

TEST REPORT

For

Watch

Model Number: OPWE242

FCC ID: 2ABZ2-OPWE242

IC: 12739A-OPWE242

Report Number : WT248002354

Test Laboratory : Shenzhen Academy of Metrology and Quality Inspection

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The "important statement" on the back of report's homepage is an element of the report, and any copy that does not contain the "important statement" is incomplete.

Revision History

No	Date	Remark
V1.0	2025.013.11	Initial issue

TEST REPORT DECLARATION

Applicant : OnePlus Technology (Shenzhen) Co., Ltd.
Address : 18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building,
Binhe Avenue North, Futian District, Shenzhen, Guangdong,
518100, P.R. China
Manufacturer : OnePlus Technology (Shenzhen) Co., Ltd.
Address : 18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building,
Binhe Avenue North, Futian District, Shenzhen, Guangdong,
518100, P.R. China
EUT Description : Watch
Model No. : OPWE242
Trade mark : ONEPLUS
HVIN : OPWE242
FCC ID : 2ABZ2-OPWE242
IC : 12739A-OPWE242

Test Standards:

FCC Part 15 Subpart C
RSS-247 Issue 3 (2023-08)
RSS-GEN Issue 5 (2021-02)

The EUT described above is tested by Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory to determine the maximum emissions from the EUT. Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory is assumed full responsibility for the accuracy of the test results, unless they depend on the manufacturer information.

The test report is valid for above tested sample only and shall not be reproduced in part without written approval of the laboratory.

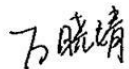
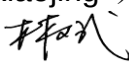
Project Engineer:	 (Chen Silin 陈司林)	Date:	<u>Mar. 11, 2025</u>
Checked by:	 (Wan Xiaojing 万晓婧)	Date:	<u>Mar. 11, 2025</u>
Approved by:	 (Lin Bin 林斌)	Date:	<u>Mar. 11, 2025</u>

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1. TEST RESULTS SUMMARY

Table 1 Test Results Summary

Test Items	FCC Rules	ISED Rules	Test Result
20dB bandwidth measurement	15.247 (a) (1)	RSS-247 Clause 5.1(a)	Pass
Carrier frequency separation measurement	15.247 (a) (1)	RSS-247 Clause 5.1(b)	Pass
Number of hopping channel	15.247 (a) (1) III	RSS-247 Clause 5.1(d)	Pass
Time of occupancy	15.247 (a) (1) III	RSS-247 Clause 5.1(d)	Pass
Maximum conducted output power	15.247 (b) (1)	RSS-247 Clause 5.4(b)	Pass
Radiated spurious emission & Radiated restricted band measurement	15.247 (d) / 15.205 & 15.209	RSS-Gen Clause 8.9 RSS-247 Clause 5.5	Pass
Conducted Bandedge and Spurious	15.247 (d)	RSS-247 Clause 5.5	Pass
Conducted emission	15.207	RSS-GEN Clause 8.8	Pass
99% Occupied bandwidth	N/A	RSS-Gen Clause 6.7	Pass
Antenna requirements	15.203	RSS-GEN Clause 6.8	Pass

Remark: "N/A" means "Not applicable."

2. GENERAL INFORMATION

2.1. Report Information

This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that SMQ approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that SMQ in any way guarantees the later performance of the product/equipment.

The sample/s mentioned in this report is/are supplied by Applicant, SMQ therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.

Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through SMQ, unless the applicant has authorized SMQ in writing to do so.

The lab will not be liable for any loss or damage resulting for false, inaccurate, inappropriate or incomplete product information provided by the applicant/manufacturer.

2.2. Laboratory Accreditation and Relationship to Customer

The testing report were performed by the Shenzhen Academy of Metrology and quality Inspection EMC Laboratory (Guangdong EMC compliance testing center), in their facilities located at NETC Building, No.4 Tongfa Rd., Xili, Nanshan, Shenzhen, China. At the time of testing, Laboratory is accredited by the following organizations:

China National Accreditation Service for Conformity Assessment (CNAS) accredits the Laboratory for conformance to FCC standards, EMC international standards and EN standards. The Registration Number is CNAS L0579.

The Laboratory is Accredited Testing Laboratory of FCC with Designation number CN1165 and Site registration number 582918.

The Laboratory is registered to perform emission tests with Innovation, Science and Economic Development (ISED), and the registration number is 11177A.

The Laboratory is registered to perform emission tests with VCCI, and the registration number are C-20048, G20076, R-20077, R-20078 and T-20047.

The Laboratory is Accredited Testing Laboratory of American Association for Laboratory Accreditation (A2LA) and certificate number is 3292.01.

2.3.Measurement Uncertainty

Conducted Emission

9 kHz~150 kHz $U=3.7\text{dB}$ $k=2$

150 kHz~30MHz $U=3.3\text{dB}$ $k=2$

Radiated Emission

30MHz~1000MHz $U=4.3\text{dB}$ $k=2$

1GHz~6GHz $U=4.6\text{ dB}$ $k=2$

6GHz~40GHz $U=5.1\text{dB}$ $k=2$

3. PRODUCT DESCRIPTION

NOTE: The extreme test conditions for temperature and antenna gain were declared by the manufacturer.

3.1. EUT Description

Description : Watch
Manufacturer : OnePlus Technology (Shenzhen) Co., Ltd.
Model Number : OPWE242
Operate Frequency : 2.402 GHz~2.480 GHz
Antenna Designation : Monopole Antenna
Antenna Gain: -3.5 dBi
Operating Voltage : DC 3.92 V
Software Version : OPWE242_11_A.02
Hardware Version : XK935
Remark: /

Bluetooth:

Table 2 Working Frequency List

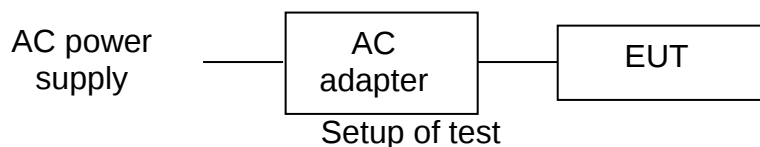
Regulatory Range	RF Channels
2.400-2.4835 GHz	f=2402+k MHz, k=0, ... ,78

3.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **2ABZ2-OPWE242** filing to comply with Section 15.207, 15.209, 15.247 of the FCC Part 15 Subpart C.

This submittal(s) (test report) is intended for IC: **12739A-OPWE242** filing to comply with RSS-247 and RSS-GEN.

3.3. Block Diagram of EUT Configuration



3.4. Operating Condition of EUT

The transmitter has a maximum peak conducted output power of Basic rate GFSK modulation and EDR mode 8DPSK modulation. Tests were performed with Basic rate GFSK modulation and EDR mode 8DPSK modulation.

3.5.Support Equipment List

Table 3 Support Equipment List

Name	Model No	S/N	Manufacturer
Adapter	VCB3HDUH	---	Huizhou Golden Lake Industrial Co., Ltd.

3.6.Test Conditions

Date of test: Dec.24, 2024- Mar.11, 2025

Date of EUT Receive: Dec.10, 2024

Temperature: 20 °C-25 °C

Relative Humidity: 25%-52%

3.7.Special Accessories

Not available for this EUT intended for grant.

3.8.Equipment Modifications

Not available for this EUT intended for grant.

3.9.Equipment Requirements

The device is designed according to specifications of SIG. So, it has a full support to Medium access protocol and fully compliant with the KDB558074 standard. The device is compliant Pseudorandom hopping, Equal hopping frequency, receiver bandwidth synchronizes and have same bandwidth with transmitted signal. And the ability to have adaptive hopping when encountering other signals.

4. TEST EQUIPMENT USED

Table 4 Test Equipment

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
SB9054/05	Test Receiver	R&S	ESCI	Jun.17, 2024	1 Year
SB8501/06	AMN	R&S	ESH-Z5	Jan.16, 2024	1 Year
SB9549	Shielded Room	Albatross	SR	Aug.28, 2024	1 Year
SB17366	Test Receiver	R&S	ESR26	Apr.30, 2024	1 Year
SB3345	Loop Antenna	Schwarzbeck	FMZB1516	Jan.12, 2024	1 Year
SB3955	Broadband Antenna	SCHWARZBECK	VULB9163	Apr.30, 2024	1 Year
SB9555/01	Semi Anechoic Chamber	Albatross	9×6×6(m)	Aug.12, 2024	1 Year
SB8501/09	Test Receiver	R&S	ESU40	Jan.17, 2024	1 Year
SB3435	Horn Antenna	R&S	HF906	Nov.19, 2024	1 Year
SB9058/03	Pre-Amplifier	R&S	SCU 18	Jan.16, 2024	1 Year
SB8501/11	Antenna	R&S	3160-09	Feb.22, 2023	3 Years
SB8501/16	Pre-Amplifier	R&S	SCU-26	Jan.16, 2024	1 Year
SB9555/02	Fully Anechoic Chamber	Albatross	10.0×5.2×5.4(m)	Aug.08, 2024	1 Year
SB9060	Signal Analyzer	R&S	FSQ40	Apr.22, 2024	1 Year

Table 5 Test software

Name	Manufacturer	Version
Bluetooth and WiFi Test System	Shenzhen JS tonscond co.,ltd	3.3.10

5. CONDUCTED EMISSION TEST

5.1. Test Standard and Limit

5.1.1. Test Standard

FCC Part 15 15.207
RSS-Gen Clause 8.8

5.1.2. Test Limit

Table 6 Conducted Emission Test Limit

Frequency	Maximum RF Line Voltage (dB μ V)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

* Decreasing linearly with logarithm of the frequency

* The lower limit shall apply at the transition frequency.

5.2. Test Procedure

The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI test receiver is used to test the emissions from both sides of AC line.

Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

The bandwidth of EMI test receiver is set at 9 kHz.

5.3. Test Arrangement

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

5.4. Test Data

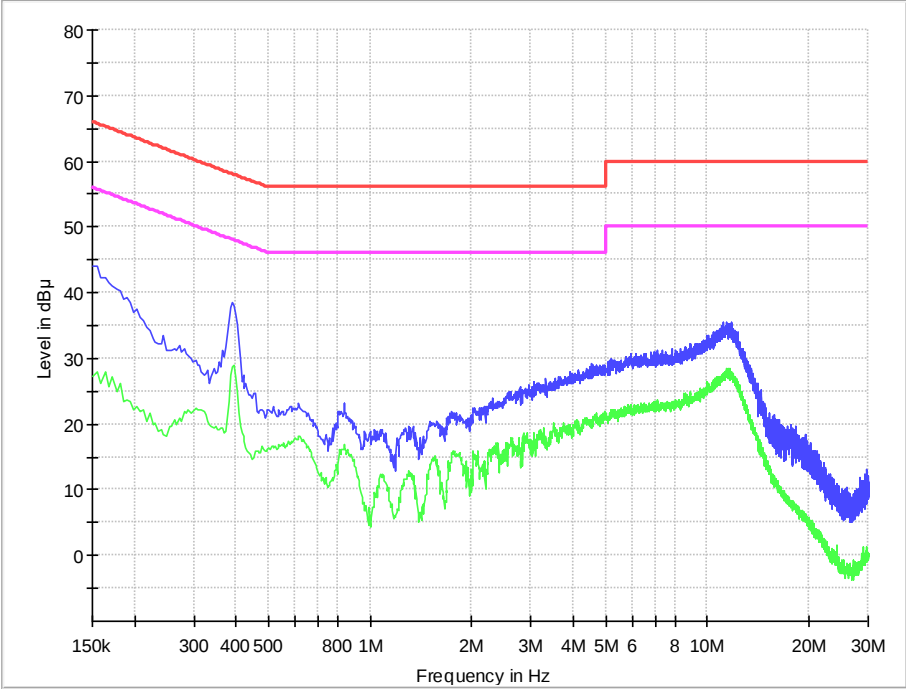
The emissions don't show in below are too low against the limits. Refer to the test curves.

Table 7 Conducted Emission Test Data

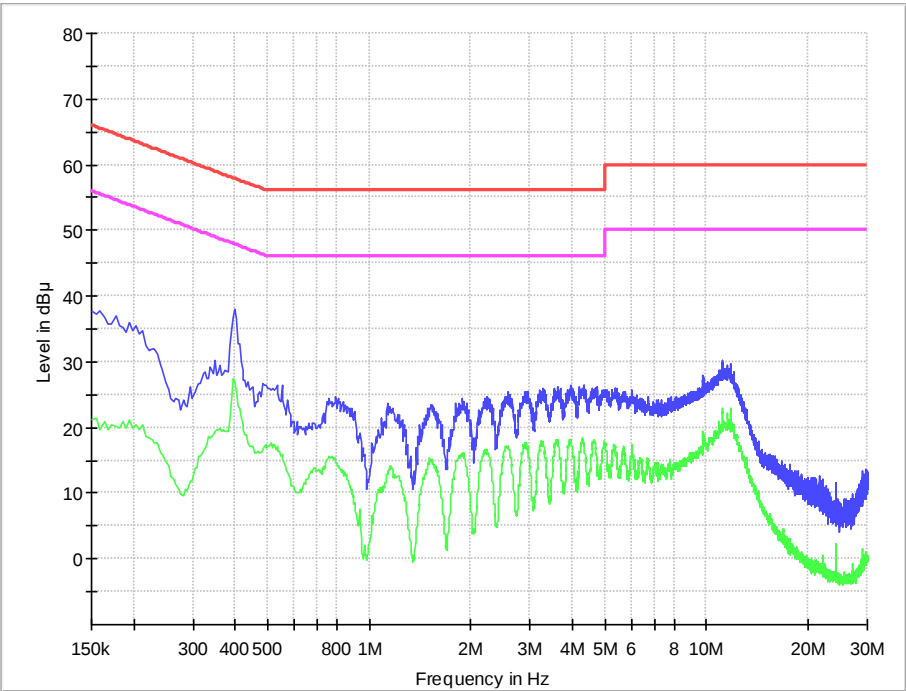
Test mode: Charging and Transmitting								
	Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
			Reading (dB μ V)	Emission Level (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Emission Level (dB μ V)	Limit (dB μ V)
Line	0.15	9.7	32.0	41.7	66	19.0	28.7	56
	0.204	9.7	24.7	34.4	63.4	12.4	22.1	53.4
	0.388	9.7	26.5	36.2	58.1	19.2	28.9	48.1
	0.838	9.8	12.0	21.8	56	7.0	16.8	46
	3.795	9.9	15.3	25.2	56	10.3	20.2	46
	11.838	9.9	21.7	31.6	60	18.8	28.7	50
Neutral	0.150	9.7	25.2	34.9	66	10.5	20.2	56
	0.195	9.7	23.1	32.8	63.8	11.4	21.1	53.8
	0.397	9.7	25.7	35.4	57.9	17.3	27.0	47.9
	0.793	9.8	11.0	20.8	56	4.8	14.6	46
	1.172	9.8	10.3	20.1	56	4.4	14.2	46
	4.200	9.9	14.3	24.2	56	7.9	17.8	46

REMARKS: 1. Emission level (dB μ V) =Read Value (dB μ V) + Correction Factor (dB)
2. Correction Factor (dB) =LISN Factor (dB) + Cable Factor (dB) +Limiter Factor (dB)
3. The other emission levels were very low against the limit.

Line



Neutral



6. RADIATED EMISSION TEST

6.1. Test Standard and Limit

6.1.1. Test Standard

FCC Part 15 15.209
RSS-247 Clause 5.5
RSS GEN Clause 8.9

6.1.2. Test Limit

Table 8 Radiation Emission Test Limit for FCC (Class B) (9 kHz-1GHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

Table 9 Radiation Emission Test Limit for FCC (Class B) (Above 1G)

Frequency (MHz)	(dBuV/m) (at 3 meters)	
	PEAK	AVERAGE
Above 1000	74	54

* The lower limit shall apply at the transition frequency.

* The test distance is 3m.

Table 10 Restricted Band Radiated Emission Data

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 -	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.17775	73 - 74.6	1645.5 -	9.3 - 9.5
4.20725 -	74.8 - 75.2	1646.5	10.6-12.7
4.20775	108 - 121.94	1660 - 1710	13.25-13.4
6.215 - 6.218	123 - 138	1718.8 -	14.47-14.5
6.26775 -	149.9 - 150.05	1722.2	15.35-16.2
6.26825	156.52475 -	2200 - 2300	17.7-21.4
6.31175 -	156.52525	2310 - 2390	22.01-23.12
6.31225	156.7 - 156.9	2483.5 - 2500	23.6-24.0
8.291 - 8.294	162.0125 - 167.17	2655 - 2900	31.2-31.8

8.362 - 8.366		167.72 - 173.2	3260 - 3267	36.43-36.5
8.37625	-	240 - 285	3332 - 3339	(²)
8.38675		322 - 335.4	3345.8 - 3358	
8.41425	-		3600 - 4400	
8.41475				
12.29 - 12.293				
12.51975	-			
12.52025				
12.57675	-			
12.57725				
13.36 - 13.41				

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

6.2. Test Procedure

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10-2013. The EUT is set to transmit in a continuous mode. Radiated measurements were performed on the frequency range from 30MHz to 25GHz. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz, VBW≥RBW. All readings above 1 GHz are AV and PK values. RBW=1MHz and 1/T (10Hz) for AV value, RBW=1MHz and VBW≥RBW for peak value. Measurements were made at 3 meters.

6.3. Test Arrangement

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

6.4. Test Data

The emissions don't show in following result tables are more than 20dB below the limits. Bluetooth basic rate and Bluetooth EDR mode were tested, below only shows worst case result of Bluetooth basic rate.

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

9 kHz-30MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

Table 11 Radiated Emission Test Data 9k Hz-30MHz

Frequency (MHz)	Cable Loss +preamp (dB)	Antenna Factor (dB)	Reading (dBµV/m)	Level (dBµV/m)	Polarity (H/V)	Limit (dBµV/m)	Margin (dB)	Note
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--

30MHz-1GHz

Worst case is shown below for 30MHz-1GHz only.

The emissions don't show in following result tables are more than 20dB below the limits.

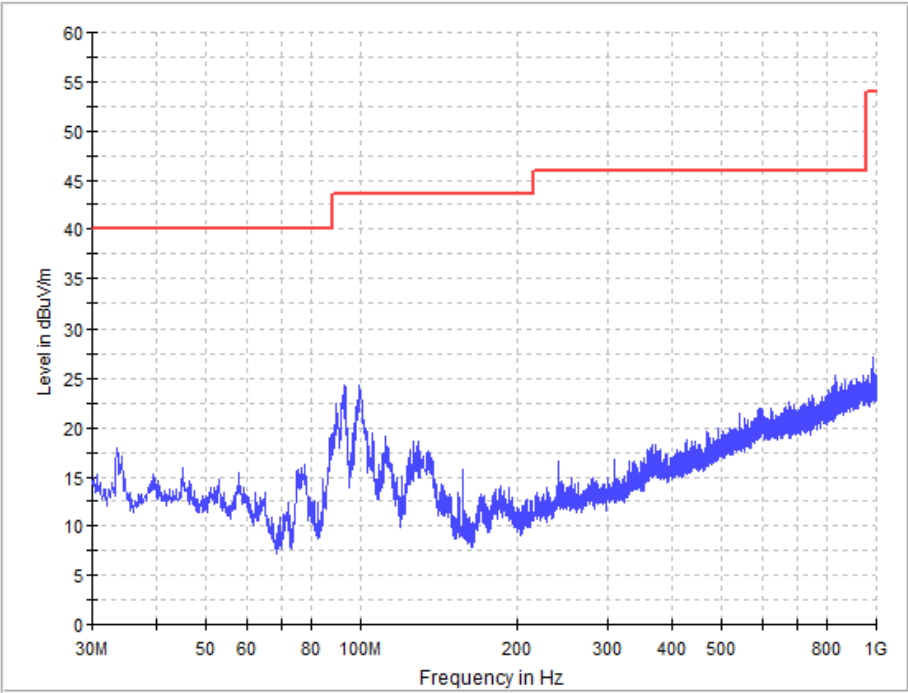
Table 12 Radiated Emission Test Data 30MHz-1GHz

Frequency (MHz)	Cable Loss +preamp (dB)	Antenna Factor (dB)	Reading (dBµV/m)	Level (dBµV/m)	Polarity (Horizontal/ Vertical)	Limit (dBµV/m)	Margin (dB)	Note
33.449	0.7	12.3	14.7	27.7	Vertical	40.0	12.3	QP
57.806	0.8	13.0	13.7	27.5	Vertical	40.0	12.5	QP
78.284	1.1	7.8	16.2	25.1	Vertical	40.0	14.9	QP
92.511	1.1	11.9	17.2	30.2	Vertical	43.5	13.3	QP
99.517	1.1	12.8	10.4	24.3	Vertical	43.5	19.2	QP
180.566	1.6	9.7	8.4	19.7	Vertical	43.5	23.8	QP
33.448	0.7	12.3	2.3	15.3	Horizontal	40	24.7	QP
44.873	0.7	13.6	1.5	15.8	Horizontal	40	24.2	QP
77.745	1.0	7.8	3.5	12.3	Horizontal	40	27.7	QP
93.050	1.1	11.9	6.5	19.5	Horizontal	43.5	24.0	QP
99.516	1.1	12.8	9.0	22.9	Horizontal	43.5	20.6	QP
129.587	1.3	10.5	2.5	14.3	Horizontal	43.5	29.2	QP

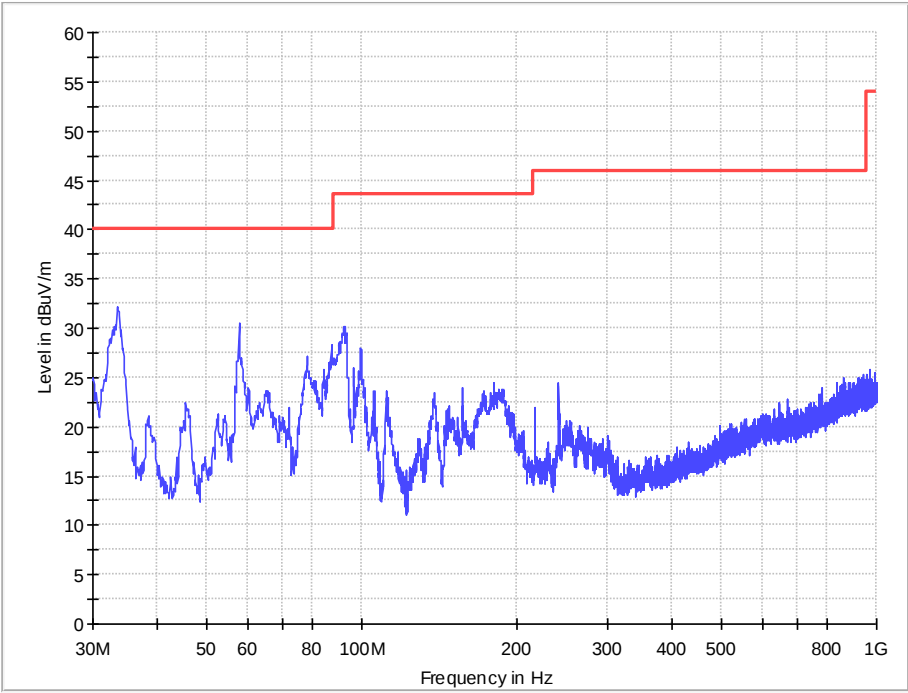
Remark: Emission level (dBµV)=Read Value(dBµV/m) + Antenna Factor(dB)+ Cable Loss +preamp(dB)

30MHz-1GHz

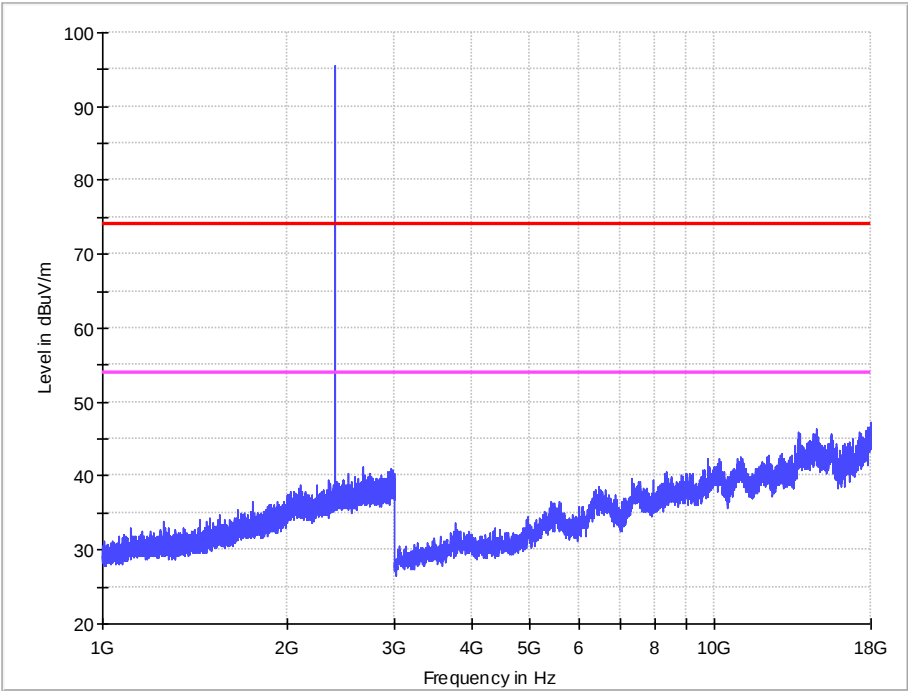
Horizontal



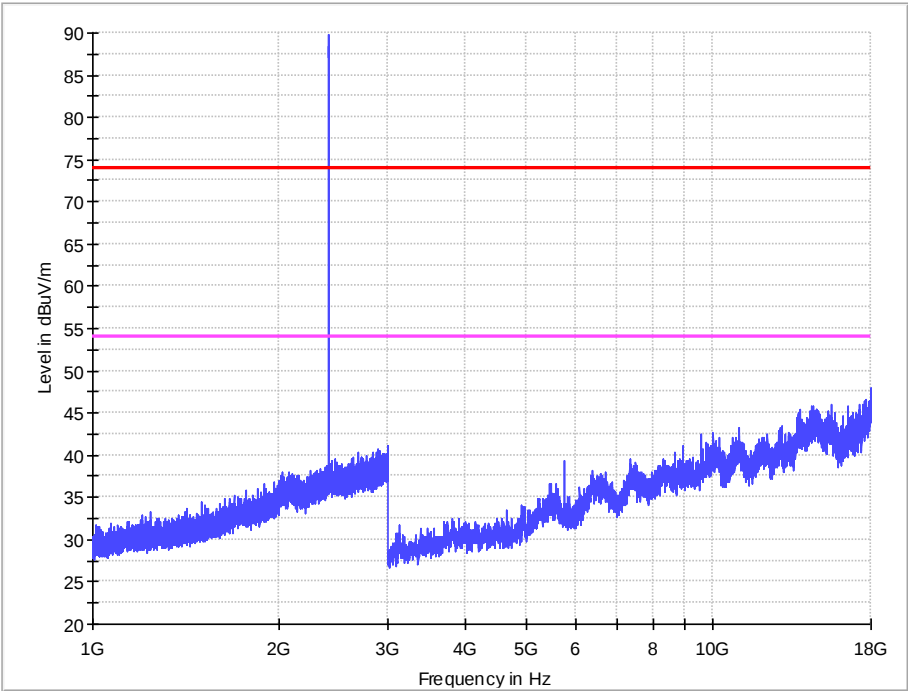
Vertical



1GHz-18GHz
GFSK CH0
Horizontal



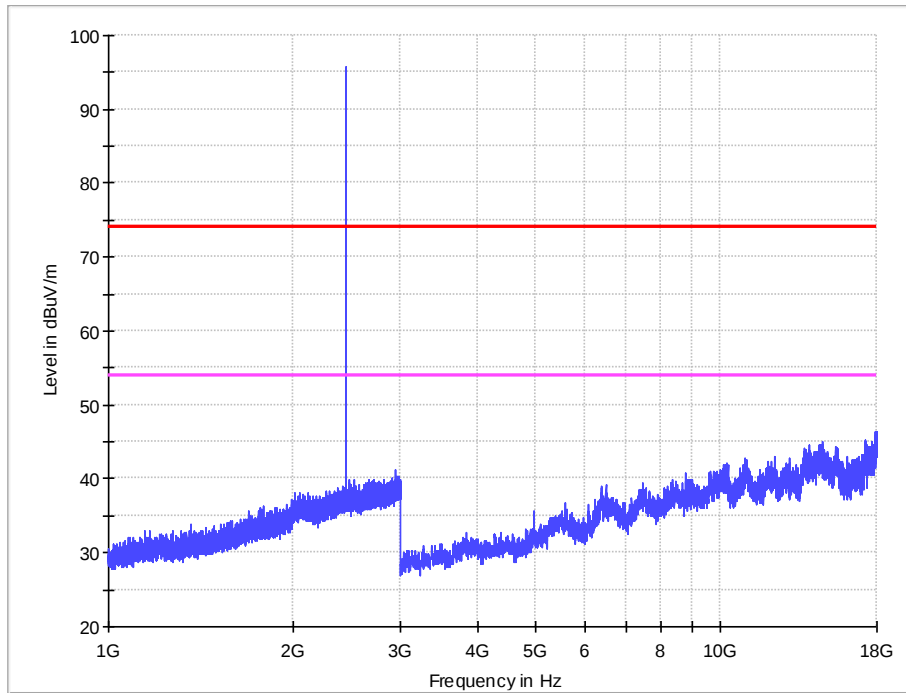
Vertical



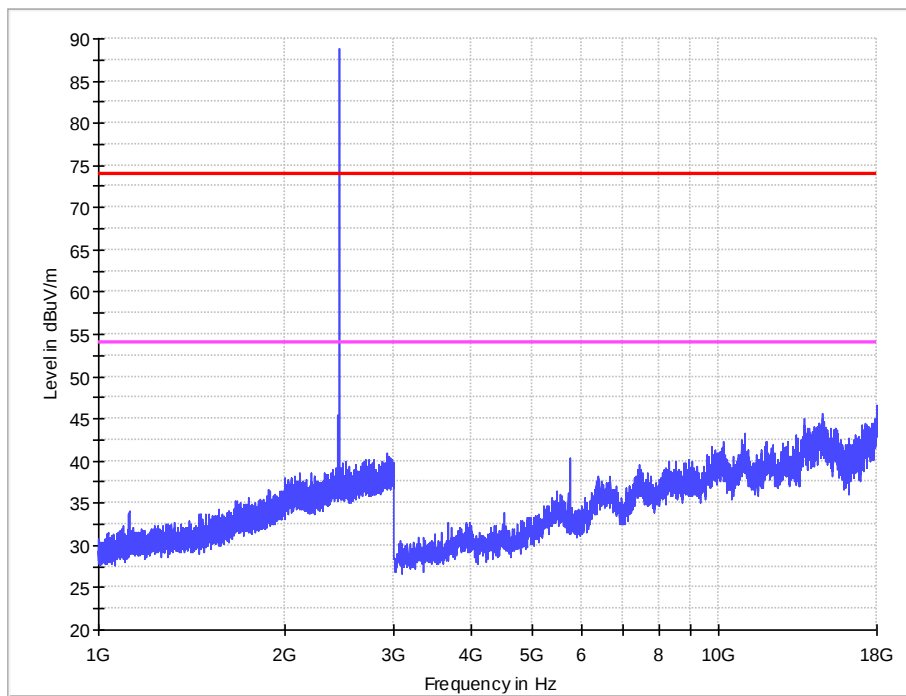
1GHz-18GHz

GFSK CH39

Horizontal



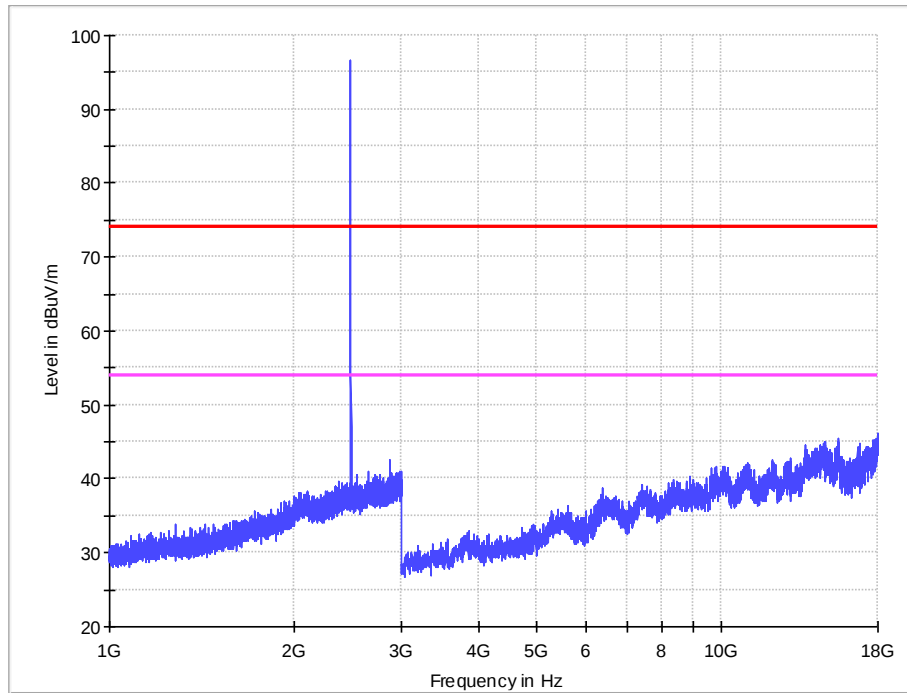
Vertical



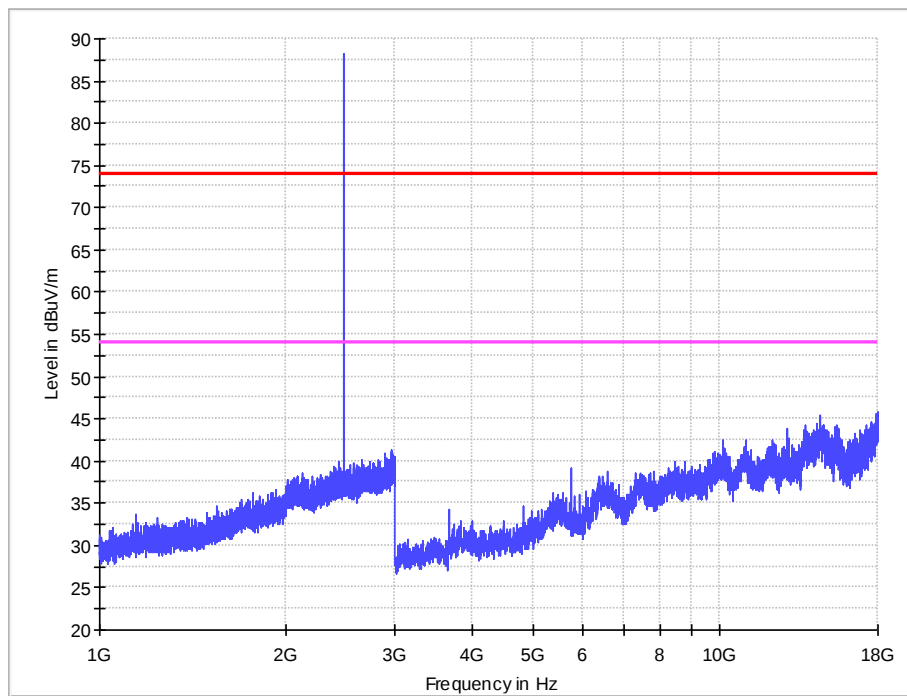
1GHz-18GHz

GFSK CH78

Horizontal



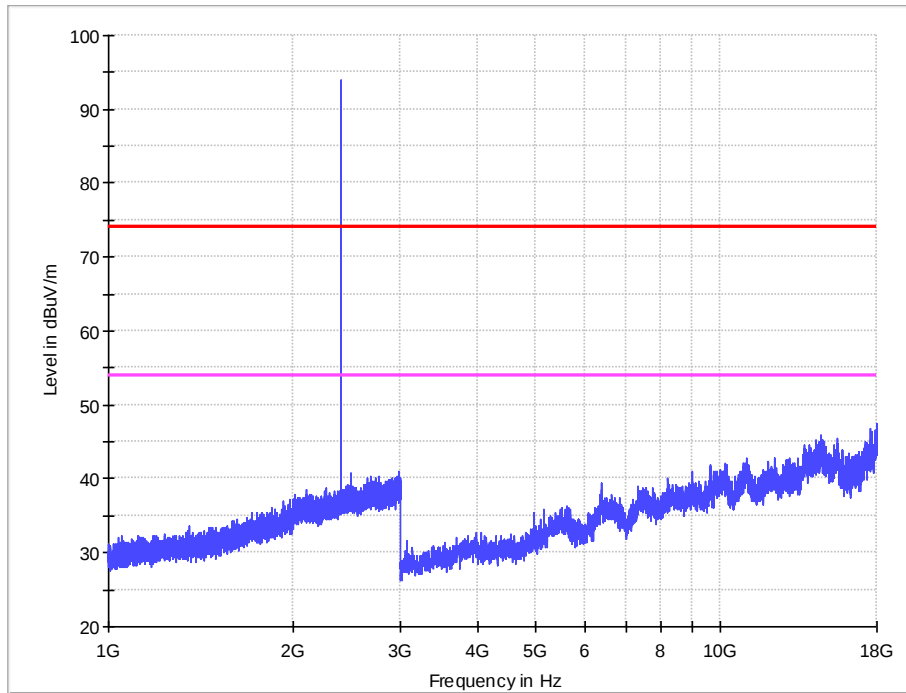
Vertical



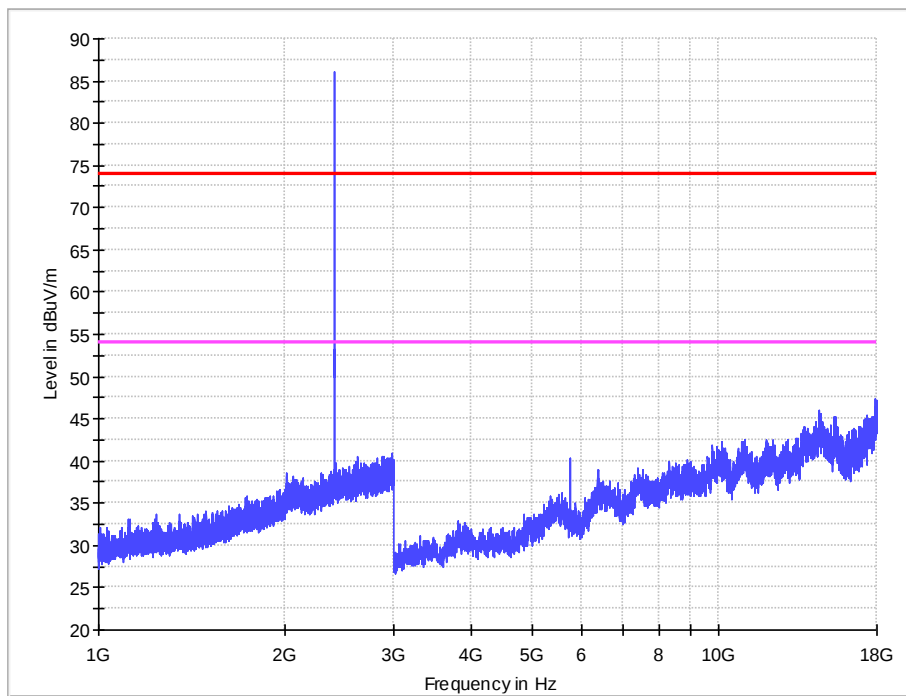
1GHz-18GHz

8DPSK CH0

Horizontal



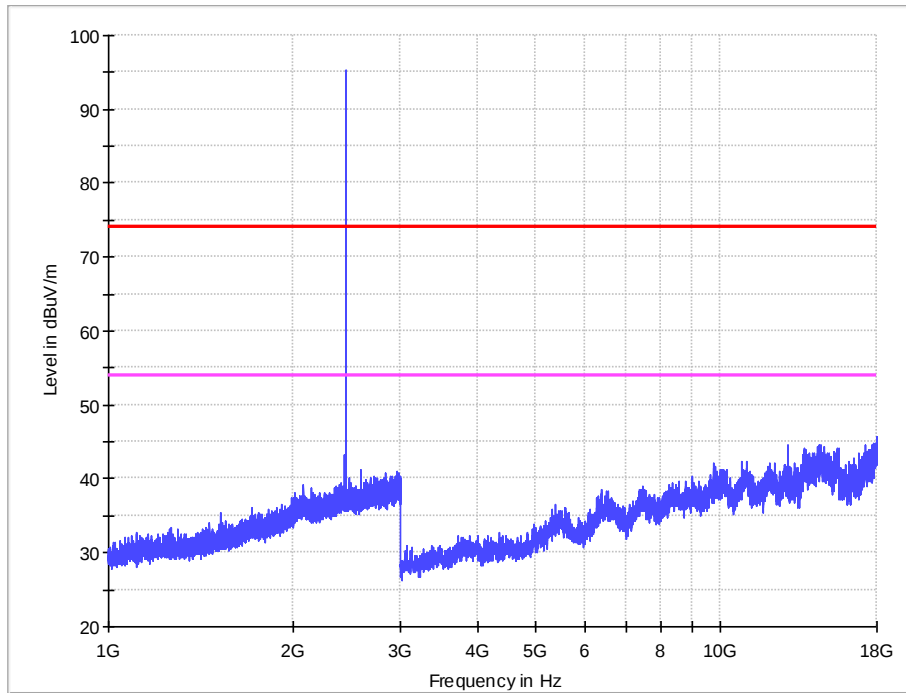
Vertical



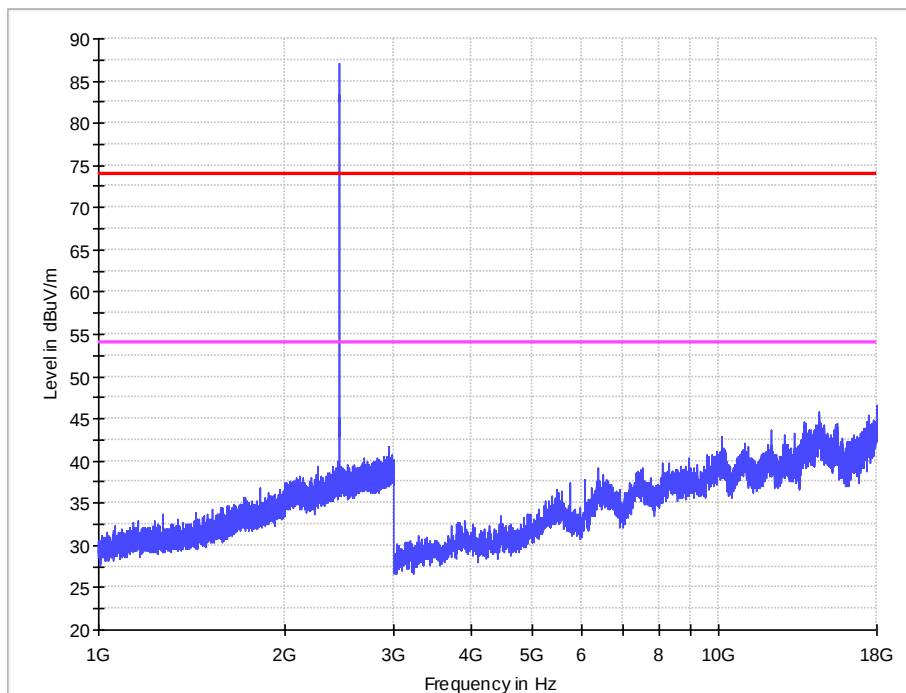
1GHz-18GHz

8DPSK CH39

Horizontal



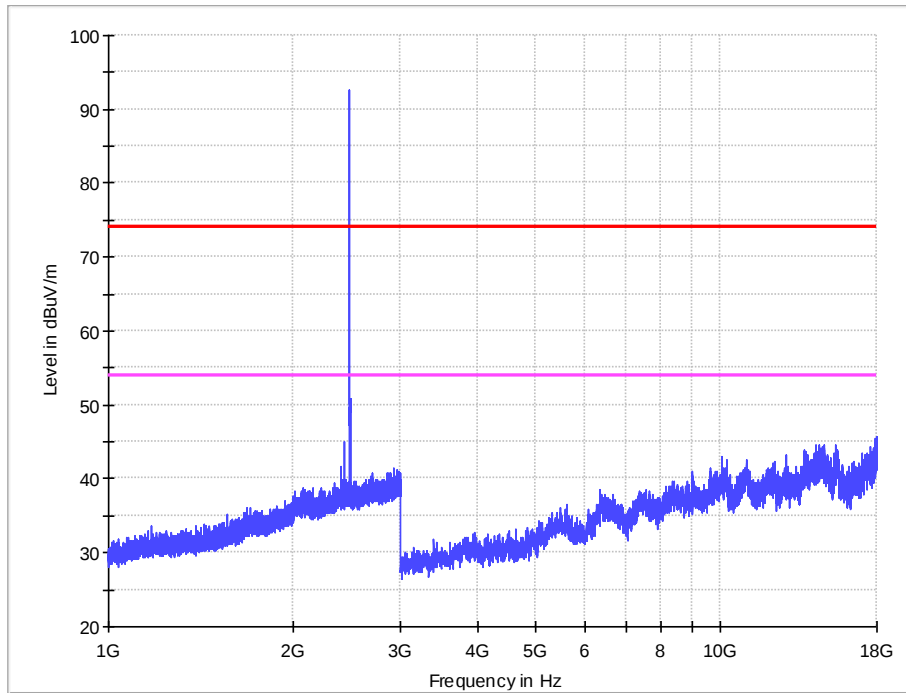
Vertical



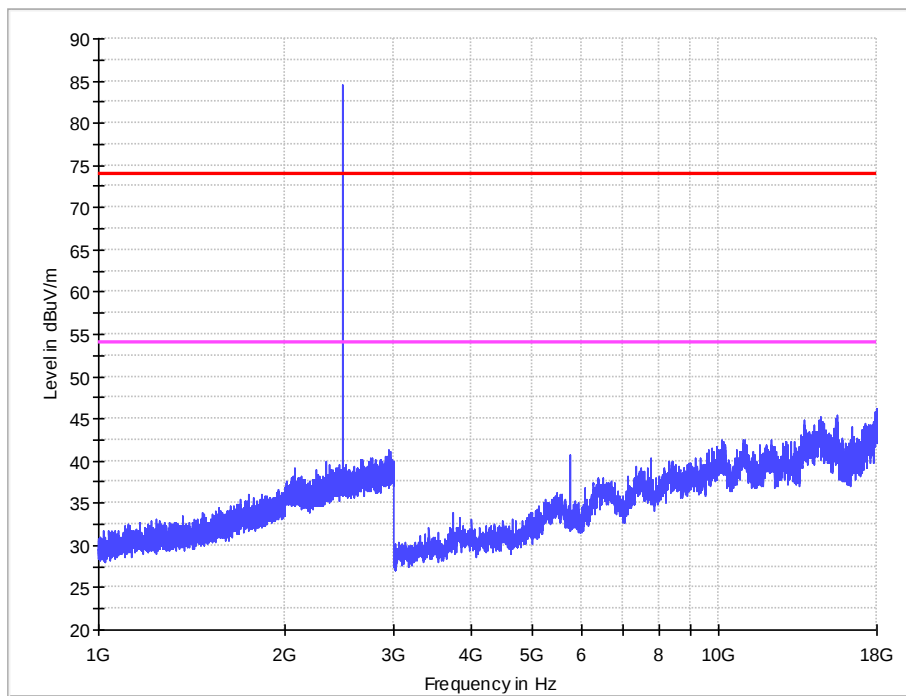
1GHz-18GHz

8DPSK CH78

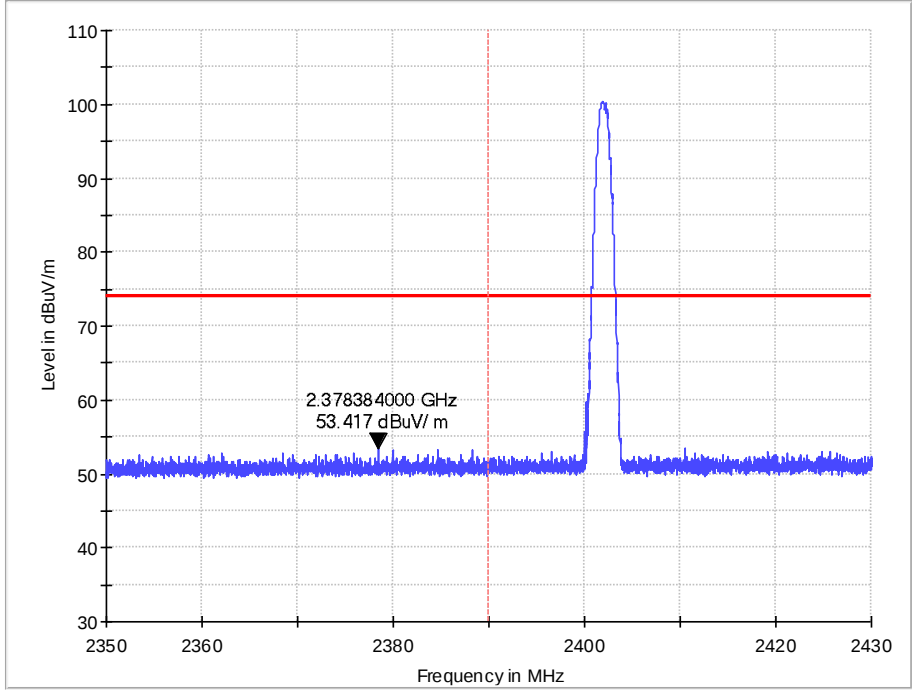
Horizontal



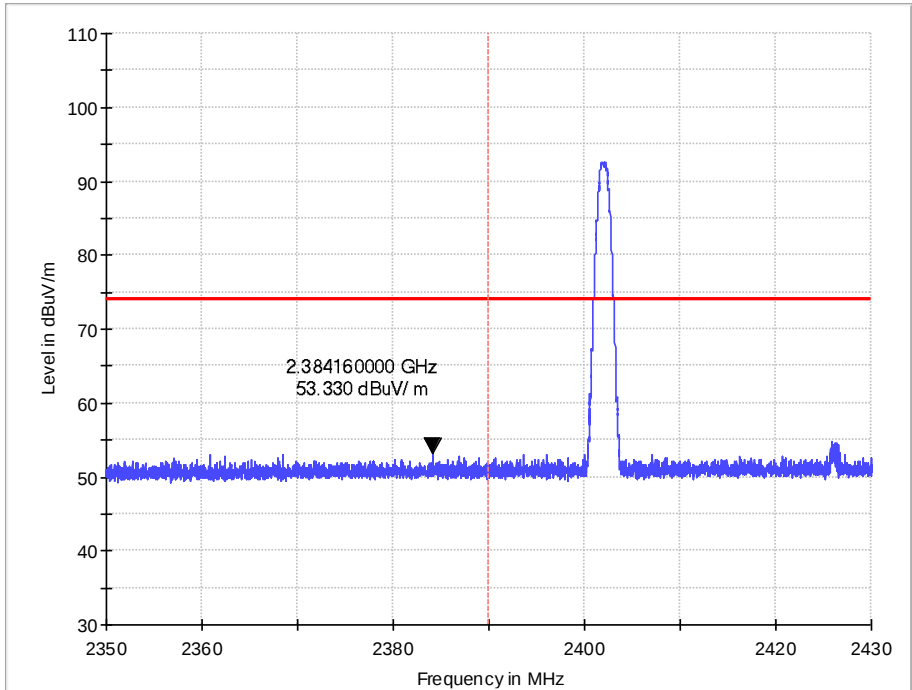
Vertical



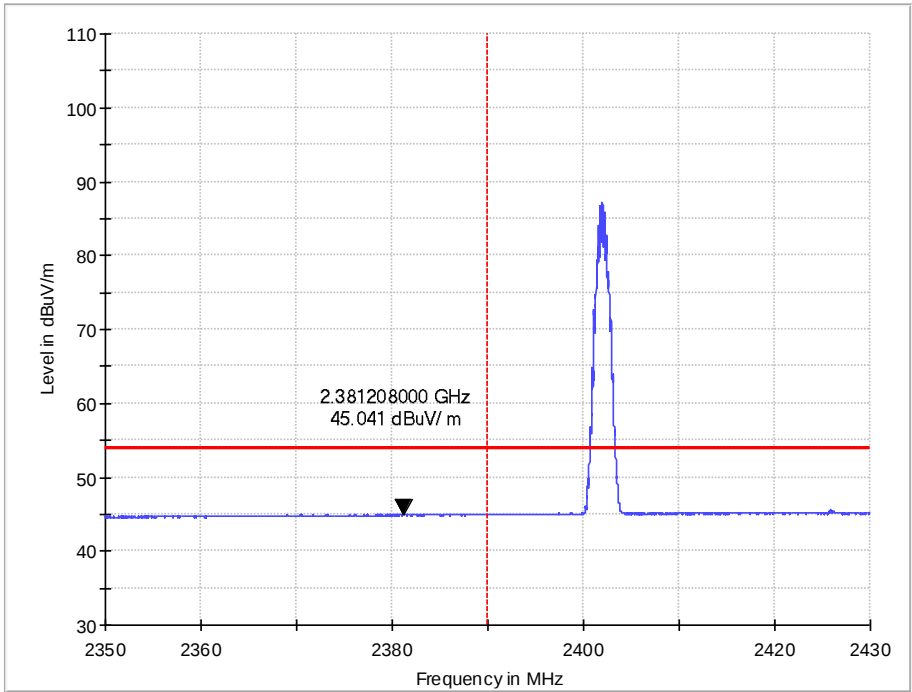
GFSK
Low edge
PK
Horizontal



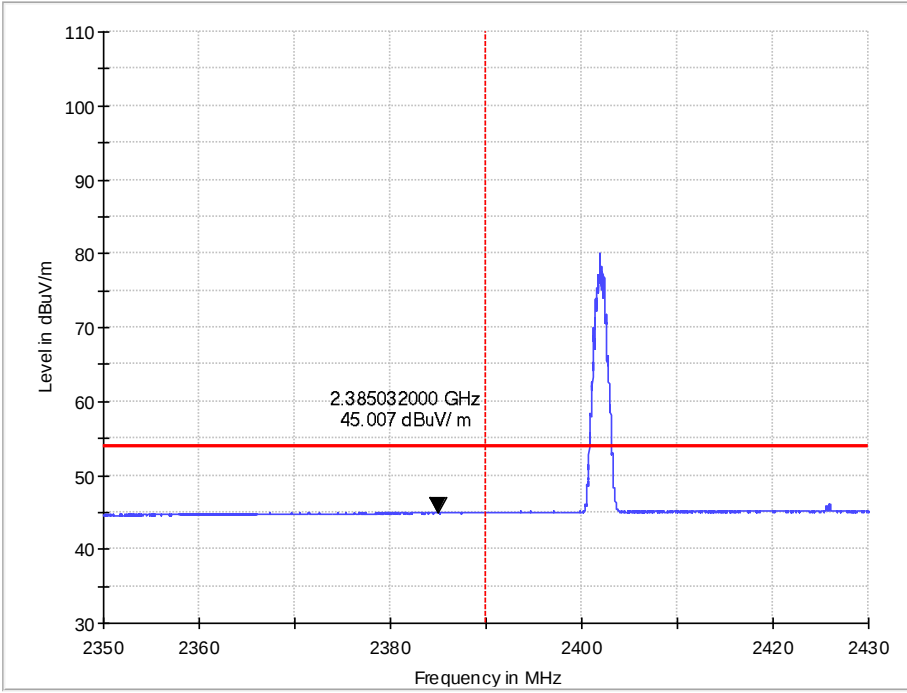
Vertical



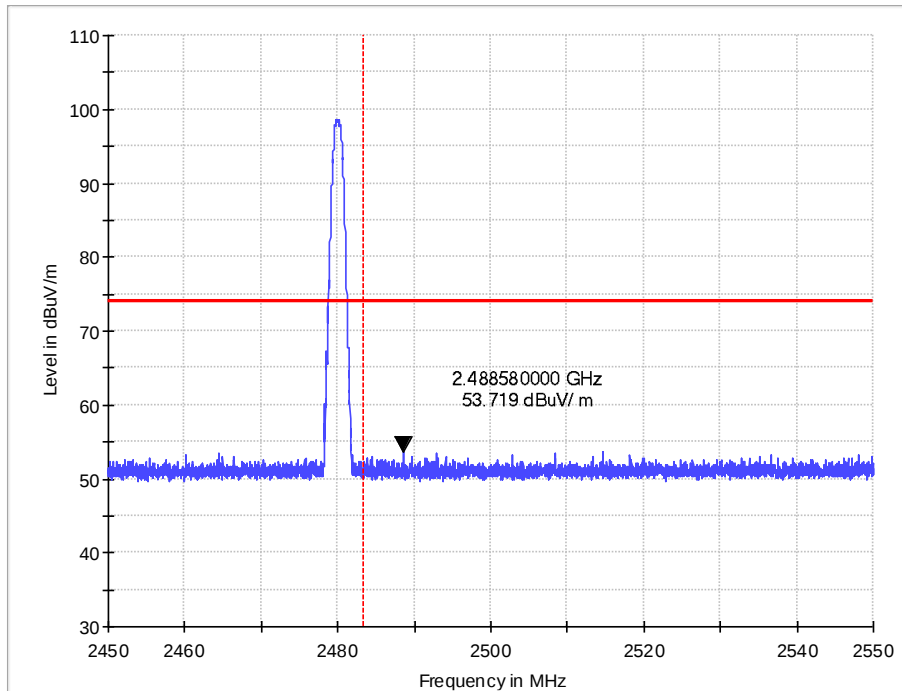
AV
Horizontal



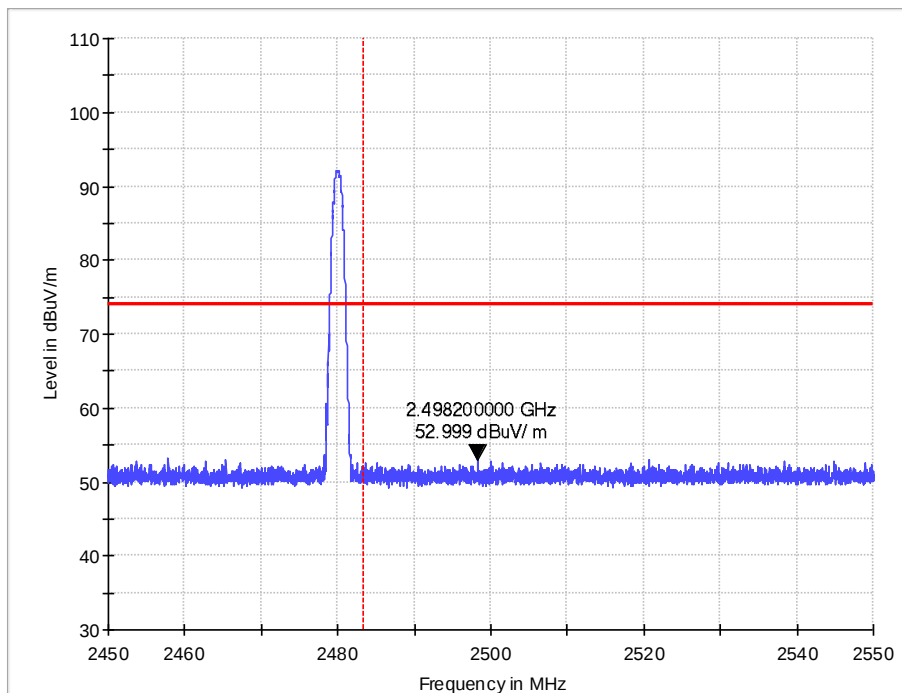
Vertical



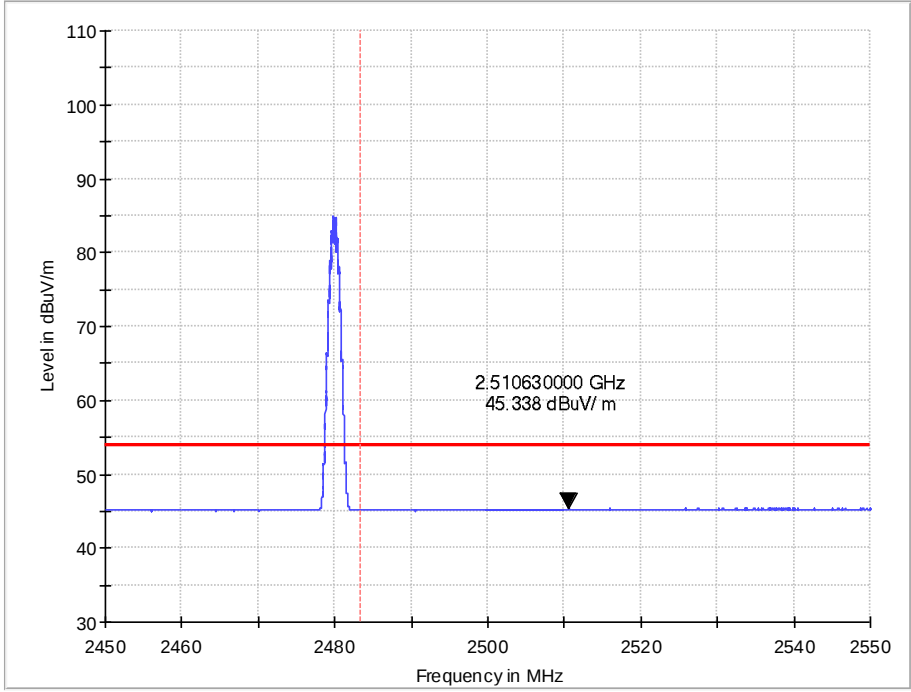
GFSK
Upper edge
PK
Horizontal



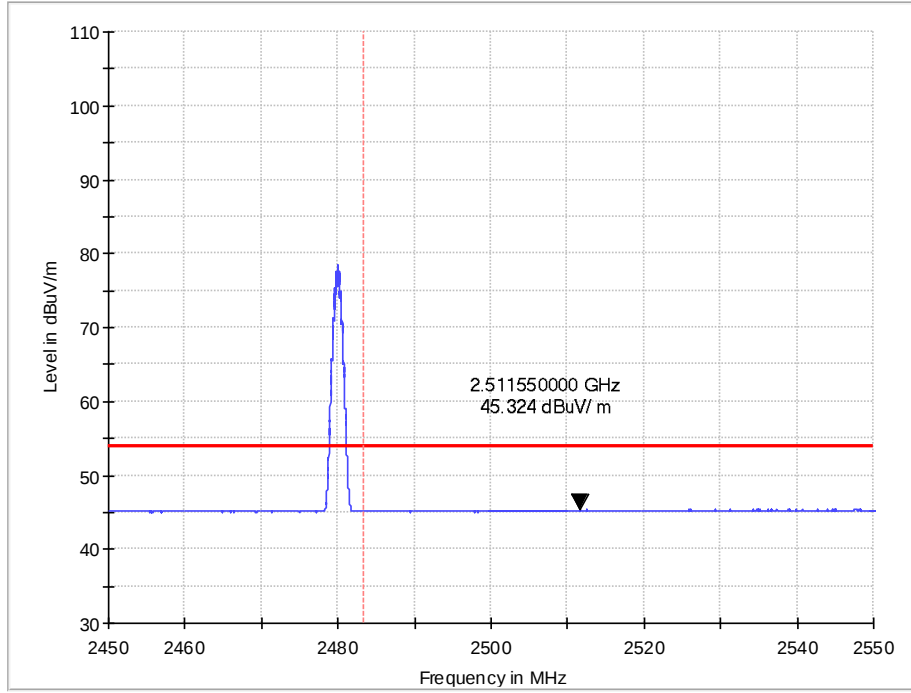
Vertical



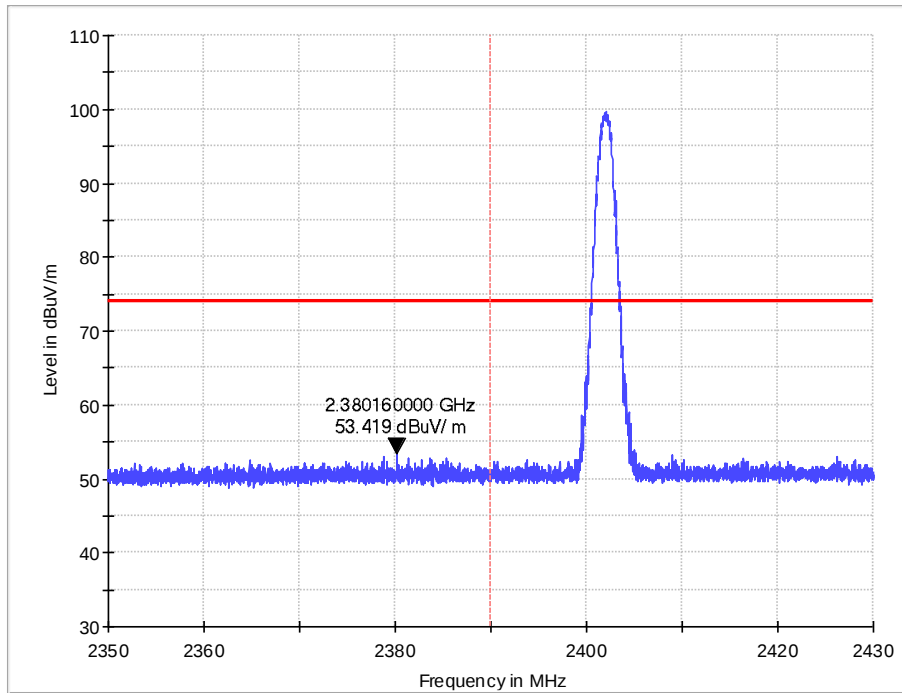
AV
Horizontal



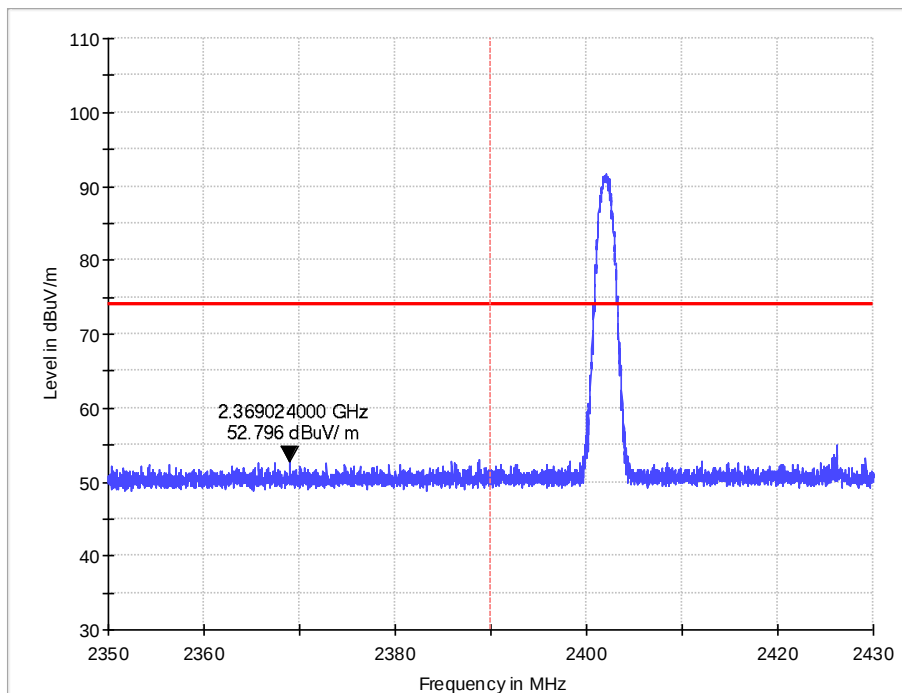
Vertical



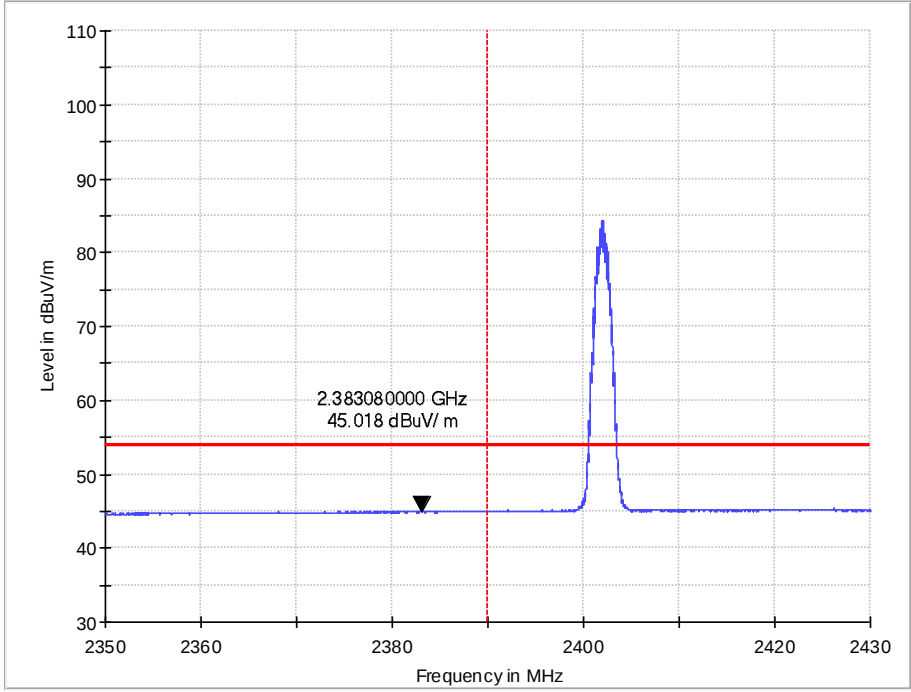
8DPSK
Low edge
PK
Horizontal



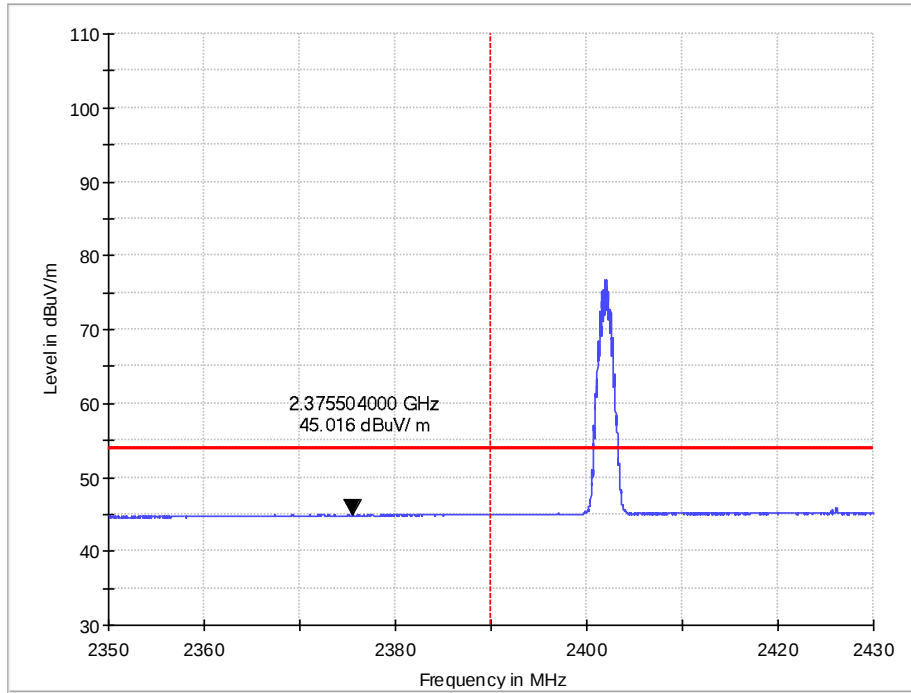
Vertical



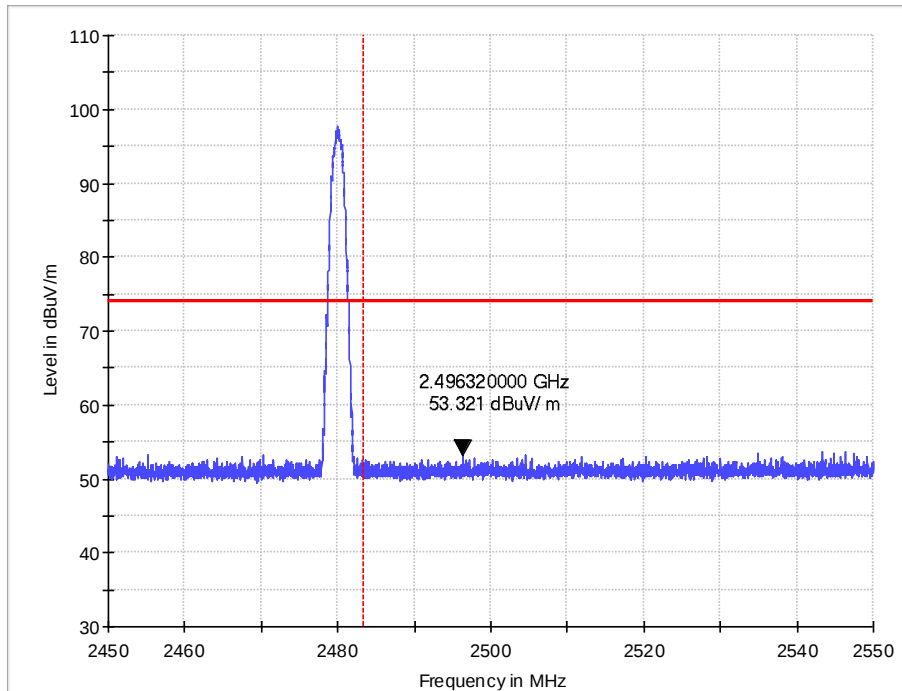
AV
Horizontal



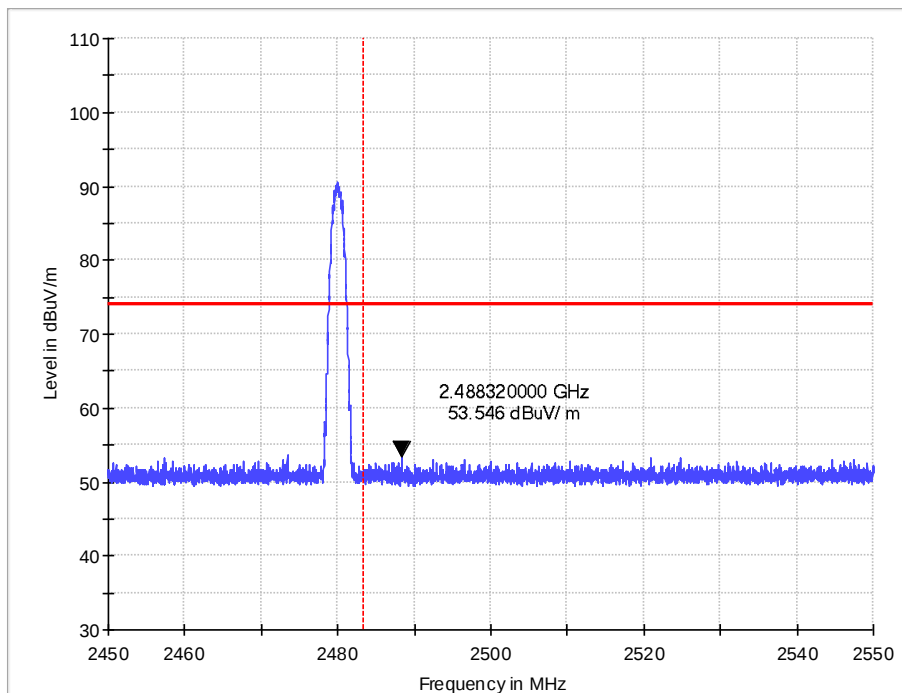
Vertical



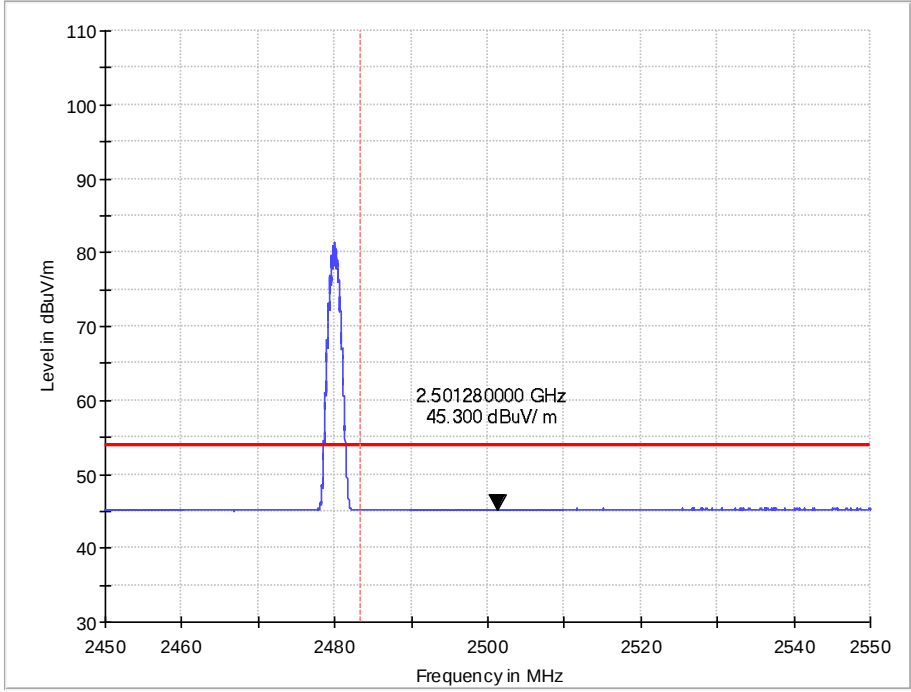
8DPSK
Upper Edge
PK
Horizontal



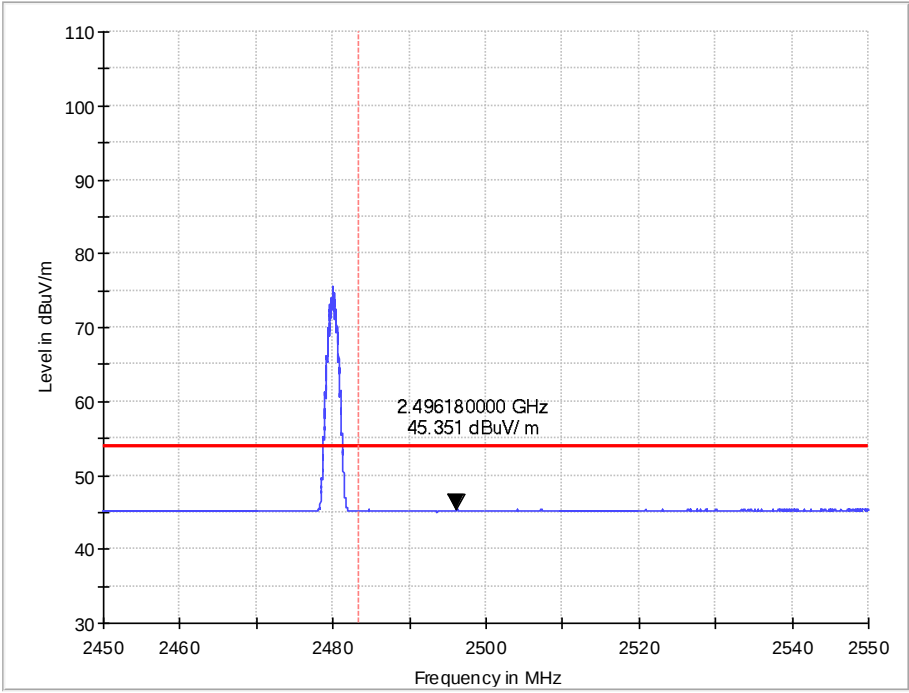
Vertical



AV
Horizontal



Vertical



7. 20DB BANDWIDTH MEASUREMENT

7.1.Limits of 20dB Bandwidth Measurement

CFR 47 (FCC) part 15.247 (a) (1) and DA 00-705
RSS-247 Clause 5.1(a)

7.2.Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 20kHz RBW and VBW $\geq$ RBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

7.3.Test Setup



7.4.Test Data

Table 13 20dB Bandwidth Test Data

TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH1	Ant1	2402	0.87	2401.54	2402.41	---	---
		2441	0.96	2440.54	2441.50	---	---
		2480	0.87	2479.54	2480.41	---	---
2DH1	Ant1	2402	1.27	2401.33	2402.60	---	---
		2441	1.27	2440.33	2441.60	---	---
		2480	1.27	2479.33	2480.60	---	---
3DH1	Ant1	2402	1.21	2401.39	2402.61	---	---
		2441	1.22	2440.39	2441.61	---	---
		2480	1.21	2479.40	2480.61	---	---

Delta 3 [T1]

Ref 30 dBm *Att 40 dB SWT 30 ms 873.000000000 kHz

30 Offset 11.7 dB

Marker 1 [T1]

-11.05 dB

2.401530000 GHz

Marker 2 [T1]

-1.28 dB

2.402000000 GHz

1. Pk View

3dB

Center 2.402 GHz 300 kHz/ Span 3 MHz

*RBW 20 kHz Delta 3 [T1]
 -3.71 dB
 *VBW 100 kHz
 SWT 30 ms 960.000000000 kHz

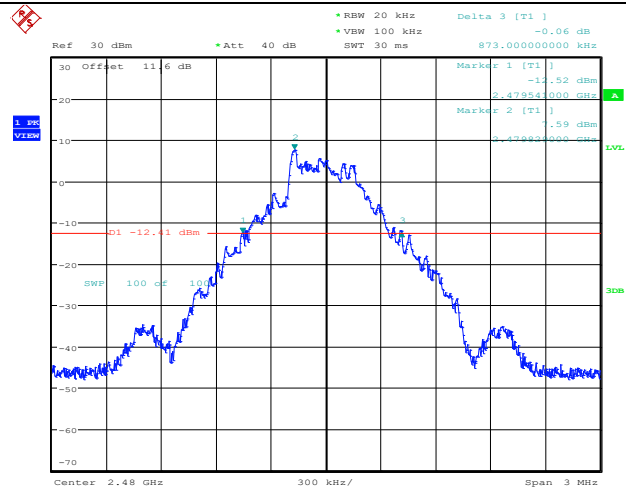
Ref 30 dBm *Att 40 dB

30 offset 11.7 dB Marker 1 [T1]
 -1.02 dB
 2.440530000 GHz

Marker 2 [T1]
 -0.19 dB
 2.440020000 GHz

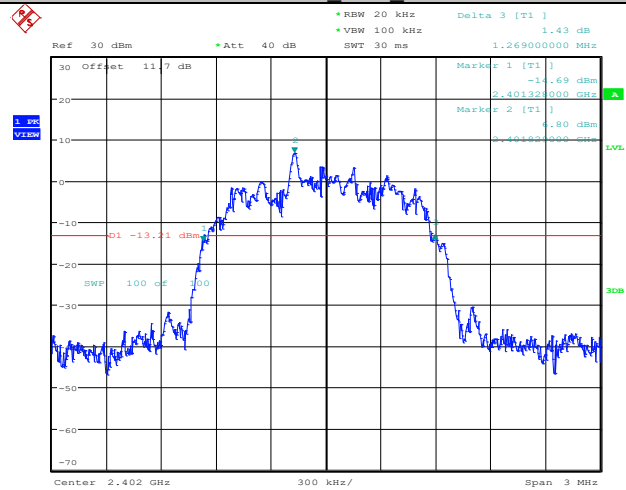
21 -10.11 dBm
 SWP 100 of

Center 2.441 GHz 300 kHz/
 Span 3 MHz



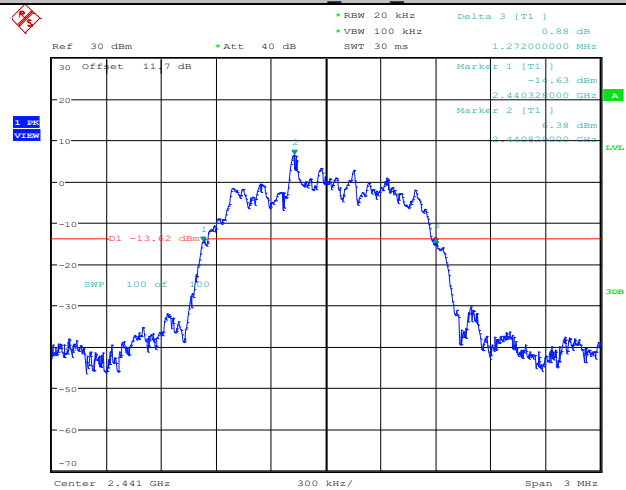
Date: 11.MAR.2025 09:23:26

2DH1 Ant1_2402



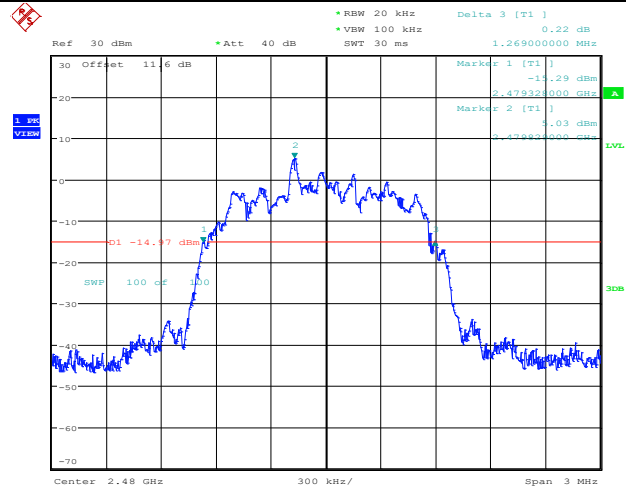
Date: 11.MAR.2025 09:24:56

2DH1 Ant1_2441



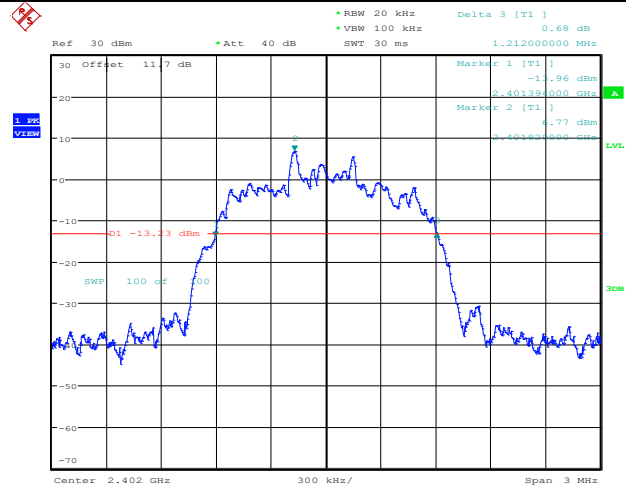
Date: 11.MAR.2025 09:25:59

2DH1_Ant1_2480



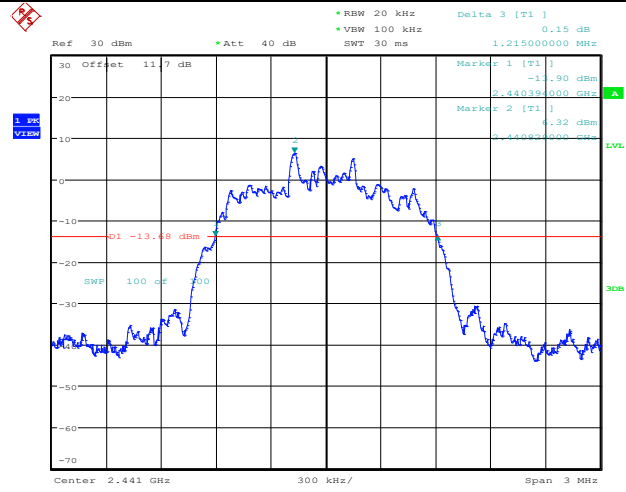
Date: 11.MAR.2025 09:26:32

3DH1_Ant1_2402



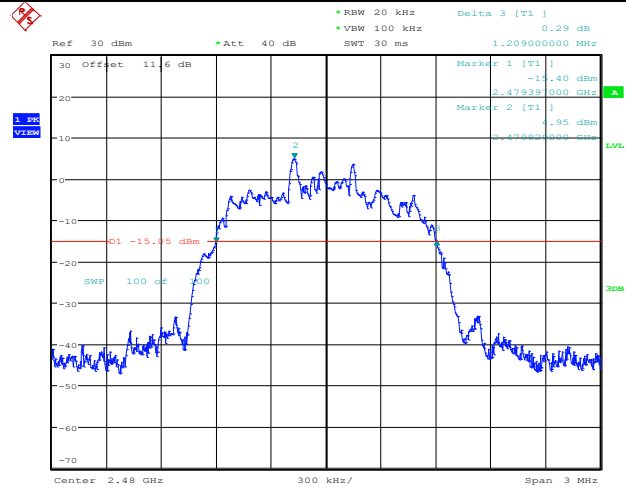
Date: 11.MAR.2025 09:29:17

3DH1_Ant1_2441



Date: 11.MAR.2025 09:30:58

3DH1_Ant1_2480



Date: 11.MAR.2025 09:31:28

8. CARRIER FREQUENCY SEPARATION MEASUREMENT

8.1.Limits of Carrier Frequency Separation Measurement

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

8.2.Test Procedure

- (a) Connect test port of EUT to spectrum analyzer and universal communication tester.
- (b) Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function, then set the measured frequency number to two adjacent channels separately and test the carrier frequency separation with spectrum analyzer.

8.3.Test Setup

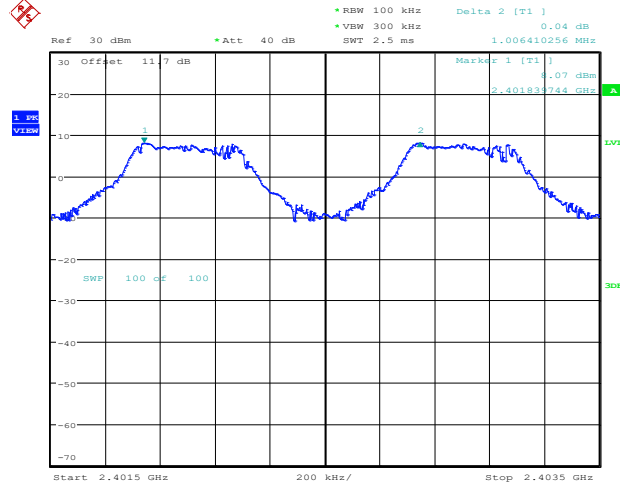


8.4.Test Data

Table 14 Carrier Frequencies Separation

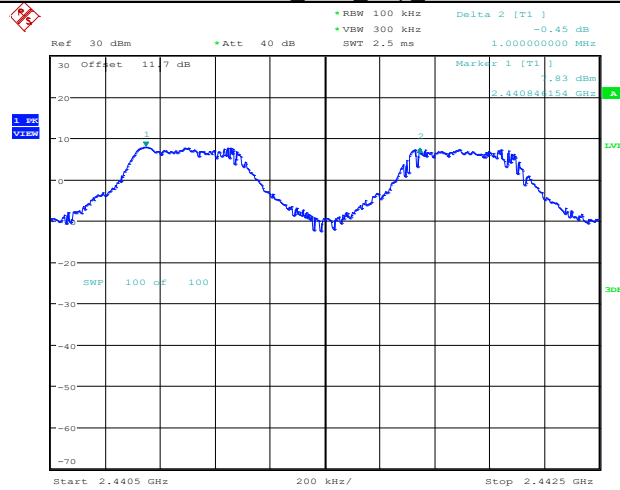
TestMode	Antenna	Channel	Result	Limit	Verdict
DH1	Ant1	Hop_2402	1.006	≥ 0.733	PASS
		Hop_2441	1	≥ 0.733	PASS
		Hop_2480	0.99	≥ 0.733	PASS
2DH1	Ant1	Hop_2402	0.994	≥ 0.913	PASS
		Hop_2441	1.016	≥ 0.913	PASS
		Hop_2480	1.003	≥ 0.913	PASS
3DH1	Ant1	Hop_2402	1.003	≥ 0.900	PASS
		Hop_2441	1	≥ 0.900	PASS
		Hop_2480	0.997	≥ 0.900	PASS

DH1_Ant1_Hop_2402



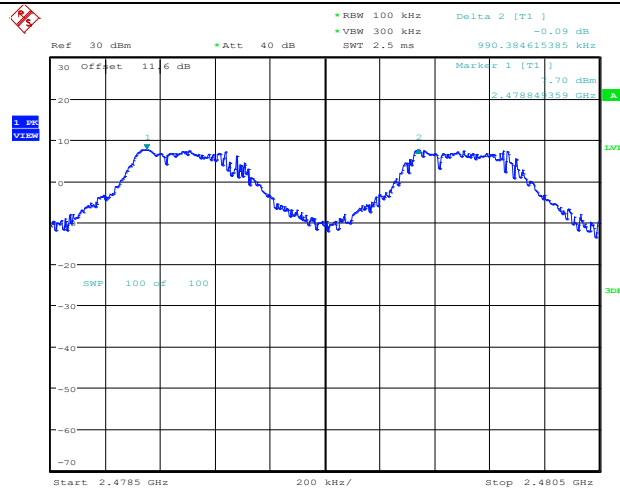
Date: 16.JAN.2025 10:06:22

DH1_Ant1_Hop_2441



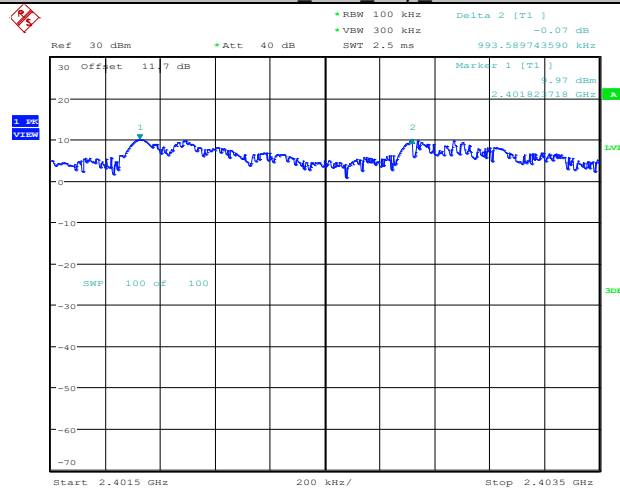
Date: 16.JAN.2025 10:07:58

DH1_Ant1_Hop_2480



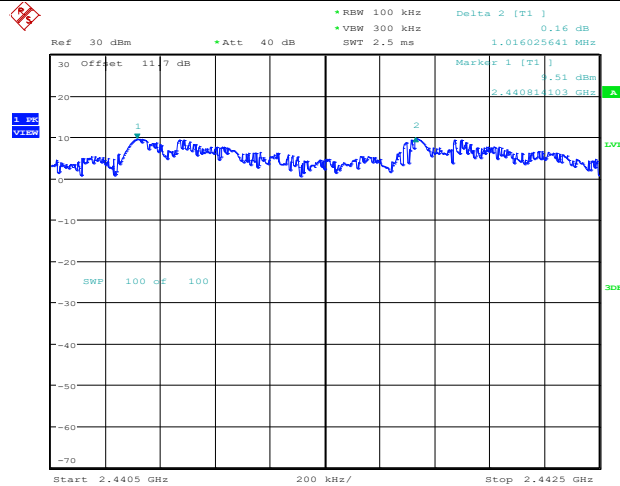
Date: 16.JAN.2025 10:09:06

2DH1_Ant1_Hop_2402



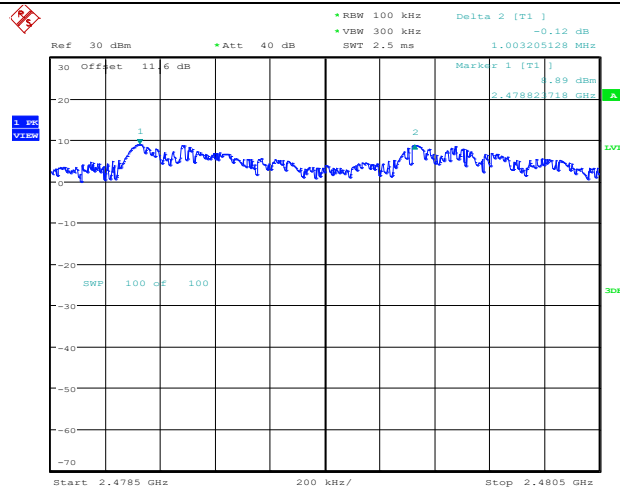
Date: 24.DEC.2024 13:54:50

2DH1_Ant1_Hop_2441



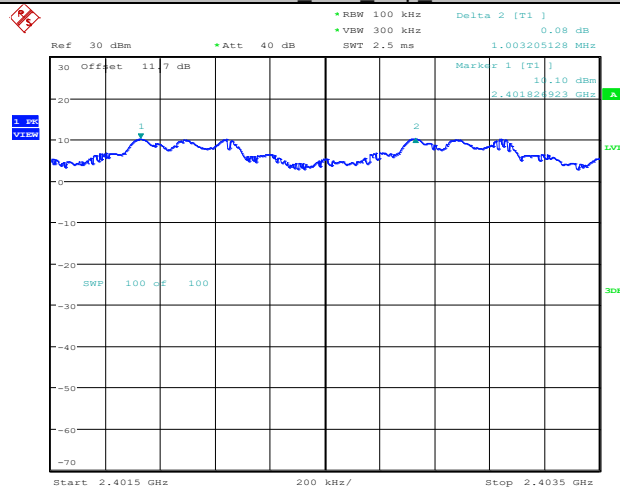
Date: 24.DEC.2024 13:57:06

2DH1_Ant1_Hop_2480



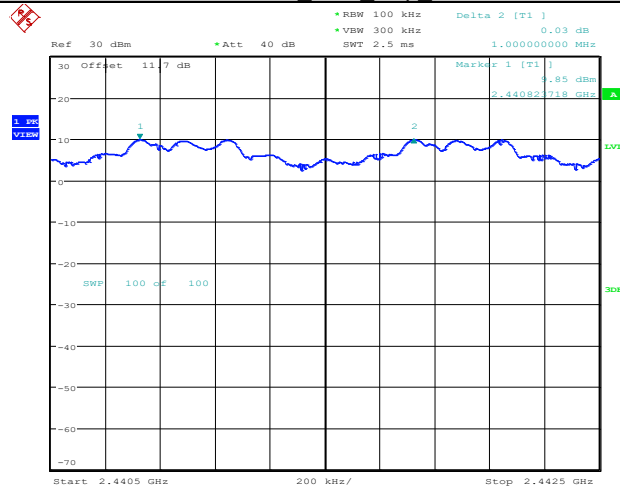
Date: 24.DEC.2024 13:59:53

3DH1_Ant1_Hop_2402



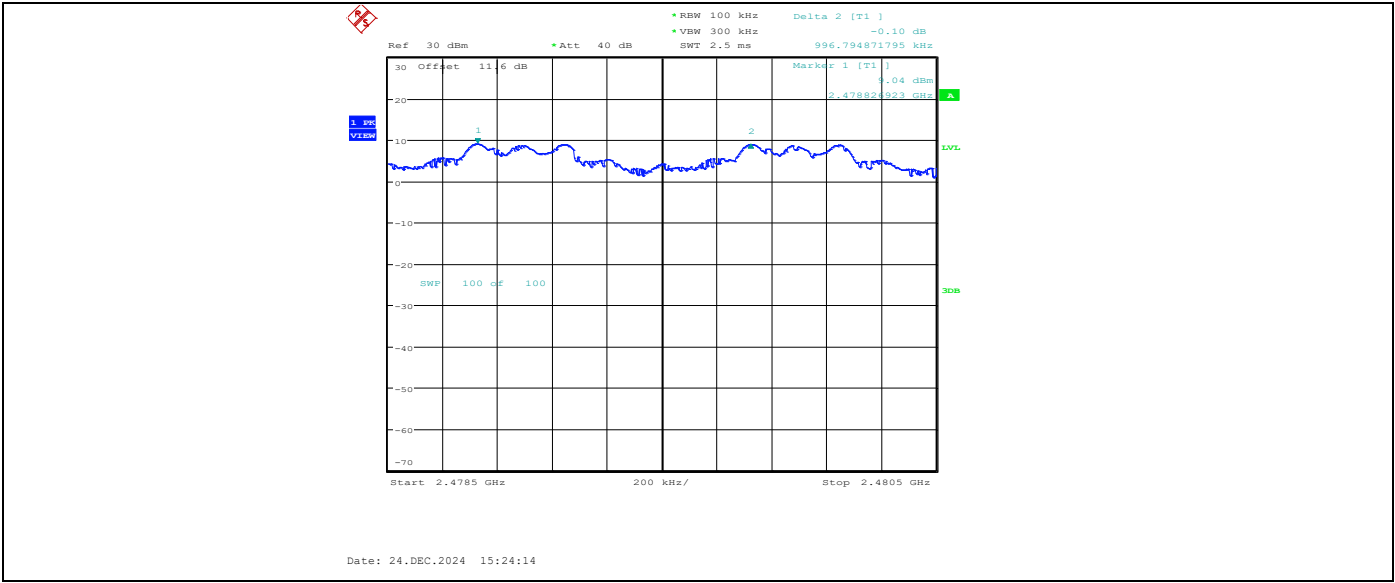
Date: 24.DEC.2024 14:57:21

3DH1_Ant1_Hop_2441



Date: 24.DEC.2024 15:14:28

3DH1_Ant1_Hop_2480



9. NUMBER OF HOPPING CHANNEL

9.1.Limits of Number of Hopping Channel

Number of hopping channel should be compliance with the requirements in part15.247 (a) (1) III and in RSS-247 Clause 5.1(d).

9.2.Test Procedure

- (a) Connect test port of EUT to spectrum analyzer.
- (b) Set the EUT to transmit maximum output power at 2.4GHz and switch on. Frequency hopping function, then set enough count time (larger than 5000 times) to get all the hopping frequency channel displayed on the screen of spectrum analyzer.
- (c) Count the quantity of peaks to get the number of hopping channels.

9.3.Test Setup

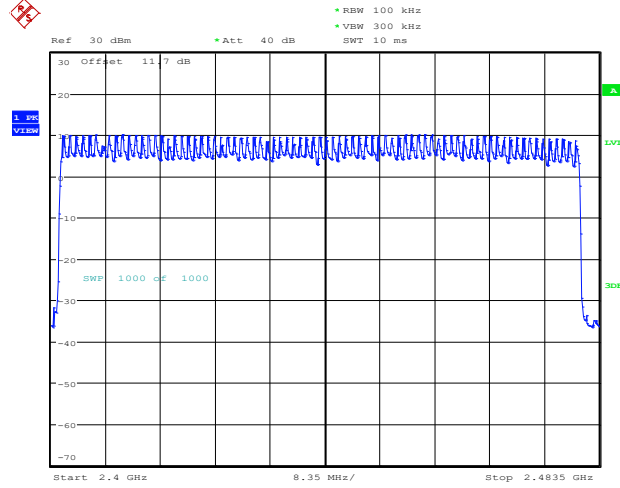


9.4.Test Data

Table 15 Hopping Channel Number Test Data

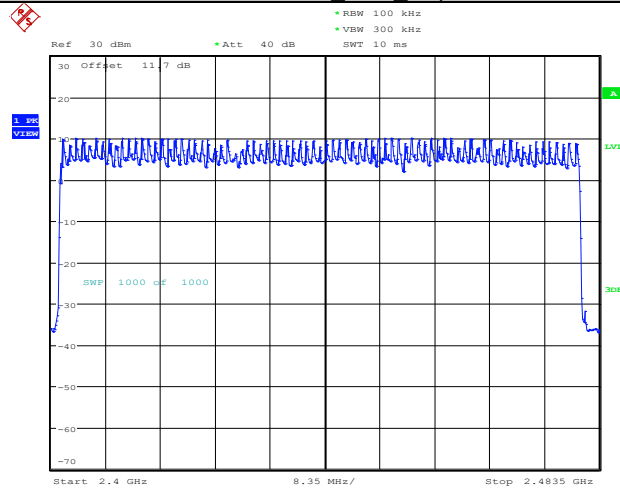
TestMode	Antenna	Frequency [MHz]	Result [Num]	Limit [Num]	Verdict
DH1	Ant1	Hop	79	≥15	PASS
2DH1	Ant1	Hop	79	≥15	PASS
3DH1	Ant1	Hop	79	≥15	PASS

DH1_Ant1_Hop



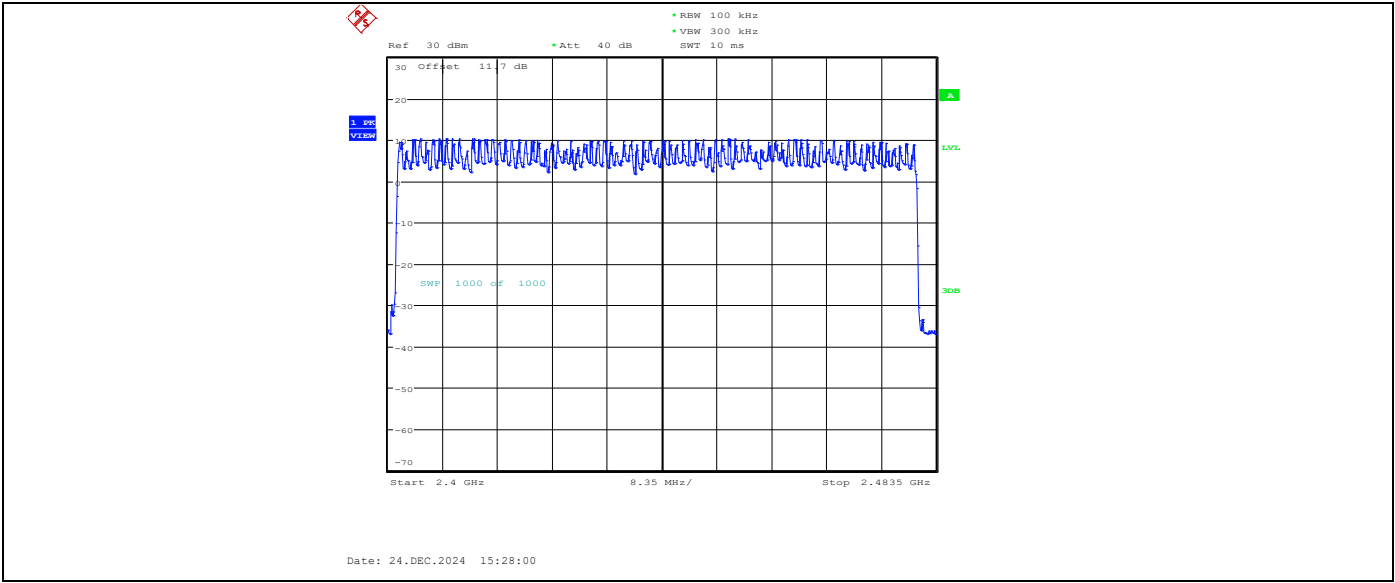
Date: 24.DEC.2024 12:07:45

2DH1_Ant1_Hop



Date: 24.DEC.2024 14:03:35

3DH1_Ant1_Hop



10. TIME OF OCCUPANCY

10.1.Limits of Time Occupancy

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

10.2.Test Procedure

- Connect test port of EUT to spectrum analyzer and universal communication tester.
- Set the EUT to transmit maximum output power at 2.4GHz and switch on frequency hopping function.
- Set the span of spectrum analyzer to 0 Hz, and set the resolution bandwidth to 1 MHz and the video bandwidth to 1 MHz, then get the time domain measured diagram. and set sweep time to 2 times of one burst occupancy time, and measure the time of occupancy of one burst.
- Set the resolution bandwidth to 1 MHz and the video bandwidth to 3 MHz, and set the sweep time to a period (0.4 seconds multiplied by the number of hopping channels employed), and count the number of the bursts.
- Calculate the time of occupancy in a period with time occupancy of a burst and quantity of bursts.

GFSK: Dwell time equal to Pluse time (ms)*(1600/2/79)*31.6ms

DH3: Dwell time equal to Pluse time (ms)*(1600/4/79)*31.6ms

DH5: Dwell time equal to Pluse time (ms)*(1600/6/79)*31.6ms

AFH Mode:

GFSK: Dwell time equal to Pluse time (ms)*(800/2/20)* (0.4*20) ms

DH3: Dwell time equal to Pluse time (ms)*(800/4/20)* (0.4*20) ms

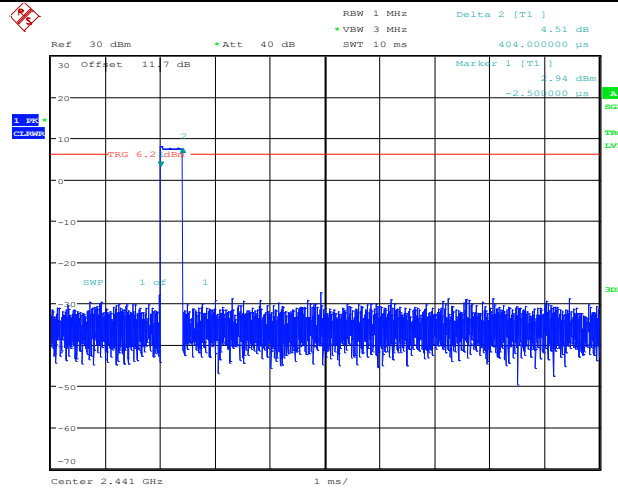
DH5: Dwell time equal to Pluse time (ms)*(800/6/20)* (0.4*20) ms

10.3.Test Data

Table 16 Time of Occupancy

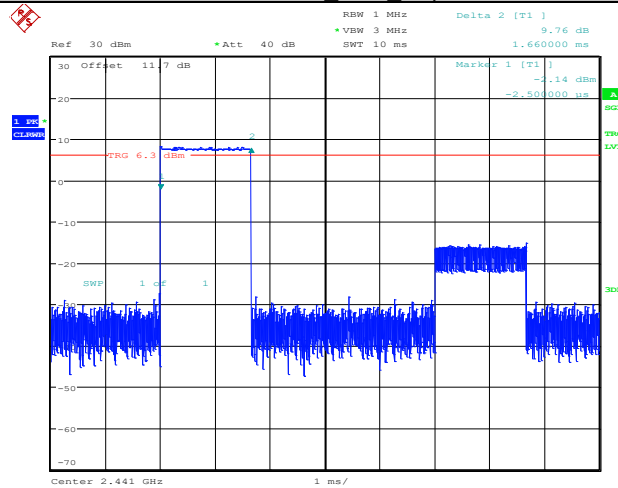
TestMode	Antenna	Frequency [MHz]	BurstWidth	TotalHops	Result	Limit	Verdict
DH1	Ant1	Hop	0.404	320	0.129	≤0.4	PASS
DH3	Ant1	Hop	1.660	180	0.299	≤0.4	PASS
DH5	Ant1	Hop	2.908	90	0.262	≤0.4	PASS
3DH1	Ant1	Hop	0.395	330	0.13	≤0.4	PASS
3DH3	Ant1	Hop	1.645	170	0.28	≤0.4	PASS
3DH5	Ant1	Hop	2.895	80	0.232	≤0.4	PASS

DH1_Ant1_Hop

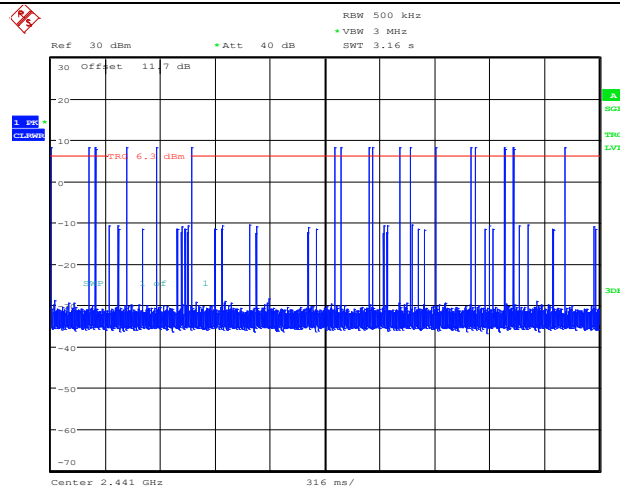


Date: 15.JAN.2025 15:27:16

DH3_Ant1_Hop

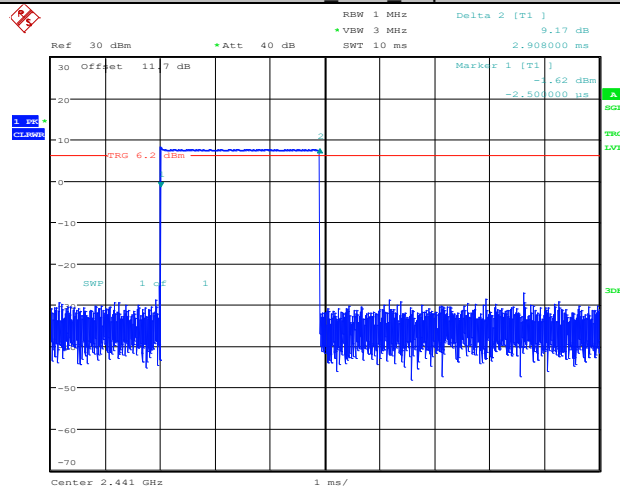


Date: 15.JAN.2025 14:51:36

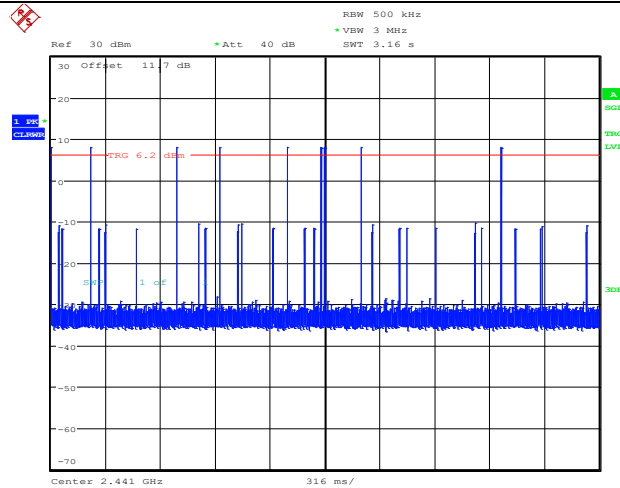


Date: 15.JAN.2025 14:51:45

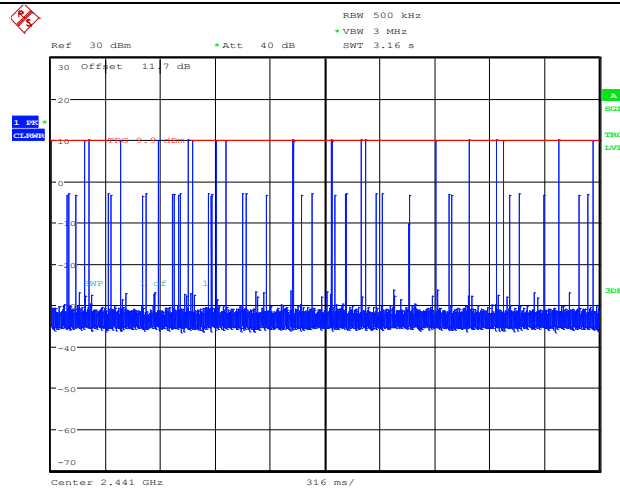
DH5_Ant1_Hop



Date: 15.JAN.2025 14:55:32

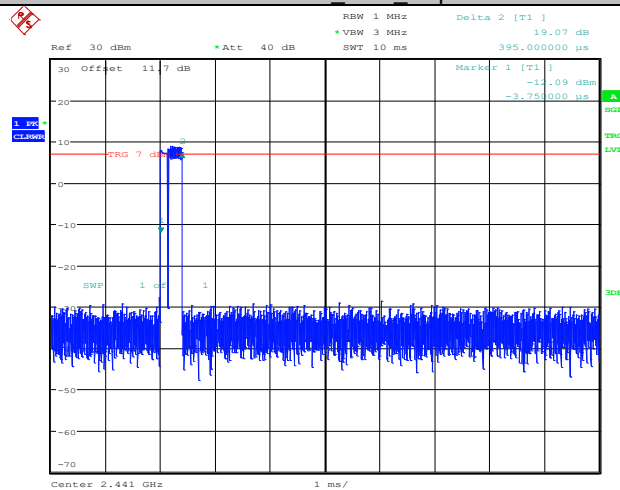


Date: 15.JAN.2025 14:55:38

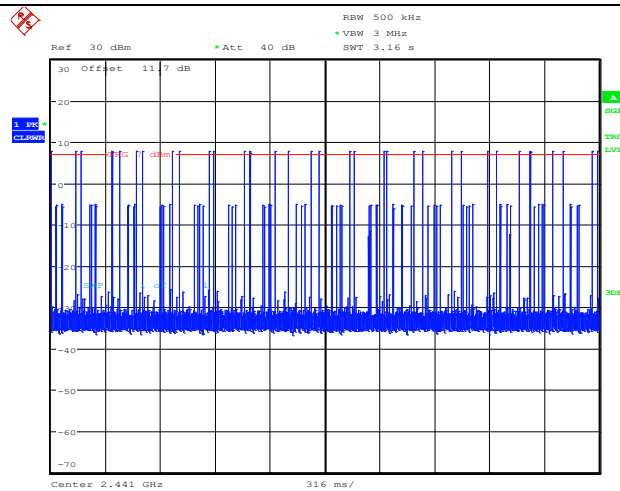


Date: 24.DEC.2024 14:03:57

3DH1_Ant1_Hop

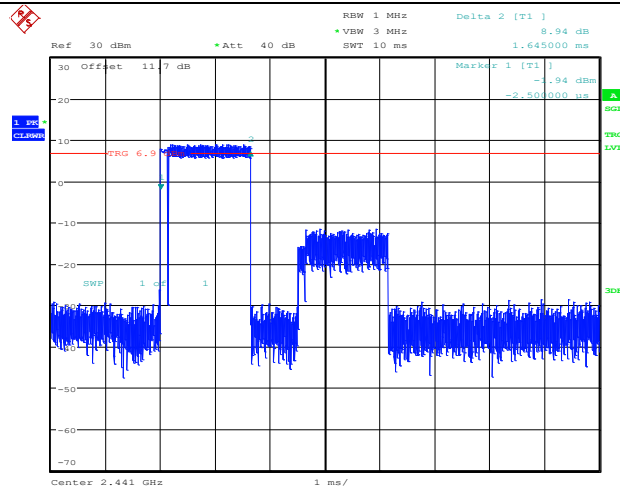


Date: 15.JAN.2025 15:00:51

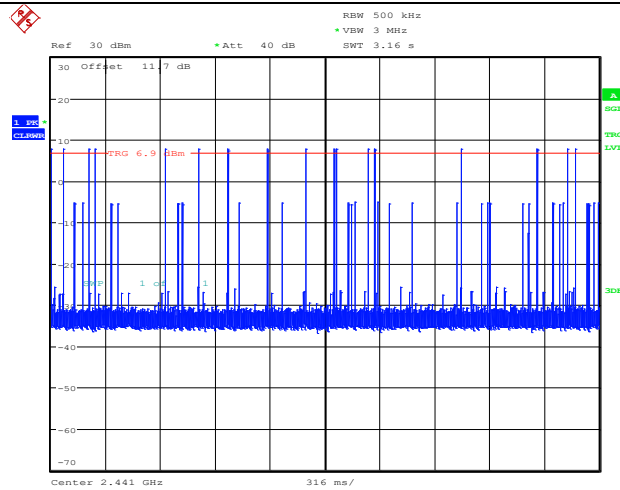


Date: 15.JAN.2025 15:00:57

3DH3_Ant1_Hop

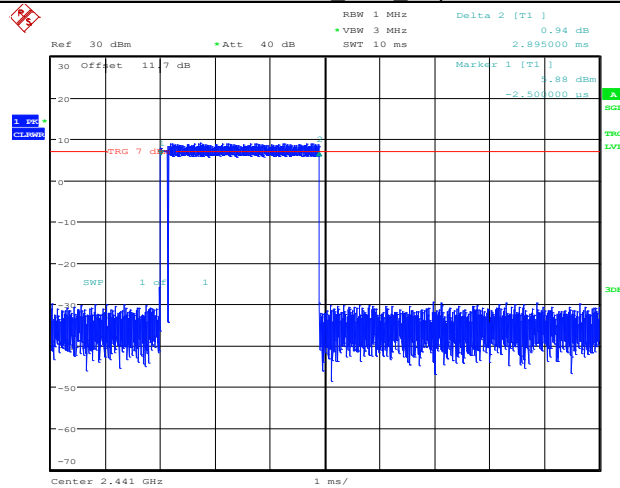


Date: 15.JAN.2025 15:02:28

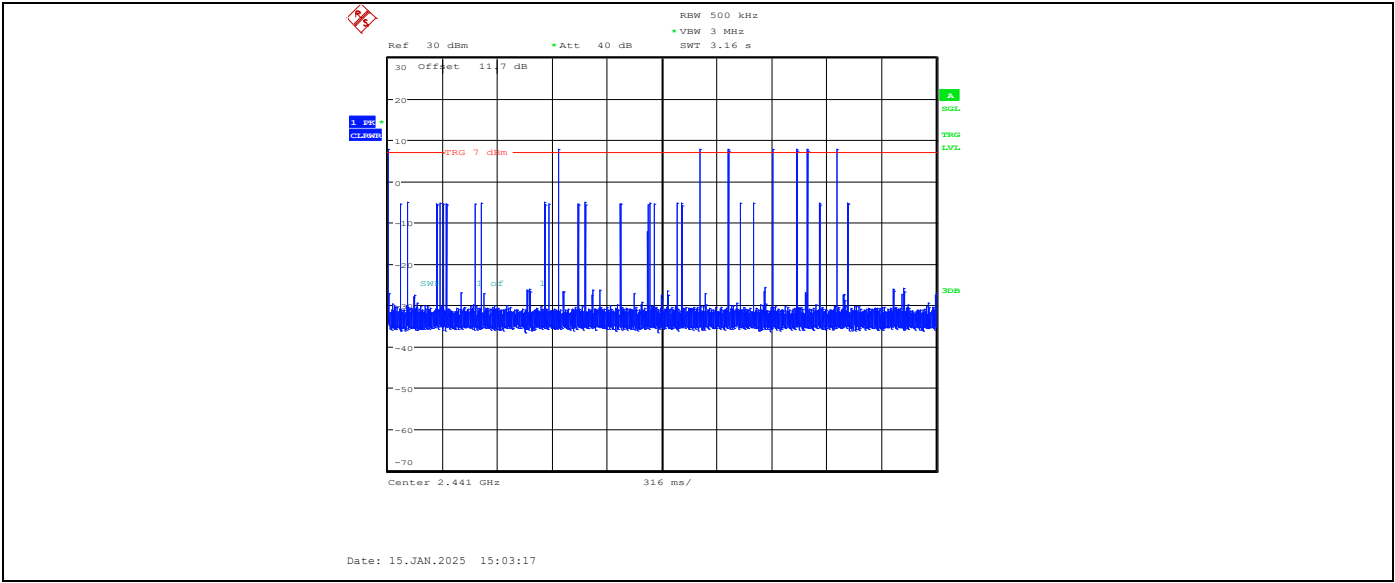


Date: 15.JAN.2025 15:02:34

3DH5_Ant1_Hop



Date: 15.JAN.2025 15:03:10



11. MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

11.1.Limits of Maximum Conducted Output Power Measurement

Compliance with part 15.247 (b) (1) & RSS-247 Clause 5.4(2), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt.

For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watt.

11.2.Test Procedure

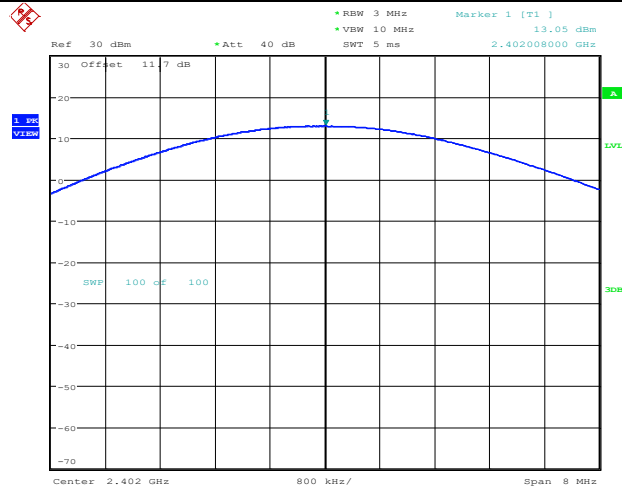
- (a) Connect test port of EUT to universal communication tester.
- (b) Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
- (c) Then set the EUT to transmit at high, middle and low frequency and measure the conducted output power separately.

11.3.Test Data

Table 17 Maximum Conducted Output Power Test Data

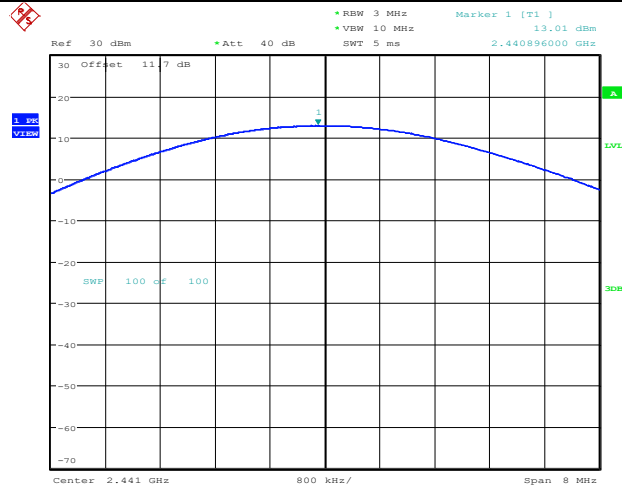
Test Mode	Antenna	Frequency [MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Antenna Gain[dBi]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
DH1	Ant1	2402	13.05	≤30	-3.5	9.55	≤36.00	PASS
		2441	13.01	≤30	-3.5	9.51	≤36.00	PASS
		2480	12.37	≤30	-3.5	8.87	≤36.00	PASS
2DH1	Ant1	2402	13.20	≤30	-3.5	9.7	≤36.00	PASS
		2441	13.36	≤30	-3.5	9.86	≤36.00	PASS
		2480	11.31	≤30	-3.5	7.81	≤36.00	PASS
3DH1	Ant1	2402	12.84	≤30	-3.5	9.34	≤36.00	PASS
		2441	13.04	≤30	-3.5	9.54	≤36.00	PASS
		2480	11.87	≤30	-3.5	8.37	≤36.00	PASS

DH1_Ant1_2402



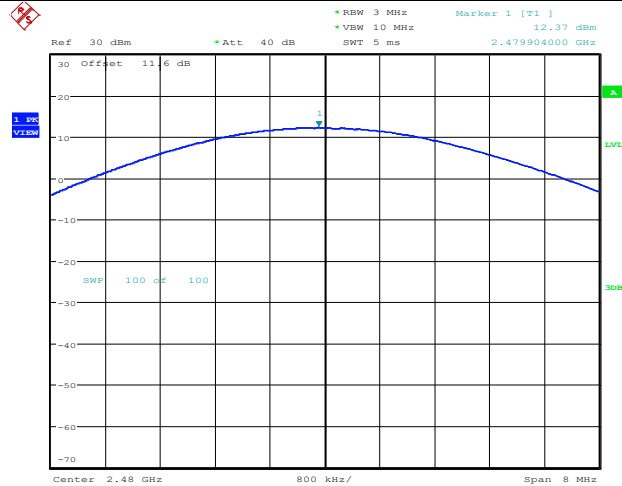
Date: 24.DEC.2024 10:25:05

DH1_Ant1_2441



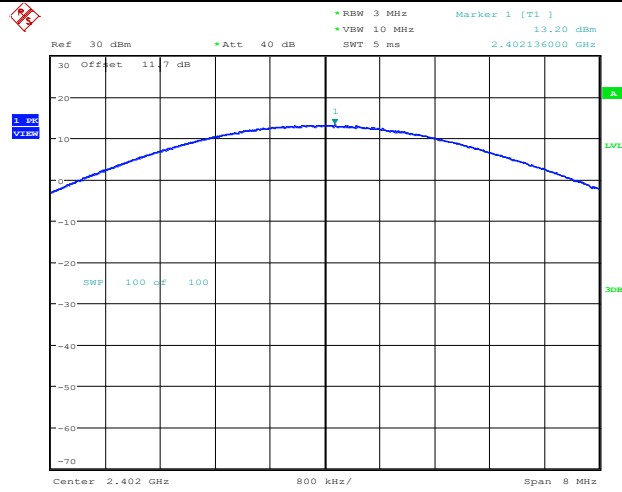
Date: 24.DEC.2024 10:35:38

DH1_Ant1_2480



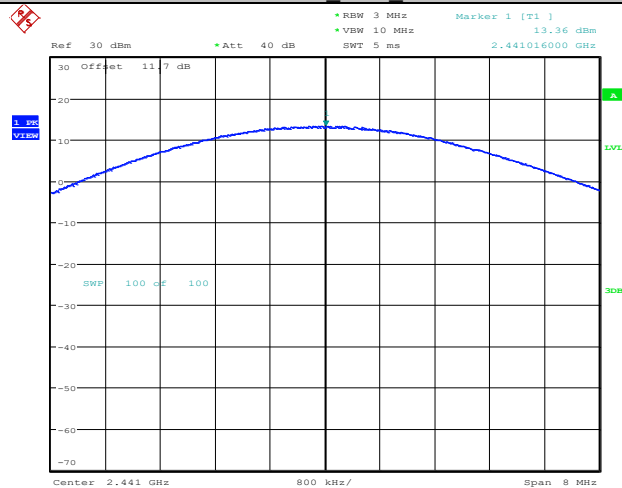
Date: 24.DEC.2024 10:38:04

2DH1_Ant1_2402



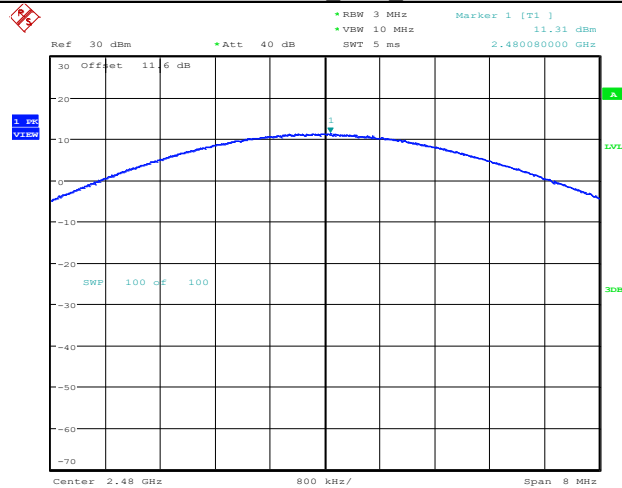
Date: 24.DEC.2024 10:48:23

2DH1_Ant1_2441



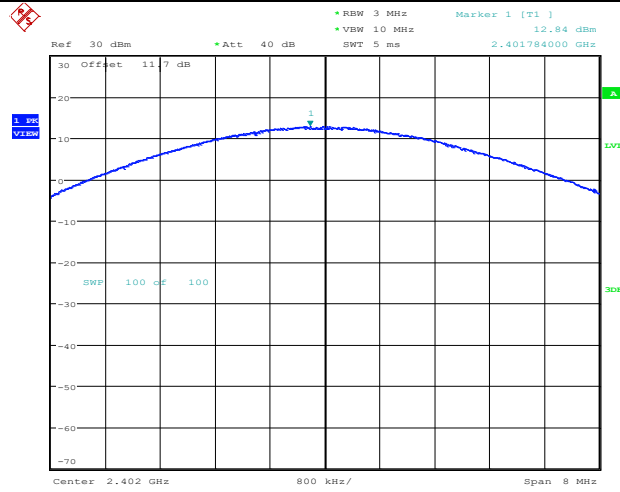
Date: 24.DEC.2024 10:51:59

2DH1_Ant1_2480



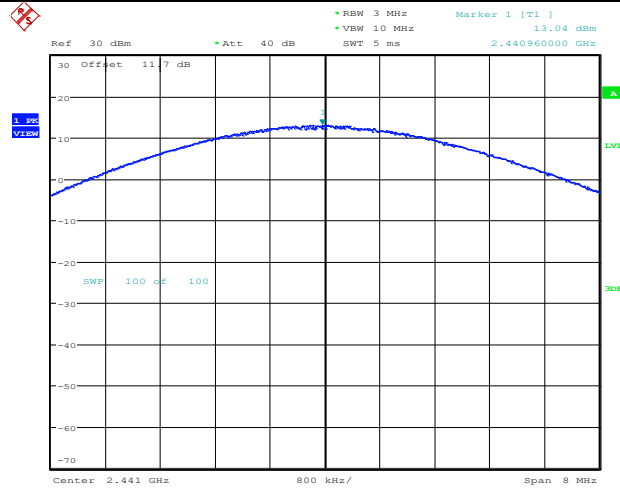
Date: 24.DEC.2024 10:55:57

3DH1_Ant1_2402



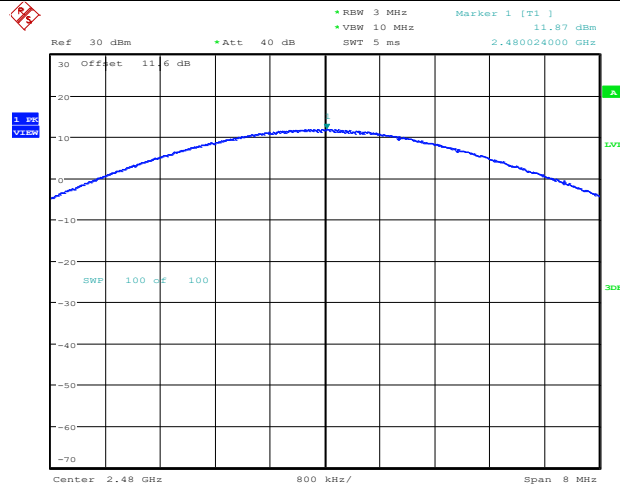
Date: 24.DEC.2024 14:10:29

3DH1_Ant1_2441



Date: 24.DEC.2024 14:16:49

3DH1_Ant1_2480



Date: 24.DEC.2024 14:23:25

12. CONDUCTED BANDEGE AND SPURIOUS

12.1.Limits of Band Edges Measurement

Below –20dB of the highest emission level of operating band (in 100 kHz resolution bandwidth).

12.2.Test Procedure

The transmitter output was connected to the spectrum analyzer.

The resolution bandwidth is set to100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

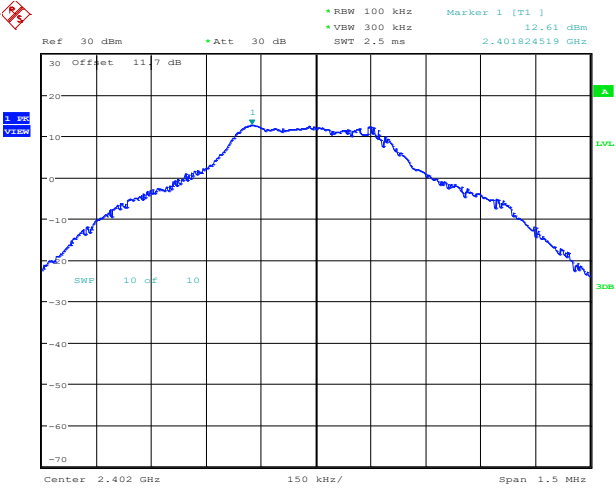
The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal

12.3.Test Data

Table 18 Maximum Conducted Spurious Emission Test Data

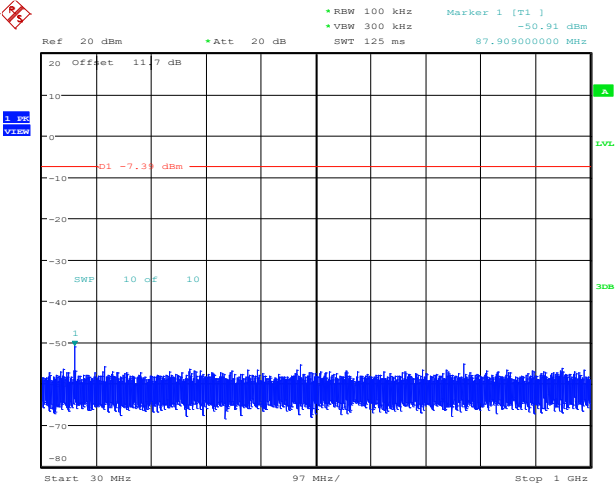
TestMode	Antenna	Frequency [MHz]	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH1	Ant1	2402	Reference	12.61	12.61	---	PASS
			30~1000	12.61	-50.91	≤-7.39	PASS
			1000~26500	12.61	-52.91	≤-7.39	PASS
		2441	Reference	13.12	13.12	---	PASS
			30~1000	13.12	-48.46	≤-6.88	PASS
			1000~26500	13.12	-51.57	≤-6.88	PASS
		2480	Reference	11.85	11.85	---	PASS
			30~1000	11.85	-51.72	≤-8.15	PASS
			1000~26500	11.85	-51.76	≤-8.15	PASS
2DH1	Ant1	2402	Reference	10.86	10.86	---	PASS
			30~1000	10.86	-55.47	≤-9.14	PASS
			1000~26500	10.86	-52.59	≤-9.14	PASS
		2441	Reference	10.72	10.72	---	PASS
			30~1000	10.72	-55.49	≤-9.28	PASS
			1000~26500	10.72	-52.44	≤-9.28	PASS
		2480	Reference	8.82	8.82	---	PASS
			30~1000	8.82	-55.58	≤-11.18	PASS
			1000~26500	8.82	-52.63	≤-11.18	PASS
3DH1	Ant1	2402	Reference	10.00	10.00	---	PASS
			30~1000	10.00	-54.01	≤-10	PASS
			1000~26500	10.00	-52.2	≤-10	PASS
		2441	Reference	9.79	9.79	---	PASS
			30~1000	9.79	-55.49	≤-10.21	PASS
			1000~26500	9.79	-51.93	≤-10.21	PASS
		2480	Reference	9.01	9.01	---	PASS
			30~1000	9.01	-54.41	≤-10.99	PASS
			1000~26500	9.01	-50.85	≤-10.99	PASS

DH1_Ant1_2402_0~Reference



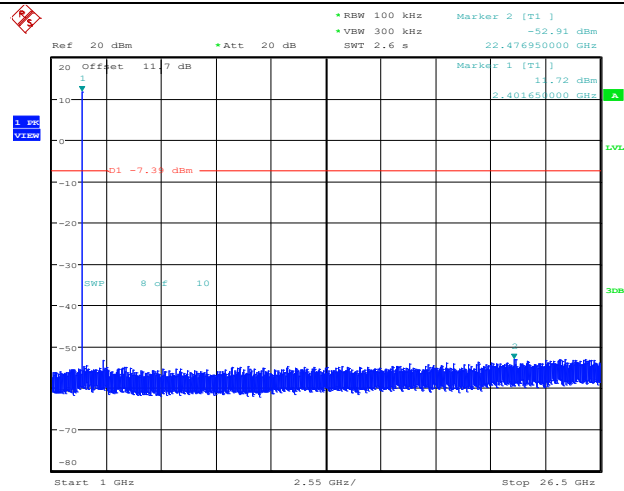
Date: 24.DEC.2024 10:27:58

DH1_Ant1_2402_30~1000



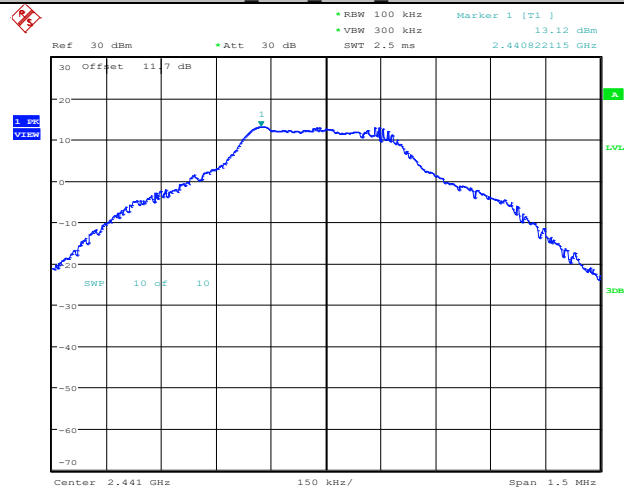
Date: 24.DEC.2024 10:28:07

DH1_Ant1_2402_1000~26500



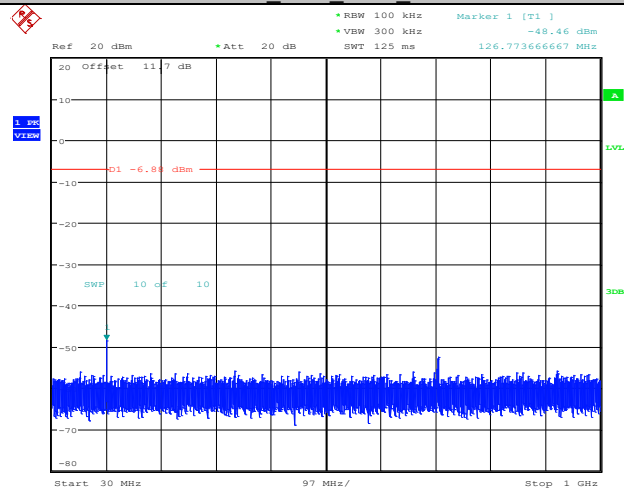
Date: 24.DEC.2024 10:28:30

DH1_Ant1_2441_0-Reference



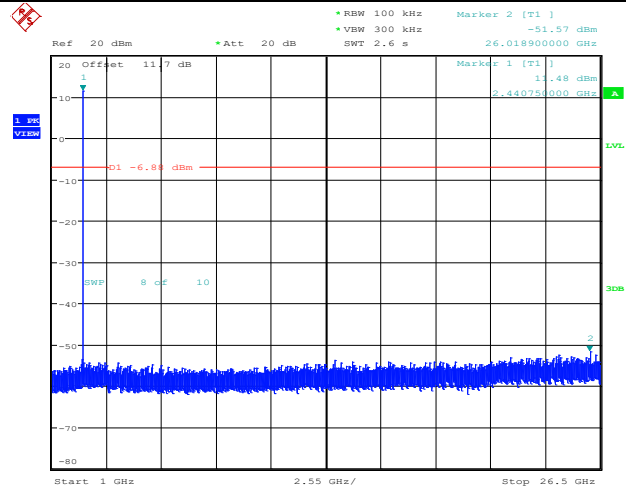
Date: 24.DEC.2024 10:35:55

DH1_Ant1_2441_30~1000



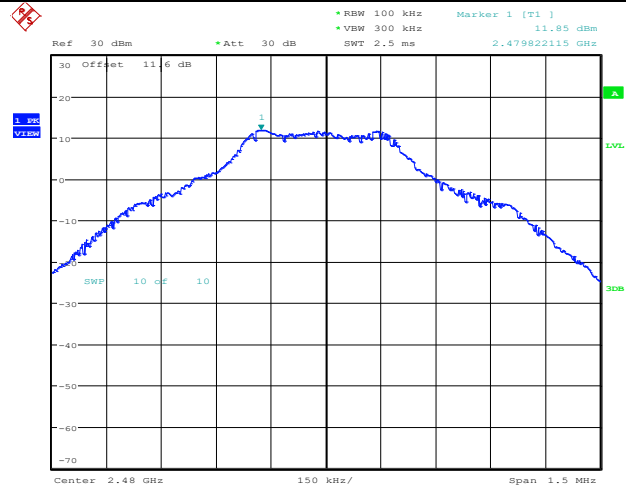
Date: 24.DEC.2024 10:36:04

DH1_Ant1_2441_1000~26500



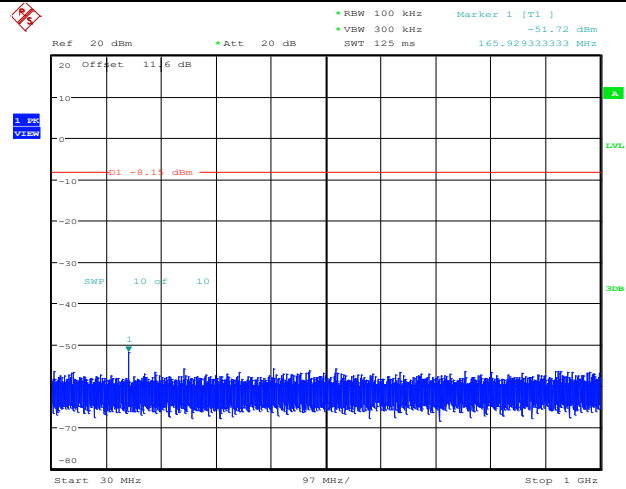
Date: 24.DEC.2024 10:36:27

DH1_Ant1_2480_0-Reference



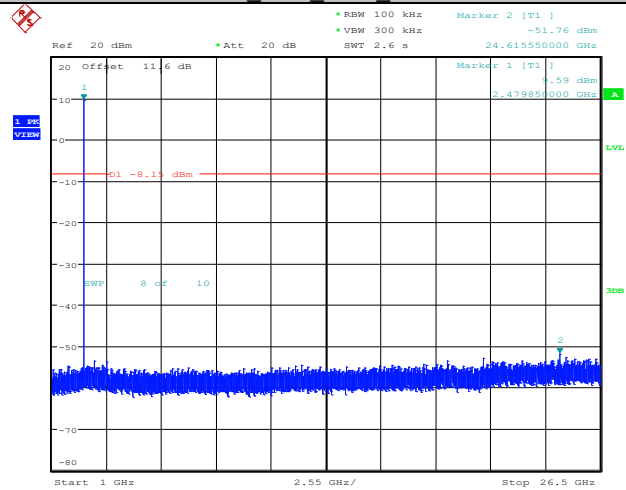
Date: 24.DEC.2024 10:38:21

DH1_Ant1_2480_30~1000



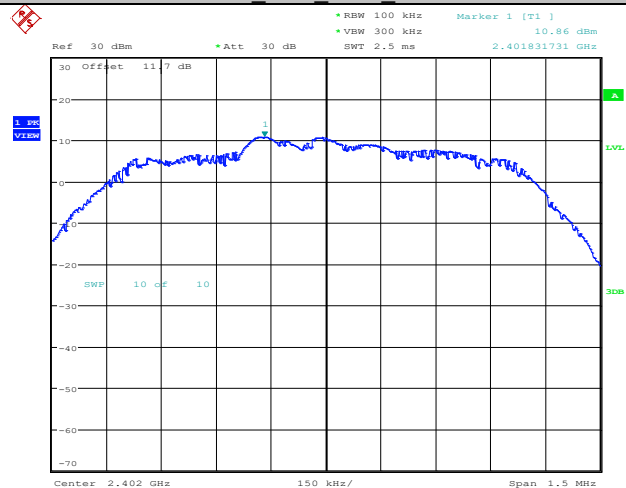
Date: 24.DEC.2024 10:38:30

DH1_Ant1_2480 1000~26500



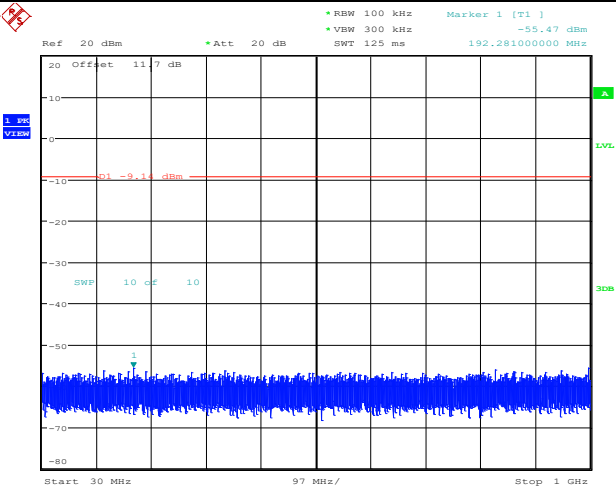
Date: 24.DEC.2024 10:38:53

2DH1_Ant1_2402 0~Reference



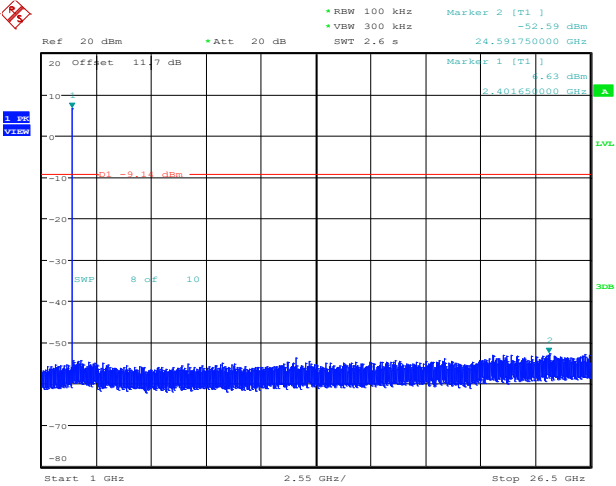
Date: 24.DEC.2024 10:48:41

2DH1_Ant1_2402_30~1000



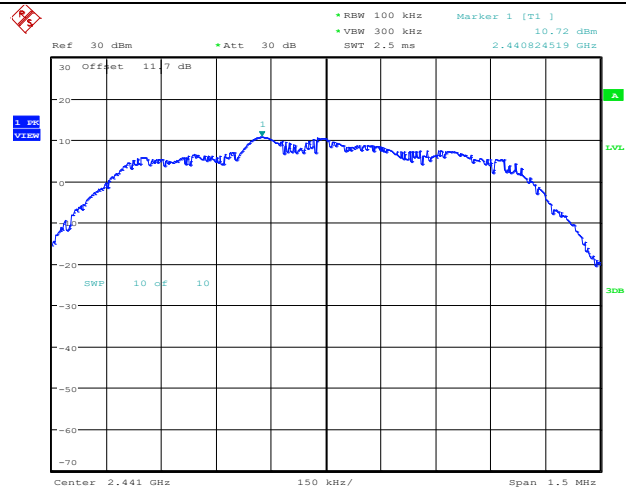
Date: 24.DEC.2024 10:48:50

2DH1_Ant1_2402_1000~26500



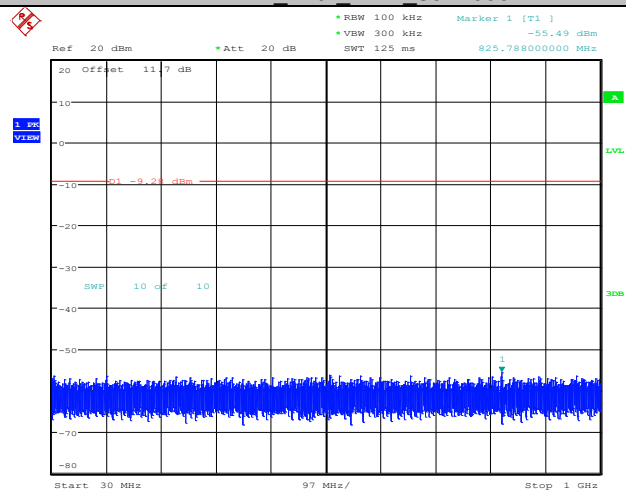
Date: 24.DEC.2024 10:49:12

2DH1_Ant1_2441_0~Reference



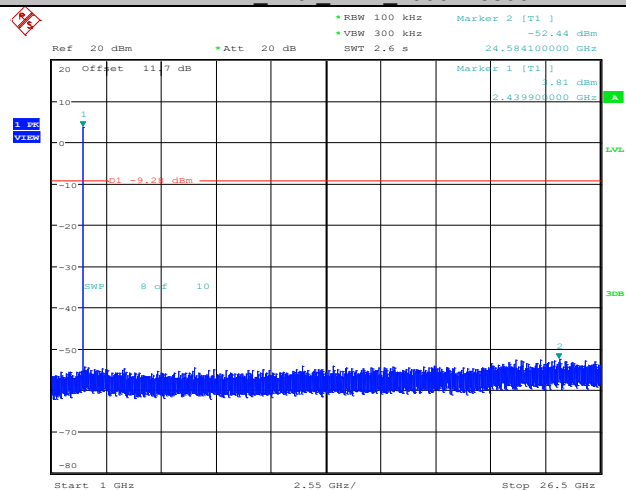
Date: 24.DEC.2024 10:52:17

2DH1 Ant1 2441 30~1000



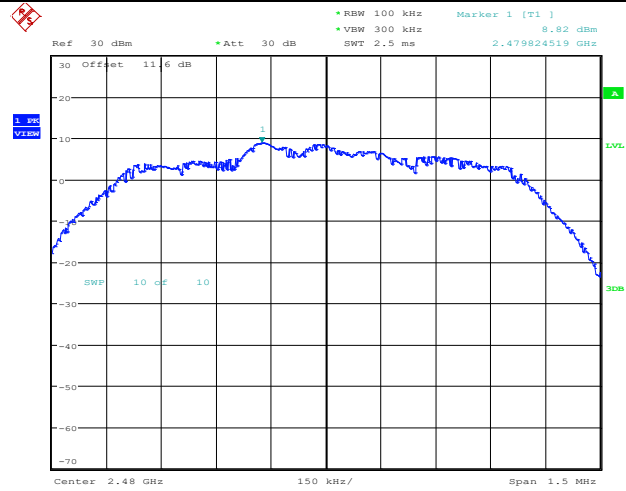
Date: 24.DEC.2024 10:52:26

2DH1 Ant1 2441 1000~26500



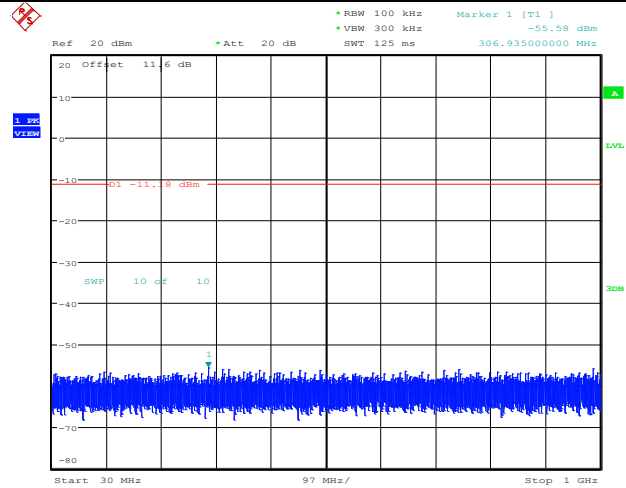
Date: 24.DEC.2024 10:52:49

2DH1_Ant1_2480_0~Reference



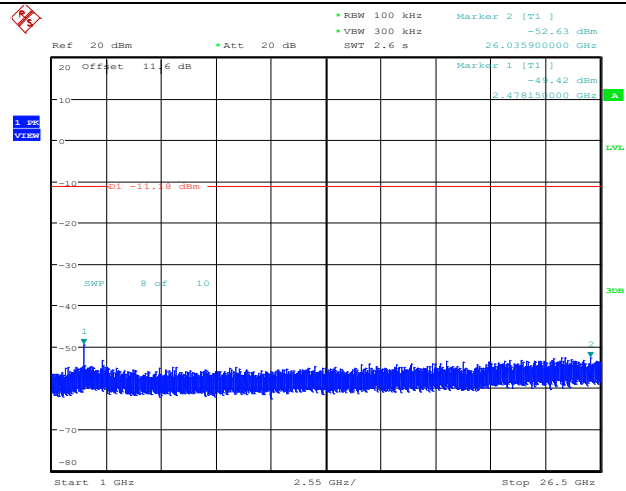
Date: 24.DEC.2024 10:56:14

2DH1_Ant1_2480_30~1000



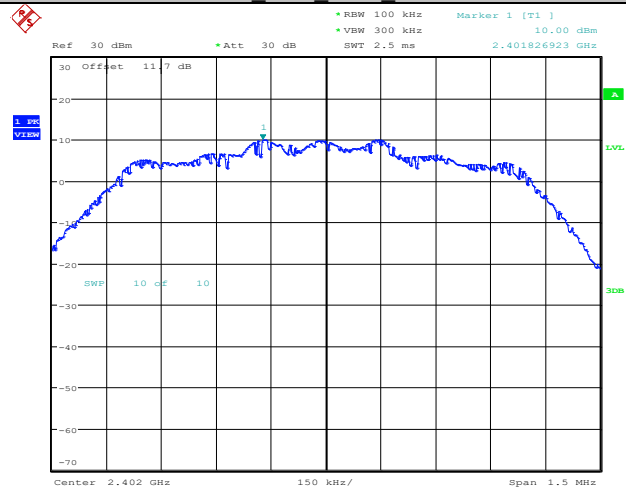
Date: 24.DEC.2024 10:56:23

2DH1_Ant1_2480_1000~26500



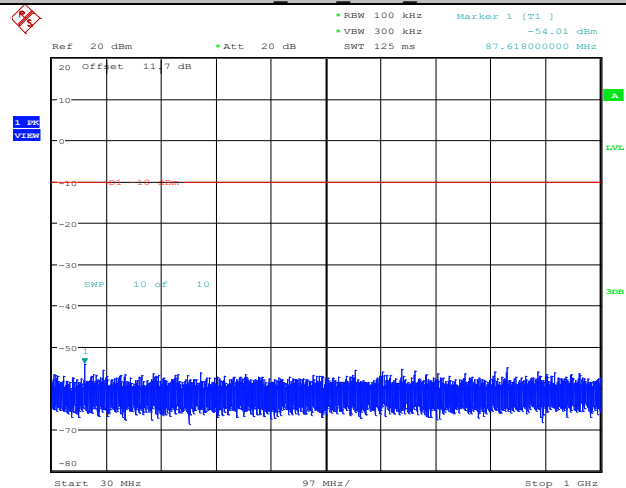
Date: 24.DEC.2024 10:56:46

3DH1_Ant1_2402_0~Reference



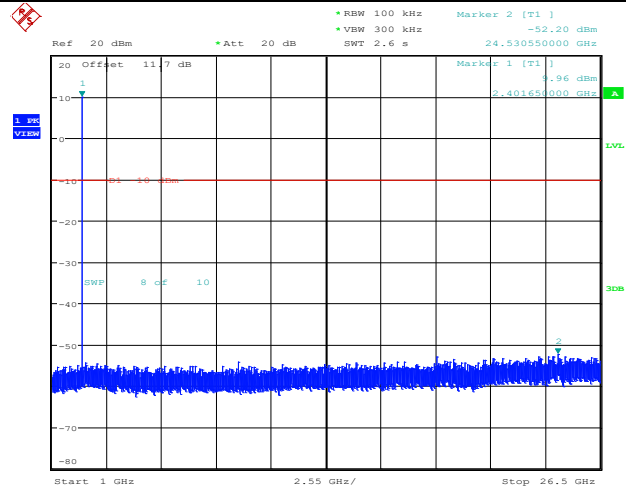
Date: 24.DEC.2024 14:10:47

3DH1_Ant1_2402_30~1000



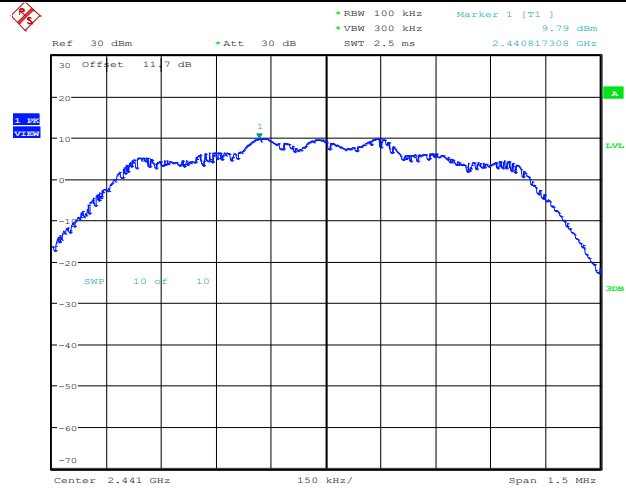
Date: 24.DEC.2024 14:10:56

3DH1_Ant1_2402_1000~26500



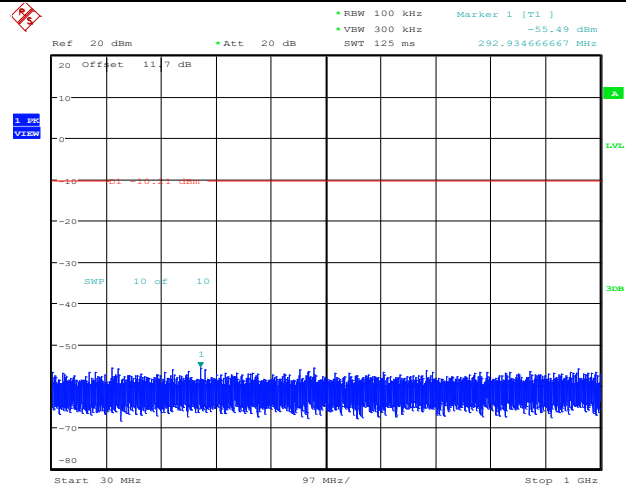
Date: 24.DEC.2024 14:11:18

3DH1_Ant1_2441_0~Reference



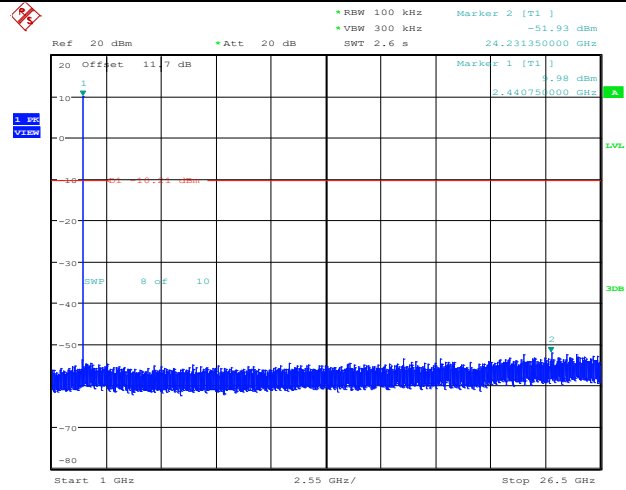
Date: 24.DEC.2024 14:17:07

3DH1_Ant1_2441_30~1000



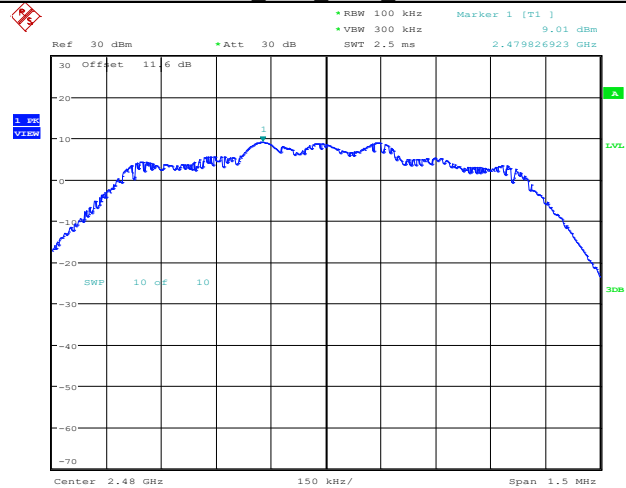
Date: 24.DEC.2024 14:17:16

3DH1 Ant1 2441 1000-26500



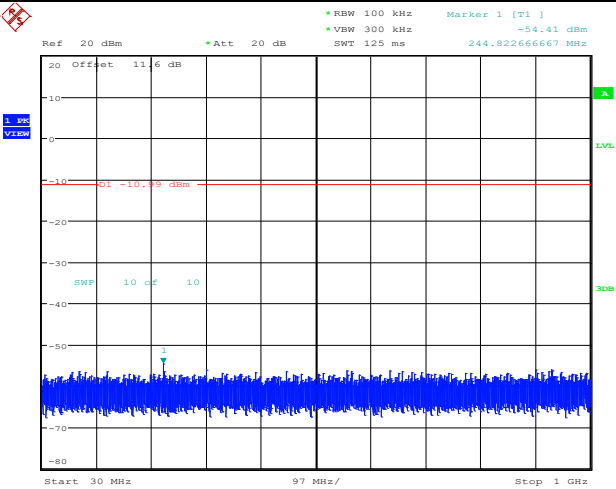
Date: 24.DEC.2024 14:17:38

3DH1 Ant1 2480 0~Reference



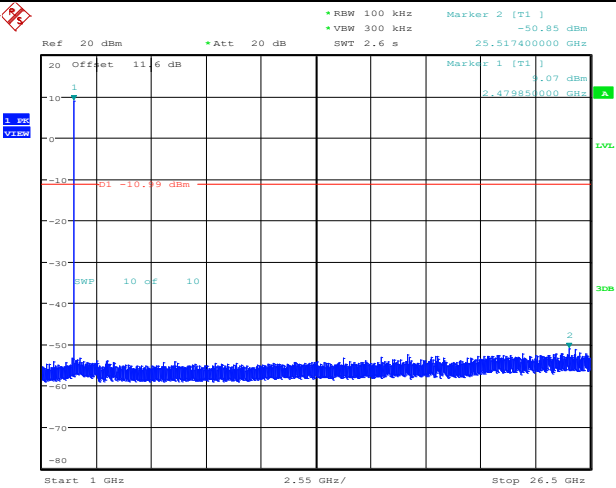
Date: 24.DEC.2024 14:23:42

3DH1 Ant1 2480 30~1000



Date: 24.DEC.2024 14:23:51

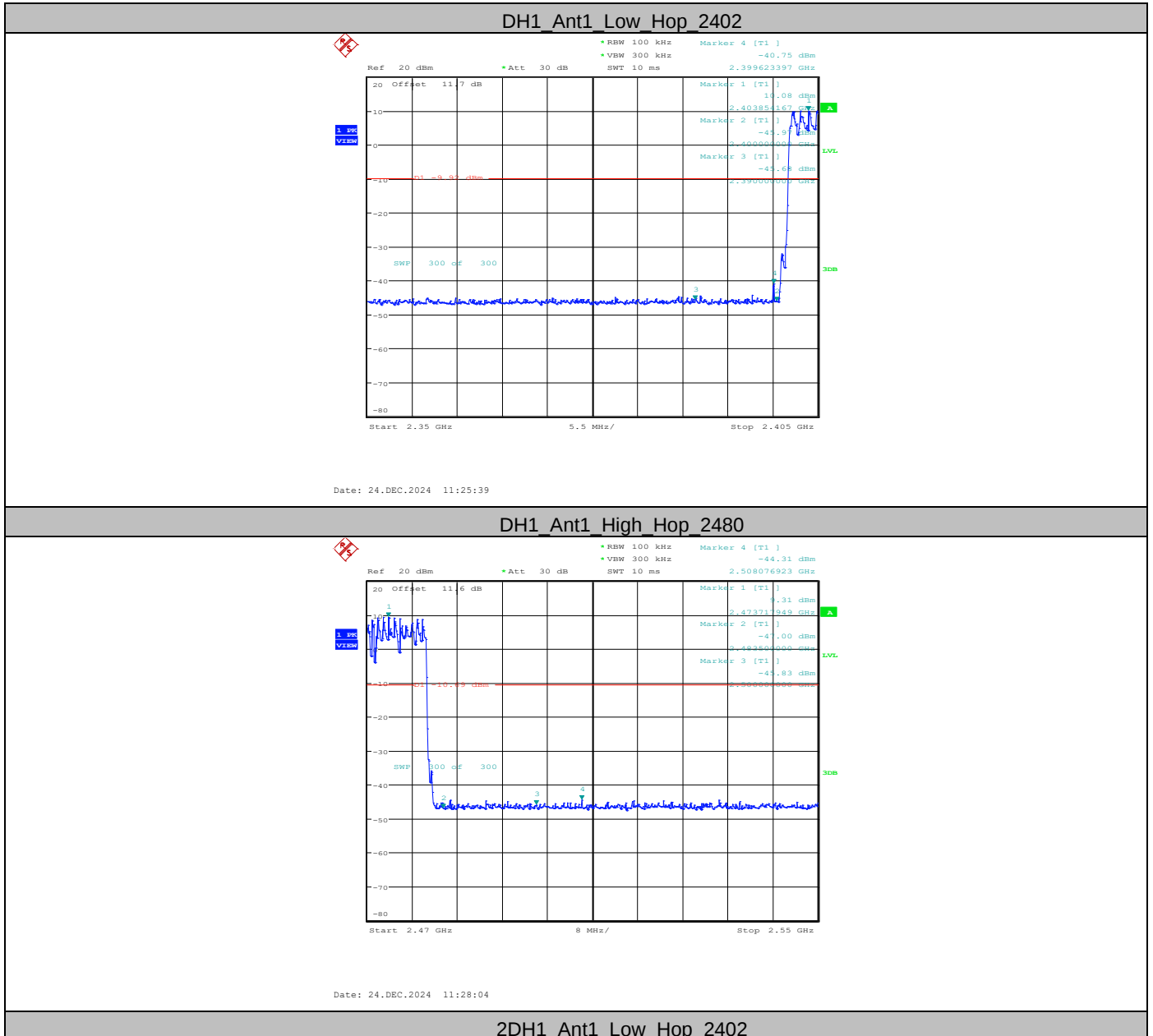
3DH1 Ant1 2480 1000~26500

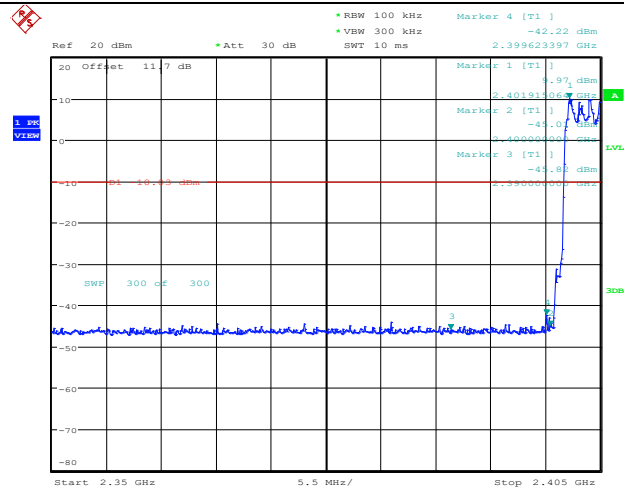


Date: 24.DEC.2024 14:28:16

Table 19 Band edge Test Data

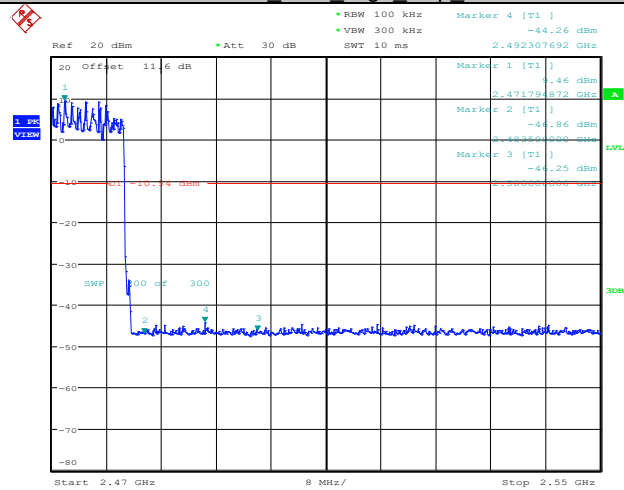
TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH1	Ant1	Low	Hop_2402	10.08	-40.75	≤-9.92	PASS
		High	Hop_2480	9.31	-44.31	≤-10.69	PASS
3DH1	Ant1	Low	Hop_2402	10.08	-44.75	≤-9.92	PASS
		High	Hop_2480	9.37	-44.37	≤-10.63	PASS





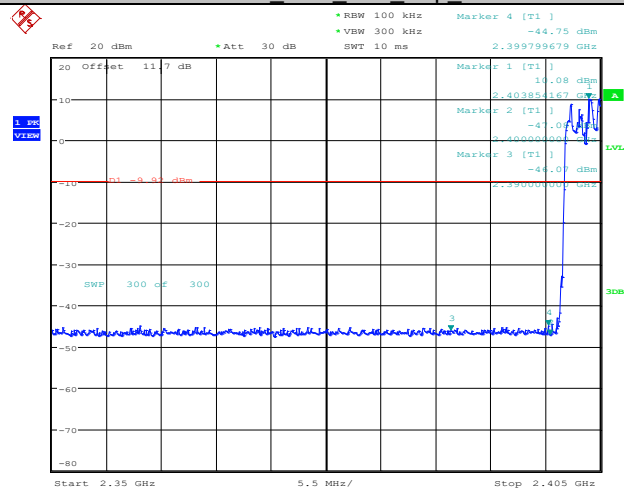
Date: 24.DEC.2024 13:41:45

2DH1 Ant1 High Hop 2480



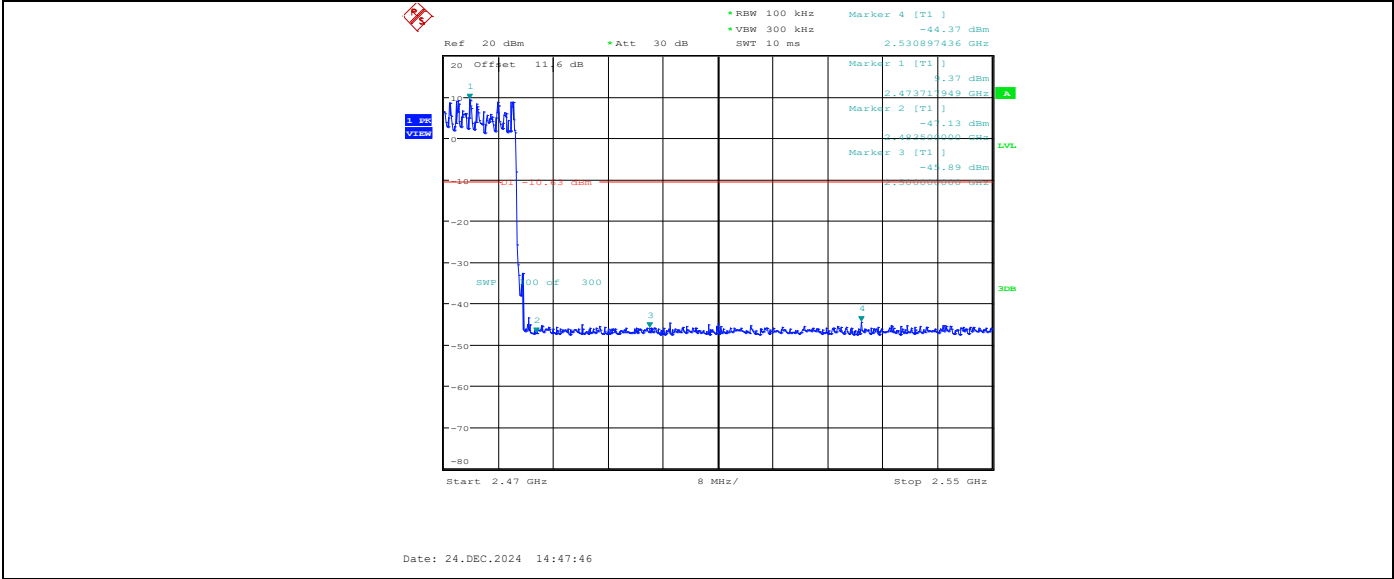
Date: 24.DEC.2024 13:51:08

3DH1 Ant1 Low Hop 2402



Date: 24.DEC.2024 14:46:37

3DH1 Ant1 High Hop 2480



13.99% OCCUPIED BANDWIDTH

13.1.LIMITS OF 99%Occupied Bandwidth

None; for reporting purposes only

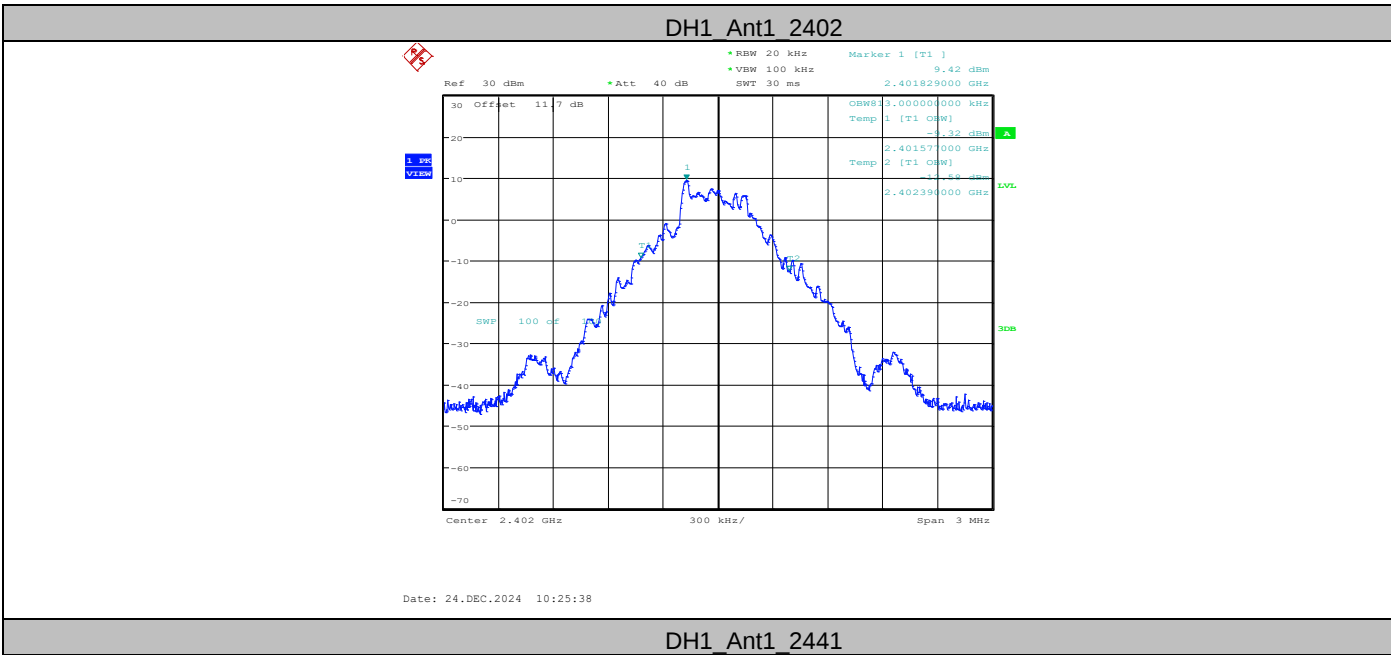
13.2.TEST PROCEDURE

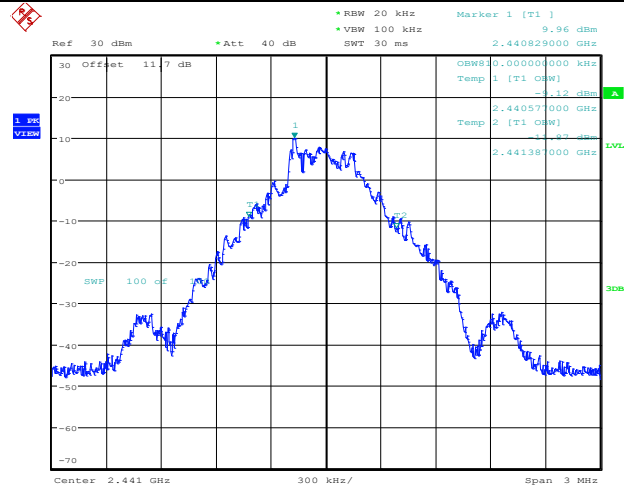
The transmitter output was connected to the spectrum analyzer.
The transmitter output is connected to a spectrum analyzer. The RBW is set to $\geq 1\%$ of the 20 dB bandwidth. The VBW is set to $\geq$ RBW. The sweep time is coupled

13.3.TEST DATA

Table 20 99%Occupied Bandwidth Test Data

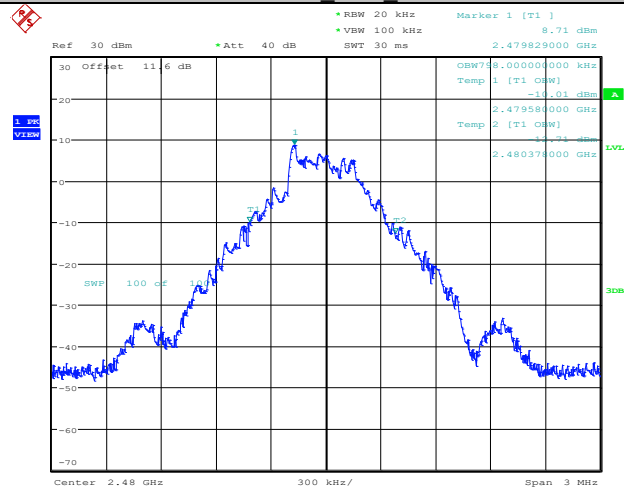
TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit [MHz]	Verdict
DH1	Ant1	2402	0.813	2401.5770	2402.3900	---	---
		2441	0.81	2440.5770	2441.3870	---	---
		2480	0.798	2479.5800	2480.3780	---	---
2DH1	Ant1	2402	1.167	2401.3910	2402.5580	---	---
		2441	1.167	2440.3910	2441.5580	---	---
		2480	1.164	2479.3910	2480.5550	---	---
3DH1	Ant1	2402	1.152	2401.4210	2402.5730	---	---
		2441	1.149	2440.4210	2441.5700	---	---
		2480	1.152	2479.4180	2480.5700	---	---





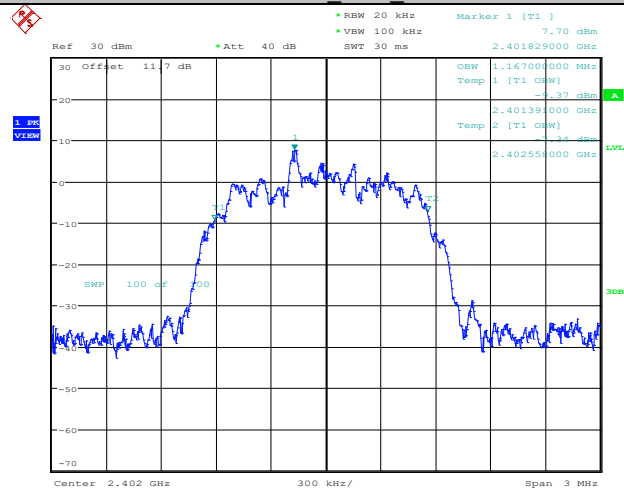
Date: 24.DEC.2024 10:35:47

DH1 Ant1 2480



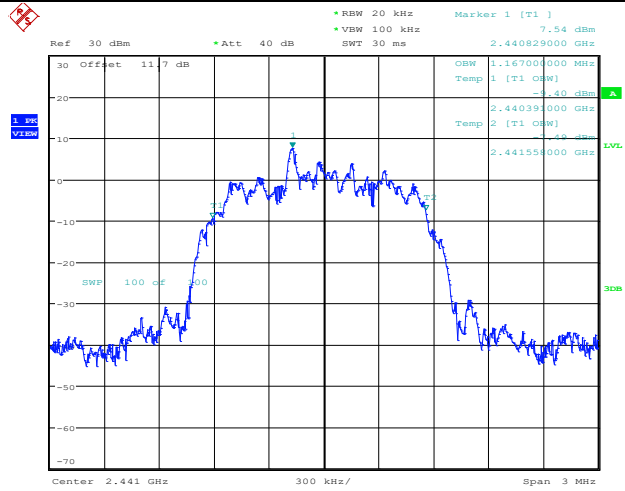
Date: 24.DEC.2024 10:38:13

2DH1 Ant1 2402



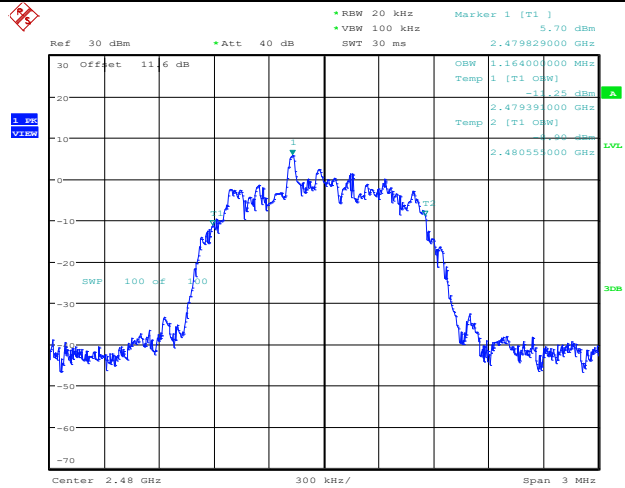
Date: 24.DEC.2024 10:48:33

2DH1_Ant1_2441



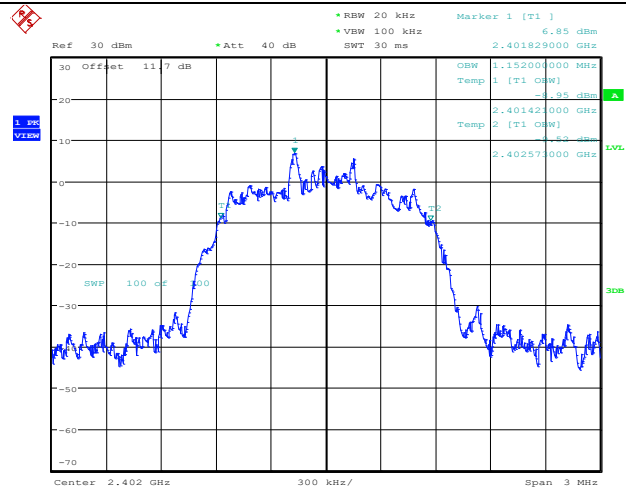
Date: 24.DEC.2024 10:52:09

2DH1_Ant1_2480



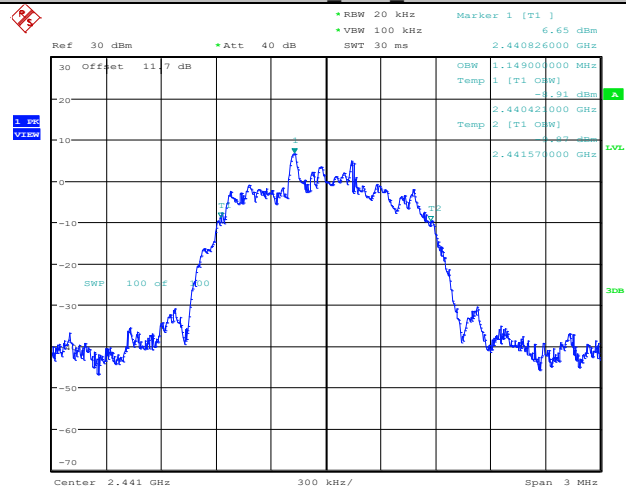
Date: 24.DEC.2024 10:56:06

3DH1_Ant1_2402



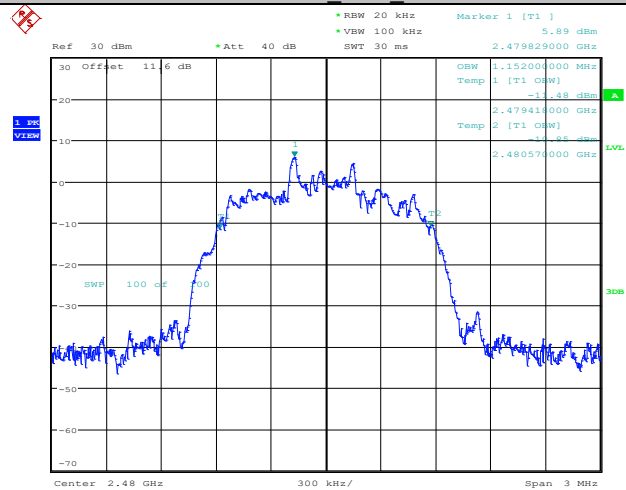
Date: 24.DEC.2024 14:10:39

3DH1 Ant1 2441



Date: 24.DEC.2024 14:16:59

3DH1 Ant1 2480



Date: 24.DEC.2024 14:23:34

14. ANTENNA REQUIREMENTS

15.203 requirements:

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.

15.247(b) (4) requirements:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

RSS-GEN Section 6.8:

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.

14.1. Antenna Connector

Antenna Connector is on the PCB within enclosure and not accessible to user.

14.2. Antenna Gain

The antenna gain of EUT is less than 6 dBi.

END OF REPORT