FCC&IC TEST REPORT

FCC ID: 2AWQV-C200

IC: 26231-C200

On Behalf of

Parceltools Pty Ltd

Scanner

Model No.: C200

Prepared for	:	Parceltools Pty Ltd
Address	:	18 Larkin St Waverton, NSW 2060 Australia

Prepared By	:	Shenzhen Alpha Product Testing Co., Ltd.
Address	:	Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

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Date of Receipt	:	March 1, 2023
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TEST REPORT DECLARATION

Applicant	:	Parceltools Pty Ltd
Address	:	18 Larkin St Waverton, NSW 2060 Australia
Manufacturer	:	Parceltools Pty Ltd
Address	:	18 Larkin St Waverton, NSW 2060 Australia
EUT Description	:	Scanner
		(A) Model No. : C200
		(B) Trademark : Cubetape

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247,

RSS-247 Issue 2, RSS-Gen Issue 5, ANSI C63.10:2013, CISPR 16-1-4:2010

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....…..:	Lucas Pang Project Engineer	Lucas Pang
Approved by (name + signature)…....:	Reak Yang Project Manager	
Date of issue……..:	March 16, 2023	

Revision History

Revision	Issue Date	Revisions	Revised By
V0	March 16, 2023	Initial released Issue	Lucas Pang

1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Test Item	Standards Paragraph	Result
Conducted Emission	FCC Part 15: 15.207 RSS-GEN(8.8) ANSI C63.10 :2013	P
6dB Bandwidth	FCC PART 15:15.247(a)(2) RSS-247(5.2 a) ANSI C63.10 :2013	P
Output Power	FCC Part 15: 15.247(b)(3) RSS-247(5.4 d) ANSI C63.10 :2013	P
Radiated Spurious Emission	FCC Part 15: 15.209 FCC Part 15: 15.247(d) RSS-Gen(8.9), RSS-247(5.5) ANSI C63.10 :2013	P
Conducted Spurious & Band Edge Emission	FCC Part 15: 15.247(d) RSS-Gen(8.9), RSS-247(5.5) ANSI C63.10 :2013	P
Power Spectral Density	FCC PART 15:15.247(e) RSS-247(5.2 b) ANSI C63.10 :2013	P
Radiated Band Edge Emission	FCC Part 15: 15.247(d) RSS-GEN(6.13) ANSI C63.10 :2013	P
Frequency stability	RSS-GEN(6.11)	P
Antenna Requirement	FCC Part 15: 15.203 RSS-GEN(6.8)	P

Note:
1. P is an abbreviation for Pass.

2. F is an abbreviation for Fail.

3. N/A is an abbreviation for Not Applicable.

4. Decision rules for the conclusion of this test report: decision by actual test data without considering measurement uncertainty.

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Description/PMN	:	Scanner
Model Number/HVIN(s)	:	C200
Diff.	:	N/A
Test Voltage	:	DC 5V from USB, DC 3.7V from battery
Radio Technology	:	Bluetooth V5.0 LE
Operation frequency	:	2402-2480MHz
Channel No.	:	40 channels
Data rate	:	1Mbps/2Mbps
Channel Separation	:	2MHz
Modulation	:	GFSK
Antenna Type	:	Internal Antenna, Maximum Gain is 2.99dBi (Antenna information is provided by applicant.)
Software Version	:	V1.0
Hardware version/FVIN	:	V1.0

Remark:
1. The worst-case simultaneous transmission configuration was evaluated with no non-compliance found. Results in this report are only for Bluetooth BLE function, and there is no other transmitter involved.
2. In this report, the main test model is C200, and the main test model serial number is 2310005.
3. The product contains two earphones with the same function, which can be used in pairs. Both modules have been tested, and this report only shows the worst data.

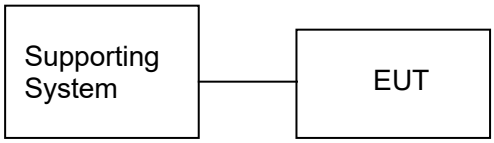
2.2. Accessories of Device (EUT)

Accessories	:	/
Manufacturer	:	/
Model	:	/
Ratings	:	/

2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or SDOC
1.	Notebook	Thinkpad	E14	N/A	N/A

2.4. Block Diagram of connection between EUT and simulators



2.5. Test Mode Description

Tested mode, channel, and data rate information		
Mode	**Channel**	**Frequency (MHz)**
GFSK(1Mbps/2Mbps)	Low : CH0	2402
	Middle: CH19	2440
	High: CH39	2480

The test software was used to control EUT work in Continuous TX mode, and select test channel, wireless mode.

2.6. Test Conditions

Items	Required	Actual
Temperature range:	15-35℃	27℃
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	98kPa

2.7. Test Facility

Shenzhen Alpha Product Testing Co., Ltd
Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,
Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission
Registration Number: 293961
Designation Number: CN1236

July 15, 2019 Certificated by IC
Registration Number: CN0085

2.8. Measurement Uncertainty

(95% confidence levels, k=2)

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	1.63dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	3.5dB
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.74dB(Polarize: V)
	3.76dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for radio frequency	5.06×10^{-8}GHz
Uncertainty for conducted RF Power	0.40dB
Uncertainty for temperature	0.2℃
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

2.9. Test Equipment List

Equipment	Manufacture	Model No.	Firmware version	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	/	N/A	2022.05.17	3Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	2.3	102137	2022.08.22	1Year
Spectrum analyzer	Agilent	N9020A	A.14.16	MY499100060	2022.08.22	1Year
Receiver	ROHDE&SCHWARZ	ESR	2.28 SP1	1316.3003K03-102082-Wa	2022.08.22	1Year
Receiver	R&S	ESCI	4.42 SP1	101165	2022.08.22	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	/	VULB 9168#627	2021.08.30	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	/	2106	2021.08.30	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	/	00059	2021.08.30	2Year
RF Cable	Resenberger	Cable 1	/	RE1	2022.08.22	1Year
RF Cable	Resenberger	Cable 2	/	RE2	2022.08.22	1Year
RF Cable	Resenberger	Cable 3	/	CE1	2022.08.22	1Year
Pre-amplifier	HP	HP8347A	/	2834A00455	2022.08.22	1Year
Pre-amplifier	Agilent	8449B	/	3008A02664	2022.08.22	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	/	8126-466	2022.08.22	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	101043	2022.08.23	1 Year
Horn Antenna	SCHWARZBECK	BBHA9170	/	00946	2021.08.30	2 Year
Preamplifier	SKET	LNPA_1840-50	/	SK2018101801	2022.08.22	1 Year
Power Meter	Agilent	E9300A	/	MY41496628	2022.08.22	1 Year
Power Sensor	DARE	RPR3006W	/	15100041SNO91	2022.08.22	1 Year
Temp. & Humid. Chamber	Weihuang	WHTH-1000-40-880	/	100631	2022.08.22	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	/	20140927-6	2022.08.22	1 Year
Adjustable attenuator	MWRFtest	N/A	/	N/A	N/A	N/A
10dB Attenuator	Mini-Circuits	DC-6G	/	N/A	N/A	N/A

Software Information			
Test Item	Software Name	Manufacturer	Version
RE	EZ-EMC	EZ	Alpha-3A1
CE	EZ-EMC	EZ	Alpha-3A1
RF-CE	MTS 8310	MW	V2.0.0.0

3. SPURIOUS EMISSION

3.1. Test Limits

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

15.205 Restricted frequency band

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])

RSS-GEN Restricted frequency band

Table 7 – Restricted frequency bands Note 1

MHz	MHz	GHz
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	156.52475 - 156.52525	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.026	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 – 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.677 - 5.683	399.9 - 410	22.01 - 23.12
6.215 - 6.218	608 - 614	23.6 - 24.0

6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 36.5
8.291 - 8.294	1645.5 - 1646.5	Above 38.6
8.362 - 8.366	1660 - 1710	
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2655 - 2900	
13.36 - 13.41	3260 – 3267	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 – 8500	
108 – 138		

Note 1: Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

15.209 Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009-0.490	300	2400/F(KHz)	/
0.490-1.705	30	24000/F(KHz)	/
1.705-30	30	30	29.5
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 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	
Note 1: The peak limit is 20 dB higher than the average limit			
Note 2: Peak limit applies (AVG limit + 20 dB) as well as RSS-247 Section 5.5			

Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

Table 5 – General field strength limits at frequencies above 30 MHz	
Frequency (MHz)	**Field strength (μV/m at 3 m)**
30 – 88	100
88 – 216	150
216 – 960	200
Above 960	500

Table 6 – General field strength limits at frequencies below 30 MHz		
Frequency	**Magnetic field strength (H-Field) (μA/m)**	**Measurement distance (m)**
9 - 490 kHz[Note 1]	6.37/F (F in kHz)	300
490 - 1705 kHz	63.7/F (F in kHz)	30
1.705 - 30 MHz	0.08	30

Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

3.2. Test Procedure

The measuring distance of 3m shall be used for measurements at frequency up to 1GH and above 1GHz.

The EUT was placed on a rotating 0.8 m high above ground for below 1GHz and 1.5m high for above1GHz testing, The table was rotated 360 degrees to determine the position of the highest radiation.

The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set of make

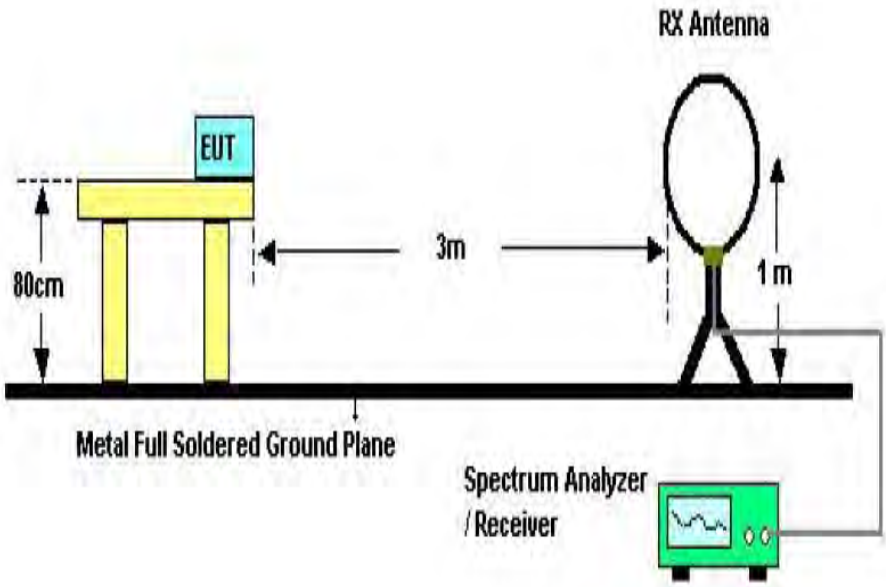
measurement.

The initial step in collecting radiated 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 premeasured.

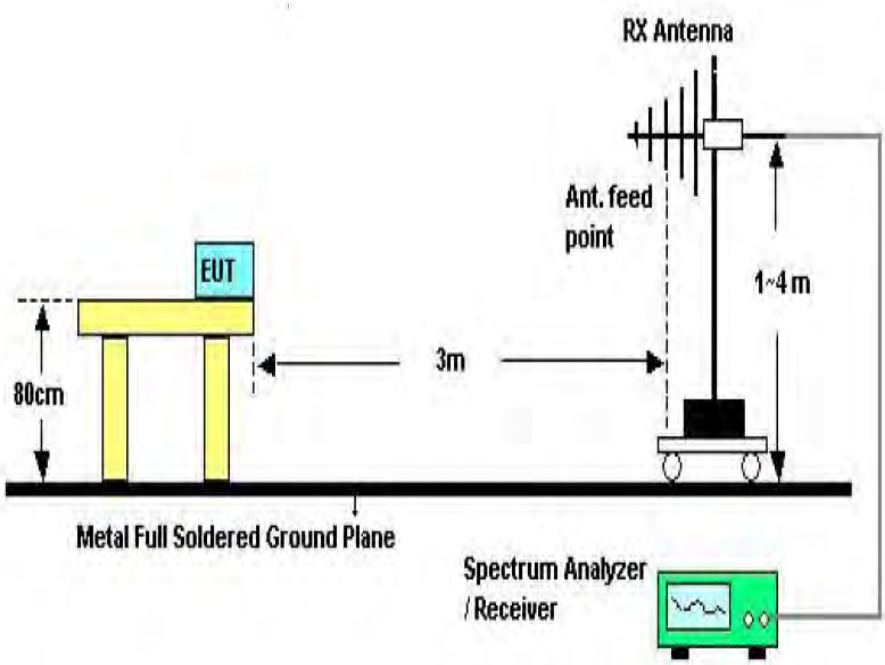
If Peak value comply with QP limit Below 1GHz, the EUT deemed to comply with QP limit. But the Peak value and average value both need to comply with applicable limit above 1GHz.

For the actual test configuration, please see the test setup photo.

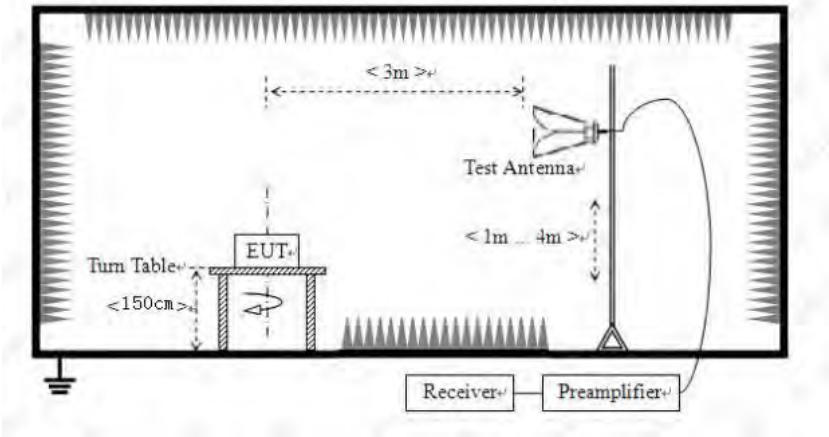
3.3. Test Setup



Below 30MHz Test Setup



Above 30MHz Test Setup



Above 1GHz Test Setup

3.4. Test Results

Test Condition

Continual Transmitting in maximum power.

9KHz~150KHz	RBW200Hz	VBW1KHz
150KHz~30MHz	RBW9KHz	VBW 30KHz
30MHZ~1GHz	RBW120KHz	VBW 300KHz
Above1GHz	RBW1MHz	VBW 3MHz

We have scanned from 9 kHz to the 10th harmonic of the EUT.

Detailed information please see the following page.

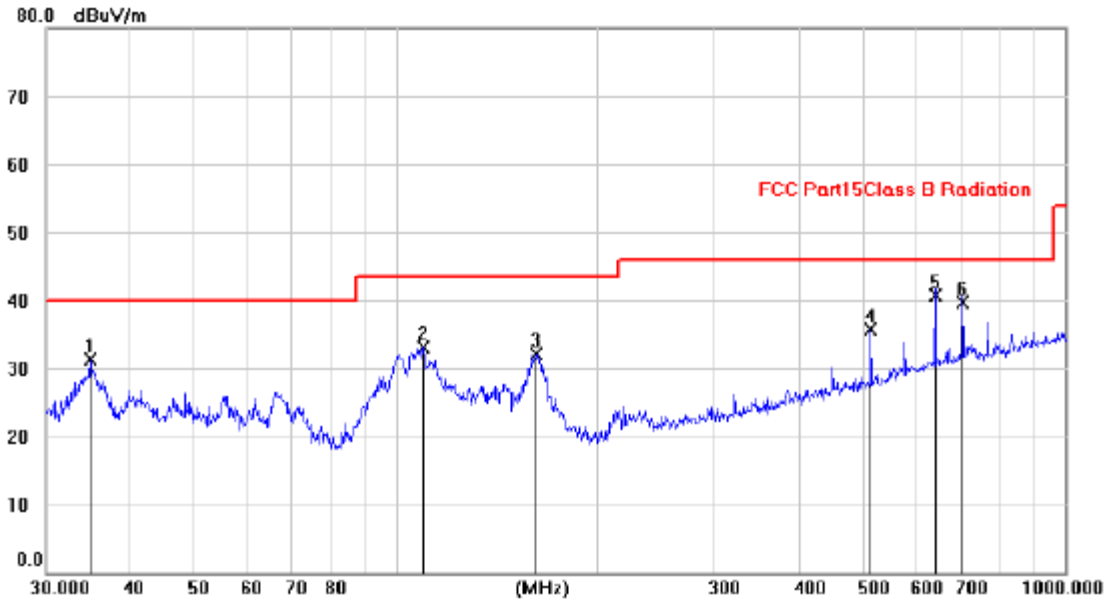
From 9KHz to 30MHz: Conclusion: Pass

Note: 1.The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

2.Only show the test data of the worst Channel in this report.

From 30MHz to 1000MHz: Conclusion: Pass

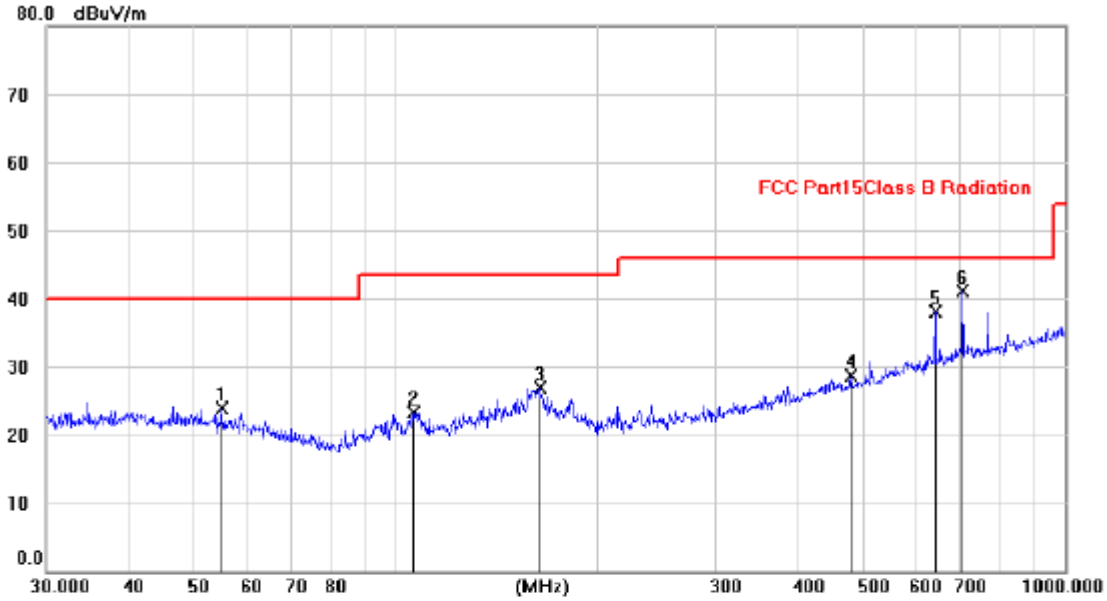
Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		34.8945	17.53	13.74	31.27	40.00	-8.73	peak			
2		110.0787	21.34	11.84	33.18	43.50	-10.32	peak			
3		162.2119	17.32	14.83	32.15	43.50	-11.35	peak			
4		512.0147	17.35	18.42	35.77	46.00	-10.23	peak			
5	*	640.0123	19.66	20.97	40.63	46.00	-5.37	QP			
6		704.0615	17.86	21.79	39.65	46.00	-6.35	QP			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Horizontal:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		54.8348	10.29	13.59	23.88	40.00	-16.12	peak			
2		106.6091	11.82	11.50	23.32	43.50	-20.18	peak			
3		163.9848	12.23	14.66	26.89	43.50	-16.61	peak			
4		480.3030	10.72	17.95	28.67	46.00	-17.33	peak			
5		640.0123	17.07	20.97	38.04	46.00	-7.96	peak			
6	*	704.0615	19.39	21.79	41.18	46.00	-4.82	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Notes: Above is below 1GHz test data. This report only shall the worst case mode for TX 2440MHz.(1Mbps)

From 1G-25GHz(1Mbps):

Test Mode: TX Low									
Freq (MHz)	Read Level (dBuV/m)	Polar (H/V)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4804	48.42	V	33.93	10.18	34.26	58.27	74	-15.73	PK
4804	36.44	V	33.93	10.18	34.26	46.29	54	-7.71	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
4804	47.30	H	33.93	10.18	34.26	57.15	74	-16.85	PK
4804	35.58	H	33.93	10.18	34.26	45.43	54	-8.57	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
Test Mode: TX Mid									
4880	49.69	V	33.95	10.20	34.26	59.58	74	-14.42	PK
4880	35.48	V	33.95	10.20	34.26	45.37	54	-8.63	AV
7320	/	/	/	/	/	/	/	/	/
9760	/	/	/	/	/	/	/	/	/
4880	48.45	H	33.95	10.20	34.26	58.34	74	-15.66	PK
4880	34.02	H	33.95	10.20	34.26	43.91	54	-10.09	AV
7320	/	/	/	/	/	/	/	/	/
9760	/	/	/	/	/	/	/	/	/
Test Mode: TX High									
4960	47.66	V	33.98	10.22	34.25	57.61	74	-16.39	PK
4960	33.75	V	33.98	10.22	34.25	43.70	54	-10.30	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/
4960	46.92	H	33.98	10.22	34.25	56.87	74	-17.13	PK
4960	32.85	H	33.98	10.22	34.25	42.80	54	-11.20	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/

Note:
1, Result = Read level + Antenna factor + cable loss-Amp factor
2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

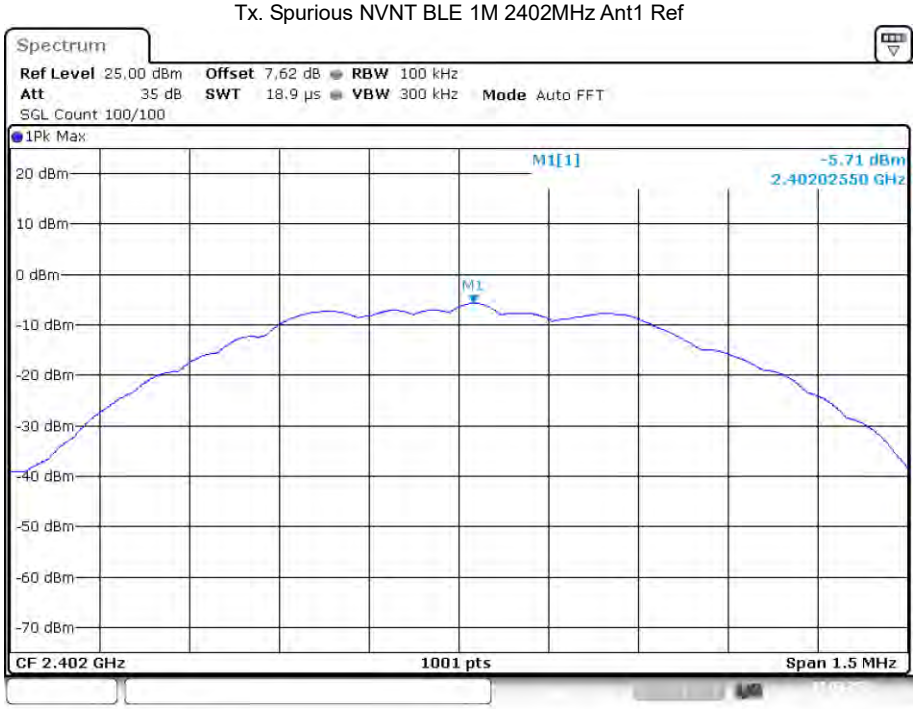
From 1G-25GHz(2Mbps):

Test Mode: TX Low									
Freq (MHz)	Read Level (dBuV/m)	Polar (H/V)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4804	48.23	V	33.93	10.18	34.26	58.08	74	-15.92	PK
4804	36.11	V	33.93	10.18	34.26	45.96	54	-8.04	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
4804	47.33	H	33.93	10.18	34.26	57.18	74	-16.82	PK
4804	35.61	H	33.93	10.18	34.26	45.46	54	-8.54	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
Test Mode: TX Mid									
4880	49.79	V	33.95	10.20	34.26	59.68	74	-14.32	PK
4880	35.56	V	33.95	10.20	34.26	45.45	54	-8.55	AV
7320	/	/	/	/	/	/	/	/	/
9760	/	/	/	/	/	/	/	/	/
4880	48.83	H	33.95	10.20	34.26	58.72	74	-15.28	PK
4880	34.92	H	33.95	10.20	34.26	44.81	54	-9.19	AV
7320	/	/	/	/	/	/	/	/	/
9760	/	/	/	/	/	/	/	/	/
Test Mode: TX High									
4960	47.83	V	33.98	10.22	34.25	57.78	74	-16.22	PK
4960	33.34	V	33.98	10.22	34.25	43.29	54	-10.71	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/
4960	46.67	H	33.98	10.22	34.25	56.62	74	-17.38	PK
4960	32.65	H	33.98	10.22	34.25	42.60	54	-11.40	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/

Note:
1, Result = Read level + Antenna factor + cable loss-Amp factor
2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

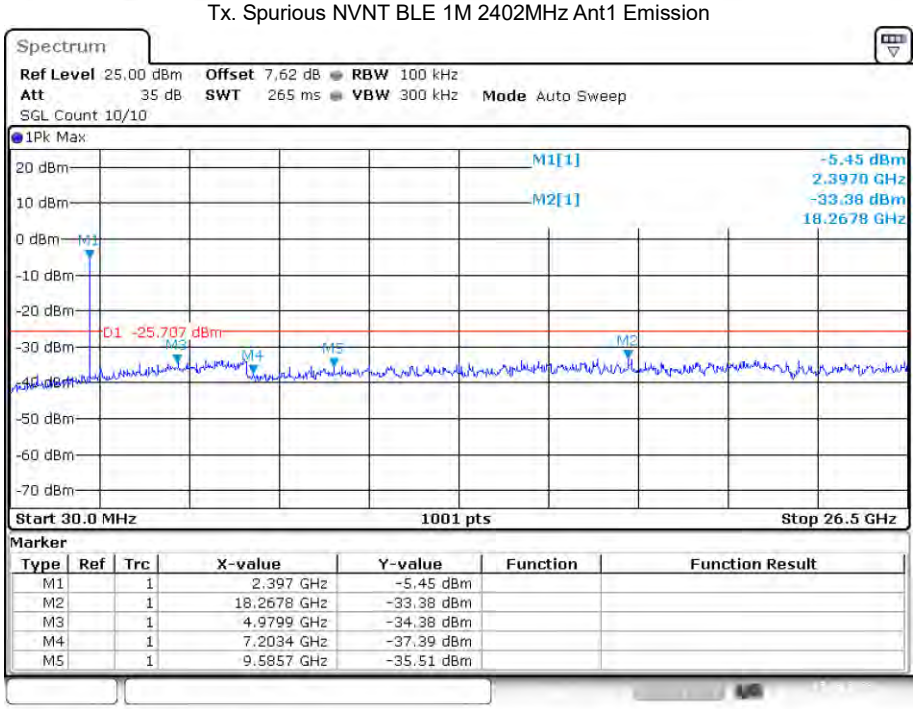
Conducted RF Spurious Emission

Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



Date: 7.MAR.2023 14:56:37

Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission

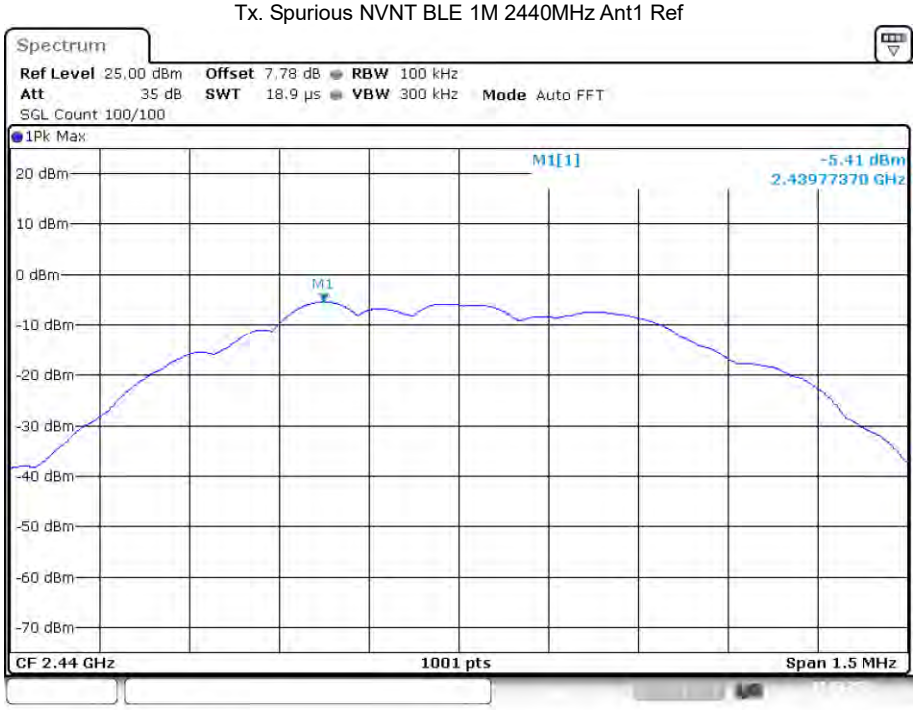


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.397 GHz	-5.45 dBm		
M2		1	18.2678 GHz	-33.38 dBm		
M3		1	4.9799 GHz	-34.38 dBm		
M4		1	7.2034 GHz	-37.39 dBm		
M5		1	9.5857 GHz	-35.51 dBm		

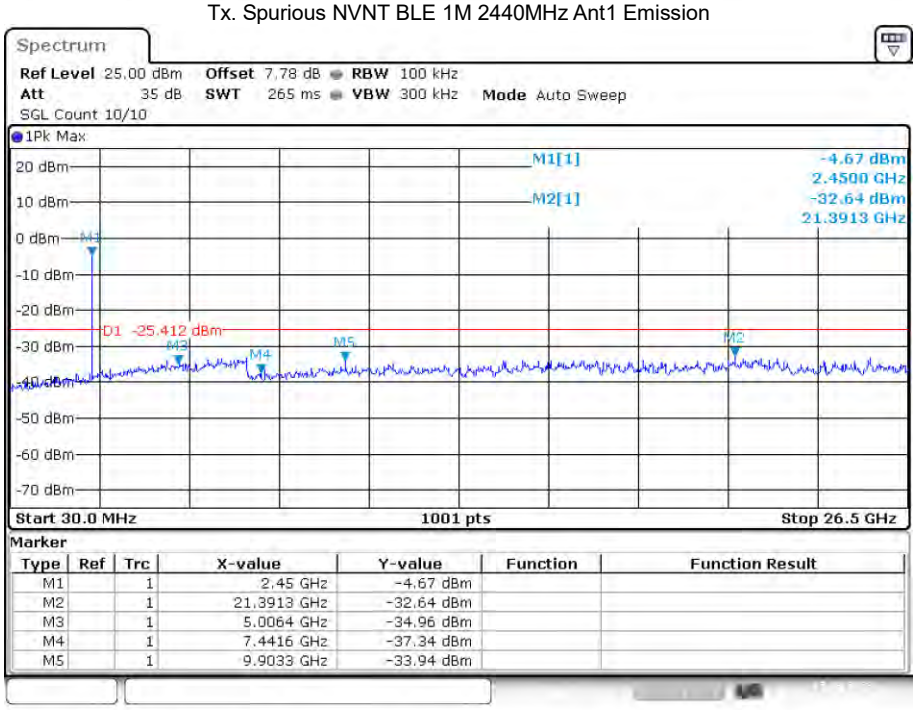
Date: 7.MAR.2023 14:56:55

Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref



Date: 7.MAR.2023 14:58:44

Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission

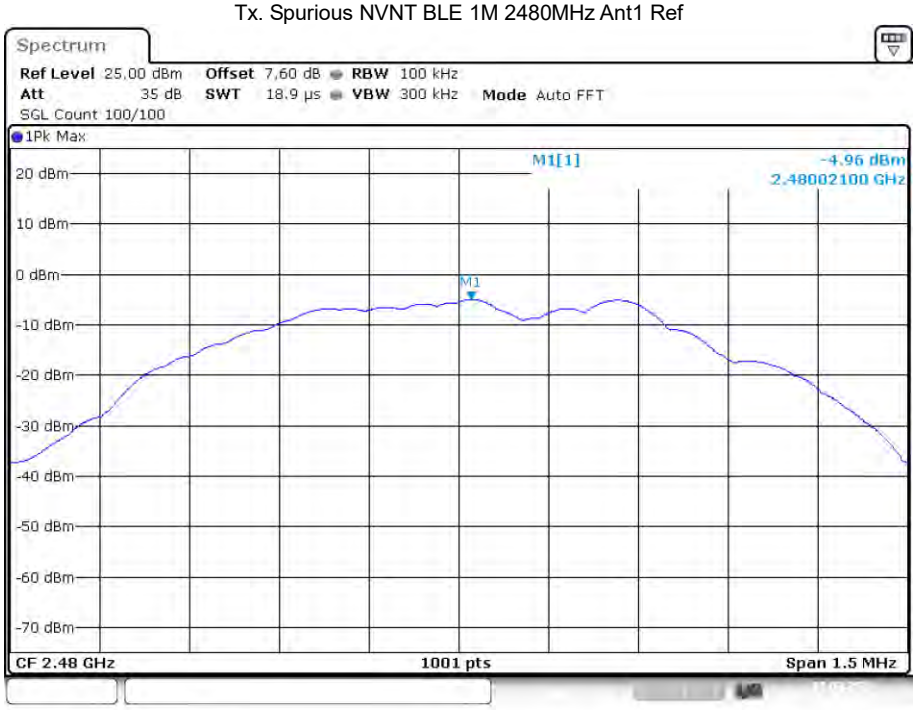


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45 GHz	-4.67 dBm		
M2		1	21.3913 GHz	-32.64 dBm		
M3		1	5.0064 GHz	-34.96 dBm		
M4		1	7.4416 GHz	-37.34 dBm		
M5		1	9.9033 GHz	-33.94 dBm		

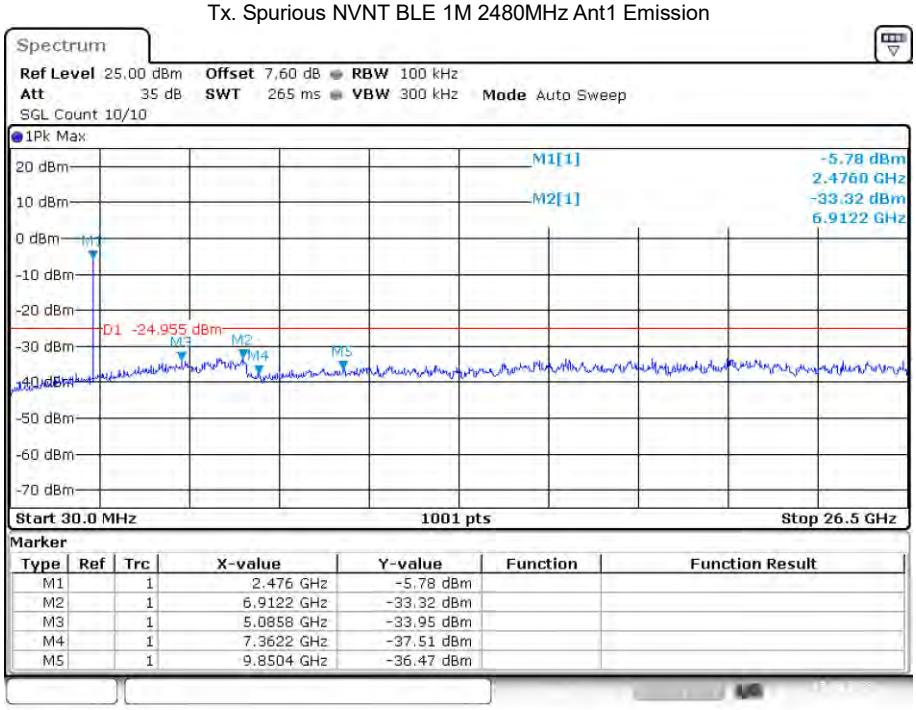
Date: 7.MAR.2023 14:59:02

Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref



Date: 7.MAR.2023 15:00:50

Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Emission

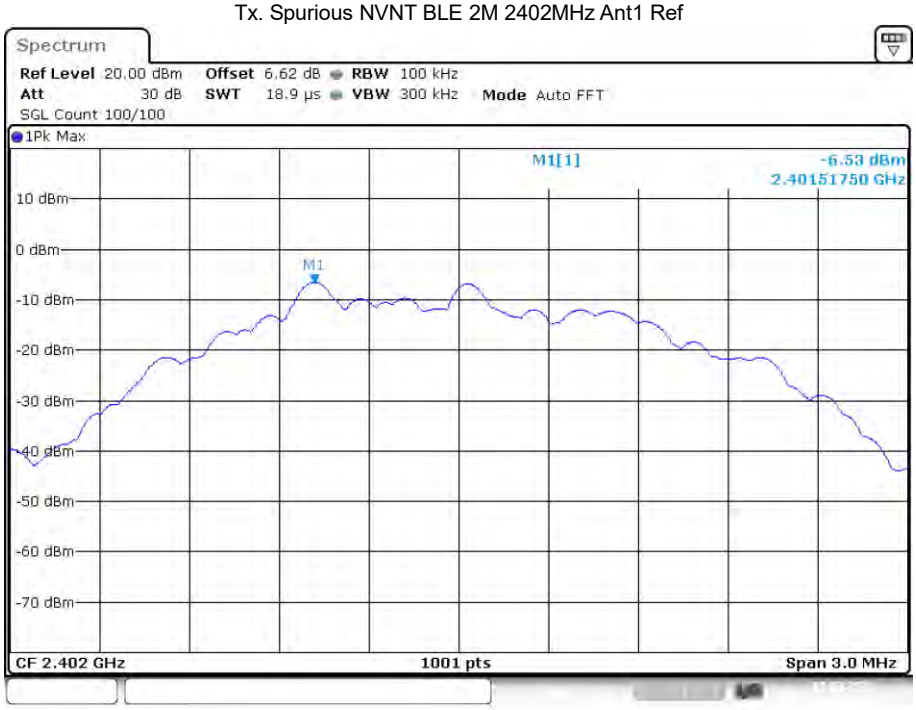


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.476 GHz	-5.78 dBm		
M2		1	6.9122 GHz	-33.32 dBm		
M3		1	5.0858 GHz	-33.95 dBm		
M4		1	7.3622 GHz	-37.51 dBm		
M5		1	9.8504 GHz	-36.47 dBm		

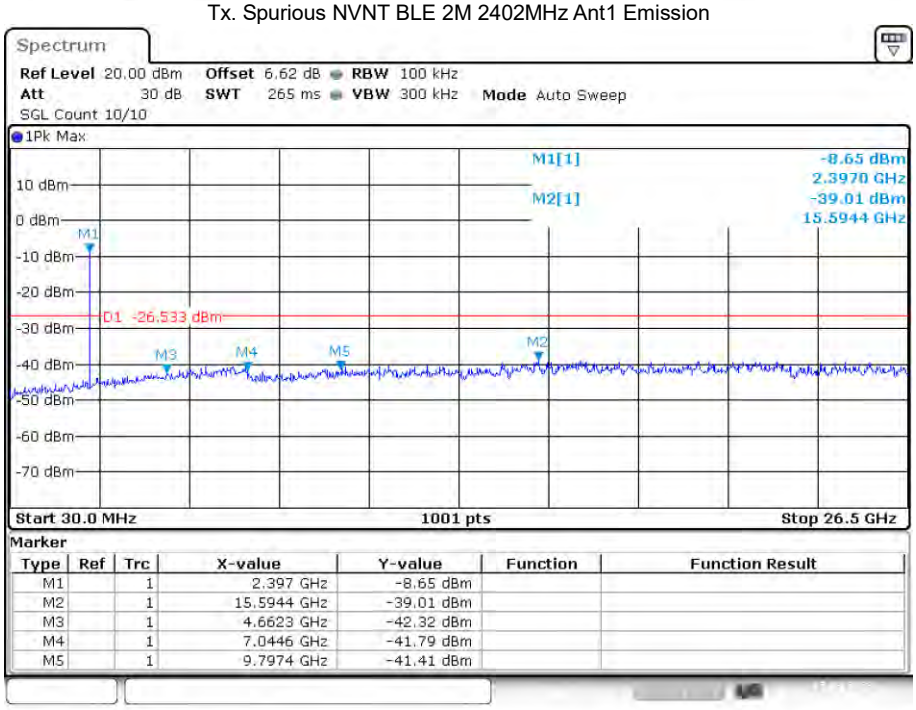
Date: 7.MAR.2023 15:01:07

Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Ref



Date: 7.MAR.2023 15:04:53

Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Emission

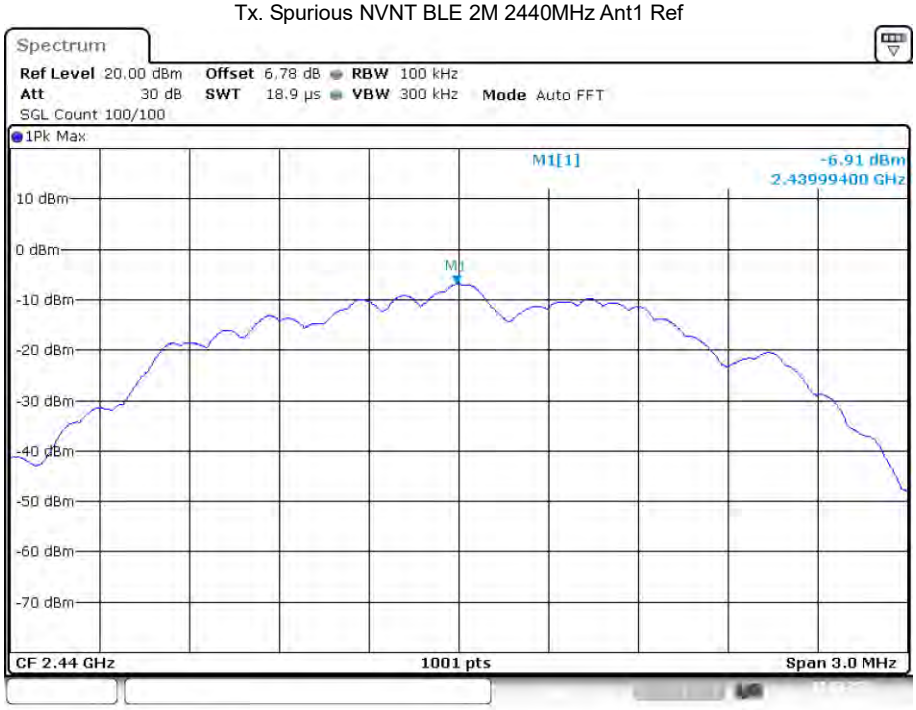


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.397 GHz	-8.65 dBm		
M2		1	15.5944 GHz	-39.01 dBm		
M3		1	4.6623 GHz	-42.32 dBm		
M4		1	7.0446 GHz	-41.79 dBm		
M5		1	9.7974 GHz	-41.41 dBm		

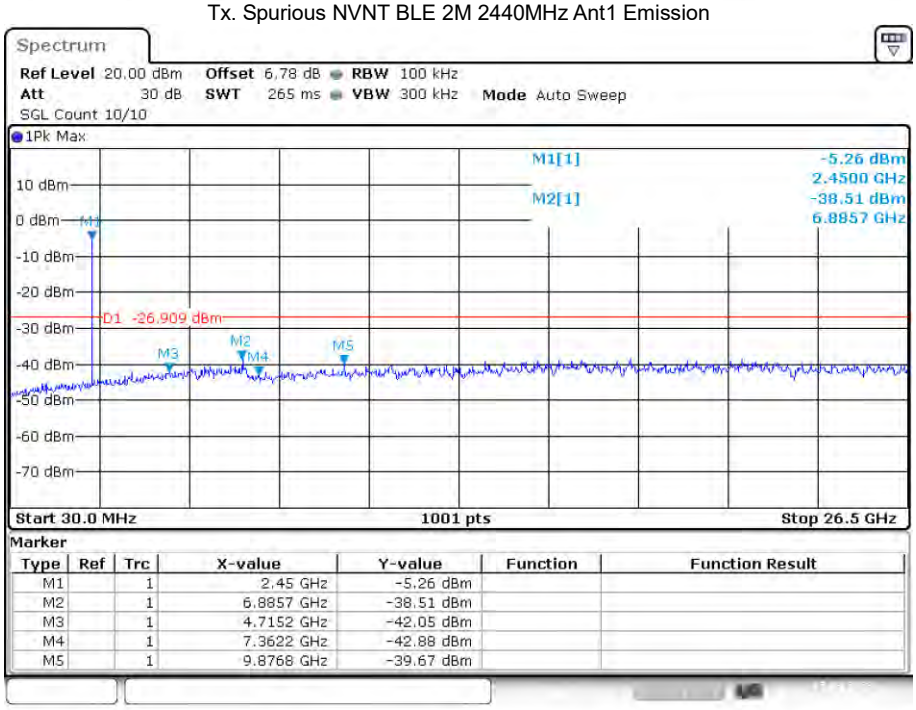
Date: 7.MAR.2023 15:05:11

Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Ref



Date: 7.MAR.2023 15:06:21

Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Emission

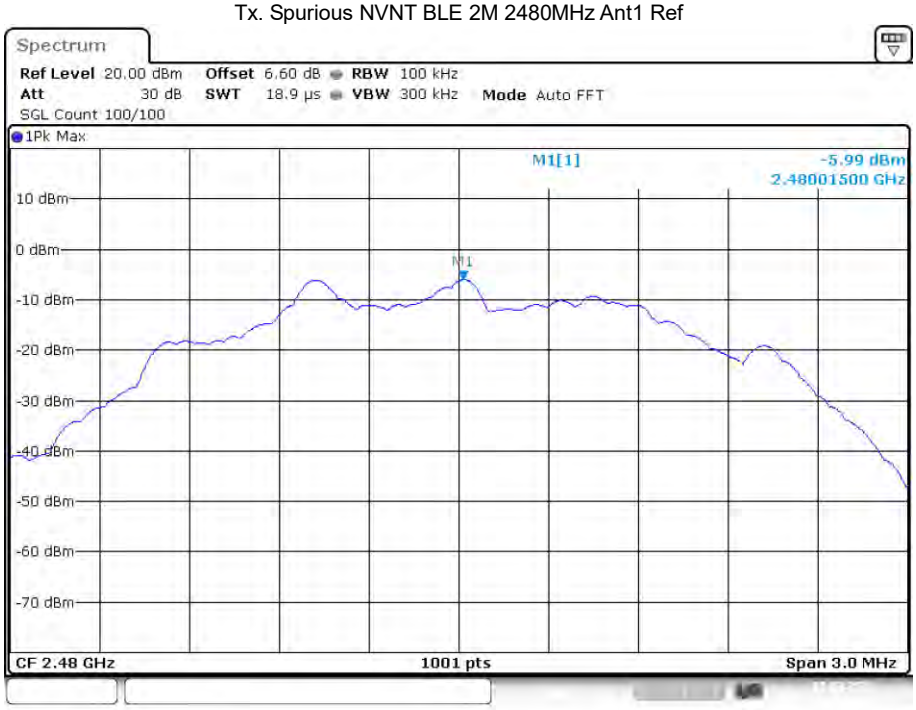


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45 GHz	-5.26 dBm		
M2		1	6.8857 GHz	-38.51 dBm		
M3		1	4.7152 GHz	-42.05 dBm		
M4		1	7.3622 GHz	-42.88 dBm		
M5		1	9.8768 GHz	-39.67 dBm		

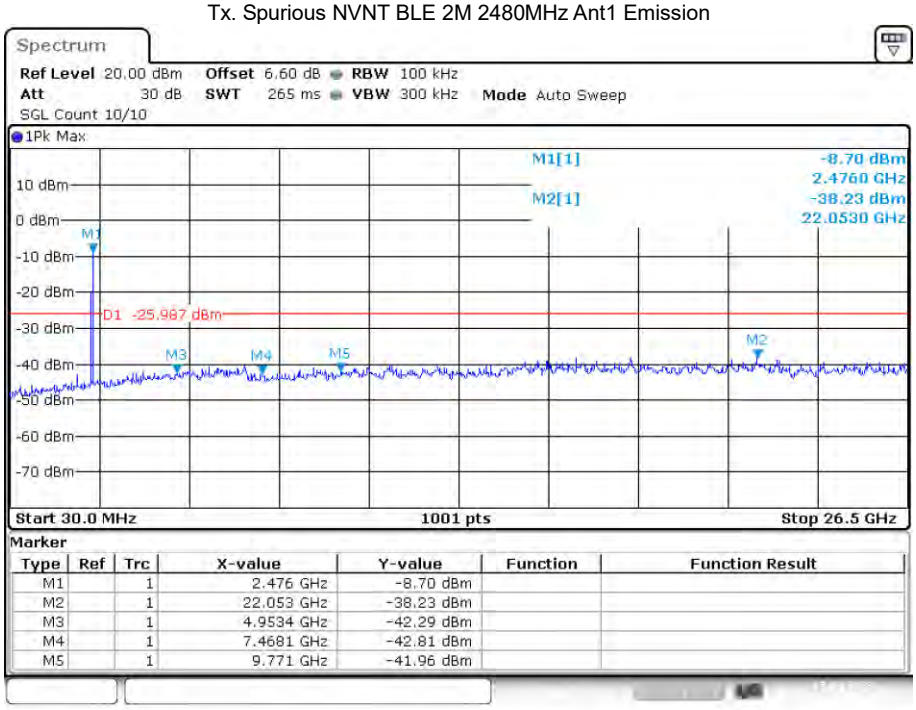
Date: 7.MAR.2023 15:06:38

Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Ref



Date: 7.MAR.2023 15:07:47

Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Emission



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.476 GHz	-8.70 dBm		
M2		1	22.053 GHz	-38.23 dBm		
M3		1	4.9534 GHz	-42.29 dBm		
M4		1	7.4681 GHz	-42.81 dBm		
M5		1	9.771 GHz	-41.96 dBm		

Date: 7.MAR.2023 15:08:05

4. POWER LINE CONDUCTED EMISSION

4.1. Test Limits

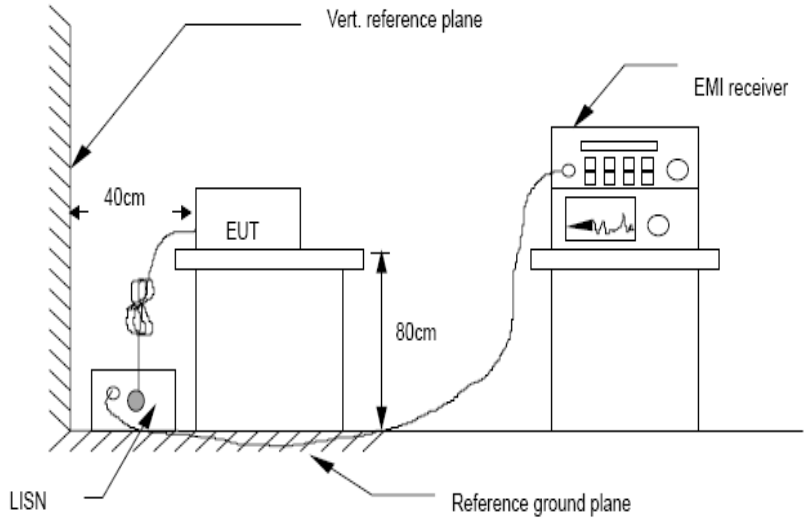
Frequency	Limits dB(μV)	
MHz	Quasi-peak Level	Average Level
0.15 -0.50	66 -56*	56 - 46*
0.50 -5.00	56	46
5.00 -30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.
3.The limit decreases in line with the logarithm of the frequency in rang of 0.15 to 0.50 MHz.

4.2. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines 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 ANSI C63.10:2013 on Conducted Emission Measurement.
The bandwidth of test receiver is set at 9 kHz.

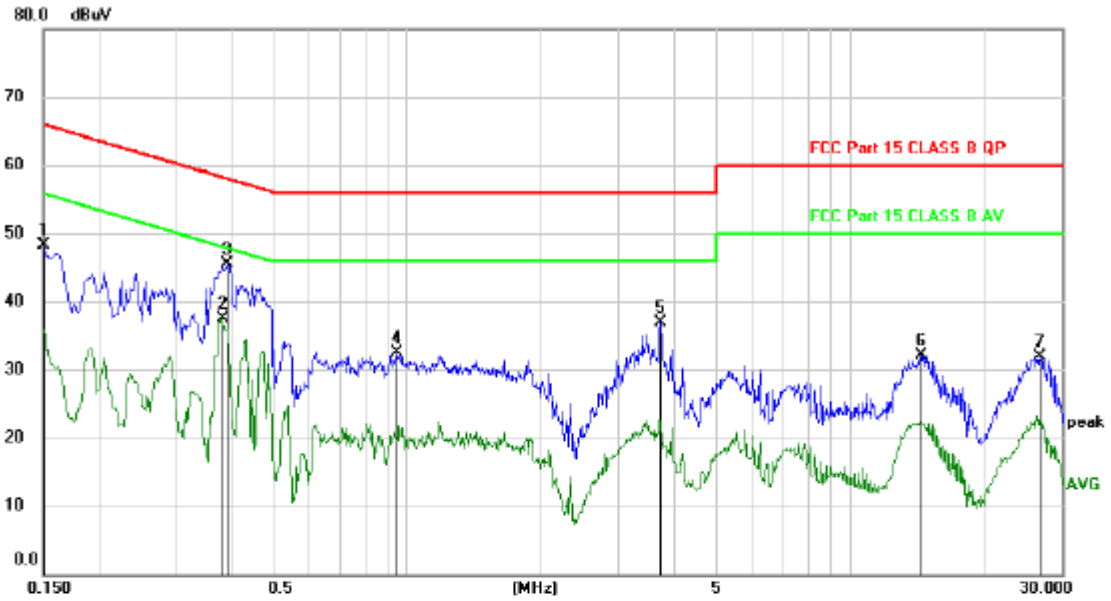
4.3. Test Setup



4.4. Test Results

Pass

Line:

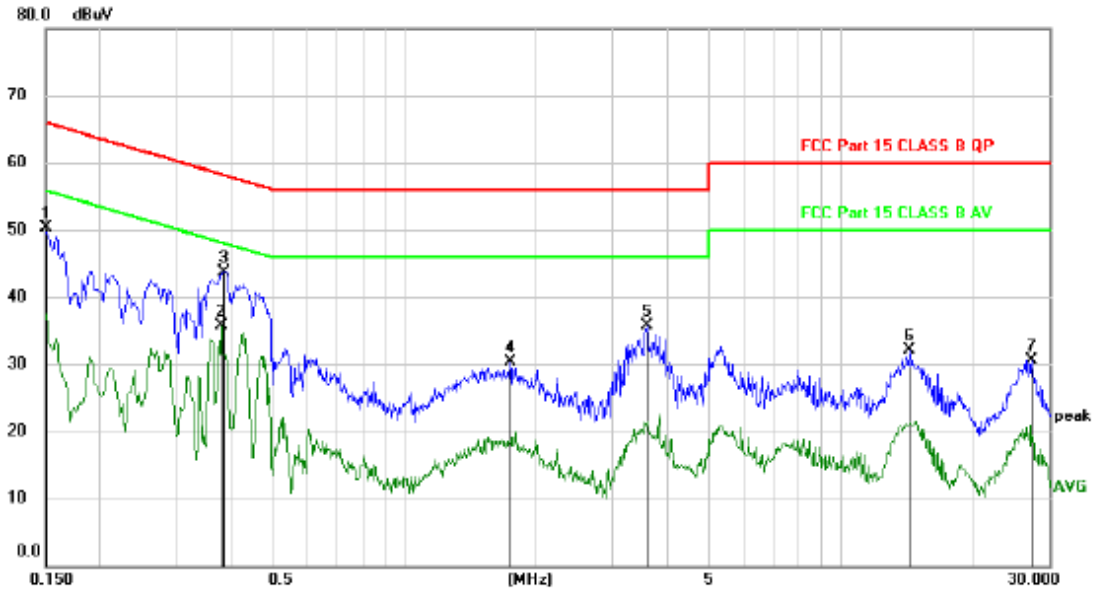


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	38.28	9.94	48.22	66.00	-17.78	peak	
2	*	0.3840	27.64	9.94	37.58	48.19	-10.61	AVG	
3		0.3930	35.59	9.94	45.53	58.00	-12.47	peak	
4		0.9450	22.49	9.95	32.44	56.00	-23.56	peak	
5		3.7200	26.98	9.97	36.95	56.00	-19.05	peak	
6		14.4690	21.85	10.32	32.17	60.00	-27.83	peak	
7		26.8380	21.42	10.52	31.94	60.00	-28.06	peak	

*:Maximum data x:Over limit !:over margin 〈Reference Only

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Neutral:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	40.28	9.94	50.22	66.00	-15.78	peak	
2	*	0.3810	25.71	9.94	35.65	48.26	-12.61	AVG	
3		0.3870	33.83	9.94	43.77	58.13	-14.36	peak	
4		1.7520	20.50	9.89	30.39	56.00	-25.61	peak	
5		3.6030	25.74	9.96	35.70	56.00	-20.30	peak	
6		14.4390	21.70	10.32	32.02	60.00	-27.98	peak	
7		27.3450	19.96	10.55	30.51	60.00	-29.49	peak	

*:Maximum data x:Over limit !:over margin 〈Reference Only

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Remark: The test mode is charging mode, and the power supply mode is DC 5V from notebook with AC 120V/60Hz

5. CONDUCTED MAXIMUM OUTPUT POWER

5.1. Test limits

Please refer section RSS-247 & 15.247.

5.2. Test Procedure

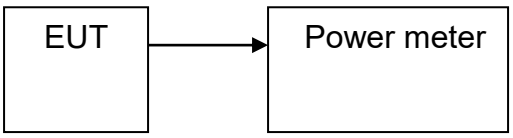
Details see the KDB558074 D01 Meas Guidance v05r02

5.2.1 Place the EUT on the table and set it in transmitting mode.

5.2.2 Measure out each mode and each bands peak output power of EUT.

Note: The cable loss and attenuator loss were offset into measure device as amplitude offset.

5.3. Test Setup



5.4. Test Results

Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
1M	2402	Ant1	-4.902	0	-4.902	30	Pass
1M	2440	Ant1	-4.659	0	-4.659	30	Pass
1M	2480	Ant1	-4.205	0	**-4.205**	30	Pass

Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
2M	2402	Ant1	-5.662	0	-5.662	30	Pass
2M	2440	Ant1	-5.286	0	-5.286	30	Pass
2M	2480	Ant1	-5.039	0	-5.039	30	Pass

6. PEAK POWER SPECTRAL DENSITY

6.1. Test limits

6.1.1 Please refer section RSS-247 & 15.247.

6.1.2 For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

6.1.3 The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

6.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance v05r02

6.2.1 Place the EUT on the table and set it in transmitting mode.

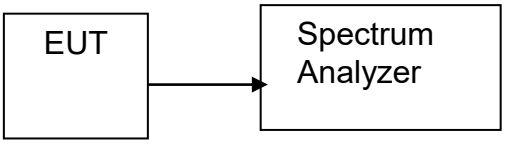
6.2.2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

6.2.3 Set the spectrum analyzer as RBW = 3kHz(Set the RBW to: 3 kHz≤RBW≤100 kHz.), VBW = 10kHz(Set the VBW≥3×RBW), span≥1.5×DTS bandwidth., detail see the test plot.

6.2.4 Record the max reading.

6.2.5 Repeat the above procedure until the measurements for all frequencies are completed.

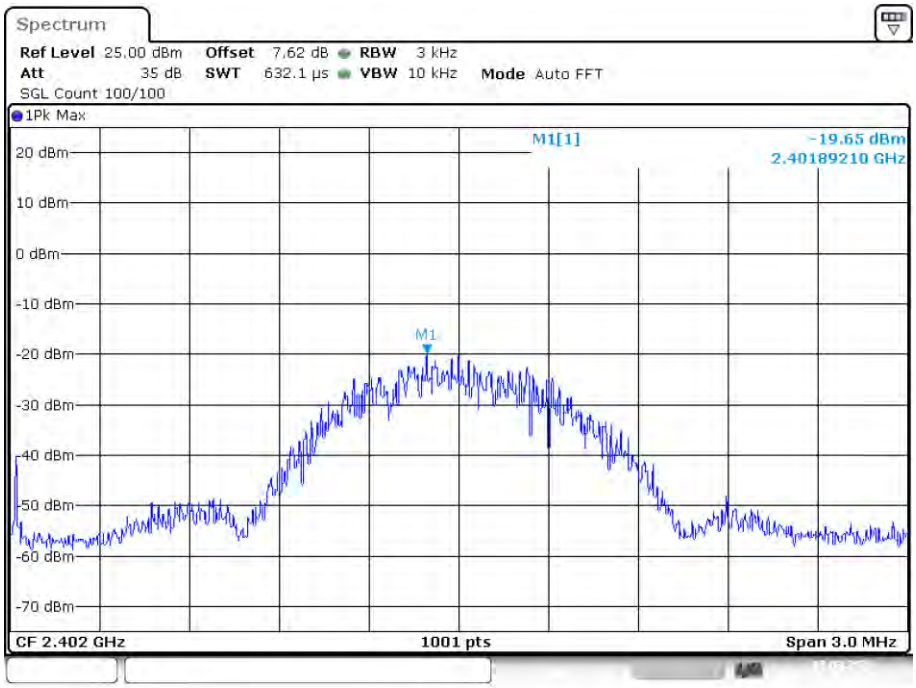
6.3. Test Setup



6.4. Test Results

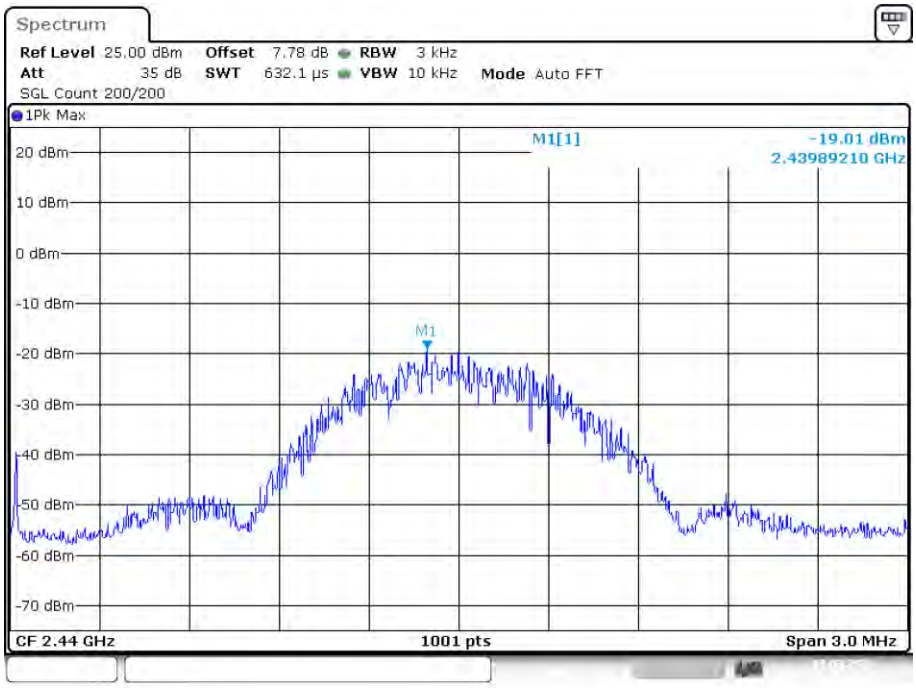
Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	1M	2402	Ant1	-19.653	8	Pass
NVNT	1M	2440	Ant1	-19.014	8	Pass
NVNT	1M	2480	Ant1	-18.779	8	Pass

PSD NVNT 1M 2402MHz Ant1



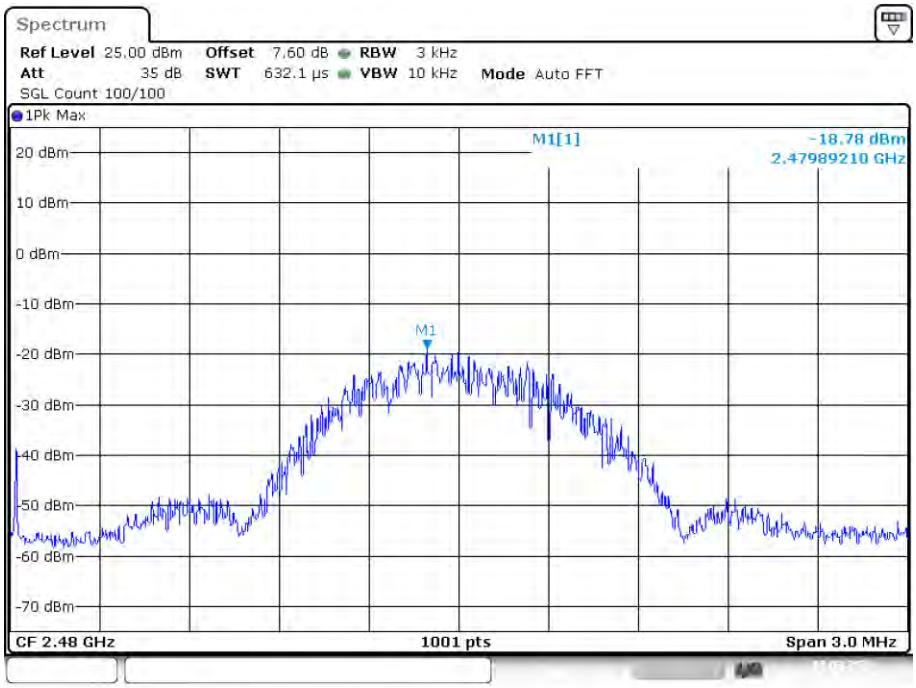
Date: 7.MAR.2023 14:56:19

PSD NVNT 1M 2440MHz Ant1



Date: 7.MAR.2023 14:58:37

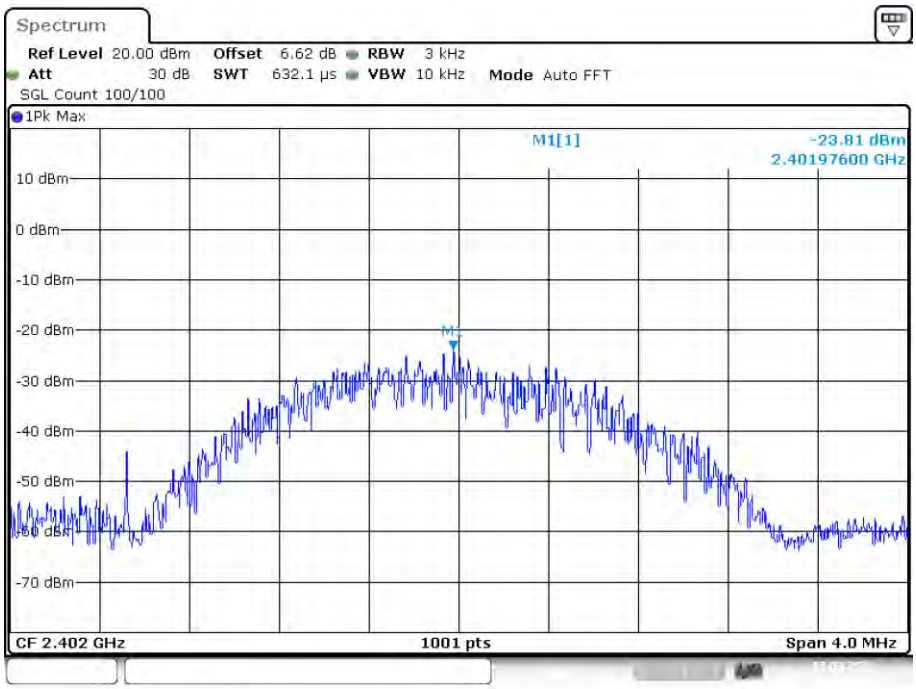
PSD NVNT 1M 2480MHz Ant1



Date: 7.MAR.2023 15:00:30

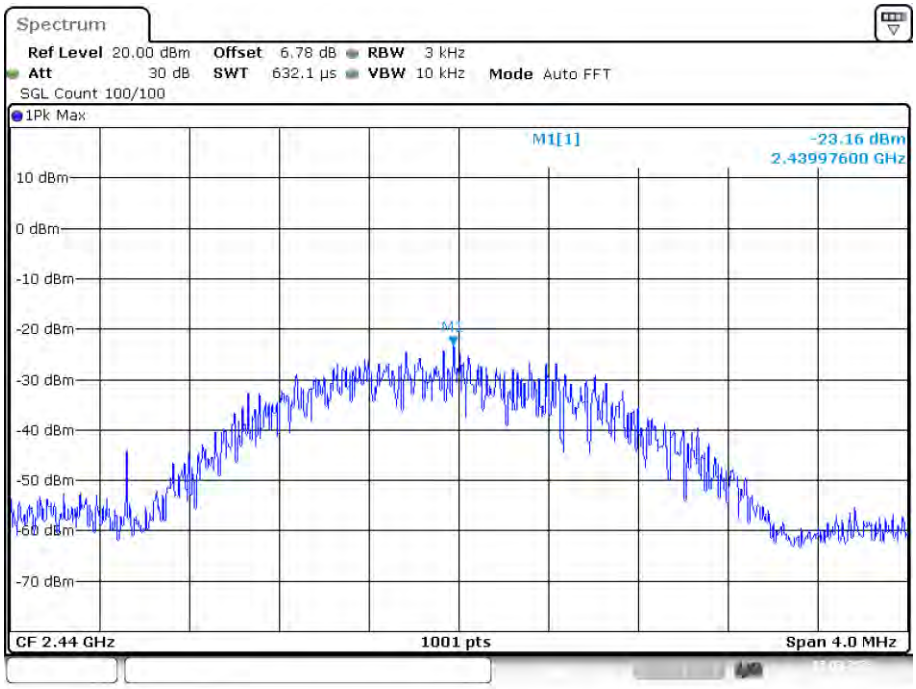
Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	2M	2402	Ant1	-23.809	8	Pass
NVNT	2M	2440	Ant1	-23.16	8	Pass
NVNT	2M	2480	Ant1	-23.093	8	Pass

PSD NVNT 2M 2402MHz Ant1



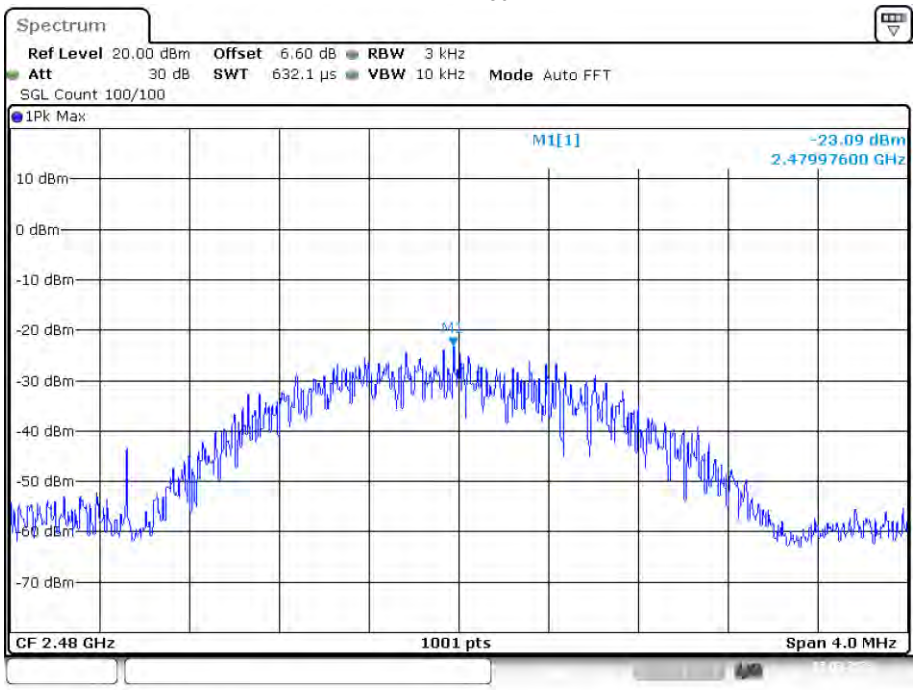
Date: 7.MAR.2023 15:04:35

PSD NVNT 2M 2440MHz Ant1



Date: 7.MAR.2023 15:06:14

PSD NVNT 2M 2480MHz Ant1



Date: 7.MAR.2023 15:07:27

7. BANDWIDTH

7.1. Test limits

Please refer sectionRSS-247 & 15.247

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz.

7.2. Test Procedure

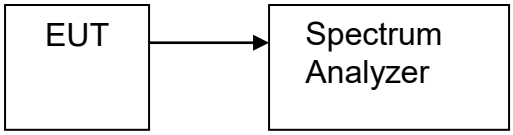
Details see the KDB558074 D01 Meas Guidance v05r02

a) The bandwidth is measured at an amplitude level reduced 6dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

b) The test receiver set RBW =1-5%BW, VBW≥3*RBW, Sweep time set auto, detail see the test plot for 99% Bandwidth.

c) The test receiver set RBW = 100kHz, VBW≥3*RBW =300kHz, Sweep time set auto, detail see the test plot for 6dB Bandwidth.

7.3. Test Setup

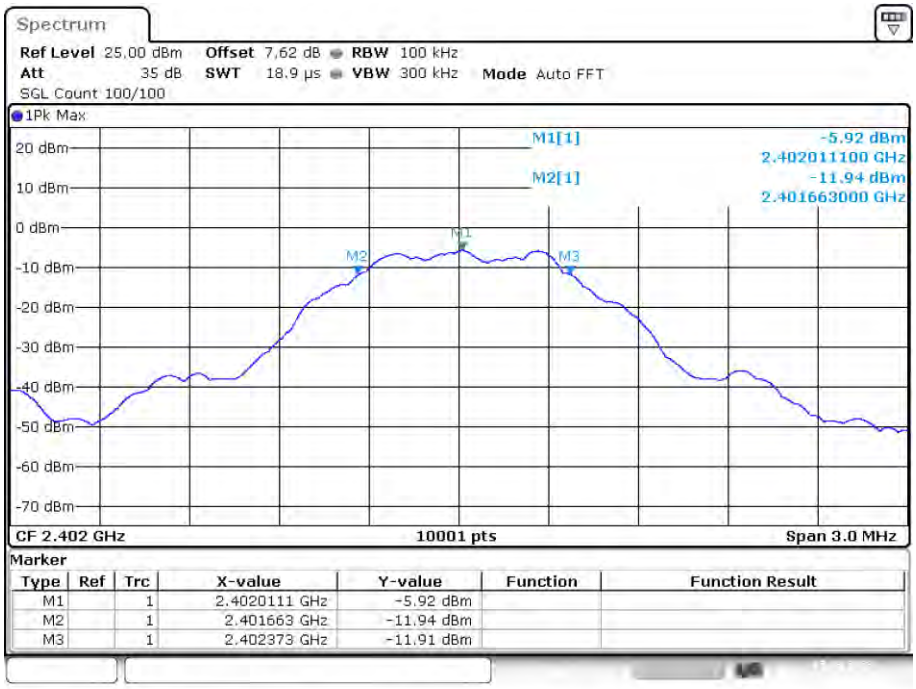


7.4. Test Results

-6dB Bandwidth

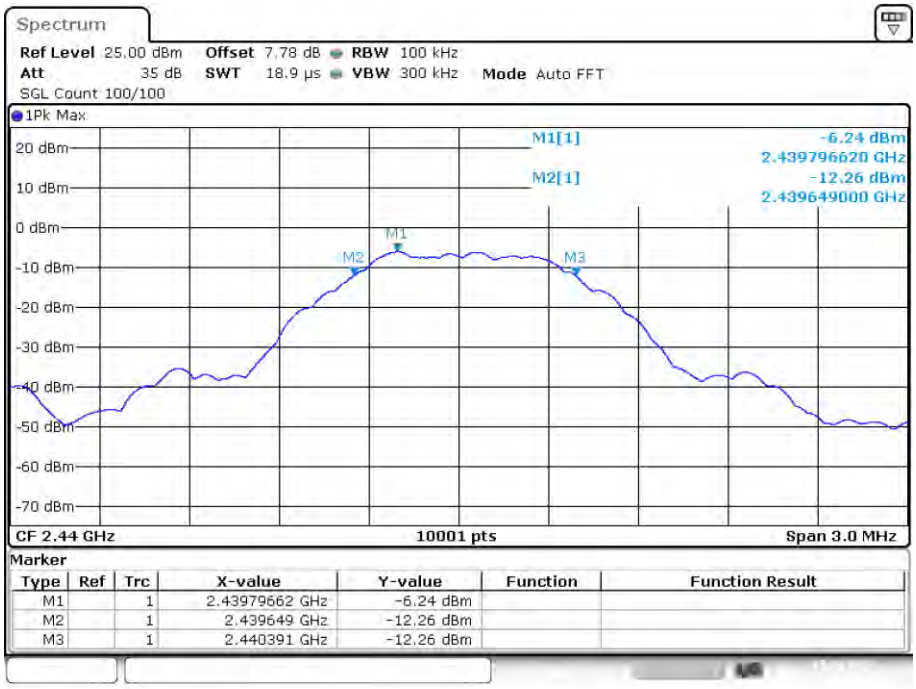
Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	1M	2402	Ant1	0.71	0.5	Pass
NVNT	1M	2440	Ant1	0.741	0.5	Pass
NVNT	1M	2480	Ant1	0.696	0.5	Pass

-6dB Bandwidth NVNT 1M 2402MHz Ant1



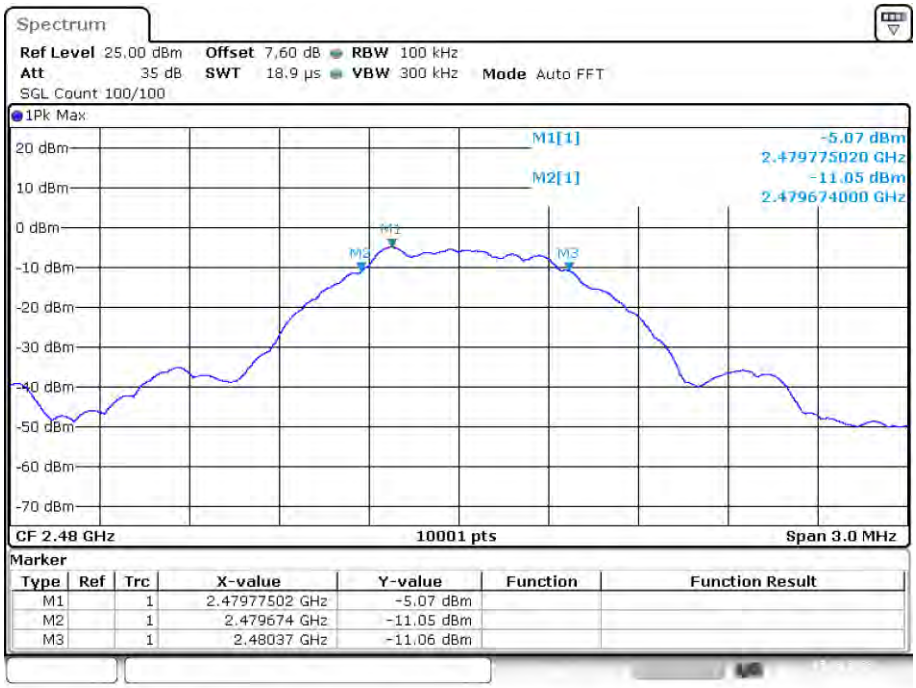
Date: 7.MAR.2023 14:56:12

-6dB Bandwidth NVNT 1M 2440MHz Ant1



Date: 7.MAR.2023 14:58:29

-6dB Bandwidth NVNT 1M 2480MHz Ant1

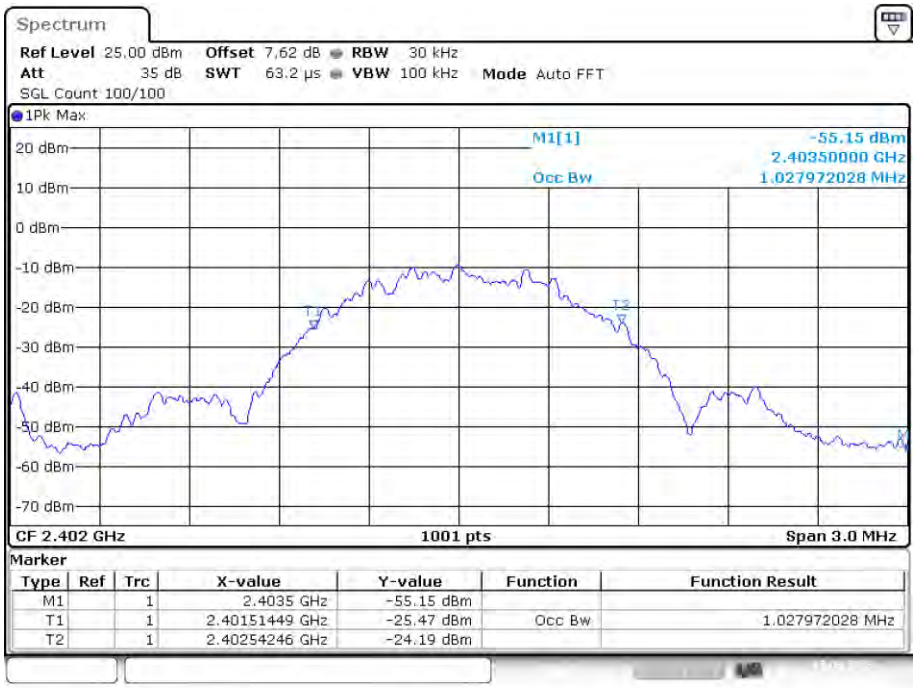


Date: 7.MAR.2023 15:00:22

Occupied Channel Bandwidth

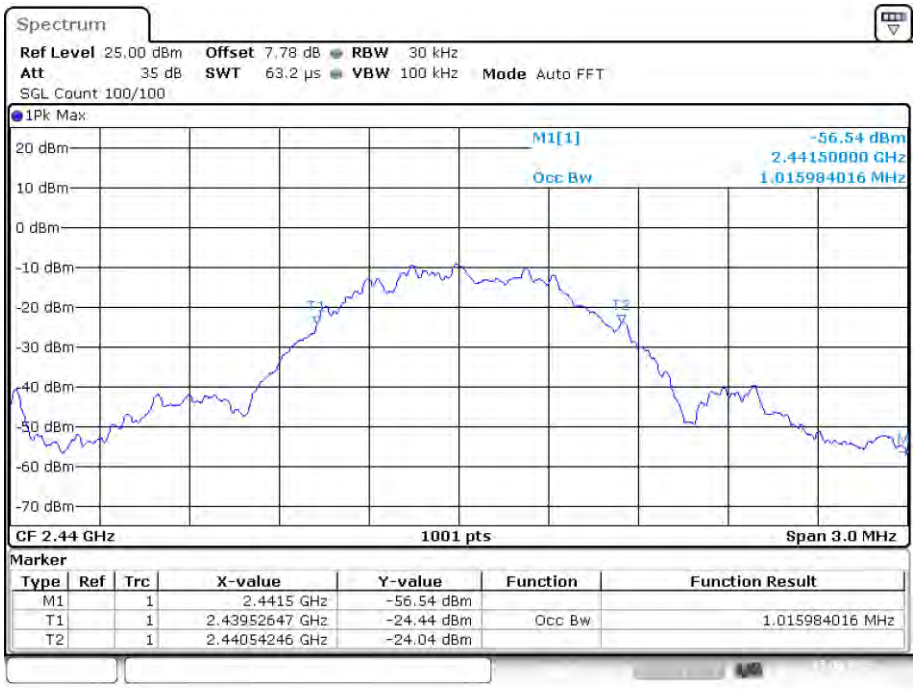
Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	1M	2402	Ant1	1.028
NVNT	1M	2440	Ant1	1.016
NVNT	1M	2480	Ant1	1.031

OBW NVNT 1M 2402MHz Ant1



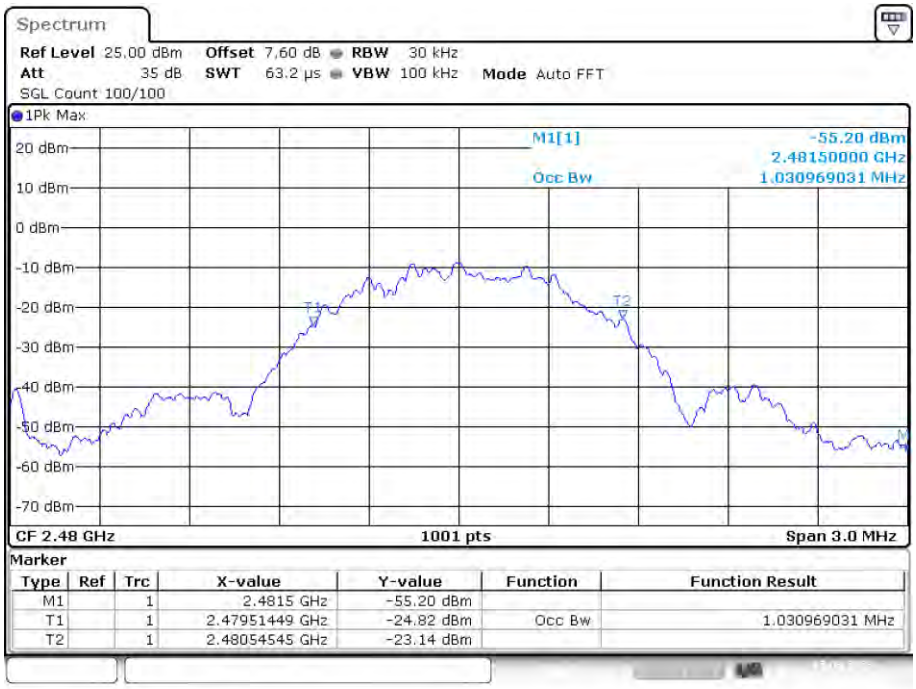
Date: 7.MAR.2023 14:56:04

OBW NVNT 1M 2440MHz Ant1



Date: 7.MAR.2023 14:58:20

OBW NVNT 1M 2480MHz Ant1

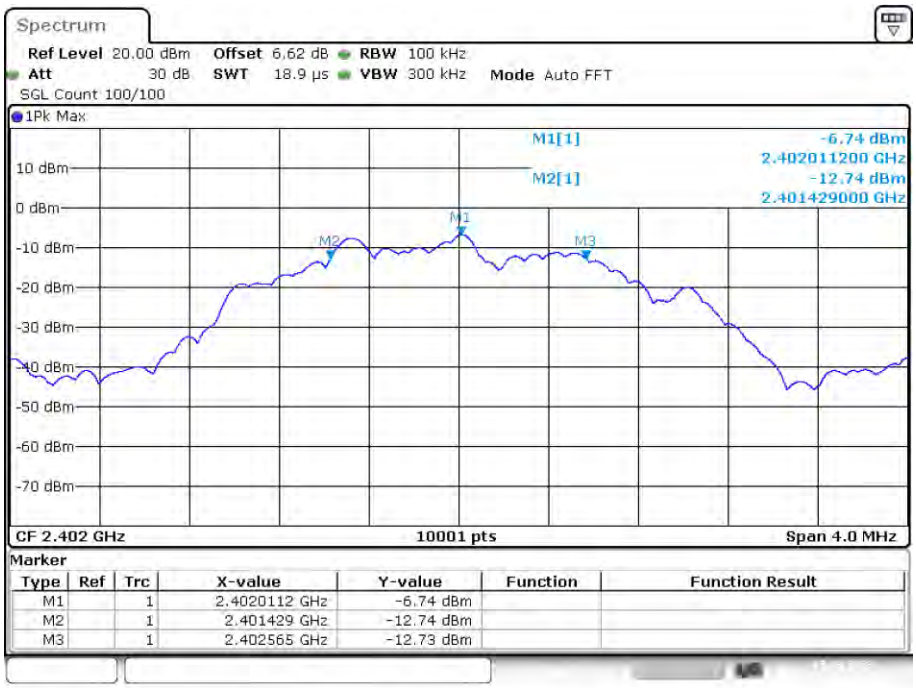


Date: 7.MAR.2023 15:00:13

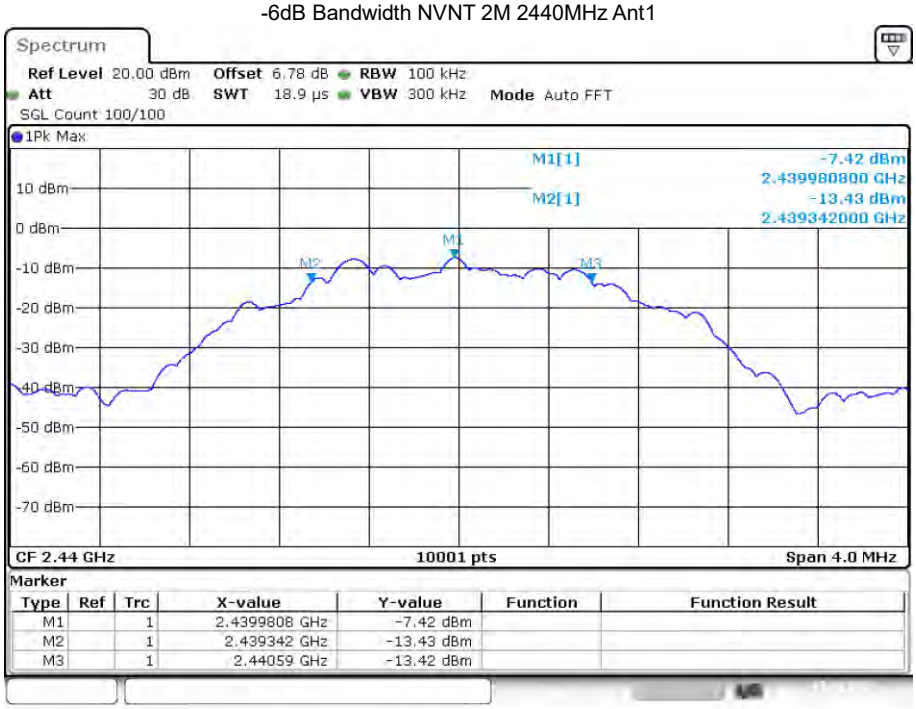
-6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	2M	2402	Ant1	1.136	0.5	Pass
NVNT	2M	2440	Ant1	1.247	0.5	Pass
NVNT	2M	2480	Ant1	1.111	0.5	Pass

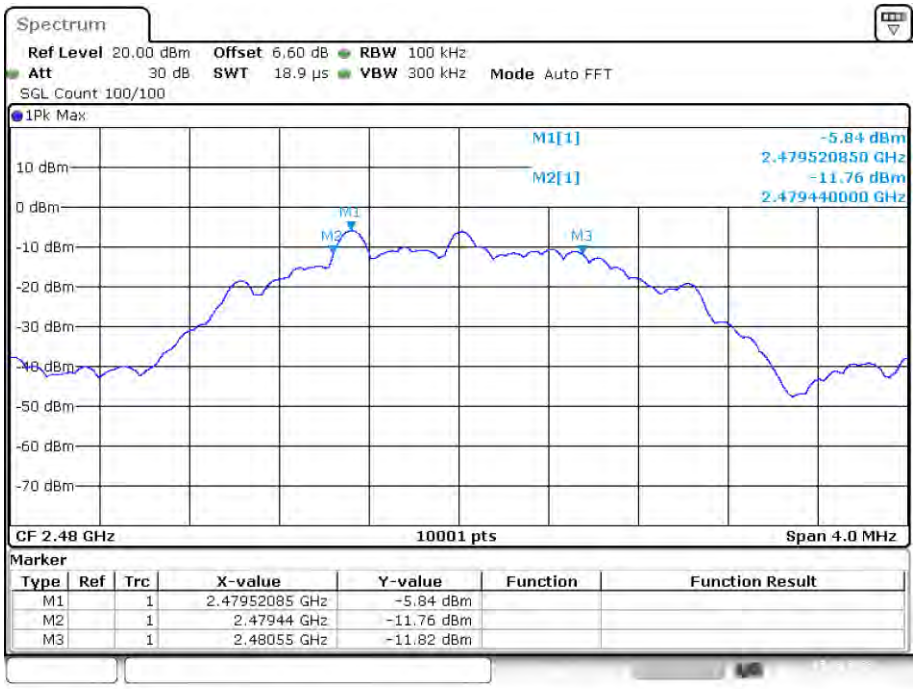
-6dB Bandwidth NVNT 2M 2402MHz Ant1



-6dB Bandwidth NVNT 2M 2440MHz Ant1



-6dB Bandwidth NVNT 2M 2480MHz Ant1

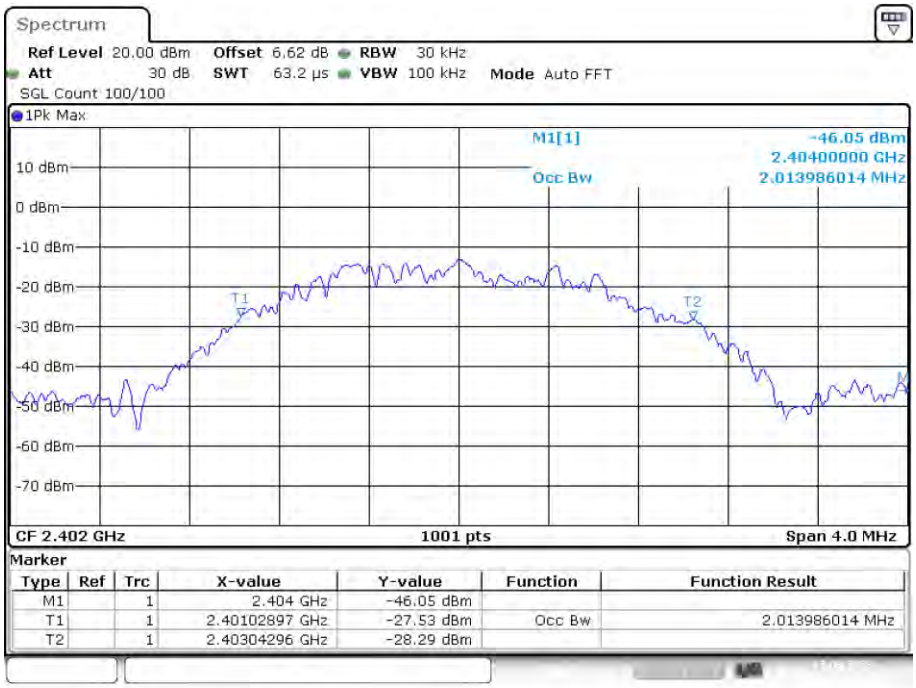


Date: 7.MAR.2023 15:07:18

Occupied Channel Bandwidth

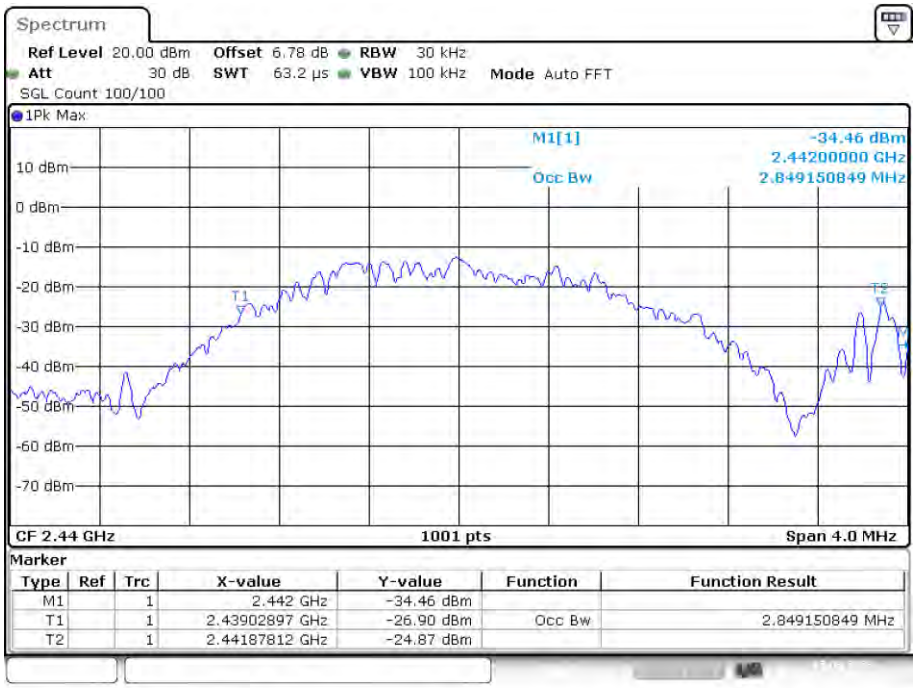
Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	2M	2402	Ant1	2.014
NVNT	2M	2440	Ant1	2.849
NVNT	2M	2480	Ant1	2.018

OBW NVNT 2M 2402MHz Ant1



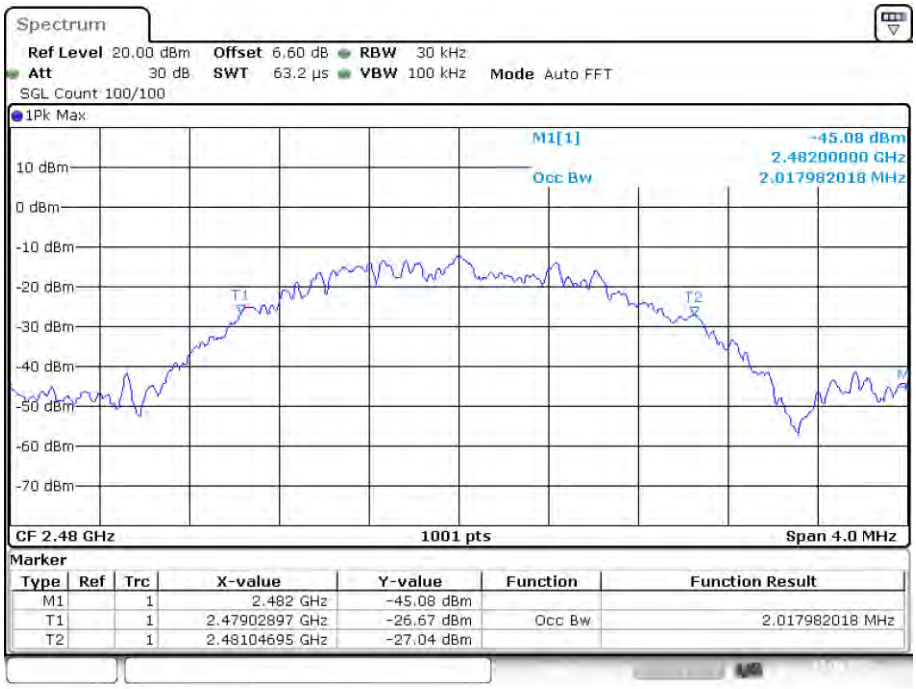
Date: 7.MAR.2023 15:04:21

OBW NVNT 2M 2440MHz Ant1



Date: 7.MAR.2023 15:05:58

OBW NVNT 2M 2480MHz Ant1



Date: 7.MAR.2023 15:07:09

8. BAND EDGE CHECK

8.1. Test limits

Please refer section RSS-GEN&15.247.

8.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance v05r02

8.2.1 Put the EUT on a 1.5m high table, power on the EUT. Emissions were scanned and measured rotating the EUT to 360 degrees, Find the maximum Emission

8.2.2 Check the spurious emissions out of band.

8.2.3 RBW 1MHz ,VBW 3MHz ,peak detector for peak value , RBW 1MHz ,VBW 3MHz ,RMS detector for AV value.

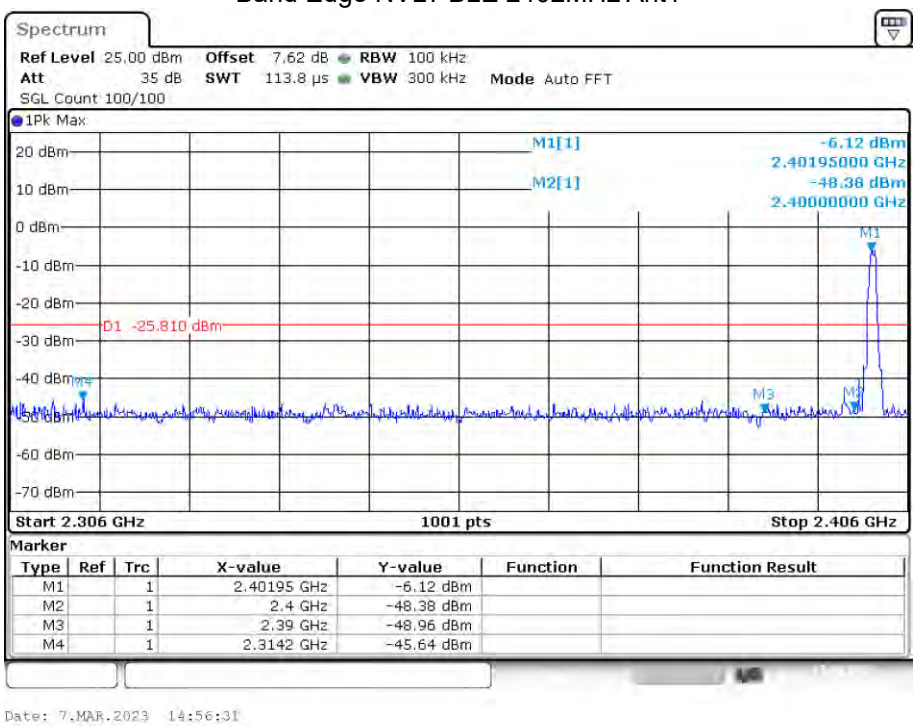
8.3. Test Setup

Same as 3.3 above 1GHz.

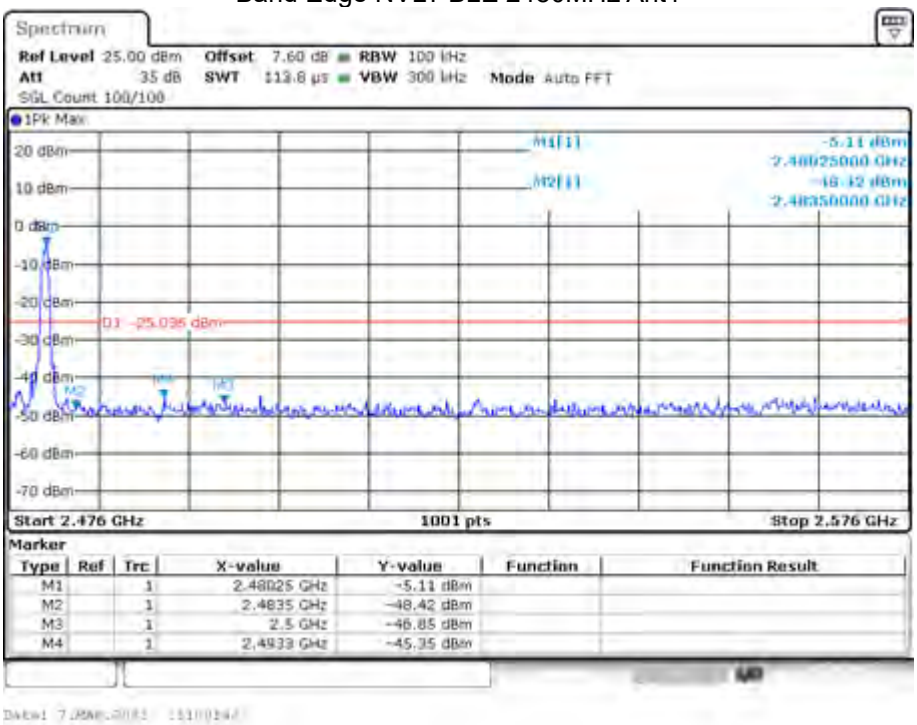
8.4. Test Results

GFSK 1M Mode:

Band Edge NVLT BLE 2402MHz Ant1

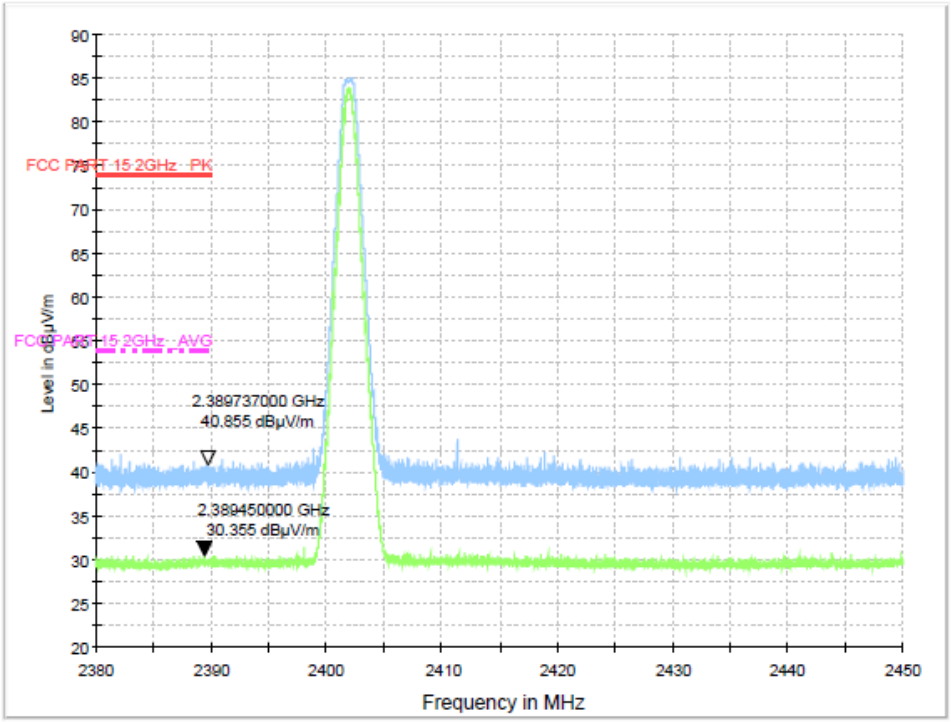


Band Edge NVLT BLE 2480MHz Ant1

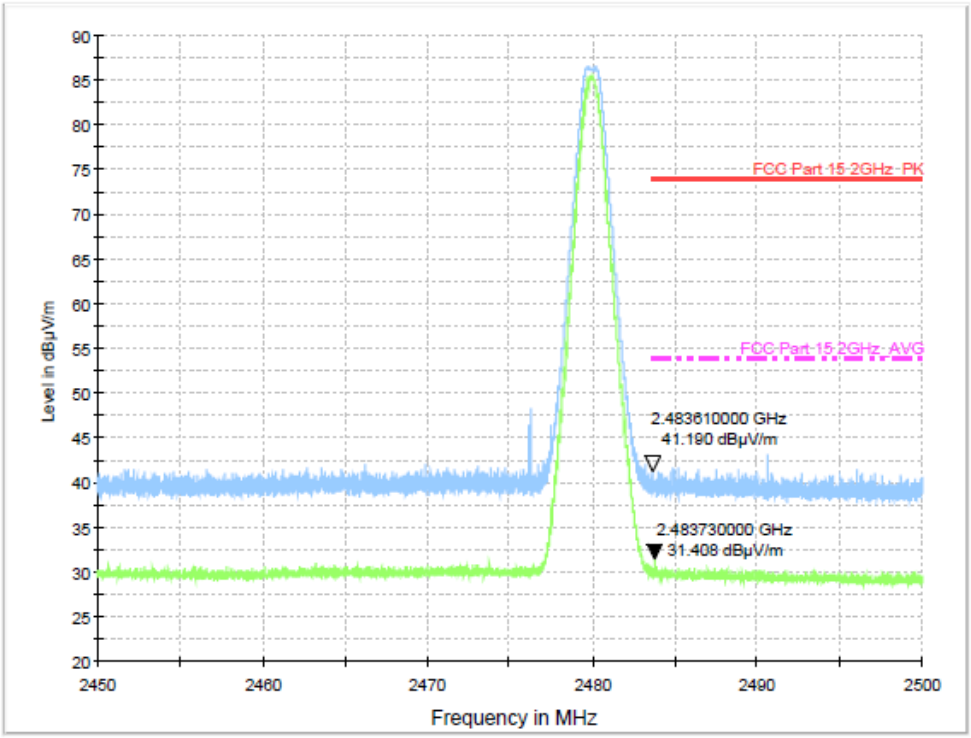


GFSK 1M Mode:

Test channel: Lowest channel

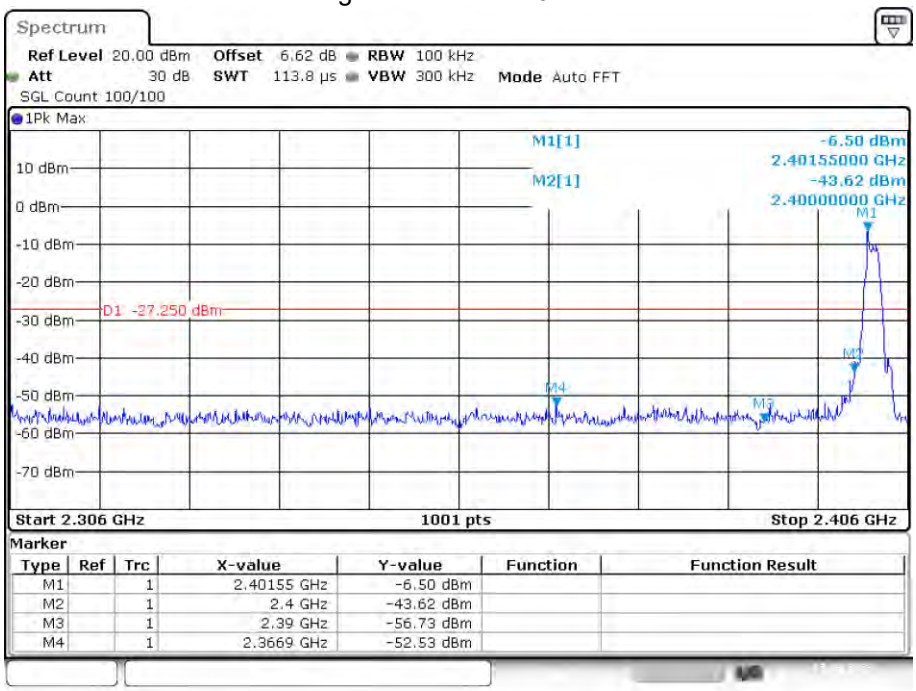


Test channel: Highest channel

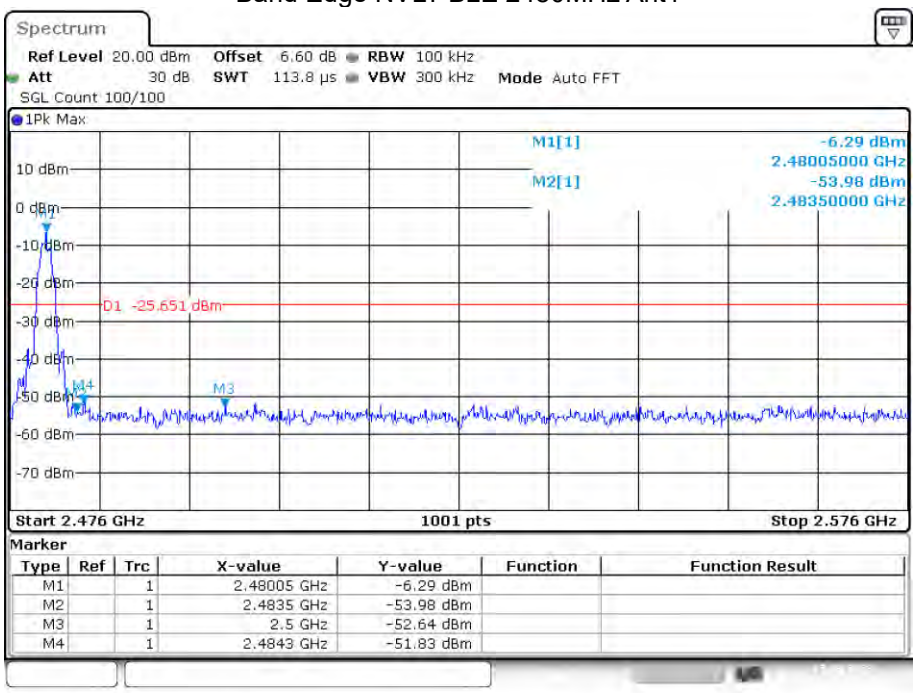


GFSK 2M Mode:

Band Edge NVLT BLE 2402MHz Ant1

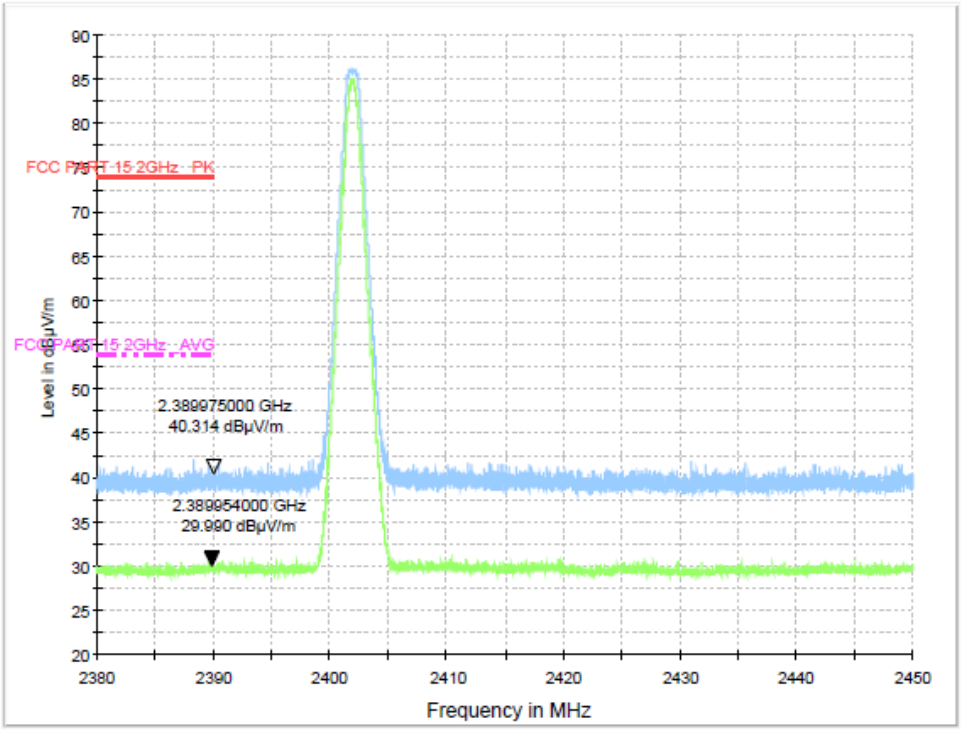


Band Edge NVLT BLE 2480MHz Ant1

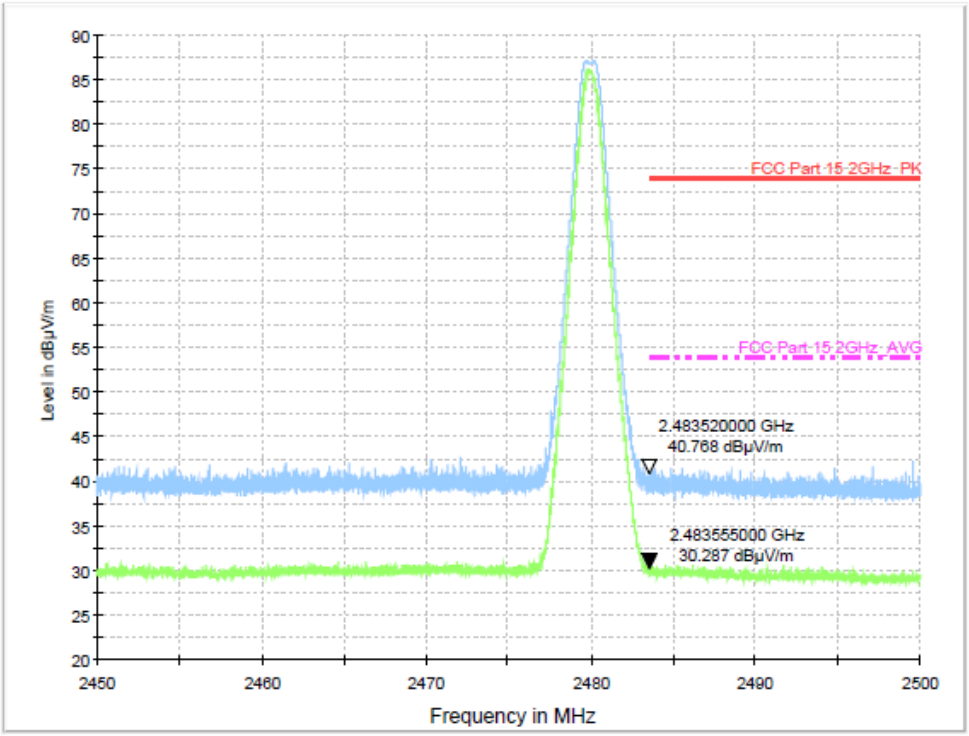


GFSK 2M Mode:

Test channel: Lowest channel



Test channel: Highest channel



9. FREQUENCY STABILITY

9.1. Test limit

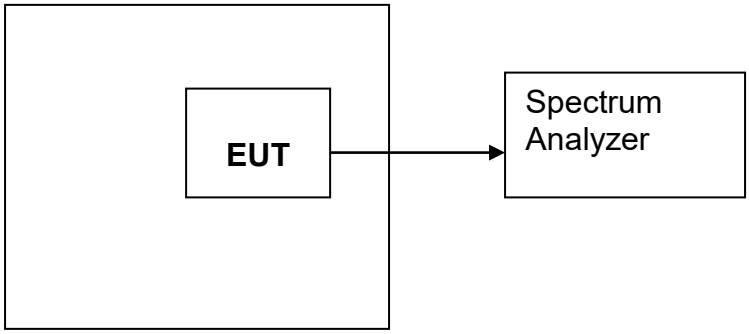
Please refer section RSS-Gen.

Regulation RSS-Gen If the frequency stability of the licence-exempt radio apparatus is not specified in the applicable RSS, the fundamental emissions of the radio apparatus should be kept within at least the central 80% of its permitted operating frequency band in order to minimize the possibility of out-of-band operation. In addition, its occupied bandwidth shall be entirely outside the restricted bands and the prohibited TV bands of 54-72 MHz, 76-88 MHz, 174-216 MHz, and 470-602 MHz, unless otherwise indicated.

9.2. Test Procedure

The following equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

9.3. Test Setup



Temperature controller

9.4. Test Results

Pass.

Detailed information please see the following page.

Assigned Frequency(MHz): 2402MHz				
Voltage	Temperature	Measured Frequency (MHz)	Frequency stability(MHz)	Limit(MHz)
Low DC 3.33V	+20℃	2402.001	0.0010	±0.020
Normal DC 3.7V	-10℃	2402.001	0.0010	±0.020
	-5℃	2402.002	0.0020	±0.020
	0℃	2402.002	0.0020	±0.020
	+10℃	2402.001	0.0010	±0.020
	+20℃	2402.001	0.0010	±0.020
	+30℃	2402.002	0.0020	±0.020
	+40℃	2402.003	0.0030	±0.020
	+50℃	2402.002	0.0020	±0.020
	+60℃	2402.002	0.0020	±0.020
High DC 4.07V	+20℃	2402.001	0.0010	±0.020

Note: All modes have been tested and only the worst mode data is reflected.

10. ANTENNA REQUIREMENT

10.1.Standard Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

10.2.Antenna Connected Construction

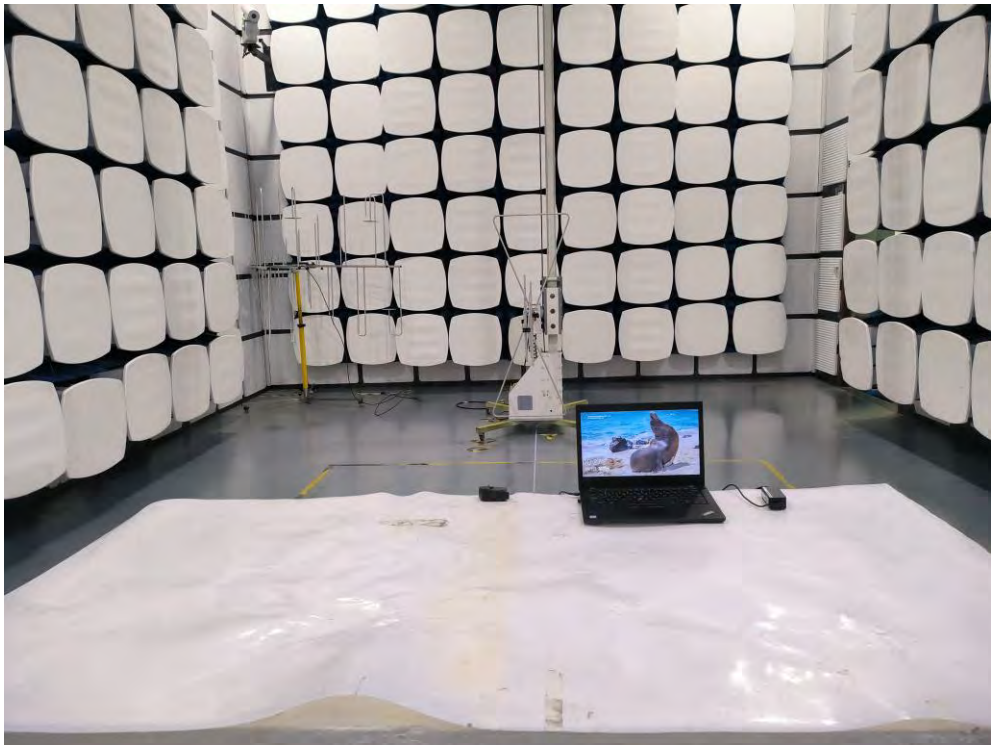
The antenna is Internal antenna and no consideration of replacement. Please see EUT photo for details.

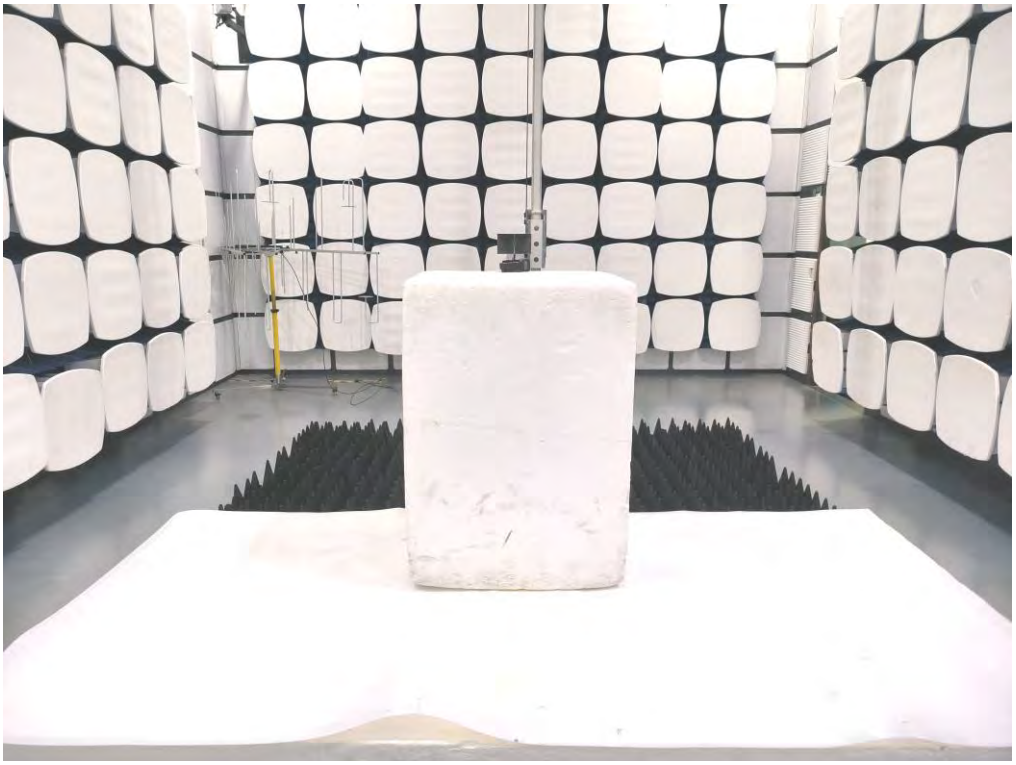
10.3.Results

The EUT antenna is Internal Antenna. It comply with the standard requirement.

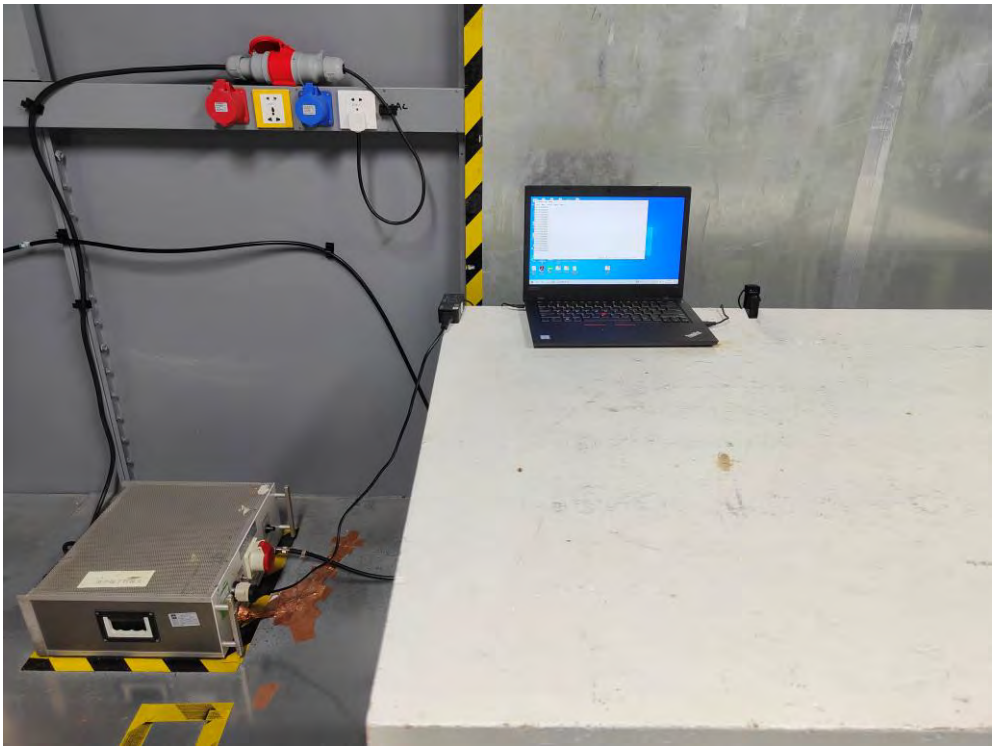
11. Test Setup Photo

11.1. Photos of Radiated emission

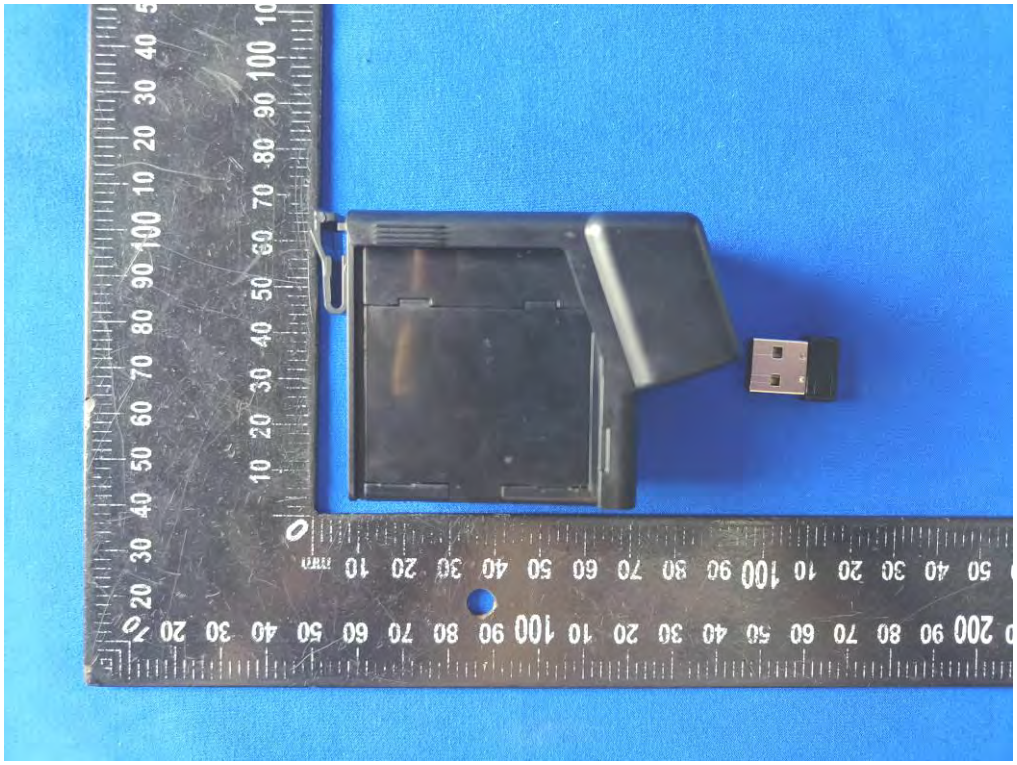


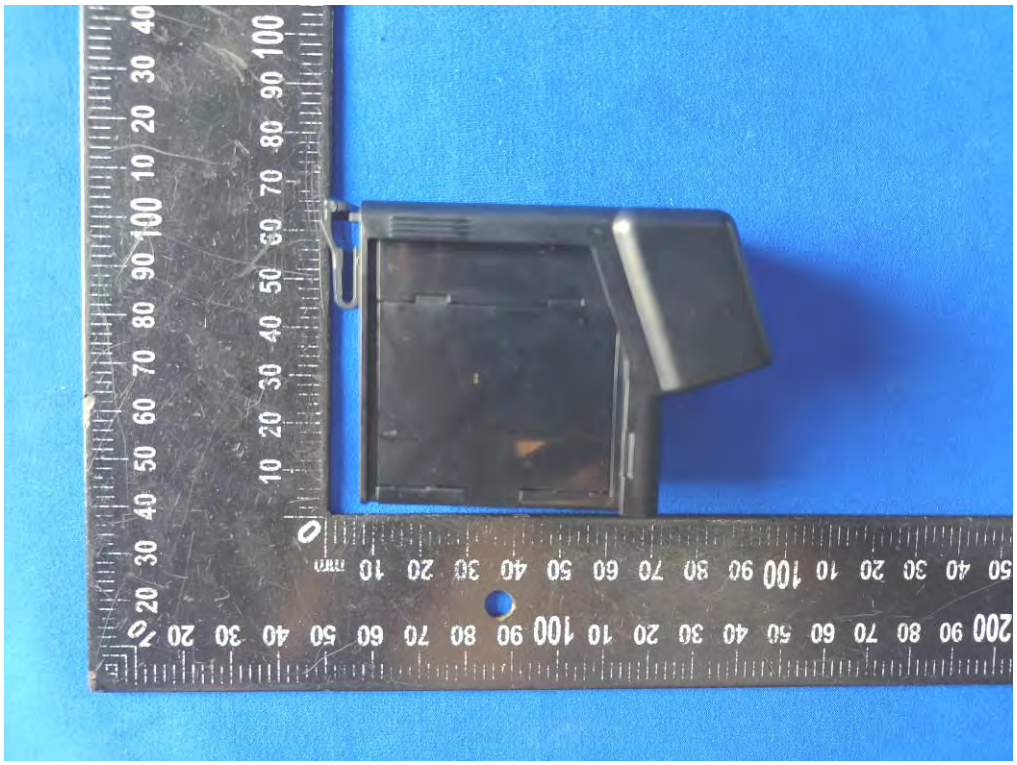


11.2.Photos of Conducted Emission test



12. EUT PHOTO





Cubetape C200 Series
www.cubetape.com
Made in Australia
M22 0122 T12544
M22 8506 T12544-UK
US Patent 11156445B2
FCC ID 2AWQV-C200
CAN ICES-003(A)/NMB-003(A)
SN 2310005

Cubetape C200 Series
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M22 8506 T12544-UK
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FCC ID 2AWQV-C200
CAN ICES-003(A)/NMB-003(A)
SN 2310005

Clubtape C200 Series
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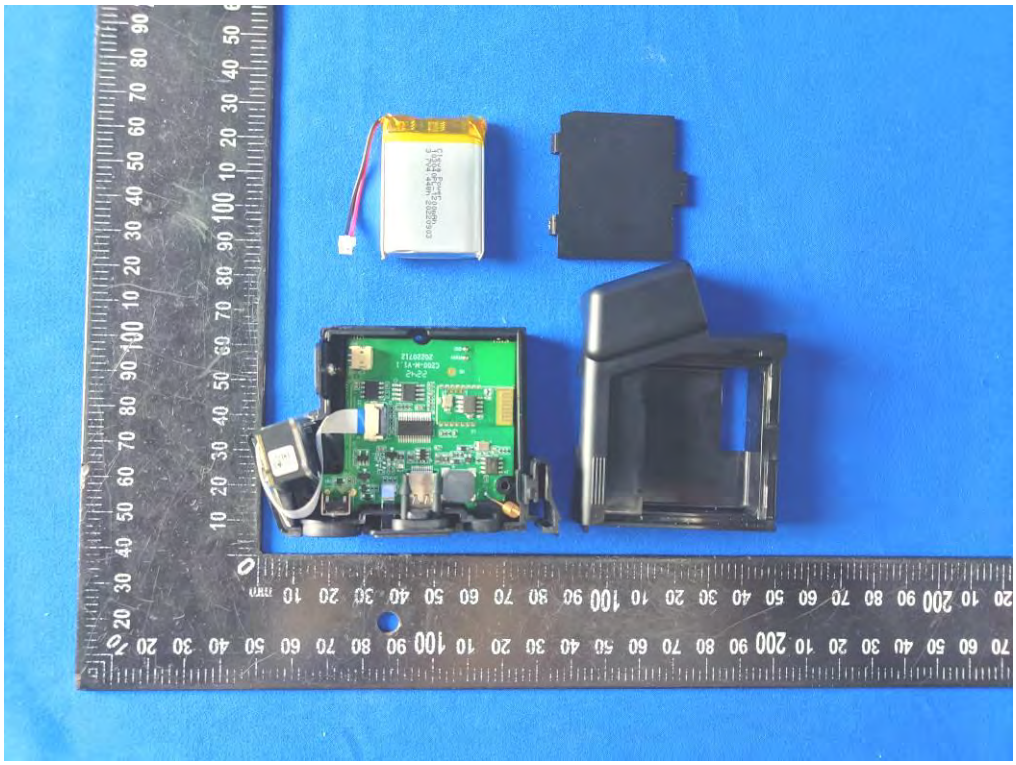

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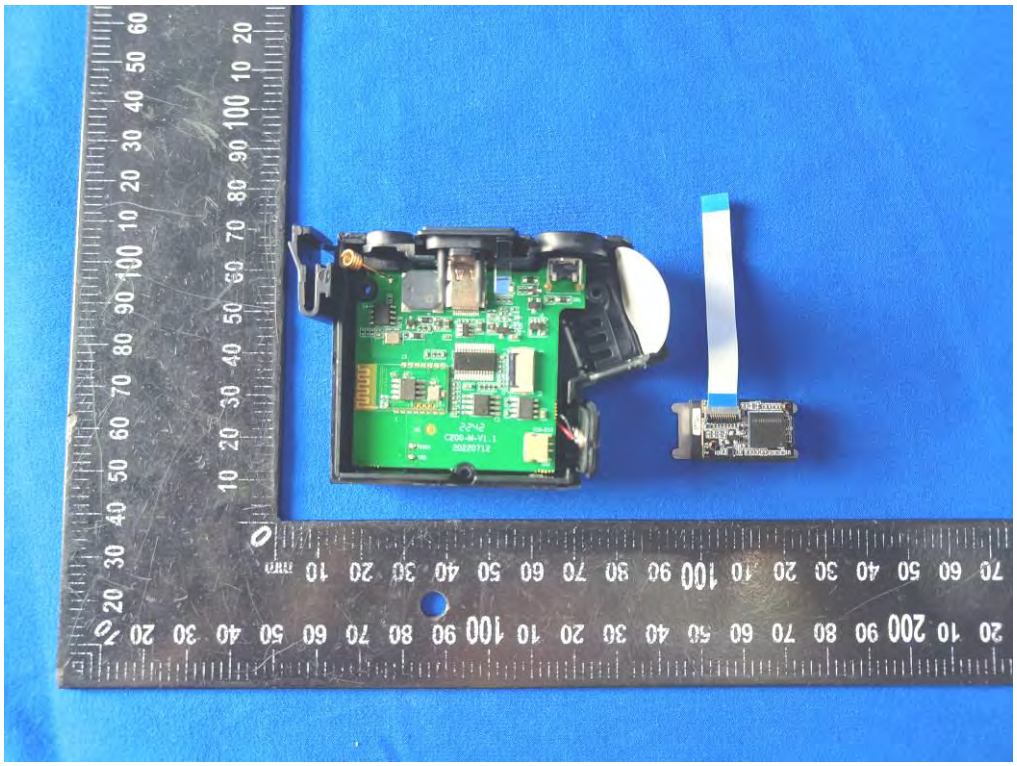
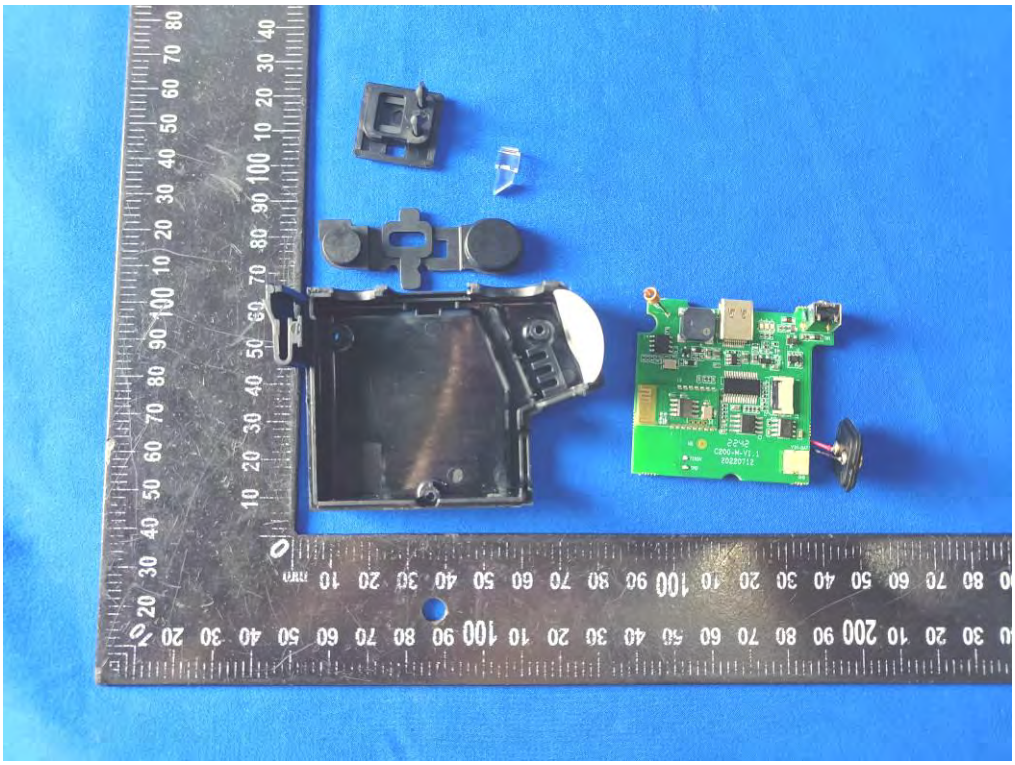
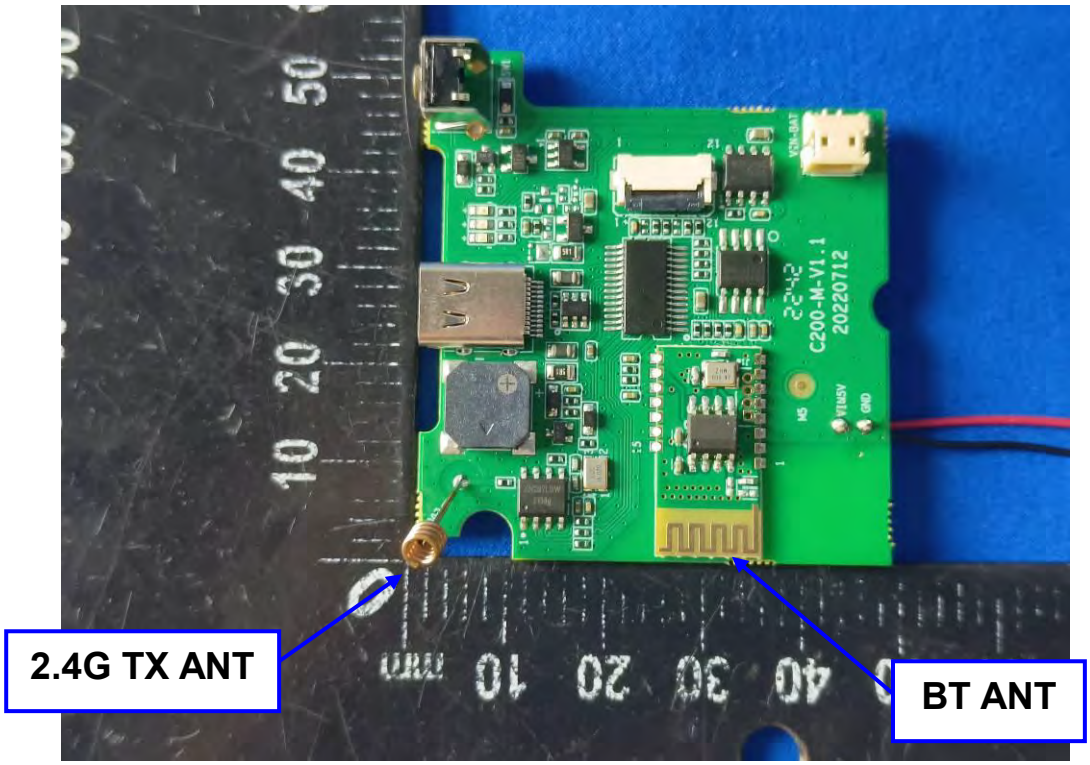
103040PL-1200mAh
3.7V4.44Wh 20220903



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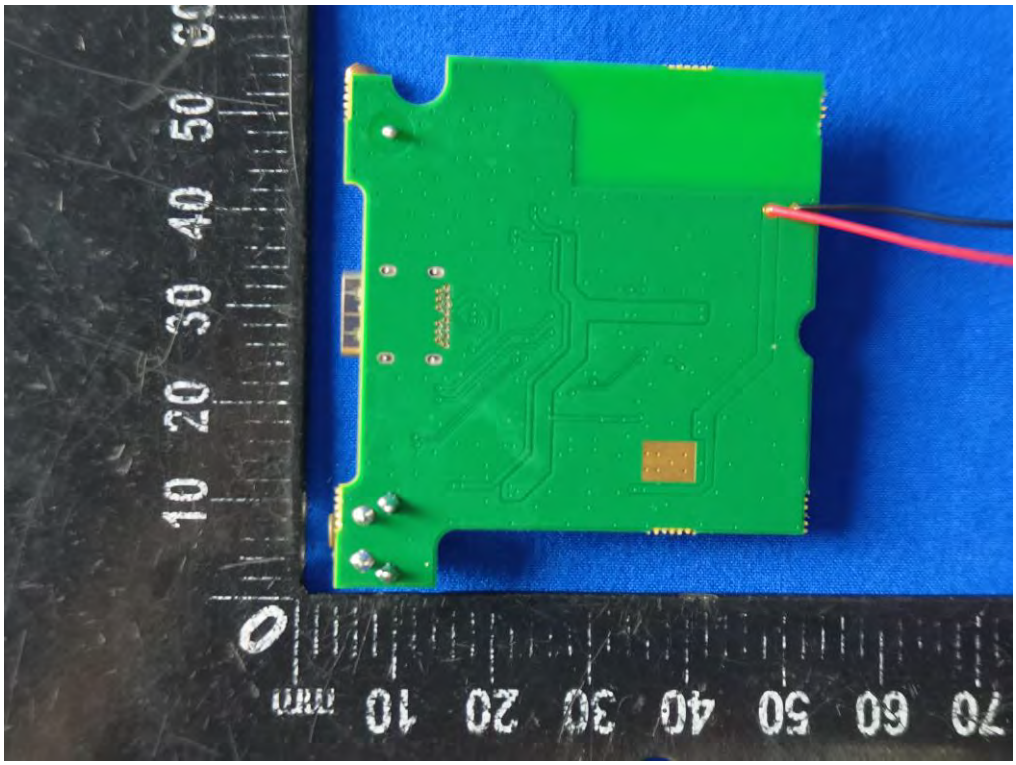
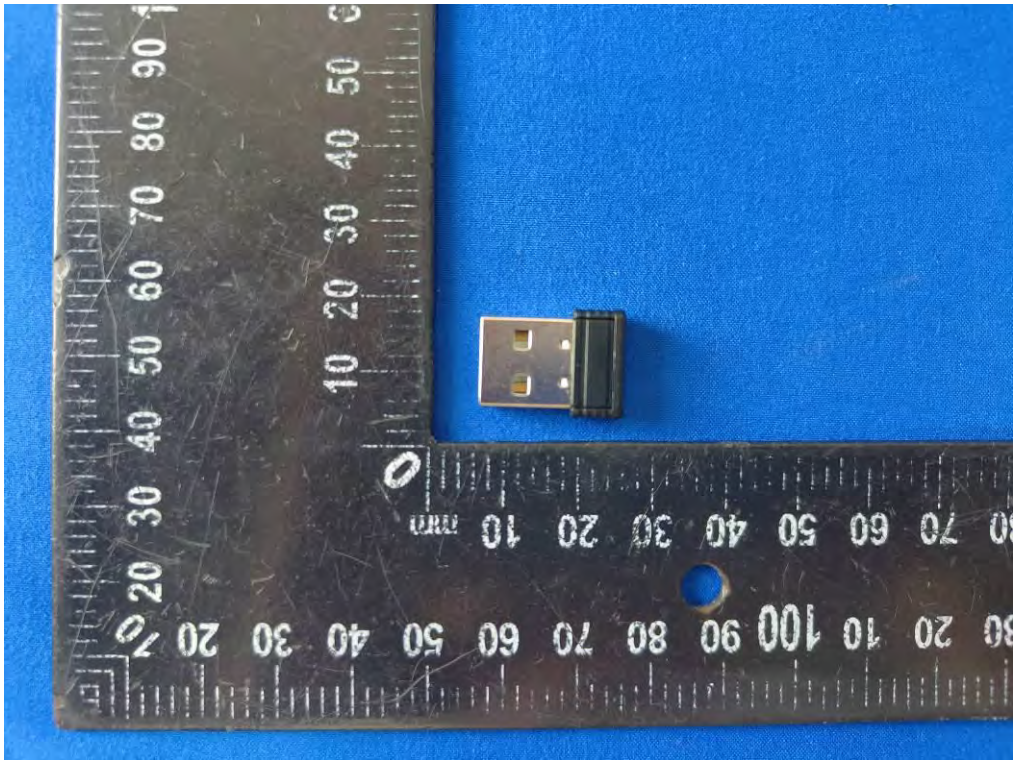
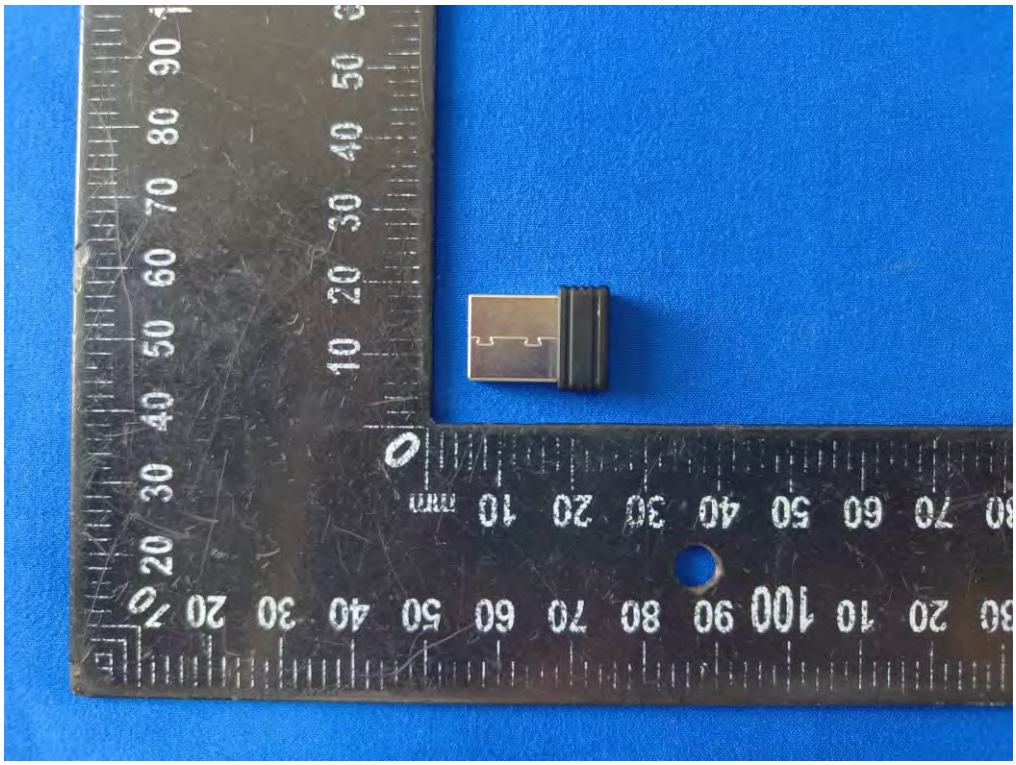
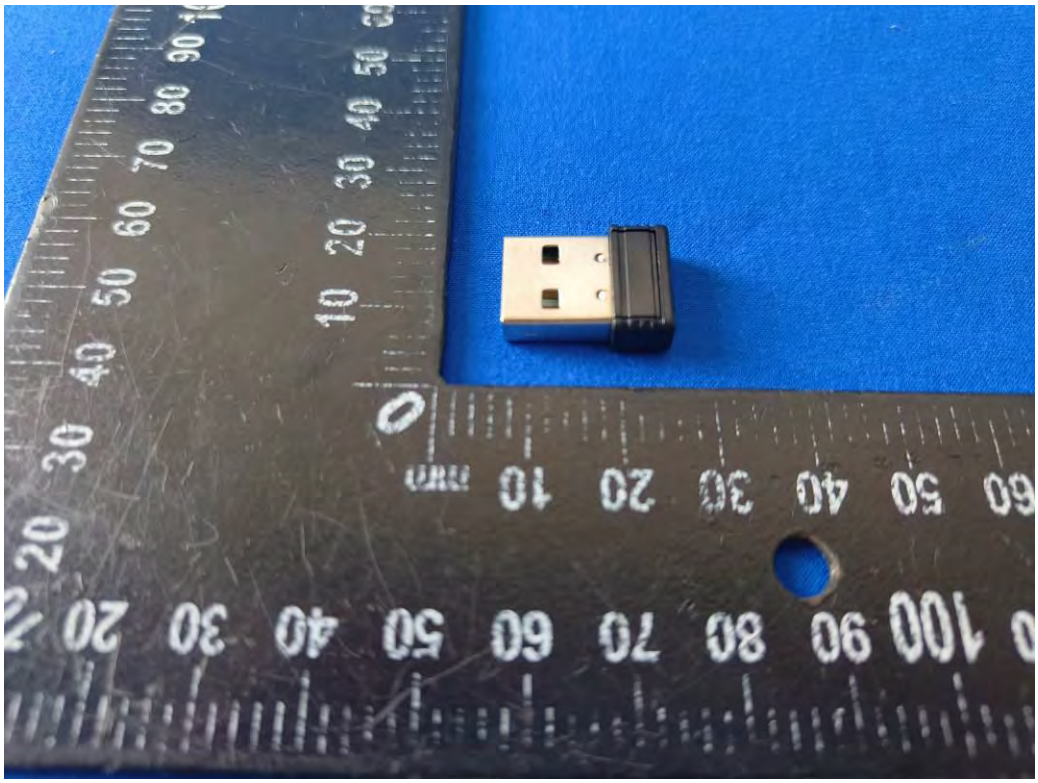
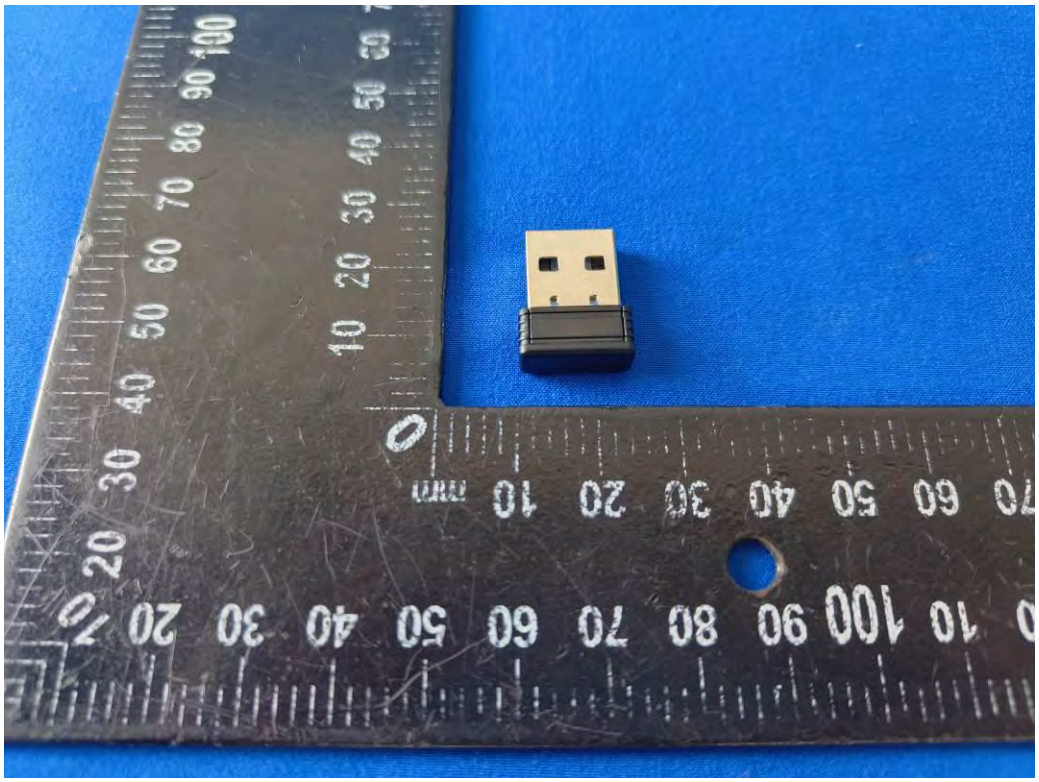
BT ANT
C200-M-V1.1
20220712

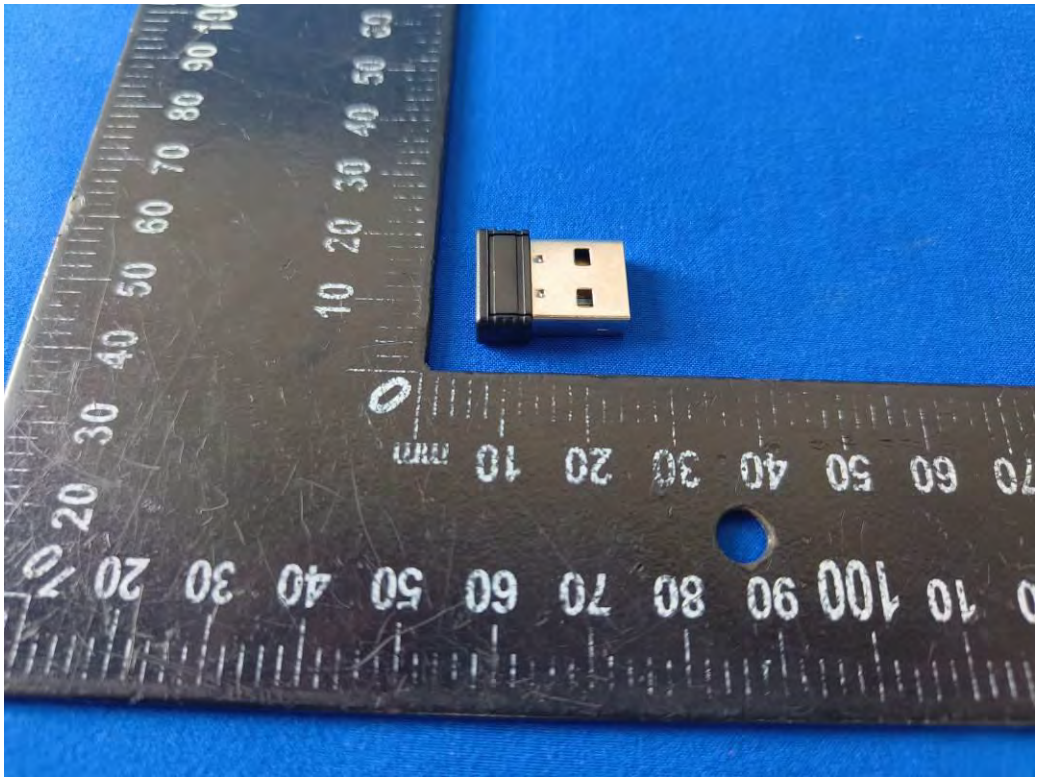


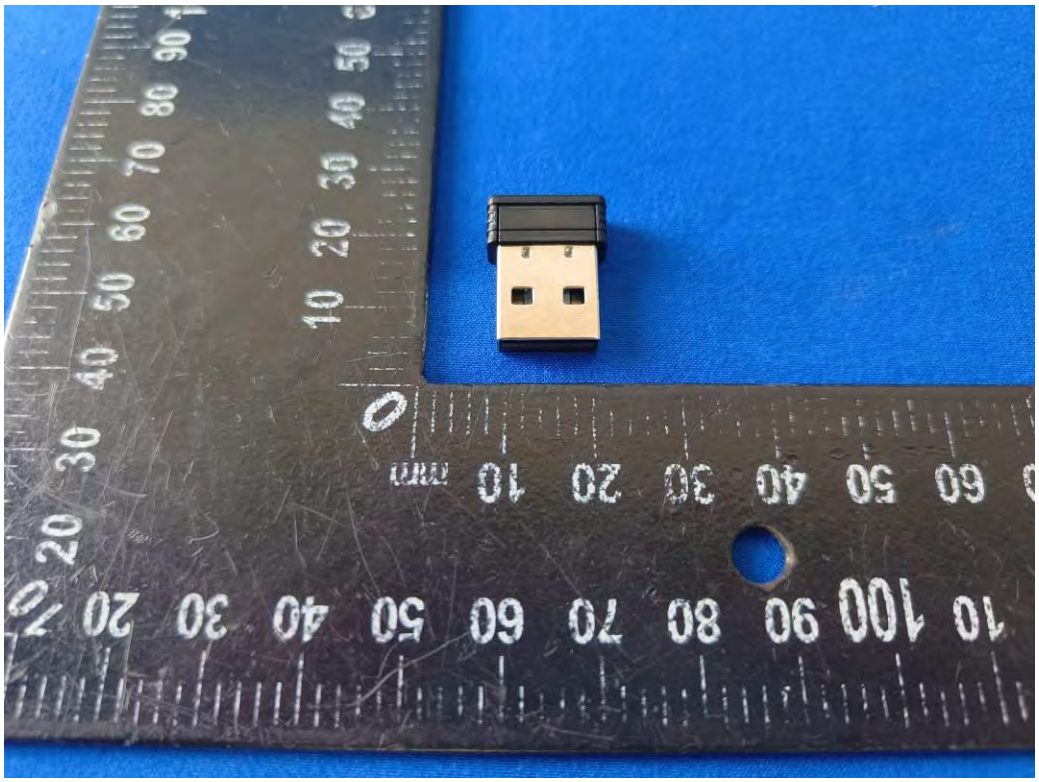


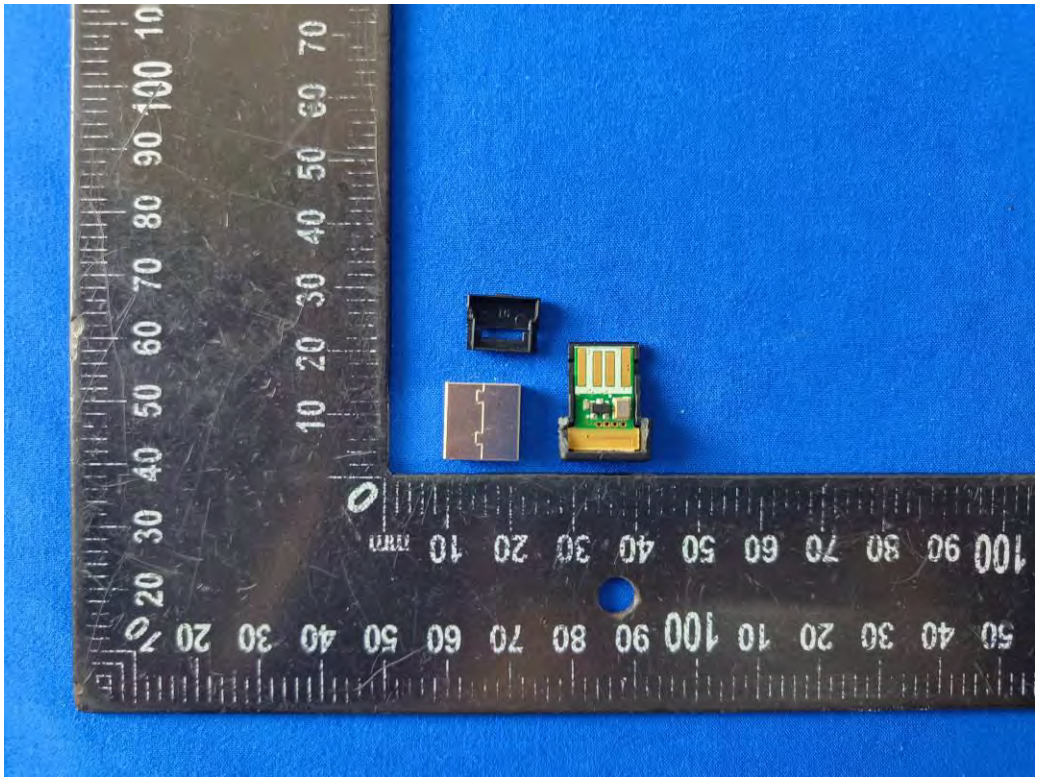


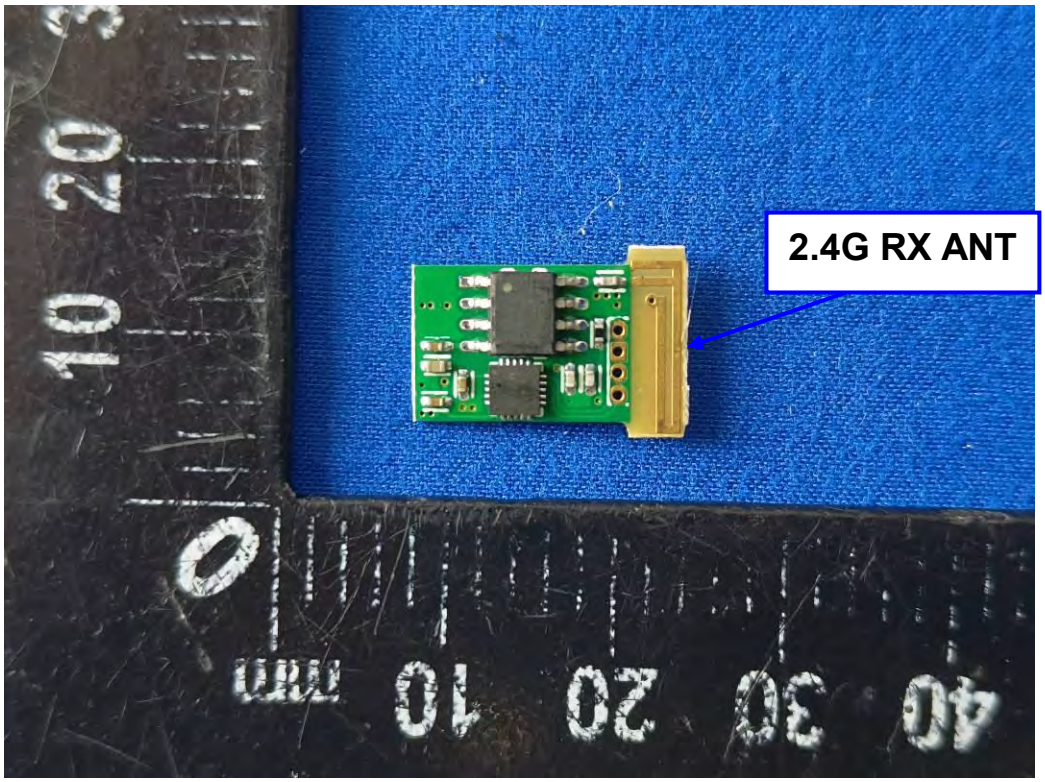


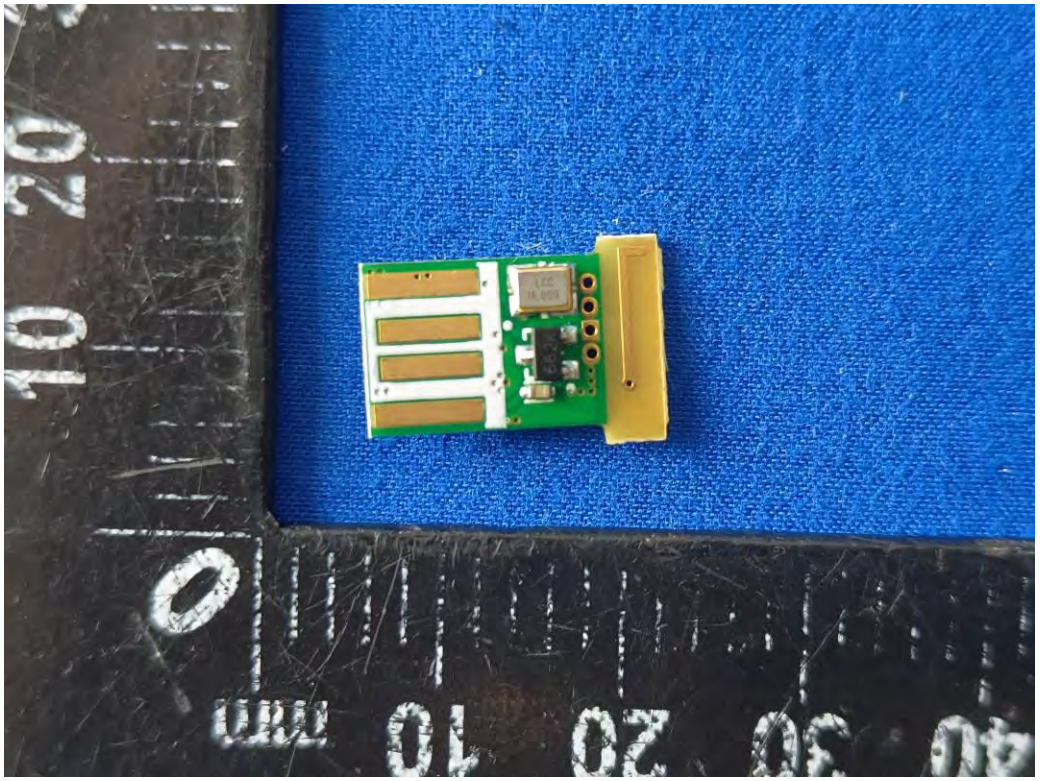












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