

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

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Appendix A. Photograph of Test

Appendix B. Photo of the EUT

TEST REPORT

Applicant : Shenzhen Horn Audio Co., Ltd.
Manufacturer : 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

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.26, 2023 Report of date: Jun.27, 2023

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



Approved & Authorized Signer : Signature: Sunny Lu / Manager

1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

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

EMISSION		
Description of Test Item	Standard	Results
Power Line Conducted Emission Test	FCC Part 15: 15.207 ANSI C63.10: 2020	PASS
Radiated Emission Test	FCC Part 15 15.209 FCC Part 15 15.205 FCC Part 15 15.247(d) ANSI C63.10: 2020	PASS
Conducted Spurious Emissions	FCC Part 15: 15.247(d) ANSI C63.10 2020	PASS
Carrier Frequency Separation Test	FCC Part 15: 15.247(a)(1) ANSI C63.10: 2020	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 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.26, 2023
Remark: This report only for BDR+EDR.	

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

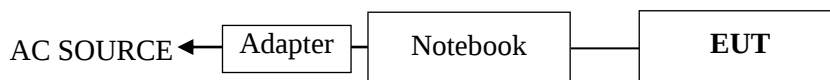
Antenna System	
Type of Antenna	Dipole Antenna
Antenna Peak Gain	Bluetooth Peak Gain: 2.87dBi

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

Tested mode, Packet Type, peak output power information			
Mode	Packet Type	Output power(dBm) P max	Output Power(dBm) P low
GFSK	DH1	9.125	8.779
	DH3		
	DH5		
$\pi/4$ DQPSK	2-DH1	8.436	8.125
	2-DH3		
	2-DH5		
8DPSK	3-DH1	7.747	7.470
	3-DH3		
	3-DH5		

$\pi/4$ DQPSK modulation is same type modulation with 8-DPSK, and according exploratory test, 8-DPSK will have worse emissions, so the final test were only performed with GFSK and 8-DPSK modulation,

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
	Frequency Occupation	GFSK	1Mbps	39
		8-DPSK	3Mbps	39
	Number of Hopping Channels	GFSK	1Mbps	78
		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 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)

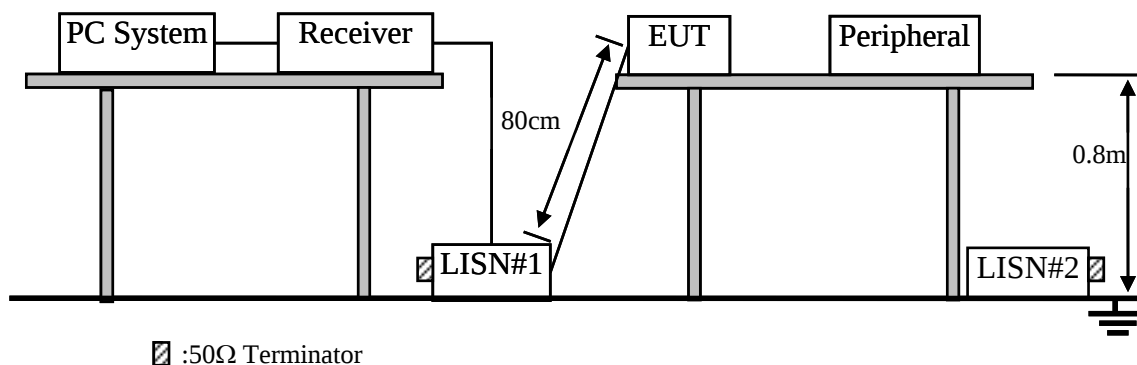
Test Item	Uncertainty
Uncertainty for Conduction emission test in No. 1 Conduction	$\pm 2.6\text{dB}(150\text{kHz to } 30\text{MHz})$
Uncertainty for Radiation Emission test in 3m chamber	$\pm 3.8\text{dB}(30\sim 200\text{MHz, Polarization: H})$
	$\pm 3.8\text{dB}(30\sim 200\text{MHz, Polarization: V})$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

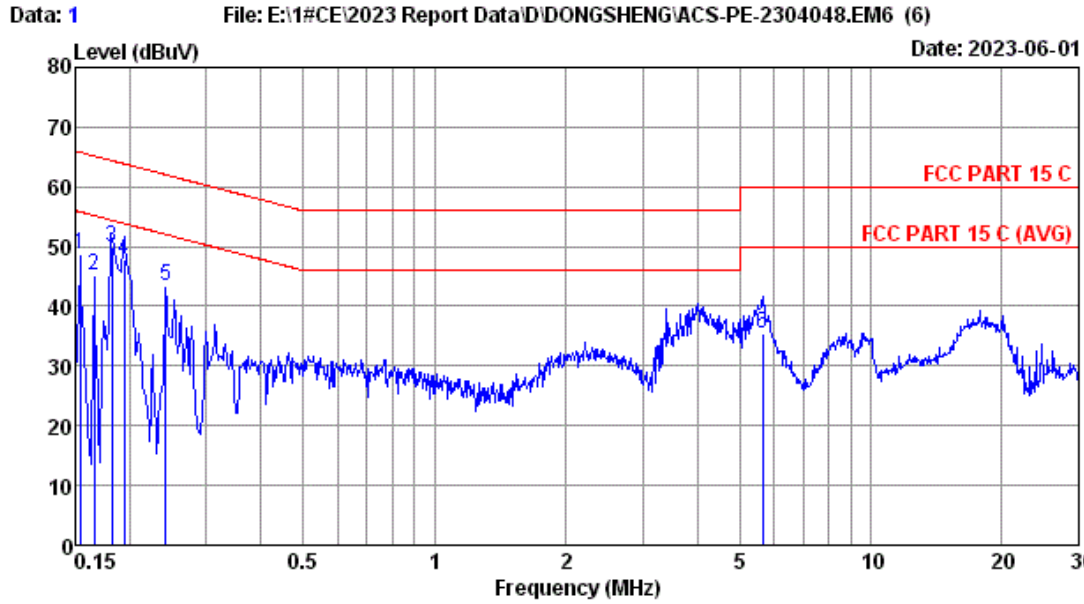
The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power Via PC unit connected to the power mains through a line impedance stabilization network (L.I.S.N. #1). This provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs). 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

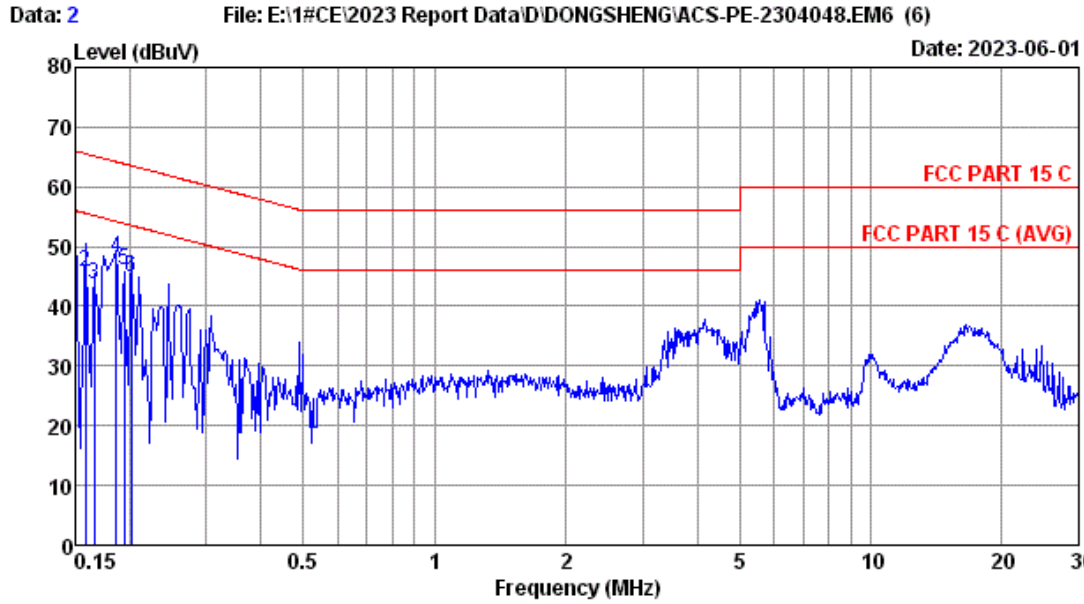
PASS. (All emissions not reported below are too low against the prescribed limits.)



Site no :1# CE Data No :1
 Dis./Lisn :2022 ENV216-L
 Limit :FCC PART 15 C
 Env./Ins. :25.1°C/59% Engineer :Evan
 Power Rating :DC 5V
 Test Mode :BT 3.0

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	39.20	48.81	65.78	16.97	QP
2	0.166	9.60	0.01	35.70	45.31	65.16	19.85	QP
3	0.182	9.60	0.01	40.30	49.91	64.39	14.48	QP
4	0.194	9.60	0.01	38.30	47.91	63.86	15.95	QP
5	0.242	9.60	0.01	33.80	43.41	62.03	18.62	QP
6	5.658	9.20	0.04	26.20	35.44	60.00	24.56	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. :25.1°C/59% Engineer :Evan
 Power Rating :DC 5V
 Test Mode :BT 3.0

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	37.30	46.91	66.00	19.09	QP
2	0.158	9.60	0.01	36.00	45.61	65.57	19.96	QP
3	0.166	9.60	0.01	34.00	43.61	65.16	21.55	QP
4	0.186	9.60	0.01	38.50	48.11	64.21	16.10	QP
5	0.194	9.60	0.01	36.30	45.91	63.86	17.95	QP
6	0.202	9.60	0.01	35.30	44.91	63.53	18.62	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: 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.

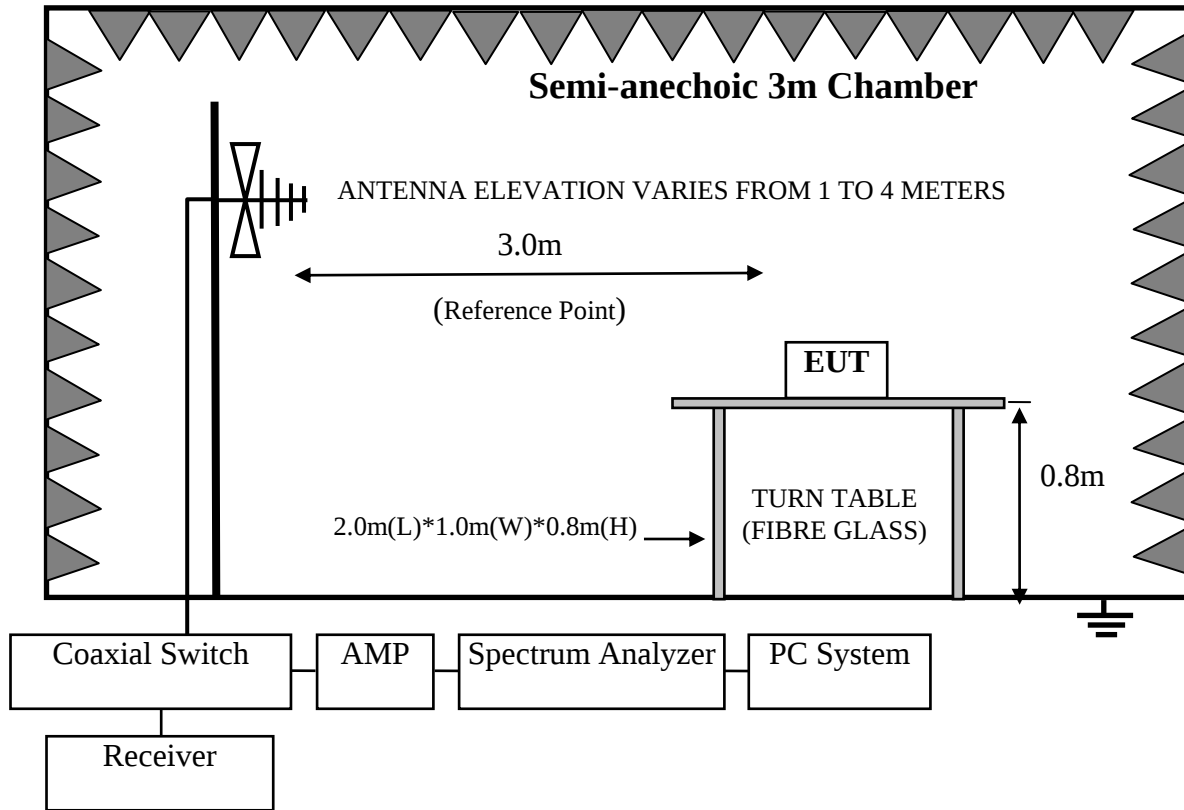
Frequency range: above 1000MHz

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

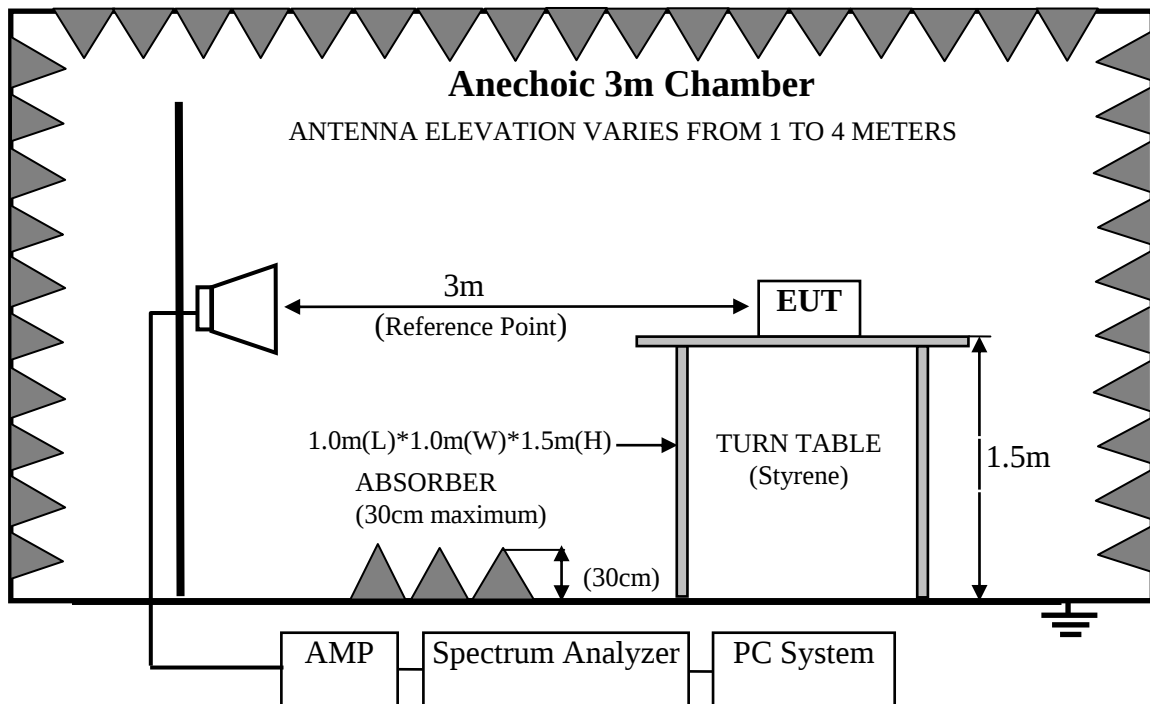
Note: N/A means Not applicable.

4.2. Block Diagram of Test Setup

For frequency range 30MHz-1000MHz



For frequency range above 1GHz



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 ($\text{dB}\mu\text{V}/\text{m}$) = Reading (Receiver) ($\text{dB}\mu\text{V}$) + Antenna Factor (dB/m) + Cable Loss (dB)
Emission Level ($\text{dB}\mu\text{V}/\text{m}$) = Reading (Spectrum) ($\text{dB}\mu\text{V}$) + 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.

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 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.

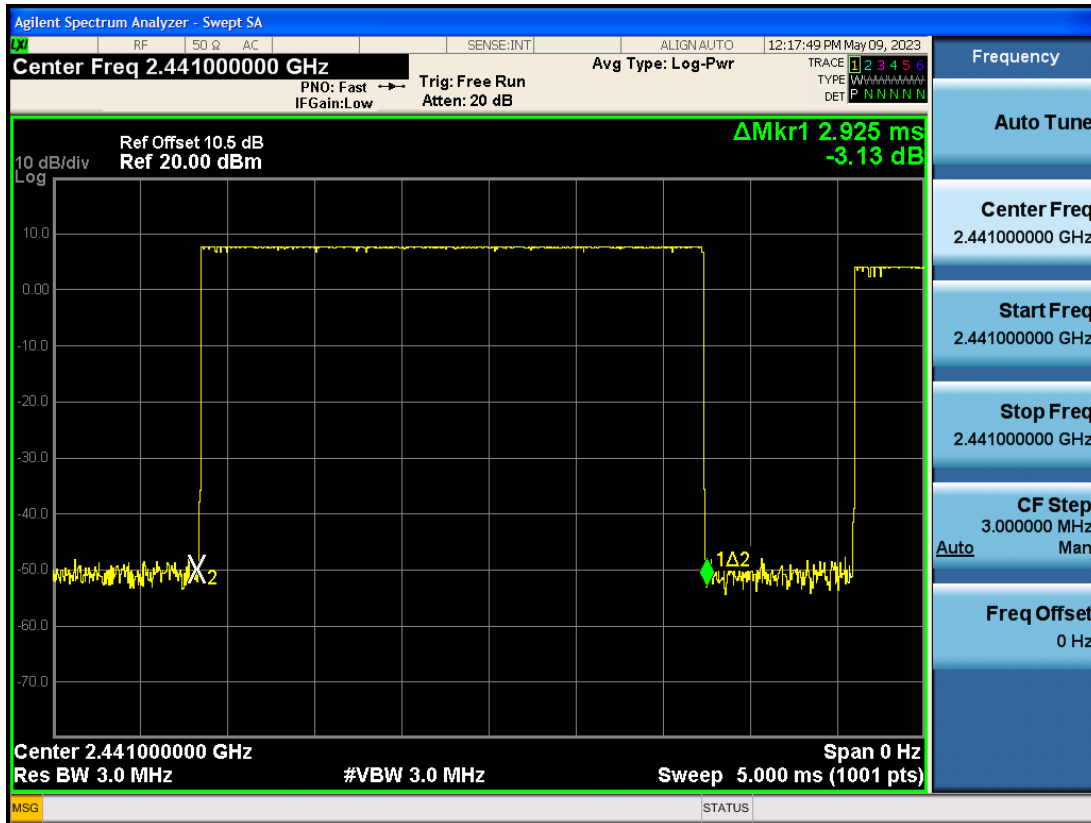
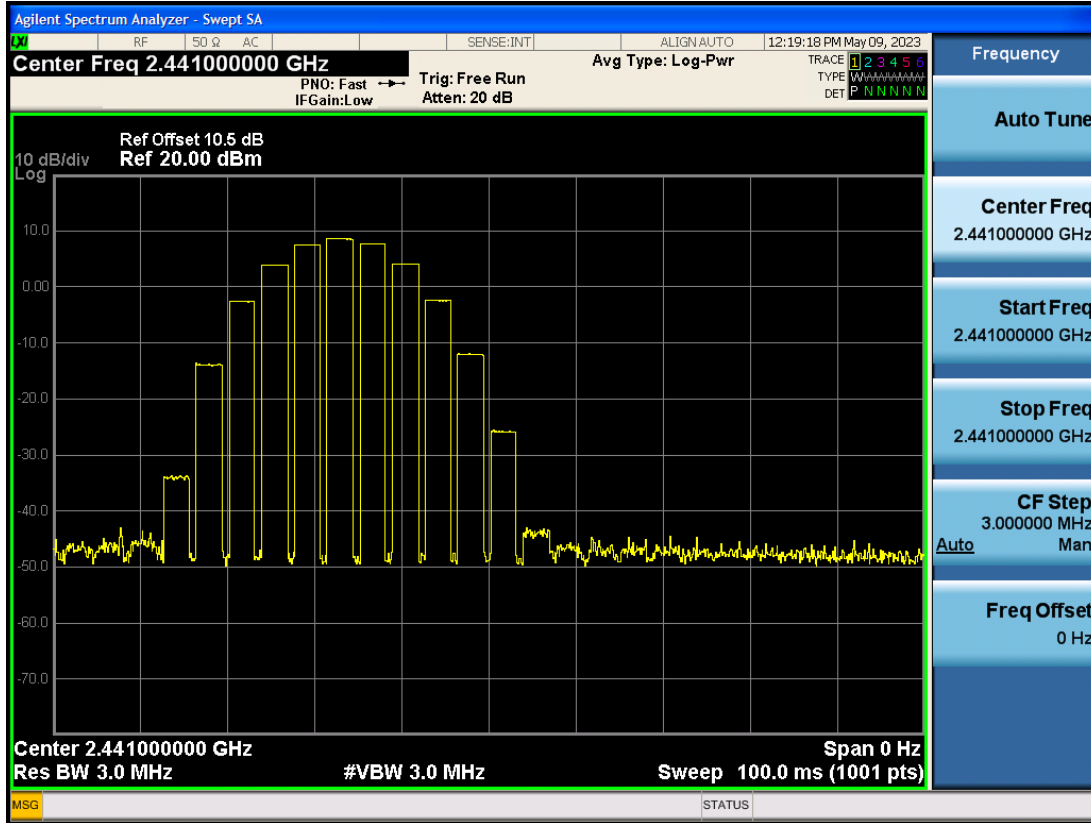
All the emissions from 30MHz to 25GHz were comply with the 15.209 Limit.

Note 1: The duty cycle factor for calculate average level is -30.677dB, 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 = $20\log(\text{Dwell time}/100\text{ms}) = -30.677\text{dB}$

Dwell Time = $2.925 \times 1\text{ms}$

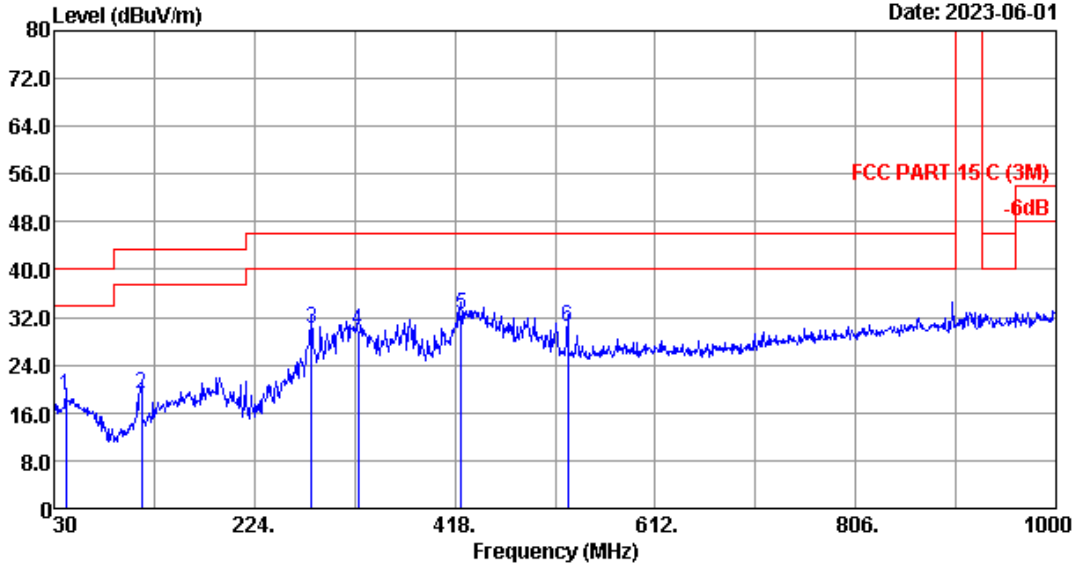


Frequency: 30MHz~1GHz

Data: 1

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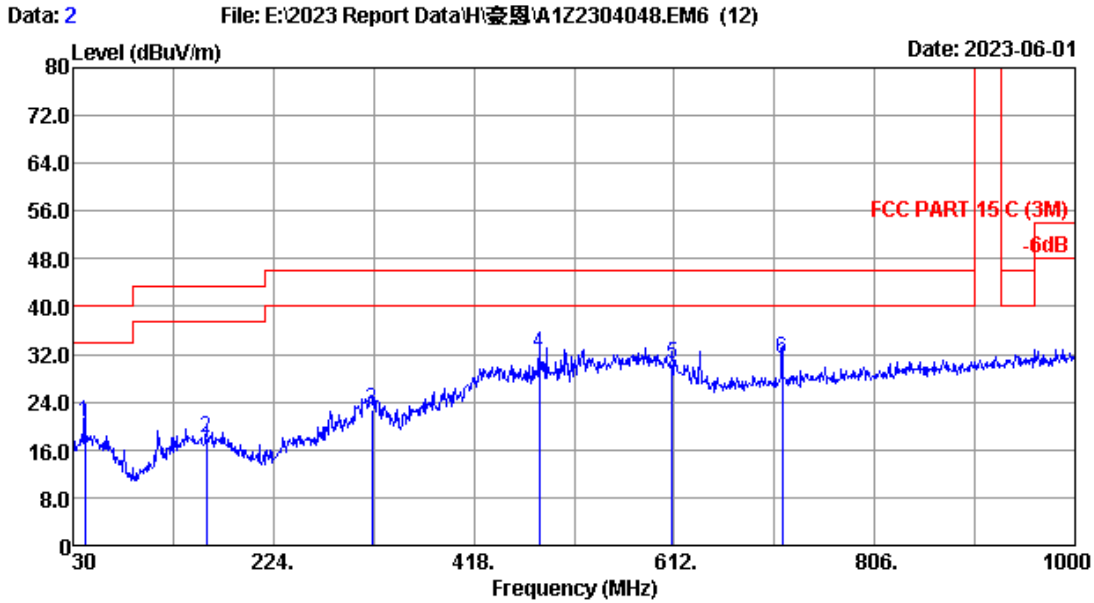
Date: 2023-06-01



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. : 22.5°C/50% Engineer : Abel
 Test Mode : BT3.0 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	41.640	19.50	0.64	-1.11	19.03	40.00	20.97	QP
2	114.390	16.30	1.07	1.83	19.20	43.50	24.30	QP
3	279.290	18.96	1.71	9.54	30.21	46.00	15.79	QP
4	324.880	20.20	1.86	7.84	29.90	46.00	16.10	QP
5	423.820	22.24	2.14	8.07	32.45	46.00	13.55	QP
6	527.610	23.96	2.46	3.96	30.38	46.00	15.62	QP

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

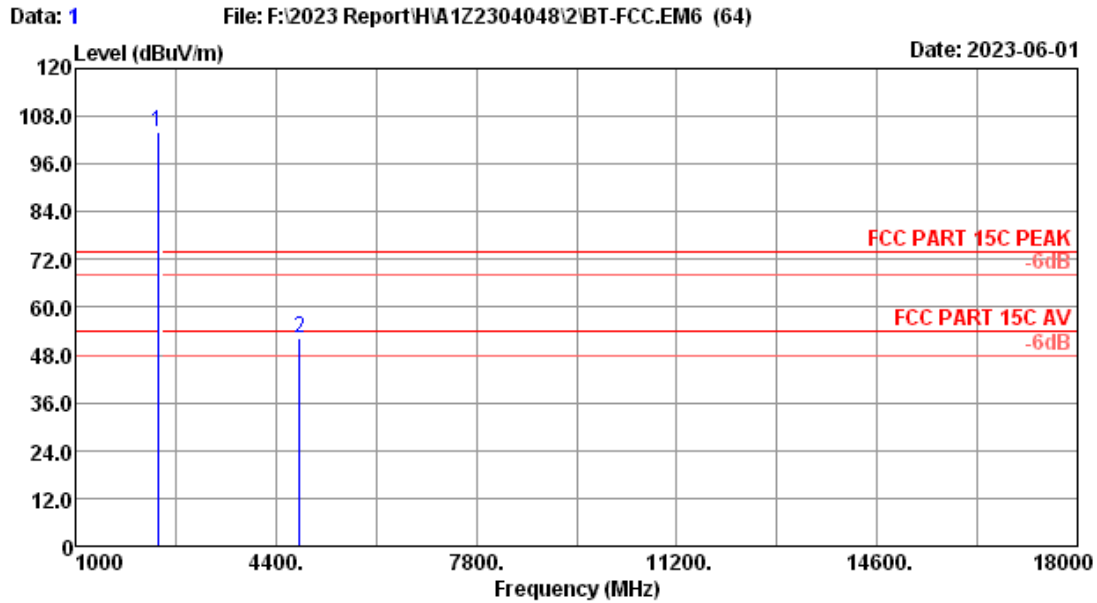


Site no. : 3m Chamber Data no. : 2
 Dis. / Ant. : 3m 2022 VULB 9168-01317 Ant. pol. : VERTICAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 22.5°C/50% Engineer : Abel
 Test Mode : BT3.0 TX Mode

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	0.50	20.64	40.00	19.36	QP
2	159.010	19.40	1.26	-2.52	18.14	43.50	25.36	QP
3	319.060	20.06	1.84	0.97	22.87	46.00	23.13	QP
4	481.050	23.32	2.32	6.55	32.19	46.00	13.81	QP
5	610.060	25.90	2.68	1.88	30.46	46.00	15.54	QP
6	716.760	27.28	2.92	1.04	31.24	46.00	14.76	QP

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

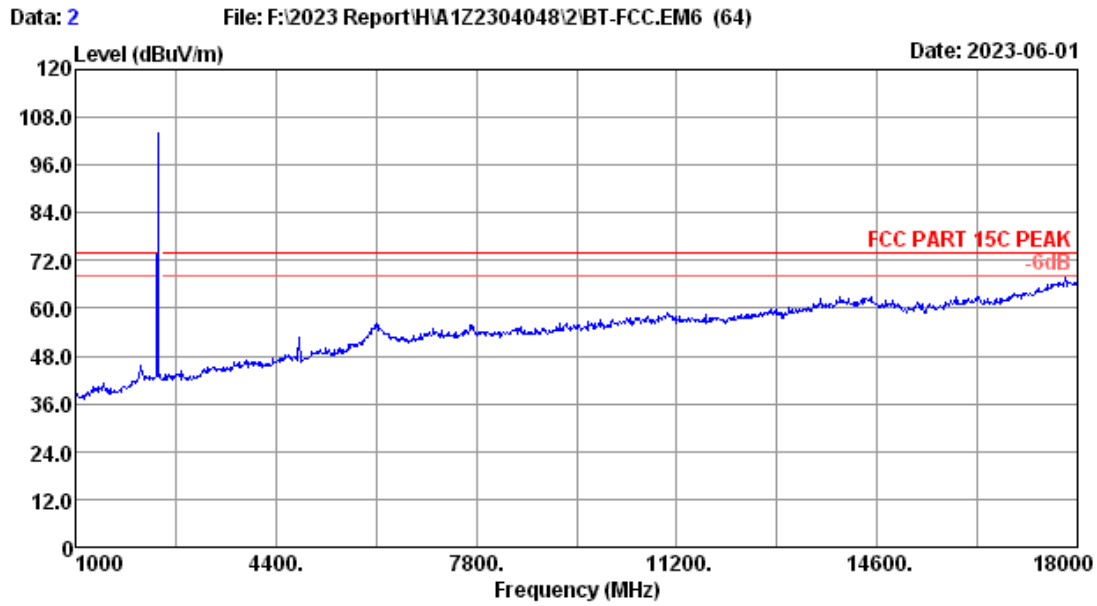
Frequency: 1GHz~18GHz



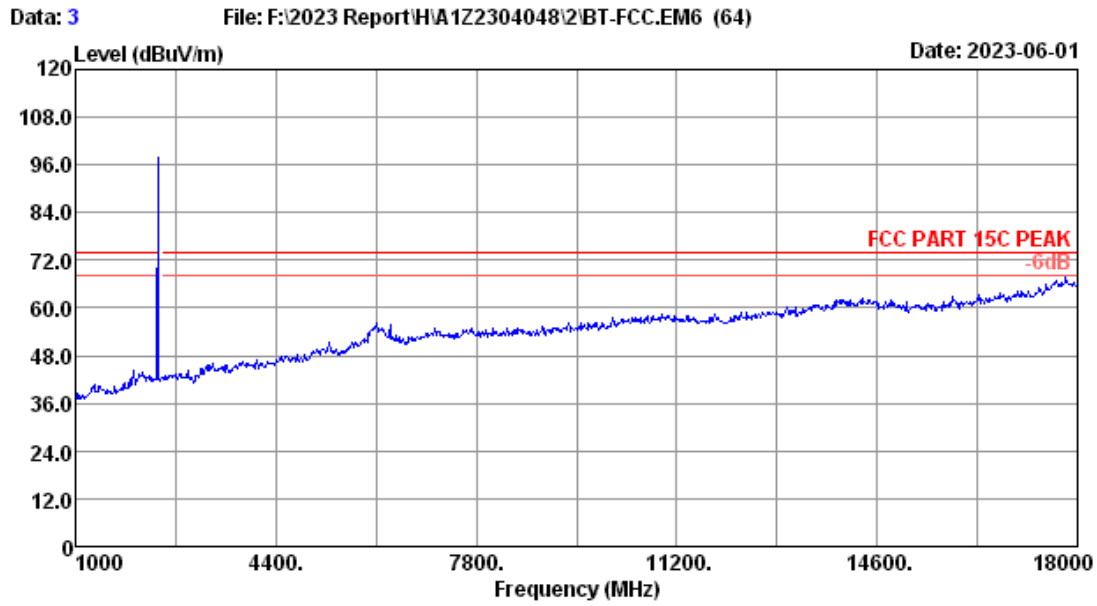
Site no. : RF Chamber Data no. : 1
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK Pressure : 101.7kPa
 Env. / Ins. : 23.2°C/52.5% Engineer : nier
 Power Rating :
 Test Mode : BT3.0 GFSK 2402 MHz TX
 :

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	108.30	34.36	103.93	-----	-----	Peak
2	4804.00	31.20	3.33	51.22	33.68	52.07	74.00	21.93	Peak

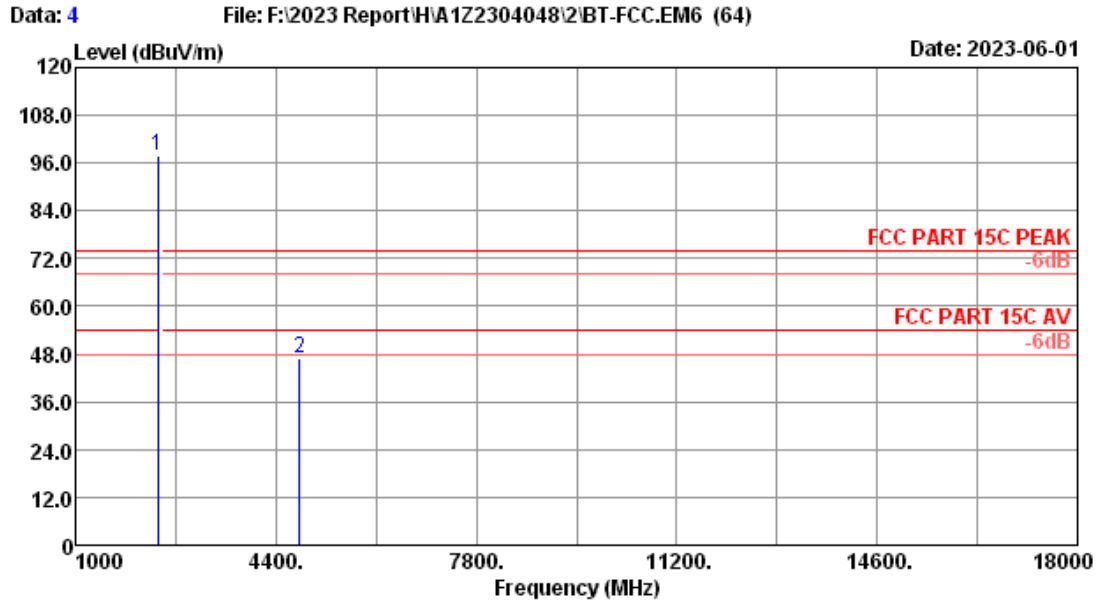
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading
 -Amp factor.
 2. The emission levels that are 20dB below the official
 limit are not reported.



Site no.	: RF Chamber	Data no.	: 2
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	: BT3.0 GFSK 2402 MHz TX		
	:		



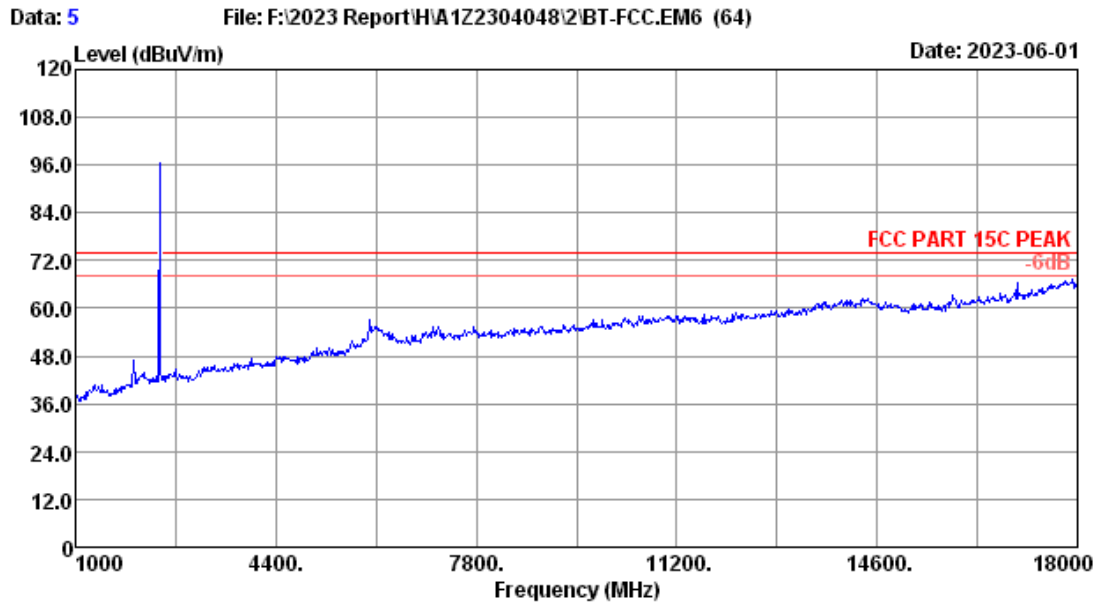
Site no.	: RF Chamber	Data no.	: 3
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BT3.0 GFSK 2402 MHz TX		
	:		



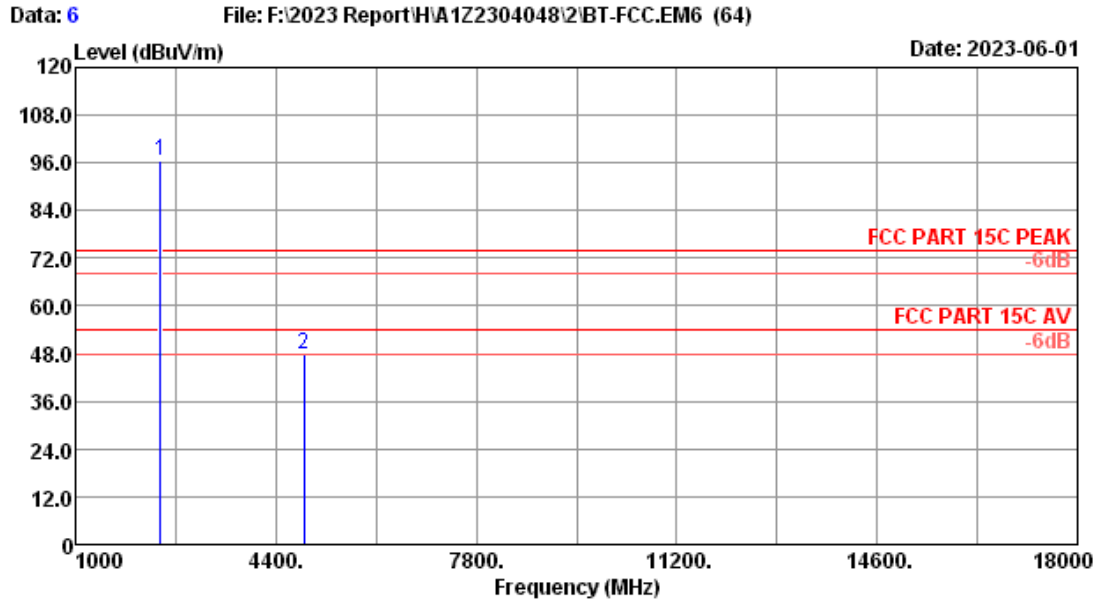
Site no. : RF Chamber Data no. : 4
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK Pressure : 101.7kPa
 Env. / Ins. : 23.2°C/52.5% Engineer : nier
 Power Rating :
 Test Mode : BT3.0 GFSK 2402 MHz TX
 :

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	102.39	34.36	98.02	-----	-----	Peak
2	4804.00	31.20	3.33	46.19	33.68	47.04	74.00	26.96	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.



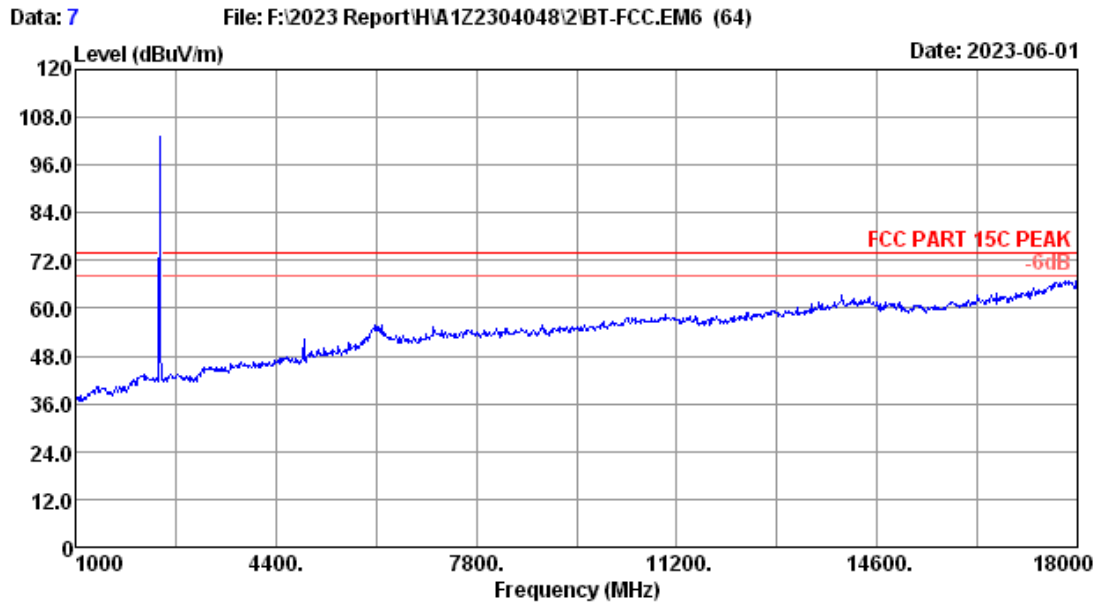
Site no.	: RF Chamber	Data no.	: 5
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BT3.0 GFSK 2441 MHz TX		
	:		



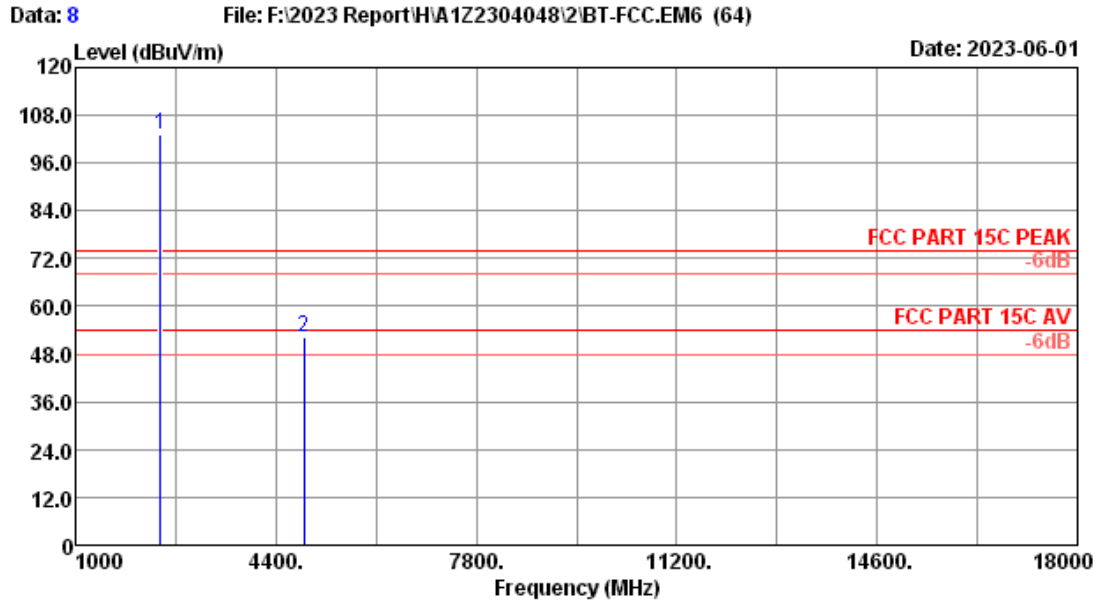
Site no. : RF Chamber Data no. : 6
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK Pressure : 101.7kPa
 Env. / Ins. : 23.2°C/52.5% Engineer : nier
 Power Rating :
 Test Mode : BT3.0 GFSK 2441 MHz TX
 :

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	2441.00	27.80	2.32	100.54	34.35	96.31	-----	-----	Peak
2	4882.00	31.43	3.35	46.52	33.69	47.61	74.00	26.39	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.



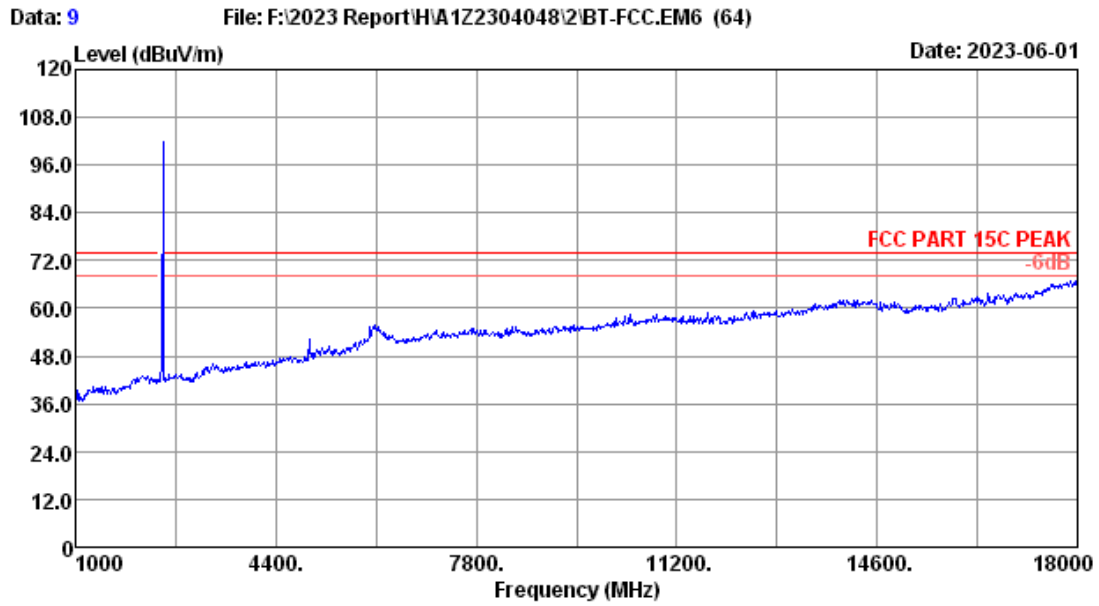
Site no.	: RF Chamber	Data no.	: 7
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BT3.0 GFSK 2441 MHz TX		
	:		



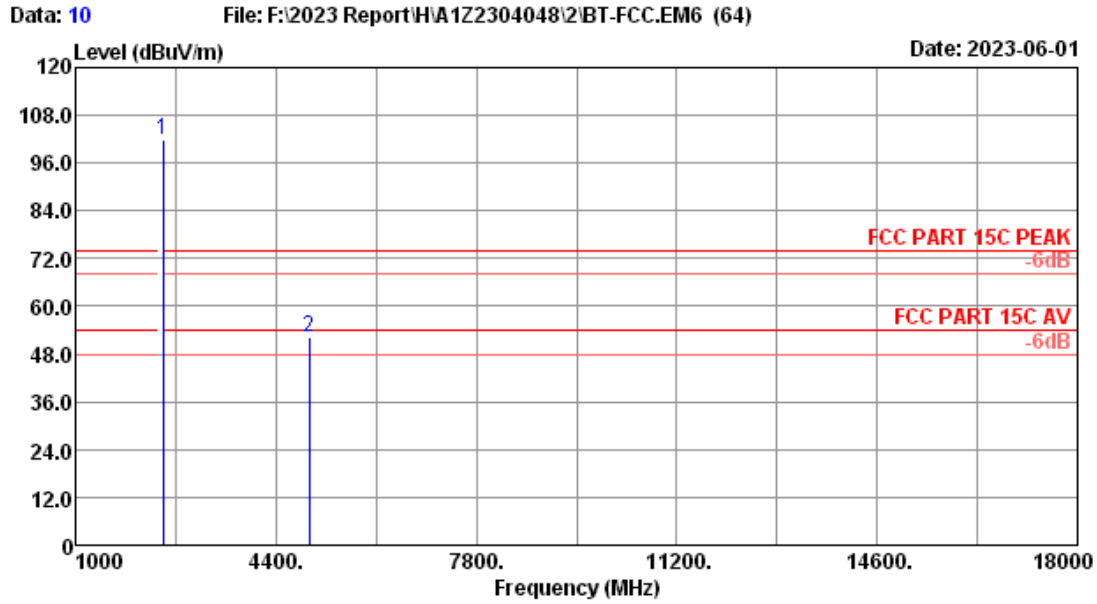
Site no.	: RF Chamber	Data no.	: 8
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BT3.0 GFSK 2441 MHz TX		
	:		

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	2441.00	27.80	2.32	107.20	34.35	102.97	-----	-----	Peak
2	4882.00	31.43	3.35	51.18	33.69	52.27	74.00	21.73	Peak

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



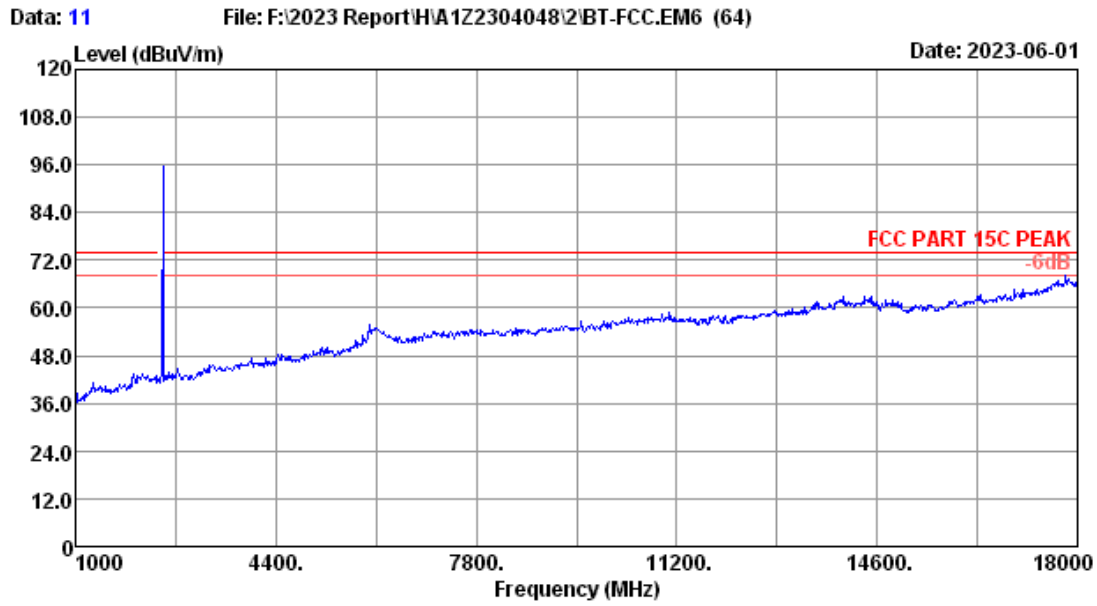
Site no.	: RF Chamber	Data no.	: 9
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BT3.0 GFSK 2480 MHz TX		
	:		



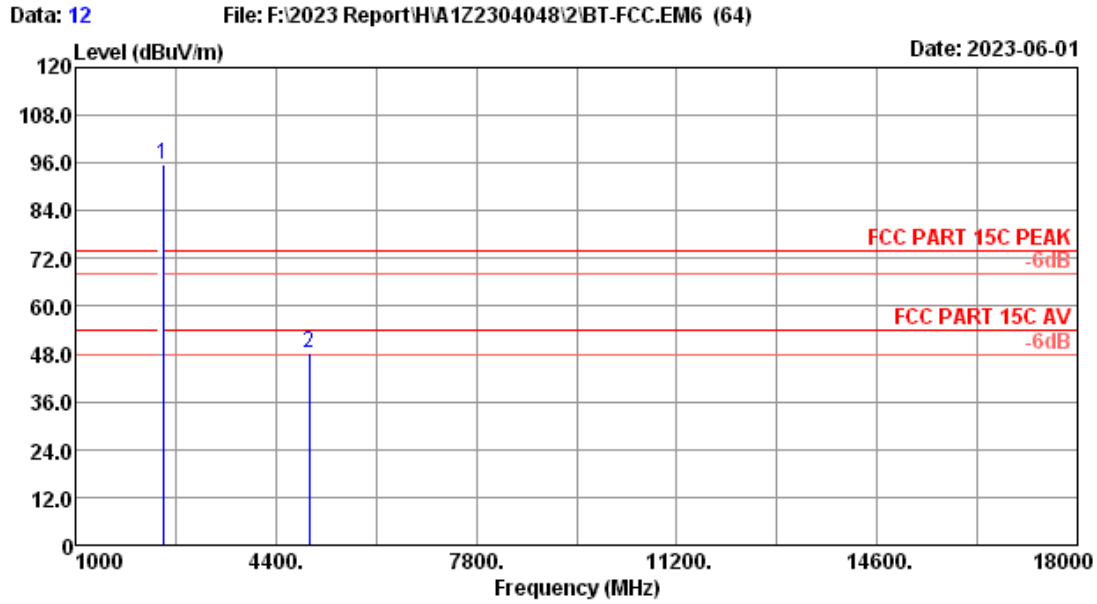
Site no. : RF Chamber	Data no. : 10
Dis. / Ant. : 3m 2022 MCTD1209-3006	Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK	Pressure : 101.7kPa
Env. / Ins. : 23.2°C/52.5%	Engineer : nier
Power Rating :	
Test Mode : BT3.0 GFSK 2480 MHz TX	

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	106.21	34.35	102.00	-----	-----	Peak
2	4960.00	32.03	3.39	50.50	33.69	52.23	74.00	21.77	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.



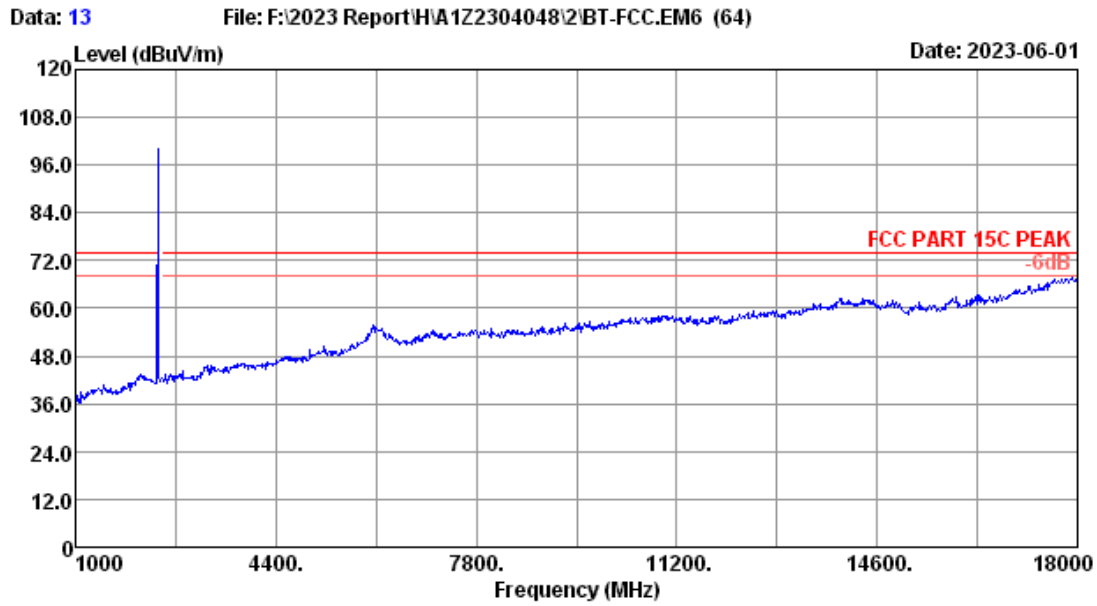
Site no.	: RF Chamber	Data no.	: 11
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BT3.0 GFSK 2480 MHz TX		
	:		



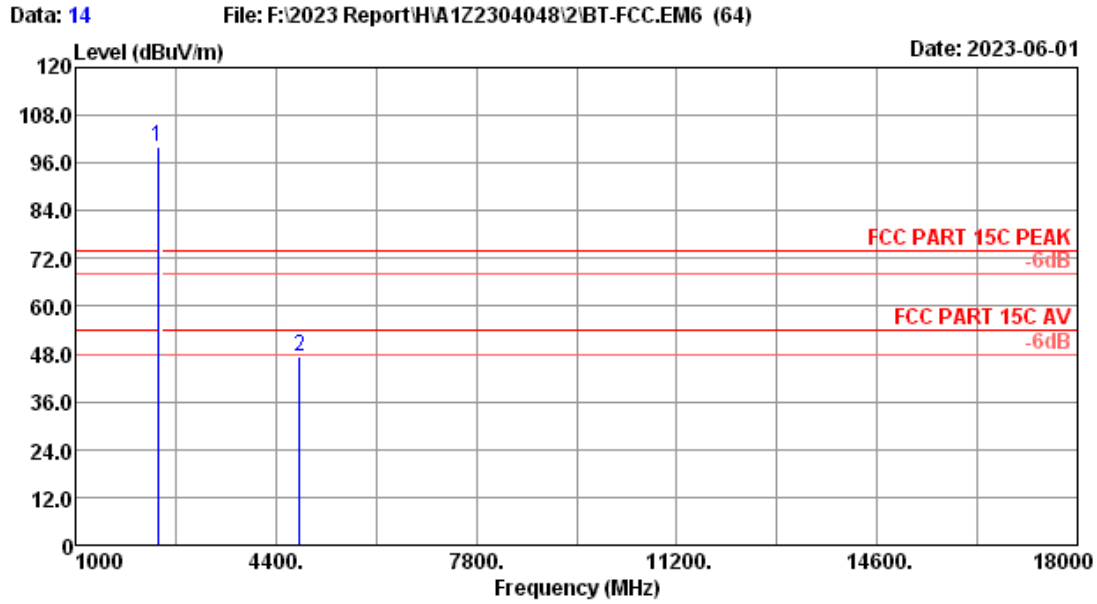
Site no. : RF Chamber Data no. : 12
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK Pressure : 101.7kPa
 Env. / Ins. : 23.2°C/52.5% Engineer : nier
 Power Rating :
 Test Mode : BT3.0 GFSK 2480 MHz TX
 :

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	100.07	34.35	95.86	-----	-----	Peak
2	4960.00	32.03	3.39	46.66	33.69	48.39	74.00	25.61	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.



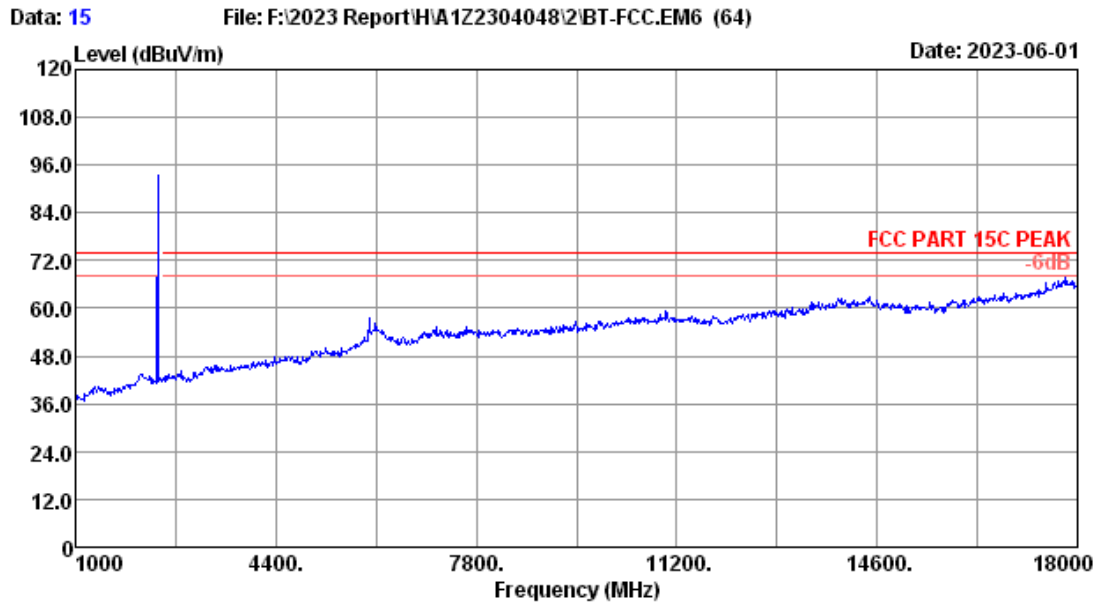
Site no.	: RF Chamber	Data no.	: 13
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BT3.0 8DPSK 2402 MHz TX		
	:		



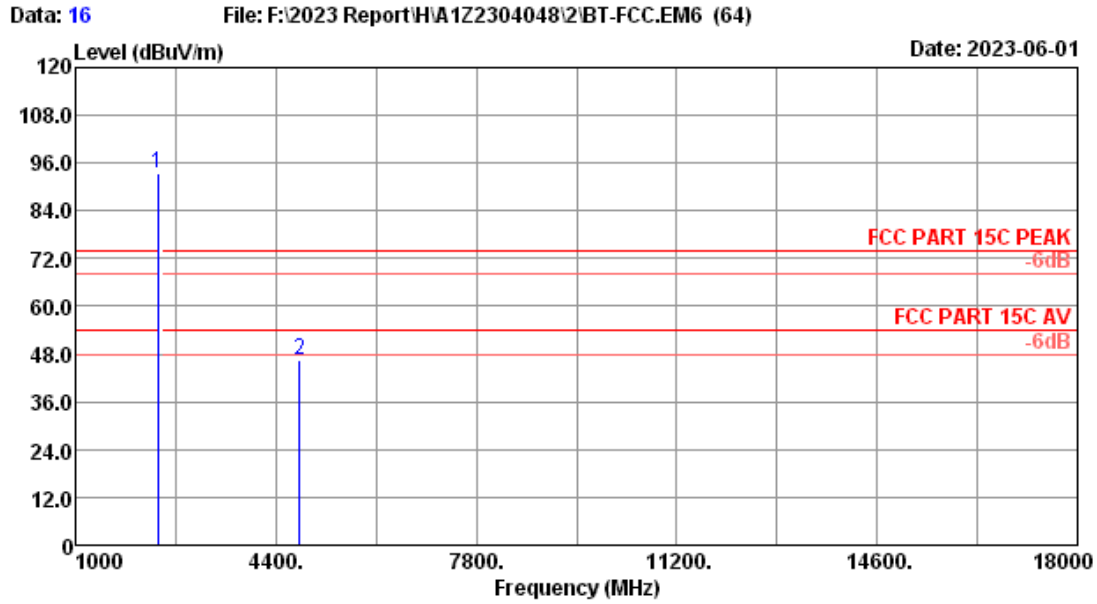
Site no. : RF Chamber Data no. : 14
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK Pressure : 101.7kPa
 Env. / Ins. : 23.2°C/52.5% Engineer : nier
 Power Rating :
 Test Mode : BT3.0 8DPSK 2402 MHz TX
 :

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	104.65	34.36	100.28	-----	-----	Peak
2	4804.00	31.20	3.33	46.60	33.68	47.45	74.00	26.55	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.



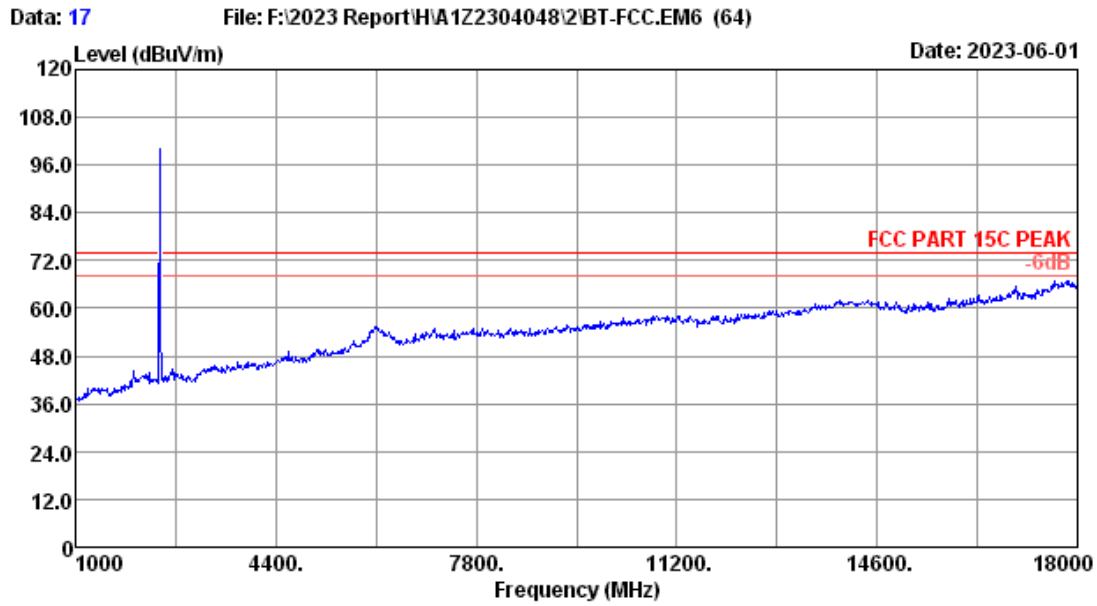
Site no.	: RF Chamber	Data no.	: 15
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BT3.0 8DPSK 2402 MHz TX		
	:		



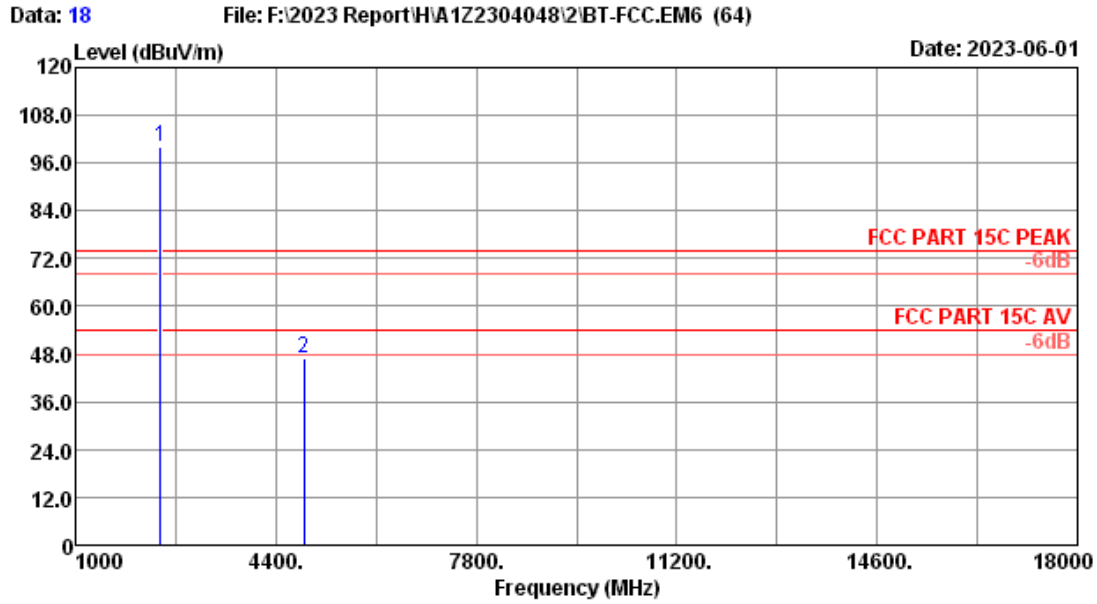
Site no. : RF Chamber Data no. : 16
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK Pressure : 101.7kPa
 Env. / Ins. : 23.2°C/52.5% Engineer : nier
 Power Rating :
 Test Mode : BT3.0 8DPSK 2402 MHz TX
 :

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	97.62	34.36	93.25	-----	-----	Peak
2	4804.00	31.20	3.33	45.56	33.68	46.41	74.00	27.59	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.



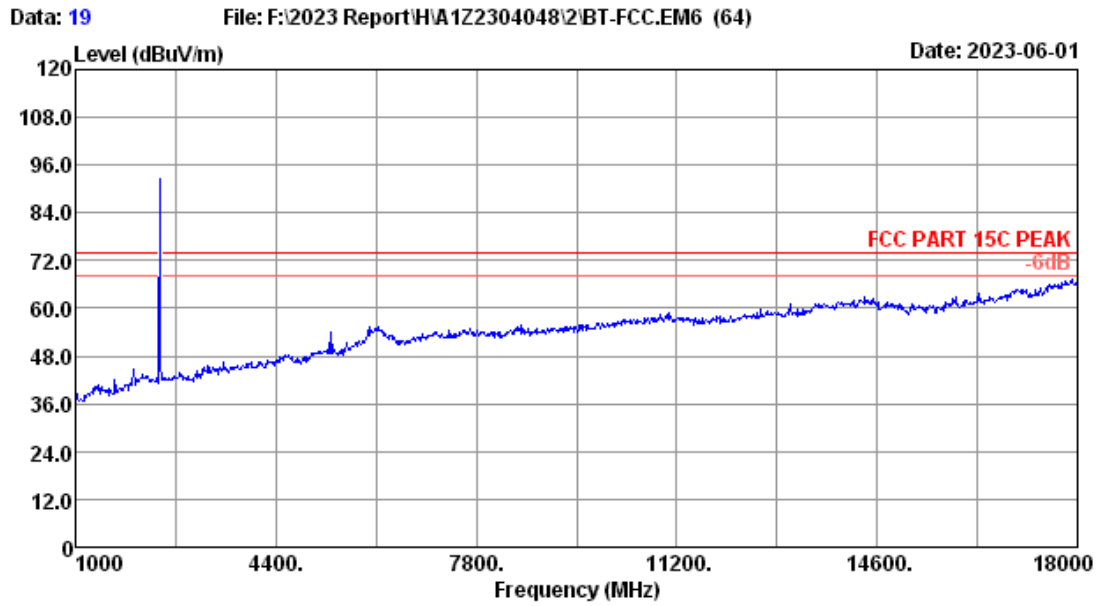
Site no.	: RF Chamber	Data no.	: 17
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BT3.0 8DPSK 2441 MHz TX		
	:		



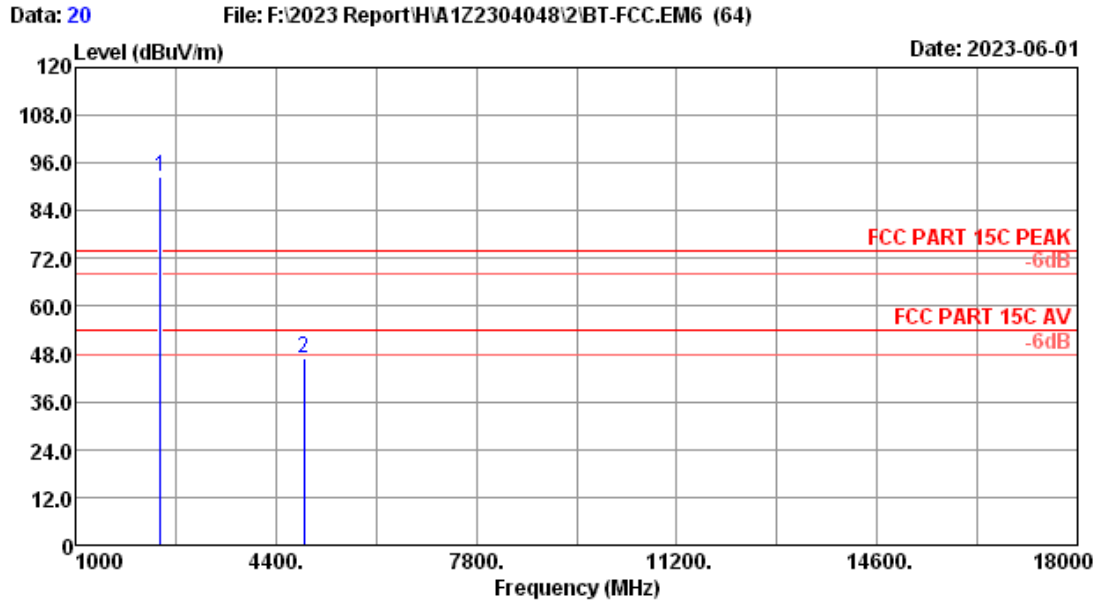
Site no. : RF Chamber Data no. : 18
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK Pressure : 101.7kPa
 Env. / Ins. : 23.2°C/52.5% Engineer : nier
 Power Rating :
 Test Mode : BT3.0 8DPSK 2441 MHz TX
 :

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	2441.00	27.80	2.32	104.41	34.35	100.18	-----	-----	Peak
2	4882.00	31.43	3.35	45.76	33.69	46.85	74.00	27.15	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.



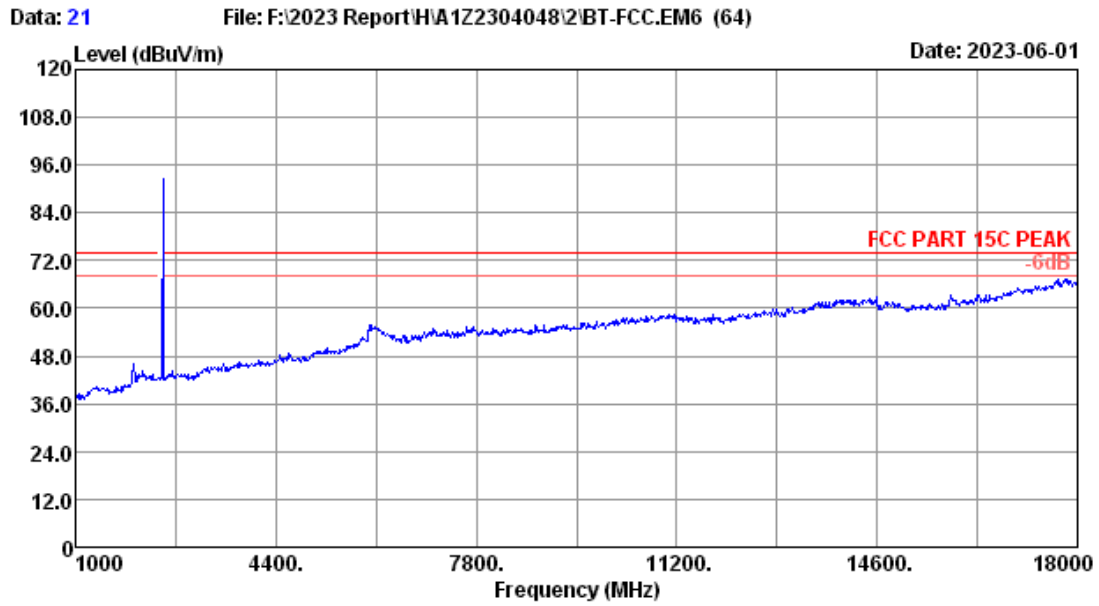
Site no.	: RF Chamber	Data no.	: 19
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BT3.0 8DPSK 2441 MHz TX		
	:		



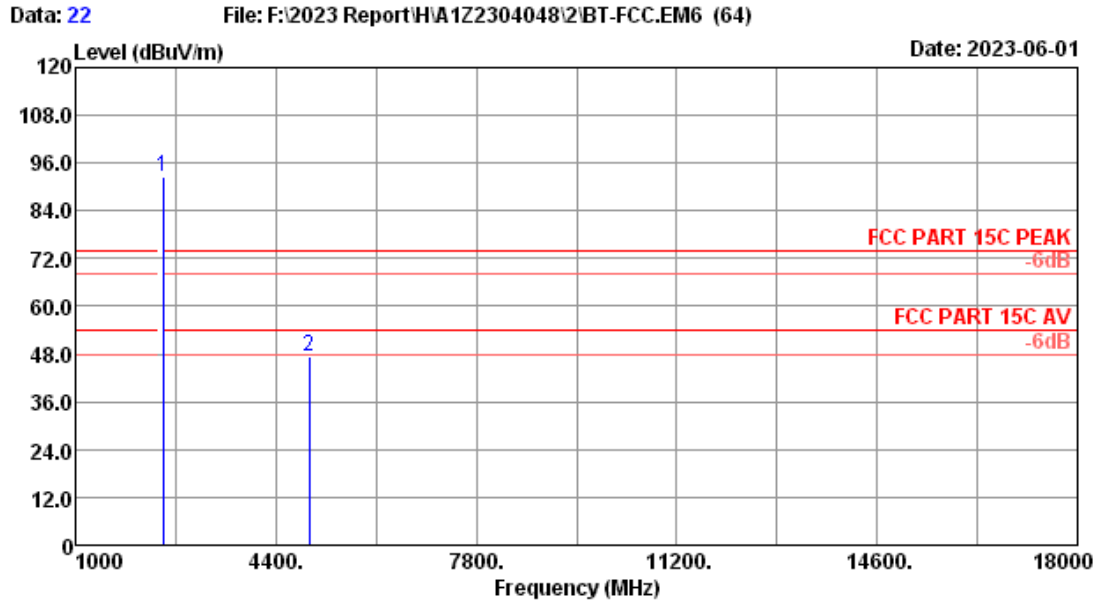
Site no.	: RF Chamber	Data no.	: 20
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BT3.0 8DPSK 2441 MHz TX		
	:		

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	2441.00	27.80	2.32	96.87	34.35	92.64	-----	-----	Peak
2	4882.00	31.43	3.35	46.05	33.69	47.14	74.00	26.86	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.



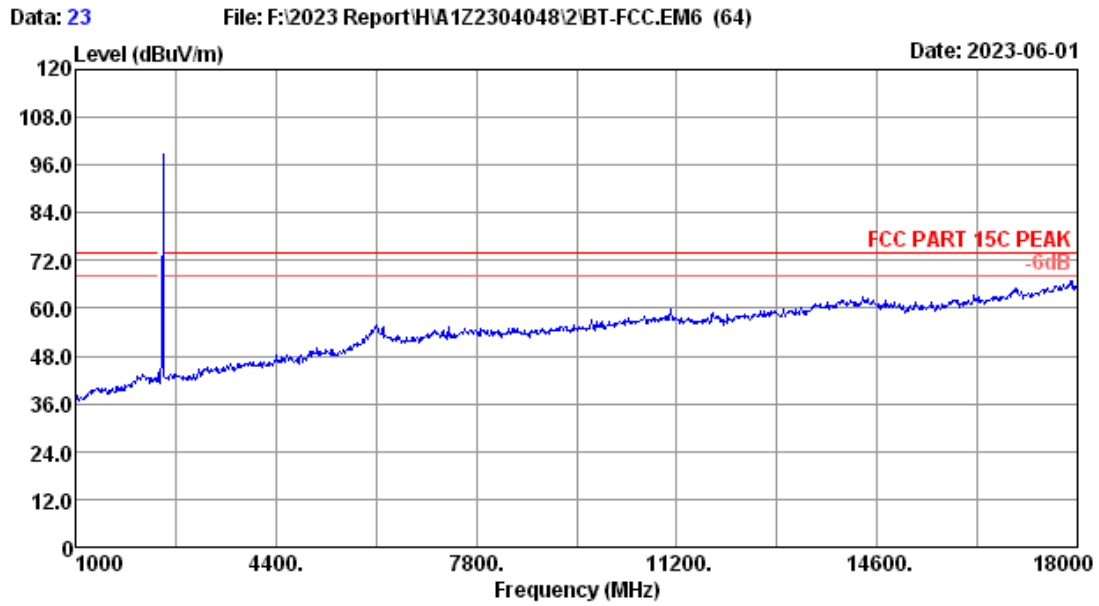
Site no.	: RF Chamber	Data no.	: 21
Dis. / Ant.	: 3m 2022 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Pressure	: 101.7kPa
Env. / Ins.	: 23.2°C/52.5%	Engineer	: nier
Power Rating	:		
Test Mode	: BT3.0 8DPSK 2480 MHz TX		
	:		



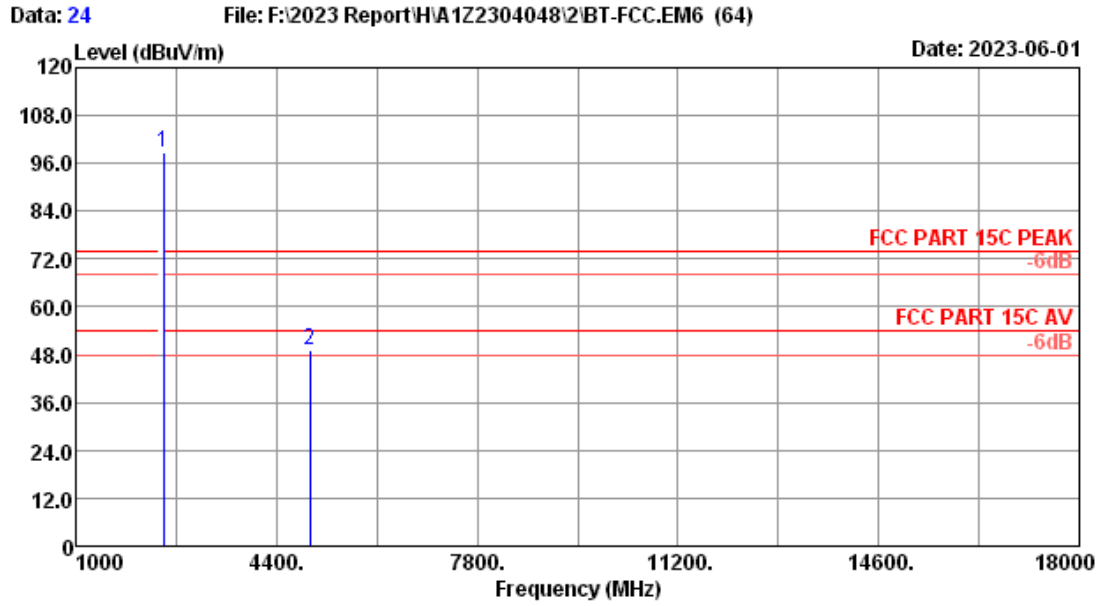
Site no. : RF Chamber Data no. : 22
 Dis. / Ant. : 3m 2022 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK Pressure : 101.7kPa
 Env. / Ins. : 23.2°C/52.5% Engineer : nier
 Power Rating :
 Test Mode : BT3.0 8DPSK 2480 MHz TX
 :

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	96.67	34.35	92.46	-----	-----	Peak
2	4960.00	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.	: 23
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	: BT3.0 8DPSK 2480 MHz TX		
	:		



Site no. : RF Chamber Data no. : 24
 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 : BT3.0 8DPSK 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	102.75	34.35	98.54	-----	-----	Peak
2	4960.00	32.03	3.39	47.56	33.69	49.29	74.00	24.71	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: DELL Wireless Headset		
M/N: HS2403		
Test date: 2023-05-09~11	Pressure: 102.1±1.0 kpa	Humidity: 52.2±3.0%
Tested by: lili	Test Site: RF site	Temperature: 23.3±0.6°C

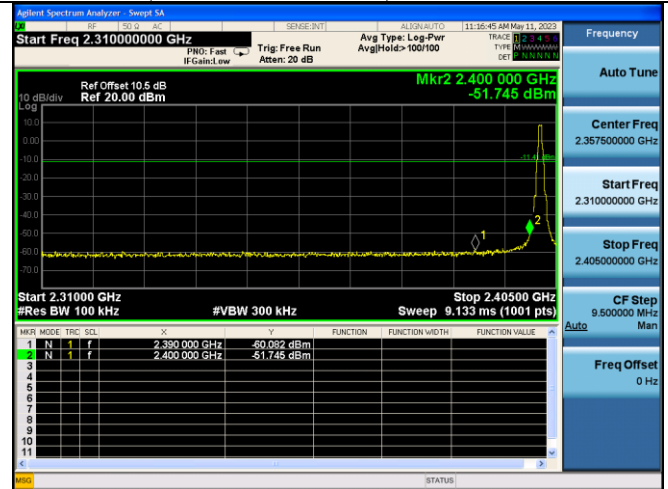
Hopping off

FSK

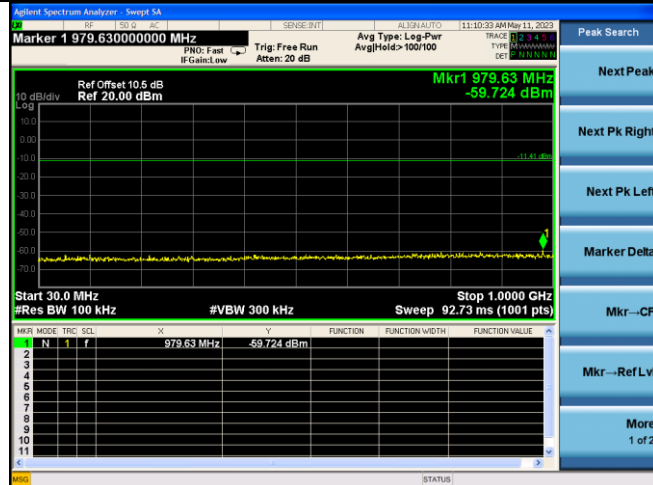
2402MHz



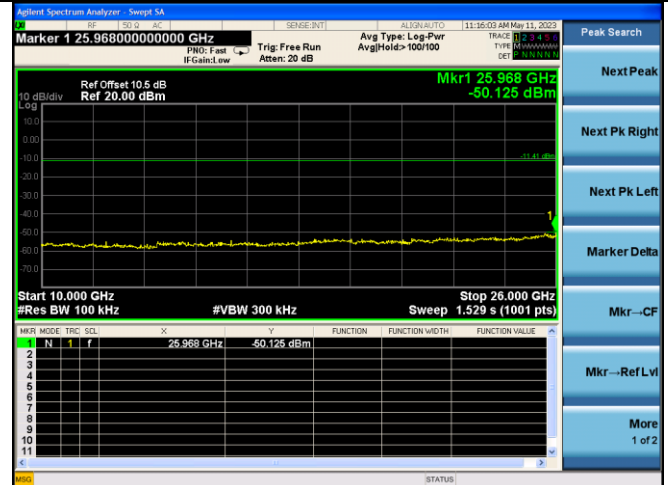
2402MHz(2.3GHz – 2.4GHz)



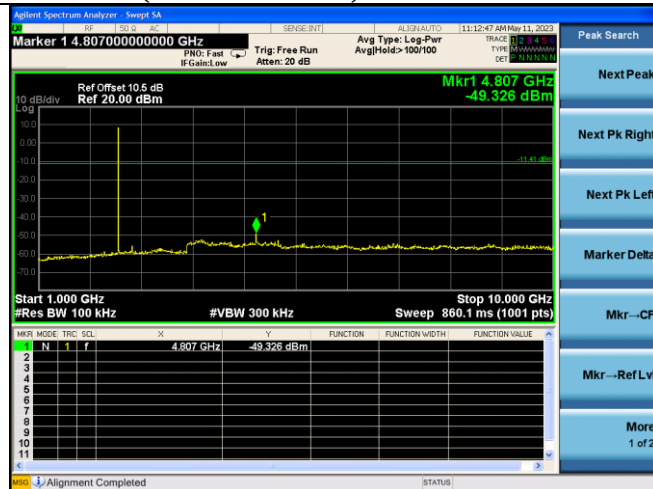
2402MHz(30MHz – 1GHz)



2402MHz(10GHz – 26GHz)



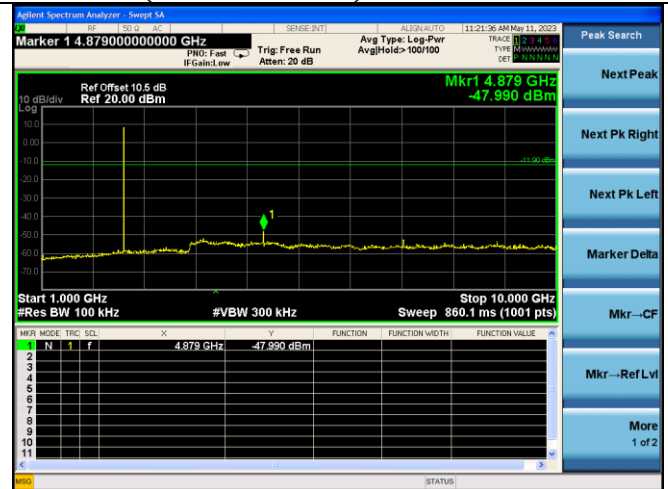
2402MHz(1GHz – 10GHz)



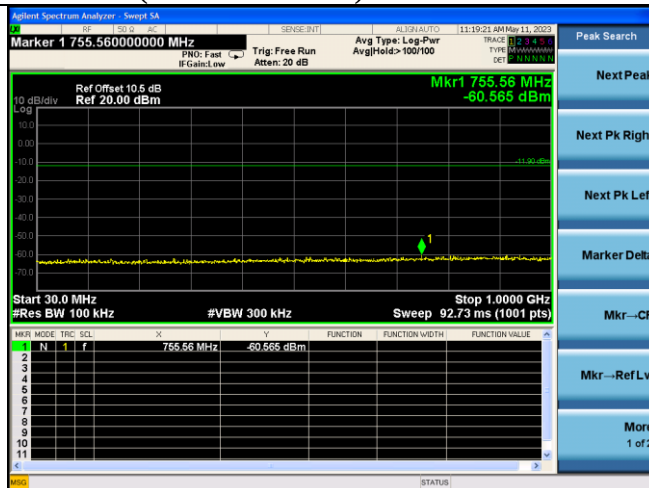
2441MHz



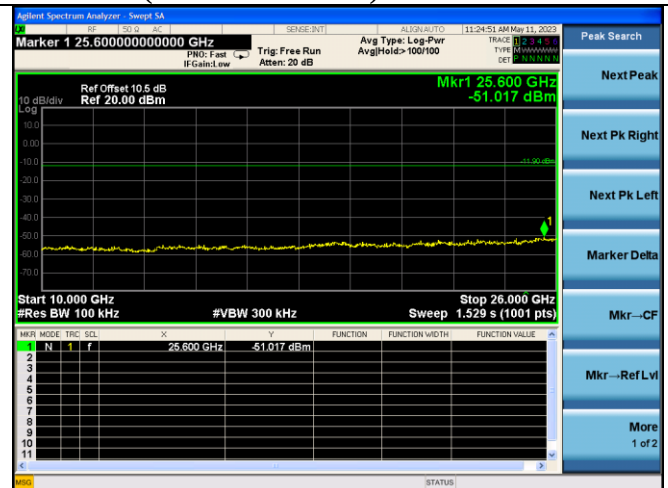
2441MHz(1GHz – 10GHz)



2441MHz(30MHz – 1GHz)



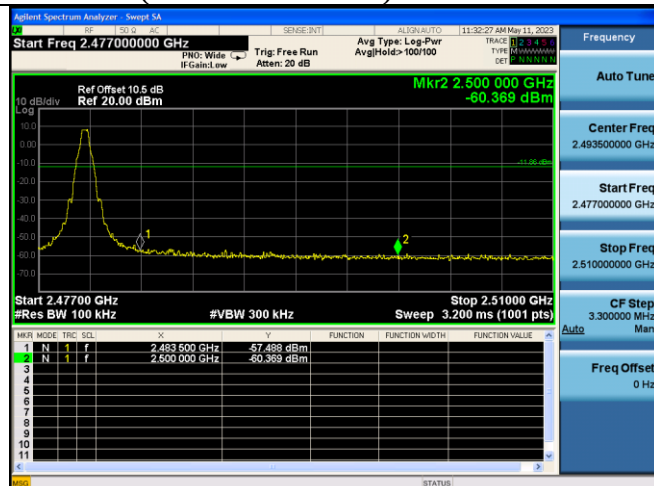
2441MHz(10GHz – 26GHz)



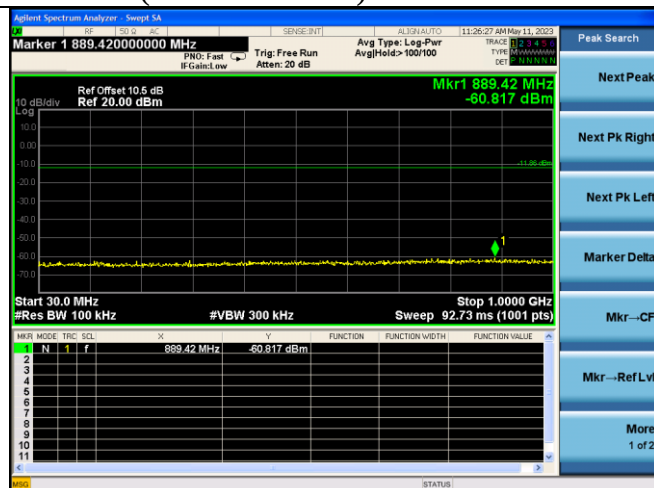
2480MHz



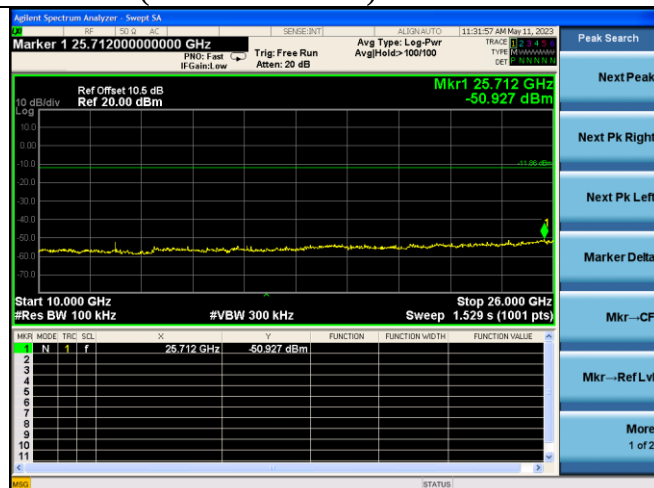
2480MHz(2.4GHz – 2.5GHz)



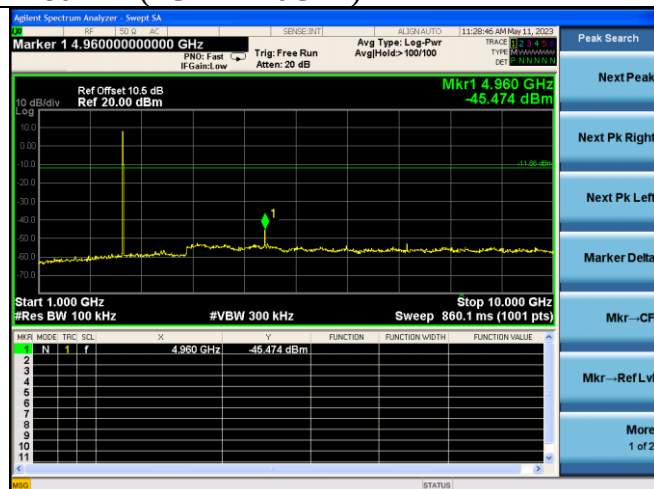
2480MHz(30MHz – 1GHz)



2480MHz(10GHz – 26GHz)

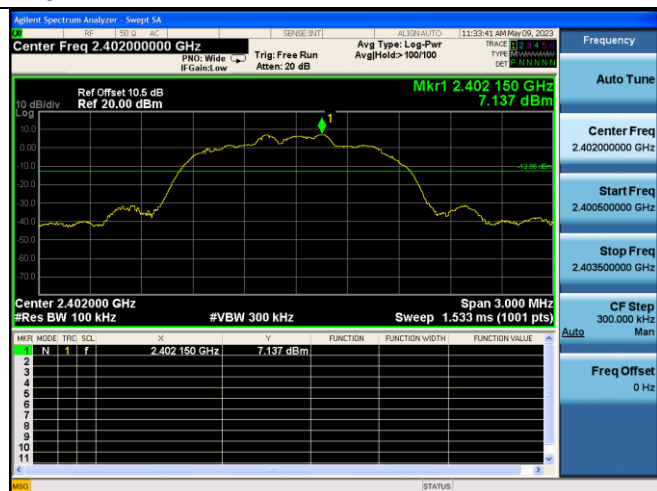


2480MHz(1GHz – 10GHz)

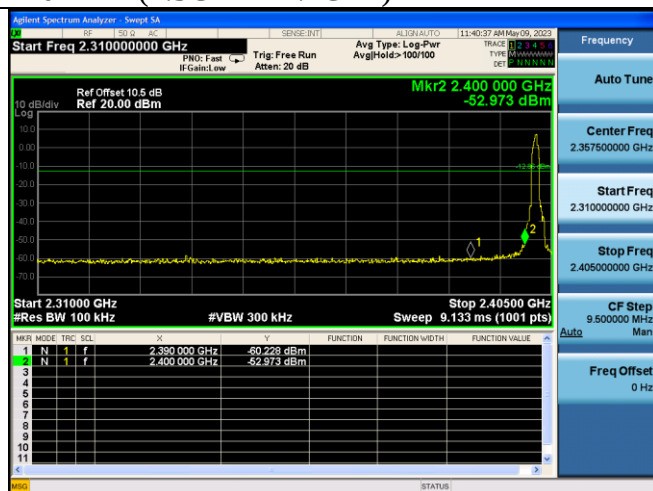


8-DPSK

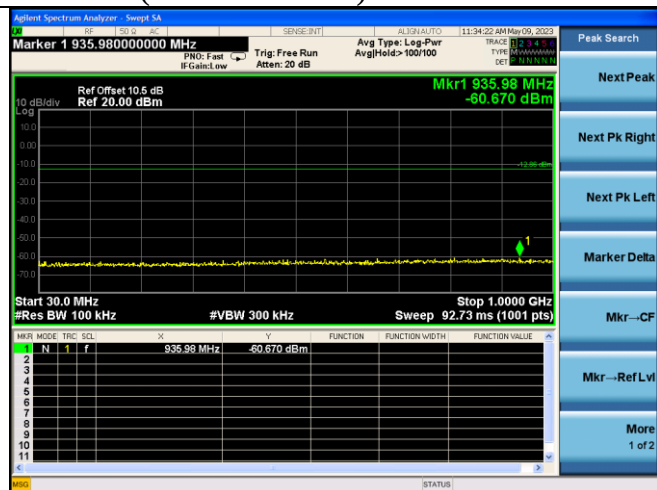
2402MHz



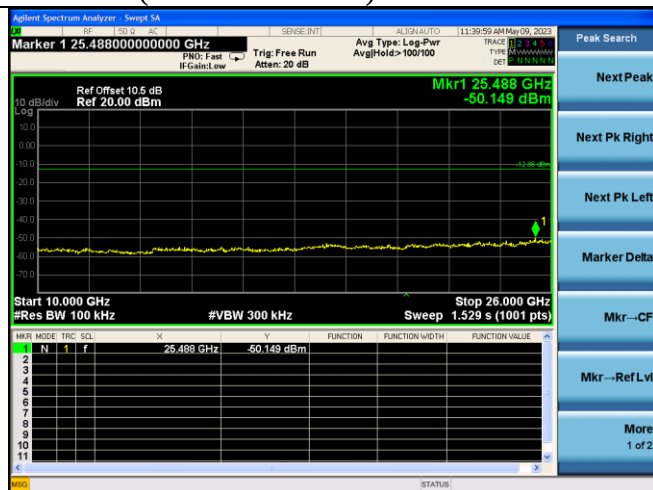
2402MHz(2.3GHz – 2.4GHz)



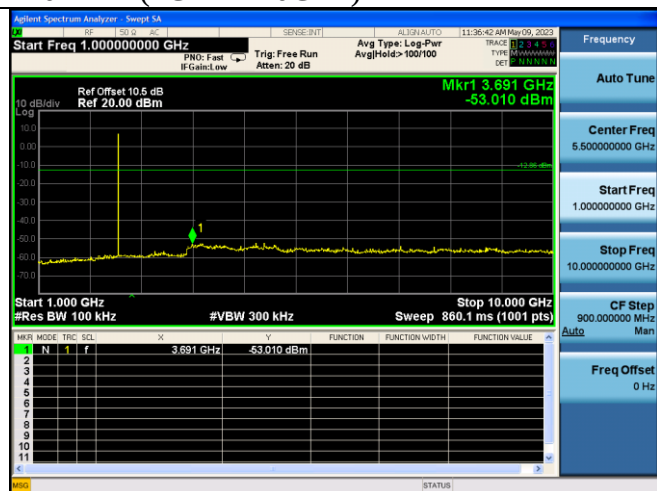
2402MHz(30MHz – 1GHz)



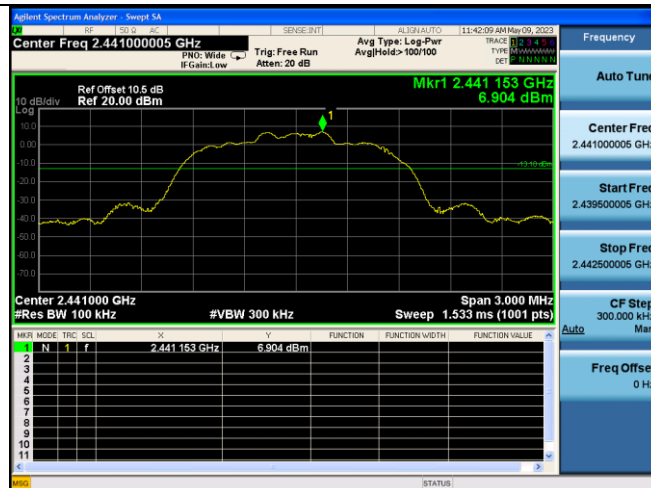
2402MHz(10GHz – 26GHz)



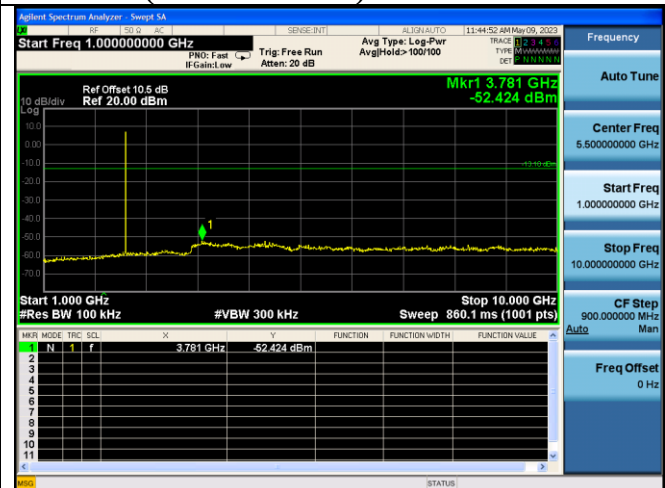
2402MHz(1GHz – 10GHz)



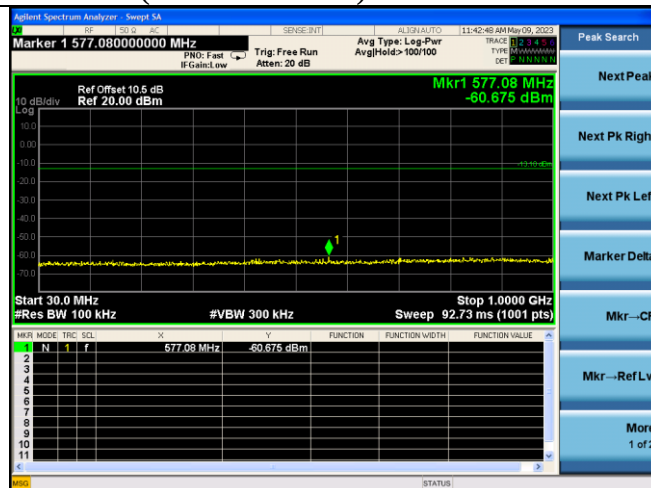
2441MHz



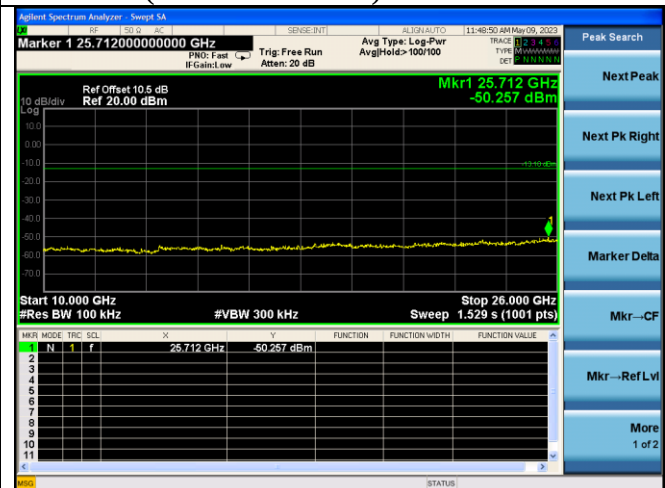
2441MHz(1GHz – 10GHz)



2441MHz(30MHz – 1GHz)



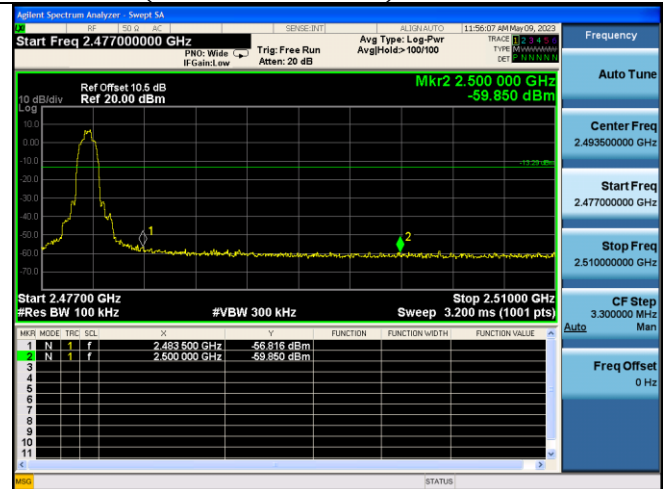
2441MHz(10GHz – 26GHz)



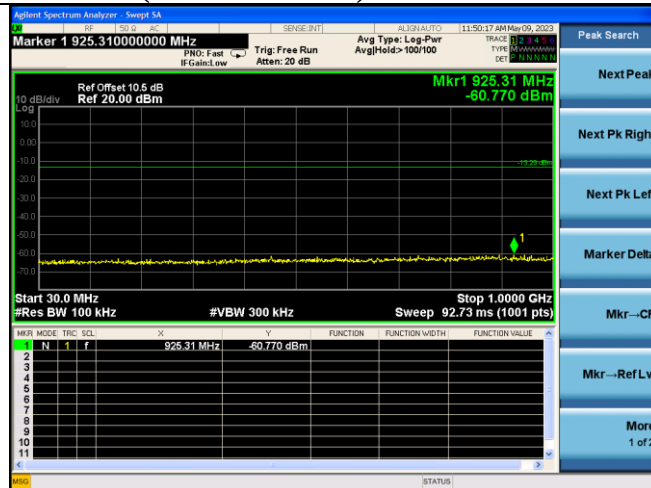
2480MHz



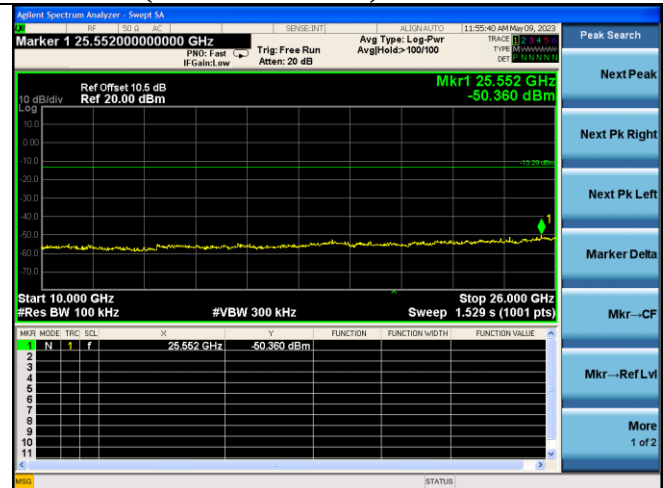
2480MHz(2.4GHz – 2.5GHz)



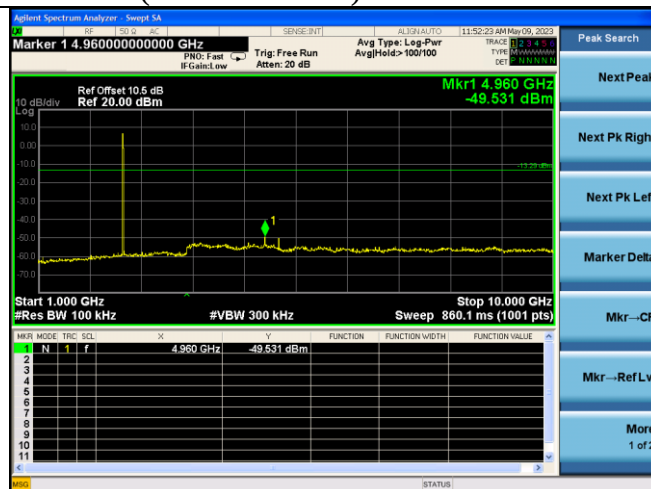
2480MHz(30MHz – 1GHz)



2480MHz(10GHz – 26GHz)

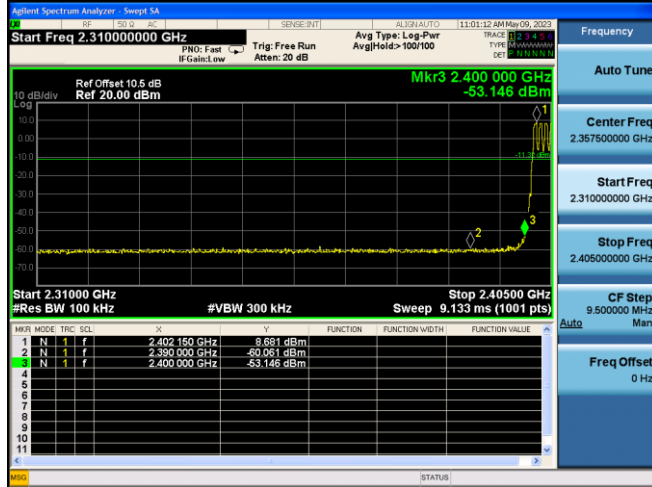


2480MHz(1GHz – 10GHz)

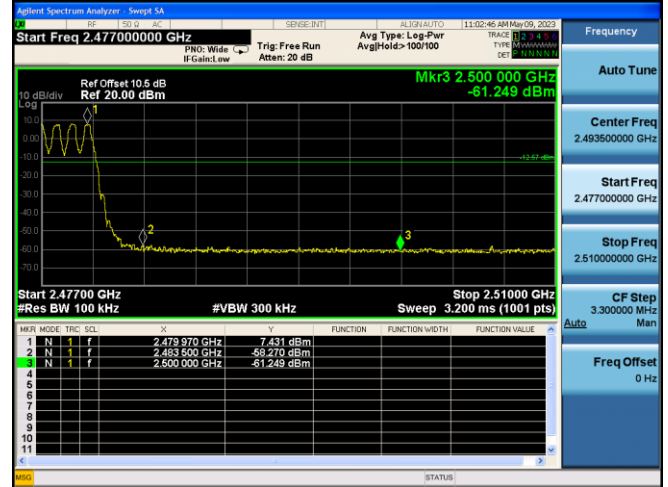


Hopping on

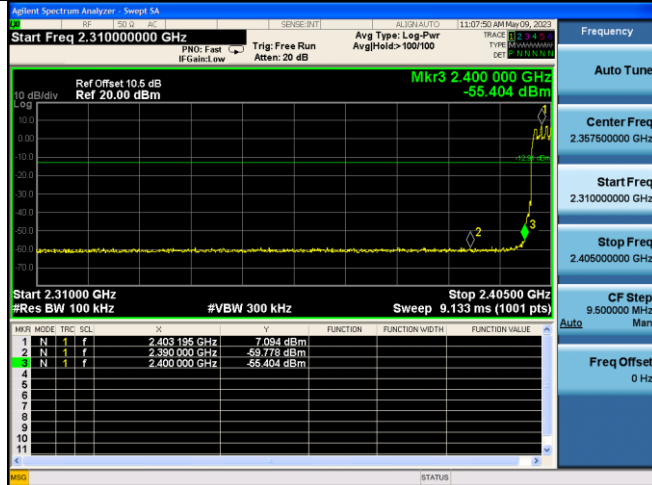
GFSK(2.3GHz – 2.4GHz)



GFSK(2.4GHz – 2.5GHz)



8-DPSK(2.3GHz – 2.4GHz)



8-DPSK(2.4GHz – 2.5GHz)

