

CFR 47 FCC PART 15 SUBPART C(DTS)

TEST REPORT

For

Cylinder Floor Lamp

MODEL NUMBER: SUR-D50-001

REPORT NUMBER: E01A2110009F00201

ISSUE DATE: July 13, 2023

FCC ID:2A9BQ-D50

Prepared for

**Shenzhen Surmountor Lighting Co. Ltd
2nd Floor, Building D, NO.5, Fu Rui Road, Qiao Tou, Fuyong town, 518103, Bao An
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Prepared by

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

Revision History

Rev.	Issue Date	Revisions	Revised By
V0	July 13, 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	Pass
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

*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 Surmountor Lighting Co. Ltd
 Address: 2nd Floor, Building D, NO.5, Fu Rui Road, Qiao Tou, Fuyong town, 518103, Bao An district, Shenzhen, Guang Dong Province, China

Manufacturer Information

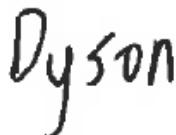
Company Name: Shenzhen Surmountor Lighting Co. Ltd
 Address: 2nd Floor, Building D, NO.5, Fu Rui Road, Qiao Tou, Fuyong town, 518103, Bao An district, Shenzhen, Guang Dong Province, China

EUT Information

EUT Name: Cylinder Floor Lamp
 Model: SUR-D50-001
 Brand: N/A
 Sample Received Date: May 22, 2023
 Sample Status: Normal
 Sample ID: A22110009 001
 Date of Tested: May 22, 2023 to May 25, 2023
 Hardware version: V1.0
 Software version: V1.0

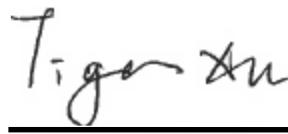
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 FCC PART 15 SUBPART C(DTS)	Pass

Prepared By:



Dyson
 Project Engineer

Approved By:


 Tiger
 Laboratory Supervisor

Checked By:



Duke
 Project Engineer



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, 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	Cylinder Floor Lamp
Model	SUR-D50-001
Ratings	DC 12V 2A
Power Supply	Input: 100-240V~ 50/60Hz 0.8A Max

Frequency Band:	2400 MHz to 2483.5 MHz
Frequency Range:	2402 MHz to 2480 MHz
Bluetooth Version:	4.2
Bluetooth Mode:	LE
Type of Modulation:	GFSK
Number of Channels:	40
Channel Separation:	2 MHz
Maximum Peak Power:	0.89 dBm
Antenna Type:	PCB antenna
Antenna Gain:	-0.58dBi
Normal Test Voltage:	12Vdc

5.2. CHANNEL LIST

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]	0.89	0.89

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		Wifi Test Tool v1.6.0 release		
Modulation Type	Transmit Antenna Number	Test Software setting value		
		CH 0	CH 19	CH 39
GFSK(1Mbps)	1	Max	Max	Max

5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna	Frequency (MHz)	Antenna Type	MAX Antenna Gain (dBi)
1	2402-2480	PCB antenna	0

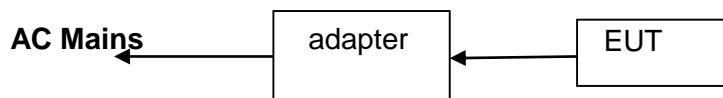
Test Mode	Transmit and Receive Mode	Description
LE 1M	<input checked="" type="checkbox"/> 1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.
Note:		
1.BT&WLAN 2.4G can't transmit simultaneously. (declared by client)		

5.7. SUPPORT UNITS FOR SYSTEM TEST

The EUT has been tested as an independent unit

Equipment	Manufacturer	Model No.
PC	Lenovo	T14

5.8. SETUP DIAGRAM



6. MEASURING EQUIPMENT AND SOFTWARE USED

Test Equipment of Conducted RF					
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	2023-05-10	2024-05-09
Radio Frequency control box	MWRF-test	MW200-RFCB 2#	/	2023-05-10	2024-05-09

Test Equipment of Radiated emissions below 1GHz					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
EMI Test Receiver	ROHDE&SCHWARZ	ESCI	100302	2023-05-10	2024-05-09
Bilog Antenna	Schwarzbeck	VULB9163	VULB9163-1290	2022-12-12	2023-12-11
RF Cable	ZKJC	ZT06S-NJ-NJ-11M	19060398	2023-05-10	2024-05-09
RF Cable	ZKJC	ZT06S-NJ-NJ-0.5M	19060400	2023-05-10	2024-05-09
RF Cable	ZKJC	ZT06S-NJ-NJ-2.5M	19060404	2023-05-10	2024-05-09
EMI Test Receiver	ROHDE&SCHWARZ	ESPI7	100502	2022-10-08	2023-10-07
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	2023-05-10	2024-05-09
Horn antenna	A-INFO	LB-10180-SF	J2031090612123	2023-05-10	2024-05-09
RF Cable	ZKJC	ZT26-NJ-NJ-11M	19060401	2023-05-10	2024-05-09
RF Cable	ZKJC	ZT26-NJ-NJ-2.5M	19060402	2023-05-10	2024-05-09
RF Cable	ZKJC	ZT26-NJ-NJ-0.5M	19060403	2023-05-10	2024-05-09
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-03A2 RE)	N/A	N/A	N/A

Test Equipment of Conducted emissions					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
EMI Test Receiver	ROHDE&SCH WARZ	ESCI	101358	2023-05-10	2024-05-09
1# Shielded Room	chengyu	8m*4m*3.3m	N/A	2022-11-22	2025-11-21
LISN	ROHDE&SCH WARZ	ENV216	101413	2022-10-08	2023-10-07
Test Software	Farad	EZ-EMC (Ver.ANCI-3A1)	N/A	N/A	N/A
RF Cable	N/A	ZT06S-NJ-NJ-2.5M	19044022	2023-05-10	2024-05-09

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	23.4°C	Relative Humidity	50%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data"

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) ISED RSS-247 5.2 (a)	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	100 kHz
VBW	≥3 × RBW
Trace	Max hold
Sweep	Auto couple

- Use the 6 dB Bandwidth function of the instrument, allow the trace to stabilize and report the measured bandwidth.
- 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	52%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data"

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	$1.5 \times \text{DTS bandwidth}$
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	52%
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	$\geq 3 \times$ 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.

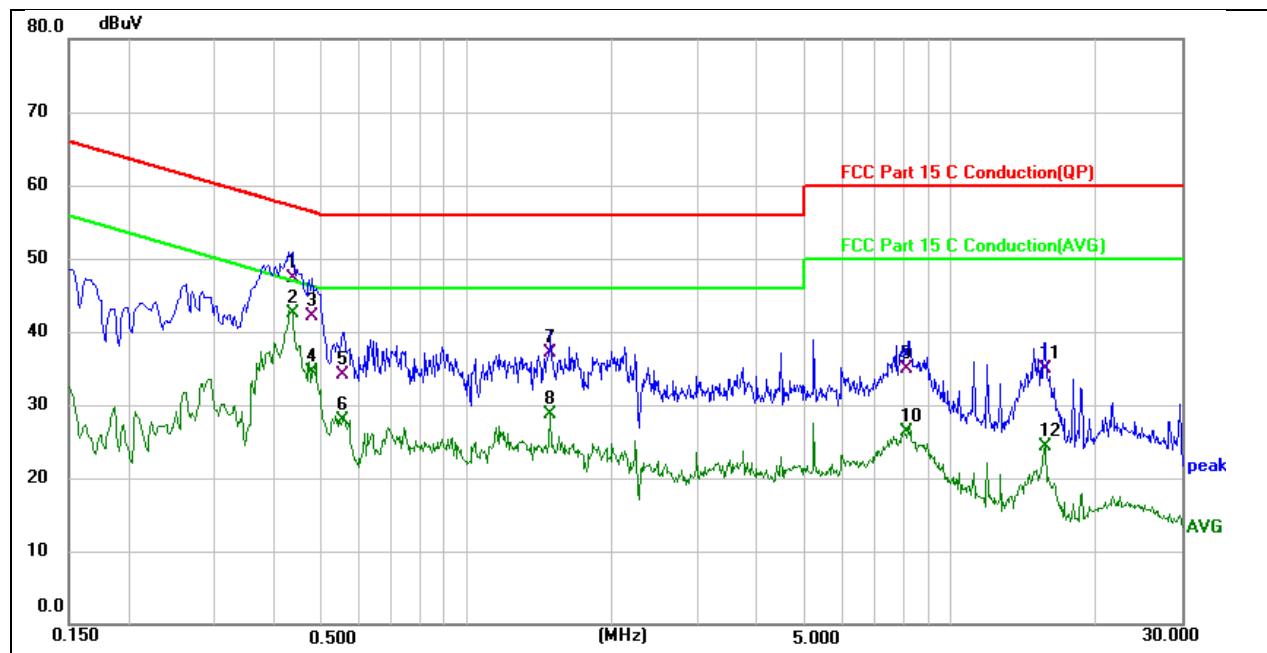
Change the settings for emission level measurement:

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100 kHz
VBW	$\geq 3 \times$ RBW
measurement points	\geq span/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.

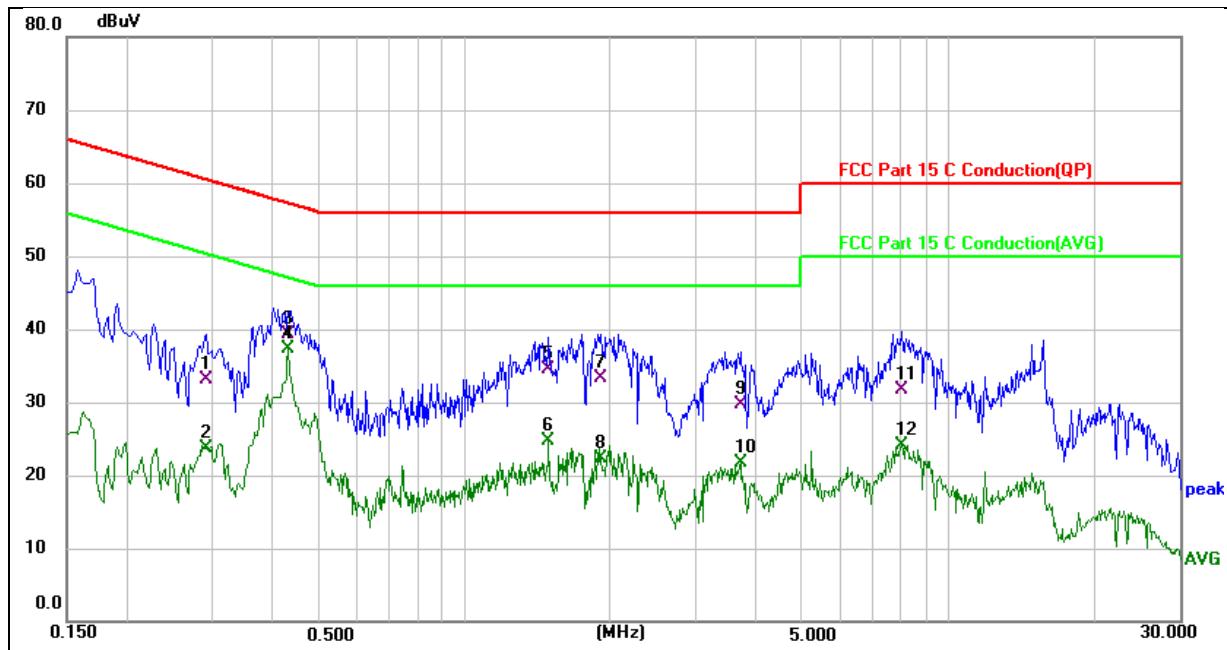
TEST ENVIRONMENT

Temperature	23.5°C	Relative Humidity	52.6%
Atmosphere Pressure	101kPa		

TEST RESULTS

Site:		Phase:N	Temperature(C):23.5(C)
Limit:	FCC Part 15 C Conduction(QP)		Humidity(%):52.6%
EUT:	Cylinder Floor Lamp	Test Time:	2023-05-22
M/N.:	SUR-D50-001	Power Rating:	AC 120V/60Hz
Mode:	BT mode	Test Engineer:	Sunshine
Note:			

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measure-ment(dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
1	0.4340	37.56	9.71	47.27	57.18	-9.91	QP	
2 *	0.4340	32.84	9.71	42.55	47.18	-4.63	AVG	
3	0.4780	32.43	9.68	42.11	56.37	-14.26	QP	
4	0.4780	24.83	9.68	34.51	46.37	-11.86	AVG	
5	0.5540	23.95	10.15	34.10	56.00	-21.90	QP	
6	0.5540	17.83	10.15	27.98	46.00	-18.02	AVG	
7	1.4900	26.88	10.14	37.02	56.00	-18.98	QP	
8	1.4900	18.55	10.14	28.69	46.00	-17.31	AVG	
9	8.1899	24.41	10.49	34.90	60.00	-25.10	QP	
10	8.1899	15.78	10.49	26.27	50.00	-23.73	AVG	
11	15.6380	24.45	10.37	34.82	60.00	-25.18	QP	
12	15.6380	13.86	10.37	24.23	50.00	-25.77	AVG	



Site:		Phase:L1	Temperature(C):23.5(C)
Limit:	FCC Part 15 C Conduction(QP)		Humidity(%):52.6%
EUT:	Cylinder Floor Lamp	Test Time:	2023-05-22
M/N.:	SUR-D50-001	Power Rating:	AC 120V/60Hz
Mode:	BT mode	Test Engineer:	Sunshine
Note:			

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measure-ment(dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
1	0.2900	23.20	9.89	33.09	60.52	-27.43	QP	
2	0.2900	13.83	9.89	23.72	50.52	-26.80	AVG	
3	0.4300	29.51	9.72	39.23	57.25	-18.02	QP	
4 *	0.4300	27.50	9.72	37.22	47.25	-10.03	AVG	
5	1.4900	24.43	10.13	34.56	56.00	-21.44	QP	
6	1.4900	14.60	10.13	24.73	46.00	-21.27	AVG	
7	1.9140	23.11	10.10	33.21	56.00	-22.79	QP	
8	1.9140	12.15	10.10	22.25	46.00	-23.75	AVG	
9	3.7180	19.41	10.23	29.64	56.00	-26.36	QP	
10	3.7180	11.52	10.23	21.75	46.00	-24.25	AVG	
11	8.0060	21.24	10.49	31.73	60.00	-28.27	QP	
12	8.0060	13.67	10.49	24.16	50.00	-25.84	AVG	

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	52%
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), 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 dB_{uV/m}, which is equivalent to $Y - 51.5 = Z$ dB_{uA/m}, which has the same margin, W dB.

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

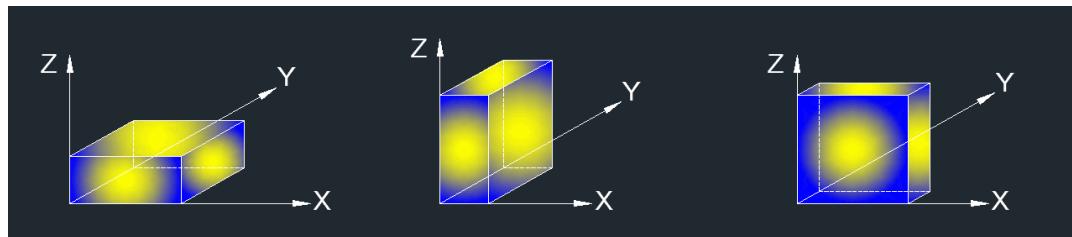
RBW	1 MHz
VBW	PEAK: 3 MHz AVG: see note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

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.

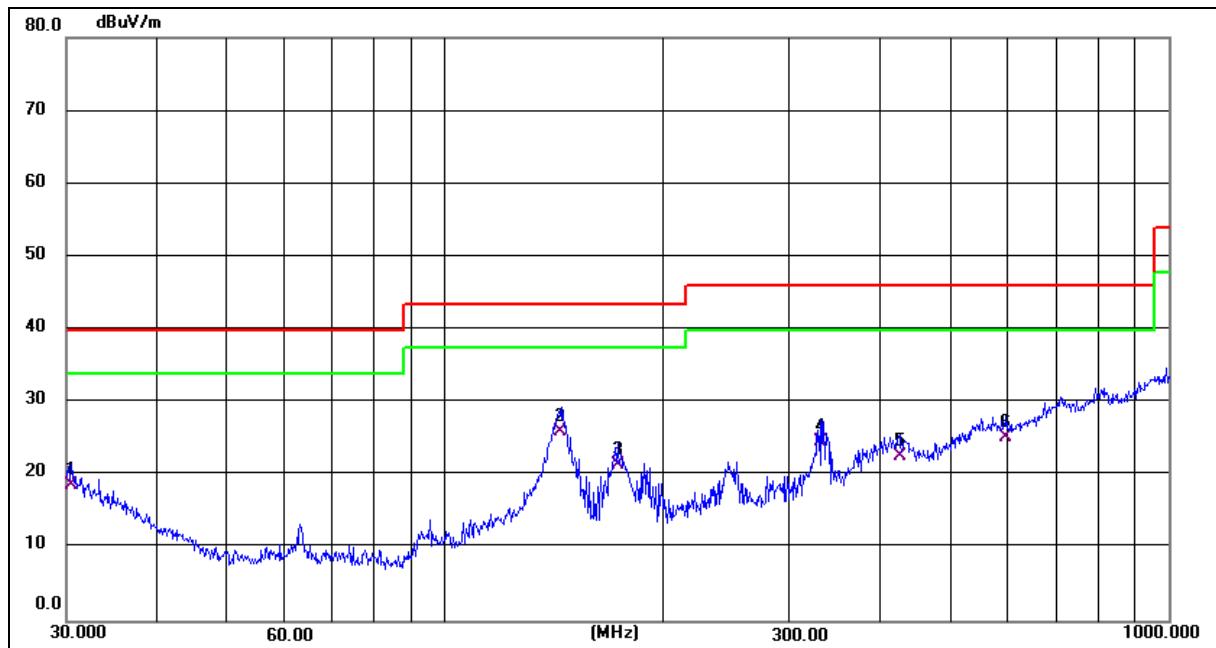
TEST ENVIRONMENT

Temperature	23°C	Relative Humidity	51%
Atmosphere Pressure	101kPa		

TEST RESULTS

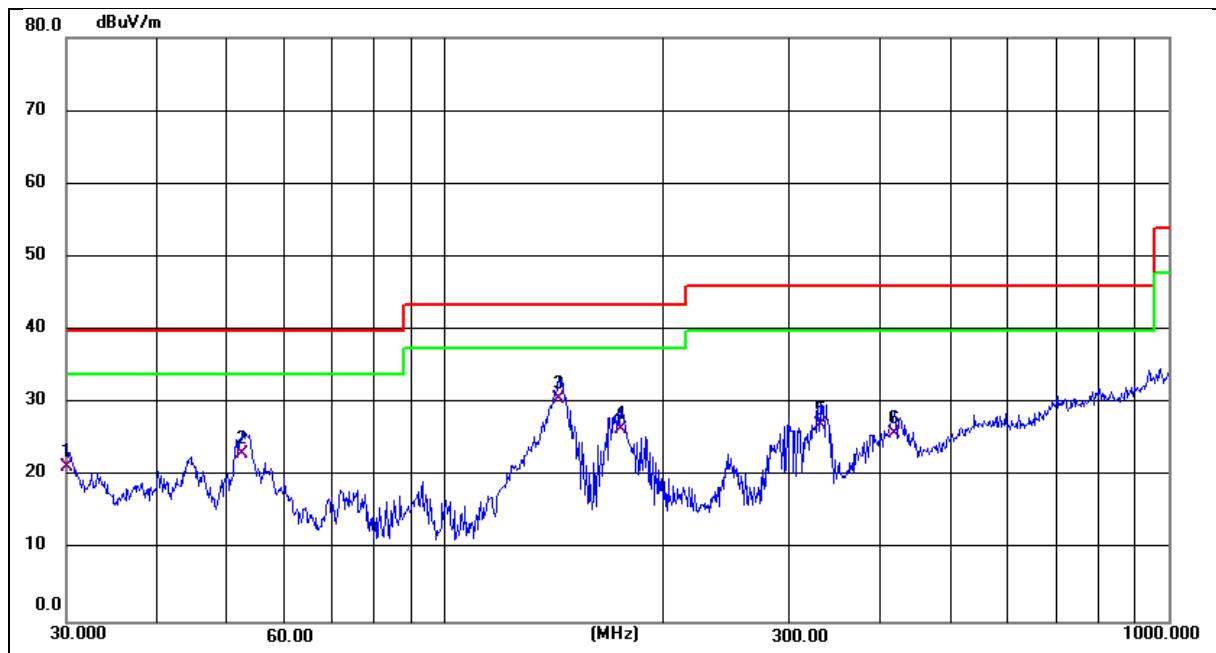
Radiated Spurious Emission :

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



Site:	ChamberA-2	Antenna::Horizontal	Temperature(C):23(C)
Limit:	FCC Part 15 Class B 3m Radiation(QP)		Humidity(%):51%
EUT:	Cylinder Floor Lamp	Test Time:	2023-05-22
M/N.:	SUR-D50-001	Power Rating:	AC 120V 60Hz
Mode:	TX2402	Test Engineer:	Sunshine
Note:			

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1	30.5306	27.70	-8.90	18.80	40.00	-21.20	QP	200	132	
2 *	144.3348	57.25	-31.15	26.10	43.50	-17.40	QP	200	208	
3	173.2051	52.40	-31.00	21.40	43.50	-22.10	QP	200	176	
4	330.1949	55.47	-30.87	24.60	46.00	-21.40	QP	200	93	
5	425.0280	52.66	-30.06	22.60	46.00	-23.40	QP	200	258	
6	597.2234	54.56	-29.36	25.20	46.00	-20.80	QP	200	312	



Site:	ChamberA-2	Antenna:::	Vertical	Temperature(C):	23(C)
Limit:	FCC Part 15 Class B 3m Radiation(QP)			Humidity(%):	51%
EUT:	Cylinder Floor Lamp	Test Time:		2023-05-22	
M/N.:	SUR-D50-001	Power Rating:		AC 120V 60Hz	
Mode:	TX2402	Test Engineer:		Sunshine	
Note:					

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1	30.1054	29.94	-8.64	21.30	40.00	-18.70	QP	100	106	
2	52.5753	48.93	-25.83	23.10	40.00	-16.90	QP	100	79	
3 *	143.8295	61.75	-31.15	30.60	43.50	-12.90	QP	100	267	
4	175.0368	57.38	-30.98	26.40	43.50	-17.10	QP	100	308	
5	330.1949	57.97	-30.87	27.10	46.00	-18.90	QP	100	192	
6	417.6411	55.89	-30.09	25.80	46.00	-20.20	QP	100	63	

Above 1000MHz~10th Harmonics:

Operation Mode: TX Mode (CH00: 2402MHz) Test Date : 2023-05-25
 Frequency Range: 1-25GHz Temperature : 24°C
 Test Result: PASS Humidity : 52 %
 Measured Distance: 3m Test By: Sunshine

Freq. (MHz)	Ant. Pol.	Reading Level(dBuV/m)		Correct Factor	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
4804	V	94.02	74.99	-32.3	63.02	42.69	74	54	-10.98	-11.31
7206	V	97.52	76.75	-37.2	60.32	39.55	74	54	-13.68	-14.45
9608	V	98.41	78.42	-39.8	58.61	38.62	74	54	-15.39	-15.38
12010	V	96.75	76.99	-40.5	56.25	36.49	74	54	-17.75	-17.51
14412	V	97.3	78.11	-41.7	55.6	36.41	74	54	-18.4	-17.59
16814	V	94.85	75.36	-40	54.85	35.36	74	54	-19.15	-18.64
4804	H	94.45	74.34	-31.6	62.85	42.74	74	54	-11.15	-11.26
7206	H	95.75	75.75	-35.5	60.25	40.25	74	54	-13.75	-13.75
9608	H	96.94	77.82	-38.3	58.64	39.52	74	54	-15.36	-14.48
12010	H	94.63	75.41	-39	55.63	36.41	74	54	-18.37	-17.59
14412	H	97.3	78.25	-42	55.3	36.25	74	54	-18.7	-17.75
16814	H	95.62	75.77	-39.3	56.32	36.47	74	54	-17.68	-17.53

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 : 2023-05-25
 Frequency Range: 1-25GHz Temperature : 24°C
 Test Result: PASS Humidity : 52%
 Measured Distance: 3m Test By: Sunshine

Freq. (MHz)	Ant. Pol.	Reading Level(dBuV/m)		Correct Factor	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
4880	V	95.08	75.04	-32.3	62.78	42.74	74	54	-11.22	-11.26
7320	V	97.4	77.22	-37.2	60.2	40.02	74	54	-13.8	-13.98
9760	V	97.12	78.21	-39.8	57.32	38.41	74	54	-16.68	-15.59
12200	V	96.82	78.82	-40.5	56.32	38.32	74	54	-17.68	-15.68
14640	V	96.14	77.85	-41	55.14	36.85	74	54	-18.86	-17.15
17080	V	94.35	77.6	-41.1	53.25	36.5	74	54	-20.75	-17.5
4880	H	94.16	74.12	-31.6	62.56	42.52	74	54	-11.44	-11.48
7320	H	95.64	75.75	-35.5	60.14	40.25	74	54	-13.86	-13.75
9760	H	96.15	76.62	-38.3	57.85	38.32	74	54	-16.15	-15.68
12200	H	95.5	75.2	-39	56.5	36.2	74	54	-17.5	-17.8
14640	H	97.34	78.58	-42	55.34	36.58	74	54	-18.66	-17.42
17080	H	96.97	77.7	-41.5	55.47	36.2	74	54	-18.53	-17.8

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 : 2023-05-25
 Frequency Range: 1-25GHz Temperature : 24°C
 Test Result: PASS Humidity : 52 %
 Measured Distance: 3m Test By: Sunshine

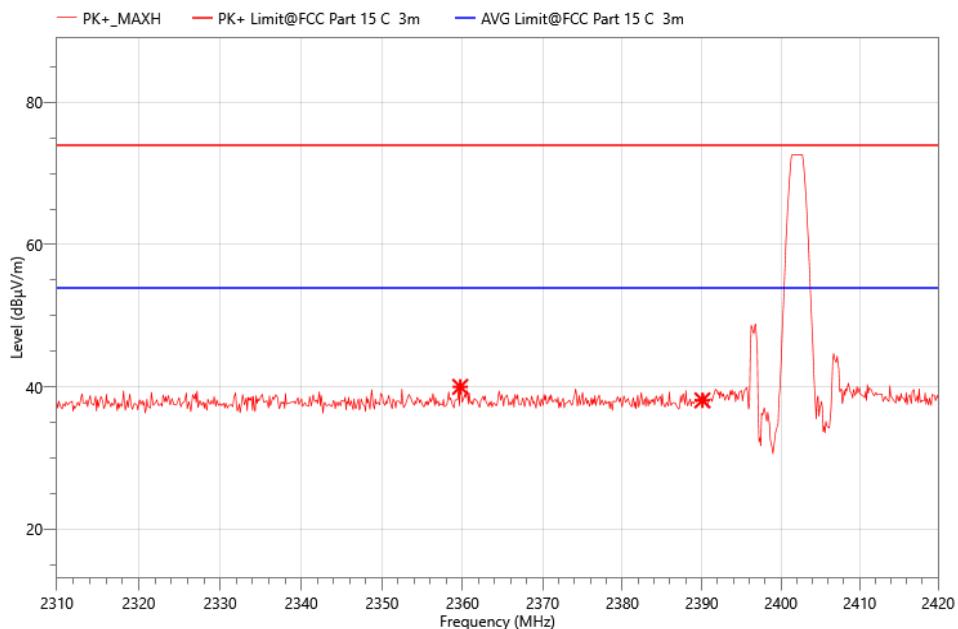
Freq. (MHz)	Ant. Pol.	Reading Level(dBuV/m)		Correct Factor	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	dB	PK	AV	PK	AV	PK	AV
4960	V	94.62	75.32	-32.3	62.32	43.02	74	54	-11.68	-10.98
7440	V	97.48	77.45	-37.2	60.28	40.25	74	54	-13.72	-13.75
9920	V	98.21	78.82	-39.8	58.41	39.02	74	54	-15.59	-14.98
12400	V	96.83	96.75	-40.5	56.33	56.25	74	54	-17.67	2.25
14880	V	96.32	77.4	-41	55.32	36.4	74	54	-18.68	-17.6
17360	V	96.38	77.3	-41.1	55.28	36.2	74	54	-18.72	-17.8
4960	H	93.85	74.6	-31.6	62.25	43	74	54	-11.75	-11
7440	H	95.52	75.75	-35.5	60.02	40.25	74	54	-13.98	-13.75
9920	H	96.93	77.32	-38.3	58.63	39.02	74	54	-15.37	-14.98
12400	H	95.33	76.32	-39	56.33	37.32	74	54	-17.67	-16.68
14880	H	97.14	78.52	-42	55.14	36.52	74	54	-18.86	-17.48
17360	H	97.13	78.05	-41.5	55.63	36.55	74	54	-18.37	-17.45

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

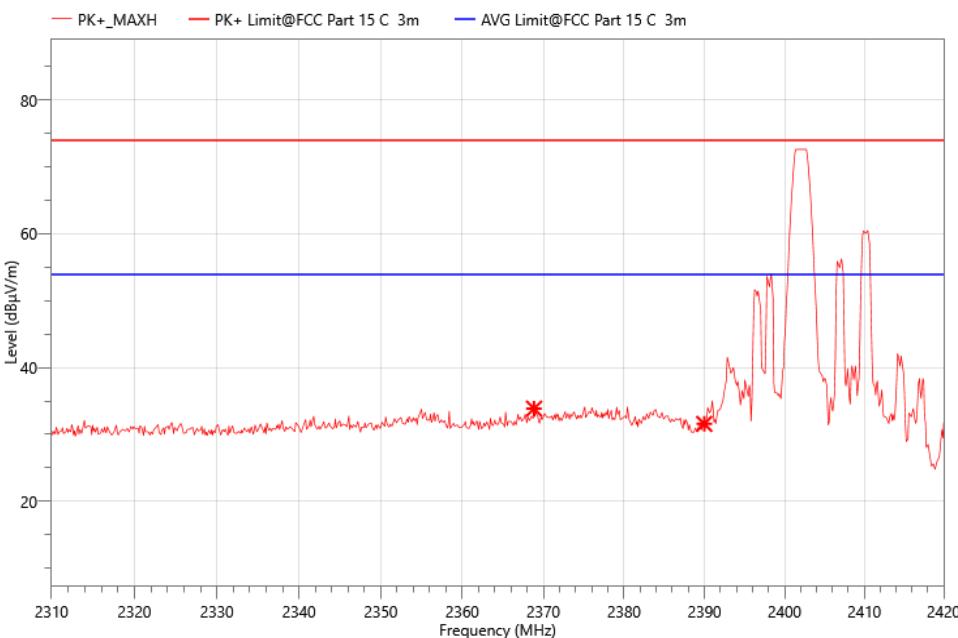
Note: (1) All Readings are Peak Value and AV.
 (2) Emission Level= Reading Level+ Probe Factor +Cable Loss.
 (3) The average measurement was not performed when the peak measured data
 under the limit of average detection.
 (4) Measuring frequencies from 1GHz to 25GHz.

Band edge:

TX Mode (CH00: 2402MHz)

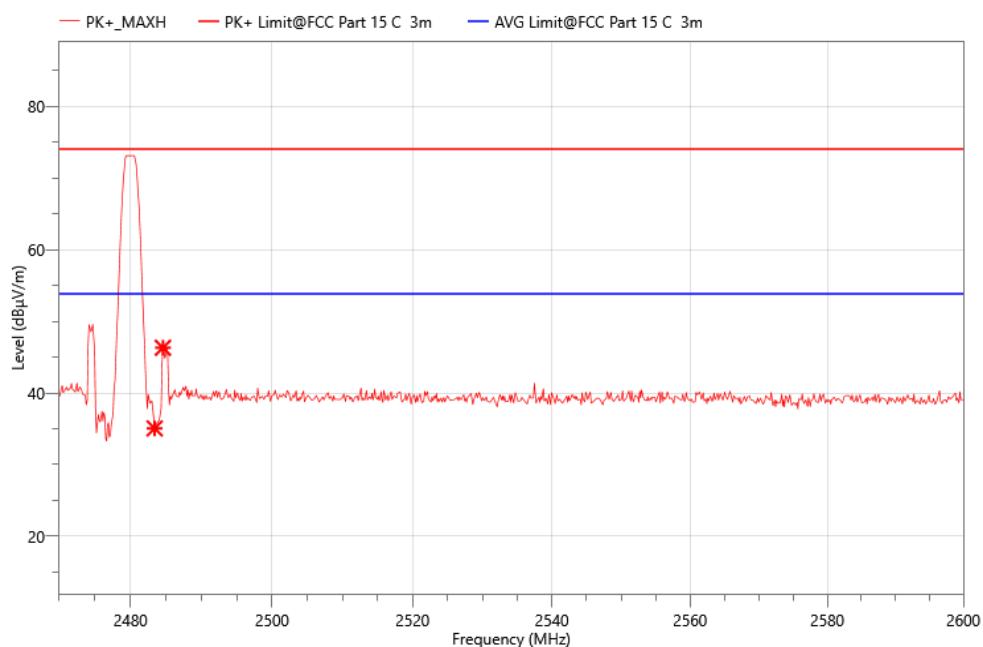
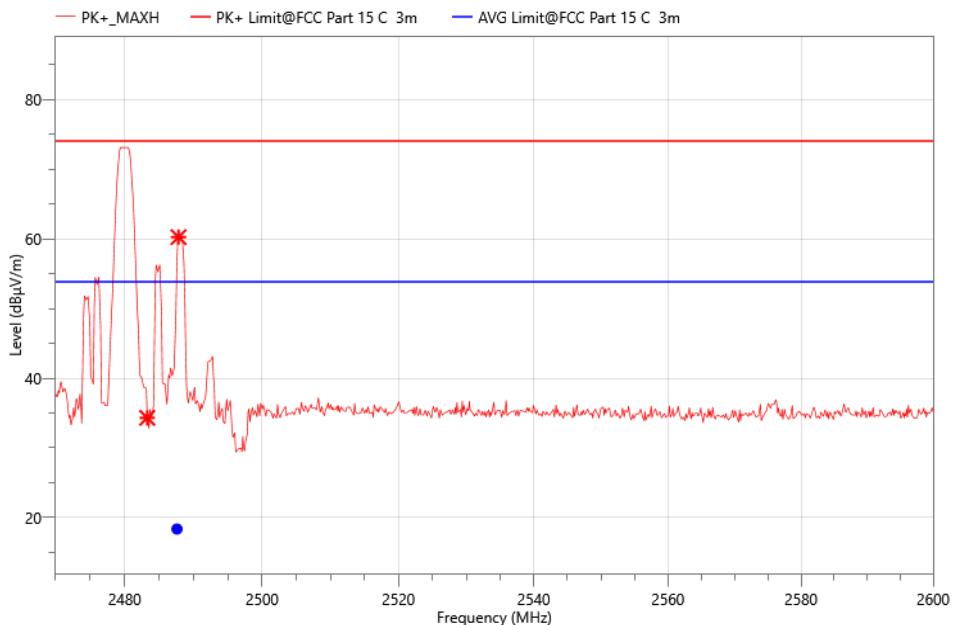


Freq. (MHz)	Reading (dB μ V)	Meas. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB μ V/m)	Det.	Pol.	Corr. (dB)
2359.72	57.44	40.01	74.00	33.99	PK+	V	-17.43
2390.08	55.59	38.11	74.00	35.89	PK+	V	-17.48



Freq. (MHz)	Reading (dB μ V)	Meas. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB μ V/m)	Det.	Pol.	Corr. (dB)
2368.85	51.29	33.86	74.00	40.14	PK+	H	-17.43
2389.97	49.06	31.58	74.00	42.42	PK+	H	-17.48

TX Mode (CH39: 2480MHz)



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. AC POWER LINE CONDUCTED EMISSION

LIMITS

Please refer to CFR 47 FCC §15.207 (a) and ISED RSS-Gen Clause 8.8

FREQUENCY (MHz)	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

TEST PROCEDURE

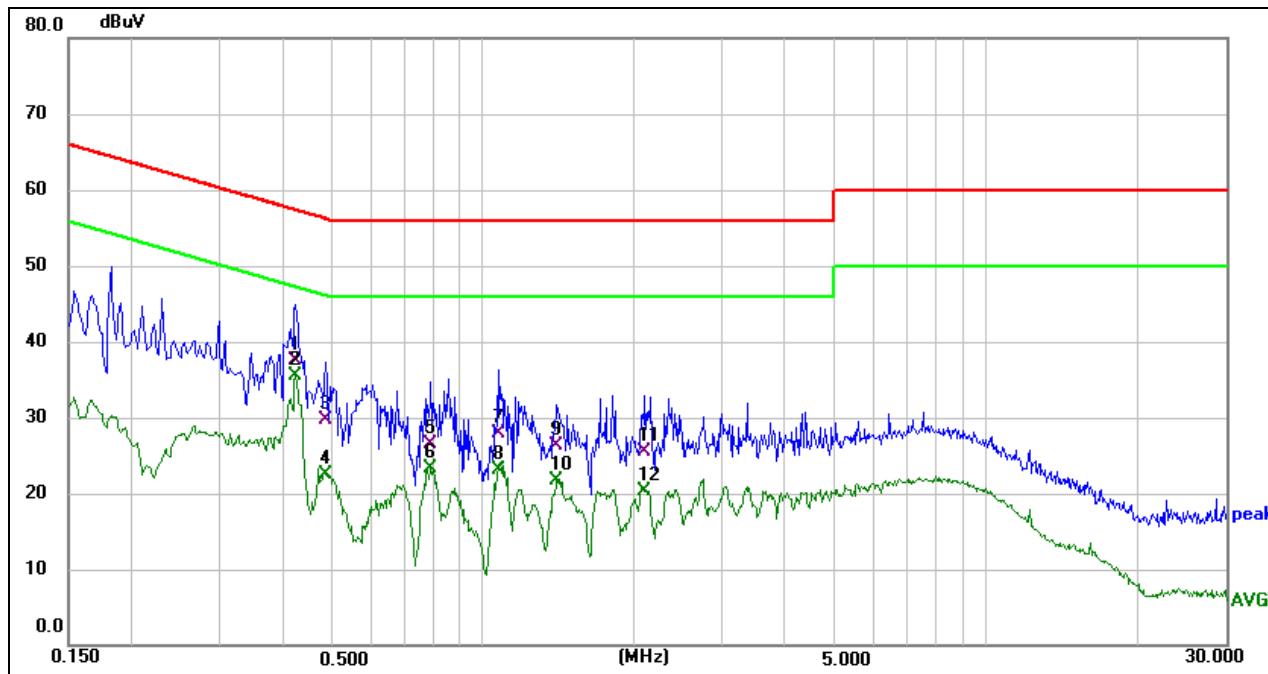
The EUT is put on a table of non-conducting material that is 80 cm high. The vertical conducting wall of shielding is located 40 cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI Measurement Receiver (R&S Test Receiver ESR3) is used to test the emissions from both sides of AC line. According to the requirements in Section 6.2 of ANSI C63.10-2013. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9 kHz.

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

TEST ENVIRONMENT

Temperature	23.5°C	Relative Humidity	52.6%
Atmosphere Pressure	101kPa		

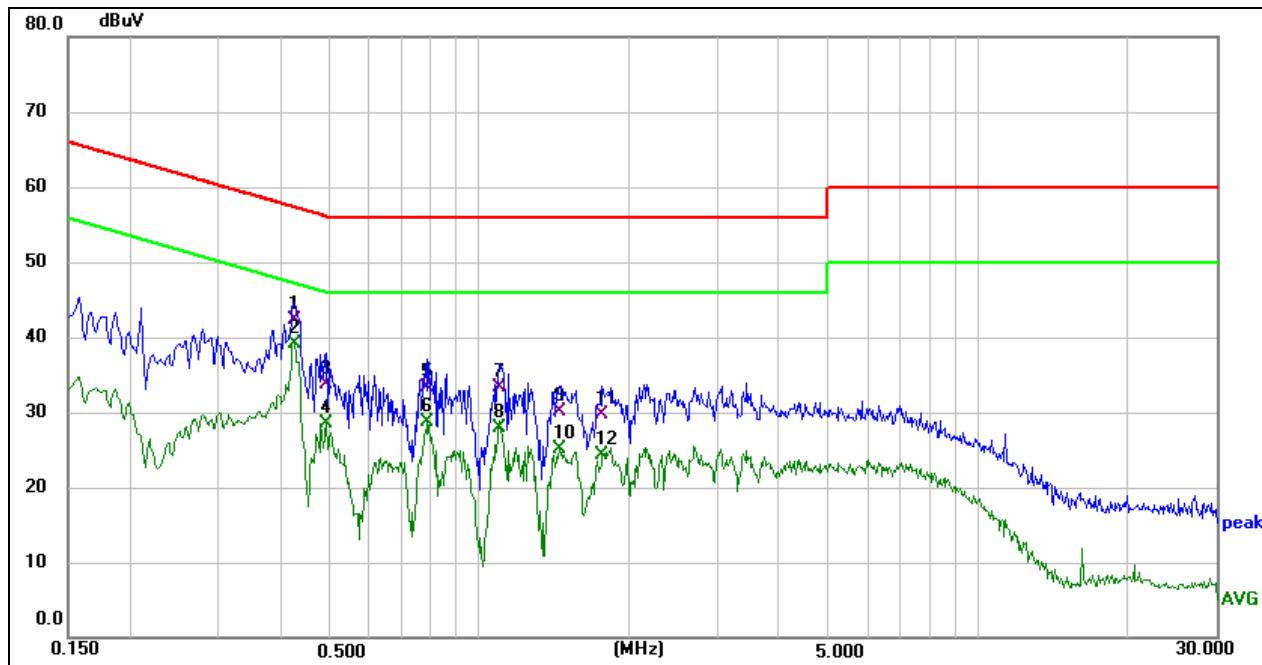
TEST RESULTS



Site:	Phase:N	Temperature(C):23.5(C)
Limit:	FCC Part 15 B Conduction(QP)	Humidity(%):52.6%
EUT:	Cylinder Floor Lamp	Test Time: 2023-03-27 19:24:52
M/N.:	SUR-D50-001	Power Rating: AC 120V/60Hz
Mode:	BT mode	Test Engineer: Sunshine
Note:		

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measure-ment(dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
1	0.4220	26.78	10.67	37.45	57.41	-19.96	QP	
2 *	0.4220	24.87	10.67	35.54	47.41	-11.87	AVG	
3	0.4860	18.86	10.76	29.62	56.24	-26.62	QP	
4	0.4860	11.79	10.76	22.55	46.24	-23.69	AVG	
5	0.7900	16.69	9.78	26.47	56.00	-29.53	QP	
6	0.7900	13.47	9.78	23.25	46.00	-22.75	AVG	
7	1.0740	17.84	9.97	27.81	56.00	-28.19	QP	
8	1.0740	13.11	9.97	23.08	46.00	-22.92	AVG	
9	1.4100	16.33	10.01	26.34	56.00	-29.66	QP	
10	1.4100	11.70	10.01	21.71	46.00	-24.29	AVG	
11	2.1060	15.72	9.88	25.60	56.00	-30.40	QP	
12	2.1060	10.49	9.88	20.37	46.00	-25.63	AVG	

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



Site:		Phase:L1	Temperature(C):23.5(C)
Limit:	FCC Part 15 B Conduction(QP)		Humidity(%):52.6%
EUT:	Cylinder Floor Lamp	Test Time:	2023-03-27 19:29:53
M/N.:	SUR-D50-001	Power Rating:	AC 120V/60Hz
Mode:	BT mode	Test Engineer:	Sunshine
Note:			

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measurement(dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
1	0.4260	31.65	10.61	42.26	57.33	-15.07	QP	
2 *	0.4260	28.57	10.61	39.18	47.33	-8.15	AVG	
3	0.4940	23.94	9.70	33.64	56.10	-22.46	QP	
4	0.4940	18.77	9.70	28.47	46.10	-17.63	AVG	
5	0.7900	23.59	9.80	33.39	56.00	-22.61	QP	
6	0.7900	18.83	9.80	28.63	46.00	-17.37	AVG	
7	1.1019	23.44	9.92	33.36	56.00	-22.64	QP	
8	1.1019	18.05	9.92	27.97	46.00	-18.03	AVG	
9	1.4500	20.11	10.01	30.12	56.00	-25.88	QP	
10	1.4500	15.01	10.01	25.02	46.00	-20.98	AVG	
11	1.7700	19.63	10.04	29.67	56.00	-26.33	QP	
12	1.7700	14.23	10.04	24.27	46.00	-21.73	AVG	

Note: 1. Result = Reading + Correct Factor.

2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 200 Hz (9 kHz ~ 150 kHz), 9 kHz (150 kHz ~ 30 MHz).

4. Step size: 80 Hz (0.009 MHz ~ 0.15 MHz), 4 kHz (0.15 MHz ~ 30 MHz), Scan time: auto.

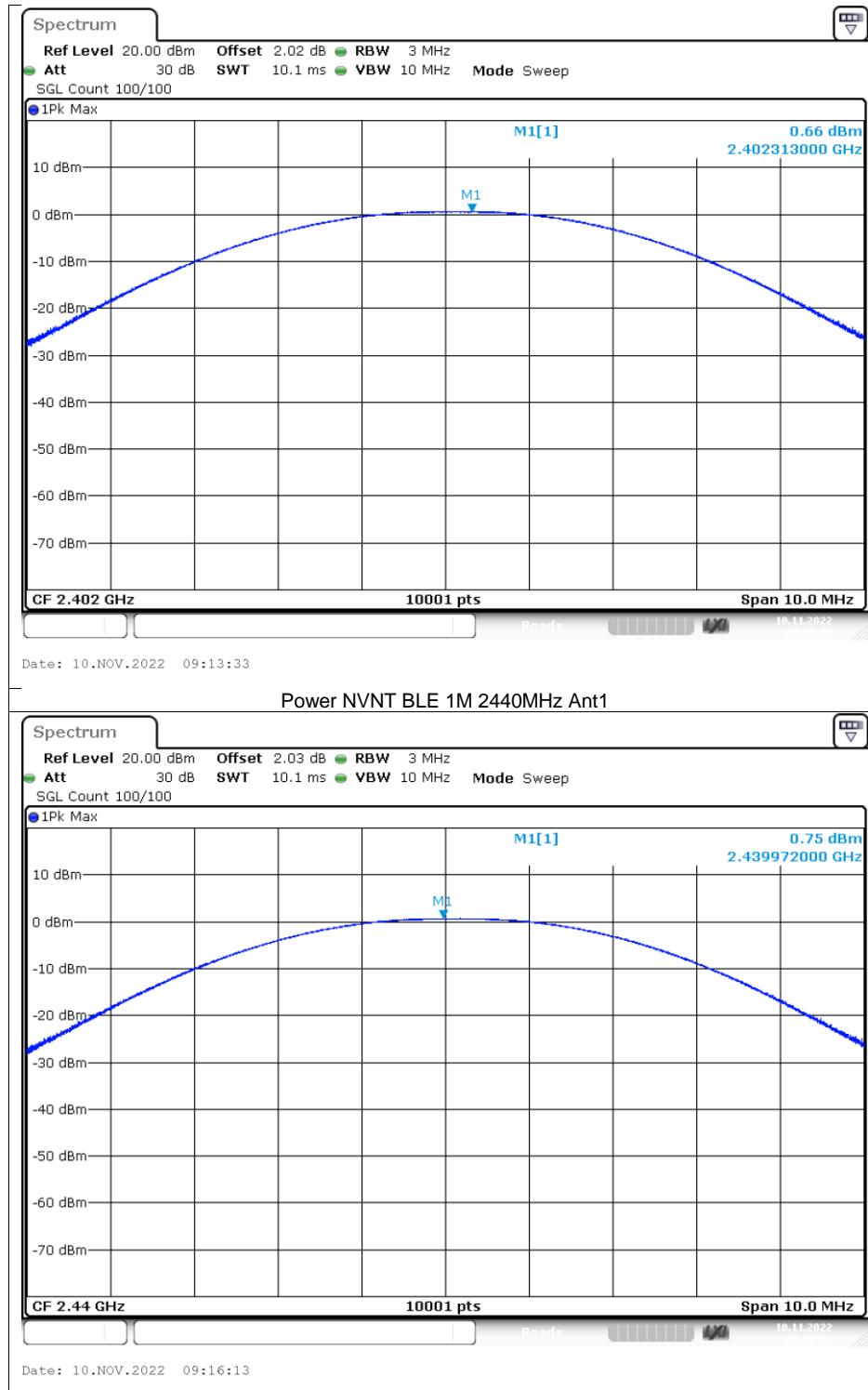
Note: All the modes have been tested, only the worst data was recorded in the report.

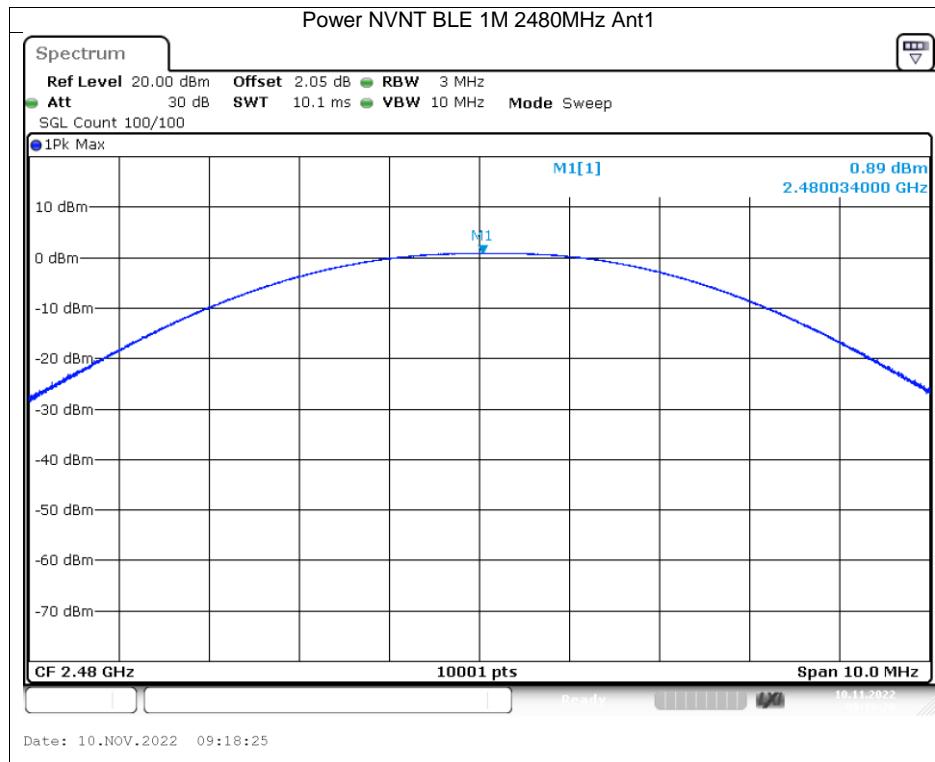
11. TEST DATA

Maximum Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	0.66	30	Pass
NVNT	BLE 1M	2440	Ant1	0.75	30	Pass
NVNT	BLE 1M	2480	Ant1	0.89	30	Pass

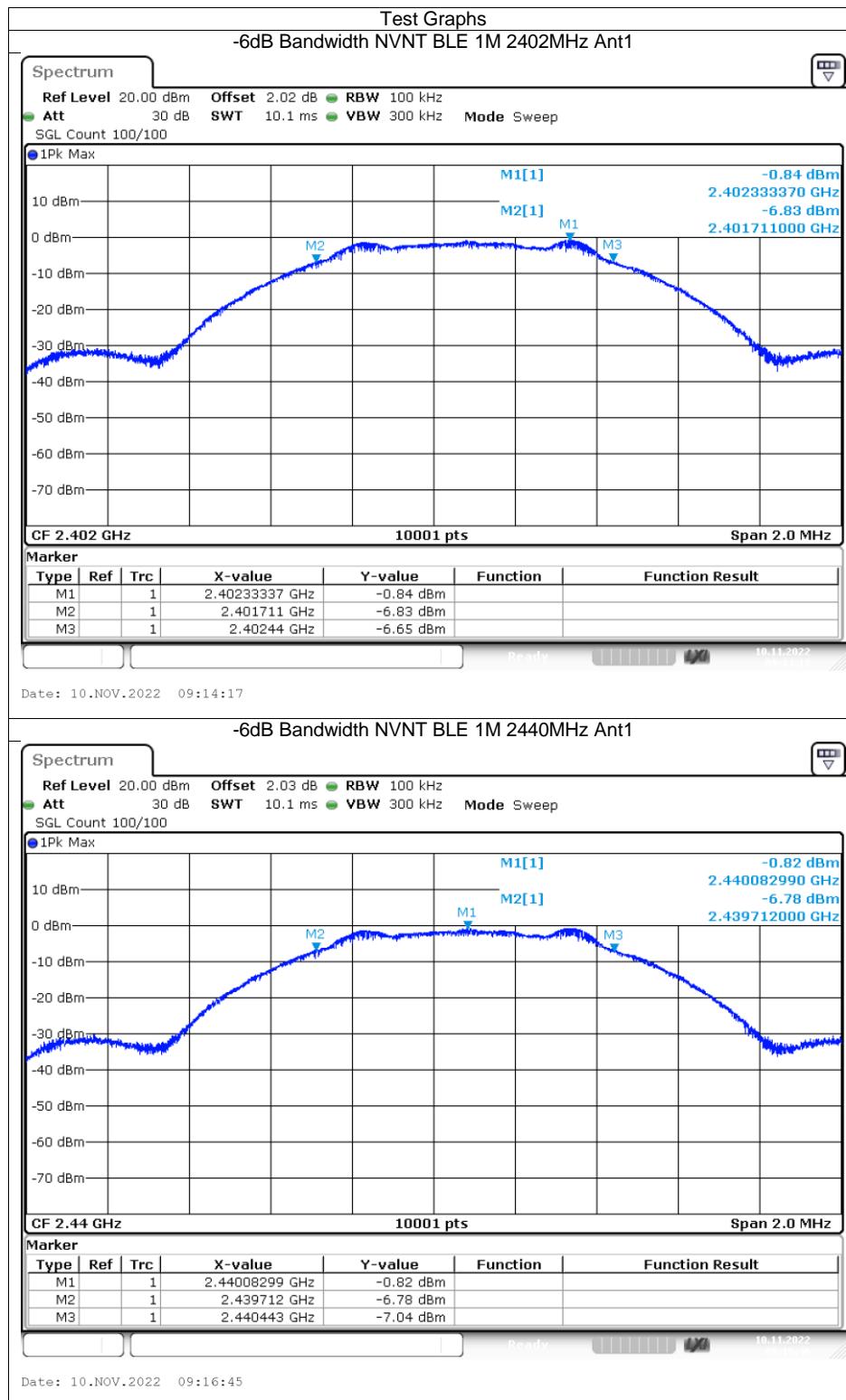
Test Graphs
Power NVNT BLE 1M 2402MHz Ant1

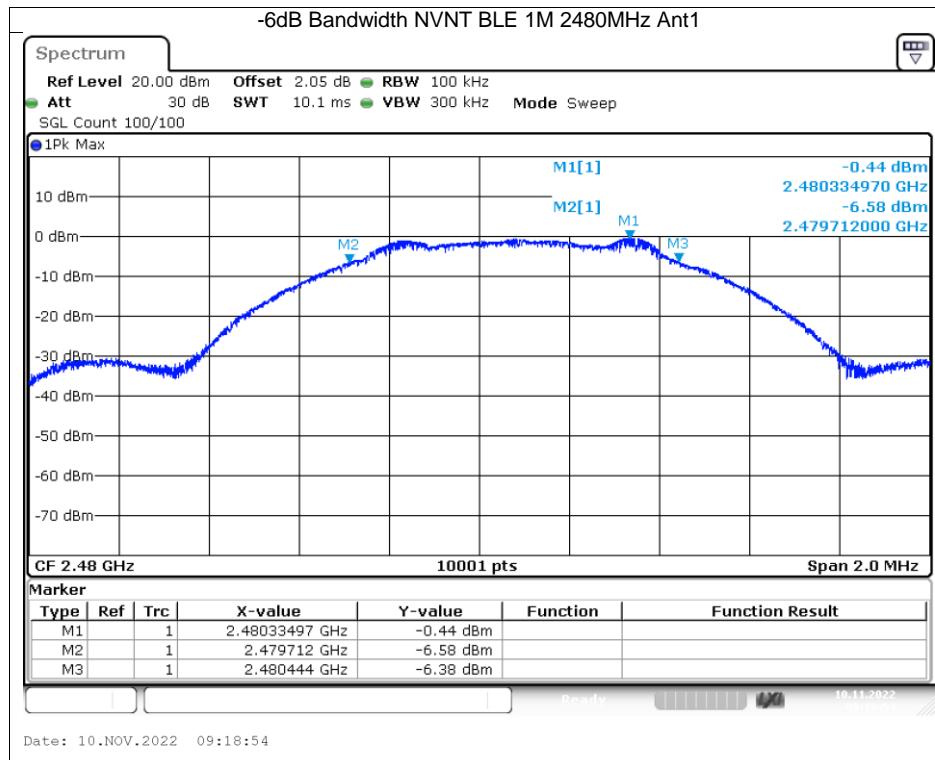




-6dB Bandwidth

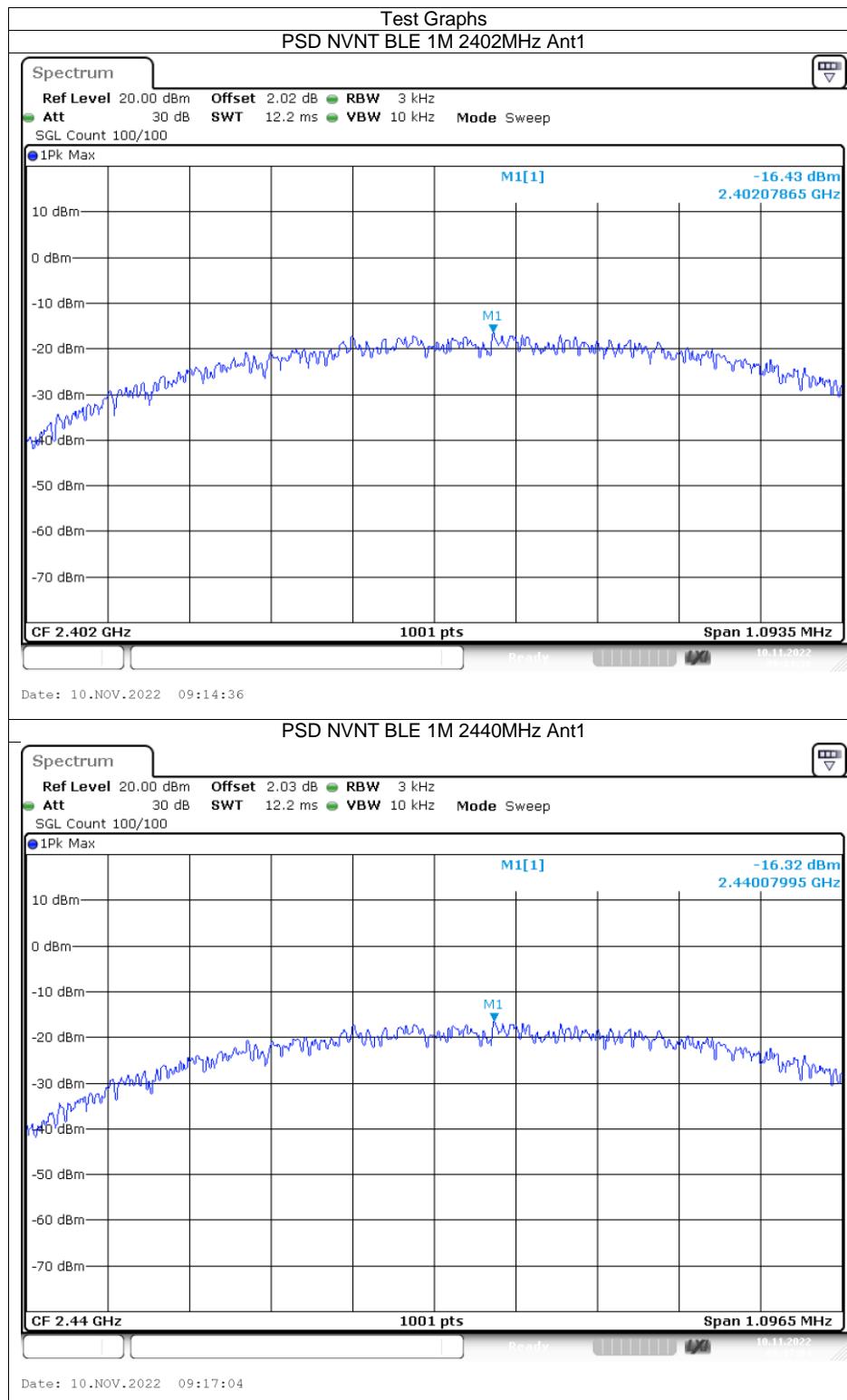
Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	0.729	0.5	Pass
NVNT	BLE 1M	2440	Ant1	0.731	0.5	Pass
NVNT	BLE 1M	2480	Ant1	0.732	0.5	Pass

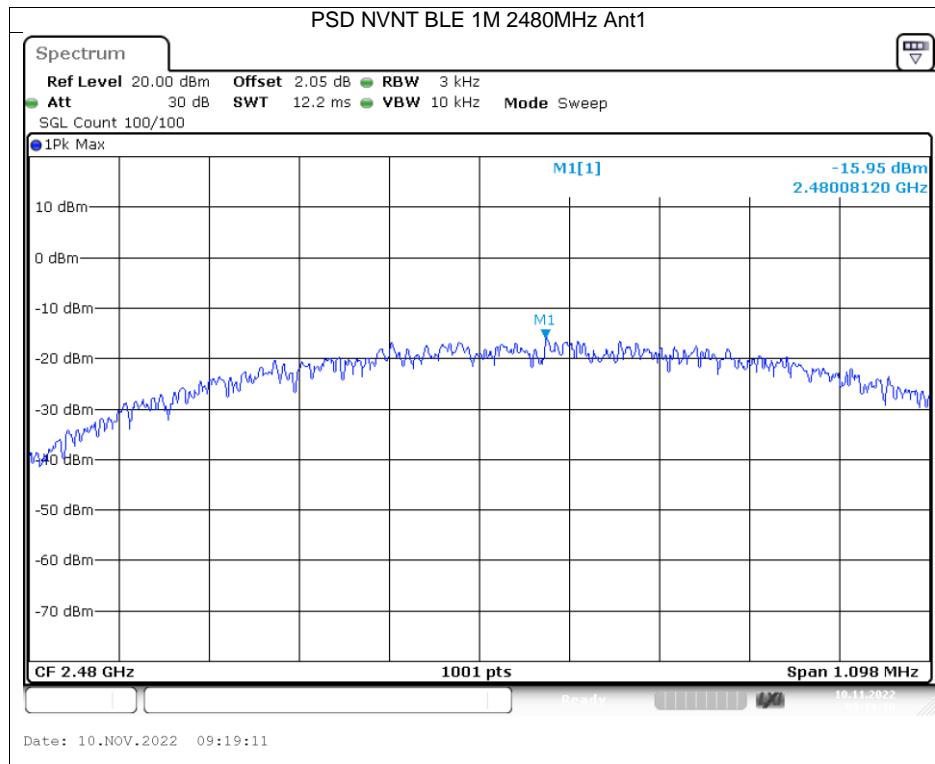




Maximum Power Spectral Density Level

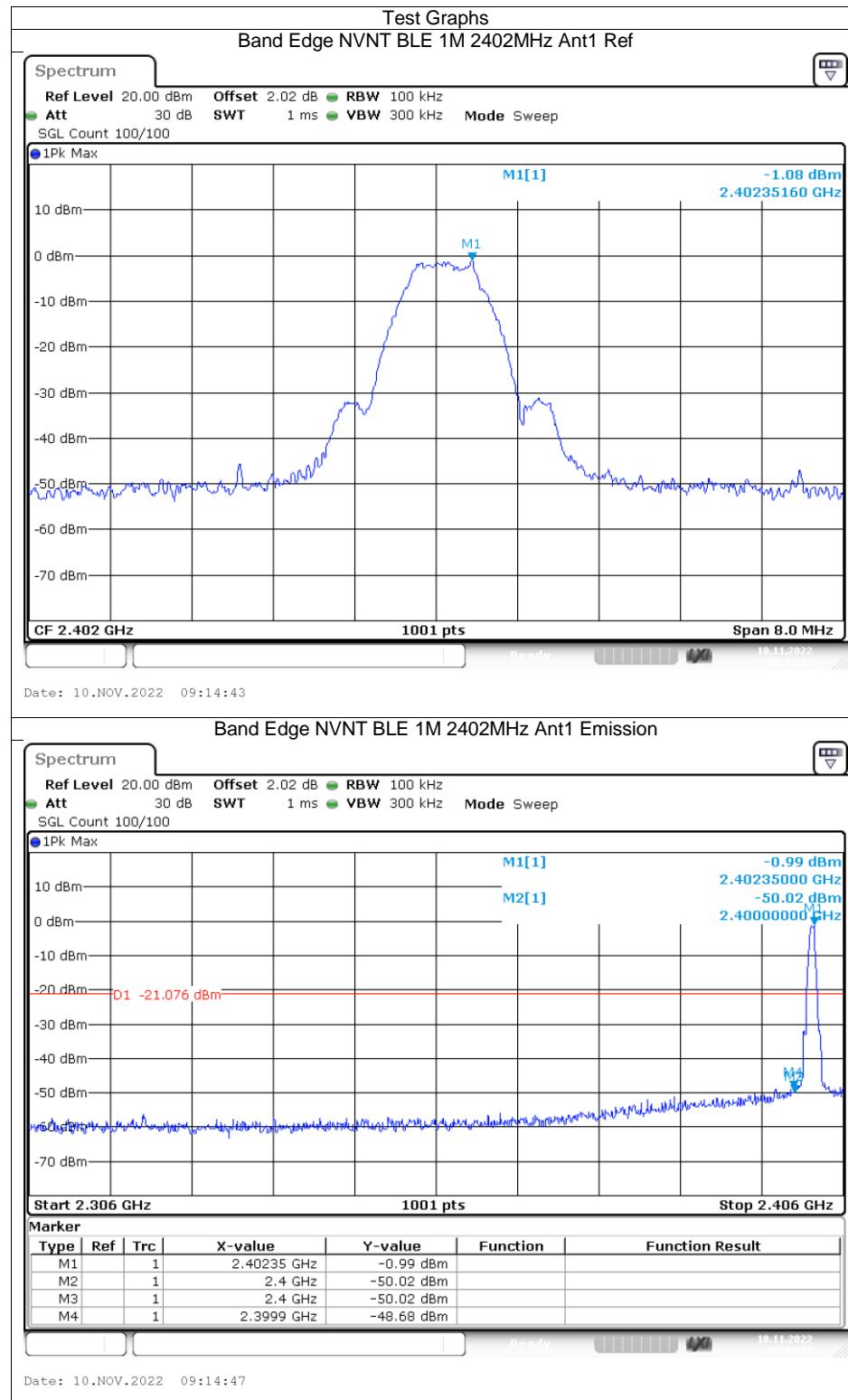
Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Duty Factor (dB)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	BLE 1M	2402	Ant1	-16.43	0	-16.43	8	Pass
NVNT	BLE 1M	2440	Ant1	-16.32	0	-16.32	8	Pass
NVNT	BLE 1M	2480	Ant1	-15.95	0	-15.95	8	Pass

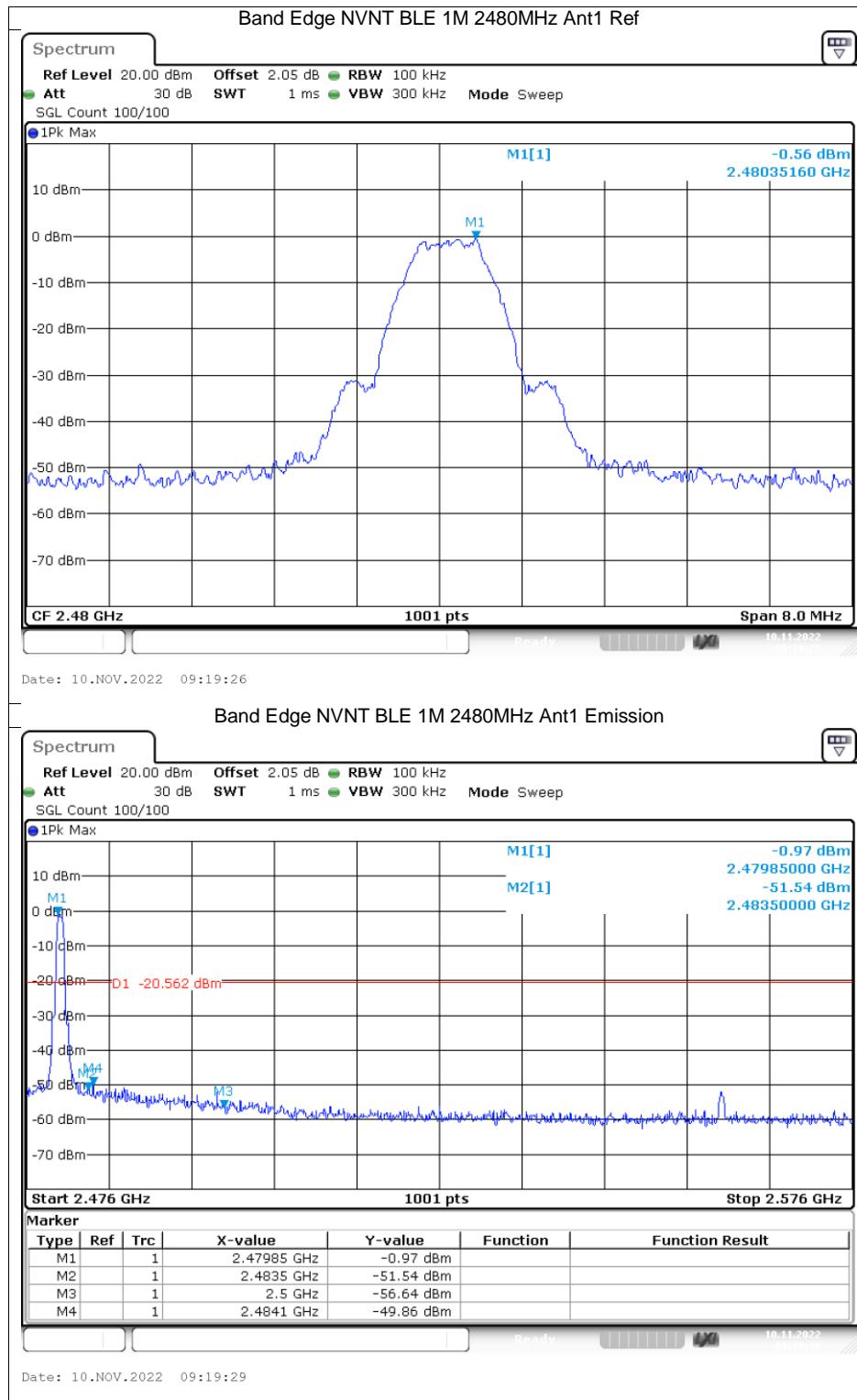




Band Edge

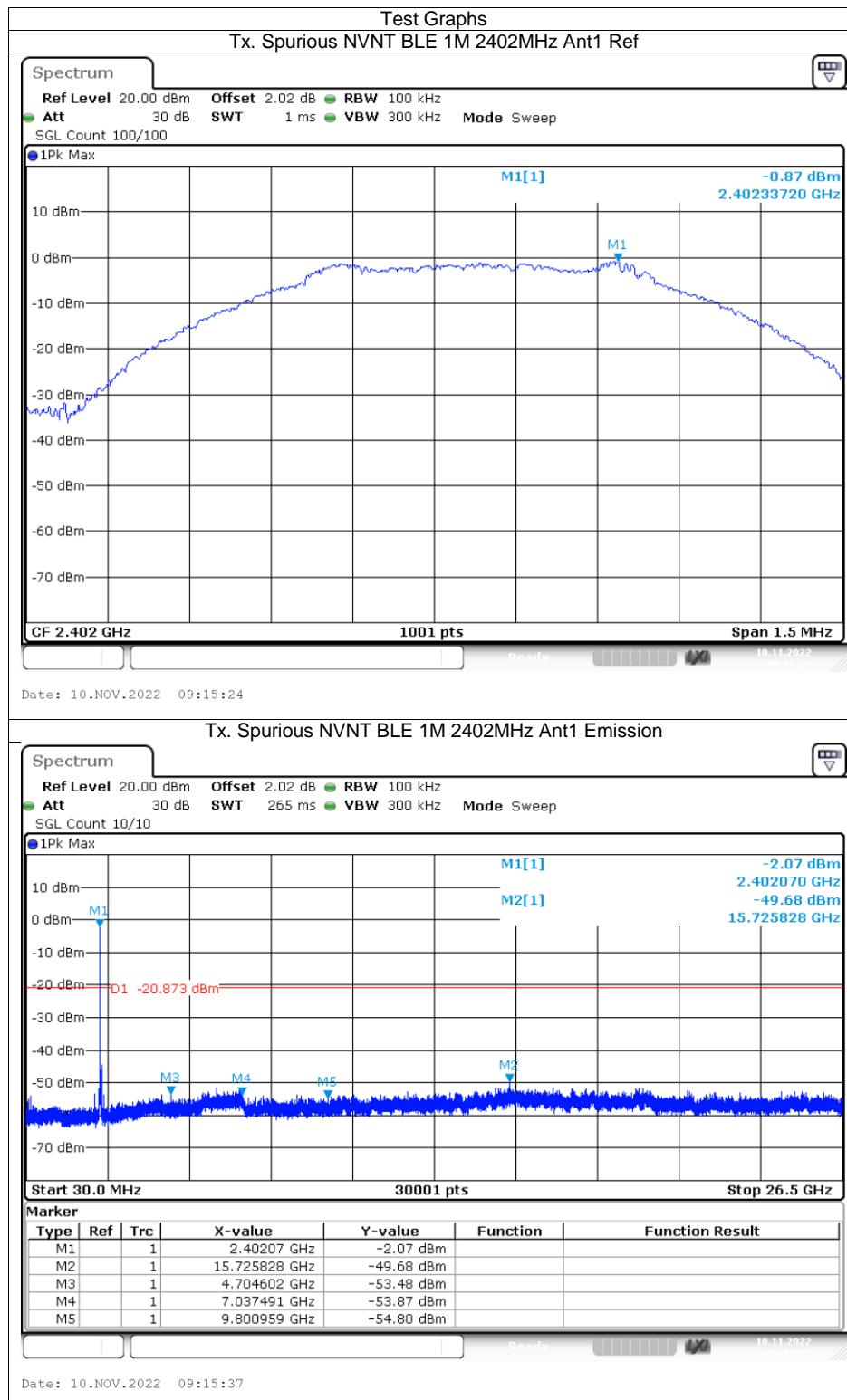
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-47.59	-20	Pass
NVNT	BLE 1M	2480	Ant1	-49.3	-20	Pass

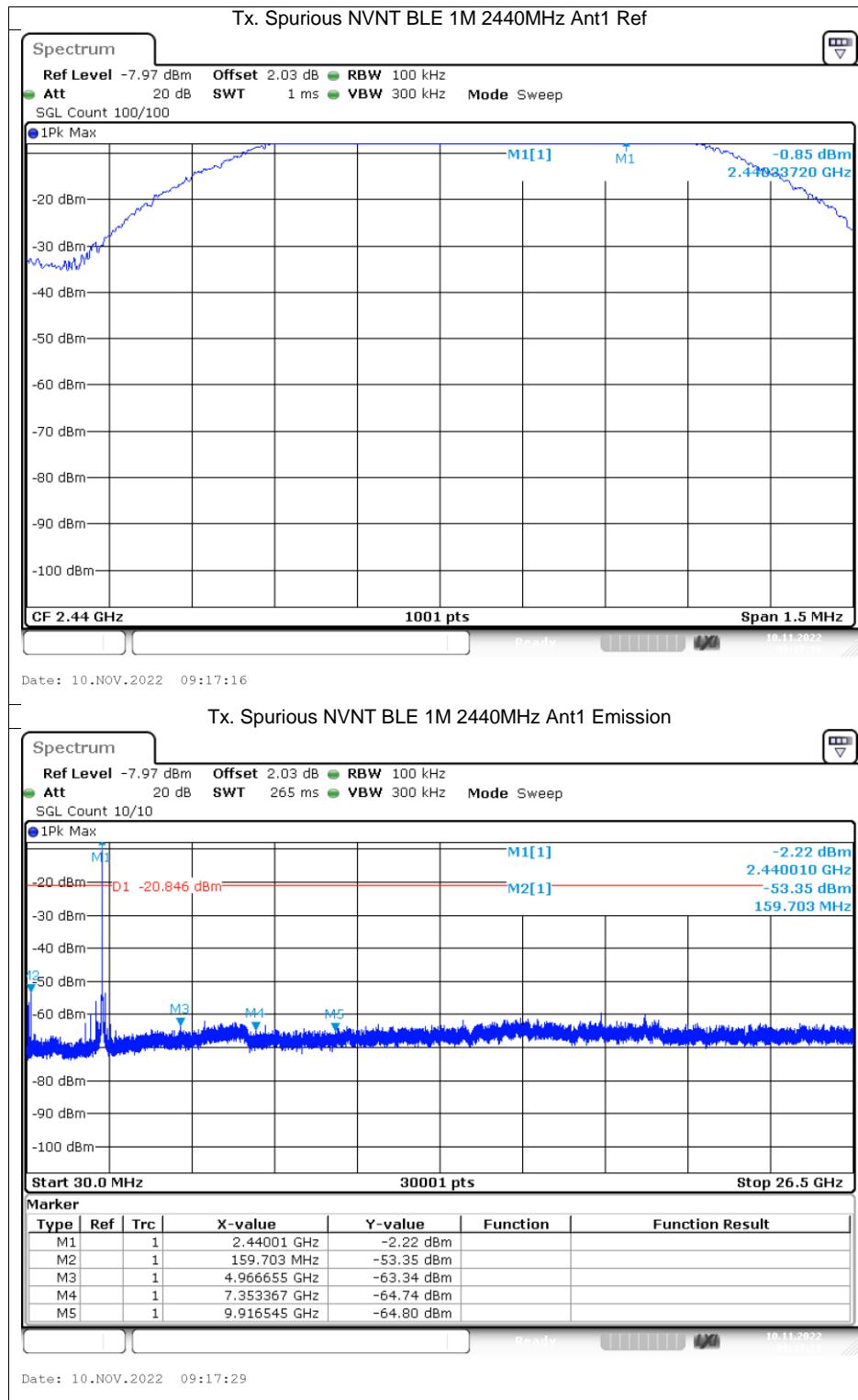


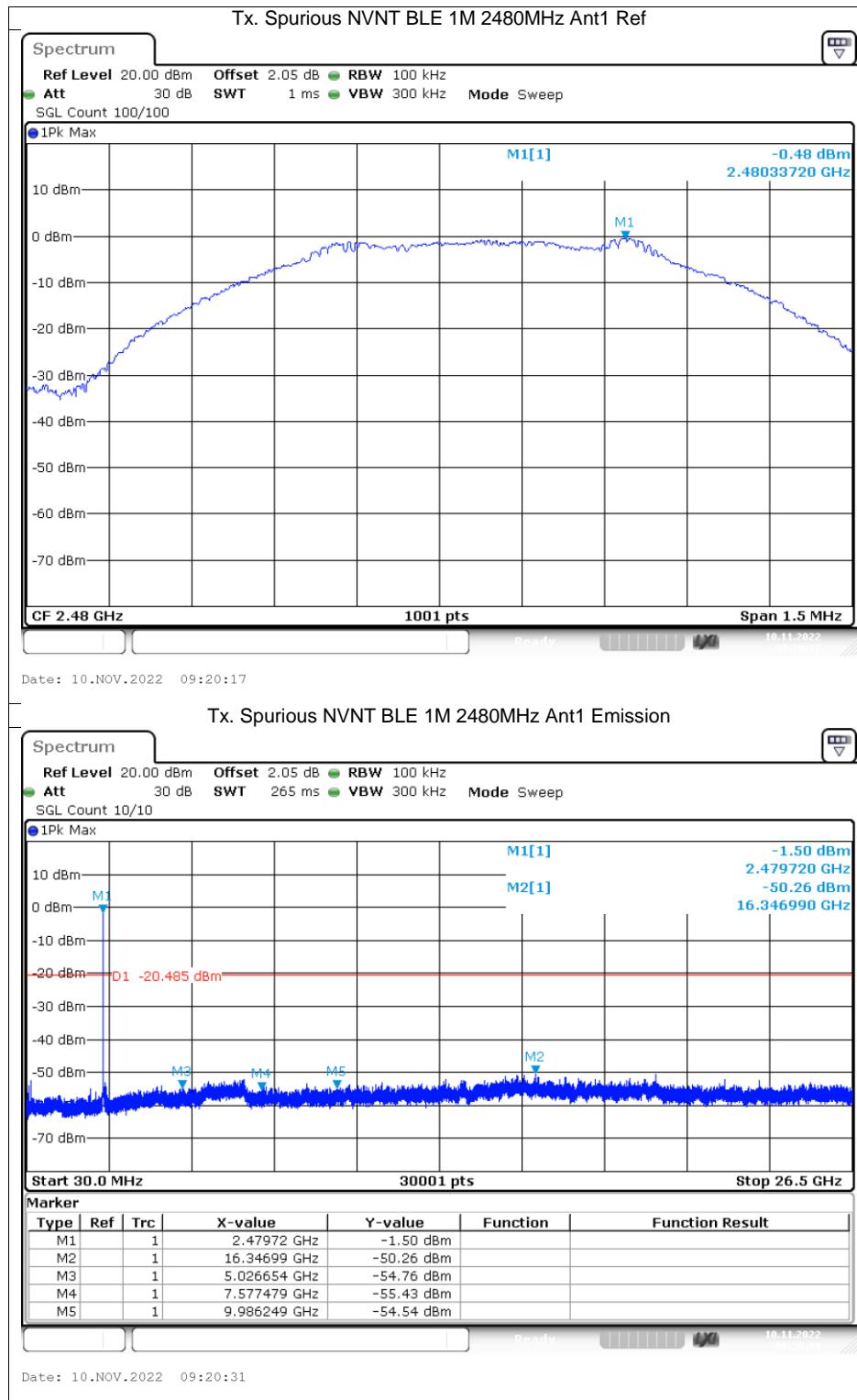


Conducted RF Spurious Emission

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-48.8	-20	Pass
NVNT	BLE 1M	2440	Ant1	-52.5	-20	Pass
NVNT	BLE 1M	2480	Ant1	-49.77	-20	Pass







Duty Cycle

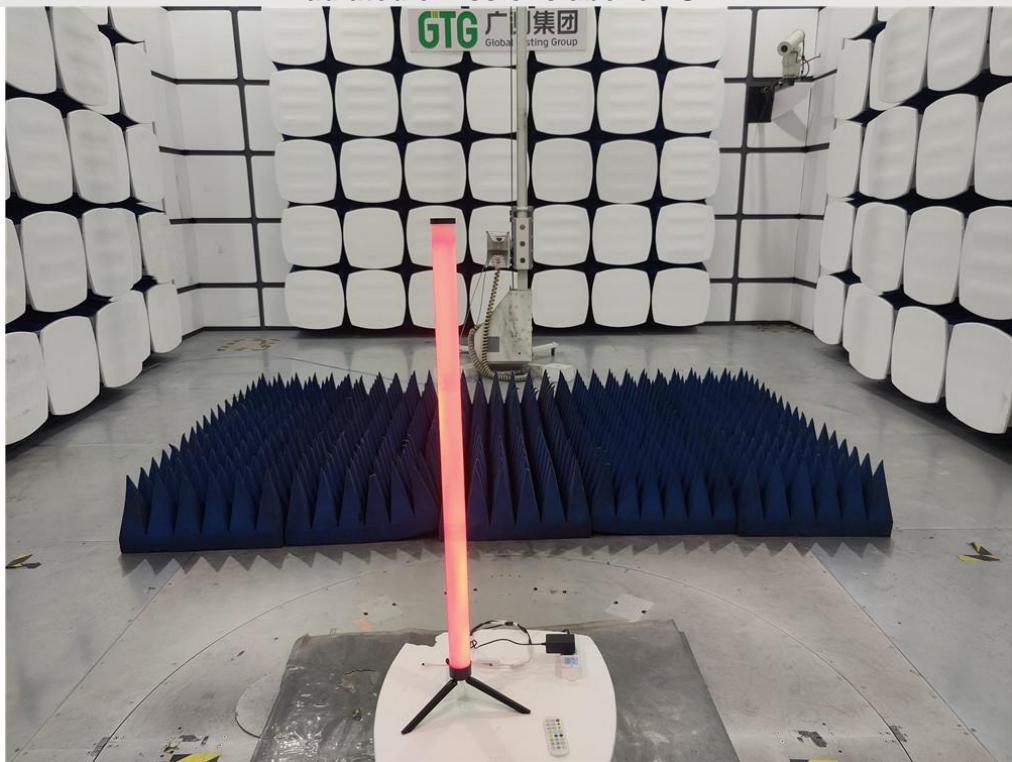
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	BLE 1M	2402	Ant1	100	0	0
NVNT	BLE 1M	2440	Ant1	100	0	0
NVNT	BLE 1M	2480	Ant1	100	0	0

APPENDIX: PHOTOGRAPHS OF TEST CONFIGURATION

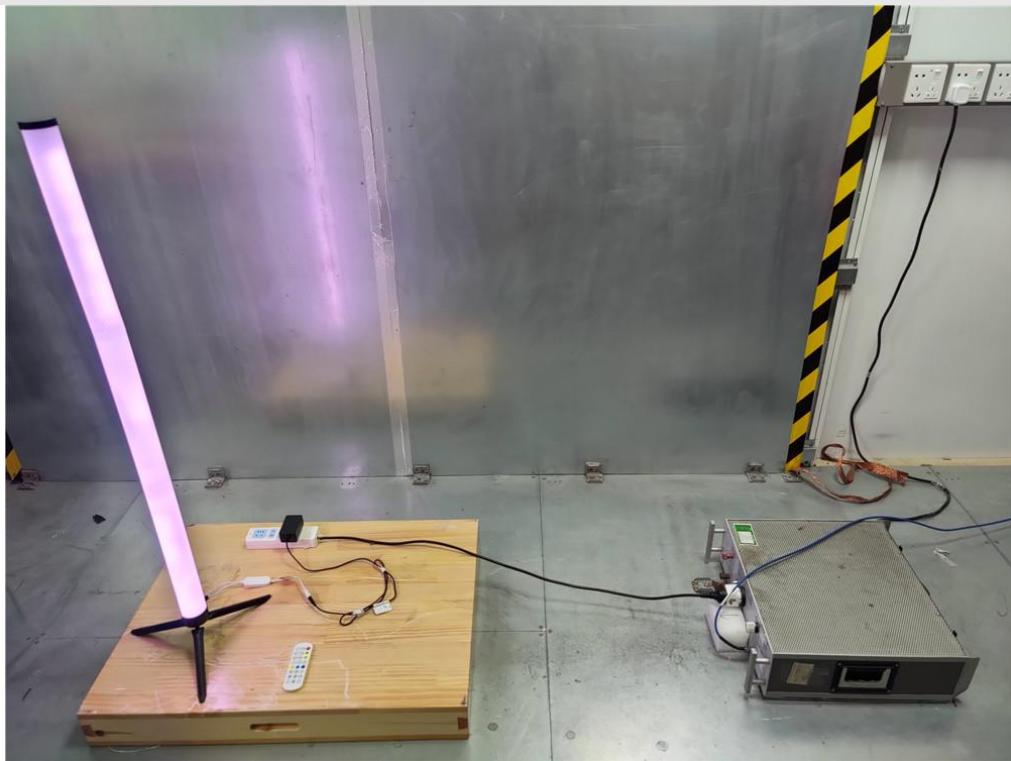
Radiated emissions below 1GHz



Radiated emissions above 1GHz

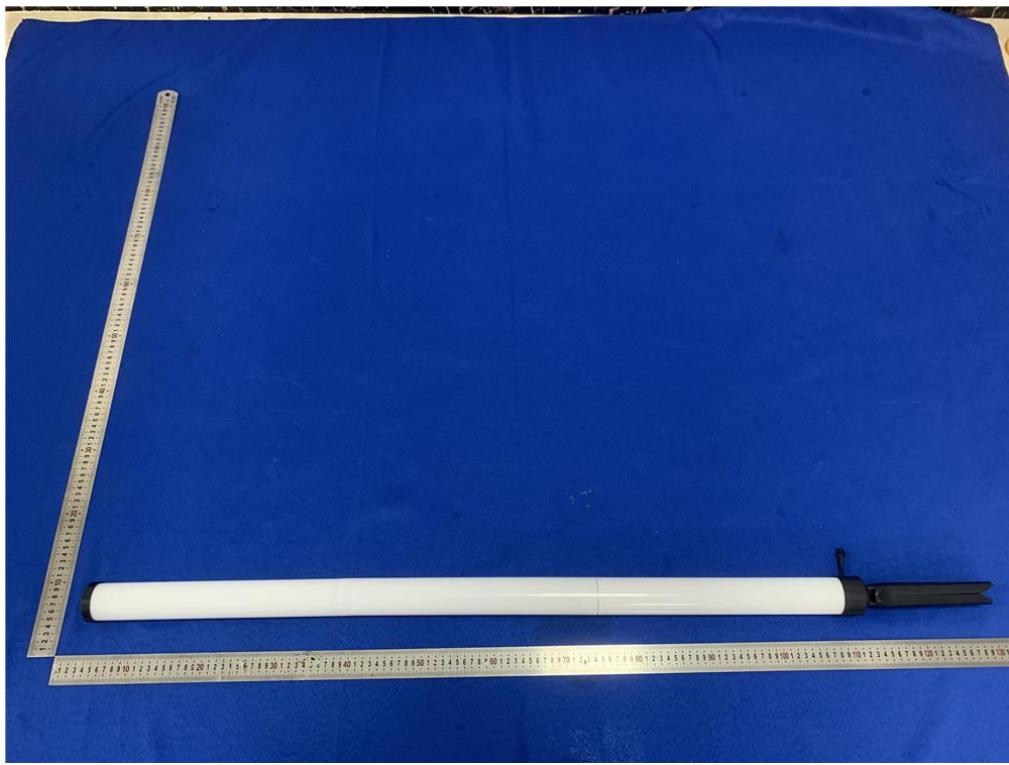


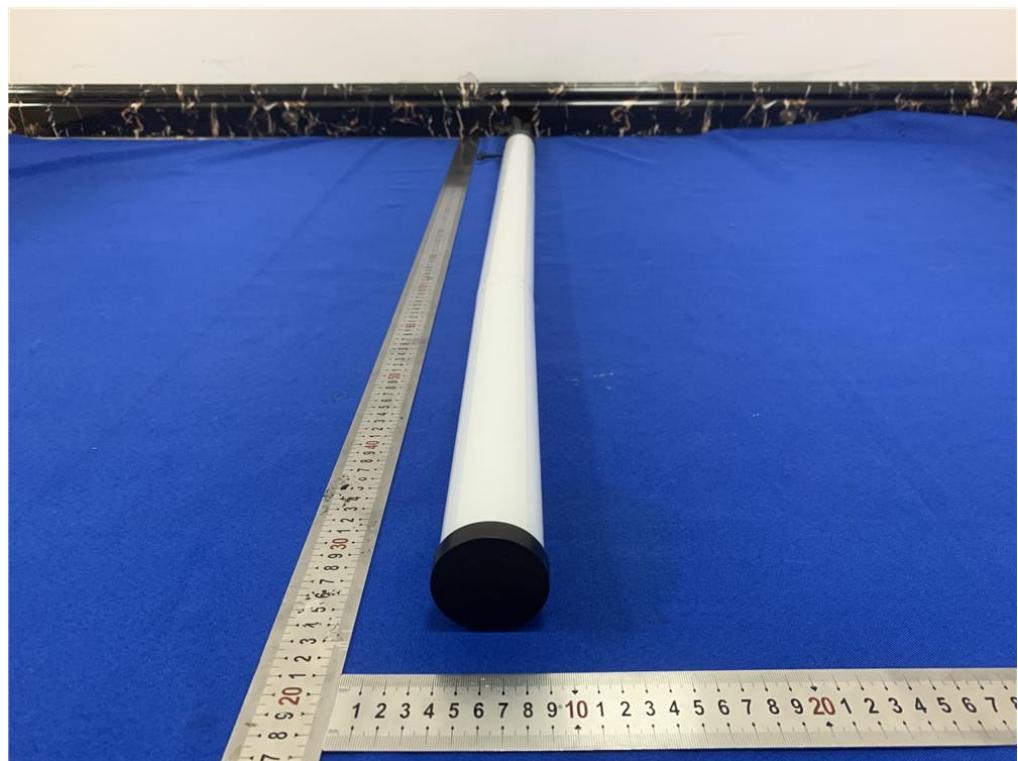
Conducted emissions

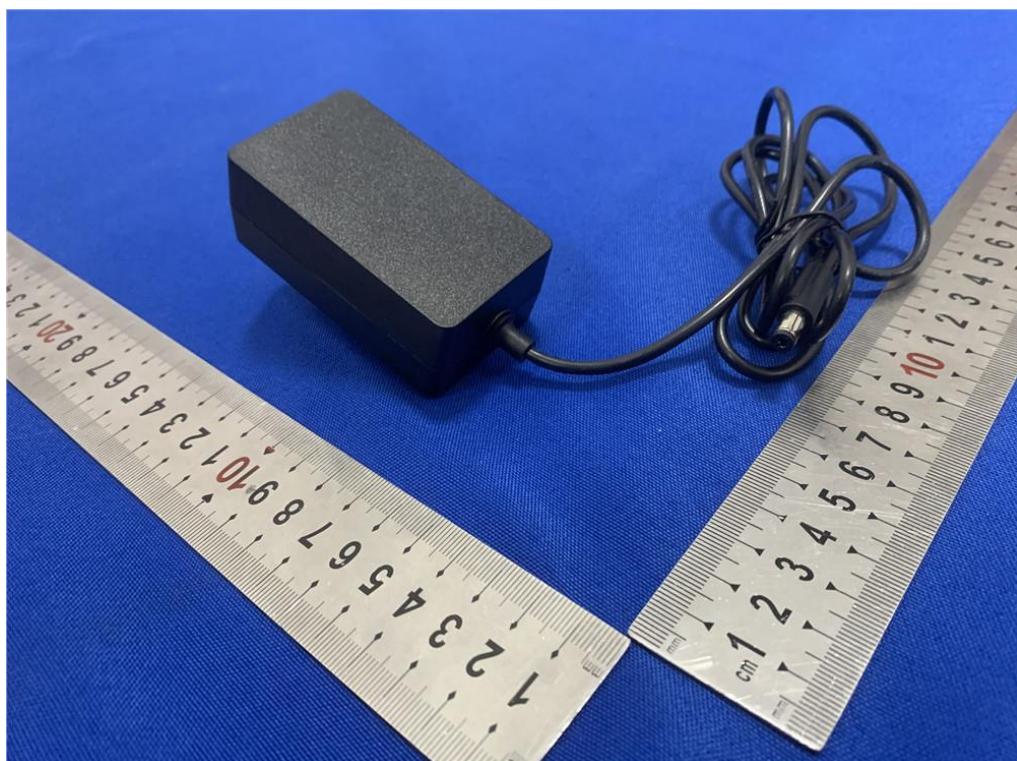
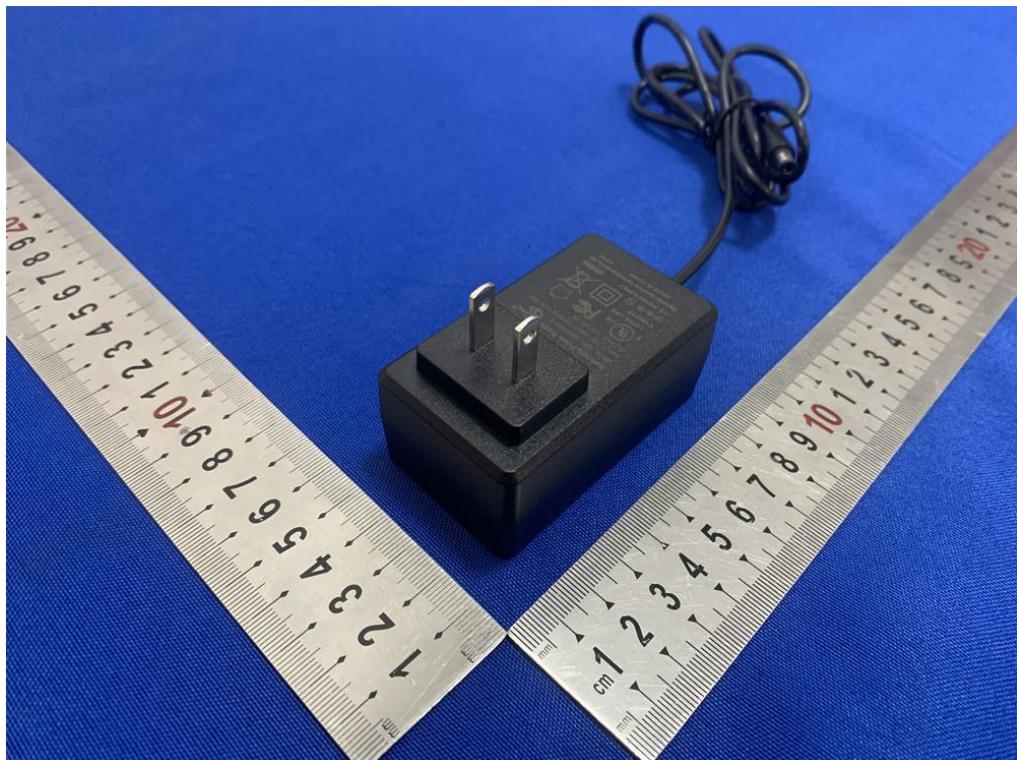


APPENDIX: PHOTOGRAPHS OF THE EUT

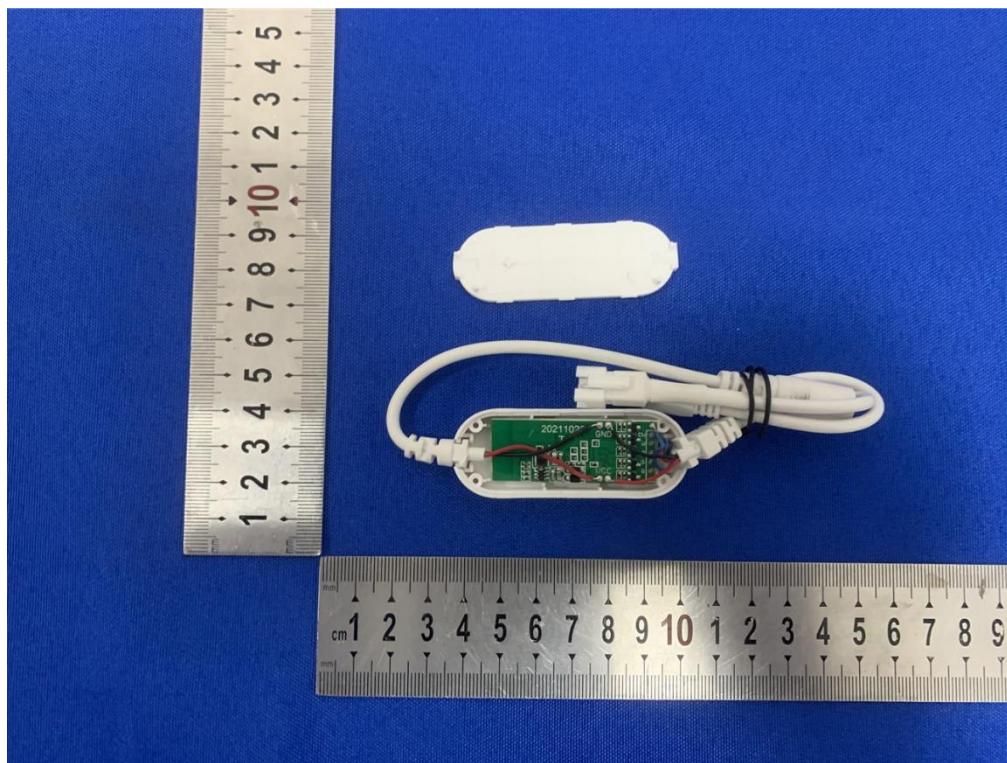
External

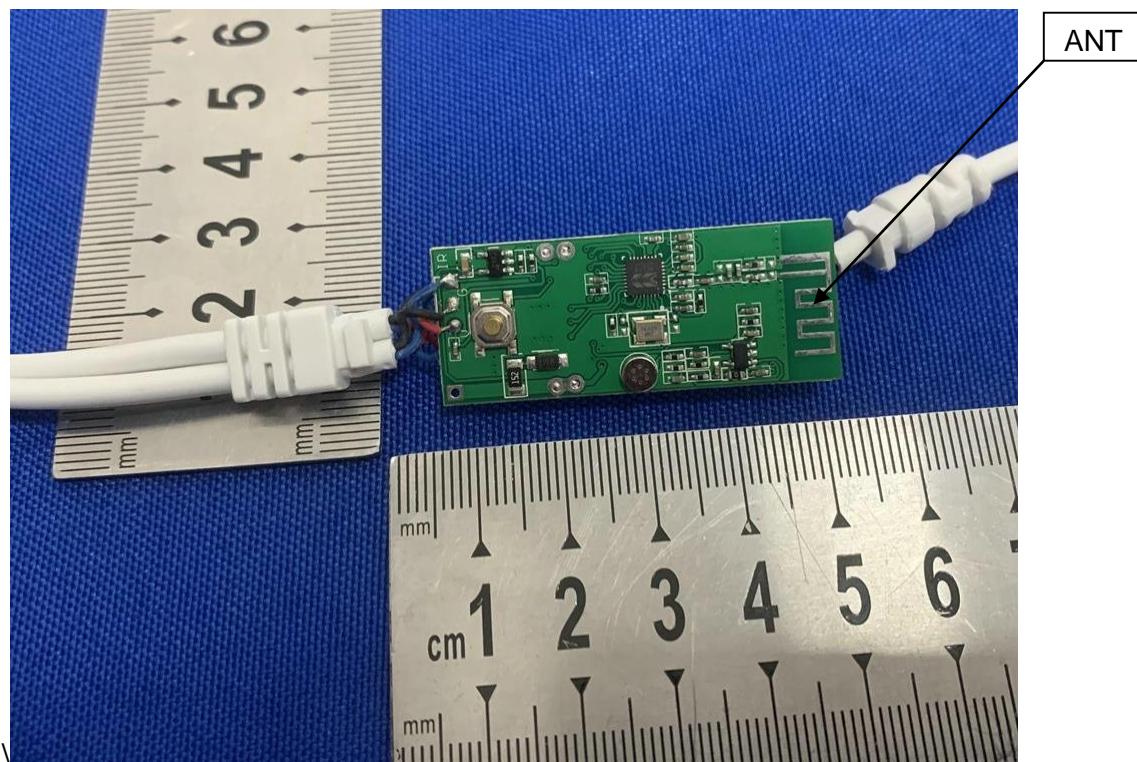
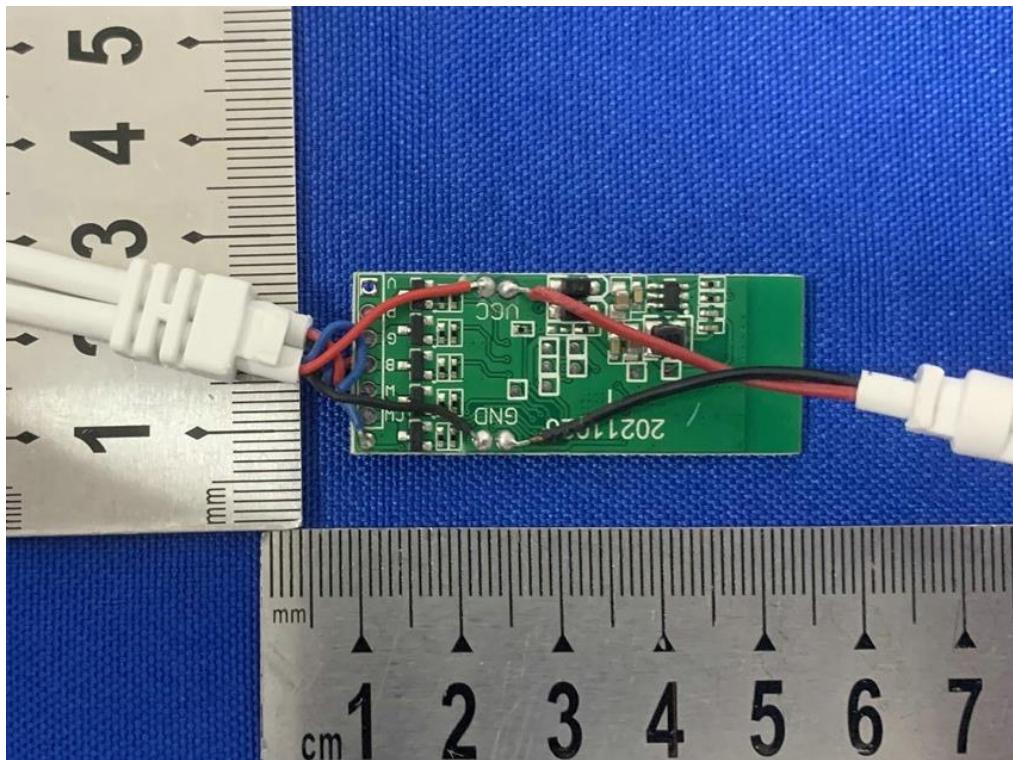


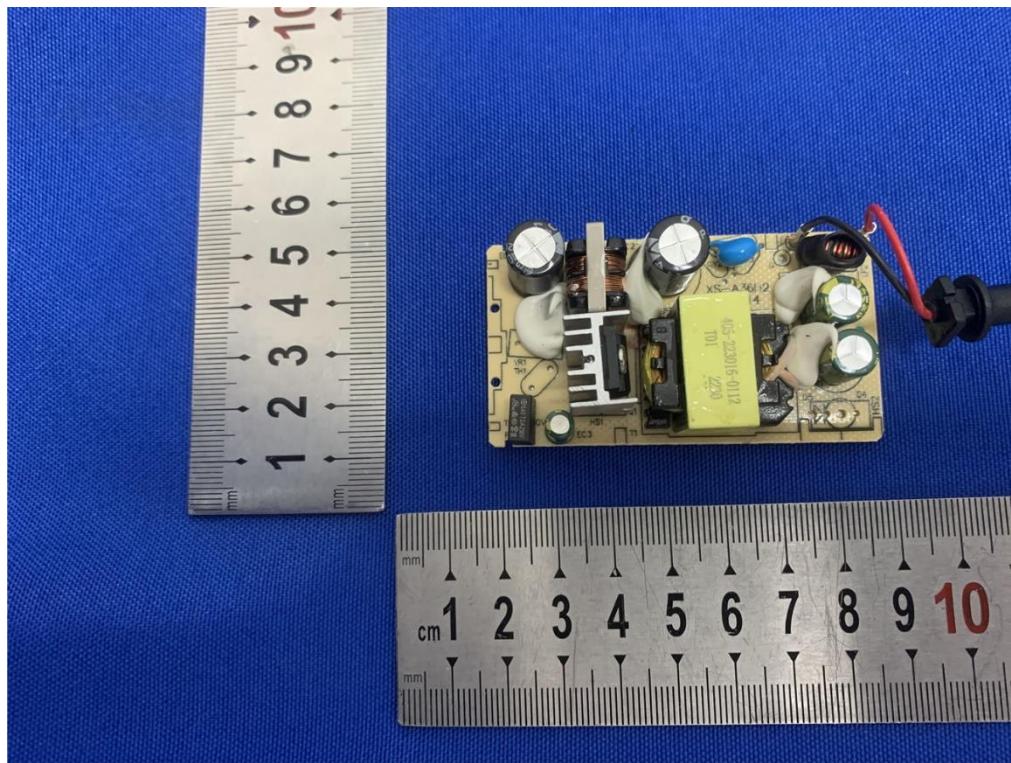


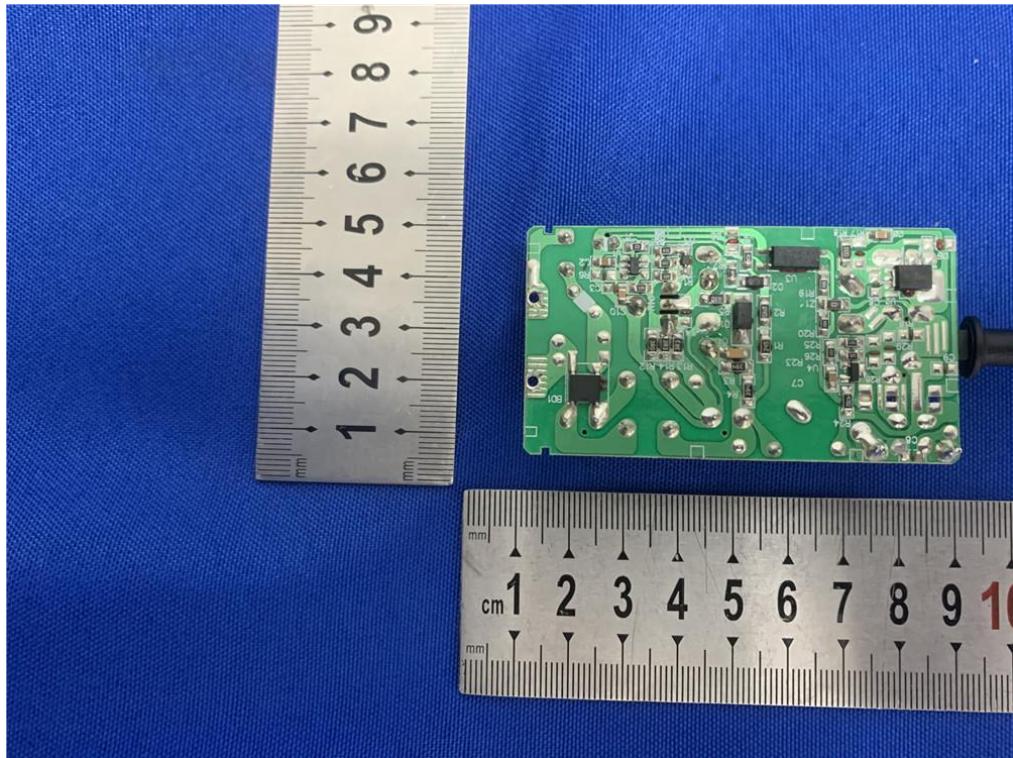


Internal









---END OF REPORT---