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:
3669ERM.006A1

Test Report

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

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

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

(*) Identification of item tested	Infotainment Head Unit
(*) Trademark	BMW
(*) Model and /or type reference	IDC23H
Other identification of the product	FCC ID: T8GIDC23H IC: 6434A-IDC23H
(*) Features	Bluetooth classic; BLE; Wi-Fi 2.4GHz; Wi-Fi 5GHz; GNSS
Manufacturer	HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH BECKER-GOERING-STR. 16; 76307 KARLSBAD GERMANY
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 Digitally signed by Domingo Galvez DN: cn=Domingo Galvez, o=DEKRA Certification Inc., ou=Regulatory Lab, email=dgalvez@dekra.com, c=US
Date of issue	01-04-2023
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 the main functionalities are Navigation, USB, voice recognition and several interfaces to the vehicle and Bluetooth / WLAN. The Head-unit provides different interfaces like: AR-CAM input, Video-out APIX3 (for the connection of an external Display), 3 USB interfaces.

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 used for testing have been selected by: The client.

Sample S/01 is composed of the following elements:

Id	Control Number	Description	Model	Serial Nº	Date of Reception	Application
S/01	3669/01	Infotainment Head Unit - non beam forming sample	IDC23	B44449N035900002	04/07/2022	Element Under Test
S/01	3669/03	Infotainment Head Unit - beam forming sample	IDC23	B44439N035900012	4/7/2022	Element Under Test

Sample S/01 is composed of the following accessories:

Id	Control Number	Description	Model	Serial Nº	Date of Reception	Application
S/01	3669/05	Harness	MGU22 RF	-	04/07/2022	Accessory
S/01	3669/09	Quad mate AXZ - High speed Fakra to SMA (male)	MGU22 RF	-	04/07/2022	Accessory
S/01	3171/18	GPS Antenna	Taoglas-Magma AA.171	171TT20120060	03/12/2021	Accessory
S/01	3669/37	BR-Adapter	--	--	4/7/2022	Accessory
S/01	3669/44	Ethernet to USB Adapter	UE300	220B191005905	4/7/2022	Accessory
S/01	3171/11	Ethernet Cable	-	-	03/05/2021	Accessory

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

Sample S/02 is composed of the following elements:

Id	Control Number	Description	Model	Serial Nº	Date of Reception	Application
S/01	3669/01	Infotainment Head Unit - non beam forming sample	IDC23	B44449N035900002	04/07/2022	Element Under Test
S/02	2874/73	Antenna	--		10/22/2021	

Sample S/02 is composed of the following accessories:

Id	Control Number	Description	Model	Serial Nº	Date of Reception	Application
S/02	3669/05	Harness	MGU22 RF	-	04/07/2022	Accessory
S/02	3669/09	Quad mate AXZ - High speed Fakra to SMA (male)	MGU22 RF	-	04/07/2022	Accessory
S/02	3171/18	GPS Antenna	Taoglas-Magma AA.171	171TT20120060	03/12/2021	Accessory
S/02	3669/37	BR-Adapter	--	--	4/7/2022	Accessory
S/02	3669/44	Ethernet to USB Adapter	UE300	220B191005905	4/7/2022	Accessory
S/02	3171/11	Ethernet Cable	-	-	03/05/2021	Accessory
S/01	3669/11	BT/WLAN Antenna with SMA (male) connector	^/4 coax cable antenna BM	--	4/7/2022	Accessory

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

Test sample description

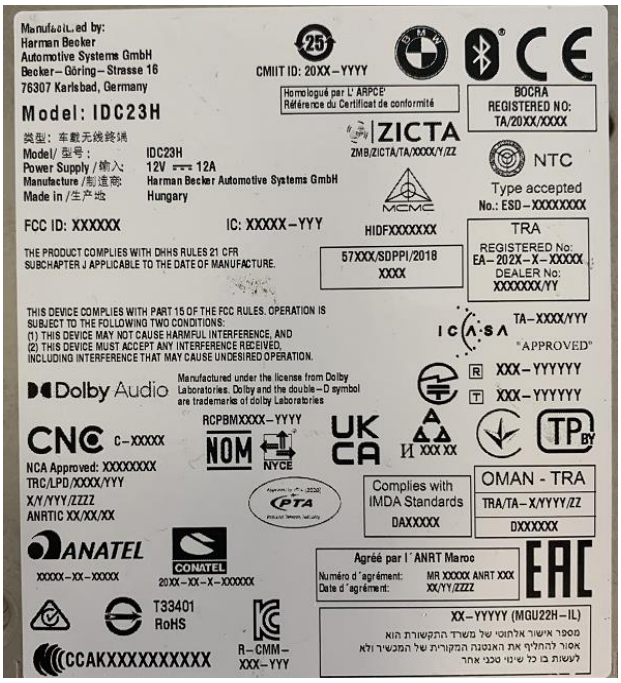
Test Sample description (compulsory information for EMC and RF testing services

Ports…… :	Port name and description		Cable			
			Specified length [m]	Attached during test	Shielded	
	BT/Wi-Fi Antenna		2	☒	☐	
	USB1/2/3		2	☒	☐	
	Power		2	☒	☐	
	CID		2	☒	☐	
	AR-Cam		2	☒	☐	
	100 Base T1/1G Base T1/GPS		2	☒	☐	
Supplementary information to the ports……:	No Data Provided					
Rated power supply .....:	Voltage and Frequency		Reference poles			
			L1	L2	L3	N
	☐	AC:	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐
	☒	DC: 8V to 16V				
	☐	DC:				
Rated Power .....:	No Data Provided					
Clock frequencies.....:	No Data Provided					
Other parameters .....:	No Data Provided					
Software version .....:	22w05.3-1-21					
Hardware version .....:	5.1.5					
Dimensions in cm (W x H x D) ....:	No Data Provided					
Mounting position .....:	☐	*Tabletop equipment*				
	☐	*Wall/Ceiling mounted equipment*				
	☐	*Floor standing equipment*				
	☐	*Hand-held equipment*				
	☒	*Other: Automotive*				
Modules/parts.....:	Module/parts of test item		Type		Manufacturer	
	No Data Provided					

Accessories (not part of the test item) .....:	Description	Type	Manufacturer
	No Data Provided		

Documents as provided by the applicant .....:	Description	File name	Issue date
	Declaration Equipment Data	FDT30_18 Declaration Equipment Data IDC23_8155_20220318	04/01/2022

Copy of marking plate:



(3) Only for Medical Equipment

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Identification of the client

HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH
BECKER-GOERING-STR. 16; 76307 KARLSBAD GERMANY

Testing period and place

Test Location	DEKRA Certification Inc.
Date (start)	2022-05-03
Date (finish)	2022-07-25

Document history

Report number	Date	Description
3669ERM.006	2022-08-01	First release.
3669ERM.006A1	01-04-2023	Second release. Added AX mode Partial RU test results in Appendix C. This modification test report cancels and replaces the test report 3669ERM.006

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, Nasir Khan and Koji Nishimoto.

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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
101	ESPEC CHMBER UNIT	19248	2022-02-28	2023-02-28
1039	FSV40 SIGNAL ANALYSER 40GHZ	101627	2020-09-24	2022-09-24
1107	ETHERNET SNMP THERMOMETER	60038026952	2020-08-16	2022-08-16
1313	WIRELESS MEASUREMENT SOFTWARE R&S WMS32	-	N/A	N/A

Radiated Measurements

CONTROL NUMBER	DESCRIPTION	Serial No	LAST CALIBRATION	NEXT CALIBRATION
981	LOW NOISE PREAMPLIFIER	1711156B	2020-11-10	2022-11-10
1012	ESR26 EMI TEST RECEIVER	101478	2022-04-12	2024-04-12
1014	FSV40 SIGNAL ANALYZER 40GHZ	101626	2021-05-19	2023-05-19
1056	3116C DOUBLE-RIDGED WAVEGUIDE HORN ANTENNAS	213179	2020-01-10	2023-01-10
1057	3115 DOUBLE-RIDGED WAVEGUIDE HORN ANTENNAS	211373	2020-06-03	2023-06-03
1065	3142E BICONILOG ANTENNA	208587	2020-08-13	2023-08-13
1111	ETHERNET SNMP THERMOMETER	60038026577	2020-08-16	2022-08-16
1179	SEMI-ANECHOIC CHAMBER	F169021	N/A	N/A
1314	WIRELESS MEASUREMENT SOFTWARE R&S EMC32	1040-OT102236	N/A	N/A

Testing verdicts

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

Summary

Bluetooth Low Energy

Requirement – Test case	FCC PART 15 PARAGRAPH / RSS-247	Verdict	Remark
RSS-247 5.2 (a) / FCC 15.247 (a) (2) 6 dB Bandwidth		Pass	N/A
RSS-247 5.2 (b) / FCC 15.247 (e) Power spectral density		Pass	N/A
RSS-247 5.4 (d) / FCC 15.247 (b) (3) Maximum Peak Conducted output power		Pass	N/A
RSS-247 5.5 / FCC 15.247 (d) Band-edge emissions compliance (Transmitter)		Pass	N/A
FCC 2.1049 / 99dBw Occupied Channel Bandwidth 99%		Pass	N/A
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Conducted		Pass	N/A
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Radiated		Pass	N/A
Supplementary information and remarks: None			

Bluetooth EDR

Requirement – Test case	FCC PART 15 PARAGRAPH / RSS-247	Verdict	Remark
RSS-247 5.1 (b) / FCC 15.247 (a) (1) 20 dB Bandwidth		Pass	N/A
RSS-247 5.1 (b) / FCC 15.247 (a) (1) Carrier Frequency Separation		Pass	N/A
RSS-247 5.1 (d) / FCC 15.247 (a) (1) (iii) Time of Occupancy (Dwell Time)		Pass	N/A
RSS-247 5.1 (d) / FCC 15.247 (a) (1) (iii) Number of hopping channels		Pass	N/A
RSS-247 5.4 (b) / FCC 15.247 (b) (1) Maximum Peak Conducted output power & Antenna gain		Pass	N/A
RSS-247 5.5 / FCC 15.247 (d) Band-edge emissions compliance (Transmitter) - Conducted		Pass	N/A
FCC 2.1049 / 99dBw Occupied Channel Bandwidth 99%		Pass	N/A
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Conducted		Pass	N/A
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Radiated		Pass	N/A
Supplementary information and remarks: None			

Wi-Fi 2.4GHz

Requirement – Test case	FCC PART 15 PARAGRAPH / RSS-247	Verdict	Remark
RSS-247 5.2 (a) / FCC 15.247 (a) (2) 6 dB Bandwidth		Pass	N/A
RSS-247 5.2 (b) / FCC 15.247 (e) Power spectral density		Pass	N/A
RSS-247 5.4 (d) / FCC 15.247 (b) (1) Maximum Average Conducted Output Power		Pass	N/A
RSS-247 5.5 / FCC 15.247 (d) Band-edge emissions compliance (Transmitter) - Conducted		Pass	N/A
FCC 2.1049 / 99dBw Occupied Channel Bandwidth 99%		Pass	N/A
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Conducted		Pass	N/A
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Radiated		Pass	N/A
Supplementary information and remarks: Appendix C1: SISO Appendix C2: MIMO			

Appendix A: Test results. Bluetooth Low Energy 5.0 (2M, 1M)

INDEX

PRODUCT INFORMATION

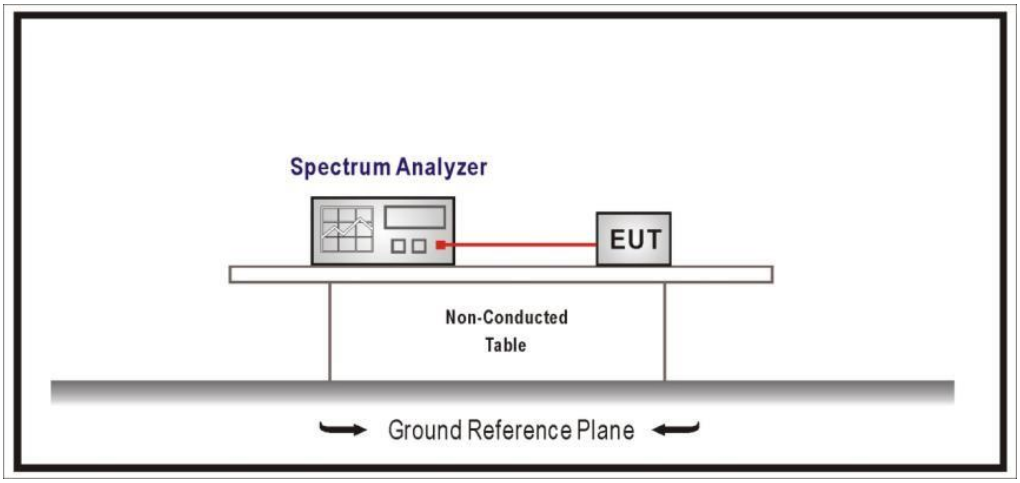
Information	Description
Modulation	BR/EDR: GFSK, π/4-DQPSK, 8-DPSK
Operation mode 1: Single Antenna Equipment	
- Operating Frequency Range	BR/EDR: 2400 - 2483.5 MHz
- Nominal Channel Bandwidth	BR/EDR: 1/ 1.5 MHz
- RF Output Power	BR/EDR: 4 dBm
Antenna type	1/4 wave coax
Antenna gain	-2.5 dBi
Nominal Voltage	
- Supply Voltage	12 Vdc
- Type of power source	DC voltage
Equipment type	Bluetooth
Geo-location capability	No

TEST CONDITIONS

(*): Data provided by the client.

TEST CONDITIONS	DESCRIPTION
TC#01 (1 Mbps)	Power supply (V): $V_{nominal}$ = 12 V dc Data Rate: 1 Mbps Bandwidth: 1 MHz Test Frequencies for Conducted/ Radiated tests: Lowest channel: 2402 MHz Middle channel: 2440 MHz Highest channel: 2480 MHz
TC#02 (2 Mbps)	Power supply (V): $V_{nominal}$ = 12 V dc Data Rate: 2 Mbps Bandwidth: 2 MHz Test Frequencies for Conducted/ Radiated tests: Lowest channel: 2402 MHz Middle channel: 2440 MHz Highest channel: 2480 MHz

CONDUCTED MEASUREMENTS:



RADIATED MEASUREMENTS:

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

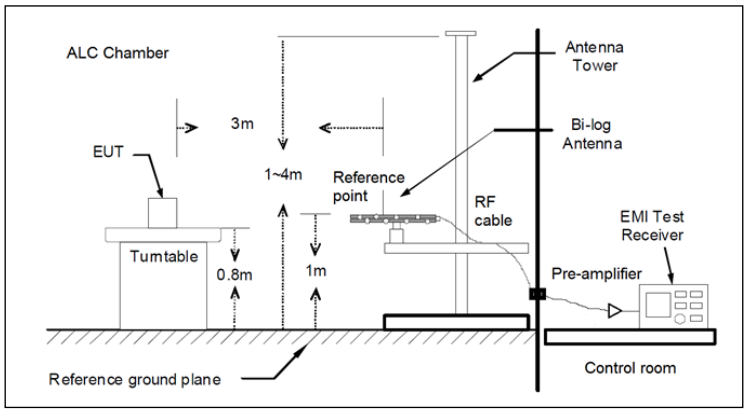


Fig A1: Radiated measurements Setup f < 1 GHz

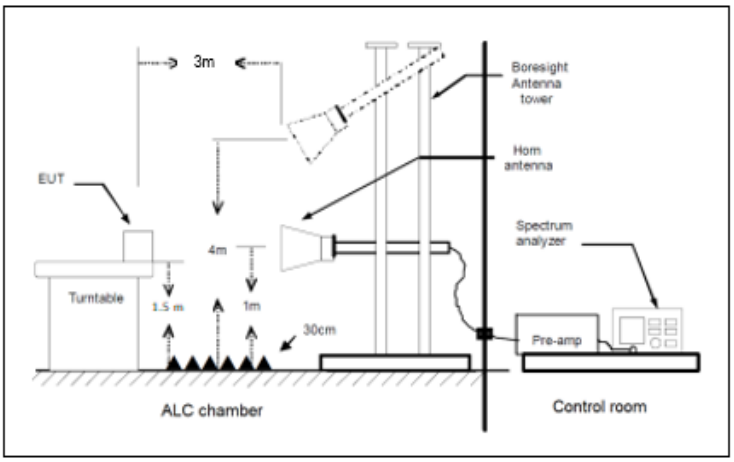


Fig A2: Radiated measurements setup f > 1-18 GHz

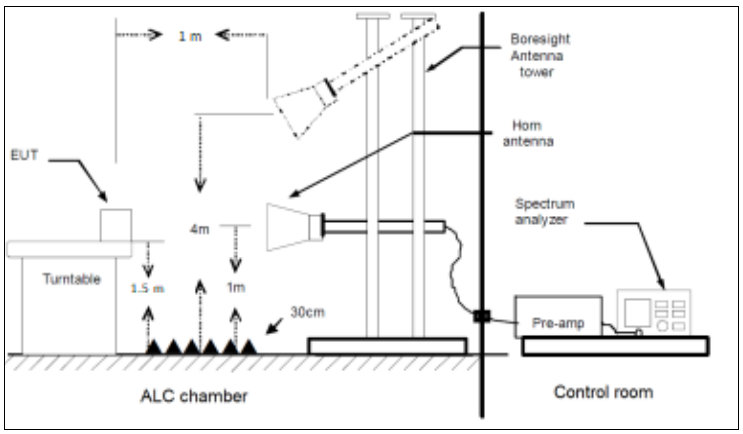


Fig A3: Radiated measurements setup f > 18 GHz

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.

Modulation: BTLE 5.1 (GFSK 2 Mbit/s)
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2402.00000				1.228
2440.00000	2	1	1	1.228
2480.00000				1.228

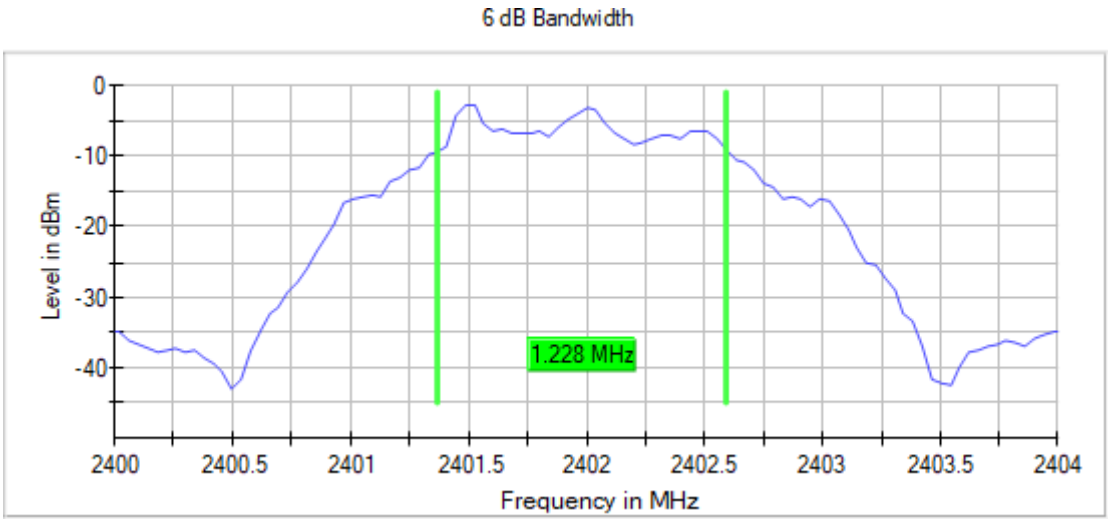
Verdict

Pass

Attachments

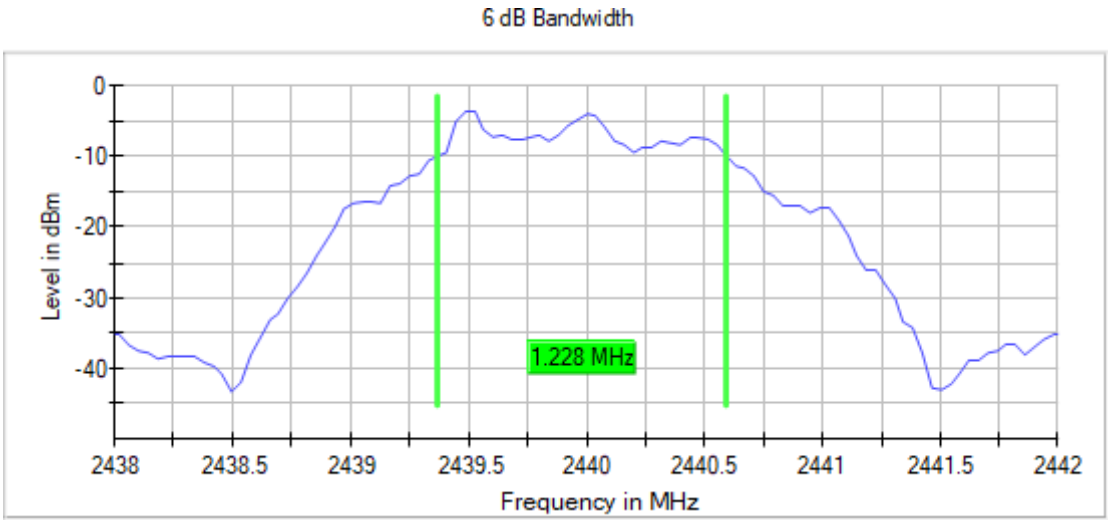
Frequency MHz = 2402.00000, Bandwidth MHz = 2, Modulation = BTLE 5.1 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



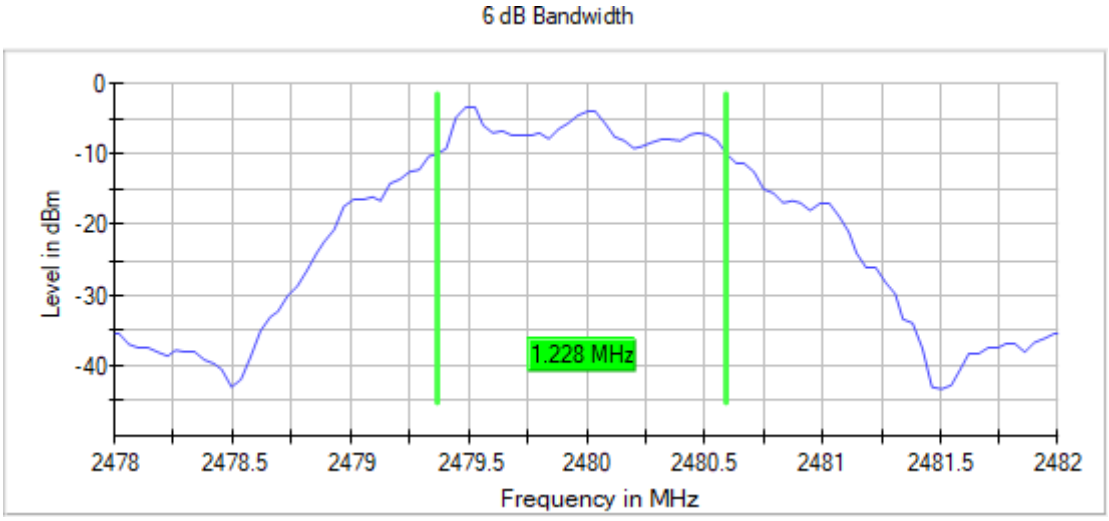
Frequency MHz = 2440.00000, Bandwidth MHz = 2, Modulation = BTLE 5.1 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Bandwidth MHz = 2, Modulation = BTLE 5.1 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BTLE 5.0 (GFSK 1 Mbit/s)
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2402.00000				0.713
2440.00000	1	1	1	0.713
2480.00000				0.713

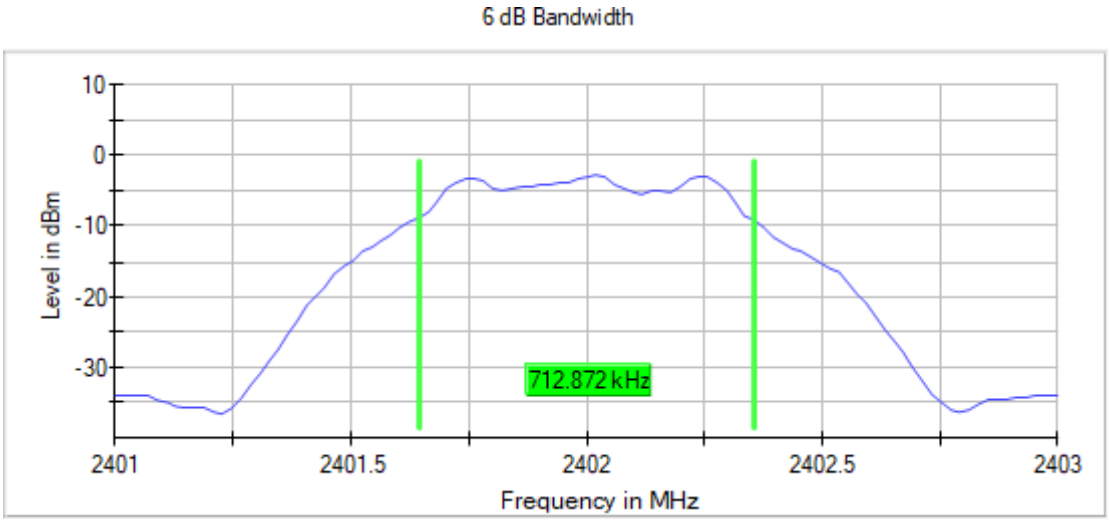
Verdict

Pass

Attachments

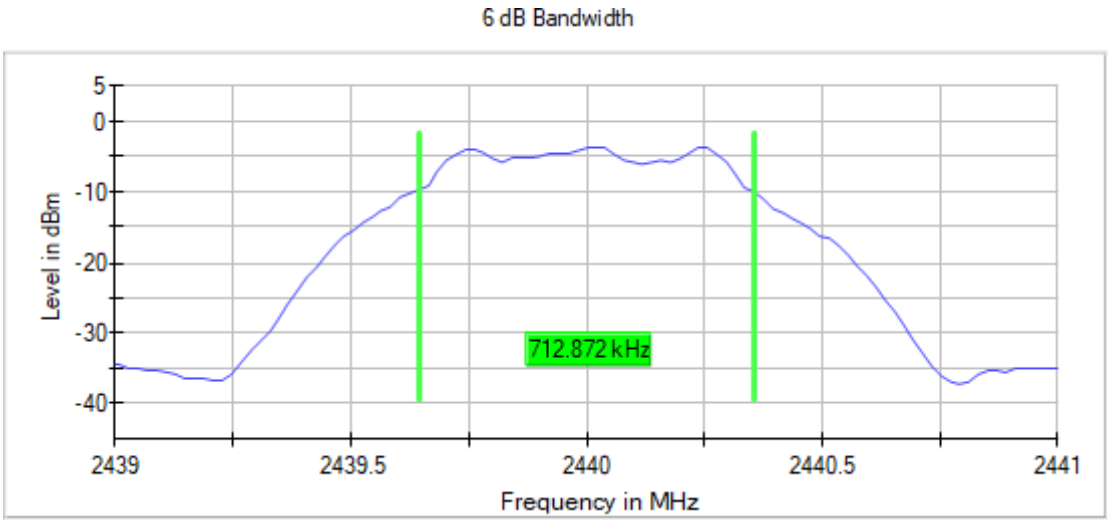
Frequency MHz = 2402.00000, Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



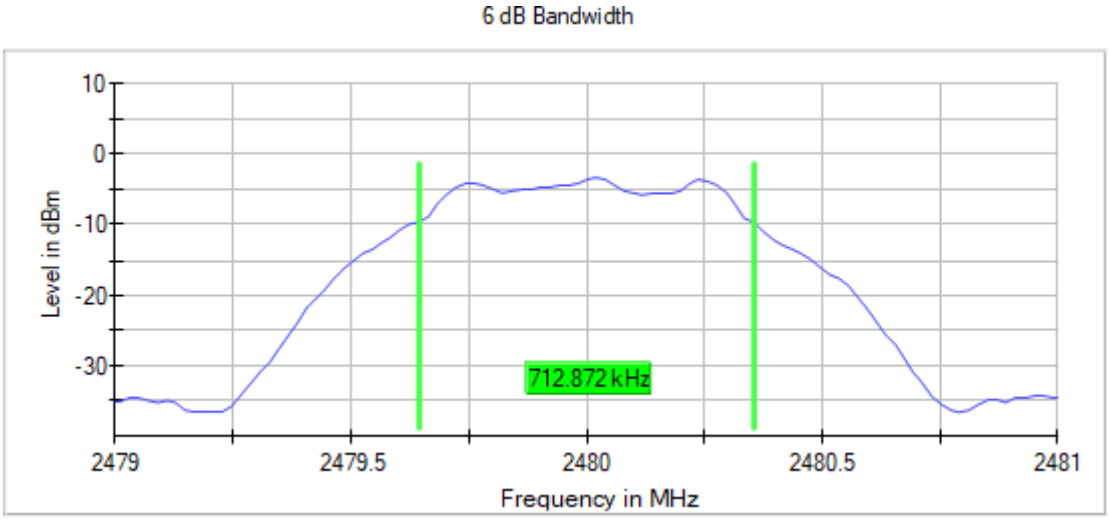
Frequency MHz = 2440.00000, Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



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.

Modulation: BTLE 5.1 (GFSK 2 Mbit/s)
Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	PSD (dBm)
2402.00000	Digital Transmission System (DTS)	2	1	1	-15.49
2440.00000					-16.29
2480.00000					-16.09

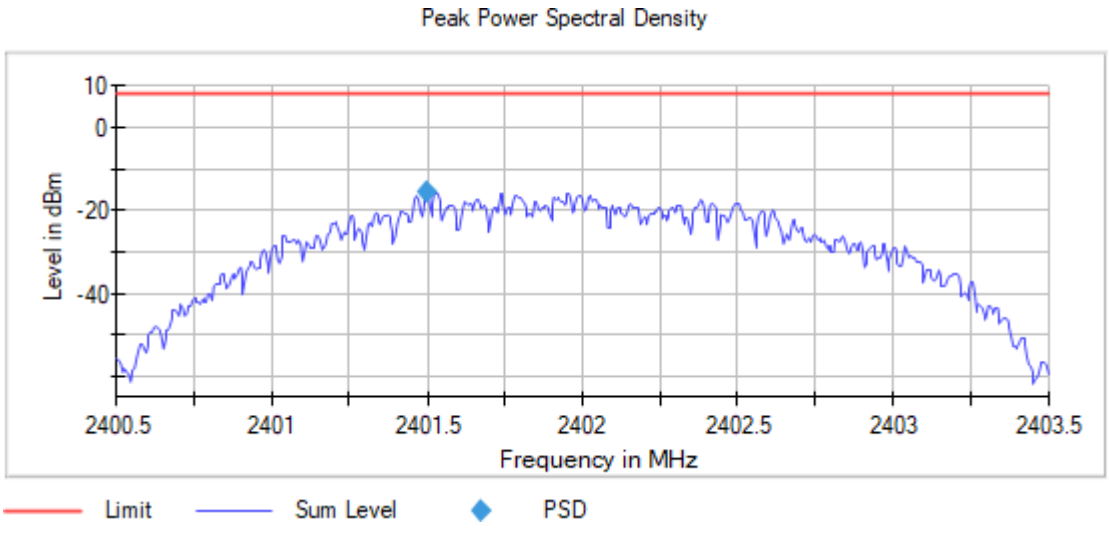
Verdict

Pass

Attachments

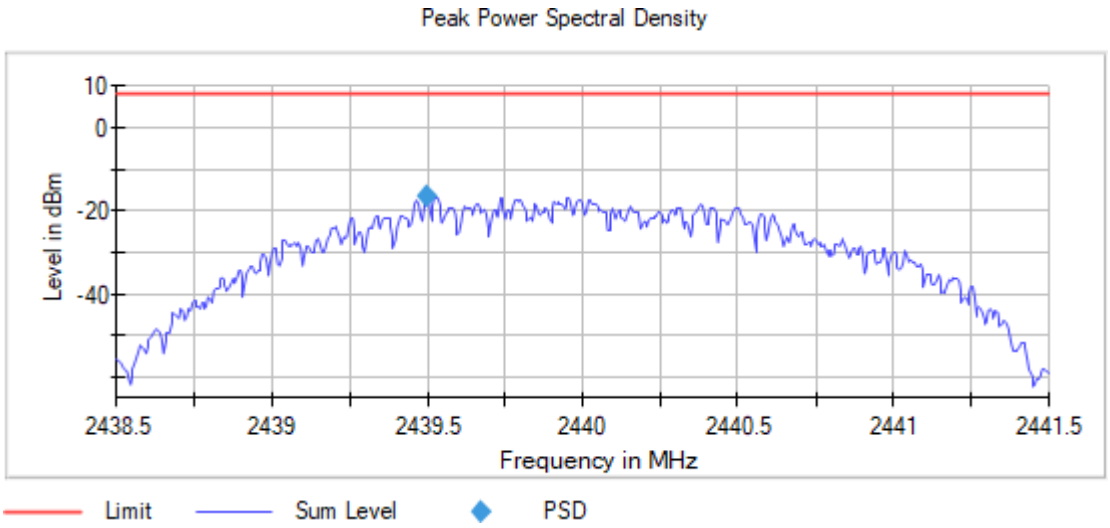
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.1 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



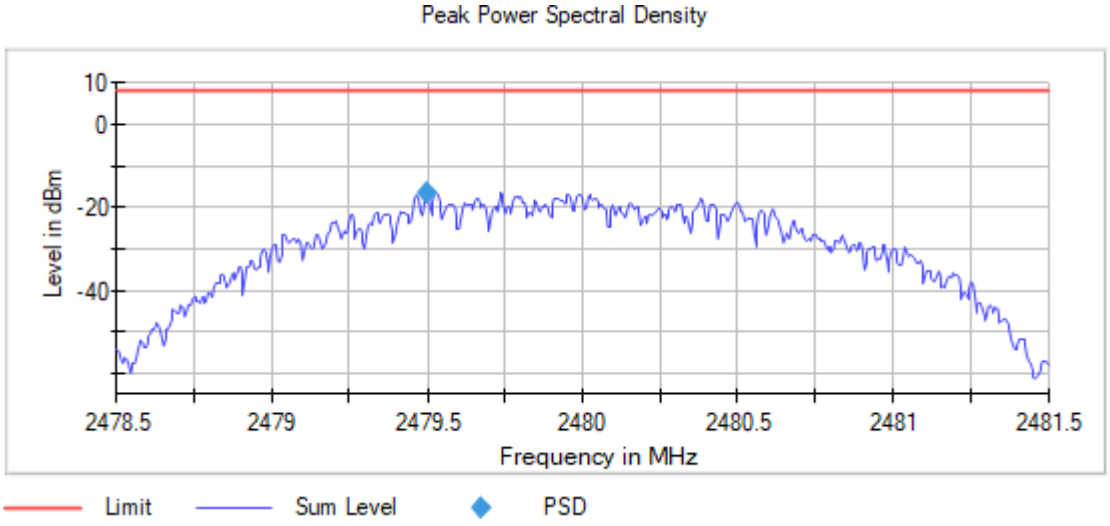
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.1 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.1 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BTLE 5.0 (GFSK 1 Mbit/s)
Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	PSD (dBm)
2402.00000	Digital Transmission System (DTS)	1	1	1	-12.19
2440.00000					-12.99
2480.00000					-12.74

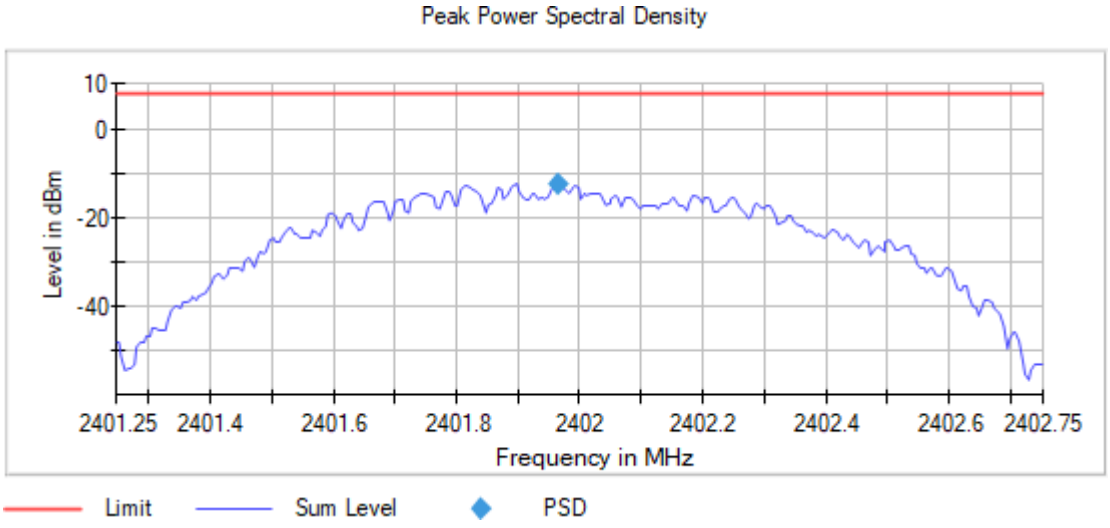
Verdict

Pass

Attachments

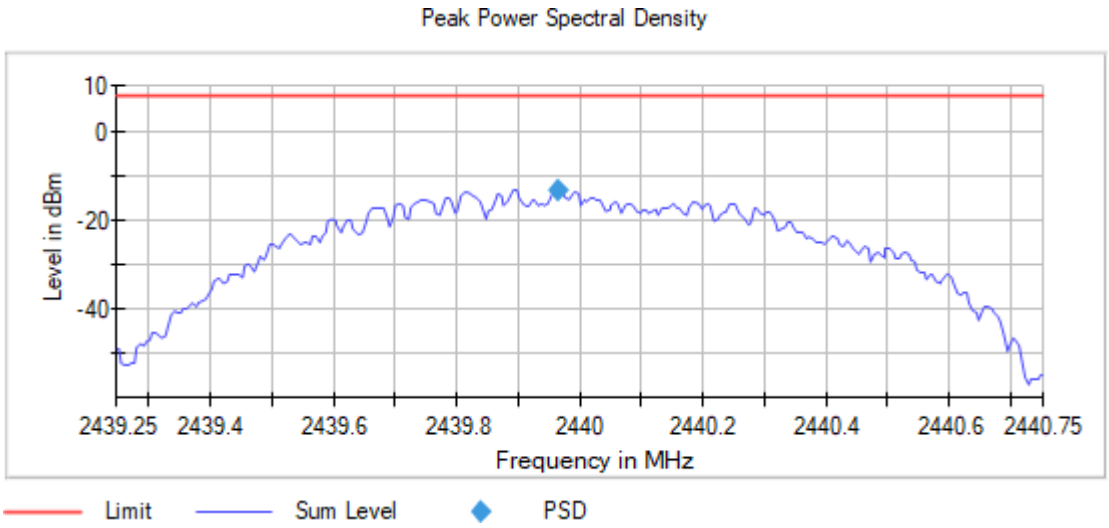
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



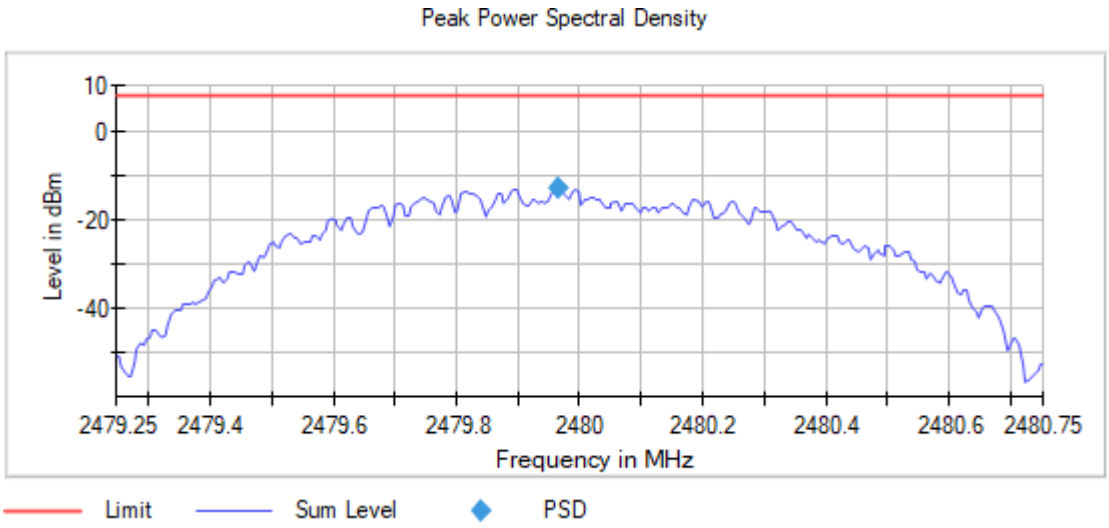
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



RSS-247 5.4 (d) / FCC 15.247 (b) (3) Maximum Peak Conducted output power

Limits

For systems using digital modulation in the 2400-2483.5 MHz band: 1 watt (30 dBm).

The e.i.r.p. shall not exceed 4 W (36 dBm) (Canada).

The maximum peak conducted output power level in the fundamental emission was measured using the method according to point 11.9.1.1 ”RBW ≥ DTS bandwidth” of ANSI C.63.10-2013.

Modulation: BTLE 5.1 (GFSK 2 Mbit/s)
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Peak Power (dBm)
2402.00000				-2.2
2440.00000	2	1	1	-3.1
2480.00000				-2.7

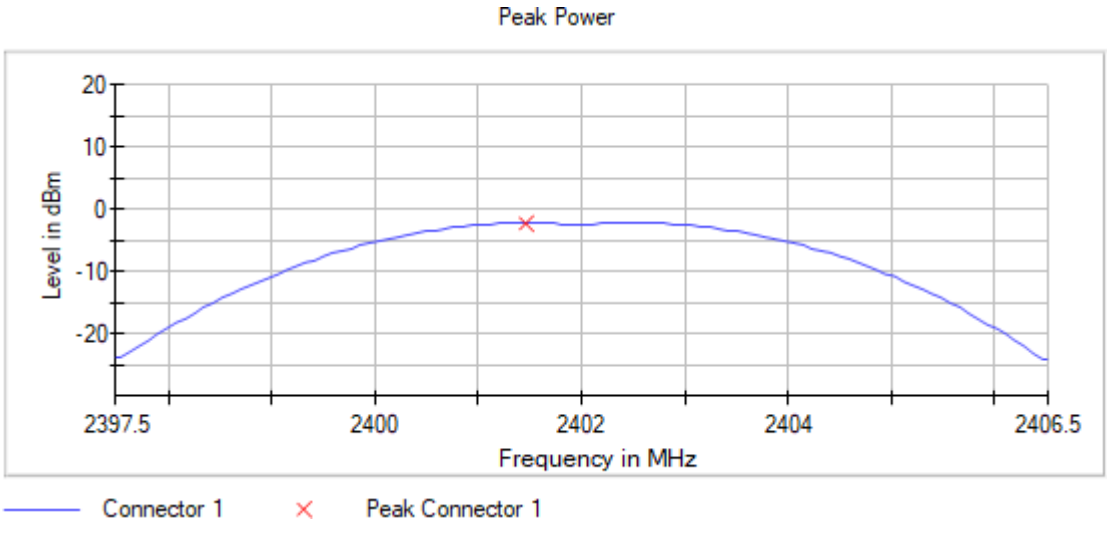
Verdict

Pass

Attachments

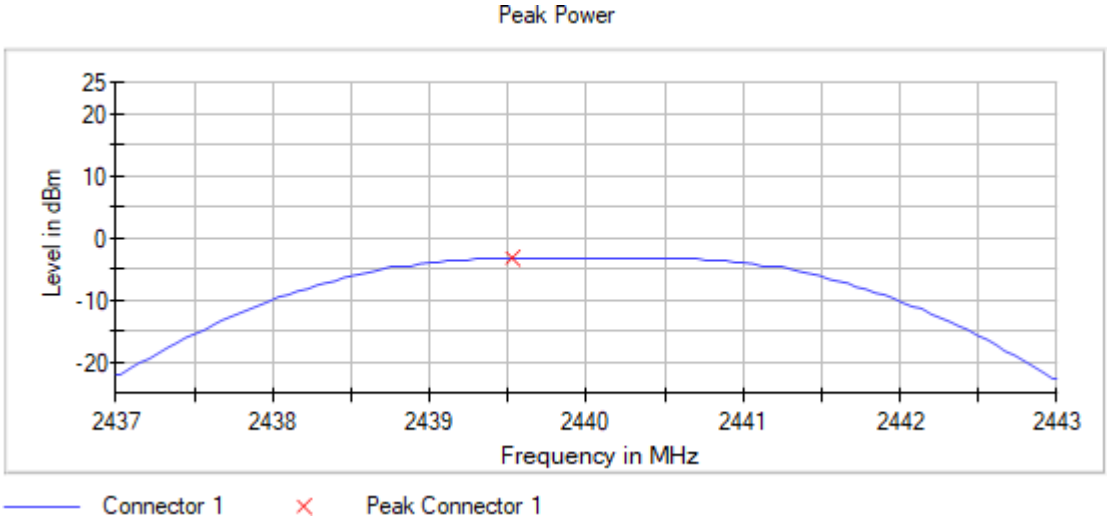
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.1 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



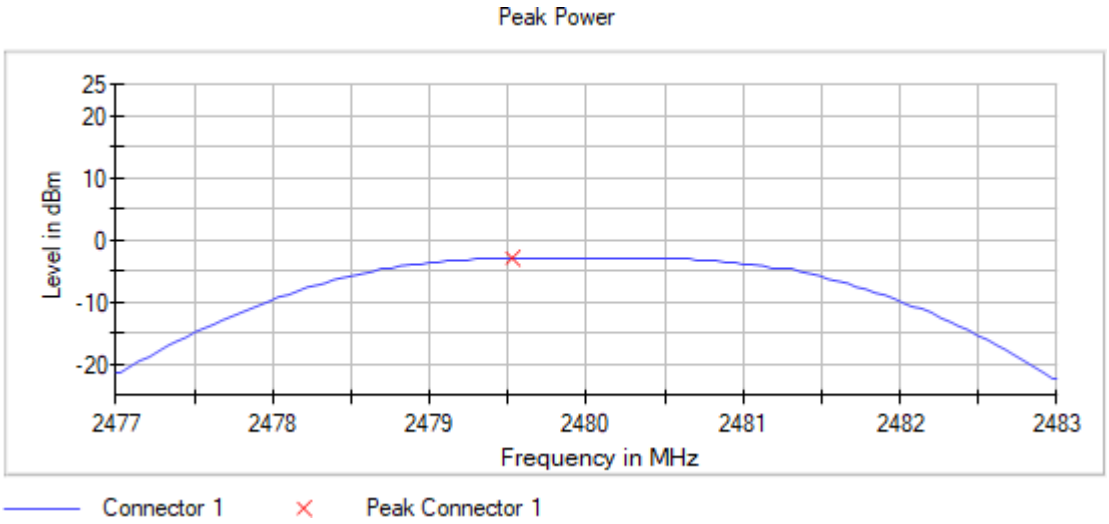
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.1 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.1 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BTLE 5.0 (GFSK 1 Mbit/s)
Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Peak Power (dBm)
2402.00000	Digital Transmission System (DTS)	1	1	1	-2.2
2440.00000					-3.1
2480.00000					-2.8

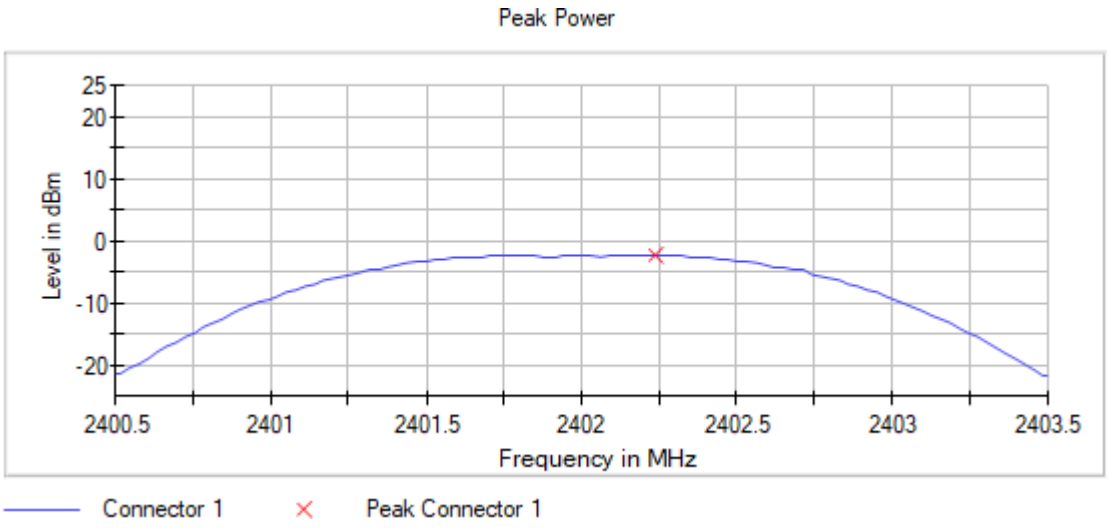
Verdict

Pass

Attachments

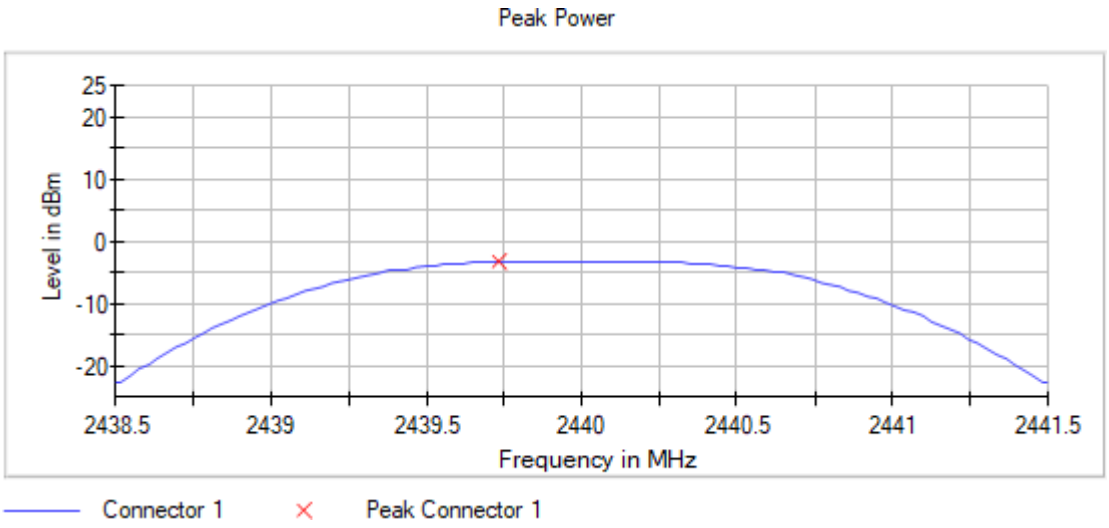
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



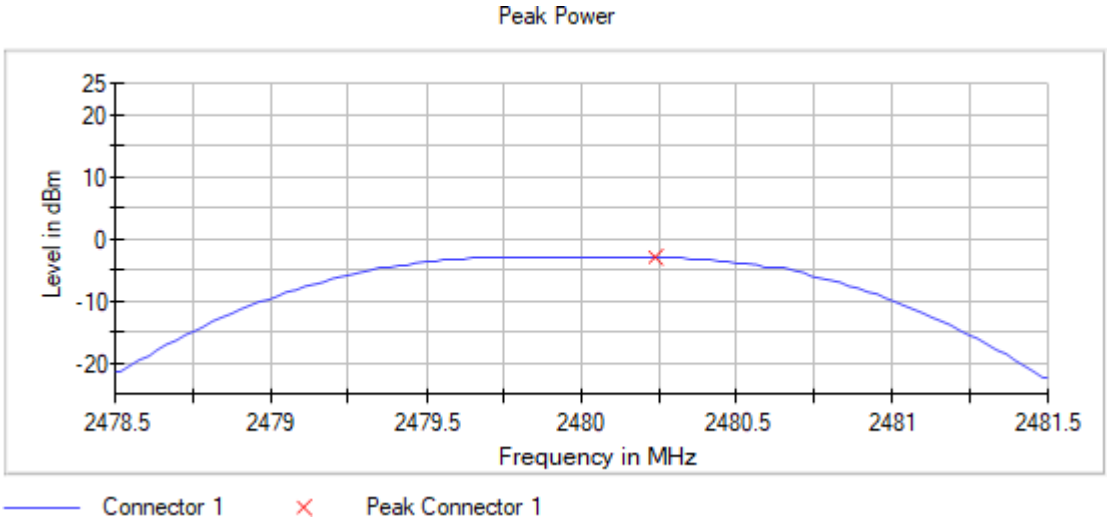
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



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

Limits

In any 100 kHz bandwidths outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Modulation: BTLE 5.1 (GFSK 2 Mbit/s)

Results

Freq (MHz)	Lvl (dBm)
2399.975000	-32.5
2399.925000	-34.7
2399.875000	-37.1
2399.825000	-40.8
2399.775000	-42.0
2399.725000	-44.0
2399.675000	-45.7
2399.625000	-46.6
2399.575000	-49.2
2487.075000	-54.2
2486.975000	-54.3
2485.625000	-54.4
2484.925000	-54.5
2483.525000	-54.5
2487.125000	-54.5
2485.575000	-54.7
2487.025000	-54.8
2498.275000	-54.8
2399.525000	-49.9
2399.475000	-50.5
2331.125000	-52.8
2399.425000	-52.9
2331.075000	-53.1
2399.375000	-53.5
2486.925000	-54.8
2496.175000	-54.8
2484.875000	-54.9

Freq (MHz)	Lvl (dBm)
2493.875000	-55.0
2497.075000	-55.1
2483.575000	-55.1

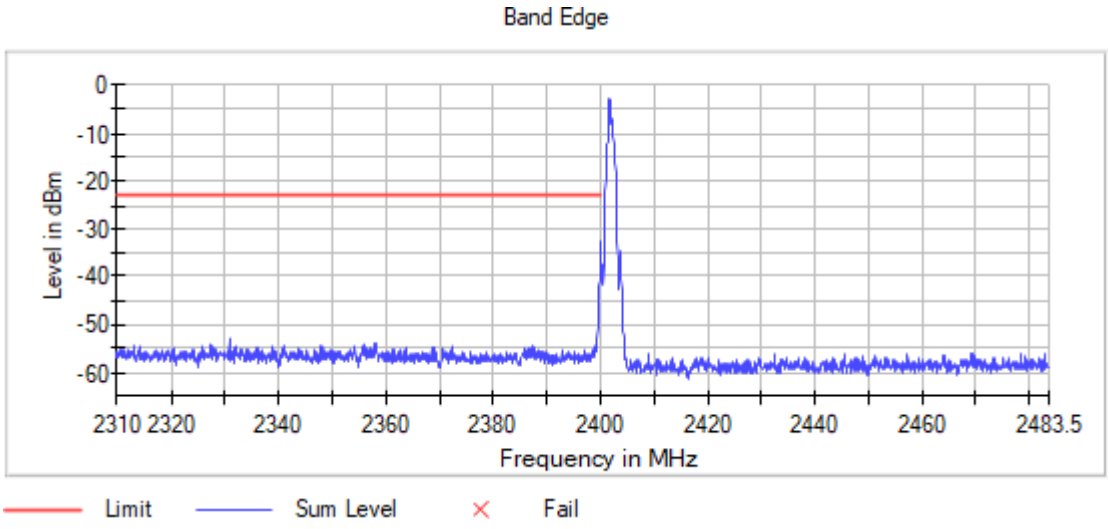
Verdict

Pass

Attachments

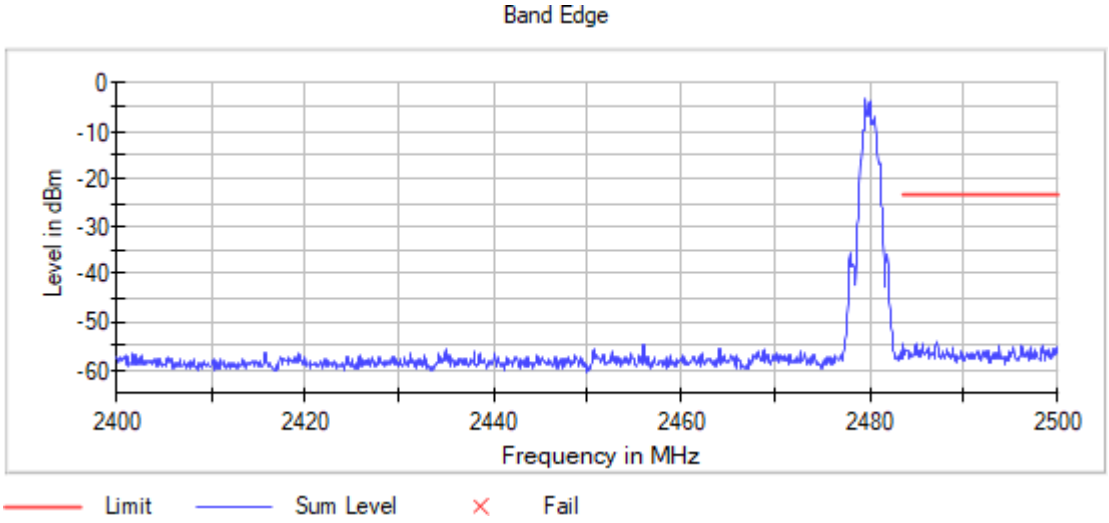
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.1 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.1 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Results

Freq (MHz)	Lvl (dBm)
2389.325000	-53.7
2358.025000	-53.7
2358.075000	-53.7
2389.275000	-53.7
2323.025000	-53.9
2366.225000	-53.9
2323.075000	-54.0
2366.275000	-54.0
2389.375000	-54.4
2493.575000	-54.1
2493.625000	-54.2
2499.975000	-54.5
2500.000000	-54.5
2483.675000	-54.6
2488.525000	-54.7
2488.575000	-54.8
2483.725000	-55.0
2483.825000	-55.1
2310.025000	-54.6
2310.000000	-54.6
2399.975000	-54.6
2383.575000	-54.6
2385.975000	-54.7
2399.925000	-54.7
2485.975000	-55.1
2488.625000	-55.2
2483.875000	-55.2
2486.025000	-55.3
2485.525000	-55.3
2483.625000	-55.4

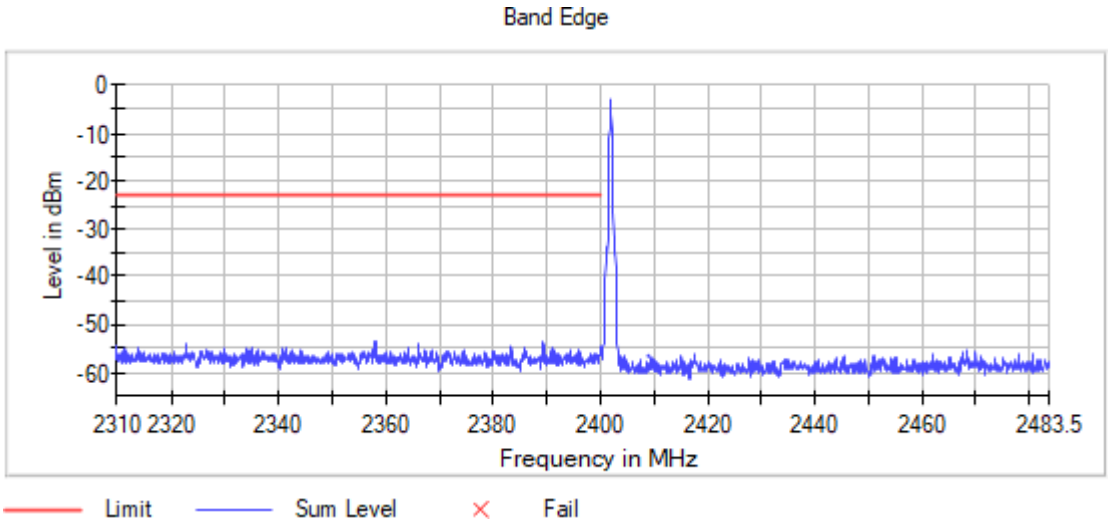
Verdict

Pass

Attachments

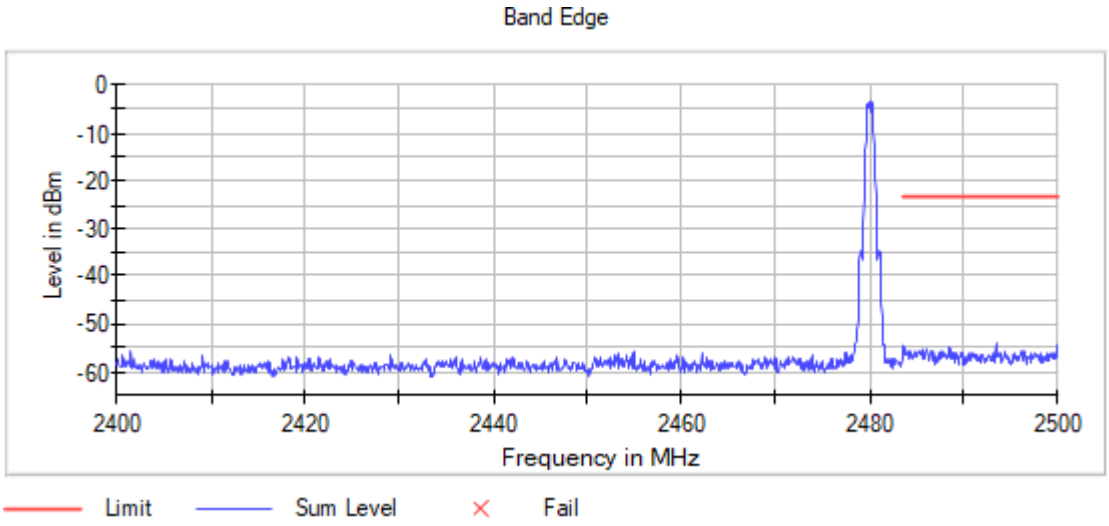
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



99dBw Occupied Channel Bandwidth 99%

Limits

No Limit has been set to this test case

Modulation: BTLE 5.1 (GFSK 2 Mbit/s)
Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2402.00000	Digital Transmission System (DTS)	2	1	1	2.040
2440.00000					2.050
2480.00000					2.050

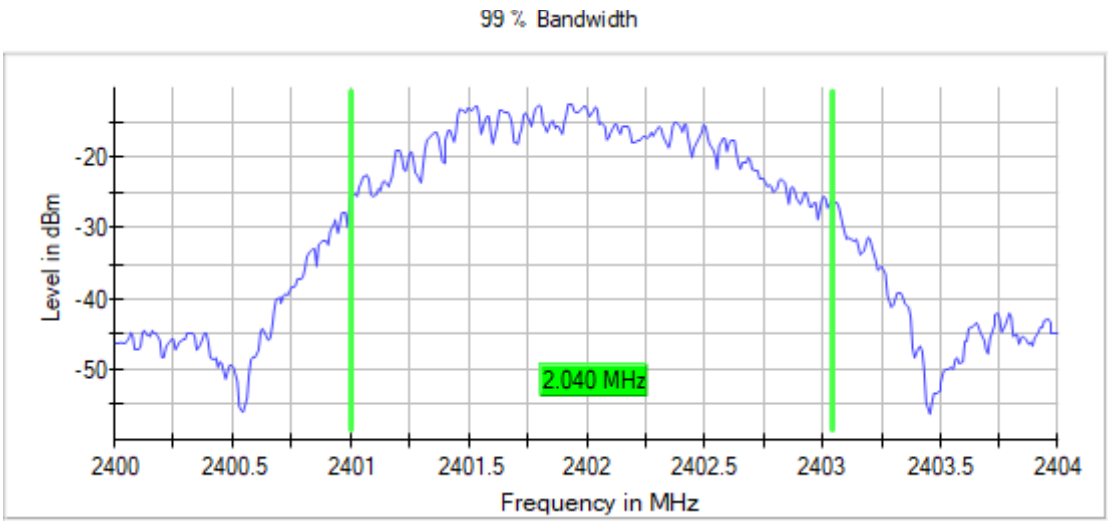
Verdict

Pass

Attachments

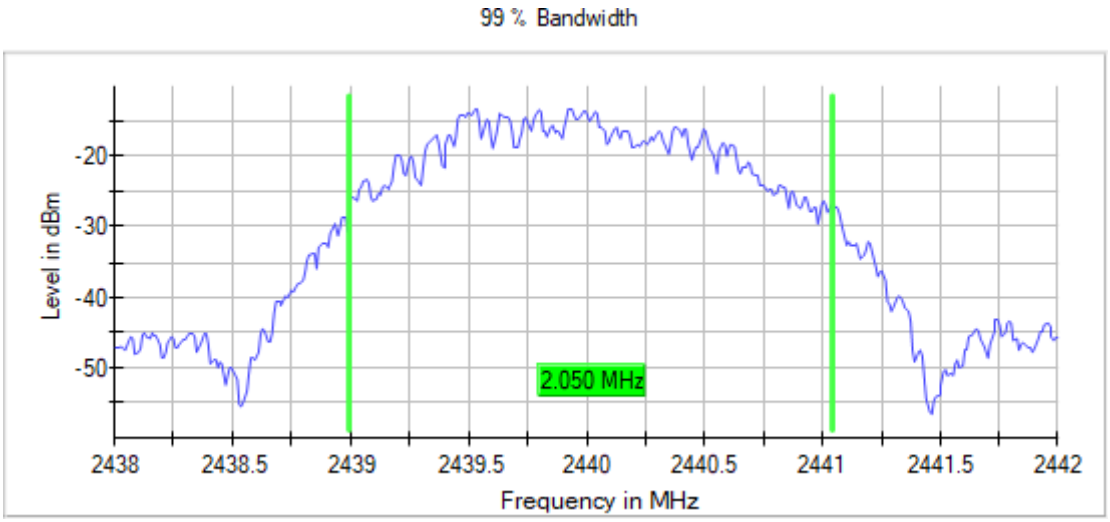
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.1 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



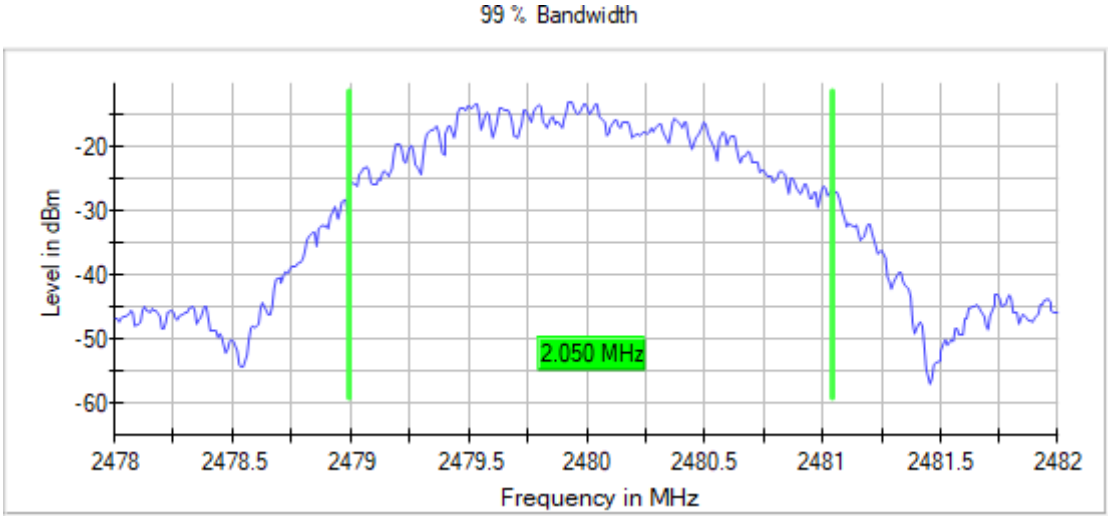
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.1 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.1 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2402.00000	Digital Transmission System (DTS)	1	1	1	1.030
2440.00000					1.030
2480.00000					1.025

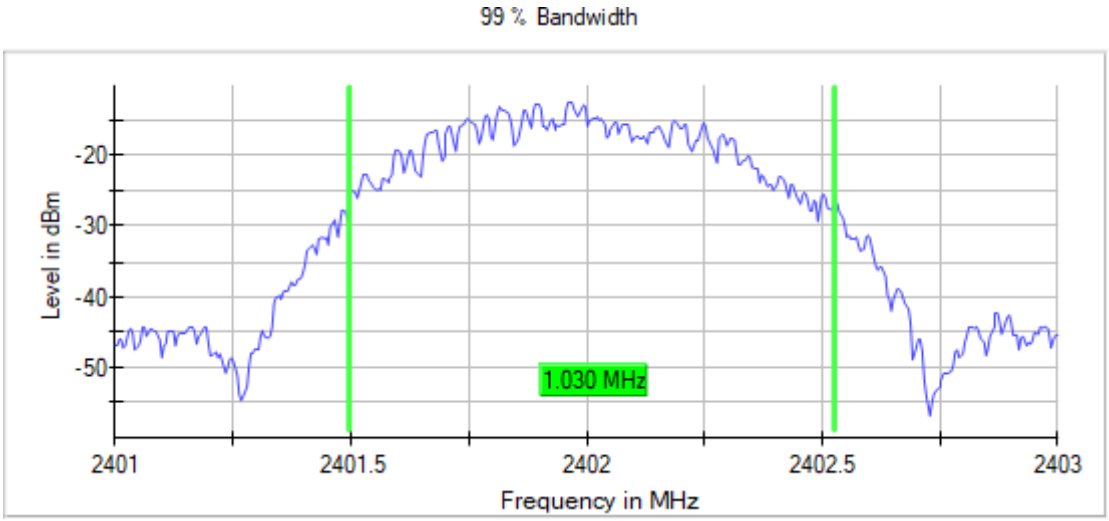
Verdict

Pass

Attachments

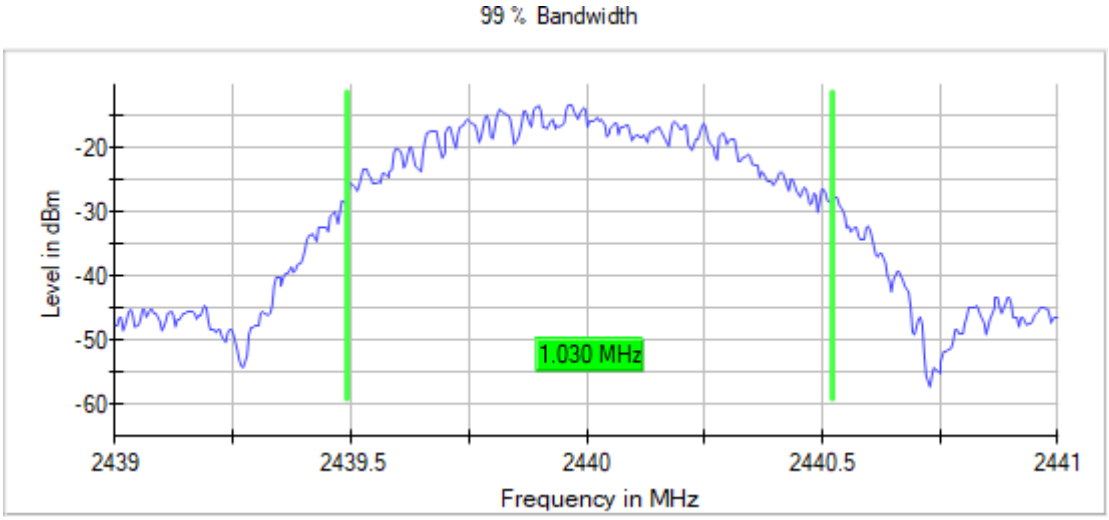
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



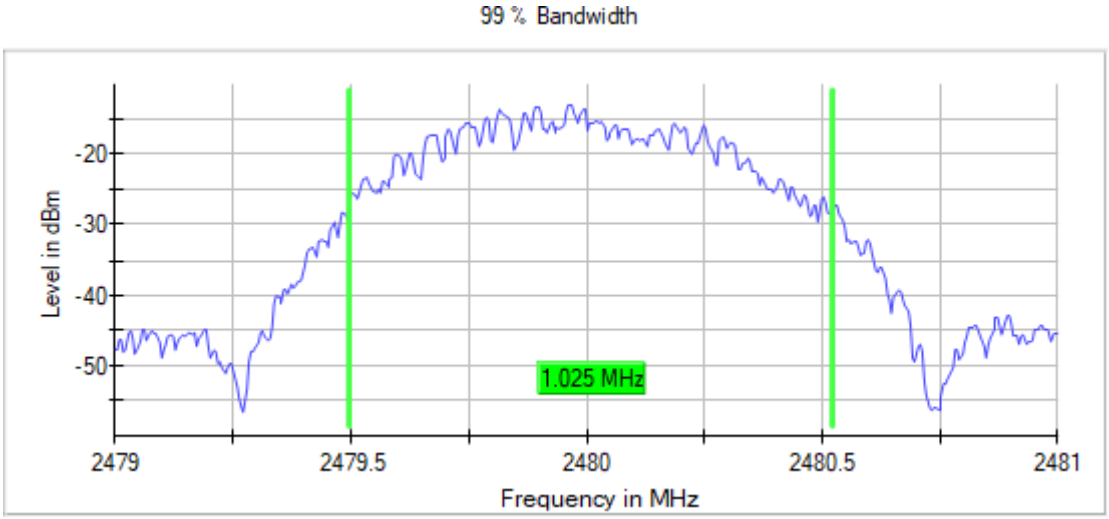
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



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

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

Limits

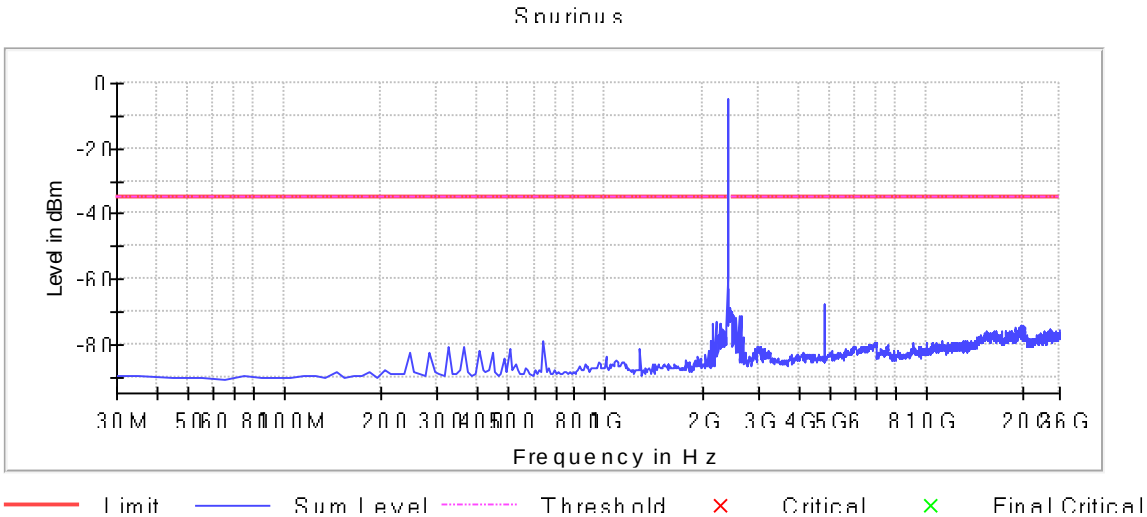
In any 100 kHz bandwidth outside the frequency band in which the digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB instead of 20 dB.

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

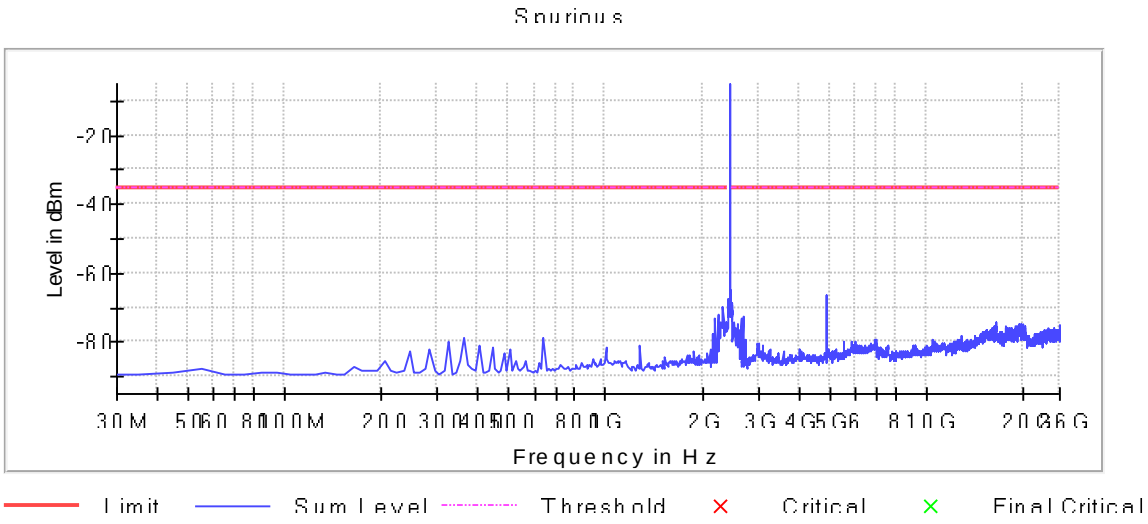
Conducted spurious signals detected were minimum 20 dB respect to the limit for the lowest, middle and highest operating channels.

Results

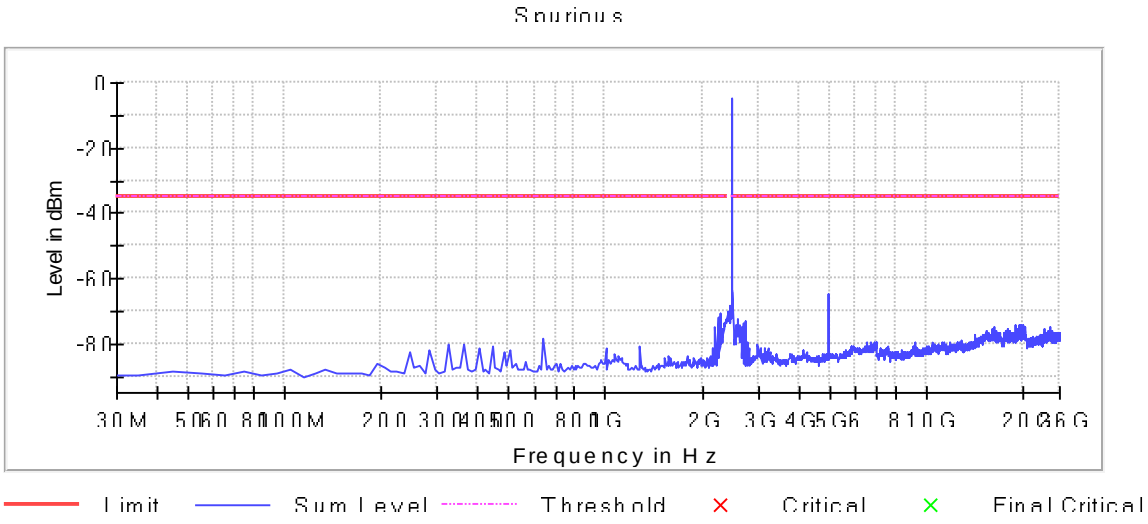
Lowest Channel



Middle Channel



Highest Channel



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

Limits

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c) / RSS-Gen):

Frequency Range (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	500	54	3

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

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

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

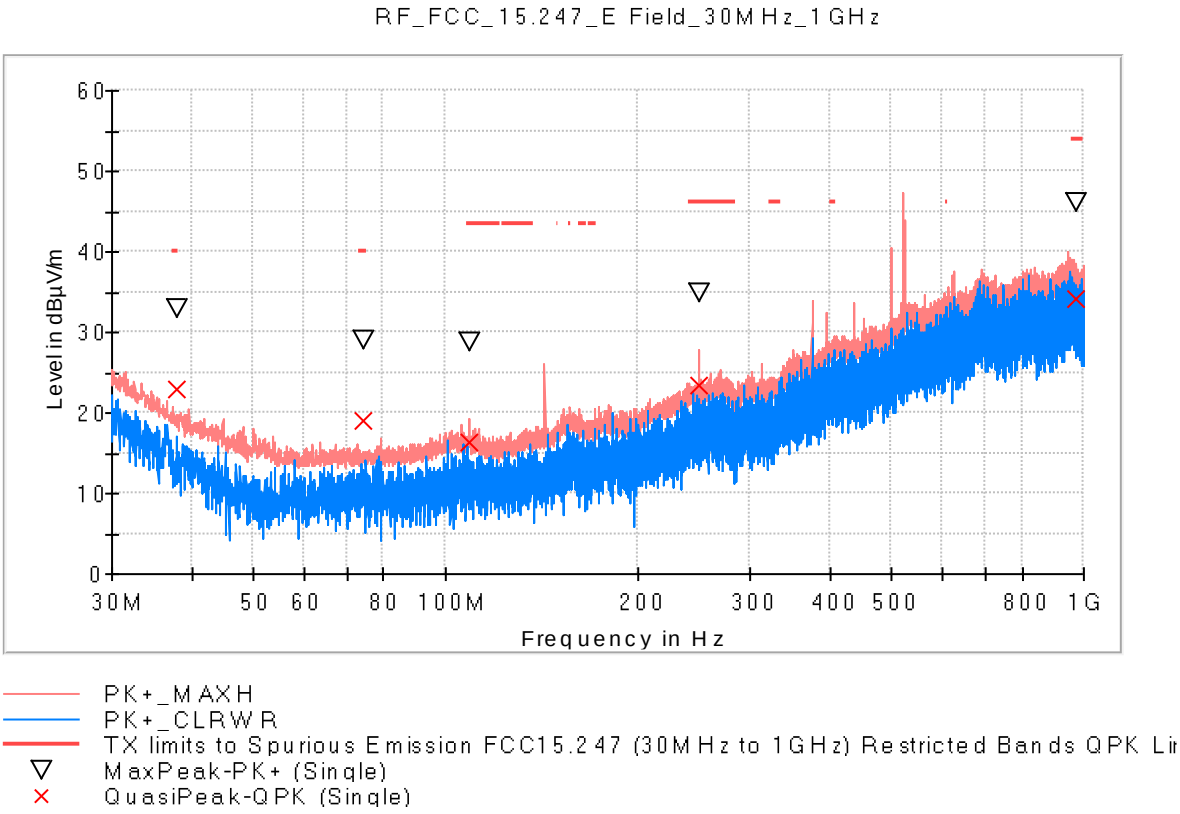
Verdict

Pass

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)
Results

Frequency range 30 - 1000 MHz

Middle Channel



Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)
37.857000	32.8	23.0	V	17.0	40.0
74.280500	29.1	19.0	V	21.0	40.0
108.764000	28.7	16.3	H	27.2	43.5
249.947500	34.9	23.5	V	22.5	46.0
972.500500	46.2	34.0	H	20.0	54.0
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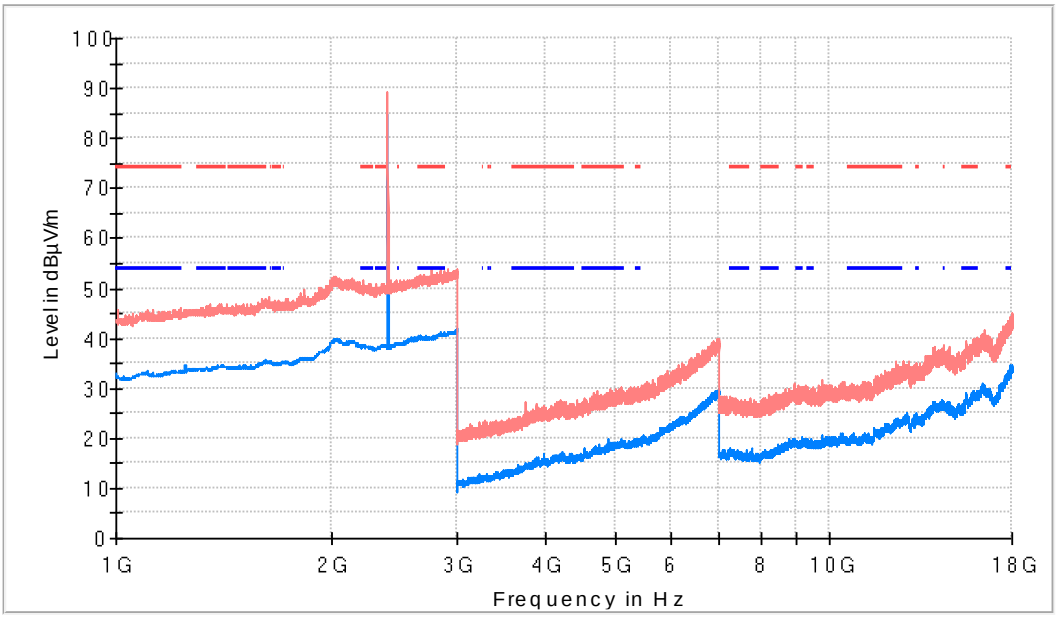
Frequency range 1 - 18 GHz

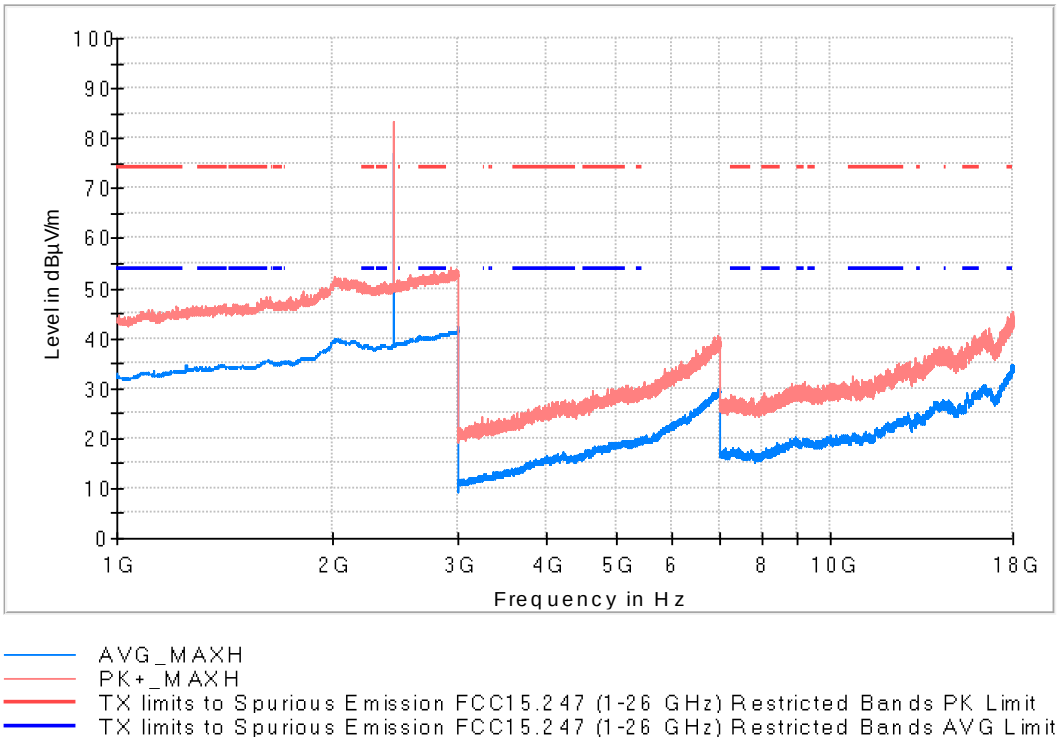
Lowest Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2402.000000	89.1	84.7	V	---	---	Fundamental
18000.000000	42.8	34.6	V	19.4	54.0	

Frequency range 1 - 18 GHz

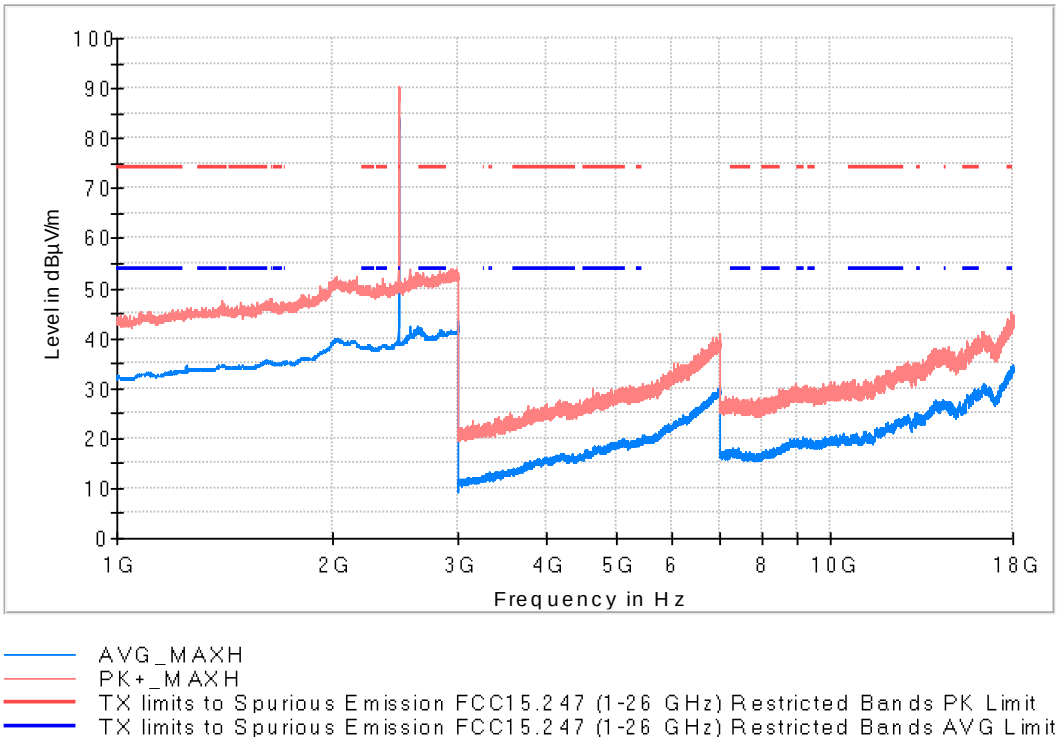
Middle Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2440.000000	83.5	77.0	H	---	---	Fundamental
17955.500000	43.4	34.8	V	19.2	54.0	

Frequency range 1 - 18 GHz

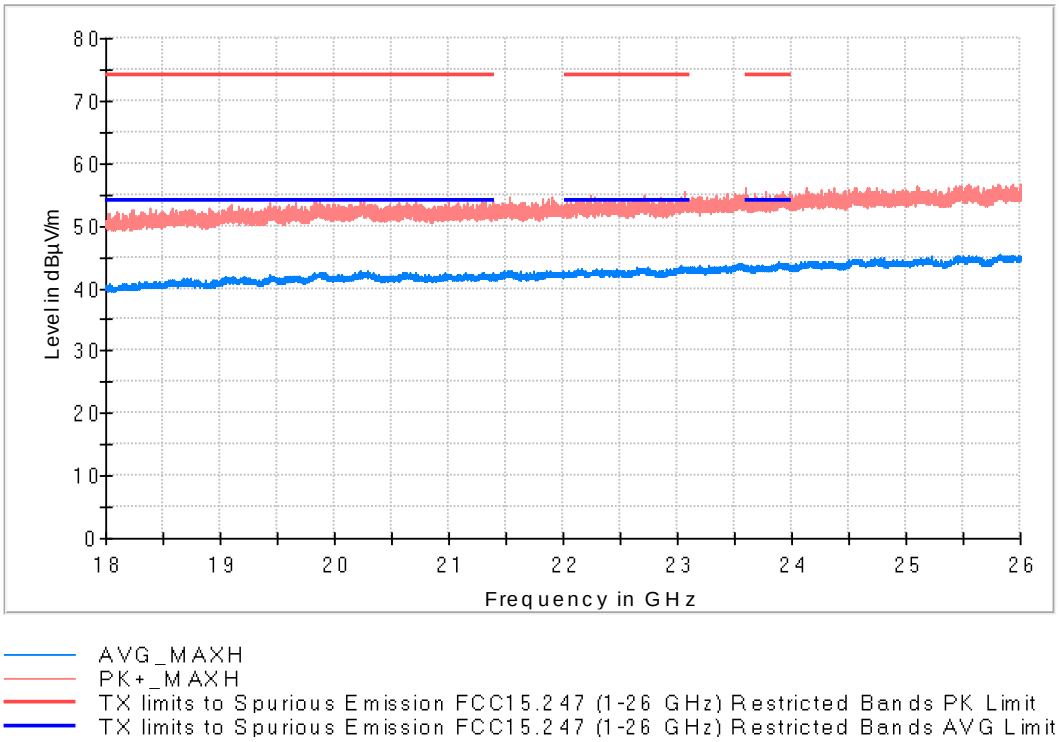
Highest Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2479.500000	90.4	84.0	V	---	---	Fundamental
17995.000000	42.5	34.7	H	19.3	54.0	

Frequency range 18 - 26 GHz

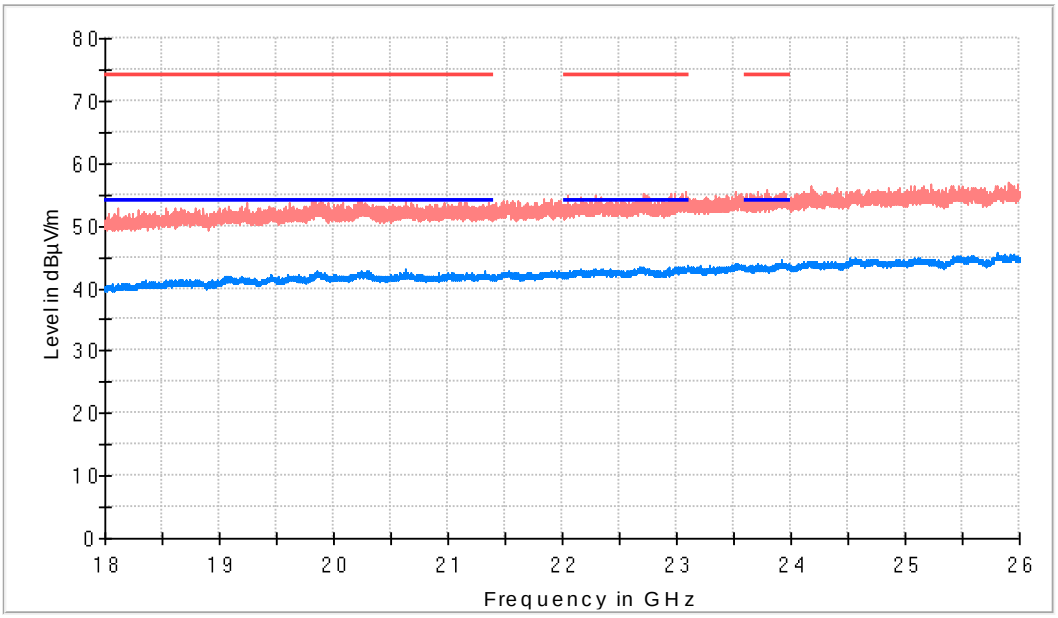
Lowest Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23892.000000	53.9	44.1	V	9.9	54.0

Frequency range 18 - 26 GHz

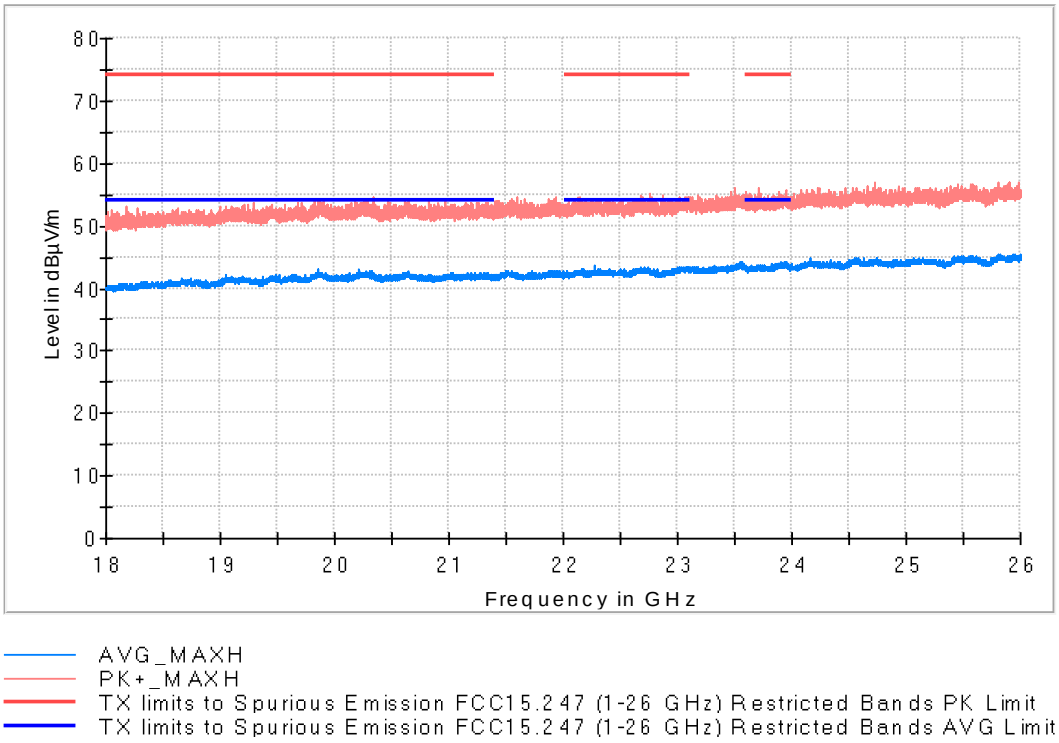
Middle Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23923.500000	53.6	44.5	H	9.5	54.0

Frequency range 18 - 26 GHz

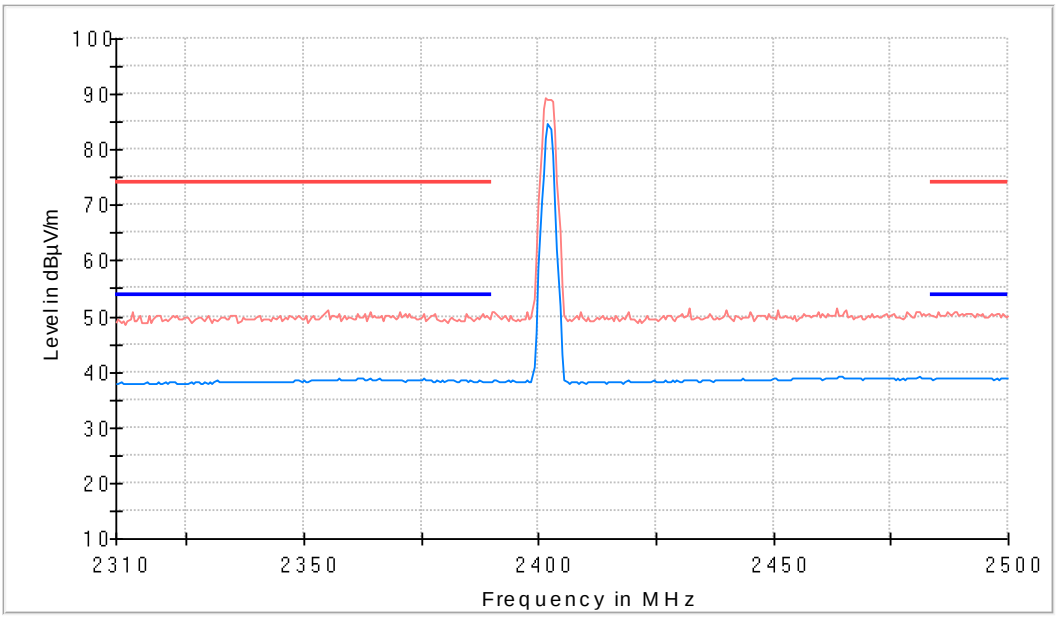
Highest Channel



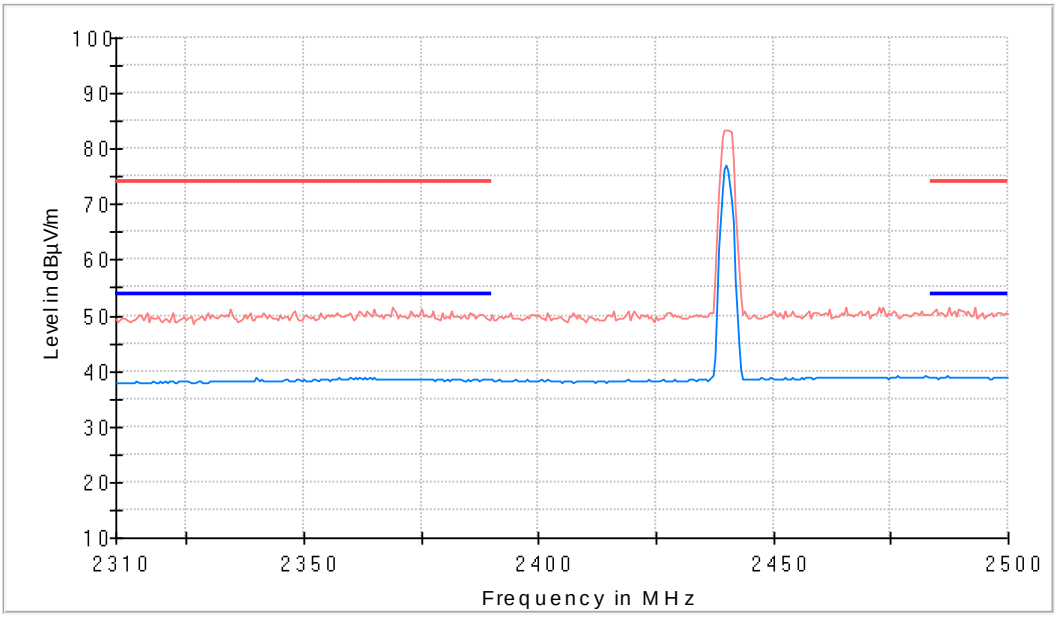
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23911.000000	53.6	44.3	V	9.7	54.0

Restricted Bands (2.31 GHz - 2.5 GHz)

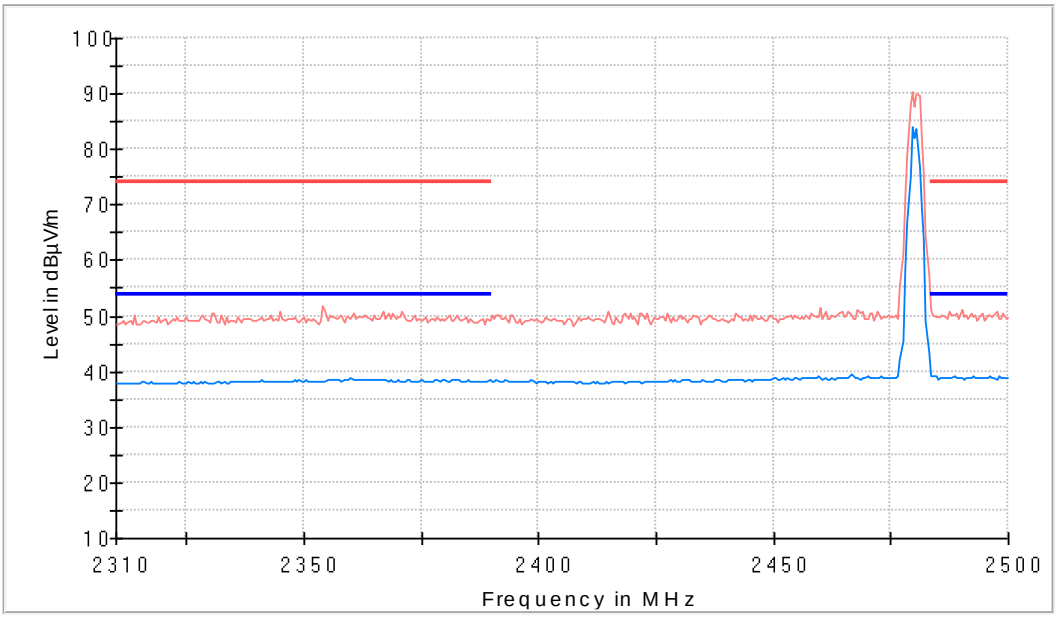
Lowest Channel



Middle Channel



Highest Channel



Appendix B: Test results. Bluetooth EDR

INDEX

PRODUCT INFORMATION

Information	Description
Modulation	FHSS
Adaptive	Non-Adaptive Equipment
Operation mode 1:	
Operating Frequency Range	2400 – 2483.5 MHz
Nominal Channel Bandwidth	2 MHz
RF Output Power	4 dBm
Extreme operating conditions	-40 ºC to +65 ºC
- Temperature range	
Antenna type	
Antenna gain	-2.5 dBi
Nominal Voltage	
- Supply Voltage	12 Vdc
- Type of power source	DC voltage
Equipment type	Bluetooth Classic
Geo-location capability	No

TEST CONDITIONS

(*): Data provided by the client.

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

TEST CASES DETAILS

FCC 47 CFR Part 15.247 / RSS-247

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

Limits

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Modulation: BT (GFSK 1-DH5)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	0.935
2441.00000					0.935
2480.00000					0.935

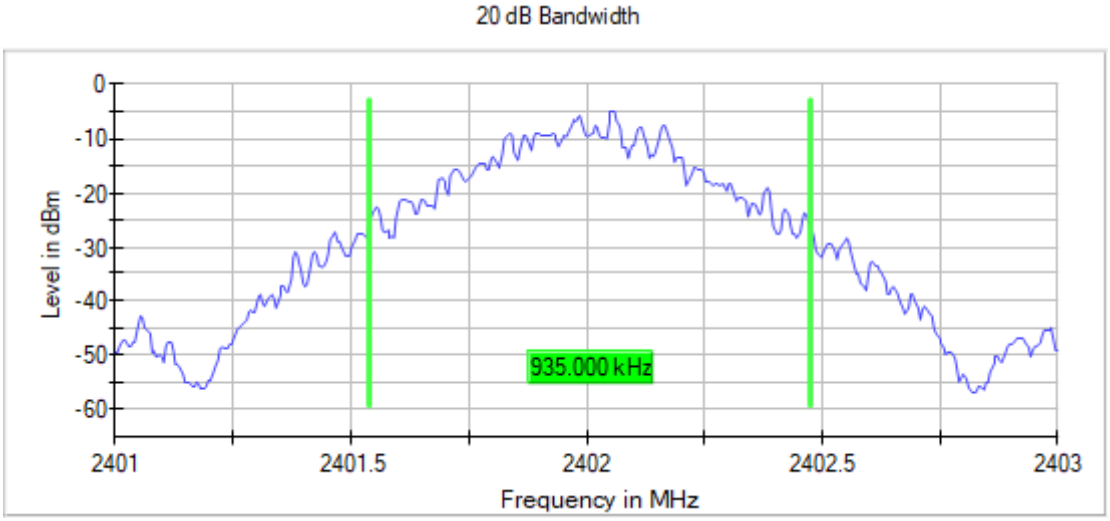
Verdict

Pass

Attachments

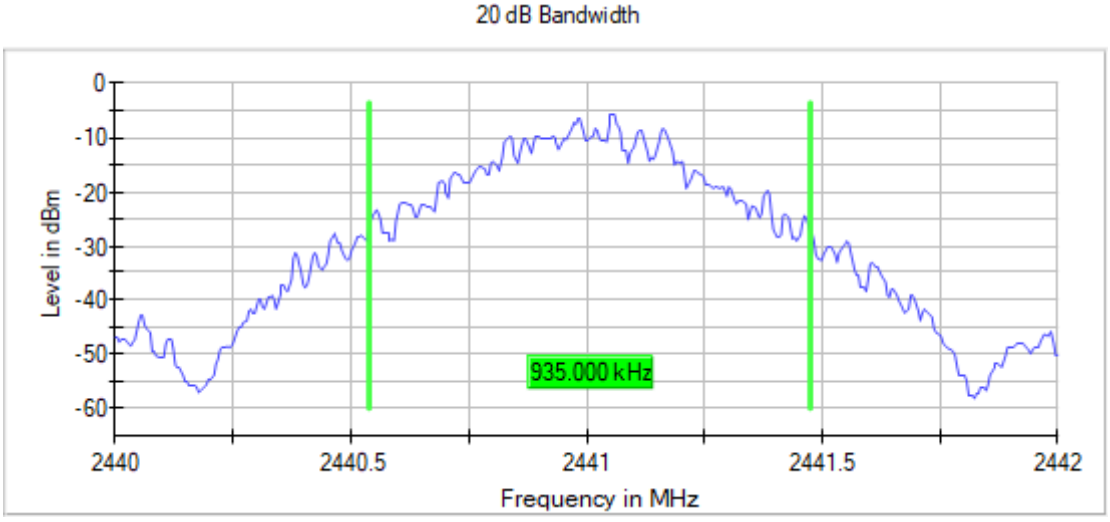
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



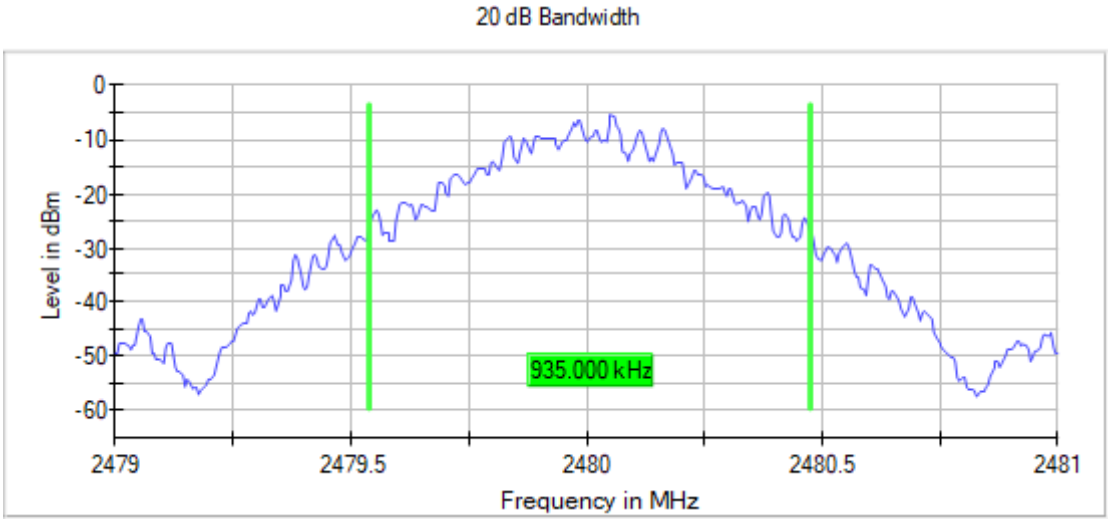
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BT (8DPSK 3-DH5)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	1.275
2441.00000					1.275
2480.00000					1.275

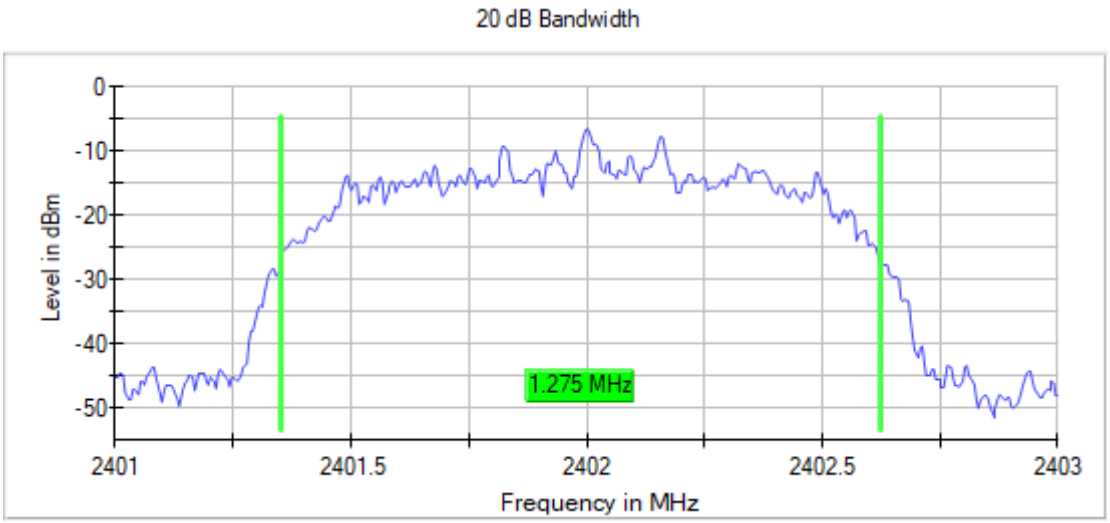
Verdict

Pass

Attachments

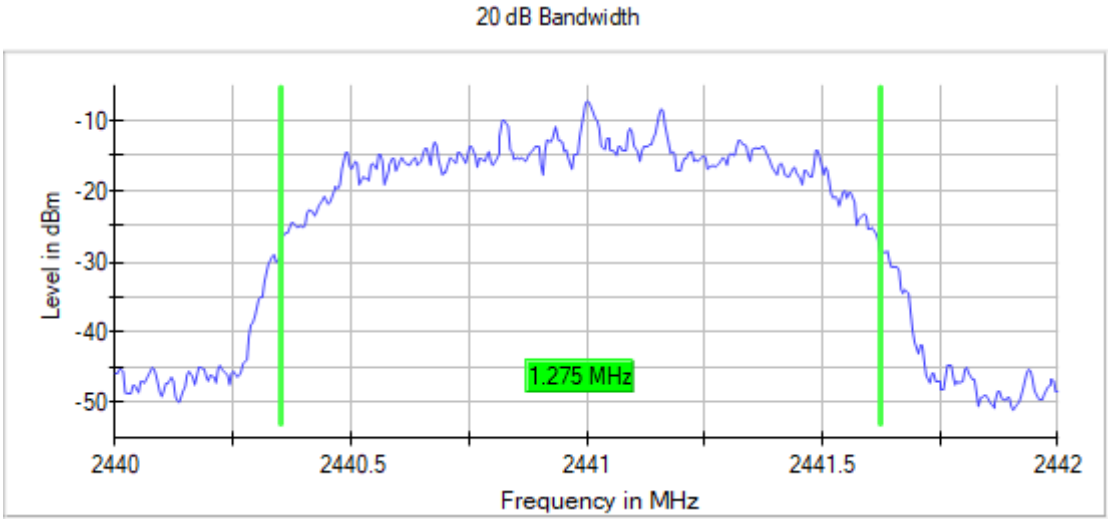
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



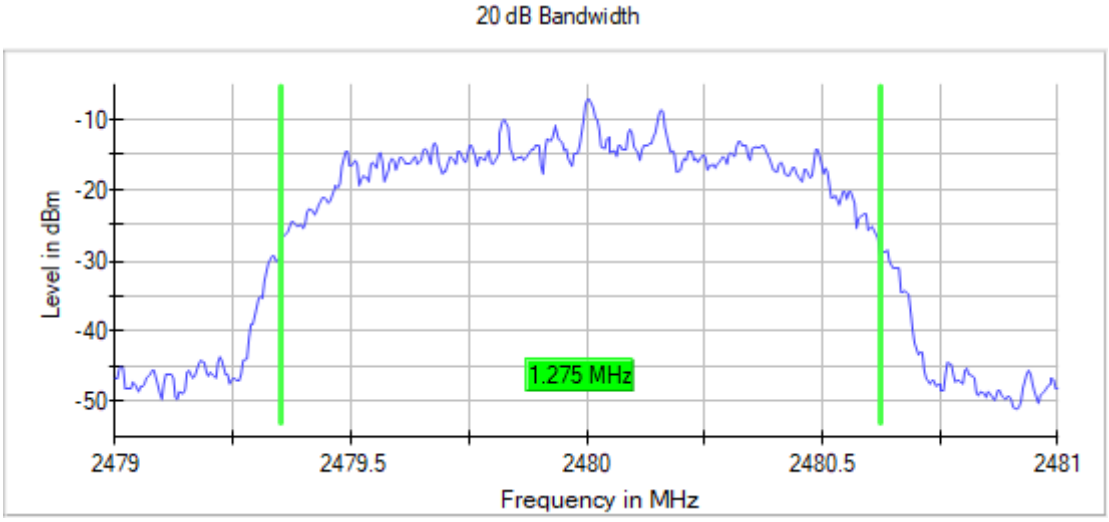
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



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

Limits

No Limit has been set to this test case

Modulation: BT (GFSK 1-DH5)

Results

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

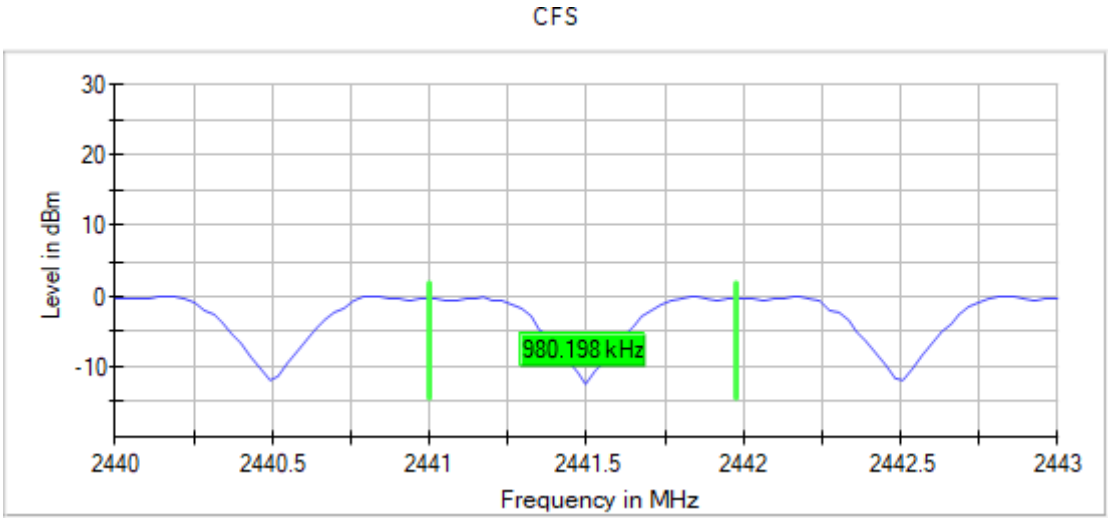
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BT (8DPSK 3-DH5)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	Freq Sep (MHz)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	1.01

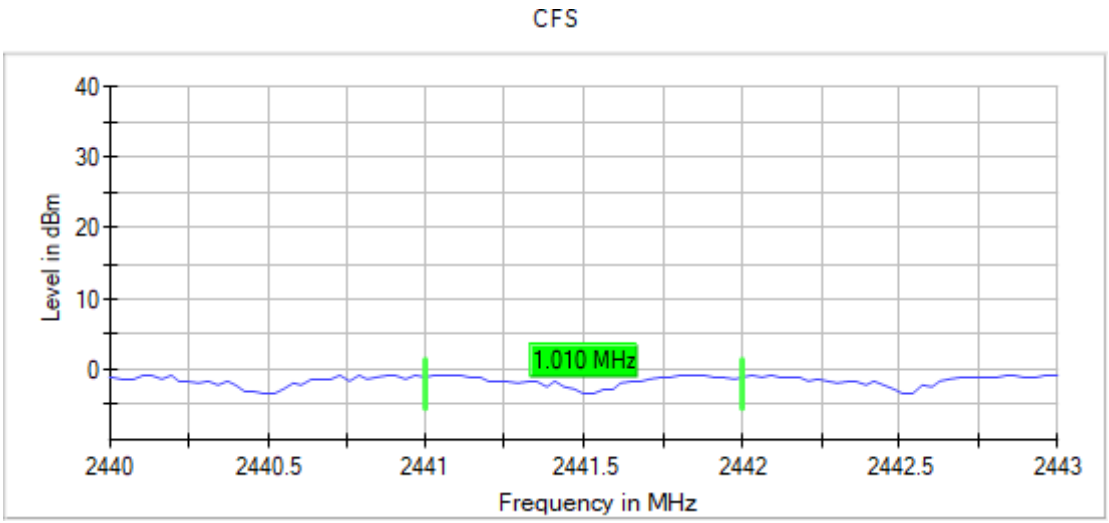
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



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

Limits

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

Modulation: BT (GFSK 1-DH1)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHp	Avg COT (ms)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1		4.65

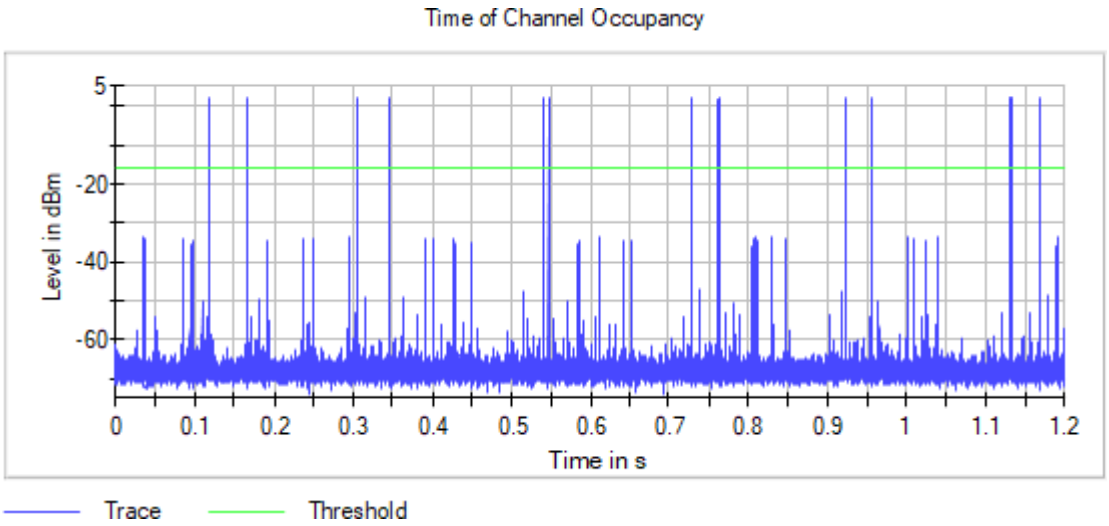
Verdict

Pass

Attachments

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

Images:



Modulation: BT (GFSK 1-DH3)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHp	Avg COT (ms)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1		13.15

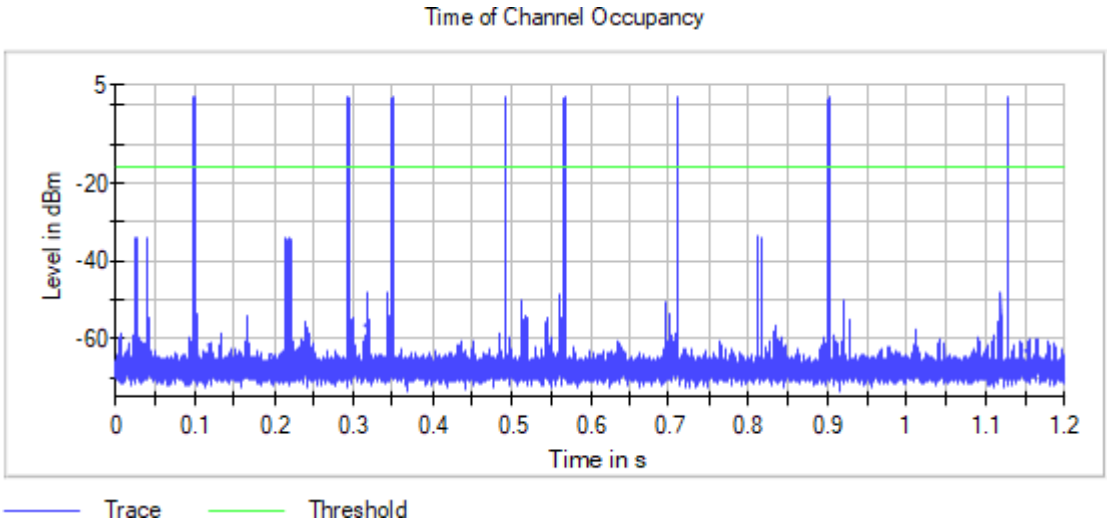
Verdict

Pass

Attachments

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

Images:



Modulation: BT (GFSK 1-DH5)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHp	Avg COT (ms)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1		20.24

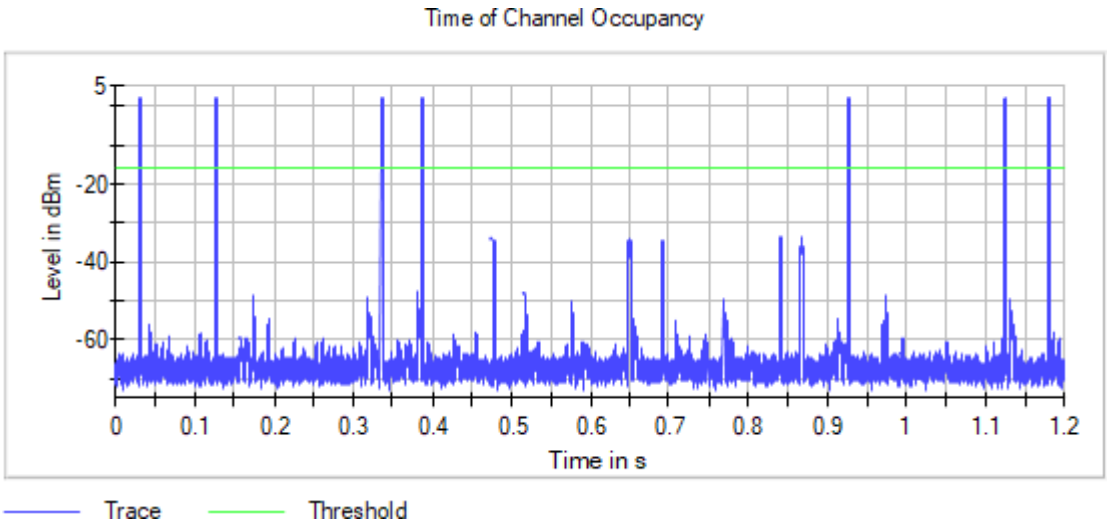
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BT (Π/4 DQPSK 2-DH1)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHp	Avg COT (ms)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	Frequency Hopping Spread Spectrum systems (DSS)111	4.62

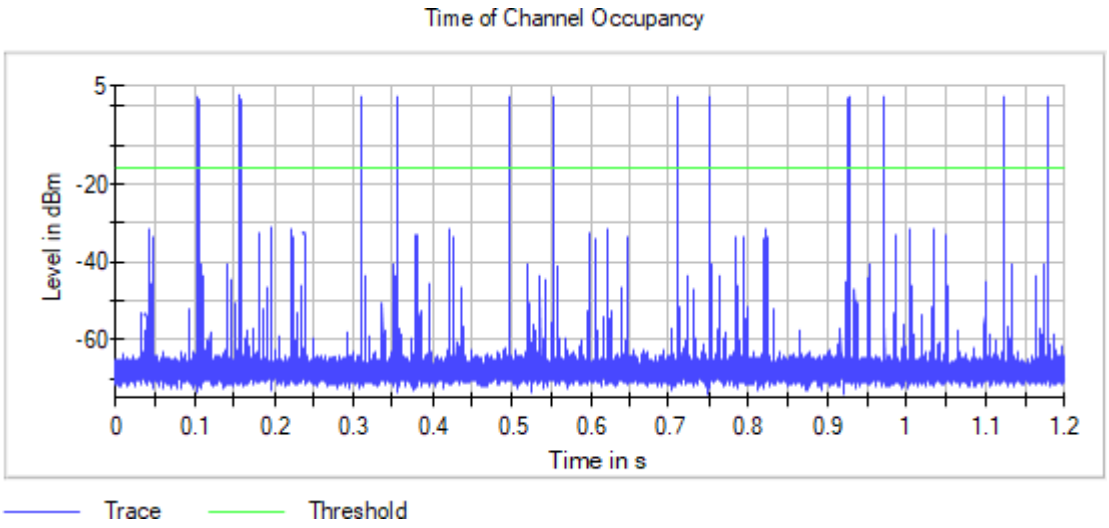
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH1), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BT (Π/4 DQPSK 2-DH3)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHp	Avg COT (ms)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	Frequency Hopping Spread Spectrum systems (DSS)111	9.78

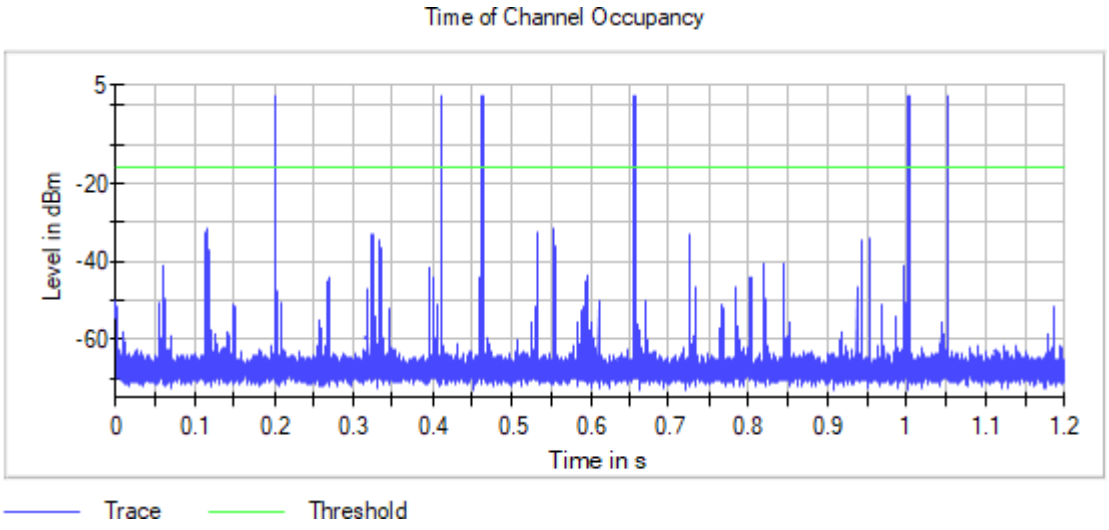
Verdict

Pass

Attachments

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

Images:



Modulation: BT (Π/4 DQPSK 2-DH5)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHp	Avg COT (ms)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	Frequency Hopping Spread Spectrum systems (DSS)111	5.73

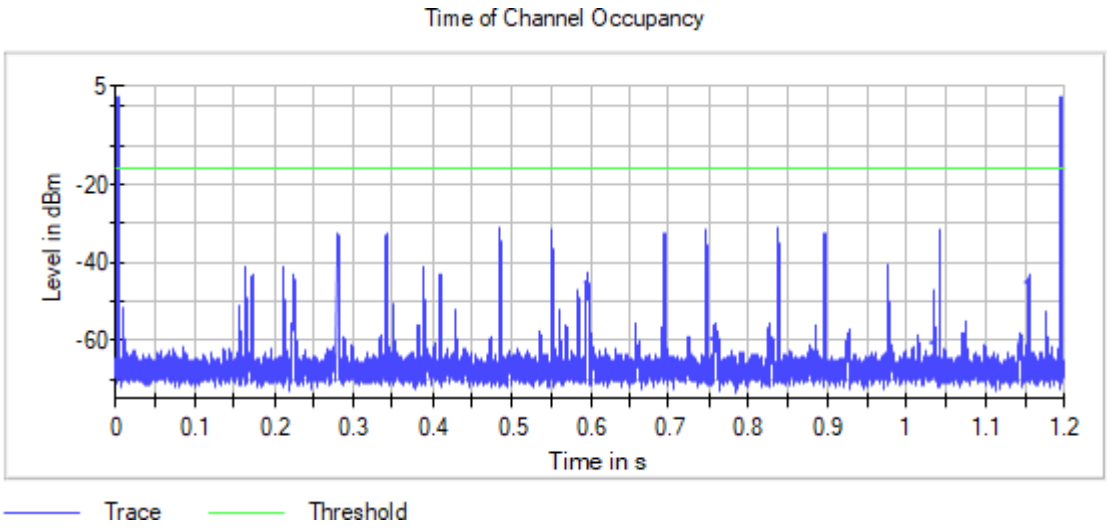
Verdict

Pass

Attachments

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

Images:



Modulation: BT (8DPSK 3-DH1)

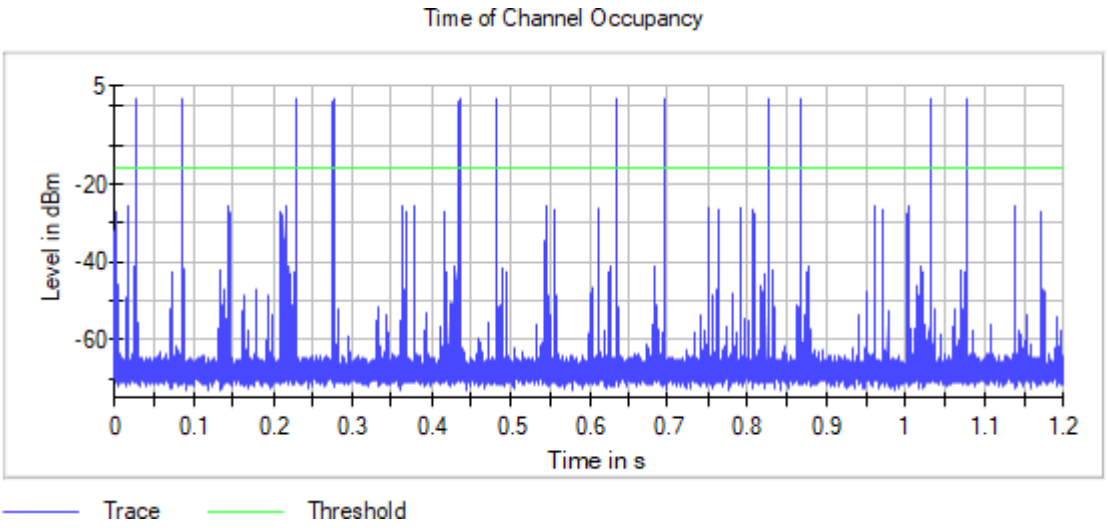
Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHp	Avg COT (ms)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1		4.64

Verdict

Pass

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH1), Number of Transmission Chains = 1, Active Port = 1



Modulation: BT (8DPSK 3-DH3)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHp	Avg COT (ms)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1		9.82

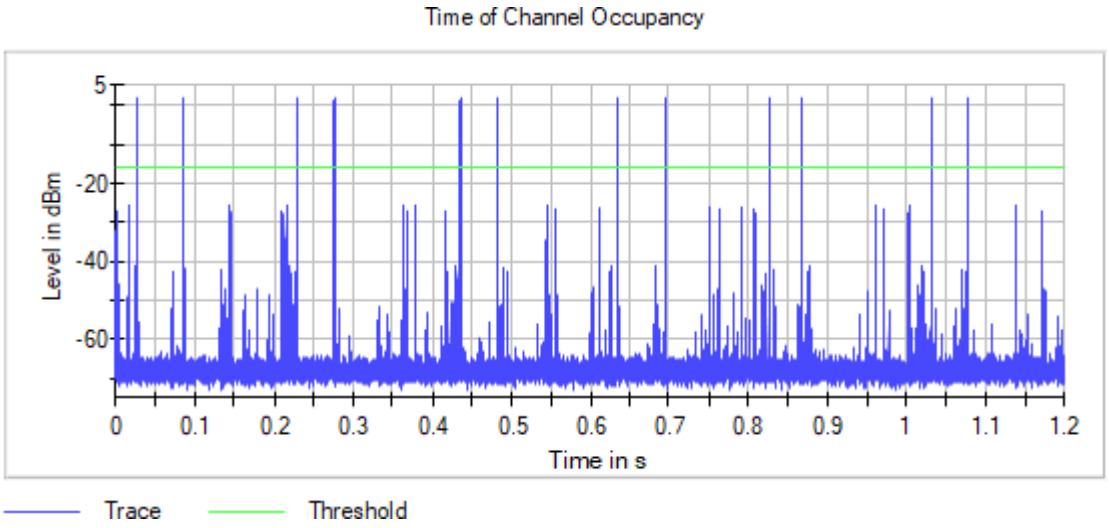
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH1), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BT (8DPSK 3-DH5)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHp	Avg COT (ms)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1		8.65

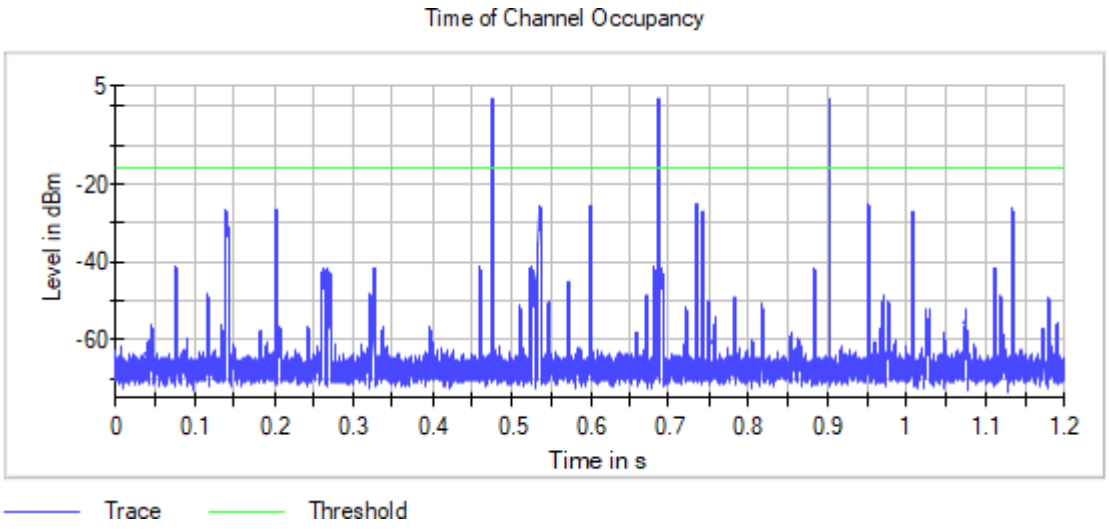
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



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

Limits

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

Modulation: BT (GFSK 1-DH5)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHC
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	79

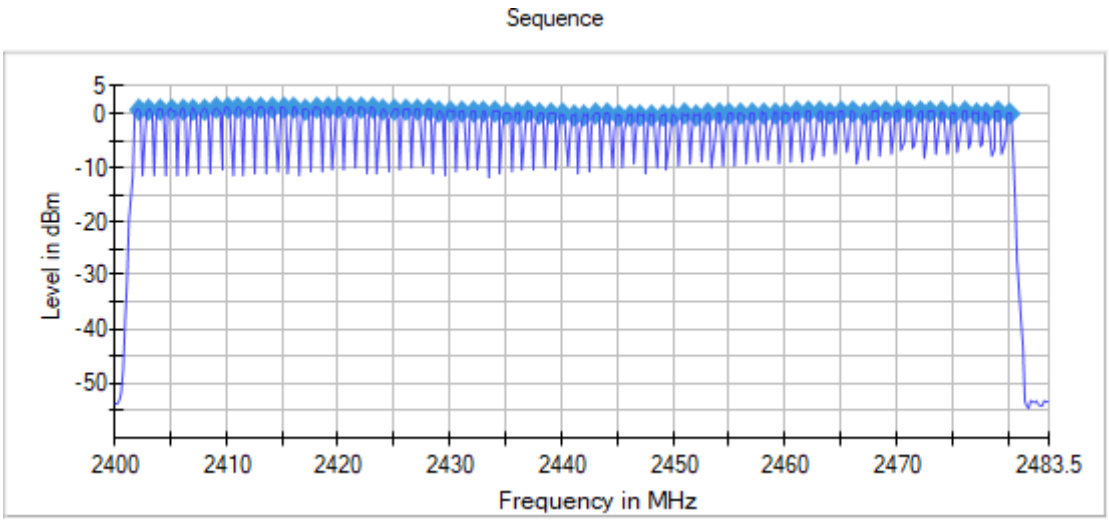
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BT (Π/4 DQPSK 2-DH5)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHC
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	79

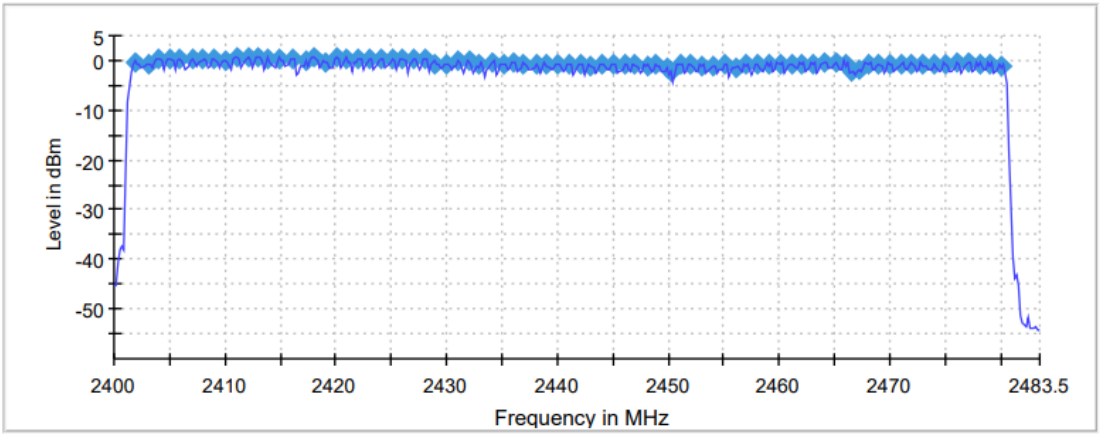
Verdict

Pass

Attachments

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

Images:



Modulation: BT (8DPSK 3-DH5)

Results

Equipment	BW (MHz)	# of Tx Chains	Port	NHC
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	79

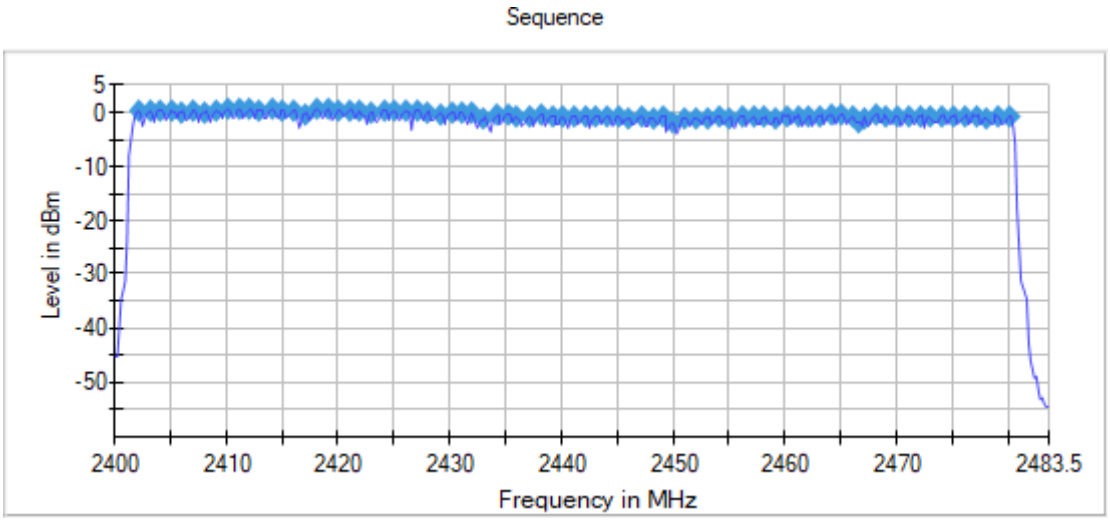
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



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

Limits

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

Modulation: BT (GFSK 1-DH5)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Peak Power (dBm)
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	0.6
2441.00000					0.5
2480.00000					0.2

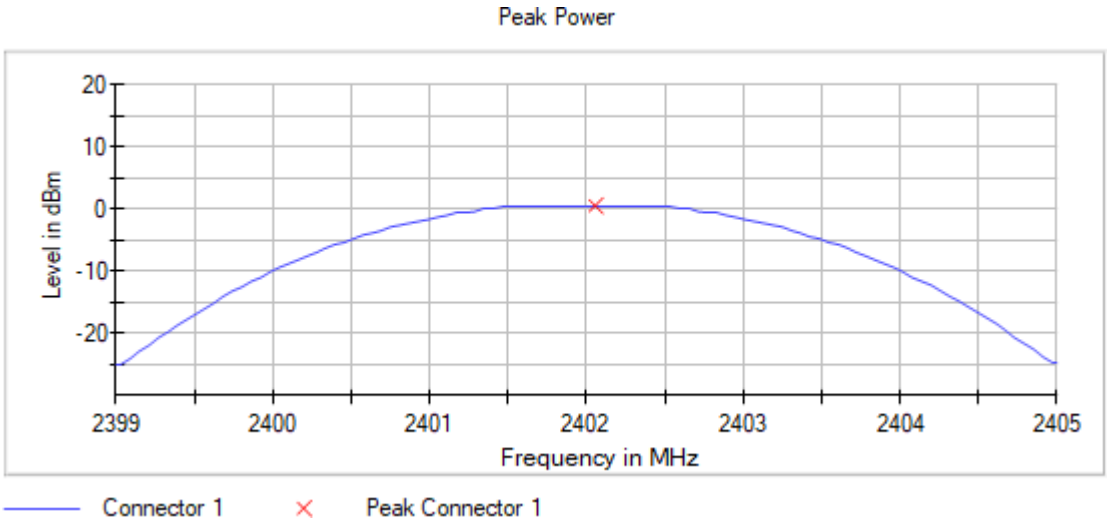
Verdict

Pass

Attachments

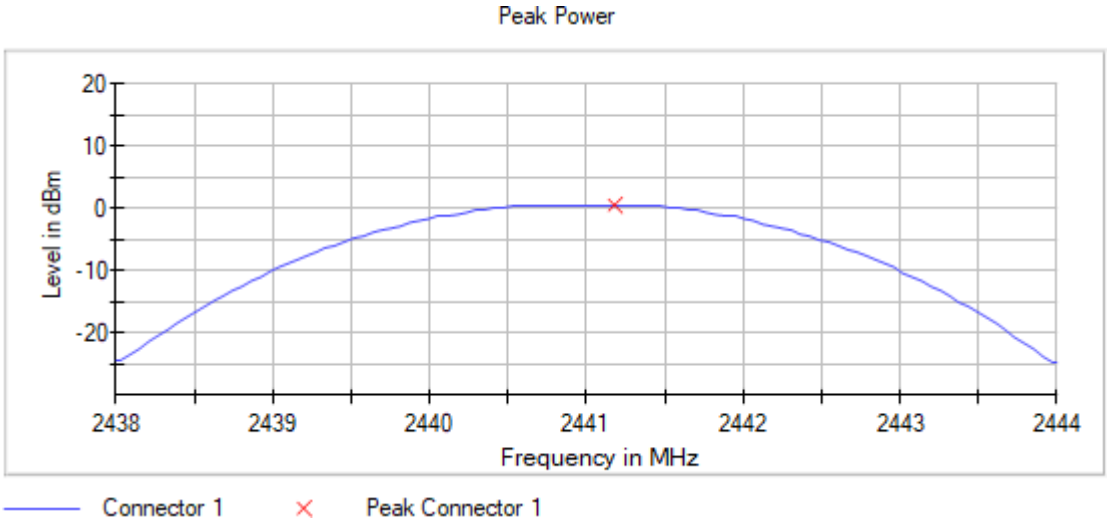
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



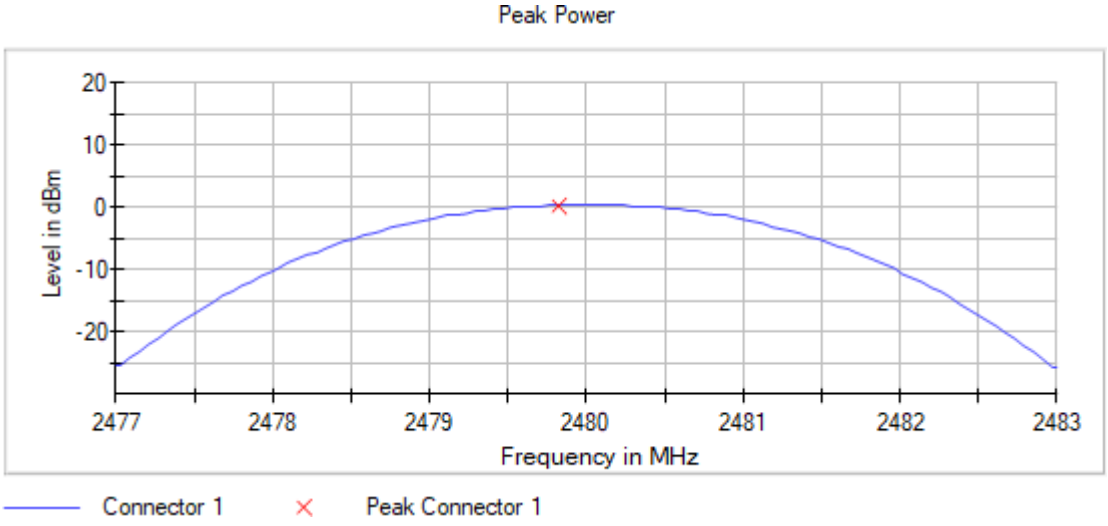
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BT (Π/4 DQPSK 2-DH5)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Peak Power (dBm)
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	2.7
2441.00000					2.5
2480.00000					2.0

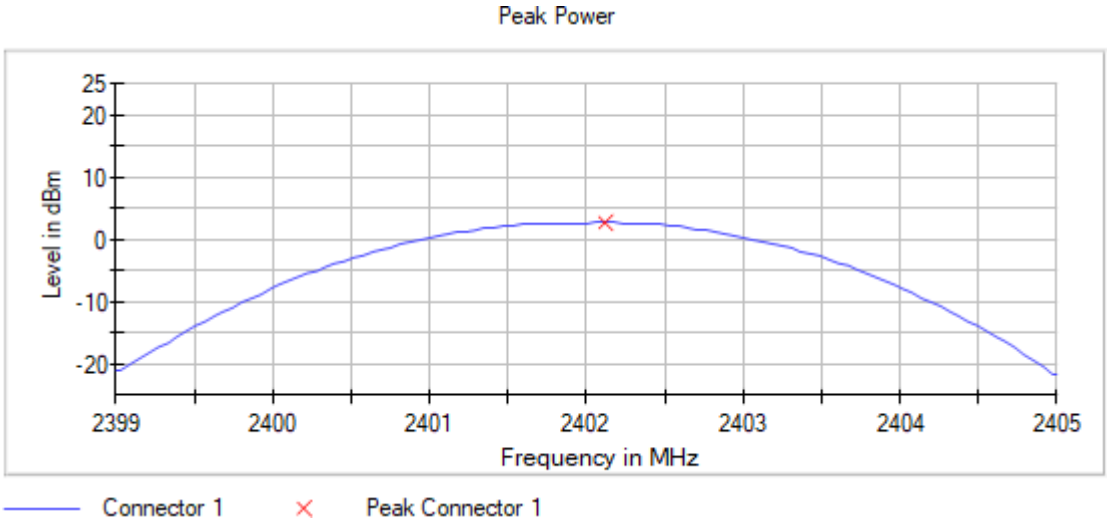
Verdict

Pass

Attachments

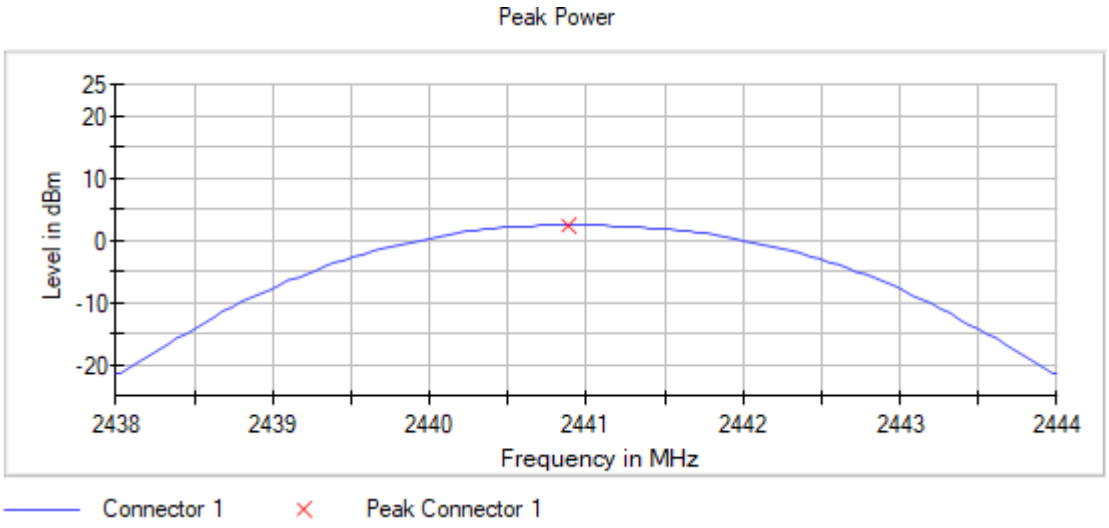
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



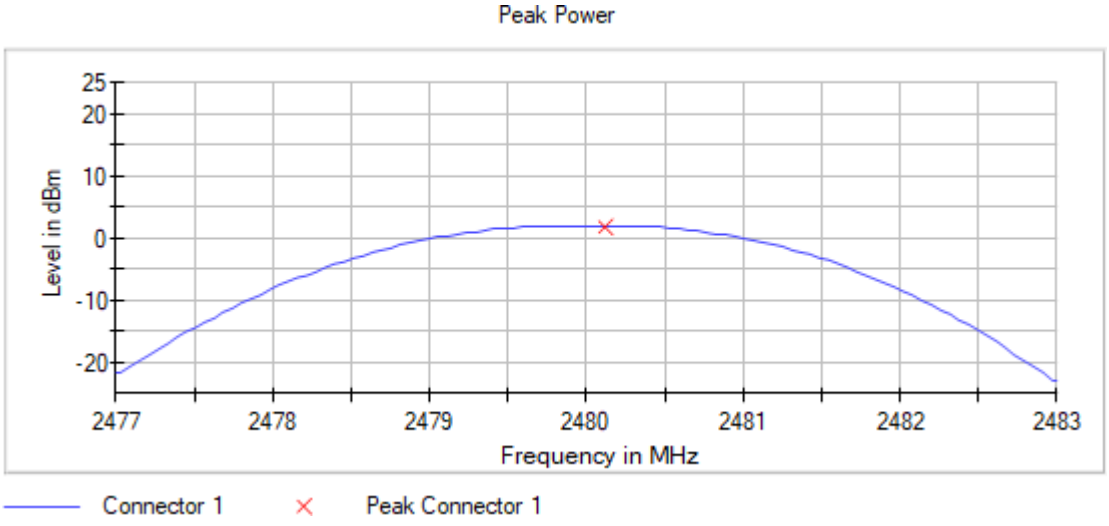
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



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

Images:



Modulation: BT (8DPSK 3-DH5)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Peak Power (dBm)
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	2.9
2441.00000					2.8
2480.00000					2.4

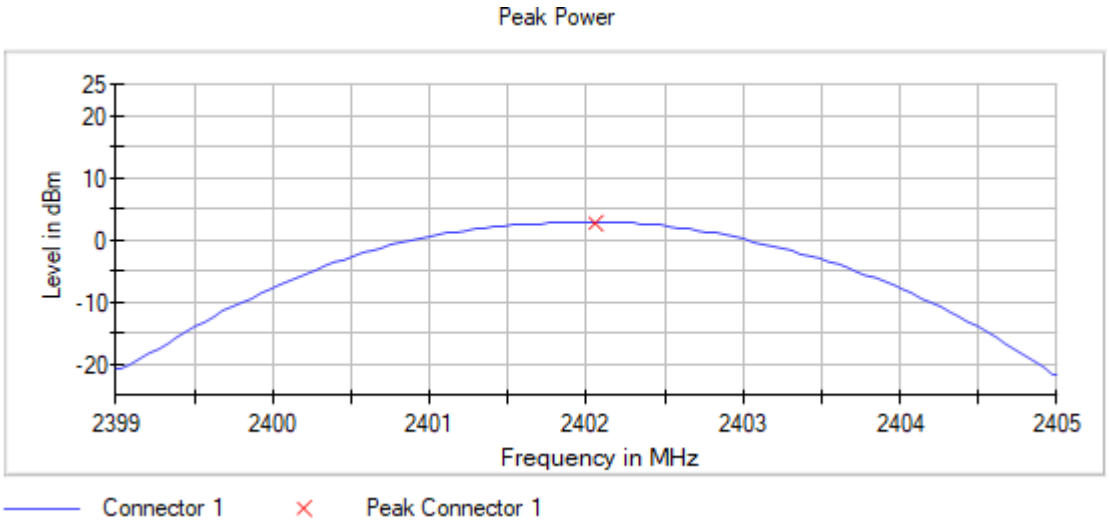
Verdict

Pass

Attachments

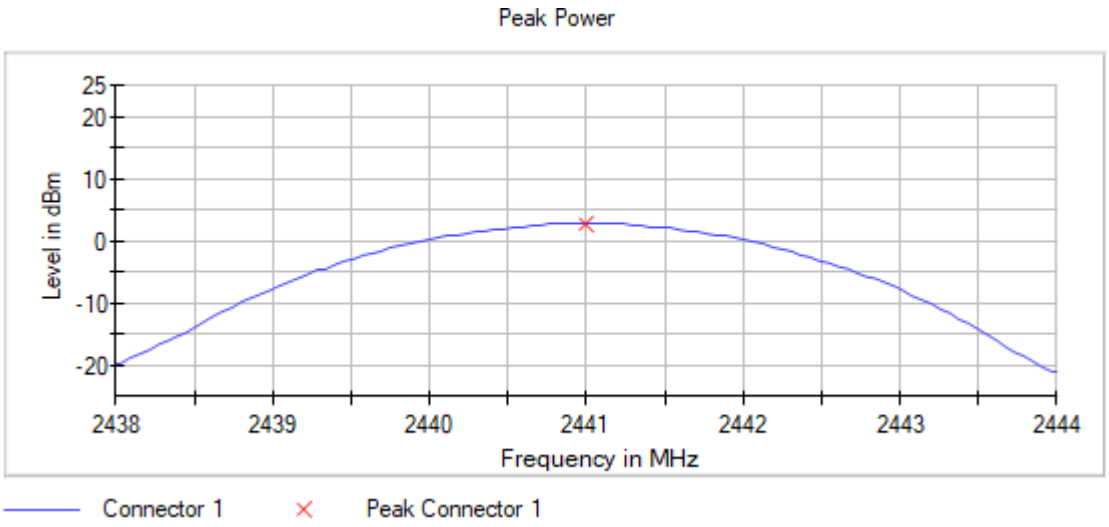
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



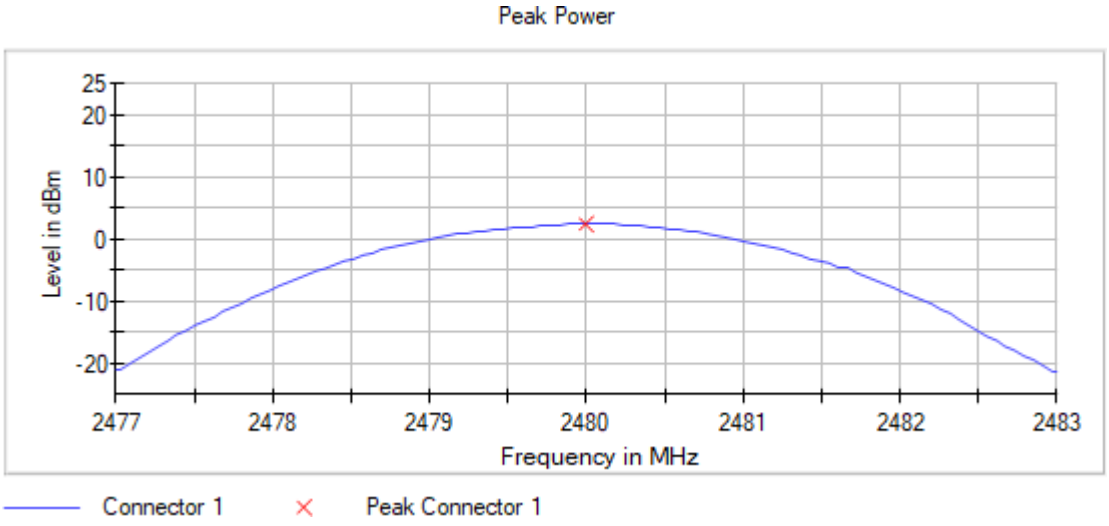
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



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

Limits

In any 100 kHz bandwidths outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Modulation: BT (GFSK 1-DH5)

Results

Freq (MHz)	Lvl (dBm)
2329.725000	-53.5
2329.675000	-53.5
2310.275000	-53.7
2310.325000	-53.9
2386.825000	-54.2
2386.775000	-54.2
2351.775000	-54.6
2397.125000	-54.7
2356.775000	-54.8
2350.325000	-54.9
2352.075000	-55.0
2337.775000	-55.1
2336.975000	-55.1
2323.975000	-55.1
2329.775000	-55.2
2495.475000	-54.2
2484.225000	-54.5
2495.525000	-54.7
2496.225000	-54.7
2484.275000	-54.8
2497.575000	-54.9
2484.575000	-54.9
2496.175000	-55.0
2484.825000	-55.1
2494.825000	-55.1

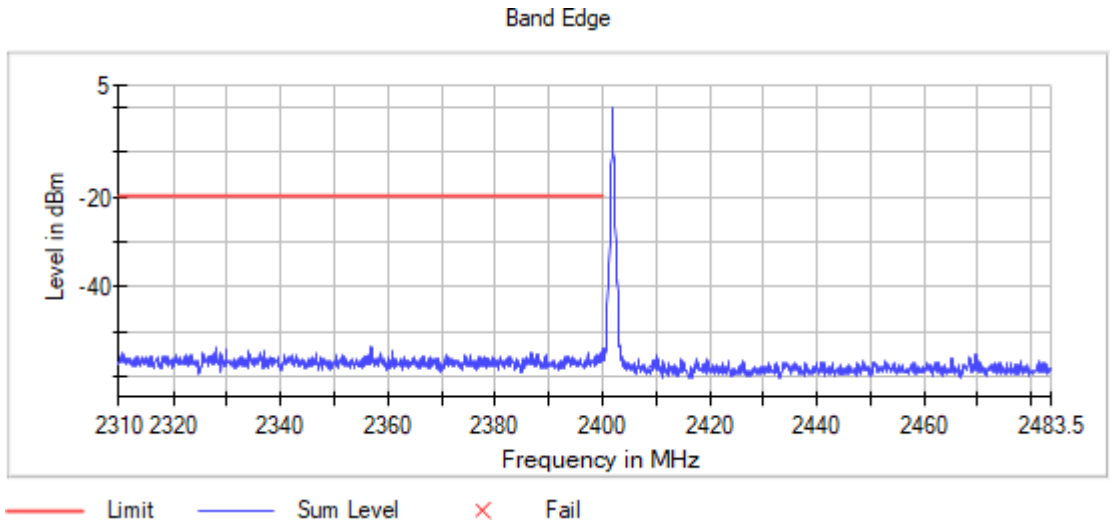
Freq (MHz)	Lvl (dBm)
2497.525000	-55.1
2486.975000	-55.2
2499.775000	-55.2
2495.425000	-55.3
2486.225000	-55.3
2356.925000	-53.5
2327.925000	-53.6
2357.125000	-53.8
2356.875000	-53.8
2357.175000	-54.0
2327.875000	-54.2
2330.075000	-54.2
2399.975000	-54.2
2356.975000	-54.3
2483.575000	-53.4
2483.525000	-53.4
2484.275000	-54.1
2483.625000	-54.1
2483.675000	-54.3
2484.225000	-54.4
2498.625000	-54.4
2498.575000	-54.6
2493.725000	-54.6
2330.025000	-54.4
2337.025000	-54.4
2334.175000	-54.4
2336.975000	-54.4
2334.125000	-54.5
2327.975000	-54.6
2493.675000	-54.6
2486.825000	-54.8
2498.875000	-55.2
2495.825000	-55.2
2489.475000	-55.2
2495.875000	-55.2

Verdict

Pass

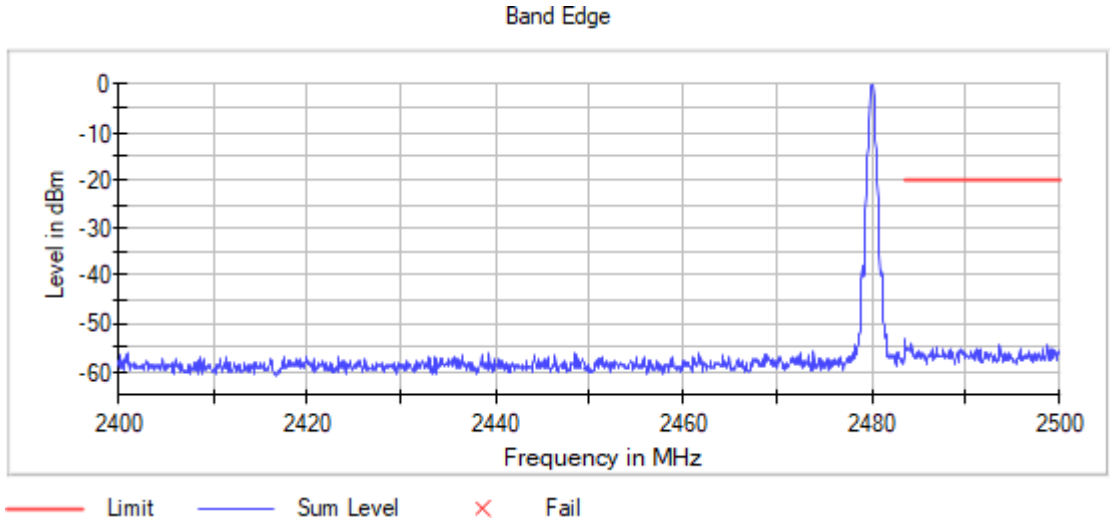
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Modulation: BT (Π/4 DQPSK)

Results

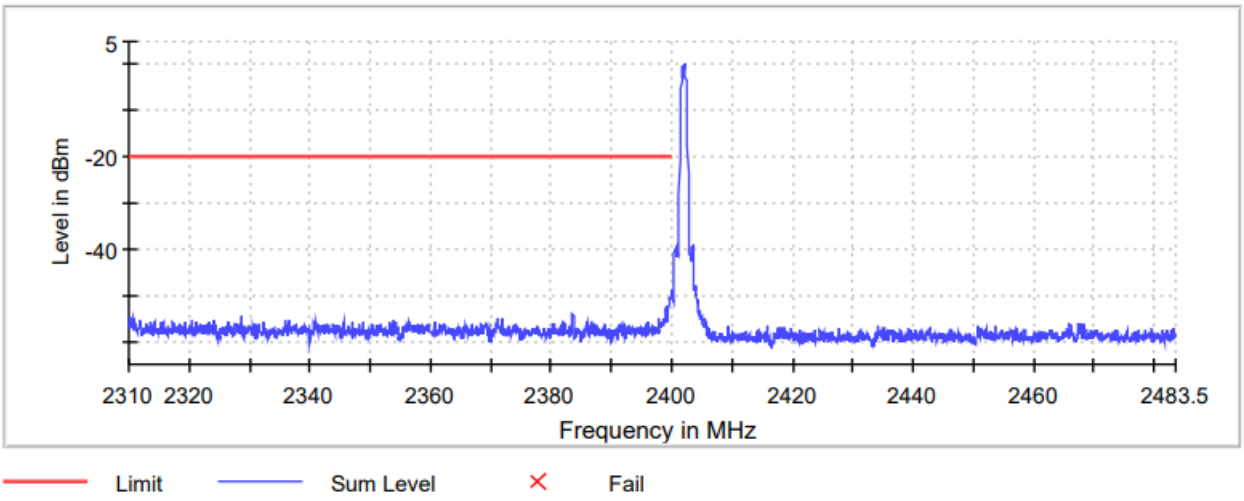
Freq (MHz)	Lvl (dBm)
2399.975000	-48.8
399.925000	-49.2
2399.875000	-49.7
2399.825000	-50.4
2399.775000	-50.4
2399.675000	-50.7
2399.725000	-50.8
2399.625000	-51.3
2399.525000	-51.7
2399.475000	-51.8
2399.575000	-52.0
2399.375000	-52.1
2399.325000	-52.1
2399.425000	-53.1
2399.075000	-53.2
2483.875000	-54.5
2483.925000	-54.6
2484.075000	-54.9
2484.825000	-54.9
2484.775000	-55.0
2483.625000	-55.1
2483.575000	-55.2
2490.625000	-55.4
2487.975000	-55.5
2487.925000	-55.5
2488.775000	-55.5
2484.025000	-55.5
2494.775000	-55.6
2485.175000	-55.6
2484.125000	-55.6

Verdict

Pass

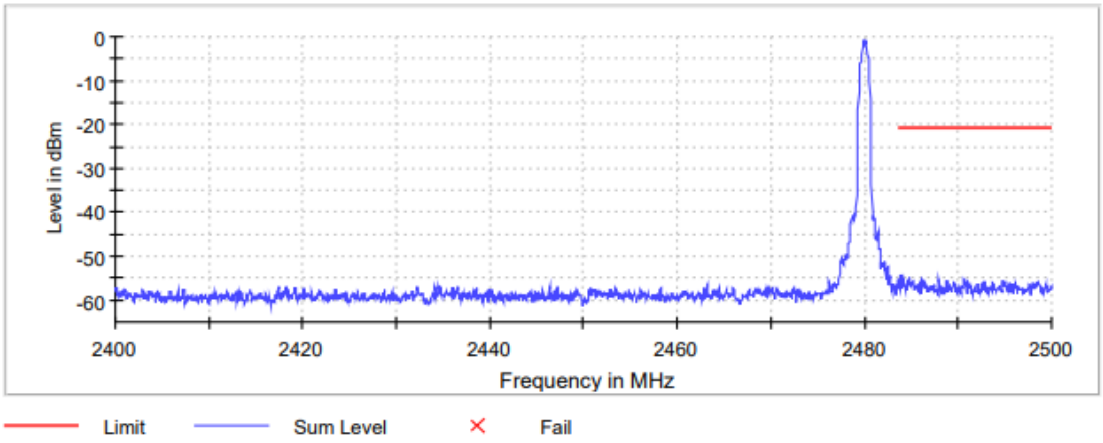
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Modulation: BT (8DPSK 3-DH5)

Results

Freq (MHz)	Lvl (dBm)
2399.625000	-48.5
2399.575000	-48.7
2399.675000	-49.1
2399.525000	-50.2
2399.725000	-50.5
2399.975000	-50.7
2399.475000	-52.1
2399.825000	-52.2
2399.875000	-52.2
2399.775000	-52.2
2399.925000	-52.9
2399.425000	-53.8
2337.925000	-53.9
2337.975000	-53.9
2398.625000	-54.1
2487.875000	-54.5
2487.825000	-54.6
2487.925000	-54.7
2486.625000	-54.8
2484.175000	-54.9
2486.675000	-54.9
2487.225000	-55.0
2487.275000	-55.1
2484.575000	-55.2
2484.225000	-55.3
2491.175000	-55.4
2497.825000	-55.4
2496.425000	-55.4
2487.775000	-55.5
2483.775000	-55.5
2399.775000	-46.5
2399.725000	-47.0
2399.975000	-47.1
2399.825000	-47.9
2399.675000	-48.2

Freq (MHz)	Lvl (dBm)
2399.875000	-48.2
2399.475000	-48.4
2399.425000	-48.6
2399.925000	-48.8
2484.175000	-54.3
2484.225000	-54.4
2483.725000	-54.8
2483.775000	-54.9
2483.825000	-54.9
2485.875000	-55.1
2496.125000	-55.1
2486.525000	-55.1
2486.575000	-55.1
2399.625000	-48.8
2399.575000	-49.9
2399.525000	-50.5
2399.025000	-50.9
2399.075000	-51.0
2398.575000	-51.1
2485.925000	-55.2
2499.075000	-55.2
2496.075000	-55.2
2484.125000	-55.2
2499.025000	-55.4
2487.025000	-55.4

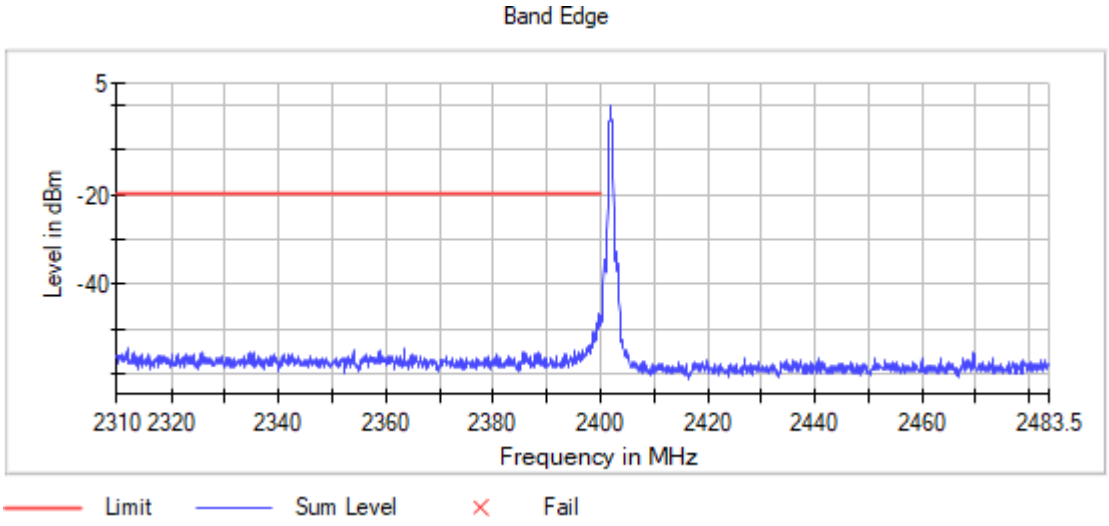
Verdict

Pass

Attachments

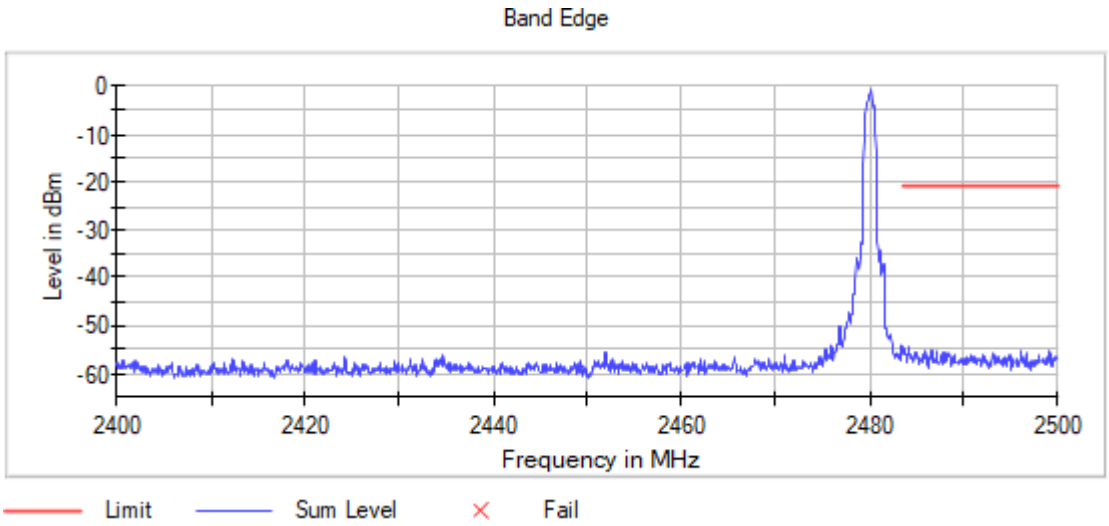
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



FCC 2.1049 / 99dBw Occupied Channel Bandwidth 99%

Limits

No Limit has been set to this test case

Modulation: BT (GFSK 1-DH5)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	0.865
2441.00000					0.870
2480.00000					0.870

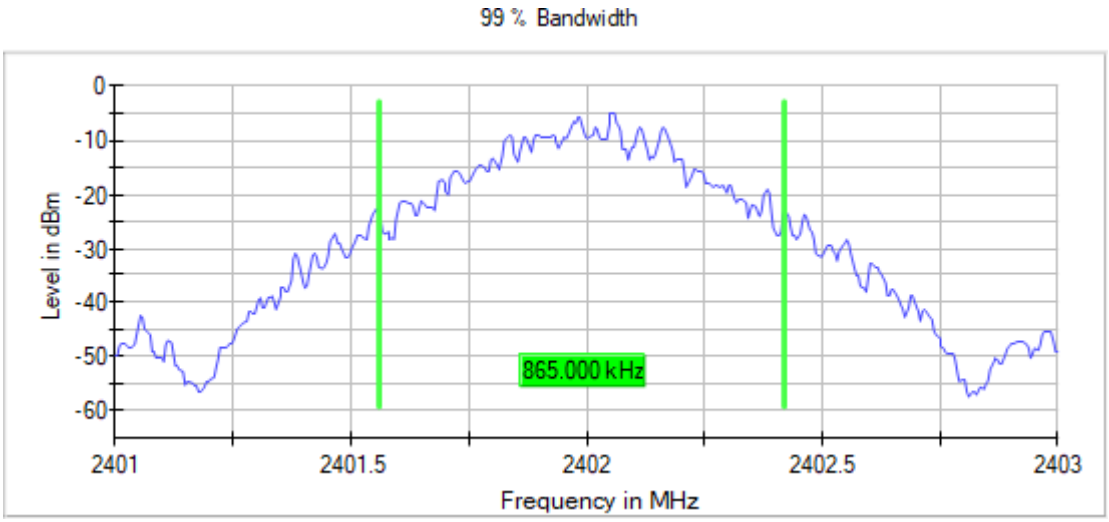
Verdict

Pass

Attachments

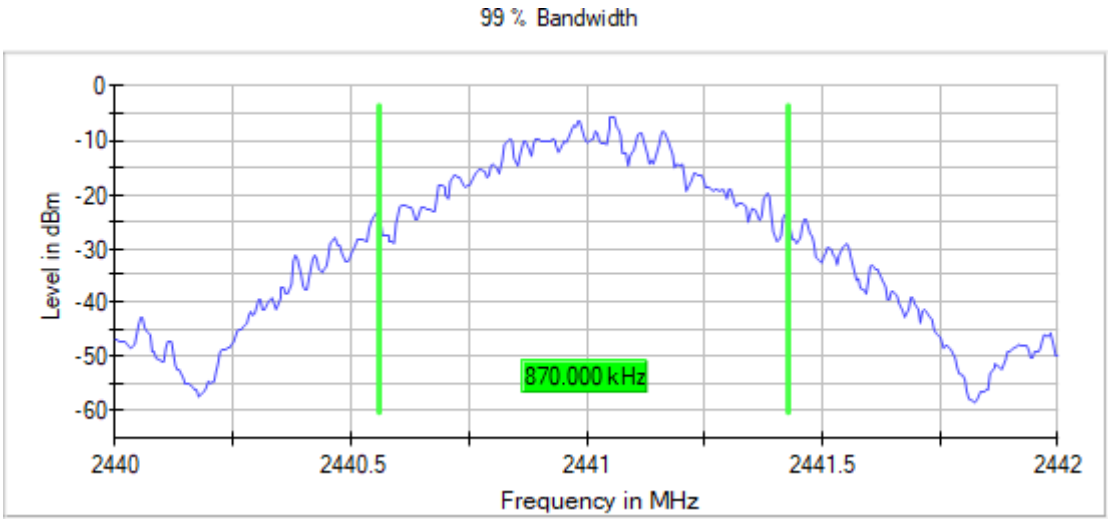
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



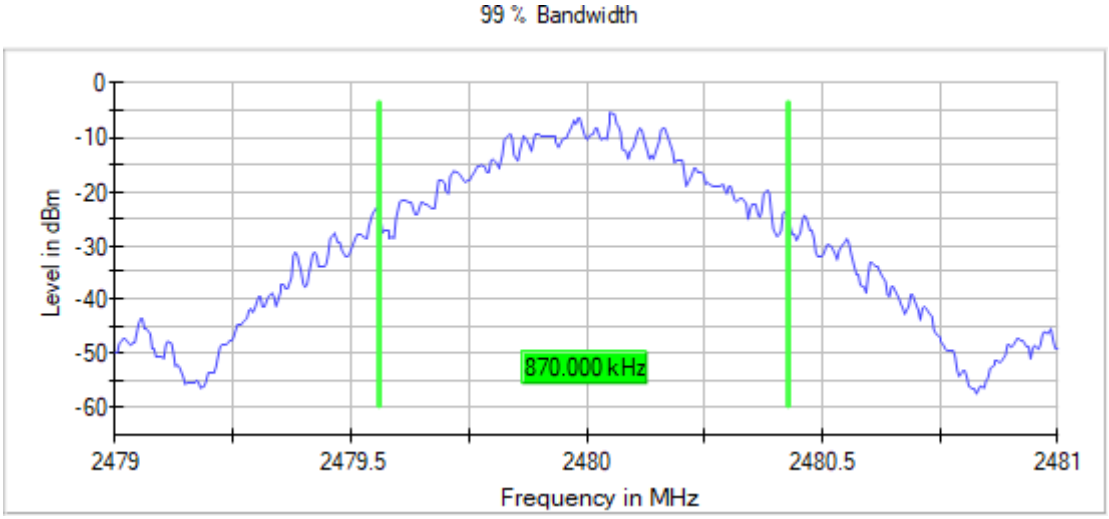
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: BT (Π/4 DQPSK 2-DH5)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	1.170
2441.00000					1.170
2480.00000					1.165

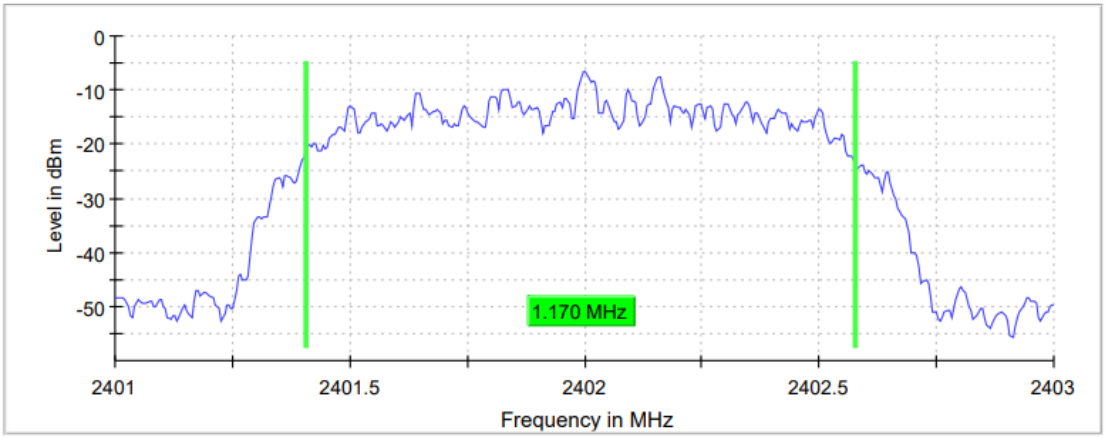
Verdict

Pass

Attachments

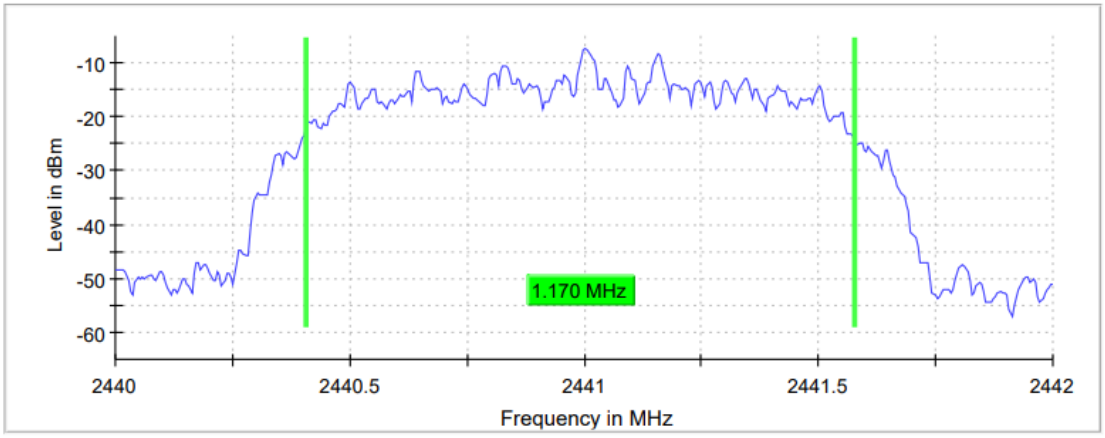
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



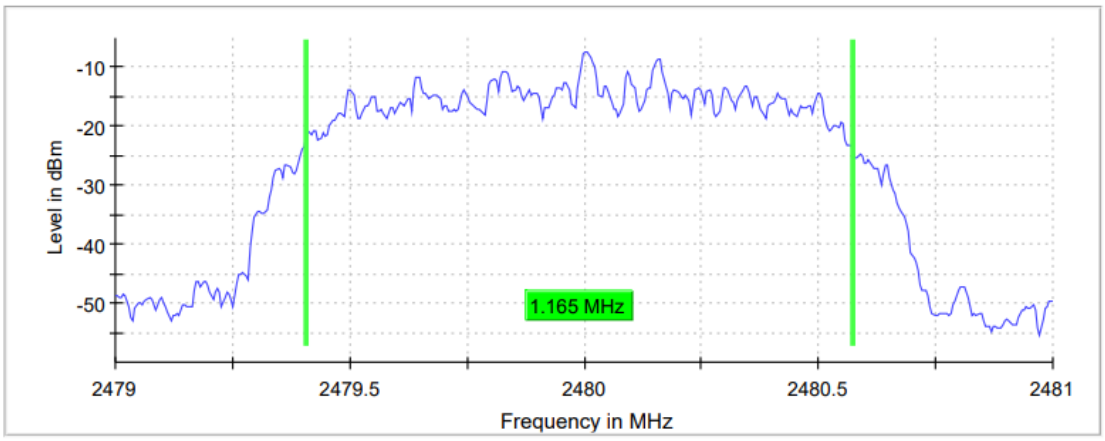
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (Π/4 DQPSK 2-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



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

Images:



Modulation: BT (8DPSK 3-DH5)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2402.00000	Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	1.175
2441.00000					1.175
2480.00000					1.175

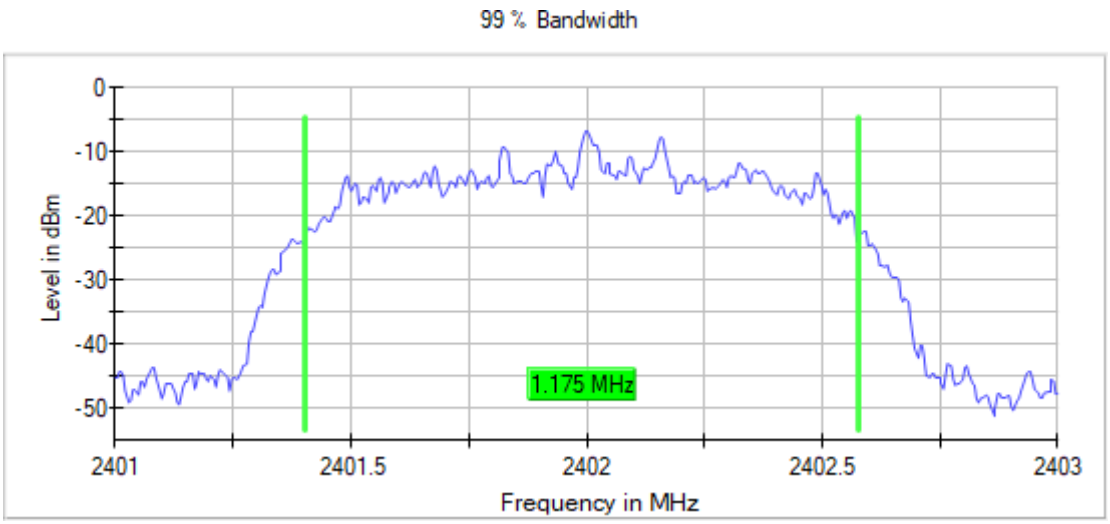
Verdict

Pass

Attachments

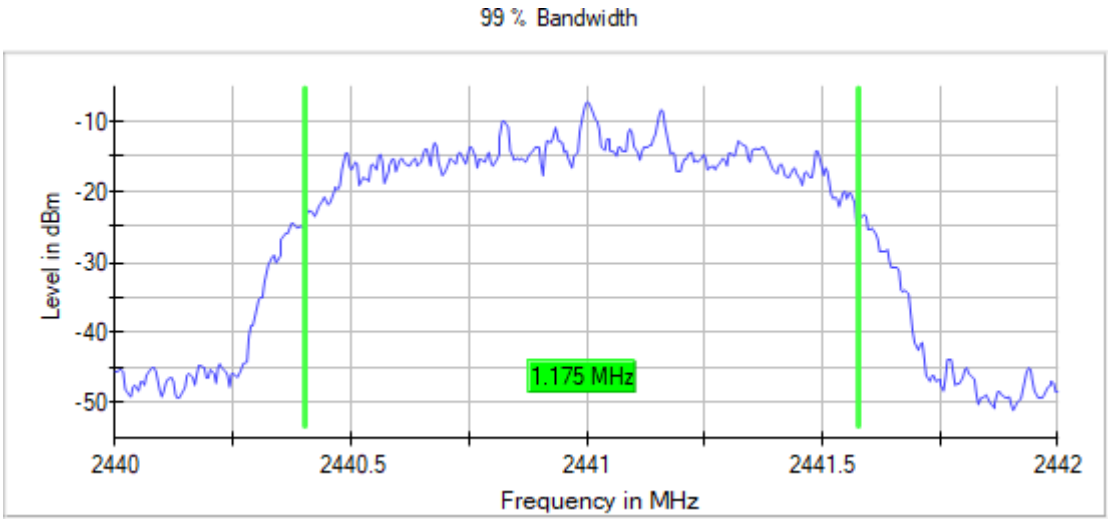
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



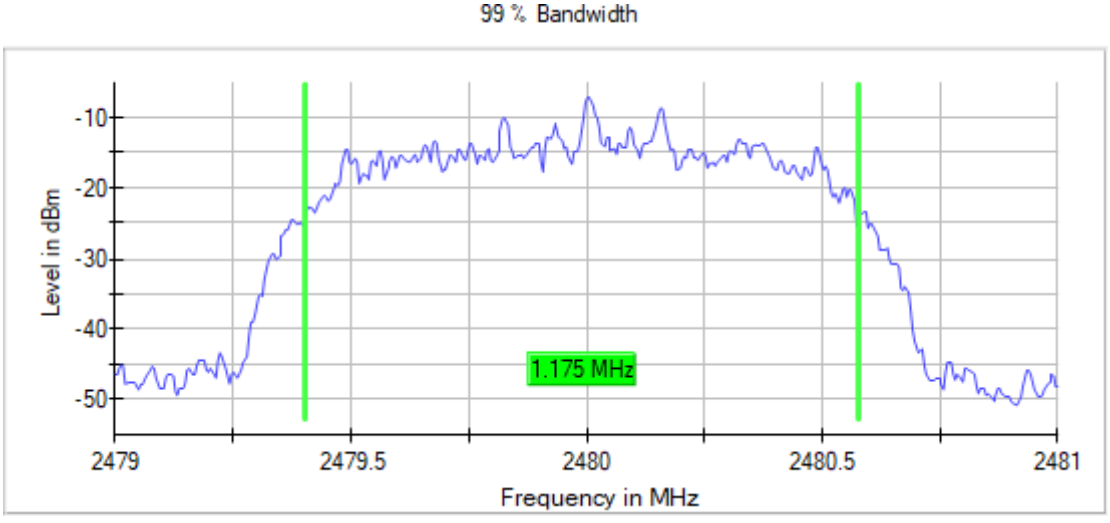
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1, Active Port = 1

Images:



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

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

Limits

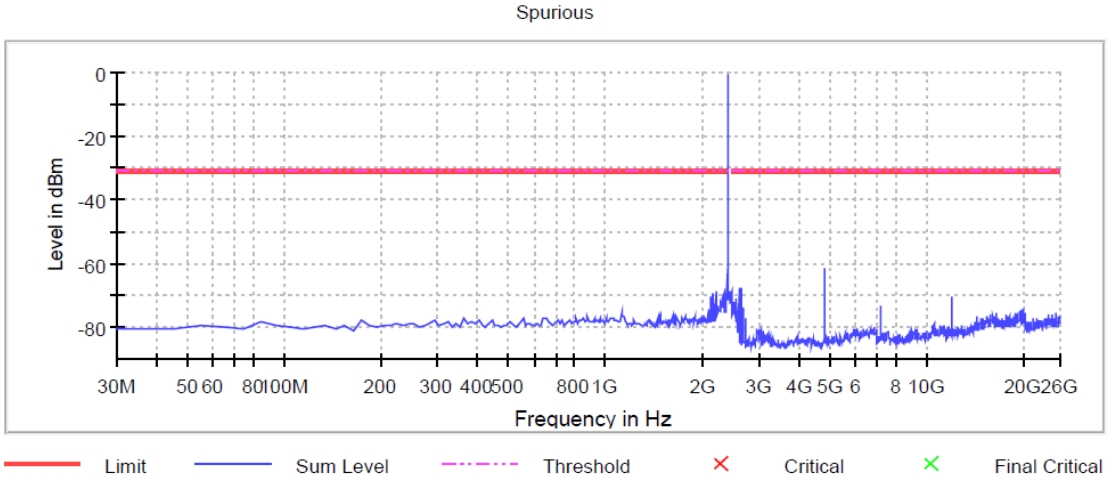
In any 100 kHz bandwidth outside the frequency band in which the digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB instead of 20 dB.

Modulation: BTBR (GFSK 1-DH5)

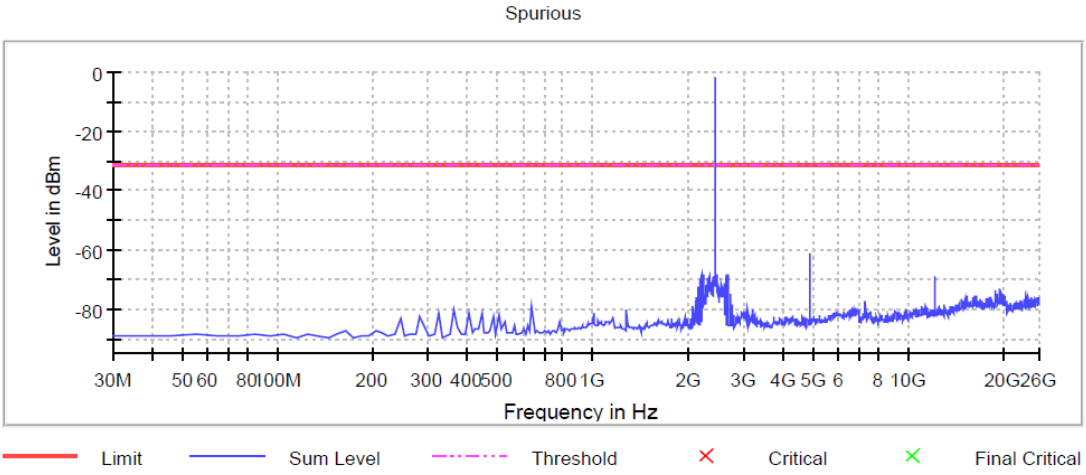
Results

Conducted spurious signals detected were minimum 20 dB respect to the limit for the lowest, middle and highest operating channels.

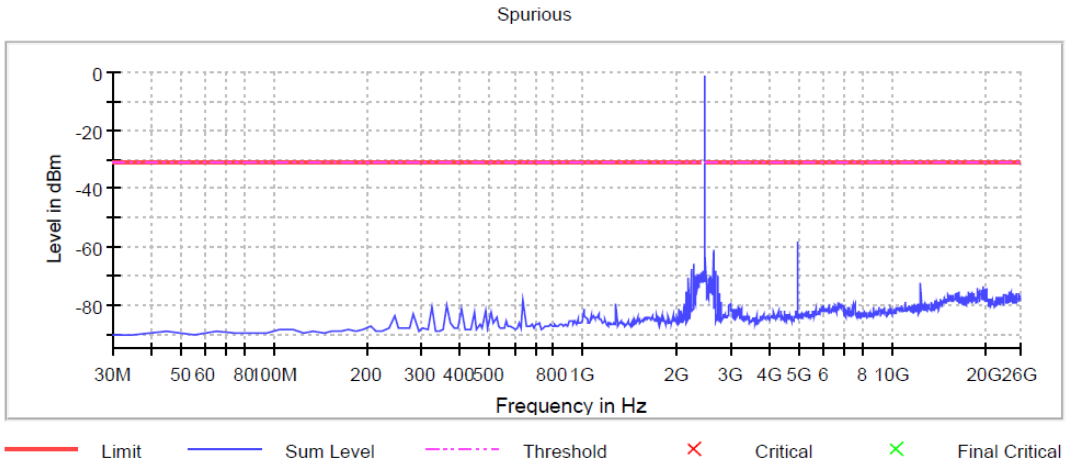
Lowest Channel



Middle Channel



Highest Channel



Verdict

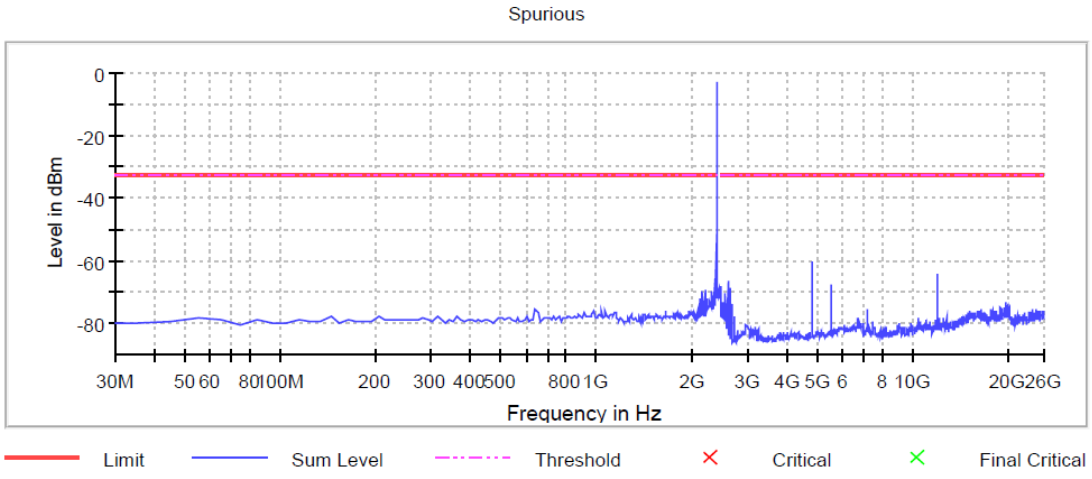
Pass

Modulation: BTEDR (π/4 DQPSK 2-DH5)

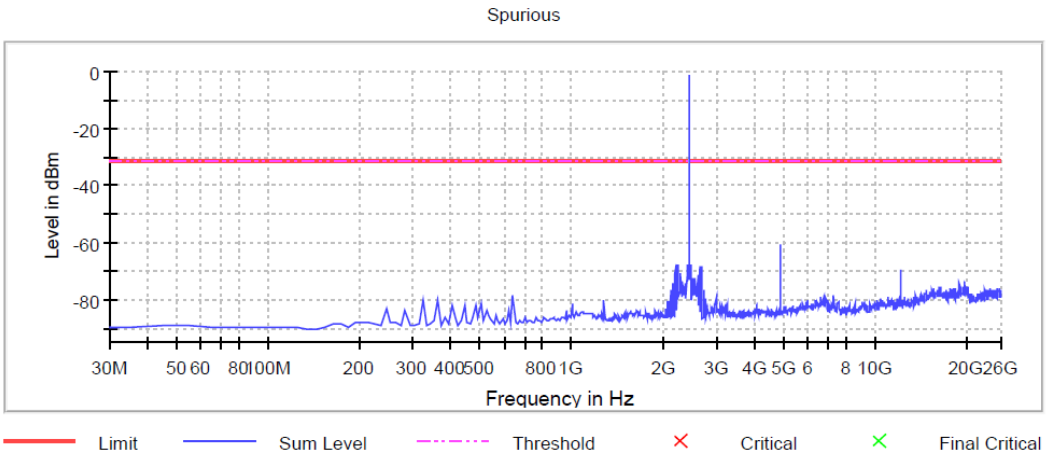
Results

Conducted spurious signals detected were minimum 20 dB respect to the limit for the lowest, middle and highest operating channels.

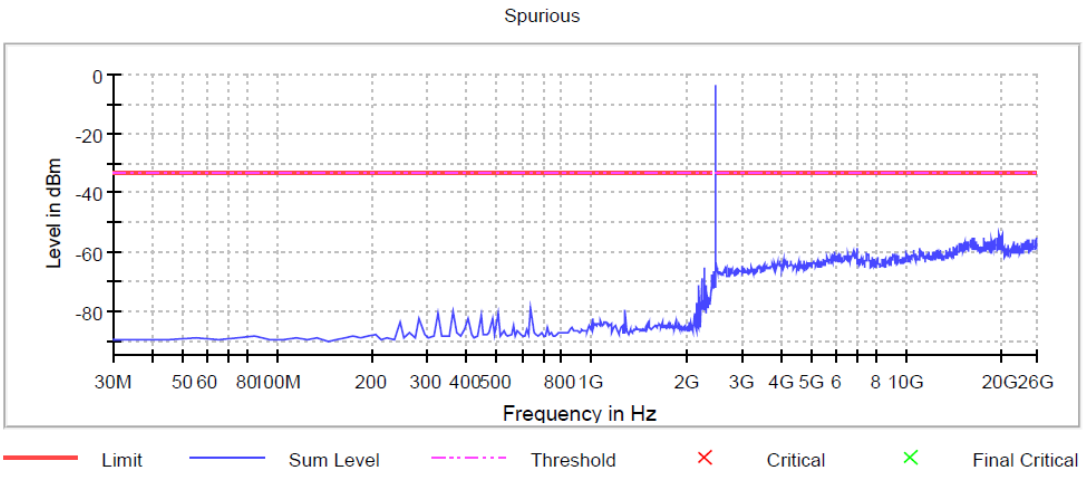
Lowest Channel



Middle Channel



Highest Channel



Verdict

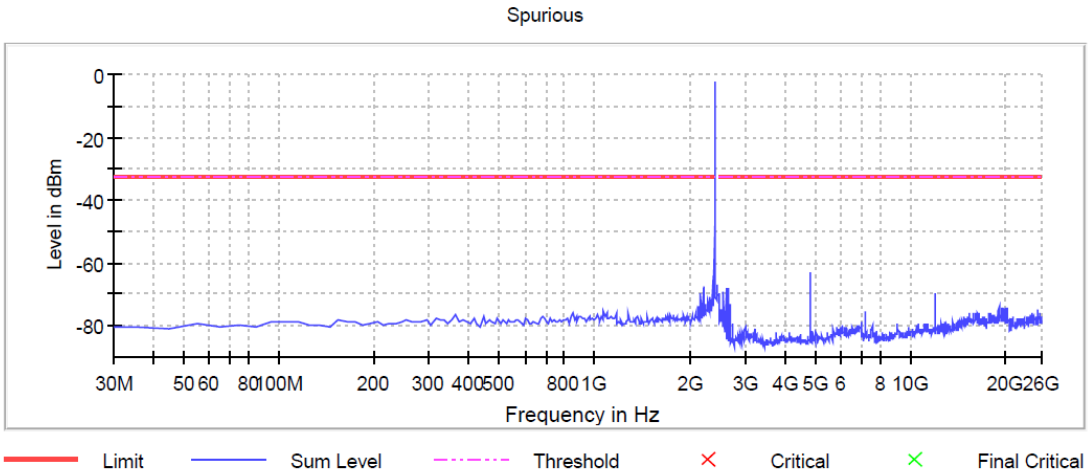
Pass

Modulation: BTEDR (8DPSK 3-DH5)

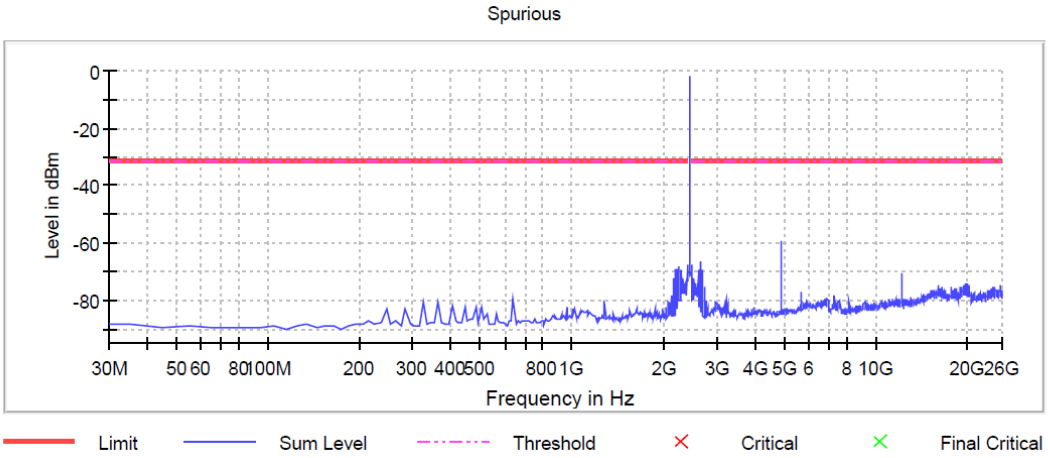
Conducted spurious signals detected were minimum 20 dB respect to the limit for the lowest, middle and highest operating channels.

Results

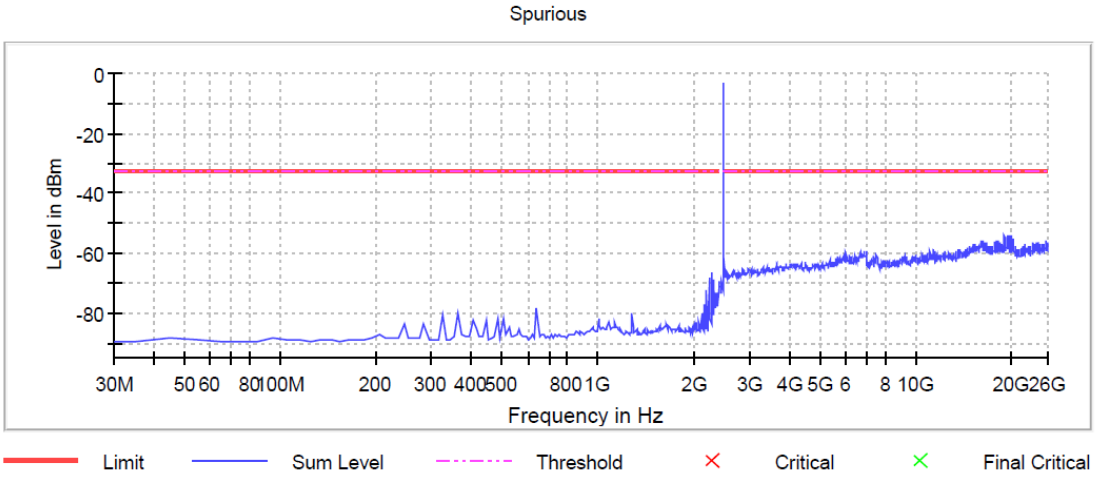
Lowest Channel



Middle Channel



Highest Channel



Verdict

Pass

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

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c) / RSS-Gen):

Frequency Range (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	500	54	3

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

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

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

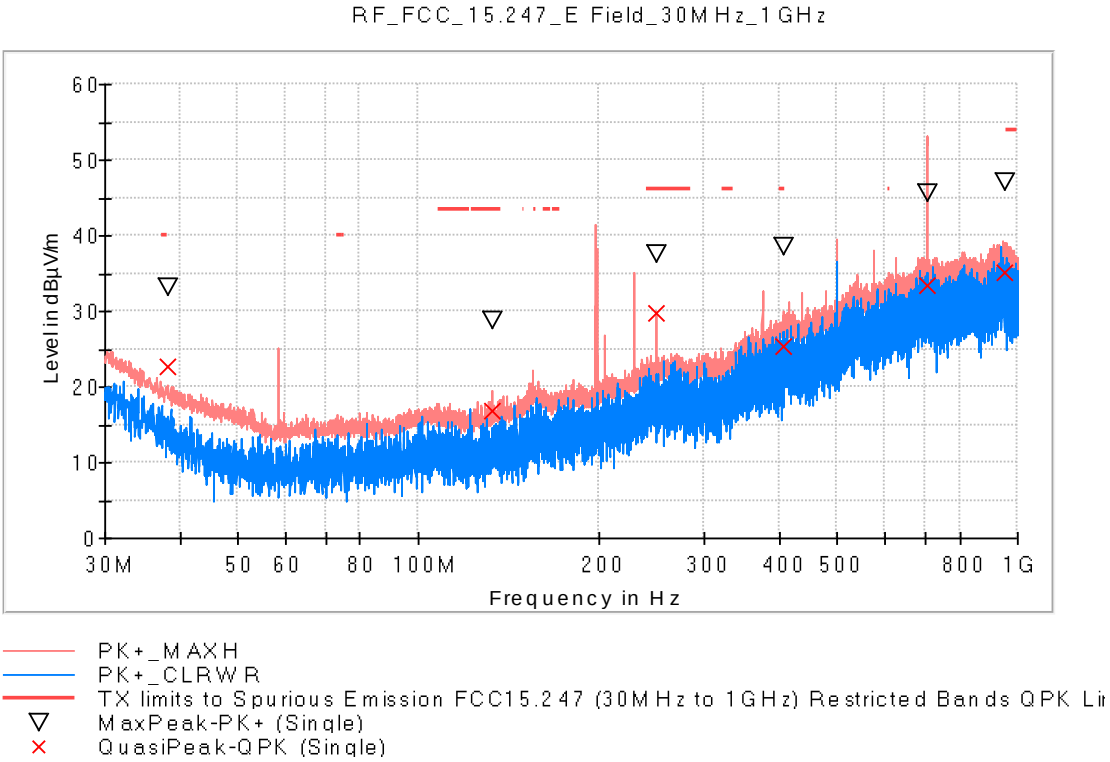
Verdict

Pass

Modulation: BT (GFSK 1-DH5)
Results

Frequency range 30 - 1000 MHz

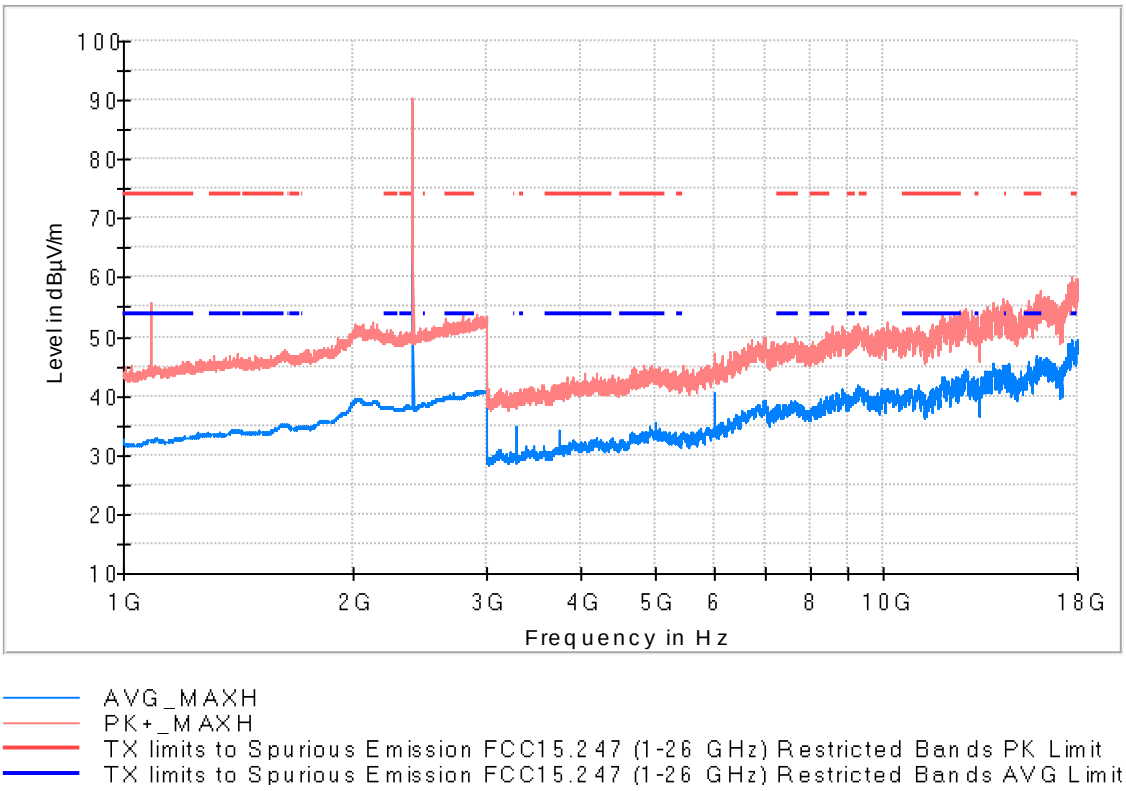
Middle Channel



Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)
38.051000	33.2	22.8	V	17.2	40.0
132.965500	28.9	16.8	V	26.7	43.5
249.996000	37.5	29.7	V	16.3	46.0
405.535500	38.5	25.3	V	20.7	46.0
706.672000	45.7	33.4	V	---	---
954.555500	47.0	35.1	V	---	---

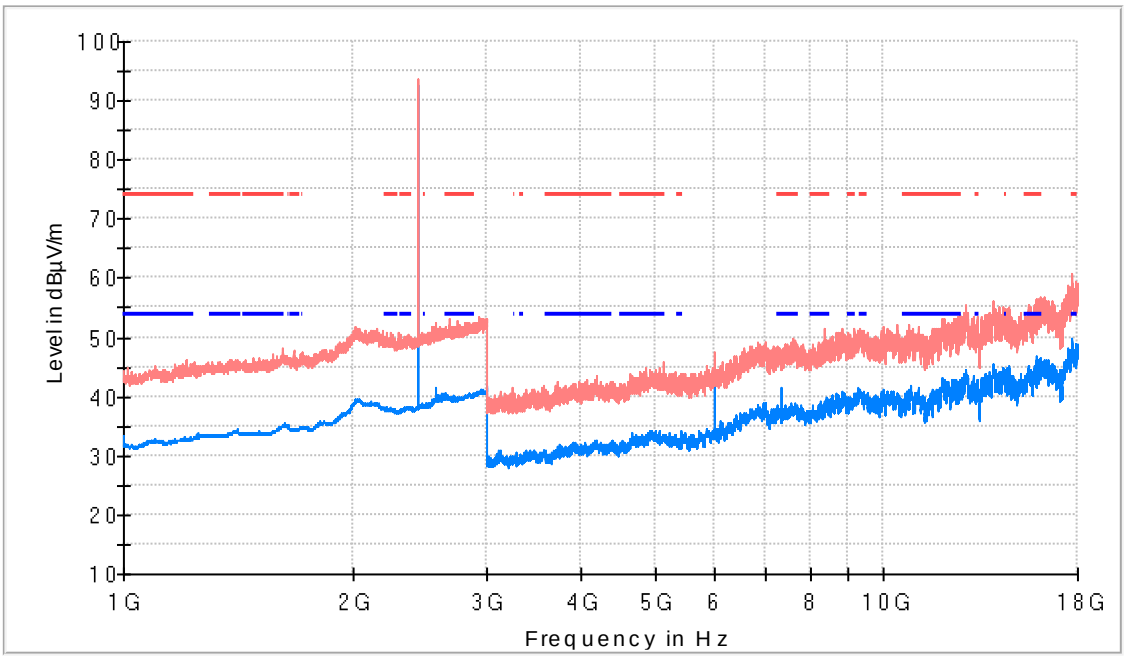
Frequency range 1 - 18 GHz

Lowest Channel



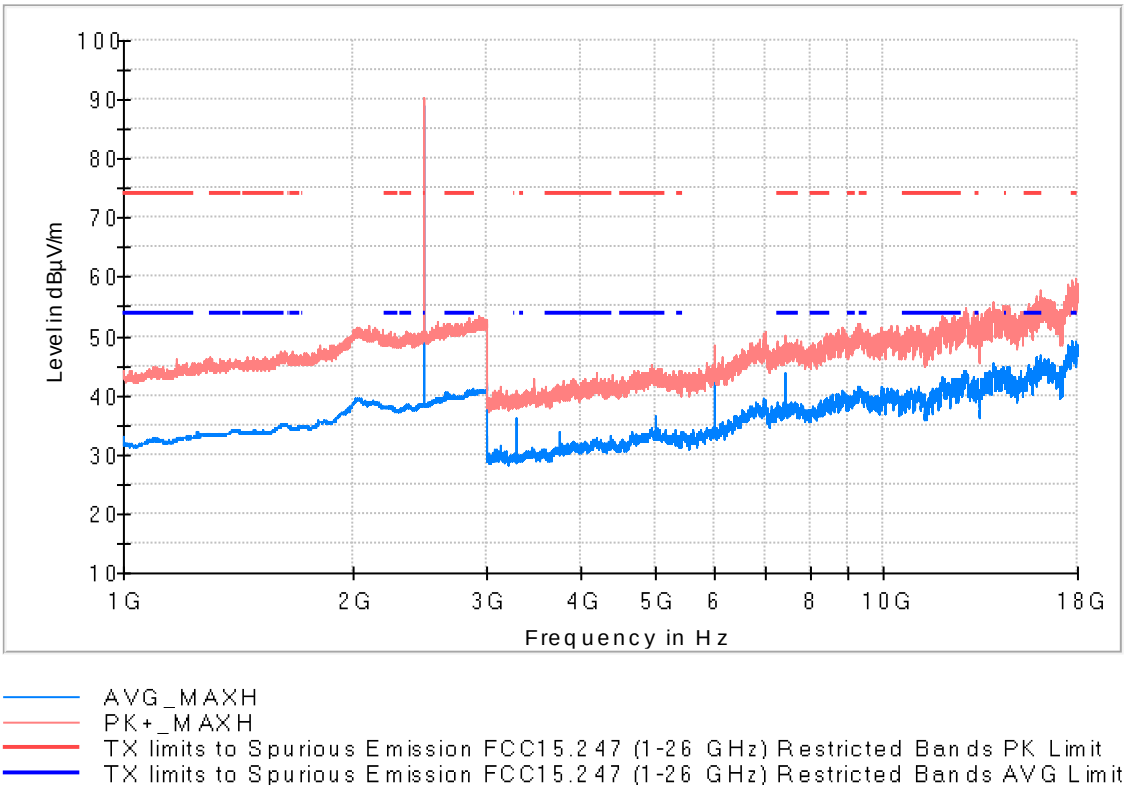
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2402.000000	90.2	89.7	V	---	---	Fundamental
11945.500000	52.6	43.3	H	10.7	54.0	
17658.000000	58.8	49.6	V	---	---	

Middle Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2441.000000	93.8	92.8	V	---	---	Fundamental
11952.500000	50.8	43.3	V	10.7	54.0	

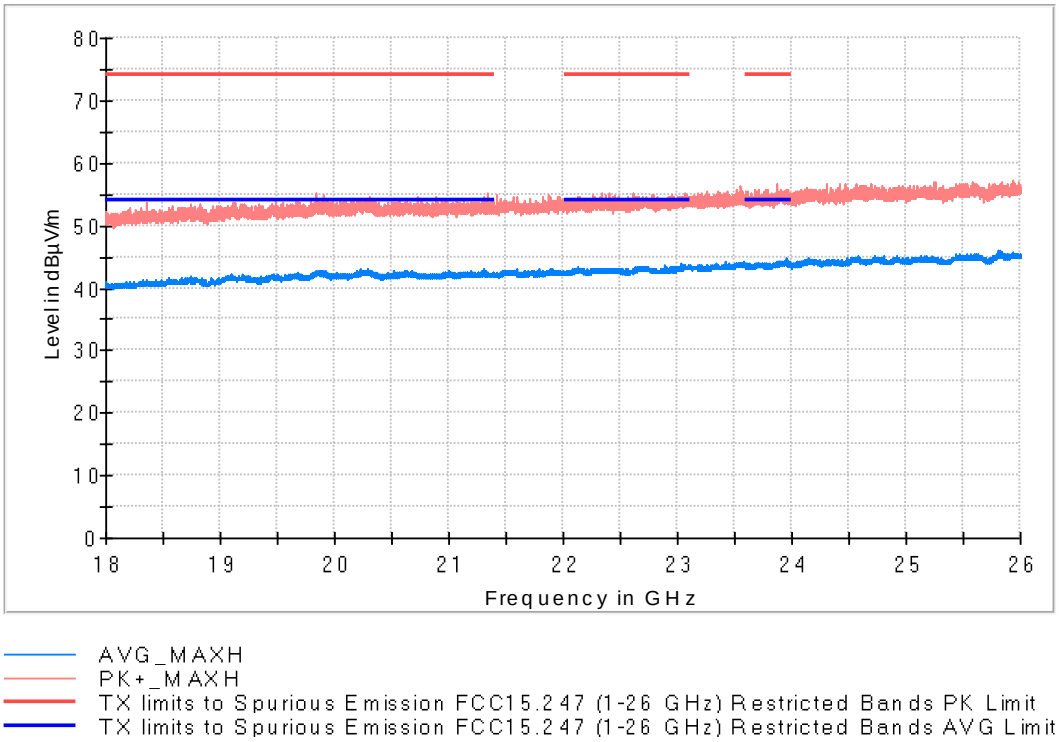
Highest Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2480.000000	89.7	89.0	V	---	---	Fundamental
7440.000000	50.1	44.0	V	10.0	54.0	

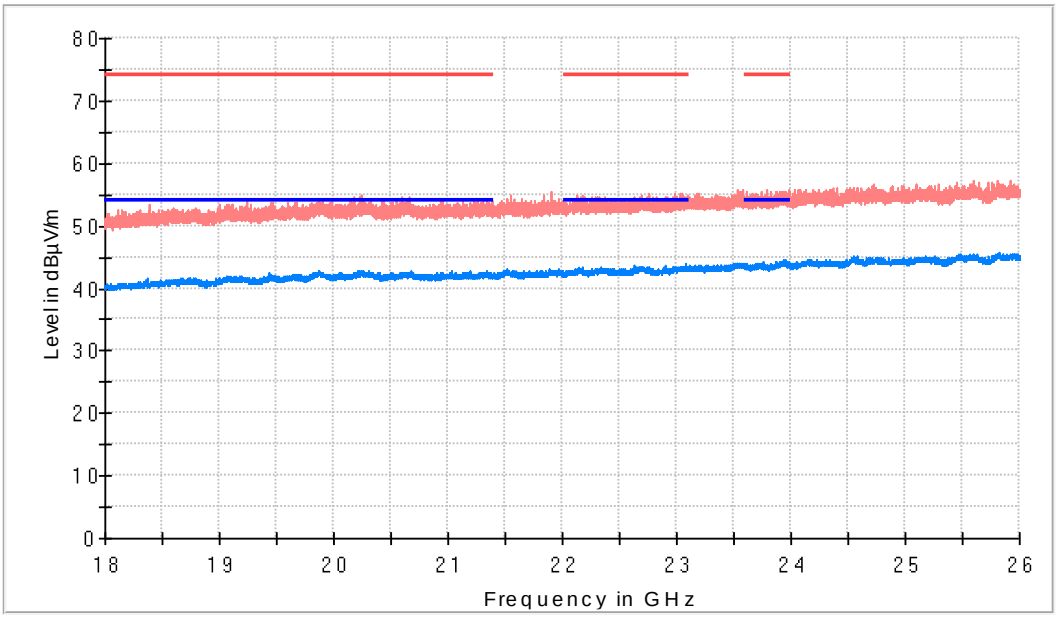
Frequency range 18 - 26 GHz

Lowest Channel



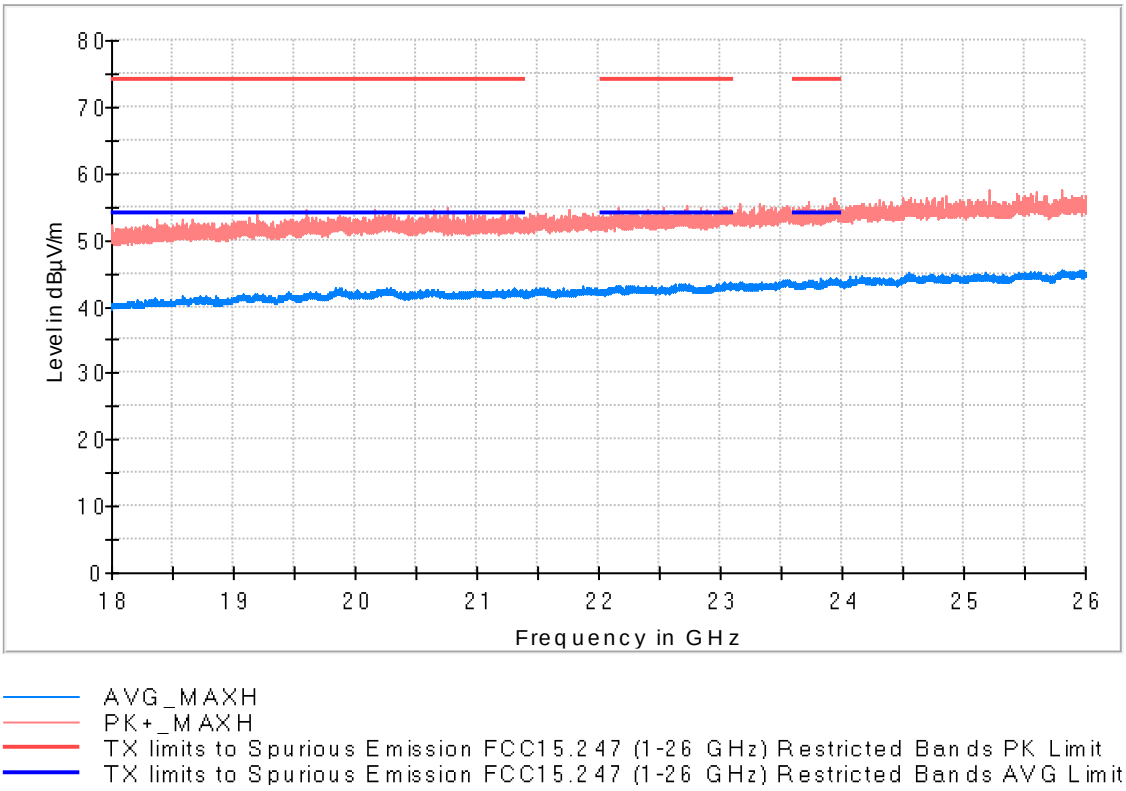
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23950.500000	54.5	44.5	V	9.5	54.0

Middle Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
22895.500000	52.7	43.8	H	10.2	54.0

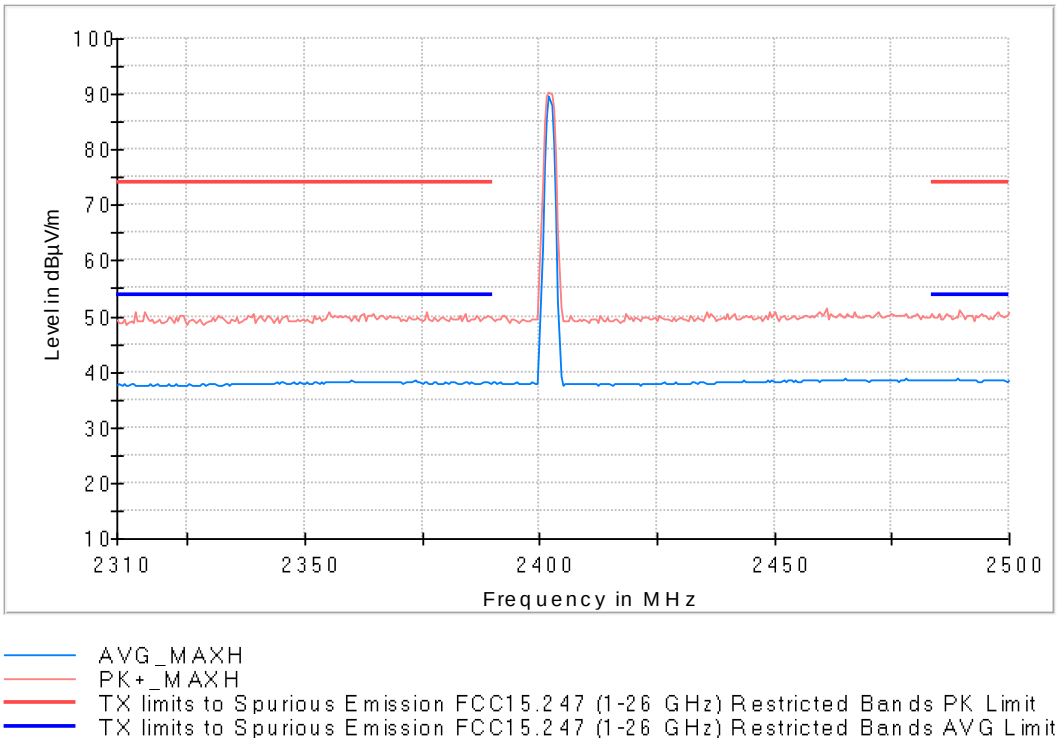
Highest Channel



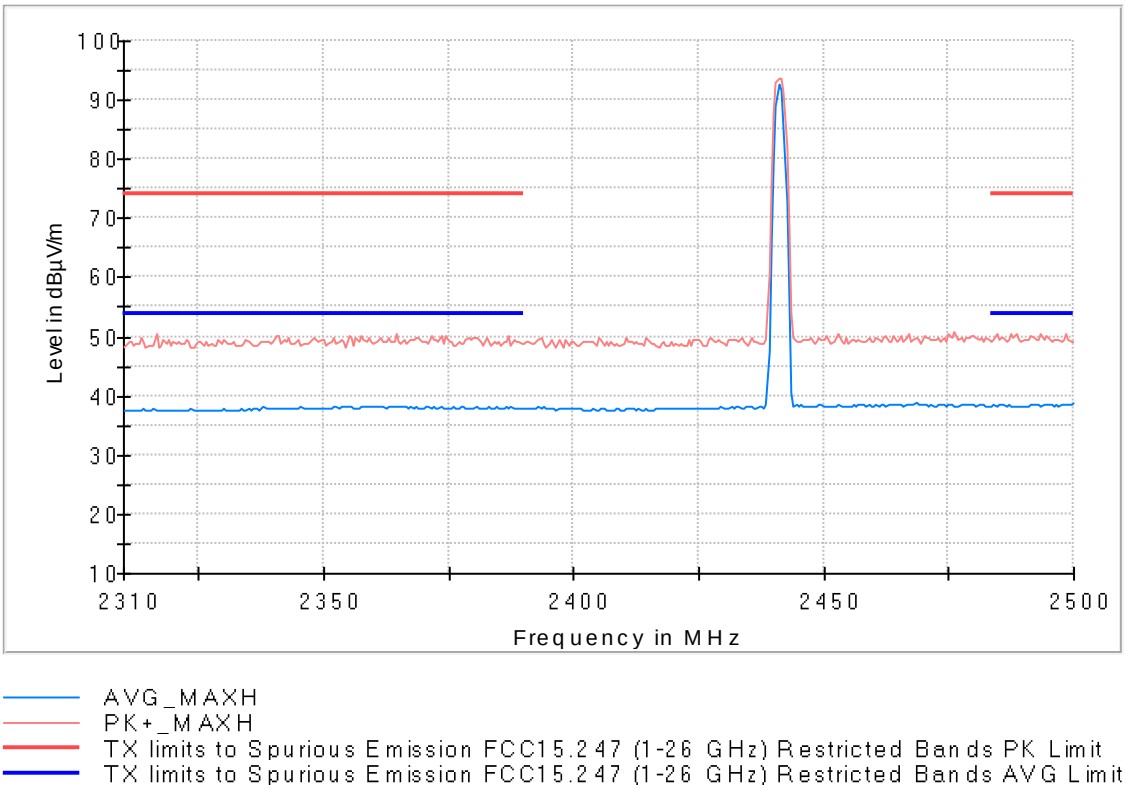
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23909.500000	54.7	44.3	H	9.7	54.0

Restricted Bands (2.31 GHz - 2.5 GHz)

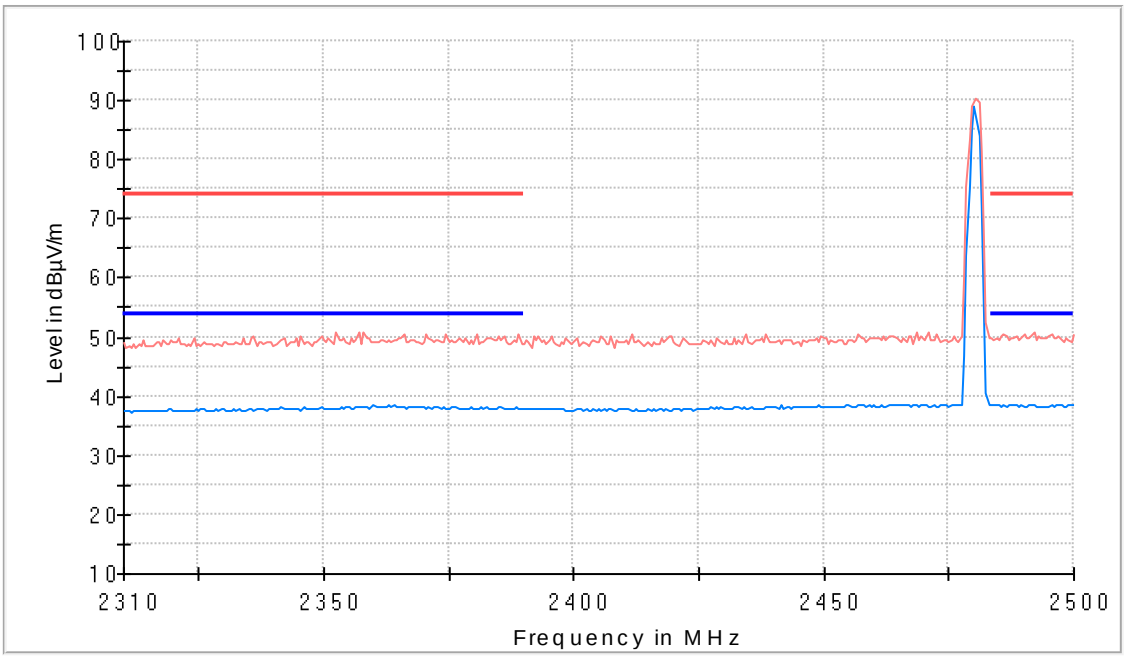
Lowest Channel



Middle Channel



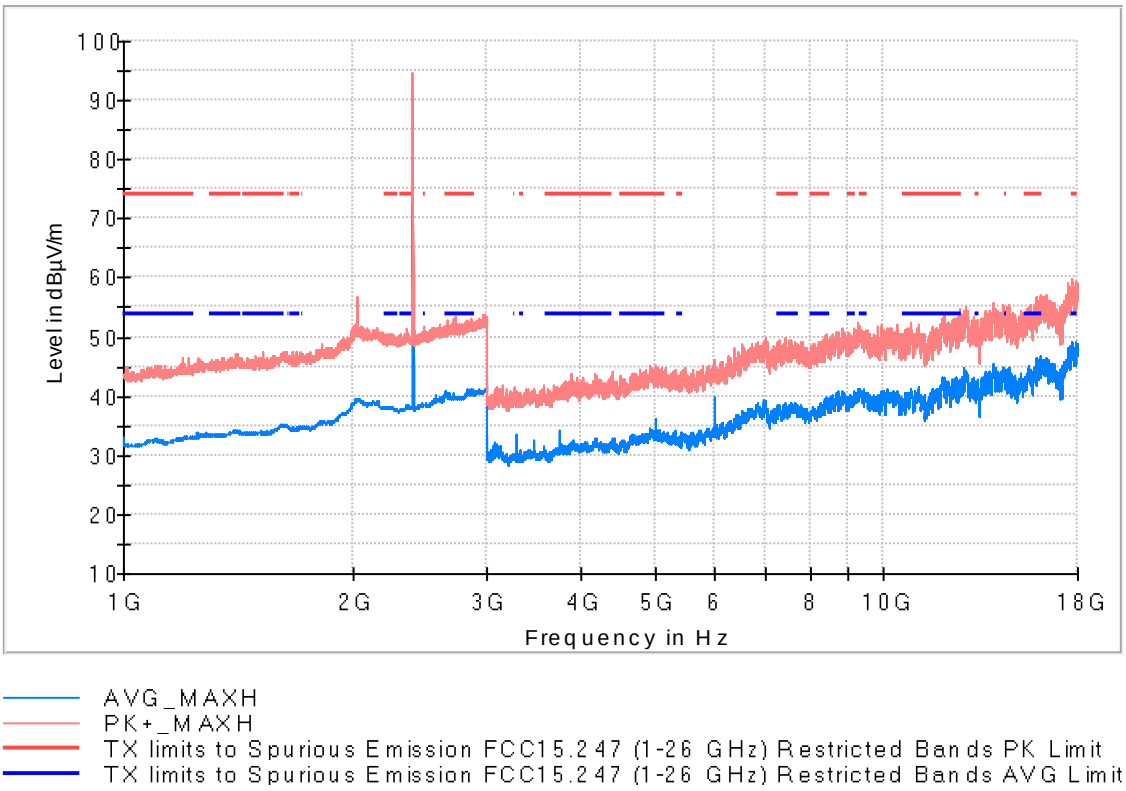
Highest Channel



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

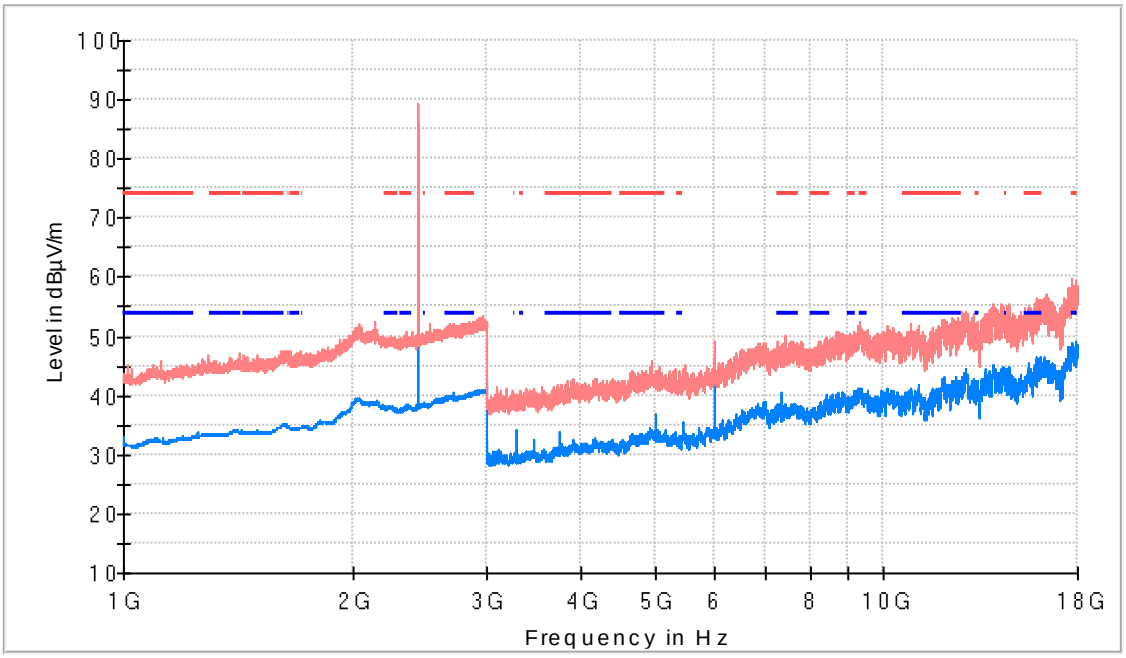
Frequency range 1 - 18 GHz

Lowest Channel



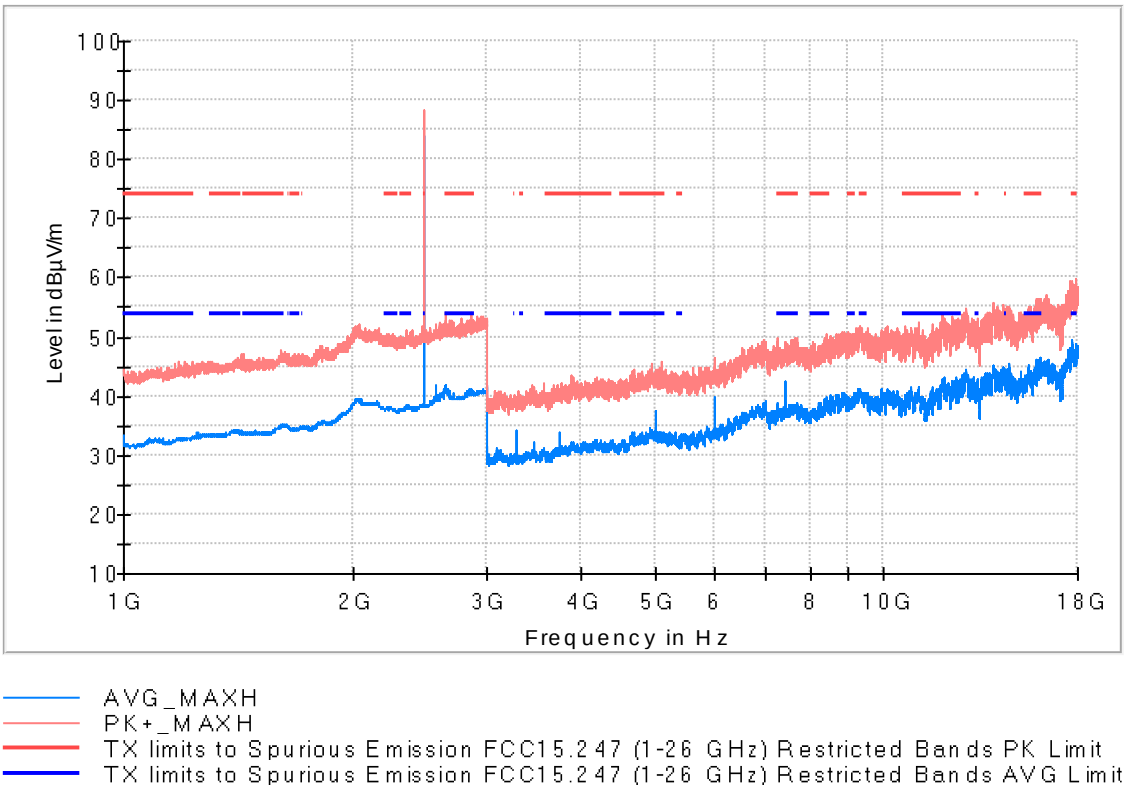
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2402.000000	94.6	91.1	V	---	---	Fundamental
11944.000000	52.0	43.2	V	10.8	54.0	

Middle Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2441.000000	89.4	85.9	V	---	---	Fundamental
11997.000000	52.1	43.1	H	10.9	54.0	
17938.000000	57.7	49.1	V	4.9	54.0	

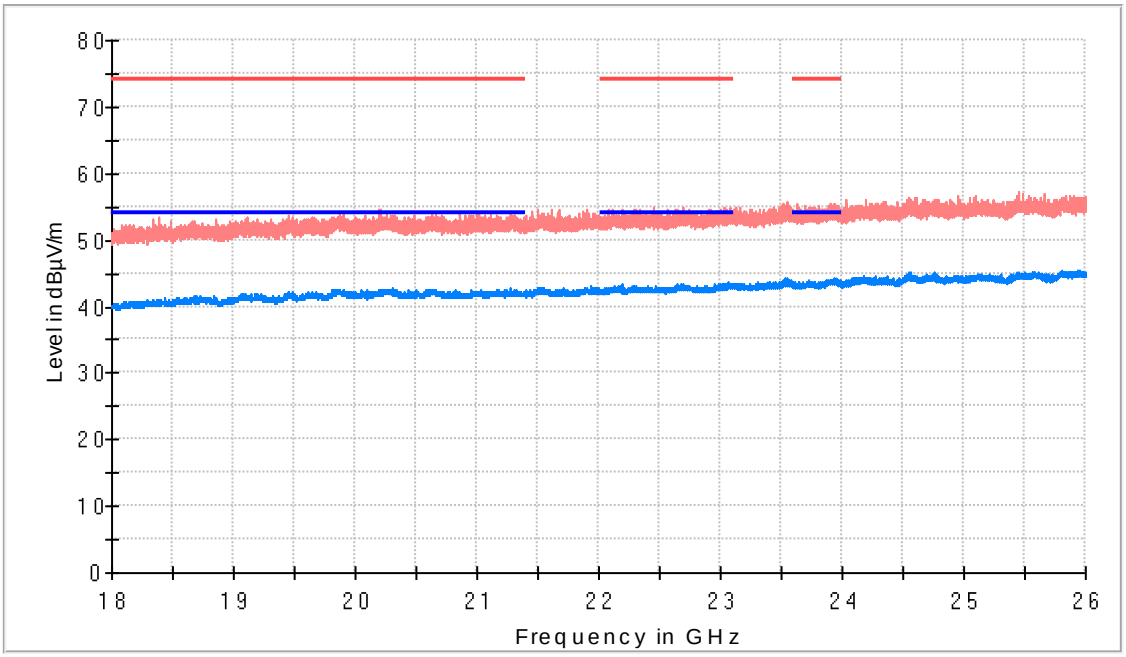
Highest Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2480.500000	88.3	83.9	V	---	---	Fundamental
12000.000000	52.6	43.2	H	10.8	54.0	

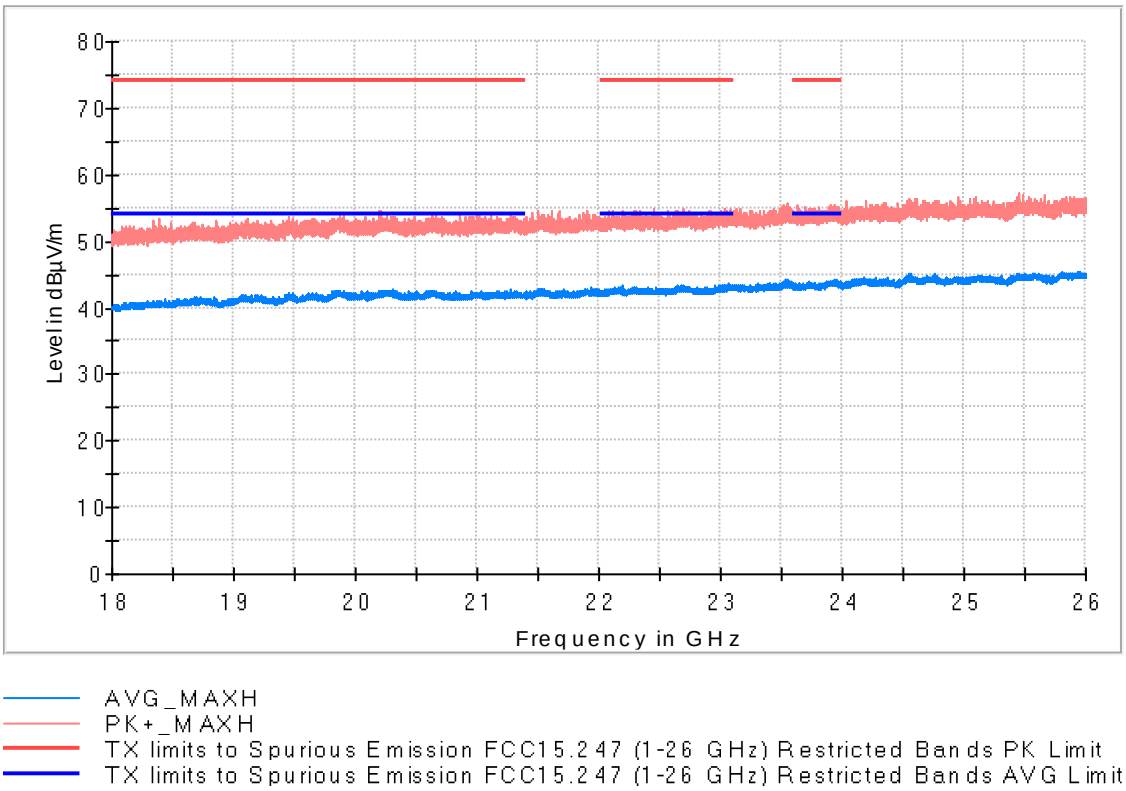
Frequency range 18 - 26 GHz

Lowest Channel



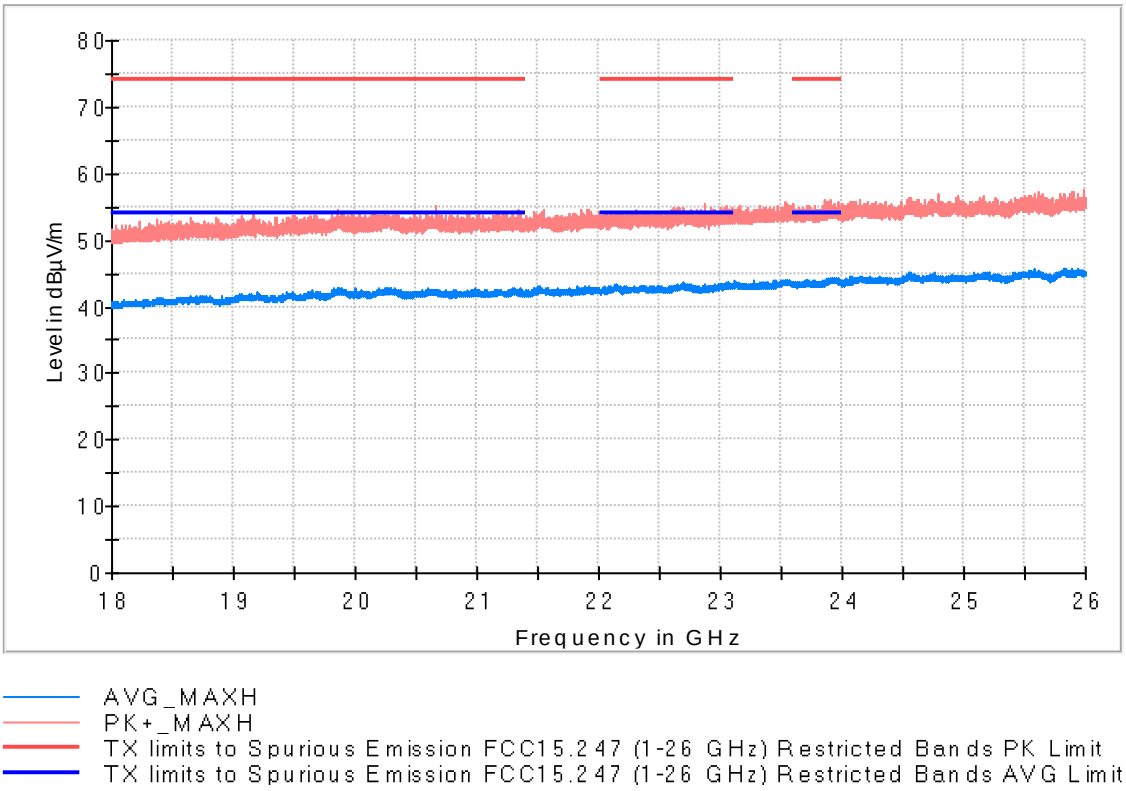
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23936.000000	53.9	44.2	V	9.8	54.0

Middle Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23936.000000	53.9	44.2	V	9.8	54.0

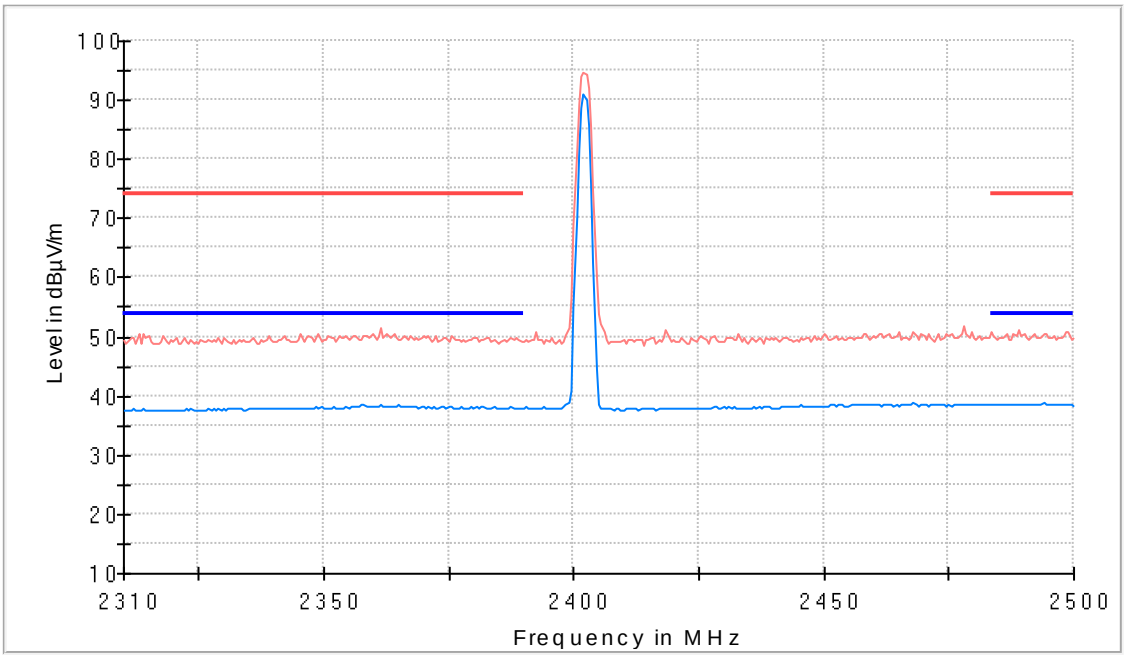
Highest Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23879.000000	53.7	44.4	H	9.6	54.0

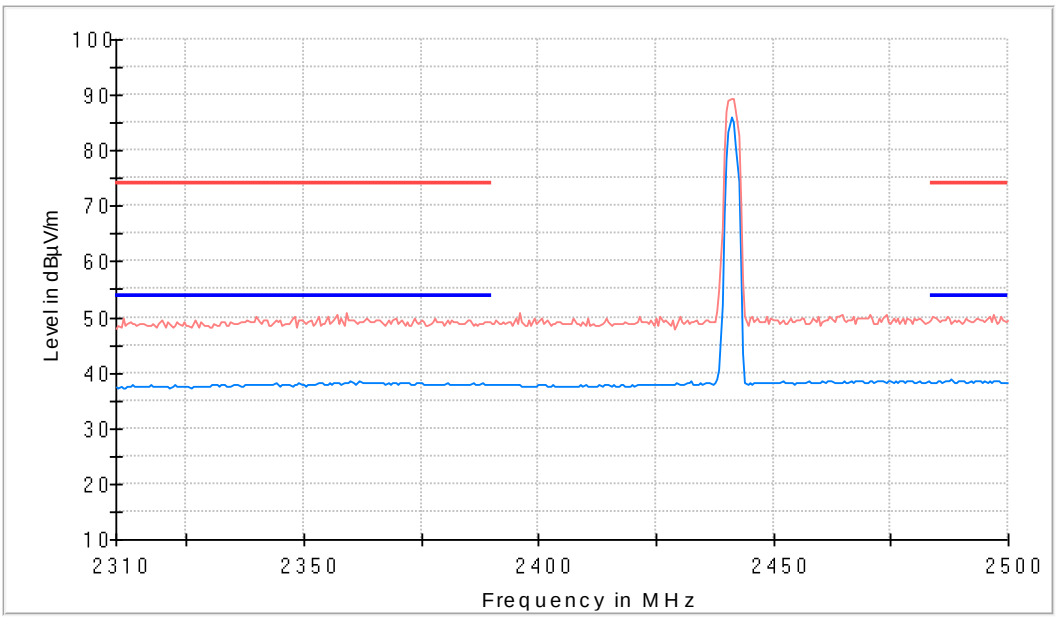
Restricted Bands (2.31 GHz - 2.5 GHz)

Lowest Channel



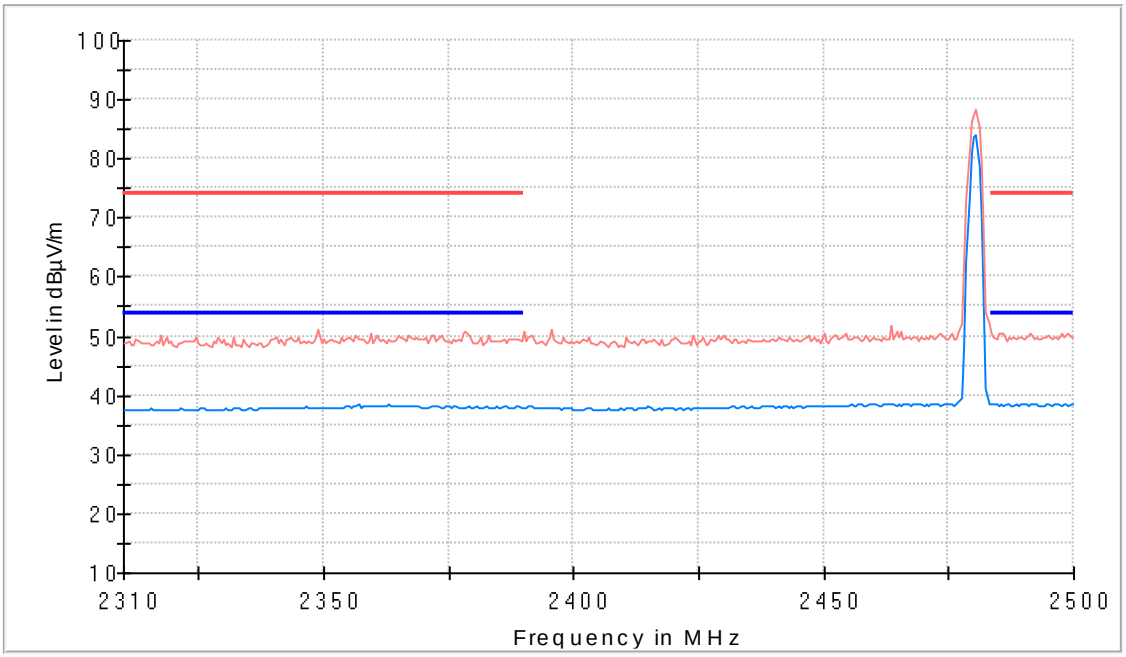
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Middle Channel



AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Highest Channel

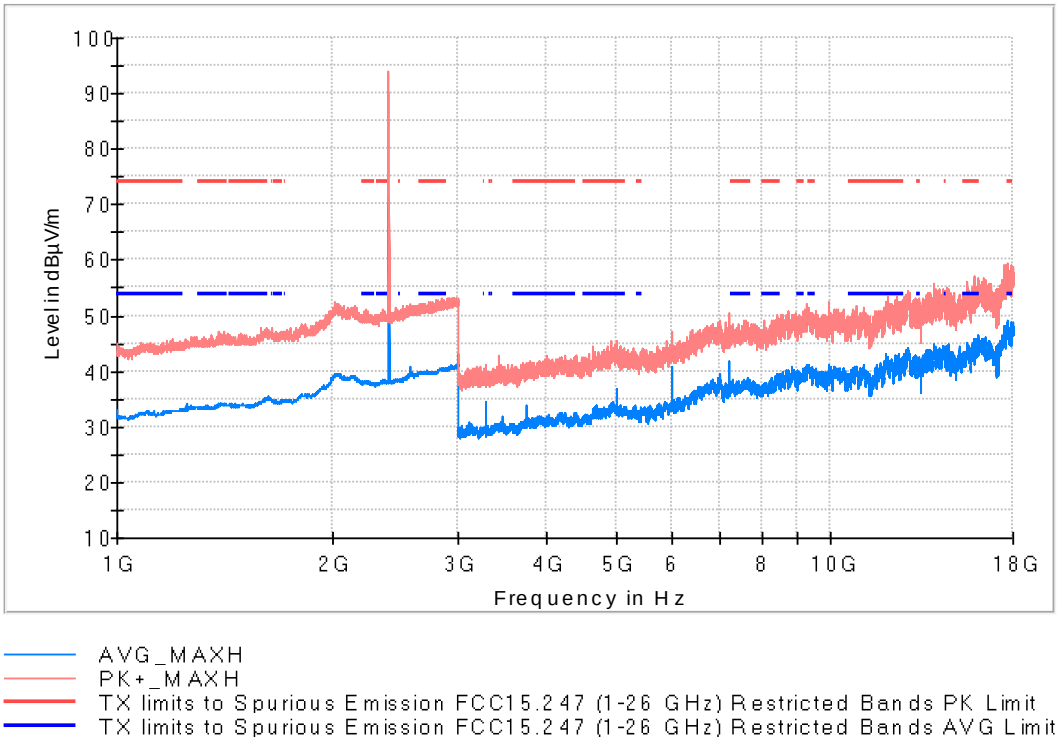


Modulation: BT (8DPSK 3-DH5)

Results

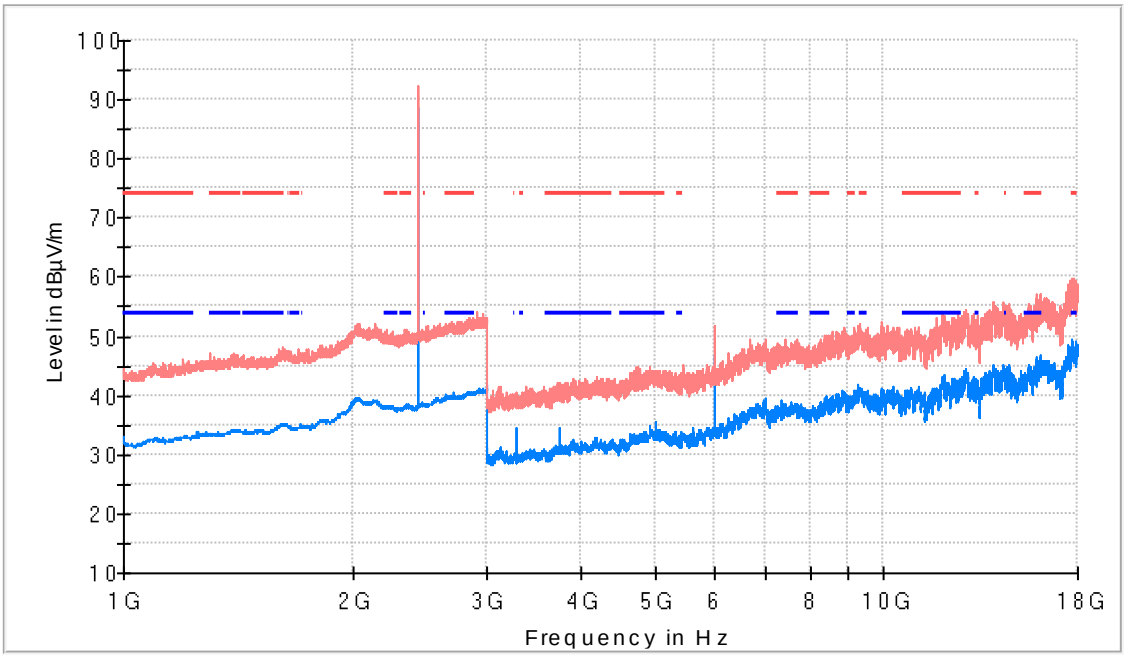
Frequency range 1 - 18 GHz

Lowest Channel



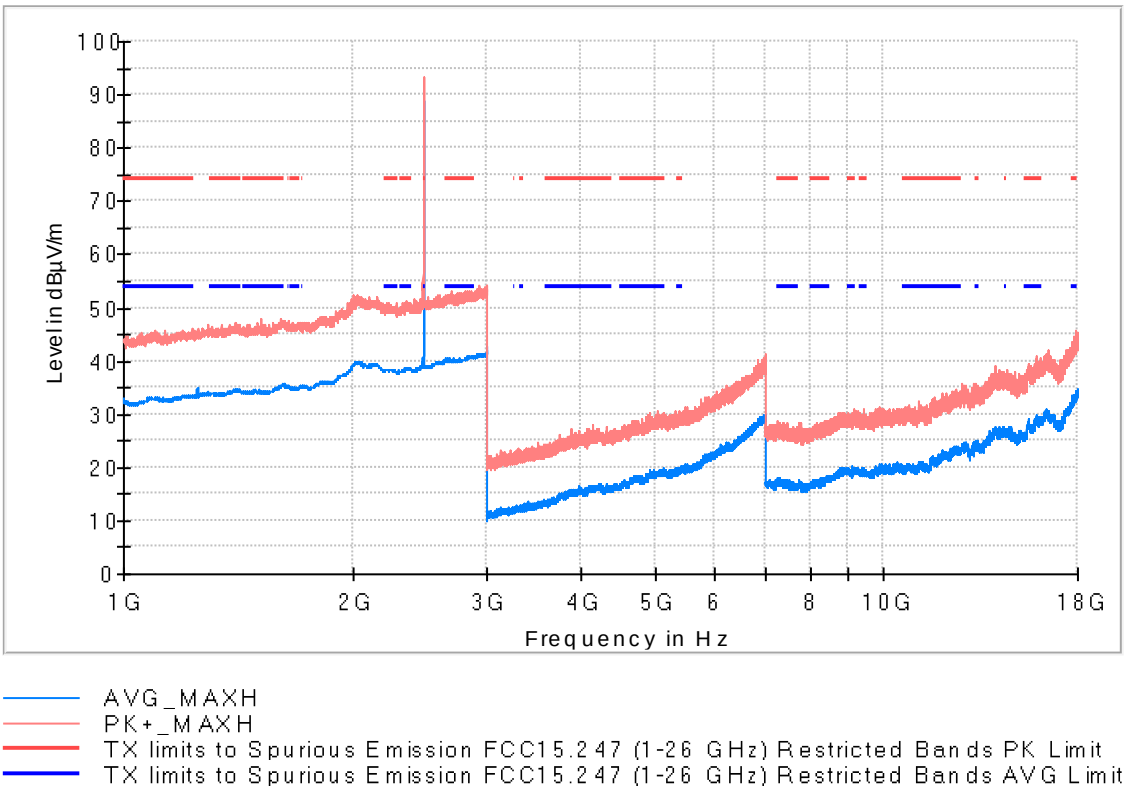
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2402.000000	94.0	90.5	V	---	---	Fundamental
11947.000000	51.4	43.3	H	10.7	54.0	

Middle Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2441.000000	92.3	88.6	V	---	---	Fundamental
11995.500000	51.7	43.5	V	10.5	54.0	

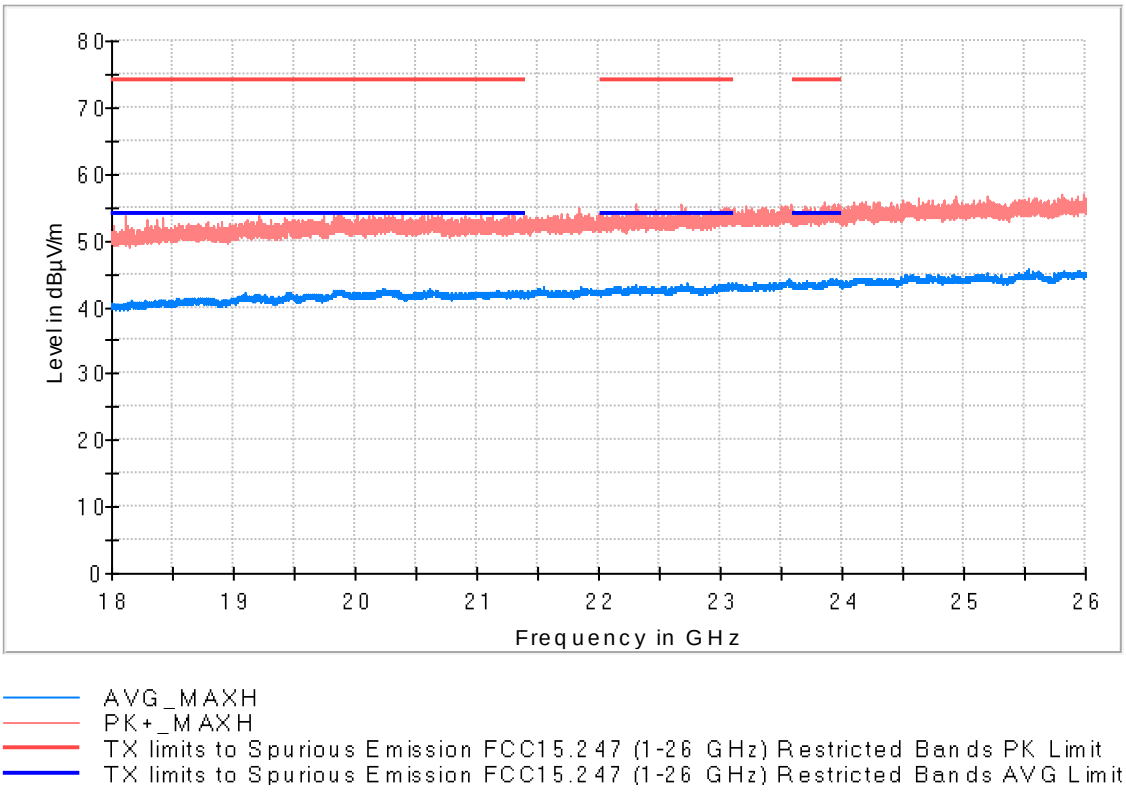
Highest Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2480.000000	92.9	89.1	V	---	---	Fundamental
17968.500000	42.8	34.7	V	19.3	54.0	

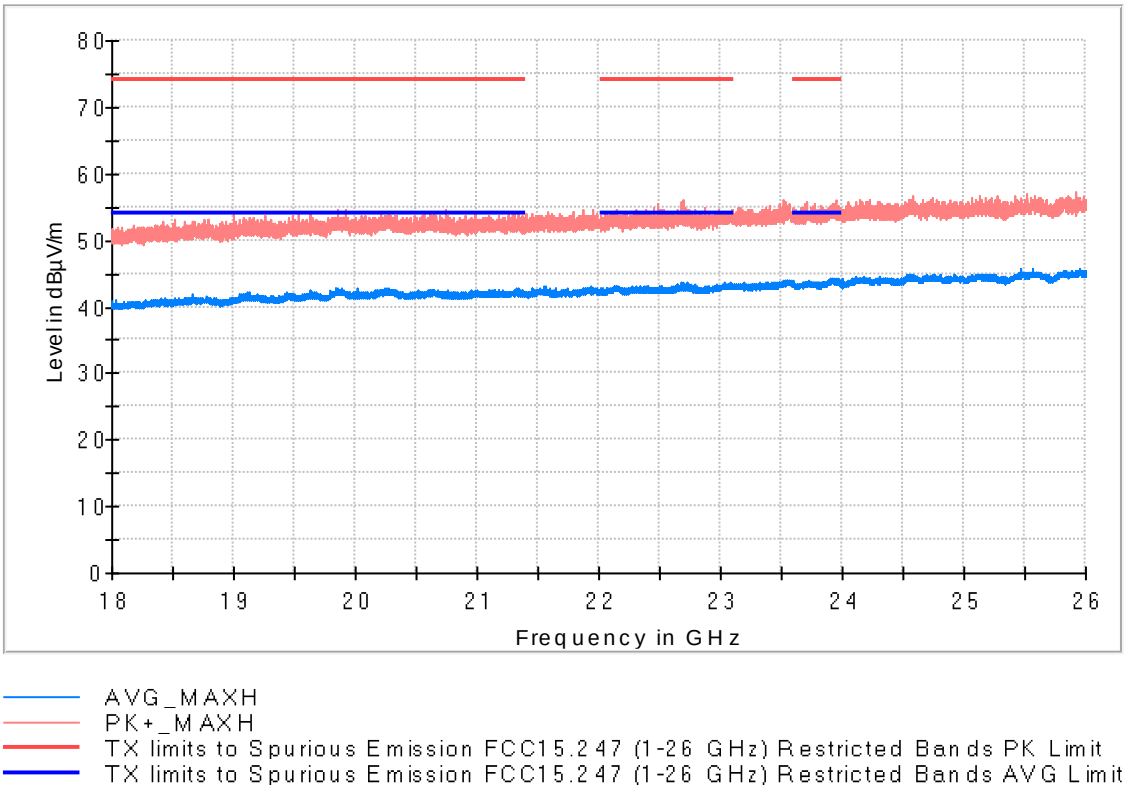
Frequency range 18 - 26 GHz

Lowest Channel



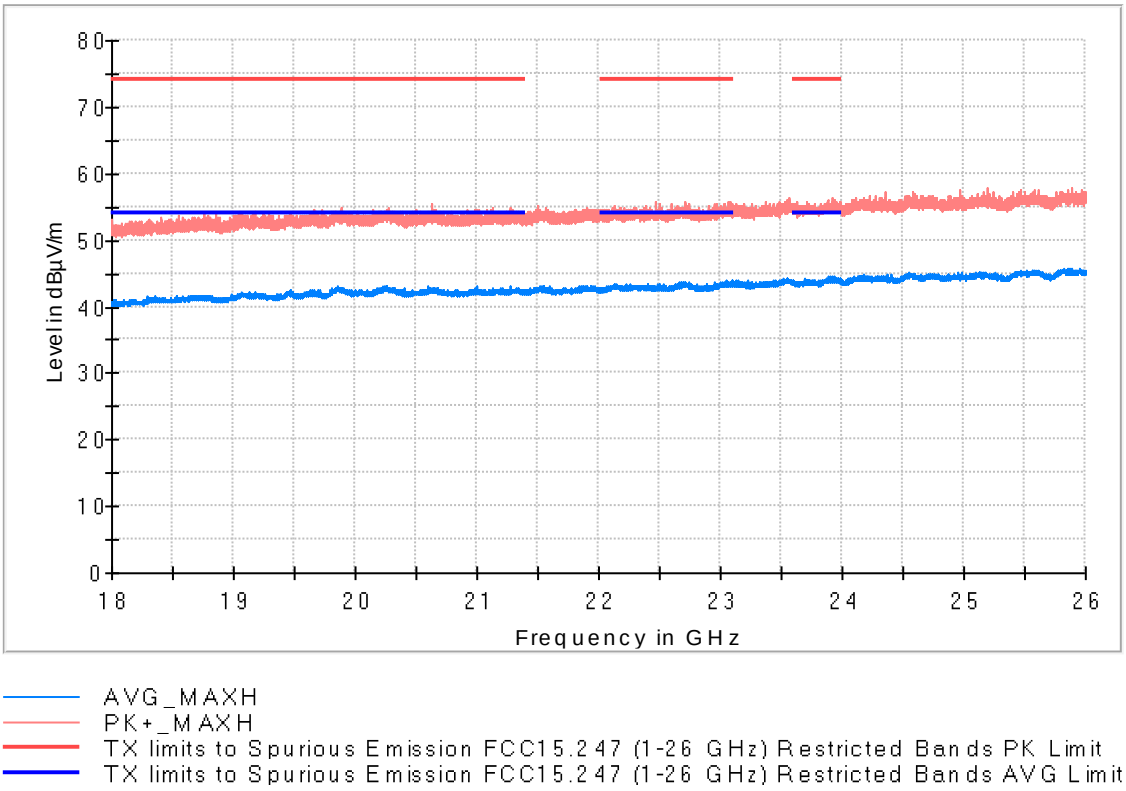
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23917.500000	54.3	44.2	V	9.8	54.0

Middle Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23912.000000	54.2	44.2	V	9.8	54.0

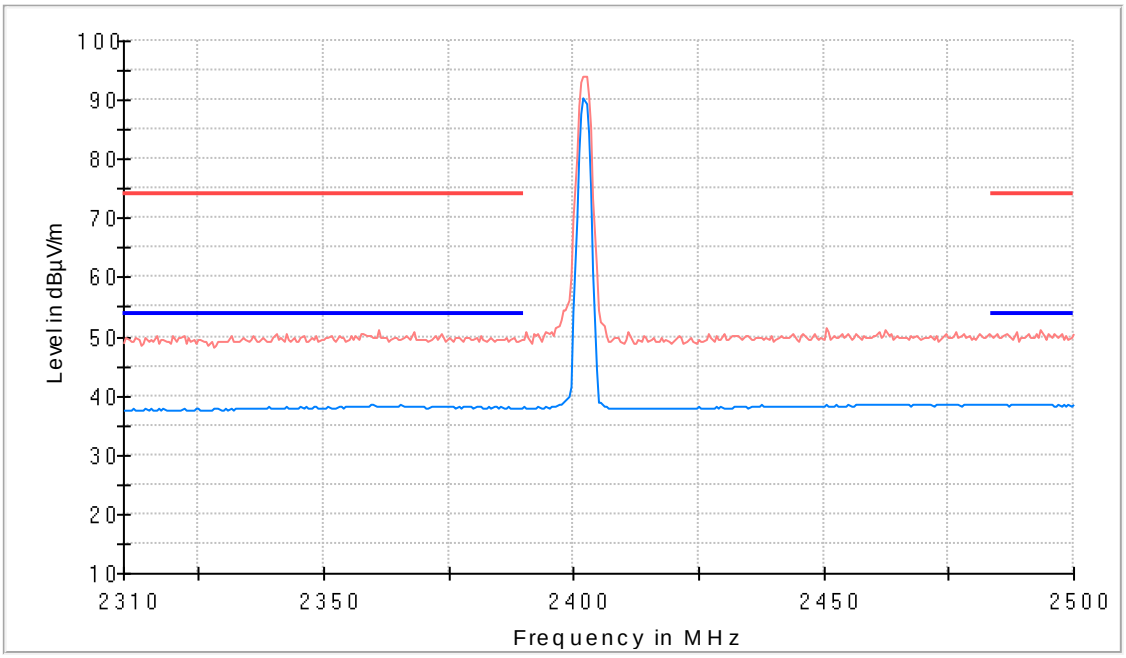
Highest Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23924.000000	56.5	44.4	H	9.6	54.0

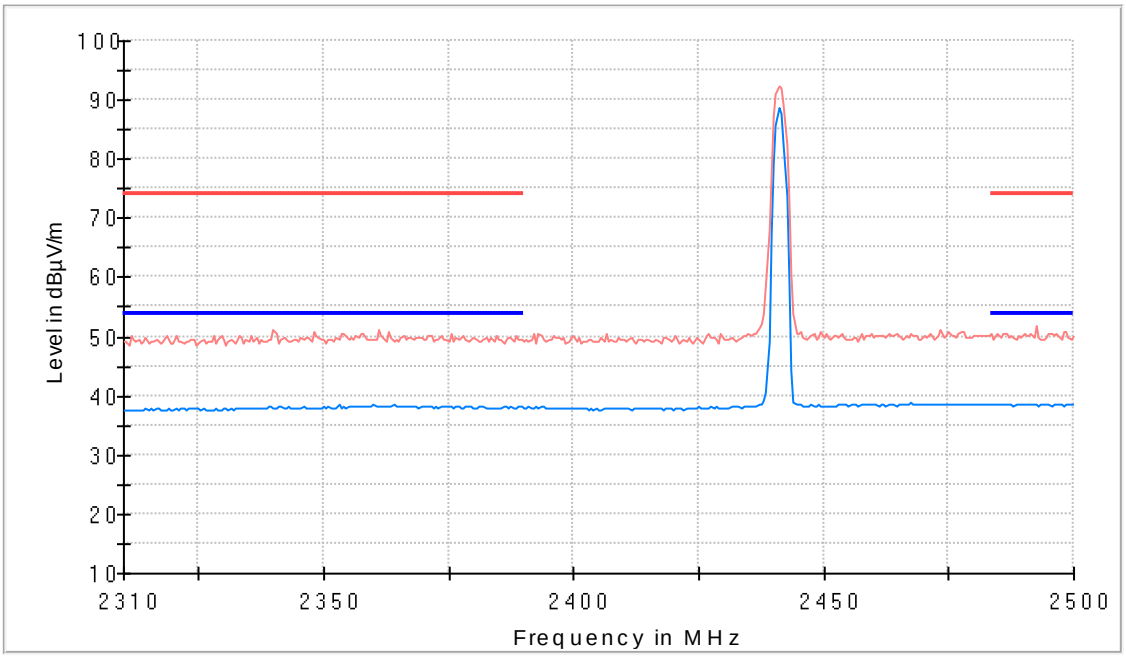
Restricted Bands (2.31 GHz - 2.5 GHz)

Lowest Channel



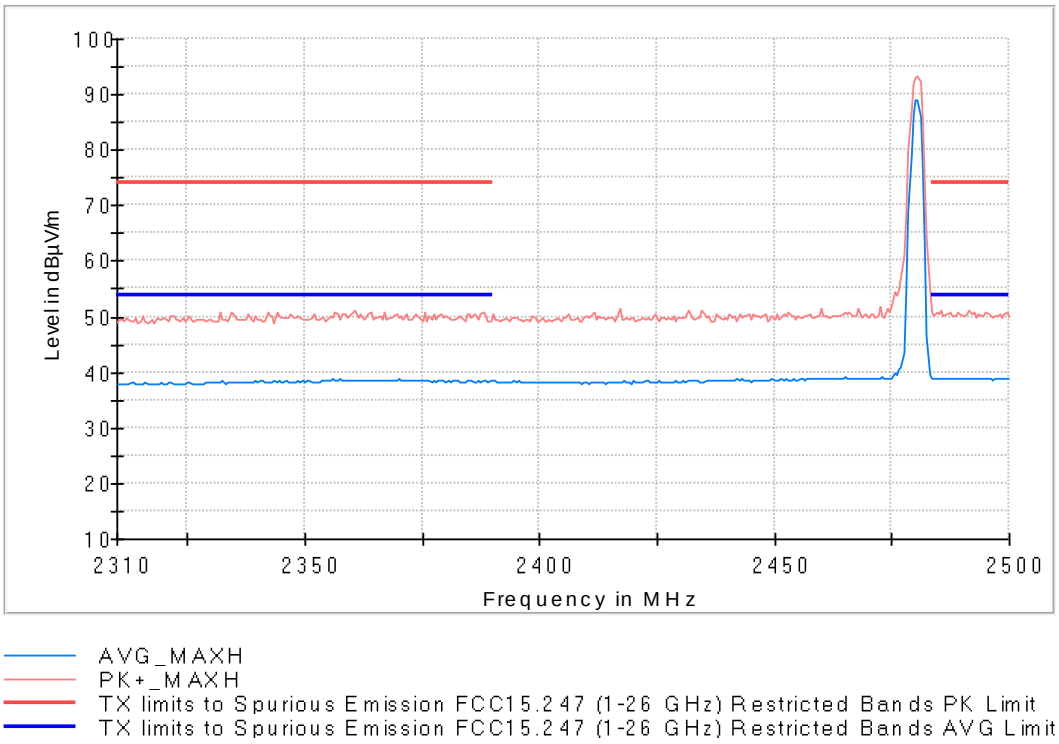
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Middle Channel



AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Highest Channel



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United States of America

Appendix C: Test results. Wi-Fi 2.4GHz

PRODUCT INFORMATION

Information	Description
Modulation	Other forms of modulation
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	-2.5 dBi
Nominal Voltage	
- Supply Voltage	12 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): $V_{nominal}$ = 12 Vdc Channel Bandwidth: 20 MHz Test Frequencies for Conducted/Radiated tests (**SISO A, SISO B, Radio A + B MIMO**): Lowest channel: 2412 MHz Middle channel: 2437 MHz Highest channel: 2462 MHz
TC#02(1) **(g mode)**	Power supply (V): $V_{nominal}$ = 12 Vdc Channel Bandwidth: 20 MHz Test Frequencies for Conducted/Radiated tests (**SISO A, SISO B, Radio A + B MIMO**): Lowest channel: 2412 MHz Middle channel: 2437 MHz Highest channel: 2462 MHz

TEST CONDITIONS	DESCRIPTION
TC#03(1) **(n mode)**	Power supply (V): $V_{nominal}$ = 12 Vdc Channel Bandwidth: 20 MHz Test Frequencies for Conducted/Radiated tests (**RADIO A, RADIO B, Radio A + B**): Lowest channel: 2412 MHz Middle channel: 2437 MHz Highest channel: 2462 MHz Channel Bandwidth: 40 MHz Test Frequencies for Conducted/Radiated tests ((**RADIO A, RADIO B, Radio A + B**): Lowest channel: 2422 MHz Middle channel: 2437 MHz Highest channel: 2452 MHz

TEST CONDITIONS	DESCRIPTION
TC#04[1][2] **(ax mode non-beam forming)**	Power supply (V): $V_{nominal}$ = 12 Vdc Channel Bandwidth: 20 MHz Test Frequencies for Conducted/Radiated tests ((**RADIO A, RADIO B, Radio A + B**): Lowest channel: 2412 MHz Middle channel: 2437 MHz Highest channel: 2462 MHz Channel Bandwidth: 40 MHz Test Frequencies for Conducted/Radiated tests ((**RADIO A, RADIO B, Radio A + B**): Lowest channel: 2422 MHz Middle channel: 2437 MHz Highest channel: 2452 MHz

TEST CONDITIONS	DESCRIPTION
TC#05(1) **(ax mode Beam forming)**	Power supply (V): $V_{nominal}$ = 12 Vdc Channel Bandwidth: 20 MHz Test Frequencies for Conducted/Radiated tests ((**RADIO A, RADIO B, Radio A + B**): Lowest channel: 2412 MHz Middle channel: 2437 MHz Highest channel: 2462 MHz Channel Bandwidth: 40 MHz Test Frequencies for Conducted/Radiated tests ((**RADIO A, RADIO B, Radio A + B**): Lowest channel: 2422 MHz Middle channel: 2437 MHz Highest channel: 2452 MHz

Note (1): For spurious emissions for OFDM modes 802.11g, 802.11n20 and 802.11ax20 a preliminary scan was performed to determine the worst case. The following tables and plots show the results for the worst case in DSSS modulation (802.11b) and OFDM modulation (802.11g).

The data rates of 11Mb/s for 802.11b, 54Mb/s for 802.11g, MCS7 for 802.11n20, MCS8 for 802.11 ax were selected based on preliminary testing that identified those rates corresponding to the worst cases.

Note (2): Preliminary measurements determined the PSD levels of partial RU is higher than the full RU in ax mode. RU 26 tone was identified as the worst-case RU (Resource Unit) carrier allocation for all ax mode testing.

The worst case RU combinations used in the SISO/MIMO modes measurement are indicated as follows:
- 20 MHz BW: RU26 offset 0
- 40 MHz BW: RU26 offset 8

Preliminary measurements determined the SISO A mode is identified as a worst case for 802.11ax HE20 Partial RU for all Conducted tests.

Directional Antenna Gain Calculations for CDD MIMO In-Band Measurements:

For 2Tx CDD MIMO modes, in accordance with KDB 662911 D01 v02r01 Section F)2)f)i), directional gain was calculated as follows:

- For power spectral density (PSD) measurements:
  Directional gain $_{PSD}$ = G_{ANT} + 10 log(N_{ANT}/N_{SS}) dBi

  N_{SS} = 1 (worst case), N_{ANT} = 2, G_{ANT} = -2.5 dBi

  Directional gain $_{PSD}$ = -2.5 + 10 log(2/1) = -2.5 + 10log(2) = -2.5 + 3.01 = +0.51 dBi

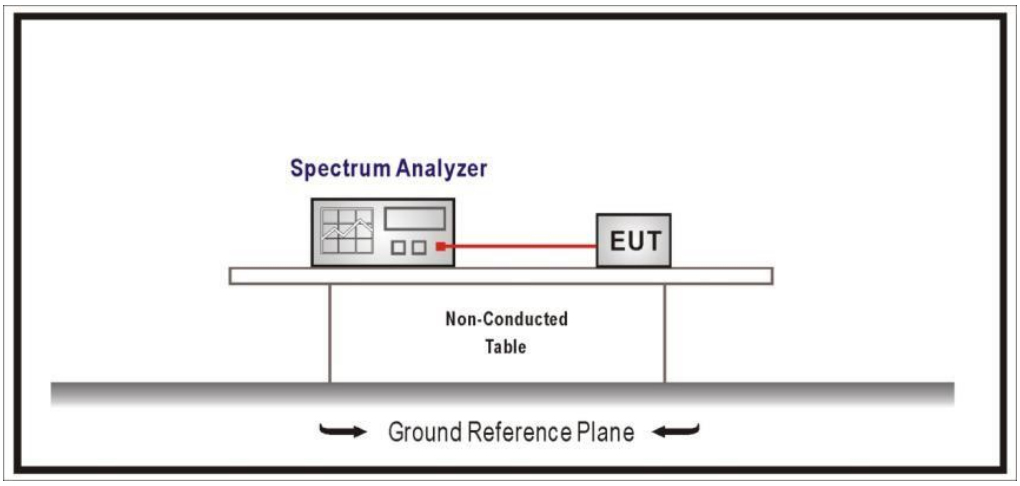
  PSD Antenna Gain MIMO Chain 0 & 1: +0.51 dBi

- For power measurements:
  Directional gain $_{POWER}$ = G_{ANT} dBi (N_{ANT} < 4)

  Directional gain $_{POWER}$ = G_{ANT} = -2.5 dBi

  Power Antenna Gain MIMO Chain 0 & 1: -2.5 dBi

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.

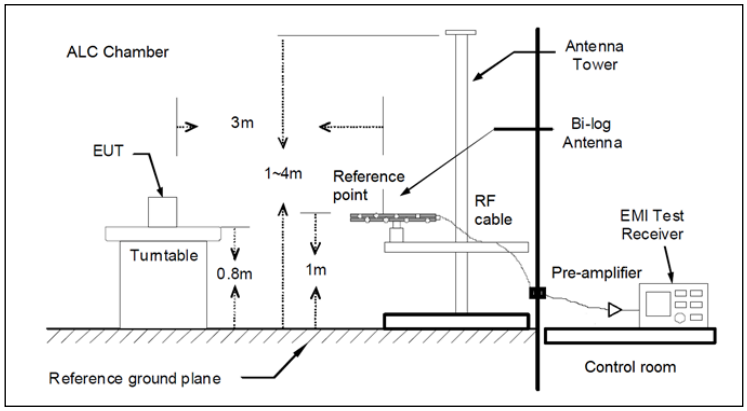


Fig A1: Radiated measurements Setup f < 1 GHz

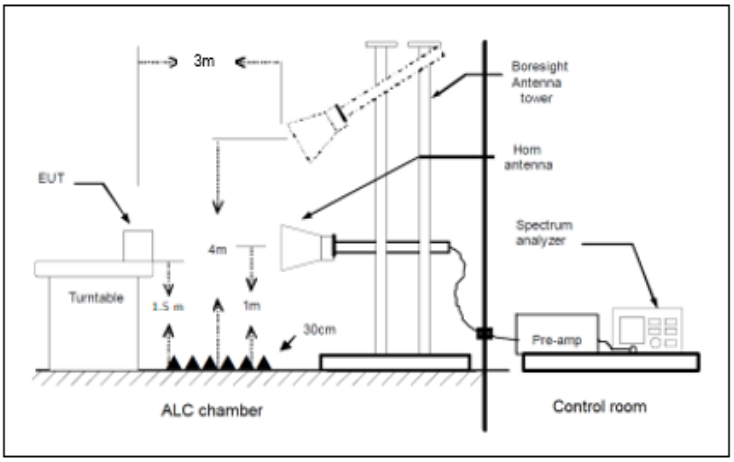


Fig A2: Radiated measurements setup f > 1-18 GHz

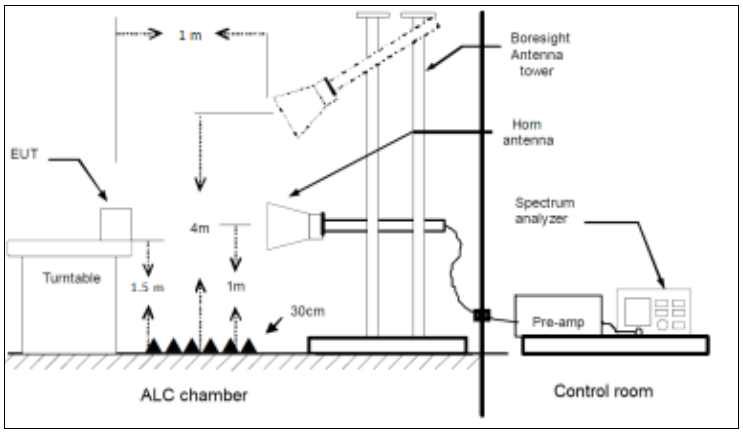


Fig A3: Radiated measurements setup f > 18 GHz

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United States of America

Appendix C.1: SISO

INDEX

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.

Modulation: 802.11b (DSSS 1 Mbit/s)

Results

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

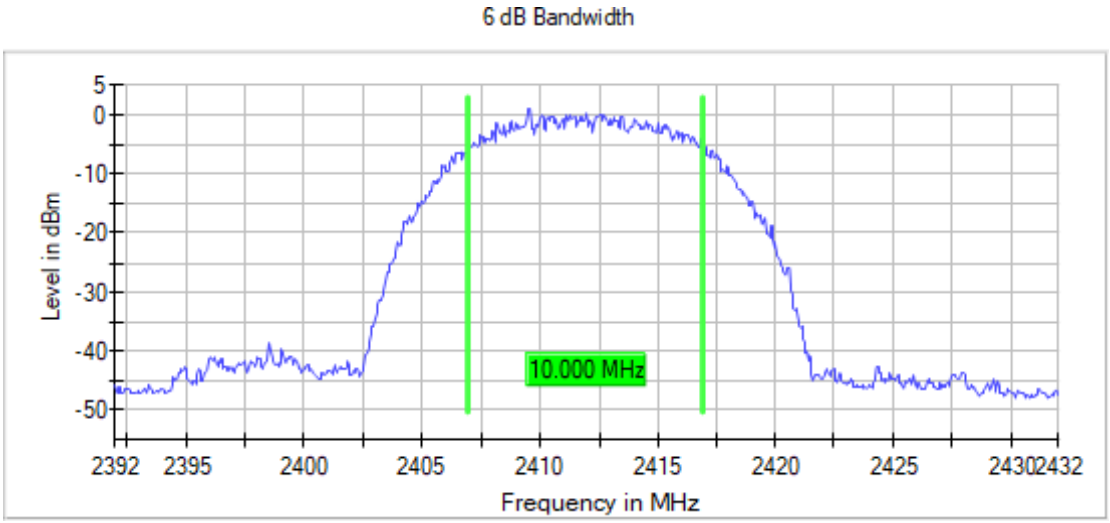
Verdict

Pass

Attachments

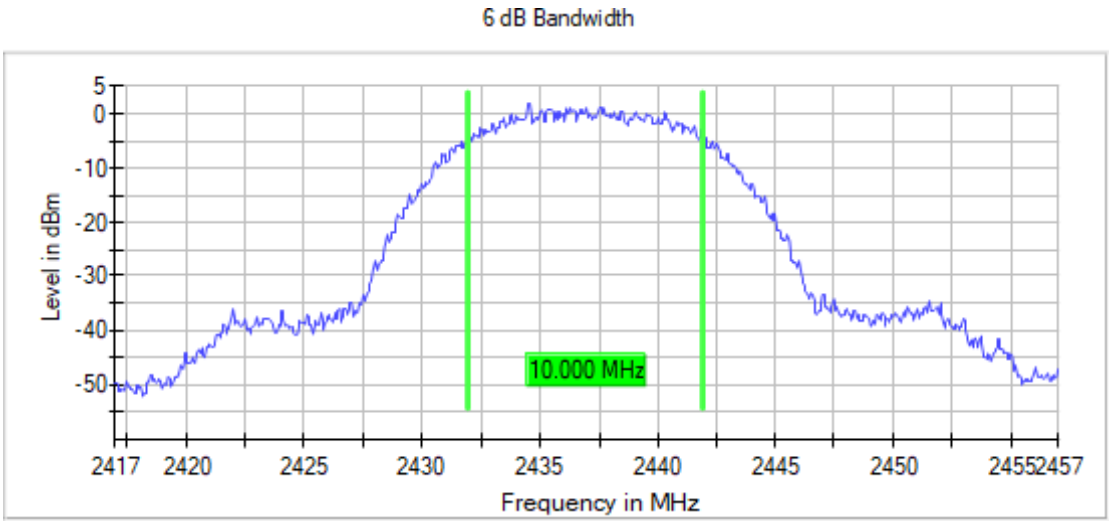
Frequency MHz = 2412.00000, Bandwidth MHz = 20, Modulation = 802.11b (DSSS 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



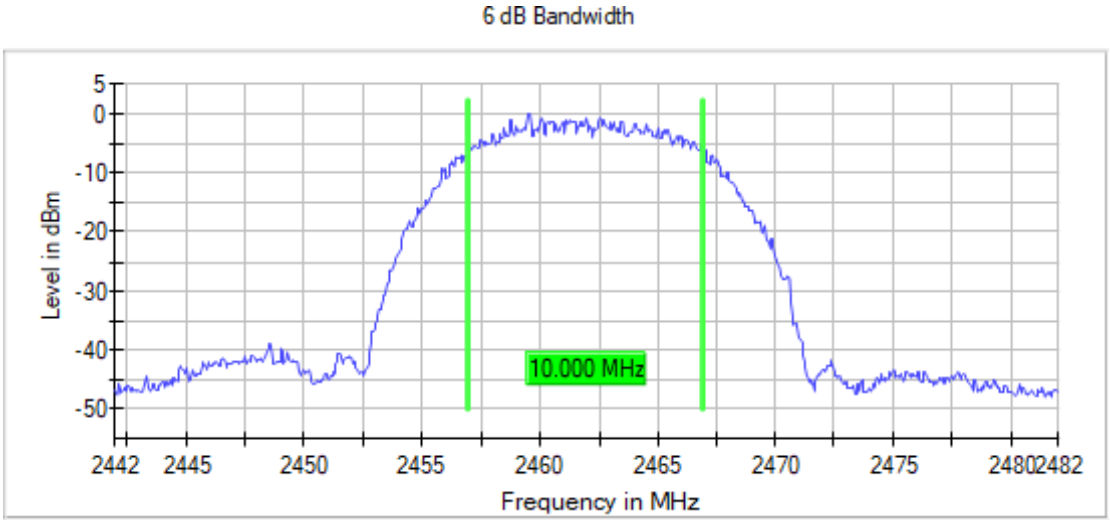
Frequency MHz = 2437.00000, Bandwidth MHz = 20, Modulation = 802.11b (DSSS 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



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

Images:



Modulation: 802.11g (OFDM 6 Mbit/s)

Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2412.00000				16.550
2437.00000	20	1	1	16.550
2462.00000				16.550

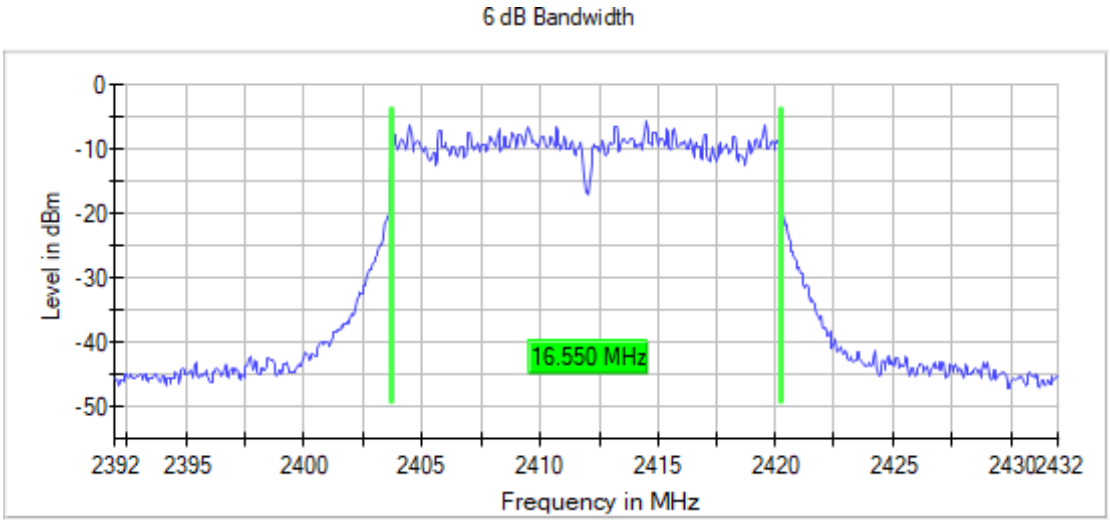
Verdict

Pass

Attachments

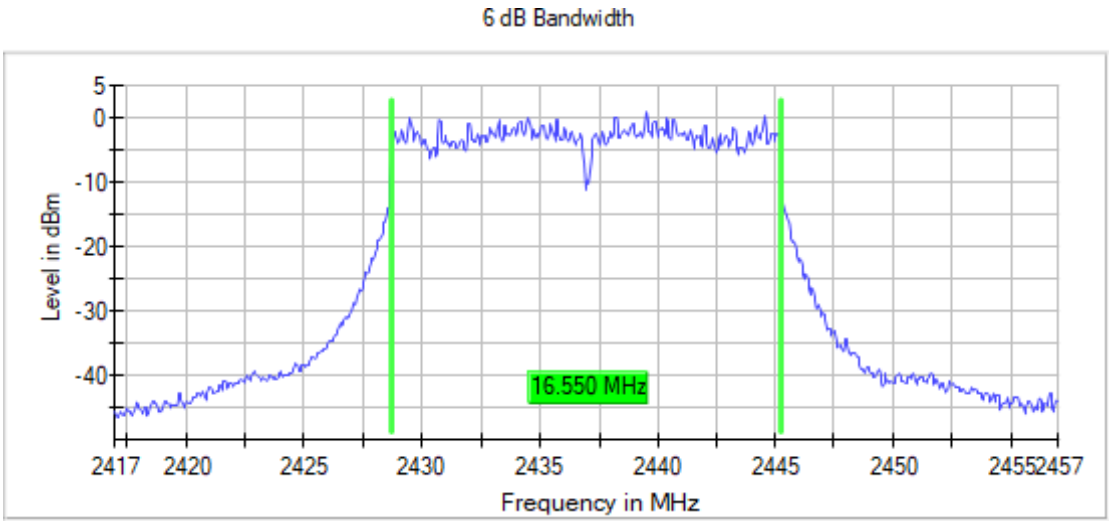
Frequency MHz = 2412.00000, Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



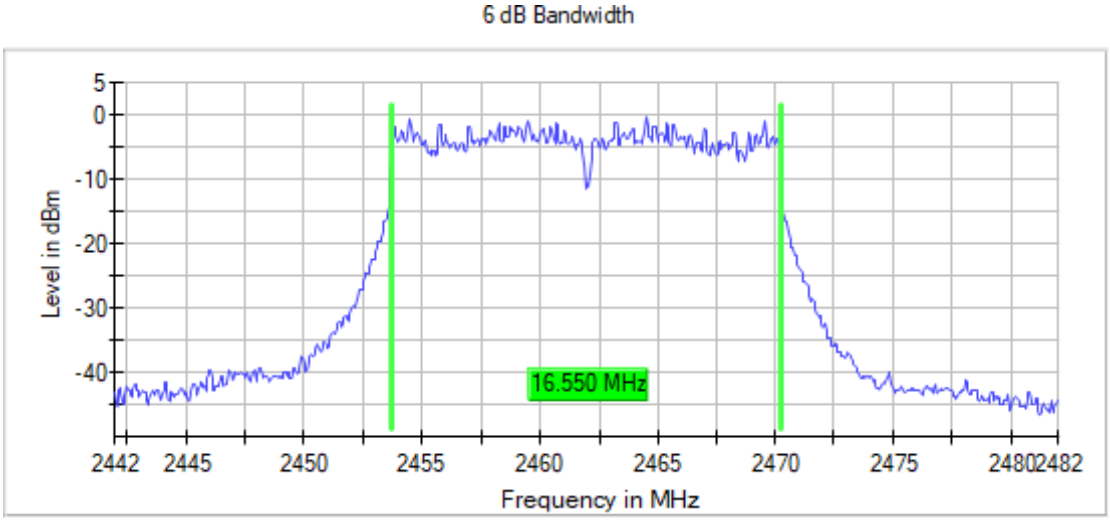
Frequency MHz = 2437.00000, Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



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

Images:



Modulation: 802.11n HT20 (OFDM MCS8 6.5 Mbit/s)

Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2412.00000				17.750
2437.00000	20	1	1	17.750
2462.00000				17.750

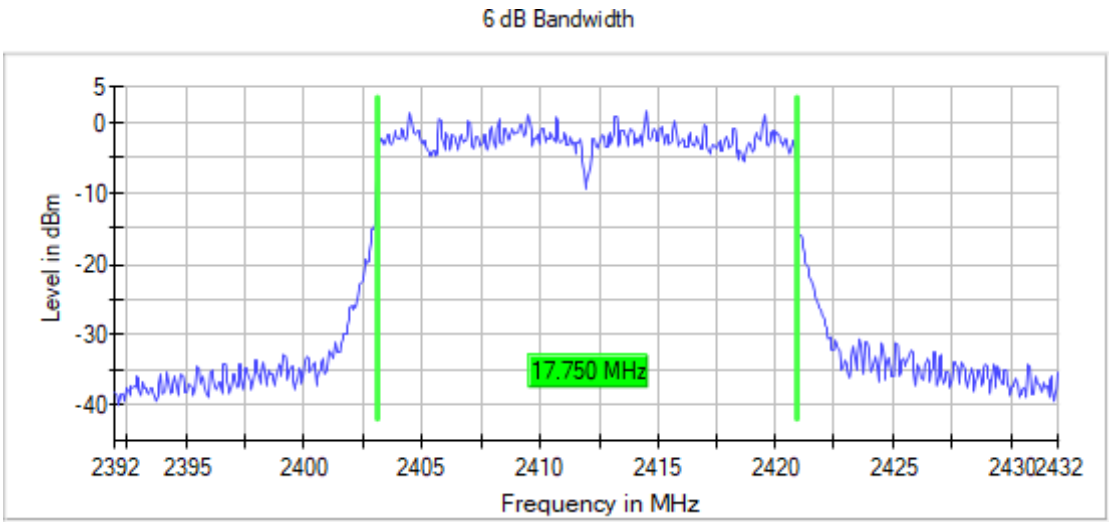
Verdict

Pass

Attachments

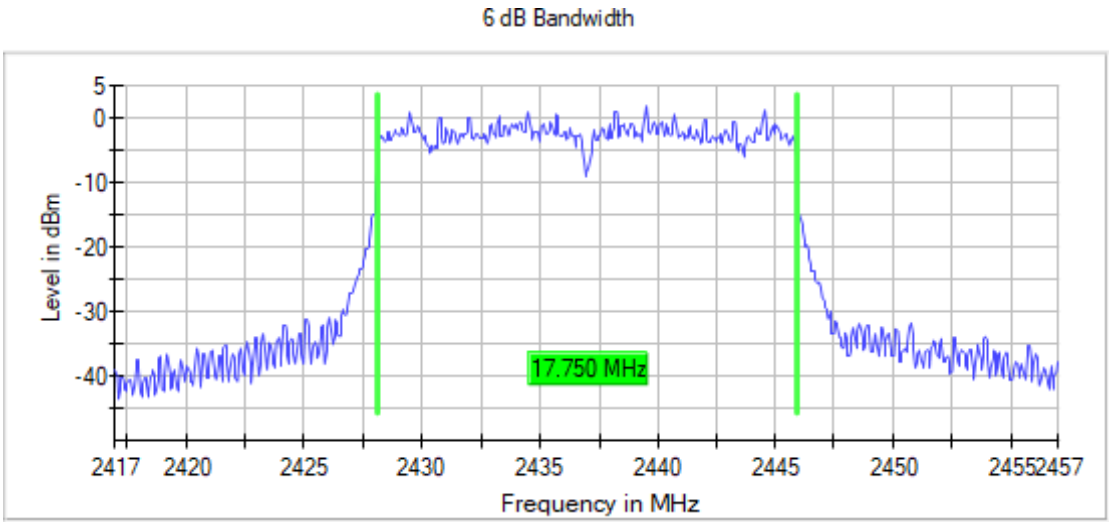
Frequency MHz = 2412.00000, Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS8 6.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



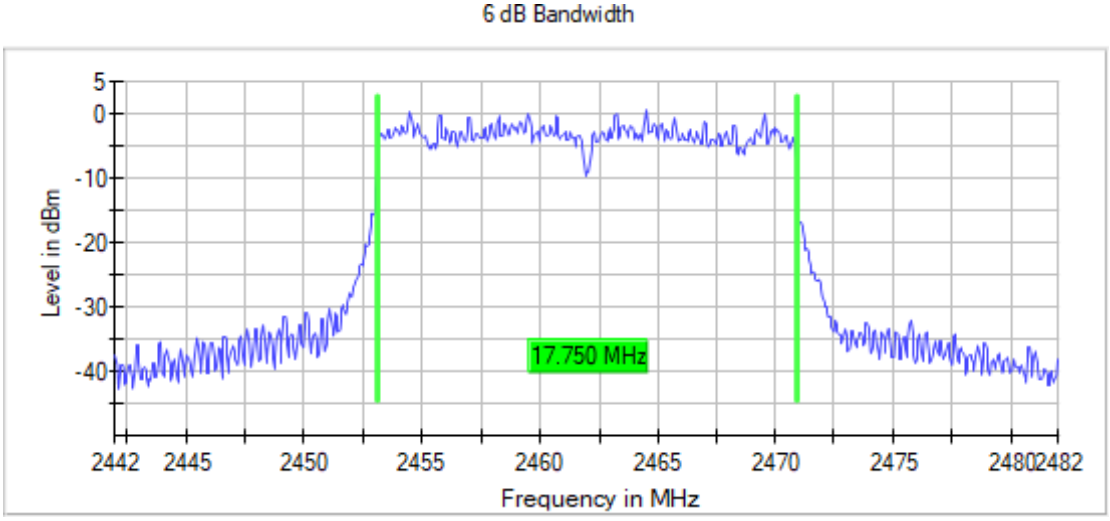
Frequency MHz = 2437.00000, Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS8 6.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2462.00000, Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS8 6.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11n HT40 (OFDM MCS8 13.5 Mbit/s)

Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2422.00000				36.450
2437.00000	40	1	1	36.400
2452.00000				36.150

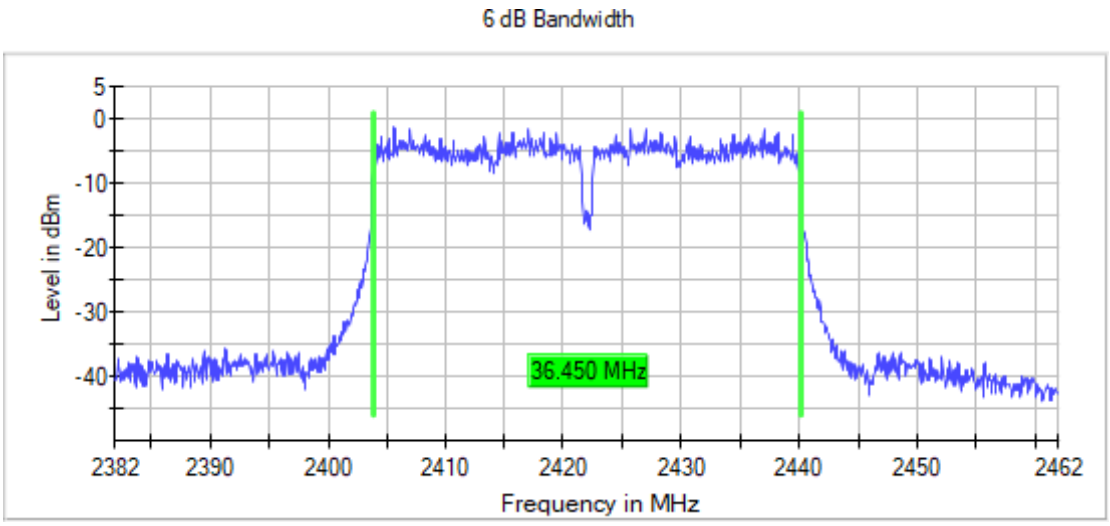
Verdict

Pass

Attachments

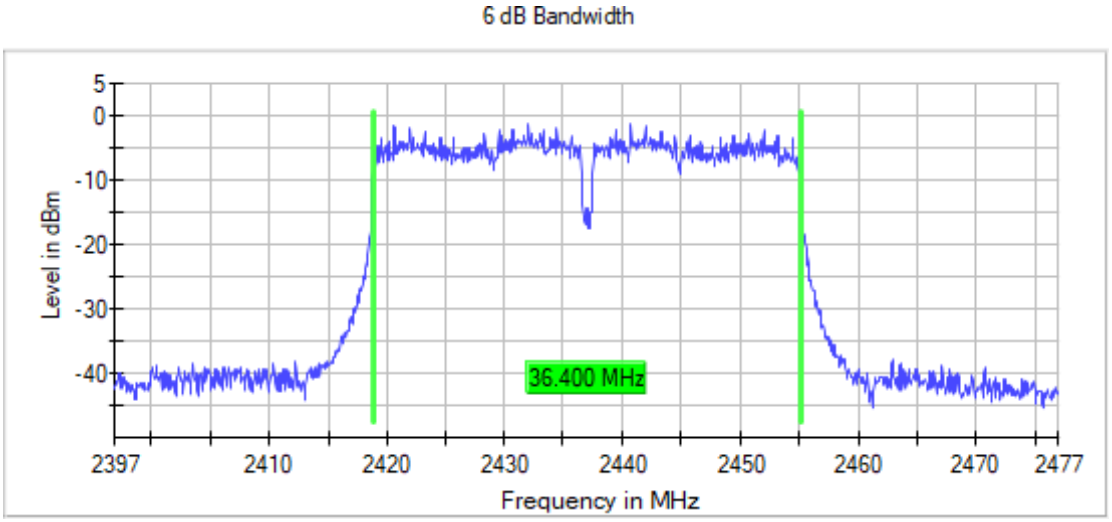
Frequency MHz = 2422.00000, Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS8 13.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



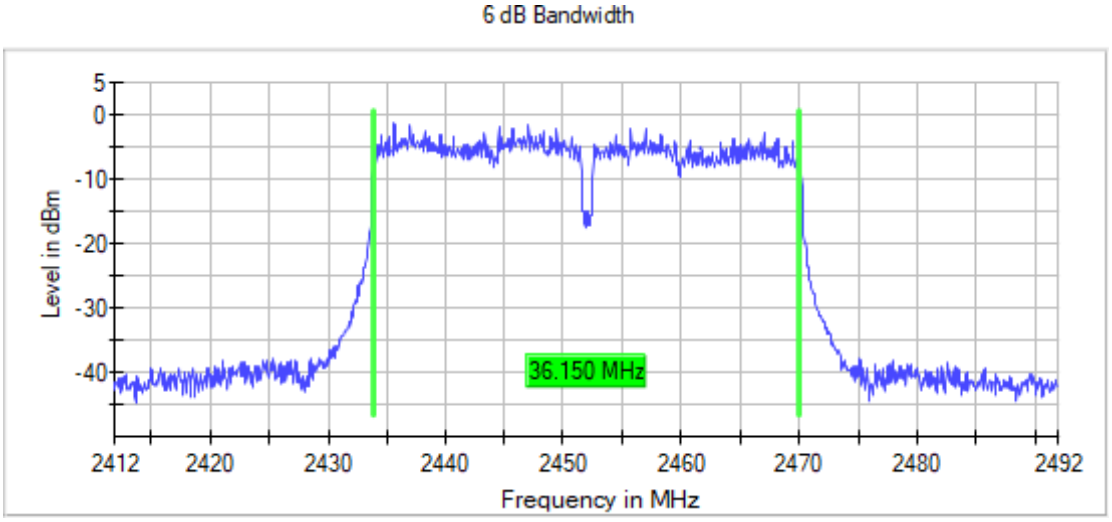
Frequency MHz = 2437.00000, Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS8 13.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2452.00000, Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS8 13.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11ax HE20 (OFDMA MCS8) - Full RU

Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2412.00000				18.250
2437.00000	20	1	1	18.400
2462.00000				18.250

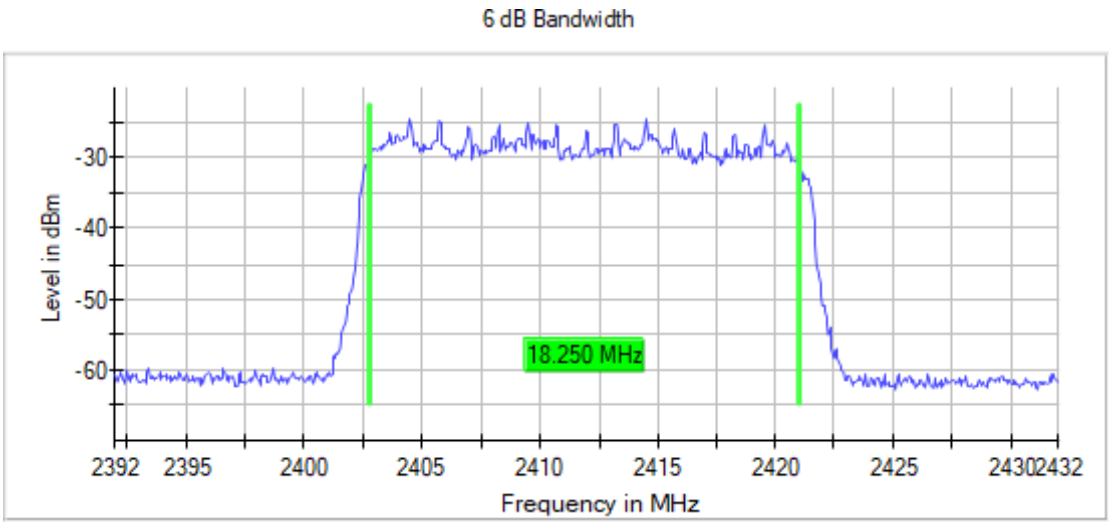
Verdict

Pass

Attachments

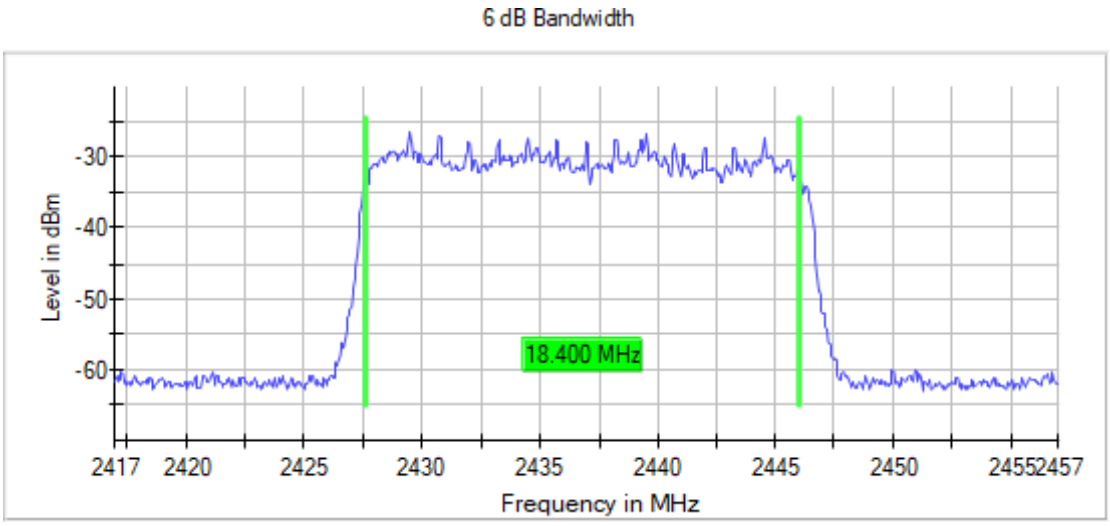
Frequency MHz = 2412.00000, Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



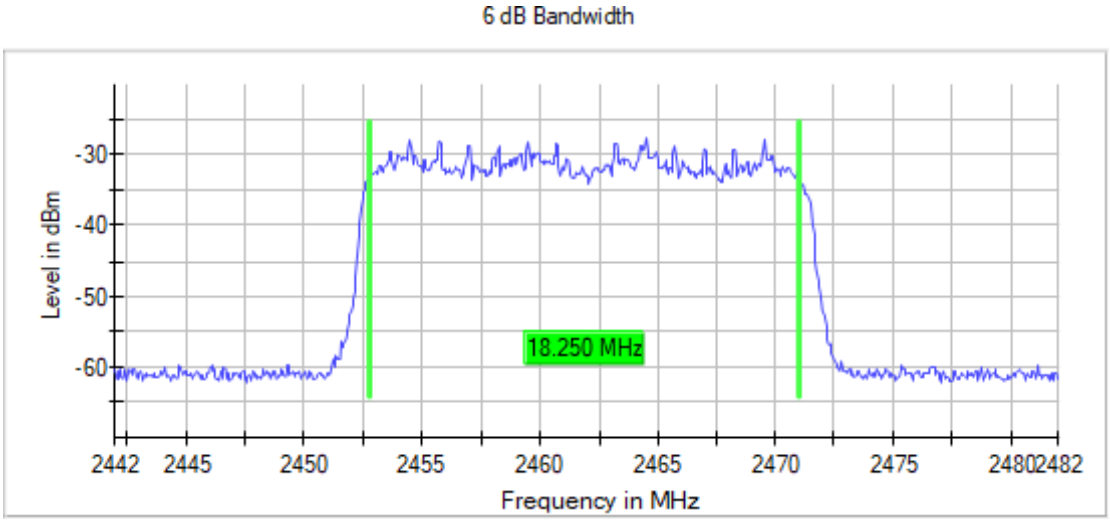
Frequency MHz = 2437.00000, Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2462.00000, Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11ax HE20 (OFDMA MCS8) - Partial RU

Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2412.00000				2.100000
2437.00000	20	1	1	2.100000
2462.00000				2.100000

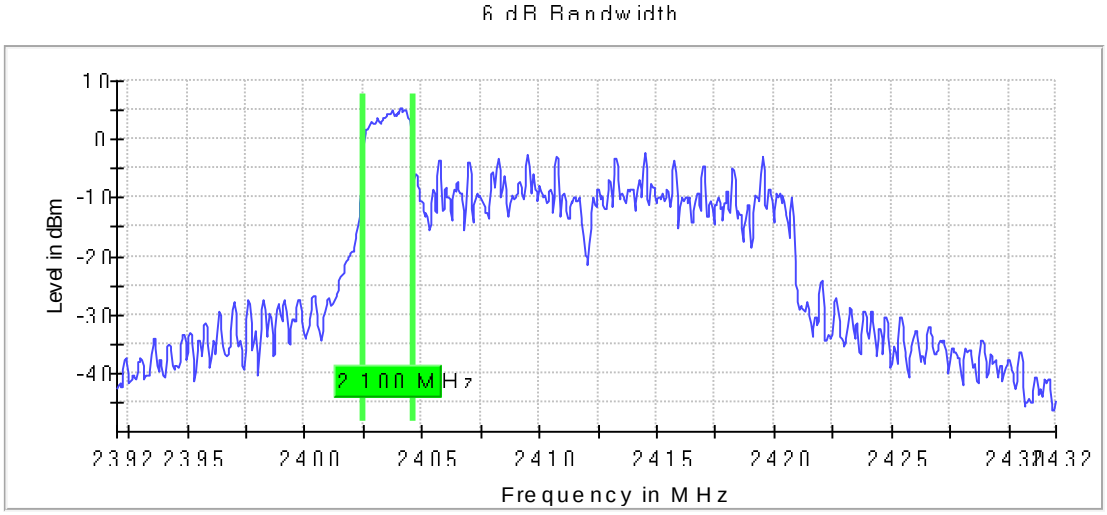
Verdict

Pass

Attachments

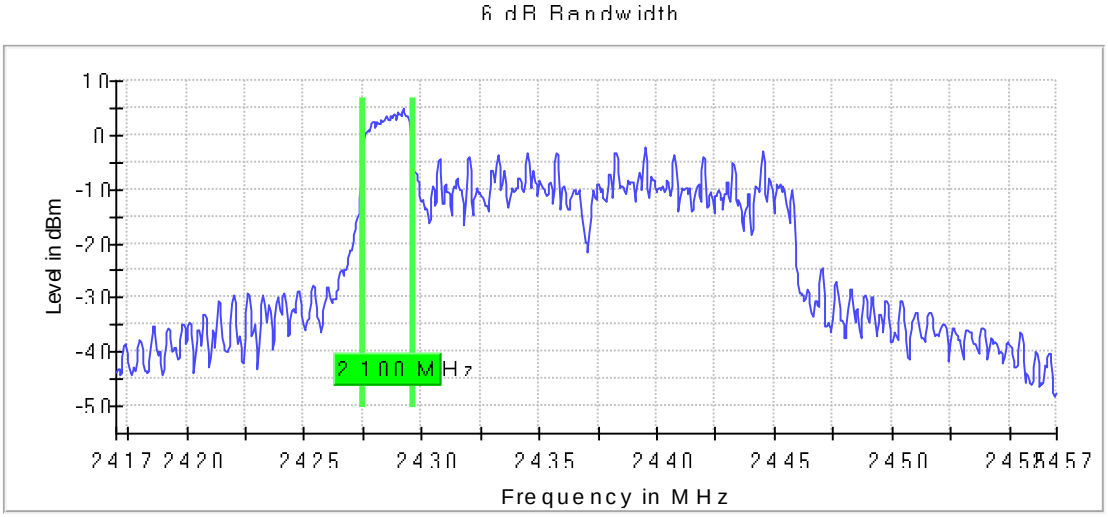
Frequency MHz = 2412.00000, Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



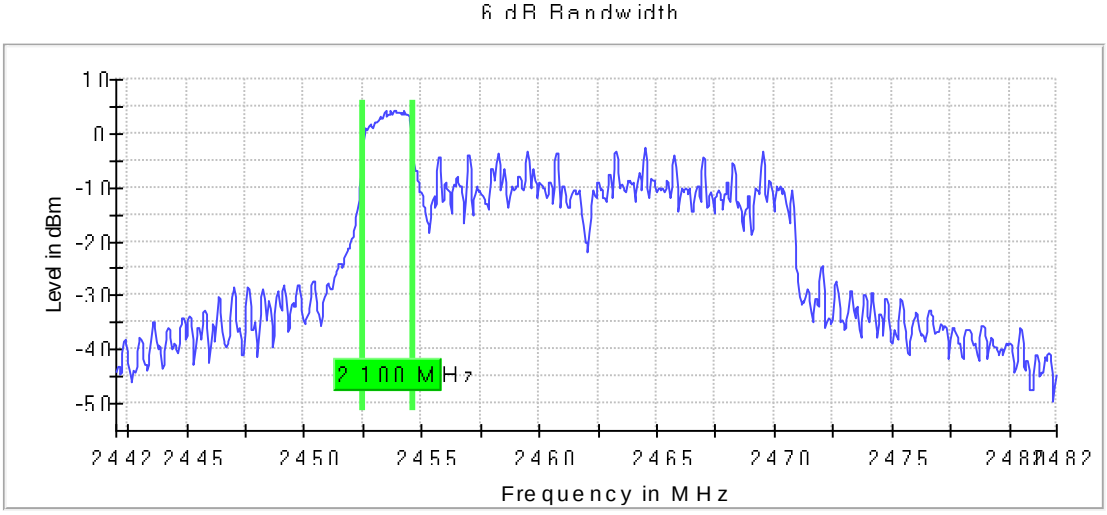
Frequency MHz = 2437.00000, Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2462.00000, Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11ax HE40 (OFDMA MCS8) - Full RU

Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2422.00000				35.200
2437.00000	40	1	1	35.200
2452.00000				35.250

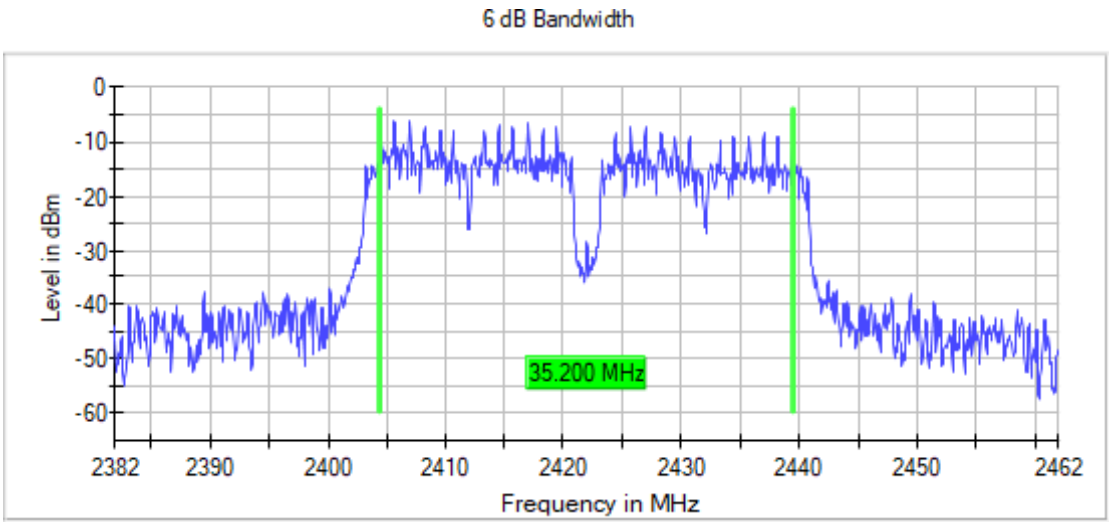
Verdict

Pass

Attachments

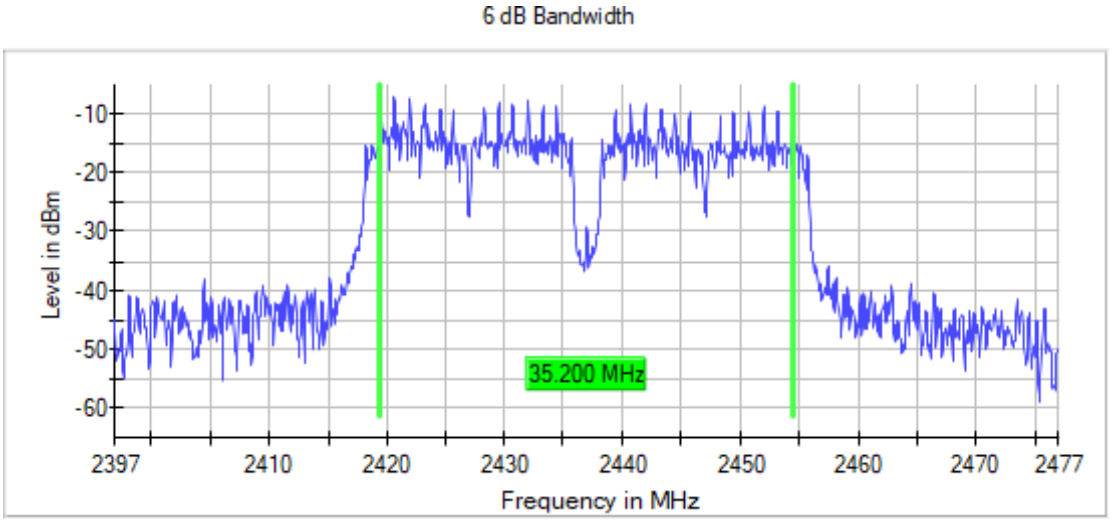
Frequency MHz = 2422.00000, Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



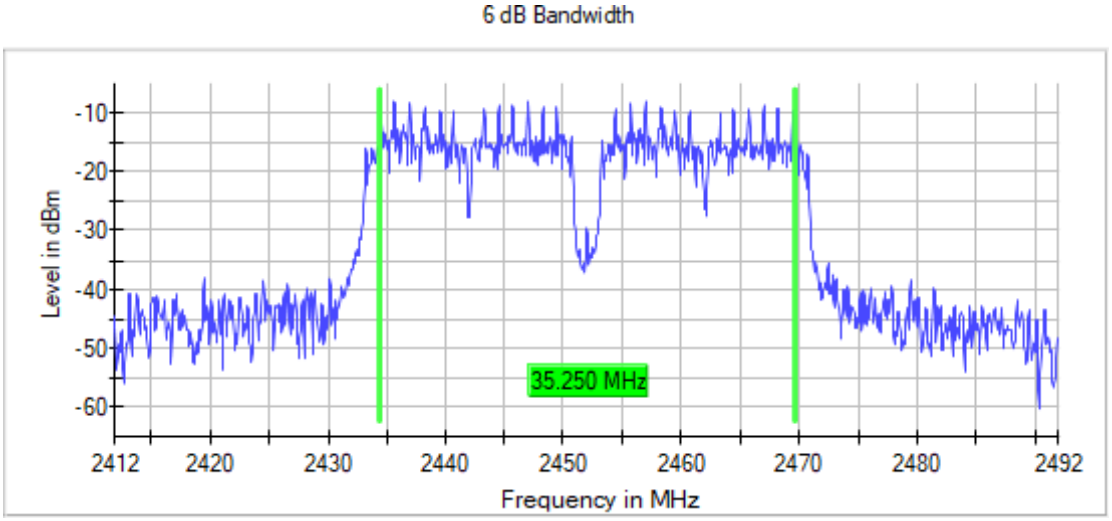
Frequency MHz = 2437.00000, Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2452.00000, Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11ax HE40 (OFDMA MCS8) - Partial RU

Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2422.00000				16.100000
2437.00000	40	1	1	2.150000
2452.00000				4.850000

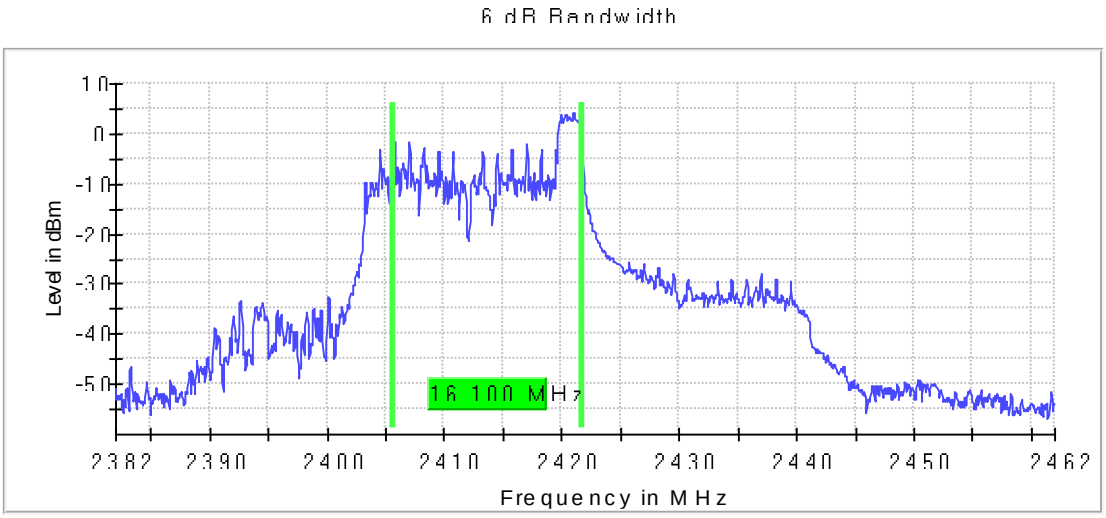
Verdict

Pass

Attachments

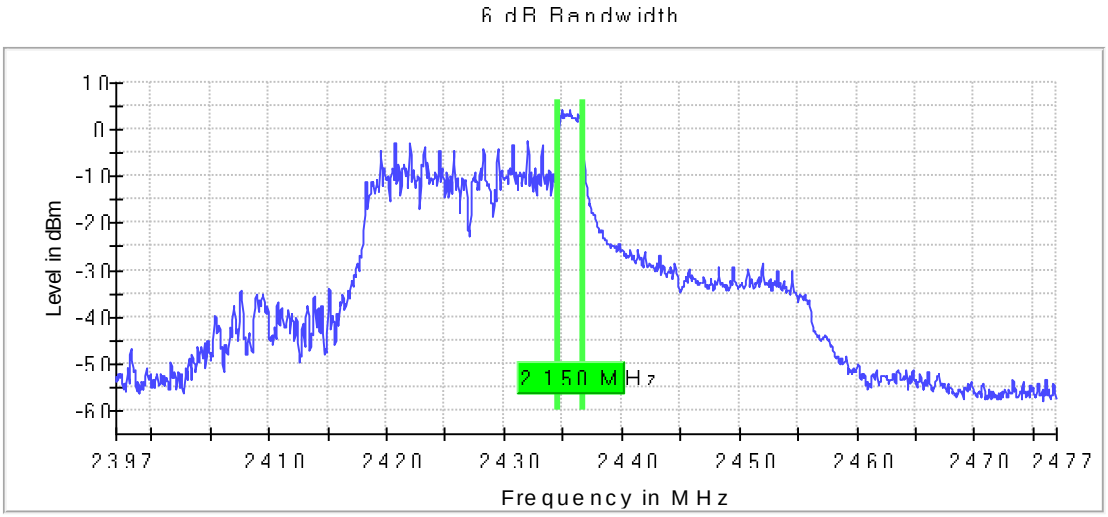
Frequency MHz = 2422.00000, Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



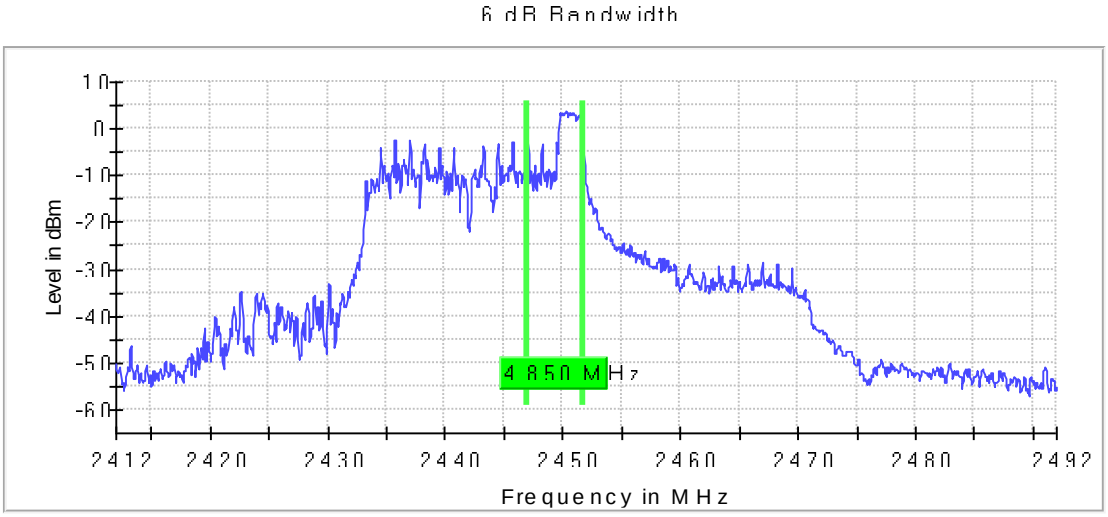
Frequency MHz = 2437.00000, Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2452.00000, Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



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.

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

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	PSD (dBm)
2412.00000	Digital Transmission System (DTS)	20	1	1	-0.47
2437.00000					6.80
2462.00000					-1.48

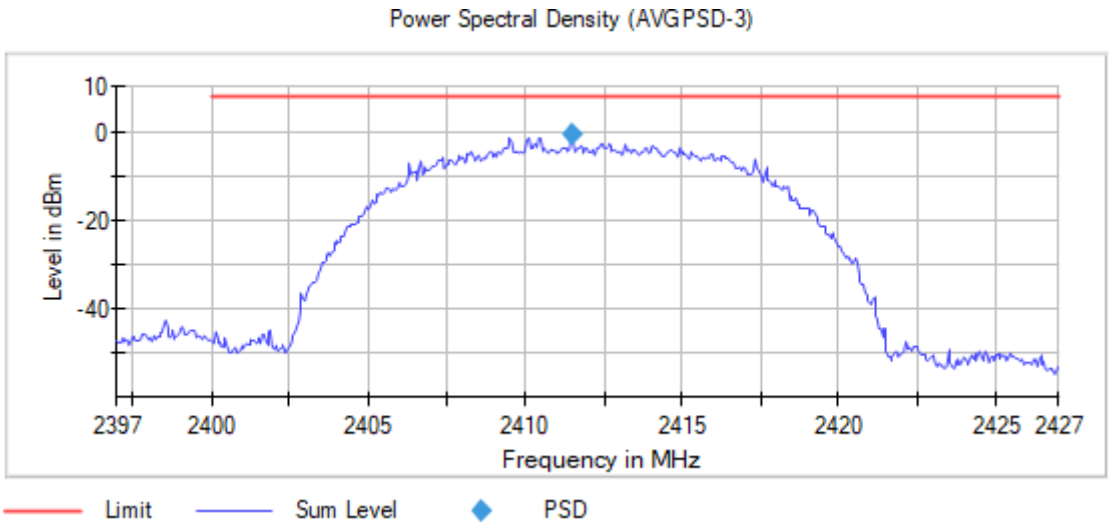
Verdict

Pass

Attachments

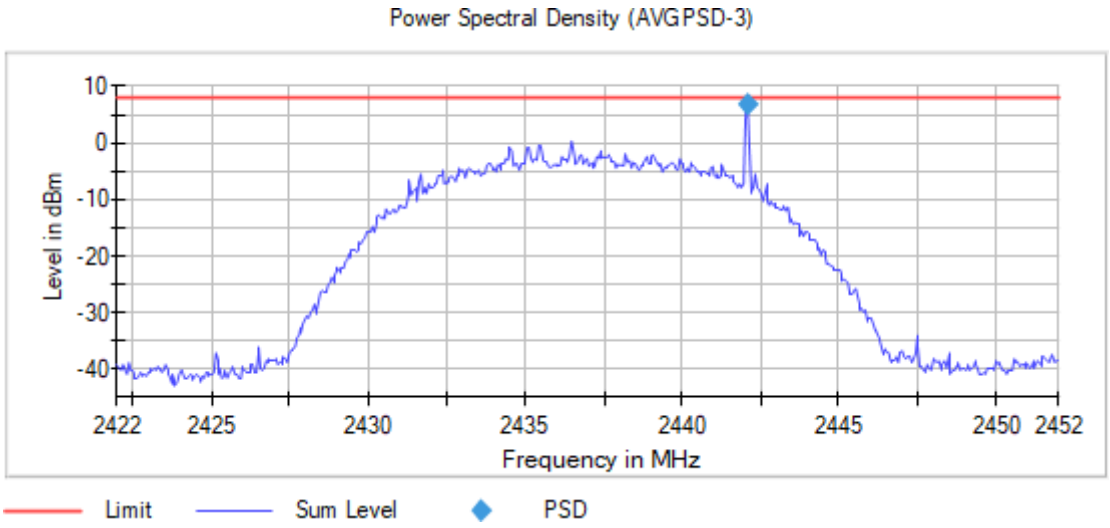
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11b (DSSS 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



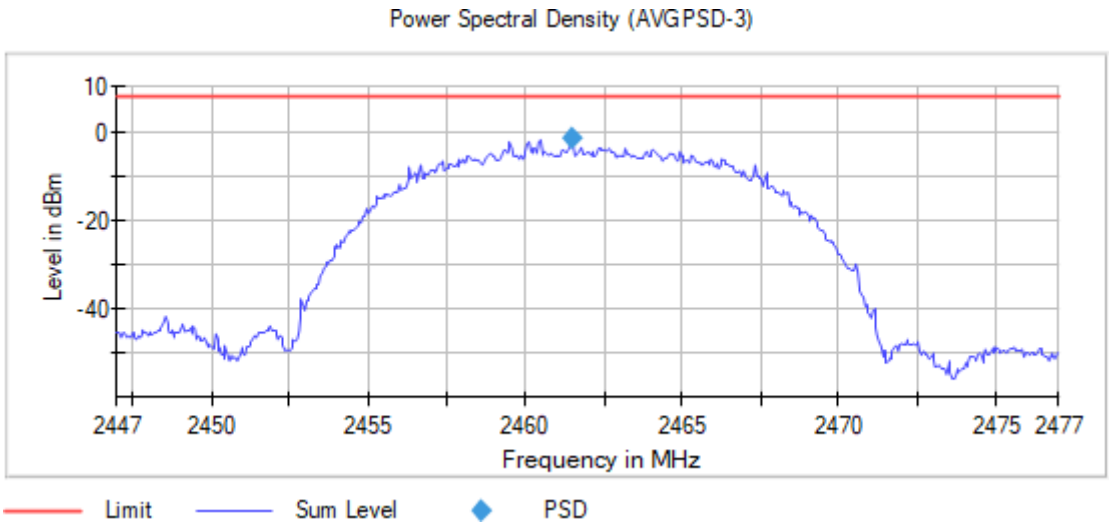
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11b (DSSS 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

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:



Modulation: 802.11g (OFDM 6 Mbit/s)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	PSD (dBm)
2412.00000	Digital Transmission System (DTS)	20	1	1	-8.98
2437.00000					-2.67
2462.00000					-3.39

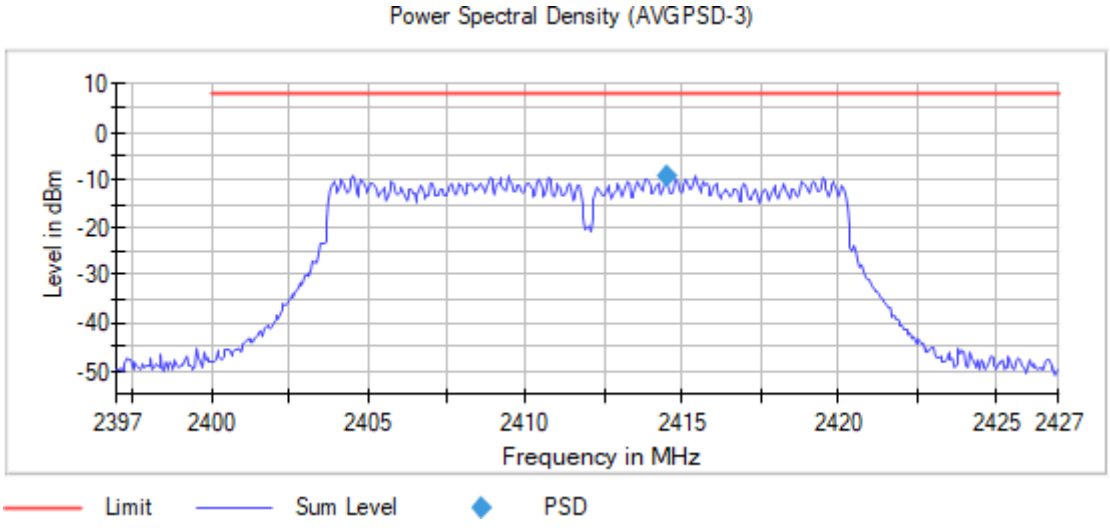
Verdict

Pass

Attachments

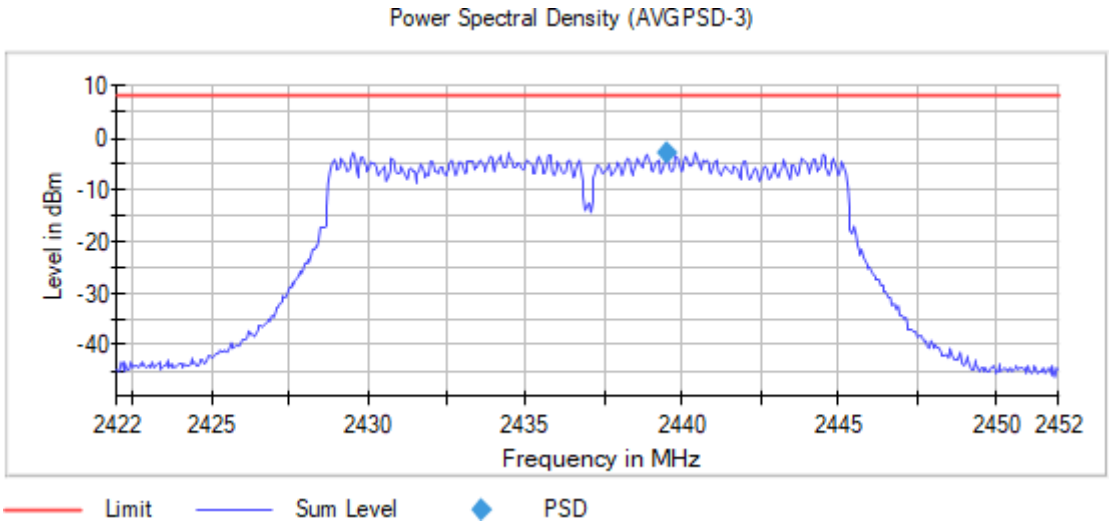
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



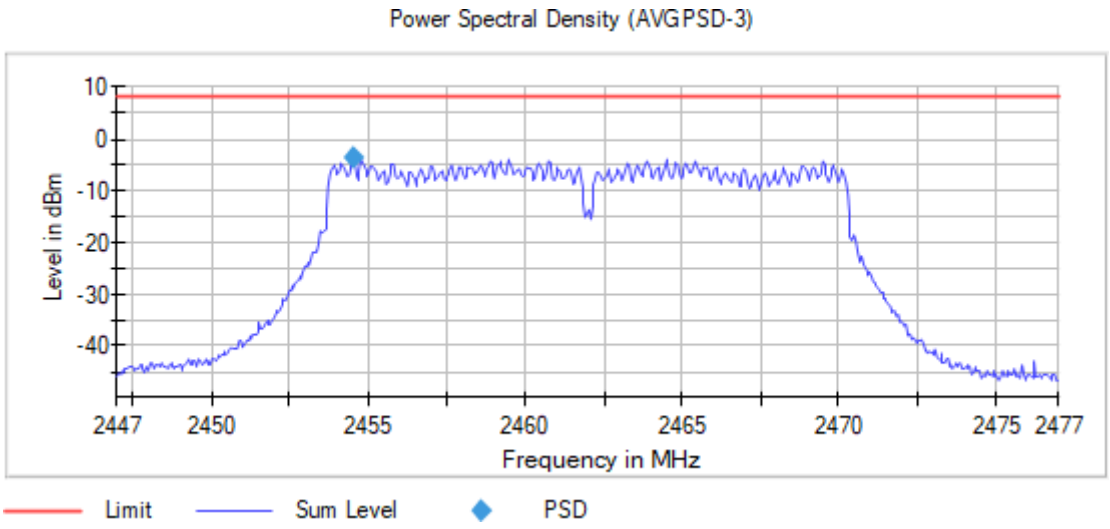
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

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:



Modulation: 802.11n HT20 (OFDM MCS8 6.5 Mbit/s)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	PSD (dBm)
2412.00000	Digital Transmission System (DTS)	20	1	1	-1.86
2437.00000					-1.72
2462.00000					-2.72

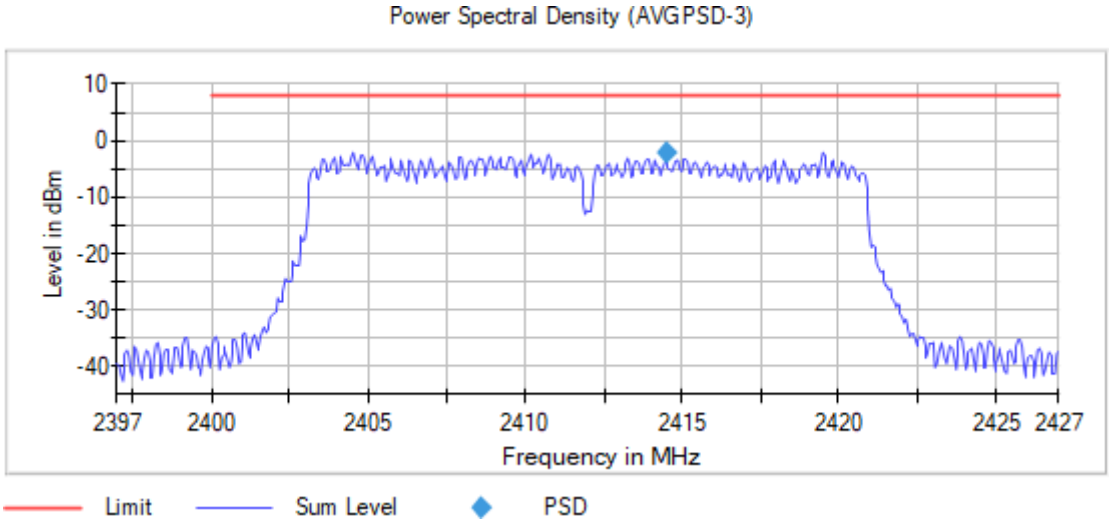
Verdict

Pass

Attachments

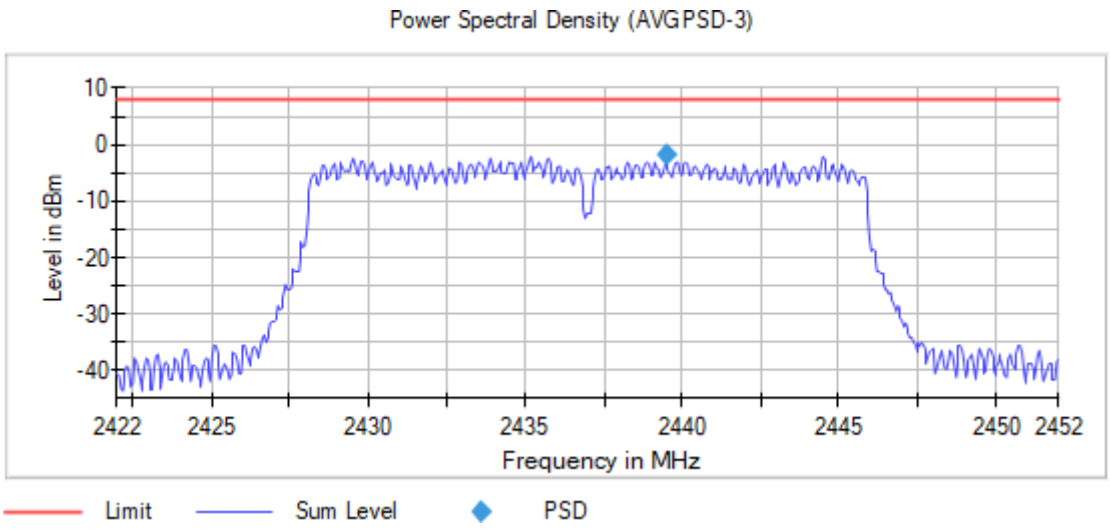
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS8 6.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



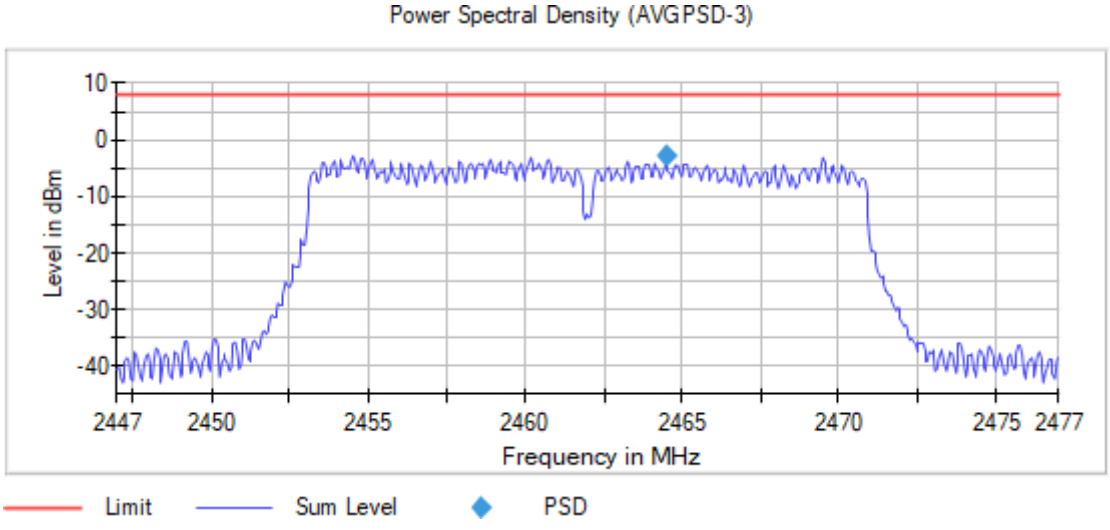
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS8 6.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS8 6.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11n HT40 (OFDM MCS8 13.5 Mbit/s)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	PSD (dBm)
2422.00000	Digital Transmission System (DTS)	40	1	1	-4.47
2437.00000					-4.10
2452.00000					-4.69

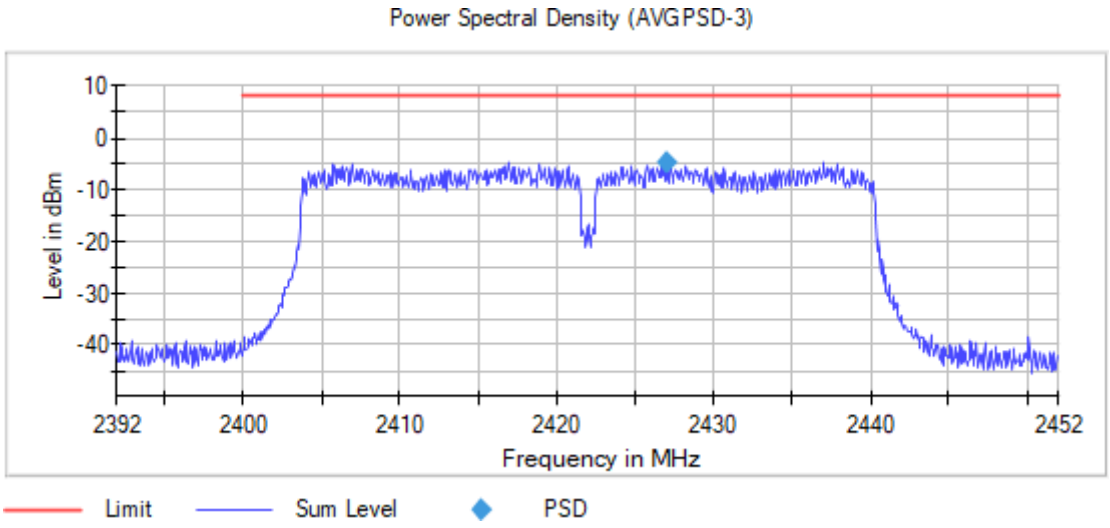
Verdict

Pass

Attachments

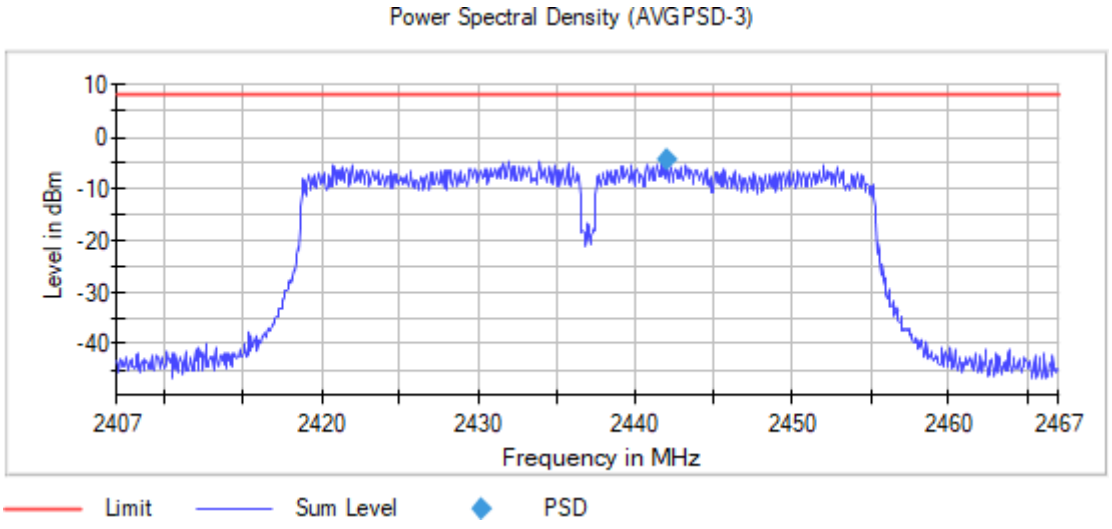
Frequency MHz = 2422.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS8 13.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



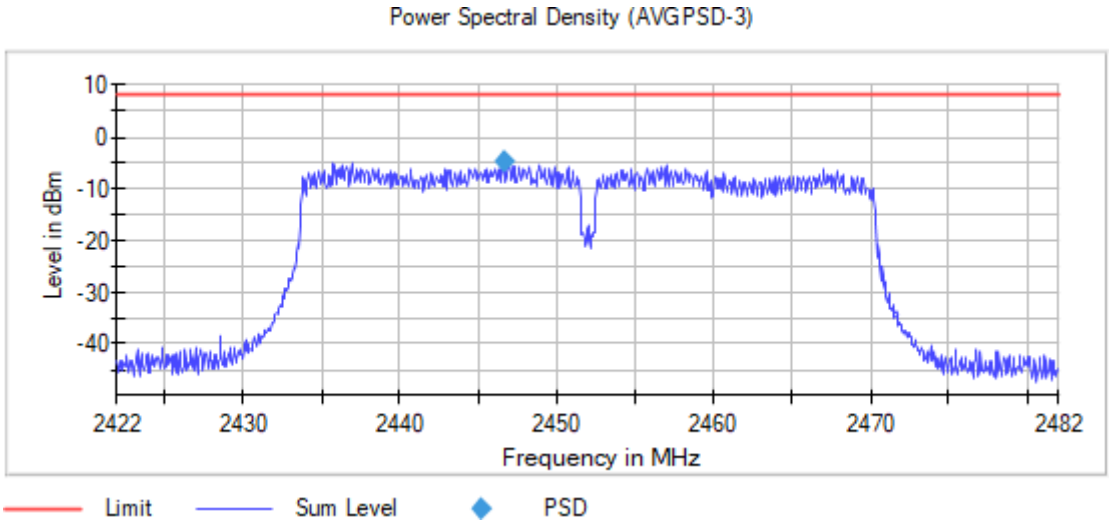
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS8 13.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2452.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS8 13.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11ax HE20 (OFDMA MCS8) - Full RU

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	PSD (dBm)
2412.00000	Digital Transmission System (DTS)	20	1	1	-4.047
2437.00000					-4.947
2462.00000					-5.615

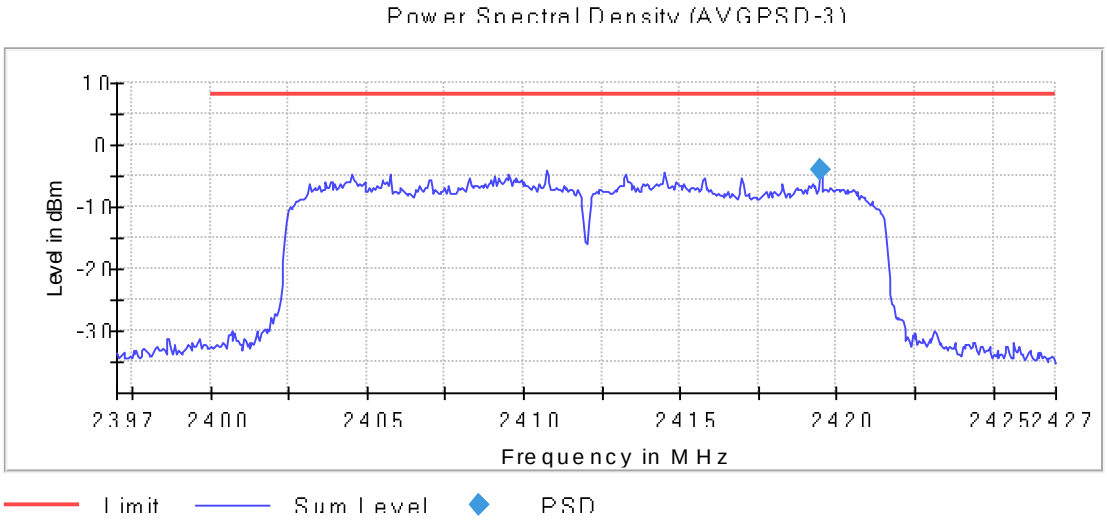
Verdict

Pass

Attachments

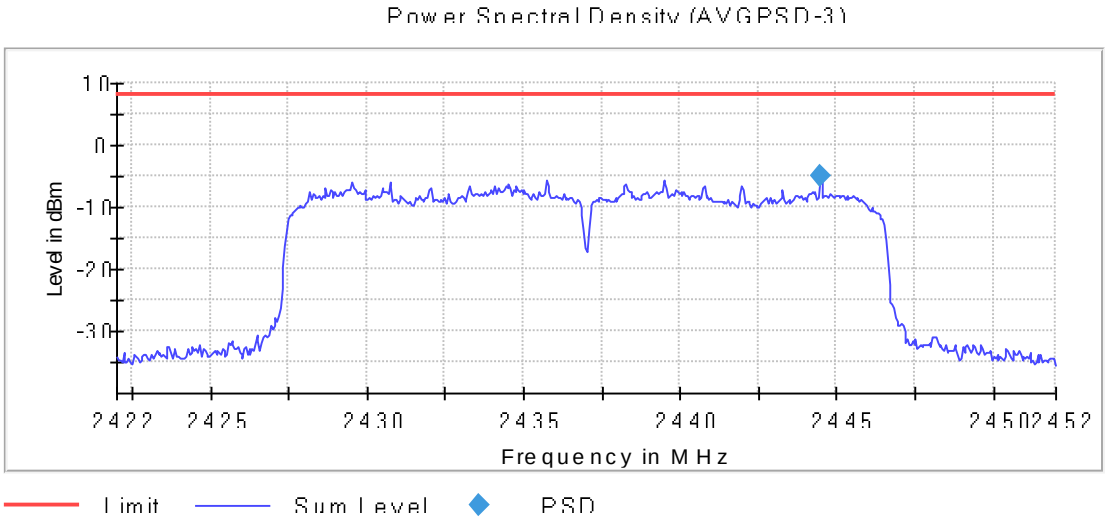
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



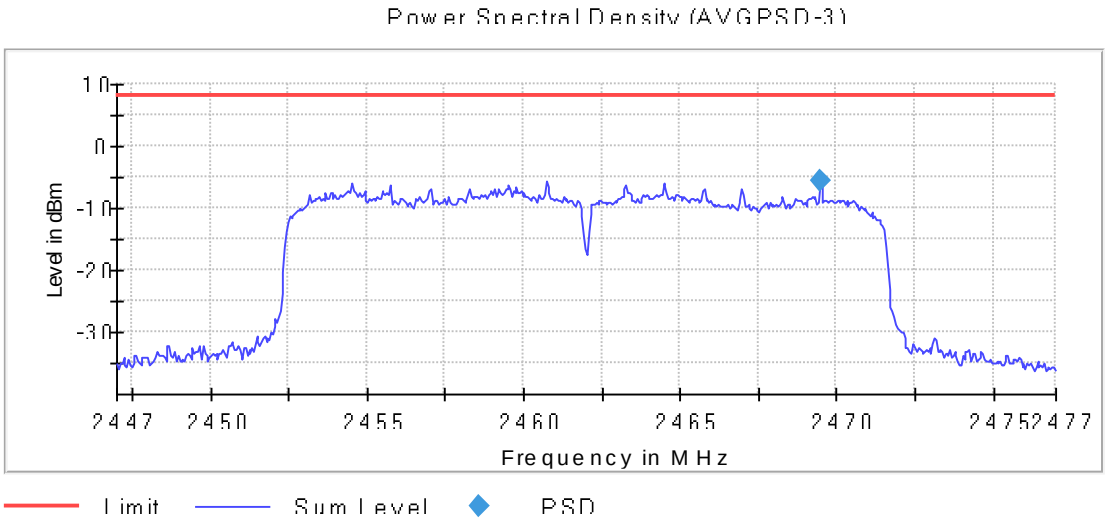
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11ax HE20 (OFDMA MCS8) – Partial RU

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	PSD (dBm)
2412.00000	Digital Transmission System (DTS)	20	1	1	2.783
2437.00000					1.333
2462.00000					1.025

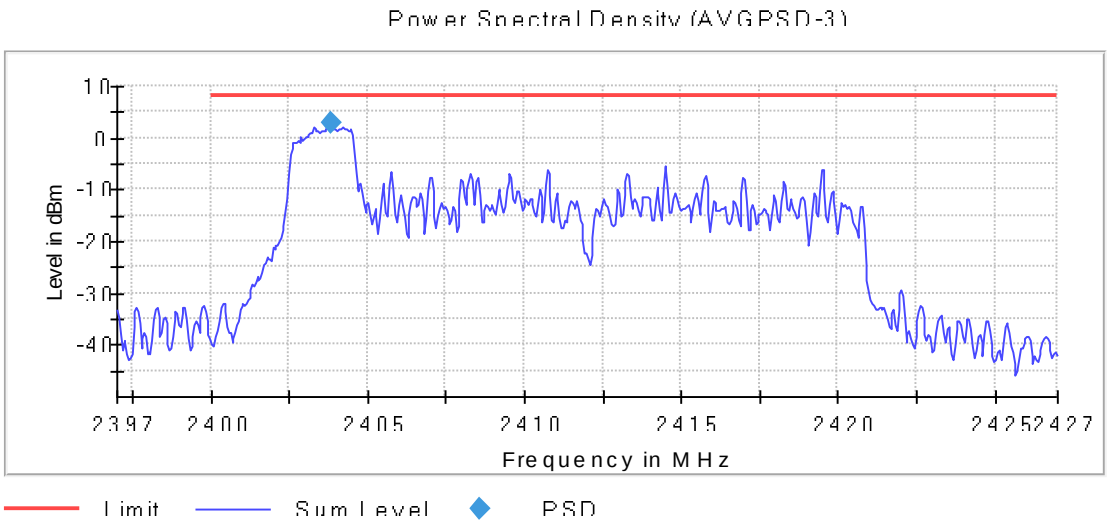
Verdict

Pass

Attachments

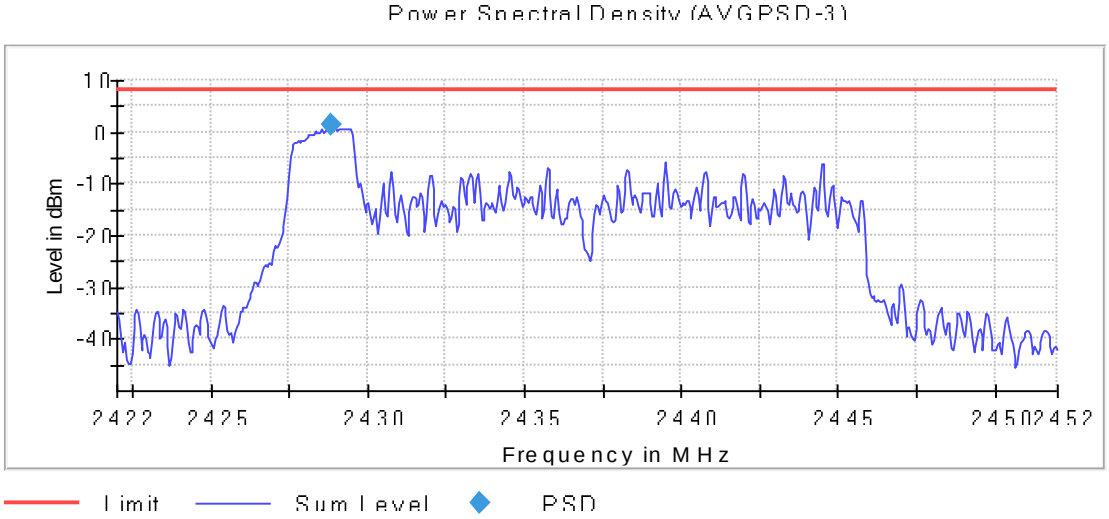
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



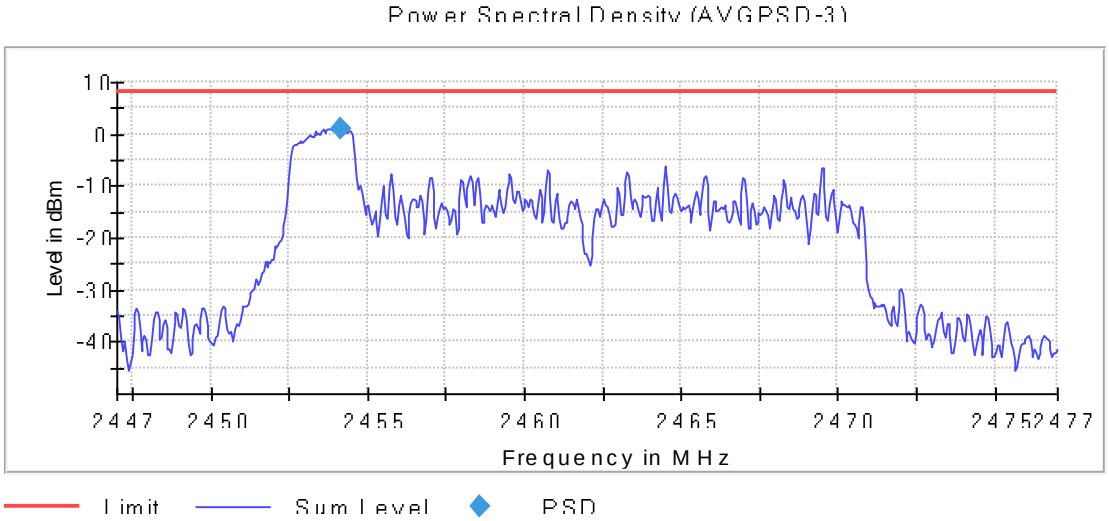
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11ax HE40 (OFDMA MCS8) - Full RU

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	PSD (dBm)
2422.00000	Digital Transmission System (DTS)	40	1	1	-7.197
2437.00000					-7.907
2452.00000					-8.390

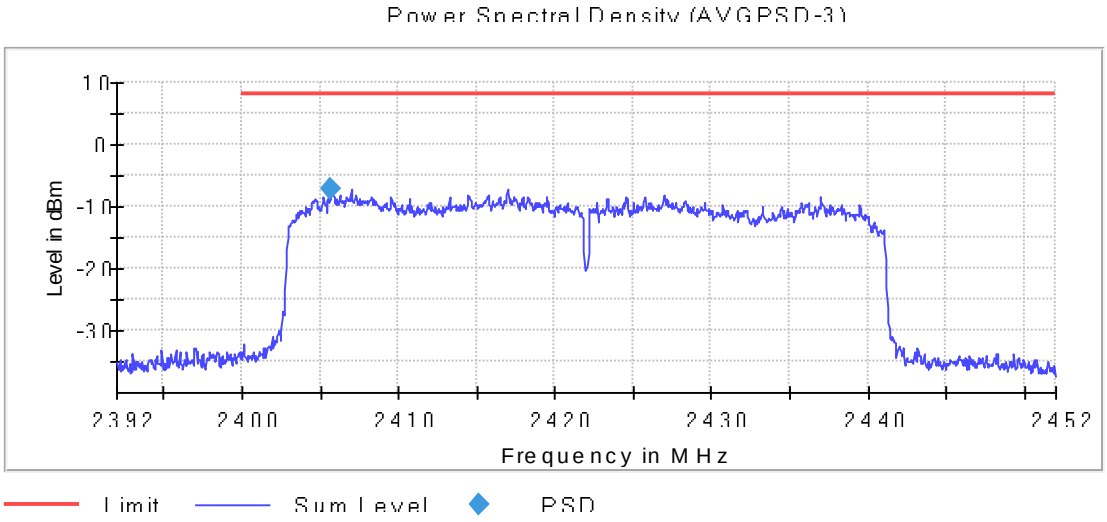
Verdict

Pass

Attachments

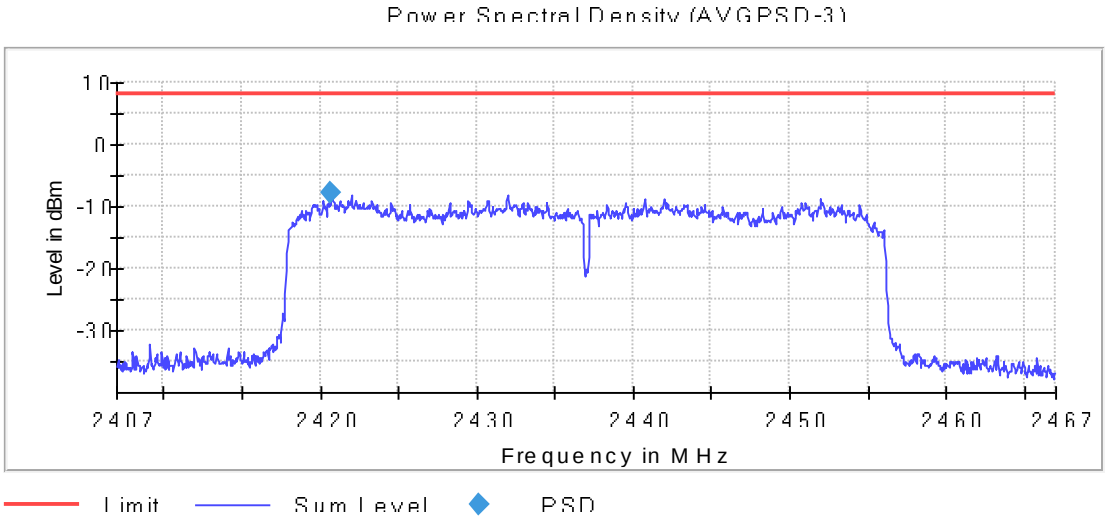
Frequency MHz = 2422.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



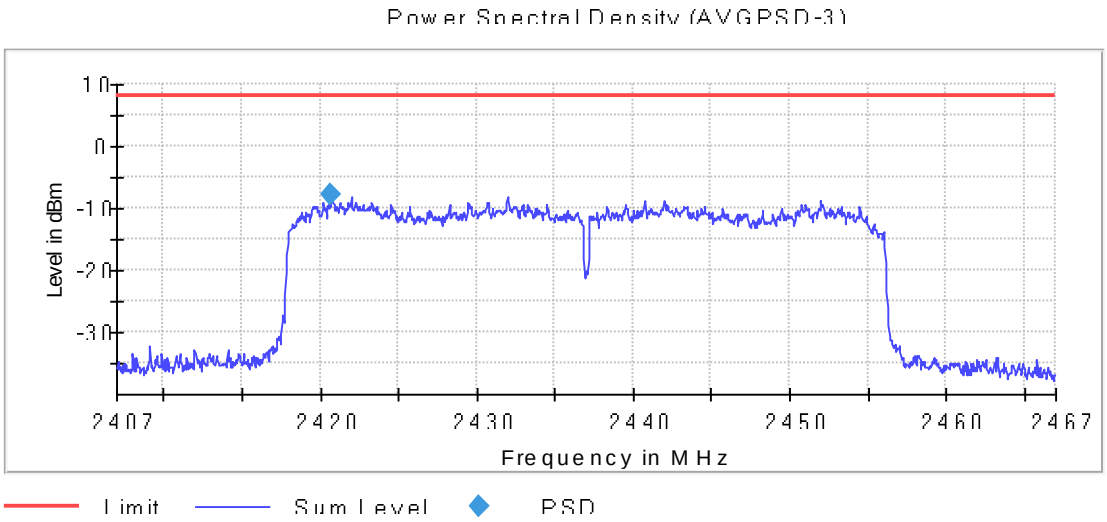
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2452.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11ax HE40 (OFDMA MCS8) – Partial RU

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	PSD (dBm)
2422.00000	Digital Transmission System (DTS)	40	1	1	0.799
2437.00000					0.815
2452.00000					0.383

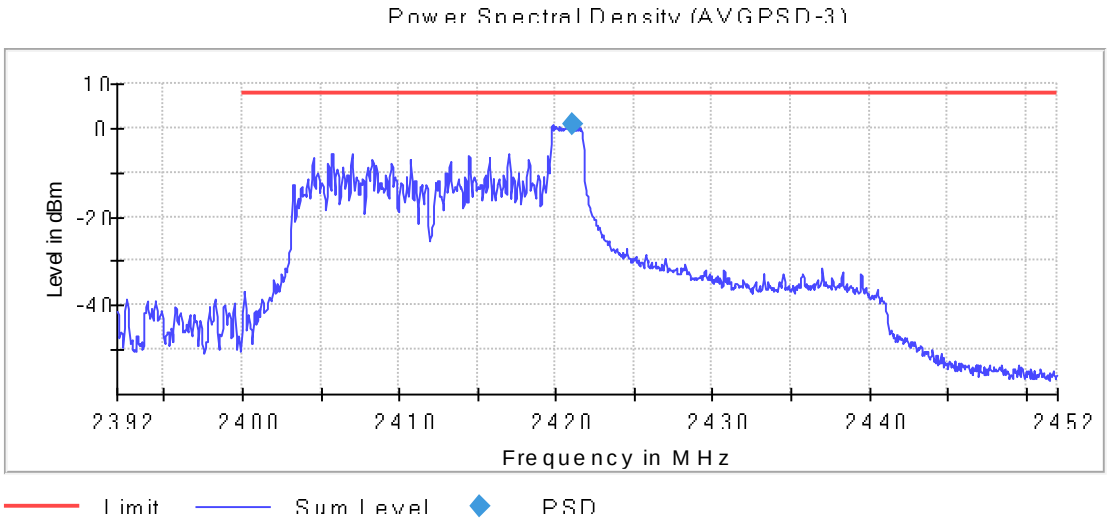
Verdict

Pass

Attachments

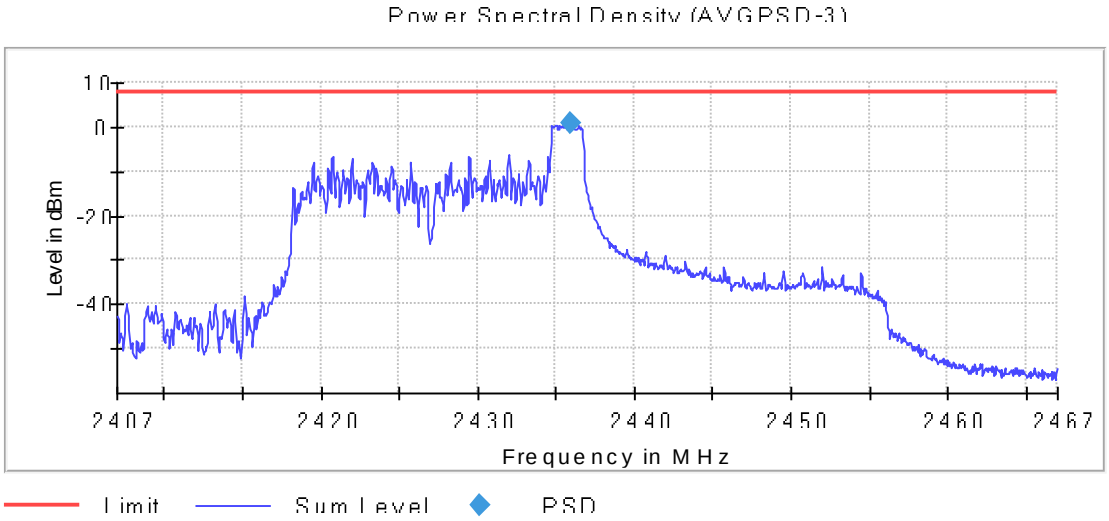
Frequency MHz = 2422.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



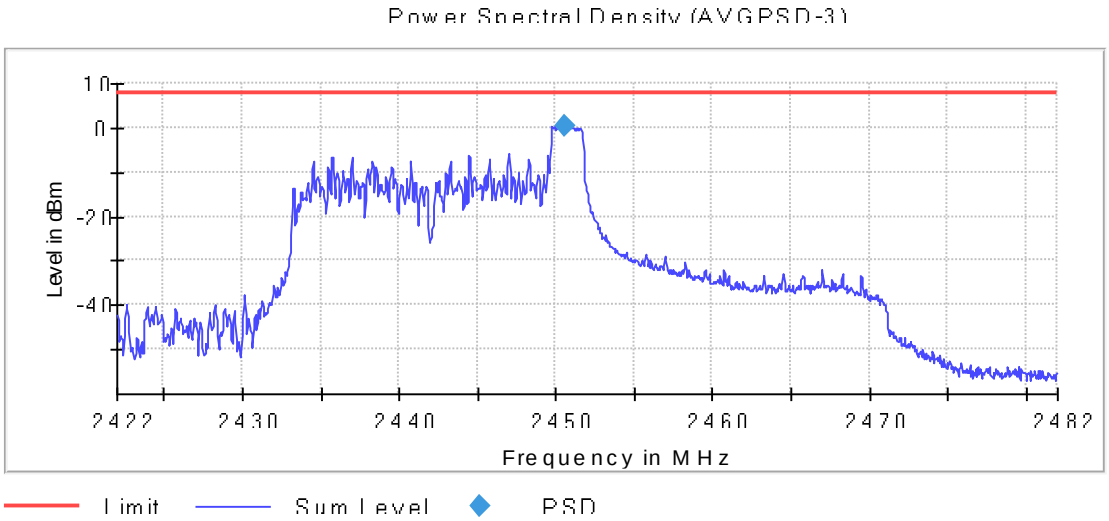
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2452.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



RSS-247 5.4 (d) / FCC 15.247 (b) (1) Maximum Average Conducted Output Power

Limits

For systems using digital modulation in the 2400 -2483.5 MHz band: 1 watt (30 dBm).

The e.i.r.p. shall not exceed 4 W (36 dBm) (RSS-247).

Maximum declared antenna gain: -2.5 dBi

Modulation: 802.11b (DSSS 1 Mbit/s)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Avg Power (dBm)
2412.00000	Digital Transmission System (DTS)	20	1	1	8.11
2437.00000					8.99
2462.00000					7.19

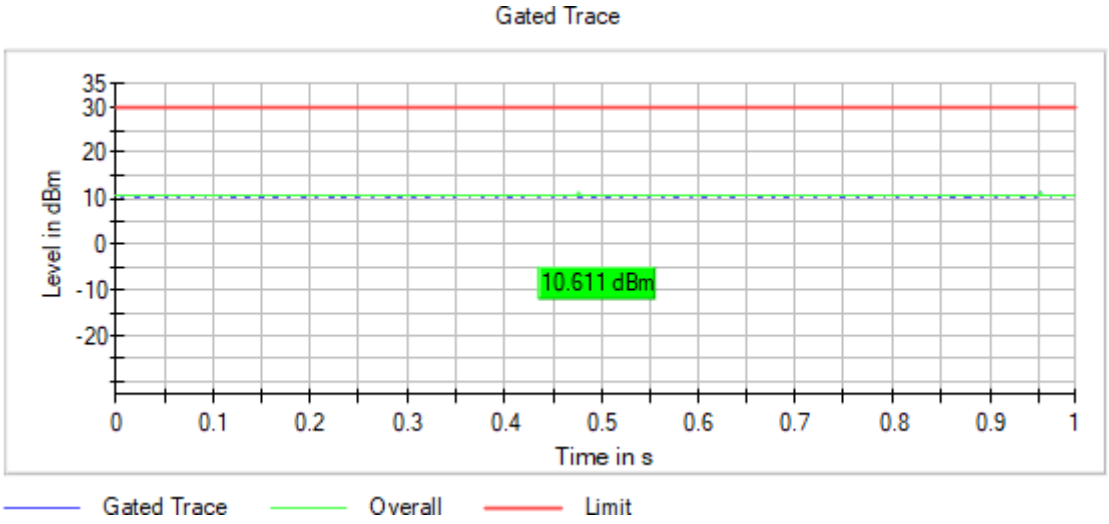
Verdict

Pass

Attachments

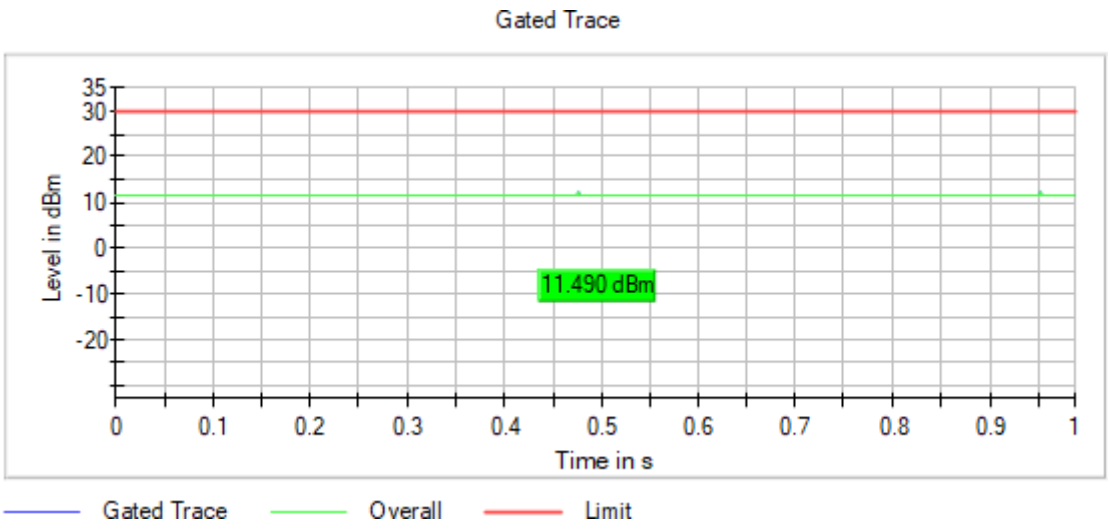
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11b (DSSS 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



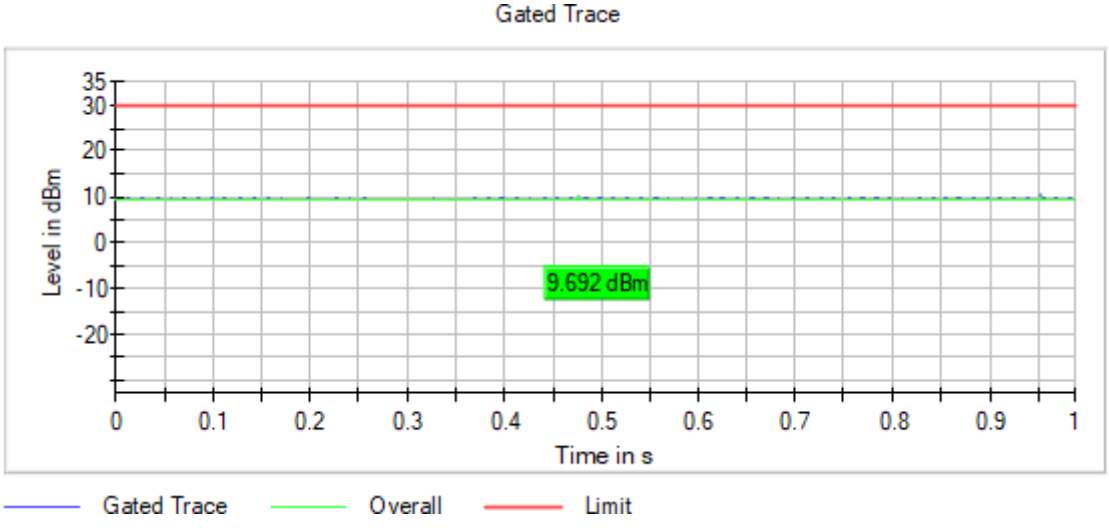
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11b (DSSS 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

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:



Modulation: 802.11g (OFDM 6 Mbit/s)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Avg Power (dBm)
2412.00000	Digital Transmission System (DTS)	20	1	1	3.02
2437.00000					9.26
2462.00000					8.27

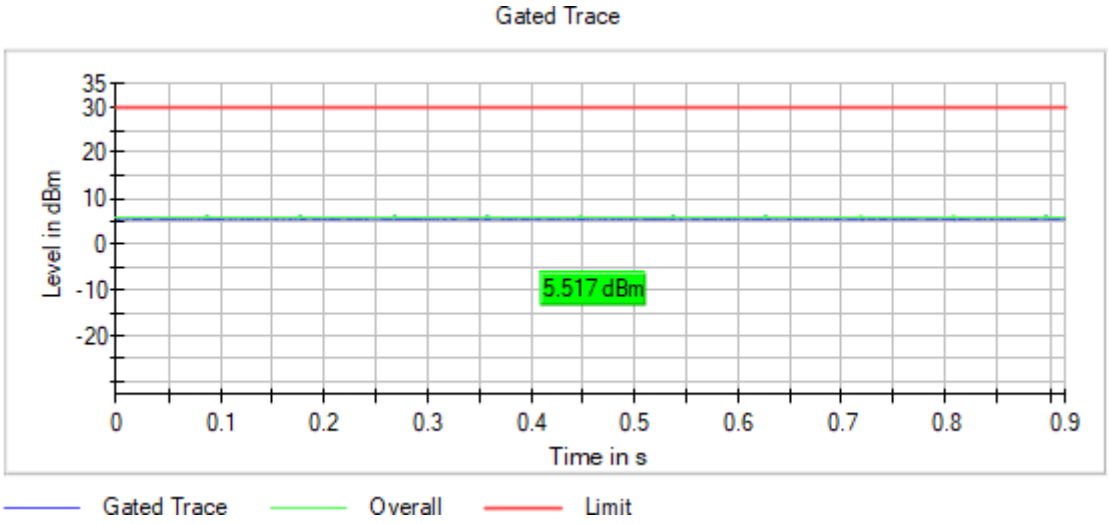
Verdict

Pass

Attachments

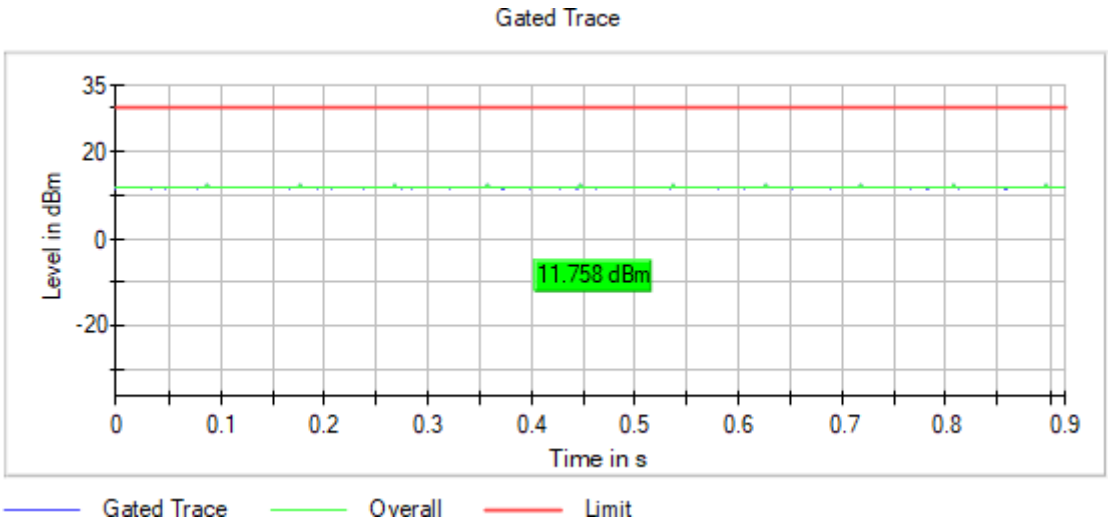
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



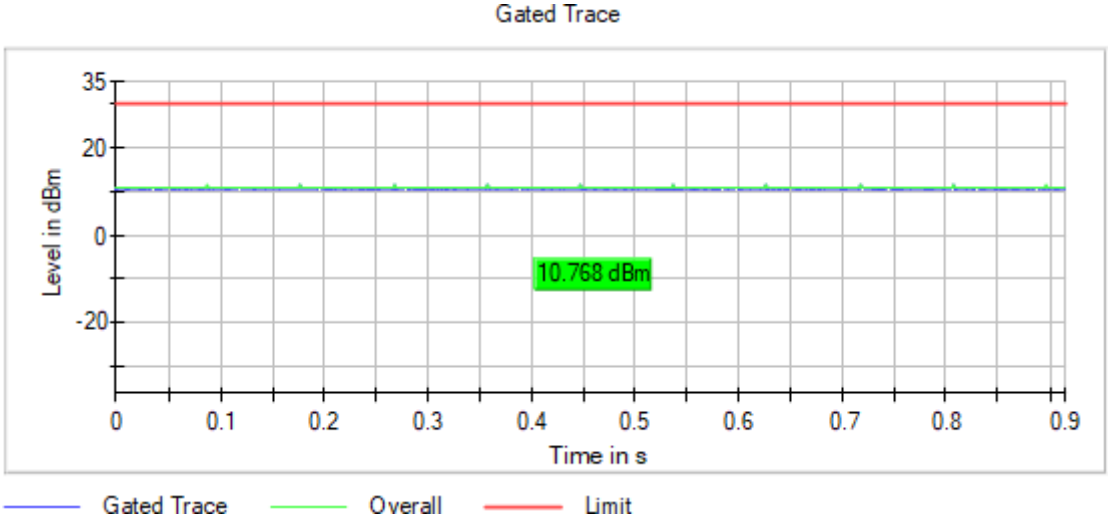
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

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:



Modulation: 802.11n HT20 (OFDM MCS8 6.5 Mbit/s)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Avg Power (dBm)
2412.00000	Digital Transmission System (DTS)	20	1	1	10.08
2437.00000					9.66
2462.00000					9.18

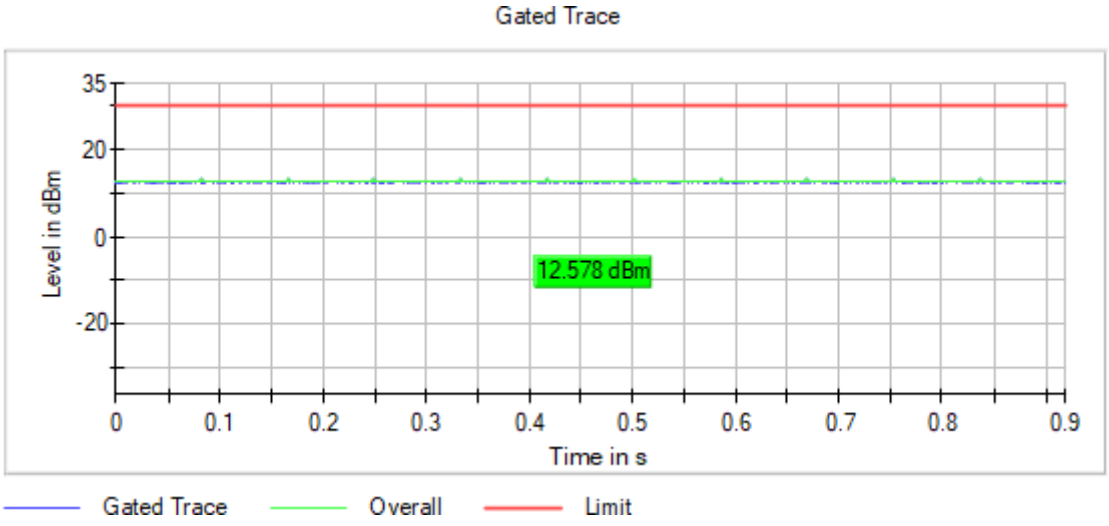
Verdict

Pass

Attachments

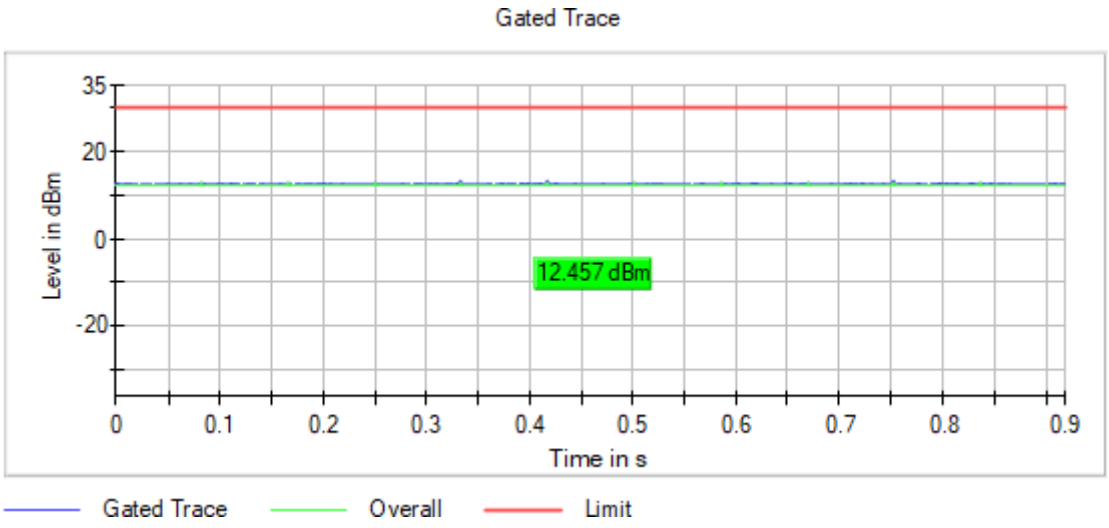
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS8 6.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



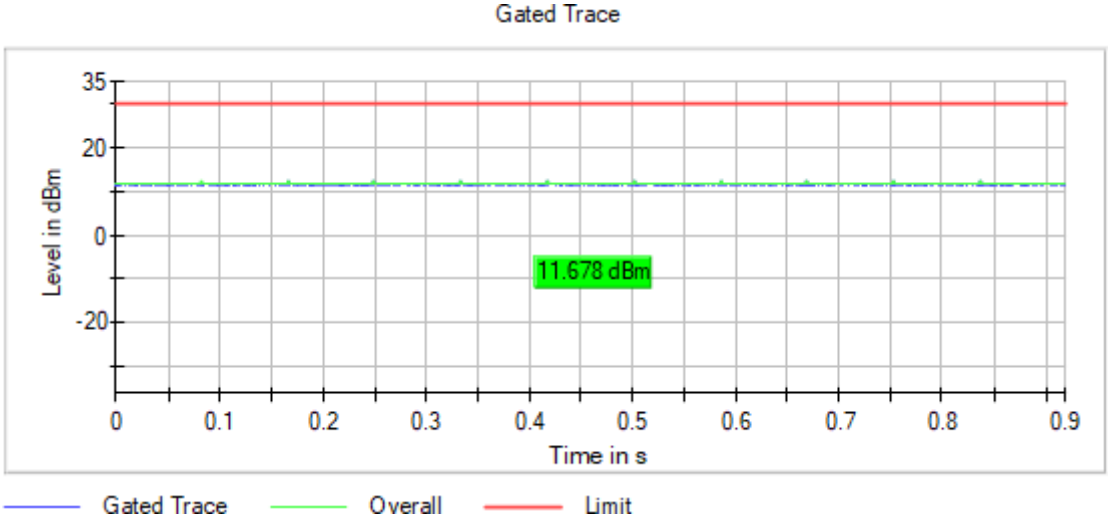
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS8 6.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS8 6.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11n HT40 (OFDM MCS8 13.5 Mbit/s)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Avg Power (dBm)
2422.00000	Digital Transmission System (DTS)	40	1	1	10.16
2437.00000					9.94
2452.00000					9.63

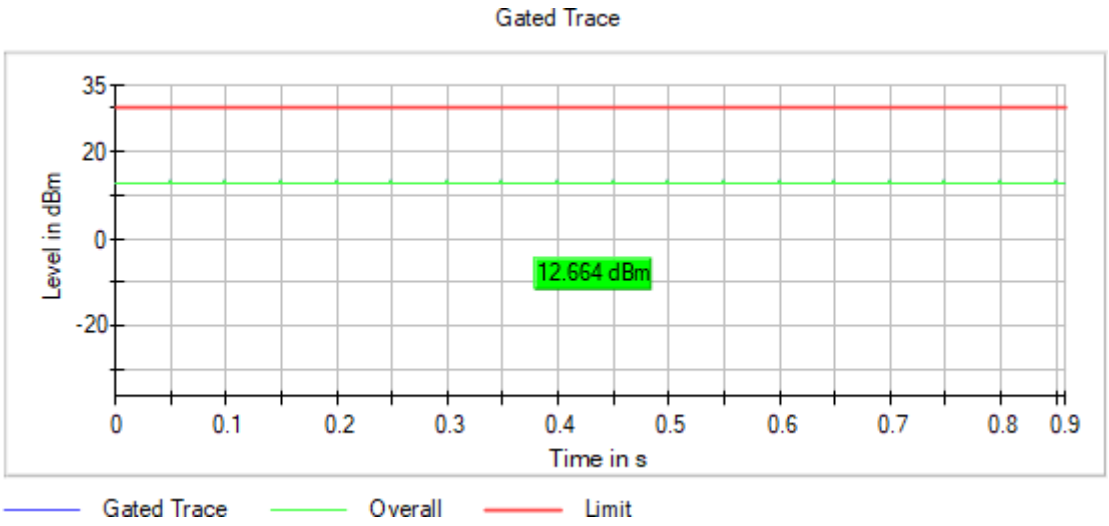
Verdict

Pass

Attachments

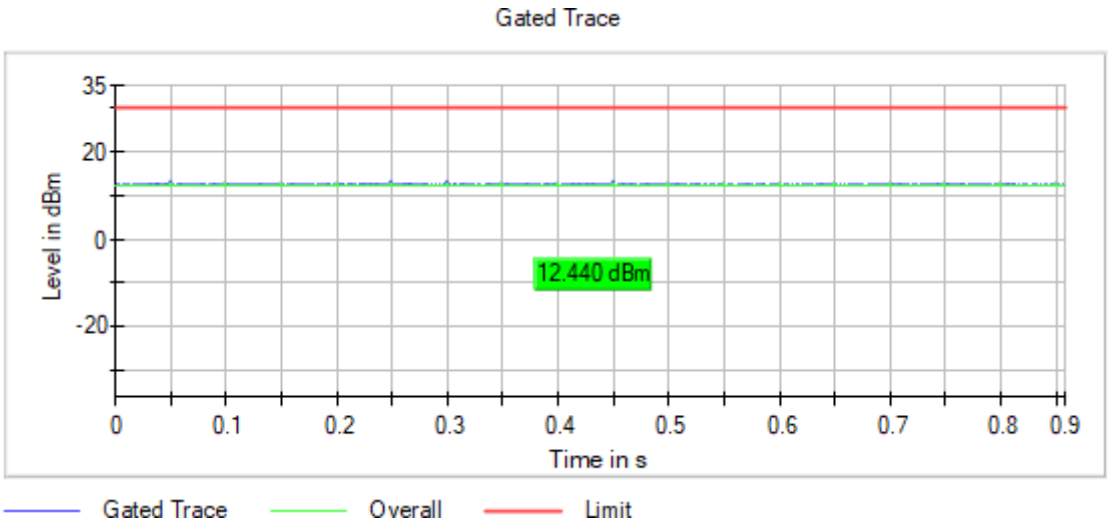
Frequency MHz = 2422.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS8 13.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



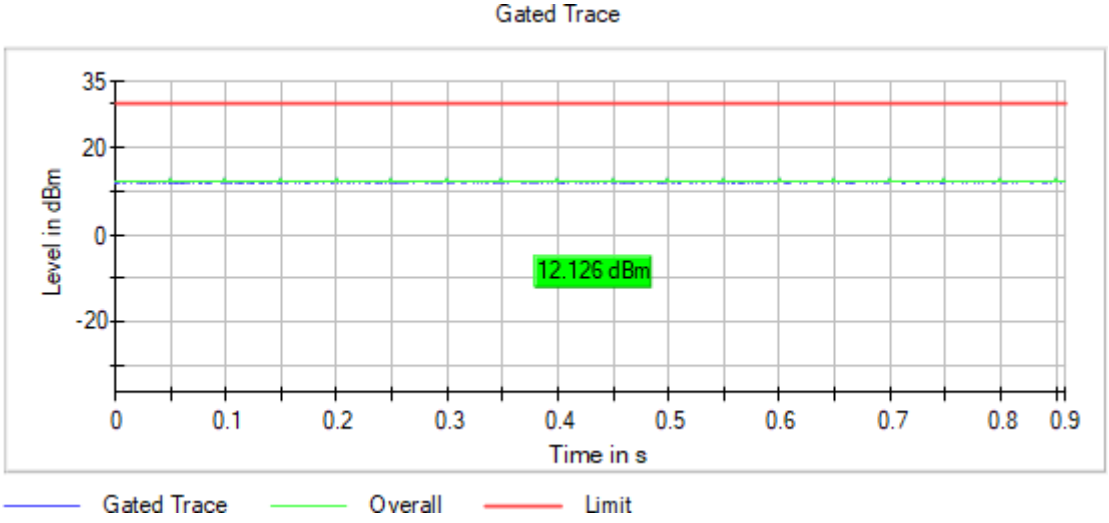
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS8 13.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2452.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS8 13.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11ax HE20 (OFDMA MCS8) - Full RU

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Avg Power (dBm)
2412.00000	Digital Transmission System (DTS)	20	1	1	8.80
2437.00000					6.80
2462.00000					7.20

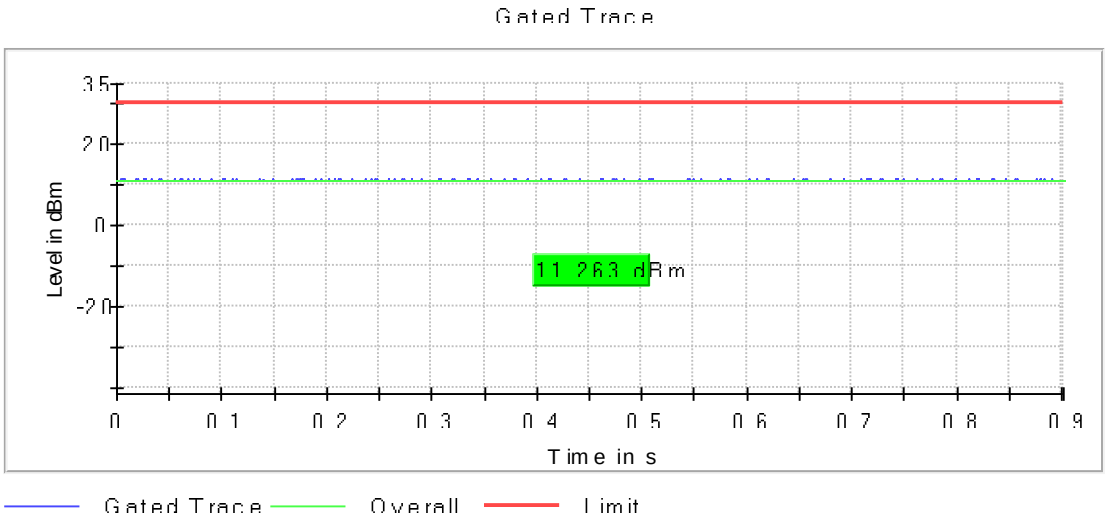
Verdict

Pass

Attachments

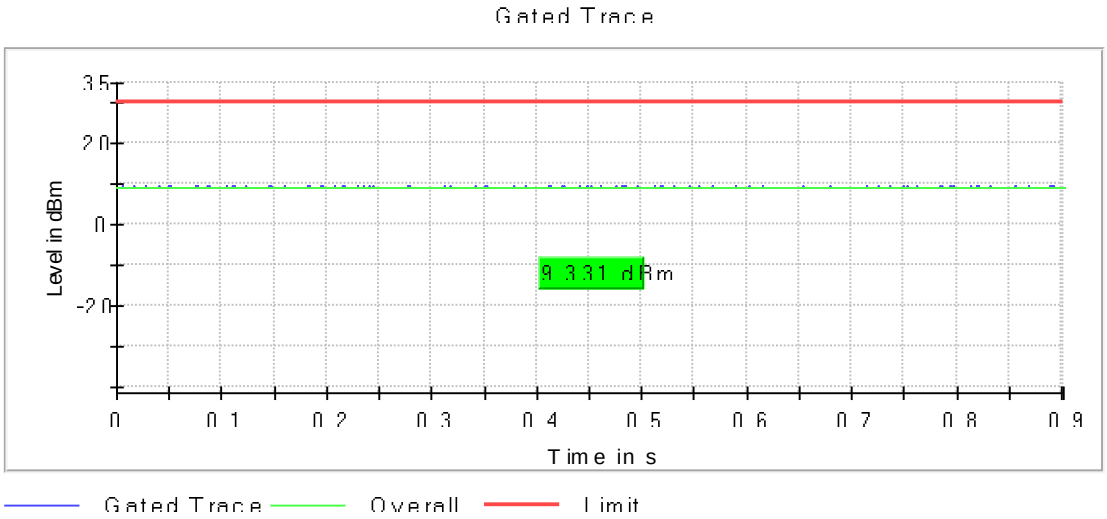
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



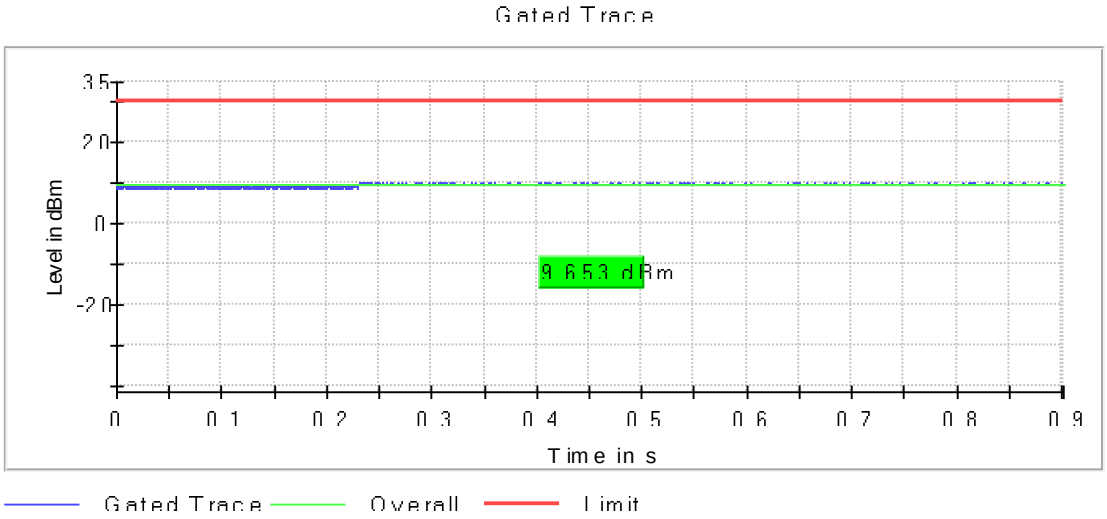
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11ax HE20 (OFDMA MCS8) – Partial RU

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Avg Power (dBm)
2412.00000	Digital Transmission System (DTS)	20	1	1	7.2
2437.00000					5.9
2462.00000					6.3

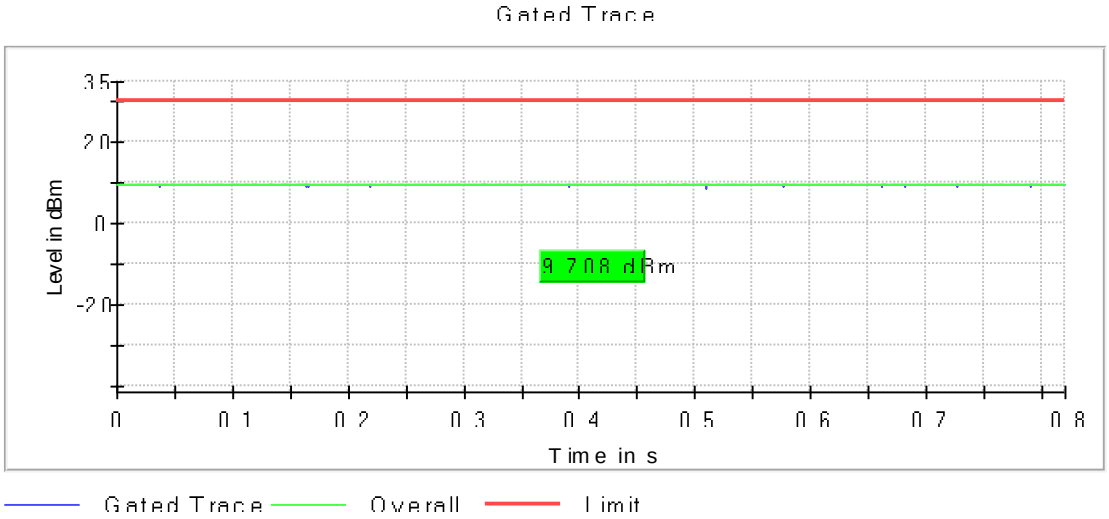
Verdict

Pass

Attachments

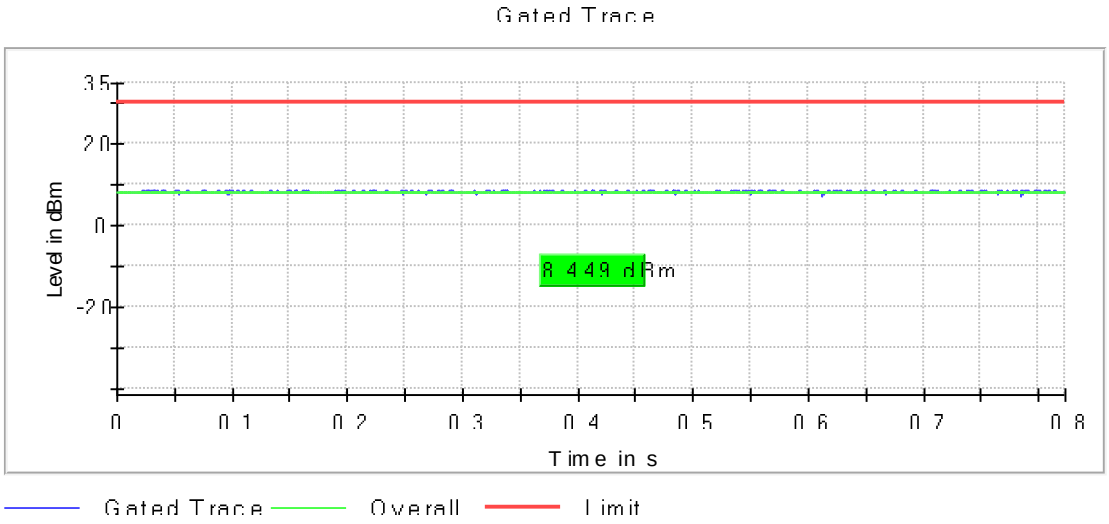
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



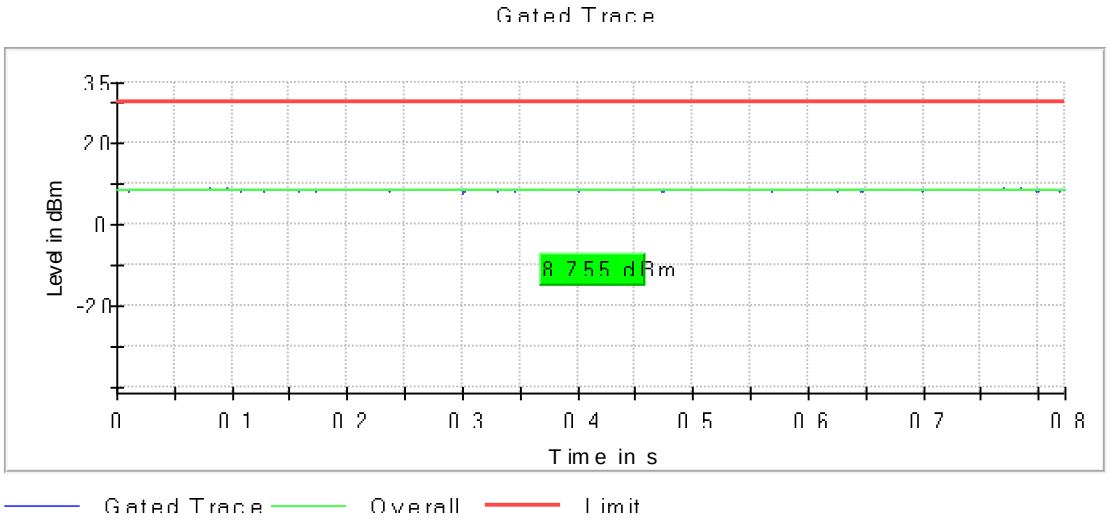
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11ax HE40 (OFDMA MCS8) - Full RU

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Avg Power (dBm)
2422.00000	Digital Transmission System (DTS)	40	1	1	7.50
2437.00000					7.00
2452.00000					7.30

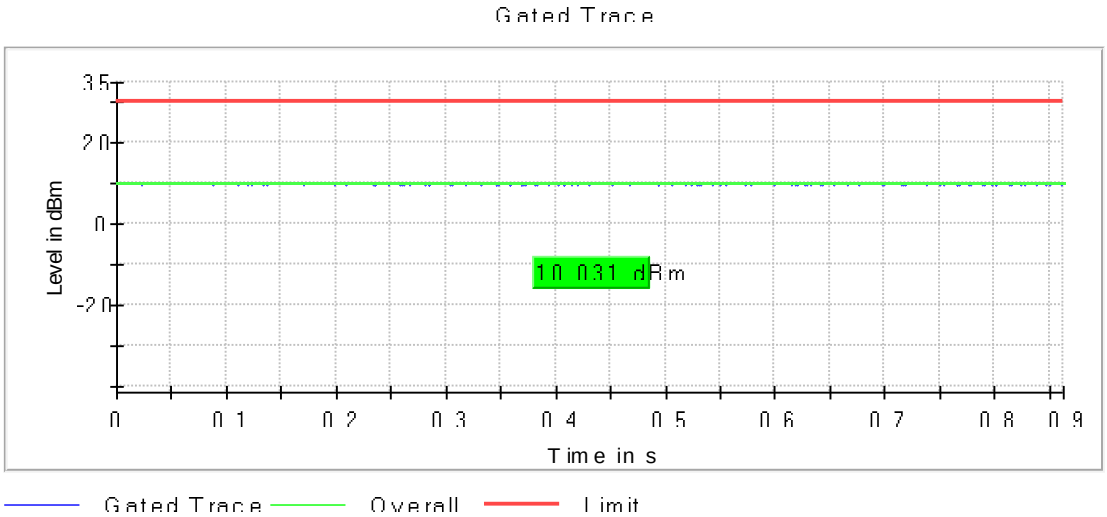
Verdict

Pass

Attachments

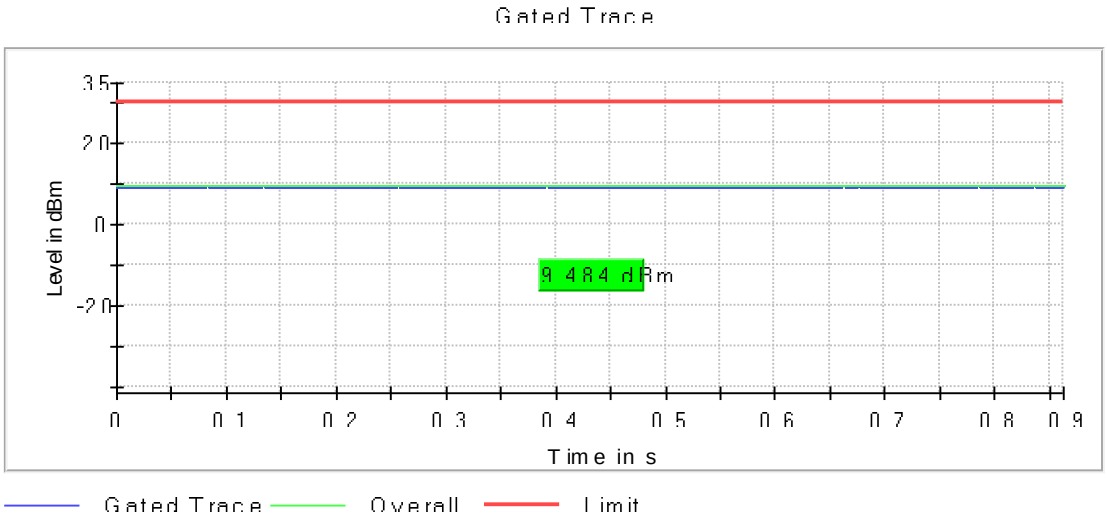
Frequency MHz = 2422.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



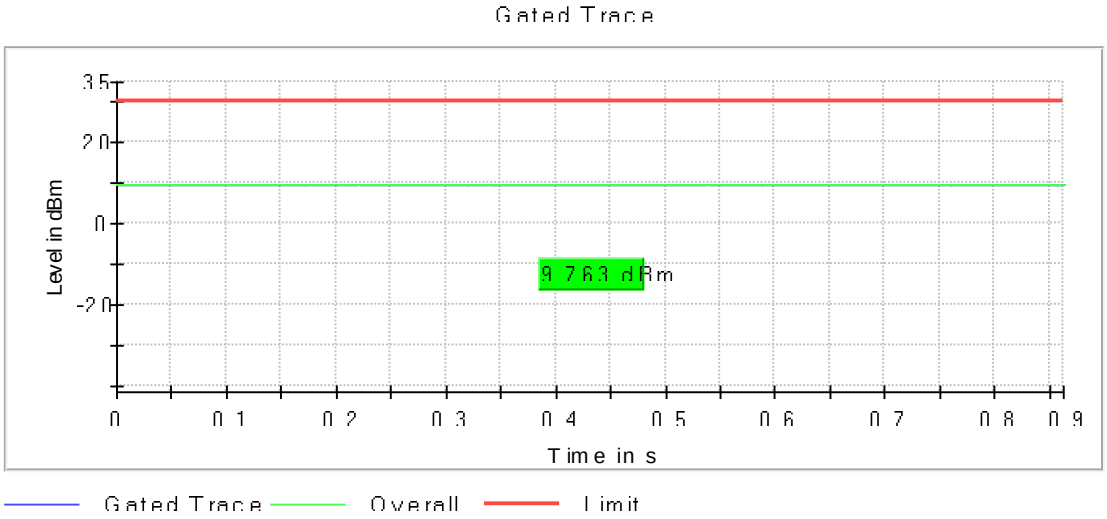
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2452.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11ax HE40 (OFDMA MCS8) – Partial RU

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Avg Power (dBm)
2422.00000	Digital Transmission System (DTS)	40	1	1	6.4
2437.00000					6.3
2452.00000					6.5

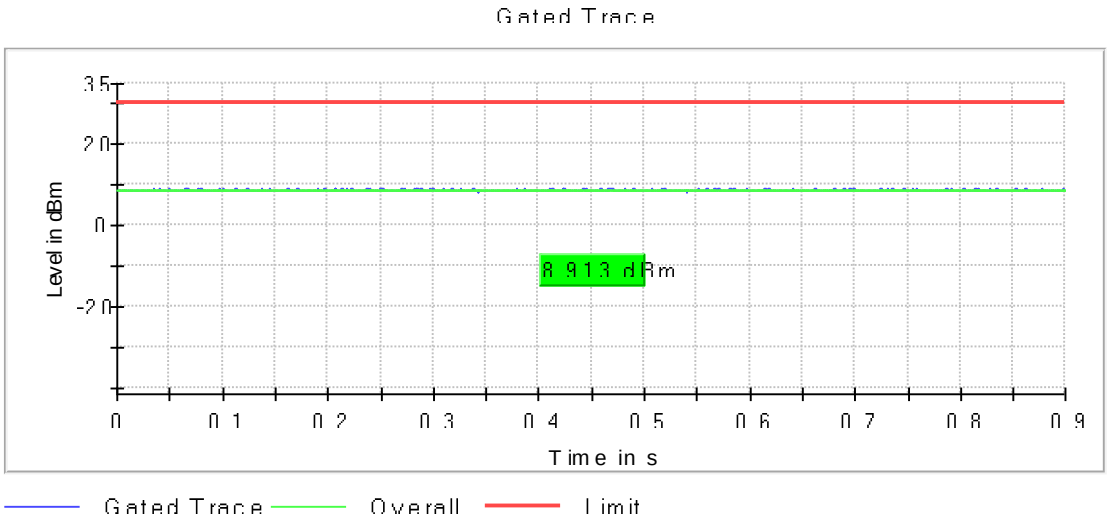
Verdict

Pass

Attachments

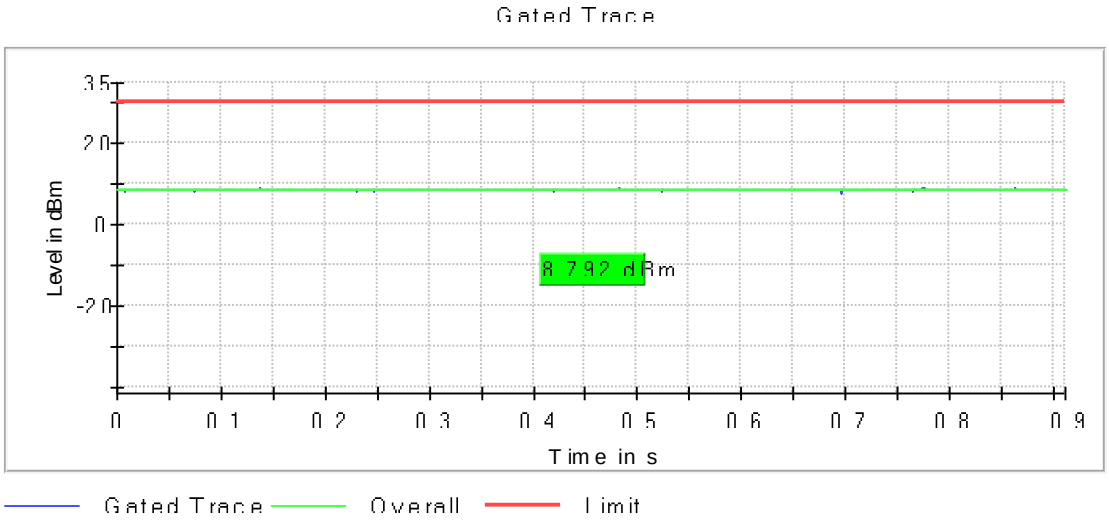
Frequency MHz = 2422.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



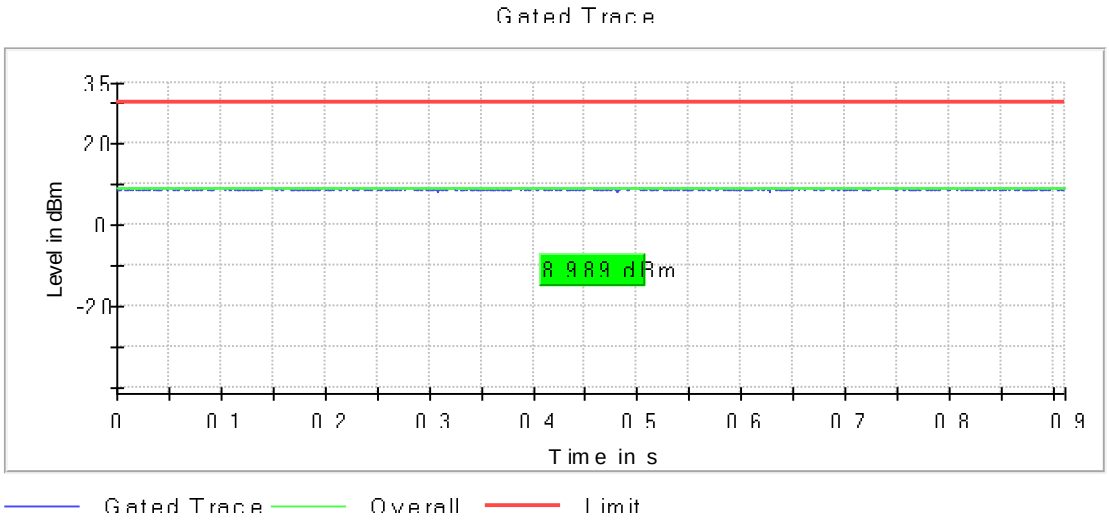
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2452.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



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

Limits

In any 100 kHz bandwidths outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Modulation: 802.11b (DSSS 1 Mbit/s)

Results

Freq (MHz)	Lvl (dBm)
2398.525000	-38.4
2398.475000	-38.8
2398.575000	-38.8
2399.075000	-39.4
2399.125000	-39.5
2399.025000	-39.8
2396.475000	-40.2
2399.325000	-40.2
2396.525000	-40.3
2484.975000	-48.9
2485.025000	-49.1
2484.925000	-50.0
2484.675000	-50.6
2484.625000	-50.8
2484.775000	-51.3
2484.825000	-51.3
2484.725000	-51.5
2484.525000	-51.6
2398.425000	-40.6
2399.375000	-40.6
2396.275000	-40.7
2397.825000	-40.7
2399.275000	-40.7
2397.775000	-40.8
2484.875000	-51.7

Freq (MHz)	Lvl (dBm)
2484.475000	-51.8
2485.075000	-51.9
2485.125000	-52.3
2483.975000	-52.7
2484.425000	-52.8

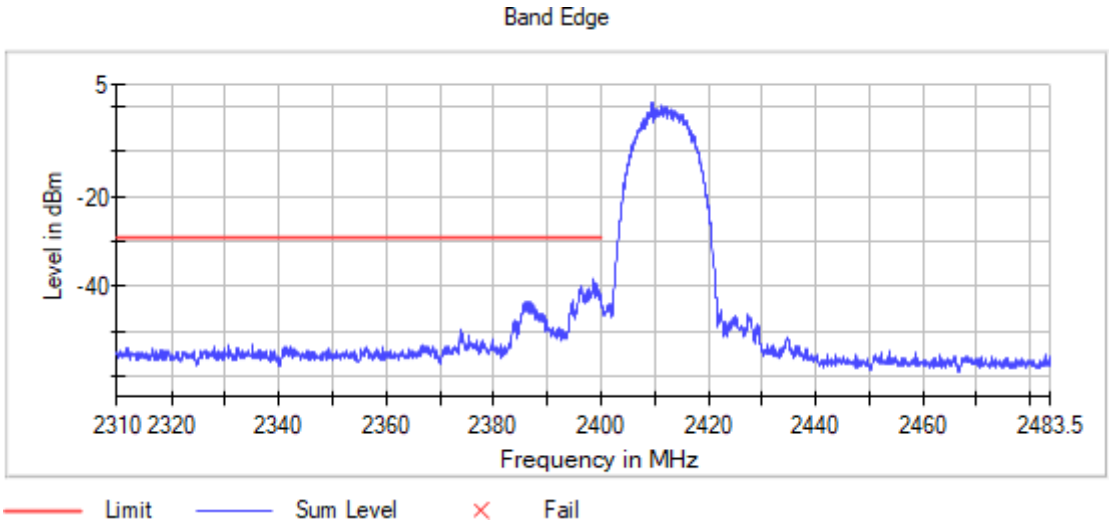
Verdict

Pass

Attachments

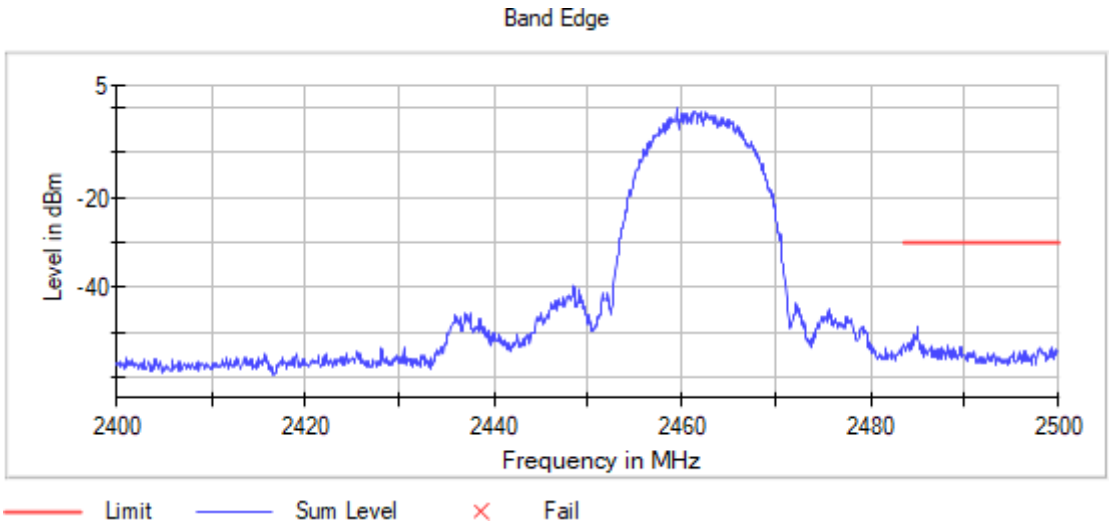
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11b (DSSS 1 Mbit/s), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

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, Measurement Point = 1, Active Port = 1

Images:



Modulation: 802.11g (OFDM 6 Mbit/s)

Results

Freq (MHz)	Lvl (dBm)
2399.725000	-41.9
2399.775000	-42.0
2399.375000	-42.2
2399.925000	-42.2
2399.425000	-42.2
2399.975000	-42.2
2399.475000	-42.4
2399.675000	-42.4
2398.625000	-42.4
2484.075000	-44.8
2483.925000	-44.9
2483.975000	-45.0
2484.125000	-45.1
2484.025000	-45.2
2483.525000	-45.2
2484.475000	-45.5
2484.425000	-45.5
2484.925000	-45.7
2396.325000	-42.5
2398.675000	-42.5
2396.675000	-42.5
2397.925000	-42.5
2396.375000	-42.5
2398.575000	-42.6
2484.625000	-45.7
2484.275000	-45.7
2484.225000	-45.8
2487.925000	-45.8
2483.825000	-45.9
2483.875000	-45.9

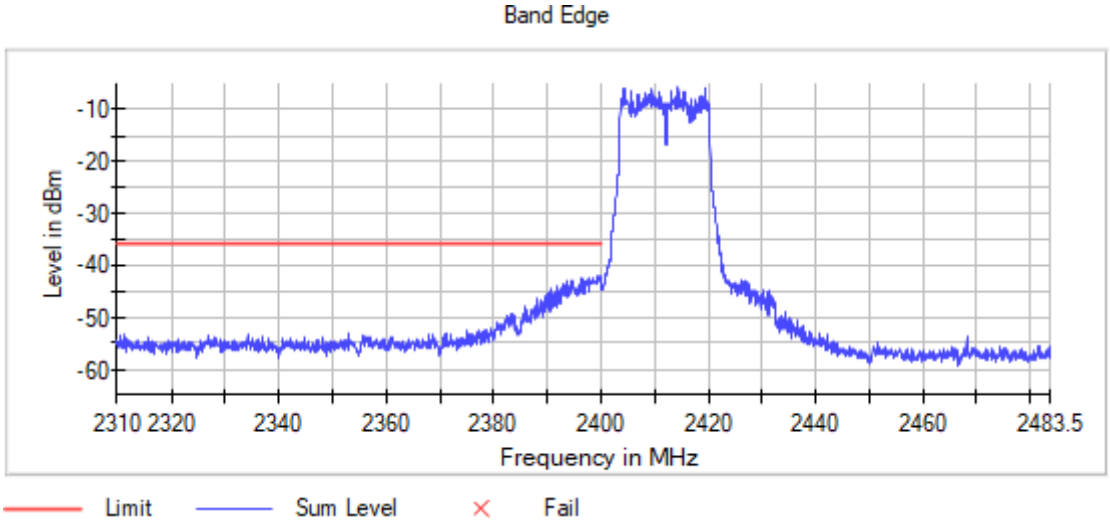
Verdict

Pass

Attachments

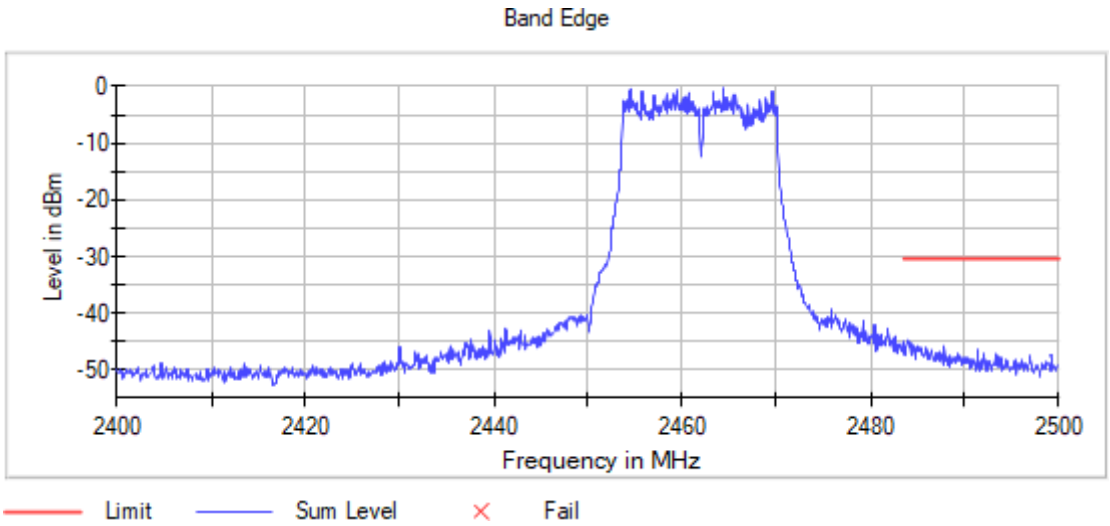
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbit/s), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

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, Measurement Point = 1, Active Port = 1

Images:



Modulation: 802.11n HT20 (OFDM MCS8 6.5 Mbit/s)

Results

Freq (MHz)	Lvl (dBm)
2399.225000	-29.3
2399.175000	-29.4
2399.275000	-31.2
2399.125000	-31.6
2397.925000	-31.8
2397.975000	-31.8
2397.875000	-32.8
2398.225000	-32.8
2396.075000	-32.8
2484.875000	-39.8
2484.825000	-39.9
2484.925000	-40.4
2486.075000	-40.4
2486.025000	-40.5
2484.175000	-40.9
2484.225000	-41.1
2484.475000	-41.6
2484.125000	-41.8
2399.525000	-32.9
2399.475000	-32.9
2399.775000	-32.9
2398.575000	-32.9
2398.175000	-32.9
2398.525000	-33.0
2483.825000	-41.8
2485.475000	-41.9
2484.625000	-41.9
2485.125000	-41.9
2484.525000	-41.9
2484.975000	-42.0

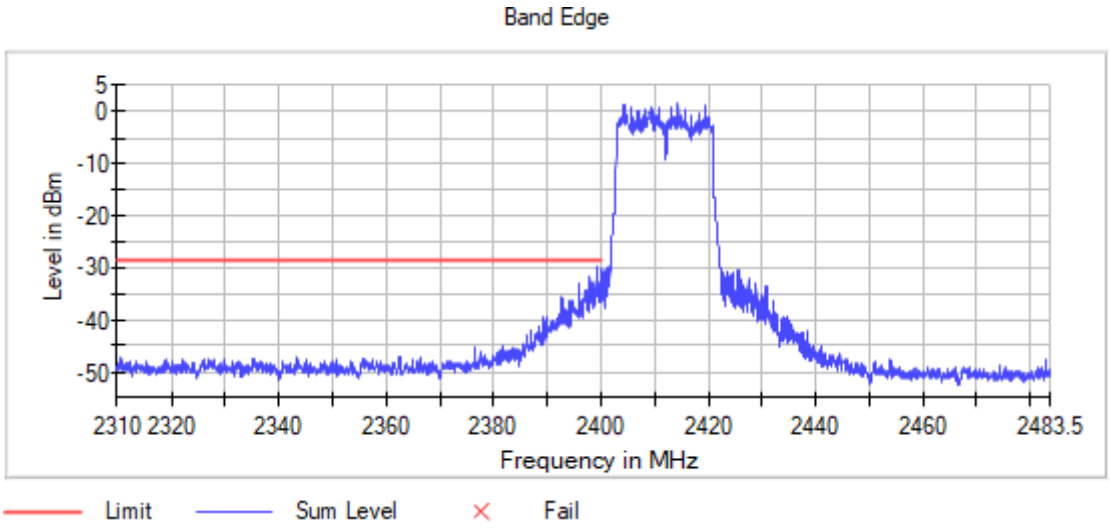
Verdict

Pass

Attachments

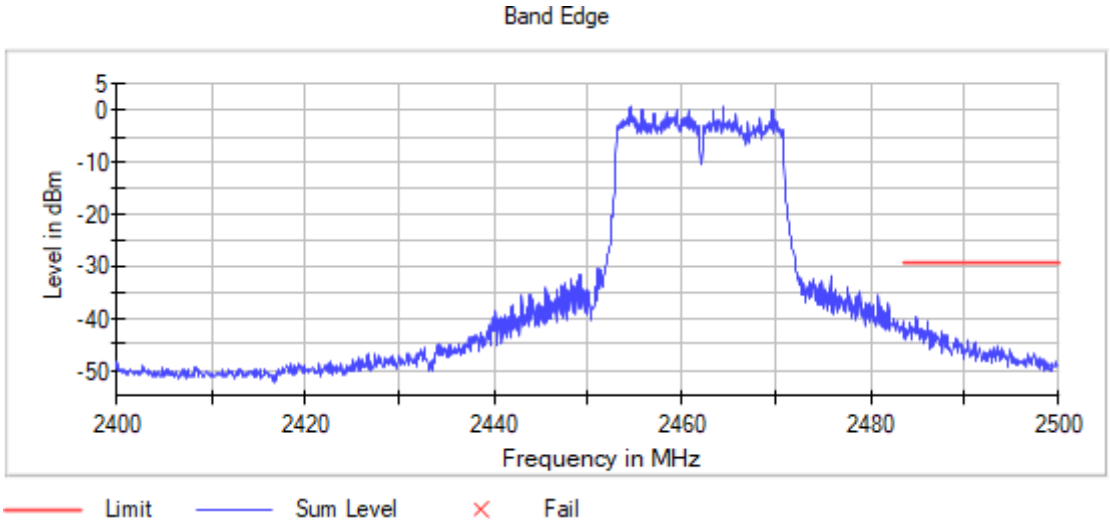
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS8 6.5 Mbit/s), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS8 6.5 Mbit/s), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Modulation: 802.11n HT40 (OFDM MCS8 13.5 Mbit/s)

Results

Freq (MHz)	Lvl (dBm)
2394.825000	-34.5
2394.775000	-34.6
2399.925000	-34.6
2397.325000	-34.6
2397.275000	-34.7
2399.875000	-34.8
2399.175000	-34.8
2399.125000	-34.8
2395.325000	-34.8
2483.525000	-37.4
2483.575000	-37.5
2485.725000	-38.0
2485.775000	-38.4
2485.675000	-38.5
2495.075000	-38.6
2494.475000	-38.6
2493.275000	-38.7
2496.025000	-38.7
2399.975000	-34.9
2388.575000	-34.9
2395.275000	-35.1
2397.925000	-35.1
2395.375000	-35.1
2398.375000	-35.1
2493.325000	-38.8
2495.125000	-38.8
2484.625000	-38.9
2494.525000	-38.9
2496.075000	-38.9
2493.925000	-39.0

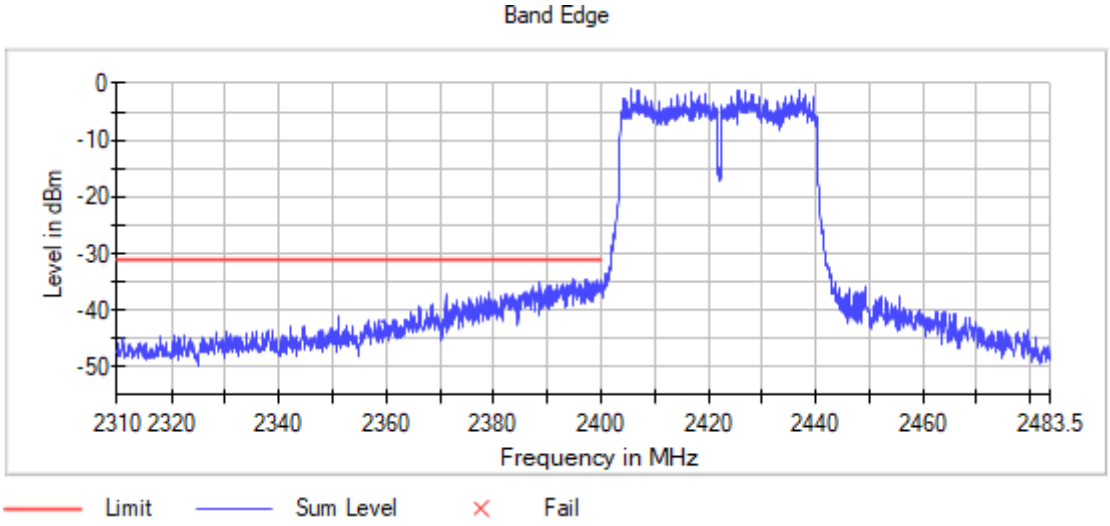
Verdict

Pass

Attachments

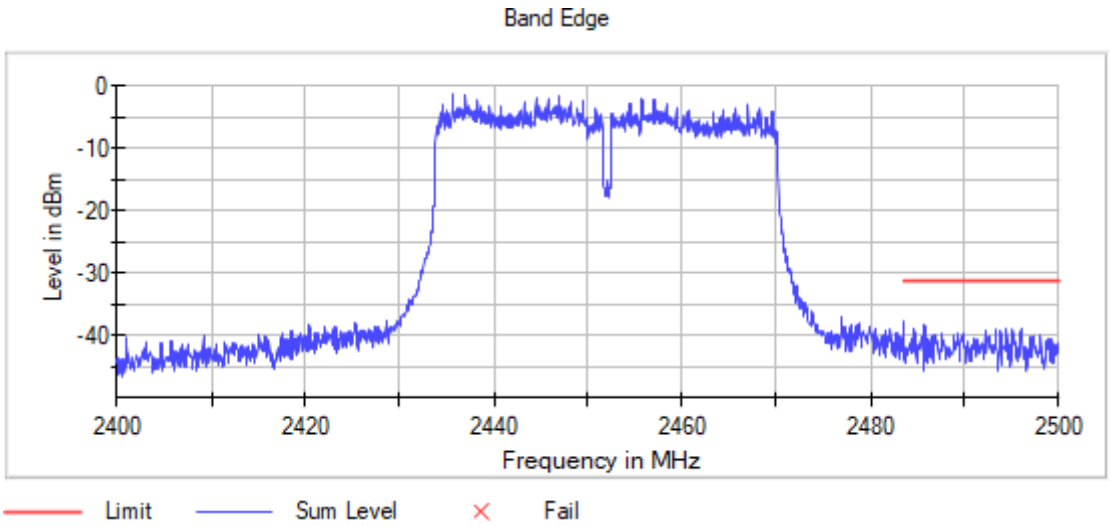
Frequency MHz = 2422.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS8 13.5 Mbit/s), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Frequency MHz = 2452.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS8 13.5 Mbit/s), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Modulation: 802.11ax HE20 (OFDMA MCS8) - Full RU

Results

Freq (MHz)	Lvl (dBm)
2399.525000	-37.8
2399.475000	-37.9
2399.875000	-38.0
2399.325000	-38.1
2399.575000	-38.1
2399.375000	-38.2
2398.325000	-38.2
2398.275000	-38.3
2398.375000	-38.3
2399.025000	-38.3
2394.525000	-38.3
2394.475000	-38.4
2399.825000	-38.4
2399.275000	-38.4
2399.225000	-38.4
2484.425000	-35.9
2483.875000	-35.9
2483.925000	-36.0
2484.475000	-36.1
2484.525000	-36.5
2485.525000	-36.7
2485.275000	-36.7
2484.725000	-36.7
2484.775000	-36.9
2485.475000	-37.0
2485.325000	-37.0
2485.575000	-37.0
2485.225000	-37.1
2484.125000	-37.2
2483.525000	-37.3

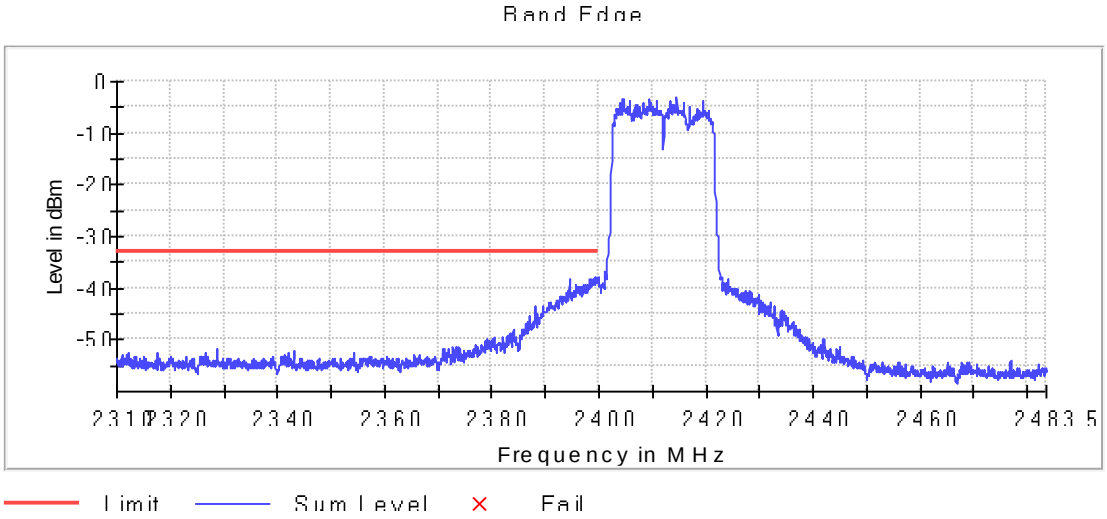
Verdict

Pass

Attachments

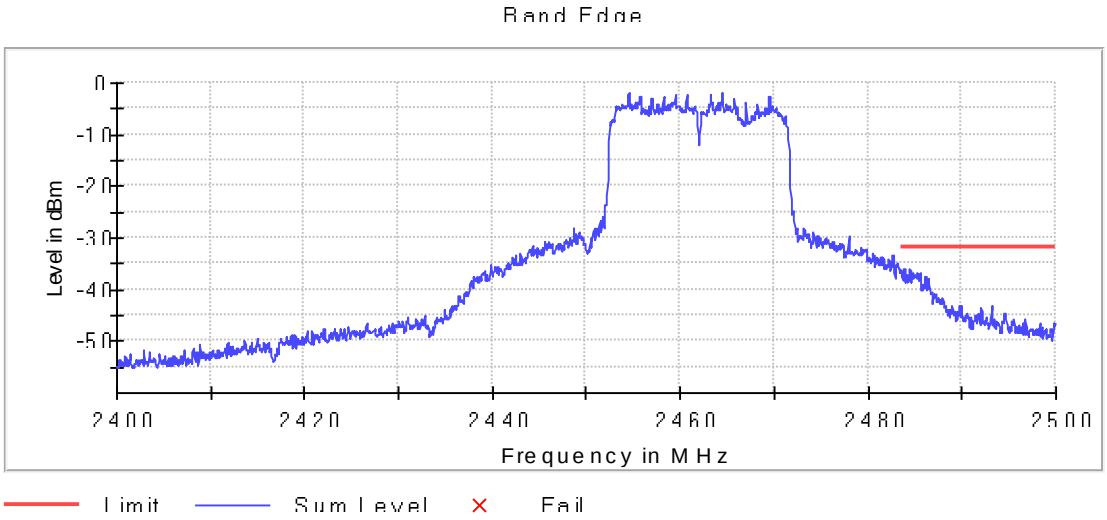
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Modulation: 802.11ax HE20 (OFDMA MCS8) – Partial RU

Results

Freq (MHz)	Lvl (dBm)
2399.775000	-25.1
2399.725000	-25.4
2399.125000	-25.4
2399.175000	-25.5
2399.825000	-25.5
2397.625000	-25.9
2397.025000	-26.1
2396.975000	-26.1
2397.675000	-26.2
2398.275000	-26.3
2398.225000	-26.4
2397.575000	-26.5
2399.075000	-26.6
2396.375000	-26.8
2396.425000	-27.2
2483.525000	-40.5
2483.575000	-40.5
2483.925000	-40.8
2484.725000	-40.8
2484.775000	-40.8
2483.625000	-40.8
2483.875000	-40.8
2483.975000	-40.9
2484.675000	-40.9
2484.375000	-41.0
2485.775000	-41.1
2484.625000	-41.1
2484.325000	-41.1
2484.425000	-41.2
2483.675000	-41.2

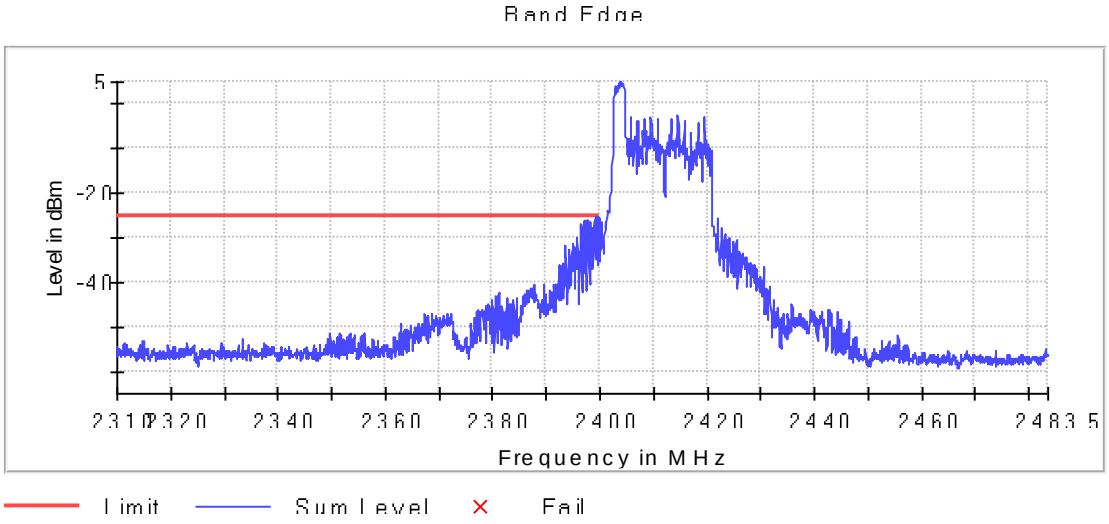
Verdict

Pass

Attachments

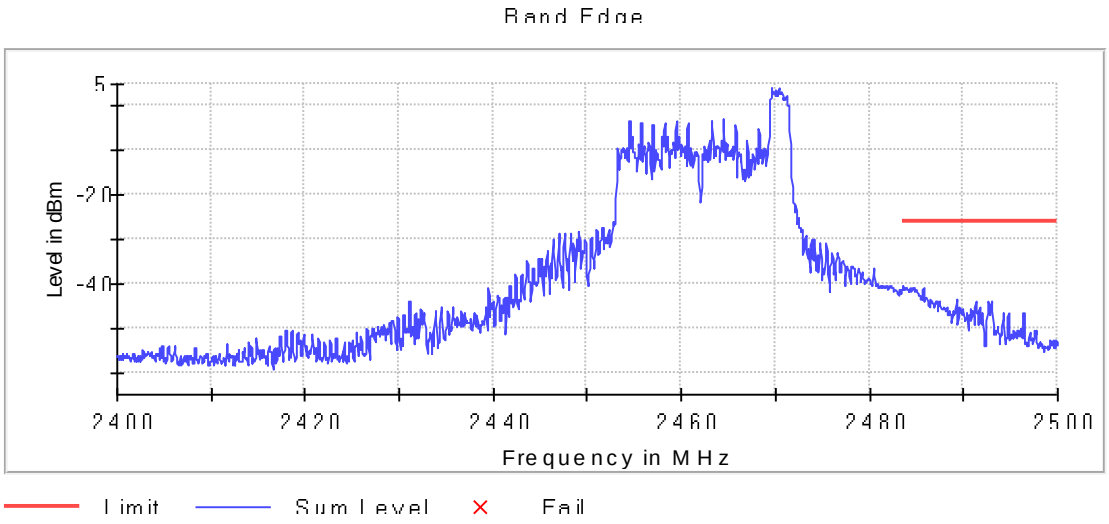
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Modulation: 802.11ax HE40 (OFDMA MCS8) - Full RU

Results

Freq (MHz)	Lvl (dBm)
2396.975000	-38.1
2397.025000	-38.2
2399.225000	-38.4
2399.275000	-38.4
2392.975000	-39.1
2393.025000	-39.3
2398.475000	-39.5
2391.525000	-39.5
2391.475000	-39.5
2398.525000	-39.6
2396.925000	-39.8
2394.725000	-39.8
2396.025000	-39.9
2394.775000	-40.0
2399.175000	-40.3
2486.975000	-41.4
2487.025000	-41.6
2484.775000	-42.2
2484.725000	-42.2
2486.925000	-42.6
2484.825000	-43.1
2487.725000	-43.2
2489.225000	-43.3
2487.775000	-43.3
2489.875000	-43.5
2489.025000	-43.6
2489.925000	-43.6
2486.025000	-43.7
2488.975000	-43.7
2485.725000	-43.8

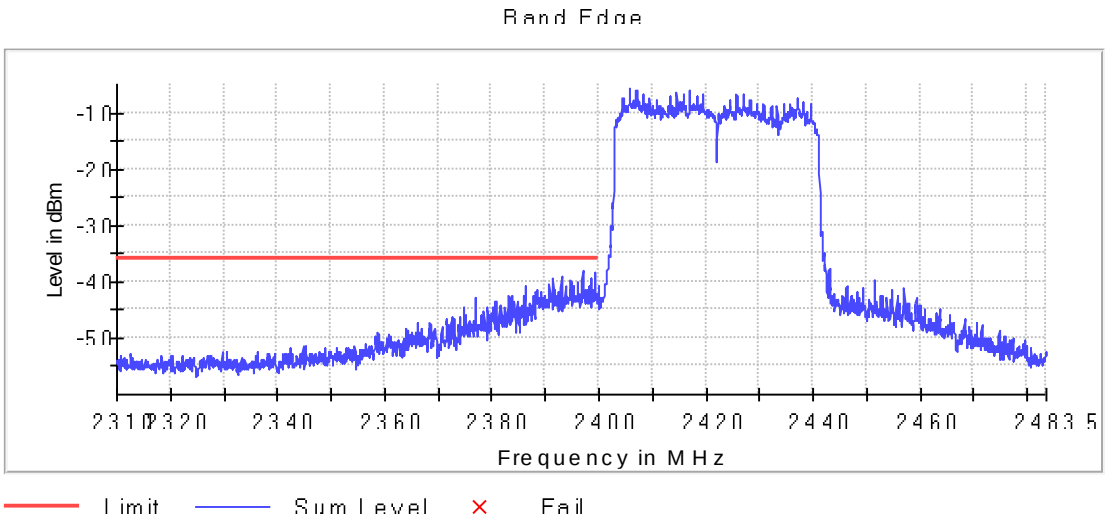
Verdict

Pass

Attachments

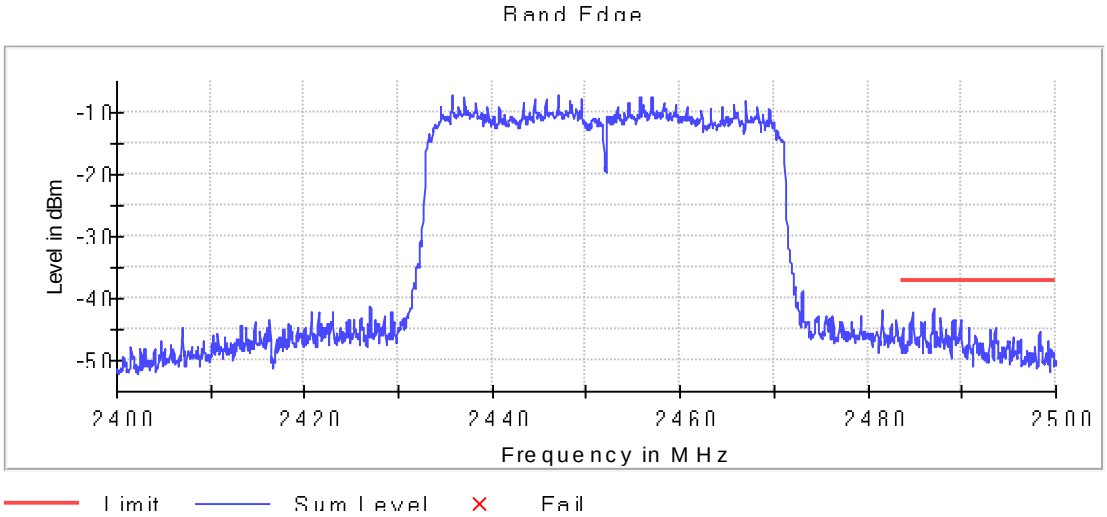
Frequency MHz = 2422.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Frequency MHz = 2452.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Mode: SISO

Modulation: 802.11ax HE40 (OFDMA MCS8)

Results

Freq (MHz)	Lvl (dBm)
2392.625000	-31.2
2398.275000	-31.3
2398.225000	-31.3
2392.575000	-31.6
2392.675000	-31.6
2393.925000	-32.1
2393.975000	-32.2
2394.475000	-32.2
2398.325000	-32.3
2394.425000	-32.3
2394.525000	-32.6
2393.875000	-32.9
2398.175000	-33.1
2399.525000	-33.2
2399.475000	-33.2
2485.775000	-39.9
2485.725000	-40.0
2485.125000	-41.3
2485.075000	-41.3
2485.825000	-42.0
2485.175000	-42.3
2485.425000	-42.4
2485.475000	-42.8
2485.025000	-42.8
2485.375000	-43.2
2483.575000	-43.2
2483.625000	-43.3
2485.675000	-43.4
2485.525000	-43.4
2483.825000	-44.1

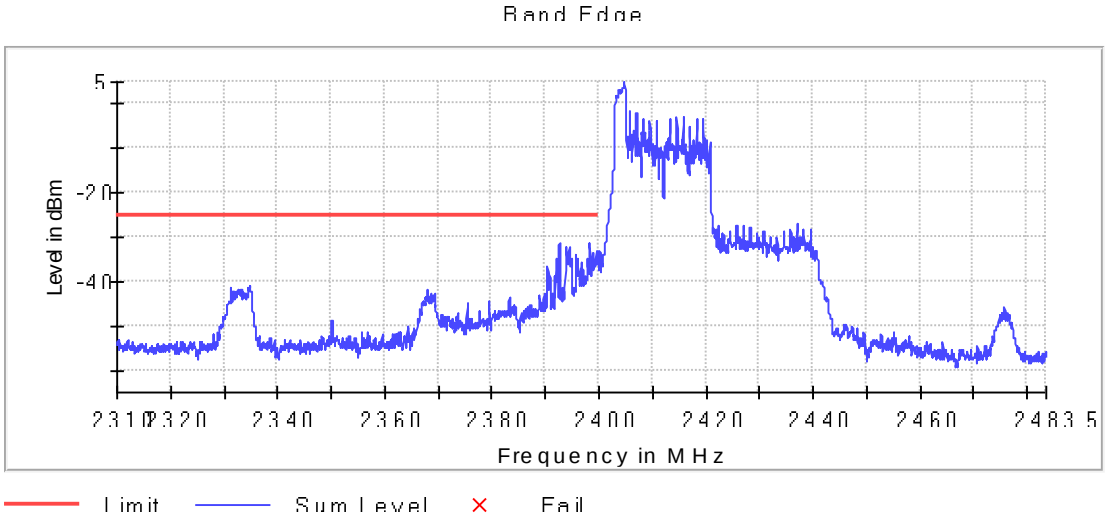
Verdict

Pass

Attachments

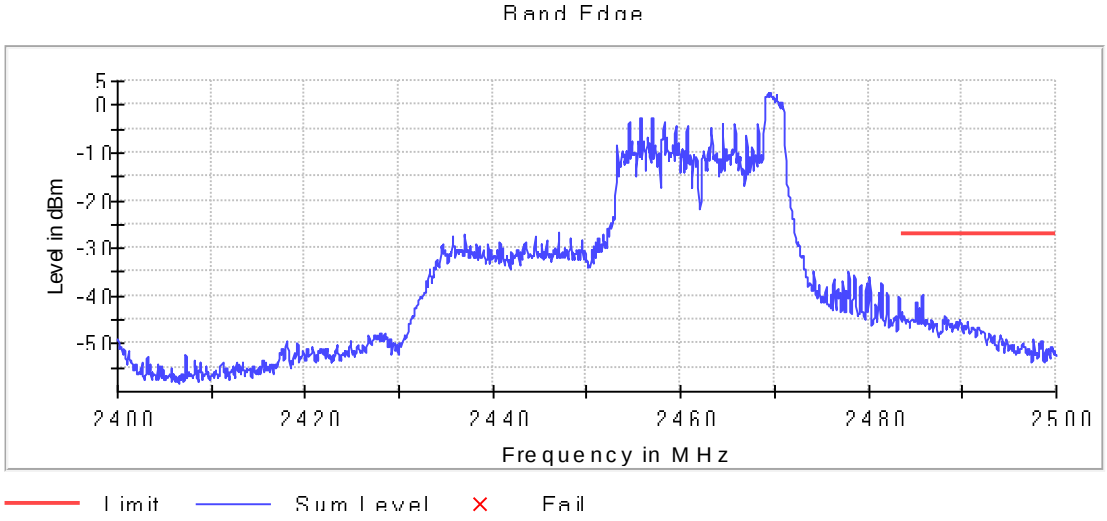
Frequency MHz = 2422.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Frequency MHz = 2452.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



FCC 2.1049 / 99dBw Occupied Channel Bandwidth 99%

Limits

No Limit has been set to this test case

Modulation: 802.11b (DSSS 1 Mbit/s)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2412.00000	Digital Transmission System (DTS)	20	1	1	13.200
2437.00000					13.100
2462.00000					13.100

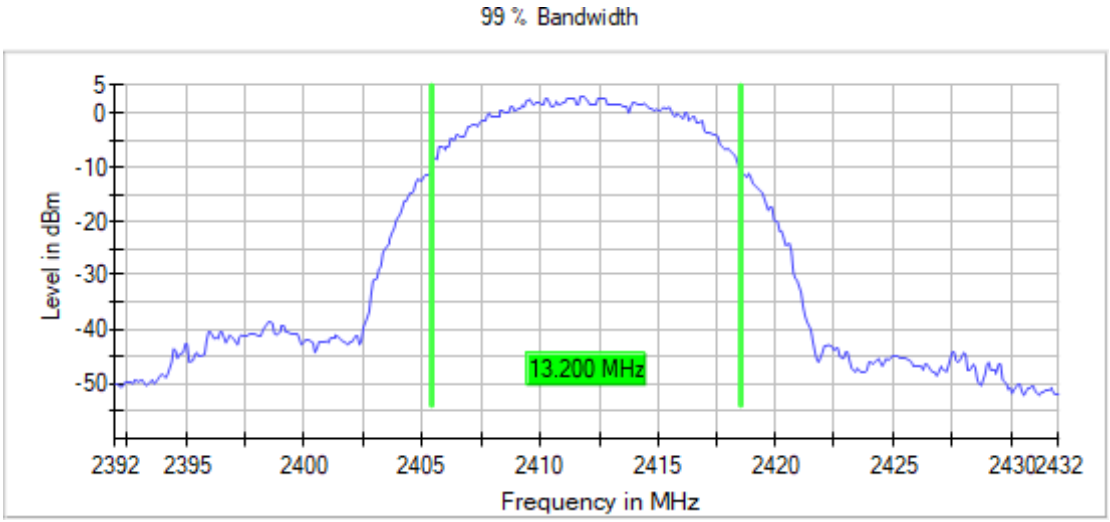
Verdict

Pass

Attachments

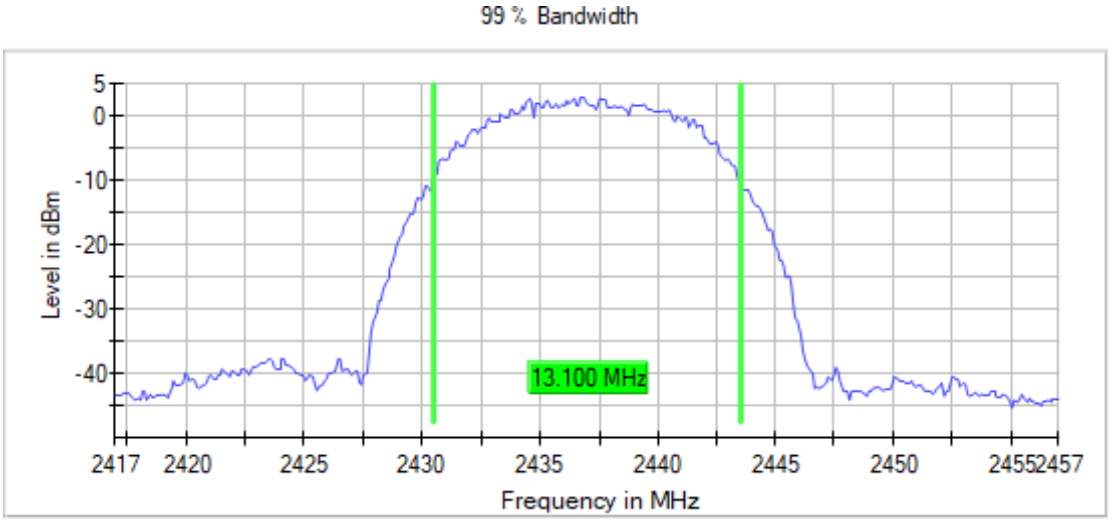
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11b (DSSS 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



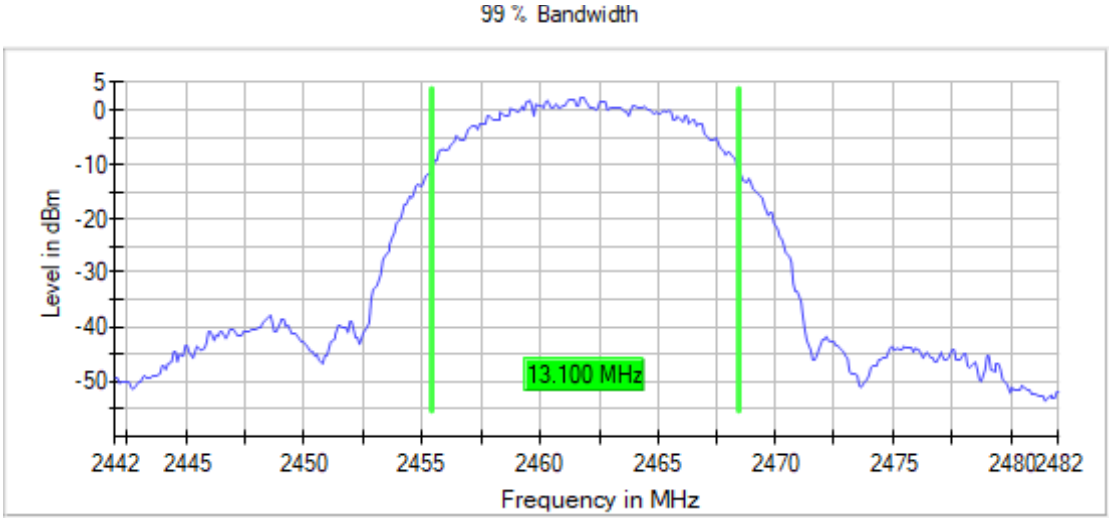
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11b (DSSS 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

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:



Modulation: 802.11g (OFDM 6 Mbit/s)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2412.00000	Digital Transmission System (DTS)	20	1	1	16.600
2437.00000					16.500
2462.00000					16.600

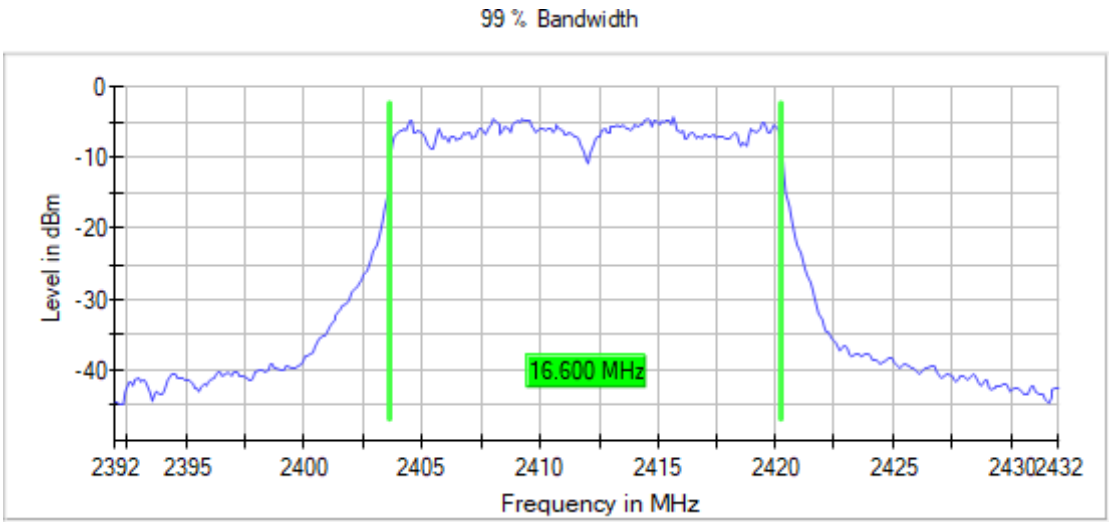
Verdict

Pass

Attachments

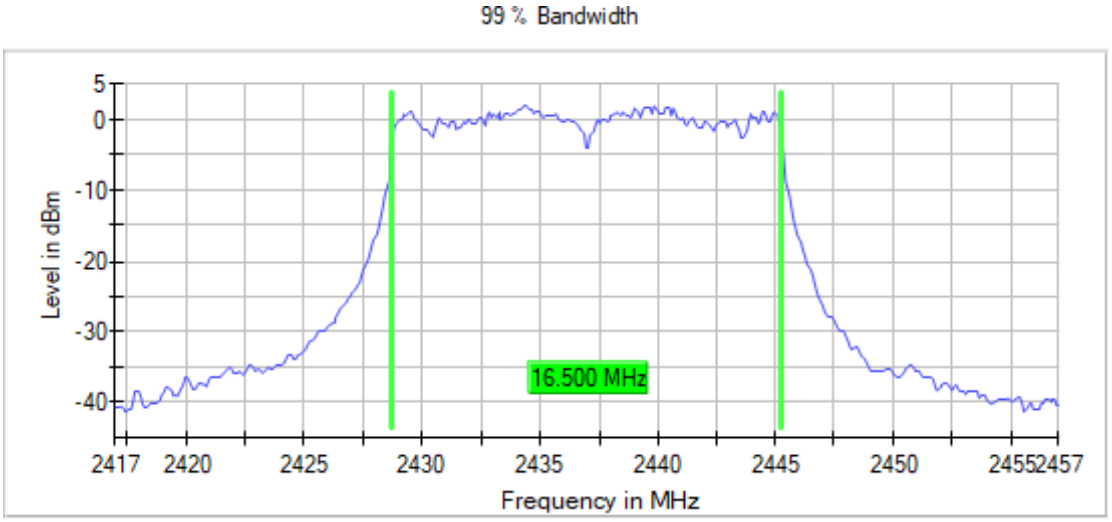
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



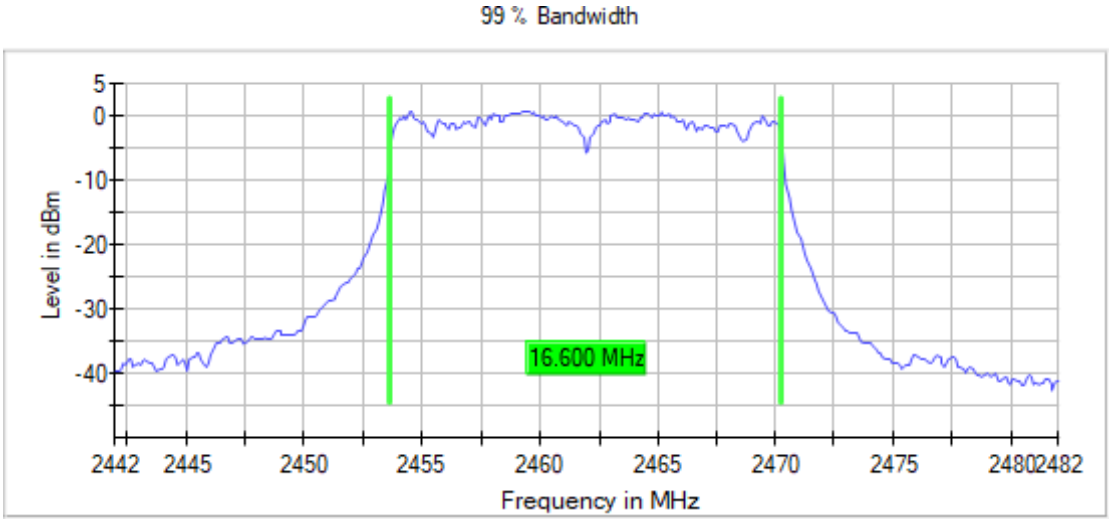
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

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:



Modulation: 802.11n HT20 (OFDM MCS8 6.5 Mbit/s)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2412.00000	Digital Transmission System (DTS)	20	1	1	17.700
2437.00000					17.700
2462.00000					17.700

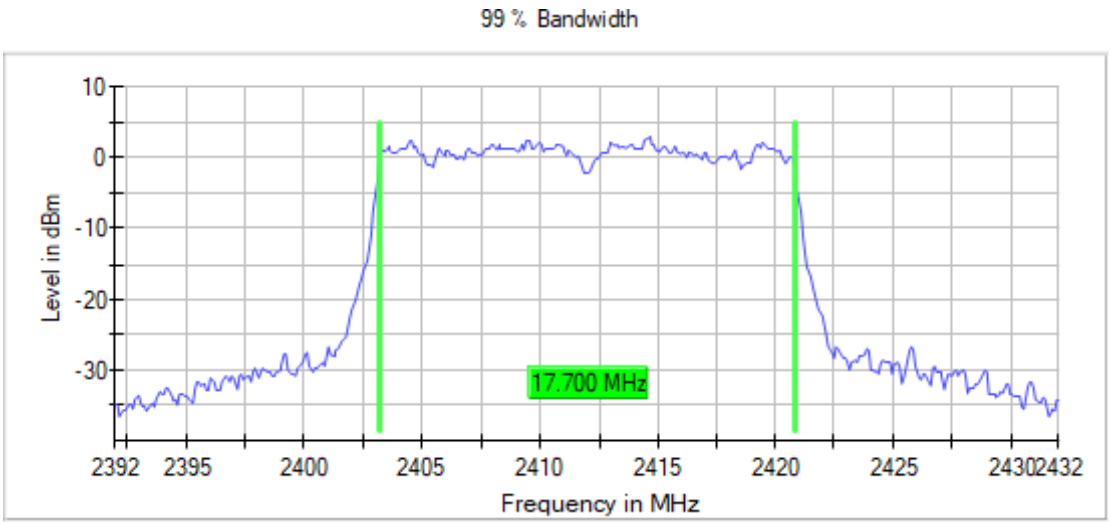
Verdict

Pass

Attachments

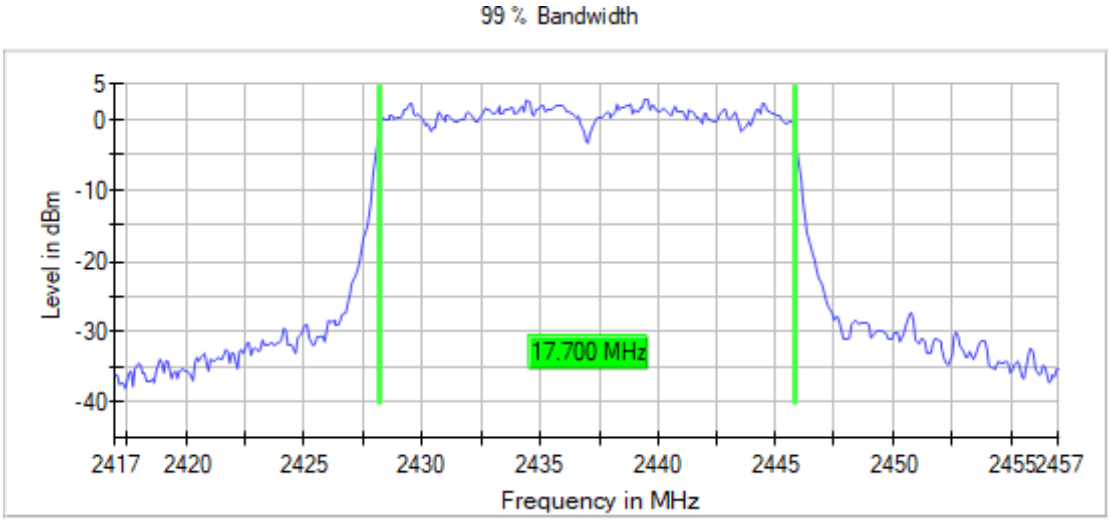
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS8 6.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



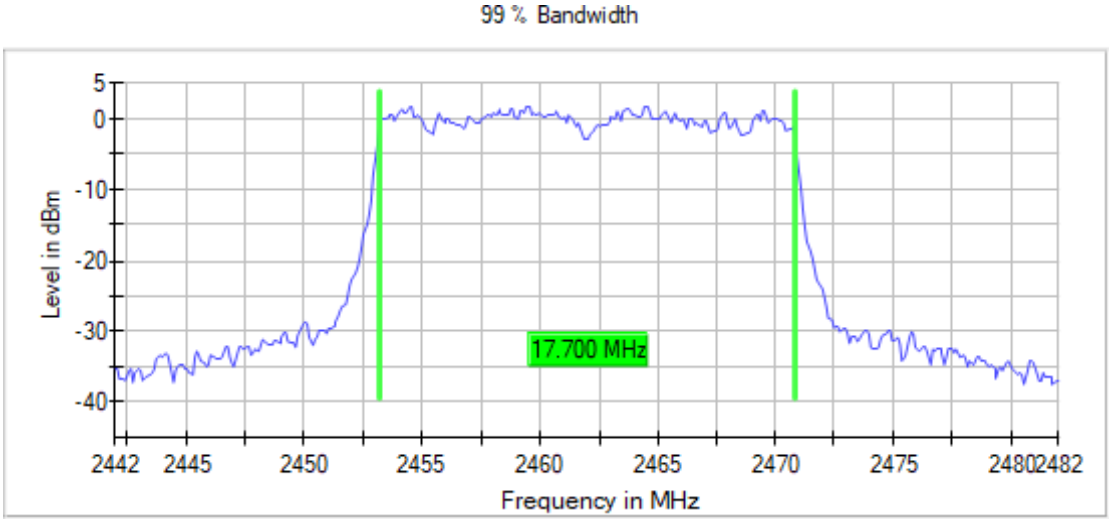
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS8 6.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11n HT20 (OFDM MCS8 6.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11n HT40 (OFDM MCS8 13.5 Mbit/s)

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2422.00000	Digital Transmission System (DTS)	40	1	1	36.500
2437.00000					36.250
2452.00000					36.250

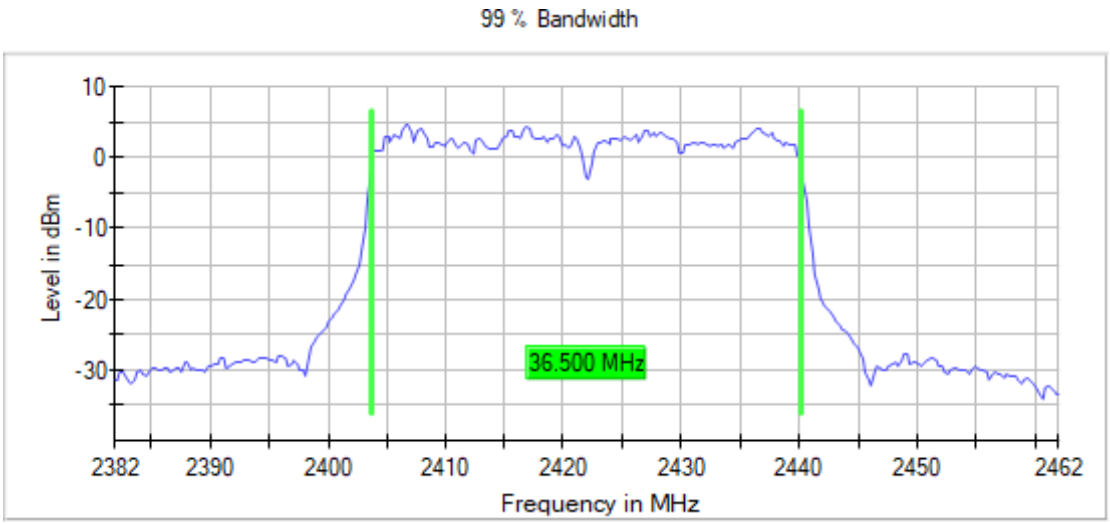
Verdict

Pass

Attachments

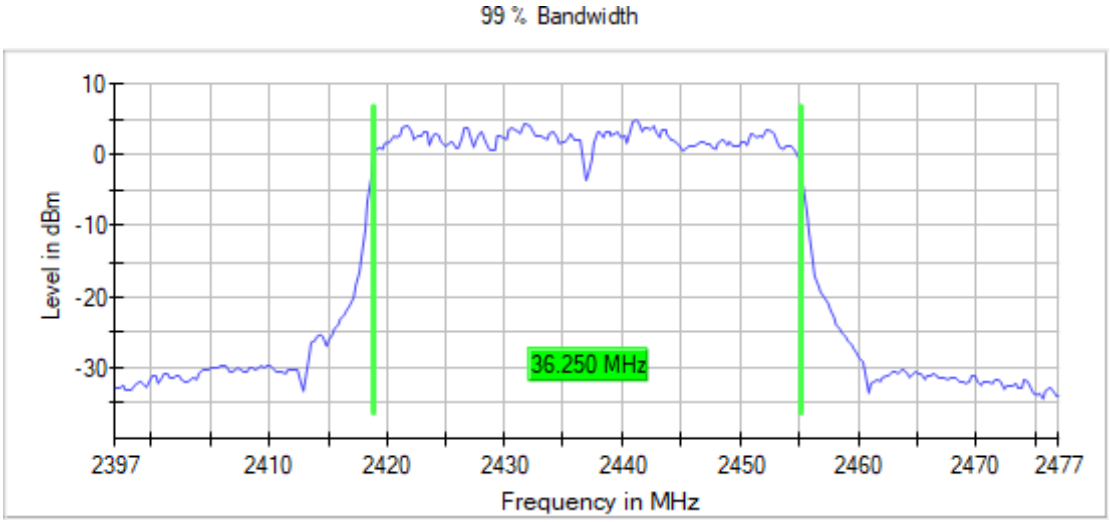
Frequency MHz = 2422.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS8 13.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



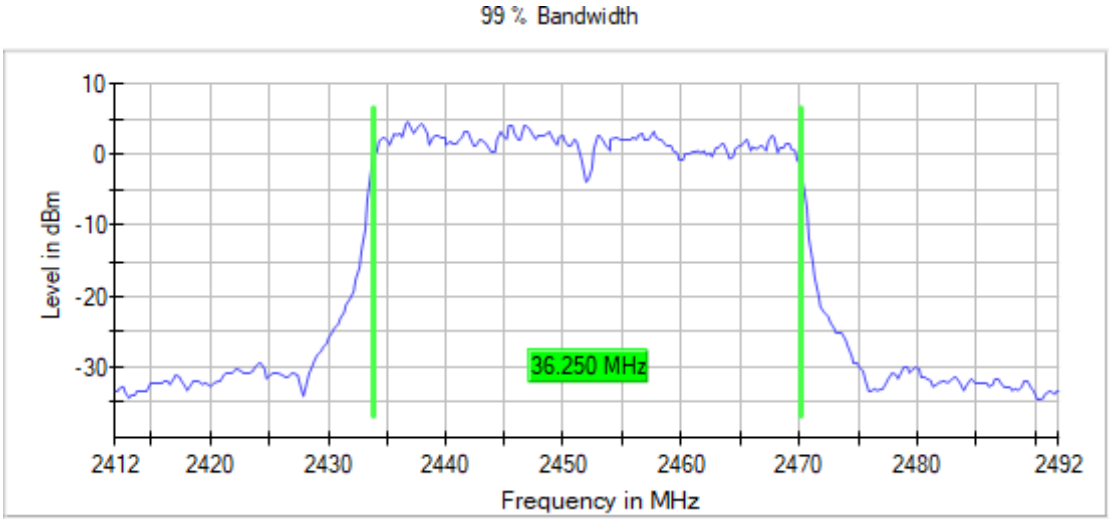
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS8 13.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2452.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS8 13.5 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11ax HE20 (OFDMA MCS8) - Full RU

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2412.00000	Digital Transmission System (DTS)	20	1	1	18.800
2437.00000					18.800
2462.00000					18.800

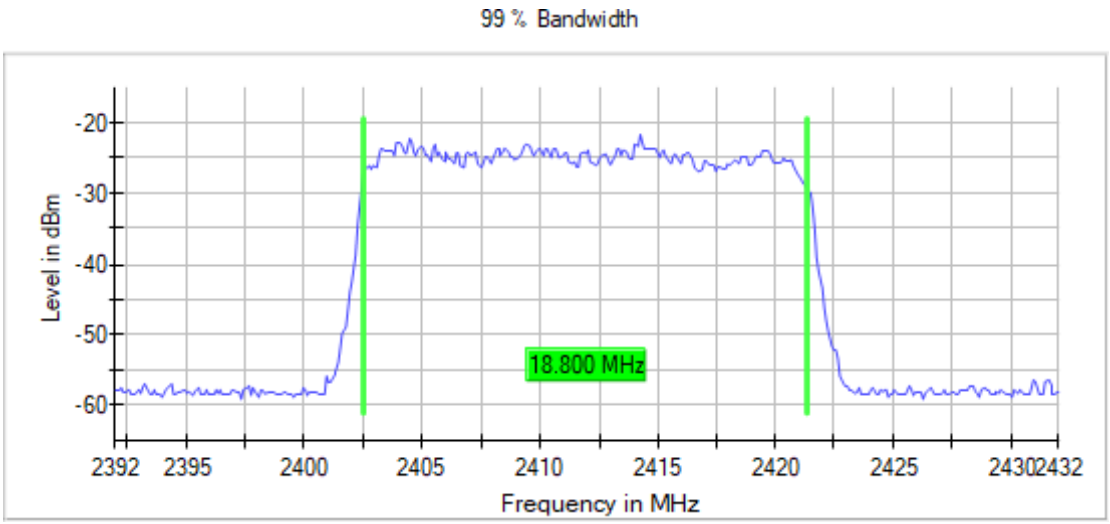
Verdict

Pass

Attachments

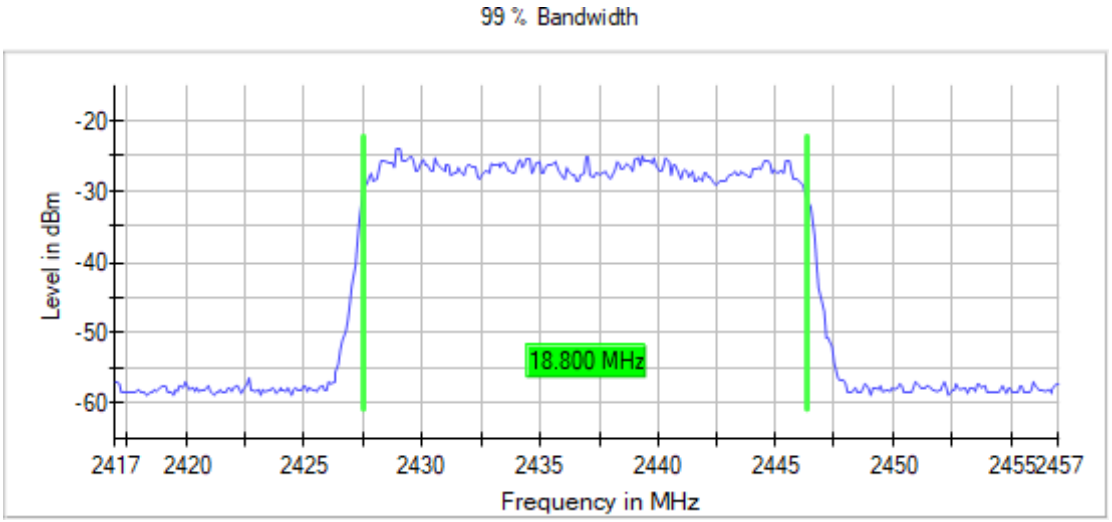
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



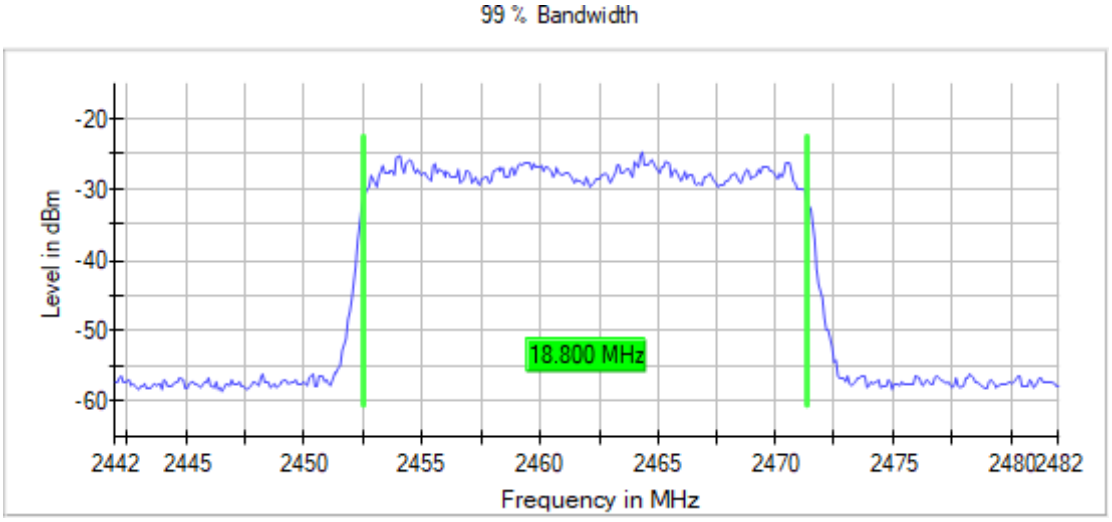
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11ax HE20 (OFDMA MCS8) – Partial RU

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2412.00000	Digital Transmission System (DTS)	20	1	1	18.100000
2437.00000					18.200000
2462.00000					18.000000

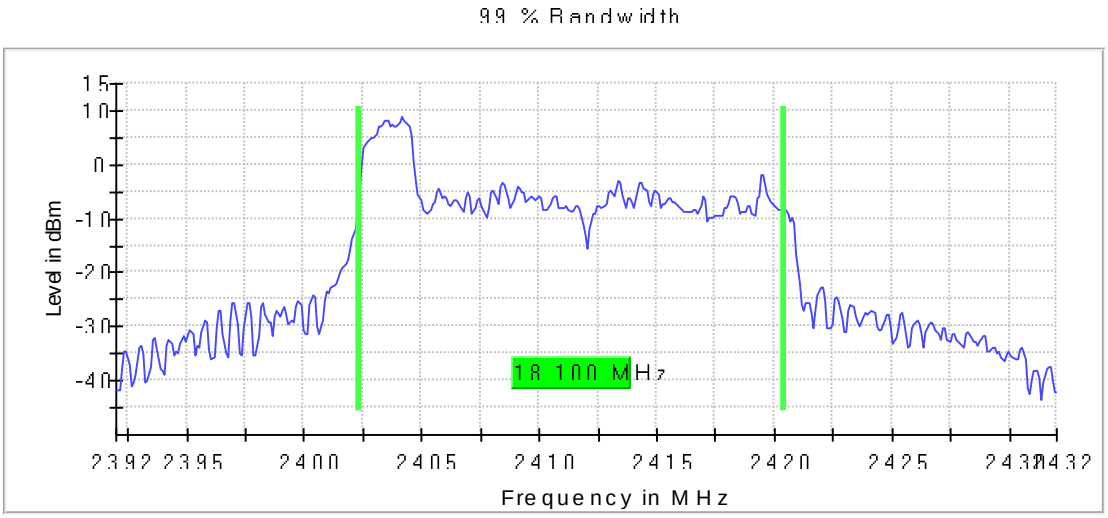
Verdict

Pass

Attachments

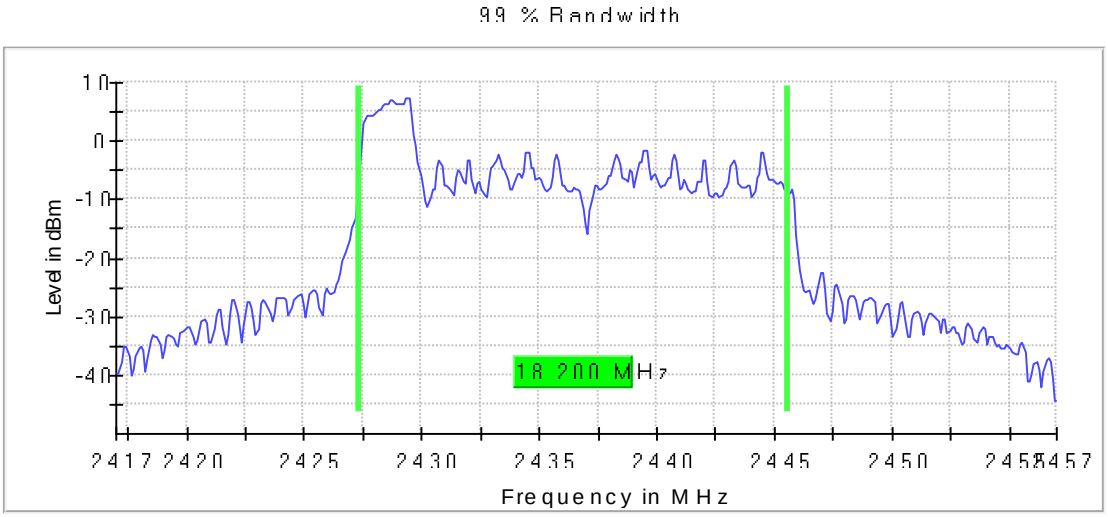
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



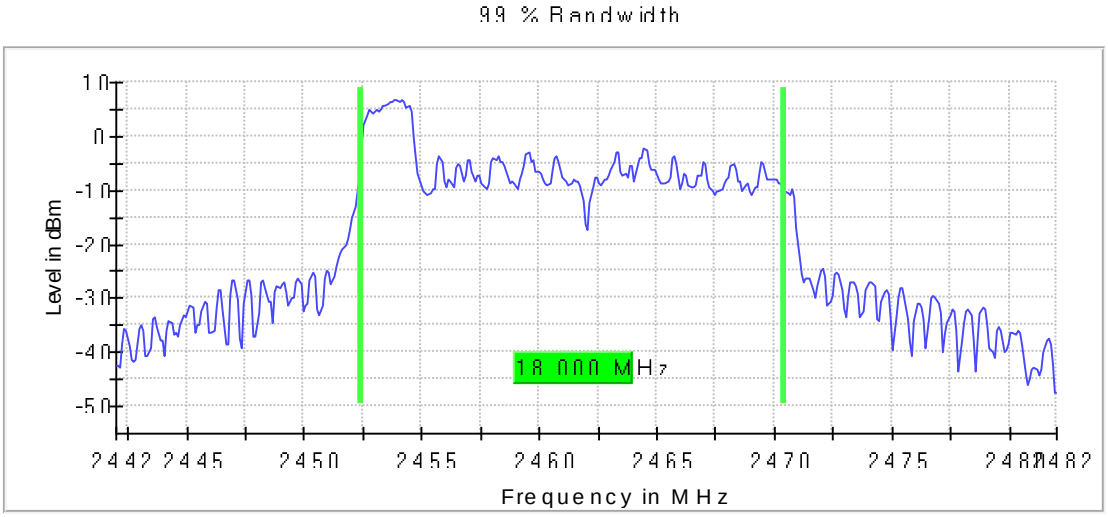
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11ax HE20 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11ax HE40 (OFDMA MCS8) - Full RU

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2422.00000	Digital Transmission System (DTS)	40	1	1	37.500
2437.00000					37.500
2452.00000					37.500

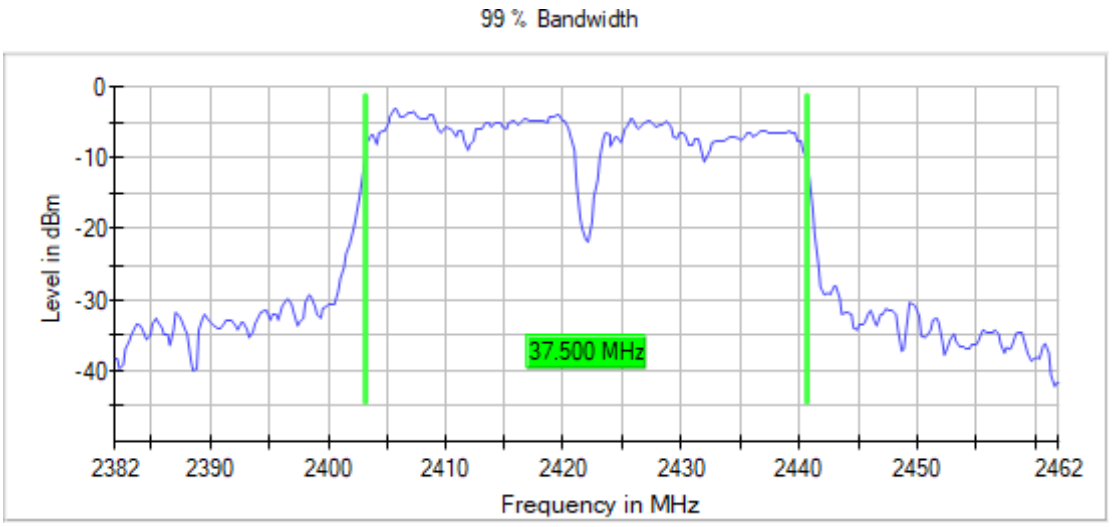
Verdict

Pass

Attachments

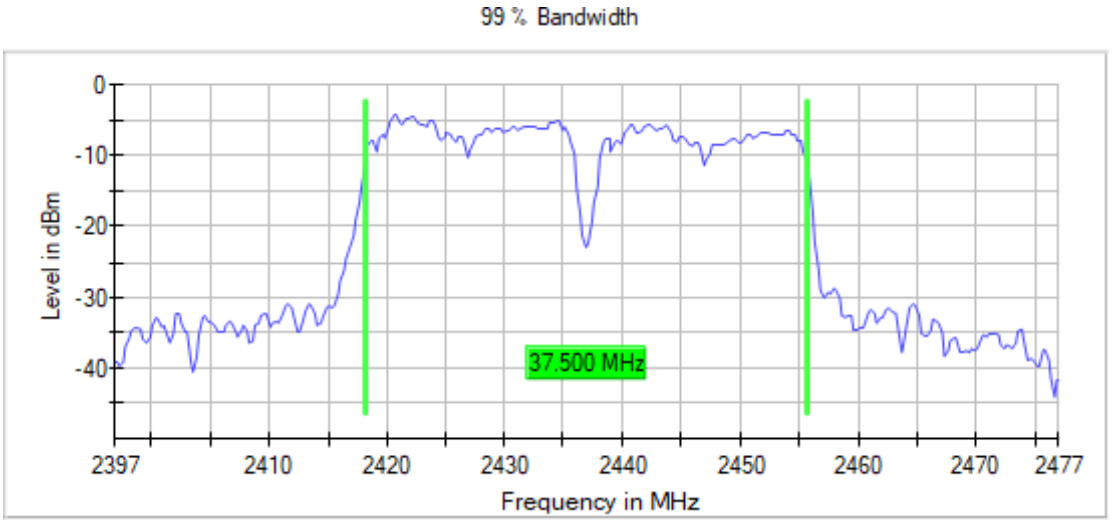
Frequency MHz = 2422.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



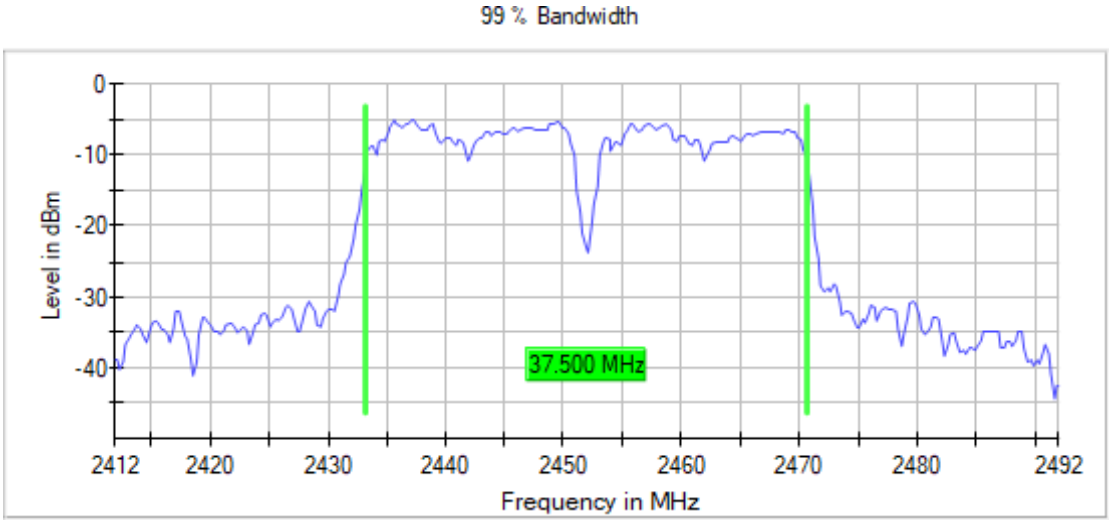
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2452.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8) - Full RU, Number of Transmission Chains = 1, Active Port = 1

Images:



Modulation: 802.11ax HE40 (OFDMA MCS8) – Partial RU

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2422.00000	Digital Transmission System (DTS)	40	1	1	20.750000
2437.00000					21.000000
2452.00000					20.250000

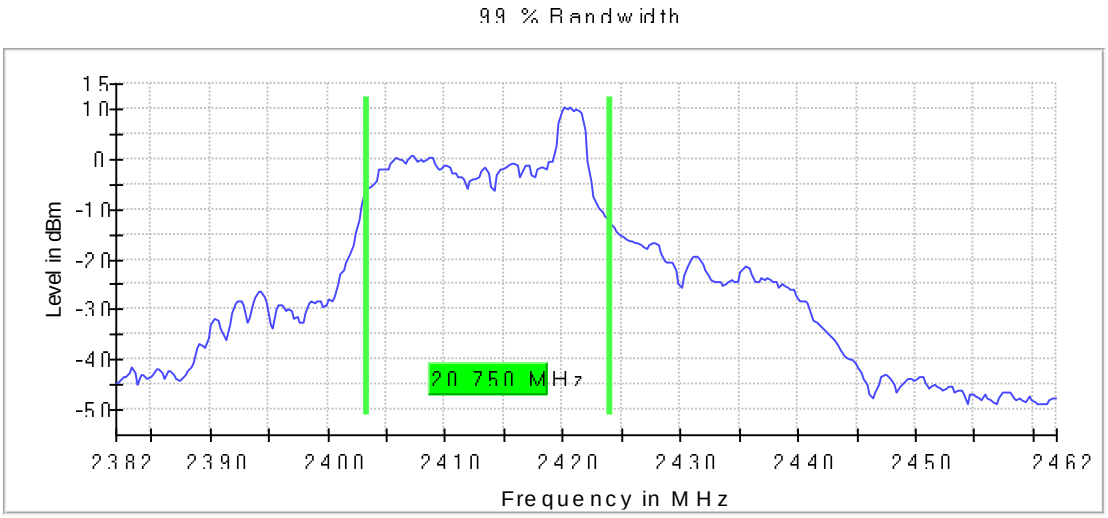
Verdict

Pass

Attachments

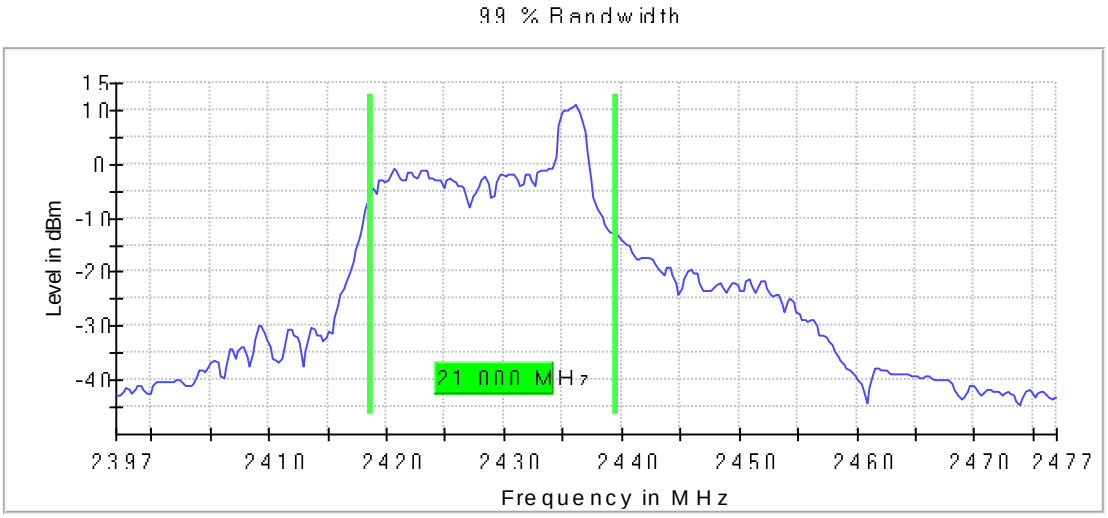
Frequency MHz = 2422.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2452.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11ax HE40 (OFDMA MCS8), Number of Transmission Chains = 1, Active Port = 1

Images: