

CFR 47 FCC PART 15 SUBPART C(DTS)

TEST REPORT

For

MiTag

MODEL NUMBER: HD-P16, HD-P16-1, HD-P16-2, HD-P16-3, HD-P16-6, HD-P16-8, HD-P16-10, HD-P16-A, HD-P16-B, HD-P16-C, HD-P16-D, HD-P16-E, HD-P16-F, HD-P16-L, HD-P16-P, HD-P16-S, HD-P16-T, HD-P16-W, HD-P16-X, HD-P16-Y, HD-P16-Z

REPORT NUMBER: E01A23020796F00401

ISSUE DATE: March 7, 2023

FCC ID:2AIAOHD-P16

Prepared for

**SHENZHEN HALI-POWER INDUSTRIAL CO.,LTD.
1/F, Building C, DaKan Science And Technology Park, Xili, Nanshan, Shenzhen,
China**

Prepared by

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Dong Guan Anci Electronic Technology Co., Ltd.**

Revision History

Rev.	Issue Date	Revisions	Revised By
V0	March 7, 2023	Initial Issue	Duke

Summary of Test Results

Summary of Test Results			
Test Item	Clause	Limit/Requirement	Result
Antenna Requirement	N/A	FCC Part 15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	ANSI C63.10-2013, Clause 6.2	FCC Part 15.207	N/A (NOTE 1, 2)
Conducted Output Power	ANSI C63.10-2013, Clause 11.9.1.3	FCC Part 15.247 (b)(3)	Pass
6dB Bandwidth and 99% Occupied Bandwidth	ANSI C63.10-2013, Clause 11.8.1	FCC Part 15.247 (a)(2)	Pass
Power Spectral Density	ANSI C63.10-2013, Clause 11.10.2	FCC Part 15.247 (e)	Pass
Conducted Band edge and spurious emission	ANSI C63.10-2013, Clause 11.11	FCC Part 15.247(d)	Pass
Radiated Band edge and Spurious Emission	ANSI C63.10-2013, Clause 11.11 & Clause 11.12	FCC Part 15.205/15.209	Pass
Duty Cycle	ANSI C63.10-2013, Clause 11.6	None; for reporting purposes only.	Pass

Note:

1. N/A: In this whole report not applicable.

2. This test is only applicable for devices which can be charged or powered by AC power cable.

*This test report is only published to and used by the applicant, and it is not for evidence purpose in China.

*The measurement result for the sample received is <Pass> according to <CFR 47 FCC PART 15 SUBPART C(DTS)> when <Accuracy Method> decision rule is applied.

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: SHENZHEN HALI-POWER INDUSTRIAL CO.,LTD.
Address: 1/F, Building C, DaKan Science And Technology Park, Xili,
Nanshan, Shenzhen, China

Manufacturer Information

Company Name: SHENZHEN HALI-POWER INDUSTRIAL CO.,LTD.
Address: 1/F, Building C, DaKan Science And Technology Park, Xili,
Nanshan, Shenzhen, China

EUT Information

EUT Name: MiTag
Model: HD-P16
Serial model: HD-P16-1, HD-P16-2, HD-P16-3, HD-P16-6, HD-P16-8, HD-P16-10,
HD-P16-A, HD-P16-B, HD-P16-C, HD-P16-D, HD-P16-E, HD-P16-F,
HD-P16-L, HD-P16-P, HD-P16-S, HD-P16-T, HD-P16-W, HD-P16-X,
HD-P16-Y, HD-P16-Z
Model difference: All models are the same except the leather case color and model
Brand: MiLi
Sample Received Date: February 24, 2023
Sample Status: Normal
Sample ID: A23020796 007
Date of Tested: March 1, 2023 to March 7, 2023

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 FCC PART 15 SUBPART C(DTS)	Pass

Prepared By:



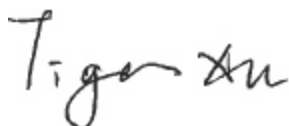
Duke
Project Engineer

Checked By:



Dyson
Project Engineer

Approved By:



Tiger
Laboratory Supervisor

2. TEST METHODOLOGY

All tests were performed in accordance with the standard CFR 47 FCC PART 15 SUBPART C(DTS)

3. FACILITIES AND ACCREDITATION

Site Description

Name of Firm : Dong Guan Anci Electronic Technology Co., Ltd.

Site Location : 1-2 Floor, Building A, No.11, Headquarters 2 Road, Songshan,
Lake Hi-tech Industrial Development Zone, Dongguan
City, evelopment Zone, Dongguan City, Guangdong Pr., China.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Measurement Frequency Range	K	U(dB)
Conducted emissions from the AC mains power ports	0.009 MHz ~ 0.15 MHz	2	4.00
Conducted emissions from the AC mains power ports	0.15 MHz ~ 30 MHz	2	3.62
Radiated emissions	9kHz ~ 30MHz	2	2.20
Radiated emissions	30 MHz ~ 1 GHz	2	3.16
Radiated emissions	1 GHz ~ 18 GHz	2	5.64

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

EUT Name		MiTag
Model		HD-P16
EUT Classification		Class B
Internal Frequency		2500MHz
Ratings		Battery 3V
Power Supply	Battery	3V

Frequency Band:	2400 MHz to 2483.5 MHz
Frequency Range:	2402 MHz to 2480 MHz
Bluetooth Version:	5.2
Bluetooth Mode:	LE
Type of Modulation:	GFSK
Number of Channels:	40
Channel Separation:	2 MHz
Maximum Peak Power:	-2.05 dBm
Antenna Type:	PCB antenna
Antenna Gain:	1.08 dBi
EUT Test software:	Lekit_200927.exe

5.2. CHANNEL LIST

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	11	2424	22	2446	33	2468
1	2404	12	2426	23	2448	34	2470
2	2406	13	2428	24	2450	35	2472
3	2408	14	2430	25	2452	36	2474
4	2410	15	2432	26	2454	37	2476
5	2412	16	2434	27	2456	38	2478
6	2414	17	2436	28	2458	39	2480
7	2416	18	2438	29	2460	/	/
8	2418	19	2440	30	2462	/	/
9	2420	20	2442	31	2464	/	/
10	2422	21	2444	32	2468	/	/

5.3. MAXIMUM AVERAGE EIRP

Test Mode	Frequency (MHz)	Channel Number	Maximum Peak Output Power (dBm)	Maximum EIRP (dBm)
LE 1M	2402 ~ 2480	0-39[40]	-2.05	-0.97

5.4. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel	Frequency
LE 1M	CH 0(Low Channel), CH 19(MID Channel), CH 39(High Channel)	2402 MHz, 2440 MHz, 2480 MHz

5.5. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band				
Test Software Version		Lekit_200927.exe		
Modulation Type	Transmit Antenna Number	Test Software setting value		
		CH 0	CH 19	CH 39
GFSK(1Mbps)	1	default	default	default

5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna	Frequency (MHz)	Antenna Type	MAX Antenna Gain (dBi)
1	2402-2480	PCB	1.08

Test Mode	Transmit and Receive Mode	Description
LE 1M	<input checked="" type="checkbox"/> 1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.

5.7. SUPPORT UNITS FOR SYSTEM TEST

The EUT has been tested as an independent unit

Equipment	Manufacturer	Model No.
PC	Lenovo	T430

5.8. SETUP DIAGRAM



6. MEASURING EQUIPMENT AND SOFTWARE USED

Test Equipment of Radiated emissions below 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
Spectrum Analyzer	Rohde & Schwarz	FSV40	US40240623	2022-10-29	2023-10-28
RF Test Software	MWRF-test	MTS 8310	N/A	N/A	N/A
Radio Frequency control box	MWRF-test	MW200-RFCB	MW220111 ANCI	2022-05-13	2023-05-12
Radio Frequency control box	MWRF-test	MW200-RFCB 2#	/	2022-05-13	2023-05-12

Test Equipment of Radiated emissions below 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
EMI Test Receiver	ROHDE&SCHWARZ	ESCI	100302	2022/5/13	2023/5/12
Bilog Antenna	Schwarzbeck	VULB9163	VULB9163-1290	2022/12/12	2023/12/11
RF Cable	ZKJC	ZT06S-NJ-NJ-11M	19060398	2022/5/13	2023/5/12
RF Cable	ZKJC	ZT06S-NJ-NJ-0.5M	19060400	2022/5/13	2023/5/12
RF Cable	ZKJC	ZT06S-NJ-NJ-2.5M	19060404	2022/5/13	2023/5/12
EMI Test Receiver	ROHDE&SCHWARZ	ESPI7	100502	2022/10/8	2023/10/7
3m Semi-anechoic Chamber	Keysight	9m*6m*6m	N/A	2021/11/13	2024/11/12

Test Equipment of Radiated emissions above 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
Low noise Amplifiers	A-INFO	LA1018N4009	J1013130524001	2022/5/13	2023/5/12
Horn antenna	A-INFO	LB-10180-SF	J2031090612123	2022/5/15	2023/5/14
RF Cable	ZKJC	ZT26-NJ-NJ-11M	19060401	2022/5/13	2023/5/12
RF Cable	ZKJC	ZT26-NJ-NJ-2.5M	19060402	2022/5/13	2023/5/12
RF Cable	ZKJC	ZT26-NJ-NJ-0.5M	19060403	2022/5/13	2023/5/12
Spectrum Analyzer	Rohde & Schwarz	FSV40	US40240623	2022-10-29	2023-10-28
3m Semi-anechoic Chamber	Keysight	9m*6m*6m	N/A	2021/11/13	2024/11/12
Test Software	Farad	EZ-EMC (Ver.FA-03A2RE)	N/A	N/A	N/A

7. ANTENNA PORT TEST RESULTS

7.1. CONDUCTED OUTPUT POWER

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(b)(3)	Peak Conduct Output Power	1 watt or 30 dBm	2400-2483.5

TEST PROCEDURE

Connect the EUT to a low loss RF cable from the antenna port to the power sensor (video bandwidth is greater than the occupied bandwidth).

Measure peak emission level, the indicated level is the peak output power, after any corrections for external attenuators and cables.

TEST ENVIRONMENT

Temperature	24°C	Relative Humidity	50%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data" - Appendix

7.2. 6DB BANDWIDTH

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(a)(2)	6 dB Bandwidth	≥ 500 kHz	2400-2483.5

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.8 for DTS bandwidth and clause 6.9 for Occupied Bandwidth.

Connect the EUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Frequency Span	For 6 dB Bandwidth: Enough to capture all products of the modulation carrier emission
Detector	Peak
RBW	For 6 dB Bandwidth: 100 kHz
VBW	For 6 dB Bandwidth: $\geq 3 \times$ RBW
Trace	Max hold
Sweep	Auto couple

a) Use the 99 % power bandwidth function of the instrument, allow the trace to stabilize and report the measured bandwidth.

b) Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

TEST ENVIRONMENT

Temperature	24°C	Relative Humidity	50%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data" - Appendix

7.3. POWER SPECTRAL DENSITY

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC §15.247 (e)	Power Spectral Density	8 dBm in any 3 kHz band	2400-2483.5

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.10.

Connect the EUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	PEAK
RBW	$3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
VBW	$\geq 3 \times \text{RBW}$
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple

Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST ENVIRONMENT

Temperature	24°C	Relative Humidity	50%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data" - Appendix

7.4. CONDUCTED BAND EDGE AND SPURIOUS EMISSION

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C		
Section	Test Item	Limit
CFR 47 FCC §15.247 (d)	Conducted Bandedge and Spurious Emissions	at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.11 and 11.13.

Connect the EUT to the spectrum analyser and use the following settings for reference level measurement:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	100 kHz
VBW	$\geq 3 \times \text{RBW}$
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum PSD level.

Change the settings for emission level measurement:

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100 kHz
VBW	$\geq 3 \times \text{RBW}$
measurement points	$\geq \text{span}/\text{RBW}$
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum PSD level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11.

TEST ENVIRONMENT

Temperature	24°C	Relative Humidity	55%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data" - Appendix

7.5. DUTY CYCLE

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.6 Zero – Span Spectrum Analyzer method.

TEST ENVIRONMENT

Temperature	24°C	Relative Humidity	50%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data" - Appendix

8. RADIATED TEST RESULTS

LIMITS

Please refer to CFR 47 FCC §15.205 and §15.209.

Radiation Disturbance Test Limit for FCC (Class B) (9 kHz ~ 1 GHz)

Emissions radiated outside of the specified frequency bands above 30 MHz			
Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m	
		Quasi-Peak	
30 - 88	100	40	
88 - 216	150	43.5	
216 - 960	200	46	
Above 960	500	54	
Above 1000	500	Peak	Average
		74	54

FCC Emissions radiated outside of the specified frequency bands below 30 MHz		
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30

FCC Restricted bands of operation refer to FCC §15.205 (a):

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

Note: ¹Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

²Above 38.6c

TEST PROCEDURE

Below 30 MHz

The setting of the spectrum analyser

RBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
VBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
Sweep	Auto

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.4.
2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both Horizontal, Face-on and Face-off polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 80 cm above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a 1 m height antenna tower.
5. The radiated emission limits 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.
6. For measurement below 1 GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak and average detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak and average detector and reported.
7. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30m open field site. Therefore sufficient tests were made

to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field site based on KDB 414788.

8. The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377Ω . For example, the measurement frequency X KHz resulted in a level of Y dBuV/m, which is equivalent to $Y-51.5 = Z$ dBuA/m, which has the same margin, W dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit.

Below 1 GHz and above 30 MHz

The setting of the spectrum analyser

RBW	120 kHz
VBW	300 kHz
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.5.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 80 cm above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. For measurement below 1 GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

Above 1G

The setting of the spectrum analyser

RBW	1 MHz
VBW	PEAK: 3 MHz AVG: see note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.6.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high

pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

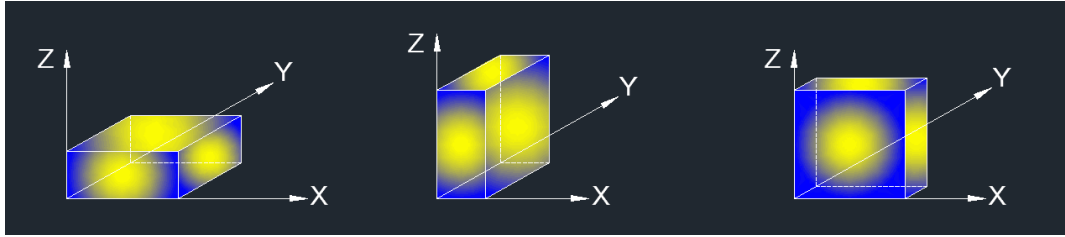
3. The EUT was placed on a turntable with 1.5 m above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement above 1 GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.

6. For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause 7.1.ON TIME AND DUTY CYCLE.

X axis, Y axis, Z axis positions:



Note 1: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

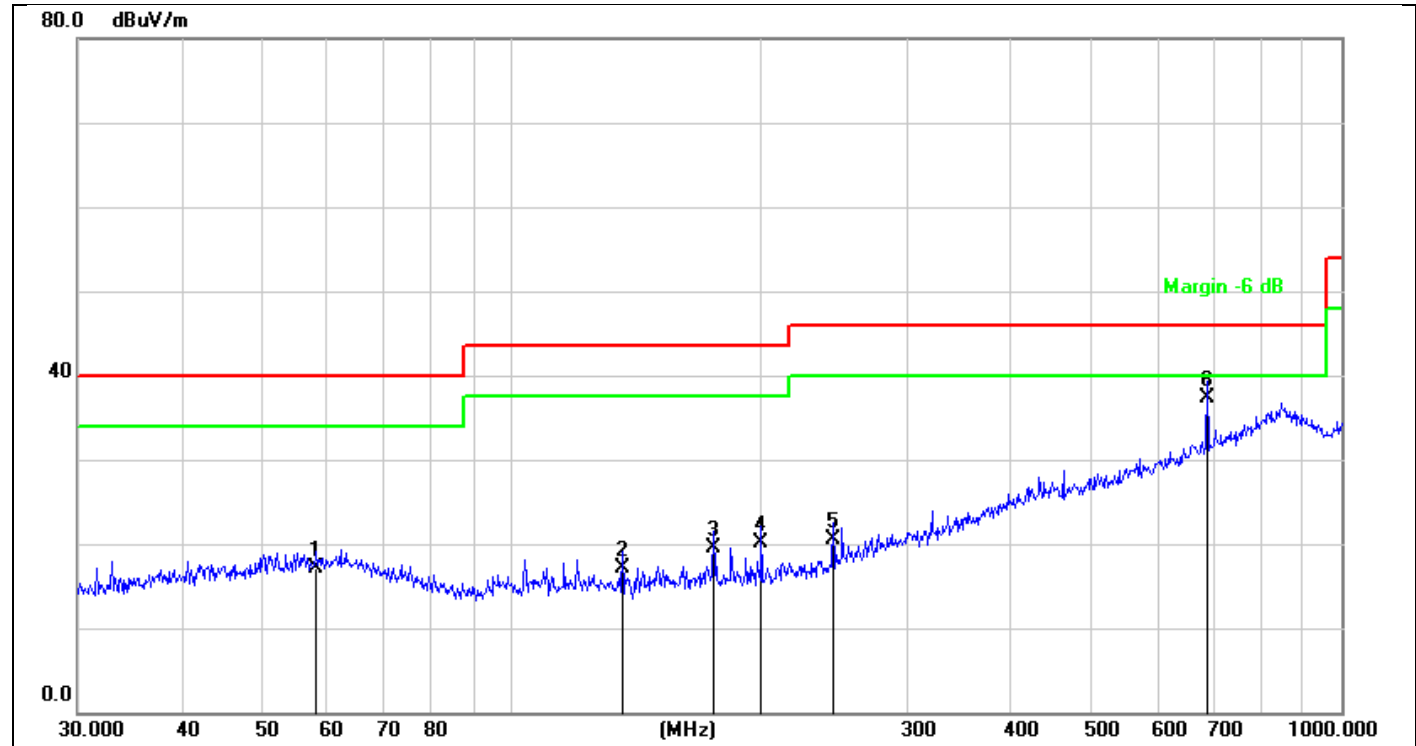
TEST ENVIRONMENT

Temperature	24°C	Relative Humidity	50%
Atmosphere Pressure	101kPa		

TEST RESULTS

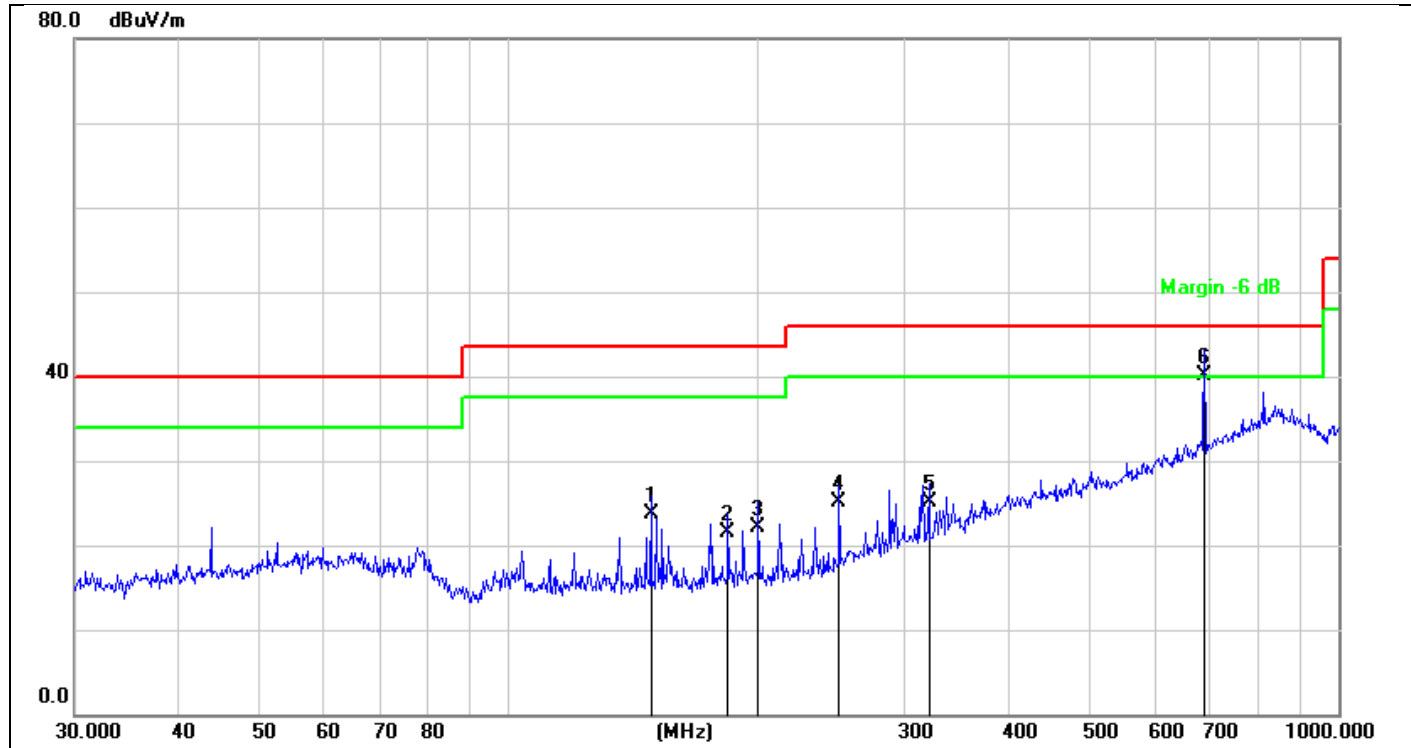
Radiated Spurious Emission :

The data of the mode (GFSK 2402MHz) are recorded in the following pages.



Site:	ChamberA-2	Antenna::	Horizontal	Temperature(C):	26(C)
Limit:	FCC Part 15 C 3m Radiation(QP)			Humidity(%):	60%
EUT:	MiTag	Test Time:	2023-03-03		
M/N.:	HD-P16	Power Rating:	Battery 3V		
Mode:	TX2402	Test Engineer:	Sunshine		
Note:					

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measure-ment(dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1	46.0164	25.43	-10.11	15.32	40.00	-24.68	QP	
2	56.7917	25.19	-9.14	16.05	40.00	-23.95	QP	
3 *	68.3908	26.34	-10.13	16.21	40.00	-23.79	QP	
4	112.9196	26.06	-11.79	14.27	43.50	-29.23	QP	
5	199.9856	25.81	-11.29	14.52	43.50	-28.98	QP	
6	280.0237	25.52	-8.01	17.51	46.00	-28.49	QP	



Site:	ChamberA-2	Antenna::Vertical	Temperature(C):26(C)
Limit:	FCC Part 15 C 3m Radiation(QP)		Humidity(%):60%
EUT:	MiTag	Test Time:	2023-03-03
M/N.:	HD-P16	Power Rating:	Battery 3V
Mode:	TX2402	Test Engineer:	Sunshine
Note:			

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measure-ment(dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1	148.4410	35.08	-11.33	23.75	43.50	-19.75	QP	
2	183.8440	32.70	-11.10	21.60	43.50	-21.90	QP	
3	199.9856	33.44	-11.29	22.15	43.50	-21.35	QP	
4	250.3012	34.23	-9.17	25.06	46.00	-20.94	QP	
5	321.0608	31.74	-6.54	25.20	46.00	-20.80	QP	
6 *	689.5644	36.89	3.26	40.15	46.00	-5.85	QP	

Above 1000MHz~10th Harmonics:

Operation Mode: TX Mode (CH00: 2402MHz) Test Date : 2023-03-03
 Frequency Range: 1-25GHz Temperature : 25°C
 Test Result: PASS Humidity : 58 %
 Measured Distance: 3m Test By: Best

Freq.	Ant. Pol.	Reading Level(dBuV/m)		Correct Factor	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
(MHz)	H/V	PK	AV	dB	PK	AV	PK	AV	PK	AV
4804	V	94.02	74.48	-32.3	62.32	42.18	74	54	-11.68	-11.82
7206	V	96.34	76.56	-37.2	59.14	39.36	74	54	-14.86	-14.64
9608	V	98.12	77.97	-39.8	58.32	38.17	74	54	-15.68	-15.83
12010	V	96.82	76.64	-40.5	56.32	36.14	74	54	-17.68	-17.86
14412	V	97.17	77.95	-41.7	55.47	36.25	74	54	-18.53	-17.75
16814	V	95.39	76.41	-40	55.39	36.41	74	54	-18.61	-17.59
4804	H	93.62	74.34	-31.6	62.02	42.74	74	54	-11.98	-11.26
7206	H	95.63	75.75	-35.5	60.13	40.25	74	54	-13.87	-13.75
9608	H	97.62	78.42	-38.3	59.32	40.12	74	54	-14.68	-13.88
12010	H	95.14	75.25	-39	56.14	36.25	74	54	-17.86	-17.75
14412	H	97.41	78.47	-42	55.41	36.47	74	54	-18.59	-17.53
16814	H	94.66	75.55	-39.3	55.36	36.25	74	54	-18.64	-17.75

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.

(2) Emission Level= Reading Level+ Probe Factor +Cable Loss.

(3) The average measurement was not performed when the peak measured data under the limit of average detection.

(4) Measuring frequencies from 1GHz to 25GHz.

Operation Mode: TX Mode (CH19: 2440MHz) Test Date : 2023-03-03
 Frequency Range: 1-25GHz Temperature : 25°C
 Test Result: PASS Humidity : 58 %
 Measured Distance: 3m Test By: Best

Freq.	Ant. Pol.	Reading Level(dBuV/m)		Correct Factor	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	dB	PK	AV	PK	AV	PK	AV
4880	V	95.57	75.58	-32.3	63.27	43.28	74	54	-10.73	-10.72
7320	V	97.22	77.45	-37.2	60.02	40.25	74	54	-13.98	-13.75
9760	V	98.12	79.03	-39.8	58.32	39.23	74	54	-15.68	-14.77
12200	V	96.82	77.72	-40.5	56.32	37.22	74	54	-17.68	-16.78
14640	V	96.14	77.14	-41	55.14	36.14	74	54	-18.86	-17.86
17080	V	95.46	76.57	-41.1	54.36	35.47	74	54	-19.64	-18.53
4880	H	94.38	75.12	-31.6	62.78	43.52	74	54	-11.22	-10.48
7320	H	95.64	76	-35.5	60.14	40.5	74	54	-13.86	-13.5
9760	H	96.49	77.71	-38.3	58.19	39.41	74	54	-15.81	-14.59
12200	H	95.5	76.52	-39	56.5	37.52	74	54	-17.5	-16.48
14640	H	97.17	78.44	-42	55.17	36.44	74	54	-18.83	-17.56
17080	H	96.82	77.64	-41.5	55.32	36.14	74	54	-18.68	-17.86

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.

(2) Emission Level= Reading Level+ Probe Factor +Cable Loss.

(3) The average measurement was not performed when the peak measured data under the limit of average detection.

(4) Measuring frequencies from 1GHz to 25GHz.

Operation Mode: TX Mode (CH39: 2480MHz) Test Date : 2023-03-03
 Frequency Range: 1-25GHz Temperature : 25°C
 Test Result: PASS Humidity : 58 %
 Measured Distance: 3m Test By: Best

Freq. (MHz)	Ant. Pol.	Reading Level(dBuV/m)		Correct Factor dB	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
4960	V	94.48	75.56	-32.3	62.18	43.26	74	54	-11.82	-10.74
7440	V	97.22	77.39	-37.2	60.02	40.19	74	54	-13.98	-13.81
9920	V	98.43	77.82	-39.8	58.63	38.02	74	54	-15.37	-15.98
12400	V	96.82	78.46	-40.5	56.32	37.96	74	54	-17.68	-16.04
14880	V	96.41	77.47	-41	55.41	36.47	74	54	-18.59	-17.53
17360	V	96.39	77.35	-41.1	55.29	36.25	74	54	-18.71	-17.75
4960	H	94.18	74.6	-31.6	62.58	43	74	54	-11.42	-11
7440	H	95.73	75.75	-35.5	60.23	40.25	74	54	-13.77	-13.75
9920	H	96.77	77.63	-38.3	58.47	39.33	74	54	-15.53	-14.67
12400	H	95.32	76.52	-39	56.32	37.52	74	54	-17.68	-16.48
14880	H	97.36	78.14	-42	55.36	36.14	74	54	-18.64	-17.86
17360	H	96.64	77.52	-41.5	55.14	36.02	74	54	-18.86	-17.98

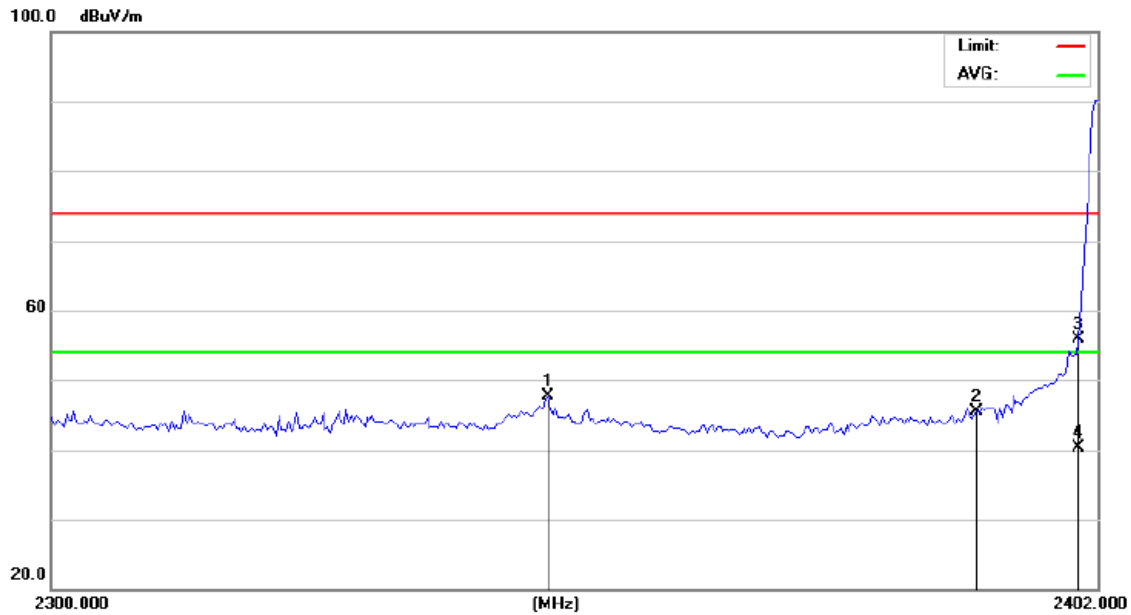
Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.

(2) Emission Level= Reading Level+ Probe Factor +Cable Loss.

(3) The average measurement was not performed when the peak measured data under the limit of average detection.

(4) Measuring frequencies from 1GHz to 25GHz.

Band edge:

Site 843

Polarization: **Horizontal**

Temperature: 26.5(C)

Limit: FCC Part 15 C 3m Above1G(Peak)

Power: Battery 3V

Humidity: 60.6 %

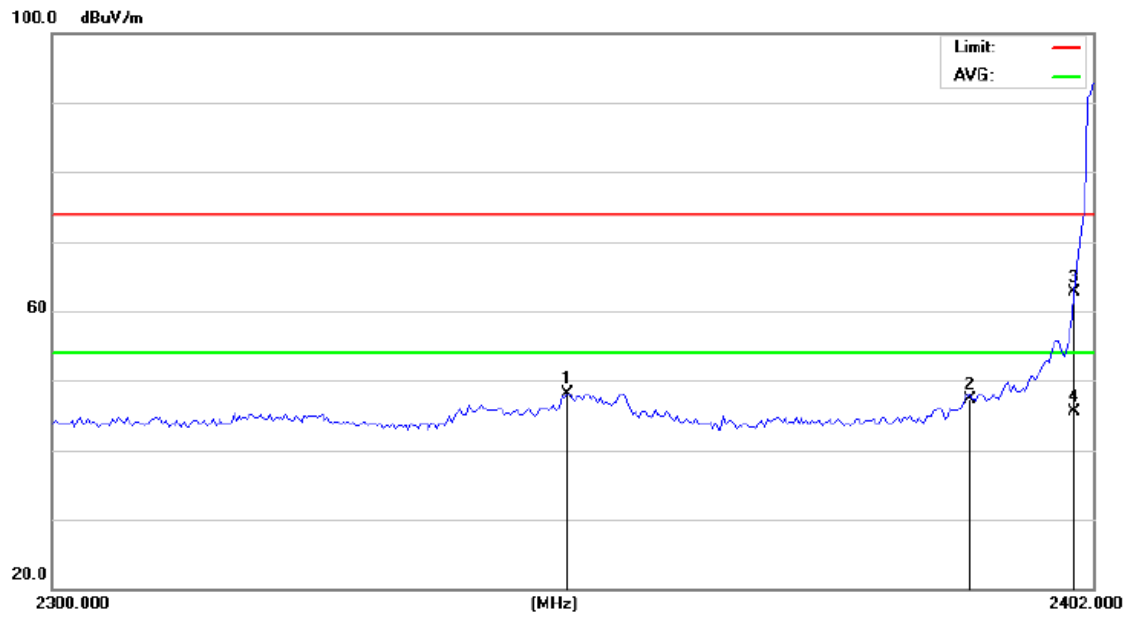
Mode: TX2402

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1		2347.898	52.84	-5.11	47.73	74.00	-26.27	peak			
2		2390.000	50.24	-4.82	45.42	74.00	-28.58	peak			
3		2400.000	60.70	-4.75	55.95	74.00	-18.05	peak			
4	*	2400.000	45.02	-4.75	40.27	54.00	-13.73	AVG			

*:Maximum data x:Over limit !:over margin

(Reference Only)



Site 843

Polarization: **Vertical**

Temperature: 26.5(C)

Limit: FCC Part 15 C 3m Above1G(Peak)

Power: Battery 3V

Humidity: 60.6 %

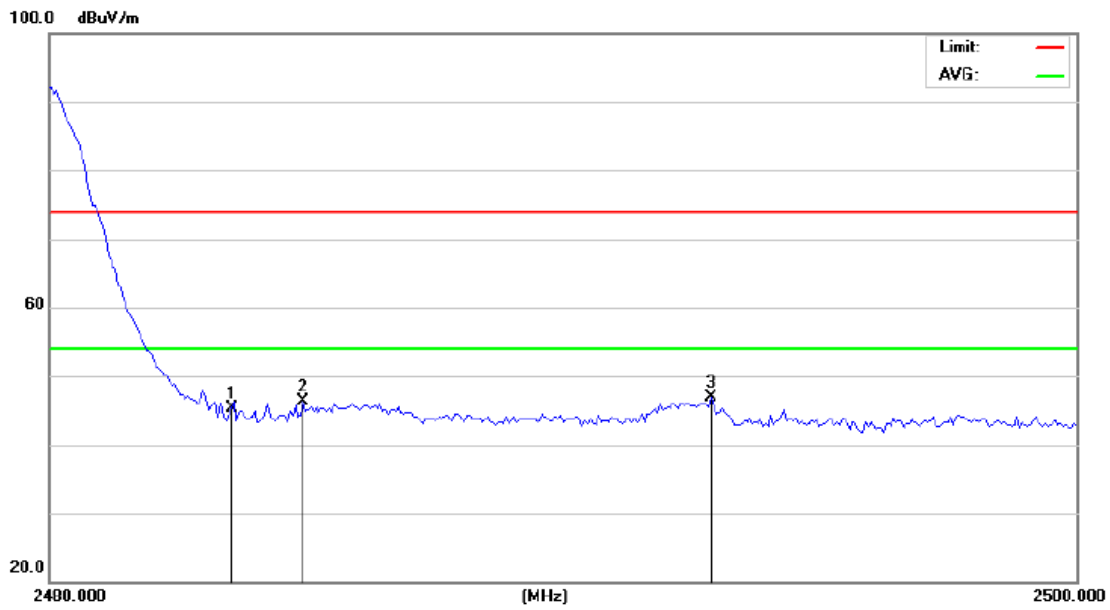
Mode: TX2402

Note:

No. Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
	MHz	dBuV	dB	dBuV/m	dB/m	dB	cm	degree	Comment
1	2349.937	53.15	-5.09	48.06	74.00	-25.94	peak		
2	2390.000	52.18	-4.82	47.36	74.00	-26.64	peak		
3	2400.000	67.50	-4.75	62.75	74.00	-11.25	peak		
4 *	2400.000	50.25	-4.75	45.50	54.00	-8.50	AVG		

*:Maximum data x:Over limit !:over margin

(Reference Only)



Site 843

Polarization: **Horizontal**

Temperature: 26.5(C)

Limit: FCC Part 15 C 3m Above1G(Peak)

Power: Battery 3V

Humidity: 60.6 %

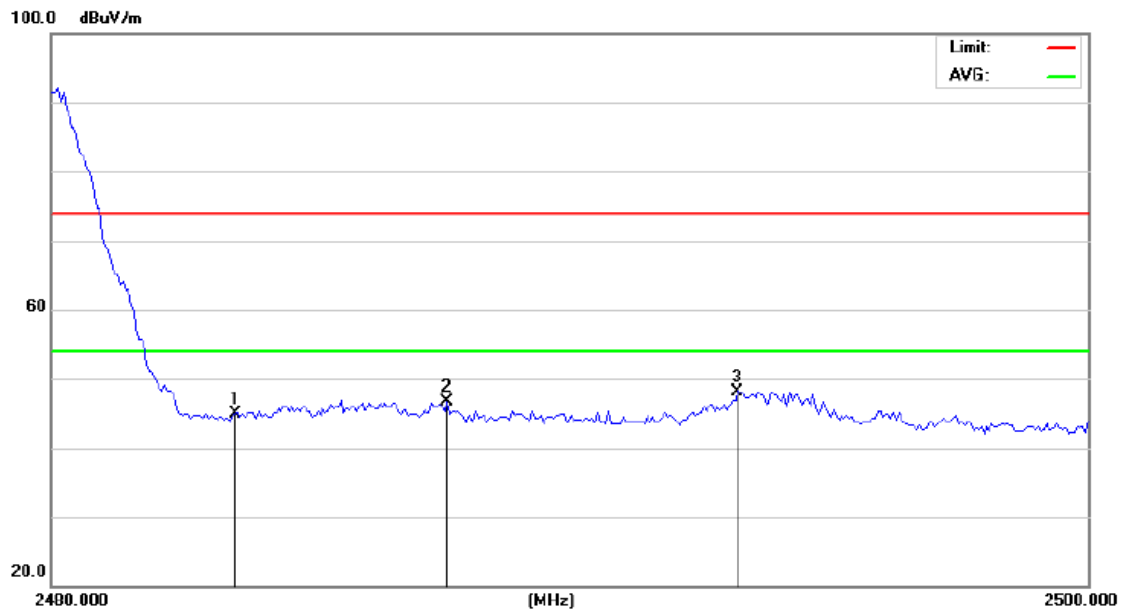
Mode: TX2480

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Antenna Height cm	Table Degree	
							Detector		degree	Comment
1		2483.500	49.55	-4.19	45.36	74.00	-28.64	peak		
2		2484.935	50.44	-4.18	46.26	74.00	-27.74	peak		
3	*	2492.882	51.08	-4.14	46.94	74.00	-27.06	peak		

*:Maximum data x:Over limit l:over margin

(Reference Only)



Site 843

Polarization: **Vertical**

Temperature: 26.5(C)

Limit: FCC Part 15 C 3m Above1G(Peak)

Power: Battery 3V

Humidity: 60.6 %

Mode: TX2480

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	cm	degree	Comment
1		2483.500	49.14	-4.19	44.95	74.00	-29.05	peak		
2		2487.631	50.85	-4.16	46.69	74.00	-27.31	peak		
3	*	2493.282	52.23	-4.14	48.09	74.00	-25.91	peak		

*:Maximum data x:Over limit !:over margin

(Reference Only)

9. ANTENNA REQUIREMENT

REQUIREMENT

The EUT'S antenna is met the requirement of FCC part 15C section 15.203 and 15.247.

FCC part 15C section 15.247 requirements:

Systems operating in the 2402-2480MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

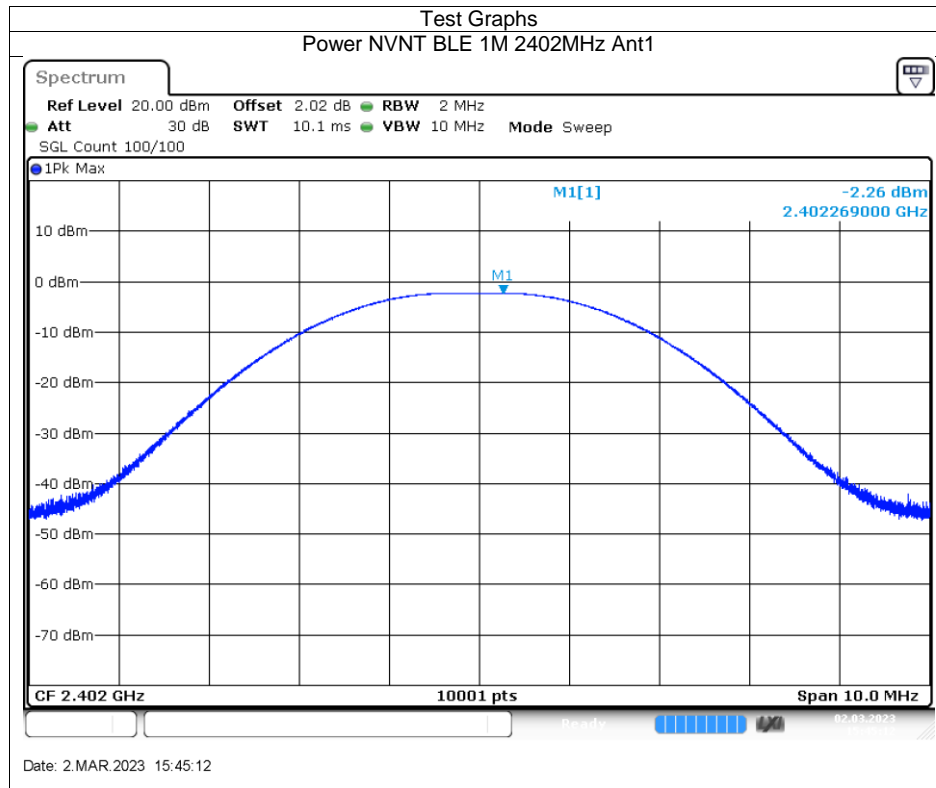
DESCRIPTION

Pass

10. TEST DATA

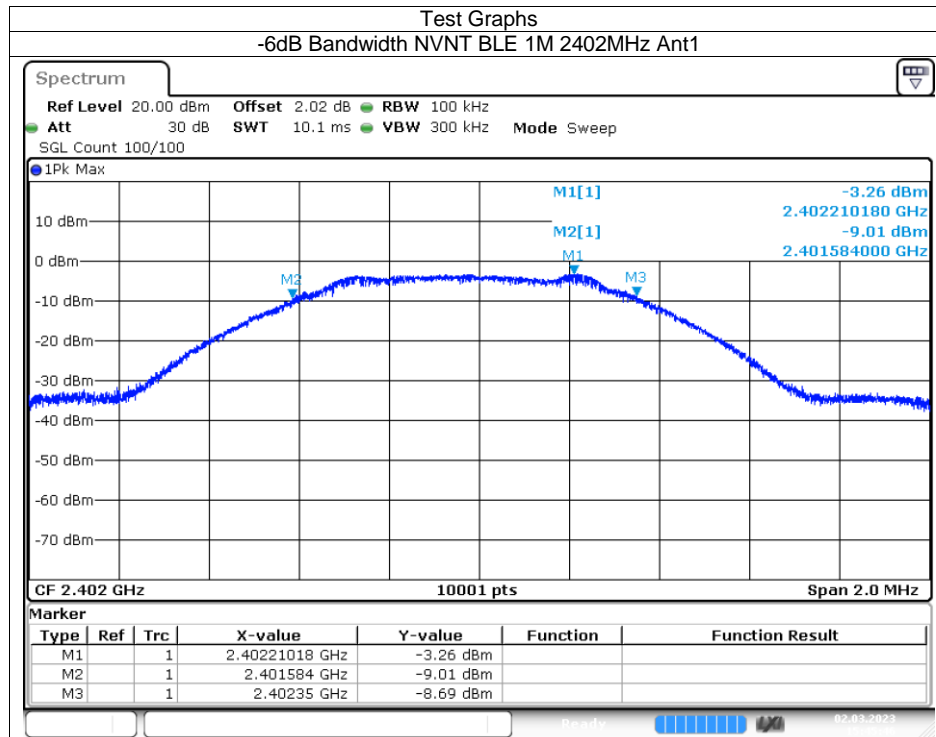
Conducted Output Power

Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
BLE 1M	2402	Ant1	-2.26	0	-2.26	30	Pass
BLE 1M	2440	Ant1	-2.22	0	-2.22	30	Pass
BLE 1M	2480	Ant1	-2.05	0	-2.05	30	Pass

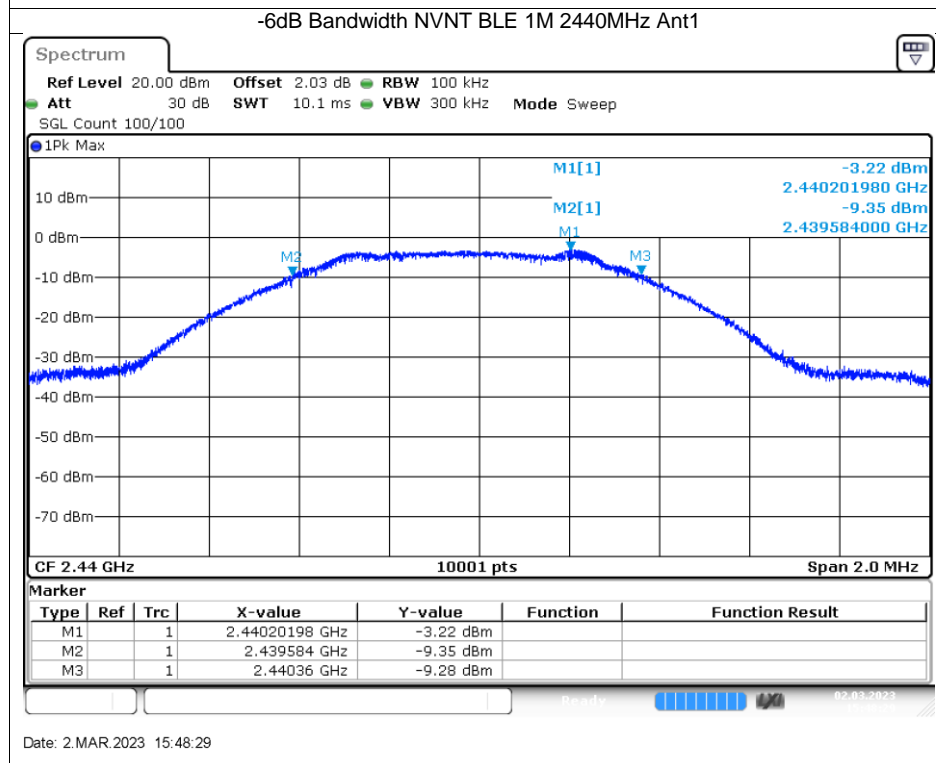


-6dB Bandwidth

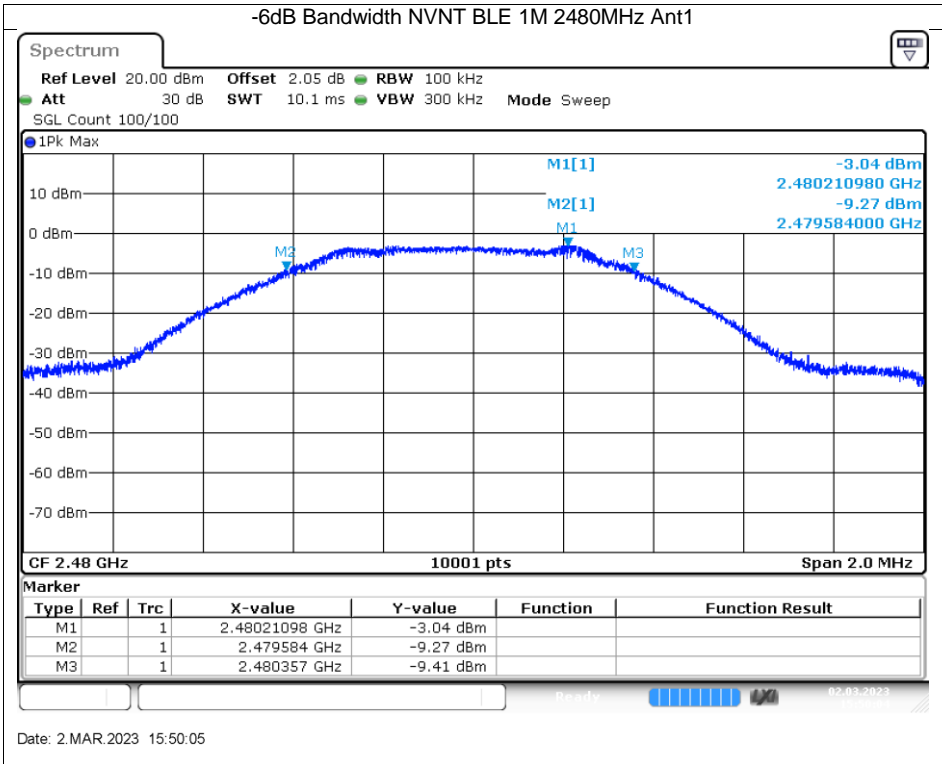
Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
BLE 1M	2402	Ant1	0.766	0.5	Pass
BLE 1M	2440	Ant1	0.775	0.5	Pass
BLE 1M	2480	Ant1	0.773	0.5	Pass



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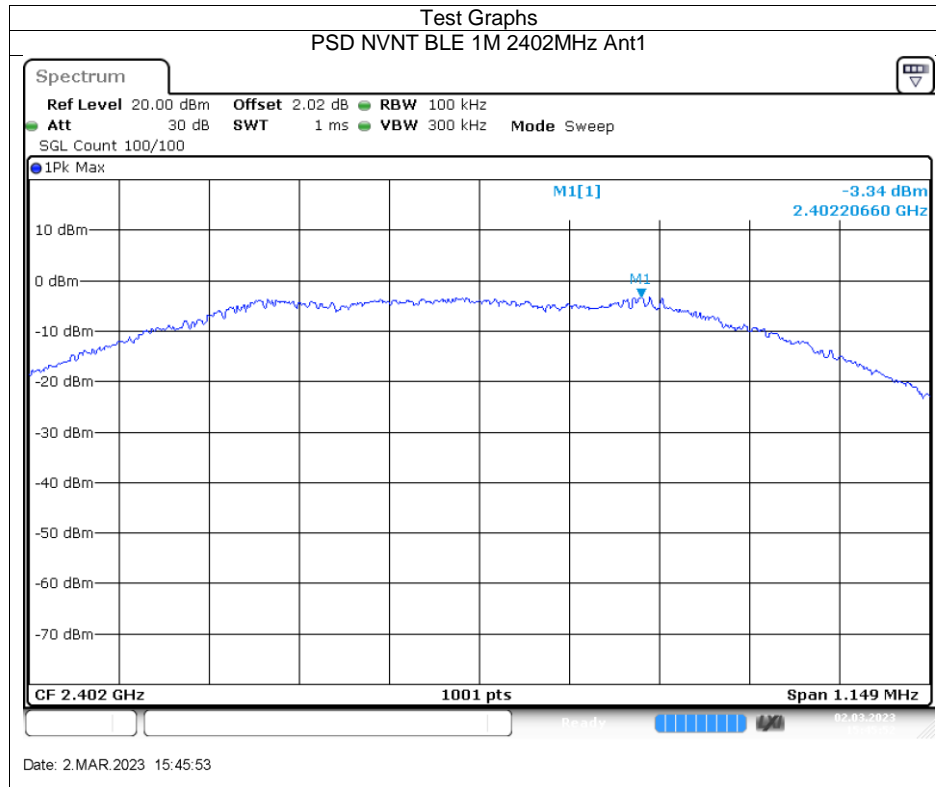


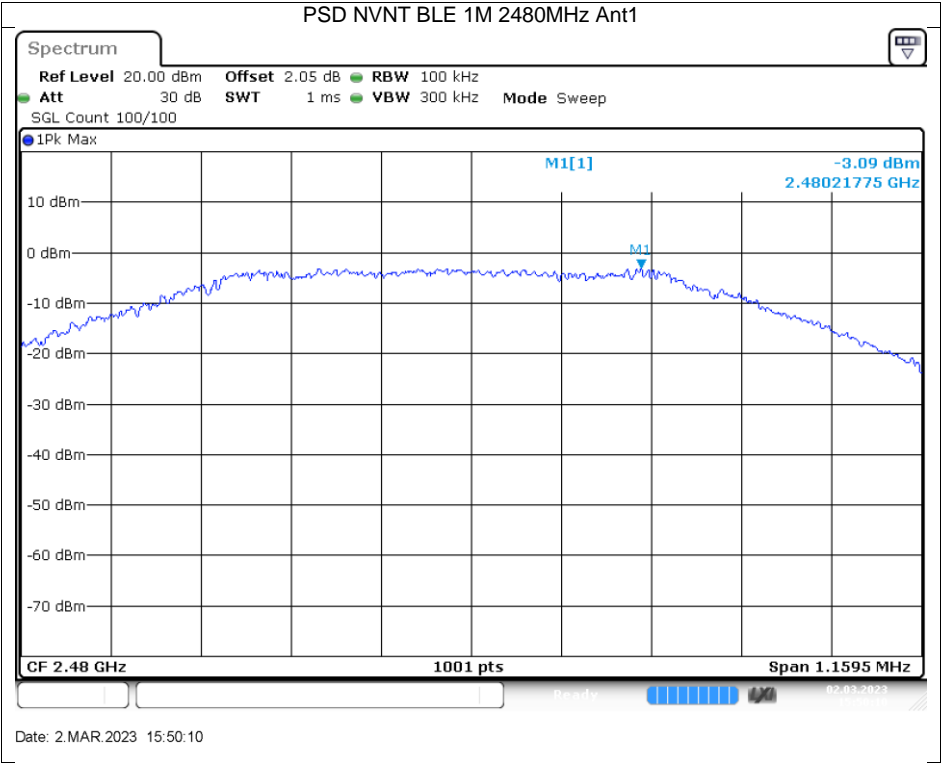
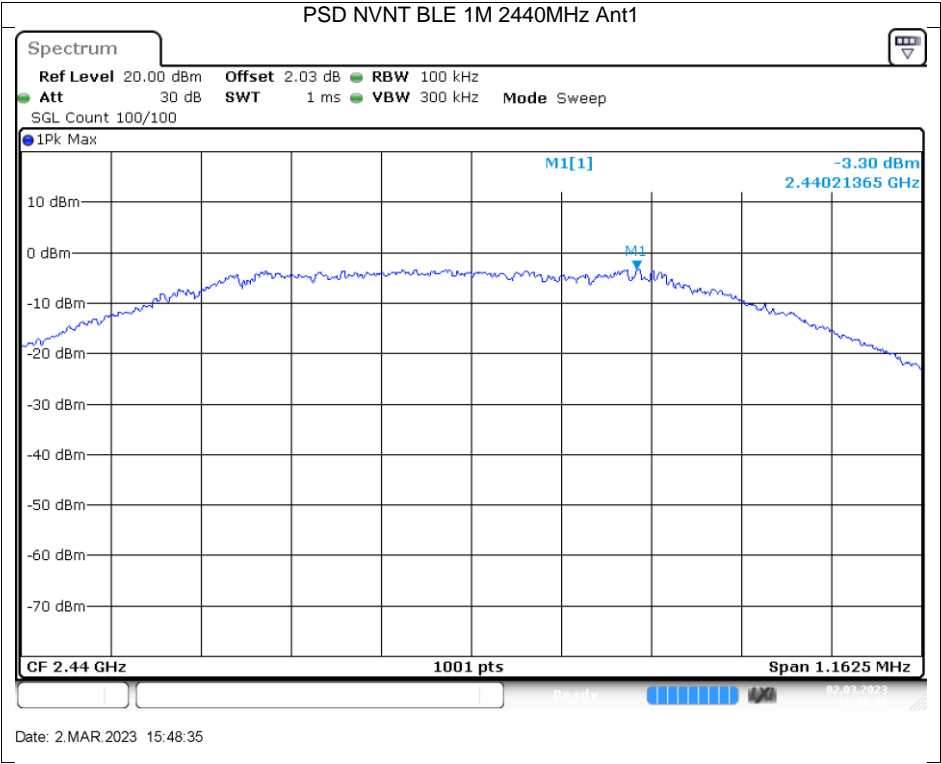
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Power Spectral Density

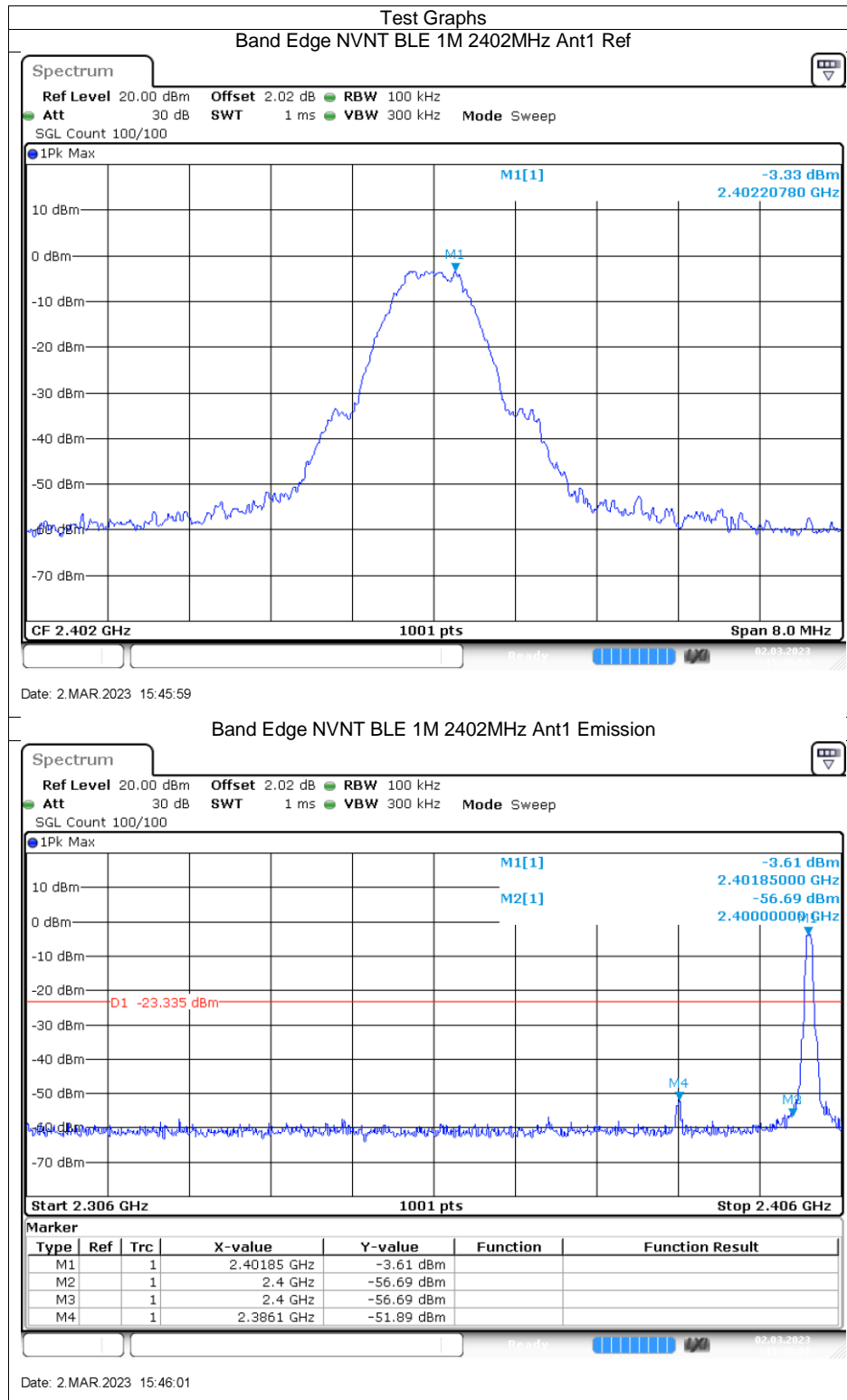
Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Duty Factor (dB)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
BLE 1M	2402	Ant1	-3.34	0	-3.34	8	Pass
BLE 1M	2440	Ant1	-3.3	0	-3.3	8	Pass
BLE 1M	2480	Ant1	-3.09	0	-3.09	8	Pass

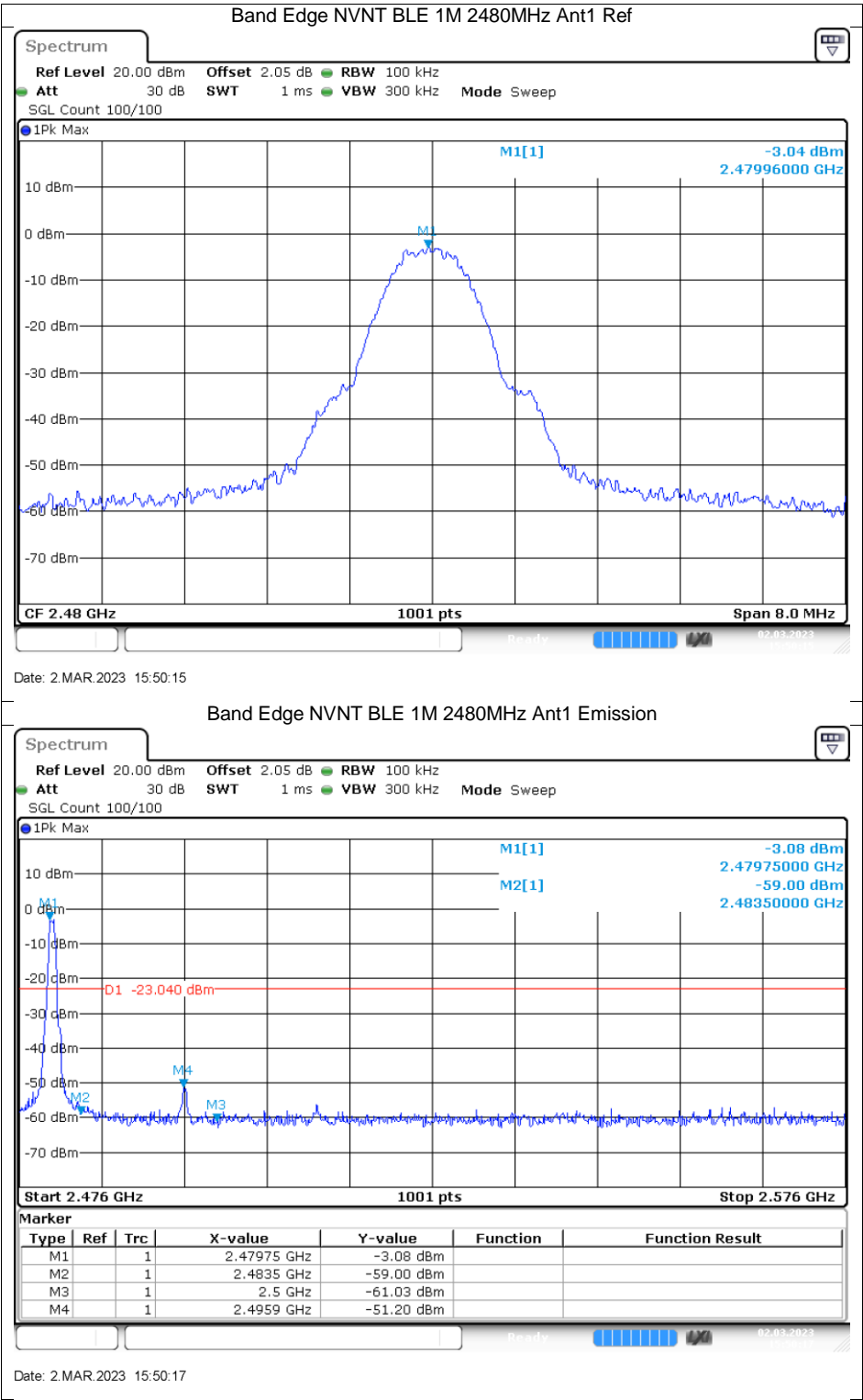




Band Edge

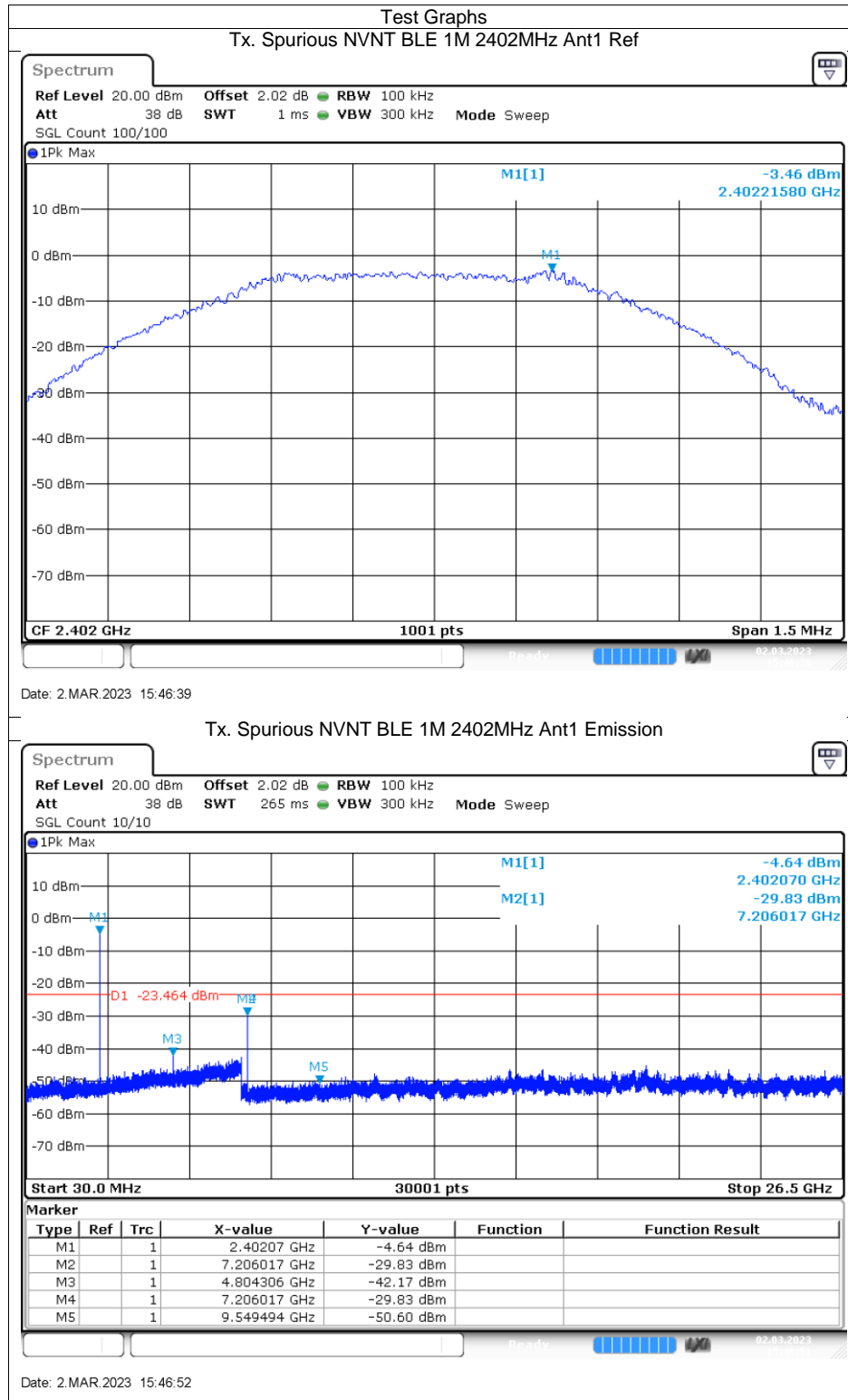
Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
BLE 1M	2402	Ant1	-48.56	-20	Pass
BLE 1M	2480	Ant1	-48.16	-20	Pass

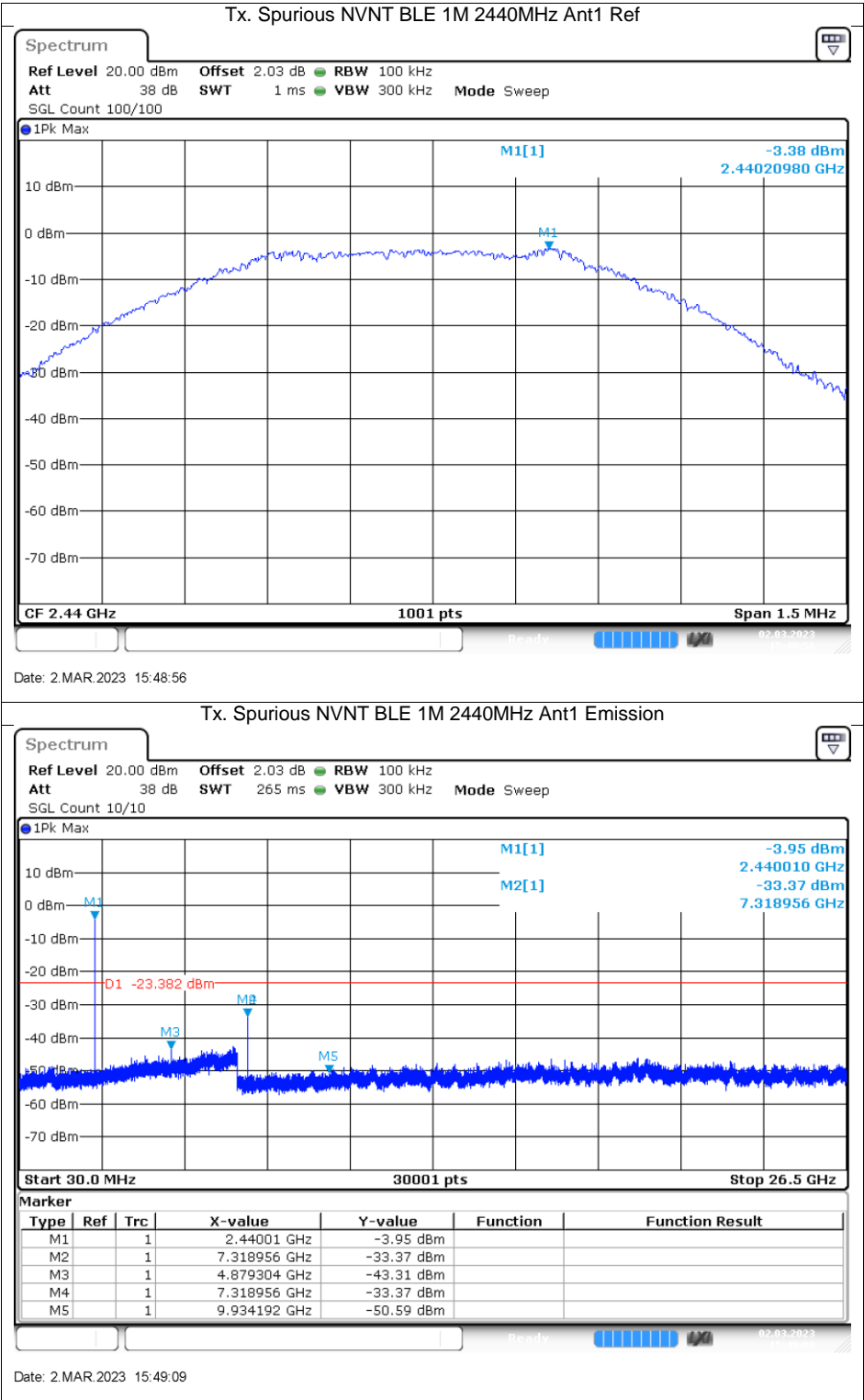


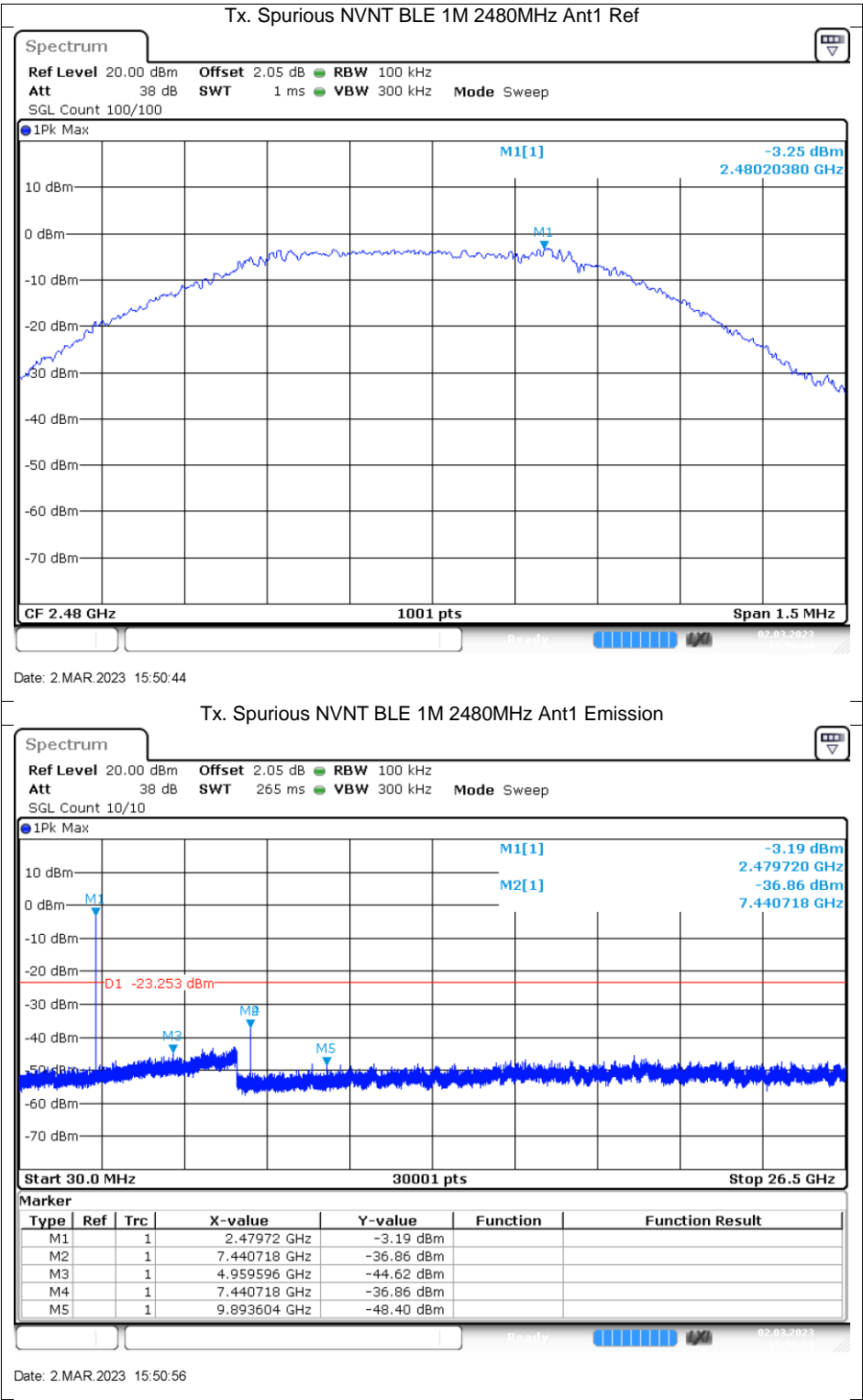


Conducted RF Spurious Emission

Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
BLE 1M	2402	Ant1	-26.37	-20	Pass
BLE 1M	2440	Ant1	-29.98	-20	Pass
BLE 1M	2480	Ant1	-33.6	-20	Pass

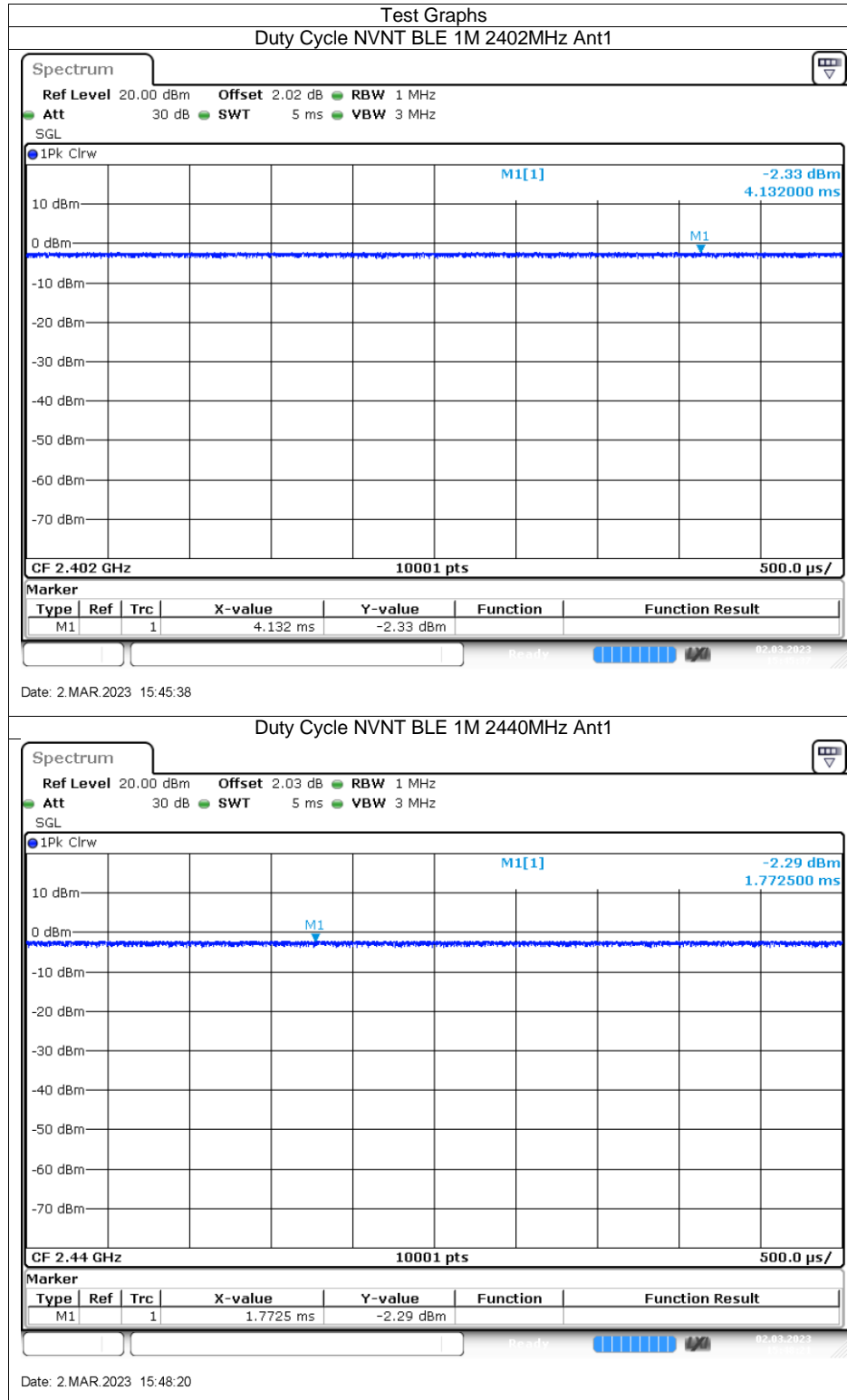


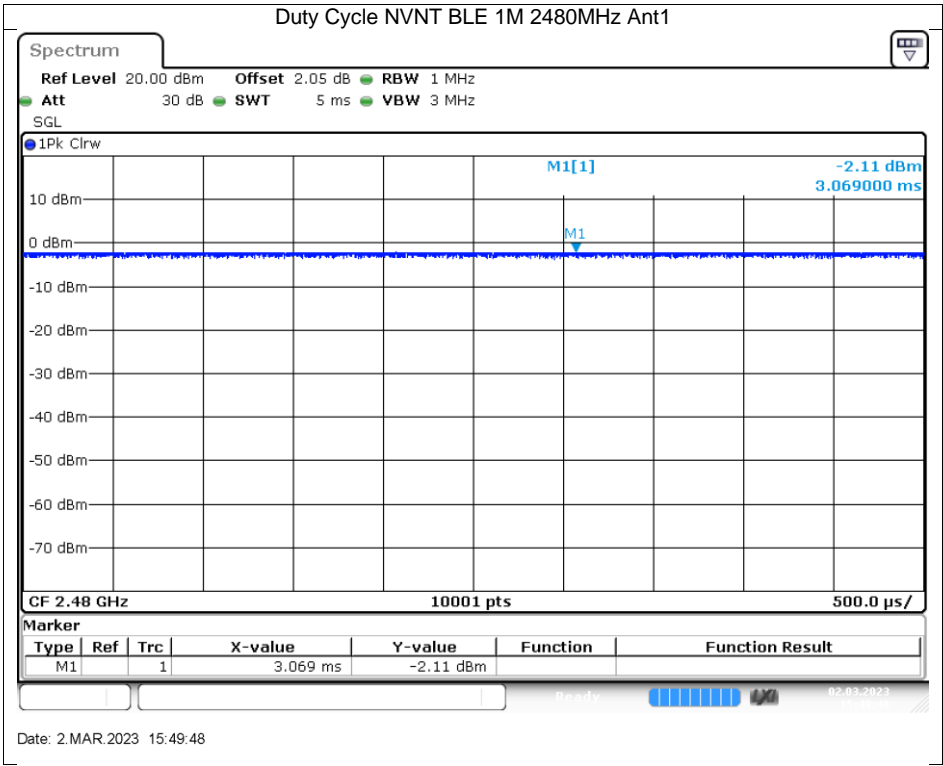




Duty Cycle

Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
BLE 1M	2402	Ant1	100	0	0
BLE 1M	2440	Ant1	100	0	0
BLE 1M	2480	Ant1	100	0	0





APPENDIX: PHOTOGRAPHS OF TEST CONFIGURATION

Radiated emissions below 1GHz



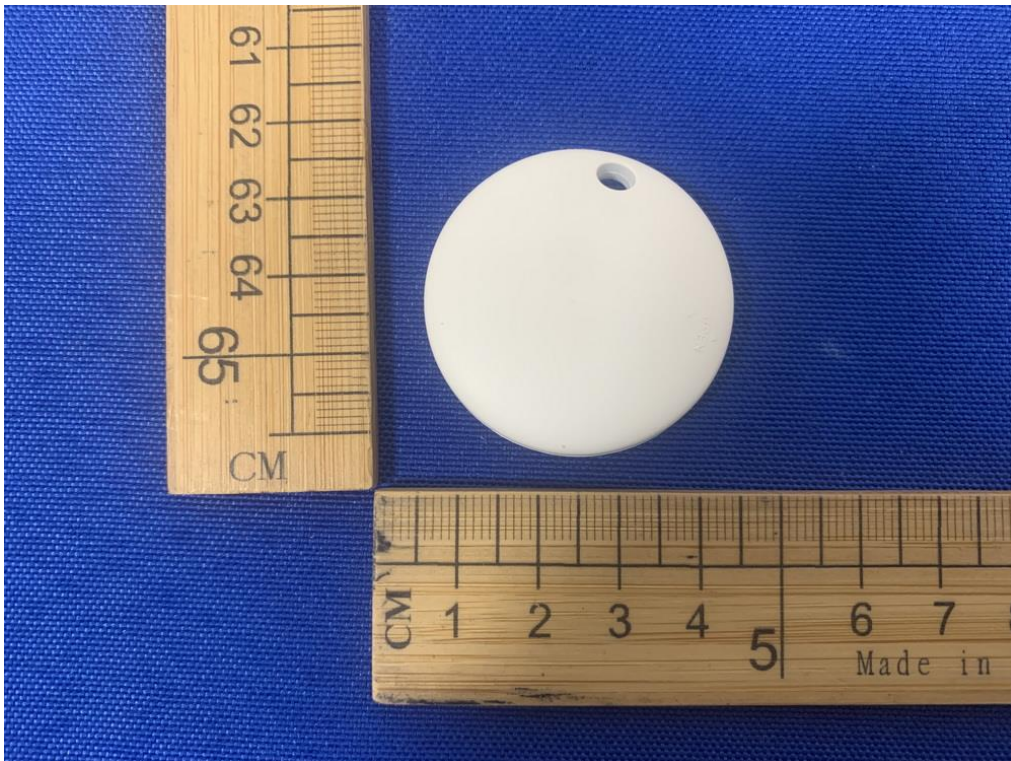
Radiated emissions above 1GHz



APPENDIX: PHOTOGRAPHS OF THE EUT

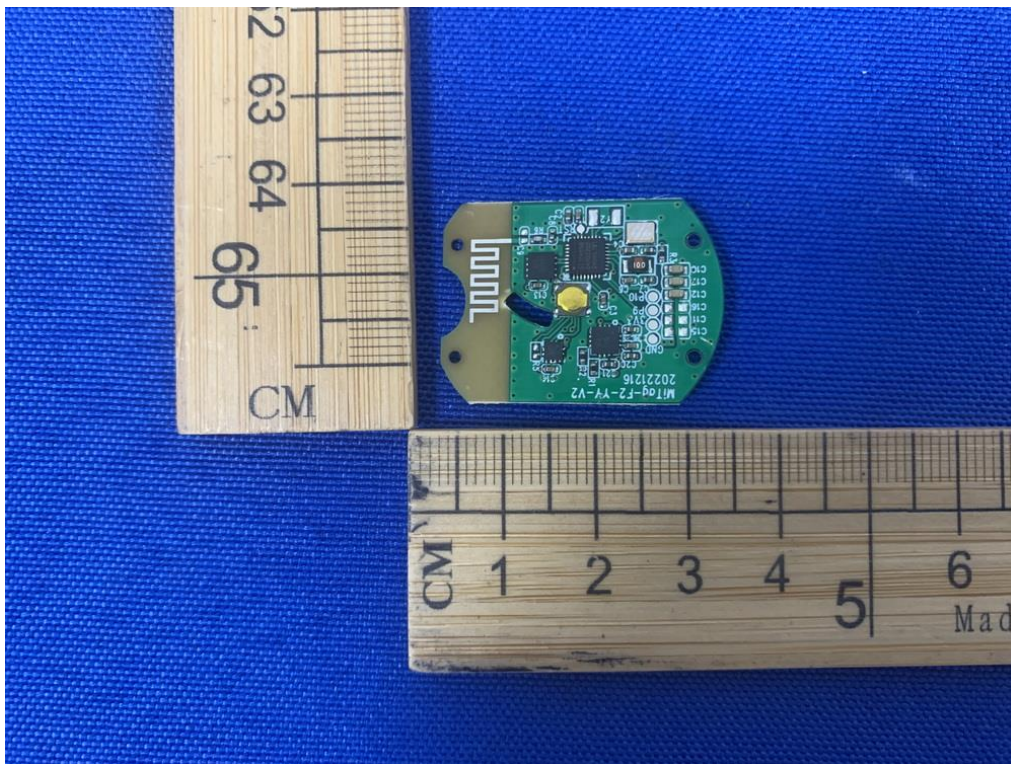
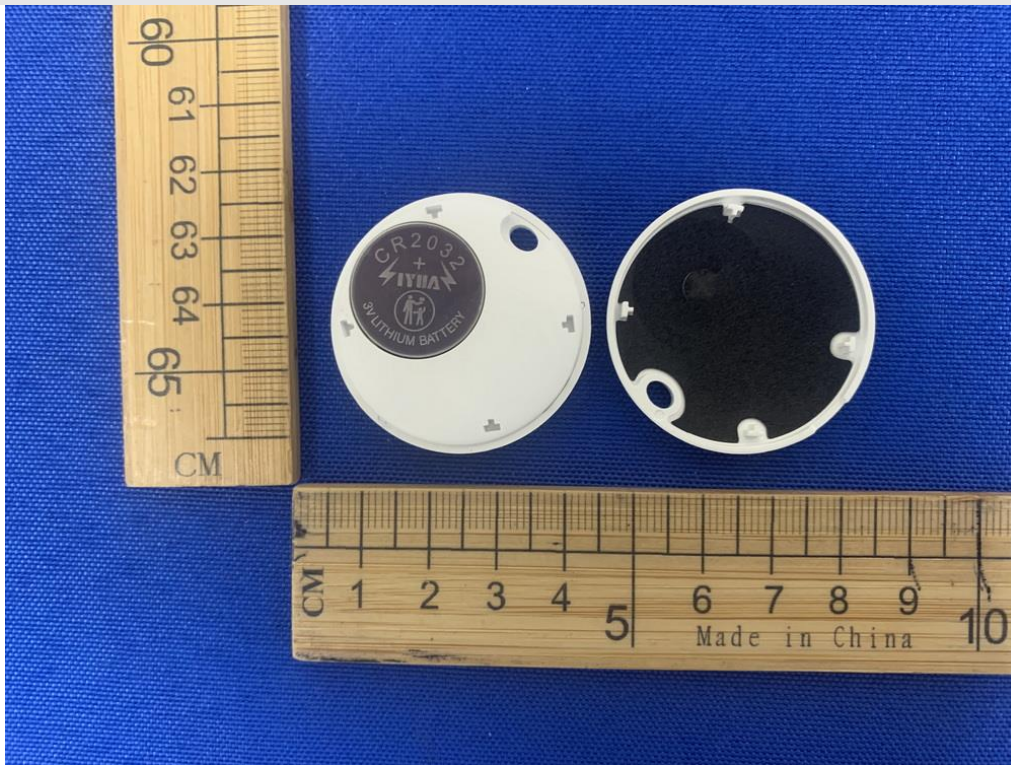
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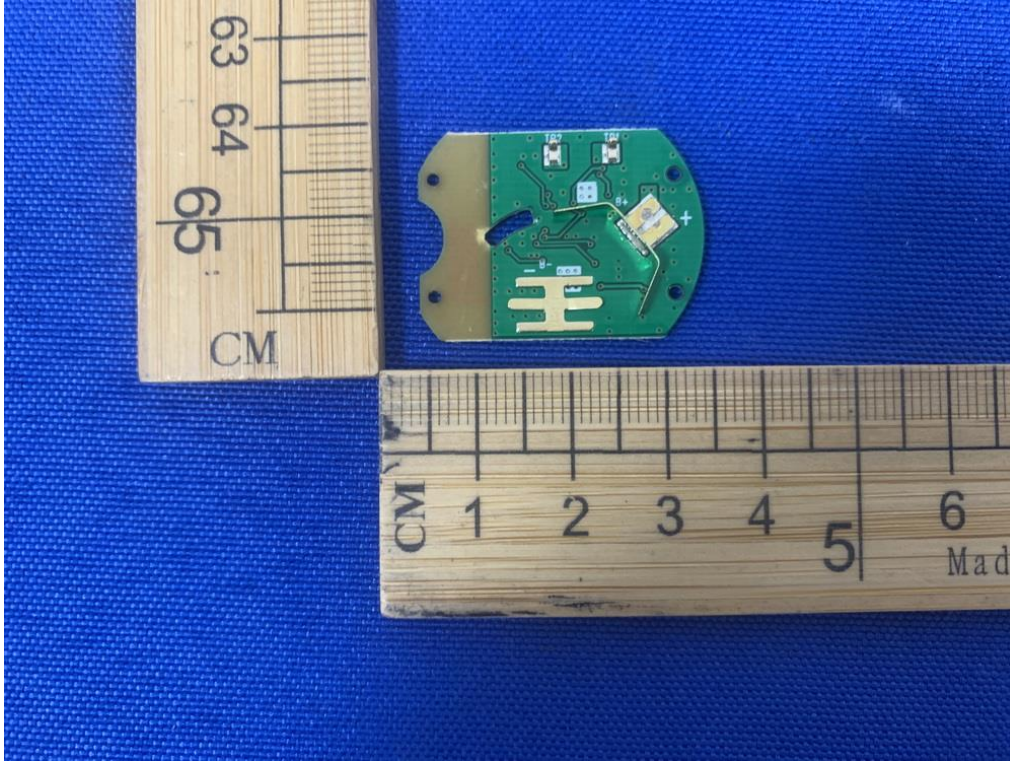






Internal





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