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

ISED CABid: ES1909

Lab. Company Number: 4621A

Test Report No:

NIE: 74540RRF.001

Test Report

USA FCC Part 15.247, 15.209
CANADA RSS-247, RSS-Gen

(*) Identification of item tested	Powermeter for bikes
(*) Trademark	ROTOR INspiderMTB
(*) Model and /or type reference	ROT118
Other identification of the product	FCC ID: R3AROT118 IC: 10992A-ROT118
(*) Features	Features: ANT+ and Bluetooth Smart HW version: Rev C SW version: 1.004
Applicant	Rotor Componentes Tecnológicos S.L. C/ Miño, 14 28864 Ajalvir, Madrid, SPAIN
Test method requested, standard	USA FCC Part 15.247 (10-1-21 Edition): Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. USA FCC Part 15.209 (10-1-21 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)	José Manuel Gómez Galván EMC Consumer & RF Lab. Manager Firmado digitalmente por 53680346W JOSE MANUEL GOMEZ (C:A29507456)
Date of issue	2023-02-24
Report template No	FDT08_24 (*) "Data provided by the client"

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Acronyms

Acronym ID	Acronym Description
# of Tx Chains	Number of Transmission Chains
BW	Bandwidth
Detector	Detector used
Ebw	Emission Bandwidth
Equipment	Equipment Type
Freq	Frequency
Freq Rng	Frequency Range
Inband Peak Lvl	Inband 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
Pol	Polarization
Port	Active Port
Unwanted Freq	Unwanted Emissions Frequency
Unwanted Lvl	Unwanted Emissions Level

Competences and guarantees

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

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

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

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

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

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

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

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General conditions

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

Uncertainty

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

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

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

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

The total uncertainty of the measurement system for the conducted testing of EUT is:
RF Peak Output Power: Measurement uncertainty ≤ ± 0,80 dB
Power Spectral Density: Measurement uncertainty ≤ ± 0,99 dB
6dB Bandwidth: Measurement uncertainty ≤ ± 2,84 %
Occupied Channel Bandwidth: Measurement uncertainty ≤ ± 1,17 %
Conducted Band-edge spurious emissions: Measurement uncertainty ≤ ± 1,76 dB

Data provided by the client

The following data has been provided by the client:

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

2. The sample consists of a power meter for mountain bikes that gives the user data about power and cadence during a ride, among other information.

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

Usage of samples

Samples undergoing test have been selected by: The client.

Id	Control Number	Description	Model	Serial Nº	Date of Reception	Application
S/01	74540_8.1	Powermeter	ROT118	9994	2023-01-19	Element Under Test
S/01	74540_5.1	USB Cable	--	--	2023-01-19	Element Under Test
S/02	74540_6.1	Powermeter (conducted)	ROT118	9996	2023-01-19	Element Under Test
S/02	74540_7.1	Battery	--	--	2023-01-19	Element Under Test

Notes referenced to samples during the project:

Id	Type
S/01	Sample used for radiated test
S/02	Sample used for conducted test

Test sample description

Ports…… :	Port name and description	Cable			
		Specified max length [m]	Attached during test	Shielded	Coupled to patient(3)
	Charge		[ ]	[ ]	[ ]
	.....	.....	[ ]	[ ]	[ ]
Supplementary information to the ports…… :	Internal battery charge port.				

Rated power supply .....:	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	[ ]	AC:	[ ]	[ ]	[ ]	[ ]	[ ]
	[X]	DC: 3,7 V (internal battery)					

Rated Power .....:	3 mW	
Clock frequencies.....:	32 MHz	
Other parameters .....:	.....	
Software version .....:	1.004	
Hardware version .....:	Rev C	
Dimensions in cm (W x H x D) ....:	115 x 115 x 10 mm	
Mounting position .....:	[ ]	Table top equipment
	[ ]	Wall/Ceiling mounted equipment
	[ ]	Floor standing equipment
	[ ]	Hand-held equipment
	[X]	Other: Assembled on a bycicle.

Modules/parts.....:	Module/parts of test item	Type	Manufacturer
	.....	.....	.....
Accessories (not part of the test item) .....:	Description	Type	Manufacturer
	Power cord	Magnetic-USB	
	.....	.....	.....
Documents as provided by the applicant .....:	Description	File name	Issue date
	Configuration Manual for testing		
	.....	.....	.....

(3) Only for Medical Equipment

Identification of the client

Rotor Componentes Tecnológicos S.L.
C/ Miño, 14
28864 Ajalvir, Madrid, SPAIN

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2023-01-23
Date (finish)	2023-01-31

Document history

Report number	Date	Description
74540RRF.001	2023-02-24	First release.

Environmental conditions

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

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 75 %

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

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % 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. = 20 % Max. = 75 %

Remarks and comments

The tests have been performed by the technical personnel: Daniel Mejías and Victoria Olmedo.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
8130	SEMIANECHOIC ABSORBER LINED CHAMBER	P29419	ALBATROSS PROJECTS GMBH	N/A
8134	SHIELDED ROOM	P29419	ALBATROSS PROJECTS GMBH	N/A
6165	EMI TEST RECEIVER 9kHz-7GHz	ESR7	ROHDE AND SCHWARZ	2023-11-08
7826	ULTRALOG ANTENNA 30MHz-6GHz	HL562E_UPG	ROHDE AND SCHWARZ	2026-01-13
7769	PREAMPLIFIER 30dB 500MHz-18GHz	BBV 9718 C	SCHWARZBECK	2023-03-25
7763	HORN ANTENNA 1-18GHz	BBHA 9120D	SCHWARZBECK MESS-ELEKTRONIK	2026-01-16
6495	HORN ANTENNA 18-40GHz	BBHA 9170	SCHWARZBECK	2024-03-19
7862	PRE-AMPLIFIER G>30dB 18-40GHz	BLMA 1840-3G	BONN ELEKTRONIK	2023-02-15
4848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	N/A
8661	SHIELDED ROOM	--	SIEPEL	N/A
6158	SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2023-10-22
7796	EXTENSION FOR OPEN SWITCH UNIT UP TO 40GHz	OSP-B157Wx	ROHDE AND SCHWARZ	2024-03-16
8848	OPEN SWITCH UNIT UP TO 7.5 GHz	OSP-B157W8 PLUS	ROHDE AND SCHWARZ	2024-12-21
7798	SOFTWARE FOR EMC/RF TESTING	WMS32	ROHDE AND SCHWARZ	N/A

Testing verdicts

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

Summary

Bluetooth Low Energy 5.0 (2M, 1M)

FCC PART 15 PARAGRAPH/ RSS-247			
Requirement – Test case		**Verdict**	**Remark**
FCC 15.247 (a)(2) / RSS-247 5.2. (a)	6 dB Bandwidth	P	-
FCC 15.247 (b) / RSS-247 5.4. (d)	Maximum output power and antenna gain	P	-
FCC 15.247 (d) / RSS-247 5.5.	Band-edge emissions compliance (Transmitter)	P	-
FCC 15.247 (e) / RSS-247 5.2. (b)	Power spectral density	P	-
FCC 15.247 (d) / RSS-247 5.5.	Emission limitations radiated (Transmitter)	P	-
Supplementary information and remarks: None			

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

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TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal:	3.7Vdc
Type of Power Supply:	Battery

ANTENNA (*):

Type of Antenna:	SMD passive
Maximum Declared Antenna Gain:	+3.7 dBi

TEST FREQUENCIES (*):

Low Channel:	2402 MHz
Middle Channel:	2440 MHz
High Channel:	2480 MHz

POWER SETTING:

The next power setting was used to configure the sample for the tests:

		Output Power
Bluetooth Low Energy 5.0 (2M, 1M)	Low Channel: 2402 MHz Middle Channel: 2440 MHz High Channel: 2480 MHz	-8dBm

CONDUCTED MEASUREMENTS:

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

RADIATED MEASUREMENTS:

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

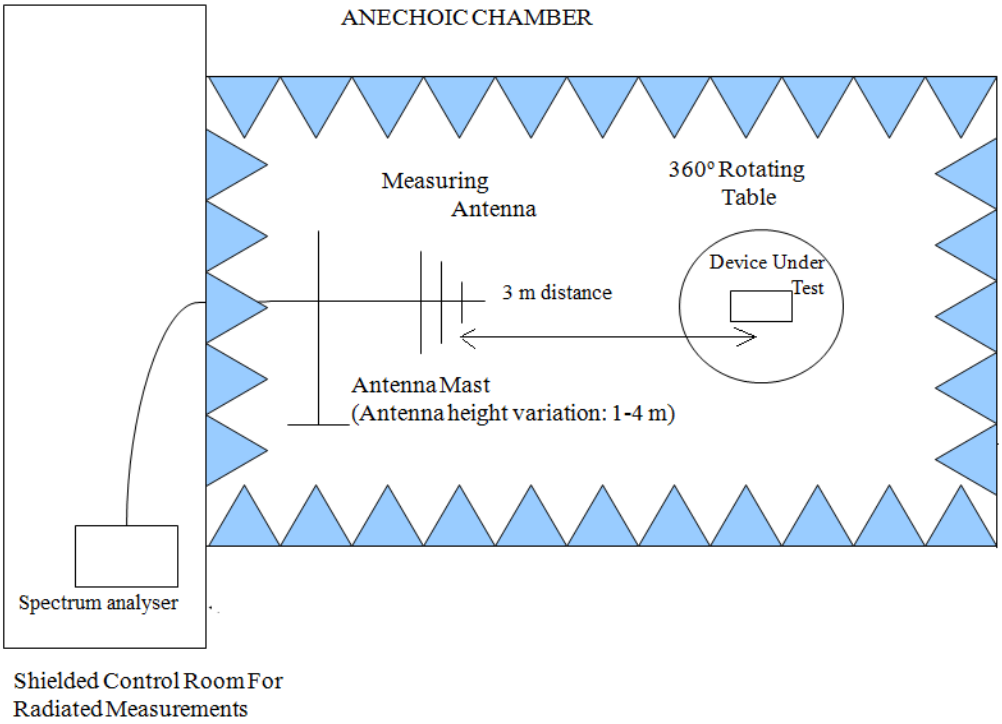
For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

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

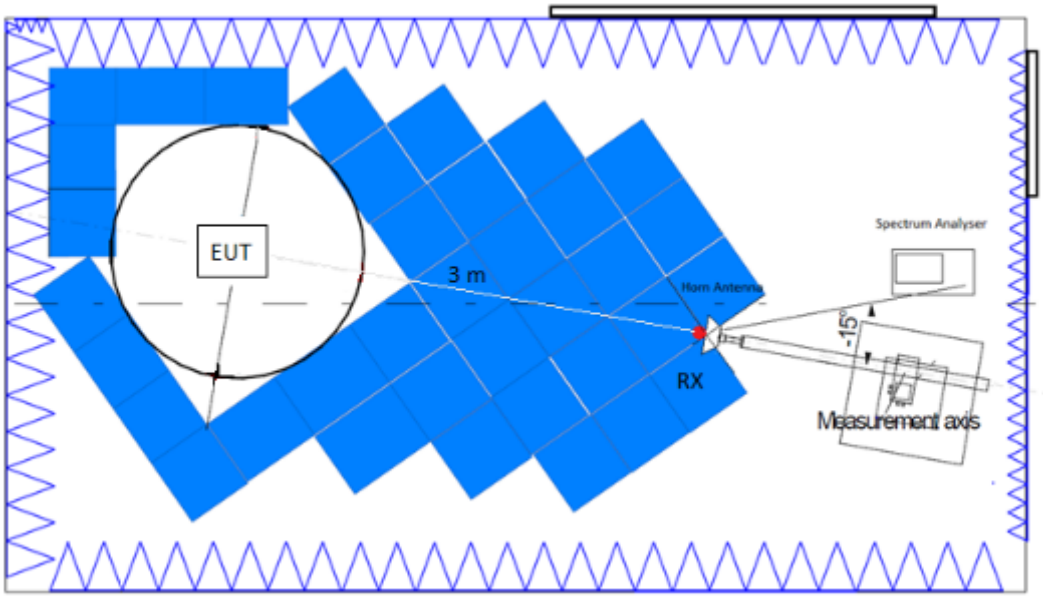
Measurements were made in both horizontal and vertical planes of polarization.

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

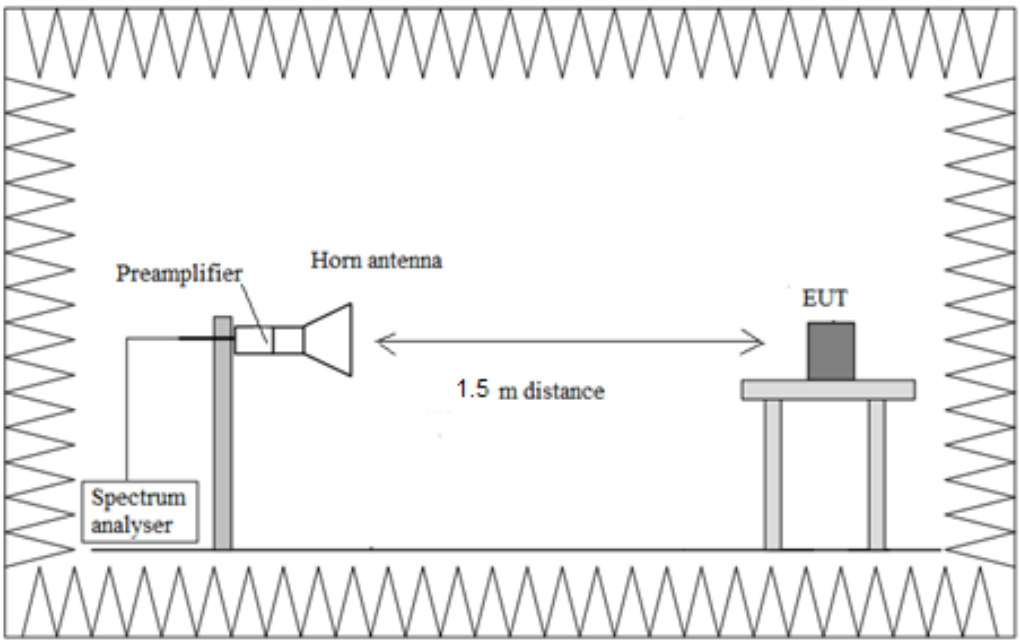
Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup f > 17 GHz:



TEST CASES DETAILS

Occupied Channel Bandwidth 99%

Results

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Freq (MHz)	Occ Ch BW (MHz)
2402.00	1.05
2440.00	1.05
2480.00	1.05

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Freq (MHz)	Occ Ch BW (MHz)
2402.00	2.05
2440.00	2.05
2480.00	2.05

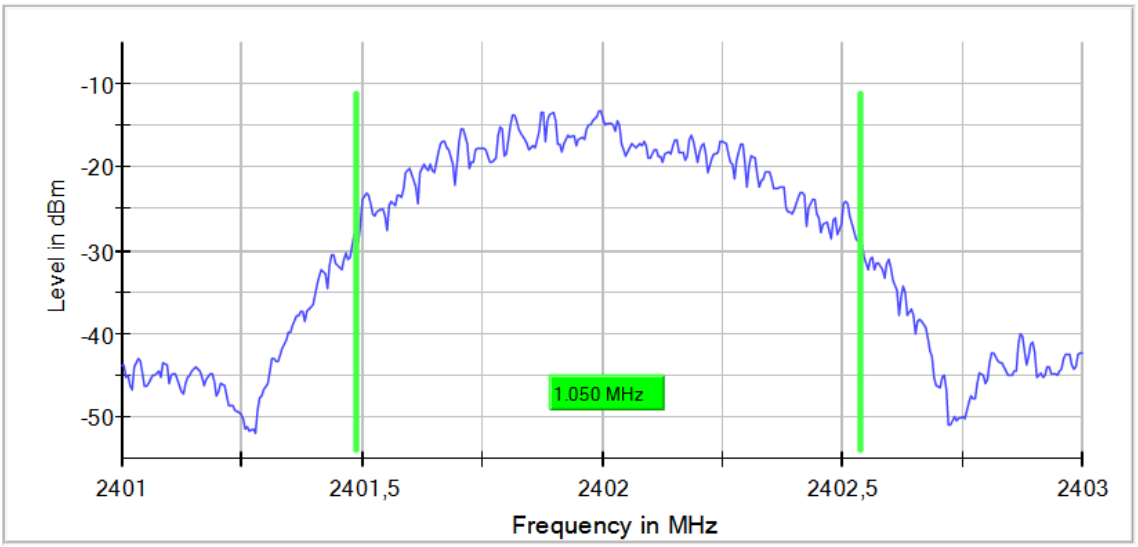
Attachments

Frequency MHz = 2402.00000 Equipment Type = Digital Transmission System (DTS)

Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Plots:

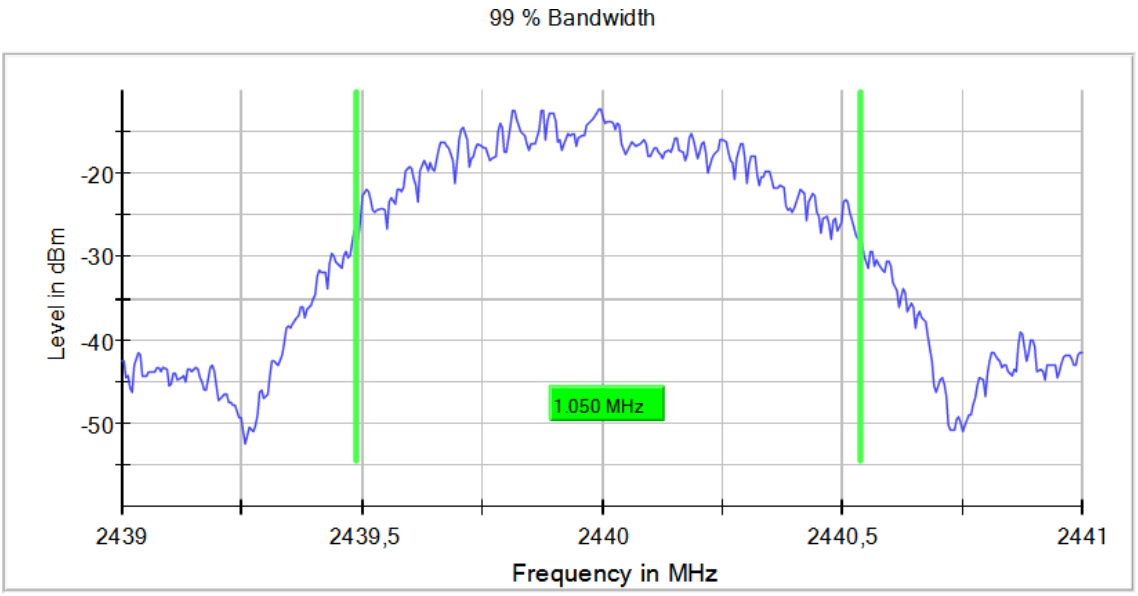
99 % Bandwidth

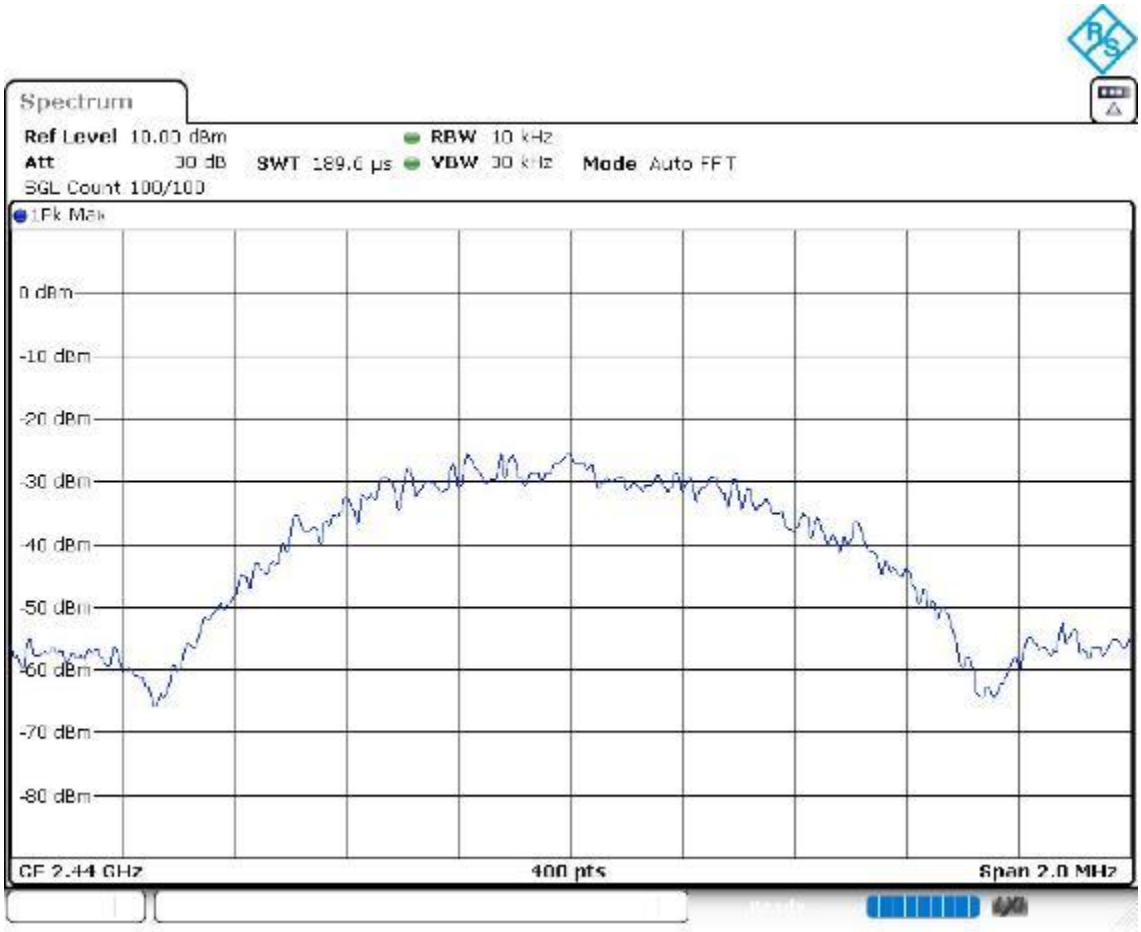


Frequency MHz = 2440.00000 Equipment Type = Digital Transmission System (DTS)

Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Plots:



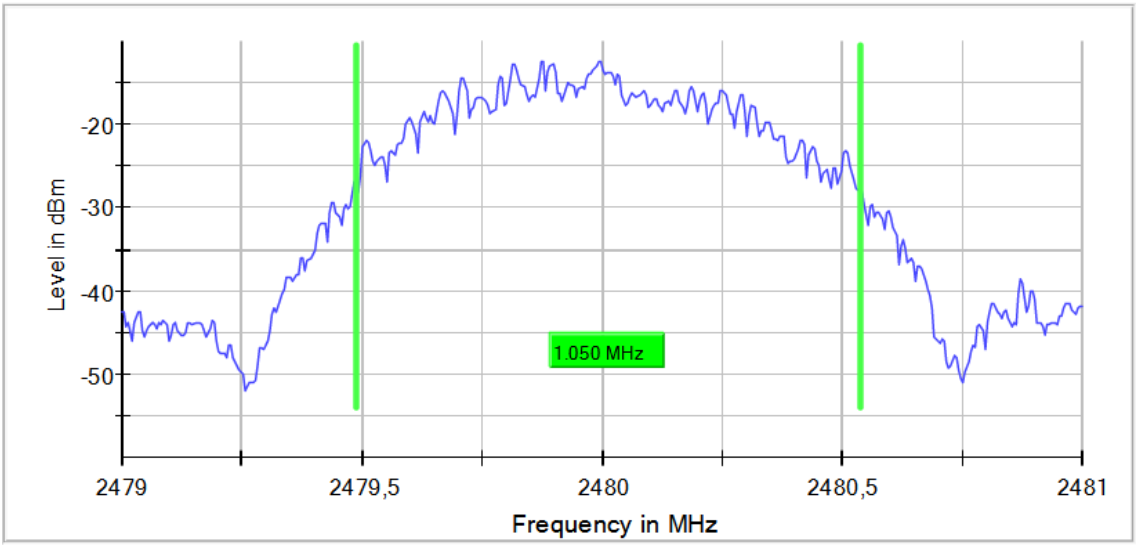


Frequency MHz = 2480.00000 Equipment Type = Digital Transmission System (DTS)

Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Plots:

99 % Bandwidth



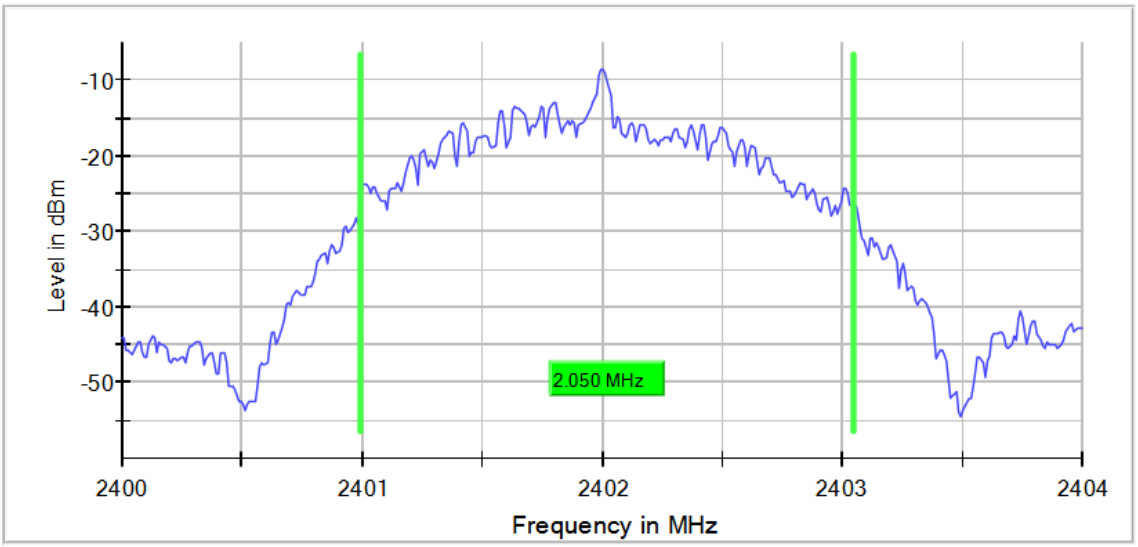
Attachments

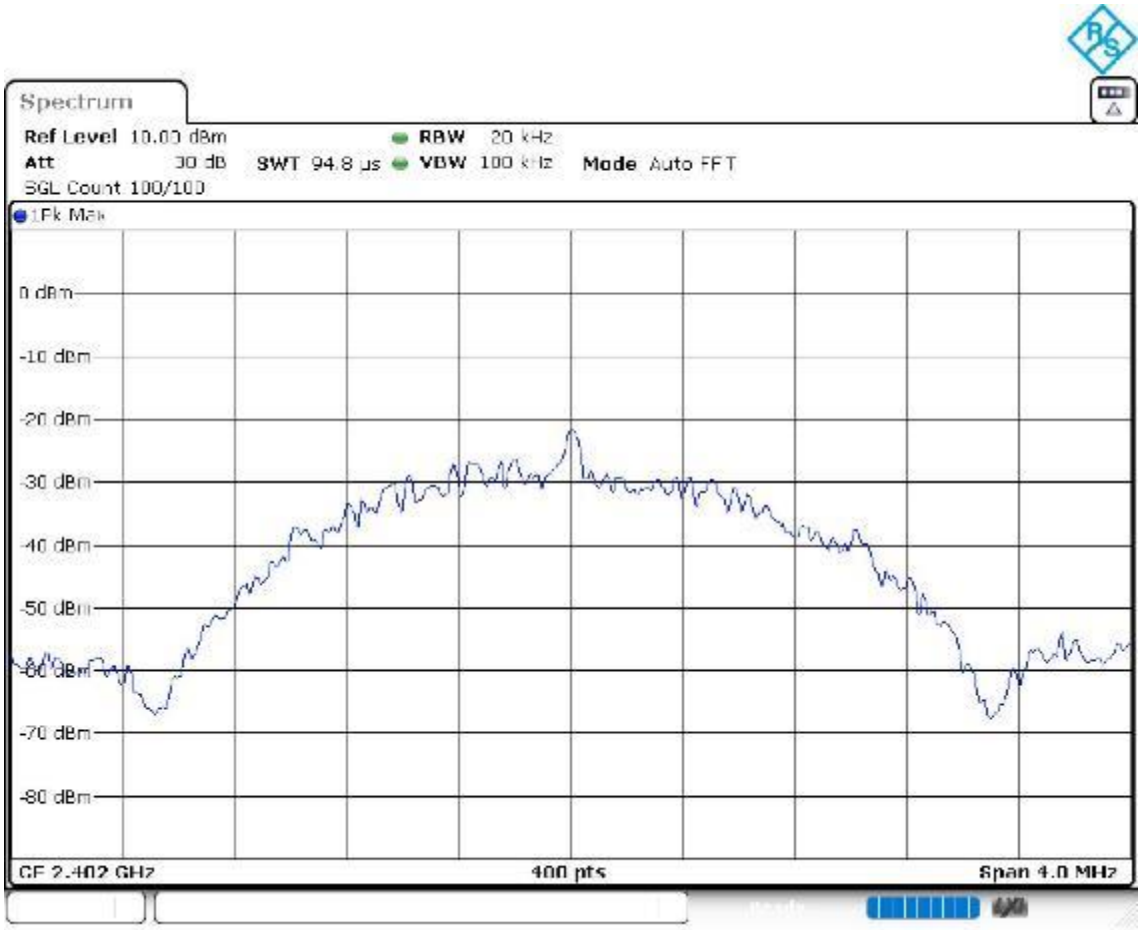
Frequency MHz = 2402.00000 Equipment Type = Digital Transmission System (DTS)

Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Plots:

99 % Bandwidth



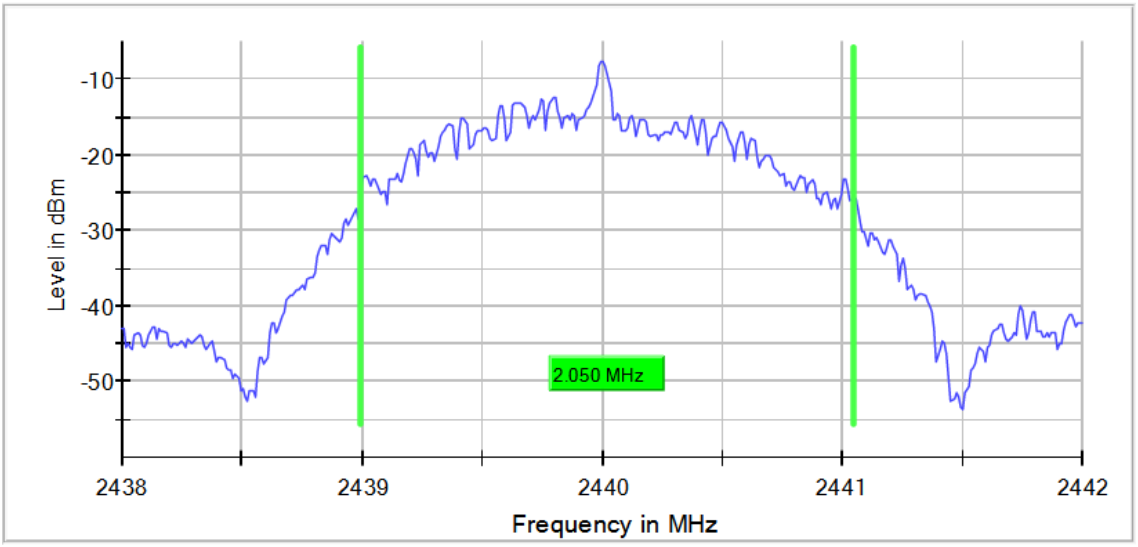


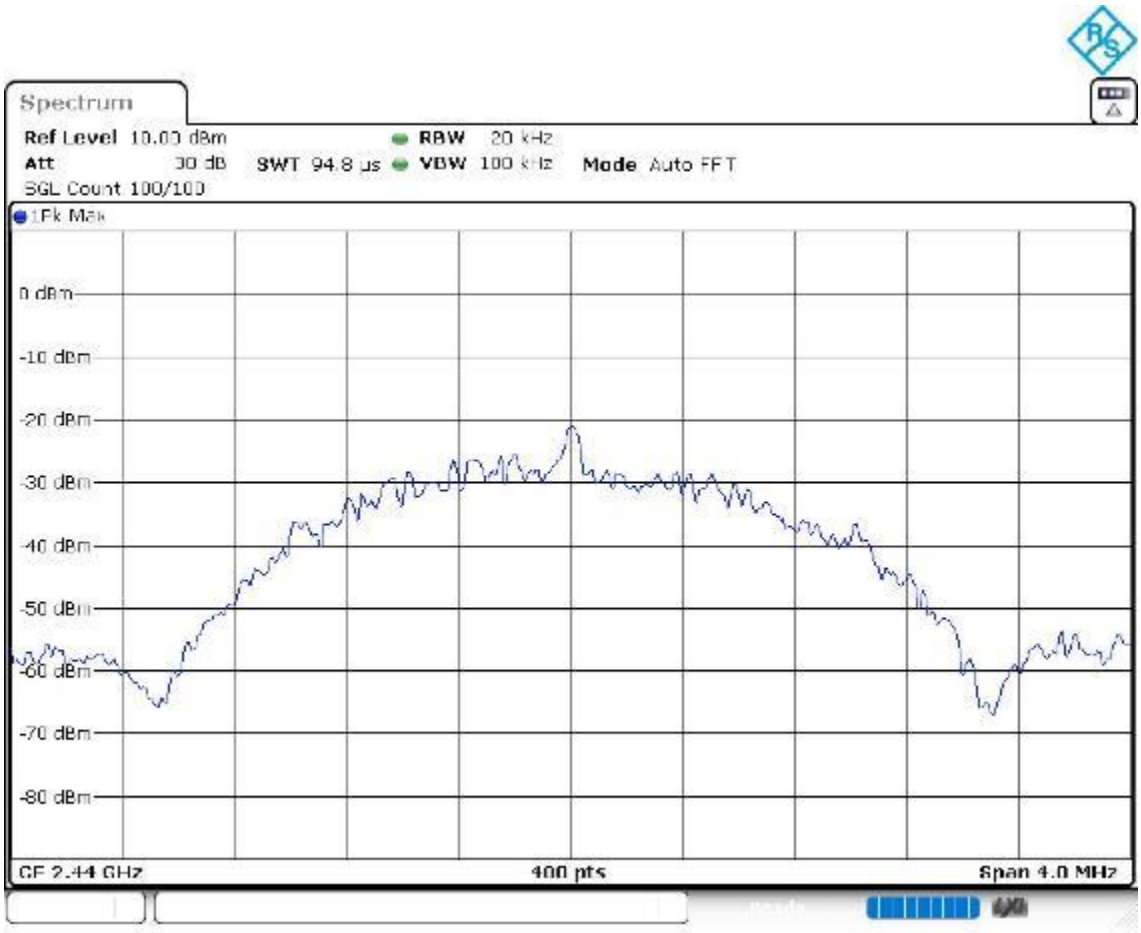
Frequency MHz = 2440.00000 Equipment Type = Digital Transmission System (DTS)

Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Plots:

99 % Bandwidth



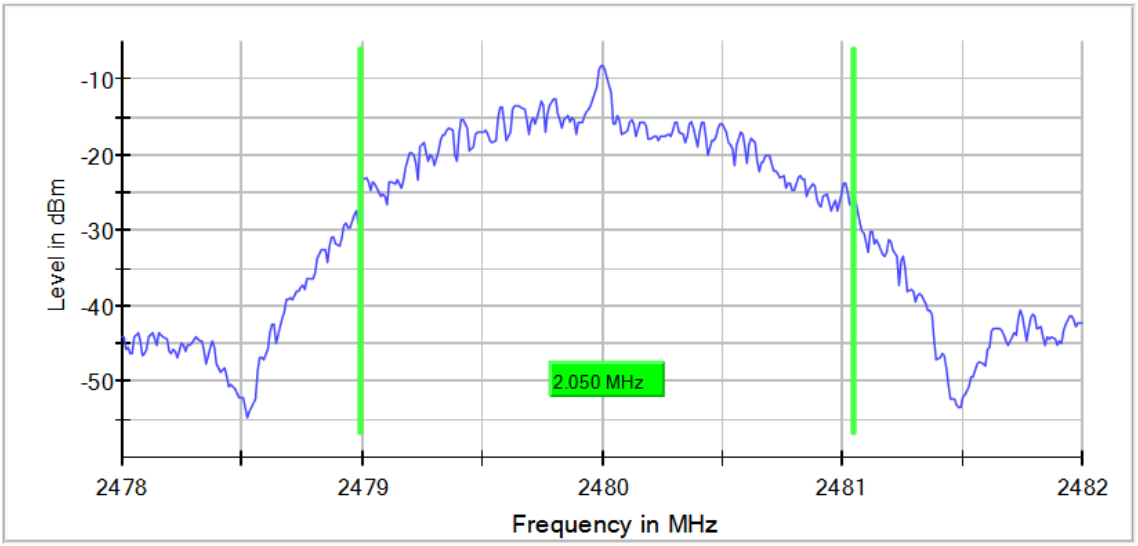


Frequency MHz = 2480.00000 Equipment Type = Digital Transmission System (DTS)

Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Plots:

99 % Bandwidth



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.

Results

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Freq (MHz)	6 dB Bandwidth (MHz)
2402.00	0.73
2440.00	0.71
2480.00	0.73

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Freq (MHz)	6 dB Bandwidth (MHz)
2402.00	1.22
2440.00	1.22
2480.00	1.22

Verdict

Pass

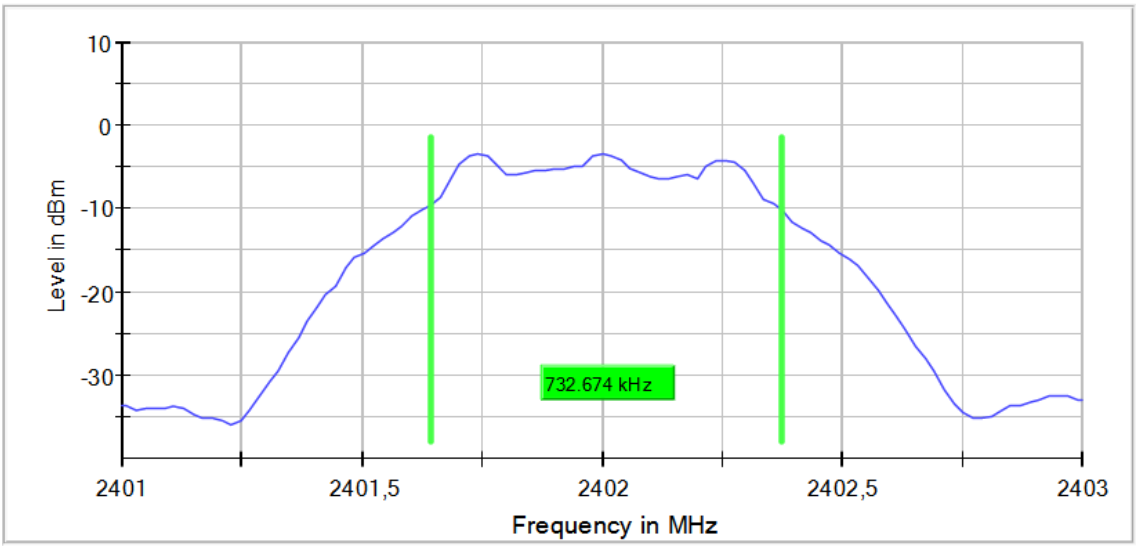
Attachments

Frequency MHz = 2402.00000 Bandwidth MHz = 1

Modulation = BTLE 5.0 (GFSK 1 Mbit/s) Number of Transmission Chains = 1

Plots:

6 dB Bandwidth

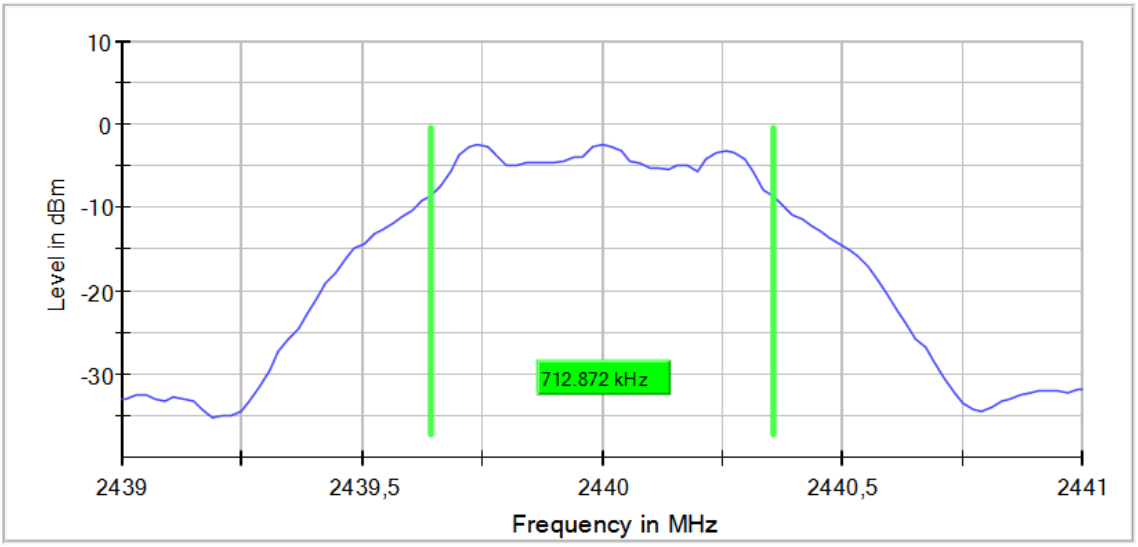


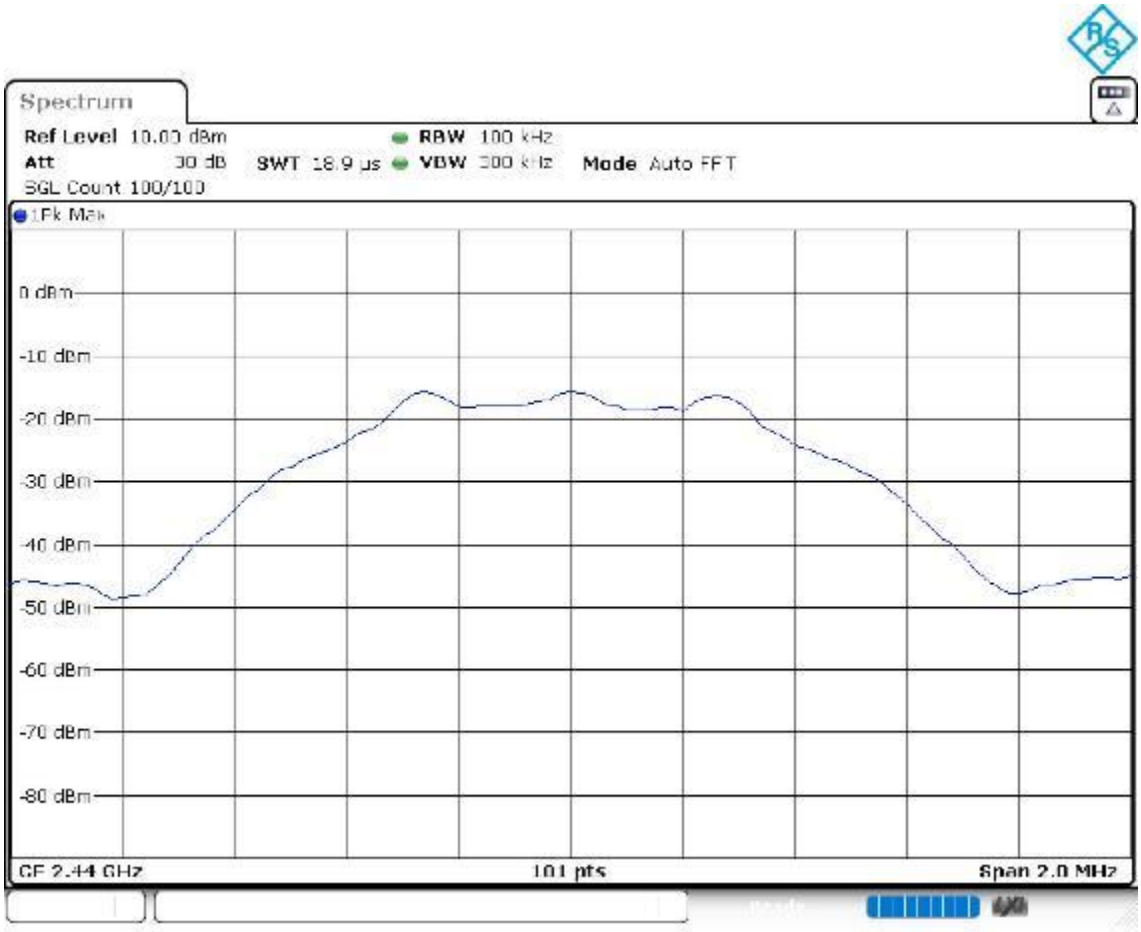
Frequency MHz = 2440.00000 Bandwidth MHz = 1

Modulation = BTLE 5.0 (GFSK 1 Mbit/s) Number of Transmission Chains = 1

Plots:

6 dB Bandwidth



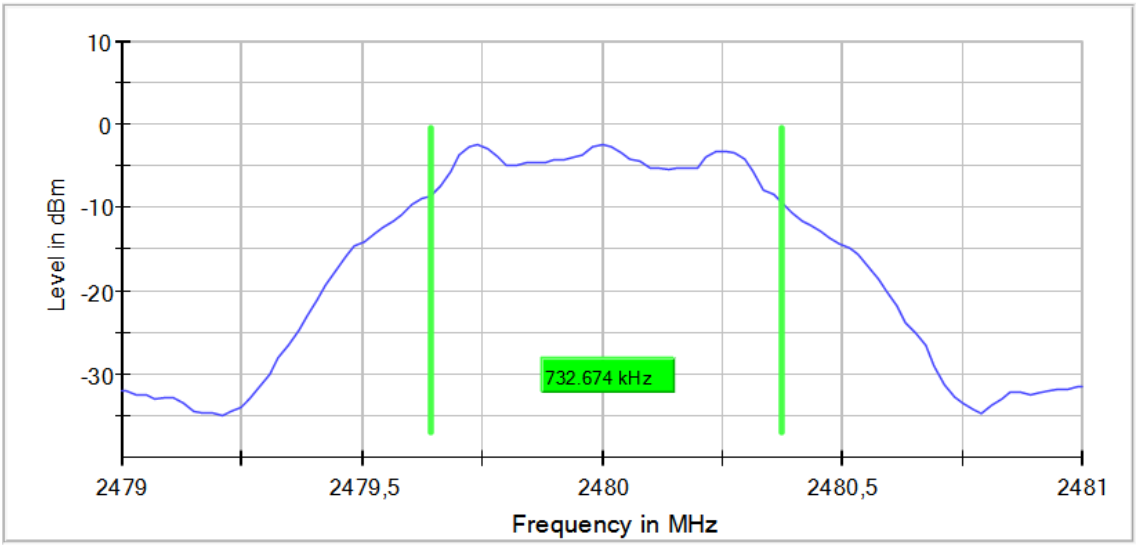


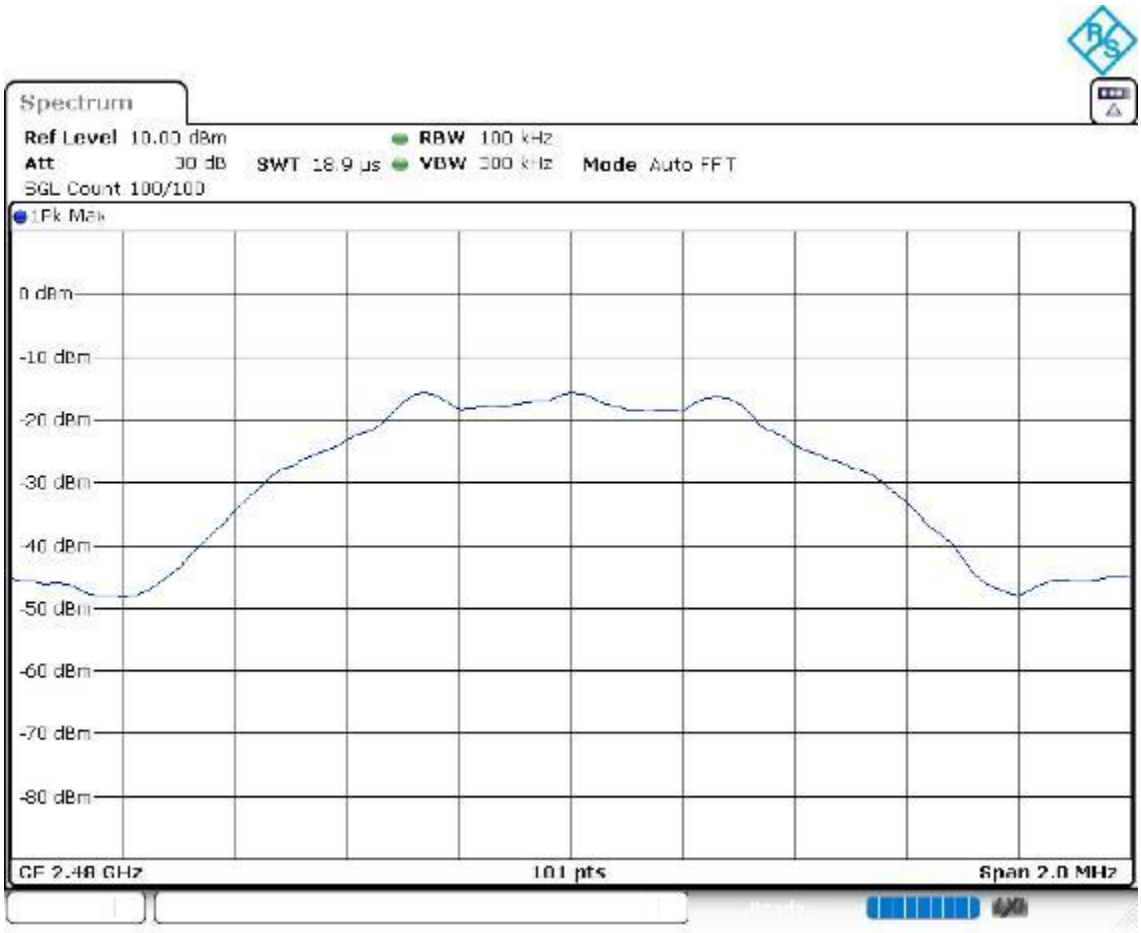
Frequency MHz = 2480.00000 Bandwidth MHz = 1

Modulation = BTLE 5.0 (GFSK 1 Mbit/s) Number of Transmission Chains = 1

Plots:

6 dB Bandwidth





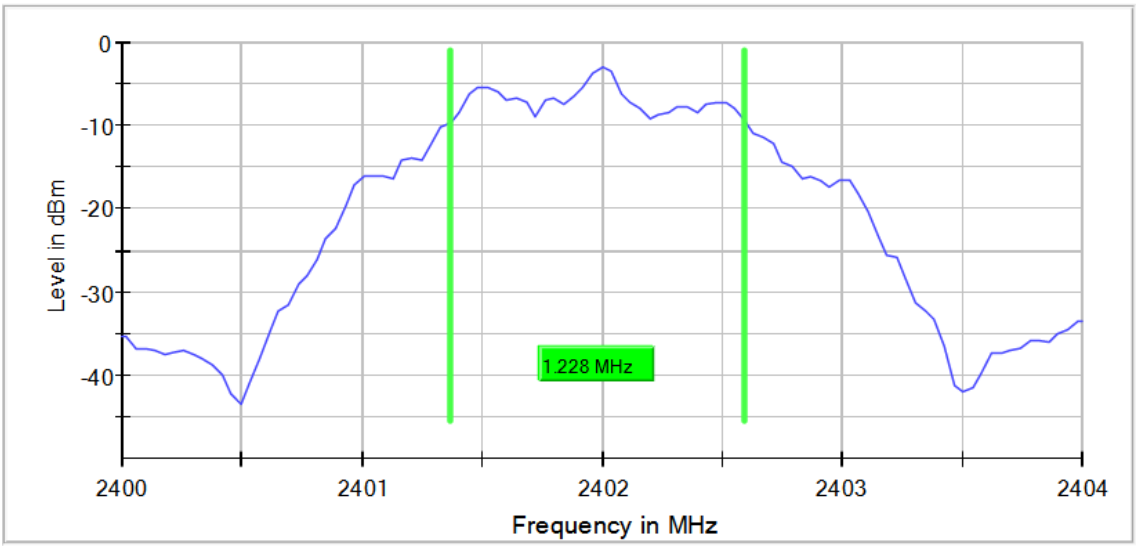
Attachments

Frequency MHz = 2402.00000 Bandwidth MHz = 2

Modulation = BTLE 5.0 (GFSK 2 Mbit/s) Number of Transmission Chains = 1

Plots:

6 dB Bandwidth

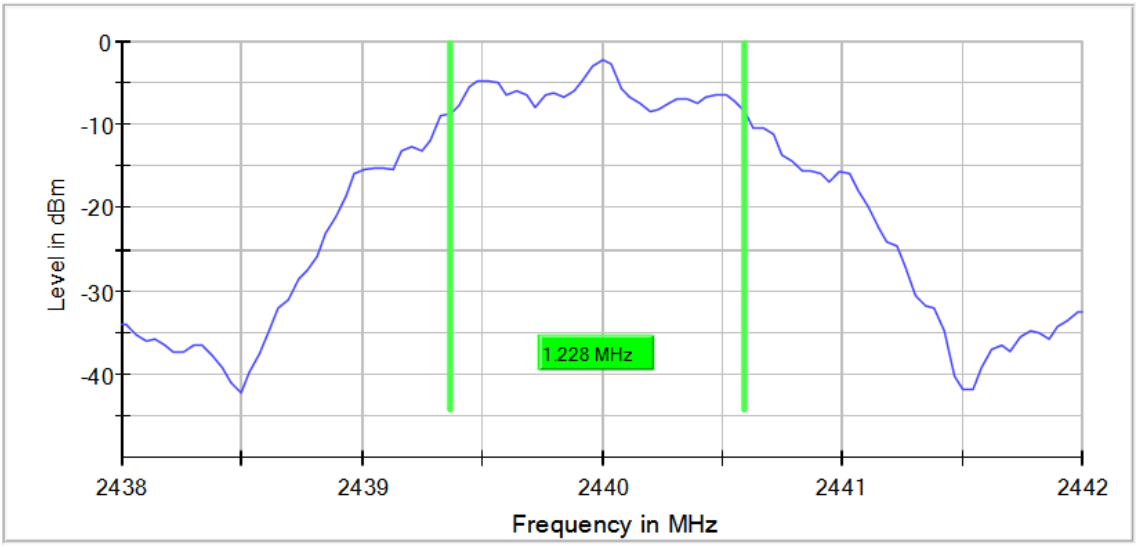


Frequency MHz = 2440.00000 Bandwidth MHz = 2

Modulation = BTLE 5.0 (GFSK 2 Mbit/s) Number of Transmission Chains = 1

Plots:

6 dB Bandwidth



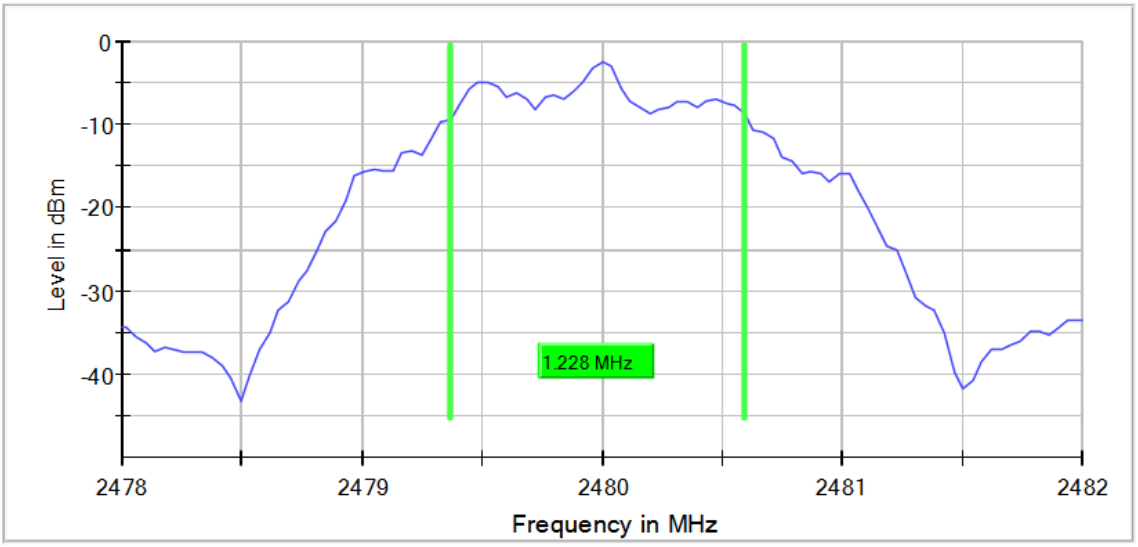
Frequency MHz = 2480.00000 Bandwidth MHz = 2

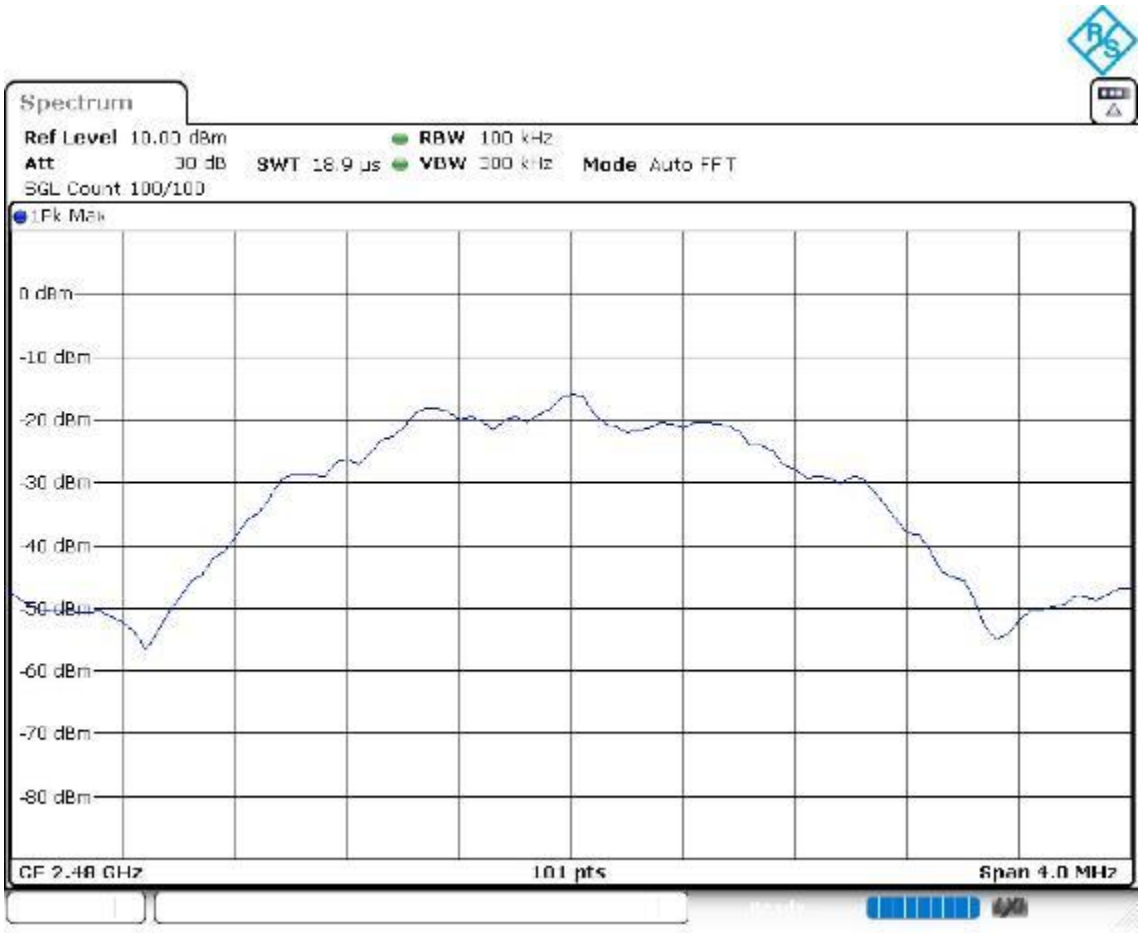
Modulation = BTLE 5.0 (GFSK 2 Mbit/s) Number of Transmission Chains = 1

Active Port = 1

Plots:

6 dB Bandwidth





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.

Results

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Freq (MHz)	Measured Freq (MHz)	PSD (dBm)
2402.00000	2401.992507	-13.169
2440.00000	2439.997502	-12.016
2480.00000	2479.997502	-12.133

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Freq (MHz)	Measured Freq (MHz)	PSD (dBm)
2402.00000	2401.997498	-13.592
2440.00000	2439.997498	-12.741
2480.00000	2479.997498	-13.144

Verdict

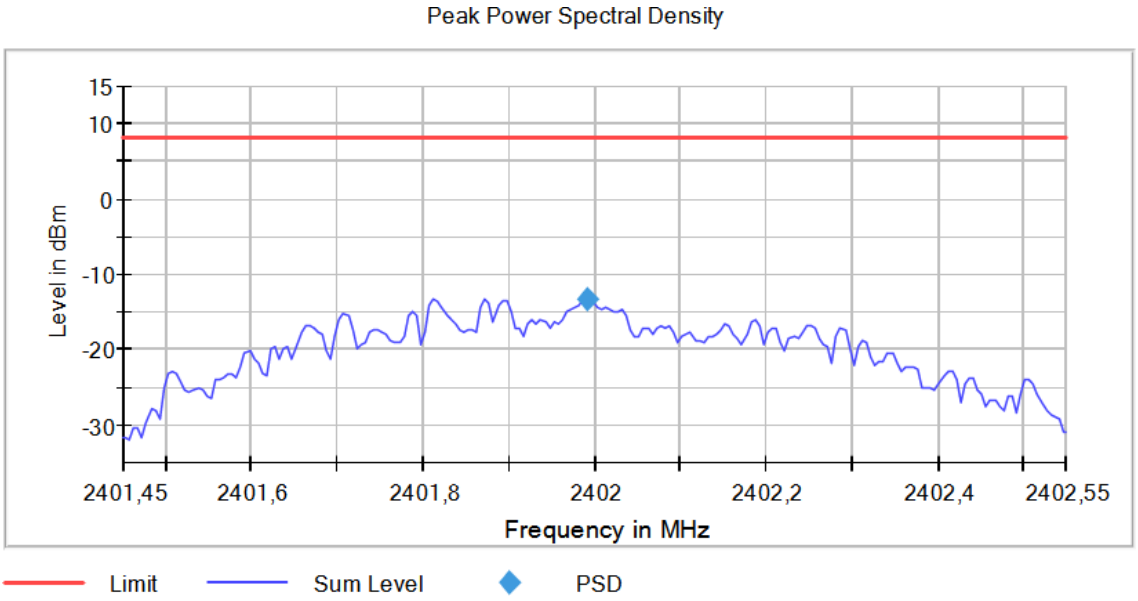
Pass

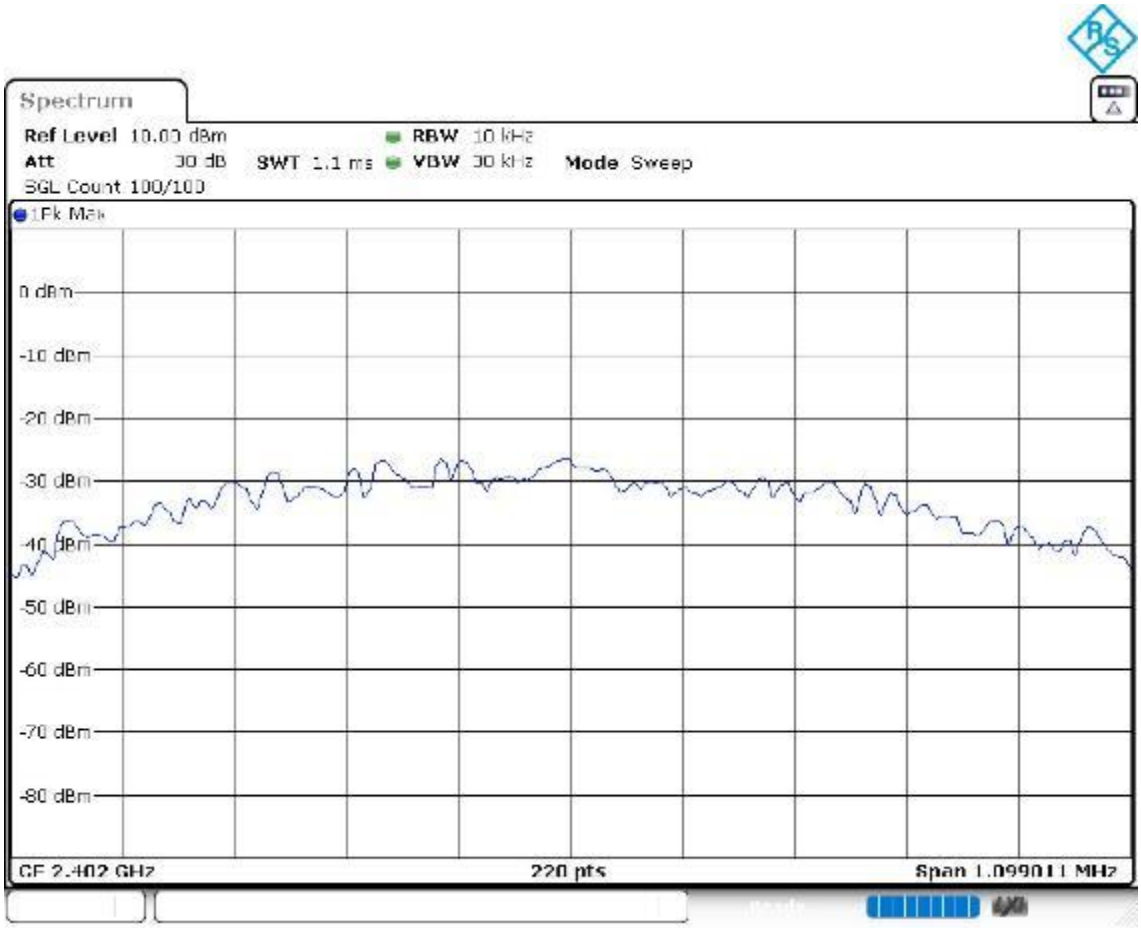
Attachments

Frequency MHz = 2402.00000 Equipment Type = Digital Transmission System (DTS)

Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Plots:

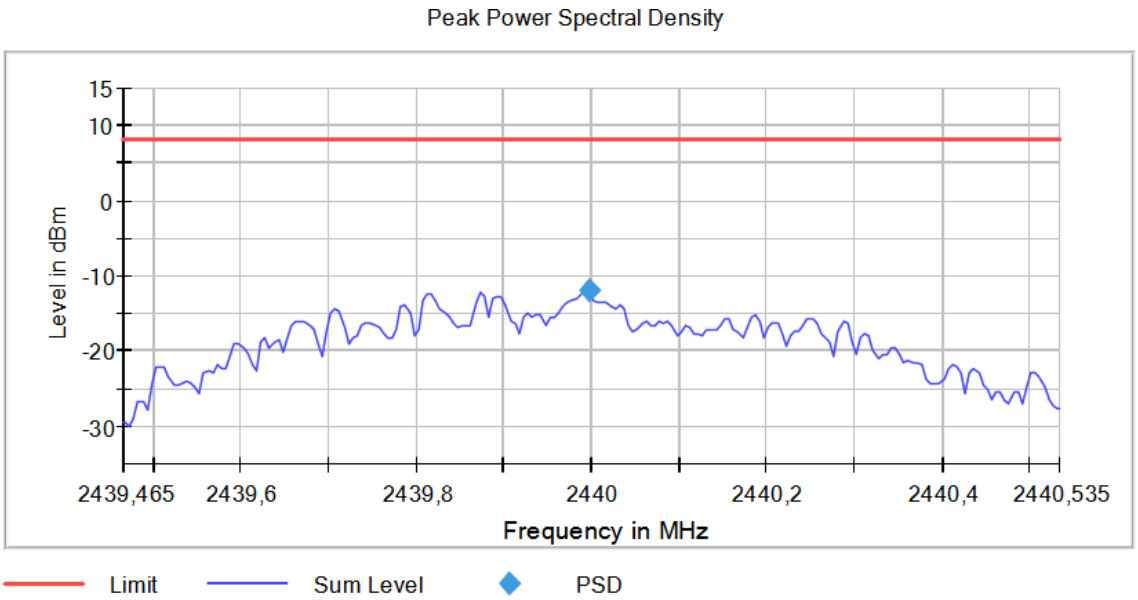


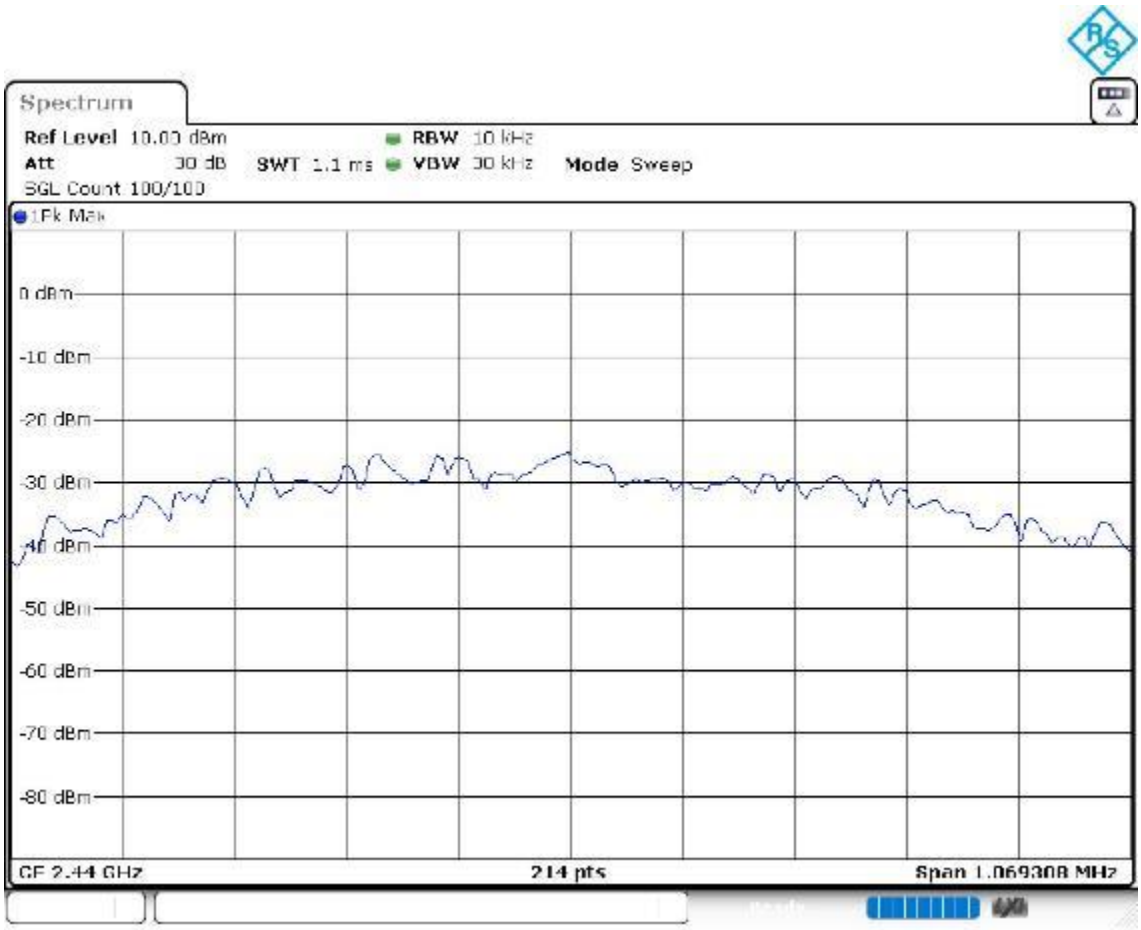


Frequency MHz = 2440.00000 Equipment Type = Digital Transmission System (DTS)

Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Plots:

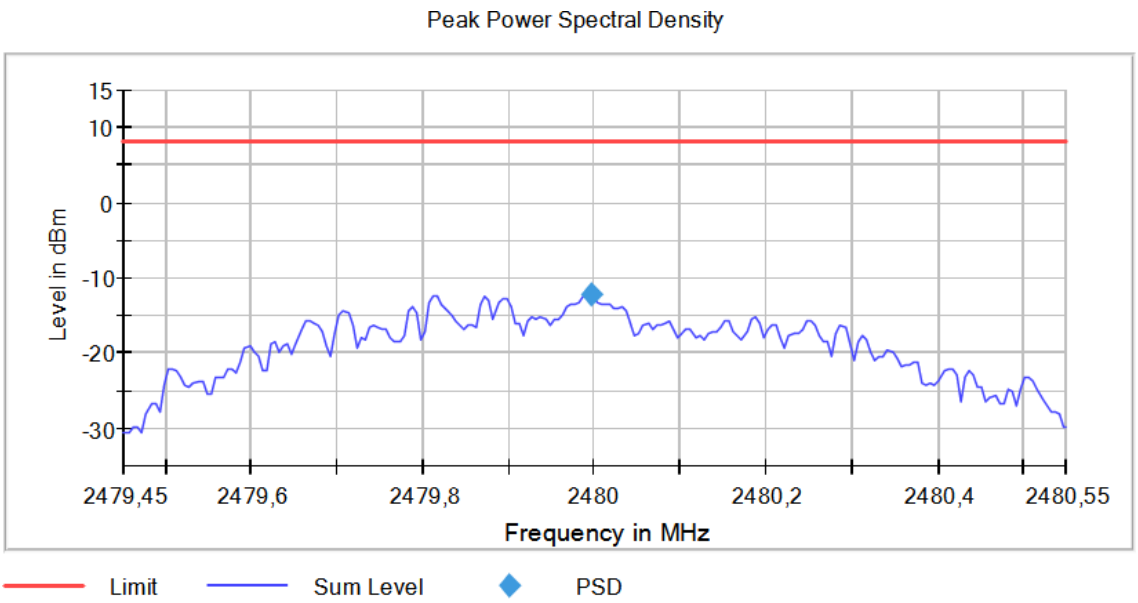


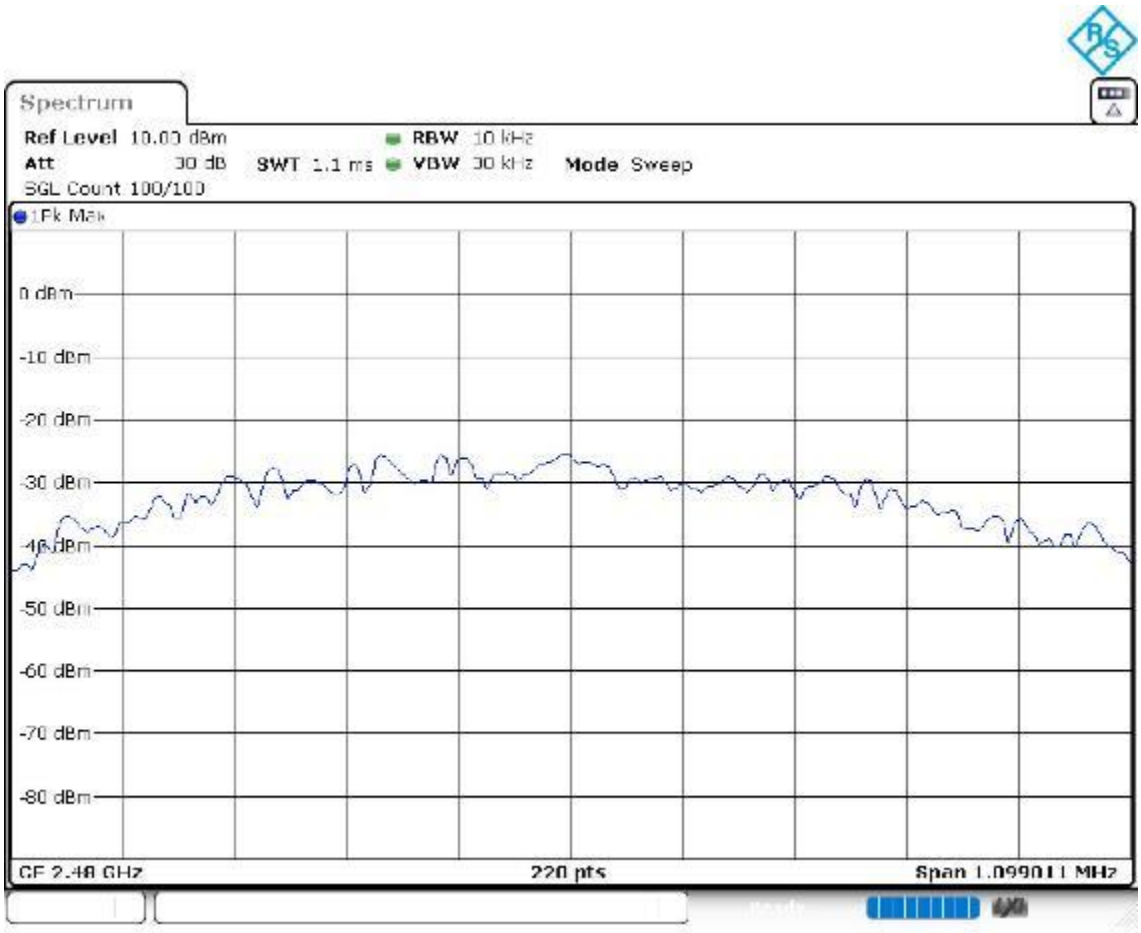


Frequency MHz = 2480.00000 Equipment Type = Digital Transmission System (DTS)

Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Plots:



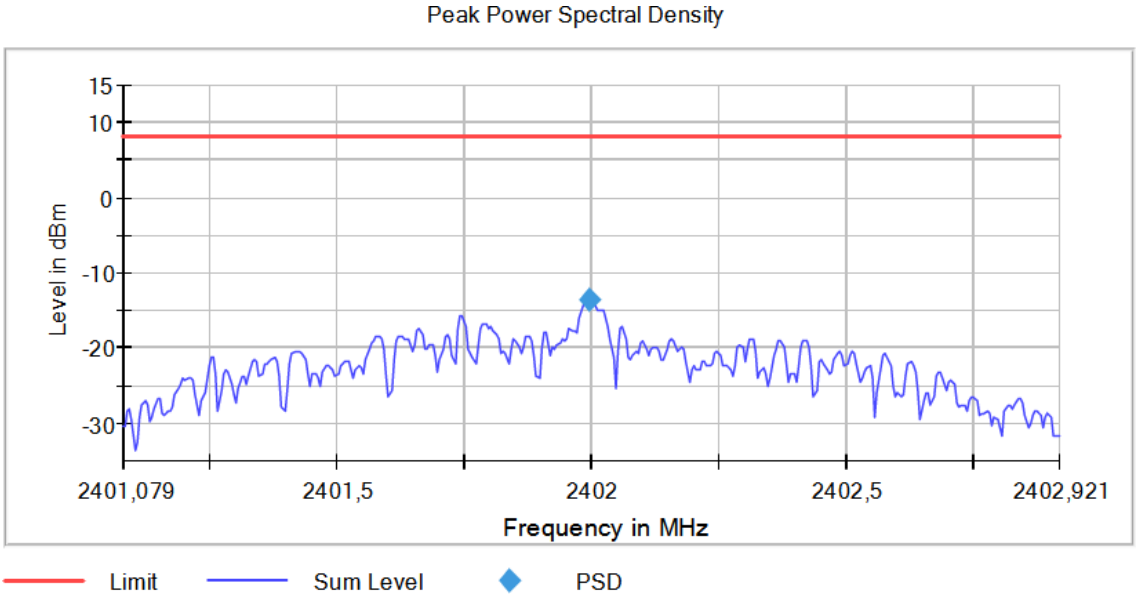


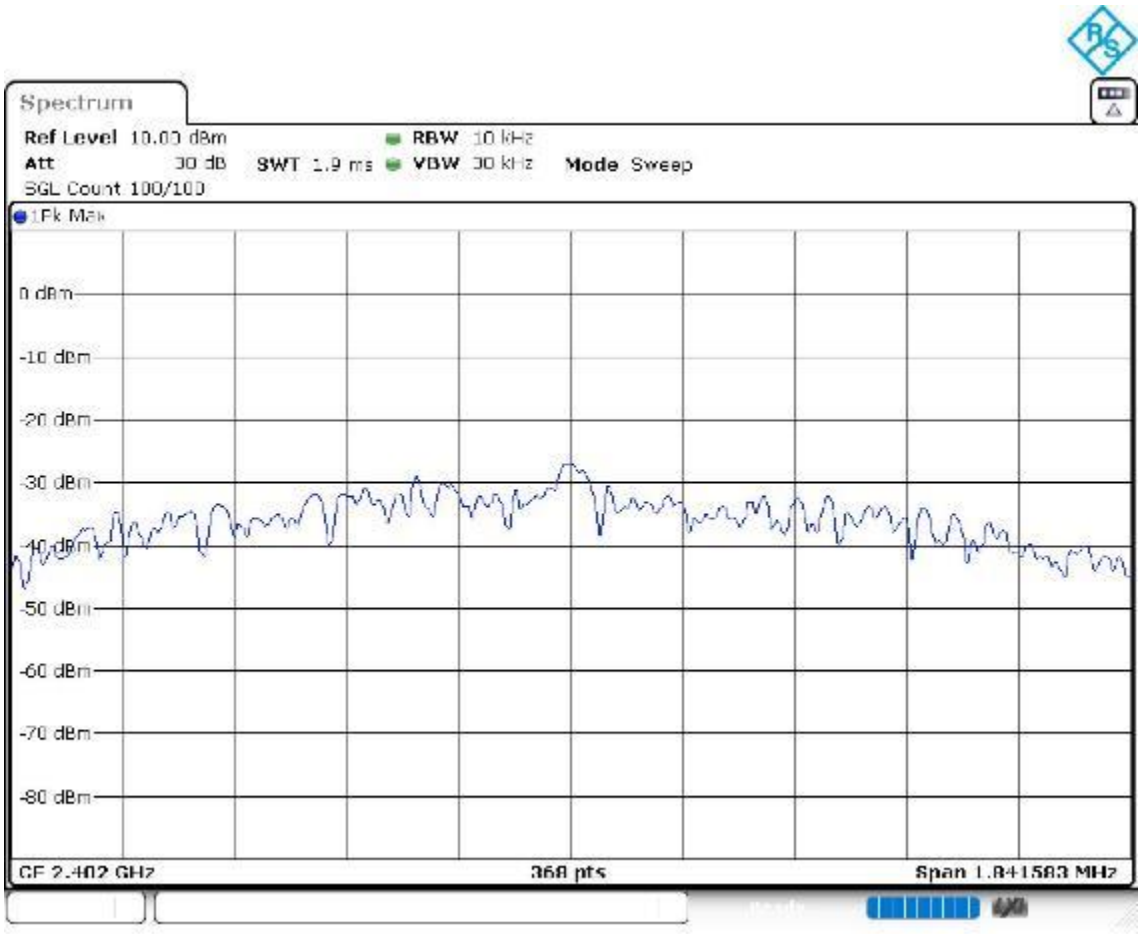
Frequency MHz = 2402.00000 Equipment Type = Digital Transmission System (DTS)

Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Number of Transmission Chains = 1 Active Port = 1

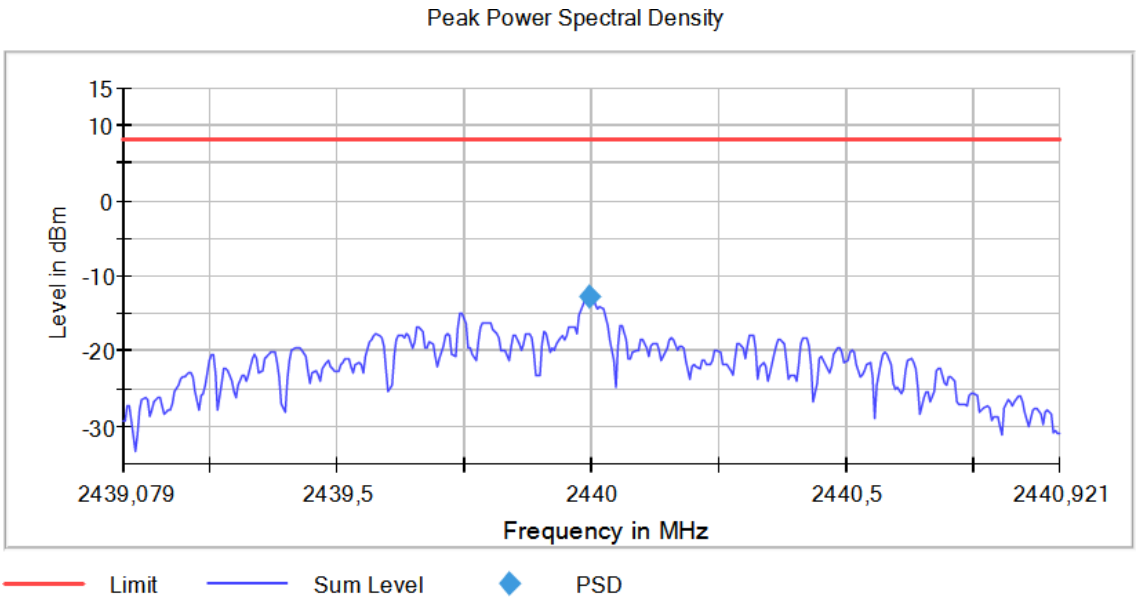
Plots:

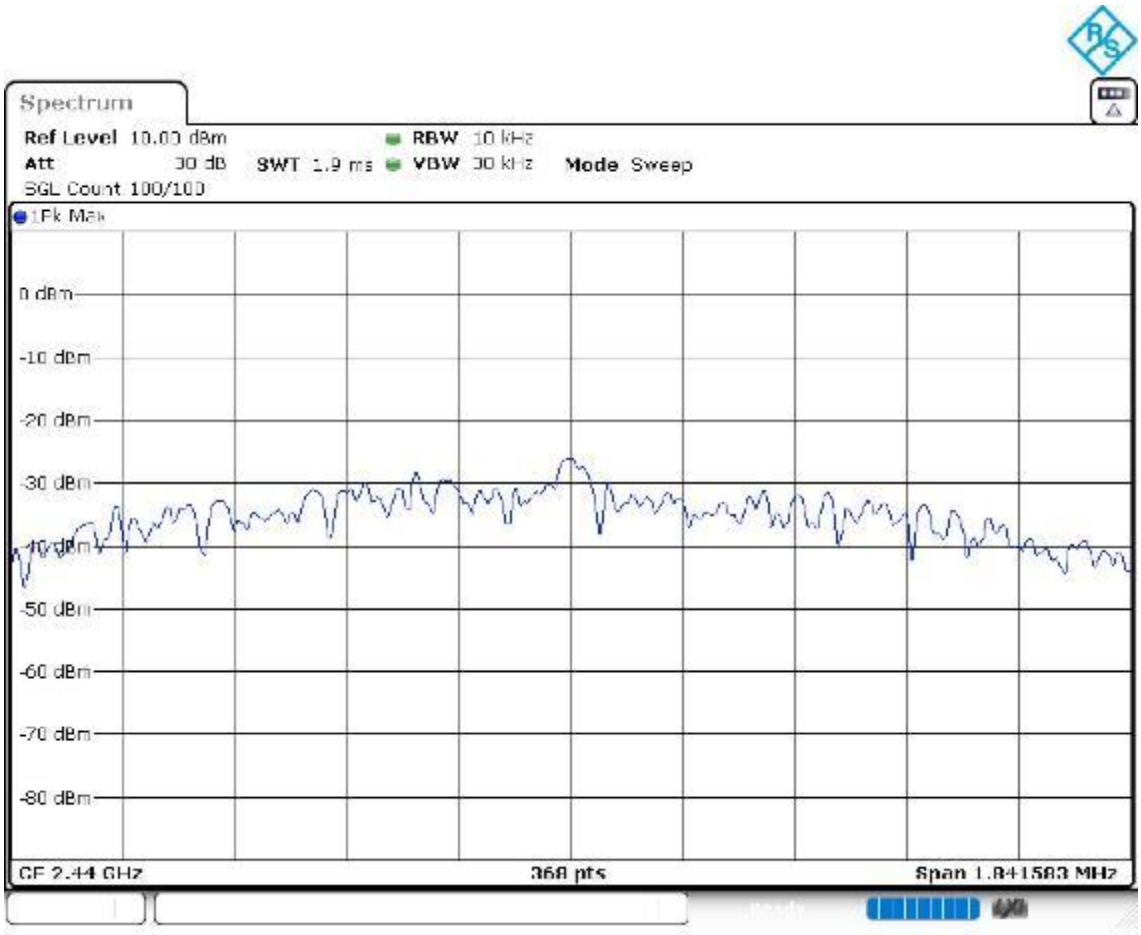




Frequency MHz = 2440.00000	Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 2	Modulation = BTLE 5.0 (GFSK 2 Mbit/s)
Number of Transmission Chains = 1	Active Port = 1

Plots:

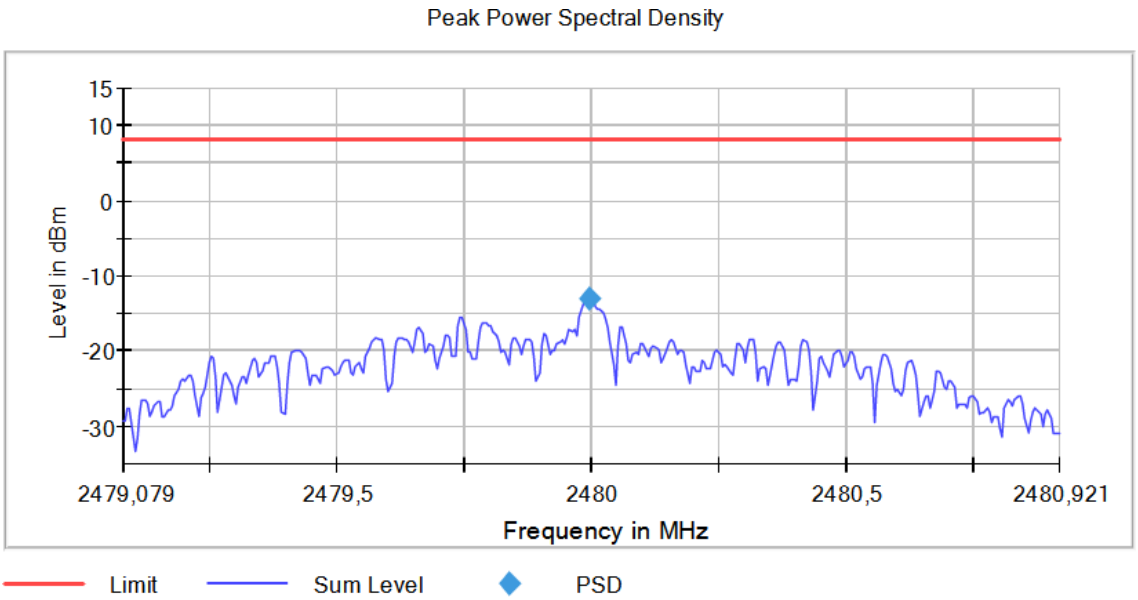


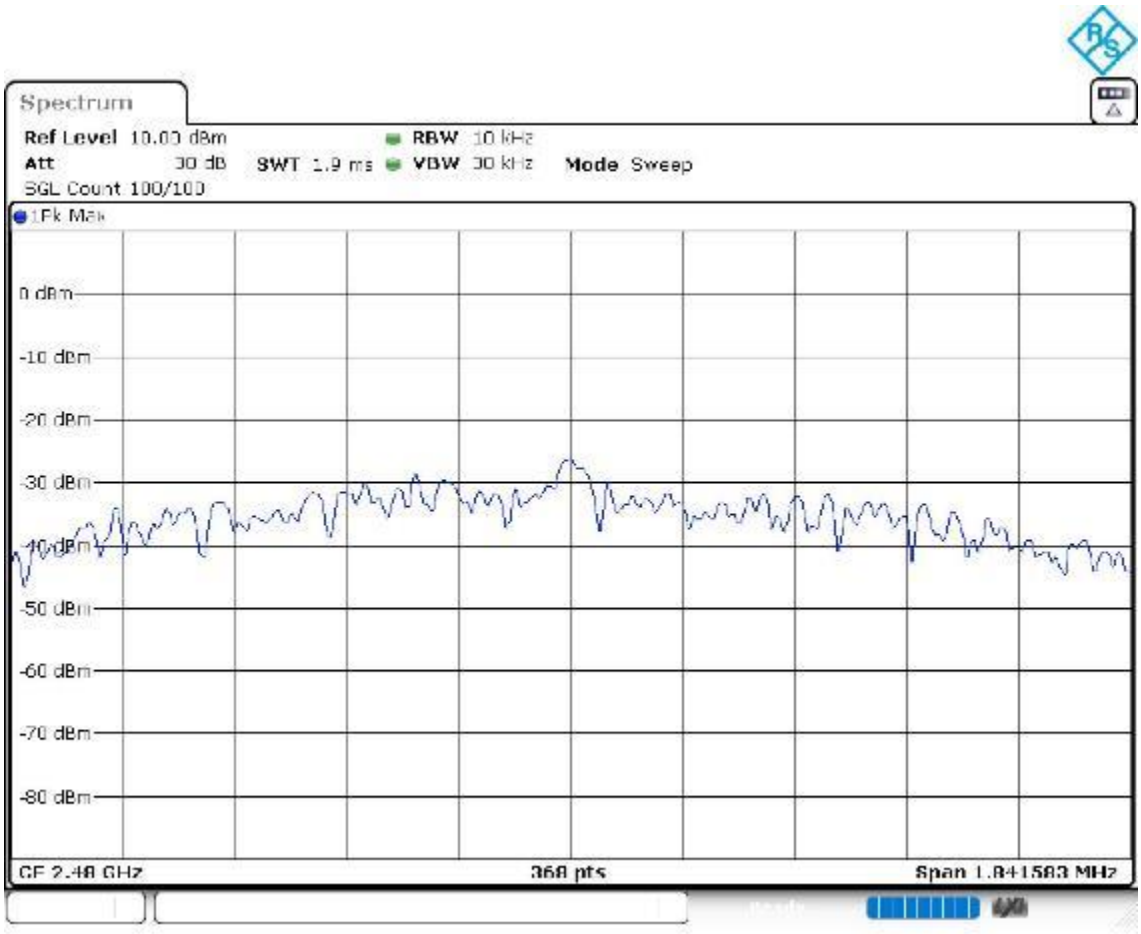


Frequency MHz = 2480.00000 Equipment Type = Digital Transmission System (DTS)

Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Plots:





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) (RSS-247).

Results

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.

The EIRP power (dBm) is calculated by adding the declared maximum antenna gain to the measured conducted power.

Maximum Declared Antenna Gain: +3.7 dBi

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Freq (MHz)	Maximum Conducted Power (dBm)	Maximum EIRP Power (dBm)
2402.00000	-3.044	0.656
2440.00000	-2.182	1.518
2480.00000	-2.155	1.545

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Freq (MHz)	Maximum Conducted Power (dBm)	Maximum EIRP Power (dBm)
2402.00000	-2.6310	1.069
2440.00000	-1.9970	1.703
2480.00000	-2.1920	1.508

Verdict

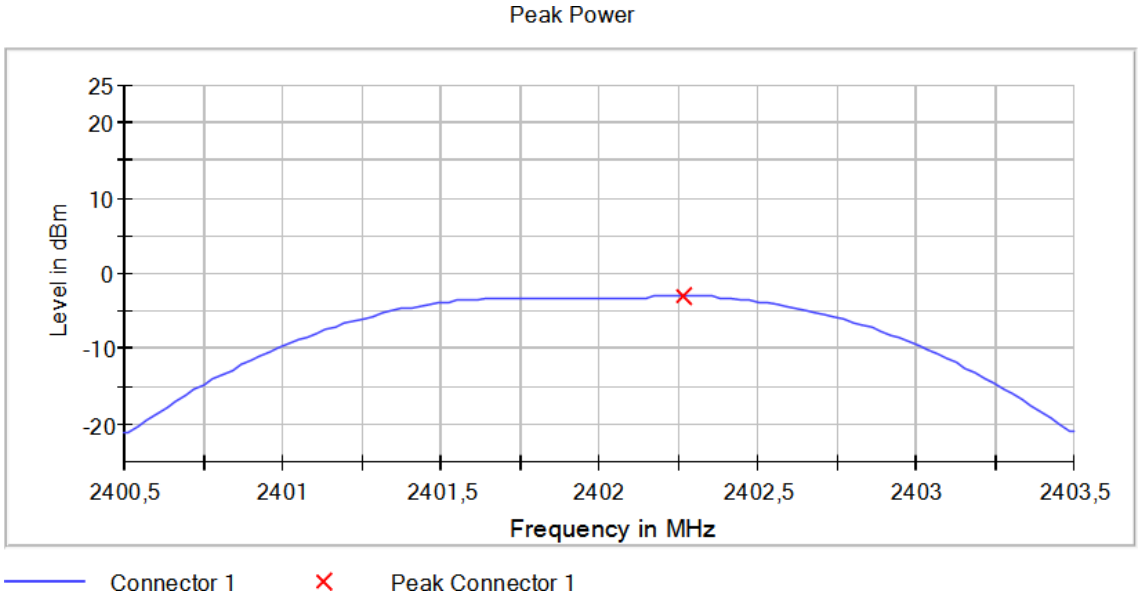
Pass

Attachments

Frequency MHz = 2402.00000 Equipment Type = Digital Transmission System (DTS)

Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

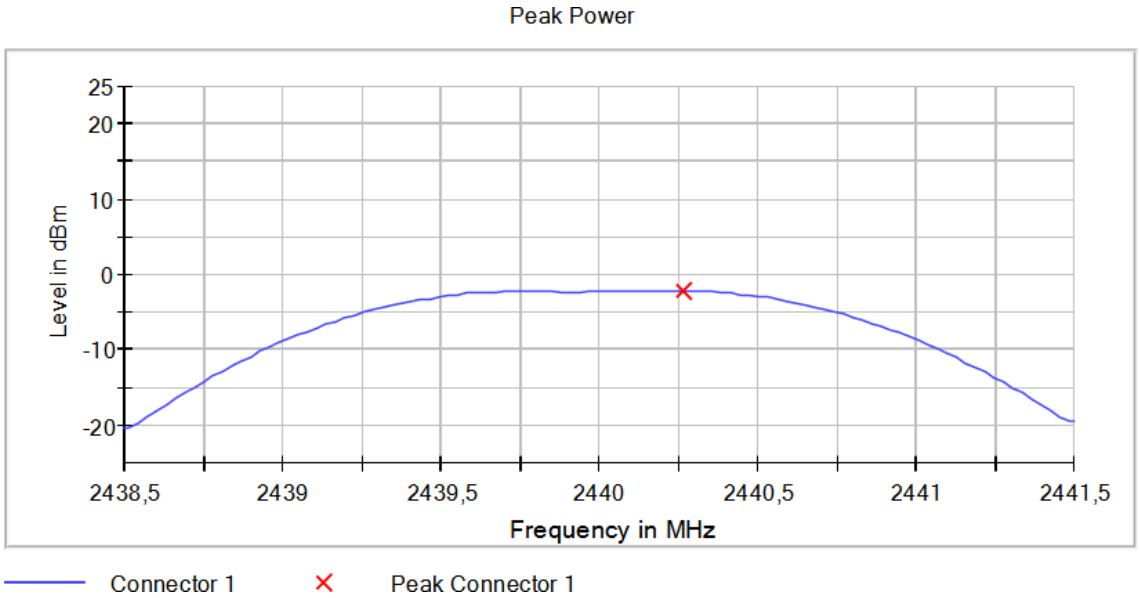
Plots:



Frequency MHz = 2440.00000 Equipment Type = Digital Transmission System (DTS)

Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

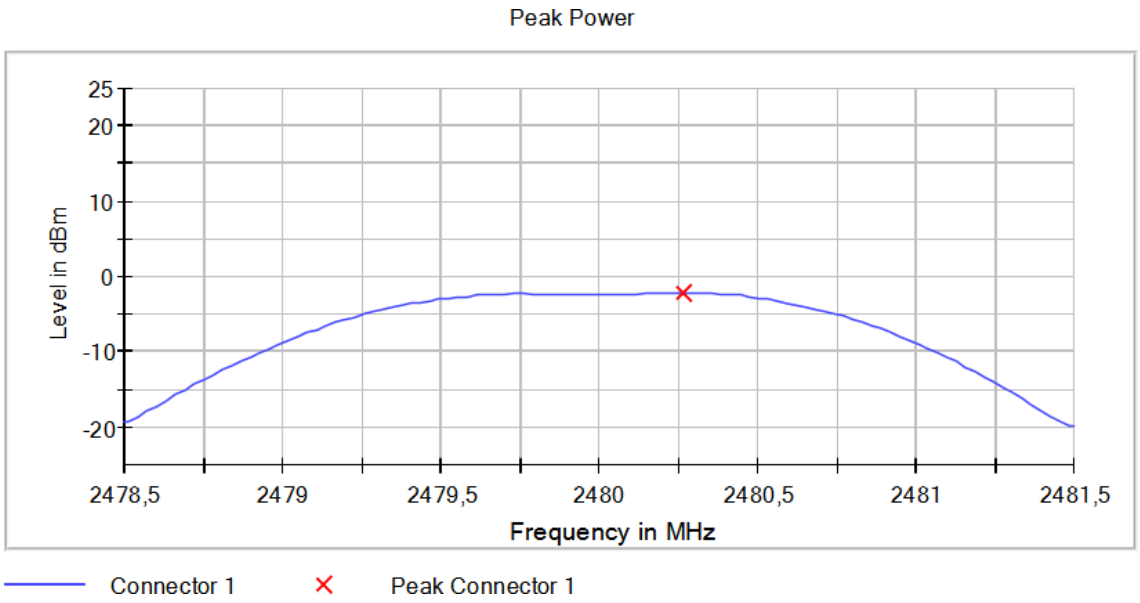
Plots:



Frequency MHz = 2480.00000 Equipment Type = Digital Transmission System (DTS)

Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

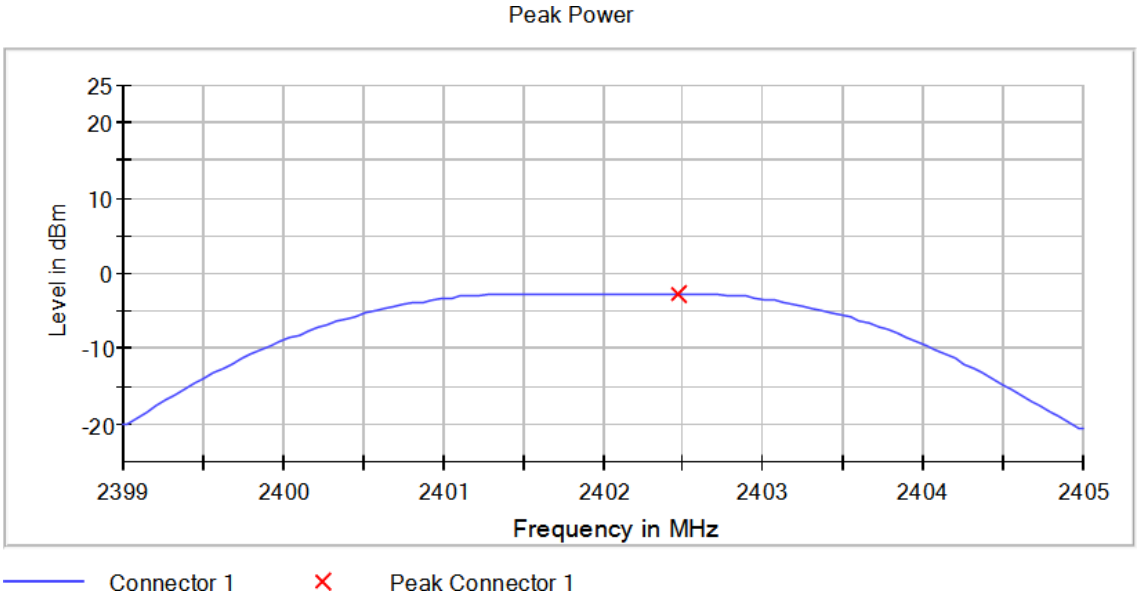
Plots:



Frequency MHz = 2402.00000 Equipment Type = Digital Transmission System (DTS)

Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

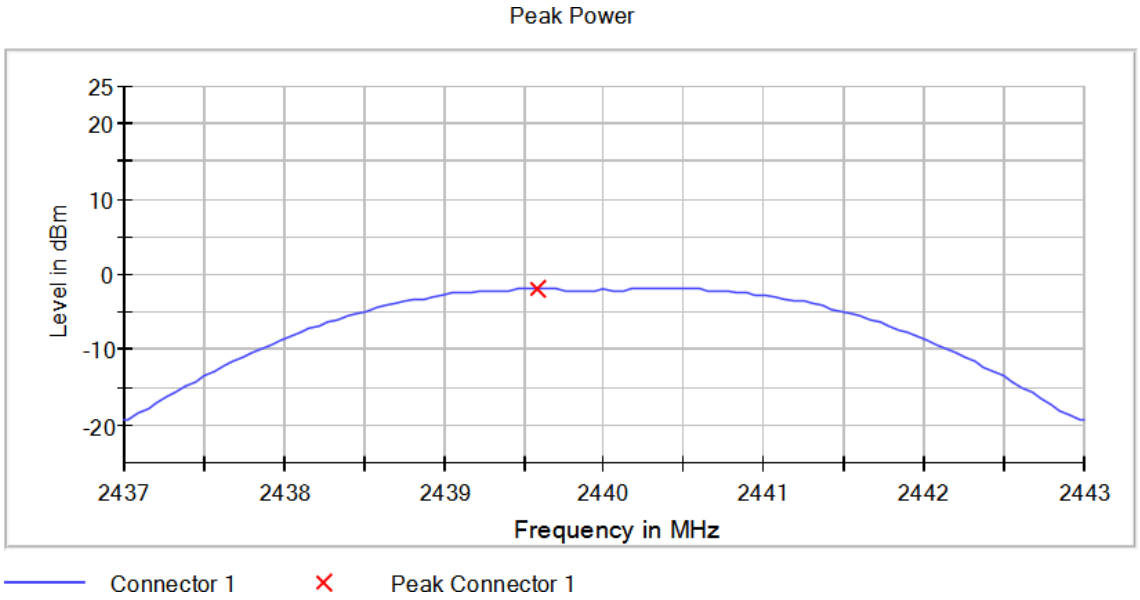
Plots:



Frequency MHz = 2440.00000 Equipment Type = Digital Transmission System (DTS)

Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

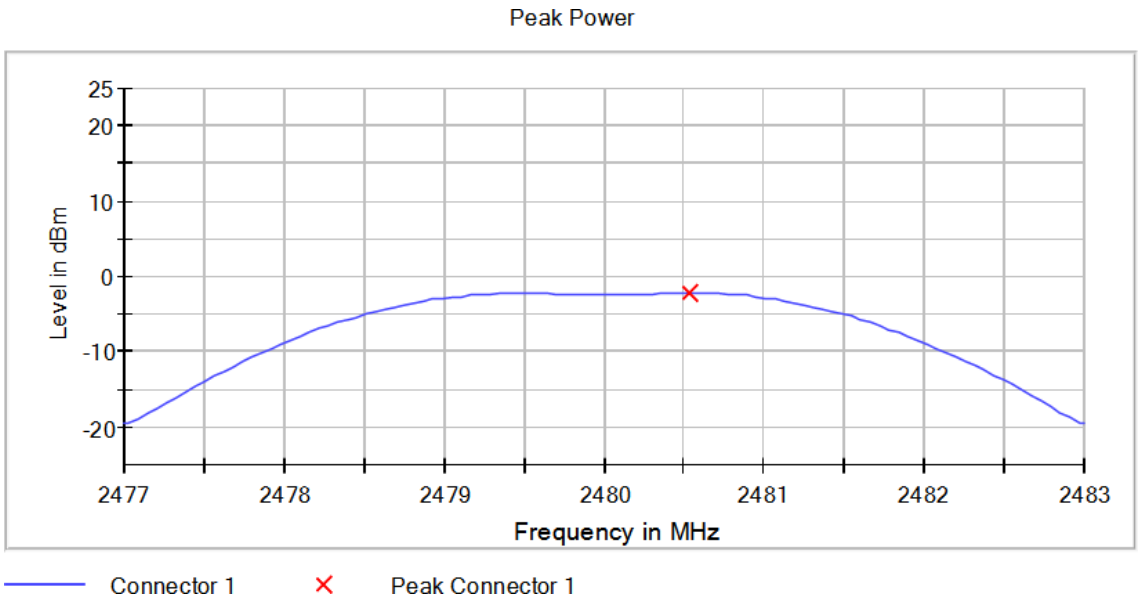
Plots:



Frequency MHz = 2480.00000 Equipment Type = Digital Transmission System (DTS)

Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Plots:



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.

Results

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Freq (MHz)	Measured Freq (MHz)	Level (dBm)	Limit (dBm)
2402.00000	2313.825000	-43.176	-19.068
	2313.775000	-43.285	
	2380.925000	-43.395	
	2340.925000	-43.430	
	2380.875000	-43.443	
	2340.975000	-43.460	
	2379.875000	-43.602	
	2379.825000	-43.671	
	2395.425000	-43.702	
	2386.175000	-43.769	
	2346.525000	-43.833	
	2386.125000	-43.863	
	2383.475000	-43.925	
	2353.975000	-44.040	
	2353.925000	-44.051	

Freq (MHz)	Measured Freq (MHz)	Level (dBm)	Limit (dBm)
2480.00000	2495.075000	-43.753	-18.472
	2483.775000	-43.782	
	2495.025000	-43.874	
	2483.625000	-43.911	
	2486.025000	-43.955	
	2483.725000	-43.988	
	2490.675000	-44.075	
	2492.225000	-44.126	
	2492.175000	-44.138	
	2490.625000	-44.141	
	2486.175000	-44.150	
	2485.975000	-44.190	
	2486.125000	-44.242	
	2485.525000	-44.248	
	2488.925000	-44.274	

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Freq (MHz)	Measured Freq (MHz)	Level (dBm)	Limit (dBm)
2402.00000	2399.975000	-30.709	-18.610
	2399.925000	-32.178	
	2399.875000	-34.581	
	2399.825000	-37.819	
	2399.775000	-38.249	
	2399.725000	-40.275	
	2399.675000	-42.408	
	2320.675000	-42.609	
	2320.625000	-42.880	
	2345.275000	-43.067	
	2399.625000	-43.155	
	2358.325000	-43.201	
	2386.925000	-43.314	
	2371.625000	-43.329	
	2371.575000	-43.379	

Freq (MHz)	Measured Freq (MHz)	Level (dBm)	Limit (dBm)
2480.00000	2485.925000	-42.780	-18.573
	2485.875000	-43.319	
	2485.975000	-43.787	
	2492.025000	-43.904	
	2494.875000	-43.951	
	2484.075000	-43.959	
	2494.925000	-43.977	
	2494.225000	-43.981	
	2484.025000	-44.035	
	2486.175000	-44.054	
	2491.975000	-44.065	
	2493.575000	-44.148	
	2495.175000	-44.174	
	2495.125000	-44.184	
	2485.725000	-44.226	

Verdict

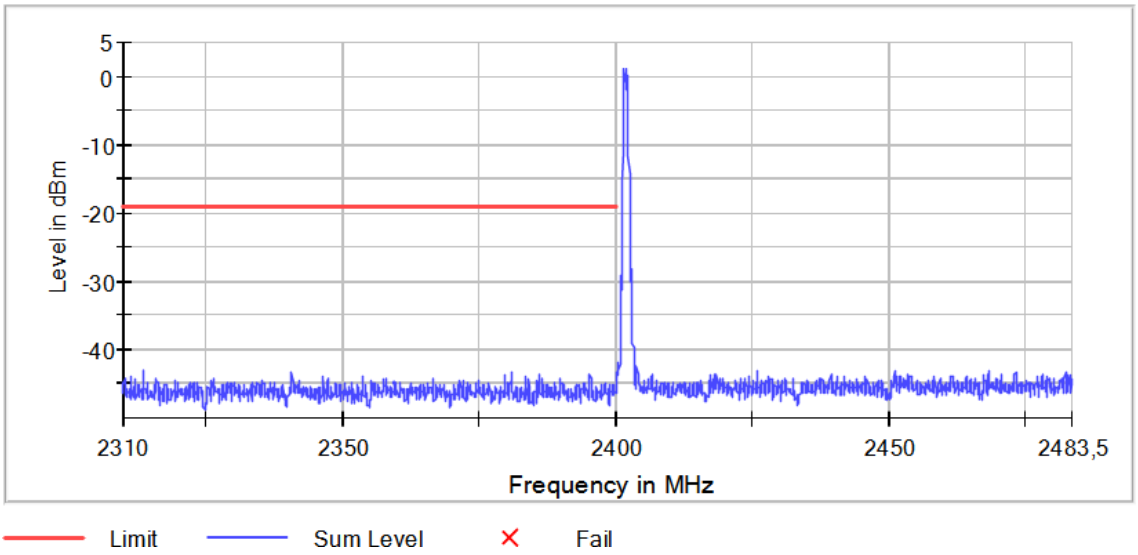
Pass

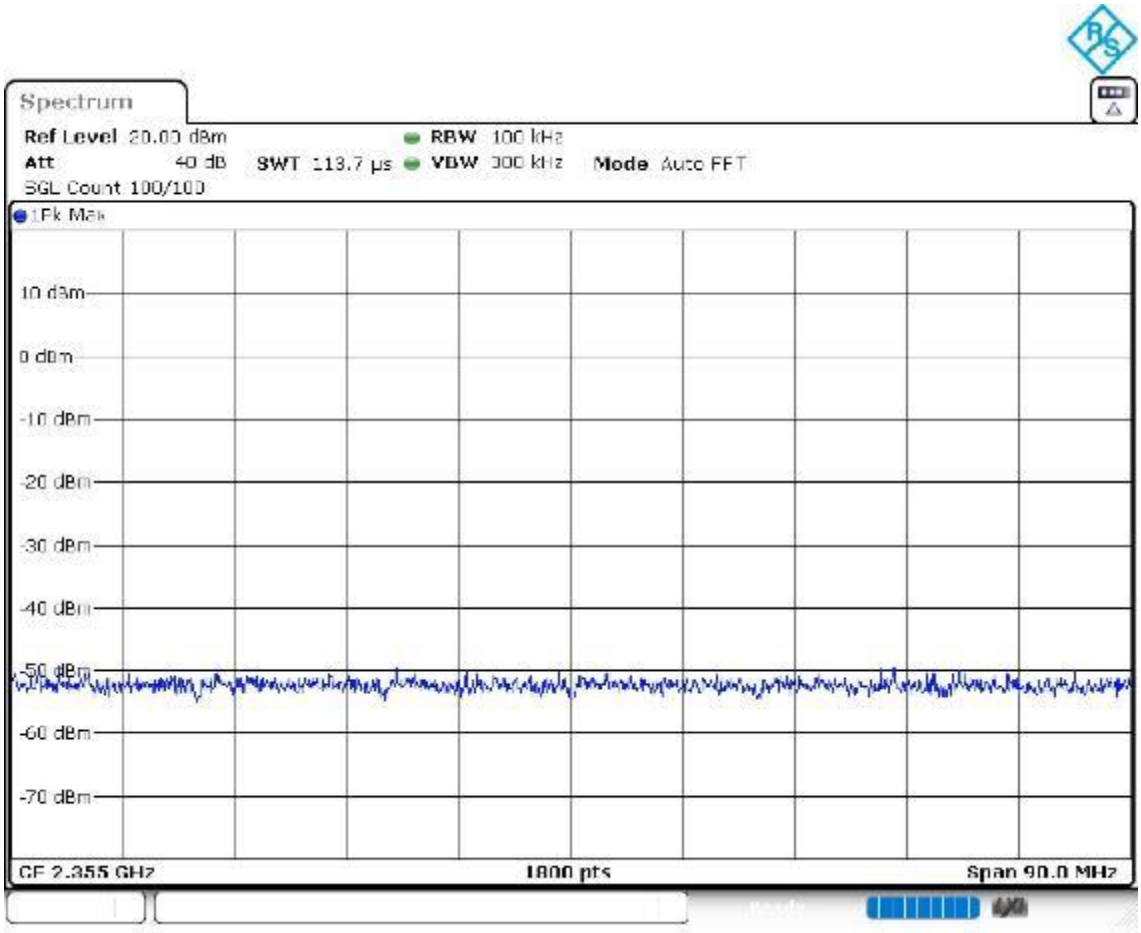
Attachments

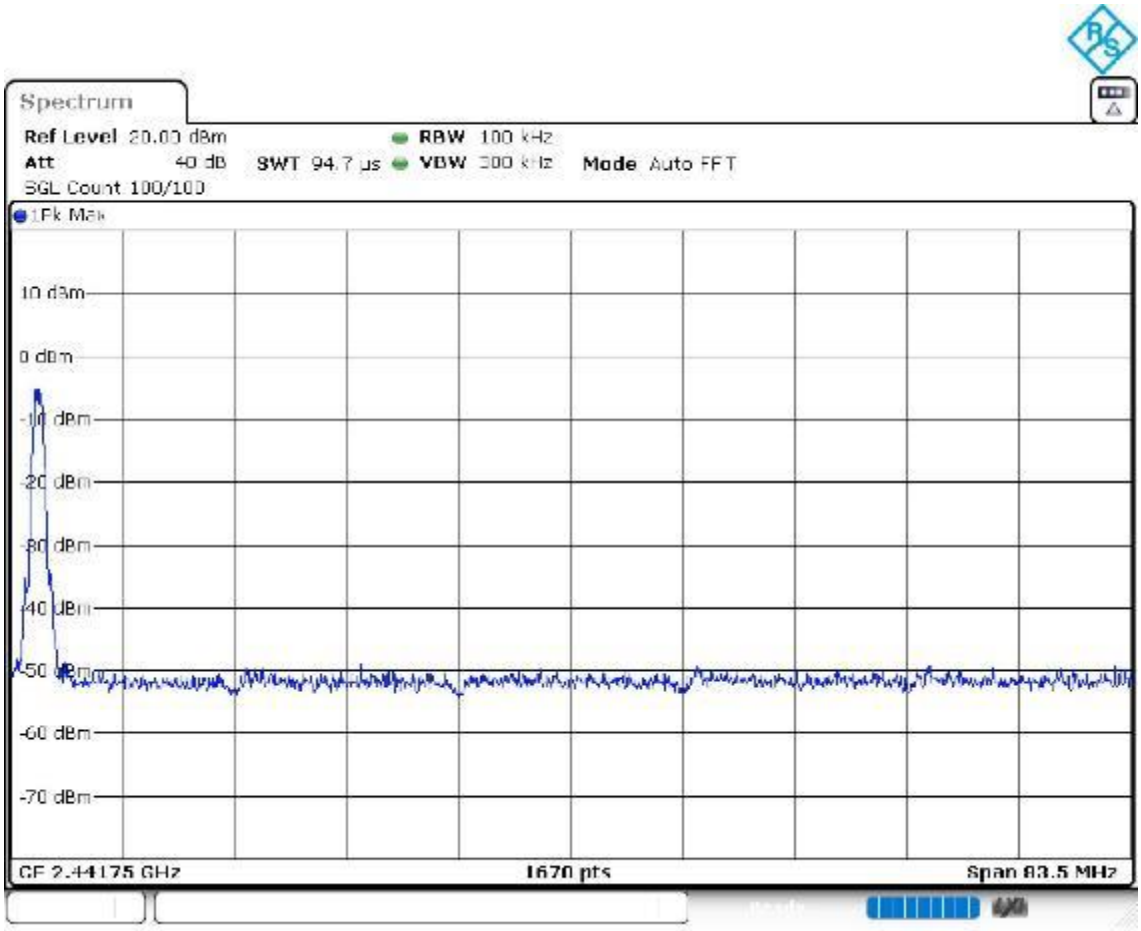
Frequency MHz = 2402.00000	Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 1	Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
Number of Transmission Chains = 1	Measurement Point = 1
Active Port = 1	

Plots:

Band Edge





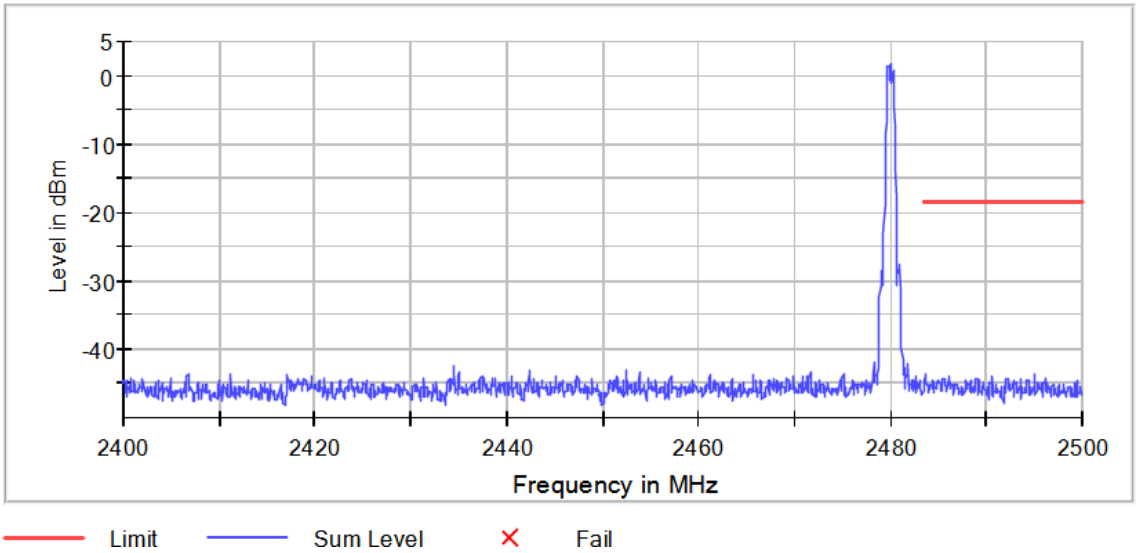

Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 40 dB
SWT 94.7 µs
VBW 300 kHz
Mode Auto FFT
SGL Count 100/100
1Pk Max
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.44175 GHz
1670 pts
Span 83.5 MHz

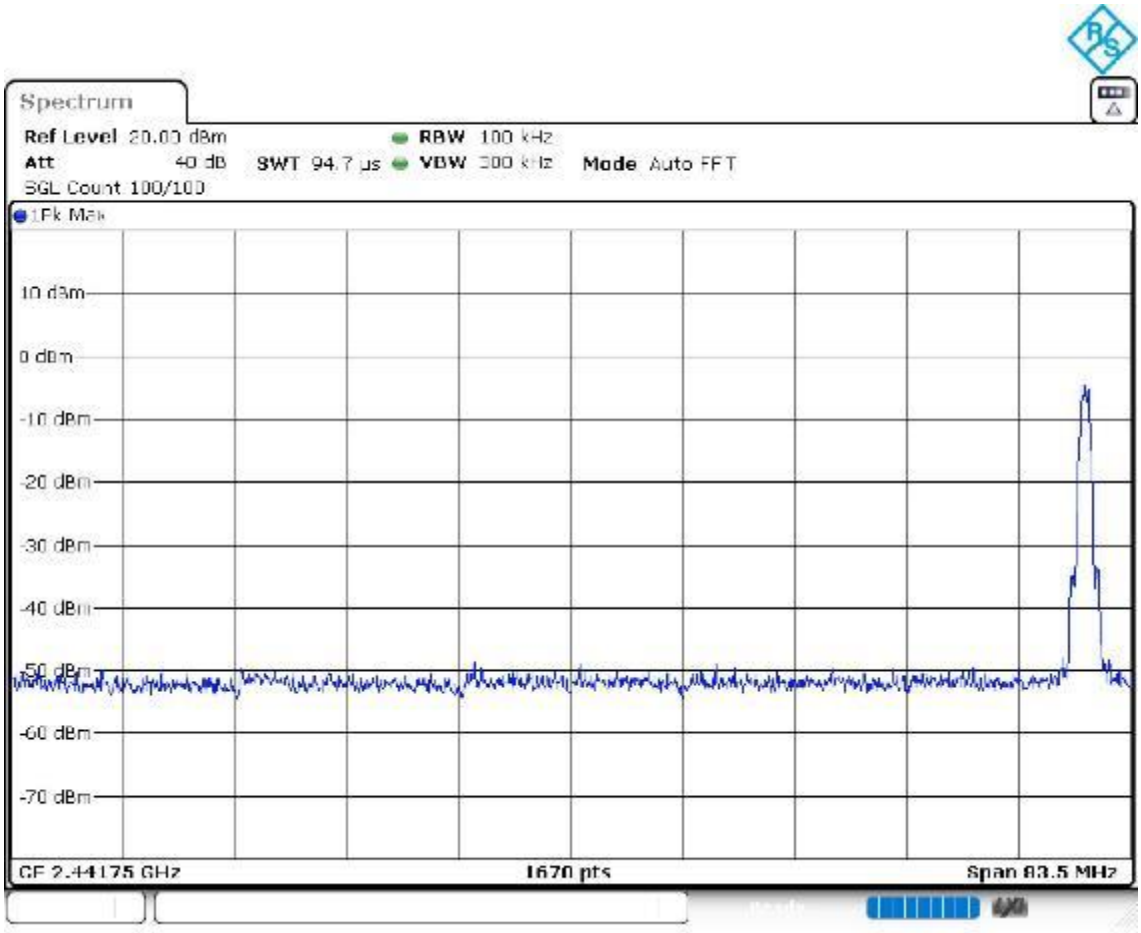
Frequency MHz = 2480.00000 Equipment Type = Digital Transmission System (DTS)

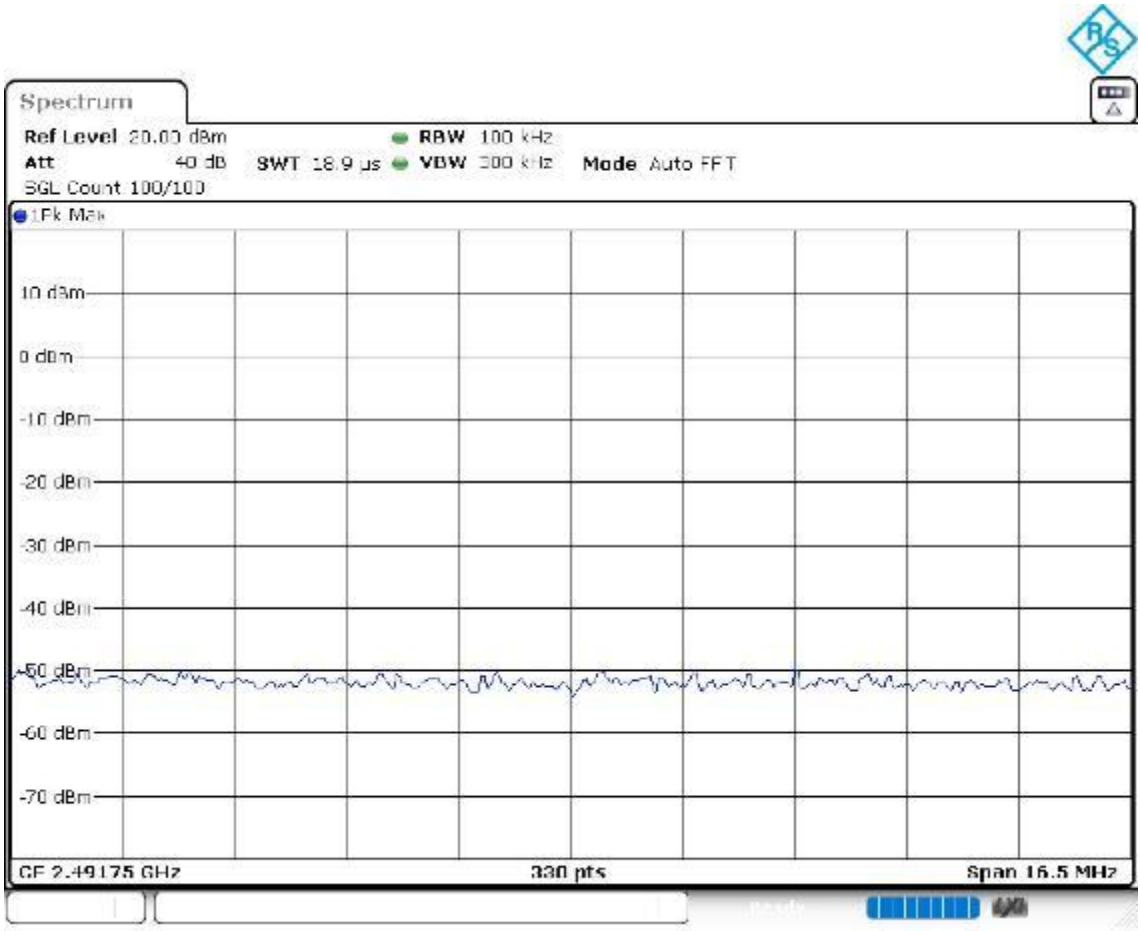
Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Plots:

Band Edge





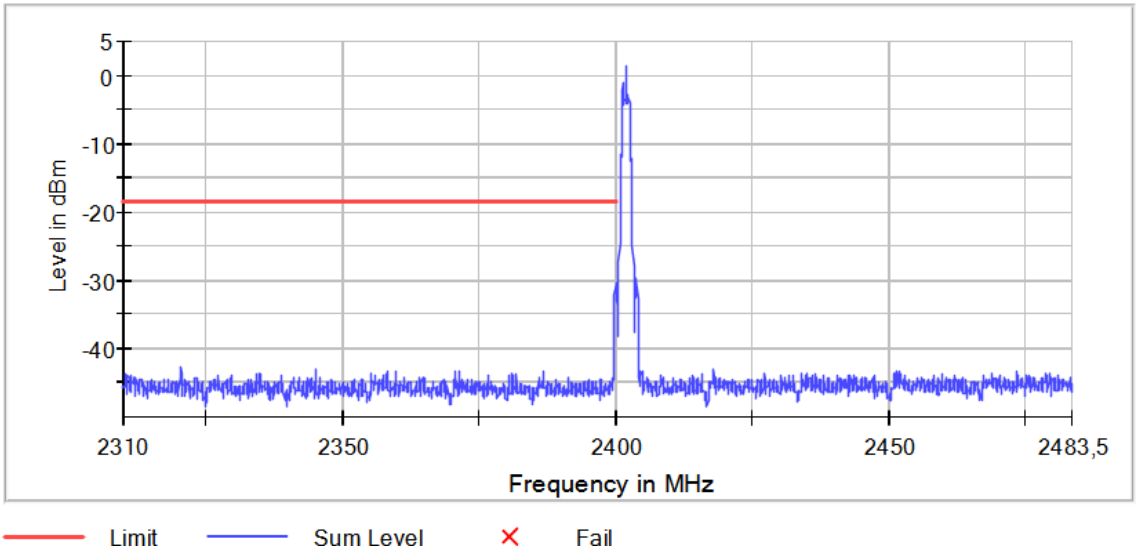

Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 40 dB
SWT 18.9 µs
VBW 300 kHz
Mode Auto FFT
SGL Count 100/100
1Pk Max
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.49175 GHz
330 pts
Span 16.5 MHz

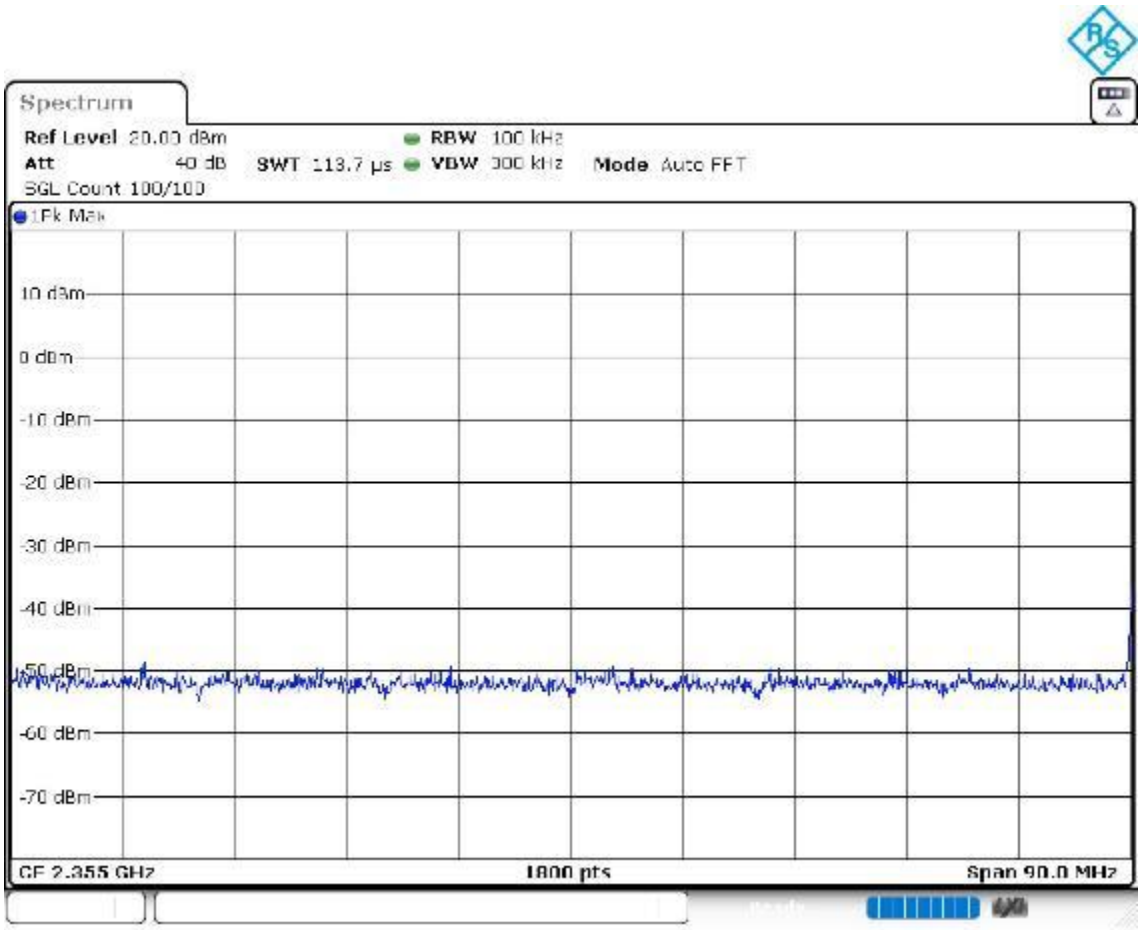
Attachments

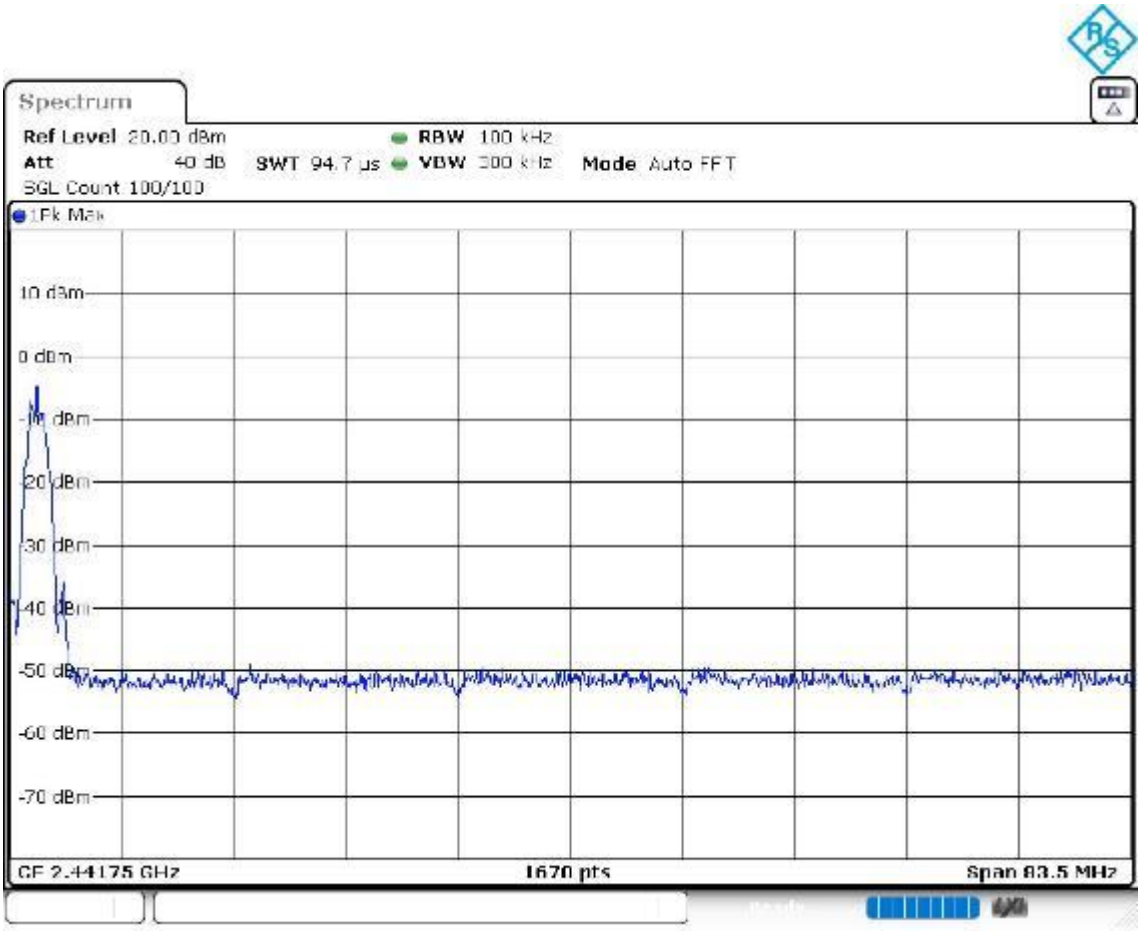
Frequency MHz = 2402.00000	Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 2	Modulation = BTLE 5.0 (GFSK 2 Mbit/s)
Number of Transmission Chains = 1	Measurement Point = 1
Active Port = 1	

Plots:

Band Edge






Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 40 dB
SWT 94.7 µs
VBW 300 kHz
Mode Auto FFT
SGL Count 100/100
1Pk Max
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.44175 GHz
1670 pts
Span 83.5 MHz

Frequency MHz = 2480.00000 Equipment Type = Digital Transmission System (DTS)

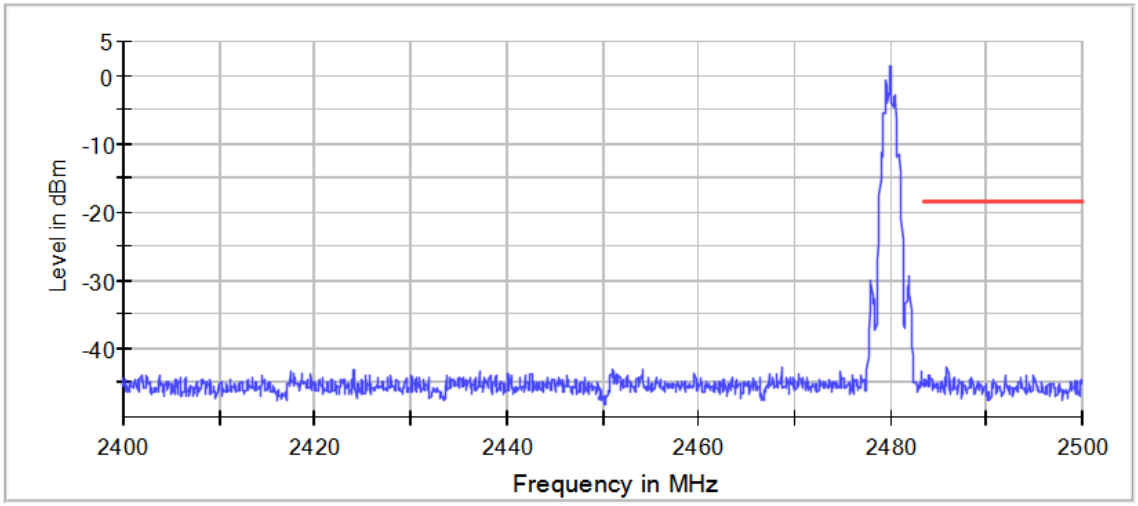
Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Number of Transmission Chains = 1 Measurement Point = 1

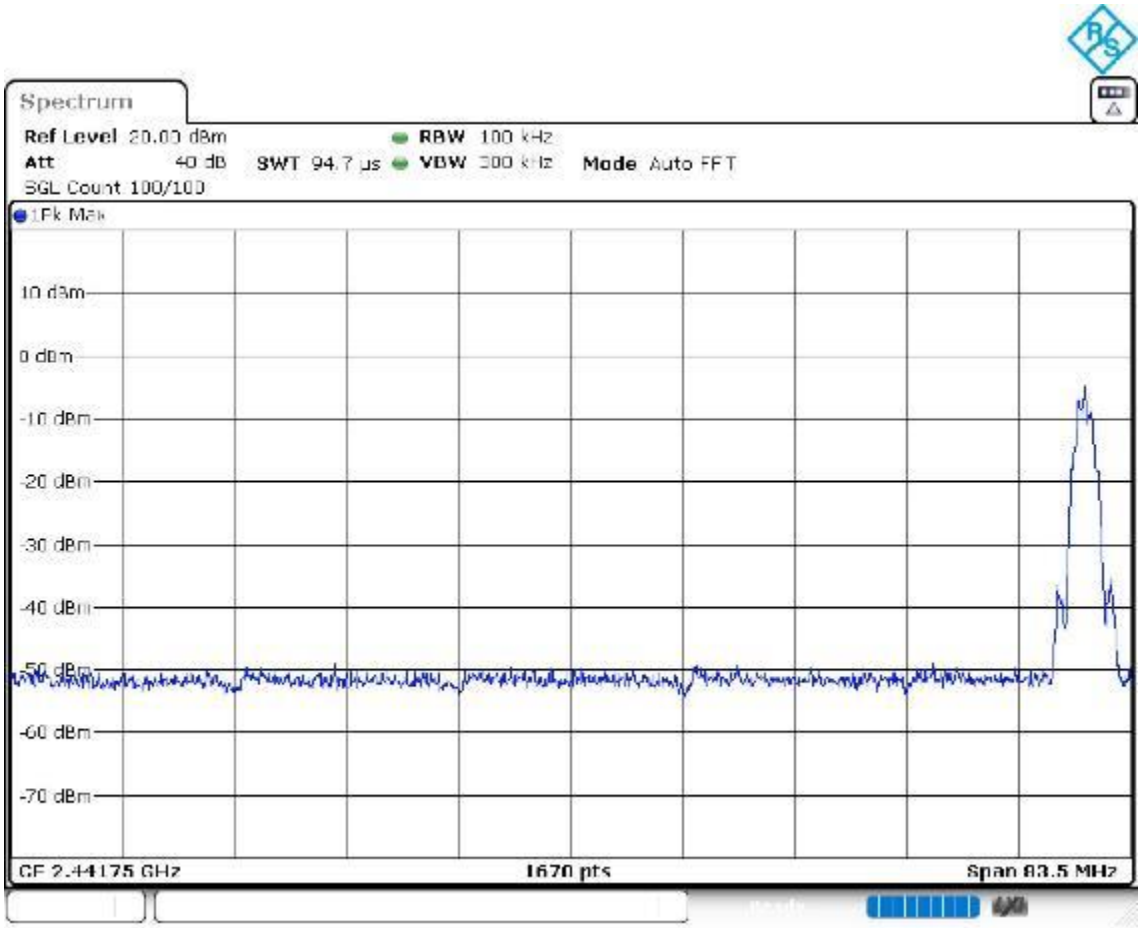
Active Port = 1

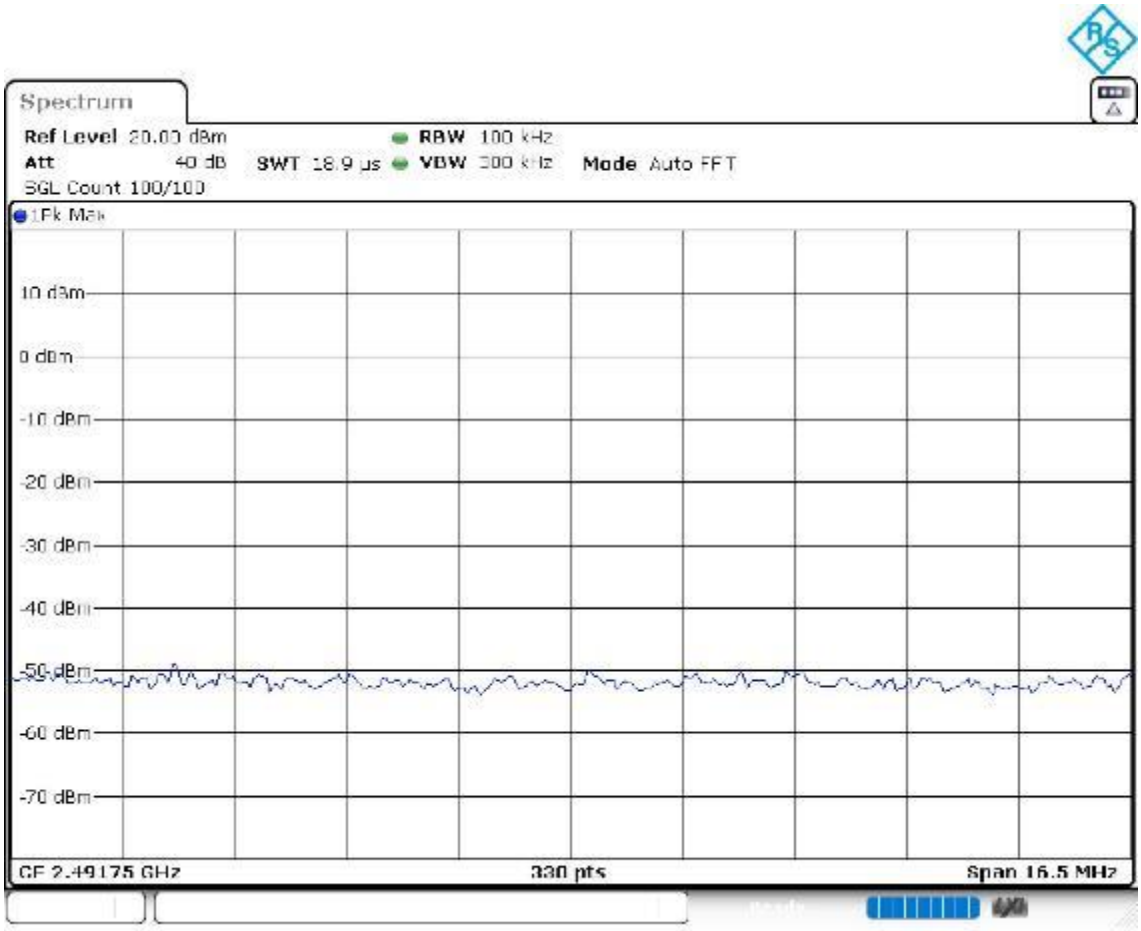
Plots:

Band Edge



Limit Sum Level Fail




Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 40 dB
SWT 18.9 µs
VBW 300 kHz
Mode Auto FFT
SGL Count 100/100
1Pk Max
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.49175 GHz
330 pts
Span 16.5 MHz

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

Limits

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 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
Above 960	500	54	3

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

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

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

Results

Frequency range 30 MHz – 1 GHz:

The spurious signals detected do not depend on either the operating channel or the modulation.

No spurious frequencies detected at less than 20 dB below the limit.

Frequency range 1 GHz – 26 GHz:

The results below show the maximum measured levels in the 1 – 26 GHz range including the restricted bands 2.31 – 2.39 GHz and 2.4835 – 2.5 GHz.

Spurious frequencies with peak levels above the average limit (54 dBµV/m at 3 m) are measured with average detector for compliance checking with the average limit.

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Freq (MHz)	Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
2402.00000	[3, 17]	4646.000	46.50	V	PK
		4803.500	52.11	V	PK
2440.00000		4647.000	50.93	V	PK
		4880.000	52.04	V	PK
2480.00000		4649.000	48.59	V	PK
		4959.500	52.35	V	PK
		7441.000	50.14	V	PK

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Freq (MHz)	Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
2402.00000	[3, 17]	4648.000	49.01	V	PK
		4805.000	51.74	H	PK
2440.00000		4650.500	47.54	V	PK
		4879.000	51.81	V	PK
2480.00000		4648.000	48.07	V	PK
		4959.000	50.70	V	PK

Verdict

Pass

Attachments

Spectrum Analyzer Parameters:

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [ESR 7]					
30 MHz - 1 GHz	48,5 kHz	PK+	100 kHz	1 s	20 dB
Receiver: [FSV 40]					
1 GHz - 3 GHz	66,667 kHz	PK+ ; AVG	1 MHz	1 s	0 dB
Receiver: [FSV 40]					
3 GHz - 17 GHz	500 kHz	PK+ ; AVG	1 MHz	1 s	0 dB
Receiver: [FSV 40]					
17 GHz - 26 GHz	500 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

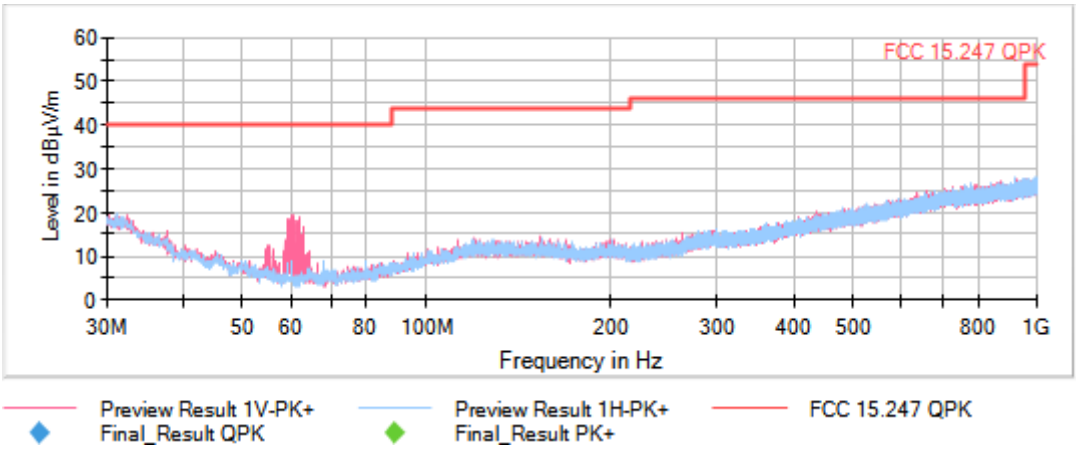
Equipment Type = Digital Transmission System (DTS)

Modulation = BTLE 5.0 (GFSK 1 Mbit/s & GFSK 2 Mbit/s) Frequency Range GHz = [0.03, 1]

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Plots:



This plot is valid for all channels and all modulation

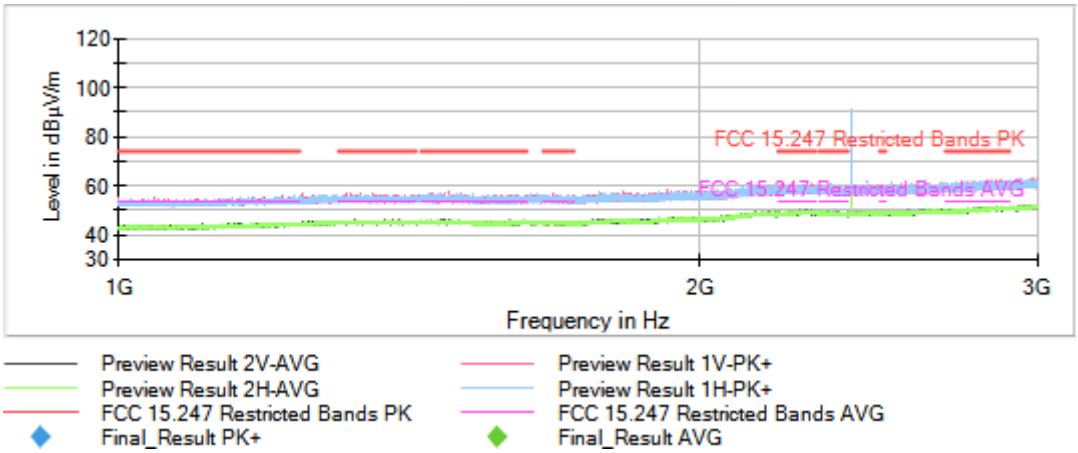
Frequency MHz = 2402.00000 | Equipment Type = Digital Transmission System (DTS)

Modulation = BTLE 5.0 (GFSK 1 Mbit/s) | Frequency Range GHz = [1, 3]

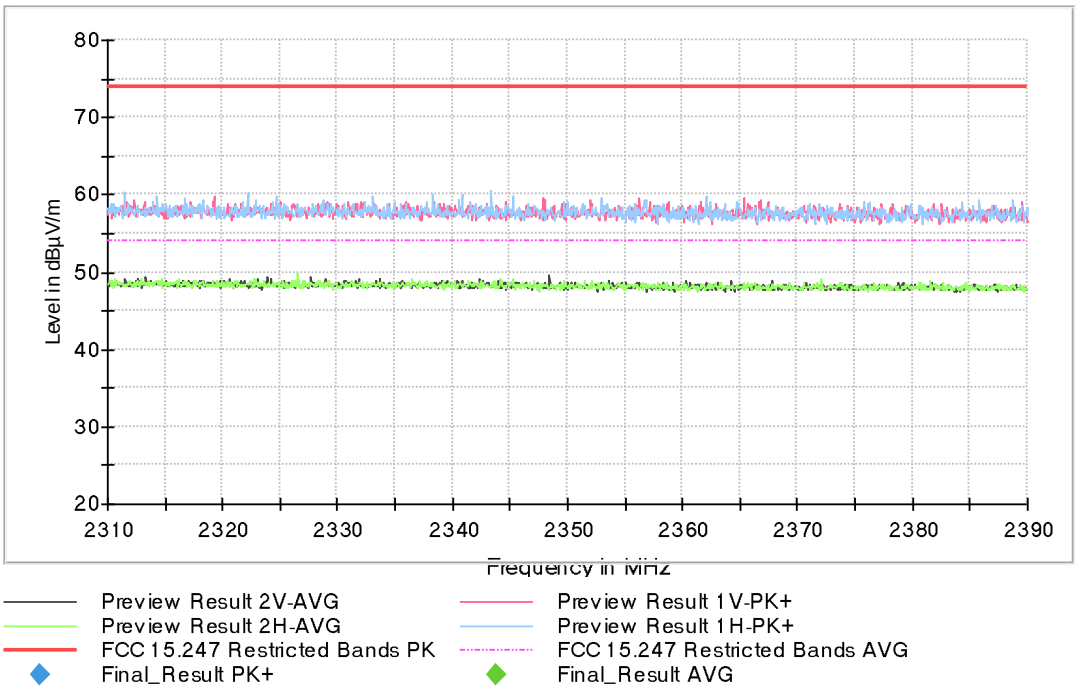
Number of Transmission Chains = 1 | Measurement Point = 1

Active Port = 1

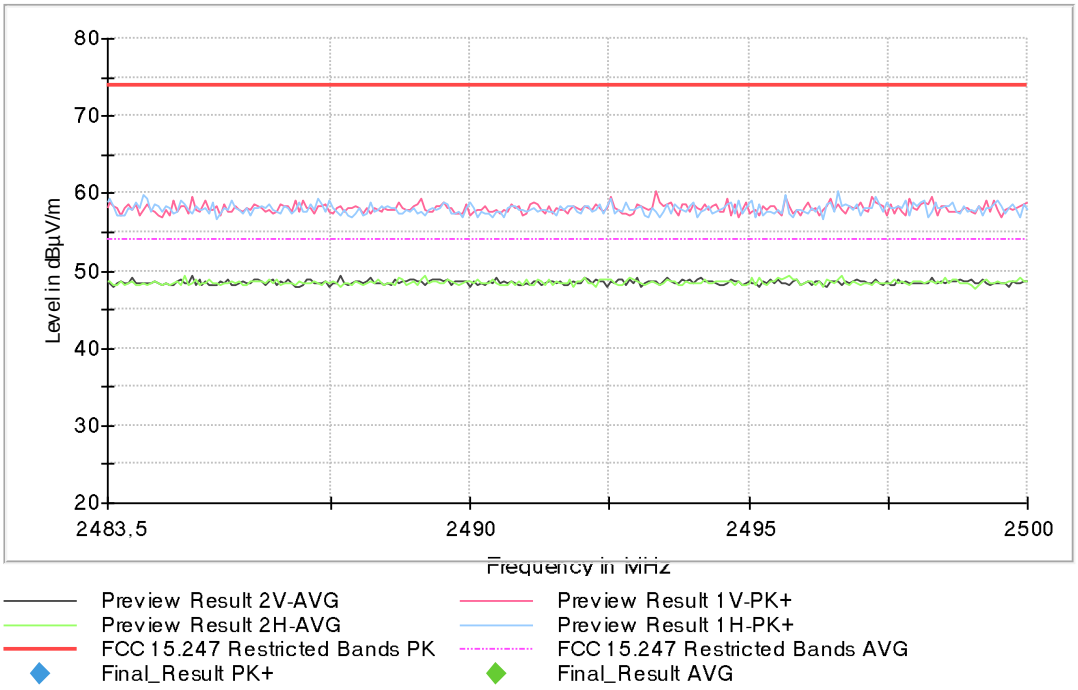
Plots:



Full Spectrum



Full Spectrum



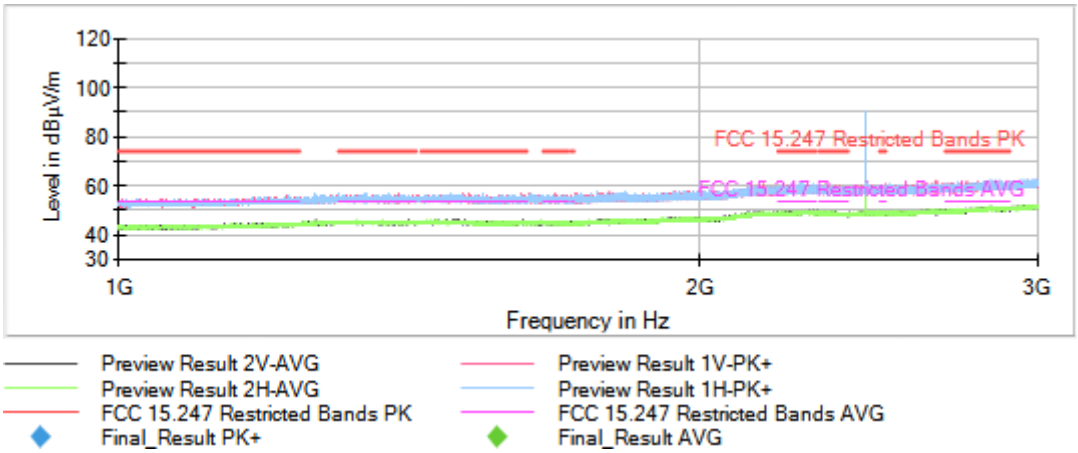
Frequency MHz = 2440.00000 | Equipment Type = Digital Transmission System (DTS)

Modulation = BTLE 5.0 (GFSK 1 Mbit/s) | Frequency Range GHz = [1, 3]

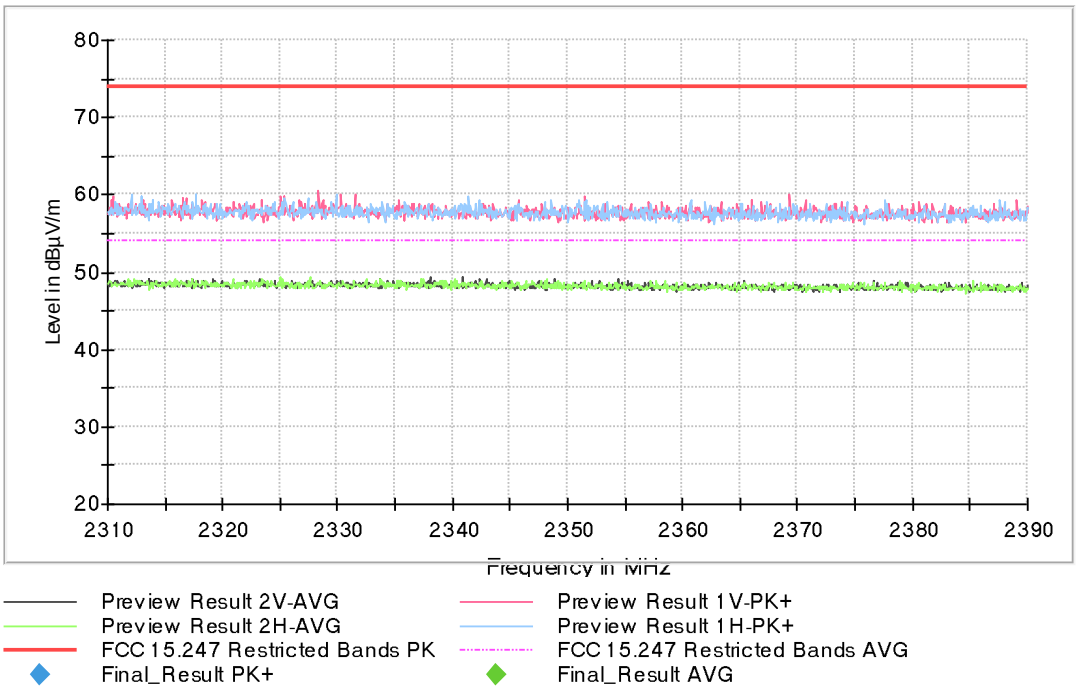
Number of Transmission Chains = 1 | Measurement Point = 1

Active Port = 1

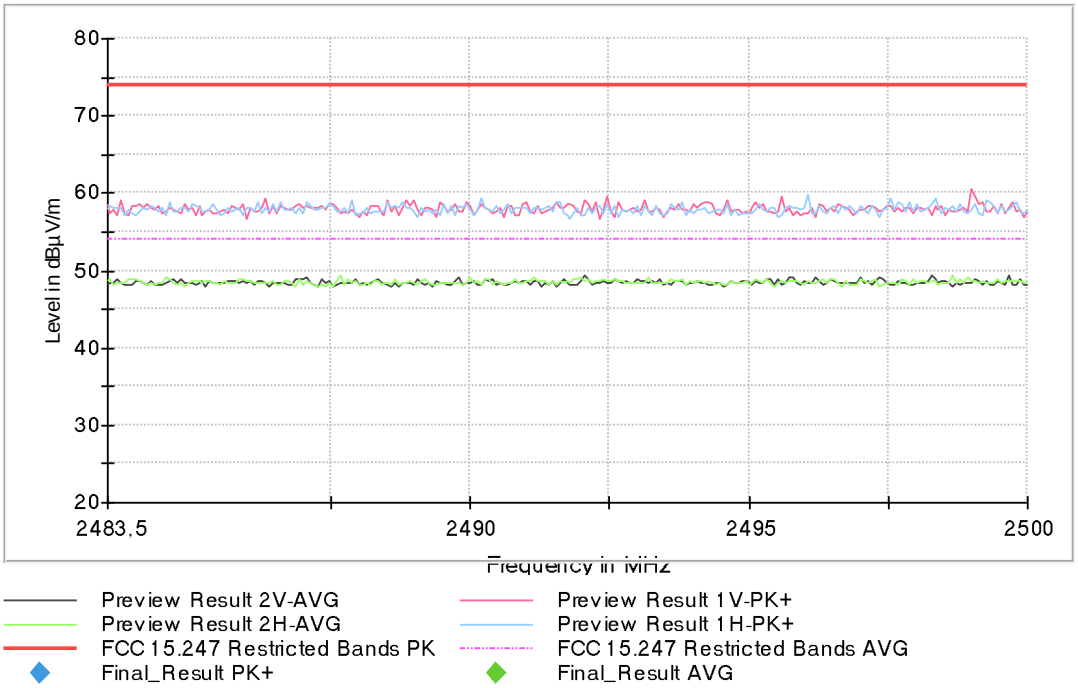
Plots:



Full Spectrum



Full Spectrum



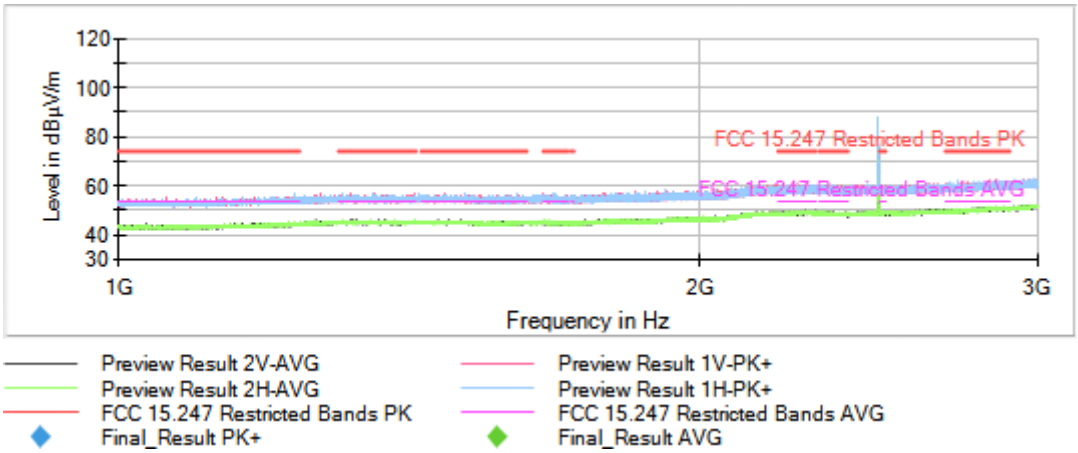
Frequency MHz = 2480.00000 | Equipment Type = Digital Transmission System (DTS)

Modulation = BTLE 5.0 (GFSK 1 Mbit/s) | Frequency Range GHz = [1, 3]

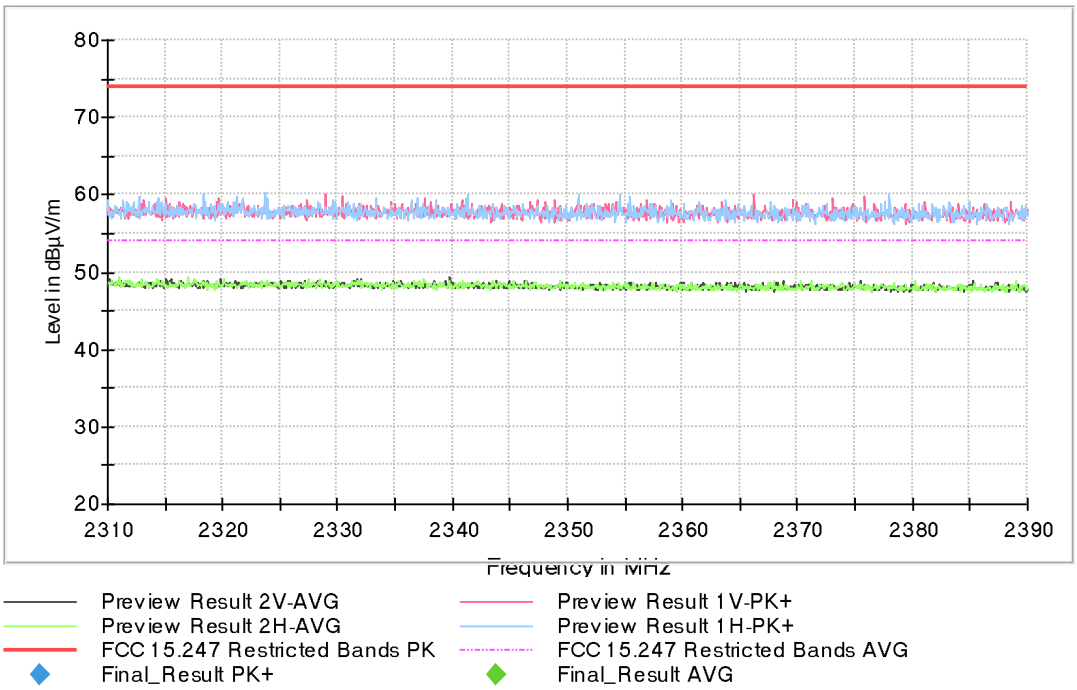
Number of Transmission Chains = 1 | Measurement Point = 1

Active Port = 1

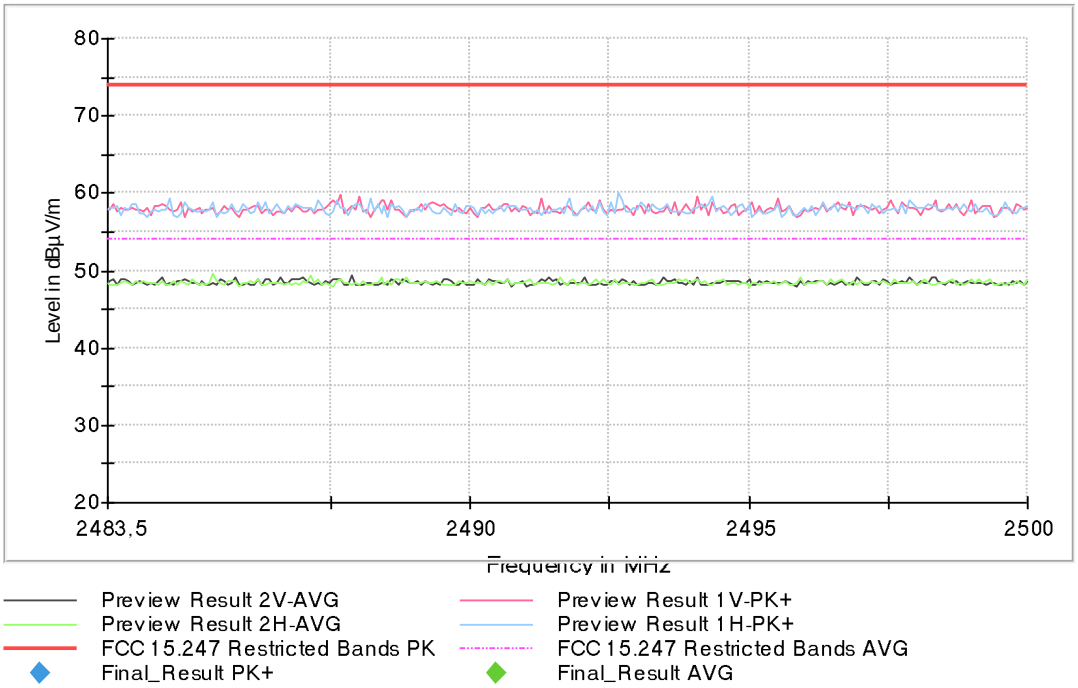
Plots:



Full Spectrum



Full Spectrum



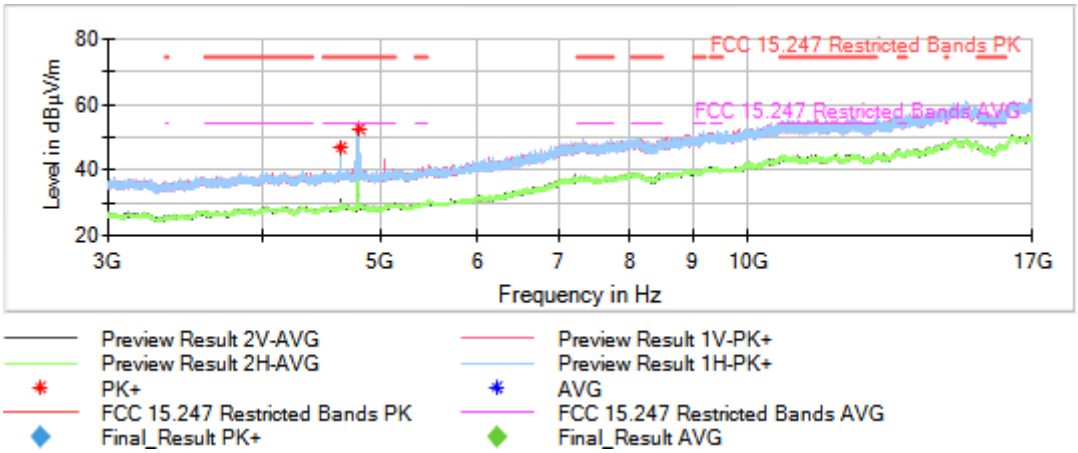
Frequency MHz = 2402.00000 Equipment Type = Digital Transmission System (DTS)

Modulation = BTLE 5.0 (GFSK 1 Mbit/s) Frequency Range GHz = [3, 17]

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Plots:



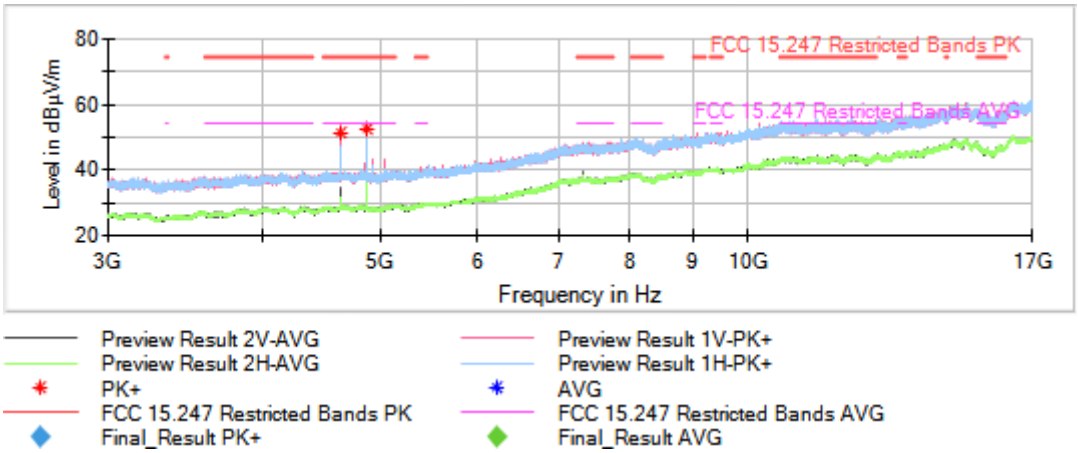
Frequency MHz = 2440.00000 Equipment Type = Digital Transmission System (DTS)

Modulation = BTLE 5.0 (GFSK 1 Mbit/s) Frequency Range GHz = [3, 17]

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Plots:



Frequency MHz = 2480.00000

Equipment Type = Digital Transmission System (DTS)

Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

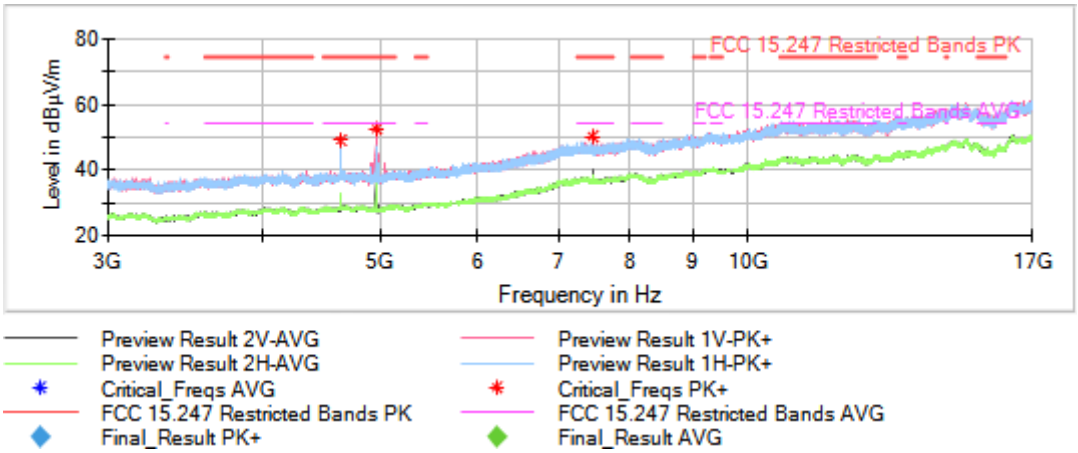
Frequency Range GHz = [3, 17]

Number of Transmission Chains = 1

Measurement Point = 1

Active Port = 1

Plots:



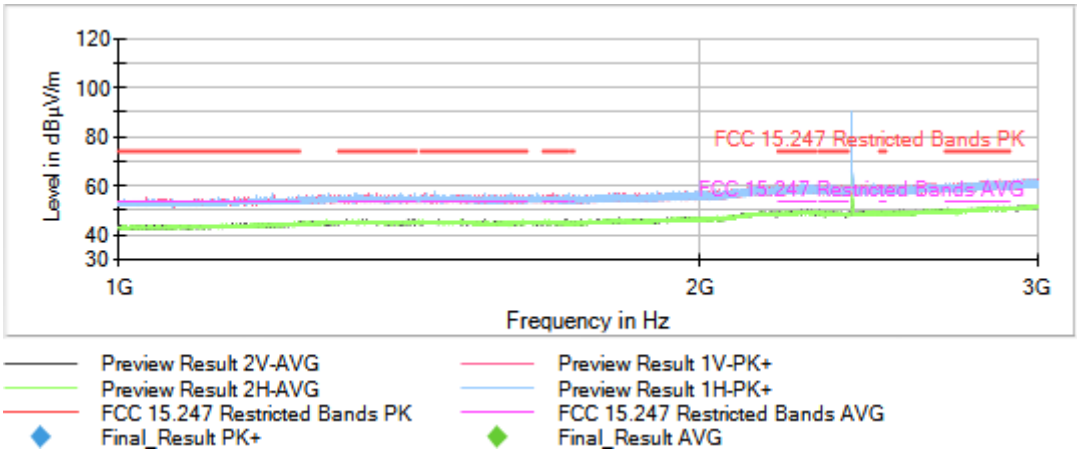
Frequency MHz = 2402.00000 | Equipment Type = Digital Transmission System (DTS)

Modulation = BTLE 5.0 (GFSK 2 Mbit/s) | Frequency Range GHz = [1, 3]

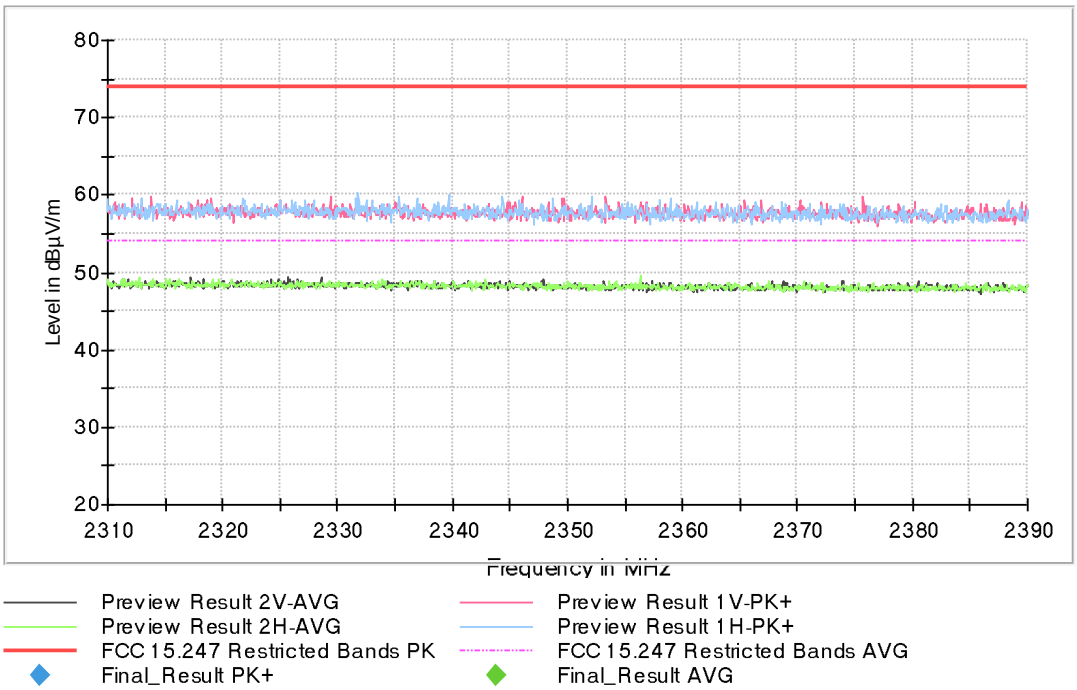
Number of Transmission Chains = 1 | Measurement Point = 1

Active Port = 1

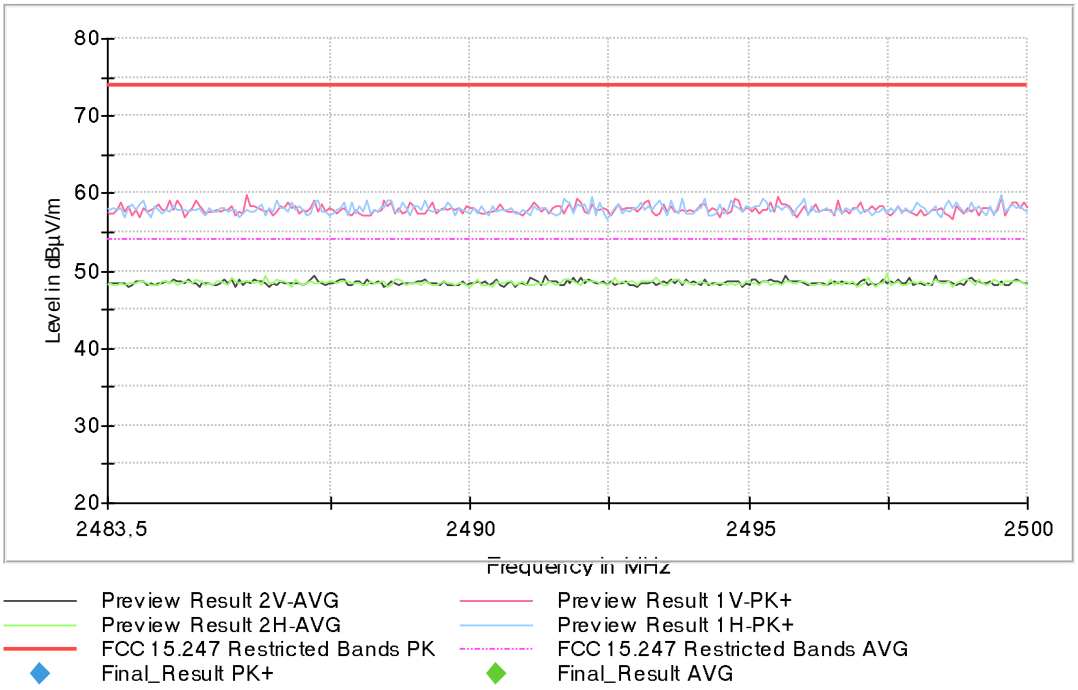
Plots:



Full Spectrum



Full Spectrum



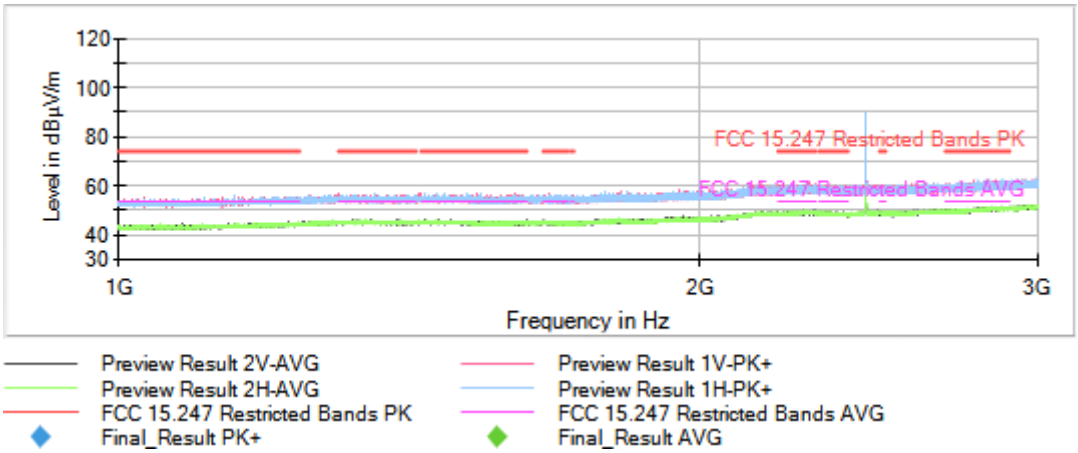
Frequency MHz = 2440.00000 | Equipment Type = Digital Transmission System (DTS)

Modulation = BTLE 5.0 (GFSK 2 Mbit/s) | Frequency Range GHz = [1, 3]

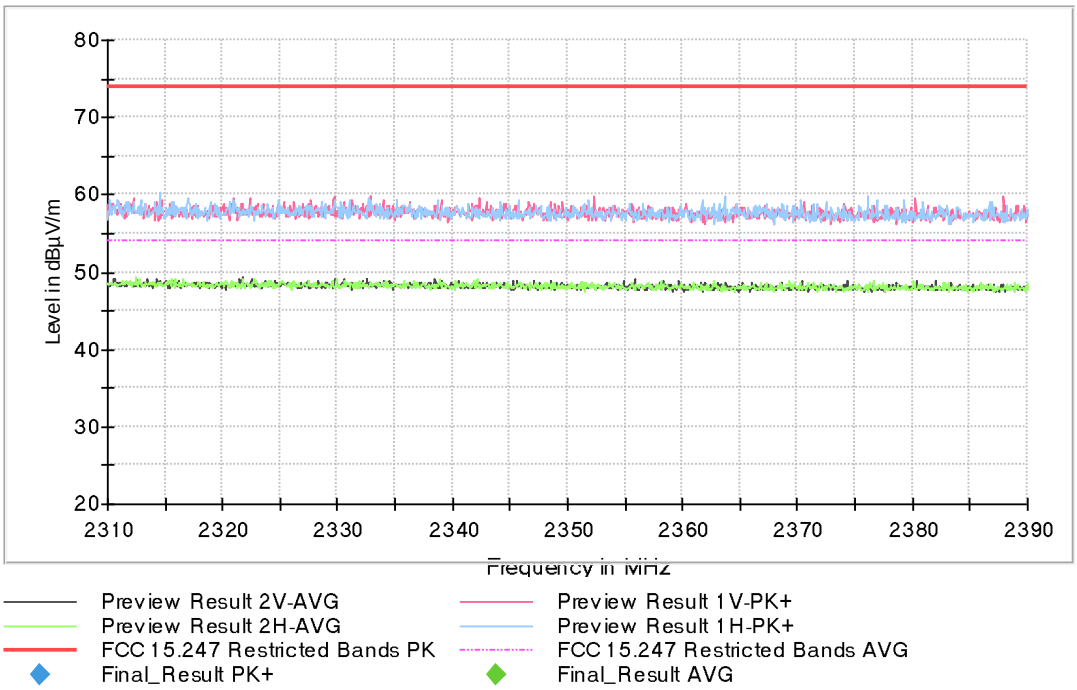
Number of Transmission Chains = 1 | Measurement Point = 1

Active Port = 1

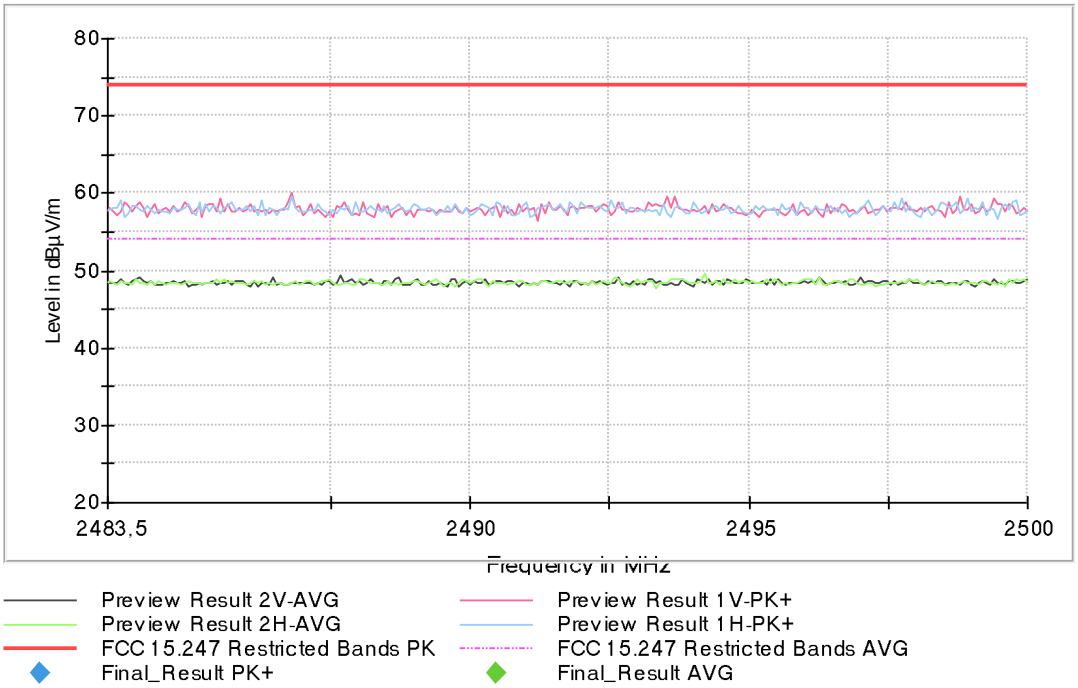
Plots:



Full Spectrum

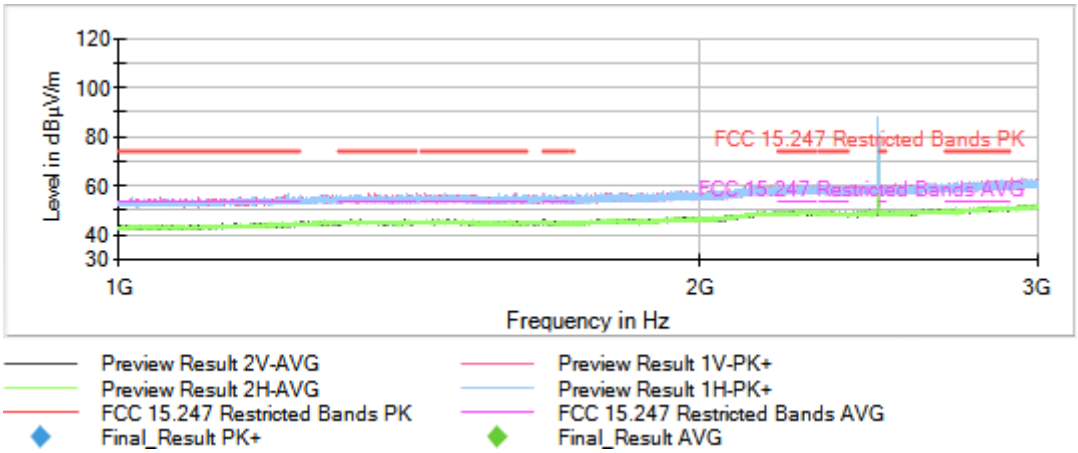


Full Spectrum

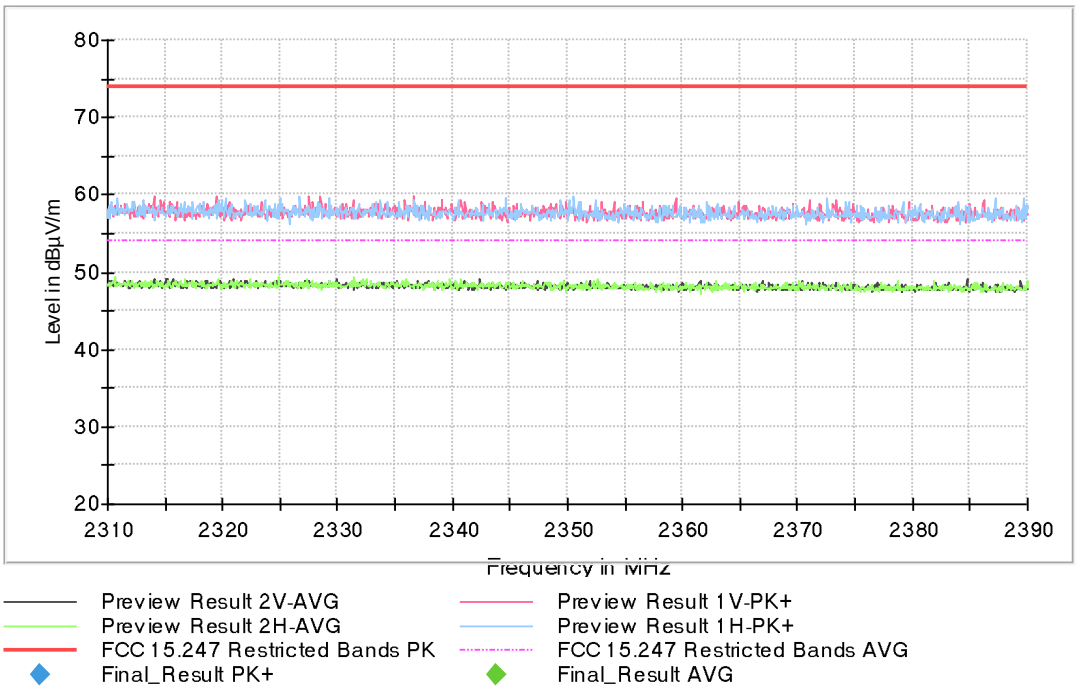


Frequency MHz = 2480.00000 | Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE 5.0 (GFSK 2 Mbit/s) | Frequency Range GHz = [1, 3]
Number of Transmission Chains = 1 | Measurement Point = 1
Active Port = 1

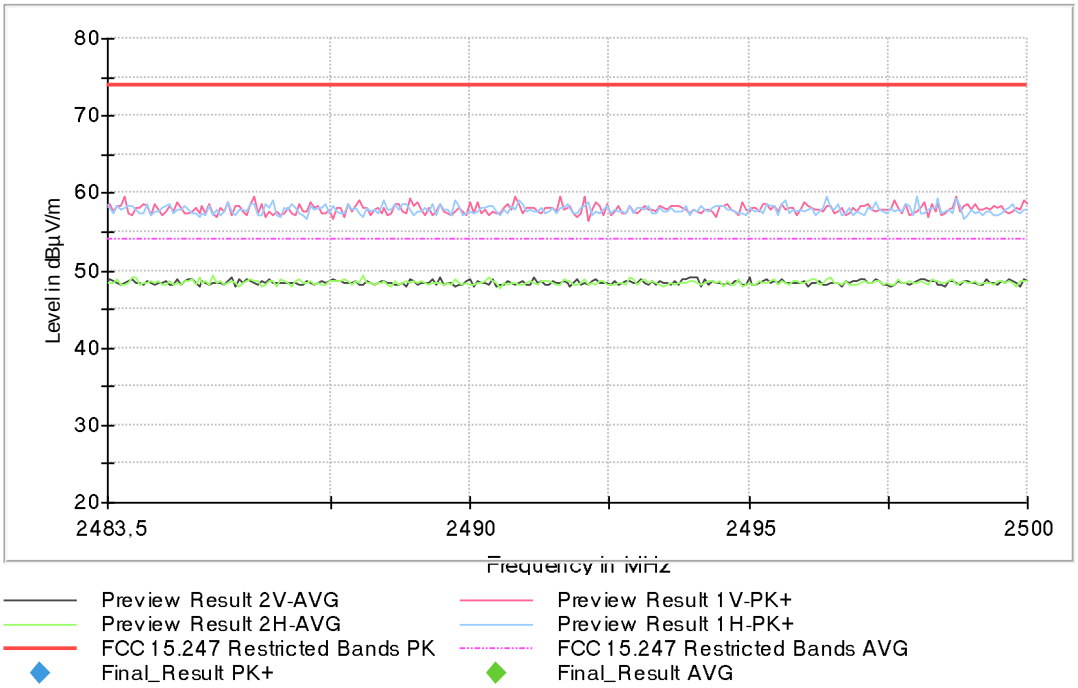
Plots:



Full Spectrum



Full Spectrum



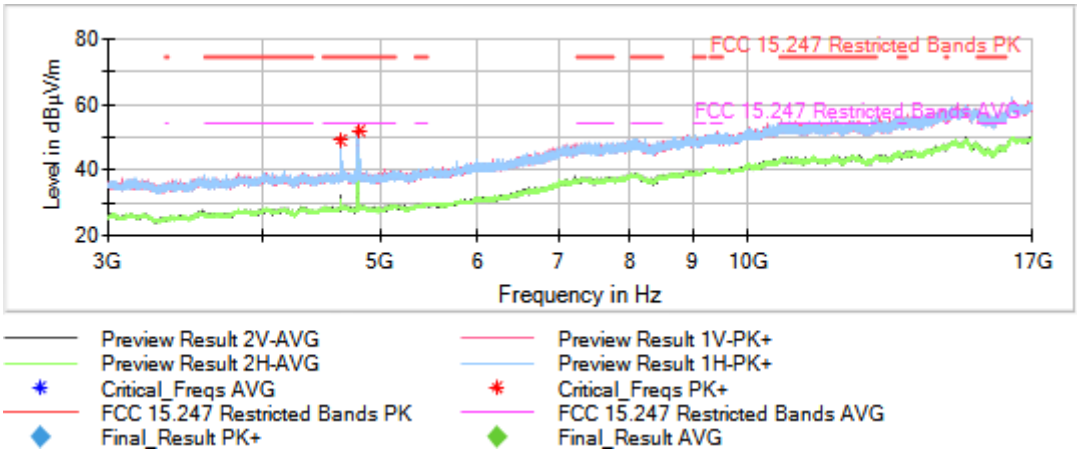
Frequency MHz = 2402.00000 Equipment Type = Digital Transmission System (DTS)

Modulation = BTLE 5.0 (GFSK 2 Mbit/s) Frequency Range GHz = [3, 17]

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Plots:



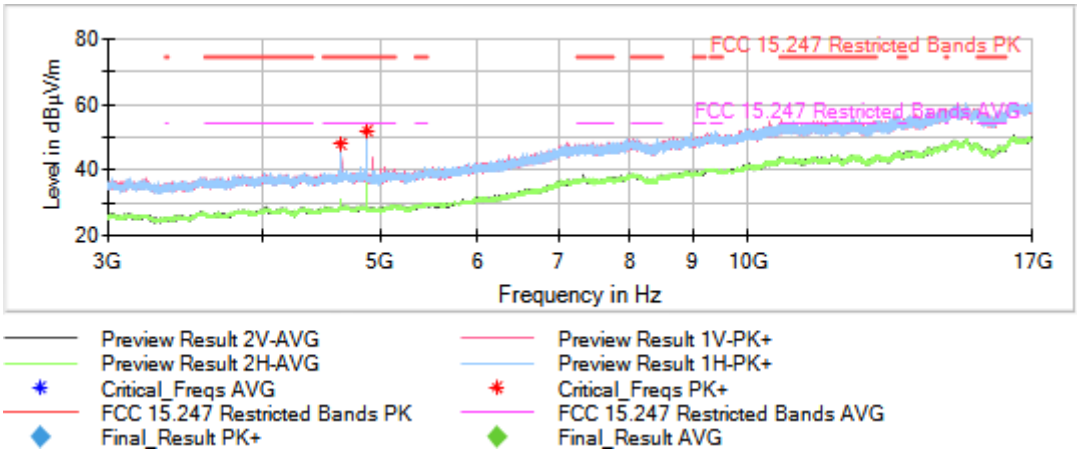
Frequency MHz = 2440.00000 Equipment Type = Digital Transmission System (DTS)

Modulation = BTLE 5.0 (GFSK 2 Mbit/s) Frequency Range GHz = [3, 17]

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Plots:



Frequency MHz = 2480.00000

Equipment Type = Digital Transmission System (DTS)

Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

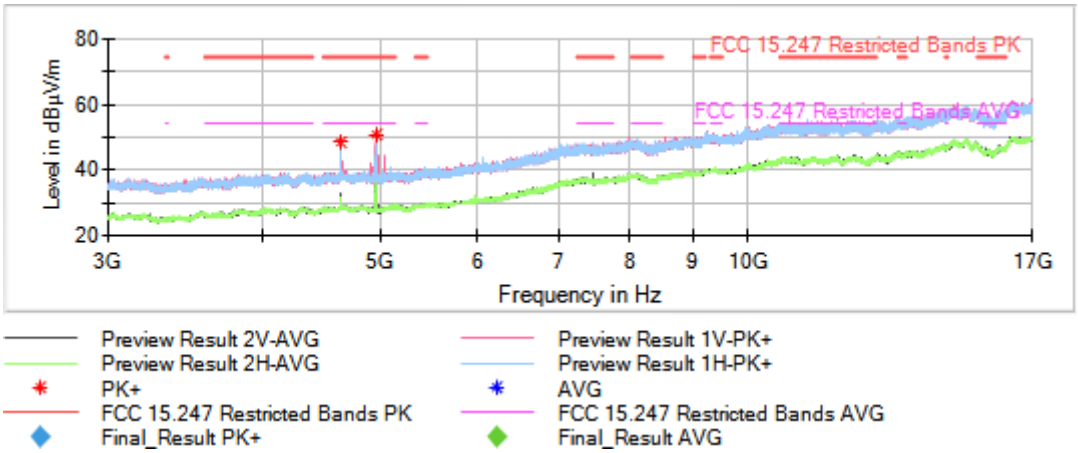
Frequency Range GHz = [3, 17]

Number of Transmission Chains = 1

Measurement Point = 1

Active Port = 1

Plots:



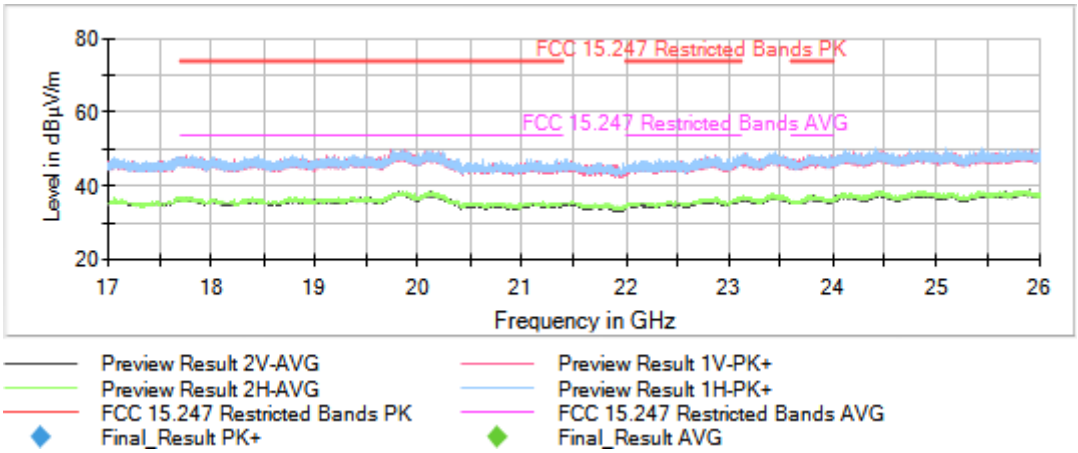
Equipment Type = Digital Transmission System (DTS)

Modulation = BTLE 5.0 (GFSK 1 Mbit/s & GFSK 2 Mbit/s) Frequency Range GHz = [17, 26]

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Plots:



This plot is valid for all channels and all modulation