

Test report No: 6207948.50

## TEST REPORT

### Radio Spectrum Matters (RF)

Identification of item tested	Multiple connected self-organizing network communication modules
Trademark	N/A
Model and /or type reference	RXD-UR2EM-01
Features	5Vdc
FCC ID	2BLNO-RXDUR2EM01
Applicant's name / address	Zhejiang Estotech Power Supply Technology Co., Ltd 1588 North Ring Road, Dipu Street, Anji County, Huzhou City, Zhejiang Province, China.
Test method requested, standard	FCC CFR Title 47 Part 15 Subpart C Section 15.247 KDB 558074 D01v05r02
Verdict Summary	IN COMPLIANCE
Prepared by (name / position & signature)	Adrian Shi Technical Supervisor 
Approved by (name / position & signature)	Lei Chen Senior Project Manager 
Date of issue	2025-04-22
Report template No	TRF_Part15C_247_RF03 V1.0

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## COMPETENCES AND GUARANTEES

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DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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## GENERAL CONDITIONS

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1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.
5. This report will not be used for social proof function in China market.

## ENVIRONMENTAL CONDITIONS

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The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15 °C – 35 °C
Relative Humidity air	30% - 60%
Atmospheric pressure	86 kPa – 106 kPa

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

## POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

## DEFINITION OF SYMBOLS USED IN THIS TEST REPORT

<input checked="" type="checkbox"/> Indicates that the listed condition, standard or equipment is applicable for this report/test/EUT.			
<input type="checkbox"/> Indicates that the listed condition, standard or equipment is not applicable for this report/test/EUT.			
Decimal separator used in this report	<input checked="" type="checkbox"/>	Comma (,)	<input type="checkbox"/> Point (.)

## ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT	: Equipment Under Test
QP	: Quasi-Peak
CAV	: CISPR Average
AV	: Average
CDN	: Coupling Decoupling Network
SAC	: Semi-Anechoic Chamber
OATS	: Open Area Test Site
BW	: Bandwidth
AM	: Amplitude Modulation
PM	: Pulse Modulation
HCP	: Horizontal Coupling Plane
VCP	: Vertical Coupling Plane
$U_N$	: Nominal voltage
$T_x$	: Transmitter
$R_x$	: Receiver
N/A	: Not Applicable
N/M	: Not Measured

## DOCUMENT HISTORY

Report nr.	Date	Description
6207948.50	2025-04-22	First release.

## REMARKS AND COMMENTS

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The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).

The test results relate only to the samples tested.

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## 1 GENERAL INFORMATION

### 1.1 General Description of the Item(s)

Description of the item .....	Multiple connected self-organizing network communication modules
Model / Type number.....	RXD-UR2EM-01
Trademark.....	N/A
FCC ID .....	2BLNO-RXDUR2EM01
Test Sample Number .....	6207948-1
Manufacturer.....	Zhejiang Estotech Power Supply Technology Co., Ltd 1588 North Ring Road, Dipu Street, Anji County, Huzhou City, Zhejiang Province, China.

Mode of Operation .....	SRD
Operating frequency range(s) .....	2402~2480 MHz
Type of Modulation .....	GFSK
Antenna type.....	PCB Antenna
Antenna gain.....	6.28 dBi
Number of channel .....	40

Rated power supply .....	Voltage and Frequency	Reference poles				
		L1	L2	L3	N	PE
	<input type="checkbox"/> AC:	<input type="checkbox"/>				
	<input checked="" type="checkbox"/> DC: 5V					
	<input type="checkbox"/> Battery:					
Mounting position.....	<input checked="" type="checkbox"/> Table top equipment					
	<input type="checkbox"/> Wall/Ceiling mounted equipment					
	<input type="checkbox"/> Floor standing equipment					
	<input type="checkbox"/> Hand-held equipment					
	<input type="checkbox"/> Other:					

Intended use of the Equipment Under Test (EUT)
The product is communication module which supports 2.4GHz function.

## 1.2 Test date

Test Location	DEKRA Testing and Certification (Shanghai) Ltd. No.250, Jiangchangsan Road, Jing'an District, Shanghai, China
Date of receipt of test item	2024-10-28
Date (s) of performance of tests	2024-10-28 to 2025-04-22

## 2 DESCRIPTION OF TEST SETUP

### 2.1 Operating mode(s) used for tests

During the tests the following operating mode(s) has(have) been used.

Operating mode	Operating mode description	Used for methos	
		Conducted	Radiated
1	Transmitting	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	---	<input type="checkbox"/>	<input type="checkbox"/>
Supplemental information: ---			

### 2.2 Support / Auxiliary equipment / unit / software for the EUT

The EUT has been tested with the following auxiliary equipment / unit / software:

Auxiliary equipment / unit / software	Type / Version	Serial number	Manufacturer	Supplied by
SSCOM	5.13.1	N/A	Nordic	Applicant
Laptop	Latitude 3430	7XB4DS3	DELL	DEKRA
Supplemental information: ---				

### 2.3 Test Configuration / Block diagram used for tests

Refer to Annex 3.

### 3 VERDICT SUMMARY SECTION

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

#### 3.1 Standards

Standard	Year	Description
FCC CFR Title 47 Part 15 Subpart C Section 15.247	2022	Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.
ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
KDB 558074 D01 v05r02	2019	Guidance for performing compliance measurements on Digital Transmission System (DTS) operating under section 15.247

#### 3.2 Deviation(s) from the Standard(s) / Test Specification(s)

The following deviation(s) was / were made from the published requirements of the listed standards: N/A.

#### 3.3 Overview of results

FCC measurement			
Requirement – Test case	Basic standard(s)	Verdict	Remark
AC Power Line Conducted Emission	FCC 15.207	N/A	See 1)
Emissions in restricted frequency bands	FCC 15.247(d), 15.209, 15.205	PASS	---
Duty cycle	ANSI C63.10:2013	PASS	---
Emissions in non-restricted frequency bands	FCC 15.247(d)	PASS	---
Radiated Emission Band Edge	FCC 15.247(d), 15.209, 15.205	PASS	---
Fundamental emission output power	FCC 15.247(b)(3)	PASS	---
DTS Bandwidth	FCC 15.247(a)(2)	PASS	---
Power Spectral Density	FCC 15.247(e)	PASS	---
Antenna Requirement	FCC 15.203	PASS	---
<u>Supplementary information:</u>			
1) The EUT does not have an AC mains power input / output port.			

### 3.4 Test Facility

<b>FCC Designation Number</b>	<b>:</b>	CN1358
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### 3.5 Measurement procedure

The EUT was controlled by USB Cable provided by applicant which connected to laptop. After connected, run the software "sscom" supplied by manufacturer to control the EUT work in required test mode as below table.

<b>Mode</b>	<b>Modulation</b>	<b>Frequency (MHz)</b>	<b>Power Setting</b>
SRD	GFSK	2402	7
		2440	7
		2480	7

## 4 TEST RESULTS

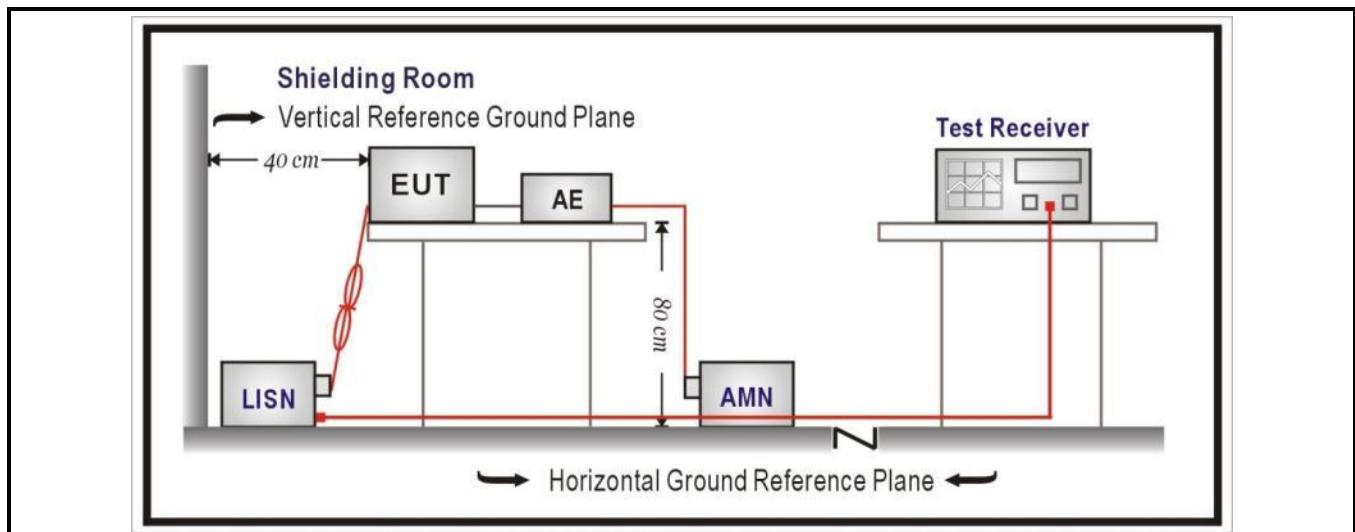
4.1	AC Power Line Conducted Emission	VERDICT: N/A
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### Limit

FCC Part 15 Subpart C Paragraph 15.207 & RSS-Gen Issue 5 Section 8.8				
Frequency range [MHz]	Limit: QP [dB( $\mu$ V) <sup>1)</sup> ]	Limit: AV [dB( $\mu$ V) <sup>1)</sup> ]	IF BW	Detector(s)
0,15 - 0,50	66 - 56 <sup>2)</sup>	56 - 46 <sup>2)</sup>	9 KHz	QP, AV
0,50 - 5,0	56	46	9 KHz	QP, AV
5,0 - 30	60	50	9 KHz	QP, AV

<sup>1)</sup> At the transition frequency, the lower limit applies.  
<sup>2)</sup> The limit decreases linearly with the logarithm of the frequency.

### Test Configuration



### Performed measurements

Port under test		Terminal											
<input type="checkbox"/>	AC mains input power	<input checked="" type="checkbox"/>	N	<input checked="" type="checkbox"/>	L1	<input type="checkbox"/>	L2	<input type="checkbox"/>	L3				
<input type="checkbox"/>	DC input power	<input type="checkbox"/>	Positive (+)			<input type="checkbox"/>	Negative (-)						
Test method applied	<input checked="" type="checkbox"/>	Artificial mains network											
	<input type="checkbox"/>	Voltage probe											
Test setup	<input checked="" type="checkbox"/>	Table top	<input type="checkbox"/>	Artificial hand applied									
	<input type="checkbox"/>	Floor standing	<input type="checkbox"/>	Other: Refer to the Annex 2 for test setup photo(s).									
	Operating mode(s) used		---										
Remark		---											

See next page.

Measurement data	Port under test	AC mains input power
Operating mode / voltage / frequency used during the test	---	
<p>The EUT does not have an AC mains power input / output port , so it doesn't need to perform this test item.</p>		
Remark		

## 4.2 Emissions in restricted frequency bands

**VERDICT: PASS**

### Limit

Standard	FCC Part 15 Subpart C Paragraph 15.247(d), 15.205, 15.209 & RSS-Gen Issue 5 Section 8.9 & 8.10		
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#### Restricted Bands of operation for FCC

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
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
8.81425 – 8.81475	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	Above 38.6
13.36 – 13.41	--	--	--

#### Restricted Bands of operation for ISED

0.090 - 0.110	13.36 - 13.41	960 - 1427	9.0 - 9.2
0.495 - 0.505	16.42 - 16.423	1435 - 1626.5	9.3 - 9.5
2.1735 - 2.1905	16.69475 - 16.69525	1645.5 - 1646.5	10.6 - 12.7
3.020 - 3.026	16.80425 - 16.80475	1660 - 1710	13.25 - 13.4
4.125 - 4.128	25.5 - 25.67	1718.8 - 1722.2	14.47 - 14.5
4.17725 - 4.17775	37.5 - 38.25	2200 - 2300	15.35 - 16.2
4.20725 - 4.20775	73 - 74.6	2310 - 2390	17.7 - 21.4
5.677 - 5.683	74.8 - 75.2	2483.5 - 2500	22.01 - 23.12
6.215 - 6.218	108 - 138	2655 - 2900	23.6 - 24.0
6.26775 - 6.26825	149.9 - 150.05	3260 - 3267	31.2 - 31.8
6.31175 - 6.31225	156.52475 - 156.52525	3332 - 3339	36.43 - 36.5
8.291 - 8.294	156.7 - 156.9	3345.8 - 3358	Above 38.6
8.362 - 8.366	162.0125 - 167.17	3500 - 4400	--
8.37625 - 8.38675	167.72 - 173.2	4500 - 5150	--
8.41425 - 8.41475	240 - 285	5350 - 5460	--
12.29 - 12.293	322 - 335.4	7250 - 7750	--
12.51975 - 12.52025	399.9 - 410	8025 - 8500	--
12.57675 - 12.57725	608 - 614	--	--

Restricted Band Emissions Limit

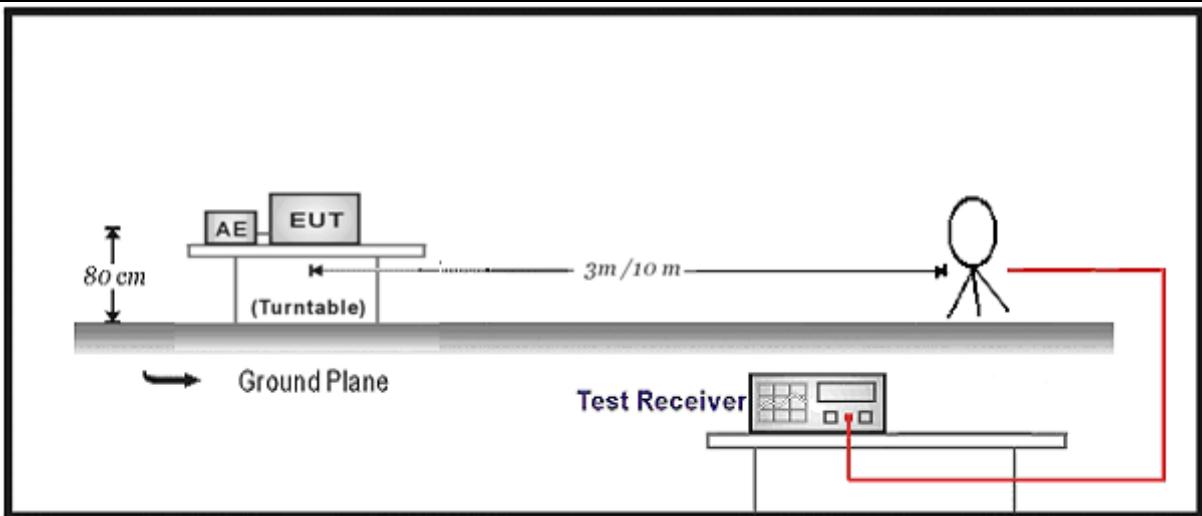
Frequency (MHz)	Field strength ( $\mu$ V/m)	Field strength (dB $\mu$ V/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30(Note 1)
1.705 - 30	30	29.5	30(Note 1)
30 - 88	100	40	3(Note 2)
88 - 216	150	43.5	3(Note 2)
216 - 960	200	46	3(Note 2)
Above 960	500	54	3(Note 2)

Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

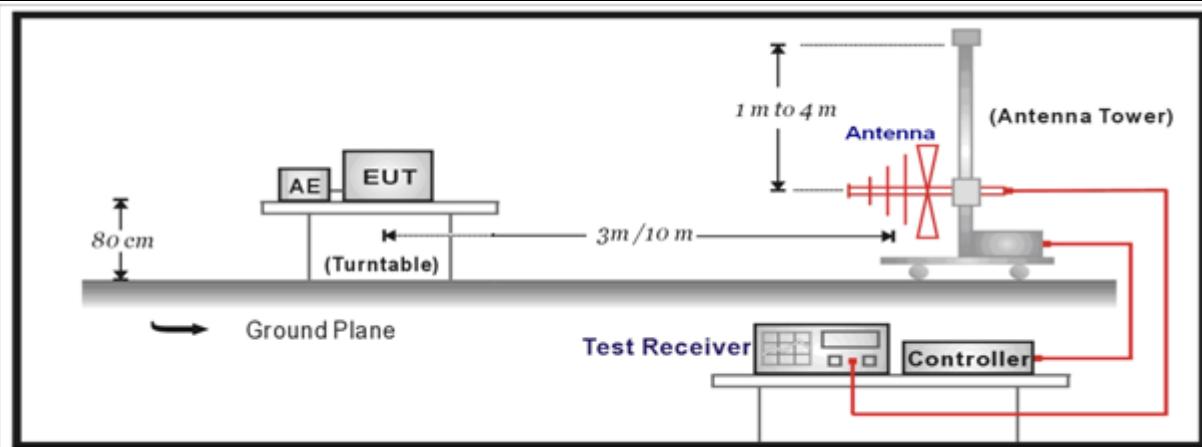
Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

## Test Configuration

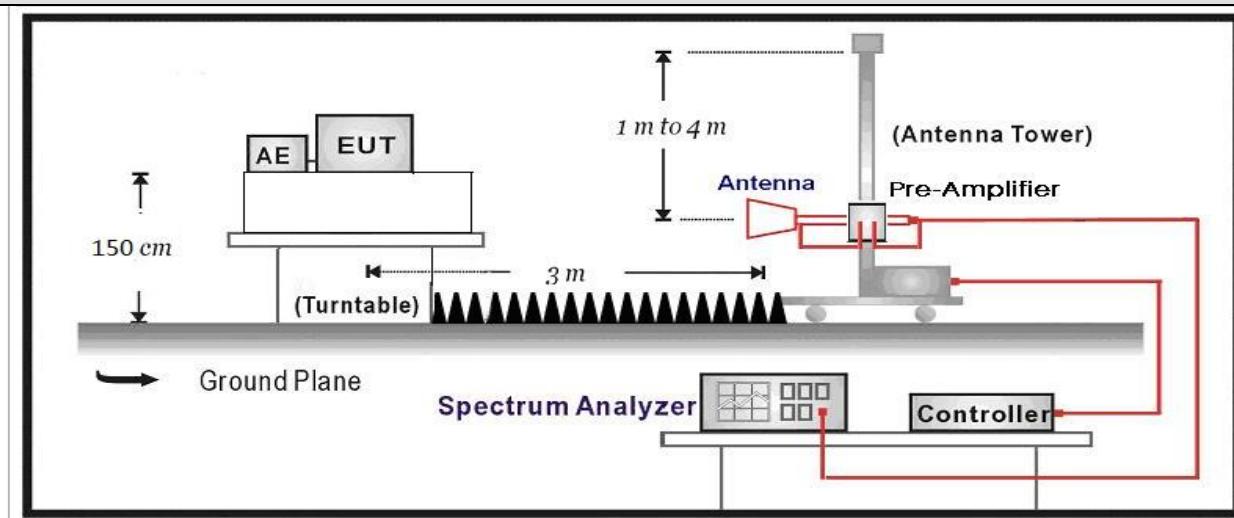
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:



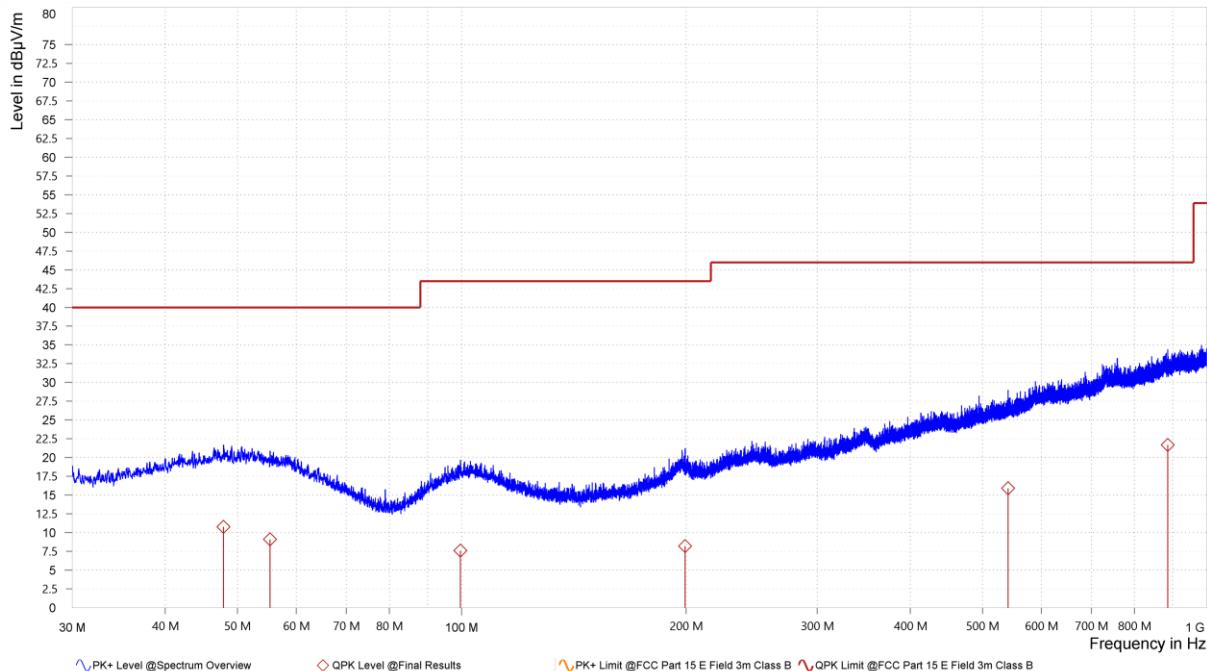
## Performed measurements

Port under test	Enclosure port
Test method applied	<input type="checkbox"/> Conducted measurement
	<input checked="" type="checkbox"/> Radiated measurement
Test setup	Refer to the Annex 3 for test setup photo(s).
Operating mode(s) used	Mode 1
Remark	<ol style="list-style-type: none"><li>1. The test frequency range, 9kHz~30MHz, 18GHz~26GHz, both of the worst case are at least 20dB below the limits, therefore no data appear in the report.</li><li>2. The EUT is working in the Normal link mode below 1 GHz. As the radiated emission was performed, so conducted emission was not tested.</li></ol>

## Results

### Emissions in restricted frequency bands

#### 30MHz – 1GHz, Normal Mode

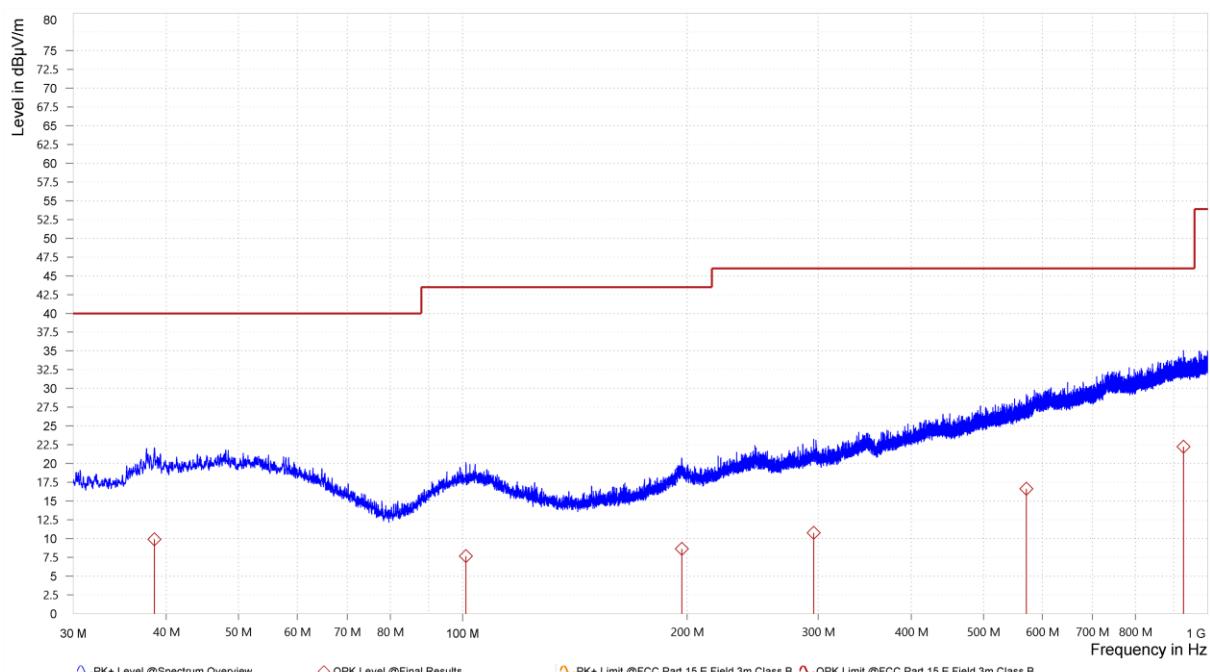


Rg	Frequency [MHz]	QPK Level [dB $\mu$ V/m]	QPK Limit [dB $\mu$ V/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	47.910	10.76	40.00	29.24	21.31	H	280.3	1
1	55.320	9.09	40.00	30.91	20.66	H	360	1
1	99.630	7.62	43.50	35.88	19.03	H	280.3	1
1	199.530	8.19	43.50	35.31	19.16	H	147.8	1
1	541.230	15.91	46.00	30.09	26.31	H	119.6	2
1	886.290	21.67	46.00	24.33	31.29	H	0.1	2

1. QPK Level [dB $\mu$ V/m]=Reading QPK Level [dB $\mu$ V/m] + Correction [dB/m]

2. Correction [dB/m]=Antenna Factor [dB/m] + Cable Loss [dB]

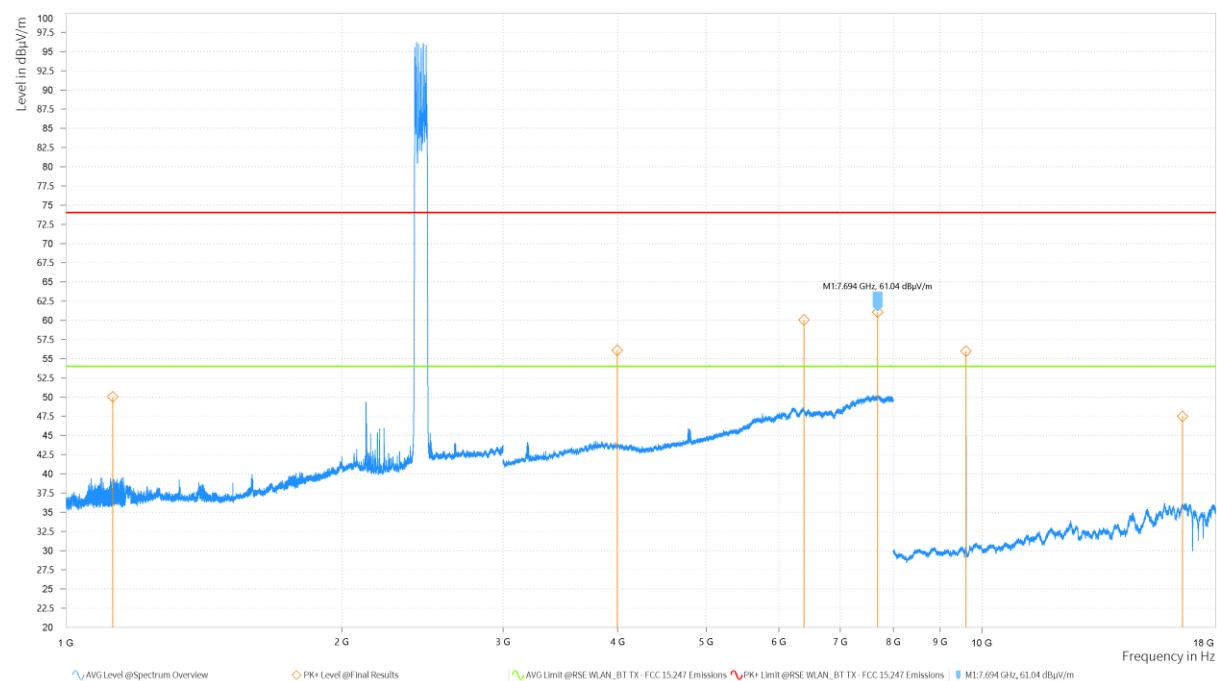
**30MHz – 1GHz, Normal Mode**



Rg	Frequency [MHz]	QPK Level [dB $\mu$ V/m]	QPK Limit [dB $\mu$ V/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	38.580	9.92	40.00	30.08	19.26	V	270.9	1
1	101.010	7.67	43.50	35.83	19.18	V	205.4	1
1	196.800	8.65	43.50	34.85	19.55	V	197.8	1
1	295.830	10.77	46.00	35.23	21.41	V	234.5	1
1	570.750	16.63	46.00	29.37	26.77	V	116.6	1
1	927.750	22.24	46.00	23.76	31.88	V	360	1

1. QPK Level [dB $\mu$ V/m]=Reading QPK Level [dB $\mu$ V/m] + Correction [dB/m]
2. Correction [dB/m]=Antenna Factor [dB/m] + Cable Loss [dB]

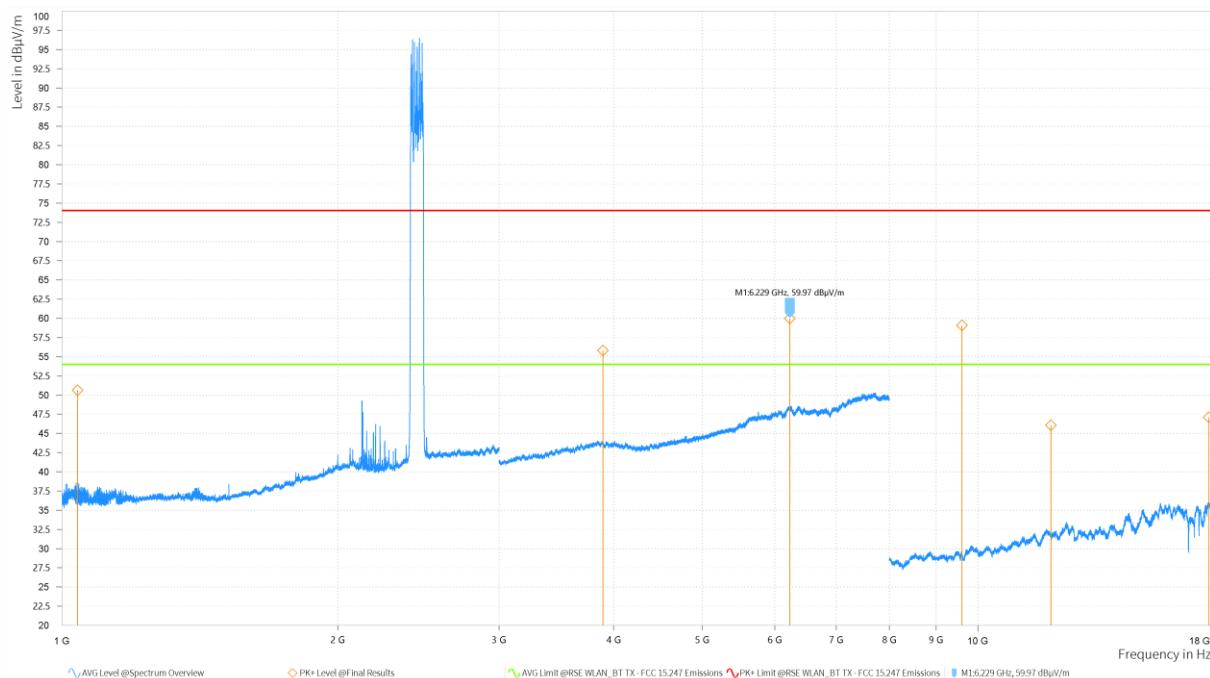
**1GHz – 10<sup>th</sup> Harmonic  
2402MHz, V, ABOVE1G**



Rg	Frequency [MHz]	AVG Level [dB $\mu$ V/m]	AVG Limit [dB $\mu$ V/m]	AVG Margin [dB]	Correction [dB]	Polarization
1	1,124.900	40.08	54.00	13.92	-0.92	V
2	3,998.500	44.48	54.00	9.52	8.97	V
2	6,391.000	48.72	54.00	5.28	14.88	V
2	7,693.500	50.28	54.00	3.72	15.98	V
3	9,606.500	47.49	54.00	6.51	5.54	V
3	16,554.000	36.33	54.00	17.67	13.55	V

Rg	Frequency [MHz]	PK+ Level [dB $\mu$ V/m]	PK+ Limit [dB $\mu$ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization
1	1,124.900	50.02	74.00	23.98	-0.92	V
2	3,998.500	56.06	74.00	17.94	8.97	V
2	6,391.000	60.02	74.00	13.98	14.88	V
2	7,693.500	61.04	74.00	12.96	15.98	V
3	9,606.500	55.95	74.00	18.05	5.54	V
3	16,554.000	47.47	74.00	26.53	13.55	V

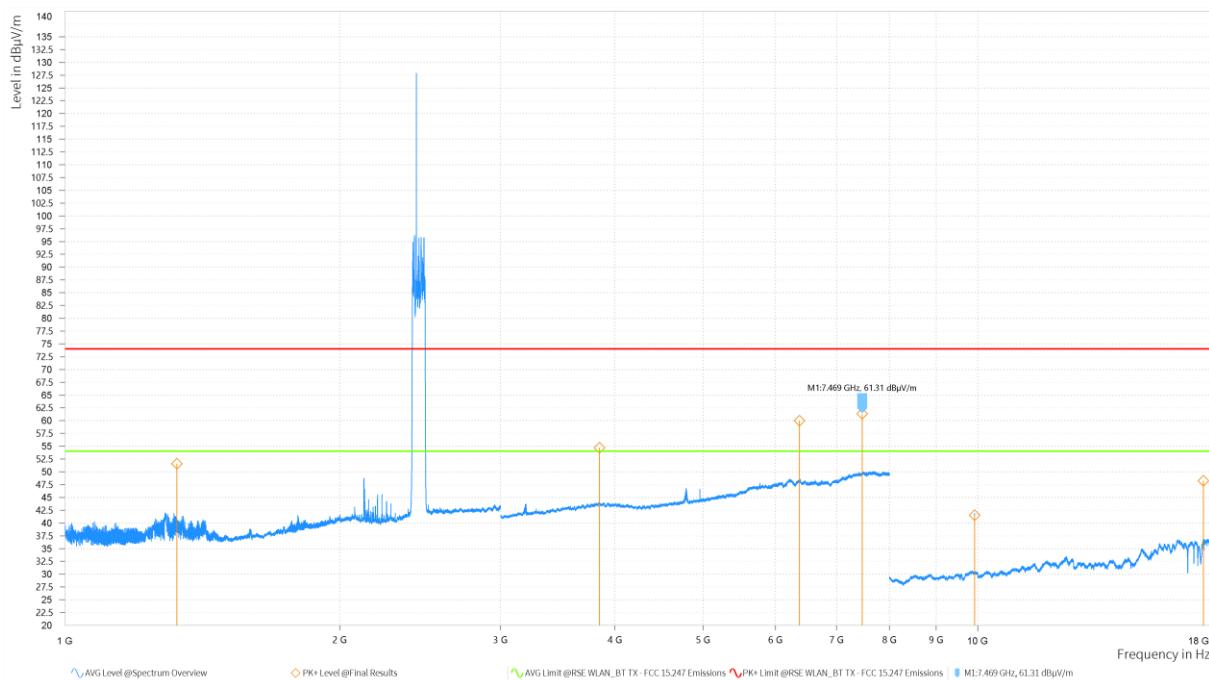
**2402MHz, H, ABOVE1G**



Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization
1	1,039.500	38.73	54.00	15.27	-1.35	H
2	3,894.250	44.06	54.00	9.94	9.03	H
2	6,229.250	48.63	54.00	5.37	14.95	H
3	9,606.500	50.65	54.00	3.35	5.54	H
3	12,011.000	34.67	54.00	19.33	8.35	H
3	17,857.500	36.05	54.00	17.95	15.79	H

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization
1	1,039.500	50.61	74.00	23.39	-1.35	H
2	3,894.250	55.79	74.00	18.21	9.03	H
2	6,229.250	59.97	74.00	14.03	14.95	H
3	9,606.500	59.06	74.00	14.94	5.54	H
3	12,011.000	46.04	74.00	27.96	8.35	H
3	17,857.500	47.09	74.00	26.91	15.79	H

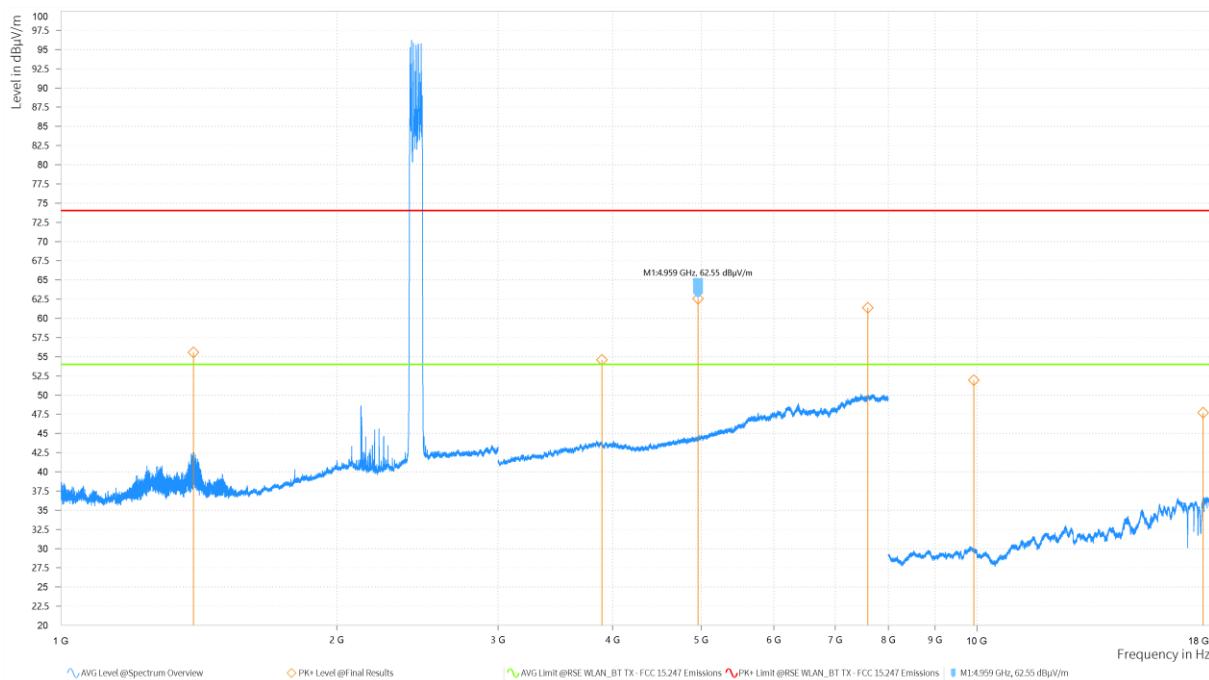
**2480MHz, V, ABOVE1G**



Rg	Frequency [MHz]	AVG Level [dB $\mu$ V/m]	AVG Limit [dB $\mu$ V/m]	AVG Margin [dB]	Correction [dB]	Polarization
1	1,325.700	43.21	54.00	10.79	0.41	V
2	3,850.500	44.19	54.00	9.81	9.05	V
2	6,375.000	48.63	54.00	5.37	14.90	V
2	7,469.000	50.18	54.00	3.82	15.92	V
3	9,919.500	41.95	54.00	12.05	6.15	V
3	17,660.000	36.90	54.00	17.10	16.96	V

Rg	Frequency [MHz]	PK+ Level [dB $\mu$ V/m]	PK+ Limit [dB $\mu$ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization
1	1,325.700	51.56	74.00	22.44	0.41	V
2	3,850.500	54.67	74.00	19.33	9.05	V
2	6,375.000	59.94	74.00	14.06	14.90	V
2	7,469.000	61.31	74.00	12.69	15.92	V
3	9,919.500	41.48	74.00	32.52	6.15	V
3	17,660.000	48.23	74.00	25.77	16.96	V

**2480MHz, H, ABOVE1G**



Rg	Frequency [MHz]	AVG Level [dB $\mu$ V/m]	AVG Limit [dB $\mu$ V/m]	AVG Margin [dB]	Correction [dB]	Polarization
1	1,394.500	42.94	54.00	11.06	0.39	H
2	3,895.000	44.17	54.00	9.83	9.03	H
2	4,959.250	52.30	54.00	1.70	10.26	H
2	7,599.750	50.18	54.00	3.82	16.05	H
3	9,918.000	44.75	54.00	9.25	6.16	H
3	17,657.000	36.91	54.00	17.09	16.98	H

Rg	Frequency [MHz]	PK+ Level [dB $\mu$ V/m]	PK+ Limit [dB $\mu$ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization
1	1,394.500	55.55	74.00	18.45	0.39	H
2	3,895.000	54.57	74.00	19.43	9.03	H
2	4,959.250	62.55	74.00	11.45	10.26	H
2	7,599.750	61.36	74.00	12.64	16.05	H
3	9,918.000	51.92	74.00	22.08	6.16	H
3	17,657.000	47.70	74.00	26.30	16.98	H

**4.3 Emissions in non-restricted frequency band**

**VERDICT: PASS**

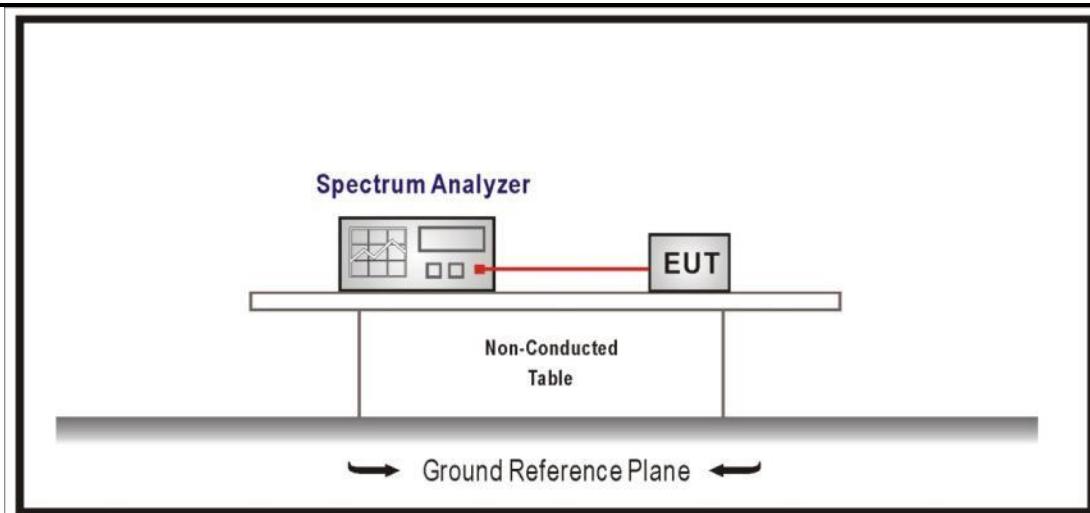
**Limit**

Standard	FCC Part 15 Subpart C Paragraph 15.247(d) & RSS-247 Issue 2 Section 5.5
RF Output power (Detection methods)	Limit(dB)
RF Output power(Average detector)	30dBc(Note1)
RF Output power(PK detector)	20dBc(Note2)

Note 1: If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD by Level in 100 kHz (i.e., 30 dBc).

Note 2: If the maximum peak conducted output power procedure was used, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD by Level in 100 kHz (i.e., 20 dBc).

**Test Configuration**



**Performed measurements**

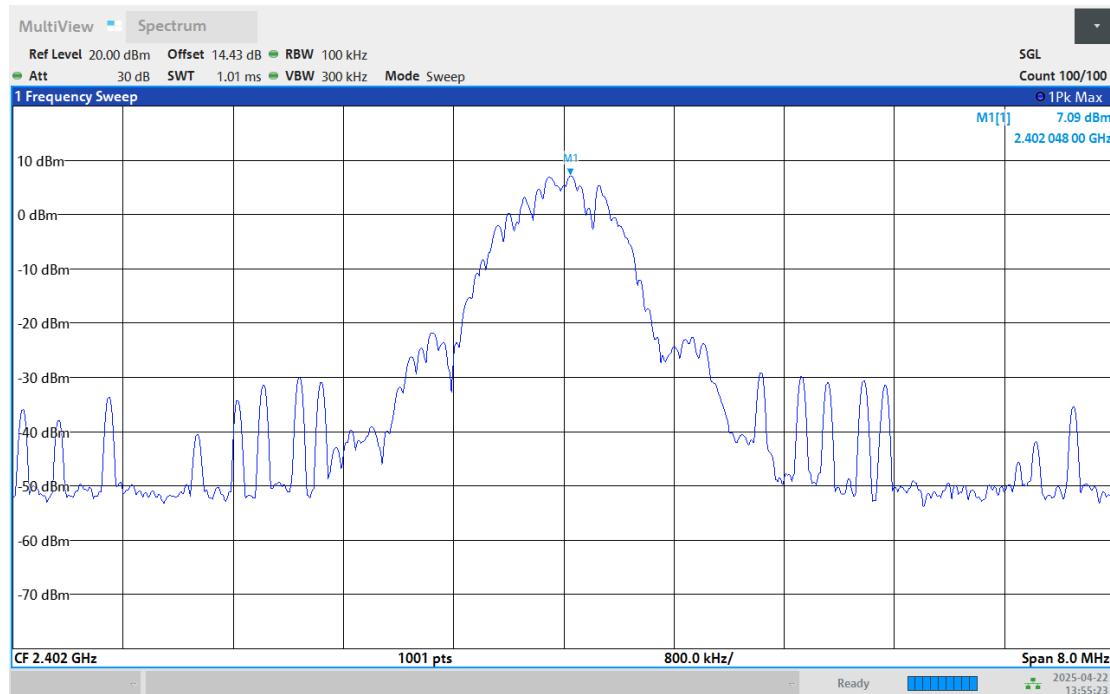
Port under test	Antenna port	
Test method applied	<input checked="" type="checkbox"/>	Conducted measurement
	<input type="checkbox"/>	Radiated measurement
Test setup	Refer to the Annex 3 for test setup photo(s).	
Operating mode(s) used	Mode 1	
Remark	---	

See next page

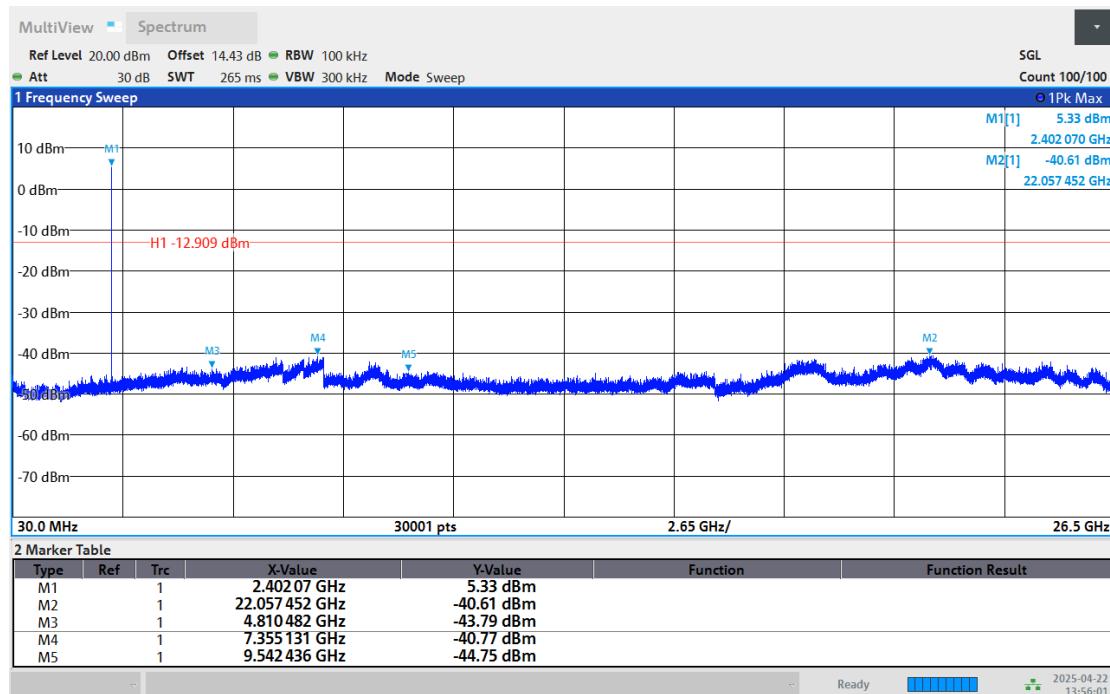
## Results

### Emissions in non-restricted frequency band

#### 2402MHz



01:55:23 PM 04/22/2025

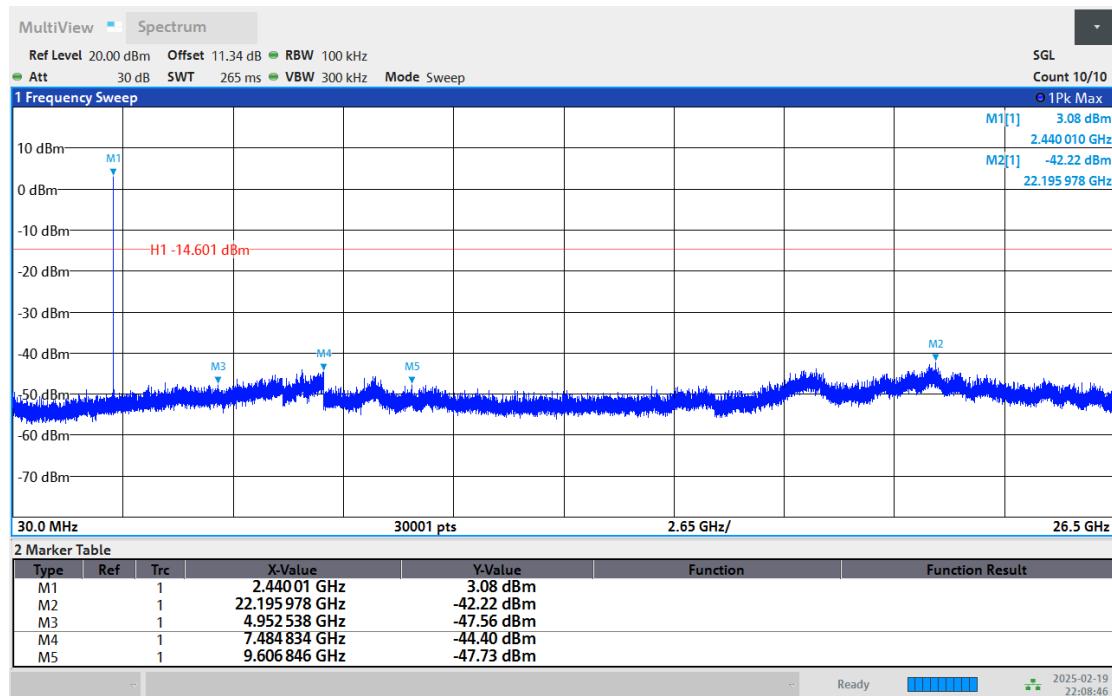


01:56:02 PM 04/22/2025

## 2440MHz

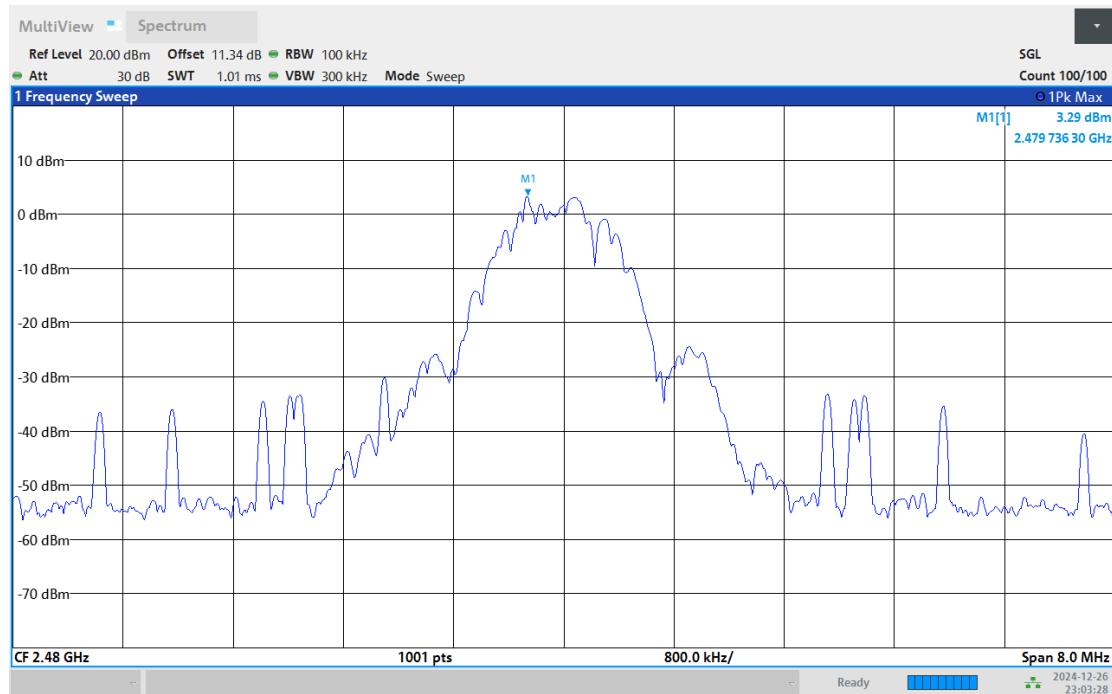


10:08:41 PM 02/19/2025

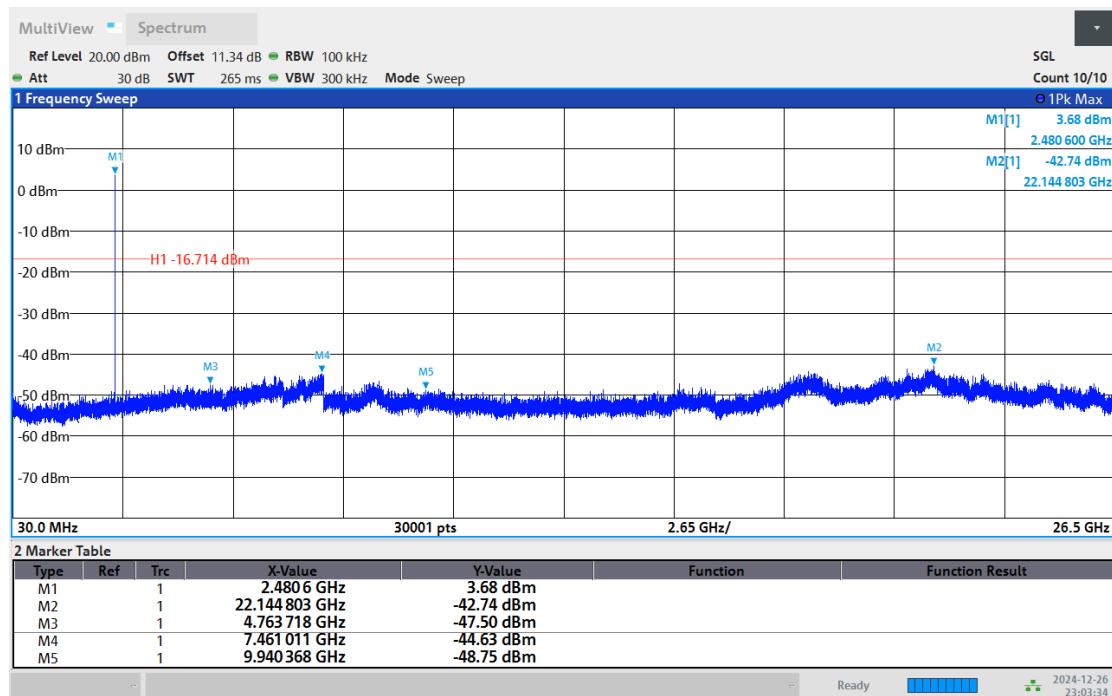


10:08:47 PM 02/19/2025

## 2480MHz

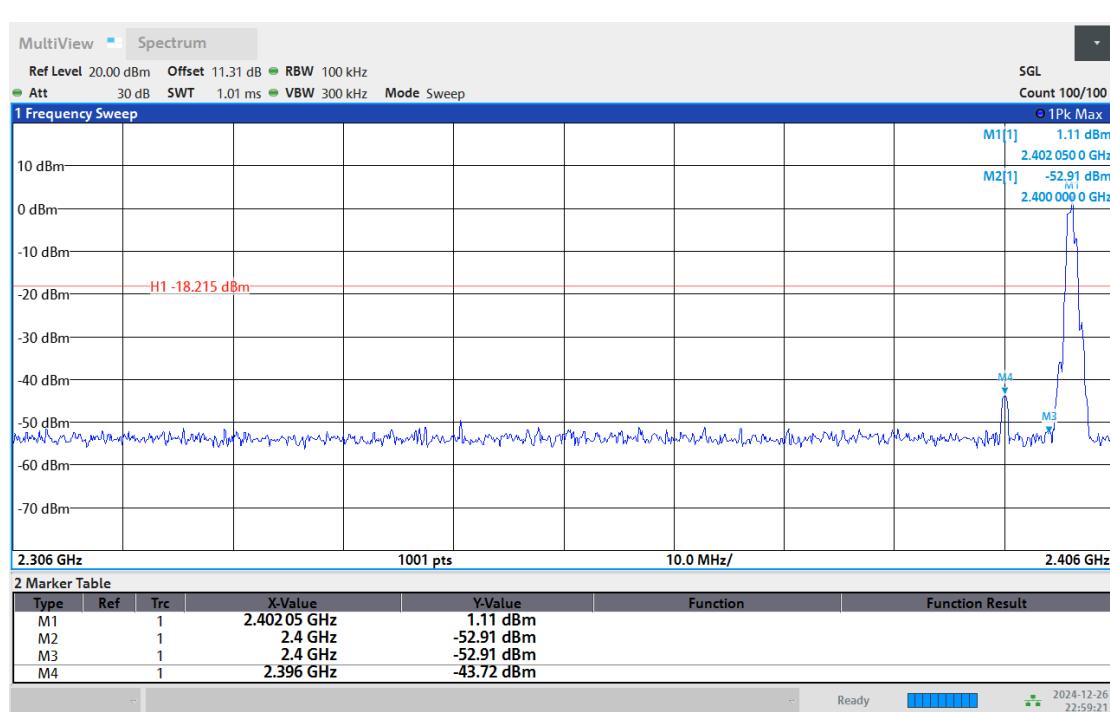
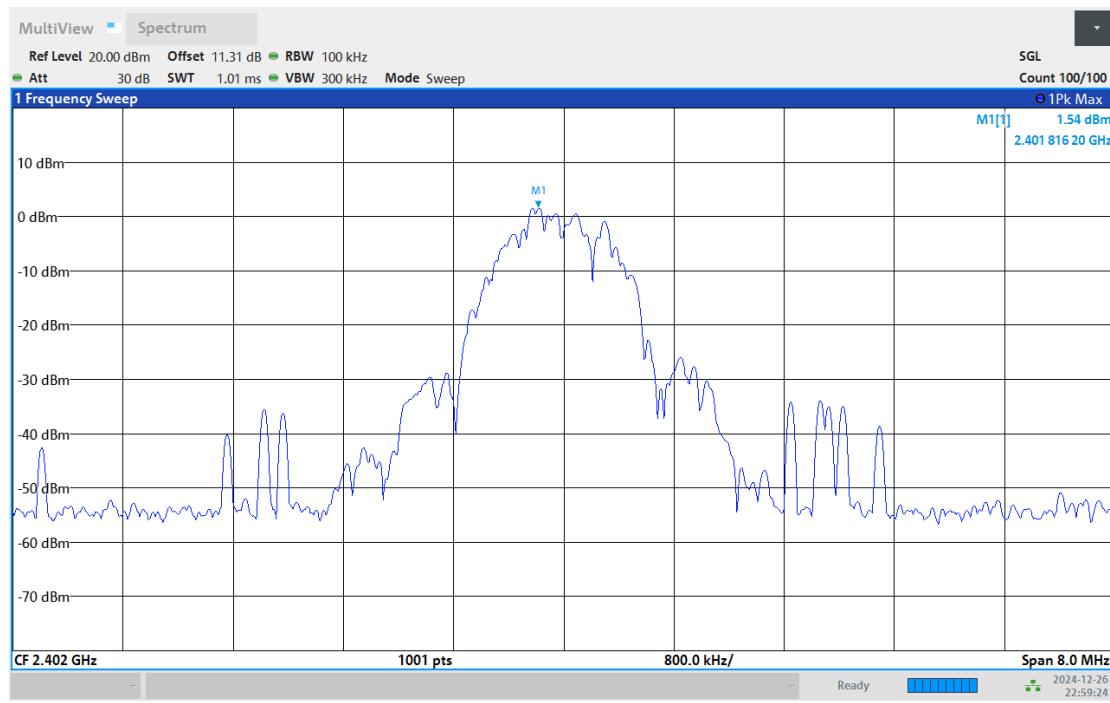


11:03:28 PM 12/26/2024

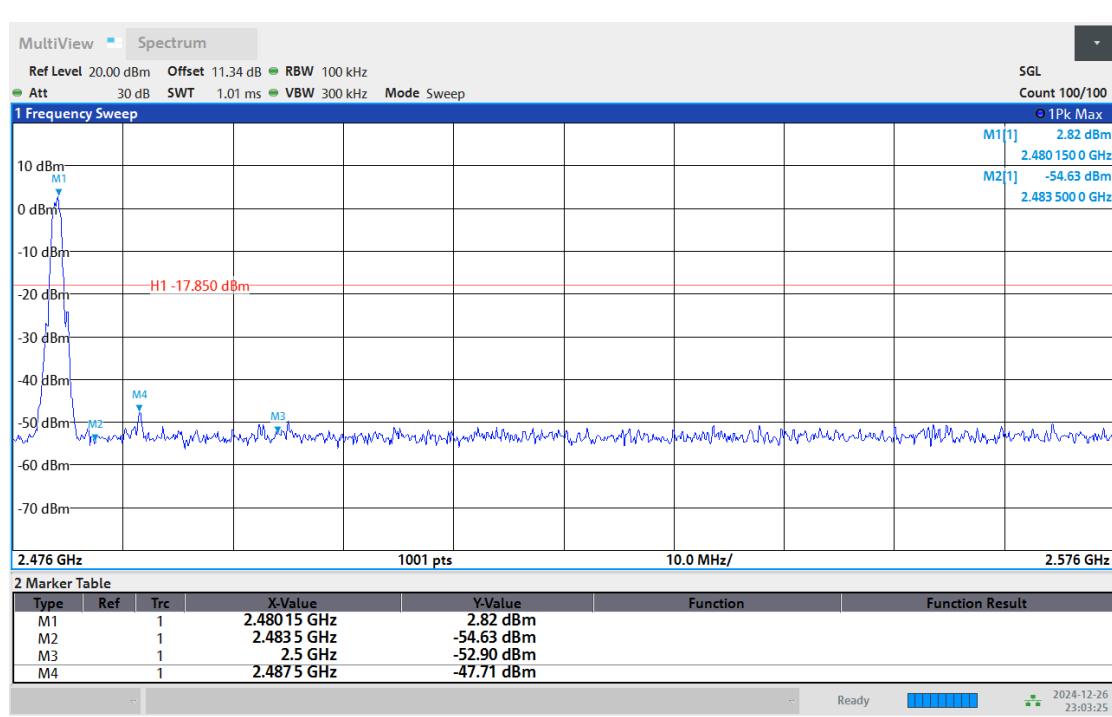
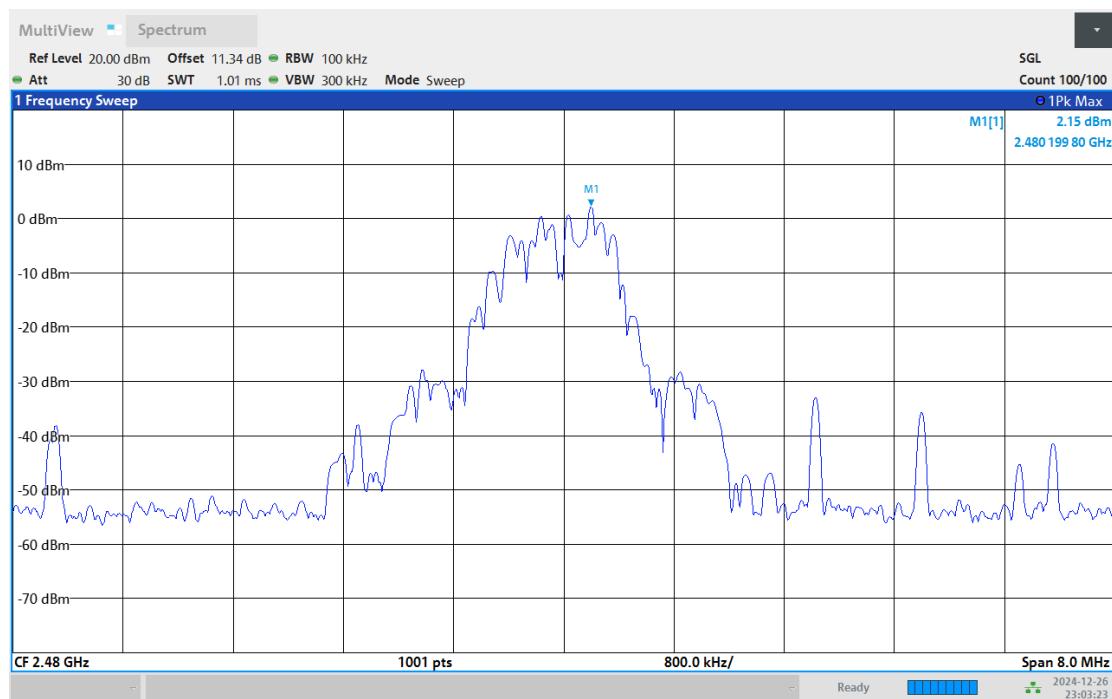


11:03:34 PM 12/26/2024

**Bnad Edge  
2402MHz**



## 2480MHz



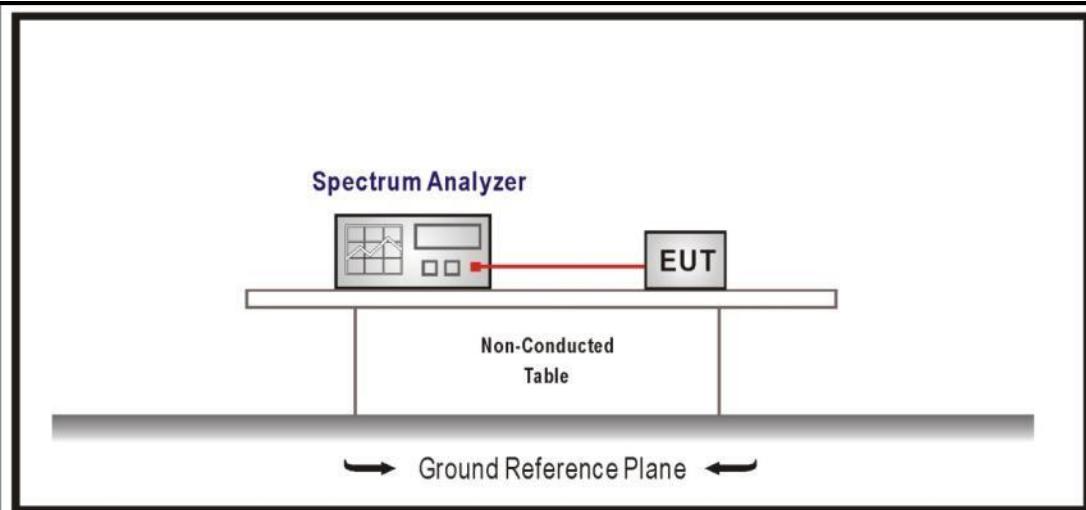
#### 4.4 Duty Cycle

**VERDICT: PASS**

##### Limit

N/A

##### Test Configuration



##### Performed measurements

Port under test	Antenna port	
Test method applied	<input checked="" type="checkbox"/>	Conducted measurement
	<input type="checkbox"/>	Radiated measurement
Test setup	Refer to the Annex 3 for test setup photo(s).	
Operating mode(s) used	Mode 1	
Remark	For reporting purpose only	

##### Results

Mode	CH.	Test Freq. (MHz)	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
BLE 1Mbps	00	2402	5.26	12.79	0
	19	2440	5.26	12.79	0
	39	2480	5.26	12.79	0

Note:

According to KDB 558074, when test for Radiated Emission Band Edge and Radiated Emission, for average detector set:  $VBW \geq 1/T$  will be used.

## 4.5 Radiated Emission Band Edge

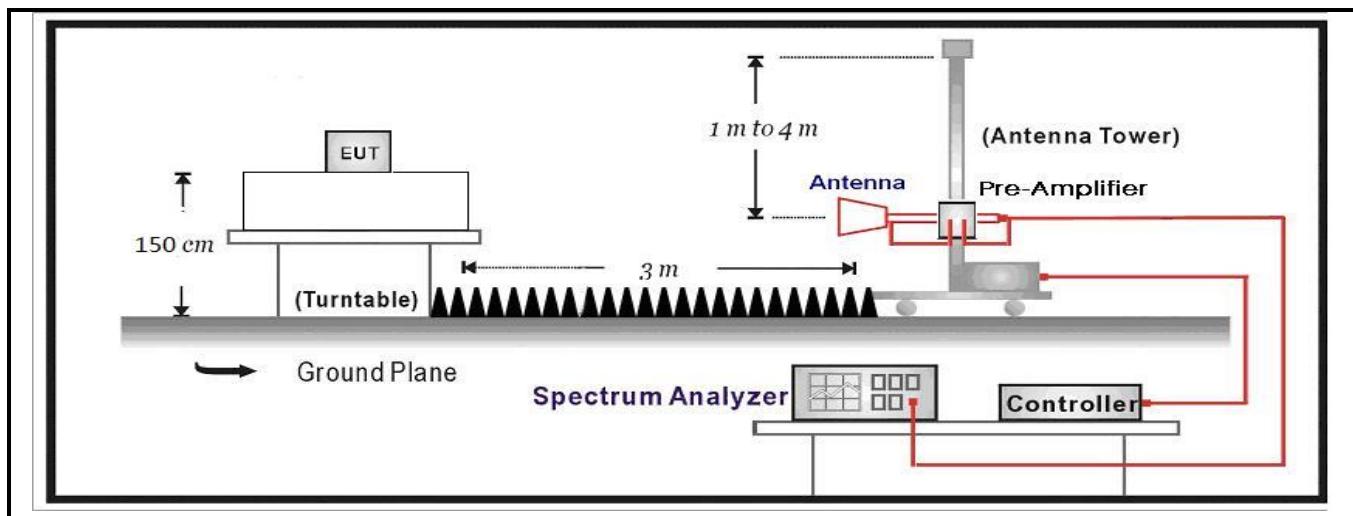
**VERDICT: PASS**

### Limit

Standard	FCC Part 15 Subpart C Paragraph 15.247(d), 15.205, 15.209 & RSS-Gen Issue 5 Section 8.9 & 8.10			
Frequency bands (MHz)	Detector	Limit (dB $\mu$ V/m)	RBW (MHz)	Distance (m)
2310-2390	PK	74	1	3
2483.5-2500	AV	54	1	3

Note: The field strength of emissions appearing within these frequency bands shall not exceed the limits.

### Test Configuration



### Performed measurements

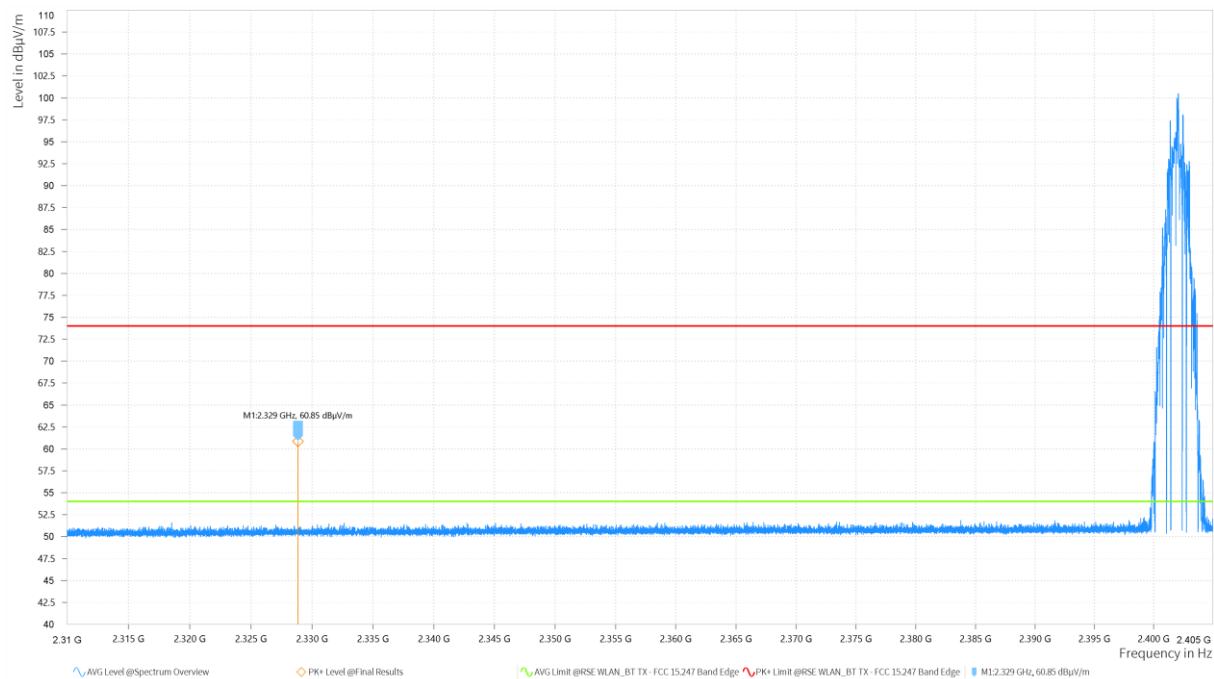
Port under test	Enclosure port	
Test method applied	<input type="checkbox"/>	Conducted measurement
	<input checked="" type="checkbox"/>	Radiated measurement
Test setup	Refer to the Annex 3 for test setup photo(s).	
Operating mode(s) used	Mode 1	
Remark	---	

See next page

## Results

### Radiated Emission Band Edge

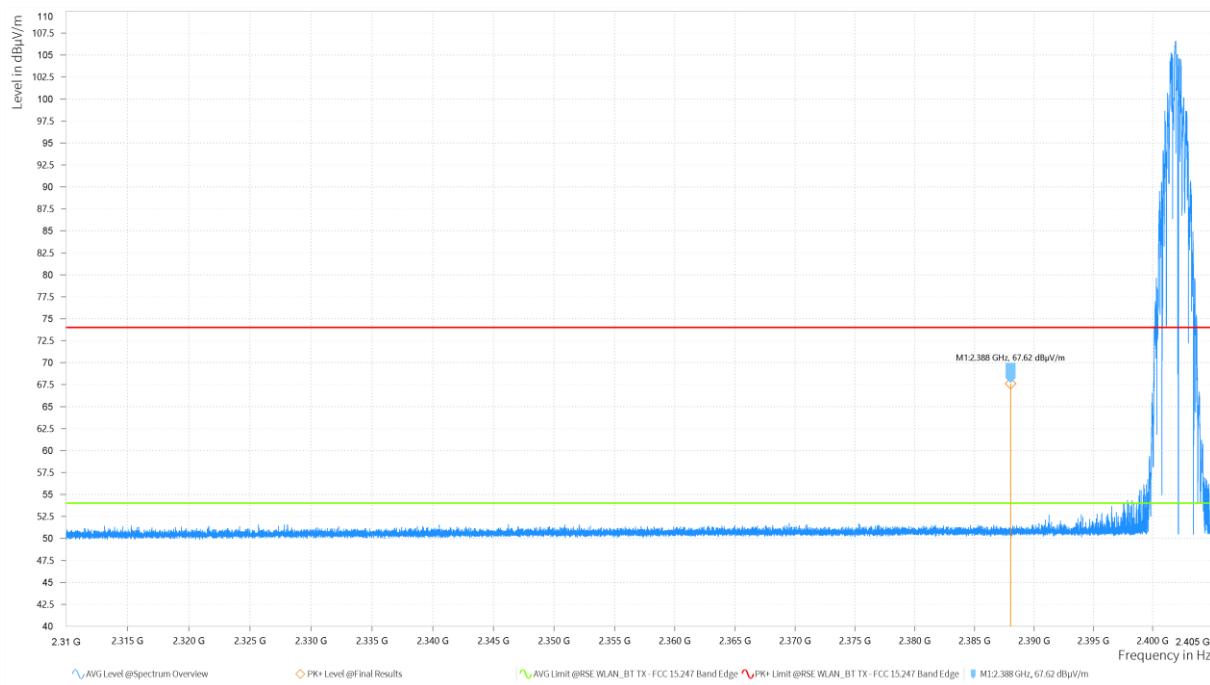
#### 2402MHz, V, BANDEDGE



Rg	Frequency [MHz]	AVG Level [dB $\mu$ V/m]	AVG Limit [dB $\mu$ V/m]	AVG Margin [dB]	Correction [dB]	Polarization
1	2,328.836	49.64	54.00	4.36	5.24	V

Rg	Frequency [MHz]	AVG Level [dB $\mu$ V/m]	AVG Limit [dB $\mu$ V/m]	AVG Margin [dB]	Correction [dB]	Polarization
1	2,328.836	49.64	54.00	4.36	5.24	V

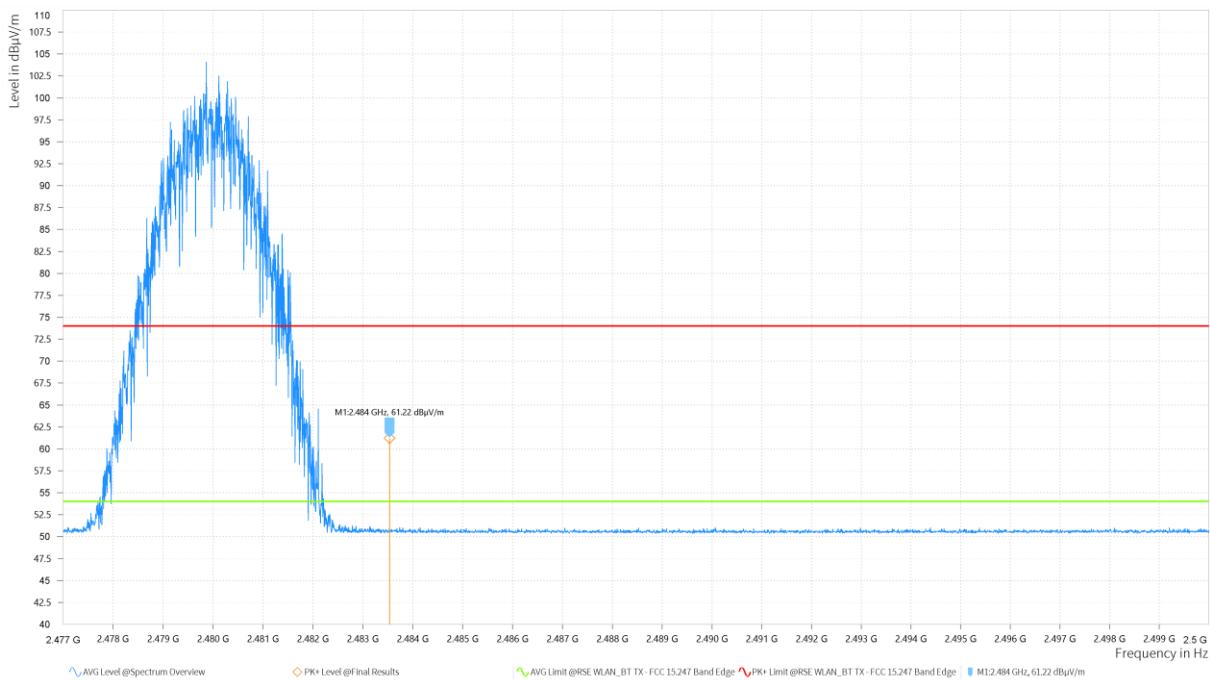
**2402MHz, H, BANDEDGE**



Rg	Frequency [MHz]	AVG Level [dB $\mu$ V/m]	AVG Limit [dB $\mu$ V/m]	AVG Margin [dB]	Correction [dB]	Polarization
1	2,388.034	49.64	54.00	4.36	5.54	H

Rg	Frequency [MHz]	PK+ Level [dB $\mu$ V/m]	PK+ Limit [dB $\mu$ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization
1	2,388.034	67.62	74.00	6.38	5.54	H

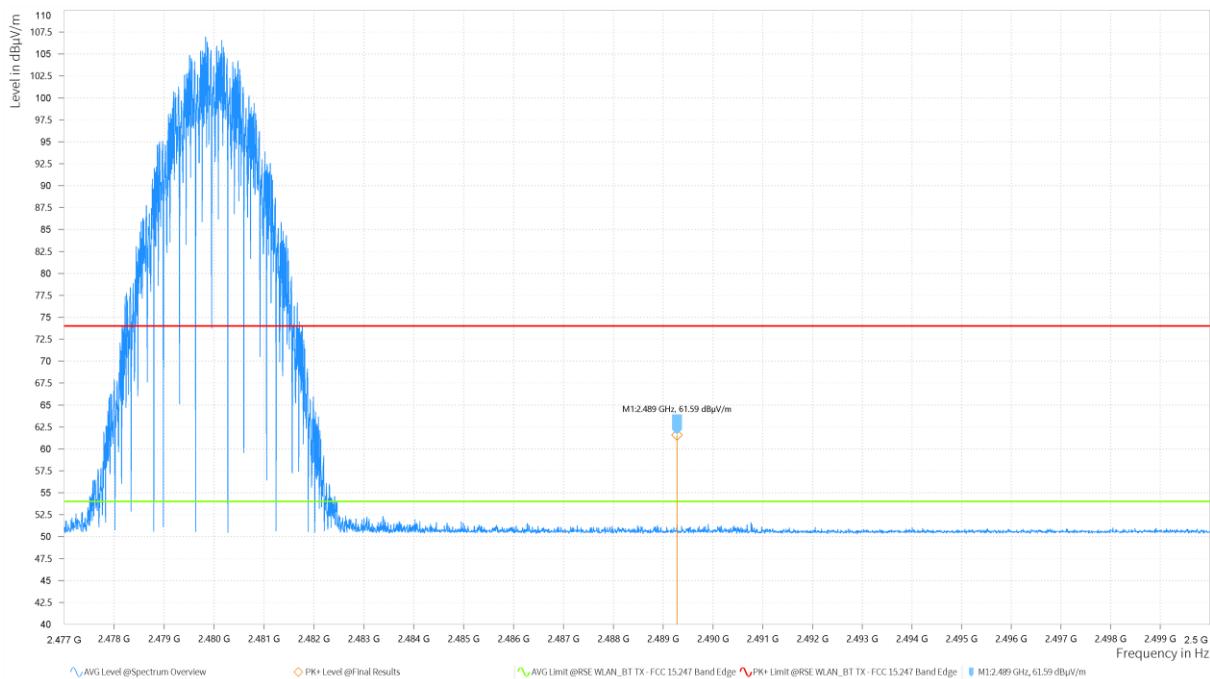
**2480MHz, V, BANDEDGE**



Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization
1	2,483.530	48.65	54.00	5.35	5.82	V

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization
1	2,483.530	61.22	74.00	12.78	5.82	V

**2480MHz, H, BANDEDGE**



Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization
1	2,489.280	50.01	54.00	3.99	5.84	H

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization
1	2,489.280	61.59	74.00	12.41	5.84	H

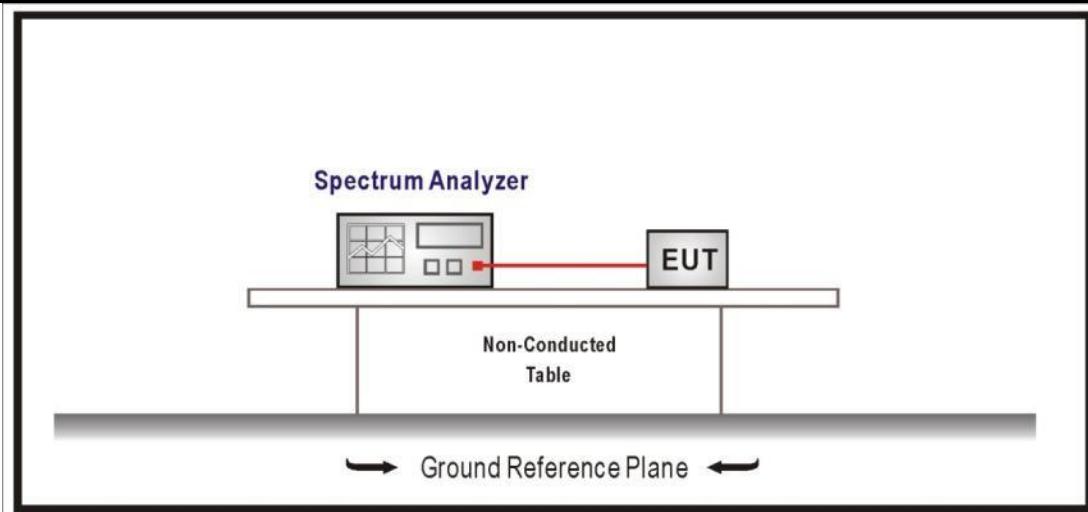
## 4.6 DTS Bandwidth & Occupied Bandwidth

**VERDICT: PASS**

### Limit

<b>Standard</b>	FCC Part 15 Subpart C Paragraph 15.247 (a)(2)
Systems using digital modulation techniques operate in the 2400-2483.5 MHz .The minimum 6 dB bandwidth shall be at least 500 kHz	
<b>Standard</b>	RSS-Gen Issue 5 Section 6.7 & RSS-247 Issue 2 Section 5.2(a)
The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs. The occupied bandwidth should within the required frequency range.	
The minimum 6 dB bandwidth shall be 500 kHz.	

### Test Configuration



### Performed measurements

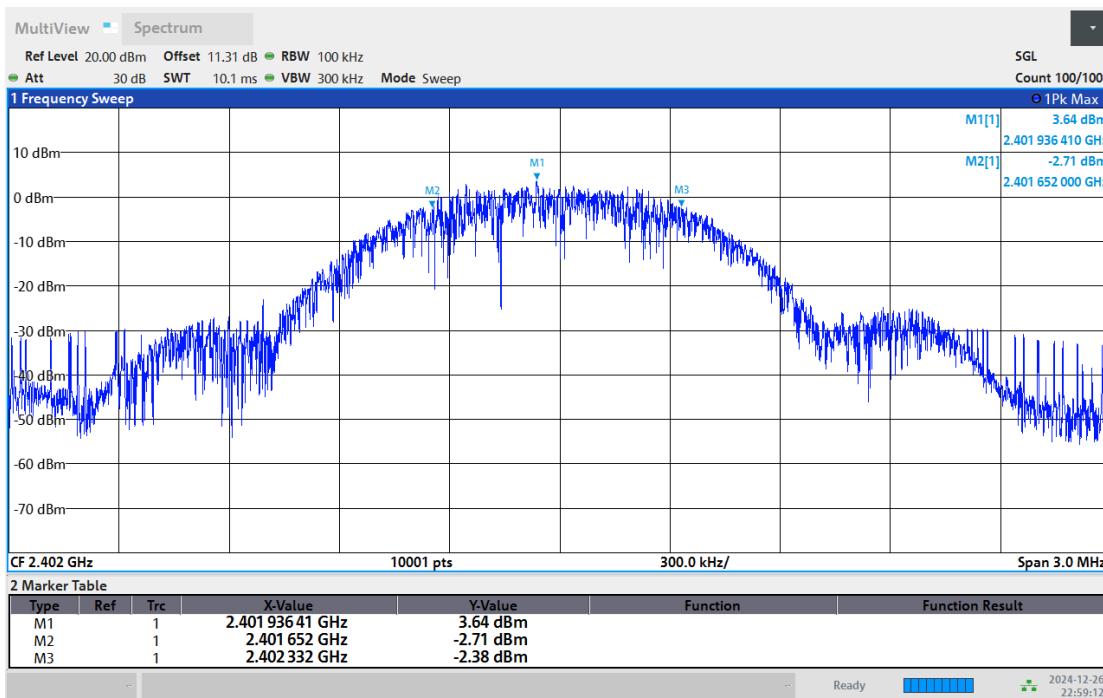
Port under test	Antenna port	
Test method applied	<input checked="" type="checkbox"/>	Conducted measurement
	<input type="checkbox"/>	Radiated measurement
Test setup	Refer to the Annex 3 for test setup photo(s).	
Operating mode(s) used	Mode 1	
Remark	---	

## Results

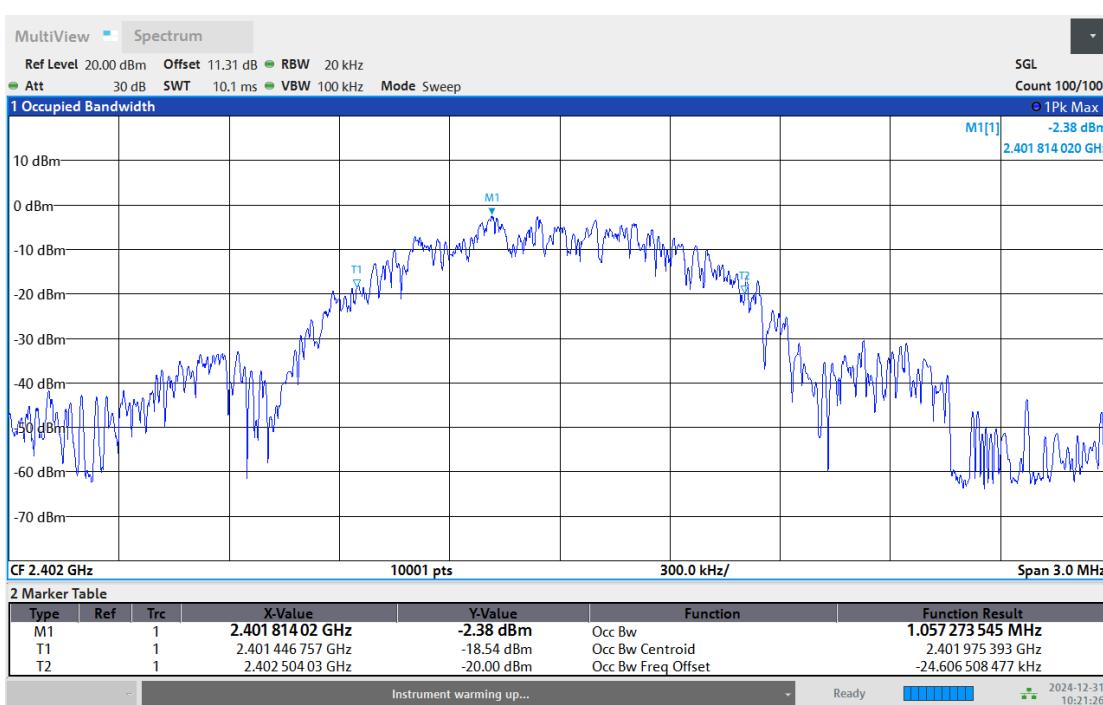
Mode	Test Freq. (MHz)	6dB Occupied Bandwidth (MHz)	Limit (MHz)	Result
SRD	2402	0.680	>0.5	Pass
	2440	0.699	>0.5	
	2480	0.718	>0.5	Pass

Mode	Test Freq. (MHz)	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
SRD	2402	1.057	Within frequency range	Pass
	2440	1.067	Within frequency range	Pass
	2480	1.106	Within frequency range	Pass

**DTS Bandwidth**  
**2402MHz**

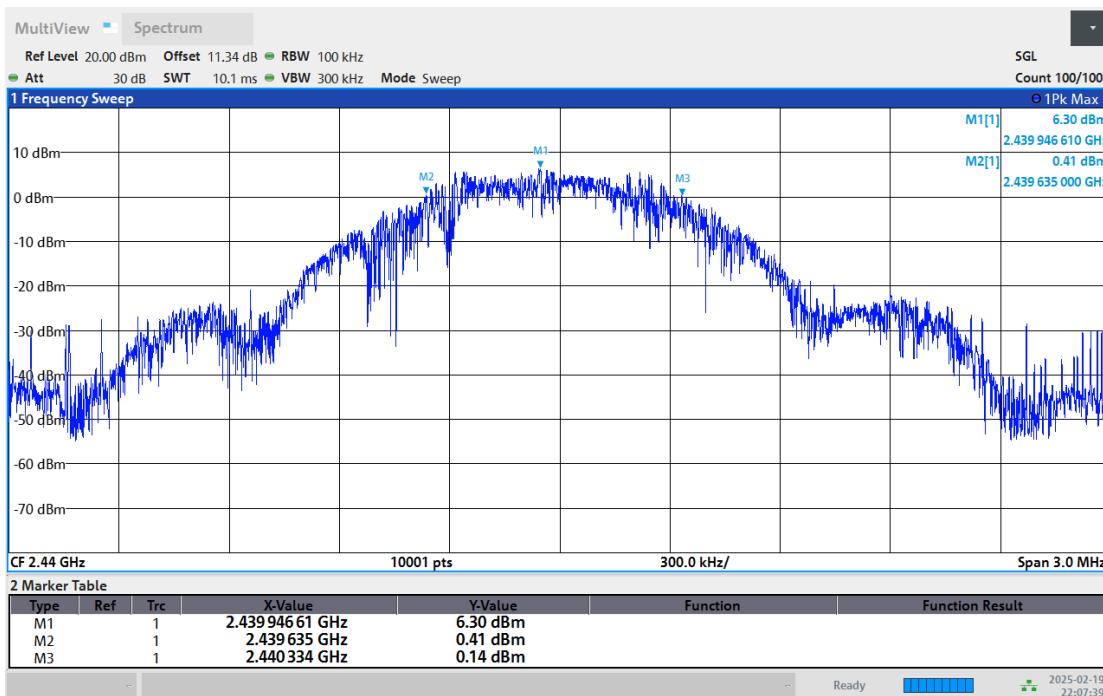


6dB Bandwidth

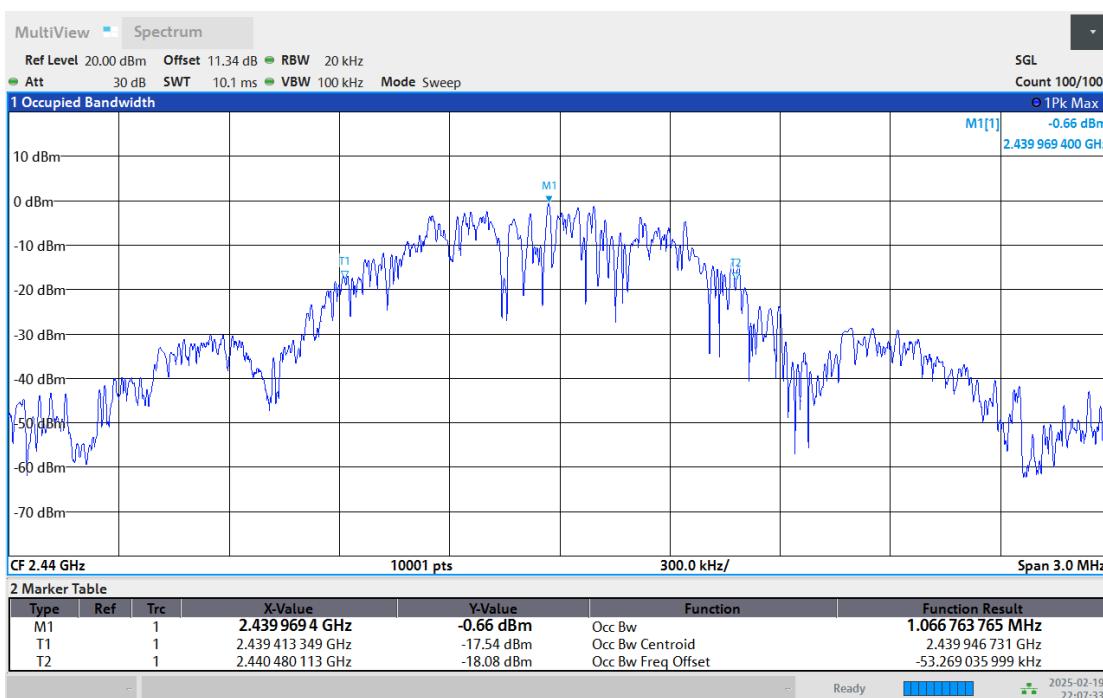


99% Occupied Bandwidth

## 2440MHz

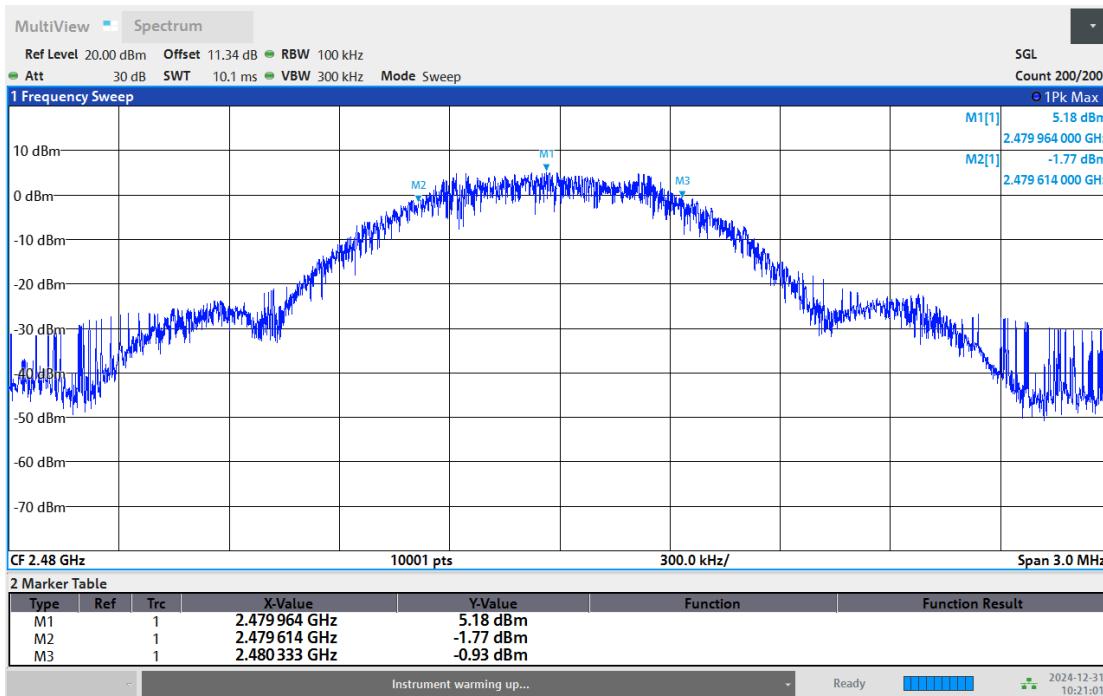


## 6dB Bandwidth

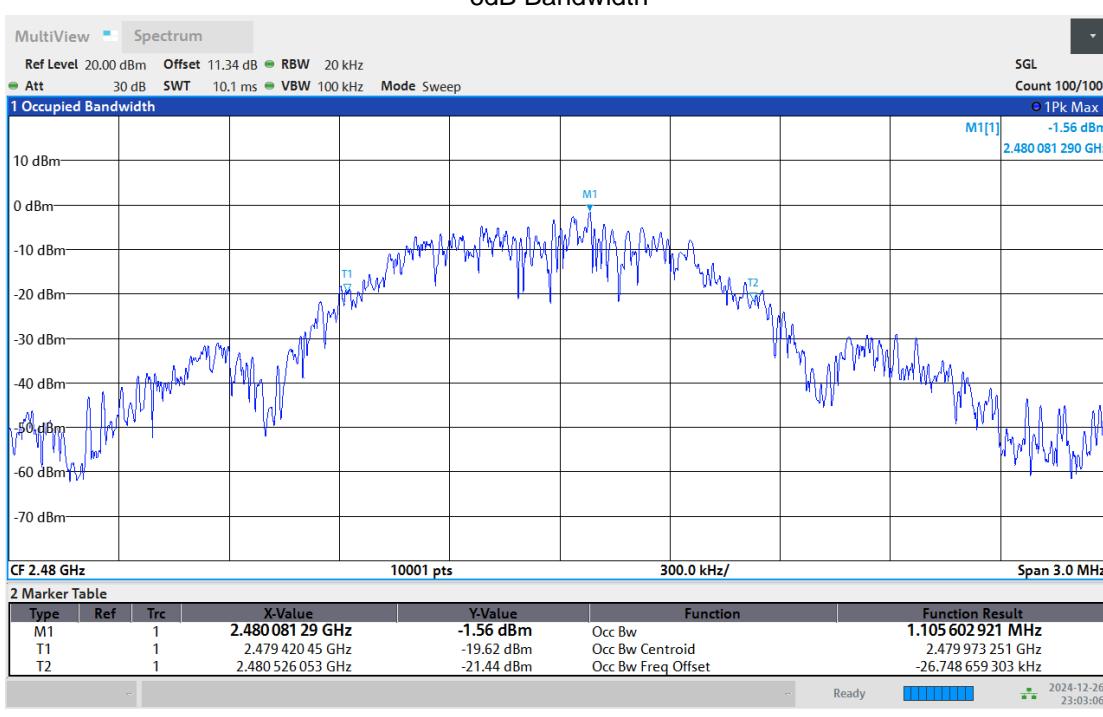


## 99% Occupied Bandwidth

## 2480MHz



## 6dB Bandwidth



## 99% Occupied Bandwidth

**4.7 Fundamental emission output power**

**VERDICT: PASS**

**Limit**

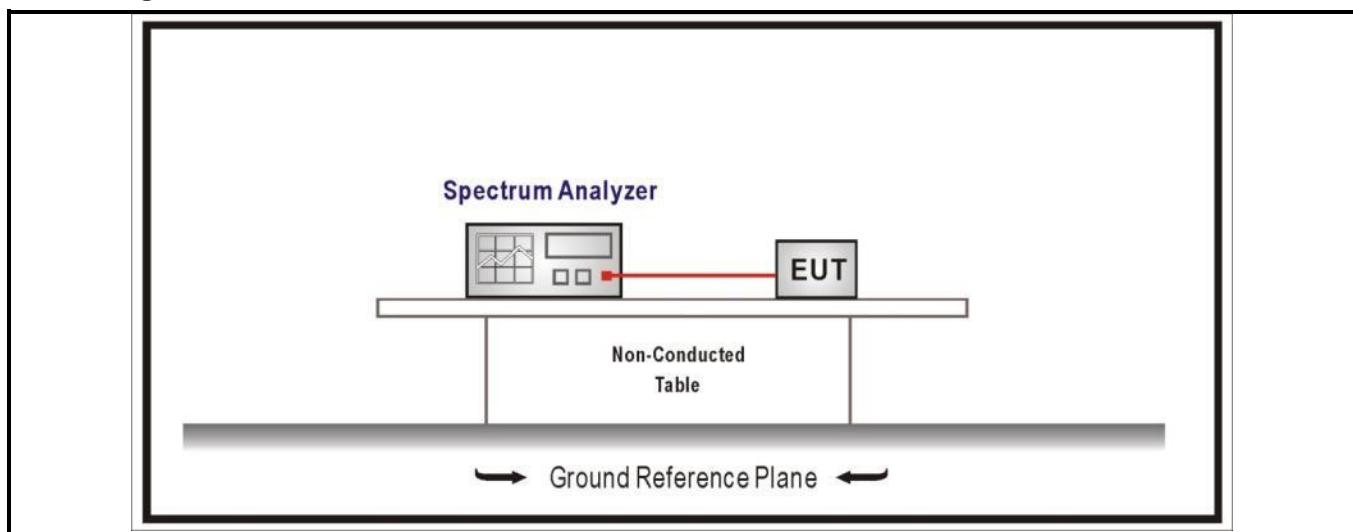
<b>Standard</b>		FCC Part 15 Subpart C Paragraph 15.247 (b)(3) & RSS-247 Issue 2 Section 5.4(d)
<input checked="" type="checkbox"/>	GTX <6dBi	Pout≤30dBm, EIRP≤36dBm
<input type="checkbox"/>	GTX >6dBi	
<input type="checkbox"/>	Non-Fix point-point	Pout≤30-( GTX -6), EIRP≤36dBm
<input type="checkbox"/>	Fix point-point	Pout≤30-[(GTX-6)]/3, EIRP≤36dBm
<input type="checkbox"/>	Point-to-multipoint	Pout≤30-(GTX-6) , EIRP≤36dBm
<input type="checkbox"/>	Overlap Beams	Pout≤30-[(GTX-6)]/3, EIRP≤36dBm
<input type="checkbox"/>	Aggregate power transmitted simultaneously on all beams	Pout≤30-[(GTX-6)]/3, EIRP≤36dBm
<input type="checkbox"/>	singby LE directional beam	Pout≤30-[(GTX-6)]/3+8dB, EIRP≤36dBm

Note 1 : GTX directional gain of transmitting antennas.

Note 2 : Pout is maximum peak conducted output power .

Note 3 : EIRP is equivalent isotropically radiated power.

**Test Configuration**



**Performed measurements**

Port under test	Antenna port	
Test method applied	<input checked="" type="checkbox"/>	Conducted measurement
	<input type="checkbox"/>	Radiated measurement
Test setup	Refer to the Annex 3 for test setup photo(s).	
Operating mode(s) used	Mode 1	
Remark	---	

See next page.

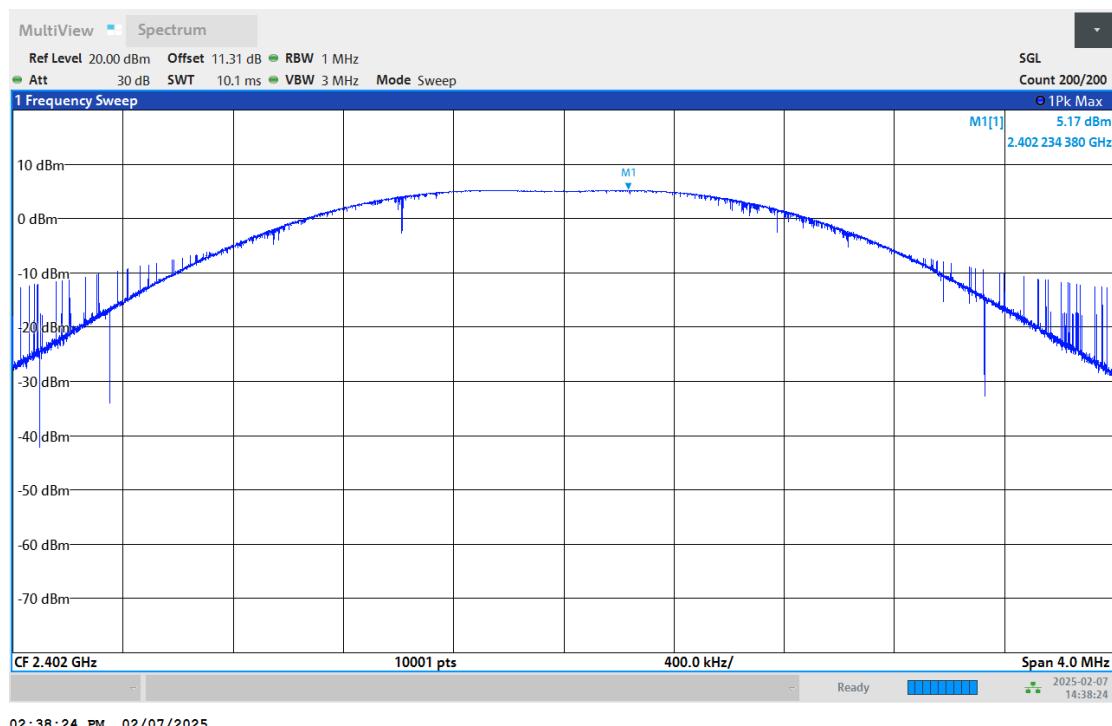
## Results

Mode	Test Frequency (MHz)	Output Power (dBm)	Output Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)	Result
SRD	2402	5.17	≤30	11.45	≤36	Pass
	2440	6.22	≤30	12.50	≤36	Pass
	2480	6.23	≤30	12.51	≤36	Pass

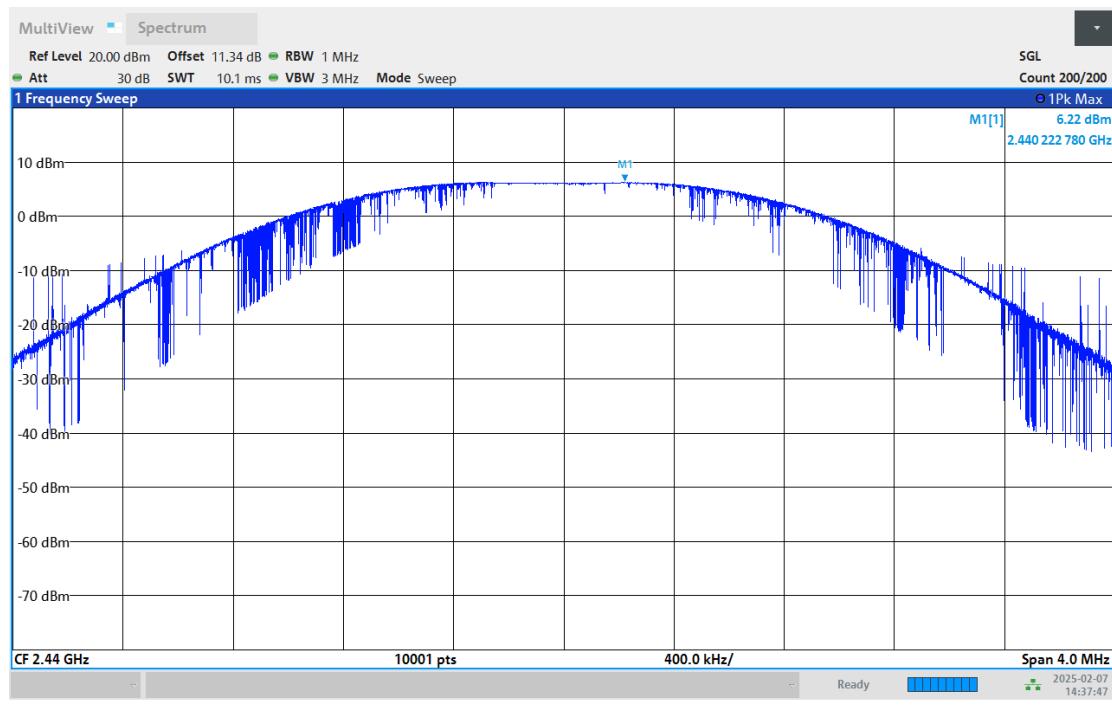
Note: EIRP = Output Power + Antenna Gain

Antenna Gain=6.28 dBi

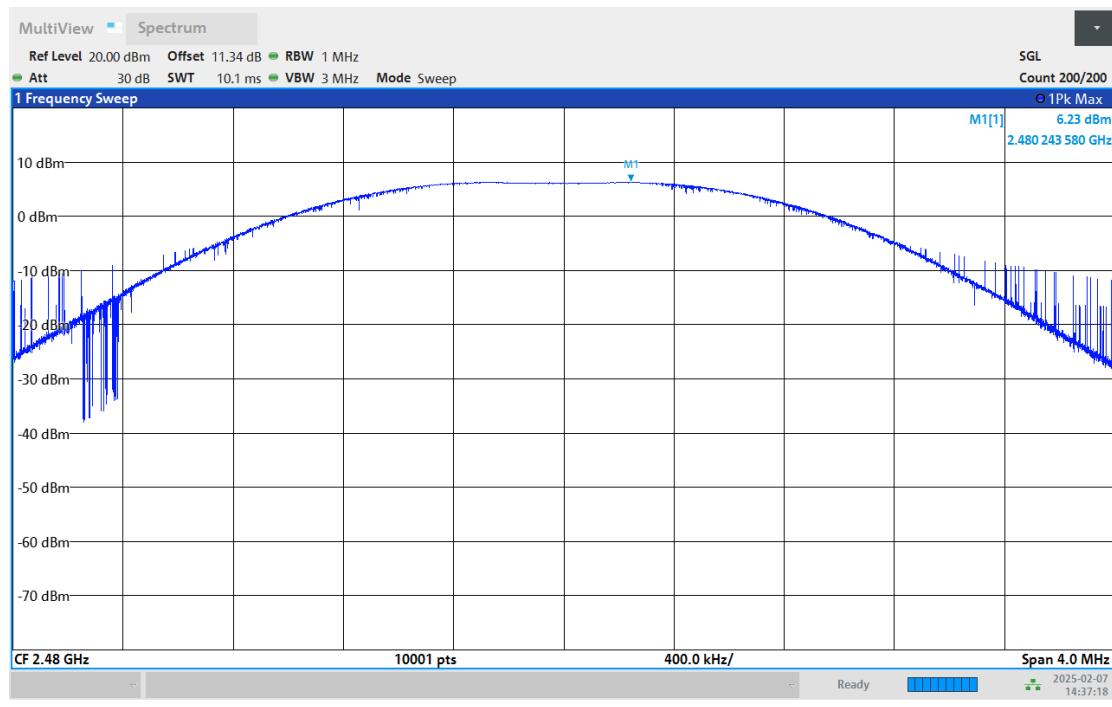
## 2402MHz



## 2440MHz



## 2480MHz



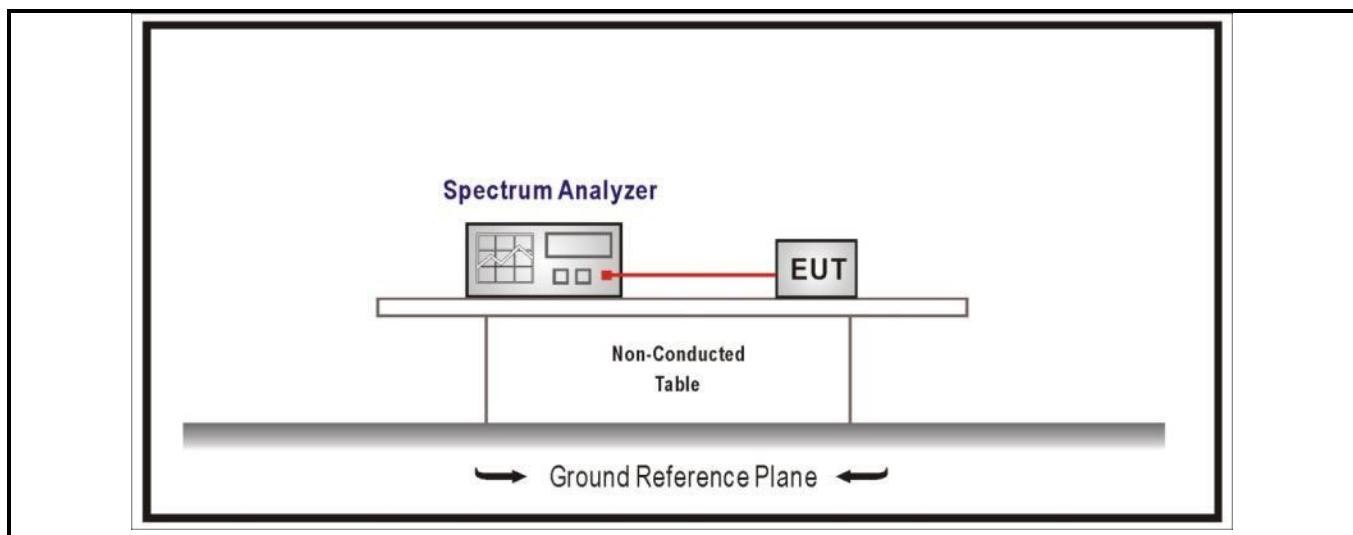
## 4.8 Power Spectral Density

**VERDICT: PASS**

### Limit

<b>Standard</b>	FCC Part 15 Subpart C Paragraph 15.247 (b)(3) & RSS-247 Issue 2 Section 5.2(b)
Power Spectral Density≤8dBm/3kHz	

### Test Configuration



### Performed measurements

Port under test	Antenna port	
Test method applied	<input checked="" type="checkbox"/>	Conducted measurement
	<input type="checkbox"/>	Radiated measurement
Test setup	Refer to the Annex 3 for test setup photo(s).	
Operating mode(s) used	Mode 1	
Remark	---	

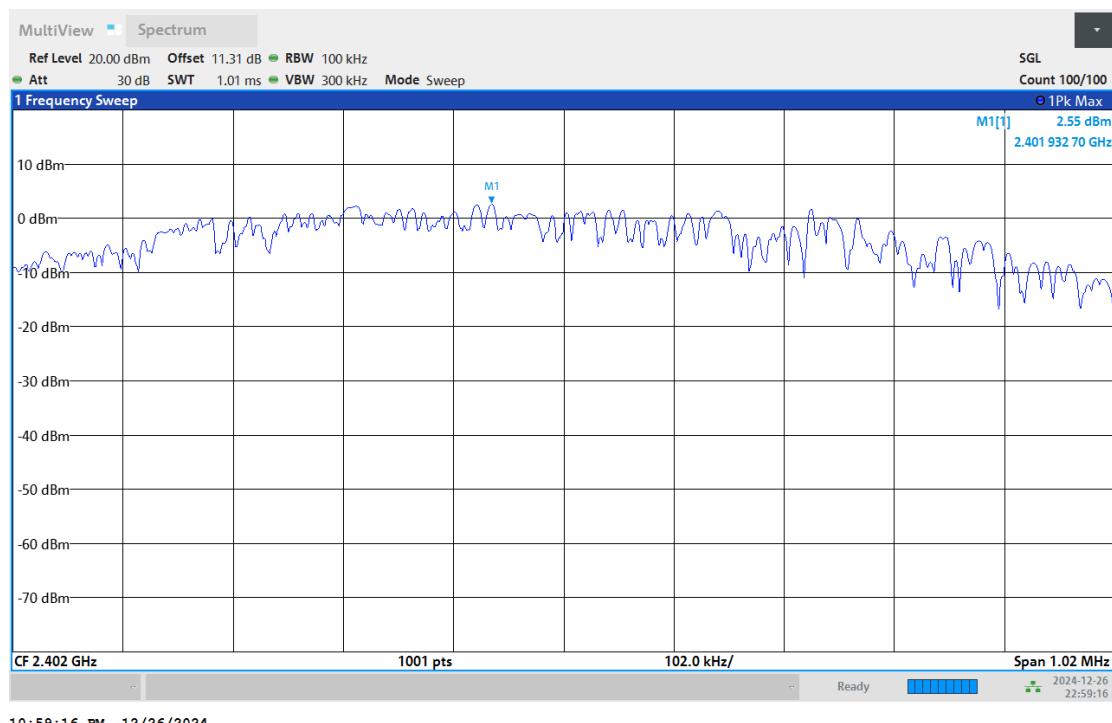
See next page.

## Results

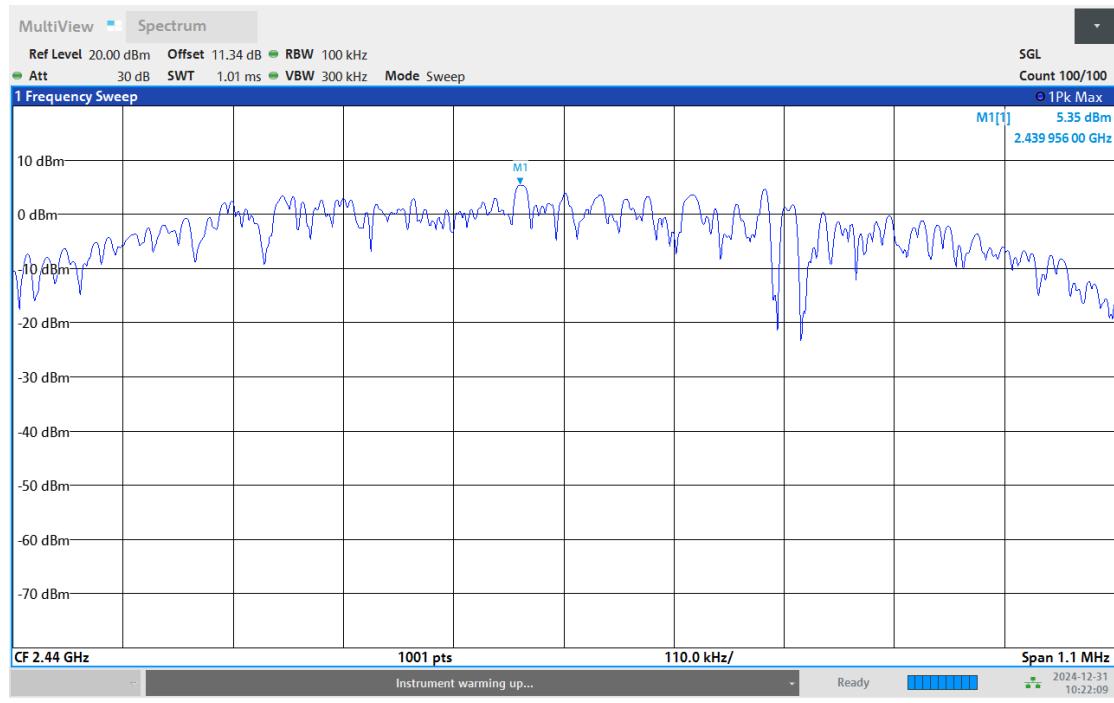
Mode	Test Frequency (MHz)	Power Spectral Density (dBm)	Limit (dBm/3kHz)	Result
SRD	2402	2.55	≤8	Pass
	2440	5.35	≤8	Pass
	2480	3.87	≤8	Pass

## Power Spectral Density

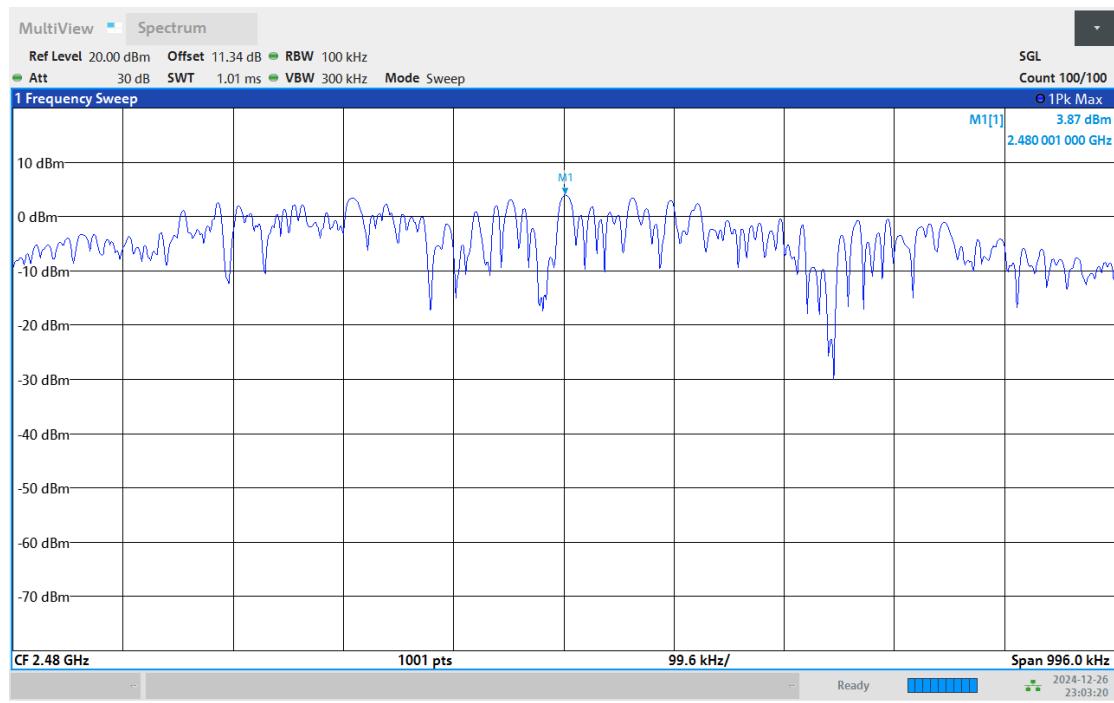
2402MHz



## 2440MHz



## 2480MHz, 1Mbps



## 4.9 Antenna Requirement

VERDICT: PASS

### Limit

Standard	FCC Part 15 Subpart C Paragraph 15.203
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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.	
Standard	RSS-Gen Issue 5 Section 6.8
A transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns.	

### Antenna Connector Construction

<input checked="" type="checkbox"/>	The use of a permanently attached antenna
<input type="checkbox"/>	The antenna use of a unique coupling to the intentional radiator
<input type="checkbox"/>	The use of a nonstandard antenna jack or electrical connector
Please refer to the attached document "Internal Photograph" to show the antenna connector.	

## 5 IDENTIFICATION OF THE EQUIPMENT UNDER TEST

Remark: The test setup photo and EUT Photo please see appendix.

## ANNEX 1 – MEASUREMENT UNCERTAINTY

Uncertainties have been calculated according to the DEKRA internal document. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95%.

Test Item	Uncertainty	
AC Power Line Conducted Emission	2.7 dB	
Radio frequency & Bandwidth	2 ppm	
RF power, conducted	0.216 dB	
Dwell Time	2.016 ms	
Spurious emissions, radiated	(9KHz~30MHz)	2.26 dB
	(30MHz~1GHz)	Horizontal: 3.992 dB
		Vertical: 3.986 dB
	(1GHz~8GHz)	Horizontal: 4.382 dB
		Vertical: 4.140 dB
	(8GHz~12.75GHz)	Horizontal: 4.266 dB
		Vertical: 4.186 dB
(12.75GHz~18GHz)	Horizontal: 4.694 dB	
	Vertical: 4.034 dB	
(18GHz~40GHz)	Horizontal: 4.010 dB	
	Vertical: 4.024 dB	
Humidity	1.4 %	
Temperature	0.5 °C	

## ANNEX 2 – USED EQUIPMENT

### For AC Power Line Conducted Emission - Shielded Room No.1

Equipment Name	Manufacturer	Type/Model	Serial Number	Last Cal Date	Cal Due date
EMI Test Receiver	ROHDE & SCHWARZ	ESR3	102958	2024/06/14	2025/06/13
Artificial Mains Network	ROHDE & SCHWARZ	ENV216	102772	2024/06/14	2025/06/13
Software	ROHDE & SCHWARZ	ELEKTRA	4.32.0	N/A	N/A

### For Radiated Emission (30 MHz to 1000 MHz) - Anechoic Chamber No.1

Equipment Name	Manufacturer	Type/Model	Serial Number	Last Cal Date	Cal Due date
EMI Test Receiver	ROHDE & SCHWARZ	ESR7	102433	2023/11/29	2024/11/28
Trilog Broadband Antenna+Attenuator	SCHWARZBECK	VULB9163/6dB	01514	2024/03/13	2025/03/12
Open Switch and Control Unit	ROHDE & SCHWARZ	OSP220	102232	N/A	N/A
Software	ROHDE & SCHWARZ	ELEKTRA	4.20.2	N/A	N/A

### For Spurious Emissions Test - Anechoic Chamber No.2

Equipment Name	Manufacturer	Type/Model	Serial Number	Last Cal Date	Cal Due date
Wideband Radio Communication Tester	ROHDE & SCHWARZ	CMW500	171082	2024/01/22	2025/01/21
Signal & Spectrum Analyzer	ROHDE & SCHWARZ	FSV3044	101286	2024/01/22	2025/01/21
FILTERBANK	ROHDE & SCHWARZ	N/A	100778	N/A	N/A
Open Switch and Control Unit	ROHDE & SCHWARZ	OSP220	102454	N/A	N/A
System Controller Interface	ROHDE & SCHWARZ	SCI-200	520020123	N/A	N/A
Trilog Boroadband Antenna	Schwarzbeck	VULB9163	01514	2024/02/29	2025/02/28
Wave Guide Antenna	Schwarzbeck	3117	00240298	2024/03/01	2025/02/28
Antenna	Schwarzbeck	QMS-00208	27745	2024/03/01	2025/02/28
Antenna	Schwarzbeck	QMS-00880	27646	2024/03/01	2025/02/28
Pre-Amplifie	ROHDE & SCHWARZ	SCU08F1	101136	2024/01/22	2025/01/21
Pre-Amplifie	ROHDE & SCHWARZ	SCU18F	100971	2024/03/13	2025/03/12
Pre-Amplifie	ROHDE &	SCU18F	100970	2024/03/13	2025/03/12

	SCHWARZ				
Pre-Amplifie	ROHDE & SCHWARZ	SCU40F1	100631	2024/03/13	2025/03/12
Software	ROHDE & SCHWARZ	ELEKTRA	4.52.1	N/A	N/A

**For other test items - Shielded Room (RF)**

Equipment Name	Manufacturer	Type/Model	Serial Number	Last Cal Date	Cal Due date
Vector signal generator	ROHDE & SCHWARZ	SMM100A	101780	2024/01/22	2025/01/21
Open switch and control platform	ROHDE & SCHWARZ	OSP150	100856	2024/11/22	2025/11/21
Signal & Spectrum Analyzer	ROHDE & SCHWARZ	FSV3044	101287	2024/04/02	2025/04/01
Wireless Connectivity Tester	ROHDE & SCHWARZ	CMW270	102651	2024/01/22	2025/01/21
Signal Generator	ROHDE & SCHWARZ	SMB100A	183222	2024/01/22	2025/01/21
DC Power Supply	apc	ADC-0800100-15	D222120022	2024/11/22	2025/11/21
Temperature & Humidity Chamber	HESON	HS-225B	CDW230301-01	2024/03/13	2025/03/12
Software	MWRFtest	MTS 8310	2.0.0.0	N/A	N/A

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