DEKRA Certification, Inc.
405 Glenn Dr. Suite 12,
Sterling, VA 20164
United States of America

FCC LISTED, REGISTRATION NUMBER: 2764.01

ISED LISTED REGISTRATION NUMBER: 23595-1

Test Report No:
4382ERM.010A1

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	Automotive Front Passenger Display Module (FPDM)
(*) Trademark	Harman
(*) Model and /or type reference	FPDM WL MCA
Other identification of the product	FCC ID: 2AHPN-BE2880 IC ID: 6434C-BE2880
(*) Features	Bluetooth v4.1
Manufacturer	Harman de México, S. de R.L de C.V Av. Industria Minera 502 Parque Industrial, Queretaro, Qro, CP 76220. México.
Test method requested, standard	USA FCC Part 15.247 (10-1-20 Edition): Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz USA FCC Part 15.209 (10-1-20 Edition): 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 Digitally signed by Domingo Galvez DN: cn=Domingo Galvez, o=Dekra Certification Inc., ou=Regulatory Lab Manager, email=domingo.galvez@dekra.com, c=US
Date of issue	04-25-2025
Report template No	FDT08_23 (*) "Data provided by the client"

Index

Acronyms

Acronym ID	Acronym Description
	Emission Bandwidth
# of Tx Chains	Number of Transmission Chains
Equipment	Equipment Type
Freq	Frequency
In band Peak Lvl	In band Peak Level
Lvl	Level
MP	Measurement Point
Mod	Modulation
Occ Ch BW	Occupied Channel Bandwidth
PSD	Power Spectrum Density
Peak Power	Maximum Peak Conducted Output Power
Port	Active Port

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.

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	5150-5850	0.88	dB
Occupied Bandwidth		1.87	%
Dwell Time		0.01	%
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 device which is intended to be installed in a passenger vehicle and powered by the vehicle's main battery. The device is an original equipment manufacturer (OEM) application and is installed by the OEM during vehicle assembly. Device is not available by normal means in the consumer market. This device is a stylized display module for use by the front seat passenger and includes a Bluetooth radio for connecting to headphones with Bluetooth capability.

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, accessories and auxiliary equipment:

Id	Control Number	Description	Manufacturer / Model	Serial Nº	Date of Reception	Application
S/01	4382/01	FPDM (Conducted)	Harman / MY 25	157000044	2024-10-21	Element Under Test
S/01	4382/05	RI Module	Harman / MY 25	T0012010472863	2024-10-21	Accessory
S/01	4382/07	PCB Board	Harman / MY 25	-	2024-10-21	Accessory
S/01	4382/09	CAN to USB	Harman / MY 25	-	2024-10-21	Accessory

Sample S/01, was used for the following test(s): All Conducted tests indicated in appendix A.

Sample S/02 is composed of the following elements, accessories and auxiliary equipment:

Id	Control Number	Description	Manufacturer / Model	Serial Nº	Date of Reception	Application
S/02	4382/03	FPDM(Radiated)	Harman / MY 25	T00141944E0012	2024-10-21	Element Under Test
S/02	4382/06	DCSD MY25 Screen	Harman / MY 25		2024-10-21	Accessory
S/02	4382/08	Ethernet to USB	Harman / MY 25	-	2024-10-21	Accessory
S/02	4382/10	RI Module	Harman / MY 25	-	2024-10-21	Accessory
S/02	4382/11	DCSD MY25 Screen	Harman / MY 25	-	2024-10-21	Accessory
S/02	4382/12	PCB Board	Harman / MY 25	-	2024-10-21	Accessory

Sample S/02, was used for the following test(s): All Radiated tests indicated in appendix A.

DEKRA Certification, Inc.
405 Glenn Dr. Suite 12,
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United States of America

Test sample description

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

Ports..... :	Port name and description		Cable			
			Specified length [m]	Attached during test	Shielded	Coupled to patient
				☐	☐	☐
				☐	☐	☐
				☐	☐	☐
				☐	☐	☐
				☐	☐	☐
Supplementary information to the ports..... :	No Data Provided					
Rated power supply..... :	Voltage and Frequency		Reference poles			
			L1	L2	L3	N	PE
	☐	AC:	☐	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐	☐
	☒	DC: 12V nominal Car battery, 8V to 16V max					
	☐	DC:					
Rated Power..... :	9-16 DC, 5A max						
Clock frequencies ..... :	No Data Provided						
Other parameters..... :	No Data Provided						
Software version..... :	No Data Provided						
Hardware version..... :	DV						
Dimensions in cm (W x H x D)..... :	609mm (H) x 135mm (W) x 70mm						
Mounting position..... :	☐	*Table top equipment*					
	☐	*Wall/Ceiling mounted equipment*					
	☐	*Floor standing equipment*					
	☐	*Hand-held equipment*					
	☒	*Other: Display module for use by the front seat passenger*					
Modules/parts ..... :	Module/parts of test item		Type		Manufacturer		
	No Data Provided						
Accessories (not part of the test item) ..... :	Description		Type		Manufacturer		
	FPDM Power Harness						
	P-CAN Adapter						
	OABR Board						
	LAN cable With USB 2.0 to Fast Ethernet Adapter						
	-						
	-						

Documents as provided by the applicant ..... :	Description	File name	Issue date
	Declaration Equipment Data	FDT30_18 Declaration Equipment Data WL MCA signed Melissa	11/19/2024
	Test Instructions set to connect the FPDM		

Copy of marking plate:

Identification of the client

Harman International Industries, Inc
30001 Cabot Drive, Novi, MI 48377, USA.

Testing period and place

Test Location	DEKRA Certification Inc.
Date (start)	10-23-2024
Date (finish)	10-24-2024

Document history

Report number	Date	Description
4382ERM.010	04-08-2025	First release.
4382ERM.010A1	04-25-2025	Second release. Added the test setup photos, included clarification regarding the 9 kHz–30 MHz range (page 56), and corrected the frequency on page 51. This revised test report cancels and replaces test report 4382ERM.010.

Environmental conditions

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

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

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

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

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

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

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

Testing verdicts

Fail	F
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
FCC 2.1049 / 99dBw Occupied Channel Bandwidth 99%		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
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Conducted		N/A	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Radiated		Pass	N/A
Supplementary information and remarks: 1. DUT has an integral antenna, and no conducted testing is required			

List of equipment used during the test

Test Equipment used for testing.

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	2024-07-15	2025-07-15
1107	ETHERNET SNMP THERMOMETER	60038026952	2022-10-18	2025-10-18
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
1471	ETHERNET SNMP THERMOMETER	60038026577	2022-10-24	2025-10-24
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)

Appendix A

PRODUCT INFORMATION

The following information is provided by the supplier

Information	Description
Modulation	GFSK, π/4-DQPSK, 8-DPSK
Operation mode 1:	
Operating Frequency Range	2402MHz - 2483.5MHz (Basic Rate EDR with 3 Mbps Baud rate over UART)
Nominal Channel Bandwidth	962.0 kHz
RF Output Power	0.0068 W
Antenna type	non-removable Internal PCB trace antenna
Antenna gain	4.91 dBi for 2402 MHz, 4.89 dBi for 2441 MHz, 7.06 dBi for 2480 MHz
Nominal Voltage	
- Supply Voltage	12 Vdc
- Type of power source	DC power supply
Equipment type	Bluetooth Classic

TEST CONDITIONS

(*): Data provided by the client.

TEST CONDITIONS	DESCRIPTION
TC/01	Power supply (V): $V_{nominal}$: 12 Vdc Temperature: $T_{nominal}$: +15 to +35 ºC Modulation: GFSK Test Frequencies for conducted/Radiated tests: Lowest range: 2402 MHz Middle channel: 2441 MHz Highest range: 2480 MHz
TC/02	Power supply (V): $V_{nominal}$: 12 Vdc Temperature: $T_{nominal}$: +15 to +35 ºC Modulation: π/4-DQPSK Test Frequencies for Conducted/Radiated tests: Lowest range: 2402 MHz Middle channel: 2441 MHz Highest range: 2480 MHz
TC/03	Power supply (V): $V_{nominal}$: 12 Vdc Temperature: $T_{nominal}$: +15 to +35 ºC Modulation: 8-DPSK Test Frequencies for Conducted/Radiated tests: Lowest range: 2402 MHz Middle channel: 2441 MHz Highest range: 2480 MHz

TEST CASES DETAILS

RSS-247 5.1 (b) / FCC 15.247 (a) (1) - 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.

Sample ID: S/01

Modulation: BT (GFSK 1-DH3)
Results

Freq (MHz)	BW (MHz)	20Ebw (MHz)
2402.00000	1	0.930
2441.00000	1	0.930
2480.00000	1	0.930

Modulation: BT (π/4 DQPSK 2-DH5)
Results

Freq (MHz)	BW (MHz)	20Ebw (MHz)
2402.00000	1	1.315
2441.00000	1	1.290
2480.00000	1	1.295

Modulation: BT (8DPSK 3-DH5)
Results

Freq (MHz)	BW (MHz)	20Ebw (MHz)
2402.00000	1	1.270
2441.00000	1	1.270
2480.00000	1	1.270

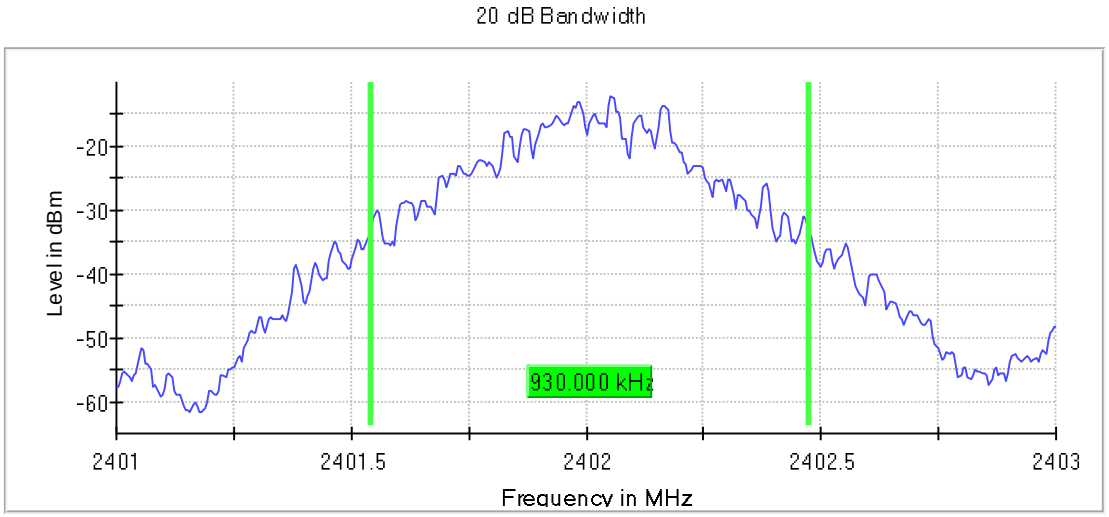
Verdict

Pass

Attachments

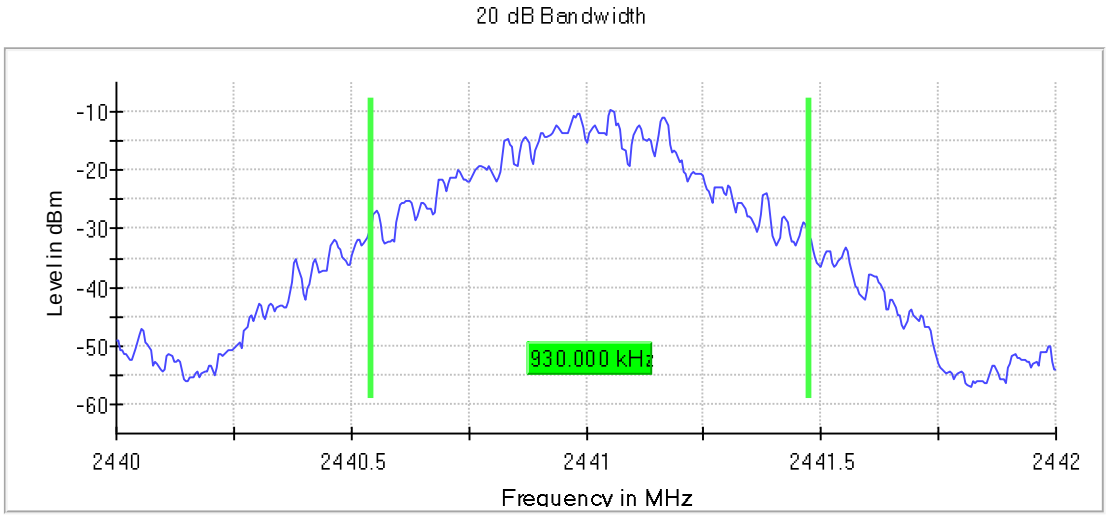
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH3)

Images:



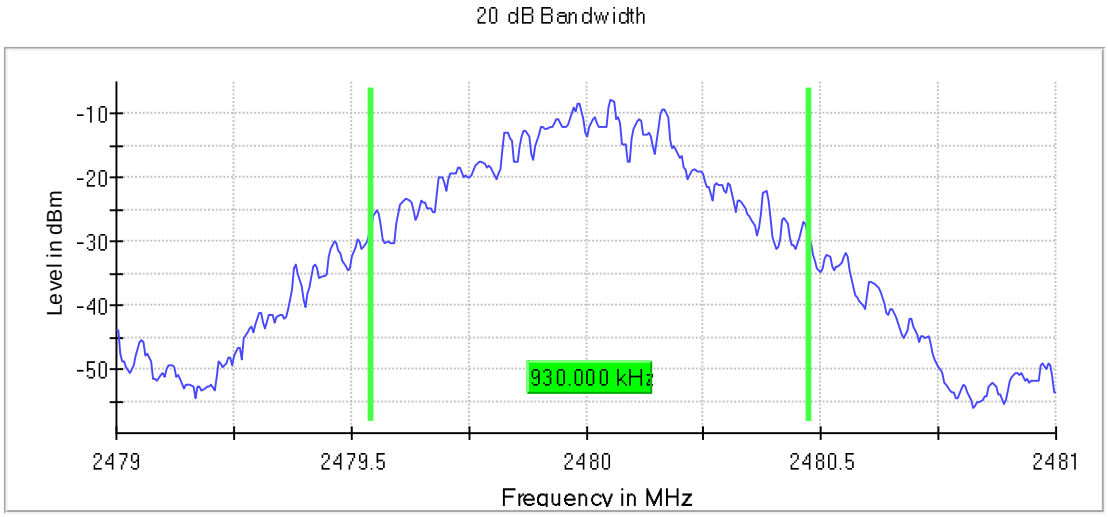
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH3)

Images:



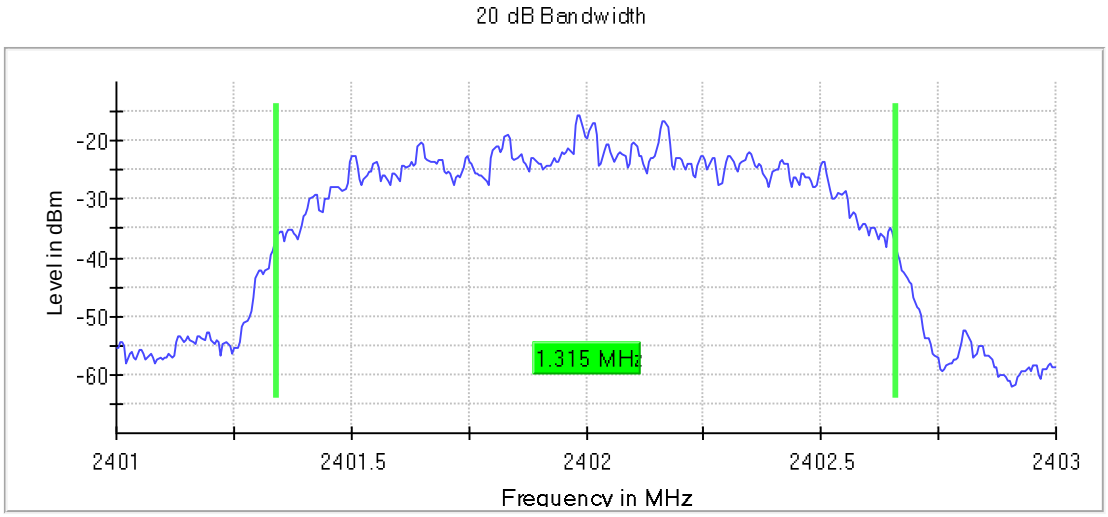
Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH3)

Images:



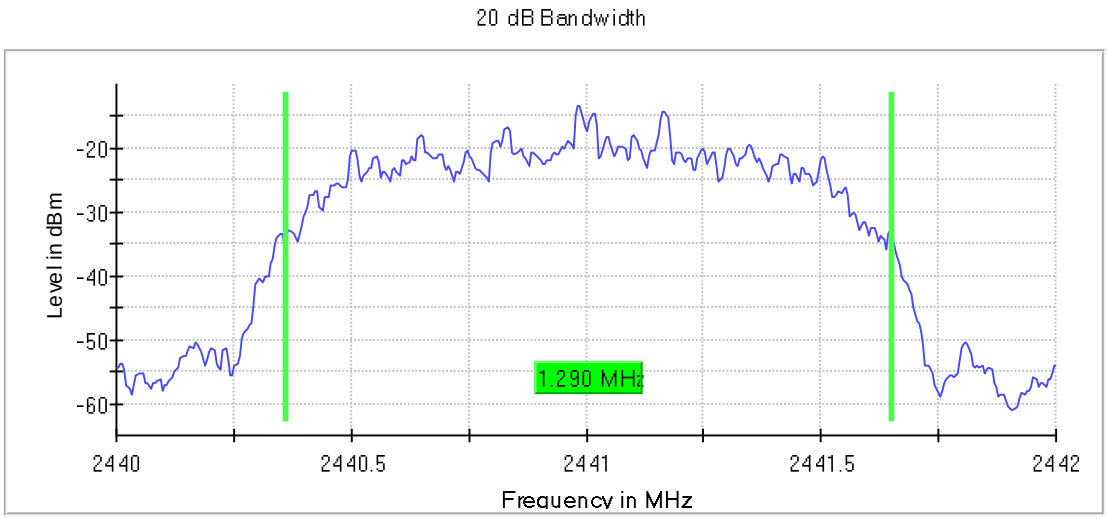
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5)

Images:



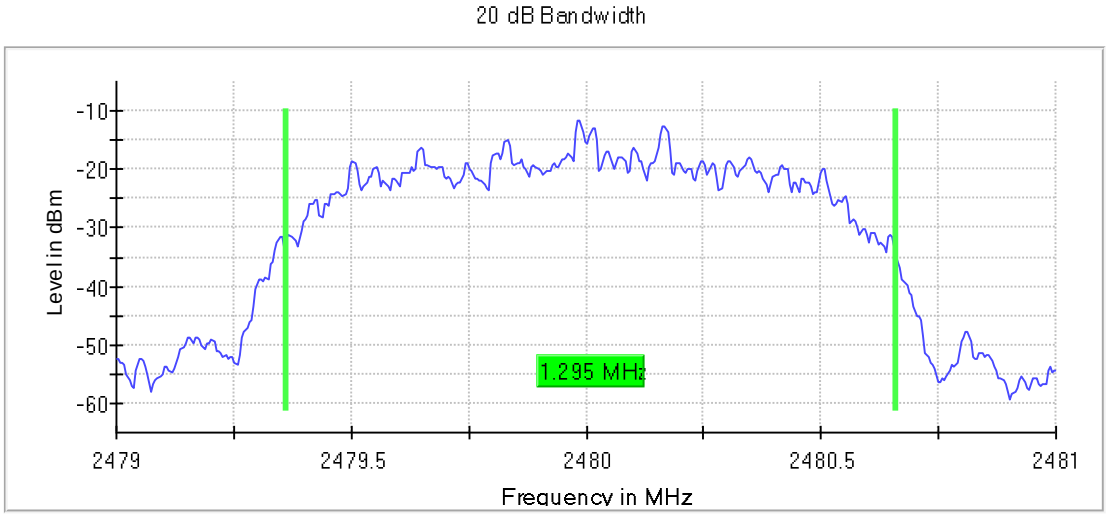
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5)

Images:



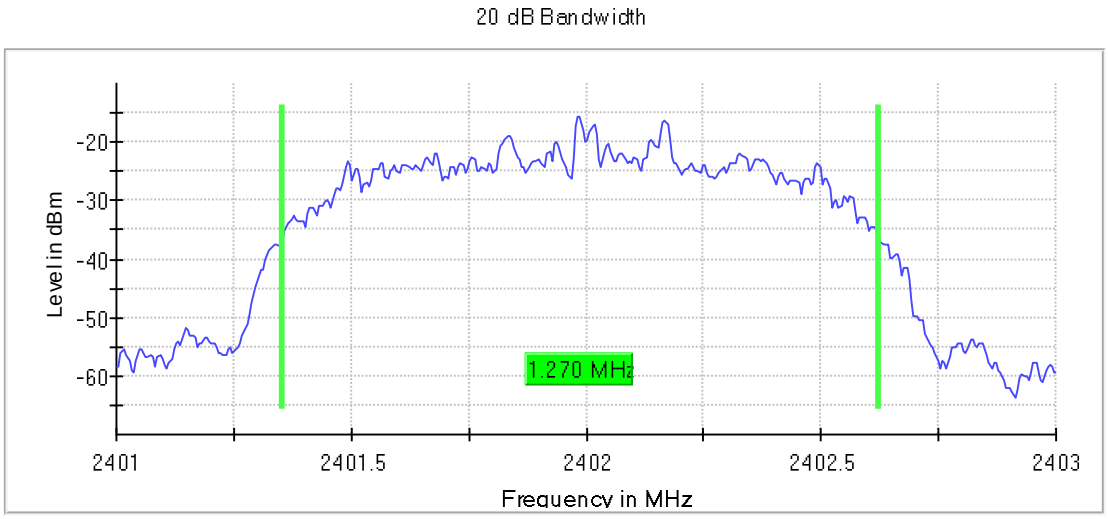
Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5)

Images:



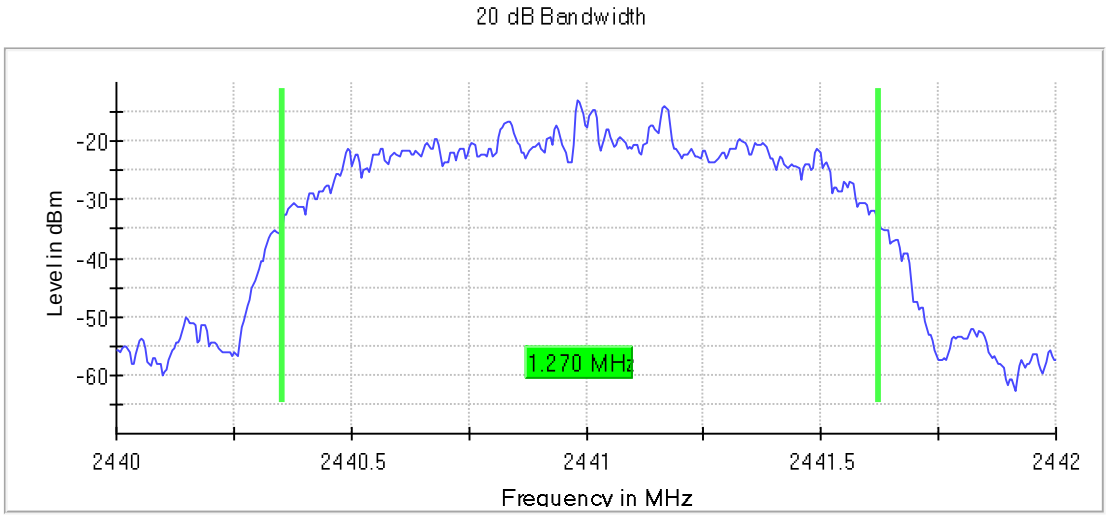
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5)

Images:



Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5)

Images:



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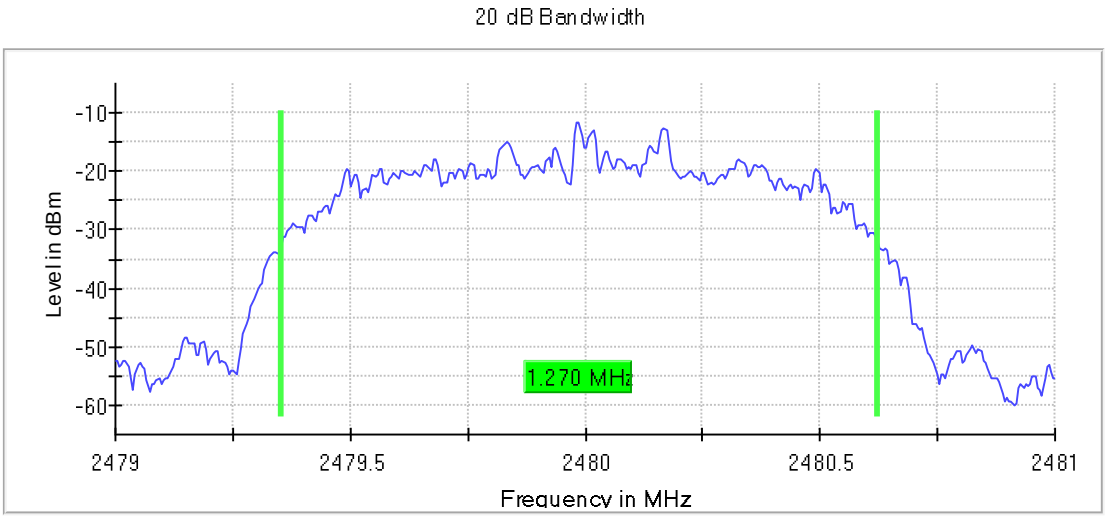
Images:



Spectrum Analyzer Parameters

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.44000 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44200 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz	2.000 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 µs	189.648 µs	189.648 µs
Reference Level	0.000 dBm	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	200	200	200
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.50 dB	0.50 dB	0.50 dB
Run	7 / max. 150	9 / max. 150	7 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.20 dB	0.20 dB	0.20 dB

FCC 2.1049 - 99dBw Occupied Channel Bandwidth 99%

Limits
No Limit has been set to this test case

Sample ID: S/01

Modulation: BT (GFSK 1-DH3)
Results

Freq (MHz)	BW (MHz)	Occ Ch BW (MHz)
2402.00000	1	0.865
2441.00000	1	0.865
2480.00000	1	0.865

Modulation: BT (Π/4 DQPSK 2-DH5)
Results

Freq (MHz)	BW (MHz)	Occ Ch BW (MHz)
2402.00000	1	1.165
2441.00000	1	1.160
2480.00000	1	1.160

Modulation: BT (8DPSK 3-DH5)
Results

Freq (MHz)	BW (MHz)	Occ Ch BW (MHz)
2402.00000	1	1.170
2441.00000	1	1.165
2480.00000	1	1.165

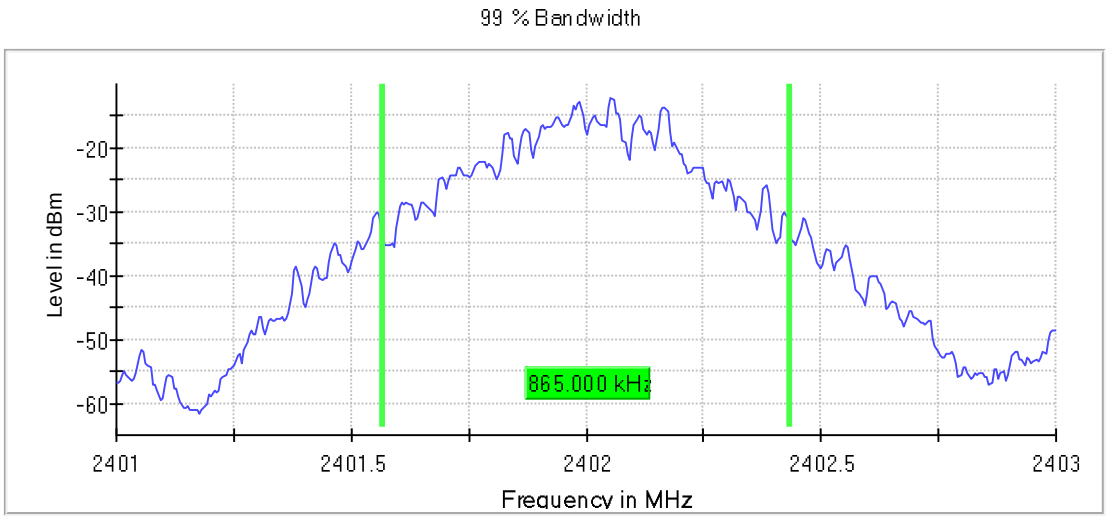
Verdict

Pass

Attachments

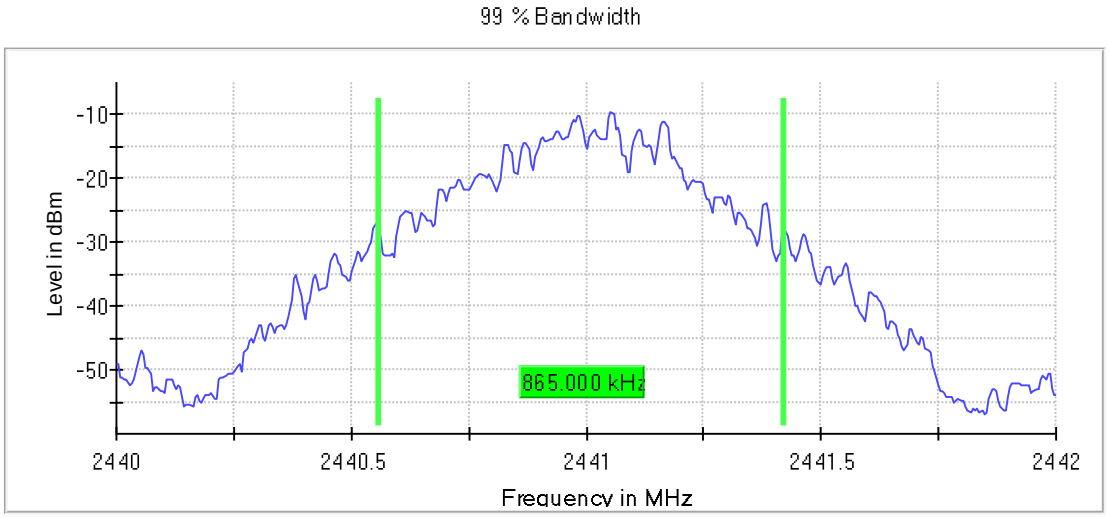
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH3)

Images:



Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH3)

Images:



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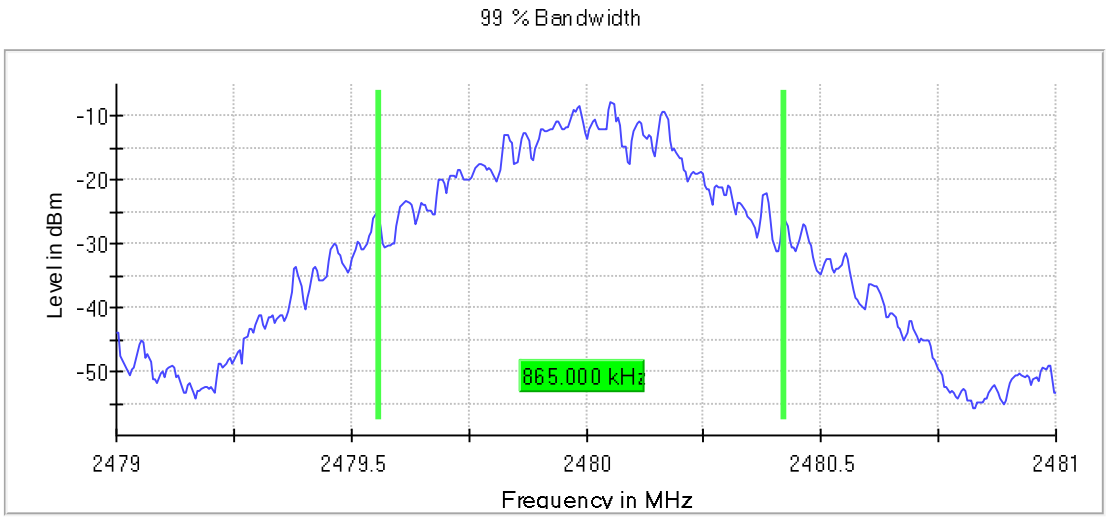
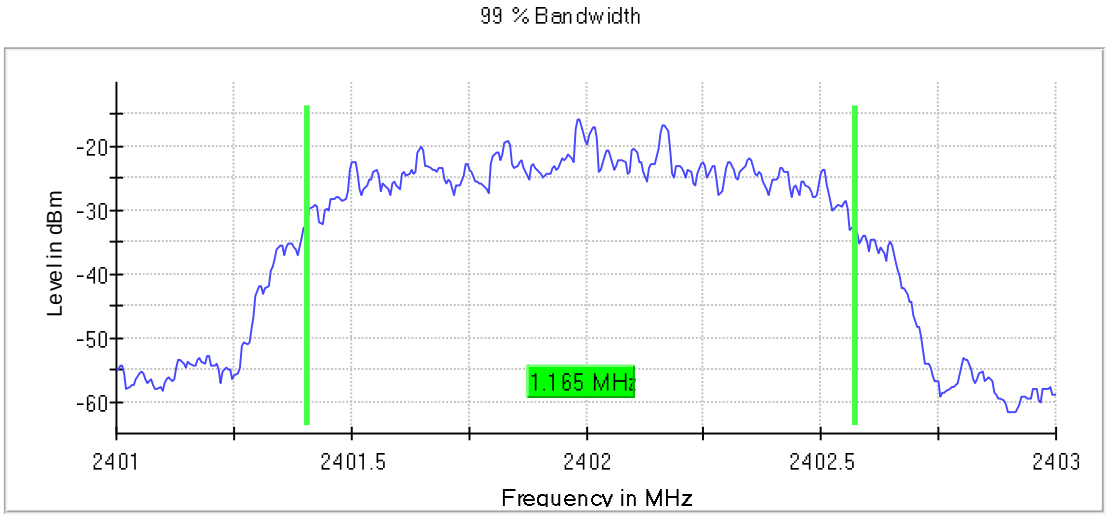


Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5)

Images:



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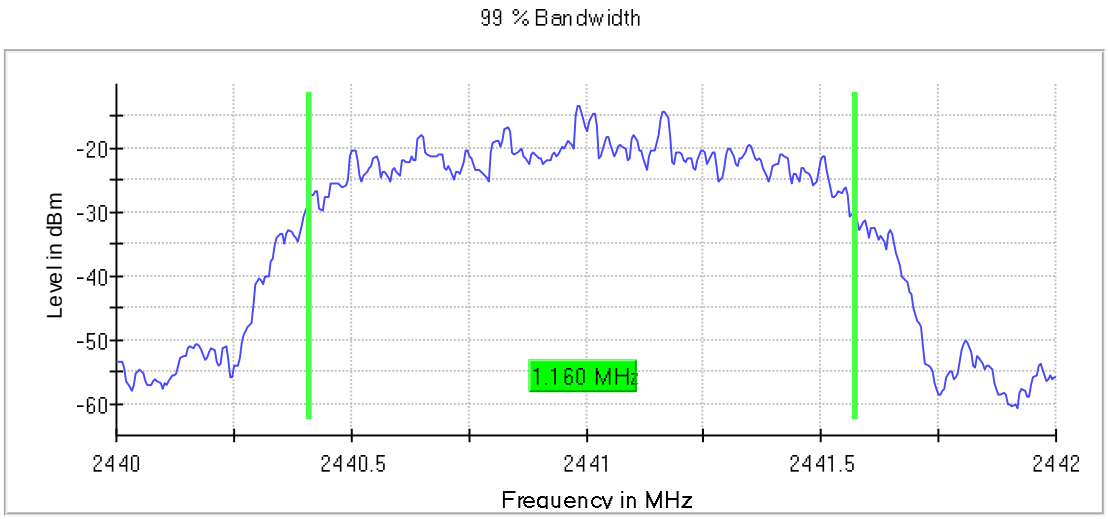
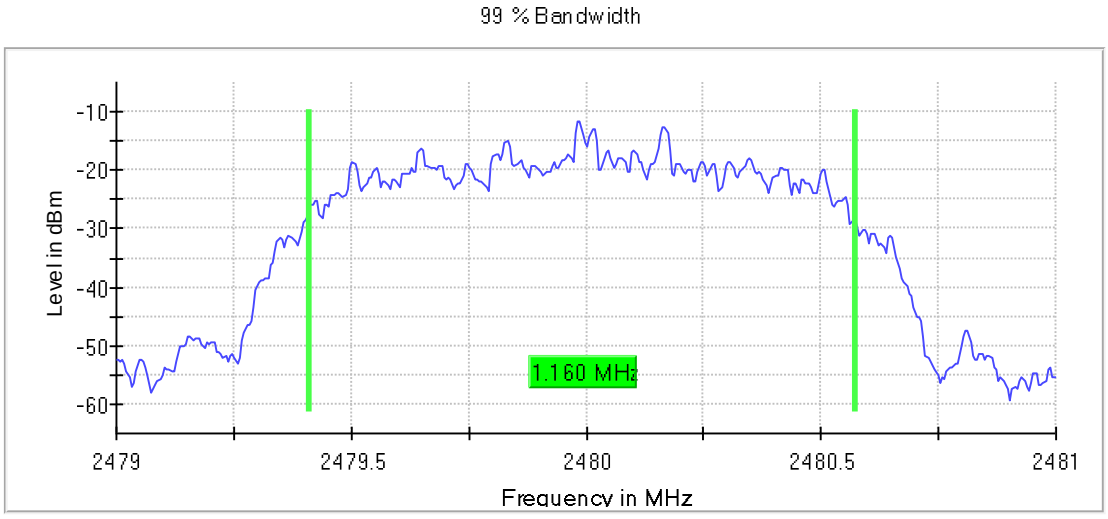
Images:



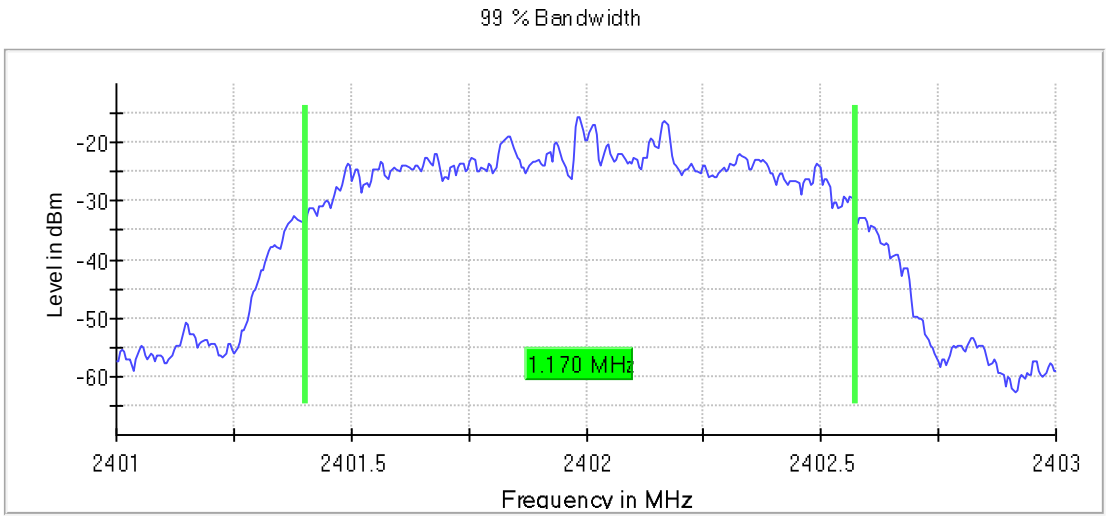
Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5)

Images:



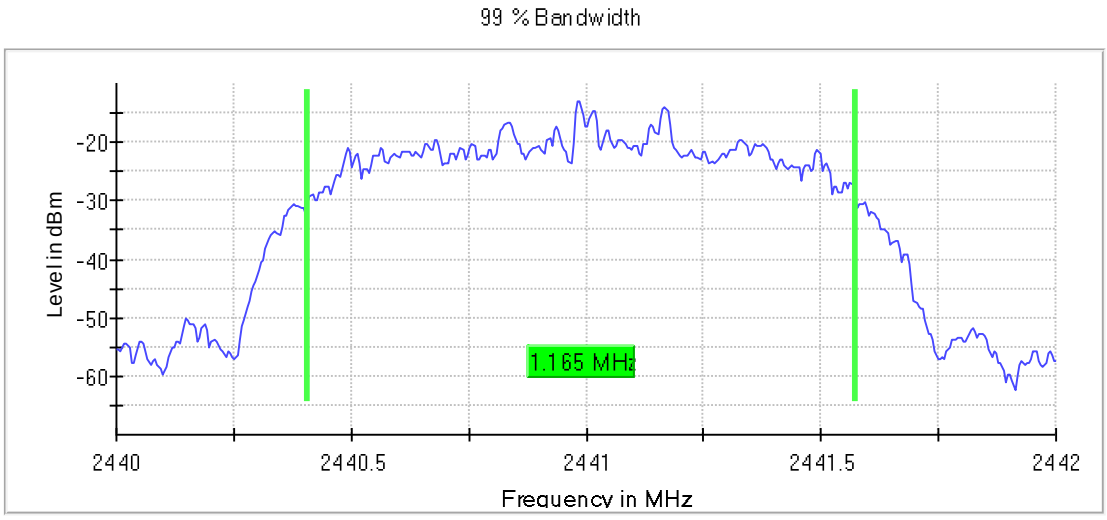
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5)

Images:



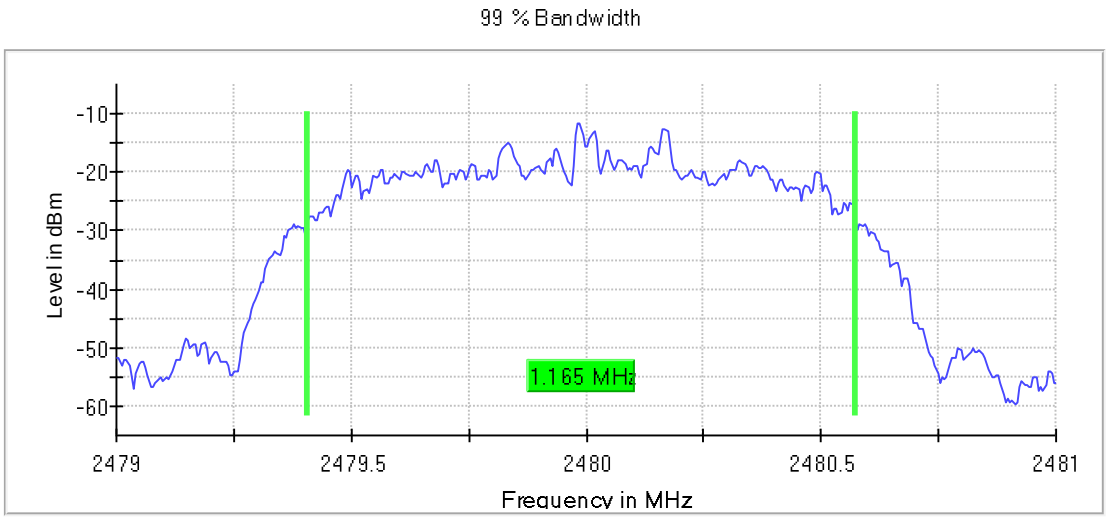
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5)

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5)

Images:



Spectrum Analyzer Parameters

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.44000 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44200 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz	2.000 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 µs	189.648 µs	189.648 µs
Reference Level	0.000 dBm	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	500	500	500
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.30 dB	0.30 dB	0.30 dB
Run	5 / max. 150	5 / max. 150	5 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.17 dB	0.10 dB	0.06 dB

RSS-247 5.1 (b) / FCC 15.247 (a) (1) - 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

Sample ID: S/01

Modulation: BT (GFSK 1-DH3)
Results

Equipment	BW (MHz)	Freq Sep (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	0.980198

Modulation: BT (π/4 DQPSK 2-DH5)
Results

Equipment	BW (MHz)	Freq Sep (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	1.009901

Modulation: BT (8DPSK 3-DH5)
Results

Equipment	BW (MHz)	Freq Sep (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	1.009901

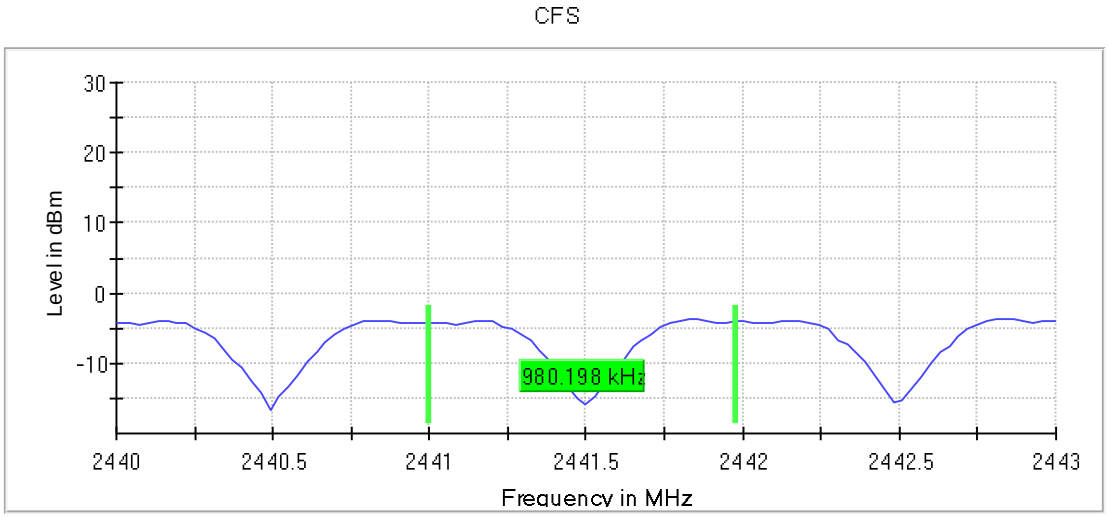
Verdict

Pass

Attachments

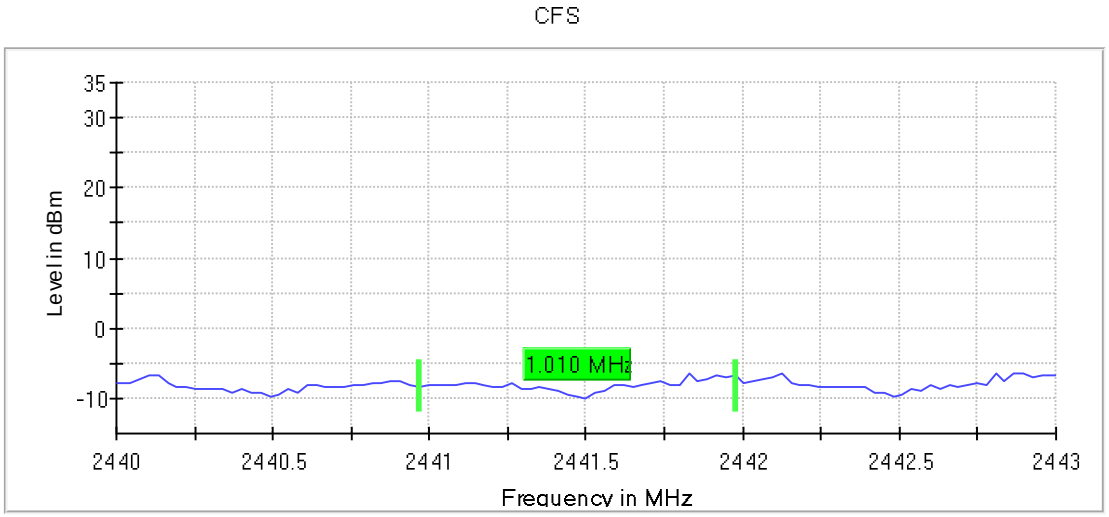
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH3)

Images:



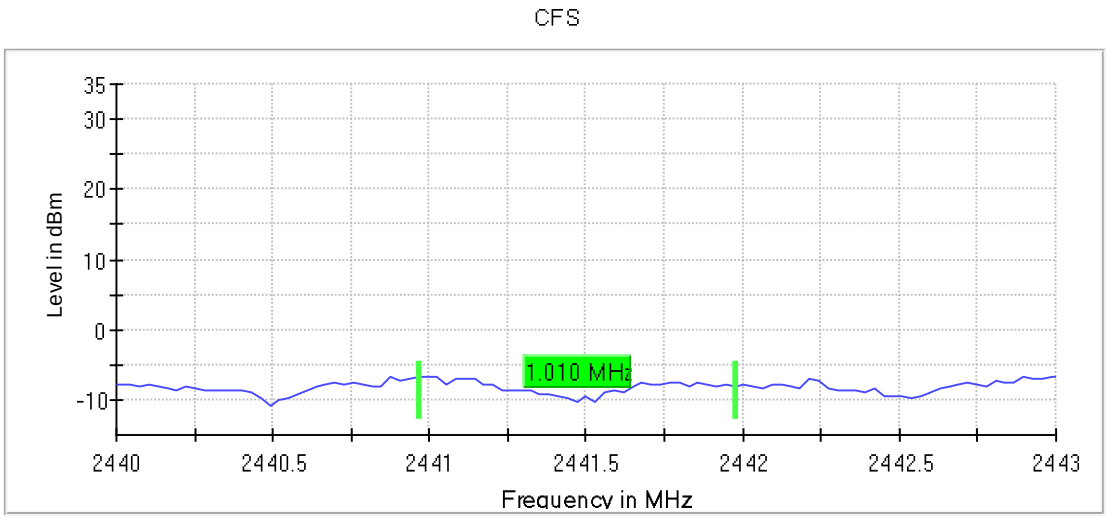
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5)

Images:



Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5)

Images:



Spectrum Analyzer Parameters

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.44000 GHz	2.44000 GHz	2.44000 GHz
Stop Frequency	2.44300 GHz	2.44300 GHz	2.44300 GHz
Span	3.000 MHz	3.000 MHz	3.000 MHz
RBW	300.000 kHz	300.000 kHz	300.000 kHz
VBW	300.000 kHz	300.000 kHz	300.000 kHz
Sweep Points	101	101	101
Sweep time	1.000 ms	1.000 ms	1.000 ms
Reference Level	0.000 dBm	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	200	200	200
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	Sweep	Sweep	Sweep
Preamp	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.50 dB	0.50 dB	0.50 dB
Run	12 / max. 150	11 / max. 150	11 / max. 150
Stable	10 / 10	10 / 10	10 / 10
Max Stable Difference	0.00 dB	0.00 dB	0.00 dB

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 x 79= 31.6 seconds.

Sample ID: S/01

Modulation: BT (GFSK 1-DH3)
Results

BW (MHz)	NHp	Avg COT (ms)
1	3	11.581

Modulation: BT (π/4 DQPSK 2-DH5)
Results

BW (MHz)	NHp	Avg COT (ms)
1	3	10.789

Modulation: BT (8DPSK 3-DH5)
Results

BW (MHz)	NHp	Avg COT (ms)
1	3	10.642

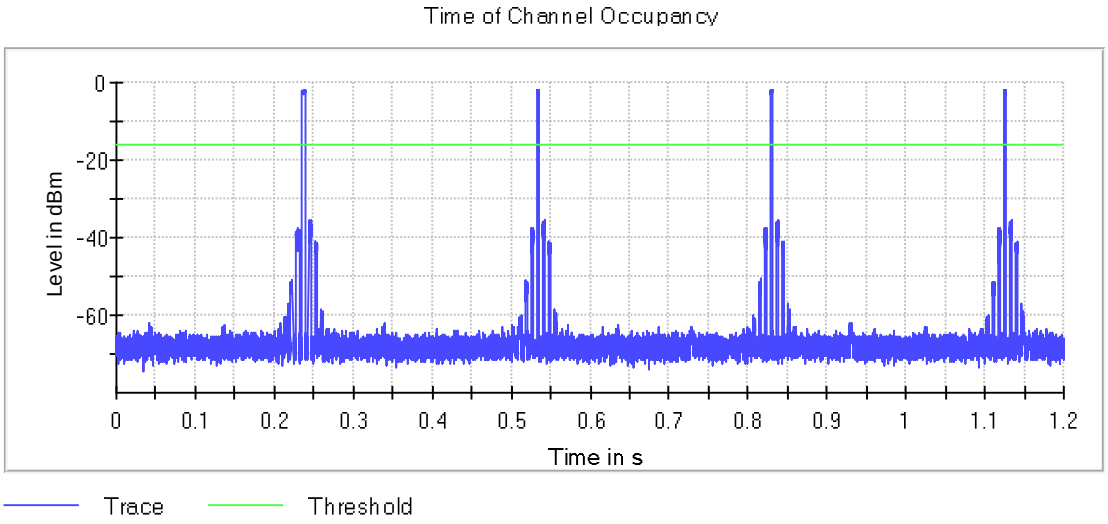
Verdict

Pass

Attachments

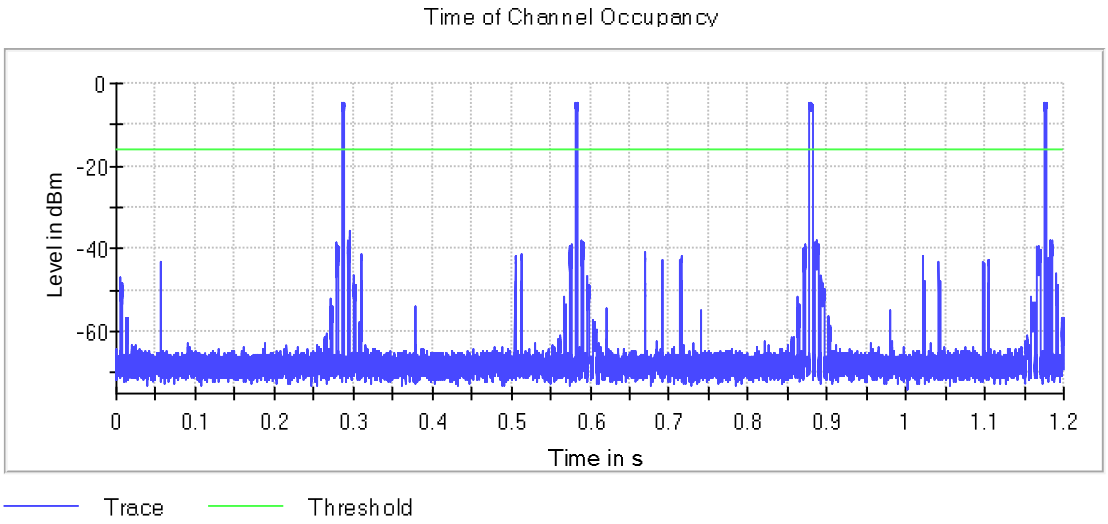
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH3)

Images:



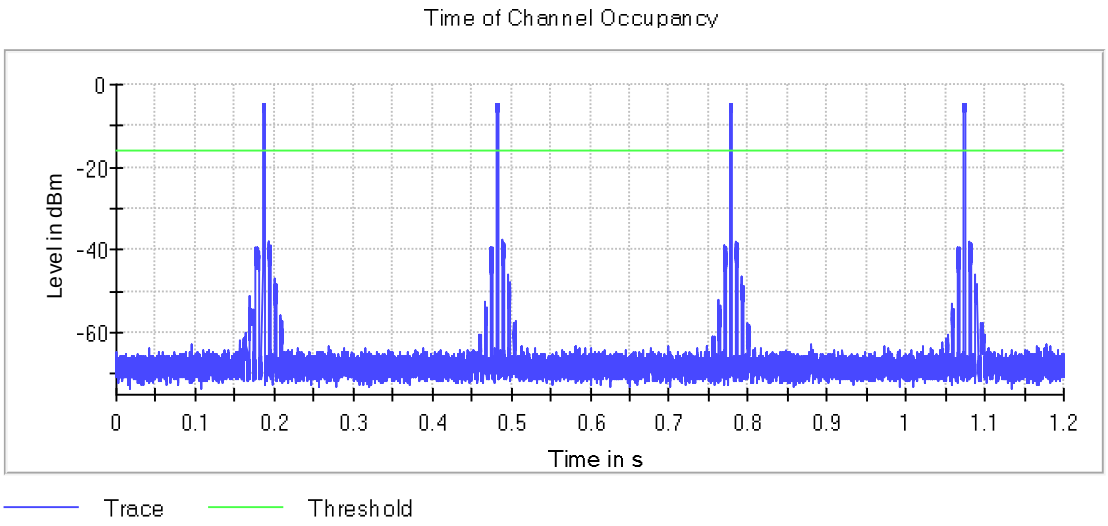
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (П/4 DQPSK 2-DH5)

Images:



Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5)

Images:



Spectrum Analyzer Parameters

Setting	Instrument Value
Center Frequency	2.44100 GHz
Span	ZeroSpan
RBW	500.000 kHz
VBW	1.000 MHz
SweepPoints	30001
Sweeptime	1.200 s
Reference Level	-10.000 dBm
Attenuation	0.000 dB
Detector	MaxPeak
SweepCount	1
Filter	Channel
Trace Mode	Clear Write
Sweeptype	Sweep
Preamp	off
Trigger	External
Trigger Offset	0.000 s

OSP

Setting	Instrument Value
Measurement Time	1.200 s
Tracepoints	1199999
Time resolution	1.000 µs
Detector	RMS

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

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

Sample ID: S/01

Modulation: BT (GFSK 1-DH3)
Results

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

Modulation: BT (Π/4 DQPSK 2-DH5)
Results

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

Modulation: BT (8DPSK 3-DH5)
Results

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

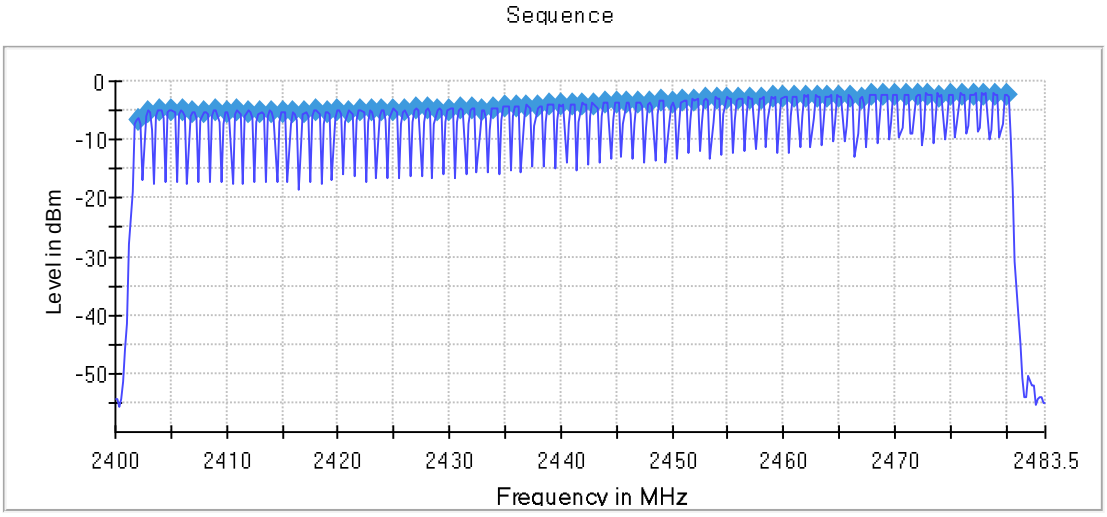
Verdict

Pass

Attachments

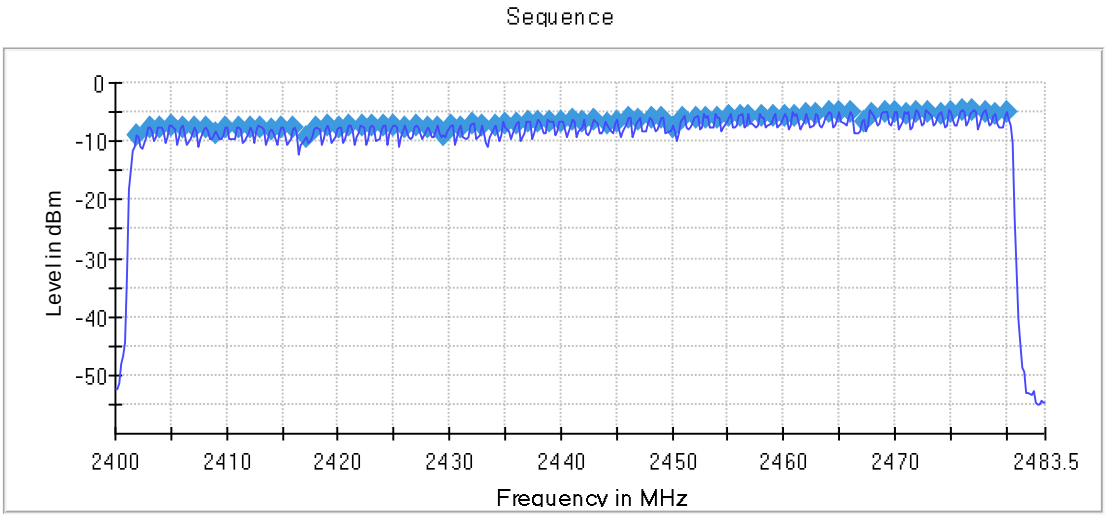
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH3)

Images:



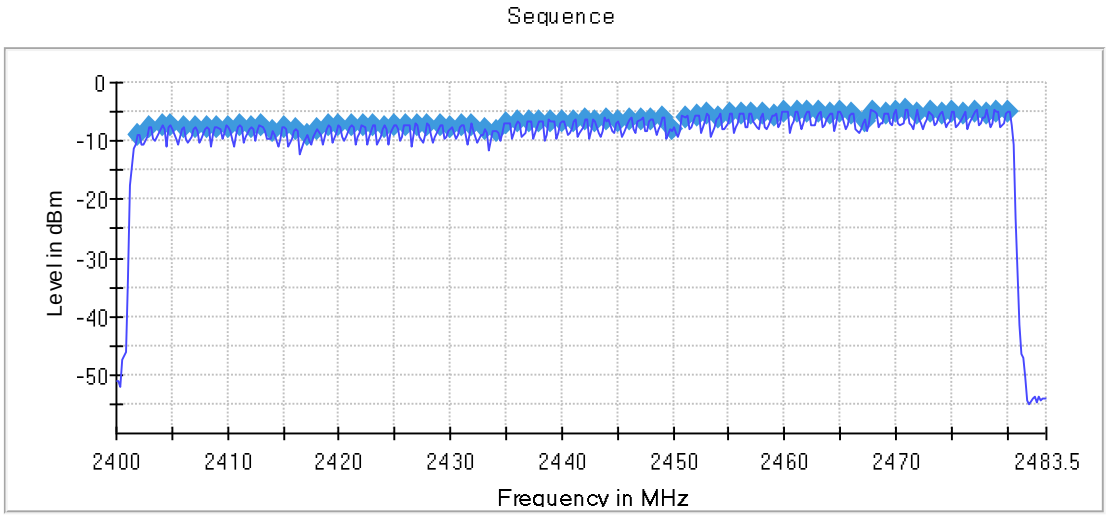
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5)

Images:



Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5)

Images:



Spectrum Analyzer Parameters

Setting	Instrument Value
Start Frequency	2.40000 GHz
Stop Frequency	2.48350 GHz
Span	83.500 MHz
RBW	200.000 kHz
VBW	200.000 kHz
SweepPoints	418
Sweeptime	47.405 µs
Reference Level	0.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	FFT
Preamp	off
Stablemode	Trace
Stablevalue	0.50 dB
Run	42 / max. 150
Stable	3 / 3
Max Stable Difference	0.41 dB

RSS-247 5.4 (b) / FCC 15.247 (b) (1) - Maximum Peak Conducted output power & Antenna gain

Limits
For Frequency Hopping systems operating in the 2400 – 2483.5 MHz band employing at least 75 hopping channels: 1 watt (30 dBm). (Part 15 Subpart C §15.247). The e.i.r.p. shall not exceed 4 W (RSS-247).

Sample ID: S/01
Maximum declared antenna gain: 4.91 dBi for 2402 MHz, 4.89 dBi for 2441 MHz, 7.06 dBi for 2480 MHz

Modulation: BT (GFSK 1-DH3)
Results

Freq (MHz)	BW (MHz)	Peak Power (dBm)	Maximum EIRP power (dBm)
2402.00000	1	-6.3	-1.39
2441.00000	1	-3.6	1.29
2480.00000	1	-1.9	5.16

Modulation: BT (Π/4 DQPSK 2-DH5)
Results

Freq (MHz)	BW (MHz)	Peak Power (dBm)	Maximum EIRP power (dBm)
2402.00000	1	-7.6	-2.69
2441.00000	1	-5.0	-0.11
2480.00000	1	-3.6	3.46

Modulation: BT (8DPSK 3-DH5)
Results

Freq (MHz)	BW (MHz)	Peak Power (dBm)	Maximum EIRP power (dBm)
2402.00000	1	-7.0	-2.09
2441.00000	1	-4.4	0.49
2480.00000	1	-2.8	4.26

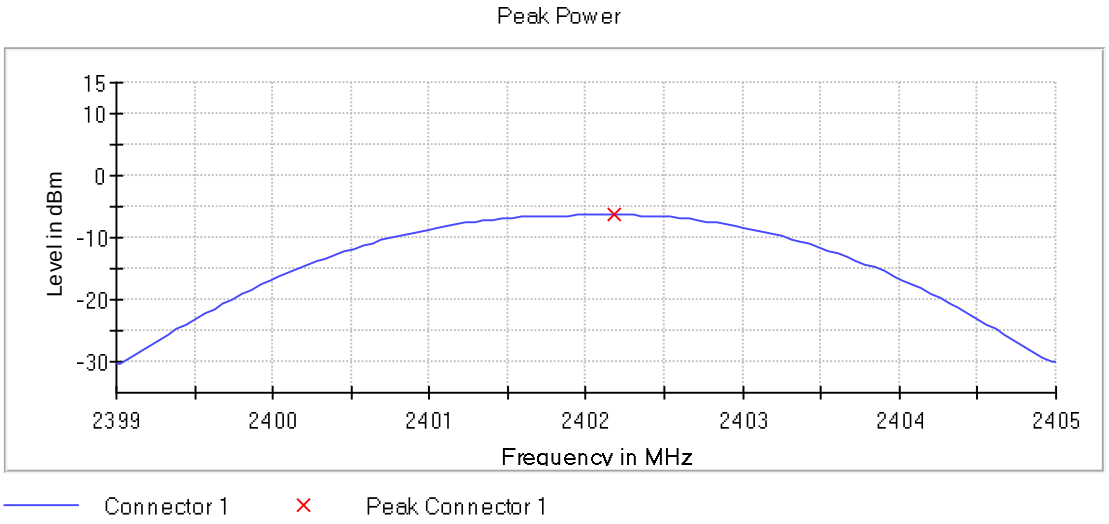
Verdict

Pass

Attachments

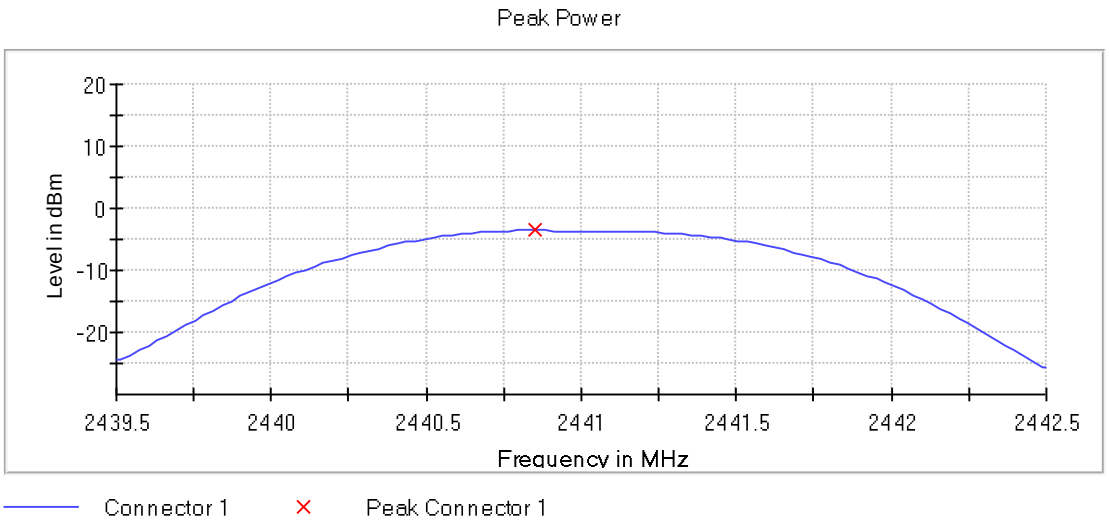
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH3)

Images:



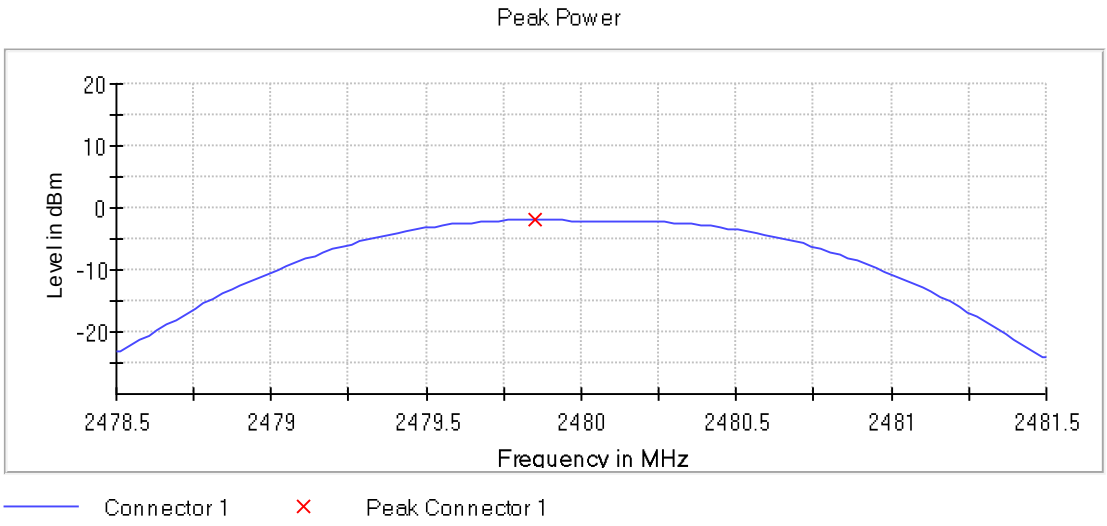
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH3)

Images:



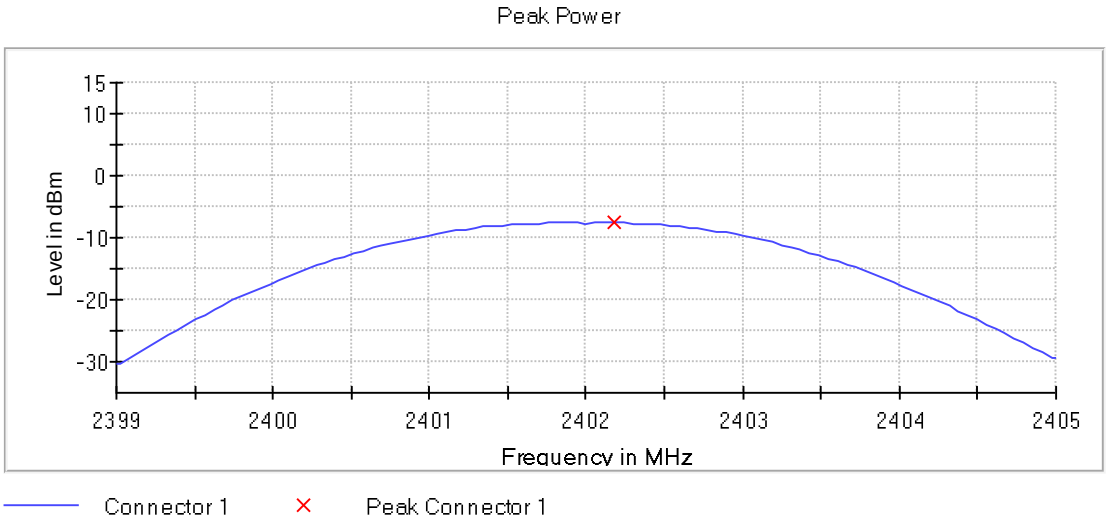
Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH3)

Images:



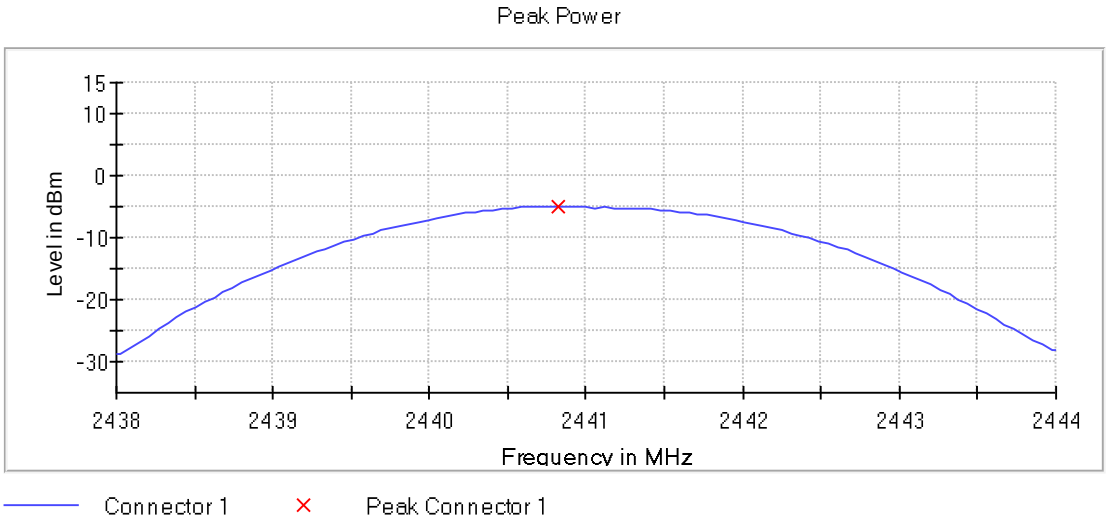
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5)

Images:



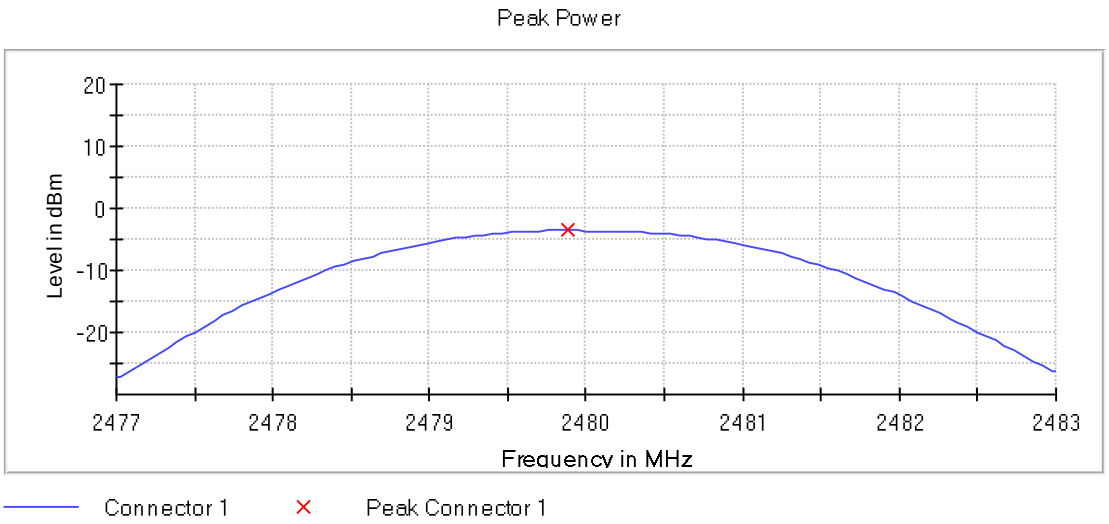
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5)

Images:



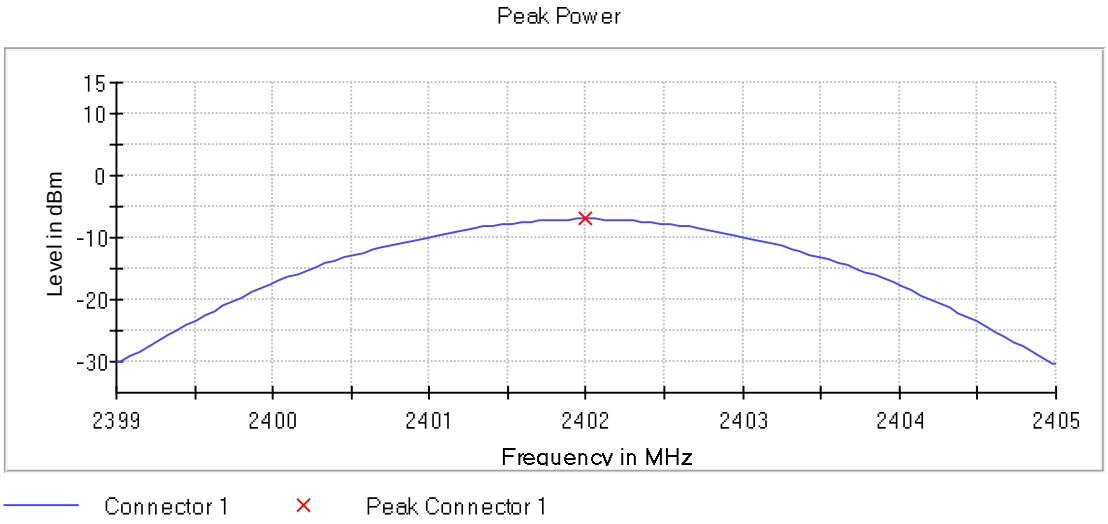
Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5)

Images:



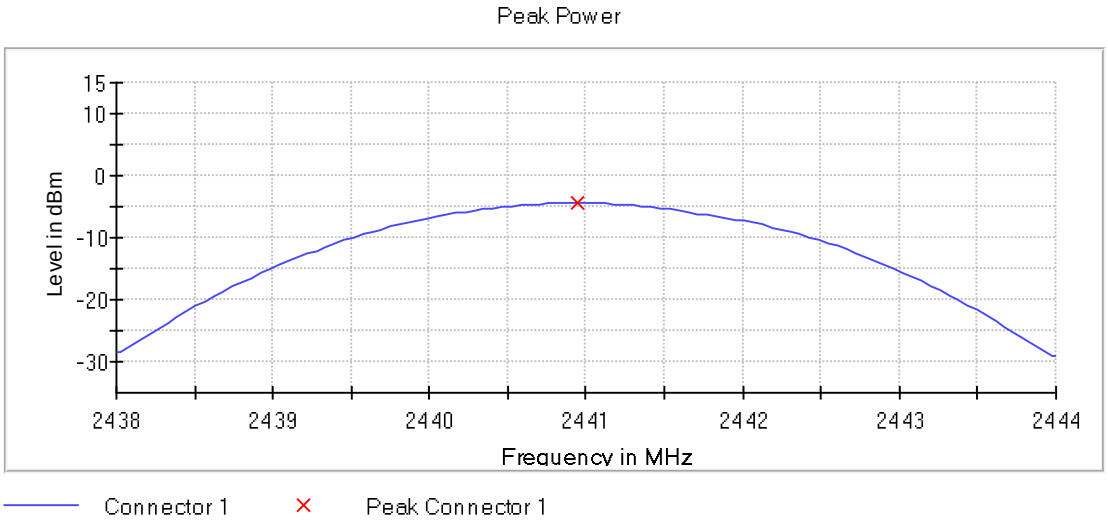
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5)

Images:



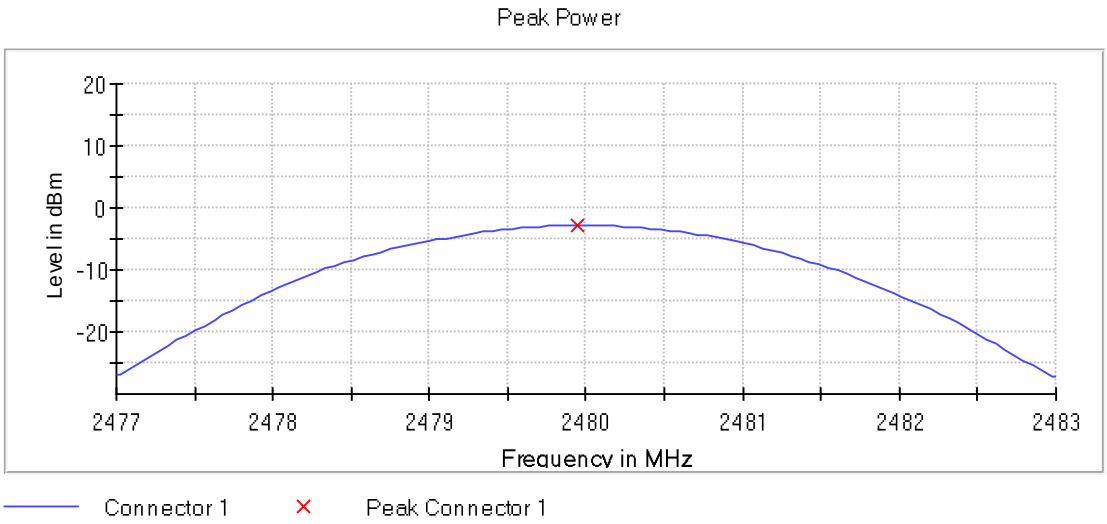
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5)

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5)

Images:



Spectrum Analyzer Parameters

Setting	Instrument Value
Start Frequency	2.39900 GHz
Stop Frequency	2.40500 GHz
Span	6.000 MHz
RBW	2.000 MHz
VBW	10.000 MHz
SweepPoints	101
Sweeptime	953.450 ns
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	FFT
Preamp	off
Stablemode	Trace
Stablevalue	0.50 dB
Run	4 / max. 150
Stable	3 / 3
Max Stable Difference	0.02 dB

RSS-247 5.5 / FCC 15.247 (d) - Band-edge emissions compliance (Transmitter) - Conducted

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.

Modulation: BT (GFSK 1-DH3) - HOPPING OFF

Sample ID: S/01

Results

DUT Frequency (MHz)	Result
2402.000000	PASS

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2366.325000	-54.8	28.3	-26.5	PASS
2366.275000	-55.0	28.5	-26.5	PASS
2310.175000	-55.2	28.7	-26.5	PASS
2310.225000	-55.3	28.7	-26.5	PASS
2319.475000	-55.3	28.8	-26.5	PASS
2319.425000	-55.3	28.8	-26.5	PASS
2357.025000	-55.4	28.9	-26.5	PASS
2399.475000	-55.5	28.9	-26.5	PASS
2356.975000	-55.5	29.0	-26.5	PASS
2343.025000	-55.5	29.0	-26.5	PASS
2362.925000	-55.6	29.1	-26.5	PASS
2310.775000	-55.6	29.1	-26.5	PASS
2343.075000	-55.7	29.2	-26.5	PASS
2388.875000	-55.7	29.2	-26.5	PASS
2388.825000	-55.7	29.2	-26.5	PASS

DUT Frequency (MHz)	Result
2480.000000	PASS

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2498.575000	-55.6	33.3	-22.3	PASS
2484.075000	-55.7	33.4	-22.3	PASS
2485.775000	-55.7	33.4	-22.3	PASS
2498.625000	-55.8	33.5	-22.3	PASS
2484.025000	-55.8	33.6	-22.3	PASS
2485.825000	-56.0	33.7	-22.3	PASS
2487.575000	-56.0	33.7	-22.3	PASS
2483.675000	-56.1	33.8	-22.3	PASS
2492.125000	-56.1	33.8	-22.3	PASS
2486.825000	-56.2	33.9	-22.3	PASS
2498.125000	-56.2	33.9	-22.3	PASS
2486.875000	-56.2	33.9	-22.3	PASS
2499.175000	-56.2	33.9	-22.3	PASS
2489.675000	-56.2	33.9	-22.3	PASS
2483.725000	-56.2	33.9	-22.3	PASS

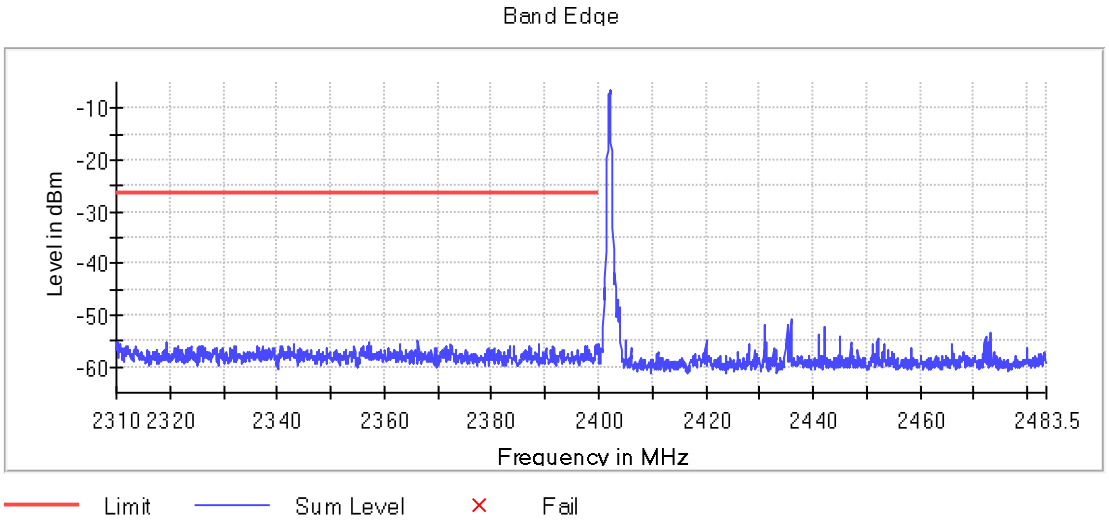
Verdict

Pass

Attachments

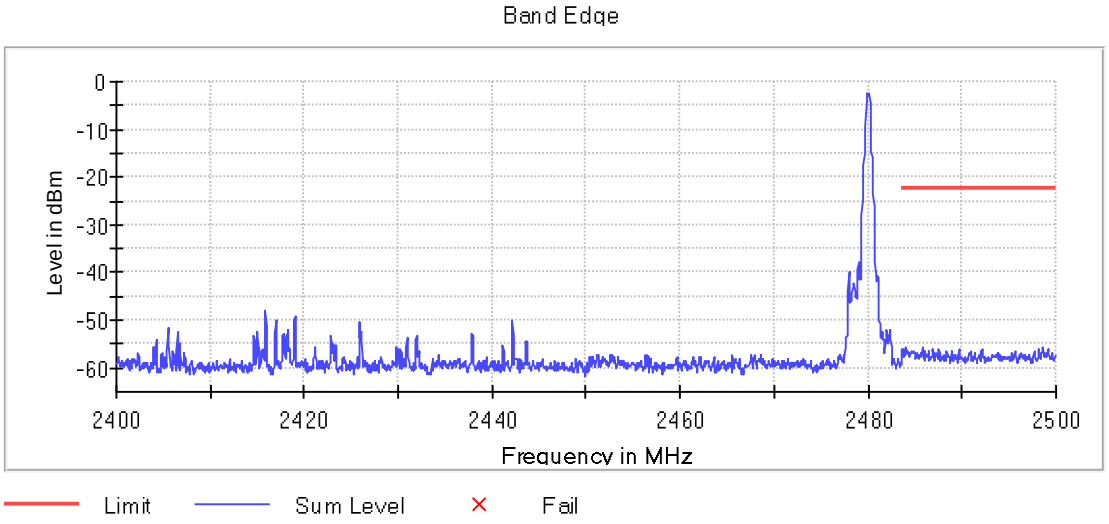
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH3)

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH3)

Images:



Modulation: BT (GFSK 1-DH3) - HOPPING ON
Chipset 1
Sample ID: S/01

Results

DUT Frequency (MHz)	Result
2402.000000	PASS

DUT Frequency (MHz)	Result
2480.000000	PASS

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2323.175000	-49.5	27.4	-22.1	PASS
2323.125000	-50.1	28.0	-22.1	PASS
2313.975000	-50.6	28.5	-22.1	PASS
2310.025000	-50.7	28.6	-22.1	PASS
2310.000000	-50.7	28.6	-22.1	PASS
2312.975000	-50.8	28.7	-22.1	PASS
2312.025000	-50.8	28.7	-22.1	PASS
2312.825000	-50.9	28.8	-22.1	PASS
2311.175000	-50.9	28.8	-22.1	PASS
2313.025000	-50.9	28.8	-22.1	PASS
2311.125000	-51.0	28.9	-22.1	PASS
2313.925000	-51.0	28.9	-22.1	PASS
2311.975000	-51.1	29.0	-22.1	PASS
2312.875000	-51.1	29.0	-22.1	PASS
2316.975000	-51.2	29.1	-22.1	PASS

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2488.925000	-54.8	32.7	-22.1	PASS
2488.975000	-54.9	32.9	-22.1	PASS
2499.975000	-55.4	33.3	-22.1	PASS
2500.000000	-55.4	33.3	-22.1	PASS
2486.325000	-55.6	33.6	-22.1	PASS
2485.425000	-55.7	33.6	-22.1	PASS
2486.275000	-55.7	33.6	-22.1	PASS
2485.375000	-55.7	33.7	-22.1	PASS
2484.675000	-55.8	33.7	-22.1	PASS
2484.625000	-55.8	33.7	-22.1	PASS
2498.025000	-55.8	33.8	-22.1	PASS
2485.075000	-55.9	33.8	-22.1	PASS
2492.075000	-55.9	33.9	-22.1	PASS
2489.475000	-55.9	33.9	-22.1	PASS
2492.025000	-56.0	33.9	-22.1	PASS

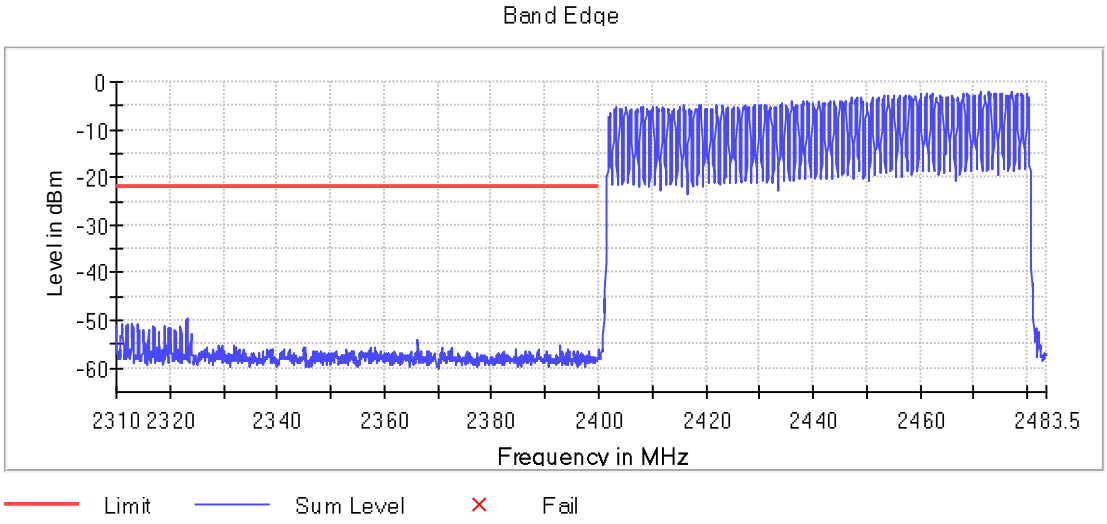
Verdict

Pass

Attachments

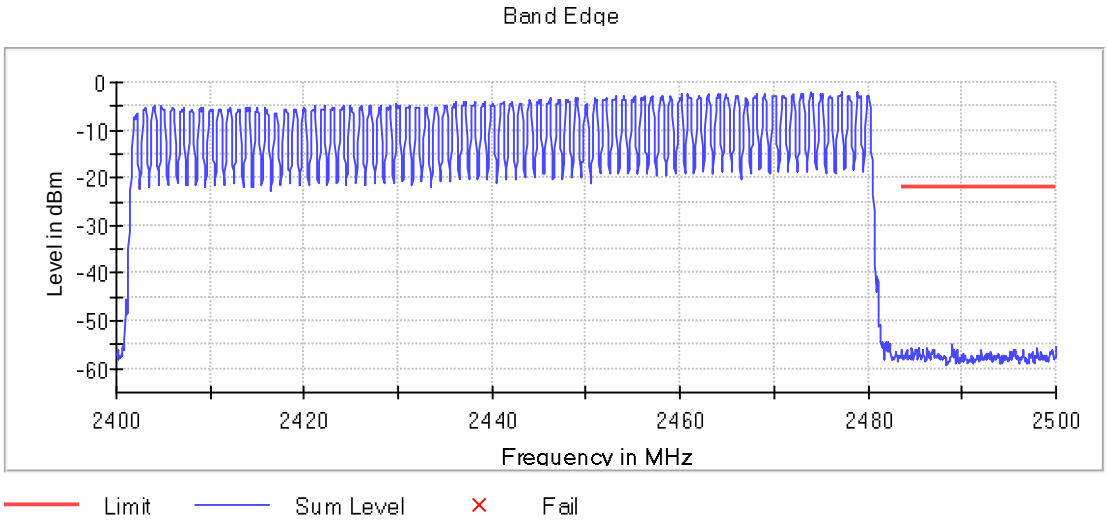
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH3)

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH3)

Images:



Modulation: BT (Π/4 DQPSK 2-DH5) - HOPPING OFF

Sample ID: S/01

Results

DUT Frequency (MHz)	Result
2402.000000	PASS

DUT Frequency (MHz)	Result
2480.000000	PASS

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.975000	-49.7	21.0	-28.7	PASS
2399.925000	-50.7	21.9	-28.7	PASS
2399.775000	-54.2	25.5	-28.7	PASS
2399.725000	-54.2	25.5	-28.7	PASS
2399.675000	-54.4	25.6	-28.7	PASS
2399.875000	-54.4	25.7	-28.7	PASS
2399.525000	-54.7	25.9	-28.7	PASS
2370.875000	-54.8	26.1	-28.7	PASS
2399.475000	-54.8	26.1	-28.7	PASS
2370.825000	-55.0	26.3	-28.7	PASS
2311.575000	-55.1	26.4	-28.7	PASS
2380.875000	-55.2	26.5	-28.7	PASS
2311.525000	-55.2	26.5	-28.7	PASS
2372.975000	-55.2	26.5	-28.7	PASS
2348.175000	-55.4	26.6	-28.7	PASS

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2483.875000	-54.6	29.3	-25.3	PASS
2483.825000	-54.6	29.3	-25.3	PASS
2499.125000	-54.8	29.5	-25.3	PASS
2499.075000	-54.8	29.5	-25.3	PASS
2483.925000	-55.5	30.1	-25.3	PASS
2483.975000	-55.5	30.2	-25.3	PASS
2494.375000	-55.6	30.3	-25.3	PASS
2494.325000	-55.6	30.3	-25.3	PASS
2496.025000	-55.6	30.3	-25.3	PASS
2491.675000	-55.7	30.4	-25.3	PASS
2492.225000	-55.7	30.4	-25.3	PASS
2491.725000	-55.8	30.5	-25.3	PASS
2495.975000	-55.8	30.5	-25.3	PASS
2486.225000	-55.8	30.5	-25.3	PASS
2487.775000	-55.9	30.6	-25.3	PASS

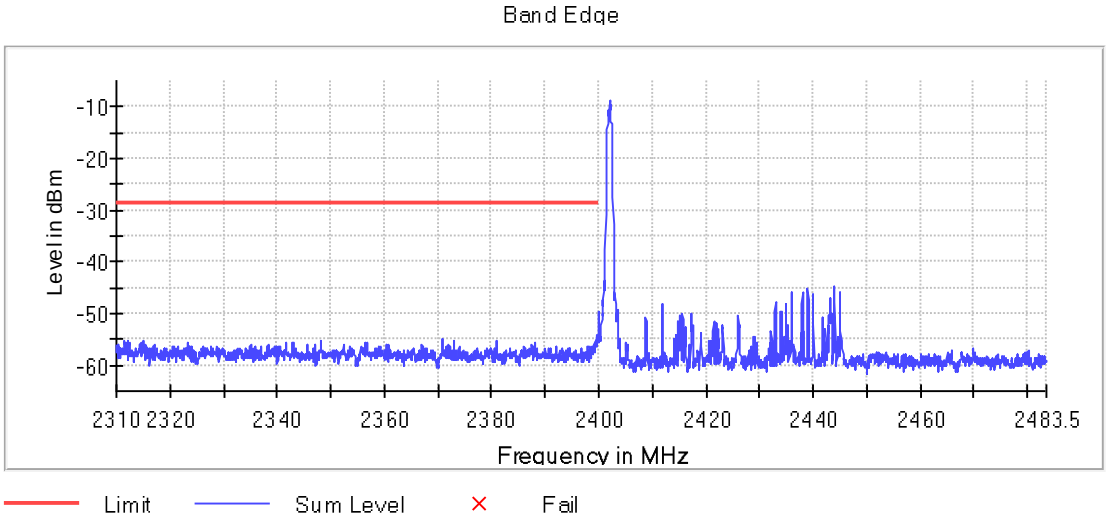
Verdict

Pass

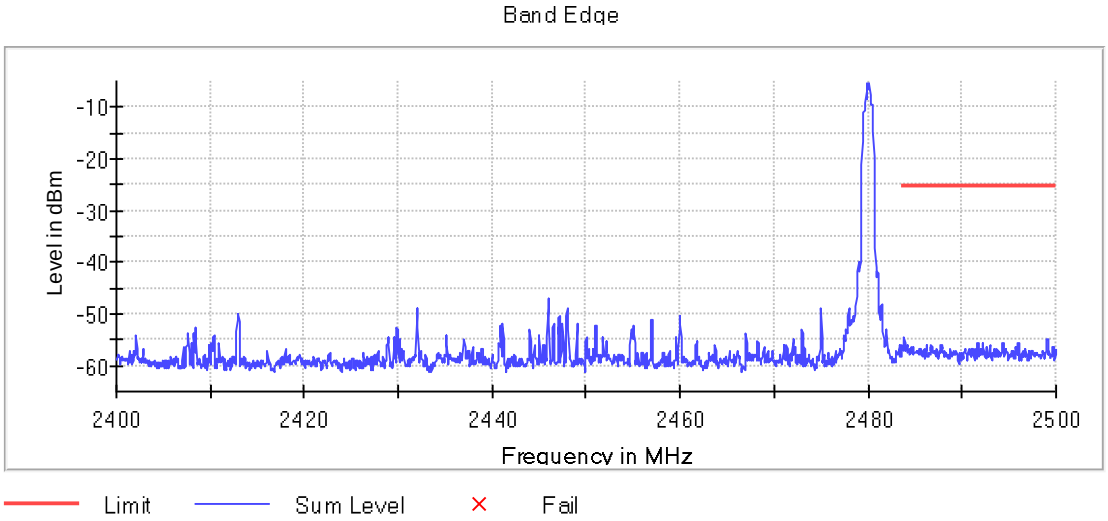
Attachments

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5)

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5)



Modulation: BT (Π/4 DQPSK 2-DH5) - HOPPING ON

Sample ID: S/01

Results

DUT Frequency (MHz)	Result
2402.000000	PASS

DUT Frequency (MHz)	Result
2480.000000	PASS

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2320.025000	-51.2	26.4	-24.8	PASS
2319.975000	-51.2	26.4	-24.8	PASS
2320.075000	-53.7	28.9	-24.8	PASS
2323.875000	-53.7	28.9	-24.8	PASS
2323.825000	-53.8	29.0	-24.8	PASS
2319.925000	-54.6	29.8	-24.8	PASS
2310.725000	-54.6	29.8	-24.8	PASS
2318.625000	-54.7	29.9	-24.8	PASS
2310.775000	-54.7	29.9	-24.8	PASS
2321.725000	-54.8	30.0	-24.8	PASS
2323.075000	-54.9	30.1	-24.8	PASS
2310.125000	-54.9	30.1	-24.8	PASS
2336.175000	-55.0	30.2	-24.8	PASS
2310.175000	-55.0	30.2	-24.8	PASS
2321.375000	-55.1	30.3	-24.8	PASS

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2491.775000	-55.3	30.4	-24.8	PASS
2491.725000	-55.5	30.7	-24.8	PASS
2489.125000	-55.5	30.7	-24.8	PASS
2483.925000	-55.6	30.8	-24.8	PASS
2483.875000	-55.7	30.9	-24.8	PASS
2489.175000	-55.7	30.9	-24.8	PASS
2489.025000	-55.8	31.0	-24.8	PASS
2491.475000	-55.8	31.0	-24.8	PASS
2491.425000	-56.0	31.2	-24.8	PASS
2494.975000	-56.0	31.2	-24.8	PASS
2499.075000	-56.0	31.2	-24.8	PASS
2499.175000	-56.1	31.2	-24.8	PASS
2490.025000	-56.1	31.3	-24.8	PASS
2489.425000	-56.1	31.3	-24.8	PASS
2485.425000	-56.1	31.3	-24.8	PASS

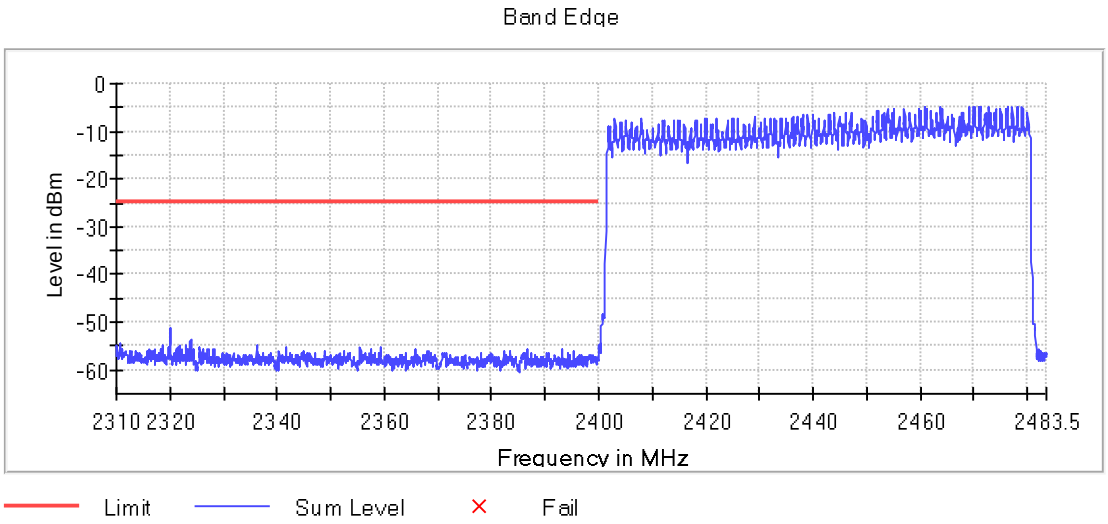
Verdict

Pass

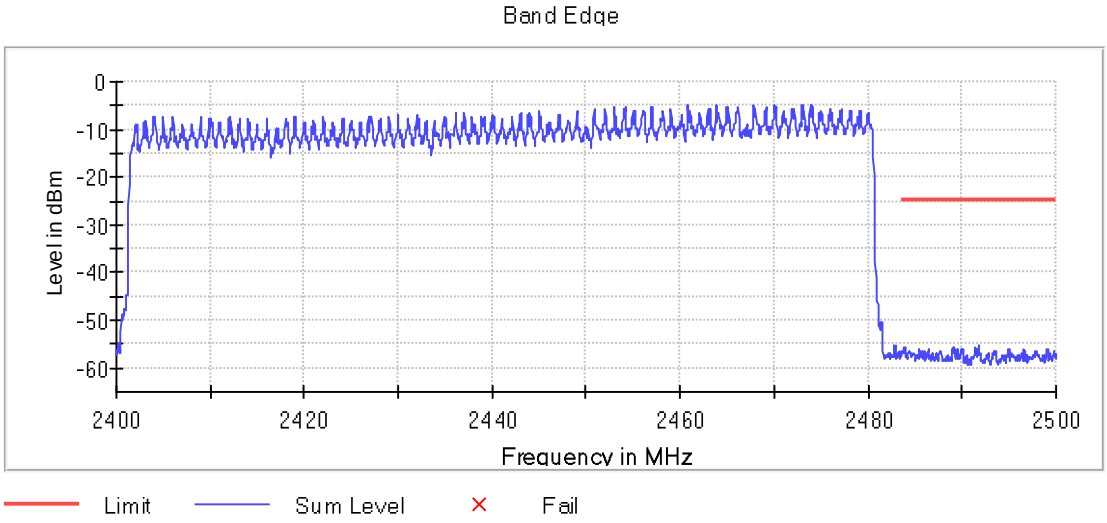
Attachments

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5)

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5)



Modulation: BT (8DPSK 3-DH5) - HOPPING OFF

Sample ID: S/01

Results

DUT Frequency (MHz)	Result
2402.000000	PASS

DUT Frequency (MHz)	Result
2480.000000	PASS

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.975000	-51.9	23.2	-28.7	PASS
2399.925000	-53.5	24.8	-28.7	PASS
2399.875000	-54.0	25.3	-28.7	PASS
2399.725000	-54.3	25.6	-28.7	PASS
2399.675000	-54.3	25.6	-28.7	PASS
2399.775000	-54.5	25.8	-28.7	PASS
2362.075000	-54.6	25.9	-28.7	PASS
2358.975000	-54.7	26.0	-28.7	PASS
2362.125000	-54.8	26.1	-28.7	PASS
2390.725000	-54.9	26.2	-28.7	PASS
2315.375000	-55.0	26.3	-28.7	PASS
2399.825000	-55.0	26.3	-28.7	PASS
2372.975000	-55.0	26.3	-28.7	PASS
2390.775000	-55.1	26.4	-28.7	PASS
2358.925000	-55.2	26.5	-28.7	PASS

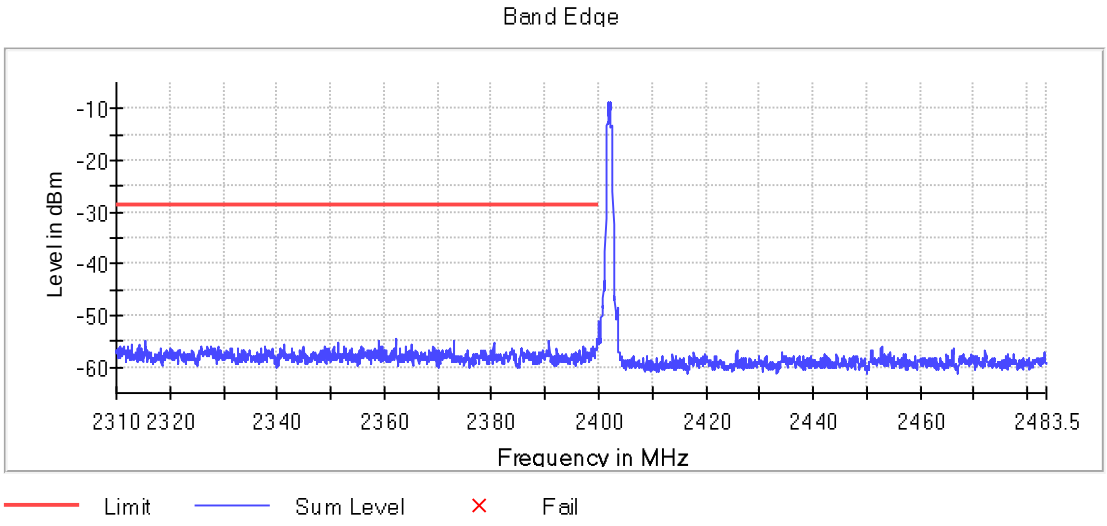
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2484.325000	-55.2	30.5	-24.7	PASS
2484.375000	-55.3	30.6	-24.7	PASS
2485.275000	-55.4	30.7	-24.7	PASS
2483.875000	-55.5	30.8	-24.7	PASS
2483.825000	-55.6	30.9	-24.7	PASS
2496.425000	-55.8	31.0	-24.7	PASS
2499.925000	-55.9	31.2	-24.7	PASS
2484.025000	-55.9	31.2	-24.7	PASS
2485.325000	-55.9	31.2	-24.7	PASS
2484.525000	-56.0	31.3	-24.7	PASS
2496.075000	-56.0	31.3	-24.7	PASS
2499.775000	-56.1	31.4	-24.7	PASS
2499.825000	-56.1	31.4	-24.7	PASS
2483.925000	-56.1	31.4	-24.7	PASS
2498.825000	-56.2	31.4	-24.7	PASS

Verdict

Pass

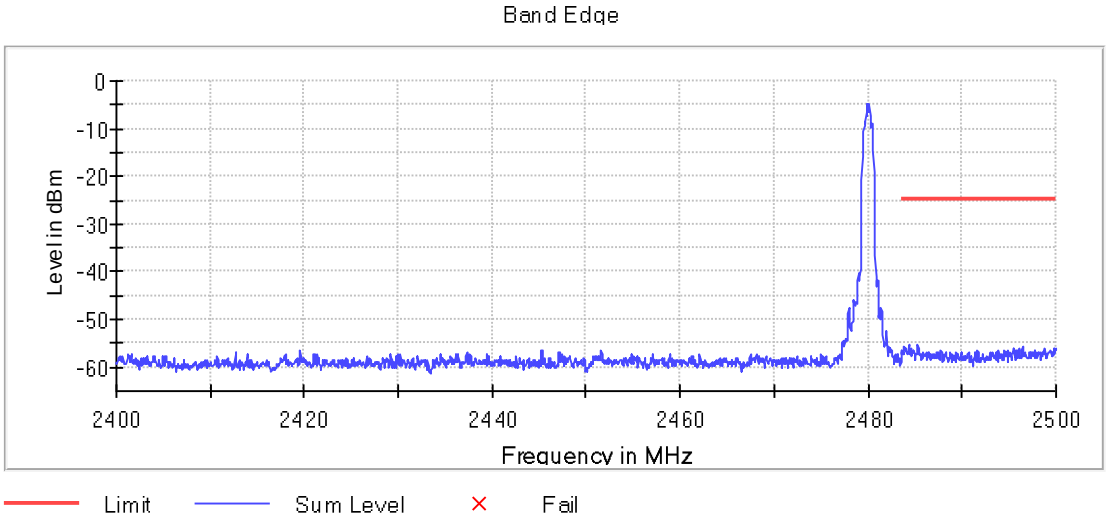
Attachments

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5)



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5)

Images:



Modulation: BT (8DPSK 3-DH5) - HOPPING ON

Sample ID: S/01

Results

DUT Frequency (MHz)	Result
2402.000000	PASS

DUT Frequency (MHz)	Result
2480.000000	PASS

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2321.275000	-53.0	28.2	-24.7	PASS
2321.225000	-53.3	28.5	-24.7	PASS
2321.325000	-53.5	28.8	-24.7	PASS
2310.025000	-54.2	29.5	-24.7	PASS
2310.000000	-54.2	29.5	-24.7	PASS
2318.175000	-54.4	29.7	-24.7	PASS
2318.125000	-54.5	29.7	-24.7	PASS
2399.875000	-54.5	29.8	-24.7	PASS
2399.925000	-54.5	29.8	-24.7	PASS
2320.025000	-54.6	29.9	-24.7	PASS
2390.275000	-54.6	29.9	-24.7	PASS
2390.225000	-54.8	30.1	-24.7	PASS
2311.925000	-55.1	30.3	-24.7	PASS
2311.975000	-55.2	30.4	-24.7	PASS
2326.025000	-55.2	30.5	-24.7	PASS

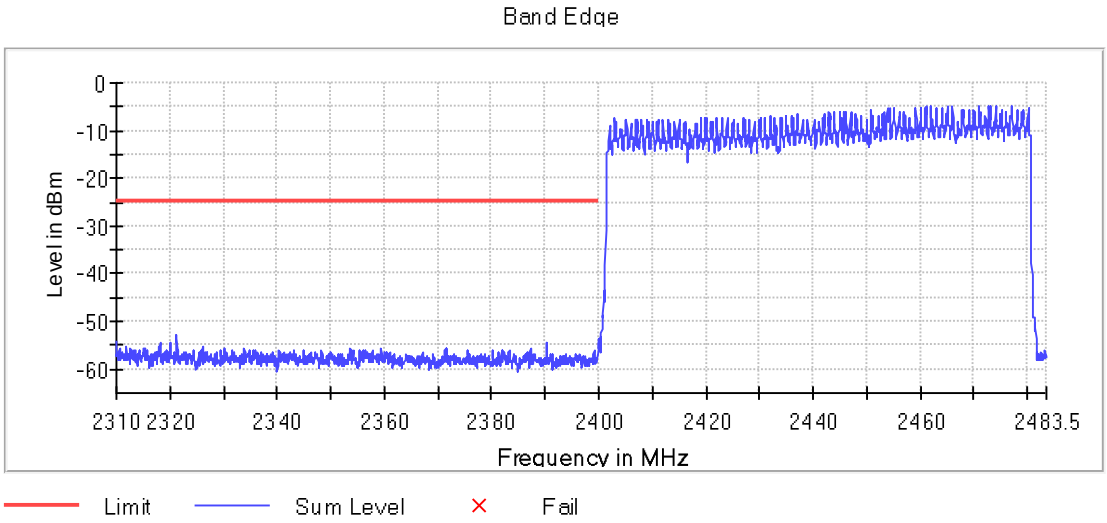
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2489.825000	-55.3	30.5	-24.8	PASS
2497.025000	-55.9	31.1	-24.8	PASS
2489.875000	-56.0	31.2	-24.8	PASS
2485.325000	-56.1	31.3	-24.8	PASS
2497.075000	-56.1	31.3	-24.8	PASS
2483.575000	-56.1	31.3	-24.8	PASS
2490.725000	-56.1	31.3	-24.8	PASS
2493.875000	-56.1	31.3	-24.8	PASS
2490.675000	-56.2	31.4	-24.8	PASS
2489.425000	-56.2	31.4	-24.8	PASS
2499.125000	-56.2	31.4	-24.8	PASS
2489.475000	-56.2	31.4	-24.8	PASS
2499.075000	-56.3	31.5	-24.8	PASS
2495.825000	-56.3	31.5	-24.8	PASS
2485.375000	-56.3	31.5	-24.8	PASS

Verdict

Pass

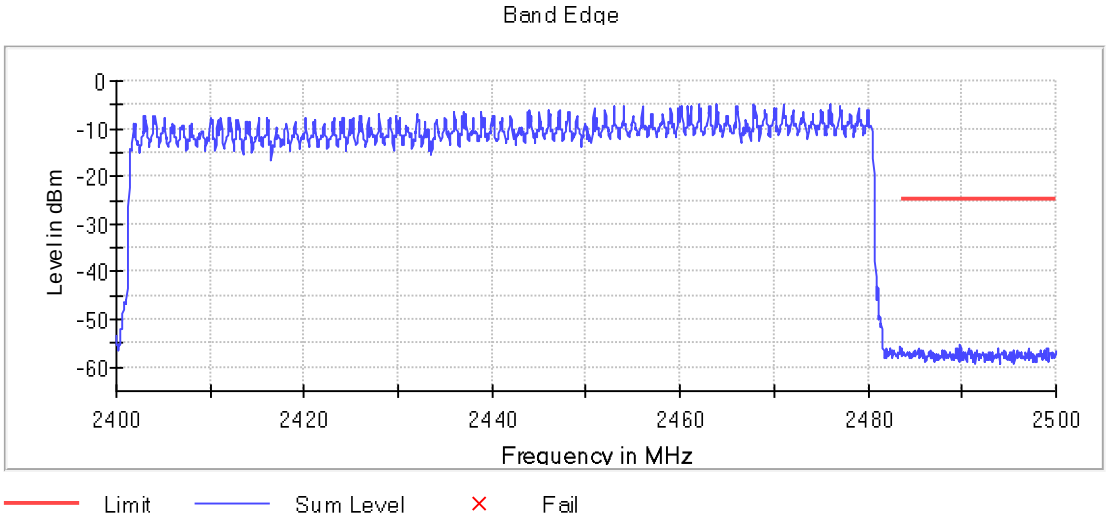
Attachments

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5)



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5)

Images:



Spectrum Analyzer Parameters

Setting	HOPPING OFF		HOPPING ON	
	Instrument Value - low	Instrument Value- high	Instrument Value- low	Instrument Value- high
Start Frequency	2.31000 GHz	2.40000 GHz	2.31000 GHz	2.40000 GHz
Stop Frequency	2.40000 GHz	2.48350 GHz	2.40000 GHz	2.48350 GHz
Span	90.000 MHz	83.500 MHz	90.000 MHz	83.500 MHz
RBW	100.000 kHz	100.000 kHz	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz	300.000 kHz	300.000 kHz
SweepPoints	1800	1670	1800	1670
Sweeptime	113.672 µs	94.727 µs	113.672 µs	94.727 µs
Reference Level	0.000 dBm	0.000 dBm	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak	MaxPeak
SweepCount	100	100	100	100
Filter	3 dB	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold	Max Hold
Sweeptype	FFT	FFT	FFT	FFT
Preamp	off	off	off	off
Stablemode	Trace	Trace	Trace	Trace
Stablevalue	0.50 dB	0.50 dB	0.50 dB	0.50 dB
Run	4 / max. 150	6 / max. 150	4 / max. 150	115 / max. 150
Stable	3 / 3	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.00 dB	0.00 dB	0.00 dB	0.18 dB

RSS-247 5.5 / FCC 15.247 (d) - Emissions compliance (Transmitter) - Radiated

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 (µV/m)	Field strength (dBµV/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

Verdict

Pass

Spurious levels operating (Radiated).
The level of spurious emissions was measured as their effective radiated power when radiated by cabinet.

Sample ID: S/02

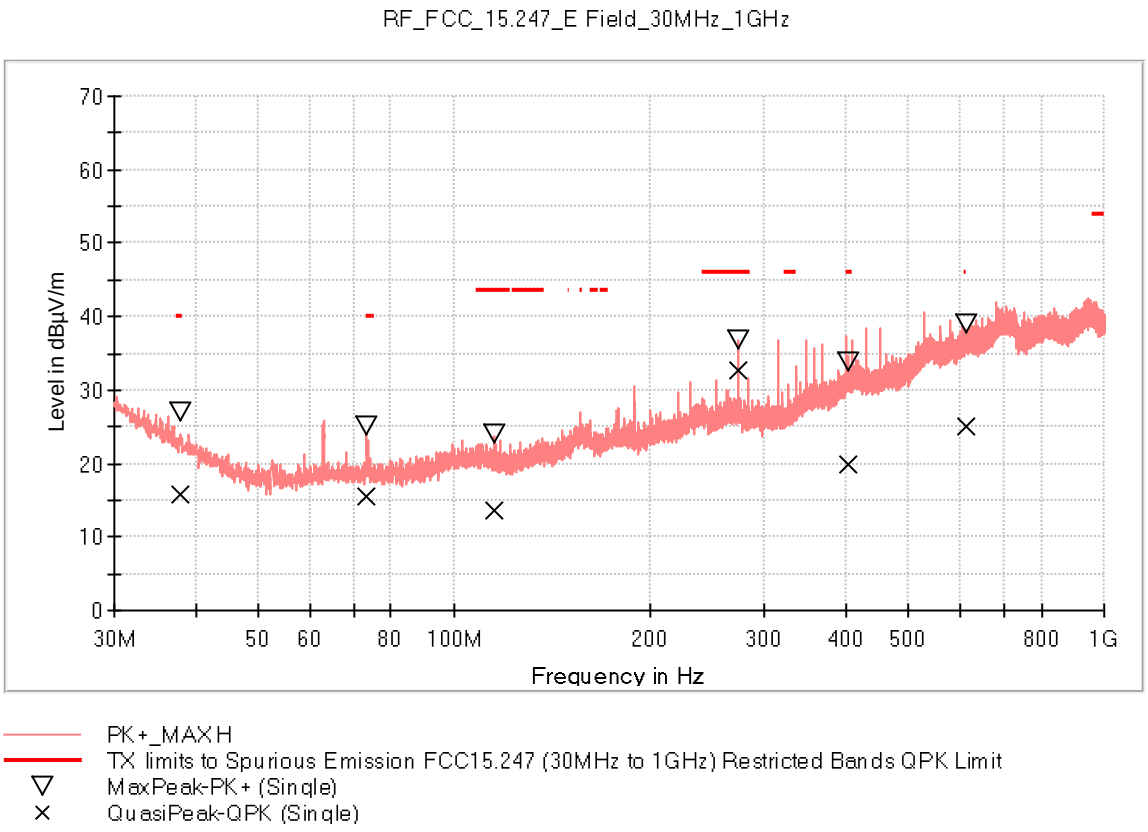
Results

Frequency range 9KHz – 30 MHz
No radiofrequency signal generated in the device found below 10º sub-harmonic, no further investigation required.

Frequency range 0.03 - 1 GHz
The spurious emissions below 1 GHz do not depend on the operating channel selected in the EUT.

Frequency MHz = 2442.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (GFSK 1-DH3), Frequency Range GHz = [0.03, 1]

Images:



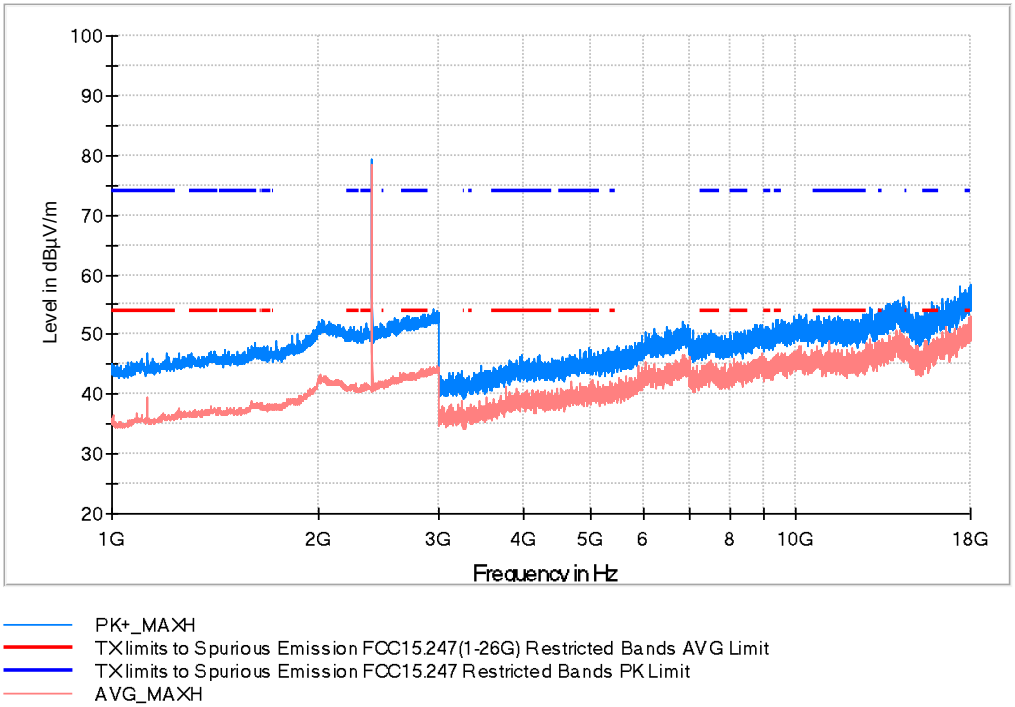
Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)
37.954000	27.0	15.8	H	24.2	40.0
73.359000	25.1	15.4	V	24.6	40.0
115.602500	24.0	13.6	H	29.9	43.5
273.567000	36.8	32.8	H	13.2	46.0
403.595500	33.8	19.9	H	26.1	46.0
613.164000	39.0	25.1	V	20.9	46.0

Frequency range 1 - 18 GHz

Lowest Channel

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (GFSK 1-DH3), Frequency Range GHz = [1, 18]

Images:



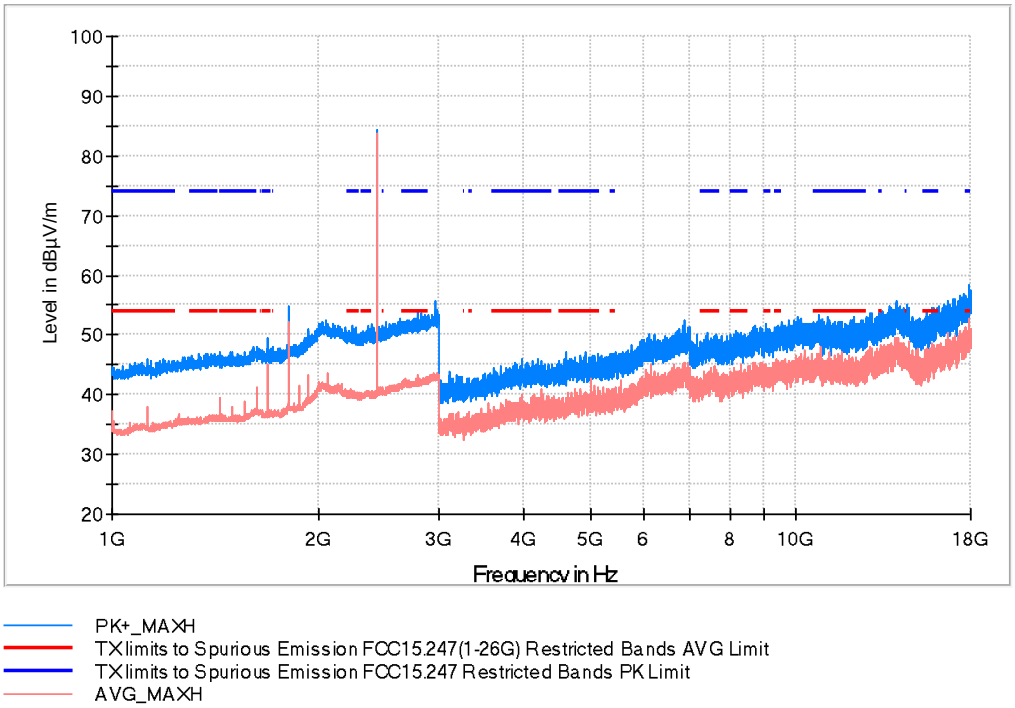
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2402.000000	79.2	78.4	V	---	---	Fundamental
11180.500000	53.1	48.9	H	5.1	54.0	

Frequency range 1 - 18 GHz

Middle Channel

Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (GFSK 1-DH3), Frequency Range GHz = [1, 18]

Images:



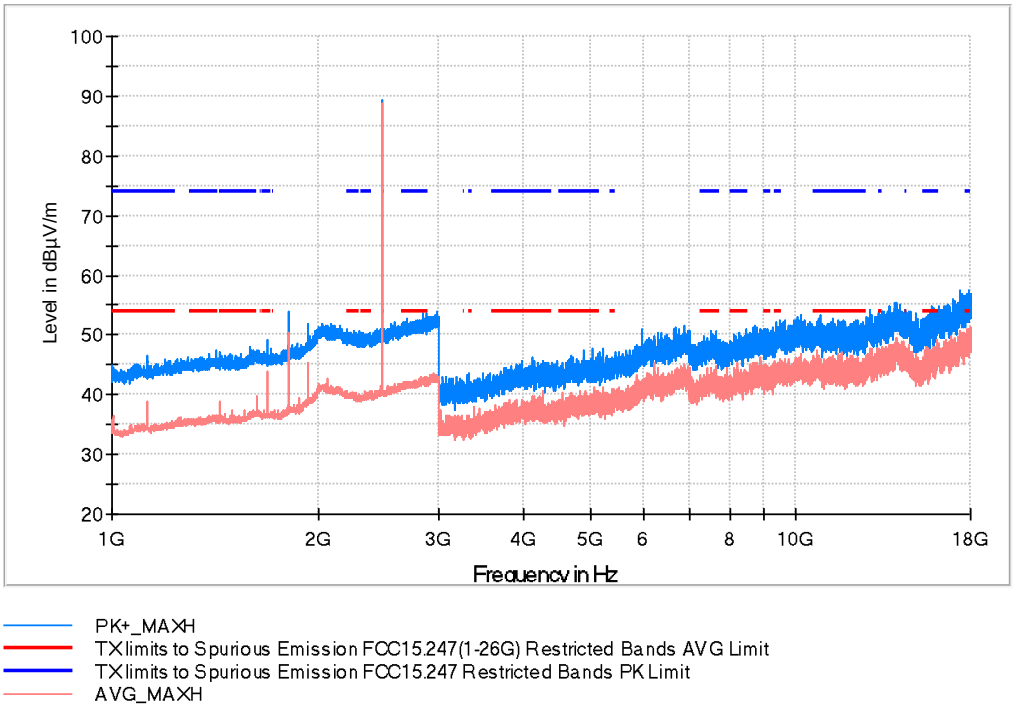
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2441.000000	84.2	83.7	V	---	---	Fundamental
17923.500000	55.4	52.8	V	1.2	54.0	

Frequency range 1 - 18 GHz

Highest Channel

Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (GFSK 1-DH3), Frequency Range GHz = [1, 18]

Images:



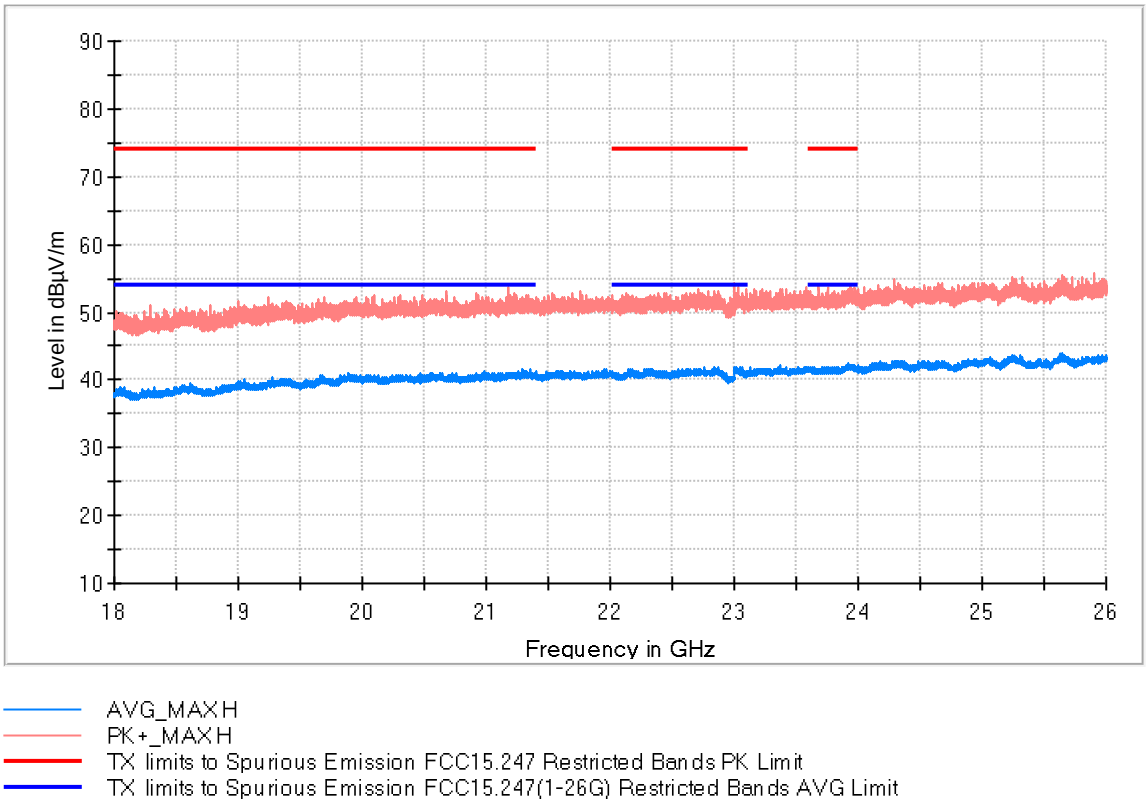
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2480.000000	89.5	88.9	V	---	---	Fundamental
17815.500000	55.2	50.9	V	3.1	54.0	

Frequency range 18 - 26 GHz

Lowest Channel

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (GFSK 1-DH3), Frequency Range GHz = [18, 26]

Images:



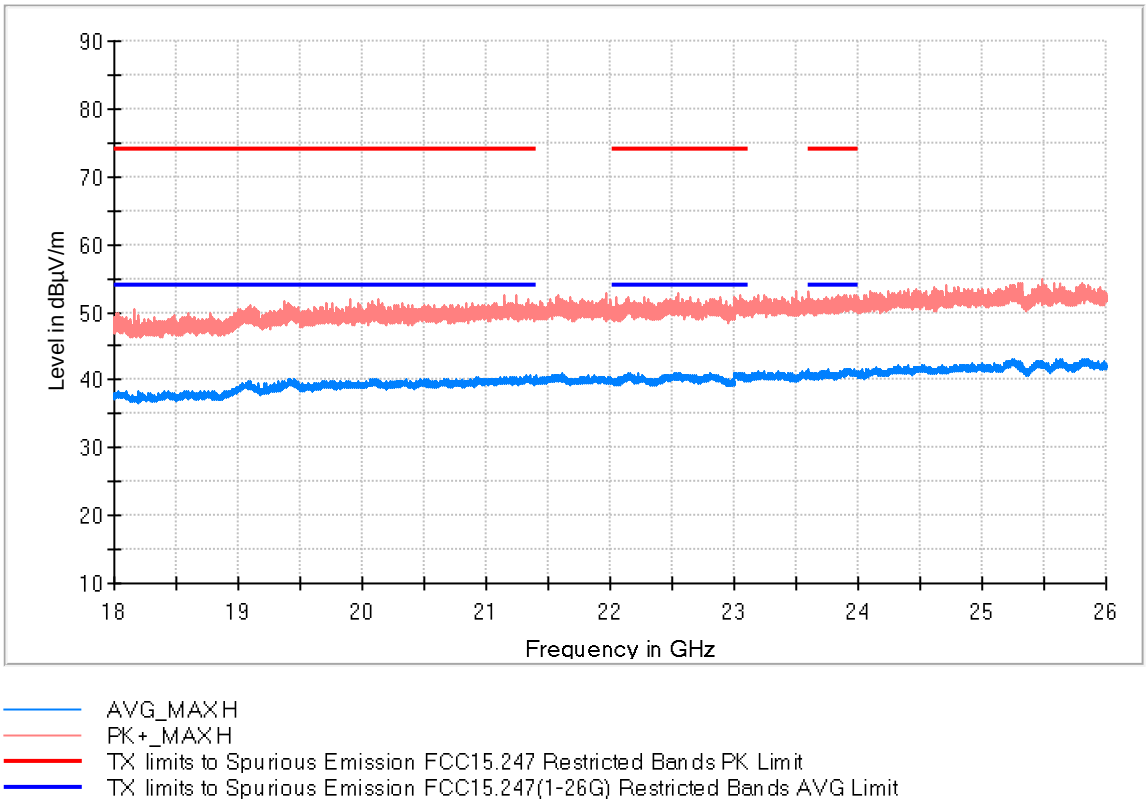
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19269.500000	49.3	40.3	V	13.7	54.0

Frequency range 18 - 26 GHz

Middle Channel

Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (GFSK 1-DH3), Frequency Range GHz = [18, 26]

Images:



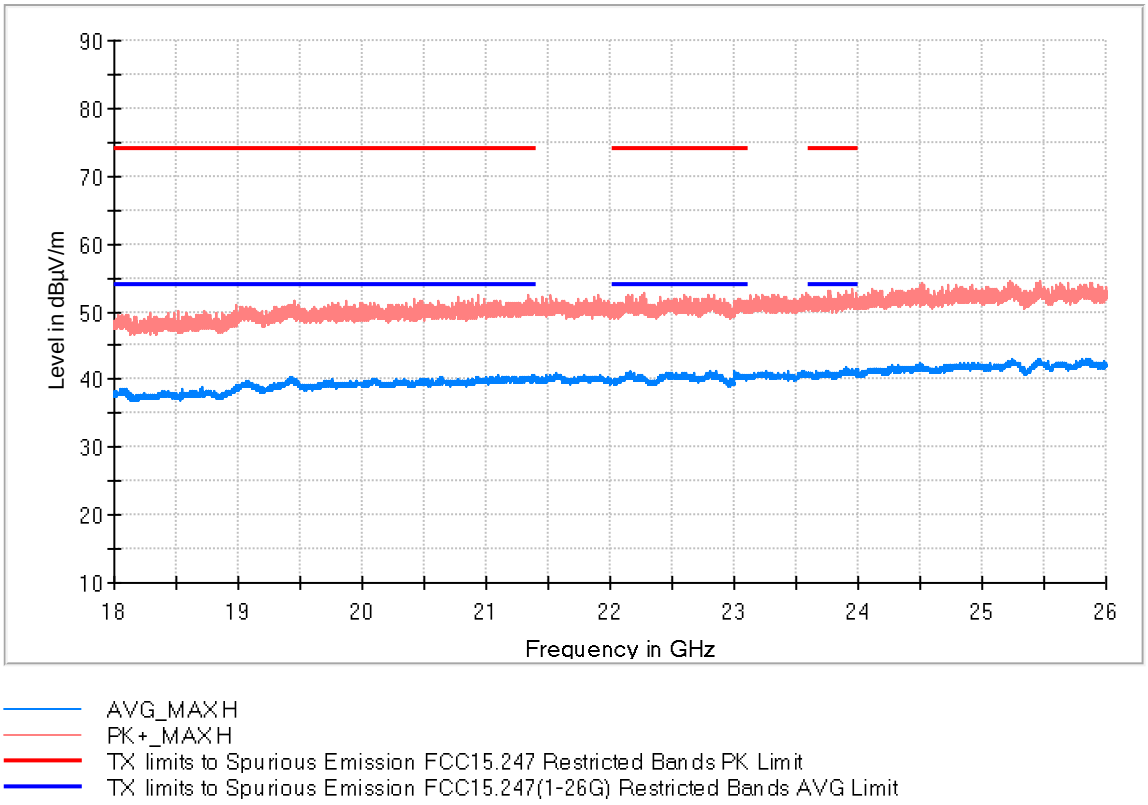
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
22802.000000	50.6	41.1	V	12.9	54.0

Frequency range 18 - 26 GHz

Highest Channel

Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (GFSK 1-DH3), Frequency Range GHz = [18, 26]

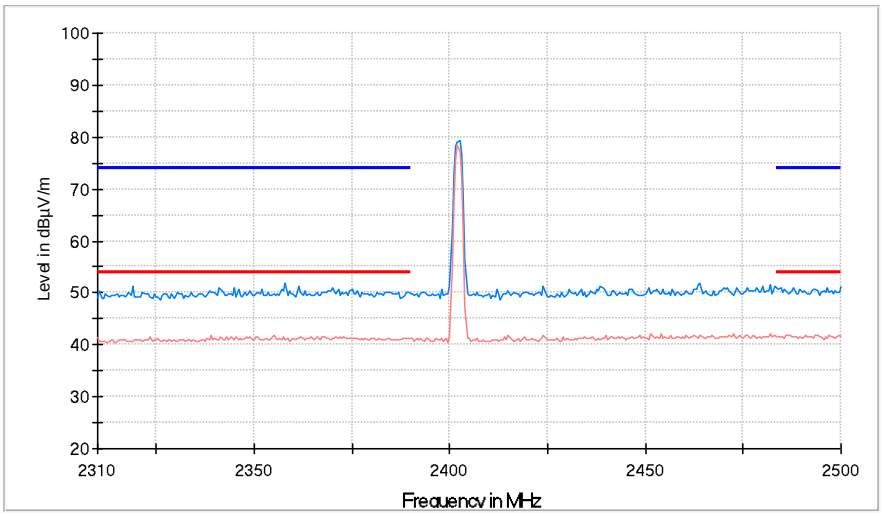
Images:



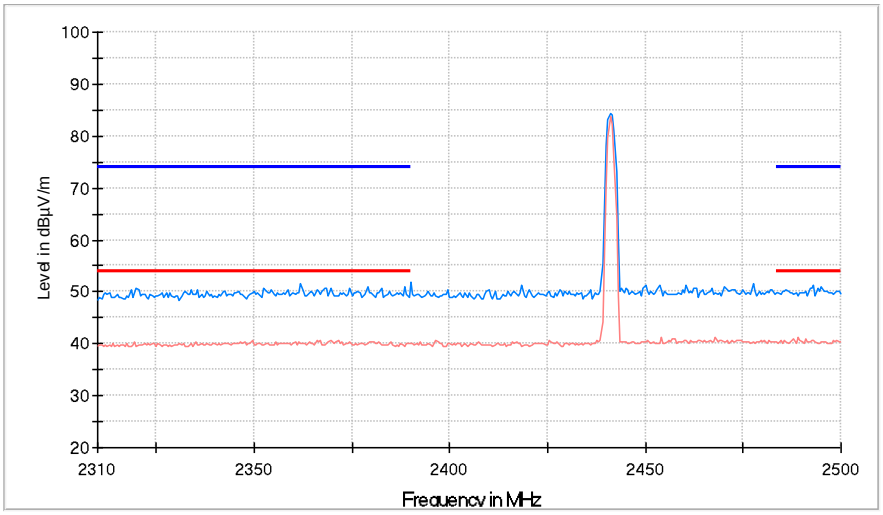
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23910.500000	51.3	41.7	H	12.3	54.0

Restricted Bands (2.31 GHz - 2.5 GHz)

Lowest Channel
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (GFSK 1-DH3), Frequency Range GHz = [1, 18]

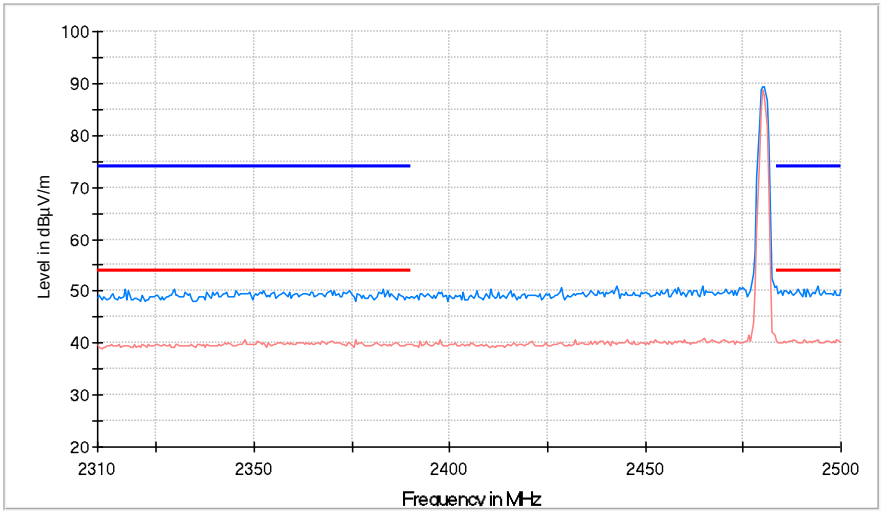


Middle Channel
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (GFSK 1-DH3), Frequency Range GHz = [1, 18]



Highest Channel

Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (GFSK 1-DH3), Frequency Range GHz = [1, 18]



Modulation: BT (π/4 DQPSK 2-DH5)

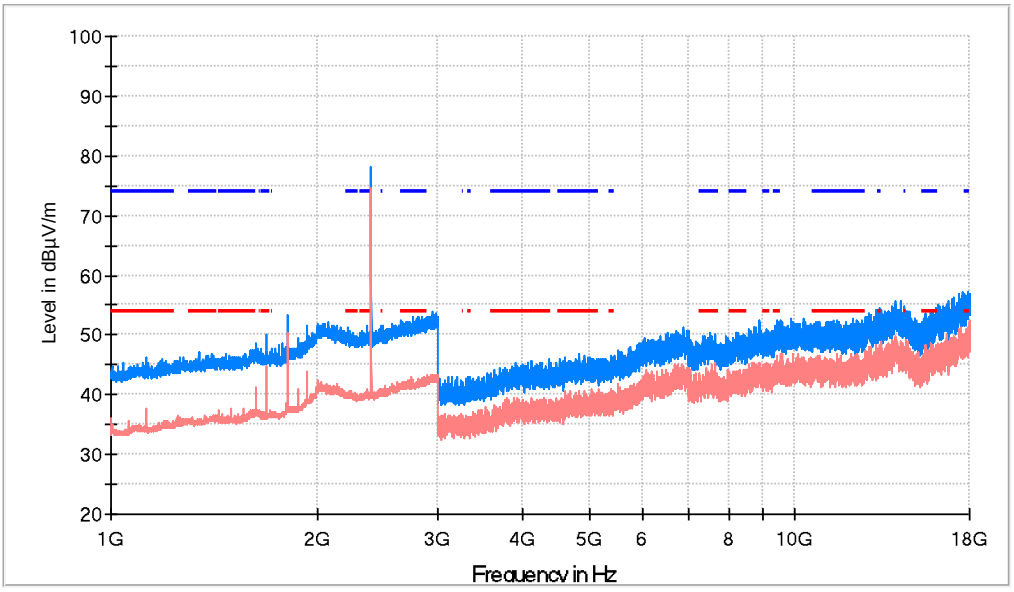
Results

Frequency range 1 - 18 GHz

Lowest Channel

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (π/4 DQPSK 2-DH5), Frequency Range GHz = [1, 18]

Images:



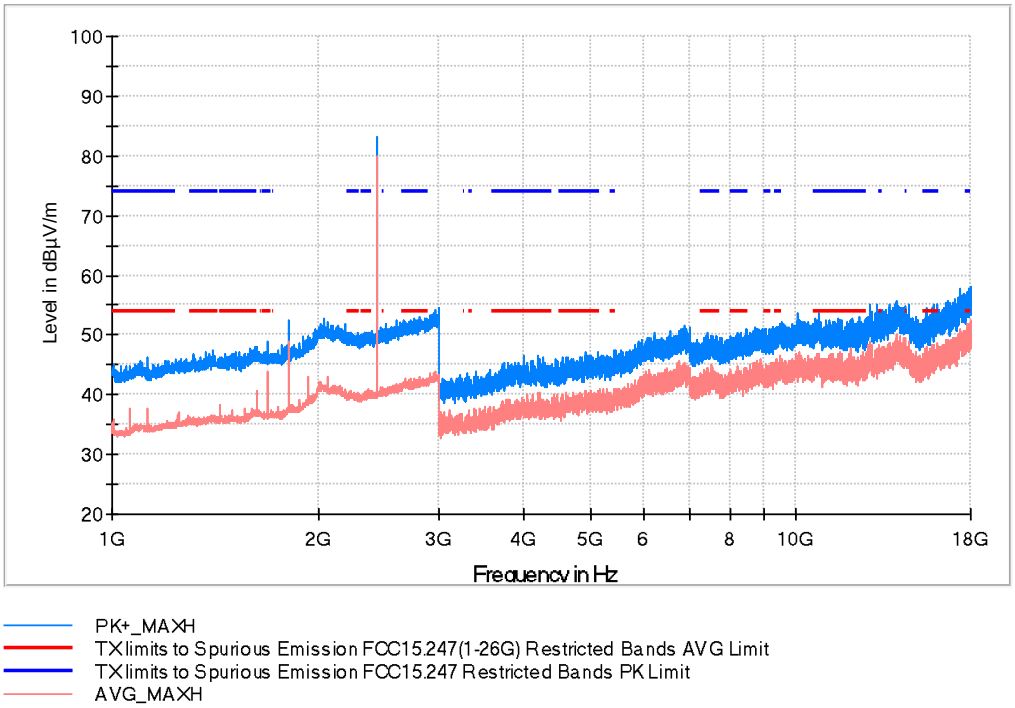
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2402.000000	78.2	74.8	V	---	---	Fundamental
17981.500000	56.1	52.6	V	1.4	54.0	

Frequency range 1 - 18 GHz

Middle Channel

Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (π/4 DQPSK 2-DH5), Frequency Range GHz = [1, 18]

Images:



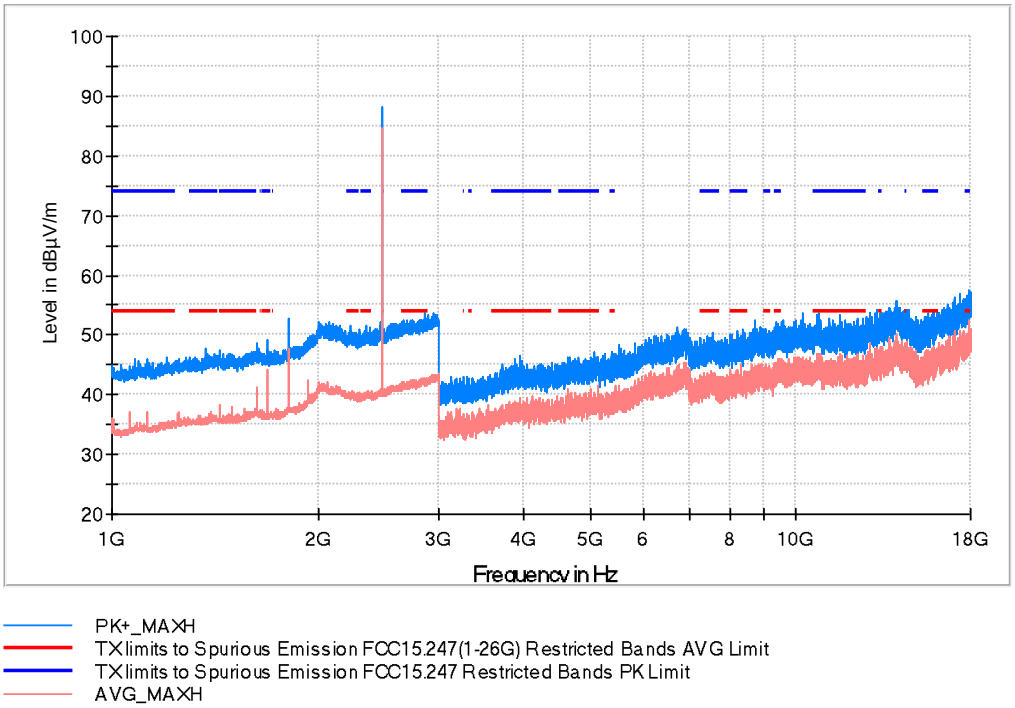
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2441.000000	83.2	80.1	V	---	---	Fundamental
12029.500000	50.1	47.6	V	6.4	54.0	

Frequency range 1 - 18 GHz

Highest Channel

Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (π/4 DQPSK 2-DH5), Frequency Range GHz = [1, 18]

Images:



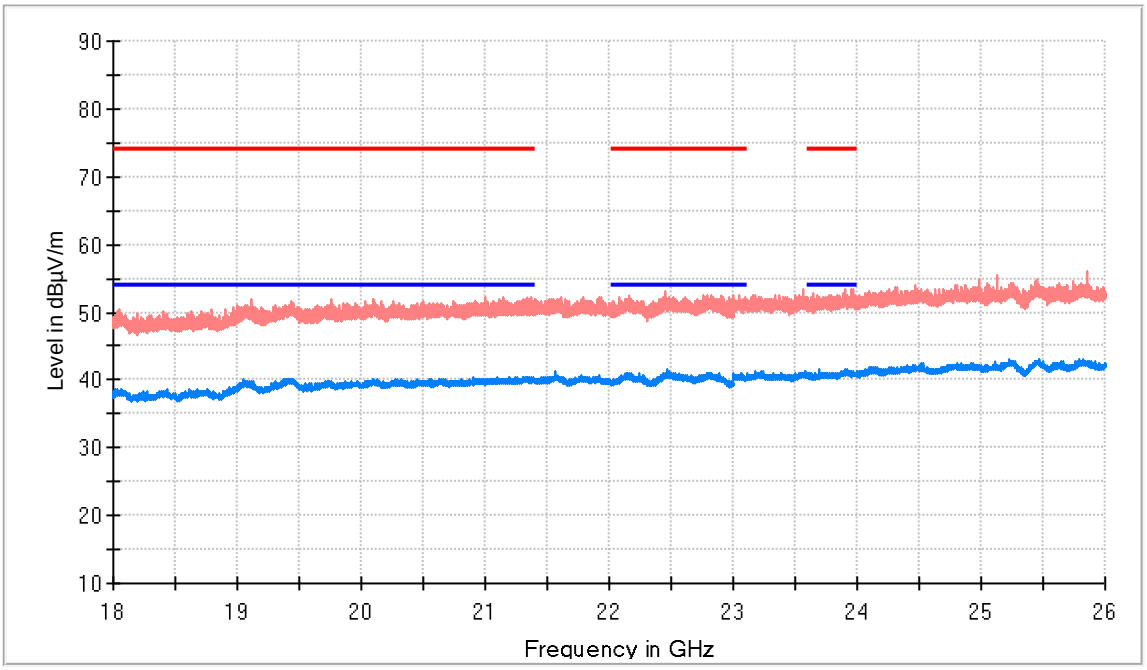
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2480.000000	88.3	84.7	V	---	---	Fundamental
17907.000000	55.9	52.6	V	1.4	54.0	

Frequency range 18 - 26 GHz

Lowest Channel

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (π/4 DQPSK 2-DH5), Frequency Range GHz = [18, 26]

Images:



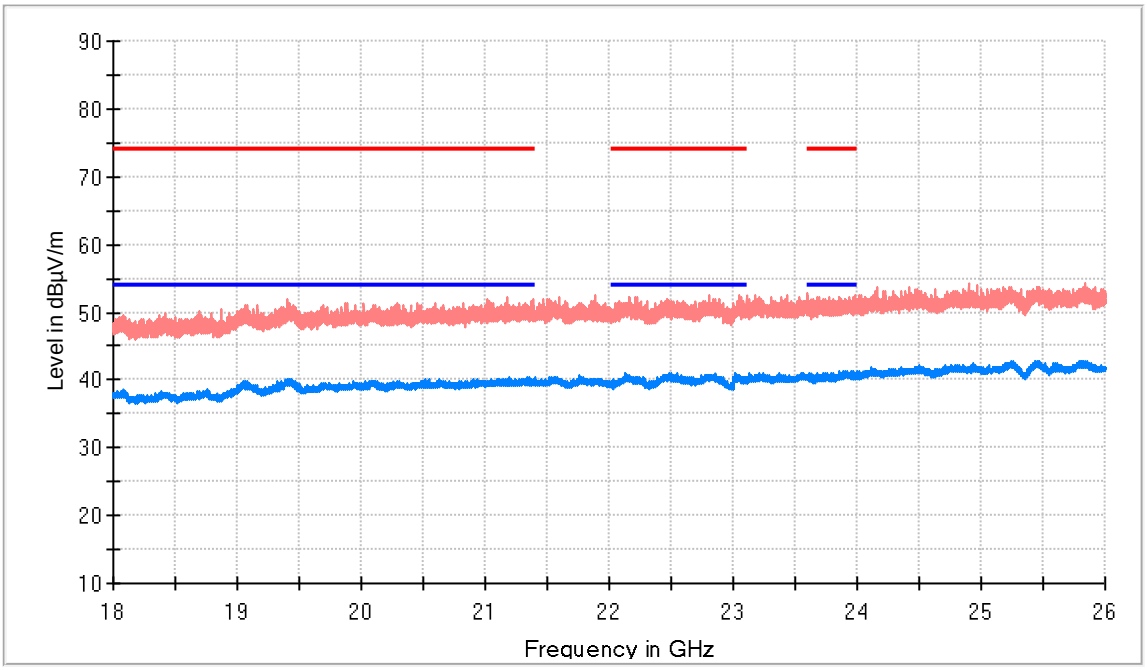
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
22460.500000	51.4	41.5	V	12.5	54.0

Frequency range 18 - 26 GHz

Middle Channel

Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (π/4 DQPSK 2-DH5), Frequency Range GHz = [18, 26]

Images:



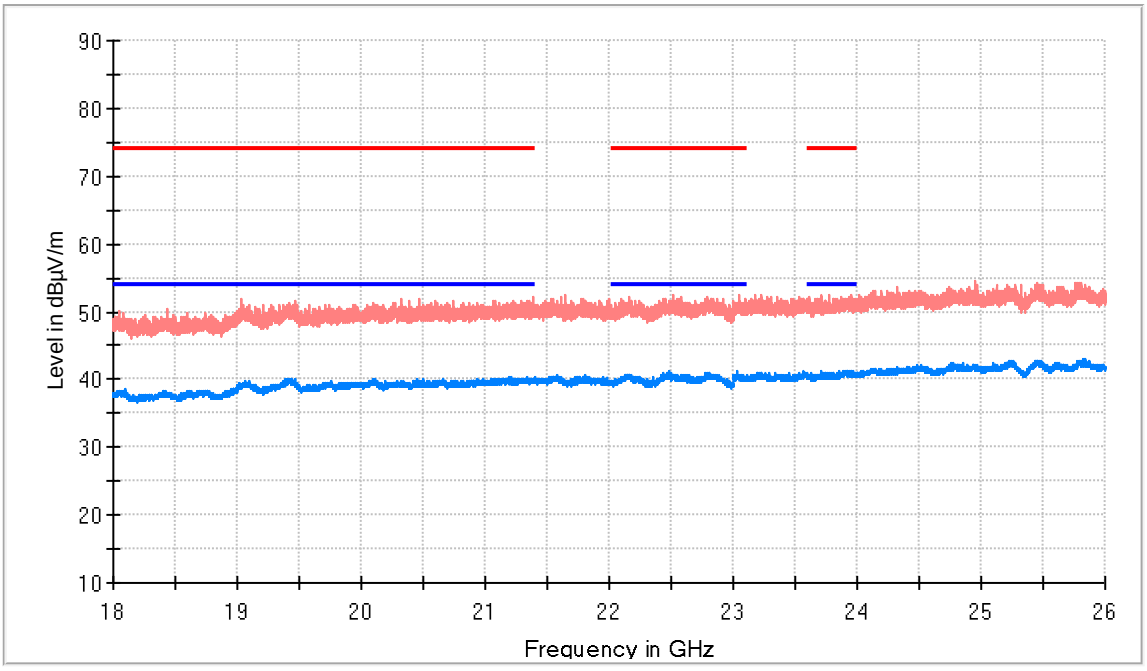
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
22127.500000	50.4	40.9	V	13.1	54.0

Frequency range 18 - 26 GHz

Highest Channel

Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (π/4 DQPSK 2-DH5), Frequency Range GHz = [18, 26]

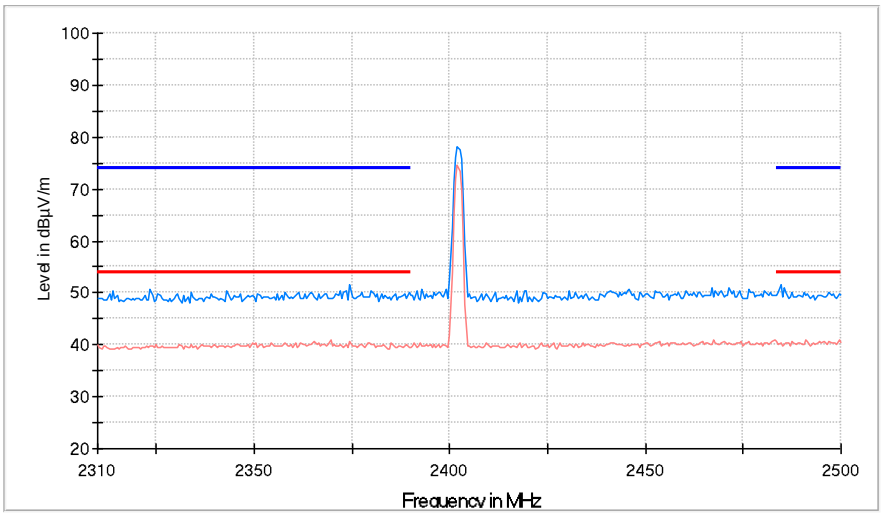
Images:



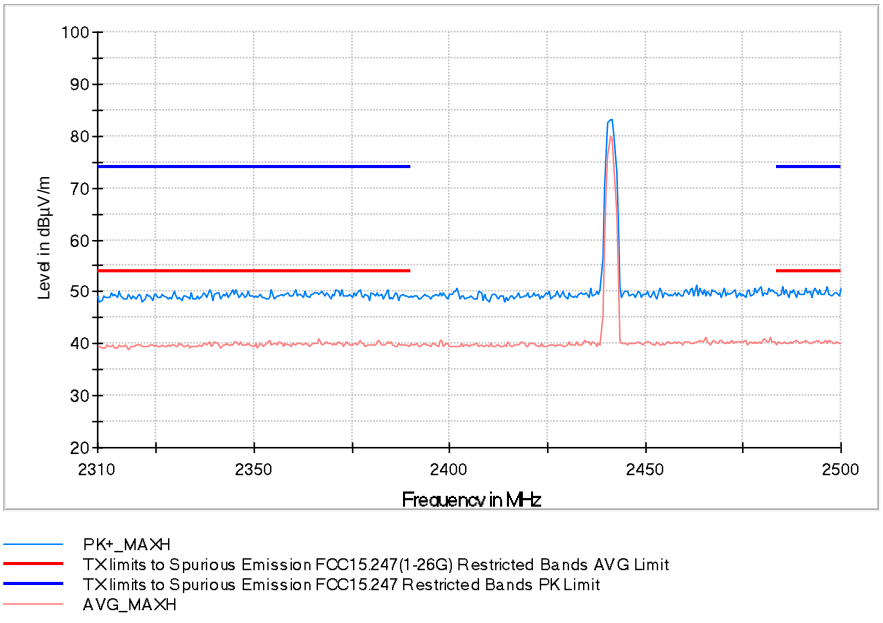
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
22479.500000	51.6	41.4	H	12.6	54.0

Restricted Bands (2.31 GHz - 2.5 GHz)

Lowest Channel
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (π/4 DQPSK 2-DH5), Frequency Range GHz = [1, 18]

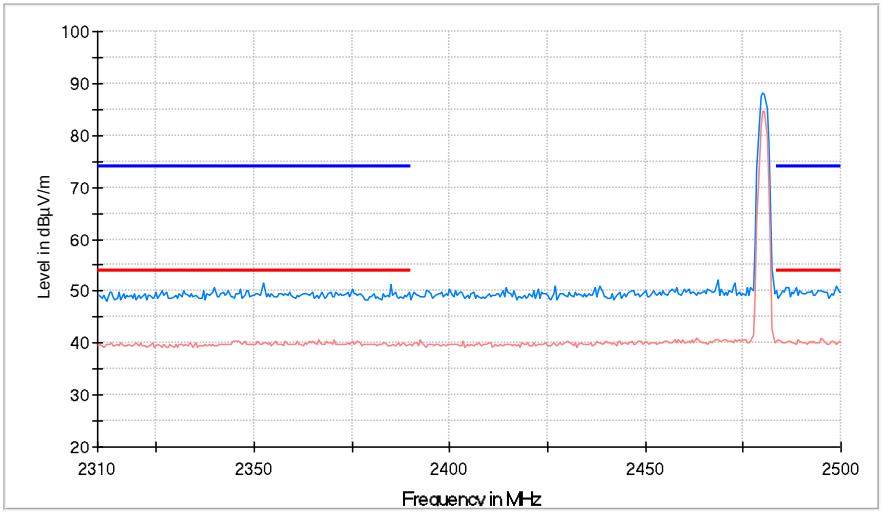


Middle Channel
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (π/4 DQPSK 2-DH5), Frequency Range GHz = [1, 18]



Highest Channel

Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (π/4 DQPSK 2-DH5), Frequency Range GHz = [1, 18]



Modulation: BT (8DPSK 3-DH5)

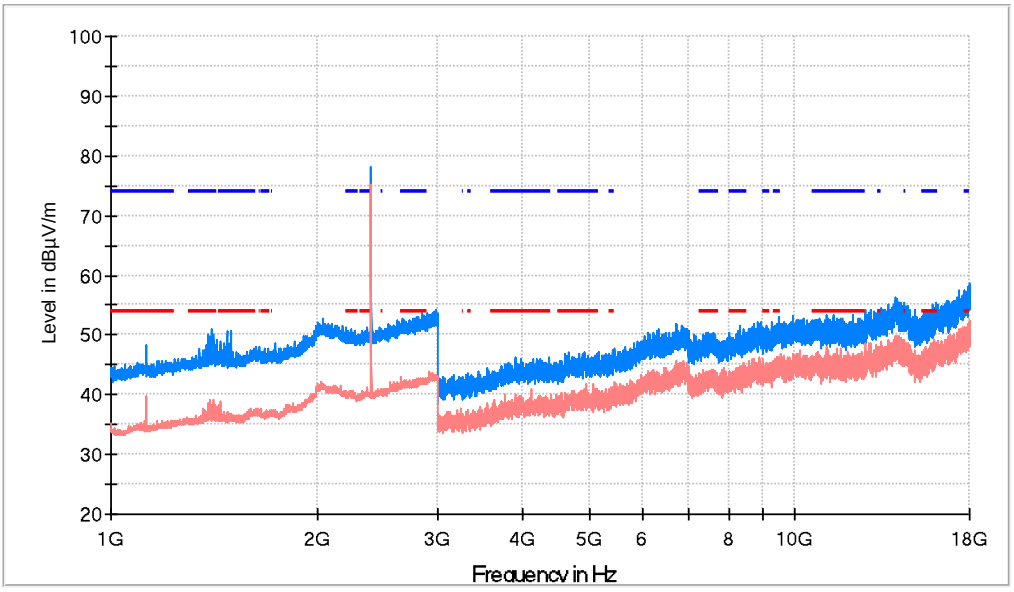
Results

Frequency range 1 - 18 GHz

Lowest Channel

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [1, 18]

Images:



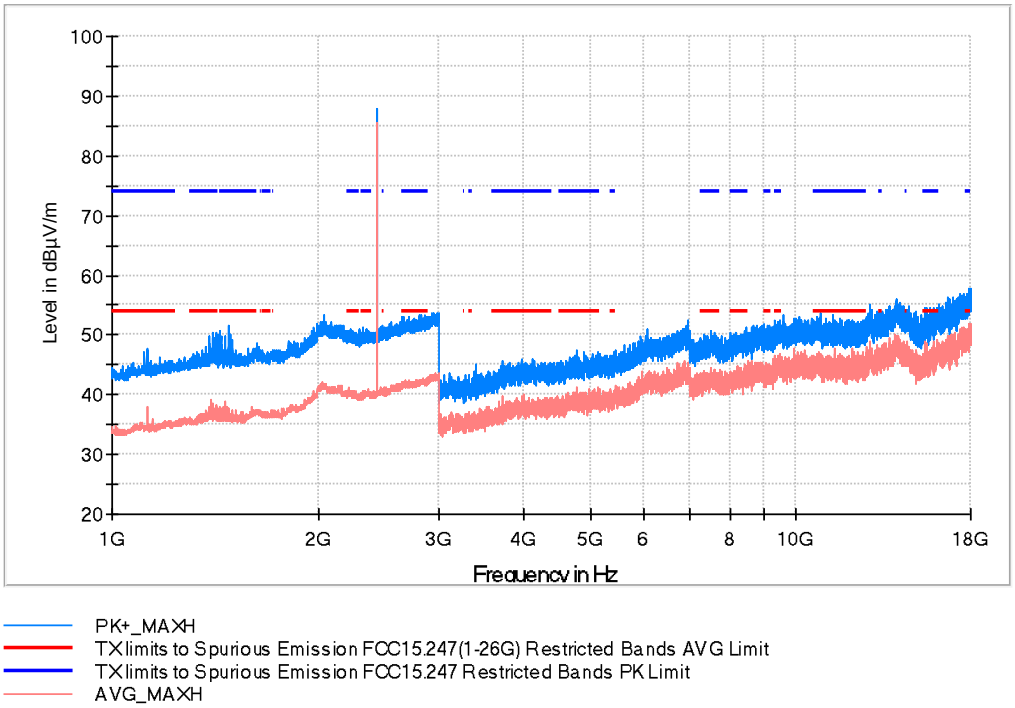
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2402.000000	78.1	75.2	V	---	---	Fundamental
11611.500000	48.4	43.0	H	11.0	54.0	

Frequency range 1 - 18 GHz

Middle Channel

Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [1, 18]

Images:



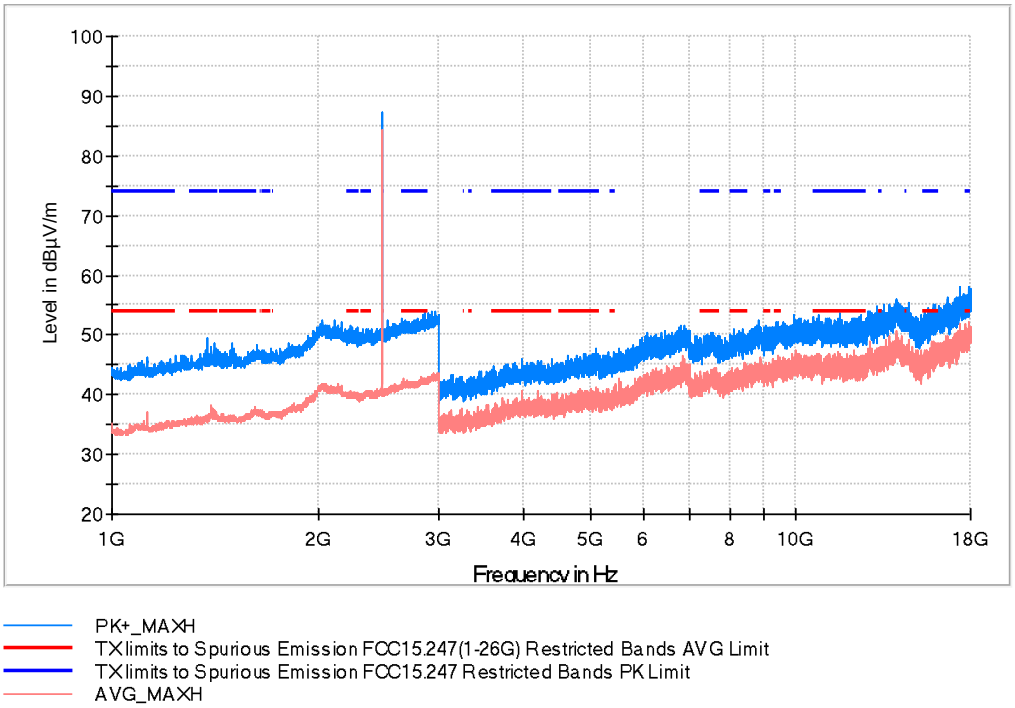
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2441.000000	87.9	85.5	V	---	---	Fundamental
11410.000000	50.3	47.7	H	6.3	54.0	

Frequency range 1 - 18 GHz

Highest Channel

Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [1, 18]

Images:



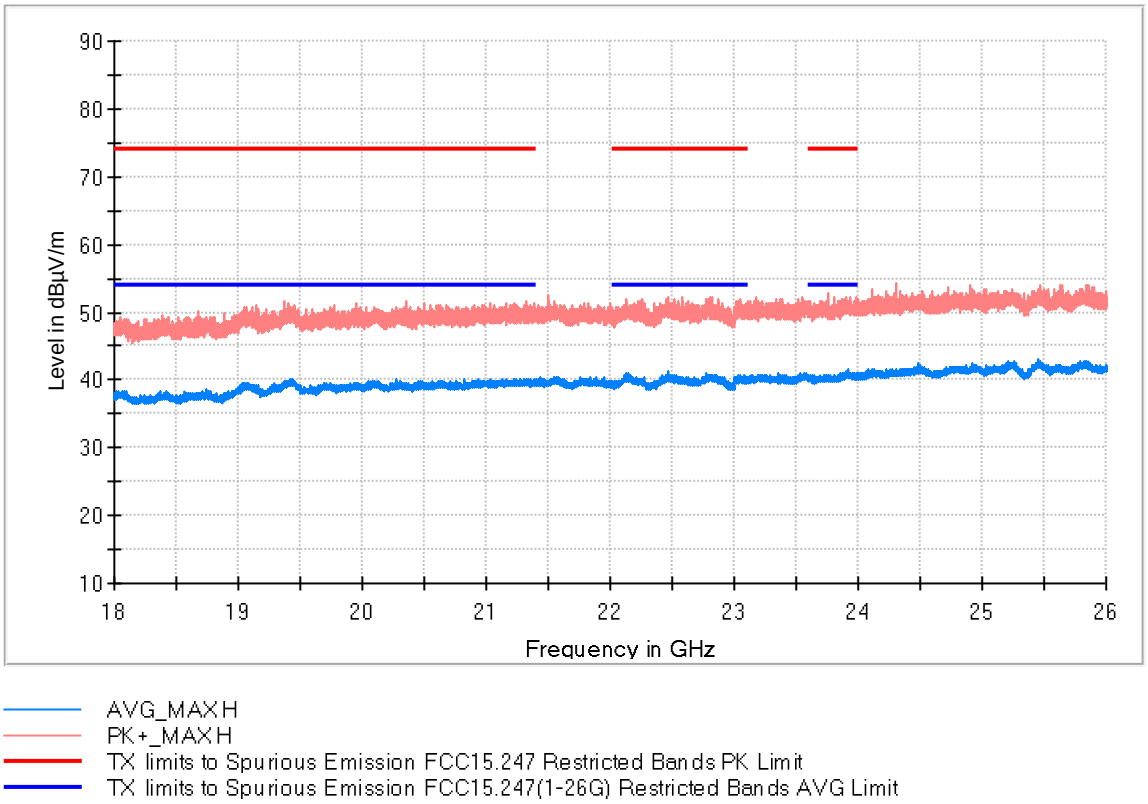
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2480.500000	87.1	84.4	H	---	---	Fundamental
12084.500000	48.6	43.9	V	10.1	54.0	

Frequency range 18 - 26 GHz

Lowest Channel

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [18, 26]

Images:



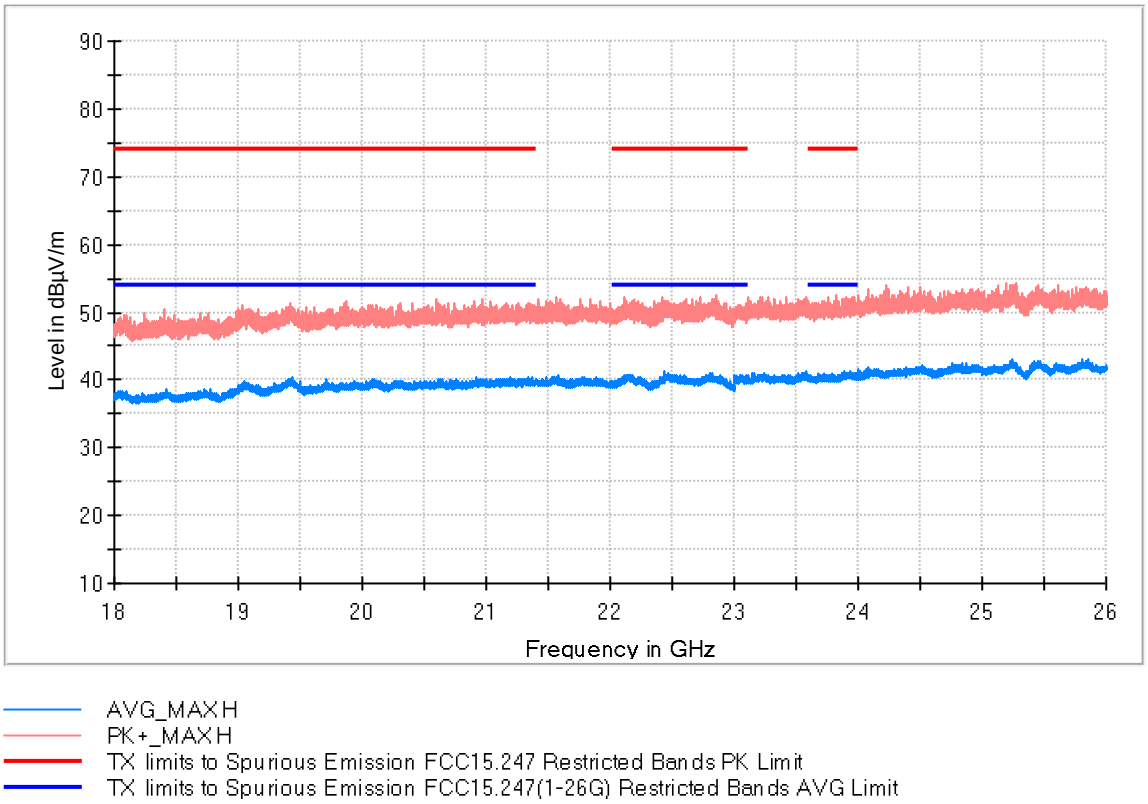
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
22460.500000	50.0	41.2	V	12.8	54.0

Frequency range 18 - 26 GHz

Middle Channel

Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [18, 26]

Images:



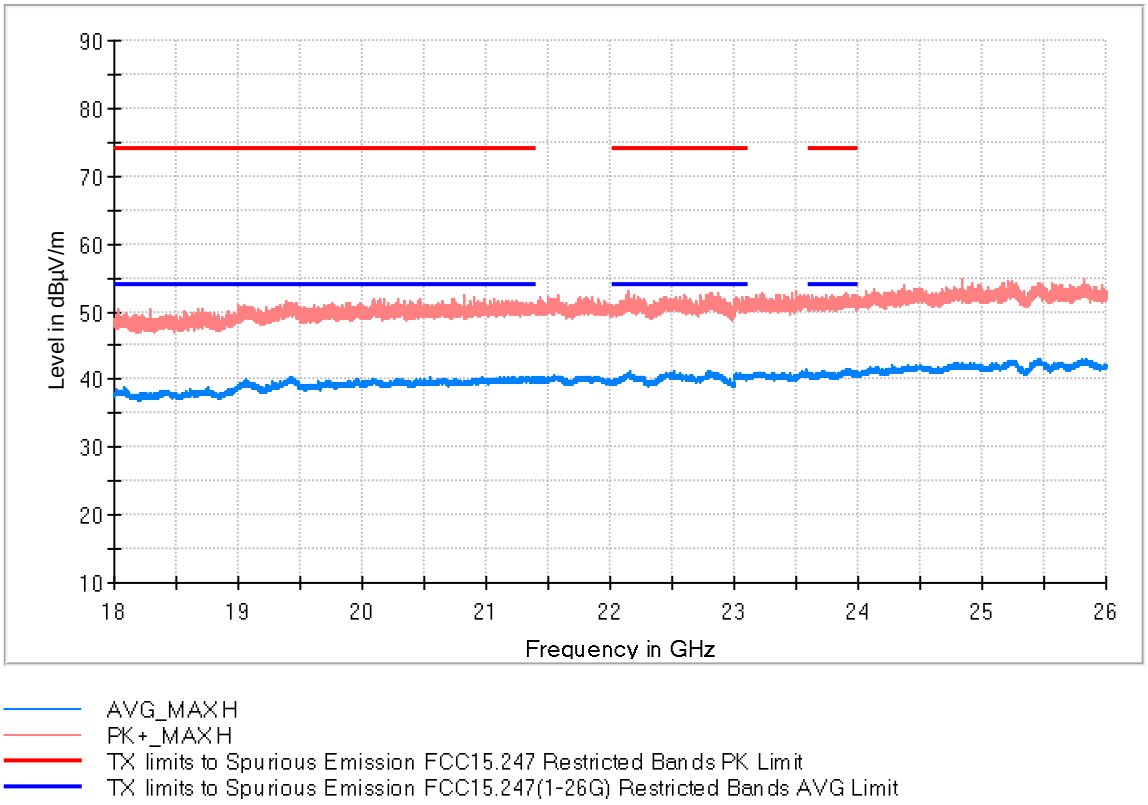
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
22441.500000	49.8	41.2	H	12.8	54.0

Frequency range 18 - 26 GHz

Highest Channel

Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [18, 26]

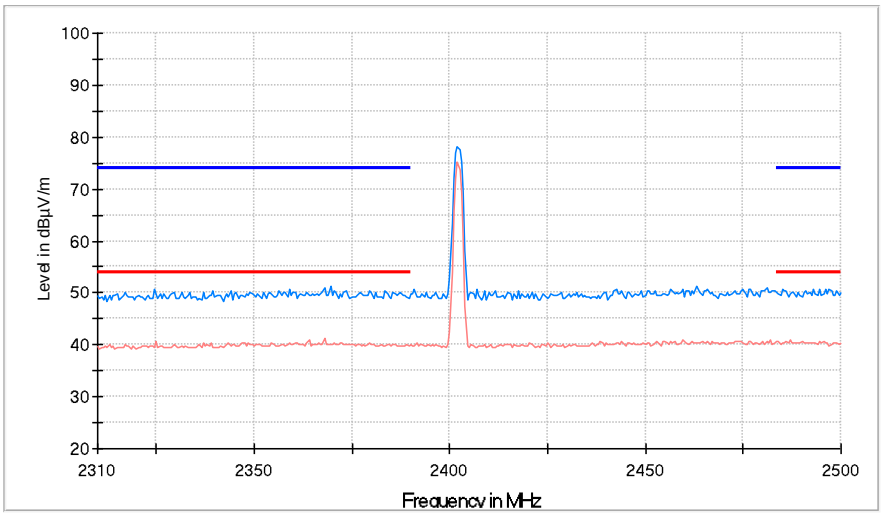
Images:



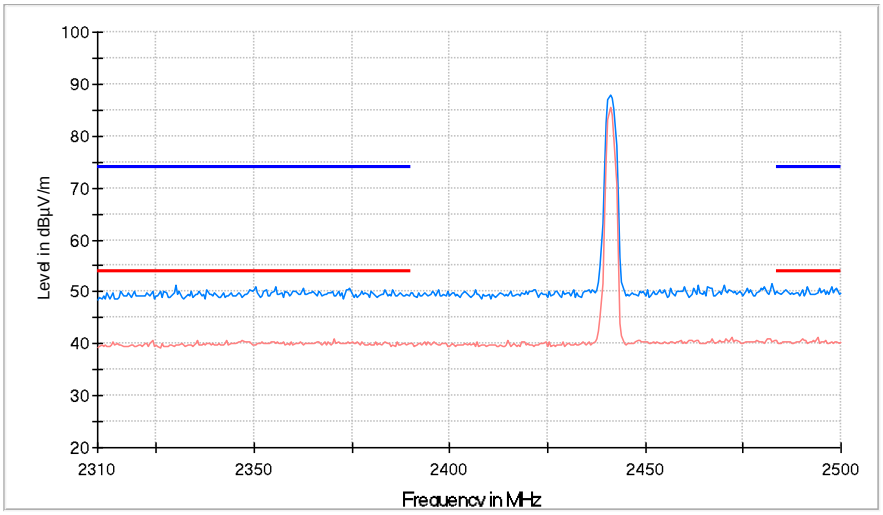
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23907.000000	50.7	41.5	H	12.5	54.0

Restricted Bands (2.31 GHz - 2.5 GHz)

Lowest Channel
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [1, 18]

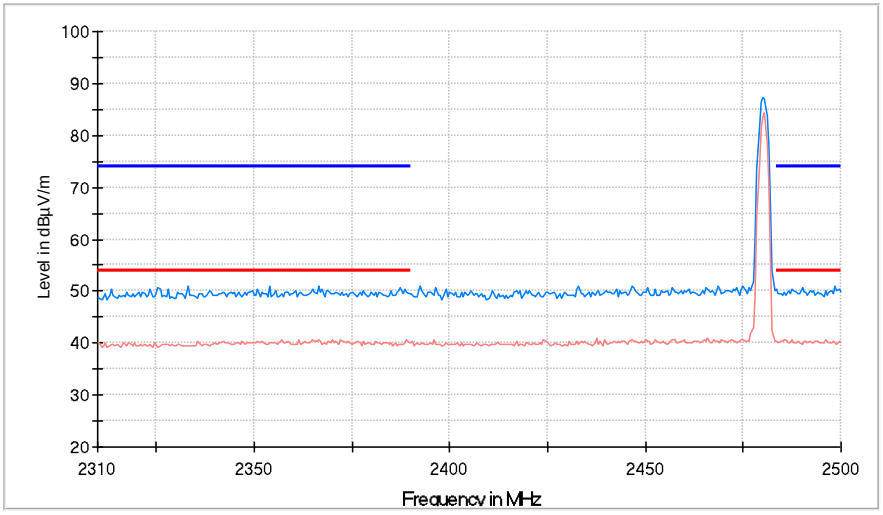


Middle Channel
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [1, 18]



Highest Channel

Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [1, 18]



Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time
30 MHz - 1 GHz	48.5 kHz	RMS ; PK+	100 kHz	1 s

Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time
1 GHz - 3 GHz	500 kHz	PK+ ; AVG	1 MHz	1 s
3 GHz - 18 GHz	500 kHz	PK+ ; AVG	1 MHz	1 s

Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time
18 GHz - 26 GHz	500 kHz	PK+ ; AVG	1 MHz	1 s