**DEKRA Testing and Certification, S.A.U.**
Parque Tecnológico de Andalucía,
c/ Severo Ochoa nº 2 · 29590 Campanillas · Málaga · España
C.I.F. A29507456

ISED CABid: ES1909

Lab. Company Number: 4621A

Test Report No:
75163RRF.004A1

# Test Report
## USA FCC Part 15.247, 15.209
## CANADA RSS-247, RSS-Gen

| | |
|---|---|
| (*) Identification of item tested | Infotainment Head Unit |
| (*) Trademark | Marelli |
| (*) Model and /or type reference | HUAIDP20BY |
| Other identification of the product | HUAIDP20BY<br>HW version: PRS2.1<br>SW version: PI26.50 |
| (*) Features | Bluethooth, WLAN 5GHz Channel #149 |
| Applicant | Marelli Europe S.p.A.<br>Viale A. Borletti 61/63 – 20011 Corbetta (MI) - ITALY |
| Test method requested, standard | USA FCC Part 15.247 (10-1-21 Edition): Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz.<br>USA FCC Part 15.209 (10-1-21 Edition): Radiated emission limits; general requirements.<br>CANADA RSS-247 Issue 3 (February 2023).<br>CANADA RSS-Gen Issue 5 amendment 2 (February 2021).<br>Guidance for Performing Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid Systems Devices Operating Under Section 15.247 of the FCC Rules. 558074 D01 Meas Guidance v05r02 dated April 2, 2019.<br>ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices. |
| Summary | IN COMPLIANCE |
| Approved by (name / position & signature) | Antonio José Jurado<br>Industrial & Automotive<br>EMC Lab. Manager<br>80157242B ANTONIO JOSE JURADO (C:A29507456) Firmado digitalmente por 80157242B ANTONIO JOSE JURADO (C:A29507456) Fecha: 2024.04.05 14:11:50 +02'00' |
| Date of issue | 2024-04-05 |
| Report template No | FDT08_24<br>(*) "Data provided by the client" |

# Index

# Acronyms

| Acronym ID | Acronym Description |
|---|---|
| Avg COT | Average Channel Occupancy Time |
| BW | Bandwidth |
| Detector | Detector used |
| Ebw | Emission Bandwidth |
| Equipment | Equipment Type |
| Freq | Frequency |
| Freq Rng | Frequency Range |
| Freq Sep | Frequency Separation |
| Inband Peak Lvl | Inband Peak Level |
| Lvl | Level |
| MP | Measurement Point |
| Mod | Modulation |
| Mode | MIMO Mode |
| NHC | Number of Hopping Channels |
| NHp | Number of hops over the period |
| Occ Ch BW | Occupied Channel Bandwidth |
| Peak Power | Maximum Peak Conducted Output Power |
| Pol | Polarization |
| Port | Active Port |
| Unwanted Freq | Unwanted Emissions Frequency |
| Unwanted Lvl | Unwanted Emissions Level |

# Competences and guarantees

DEKRA Testing and Certification S.A.U. is a testing laboratory accredited by the National Accreditation Body (ENAC -Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

DEKRA Testing and Certification S.A.U. is an FCC-recognized accredited testing laboratory with appropriate scope of accreditation that covers the performed tests in this report.

DEKRA Testing and Certification S.A.U. is an ISED-recognized accredited testing laboratory, CABid: ES1909, Company Number: 4621A, with the appropriate scope of accreditation that covers the performed tests in this report.

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

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

DEKRA Testing and Certification S.A.U. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

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

# General conditions

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

# Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

The total uncertainty of the measurement system for the radiated emissions of EUT from 30 MHz to 1 GHz is: Measurement uncertainty ≤ ± 5,35 dB with factor (k = 2).

The total uncertainty of the measurement system for the radiated emissions of EUT from 1 GHz to 17 GHz is: Measurement uncertainty ≤ ± 4,32 dB with factor (k = 2).

The total uncertainty of the measurement system for the radiated emissions of EUT from 17 GHz to 26 GHz is: Measurement uncertainty ≤ ± 5,51 dB with factor (k = 2).

The total uncertainty of the measurement system for the conducted testing of EUT is:
RF Peak Output Power: Measurement uncertainty ≤ ± 0,80 dB
Accumulated Dwell Time: Measurement uncertainty ≤ ± 0,16 %
Minimum Frequency Occupation Time: Measurement uncertainty ≤ ± 0,53 %
Hopping Frequency Separation: Measurement uncertainty ≤ ± 1,74 %
Occupied Channel Bandwidth: Measurement uncertainty ≤ ± 1,24 %
Conducted Band-edge spurious emissions: Measurement uncertainty ≤ ± 1,76 dB

# Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").

2. The sample consists of an Infotainment Head Unit with Bluetooth and WiFi.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

# Usage of samples

Samples undergoing test have been selected by: The client.

| Id | Control Number | Description | Model | Serial Nº | Date of Reception | Application |
|---|---|---|---|---|---|---|
| S/01 | 75163_10.1 | Cable FAKRA | -- | -- | 2023-09-25 | Element Under Test |
| | 75163_11.1 | Cable FAKRA | -- | -- | 2023-09-25 | Element Under Test |
| | 75163_12.1 | Cable FAKRA | -- | -- | 2023-09-25 | Element Under Test |
| | 75163_13.1 | Cable FAKRA | -- | -- | 2023-09-25 | Element Under Test |
| | 75163_14.1 | Cable FAKRA | -- | -- | 2023-09-25 | Element Under Test |
| | 75163_16.1 | Infotainment Unit | HUAIDP20BY | 190S3B0PM47D | 2023-09-25 | Element Under Test |
| | 75163_3.1 | Harness | -- | -- | 2023-09-25 | Element Under Test |
| | 75163_5.1 | Cable FAKRA | -- | -- | 2023-09-25 | Element Under Test |
| | 75163_6.1 | Cable FAKRA | -- | -- | 2023-09-25 | Element Under Test |
| | 75163_8.1 | Cable FAKRA | -- | -- | 2023-09-25 | Element Under Test |
| | 75163_9.1 | Cable FAKRA | -- | -- | 2023-09-25 | Element Under Test |
| | 75163_1.1 | Module | -- | -- | 2023-09-25 | Auxiliary Element |
| | 75163_4.1 | AIDA CANBOX | -- | -- | 2023-09-25 | Auxiliary Element |
| S/02 | 75163_19.1 | Infoteinment module CONDUCTED | IVI-R2 HIGH ETH100M ROW | 190S3B0T047D | 2023-10-04 | Element Under Test |
| | 75163_17.1 | Canbox | AIDA | -- | 2023-10-04 | Auxiliary Element |
| | 75163_23.1 | Harness | -- | -- | 2023-10-04 | Auxiliary Element |
| | 75163_24.1 | USB- FAKRA cable | -- | -- | 2023-10-04 | Auxiliary Element |

Notes referenced to samples during the project:

| Id | Type |
|---|---|
| S/01 | Radiated |
| S/02 | Conducted |

# Test sample description

<table>
<tr><td rowspan="7">Ports…… :</td><td rowspan="2">Port name and description</td><td colspan="4">Cable</td></tr>
<tr><td>Specified max length [m]</td><td>Attached during test</td><td>Shielded</td><td>Coupled to patient(3)</td></tr>
<tr><td>MB connector (black)</td><td>>3</td><td>[X]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>SB connector (blue)</td><td>>3</td><td>[X]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>shielded cables</td><td>>3</td><td>[X]</td><td>[X]</td><td>[ ]</td></tr>
<tr><td>.....</td><td>.....</td><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>.....</td><td>.....</td><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>.....</td><td>.....</td><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>Supplementary information to the ports…… :</td><td colspan="5">.....</td></tr>
<tr><td rowspan="5">Rated power supply .....:</td><td colspan="2" rowspan="2">Voltage and Frequency</td><td colspan="5">Reference poles</td></tr>
<tr><td>L1</td><td>L2</td><td>L3</td><td>N</td><td>PE</td></tr>
<tr><td>[ ]</td><td>AC: .....</td><td>[ ]</td><td>[ ]</td><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>[ ]</td><td>AC: .....</td><td>[ ]</td><td>[ ]</td><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>[X]</td><td colspan="5">DC: MB and SB: 9.5 – 16Vdc; Nominal voltage: 12 Vdc</td></tr>
<tr><td></td><td>[X]</td><td colspan="5">DC: shielded cables: 13.5Vdc nominal voltage</td></tr>
<tr><td>Rated Power .....:</td><td colspan="6">.....</td></tr>
<tr><td>Clock frequencies.....:</td><td colspan="6">.....</td></tr>
<tr><td>Other parameters.....:</td><td colspan="6">.....</td></tr>
<tr><td>Software version .....:</td><td colspan="6">PI26.50</td></tr>
<tr><td>Hardware version.....:</td><td colspan="6">PRS2.1</td></tr>
<tr><td>Dimensions in cm (W x H x D) ....:</td><td colspan="6">220 x 160 x 52 mm</td></tr>
<tr><td rowspan="5">Mounting position.....:</td><td>[ ]</td><td colspan="5">Table top equipment</td></tr>
<tr><td>[ ]</td><td colspan="5">Wall/Ceiling mounted equipment</td></tr>
<tr><td>[ ]</td><td colspan="5">Floor standing equipment</td></tr>
<tr><td>[ ]</td><td colspan="5">Hand-held equipment</td></tr>
<tr><td>[X]</td><td colspan="5">Other: HUAIDP20BY is installed in vehicle dashboard (automotive environment)</td></tr>
</table>

| | | | |
|---|---|---|---|
| Modules/parts.....: | Module/parts of test item | Type | Manufacturer |
| | ..... | ..... | ..... |
| | ..... | ..... | ..... |
| | ..... | ..... | ..... |
| | ..... | ..... | ..... |
| Accessories (not part of the test item) .....: | Description | Type | Manufacturer |
| | ..... | ..... | ..... |
| | ..... | ..... | ..... |
| | ..... | ..... | ..... |
| | ..... | ..... | ..... |
| | ..... | ..... | ..... |
| | ..... | ..... | ..... |
| Documents as provided by the applicant.....: | Description | File name | Issue date |
| | ..... | ..... | ..... |
| | ..... | ..... | ..... |
| | ..... | ..... | ..... |
| | ..... | ..... | ..... |

(3) Only for Medical Equipment

# Identification of the client

Marelli Europe S.p.A.
Viale A. Borletti 61/63 – 20011 Corbetta (MI) - ITALY

# Testing period and place

| | |
|---|---|
| **Test Location** | DEKRA Testing and Certification S.A.U. |
| **Date (start)** | 2023-09-28 |
| **Date (finish)** | 2024-01-08 |

# Document history

| Report number | Date | Description |
|---|---|---|
| 75163RRF.004 | 2024-01-29 | First release. |
| 75163RRF.004A1 | 2024-04-05 | First modification.<br>Some typos in the “e.i.r.p.” values are corrected on page 71.<br>A clarification is included for justifying the selected channels/modes for the [RSE] Emission limitations radiated test on pages 101, 115 and 129.<br>Some typos in the main page, apartment “Test method requested, standard” are corrected. The standard “CANADA RSS-247 Issue 2 (February 2017)” is corrected to “CANADA RSS-247 Issue 3 (February 2023)”.<br>This report cancels and replaces the previous 75163RRF.004. |

# Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

| | |
|---|---|
| **Temperature** | Min. = 15 ºC<br>Max. = 35 ºC |
| **Relative humidity** | Min. = 20 %<br>Max. = 75 % |

In the semianechoic chamber, the following limits were not exceeded during the test.

| | |
|---|---|
| **Temperature** | Min. = 15 ºC<br>Max. = 35 ºC |
| **Relative humidity** | Min. = 20 %<br>Max. = 75 % |

In the chamber for conducted measurements, the following limits were not exceeded during the test:

| | |
|---|---|
| **Temperature** | Min. = 15 ºC<br>Max. = 35 ºC |
| **Relative humidity** | Min. = 20 %<br>Max. = 75 % |

## Remarks and comments

The tests have been performed by the technical personnel: Jia Hao Luo Chen, Rubén Mora Fernández and Victoria Olmedo Villalba.

Used instrumentation:

| Control No. | Equipment | Model | Manufacturer | Next Calibration |
|---|---|---|---|---|
| 05862 | EMI TEST RECEIVER 9kHz-7GHz | ESR7 | ROHDE AND SCHWARZ | 2025-02-15 |
| 07040 | EXTENSION FOR OPEN SWITCH UNIT UP TO 40GHz | OSP-B157Wx | Rohde&Schwarz | 2025-04-19 |
| 07763 | HORN ANTENNA 1-18GHz | BBHA 9120D | SCHWARZBECK MESS-ELEKTRONIK | 2026-01-16 |
| 06495 | HORN ANTENNA 18-40GHz | BBHA 9170 | SCHWARZBECK | 2024-03-19 |
| 09968 | HYBRID BILOG ANTENNA 30MHz-6GHz | 3142E | ETS LINDGREN | 2026-09-22 |
| 07862 | PRE-AMPLIFIER G>30dB 18-40GHz | BLMA 1840-3G | BONN ELEKTRONIK | 2024-03-14 |
| 07769 | PREAMPLIFIER 30dB 500MHz-18GHz | BBV 9718 C | SCHWARZBECK | 2024-02-15 |
| 07039 | Rohde&Schwarz | OSP-B157W8 | ROHDE & SCHWARZ | 2025-05-25 |
| 08130 | SEMIANECHOIC ABSORBER LINED CHAMBER | P29419 | ALBATROSS | -- |
| 08134 | SHIELDED ROOM | P29419 | ALBATROSS PROJECTS GMBH | -- |
| 08661 | SHIELDED ROOM | - | SIEPEL | -- |
| 06668 | SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz | FSV40 | ROHDE AND SCHWARZ | 2024-12-14 |
| 08835 | SIGNAL AND SPECTRUM ANALYZER 2Hz-50GHz | FSW50 | ROHDE AND SCHWARZ | 2025-02-08 |
| 04848 | SOFTWARE FOR EMC/RF TESTING | EMC32 | ROHDE AND SCHWARZ | -- |
| 07549 | TEMPERATURE AND HUMIDITY PROBE | HWg-STE | HW GROUP | 2024-05-02 |
| 07550 | TEMPERATURE AND HUMIDITY PROBE | HWg-STE | HW GROUP | 2024-05-02 |

| Control No. | Equipment | Model | Manufacturer | Next Calibration |
|---|---|---|---|---|
| 07552 | TEMPERATURE AND HUMIDITY PROBE | HWg-STE | HW GROUP | 2024-05-02 |
| 07798 | WMS32 | WMS32 | ROHDE AND SCHWARZ | -- |

# Testing verdicts

| | |
|---|---|
| Fail | F |
| Inconclusive | I |
| Not applicable | N/A |
| Not measured | N/M |
| Pass | P |

# Summary

## Bluetooth EDR

| Requirement – Test case | FCC PART 15 PARAGRAPH / RSS-247 | Verdict | Remark |
|---|---|---|---|
| FCC 15.247 (a) (1) / RSS-247 5.1 (b) | 20 dB Bandwidth | P | -- |
| FCC 15.247 (a) (1) (iii) / RSS-247 5.1 (d) | Time of Occupancy (Dwell Time) | P | -- |
| FCC 15.247 (b) / RSS-247 5.4. (b) | Maximum peak output power and | P | -- |
| FCC 15.247 (a) (1) (iii) / RSS-247 5.1 (d)] | Number of hopping channels | P | -- |
| FCC 15.247 (d) / RSS-247 5.5 | Band-edge emissions compliance | P | -- |
| FCC 15.247 (d) / RSS-247 5.5 | Emission limitations radiated (Transmitter) | P | -- |
| Supplementary information and remarks:<br>None | | | |

# **Appendix A:** Test results. Bluetooth EDR

# INDEX

# TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

| | |
|---|---|
| Vnominal: | 12Vdc |
| Type of Power Supply: | External power supply (DC) |

ANTENNA (*):

| | |
|---|---|
| Type of Antenna: | Integral |
| Maximum Declared Antenna Gain: | 0dBi |

TEST FREQUENCIES (*):

| Modulation | Data rates | Low Channel: | Middle Channel | High Channel |
|---|---|---|---|---|
| BTEDR GFSK | 1-DH5 | 2402 MHz | 2441 MHz | 2480 MHz |
| BTEDR PI/4 DQPSK | 2-DH5 | 2402 MHz | 2441 MHz | 2480 MHz |
| BTEDR 8DPSK | 3-DH5 | 2402 MHz | 2441 MHz | 2480 MHz |

During transmitter test the EUT was controlled by a SW tool provided by the client to operate in a continuous transmit mode on the modulation schemes and test channels as required.

CONDUCTED MEASUREMENTS:

The equipment under test was set up in a shielded room and it is connected to the TS8997 using a low loss RF cable. The reading of the spectrum analyser is corrected taking into account the cable loss.


RADIATED MEASUREMENTS:

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Bilog antenna for the range between 30 MHz to 1000 MHz and 1 GHz-17 GHz Double ridge horn antenna) is situated at a distance of 3 m and at a distance of 1.5 m for the frequency range 17 GHz-26 GHz (17 GHz-40 GHz horn antenna).

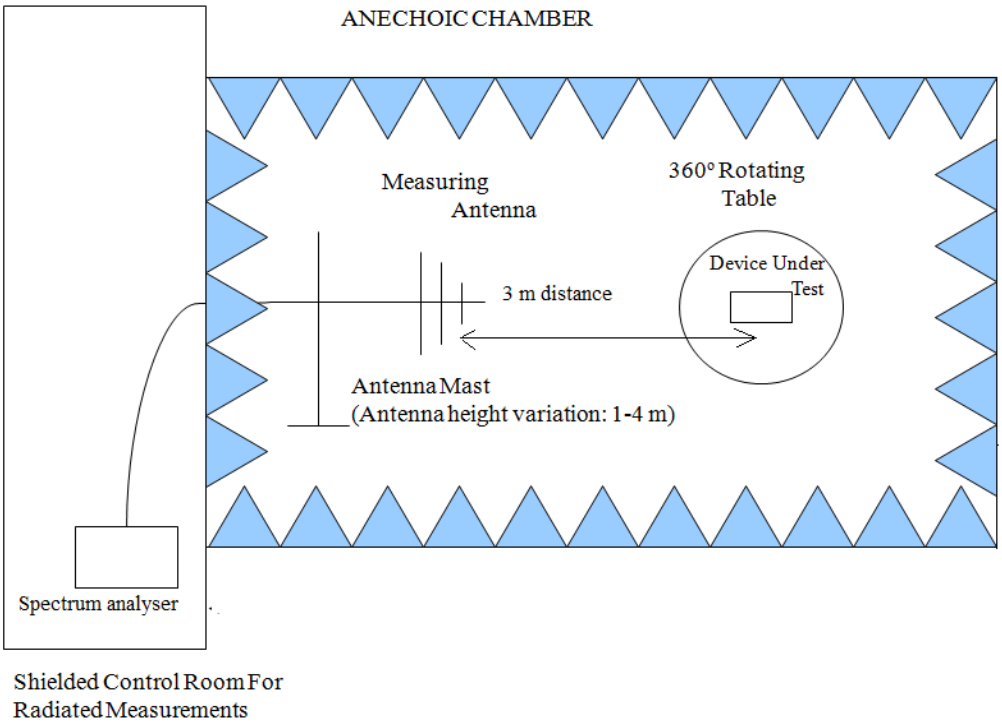
For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height (Bilog antenna and Double ridge horn antenna) was varied from 1 to 4 meters to find the maximum radiated emission.

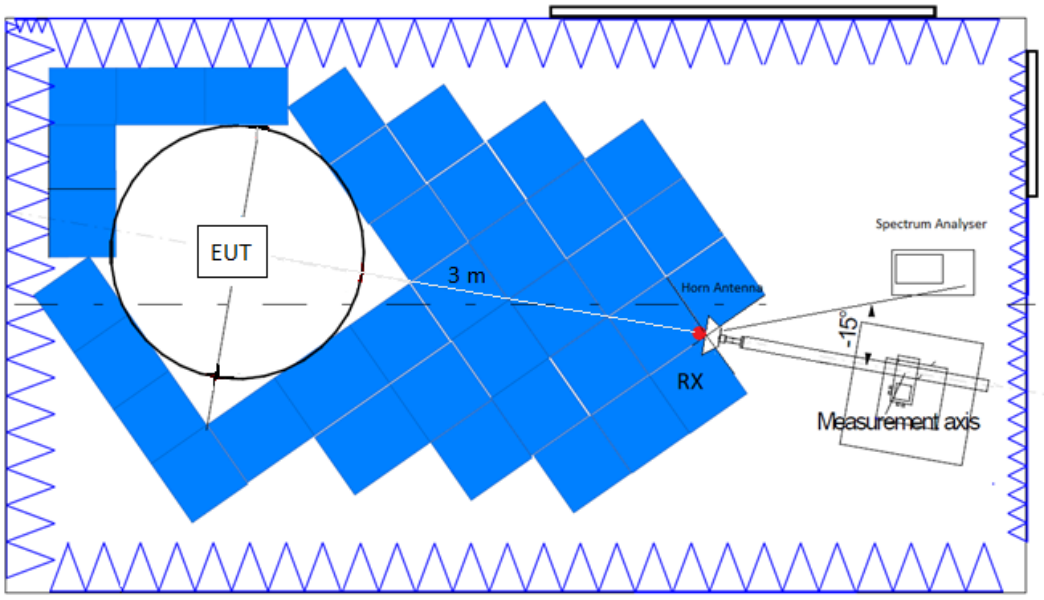
Measurements were made in both horizontal and vertical planes of polarization.

A resolution bandwidth/video bandwidth of 100 kHz / 300 kHz was used for frequencies below 1 GHz and 1 MHz / 3 MHz for frequencies above 1 GHz.

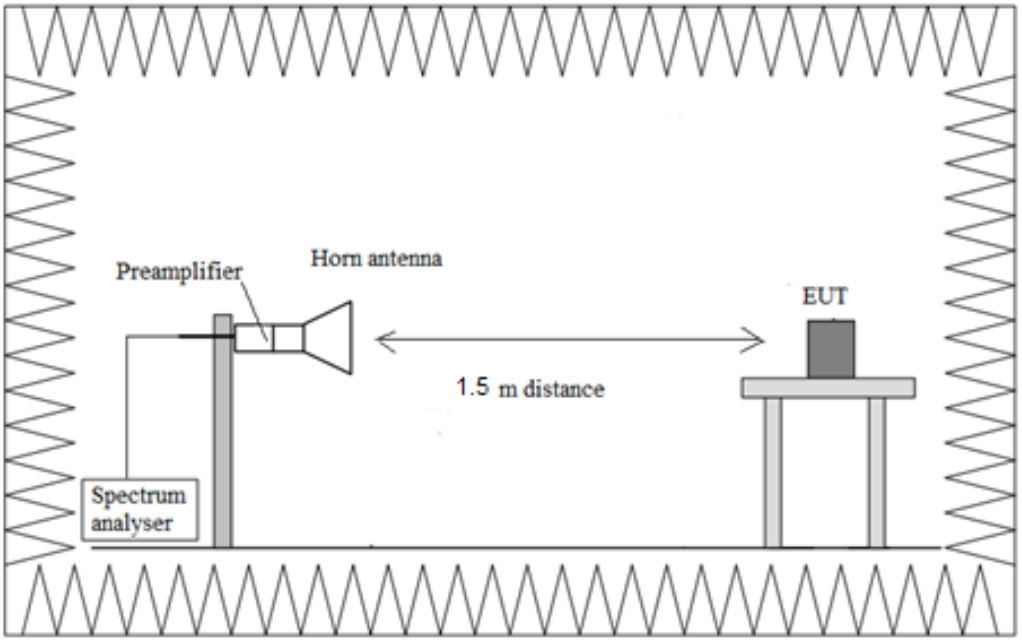
Radiated measurements setup from 30 MHz to 1 GHz:




Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup f > 17 GHz:



# TEST CASES DETAILS

## 99dBw Occupied Channel Bandwidth 99%

Modulation: BT (GFSK 1-DH5)

***Results***

| Equipment | BW (MHz) | Freq (MHz) | Port | Occ Ch BW (MHz) |
|---|---|---|---|---|
| Frequency Hopping Spread Spectrum systems (DSS) | 1 | 2402.00000 | 1 | 0.860 |
| | | 2441.00000 | | 0.865 |
| | | 2480.00000 | | 0.860 |

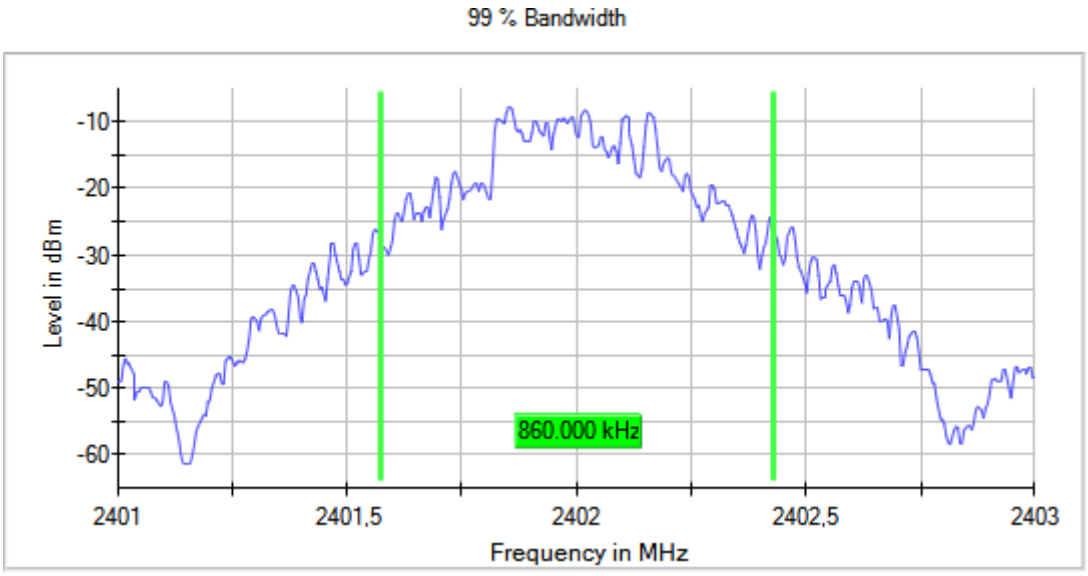
***Verdict***

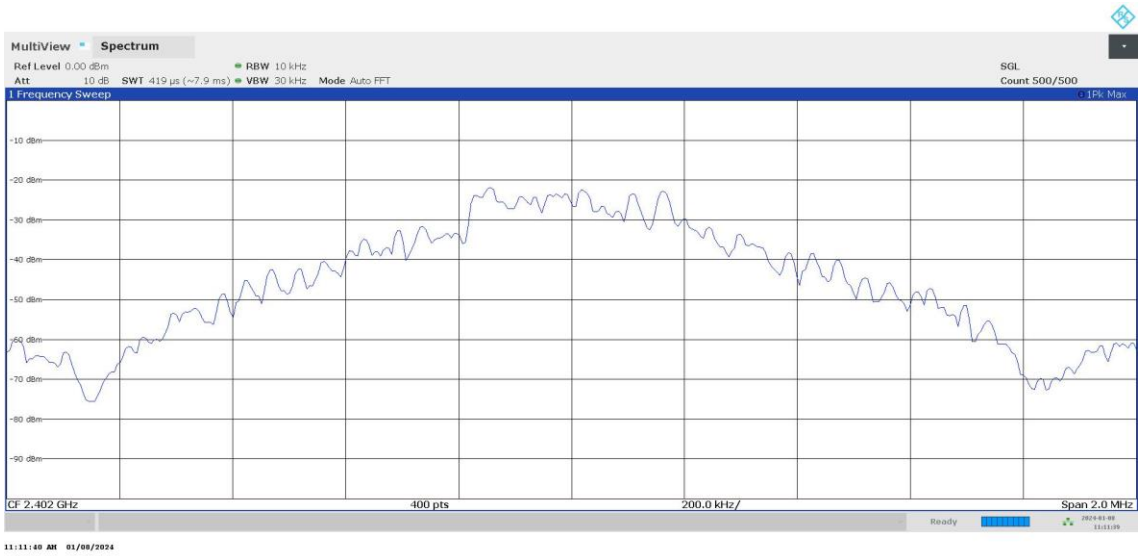
Pass

### *Attachments*

Modulation = BT (GFSK 1-DH5) Frequency MHz = 2402.00000

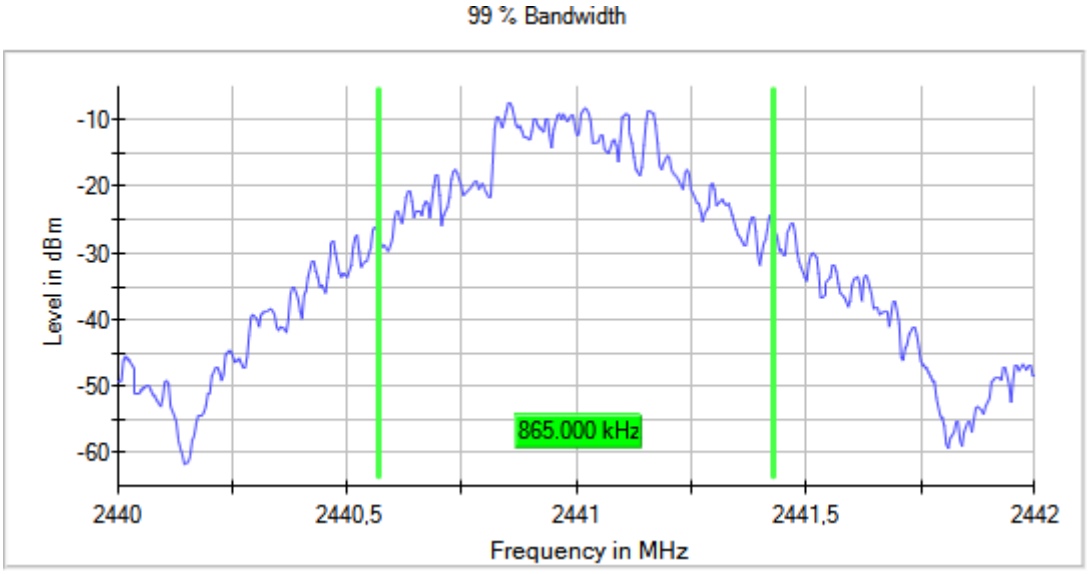
**Images:**

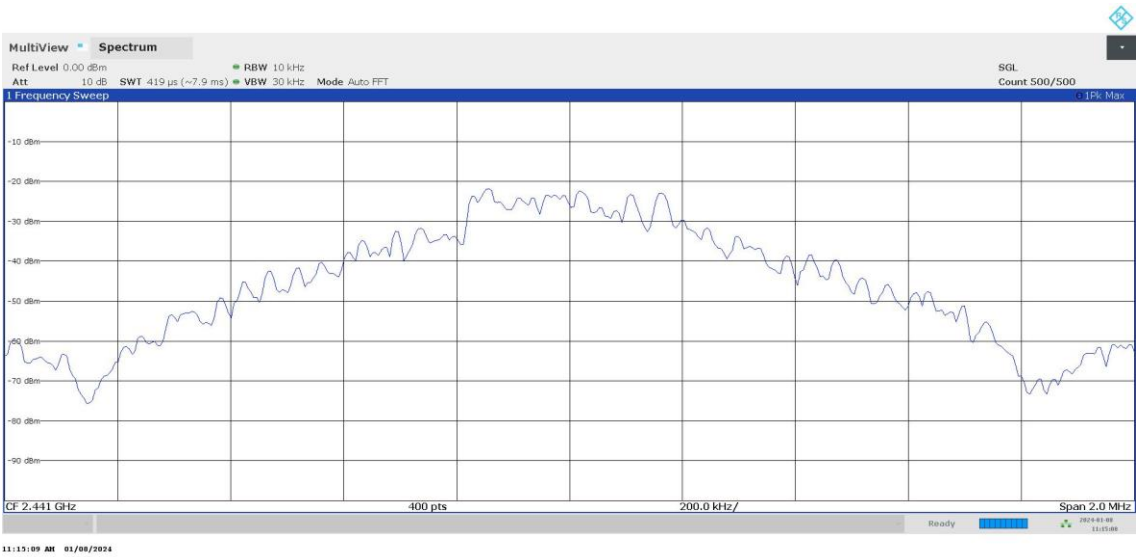


Modulation = BT (GFSK 1-DH5) Frequency MHz = 2441.00000

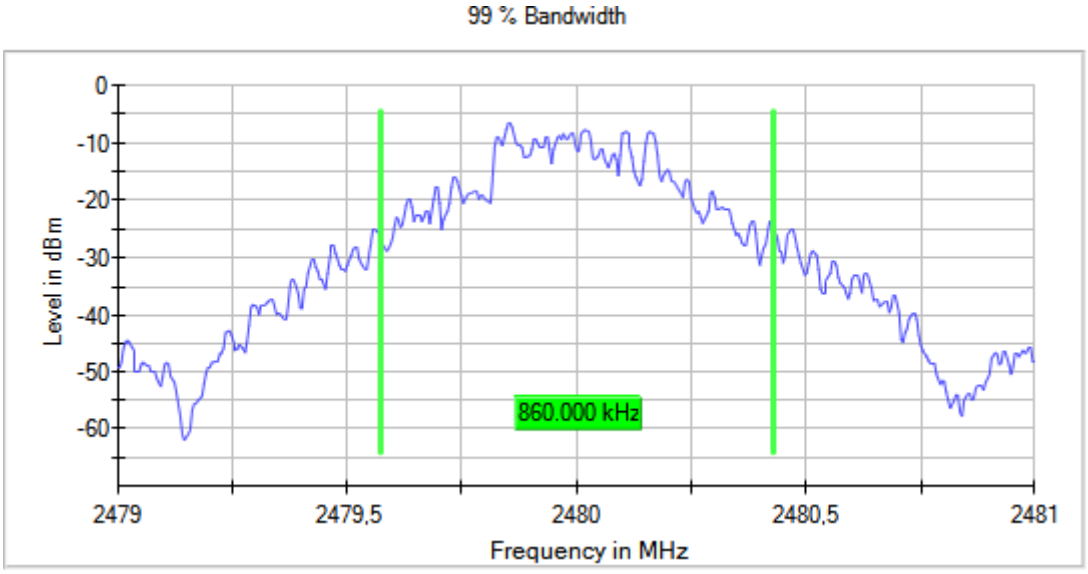
**Images:**

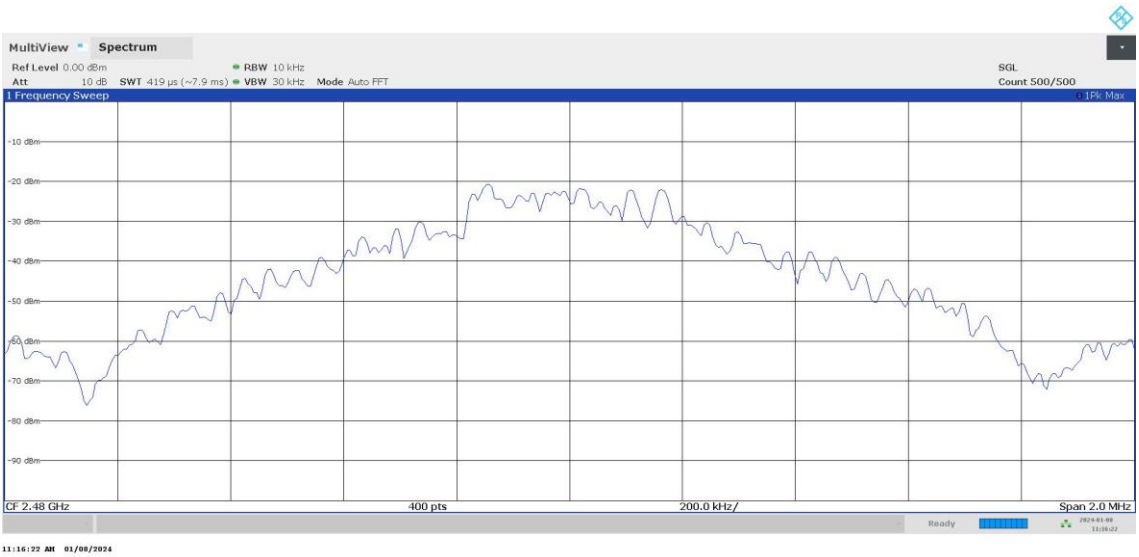


Modulation = BT (GFSK 1-DH5) Frequency MHz = 2480.00000

**Images:**



Modulation: BT (Pi/4 DQPSK 2-DH5)

***Results***

| Equipment | BW (MHz) | Freq (MHz) | Port | Occ Ch BW (MHz) |
|---|---|---|---|---|
| Frequency Hopping Spread Spectrum systems (DSS) | 1 | 2402.00000 | 1 | 1.140 |
| | | 2441.00000 | | 1.140 |
| | | 2480.00000 | | 1.135 |

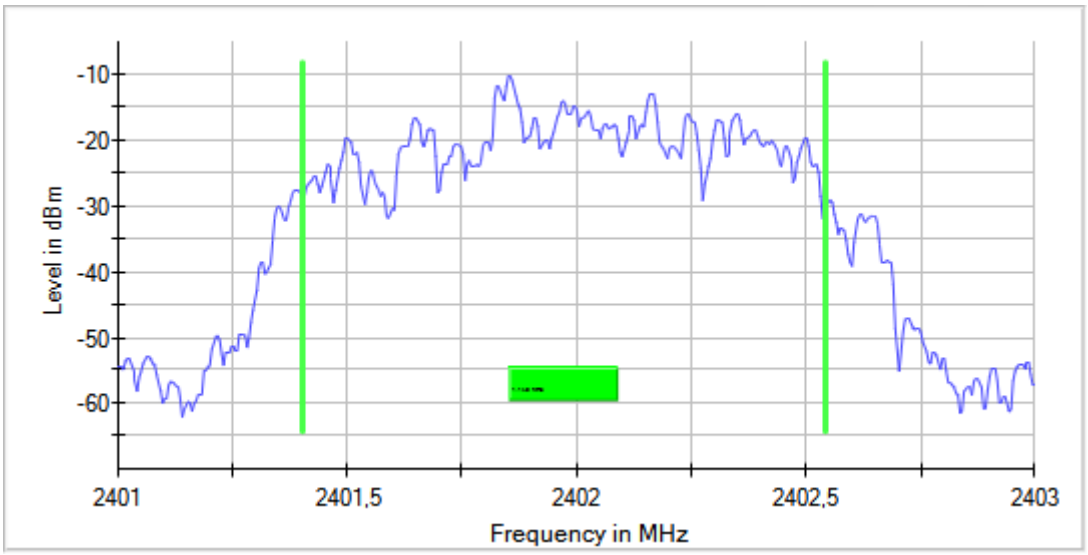
***Verdict***

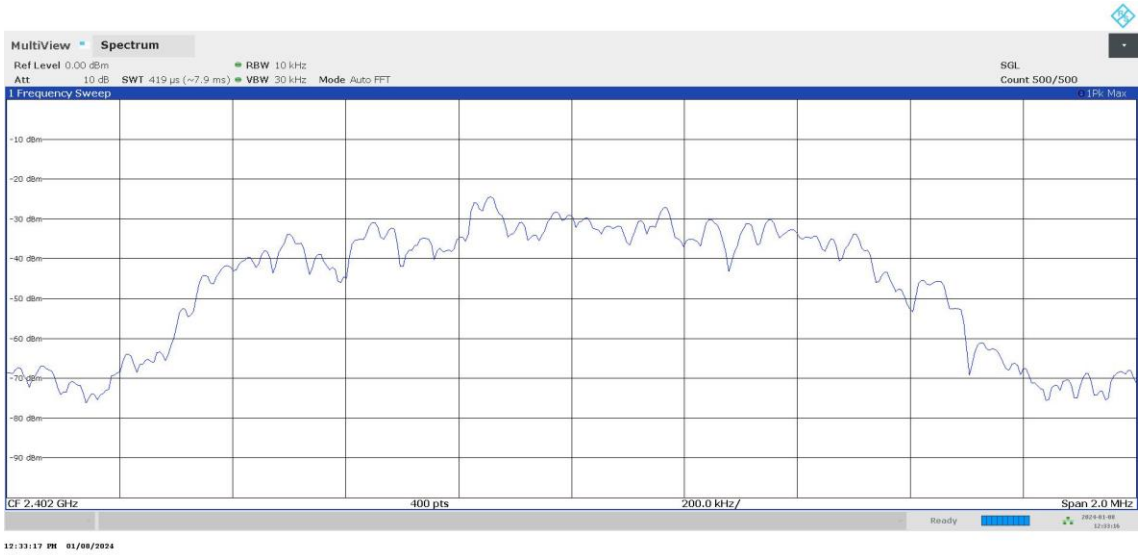
Pass

### *Attachments*

Modulation = BT (Pi/4 DQPSK 2-DH5) Frequency MHz = 2402.00000

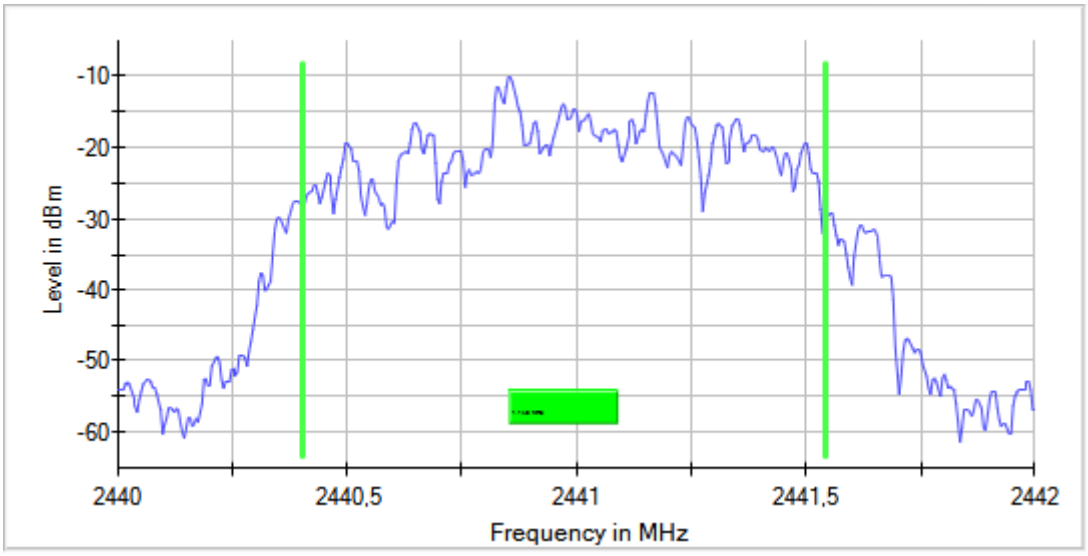
**Images:**

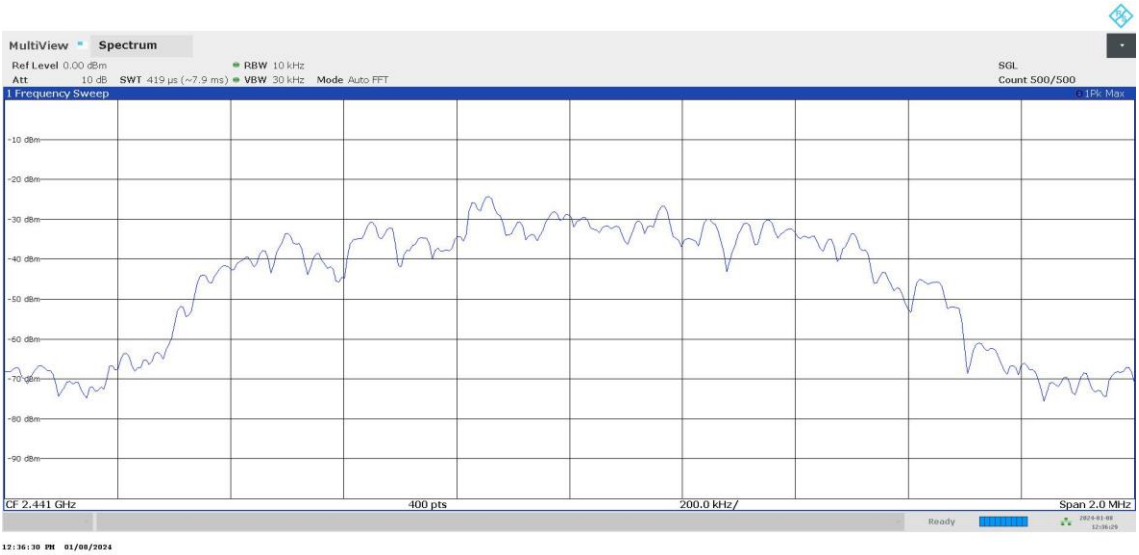


Modulation = BT (Pi/4 DQPSK 2-DH5) Frequency MHz = 2441.00000

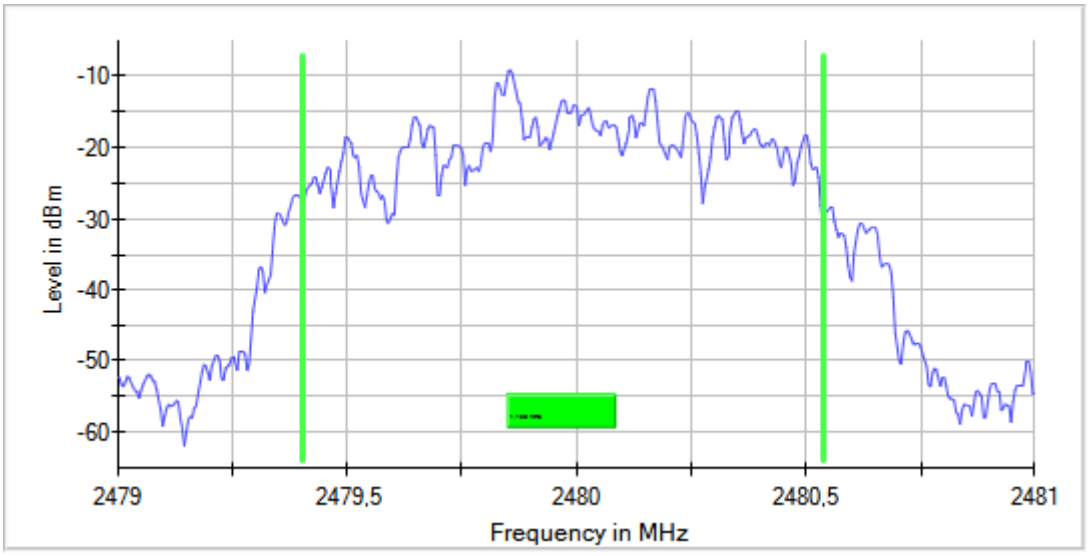
**Images:**

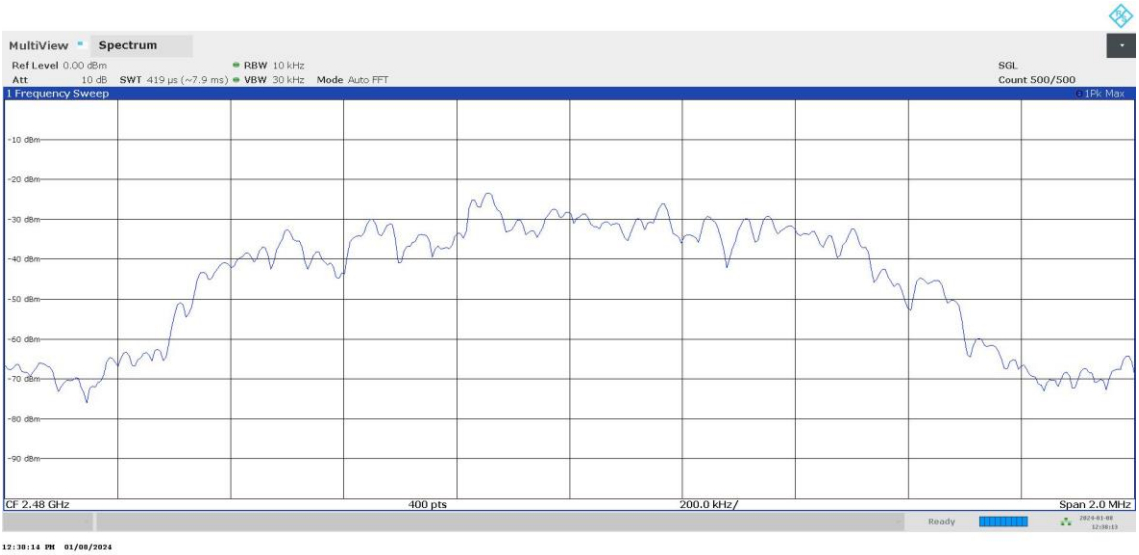


Modulation = BT (Pi/4 DQPSK 2-DH5) Frequency MHz = 2480.00000

**Images:**



Modulation: BT (8DPSK 3-DH5)

***Results***

| Equipment | BW (MHz) | Freq (MHz) | Port | Occ Ch BW (MHz) |
|---|---|---|---|---|
| Frequency Hopping Spread Spectrum systems (DSS) | 1 | 2402.00000 | 1 | 1.125 |
| | | 2441.00000 | | 1.130 |
| | | 2480.00000 | | 1.130 |

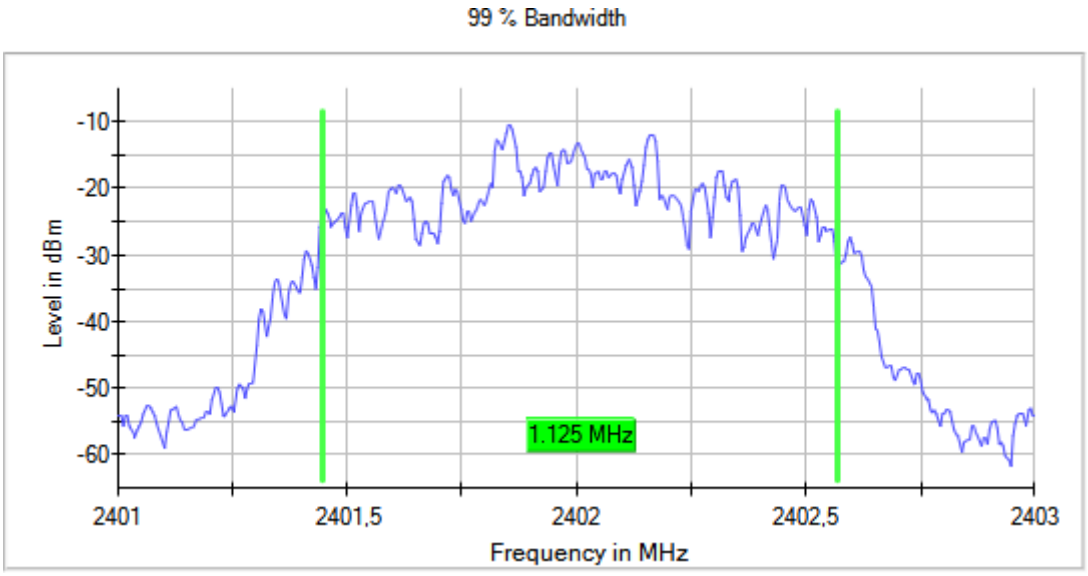
***Verdict***

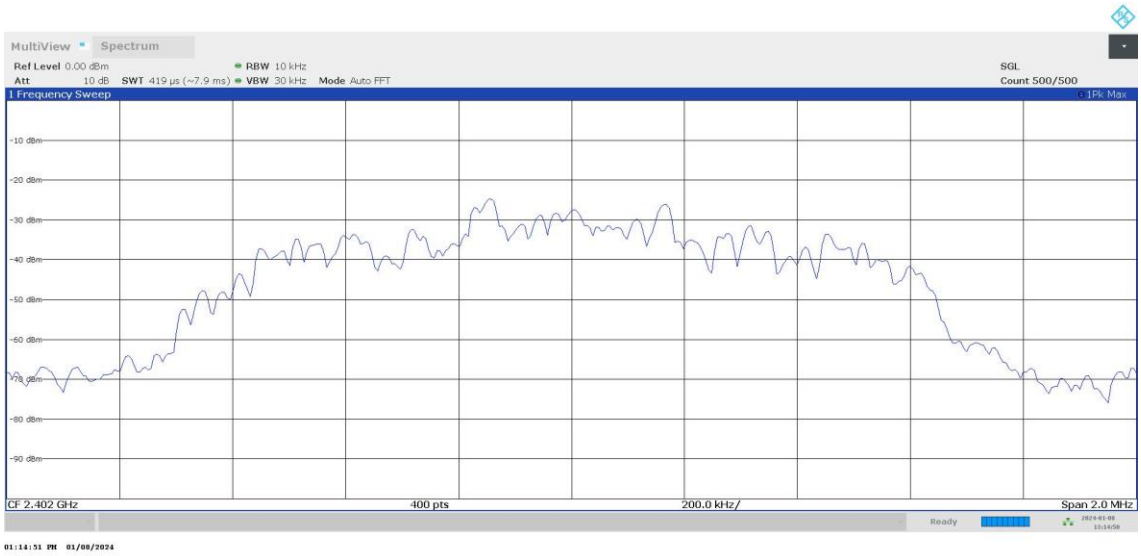
Pass

### *Attachments*

Modulation = BT (8DPSK 3-DH5) Frequency MHz = 2402.00000

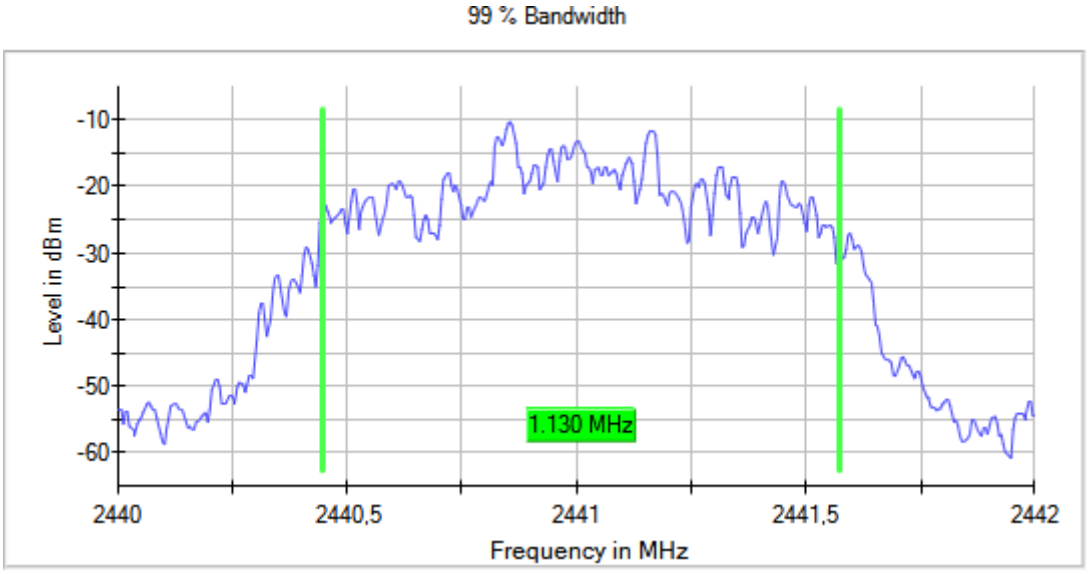
**Images:**

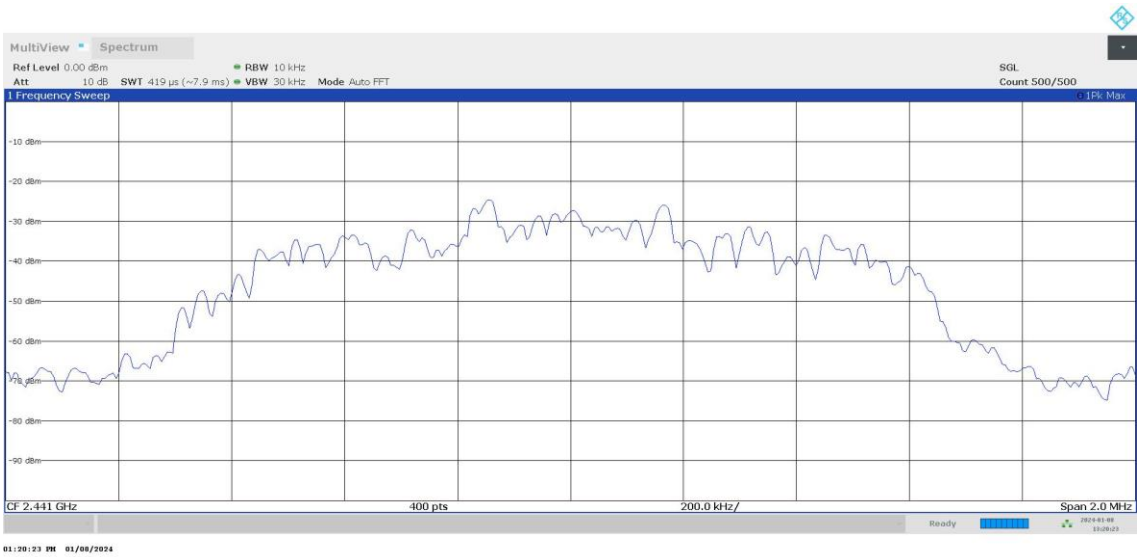


Modulation = BT (8DPSK 3-DH5) Frequency MHz = 2441.00000

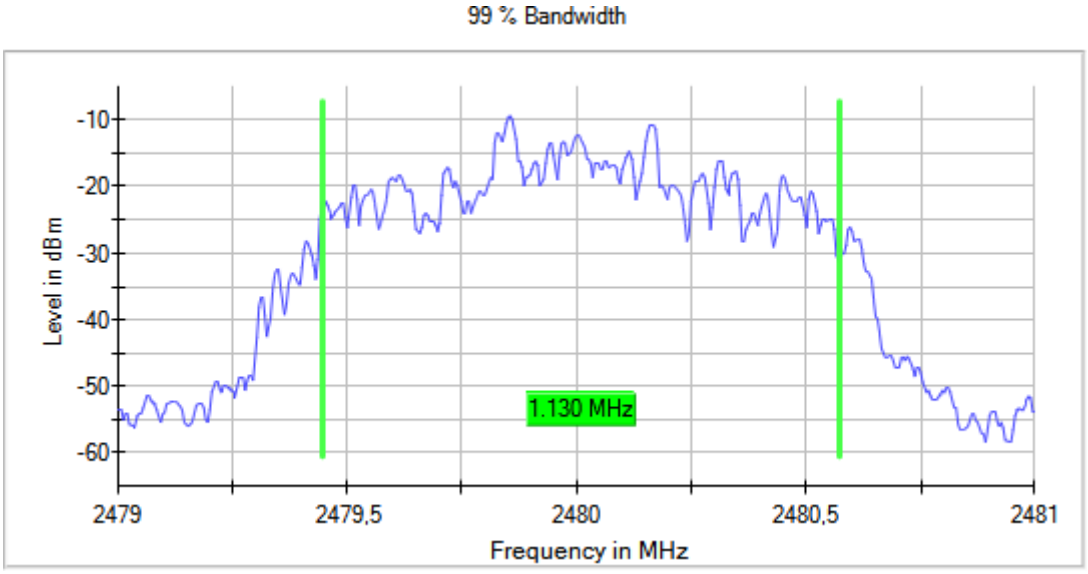
**Images:**

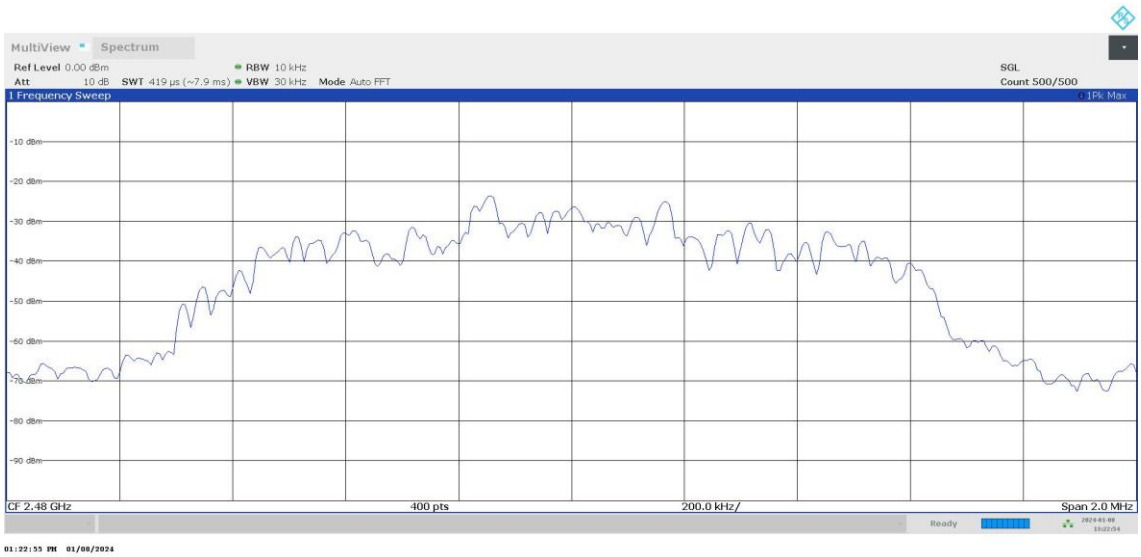


Modulation = BT (8DPSK 3-DH5) Frequency MHz = 2480.00000

**Images:**



# RSS-247 5.1 (b) / FCC 15.247 (a) (1) [20dBW] 20 dB Bandwidth

***Limits***

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.

Modulation: BT (GFSK 1-DH5)

***Results***

| Equipment | BW (MHz) | Freq (MHz) | Port | Ebw (MHz) |
|---|---|---|---|---|
| Frequency Hopping Spread Spectrum systems (DSS) | 1 | 2402.00000 | 1 | 0.930 |
| | | 2441.00000 | | 0.970 |
| | | 2480.00000 | | 0.930 |

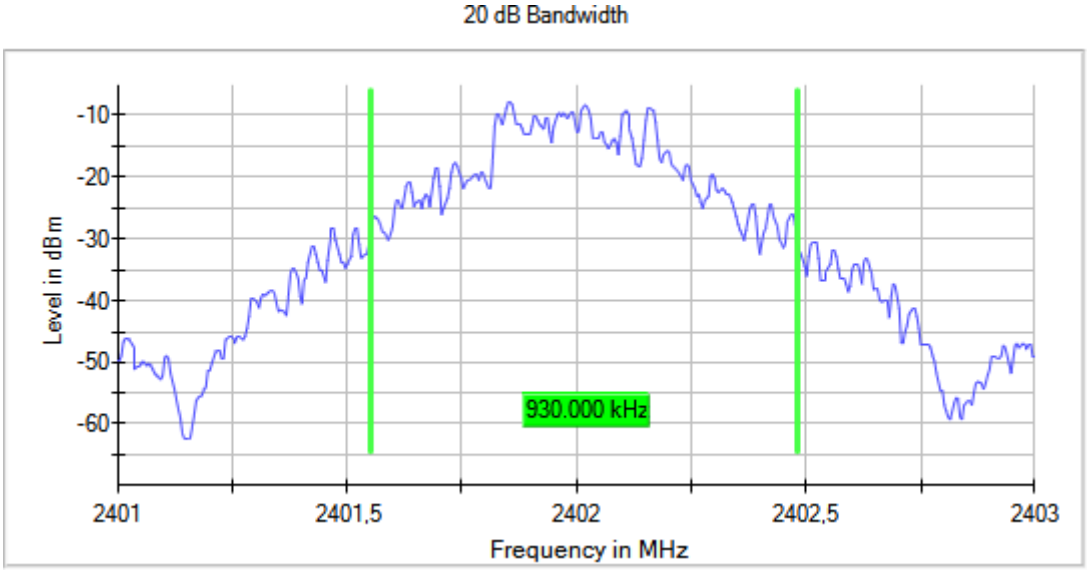
***Verdict***

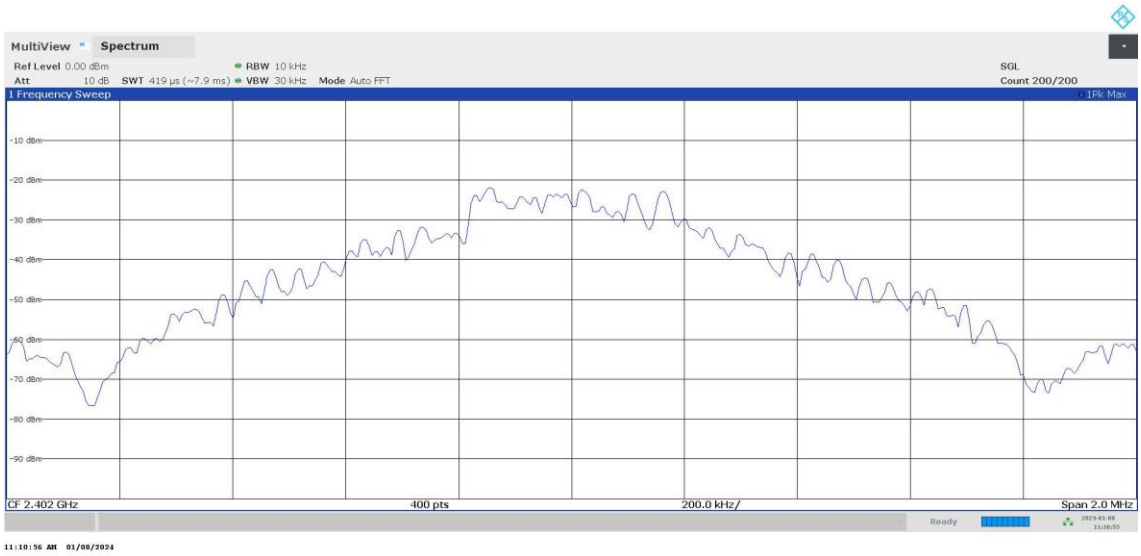
Pass

### *Attachments*

Modulation = BT (GFSK 1-DH5) Frequency MHz = 2402.00000

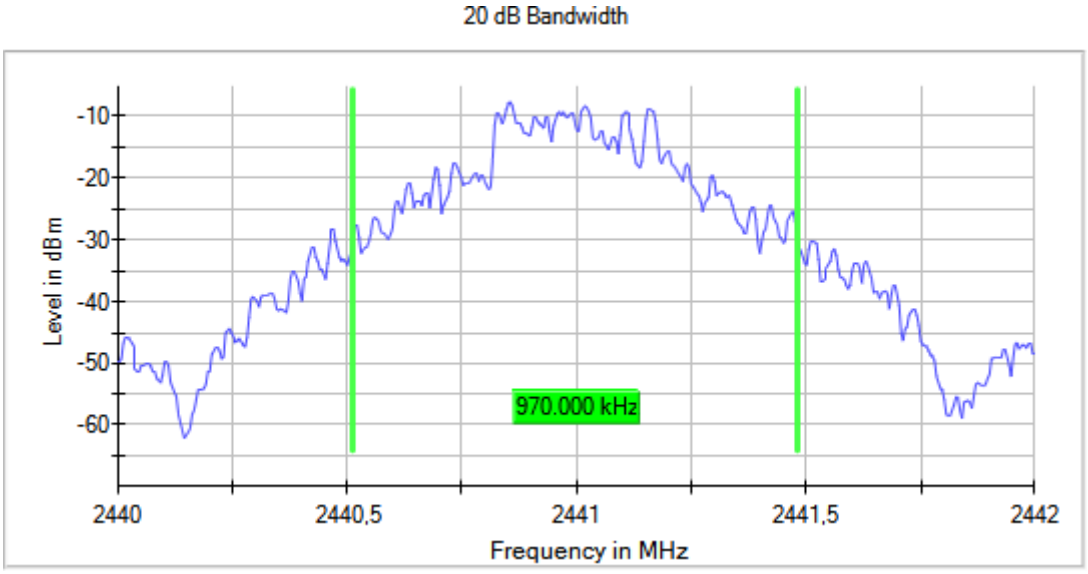
**Images:**

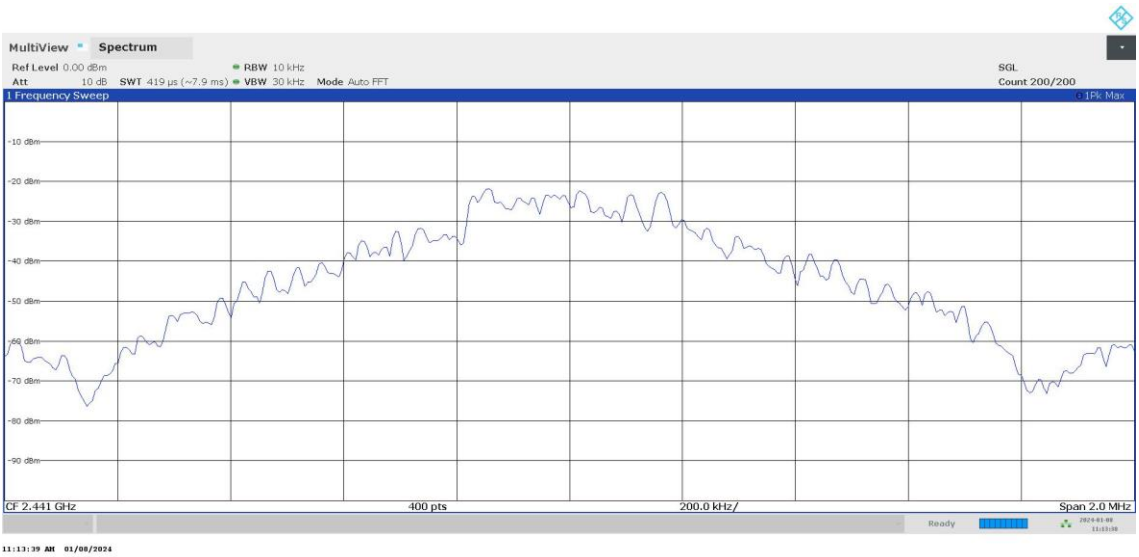


Modulation = BT (GFSK 1-DH5) Frequency MHz = 2441.00000

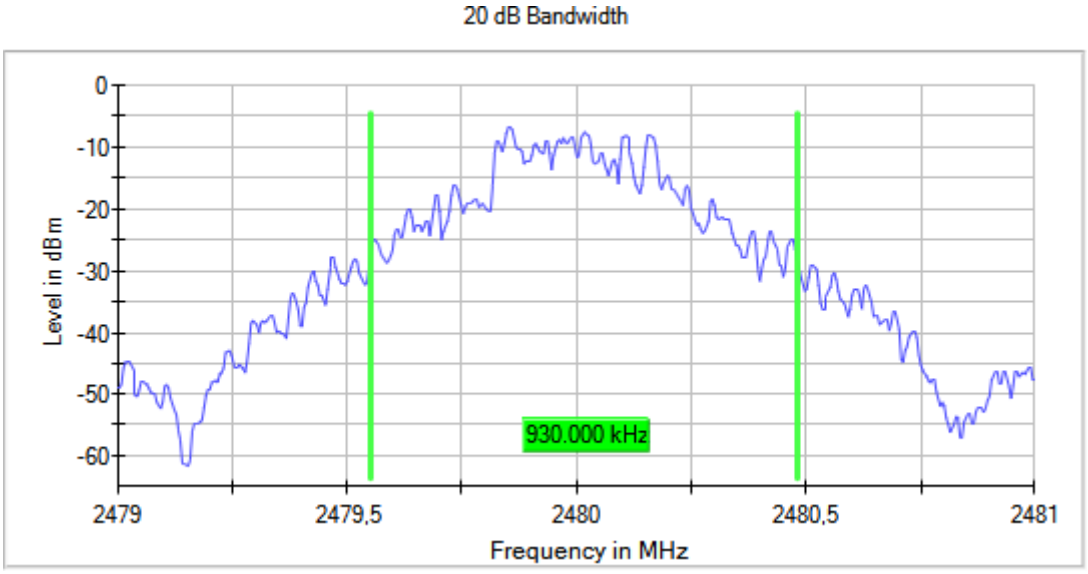
**Images:**

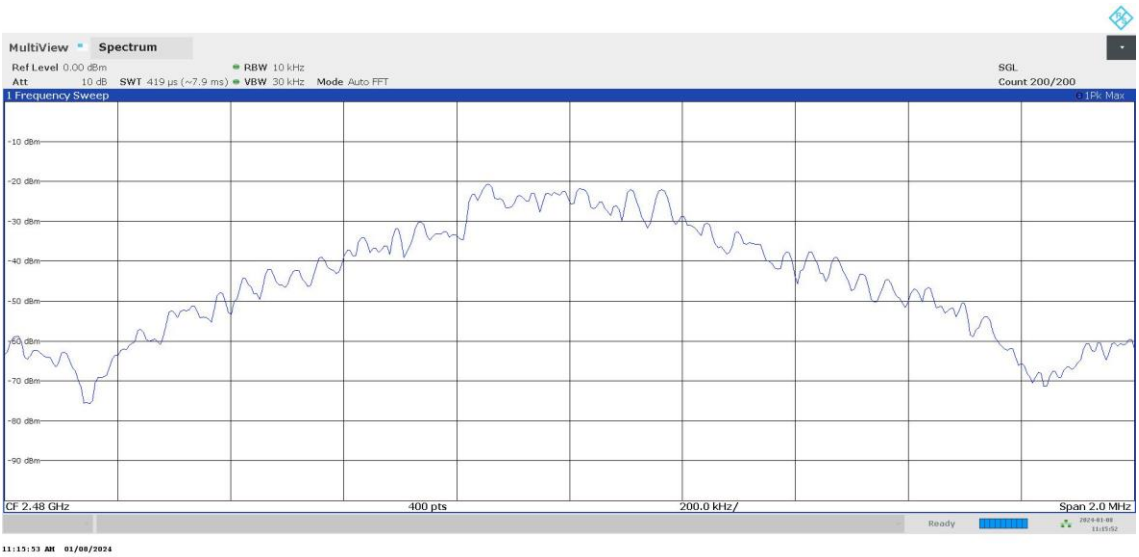


Modulation = BT (GFSK 1-DH5) Frequency MHz = 2480.00000

**Images:**



Modulation: BT (Pi/4 DQPSK 2-DH5)

***Results***

| Equipment | BW (MHz) | Freq (MHz) | Port | Ebw (MHz) |
|---|---|---|---|---|
| Frequency Hopping Spread Spectrum systems (DSS) | 1 | 2402.00000 | 1 | 1.215 |
| | | 2441.00000 | | 1.220 |
| | | 2480.00000 | | 1.215 |

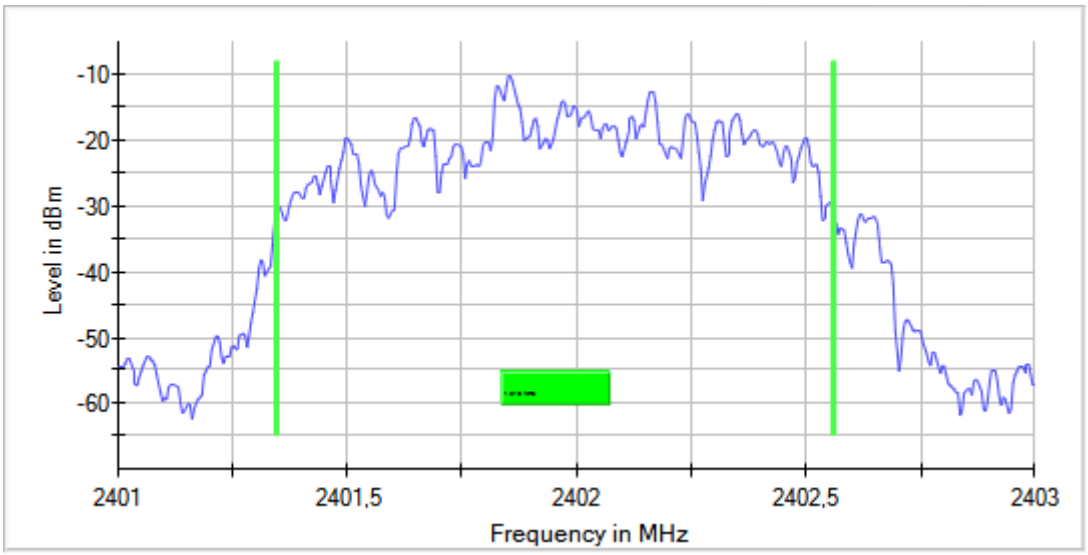
***Verdict***

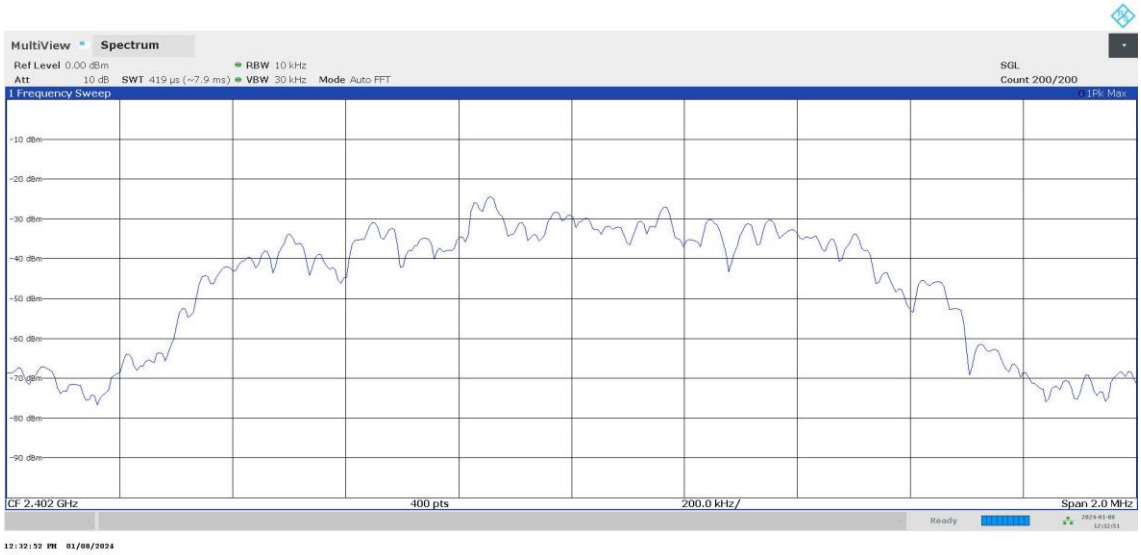
Pass

### *Attachments*

Modulation = BT (Pi/4 DQPSK 2-DH5) Frequency MHz = 2402.00000

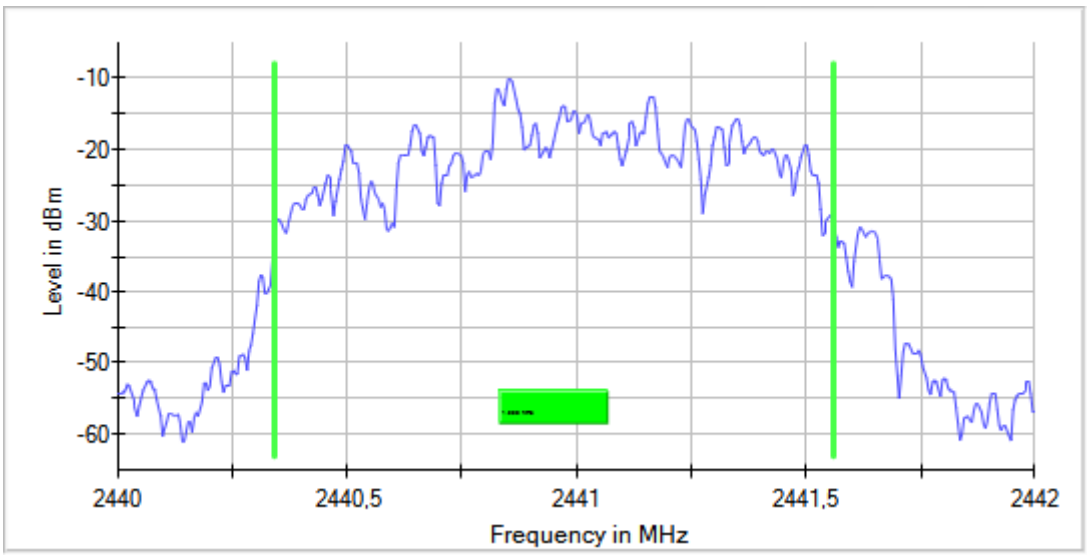
**Images:**

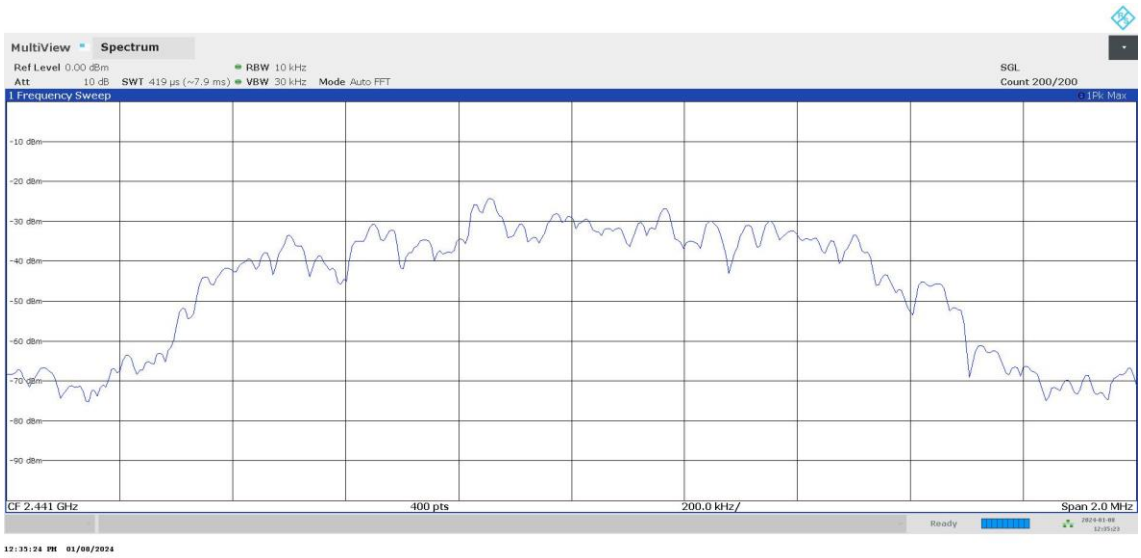


Modulation = BT (Pi/4 DQPSK 2-DH5) Frequency MHz = 2441.00000

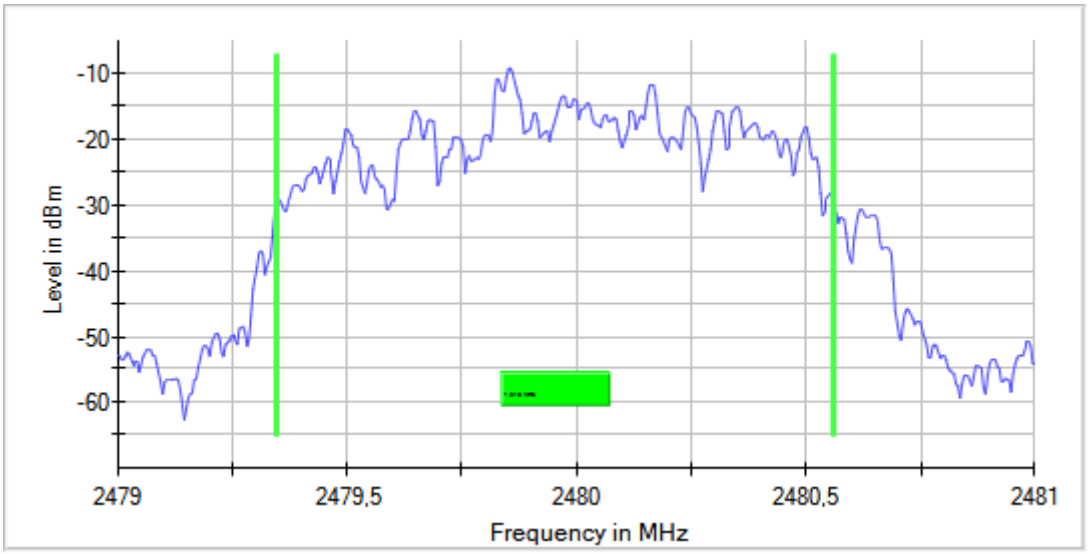
**Images:**

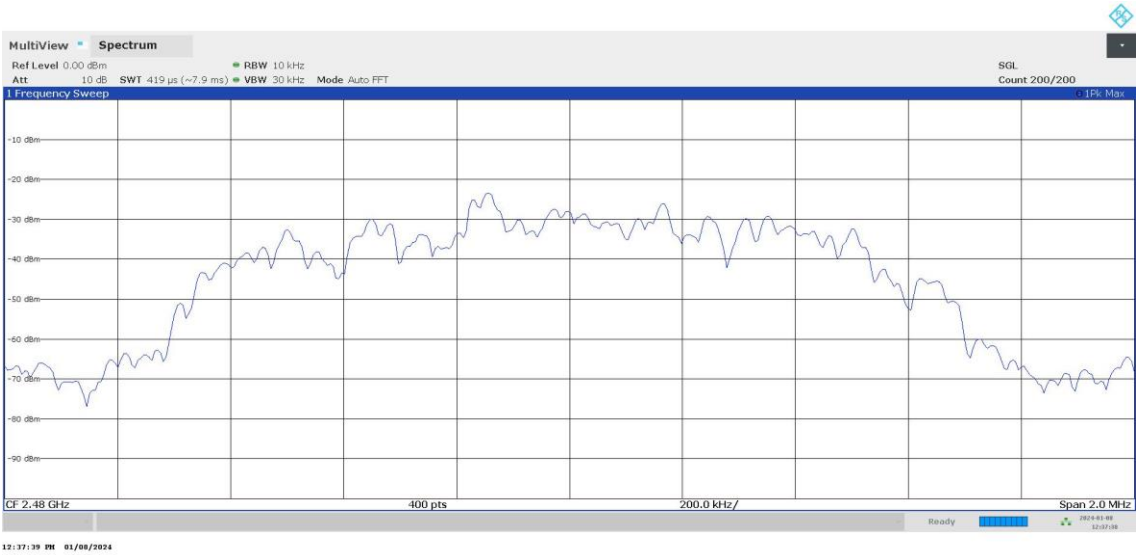


Modulation = BT (Pi/4 DQPSK 2-DH5) Frequency MHz = 2480.00000

**Images:**



Modulation: BT (8DPSK 3-DH5)

***Results***

| Equipment | BW (MHz) | Freq (MHz) | Port | Ebw (MHz) |
|---|---|---|---|---|
| Frequency Hopping Spread Spectrum systems (DSS) | 1 | 2402.00000 | 1 | 1.220 |
| | | 2441.00000 | | 1.220 |
| | | 2480.00000 | | 1.220 |

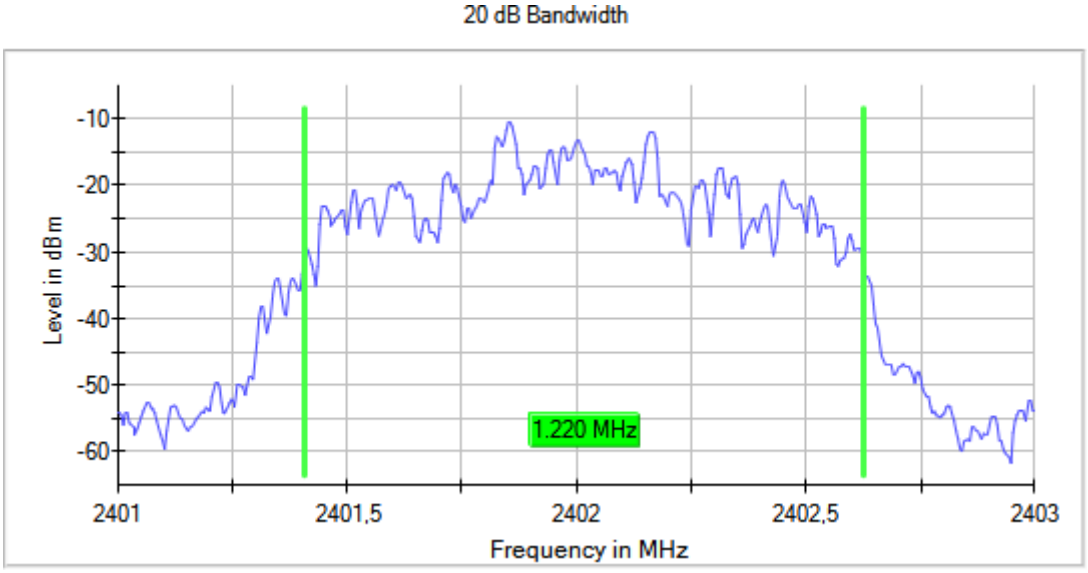
***Verdict***

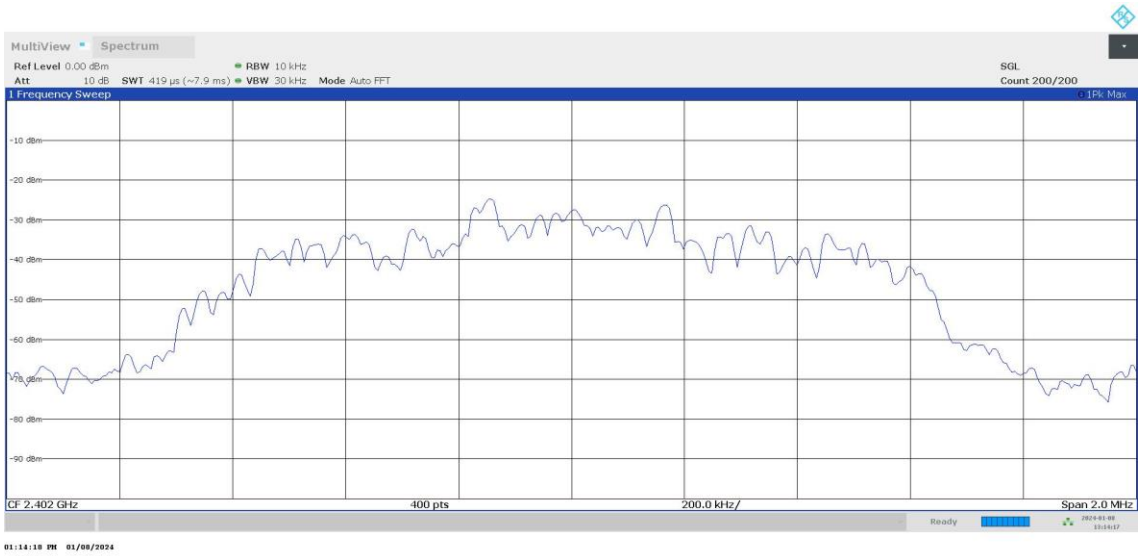
Pass

### *Attachments*

Modulation = BT (8DPSK 3-DH5) Frequency MHz = 2402.00000

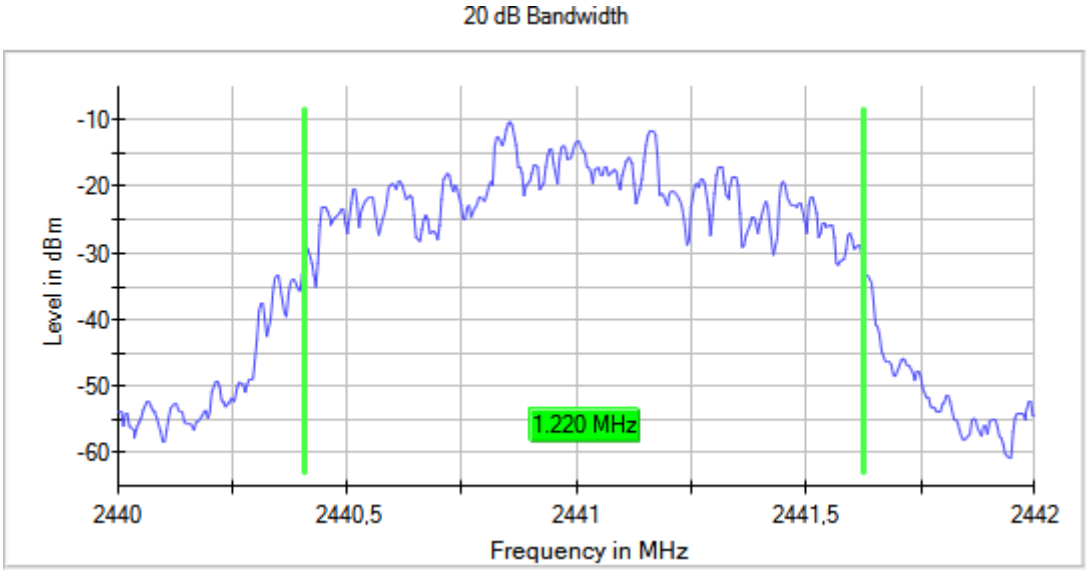
**Images:**

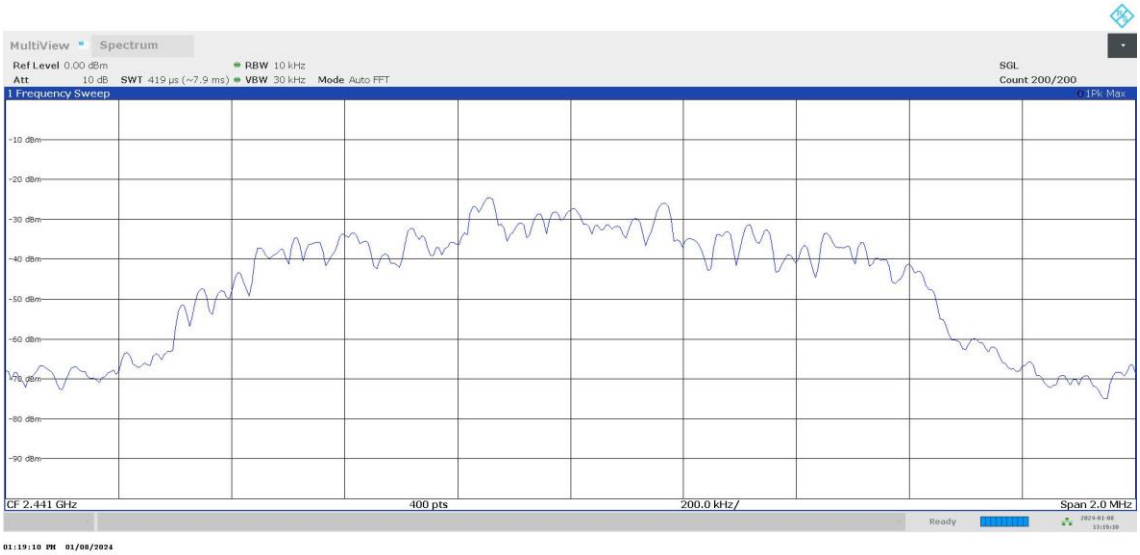


Modulation = BT (8DPSK 3-DH5) Frequency MHz = 2441.00000

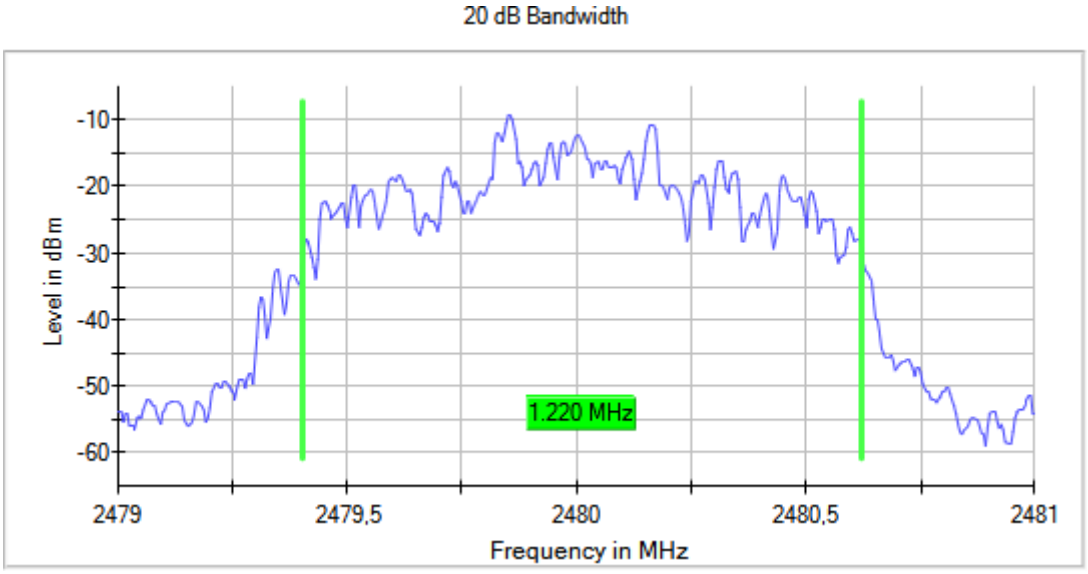
**Images:**

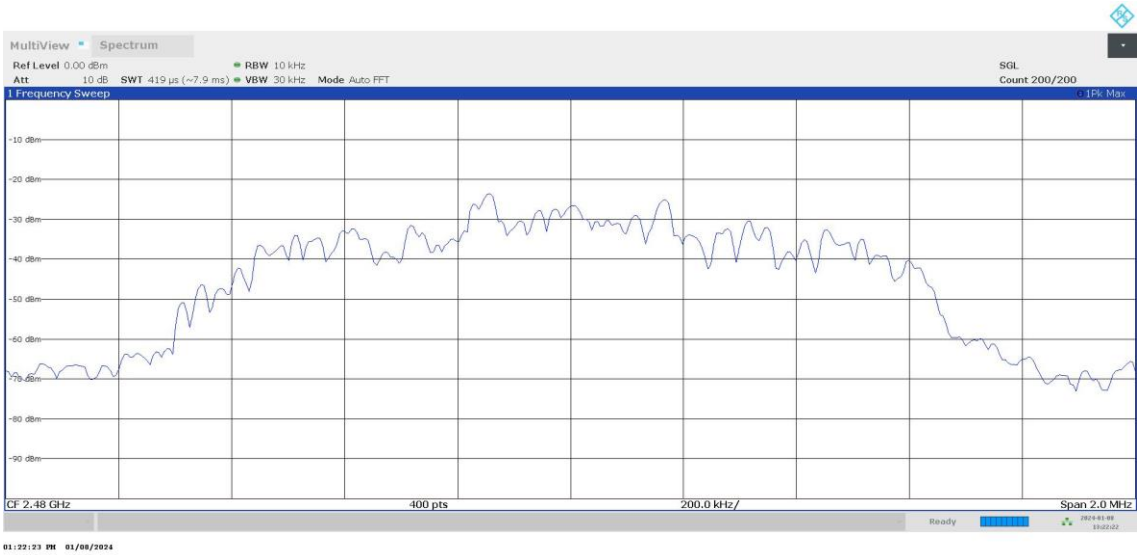


Modulation = BT (8DPSK 3-DH5) Frequency MHz = 2480.00000

**Images:**



# RSS-247 5.1 (b) / FCC 15.247 (a) (1) [CFS] Carrier Frequency Separation

Modulation: BT (GFSK 1-DH5)

***Results***

| Equipment | BW (MHz) | Port | Freq Sep (MHz) |
|---|---|---|---|
| Frequency Hopping Spread Spectrum systems (DSS) | 1 | 1 | 1.01 |

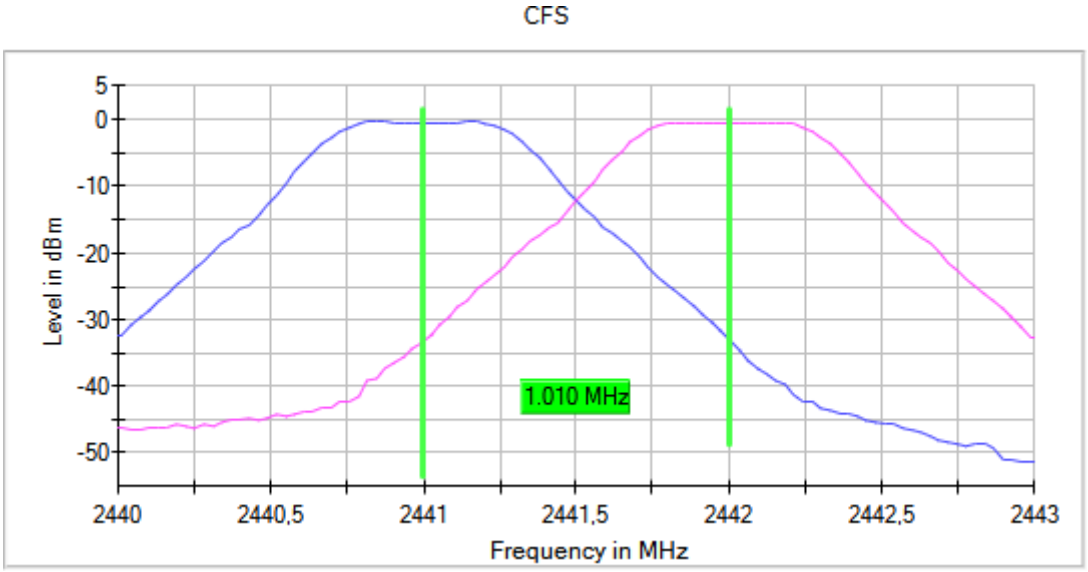
***Verdict***

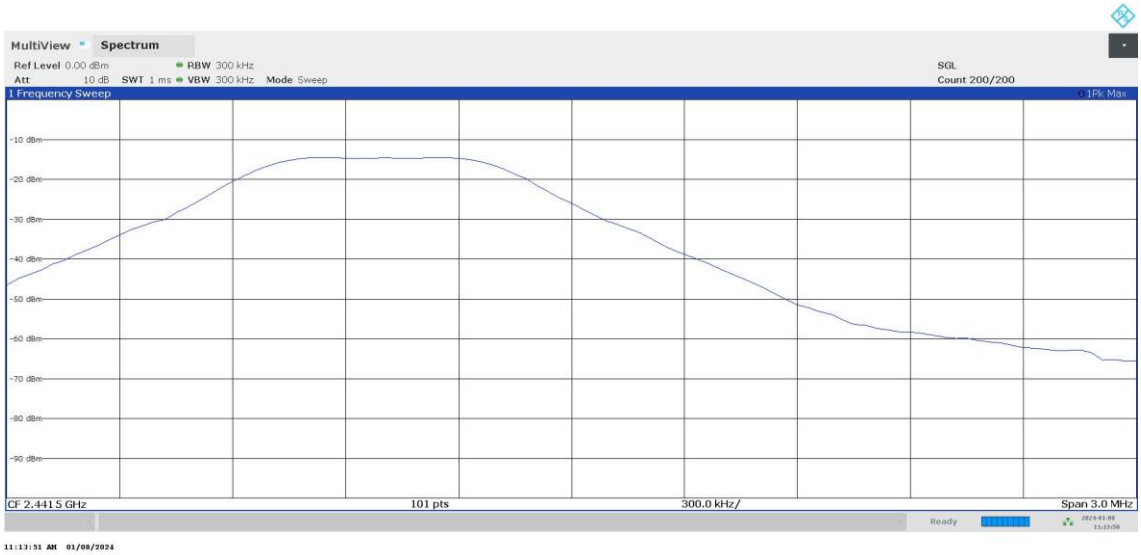
Pass

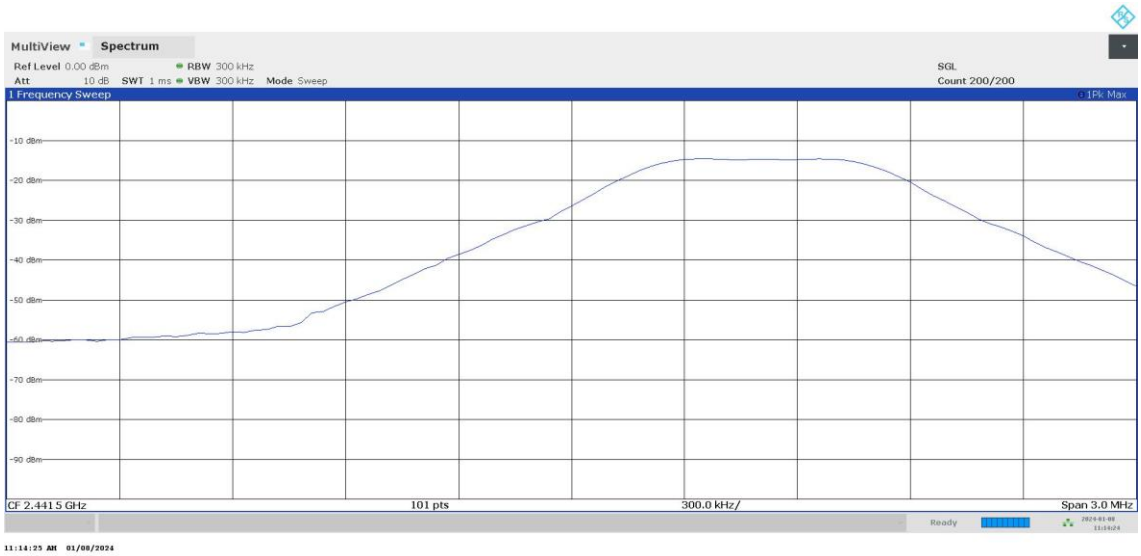
***Attachments***

Modulation = BT (GFSK 1-DH5)

**Images:**




MultiView
Spectrum
Ref Level 0.00 dBm
RBW 300 kHz
Att 10 dB
SWT 1 ms
VBW 300 kHz
Mode Sweep
SGL
Count 200/200
1 Frequency Sweep
1Pk Max
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
CF 2.441 5 GHz
101 pts
300.0 kHz/
Span 3.0 MHz
Ready
11:13:51 AM 01/08/2024


MultiView
Spectrum
Ref Level 0.00 dBm
RBW 300 kHz
Att 10 dB
SWT 1 ms
VBW 300 kHz
Mode Sweep
SGL
Count 200/200
1 Frequency Sweep
1Pk Max
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
CF 2.441 5 GHz
101 pts
300.0 kHz/
Span 3.0 MHz
Ready
11:14:25 AM 01/08/2024

Modulation: BT (Pi/4 DQPSK 2-DH5)

***Results***

| Equipment | BW (MHz) | Port | Freq Sep (MHz) |
|---|---|---|---|
| Frequency Hopping Spread Spectrum systems (DSS) | 1 | 1 | 1.01 |

***Verdict***

Pass

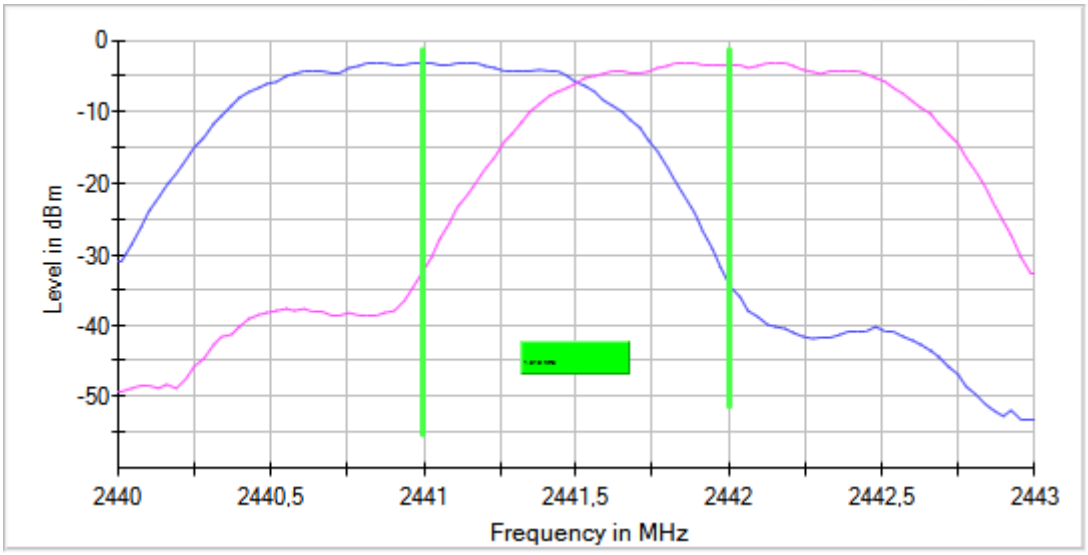
***Attachments***

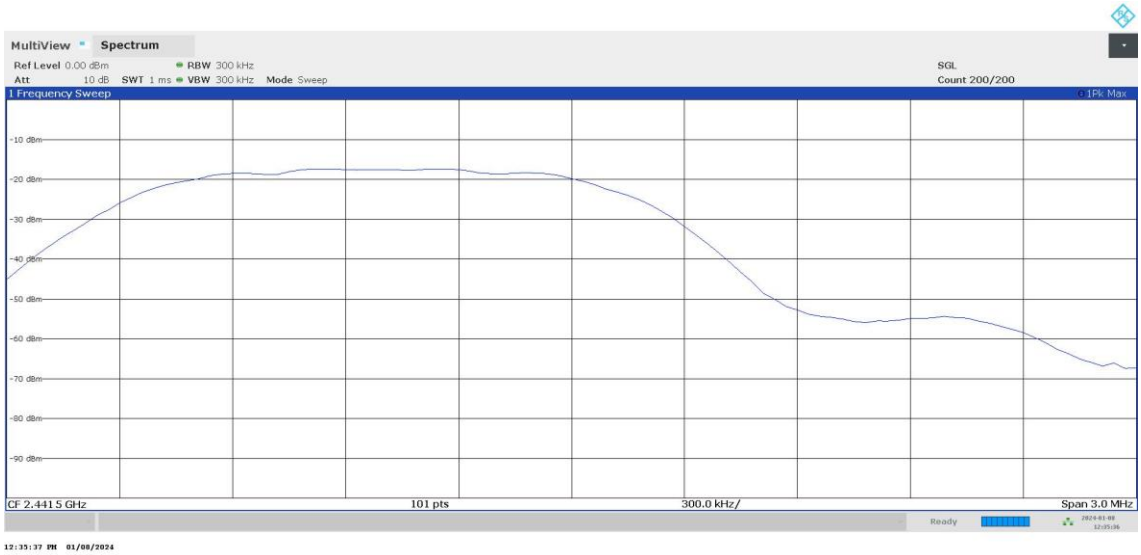
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1

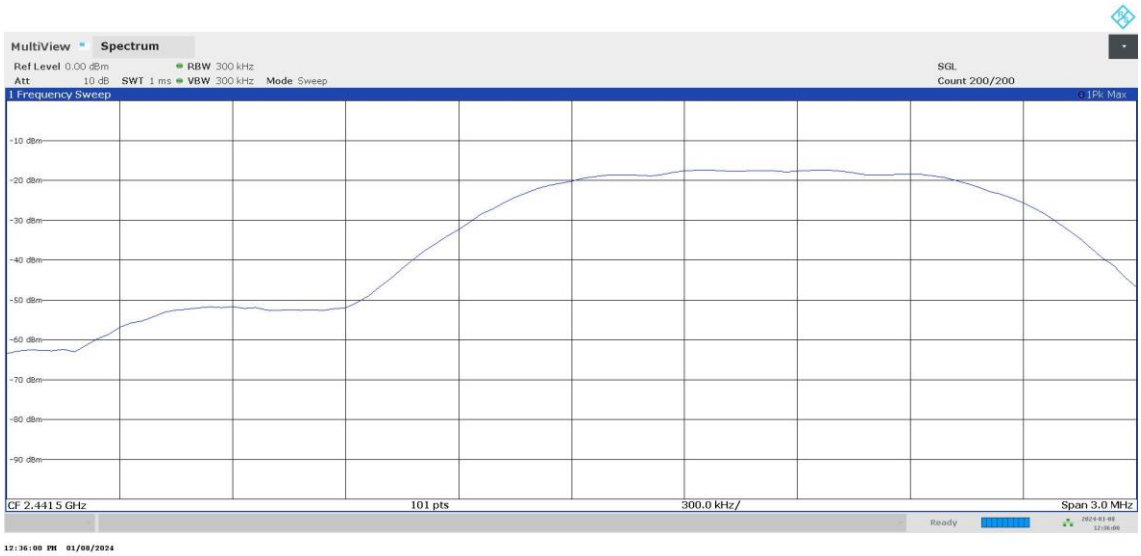
Modulation = BT (Pi/4 DQPSK 2-DH5) MIMO Mode = SISO

Active Port = 1

**Images:**




MultiView
Spectrum
Ref Level 0.00 dBm
RBW 300 kHz
Att 10 dB
SWT 1 ms
VBW 300 kHz
Mode Sweep
SGL
Count 200/200
1 Frequency Sweep
1Pk Max
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
CF 2.441 5 GHz
101 pts
300.0 kHz/
Span 3.0 MHz
Ready
12:35:37 PM 01/08/2024


MultiView
Spectrum
Ref Level 0.00 dBm
RBW 300 kHz
Att 10 dB
SWT 1 ms
VBW 300 kHz
Mode Sweep
SGL
Count 200/200
1 Frequency Sweep
1Pk Max
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
CF 2.441 5 GHz
101 pts
300.0 kHz/
Span 3.0 MHz
Ready
12:36:00 PM 01/08/2024

Modulation: BT (8DPSK 3-DH5)

MIMO Mode: SISO

***Results***

| Equipment | BW (MHz) | Port | Freq Sep (MHz) |
|---|---|---|---|
| Frequency Hopping Spread Spectrum systems (DSS) | 1 | 1 | 1.01 |

***Verdict***

Pass

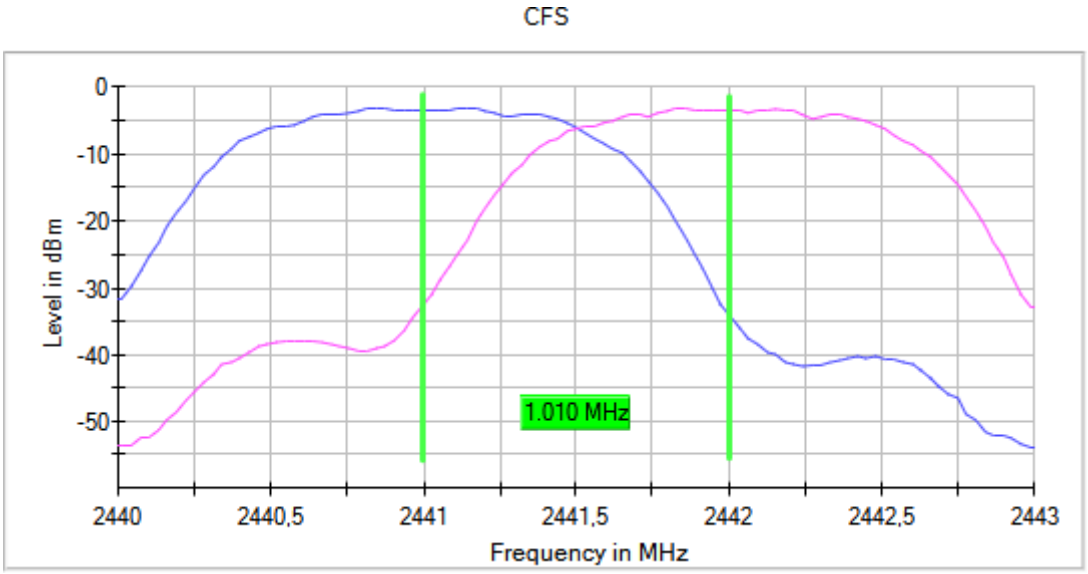
***Attachments***

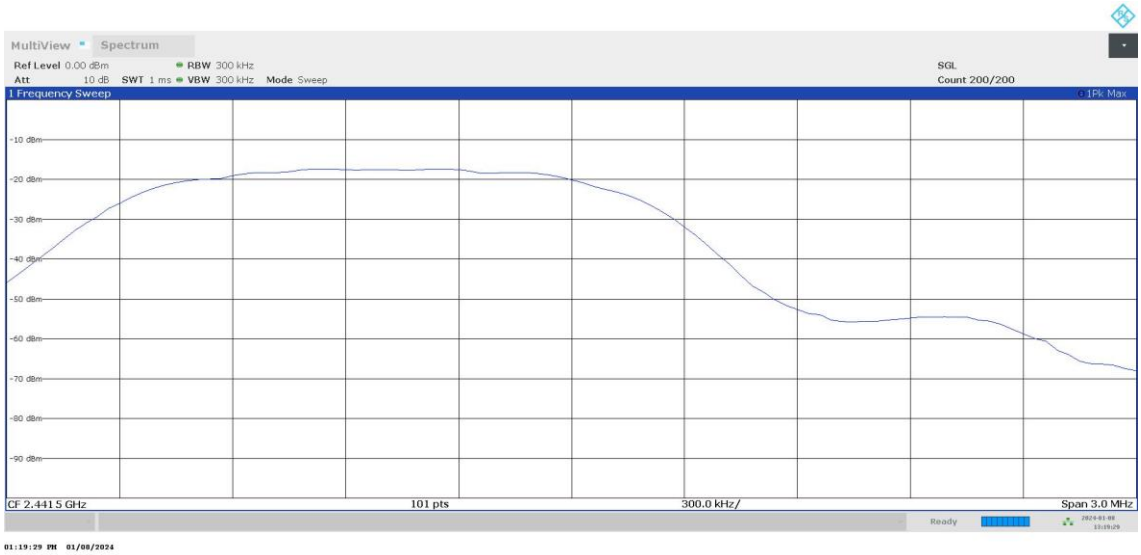
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1

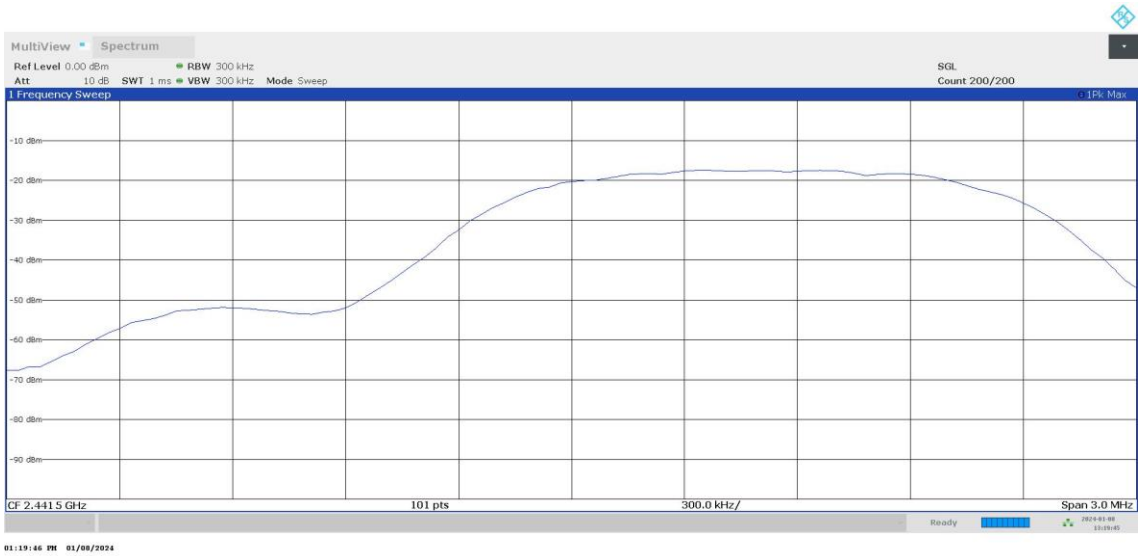
Modulation = BT (8DPSK 3-DH5) MIMO Mode = SISO

Active Port = 1

**Images:**




MultiView
Spectrum
Ref Level 0.00 dBm
RBW 300 kHz
SGL
Att 10 dB
SWT 1 ms
VBW 300 kHz
Mode Sweep
Count 200/200
1 Frequency Sweep
1Pk Max
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
CF 2.441 5 GHz
101 pts
300.0 kHz/
Span 3.0 MHz
Ready
01:19:29 PM 01/08/2024


MultiView
Spectrum
Ref Level 0.00 dBm
RBW 300 kHz
SGL
Att 10 dB
SWT 1 ms
VBW 300 kHz
Mode Sweep
Count 200/200
1 Frequency Sweep
1Pk Max
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
CF 2.441 5 GHz
101 pts
300.0 kHz/
Span 3.0 MHz
Ready
01:19:46 PM 01/08/2024

# RSS-247 5.1 (d) / FCC 15.247 (a) (1) (iii) [DwT] Time of Occupancy (Dwell Time)

***Limits***

The average time of occupancy on any channel shall not be greater than 0.4 seconds (400 ms) within a period of 0.4 seconds multiplied by the number of hopping channels employed = 0.4 x 79= 31.6 seconds.

Modulation: BT (GFSK 1-DH5)

***Results***

| Equipment | BW (MHz) | Port | Freq (MHz) | NHp | Avg COT (ms) |
|---|---|---|---|---|---|
| Frequency Hopping Spread Spectrum systems (DSS) | 1 | 1 | 2402.00000 | 106 | 42.90 |
| | | | 2441.00000 | 110 | 44.50 |
| | | | 2480.00000 | 102 | 41.74 |

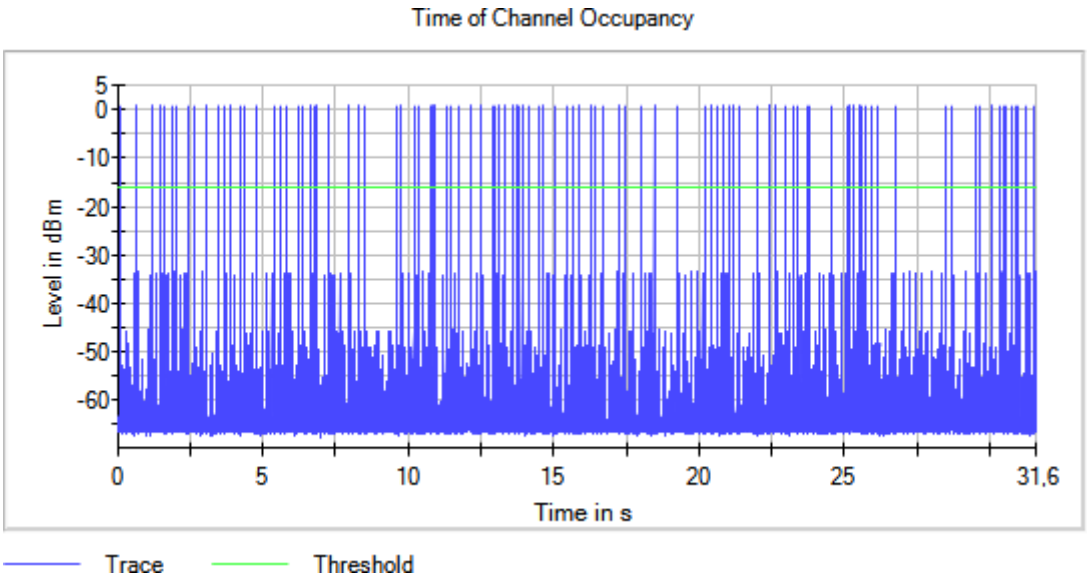
***Verdict***

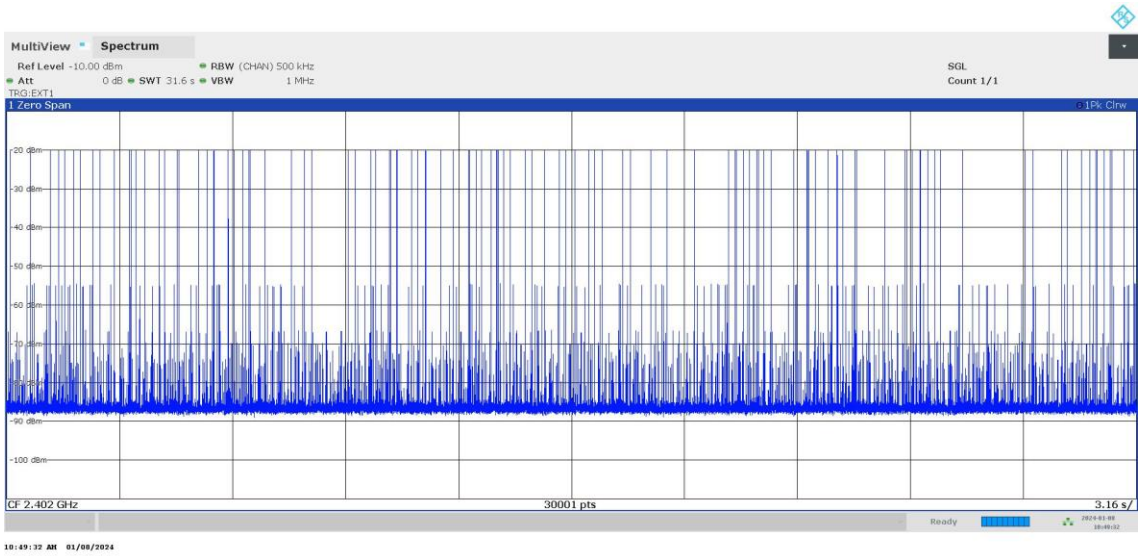
Pass

### *Attachments*

Modulation = BT (GFSK 1-DH5)

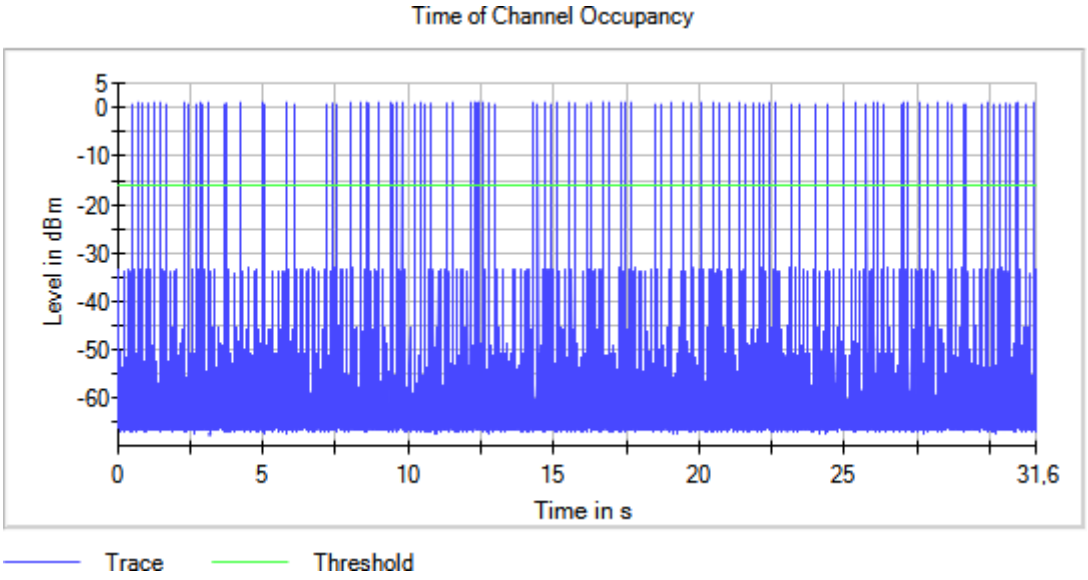
**Images:**

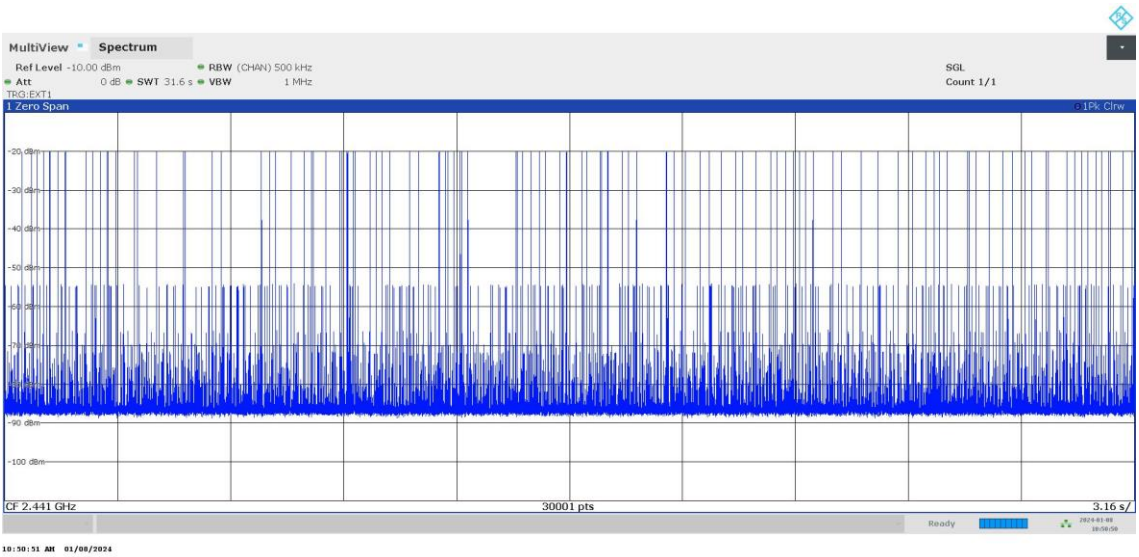


Modulation = BT (GFSK 1-DH5)

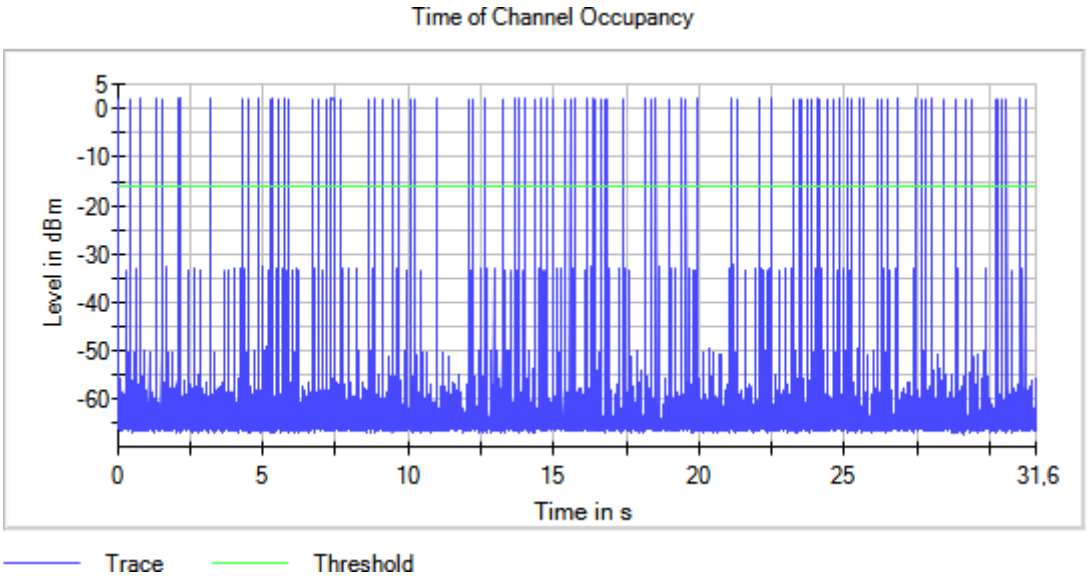
**Images:**

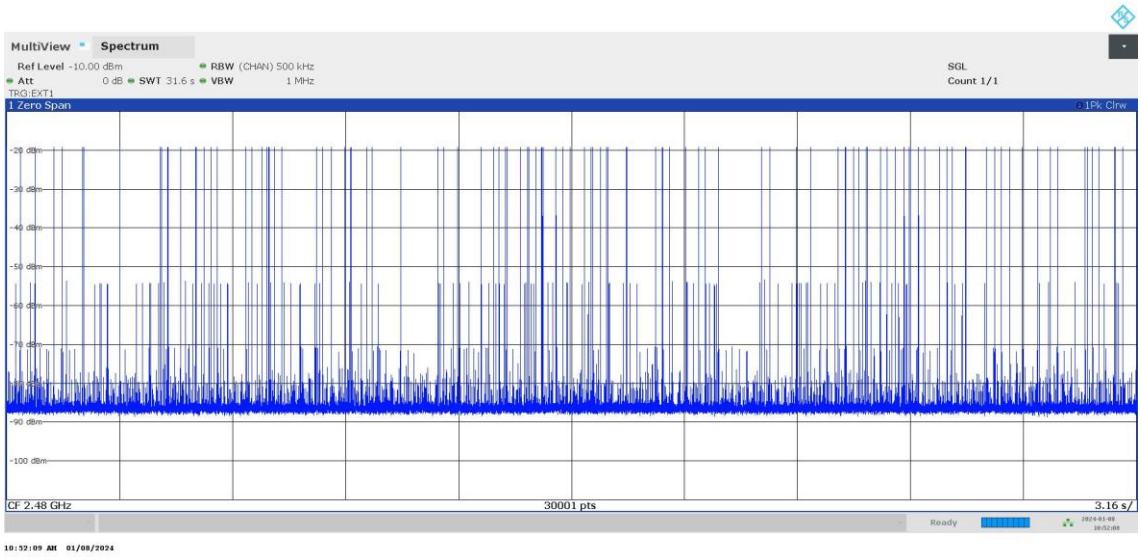


Modulation = BT (GFSK 1-DH5)

**Images:**



Modulation: BT (Pi/4 DQPSK 2-DH5)

***Results***

| Equipment | BW (MHz) | Port | Freq (MHz) | NHp | Avg COT (ms) |
|---|---|---|---|---|---|
| Frequency Hopping Spread Spectrum systems (DSS) | 1 | 1 | 2402.00000 | 95 | 27.39 |
| | | | 2441.00000 | 101 | 29.28 |
| | | | 2480.00000 | 103 | 29.76 |

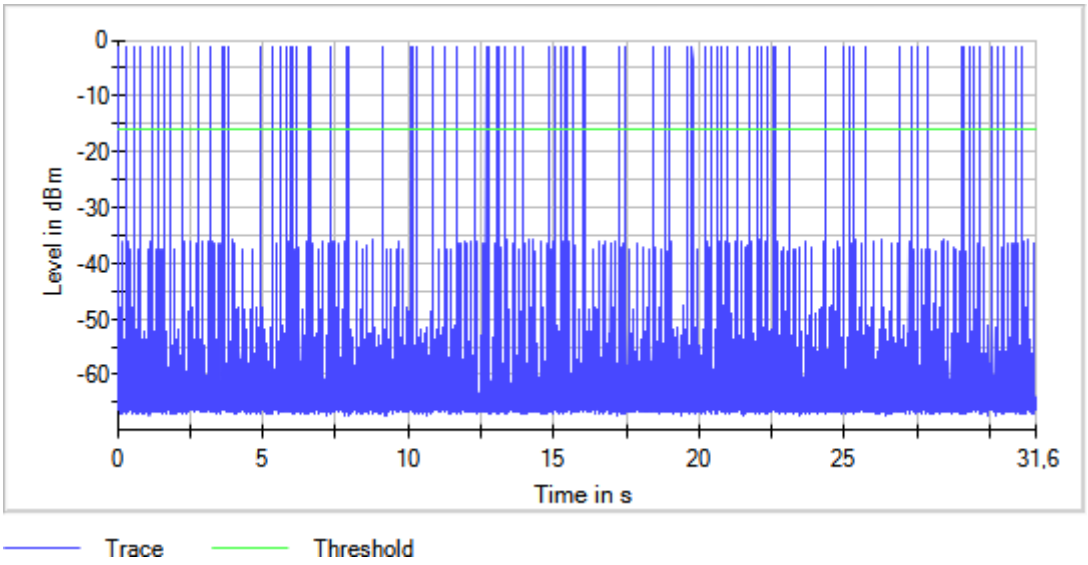
***Verdict***

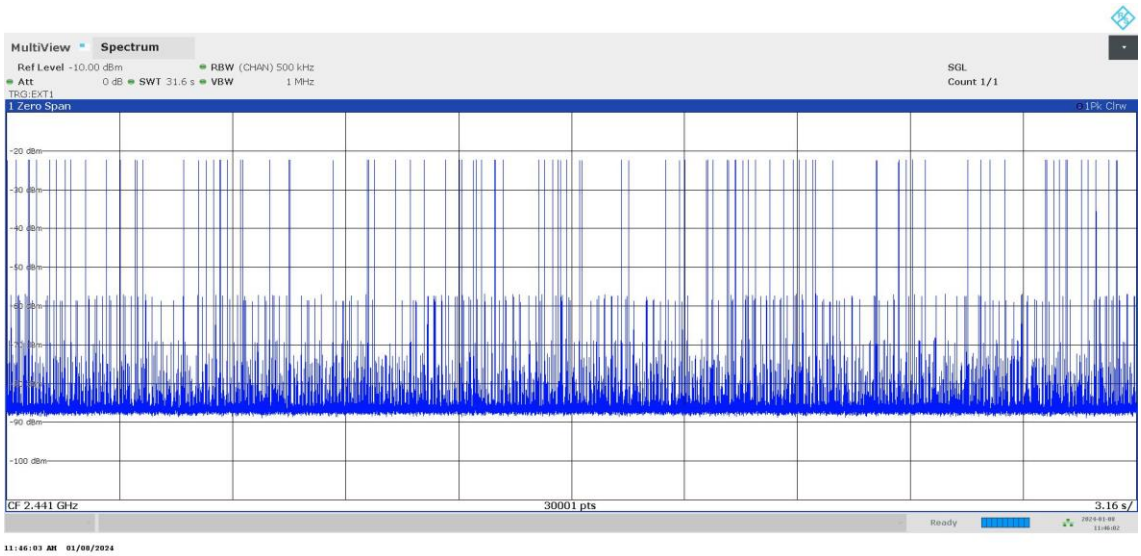
Pass

### *Attachments*

Modulation = BT (Pi/4 DQPSK 2-DH5)

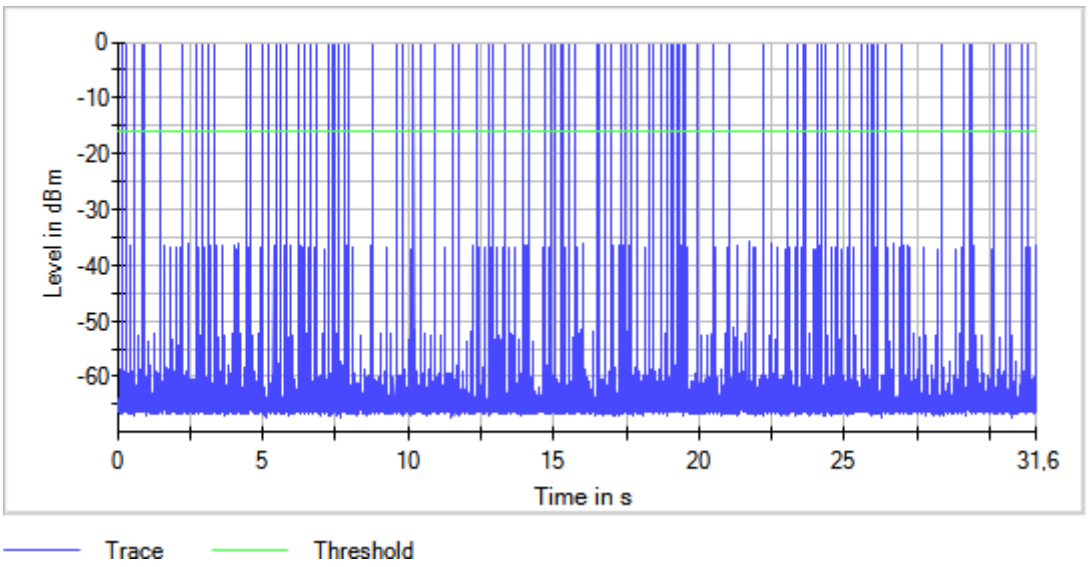
**Images:**

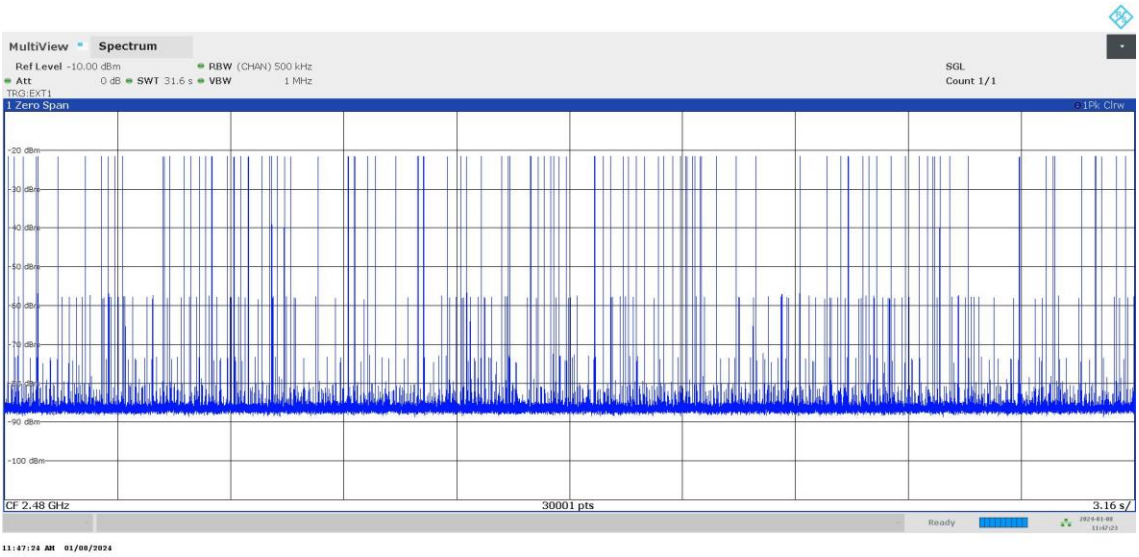


Modulation = BT (Pi/4 DQPSK 2-DH5)

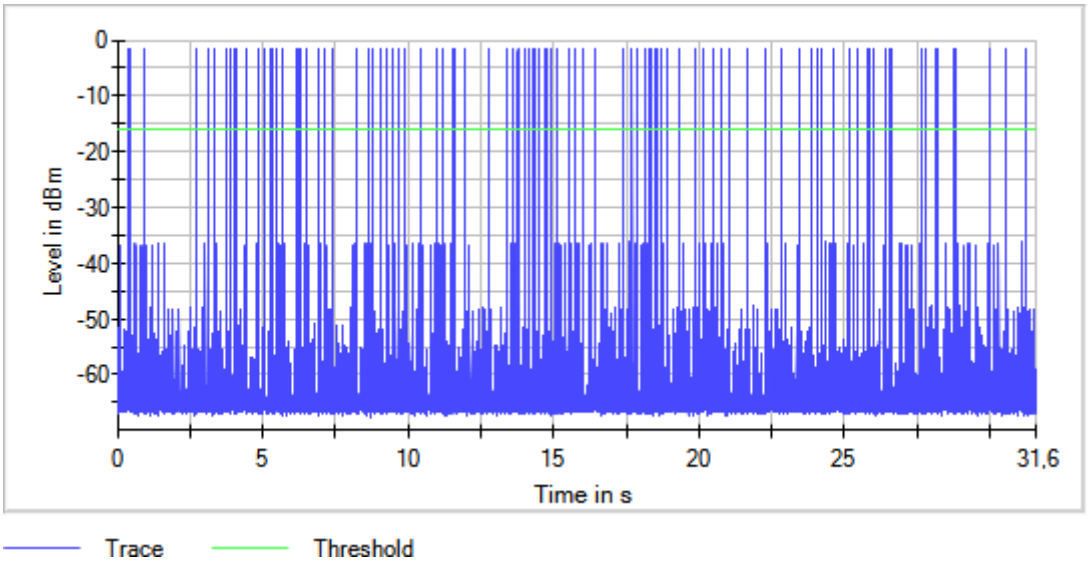
**Images:**

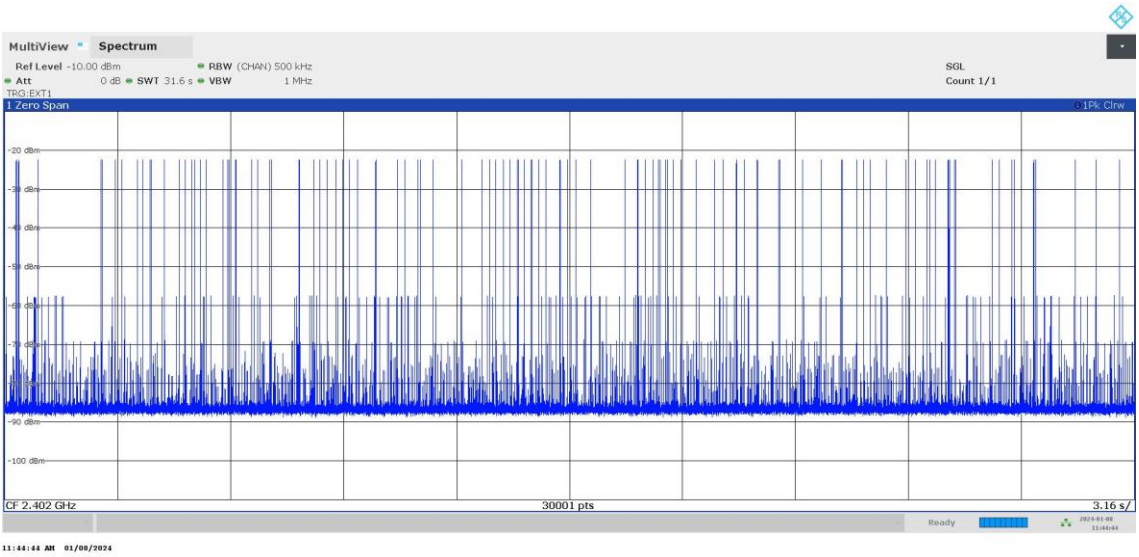


Modulation = BT (Pi/4 DQPSK 2-DH5)

**Images:**



Modulation: BT (8DPSK 3-DH5)

***Results***

| Equipment | BW (MHz) | Port | Freq (MHz) | NHp | Avg COT (ms) |
|---|---|---|---|---|---|
| Frequency Hopping Spread Spectrum systems (DSS) | 1 | 1 | 2402.00000 | 108 | 27.16 |
| | | | 2441.00000 | 122 | 30.62 |
| | | | 2480.00000 | 104 | 26.15 |

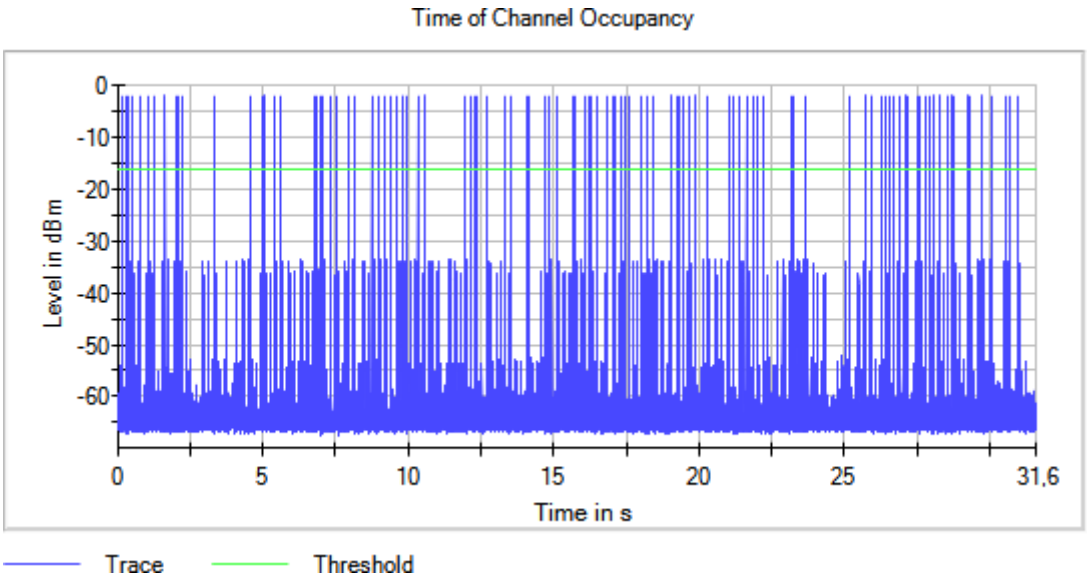
***Verdict***

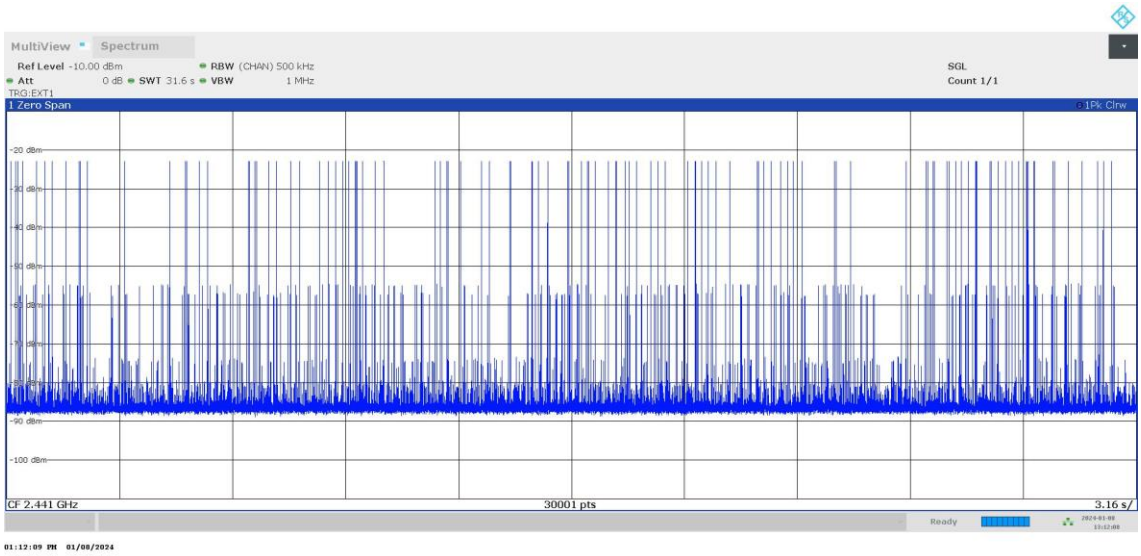
Pass

### *Attachments*

Modulation = BT (8DPSK 3-DH5)

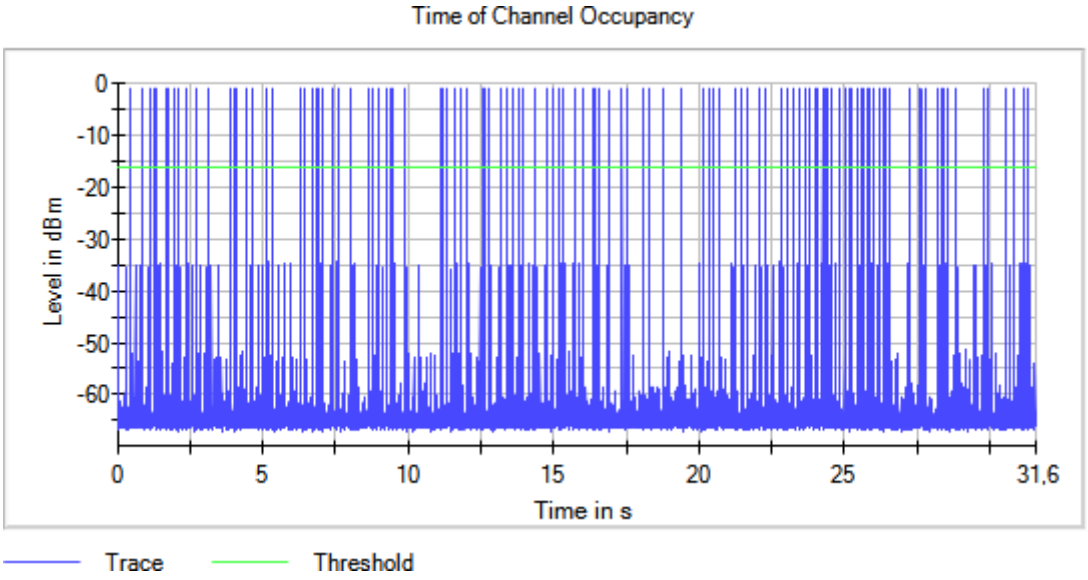
**Images:**

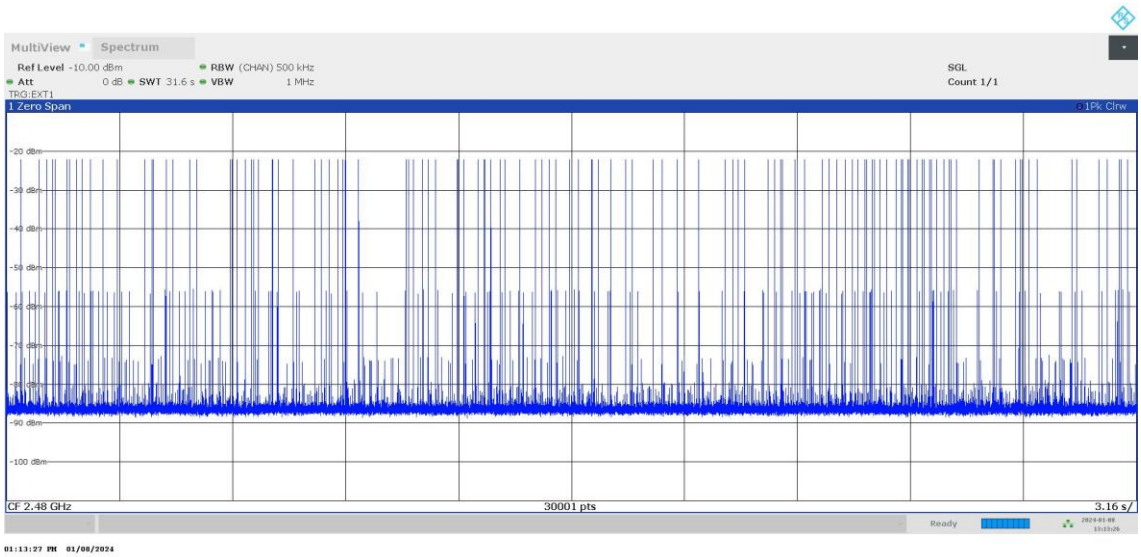


Modulation = BT (8DPSK 3-DH5)

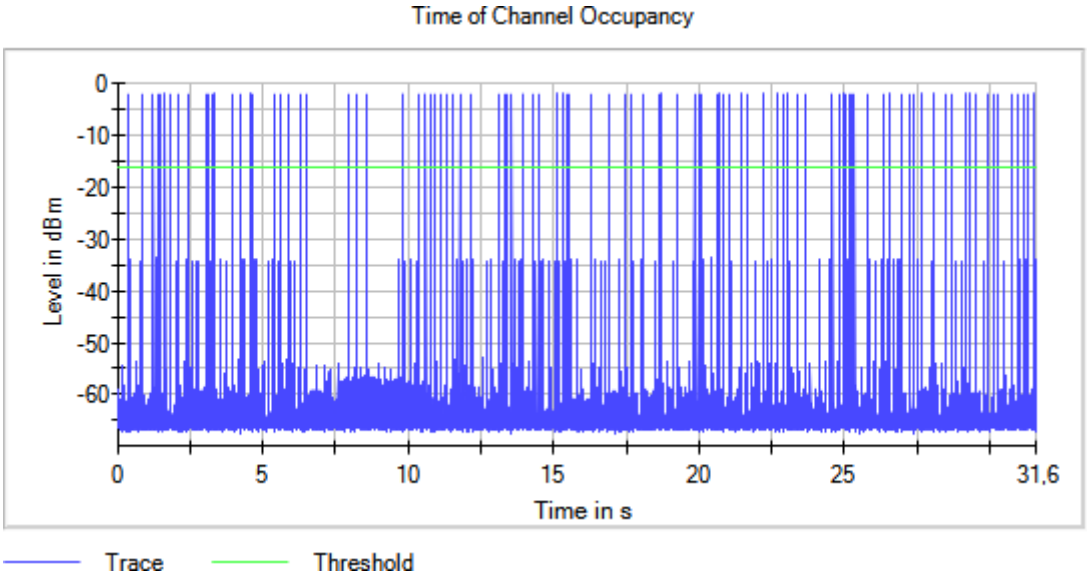
**Images:**

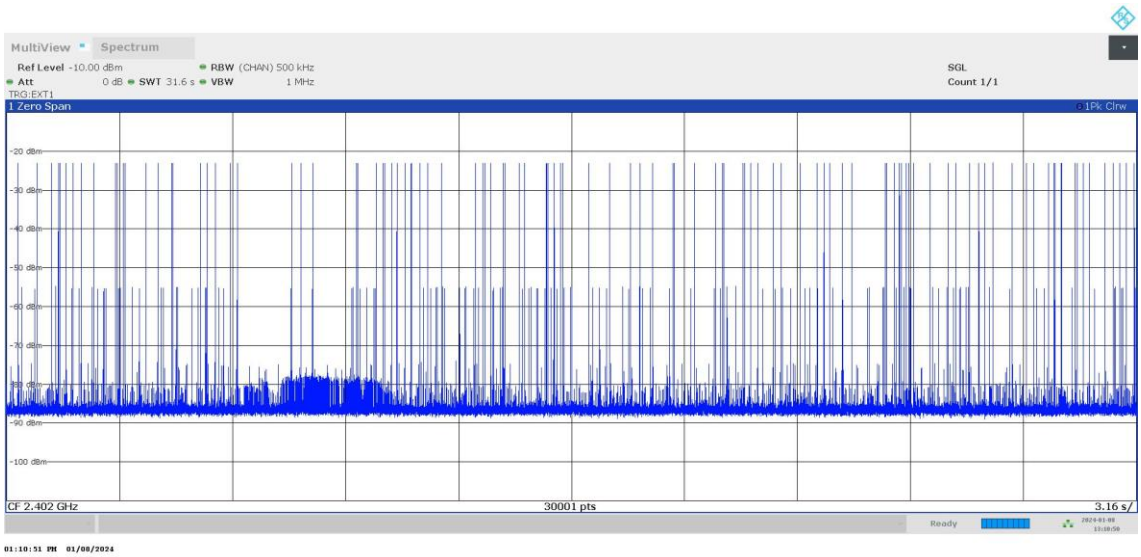


Modulation = BT (8DPSK 3-DH5)

**Images:**



# RSS-247 5.1 (d) / FCC 15.247 (a) (1) (iii) [NHC] Number of hopping channels

***Limits***

Frequency hopping system in the 2400-2483.5 MHz band shall use at least 15 channels.

Modulation: BT (GFSK 1-DH5)

***Results***

| Equipment | BW (MHz) | Port | NHC |
|---|---|---|---|
| Frequency Hopping Spread Spectrum systems (DSS) | 1 | 1 | 79 |

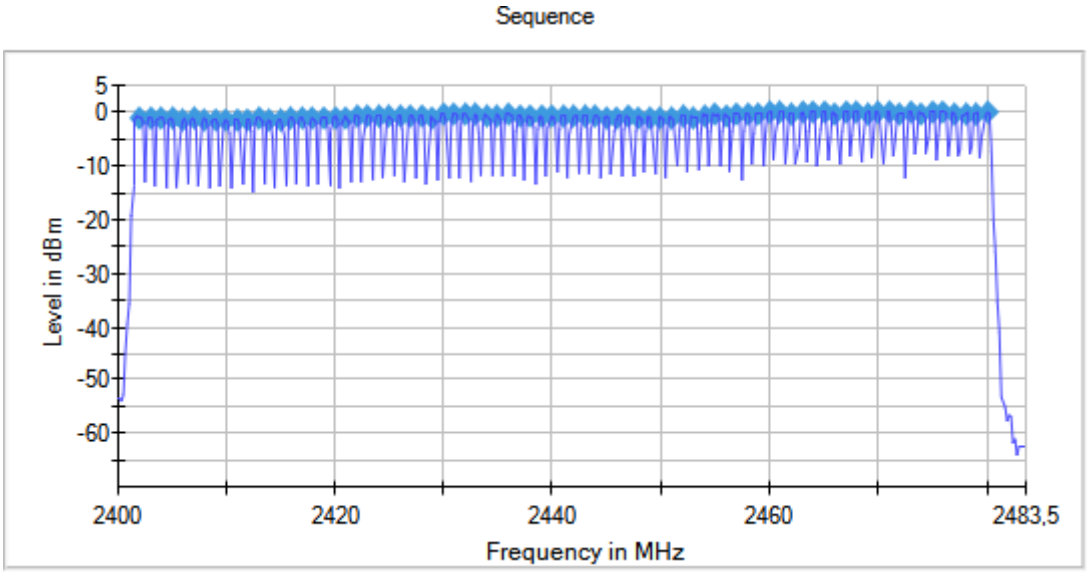
***Verdict***

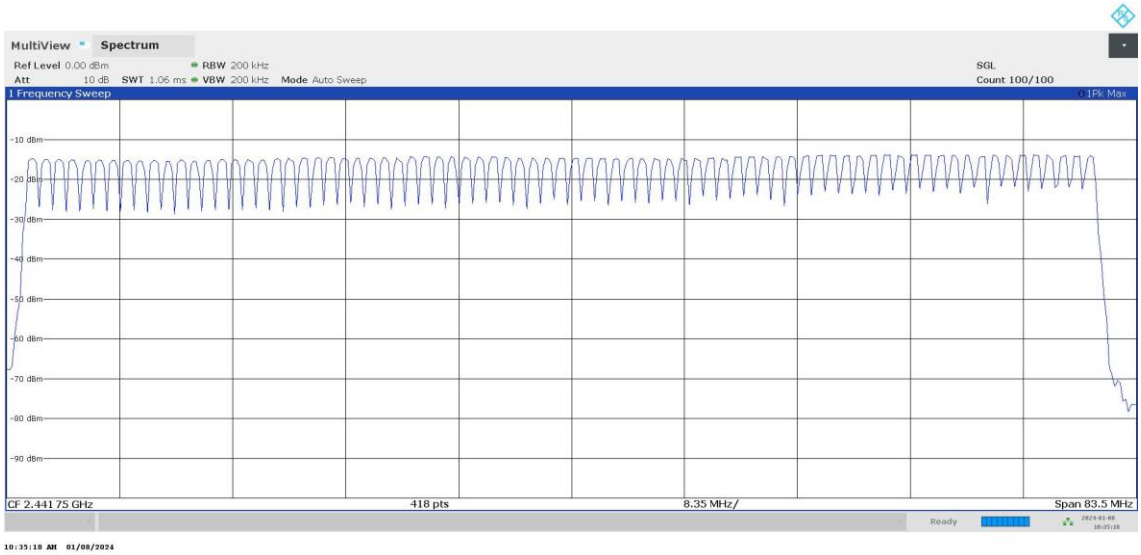
Pass

***Attachments***

Modulation = BT (GFSK 1-DH5)

**Images:**




MultiView
Spectrum
Ref Level 0.00 dBm
RBW 200 kHz
SGL
Att 10 dB
SWT 1.06 ms
VBW 200 kHz
Mode Auto Sweep
Count 100/100
1 Frequency Sweep
1Pk Max
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
CF 2.441 75 GHz
418 pts
8.35 MHz/
Span 83.5 MHz
Ready
10:35:18 AM 01/08/2024

Modulation: BT (Pi/4 DQPSK 2-DH5)

***Results***

| Equipment | BW (MHz) | Port | NHC |
|---|---|---|---|
| Frequency Hopping Spread Spectrum systems (DSS) | 1 | 1 | 79 |

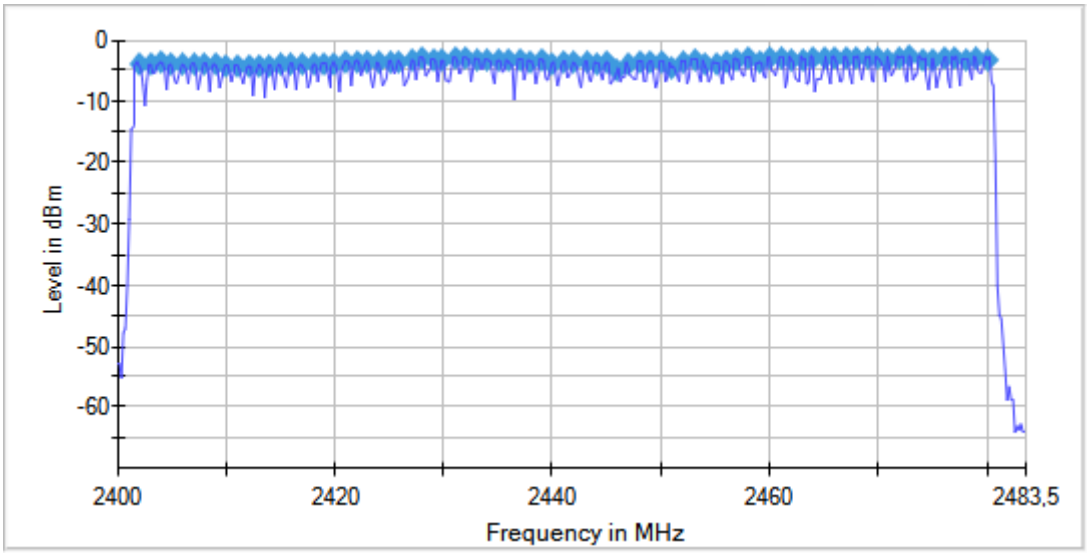
***Verdict***

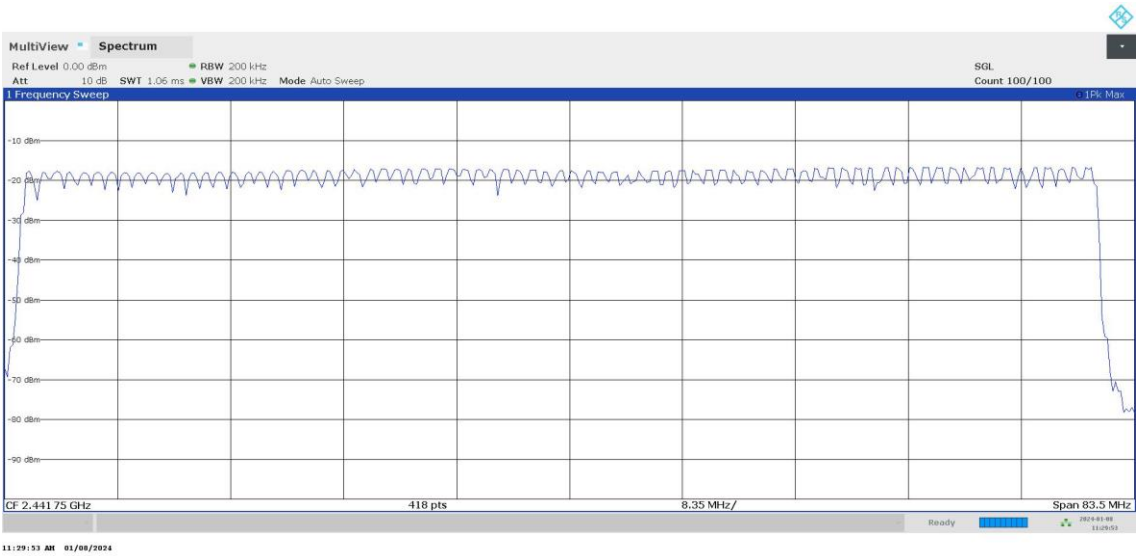
Pass

***Attachments***

Modulation = BT (Pi/4 DQPSK 2-DH5)

**Images:**



Modulation: BT (8DPSK 3-DH5)

***Results***

| Equipment | BW (MHz) | Port | NHC |
|---|---|---|---|
| Frequency Hopping Spread Spectrum systems (DSS) | 1 | 1 | 80 |

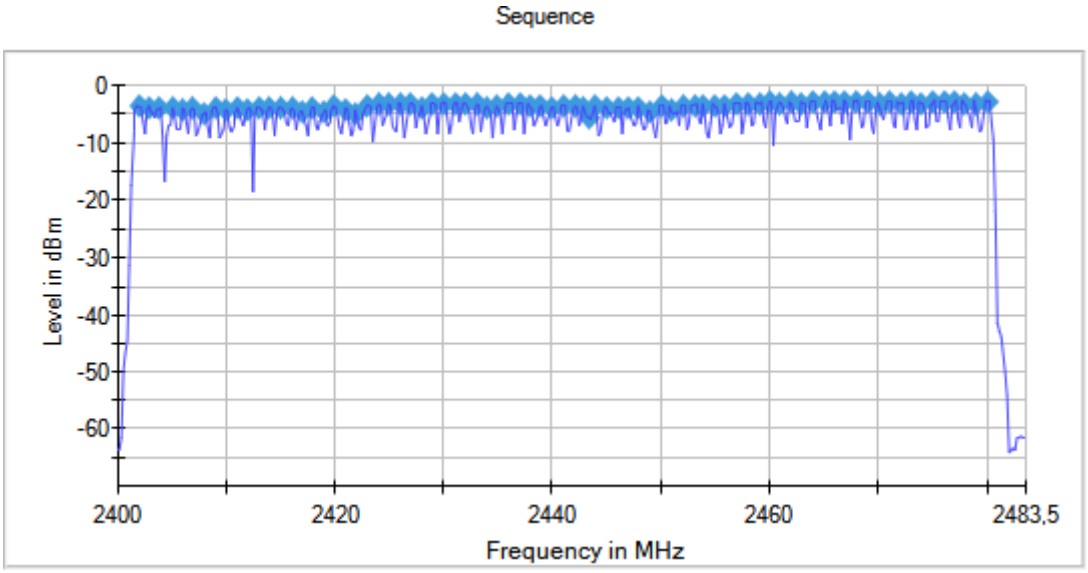
***Verdict***

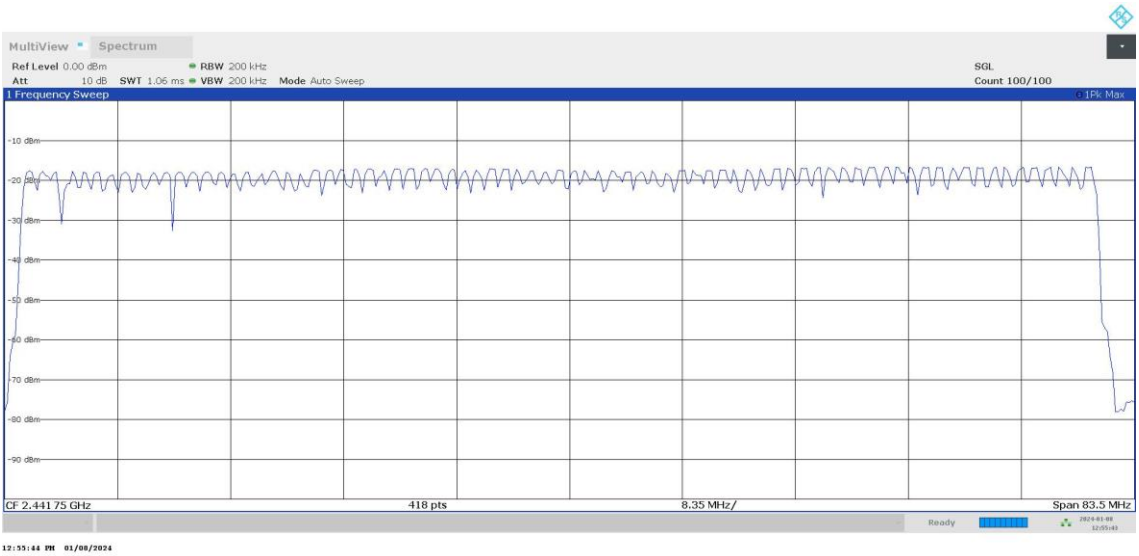
Pass

***Attachments***

Modulation = BT (8DPSK 3-DH5)

**Images:**



# RSS-247 5.4 (b) / FCC 15.247 (b) (1) [Pkcp] Maximum Peak Conducted output power

***Limits***

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels: 1 watt (30 dBm). The e.i.r.p. shall not exceed 4 W (RSS-247).

Modulation: BT (GFSK 1-DH5)

***Results***

| Equipment | BW (MHz) | Freq (MHz) | Port | Peak Power (dBm) | Peak Power (dBm ) e.i.r.p |
|---|---|---|---|---|---|
| Frequency Hopping Spread Spectrum systems (DSS) | 1 | 2402.00000 | 1 | -0.5110 | -0.5110 |
| | | 2441.00000 | | -0.4820 | -0.4820 |
| | | 2480.00000 | | 0.3900 | 0.3900 |

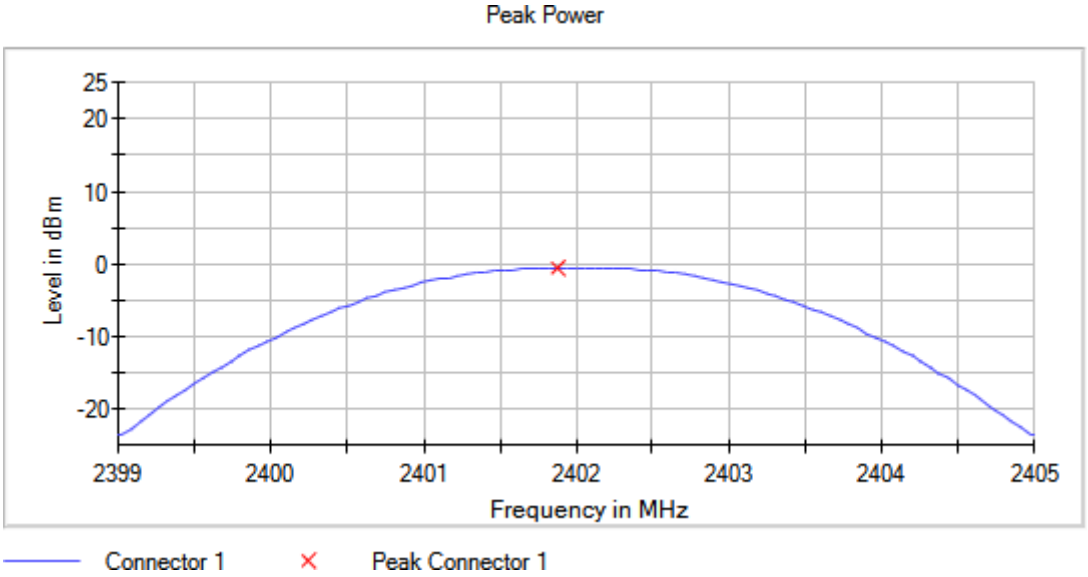
***Verdict***

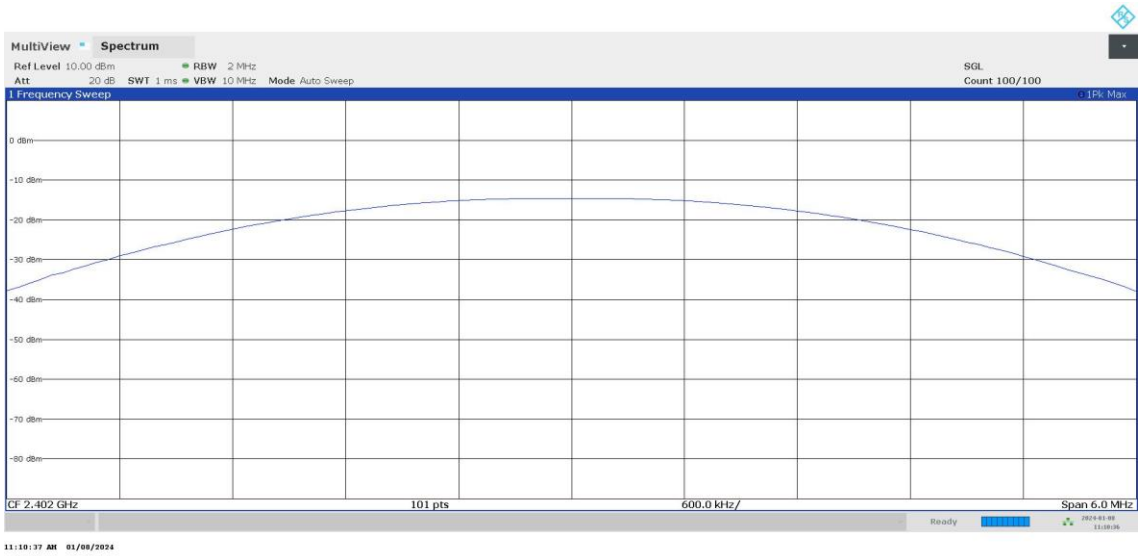
Pass

### *Attachments*

Modulation = BT (GFSK 1-DH5) Frequency MHz = 2402.00000

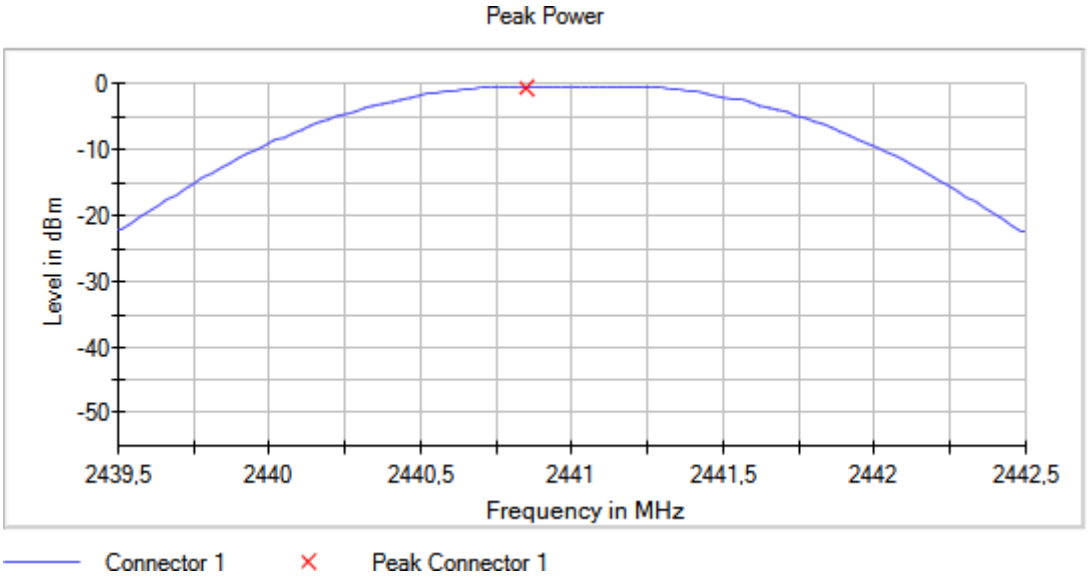
**Images:**

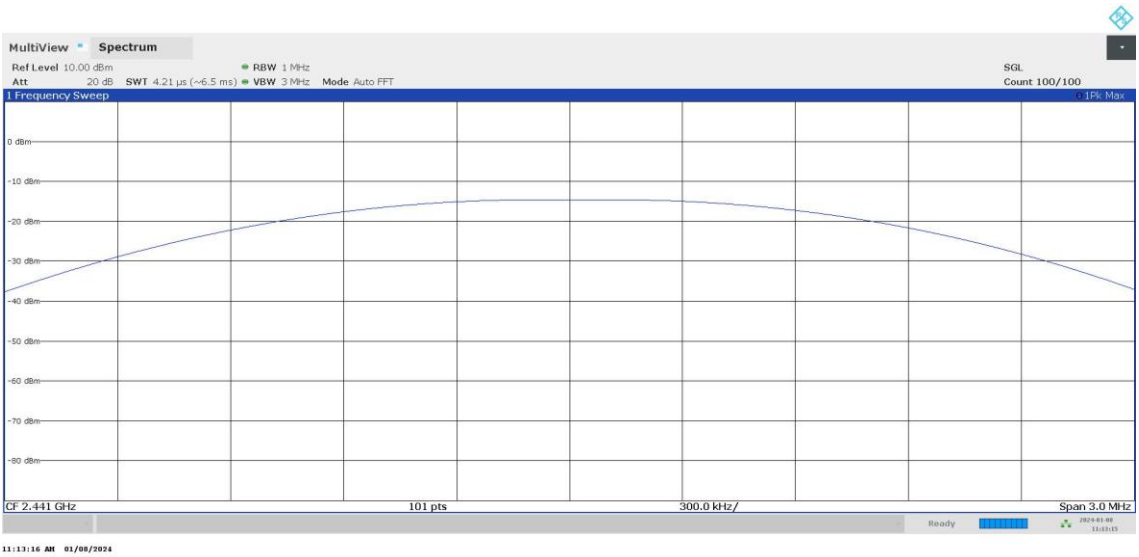


Modulation = BT (GFSK 1-DH5) Frequency MHz = 2441.00000

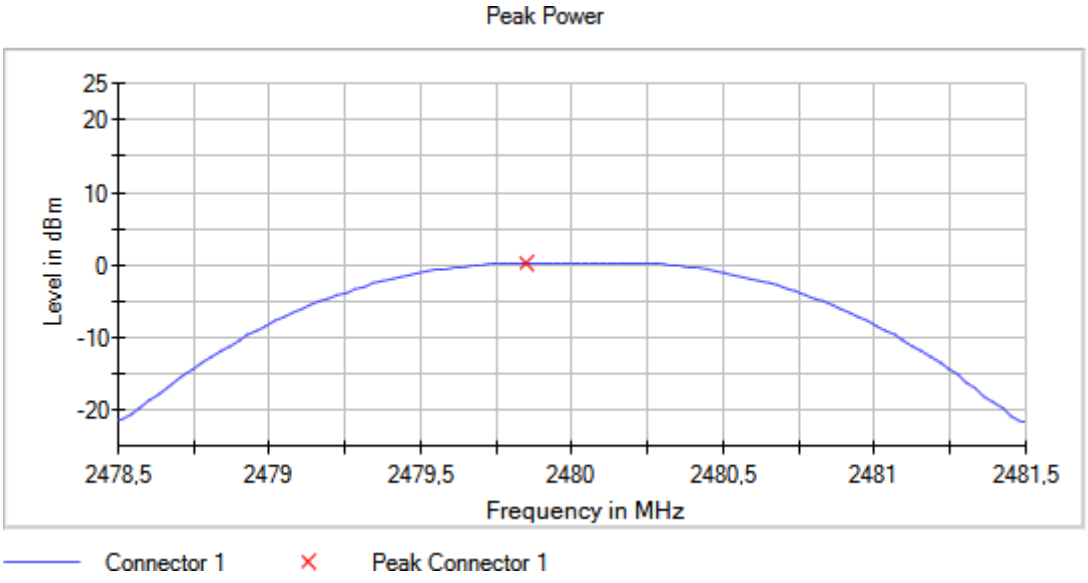
**Images:**

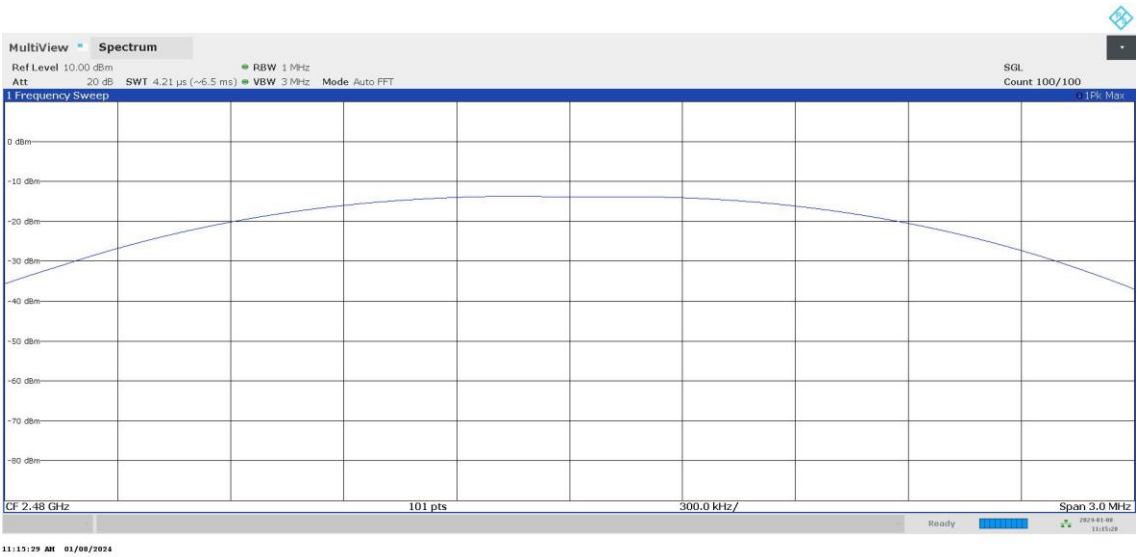


Modulation = BT (GFSK 1-DH5) Frequency MHz = 2480.00000

**Images:**



Modulation: BT (Pi/4 DQPSK 2-DH5)

***Results***

| Equipment | BW (MHz) | Freq (MHz) | Port | Peak Power (dBm) | Peak Power (dBm ) e.i.r.p |
|---|---|---|---|---|---|
| Frequency Hopping Spread Spectrum systems (DSS) | 1 | 2402.00000 | 1 | -1.6290 | -1.6290 |
| | | 2441.00000 | | -1.4570 | -1.4570 |
| | | 2480.00000 | | -0.6160 | -0.6160 |

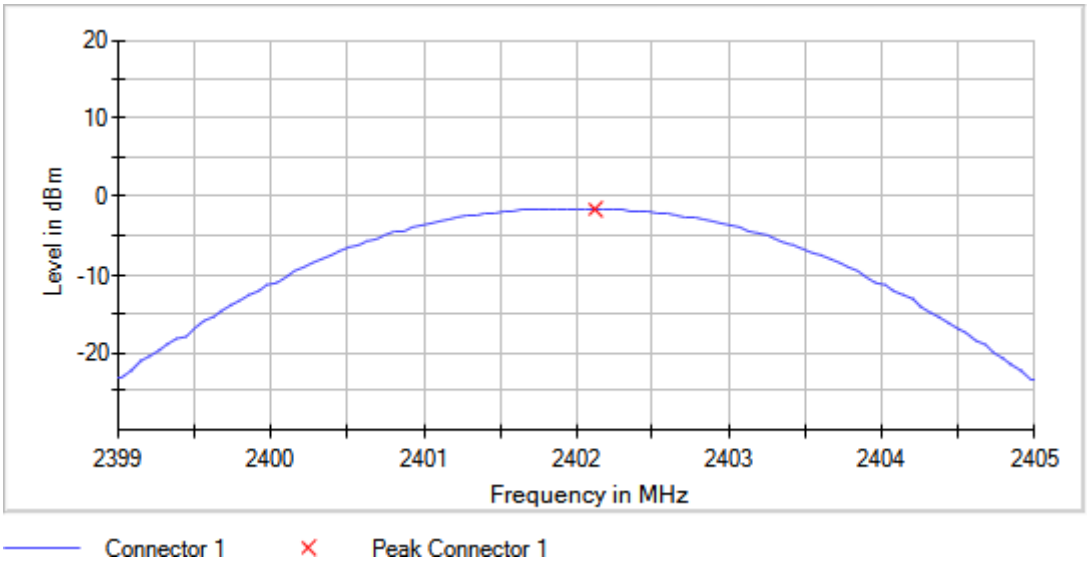
***Verdict***

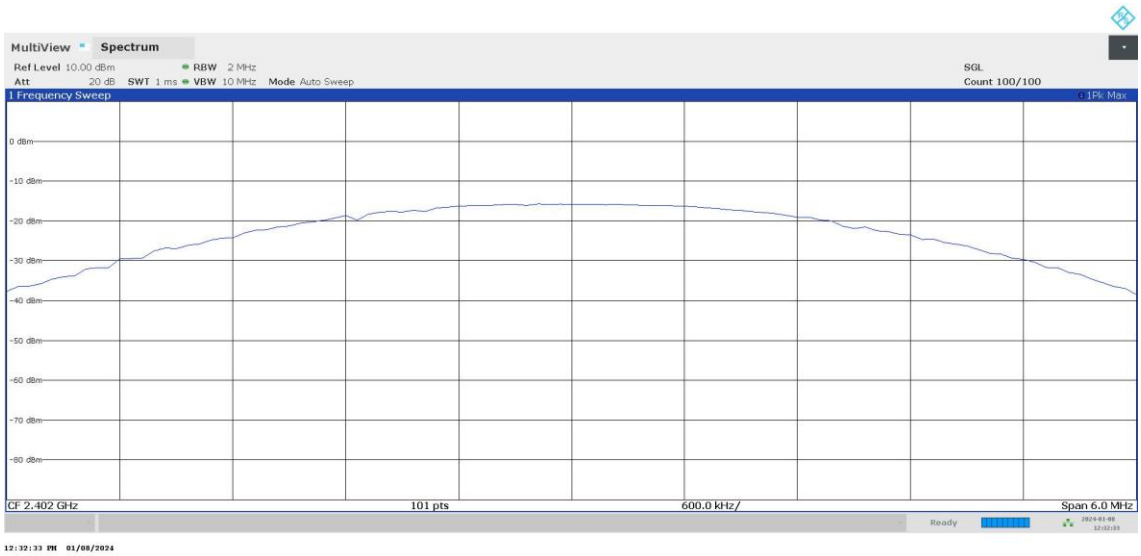
Pass

### *Attachments*

Modulation = BT (Pi/4 DQPSK 2-DH5) Frequency MHz = 2402.00000

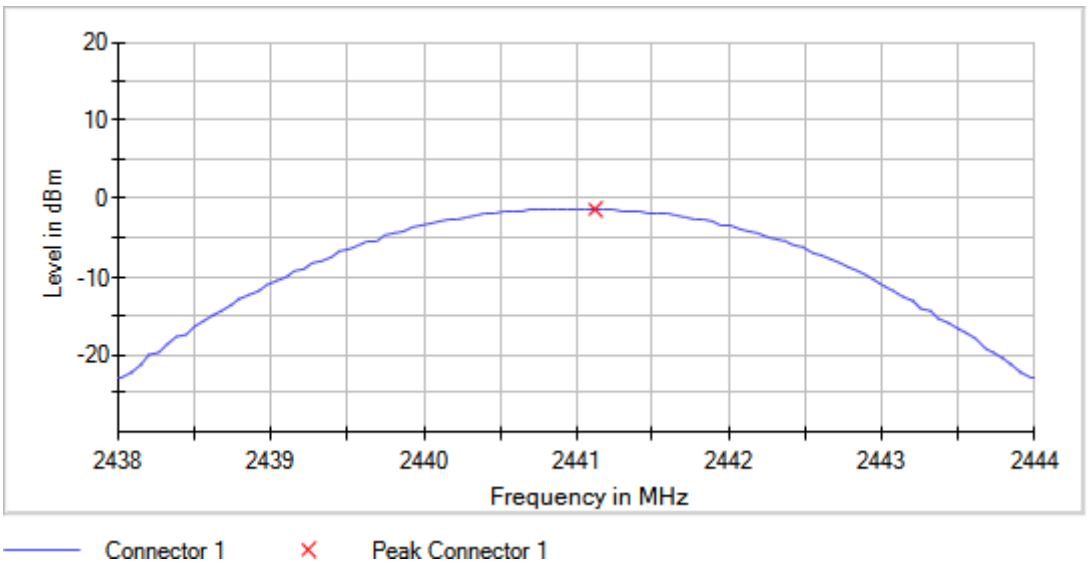
**Images:**

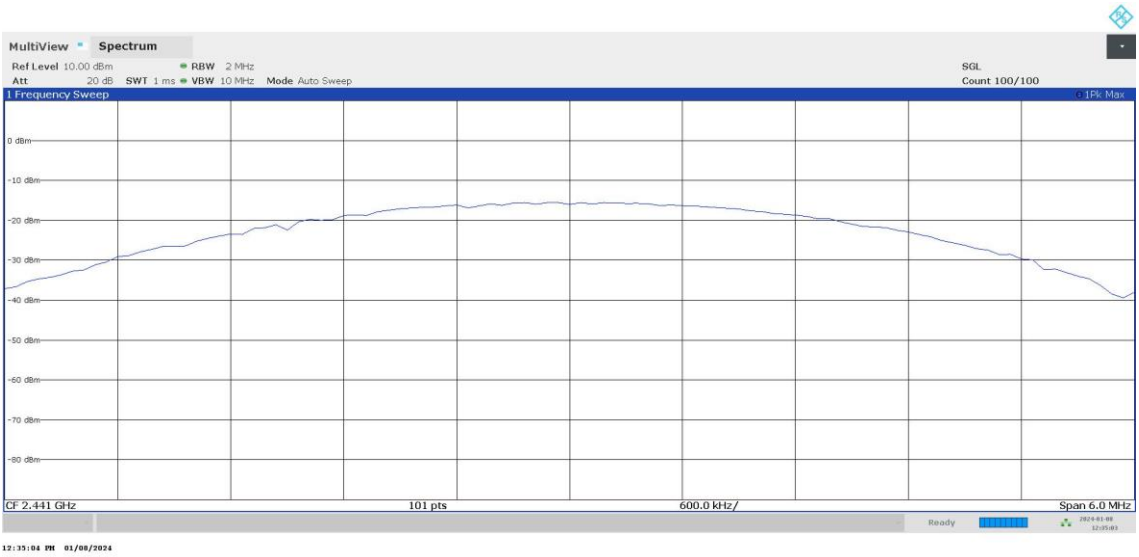


Modulation = BT (Pi/4 DQPSK 2-DH5) Frequency MHz = 2441.00000

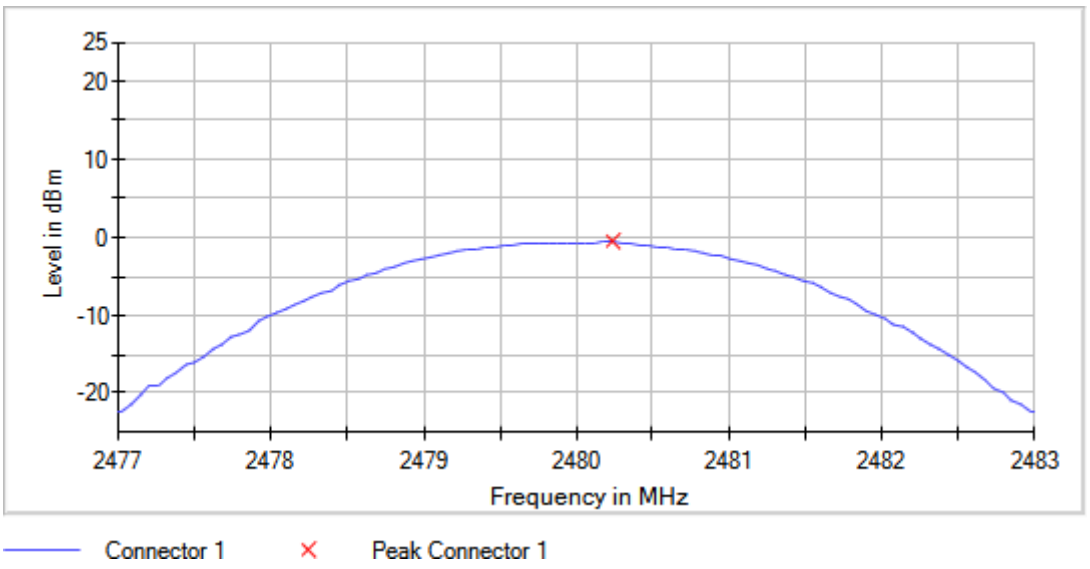
**Images:**

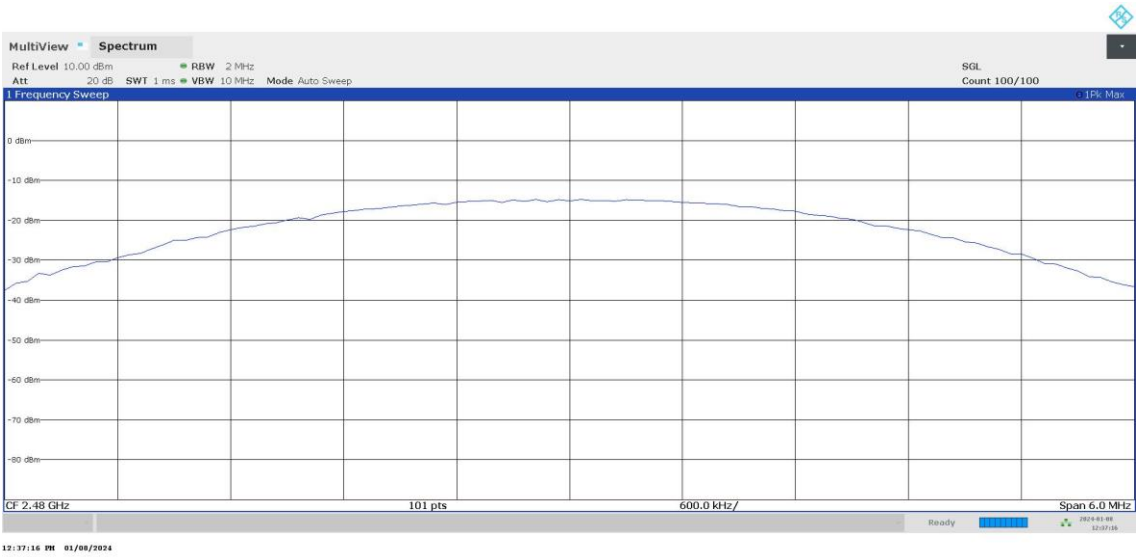


Modulation = BT (Pi/4 DQPSK 2-DH5) Frequency MHz = 2480.00000

**Images:**



Modulation: BT (8DPSK 3-DH5)

***Results***

| Equipment | BW (MHz) | Freq (MHz) | Port | Peak Power (dBm) | Peak Power (dBm ) e.i.r.p |
|---|---|---|---|---|---|
| Frequency Hopping Spread Spectrum systems (DSS) | 1 | 2402.00000 | 1 | -1.2060 | -1.2060 |
| | | 2441.00000 | | -1.0530 | -1.0530 |
| | | 2480.00000 | | -0.2040 | -0.2040 |

***Verdict***

Pass