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:
3492ERM.023

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	Motorcycle cockpit domain controller, called Infotainment Front Control Unit (IFCU) of 12.3 inch
(*) Trademark	Visteon
(*) Model and /or type reference	HARLEYIFCU
Other identification of the product	FCC ID: NT8- HARLEYIFCU IC: 3043A- HARLEYIFCU Hw version: 1.E / 1.F / 1.G Sw version: v1315 FVIN: 1.0 HVIN: 1.E / 1.F / 1.G
(*) Features	Audio, Tuner (FM, MW, LW, DAB+, AM WB, HD Radio), Bluetooth (Dual HFP), USB (C Type), Wi-Fi (Access Point / Master 5GHz - STA / Slave mode 2.4GHz & 5GHz), A2B (RF Link), GNSS, Display (Capacitive, 12.7") 1.E Variant: AM/FM HD, Tuner and water band 1.G Variant: AM/FM, Tuner 1.F: AM/FM, DAB Tuner and Radio
Manufacturer	Visteon Corporation One Village Center Drive, Van Buren Township, MI 48111, USA
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 2 (February 2017). 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	04-20-2023
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.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA Certification Inc.

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 Instrument cluster functionality with Speedometer, Tachometer, Battery, Fuel Main Gages plus common warning lights. Infotainment functionality as included HD Radio NA, DAB Radio EU, or FM/AM Radio RoW, plus connectivity (USB, Bluetooth and Wi-Fi connections for Cellphone and Helmets).

3. Applicant’s declaration letter shown below for model similarity

Visteon

Name
Heidi Sepanik
Corporate Secretary

Visteon Corporation
One Village Center Drive
Van Buren Township, MI, 48111
Tel 734.710.4672
Fax 734.736.5540
hdiebol@visteon.com

Date: March 20, 2023

To:	From:
Regulatory Certification Body DEKRA Testing and Certification, S.A.U. Parque Tecnológico de Andalucía C/ Severo Ochoa 2 & 6, 29590,Málaga, España	**Visteon Corporation** One Village Center Drive, Van Buren Township, MI, USA. Postcode/Zip Code: 48111

Ref: EU-TEC/FCC/ISED update related to product:

Type of equipment:	Infotainment Control Unit
Brand name:	Visteon
Model name:	HARLEYIFCU

To whom it may concern,

Model name:	HARLEYIFCU	**CHANGES**
HW version:	1.E	Audio Hub, Audio Processing, HD digital radio and weather band
HW version:	1.F	Audio Hub, Audio Processing, DAB digital radio and Radion
HW version:	1.G	Audio Hub and Audio Processing
SW version:	v1315	Same for 3 HW versions

*Same PCB, different Tunner Specs, weather band only populated on 1.E variant and Radion only populated on 1.F variant.
*Same electrical and mechanical features.
*Same PCB board is used on the 3 Hardware versions. However, only the 1.F Hardware has the DAB digital radio populated and therefore is being considered as the most complex hardware for RED certification. 1.E hardware has HD radio and water band, which make if the most complex one for FCC.
*For RED certification, partial tests have been performed over 1.E and 1.G hardware to corroborate the behaviour is the same as on 1.F hardware, test report results for 1.F product version are valid and representative for the rest of hardware versions 1.E and 1.G and partial test reports were performer for each variant depending on the product features.
*For FCC/ISED certification, partial tests have been performed over 1.F and 1.G hardware to corroborate the behaviour is the same as on 1.E hardware, test report results for 1.E product version are valid and representative for the rest of hardware versions 1.F and 1.G and partial test reports were performer for each variant depending on the product features.
*According to the geolocation of the product, the features available will be automatically activates or deactivated.

Sincerely,

By:	Heidi Sepanik	Heidi A Sepanik
Title:	Corporate Secretary	
Company:	Visteon Corporation	
Telephone:	734.710.4672	
e-mail:	hdiebol@visteon.com	**Signature**

Visteon Corporation CORPORATE SEAL JAN. 5, 2000 DELAWARE

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	3492/77	IFCU-HD (NA)	Visteon / HARLEYIFCU	999947	2022-11-14	Element Under Test
S/01	3492/71	Display 12.7"	-	220505003086	2022-11-14	Element Under Test
S/01	3492/79	Break out board & Main harness	-	-	2022-11-14	Accessory
S/01	3492/13	HSD to USB Cable	Visteon	-	2022-11-14	Accessory
S/01	3492/19	USB type A (male) to USB type A (male) Cable	-	-	2022-11-14	Accessory
S/01	3492/85	VCAN	V-CAN / FV 5.2	4300922	2022-11-14	Accessory
S/01	3492/82	Coaxial cable	-	-	2022-11-14	Accessory
S/01	3492/83	Coaxial cable	-	-	2022-11-14	Accessory
S/01	3492/84	Coaxial cable	-	-	2022-11-14	Accessory
S/01	3492/59	USB type A (male) to USB type A (Female) Cable	-	-	2022-11-14	Accessory
S/01	1482	Laptop	LENOVO / V14 G2 ITL	PF3QAFFH	-	Auxiliary

1. 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	3492/88	IFCU-HD (NA)	Visteon / HARLEYIFCU	P70901090_C23260087	2023-01-04	Element Under Test
S/02	3492/02	GPS antenna	PKG001238	-	2022-11-14	Element Under Test
S/02	3492/28	Break out board & Main harness	-	-	2022-11-14	Accessory
S/02	3492/38	FM/AM/DAB Antenna	NEXTIUM	-	2022-11-14	Accessory
S/02	3492/06	Amplifier Harness	-	-	2022-11-14	Accessory
S/02	3492/09	Audio Amplifier	ROCKFORDFOSGATE / DV3	6300000207-71	2022-11-14	Accessory
S/02	3492/12	HSD to USB Cable	Visteon	-	2022-11-14	Accessory
S/02	3492/17	USB type A (male) to USB type A (male) Cable	-	-	2022-11-14	Accessory
S/02	3492/33	Speaker	Kicker / DSC50	40214091010343	2022-11-14	Accessory
S/02	3492/62	VCAN	V-CAN / FV 5.2	4280922	2022-11-14	Accessory
S/02	Dekra 53	USB type A (male) to USB type A (Female) Cable	-	-	-	Auxiliary
S/02	1484	Laptop	LENOVO / V14 G2 ITL	PF3Q2NKL	-	Auxiliary

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

Sample S/03 is composed of the following elements, accessories and auxiliary equipment:

Id	Control Number	Description	Manufacturer / Model	Serial Nº	Date of Reception	Application
S/03	3492/90	IFCU-HD (EU)	Visteon / HARLEYIFCU	P70901092_B22940084	2023-01-04	Element Under Test
S/03	3492/02	GPS antenna	PKG001238	-	2022-11-14	Element Under Test
S/03	3492/28	Break out board & Main harness	-	-	2022-11-14	Accessory
S/03	3492/38	FM/AM/DAB Antenna	NEXTIUM	-	2022-11-14	Accessory
S/03	3492/06	Amplifier Harness	-	-	2022-11-14	Accessory
S/03	3492/09	Audio Amplifier	ROCKFORDFOSGATE / DV3	6300000207-71	2022-11-14	Accessory
S/03	3492/12	HSD to USB Cable	Visteon	-	2022-11-14	Accessory
S/03	3492/17	USB type A (male) to USB type A (male) Cable	-	-	2022-11-14	Accessory
S/03	3492/33	Speaker	Kicker / DSC50	40214091010343	2022-11-14	Accessory
S/03	3492/62	VCAN	V-CAN / FV 5.2	4280922	2022-11-14	Accessory
S/03	Dekra 53	USB type A (male) to USB type A (Female) Cable	-	-	-	Auxiliary
S/03	1484	Laptop	LENOVO / V14 G2 ITL	PF3Q2NKL	-	Auxiliary

1. Sample S/03, was used for the following test(s): All Radiated tests indicated in appendix B.

Sample S/04 is composed of the following elements, accessories and auxiliary equipment:

Id	Control Number	Description	Manufacturer / Model	Serial Nº	Date of Reception	Application
S/04	3492/94	IFCU-HD (ROW)	Visteon / HARLEYIFCU	P70901093_C23260050	2023-01-04	Element Under Test
S/04	3492/02	GPS antenna	PKG001238	-	2022-11-14	Element Under Test
S/04	3492/28	Break out board & Main harness	-	-	2022-11-14	Accessory
S/04	3492/38	FM/AM/DAB Antenna	NEXTIUM	-	2022-11-14	Accessory
S/04	3492/06	Amplifier Harness	-	-	2022-11-14	Accessory
S/04	3492/09	Audio Amplifier	ROCKFORDFOSGATE / DV3	6300000207-71	2022-11-14	Accessory
S/04	3492/12	HSD to USB Cable	Visteon	-	2022-11-14	Accessory
S/04	3492/17	USB type A (male) to USB type A (male) Cable	-	-	2022-11-14	Accessory
S/04	3492/33	Speaker	Kicker / DSC50	40214091010343	2022-11-14	Accessory
S/04	3492/62	VCAN	V-CAN / FV 5.2	4280922	2022-11-14	Accessory
S/04	Dekra 53	USB type A (male) to USB type A (Female) Cable	-	-	-	Auxiliary
S/04	1484	Laptop	LENOVO / V14 G2 ITL	PF3Q2NKL	-	Auxiliary

1. Sample S/04, was used for the following test(s): All Radiated tests indicated in appendix C.

DEKRA Certification, Inc.
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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	
	Main Connector Harness	1.5	☒	☐	☐	
	AM/FM Antenna Connector	0.1	☒	☐	☐	
	GPS Antenna Connector	0.1	☒	☐	☐	
	USB Connector	0.1	☒	☐	☐	
			☐	☐	☐	
Supplementary information to the ports..... :	No Data Provided					
Rated power supply..... :	Voltage and Frequency		Reference poles			
			L1	L2	L3	N	PE
	☐	AC:	☐	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐	☐
	☒	DC: 13.5 Vdc					
	☐	DC:					
Rated Power..... :	16A						
Clock frequencies ..... :	40 MHz, 8MHz, 38.4MHz, 55.4667MHz						
Other parameters..... :	No Data Provided						
Software version..... :	v1315 / FVIN:1.0						
Hardware version..... :	1.E / 1.F / 1.G						
Dimensions in cm (W x H x D)..... :	36.8 x 15.4 x 6.3						
Mounting position..... :	☐	*Table top equipment*					
	☐	*Wall/Ceiling mounted equipment*					
	☐	*Floor standing equipment*					
	☐	*Hand-held equipment*					
	☒	*Other: Installed in a Motorcycle*					
Modules/parts ..... :	Module/parts of test item		Type		Manufacturer	
	No Data Provided					
Accessories (not part of the test item) ..... :	Description		Type		Manufacturer	
	Break Out Board + Main harness					
	Amplifier + Amplifier Harness + Speaker					
	AM/FM or AM/FM/DAF Antenna					
	GPS Antenna					
	VCAN + VCAN Connection					
	Wireless Headset					

Documents as provided by the applicant ..... :	Description	File name	Issue date
	Declaration Equipment Data	FDT30_18 Declaration Equipment Data - R2 Final	02/21/2023
	Test Instructions		
	Technical Files		
	DUT Manual		

Copy of marking plate:

Identification of the client

Visteon Corporation
One Village Center Drive,
Van Buren Township, MI 48111,
USA

Testing period and place

Test Location	DEKRA Certification Inc.
Date (start)	01-13-2023
Date (finish)	03-03-2023

Document history

Report number	Date	Description
3492ERM.023	4/20/2023	First release.

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 %

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 %

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. = 75 %

Remarks and comments

The tests have been performed by the technical personnel: Lakshmi Gollamudi, Juliana Cherry, Yuri Barone, Qi Zhang, Koji Nishimoto, and Victor Albrecht.

DEKRA Certification, Inc.
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United States of America

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
897	Power supply (AMETEK / PROG-DC-PS)	1707A01906	N/A	N/A
710	WIFI R&S CMW500 Tester	151743	2020-07-01	2023-07-01
1039	FSV40 Signal Analyzer 40GHz	101627	2022-11-01	2024-11-01
1042	SMBV 100A Vector Signal Generator	262575	2022-03-16	2024-03-16
1107	Ethernet SNMP Thermometer- RF1 Room	60038026952	2022-10-18	2024-10-18
1313	Wireless Measurement Software R&S EMC32	-	N/A	N/A

Radiated Measurements

CONTROL NUMBER	DESCRIPTION	Serial No	LAST CALIBRATION	NEXT CALIBRATION
878	Power supply (AMETEK / PROG-DC-PS)	1707A01783	N/A	N/A
1012	ESR26 EMI Test Receiver	101478	2022-04-12	2024-04-12
1014	FSV40 Signal Analyzer 40GHz	101626	2021-05-19	2023-05-19
1055	3115 Double-Ridged Waveguide Horn Antenna 1-18 GHz	211394	2023-02-06	2026-02-06
1057	3115 Double-Ridged Waveguide Horn Antenna 1-18 GHz	211373	2020-06-03	2023-06-03
1065	3142E Biconilog Antenna	208587	2020-08-13	2023-08-13
1108	Ethernet SNMP Thermometer- CR Room	60038026954	2022-10-18	2024-10-18
1111	Ethernet SNMP Thermometer- SAC	60038026577	2022-10-18	2024-10-18
1179	Semi anechoic Absorber Lined Chamber	F169021	N/A	N/A
1314	Wireless Measurement Software R&S EMC32	1040-OT102236	N/A	N/A
1461	Low Noise Preamplifier (0.1-18GHz)	BLMA0118-4A	2022-06-01	2024-06-01

Testing verdicts

Fail	F
Not applicable	N/A
Not measured	N/M
Pass	P

Summary

Appendix A: Hw: 1.E (NA variant)

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			

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
FCC 2.1049 / Occupied Channel Bandwidth 99%		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
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			

Appendix A: Hw: 1.F (EU variant)

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		N/M	Refer 1
FCC 2.1049 / 99dBw Occupied Channel Bandwidth 99%		N/M	Refer 1
RSS-247 5.1 (b) / FCC 15.247 (a) (1) Carrier Frequency Separation		N/M	Refer 1
RSS-247 5.1 (d) / FCC 15.247 (a) (1) (iii) Time of Occupancy (Dwell Time)		N/M	Refer 1
RSS-247 5.1 (d) / FCC 15.247 (a) (1) (iii) Number of hopping channels		N/M	Refer 1
RSS-247 5.4 (b) / FCC 15.247 (b) (1) Maximum Peak Conducted output power & Antenna gain		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Band-edge emissions compliance (Transmitter) - Conducted		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Conducted		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Radiated		Pass	Refer 2

Supplementary information and remarks:

1. Test case not requested.
2. Only partial testing has been performed because the test result of spurious emission is similar to the variant full tested (1.E).

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		N/M	Refer 1
FCC 2.1049 / Occupied Channel Bandwidth 99%		N/M	Refer 1
RSS-247 5.2 (b) / FCC 15.247 (e) Power spectral density		N/M	Refer 1
RSS-247 5.4 (d) / FCC 15.247 (b) (1) Maximum Average Conducted output Power		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Band-edge emissions compliance (Transmitter) - Conducted		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Conducted		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Radiated		Pass	Refer 2

Supplementary information and remarks:

1. Test case not requested.
2. Only partial testing has been performed because the test result of spurious emission is similar to the variant full tested (1.E).

Appendix A: Hw: 1.G (ROW variant)

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		N/M	Refer 1
FCC 2.1049 / 99dBw Occupied Channel Bandwidth 99%		N/M	Refer 1
RSS-247 5.1 (b) / FCC 15.247 (a) (1) Carrier Frequency Separation		N/M	Refer 1
RSS-247 5.1 (d) / FCC 15.247 (a) (1) (iii) Time of Occupancy (Dwell Time)		N/M	Refer 1
RSS-247 5.1 (d) / FCC 15.247 (a) (1) (iii) Number of hopping channels		N/M	Refer 1
RSS-247 5.4 (b) / FCC 15.247 (b) (1) Maximum Peak Conducted output power & Antenna gain		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Band-edge emissions compliance (Transmitter) - Conducted		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Conducted		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Radiated		Pass	N/A

Supplementary information and remarks:

1. Test case not requested.
2. Only partial testing has been performed because the test result of spurious emission is similar to the variant full tested (1.E).

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		N/M	Refer 1
FCC 2.1049 / Occupied Channel Bandwidth 99%		N/M	Refer 1
RSS-247 5.2 (b) / FCC 15.247 (e) Power spectral density		N/M	Refer 1
RSS-247 5.4 (d) / FCC 15.247 (b) (1) Maximum Average Conducted output Power		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Band-edge emissions compliance (Transmitter) - Conducted		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Conducted		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Radiated		Pass	N/A

Supplementary information and remarks:

1. Test case not requested.
2. Only partial testing has been performed because the test result of spurious emission is similar to the variant full tested (1.E).

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

Appendix A: Test results; Hw: 1.E (NA variant)

Appendix A

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Appendix A.1: Test results. Bluetooth EDR

Appendix A.1

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	2402 – 2480 MHz
Nominal Channel Bandwidth	1 MHz
RF Output Power	4 dBm
Antenna type	Integral Antenna
Antenna gain	1.5 dBi
Nominal Voltage	
- Supply Voltage	13.5 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): $V_{nominal}$: 13.2 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): $V_{nominal}$: 13.2 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): $V_{nominal}$: 13.2 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.

Chipset 1
Sample ID: S/01

Modulation: BT (GFSK 1-DH5)
Results

Freq (MHz)	BW (MHz)	20Ebw (MHz)
2402.00000	1	0.930
2441.00000	1	0.930
2480.00000	1	0.935

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

Freq (MHz)	BW (MHz)	20Ebw (MHz)
2402.00000	1	1.325
2441.00000	1	1.325
2480.00000	1	1.325

Modulation: BT (8DPSK 3-DH5)
Results

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

Verdict

Pass

Chipset 2
Sample ID: S/01

Modulation: BT (GFSK 1-DH5)
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	1.325
2441.00000	1	1.325
2480.00000	1	1.325

Modulation: BT (8DPSK 3-DH5)
Results

Freq (MHz)	BW (MHz)	20Ebw (MHz)
2402.00000	1	1.280
2441.00000	1	1.345
2480.00000	1	1.280

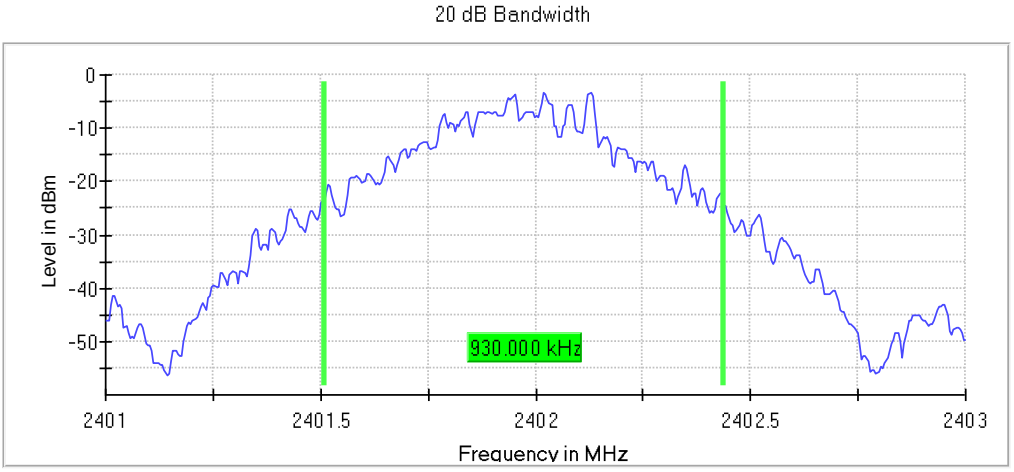
Verdict

Pass

Attachments

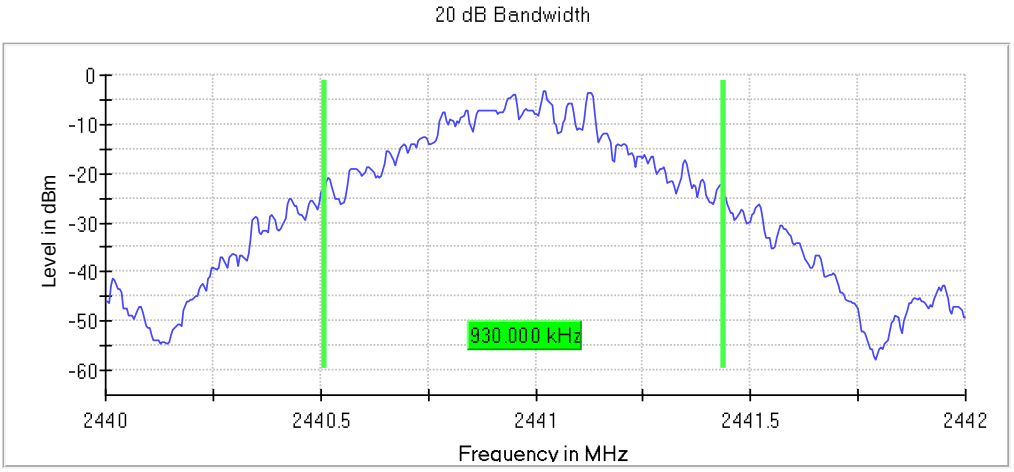
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 1

Images:



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

Images:



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

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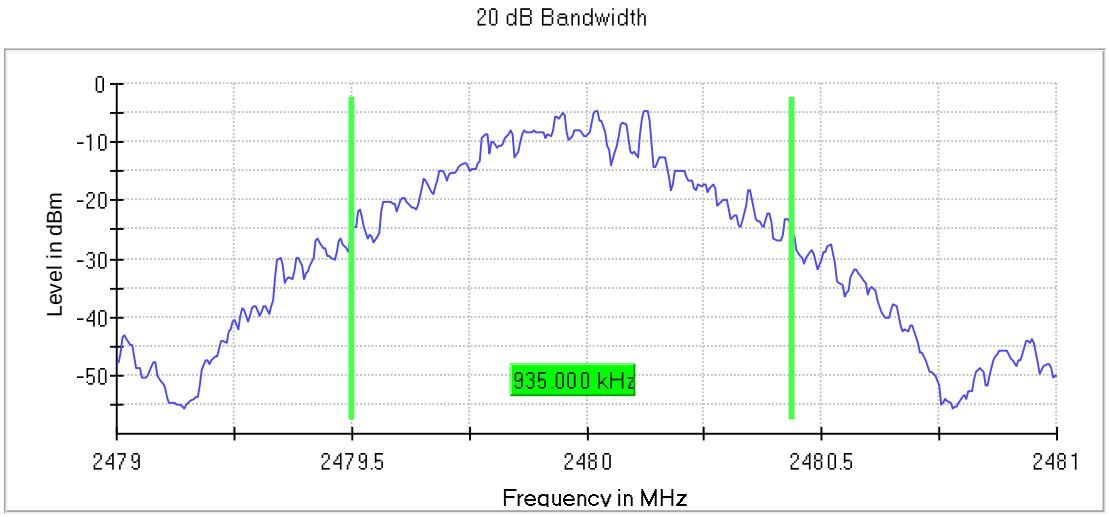
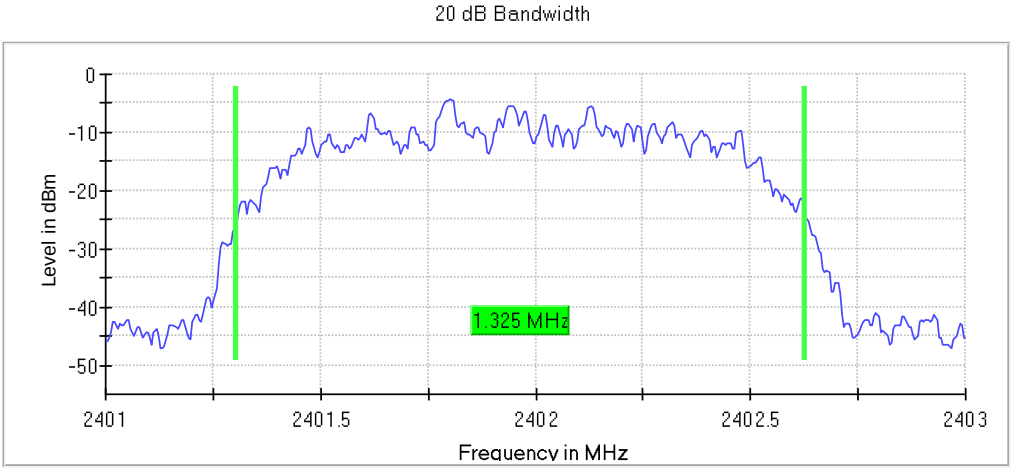


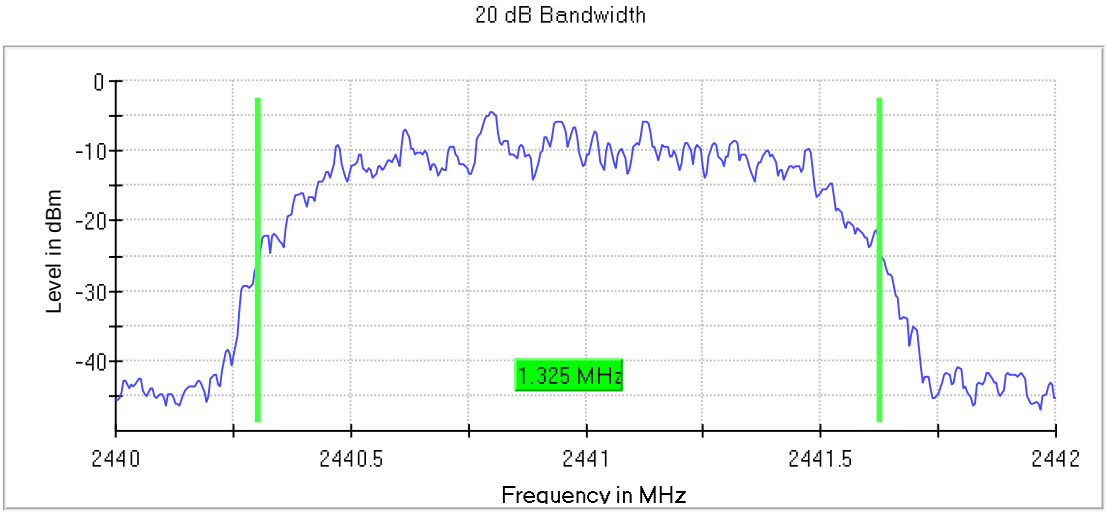
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 1

Images:



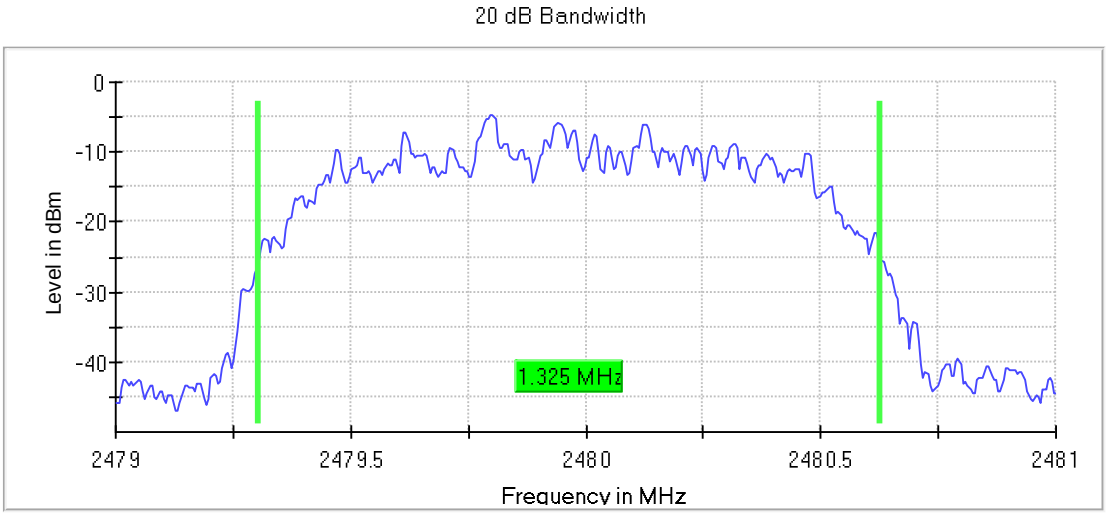
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 1

Images:



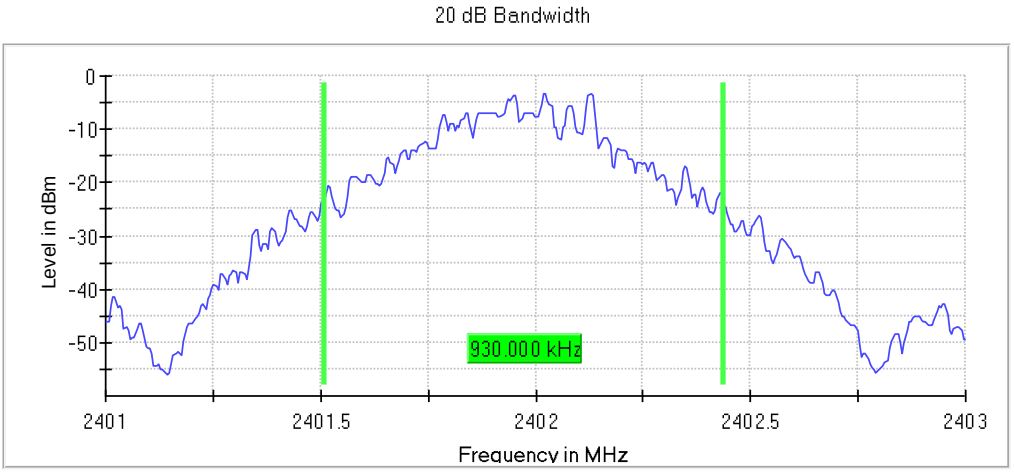
Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 1

Images:



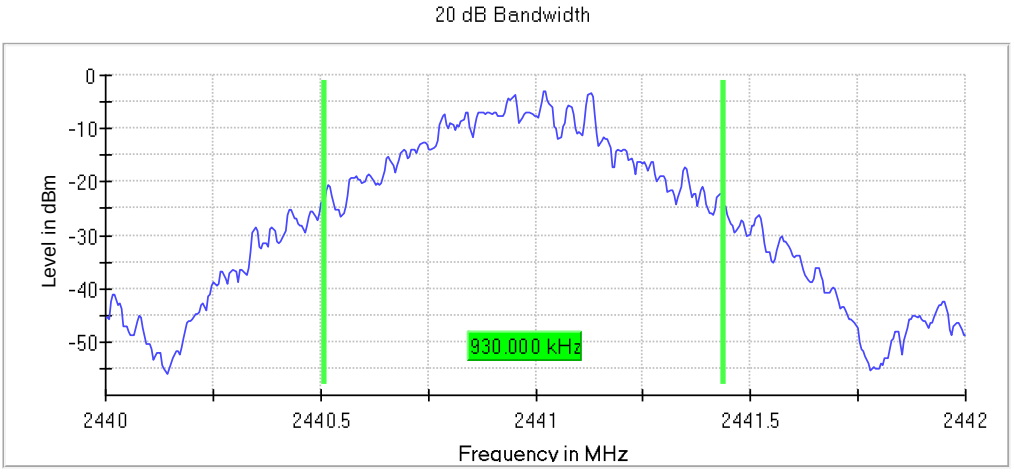
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 1

Images:



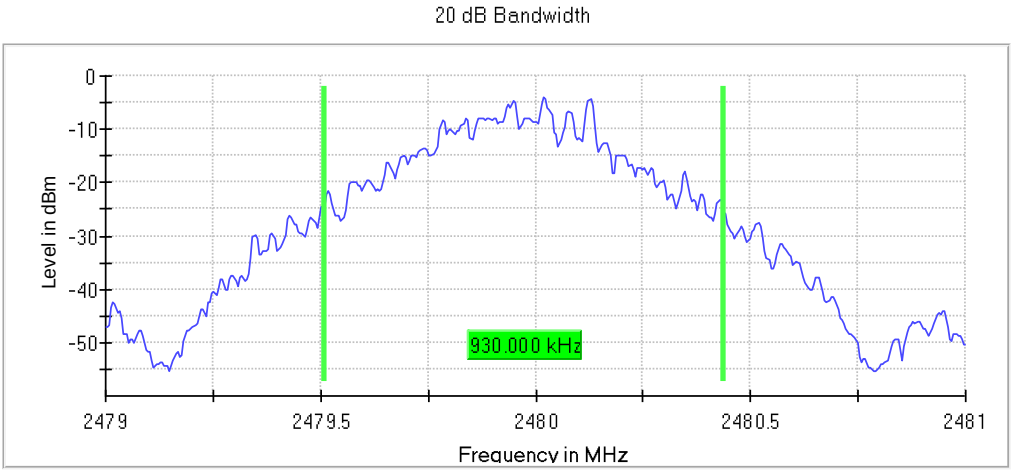
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 1

Images:



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

Images:



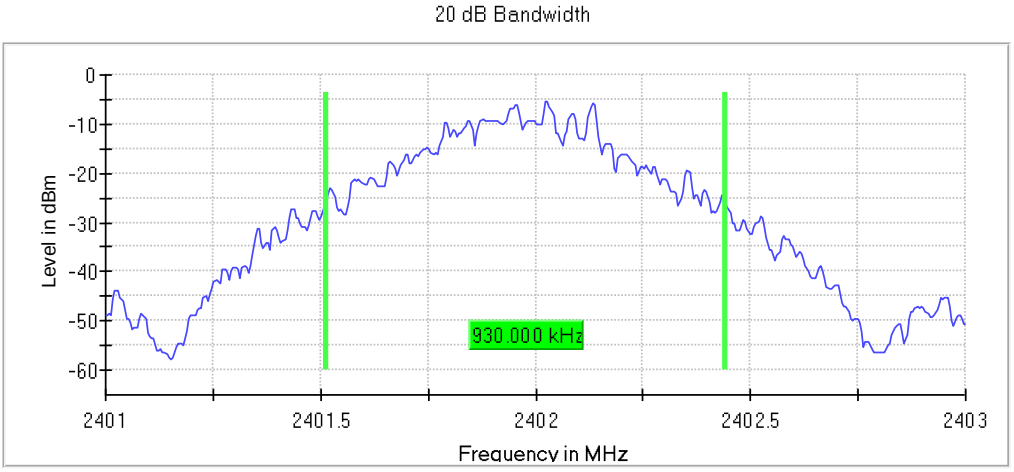
Spectrum Analyzer Parameters

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44100 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	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 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	12 / max. 150	8 / max. 1150150	9 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.09 dB	0.10 dB	0.04 dB

Attachments

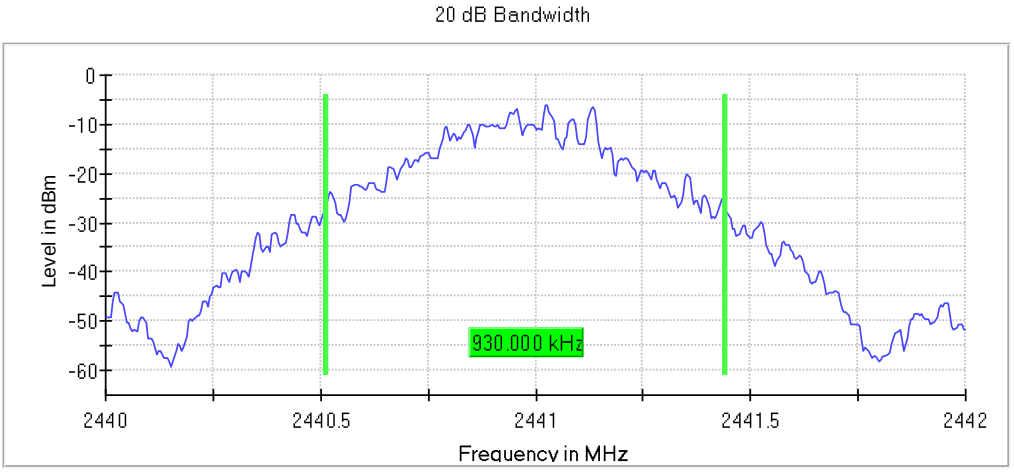
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 2

Images:



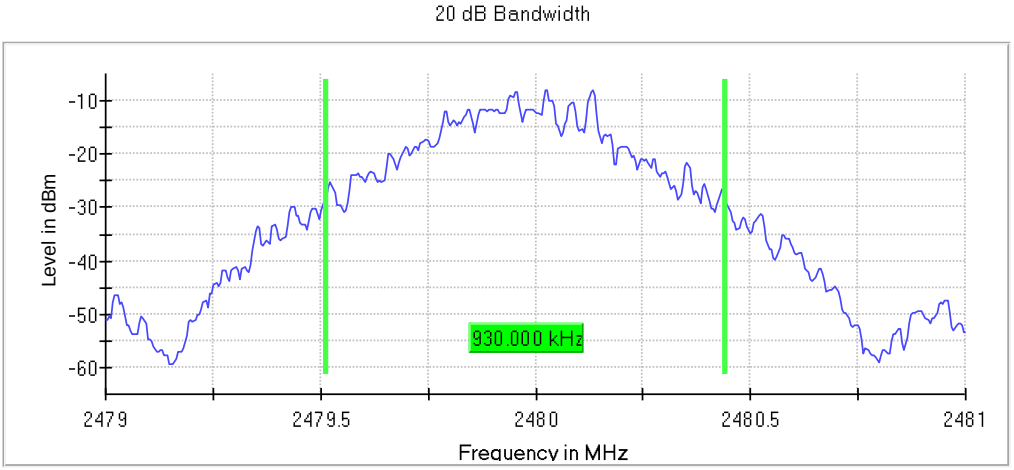
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 2

Images:



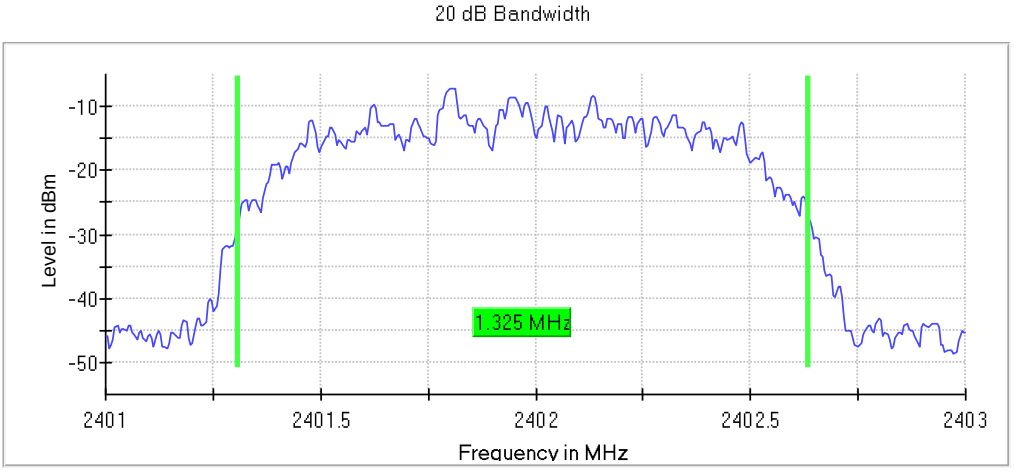
Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 2

Images:



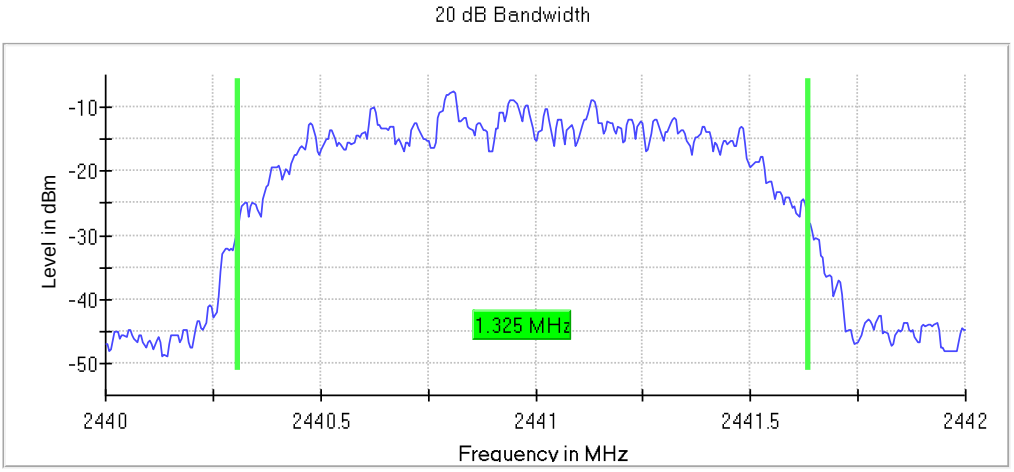
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 2

Images:



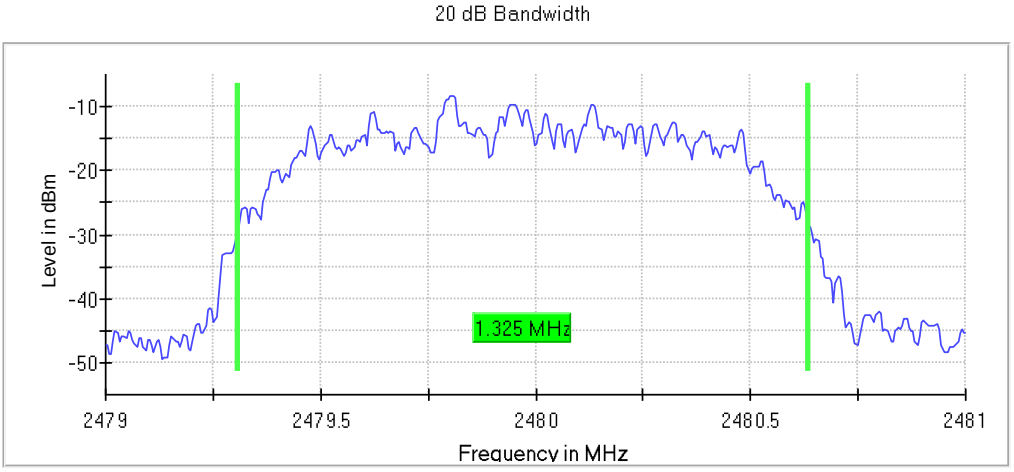
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 2

Images:



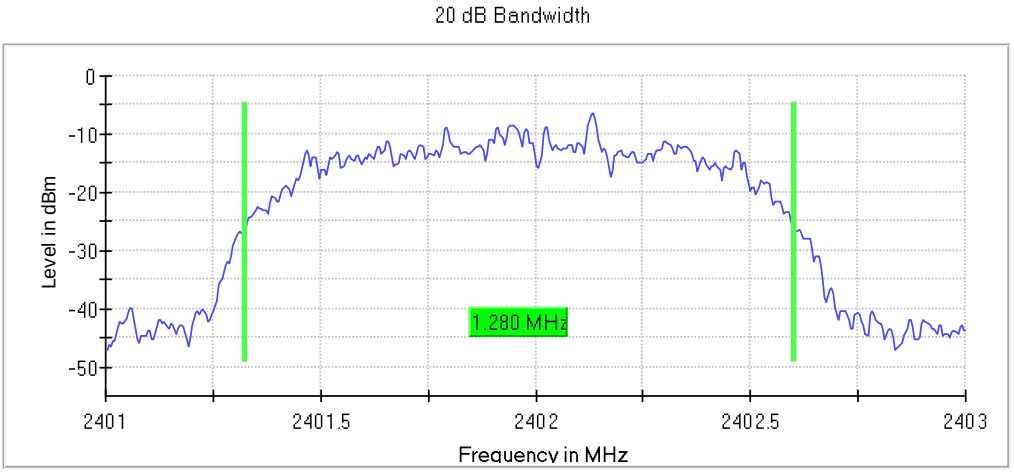
Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 2

Images:



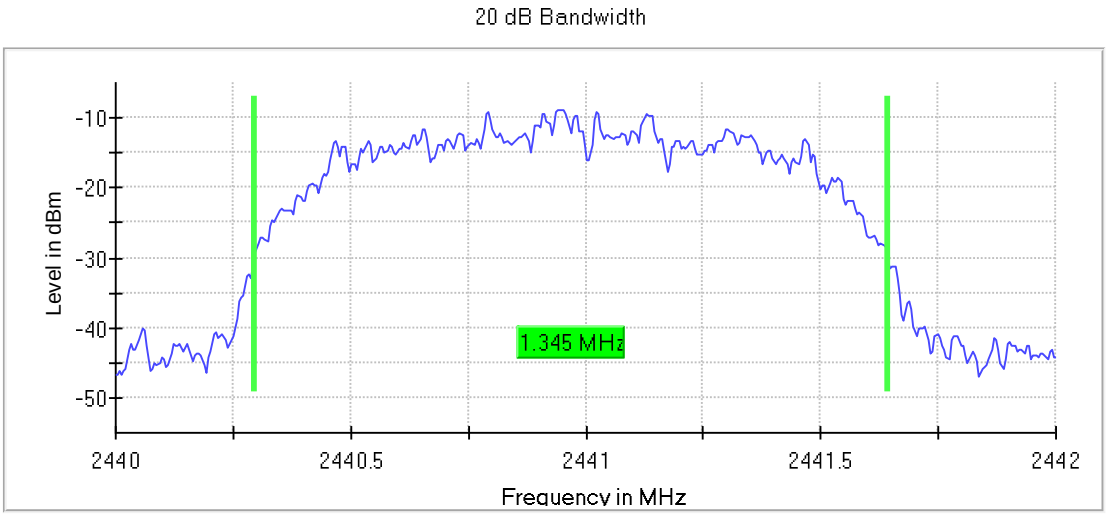
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 2

Images:



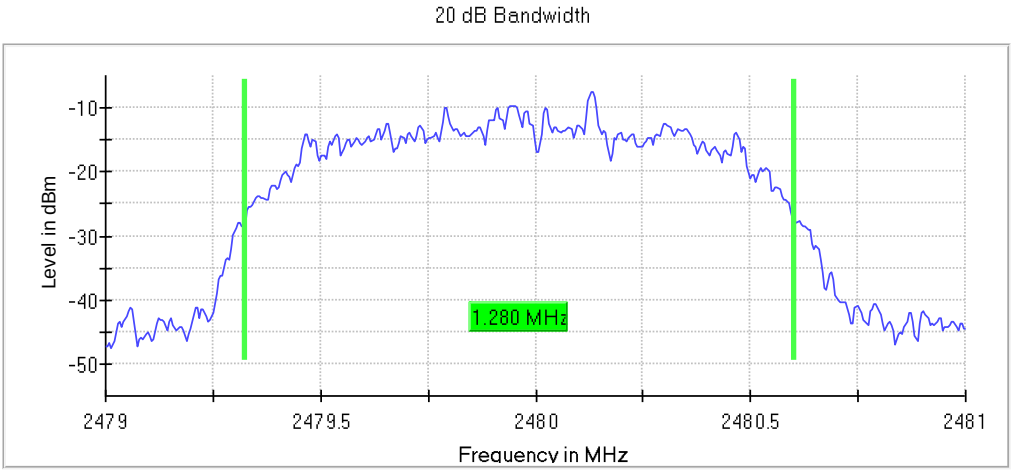
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 2

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 2

Images:



Spectrum Analyzer Parameters

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44100 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	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 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	12 / max. 150	8 / max. 1150150	9 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.09 dB	0.10 dB	0.04 dB

FCC 2.1049 - 99dBw Occupied Channel Bandwidth 99%

Limits
No Limit has been set to this test case

Chipset 1
Sample ID: S/01

Modulation: BT (GFSK 1-DH5)
Results

Freq (MHz)	BW (MHz)	Occ Ch BW (MHz)
2402.00000	1	0.860
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	1.180
2441.00000	1	1.180
2480.00000	1	1.180

Modulation: BT (8DPSK 3-DH5)
Results

Freq (MHz)	BW (MHz)	Occ Ch BW (MHz)
2402.00000	1	0.860
2441.00000	1	0.870
2480.00000	1	0.865

Verdict

Pass

Chipset 2
Sample ID: S/01

Modulation: BT (GFSK 1-DH5)
Results

Freq (MHz)	BW (MHz)	Occ Ch BW (MHz)
2402.00000	1	0.865
2441.00000	1	0.860
2480.00000	1	0.865

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

Freq (MHz)	BW (MHz)	Occ Ch BW (MHz)
2402.00000	1	1.180
2441.00000	1	1.180
2480.00000	1	1.185

Modulation: BT (8DPSK 3-DH5)
Results

Freq (MHz)	BW (MHz)	Occ Ch BW (MHz)
2402.00000	1	1.190
2441.00000	1	1.190
2480.00000	1	1.190

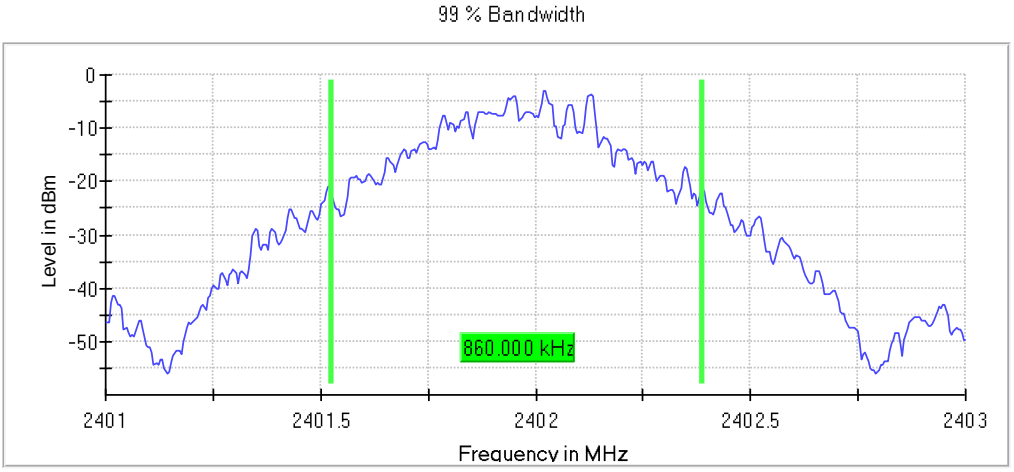
Verdict

Pass

Attachments

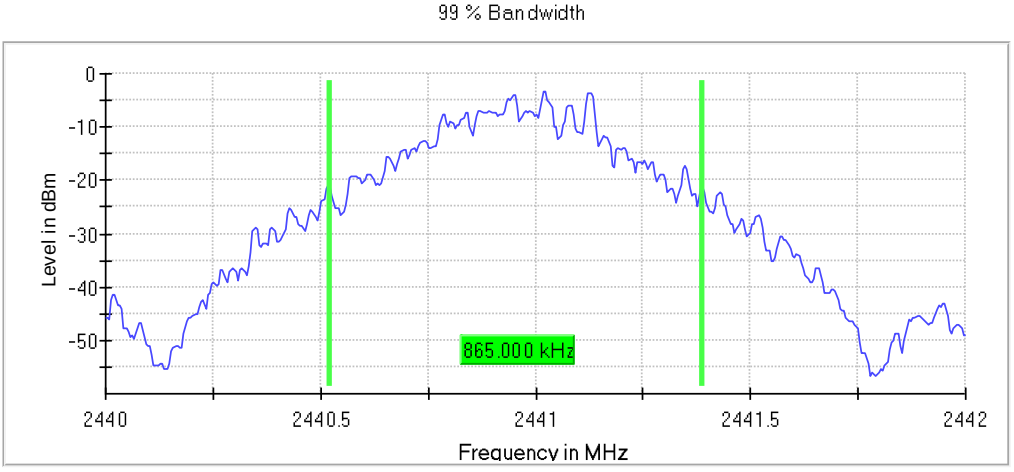
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 1

Images:



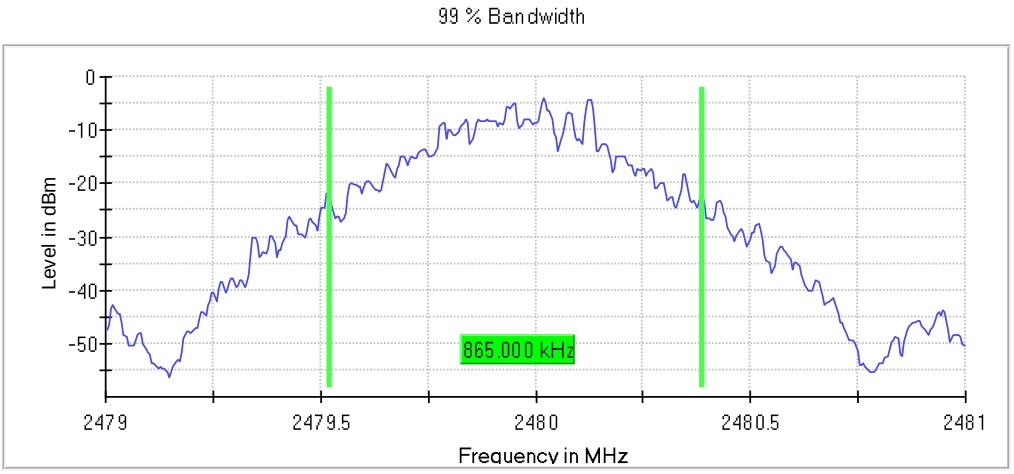
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 1

Images:



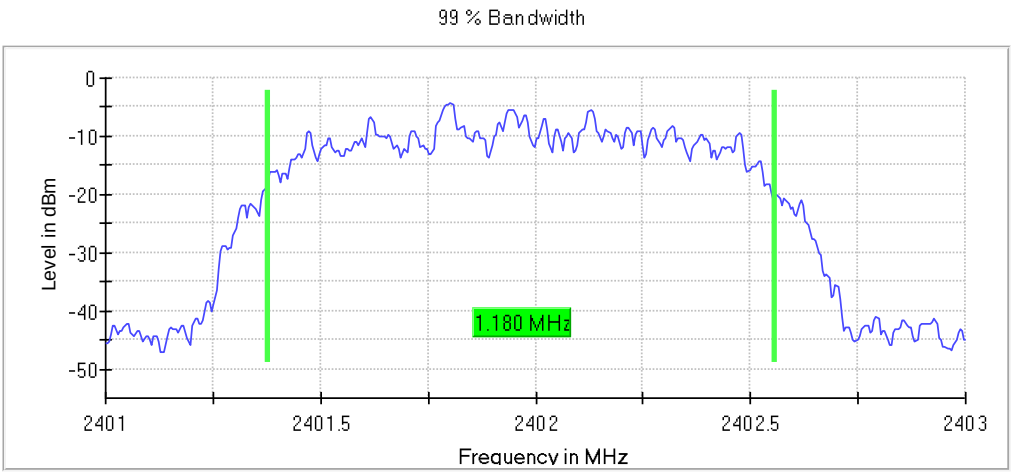
Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 1

Images:



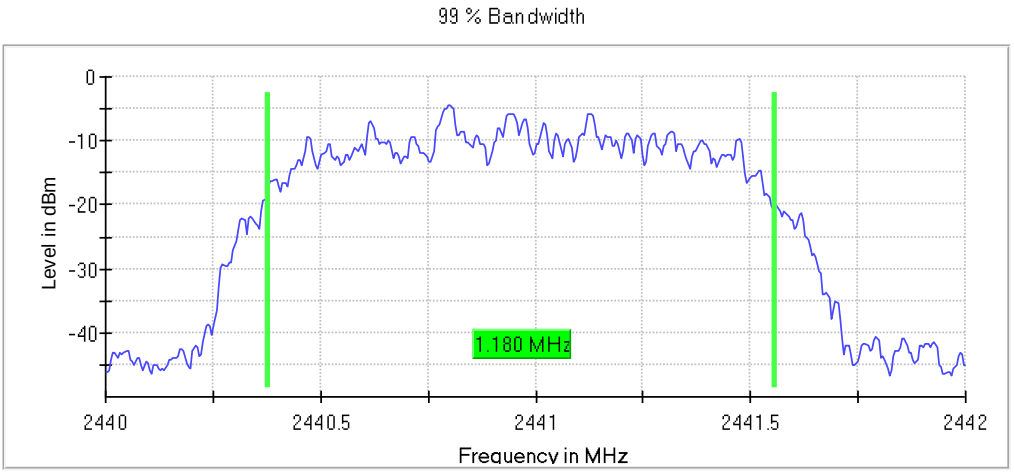
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 1

Images:



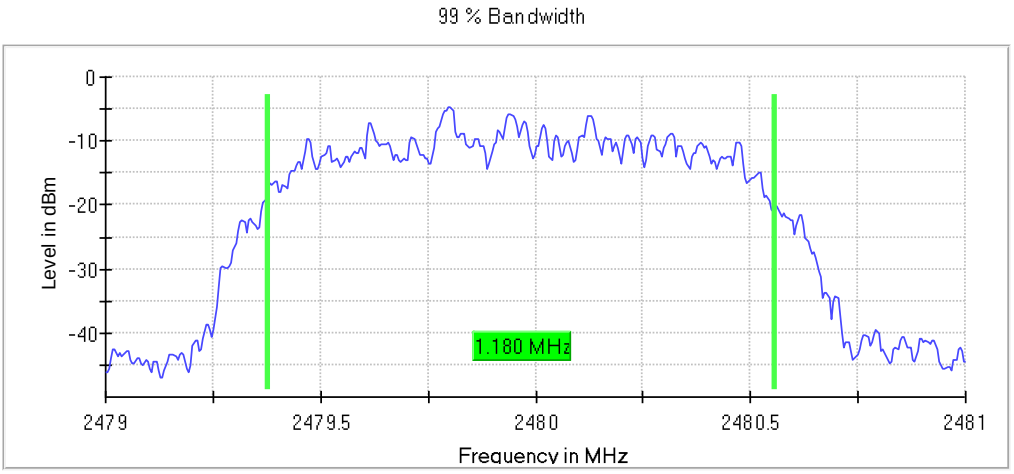
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 1

Images:



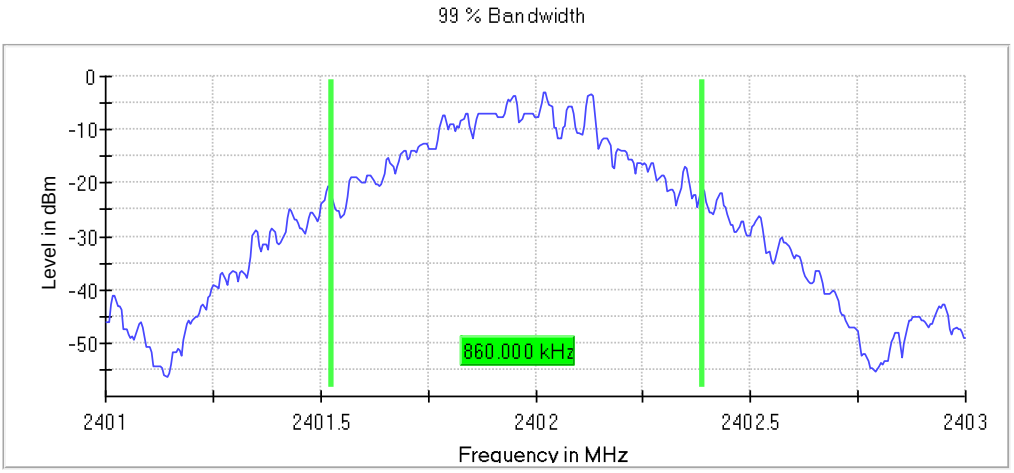
Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 1

Images:



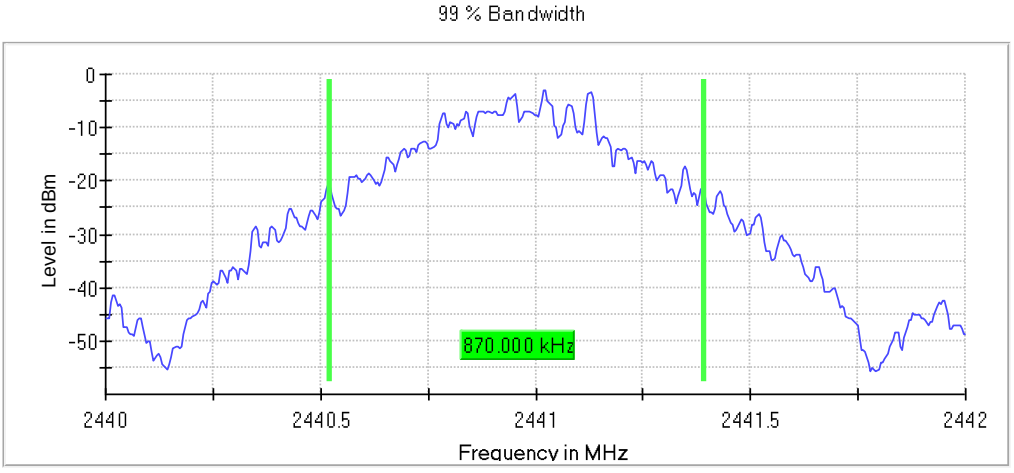
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 1

Images:



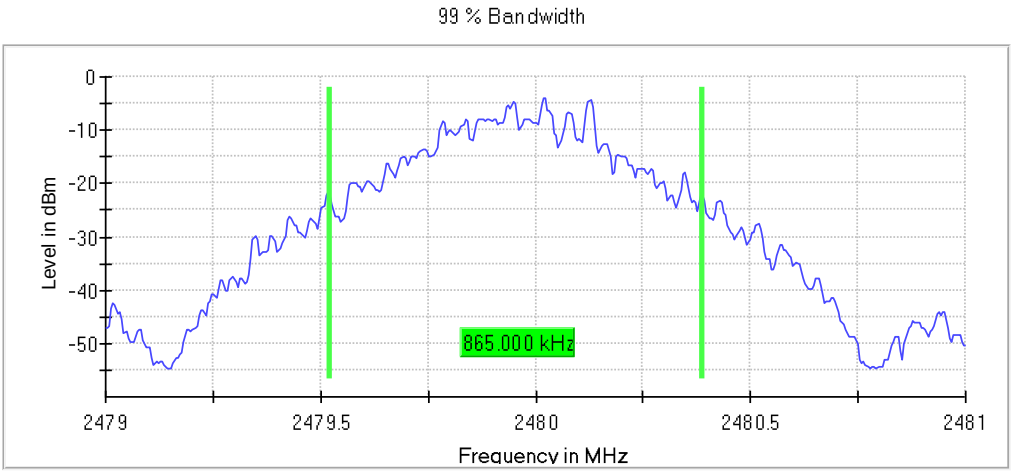
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 1

Images:



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

Images:



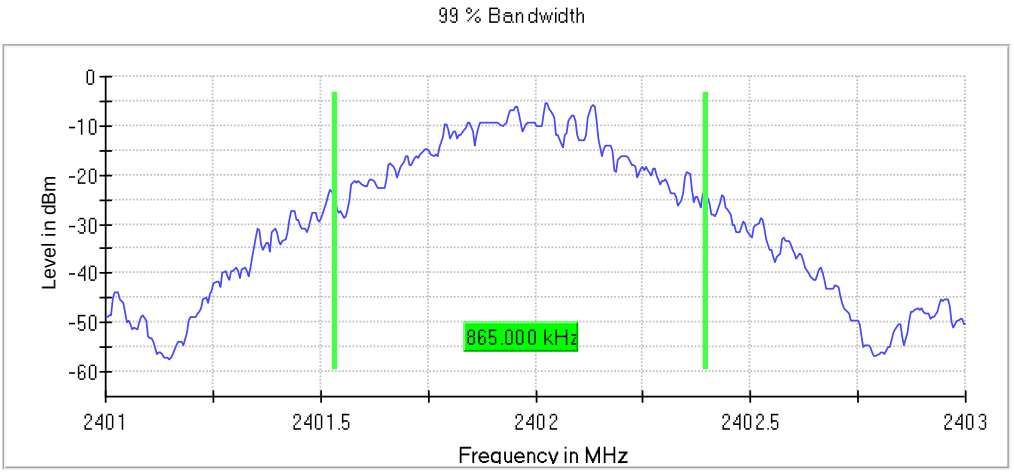
Spectrum Analyzer Parameters

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44100 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	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 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	6 / max.150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.17 dB	0.08 dB	0.12 dB

Attachments

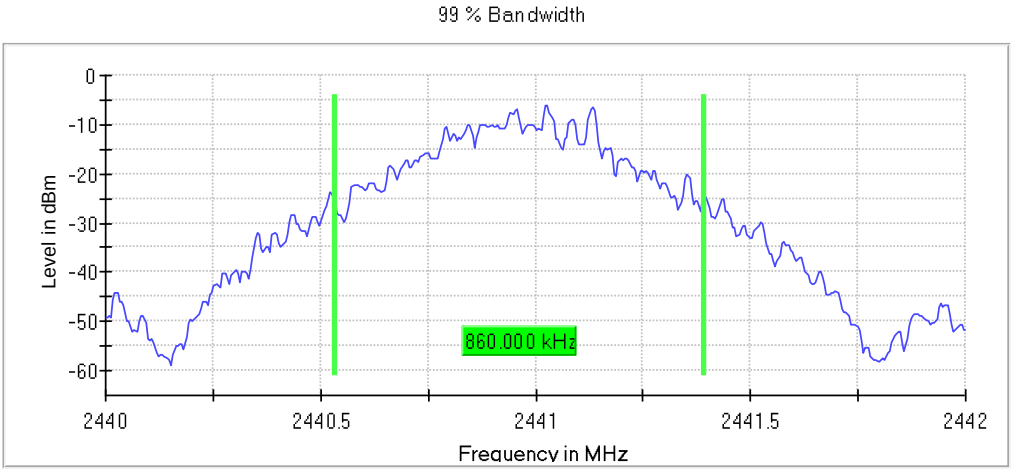
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 2

Images:



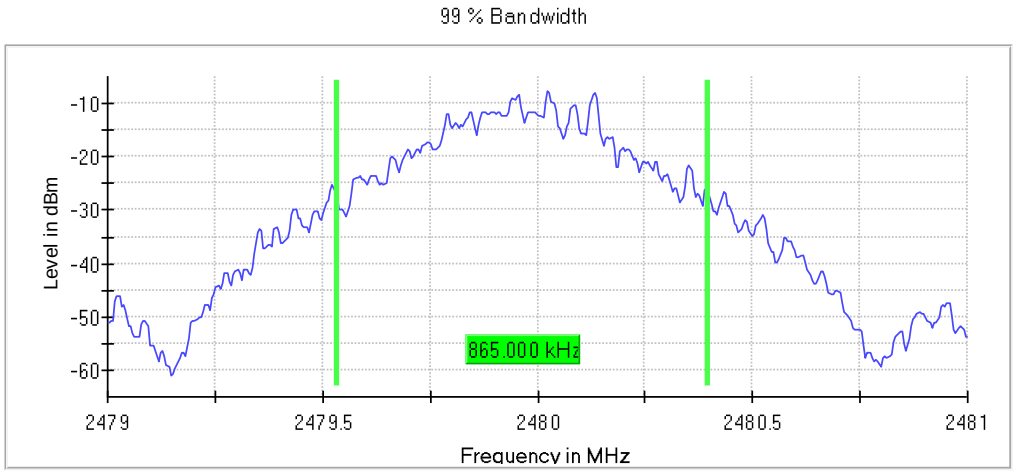
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 2

Images:



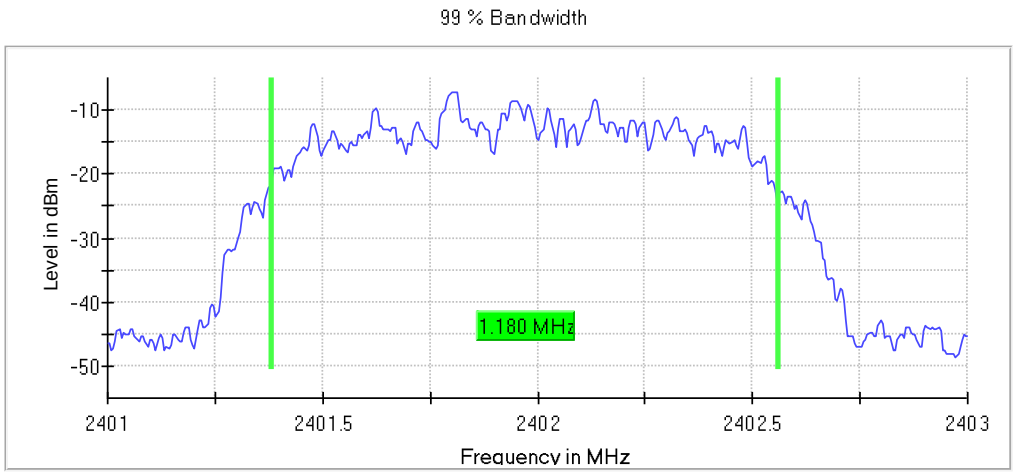
Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 2

Images:



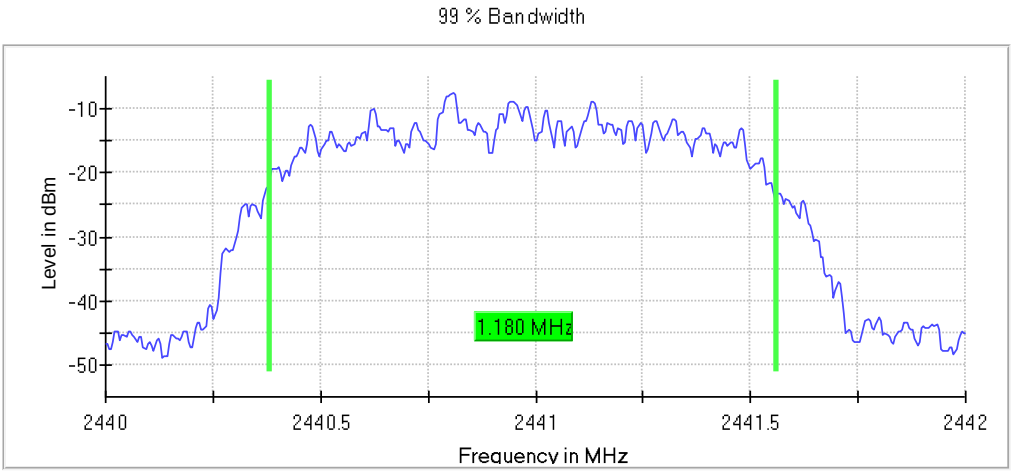
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 2

Images:



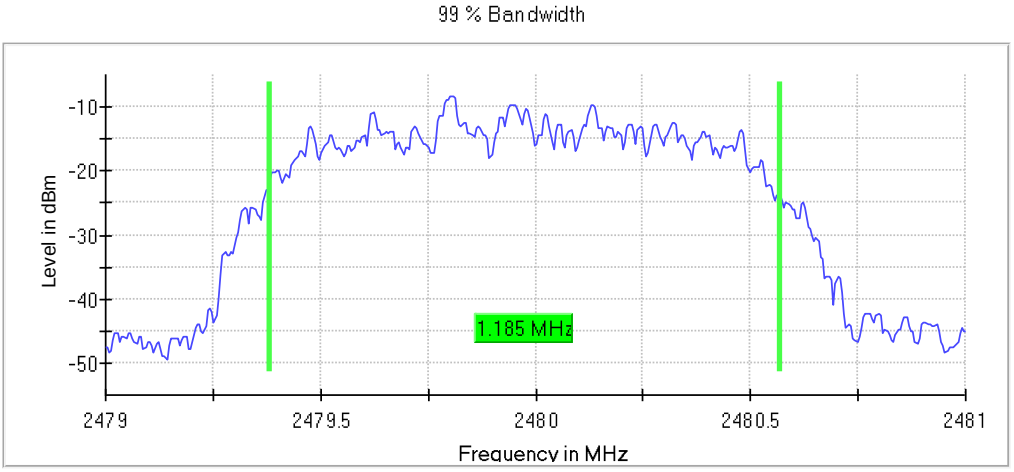
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 2

Images:



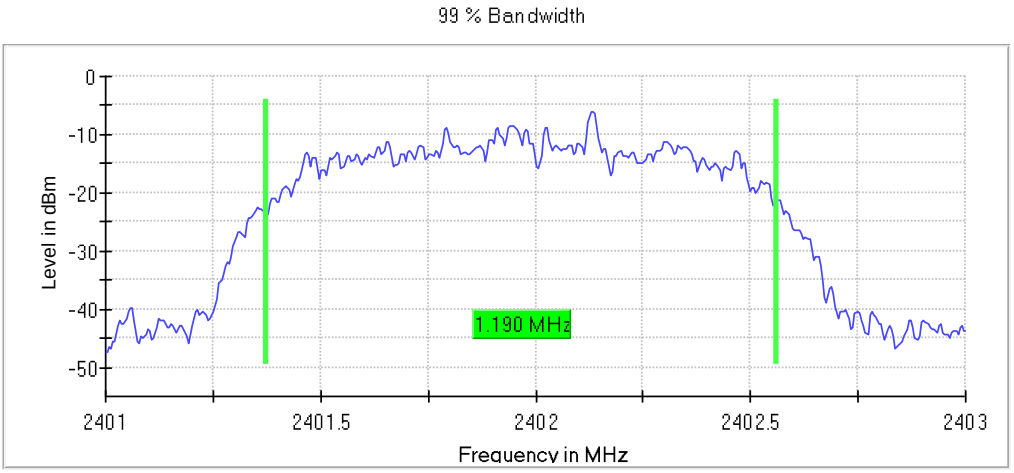
Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 2

Images:



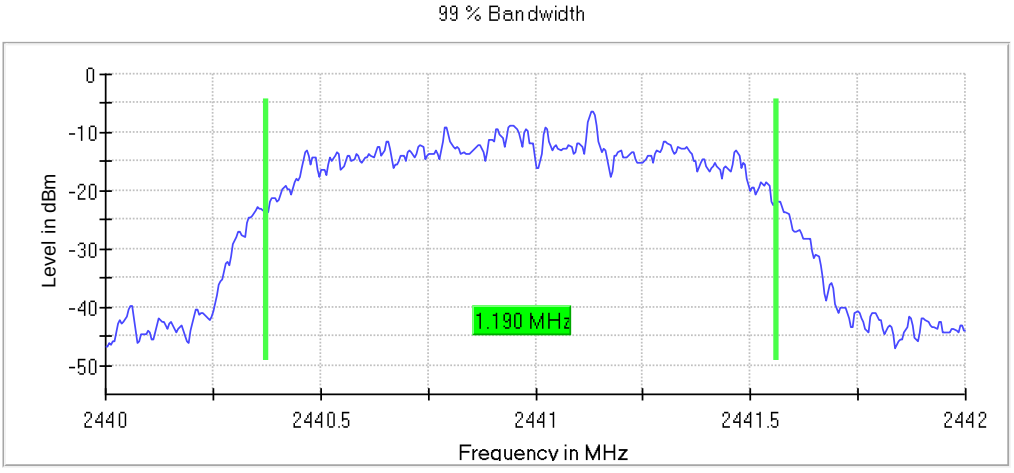
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 2

Images:



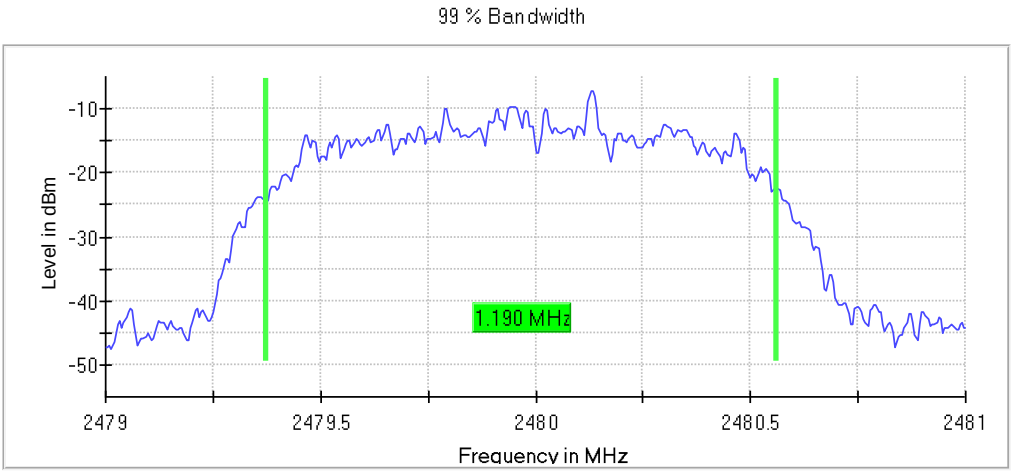
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 2

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 2

Images:



Spectrum Analyzer Parameters

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44100 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	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 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	6 / max.150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.17 dB	0.08 dB	0.12 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

Chipset 1
Sample ID: S/01

Modulation: BT (GFSK 1-DH5)
Results

Equipment	BW (MHz)	Freq Sep (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	0.980

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

Equipment	BW (MHz)	Freq Sep (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	0.980

Modulation: BT (8DPSK 3-DH5)
Results

Equipment	BW (MHz)	Freq Sep (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	0.980

Verdict

Pass

Chipset 2
Sample ID: S/01

Modulation: BT (GFSK 1-DH5)
Results

Equipment	BW (MHz)	Freq Sep (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	0.980

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

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

Modulation: BT (8DPSK 3-DH5)
Results

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

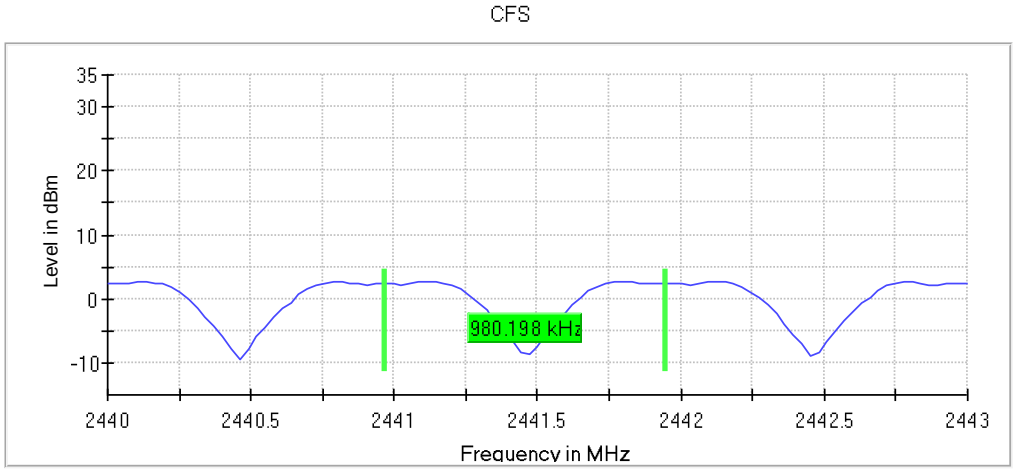
Verdict

Pass

Attachments

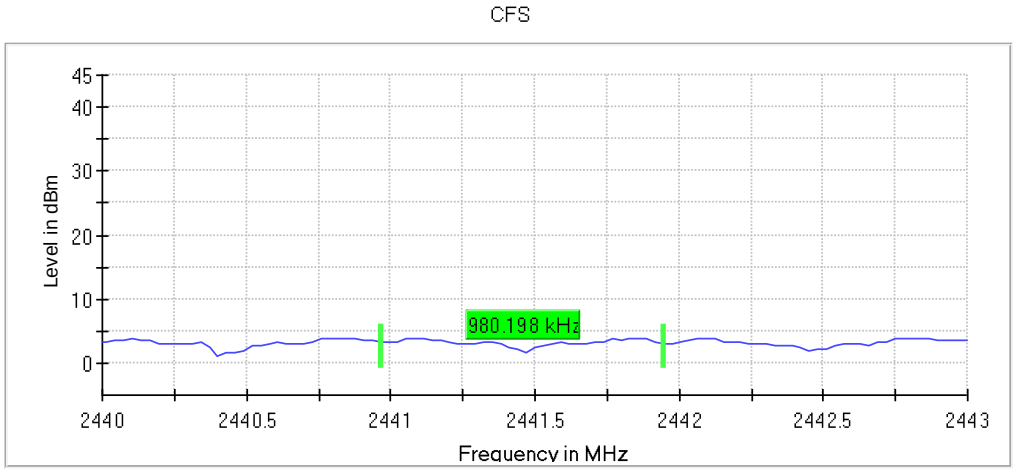
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 1

Images:



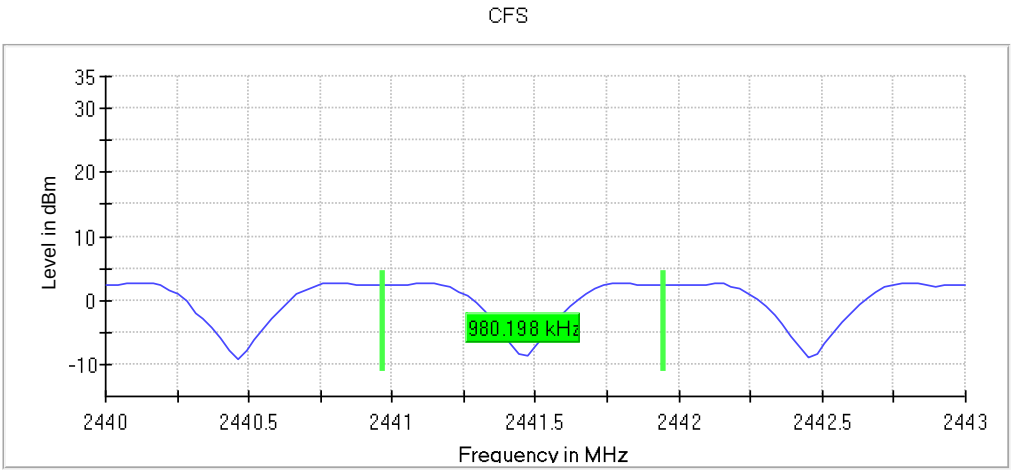
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 1

Images:



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

Images:



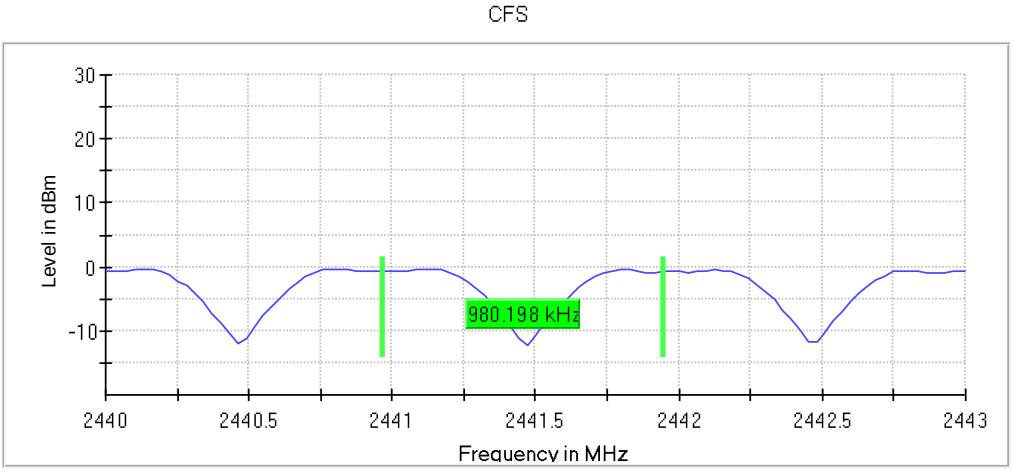
Spectrum Analyzer Parameters

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44100 GHz	2.48100 GHz
Span	2.00 MHz	2.00 MHz	2.00 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	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 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	10 / max. 150	7 / max. 150	8 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.10 dB	0.10 dB	0.07 dB

Attachments

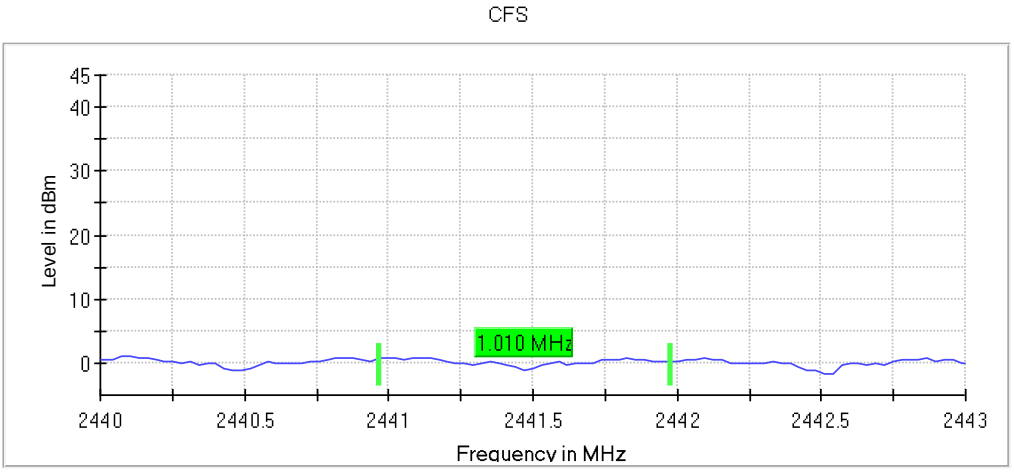
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 2

Images:



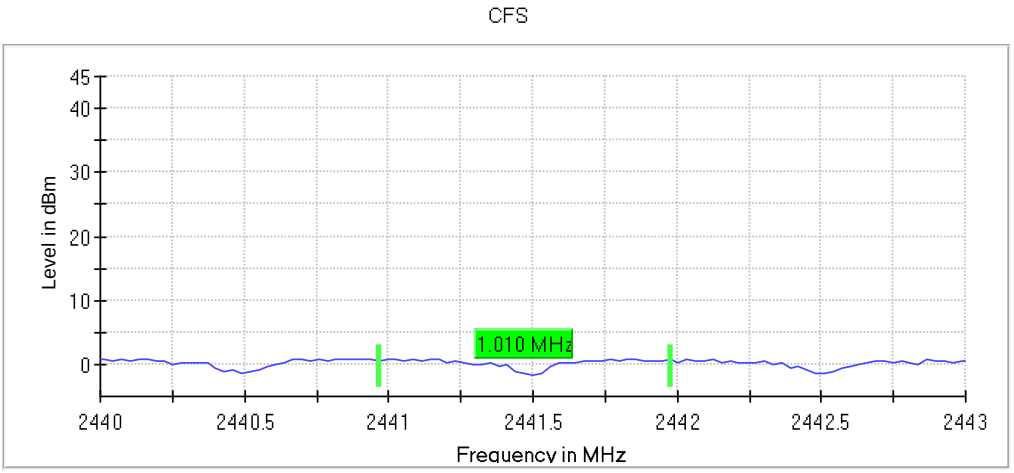
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 2

Images:



Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 2

Images:



Spectrum Analyzer Parameters

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44100 GHz	2.48100 GHz
Span	2.00 MHz	2.00 MHz	2.00 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	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 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	10 / max. 150	7 / max. 150	8 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.10 dB	0.10 dB	0.07 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.

Chipset 1
Sample ID: S/01

Modulation: BT (GFSK 1-DH5)
Results

BW (MHz)	NHp	Avg COT (ms)
1	3	11.567

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

BW (MHz)	NHp	Avg COT (ms)
1	2	8.667

Modulation: BT (8DPSK 3-DH5)
Results

BW (MHz)	NHp	Avg COT (ms)
1	1	5.779

Verdict

Pass

Chipset 2
Sample ID: S/01

Modulation: BT (GFSK 1-DH5)
Results

BW (MHz)	NHp	Avg COT (ms)
1	6	20.231

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

BW (MHz)	NHp	Avg COT (ms)
1	2	8.606

Modulation: BT (8DPSK 3-DH5)
Results

BW (MHz)	NHp	Avg COT (ms)
1	1	5.777

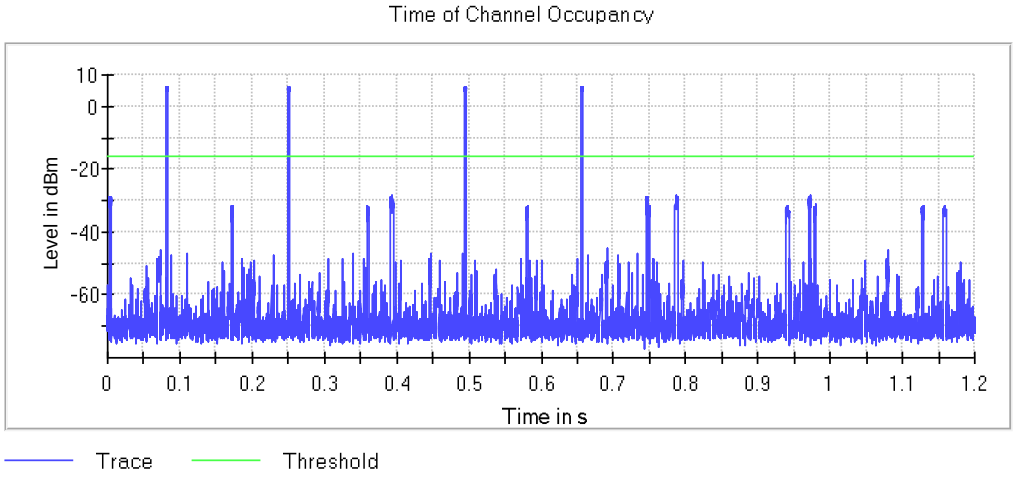
Verdict

Pass

Attachments

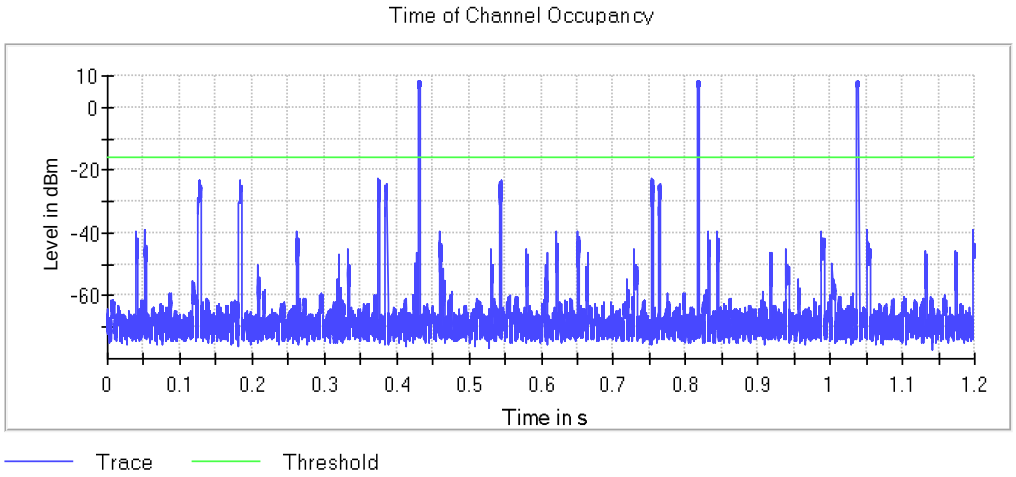
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 1

Images:



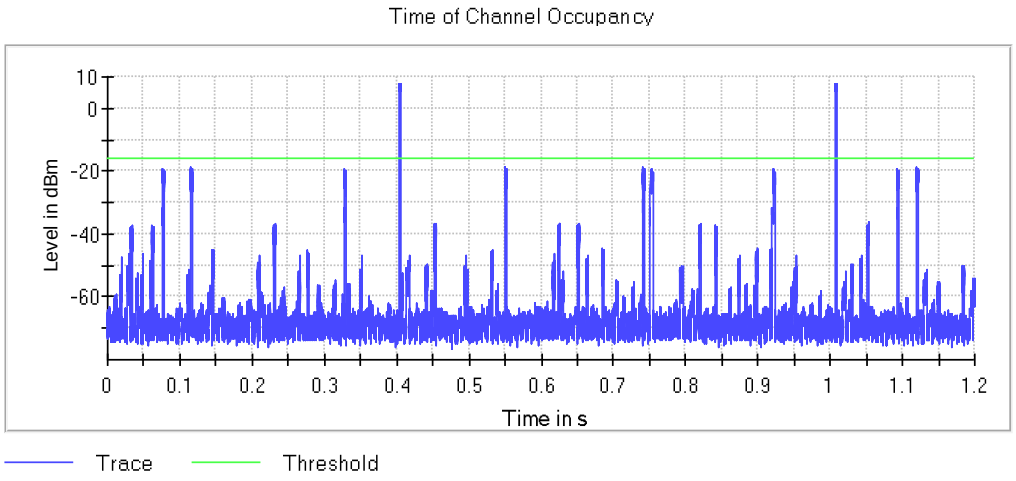
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 1

Images:



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

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

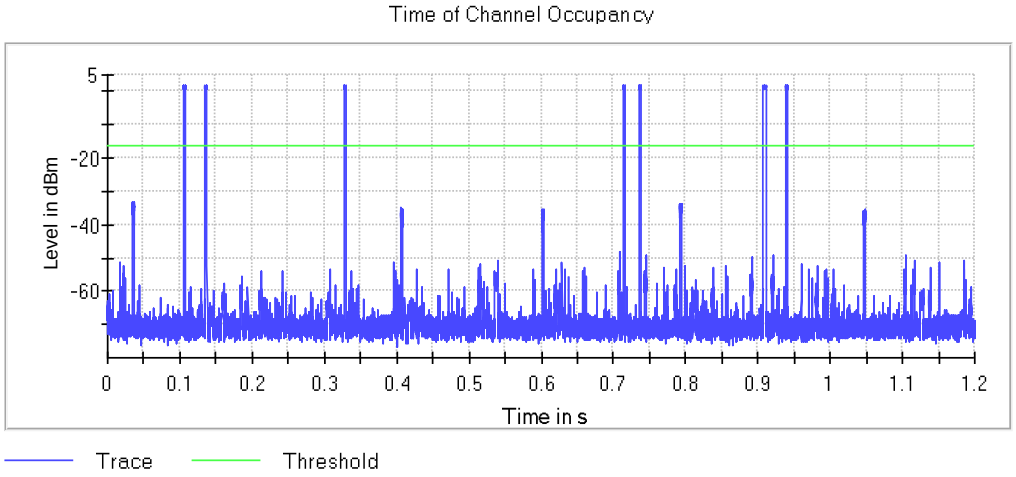
OSP

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

Attachments

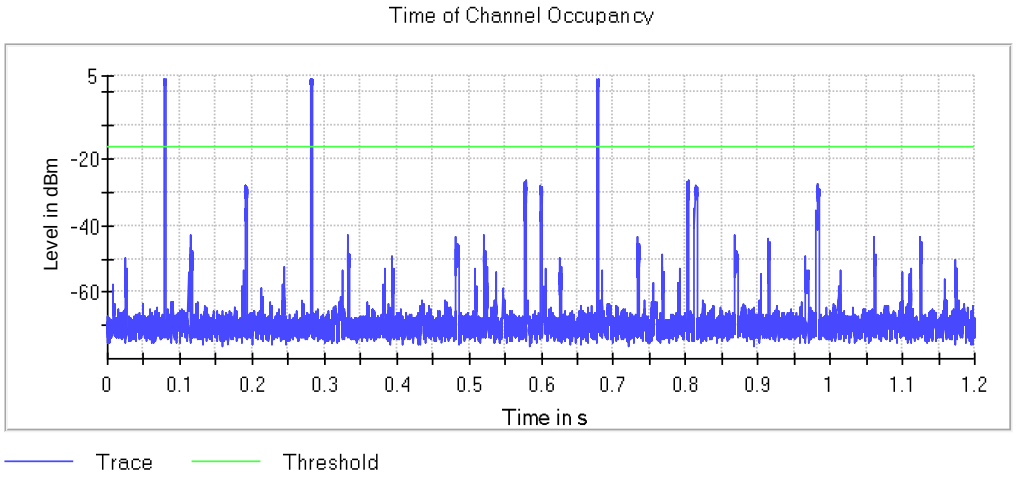
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 2

Images:



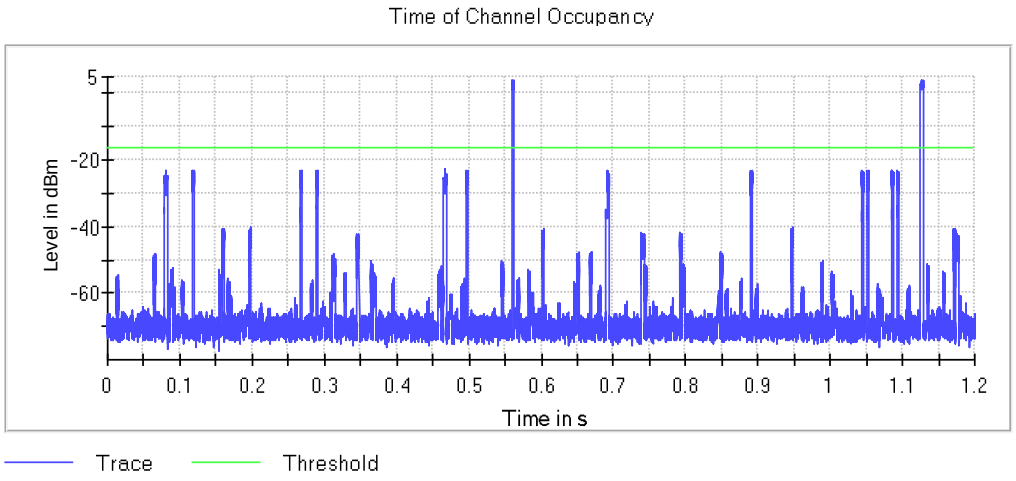
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 2

Images:



Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 2

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

Chipset 1
Sample ID: S/01

Modulation: BT (GFSK 1-DH5)
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	79

Modulation: BT (8DPSK 3-DH5)
Results

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

Verdict

Pass

Chipset 2
Sample ID: S/01

Modulation: BT (GFSK 1-DH5)
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	81

Modulation: BT (8DPSK 3-DH5)
Results

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

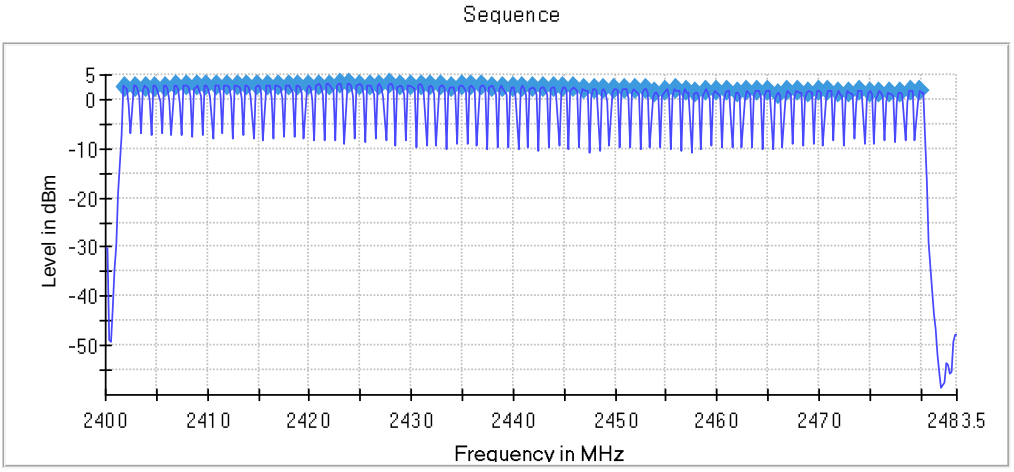
Verdict

Pass

Attachments

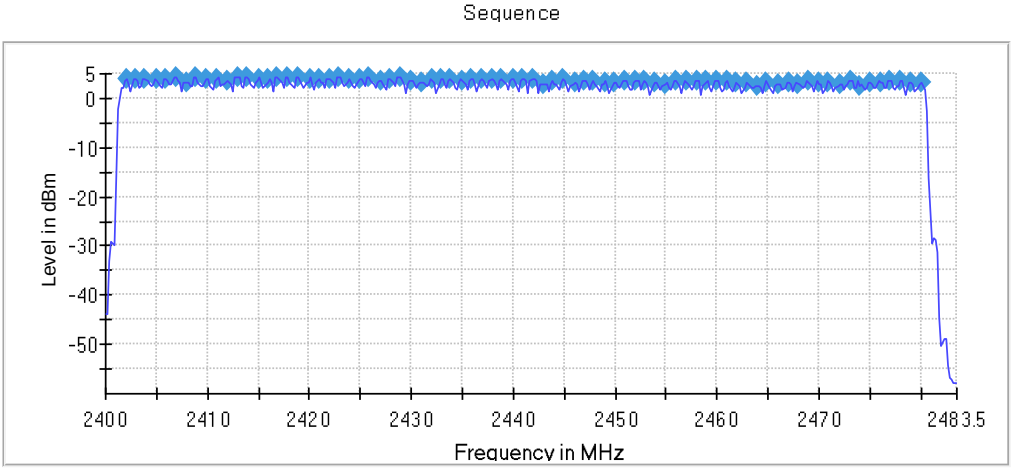
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 1

Images:



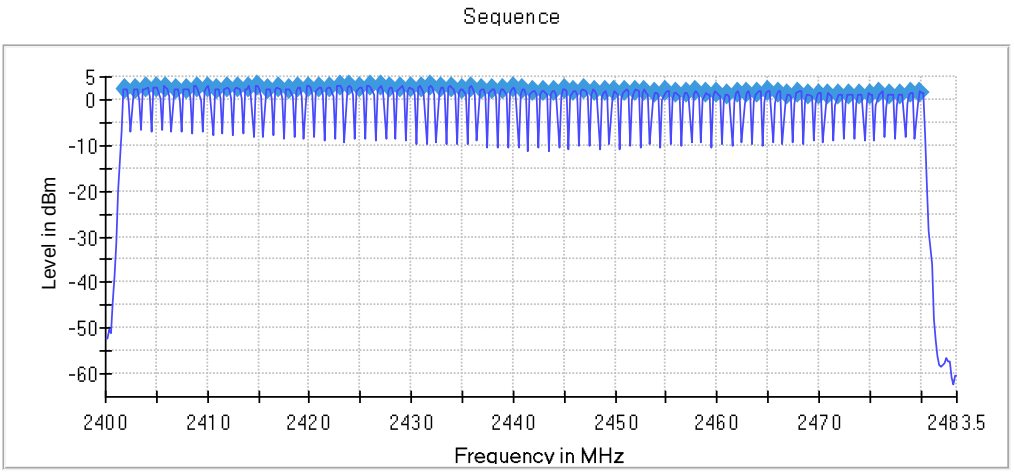
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 1

Images:



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

Images:



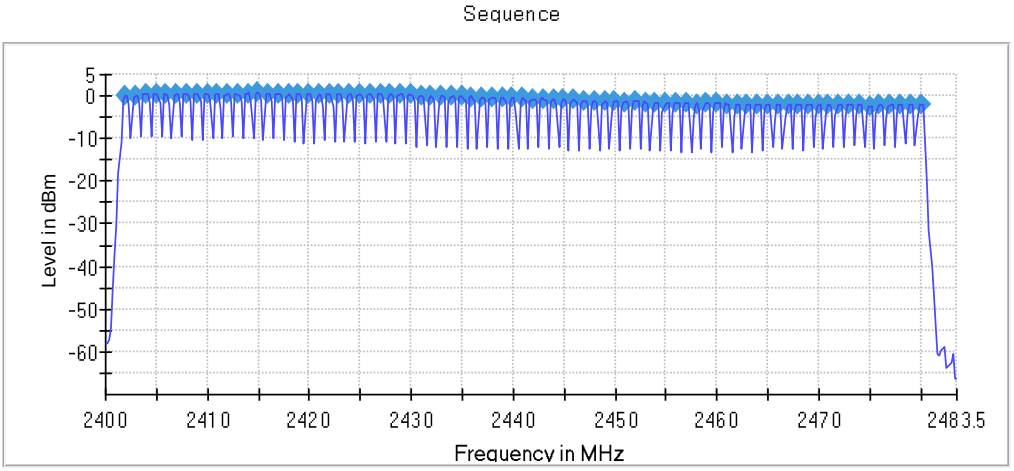
Spectrum Analyzer Parameters

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	52 / max. 150
Stable	3 / 3
Max Stable Difference	0.28 dB

Attachments

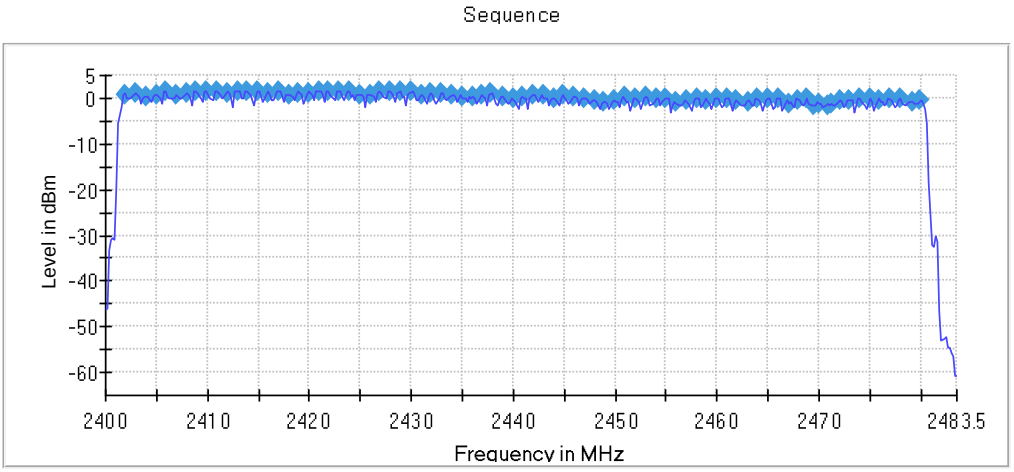
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 2

Images:



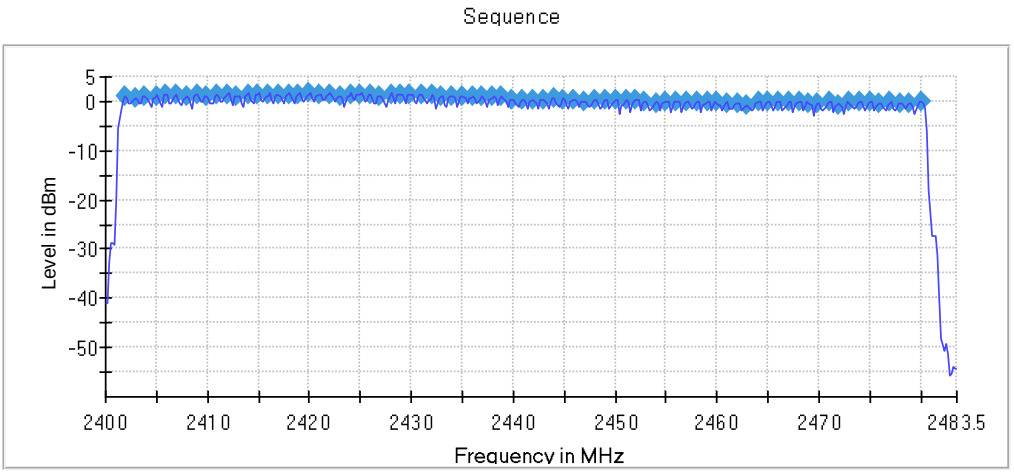
Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (П/4 DQPSK 2-DH5), Chipset 2

Images:



Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 2

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	52 / max. 150
Stable	3 / 3
Max Stable Difference	0.28 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).

Chipset 1
Sample ID: S/01
Maximum declared antenna gain: 1.5 dBi

Modulation: BT (GFSK 1-DH5)
Results

Freq (MHz)	BW (MHz)	Peak Power (dBm)	Maximum EIRP power (dBm)
2402.00000	1	2.7	4.2
2441.00000	1	2.6	4.1
2480.00000	1	1.7	3.2

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

Freq (MHz)	BW (MHz)	Peak Power (dBm)	Maximum EIRP power (dBm)
2402.00000	1	6.0	7.5
2441.00000	1	5.8	7.3
2480.00000	1	5.5	7.0

Modulation: BT (8DPSK 3-DH5)
Results

Freq (MHz)	BW (MHz)	Peak Power (dBm)	Maximum EIRP power (dBm)
2402.00000	1	2.8	4.3
2441.00000	1	2.7	4.2
2480.00000	1	1.7	3.2

Verdict

Pass

Chipset 2
Sample ID: S/01
Maximum declared antenna gain: 1.5 dBi

Modulation: BT (GFSK 1-DH5)
Results

Freq (MHz)	BW (MHz)	Peak Power (dBm)	Maximum EIRP power (dBm)
2402.00000	1	0.5	2.0
2441.00000	1	-0.4	1.1
2480.00000	1	-1.9	-0.4

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

Freq (MHz)	BW (MHz)	Peak Power (dBm)	Maximum EIRP power (dBm)
2402.00000	1	3.0	4.5
2441.00000	1	2.7	4.2
2480.00000	1	1.9	3.4

Modulation: BT (8DPSK 3-DH5)
Results

Freq (MHz)	BW (MHz)	Peak Power (dBm)	Maximum EIRP power (dBm)
2402.00000	1	3.3	4.8
2441.00000	1	2.9	4.4
2480.00000	1	2.1	3.6

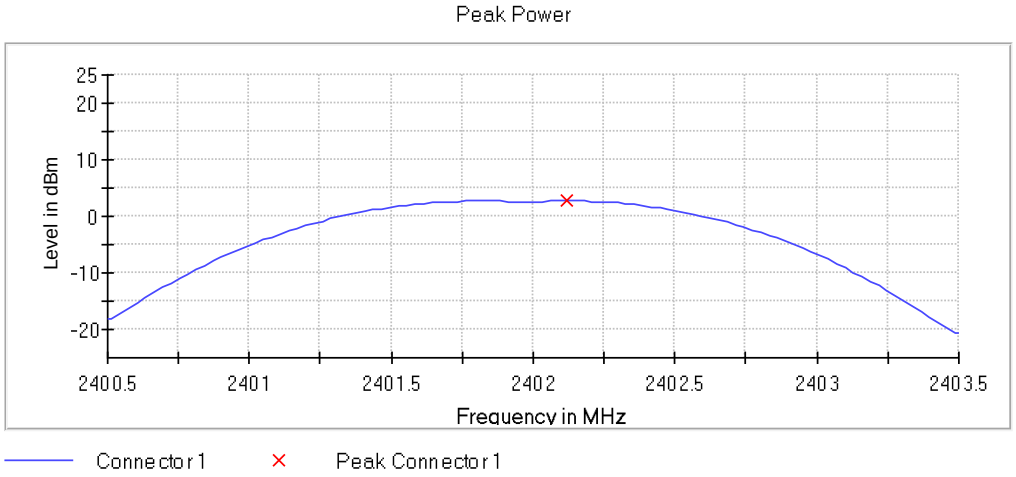
Verdict

Pass

Attachments

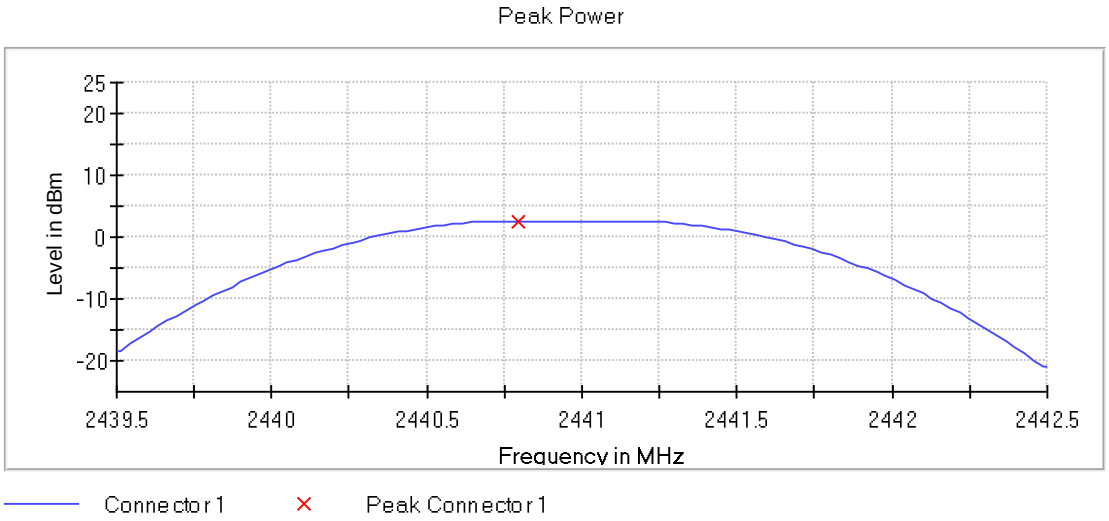
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 1

Images:



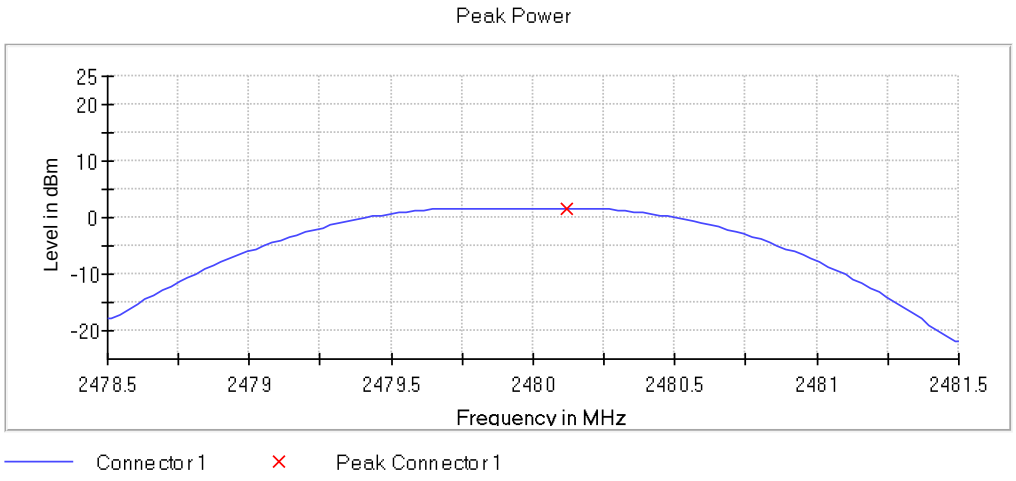
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 1

Images:



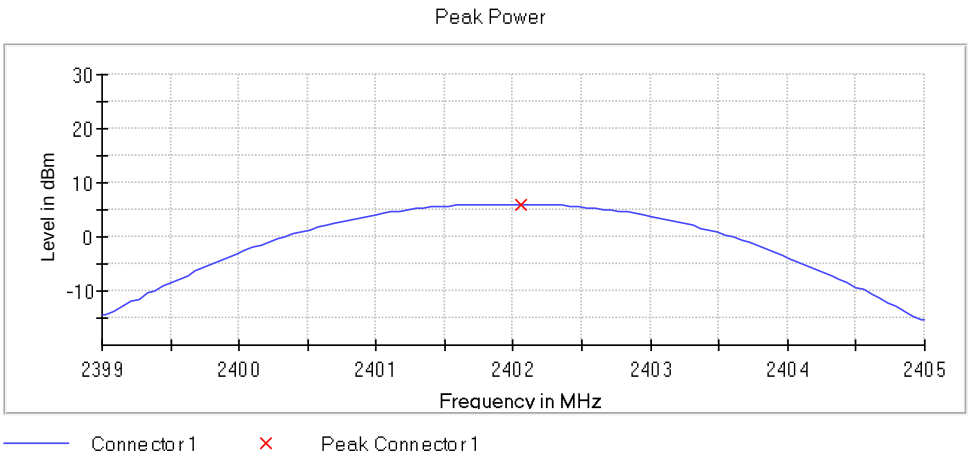
Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 1

Images:



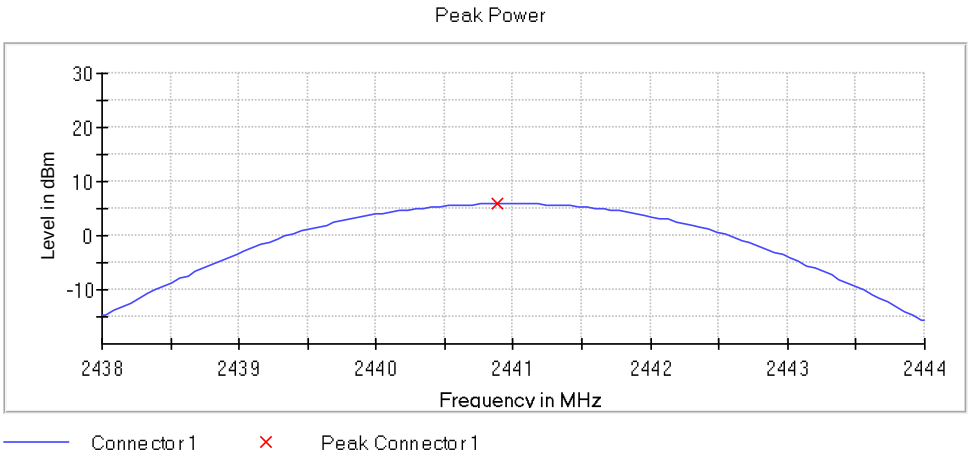
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 1

Images:



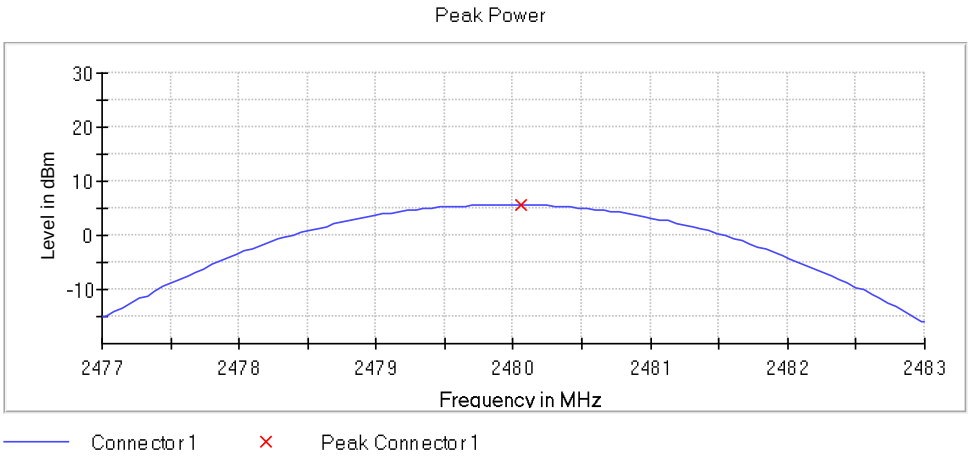
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 1

Images:



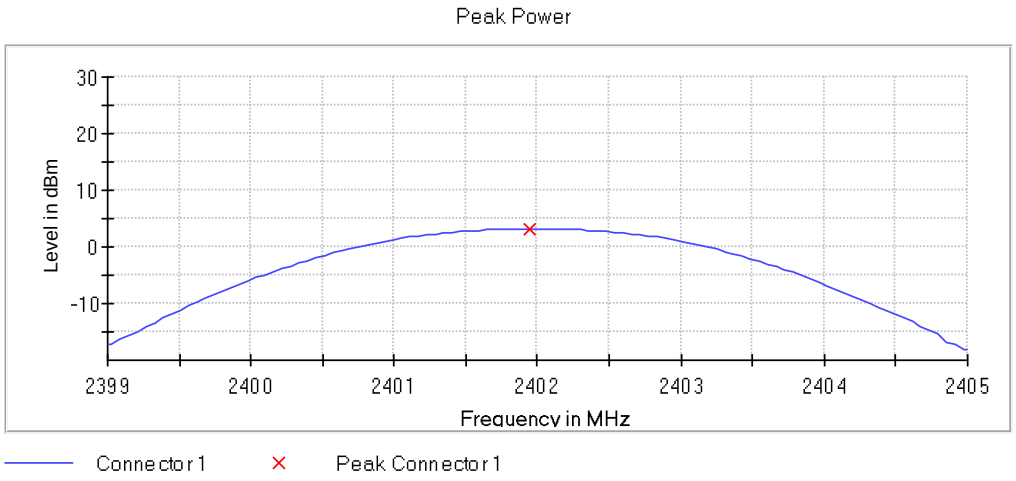
Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 1

Images:



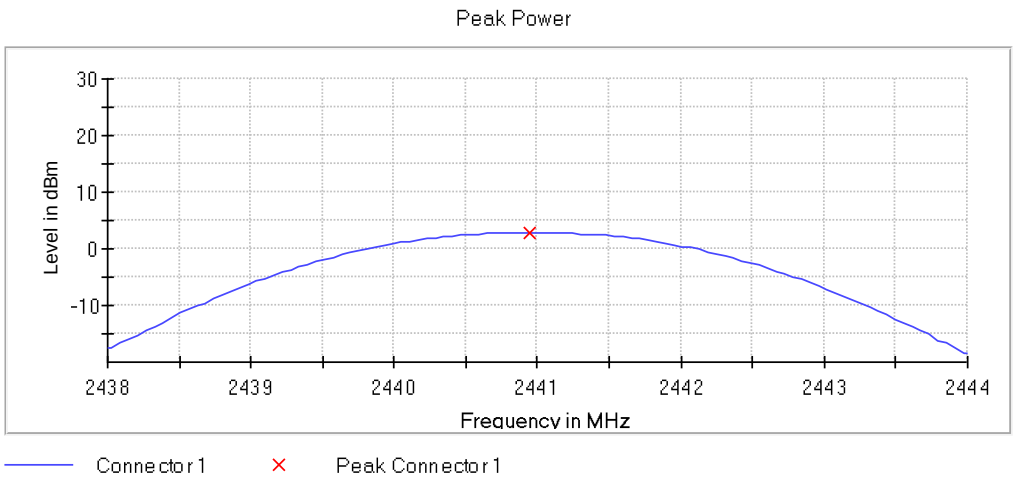
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 1

Images:



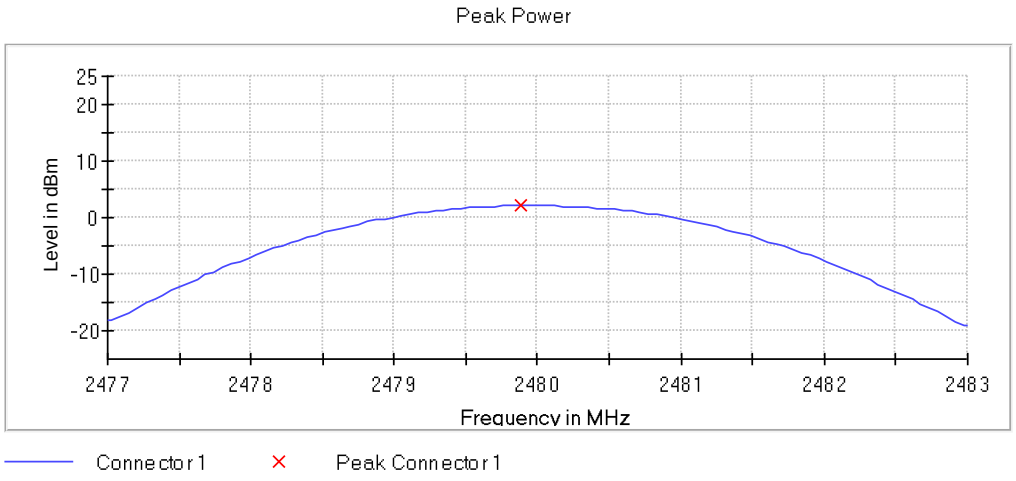
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 1

Images:



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

Images:



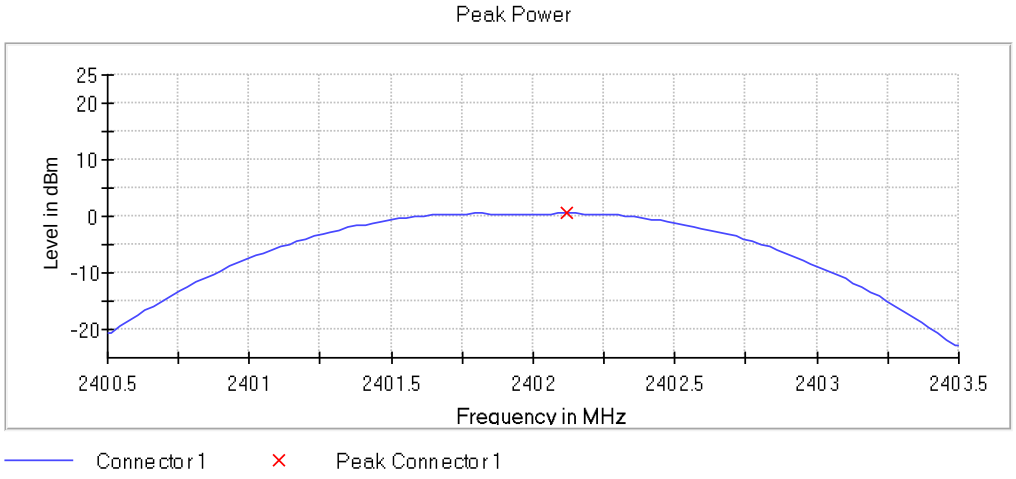
Spectrum Analyzer Parameters

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	5 / max. 150
Stable	3 / 3
Max Stable Difference	0.01 dB

Attachments

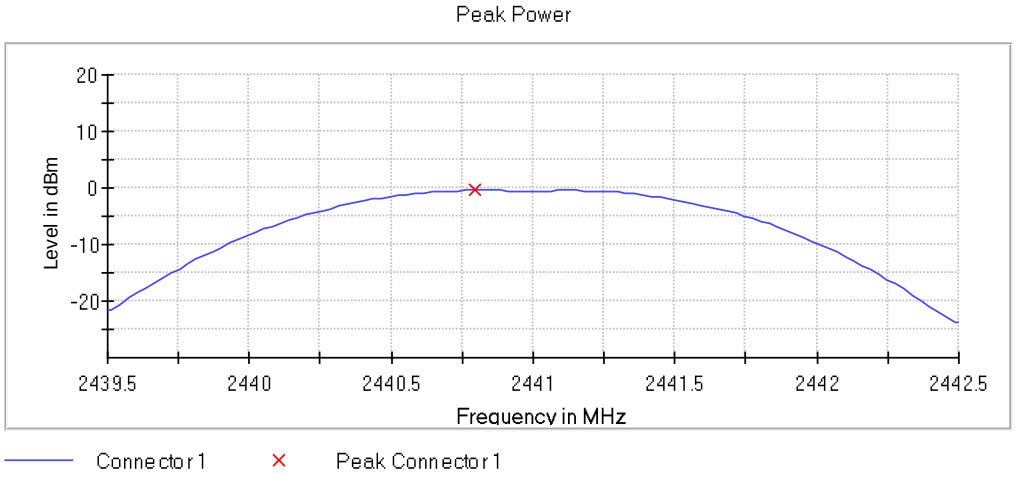
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 2

Images:



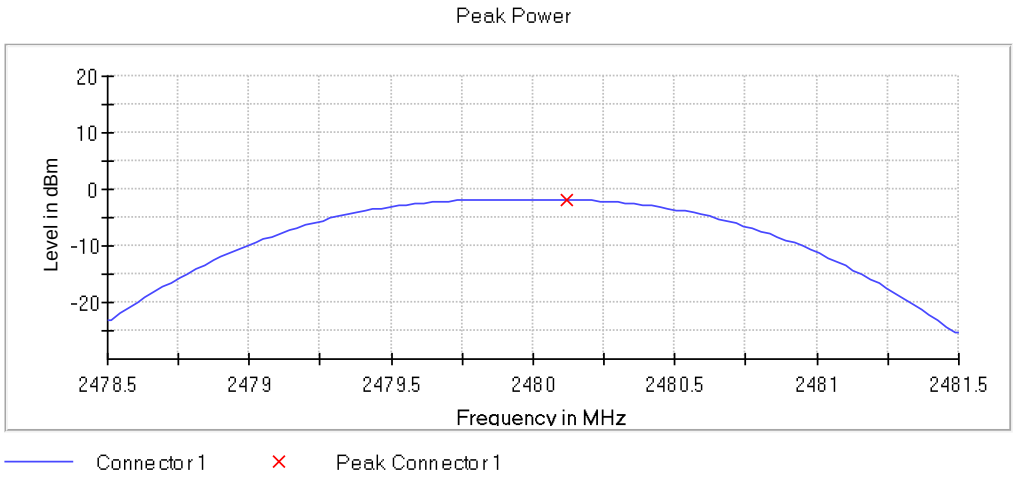
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 2

Images:



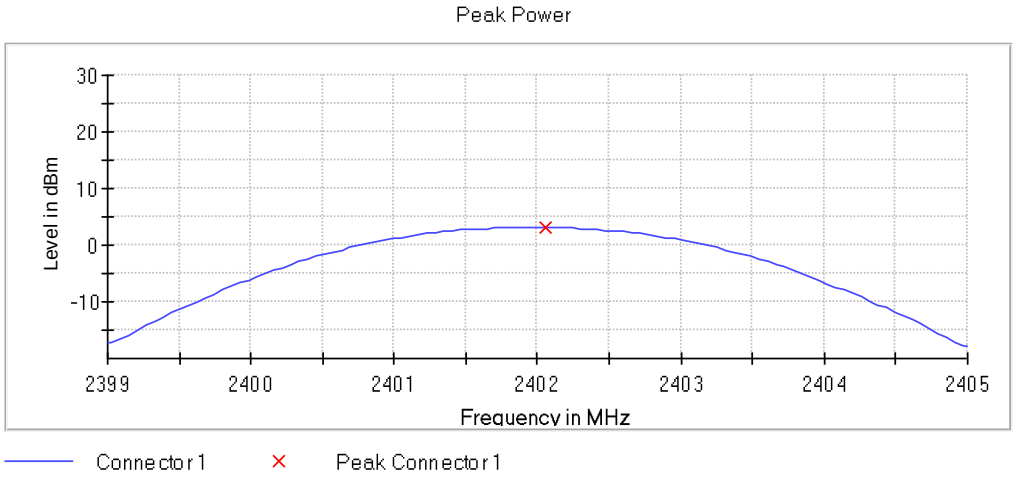
Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 2

Images:



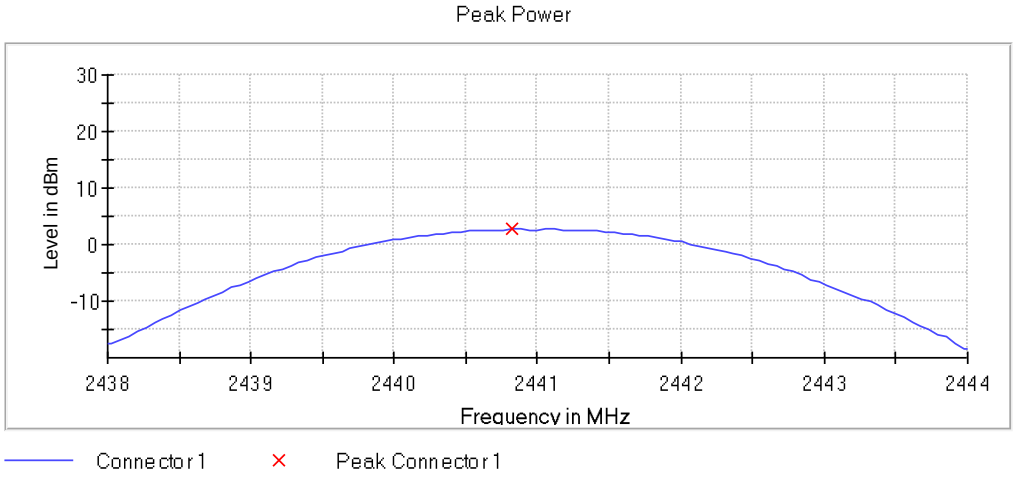
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 2

Images:



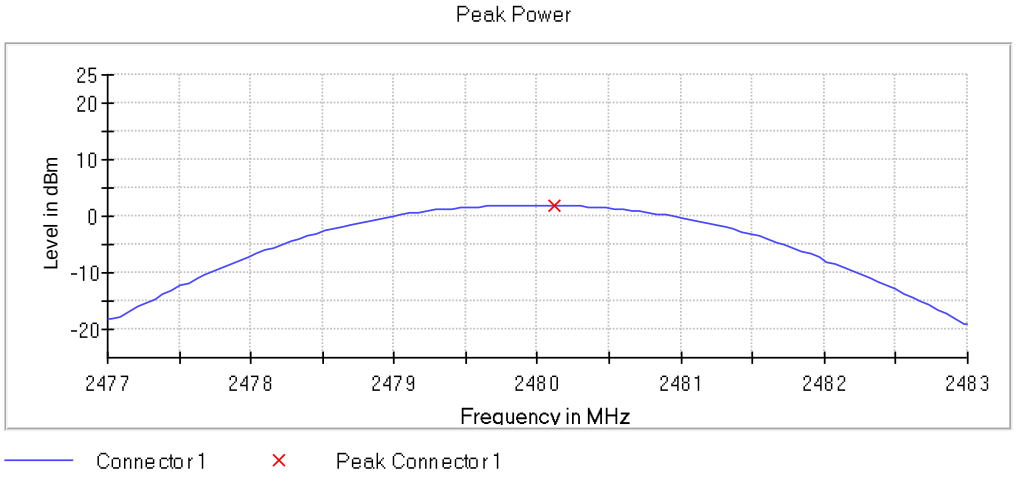
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 2

Images:



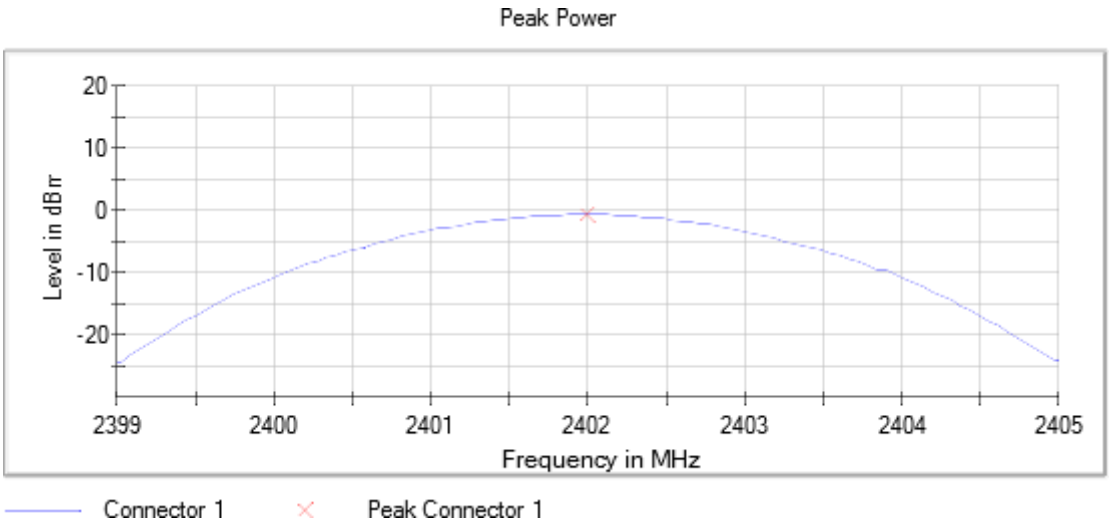
Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Chipset 2

Images:



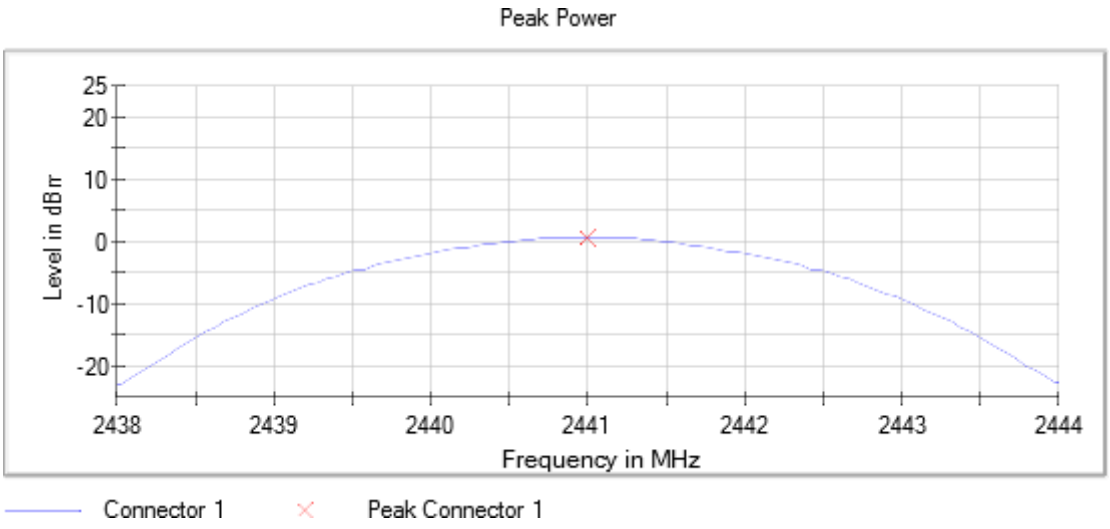
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 2

Images:



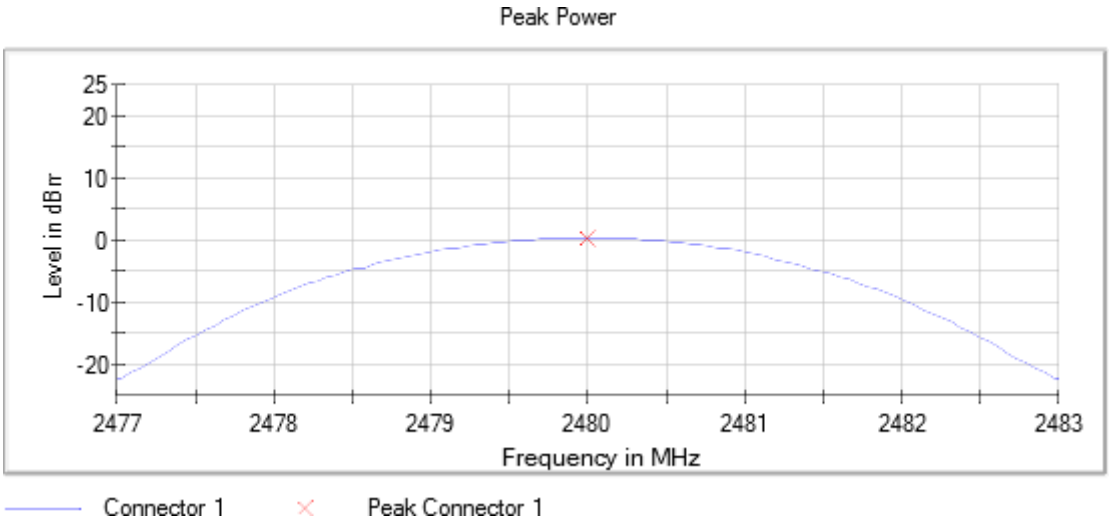
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 2

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 2

Images:



Spectrum Analyzer Parameters

Setting	Instrument Value
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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	5 / max. 150
Stable	3 / 3
Max Stable Difference	0.01 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-DH5) - HOPPING OFF
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
2392.325000	-47.8	30.4	-17.4	PASS
2392.275000	-48.0	30.6	-17.4	PASS
2392.225000	-48.1	30.8	-17.4	PASS
2392.375000	-48.4	31.0	-17.4	PASS
2392.175000	-49.8	32.4	-17.4	PASS
2392.425000	-50.0	32.6	-17.4	PASS
2399.625000	-51.8	34.4	-17.4	PASS
2392.475000	-52.2	34.8	-17.4	PASS
2399.575000	-52.6	35.2	-17.4	PASS
2392.125000	-52.9	35.5	-17.4	PASS
2399.675000	-53.1	35.7	-17.4	PASS
2399.975000	-54.2	36.8	-17.4	PASS
2399.525000	-54.6	37.2	-17.4	PASS
2399.075000	-54.8	37.4	-17.4	PASS
2399.125000	-55.1	37.7	-17.4	PASS

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2489.225000	-49.5	31.0	-18.5	PASS
2489.175000	-50.0	31.5	-18.5	PASS
2489.425000	-52.7	34.2	-18.5	PASS
2489.275000	-53.2	34.8	-18.5	PASS
2489.125000	-53.3	34.8	-18.5	PASS
2489.375000	-53.4	34.9	-18.5	PASS
2489.075000	-55.7	37.2	-18.5	PASS
2489.475000	-56.2	37.8	-18.5	PASS
2498.675000	-58.1	39.6	-18.5	PASS
2498.825000	-58.3	39.9	-18.5	PASS
2498.725000	-58.6	40.1	-18.5	PASS
2498.625000	-58.6	40.2	-18.5	PASS
2499.025000	-58.9	40.4	-18.5	PASS
2489.725000	-59.0	40.5	-18.5	PASS
2489.025000	-59.0	40.5	-18.5	PASS

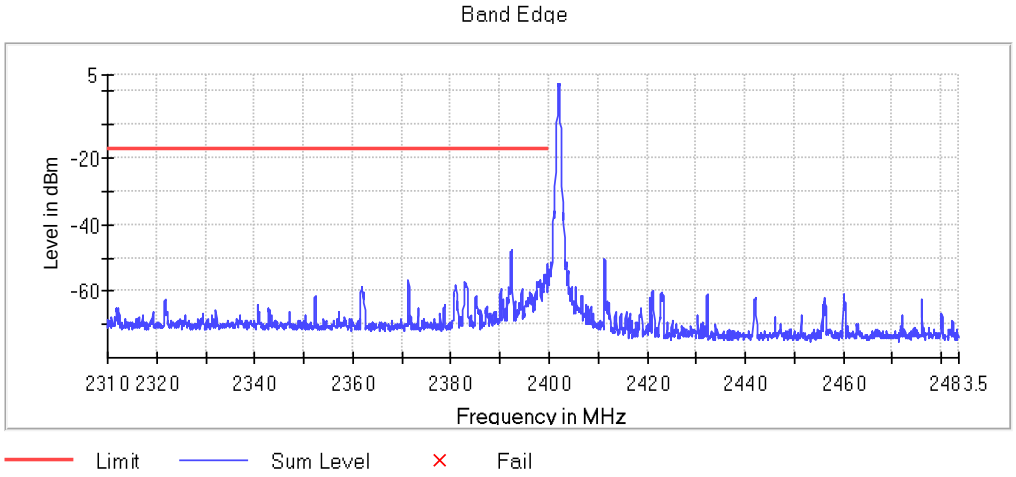
Verdict

Pass

Attachments

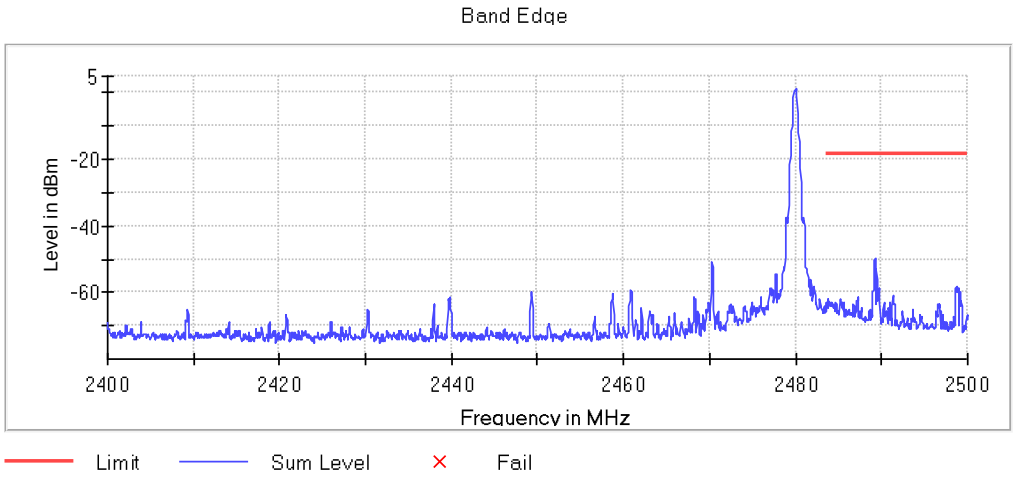
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 1

Images:



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

Images:



Modulation: BT (GFSK 1-DH5) - 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
2393.325000	-47.8	30.5	-17.2	PASS
2393.275000	-47.8	30.6	-17.2	PASS
2393.375000	-48.9	31.7	-17.2	PASS
2393.225000	-48.9	31.7	-17.2	PASS
2393.425000	-52.3	35.1	-17.2	PASS
2393.175000	-52.4	35.2	-17.2	PASS
2385.875000	-56.6	39.4	-17.2	PASS
2389.875000	-56.6	39.4	-17.2	PASS
2385.825000	-56.7	39.4	-17.2	PASS
2392.875000	-56.7	39.5	-17.2	PASS
2389.925000	-56.8	39.5	-17.2	PASS
2392.925000	-57.1	39.9	-17.2	PASS
2392.825000	-57.1	39.9	-17.2	PASS
2385.925000	-57.2	40.0	-17.2	PASS
2389.825000	-57.5	40.3	-17.2	PASS

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2484.375000	-51.3	34.1	-17.1	PASS
2484.425000	-51.6	34.5	-17.1	PASS
2485.075000	-54.7	37.6	-17.1	PASS
2485.125000	-54.8	37.7	-17.1	PASS
2484.325000	-55.5	38.4	-17.1	PASS
2490.675000	-57.5	40.4	-17.1	PASS
2487.625000	-58.5	41.3	-17.1	PASS
2498.975000	-58.5	41.4	-17.1	PASS
2489.625000	-58.5	41.4	-17.1	PASS
2487.675000	-58.6	41.5	-17.1	PASS
2490.725000	-58.6	41.5	-17.1	PASS
2494.775000	-58.6	41.5	-17.1	PASS
2487.875000	-58.7	41.6	-17.1	PASS
2496.825000	-58.9	41.8	-17.1	PASS
2490.325000	-58.9	41.8	-17.1	PASS

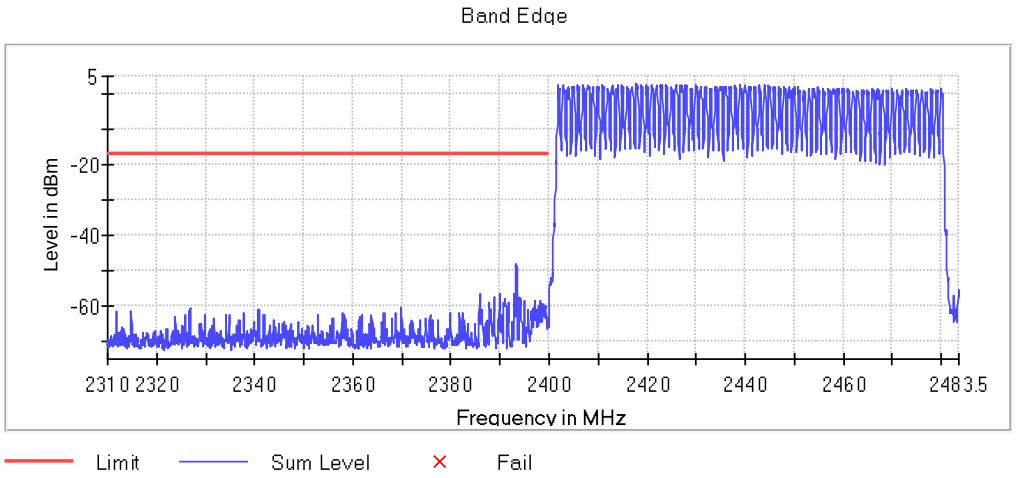
Verdict

Pass

Attachments

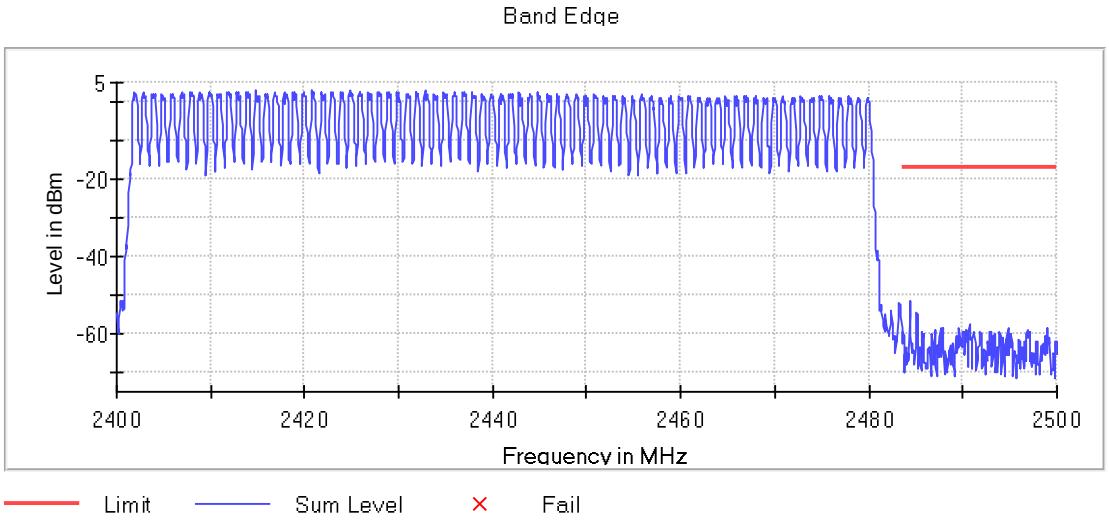
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 1

Images:



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

Images:



Modulation: BT (Π/4 DQPSK 2-DH5) - HOPPING OFF
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
2399.975000	-47.1	31.0	-16.1	PASS
2399.925000	-48.7	32.6	-16.1	PASS
2399.775000	-48.9	32.8	-16.1	PASS
2399.825000	-49.0	32.9	-16.1	PASS
2399.875000	-49.1	33.0	-16.1	PASS
2399.725000	-49.5	33.4	-16.1	PASS
2399.675000	-49.6	33.5	-16.1	PASS
2399.625000	-49.9	33.8	-16.1	PASS
2399.575000	-50.7	34.6	-16.1	PASS
2399.475000	-51.3	35.2	-16.1	PASS
2399.525000	-51.3	35.2	-16.1	PASS
2399.425000	-52.3	36.2	-16.1	PASS
2399.375000	-53.7	37.7	-16.1	PASS
2398.825000	-54.1	38.0	-16.1	PASS
2398.525000	-54.2	38.1	-16.1	PASS

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2485.875000	-55.4	38.8	-16.6	PASS
2486.625000	-55.4	38.8	-16.6	PASS
2486.675000	-55.5	38.9	-16.6	PASS
2485.925000	-55.9	39.3	-16.6	PASS
2483.975000	-55.9	39.4	-16.6	PASS
2484.075000	-56.0	39.4	-16.6	PASS
2485.025000	-56.0	39.4	-16.6	PASS
2484.125000	-56.0	39.5	-16.6	PASS
2485.625000	-56.1	39.5	-16.6	PASS
2484.975000	-56.1	39.5	-16.6	PASS
2483.925000	-56.2	39.6	-16.6	PASS
2483.875000	-56.2	39.6	-16.6	PASS
2484.825000	-56.2	39.7	-16.6	PASS
2484.725000	-56.3	39.7	-16.6	PASS
2485.125000	-56.3	39.7	-16.6	PASS

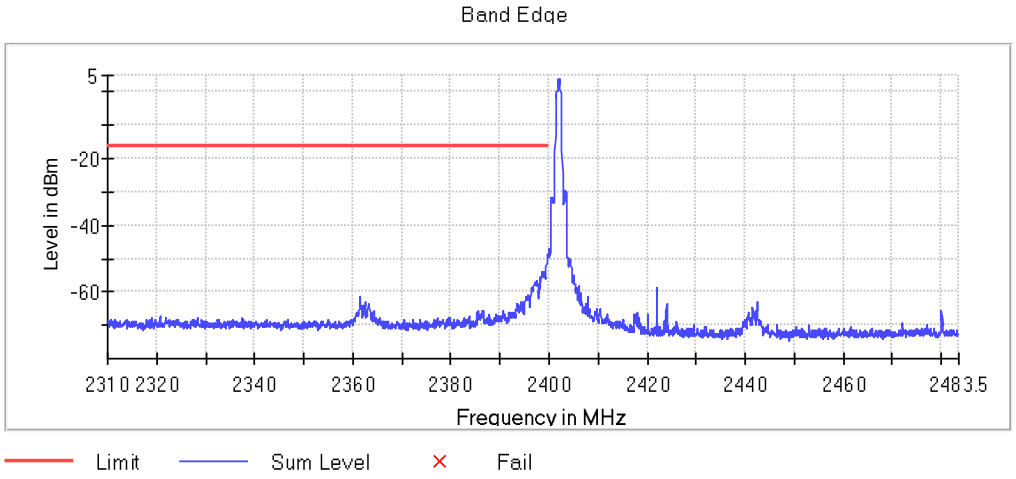
Verdict

Pass

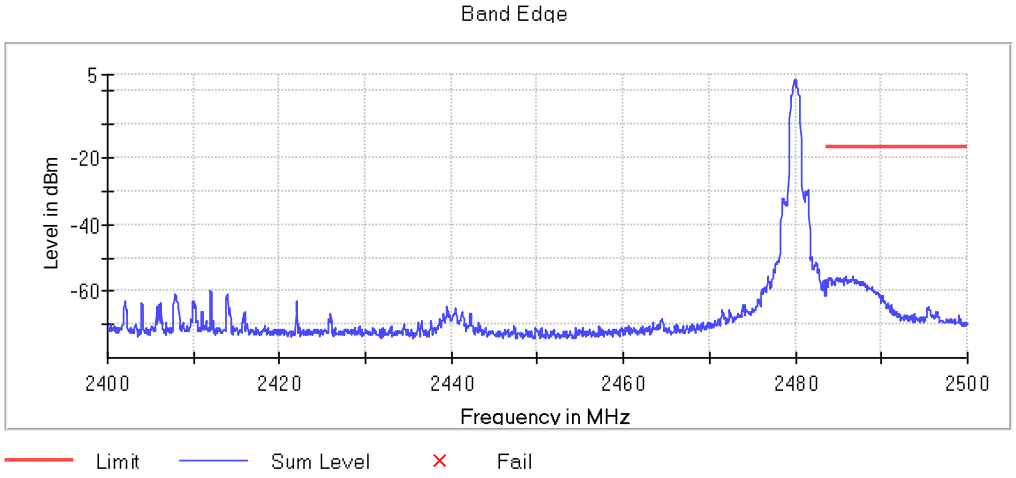
Attachments

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

Images:



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



Modulation: BT (Π/4 DQPSK 2-DH5) - 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
2399.925000	-49.7	33.7	-16.0	PASS
2399.975000	-50.2	34.2	-16.0	PASS
2399.875000	-51.1	35.1	-16.0	PASS
2399.825000	-53.3	37.3	-16.0	PASS
2399.525000	-53.3	37.3	-16.0	PASS
2399.775000	-53.5	37.5	-16.0	PASS
2399.475000	-53.5	37.6	-16.0	PASS
2399.575000	-53.6	37.6	-16.0	PASS
2399.675000	-54.2	38.2	-16.0	PASS
2399.625000	-54.5	38.5	-16.0	PASS
2399.725000	-54.7	38.7	-16.0	PASS
2399.325000	-55.2	39.2	-16.0	PASS
2399.425000	-55.5	39.5	-16.0	PASS
2399.375000	-55.6	39.6	-16.0	PASS
2399.275000	-55.6	39.7	-16.0	PASS

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2483.625000	-62.3	46.4	-16.0	PASS
2483.675000	-62.6	46.6	-16.0	PASS
2483.725000	-62.9	46.9	-16.0	PASS
2495.425000	-63.2	47.3	-16.0	PASS
2484.025000	-63.7	47.8	-16.0	PASS
2495.375000	-63.8	47.8	-16.0	PASS
2483.975000	-64.1	48.1	-16.0	PASS
2484.075000	-64.1	48.1	-16.0	PASS
2484.125000	-64.2	48.2	-16.0	PASS
2495.475000	-64.2	48.3	-16.0	PASS
2483.575000	-64.3	48.3	-16.0	PASS
2483.825000	-64.4	48.4	-16.0	PASS
2483.775000	-64.4	48.4	-16.0	PASS
2492.475000	-64.4	48.5	-16.0	PASS
2499.475000	-64.5	48.5	-16.0	PASS

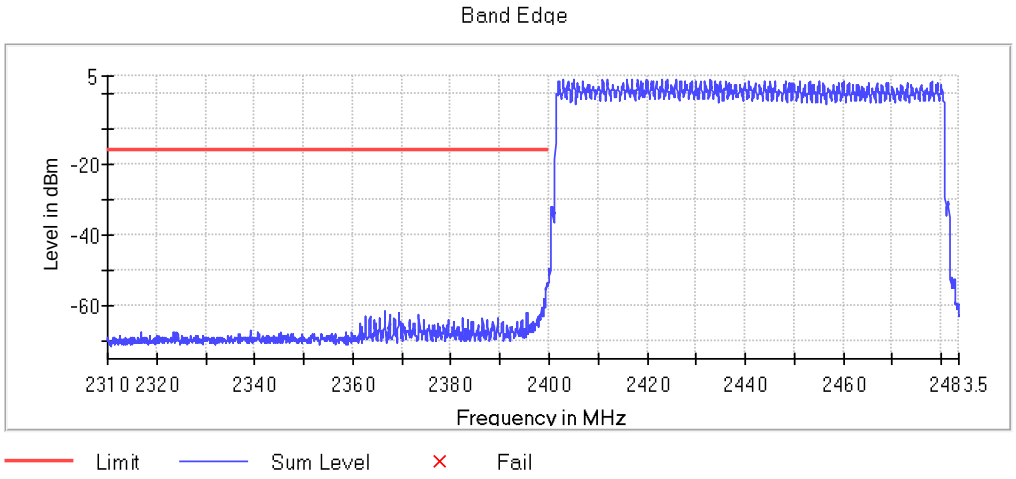
Verdict

Pass

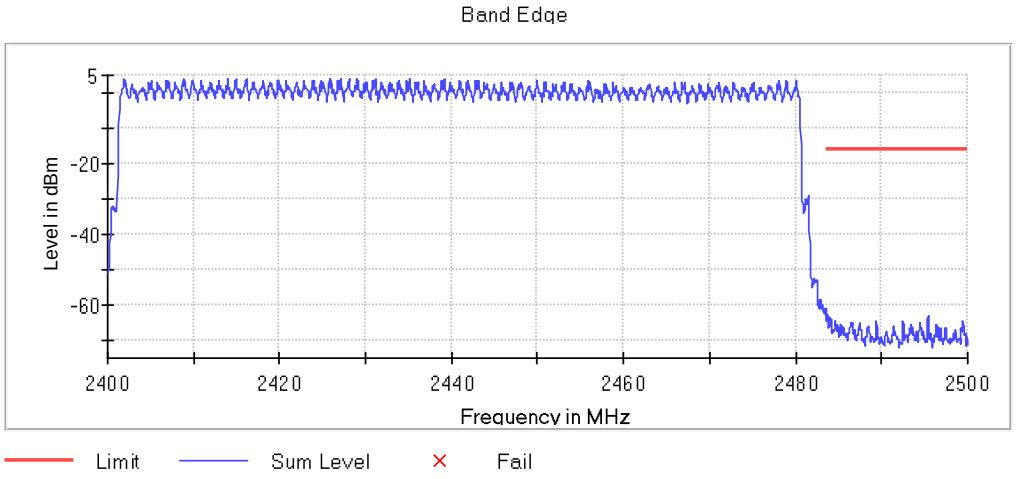
Attachments

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

Images:



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



Modulation: BT (8DPSK 3-DH5) - HOPPING OFF
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
2392.225000	-48.7	31.4	-17.4	PASS
2392.275000	-48.8	31.4	-17.4	PASS
2392.325000	-49.7	32.3	-17.4	PASS
2392.175000	-49.8	32.4	-17.4	PASS
2392.375000	-50.3	32.9	-17.4	PASS
2392.425000	-50.4	33.0	-17.4	PASS
2399.675000	-51.4	34.1	-17.4	PASS
2399.625000	-51.6	34.2	-17.4	PASS
2392.475000	-52.1	34.8	-17.4	PASS
2399.975000	-52.8	35.4	-17.4	PASS
2392.125000	-52.9	35.5	-17.4	PASS
2399.575000	-52.9	35.5	-17.4	PASS
2399.525000	-53.7	36.4	-17.4	PASS
2399.725000	-53.8	36.4	-17.4	PASS
2399.775000	-53.9	36.5	-17.4	PASS

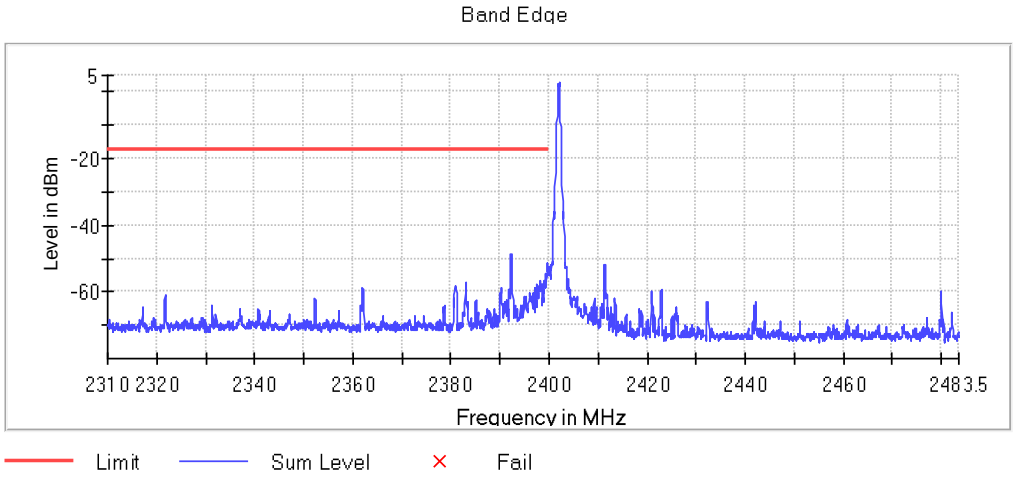
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2489.275000	-48.8	30.1	-18.7	PASS
2489.325000	-49.5	30.8	-18.7	PASS
2489.375000	-49.5	30.9	-18.7	PASS
2489.225000	-49.8	31.2	-18.7	PASS
2489.175000	-50.3	31.6	-18.7	PASS
2489.425000	-51.4	32.8	-18.7	PASS
2489.125000	-51.8	33.2	-18.7	PASS
2489.475000	-54.0	35.3	-18.7	PASS
2489.075000	-55.0	36.3	-18.7	PASS
2498.725000	-57.5	38.9	-18.7	PASS
2498.675000	-57.8	39.2	-18.7	PASS
2498.625000	-58.5	39.9	-18.7	PASS
2498.775000	-58.7	40.0	-18.7	PASS
2499.025000	-59.4	40.7	-18.7	PASS
2484.025000	-59.6	40.9	-18.7	PASS

Verdict

Pass

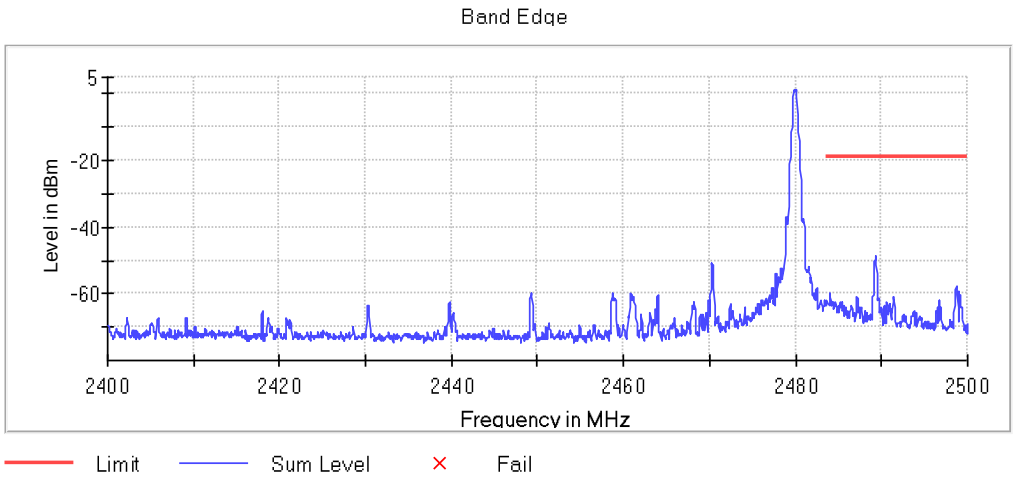
Attachments

Frequency MHz = 0.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 1



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

Images:



Modulation: BT (8DPSK 3-DH5) - 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
2395.125000	-60.5	43.6	-16.9	PASS
2395.175000	-60.5	43.6	-16.9	PASS
2395.225000	-61.2	44.3	-16.9	PASS
2395.075000	-61.4	44.5	-16.9	PASS
2374.375000	-61.5	44.6	-16.9	PASS
2399.675000	-61.5	44.6	-16.9	PASS
2310.125000	-61.6	44.7	-16.9	PASS
2374.425000	-61.7	44.8	-16.9	PASS
2374.325000	-61.7	44.8	-16.9	PASS
2310.075000	-61.7	44.8	-16.9	PASS
2399.625000	-61.8	44.9	-16.9	PASS
2399.775000	-62.1	45.2	-16.9	PASS
2336.875000	-62.1	45.2	-16.9	PASS
2399.725000	-62.2	45.3	-16.9	PASS
2336.825000	-62.2	45.3	-16.9	PASS

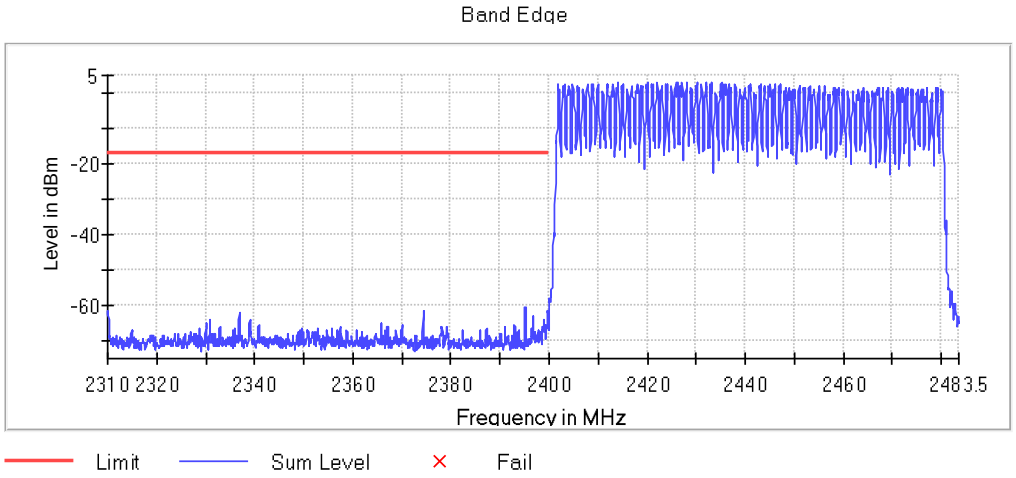
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2488.125000	-51.9	34.9	-17.0	PASS
2488.175000	-51.9	34.9	-17.0	PASS
2488.075000	-57.5	40.5	-17.0	PASS
2494.775000	-58.5	41.5	-17.0	PASS
2497.725000	-59.1	42.1	-17.0	PASS
2488.225000	-59.1	42.1	-17.0	PASS
2497.775000	-59.5	42.5	-17.0	PASS
2494.725000	-59.6	42.6	-17.0	PASS
2489.975000	-59.8	42.8	-17.0	PASS
2489.925000	-59.9	42.9	-17.0	PASS
2489.725000	-60.0	43.1	-17.0	PASS
2489.675000	-60.1	43.1	-17.0	PASS
2498.825000	-60.2	43.2	-17.0	PASS
2498.875000	-60.2	43.2	-17.0	PASS
2496.975000	-60.7	43.7	-17.0	PASS

Verdict

Pass

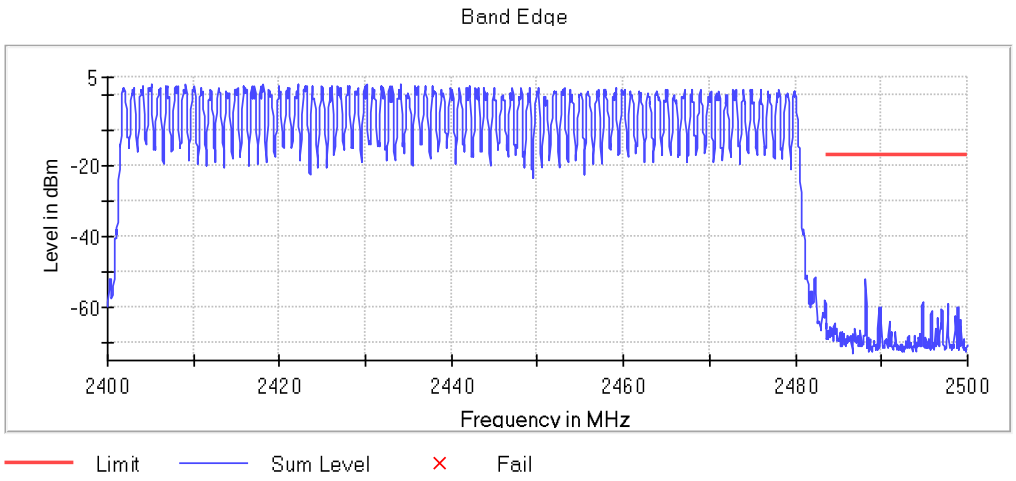
Attachments

Frequency MHz = 0.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 1



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

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	5 / max. 150	4 / max. 150	139 / max. 150
Stable	3 / 3	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.00 dB	0.12 dB	0.00 dB	0.00 dB

Modulation: BT (GFSK 1-DH5) - HOPPING OFF
Chipset 2
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
2392.325000	-50.1	30.1	-20.0	PASS
2392.275000	-50.1	30.1	-20.0	PASS
2392.225000	-50.8	30.9	-20.0	PASS
2392.375000	-50.9	30.9	-20.0	PASS
2392.175000	-52.3	32.3	-20.0	PASS
2392.425000	-53.2	33.3	-20.0	PASS
2399.975000	-53.6	33.7	-20.0	PASS
2399.625000	-54.7	34.8	-20.0	PASS
2392.125000	-54.9	34.9	-20.0	PASS
2399.675000	-55.0	35.0	-20.0	PASS
2399.725000	-55.8	35.8	-20.0	PASS
2399.875000	-56.1	36.1	-20.0	PASS
2399.775000	-56.2	36.3	-20.0	PASS
2399.925000	-56.6	36.6	-20.0	PASS
2399.825000	-56.6	36.6	-20.0	PASS

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2489.275000	-52.4	30.2	-22.2	PASS
2489.325000	-52.5	30.4	-22.2	PASS
2489.225000	-52.7	30.6	-22.2	PASS
2489.175000	-54.3	32.1	-22.2	PASS
2489.425000	-57.2	35.0	-22.2	PASS
2489.475000	-58.4	36.2	-22.2	PASS
2489.375000	-58.6	36.4	-22.2	PASS
2489.075000	-60.0	37.8	-22.2	PASS
2498.725000	-61.5	39.3	-22.2	PASS
2498.975000	-61.9	39.7	-22.2	PASS
2489.025000	-62.0	39.8	-22.2	PASS
2498.875000	-62.0	39.8	-22.2	PASS
2498.625000	-62.2	40.0	-22.2	PASS
2498.825000	-62.2	40.1	-22.2	PASS
2489.125000	-62.3	40.1	-22.2	PASS

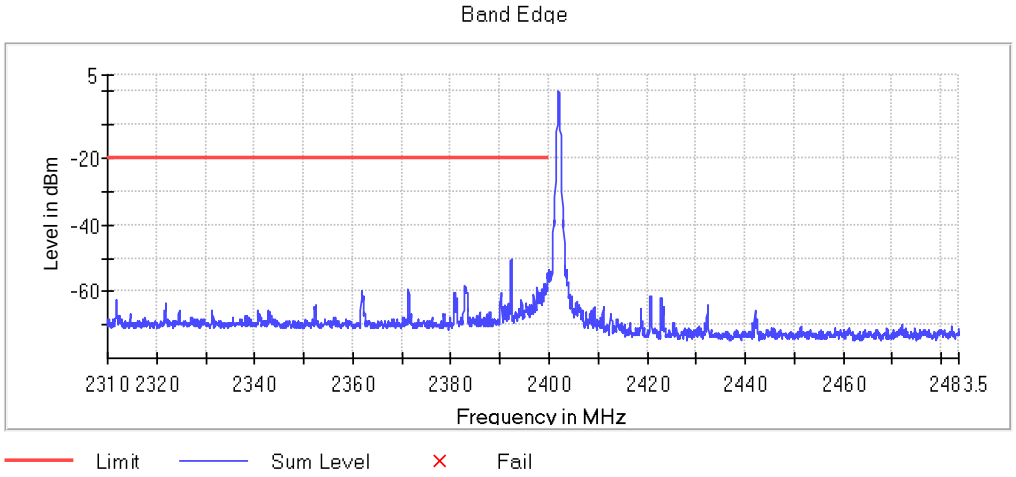
Verdict

Pass

Attachments

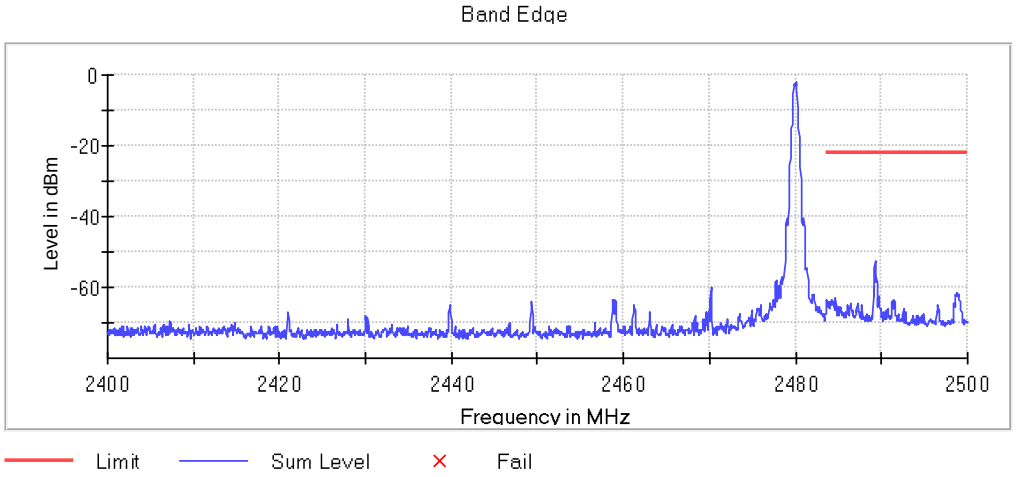
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 2

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 2

Images:



Modulation: BT (GFSK 1-DH5) - HOPPING ON
Chipset 2
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
2313.825000	-57.3	38.0	-19.3	PASS
2313.775000	-57.4	38.1	-19.3	PASS
2313.875000	-58.2	38.8	-19.3	PASS
2377.325000	-59.5	40.2	-19.3	PASS
2313.725000	-59.6	40.2	-19.3	PASS
2377.275000	-60.0	40.6	-19.3	PASS
2377.375000	-60.2	40.8	-19.3	PASS
2389.975000	-60.6	41.3	-19.3	PASS
2390.025000	-60.8	41.5	-19.3	PASS
2342.775000	-61.0	41.7	-19.3	PASS
2389.925000	-61.1	41.8	-19.3	PASS
2389.075000	-61.2	41.8	-19.3	PASS
2342.725000	-61.2	41.9	-19.3	PASS
2390.325000	-61.3	42.0	-19.3	PASS
2390.375000	-61.4	42.0	-19.3	PASS

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2488.975000	-62.1	42.7	-19.4	PASS
2488.925000	-62.5	43.1	-19.4	PASS
2490.175000	-63.1	43.7	-19.4	PASS
2490.225000	-63.1	43.7	-19.4	PASS
2486.975000	-63.8	44.4	-19.4	PASS
2491.425000	-64.2	44.8	-19.4	PASS
2491.375000	-64.3	44.9	-19.4	PASS
2487.025000	-64.3	44.9	-19.4	PASS
2486.375000	-66.5	47.1	-19.4	PASS
2489.025000	-66.5	47.1	-19.4	PASS
2487.225000	-66.6	47.2	-19.4	PASS
2495.525000	-66.7	47.3	-19.4	PASS
2486.575000	-67.0	47.6	-19.4	PASS
2487.975000	-67.1	47.7	-19.4	PASS
2487.175000	-67.1	47.7	-19.4	PASS

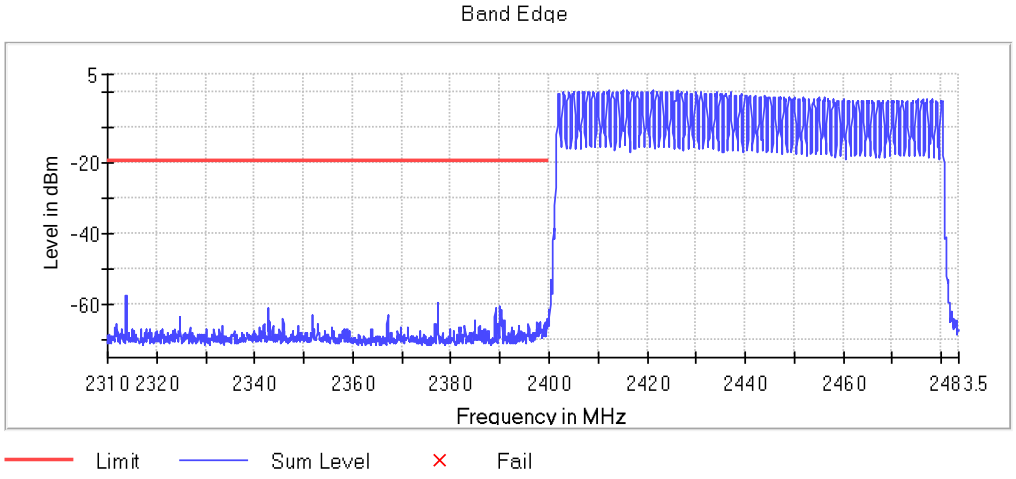
Verdict

Pass

Attachments

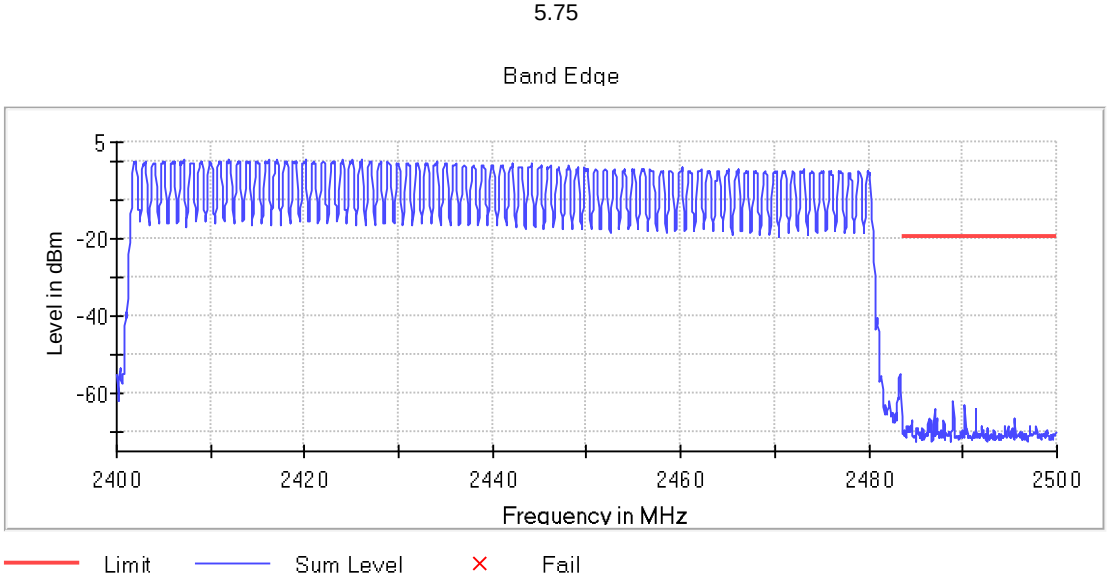
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 2

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Chipset 2

Images:



Modulation: BT (Π/4 DQPSK 2-DH5) - HOPPING OFF
Chipset 2
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	-50.5	31.5	-19.0	PASS
2399.925000	-50.9	31.9	-19.0	PASS
2399.875000	-51.4	32.4	-19.0	PASS
2399.825000	-51.8	32.9	-19.0	PASS
2399.775000	-51.9	32.9	-19.0	PASS
2399.725000	-52.0	33.1	-19.0	PASS
2399.675000	-52.7	33.7	-19.0	PASS
2399.575000	-53.7	34.7	-19.0	PASS
2399.625000	-54.0	35.0	-19.0	PASS
2399.525000	-54.5	35.5	-19.0	PASS
2399.475000	-55.1	36.1	-19.0	PASS
2399.425000	-55.2	36.2	-19.0	PASS
2399.375000	-56.4	37.4	-19.0	PASS
2399.025000	-56.6	37.6	-19.0	PASS
2398.975000	-56.8	37.8	-19.0	PASS

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2486.275000	-60.0	39.5	-20.5	PASS
2486.325000	-60.3	39.8	-20.5	PASS
2484.025000	-60.5	40.1	-20.5	PASS
2485.075000	-60.6	40.1	-20.5	PASS
2483.975000	-60.6	40.1	-20.5	PASS
2485.675000	-60.6	40.1	-20.5	PASS
2487.075000	-60.6	40.2	-20.5	PASS
2487.025000	-60.9	40.5	-20.5	PASS
2487.125000	-60.9	40.5	-20.5	PASS
2487.275000	-60.9	40.5	-20.5	PASS
2487.325000	-61.0	40.6	-20.5	PASS
2484.725000	-61.1	40.6	-20.5	PASS
2487.175000	-61.1	40.6	-20.5	PASS
2485.775000	-61.1	40.7	-20.5	PASS
2485.275000	-61.2	40.8	-20.5	PASS

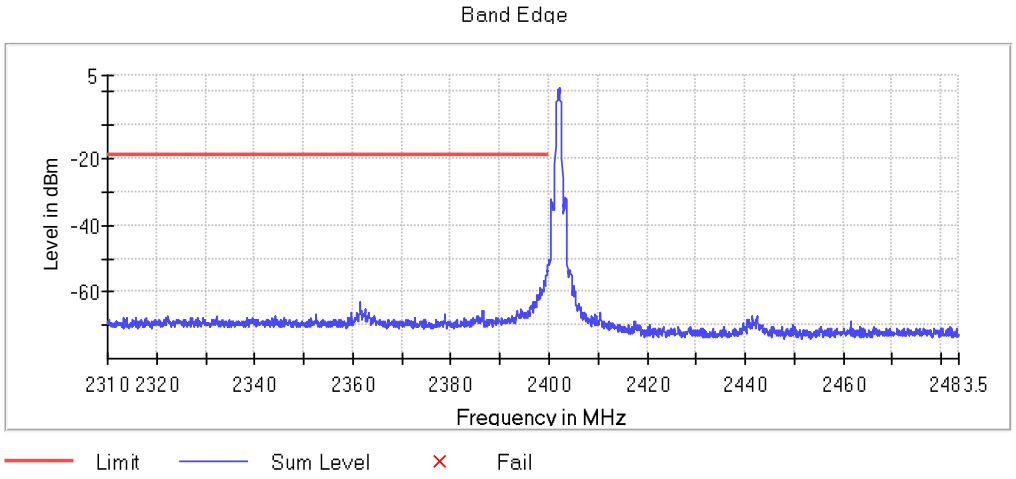
Verdict

Pass

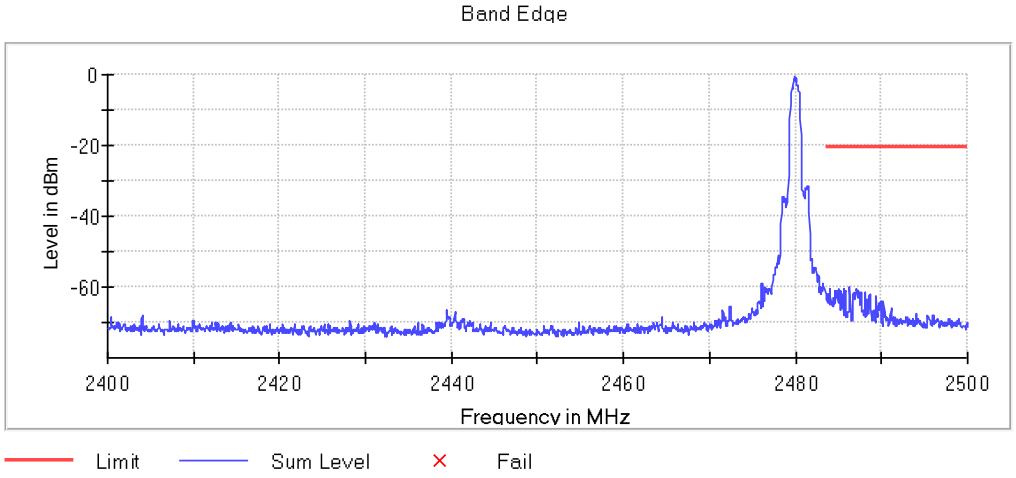
Attachments

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

Images:



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



Modulation: BT (Π/4 DQPSK 2-DH5) - HOPPING ON
Chipset 2
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
2399.825000	-53.6	34.9	-18.7	PASS
2399.875000	-53.7	35.0	-18.7	PASS
2399.775000	-53.9	35.2	-18.7	PASS
2399.725000	-55.8	37.1	-18.7	PASS
2399.925000	-56.3	37.6	-18.7	PASS
2399.975000	-56.6	37.9	-18.7	PASS
2399.675000	-58.5	39.8	-18.7	PASS
2399.275000	-59.1	40.4	-18.7	PASS
2399.225000	-59.5	40.8	-18.7	PASS
2399.325000	-60.3	41.6	-18.7	PASS
2399.625000	-60.8	42.1	-18.7	PASS
2398.475000	-61.0	42.3	-18.7	PASS
2398.425000	-61.1	42.4	-18.7	PASS
2399.375000	-61.2	42.5	-18.7	PASS
2398.525000	-61.5	42.8	-18.7	PASS

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2483.875000	-65.4	46.9	-18.6	PASS
2483.925000	-65.6	47.1	-18.6	PASS
2488.375000	-65.6	47.1	-18.6	PASS
2483.675000	-65.8	47.2	-18.6	PASS
2483.725000	-66.2	47.7	-18.6	PASS
2492.375000	-66.3	47.7	-18.6	PASS
2483.525000	-66.5	48.0	-18.6	PASS
2483.625000	-66.5	48.0	-18.6	PASS
2488.325000	-66.6	48.0	-18.6	PASS
2484.475000	-66.6	48.1	-18.6	PASS
2494.475000	-66.9	48.3	-18.6	PASS
2484.425000	-67.0	48.5	-18.6	PASS
2498.525000	-67.2	48.6	-18.6	PASS
2498.475000	-67.2	48.6	-18.6	PASS
2492.325000	-67.3	48.7	-18.6	PASS

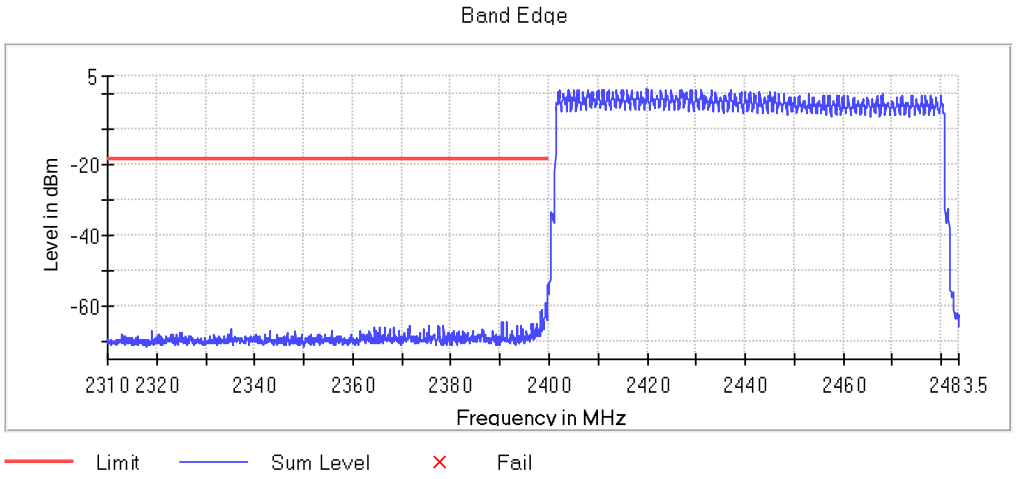
Verdict

Pass

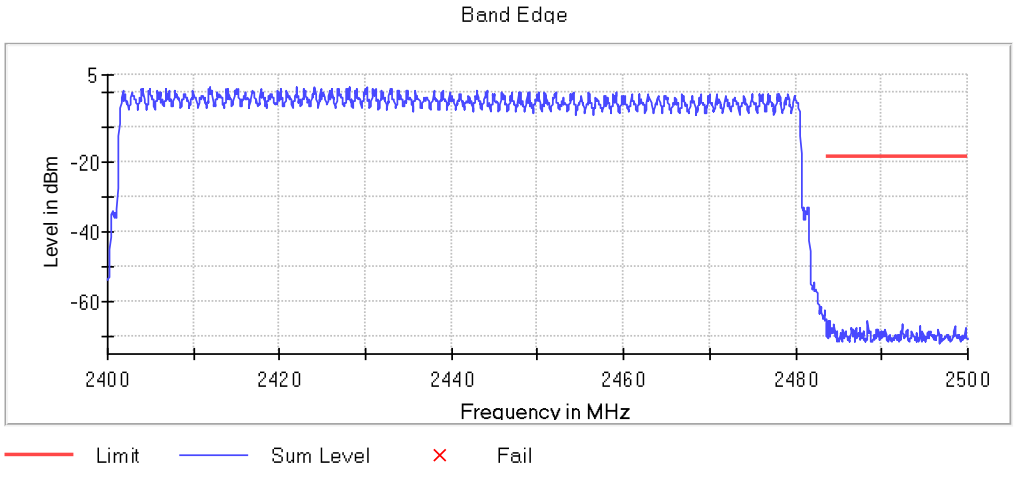
Attachments

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

Images:



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



Modulation: BT (8DPSK 3-DH5) - HOPPING OFF
Chipset 2
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	-47.4	28.3	-19.1	PASS
2399.925000	-48.7	29.6	-19.1	PASS
2399.875000	-49.4	30.3	-19.1	PASS
2399.825000	-49.8	30.6	-19.1	PASS
2399.725000	-49.8	30.7	-19.1	PASS
2399.775000	-50.2	31.1	-19.1	PASS
2399.575000	-50.3	31.2	-19.1	PASS
2399.675000	-50.4	31.3	-19.1	PASS
2399.625000	-50.7	31.5	-19.1	PASS
2399.525000	-51.7	32.6	-19.1	PASS
2398.875000	-52.2	33.1	-19.1	PASS
2398.925000	-52.6	33.5	-19.1	PASS
2398.825000	-52.8	33.7	-19.1	PASS
2399.425000	-53.2	34.1	-19.1	PASS
2399.475000	-53.2	34.1	-19.1	PASS

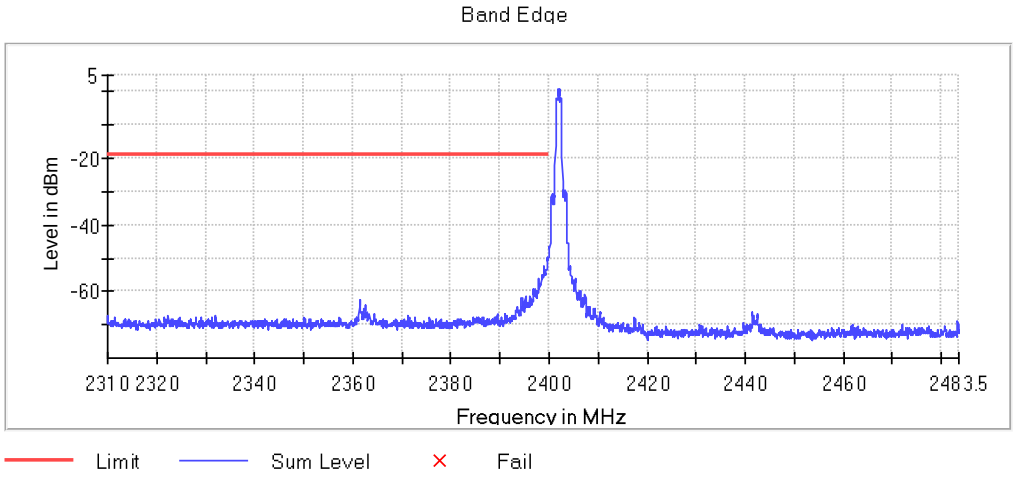
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2483.525000	-57.7	36.7	-21.0	PASS
2484.325000	-58.3	37.3	-21.0	PASS
2484.275000	-58.6	37.6	-21.0	PASS
2483.825000	-58.6	37.6	-21.0	PASS
2483.875000	-58.7	37.7	-21.0	PASS
2484.375000	-59.2	38.2	-21.0	PASS
2483.575000	-59.8	38.7	-21.0	PASS
2484.125000	-59.9	38.9	-21.0	PASS
2484.225000	-60.0	39.0	-21.0	PASS
2484.075000	-60.0	39.0	-21.0	PASS
2483.625000	-60.1	39.1	-21.0	PASS
2483.925000	-60.5	39.5	-21.0	PASS
2484.425000	-60.6	39.6	-21.0	PASS
2484.175000	-60.7	39.7	-21.0	PASS
2483.675000	-60.8	39.8	-21.0	PASS

Verdict

Pass

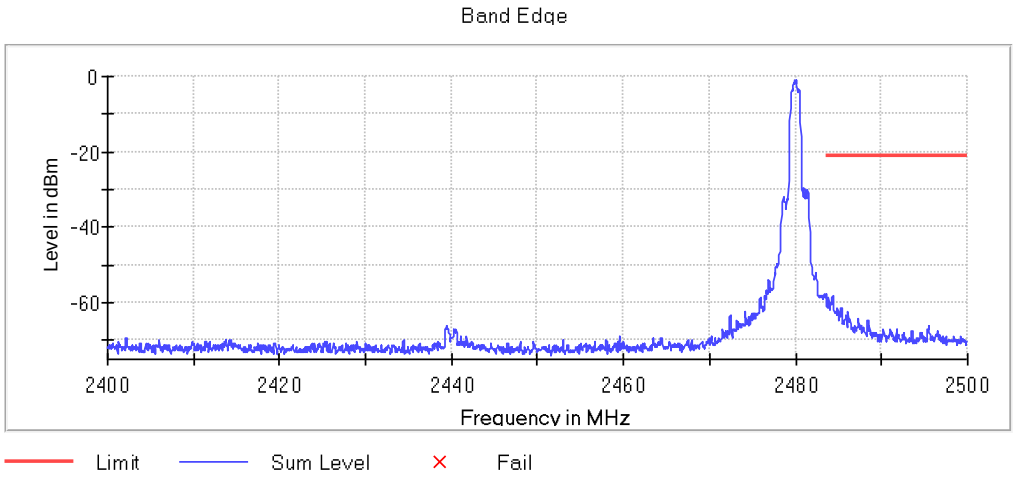
Attachments

Frequency MHz = 0.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 2



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 2

Images:



Modulation: BT (8DPSK 3-DH5) - HOPPING ON
Chipset 2
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
2399.775000	-50.5	32.0	-18.4	PASS
2399.725000	-50.5	32.0	-18.4	PASS
2399.975000	-50.6	32.2	-18.4	PASS
2399.825000	-51.9	33.5	-18.4	PASS
2399.675000	-52.2	33.8	-18.4	PASS
2399.875000	-52.4	33.9	-18.4	PASS
2399.575000	-52.5	34.1	-18.4	PASS
2399.625000	-52.6	34.1	-18.4	PASS
2399.925000	-53.4	34.9	-18.4	PASS
2399.525000	-54.4	36.0	-18.4	PASS
2399.425000	-54.5	36.0	-18.4	PASS
2399.475000	-54.5	36.1	-18.4	PASS
2399.375000	-55.9	37.4	-18.4	PASS
2399.325000	-56.2	37.7	-18.4	PASS
2399.225000	-56.6	38.2	-18.4	PASS

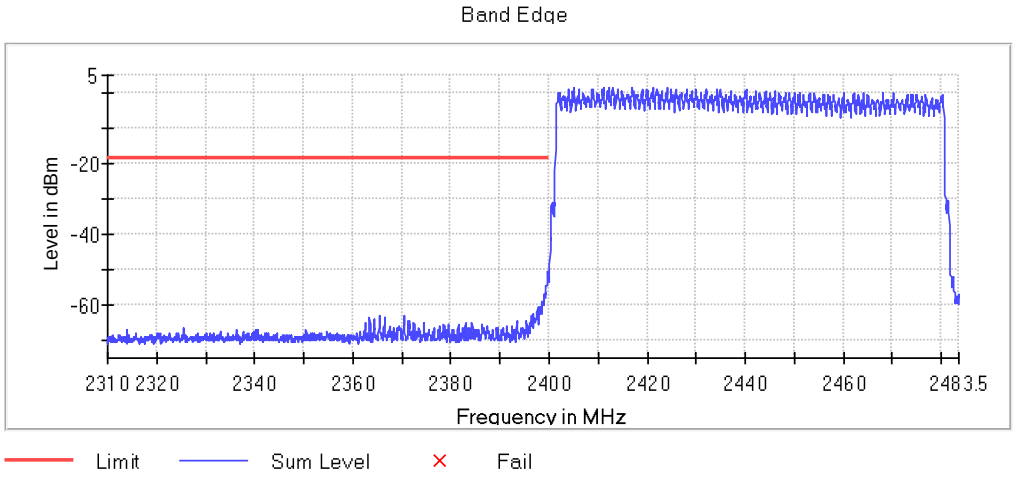
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2484.125000	-60.7	42.3	-18.4	PASS
2484.175000	-60.7	42.3	-18.4	PASS
2485.275000	-62.2	43.9	-18.4	PASS
2485.325000	-62.9	44.5	-18.4	PASS
2483.625000	-63.3	44.9	-18.4	PASS
2484.225000	-64.0	45.6	-18.4	PASS
2483.825000	-64.1	45.7	-18.4	PASS
2485.725000	-64.1	45.7	-18.4	PASS
2484.025000	-64.2	45.9	-18.4	PASS
2483.875000	-64.4	46.0	-18.4	PASS
2483.975000	-64.5	46.1	-18.4	PASS
2485.675000	-64.8	46.4	-18.4	PASS
2483.675000	-65.0	46.7	-18.4	PASS
2483.575000	-65.4	47.1	-18.4	PASS
2485.225000	-65.8	47.4	-18.4	PASS

Verdict

Pass

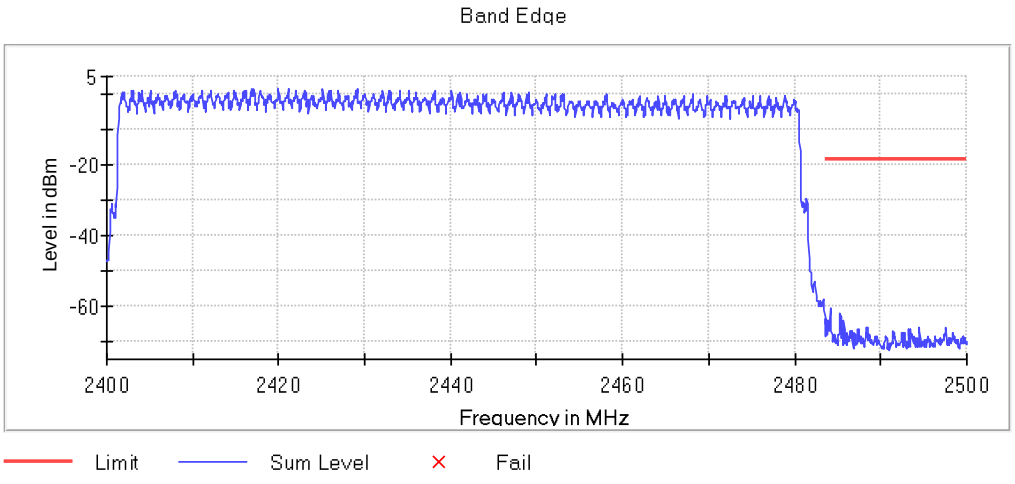
Attachments

Frequency MHz = 0.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 2



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Chipset 2

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	5 / max. 150	4 / max. 150	139 / max. 150
Stable	3 / 3	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.00 dB	0.12 dB	0.00 dB	0.00 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

The following tables and plots show the results for the worst case

Verdict

Pass

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

Modulation: BT (π/4 DQPSK 2-DH5)
Sample ID: S/02
The result for worst operation is shown below

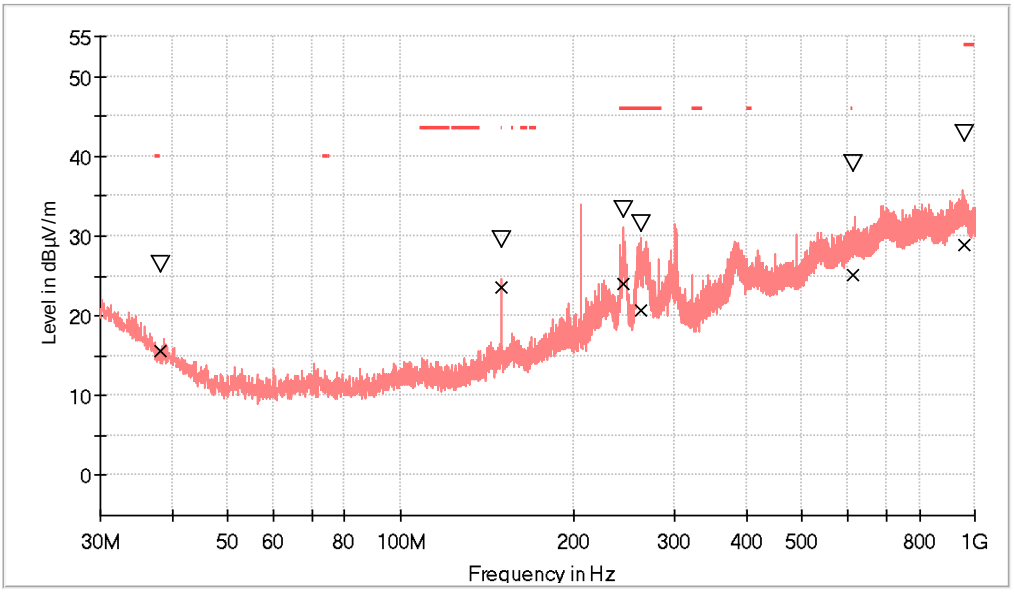
Results

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

Middle Channel

Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (π/4 DQPSK 2-DH5), Frequency Range GHz = [0.03, 1]

Images:



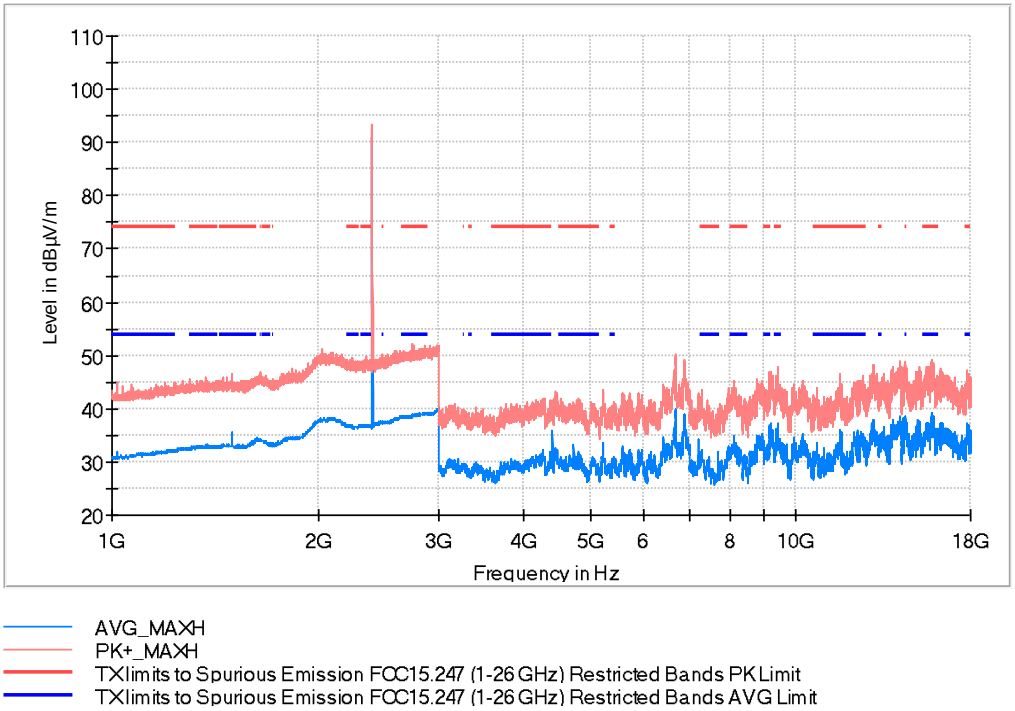
Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)
38.051000	26.5	15.5	V	24.5	40.0
149.989000	29.5	23.5	V	20.0	43.5
244.127500	33.4	24.0	V	22.0	46.0
261.296500	31.5	20.7	V	25.3	46.0
613.018500	39.0	25.2	V	20.8	46.0
960.909000	42.7	28.8	V	25.2	54.0

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:



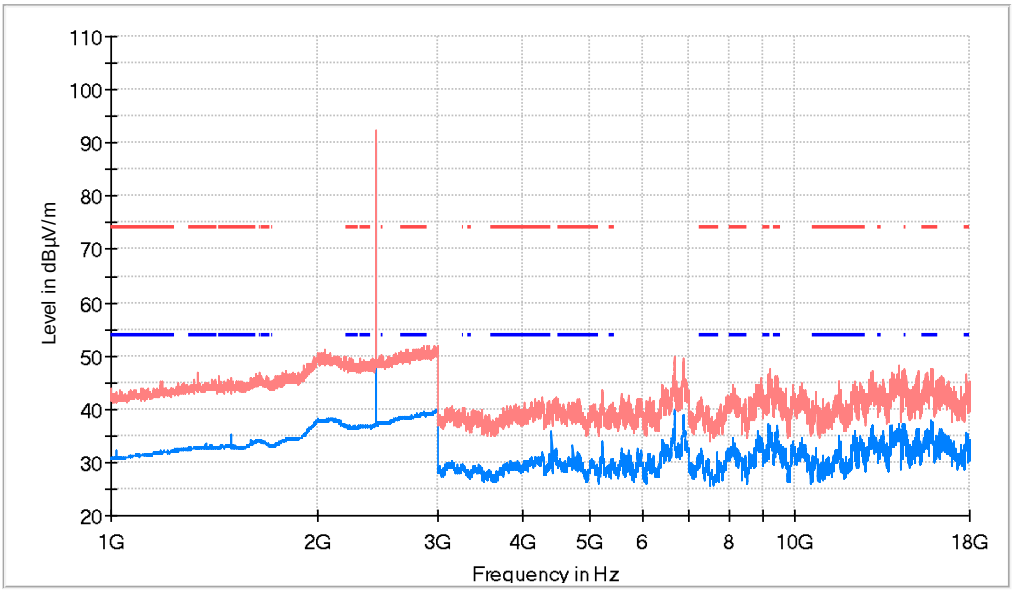
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2402.000000	93.3	91.2	H	---	---	Fundamental
9165.500000	45.9	37.3	V	16.7	54.0	
15829.500000	47.4	39.4	V	14.6	54.0	

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:



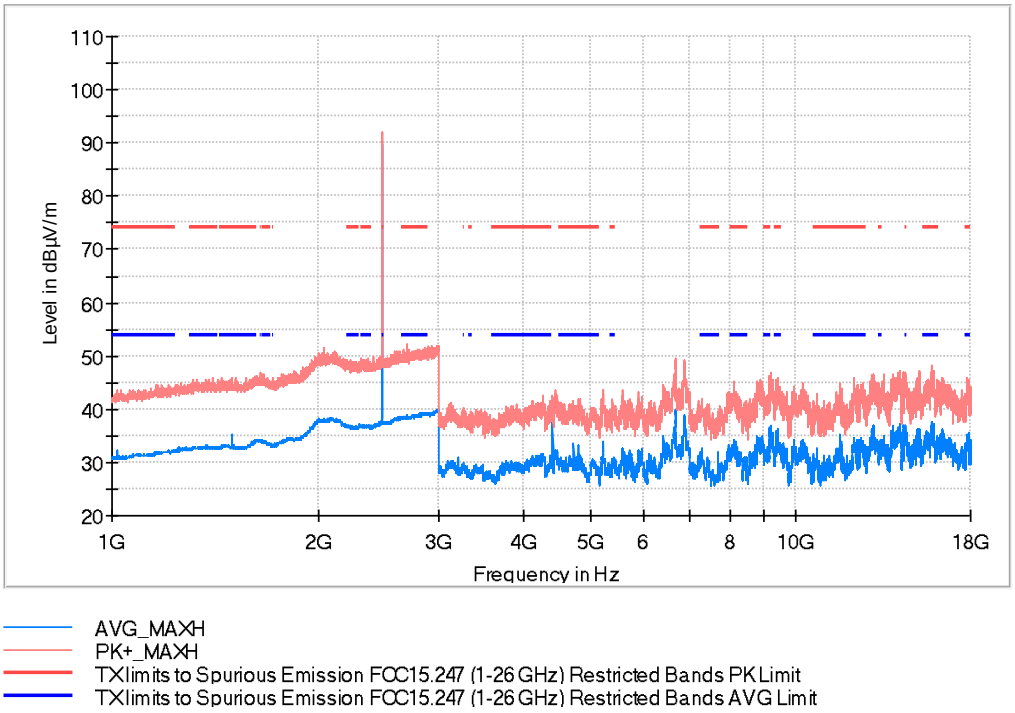
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2441.000000	92.4	90.1	V	---	---	Fundamental
9163.500000	44.2	37.2	H	16.8	54.0	
15814.000000	45.9	37.8	H	16.2	54.0	

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:



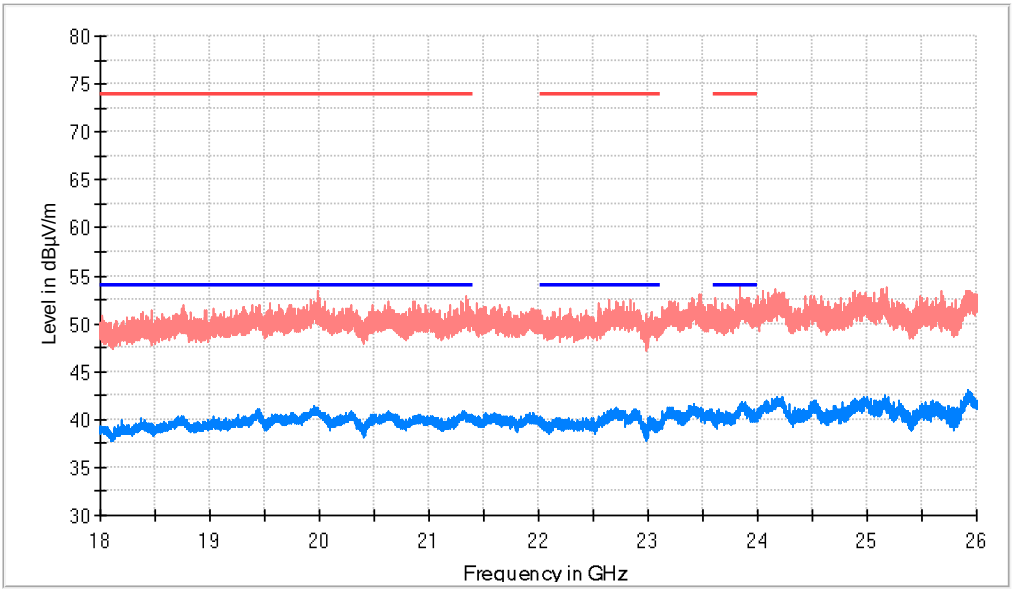
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2480.000000	92.0	89.7	V	---	---	Fundamental
9164.500000	46.1	36.6	H	17.4	54.0	
15797.000000	48.1	37.1	H	16.9	54.0	

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:



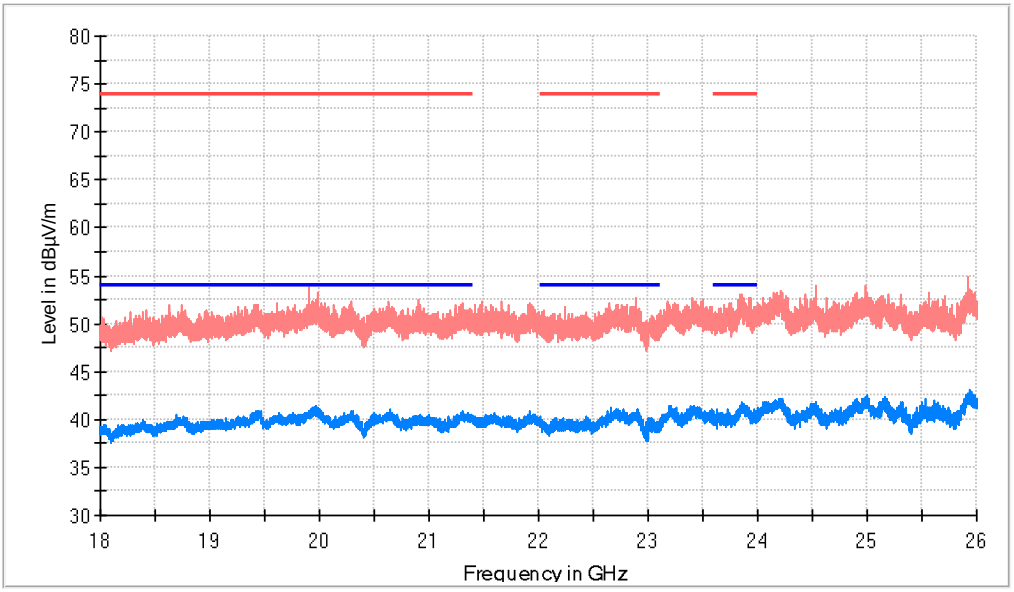
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23889.000000	51.5	41.9	H	12.1	54.0

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:



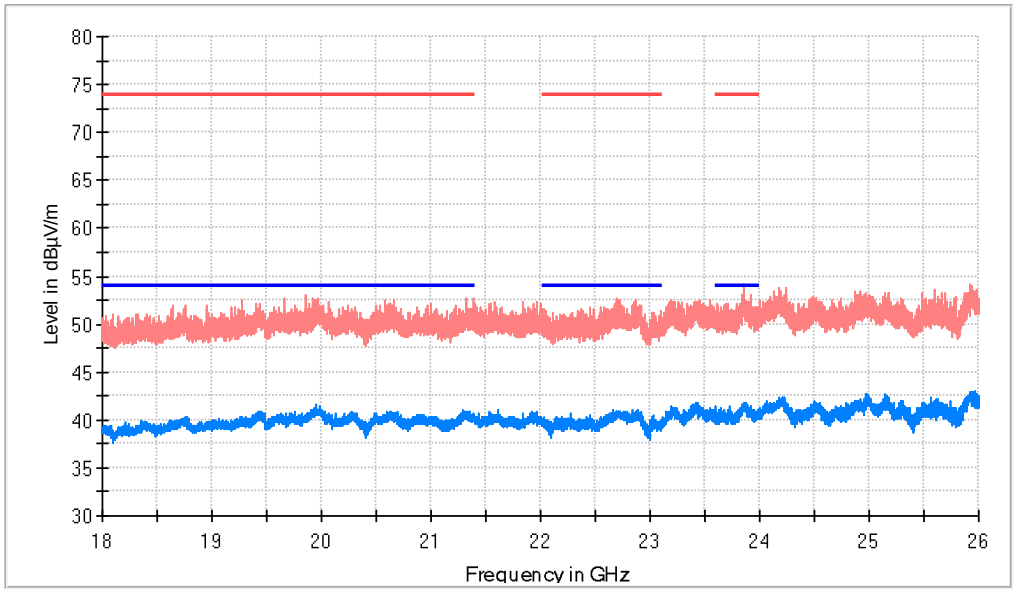
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23861.000000	51.7	41.7	V	12.3	54.0

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]

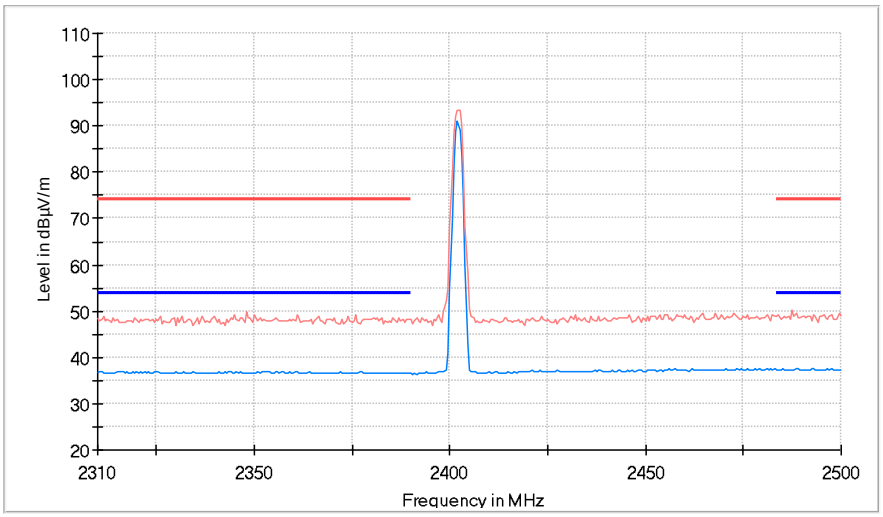
Images:



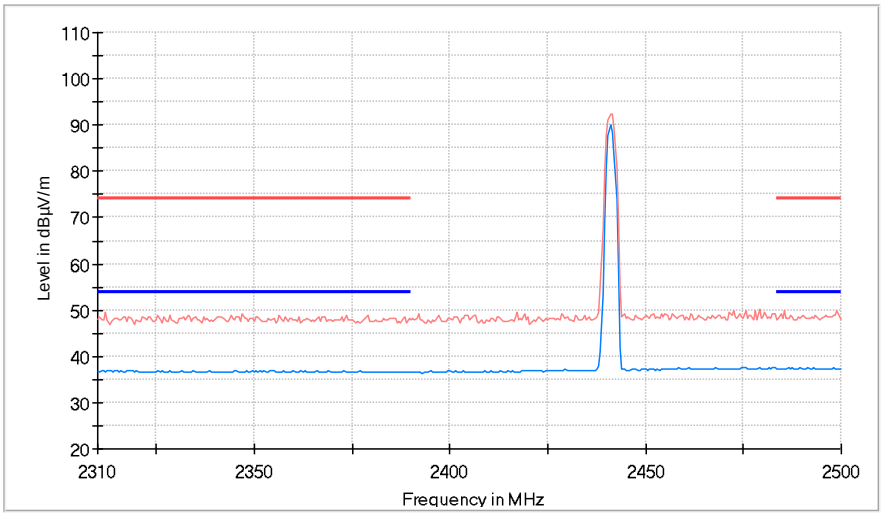
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23869.000000	50.7	41.8	V	12.2	54.0

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]

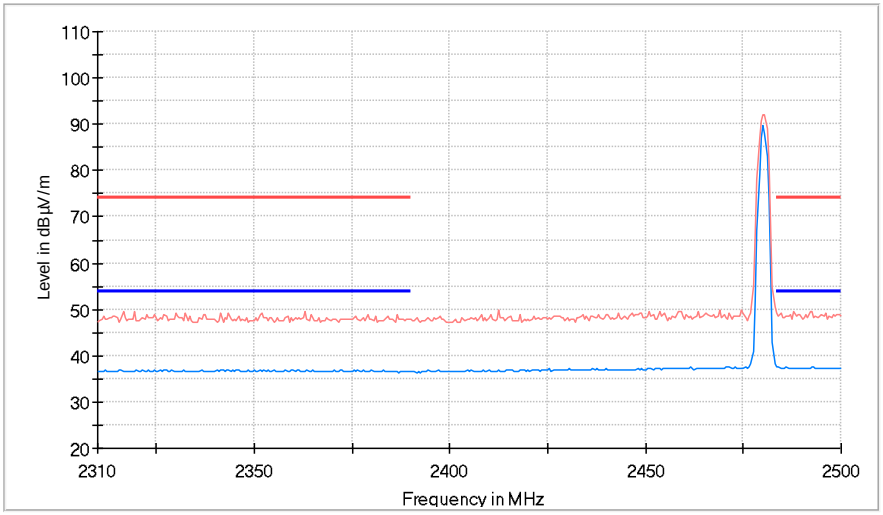


Middle Channel
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (π/4 DQPSK 2-DH5), Frequency Range GHz = [1, 18]



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]



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

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

Appendix A.2: Test results. Wi-Fi 2.4GHz

Appendix A.2

PRODUCT INFORMATION

The following information is provided by the supplier

Information	Description
Modulation	non-FHSS
Maximum RF Output Power	Adaptive Equipment without the possibility to switch to a non- adaptive mode.
Operation mode	
- Operating Frequency Range	2400 – 2483.5 MHz
- Nominal Channel Bandwidth	20 MHz 40 MHz
Extreme operating conditions	
- Temperature range	-40 ºC to +65 ºC
Antenna type	
Antenna gain	1.5 dBi
Nominal Voltage	
- Supply Voltage	13.5 Vdc
- Type of power source	DC voltage
Equipment type	Wi-Fi 2.4 GHz b/g/n20/n40/ax20/ax40
Geo-location capability	No

TEST CONDITIONS

(*): Data provided by the client.

TEST CONDITIONS	DESCRIPTION
TC/01(1) **(b mode)**	Power supply (V): $V_{nominal}$: 13.5 Vdc Temperature: $T_{nominal}$: +15 to +35 ºC Channel Bandwidth: 20 MHz Test Frequencies for Conducted/Radiated tests: Lowest channel: 2412 MHz Middle channel: 2437 MHz Highest channel: 2462 MHz
TC/02(1) **(g mode)**	Power supply (V): $V_{nominal}$: 13.5 Vdc Temperature: $T_{nominal}$: +15 to +35 ºC Channel Bandwidth: 20 MHz Test Frequencies for Conducted/Radiated tests: Lowest channel: 2412 MHz Middle channel: 2437 MHz Highest channel: 2462 MHz
TC/03(1) **(n mode)**	Power supply (V): $V_{nominal}$: 13.5 Vdc Temperature: $T_{nominal}$: +15 to +35 ºC Channel Bandwidth: 20/40 MHz Test Frequencies for Conducted/Radiated tests: 20 MHz: Lowest channel: 2412 MHz; Middle channel: 2437 MHz; Highest channel: 2462 MHz 40 MHz: Lowest channel: 2422 MHz; Middle channel: 2442 MHz; Highest channel: 2462 MHz
TC/04(1) **(ax mode)**	Power supply (V): $V_{nominal}$: 13.5 Vdc Temperature: $T_{nominal}$: +15 to +35 ºC Channel Bandwidth: 20/40 MHz Test Frequencies for Conducted/Radiated tests: 20 MHz: Lowest channel: 2412 MHz; Middle channel: 2437 MHz; Highest channel: 2462 MHz 40 MHz: Lowest channel: 2422 MHz; Middle channel: 2437 MHz; Highest channel: 2452 MHz

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

The data rates below were selected as the worst-case ones in terms of conducted power and spurious emissions for each modulation scheme, based on preliminary testing:

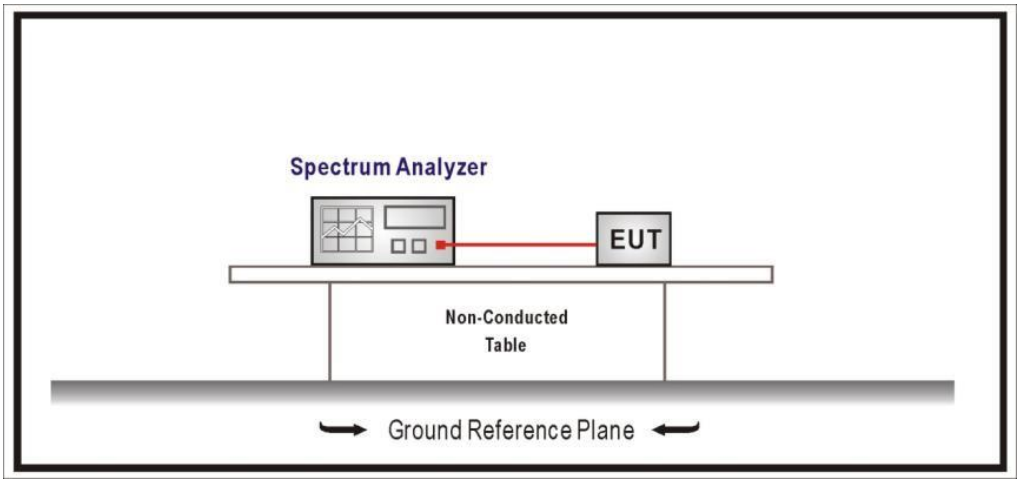
802.11b: 1 Mbit/s
802.11g: 6 Mbit/s
802.11n: HT20 (OFDM MCS5)
802.11n: HT40 (OFDM MCS5)
802.11ax20 OFDM – SU Full-channel allocation: HE20 SS1 (OFDM MCS5)
802.11ax20 OFDMA – RU Subcarrier allocation: HE20 SS1 (OFDMA MCS5)
802.11ax40 OFDM – SU Full-channel allocation: HE40 SS1 (OFDM MCS5)
802.11ax40 OFDMA – RU Subcarrier allocation: HE40 SS1 (OFDMA MCS5)

Preliminary measurements determined 26 tones as the worst-case RU (Resource Unit) carrier allocation.

The worst case RU combinations used in the SISO/MIMO modes measurement are indicated as follows:

- 20 MHz BW: RU26 offset 8 (High Tone)
- 40 MHz BW: RU26 offset 8 (Mid Tone)

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 antenna), 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 360º 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.

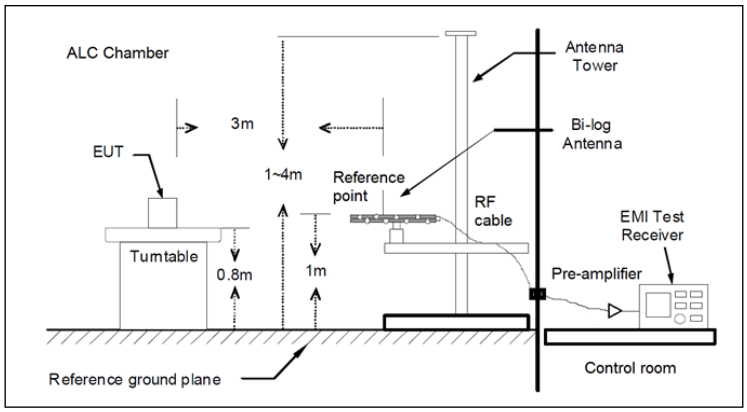


Fig A1: Radiated measurements Setup f < 1 GHz

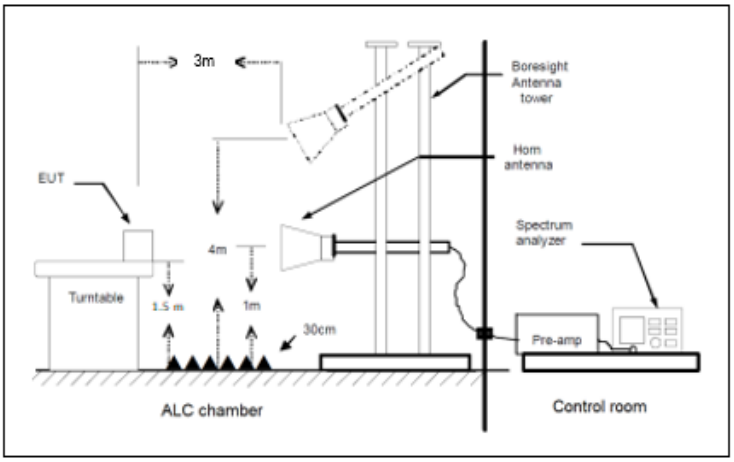


Fig A2: Radiated measurements setup f > 1-18 GHz

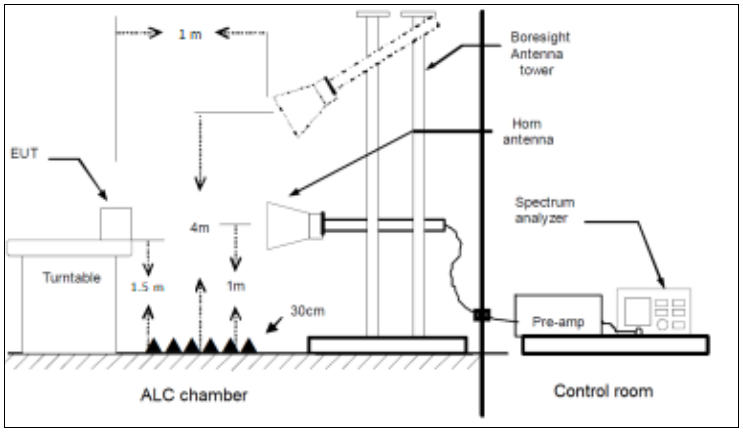


Fig A3: Radiated measurements setup f > 18 GHz

TEST CASES DETAILS

RSS-247 5.2 (a) / FCC 15.247 (a) (2) - 6 dB Bandwidth

Limits
The minimum 6 dB bandwidth shall be at least 500 kHz

Chipset 1
Sample ID: S/01

Modulation: 802.11b (DSSS 1 Mbit/s)
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2412.00000	20	1	1	10.150
2437.00000	20	1	1	10.000
2462.00000	20	1	1	10.150

Modulation: 802.11g (OFDM 6 Mbit/s)
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2412.00000	20	1	1	16.400
2437.00000	20	1	1	16.450
2462.00000	20	1	1	16.450

Modulation: 802.11n HT20 (OFDM MCS5)
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2412.00000	20	1	1	17.150
2437.00000	20	1	1	17.650
2462.00000	20	1	1	17.400

Modulation: 802.11n HT40 (OFDM MCS5)
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2422.00000	40	1	1	35.850
2437.00000	40	1	1	35.550
2452.00000	40	1	1	35.800

Modulation: 802.11ax HE20 SS1 (OFDM MCS5) - SU Full-channel allocation
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2412.00000	20	1	1	18.750
2437.00000	20	1	1	18.900
2462.00000	20	1	1	18.950

Modulation: 802.11ax HE20 SS1 (OFDMA MCS5) - RU Subcarrier allocation
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2412.00000	20	1	1	2.150
2437.00000	20	1	1	2.150
2462.00000	20	1	1	2.150

Modulation: 802.11ax HE40 SS1 (OFDM MCS5) - SU Full-channel allocation
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2422.00000	40	1	1	37.950
2437.00000	40	1	1	37.950
2452.00000	40	1	1	37.950

Modulation: 802.11ax HE40 SS1 (OFDMA MCS5) - RU Subcarrier allocation
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2422.00000	40	1	1	2.150
2437.00000	40	1	1	2.150
2452.00000	40	1	1	2.150

Verdict

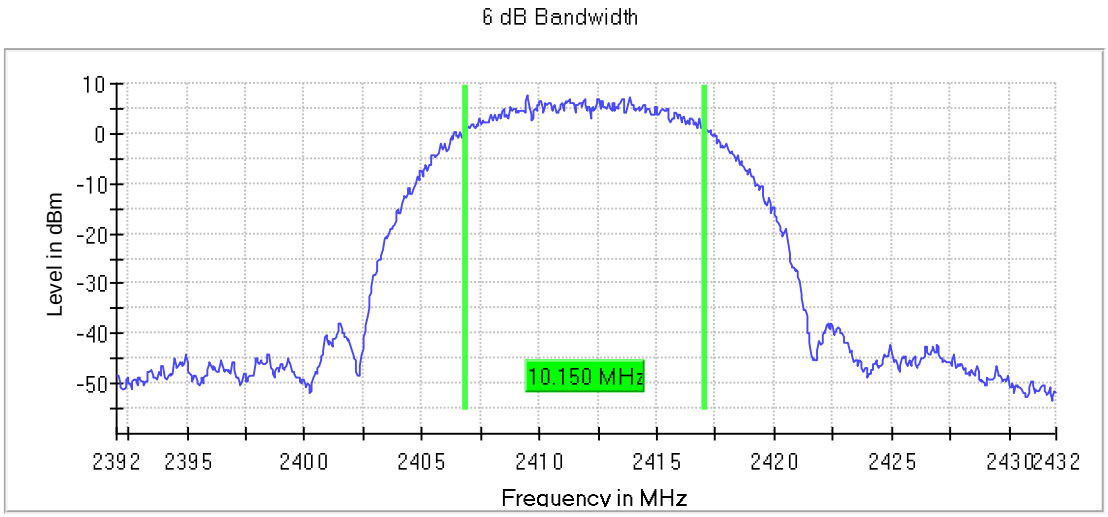
Pass

Attachments

Frequency MHz = 2412.00000, Bandwidth MHz = 20, Modulation = 802.11b (DSSS 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

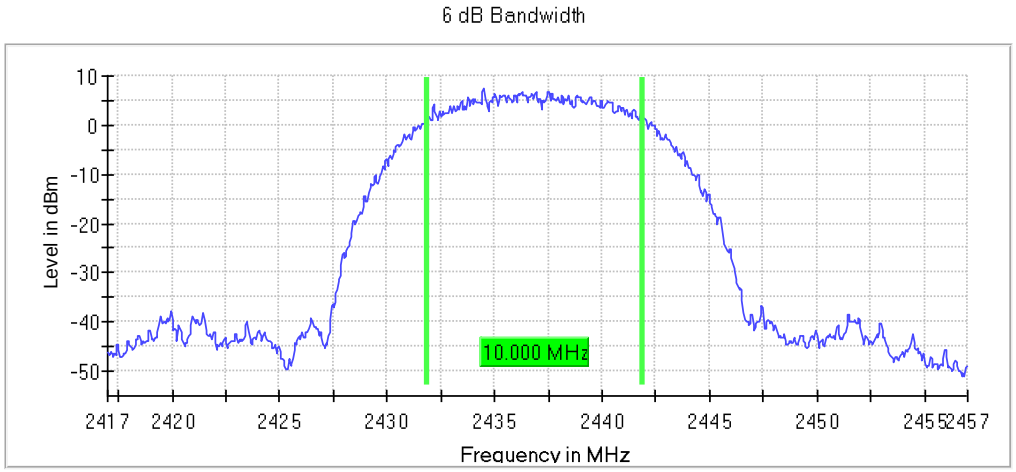
Images:

5.75



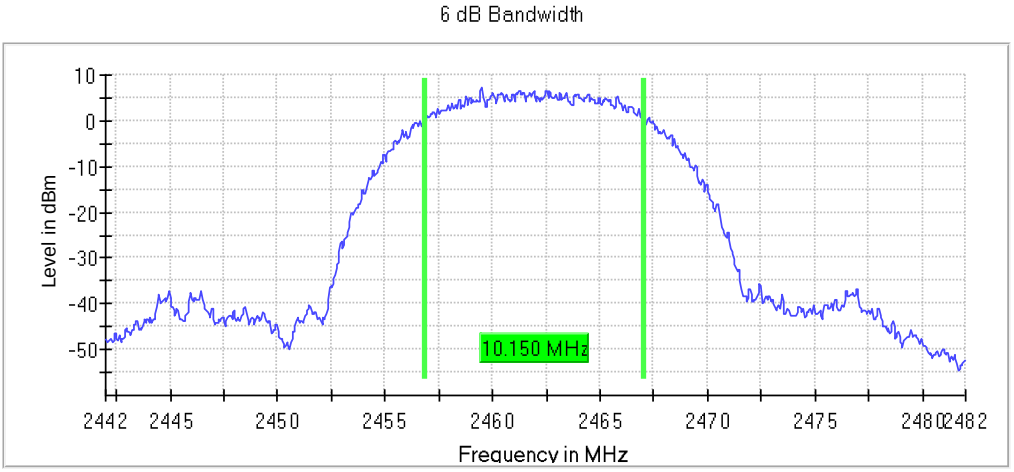
Frequency MHz = 2437.00000, Bandwidth MHz = 20, Modulation = 802.11b (DSSS 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



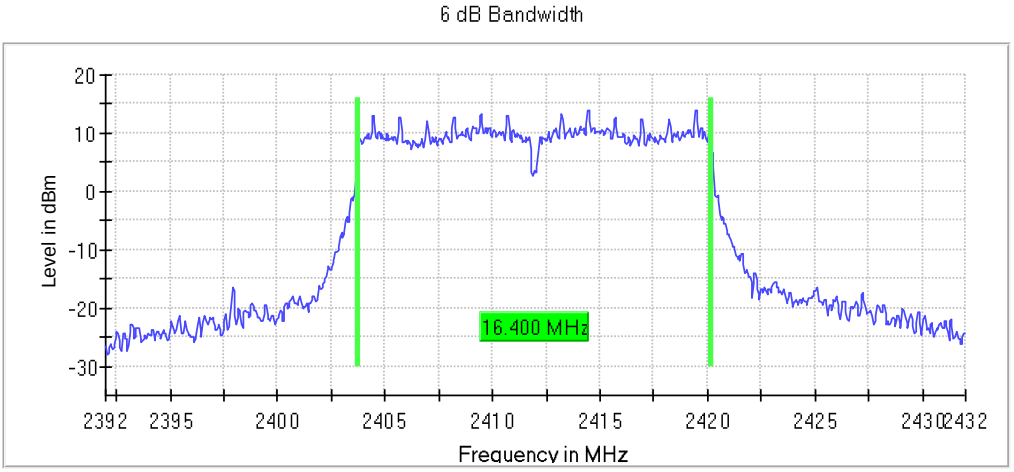
Frequency MHz = 2462.00000, Bandwidth MHz = 20, Modulation = 802.11b (DSSS 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



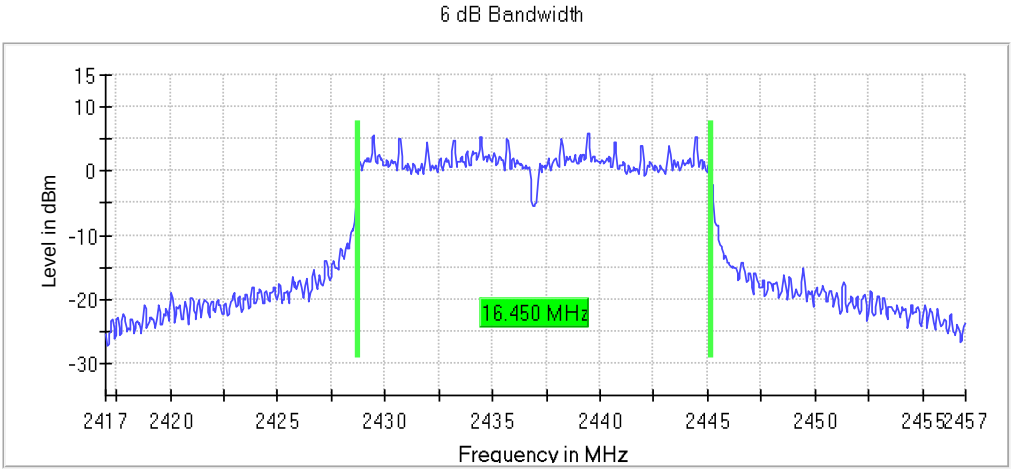
Frequency MHz = 2412.00000, Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



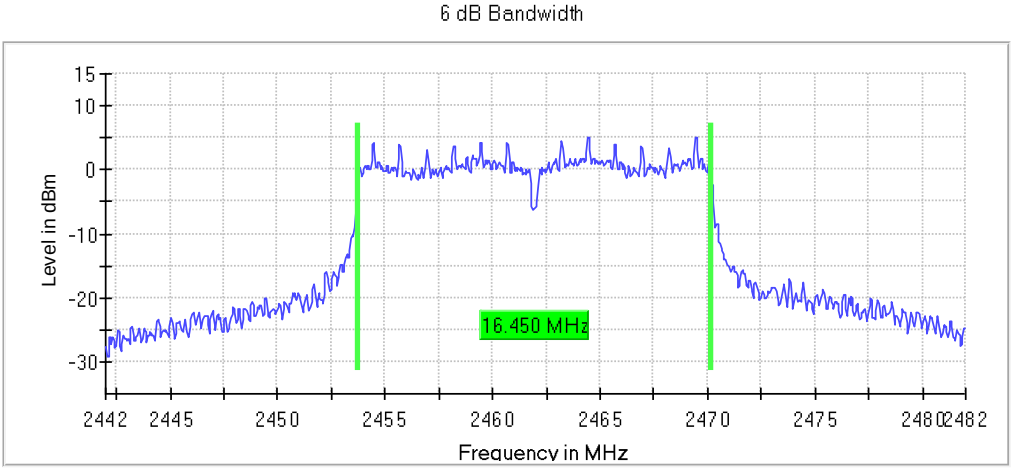
Frequency MHz = 2437.00000, Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



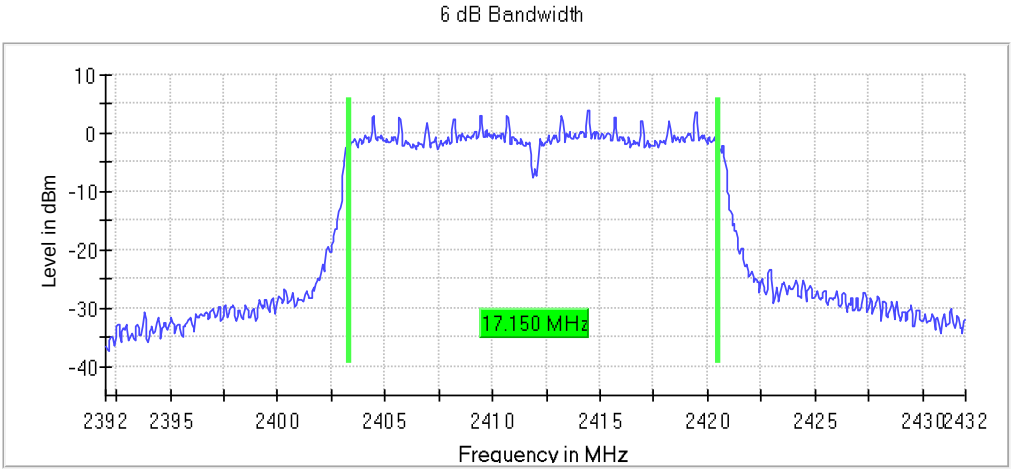
Frequency MHz = 2462.00000, Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



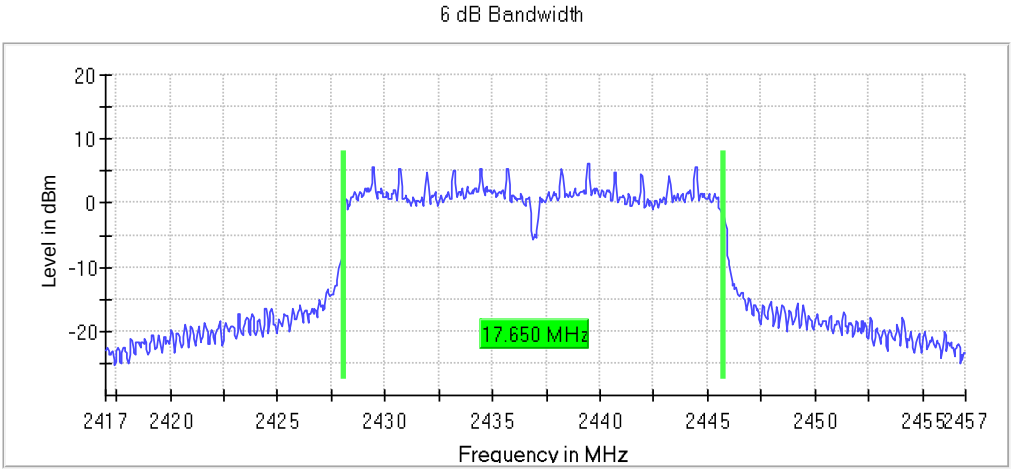
Frequency MHz = 2412.00000, Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1

Images:



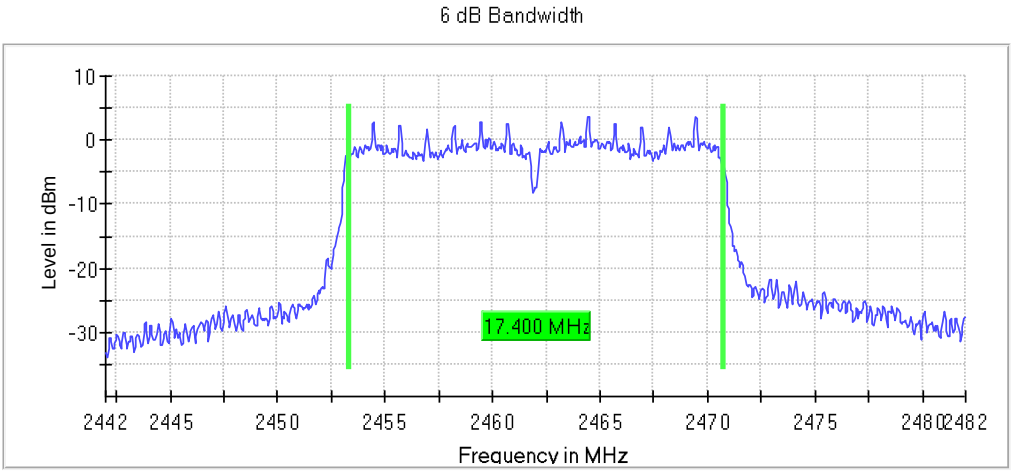
Frequency MHz = 2437.00000, Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1

Images:



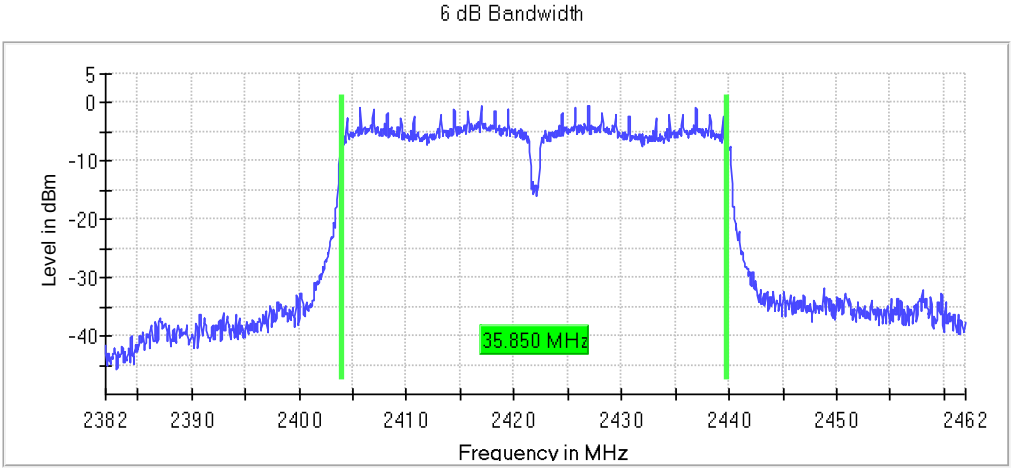
Frequency MHz = 2462.00000, Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1

Images:



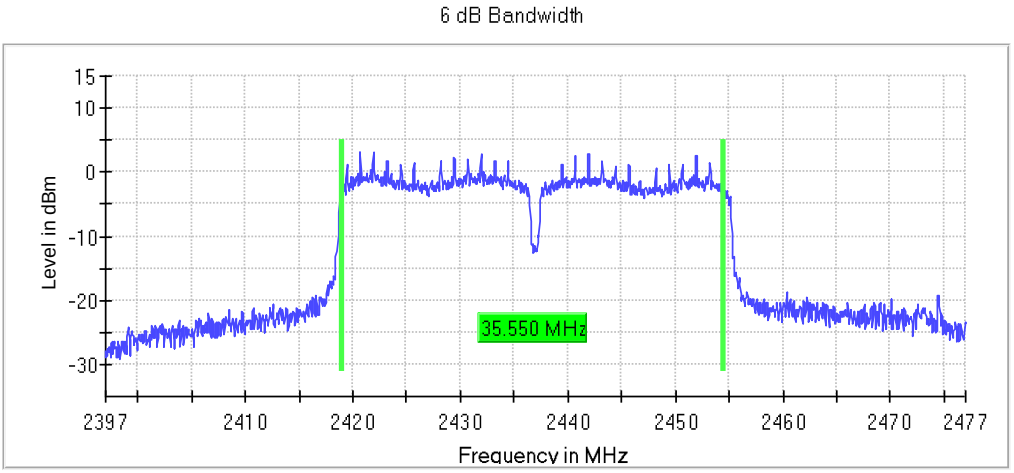
Frequency MHz = 2422.00000, Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1

Images:



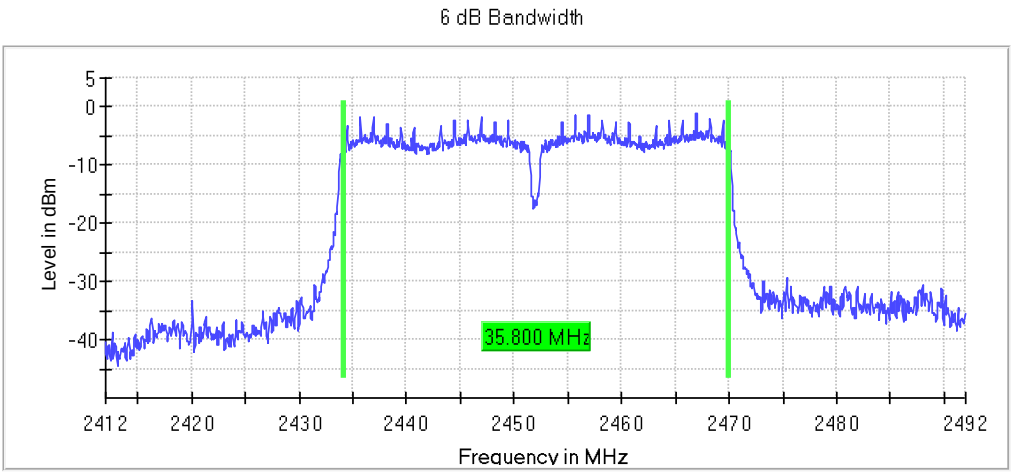
Frequency MHz = 2437.00000, Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1

Images:



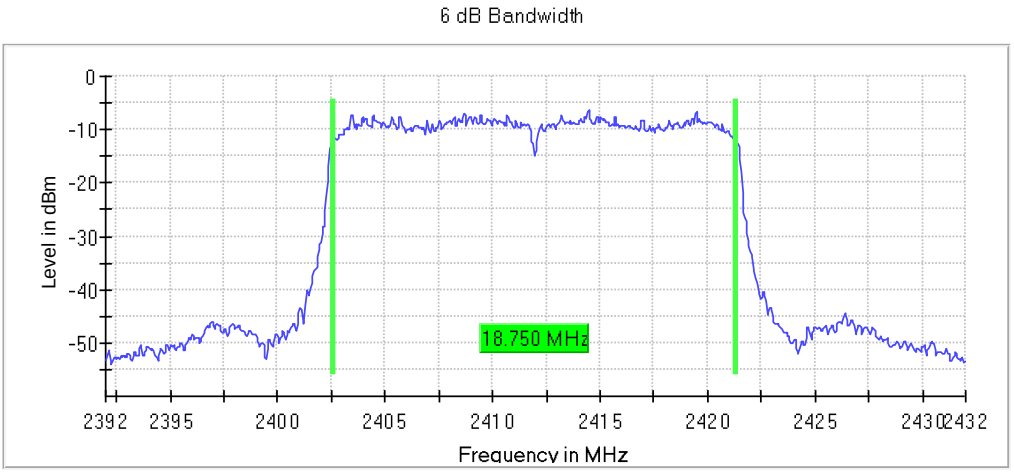
Frequency MHz = 2452.00000, Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1

Images:



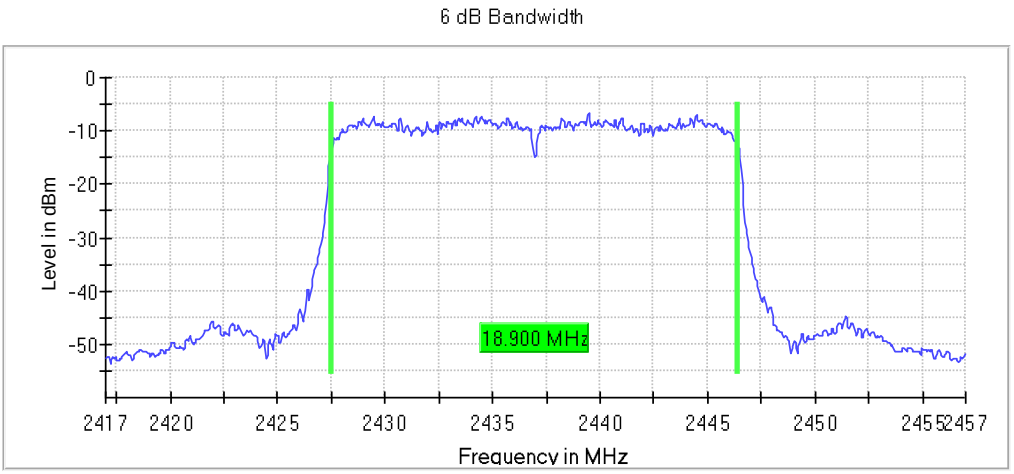
Frequency MHz = 2412.00000, Bandwidth MHz = 20, Modulation = 802.11ax HE20 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - SU Full-channel allocation

Images:



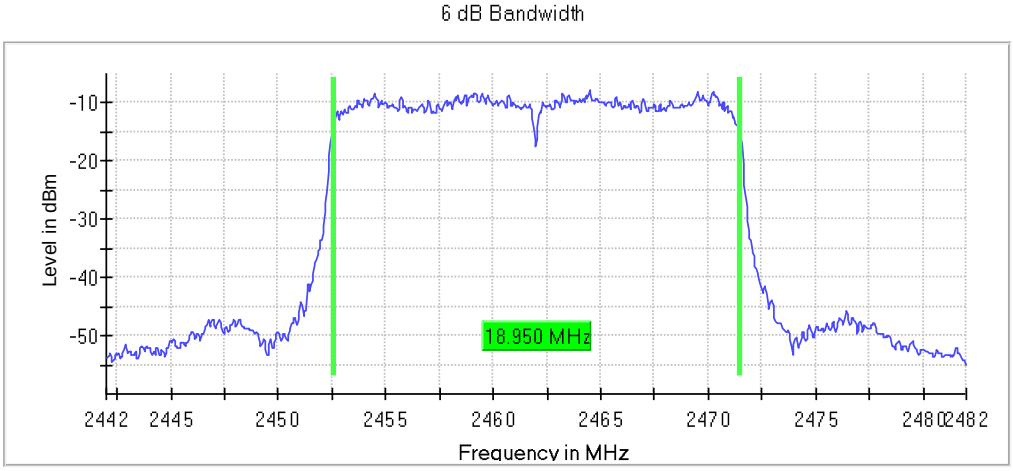
Frequency MHz = 2437.00000, Bandwidth MHz = 20, Modulation = 802.11ax HE20 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - SU Full-channel allocation

Images:



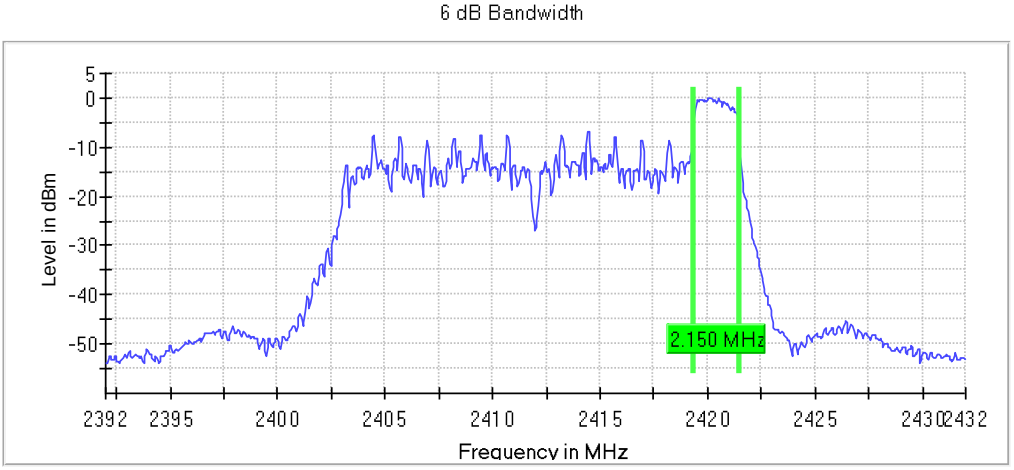
Frequency MHz = 2462.00000, Bandwidth MHz = 20, Modulation = 802.11ax HE20 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - SU Full-channel allocation

Images:



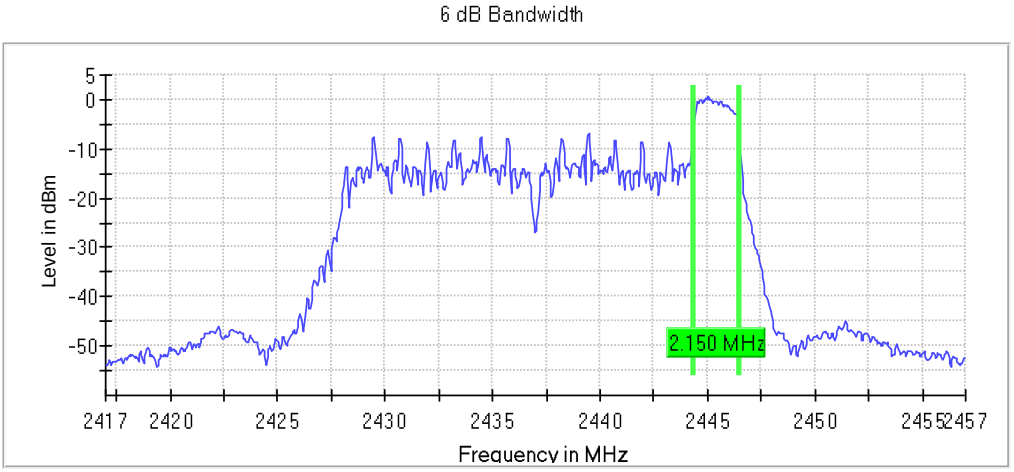
Frequency MHz = 2412.00000, Bandwidth MHz = 20, Modulation = 802.11ax HE20 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - RU Subcarrier allocation

Images:



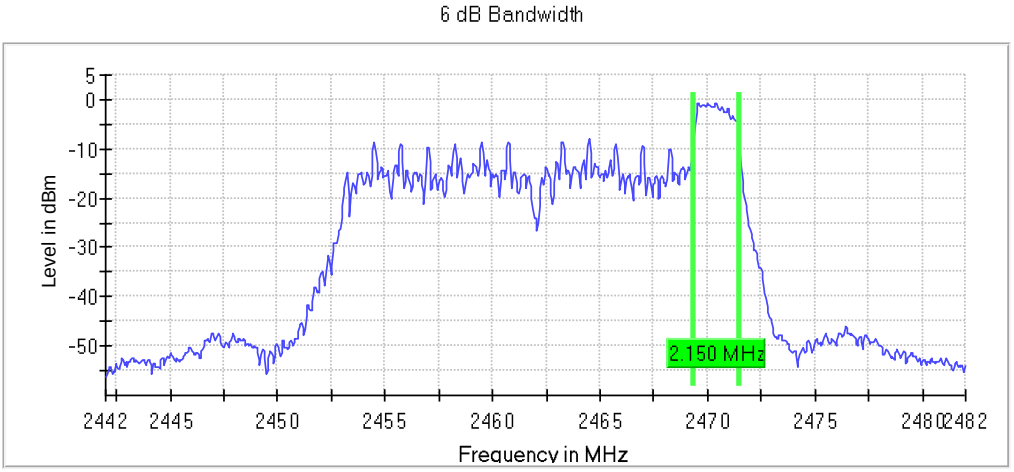
Frequency MHz = 2437.00000, Bandwidth MHz = 20, Modulation = 802.11ax HE20 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - RU Subcarrier allocation

Images:



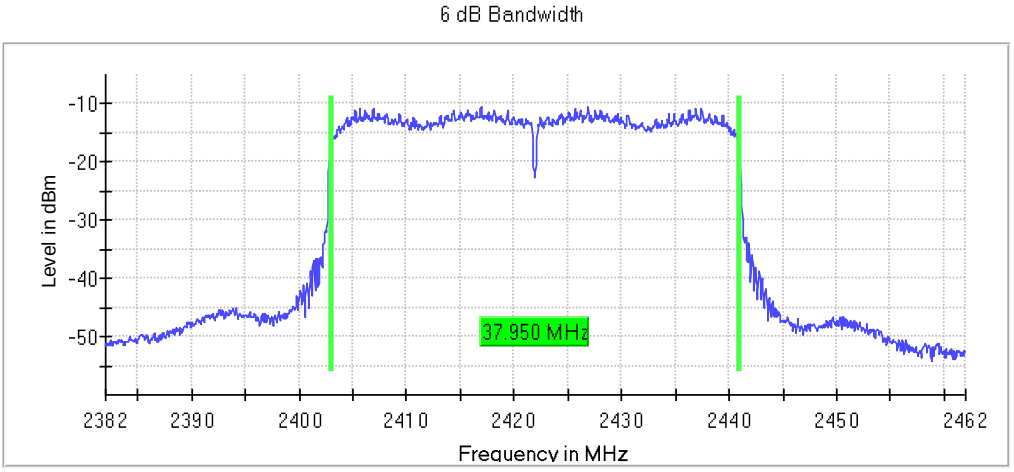
Frequency MHz = 2462.00000, Bandwidth MHz = 20, Modulation = 802.11ax HE20 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - RU Subcarrier allocation

Images:



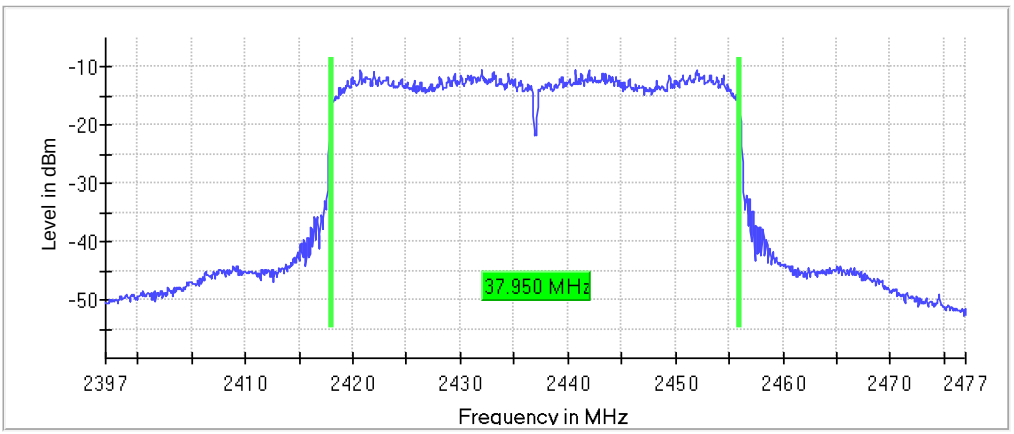
Frequency MHz = 2422.00000, Bandwidth MHz = 40, Modulation = 802.11ax HE40 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - SU Full-channel allocation

Images:



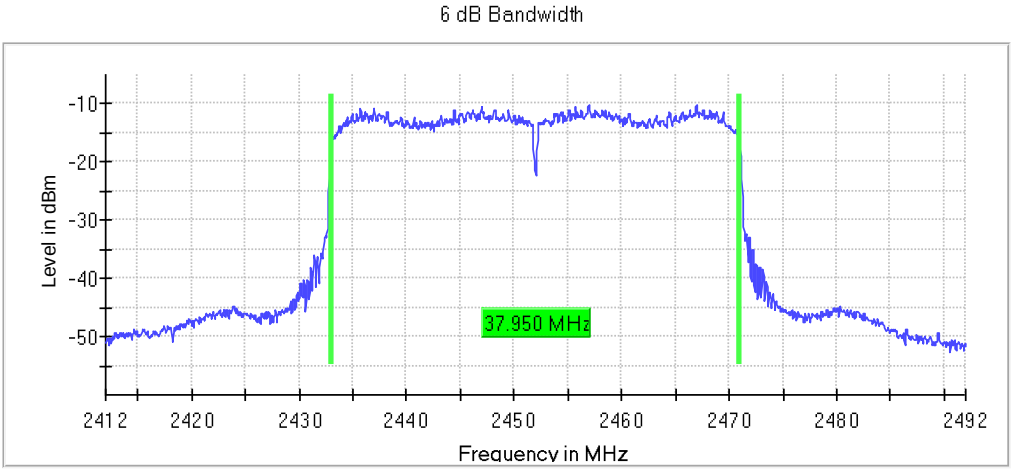
Frequency MHz = 2437.00000, Bandwidth MHz = 40, Modulation = 802.11ax HE40 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - SU Full-channel allocation

Images:



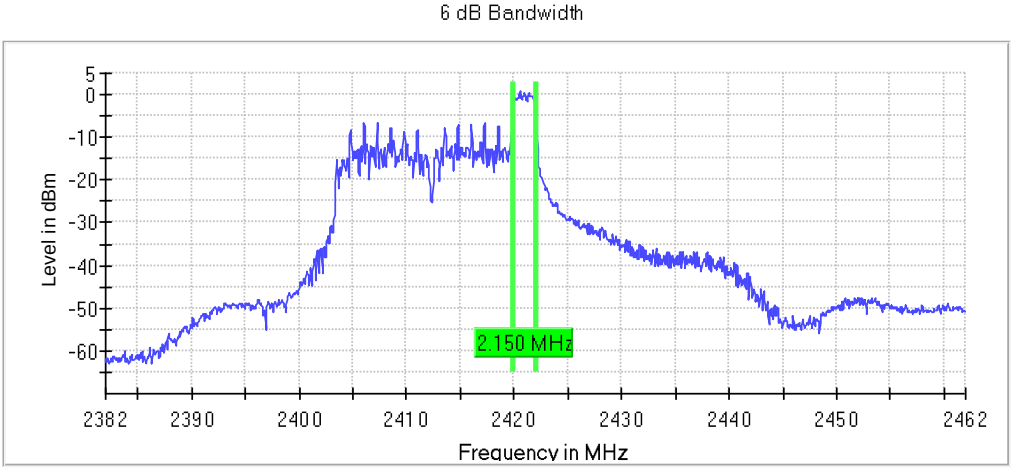
Frequency MHz = 2452.00000, Bandwidth MHz = 40, Modulation = 802.11ax HE40 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - SU Full-channel allocation

Images:



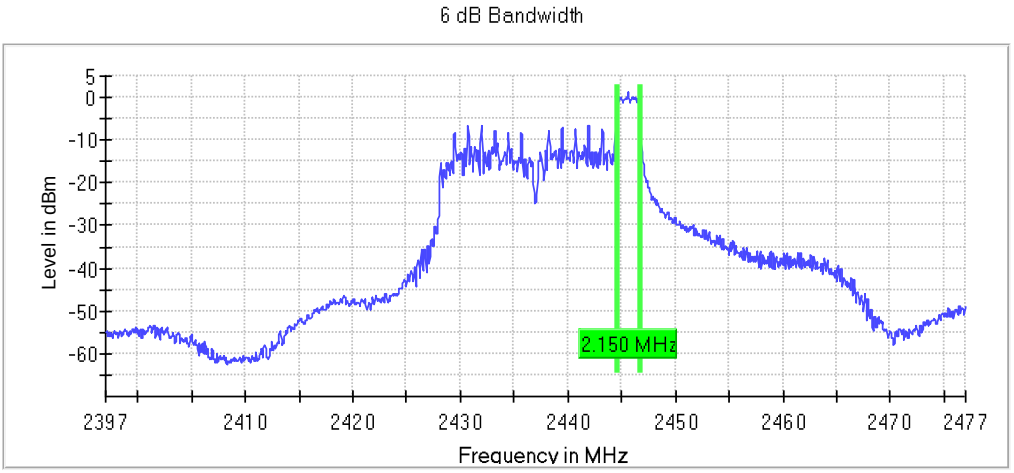
Frequency MHz = 2422.00000, Bandwidth MHz = 40, Modulation = 802.11ax HE40 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - RU Subcarrier allocation

Images:



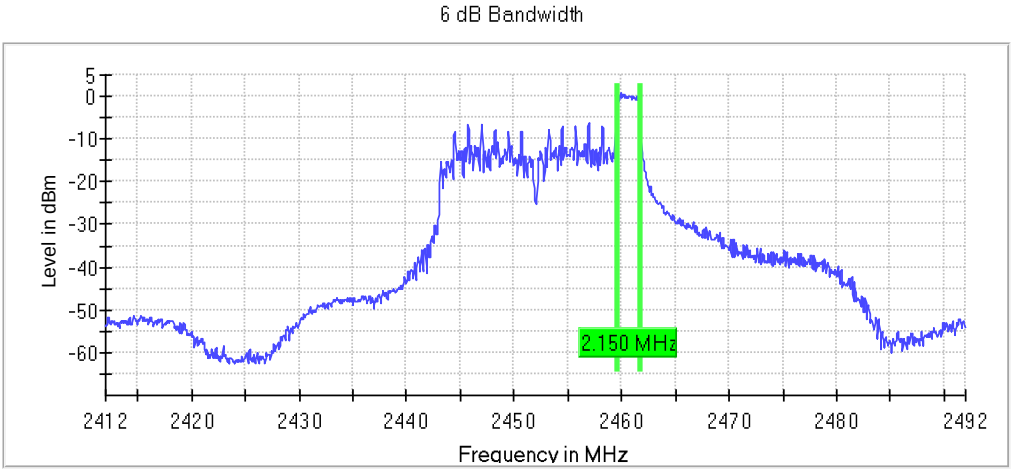
Frequency MHz = 2437.00000, Bandwidth MHz = 40, Modulation = 802.11ax HE40 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - RU Subcarrier allocation

Images:



Frequency MHz = 2452.00000, Bandwidth MHz = 40, Modulation = 802.11ax HE40 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - RU Subcarrier allocation

Images:



Spectrum Analyzer Parameters

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.39200 GHz	2.41700 GHz	2.44200 GHz
Stop Frequency	2.43200 GHz	2.45700 GHz	2.48200 GHz
Span	40.00 MHz	40.000 MHz	40.000 MHz
RBW	100.000 kHz	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz	300.000 kHz
Sweep Points	800	800	800
Sweep time	56.836 µs	56.836 µs	56.836 µs
Reference Level	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	100	100	100
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	15 / max. 150	20 / max. 150	29 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.33 dB	0.27 dB	0.04 dB

FCC 2.1049 - 99dBw Occupied Channel Bandwidth 99%

Limits
No Limit has been set to this test case

Chipset 1
Sample ID: S/01

Modulation: 802.11b (DSSS 1 Mbit/s)
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2412.00000	20	1	1	13.400
2437.00000	20	1	1	13.400
2462.00000	20	1	1	13.400

Modulation: 802.11g (OFDM 6 Mbit/s)
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2412.00000	20	1	1	16.700
2437.00000	20	1	1	18.700
2462.00000	20	1	1	17.800

Modulation: 802.11n HT20 (OFDM MCS5)
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2412.00000	20	1	1	17.700
2437.00000	20	1	1	19.500
2462.00000	20	1	1	17.800

Modulation: 802.11n HT40 (OFDM MCS5)
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2422.00000	40	1	1	36.250
2437.00000	40	1	1	44.500
2452.00000	40	1	1	36.750

Modulation: 802.11ax HE20 SS1 (OFDM MCS5) - SU Full-channel allocation
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2412.00000	20	1	1	18.800
2437.00000	20	1	1	18.800
2462.00000	20	1	1	18.800

Modulation: 802.11ax HE20 SS1 (OFDMA MCS5) - RU Subcarrier allocation
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2412.00000	20	1	1	18.200
2437.00000	20	1	1	18.100
2462.00000	20	1	1	18.100

Modulation: 802.11ax HE40 SS1 (OFDM MCS5) - SU Full-channel allocation
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2422.00000	40	1	1	37.750
2437.00000	40	1	1	38.000
2452.00000	40	1	1	37.750

Modulation: 802.11ax HE40 SS1 (OFDMA MCS5) - RU Subcarrier allocation
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2422.00000	40	1	1	21.750
2437.00000	40	1	1	21.750
2452.00000	40	1	1	21.500

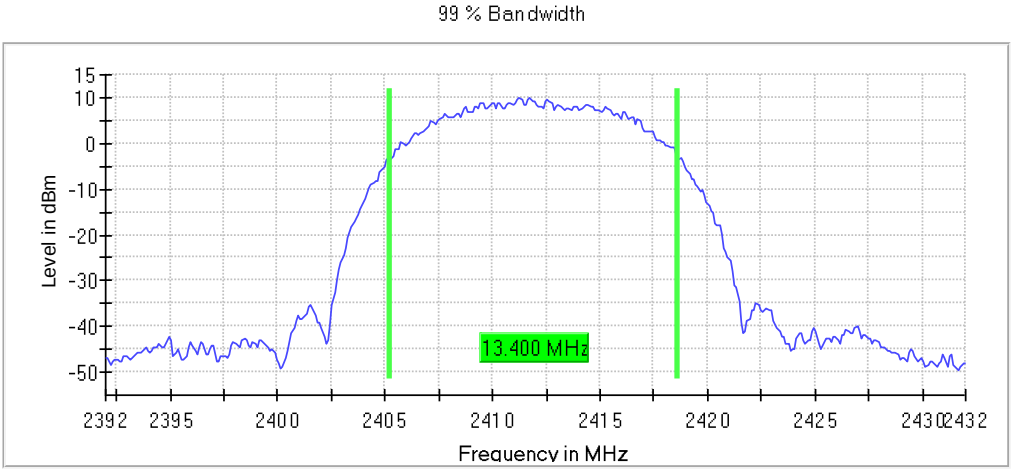
Verdict

Pass

Attachments

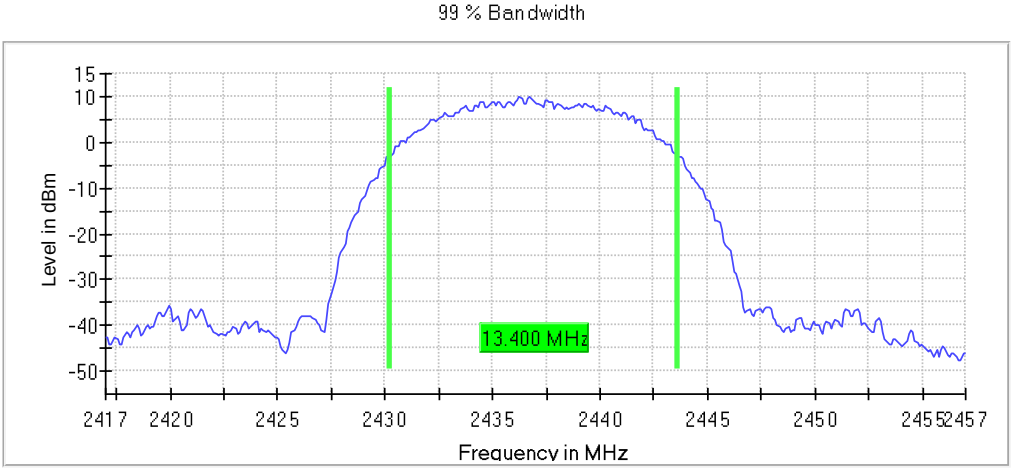
Frequency MHz = 2412.00000, Bandwidth MHz = 20, Modulation = 802.11b (DSSS 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



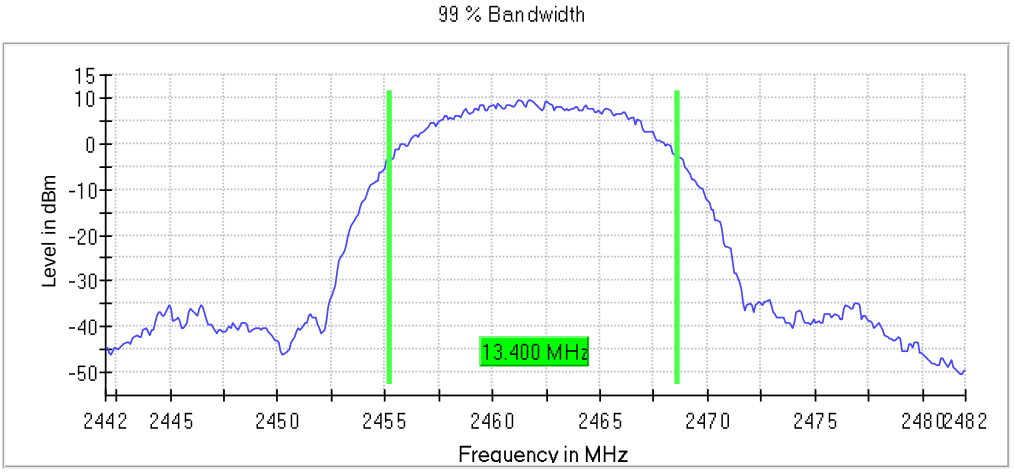
Frequency MHz = 2437.00000, Bandwidth MHz = 20, Modulation = 802.11b (DSSS 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



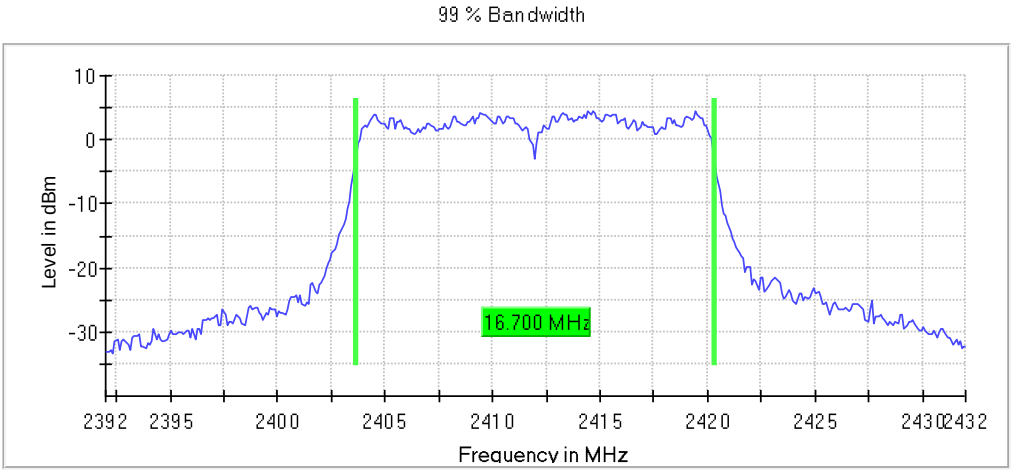
Frequency MHz = 2462.00000, Bandwidth MHz = 20, Modulation = 802.11b (DSSS 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



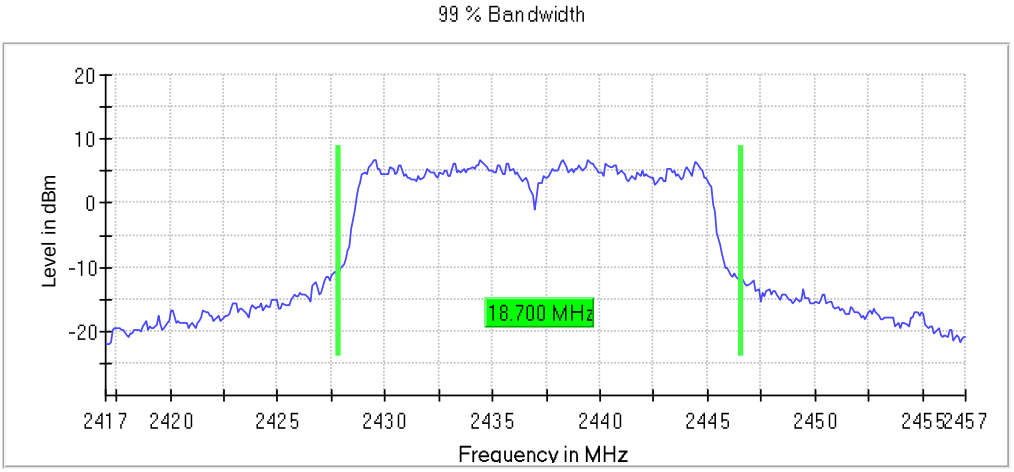
Frequency MHz = 2412.00000, Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



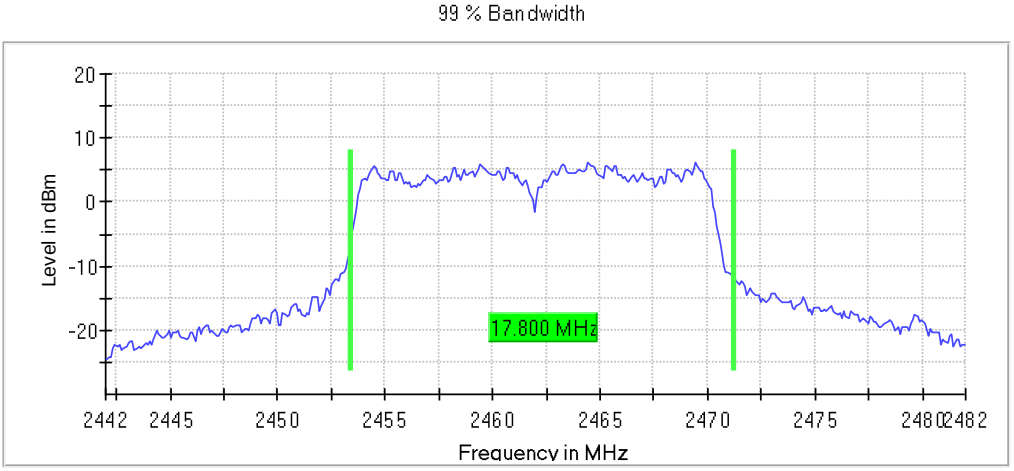
Frequency MHz = 2437.00000, Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



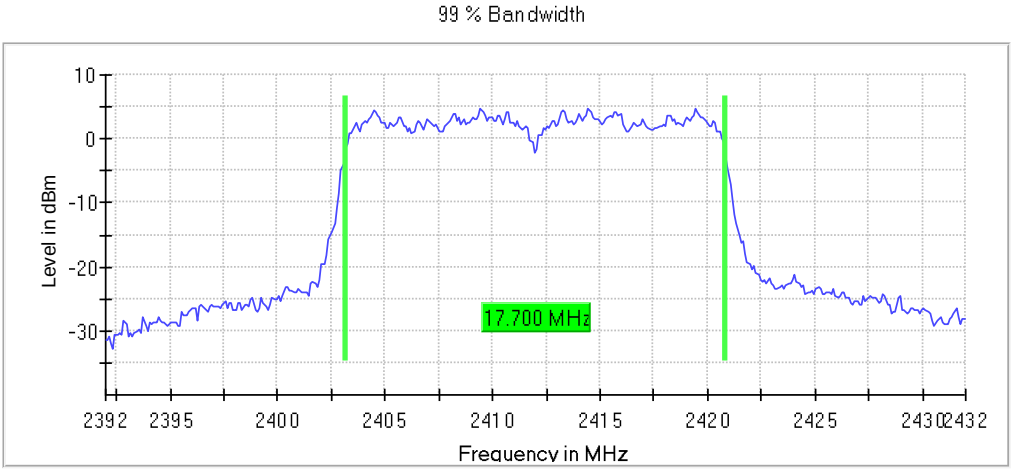
Frequency MHz = 2462.00000, Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



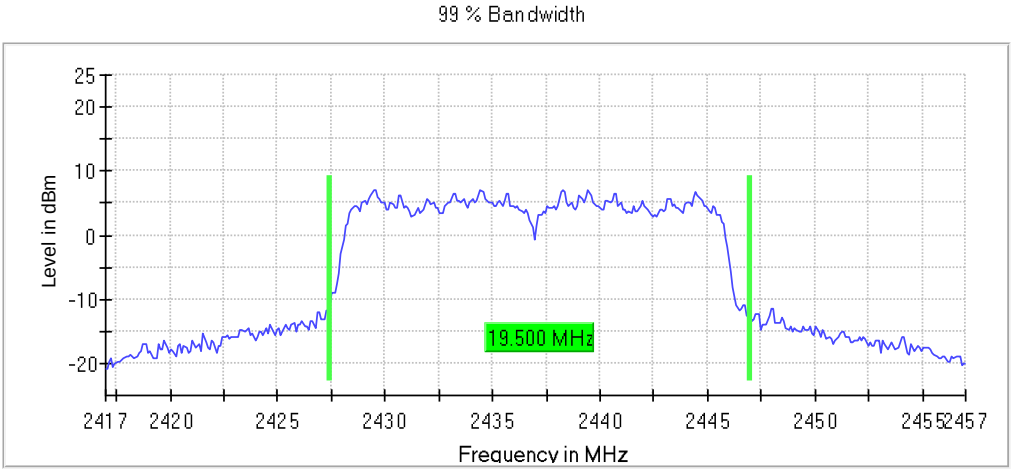
Frequency MHz = 2412.00000, Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1

Images:



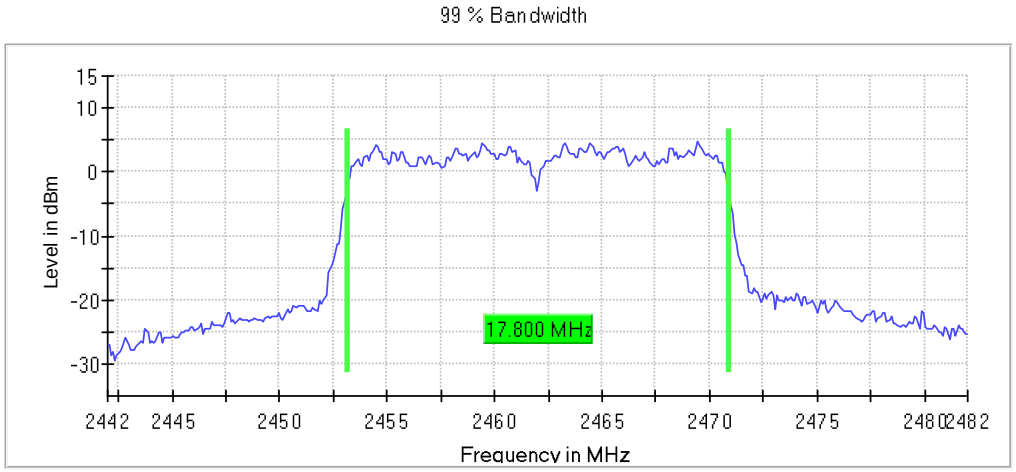
Frequency MHz = 2437.00000, Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1

Images:



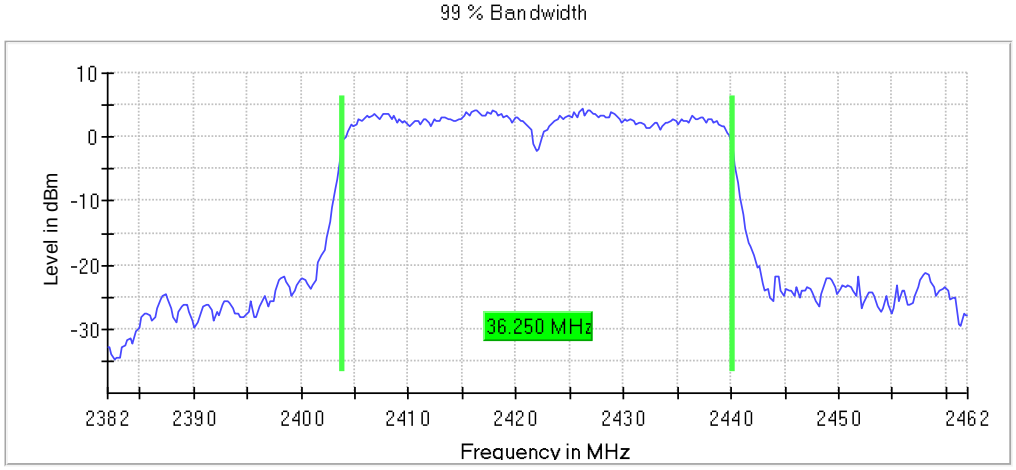
Frequency MHz = 2462.00000, Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1

Images:



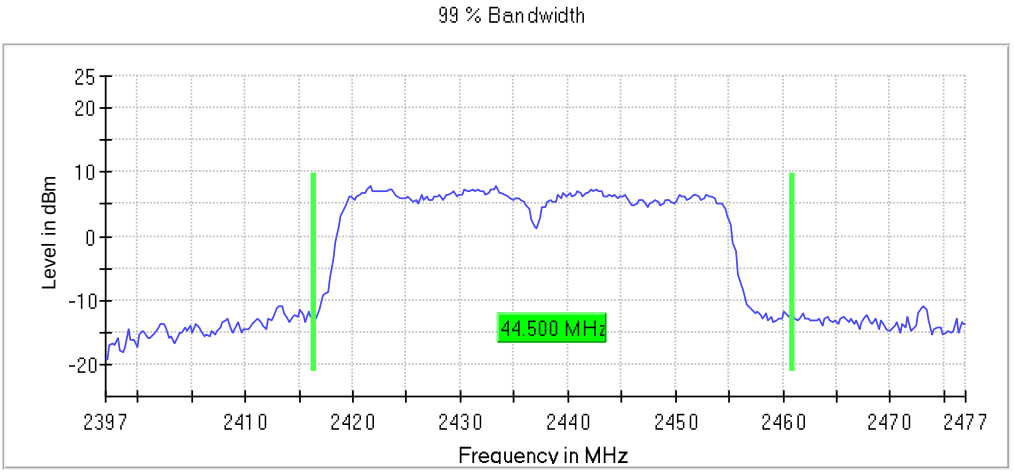
Frequency MHz = 2422.00000, Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1

Images:



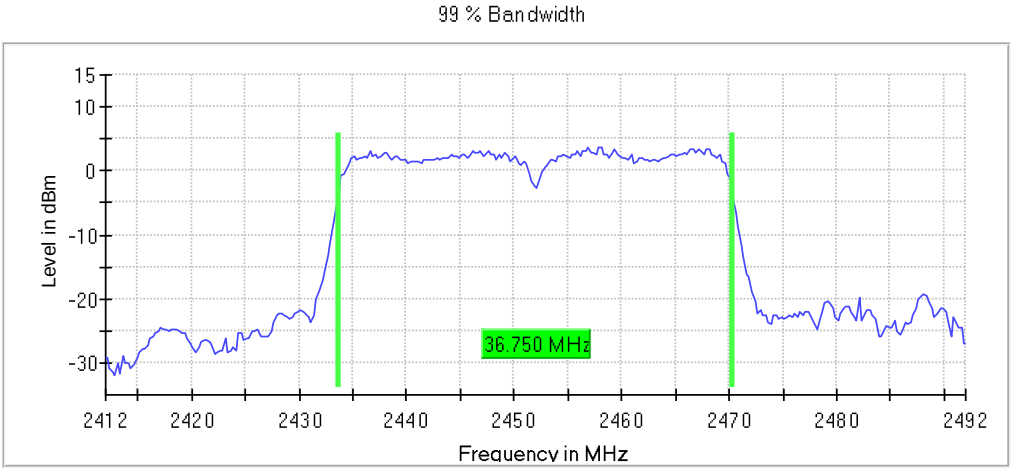
Frequency MHz = 2437.00000, Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1

Images:



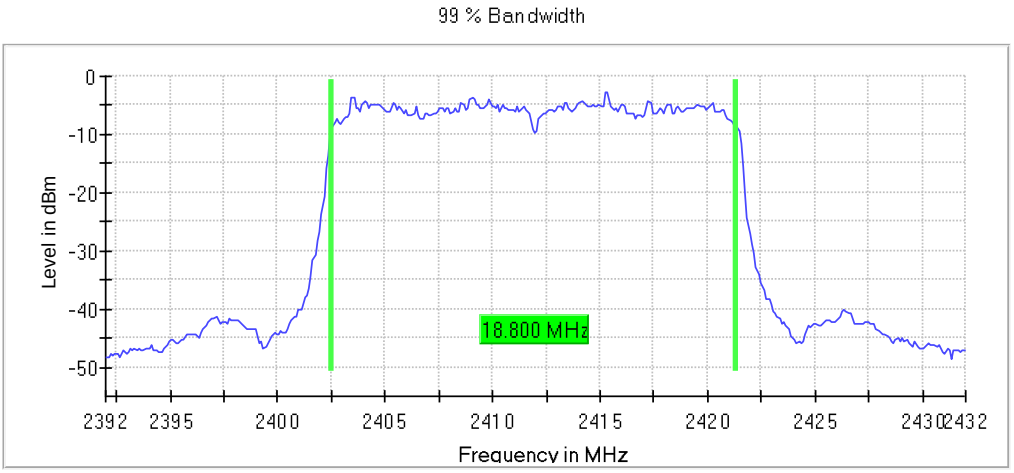
Frequency MHz = 2452.00000, Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1

Images:



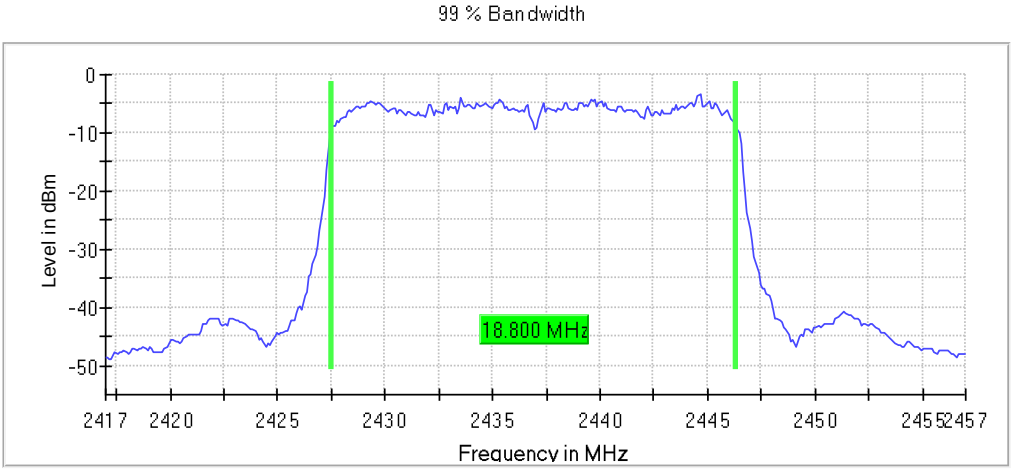
Frequency MHz = 2412.00000, Bandwidth MHz = 20, Modulation = 802.11ax HE20 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - SU Full-channel allocation

Images:



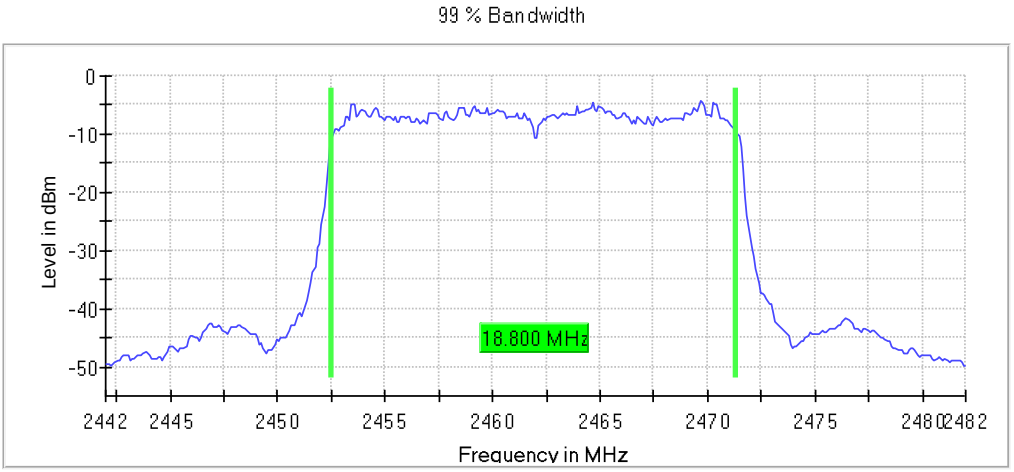
Frequency MHz = 2437.00000, Bandwidth MHz = 20, Modulation = 802.11ax HE20 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - SU Full-channel allocation

Images:



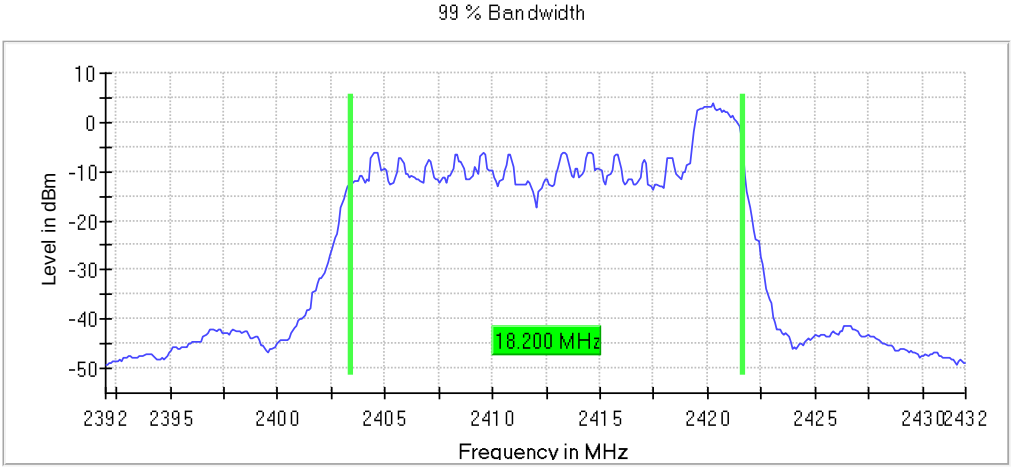
Frequency MHz = 2462.00000, Bandwidth MHz = 20, Modulation = 802.11ax HE20 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - SU Full-channel allocation

Images:



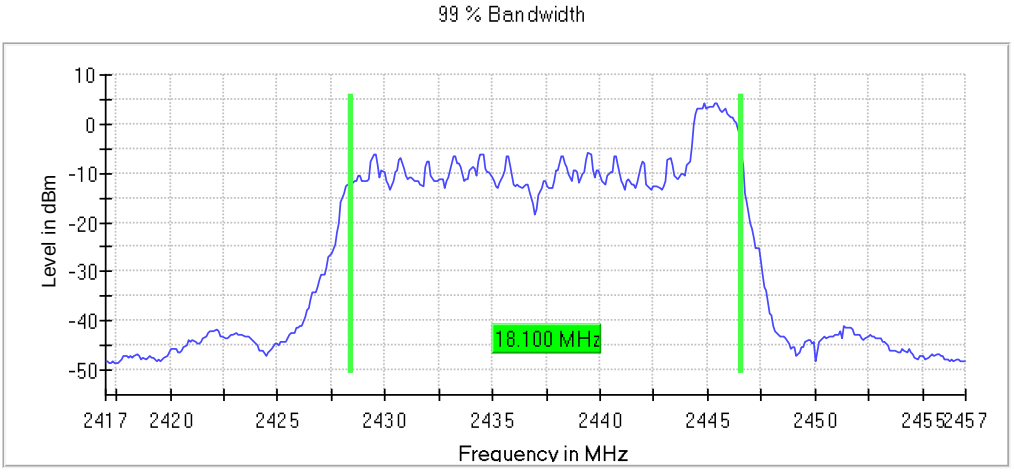
Frequency MHz = 2412.00000, Bandwidth MHz = 20, Modulation = 802.11ax HE20 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - RU Subcarrier allocation

Images:



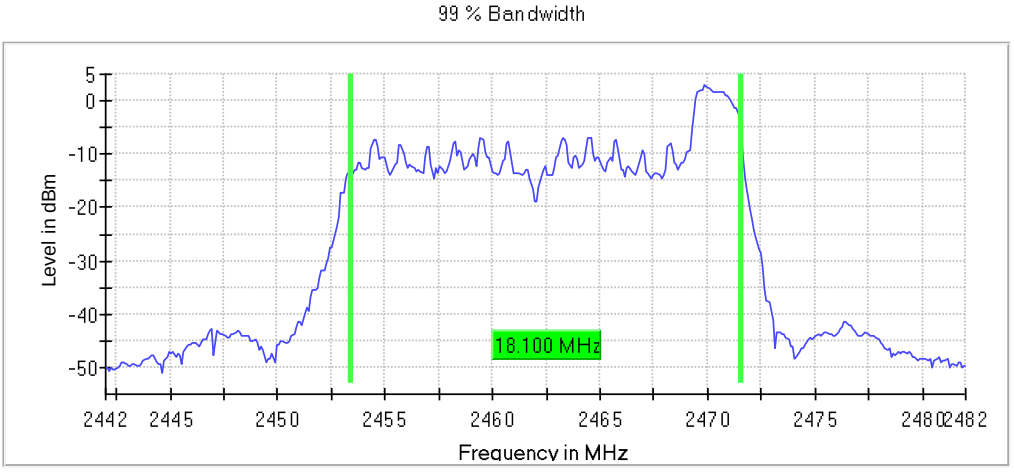
Frequency MHz = 2437.00000, Bandwidth MHz = 20, Modulation = 802.11ax HE20 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - RU Subcarrier allocation

Images:



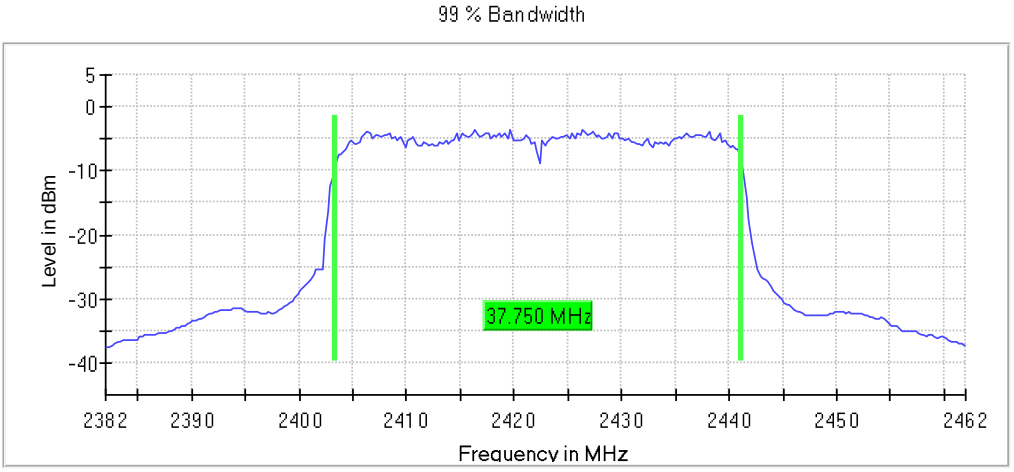
Frequency MHz = 2462.00000, Bandwidth MHz = 20, Modulation = 802.11ax HE20 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - RU Subcarrier allocation

Images:



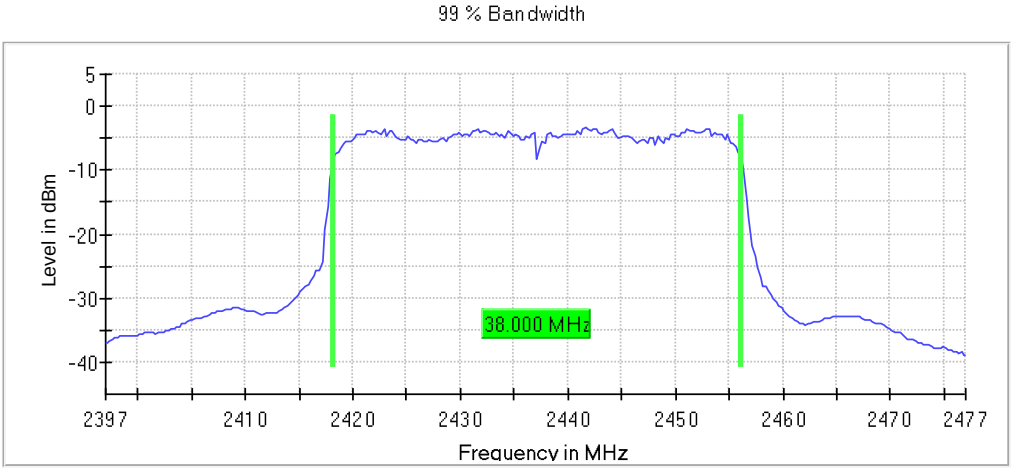
Frequency MHz = 2422.00000, Bandwidth MHz = 40, Modulation = 802.11ax HE40 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - SU Full-channel allocation

Images:



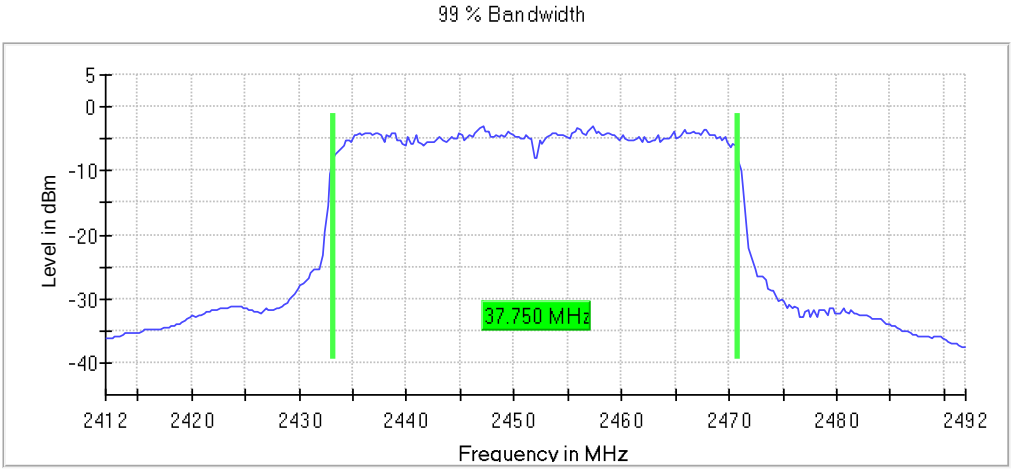
Frequency MHz = 2437.00000, Bandwidth MHz = 40, Modulation = 802.11ax HE40 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - SU Full-channel allocation

Images:



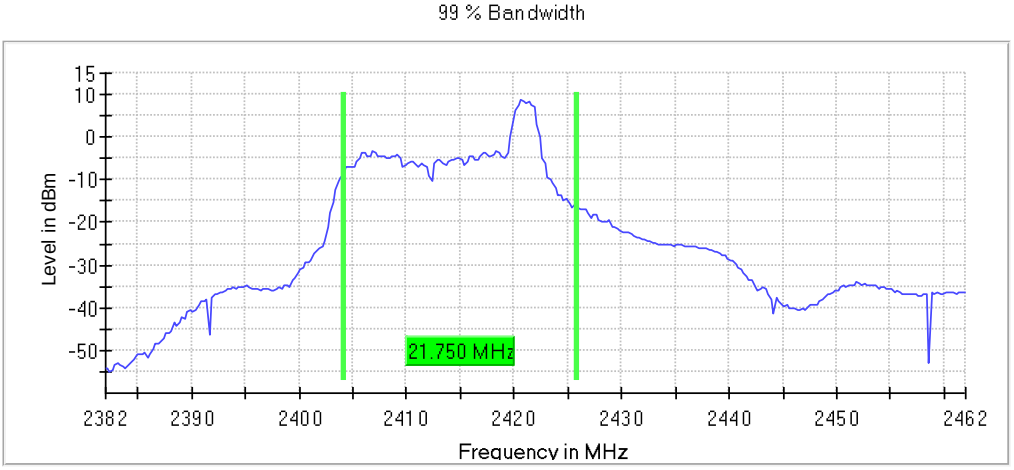
Frequency MHz = 2452.00000, Bandwidth MHz = 40, Modulation = 802.11ax HE40 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - SU Full-channel allocation

Images:



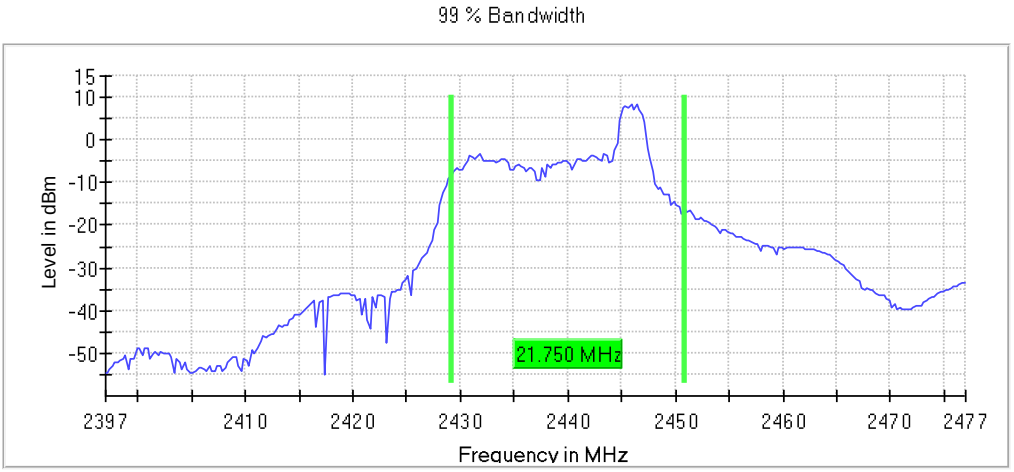
Frequency MHz = 2422.00000, Bandwidth MHz = 40, Modulation = 802.11ax HE40 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - RU Subcarrier allocation

Images:



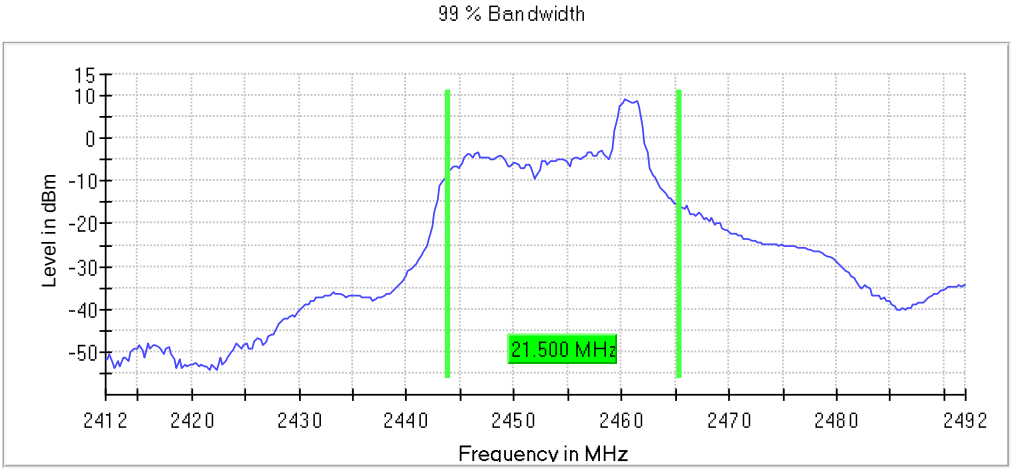
Frequency MHz = 2437.00000, Bandwidth MHz = 40, Modulation = 802.11ax HE40 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - RU Subcarrier allocation

Images:



Frequency MHz = 2452.00000, Bandwidth MHz = 40, Modulation = 802.11ax HE40 SS1 (OFDM MCS5), Number of Transmission Chains = 1, Active Port = 1 - RU Subcarrier allocation

Images:



Spectrum Analyzer Parameters

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.39200 GHz	2.41700 GHz	2.44200 GHz
Stop Frequency	2.43200 GHz	2.45700 GHz	2.48200 GHz
Span	40.00 MHz	40.000 MHz	40.000 MHz
RBW	200.000 kHz	200.000 kHz	200.000 kHz
VBW	1.000 MHz	1.000 MHz	1.000 MHz
Sweep Points	400	400	400
Sweep time	28.447 µs	28.447 µs	28.447 µs
Reference Level	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	100	100	100
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	15 / max. 150	16 / max. 150	16 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.04 dB	0.02 dB	0.32 dB

RSS-247 5.2 (b) / FCC 15.247 (e) - Power spectral density

Limits
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Chipset 1
Sample ID: S/01

Modulation: 802.11b (DSSS 1 Mbit/s)
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	PSD (dBm)
2412.00000	20	1	1	5.96
2437.00000	20	1	1	5.89
2462.00000	20	1	1	5.70

Modulation: 802.11g (OFDM 6 Mbit/s)
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	PSD (dBm)
2412.00000	20	1	1	0.32
2437.00000	20	1	1	2.59
2462.00000	20	1	1	1.87

Modulation: 802.11n HT20 (OFDM MCS5)
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	PSD (dBm)
2412.00000	20	1	1	0.10
2437.00000	20	1	1	2.14
2462.00000	20	1	1	0.10

Modulation: 802.11n HT40 (OFDM MCS5)
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	PSD (dBm)
2422.00000	40	1	1	-4.15
2437.00000	40	1	1	-54.0
2452.00000	40	1	1	-4.69

Modulation: 802.11ax HE20 SS1 (OFDM MCS5) - SU Full-channel allocation
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	PSD (dBm)
2412.00000	20	1	1	-9.39
2437.00000	20	1	1	-9.44
2462.00000	20	1	1	-8.72

Modulation: 802.11ax HE20 SS1 (OFDMA MCS5) - RU Subcarrier allocation
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	PSD (dBm)
2412.00000	20	1	1	-2.34
2437.00000	20	1	1	-2.65
2462.00000	20	1	1	-3.46

Modulation: 802.11ax HE40 SS1 (OFDM MCS5) - SU Full-channel allocation
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	PSD (dBm)
2422.00000	40	1	1	-13.61
2437.00000	40	1	1	-9.19
2452.00000	40	1	1	-13.57

Modulation: 802.11ax HE40 SS1 (OFDMA MCS5) - RU Subcarrier allocation
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	PSD (dBm)
2422.00000	40	1	1	-2.49
2437.00000	40	1	1	-2.54
2452.00000	40	1	1	-1.77

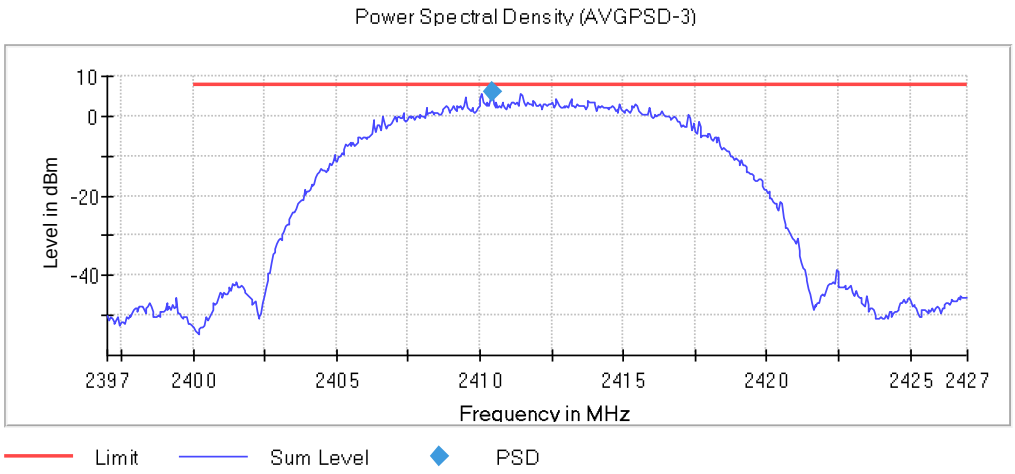
Verdict

Pass

Attachments

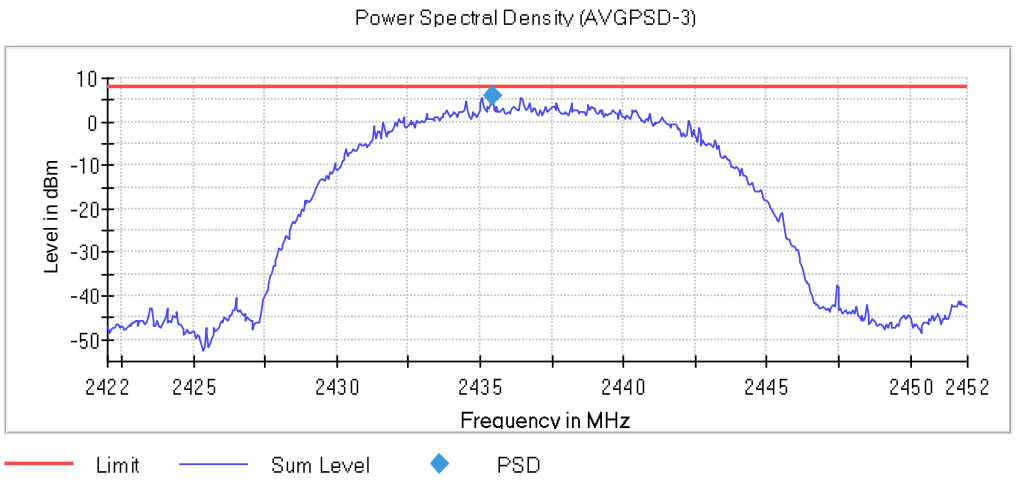
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11b (DSSS 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



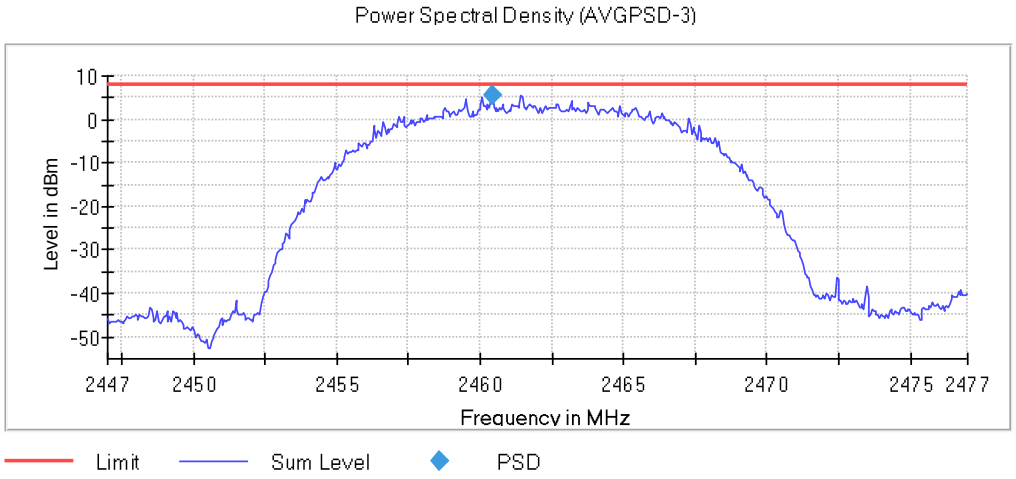
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11b (DSSS 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



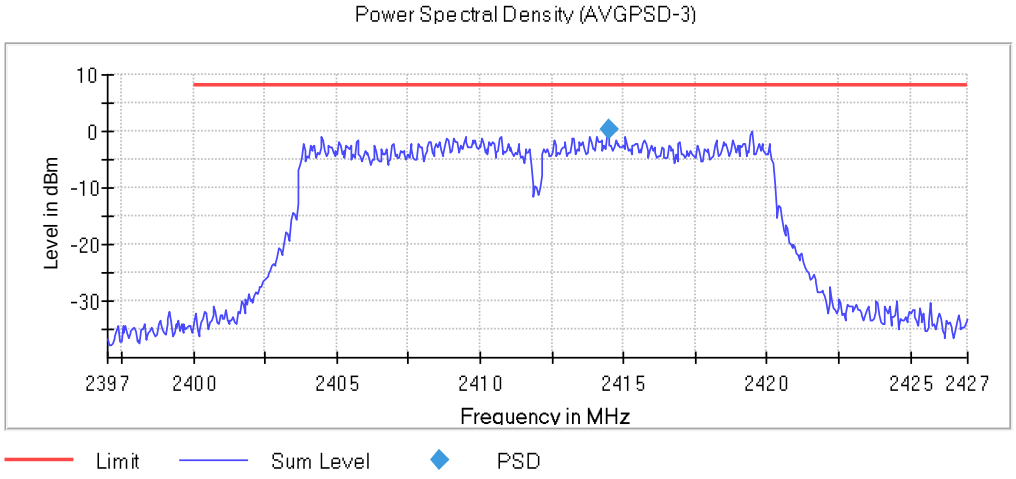
Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11b (DSSS 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



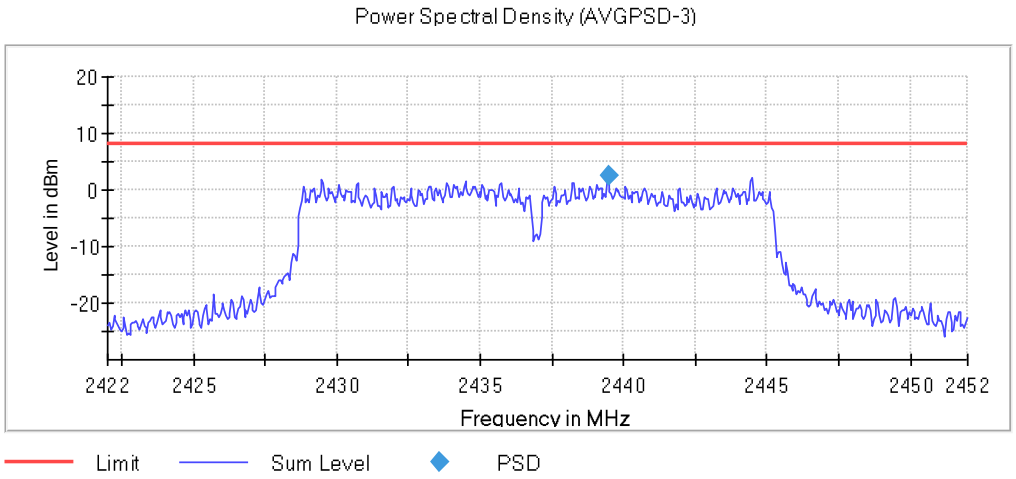
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images: