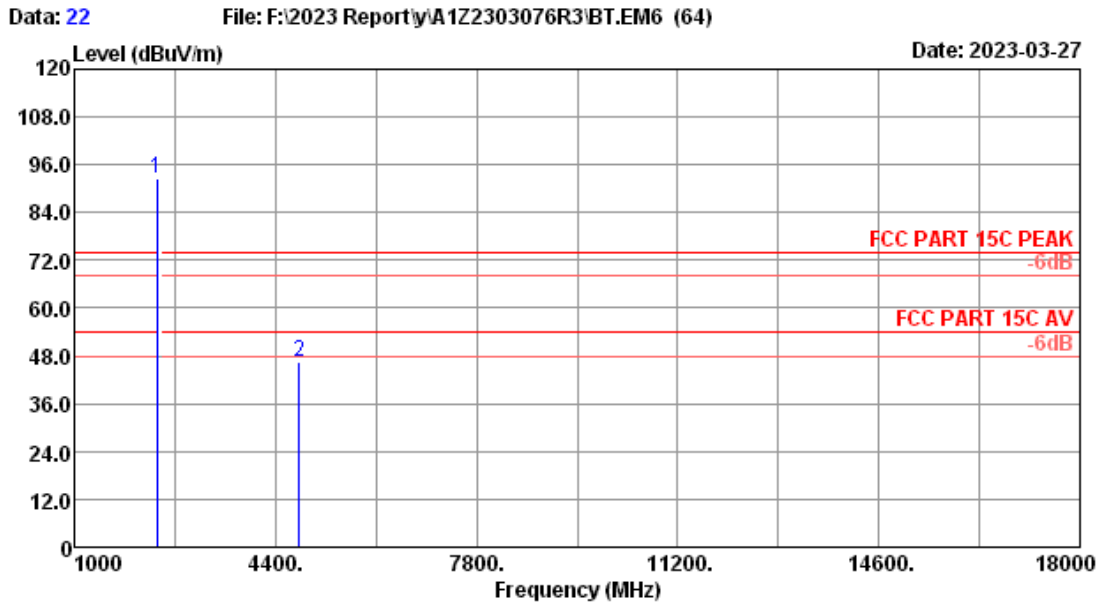
Site no. : 3m Chamber Data no. : 20
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : BT3.0 8-DPSK 2402MHz TX

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	27.70	2.29	95.18	34.36	90.81	-----	-----	Peak
2	4804.00	31.20	3.33	45.18	33.68	46.03	74.00	27.97	Peak

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



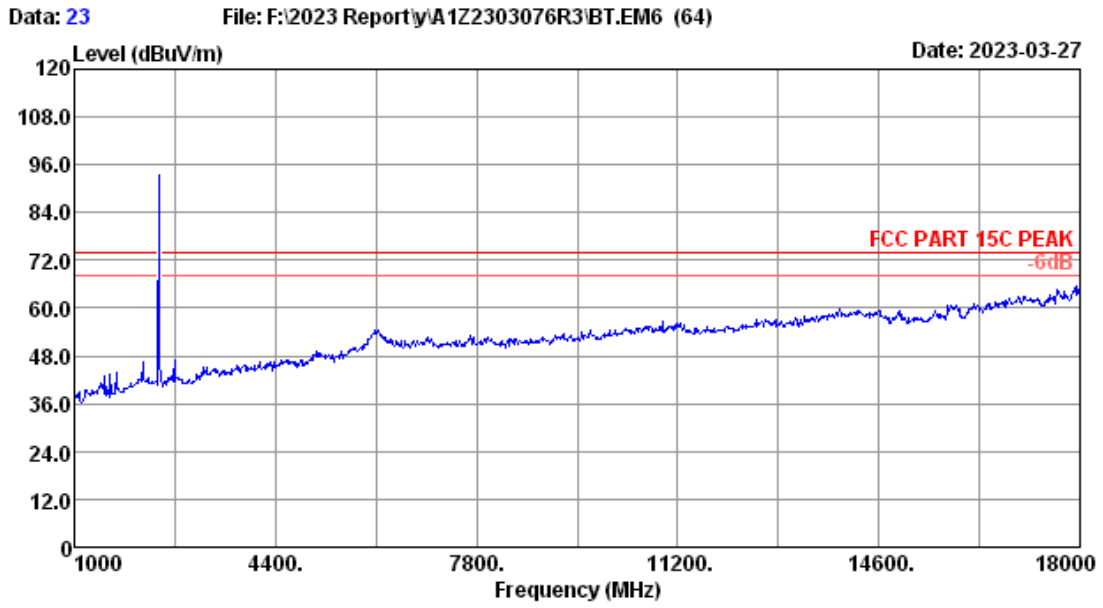
Site no.	: 3m Chamber	Data no.	: 21
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2*C/52.5%	Engineer	: nier
Test Mode	: BT3.0 8-DPSK 2402MHz TX		



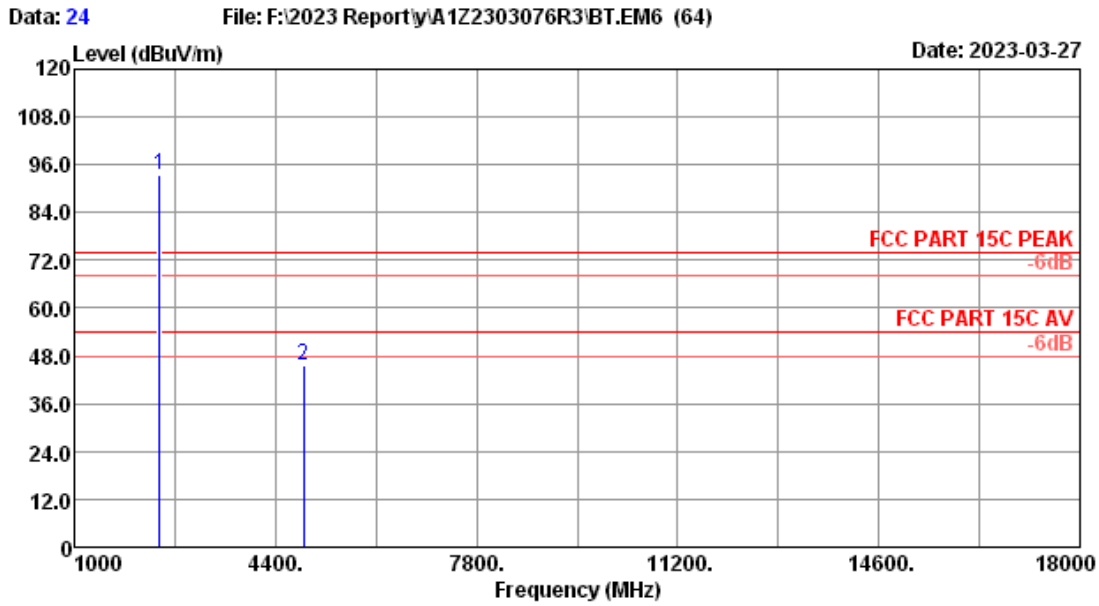
Site no. : 3m Chamber Data no. : 22
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : BT3.0 8-DPSK 2402MHz TX

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	27.70	2.29	96.91	34.36	92.54	-----	-----	Peak
2	4804.00	31.20	3.33	45.61	33.68	46.46	74.00	27.54	Peak

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



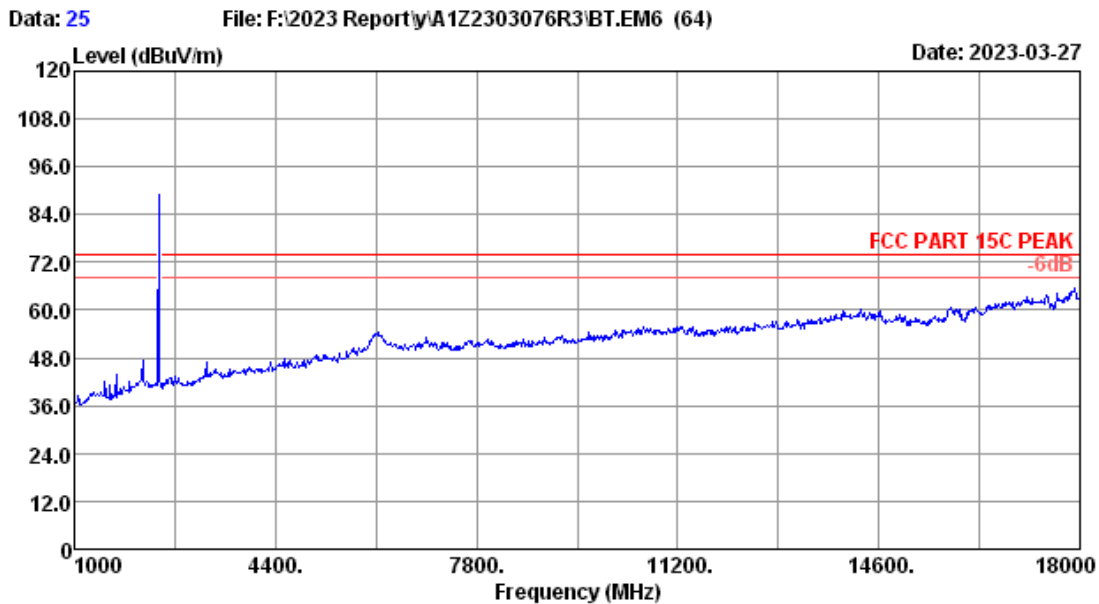
Site no.	: 3m Chamber	Data no.	: 23
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2*C/52.5%	Engineer	: nier
Test Mode	: BT3.0 8-DPSK 2441MHz TX		



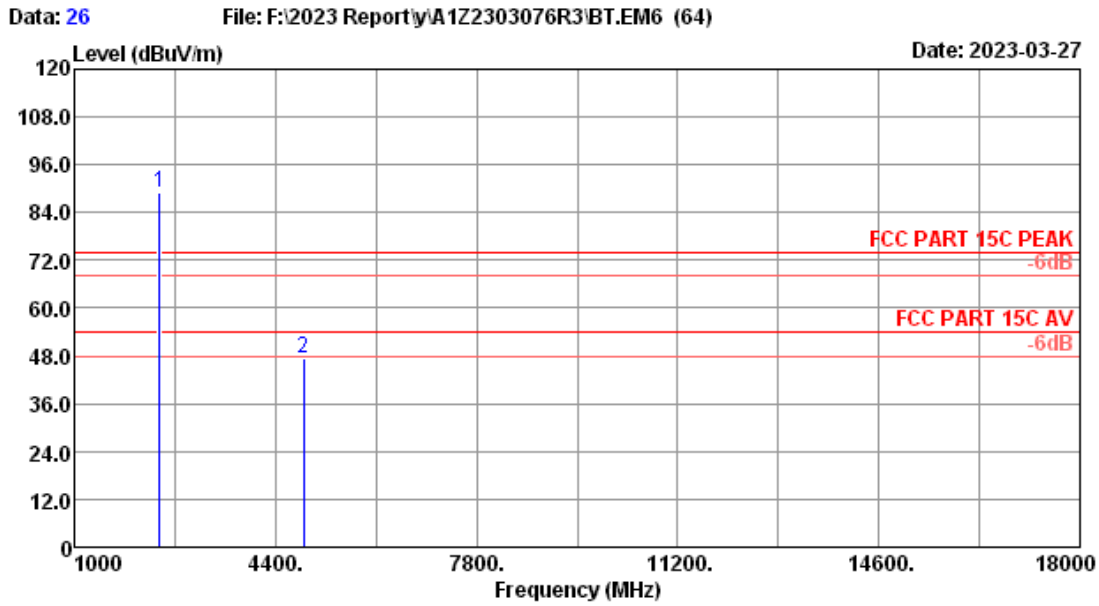
Site no. : 3m Chamber Data no. : 24
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2°C/52.5% Engineer : nier
 Test Mode : BT3.0 8-DPSK 2441MHz TX

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	2441.00	27.80	2.32	97.66	34.35	93.43	-----	-----	Peak
2	4882.00	31.43	3.35	44.69	33.69	45.78	74.00	28.22	Peak

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



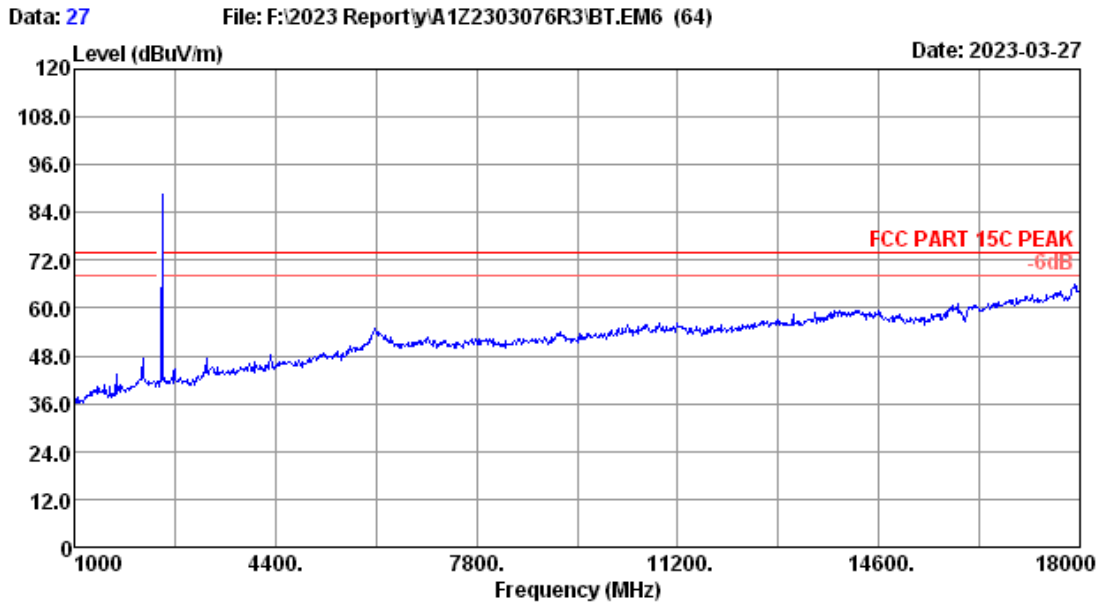
Site no.	: 3m Chamber	Data no.	: 25
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2*C/52.5%	Engineer	: nier
Test Mode	: BT3.0 8-DPSK 2441MHz TX		



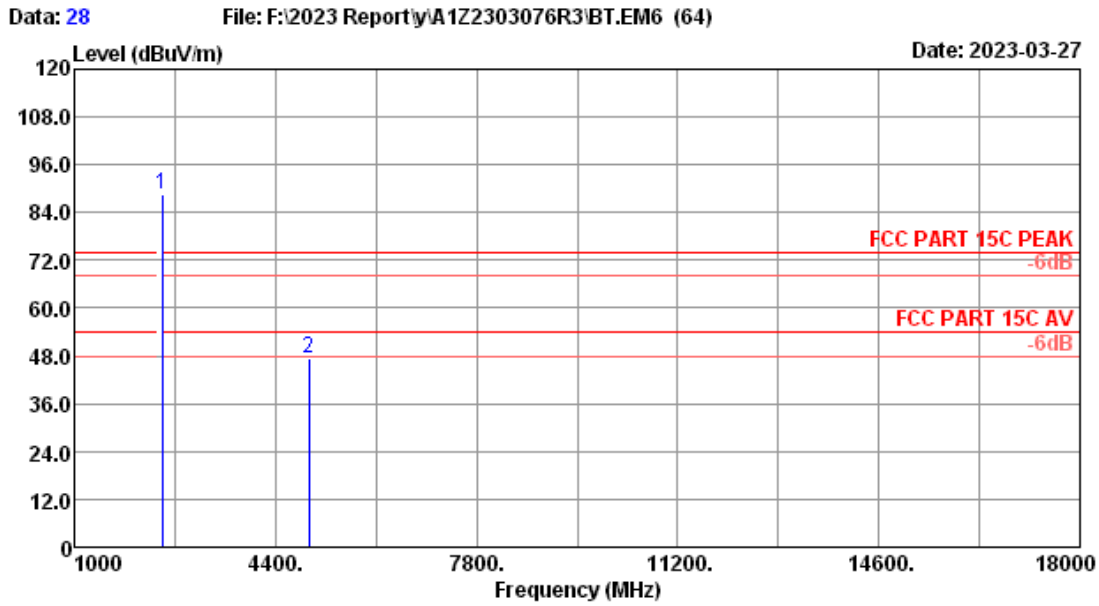
Site no. : 3m Chamber Data no. : 26
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : BT3.0 8-DPSK 2441MHz TX

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	2441.00	27.80	2.32	93.21	34.35	88.98	-----	-----	Peak
2	4882.00	31.43	3.35	46.39	33.69	47.48	74.00	26.52	Peak

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



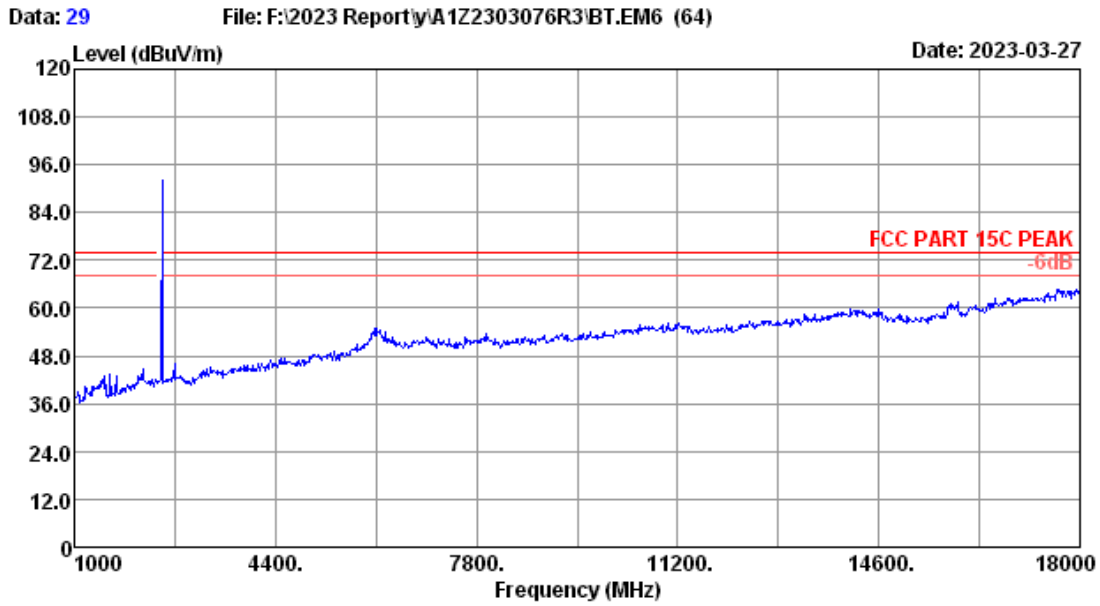
Site no.	: 3m Chamber	Data no.	: 27
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2*C/52.5%	Engineer	: nier
Test Mode	: BT3.0 8-DPSK 2480MHz TX		



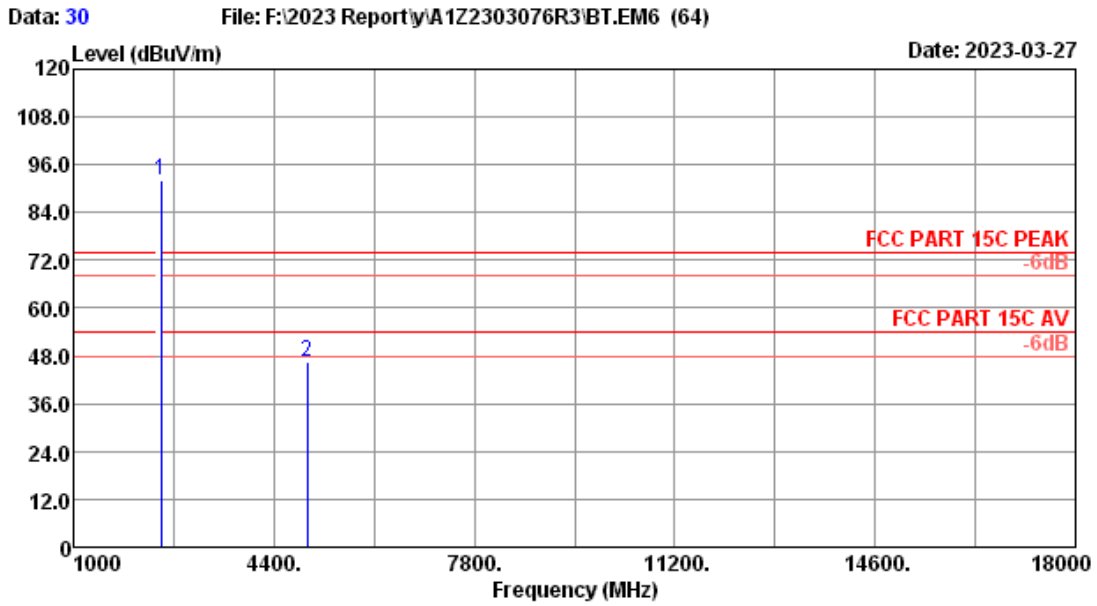
Site no. : 3m Chamber Data no. : 28
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : BT3.0 8-DPSK 2480MHz TX

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	2.34	92.73	34.35	88.52	-----	-----	Peak
2	4960.00	32.03	3.39	45.43	33.69	47.16	74.00	26.84	Peak

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



Site no.	: 3m Chamber	Data no.	: 29
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2*C/52.5%	Engineer	: nier
Test Mode	: BT3.0 8-DPSK 2480MHz TX		

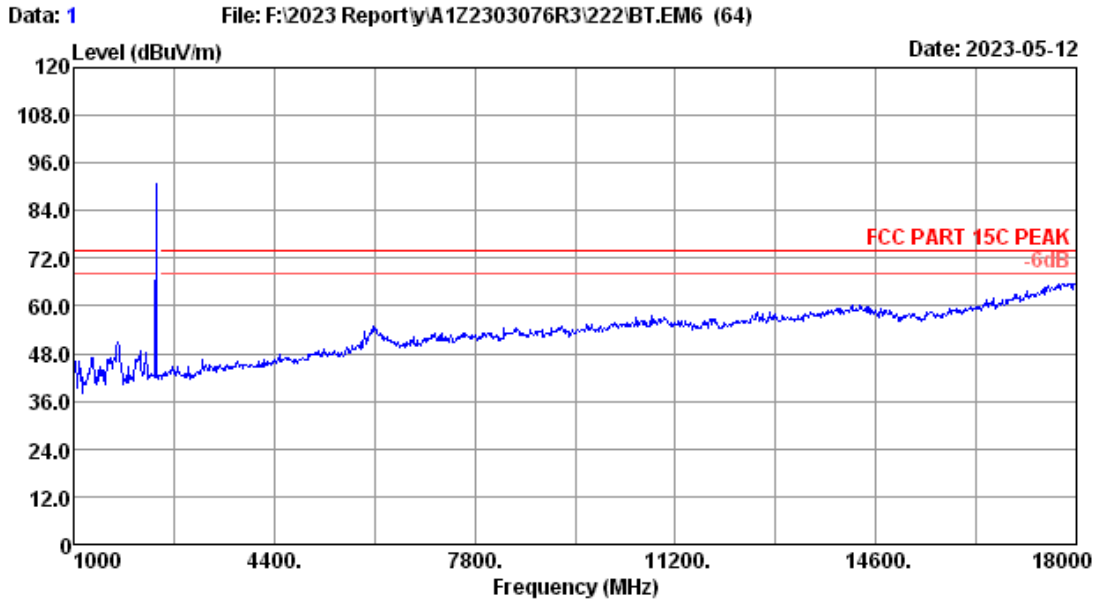


Site no. : 3m Chamber Data no. : 30
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2°C/52.5% Engineer : nier
 Test Mode : BT3.0 8-DPSK 2480MHz TX

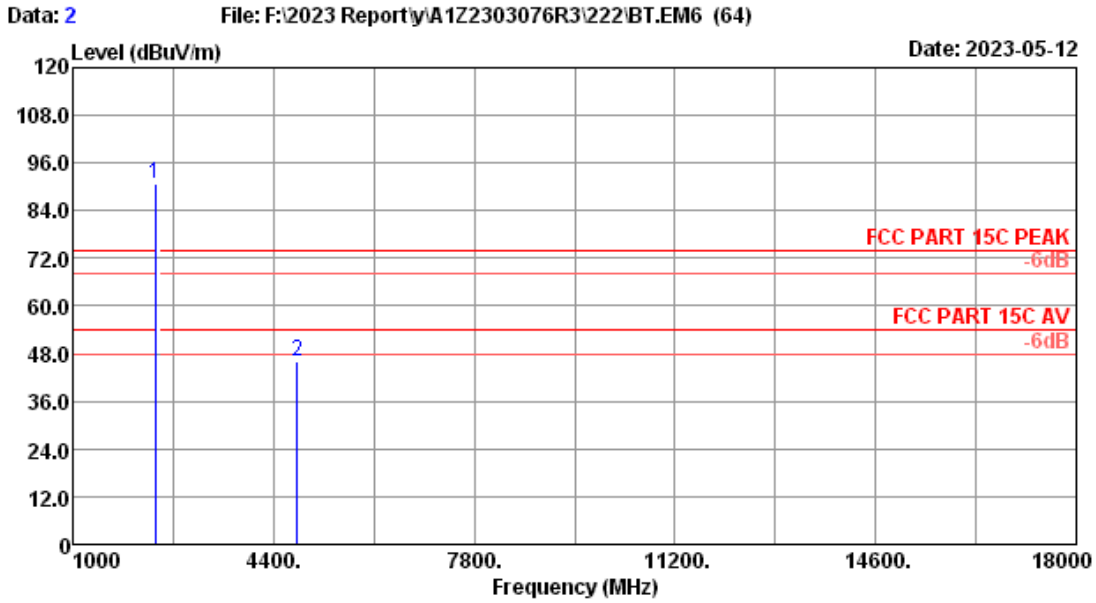
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	27.80	2.34	96.47	34.35	92.26	-----	-----	Peak
2	4960.00	32.03	3.39	44.71	33.69	46.44	74.00	27.56	Peak

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.

Data for metal appearance:



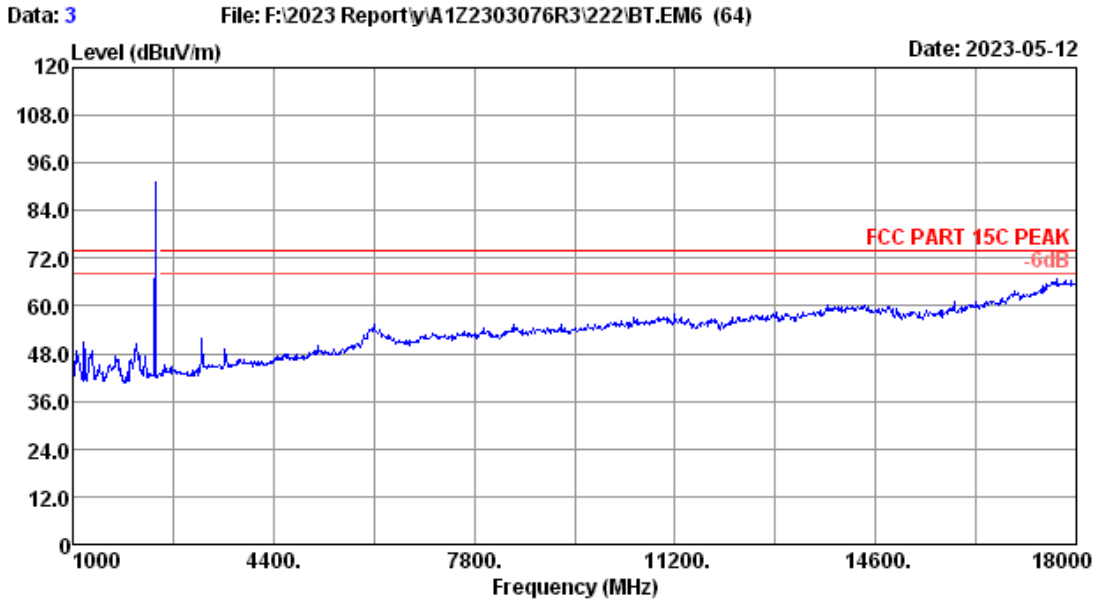
Site no.	: 3m Chamber	Data no.	: 1
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Test Mode	: GFSK 2402 MHz TX		
	:		
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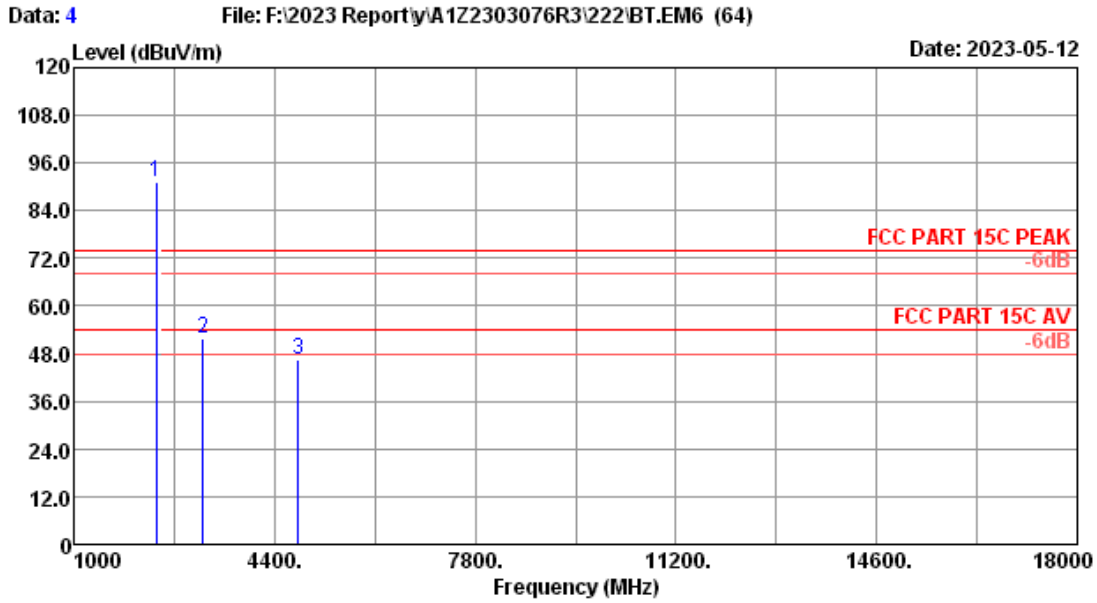
Site no. : 3m Chamber Data no. : 2
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : GFSK 2402 MHz TX
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No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.70	2.29	34.36	95.02	90.65	-----	-----	Peak
2	4804.00	31.20	3.33	33.68	45.09	45.94	74.00	28.06	Peak

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



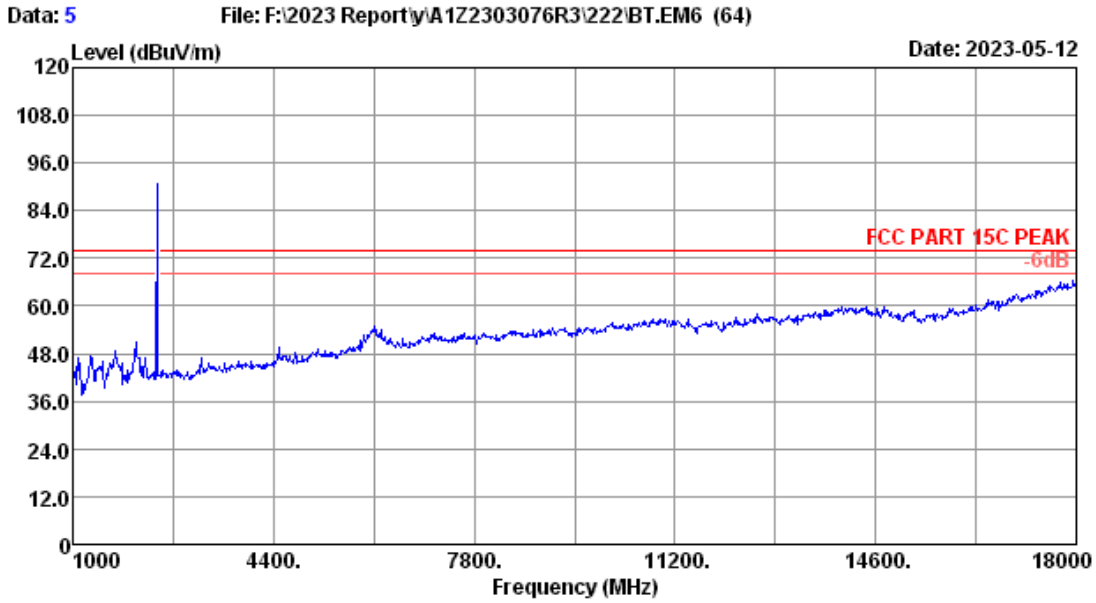
Site no.	: 3m Chamber	Data no.	: 3
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2*C/52.5%	Engineer	: nier
Test Mode	: GFSK 2402 MHz TX		
	:		
	:		



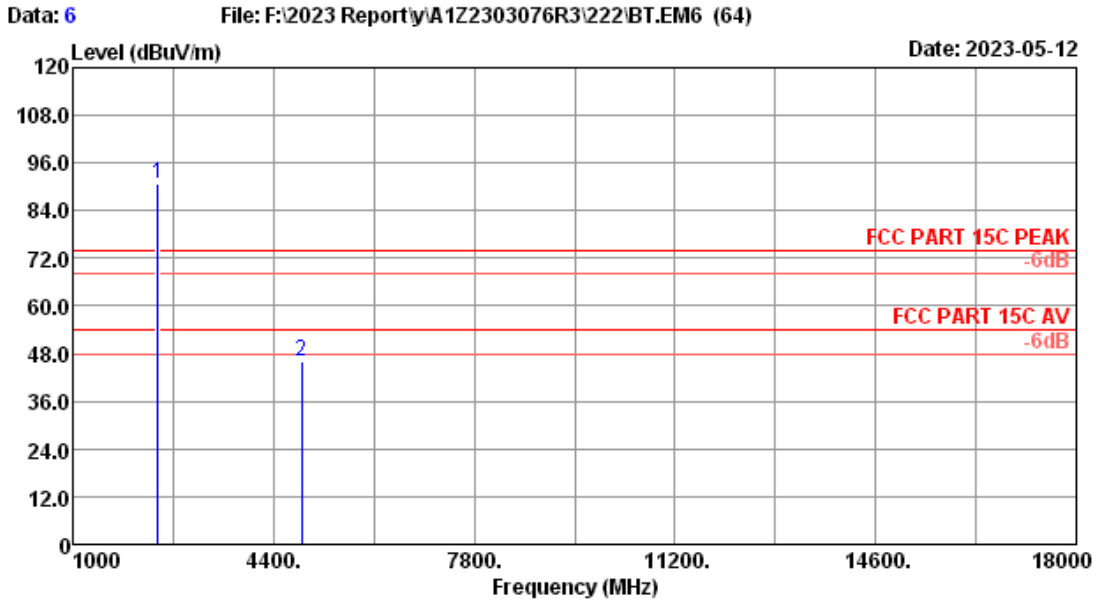
Site no. : 3m Chamber Data no. : 4
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : GFSK 2402 MHz TX
 :
 :

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.70	2.29	34.36	95.77	91.40	-----	-----	Peak
2	3193.00	29.60	2.68	34.16	53.51	51.63	74.00	22.37	Peak
3	4804.00	31.20	3.33	33.68	45.71	46.56	74.00	27.44	Peak

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



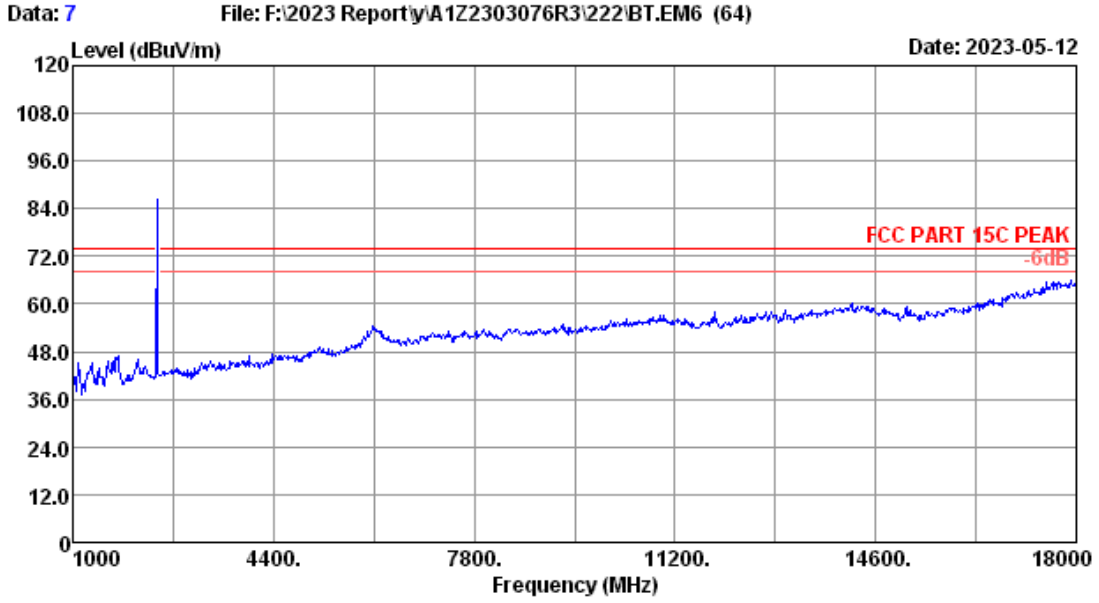
Site no.	: 3m Chamber	Data no.	: 5
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2*C/52.5%	Engineer	: nier
Test Mode	: GFSK 2441 MHz TX		
	:		
	:		



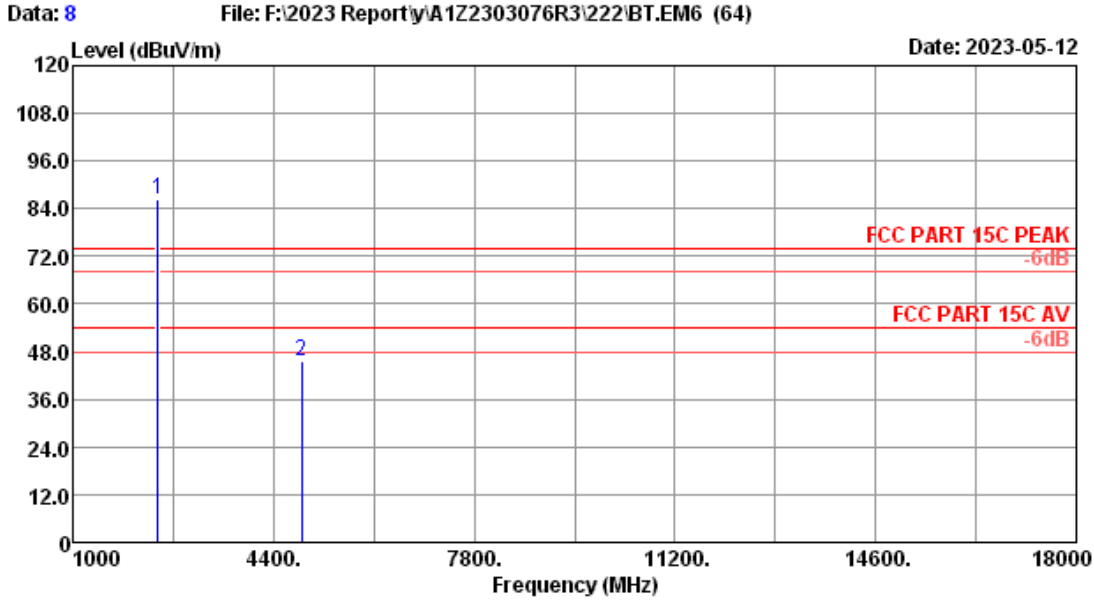
Site no. : 3m Chamber Data no. : 6
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : GFSK 2441 MHz TX
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No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.00	27.80	2.32	34.35	95.05	90.82	-----	-----	Peak
2	4882.00	31.43	3.35	33.69	45.14	46.23	74.00	27.77	Peak

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



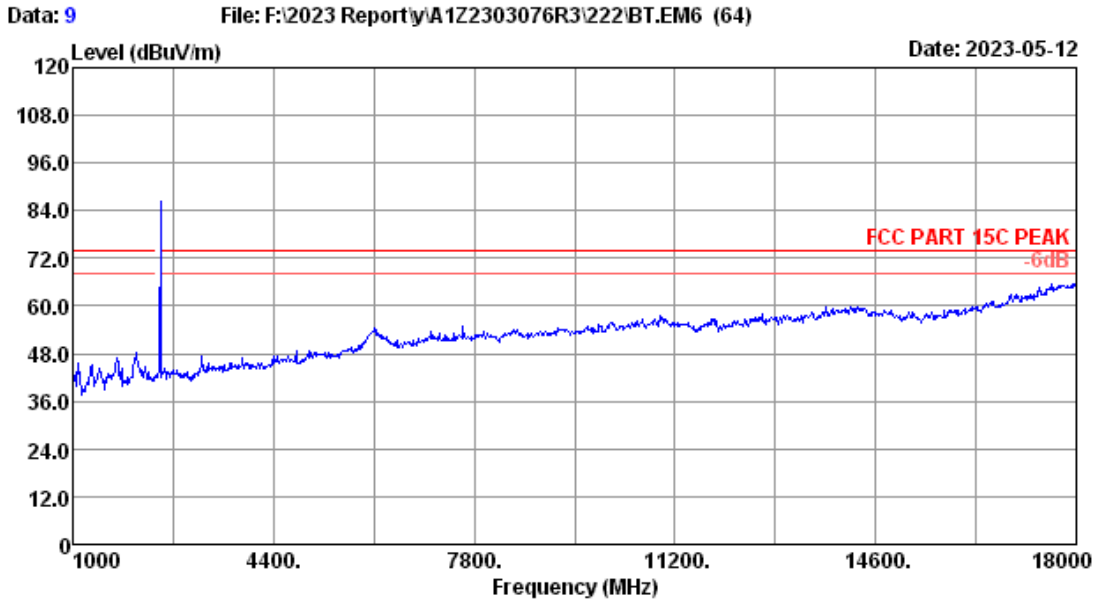
Site no.	: 3m Chamber	Data no.	: 7
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2*C/52.5%	Engineer	: nier
Test Mode	: GFSK 2441 MHz TX		
	:		
	:		



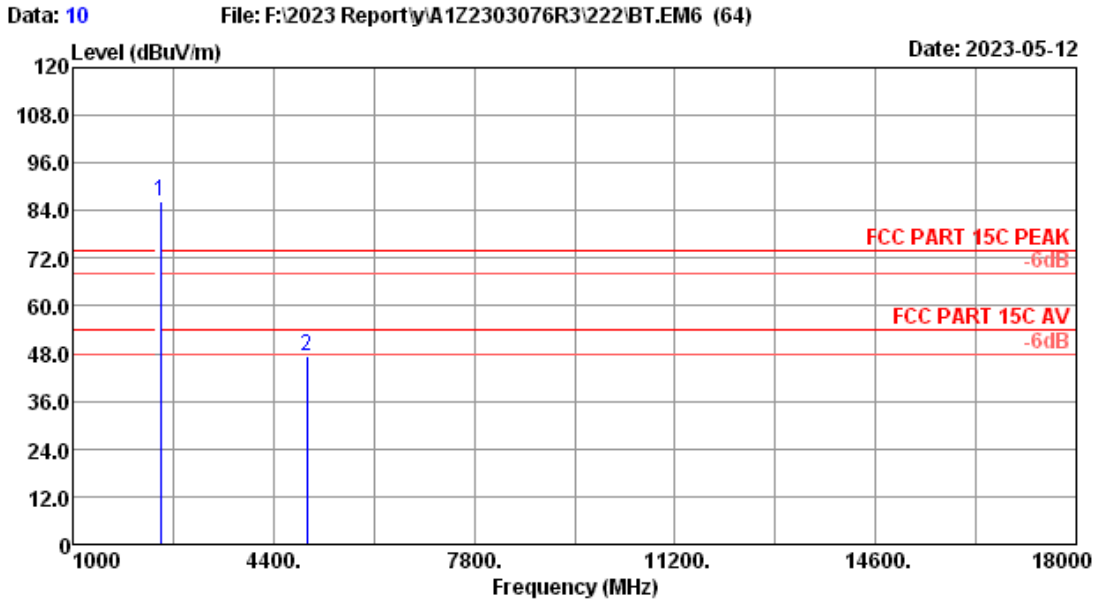
Site no. : 3m Chamber Data no. : 8
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : GFSK 2441 MHz TX
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No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.00	27.80	2.32	34.35	90.49	86.26	-----	-----	Peak
2	4882.00	31.43	3.35	33.69	44.61	45.70	74.00	28.30	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.



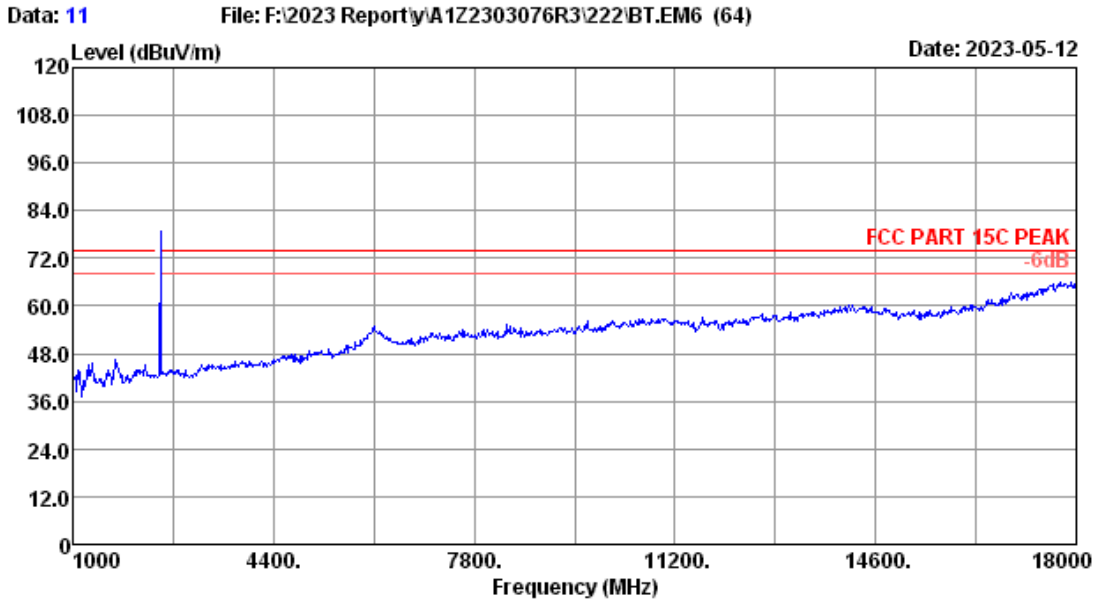
Site no.	: 3m Chamber	Data no.	: 9
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2*C/52.5%	Engineer	: nier
Test Mode	: GFSK 2480 MHz TX		
	:		
	:		



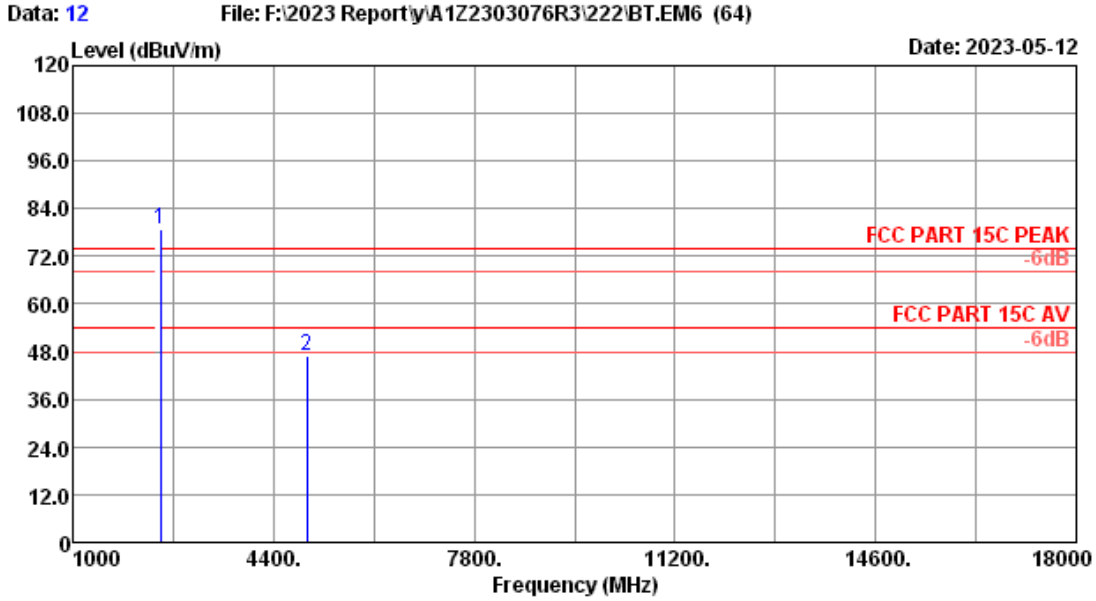
Site no. : 3m Chamber Data no. : 10
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : GFSK 2480 MHz TX
 :
 :

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	27.80	2.34	34.35	90.51	86.30	-----	-----	Peak
2	4960.00	32.03	3.39	33.69	45.46	47.19	74.00	26.81	Peak

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



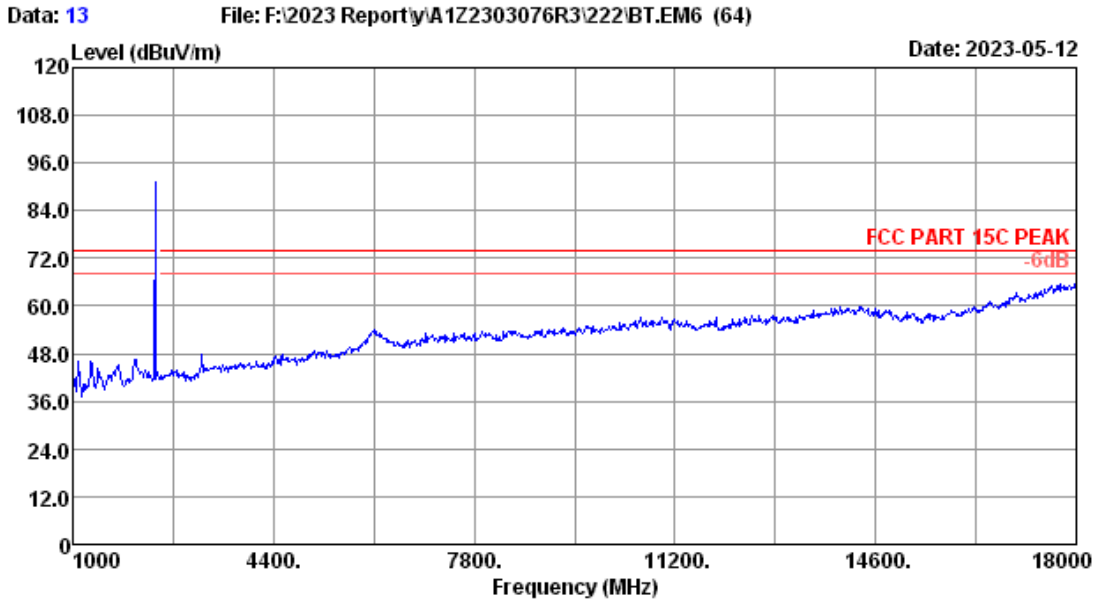
Site no.	: 3m Chamber	Data no.	: 11
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2*C/52.5%	Engineer	: nier
Test Mode	: GFSK 2480 MHz TX		
	:		
	:		



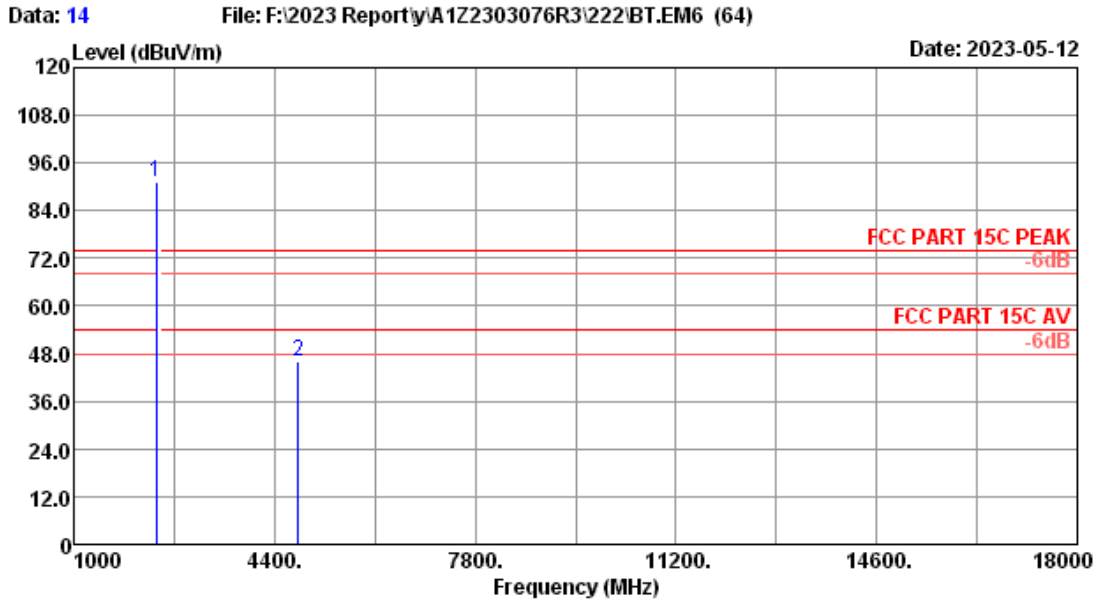
Site no. : 3m Chamber Data no. : 12
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : GFSK 2480 MHz TX
 :
 :

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	27.80	2.34	34.35	83.25	79.04	-----	-----	Peak
2	4960.00	32.03	3.39	33.69	45.23	46.96	74.00	27.04	Peak

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



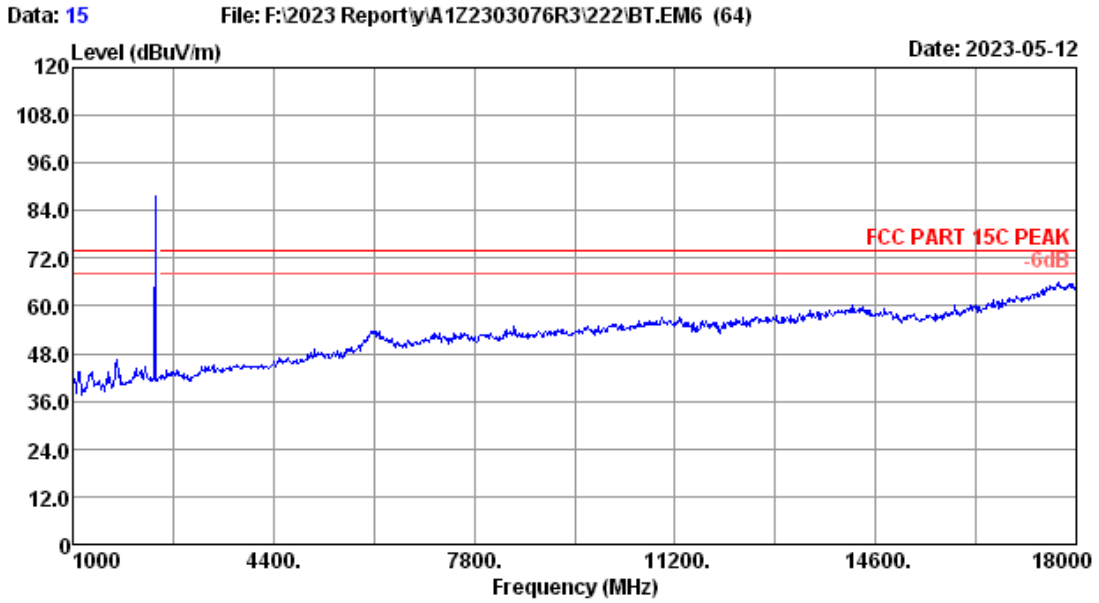
Site no.	: 3m Chamber	Data no.	: 13
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2*C/52.5%	Engineer	: nier
Test Mode	: 8DPSK 2402 MHz TX		
	:		
	:		



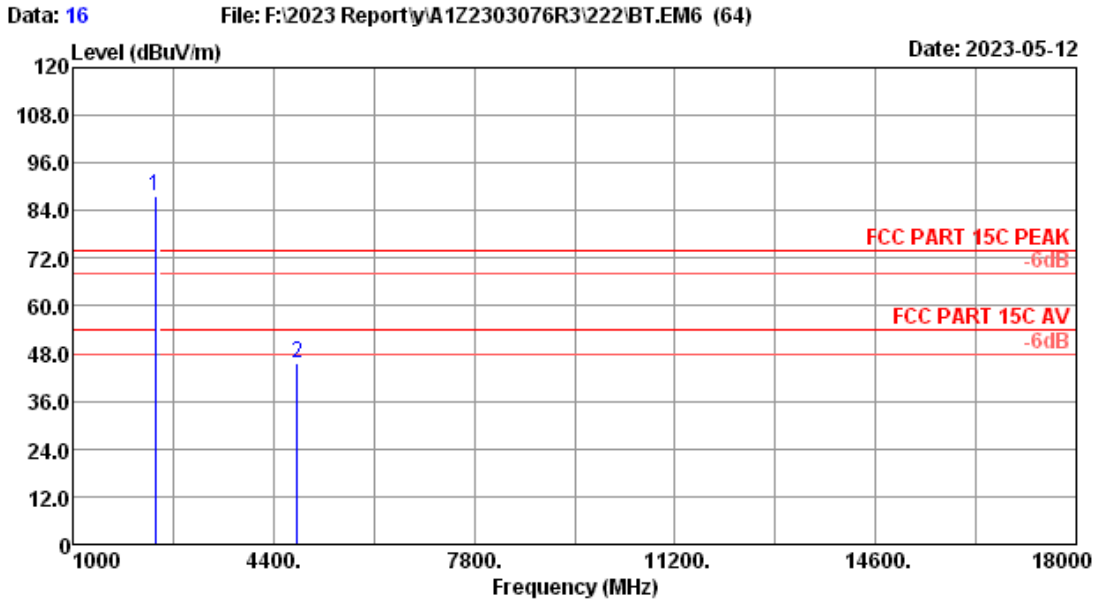
Site no. : 3m Chamber Data no. : 14
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : 8DPSK 2402 MHz TX
 :
 :

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.70	2.29	34.36	95.58	91.21	-----	-----	Peak
2	4804.00	31.20	3.33	33.68	44.99	45.84	74.00	28.16	Peak

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



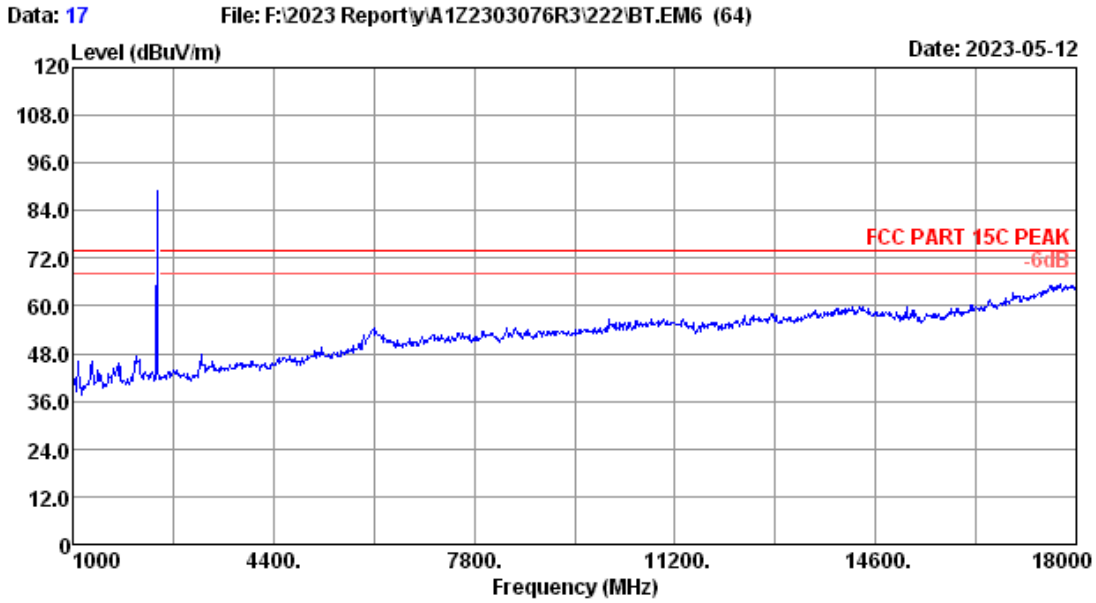
Site no.	: 3m Chamber	Data no.	: 15
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2*C/52.5%	Engineer	: nier
Test Mode	: 8DPSK 2402 MHz TX		
	:		
	:		



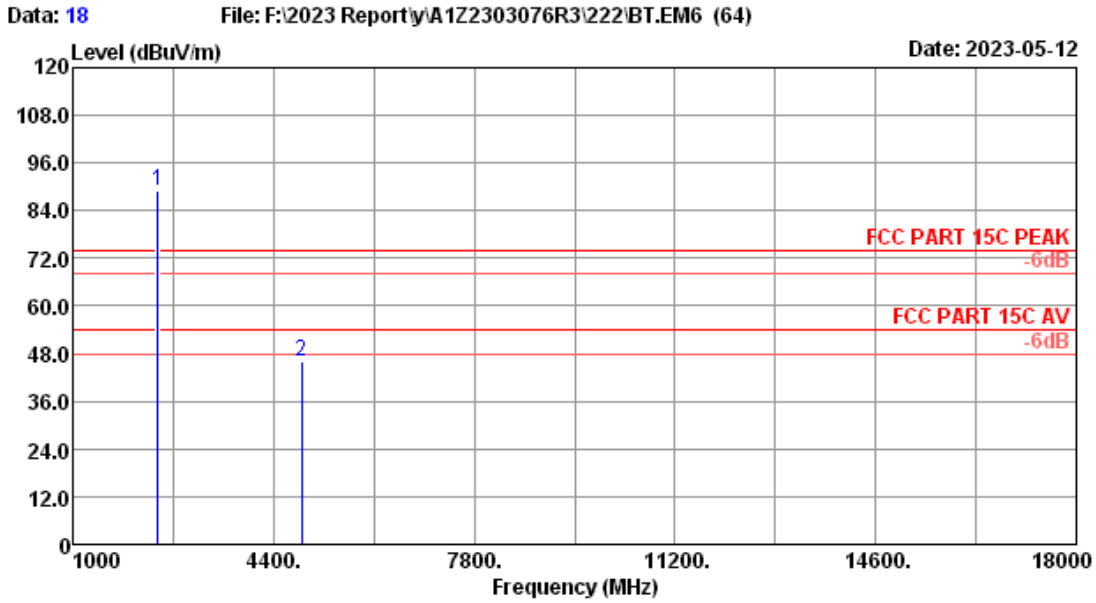
Site no. : 3m Chamber Data no. : 16
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : 8DPSK 2402 MHz TX
 :
 :

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.70	2.29	34.36	92.16	87.79	-----	-----	Peak
2	4804.00	31.20	3.33	33.68	44.72	45.57	74.00	28.43	Peak

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



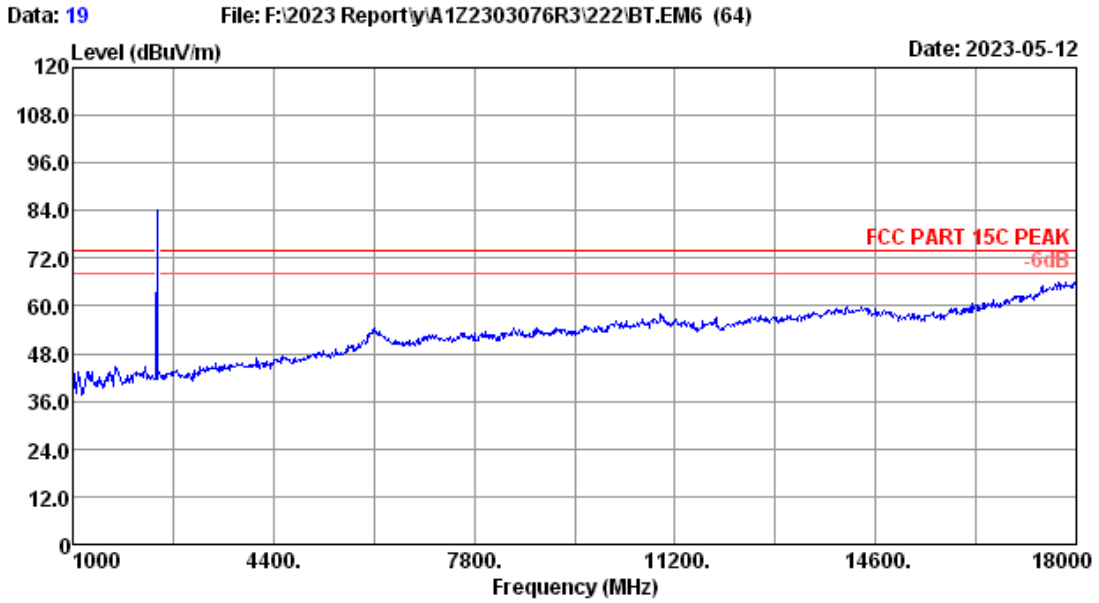
Site no.	: 3m Chamber	Data no.	: 17
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2*C/52.5%	Engineer	: nier
Test Mode	: 8DPSK 2441 MHz TX		
	:		
	:		



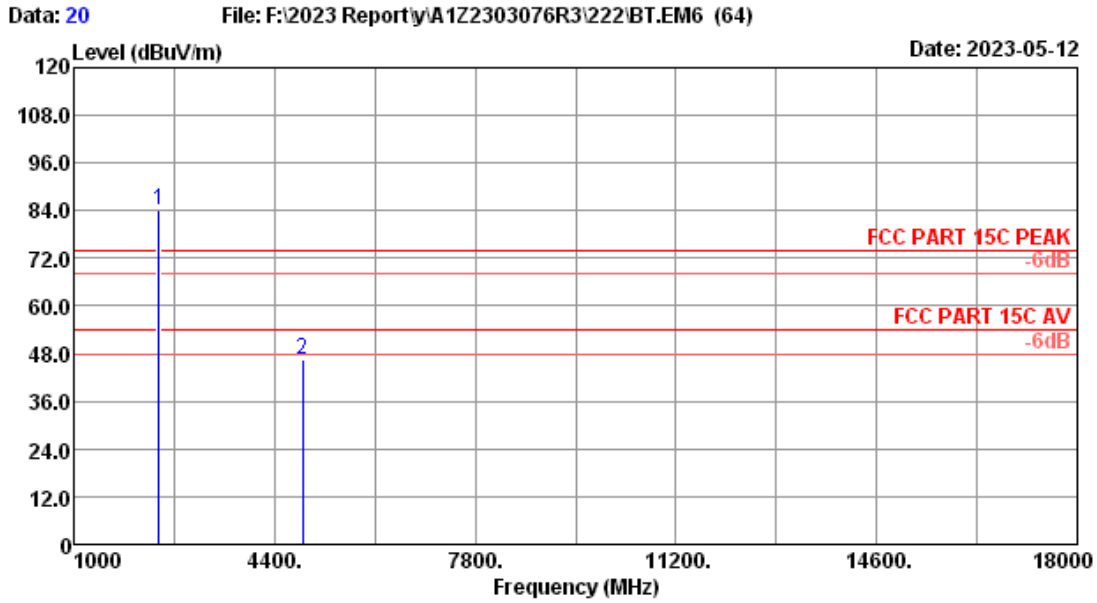
Site no. : 3m Chamber Data no. : 18
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : 8DPSK 2441 MHz TX
 :
 :

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.00	27.80	2.32	34.35	93.44	89.21	-----	-----	Peak
2	4882.00	31.43	3.35	33.69	45.07	46.16	74.00	27.84	Peak

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



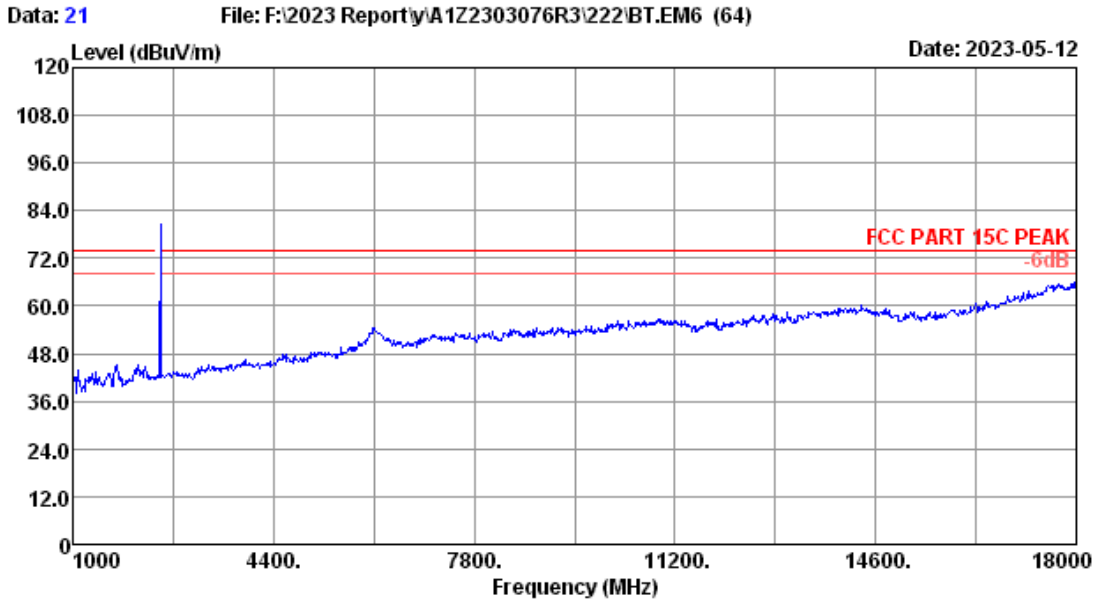
Site no.	: 3m Chamber	Data no.	: 19
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2*C/52.5%	Engineer	: nier
Test Mode	: 8DPSK 2441 MHz TX		
	:		
	:		



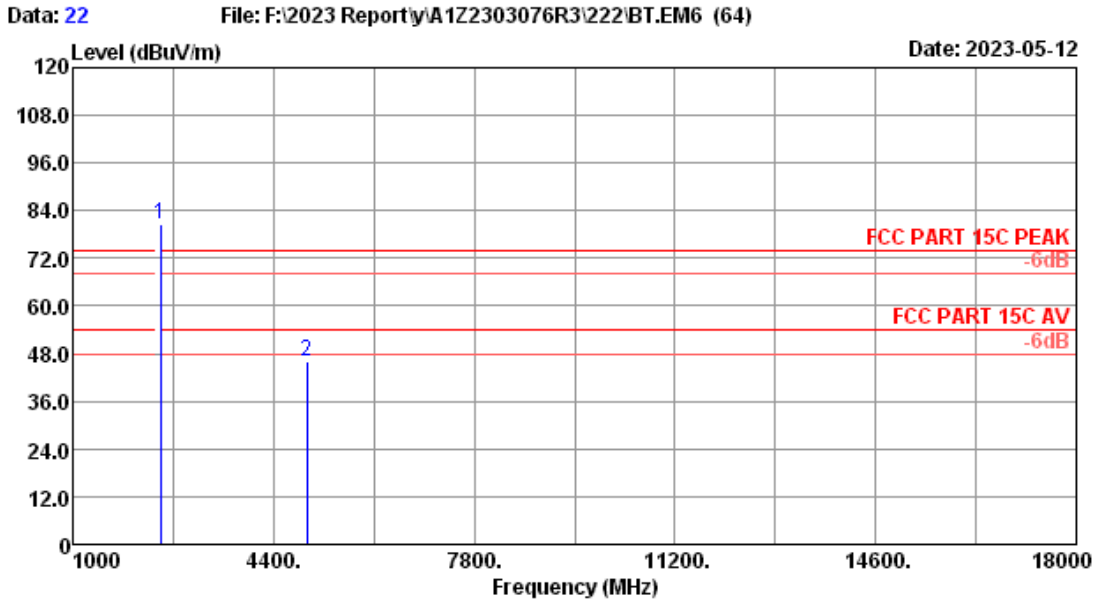
Site no. : 3m Chamber Data no. : 20
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : 8DPSK 2441 MHz TX
 :
 :

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.00	27.80	2.32	34.35	88.21	83.98	-----	-----	Peak
2	4882.00	31.43	3.35	33.69	45.47	46.56	74.00	27.44	Peak

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



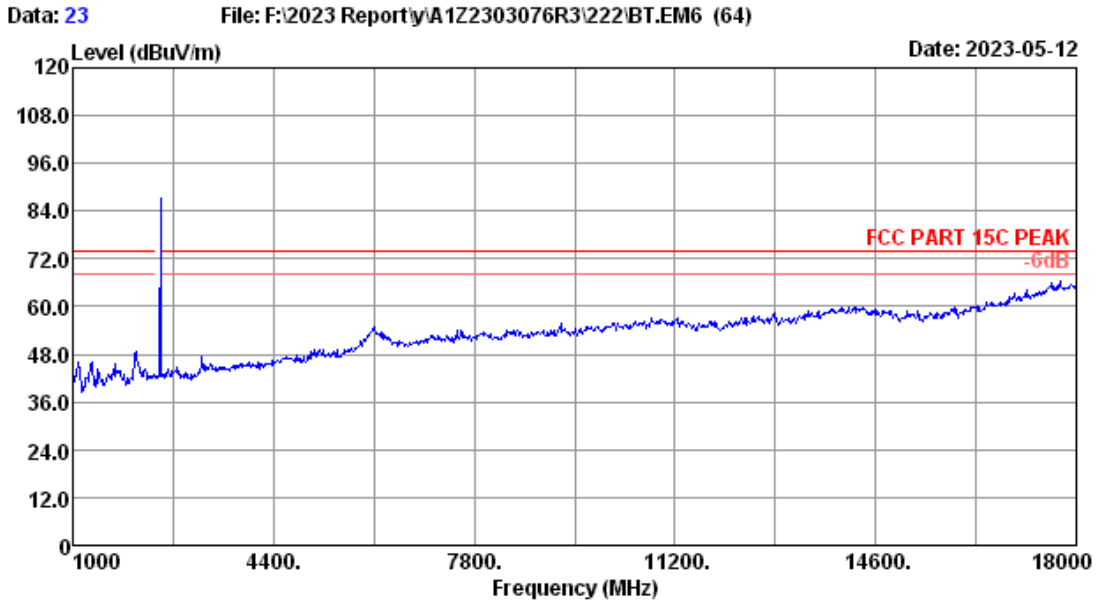
Site no.	: 3m Chamber	Data no.	: 21
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2*C/52.5%	Engineer	: nier
Test Mode	: 8DPSK 2480 MHz TX		
	:		
	:		



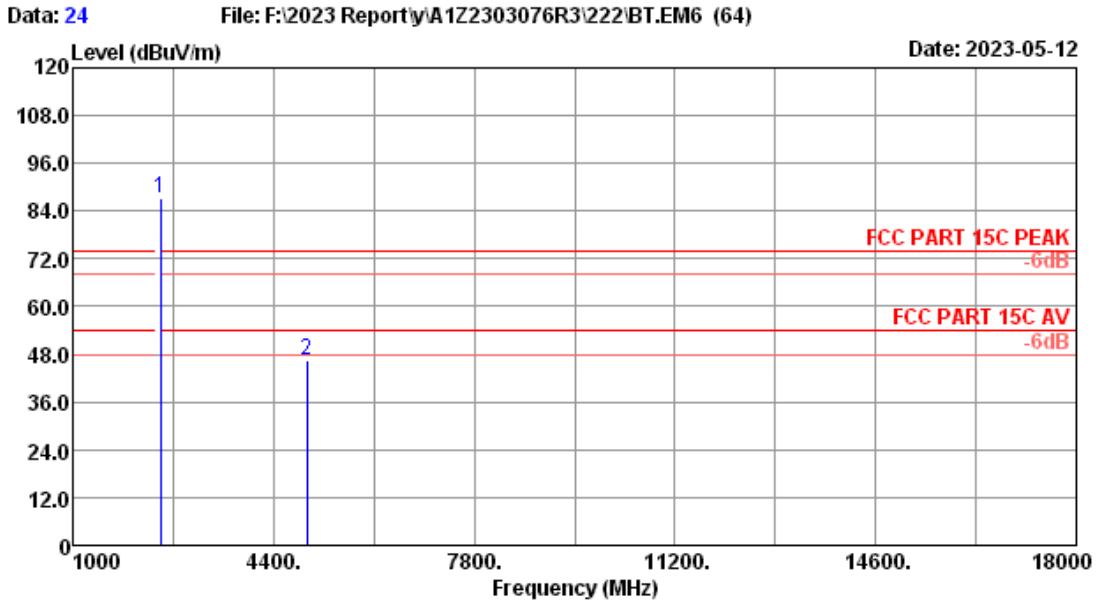
Site no. : 3m Chamber Data no. : 22
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : 8DPSK 2480 MHz TX
 :
 :

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	27.80	2.34	34.35	84.84	80.63	-----	-----	Peak
2	4960.00	32.03	3.39	33.69	44.33	46.06	74.00	27.94	Peak

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



Site no.	: 3m Chamber	Data no.	: 23
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23.2*C/52.5%	Engineer	: nier
Test Mode	: 8DPSK 2480 MHz TX		
	:		
	:		



Site no. : 3m Chamber Data no. : 24
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23.2*C/52.5% Engineer : nier
 Test Mode : 8DPSK 2480 MHz TX
 :
 :

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	27.80	2.34	34.35	91.36	87.15	-----	-----	Peak
2	4960.00	32.03	3.39	33.69	44.87	46.60	74.00	27.40	Peak

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

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.02,23	1Year
2.	RF Cable	eastsheep	141-SMA-JJ -1000	NO.1	Jul.01,22	1Year

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 clause 7.8.8:

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.

Note: The cable loss and attenuator loss were offset into spectrum analyzer as an amplitude offset.

5.4. Test result

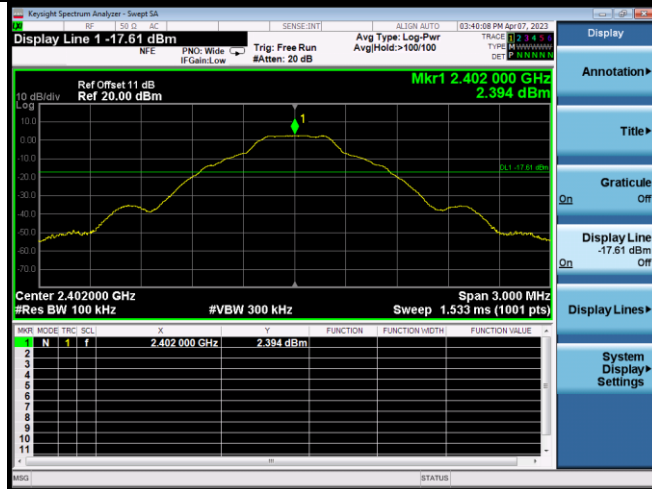
PASS (The testing data was attached in the next pages.)

EUT: Mini PC		
M/N: A Series		
Test date: 2023-04-07	Pressure: 102.1±1.0 kpa	Humidity: 52.2±3.0%
Tested by: Nier	Test Site: RF site	Temperature:23.3±0.6°C

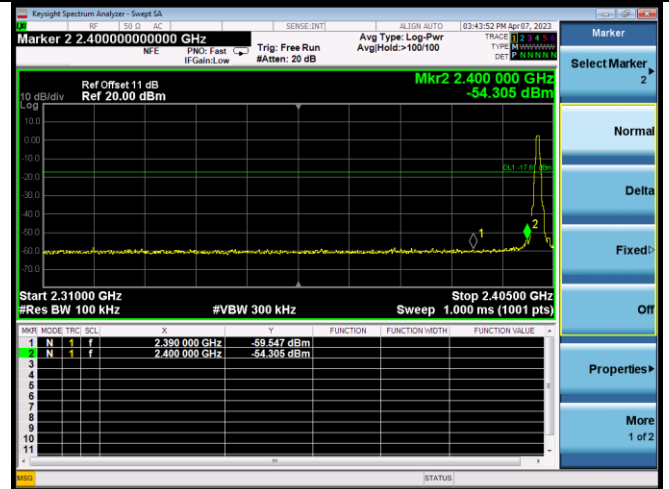
Hopping off

GFSK

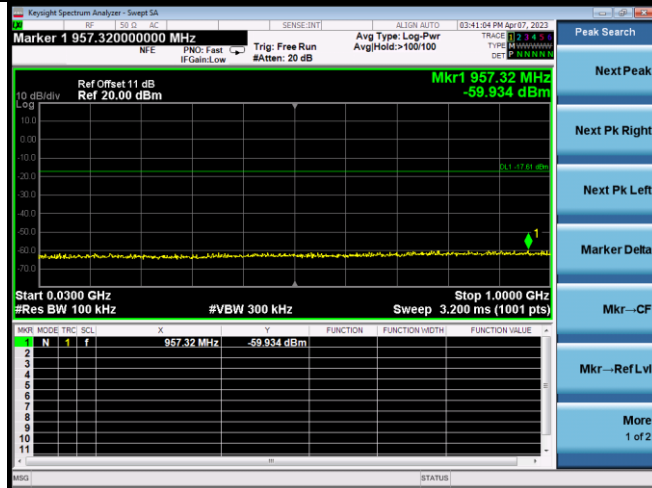
2402MHz



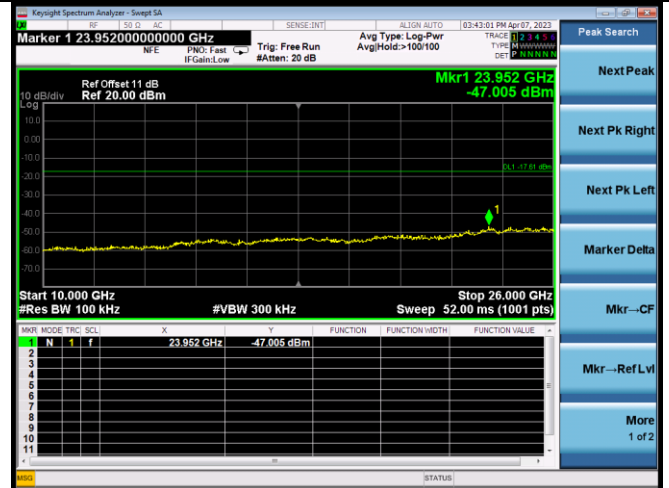
2402MHz(2.3GHz – 2.4GHz)



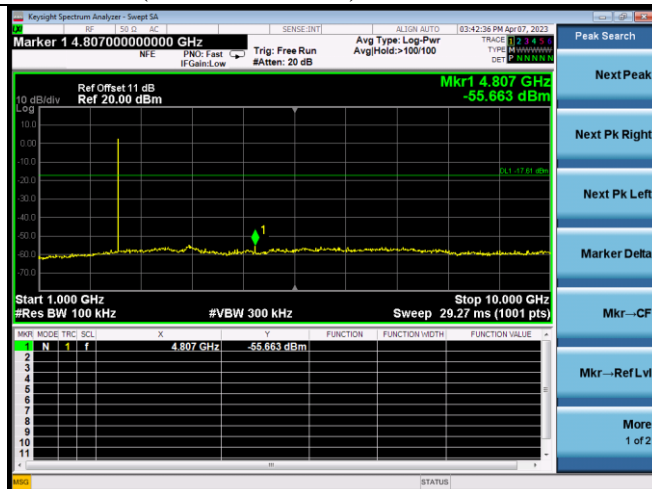
2402MHz(30MHz – 1GHz)



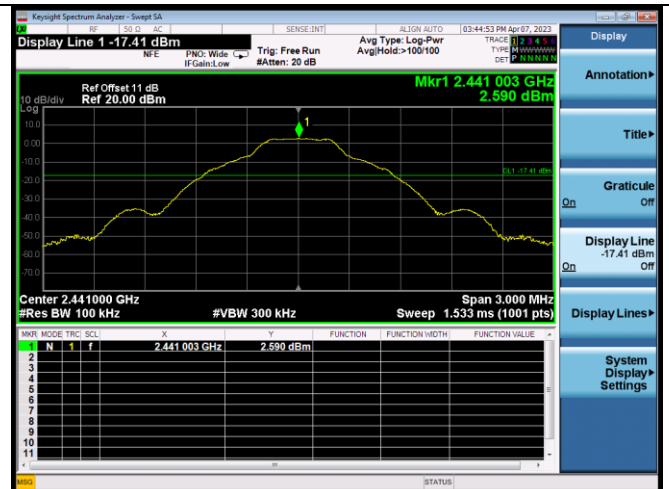
2402MHz(10GHz – 26GHz)



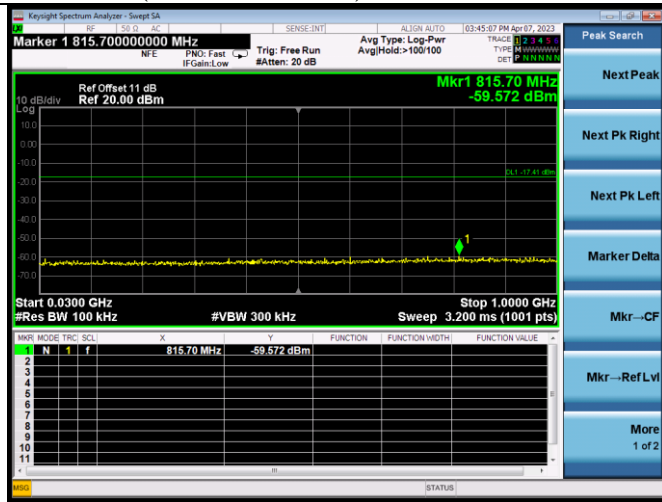
2402MHz(1GHz – 10GHz)



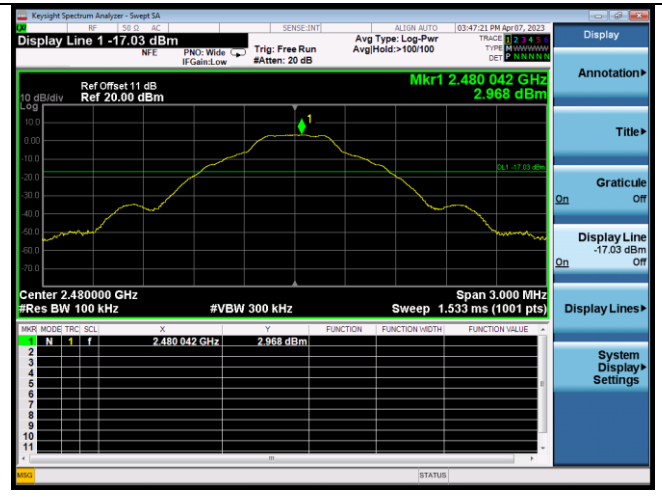
2441MHz



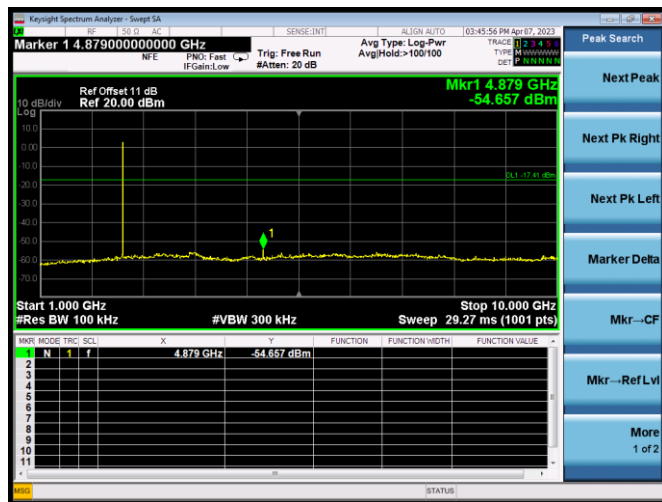
2441MHz(30MHz – 1GHz)



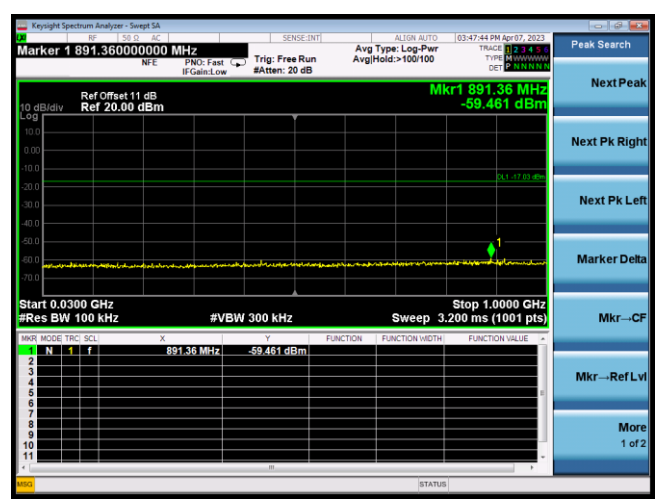
2480MHz



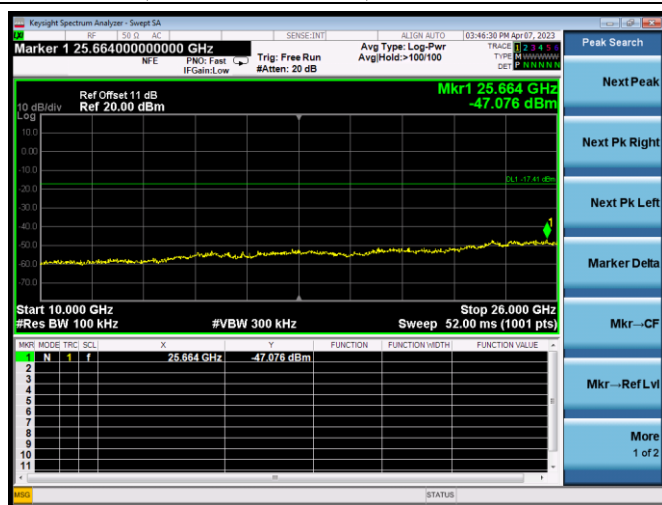
2441MHz(1GHz – 10GHz)



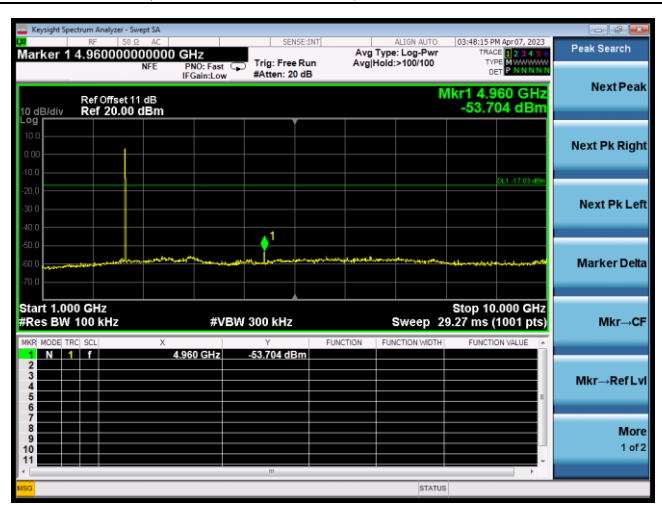
2480MHz(30MHz – 1GHz)



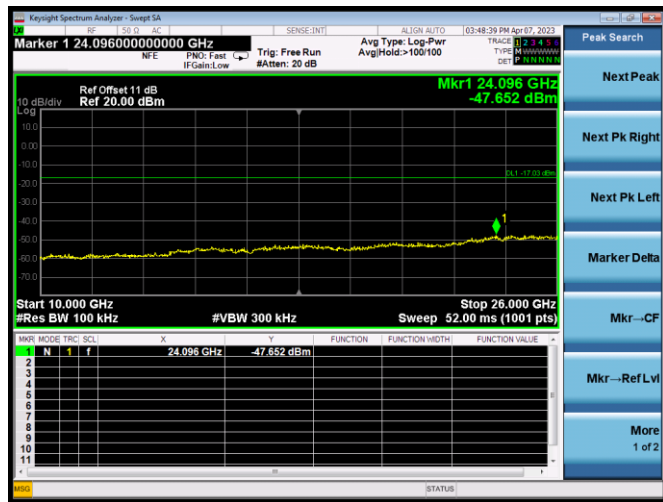
2441MHz(10GHz – 26GHz)



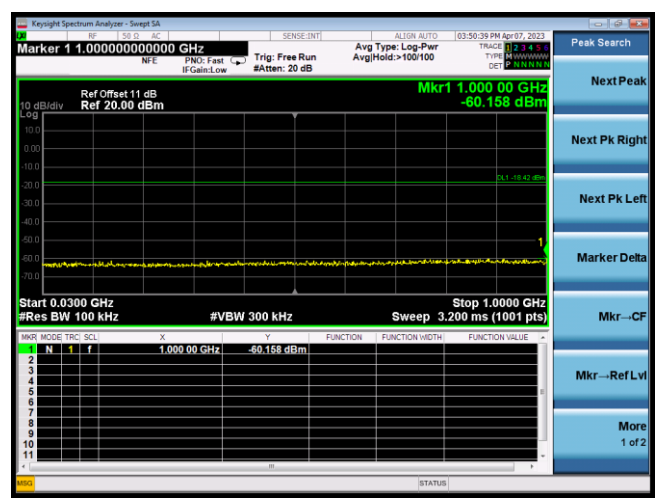
2480MHz(1GHz – 10GHz)



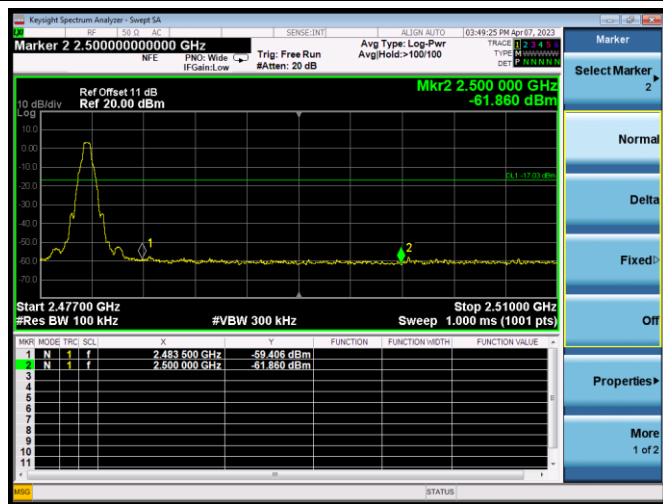
2480MHz(10GHz – 26GHz)



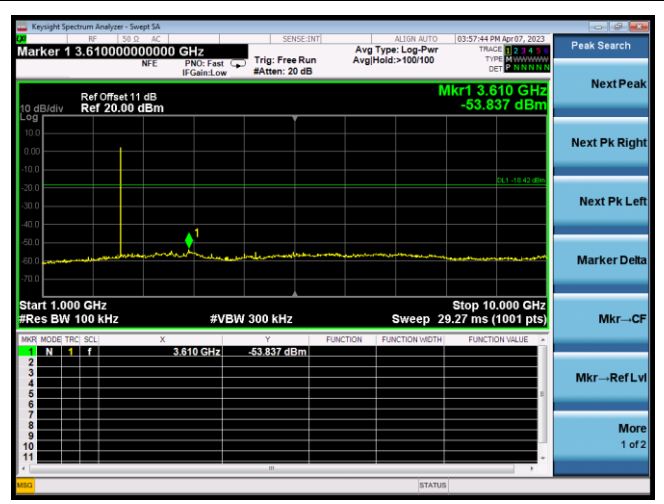
2402MHz(30MHz – 1GHz)



2480MHz(2.4GHz – 2.5GHz)

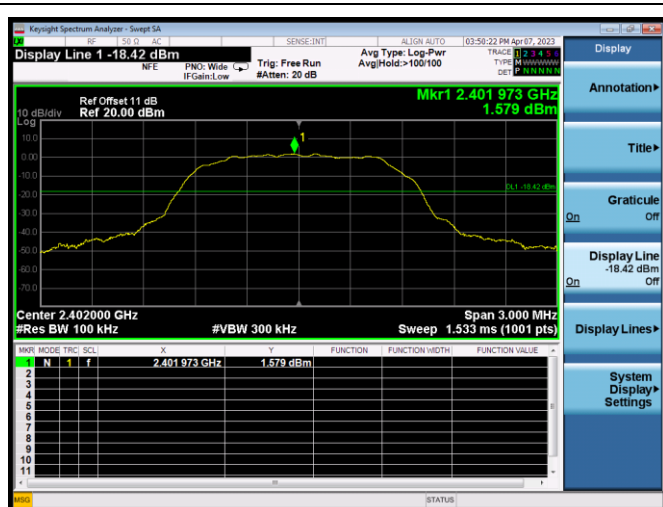


2402MHz(1GHz – 10GHz)

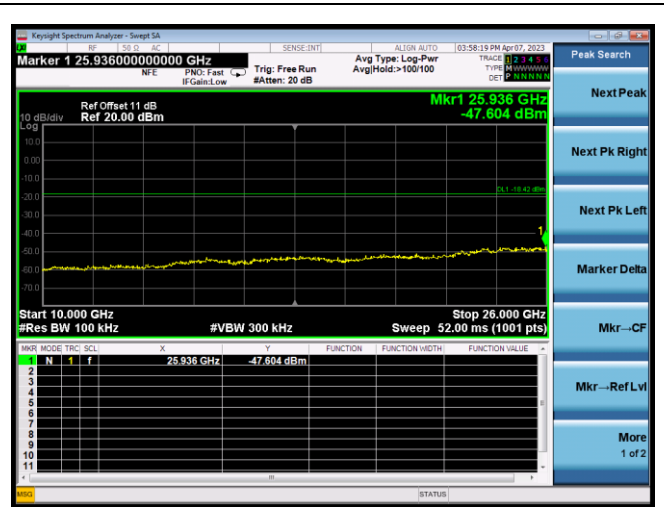


8-DPSK

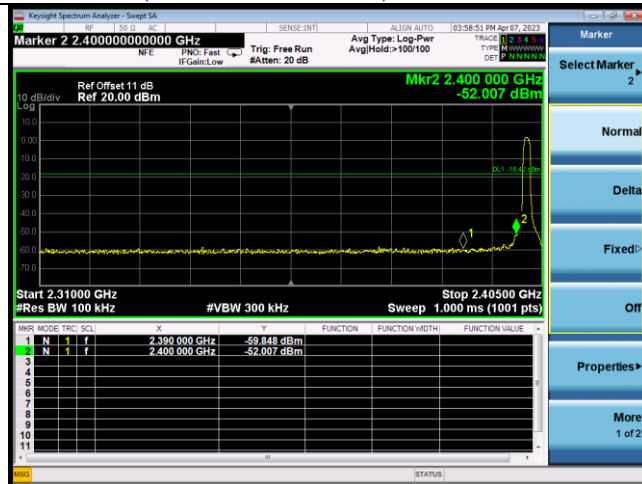
2402MHz



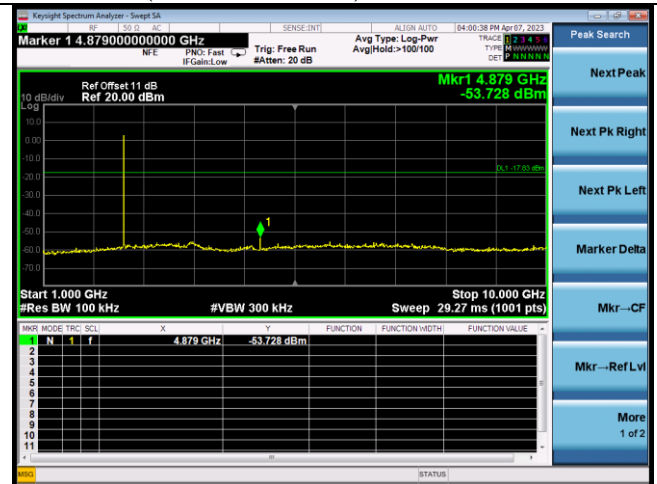
2402MHz(10GHz – 26GHz)



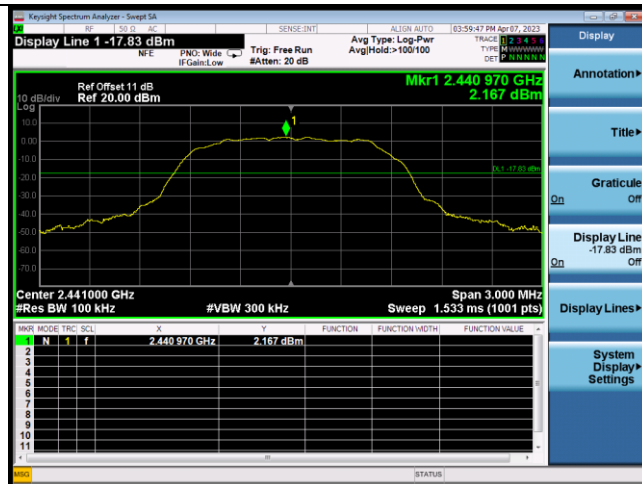
2402MHz(2.3GHz – 2.4GHz)



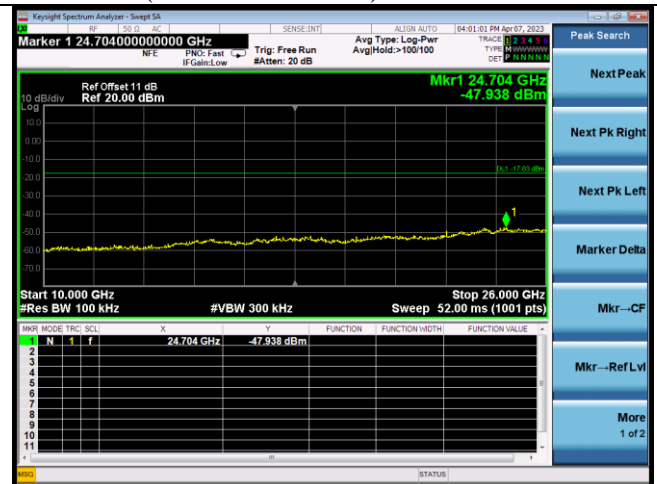
2441MHz(1GHz – 10GHz)



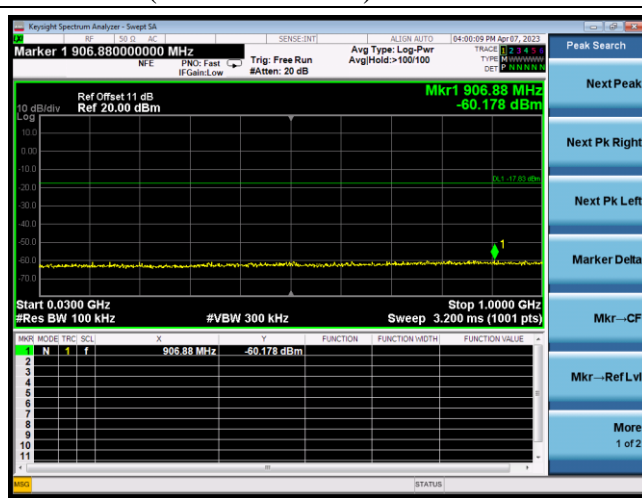
2441MHz



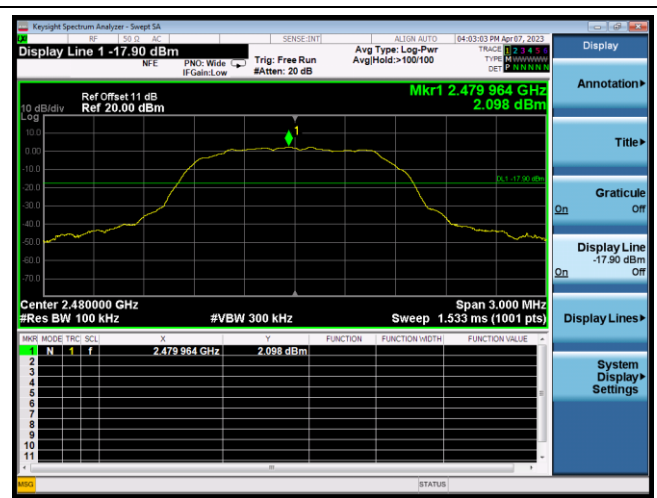
2441MHz(10GHz – 26GHz)



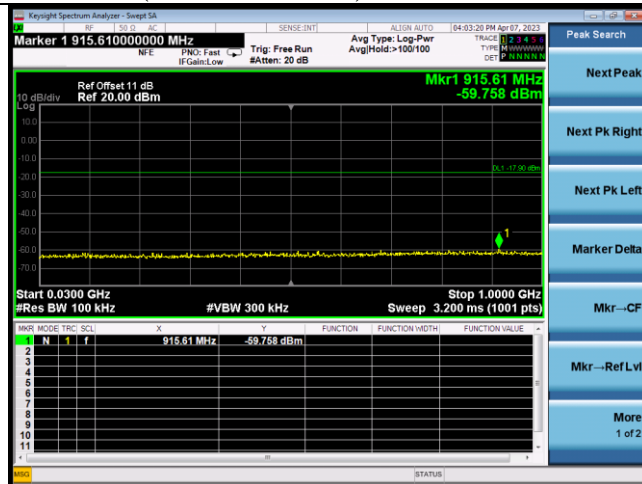
2441MHz (30MHz – 1GHz)



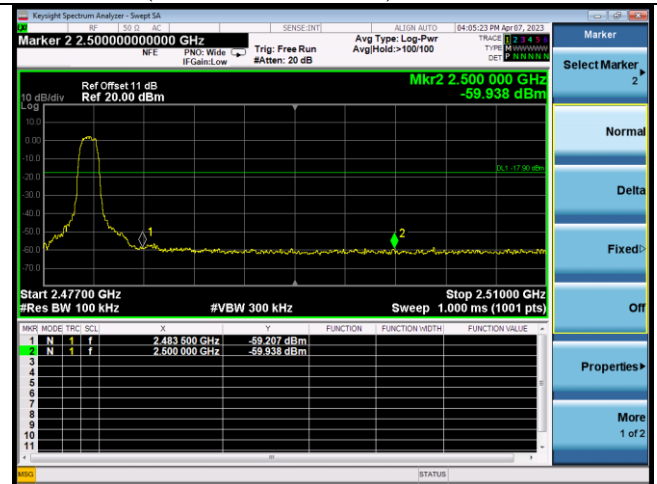
2480MHz



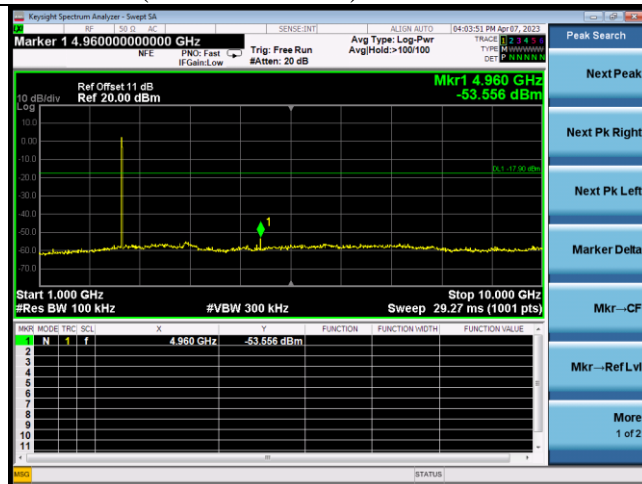
2480MHz(30MHz – 1GHz)



2480MHz(2.4GHz – 2.5GHz)

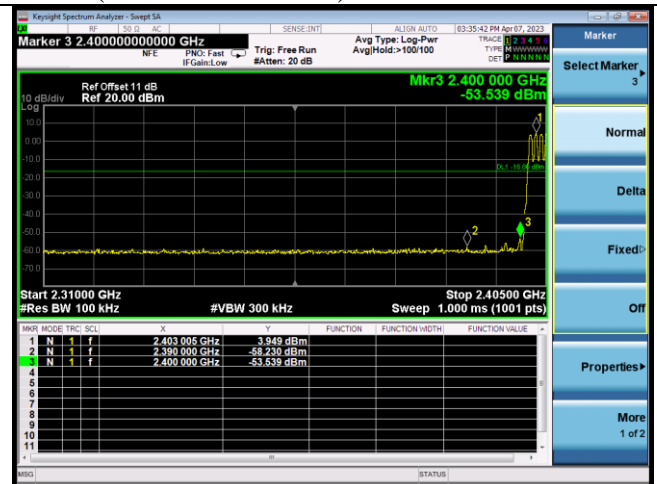


2480MHz(1GHz – 10GHz)

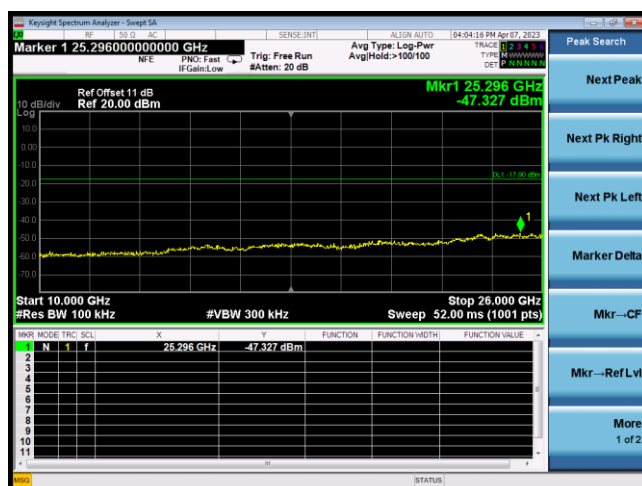


Hopping on

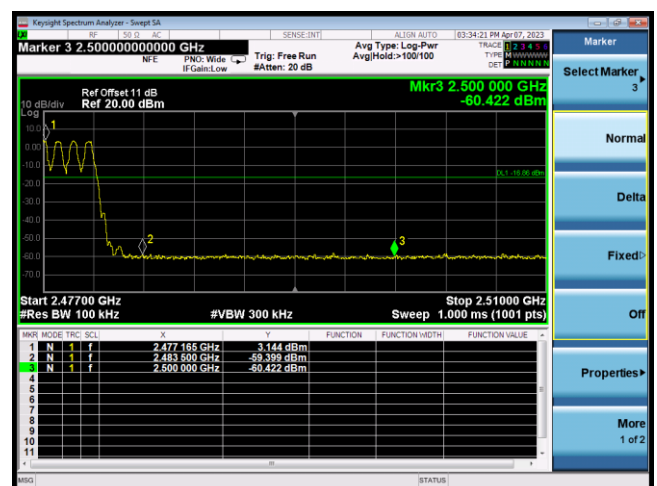
GFSK(2.3GHz – 2.4GHz)



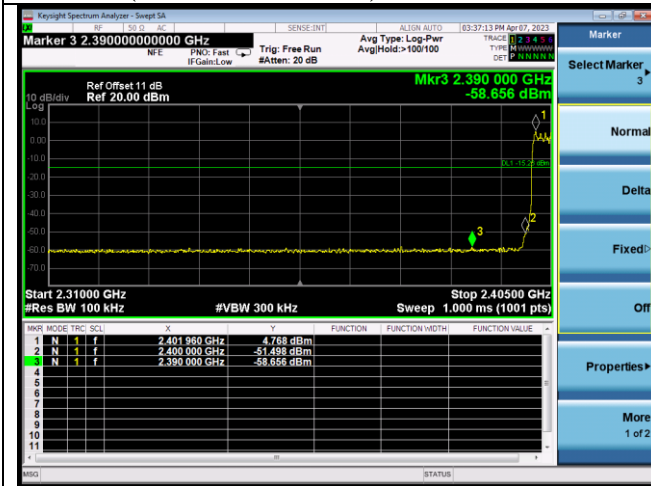
2480MHz(10GHz – 26GHz)



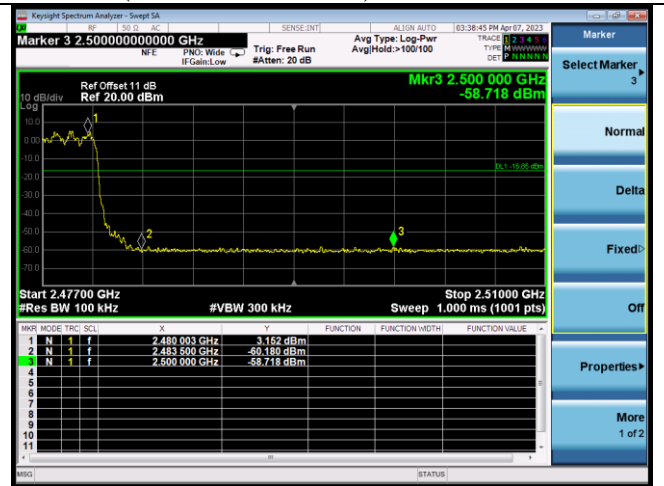
GFSK(2.4GHz – 2.5GHz)



8-DPSK(2.3GHz – 2.4GHz)



8-DPSK(2.4GHz – 2.5GHz)



6. 20 DB & 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.02,23	1 Year
2.	RF Cable	eastsheep	141-SMA-J J-1000	NO.1	Jul.01,22	1Year

6.2. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

6.3. Test Procedure

Use the test method described in ANSI C63.10 clause 7.8.7:

1. Connect the antenna port of the EUT to the spectrum analyzer.
2. Let the EUT transmit at Low/ Mid/ High channel with test software.
3. Setting of SA is following as: RBW: 30kHz / VBW: 100kHz
Sweep Mode: Continuous sweep
Detect mode: Positive peak
Trace mode: Max hold.
4. Use the occupied bandwidth function of the SA measure the 20dB bandwidth directly.

6.4. Test Results

EUT: Mini PC		
M/N: A Series		
Test date: 2023-04-07	Pressure: 102.1±1.0 kpa	Humidity: 52.2±3.0%
Tested by: Nier	Test Site: RF site	Temperature: 23.3±0.6°C

Test Mode	Frequency (MHz)	20dB bandwidth (KHz)	Limit (KHz)
GFSK	2402	1357	N/A
	2441	1362	N/A
	2480	1362	N/A
8-DPSK	2402	965.1	N/A
	2441	952.2	N/A
	2480	962.8	N/A
Conclusion : PASS			

Test Mode	Frequency (MHz)	99% Bandwidth (KHz)	Limit (KHz)
GFSK	2402	1203.3	N/A
	2441	1200.6	N/A
	2480	1200.4	N/A
8-DPSK	2402	891.76	N/A
	2441	884.29	N/A
	2480	888.86	N/A
Conclusion : PASS			