



FCC TEST REPORT
FCC ID: 2BA4I-E1000

On Behalf of

Shenzhen Flamma Innovation Co., Ltd.
Intelligent Guitar
Model No.: See model list

Prepared for : Shenzhen Flamma Innovation Co., Ltd.
Address : 6F-2, Unit A, Jinghang Electronic, Xingdong 71 District, Xin'an Street,
Bao'an, Shenzhen, China

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 : August 22, 2023
Date of Test : August 22, 2023 – March 13, 2024
Date of Report : March 13, 2024
Version Number : V0
Result **Pass**

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TEST REPORT DECLARATION

Applicant : Shenzhen Flamma Innovation Co., Ltd.
Address : 6F-2, Unit A, Jinghang Electronic, Xingdong 71 District, Xin'an Street, Bao'an, Shenzhen, China
Manufacturer : Shenzhen Mooer Audio Co.,Ltd
Address : 5F/2F, Unit B and 6F, Unit D, Jinghang Building, Liuxian 3rd Road, Baoan 71 District, Shenzhen
EUT Description : Intelligent Guitar

(A) Model No. See model list

(B) Trademark

FLAMMA

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247

ANSI C63.10-2013

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).....: Yannis Wen
Project Engineer

Yannis Wen

Approved by (name + signature).....: Reak Yang
Project Manager

Reak Yang

Date of issue.....: March 13, 2024

Revision History

Revision	Issue Date	Revisions	Revised By
V0	March 13, 2024	Initial released Issue	Yannis Wen

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	Test Requirement	Standards Paragraph	Result
Conducted Emission	FCC PART 15	15.207	P
6dB Bandwidth	FCC PART 15	15.247 (a)(2)	P
Conducted Maximum Peak Output Power	FCC PART 15	15.247 (b)(3)	P
Radiated Spurious Emission	FCC PART 15	15.247 (c)	P
Conducted Spurious & Band Edge Emission	FCC PART 15	15.247 (d)	P
Power Spectral Density	FCC PART 15	15.247 (e)	P
Radiated Band Edge Emission	FCC PART 15	15.205	P
Antenna Requirement	FCC PART 15	15.203	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. The conclusion of this test report is judged by actual test data without considering measurement uncertainty.

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Description	: Intelligent Guitar
Model Number	: See model list
Diff	: There is no difference except the name of the model. All tests are made with the E1000 model.
Power supply	: DC 5V from Type-C port, DC 3.7V from battery
Radio Technology	: 2.4G
Operation frequency	: 2415-2455MHz
Channel No.	: 3 Channels(2415MHz, 2435MHz, 2455MHz)
Modulation type	: GFSK
Antenna Type	: Internal antenna, Maximum Gain is -0.58dBi. (Antenna information is provided by applicant.)
Software version	: V1.0
Hardware version	: V1.0
Coaxial cable loss	: Max. coaxial cable loss:0.5dB (Cable lossvalue is provided by applicant.)
Intend use environment	: Residential, commercial and light industrial environment

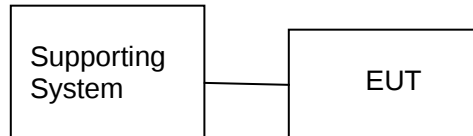
2.2. Accessories of Device (EUT)

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

2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or SDoC
1.	Notebook PC	Lenovo	ThinkPad E14	/	/

2.4. Block Diagram of connection between EUT and simulators



2.5. Test Mode Description

Duty cycle :100%		
Mode	Channel	Frequency (MHz)
GFSK	Low :CH1	2415
	Middle: CH2	2435
	High: CH3	2455

2.6. Test Conditions

Items	Required	Actual
Temperature range:	15-35℃	24℃
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

July 25, 2017 Certificated by IC
 Registration Number: 12135A

2.8. Measurement Uncertainty

(95% confidence levels, k=2)

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	2.74dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13 dB(Polarize: V)
	2.57dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.13dB(Polarize: H)
	4.16dB(Polarize: V)
Uncertainty for radio frequency	5.4×10^{-8}
Uncertainty for conducted RF Power	0.37dB
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	2023.08.16	1Year
Spectrum analyzer	Agilent	N9020A	A.14.16	MY499100060	2023.08.16	1Year
Receiver	ROHDE&SCHWARZ	ESR	2.28 SP1	1316.3003K03-10 2082-Wa	2023.08.16	1Year
Receiver	R&S	ESCI	4.42 SP1	101165	2023.08.16	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	/	VULB 9168#627	2023.08.28	1Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	/	2106	2023.08.19	1Year
Loop Antenna	SCHWARZBECK	FMZB 1519B	/	00128	2023.08.19	1Year
RF Cable	Resenberger	Cable 1	/	RE1	2023.08.16	1Year
RF Cable	Resenberger	Cable 2	/	RE2	2023.08.16	1Year
RF Cable	Resenberger	Cable 3	/	CE1	2023.08.16	1Year
Pre-amplifier	HP	HP8347A	/	2834A00455	2023.08.16	1Year
Pre-amplifier	Agilent	8449B	/	3008A02664	2023.08.16	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	/	8126-466	2023.08.16	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	101043	2023.08.16	1Year
Horn Antenna	SCHWARZBECK	BBHA 9170	/	00946	2023.08.19	1Year
Preamplifier	SKET	LNPA_1840 -50	/	SK2018101801	2023.08.16	1 Year
Power Meter	Agilent	E9300A	/	MY41496628	2023.08.16	1 Year
Power Sensor	DARE	RPR3006W	/	15100041SNO91	2023.08.16	1 Year
Temp. & Humid. Chamber	Teelong	TL-HW408S	/	TL-20191205-01	2023.07.25	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	/	20140927-6	2023.08.16	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

Frequencies (MHz)	Field Strength (micorvolts/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
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

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.

NOTE:

- a) The tighter limit applies at the band edges.
- b) $\text{Emission Level(dB } \mu\text{V/m)} = 20 \log \text{Emission Level}(\mu\text{V/m)}$

3.2. Test Procedure

The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1GHz, The EUT was placed on a rotating 0.8 m high above ground for below 1GHz and 1.5m high for above 1GHz testing, The table was rotated 360 degrees to determine the position of the highest radiation

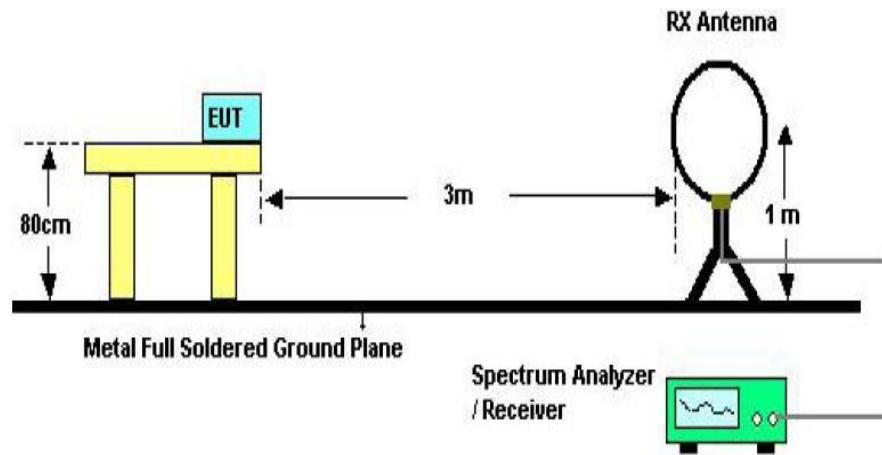
The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set of make measurement.

The initial step in collecting conducted emission data is a spectrum analyzer Peak detector mode pre-scanning the measurement frequency range. Significant Peaks are then marked. and then Qusia Peak Detector mode premeasured

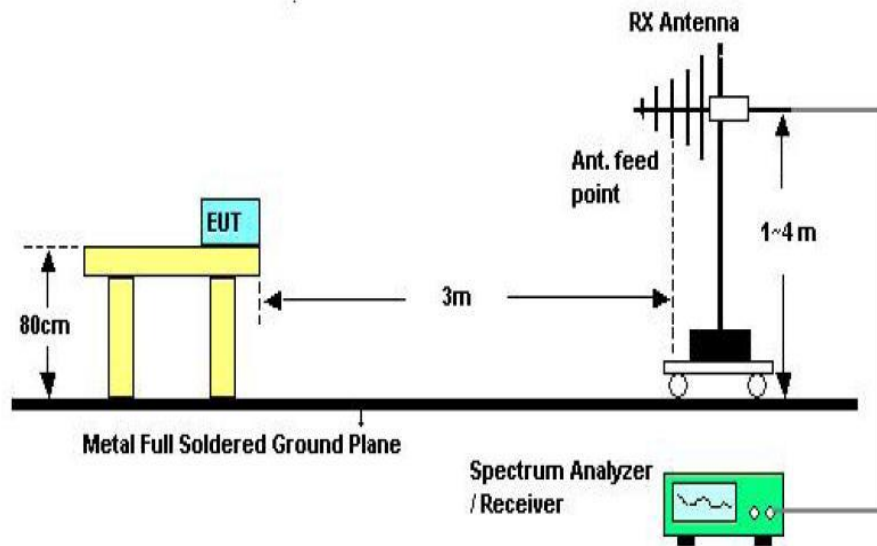
If Peak value comply with QP limit Below 1GHz. The EUT deemed to comply with QP limit. But the Peak value and average value both need to comply with applicable limit above 1GHz.

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

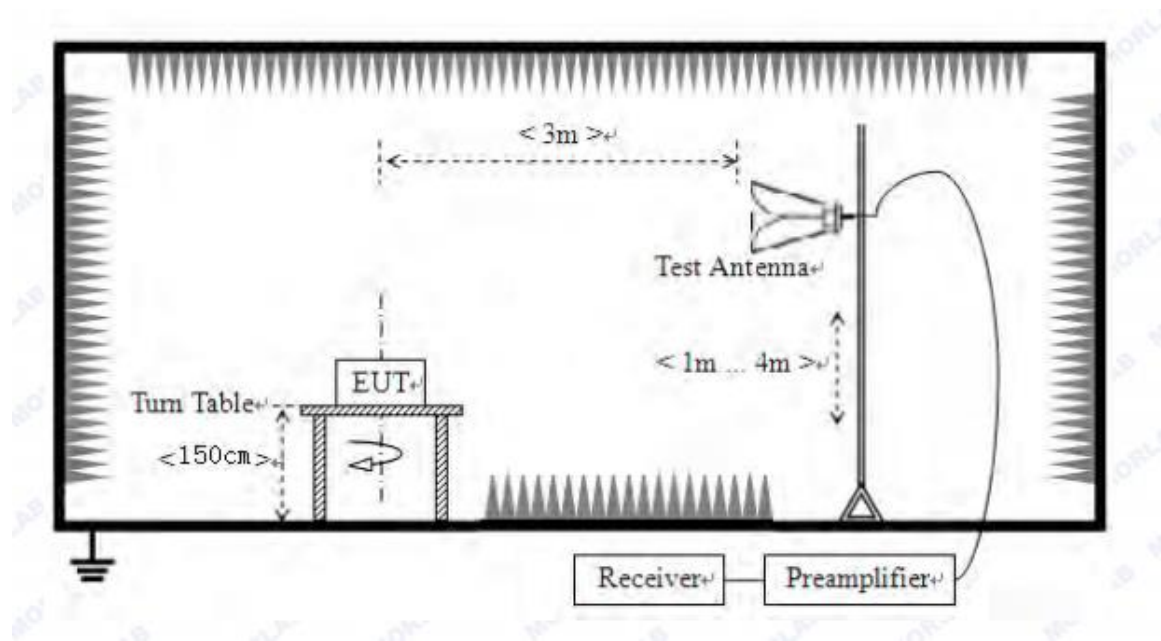
3.3. Test Setup



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 the 10th harmonic from 9 kHz to the EUT.

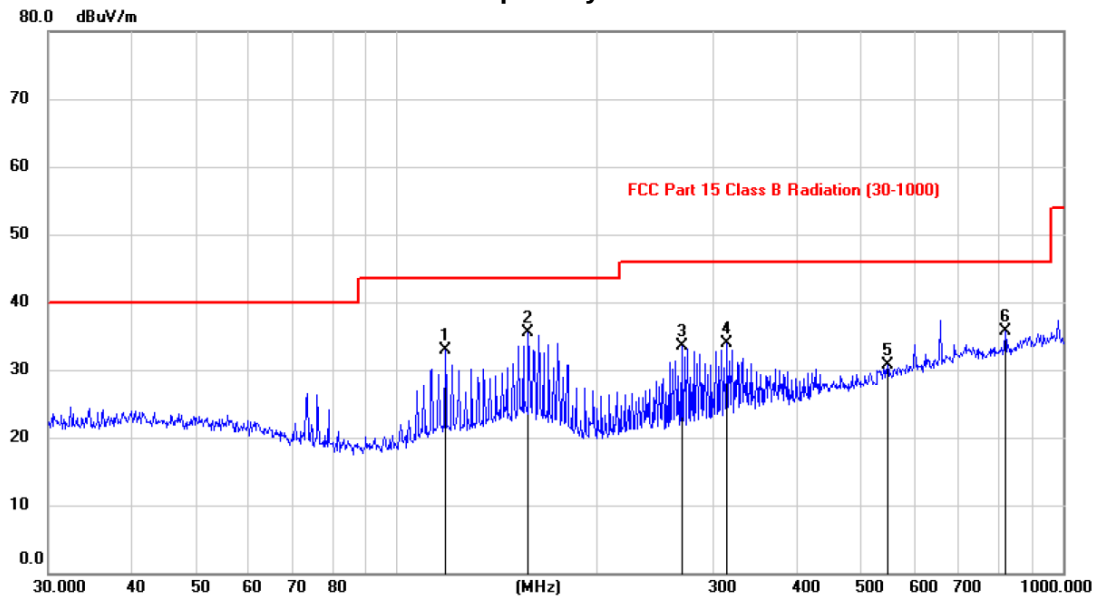
Detailed information please see the following page.

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. All EUTs, modes and channels have been tested, only show the test data of the worst Channel in this report.

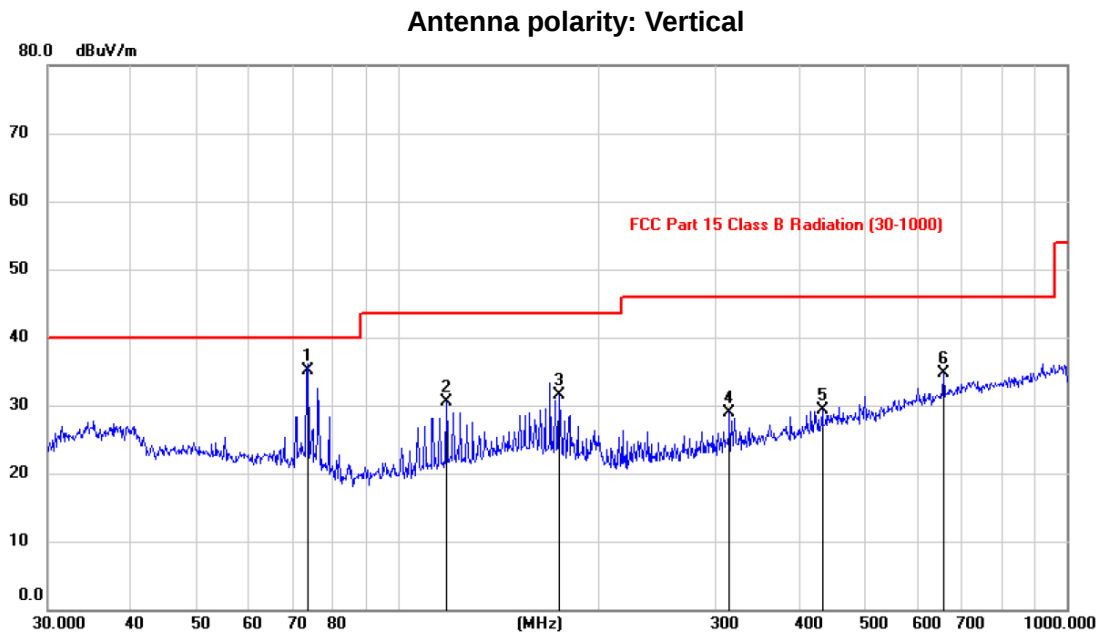
Mode: 2.4G

Antenna polarity: Horizontal

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		118.5459	20.02	12.87	32.89	43.50	-10.61	peak		
2	*	158.0569	20.50	15.04	35.54	43.50	-7.96	peak		
3		268.1403	20.35	13.23	33.58	46.00	-12.42	peak		
4		313.3126	19.44	14.44	33.88	46.00	-12.12	peak		
5		546.8419	11.59	19.14	30.73	46.00	-15.27	peak		
6		819.3128	12.54	23.13	35.67	46.00	-10.33	peak		

Note:1. *:Maximum data; x:Over limit; !:over margin.

2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



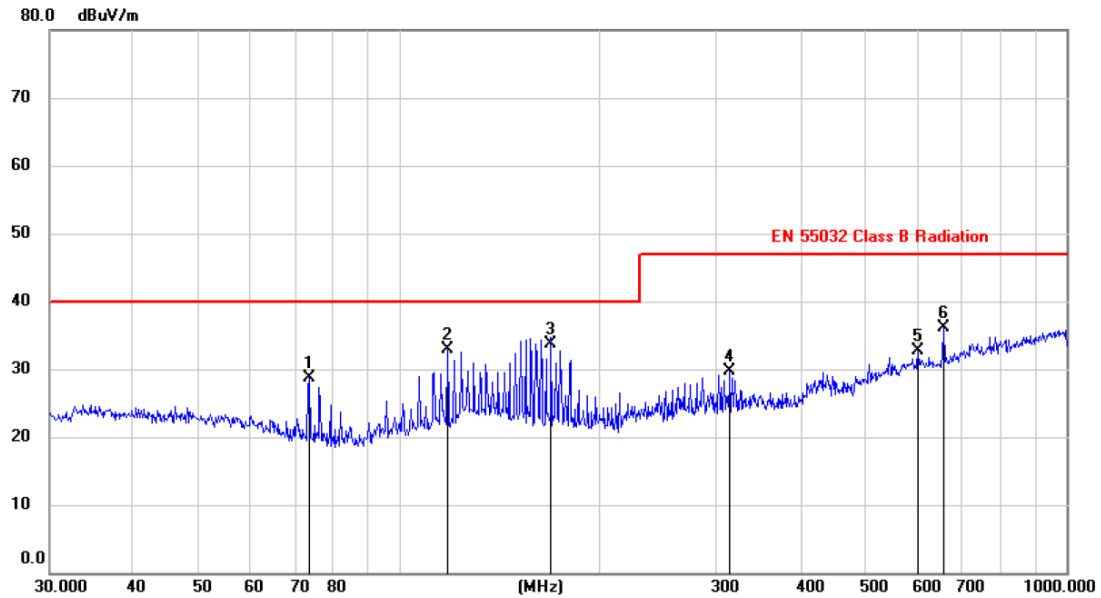
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	73.3936	24.39	10.81	35.20	40.00	-4.80	QP		
2		118.5459	17.61	12.87	30.48	43.50	-13.02	peak		
3		175.0163	18.19	13.38	31.57	43.50	-11.93	peak		
4		313.3126	14.44	14.44	28.88	46.00	-17.12	peak		
5		431.8384	12.17	17.12	29.29	46.00	-16.71	peak		
6		655.4565	13.45	21.16	34.61	46.00	-11.39	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 2415MHz.

Mode: BLE+2.4G

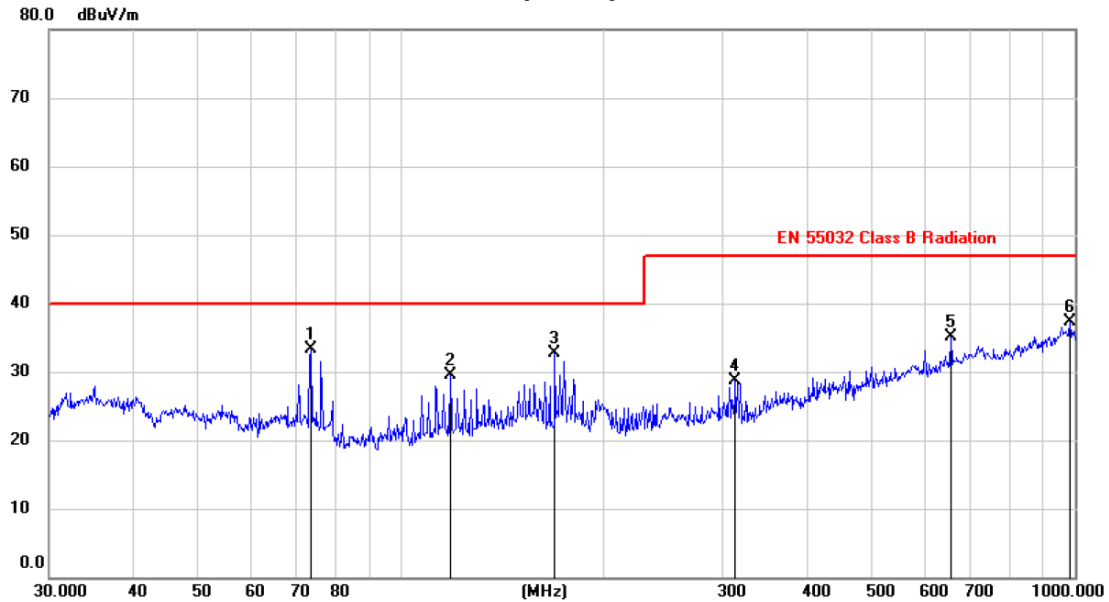
Antenna polarity: Horizontal

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		73.3764	17.81	10.81	28.62	40.00	-11.38	peak		
2		118.5459	20.01	12.87	32.88	40.00	-7.12	peak		
3	*	169.3412	19.51	14.14	33.65	40.00	-6.35	QP		
4		313.2760	15.34	14.43	29.77	47.00	-17.23	peak		
5		600.0221	12.46	20.22	32.68	47.00	-14.32	peak		
6		655.4563	15.03	21.16	36.19	47.00	-10.81	peak		

Note:1. *:Maximum data; x:Over limit; !:over margin.

2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Antenna polarity: Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Antenna Height cm	Table Degree	Comment
1	*	73.4021	22.53	10.81	33.34	40.00	-6.66	peak			
2		118.5318	16.63	12.87	29.50	40.00	-10.50	peak			
3		169.3610	18.62	14.14	32.76	40.00	-7.24	peak			
4		313.3125	14.27	14.44	28.71	47.00	-18.29	peak			
5		655.4563	13.96	21.16	35.12	47.00	-11.88	peak			
6		983.1942	12.53	24.71	37.24	47.00	-9.76	peak			

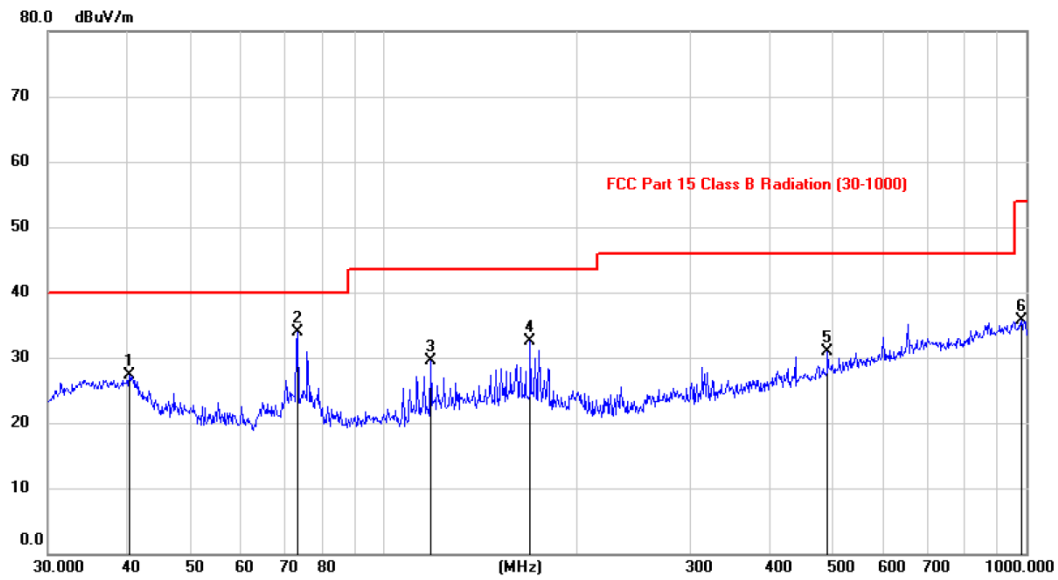
Note: 1. *:Maximum data; x:Over limit; !:over margin.

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 2402MHz(1Mbps)+2415MHz.

Mode: EDR+2.4G

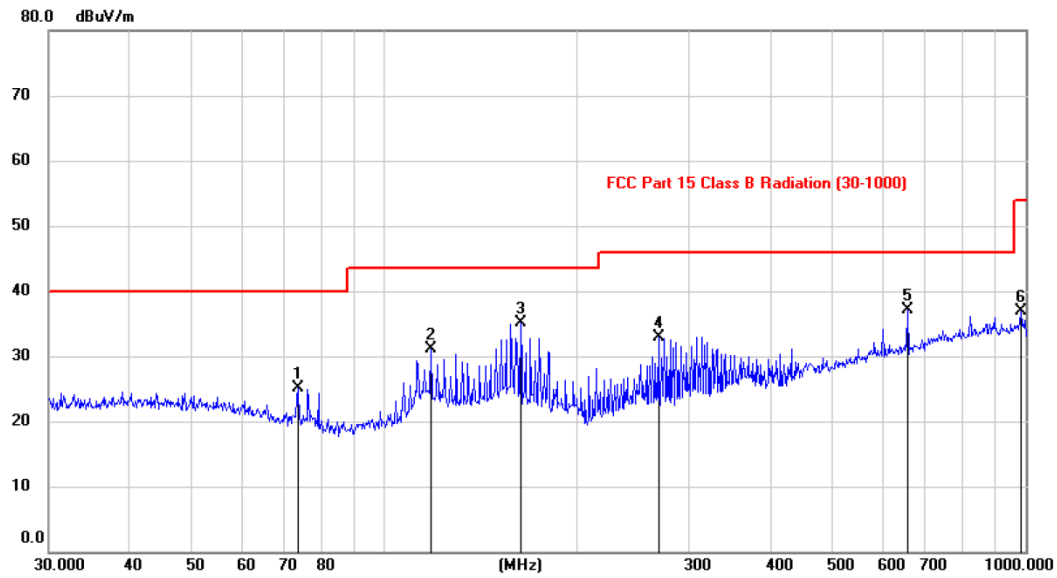
Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		40.1957	12.83	14.44	27.27	40.00	-12.73			peak
2	*	73.3850	23.10	10.81	33.91	40.00	-6.09			peak
3		118.5459	16.69	12.87	29.56	43.50	-13.94			peak
4		169.3611	18.46	14.14	32.60	43.50	-10.90			peak
5		491.6057	12.83	18.10	30.93	46.00	-15.07			peak
6		983.1942	11.01	24.71	35.72	54.00	-18.28			peak

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	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		73.3936	14.21	10.81	25.02	40.00	-14.98	peak		
2		118.5319	18.31	12.87	31.18	43.50	-12.32	peak		
3	*	163.6974	20.44	14.68	35.12	43.50	-8.38	peak		
4		268.1401	19.73	13.23	32.96	46.00	-13.04	peak		
5		655.4563	15.99	21.16	37.15	46.00	-8.85	peak		
6		983.1943	12.25	24.71	36.96	54.00	-17.04	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 2402MHz(GFSK)+2415MHz..

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	42.15	V	33.95	10.18	34.26	52.02	74	-21.98	PK
4804	39.04	V	33.95	10.18	34.26	48.91	54	-5.09	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
4804	44.47	H	33.95	10.18	34.26	54.34	74	-19.66	PK
4804	37.89	H	33.95	10.18	34.26	47.76	54	-6.24	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
Test Mode: TX Mid									
4880	43.45	V	33.93	10.2	34.29	53.29	74	-20.71	PK
4880	35.75	V	33.93	10.2	34.29	45.59	54	-8.41	AV
7320	/	/	/	/	/	/	/	/	/
9760	/	/	/	/	/	/	/	/	/
4880	44.03	H	33.93	10.2	34.29	53.87	74	-20.13	PK
4880	35.37	H	33.93	10.2	34.29	45.21	54	-8.79	AV
7320	/	/	/	/	/	/	/	/	/
9760	/	/	/	/	/	/	/	/	/
Test Mode: TX High									
4960	44.41	V	33.98	10.22	34.25	54.36	74	-19.64	PK
4960	36.79	V	33.98	10.22	34.25	46.74	54	-7.26	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/
4960	45.47	H	33.98	10.22	34.25	55.42	74	-18.58	PK
4960	32.39	H	33.98	10.22	34.25	42.34	54	-11.66	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.									

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	46.44	V	33.95	10.18	34.26	56.31	74	-17.69	PK
4804	37.27	V	33.95	10.18	34.26	47.14	54	-6.86	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
4804	46.30	H	33.95	10.18	34.26	56.17	74	-17.83	PK
4804	35.13	H	33.95	10.18	34.26	45.00	54	-9.00	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
Test Mode: TX Mid									
4880	41.70	V	33.93	10.2	34.29	51.54	74	-22.46	PK
4880	35.30	V	33.93	10.2	34.29	45.14	54	-8.86	AV
7320	/	/	/	/	/	/	/	/	/
9760	/	/	/	/	/	/	/	/	/
4880	44.69	H	33.93	10.2	34.29	54.53	74	-19.47	PK
4880	34.71	H	33.93	10.2	34.29	44.55	54	-9.45	AV
7320	/	/	/	/	/	/	/	/	/
9760	/	/	/	/	/	/	/	/	/
Test Mode: TX High									
4960	45.27	V	33.98	10.22	34.25	55.22	74	-18.78	PK
4960	35.79	V	33.98	10.22	34.25	45.74	54	-8.26	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/
4960	41.64	H	33.98	10.22	34.25	51.59	74	-22.41	PK
4960	32.01	H	33.98	10.22	34.25	41.96	54	-12.04	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/

Note:

1, Result = Read level + Antenna factor + cable loss-Amp factor

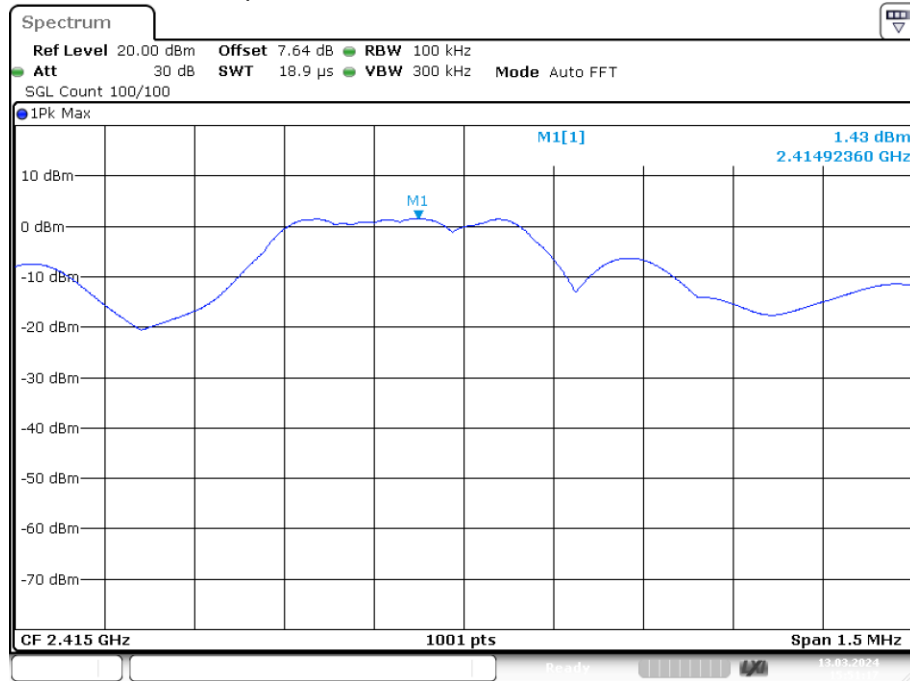
2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

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	47.54	V	33.95	10.18	34.26	57.41	74	-16.59	PK
4804	36.81	V	33.95	10.18	34.26	46.68	54	-7.32	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
4804	43.86	H	33.95	10.18	34.26	53.73	74	-20.27	PK
4804	34.75	H	33.95	10.18	34.26	44.62	54	-9.38	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
Test Mode: TX Mid									
4882	41.87	V	33.93	10.2	34.29	51.71	74	-22.29	43.99
4882	36.17	V	33.93	10.2	34.29	46.01	54	-7.99	33.69
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
4882	46.45	H	33.93	10.2	34.29	56.29	74	-17.71	45.30
4882	36.12	H	33.93	10.2	34.29	45.96	54	-8.04	35.63
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
Test Mode: TX High									
4960	45.47	V	33.98	10.22	34.25	55.42	74	-18.58	PK
4960	35.73	V	33.98	10.22	34.25	45.68	54	-8.32	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/
4960	41.72	H	33.98	10.22	34.25	51.67	74	-22.33	PK
4960	34.59	H	33.98	10.22	34.25	44.54	54	-9.46	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.									

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	46.70	V	33.95	10.18	34.26	56.57	74	-17.43	PK
4804	36.74	V	33.95	10.18	34.26	46.61	54	-7.39	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
4804	45.26	H	33.95	10.18	34.26	55.13	74	-18.87	PK
4804	36.80	H	33.95	10.18	34.26	46.67	54	-7.33	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
Test Mode: TX Mid									
4882	44.32	V	33.93	10.2	34.29	54.16	74	-19.84	PK
4882	34.78	V	33.93	10.2	34.29	44.62	54	-9.38	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
4882	46.17	H	33.93	10.2	34.29	56.01	74	-17.99	PK
4882	35.60	H	33.93	10.2	34.29	45.44	54	-8.56	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
Test Mode: TX High									
4960	45.34	V	33.98	10.22	34.25	55.29	74	-18.71	PK
4960	33.48	V	33.98	10.22	34.25	43.43	54	-10.57	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/
4960	42.55	H	33.98	10.22	34.25	52.50	74	-21.50	PK
4960	33.42	H	33.98	10.22	34.25	43.37	54	-10.63	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.									

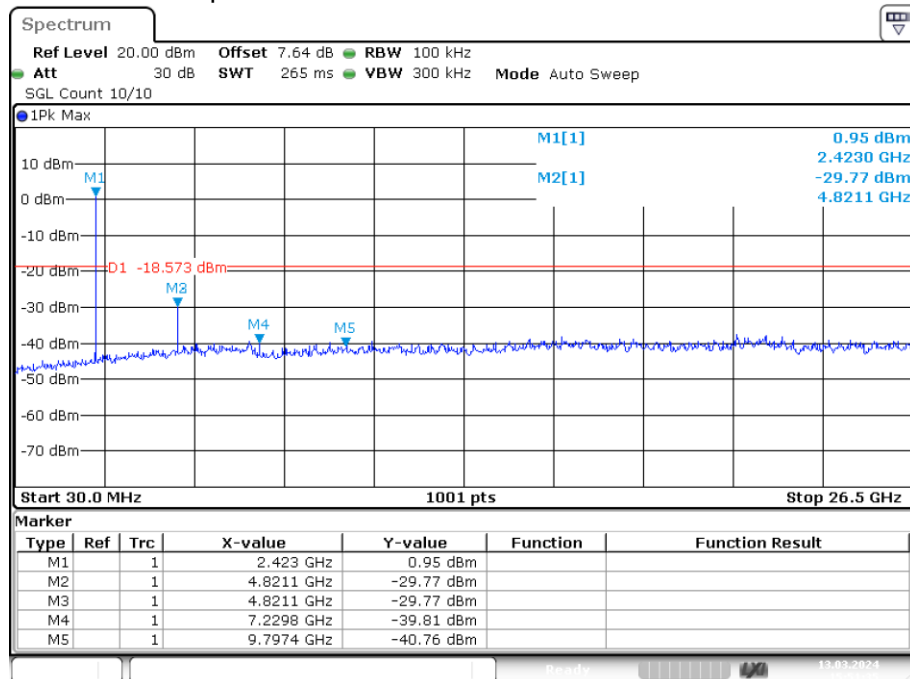
Conducted RF Spurious Emission

Tx. Spurious NVNT GFSK 2415MHz Ant1 Ref



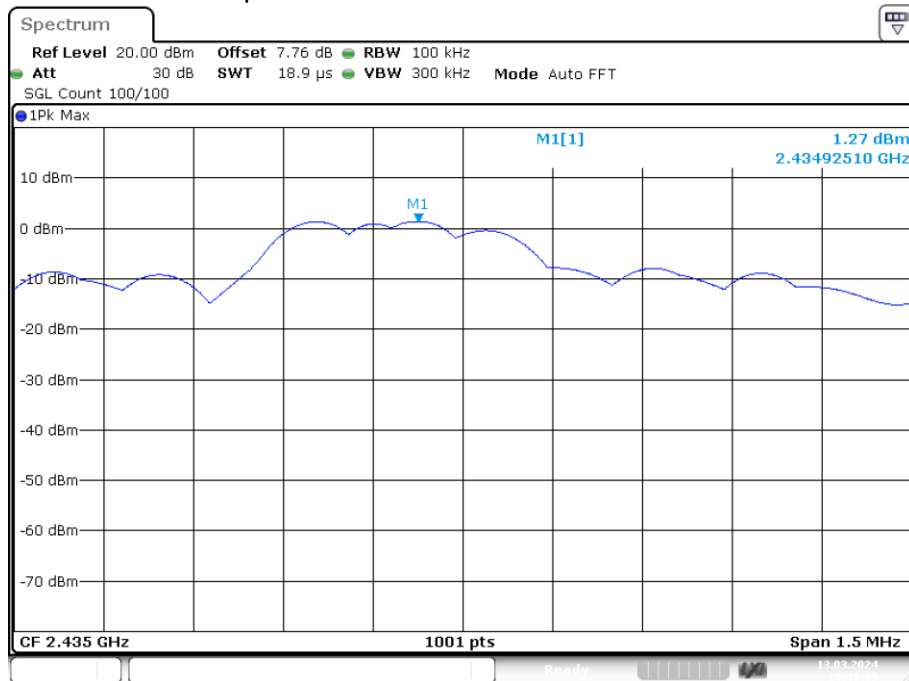
Date: 13.MAR.2024 15:51:16

Tx. Spurious NVNT GFSK 2415MHz Ant1 Emission



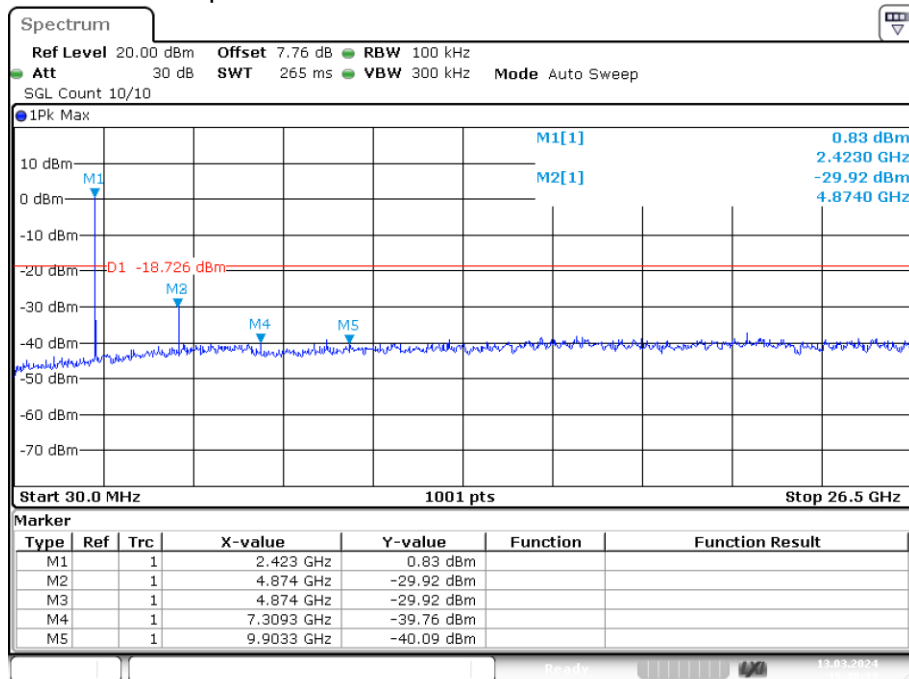
Date: 13.MAR.2024 15:51:34

Tx. Spurious NVNT GFSK 2435MHz Ant1 Ref



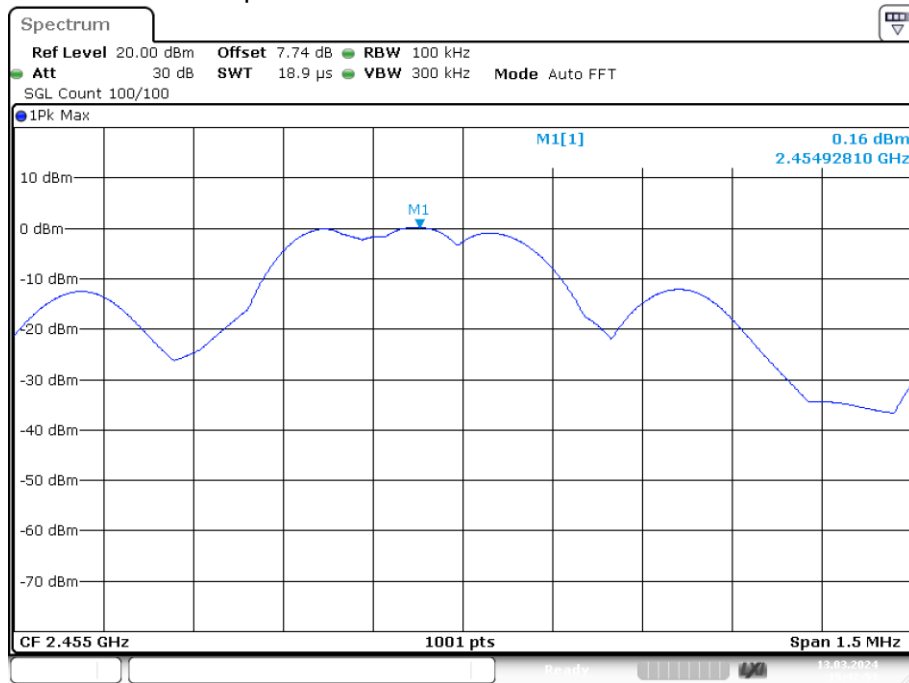
Date: 13.MAR.2024 15:48:15

Tx. Spurious NVNT GFSK 2435MHz Ant1 Emission



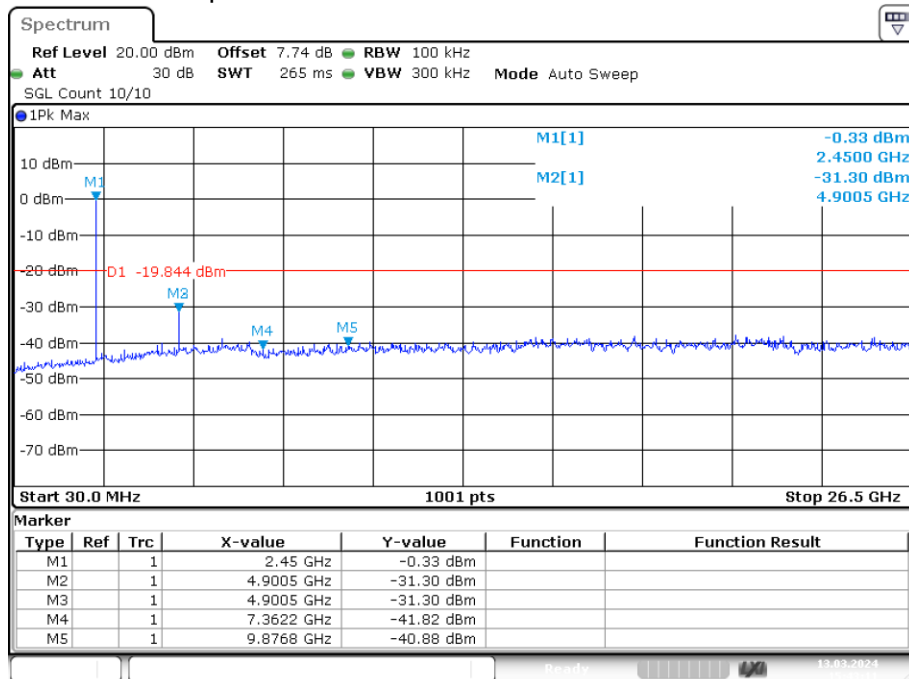
Date: 13.MAR.2024 15:48:33

Tx. Spurious NVNT GFSK 2455MHz Ant1 Ref



Date: 13.MAR.2024 15:42:53

Tx. Spurious NVNT GFSK 2455MHz Ant1 Emission



Date: 13.MAR.2024 15:43:11

4. POWER LINE CONDUCTED EMISSION

4.1. Test Limits

Frequency MHz	Limits dB(μ V)	
	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.

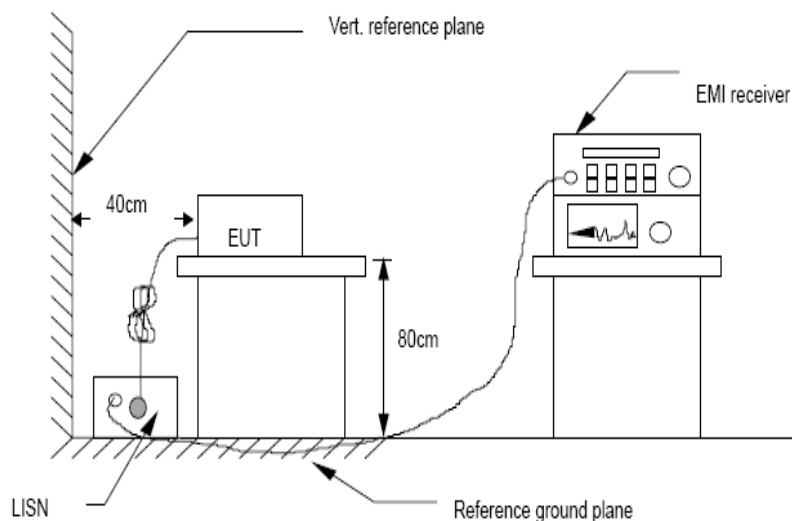
3. The limit decreases in line with the logarithm of the frequency in rang of 0.15 to 0.50 MHz.

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 C63.10:2013 on Conducted Emission Measurement.

The bandwidth of test receiver is set at 9 kHz.

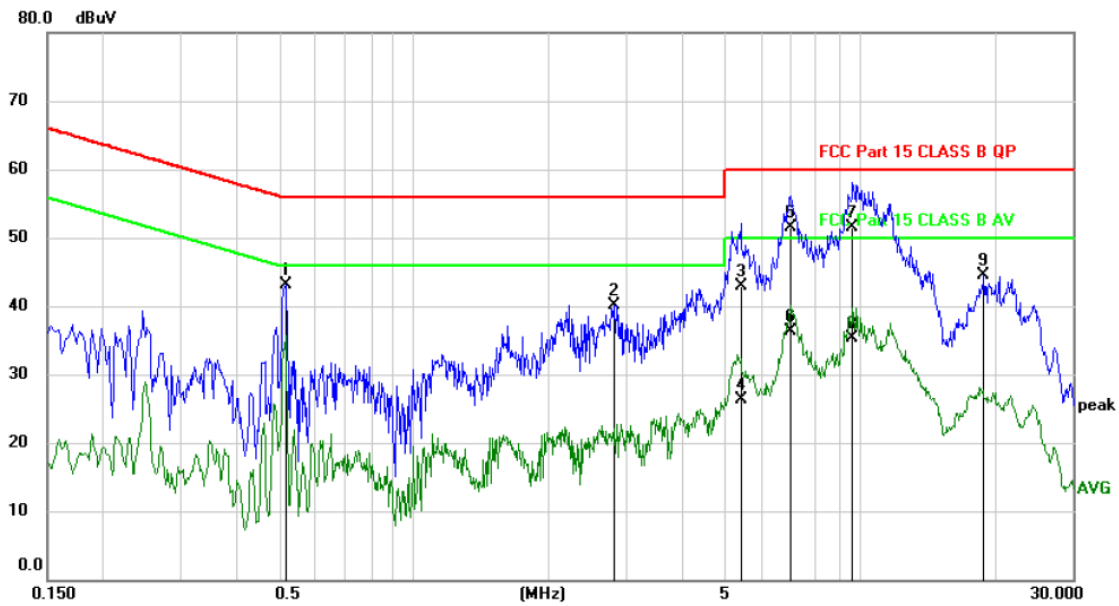
4.3. Test Setup



4.4. Test Results

Pass

Polarity: L

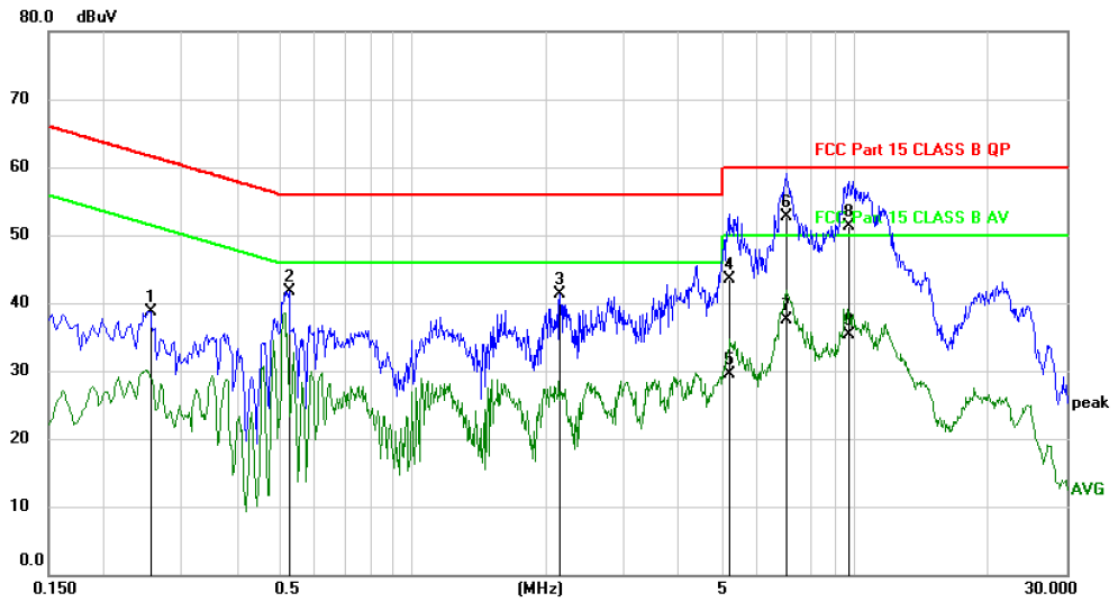


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	
		MHz	Level	Factor	ment			
			dBuV	dB	dBuV	dBuV	dB	Detector
1		0.5130	32.74	10.27	43.01	56.00	-12.99	peak
2		2.7960	29.66	10.48	40.14	56.00	-15.86	peak
3		5.4060	32.24	10.65	42.89	60.00	-17.11	QP
4		5.4060	15.56	10.65	26.21	50.00	-23.79	AVG
5		7.0140	40.77	10.71	51.48	60.00	-8.52	QP
6		7.0140	25.52	10.71	36.23	50.00	-13.77	AVG
7	*	9.6450	40.72	10.81	51.53	60.00	-8.47	QP
8		9.6450	24.51	10.81	35.32	50.00	-14.68	AVG
9		18.9570	33.38	11.04	44.42	60.00	-15.58	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

Polarity: N

No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.2550	28.53	10.11	38.64	61.59	-22.95	peak	
2	0.5250	31.40	10.27	41.67	56.00	-14.33	peak	
3	2.1480	30.79	10.42	41.21	56.00	-14.79	peak	
4	5.1640	32.91	10.65	43.56	60.00	-16.44	QP	
5	5.1640	18.76	10.65	29.41	50.00	-20.59	AVG	
6 *	6.9494	41.95	10.71	52.66	60.00	-7.34	QP	
7	6.9494	26.78	10.71	37.49	50.00	-12.51	AVG	
8	9.6833	40.44	10.81	51.25	60.00	-8.75	QP	
9	9.6833	24.49	10.81	35.30	50.00	-14.70	AVG	

*: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

Note: All modes and channels have been tested and only the 2415MHz mode with the worst data is listed.

5. CONDUCTED MAXIMUM PEAK OUTPUT POWER

5.1. Test limits

Please refer section RSS-247 & 15.247.

5.2. Test Procedure

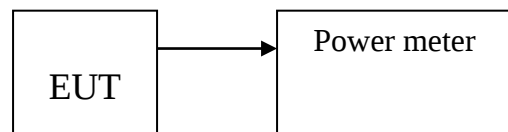
Details see the KDB 558074 D01 15.247 Meas Guidance v05r02

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

GFSK

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	EIRP (dBm)	Limit (dBm)	Verdict
NVNT	GFSK	2415	Ant1	0.921	1.501	30	Pass
NVNT	GFSK	2435	Ant1	0.342	0.922	30	Pass
NVNT	GFSK	2455	Ant1	0.140	0.72	30	Pass

Duty Cycle

Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)
NVNT	GFSK	2415	Ant1	99.51
NVNT	GFSK	2435	Ant1	99.48
NVNT	GFSK	2455	Ant1	99.66

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 KDB 558074 D01 15.247 Meas Guidance v05r02

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

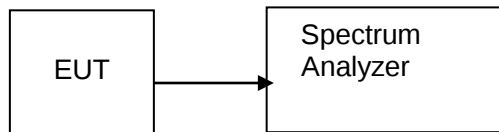
6.2.2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

6.2.3 Set the spectrum analyzer as RBW = 3kHz(Set the RBW to: $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$.), VBW = 10kHz(Set the $\text{VBW} \geq 3 \times \text{RBW}$), span= $1.5 \times \text{DTS bandwidth}$., 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



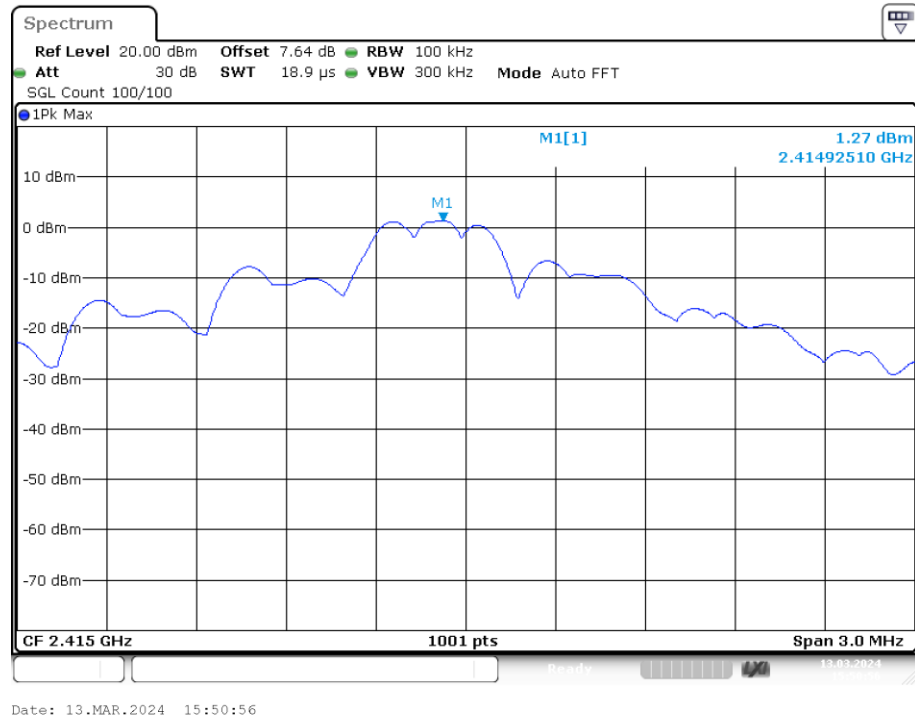
6.4. Test Results

Pass

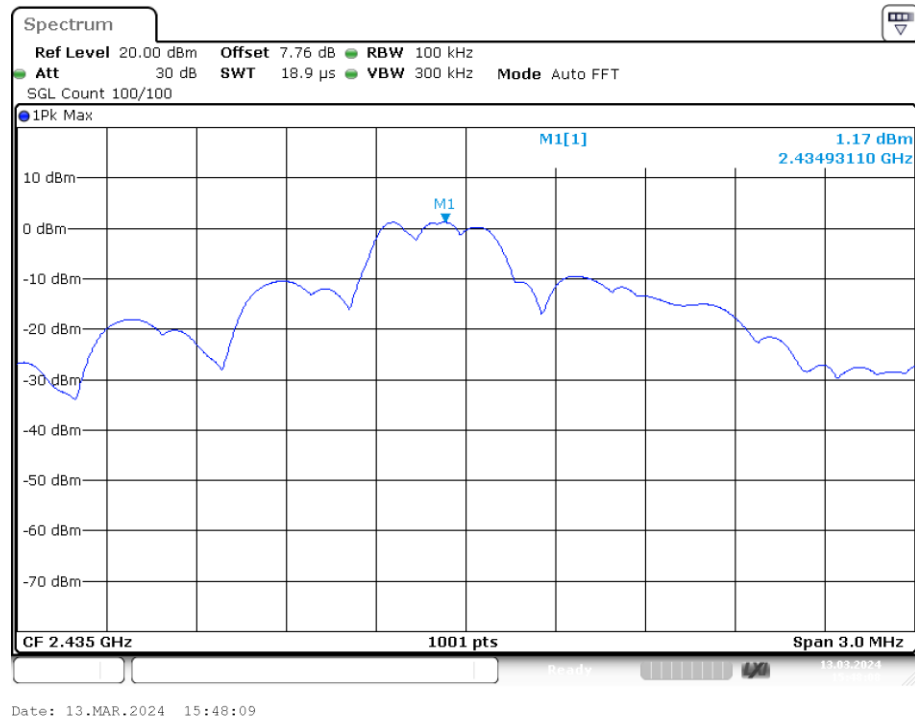
The test results are listed in next pages.

Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	GFSK	2415	Ant1	1.272	8	Pass
NVNT	GFSK	2435	Ant1	1.172	8	Pass
NVNT	GFSK	2455	Ant1	1.166	8	Pass

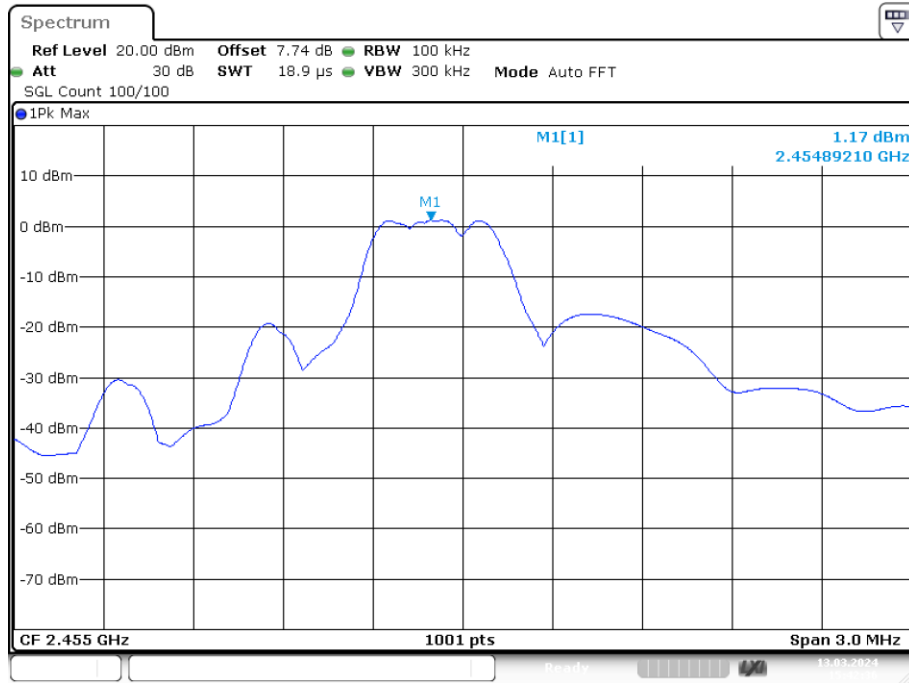
PSD NVNT GFSK 2415MHz Ant1



PSD NVNT GFSK 2435MHz Ant1



PSD NVNT GFSK 2455MHz Ant1



Date: 13.MAR.2024 15:42:36

7. BANDWIDTH

7.1. Test limits

Please refer section RSS-247 & 15.247

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

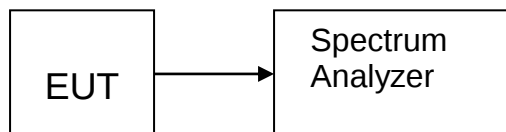
7.2. Test Procedure

Details see the KDB 558074 D01 15.247 Meas Guidance v05r02

a) The bandwidth is measured at an amplitude level reduced 20dB 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 = 100kHz, VBW $\geq$ 3*RBW =300kHz, sweep time set auto, detail see the test plot.

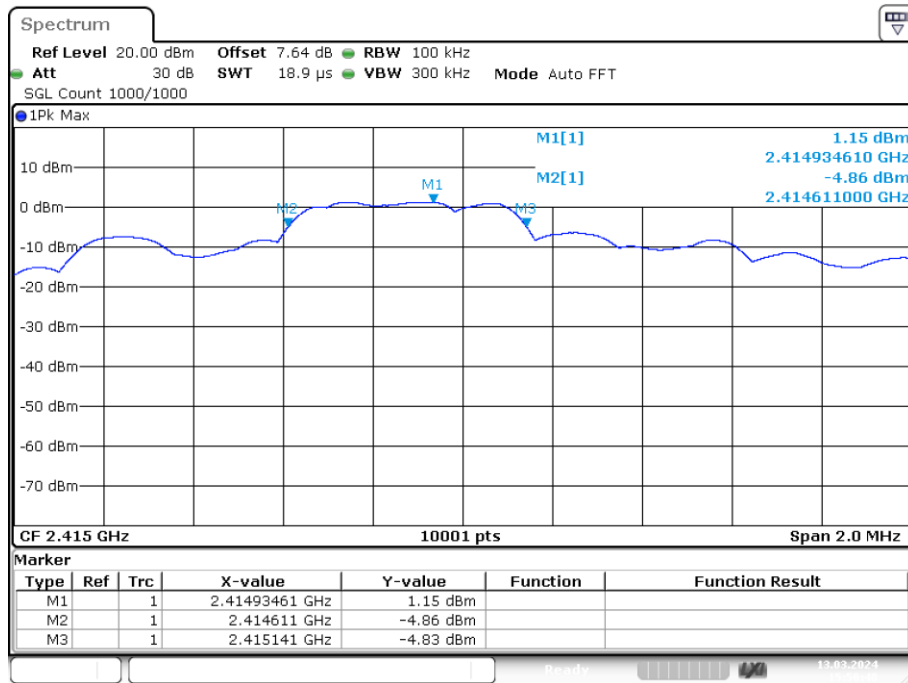
7.3. Test Setup



7.4. Test Results

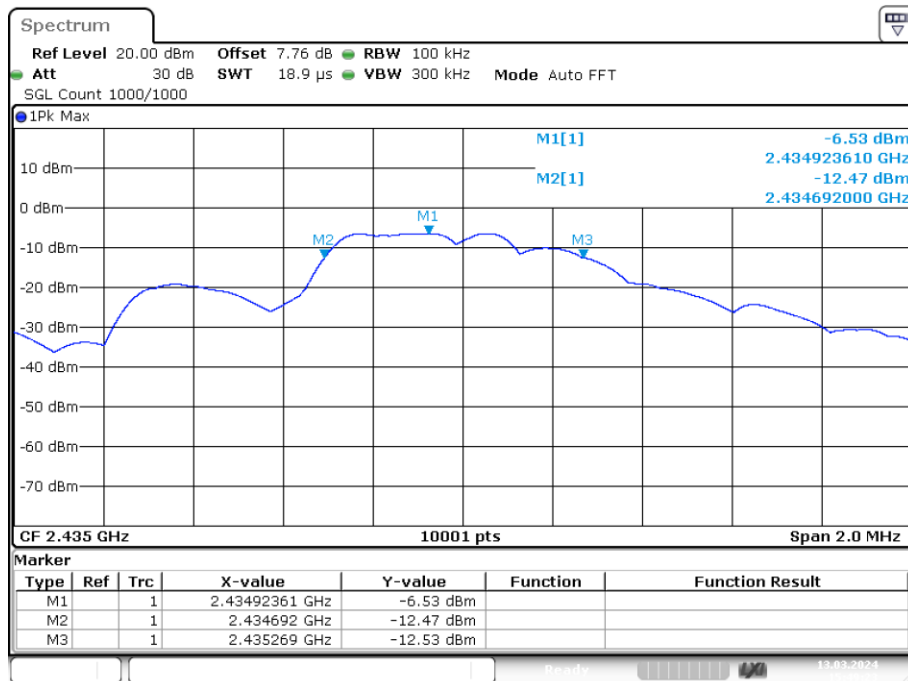
Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	GFSK	2402	Ant 1	1.636	0.53	0.5	Pass
NVNT	GFSK	2440	Ant 1	1.405	0.577	0.5	Pass
NVNT	GFSK	2480	Ant 1	1.207	0.505	0.5	Pass

-6dB Bandwidth NVNT GFSK 2415MHz Ant1



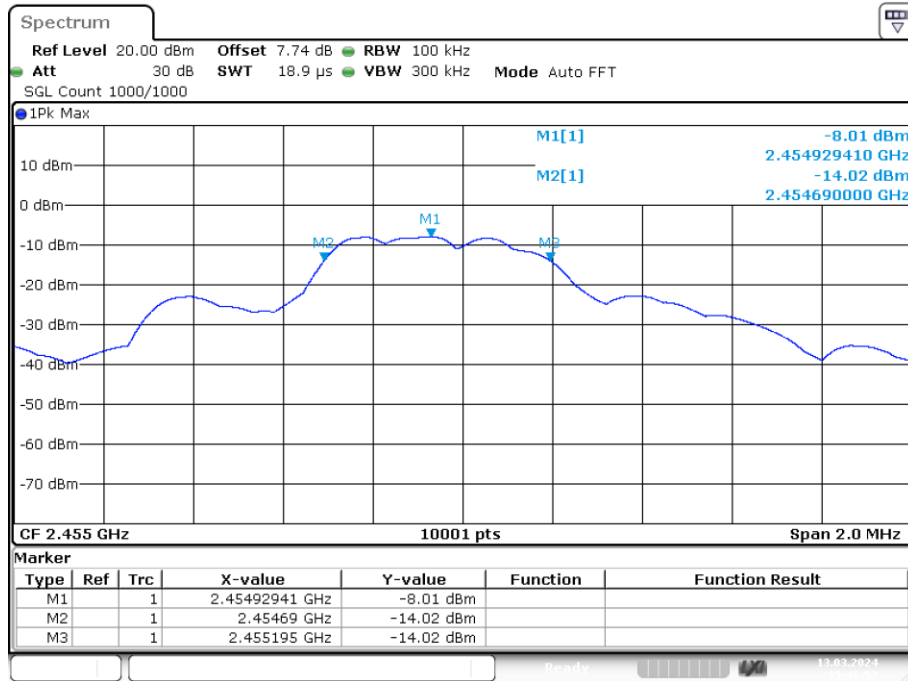
Date: 13.MAR.2024 15:50:48

-6dB Bandwidth NVNT GFSK 2435MHz Ant1



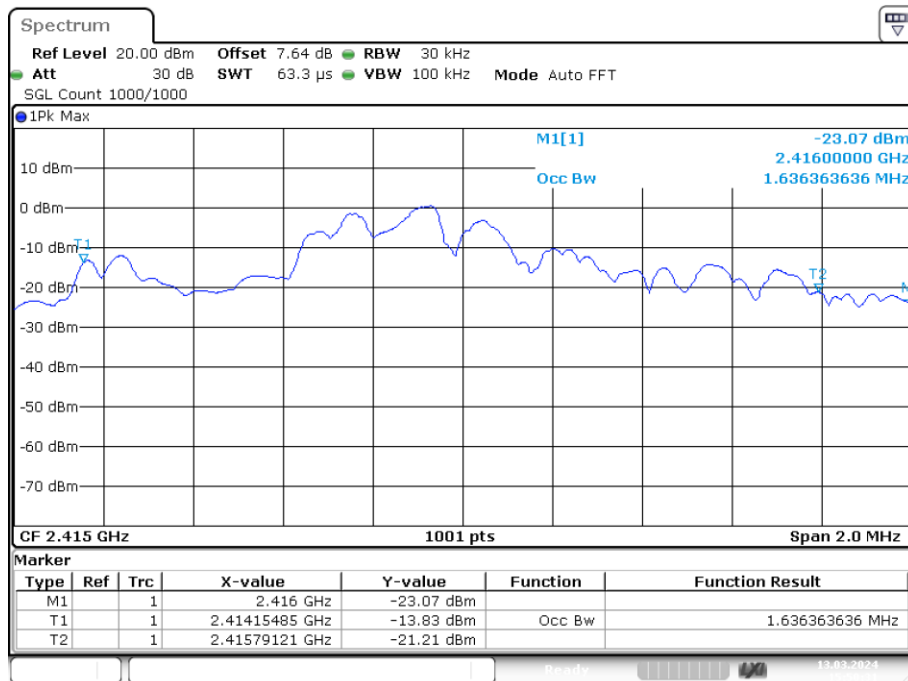
Date: 13.MAR.2024 15:49:23

-6dB Bandwidth NVNT GFSK 2455MHz Ant1



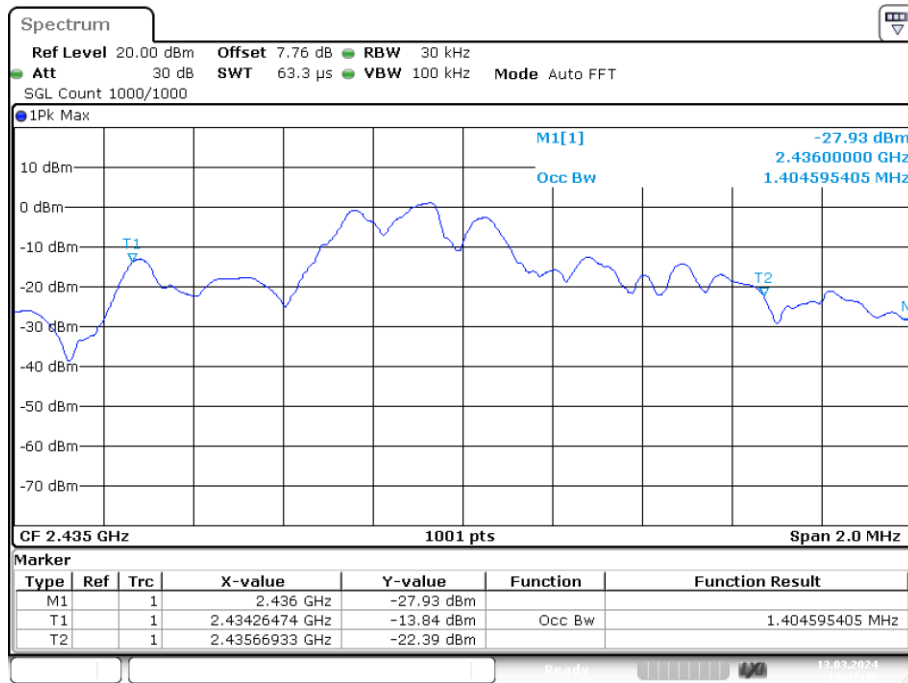
Date: 13.MAR.2024 15:46:57

OBW NVNT GFSK 2415MHz Ant1



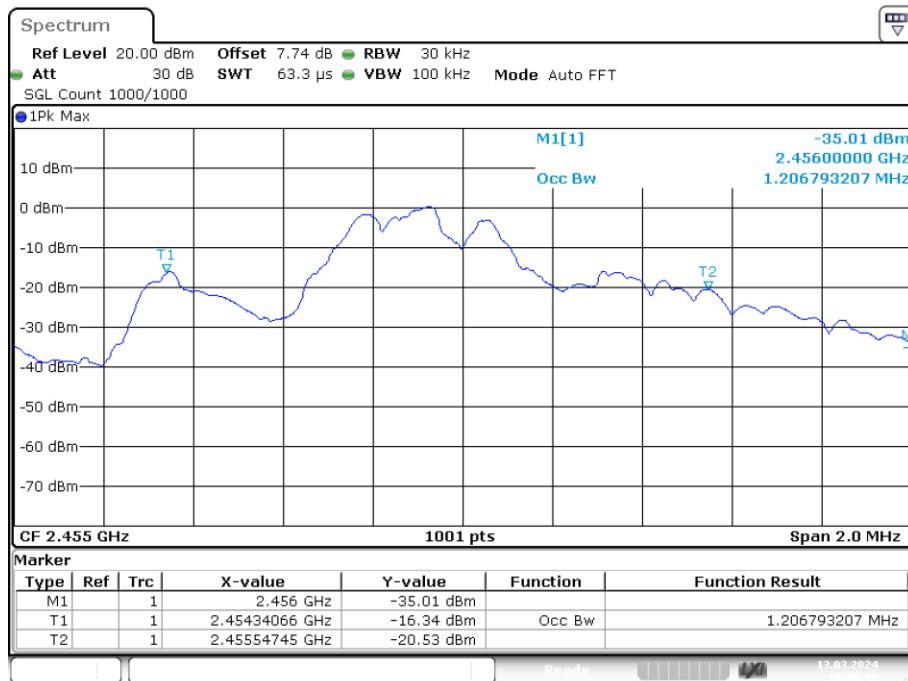
Date: 13.MAR.2024 15:50:31

OBW NVNT GFSK 2435MHz Ant1



Date: 13.MAR.2024 15:47:45

OBW NVNT GFSK 2455MHz Ant1



Date: 13.MAR.2024 15:45:12

8. BAND EDGE CHECK

8.1. Test limits

Please refer section RSS-GEN&15.247.

8.2. Test Procedure

Details see the KDB 558074 D01 15.247 Meas Guidance v05r02

8.2.1 Put the EUT on a 0.8m 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

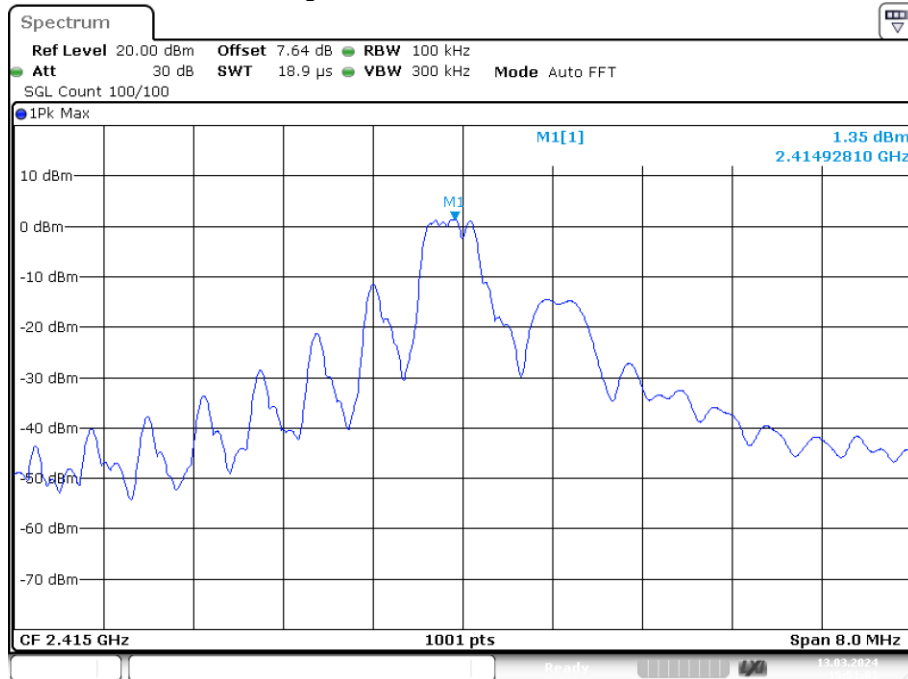
Same as 5.2.2.

8.4. Test Results

Pass

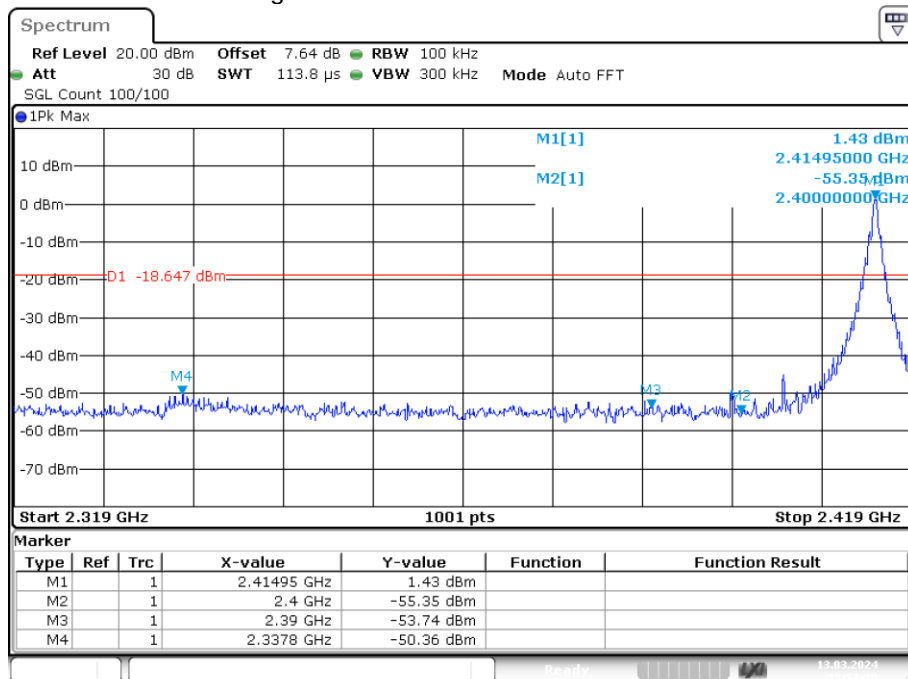
The test results are listed in next pages.

Band Edge NVNT GFSK 2415MHz Ant1 Ref



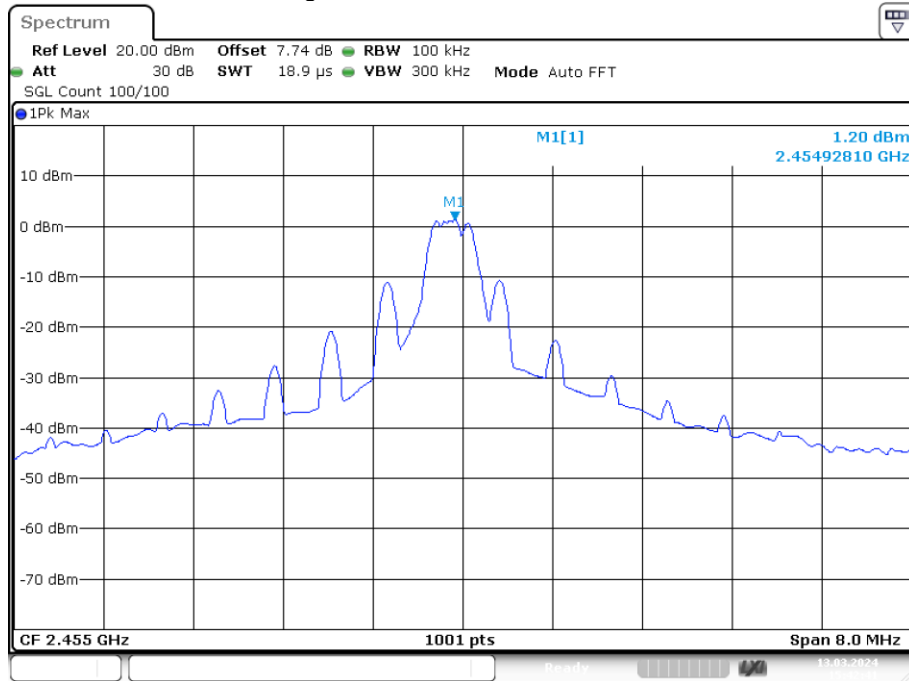
Date: 13.MAR.2024 15:51:03

Band Edge NVNT GFSK 2415MHz Ant1 Emission



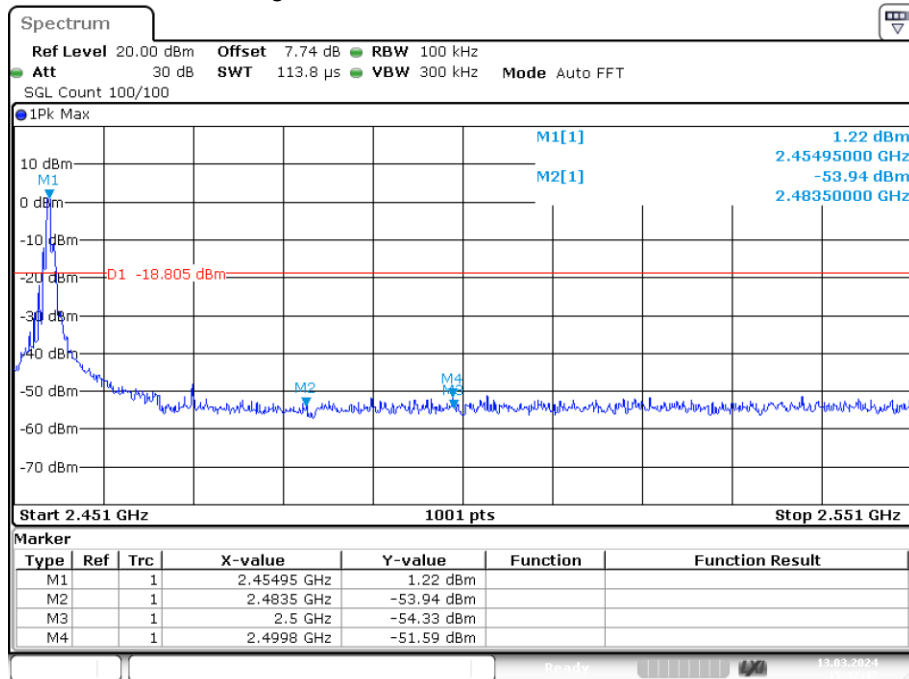
Date: 13.MAR.2024 15:51:09

Band Edge NVNT GFSK 2455MHz Ant1 Ref



Date: 13.MAR.2024 15:42:41

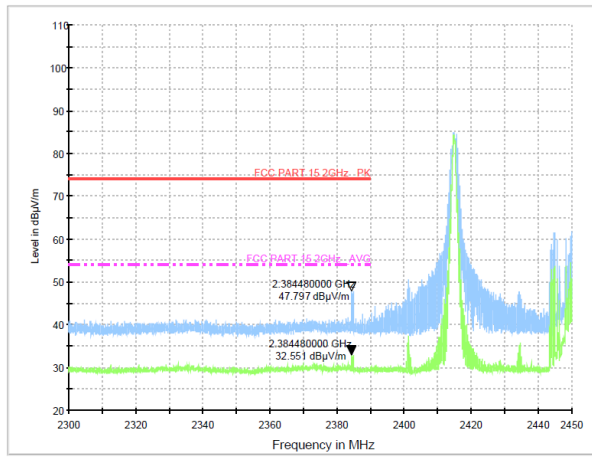
Band Edge NVNT GFSK 2455MHz Ant1 Emission



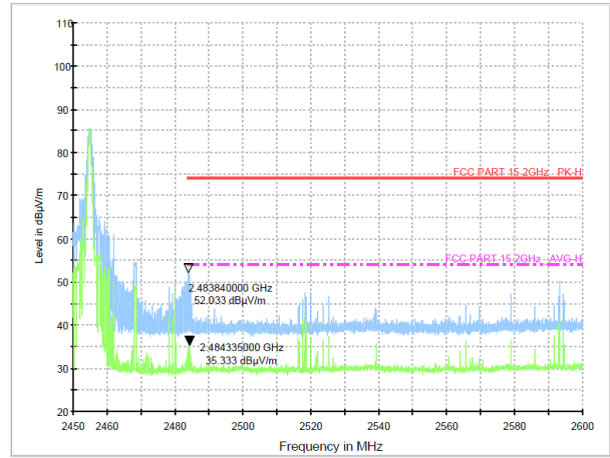
Date: 13.MAR.2024 15:42:47

Radiated Method: GFSK

Test Mode: CH-L



Test Mode: CH-H



9. ANTENNA REQUIREMENT

9.1. 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.

9.2. Antenna Connected Construction

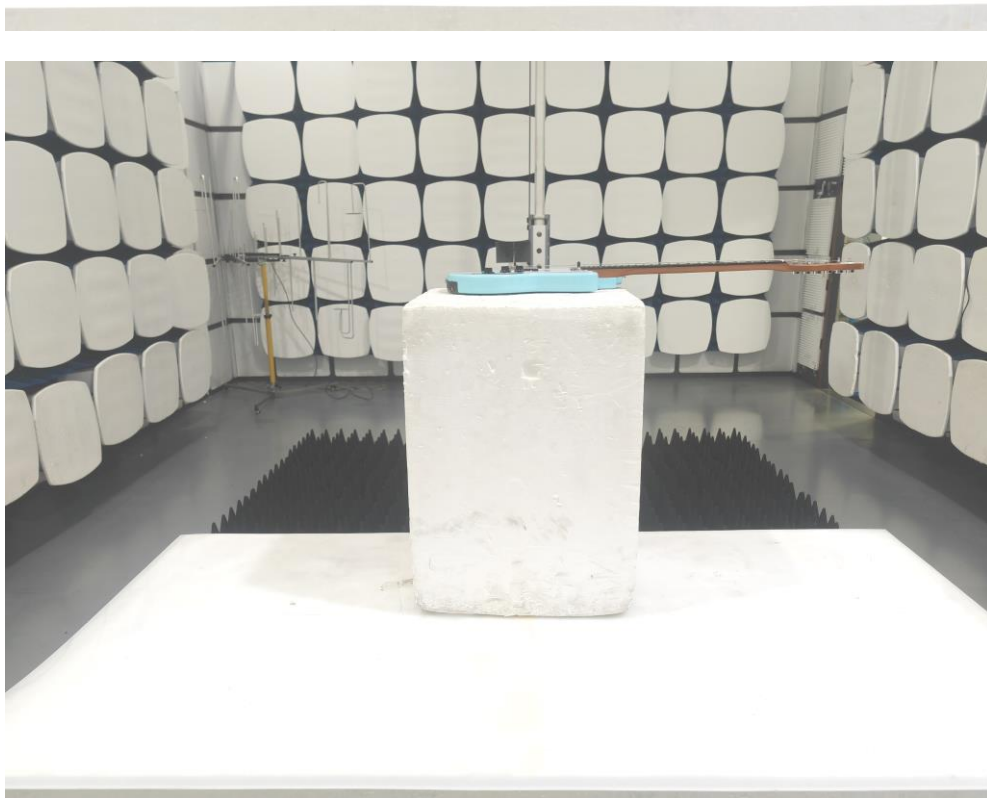
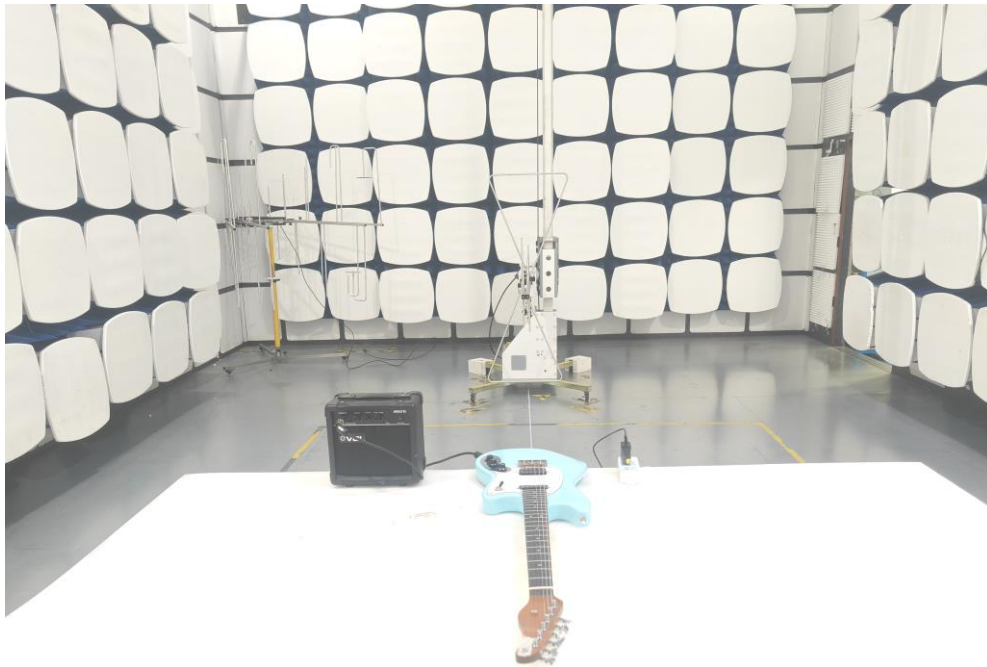
The antenna is internal antenna and no consideration of replacement. Please see EUT photo for details.

9.3. Results

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

10. TEST SETUP PHOTO

10.1.Photo of Radiated Emission test



10.2.Photo of Conducted Emission test



11. MODEL LIST

F100	E1000	E1100	E1200	E1010	E1110	E1210	E1020
E1120	E1220	E1030	E1130	E1230	E1040	E1140	E1240
E1050	E1150	E1250	SR1000	SR1100	SR1200	SR1010	SR1110
SR1210	SR1020	SR1120	SR1220	SR1030	SR1130	SR1230	SR1040
SR1140	SR1240	SR1050	SR1150	SR1250	WA1000	WA1100	WA1200
WN1000	WN1100	WN1200	WE1000	WE1100	WE1200	QA1000	QA1100
QA1200	QN1000	QN1100	QN1200	QE1000	QE1100	QE1200	

-----END OF REPORT-----