



FCC LISTED, REGISTRATION
 NUMBER: 2764.01

ISED LISTED REGISTRATION
 NUMBER: 23595-1

Test Report No:

4415ERM.002A2

Test Report

USA FCC Part 15.247, 15.209, 15.207; & CANADA RSS-247, RSS-Gen

Radio Frequency Devices. Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz

Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices.

(*) Identification of item tested	Infotainment Head Unit Android Based
(*) Trademark	HARMAN
(*) Model and /or type reference	TAS700 BRA
Other identification of the product	Model: B-Plat FCC ID: 2AHPN-BE2874
(*) Features	AM/FM receiver, Bluetooth EDR, Wi-Fi 2.4GHz & 5GHz
Manufacturer	Harman da Amazonia. Av. Cupiúba, 401 – Distrito Industrial Manaus, Amazonas, 69075-060, Brasil
Test method requested, standard	USA FCC Part 15.247 (06-01-20): Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz USA FCC Part 15.209 (06-28-21): Radiated emission limits; general requirements. CANADA RSS-247 Issue 3 (August 2023). CANADA RSS-Gen Issue 5 amendment 1 (March 2019). 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. ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Domingo Galvez EMC&RF Lab Manager
Date of issue	07-25-2024
Report template No	FDT08_24 (* "Data provided by the client")

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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 Certification Inc. is a testing laboratory accredited by A2LA (The American Association for Laboratory Accreditation), to perform the tests indicated in the Certificate 2764.01

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

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

DEKRA Certification Inc. 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 Certification at the time of performance of the test.

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

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

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General conditions

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 Certification Inc.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Certification Inc. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Certification internal document PODT000.

Test case	Frequency (MHz)	U (k=2)	Units
RF Power and PSD	2402-2483	0.88	dB
Occupied Bandwidth		1.87	%
Band Edge		0.64	dB
Radiated Spurious Emission	30-180	4.27	dB
	180-1000	3.14	dB
	1000-18000	3.30	dB
	18000-40000	3.49	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 a Receiver Assy, Radio & Display.

DEKRA 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.

Sample S/01 is composed of the following elements:

Id	Control Number	Description	Model	Serial N°	Date of Reception	Application
S/01	4415/24	Infotainment Unit - BRA B (Conducted)	TAS700	T2869HR039900002	04/04/2024	Element Under Test

Sample S/01 is composed of the following accessories:

Id	Control Number	Description	Model	Serial N°	Date of Reception	Application
S/01	4415/01	Bench setup	TAS700	-	02/23/2024	Accessory

1. SAMPLE S/01 WAS USED FOR THE TEST(S): ALL CONDUCTED TESTS INDICATED IN APPENDIX A AND B.

Sample S/02 is composed of the following elements:

Id	Control Number	Description	Model	Serial N°	Date of Reception	Application
S/02	4415/04	Infotainment Unit - BRA B (Radiated)	TAS700	T2869HR047900008	02/23/2024	Element Under Test

Sample S/02 is composed of the following accessories:

Id	Control Number	Description	Model	Serial N°	Date of Reception	Application
S/02	4415/26	USB C-Type Hub Harness	-	-	04/04/2024	Accessory
S/02	4415/30	USB Cables (Type A)	-	-	04/04/2024	Accessory
S/02	4415/31	HU Power Harness	-	-	04/04/2024	Accessory
S/02	4415/34	AM/FM and GPS Antennas	-	-	04/04/2024	Accessory

2. SAMPLE S/02 WAS USED FOR THE TEST(S): ALL RADIATED TESTS INDICATED IN APPENDIX A AND B.

Test sample description

Test Sample description (compulsory information for EMC and RF testing services)

Ports..... :	Port name and description	Cable				
		Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾	
	RF_Port 1 = BT/WLAN-5GHz (Module Pin C01)	.....	[X]	[X]	[]
	RF_Port 2 = WLAN 2,4GHz (Module Pin K02)	.....	[X]	[X]	[]
	No Data Provided	.....	[ ]	[ ]	[ ]
	No Data Provided	.....	[ ]	[ ]	[ ]
	No Data Provided	.....	[ ]	[ ]	[ ]
	No Data Provided	.....	[ ]	[ ]	[ ]
Supplementary information to the ports..... :	No Data Provided					
Rated power supply..... :	Voltage and Frequency	Reference poles				
		L1	L2	L3	N	PE
	[] AC:	[]	[]	[]	[]	[]
	[] AC:	[]	[]	[]	[]	[]
	[X] DC: 12 V nominal Car battery, 8V to 16V max					
	[] DC:					
Rated Power..... :	No Data Provided					
Clock frequencies..... :	No Data Provided					
Other parameters..... :	No Data Provided					
Software version..... :	R5.2					
Hardware version..... :	C1					
Dimensions in cm (W x H x D)..... :	No Data Provided					
Mounting position..... :	[]	Tabletop equipment				
	[]	Wall/Ceiling mounted equipment				
	[]	Floor standing equipment				
	[]	Hand-held equipment				
	[X]	Other:				

Modules/parts	Module/parts of test item	Type	Manufacturer
	No Data Provided	.....	.....
Accessories (not part of the test item)	Description	Type	Manufacturer
	Bench Setup + antenna		
	Cable Harness		
Documents as provided by the applicant	Description	File name	Issue date
	Declaration Equipment Data	FDT30_18 Declaration Equipment Data	04/30/2024

Copy of marking plate:



Identification of the client

Harman International Industries, Inc.
 3001 Cabot Drive,
 Novi, MI 48377
 USA

Testing period and place

Test Location	DEKRA Certification Inc.
Date (start)	04-08-2024
Date (finish)	05-01-2024

Document history

Report number	Date	Description
4415ERM.002	05-08-2024	First release.
4415ERM.002A1	05-20-2024	Second release. There is a change in Antenna Gain, also from the Cover page IC ID is removed as per the customers decision. This modified report cancels and replaces the report 4415ERM.002.
4415ERM.002A2	07-25-2024	Third release. There are some modifications in general information part. This modified report cancels and replaces the report 4415ERM.002A1.

Environmental conditions

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

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860mbar Max. = 1060mbar

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

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860mbar Max. = 1060mbar

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

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860mbar Max. = 1060mbar

Remarks and comments

The tests have been performed by the technical personnel: Madhava Gooduru, Yuqi Wang, Prudhvi Kothapalli and Koji Nishimoto.

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
RSS-247 5.1 (b) / FCC 15.247 (a) (1) 20 dB Bandwidth		Pass	N/A
RSS-247 5.1 (b) / FCC 15.247 (a) (1) Carrier Frequency Separation		Pass	N/A
RSS-247 5.1 (d) / FCC 15.247 (a) (1) (iii) Time of Occupancy (Dwell Time)		Pass	N/A
RSS-247 5.1 (d) / FCC 15.247 (a) (1) (iii) Number of hopping channels		Pass	N/A
RSS-247 5.4 (b) / FCC 15.247 (b) (1) Maximum Peak Conducted output power & Antenna gain		Pass	N/A
RSS-247 5.5 / FCC 15.247 (d) Band-edge emissions compliance (Transmitter) - Conducted		Pass	N/A
FCC 2.1049 / 99dBw Occupied Channel Bandwidth 99%		Pass	N/A
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Radiated		Pass	N/A
Supplementary information and remarks: None			

Wi-Fi 2.4GHz

Requirement – Test case	FCC PART 15 PARAGRAPH / RSS-247	Verdict	Remark
RSS-247 5.2 (a) / FCC 15.247 (a) (2) 6 dB Bandwidth		Pass	N/A
RSS-247 5.2 (b) / FCC 15.247 (e) Power spectral density		Pass	N/A
RSS-247 5.4 (d) / FCC 15.247 (b) (1) Maximum Average Conducted Output Power		Pass	N/A
RSS-247 5.5 / FCC 15.247 (d) Band-edge emissions compliance (Transmitter) - Conducted		Pass	N/A
FCC 2.1049 / 99dBw Occupied Channel Bandwidth 99%		Pass	N/A
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Radiated		Pass	N/A
Supplementary information and remarks: None			

List of equipment used during the test

FCC 47 CFR Part 15.247 / RSS-247

Conducted Measurements

CONTROL NUMBER	DESCRIPTION	Serial No	LAST CALIBRATION	NEXT CALIBRATION
1039	FSV40 SIGNAL ANALYSER 40GHZ	101627	2022-11-01	2024-11-01
1107	ETHERNET SNMP THERMOMETER	60038026952	2022-10-18	2024-10-18
1313	WIRELESS MEASUREMENT SOFTWARE R&S WMS32	-	N/A	N/A

Radiated Measurements

CONTROL NUMBER	DESCRIPTION	Serial No	LAST CALIBRATION	NEXT CALIBRATION
981	LOW NOISE PREAMPLIFIER	1711156B	2024-02-20	2026-02-20
1012	ESR26 EMI TEST RECEIVER	101478	2023-01-18	2025-01-18
1014	FSV40 SIGNAL ANALYZER 40GHZ	101626	2023-01-18	2025-01-18
1056	3116C DOUBLE-RIDGED WAVEGUIDE HORN ANTENNAS	213179	2023-02-23	2026-02-23
1057	3115 DOUBLE-RIDGED WAVEGUIDE HORN ANTENNAS	211373	2023-07-18	2026-07-18
1064	3142E BICONILOG ANTENNA	208600	2021-12-13	2024-12-13
1111	ETHERNET SNMP THERMOMETER	60038026577	2022-10-18	2024-10-18
1179	SEMI-ANECHOIC CHAMBER	F169021	N/A	N/A
1314	WIRELESS MEASUREMENT SOFTWARE R&S EMC32	1040-OT102236	N/A	N/A

Appendix A: Test results. Bluetooth EDR

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TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal: 12 V nominal Car battery, 8V to 16V max V
Type of Power Supply:

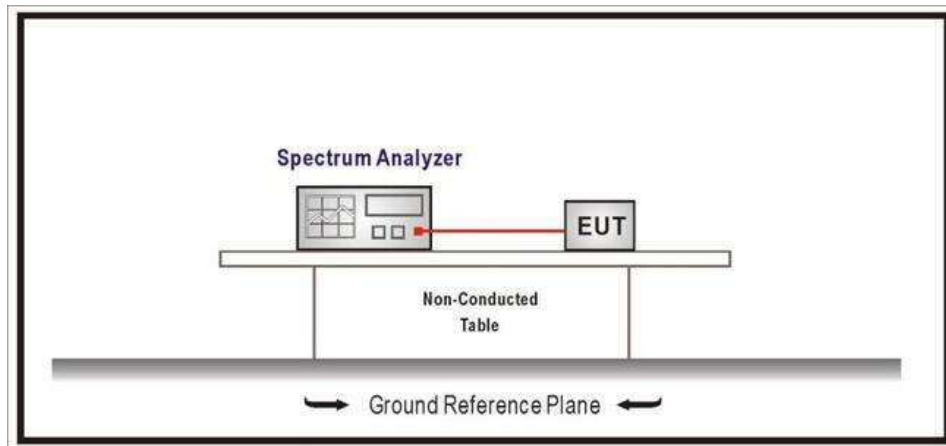
ANTENNA (*):

Type of Antenna: Internal PCB trace antenna
Maximum Declared Antenna Gain: 3.15 dBi @Wi-Fi 2.4 GHz and 3.82 dBi @BT.

TEST FREQUENCIES (*):

Low Channel: 2402 MHz
Middle Channel: 2441 MHz
High Channel: 2480 MHz

CONDUCTED MEASUREMENTS:



RADIATED MEASUREMENTS:

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at 3 m for the frequency range 30-1000 MHz (Bilog antenna) and 1-18 GHz Double ridge horn antennas, and 1m for the frequency range 18 GHz- 26 GHz Double ridge horn antenna.

For radiated emissions in the range 18 - 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 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

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

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

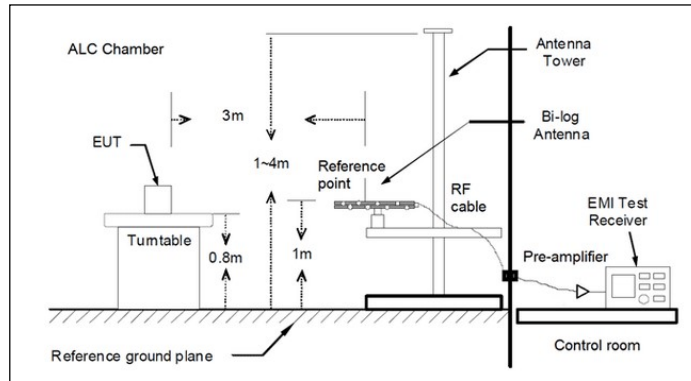


Fig A1: Radiated measurements Setup $f < 1$ GHz

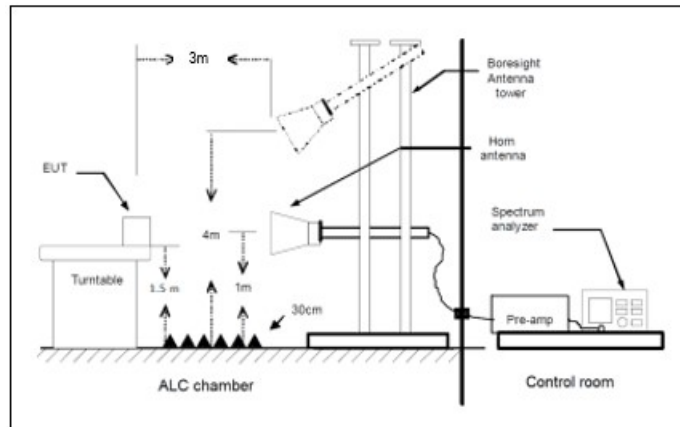


Fig A2: Radiated measurements setup $f > 1-18$ GHz

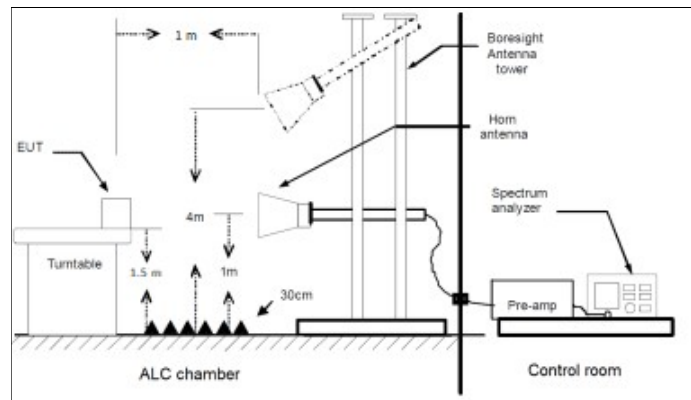


Fig A3: Radiated measurements setup $f > 18$ GHz

TEST CASES DETAILS

FCC 47 CFR Part 15.247 / RSS-247

FCC 2.1049 / 99dBw Occupied Channel Bandwidth 99%

Limits

No Limit has been set to this test case

Results

Modulation: BT (GFSK 1-DH1)

MIMO Mode: SISO

Equipment	BW (MHz)	Freq (MHz)	Port	Occ Ch BW (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	2402.00000	1	0.885
		2441.00000		0.875
		2480.00000		0.885

Verdict

Pass

Attachments

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

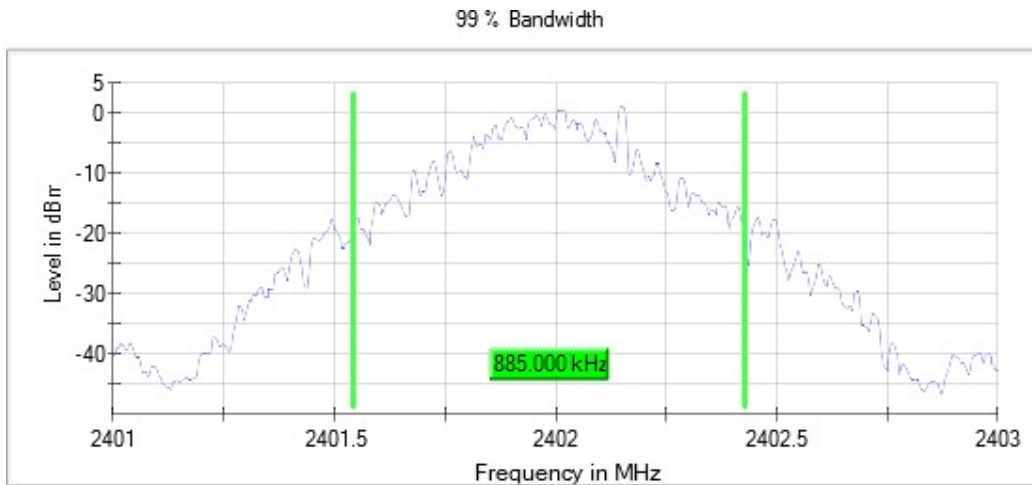
Modulation = BT (GFSK 1-DH1)

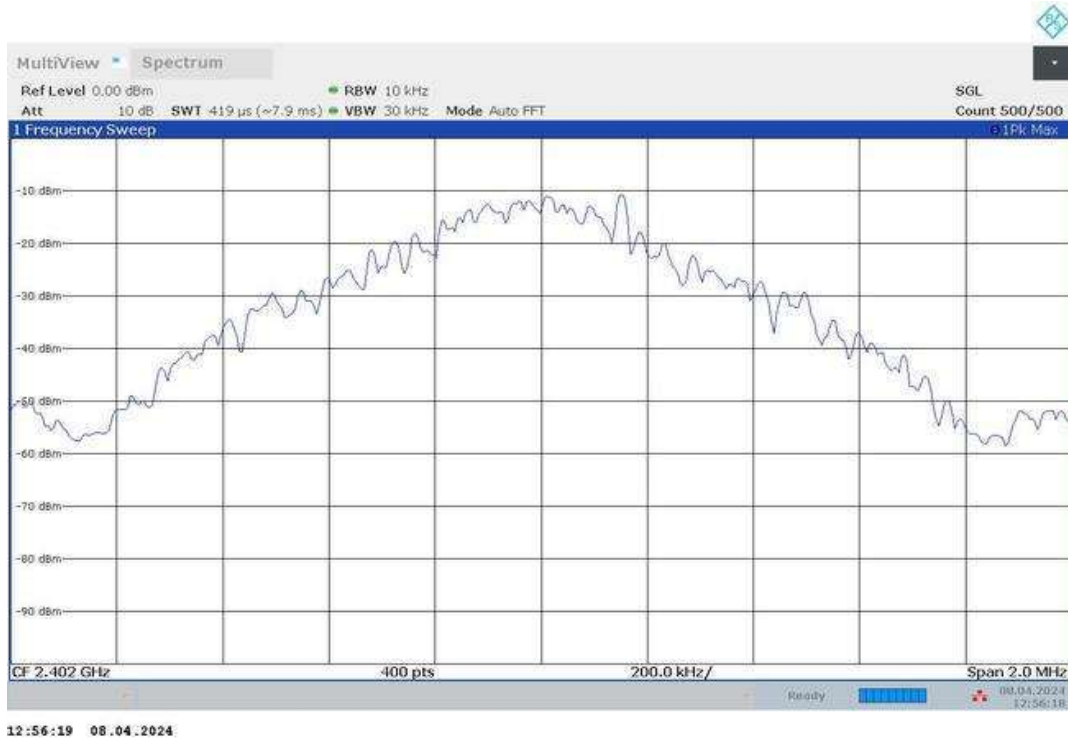
Frequency MHz = 2402.00000

MIMO Mode = SISO

Active Port = 1

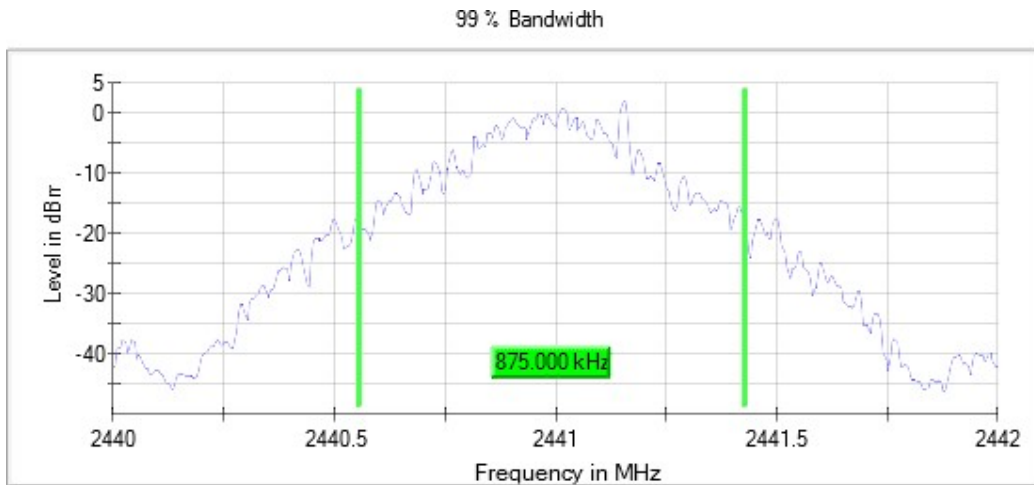
Images:





Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
 Modulation = BT (GFSK 1-DH1) Frequency MHz = 2441.00000
 MIMO Mode = SISO Active Port = 1

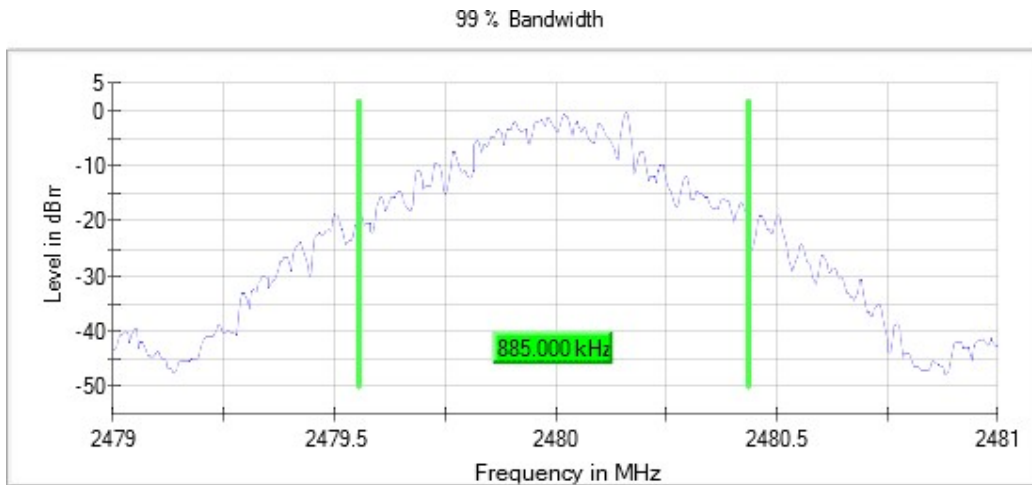
Images:

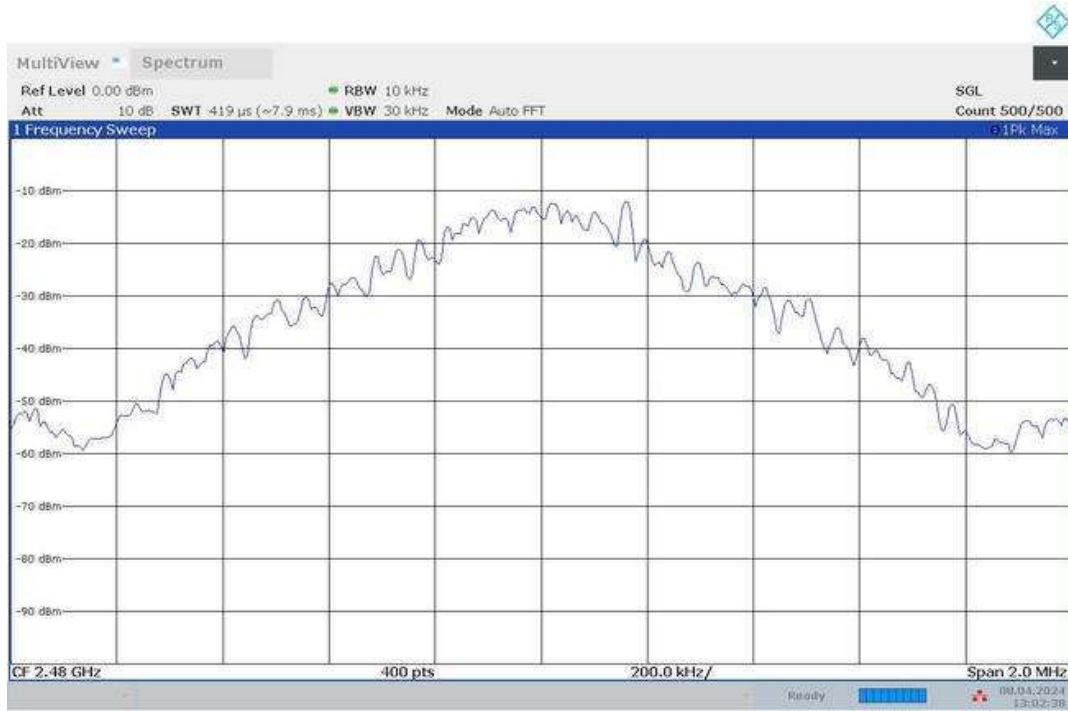




Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
Modulation = BT (GFSK 1-DH1) Frequency MHz = 2480.00000
MIMO Mode = SISO Active Port = 1

Images:





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Modulation: BT (Pi/4 DQPSK 2-DH3)

MIMO Mode: SISO

Results

Equipment	BW (MHz)	Freq (MHz)	Port	Occ Ch BW (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	2402.00000	1	0.885
		2441.00000		0.885
		2480.00000		0.880

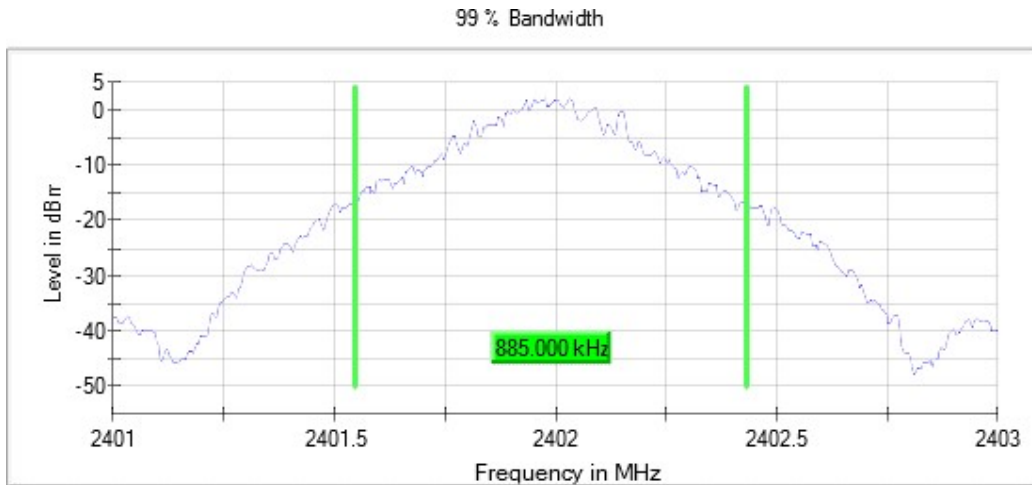
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
 Modulation = BT (Pi/4 DQPSK 2-DH3) Frequency MHz = 2402.00000
 MIMO Mode = SISO Active Port = 1

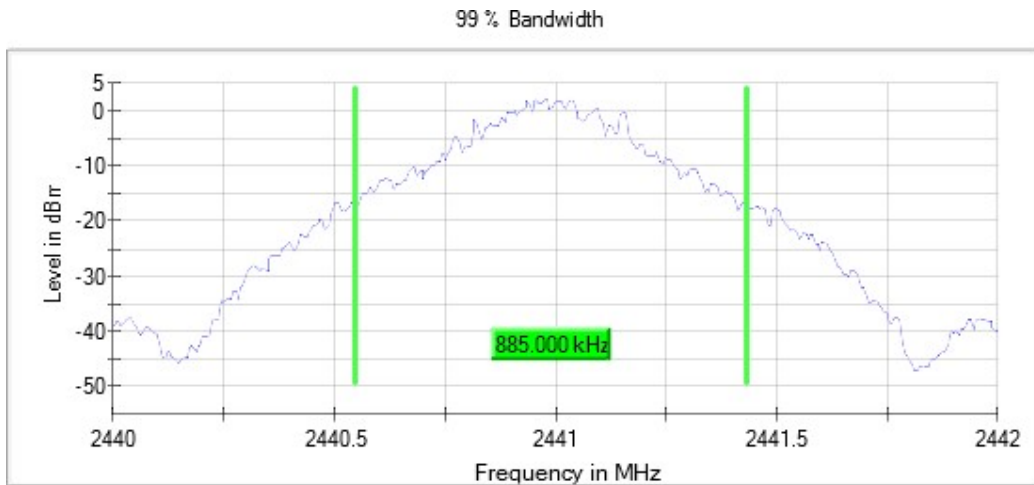
Images:





Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
 Modulation = BT (Pi/4 DQPSK 2-DH3) Frequency MHz = 2441.00000
 MIMO Mode = SISO Active Port = 1

Images:

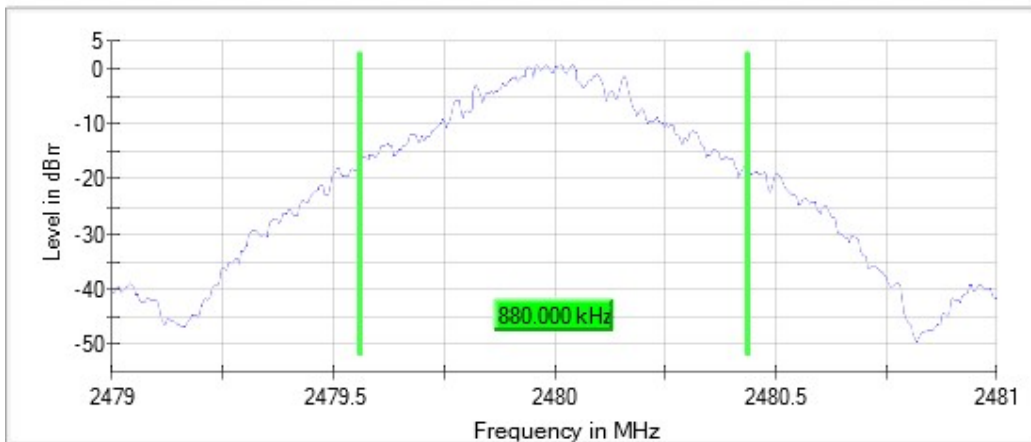




Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
 Modulation = BT (Pi/4 DQPSK 2-DH3) Frequency MHz = 2480.00000
 MIMO Mode = SISO Active Port = 1

Images:

99 % Bandwidth





13:40:39 08.04.2024

Modulation: BT (8DPSK 3-DH3)

MIMO Mode: SISO

Results

Equipment	BW (MHz)	Freq (MHz)	Port	Occ Ch BW (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	2402.00000	1	0.890
		2441.00000		0.890
		2480.00000		0.890

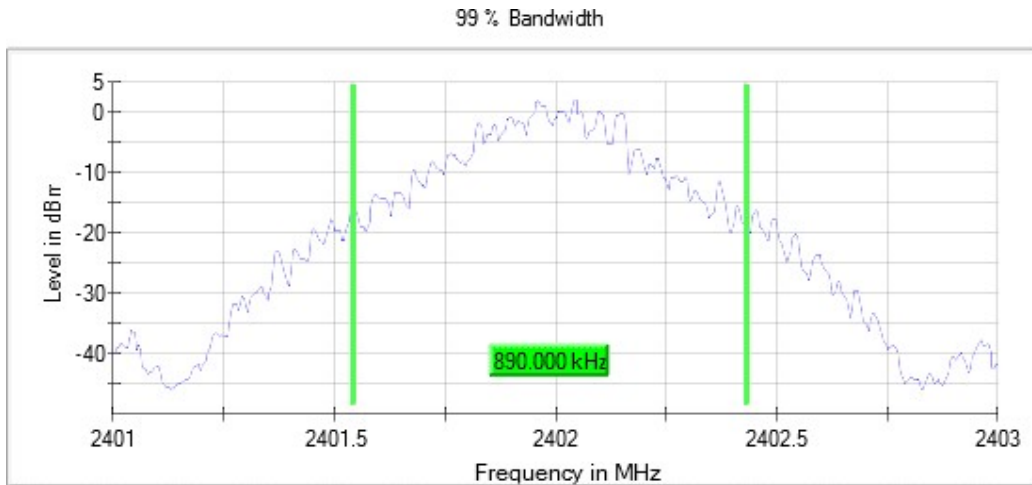
Verdict

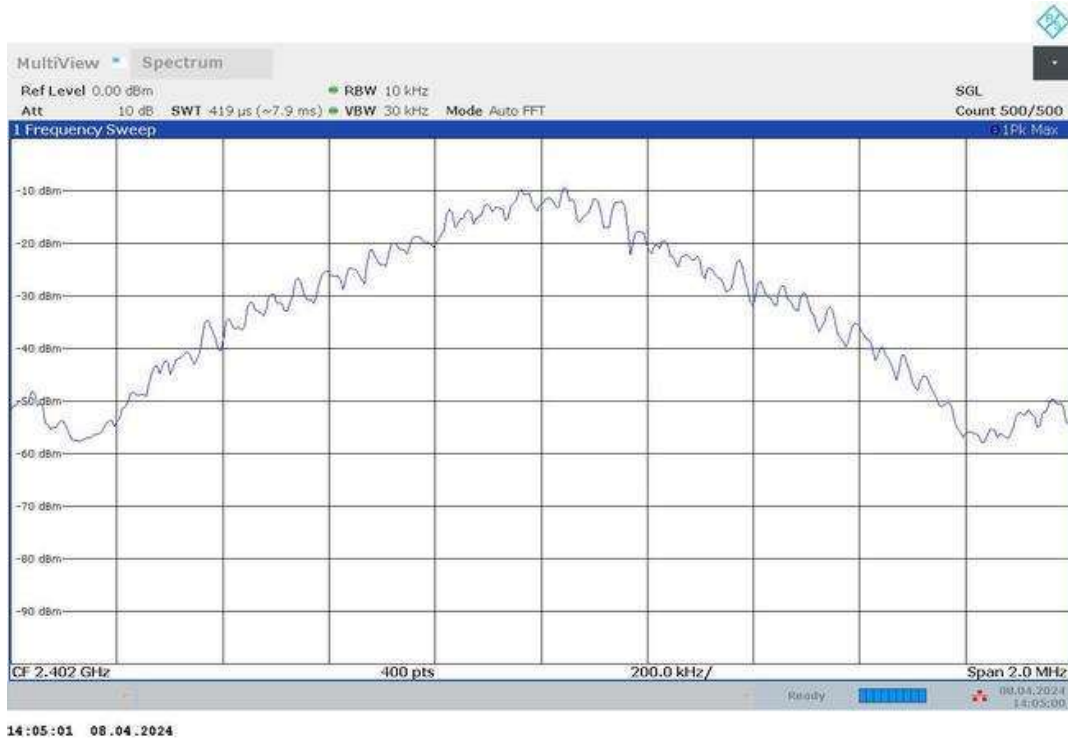
Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
 Modulation = BT (8DPSK 3-DH3) Frequency MHz = 2402.00000
 MIMO Mode = SISO Active Port = 1

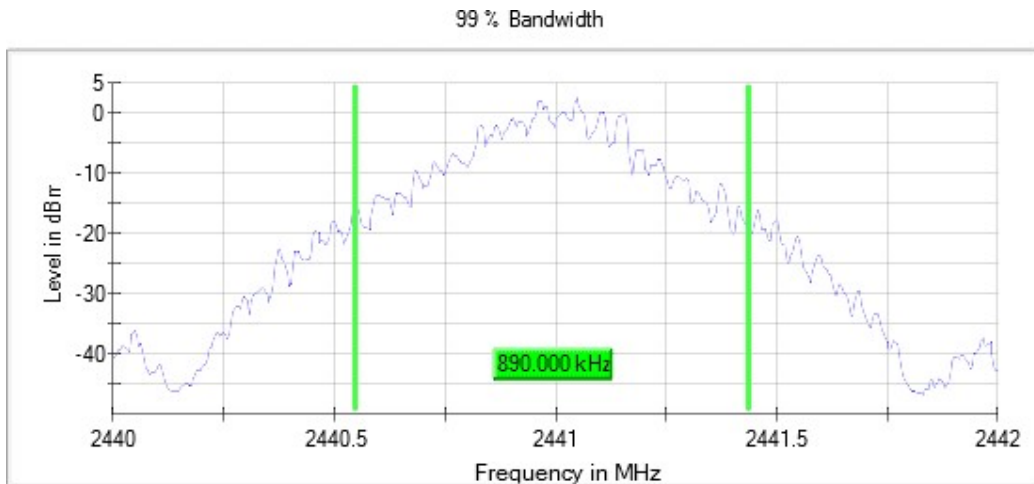
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Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
 Modulation = BT (8DPSK 3-DH3) Frequency MHz = 2441.00000
 MIMO Mode = SISO Active Port = 1

Images:

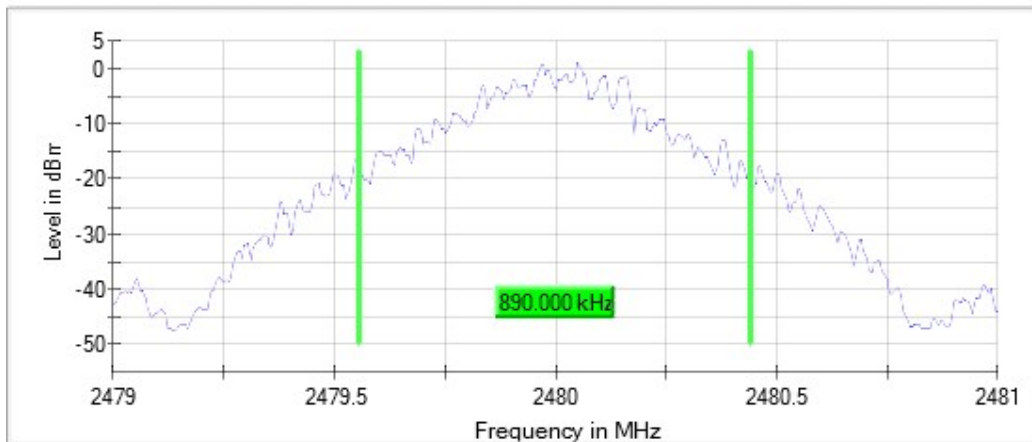


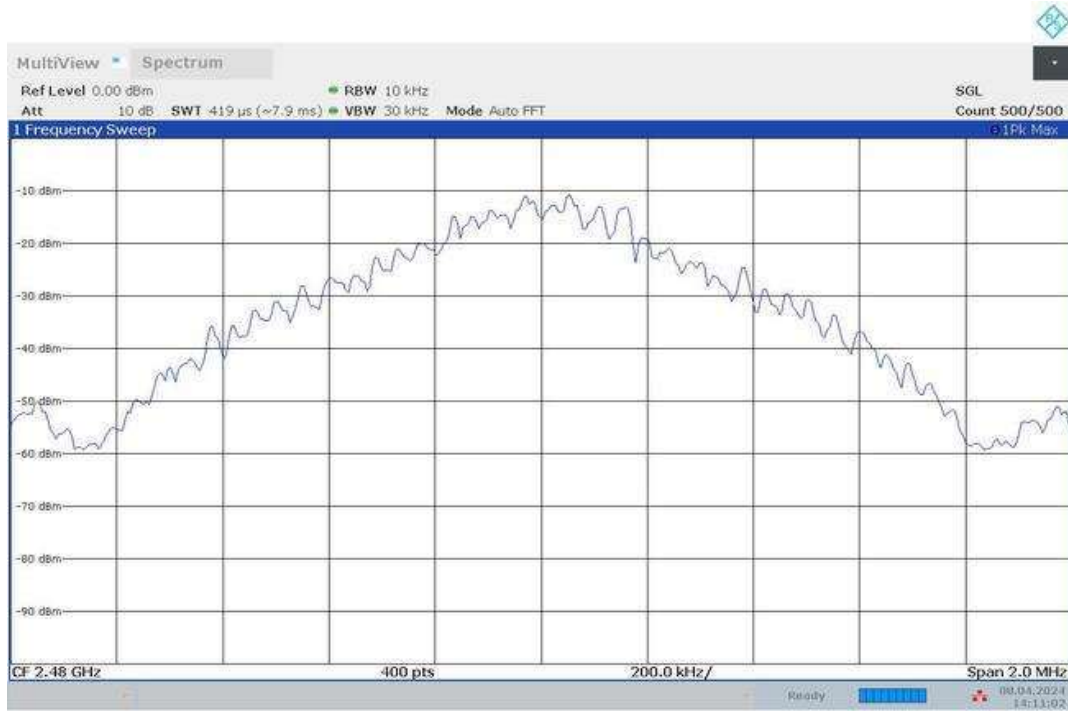


Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
 Modulation = BT (8DPSK 3-DH3) Frequency MHz = 2480.0000
 MIMO Mode = SISO Active Port = 1

Images:

99 % Bandwidth





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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.

Results

Modulation: BT (GFSK 1-DH1)

MIMO Mode: SISO

Equipment	BW (MHz)	Freq (MHz)	Port	Ebw (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	2402.00000	1	1.020
		2441.00000		1.020
		2480.00000		1.020

Verdict

Pass

Attachments

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

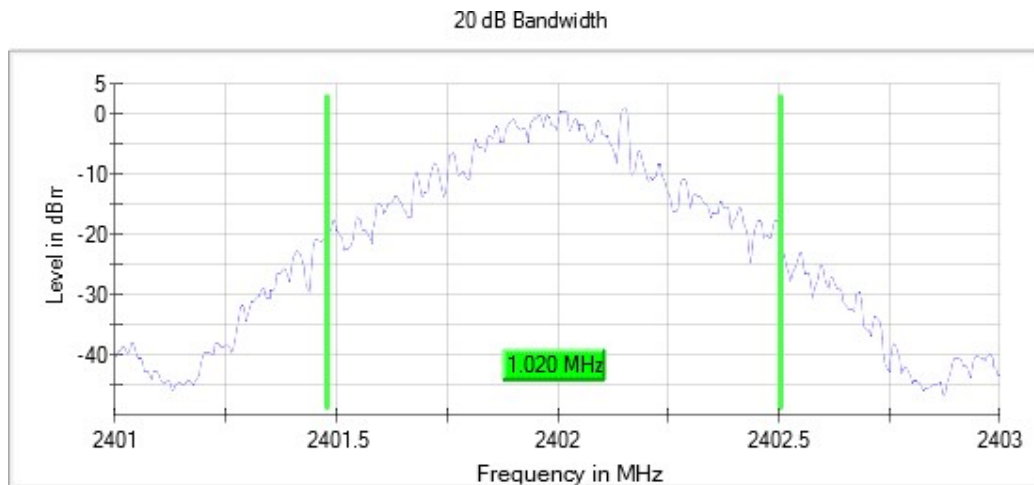
Modulation = BT (GFSK 1-DH1)

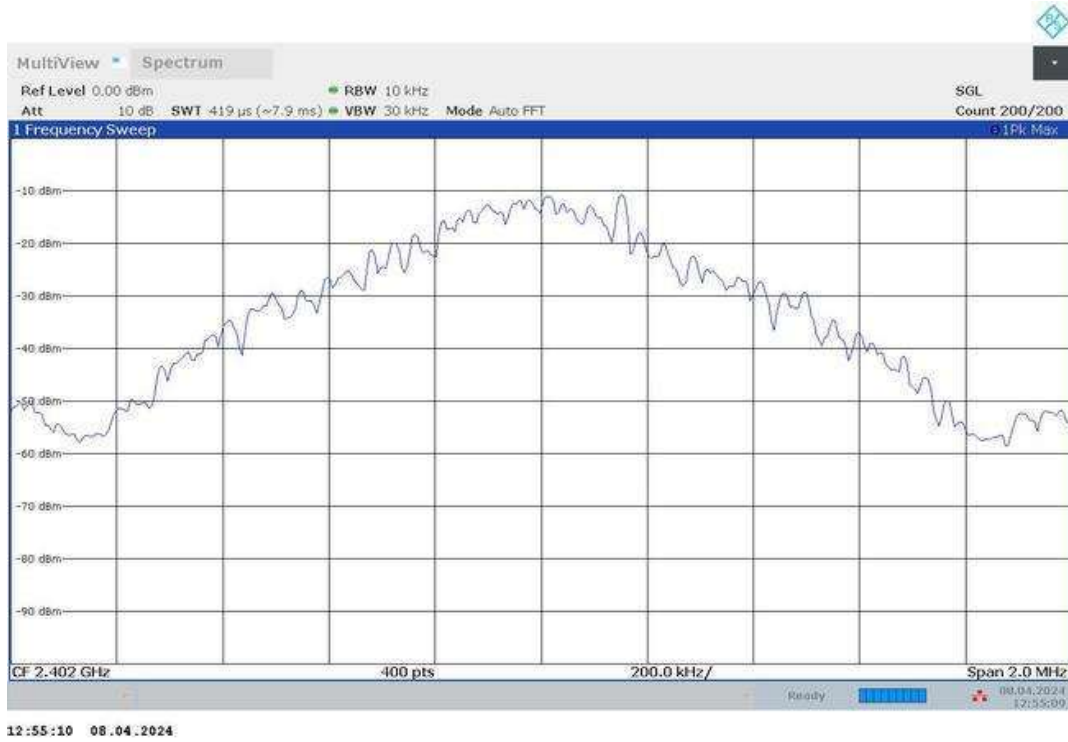
Frequency MHz = 2402.00000

MIMO Mode = SISO

Active Port = 1

Images:

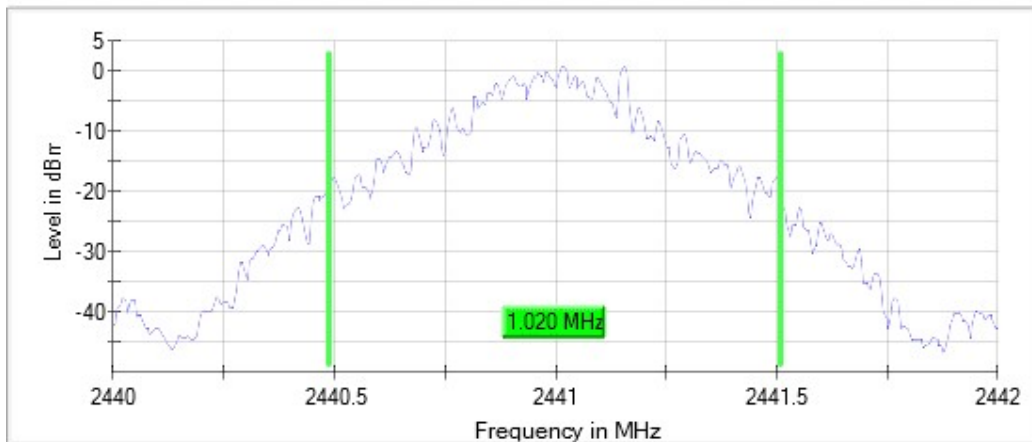


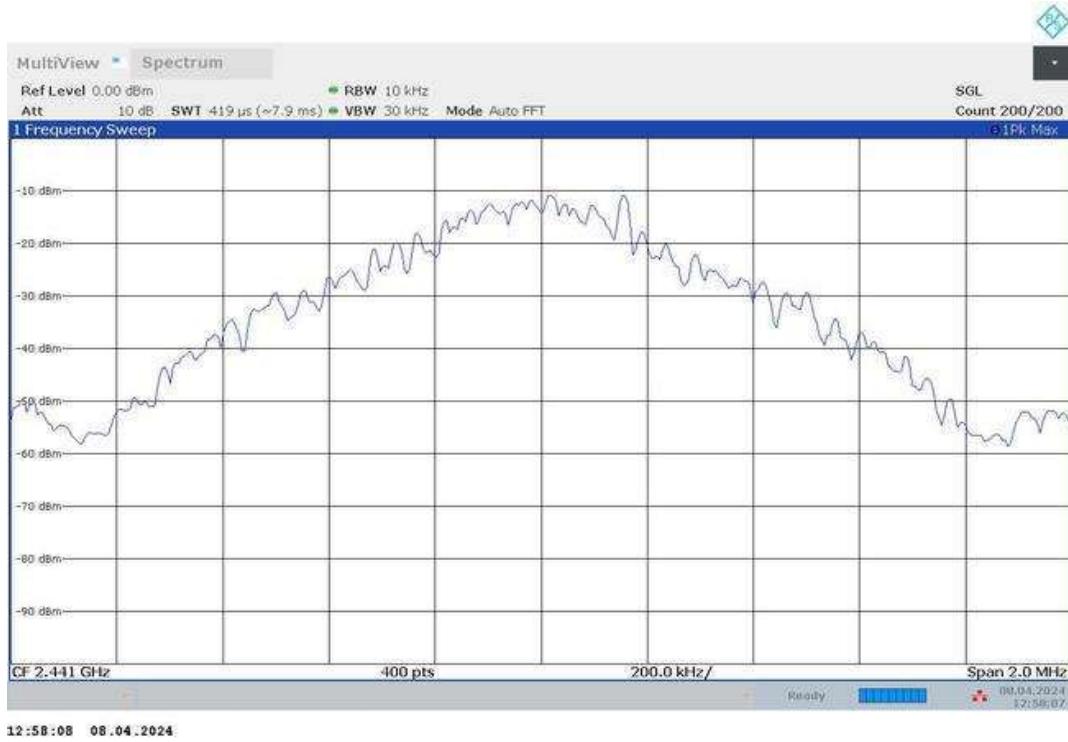


Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
 Modulation = BT (GFSK 1-DH1) Frequency MHz = 2441.00000
 MIMO Mode = SISO Active Port = 1

Images:

20 dB Bandwidth

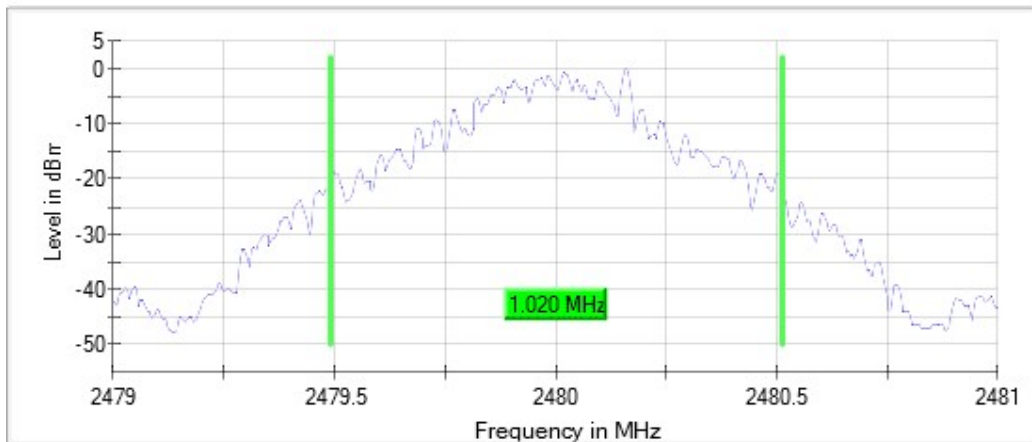




Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
Modulation = BT (GFSK 1-DH1) Frequency MHz = 2480.00000
MIMO Mode = SISO Active Port = 1

Images:

20 dB Bandwidth





13:01:22 08.04.2024

Modulation: BT (Pi/4 DQPSK 2-DH3)

MIMO Mode: SISO

Results

Equipment	BW (MHz)	Freq (MHz)	Port	Ebw (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	2402.00000	1	1.015
		2441.00000		1.005
		2480.00000		1.010

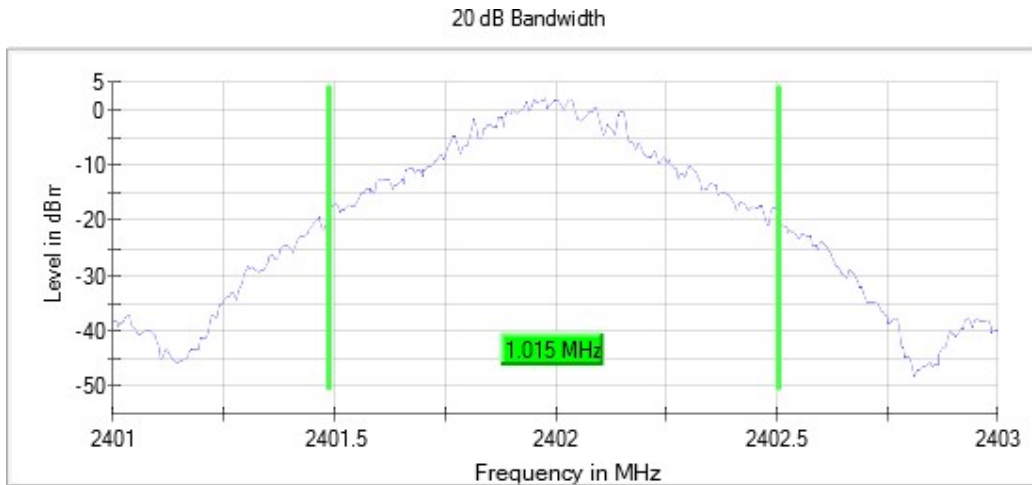
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
 Modulation = BT (Pi/4 DQPSK 2-DH3) Frequency MHz = 2402.00000
 MIMO Mode = SISO Active Port = 1

Images:

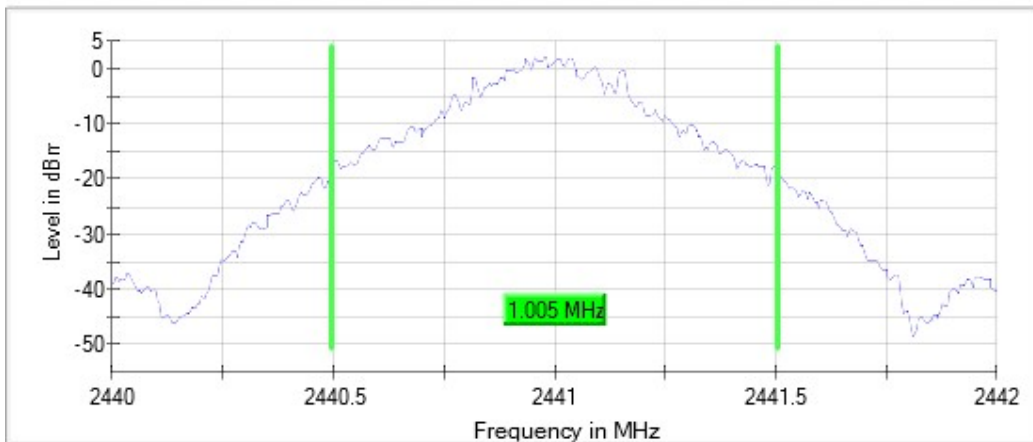




Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
 Modulation = BT (Pi/4 DQPSK 2-DH3) Frequency MHz = 2441.00000
 MIMO Mode = SISO Active Port = 1

Images:

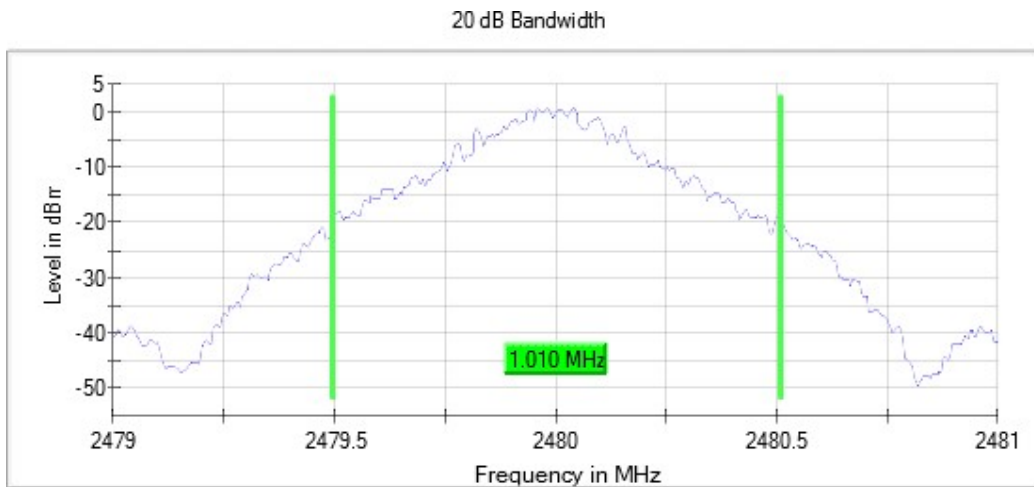
20 dB Bandwidth





Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
Modulation = BT (Pi/4 DQPSK 2-DH3) Frequency MHz = 2480.00000
MIMO Mode = SISO Active Port = 1

Images:





13:36:08 08.04.2024

Modulation: BT (8DPSK 3-DH3)

MIMO Mode: SISO

Results

Equipment	BW (MHz)	Freq (MHz)	Port	Ebw (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	2402.00000	1	0.930
		2441.00000		0.930
		2480.00000		0.965

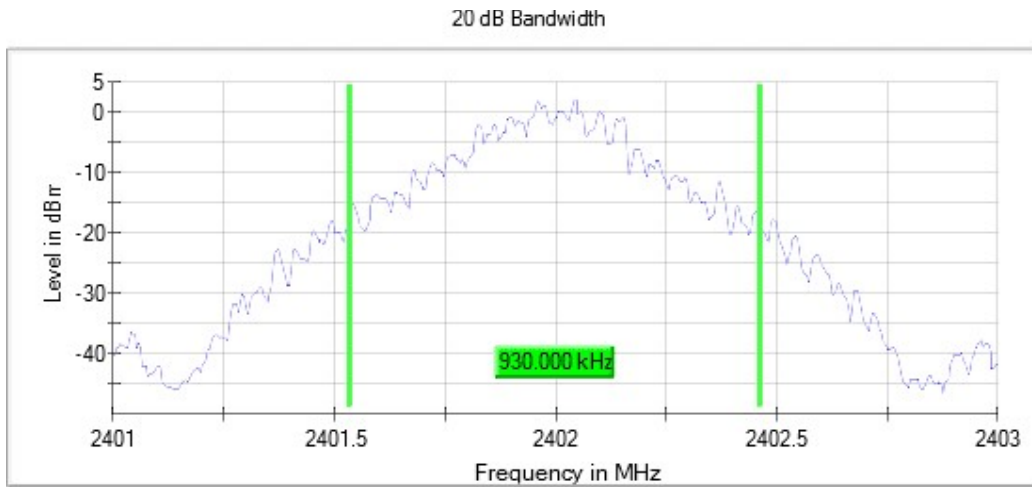
Verdict

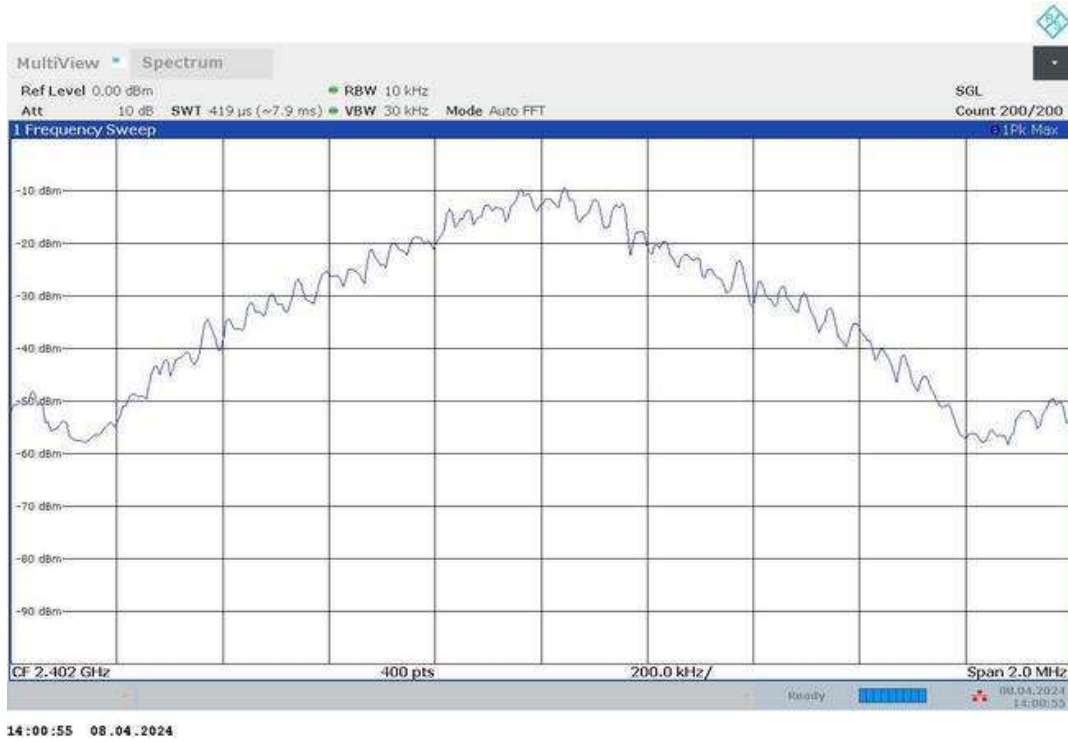
Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
 Modulation = BT (8DPSK 3-DH3) Frequency MHz = 2402.00000
 MIMO Mode = SISO Active Port = 1

Images:

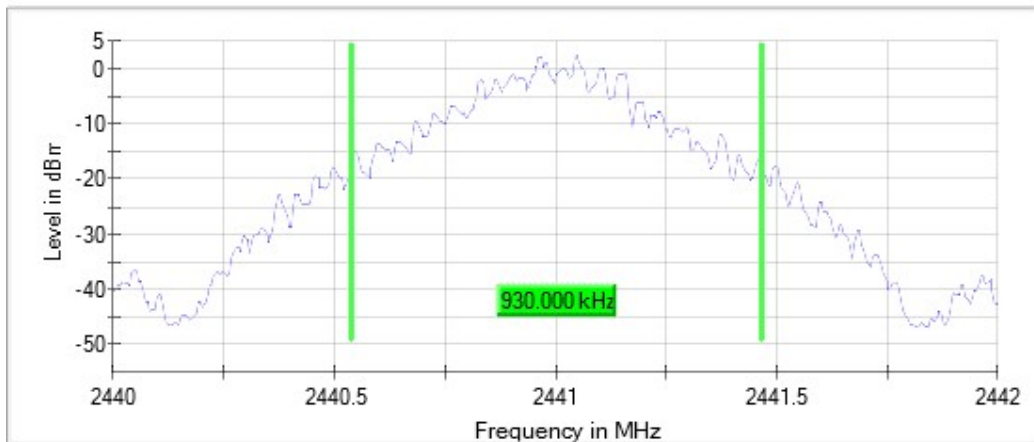




Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
 Modulation = BT (8DPSK 3-DH3) Frequency MHz = 2441.00000
 MIMO Mode = SISO Active Port = 1

Images:

20 dB Bandwidth

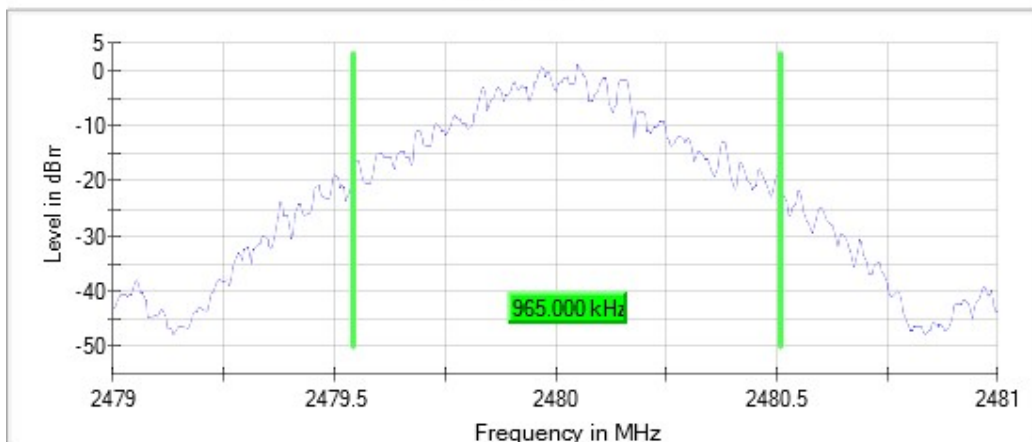




Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
 Modulation = BT (8DPSK 3-DH3) Frequency MHz = 2480.00000
 MIMO Mode = SISO Active Port = 1

Images:

20 dB Bandwidth





14:09:23 08.04.2024

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

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.

Results

Modulation: BT (GFSK 1-DH1)

MIMO Mode: SISO

Equipment	BW (MHz)	Port	Freq Sep (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	0.98

Verdict

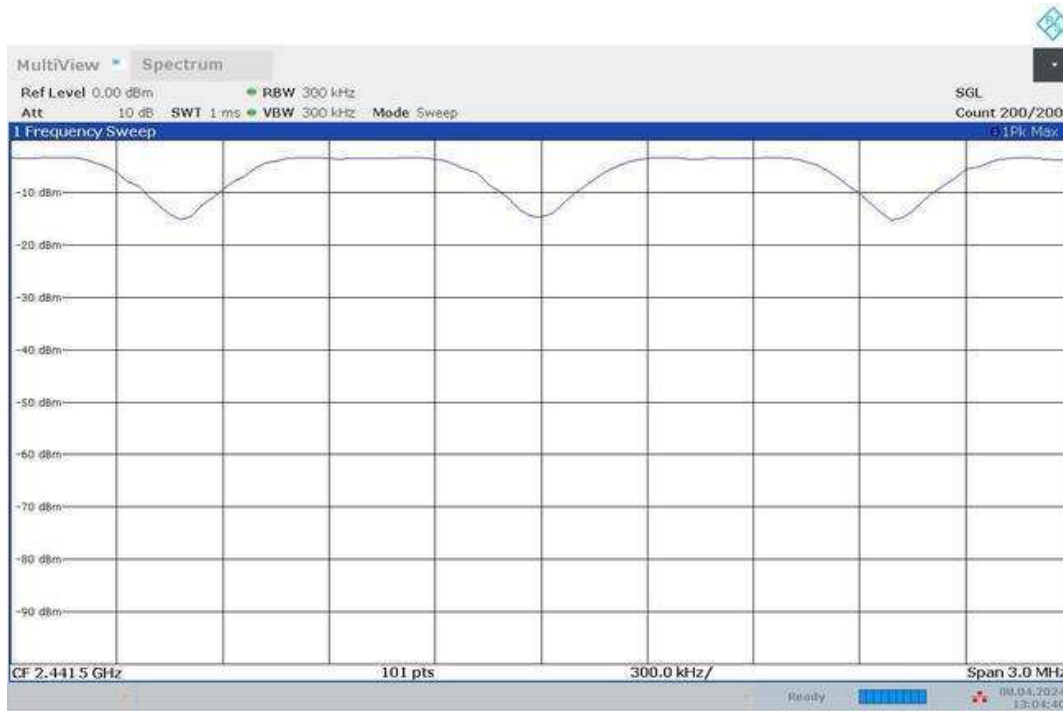
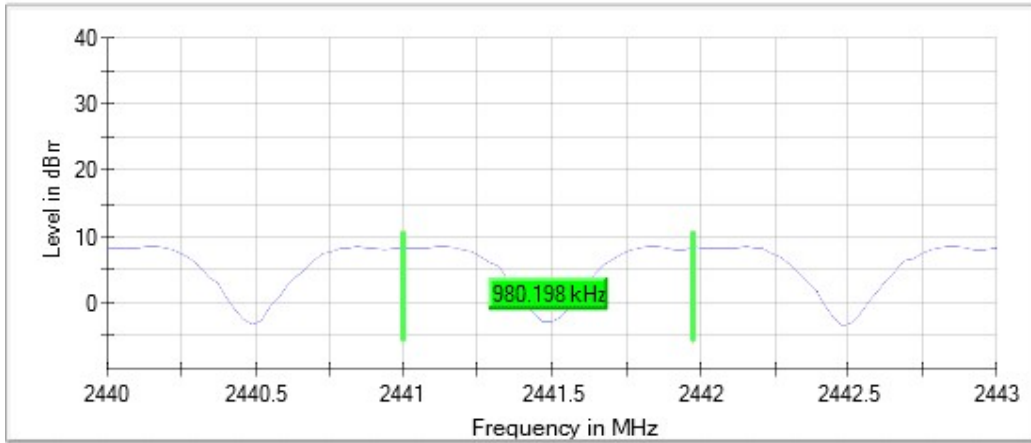
Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
Modulation = BT (GFSK 1-DH1) MIMO Mode = SISO
Active Port = 1

Images:

CFS



Modulation: BT (Pi/4 DQPSK 2-DH3)

MIMO Mode: SISO

Results

Equipment	BW (MHz)	Port	Freq Sep (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	0.98

Verdict

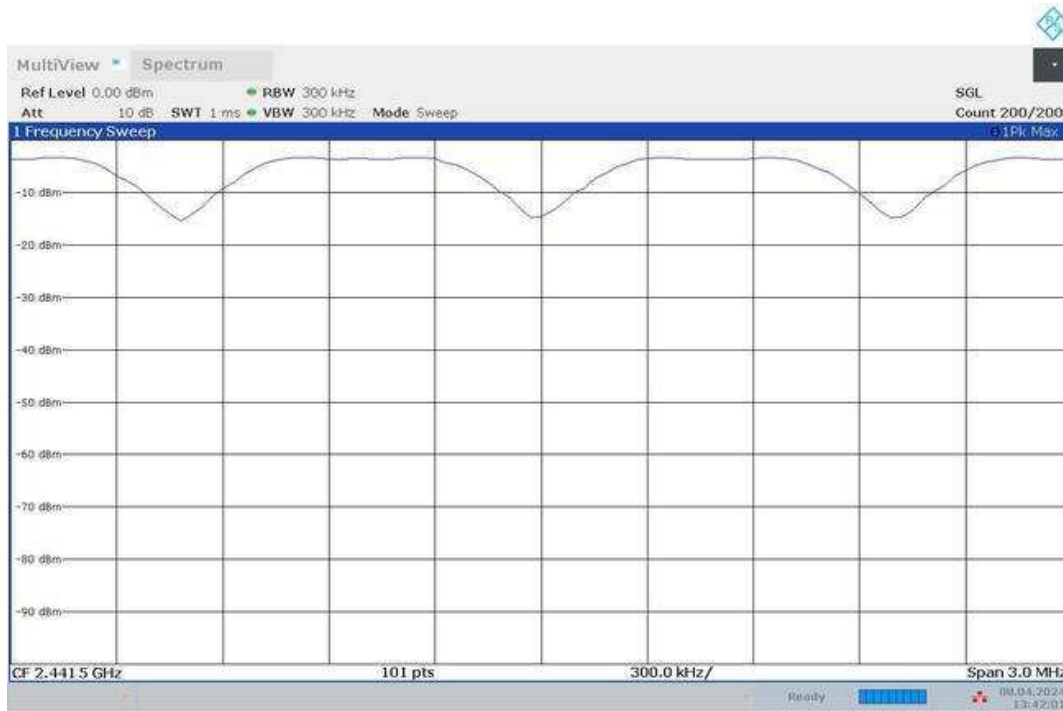
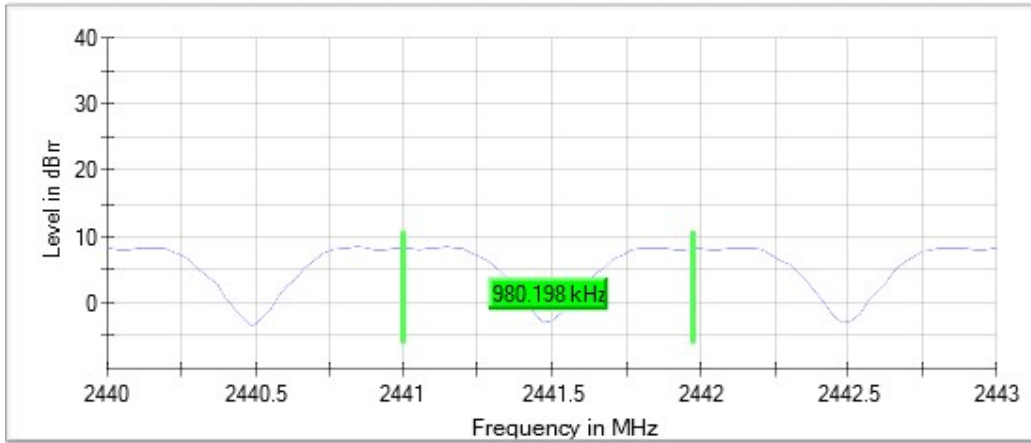
Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
Modulation = BT (Pi/4 DQPSK 2-DH3) MIMO Mode = SISO
Active Port = 1

Images:

CFS



13:42:02 08.04.2024

Modulation: BT (8DPSK 3-DH3)

MIMO Mode: SISO

Results

Equipment	BW (MHz)	Port	Freq Sep (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	0.98

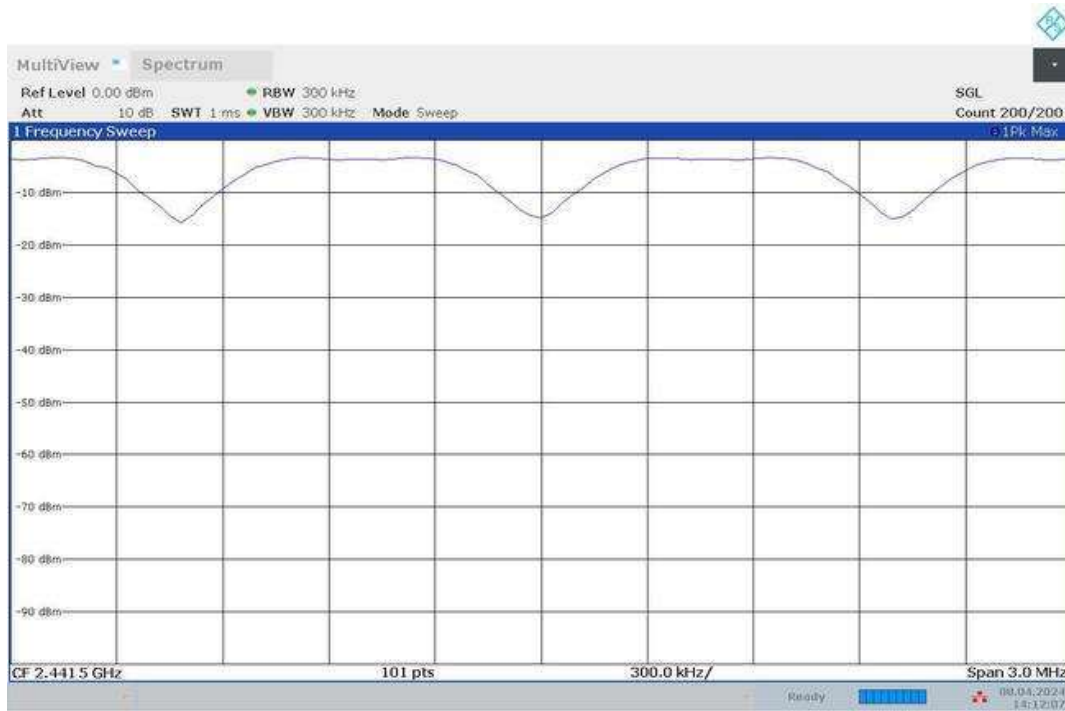
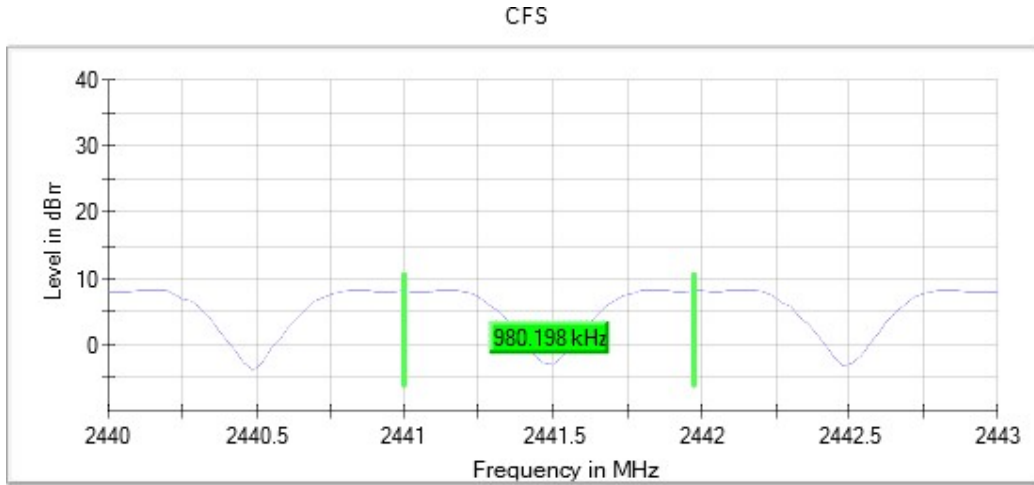
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
Modulation = BT (8DPSK 3-DH3) MIMO Mode = SISO
Active Port = 1

Images:



RSS-247 5.1 (d) / FCC 15.247 (a) (1) (iii) 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 = $0.4 \times 79 = 31.6$ seconds.

Results

Modulation: BT (GFSK 1-DH1)

Equipment	BW (MHz)	# of Tx Chains	Port	NHp	Avg COT (ms)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	11	4.63

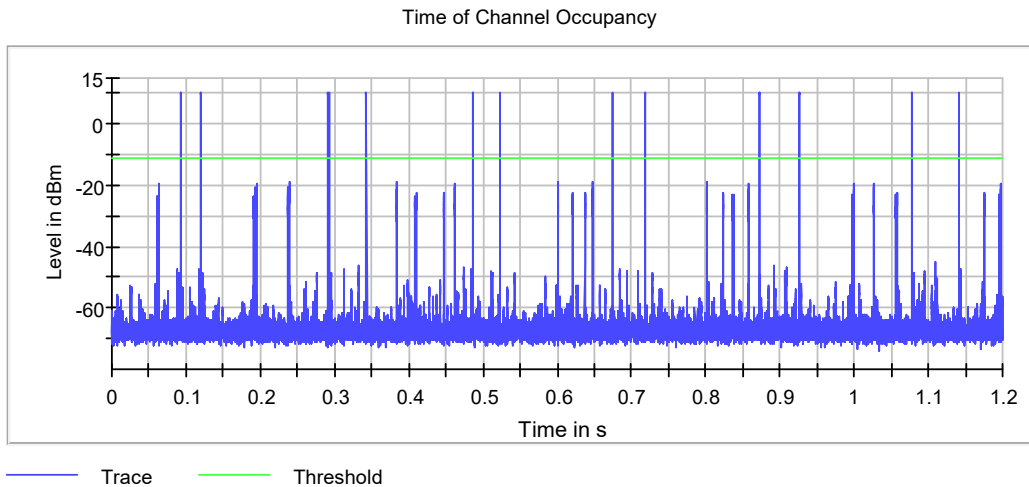
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH1), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BT $\pi/4$ DQPSK 2-DH3)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHp	Avg COT (ms)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	5	9.878

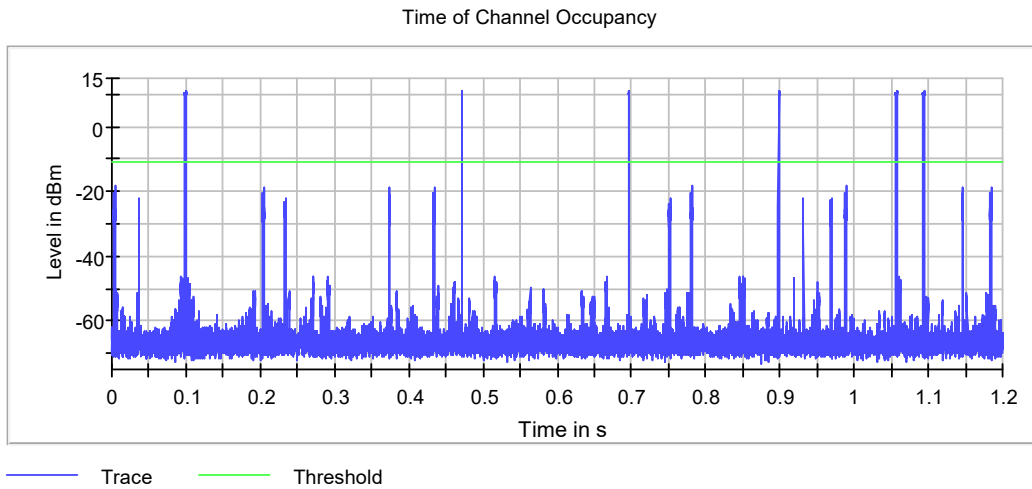
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT ($\pi/4$ DQPSK 2-DH3), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BT (8DPSK 3-DH3)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHp	Avg COT (ms)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	7	13.138

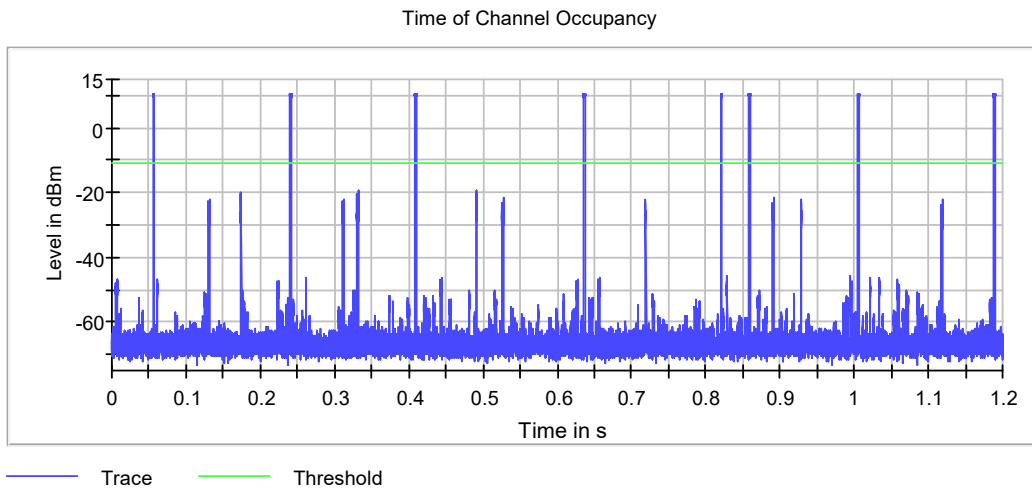
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH3), Number of Transmission Chains = 1, Active Port = 1

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.

Results

Modulation: BT (GFSK 1-DH1)
MIMO Mode: SISO

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

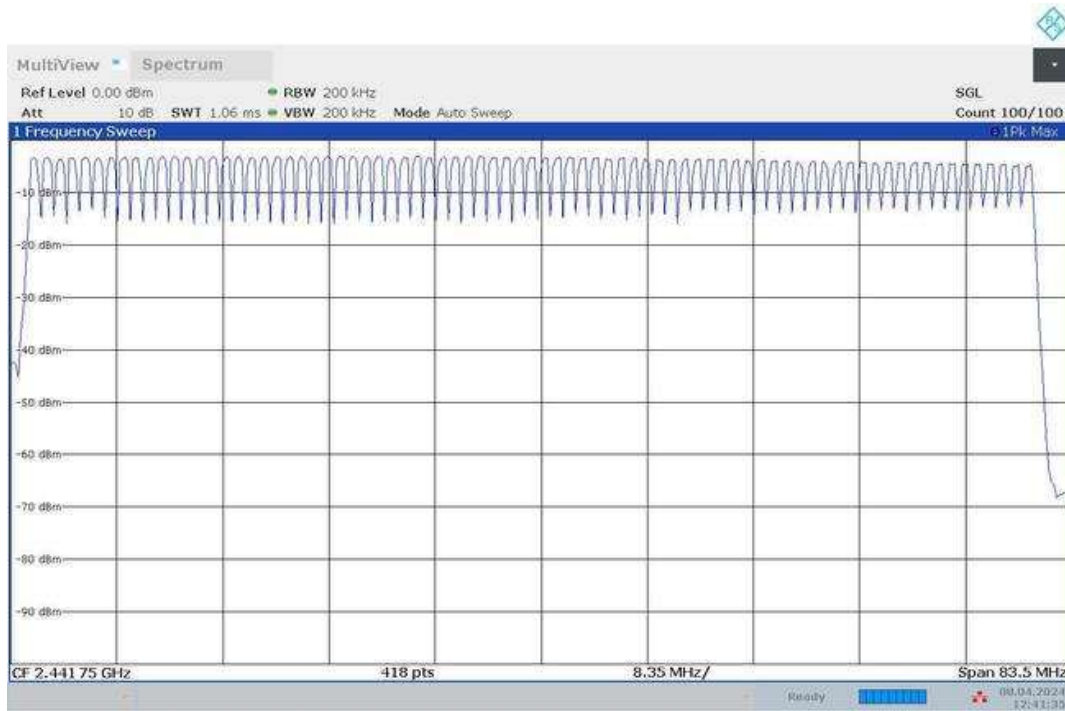
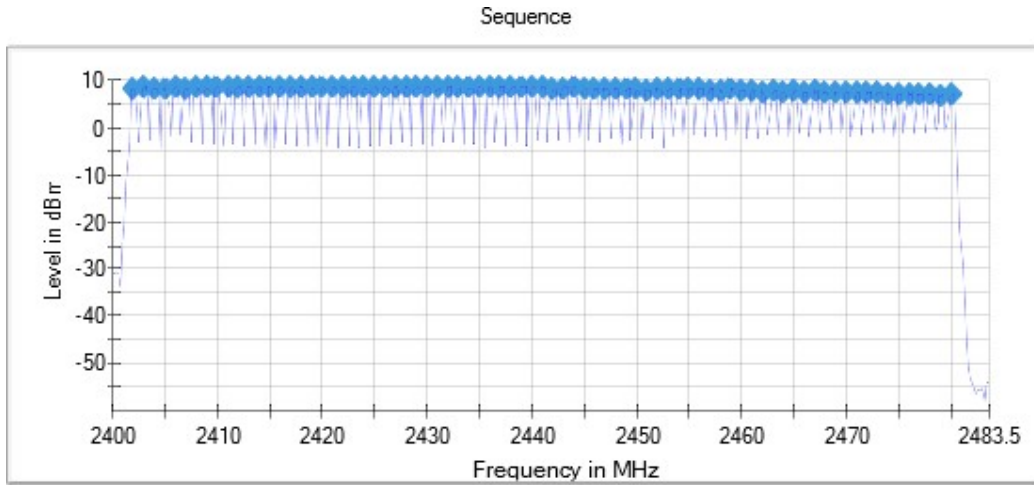
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
Modulation = BT (GFSK 1-DH1) MIMO Mode = SISO
Active Port = 1

Images:



Modulation: BT (Pi/4 DQPSK 2-DH3)

MIMO Mode: SISO

Results

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

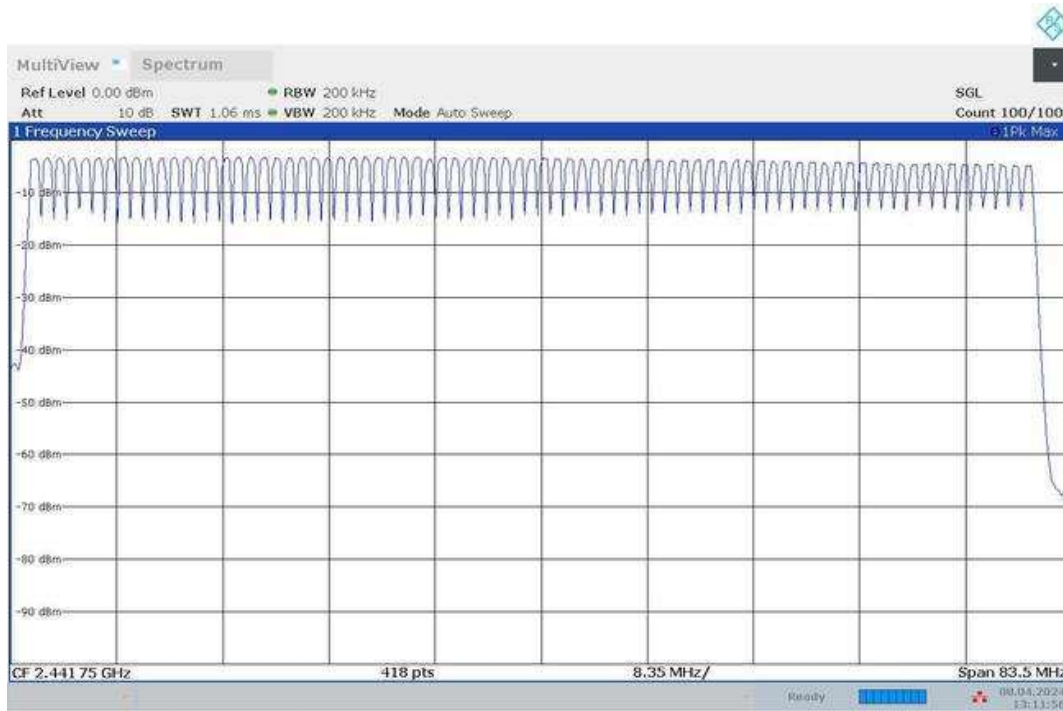
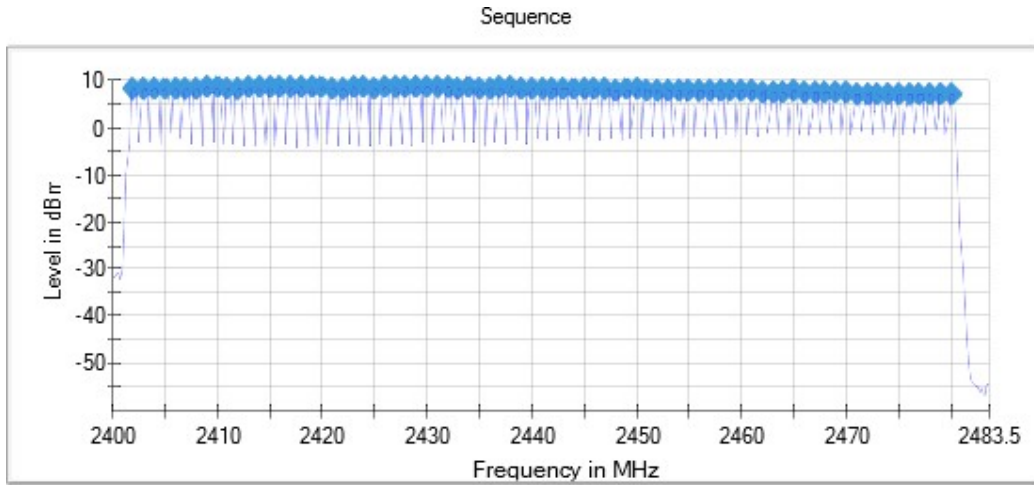
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
Modulation = BT (Pi/4 DQPSK 2-DH3) MIMO Mode = SISO
Active Port = 1

Images:



Modulation: BT (8DPSK 3-DH3)

MIMO Mode: SISO

Results

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

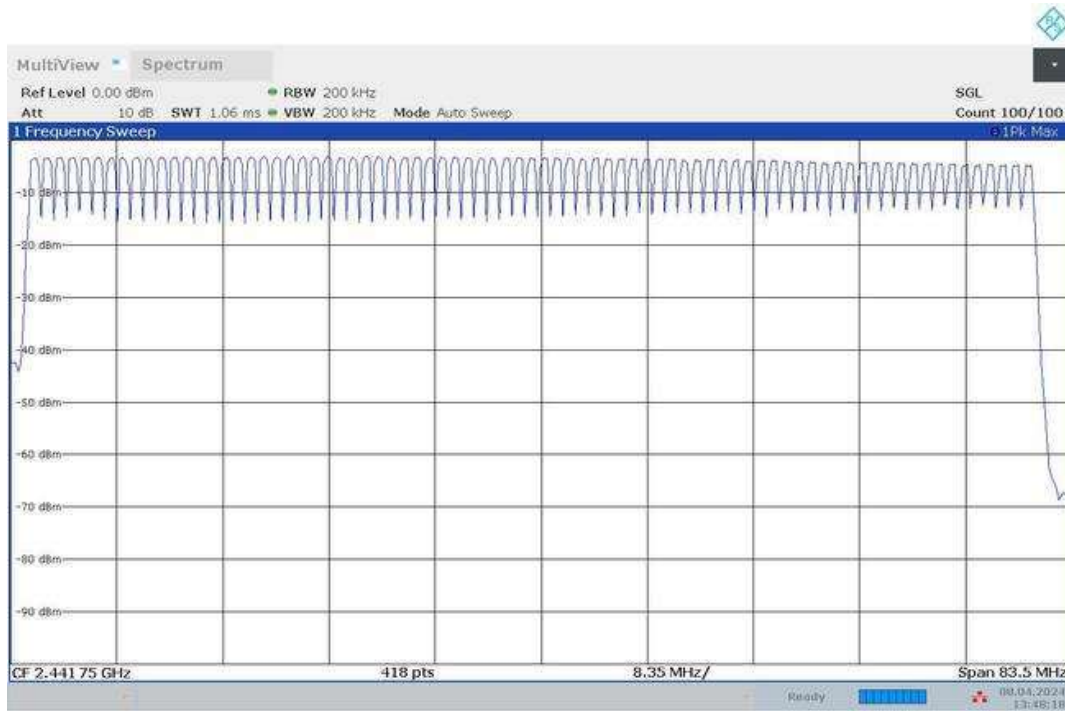
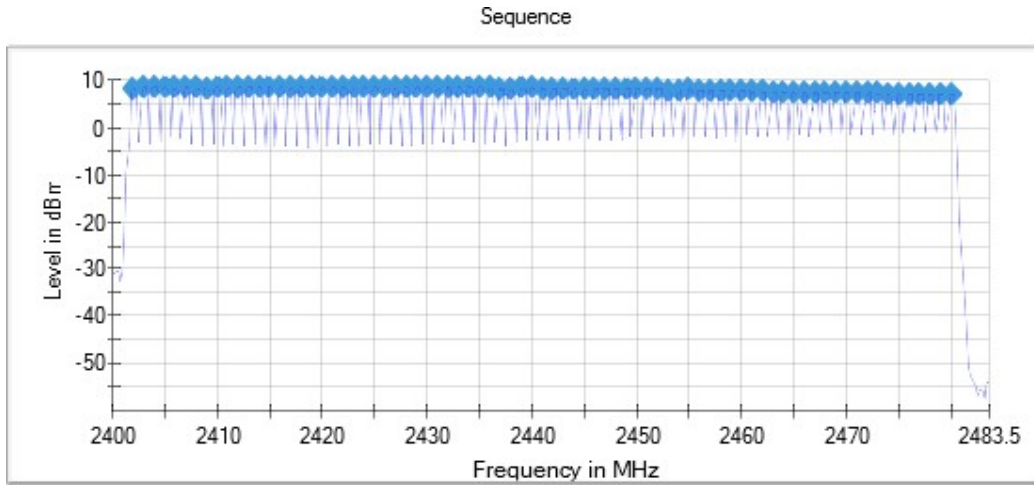
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
Modulation = BT (8DPSK 3-DH3) MIMO Mode = SISO
Active Port = 1

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).

Results

Antenna Gain: 3.82 dBi

Modulation: BT (GFSK 1-DH1)

MIMO Mode: SISO

Equipment	BW (MHz)	Freq (MHz)	Port	Peak Power (dBm)	Maximum E.I.R.P (dBm)
Frequency Hopping Spread Spectrum systems (DSS)	1	2402.00000	1	8.5	12.3
Frequency Hopping Spread Spectrum systems (DSS)	1	2441.00000	1	8.5	12.3
Frequency Hopping Spread Spectrum systems (DSS)	1	2480.00000	1	7.3	11.1

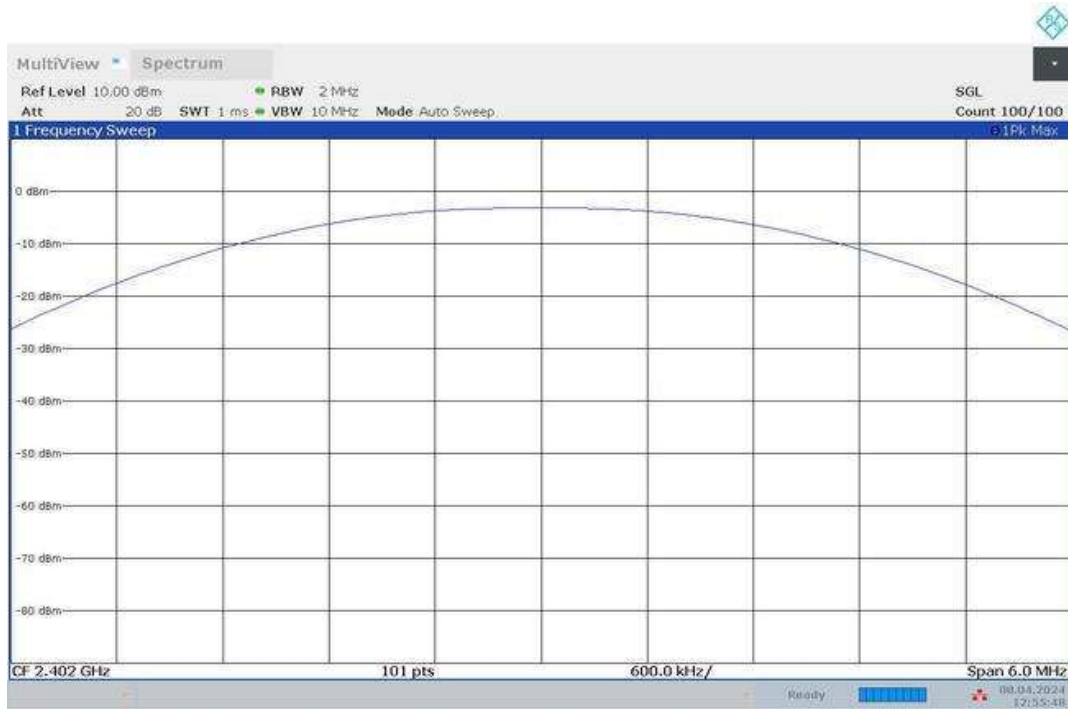
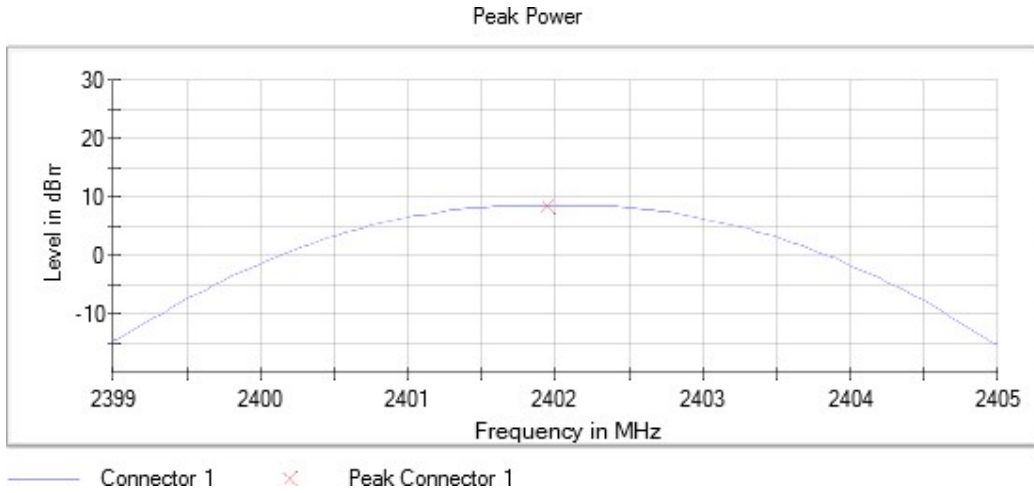
Verdict

Pass

Attachments

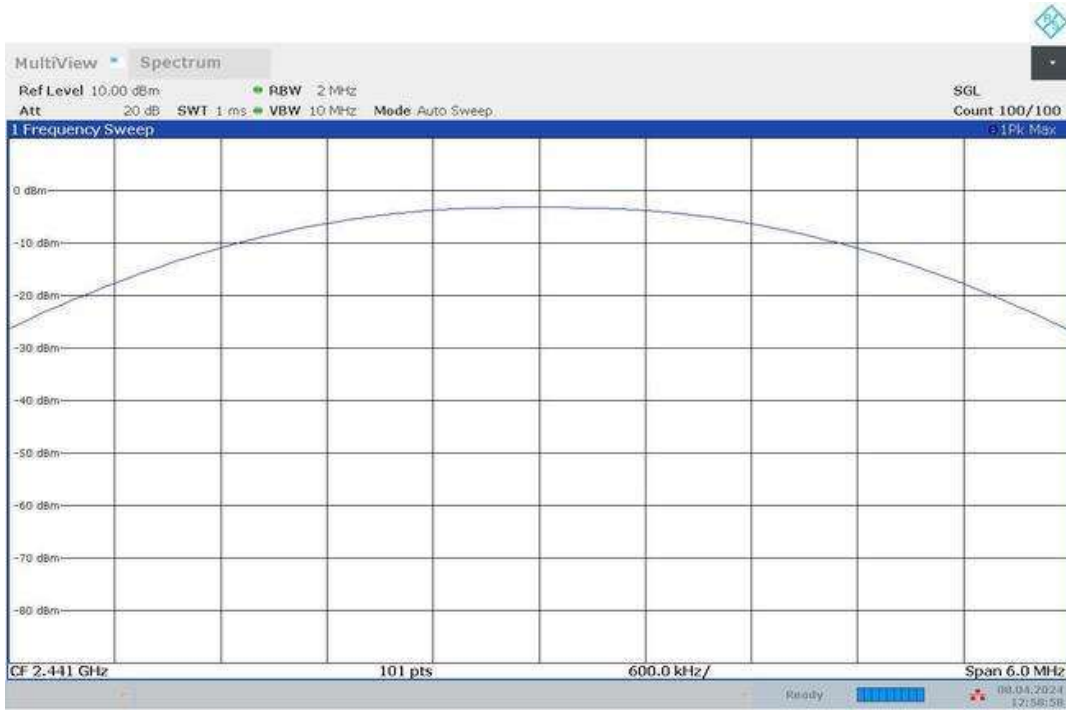
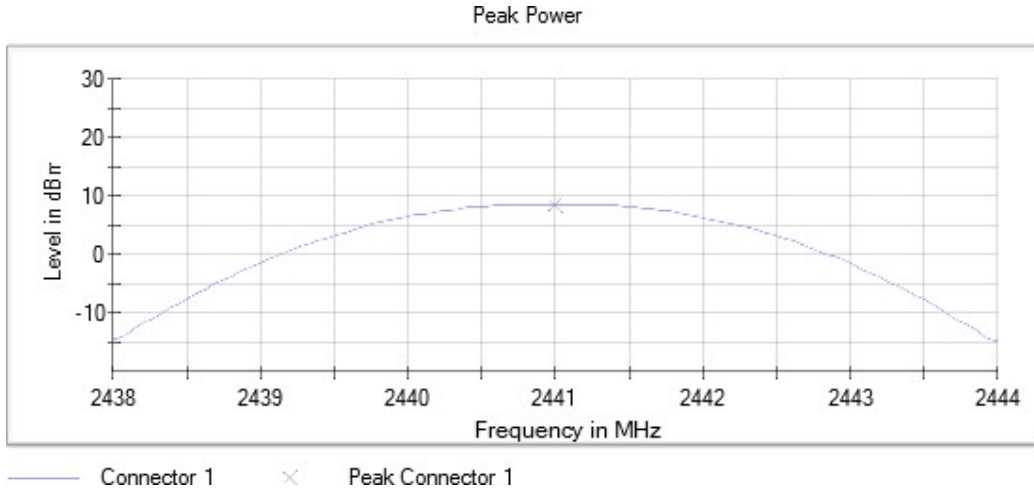
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
Modulation = BT (GFSK 1-DH1) Frequency MHz = 2402.00000
MIMO Mode = SISO Active Port = 1

Images:



Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
Modulation = BT (GFSK 1-DH1) Frequency MHz = 2441.00000
MIMO Mode = SISO Active Port = 1

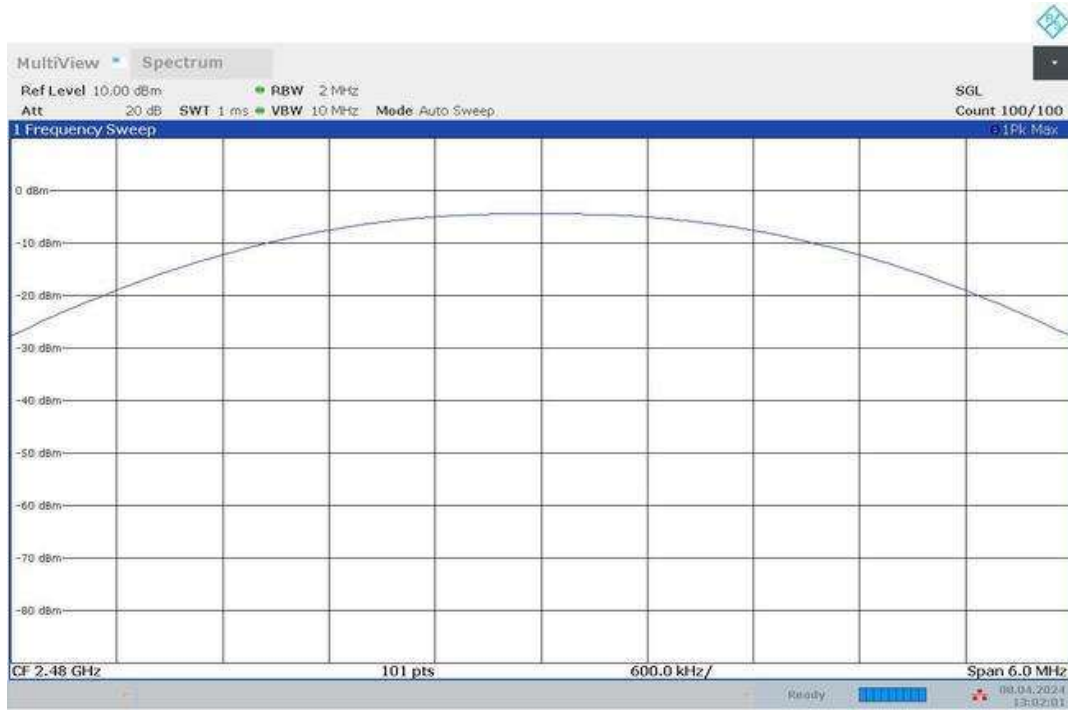
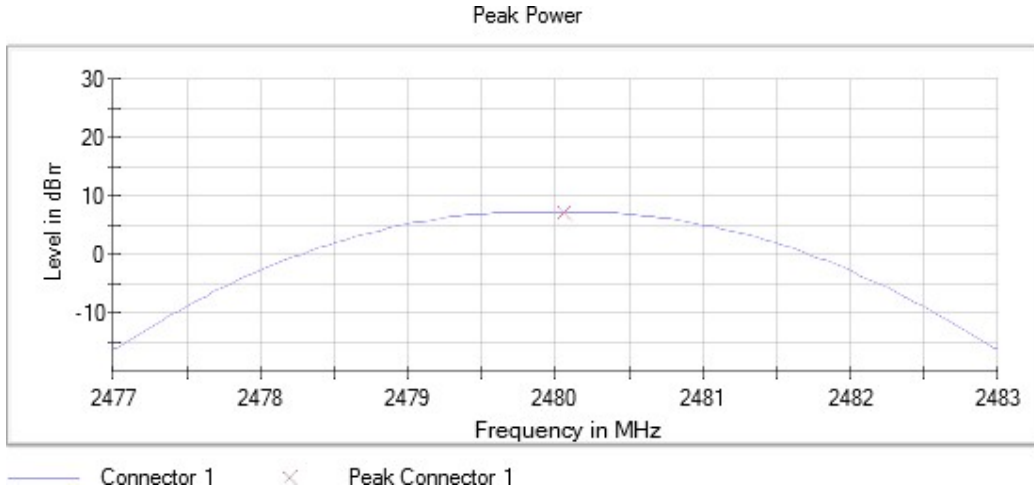
Images:



12:58:59 08.04.2024

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
Modulation = BT (GFSK 1-DH1) Frequency MHz = 2480.00000
MIMO Mode = SISO Active Port = 1

Images:



13:02:02 08.04.2024

Modulation: BT (Pi/4 DQPSK 2-DH3)

MIMO Mode: SISO

Results

Equipment	BW (MHz)	Freq (MHz)	Port	Peak Power (dBm)	Maximum E.I.R.P (dBm)
Frequency Hopping Spread Spectrum systems (DSS)	1	2402.00000	1	8.4	12.2
Frequency Hopping Spread Spectrum systems (DSS)	1	2441.00000	1	8.5	12.3
Frequency Hopping Spread Spectrum systems (DSS)	1	2480.00000	1	7.2	11.0

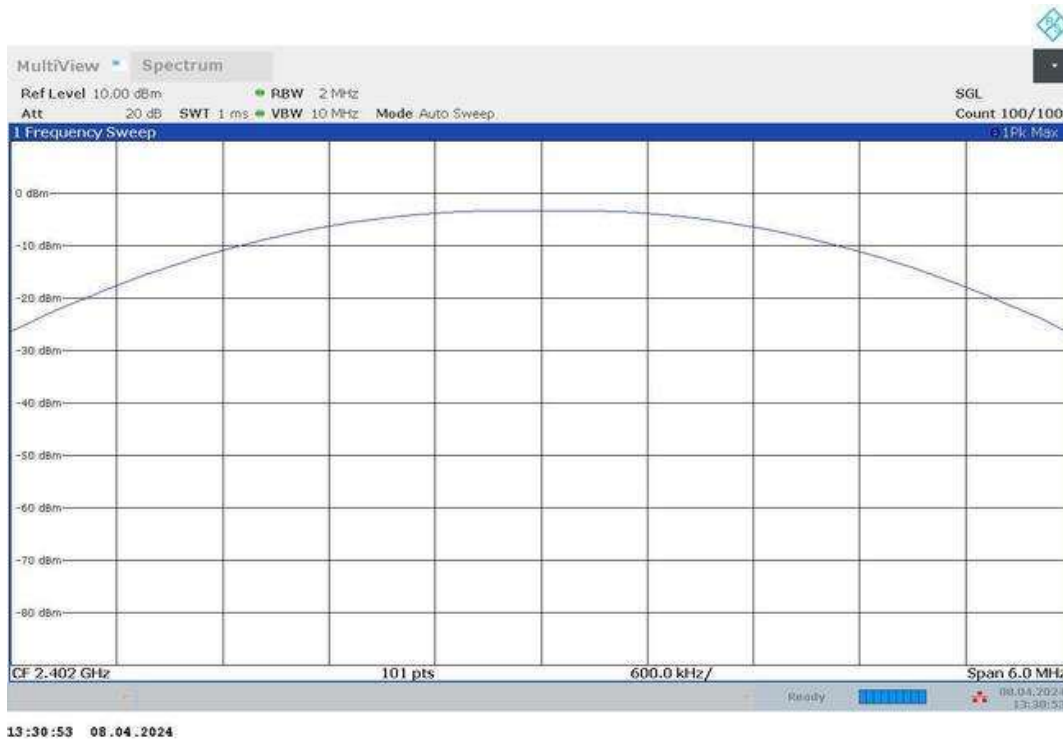
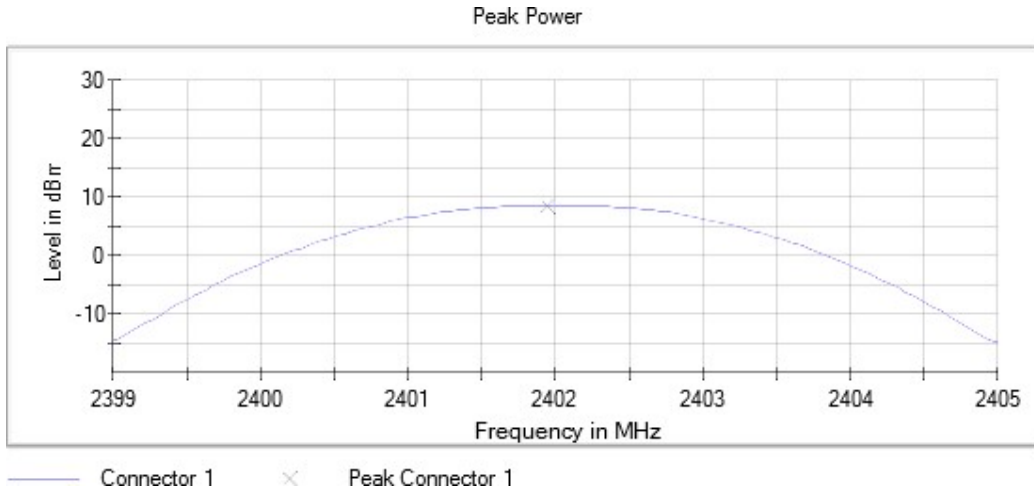
Verdict

Pass

Attachments

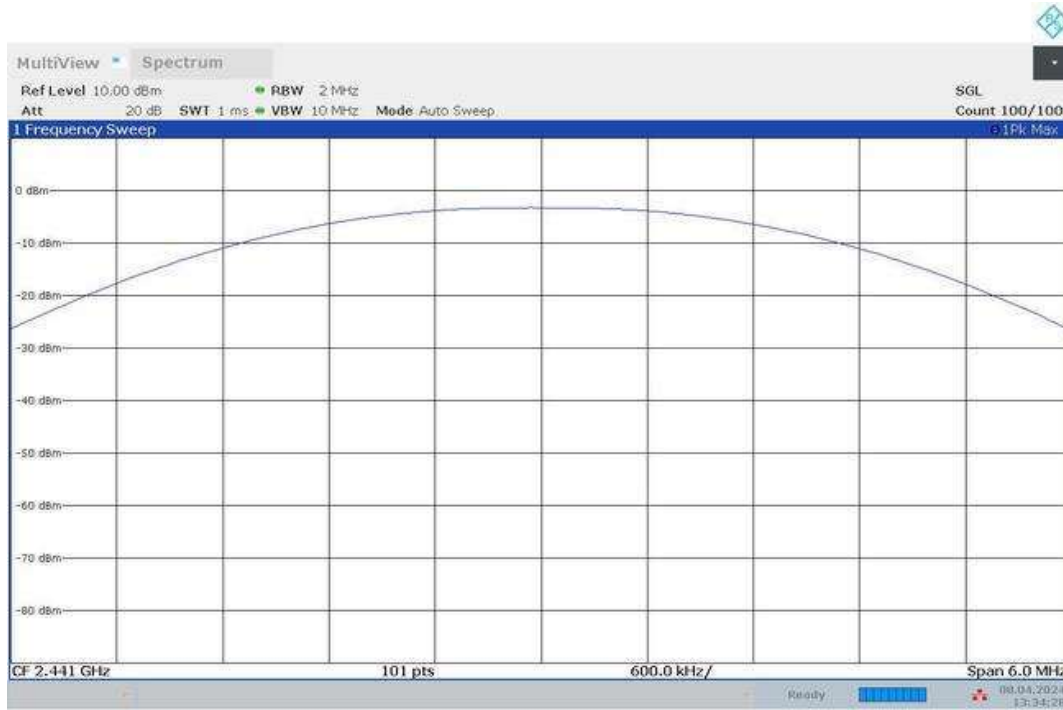
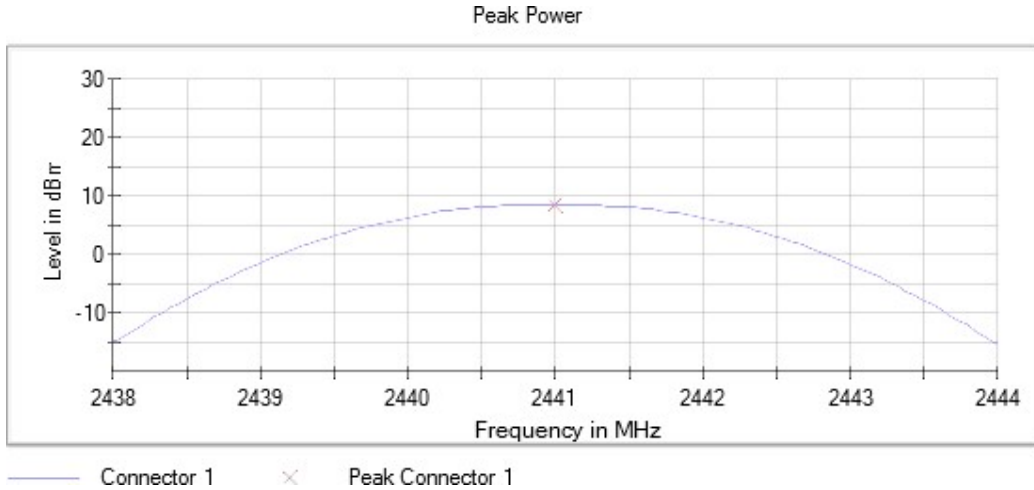
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
Modulation = BT (Pi/4 DQPSK 2-DH3) Frequency MHz = 2402.00000
MIMO Mode = SISO Active Port = 1

Images:



Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
 Modulation = BT (Pi/4 DQPSK 2-DH3) Frequency MHz = 2441.00000
 MIMO Mode = SISO Active Port = 1

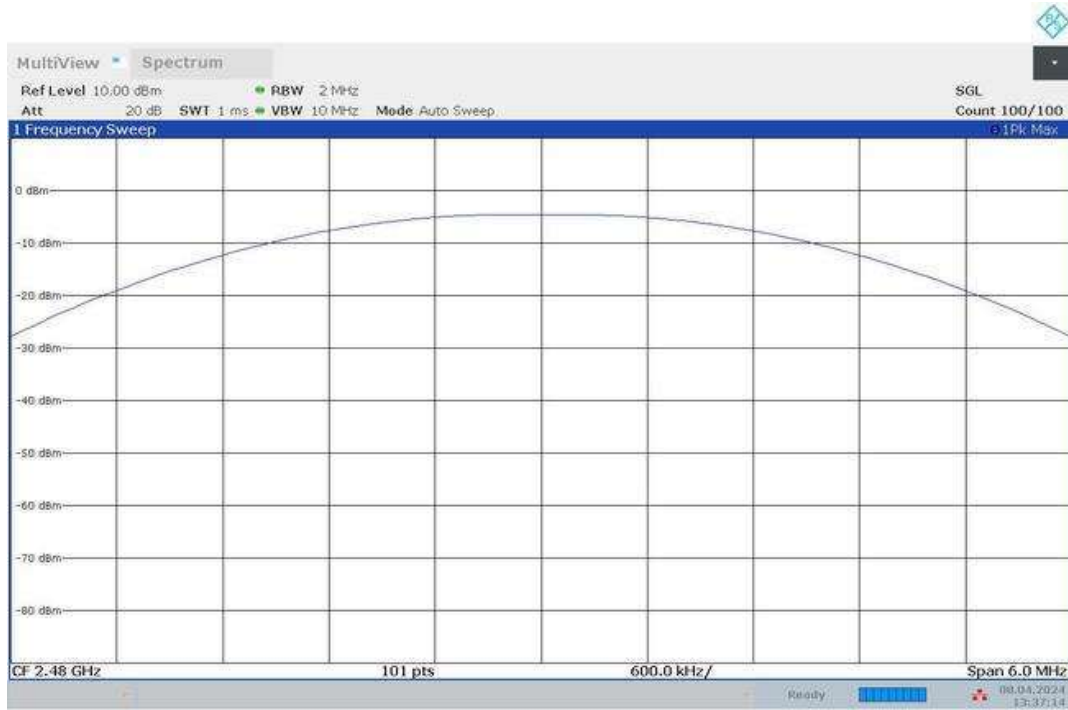
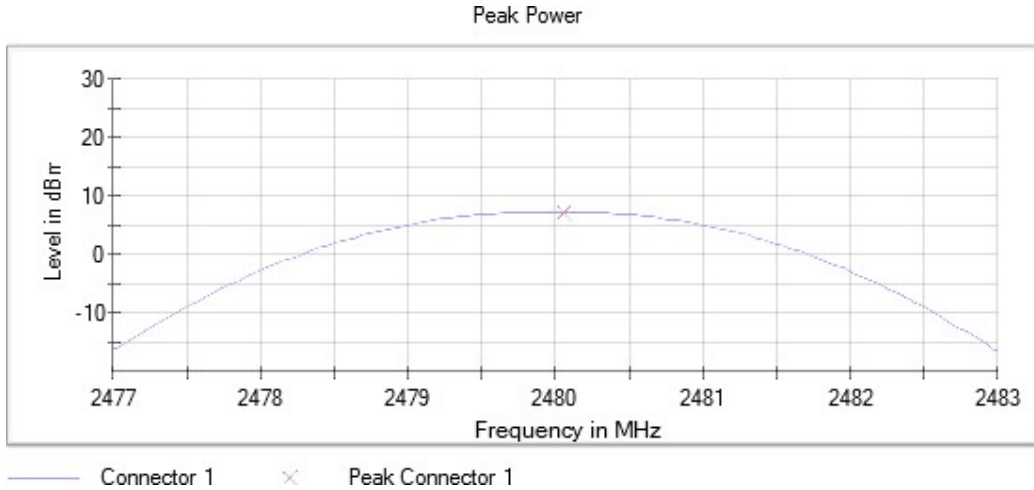
Images:



13:34:29 08.04.2024

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
Modulation = BT (Pi/4 DQPSK 2-DH3) Frequency MHz = 2480.00000
MIMO Mode = SISO Active Port = 1

Images:



13:37:14 08.04.2024

Modulation: BT (8DPSK 3-DH3)

MIMO Mode: SISO

Results

Equipment	BW (MHz)	Freq (MHz)	Port	Peak Power (dBm)	Maximum E.I.R.P (dBm)
Frequency Hopping Spread Spectrum systems (DSS)	1	2402.00000	1	8.4	12.2
Frequency Hopping Spread Spectrum systems (DSS)	1	2441.00000	1	8.3	12.1
Frequency Hopping Spread Spectrum systems (DSS)	1	2480.00000	1	7.1	10.9

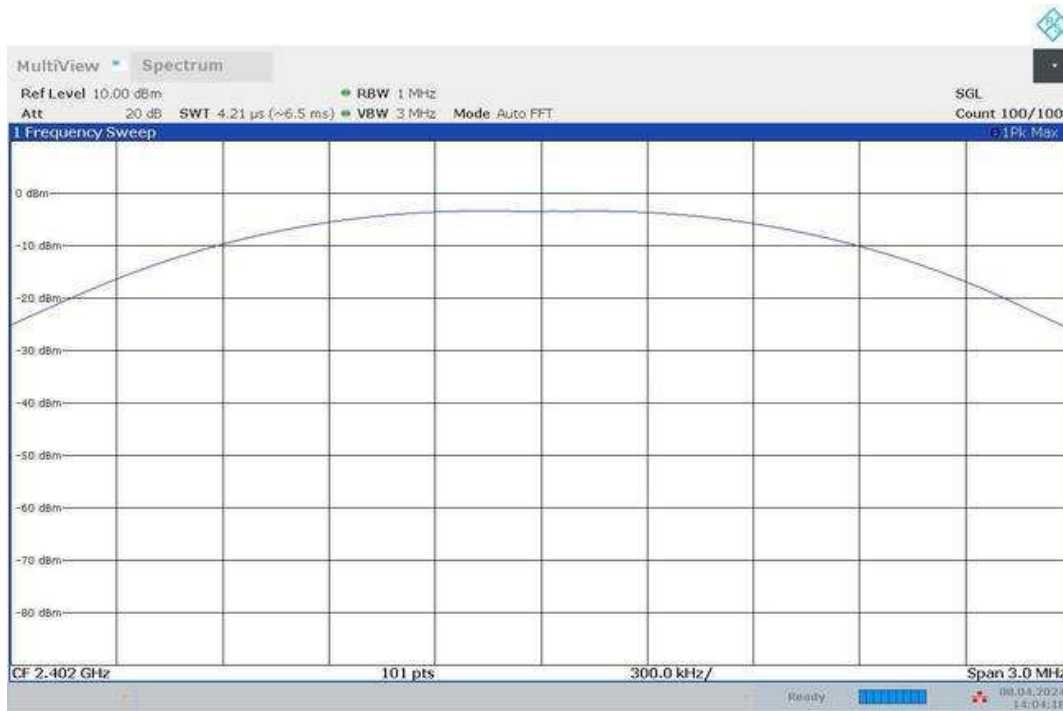
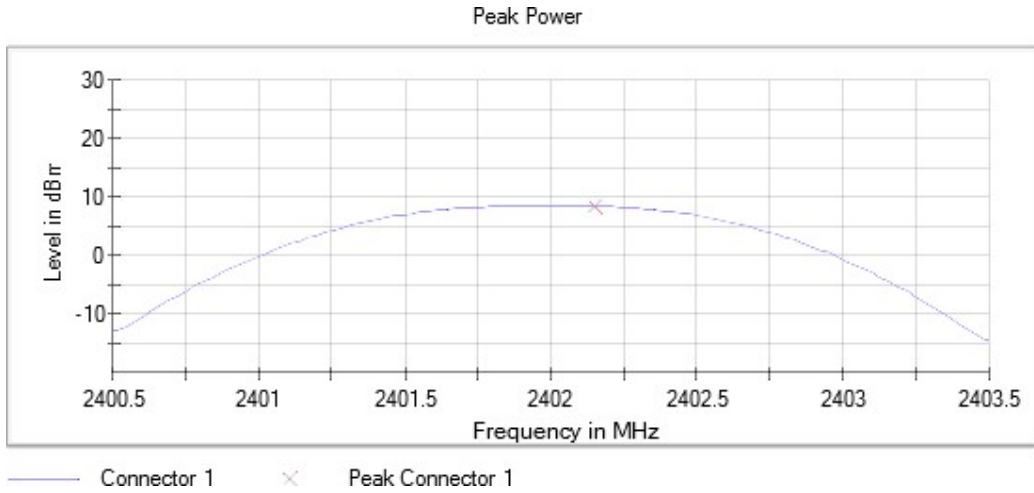
Verdict

Pass

Attachments

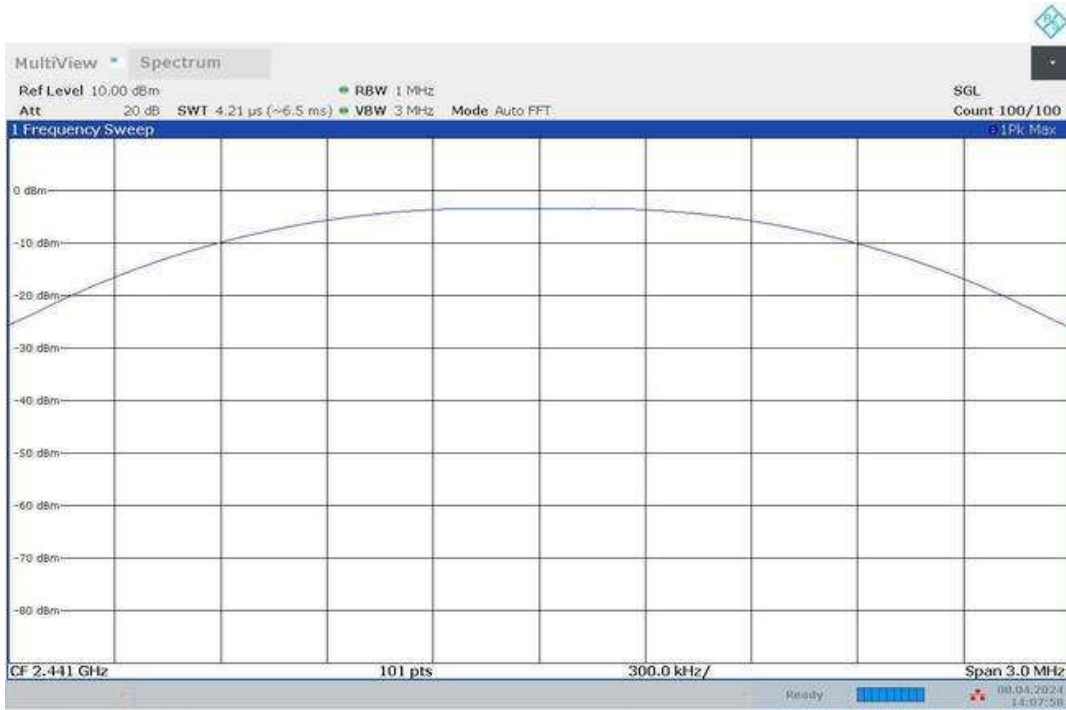
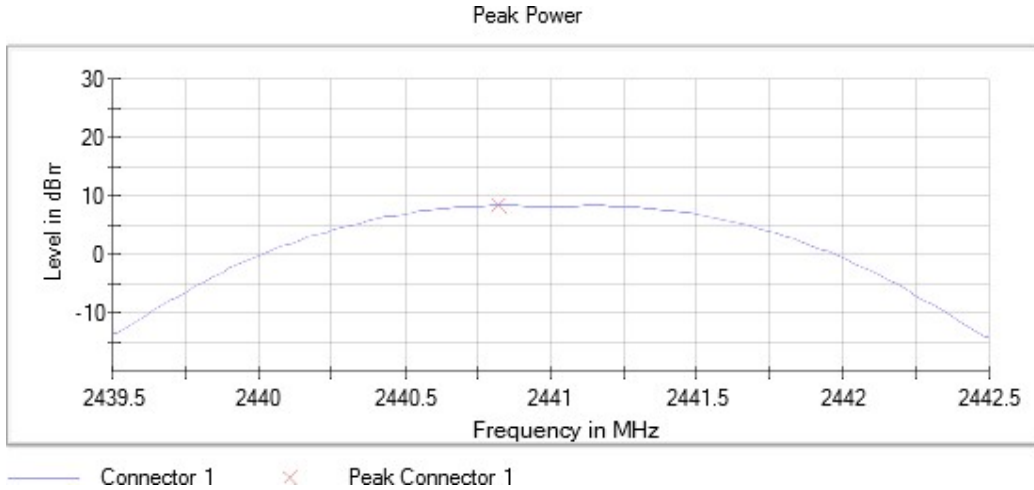
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
Modulation = BT (8DPSK 3-DH3) Frequency MHz = 2402.00000
MIMO Mode = SISO Active Port = 1

Images:



Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
Modulation = BT (8DPSK 3-DH3) Frequency MHz = 2441.00000
MIMO Mode = SISO Active Port = 1

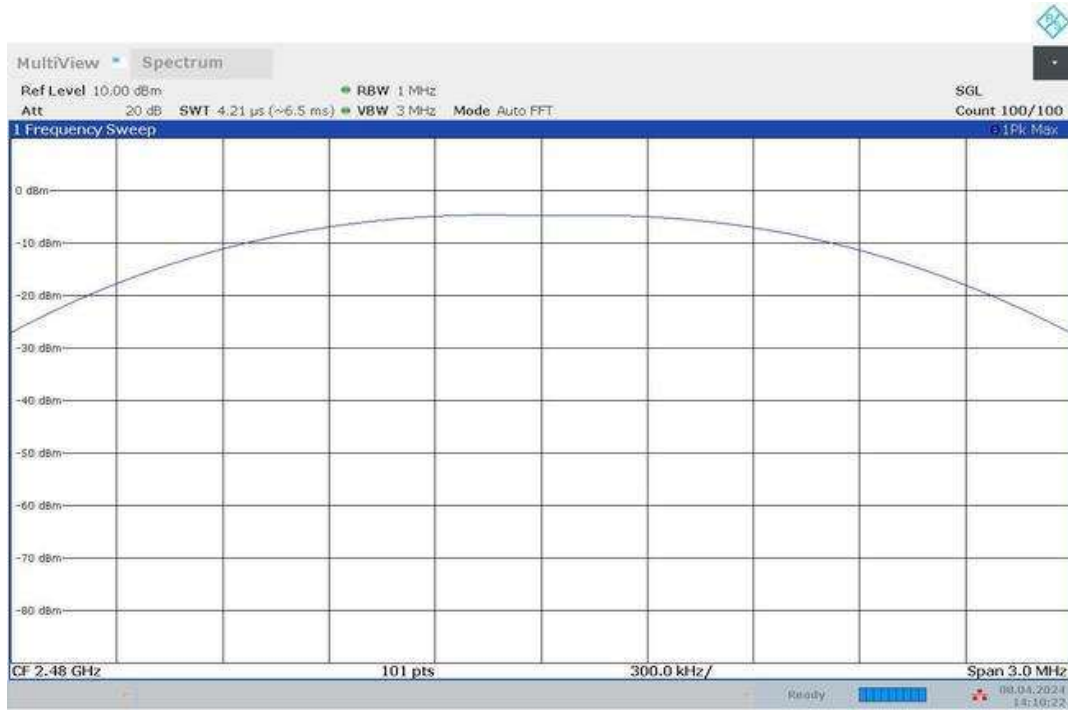
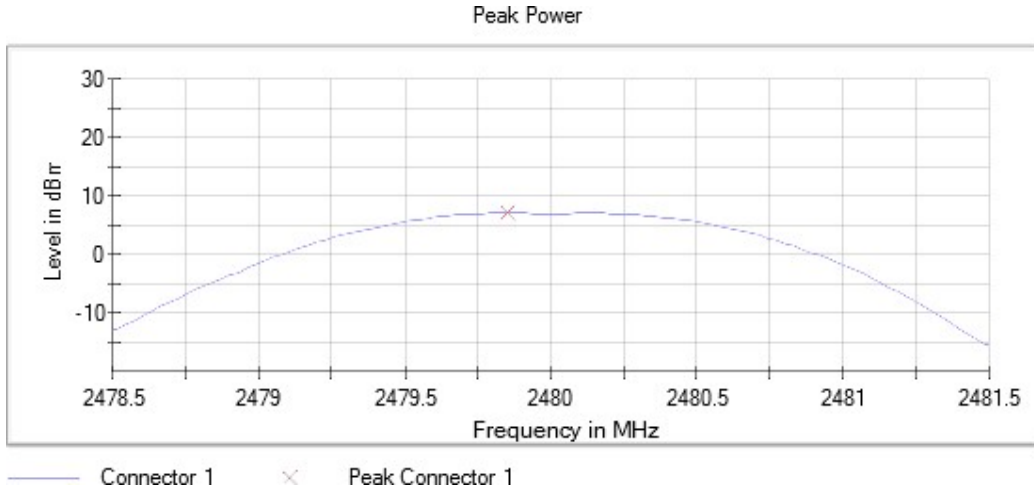
Images:



14:07:59 08.04.2024

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Bandwidth MHz = 1
Modulation = BT (8DPSK 3-DH3) Frequency MHz = 2480.00000
MIMO Mode = SISO Active Port = 1

Images:



RSS-247 5.5 / FCC 15.247 (d) [Bandedge] Band-edge emissions compliance (Transmitter)

Limits

In any 100 kHz bandwidths outside the frequency band in which the 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, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Results

Modulation: BT (GFSK 1-DH1)
 MIMO Mode: SISO

Freq (MHz)	Port	Freq (MHz)	Lvl (dBm)
0.00000	1	2486.225000	-52.7
0.00000	1	2395.225000	-35.5
0.00000	1	2395.175000	-36.0
0.00000	1	2488.825000	-53.0
0.00000	1	2395.275000	-36.5
0.00000	1	2483.525000	-53.0
0.00000	1	2488.975000	-53.1
0.00000	1	2395.125000	-38.2
0.00000	1	2395.325000	-41.7
0.00000	1	2486.375000	-53.2
0.00000	1	2395.075000	-43.8
0.00000	1	2488.925000	-53.2
0.00000	1	2486.325000	-53.2
0.00000	1	2399.775000	-43.8
0.00000	1	2395.025000	-44.2
0.00000	1	2490.775000	-53.3
0.00000	1	2486.175000	-53.3
0.00000	1	2399.725000	-44.2
0.00000	1	2398.575000	-44.7
0.00000	1	2488.775000	-53.4
0.00000	1	2398.525000	-44.9
0.00000	1	2484.775000	-53.5
0.00000	1	2399.825000	-45.1
0.00000	1	2484.825000	-53.5
0.00000	1	2394.975000	-45.2
0.00000	1	2493.775000	-53.5
0.00000	1	2399.075000	-45.9
0.00000	1	2490.825000	-53.6
0.00000	1	2397.225000	-46.0

Freq (MHz)	Port	Freq (MHz)	Lvl (dBm)
0.00000	1	2483.675000	-53.7
2402.00000	1	2395.325000	-34.4
2402.00000	1	2395.175000	-34.5
2402.00000	1	2395.225000	-34.9
2402.00000	1	2395.375000	-35.0
2402.00000	1	2395.075000	-35.1
2402.00000	1	2395.125000	-35.3
2402.00000	1	2395.275000	-35.4
2402.00000	1	2395.025000	-35.5
2402.00000	1	2394.975000	-37.1
2402.00000	1	2395.425000	-39.4
2402.00000	1	2394.925000	-40.3
2402.00000	1	2395.475000	-43.2
2402.00000	1	2394.875000	-44.5
2402.00000	1	2394.825000	-45.9
2402.00000	1	2395.525000	-46.5
2480.00000	1	2483.725000	-58.3
2480.00000	1	2483.625000	-58.8
2480.00000	1	2483.575000	-58.9
2480.00000	1	2483.525000	-58.9
2480.00000	1	2483.825000	-59.1
2480.00000	1	2483.675000	-59.2
2480.00000	1	2484.125000	-60.0
2480.00000	1	2483.775000	-60.1
2480.00000	1	2483.925000	-60.1
2480.00000	1	2484.175000	-60.3
2480.00000	1	2484.525000	-60.4
2480.00000	1	2483.975000	-60.6
2480.00000	1	2484.025000	-60.6
2480.00000	1	2484.575000	-60.7
2480.00000	1	2484.075000	-60.8

*Frequency 0.00000 MHz: Hopping Mode ON

Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (Hop ON)

Modulation = BT (GFSK 1-DH1)

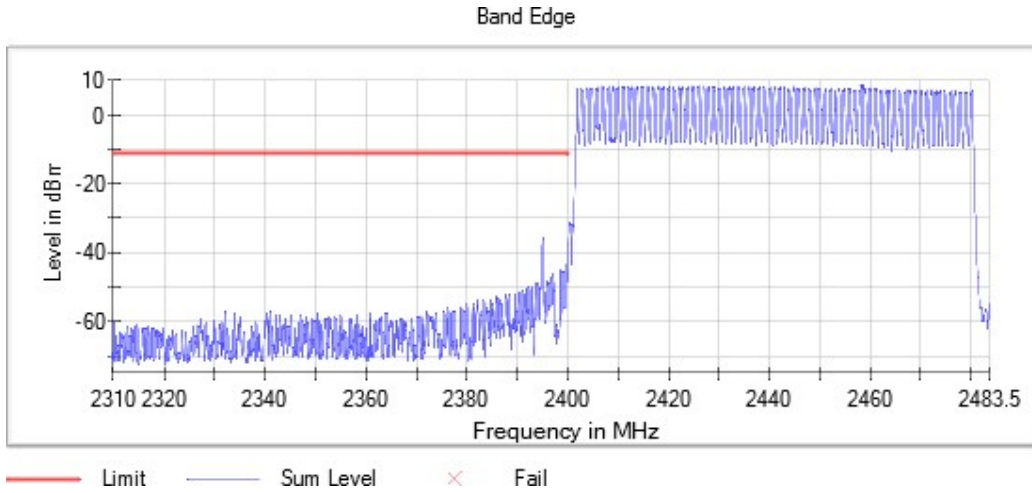
MIMO Mode = SISO

Bandwidth MHz = 1

Frequency MHz = 0.00000

Active Port = 1

Images:



Equipment Type = Frequency Hopping Spread Spectrum systems (Hop ON)

Modulation = BT (GFSK 1-DH1)

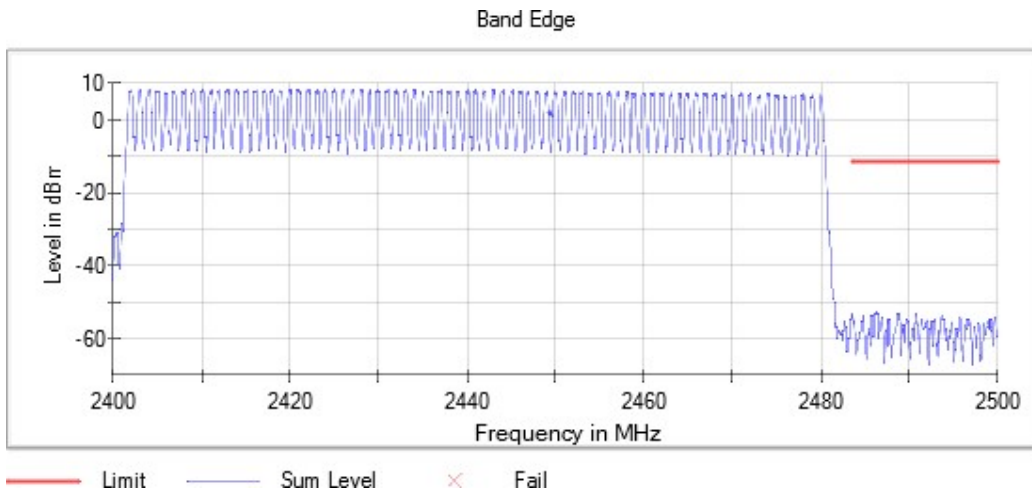
MIMO Mode = SISO

Bandwidth MHz = 1

Frequency MHz = 0.00000

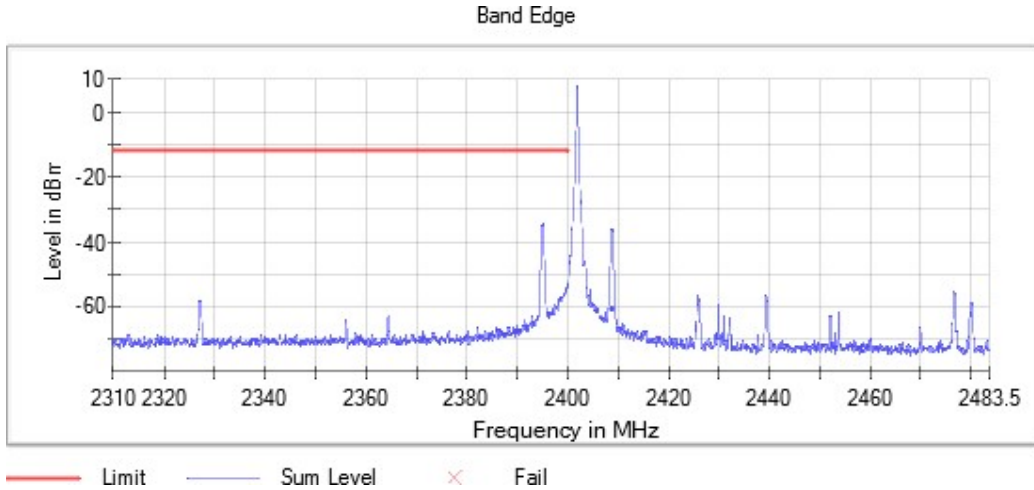
Active Port = 1

Images:



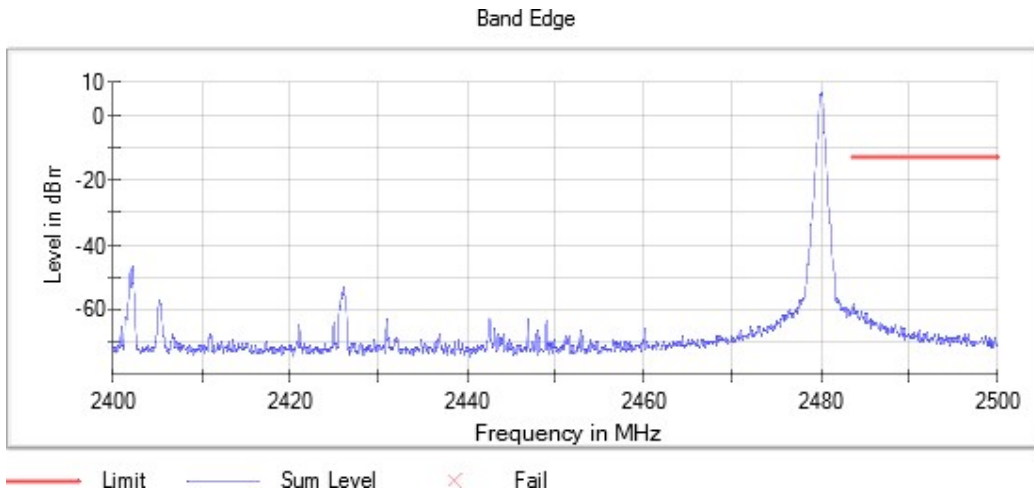
Equipment Type = Frequency Hopping Spread Spectrum systems (Hop OFF) Bandwidth MHz = 1
Modulation = BT (GFSK 1-DH1) Frequency MHz = 2402.00000
MIMO Mode = SISO Active Port = 1

Images:



Equipment Type = Frequency Hopping Spread Spectrum systems (Hop OFF) Bandwidth MHz = 1
Modulation = BT (GFSK 1-DH1) Frequency MHz = 2480.00000
MIMO Mode = SISO Active Port = 1

Images:



Tables:
 Spectrum Analyzer Parameters 1

Setting	Instrument Value	Target Value
Start Frequency	2.31000 GHz	2.31000 GHz
Stop Frequency	2.40000 GHz	2.40000 GHz
Span	90.000 MHz	90.000 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1800	~ 1800
Sweeptime	1.800 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	5 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

Spectrum Analyzer Parameters 2

Setting	Instrument Value	Target Value
Start Frequency	2.40000 GHz	2.40000 GHz
Stop Frequency	2.48350 GHz	2.48350 GHz
Span	83.500 MHz	83.500 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
Sweeptime	1.670 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	107 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.38 dB	0.50 dB

Modulation: BT (Pi/4 DQPSK 2-DH3)

MIMO Mode: SISO

Results

Freq (MHz)	Port	Freq (MHz)	Lvl (dBm)
0.00000	1	2483.525000	-53.2
0.00000	1	2397.725000	-32.8
0.00000	1	2487.825000	-53.5
0.00000	1	2397.675000	-33.6
0.00000	1	2483.575000	-53.5
0.00000	1	2397.775000	-33.7
0.00000	1	2493.775000	-53.5
0.00000	1	2397.825000	-34.4
0.00000	1	2395.125000	-35.4
0.00000	1	2486.225000	-53.5
0.00000	1	2487.775000	-53.5
0.00000	1	2395.175000	-35.5
0.00000	1	2493.825000	-53.5
0.00000	1	2397.875000	-35.8
0.00000	1	2395.225000	-35.9
0.00000	1	2483.775000	-53.7
0.00000	1	2395.075000	-36.0
0.00000	1	2493.925000	-53.7
0.00000	1	2395.275000	-36.2
0.00000	1	2483.625000	-53.7
0.00000	1	2395.325000	-36.3
0.00000	1	2486.275000	-53.8
0.00000	1	2488.775000	-53.9
0.00000	1	2397.625000	-36.3
0.00000	1	2397.925000	-37.7
0.00000	1	2488.875000	-54.0
0.00000	1	2486.175000	-54.1
0.00000	1	2395.375000	-39.4
0.00000	1	2490.725000	-54.1
0.00000	1	2397.975000	-39.8
2402.00000	1	2395.175000	-34.5
2402.00000	1	2395.325000	-34.8
2402.00000	1	2395.125000	-35.0
2402.00000	1	2395.075000	-35.0
2402.00000	1	2395.275000	-35.0
2402.00000	1	2395.225000	-35.1
2402.00000	1	2395.025000	-35.2

Freq (MHz)	Port	Freq (MHz)	Lvl (dBm)
2402.00000	1	2395.375000	-35.4
2402.00000	1	2394.975000	-35.6
2402.00000	1	2395.425000	-39.5
2402.00000	1	2394.925000	-39.8
2402.00000	1	2394.875000	-43.8
2402.00000	1	2395.475000	-44.1
2402.00000	1	2394.825000	-45.7
2402.00000	1	2395.525000	-45.7
2480.00000	1	2483.625000	-57.9
2480.00000	1	2483.675000	-58.7
2480.00000	1	2483.575000	-58.7
2480.00000	1	2483.525000	-58.9
2480.00000	1	2483.725000	-59.5
2480.00000	1	2483.775000	-60.3
2480.00000	1	2484.025000	-60.6
2480.00000	1	2483.975000	-60.6
2480.00000	1	2483.875000	-60.8
2480.00000	1	2484.175000	-60.8
2480.00000	1	2484.275000	-60.9
2480.00000	1	2483.925000	-60.9
2480.00000	1	2484.375000	-61.1
2480.00000	1	2484.225000	-61.2
2480.00000	1	2484.325000	-61.2

*Frequency 0.00000 MHz: Hopping Mode ON

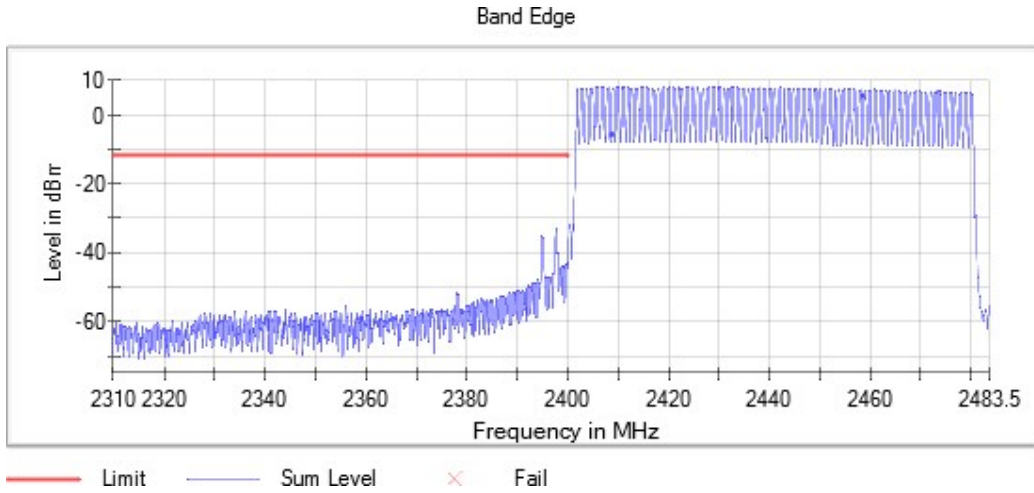
Verdict

Pass

Attachments

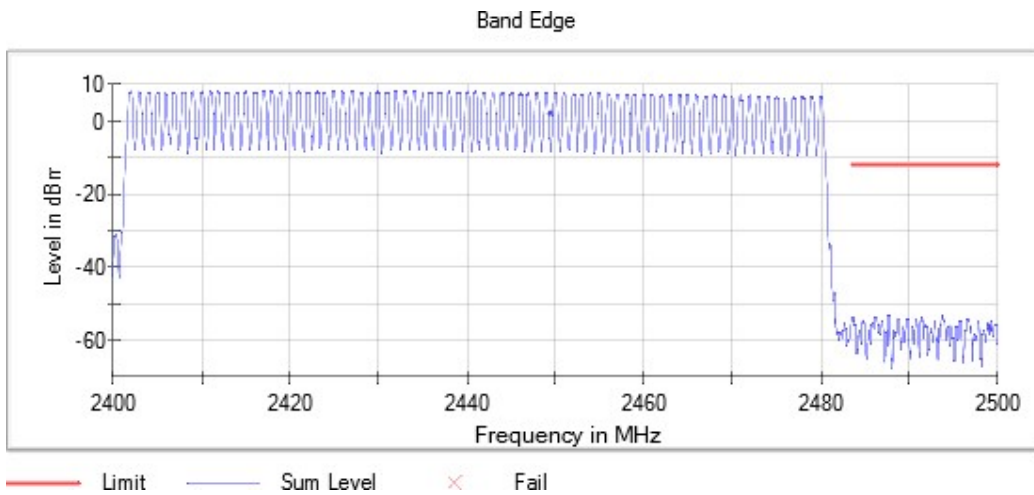
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Modulation = BT (Pi/4 DQPSK 2-DH3) Frequency MHz = 0.00000
MIMO Mode = SISO Active Port = 1

Images:



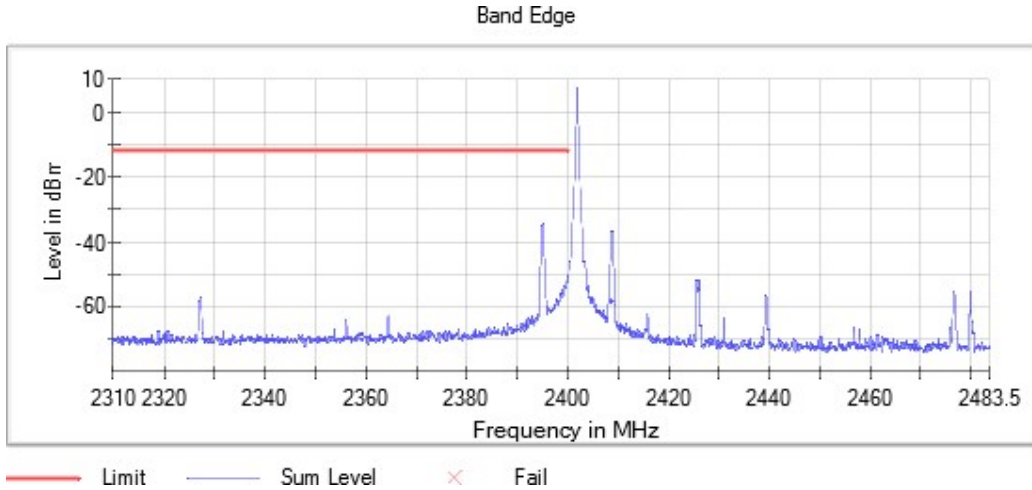
Equipment Type = Frequency Hopping Spread Spectrum systems (Hop ON) Bandwidth MHz = 1
Modulation = BT (Pi/4 DQPSK 2-DH3) Frequency MHz = 0.00000
MIMO Mode = SISO Active Port = 1

Images:



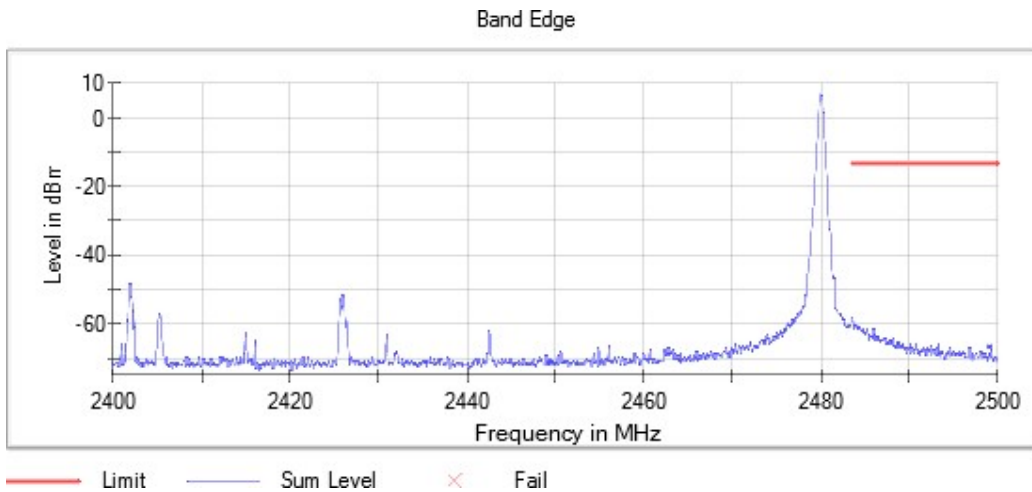
Equipment Type = Frequency Hopping Spread Spectrum systems (Hop OFF) Bandwidth MHz = 1
Modulation = BT (Pi/4 DQPSK 2-DH3) Frequency MHz = 2402.00000
MIMO Mode = SISO Active Port = 1

Images:



Equipment Type = Frequency Hopping Spread Spectrum systems (Hop OFF) Bandwidth MHz = 1
Modulation = BT (Pi/4 DQPSK 2-DH3) Frequency MHz = 2480.00000
MIMO Mode = SISO Active Port = 1

Images:



Tables:
 Spectrum Analyzer Parameters 1

Setting	Instrument Value	Target Value
Start Frequency	2.31000 GHz	2.31000 GHz
Stop Frequency	2.40000 GHz	2.40000 GHz
Span	90.000 MHz	90.000 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1800	~ 1800
Sweeptime	1.800 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	13 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

Spectrum Analyzer Parameters 2

Setting	Instrument Value	Target Value
Start Frequency	2.40000 GHz	2.40000 GHz
Stop Frequency	2.48350 GHz	2.48350 GHz
Span	83.500 MHz	83.500 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
Sweeptime	1.670 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	129 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.01 dB	0.50 dB

Modulation: BT (8DPSK 3-DH3)

MIMO Mode: SISO

Results

Freq (MHz)	Port	Freq (MHz)	Lvl (dBm)
0.00000	1	2397.675000	-33.0
0.00000	1	2483.625000	-52.7
0.00000	1	2483.525000	-53.0
0.00000	1	2397.725000	-33.3
0.00000	1	2483.575000	-53.0
0.00000	1	2397.625000	-33.4
0.00000	1	2397.775000	-33.5
0.00000	1	2486.175000	-53.4
0.00000	1	2486.075000	-53.5
0.00000	1	2397.825000	-33.9
0.00000	1	2397.875000	-34.2
0.00000	1	2486.125000	-53.5
0.00000	1	2486.225000	-53.5
0.00000	1	2395.175000	-34.6
0.00000	1	2488.775000	-53.5
0.00000	1	2395.325000	-34.7
0.00000	1	2395.375000	-35.2
0.00000	1	2483.675000	-53.7
0.00000	1	2491.425000	-53.9
0.00000	1	2395.225000	-35.8
0.00000	1	2395.075000	-35.8
0.00000	1	2486.375000	-53.9
0.00000	1	2395.275000	-35.9
0.00000	1	2483.775000	-54.0
0.00000	1	2488.825000	-54.1
0.00000	1	2395.125000	-35.9
0.00000	1	2486.325000	-54.1
0.00000	1	2397.925000	-35.9
0.00000	1	2397.575000	-36.2
0.00000	1	2499.775000	-54.1
2402.00000	1	2395.025000	-34.8
2402.00000	1	2395.325000	-34.8
2402.00000	1	2395.175000	-34.8
2402.00000	1	2395.075000	-34.9
2402.00000	1	2395.225000	-35.0
2402.00000	1	2395.125000	-35.1
2402.00000	1	2395.275000	-35.3

Freq (MHz)	Port	Freq (MHz)	Lvl (dBm)
2402.00000	1	2394.975000	-35.6
2402.00000	1	2395.375000	-35.9
2402.00000	1	2395.425000	-39.2
2402.00000	1	2394.925000	-40.1
2402.00000	1	2395.475000	-43.8
2402.00000	1	2394.875000	-44.3
2402.00000	1	2395.525000	-46.0
2402.00000	1	2394.825000	-46.0
2480.00000	1	2483.625000	-58.2
2480.00000	1	2483.775000	-58.7
2480.00000	1	2483.525000	-58.7
2480.00000	1	2483.725000	-58.8
2480.00000	1	2483.575000	-58.8
2480.00000	1	2483.675000	-59.0
2480.00000	1	2484.025000	-59.8
2480.00000	1	2483.975000	-59.9
2480.00000	1	2483.875000	-60.0
2480.00000	1	2484.175000	-60.2
2480.00000	1	2483.825000	-60.2
2480.00000	1	2483.925000	-60.2
2480.00000	1	2484.075000	-60.7
2480.00000	1	2484.225000	-61.0
2480.00000	1	2484.125000	-61.0

*Frequency 0.00000 MHz: Hopping Mode ON

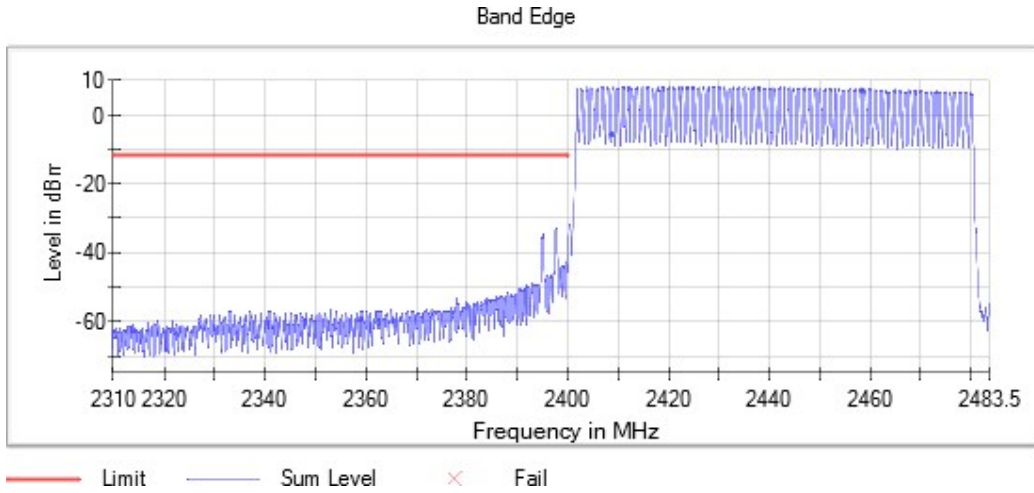
Verdict

Pass

Attachments

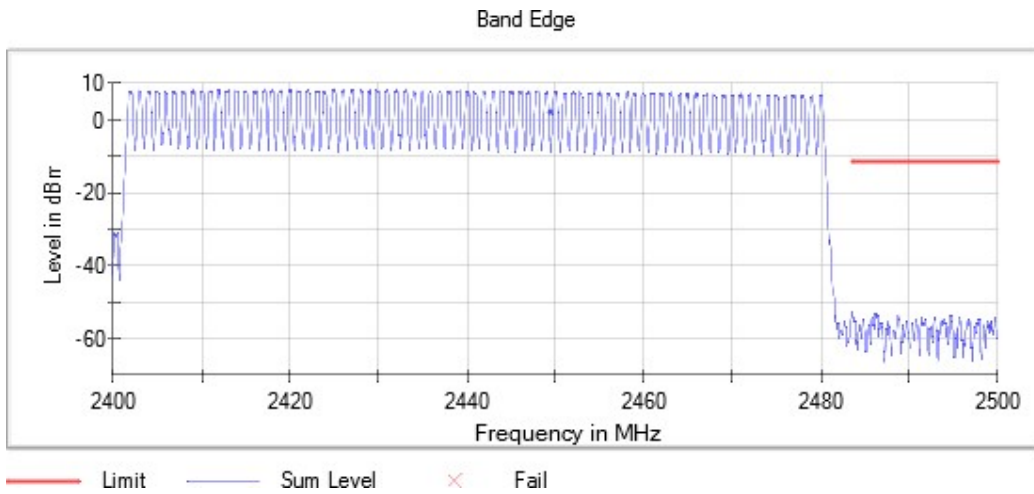
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Modulation = BT (8DPSK 3-DH3) Frequency MHz = 0.00000
MIMO Mode = SISO Active Port = 1

Images:



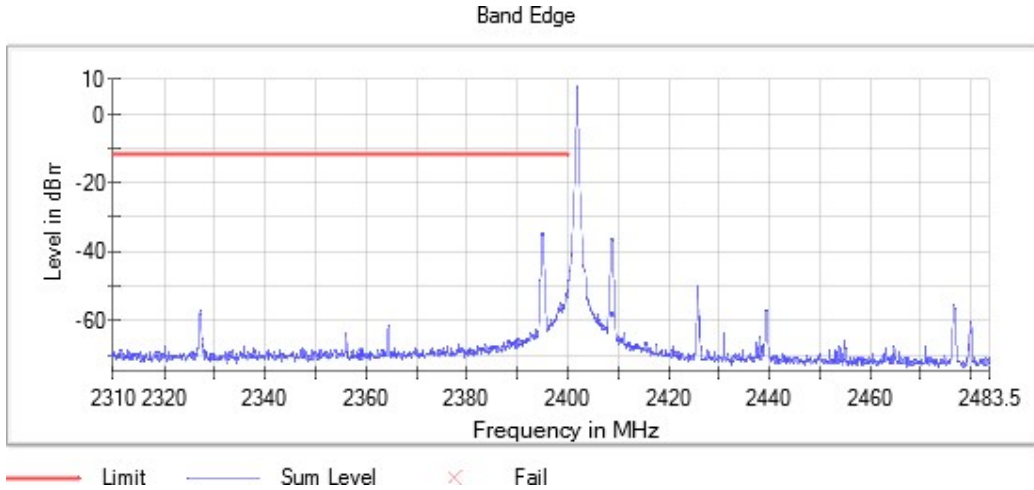
Equipment Type = Frequency Hopping Spread Spectrum systems (Hop ON) Bandwidth MHz = 1
Modulation = BT (8DPSK 3-DH3) Frequency MHz = 0.00000
MIMO Mode = SISO Active Port = 1

Images:



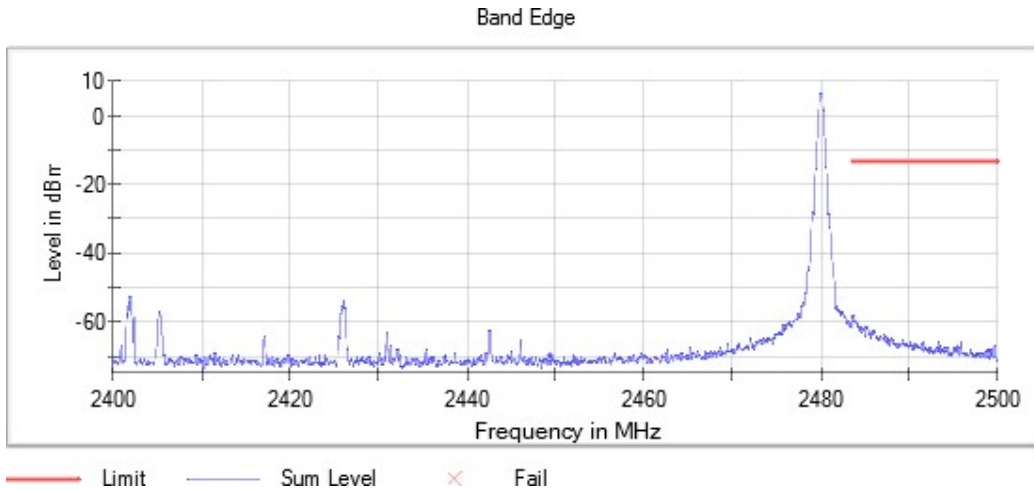
Equipment Type = Frequency Hopping Spread Spectrum systems (Hop OFF) Bandwidth MHz = 1
Modulation = BT (8DPSK 3-DH3) Frequency MHz = 2402.00000
MIMO Mode = SISO Active Port = 1

Images:



Equipment Type = Frequency Hopping Spread Spectrum systems (Hop OFF) Bandwidth MHz = 1
Modulation = BT (8DPSK 3-DH3) Frequency MHz = 2480.00000
MIMO Mode = SISO Active Port = 1

Images:



Tables:
 Spectrum Analyzer Parameters 1

Setting	Instrument Value	Target Value
Start Frequency	2.31000 GHz	2.31000 GHz
Stop Frequency	2.40000 GHz	2.40000 GHz
Span	90.000 MHz	90.000 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1800	~ 1800
Sweeptime	1.800 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	14 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

Spectrum Analyzer Parameters 2

Setting	Instrument Value	Target Value
Start Frequency	2.40000 GHz	2.40000 GHz
Stop Frequency	2.48350 GHz	2.48350 GHz
Span	83.500 MHz	83.500 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
Sweeptime	1.670 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	91 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.23 dB	0.50 dB

RSS-247 5.5 / FCC 15.247 (d) [RSE] Emission limitations radiated (Transmitter)

Limits

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) / RSS-Gen):

Frequency Range (MHz)	Field strength ($\mu\text{V}/\text{m}$)	Field strength ($\text{dB}\mu\text{V}/\text{m}$)	Measurement distance (m)
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	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RSS-247. Attenuation below the general field strength limits specified in RSS-Gen is not required

Results

Modulation: BT (GFSK 1-DH1)
 MIMO Mode: SISO

Freq Rng (GHz)	Equipment	Freq (MHz)	Port	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
[0.03, 1]	Frequency Hopping Spread Spectrum systems	2441.00000	1	130.541	10.60	V	QP
				266.777	22.10	V	QP
				407.136	20.20	V	QP
				612.922	25.40	H	QP
				74.572	11.80	H	QP
				976.623	28.30	H	QP
[1, 18]		2402.00000		11779.500	44.90	V	AVG
				2402.000	100.90*	H	AVG
		2441.00000		5120.000	38.30	V	AVG
				2441.000	103.70*	H	AVG
		2480.00000		4959.000	38.00	V	AVG
				8334.000	41.90	V	AVG
				13316.500	46.80	V	AVG
				2480.000	104.50*	H	AVG
[18, 26]		2402.00000		4907.500	38.10	H	AVG
				20767.500	42.70	V	AVG
		2441.00000		23942.000	43.40	V	AVG
				19594.000	42.50	V	AVG
	2480.00000	22474.500	43.00	H	AVG		
		18964.500	41.30	V	AVG		
		22570.500	42.80	H	AVG		

*Bluetooth Fundamental

Verdict

Pass

Frequency range 9KHz – 30 MHz

No radiofrequency signal generated in the device found below 10° sub-harmonic, no further investigation required.

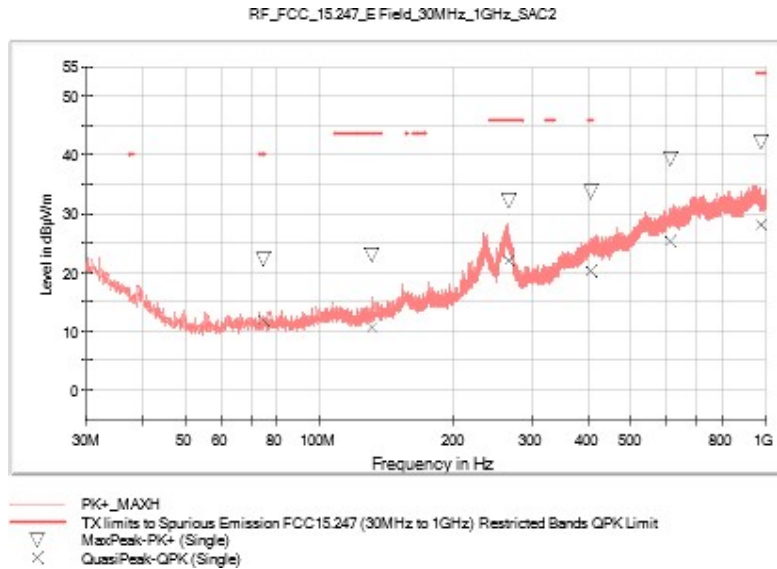
Frequency range 30 MHz – 1000 MHz

The spurious emissions below 1 GHz do not depend on the operating channel and modulation selected in the EUT.

Attachments

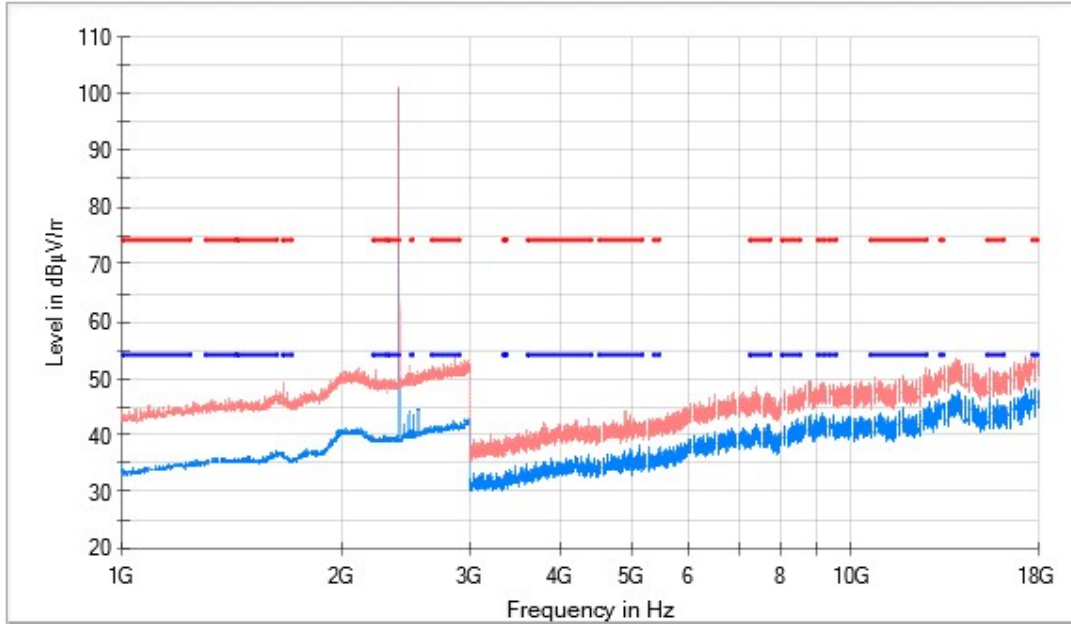
Frequency Range GHz = [0.03, 1] Equipment Type = Frequency Hopping Spread Spectrum systems
Modulation = BT (GFSK 1-DH1) Frequency MHz = 2441.00000
MIMO Mode = SISO Active Port = 1

Images:

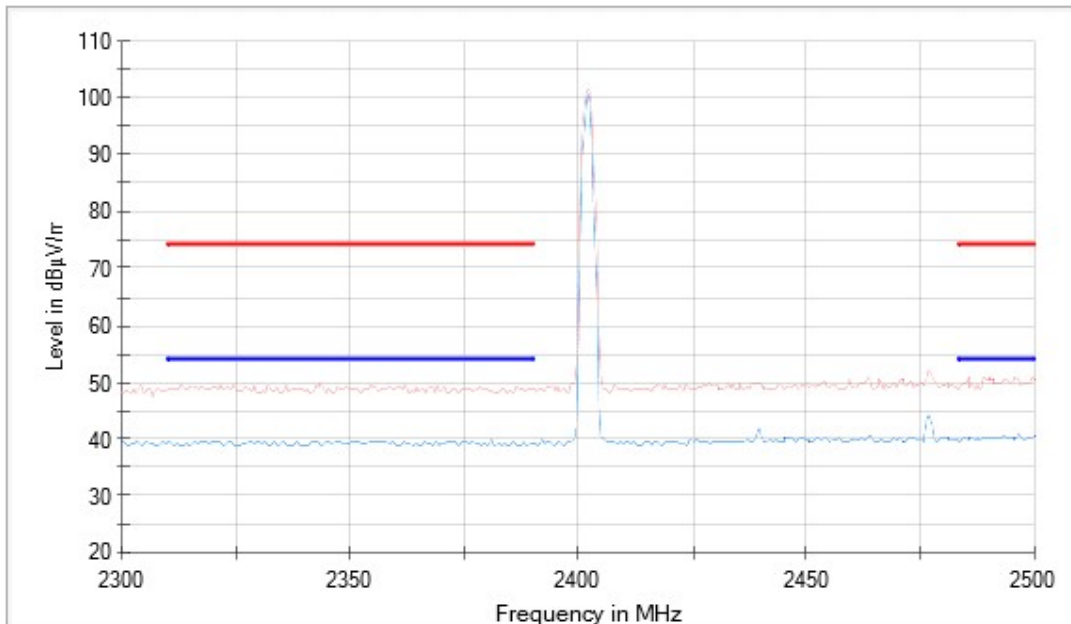


Frequency Range GHz = [1, 18] Equipment Type = Frequency Hopping Spread Spectrum systems
 Modulation = BT (GFSK 1-DH1) Frequency MHz = 2402.00000
 MIMO Mode = SISO Active Port = 1

Images:



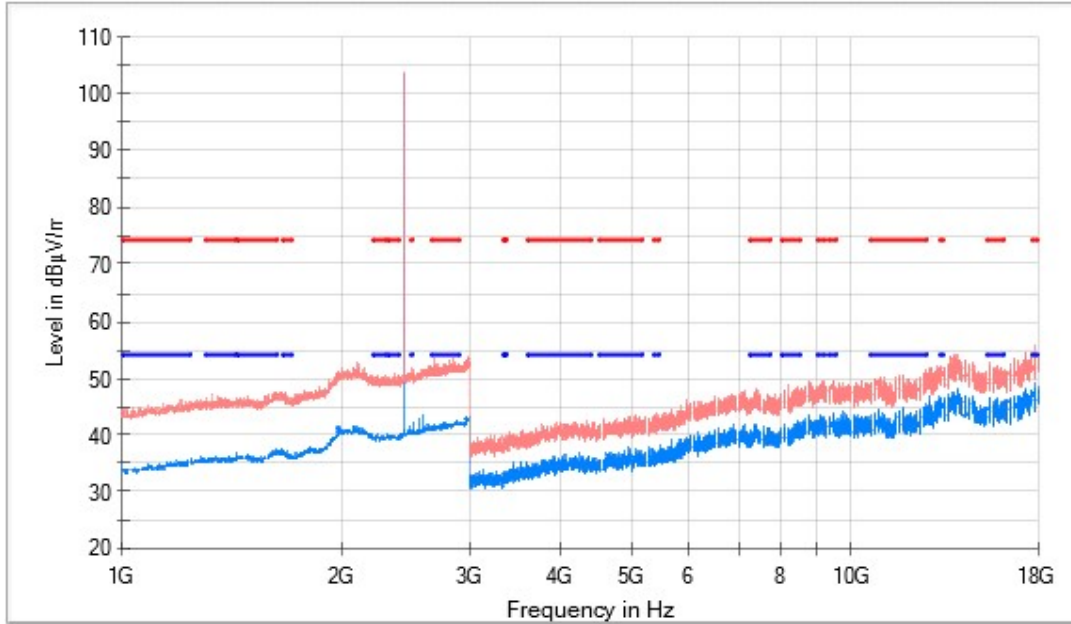
— AVG_MAXH
 — PK+_MAXH
 — TXlimits to Spurious Emission FCC15.247(1-26G) Restricted Bands AVG Limit
 — TXlimits to Spurious Emission FCC15.247 Restricted Bands PK Limit



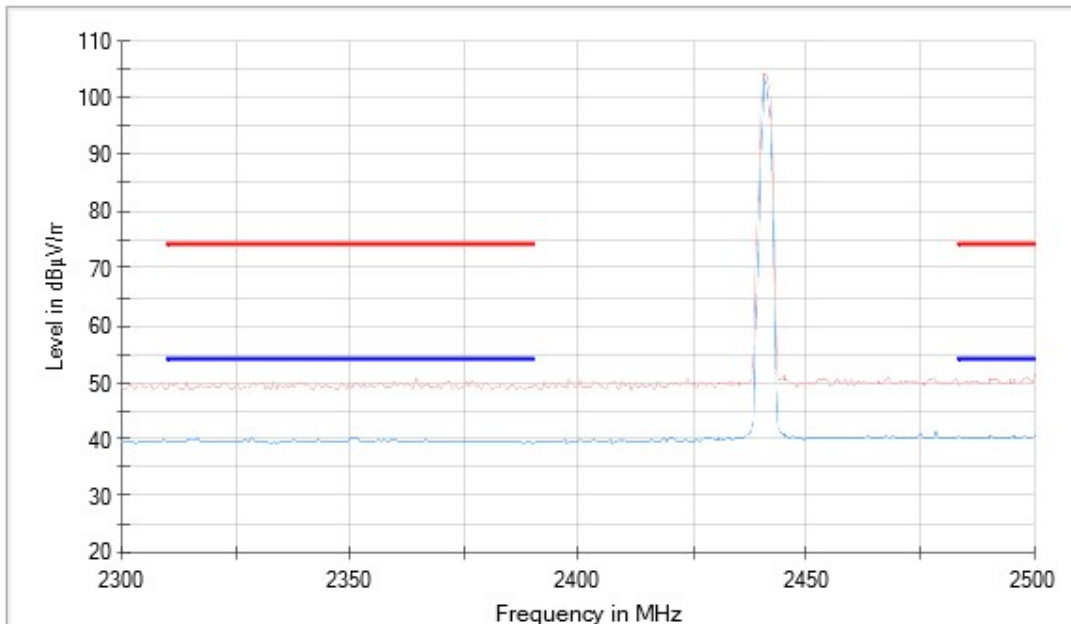
— AVG_MAXH
 — PK+_MAXH
 — TXlimits to Spurious Emission FCC15.247(1-26G) Restricted Bands AVG Limit
 — TXlimits to Spurious Emission FCC15.247 Restricted Bands PK Limit

Frequency Range GHz = [1, 18] Equipment Type = Frequency Hopping Spread Spectrum systems
 Modulation = BT (GFSK 1-DH1) Frequency MHz = 2441.00000
 MIMO Mode = SISO Active Port = 1

Images:



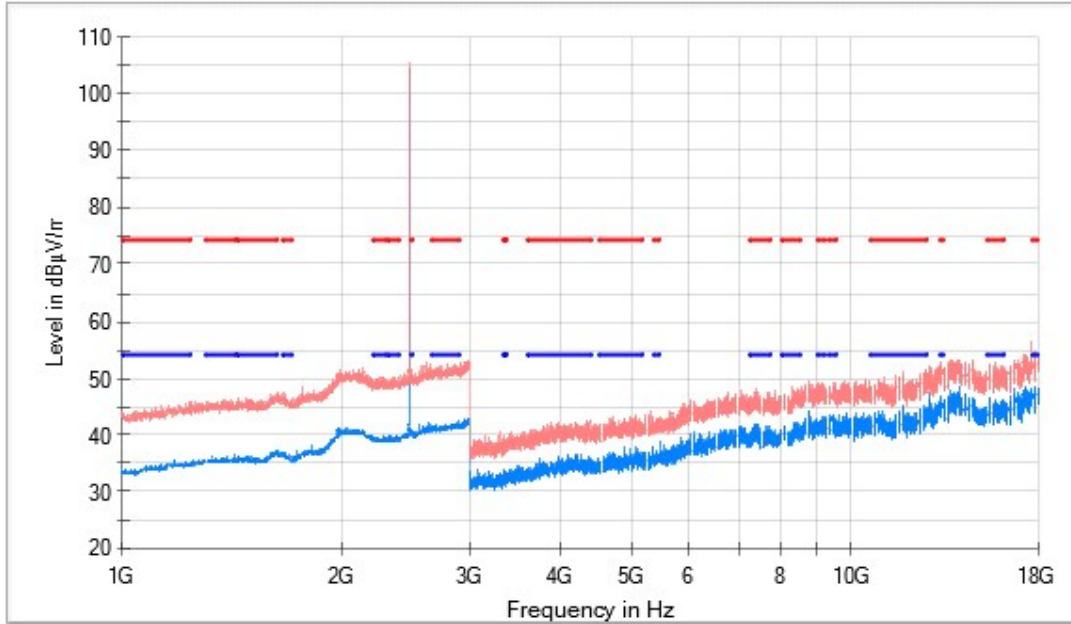
— AVG_MAXH
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 — TXlimits to Spurious Emission FCC15.247 Restricted Bands PK Limit



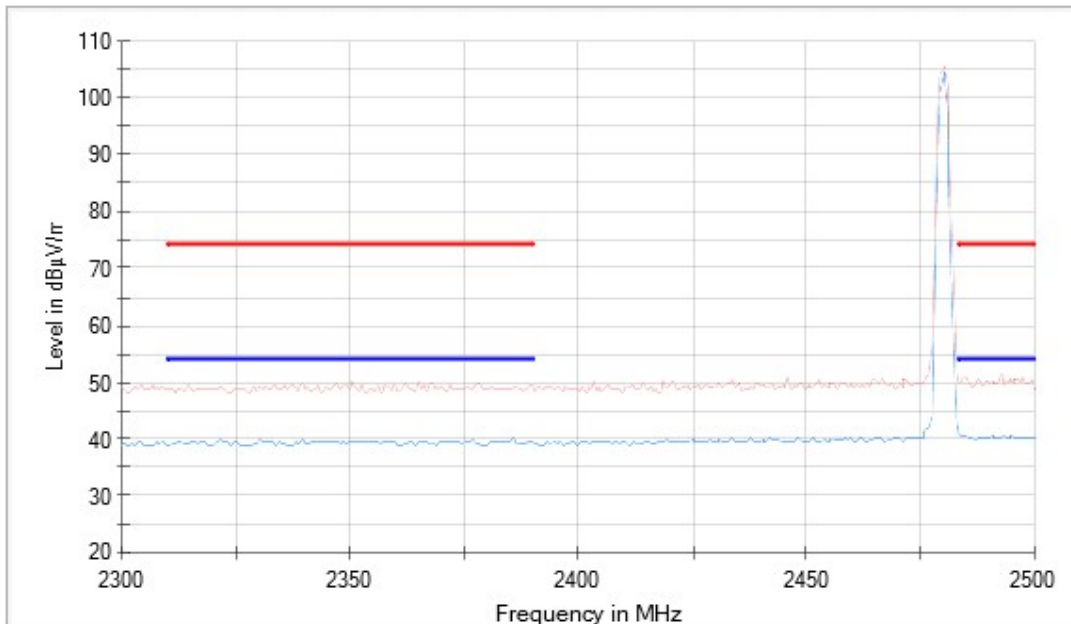
— AVG_MAXH
 — PK+_MAXH
 — TXlimits to Spurious Emission FCC15.247(1-26G) Restricted Bands AVG Limit
 — TXlimits to Spurious Emission FCC15.247 Restricted Bands PK Limit

Frequency Range GHz = [1, 18] Equipment Type = Frequency Hopping Spread Spectrum systems
 Modulation = BT (GFSK 1-DH1) Frequency MHz = 2480.00000
 MIMO Mode = SISO Active Port = 1

Images:



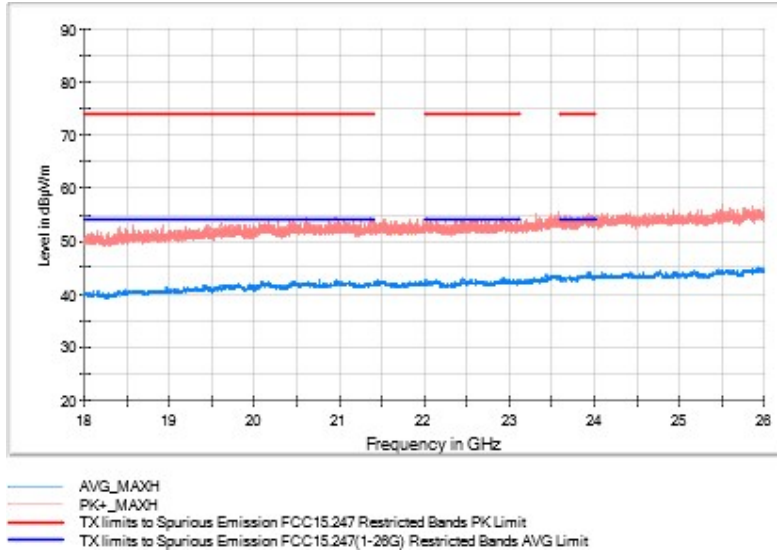
— AVG_MAXH
 — PK+_MAXH
 — TXlimits to Spurious Emission FCC15.247(1-26G) Restricted Bands AVG Limit
 — TXlimits to Spurious Emission FCC15.247 Restricted Bands PK Limit



— AVG_MAXH
 — PK+_MAXH
 — TXlimits to Spurious Emission FCC15.247(1-26G) Restricted Bands AVG Limit
 — TXlimits to Spurious Emission FCC15.247 Restricted Bands PK Limit

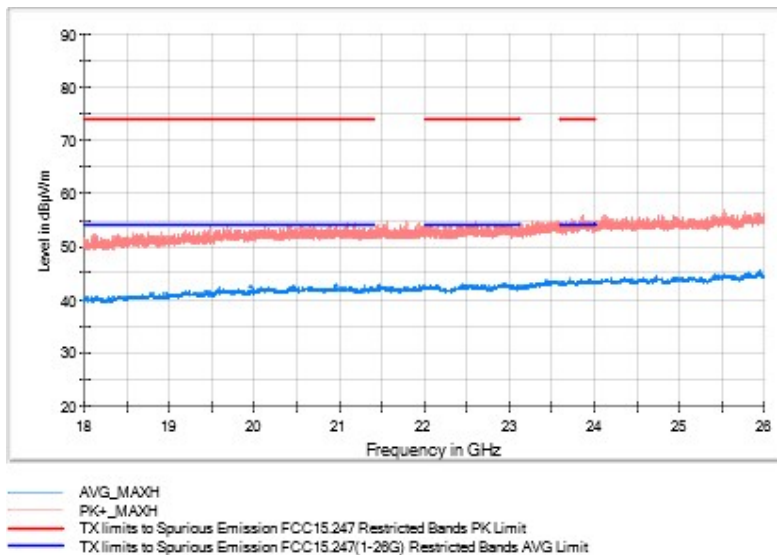
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Modulation = BT (GFSK 1-DH1) Frequency MHz = 2402.00000
MIMO Mode = SISO Active Port = 1

Images:



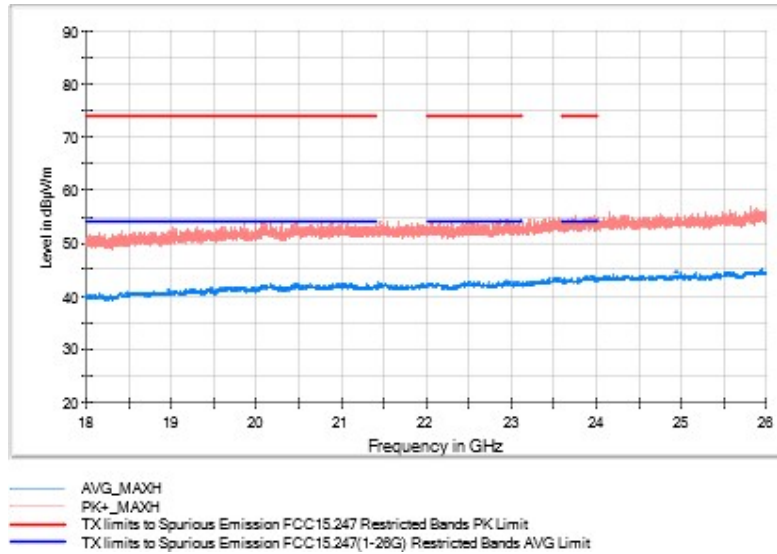
Frequency Range GHz = [18, 26] Equipment Type = Frequency Hopping Spread Spectrum systems
Modulation = BT (GFSK 1-DH1) Frequency MHz = 2441.00000
MIMO Mode = SISO Active Port = 1

Images:



Frequency Range GHz = [18, 26] Equipment Type = Frequency Hopping Spread Spectrum systems
Modulation = BT (GFSK 1-DH1) Frequency MHz = 2480.00000
MIMO Mode = SISO Active Port = 1

Images:



Modulation: BT (Pi/4 DQPSK 2-DH3)

MIMO Mode: SISO

Results

Freq Rng (GHz)	Equipment	Freq (MHz)	Port	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector		
[1, 18]	Frequency Hopping Spread Spectrum systems	2402.00000	1	15690.500	46.20	H	AVG		
				2402.000	100.80*	H	AVG		
				8074.000	42.30	H	AVG		
		2441.00000		15515.500	46.90	H	AVG		
				17935.500	48.50	V	AVG		
				2441.000	102.70*	H	AVG		
		2480.00000		11725.000	45.50	H	AVG		
				2480.000	104.90*	H	AVG		
				4739.000	37.70	V	AVG		
[18, 26]		2402.00000		2402.00000	18964.500	41.30	V	AVG	
					22570.500	42.80	H	AVG	
					2441.00000	19950.000	42.10	H	AVG
						22279.000	42.60	V	AVG
					2480.00000	20471.000	42.60	H	AVG
						23936.000	44.10	V	AVG

*Bluetooth Fundamental

Verdict

Pass