

FCC PART 15C TEST REPORT FOR CERTIFICATION

On Behalf of

Amino Communications Ltd.

STB

H200W; H200zzzzzzzz

(zzzzzzzz can be combination of A-Z,a-z,0-9, “-” , “/” , “blank” for marketing purpose)

FCC ID: XVG500107APBT

amino

Prepared for : Amino Communications Ltd.

1010 Cambourne Business Park Cambourne, Cambridge CB23
6DP

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

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Date of Test : Jul.09~Aug.27, 2024

Date of Report : Oct.10, 2024

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Appendix A. Photograph of Test

Appendix B. Photo of the EUT

TEST REPORT

Applicant : Amino Communications Ltd.
Manufacturer : Amino Communications Ltd.
Product : STB
FCC ID : XVG500107APBT

(A) Model No. : H200W; H200zzzzzzzz
(zzzzzzzz can be combination of
A-Z,a-z,0-9,"-", "/", "blank" for marketing purpose)
(B) Brand : amino
(C) Test Voltage : DC 12V Adapter Input AC 120V/60Hz

Tested for comply with:
FCC CFR47 Part 15 Subpart C

Test procedure used:
ANSI C63.10:2020+Cor1:2023

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 : Jul.09~Aug.27, 2024 Date of Report: Oct.10, 2024

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

Approved & Authorized Signer :



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+Cor1:2023	PASS
Radiated Emission Test	FCC Part 15 15.209 FCC Part 15 15.205 FCC Part 15 15.247(d) ANSI C63.10:2020+Cor1:2023	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+Cor1:2023	PASS
20dB & 99% Bandwidth Test	FCC Part 15: 15.215 ANSI C63.10:2020+Cor1:2023	PASS
Number Of Hopping Frequency Test	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.10:2020+Cor1:2023	PASS
Dwell Time Test	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.10:2020+Cor1:2023	PASS
Maximum Peak Output Power Test	FCC Part 15 15.247(b)(1) ANSI C63.10:2020+Cor1:2023	PASS
Band Edge Compliance Test	FCC Part 15 15.247(d) ANSI C63.10:2020+Cor1:2023	PASS
Antenna requirement	FCC Part 15: 15.203	PASS
Note: Measurement uncertainty affection to the result is not considered, the EUT is technically compliant with standard requirements.		

2. GENERAL INFORMATION

2.1. Description of Equipment Under Test

Applicant	Amino Communications Ltd.
Applicant Address	1010 Cambourne Business Park Cambourne, Cambridge CB23 6DP
Manufacturer	Amino Communications Ltd.
Manufacturer Address	1010 Cambourne Business Park Cambourne, Cambridge CB23 6DP
Product	STB
Model No.	H200W; H200zzzzzzzz (zzzzzzzz can be combination of A-Z,a-z,0-9,“-”,“/”,“blank”for marketing purpose)
Test Model	H200W
Brand	amino
FCC ID	XVG500107APBT
Sample Type	Prototype production
Date of Receipt	Jun.24, 2024
Date of Test	Jul.09~Aug.27, 2024
Remark: This report only for BDR+EDR.	

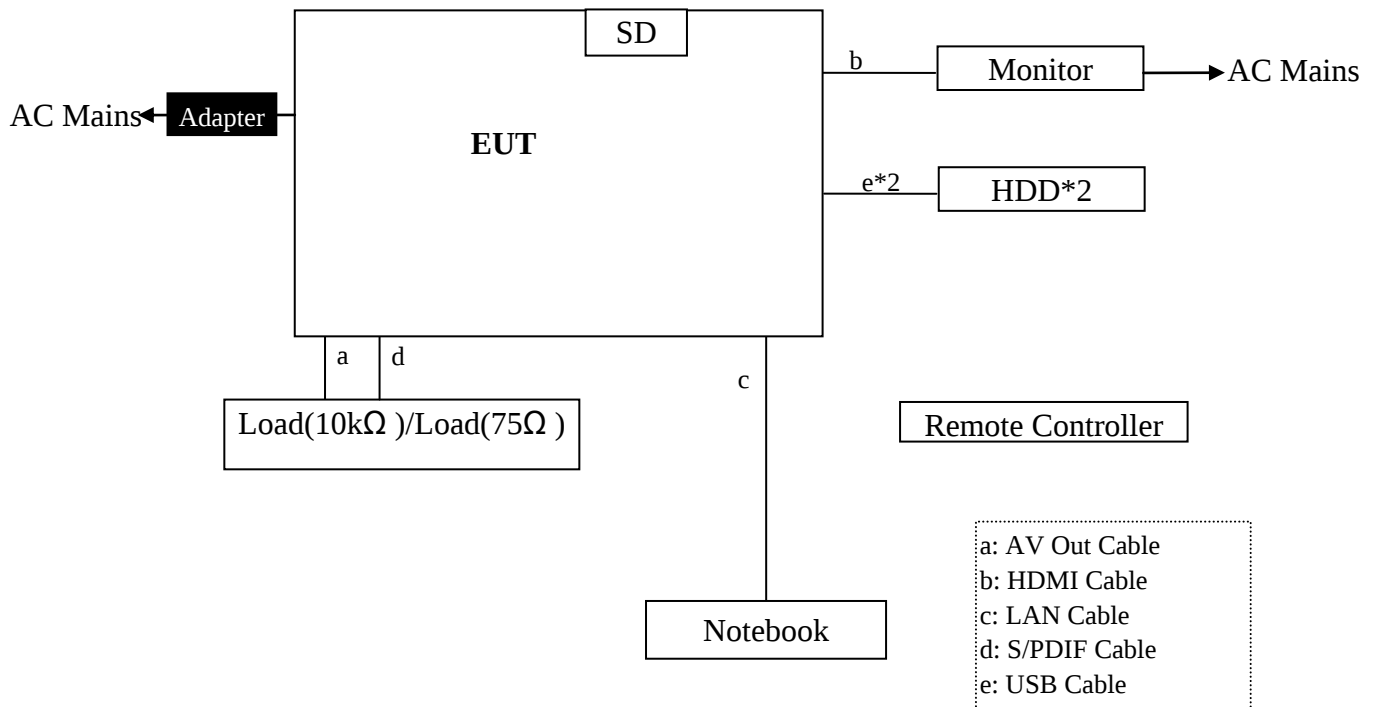
2.2. Feature of Equipment Under Test

Product Feature & Specification		
Product	STB	
Model No.	H200W	
Power Source	☒ Commercial Power	AC 100-240V,50/60Hz ,0.5A
	☒ External Power Source	DC 12V 1A
	☐ Lithium battery	DC V, mAh
	☐ 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	
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	
Frequency Range	5180-5240MHz, 5500-5700MHz, 5260-5320MHz, 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	5MHz	
Antenna System		
Type of Antenna	Dipole Antenna	
Antenna Number	2 (ANT 0 and ANT 1)	
Operation Modes	SISO and MIMO mode supported	
Antenna Peak Gain	Bluetooth Peak Gain: 3dBi. WIFI 2.4G Band Peak Gain: Ant0:3dBi; Ant1:3.3dBi U-NII-1 Band Peak Gain: Ant0:3.1dBi; Ant1:2.8dBi U-NII-2A Band Peak Gain: Ant0:3.2dBi; Ant1:3.2dBi U-NII-2CBand Peak Gain: Ant0:3.4dBi; Ant1:3.4dBi U-NII-3 Band Peak Gain: Ant0:3dBi; Ant1:3dBi	

2.3. Tested Supporting System Details

No.	Description	ACS No.	Manufacturer	Model	Serial Number
1.	Monitor	---	BenQ	EW3270-T	---
		Power Cord: Unshielded, Detachable, 1.8m			
2.	---	AV Cable: Unshielded, Detachable, 1.5m			
3.	---	S/PDIF Cable: Unshielded, Detachable, 1.5m			
4.	SD Card: aigo / 2G				
5.	Notebook	N/A	ACER	ZOW	N/A
		Power Cord(3C): Unshielded, Detachable, 1.8m			
		Power Adapter: Manufacturer: Lite-On, M/N: PA-1900-32			
		Data Cable: Shielded, Undetectable, 4.0m(Bond one ferrite core)			
6.	HDD#1	ACS-EMC-HDD42	WD	WD Elements	WXA1A7396898
		Data Cable: Shielded, Detachable, 0.4m			
7.	HDD#2	ACS-EMC-HDD43	WD	WD Elements	WX31E63TU717
		Data Cable: Shielded, Detachable, 0.4m			

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



for the other test items:



(EUT: STB)

2.5.Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	1# Shielding Room(SE)	AUDIX	N/A	N/A	Nov.09,22	3 Year
2.	3m Chamber(NSA)	AUDIX	N/A	N/A	Aug.11,22	3Year
3.	3m Chamber(SE)	AUDIX	N/A	N/A	Sep.16,22	3 Year
4.	EMI Test Receiver	Rohde & Schwarz	ESCI	100842	Mar.16,24	1 Year
5.	Signal Analyzer	Rohde & Schwarz	FSV40	101608	Nov.07,23	1 Year
6.	L.I.S.N.#1	Rohde & Schwarz	ENV216	102160	Jun.19,24	1 Year
7.	RF Cable	Eastsheep	RG223	190424	Sep.15,23	1Year
8.	Tri-log-Broadband Antenna	SCHWARZBECK	VULB 9168	429	Oct.10,23	1 Year
9.	NSA Cable	HUBER+SUHNER	CFD400NL-LW	No.3+190411	Sep.20,23	1 Year
10.	Coaxial Switch	Anritsu	MP59B	6201397223	Mar.17,24	1 Year
11.	RF Cable	TIMES MICROWAVE	SFT205-NMSM-10.00M	689241	Aug.25,23	1 Year
12.	RF Cable	TIMES MICROWAVE	SFT205-NMSM-10.00M	689241	Aug.13,24	1 Year
13.	EMI Test Receiver	Rohde & Schwarz	ESR3	101931	Mar.17,24	1 Year
14.	Amplifier	EMCI	EMC0518A45SE	980965	Aug.25,23	1 Year
15.	Amplifier	EMCI	EMC0518A45SE	980965	Aug.13,24	1 Year
16.	Amplifier	KEYSIGHT	83017A	39500711	Mar.16,24	1 Year
17.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Mar.16,24	1 Year
18.	RF Cable	HUBER+SUHNER	SUCOFLEX-106	190423	Mar.16,24	1 Year
19.	Attenuator(10dB)	eastsheep	2W-SMA-JK-6G-10dB	No. 4	Sep.19,23	1 Year
20.	Signal Analyzer	Rohde & Schwarz	FSV30	104050	Mar.17,24	1 Year
21.	Horn Antenna	ETC	MCTD 1209	DRH15F03006	Aug.23,23	1 Year
22.	Horn Antenna	ETC	MCTD 1209	DRH15F03006	Sep.08,24	1 Year

Note: N/A means Not applicable.

2.6. Test information

A special software (adb) 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	7.264	6.993
	DH3		
	DH5		
8-DPSK	3-DH1	8.827	8.363
	3-DH3		
	3-DH5		

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	Hopping Channel
		8-DPSK	3Mbps	Hopping Channel
	Time of Occupancy	GFSK	1Mbps	Hopping Channel
		8-DPSK	3Mbps	Hopping Channel
	Number of Hopping Channels	GFSK	1Mbps	Hopping Channel
		8-DPSK	3Mbps	Hopping Channel
	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

2.7. 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, 2025

: Accredited by NVLAP, USA
NVLAP Code: 200372-0
Valid Date: Mar.31, 2025

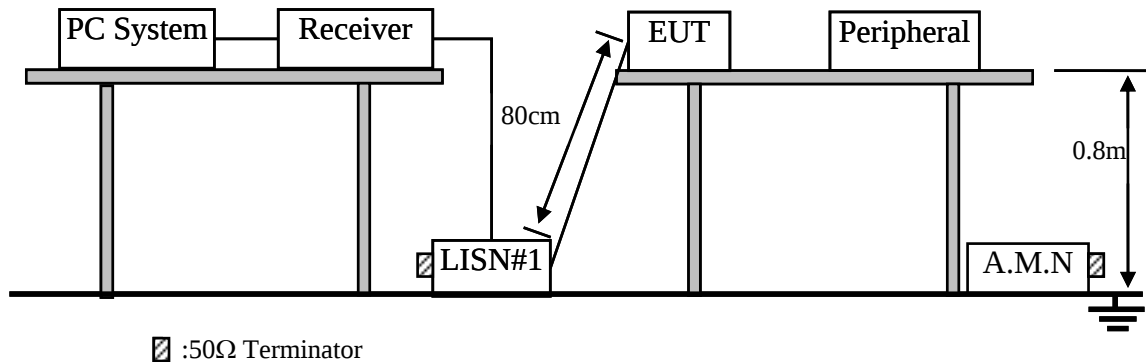
: Certificated by FCC, USA
Designation No: CN5022
Valid Date: Mar.31, 2025

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

Test Item	Uncertainty
Uncertainty for Conduction emission test in No. 1 Conduction	2.6dB (150kHz to 30MHz)
Uncertainty for Radiation Emission test in 3m chamber	$\pm 3.8\text{dB}(30\sim 200\text{MHz}, \text{Polarization: H})$
	$\pm 3.8\text{dB}(30\sim 200\text{MHz}, \text{Polarization: V})$
	$\pm 4.0\text{dB}(200\text{M}\sim 1\text{GHz}, \text{Polarization: H})$
	$\pm 4.0\text{dB}(200\text{M}\sim 1\text{GHz}, \text{Polarization: V})$
Uncertainty for Radiation Emission test in 3m chamber(1GHz-25GHz)	$\pm 4.0\text{dB}(1\sim 6\text{GHz}, \text{Distance: 3m})$
	$\pm 4.0\text{dB}(6\sim 25\text{GHz}, \text{Distance: 3m})$
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	$\pm 83\text{kHz}$
Uncertainty for DC power test	$\pm 1\%$
Uncertainty for test site temperature and humidity	$\pm 0.6^{\circ}\text{C}$
	$\pm 3\%$

3. POWER LINE CONDUCTED EMISSION TEST

3.1. Block Diagram of Test Setup



3.2. 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)

3.3. 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.

3.3.1. STB (EUT)

Model No. : H200W

Serial No. : N/A

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

3.4.Operating Condition of EUT

- 3.4.1. Setup the EUT as shown as Section 3.1.
- 3.4.2. Turn on the power of EUT.
- 3.4.3. PC run test software to control EUT work in Tx mode.

3.5.Test Procedure

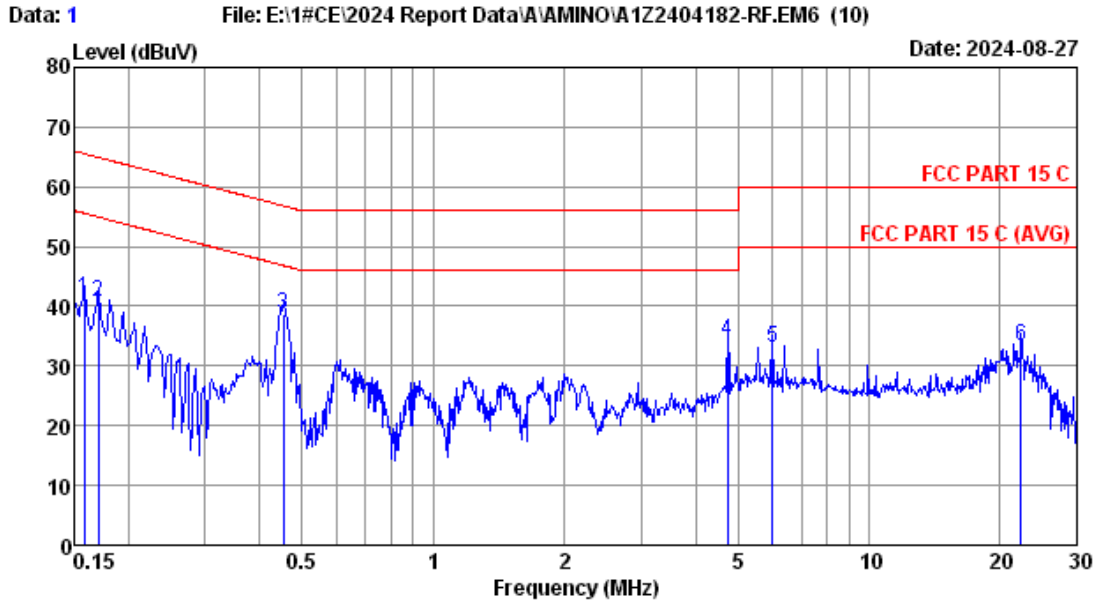
The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power Via Adapter unit connected to the power mains through a line impedance stabilization network (L.I.S.N. #1). This provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and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

3.6.Power Line Conducted Emission Test Results

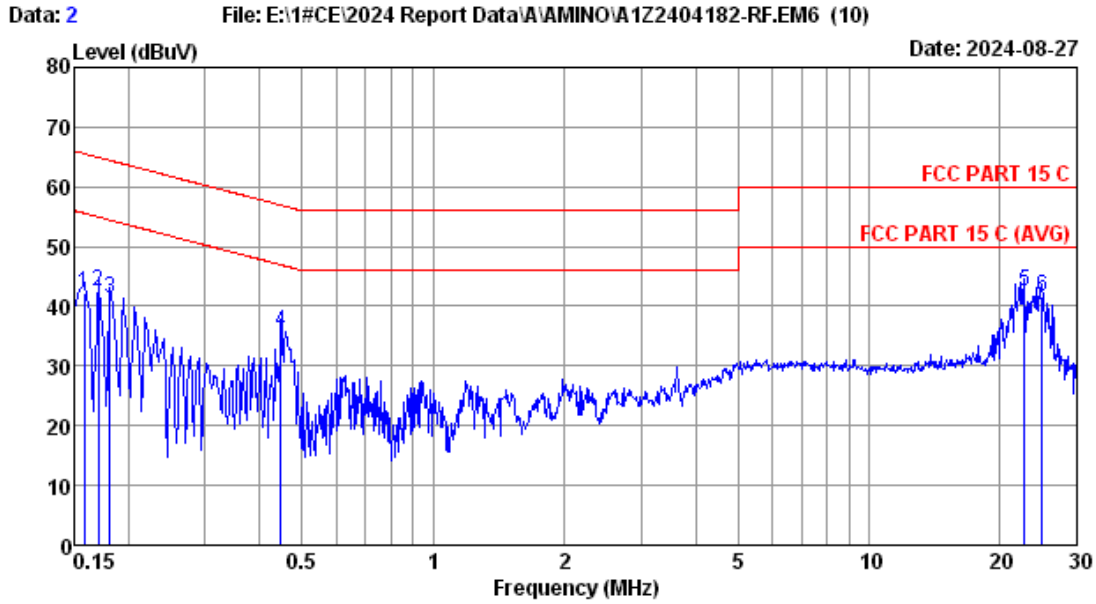
PASS. (All emissions not reported below are too low against the prescribed limits.)



Site no :1# CE Data No :1
 Dis./Lisn :2024 ENV216-N
 Limit :FCC PART 15 C
 Env./Ins. :22.1°C/59% Engineer :Hongjie
 Power Rating :
 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	9.76	0.01	31.56	41.33	65.56	24.23	QP
2	0.170	9.77	0.01	30.89	40.67	64.94	24.27	QP
3	0.454	9.78	0.02	28.95	38.75	56.80	18.05	QP
4	4.746	9.83	0.06	24.45	34.34	56.00	21.66	QP
5	5.993	9.84	0.06	23.22	33.12	60.00	26.88	QP
6	22.298	9.91	0.13	23.25	33.29	60.00	26.71	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 :2024 ENV216-L
 Limit :FCC PART 15 C
 Env./Ins. :22.1°C/59% Engineer :Hongjie
 Power Rating :
 Test Mode :BT3.0 TX Mode

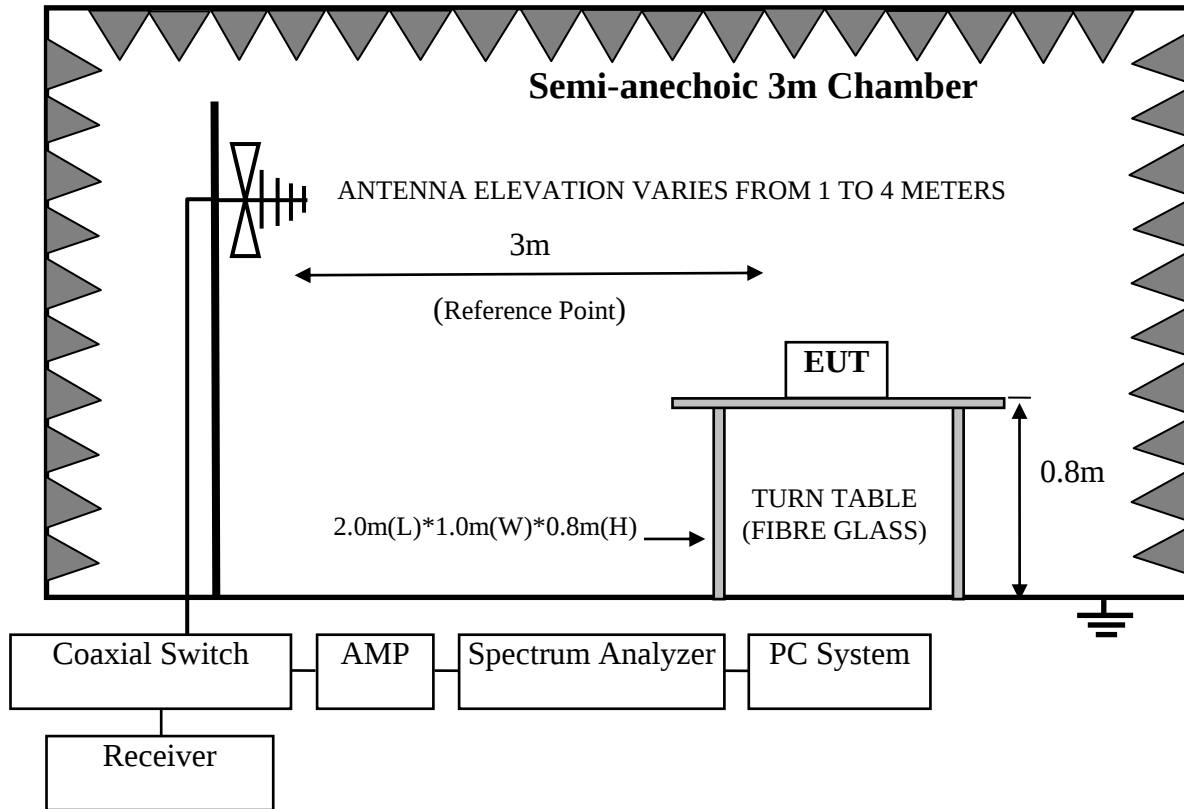
No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.158	9.77	0.01	32.34	42.12	65.56	23.44	QP
2	0.170	9.77	0.01	32.63	42.41	64.94	22.53	QP
3	0.182	9.76	0.01	31.44	41.21	64.42	23.21	QP
4	0.447	9.76	0.02	25.97	35.75	56.93	21.18	QP
5	22.775	9.88	0.13	32.65	42.66	60.00	17.34	QP
6	24.922	9.88	0.14	31.72	41.74	60.00	18.26	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.

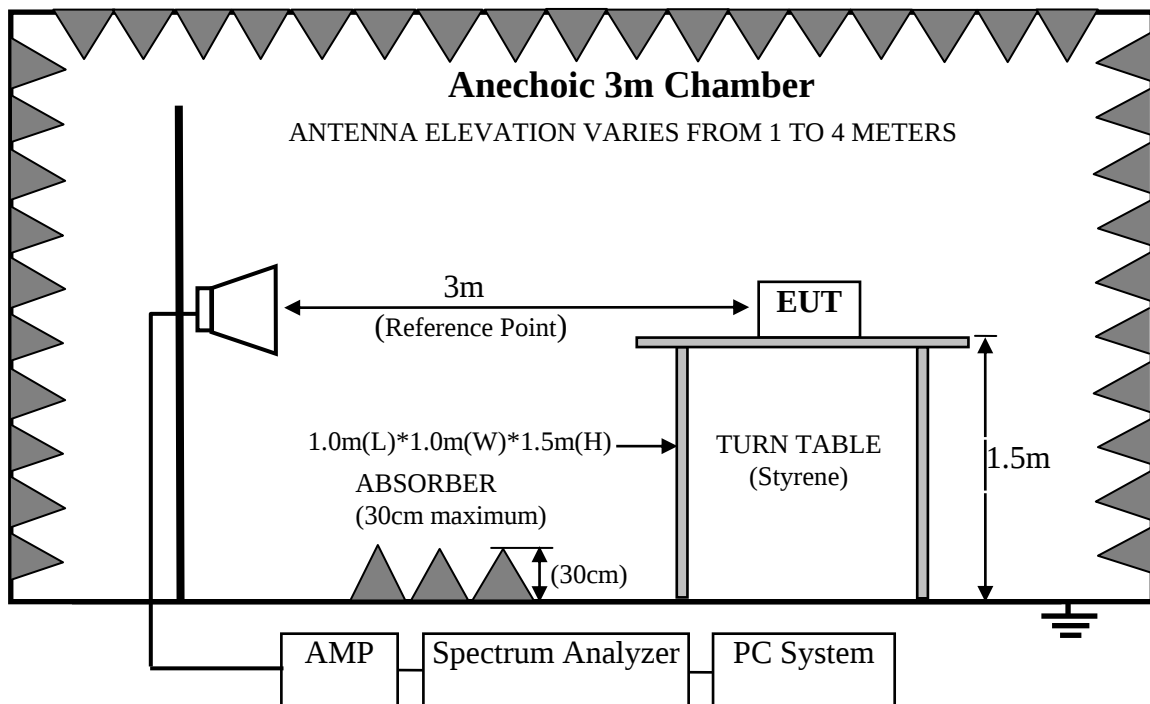
4. RADIATED EMISSION TEST

4.1. Block Diagram of Test Setup

For frequency range 30MHz-1000MHz



For frequency range above 1GHz



4.2. 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.

4.3. 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.

4.3.1. STB (EUT)

Model Number : H200W
Serial Number : N/A

4.4. Operating Condition of EUT

- 4.4.1. Setup the EUT and simulator as shown as Section 4.1.
- 4.4.2. Turn on the power of all equipments.
- 4.4.3. Let EUT work in Tx mode.

4.5. 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+Cor1:2023 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+Cor1:2023 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.

4.6. Radiated Emission Test Results

PASS.

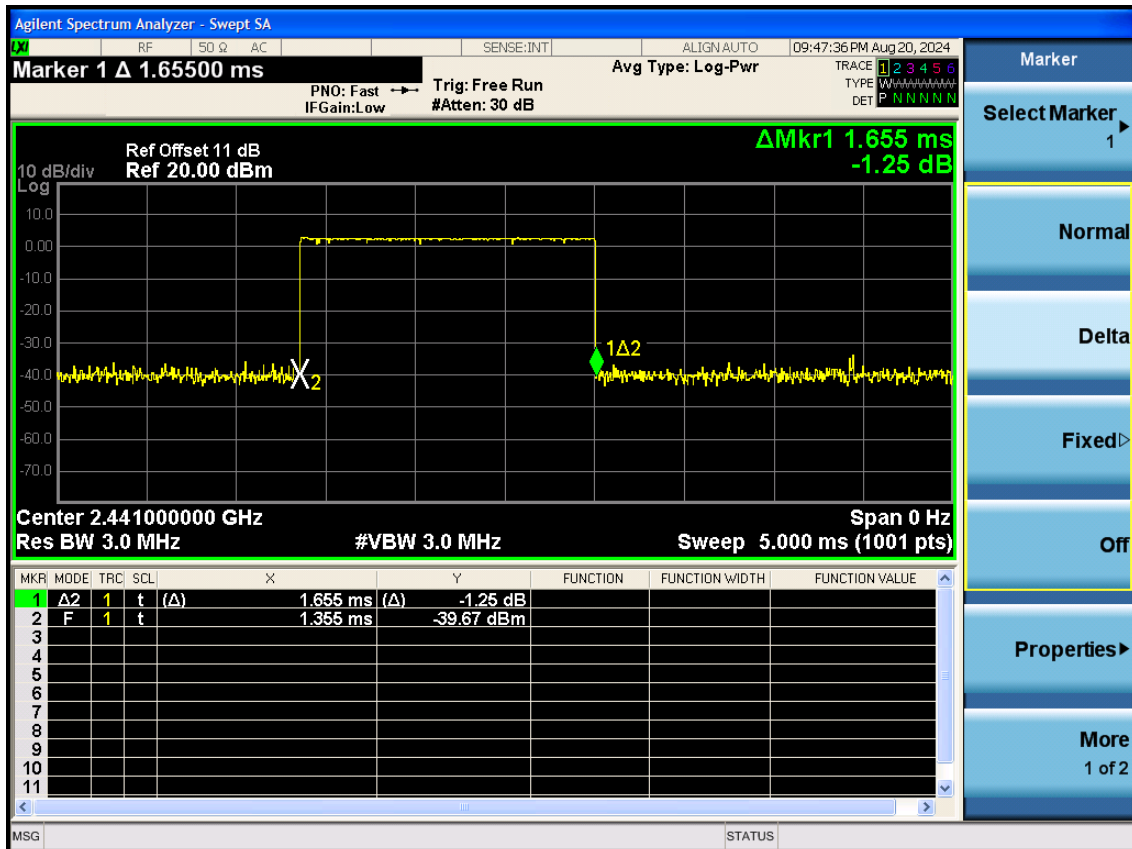
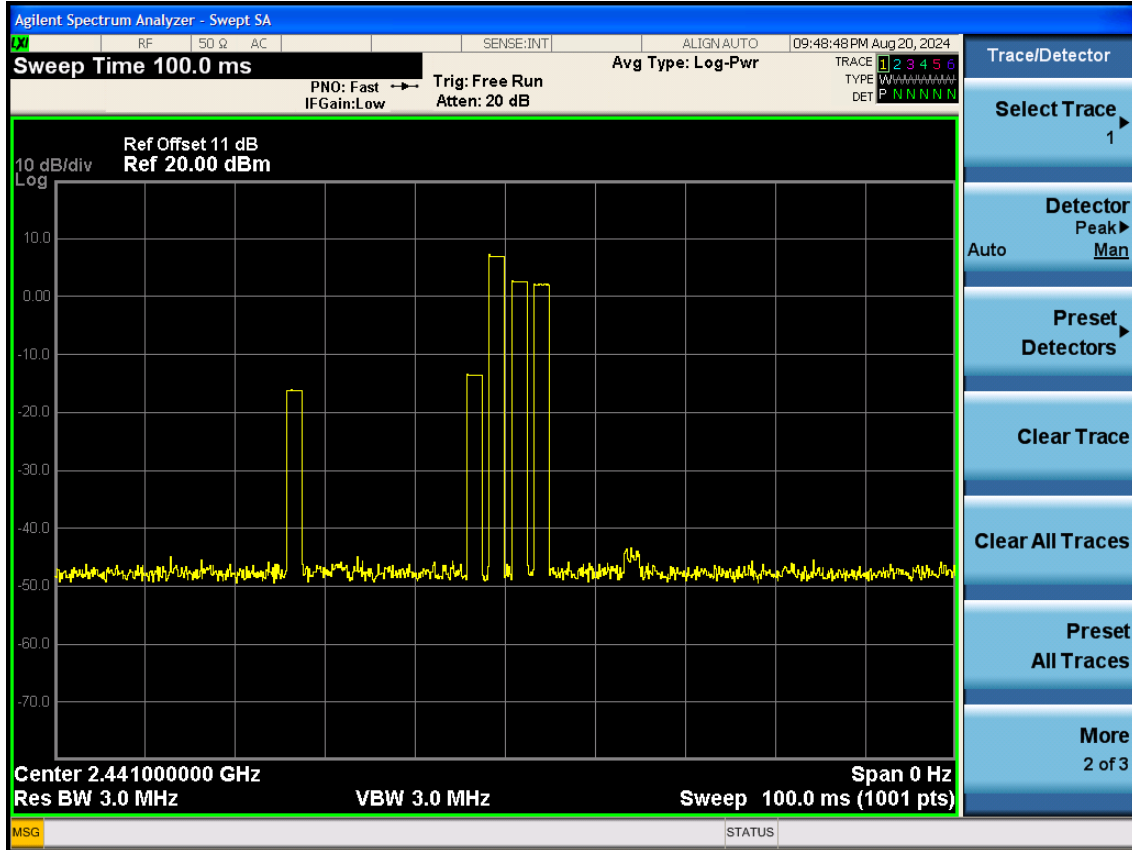
All the emissions from 30MHz to 25GHz were comply with the 15.209 Limit.

Note 1: The duty cycle factor for calculate average level is -21.645dB, 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.

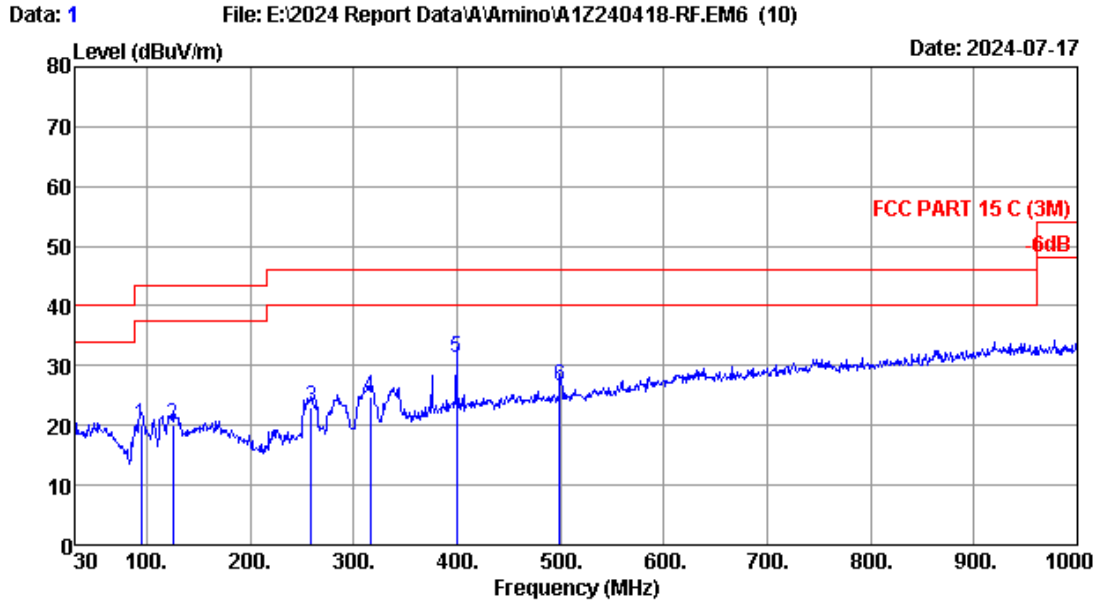
Note 2: The emissions (9kHz~30MHz) not reported for there is no emission be found.

Duty cycle factor = $20\log(\text{Dwell time}/100\text{ms}) = -21.645\text{dB}$

Dwell Time = $1.655 \times 5\text{ms}$



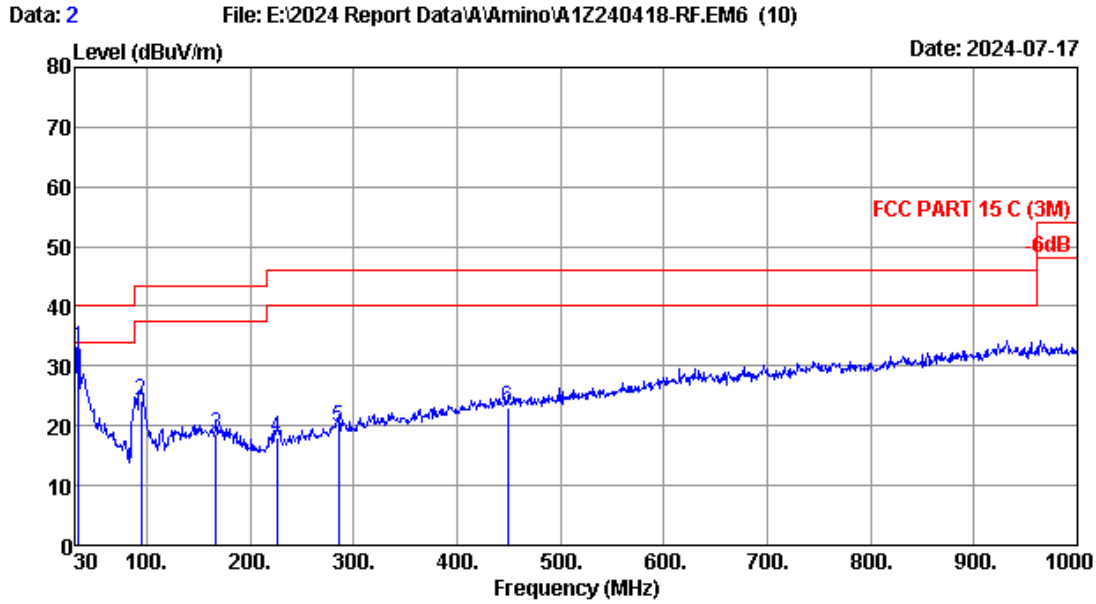
Frequency: 30MHz~1GHz



Site no. : 3m Chamber Data no. : 1
 Dis. / Ant. : 3m 2023 VULB 9168-429 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 26.8°C/57% Engineer : Abel
 EUT :
 Power rating : AC 120V/60Hz
 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	94.020	14.40	0.84	4.93	20.17	43.50	23.33	QP
2	125.060	17.71	0.94	1.48	20.13	43.50	23.37	QP
3	258.920	18.00	1.34	3.58	22.92	46.00	23.08	QP
4	316.150	19.92	1.45	3.56	24.93	46.00	21.07	QP
5	399.570	21.49	1.63	8.08	31.20	46.00	14.80	QP
6	499.480	23.69	1.83	0.98	26.50	46.00	19.50	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 2023 VULB 9168-429 Ant. pol. : VERTICAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 26.8°C/57% Engineer : Abel
 EUT :
 Power rating : AC 120V/60Hz
 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	33.880	18.90	0.52	13.51	32.93	40.00	7.07	QP
2	94.020	14.40	0.84	8.91	24.15	43.50	19.35	QP
3	166.770	18.90	1.06	-1.41	18.55	43.50	24.95	QP
4	225.940	15.91	1.27	0.82	18.00	46.00	28.00	QP
5	285.110	19.10	1.39	-0.61	19.88	46.00	26.12	QP
6	449.040	23.16	1.73	-1.80	23.09	46.00	22.91	QP

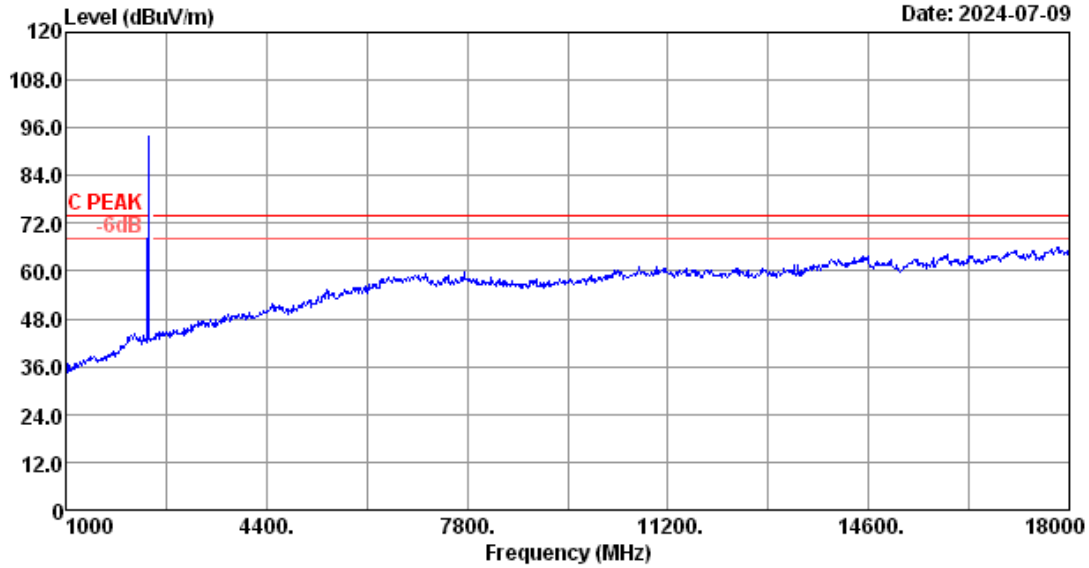
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

Frequency: 1GHz~18GHz

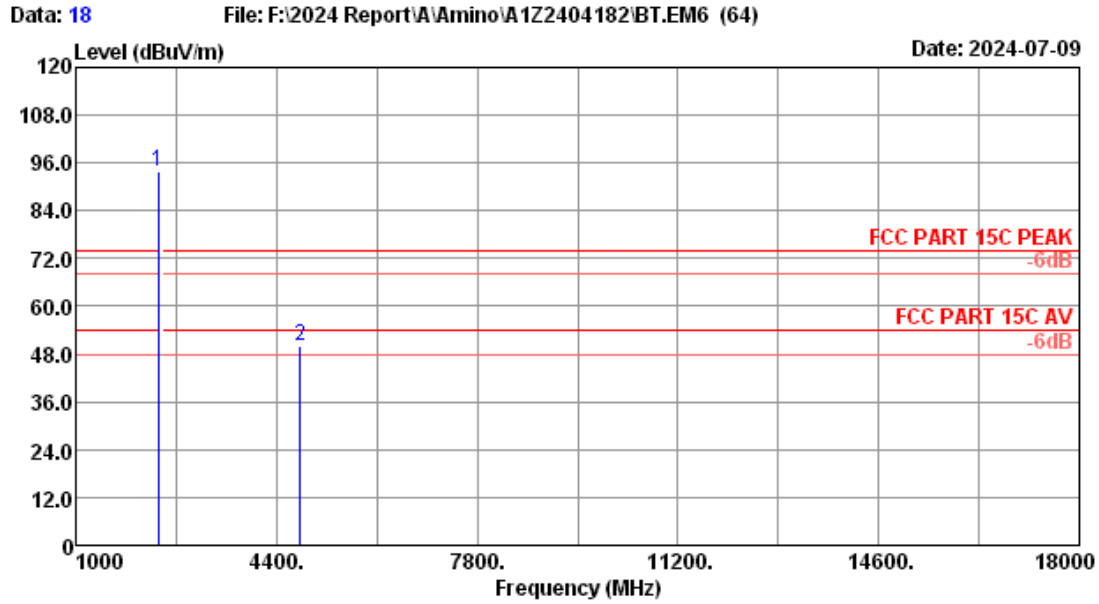
Data: 52

File: F:\2024 Report\A\Amino\A1Z2404182\BT.EM6 (64)

Date: 2024-07-09



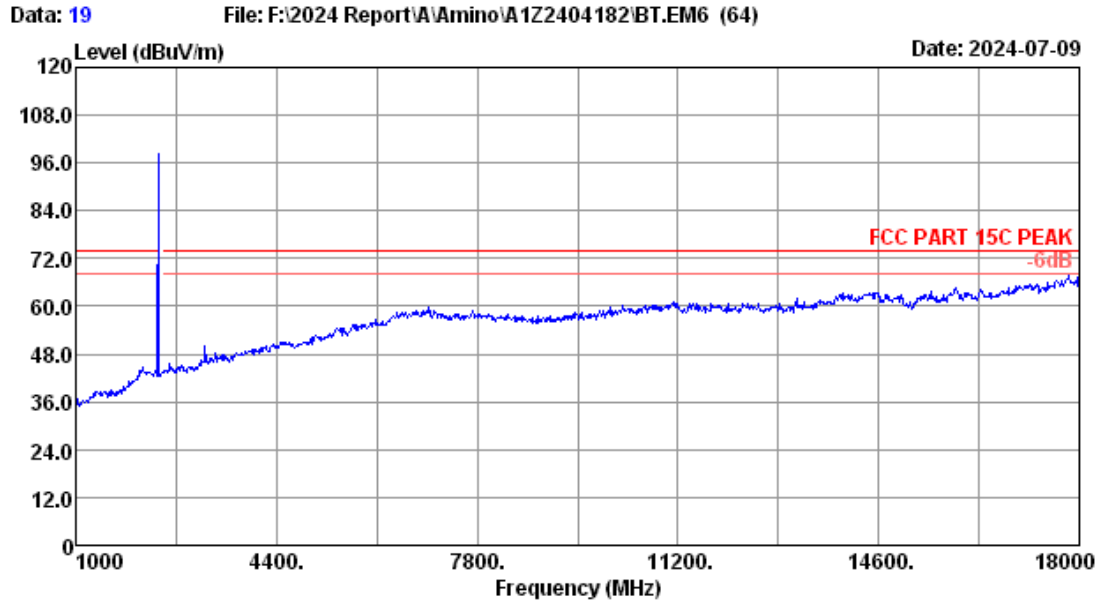
Site no.	: 3m Chamber	Data no.	: 52
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.5°C/53.1%	Engineer	: WINTER
Test Mode	: BT3.0 GFSK 2402MHz TX Mode		



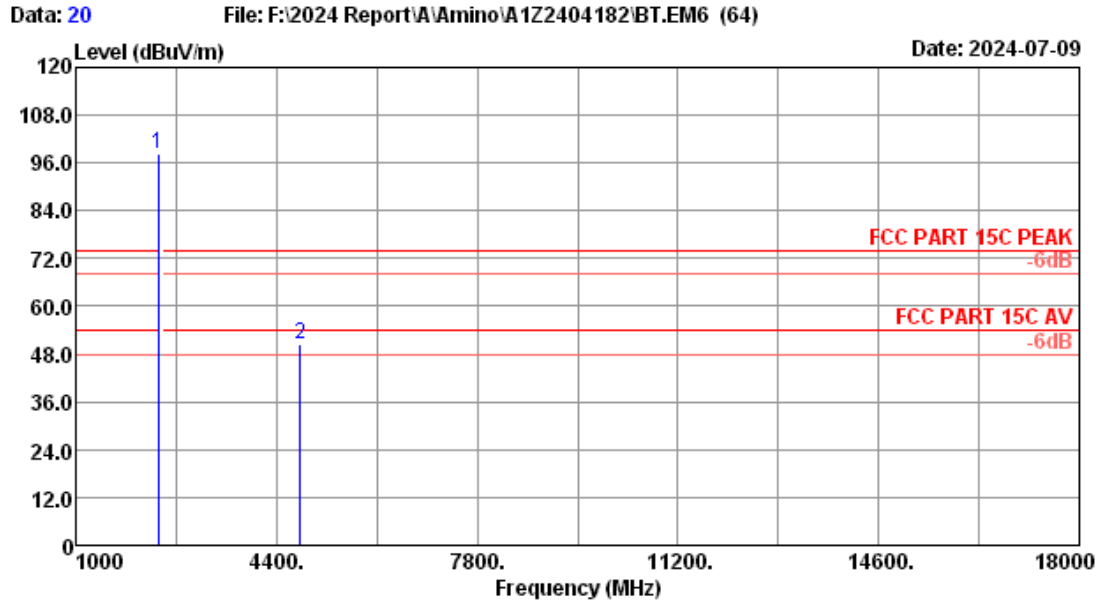
Site no. : 3m Chamber Data no. : 18
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.5°C/53.1% Engineer : WINTER
 Test Mode : BT3.0 GFSK 2402MHz TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.61	5.32	93.08	32.22	93.79	-----	-----	Peak
2	4804.00	31.20	7.41	42.62	31.08	50.15	74.00	23.85	Peak

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



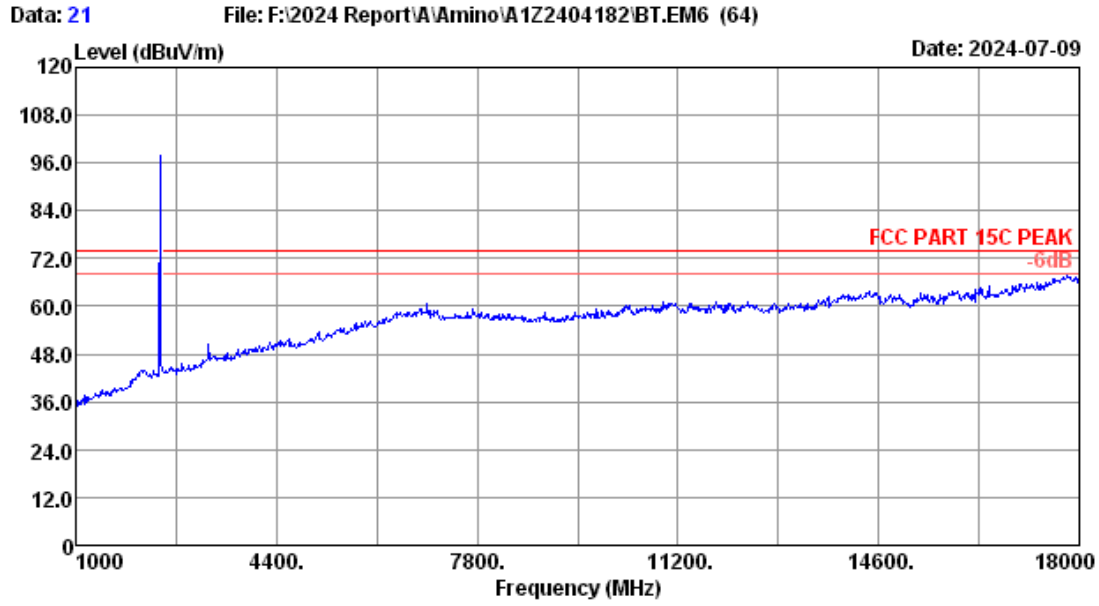
Site no.	: 3m Chamber	Data no.	: 19
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.5°C/53.1%	Engineer	: WINTER
Test Mode	: BT3.0 GFSK 2402MHz TX Mode		



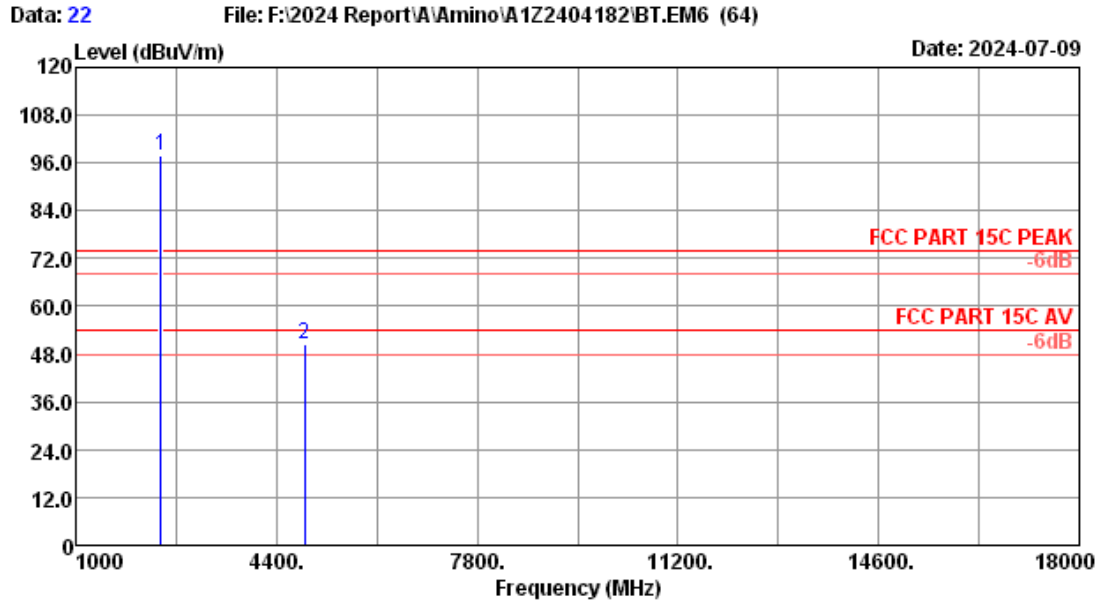
Site no. : 3m Chamber Data no. : 20
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.5°C/53.1% Engineer : WINTER
 Test Mode : BT3.0 GFSK 2402MHz TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.61	5.32	97.66	32.22	98.37	-----	-----	Peak
2	4804.00	31.20	7.41	42.74	31.08	50.27	74.00	23.73	Peak

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



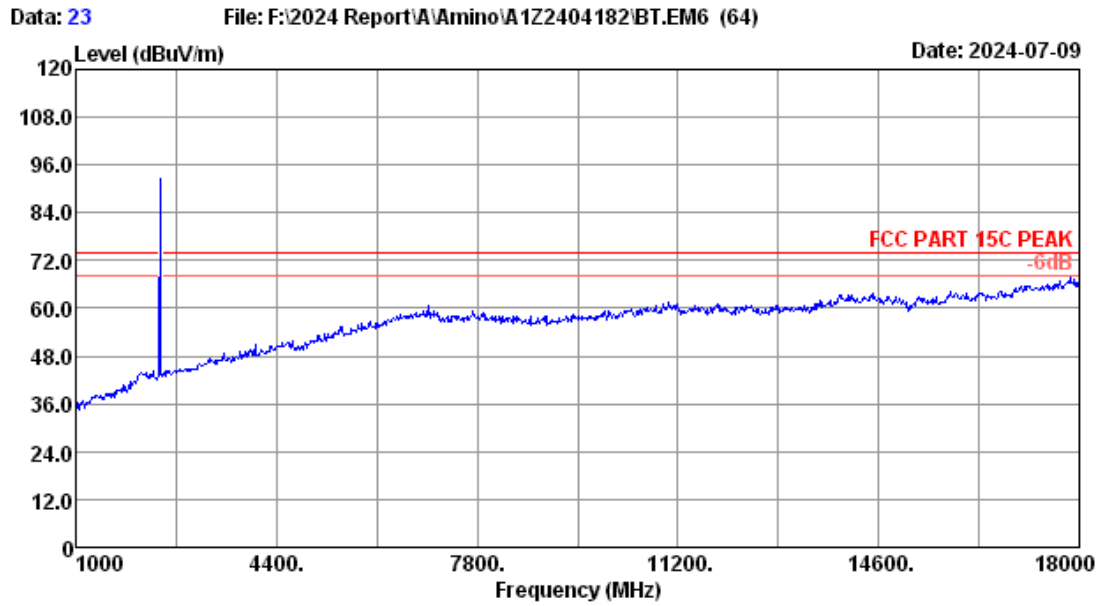
Site no.	: 3m Chamber	Data no.	: 21
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.5°C/53.1%	Engineer	: WINTER
Test Mode	: BT3.0 GFSK 2441MHz TX Mode		



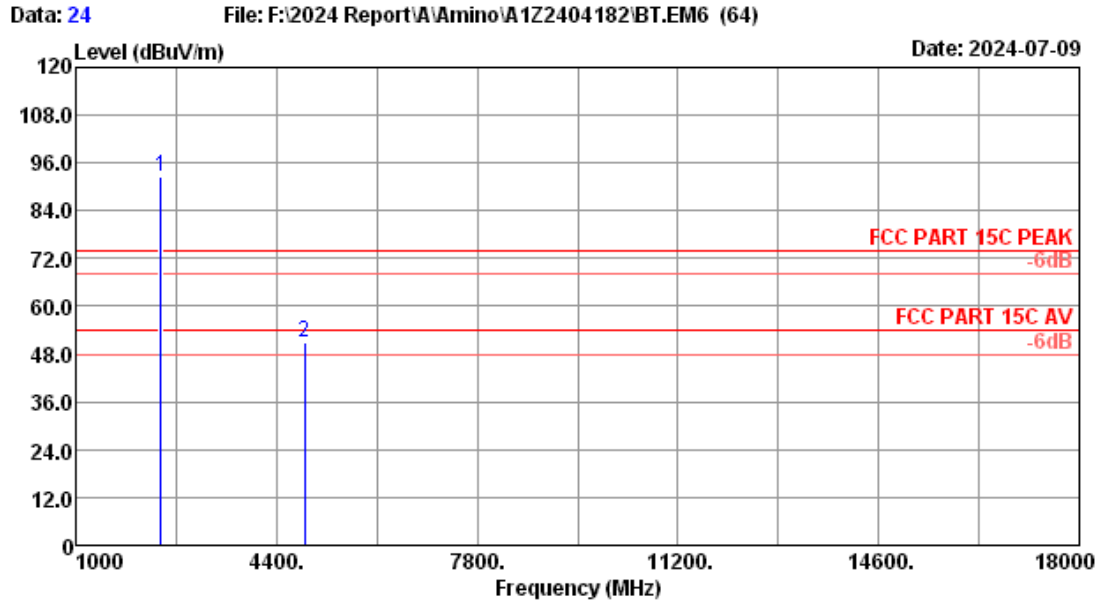
Site no. : 3m Chamber Data no. : 22
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.5°C/53.1% Engineer : WINTER
 Test Mode : BT3.0 GFSK 2441MHz TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.00	27.76	5.37	96.97	32.19	97.91	-----	-----	Peak
2	4882.00	31.46	7.45	42.80	31.05	50.66	74.00	23.34	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.



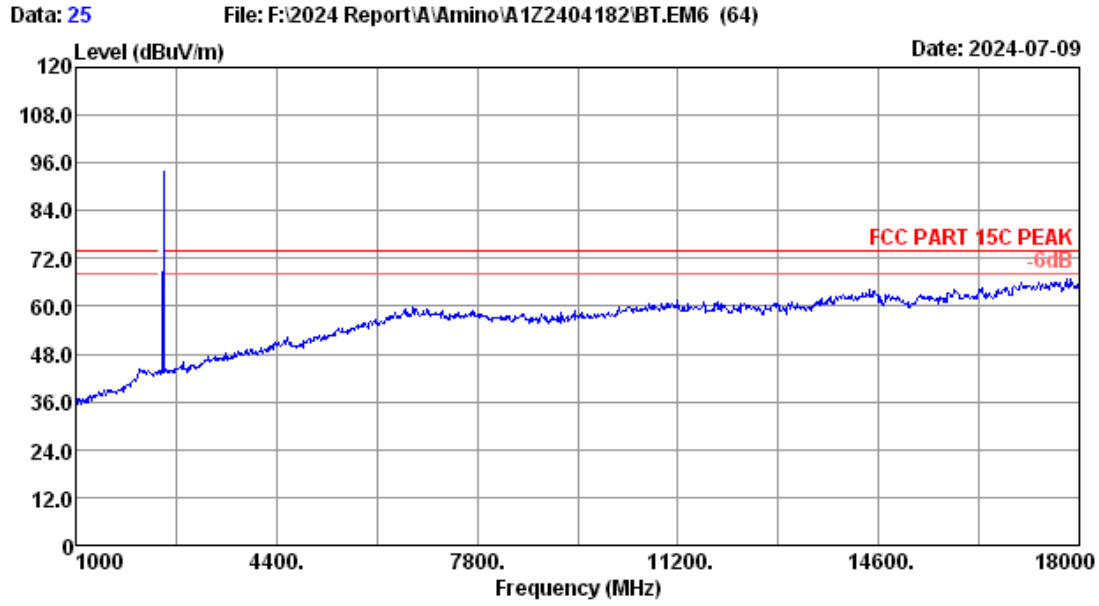
Site no.	: 3m Chamber	Data no.	: 23
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.5°C/53.1%	Engineer	: WINTER
Test Mode	: BT3.0 GFSK 2441MHz TX Mode		



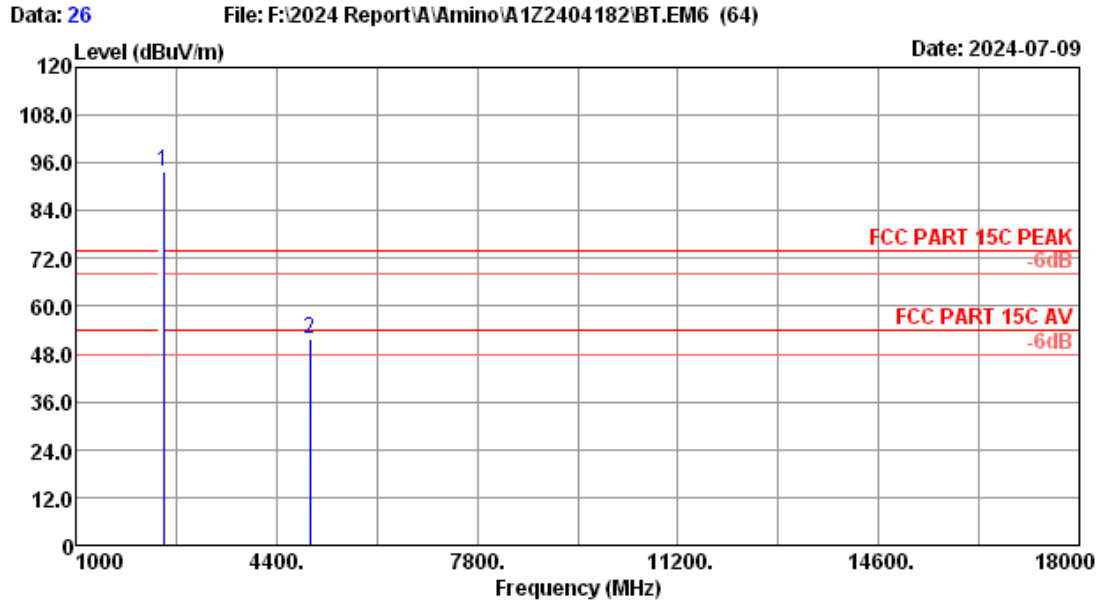
Site no. : 3m Chamber Data no. : 24
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.5°C/53.1% Engineer : WINTER
 Test Mode : BT3.0 GFSK 2441MHz TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.00	27.76	5.37	91.59	32.19	92.53	-----	-----	Peak
2	4882.00	31.46	7.45	42.90	31.05	50.76	74.00	23.24	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.



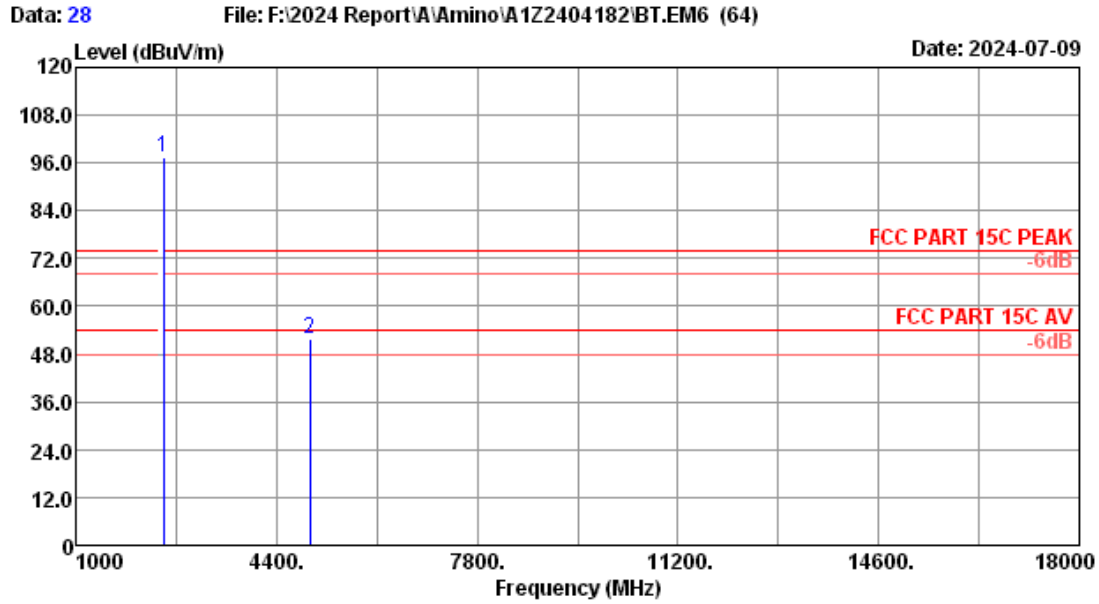
Site no.	: 3m Chamber	Data no.	: 25
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.5°C/53.1%	Engineer	: WINTER
Test Mode	: BT3.0 GFSK 2480MHz TX Mode		



Site no. : 3m Chamber Data no. : 26
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.5°C/53.1% Engineer : WINTER
 Test Mode : BT3.0 GFSK 2480MHz TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	27.80	5.41	92.72	32.16	93.77	-----	-----	Peak
2	4960.00	31.98	7.50	43.43	31.02	51.89	74.00	22.11	Peak

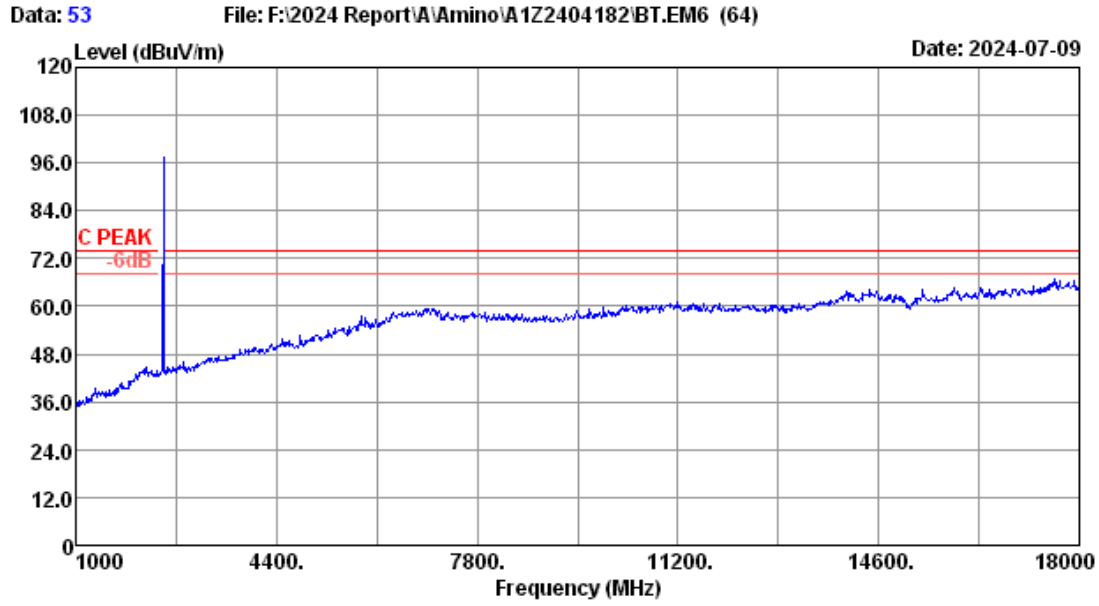
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading
 -Amp factor.
 2. The emission levels that are 20dB below the official
 limit are not reported.



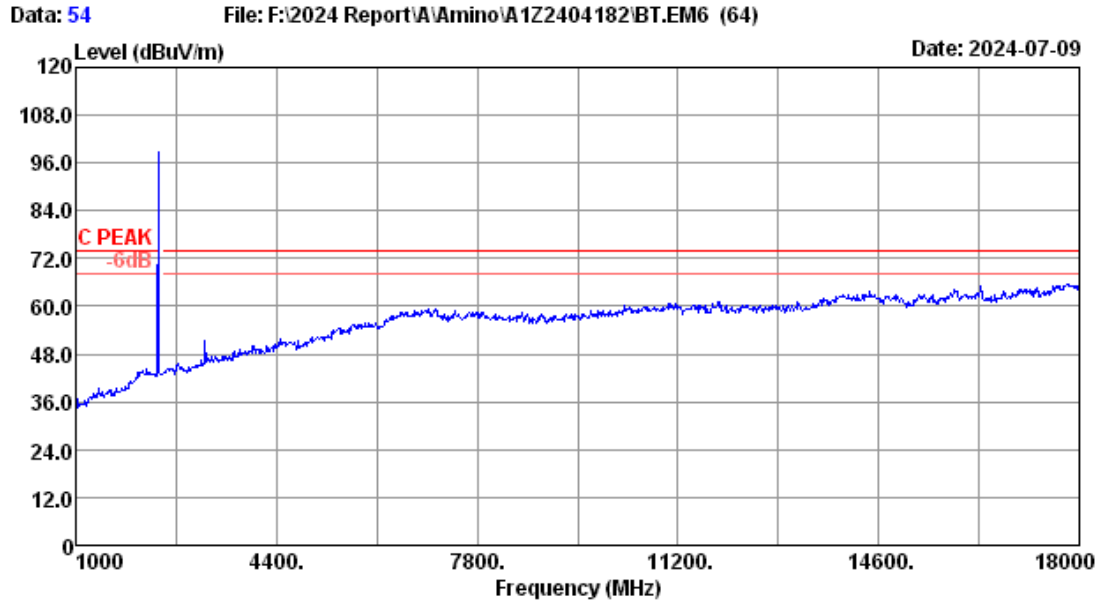
Site no. : 3m Chamber Data no. : 28
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.5°C/53.1% Engineer : WINTER
 Test Mode : BT3.0 GFSK 2480MHz TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	27.80	5.41	96.19	32.16	97.24	-----	-----	Peak
2	4960.00	31.98	7.50	43.45	31.02	51.91	74.00	22.09	Peak

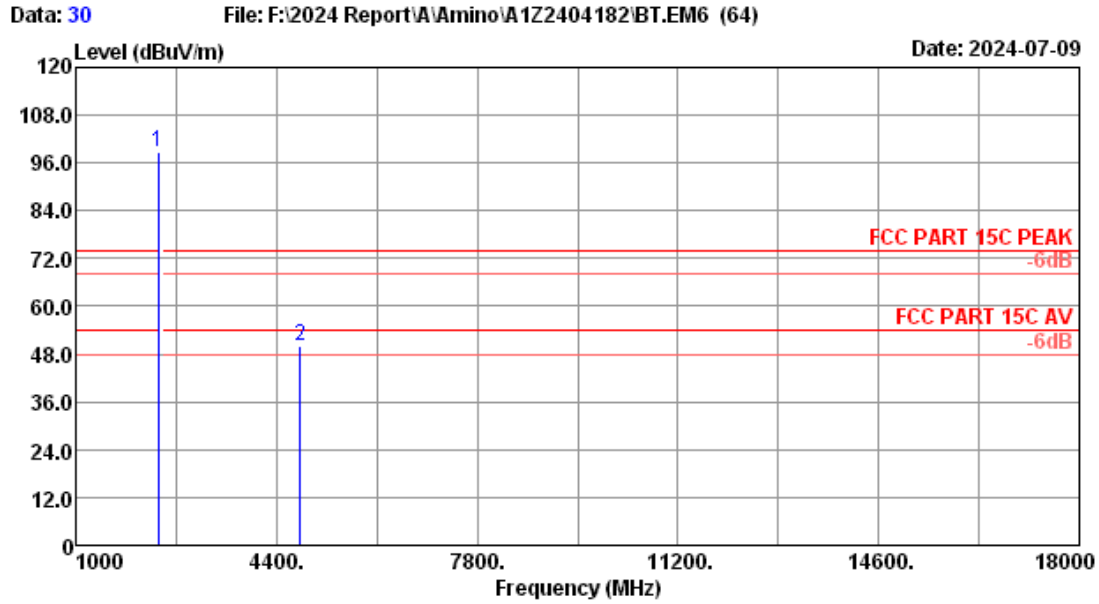
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading
 -Amp factor.
 2. The emission levels that are 20dB below the official
 limit are not reported.



Site no.	: 3m Chamber	Data no.	: 53
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.5°C/53.1%	Engineer	: WINTER
Test Mode	: BT3.0 GFSK 2480MHz TX Mode		



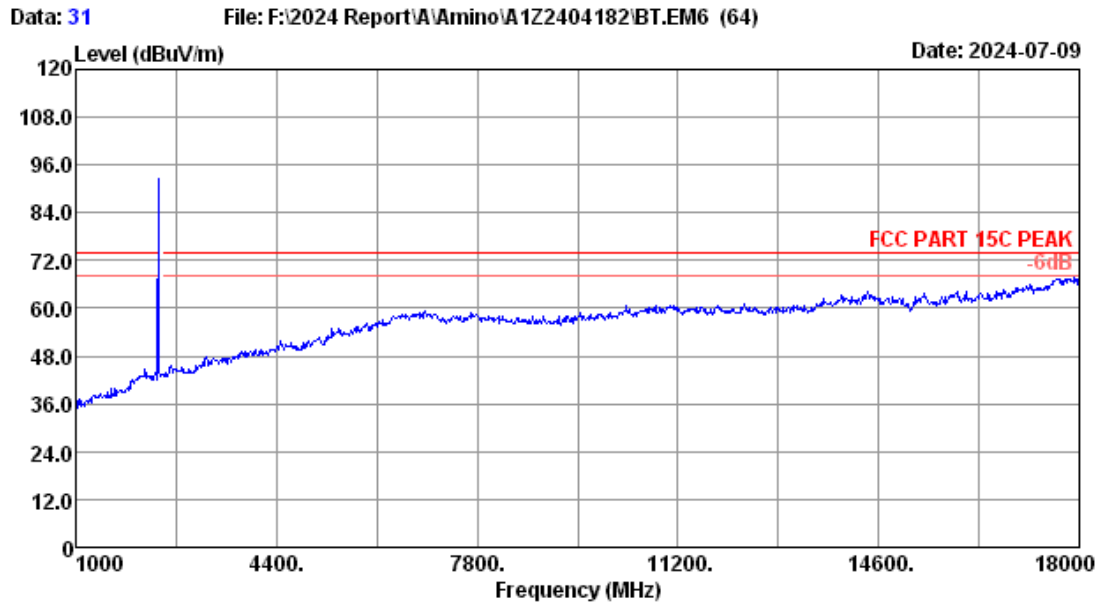
Site no.	: 3m Chamber	Data no.	: 54
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.5°C/53.1%	Engineer	: WINTER
Test Mode	: BT3.0 8-DPSK 2402MHz TX Mode		



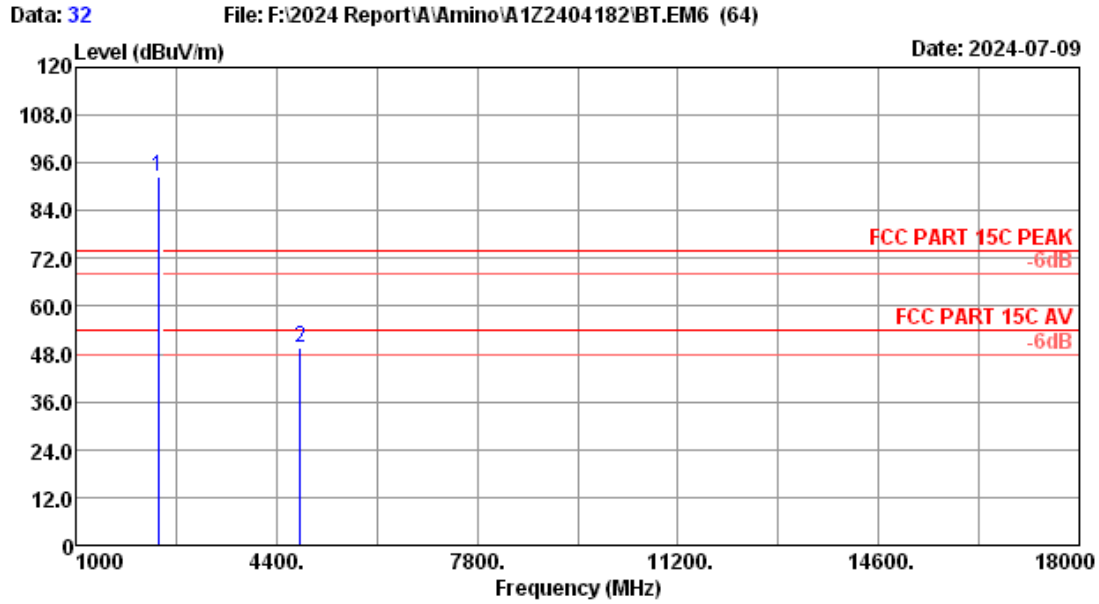
Site no. : 3m Chamber Data no. : 30
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.5°C/53.1% Engineer : WINTER
 Test Mode : BT3.0 8-DPSK 2402MHz TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.61	5.32	97.93	32.22	98.64	-----	-----	Peak
2	4804.00	31.20	7.41	42.30	31.08	49.83	74.00	24.17	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.



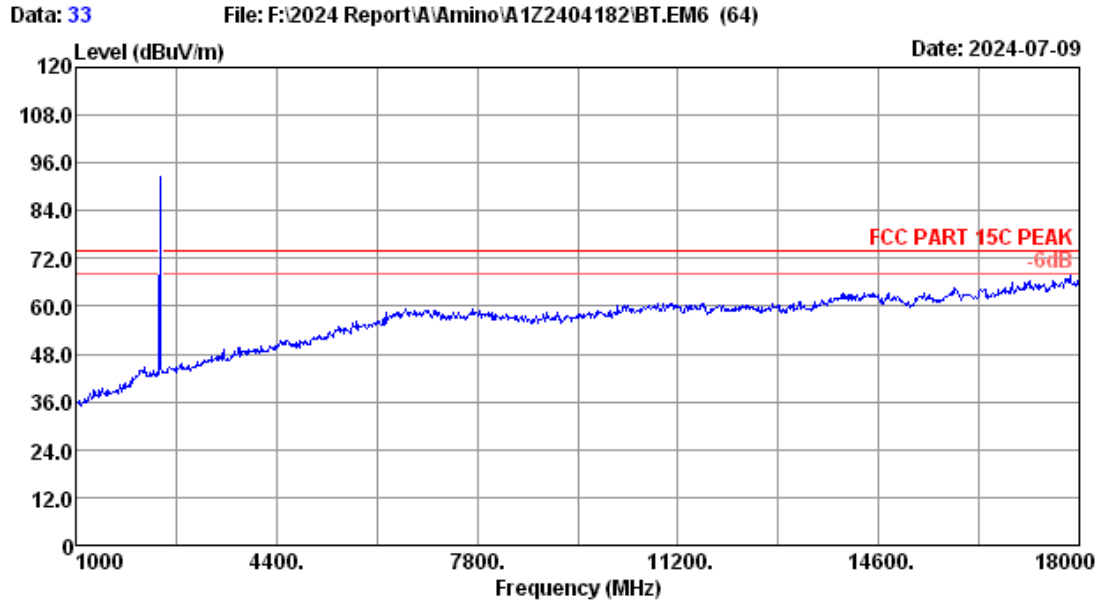
Site no.	: 3m Chamber	Data no.	: 31
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.5°C/53.1%	Engineer	: WINTER
Test Mode	: BT3.0 8-DPSK 2402MHz TX Mode		



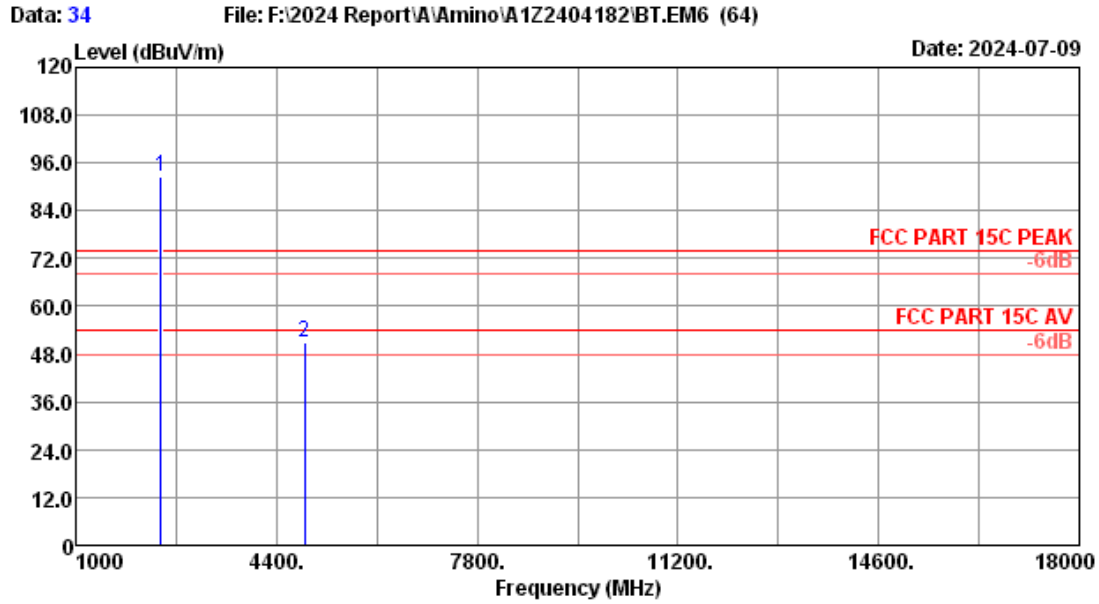
Site no. : 3m Chamber Data no. : 32
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.5°C/53.1% Engineer : WINTER
 Test Mode : BT3.0 8-DPSK 2402MHz TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.61	5.32	91.74	32.22	92.45	-----	-----	Peak
2	4804.00	31.20	7.41	42.08	31.08	49.61	74.00	24.39	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.



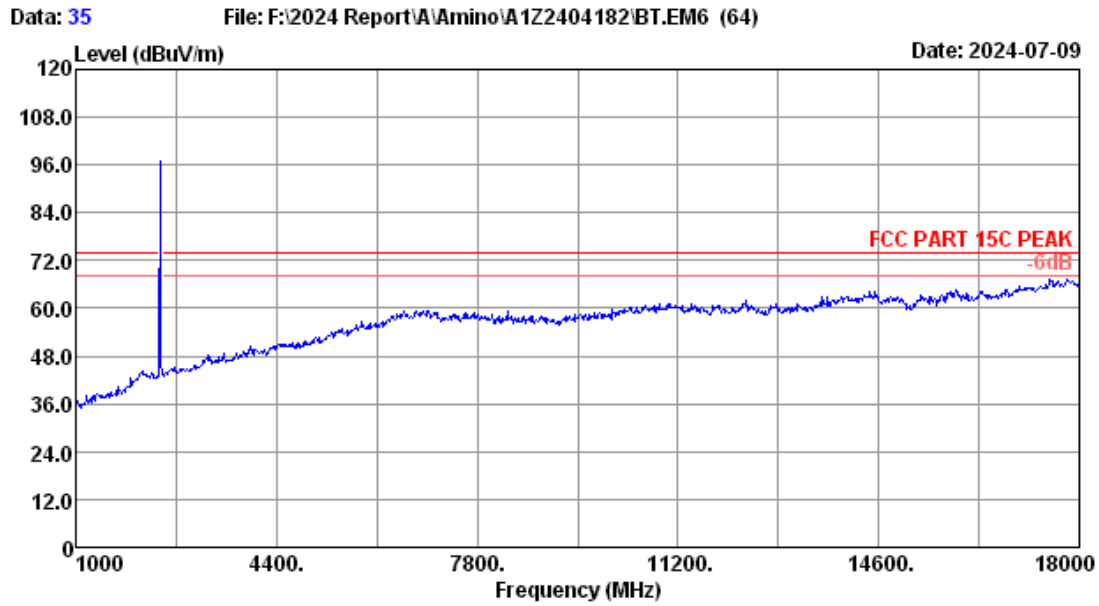
Site no.	: 3m Chamber	Data no.	: 33
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.5°C/53.1%	Engineer	: WINTER
Test Mode	: BT3.0 8-DPSK 2441MHz TX Mode		



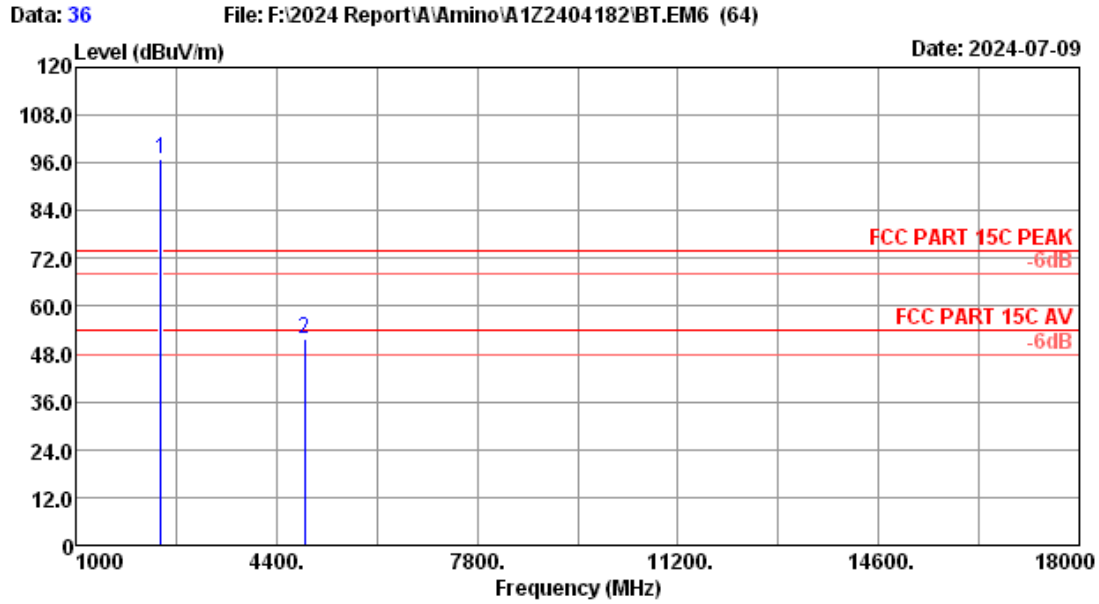
Site no. : 3m Chamber Data no. : 34
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.5°C/53.1% Engineer : WINTER
 Test Mode : BT3.0 8-DPSK 2441MHz TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.00	27.76	5.37	91.41	32.19	92.35	-----	-----	Peak
2	4882.00	31.46	7.45	42.97	31.05	50.83	74.00	23.17	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.



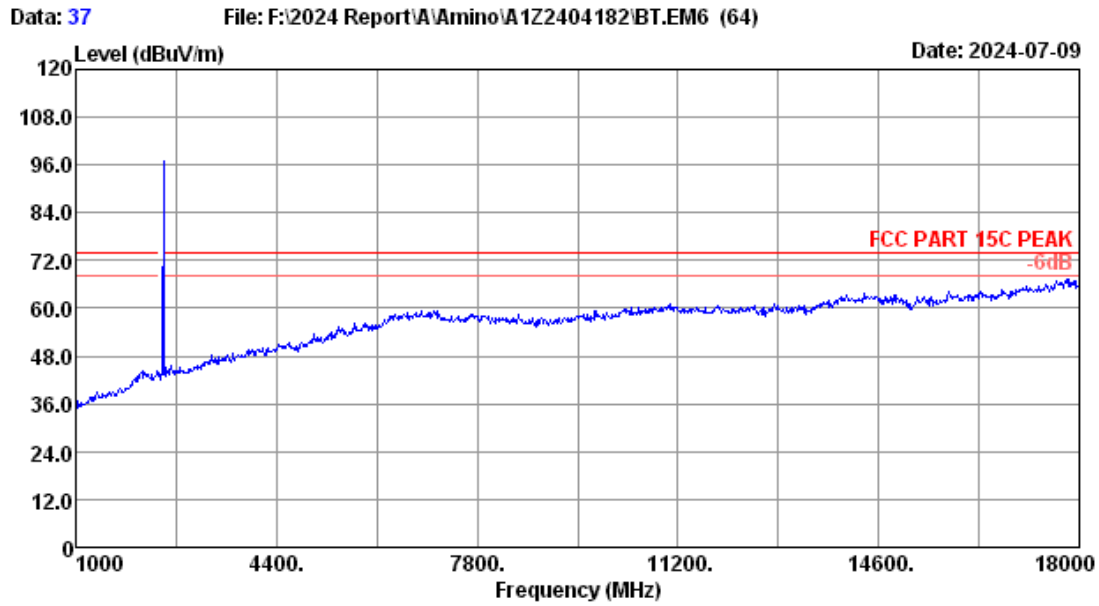
Site no.	: 3m Chamber	Data no.	: 35
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.5°C/53.1%	Engineer	: WINTER
Test Mode	: BT3.0 8-DPSK 2441MHz TX Mode		



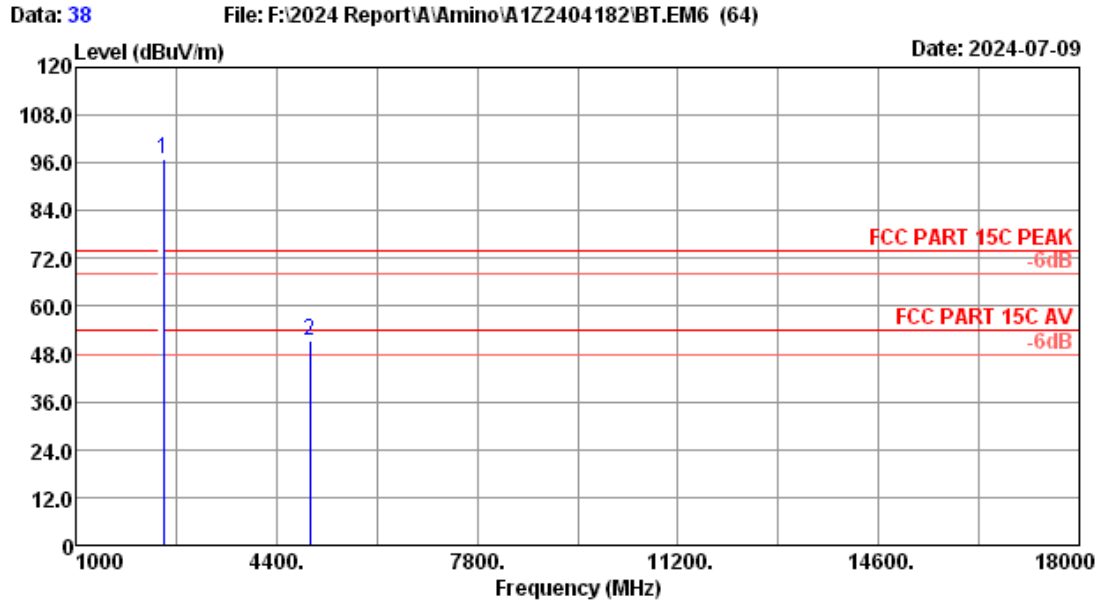
Site no. : 3m Chamber Data no. : 36
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.5°C/53.1% Engineer : WINTER
 Test Mode : BT3.0 8-DPSK 2441MHz TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.00	27.76	5.37	95.82	32.19	96.76	-----	-----	Peak
2	4882.00	31.46	7.45	43.76	31.05	51.62	74.00	22.38	Peak

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



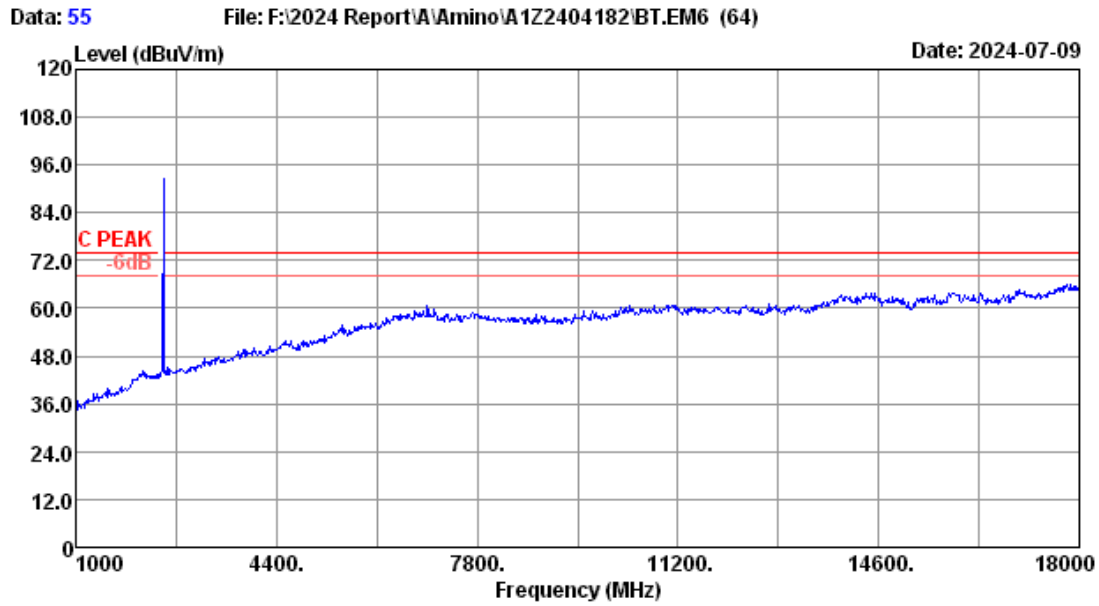
Site no.	: 3m Chamber	Data no.	: 37
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.5°C/53.1%	Engineer	: WINTER
Test Mode	: BT3.0 8-DPSK 2480MHz TX Mode		



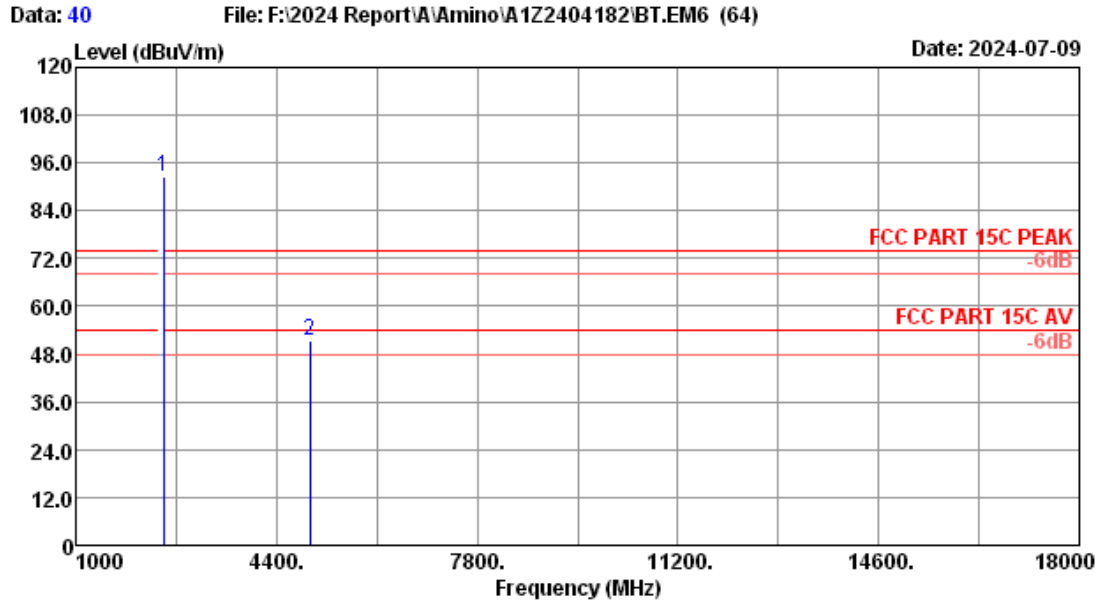
Site no. : 3m Chamber Data no. : 38
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.5°C/53.1% Engineer : WINTER
 Test Mode : BT3.0 8-DPSK 2480MHz TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	27.80	5.41	95.91	32.16	96.96	-----	-----	Peak
2	4960.00	31.98	7.50	42.83	31.02	51.29	74.00	22.71	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.



Site no.	: 3m Chamber	Data no.	: 55
Dis. / Ant.	: 3m 2023 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 21.5°C/53.1%	Engineer	: WINTER
Test Mode	: BT3.0 8-DPSK 2480MHz TX Mode		



Site no. : 3m Chamber Data no. : 40
 Dis. / Ant. : 3m 2023 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 21.5°C/53.1% Engineer : WINTER
 Test Mode : BT3.0 8-DPSK 2480MHz TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	27.80	5.41	91.46	32.16	92.51	-----	-----	Peak
2	4960.00	31.98	7.50	42.72	31.02	51.18	74.00	22.82	Peak

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

5. CONDUCTED SPURIOUS EMISSIONS

5.1. 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.

5.2. 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.

5.3. Test result

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

EUT: STB		
M/N: H200W		
Test date: 2024-08-14	Pressure: 102.5±1.0 kpa	Humidity: 53.2±3.0%
Tested by: Epoch	Test site: RF site	Temperature:24.3±0.6 °C

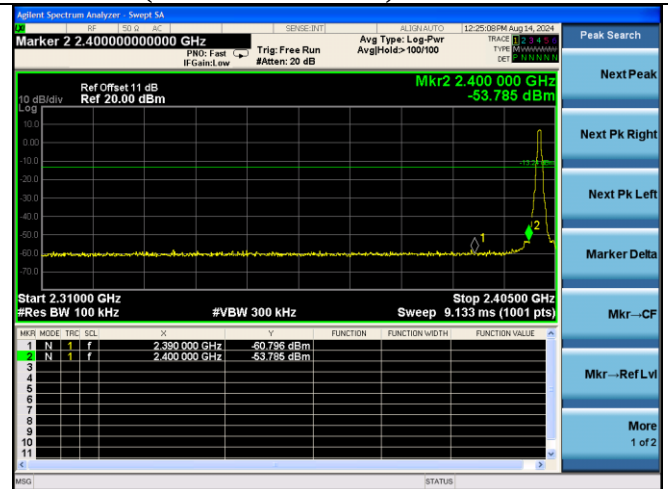
Hopping off

GFSK

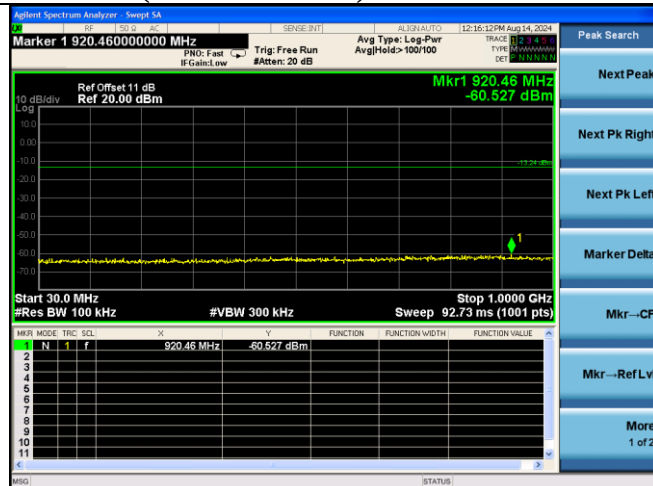
2402MHz



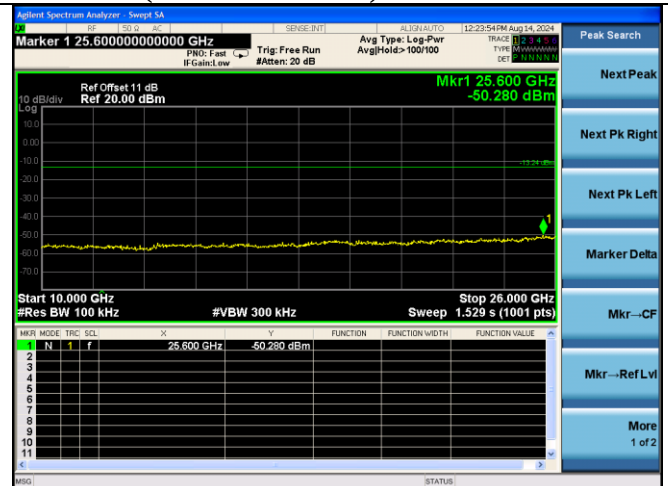
2402MHz(2.3GHz – 2.4GHz)



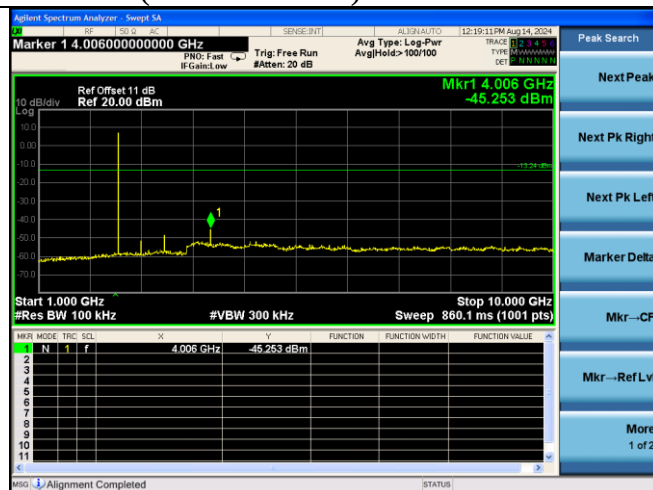
2402MHz(30MHz – 1GHz)



2402MHz(10GHz – 26GHz)



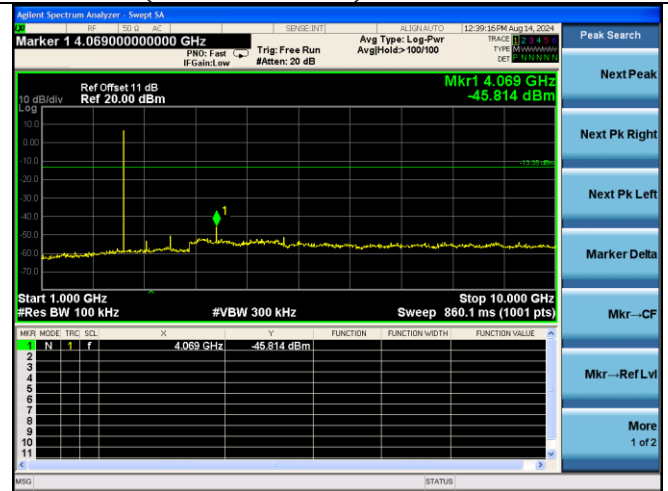
2402MHz(1GHz – 10GHz)



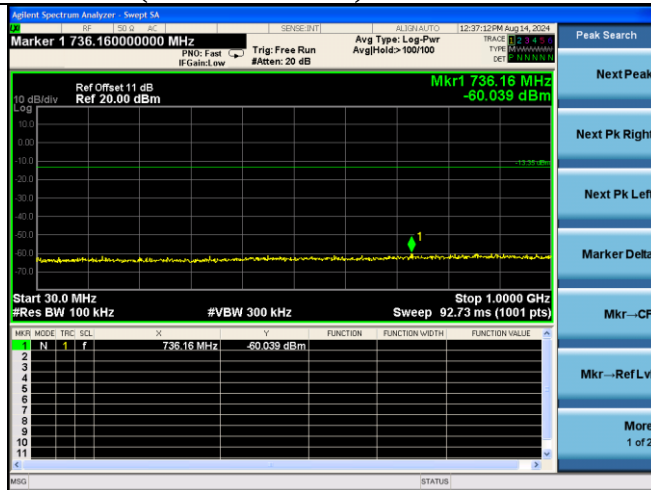
2441MHz



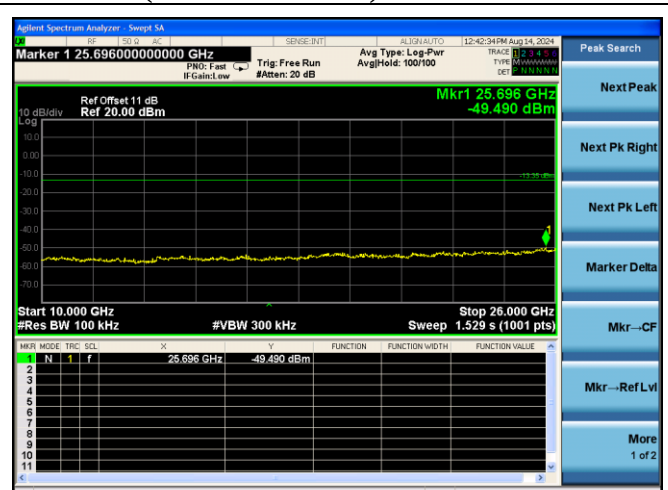
2441MHz(1GHz – 10GHz)



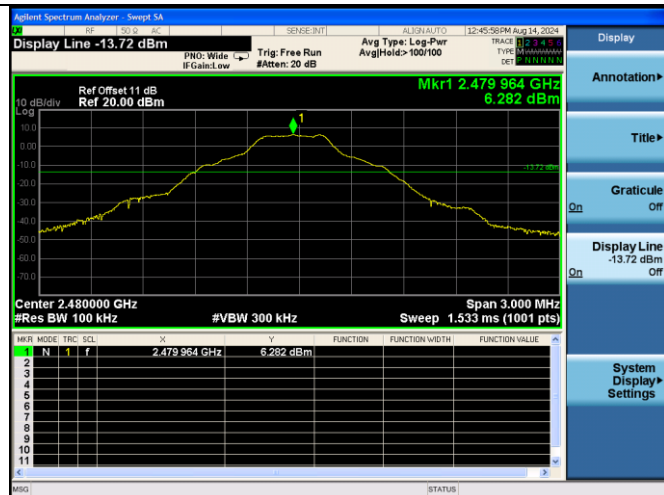
2441MHz(30MHz – 1GHz)



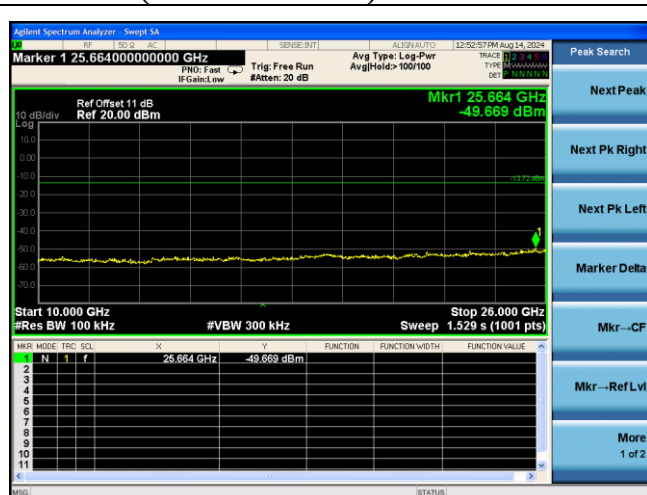
2441MHz(10GHz – 26GHz)



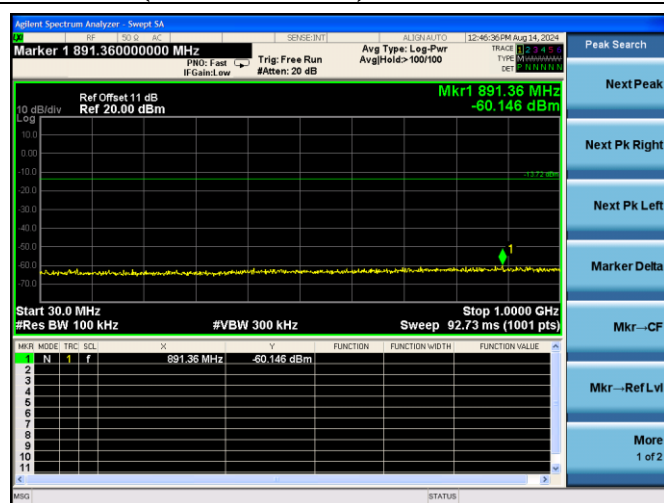
2480MHz



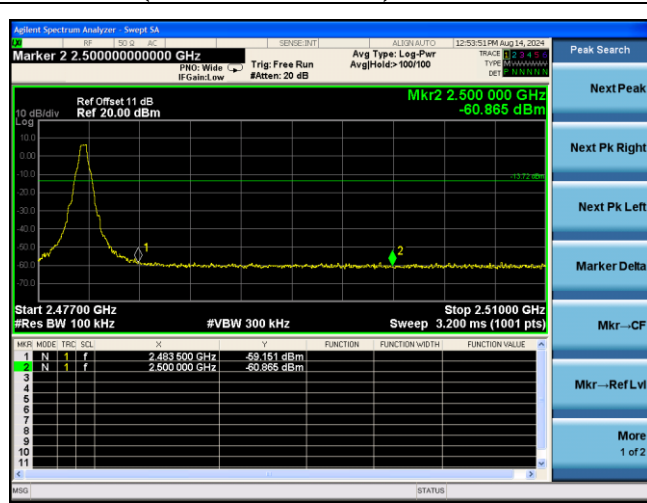
2480MHz(10GHz – 26GHz)



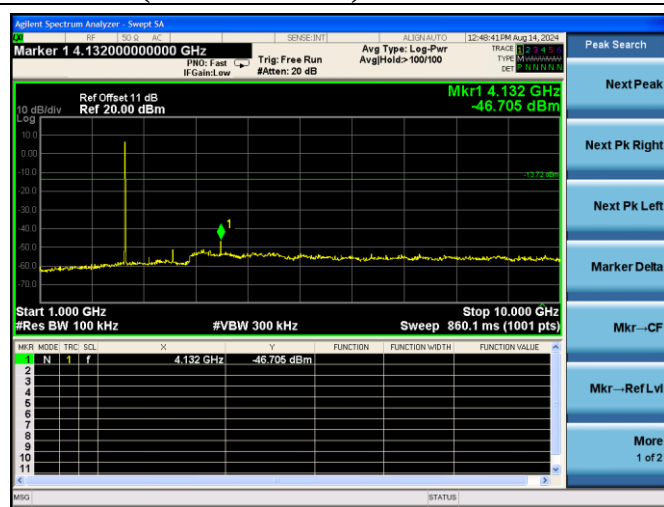
2480MHz(30MHz – 1GHz)

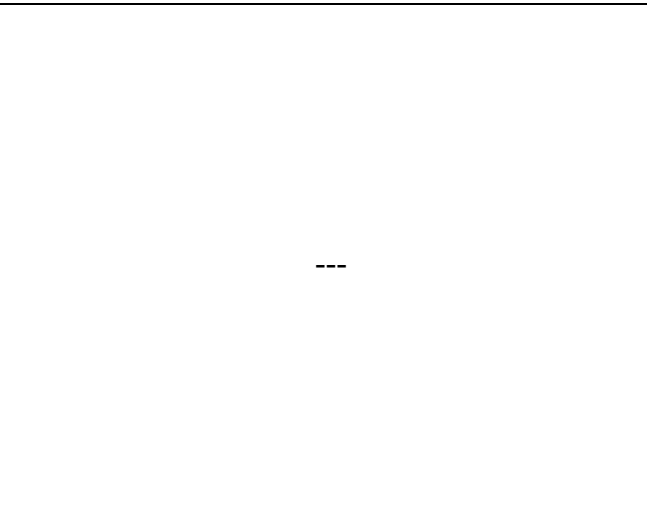


2480MHz(2.4GHz – 2.5GHz)



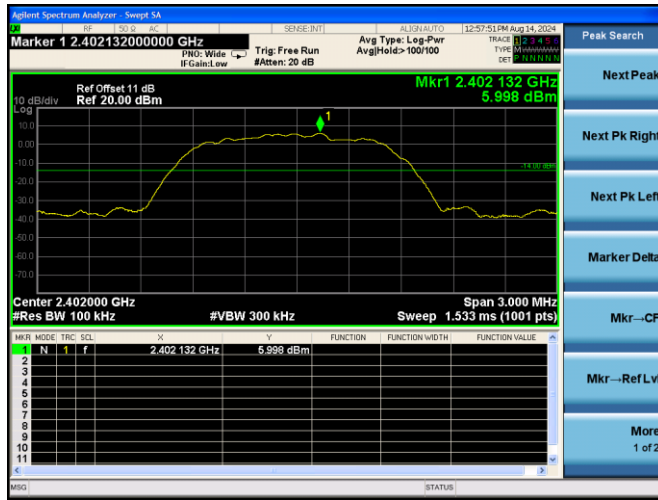
2480MHz(1GHz – 10GHz)



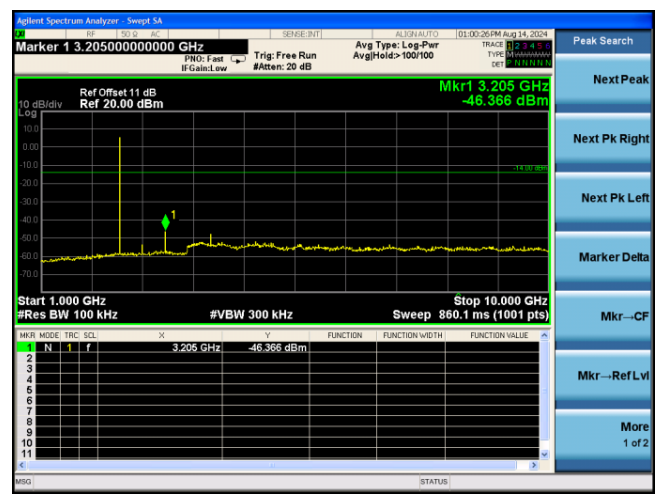


8-DPSK

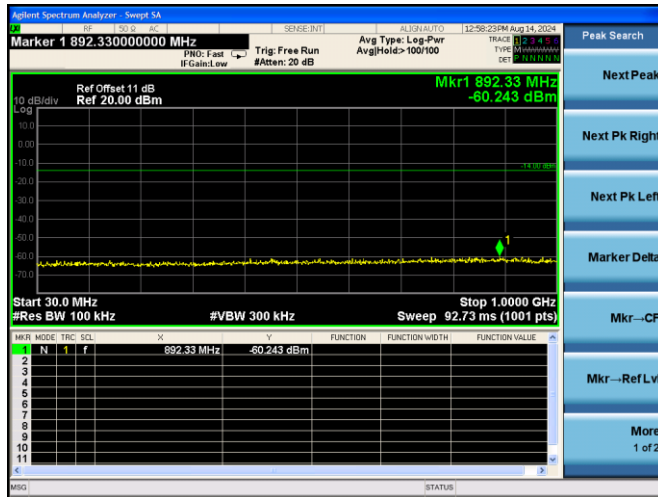
2402MHz



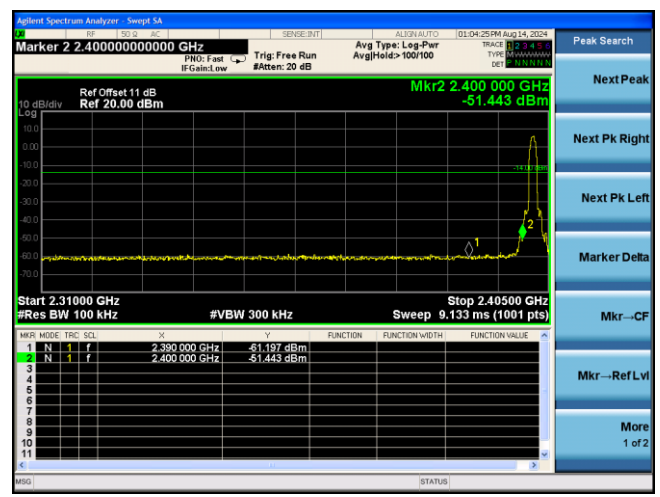
2402MHz(10GHz – 26GHz)



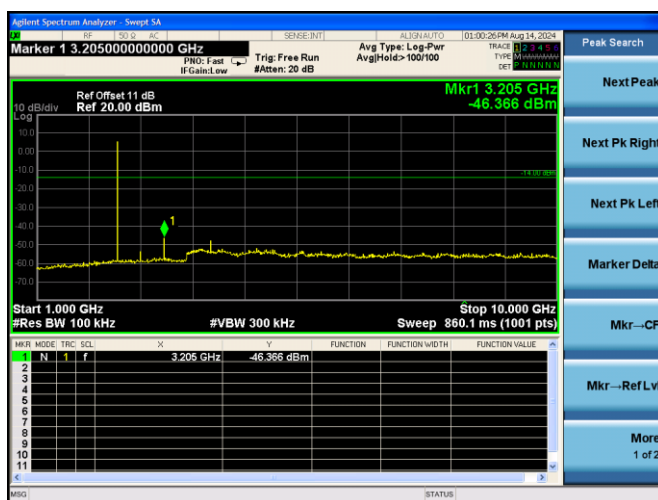
2402MHz(30MHz – 1GHz)



2402MHz(2.3GHz – 2.4GHz)

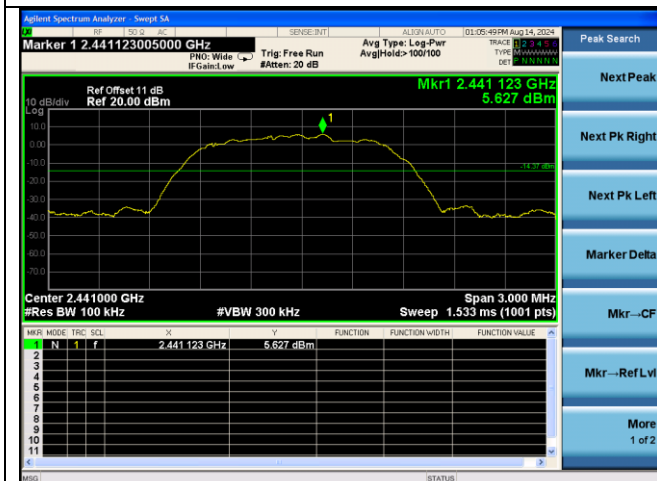


2402MHz(1GHz – 10GHz)

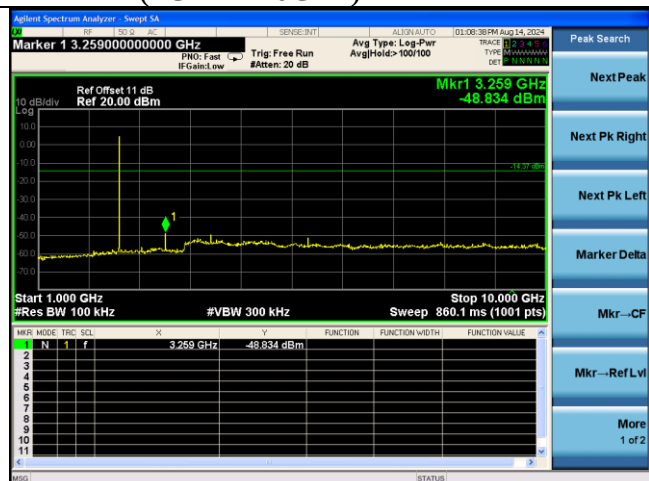




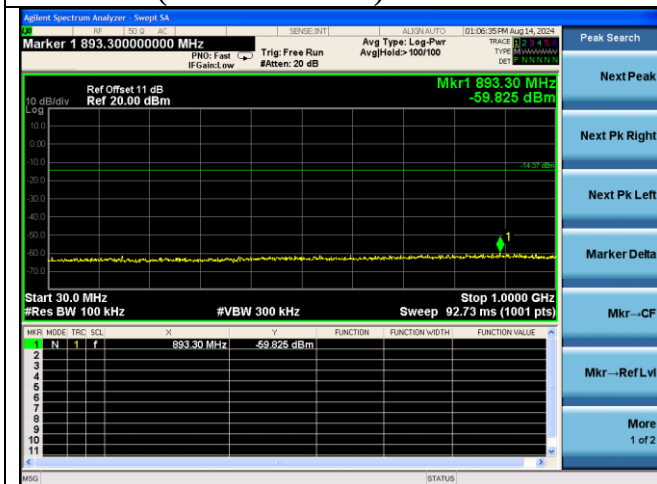
2441MHz



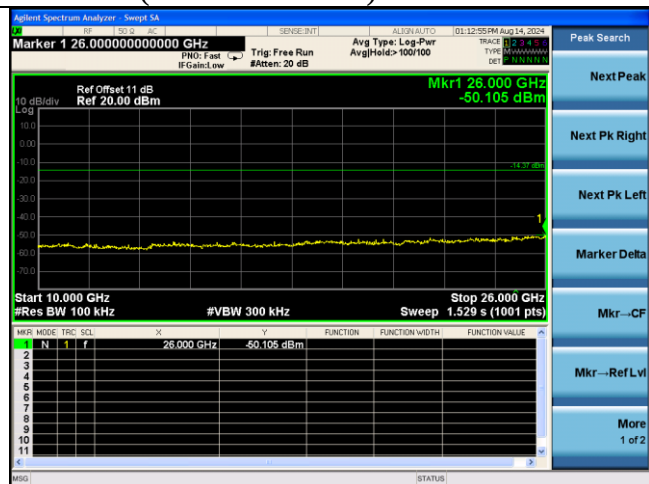
2441MHz(1GHz – 10GHz)



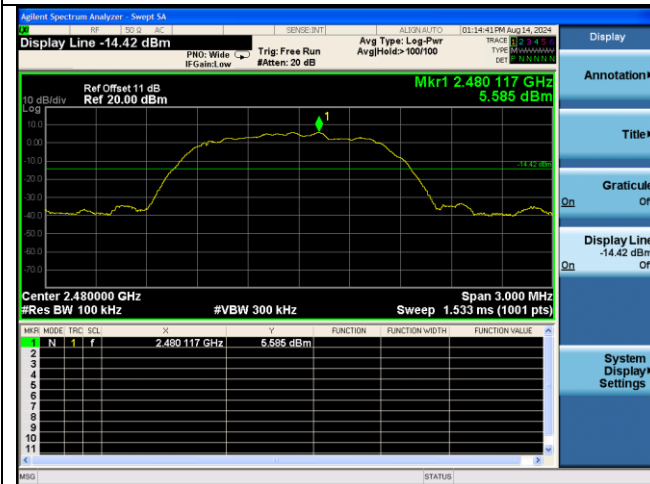
2441MHz (30MHz – 1GHz)



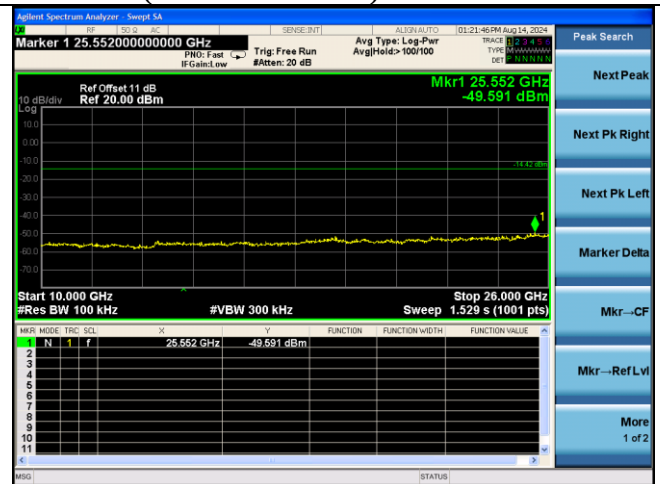
2441MHz(10GHz – 26GHz)



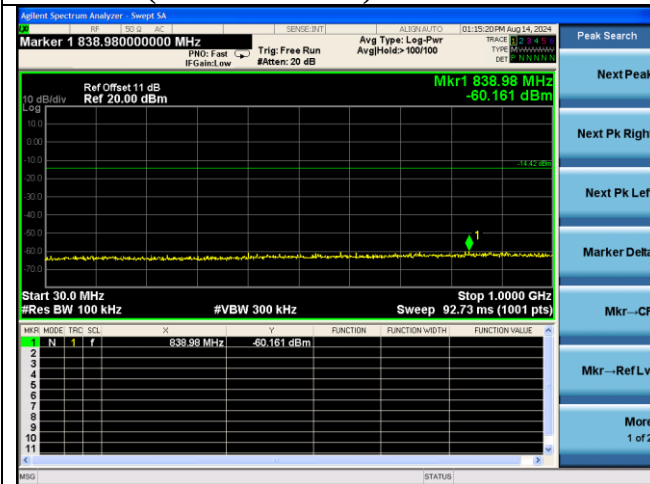
2480MHz



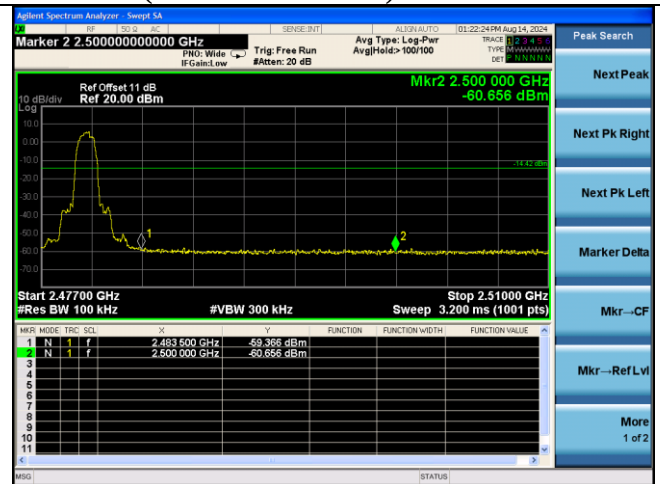
2480MHz(10GHz – 26GHz)



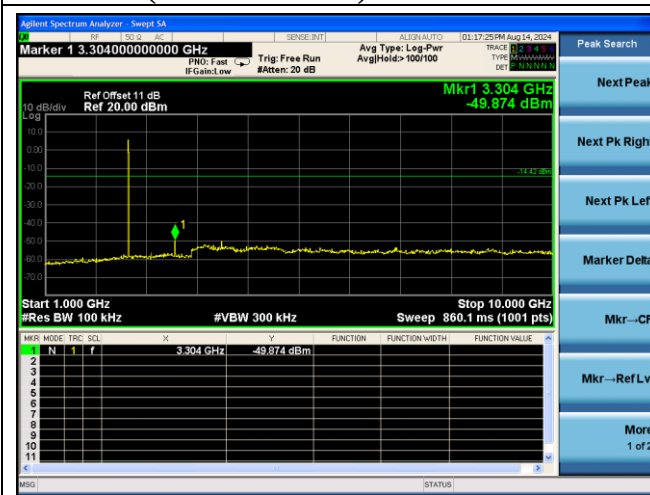
2480MHz(30MHz – 1GHz)



2480MHz(2.4GHz – 2.5GHz)

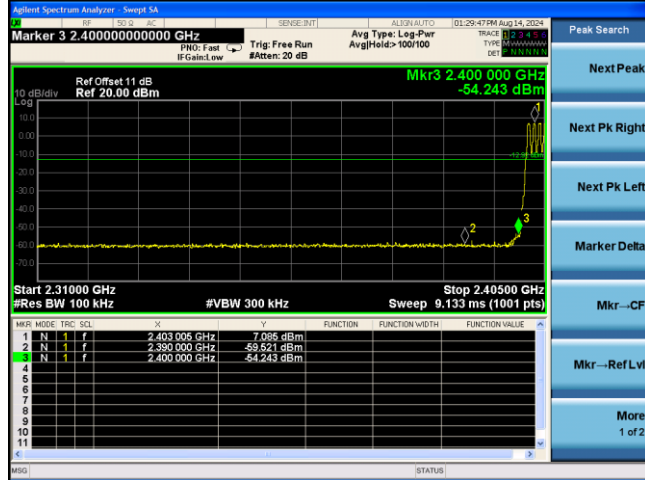


2480MHz(1GHz – 10GHz)

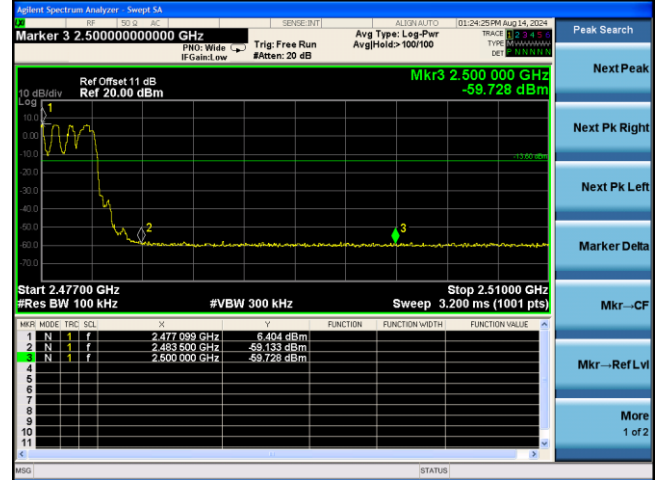


Hopping on

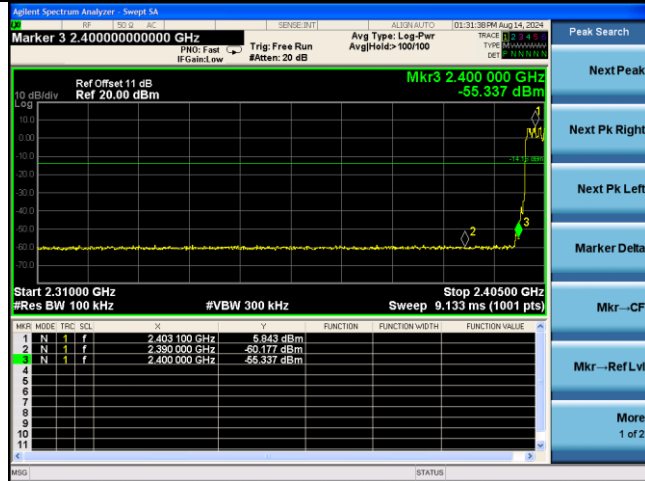
GFSK(2.3GHz – 2.4GHz)



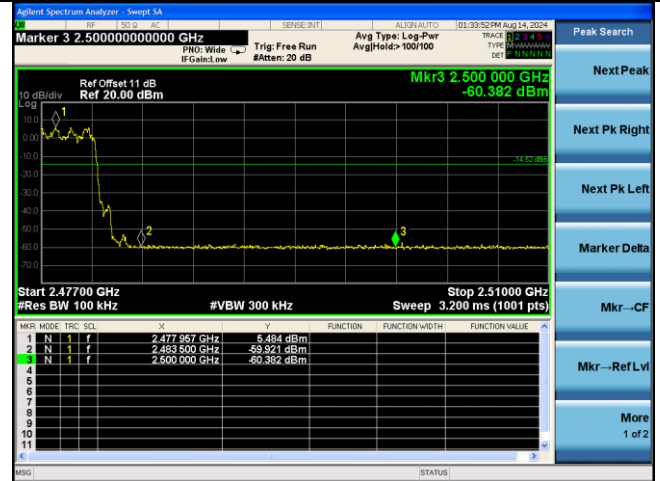
GFSK(2.4GHz – 2.5GHz)



8-DPSK(2.3GHz – 2.4GHz)



8-DPSK(2.4GHz – 2.5GHz)



6. 20 DB & 99% BANDWIDTH TEST

6.1.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.

6.2.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.

6.3.Test Results

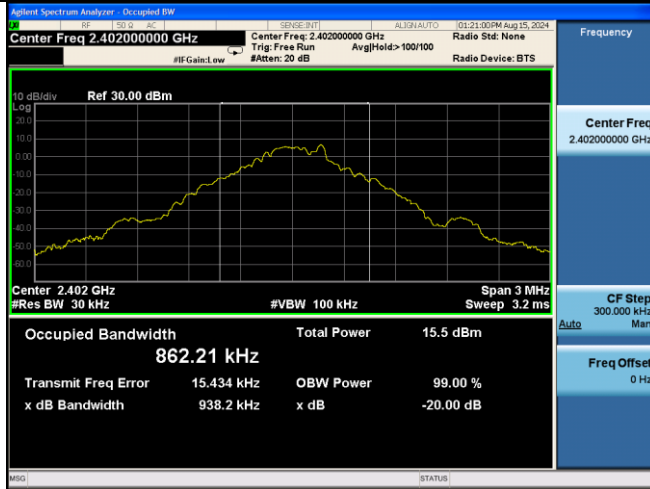
EUT: STB		
M/N: H200W		
Test date: 2024-08-15	Pressure: 102.3±1.0 kpa	Humidity: 53.5±3.0%
Tested by: Epoch	Test site: RF site	Temperature:25.4±0.6 °C

Test Mode	Frequency (MHz)	20dB bandwidth (KHz)	Limit (KHz)
GFSK	2402	938.2	N/A
	2441	937.9	N/A
	2480	940.6	N/A
8-DPSK	2402	1310.0	N/A
	2441	1313.0	N/A
	2480	1309.0	N/A
Conclusion : PASS			

Test Mode	Frequency (MHz)	99% Bandwidth (KHz)	Limit (KHz)
GFSK	2402	862.21	N/A
	2441	859.35	N/A
	2480	861.31	N/A
8-DPSK	2402	1198.20	N/A
	2441	1198.40	N/A
	2480	1198.20	N/A
Conclusion : PASS			

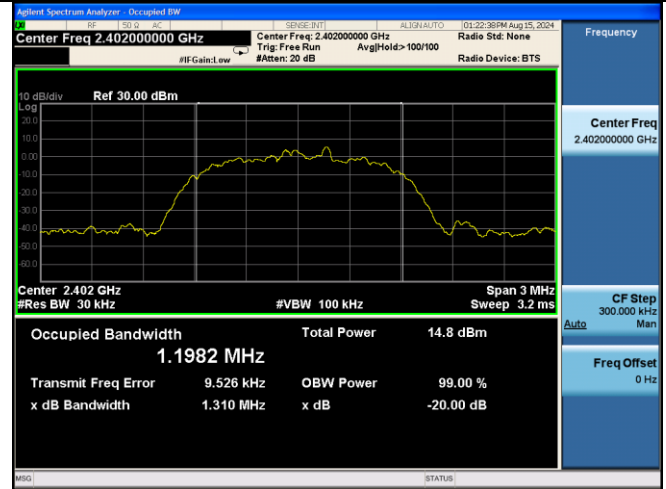
GFSK

2402MHz

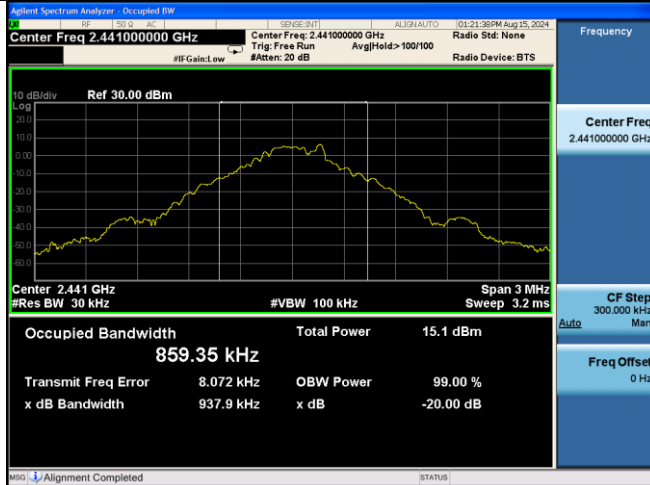


8-DPSK

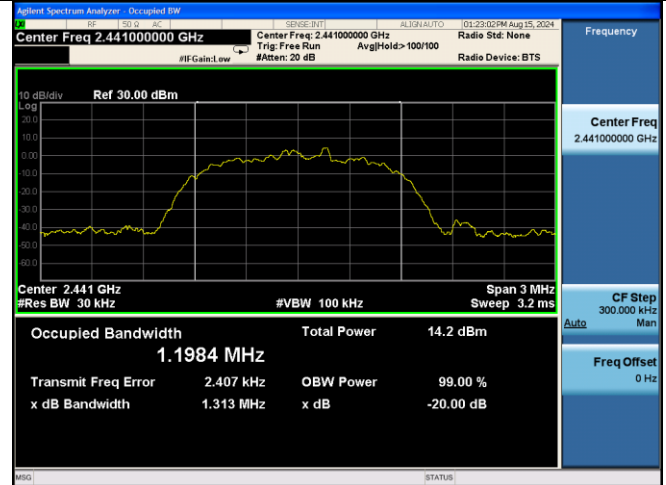
2402MHz



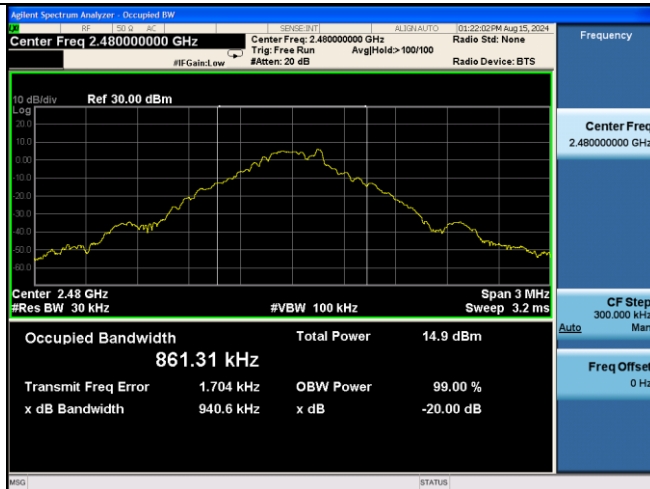
2441MHz



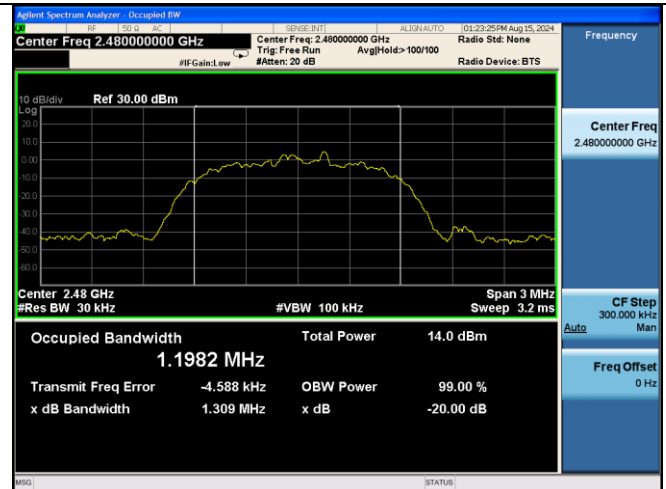
2441MHz



2480MHz



2480MHz



7. CARRIER FREQUENCY SEPARATION TEST

7.1.Limit

Frequency hopping systems shall have hopping channel carrier frequency separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

7.2.Test Procedure

Use the test method described in ANSI C63.10 clause 7.8.2:

1. Connect the antenna port of the EUT to the Spectrum analyzer.
2. Let the EUT transmit at Low/ Mid/ High channel.
3. Setting of SA is following as: RBW: 100kHz / VBW: 300kHz.Span: 5MHz
4. Use the mark Delta function of the SA measure out the channel separation.