

FCC Part 15.247

TEST REPORT

For

TRANSCEND INFORMATION INC.

No.70, Xingzhong Rd., Neihu Dist., Taipei City 114, Taiwan, R.O.C.

FCC ID: A4Z-B0046

Report Type:
Original Report

Product Type:
Body Camera

Report Producer : Jojo Lu

Report Number : RXZ221220003RF06

Report Date : 2023-03-15

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Revision History

Revision	No.	Report Number	Issue Date	Description	Author/ Revised by
0.0	RXZ221220003	RXZ221220003RF06	2023.03.15	Original Report	Jojo Lu

TABLE OF CONTENTS

1. General Information	5
1.1. Product Description for Equipment under Test (EUT)	5
1.2. Objective	6
1.3. Related Submittal(s)/Grant(s).....	6
1.4. Test Methodology.....	6
1.5. Statement of Compliance	7
1.6. Measurement Uncertainty	7
1.7. Environmental Conditions.....	8
1.8. Test Facility	8
2. System Test Configuration.....	9
2.1. Description of Test Configuration.....	9
2.2. Equipment Modifications	9
2.3. EUT Exercise Software	9
2.4. Test Mode.....	9
2.5. Support Equipment List and Details.....	9
2.6. External Cable List and Details	9
2.7. Block Diagram of Test Setup	10
3. Summary of Test Results.....	12
4. Test Equipment List and Details	13
5. FCC §15.247(i), §1.1307(b)(3)(i) - RF Exposure	14
5.1. Applicable Standard	14
5.2. RF Exposure Evaluation Result.....	15
6. FCC §15.203 – Antenna Requirements.....	16
6.1. Applicable Standard	16
6.2. Antenna Information	16
7. FCC §15.207(a) – AC Line Conducted Emissions	17
7.1. Applicable Standard	17
7.2. EUT Setup	17
7.3. EMI Test Receiver Setup	18
7.4. Test Procedure.....	18
7.5. Corrected Factor & Margin Calculation.....	18
7.6. Test Results	19
8. FCC §15.209, §15.205 , §15.247(d) – Spurious Emissions	20
8.1. Applicable Standard	20
8.2. EUT Setup	21
8.3. EMI Test Receiver & Spectrum Analyzer Setup.....	22
8.4. Test Procedure.....	22
8.5. Corrected Factor & Margin Calculation.....	22
8.6. Test Results	23
9. FCC §15.247(a)(1) – 20 dB Emission Bandwidth.....	43
9.1. Applicable Standard	43
9.2. Test Procedure	43
9.3. Test Results	43
10. FCC §15.247(a)(1) – Channel Separation Test.....	49

10.1. Applicable Standard	49
10.2. Test Procedure	49
10.3. Test Results	49
11. FCC§15.247(a)(1)(iii) –Time of Occupancy (Dwell Time)	55
11.1. Applicable Standard	55
11.2. Test Procedure	55
11.3. Test Results	56
12. FCC §15.247(a)(1)(iii) –Quantity of hopping channel Test.....	71
12.1. Applicable Standard	71
12.2. Test Procedure	71
12.3. Test Results	71
13. FCC §15.247(b)(1) – Maximum Output Power	74
13.1. Applicable Standard	74
13.2. Test Procedure	74
13.3. Test Results	75
14. FCC §15.247(d) – 100 kHz Bandwidth of Frequency Band Edge	77
14.1. Applicable Standard	77
14.2. Test Procedure	77
14.3. Test Results	77

1. General Information

1.1. Product Description for Equipment under Test (EUT)

Manufacturer	TRANSCEND INFORMATION INC.
	No.70, Xingzhong Rd., Neihu Dist., Taipei City 114, Taiwan, R.O.C.
Brand(Trade) Name	
Product (Equipment)	Body Camera
Main Model Name	DrivePro Body 70
Series Model Name	DPB70, DrivePro Body 7XXXXX, DPB7XXXXX, TSXXXXDPB7XXXXX, DrivePro Body 60, DPB60, DrivePro Body 6XXXXX, DPB6XXXXX, TSXXXXDPB6XXXXX (Multiple Listing: The "X" in the Model Number could be defined as AZ, 0-9, -, _, or blank for marketing differentiation.)
Model Discrepancy	Reference below ** Model Discrepancy statement:
Frequency Range	2402 ~ 2480 MHz
Conducted Peak Output Power	BR(GFSK) Mode: 3.46 dBm EDR($\pi/4$ -DQPSK) Mode: 4.75 dBm EDR(8DPSK) Mode: 5.15 dBm
Modulation Technique	BR Mode: GFSK EDR Mode: $\pi/4$ -DQPSK, 8DPSK
Transmit Data Rate	BR(GFSK) Mode: 1 Mbps EDR($\pi/4$ -DQPSK) Mode: 2 Mbps EDR(8DPSK) Mode: 3 Mbps
Power Operation (Voltage Range)	☒ AC 230 V / 50 Hz ☒ Adapter Brand Name: APD Model:WB-10G05R I/P:AC 100V~240V~50-60Hz O/P:DC 5V/2A ☐ By AC Power Cord ☐ PoE
	☒ DC Type 3.6V ☒ Battery li-polymer battery pack Model:DPB30 ☐ DC Power Supply ☐ External from USB Cable ☐ External DC Adapter
	☐ Host System
Received Date	2022-12-20
Date of Test	2022-12-24~2022-12-30

*All measurement and test data in this report was gathered from production sample serial number: RXZ221220003-1-1&RXZ221220003-1-2 (Assigned by BACL, New Taipei Laboratory).

**** Model Discrepancy statement:**

A description of the differences between the tested model and those that are declared similar are as follows:

Model Name	DrivePro Body 70	
Serial Model Name	DPB70, DrivePro Body 7XXXXX, DPB7XXXXX, TSXXXXDPB7XXXXX, (Multiple Listing: The "X" in the Model Number could be defined as A-Z, 0-9, -, _, or blank for marketing differentiation.)	DrivePro Body 60, DPB60, DrivePro Body 6XXXXX, DPB6XXXXX, TSXXXXDPB6XXXXX (Multiple Listing: The "X" in the Model Number could be defined as A-Z, 0-9, -, _, or blank for marketing differentiation.)
Difference Description	F/W version is 0.9.12, camera outlook is round 	F/W version is 0.9.7, camera outlook is square 

1.2. Objective

This report is prepared on behalf of **TRANSCEND INFORMATION INC.** in accordance with Part 2, Subpart J, Part 15, Subparts A and C of the Federal Communication Commission's rules.

The tests were performed in order to determine the Bluetooth BR and EDR mode of EUT compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

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

FCC Part 15.247 DTS submissions with FCC ID: A4Z-B0046

1.4. Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

FCC 558074 D01 15.247 Meas Guidance v05r02.

1.5. Statement of Compliance

Decision Rule: No, (The test results do not include MU judgment)

It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (New Taipei Laboratory)

Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

The determination of the test results does not require consideration of the uncertainty of the measurement, unless the assessment is required by customer agreement, regulation or standard document specification.

Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) is not responsible for the authenticity of the information provided by the applicant that affects the test results.

1.6. Measurement Uncertainty

Parameter		Uncertainty
AC Mains		± 2.36 (dB)
RF output power, conducted		± 0.93 (dB)
Occupied Bandwidth		± 0.35 (MHz)
Unwanted Emissions, conducted		± 1.69 (dB)
Emissions, radiated	30 MHz~1GHz	± 5.22 (dB)
	1 GHz~6 GHz	± 6.12 (dB)
	6 GHz~18 GHz	± 6.12 (dB)
	18 GHz~40 GHz	± 4.99 (dB)
Temperature		+/- 1.27 °C
Humidity		+/- 3 %

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty

1.7. Environmental Conditions

Test Site	Test Date	Temperature (°C)	Relative Humidity (%)	ATM Pressure (hPa)	Test Engineer
AC Line Conducted Emissions	2022-12-28	20.6	70	1010	Andy Cheng
Radiation Spurious Emissions	2022-12-24~2022-12-30	16.8~19.8	56~74	1010	Aaron Pan Jim Chen
Conducted Spurious Emissions	2022-12-29	23.7	45	1010	Andy Cheng
20 dB Emission Bandwidth	2022-12-29	23.7	45	1010	Andy Cheng
Channel Separation Test	2022-12-29	23.7	45	1010	Andy Cheng
Time of Occupancy	2022-12-29	23.7	45	1010	Andy Cheng
Quantity of hopping channel	2022-12-29	23.7	45	1010	Andy Cheng
Maximum Output Power	2022-12-29	23.7	45	1010	Andy Cheng
100 kHz Bandwidth of Frequency Band Edge	2022-12-29	23.7	45	1010	Andy Cheng

1.8. Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) to collect test data is located on

☒70, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.

Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 3732) and the FCC designation No.TW3732 under the Mutual Recognition Agreement (MRA) in FCC Test.

2. System Test Configuration

2.1. Description of Test Configuration

For BT mode, 79 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	40	2442
1	2403	--	--
2	2404	76	2478
3	2405	77	2479
--	--	78	2480
39	2441	/	/

For BT Modes were tested with channel 0, 39 and 78.

The system was configured for testing in engineering mode, which was provided by manufacturer.

2.2. Equipment Modifications

No modification was made to the EUT.

2.3. EUT Exercise Software

The test software was used “Putty”

Test Frequency		2402MHz	2441MHz	2480MHz
Power Level Setting	GFSK	0x1C	0x1C	0x1C
	$\pi/4$ -DQPSK	0x1C	0x1C	0x1C
	8DPSK	0x1C	0x1C	0x1C

2.4. Test Mode

There are two modes:

MODE1: **DrivePro Body 70** (Sample serial number: RXZ221220003-1-1).

MODE2: **DrivePro Body 60** (Sample serial number: RXZ221220003-1-2).

After pre scan, mode1 was the worst case which was used for all the test items.

Full System (model: **DrivePro Body 70**) for all test item.

2.5. Support Equipment List and Details

Description	Manufacturer	Model Number	S/N
Adapter	Asian Power Devices	WB-10G05R	Y17310056692

2.6. External Cable List and Details

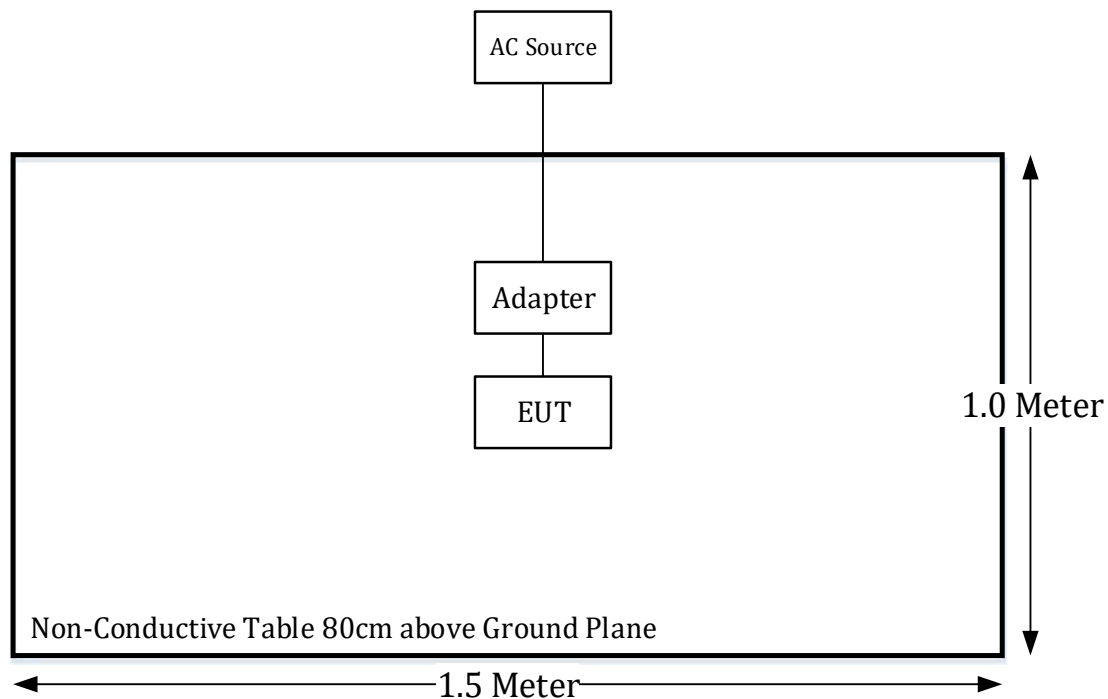
Cable Description	Length (m)	From	To
USB to 3.5mm Cable	1m	Adapter	EUT

2.7. Block Diagram of Test Setup

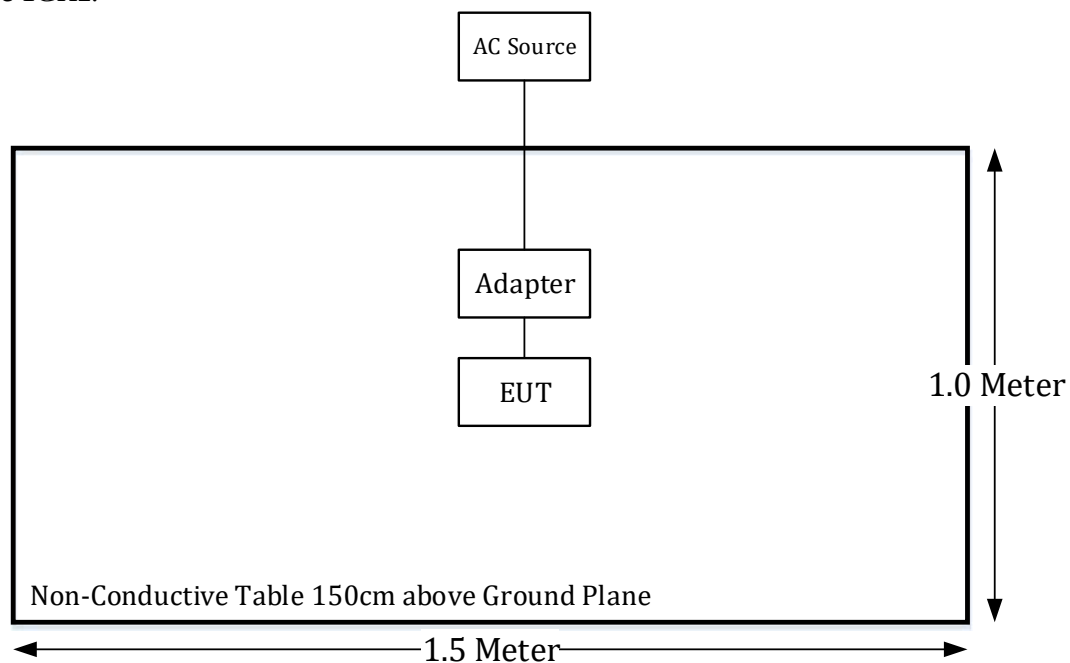
See test photographs attached in annex setup photos for the actual connections between EUT and support equipment.

Radiation:

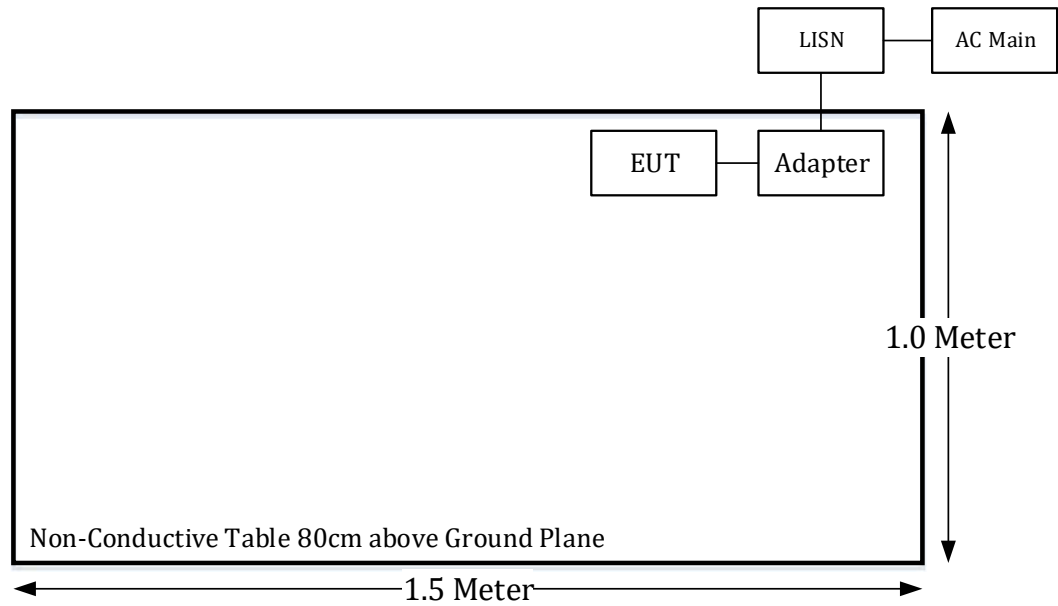
Below 1GHz:



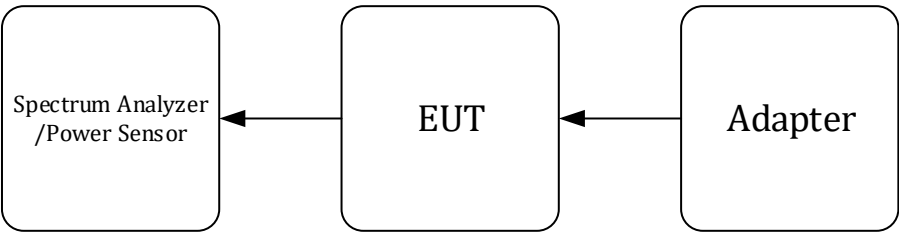
Above 1GHz:



Conduction:



Conducted



3. Summary of Test Results

FCC Rules	Description of Test	Results
§15.247(i), §1.1307(b)(3)(i)	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247(a)(1)	20 dB Emission Bandwidth	Compliance
§15.247 (a)(1)	Channel Separation Test	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliance
§15.247(b)(1)	Maximum Peak Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance

4. Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
AC Line Conduction Room (CON-A)					
LISN	Rohde & Schwarz	ENV216	101248	2022/6/22	2023/6/21
EMI Test Receiver	Rohde & Schwarz	ESR3	102099	2022/6/16	2023/6/15
Pulse Limiter	Rohde & Schwarz	ESH3Z2	TXZEM104	2022/7/19	2023/7/18
RF Cable	EMEC	EM-CB5D	1	2022/6/7	2023/6/6
Software	AUDIX	E3	V9.150826k	N.C.R	N.C.R
Radiation 3M Room (966-A)					
Active Loop Antenna	ETS-Lindgren	6502	35796	2022/3/25	2023/3/24
Bilog Antenna with 6 dB Attenuator	SUNOL SCIENCES & MINI-CIRCUITS	JB6/UNAT-6+	A050115/15542_01	2022/2/14	2023/2/13
EMI Test Receiver	Rohde & Schwarz	ESR7	101419	2022/11/2	2023/11/1
Horn Antenna	EMCO	SAS-571	1020	2022/5/25	2023/5/24
Horn Antenna	ETS-Lindgren	3116	62638	2022/8/18	2023/8/17
Preamplifier	Sonoma	310N	130602	2022/6/16	2023/6/15
Microwave Preamplifier	EM Electronics Corporation	EM18G40G	60656	2023/1/6	2024/1/5
Spectrum Analyzer	Rohde & Schwarz	FSV40	101435	2023/2/1	2024/1/31
Coaxial Cable	COMMATE	PEWC	8Dr	2022/12/24	2023/12/23
Coaxial Cable	JUNFLON	J12J102248-00-B-5	AUG-07-15-044	2022/12/24	2023/12/23
Preamplifier	A.H. system Inc.	PAM-0118P	470	2022/3/28	2023/3/27
Software	AUDIX	E3	18621a	N.C.R	N.C.R
Conducted Room					
Spectrum Analyzer	Rohde & Schwarz	FSV40	101140	2022/2/18	2023/2/17
Cable	UTIFLEX	UFA210A	9435	2022/10/3	2023/10/2
Attenuator	MINI-CIRCUITS	BW-S10W5+	1419	2022/2/11	2023/2/10
Power Sensor	KEYSIGHT	U2021XA	MY58140006	2022/11/2	2023/11/1

***Statement of Traceability:** BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to the SI System of Units via the R.O.C. Center for Measurement Standards of the Electronics Testing Center, Taiwan (ETC) or to another internationally recognized National Metrology Institute (NMI), and were compliant with the current Taiwan Accreditation Foundation (TAF) requirements

5. FCC §15.247(i), §1.1307(b)(3)(i) - RF Exposure

5.1. Applicable Standard

According to subpart 15.247(i) and subpart §1.1307(b)(3)(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

For single RF sources (*i.e.*, any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

(A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);

(B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

(C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1,920 R^2$
1.34-30	$3,450 R^2/f^2$
30-300	$3.83 R^2$
300-1,500	$0.0128 R^2 f$
1,500-100,000	$19.2 R^2$

5.2. RF Exposure Evaluation Result

Project info

Band	Freq (MHz)	Turn-up Average Power (dBm)	Ant Gain (dBi)	Distances (mm)	Turn-up (mW)	ERP (dBm)	ERP (mW)
BT	2480	3.5	2.64	5	2.24	3.99	2.51

§ 1.1307(b)(3)(i)(A) and § 1.1307(b)(3)(i)(C) method os not applicable.

§ 1.1307(b)(3)(i)(B)

Band	Freq (MHz)	Pth (mW)	X	ERP 20cm (mW)	Result Option B
BT	2480	2.72	1.905	3060	exempt

The available maximum time-averaged power or effective radiated power (ERP), whichever is greater.

This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive).

Result: The device meets the exemption requirement.

6. FCC §15.203 – Antenna Requirements

6.1. Applicable Standard

According to § 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 user of a standard antenna jack or electrical connector is prohibited.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna does not exceed 6dBi.

6.2. Antenna Information

Manufacturer	Model	Type	Antenna Gain
Walsin Technology Corporation	RFECA3216060A1T	Chip	2.64 dBi

Result: Compliance

7. FCC §15.207(a) – AC Line Conducted Emissions

7.1. Applicable Standard

According to §15.207

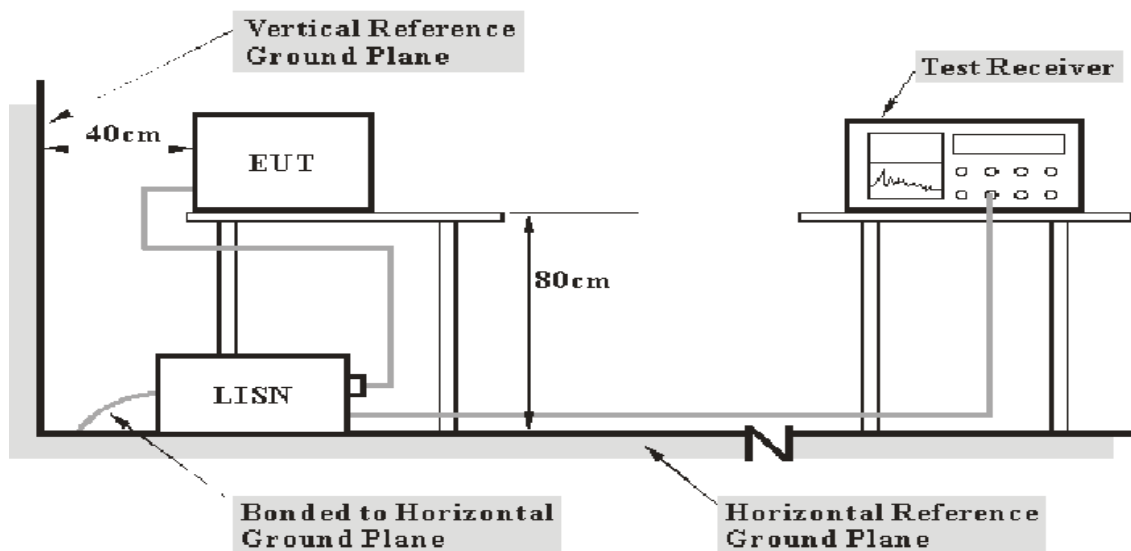
For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56 ^{Note 1}	56 to 46 ^{Note 2}
0.5-5	56	46
5-30	60	50

Note 1: Decreases with the logarithm of the frequency.

Note 2: A linear average detector is required

7.2. EUT Setup



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

7.3. EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150kHz to 30MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations

Frequency Range	IF B/W
150kHz – 30MHz	9kHz

7.4. Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

7.5. Corrected Factor & Margin Calculation

The factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Factor} = \text{LISN VDF} + \text{Cable Loss} + \text{Transient Limiter Attenuation}$$

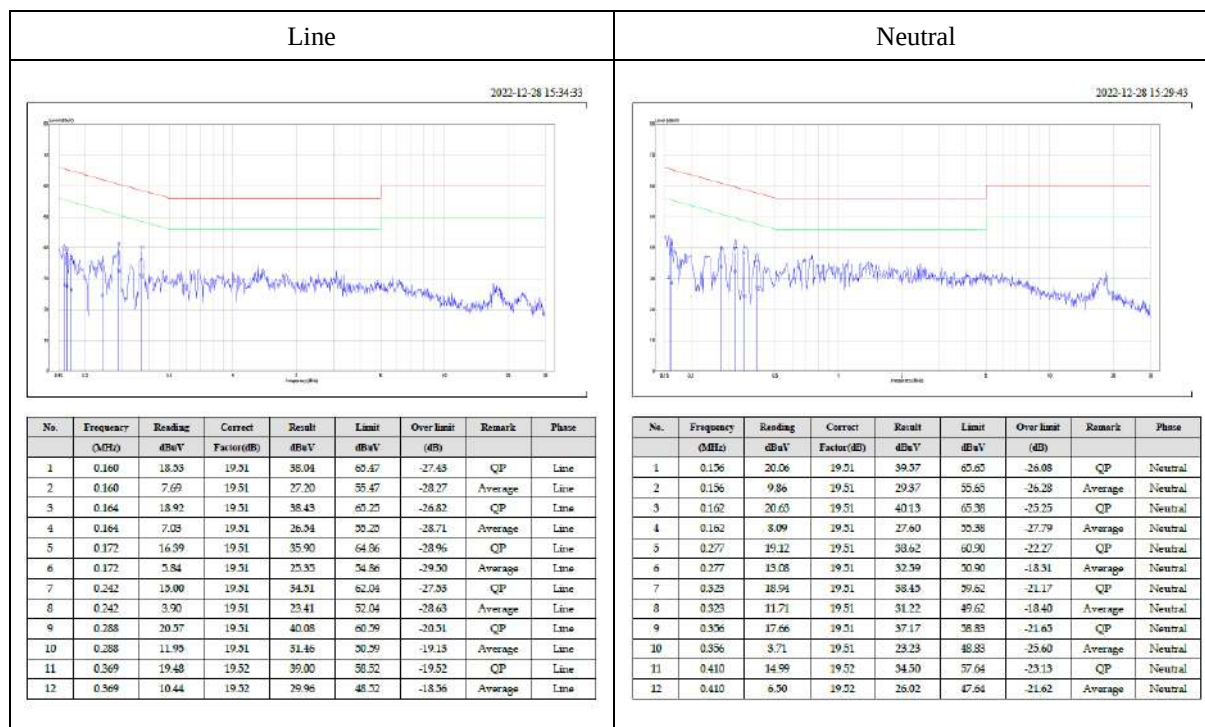
The “Over Limit” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an over limit of -7 dB means the emission is 7 dB below the limit. The equation for Over Limit calculation is as follows:

$$\text{Over Limit} = \text{Level} - \text{Limit Line}$$

7.6. Test Results

Test Mode: Transmitting

Power: AC 120V/60Hz



Note:

Result = Reading + Correct Factor

Over Limit = Result - Limit Line

Correct Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss + Attenuator

8. FCC §15.209, §15.205 , §15.247(d) – Spurious Emissions

8.1. Applicable Standard

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1MHz.

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423	608 – 614	4. 5 – 5. 15
0.495 – 0.505	16.69475 – 16.69525	960 – 1240	5. 35 – 5. 46
2.1735 – 2.1905	16.80425 – 16.80475	1300 – 1427	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1435 – 1626.5	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1645.5 – 1646.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1660 – 1710	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1718.8 – 1722.2	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	2200 – 2300	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2310 – 2390	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2483.5 – 2500	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2690 – 2900	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	3260 – 3267	22.01 – 23.12
8.41425 – 8.41475	162.0125 – 167.17	3.332 – 3.339	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3 3458 – 3 358	31.2 – 31.8
12.51975 – 12.52025	240 – 285	3.600 – 4.400	36.43 – 36.5
12.57675 – 12.57725	322 – 335.4		Above 38.6
13.36 – 13.41	399.9 – 410		

As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

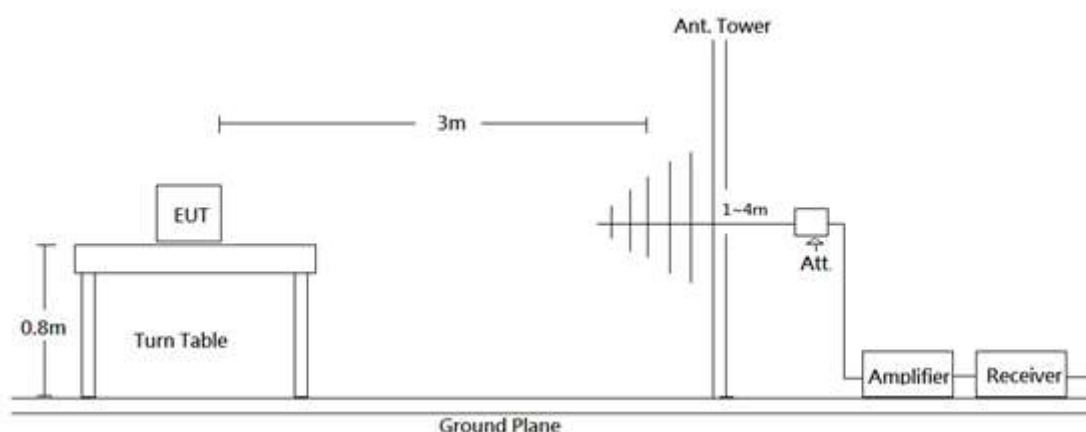
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As per FCC §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains

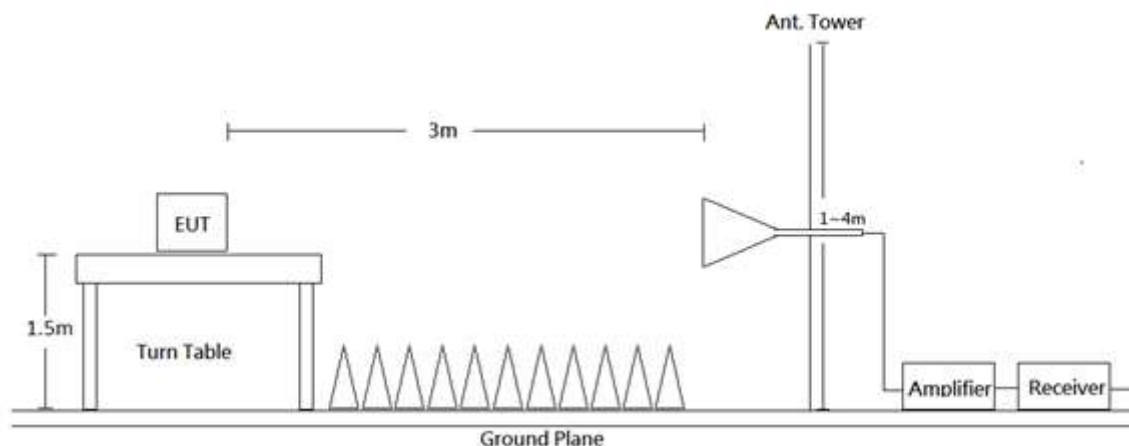
the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

8.2. EUT Setup

Below 1 GHz:



Above 1 GHz:



Radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC Part 15.209 and FCC 15.247 Limits.

8.3. EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 26.5 GHz. During the radiated emission test, the EMI test receiver was set with the following configurations measurement method 6.3 in ANSI C63.10.

Frequency Range	RBW	VBW	Measurement method
30-1000 MHz	120 kHz	/	QP
Above 1 GHz	1 MHz	3 MHz	PK
	1 MHz	10 Hz	Ave

8.4. Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz and PK and average detector modes for frequencies above 1 GHz.

8.5. Corrected Factor & Margin Calculation

The Correct Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Correct Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Result} - \text{Limit}$$

8.6. Test Results

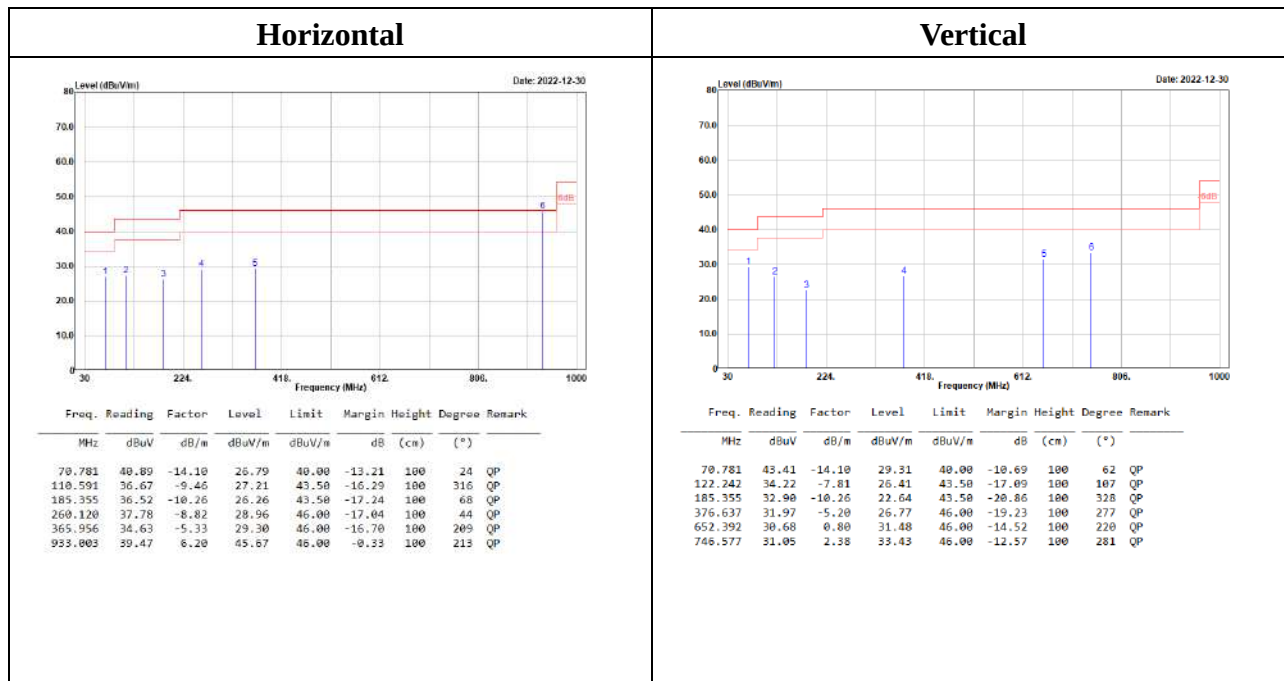
Test Mode: Transmitting

(Pre-scan with three orthogonal axis, and worse case as Y axis.)

(worst case is BR (GFSK) mode Middle channel)

Power: AC 120V/60Hz

30MHz-1GHz:



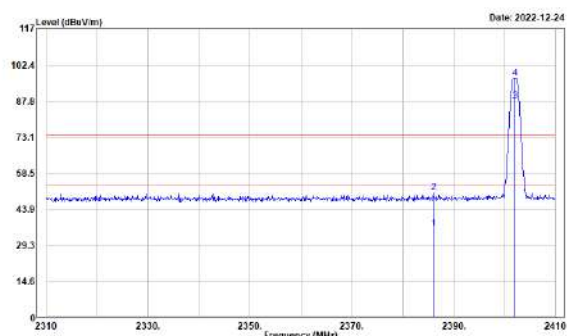
Note:

Level = Reading + Factor.

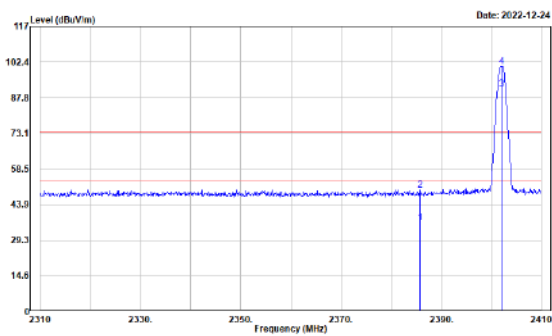
Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

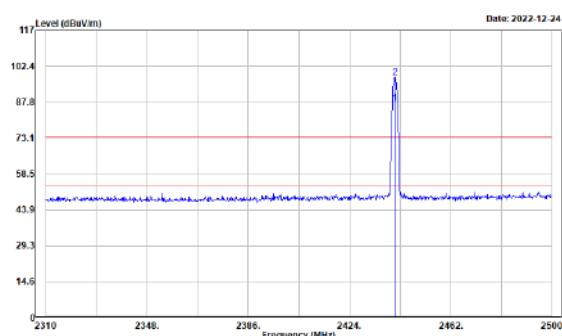
Spurious emissions more than 20 dB below the limit were not reported.

Fundamental:**Low channel****Horizontal**

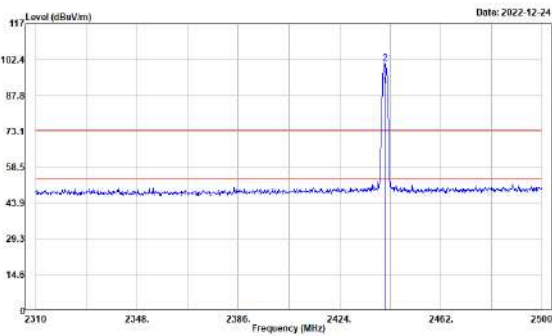
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2385.976	40.62	-4.62	36.00	54.00	-18.00	120	4	Average
2385.976	55.24	-4.62	50.62	74.00	-23.38	120	4	Peak
2402.000	92.43	-4.48	87.95			120	4	Average
2402.000	101.61	-4.48	97.13			120	4	Peak

Vertical

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2385.676	41.04	-4.62	36.42	54.00	-17.58	136	9	Average
2385.676	54.52	-4.62	49.90	74.00	-24.10	136	9	Peak
2402.000	95.85	-4.48	91.37			136	9	Average
2402.000	105.13	-4.48	100.65			136	9	Peak

Middle channel**Horizontal**

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2441.000	91.41	-4.19	87.22			120	6	Average
2441.000	101.98	-4.19	97.79			120	6	Peak

Vertical

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2441.000	95.69	-4.19	91.50			151	74	Average
2441.000	104.96	-4.19	100.77			151	74	Peak

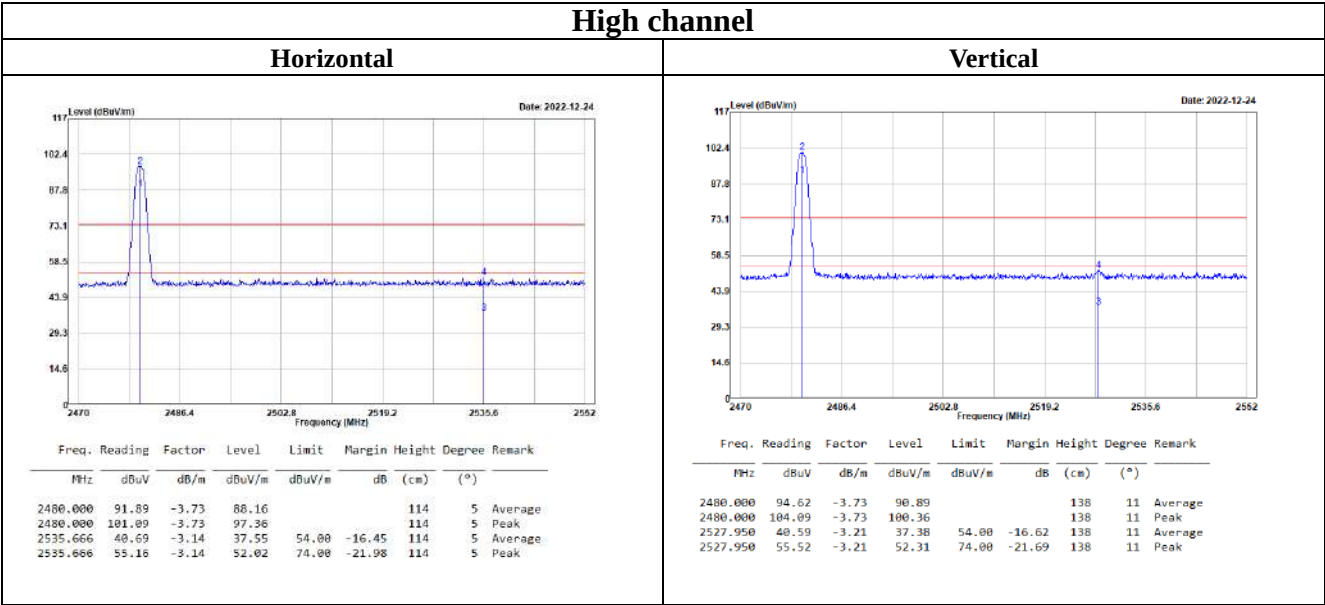
Note:

Level = Reading + Factor.

Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Spurious emissions more than 20 dB below the limit were not reported.



Note:

Level = Reading + Factor.

Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Spurious emissions more than 20 dB below the limit were not reported.

Above 1GHz

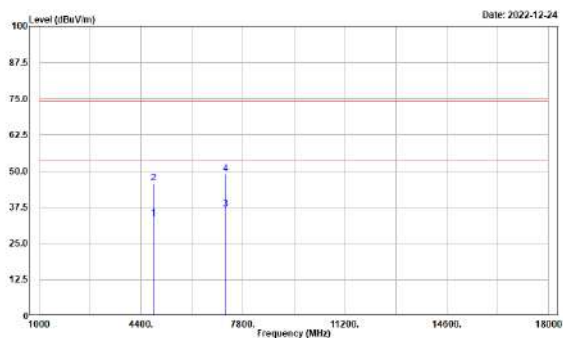
BR (GFSK)

Power: AC 120V/60Hz

1GHz-18GHz

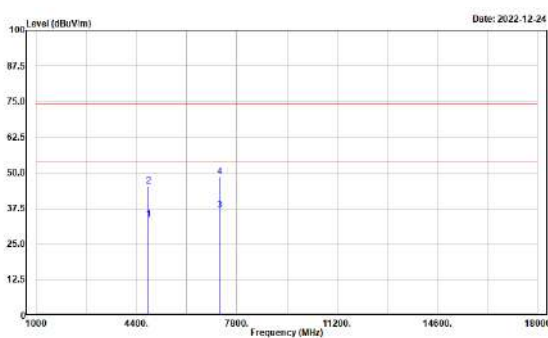
Low channel

Horizontal



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4882.000	30.02	3.45	33.47	54.00	-20.53	151	340	Average
4884.000	42.35	3.45	45.80	74.00	-28.20	151	340	Peak
7206.000	27.89	9.05	36.94	54.00	-17.06	148	226	Average
7206.000	39.95	9.05	49.00	74.00	-25.00	148	226	Peak

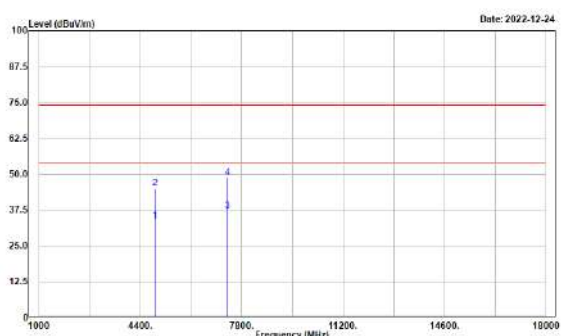
Vertical



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4882.000	30.04	3.45	33.49	54.00	-20.51	144	349	Average
4884.000	41.87	3.45	45.32	74.00	-28.68	144	349	Peak
7206.000	27.77	9.05	36.82	54.00	-17.18	149	182	Average
7206.000	39.49	9.05	48.54	74.00	-25.46	149	182	Peak

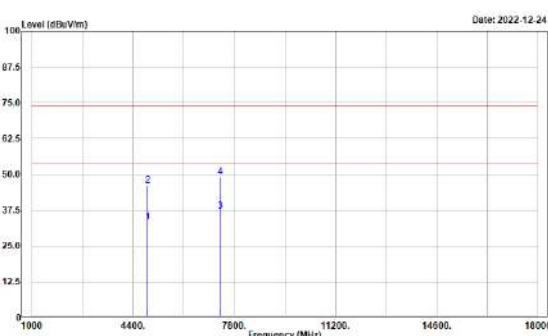
Middle channel

Horizontal



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4882.000	30.05	3.58	33.63	54.00	-20.37	150	158	Average
4882.000	41.54	3.58	45.12	74.00	-28.88	150	158	Peak
7323.000	27.90	9.26	37.16	54.00	-16.84	144	0	Average
7323.000	39.47	9.26	48.73	74.00	-25.27	144	0	Peak

Vertical



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4882.000	29.79	3.58	33.37	54.00	-20.63	149	199	Average
4882.000	42.38	3.58	45.96	74.00	-28.04	149	199	Peak
7323.000	27.97	9.26	37.23	54.00	-16.77	140	90	Average
7323.000	39.74	9.26	49.00	74.00	-25.00	140	90	Peak

Note:

Level = Reading + Factor.

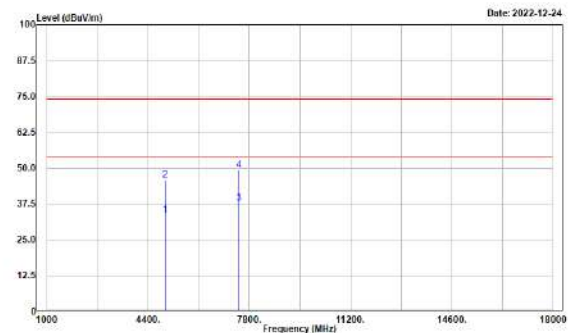
Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Spurious emissions more than 20 dB below the limit were not reported.

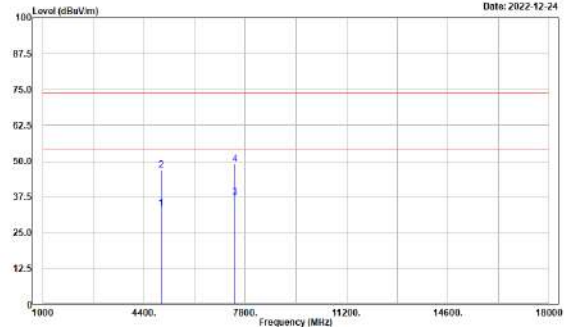
High channel

Horizontal



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4960.000	29.79	3.92	33.71	54.00	-20.29	144	312	Average
4960.000	41.94	3.92	45.86	74.00	-28.14	144	312	Peak
7440.000	28.22	9.42	37.64	54.00	-16.36	148	85	Average
7440.000	39.82	9.42	49.24	74.00	-24.76	148	85	Peak

Vertical



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4960.000	29.69	3.92	33.61	54.00	-20.39	148	335	Average
4960.000	42.99	3.92	46.91	74.00	-27.09	148	335	Peak
7440.000	28.10	9.42	37.52	54.00	-16.48	142	285	Average
7440.000	39.61	9.42	49.03	74.00	-24.97	142	285	Peak

Note:

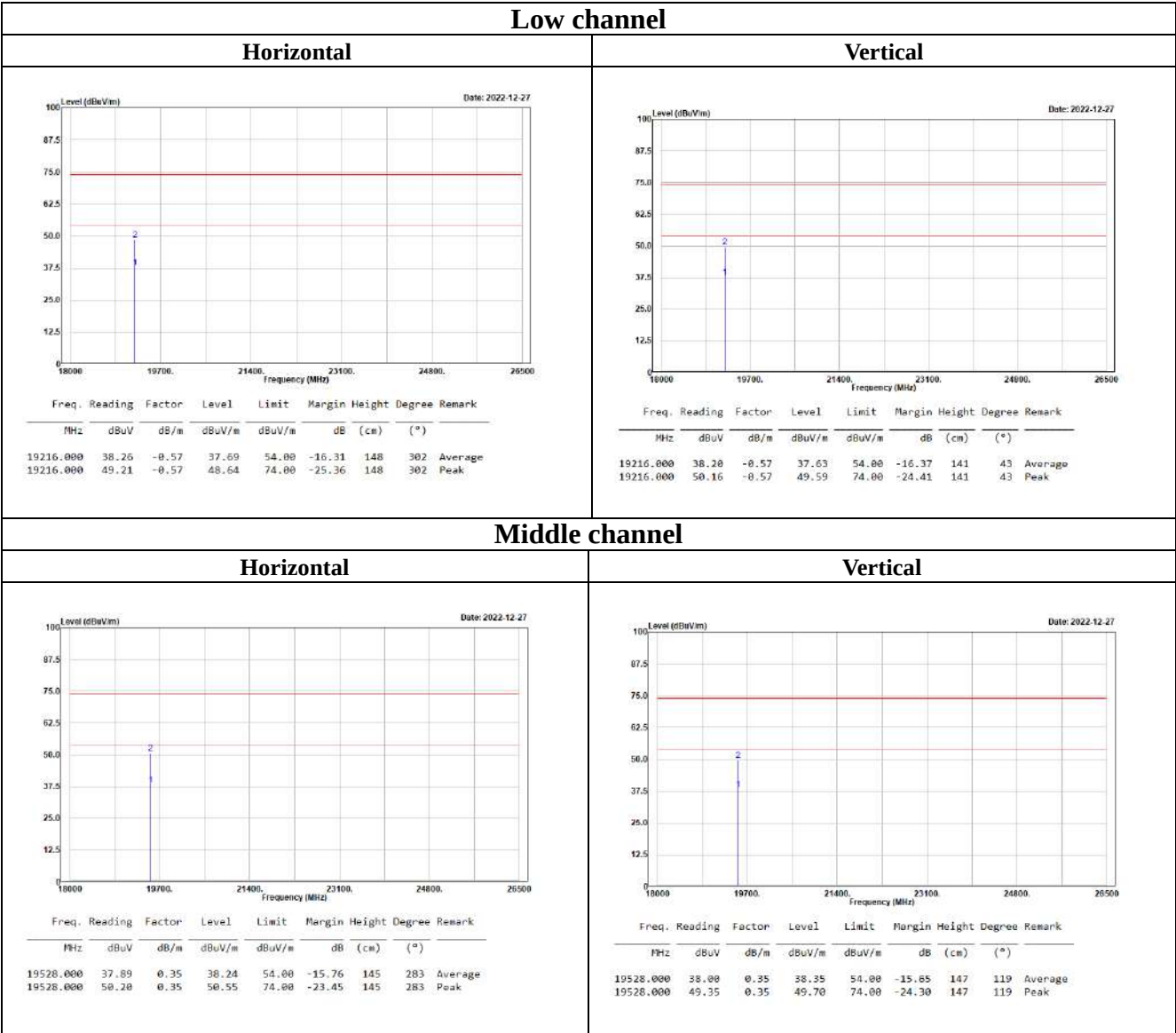
Level = Reading + Factor.

Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Spurious emissions more than 20 dB below the limit were not reported.

18GHz-26.5GHz



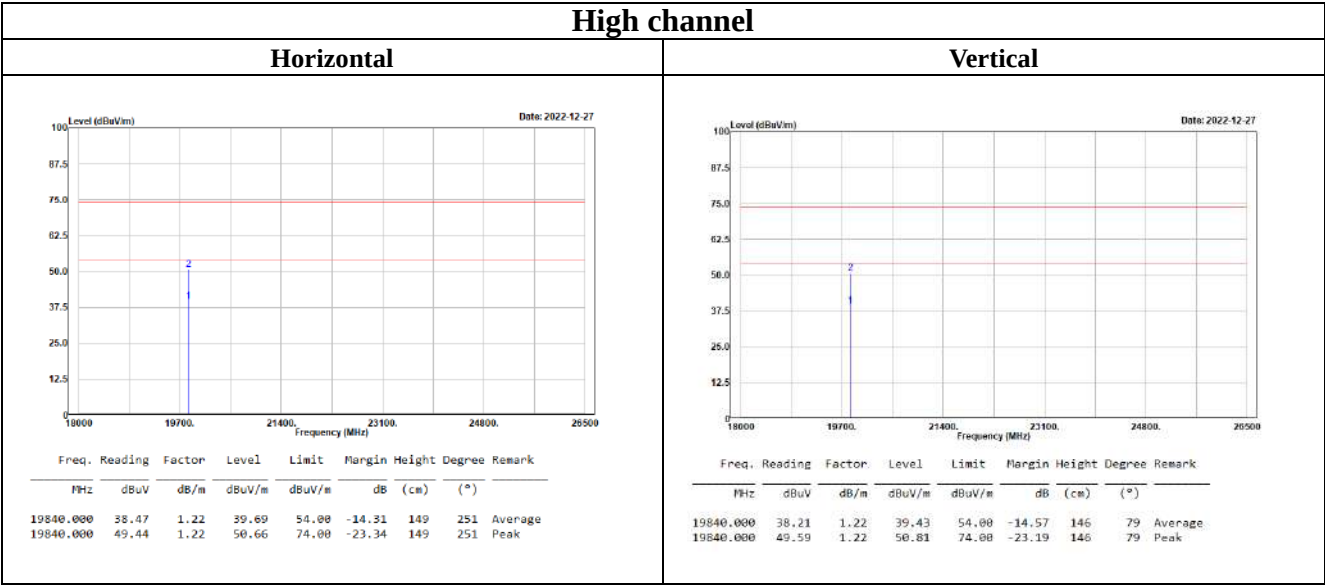
Note:

Level = Reading + Factor.

Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Spurious emissions more than 20 dB below the limit were not reported.



Note:

Level = Reading + Factor.

Margin = Level – Limit.

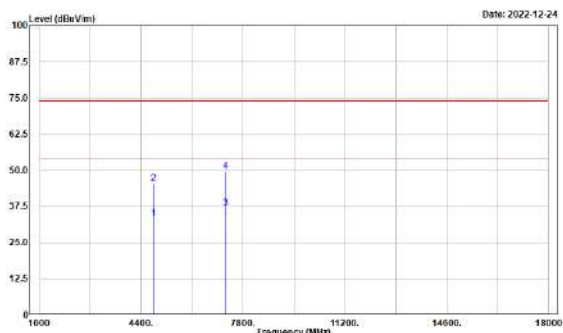
Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Spurious emissions more than 20 dB below the limit were not reported.

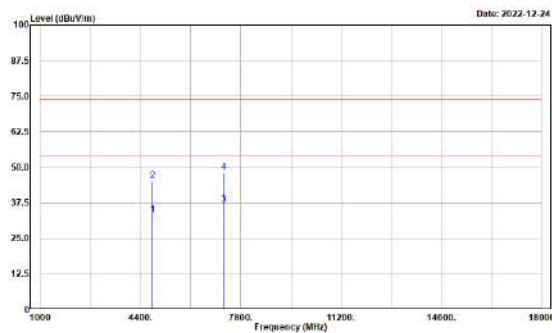
EDR ($\pi/4$ -DQPSK)

Power: AC 120V/60Hz

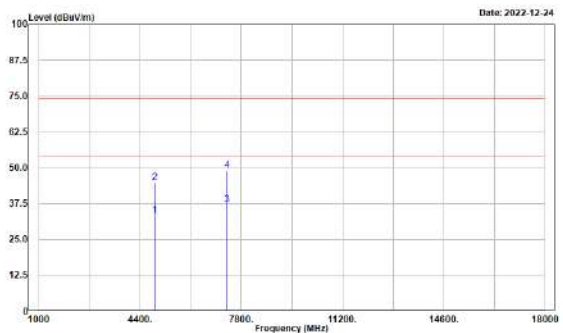
1GHz-18GHz:

Low channel**Horizontal**

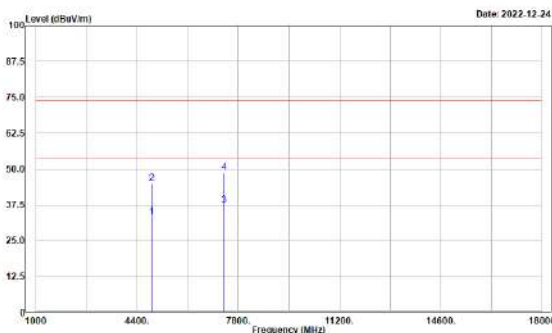
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4884.000	29.78	3.45	33.23	54.00	-20.77	147	335	Average
4884.000	41.74	3.45	45.19	74.00	-28.81	147	335	Peak
7206.000	27.76	9.05	36.81	54.00	-17.19	145	197	Average
7206.000	40.61	9.05	49.66	74.00	-24.34	145	197	Peak

Vertical

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4884.000	29.80	3.45	33.25	54.00	-20.75	147	221	Average
4884.000	41.73	3.45	45.18	74.00	-28.82	147	221	Peak
7206.000	27.81	9.05	36.86	54.00	-17.14	140	128	Average
7206.000	39.28	9.05	48.33	74.00	-25.67	140	128	Peak

Middle channel**Horizontal**

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4882.000	29.86	3.58	33.44	54.00	-20.56	149	58	Average
4882.000	41.16	3.58	44.74	74.00	-29.26	149	58	Peak
7323.000	27.94	9.26	37.20	54.00	-16.80	144	357	Average
7323.000	39.71	9.26	48.97	74.00	-25.03	144	357	Peak

Vertical

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4882.000	29.79	3.58	33.37	54.00	-20.63	144	360	Average
4882.000	41.28	3.58	44.86	74.00	-29.14	144	360	Peak
7323.000	28.20	9.26	37.46	54.00	-16.54	148	358	Average
7323.000	39.58	9.26	48.84	74.00	-25.16	148	358	Peak

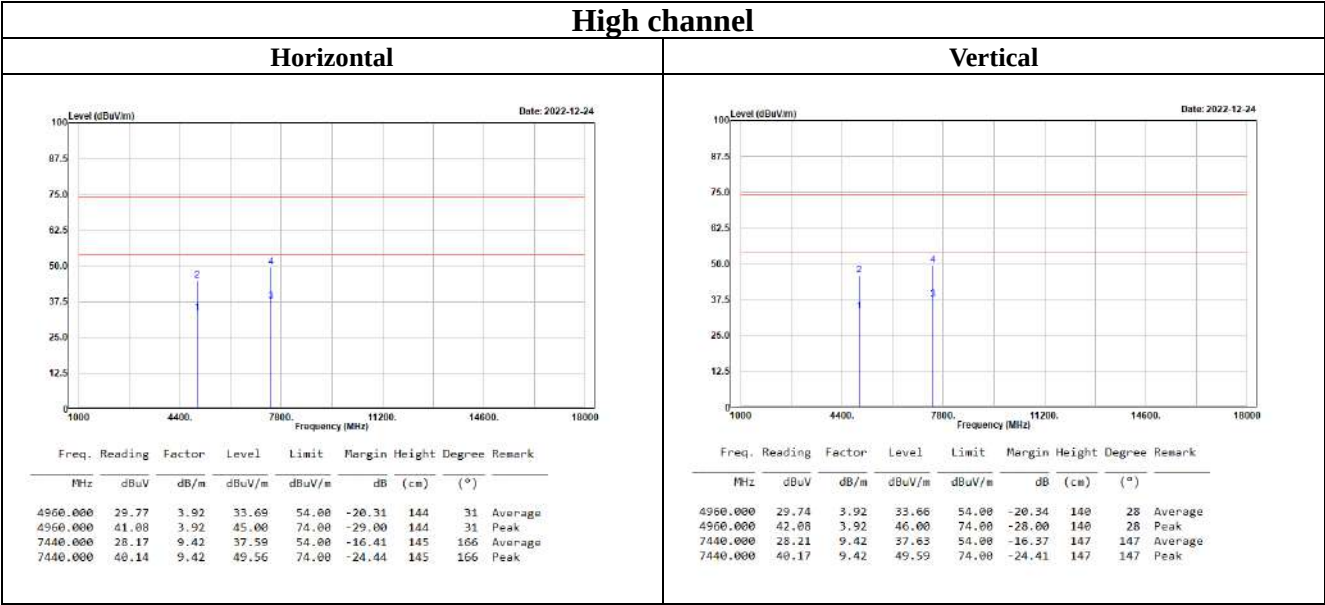
Note:

Level = Reading + Factor.

Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Spurious emissions more than 20 dB below the limit were not reported.



Note:

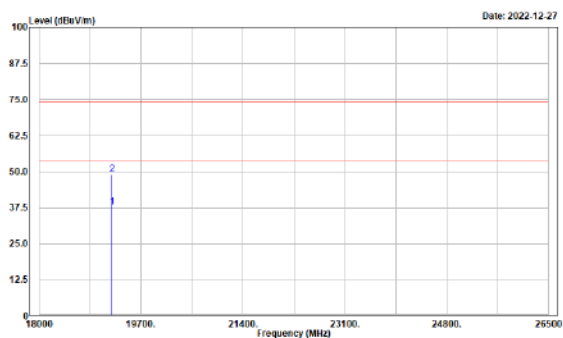
Level = Reading + Factor.

Margin = Level – Limit.

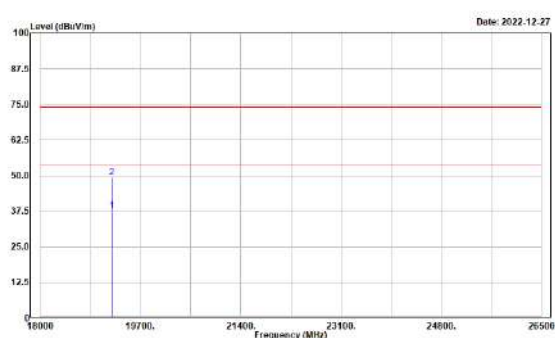
Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Spurious emissions more than 20 dB below the limit were not reported.

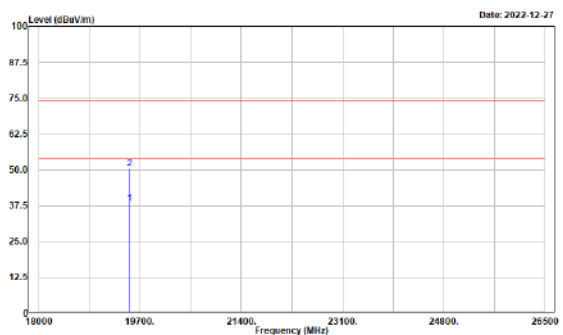
18GHz-26.5GHz

Low channel**Horizontal**

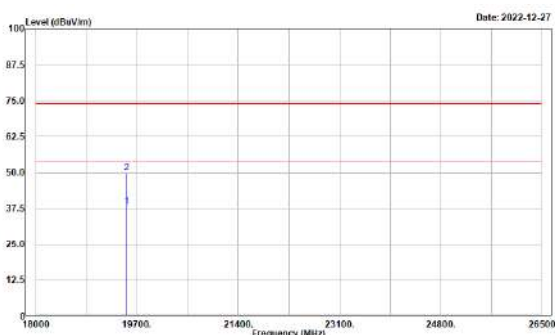
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
19216.000	38.20	-0.57	37.63	54.00	-16.37	144	219	Average
19216.000	49.49	-0.57	48.92	74.00	-25.88	144	219	Peak

Vertical

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
19216.000	38.27	-0.57	37.70	54.00	-16.30	148	360	Average
19216.000	49.82	-0.57	49.25	74.00	-24.75	148	360	Peak

Middle channel**Horizontal**

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
19528.000	37.94	0.35	38.29	54.00	-15.71	147	288	Average
19528.000	49.56	0.35	50.31	74.00	-23.69	147	288	Peak

Vertical

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
19528.000	37.90	0.35	38.25	54.00	-15.75	146	71	Average
19528.000	49.55	0.35	49.90	74.00	-24.10	146	71	Peak

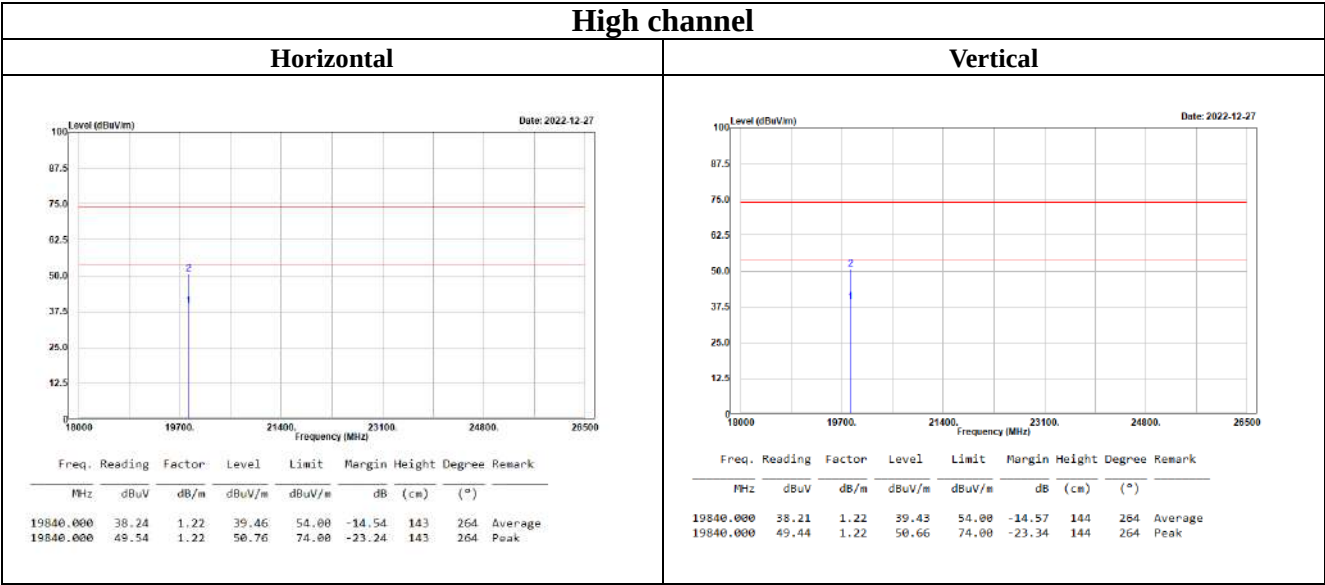
Note:

Level = Reading + Factor.

Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Spurious emissions more than 20 dB below the limit were not reported.



Note:

Level = Reading + Factor.

Margin = Level – Limit.

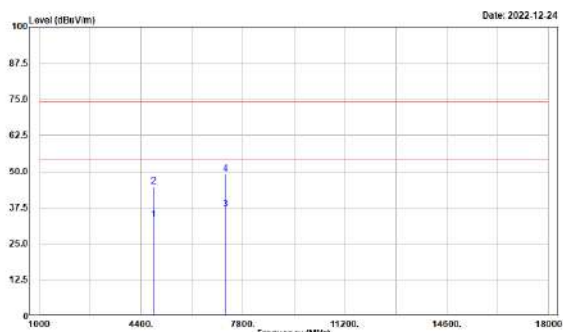
Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Spurious emissions more than 20 dB below the limit were not reported.

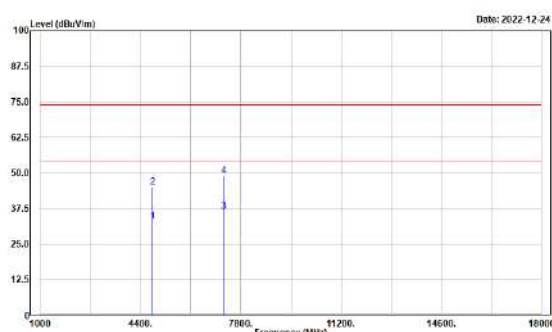
EDR (8DPSK)

Power: AC 120V/60Hz

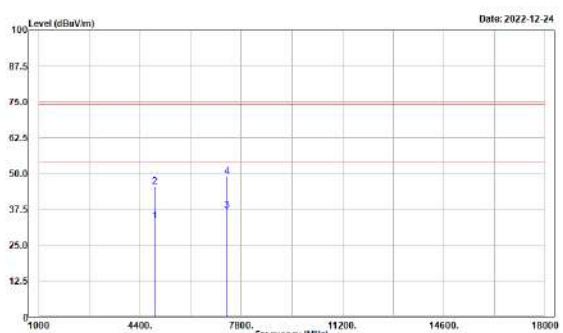
1GHz-18GHz:

Low channel**Horizontal**

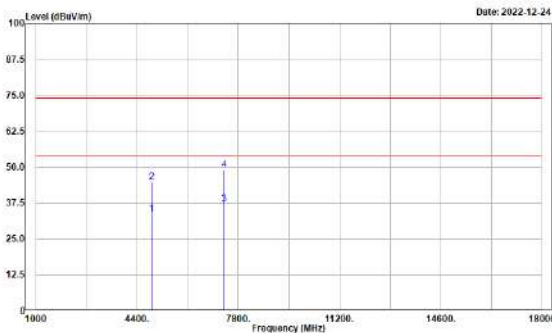
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4884.000	29.87	3.45	33.32	54.00	-20.68	148	56	Average
4884.000	41.29	3.45	44.74	74.00	-29.26	148	56	Peak
7206.000	27.80	9.05	36.85	54.00	-17.15	141	34	Average
7206.000	39.97	9.05	49.02	74.00	-24.98	141	34	Peak

Vertical

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4884.000	29.73	3.45	33.18	54.00	-20.82	149	0	Average
4884.000	41.47	3.45	44.92	74.00	-29.08	149	0	Peak
7206.000	27.67	9.05	36.72	54.00	-17.28	145	55	Average
7206.000	39.94	9.05	48.99	74.00	-25.01	145	55	Peak

Middle channel**Horizontal**

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4882.000	29.93	3.58	33.51	54.00	-20.49	148	205	Average
4882.000	41.84	3.58	45.42	74.00	-28.58	148	205	Peak
7323.000	27.82	9.26	37.08	54.00	-16.92	145	73	Average
7323.000	39.89	9.26	49.15	74.00	-24.85	145	73	Peak

Vertical

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4882.000	29.92	3.58	33.50	54.00	-20.50	148	222	Average
4882.000	41.21	3.58	44.79	74.00	-29.21	148	222	Peak
7323.000	27.91	9.26	37.17	54.00	-16.83	151	334	Average
7323.000	39.75	9.26	49.01	74.00	-24.99	151	334	Peak

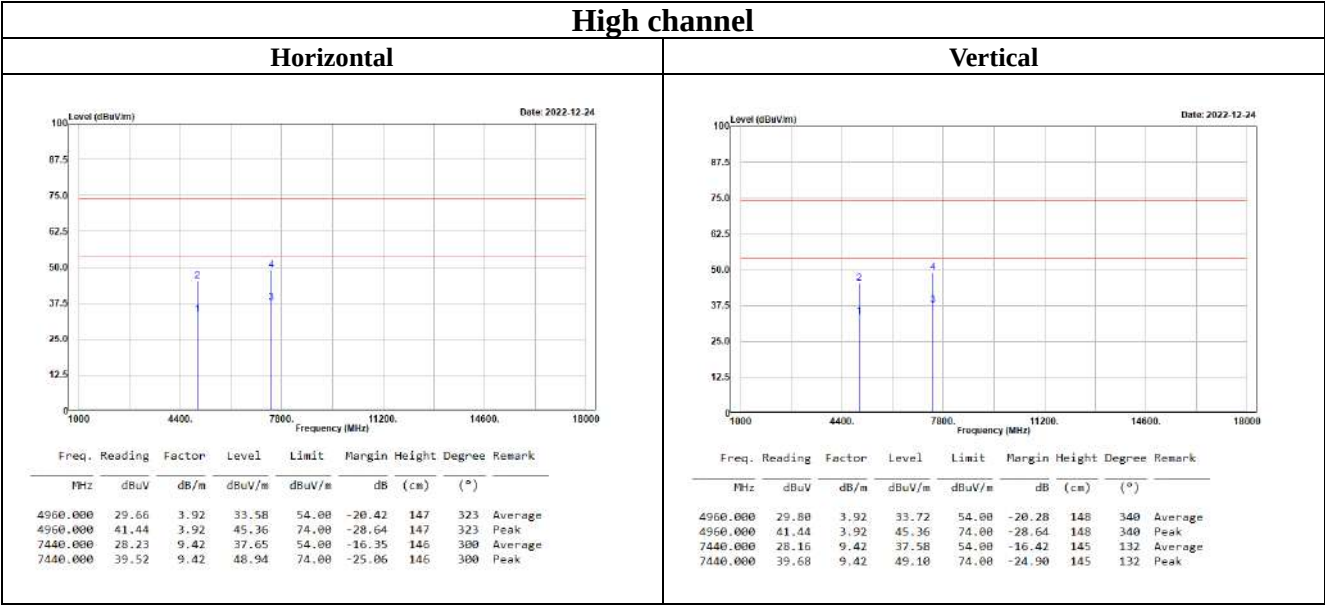
Note:

Level = Reading + Factor.

Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Spurious emissions more than 20 dB below the limit were not reported.



Note:

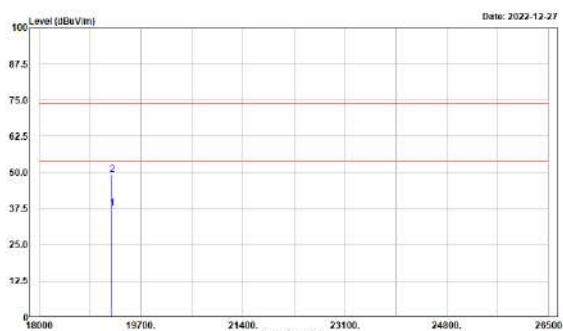
Level = Reading + Factor.

Margin = Level – Limit.

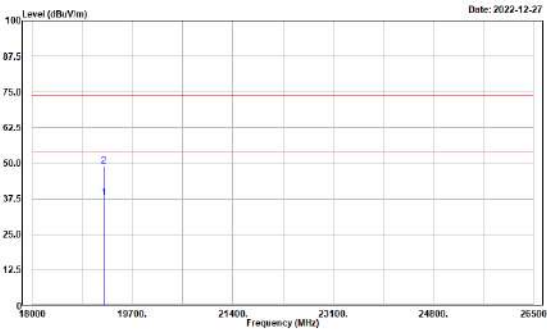
Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Spurious emissions more than 20 dB below the limit were not reported.

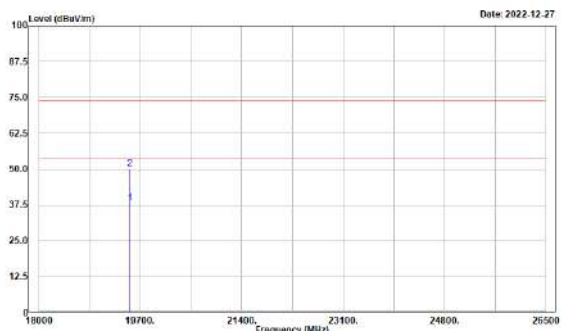
18GHz-26.5GHz

Low channel**Horizontal**

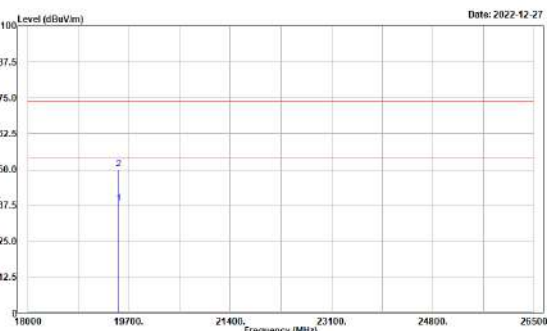
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
19216.000	38.30	-0.57	37.73	54.00	-16.27	145	25	Average
19216.000	49.80	-0.57	49.23	74.00	-24.77	145	25	Peak

Vertical

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
19216.000	38.43	-0.57	37.86	54.00	-16.14	148	84	Average
19216.000	49.56	-0.57	48.99	74.00	-25.01	148	84	Peak

Middle channel**Horizontal**

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
19528.000	37.98	0.35	38.33	54.00	-15.67	145	139	Average
19528.000	49.90	0.35	50.25	74.00	-23.75	145	139	Peak

Vertical

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
19528.000	37.95	0.35	38.30	54.00	-15.70	148	148	Average
19528.000	49.91	0.35	50.26	74.00	-23.74	148	148	Peak

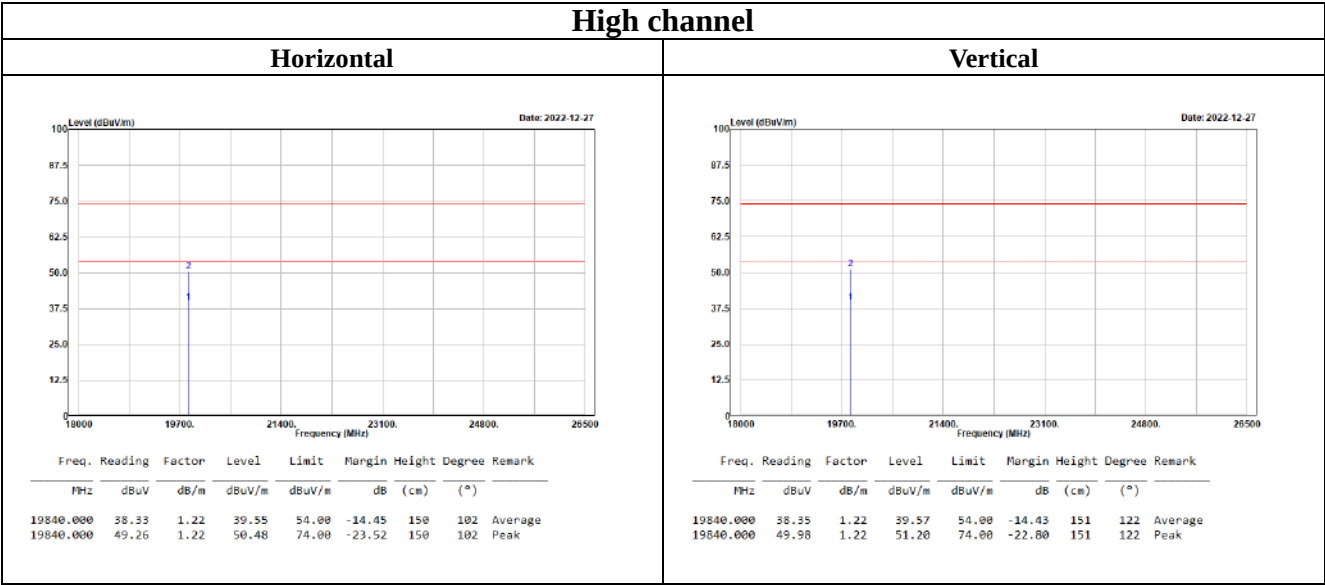
Note:

Level = Reading + Factor.

Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Spurious emissions more than 20 dB below the limit were not reported.



Note:

Level = Reading + Factor.

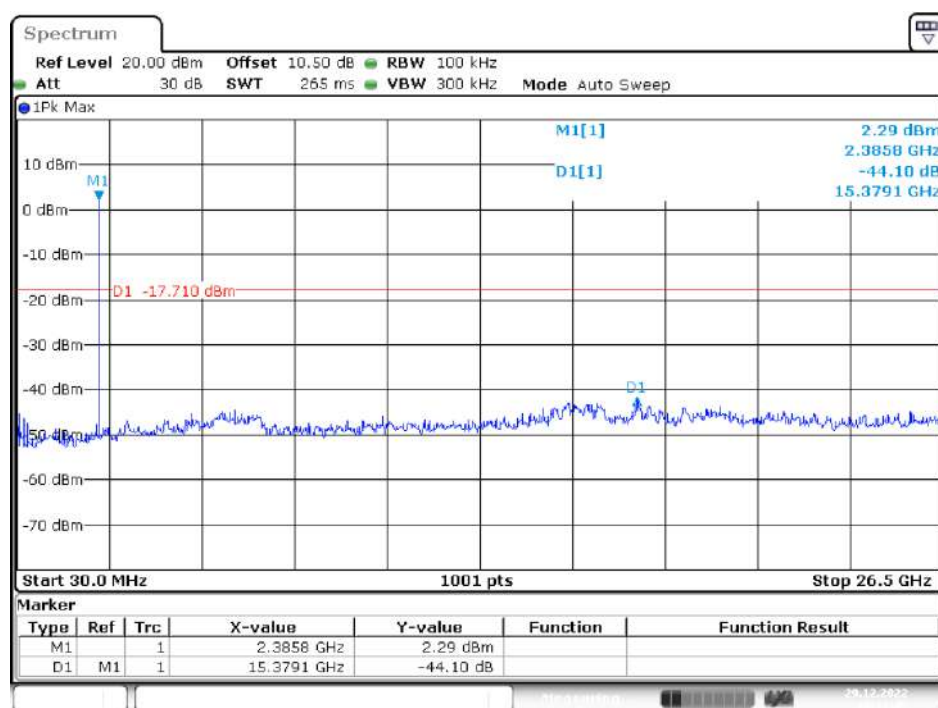
Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Spurious emissions more than 20 dB below the limit were not reported.

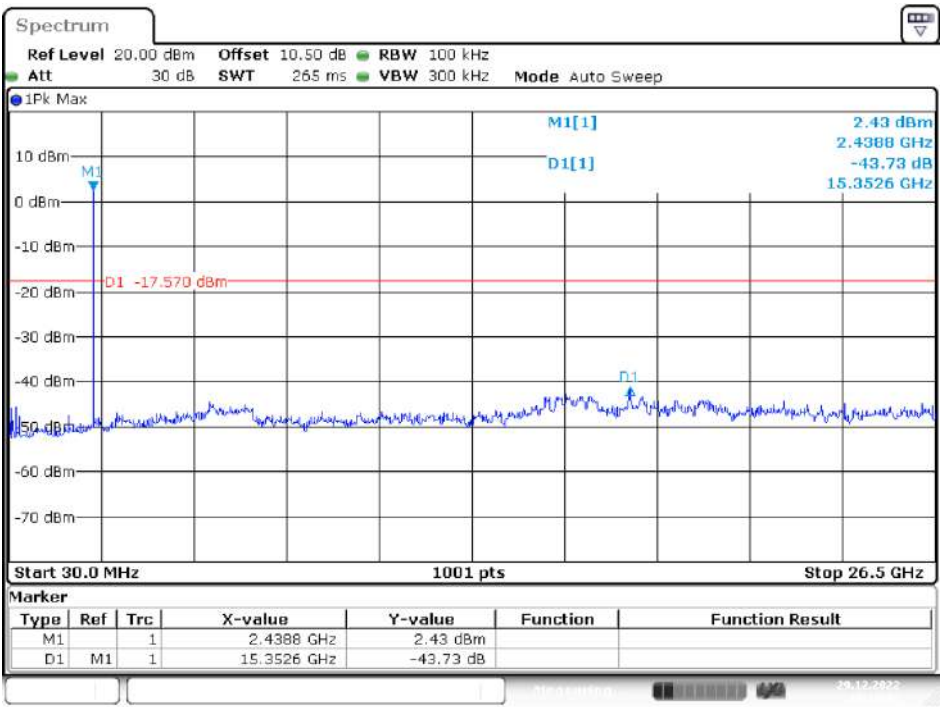
Conducted Spurious Emissions:

Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
BR Mode (GFSK)				
Low	2402	44.10	≥ 20	PASS
Mid	2441	43.73	≥ 20	PASS
High	2480	43.82	≥ 20	PASS
EDR Mode ($\pi/4$ -DQPSK):				
Low	2402	43.57	≥ 20	PASS
Mid	2441	41.72	≥ 20	PASS
High	2480	42.81	≥ 20	PASS
EDR Mode (8DPSK):				
Low	2402	40.11	≥ 20	PASS
Mid	2441	43.00	≥ 20	PASS
High	2480	41.54	≥ 20	PASS

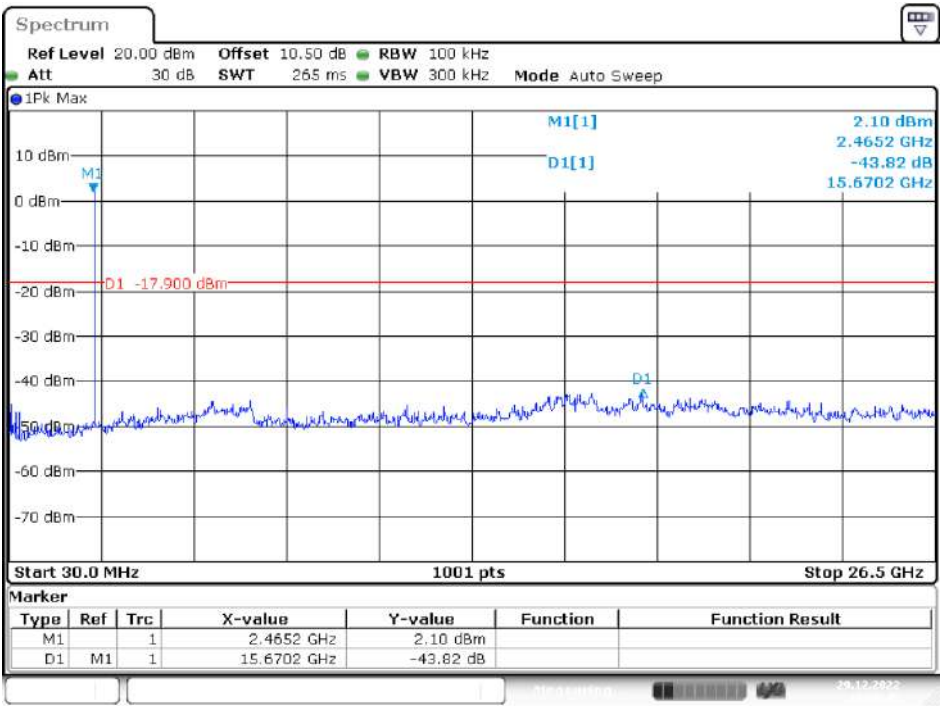
BR Mode (GFSK)**Low Channel**

Date: 29.DEC.2022 14:11:45

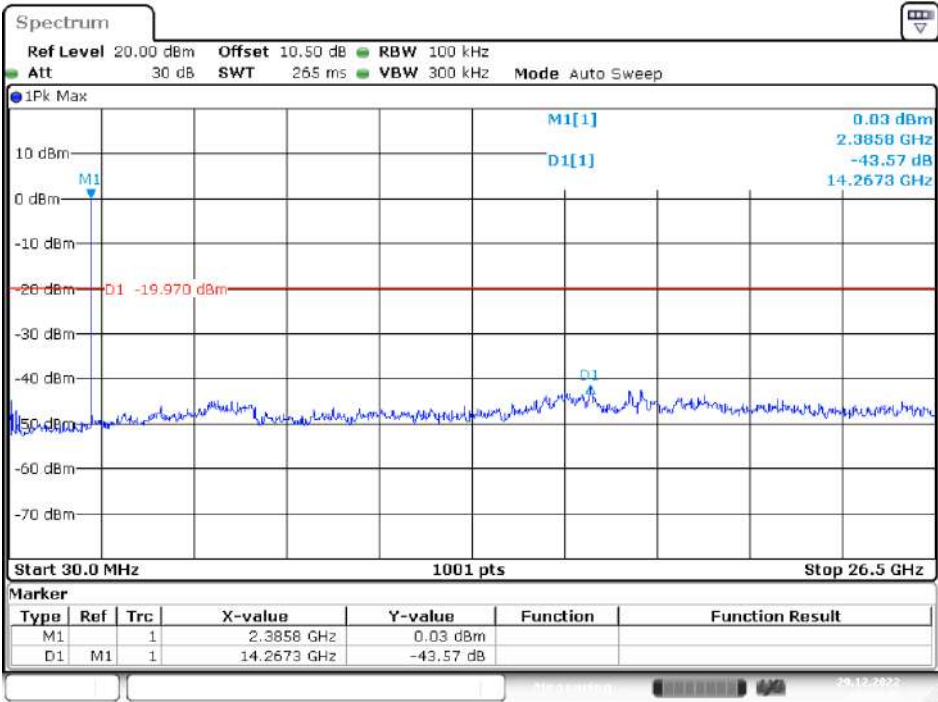
Middle Channel



High Channel

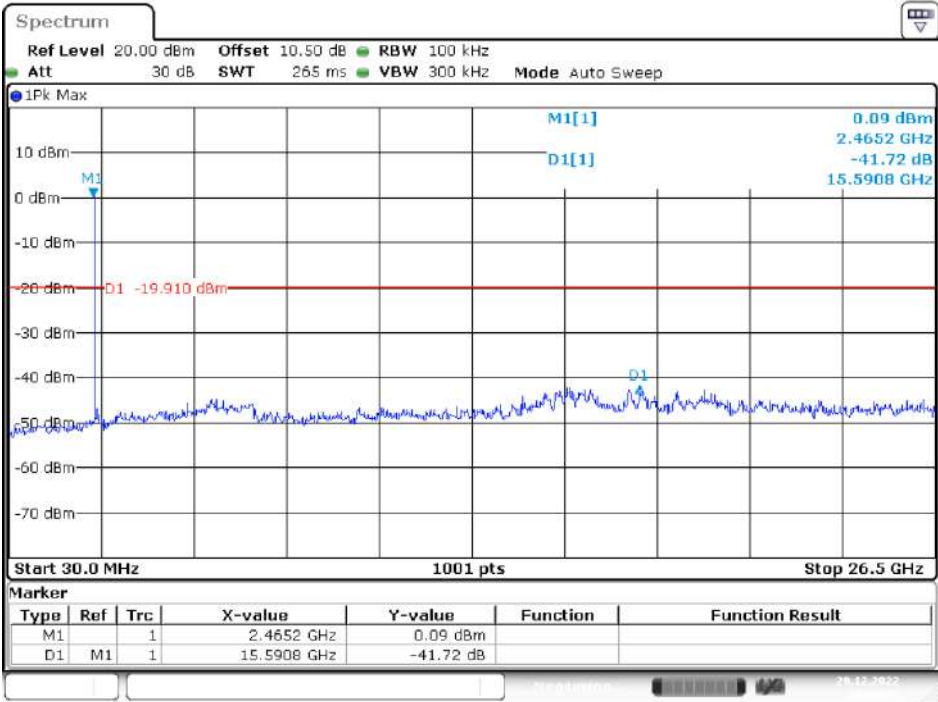


EDR Mode ($\pi/4$ -DQPSK)
Low Channel



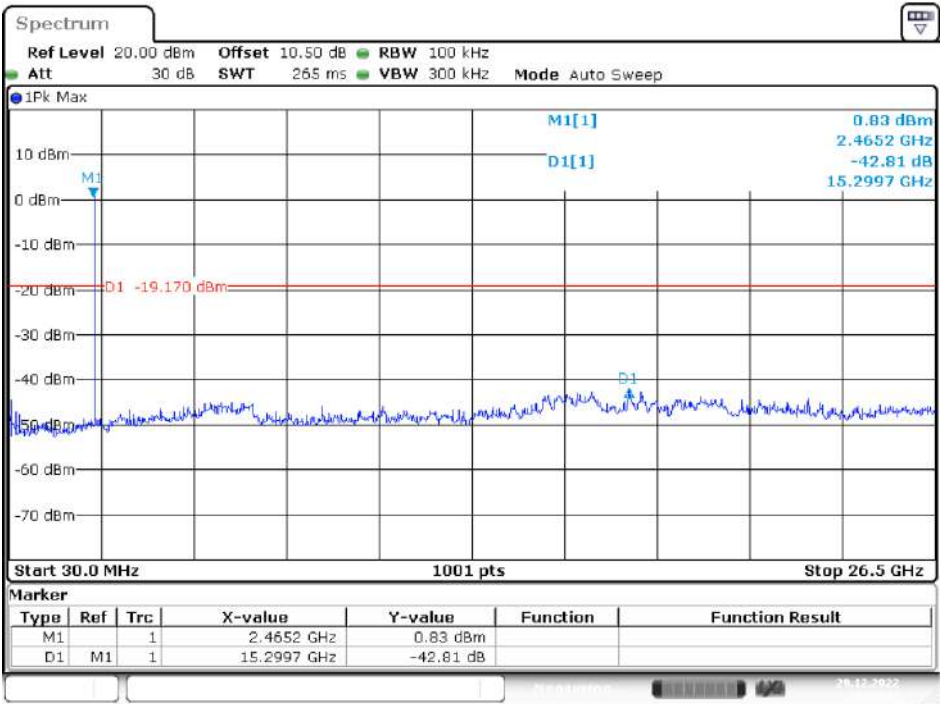
Date: 29.DEC.2022 14:23:46

Middle Channel



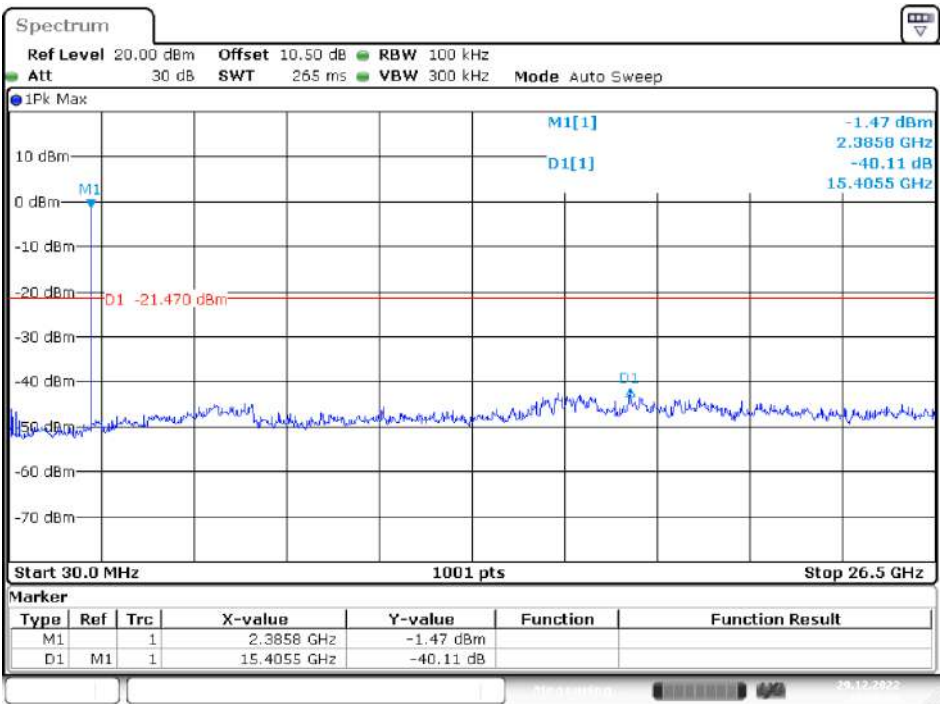
Date: 29.DEC.2022 14:27:33

High Channel

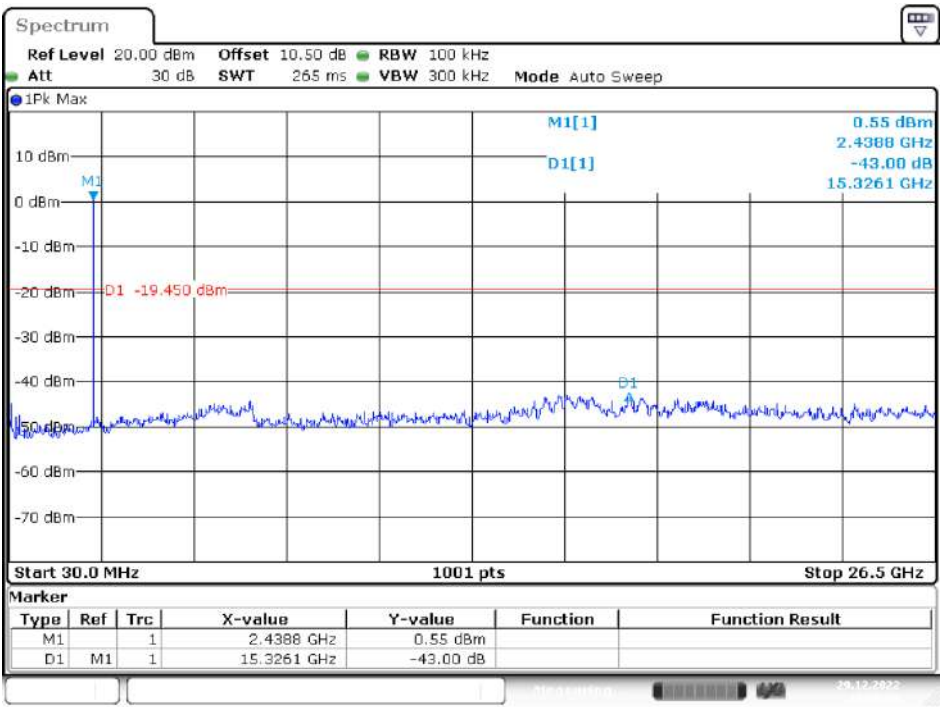


EDR Mode (8DPSK)

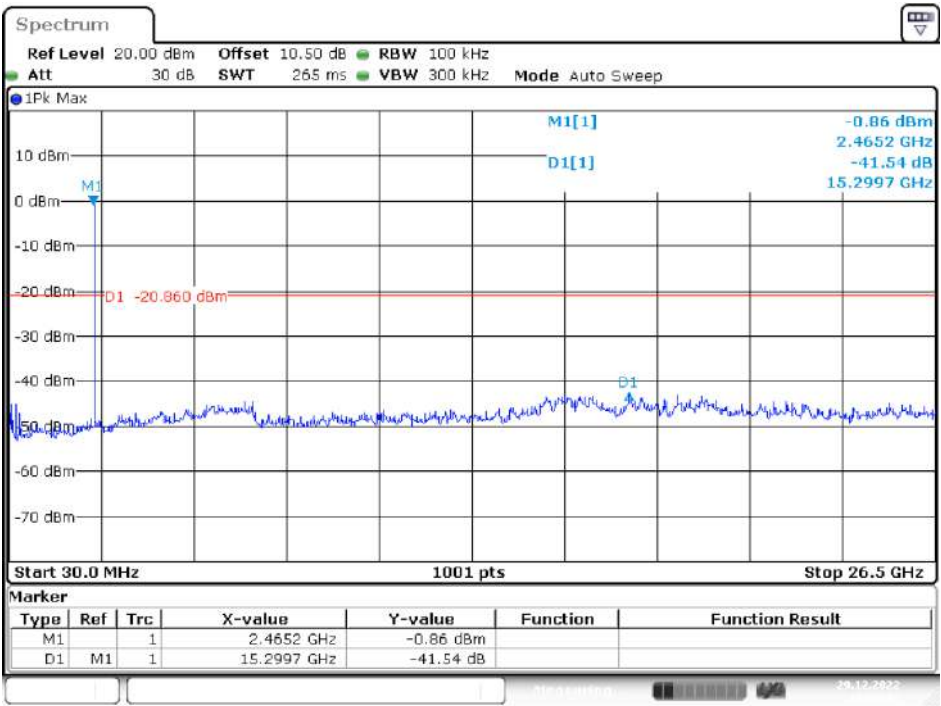
Low Channel



Middle Channel



High Channel



9. FCC §15.247(a)(1) – 20 dB Emission Bandwidth

9.1. Applicable Standard

According to FCC §15.247(a) (1) the maximum 20 dB bandwidth of the hopping channel shall be presented.

9.2. Test Procedure

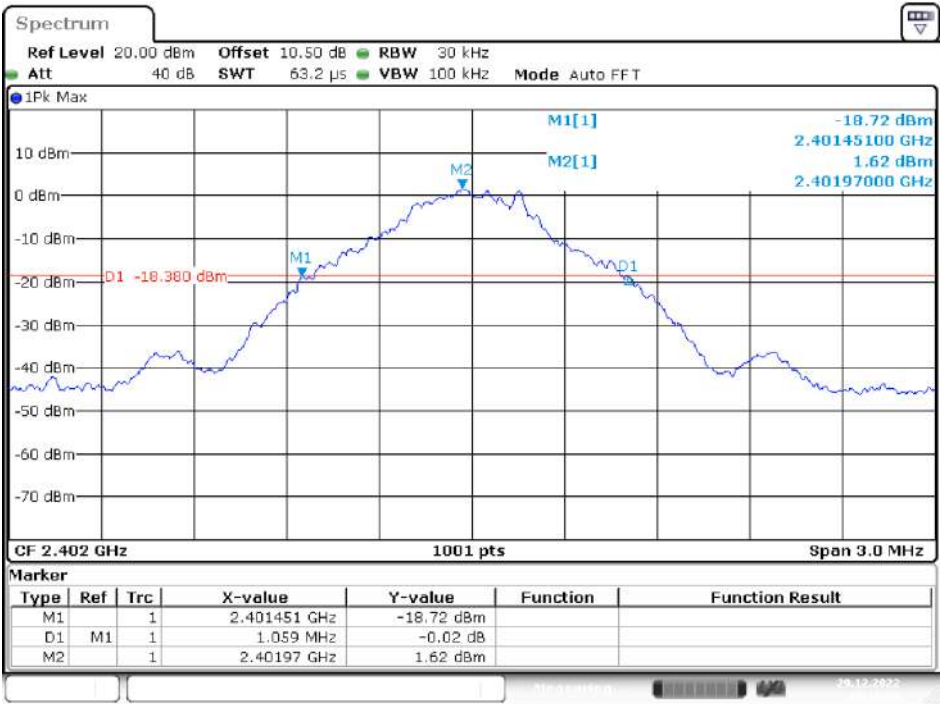
- (1) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- (2) Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- (3) Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
- (4) Repeat above procedures until all frequencies measured were complete.

9.3. Test Results

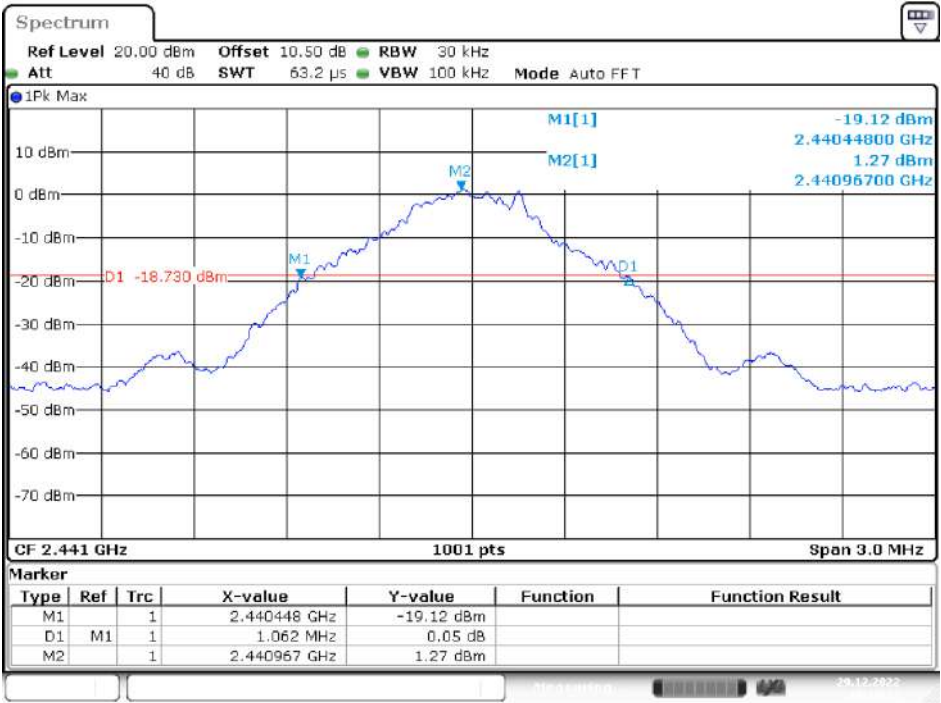
Channel	Frequency (MHz)	20 dBc BW (MHz)
BR Mode (GFSK)		
Low	2402	1.06
Middle	2441	1.06
High	2480	1.07
EDR Mode ($\pi/4$ -DQPSK)		
Low	2402	1.31
Middle	2441	1.31
High	2480	1.31
EDR Mode (8DPSK)		
Low	2402	1.30
Middle	2441	1.30
High	2480	1.30

Please refer to the following plots

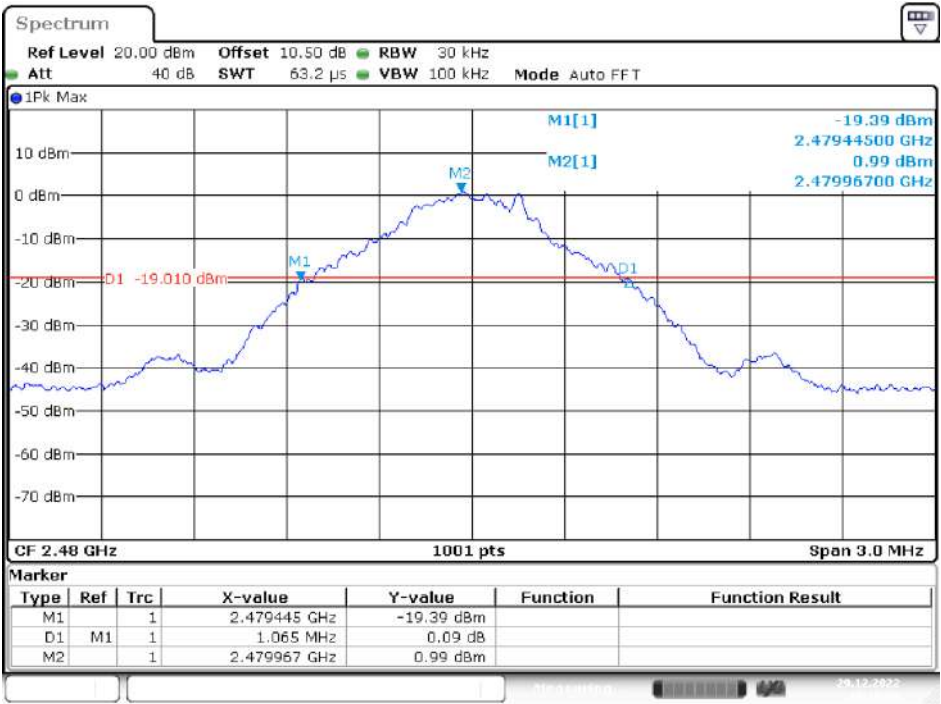
BR Mode (GFSK)
Low Channel



Middle Channel

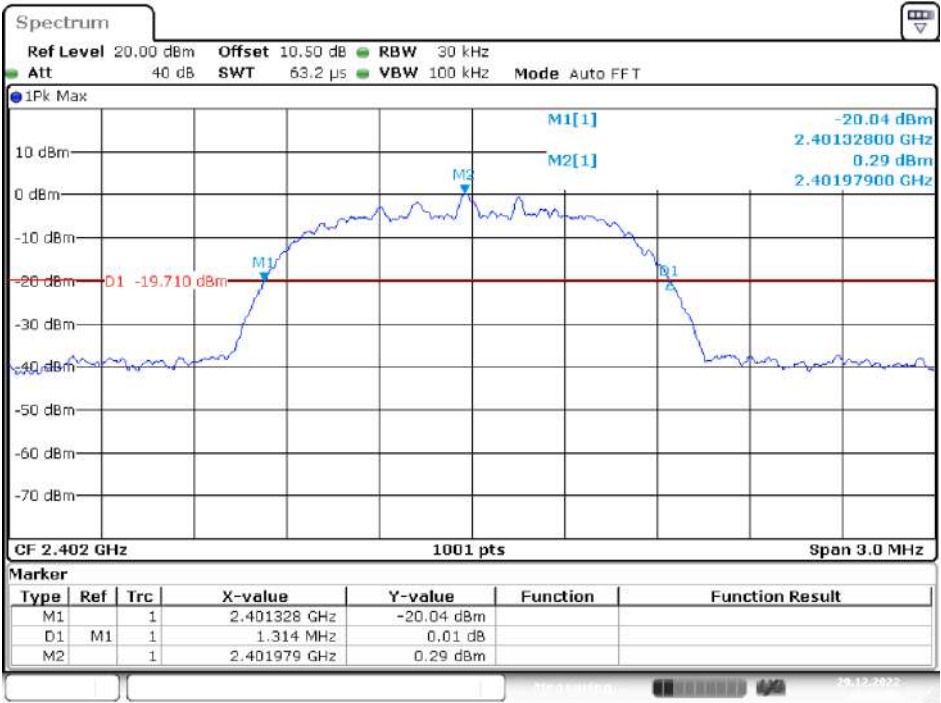


High Channel

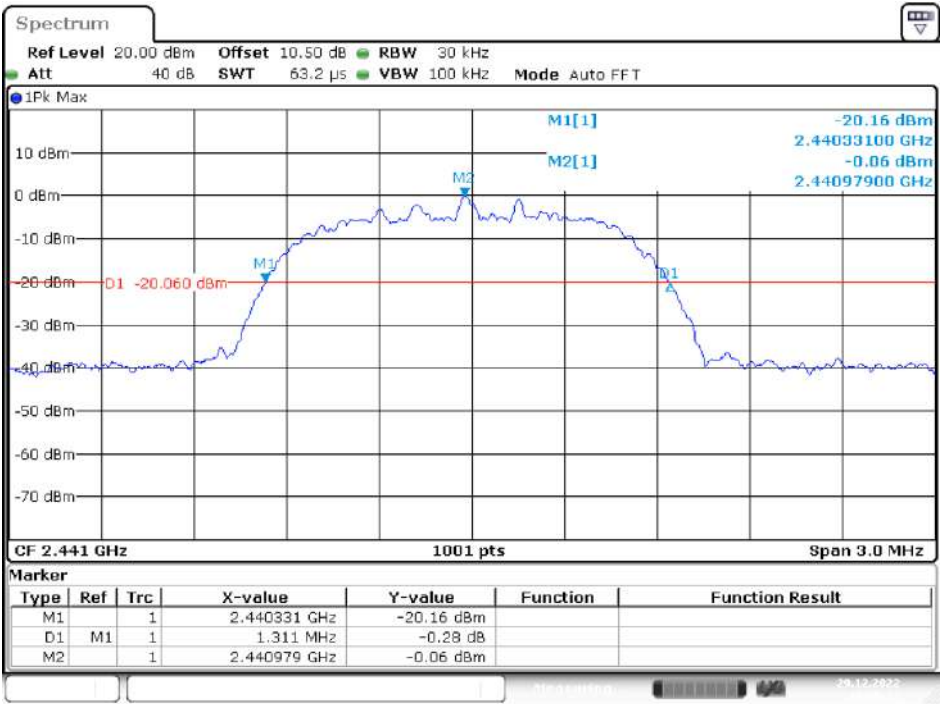


EDR Mode ($\pi/4$ -DQPSK)

Low Channel

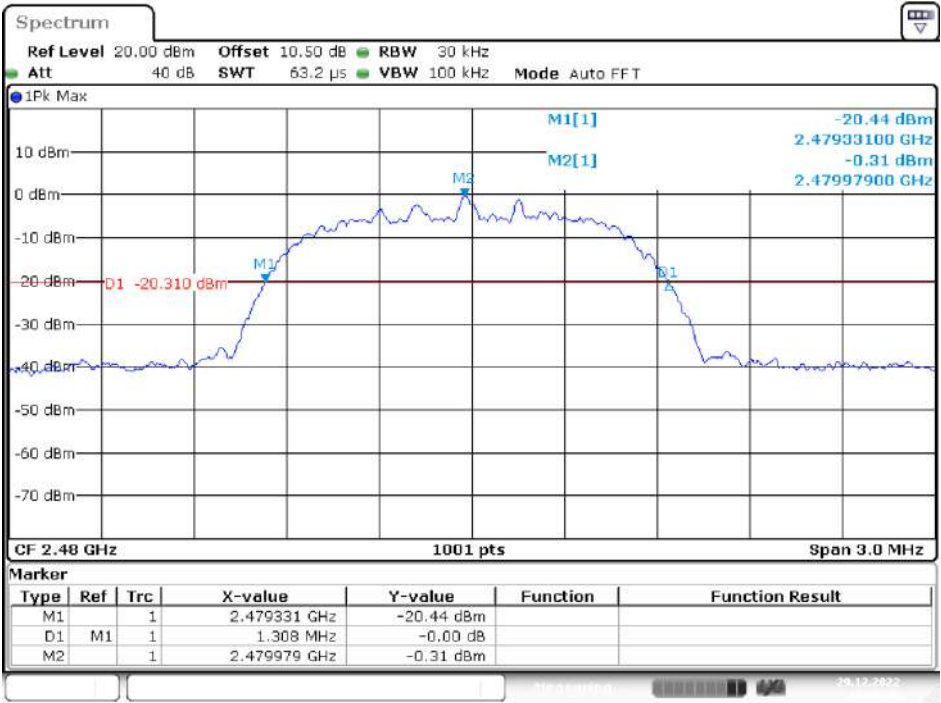


Middle Channel



Date: 29.DEC.2022 14:25:18

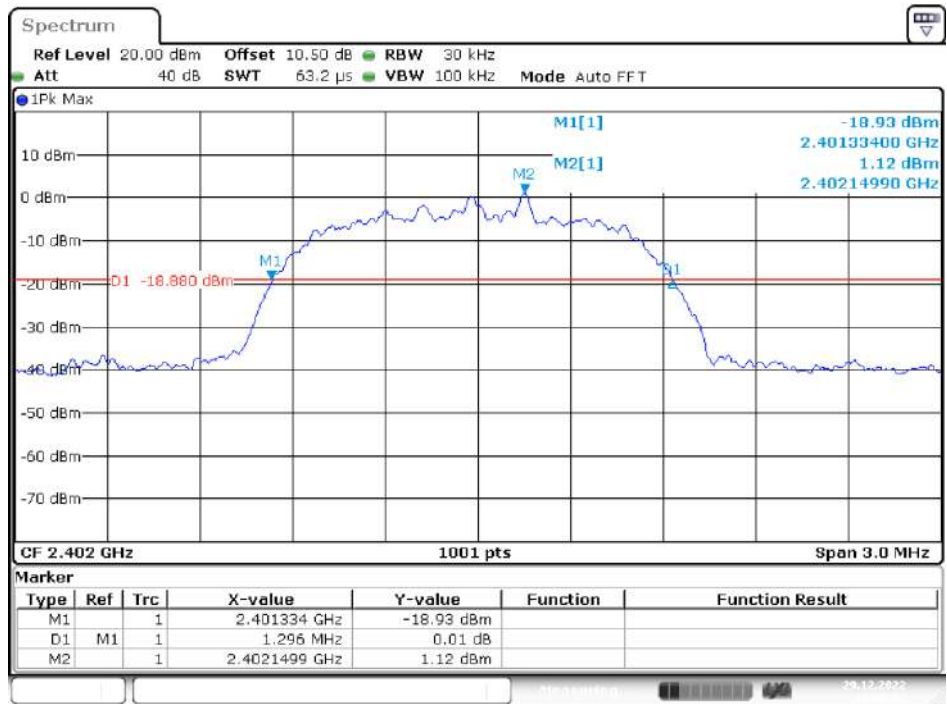
High Channel



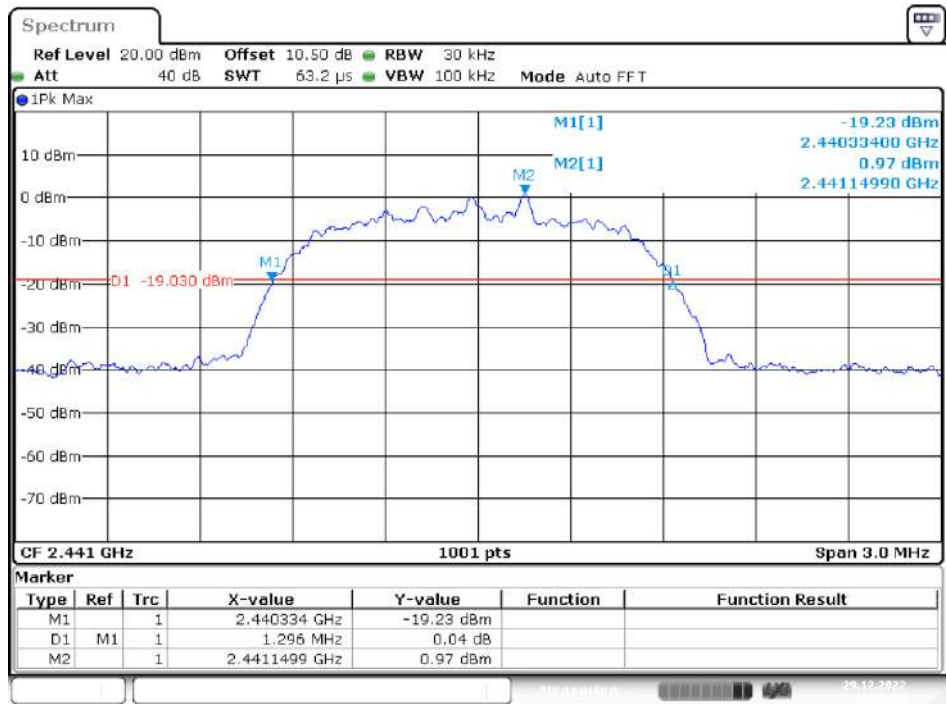
Date: 29.DEC.2022 14:26:47

EDR Mode (8DPSK)

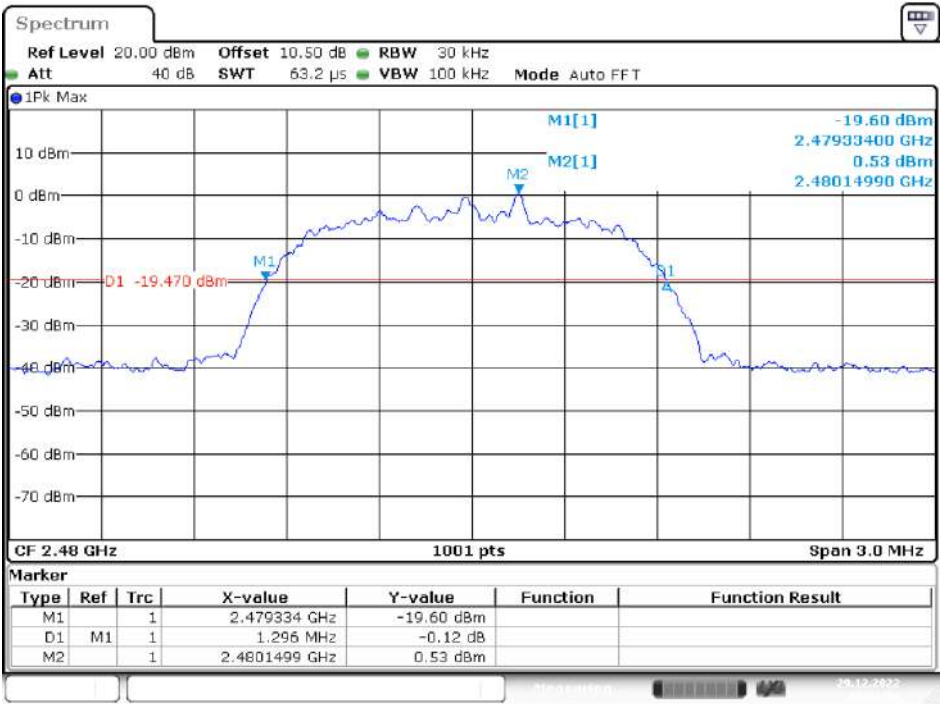
Low Channel



Middle Channel



High Channel



Date: 29.DEC.2022 14:31:55

10. FCC §15.247(a)(1) – Channel Separation Test

10.1. Applicable Standard

According to FCC §15.247(a) (1): 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, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

10.2. Test Procedure

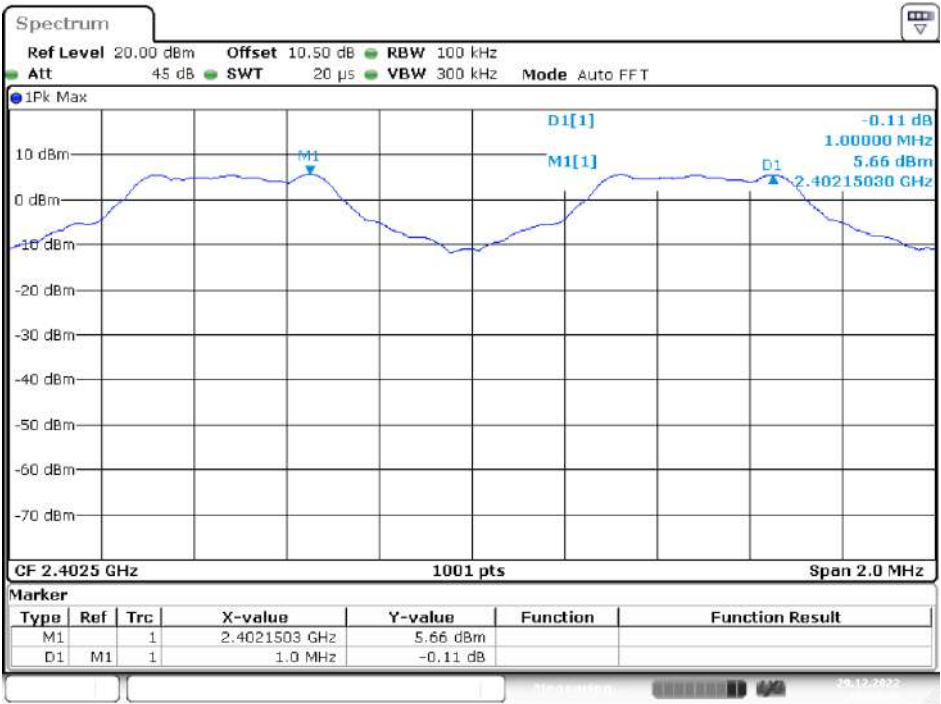
1. Set the EUT in transmitting mode, max hold the channel.
2. Set the adjacent channel of the EUT and max hold another trace.
3. Measure the channel separation.

10.3. Test Results

Channel	Channel Separation (MHz)	20 dBc BW (MHz)	Two-thirds of the 20 dB bandwidth (MHz)	Channel Separation Limit	Result
BR Mode (GFSK)					
Low	1.000	1.06	0.706	>two-thirds of the 20 dB bandwidth	Compliance
Middle	1.002	1.06	0.708	>two-thirds of the 20 dB bandwidth	Compliance
High	1.000	1.07	0.710	>two-thirds of the 20 dB bandwidth	Compliance
EDR Mode ($\pi/4$ -DQPSK)					
Low	1.000	1.31	0.876	>two-thirds of the 20 dB bandwidth	Compliance
Middle	1.000	1.31	0.874	>two-thirds of the 20 dB bandwidth	Compliance
High	1.002	1.31	0.872	>two-thirds of the 20 dB bandwidth	Compliance
EDR Mode (8DPSK)					
Low	1.000	1.30	0.864	>two-thirds of the 20 dB bandwidth	Compliance
Middle	1.000	1.30	0.864	>two-thirds of the 20 dB bandwidth	Compliance
High	1.000	1.30	0.864	>two-thirds of the 20 dB bandwidth	Compliance

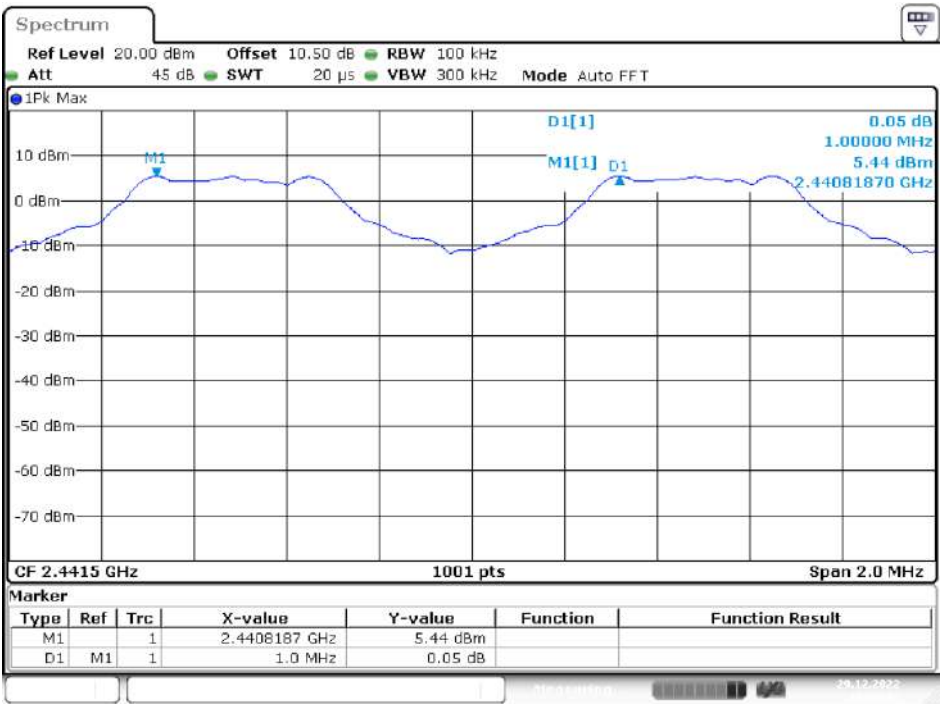
Please refer to the following plots.

BR Mode (GFSK)
Low Channel



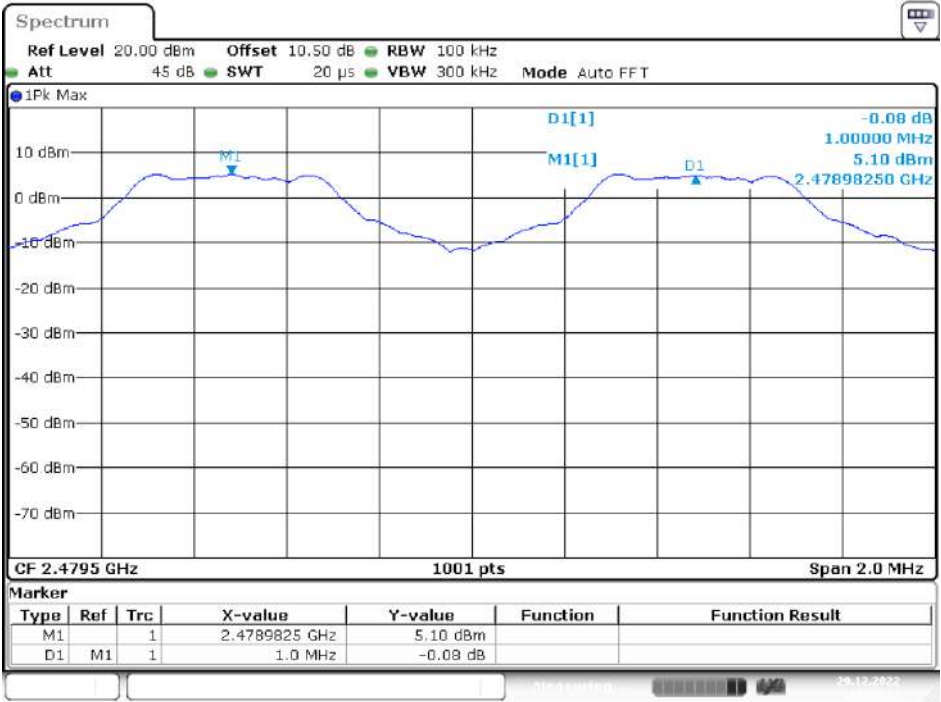
Date: 29.DEC.2022 14:54:41

Middle Channel



Date: 29.DEC.2022 14:52:42

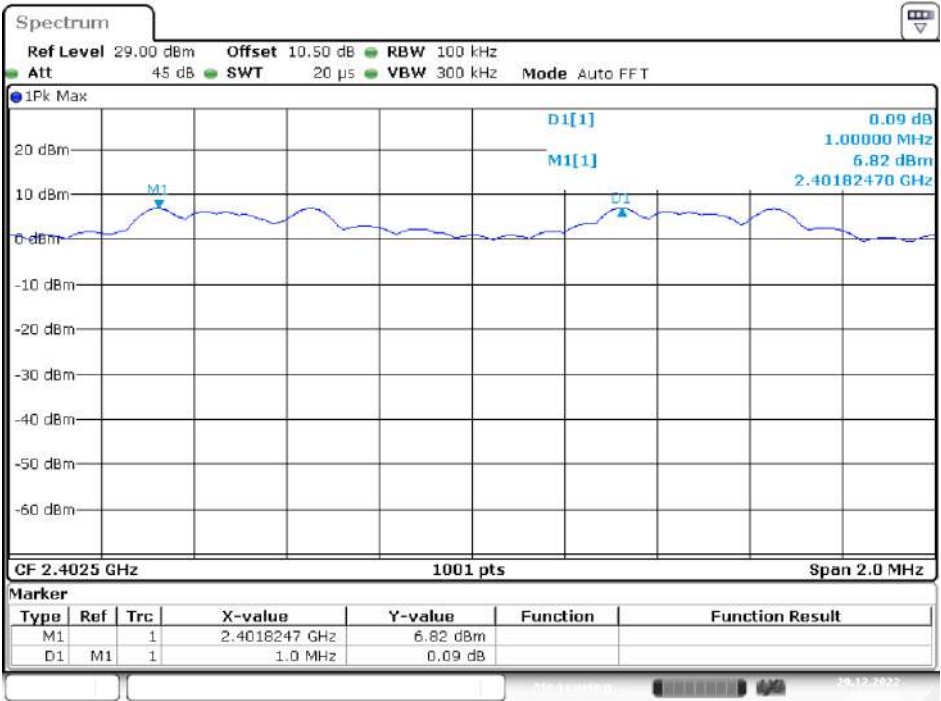
High Channel



Date: 29.DEC.2022 14:50:17

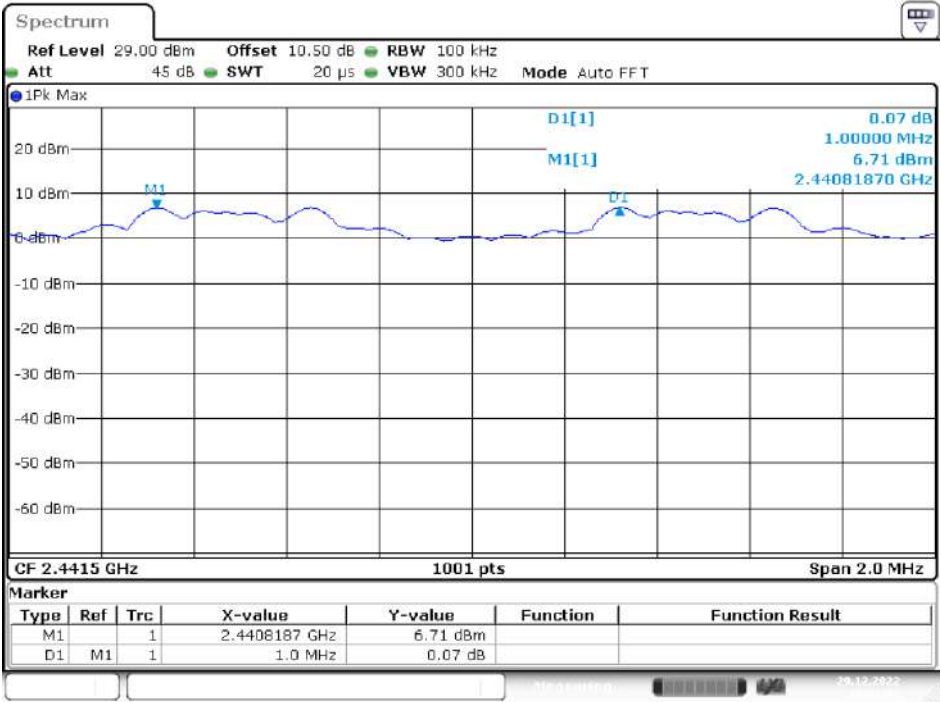
EDR Mode ($\pi/4$ -DQPSK)

Low Channel

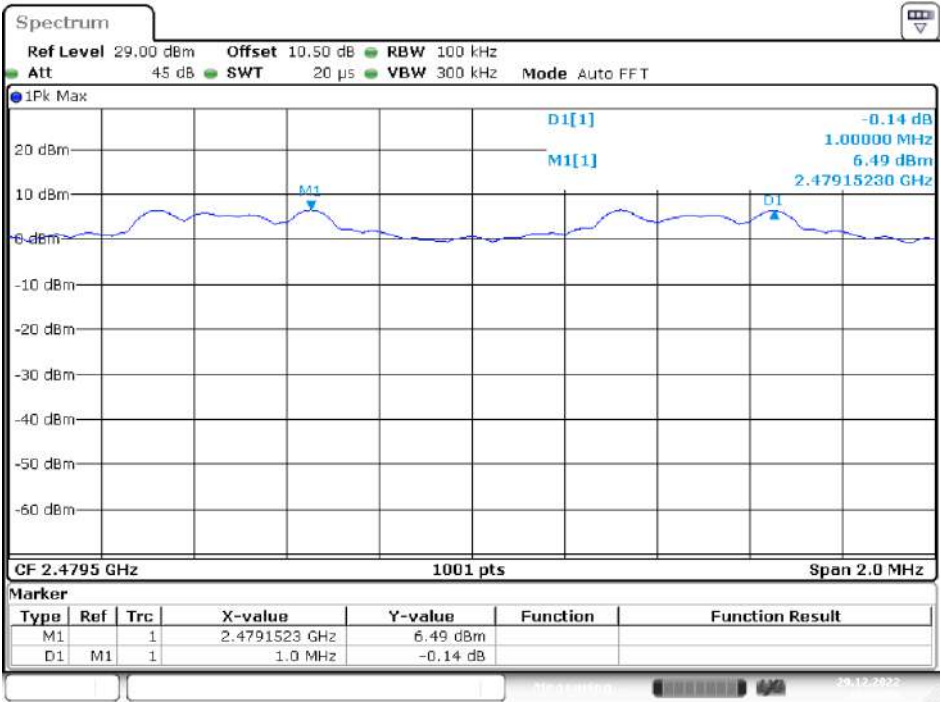


Date: 29.DEC.2022 15:32:50

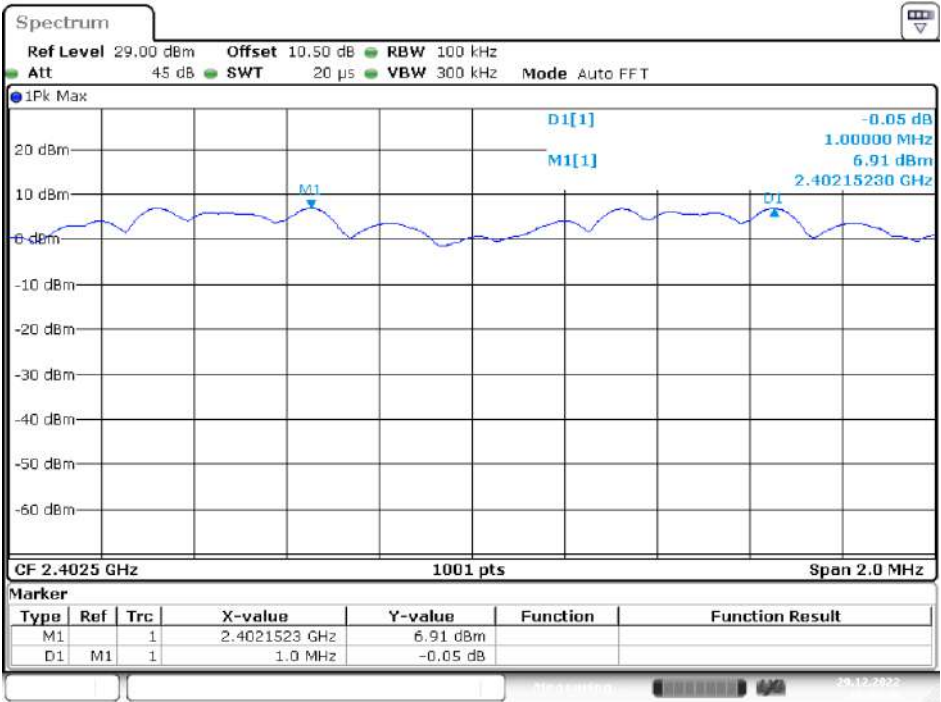
Middle Channel



High Channel

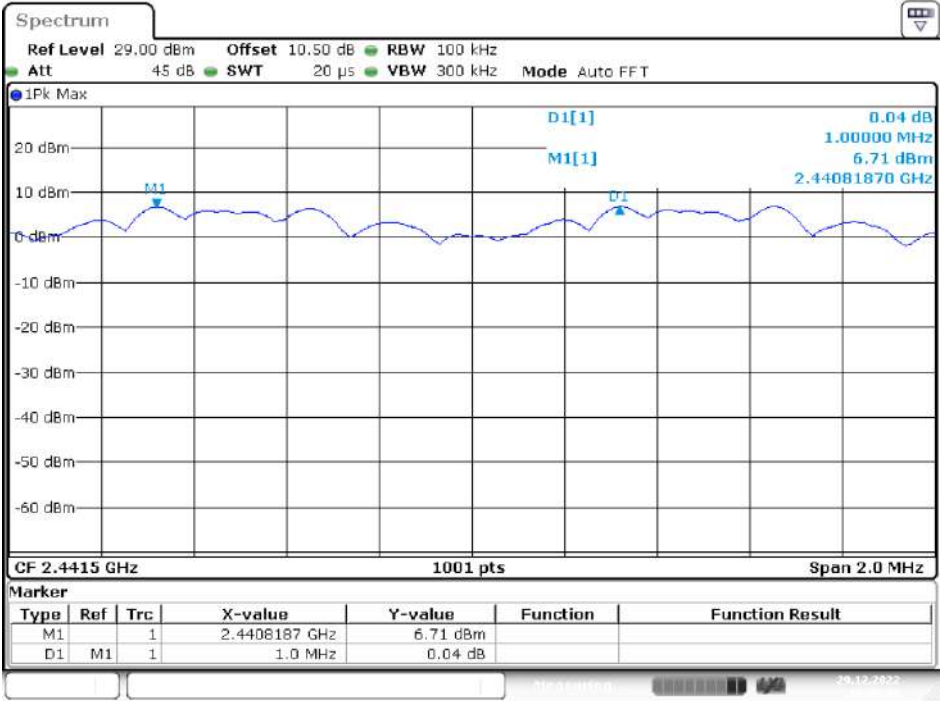


EDR Mode (8DPSK)
Low Channel



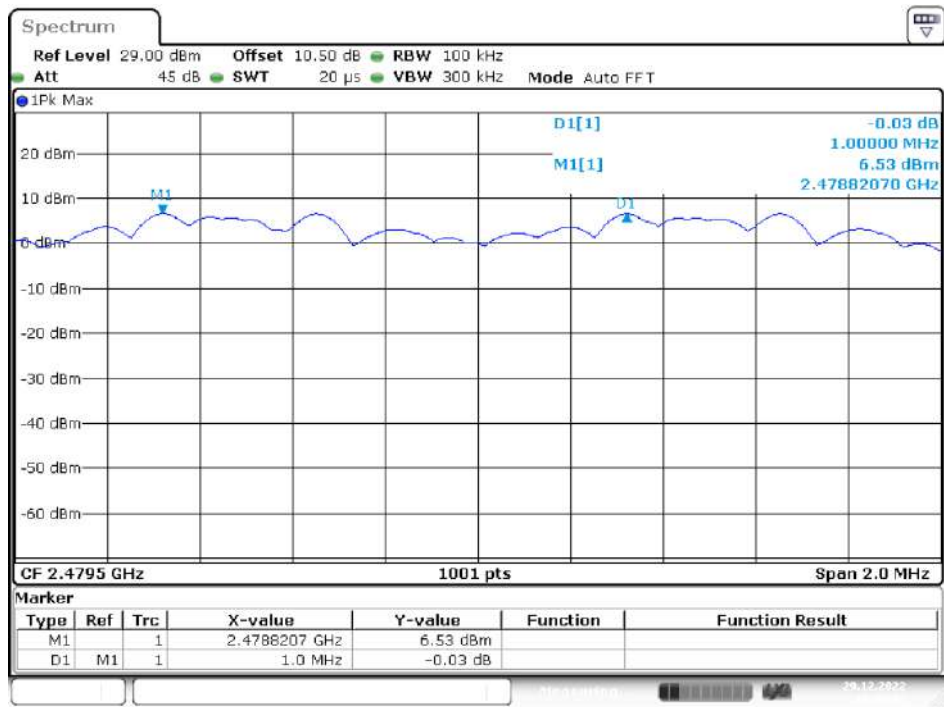
Date: 29.DEC.2022 15:47:29

Middle Channel



Date: 29.DEC.2022 15:46:09

High Channel



Date: 29.DEC.2022 15:42:56

11. FCC§15.247(a)(1)(iii) –Time of Occupancy (Dwell Time)

11.1. Applicable Standard

According to FCC §15.247(a) (1) (iii).

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. 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.

11.2. Test Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel $RBW \leq$ channel spacing and where possible RBW should be set $\gg 1/T$, where T is the expected dwell time per channel Sweep = as necessary to capture the entire dwell time per hopping channel Detector function = peak Trace = max hold

Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time.

Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements.

Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:

(Number of hops in the period specified in the requirements) = (number of hops on spectrum analyzer) x (period specified in the requirements / analyzer sweep time)

The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified. If the number of hops in a specific time varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation.

11.3. Test Results

Test mode: BR mode / 2402 ~ 2480MHz (GFSK)						
Mode	Pulse Time (ms)	Hopping Number	Period Time (s)	Total of Dwell (ms)	Limit (ms)	Result
DH1	0.38	310	31.6	117.49	<400	PASS
DH3	1.64	130	31.6	212.68	<400	PASS
DH5	2.89	130	31.6	375.18	<400	PASS
Test mode: EDR mode / 2402 ~ 2480MHz ($\pi/4$-DQPSK)						
Mode	Pulse Time (ms)	Hopping Number	Period Time (s)	Total of Dwell (ms)	Limit (ms)	Result
2DH1	0.39	320	31.6	124.48	<400	PASS
2DH3	1.64	150	31.6	246.00	<400	PASS
2DH5	2.89	120	31.6	346.80	<400	PASS
Test mode: EDR mode / 2402 ~ 2480MHz (8DPSK)						
Mode	Pulse Time (ms)	Hopping Number	Period Time (s)	Total of Dwell (ms)	Limit (ms)	Result
3DH1	0.39	320	31.6	124.80	<400	PASS
3DH3	1.64	130	31.6	213.72	<400	PASS
3DH5	2.89	130	31.6	376.22	<400	PASS

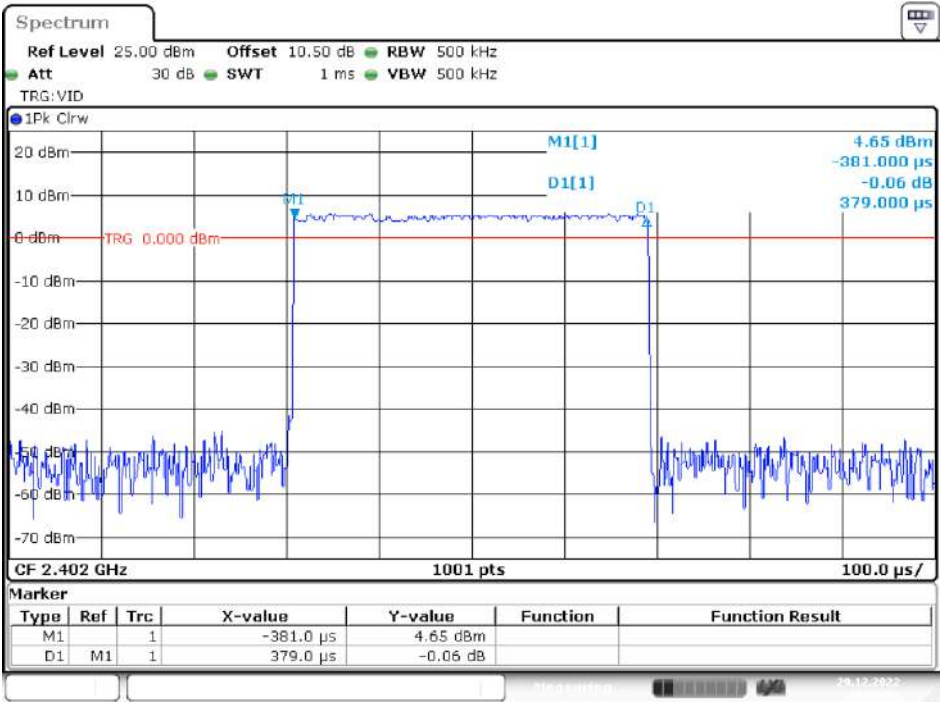
Note 1: A period time = $0.4 \times 79 = 31.6$ (s), Total of Dwell = Pulse Time * Hopping Number

Note 2: Hopping Number = Hopping Number/10 * 10

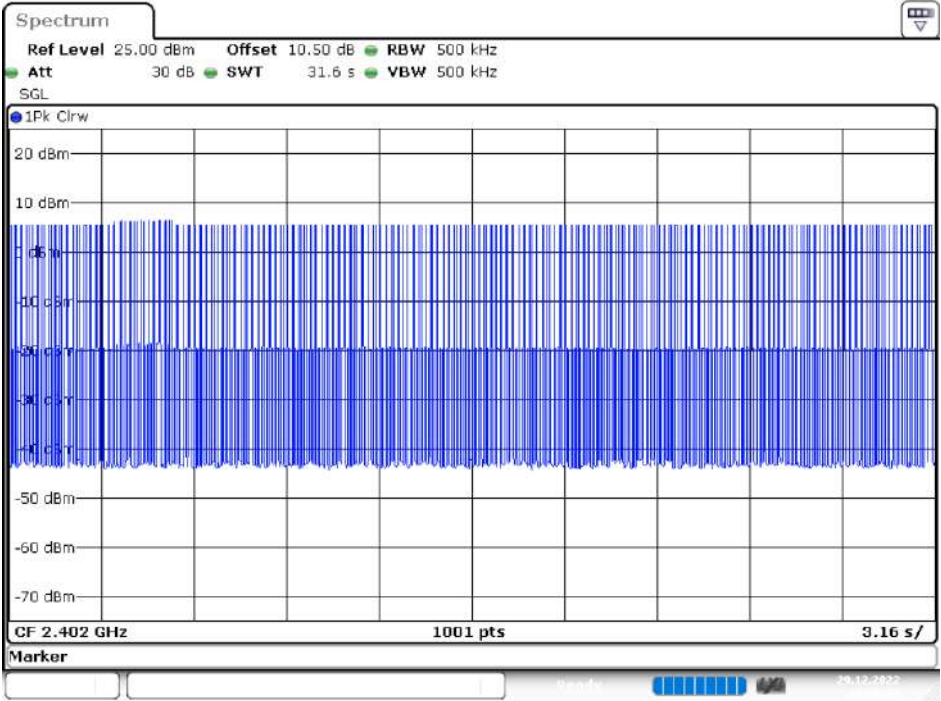
Note 3: Hopping Number/10 = Total of highest signals in 3.16s. (Second high signals were other channel)

Please refer to the following plots

BR Mode (GFSK)
DH1: Pulse Width

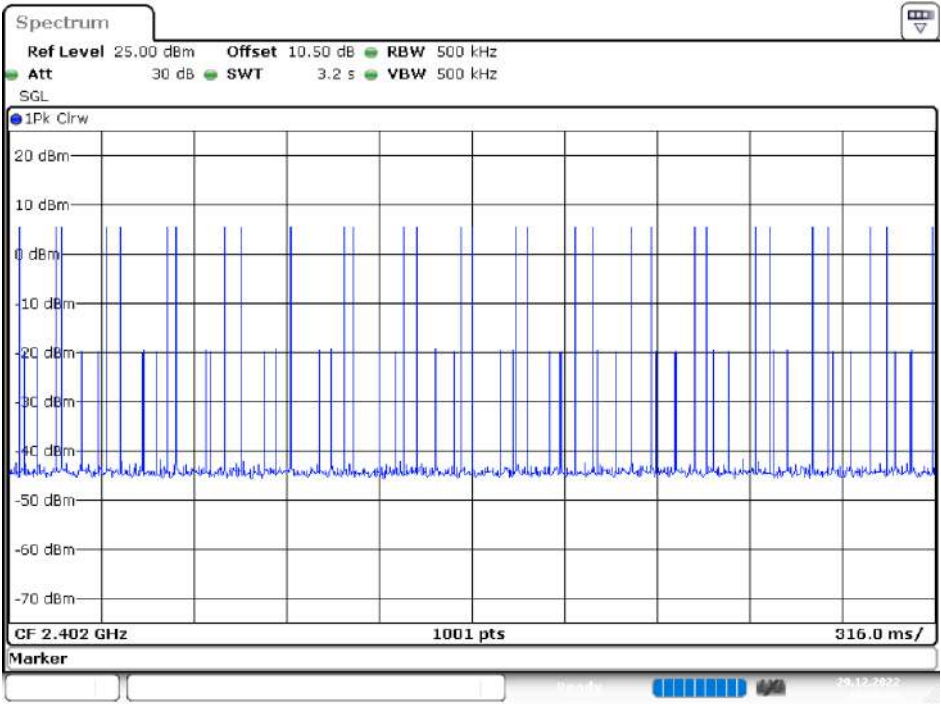


DH1: Hopping Number

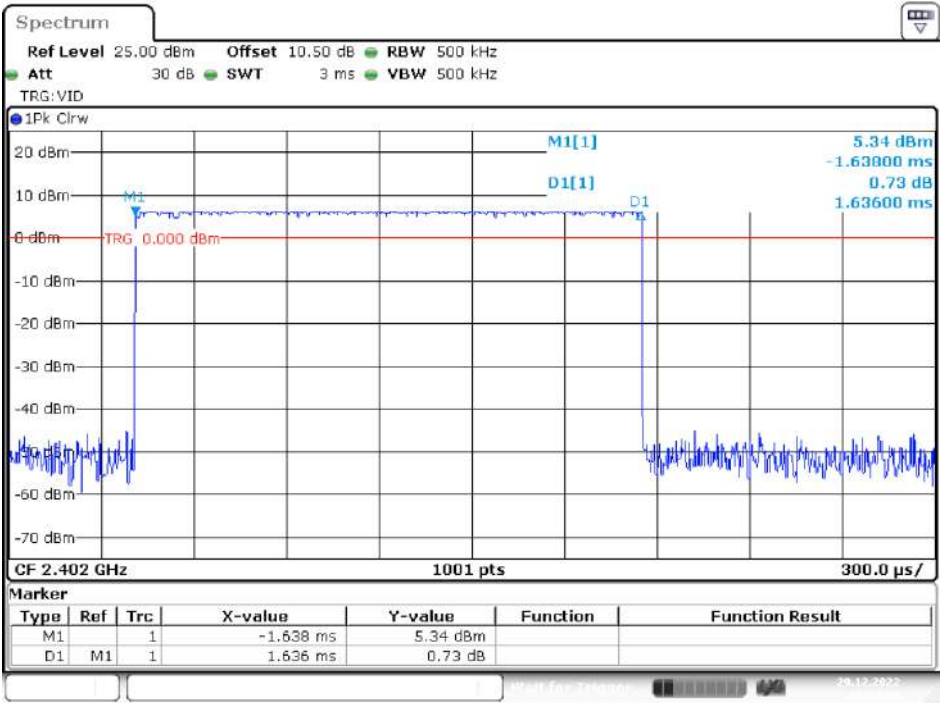


DH1: Hopping Number /10

(Hopping Number = 31 in 1/10 period of highest signals, Second High signals were other channel)



DH3: Pulse Width



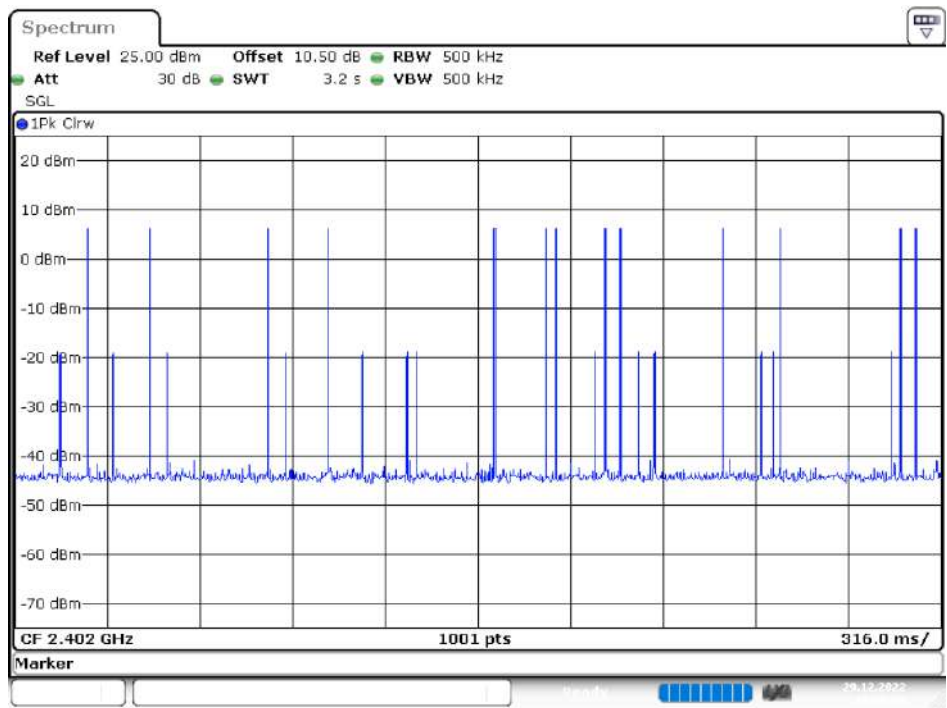
DH3: Hopping Number



Date: 29.DEC.2022 15:58:13

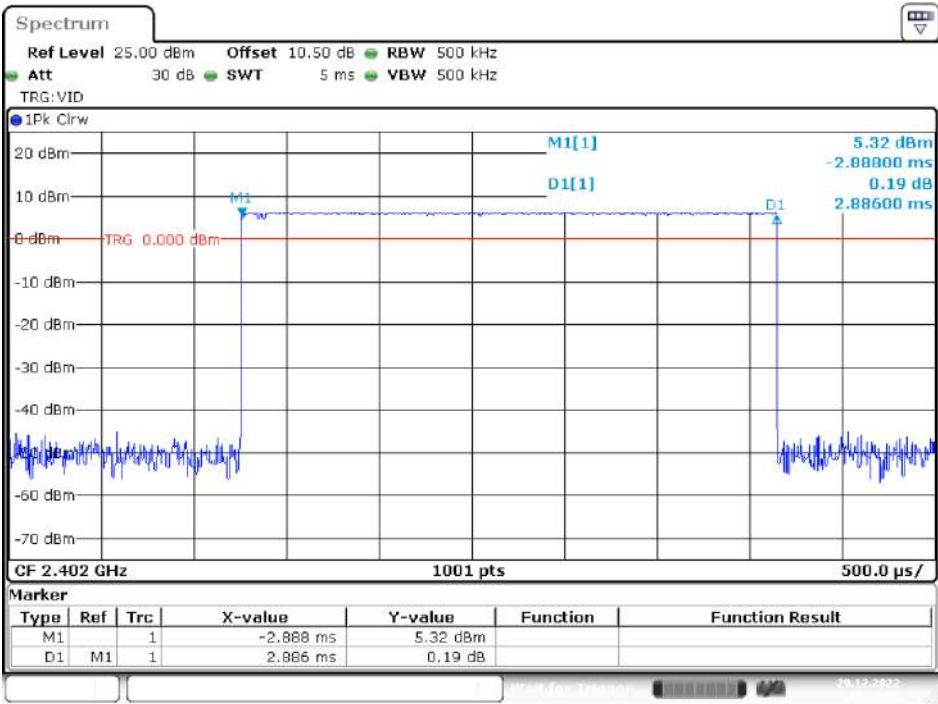
DH3: Hopping Number /10

(Hopping Number = 13 in 1/10 period of highest signals, Second High signals were other channel)

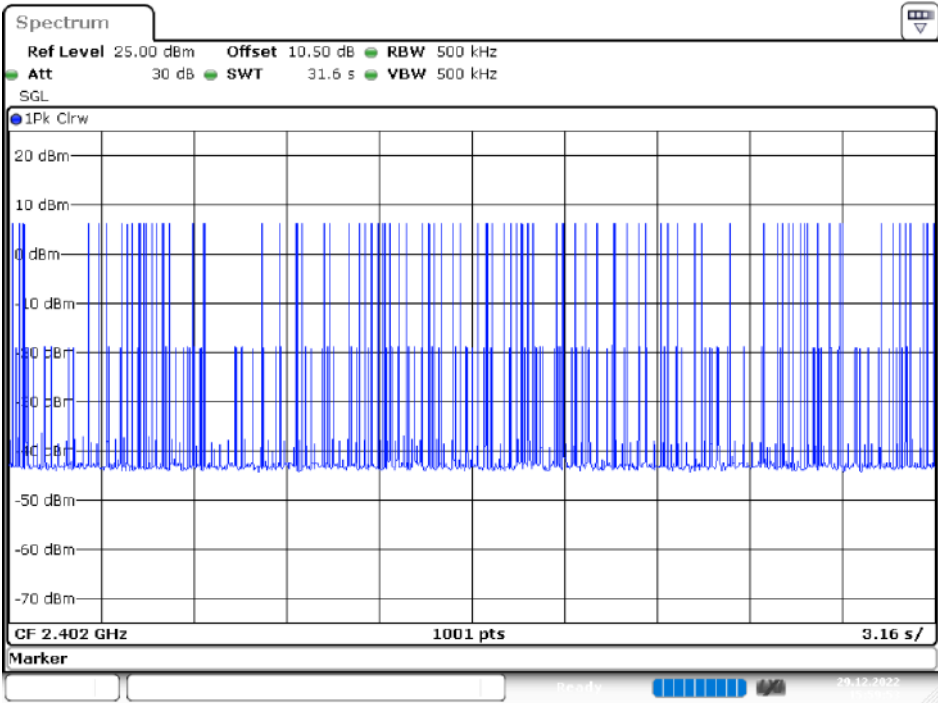


Date: 29.DEC.2022 15:58:19

DH5: Pulse Width

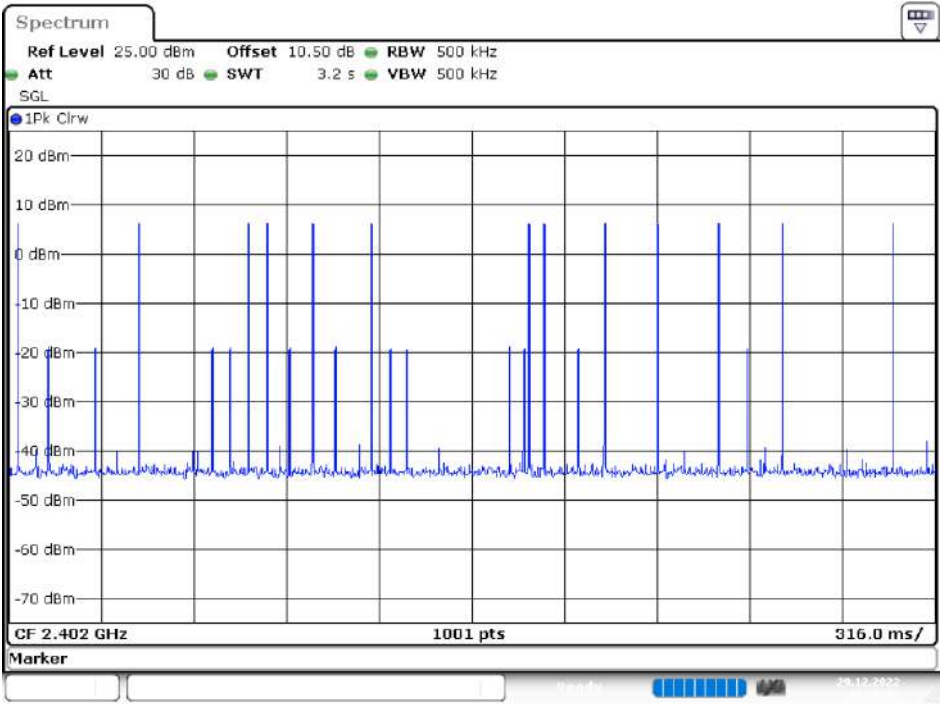


DH5: Hopping Number

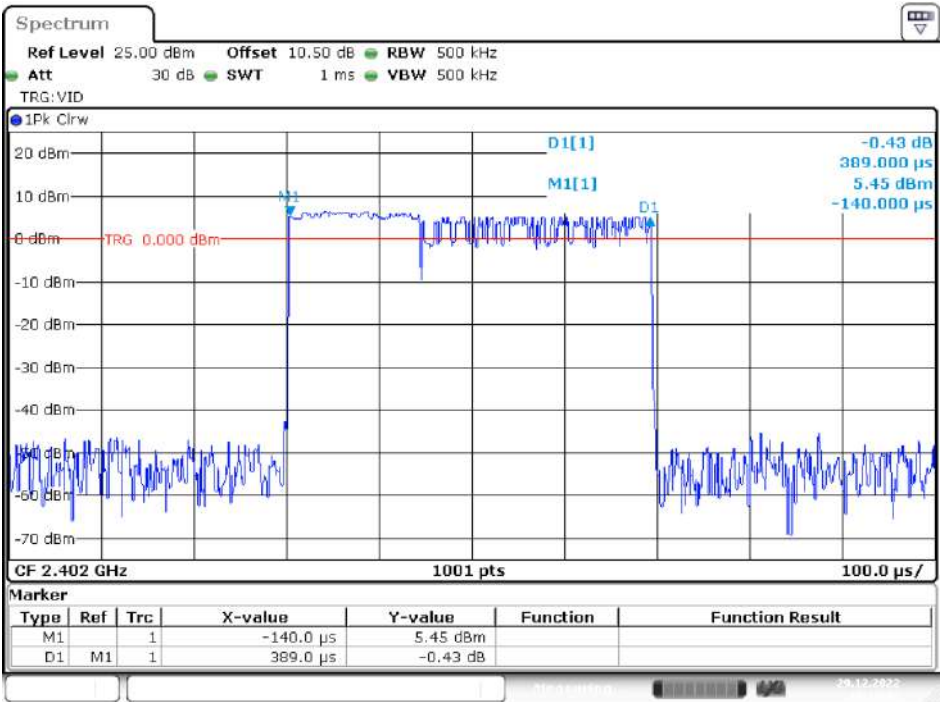


DH5: Hopping Number /10

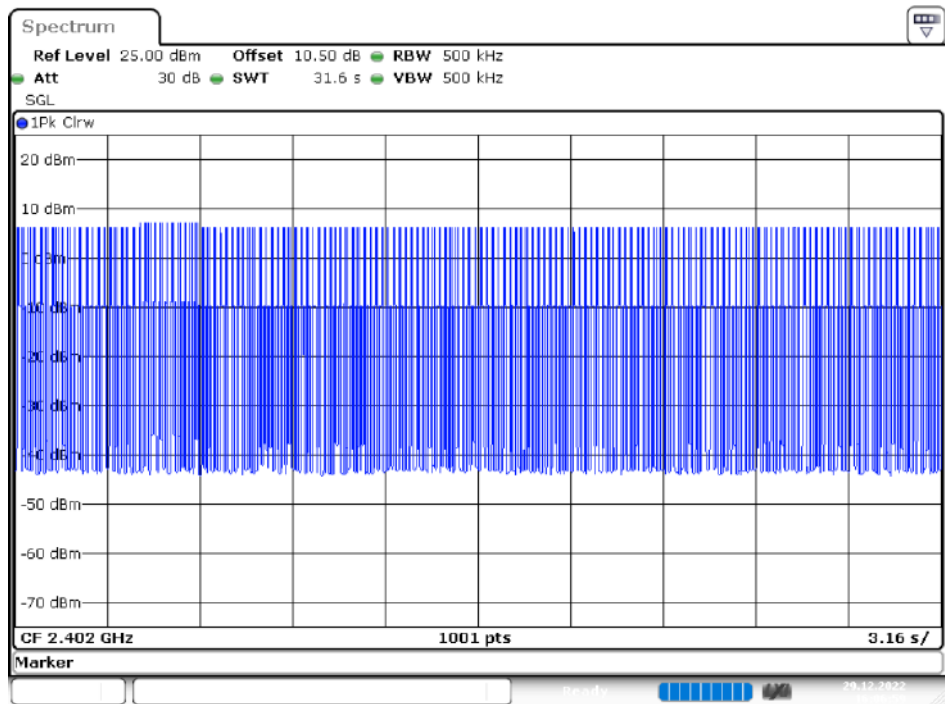
(Hopping Number = 13 in 1/10 period of highest signals, Second High signals were other channel)



EDR Mode ($\pi/4$ -DQPSK)
2DH1: Pulse Width



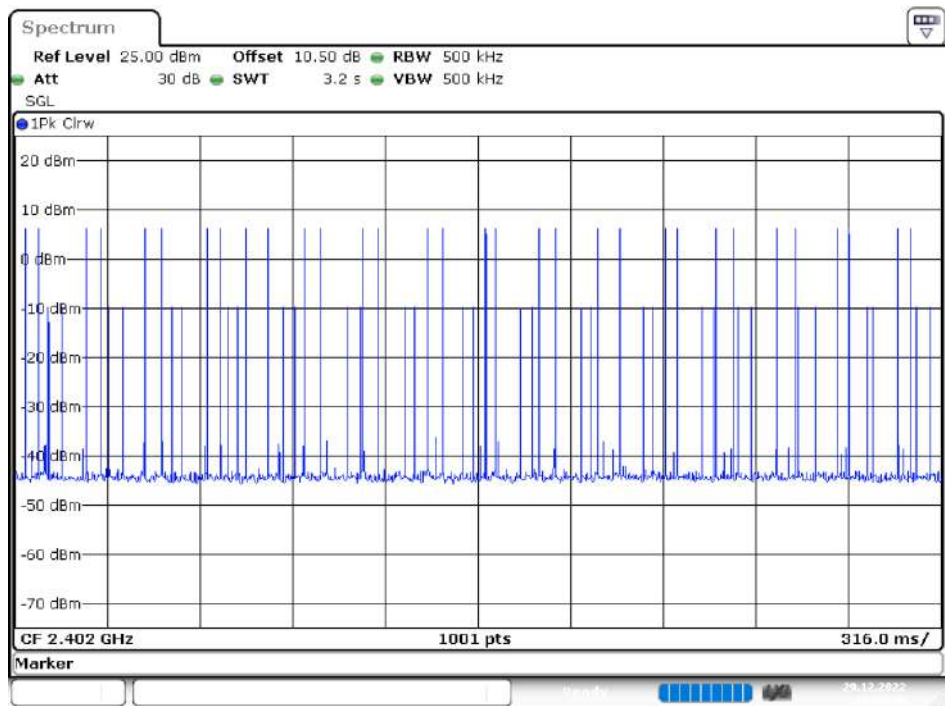
2DH1: Hopping Number



Date: 29.DEC.2022 16:06:59

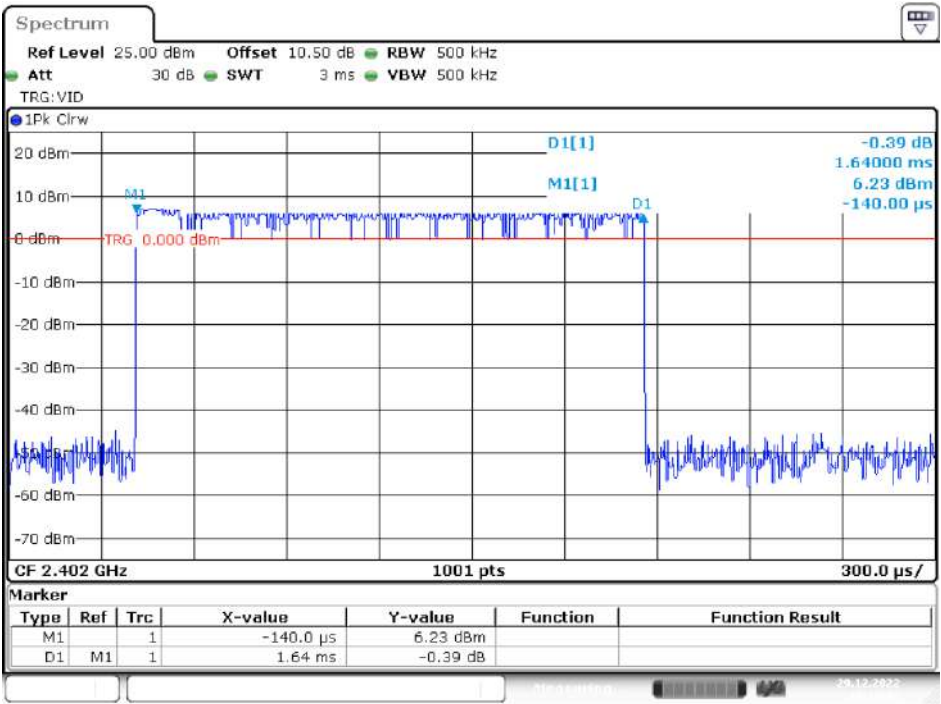
2DH1: Hopping Number /10

(Hopping Number = 32 in 1/10 period of highest signals, Second High signals were other channel)



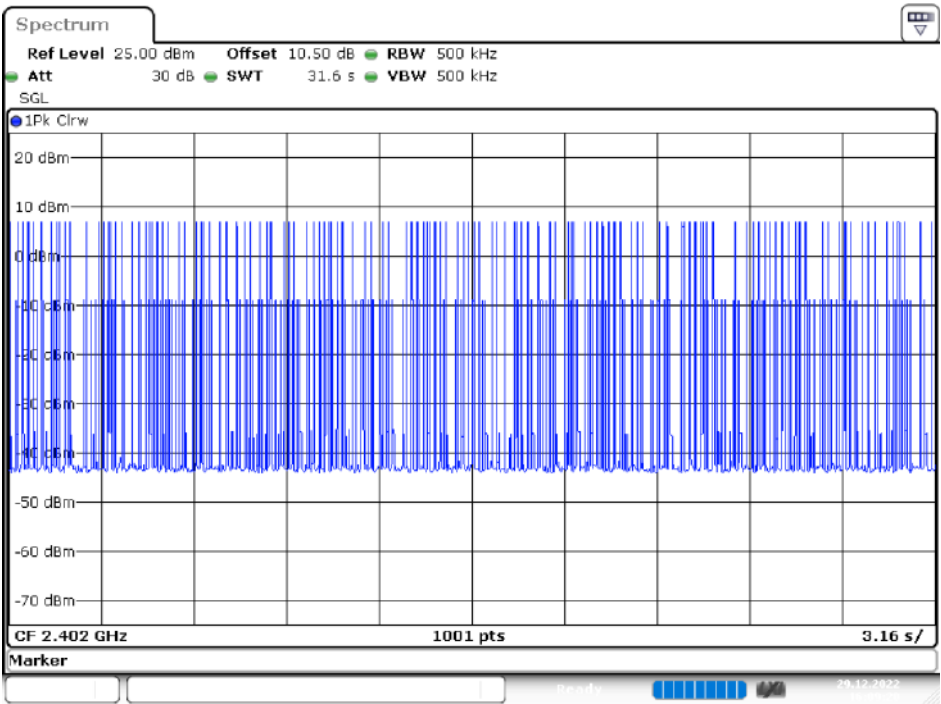
Date: 29.DEC.2022 16:07:40

2DH3: Pulse Width



Date: 29.DEC.2022 16:13:42

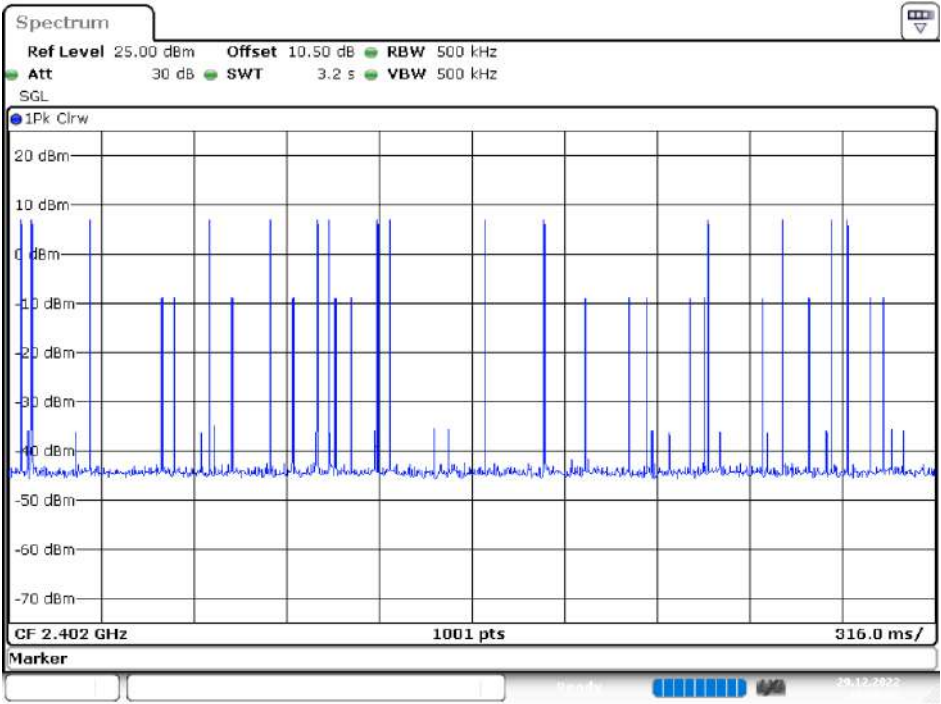
2DH3: Hopping Number



Date: 29.DEC.2022 16:09:20

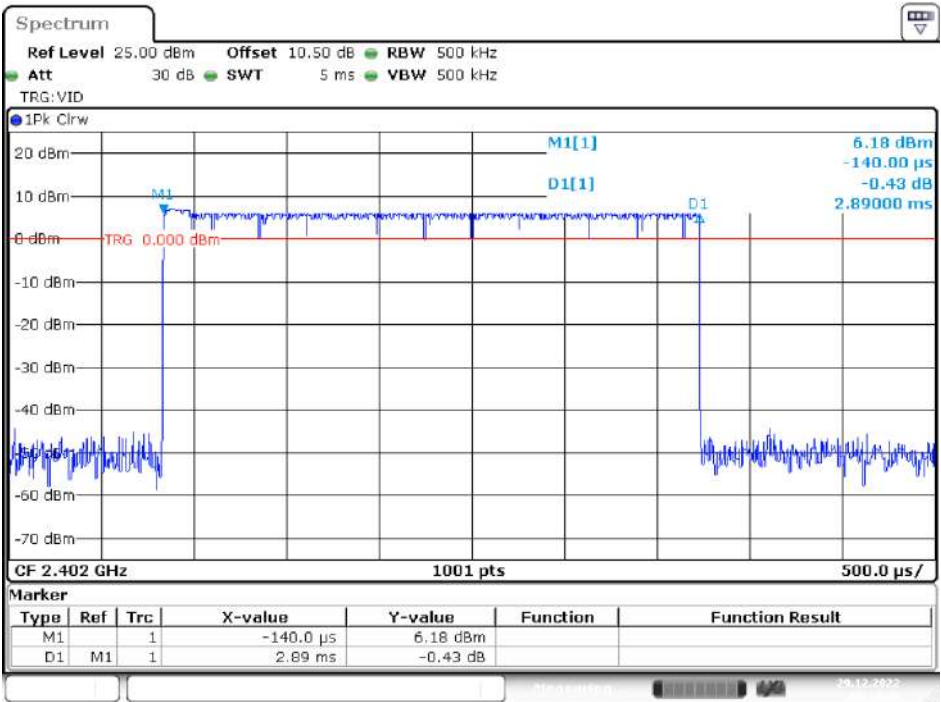
2DH3: Hopping Number /10

(Hopping Number = 15 in 1/10 period of highest signals, Second High signals were other channel)

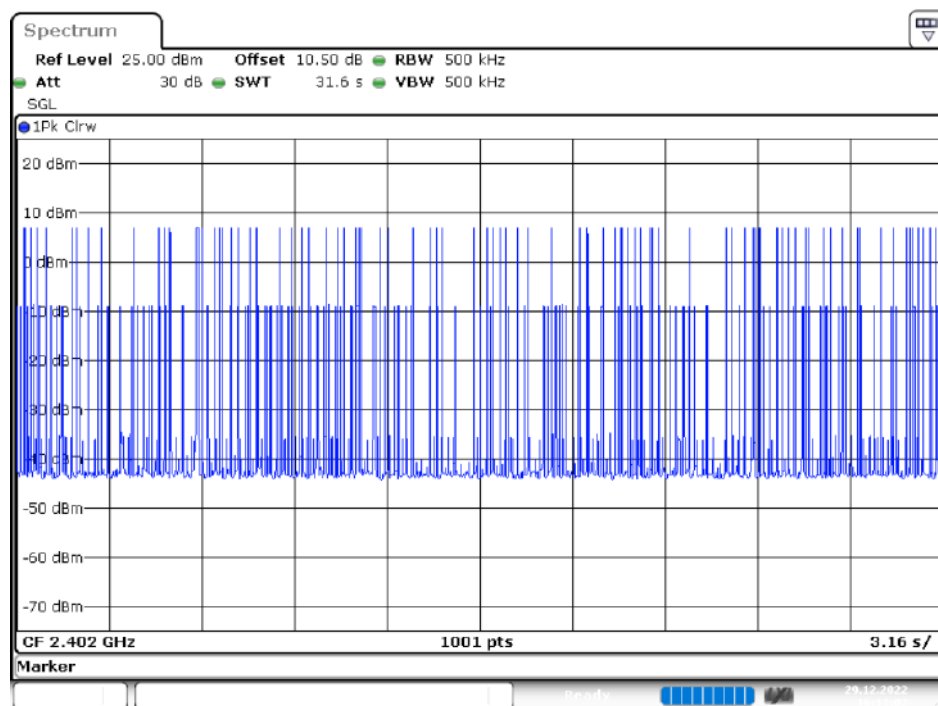


Date: 29.DEC.2022 16:09:35

2DH5: Pulse Width



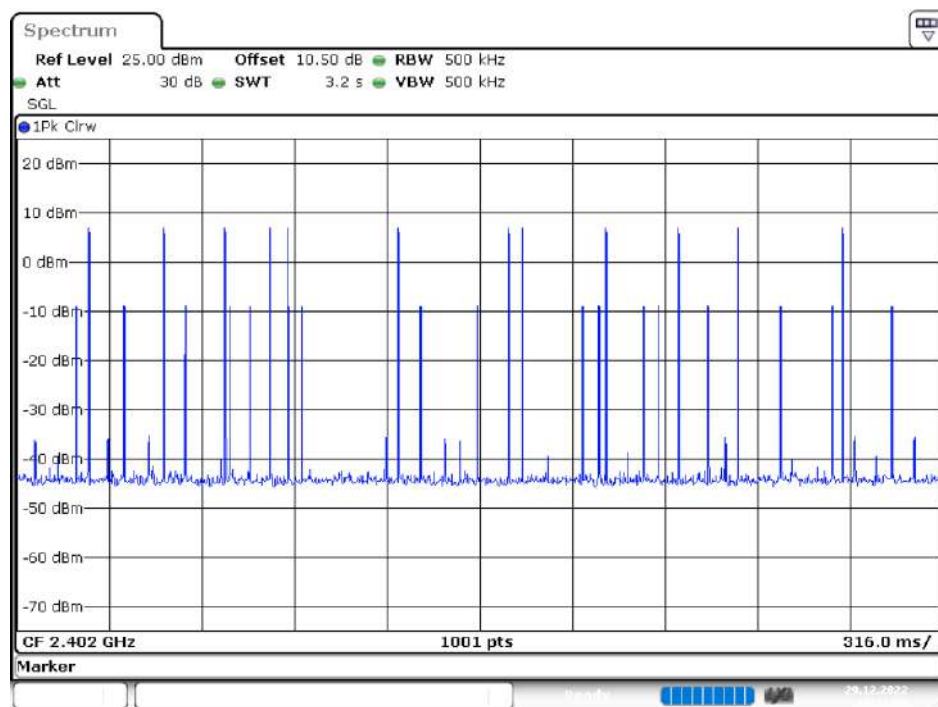
Date: 29.DEC.2022 16:14:30

2DH5: Hopping Number

Date: 29.DEC.2022 16:11:07

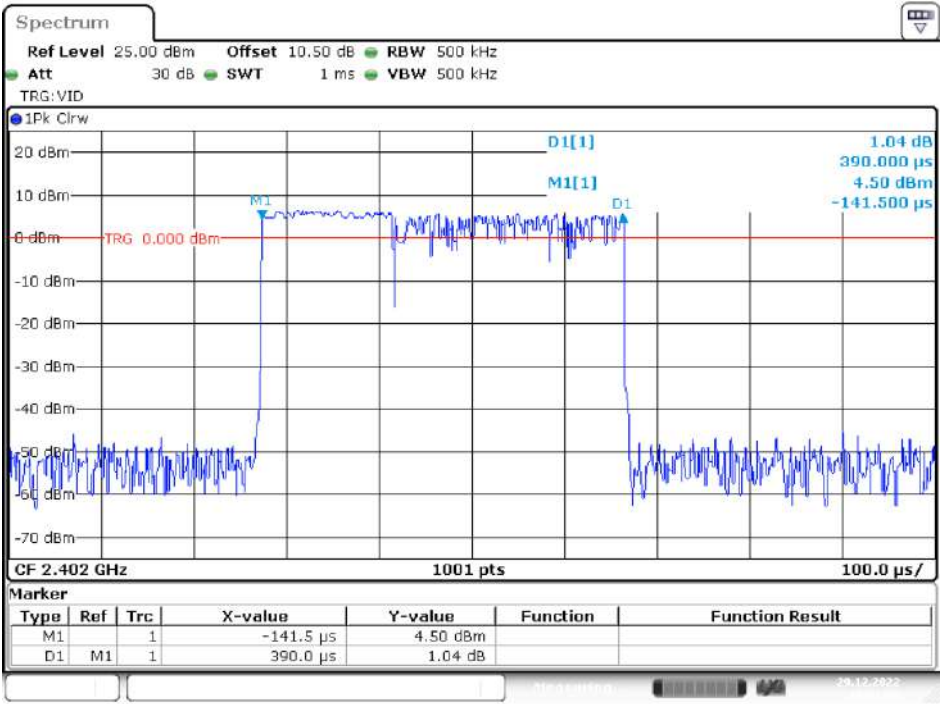
2DH5: Hopping Number /10

(Hopping Number = 12 in 1/10 period of highest signals, Second High signals were other channel)



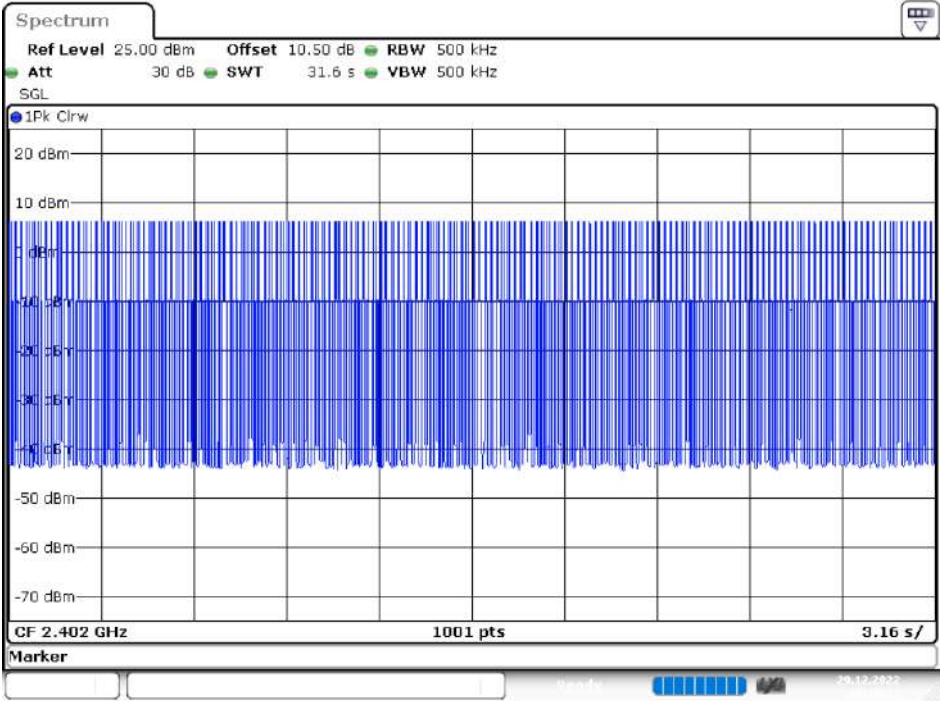
Date: 29.DEC.2022 16:11:19

EDR Mode (8DPSK)
3DH1: Pulse Width



Date: 29.DEC.2022 16:21:26

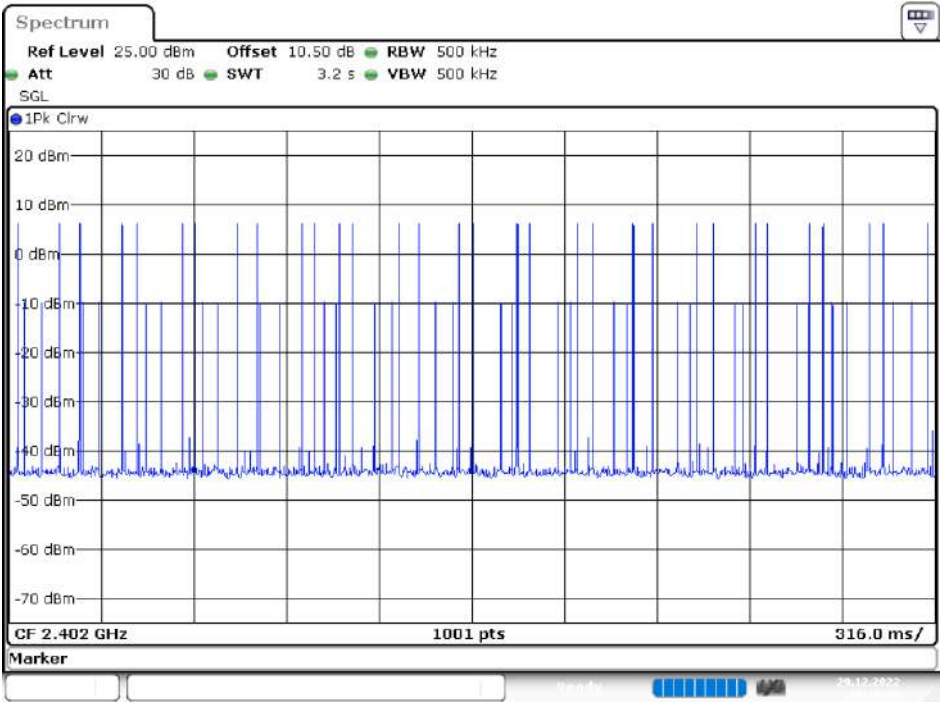
3DH1: Hopping Number



Date: 29.DEC.2022 16:16:21

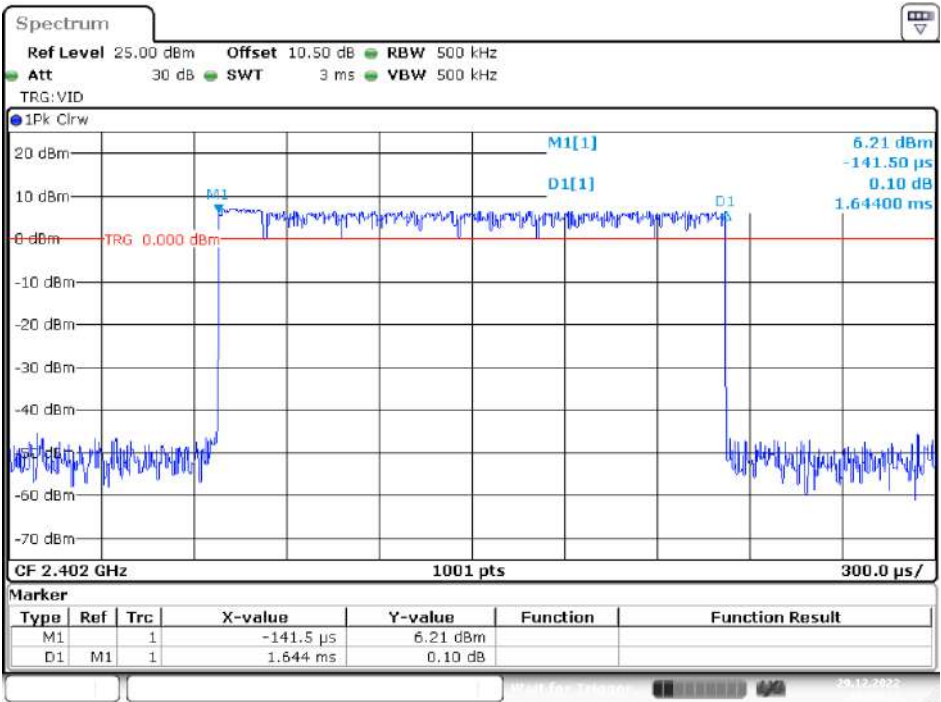
3DH1: Hopping Number /10

(Hopping Number = 32 in 1/10 period of highest signals, Second High signals were other channel)



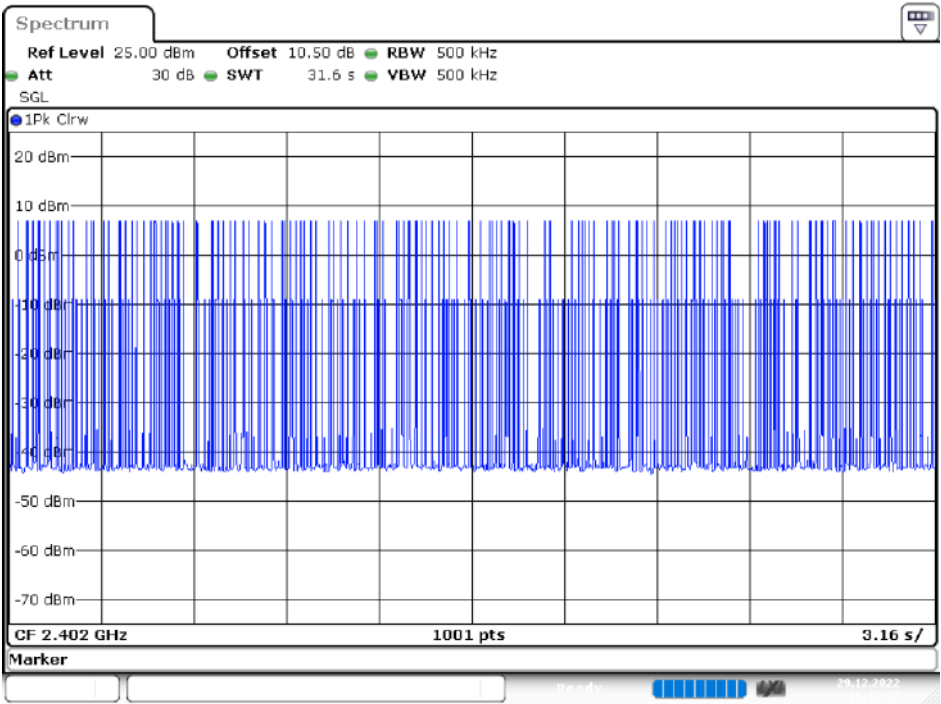
Date: 29.DEC.2022 16:16:26

3DH3: Pulse Width



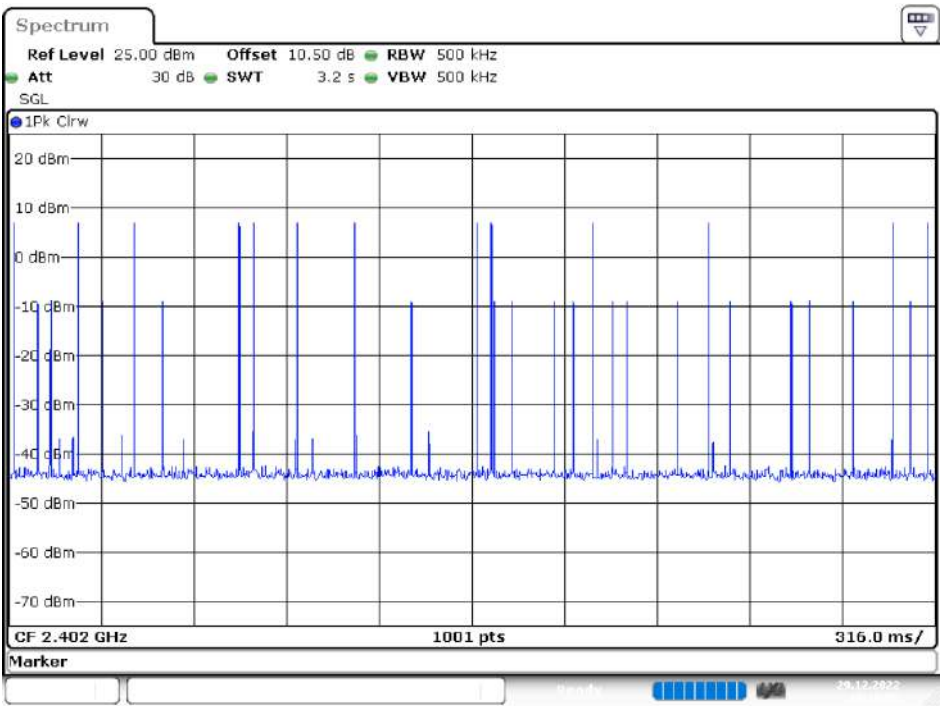
Date: 29.DEC.2022 16:22:13

3DH3: Hopping Number

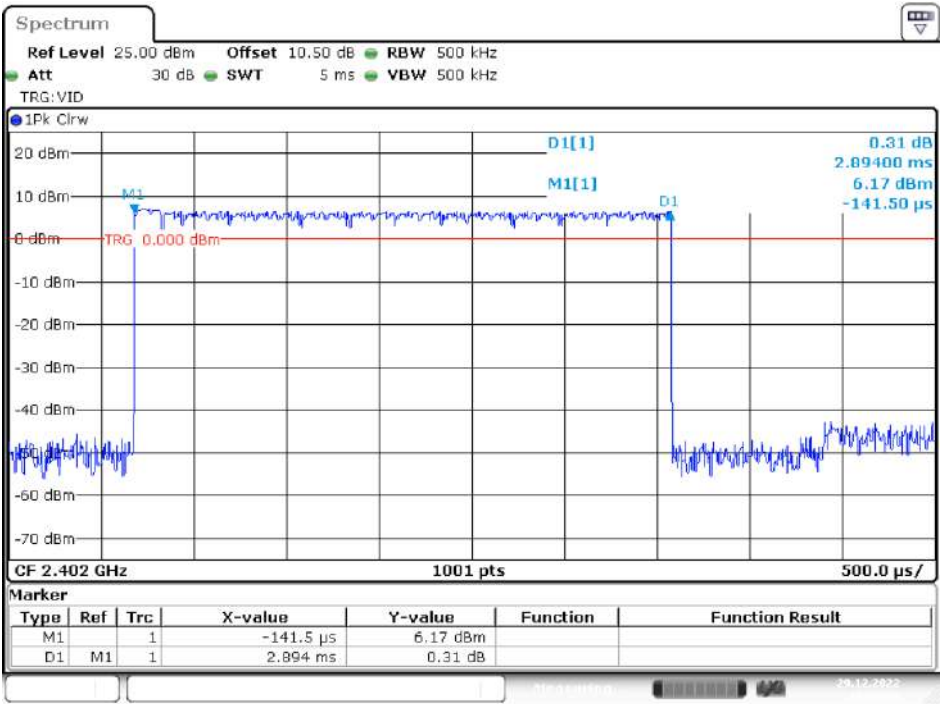


3DH3: Hopping Number /10

(Hopping Number = 13 in 1/10 period of highest signals, Second High signals were other channel)

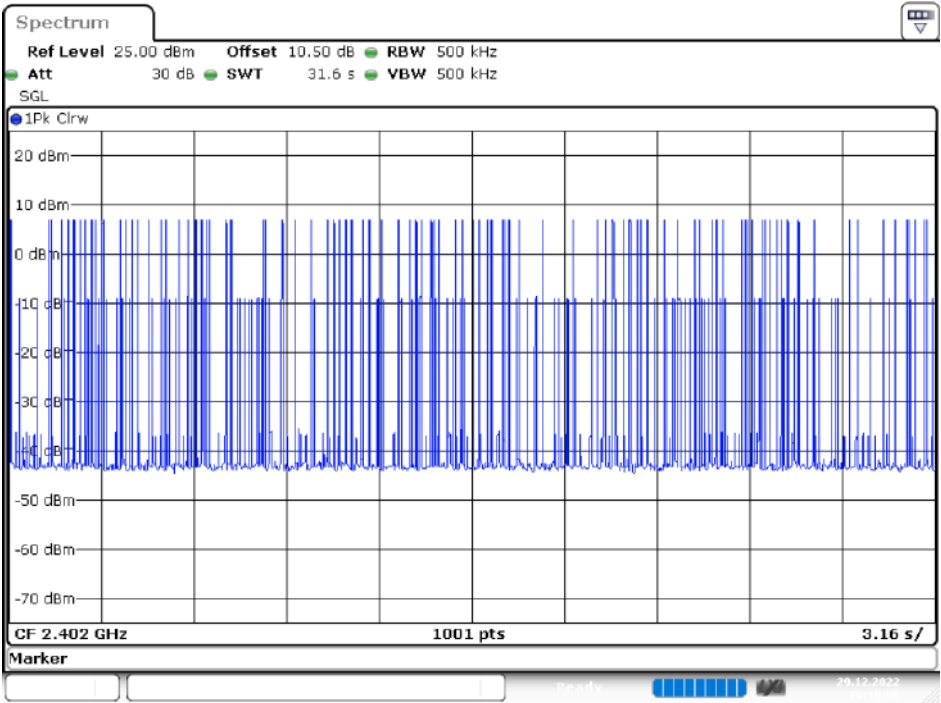


3DH5: Pulse Width



Date: 29.DEC.2022 16:23:00

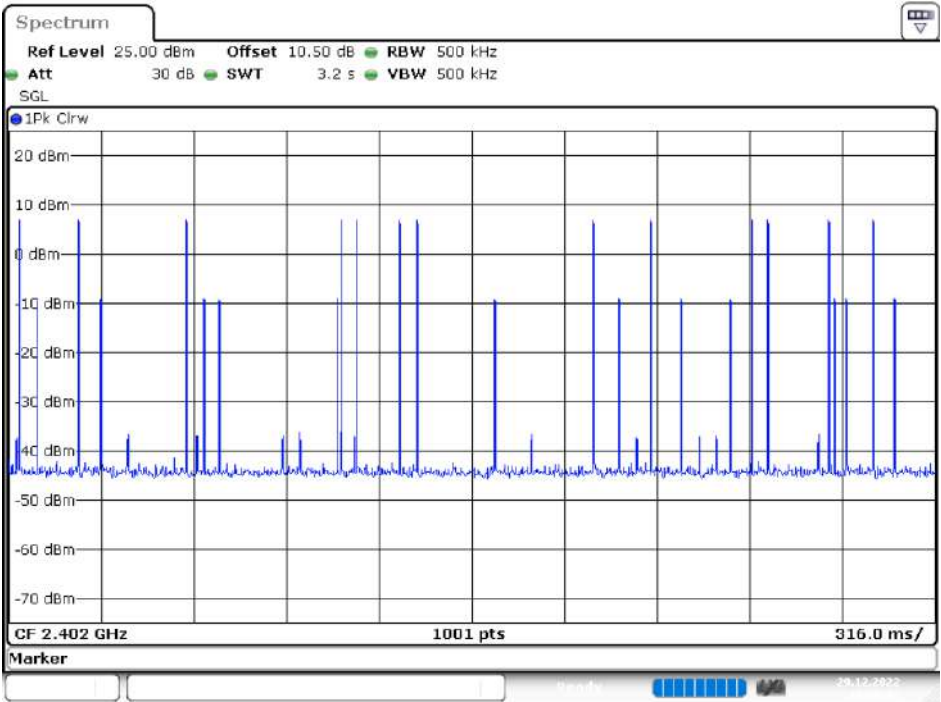
3DH5: Hopping Number



Date: 29.DEC.2022 16:19:56

3DH5: Hopping Number /10

(Hopping Number = 13 in 1/10 period of highest signals, Second High signals were other channel)



Date: 29.DEC.2022 16:20:02

12. FCC §15.247(a)(1)(iii) –Quantity of hopping channel Test

12.1. Applicable Standard

According to FCC §15.247(a) (1) (iii).

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. 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.

12.2. Test Procedure

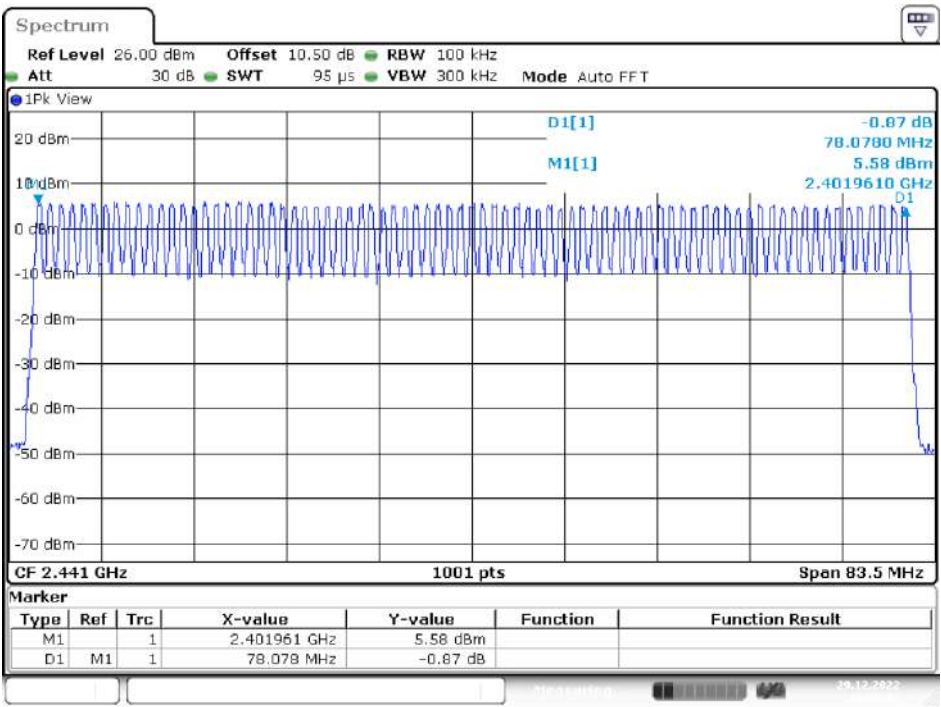
1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in hopping mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

12.3. Test Results

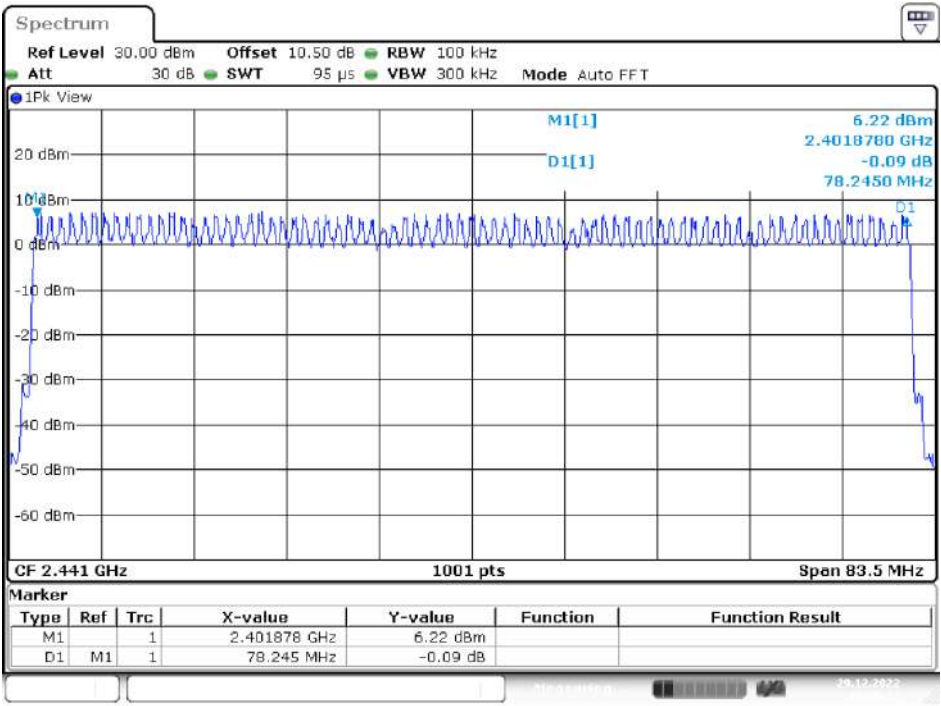
Mode	Frequency Range (MHz)	Number of Hopping Channel (CH)	Limit (CH)	Result
GFSK	2402-2480	79	>15	Compliance
$\pi/4$ -DQPSK	2402-2480	79	>15	Compliance
8DPSK	2402-2480	79	>15	Compliance

Please refer to the following plots

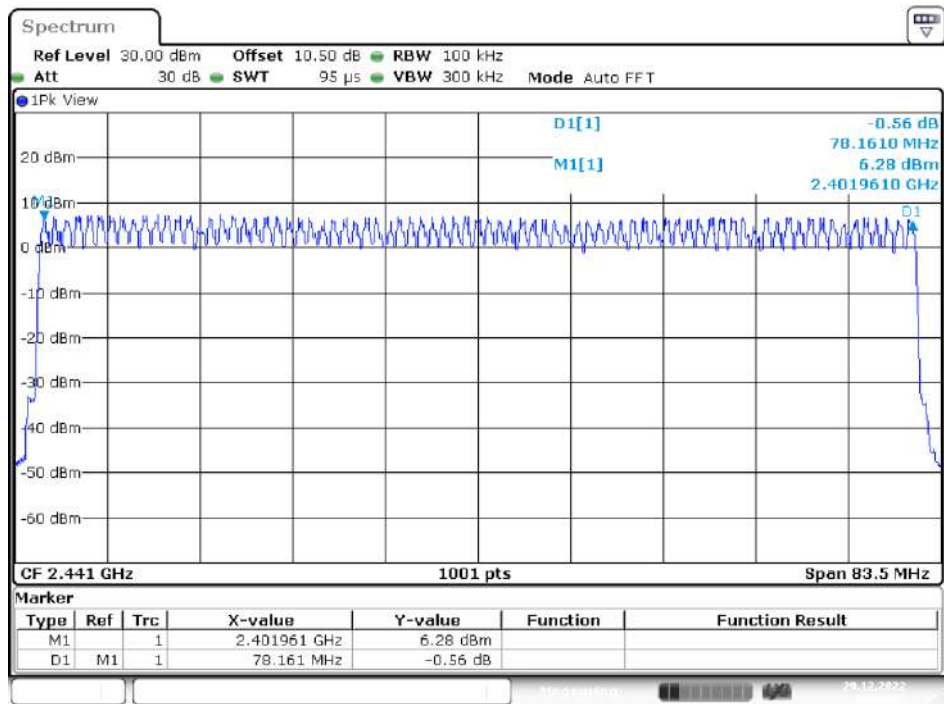
BR Mode (GFSK)



EDR Mode ($\pi/4$ -DQPSK)



EDR Mode (8DPSK)



Date: 29.DEC.2022 15:52:32

13. FCC §15.247(b)(1) – Maximum Output Power

13.1. Applicable Standard

According to FCC §15.247(b) (1).

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 watts.

13.2. Test Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to measuring equipment.

13.3. Test Results**DrivePro Body 70**

Channel	Frequency (MHz)	Peak Conducted Output Power		Limit (W)	Result
		(dBm)	(W)		
BR Mode (GFSK)					
Low	2402	3.46	0.002	0.125	Compliance
Middle	2441	3.26	0.002	0.125	Compliance
High	2480	2.83	0.002	0.125	Compliance
EDR Mode ($\pi/4$ -DQPSK)					
Low	2402	4.75	0.003	0.125	Compliance
Middle	2441	4.47	0.003	0.125	Compliance
High	2480	4.03	0.003	0.125	Compliance
EDR Mode (8DPSK)					
Low	2402	5.15	0.003	0.125	Compliance
Middle	2441	4.93	0.003	0.125	Compliance
High	2480	4.58	0.003	0.125	Compliance

Channel	Frequency (MHz)	Average Conducted Output Power		Limit (W)	Result
		(dBm)	(W)		
BR Mode (GFSK)					
Low	2402	3.23	0.002	0.125	Compliance
Middle	2441	2.96	0.002	0.125	Compliance
High	2480	2.54	0.002	0.125	Compliance
EDR Mode ($\pi/4$ -DQPSK)					
Low	2402	2.30	0.002	0.125	Compliance
Middle	2441	1.98	0.002	0.125	Compliance
High	2480	1.60	0.001	0.125	Compliance
EDR Mode (8DPSK)					
Low	2402	2.27	0.002	0.125	Compliance
Middle	2441	1.97	0.002	0.125	Compliance
High	2480	1.62	0.001	0.125	Compliance

DrivePro Body 60

Channel	Frequency (MHz)	Peak Conducted Output Power		Limit (W)	Result
		(dBm)	(W)		
BR Mode (GFSK)					
Low	2402	3.25	0.002	0.125	Compliance
Middle	2441	3.11	0.002	0.125	Compliance
High	2480	2.67	0.002	0.125	Compliance
EDR Mode ($\pi/4$ -DQPSK)					
Low	2402	4.55	0.003	0.125	Compliance
Middle	2441	4.21	0.003	0.125	Compliance
High	2480	3.91	0.002	0.125	Compliance
EDR Mode (8DPSK)					
Low	2402	4.88	0.003	0.125	Compliance
Middle	2441	4.71	0.003	0.125	Compliance
High	2480	4.30	0.003	0.125	Compliance

Channel	Frequency (MHz)	Average Conducted Output Power		Limit (W)	Result
		(dBm)	(W)		
BR Mode (GFSK)					
Low	2402	3.09	0.002	0.125	Compliance
Middle	2441	2.79	0.002	0.125	Compliance
High	2480	2.39	0.002	0.125	Compliance
EDR Mode ($\pi/4$ -DQPSK)					
Low	2402	2.21	0.002	0.125	Compliance
Middle	2441	1.77	0.002	0.125	Compliance
High	2480	1.48	0.001	0.125	Compliance
EDR Mode (8DPSK)					
Low	2402	2.20	0.002	0.125	Compliance
Middle	2441	1.91	0.002	0.125	Compliance
High	2480	1.54	0.001	0.125	Compliance

14. FCC §15.247(d) – 100 kHz Bandwidth of Frequency Band Edge

14.1. Applicable Standard

According to FCC §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emissions limits specified in §15.209(a) see §15.205(c).

14.2. Test Procedure

Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation.

RBW = 100 kHz VBW = 300 kHz

Sweep = coupled

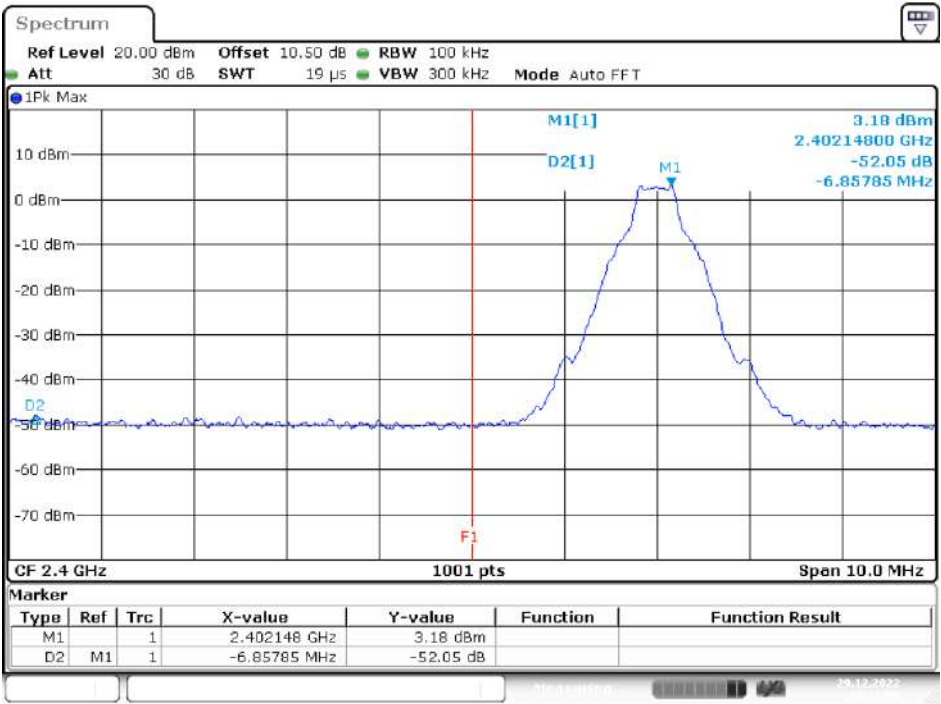
Detector function = peak Trace = max hold

14.3. Test Results

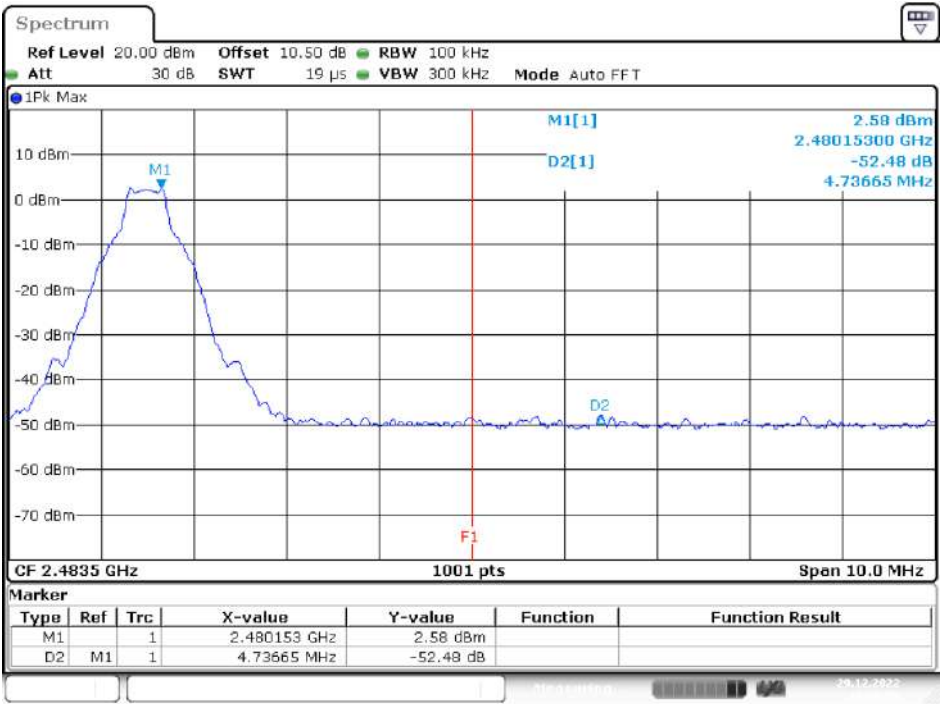
Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
BR Mode (GFSK)				
Low	2402	52.05	≥ 20	PASS
High	2480	52.48	≥ 20	PASS
BR Hopping Mode (GFSK)				
Low	2402-2480	53.27	≥ 20	PASS
High	2402-2480	53.16	≥ 20	PASS
EDR Mode ($\pi/4$ -DQPSK)				
Low	2402	53.83	≥ 20	PASS
High	2480	53.64	≥ 20	PASS
EDR Hopping Mode ($\pi/4$ -DQPSK)				
Low	2402-2480	54.10	≥ 20	PASS
High	2402-2480	54.18	≥ 20	PASS
EDR Mode (8DPSK)				
Low	2402	50.96	≥ 20	PASS
High	2480	53.00	≥ 20	PASS
EDR Hopping Mode (8DPSK)				
Low	2402-2480	52.15	≥ 20	PASS
High	2402-2480	54.39	≥ 20	PASS

Please refer to the following plots.

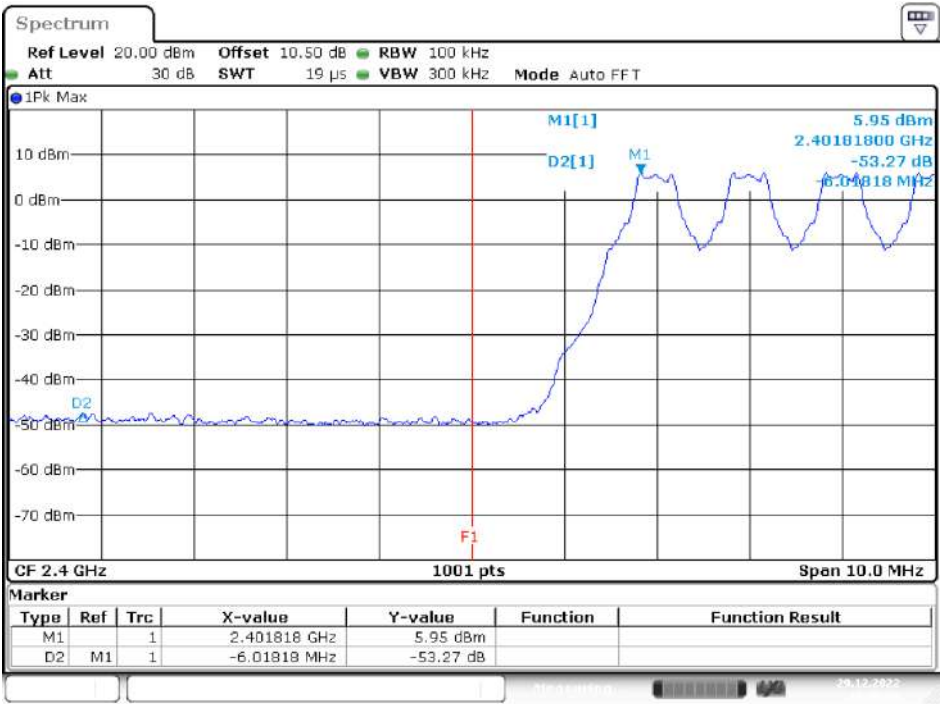
BR Mode (GFSK)
Band Edge, CH Low



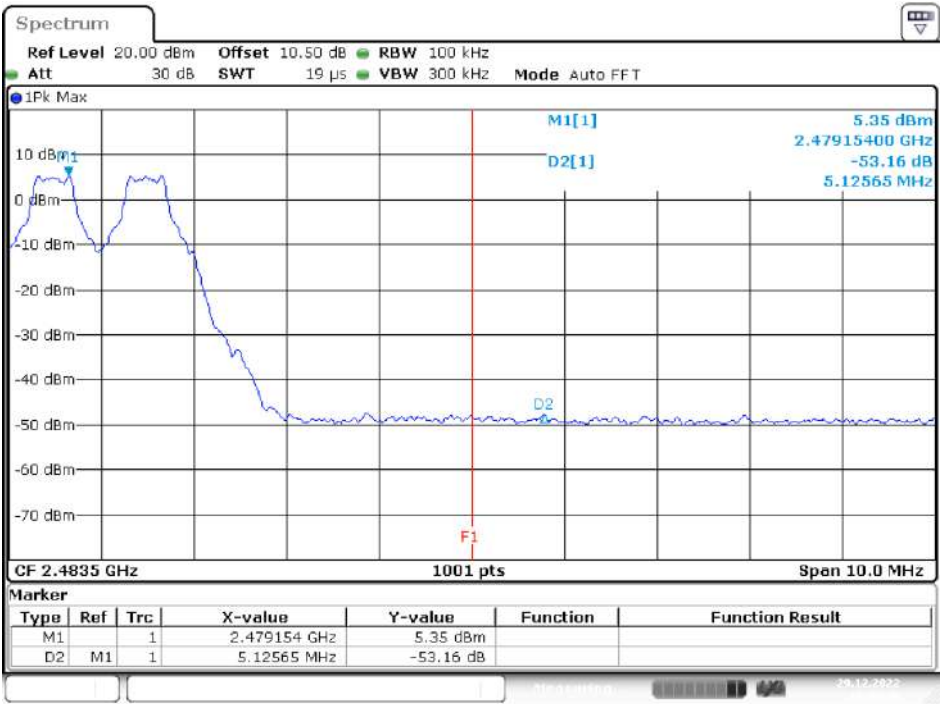
Band Edge, CH High



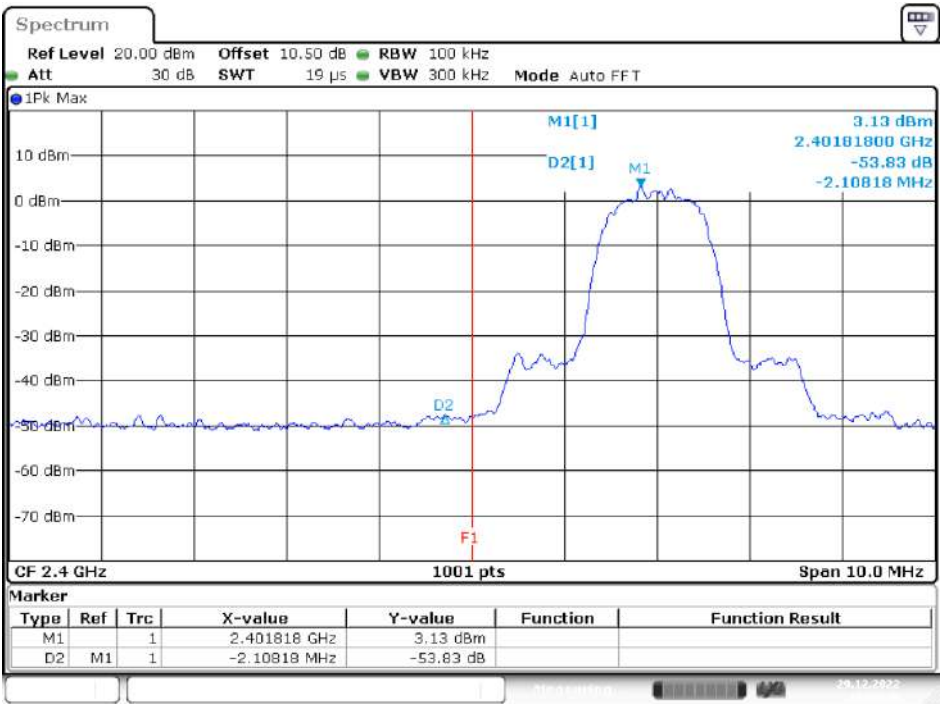
BR Hopping Mode (GFSK)
Band Edge, CH Low



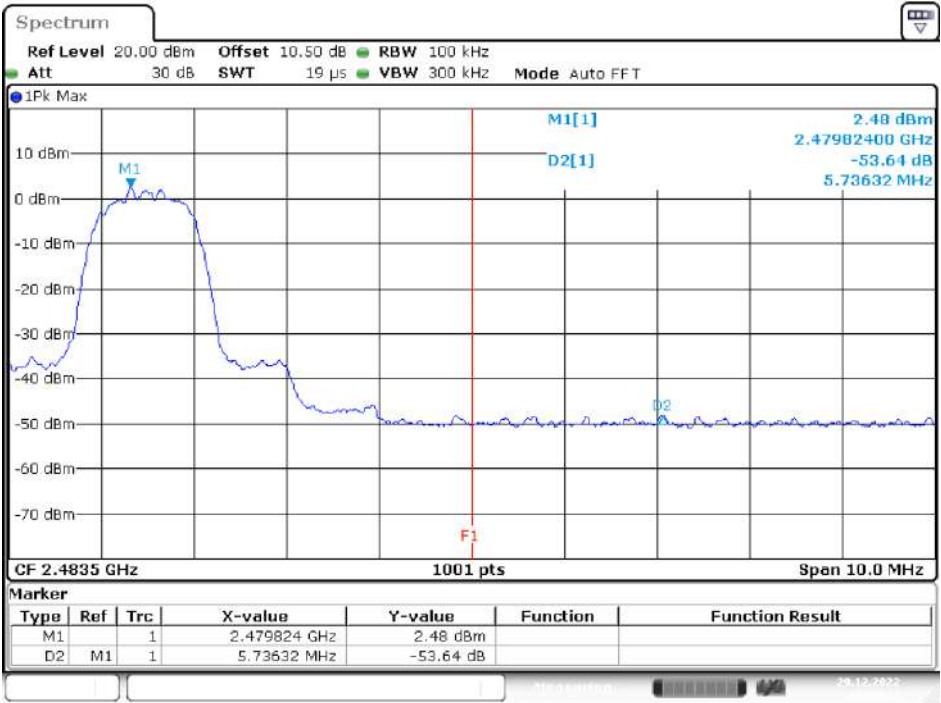
Band Edge, CH High



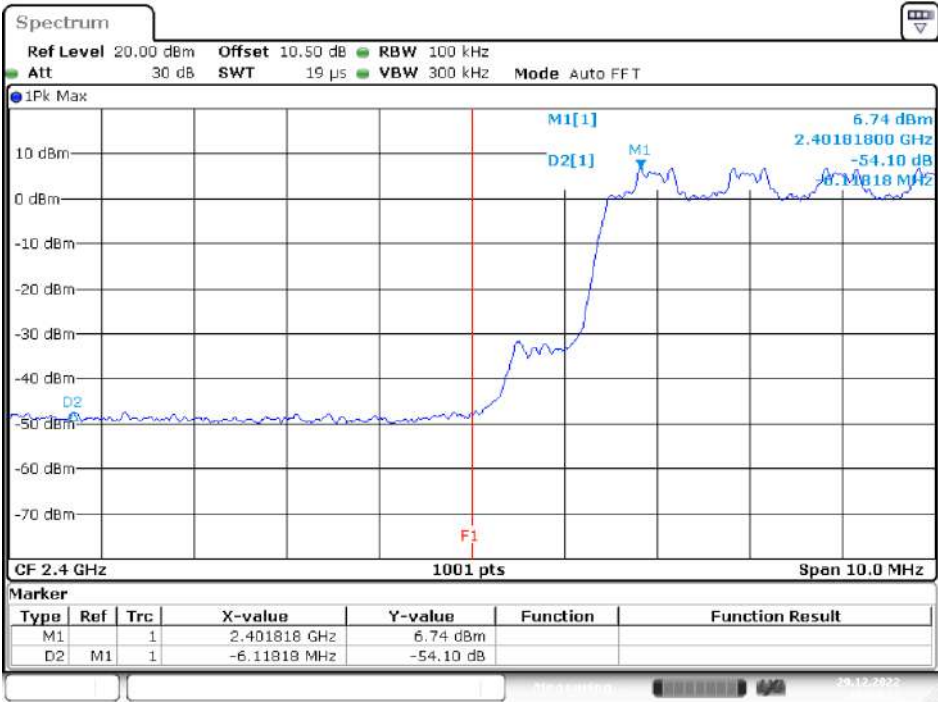
EDR Mode ($\pi/4$ -DQPSK)
Band Edge, CH Low



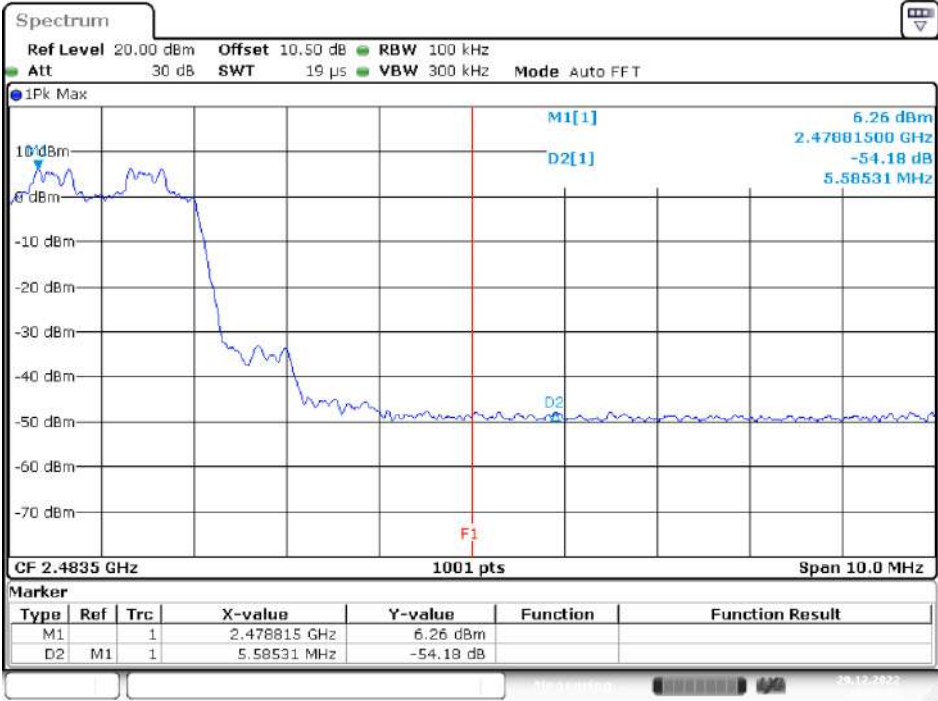
Band Edge, CH High



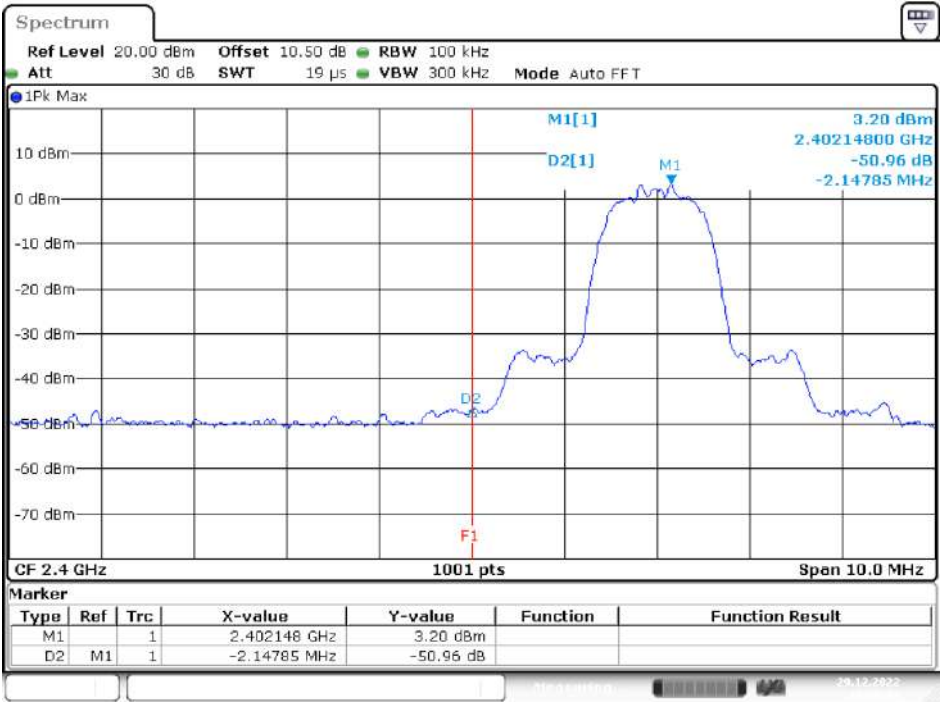
EDR Hopping Mode ($\pi/4$ -DQPSK)
Band Edge, CH Low



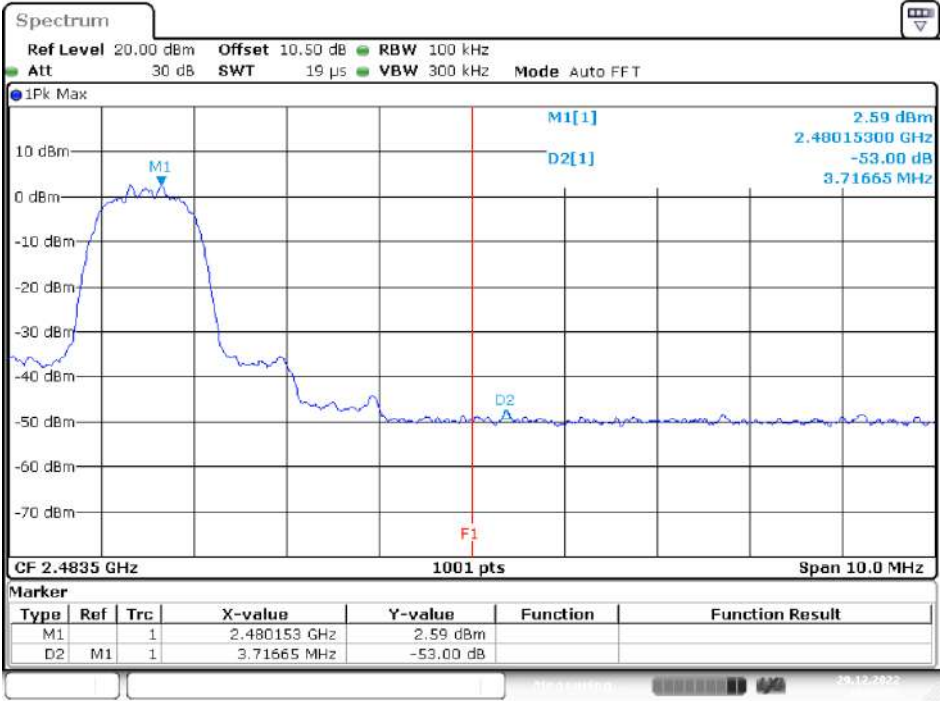
Band Edge, CH High



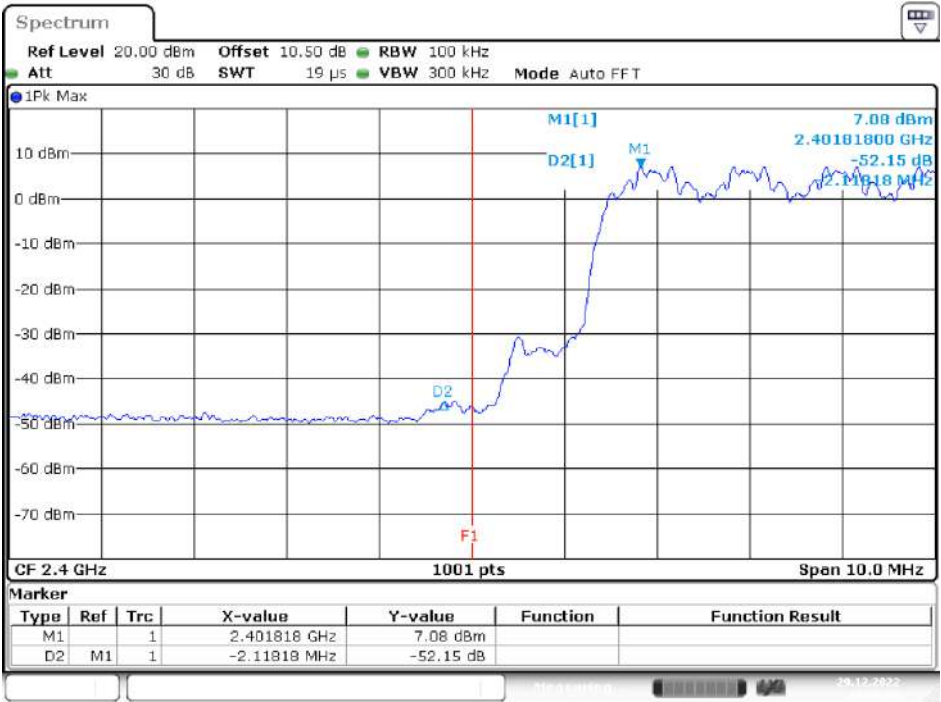
EDR Mode (8DPSK)
Band Edge, CH Low



Band Edge, CH High

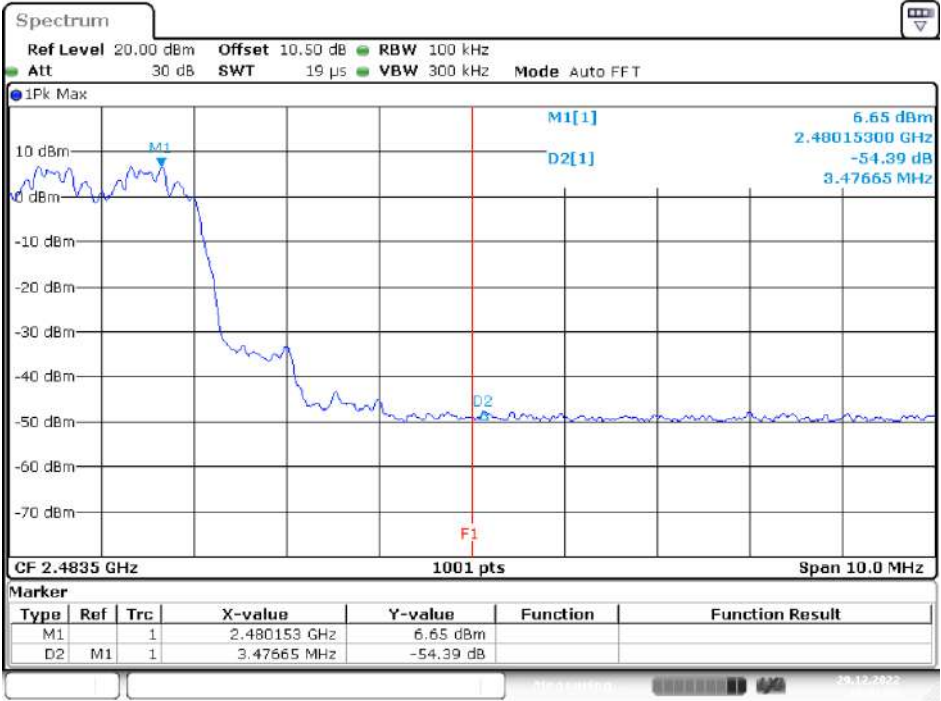


EDR Hopping Mode (8DPSK)
Band Edge, CH Low



Date: 29.DEC.2022 15:36:55

Band Edge, CH High



Date: 29.DEC.2022 15:41:06

***** END OF REPORT *****