FCC TEST REPORT

FCC ID: SY4-A02068

On Behalf of

Shanghai Huace Navigation Technology Ltd.

Unmanned Surface Vessel

Model No.: APACHE 6 2025, APACHE 6

Prepared for	:	Shanghai Huace Navigation Technology Ltd.
Address	:	577 Songying Road, Qingpu District, 201706 Shanghai, 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

Report Number	:	A2505207-C01-R03
Date of Receipt	:	May 9, 2025
Date of Test	:	May 9, 2025 - October 24, 2025
Date of Report	:	October 24, 2025
Version Number	:	V0
Test Result	**:**	**Pass**

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TEST REPORT DECLARATION

Applicant	:	Shanghai Huace Navigation Technology Ltd.
Address	:	577 Songying Road, Qingpu District, 201706 Shanghai, China
Manufacturer	:	Shanghai Huace Navigation Technology Ltd.
Address	:	577 Songying Road, Qingpu District, 201706 Shanghai, China
EUT Description	:	Unmanned Surface Vessel
	(A) Model No.	APACHE 6 2025, APACHE 6
	(B) Trademark	CHCNAV

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247

ANSI C63.10-2020

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).....:	Jack Xu Project Manager	Jack Xu
Date of issue..... .....:	October 24, 2025	

Revision History

Revision	Issue Date	Revisions	Revised By
V0	October 24, 2025	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 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	:	Unmanned Surface Vessel
Model Number	:	APACHE 6 2025, APACHE 6
Diff	:	There is no difference except for the model name and appearance. All tests were conducted using the APACHE 6 2025 model.
Power supply	:	DC 32.4V from battery.
Radio Technology	:	2.4G
Operation frequency	:	2409-2474MHz
Channel No.	:	14 Channels
Modulation type	:	GFSK, 16QAM, 64QAM
Antenna Type	:	Rod antenna, Maximum Gain is 6.24dBi (Antenna information is provided by applicant.)
Software version	:	V1.0
Hardware version	:	V1.0
Intend use environment	:	Residential, commercial and light industrial environment

Channel list:

2409-2474MHz

Channel	Freq (MHz)	Channel	Freq (MHz)
CH0	**2409**	CH7	2444
CH1	2414	CH8	2449
CH2	2419	CH9	2454
CH3	2424	CH10	2459
CH4	2429	CH11	2464
CH5	2434	CH12	2469
CH6	**2439**	**CH13**	**2474**

2.2. Accessories of Device (EUT)

Accessories : /

Manufacturer : /

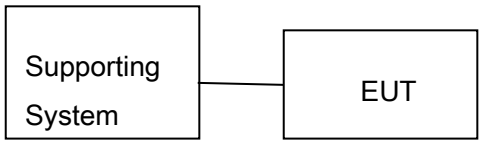
Model : /

Ratings : /

2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or SDoC
1	Notebook PC	Lenovo	ThinkPad L14	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)**
QPSK/16QAM/64QAM	Low :CH0	2409
	Middle: CH6	2439
	High: CH13	2474

Using QRCT testing software to control EUT work in Continuous TX mode, and select test channel, wireless mode, the power level of the test is set to default.

2.6. Test Conditions

Items	Required	Actual
Temperature range:	15-35℃	24℃
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	980kPa

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

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 Radiation Emission test in 3m chamber (18GHz to 40GHz)	4.31 dB(Polarize: V)
	4.30 dB(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	2025.03.09	4Year
4*4*3 Shielded room	CHENYU	4*4*3	/	N/A	2025.03.09	4Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	2.3	102137	2024.08.08	1Year
Spectrum analyzer	Agilent	N9020A	A.14.16	MY499100060	2024.08.08	1Year
Receiver	ROHDE&SCHWARZ	ESR	2.28 SP1	1316.3003K03-102082-Wa	2024.08.08	1Year
Receiver	R&S	ESCI	4.42 SP1	101165	2024.08.08	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	/	VULB 9168#627	2023.08.28	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	/	2106	2023.08.19	2Year
Loop Antenna	SCHWARZBECK	FMZB 1519B	/	00128	2023.08.19	2Year
RF Cable	Resenberger	Cable 1	/	RE1	2024.08.08	1Year
RF Cable	Resenberger	Cable 2	/	RE2	2024.08.08	1Year
RF Cable	Resenberger	Cable 3	/	CE1	2024.08.08	1Year
Pre-amplifier	HP	HP8347A	/	2834A00455	2024.08.08	1Year
Pre-amplifier	Agilent	8449B	/	3008A02664	2024.08.08	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	/	8126-466	2024.08.08	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	101043	2024.08.08	1Year
Horn Antenna	SCHWARZBECK	BBHA 9170	/	00946	2023.08.19	2Year
Preamplifier	SKET	LNPA_1840-50	/	SK2018101801	2024.08.08	1 Year
Power Meter	Agilent	E9300A	/	MY41496628	2024.08.08	1 Year
Power Sensor	DARE	RPR3006W	/	15100041SNO91	2024.08.08	1 Year
Temp. & Humid. Chamber	Teelong	TL-HW408S	/	TL-20191205-01	2024.07.15	1 Year
Electronic Thermo-Hygrometer	S.H.Qixiang	HTC-1	/	N/A	2024.08.11	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	/	20140927-6	2024.08.08	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

Equipment	Manufacturer	Model No.	Firmware version	Serial No.	Last Cal.	Cal. Due day
9*6*6 anechoic chamber	CHENYU	9*6*6	/	N/A	2025.03.09	4Year
4*4*3 Shielded room	CHENYU	4*4*3	/	N/A	2025.03.09	4Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	2.3	102137	2025.08.04	1Year
Spectrum analyzer	Agilent	N9020A	A.14.16	MY499100060	2025.08.04	1Year
Test Receiver	ROHDE&SCHWARZ	ESR	2.28 SP1	1316.3003K03 -102082-Wa	2025.08.04	1Year
Test Receiver	ROHDE&SCHWARZ	ESCI	4.42 SP1	101165	2025.08.04	1Year
Bilog Antenna	SCHWARZBECK	VULB 9168	/	VULB 9168#627	2025.08.11	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	/	2106	2025.08.11	2Year
Loop Antenna	SCHWARZBECK	FMZB 1519B	/	00128	2025.08.11	2Year
RF Cable	Resenberger	Cable 1	/	RE1	2025.08.04	1Year
RF Cable	Resenberger	Cable 2	/	RE2	2025.08.04	1Year
RF Cable	Resenberger	Cable 3	/	CE1	2025.08.04	1Year
Amplifier	HP	HP8347A	/	2834A00455	2025.08.04	1Year
Amplifier	Agilent	8449B	/	3008A02664	2025.08.04	1Year
L.I.S.N.#1	SCHWARZBECK	NSLK8126	/	8126-466	2025.08.04	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	101043	2025.08.04	1Year
Horn Antenna	SCHWARZBECK	BBHA 9170	/	00946	2025.08.11	2Year
Preamplifier	SKET	LNPA_1840-50	/	SK2018101801	2025.08.04	1 Year
Power Meter	Agilent	E4419B	/	GB40202122	2025.08.04	1 Year
Power Sensor	Agilent	E9300A	/	MY41496628	2025.08.04	1 Year
Power Sensor	Agilent	E9304A	/	MY41496815	2025.08.04	1 Year
Temp. & Humid. Chamber	Teelong	TL-HW408S	/	TL-20191205-01	2025.07.14	1 Year
Electronic Thermo-Hygrometer	S.H.Qixiang	HTC-1	/	N/A	2025.08.04	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	/	20140927-6	2025.08.04	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	Farad	Alpha-3A1
RF-CE	MTS 8310	MWRFtest	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) Emission Level(dB uV/m)=20log Emission Level(uv/m)

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

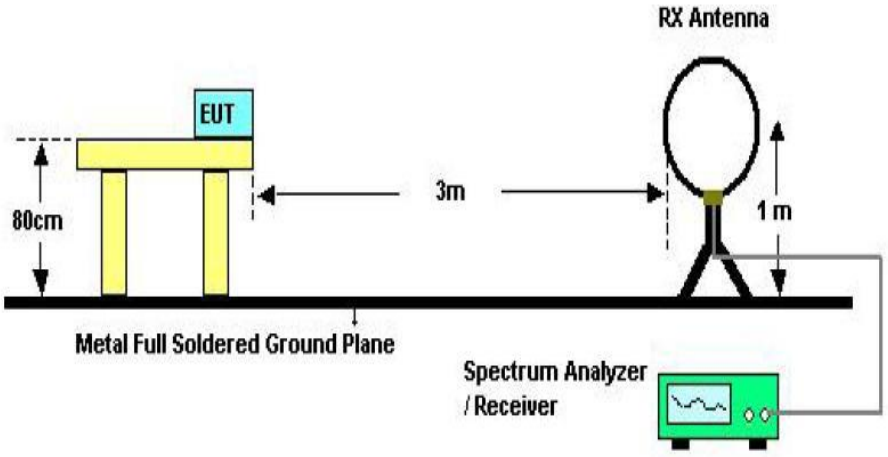
The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set of make measurement.

The initial step in collecting 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

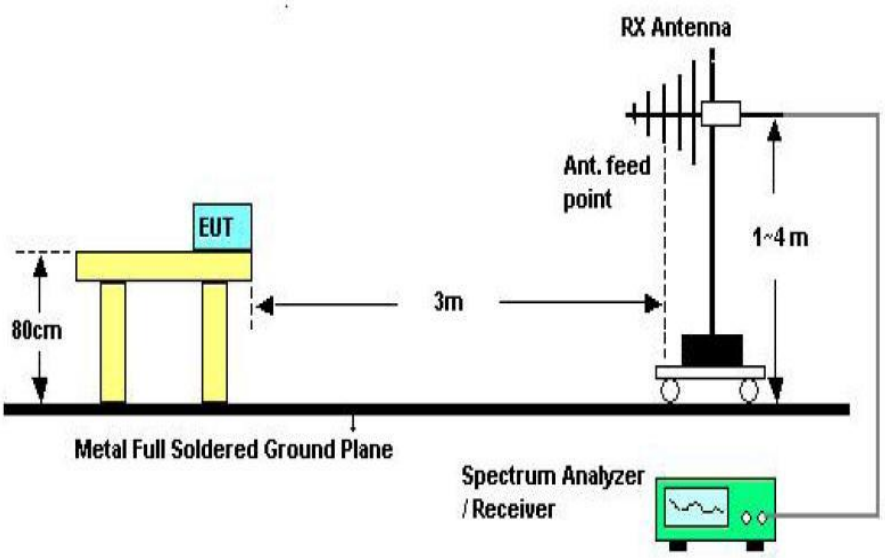
If Peak value comply with QP limit Below 1GHz.The EUT deemed to comply with QP limit. But the Peak value and average value both need to comply with applicable limit above 1GHz.

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

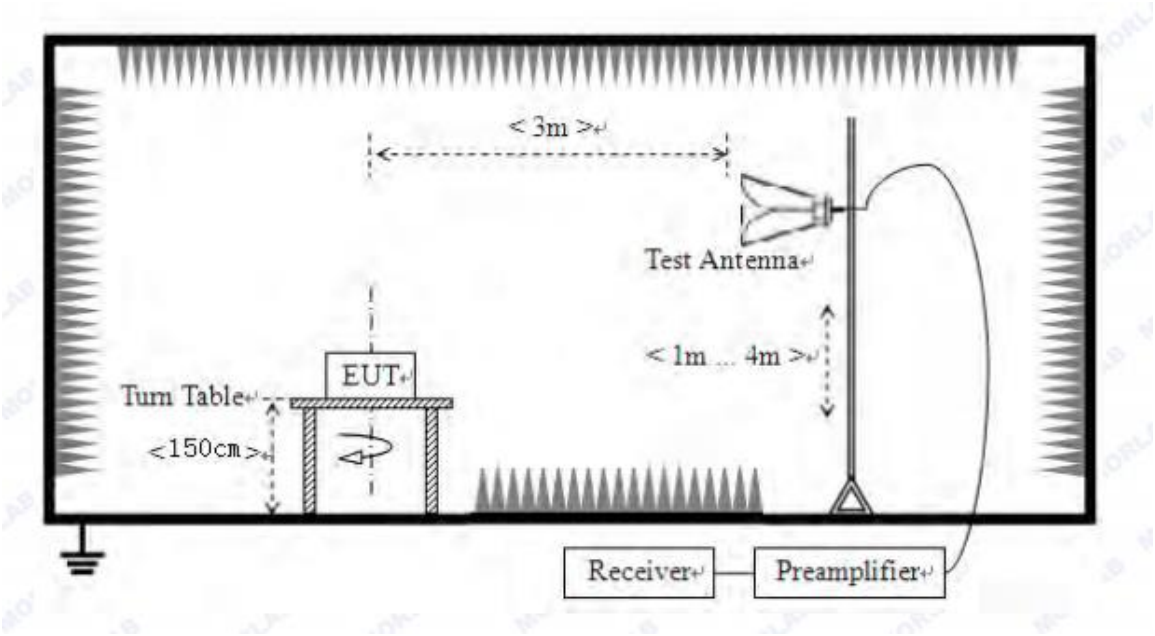
3.3. Test Setup



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.

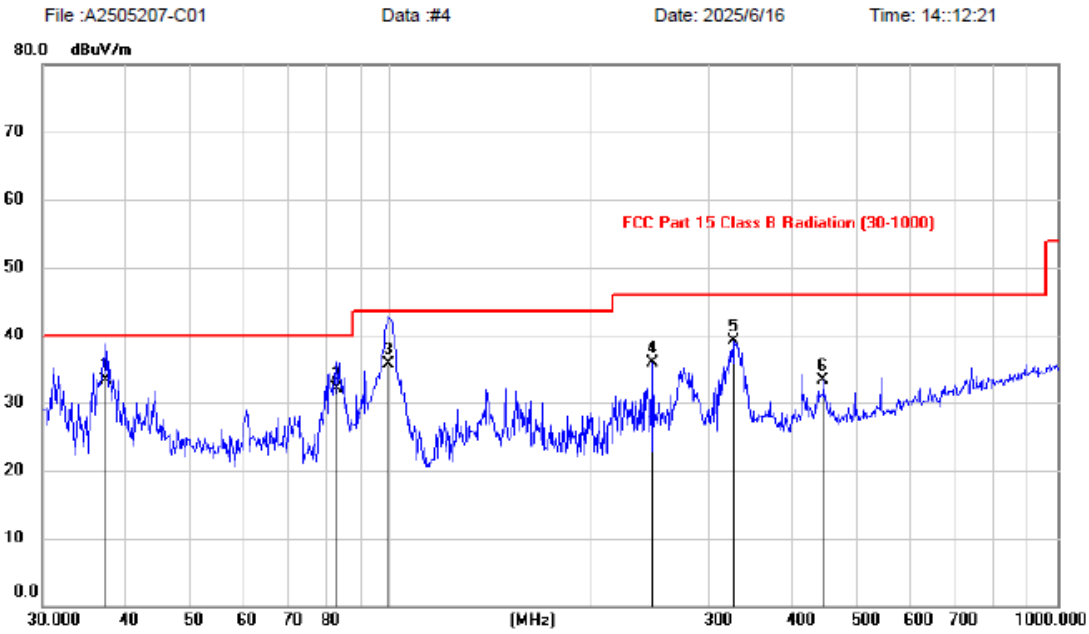
From 9KHz to 30MHz: Conclusion: PASS

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

APACHE 6 2025:

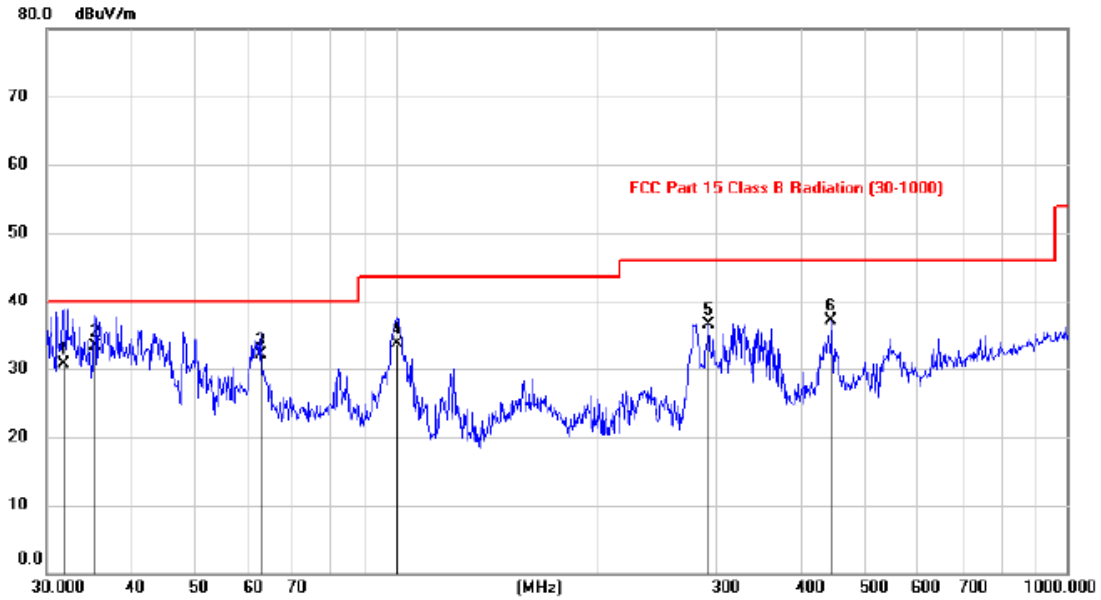
Antenna polarity: Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	*	37.3902	19.19	14.10	33.29	40.00	-6.71	QP
2		83.0548	22.20	9.95	32.15	40.00	-7.85	QP
3		99.4932	24.83	10.84	35.67	43.50	-7.83	QP
4		247.5081	23.11	12.71	35.82	46.00	-10.18	QP
5		327.0833	24.38	14.76	39.14	46.00	-6.86	peak
6		445.5278	15.80	17.46	33.26	46.00	-12.74	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



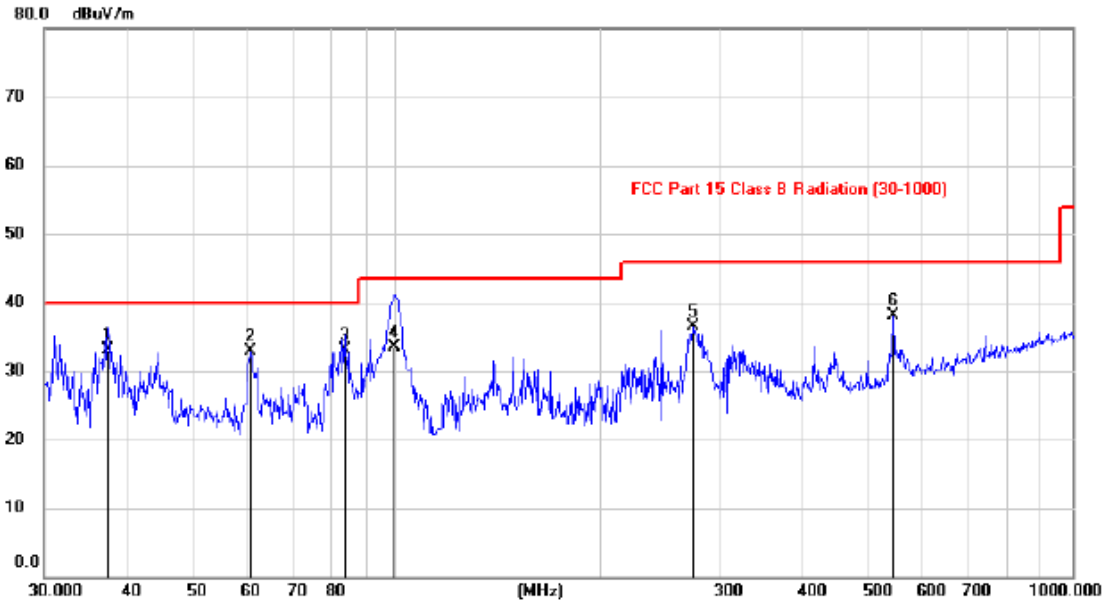
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		31.7646	17.08	13.60	30.68	40.00	-9.32	QP
2	*	35.4992	19.52	13.74	33.26	40.00	-6.74	QP
3		62.6580	19.53	12.64	32.17	40.00	-7.83	QP
4		100.0413	22.84	10.85	33.69	43.50	-9.81	QP
5		292.1265	22.62	13.93	36.55	46.00	-9.45	peak
6		445.4757	19.57	17.46	37.03	46.00	-8.97	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 GFSK 2409MHz.

APACHE 6:

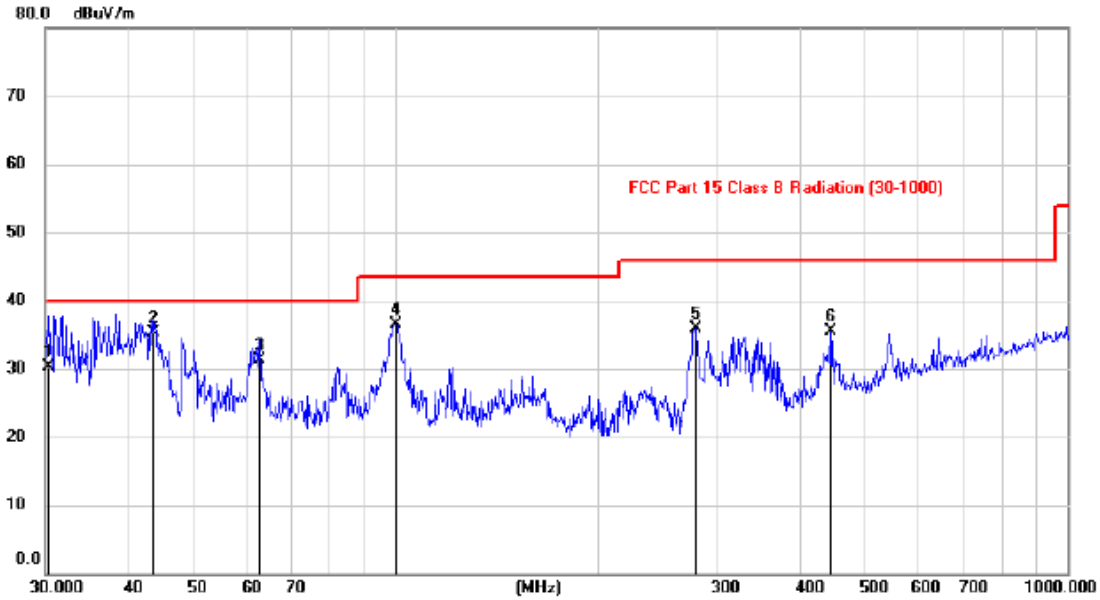
Antenna polarity: Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		37.3902	19.05	14.10	33.15	40.00	-6.85	QP
2		60.9104	19.99	12.90	32.89	40.00	-7.11	peak
3	*	83.5417	23.22	9.95	33.17	40.00	-6.83	QP
4		99.4932	22.65	10.84	33.49	43.50	-10.01	QP
5		274.7712	23.10	13.42	36.52	46.00	-9.48	peak
6		544.4818	19.04	19.10	38.14	46.00	-7.86	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.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		30.3669	16.83	13.54	30.37	40.00	-9.63	QP
2	*	43.6227	21.06	14.23	35.29	40.00	-4.71	QP
3		62.6580	18.66	12.64	31.30	40.00	-8.70	QP
4		100.0413	25.67	10.85	36.52	43.50	-6.98	peak
5		279.0760	22.42	13.54	35.96	46.00	-10.04	peak
6		445.4757	18.07	17.46	35.53	46.00	-10.47	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 GFSK 2409MHz.

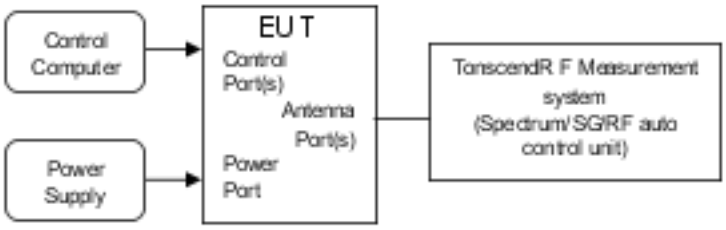
From 1G-25GHz

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
4818	43.82	V	33.95	10.18	34.26	53.69	74	-20.31	PK
4818	38.92	V	33.95	10.18	34.26	48.79	54	-5.21	AV
7227	/	/	/	/	/	/	/	/	/
9636	/	/	/	/	/	/	/	/	/
4818	45.82	H	33.95	10.18	34.26	55.69	74	-18.31	PK
4818	35.24	H	33.95	10.18	34.26	45.11	54	-8.89	AV
7227	/	/	/	/	/	/	/	/	/
9636	/	/	/	/	/	/	/	/	/
Test Mode: TX Mid									
4878	42.58	V	33.93	10.2	34.29	52.42	74	-21.58	PK
4878	34.34	V	33.93	10.2	34.29	44.18	54	-9.82	AV
7317	/	/	/	/	/	/	/	/	/
9756	/	/	/	/	/	/	/	/	/
4878	45.65	H	33.93	10.2	34.29	55.49	74	-18.51	PK
4878	36.59	H	33.93	10.2	34.29	46.43	54	-7.57	AV
7317	/	/	/	/	/	/	/	/	/
9756	/	/	/	/	/	/	/	/	/
Test Mode: TX High									
4948	46.49	V	33.98	10.22	34.25	56.44	74	-17.56	PK
4948	32.95	V	33.98	10.22	34.25	42.90	54	-11.10	AV
7422	/	/	/	/	/	/	/	/	/
9896	/	/	/	/	/	/	/	/	/
4948	43.59	H	33.98	10.22	34.25	53.54	74	-20.46	PK
4948	34.88	H	33.98	10.22	34.25	44.83	54	-9.17	AV
7422	/	/	/	/	/	/	/	/	/
9896	/	/	/	/	/	/	/	/	/

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.

4. RF CONDUCTED SPURIOUS EMISSIONS

4.1. Block diagram of test setup



4.2. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20dB.
In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified
in § 15.209(a) (see § 15.205(c)).

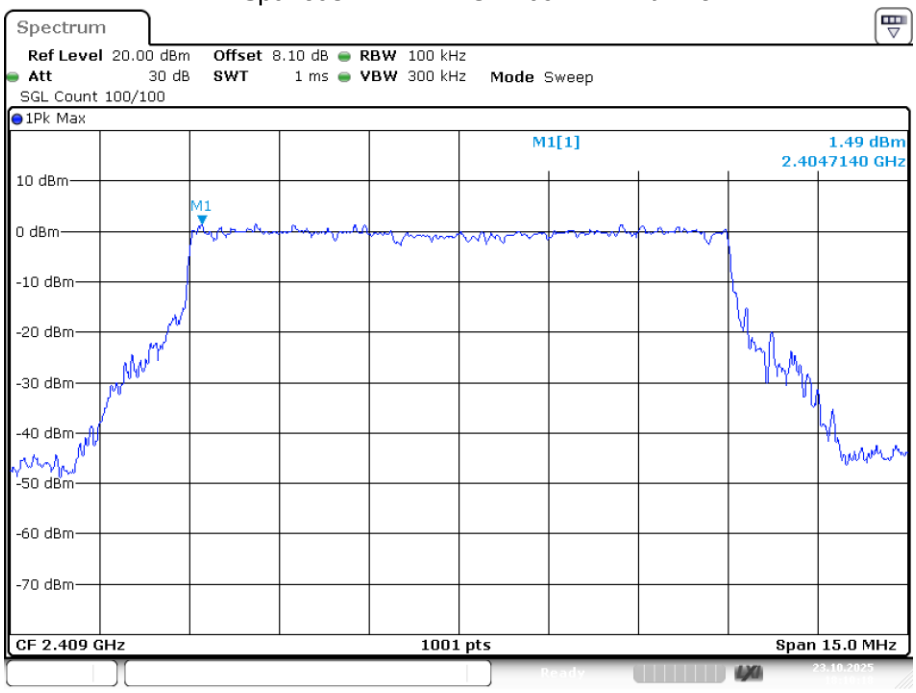
4.3. Test procedure

The test receiver set RBW = 100kHz, VBW≥3*RBW =300kHz, detector: peak, sweep time set auto

4.4. Test result

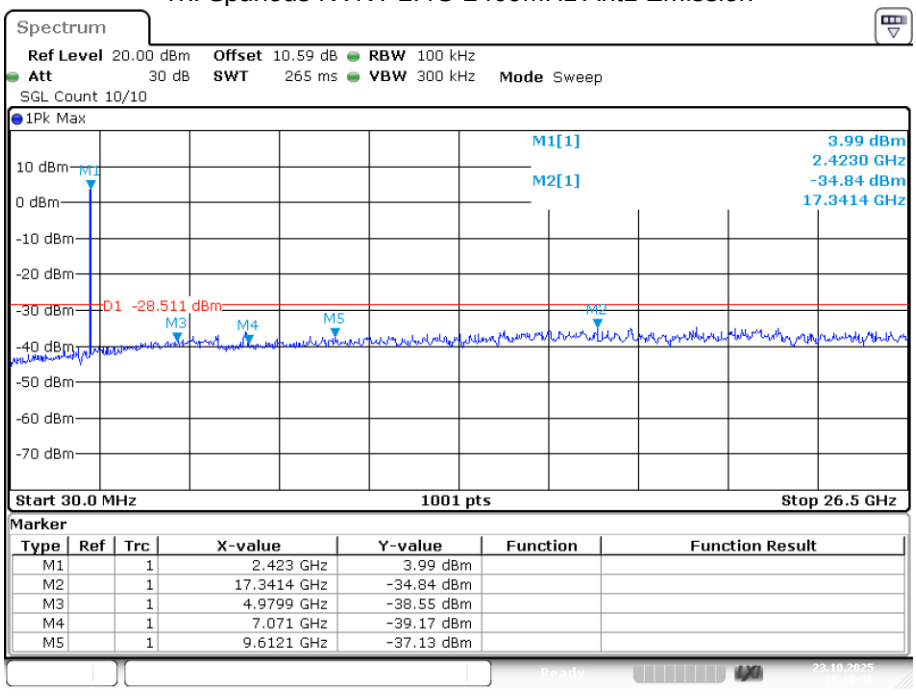
PASS

Tx. Spurious NVNT 2.4G 2409MHz Ant1 Ref



Date: 23.OCT.2025 18:10:17

Tx. Spurious NVNT 2.4G 2409MHz Ant1 Emission

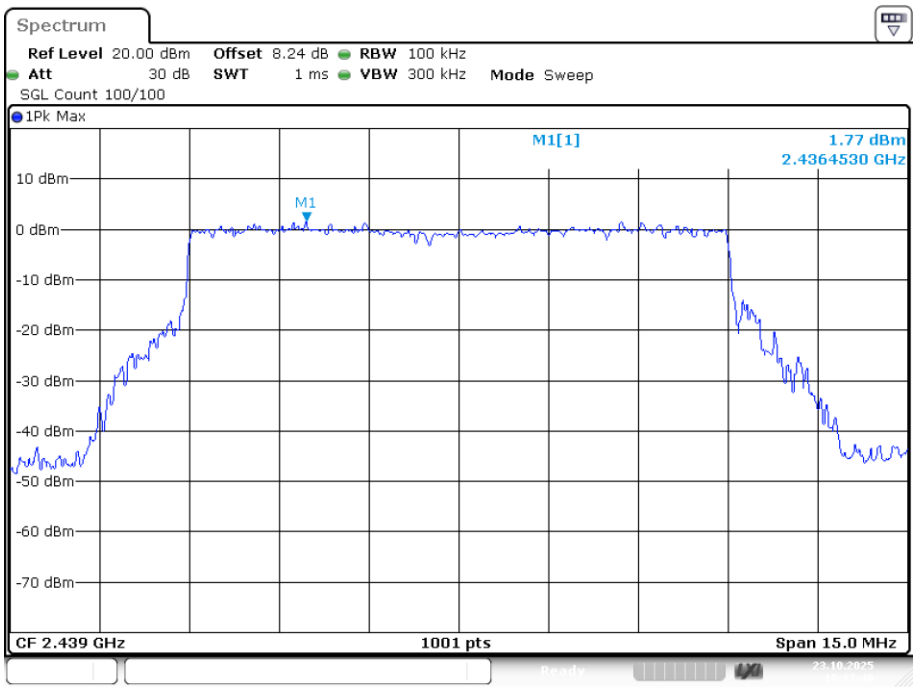


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.423 GHz	3.99 dBm		
M2		1	17.3414 GHz	-34.84 dBm		
M3		1	4.9799 GHz	-38.55 dBm		
M4		1	7.071 GHz	-39.17 dBm		
M5		1	9.6121 GHz	-37.13 dBm		

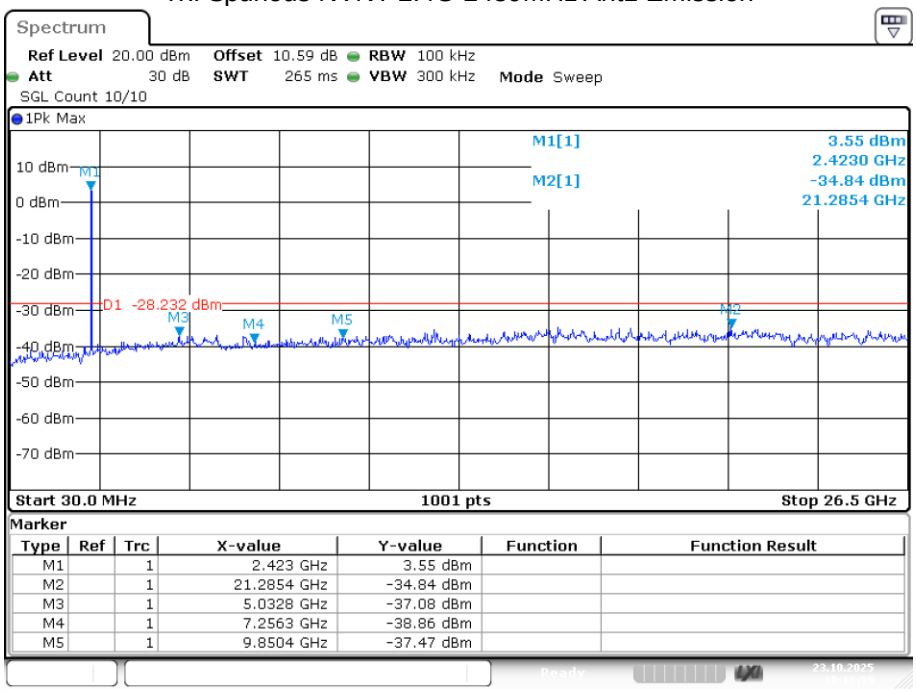
Date: 23.OCT.2025 18:10:35

Tx. Spurious NVNT 2.4G 2439MHz Ant1 Ref



Date: 23.OCT.2025 18:13:40

Tx. Spurious NVNT 2.4G 2439MHz Ant1 Emission

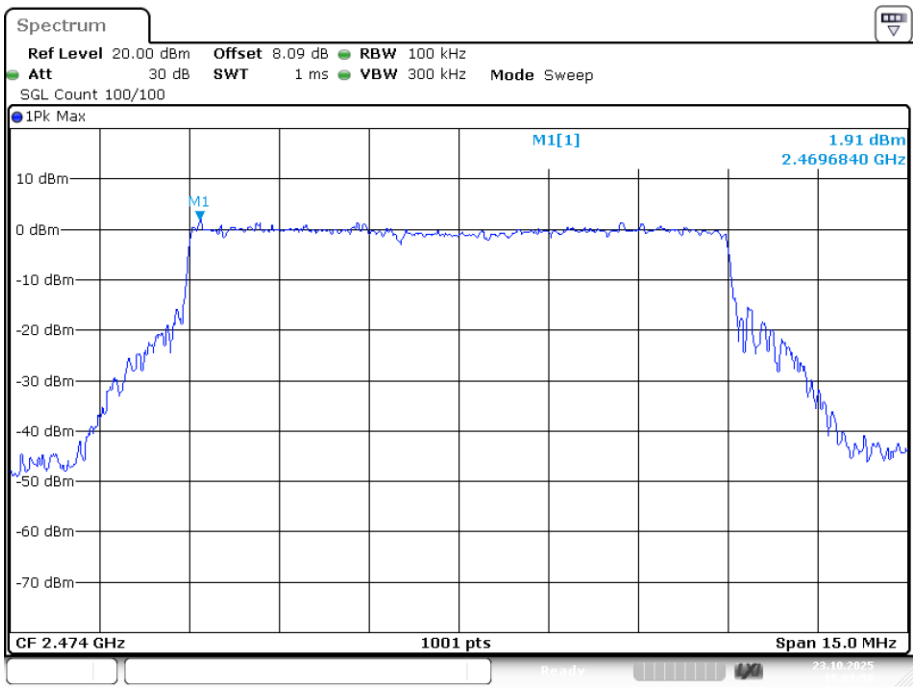


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.423 GHz	3.55 dBm		
M2		1	21.2854 GHz	-34.84 dBm		
M3		1	5.0328 GHz	-37.08 dBm		
M4		1	7.2563 GHz	-38.86 dBm		
M5		1	9.8504 GHz	-37.47 dBm		

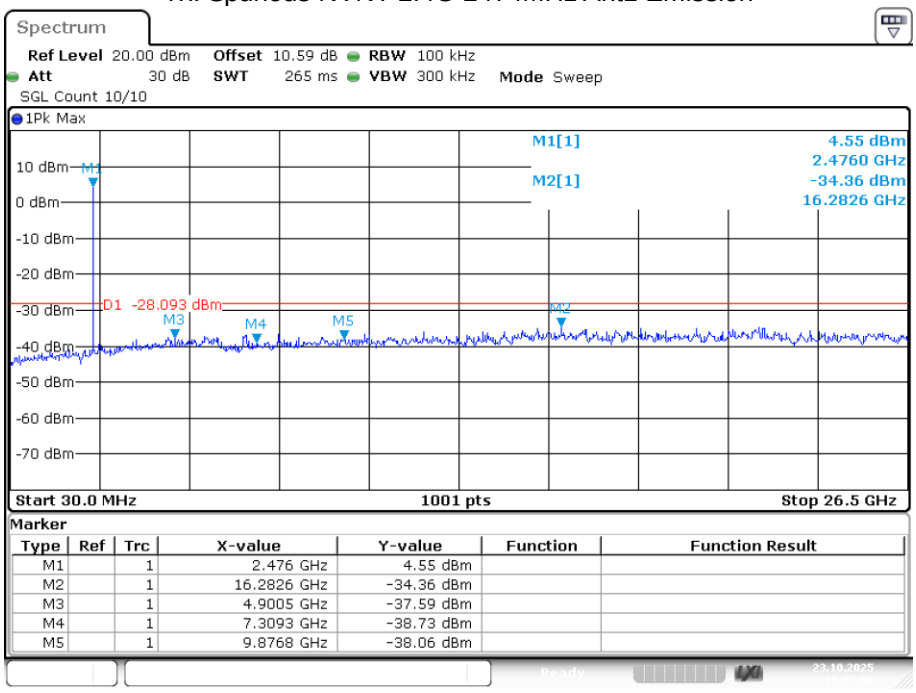
Date: 23.OCT.2025 18:13:58

Tx. Spurious NVNT 2.4G 2474MHz Ant1 Ref



Date: 23.OCT.2025 18:01:49

Tx. Spurious NVNT 2.4G 2474MHz Ant1 Emission



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.476 GHz	4.55 dBm		
M2		1	16.2826 GHz	-34.36 dBm		
M3		1	4.9005 GHz	-37.59 dBm		
M4		1	7.3093 GHz	-38.73 dBm		
M5		1	9.8768 GHz	-38.06 dBm		

Date: 23.OCT.2025 18:02:08

5. POWER LINE CONDUCTED EMISSION

5.1. Test Limits

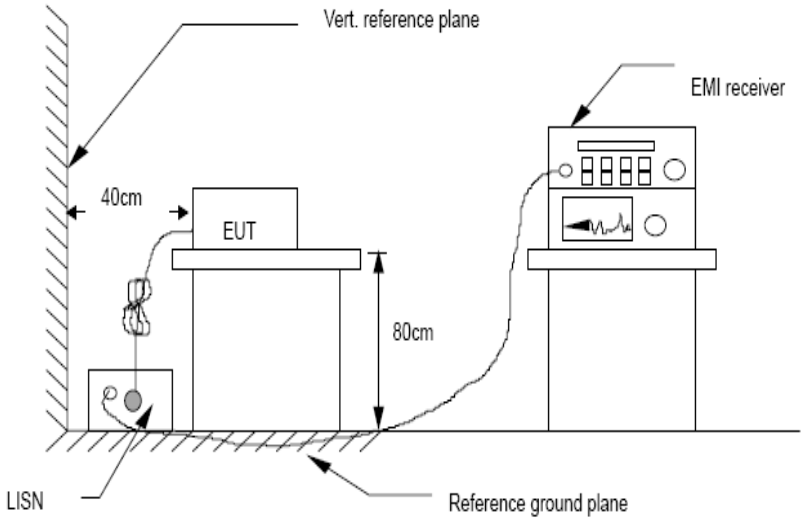
Frequency	Limits dB(μV)	
MHz	Quasi-peak Level	Average Level
0.15 -0.50	66 -56*	56 - 46*
0.50 -5.00	56	46
5.00 -30.00	60	50

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.

5.2. 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 on Conducted Emission Measurement.
The bandwidth of test receiver is set at 9 kHz.

5.3. Test Setup

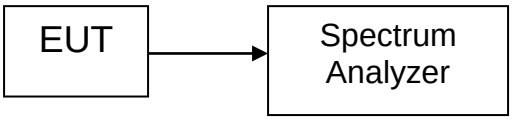


5.4. Test Results

Not applicable for equipment operated with PC, battery, or DC Power Supply.

6. DUTY CYCLE

6.1. Block diagram of test setup



6.2. Test Procedure

Details see the KDB 558074 D01 15.247 Meas Guidance v05r02

6.2.1 A diode detector and an oscilloscope that together have sufficiently short response time to permit accurate measurements of the on and off times of the transmitted signal.

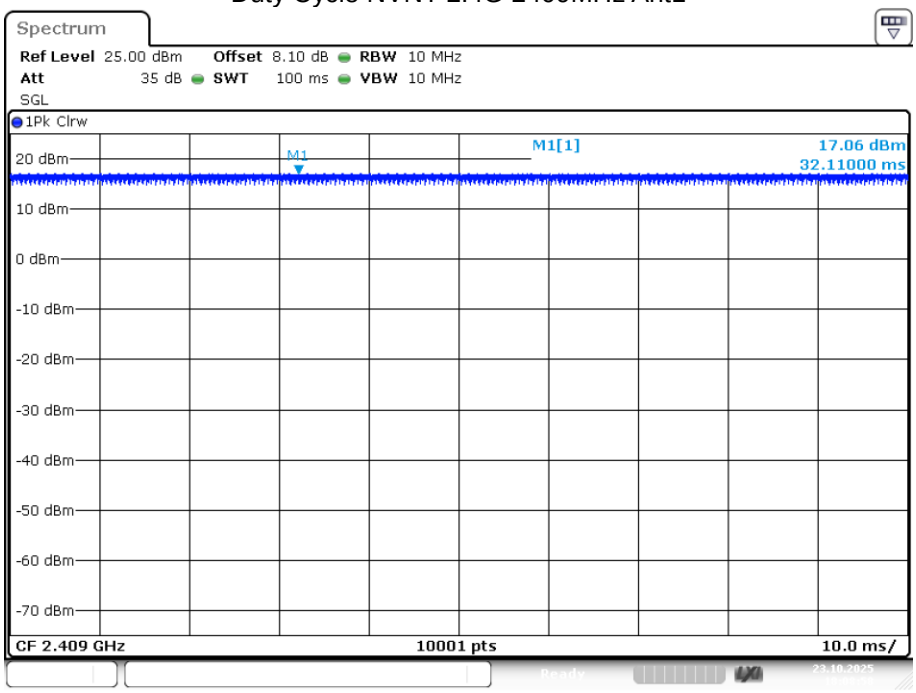
6.2.2 The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW ≥ EBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/*T*, where *T* is defined in II.B.1.a), and the number of sweep points across duration *T* exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if *T* ≤ 16.7 microseconds.)

6.3. Test Results

Pass

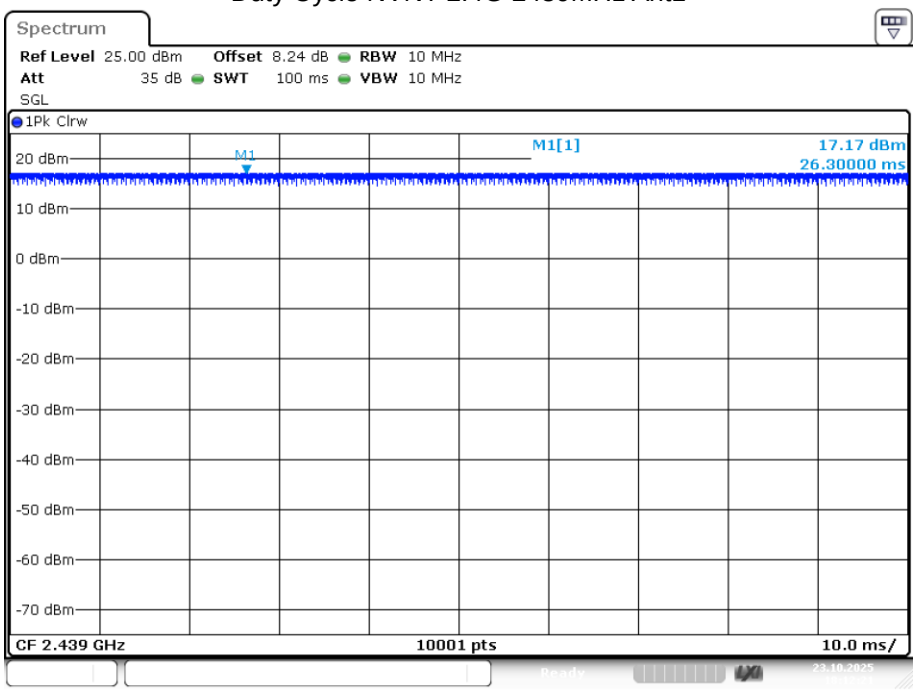
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)
NVNT	2.4G	2409	Ant1	100	0
NVNT	2.4G	2439	Ant1	100	0
NVNT	2.4G	2474	Ant1	100	0

Duty Cycle NVNT 2.4G 2409MHz Ant1



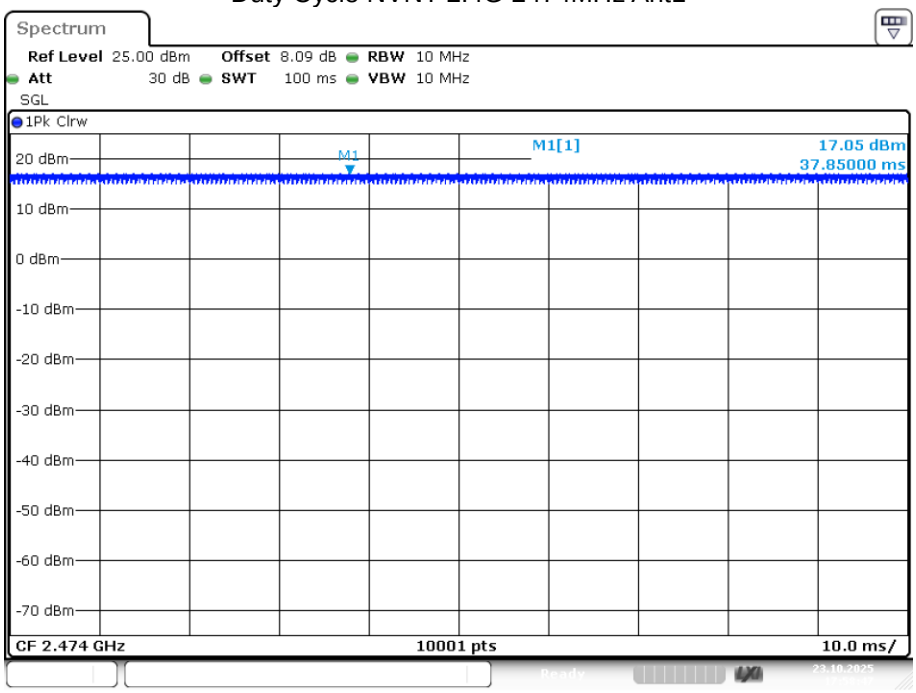
Date: 23.OCT.2025 18:08:58

Duty Cycle NVNT 2.4G 2439MHz Ant1



Date: 23.OCT.2025 18:12:21

Duty Cycle NVNT 2.4G 2474MHz Ant1



Date: 23.OCT.2025 17:58:48

7. MAXIMUM PEAK CONDUCTED OUTPUT POWER

7.1. Test limits

Please refer section RSS-247 & 15.247.
Please referRSS-247 &FCC PART 15: 15.247.
Regulation 15.247(b) The limit of Maximum Peak conducted output power Measurement is 1W(30dBm). The eirp. shall not exceed 4 W(36dBm).

7.2. Test Procedure

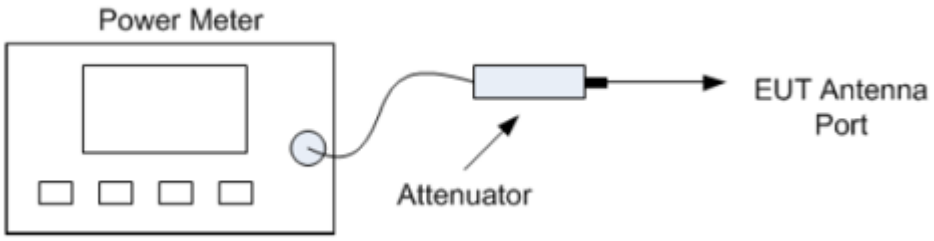
Details see the ANSI C63.10 -

7.2.1 Place the EUT on the table and connected to a power meter. The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

7.2.2 At all times when the EUT is transmiting, it must be transmiting at its maximum power control level.

7.2.3 Measure out each mode and each bands Peak output power of EUT

7.3. Test Setup



7.4. Test Results

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	2.4G	2409	Ant1	13.892	29.76	Pass
NVNT	2.4G	2439	Ant1	13.973	29.76	Pass
NVNT	2.4G	2474	Ant1	13.872	29.76	Pass

Note: 1. Directional gain=6.24dBi, so the Conducted Power Limit need to reduce 0.24.

8. POWER SPECTRAL DENSITY

8.1. Test limits

8.1.1 Please refer section RSS-247 & 15.247.

8.1.2 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.

8.1.3 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.

8.2. Test Procedure

Details see the KDB 558074 D01 15.247 Meas Guidance v05r02

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

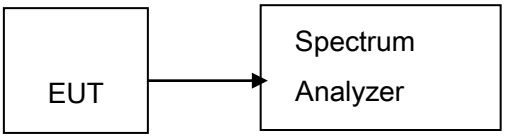
8.2.2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

8.2.3 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, Detector = peak, detail see the test plot.

8.2.4 Record the max reading.

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

8.3. Test Setup



8.4. Test Results

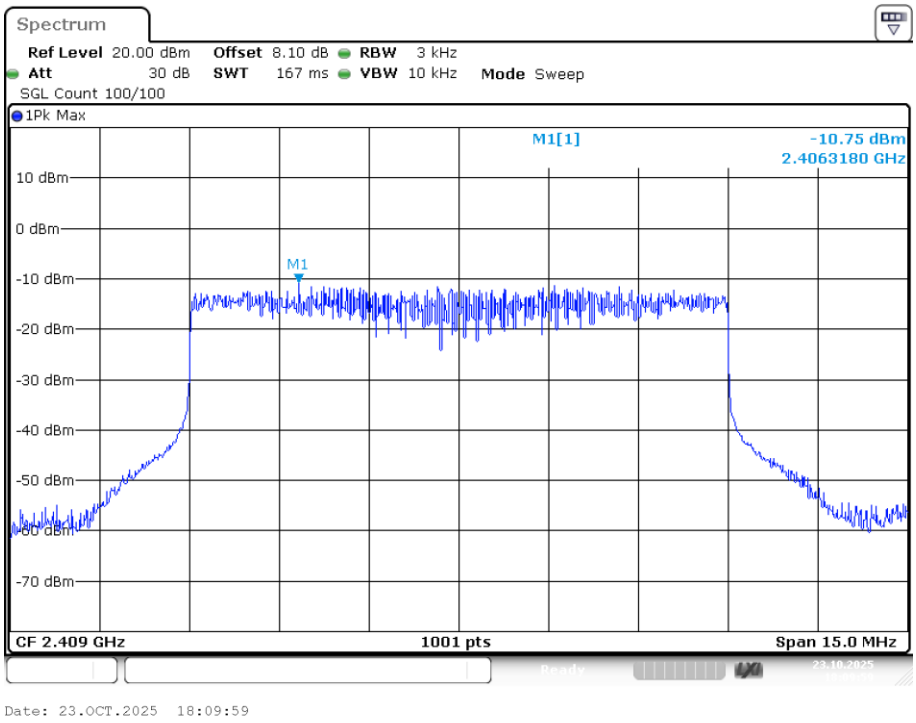
Pass

The test results are listed in next pages.

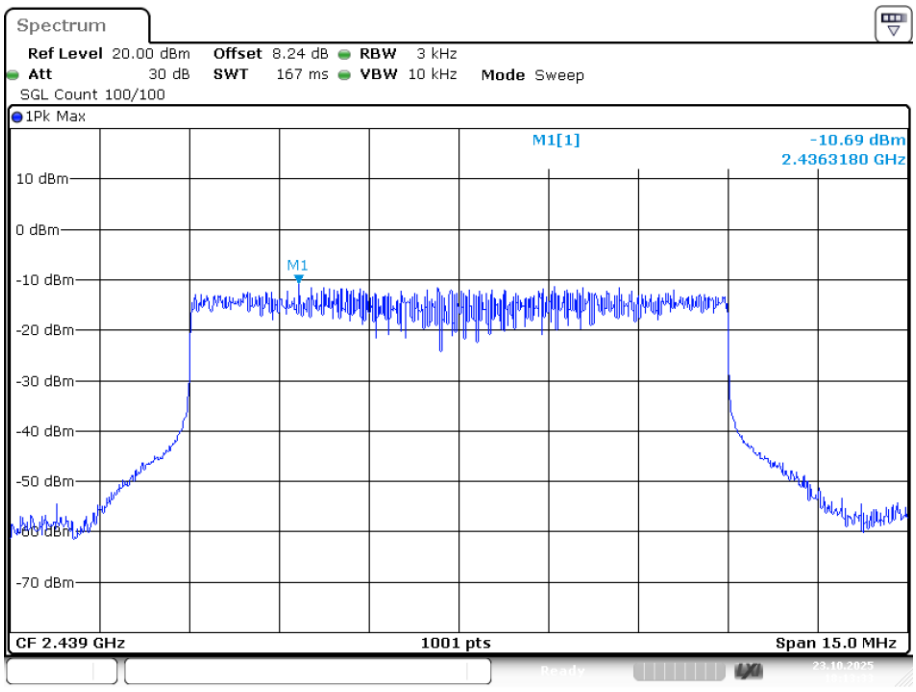
Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm/3KHz)	Limit (dBm)	Verdict
NVNT	2.4G	2409	Ant1	-10.748	7.76	Pass
NVNT	2.4G	2439	Ant1	-10.693	7.76	Pass
NVNT	2.4G	2474	Ant1	-10.761	7.76	Pass

Note: 1. Directional gain=6.24dBi, so the Conducted Power Limit need to reduce 0.24.

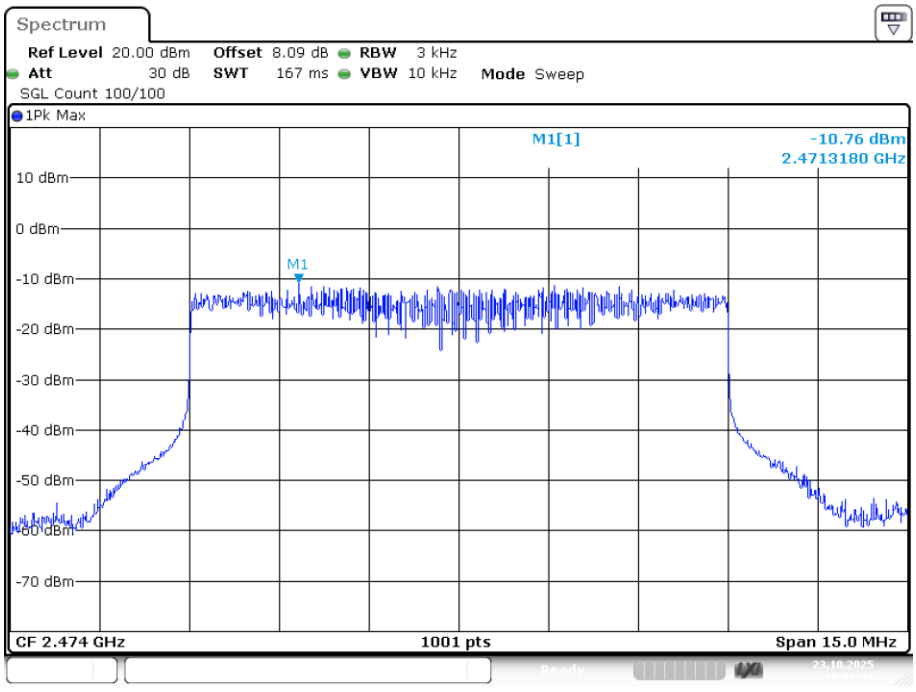
PSD NVNT 2.4G 2409MHz Ant1



PSD NVNT 2.4G 2439MHz Ant1



PSD NVNT 2.4G 2474MHz Ant1



9. BANDWIDTH

9.1. Test limits

Please refer section RSS-247 & 15.247

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

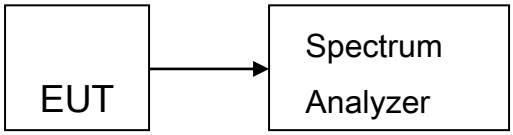
9.2. Test Procedure

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≥3*RBW =300kHz, sweep time set auto, detail see the test plot.

9.3. Test Setup

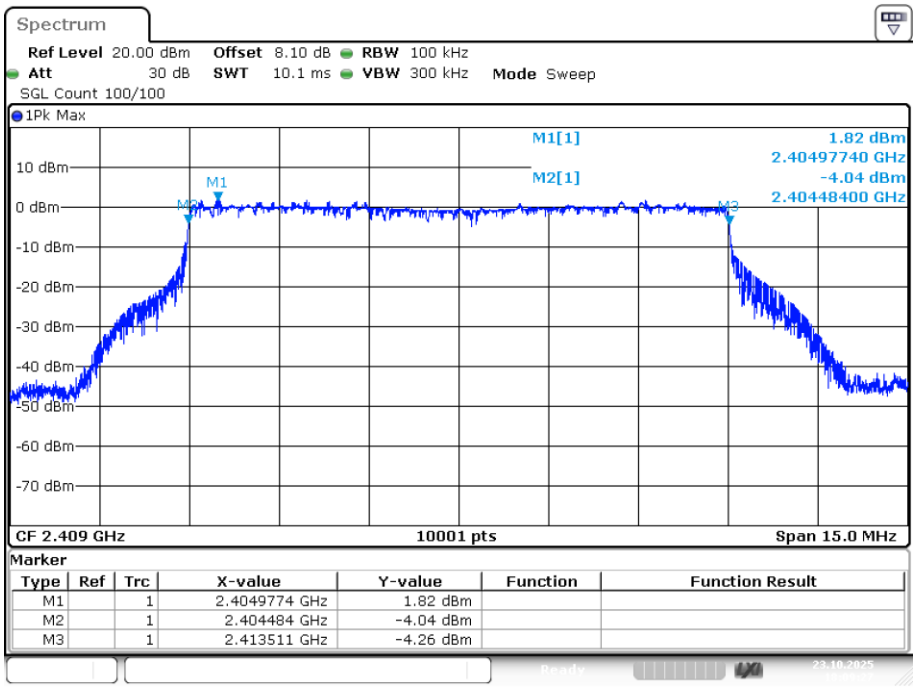


9.4. Test Results

-6dB Bandwidth

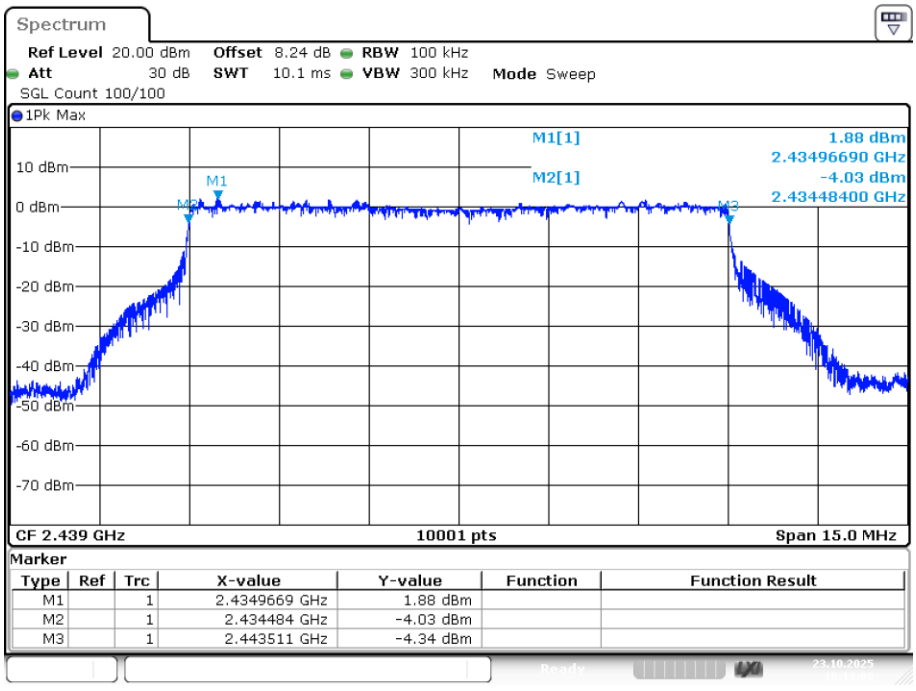
Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	2.4G	2409	Ant1	9.027	0.5	Pass
NVNT	2.4G	2439	Ant1	9.027	0.5	Pass
NVNT	2.4G	2474	Ant1	9.024	0.5	Pass

-6dB Bandwidth NVNT 2.4G 2409MHz Ant1



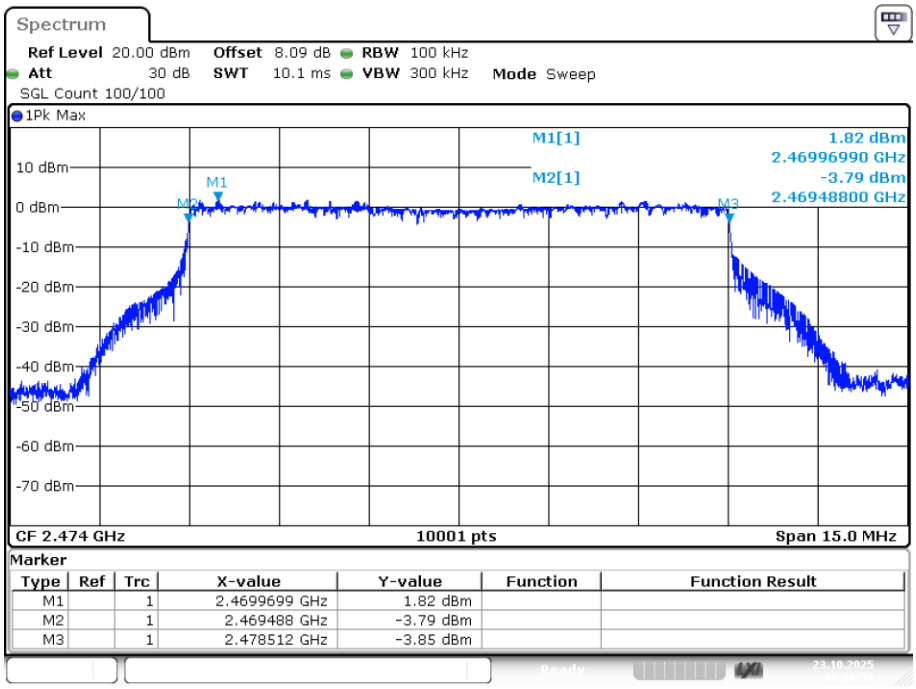
Date: 23.OCT.2025 18:09:27

-6dB Bandwidth NVNT 2.4G 2439MHz Ant1



Date: 23.OCT.2025 18:13:00

-6dB Bandwidth NVNT 2.4G 2474MHz Ant1

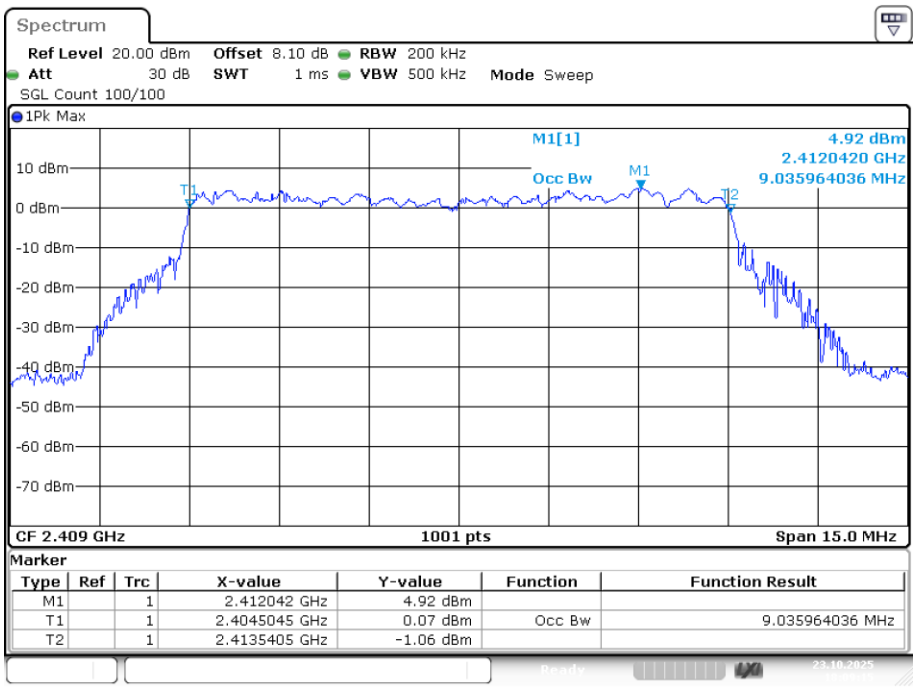


Date: 23.OCT.2025 18:00:59

Occupied Channel Bandwidth

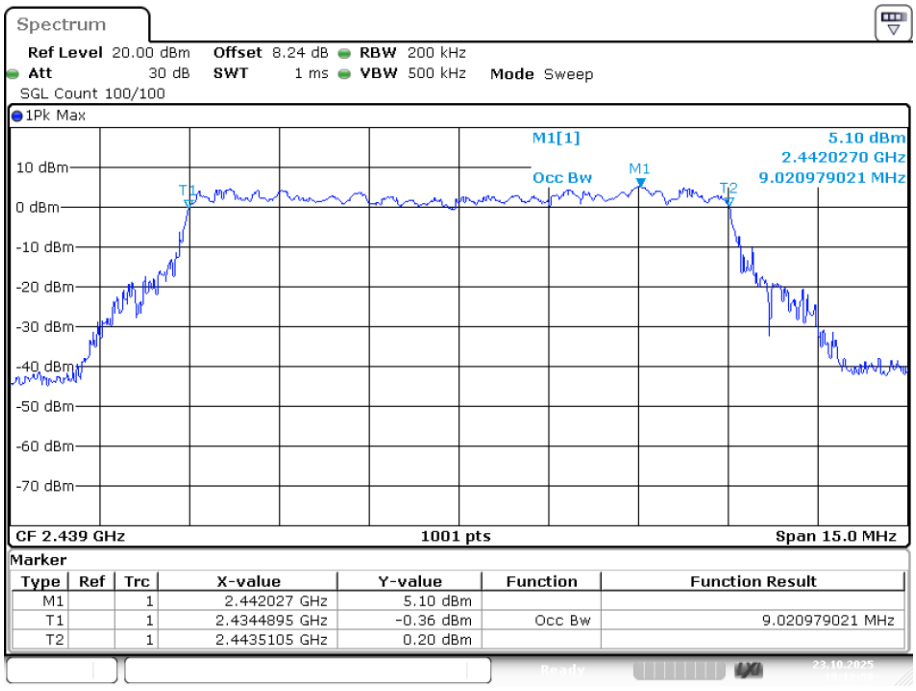
Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	2.4G	2409	Ant1	9.036
NVNT	2.4G	2439	Ant1	9.021
NVNT	2.4G	2474	Ant1	9.051

OBW NVNT 2.4G 2409MHz Ant1



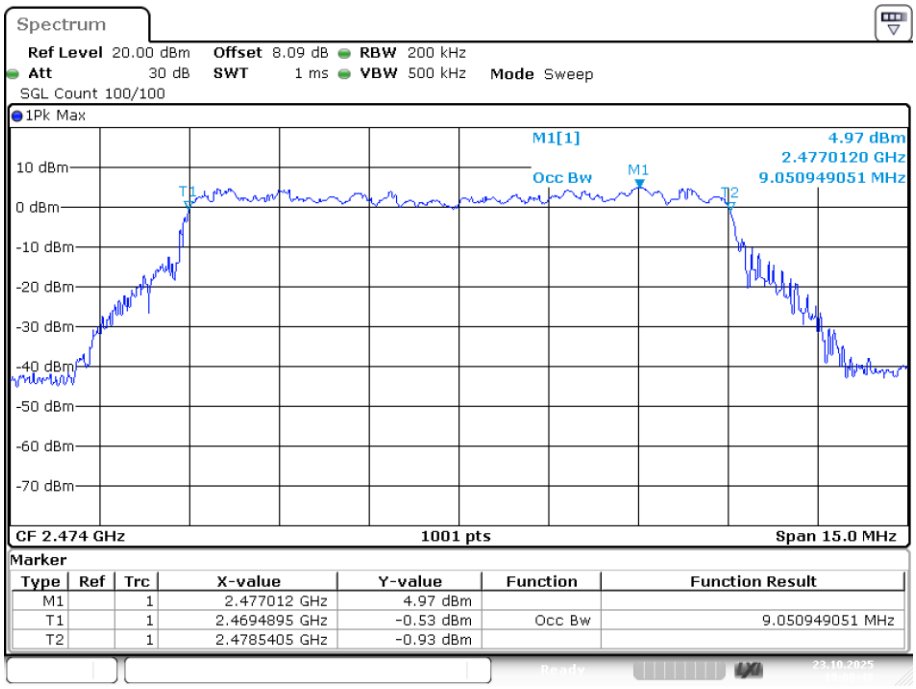
Date: 23.OCT.2025 18:09:16

OBW NVNT 2.4G 2439MHz Ant1



Date: 23.OCT.2025 18:12:50

OBW NVNT 2.4G 2474MHz Ant1



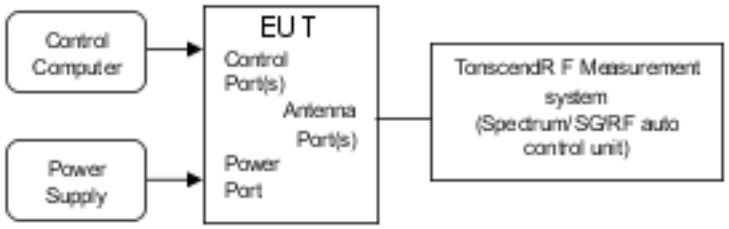
Date: 23.OCT.2025 18:00:48

10. BAND EDGE (CONDUCTED)

10.1.Test limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

10.2.Block diagram of test setup



10.3.Test Procedure

Details see the KDB 558074 D01 15.247 Meas Guidance v05r02

10.3.1 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

10.3.2 Check the spurious emissions out of band.

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

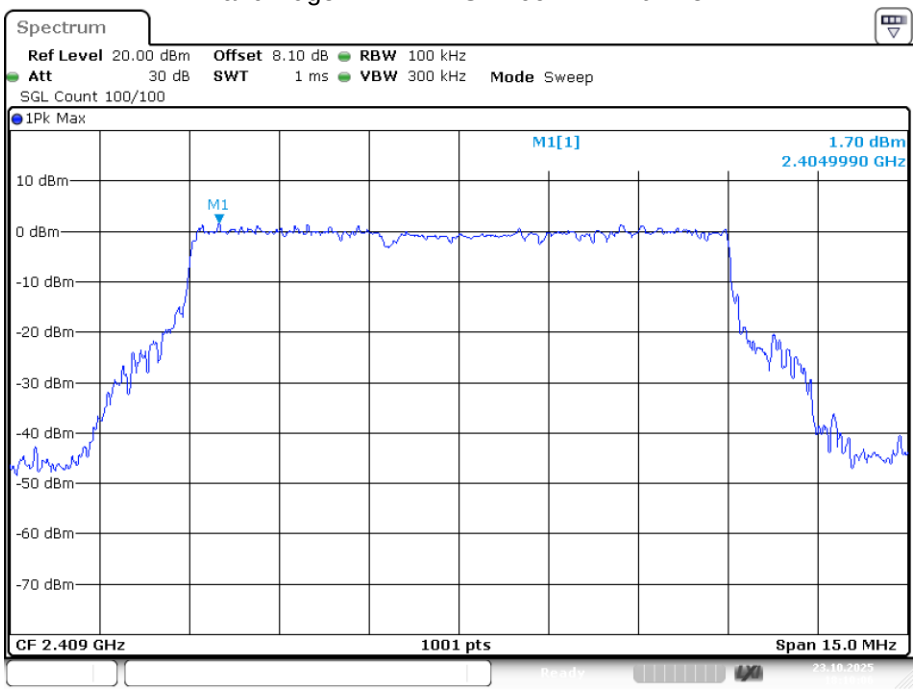
10.4.Test Results

Pass

The test results are listed in next pages.

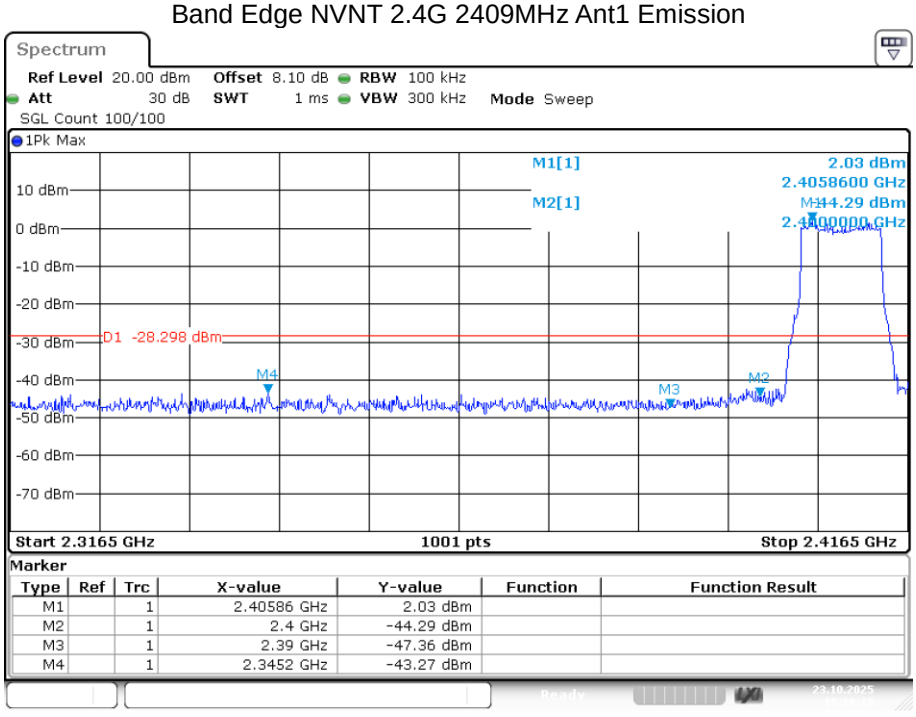
GFSK

Band Edge NVNT 2.4G 2409MHz Ant1 Ref



Date: 23.OCT.2025 18:10:06

Band Edge NVNT 2.4G 2409MHz Ant1 Emission

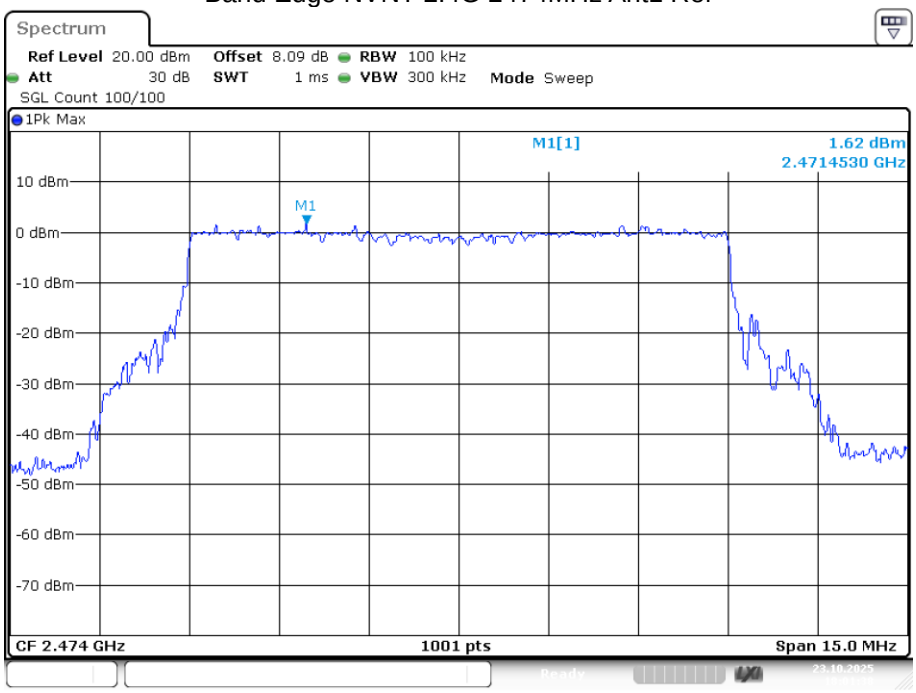


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40586 GHz	2.03 dBm		
M2		1	2.4 GHz	-44.29 dBm		
M3		1	2.39 GHz	-47.36 dBm		
M4		1	2.3452 GHz	-43.27 dBm		

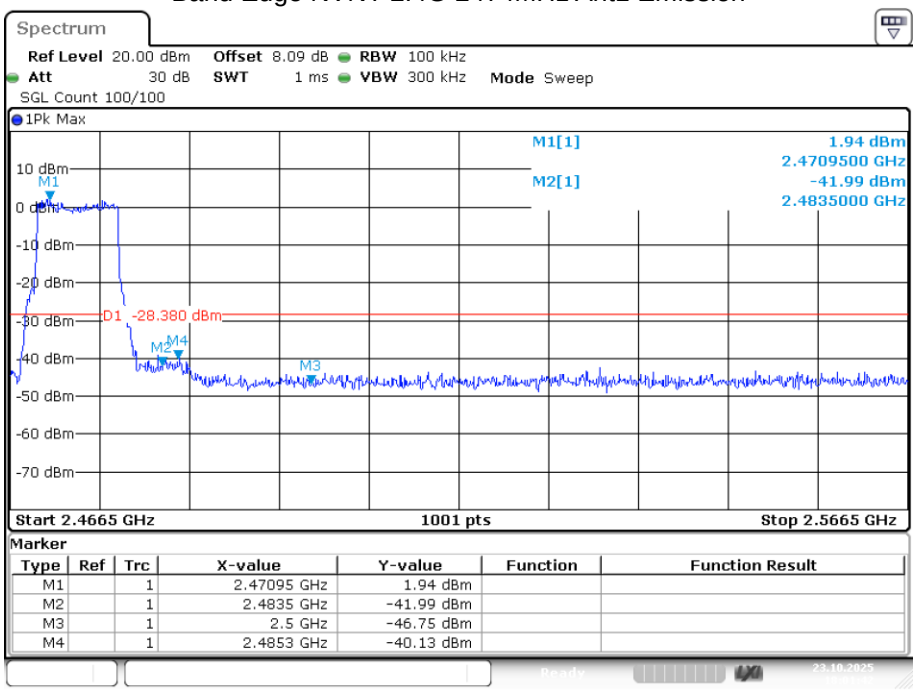
Date: 23.OCT.2025 18:10:10

Band Edge NVNT 2.4G 2474MHz Ant1 Ref



Date: 23.OCT.2025 18:01:38

Band Edge NVNT 2.4G 2474MHz Ant1 Emission



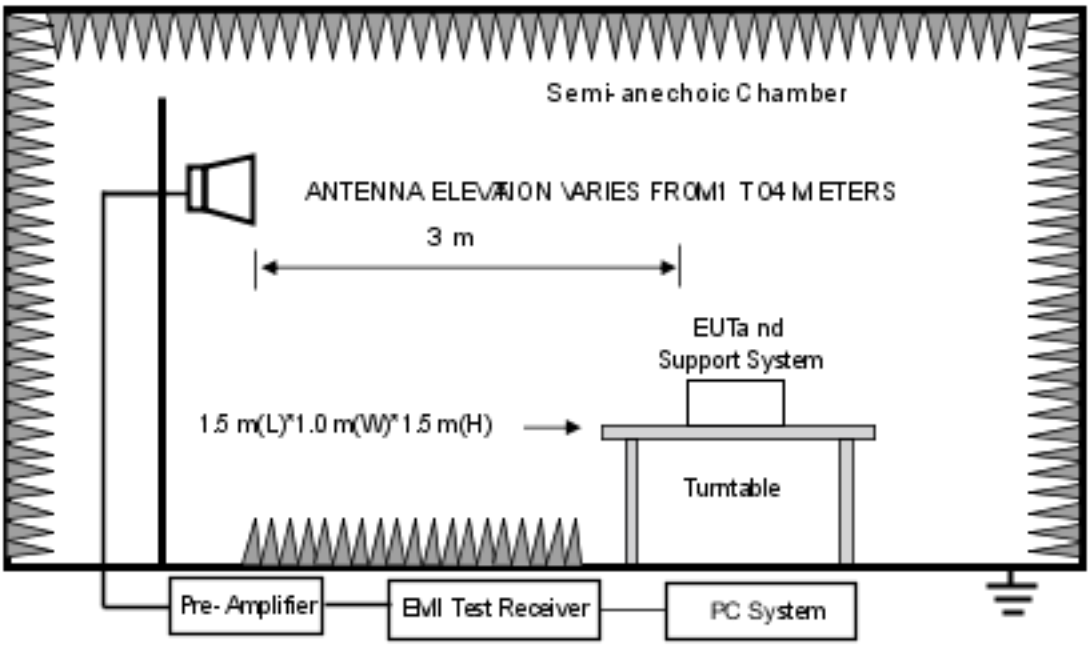
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.47095 GHz	1.94 dBm		
M2		1	2.4835 GHz	-41.99 dBm		
M3		1	2.5 GHz	-46.75 dBm		
M4		1	2.4853 GHz	-40.13 dBm		

Date: 23.OCT.2025 18:01:42

11. BAND EDGE(RADIATED)

11.1.Block diagram of test setup



11.2.Limits

Please refer section 15.247.

11.3.Test procedure

Details see the KDB 558074 D01 15.247 Meas Guidance v05r02

11.3.1 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

11.3.2 Check the spurious emissions out of band.

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

All restriction band and non- restriction band have been tested, only worse case is reported.

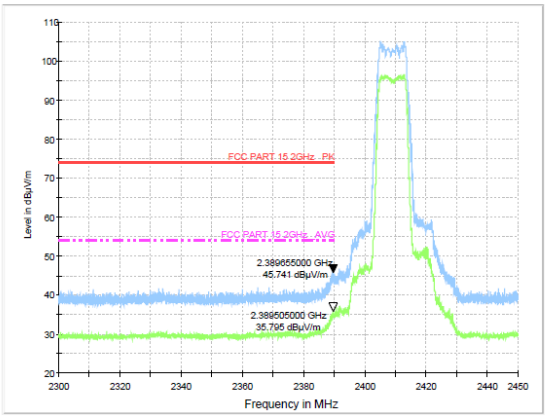
11.4.Test Results

Pass

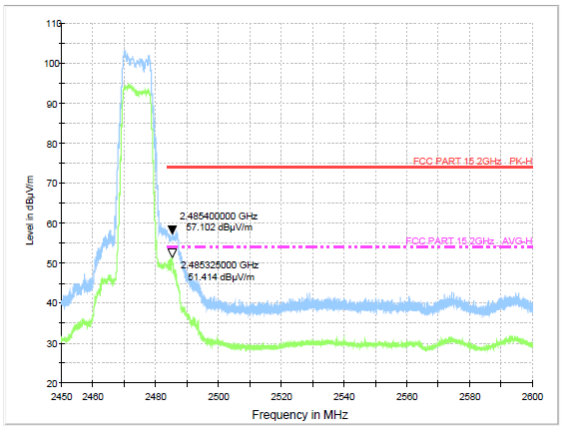
The test results are listed in next pages.

Radiated Method: GFSK

Test Mode: CH-L



Test Mode: CH-H



12. ANTENNA REQUIREMENT

12.1.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.

12.2.Antenna Connected Construction

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

12.3.Results

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

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