

ISED CABid: ES1909

Test Report No:

Lab. Company Number: 4621A

74000RRF.003

Test Report

USA FCC Part 15.247, 15.209

CANADA RSS-247, RSS-Gen

(*) Identification of item tested	Sports watch with GNSS and BLE and WLAN connectivity
(*) Trademark	SUUNTO
(*) Model and /or type reference	OW222
Other identification of the product	FCC ID: RYPOW222 IC: 5175A-OW222
(*) Features	Features: GNSS, BLE, WLAN HW version: D2 SW version: 2.24
Applicant	Suunto Oy Tammiston kauppatie 7A 01510 Vantaa, FINLAND
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
Date of issue	2023-03-22
Report template No	FDT08_24 (* "Data provided by the client")

Index

INDEX	2
ACRONYMS	3
COMPETENCES AND GUARANTEES	3
GENERAL CONDITIONS	4
UNCERTAINTY	4
DATA PROVIDED BY THE CLIENT	4
USAGE OF SAMPLES	5
TEST SAMPLE DESCRIPTION	6
IDENTIFICATION OF THE CLIENT	7
TESTING PERIOD AND PLACE	7
DOCUMENT HISTORY	7
ENVIRONMENTAL CONDITIONS	7
REMARKS AND COMMENTS	8
TESTING VERDICTS	9
SUMMARY.....	9
APPENDIX A: TEST RESULTS. BLUETOOTH LOW ENERGY 5.0 (2M, 1M)	11
APPENDIX B: TEST RESULTS. 802.11 B/G/N 20 MHZ 1X1	79

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
PeakPower	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.

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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.

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2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
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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 $\leq \pm 5,35$ 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 $\leq \pm 4,32$ 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 $\leq \pm 5,51$ 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 $\leq \pm 0,80$ dB
- RF Average Output Power: Measurement uncertainty $\leq \pm 0,99$ dB
- Power Spectral Density: Measurement uncertainty $\leq \pm 0,99$ dB
- 6dB Bandwidth: Measurement uncertainty $\leq \pm 2,84$ %
- Occupied Channel Bandwidth: Measurement uncertainty $\leq \pm 1,17$ %
- Conducted Band-edge spurious emissions: Measurement uncertainty $\leq \pm 1,76$ 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 sports watch with GPS for tracking outdoor trainings, optical heart rate measurement and BLE connectivity to connect with a smart phone and the Suunto App for recording training logs and analyze training and 24/7 data. WLAN connectivity for map downloading.

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	74000_60.1	Sports watch	OW222	22511300139	2023-01-11	Element Under Test
S/02	74000_48.1	Sports watch	OW222	22511300120	2023-01-11	Element Under Test
S/01 & S/02	74000_61.1	USB charger Watch	--	--	2023-01-11	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⁾		
	Charging cable	< 3m	[X]	[]	[]		
.....			[]	[]	[]		
Supplementary information to the ports..... :						
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	[]	AC:	[]	[]	[]	[]	[]
[X]	DC: 3.87Vdc (internal battery)						
Rated Power						
Clock frequencies.....						
Other parameters						
Software version	2.24						
Hardware version	D2						
Dimensions in cm (W x H x D)						
Mounting position	[]	Table top equipment					
	[]	Wall/Ceiling mounted equipment					
	[]	Floor standing equipment					
	[]	Hand-held equipment					
	[X]	Other: Wearable device					
Modules/parts..... :	Module/parts of test item		Type	Manufacturer			
	Sports watch		OW222	Suunto Oy			
	Charging cable		CC221	Suunto Oy			
			
Accessories (not part of the test item)	Description		Type	Manufacturer			
			
Documents as provided by the applicant..... :	Description		File name	Issue date			
			

⁽³⁾ Only for Medical Equipment

Identification of the client

Suunto Oy
Tammiston kauppatie 7A
01510 Vantaa, FINLAND

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2023-01-13
Date (finish)	2023-02-07

Document history

Report number	Date	Description
74000RRF.003	2023-03-22	First release.

Environmental conditions

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

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

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

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

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

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

Remarks and comments

The tests have been performed by the technical personnel: Antonio Manuel Sánchez, 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
5862	EMI TEST RECEIVER 9kHz-7GHz	ESR7	ROHDE AND SCHWARZ	2025-02-15
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
8835	SIGNAL AND SPECTRUM ANALYZER 2Hz-50GHz	FSW50	ROHDE AND SCHWARZ	2025-02-08
7040	EXTENSION FOR OPEN SWITCH UP TO 40GHz	OSP-B157Wx	ROHDE AND SCHWARZ	2023-03-23
9391	DC POWER SUPPLY 30V / 3A	ALR3003	ELC	N/A
7756	DIGITAL MULTIMETER	175	FLUKE	2023-12-21

Testing verdicts

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

Summary

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

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

2. 802.11 B/G/N 20 MHz 1x1. Appendix B

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

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

INDEX

TEST CONDITIONS	13
TEST CASES DETAILS	16
<i>Occupied Channel Bandwidth 99%</i>	16
<i>RSS-247 5.2 (a) / FCC 15.247 (a) (2) 6 dB Bandwidth</i>	23
<i>RSS-247 5.2 (b) / FCC 15.247 (e) Power spectral density</i>	30
<i>RSS-247 5.4 (d) / FCC 15.247 (b) (3) Maximum Peak Conducted output power</i>	37
<i>RSS-247 5.5 / FCC 15.247 (d) Band-edge emissions compliance (Transmitter)</i>	44
<i>RSS-247 5.5 / FCC 15.247 (d) Emission limitations radiated (Transmitter)</i>	55

TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal:	3.87Vdc
Type of Power Supply:	Battery

ANTENNA (*):

Type of Antenna:	Integral
Maximum Declared Antenna Gain:	-3.6dBi

TEST FREQUENCIES (*):

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

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).

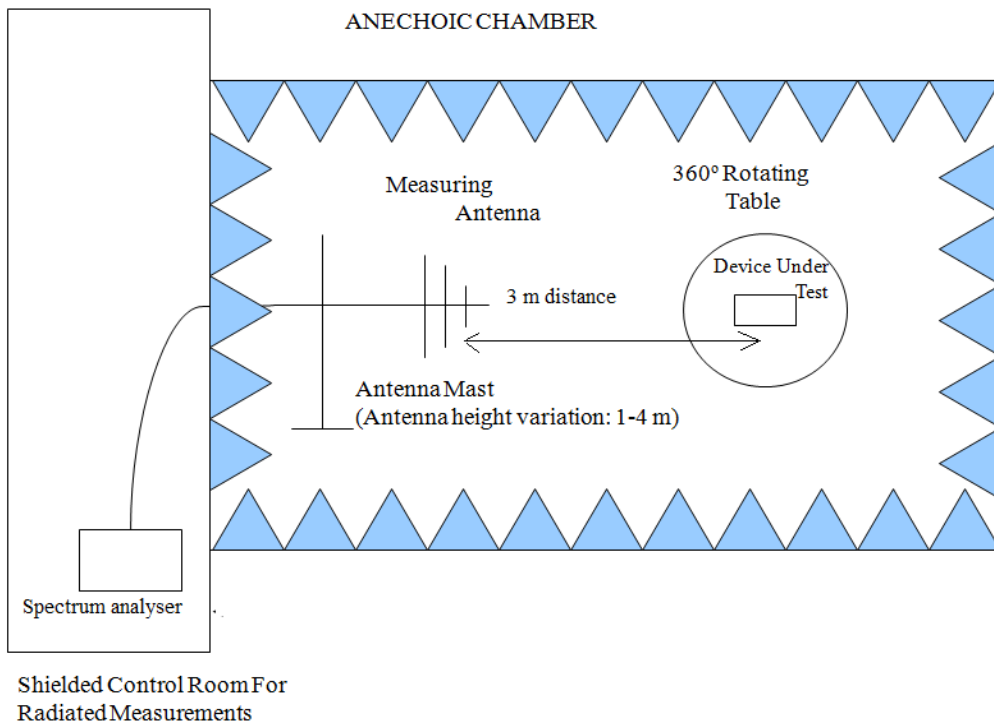
For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

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 360° and the antenna height (Bilog antenna and Double ridge horn antenna) was varied from 1 to 4 meters to find the maximum radiated emission.

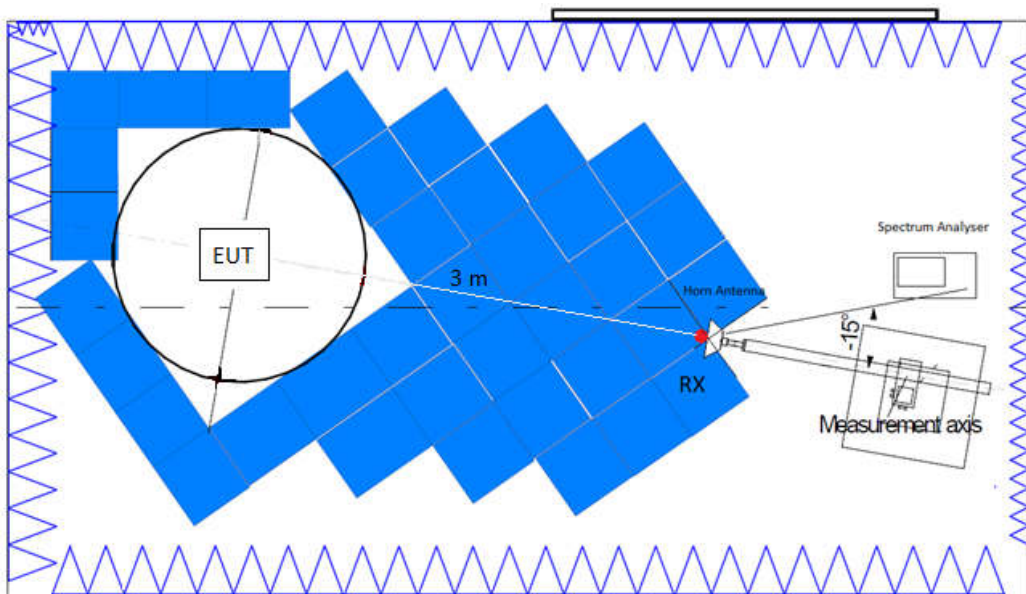
Measurements were made in both horizontal and vertical planes of polarization.

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.

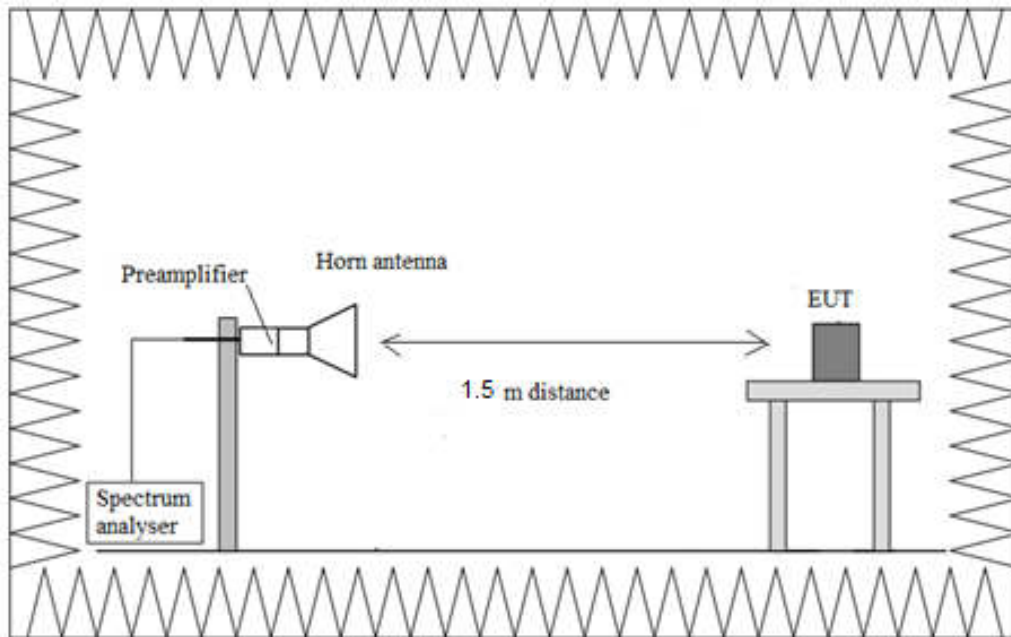
Radiated measurements setup from 30 MHz to 1 GHz:



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)
2402.00000	1.040
2440.00000	1.050
2480.00000	1.040

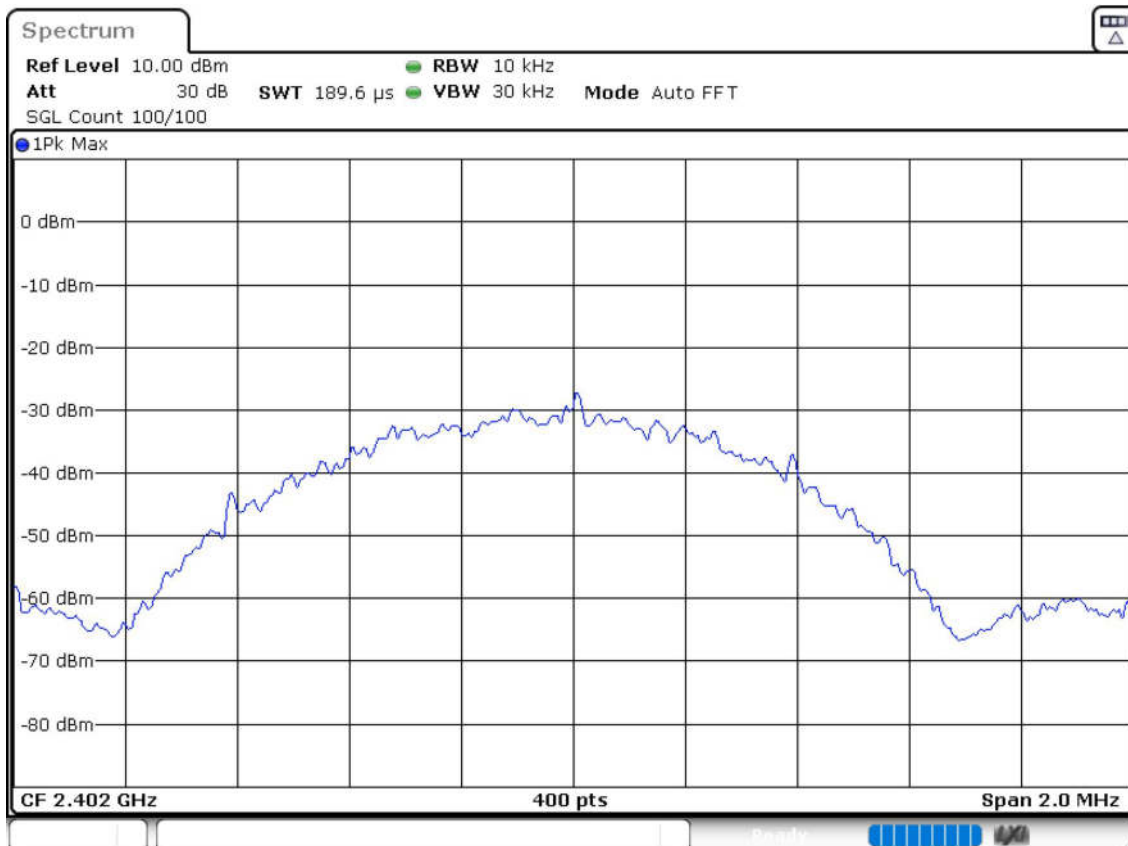
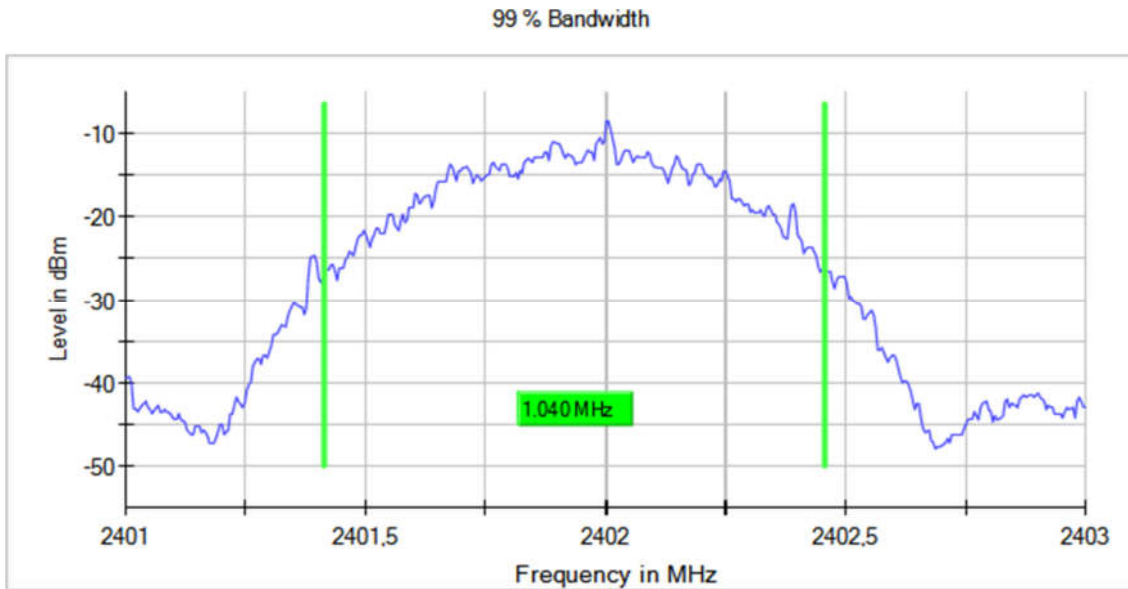
Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Freq (MHz)	Occ Ch BW (MHz)
2402.00000	2.060
2440.00000	2.080
2480.00000	2.070

Attachments

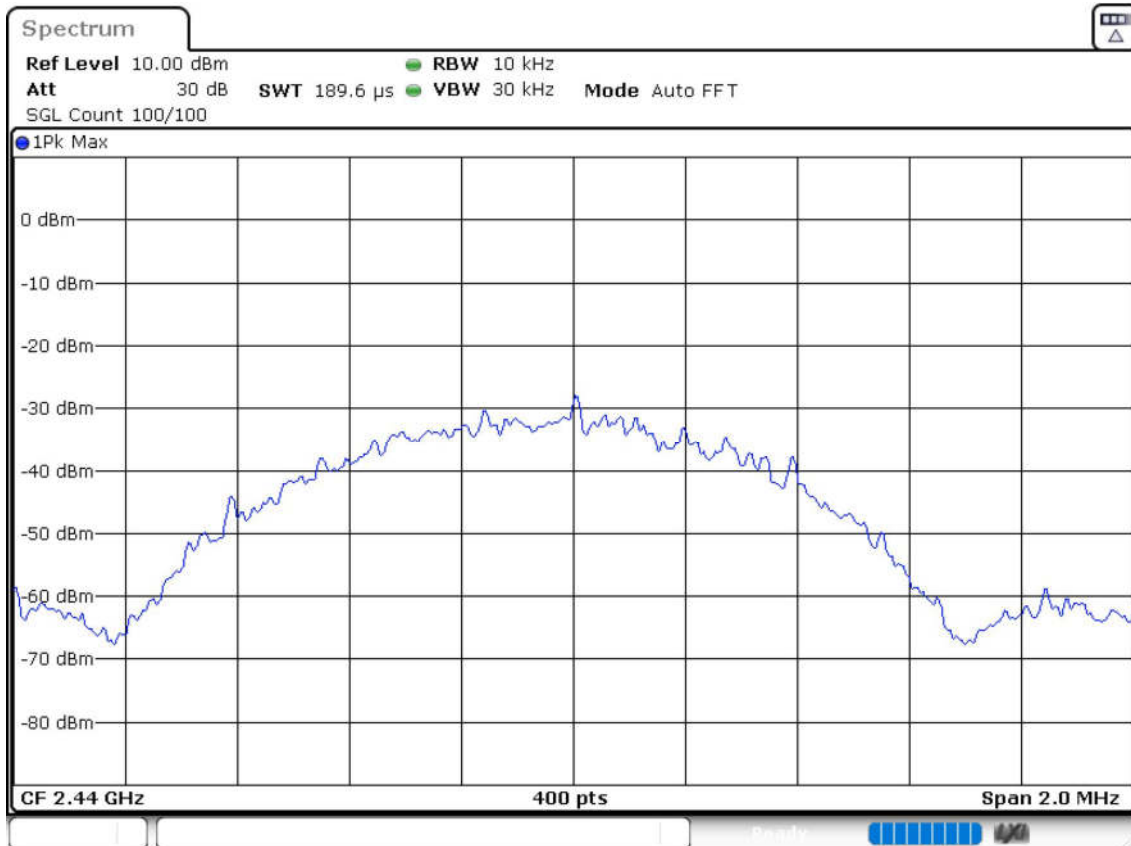
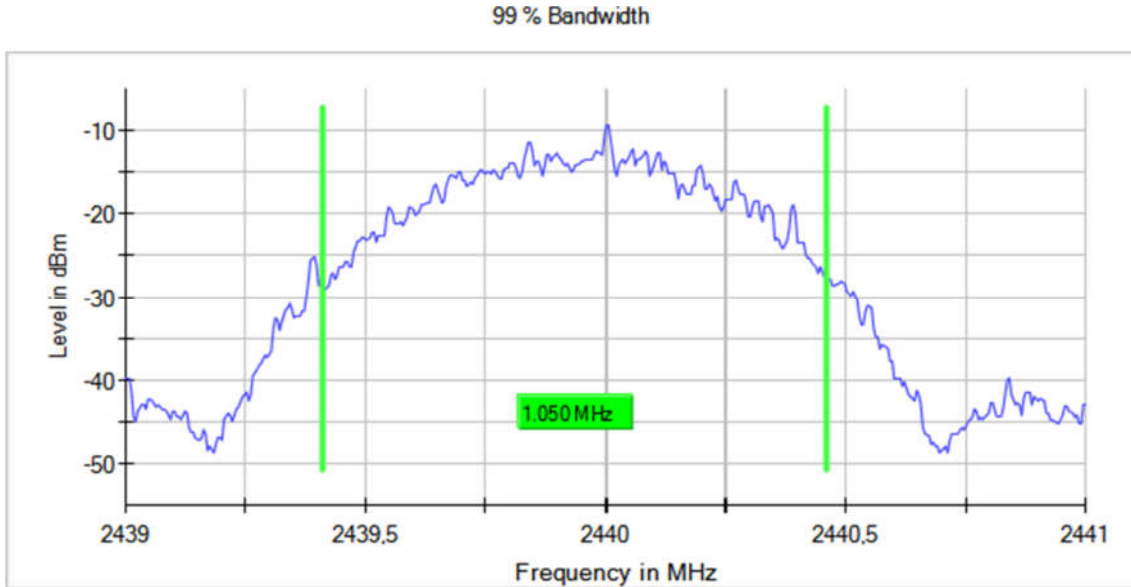
Frequency MHz = 2402.00000 Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
Number of Transmission Chains = 1 Active Port = 1

Plots:



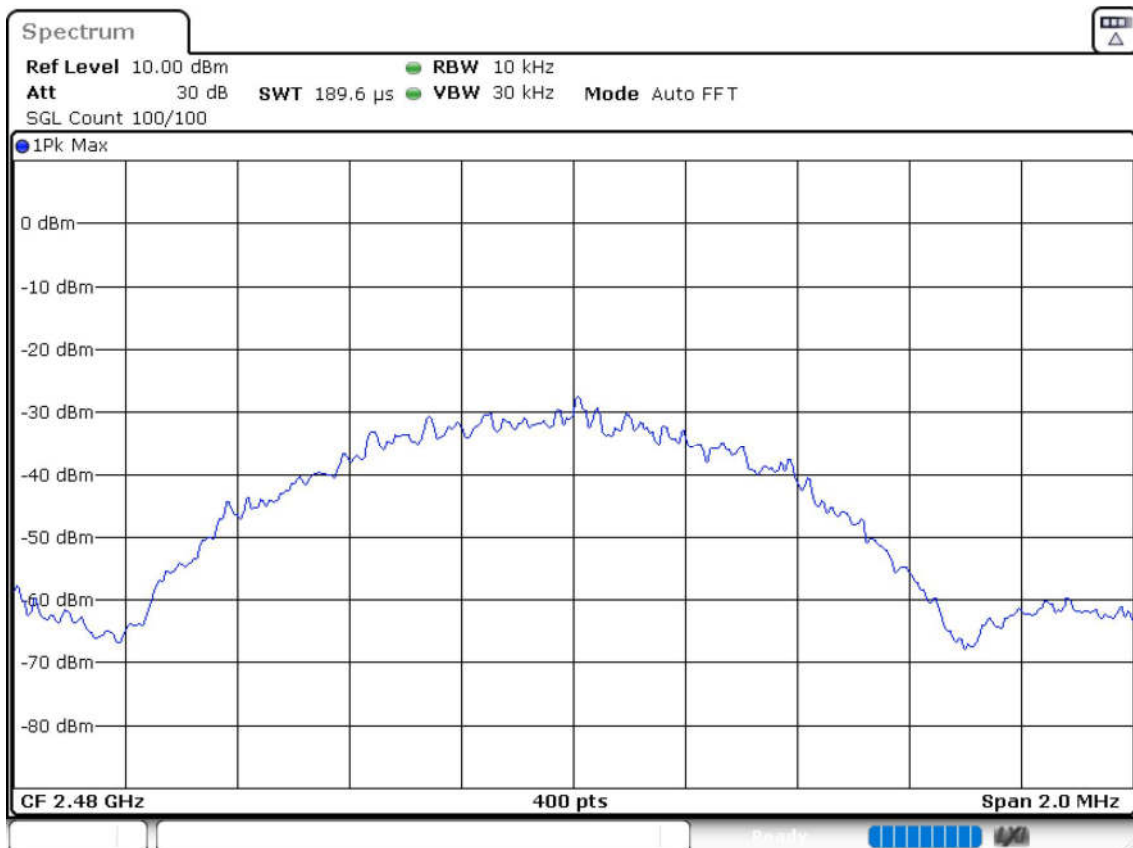
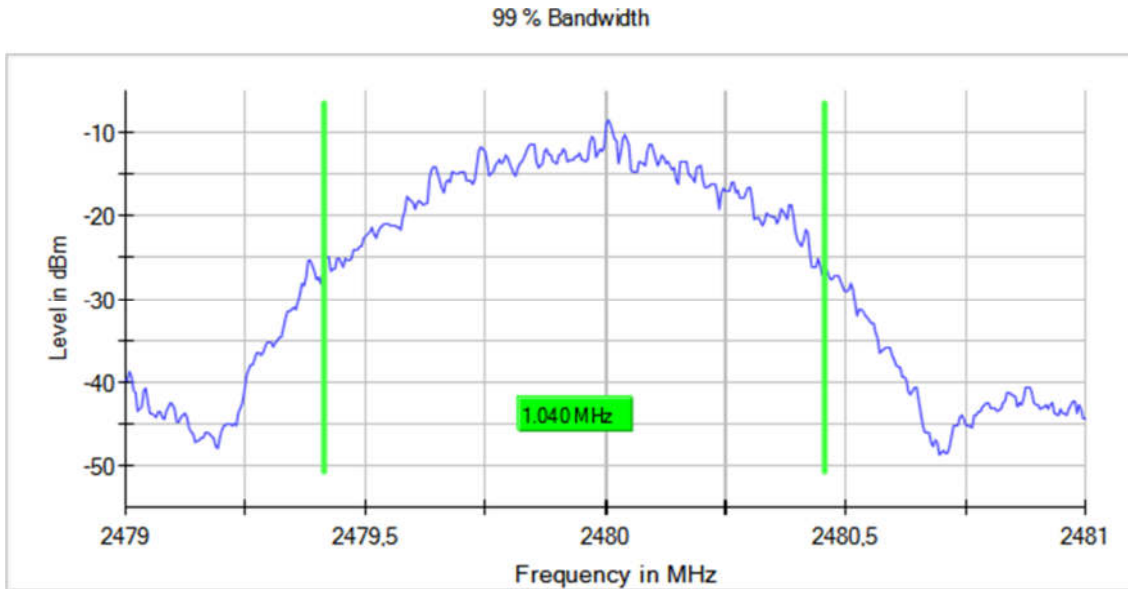
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Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
Number of Transmission Chains = 1 Active Port = 1

Plots:



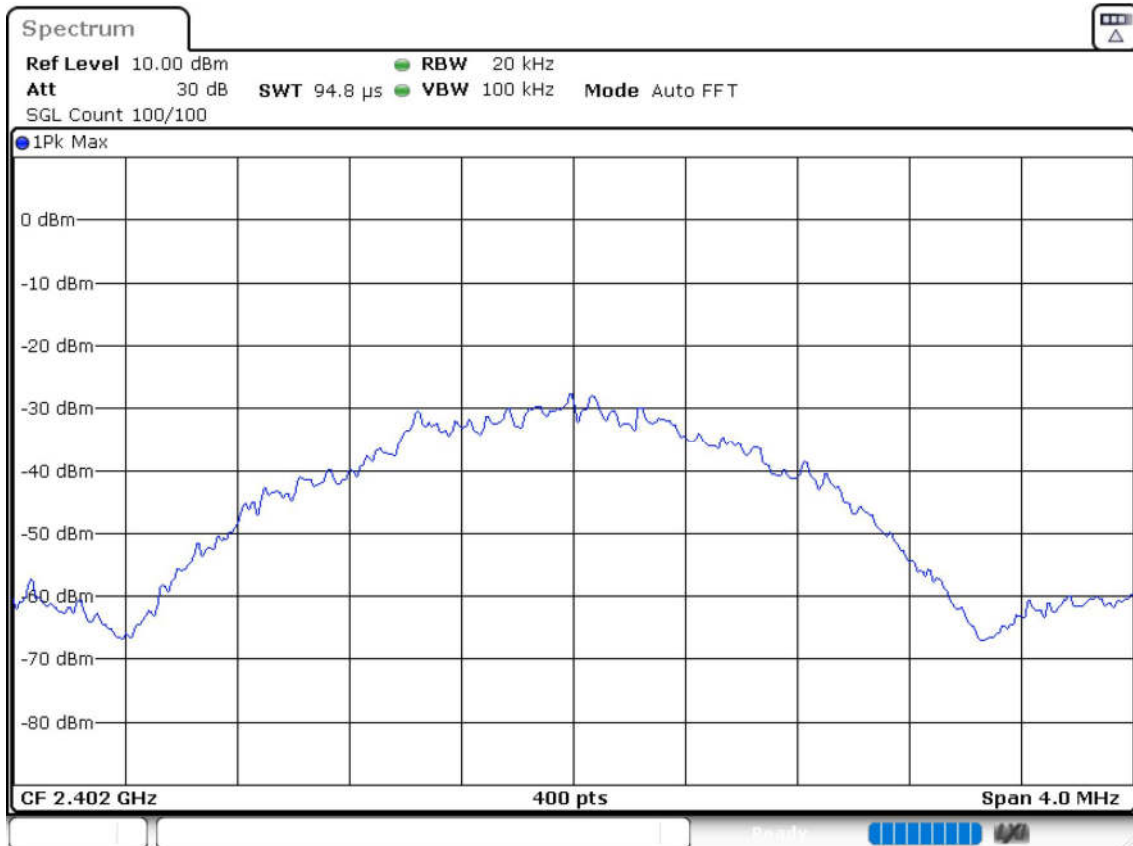
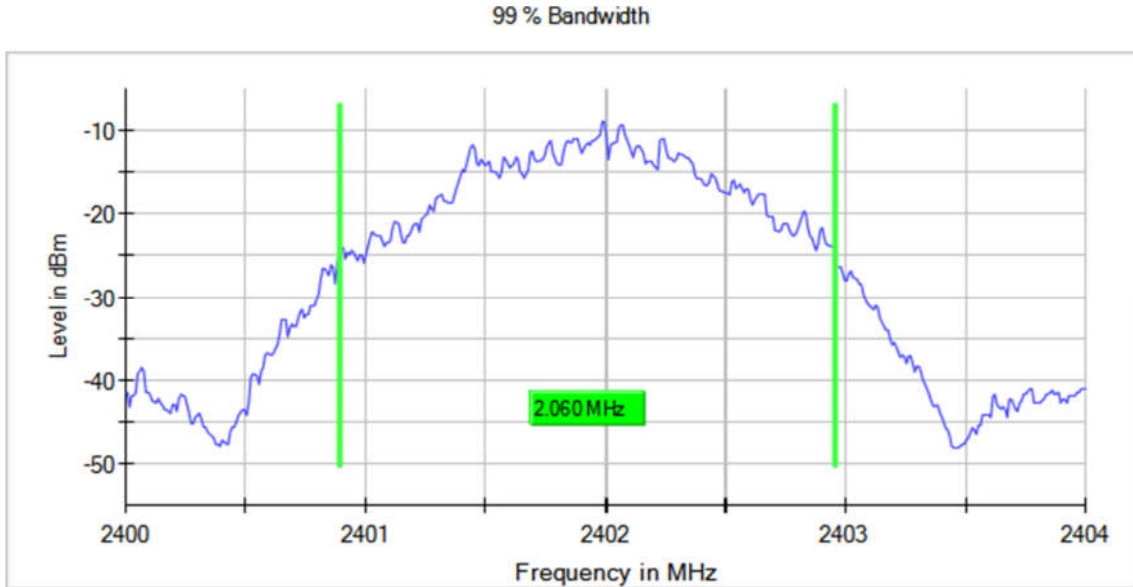
Frequency MHz = 2480.00000 Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
Number of Transmission Chains = 1 Active Port = 1

Plots:



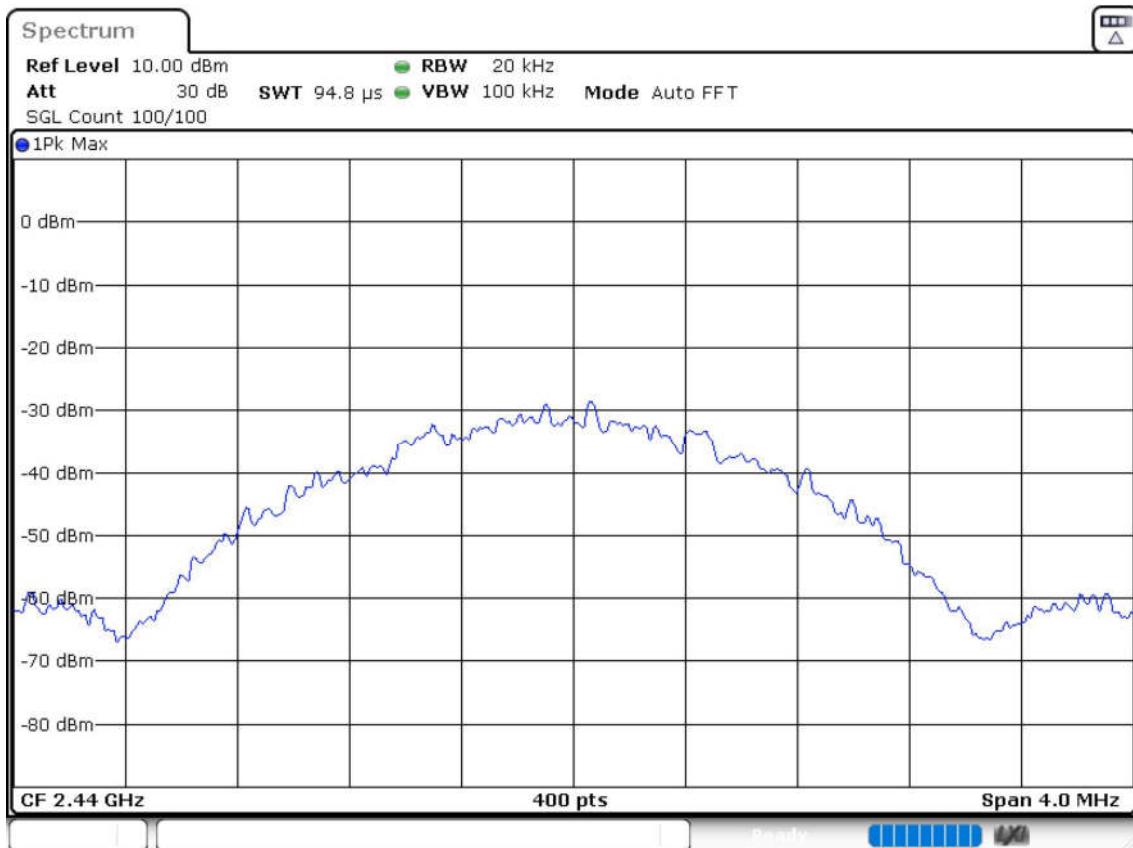
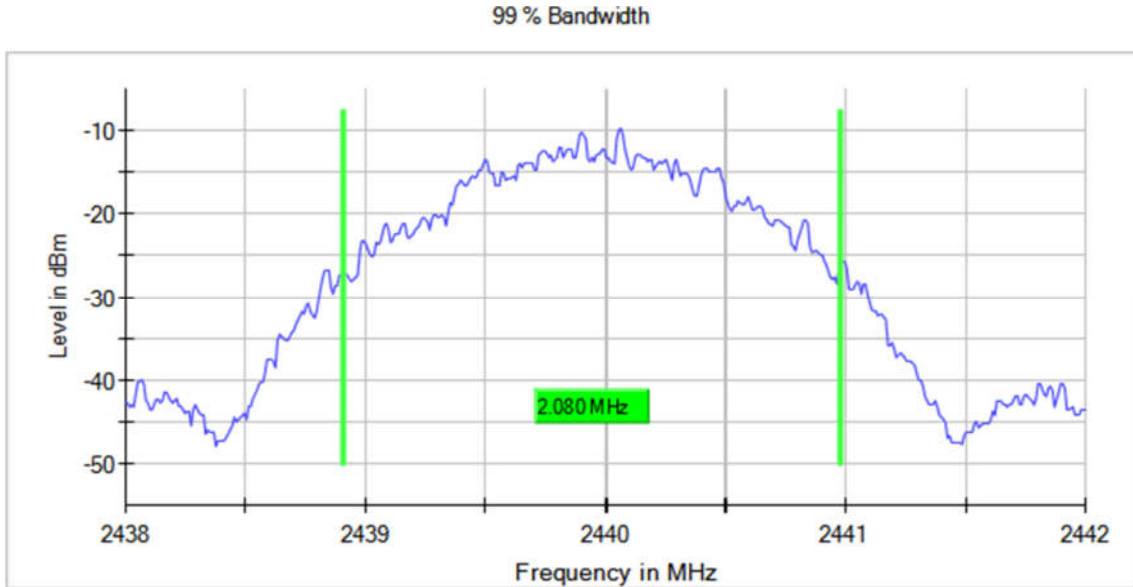
Frequency MHz = 2402.00000 Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)
Number of Transmission Chains = 1 Active Port = 1

Plots:



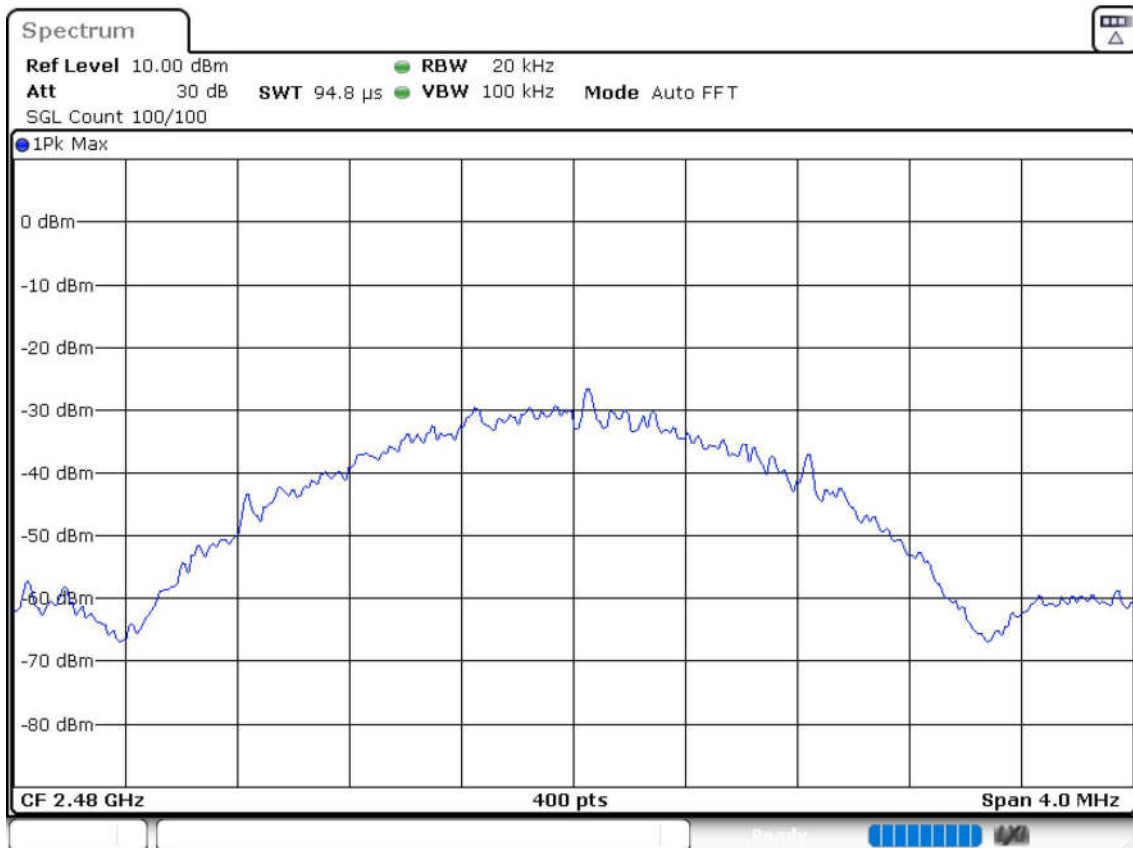
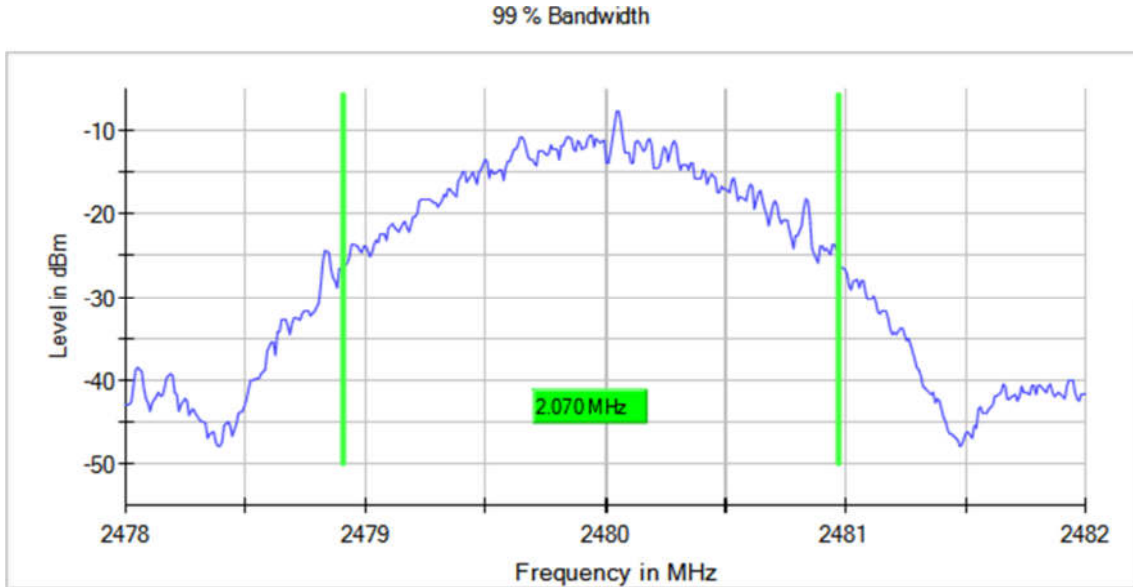
Frequency MHz = 2440.00000 Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)
Number of Transmission Chains = 1 Active Port = 1

Plots:



Frequency MHz = 2480.00000 Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)
Number of Transmission Chains = 1 Active Port = 1

Plots:



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)	Emission Bandwidth (MHz)
2402.00000	0.733
2440.00000	0.733
2480.00000	0.733

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Freq (MHz)	Emission Bandwidth (MHz)
2402.00000	1.267
2440.00000	1.228
2480.00000	1.149

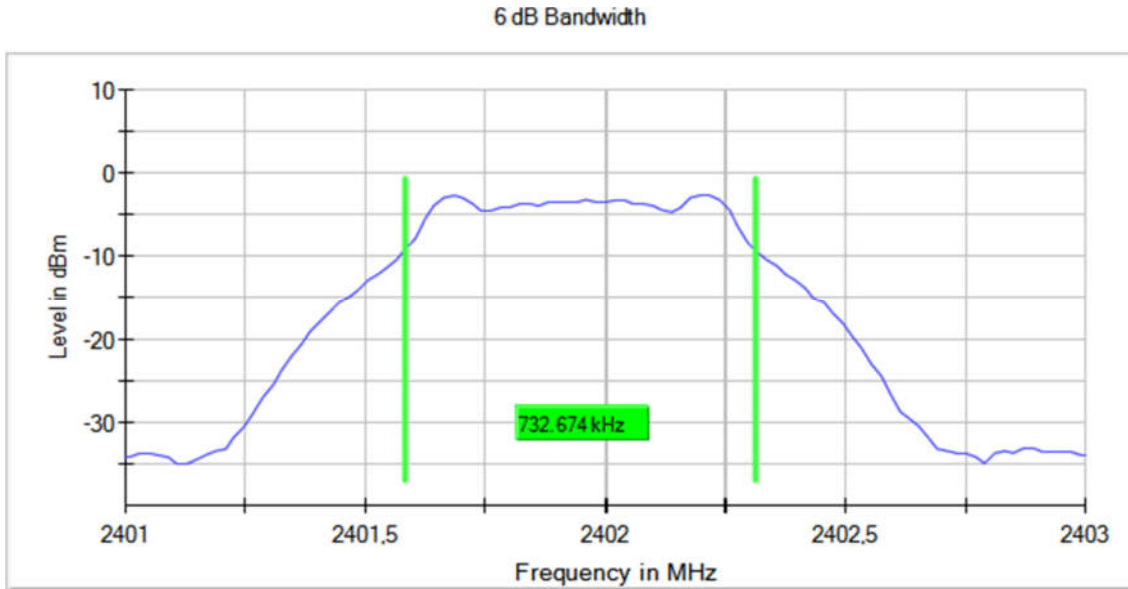
Verdict

Pass

Attachments

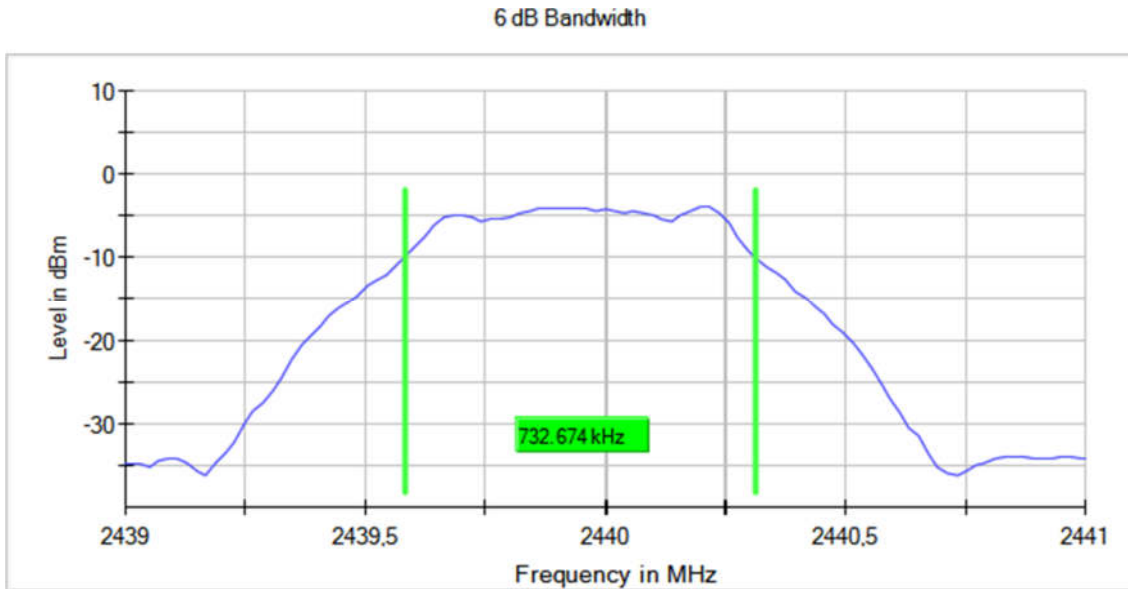
Frequency MHz = 2402.00000 Bandwidth MHz = 1
Modulation = BTLE 5.0 (GFSK 1 Mbit/s) Number of Transmission Chains = 1
Active Port = 1

Plots:



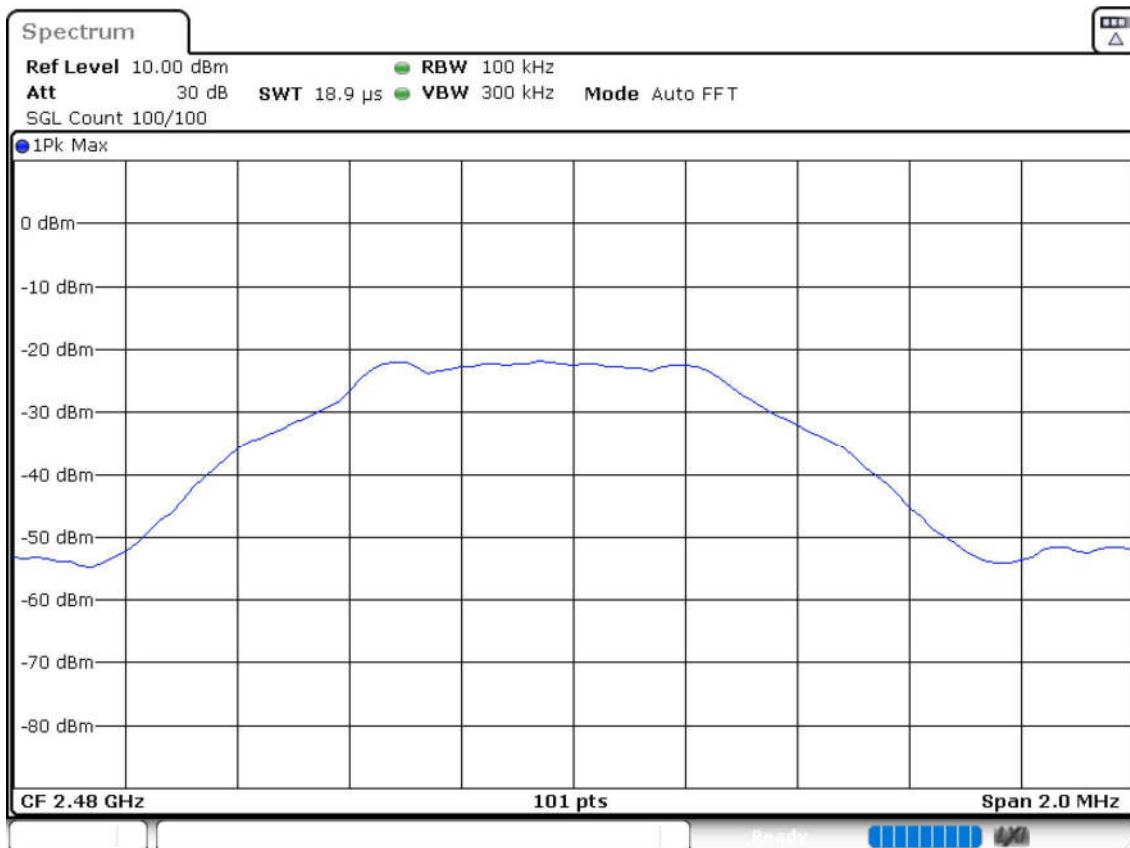
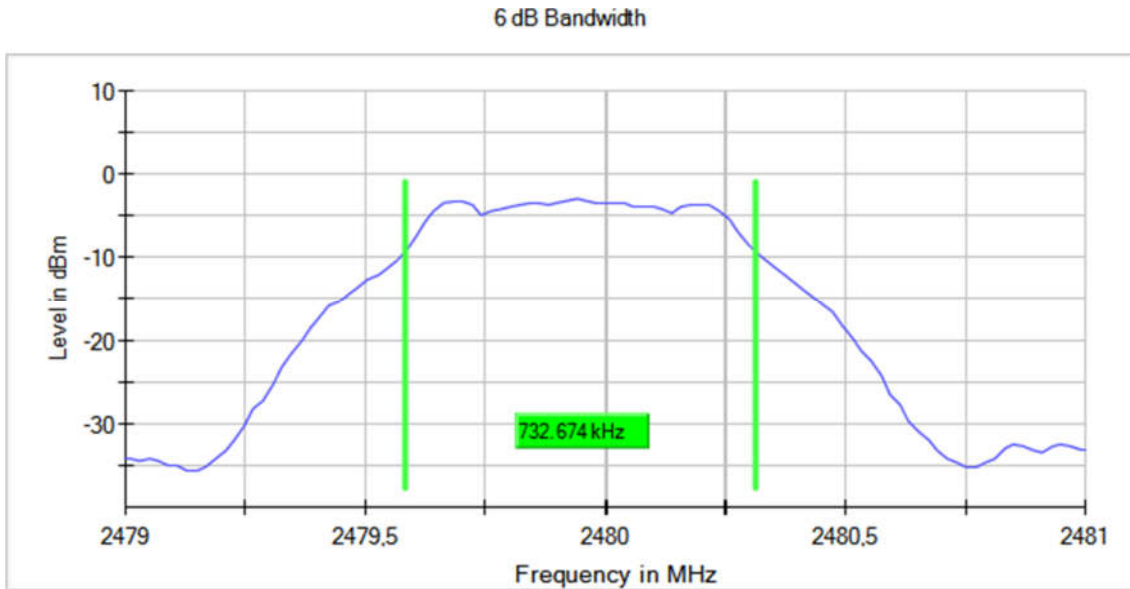
Frequency MHz = 2440.00000 Bandwidth MHz = 1
Modulation = BTLE 5.0 (GFSK 1 Mbit/s) Number of Transmission Chains = 1
Active Port = 1

Plots:



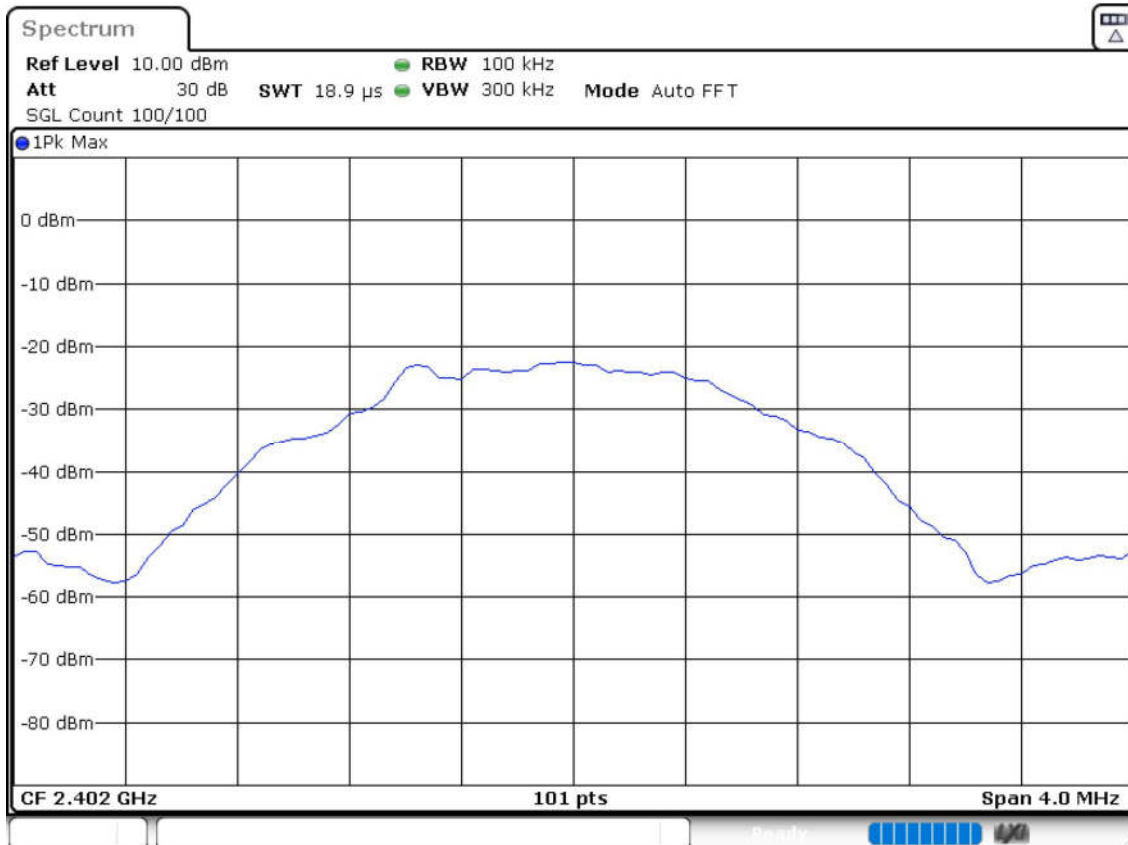
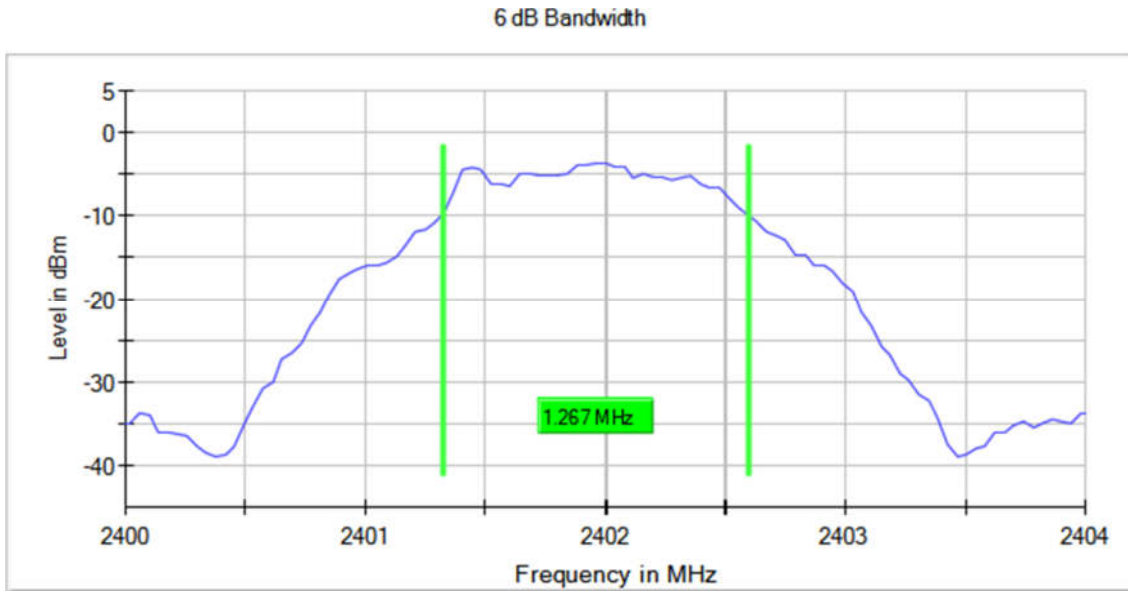
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Modulation = BTLE 5.0 (GFSK 1 Mbit/s) Number of Transmission Chains = 1
Active Port = 1

Plots:



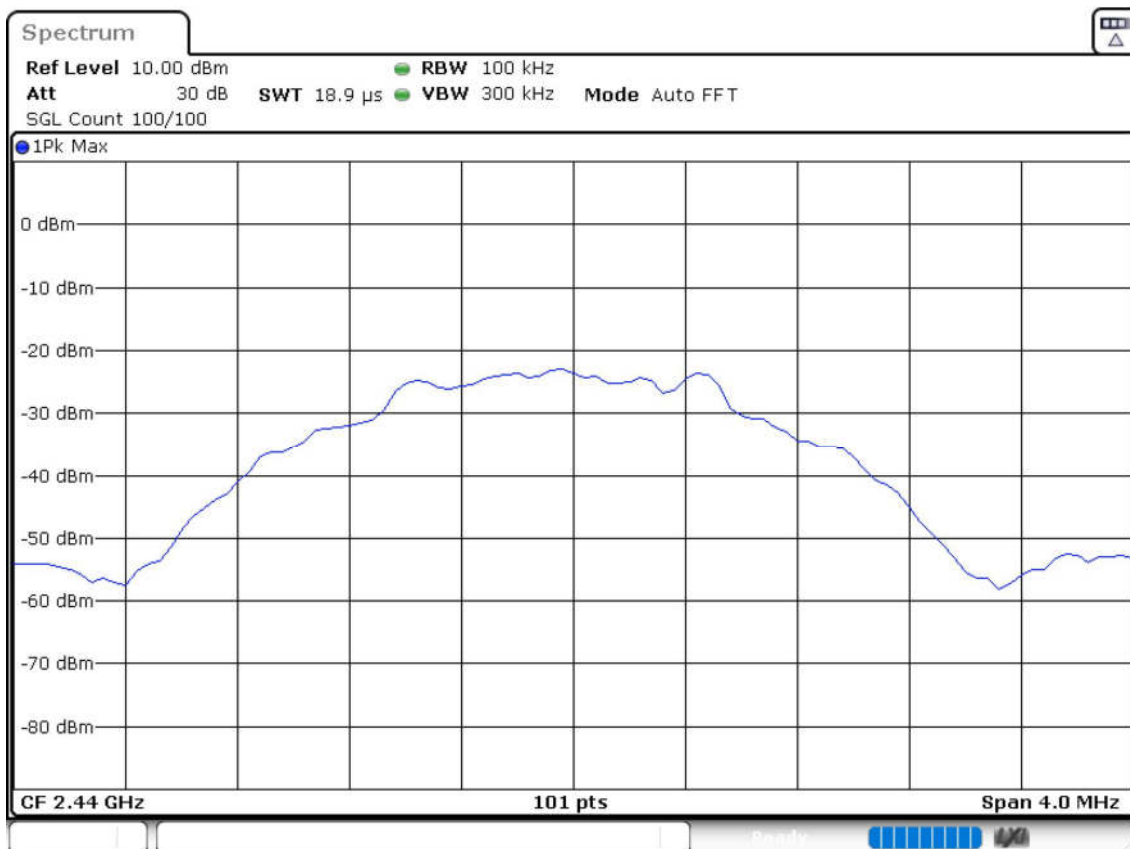
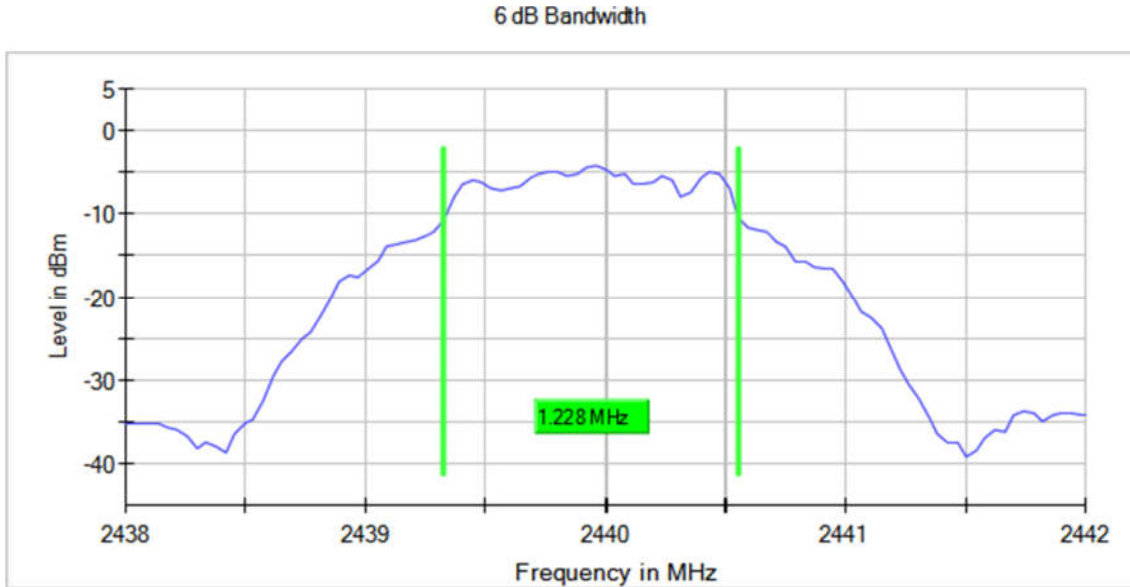
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Modulation = BTLE 5.0 (GFSK 2 Mbit/s) Number of Transmission Chains = 1
Active Port = 1

Plots:



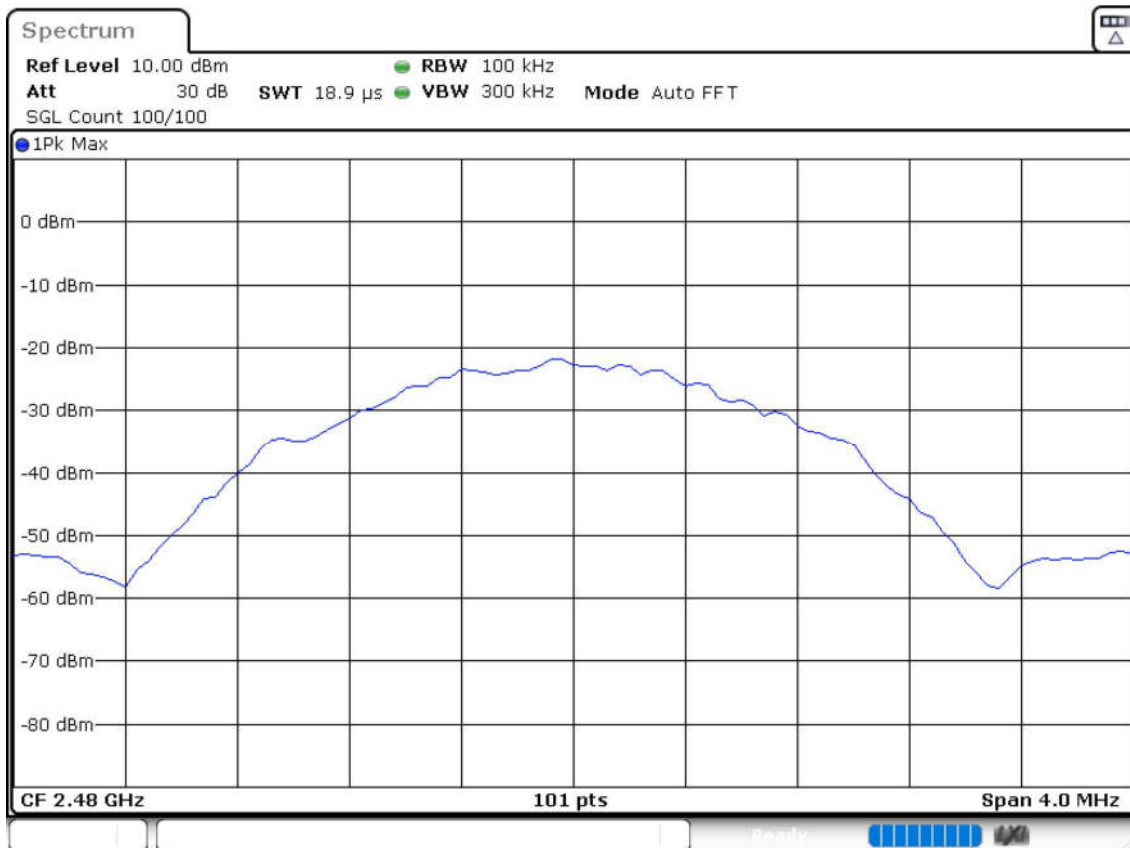
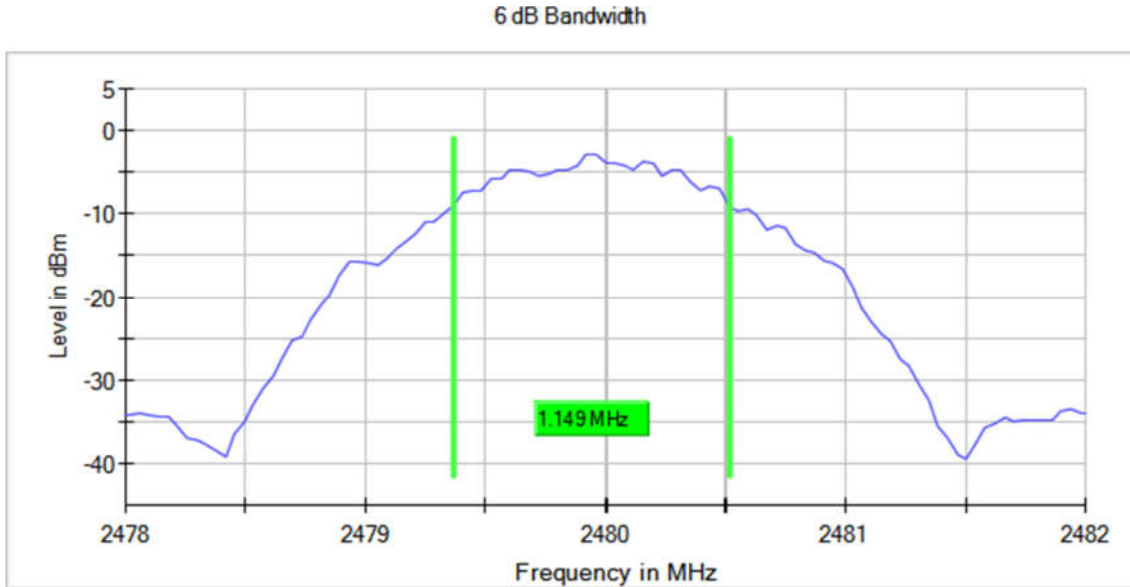
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Modulation = BTLE 5.0 (GFSK 2 Mbit/s) Number of Transmission Chains = 1
Active Port = 1

Plots:



Frequency MHz = 2480.00000 Bandwidth MHz = 2
Modulation = BTLE 5.0 (GFSK 2 Mbit/s) Number of Transmission Chains = 1
Active Port = 1

Plots:



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)
2402.0000	2402.0025	-8.27
2440.0000	2440.0025	-9.16
2480.0000	2480.0075	-8.43

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Freq (MHz)	Measured Freq (MHz)	PSD (dBm)
2402.0000	2401.9875	-12.63
2440.0000	2439.9074	-13.42
2480.0000	2480.0499	-10.71

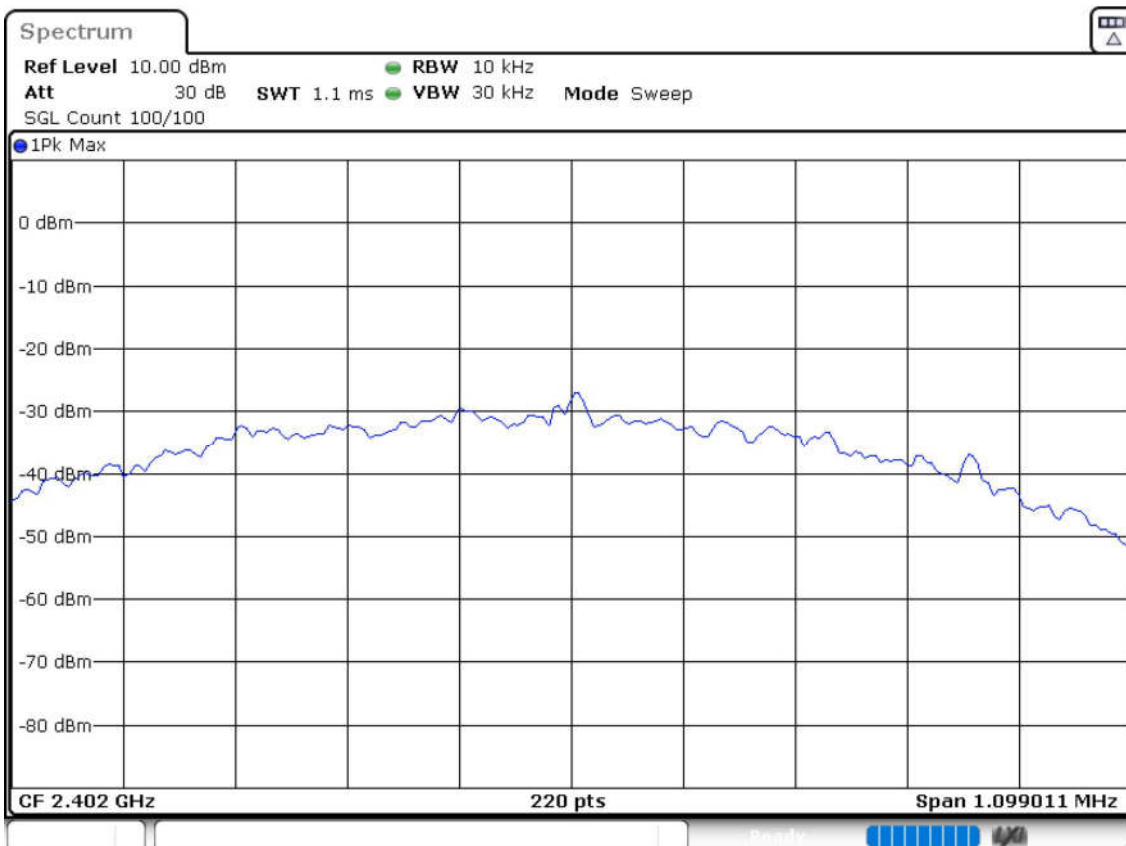
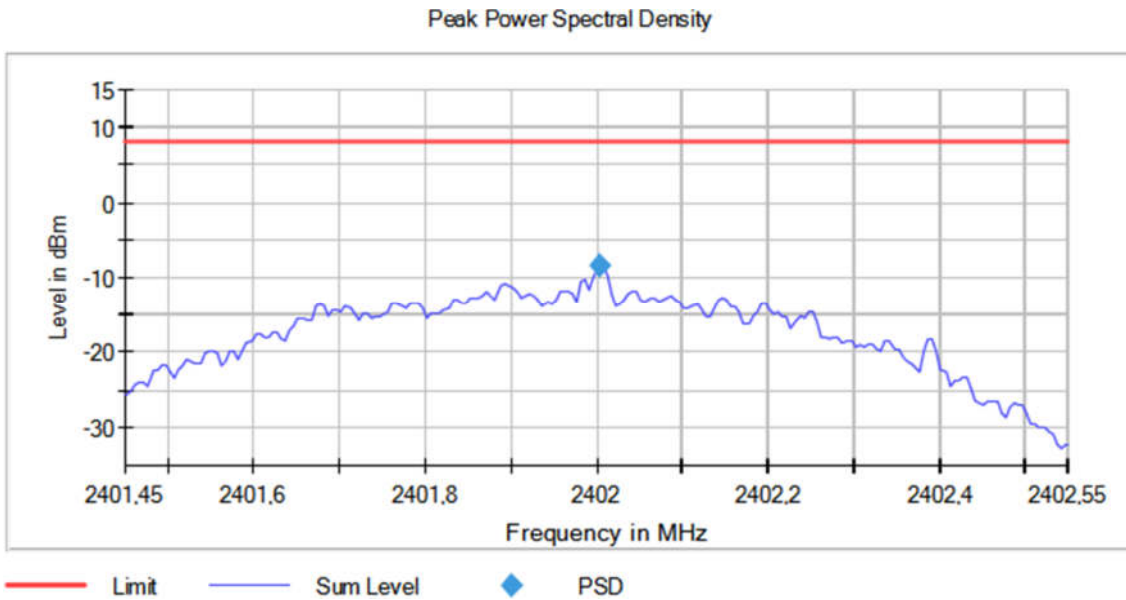
Verdict

Pass

Attachments

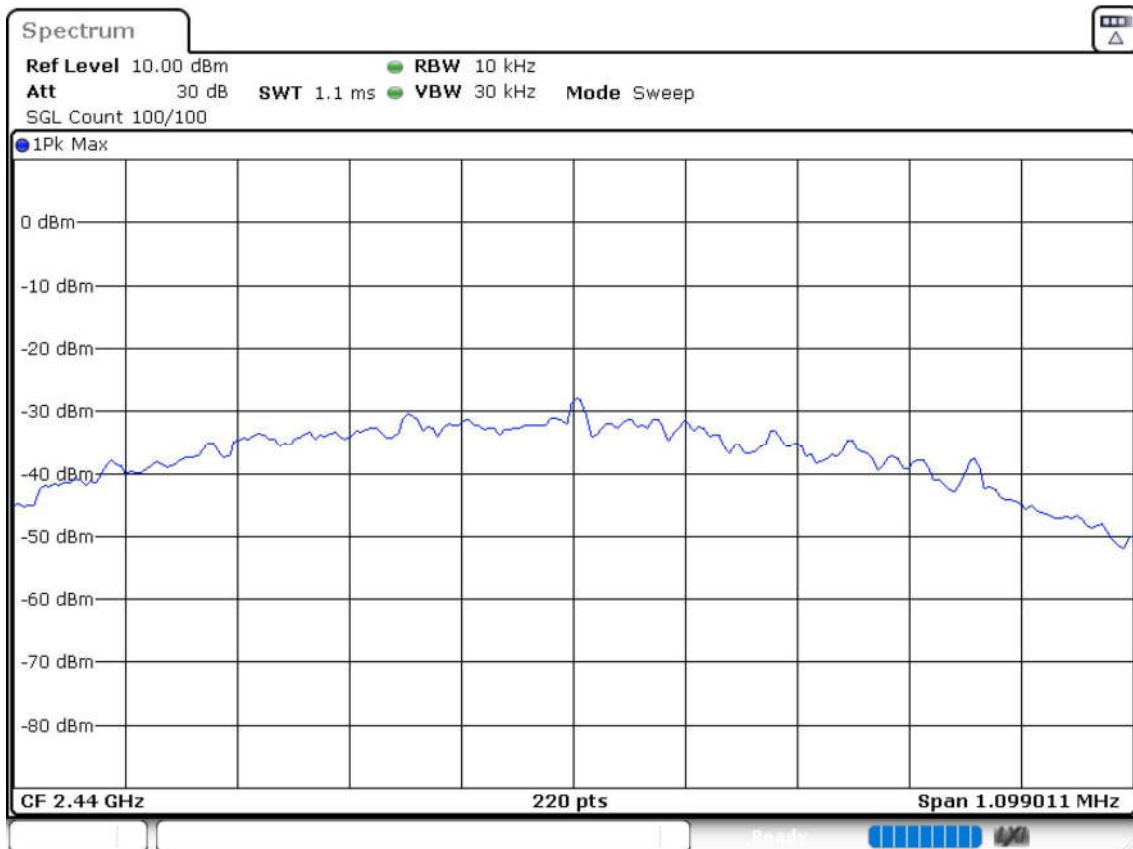
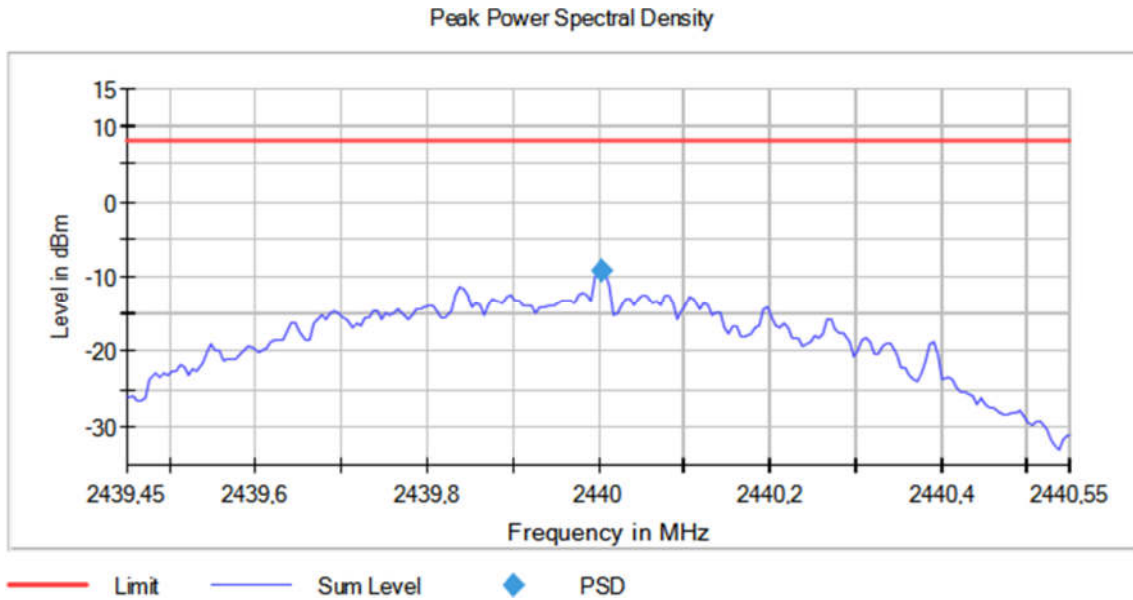
Frequency MHz = 2402.00000 Equipment Type = Digital Transmission System (DTS)
 Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
 Number of Transmission Chains = 1 Active Port = 1

Plots:



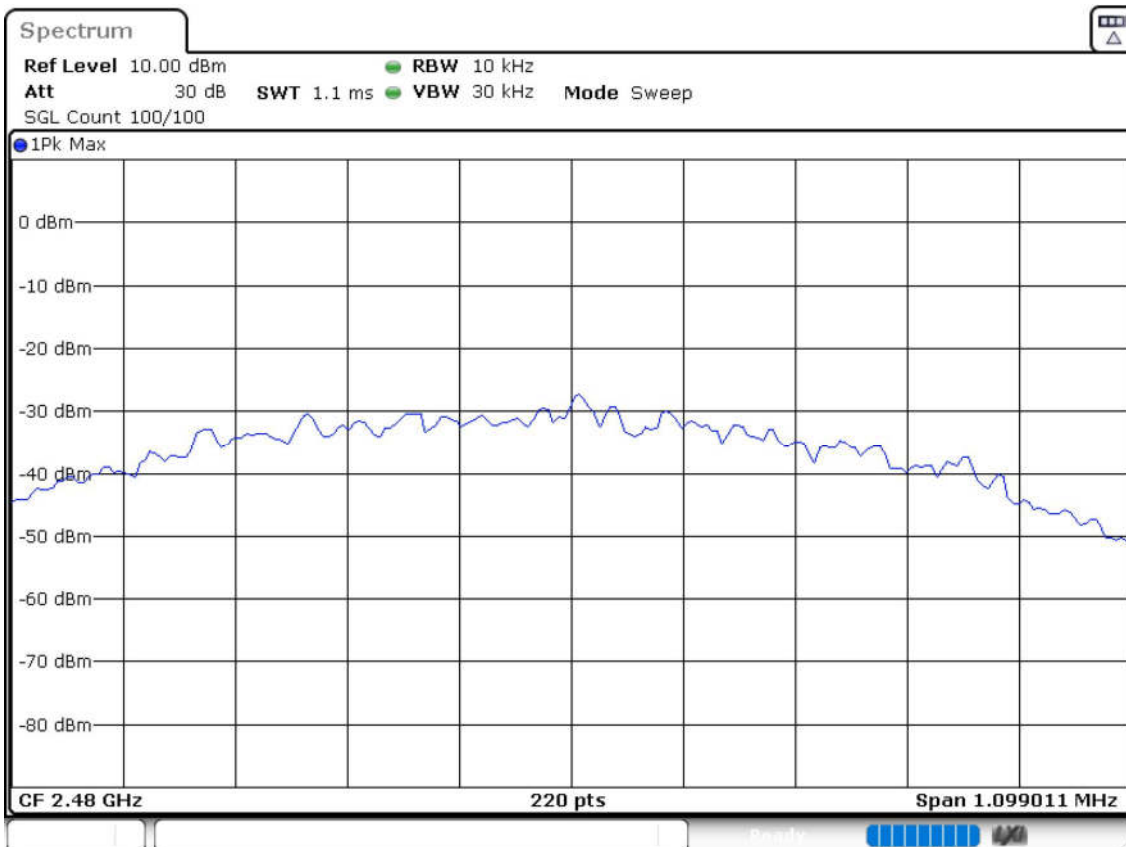
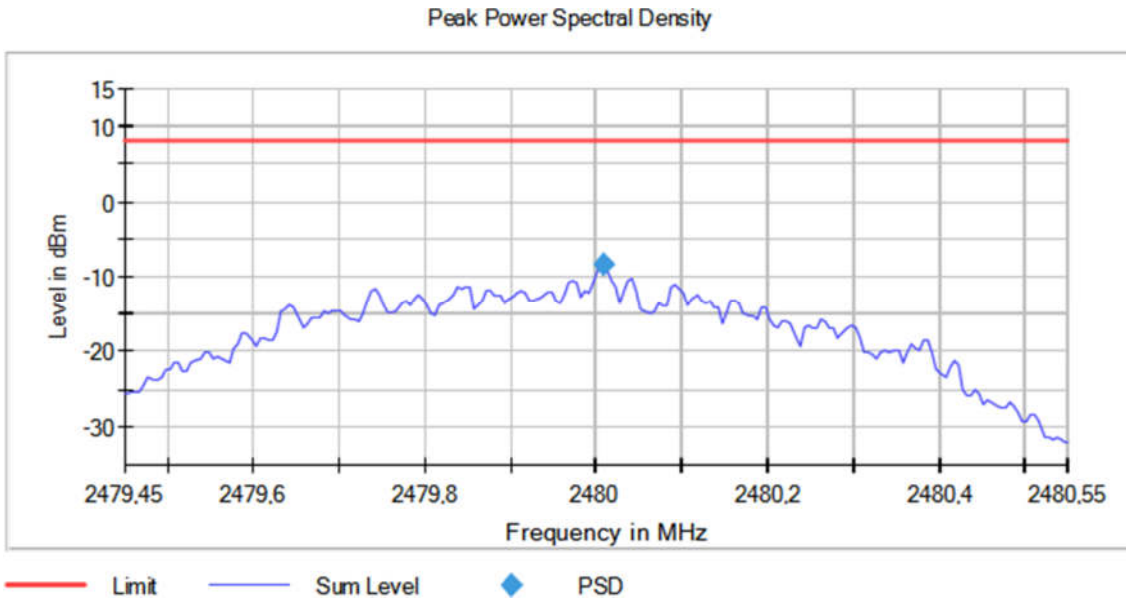
Frequency MHz = 2440.00000 Equipment Type = Digital Transmission System (DTS)
 Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
 Number of Transmission Chains = 1 Active Port = 1

Plots:



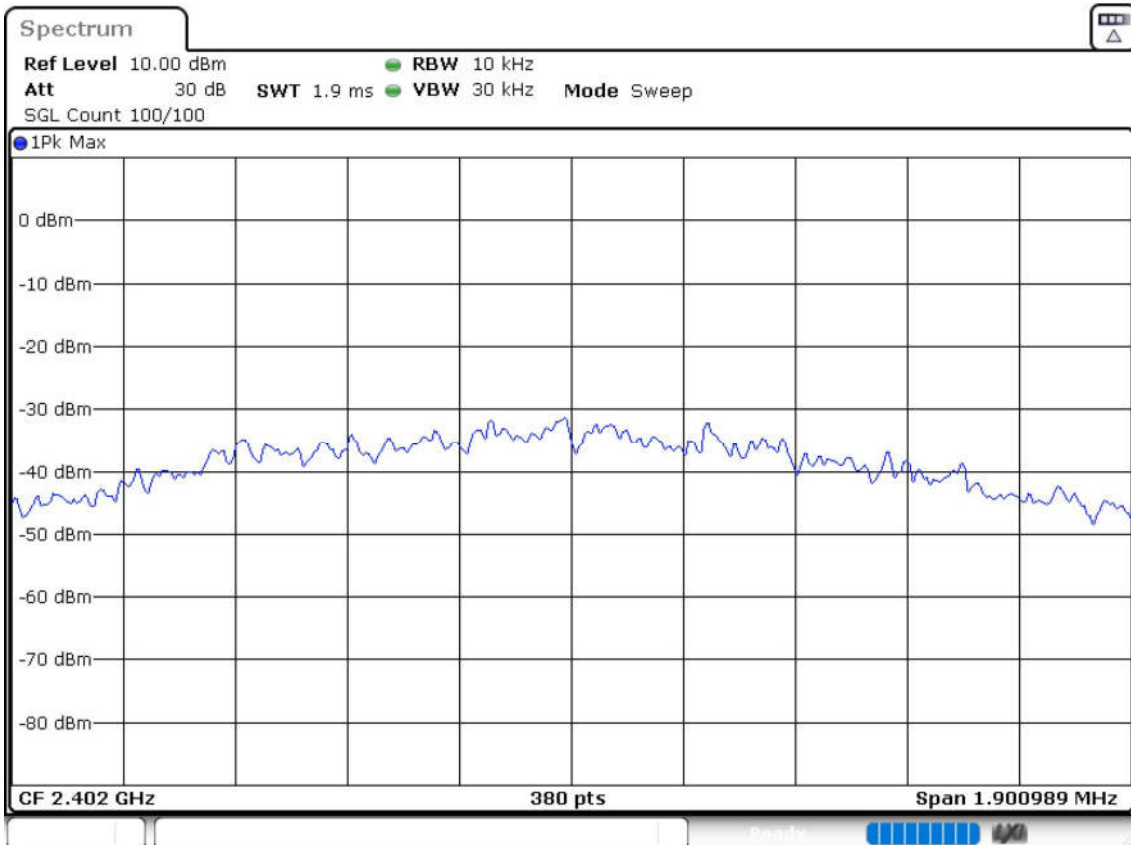
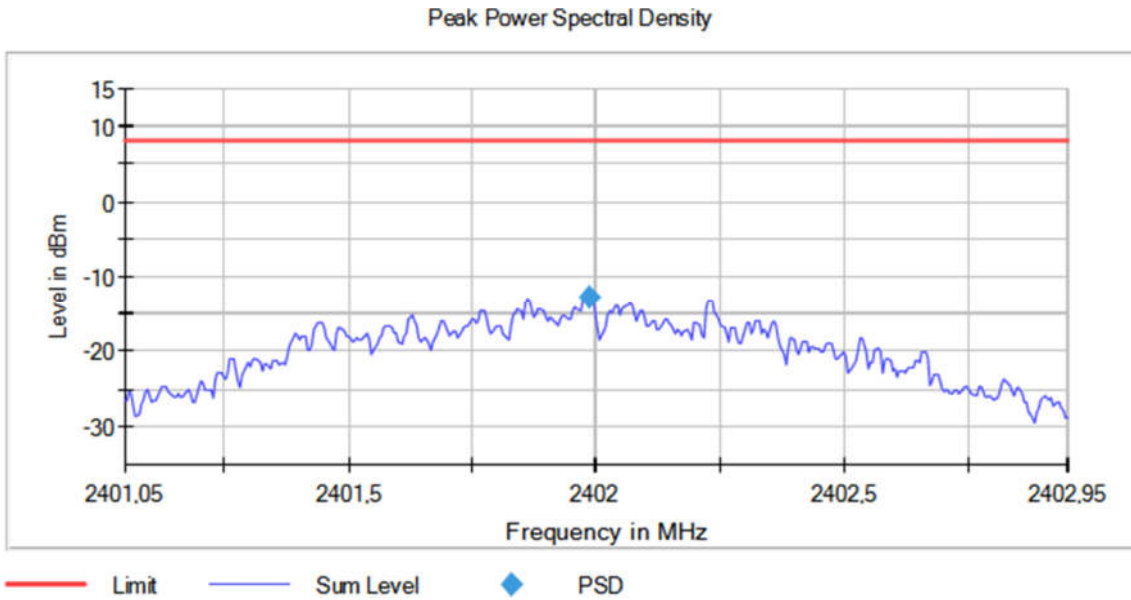
Frequency MHz = 2480.00000 Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
Number of Transmission Chains = 1 Active Port = 1

Plots:



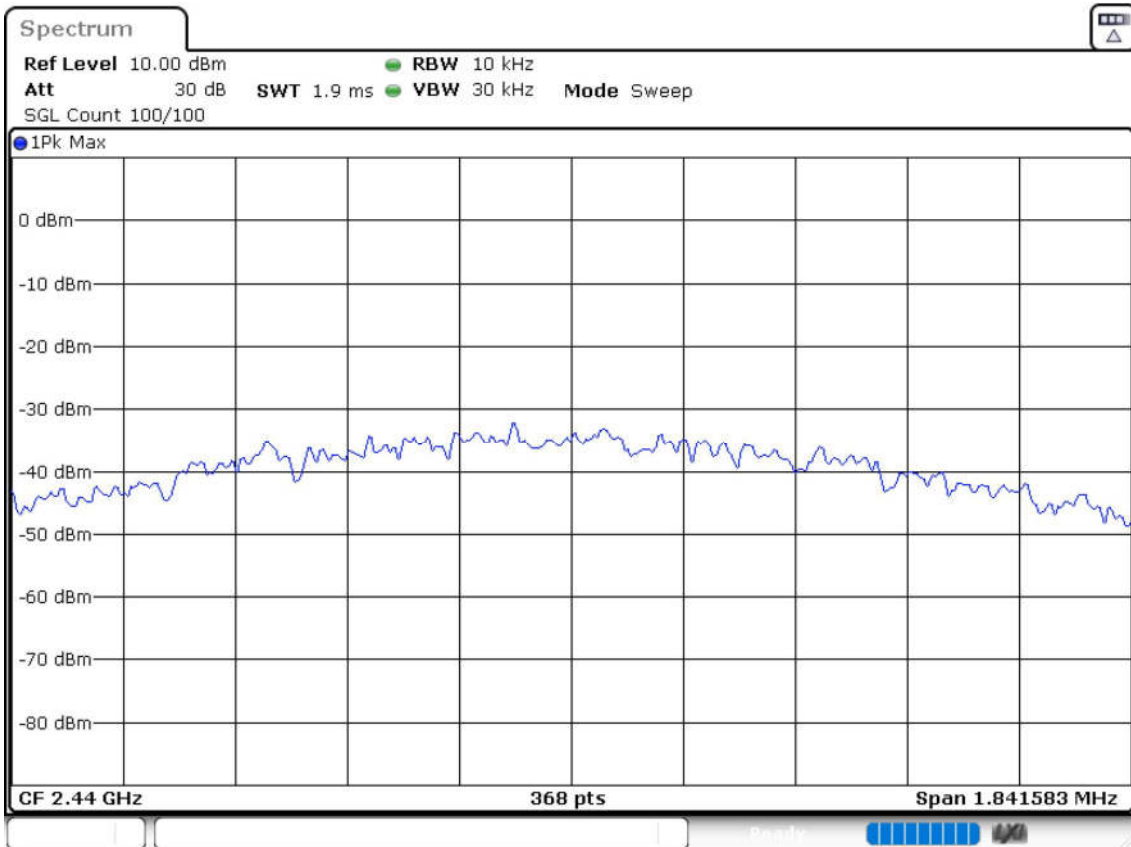
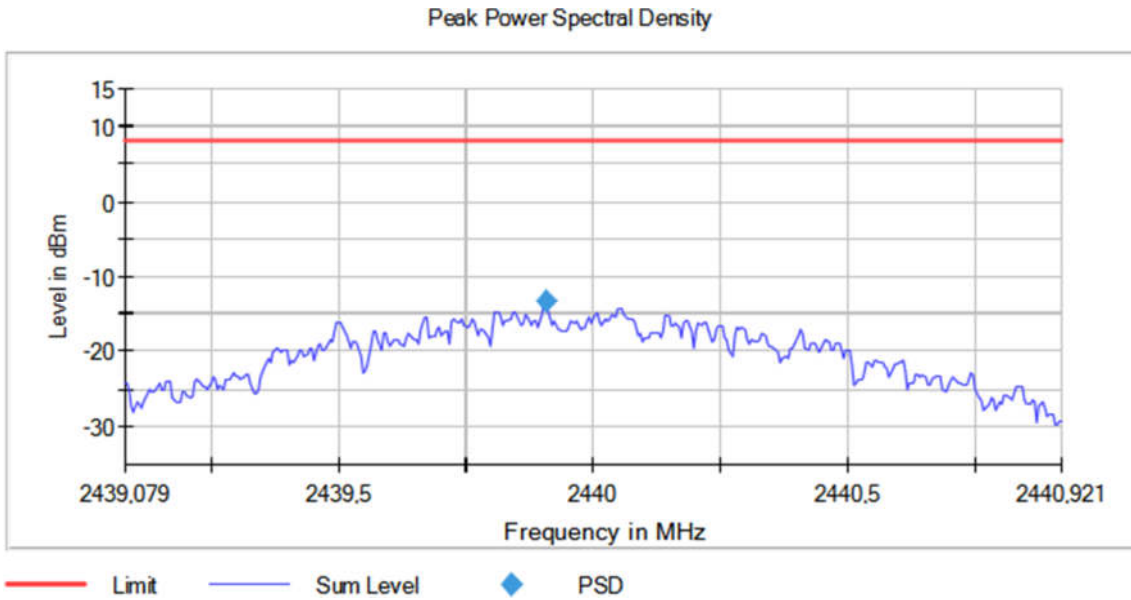
Frequency MHz = 2402.00000 Equipment Type = Digital Transmission System (DTS)
 Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)
 Number of Transmission Chains = 1 Active Port = 1

Plots:



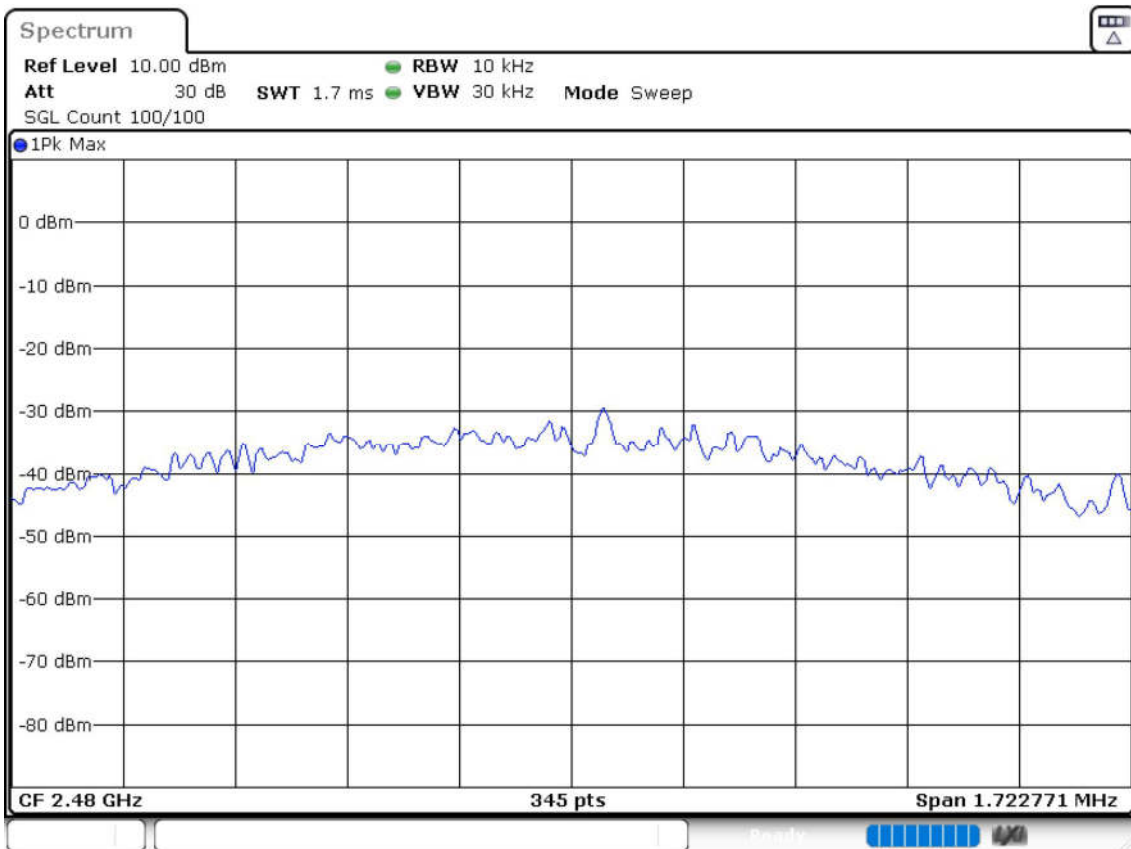
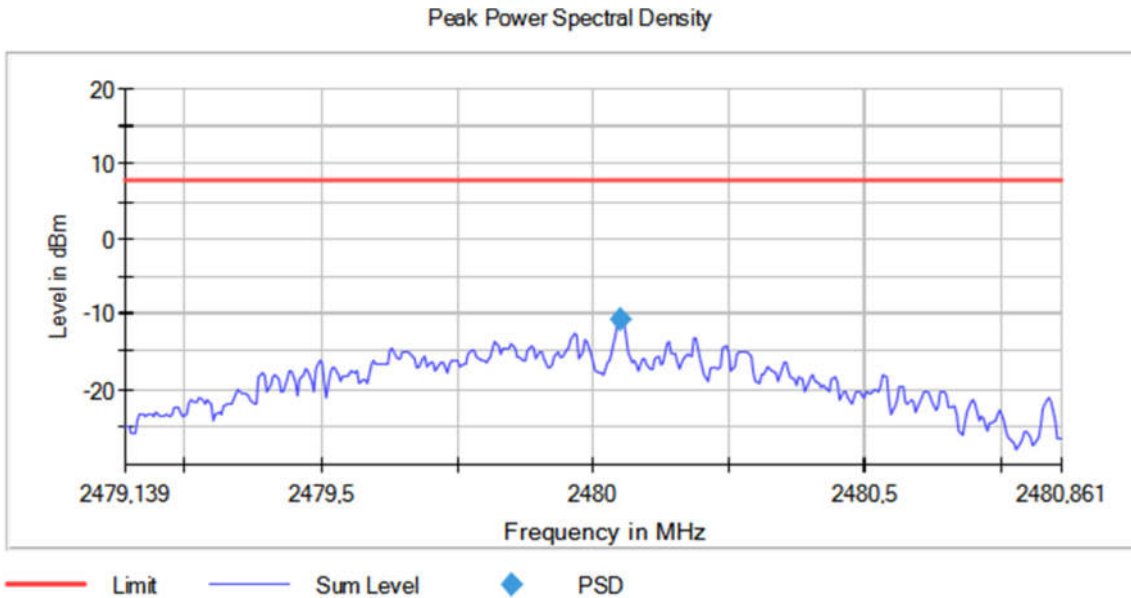
Frequency MHz = 2440.00000 Equipment Type = Digital Transmission System (DTS)
 Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)
 Number of Transmission Chains = 1 Active Port = 1

Plots:



Frequency MHz = 2480.00000 Equipment Type = Digital Transmission System (DTS)
 Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)
 Number of Transmission Chains = 1 Active Port = 1

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) (Canada).

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 \geq 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: -3.6 dBi

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Freq (MHz)	Maximum Conducted Power (dBm)	Maximum EIRP Power (dBm)
2402.00000	-1.736	-5.336
2440.00000	-2.403	-6.003
2480.00000	-1.795	-5.395

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Freq (MHz)	Maximum Conducted Power (dBm)	Maximum EIRP Power (dBm)
2402.00000	-1.641	-5.241
2440.00000	-2.172	-5.772
2480.00000	-1.417	-5.017

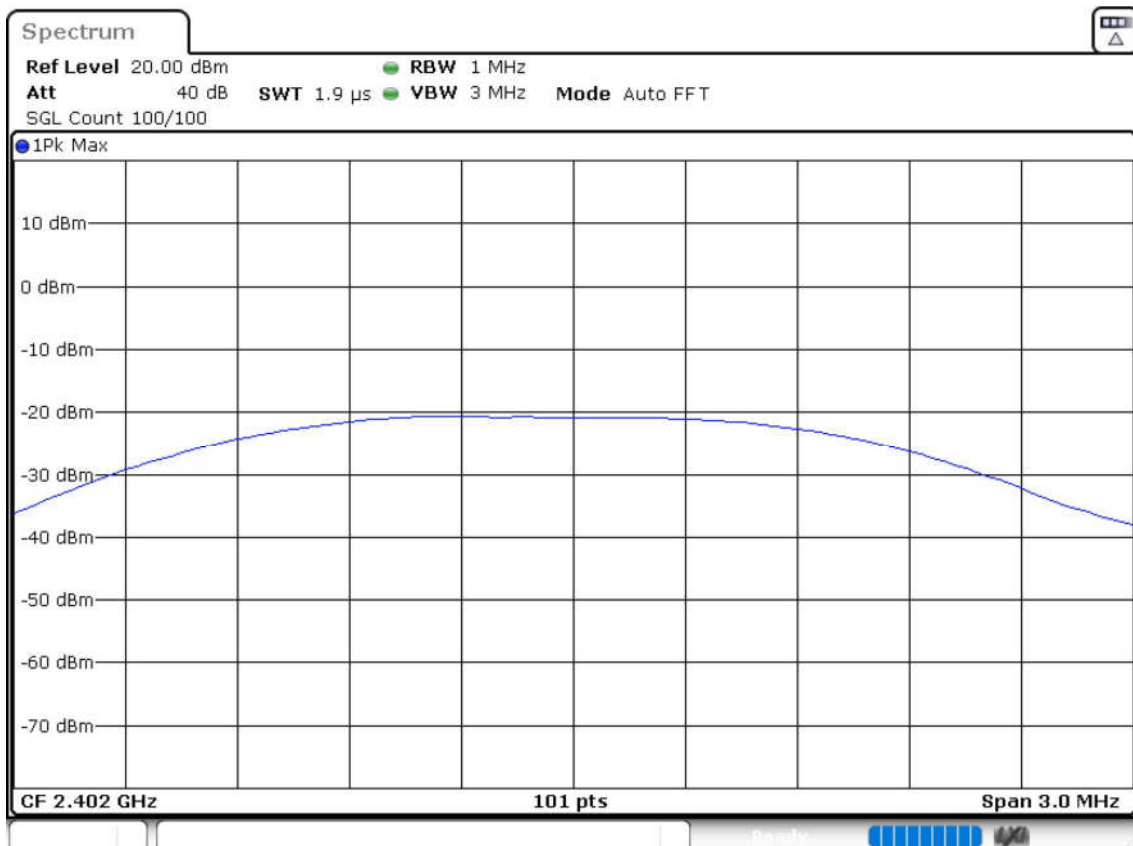
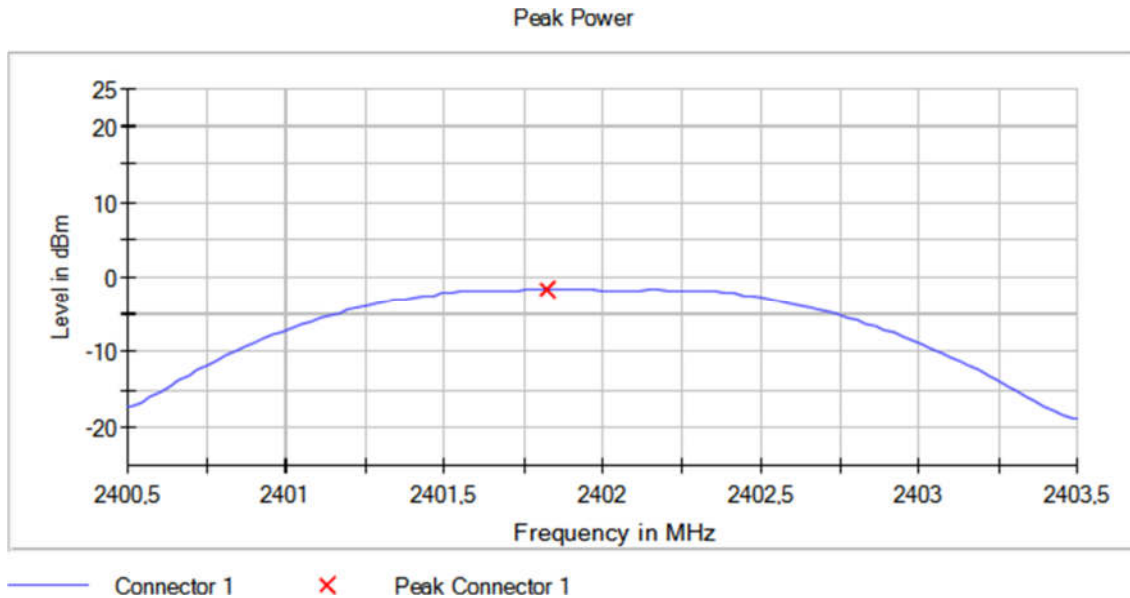
Verdict

Pass

Attachments

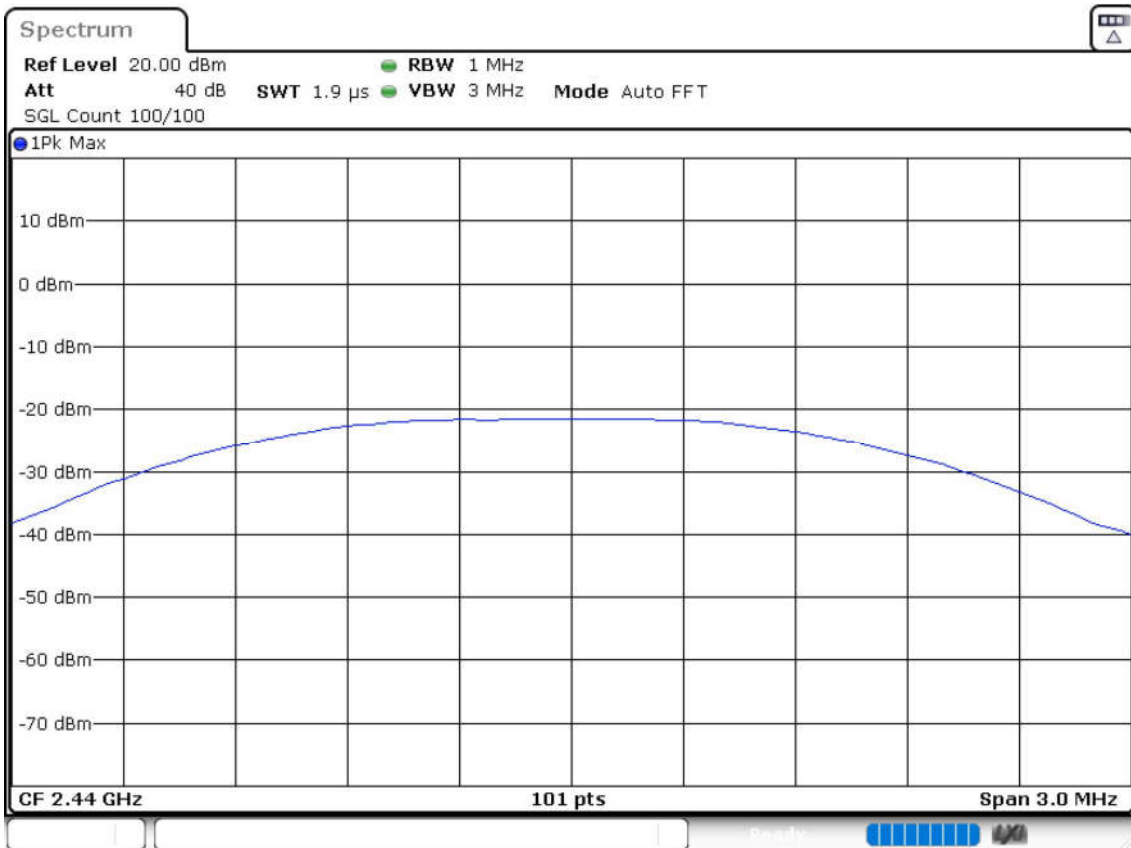
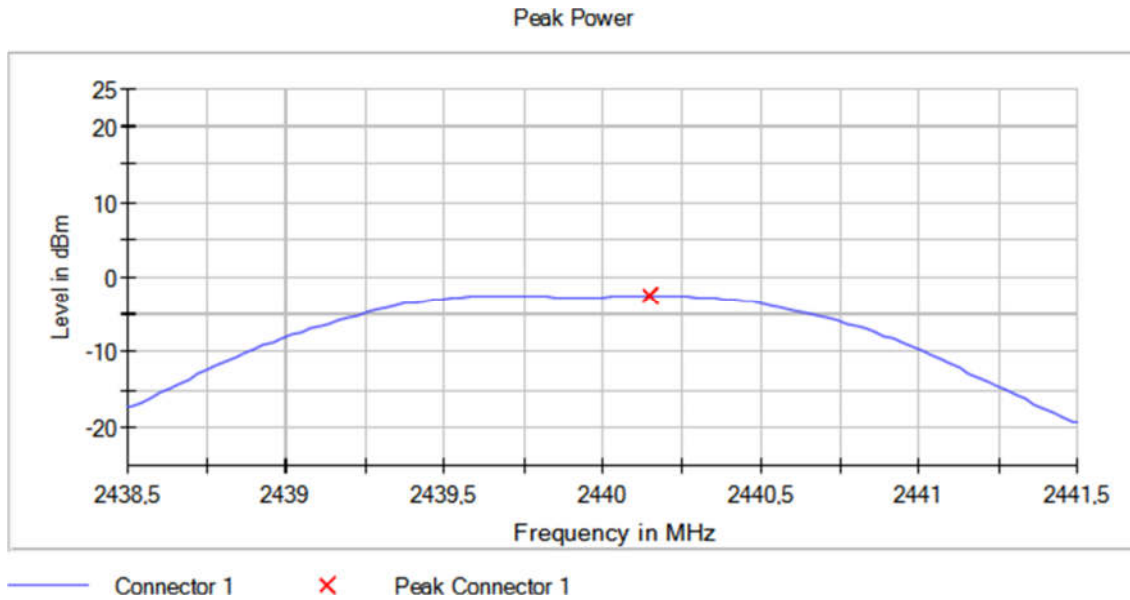
Frequency MHz = 2402.00000 Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
Number of Transmission Chains = 1 Active Port = 1

Plots:



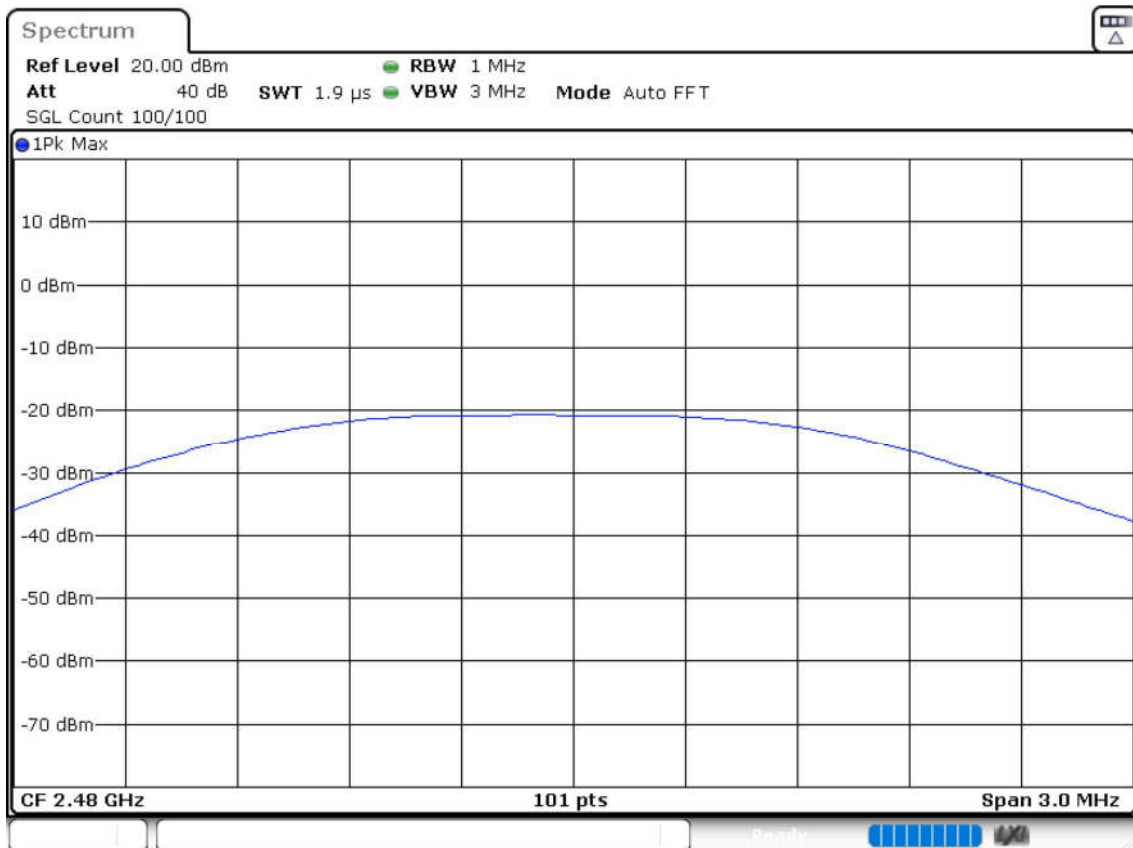
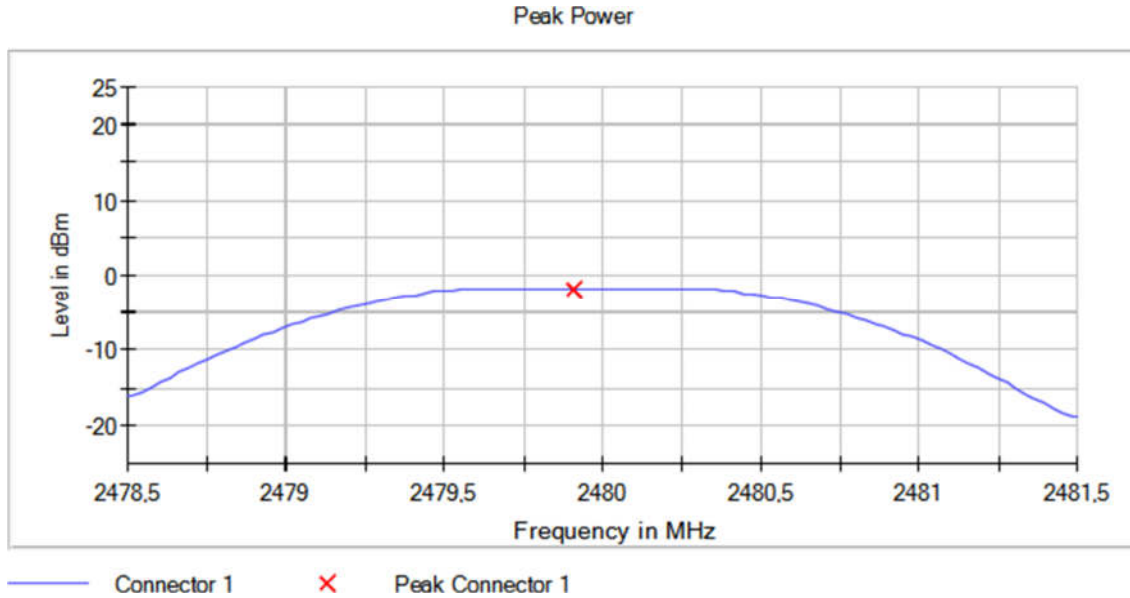
Frequency MHz = 2440.00000 Equipment Type = Digital Transmission System (DTS)
 Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
 Number of Transmission Chains = 1 Active Port = 1

Plots:



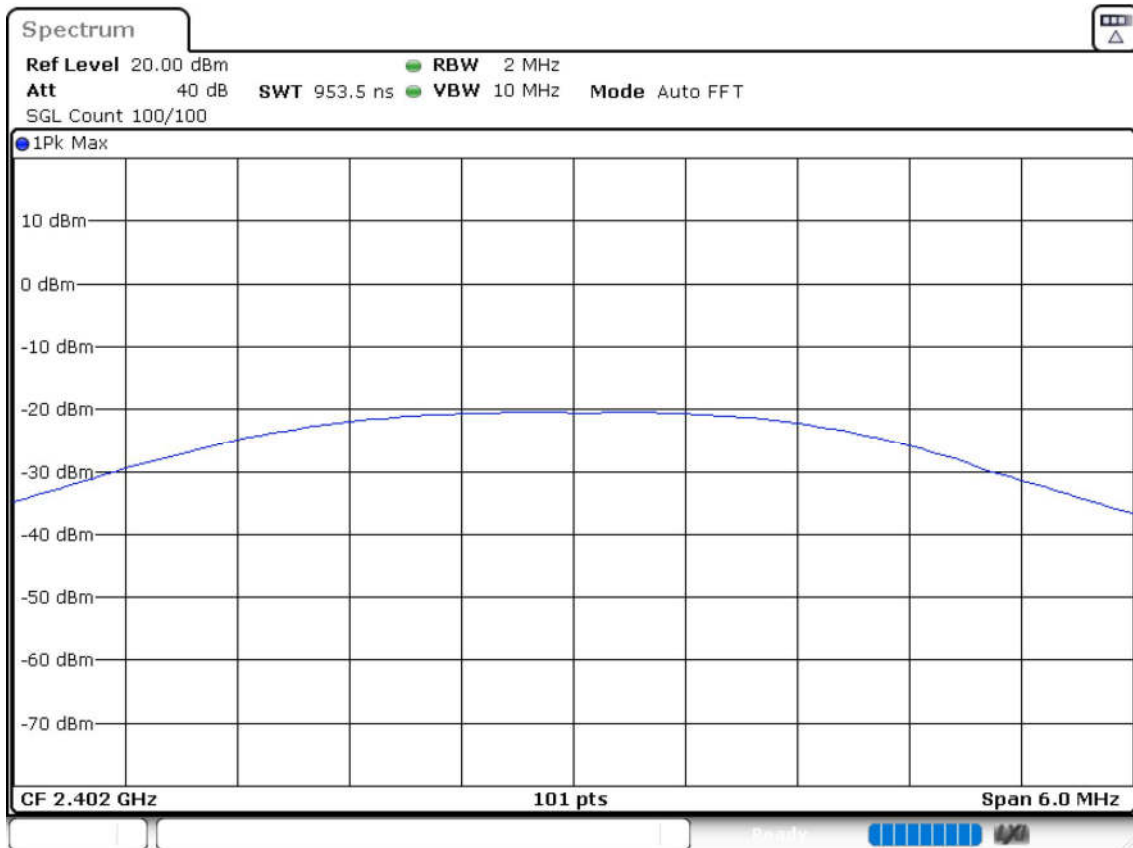
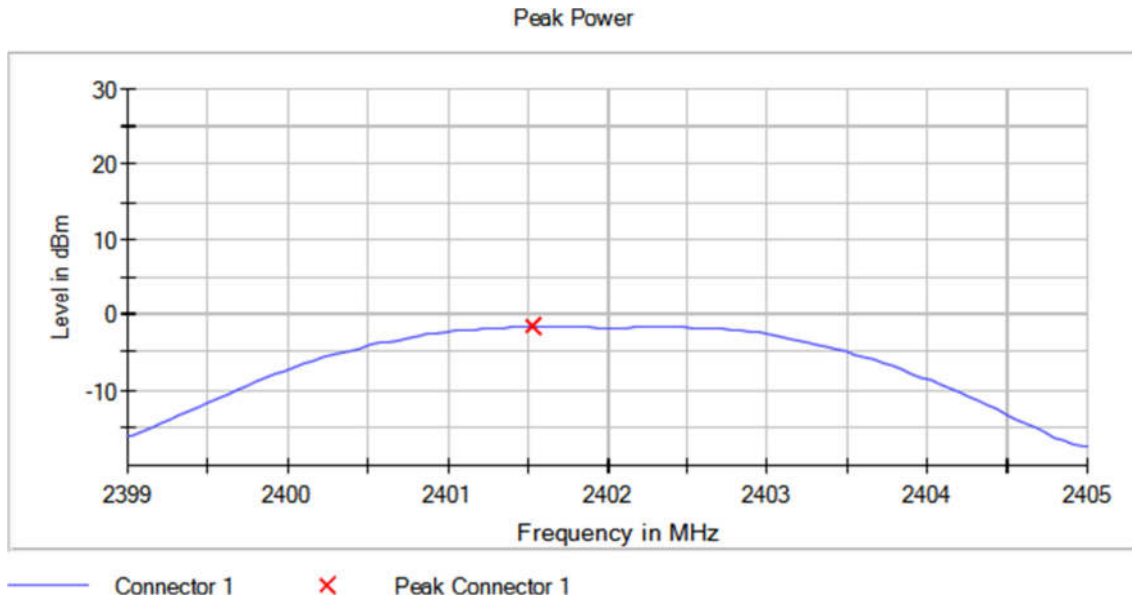
Frequency MHz = 2480.00000 Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
Number of Transmission Chains = 1 Active Port = 1

Plots:



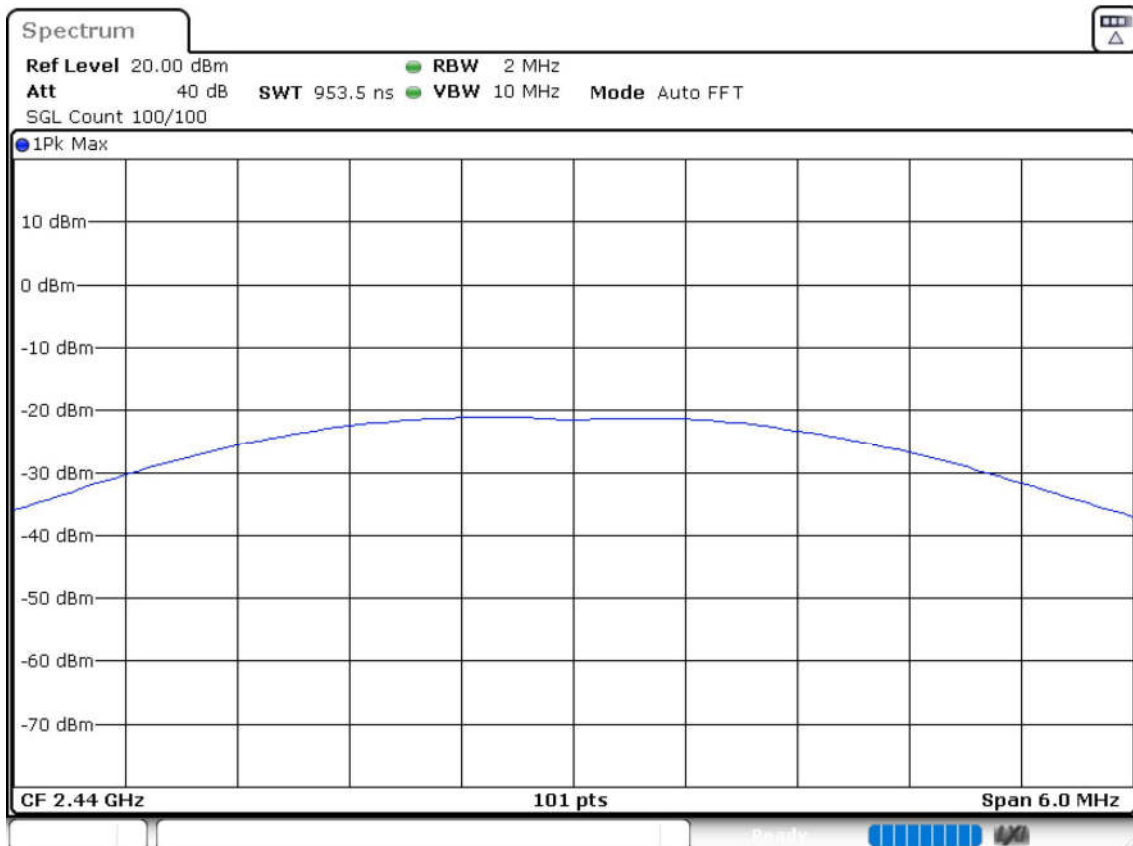
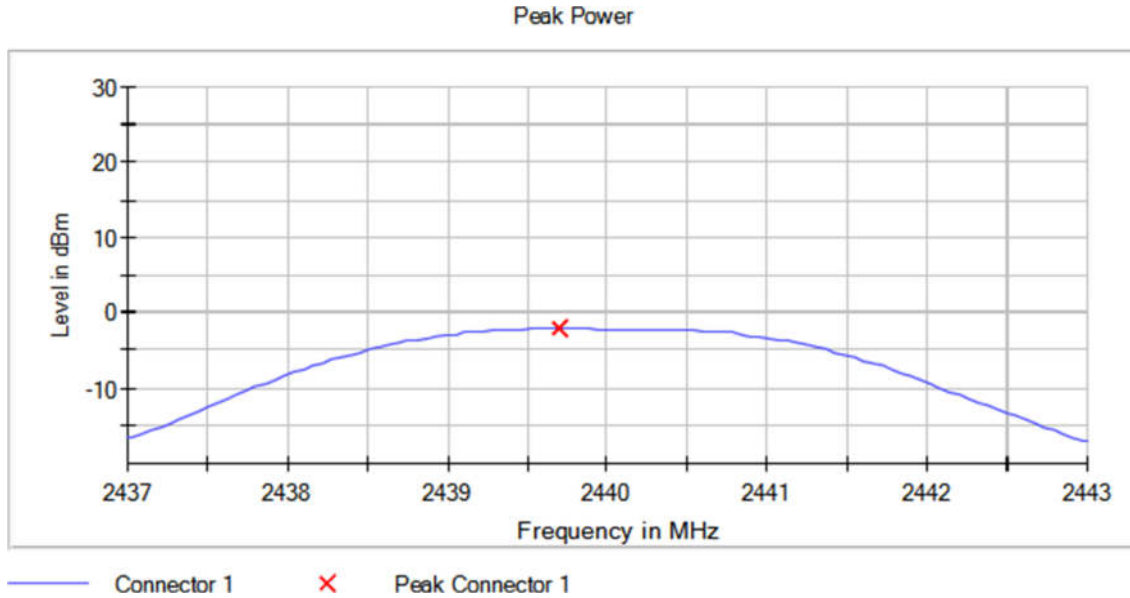
Frequency MHz = 2402.00000 Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)
Number of Transmission Chains = 1 Active Port = 1

Plots:



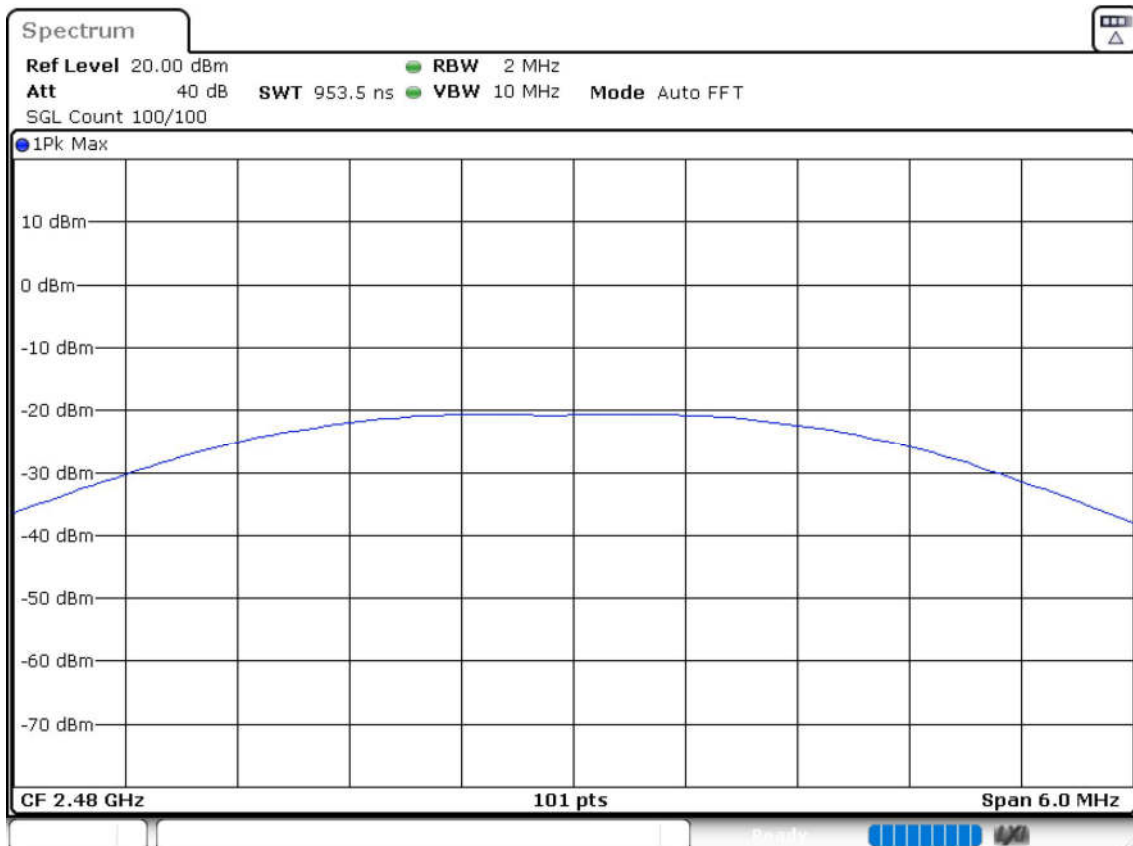
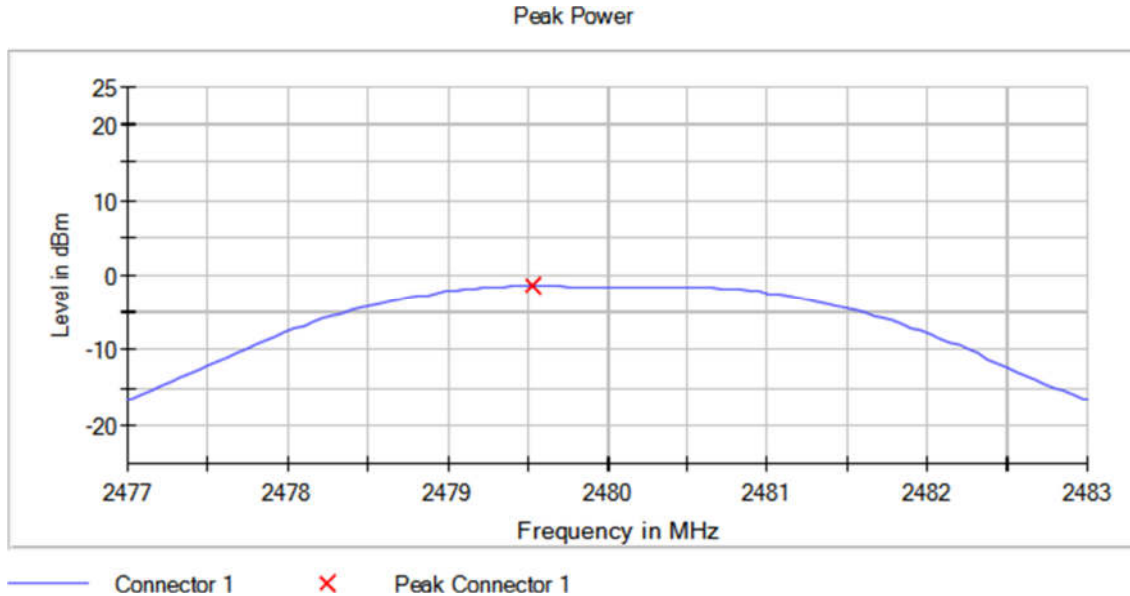
Frequency MHz = 2440.00000 Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)
Number of Transmission Chains = 1 Active Port = 1

Plots:



Frequency MHz = 2480.00000 Equipment Type = Digital Transmission System (DTS)
 Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)
 Number of Transmission Chains = 1 Active Port = 1

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	2310.475000	-38.520	-26.077
	2310.525000	-38.768	
	2385.875000	-38.806	
	2385.925000	-38.932	
	2317.475000	-39.161	
	2317.425000	-39.288	
	2358.425000	-39.333	
	2398.725000	-39.358	
	2326.975000	-39.639	
	2357.125000	-39.668	
	2327.025000	-39.679	
	2310.425000	-39.694	
	2337.075000	-39.780	
	2312.525000	-39.804	
2358.475000	-39.806		

Freq (MHz)	Measured Freq (MHz)	Level (dBm)	Limit (dBm)
2480.00000	2485.525000	-39.280	-26.114
	2485.475000	-39.286	
	2494.325000	-39.301	
	2494.275000	-39.481	
	2492.625000	-39.634	
	2492.575000	-39.680	
	2488.525000	-39.681	
	2488.475000	-39.795	
	2485.375000	-39.832	
	2485.225000	-39.898	
	2492.675000	-40.024	
	2485.175000	-40.071	
	2486.875000	-40.114	
	2484.675000	-40.127	
2489.125000	-40.140		

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Freq (MHz)	Measured Freq (MHz)	Level (dBm)	Limit (dBm)
2402.00000	2399.975000	-33.210	-26.959
	2399.925000	-33.648	
	2399.875000	-34.282	
	2399.825000	-36.316	
	2399.725000	-36.976	
	2399.675000	-37.465	
	2399.775000	-37.644	
	2323.275000	-38.991	
	2323.225000	-39.013	
	2358.075000	-39.362	
	2358.125000	-39.436	
	2348.275000	-39.606	
	2336.025000	-39.634	
	2329.075000	-39.637	
2329.125000	-39.661		

Freq (MHz)	Measured Freq (MHz)	Level (dBm)	Limit (dBm)
2480.00000	2485.125000	-38.648	-26.035
	2484.825000	-38.745	
	2485.075000	-38.750	
	2484.875000	-38.903	
	2496.425000	-39.403	
	2484.775000	-39.440	
	2493.075000	-39.467	
	2484.225000	-39.490	
	2484.425000	-39.490	
	2484.925000	-39.550	
	2484.275000	-39.573	
	2485.025000	-39.583	
	2489.225000	-39.655	
	2484.975000	-39.749	
	2486.025000	-39.870	

Verdict

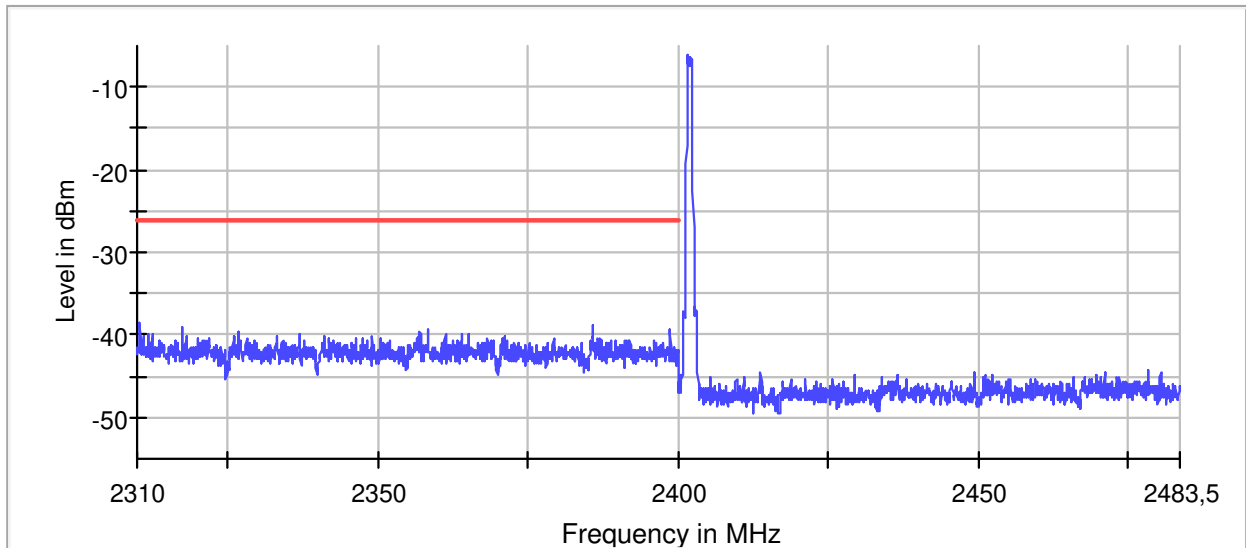
Pass

Attachments

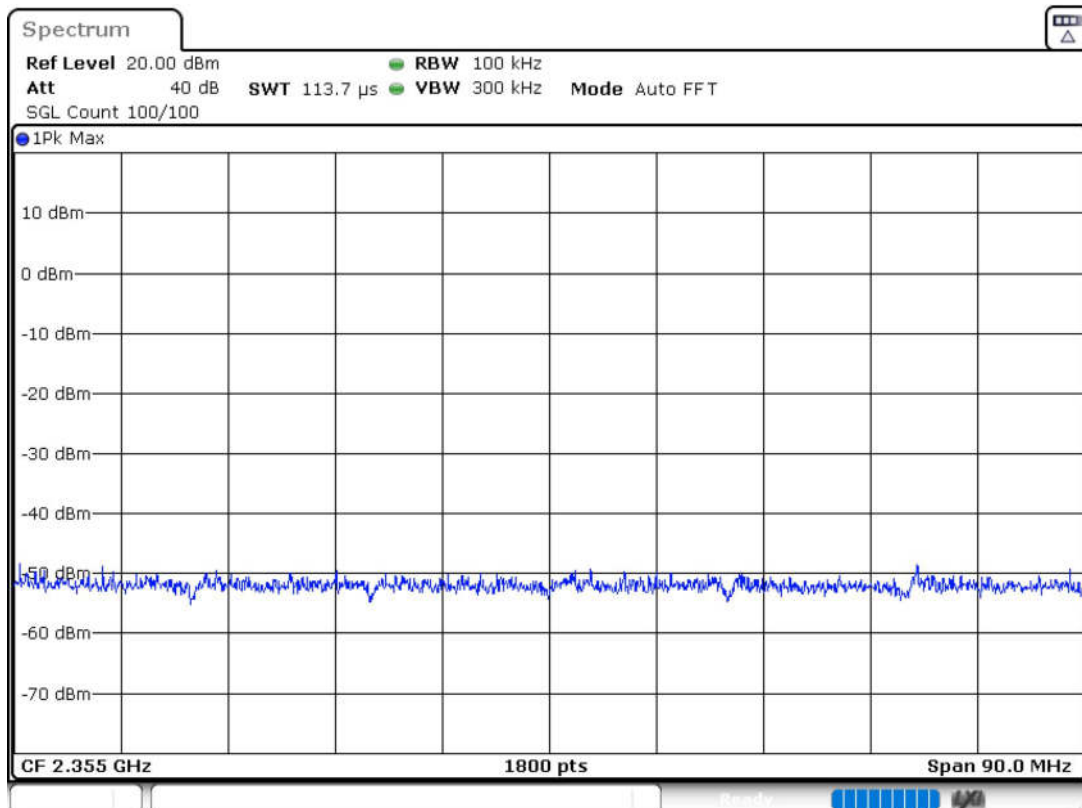
Frequency MHz = 2402.00000 Equipment Type = Digital Transmission System (DTS)
 Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
 Number of Transmission Chains = 1 Measurement Point = 1
 Active Port = 1

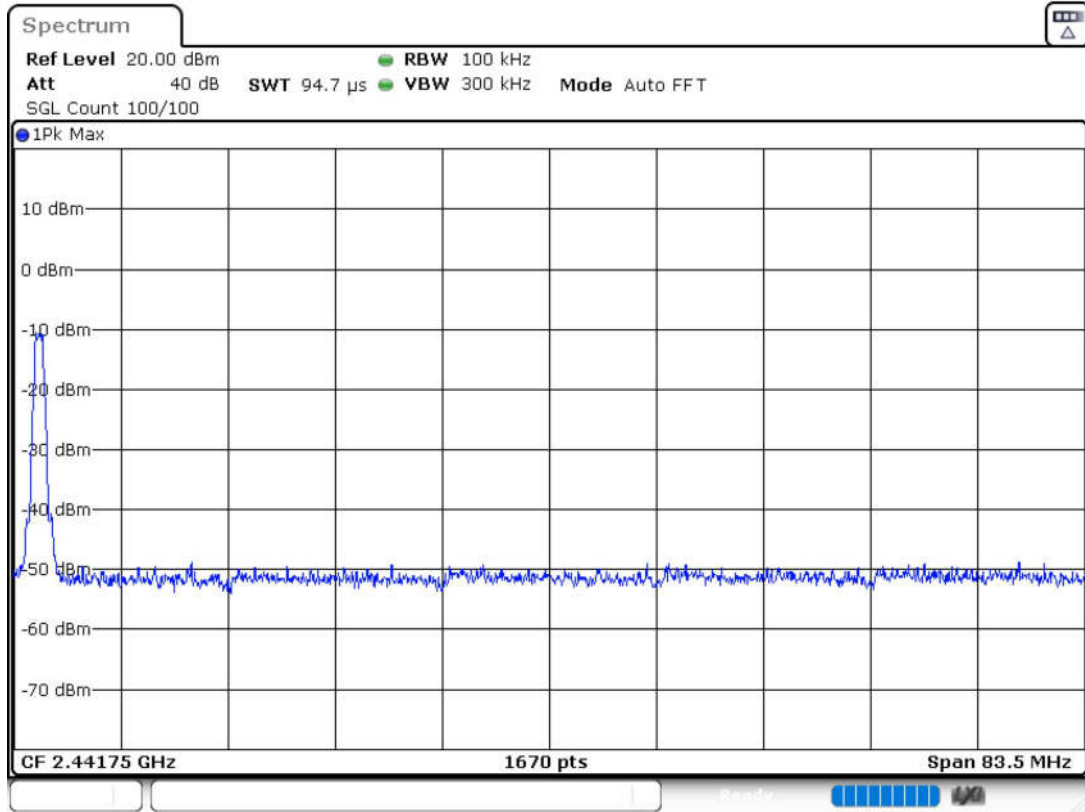
Plots:

Band Edge



— Limit — Sum Level × Fail

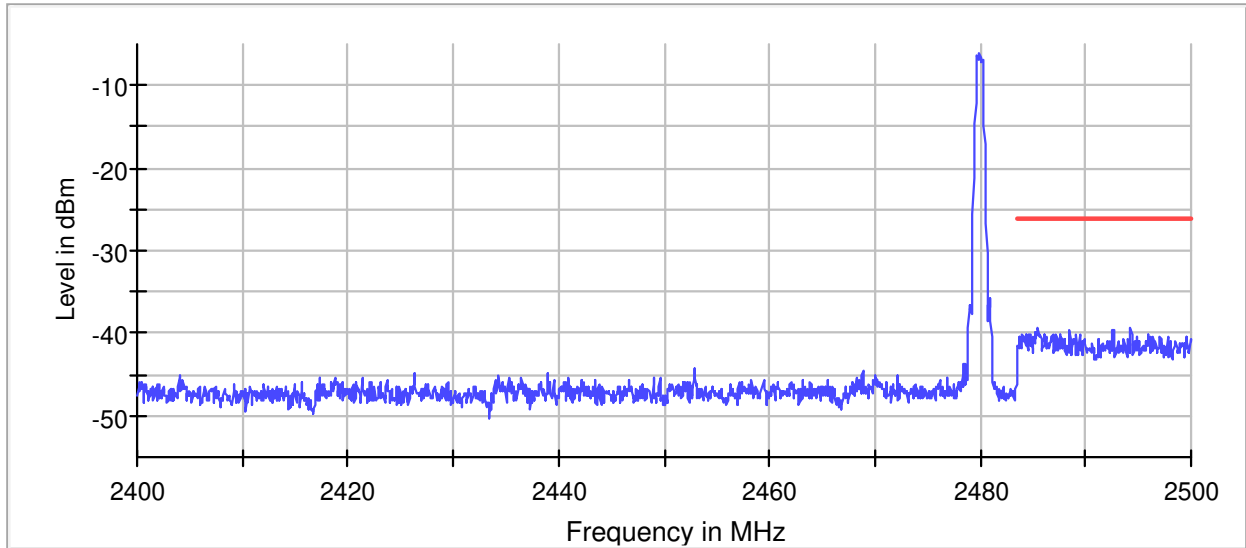




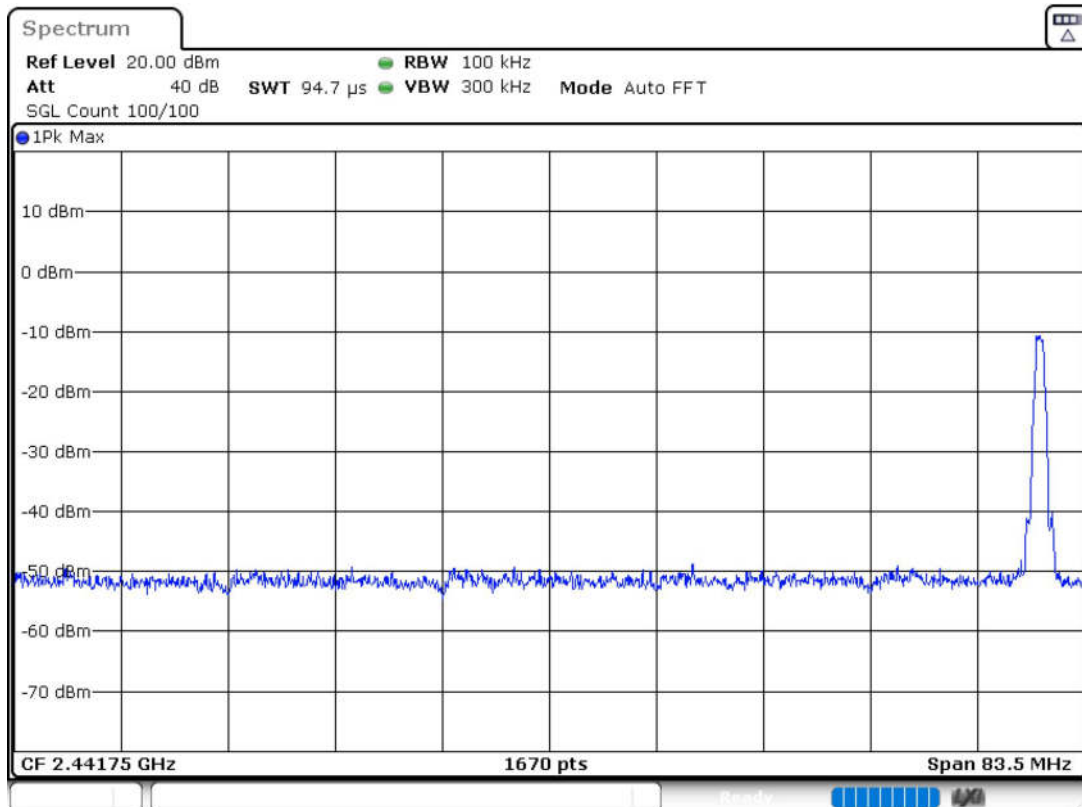
Frequency MHz = 2480.00000 Equipment Type = Digital Transmission System (DTS)
 Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
 Number of Transmission Chains = 1 Measurement Point = 1
 Active Port = 1

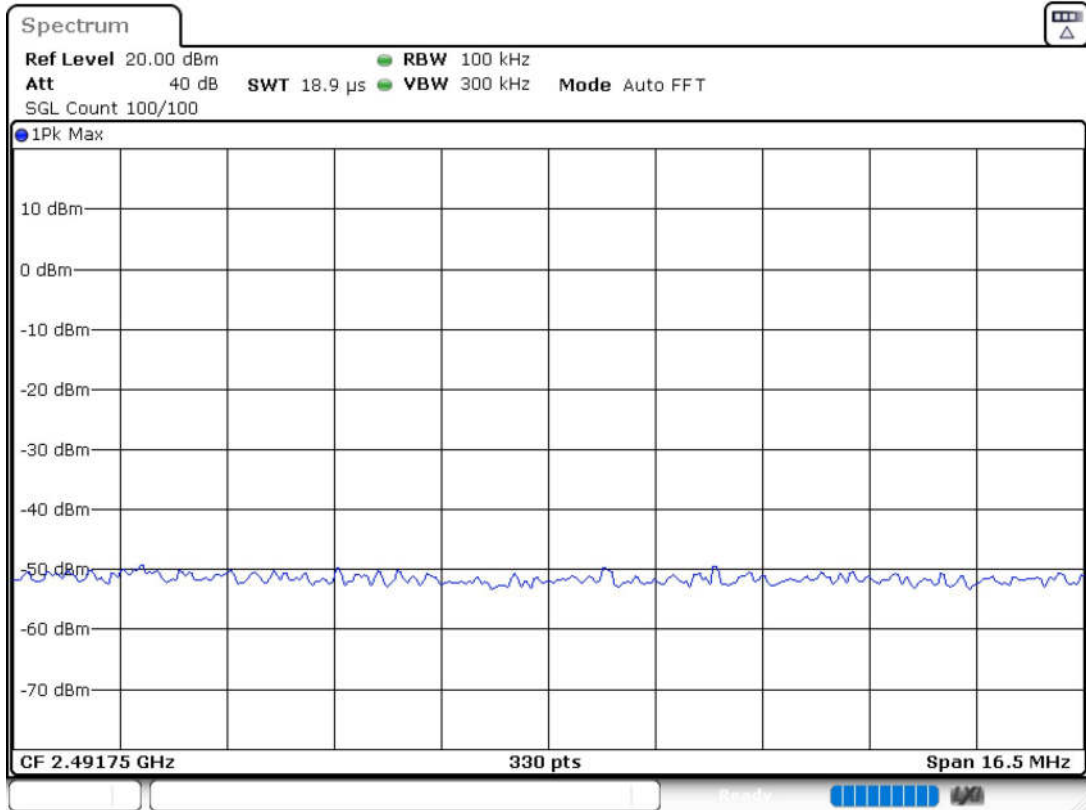
Plots:

Band Edge



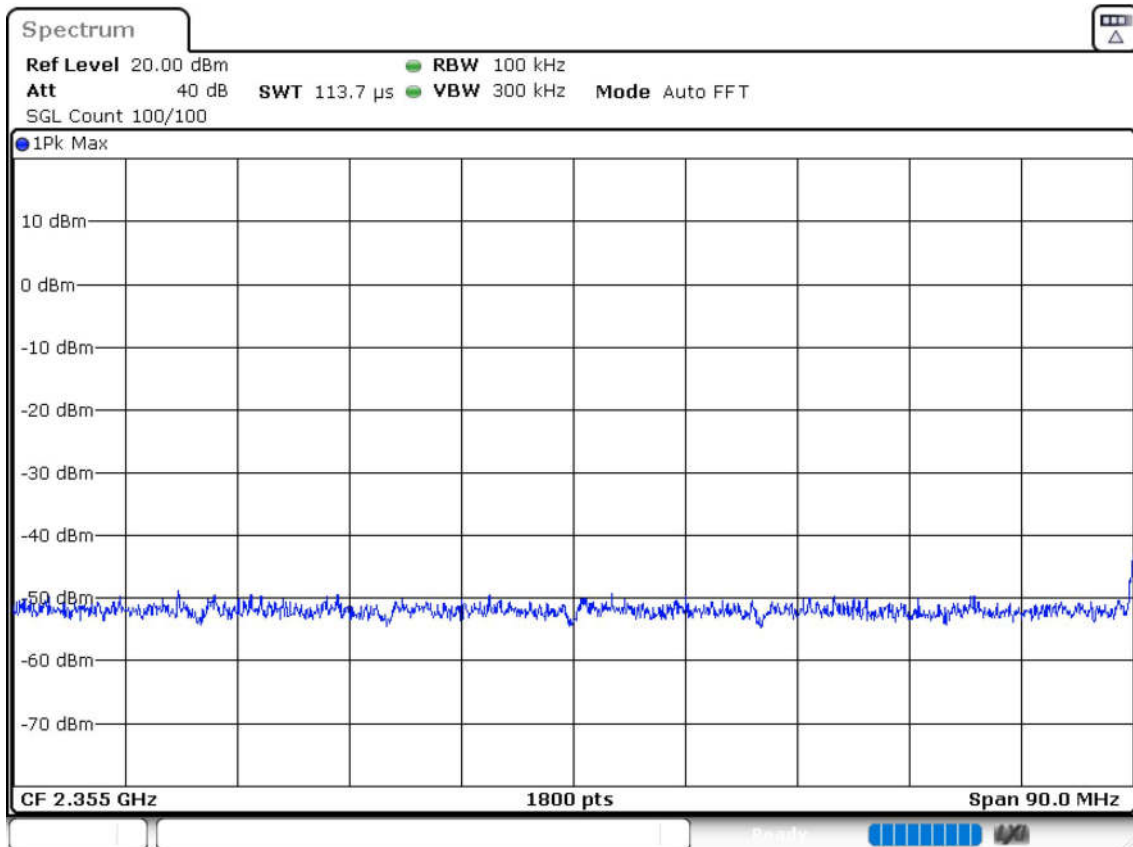
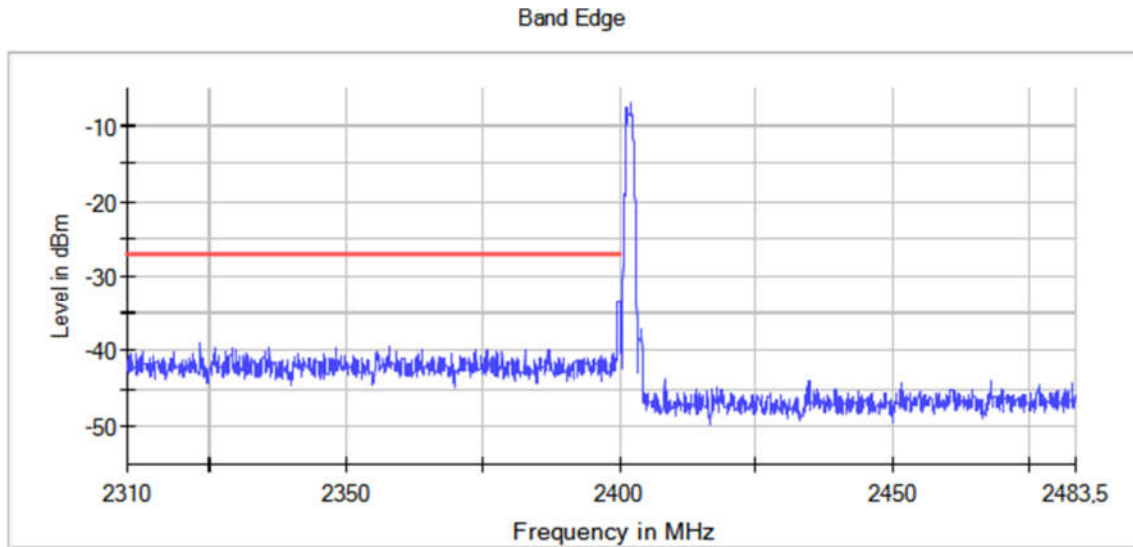
— Limit — Sum Level × Fail

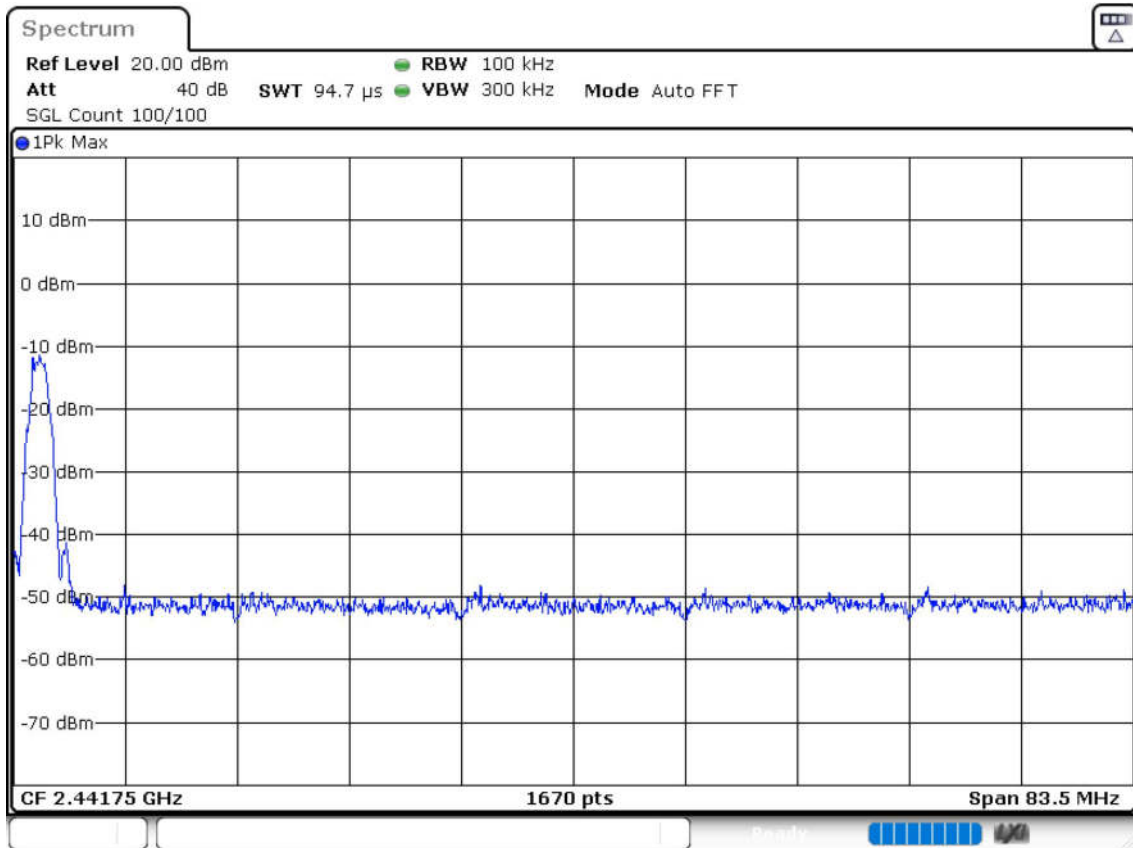




Frequency MHz = 2402.00000 Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)
Number of Transmission Chains = 1 Measurement Point = 1
Active Port = 1

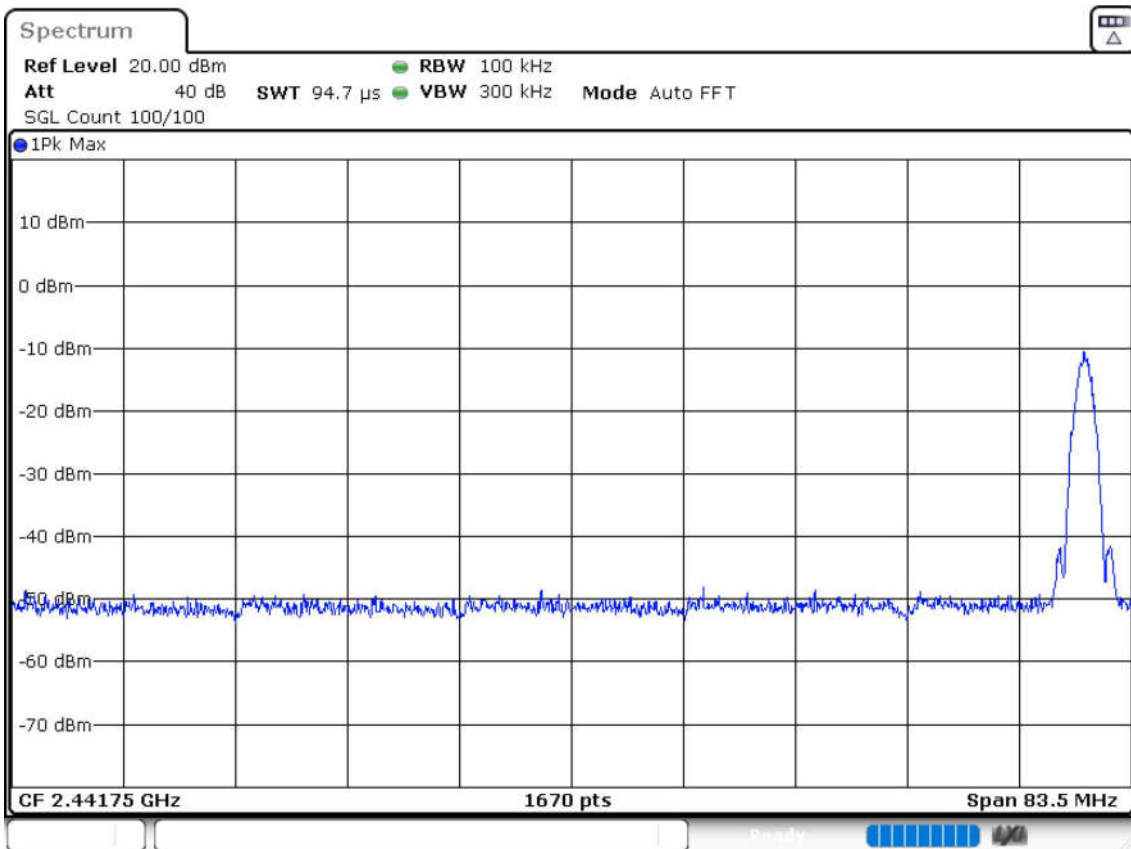
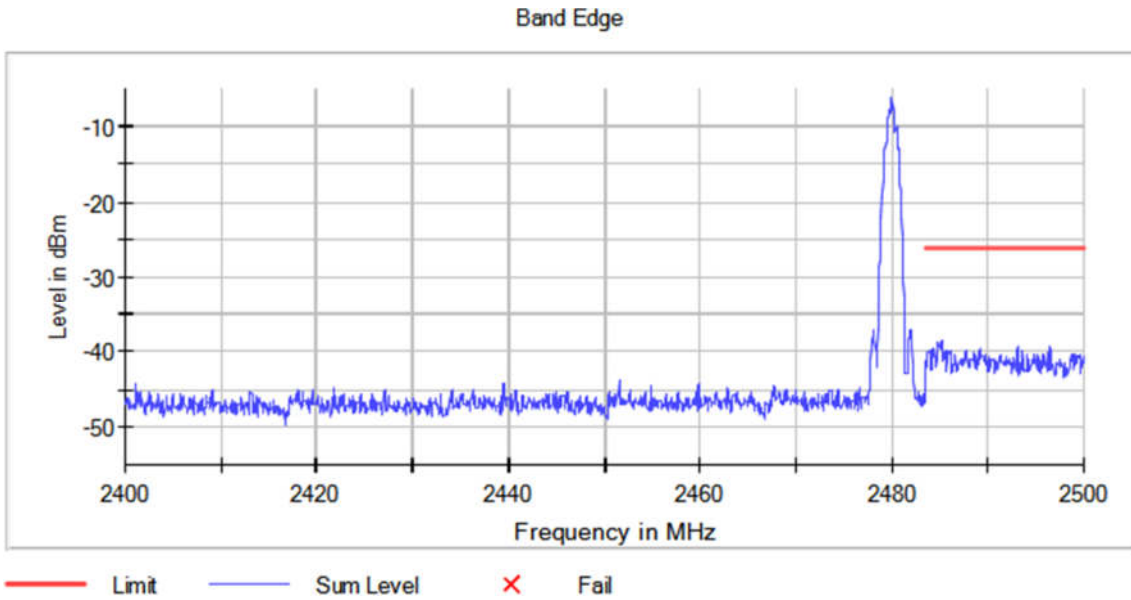
Plots:

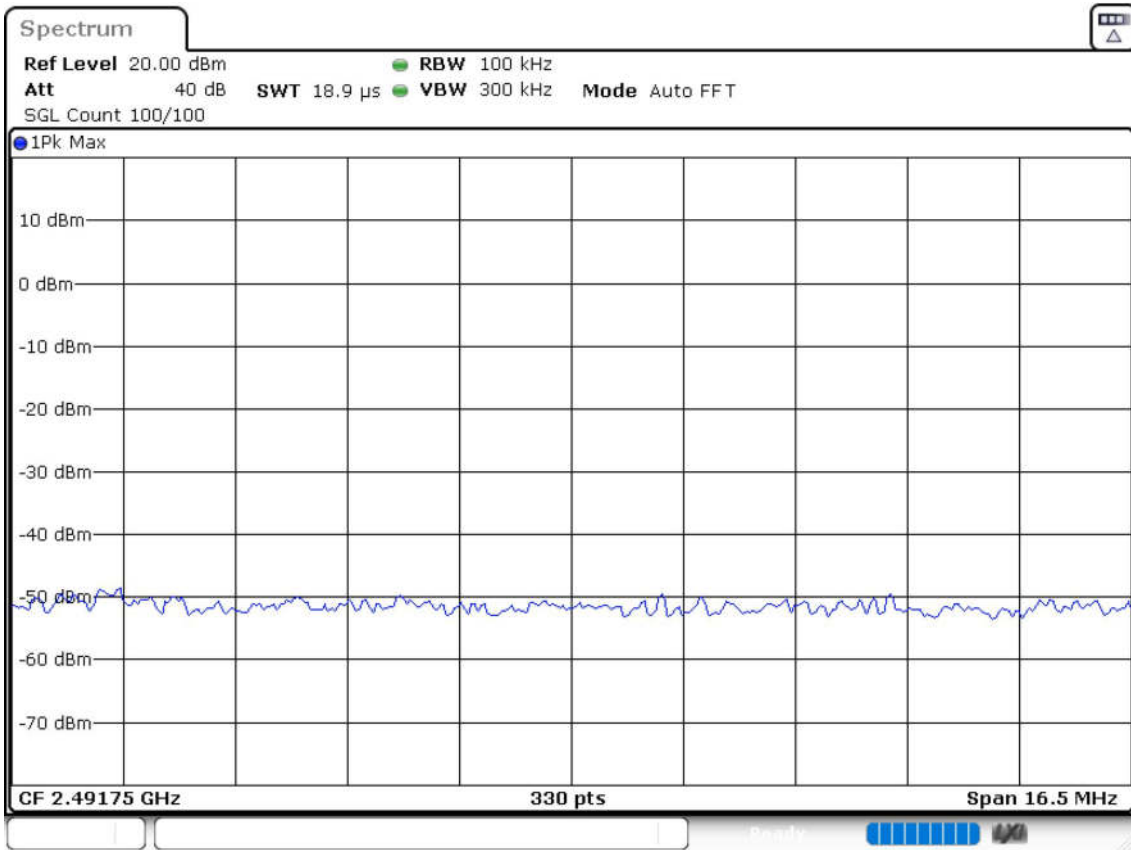




Frequency MHz = 2480.00000 Equipment Type = Digital Transmission System (DTS)
 Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)
 Number of Transmission Chains = 1 Measurement Point = 1
 Active Port = 1

Plots:





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 ($\mu\text{V/m}$)	Field strength ($\text{dB}\mu\text{V/m}$)	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

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Frequency range 30 MHz – 1 GHz:

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 ($54 \text{ dB}\mu\text{V/m}$ at 3 m) are measured with average detector for compliance checking with the average limit.

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

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Frequency range 30 MHz – 1 GHz:

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 dB μ V/m at 3 m) are measured with average detector for compliance checking with the average limit.

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

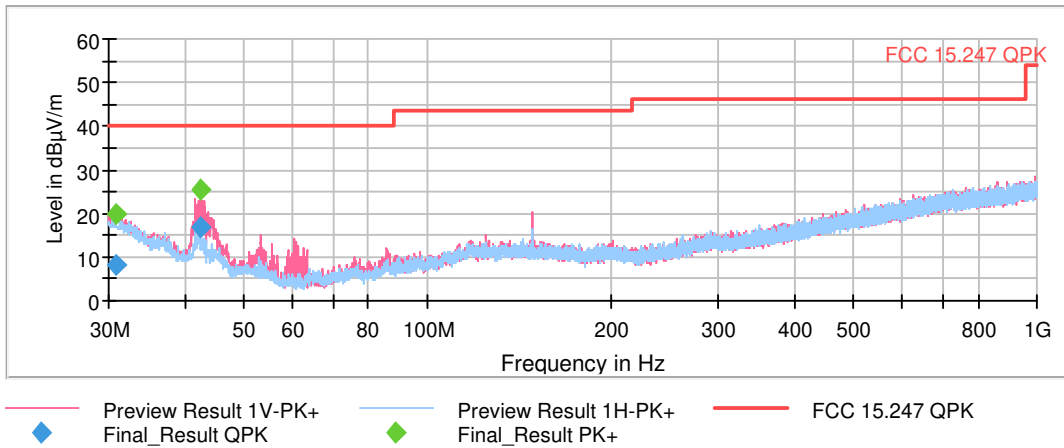
Verdict

Pass

Attachments

Equipment Type = Digital Transmission System (DTS)
 Modulation = BTLE 5.0 (GFSK 1 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 channel

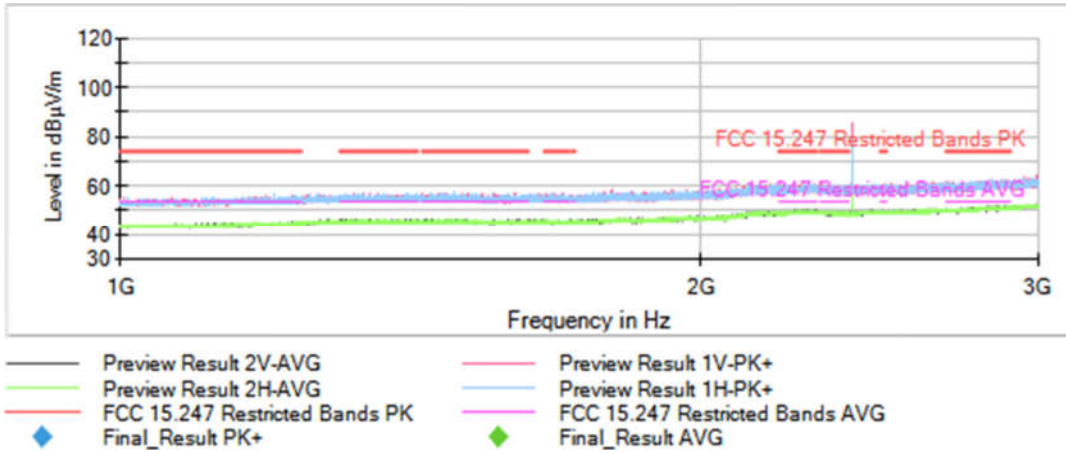
Tables:

Spectrum Analyzer Parameters

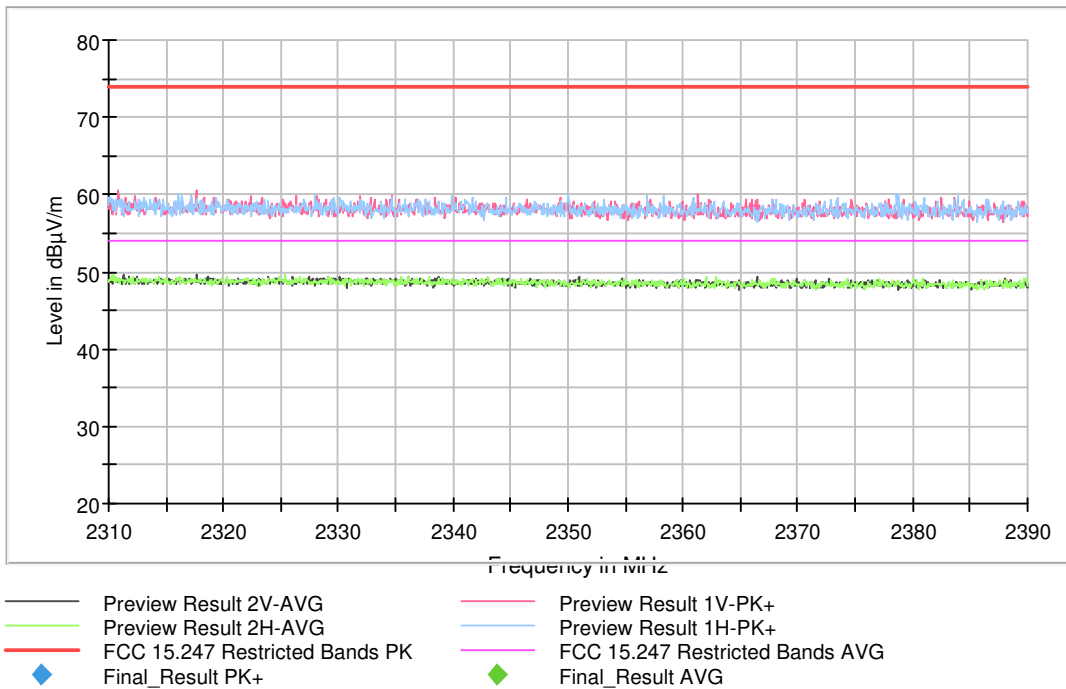
	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver:	[ESR 7]					
	30 MHz - 1 GHz	48,5 kHz	PK+	100 kHz	1 s	20 dB

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

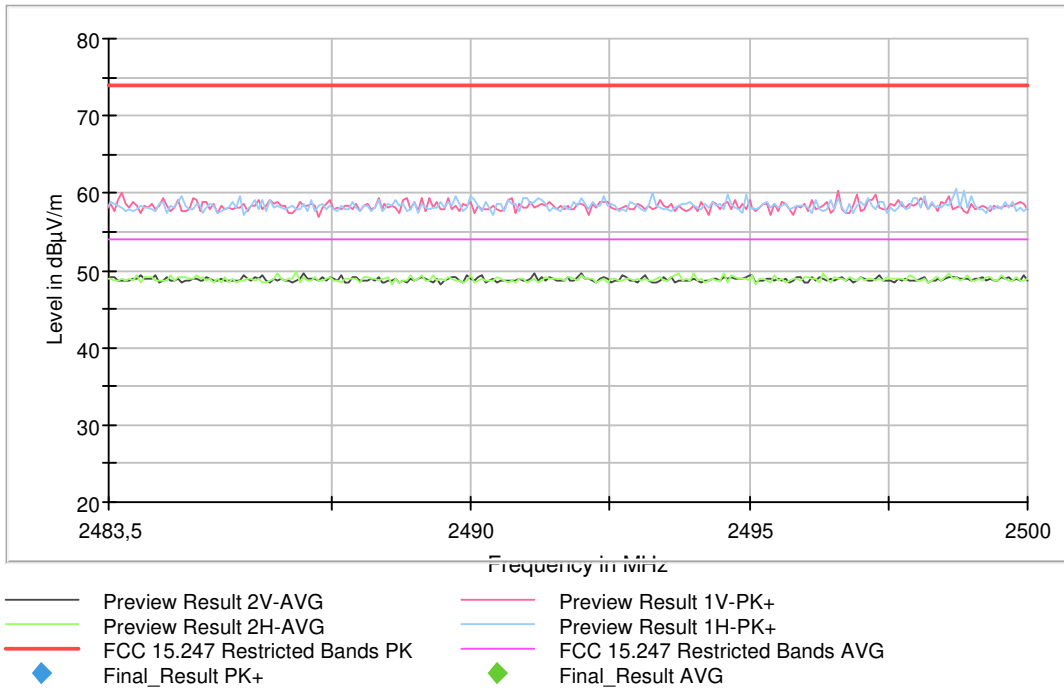
Plots:



Full Spectrum



Full Spectrum



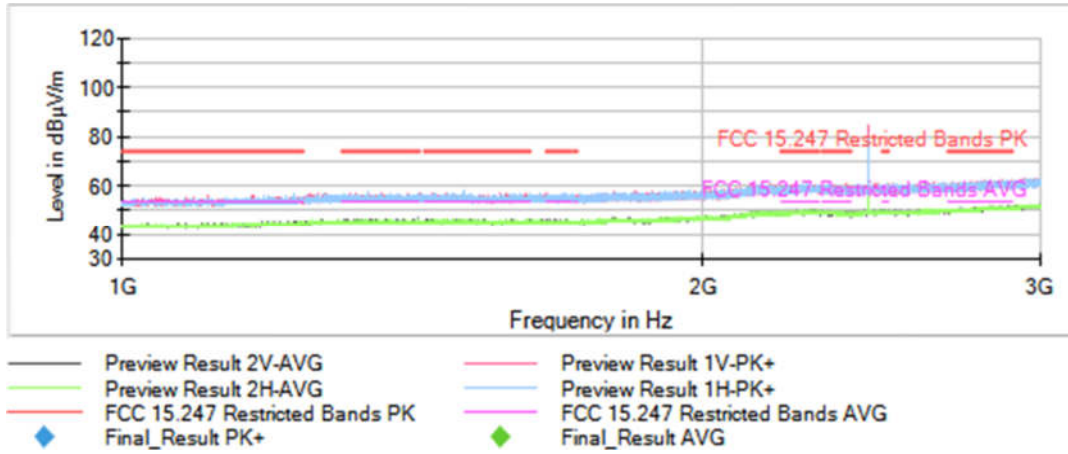
Tables:

Spectrum Analyzer Parameters

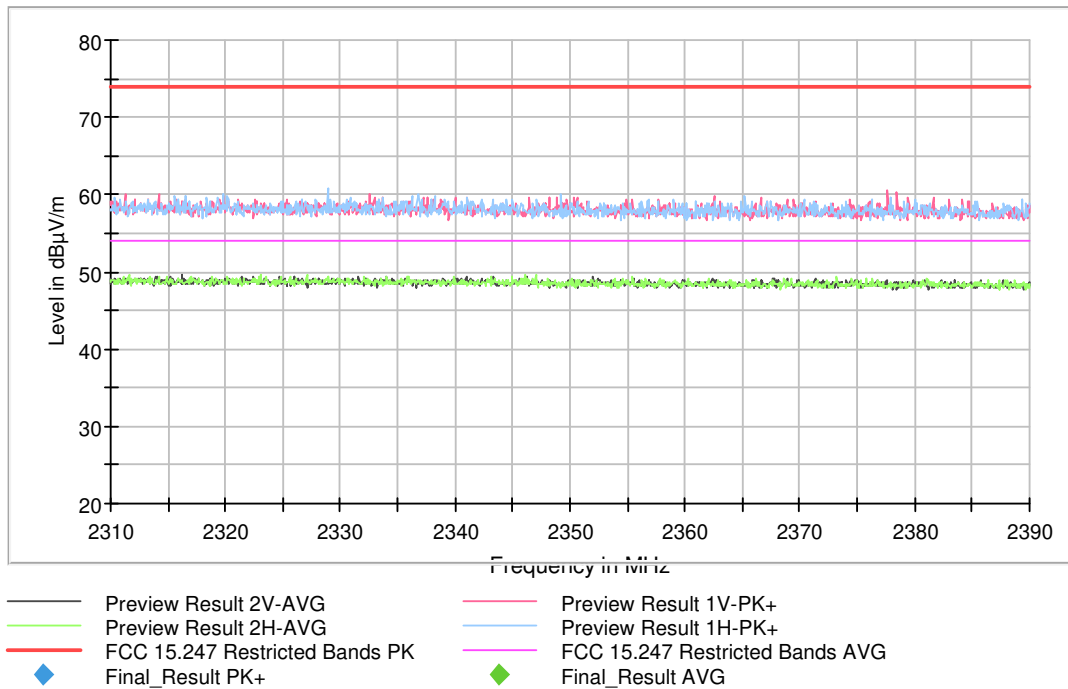
	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [FSV 40]					
	1 GHz - 3 GHz	66,667 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

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

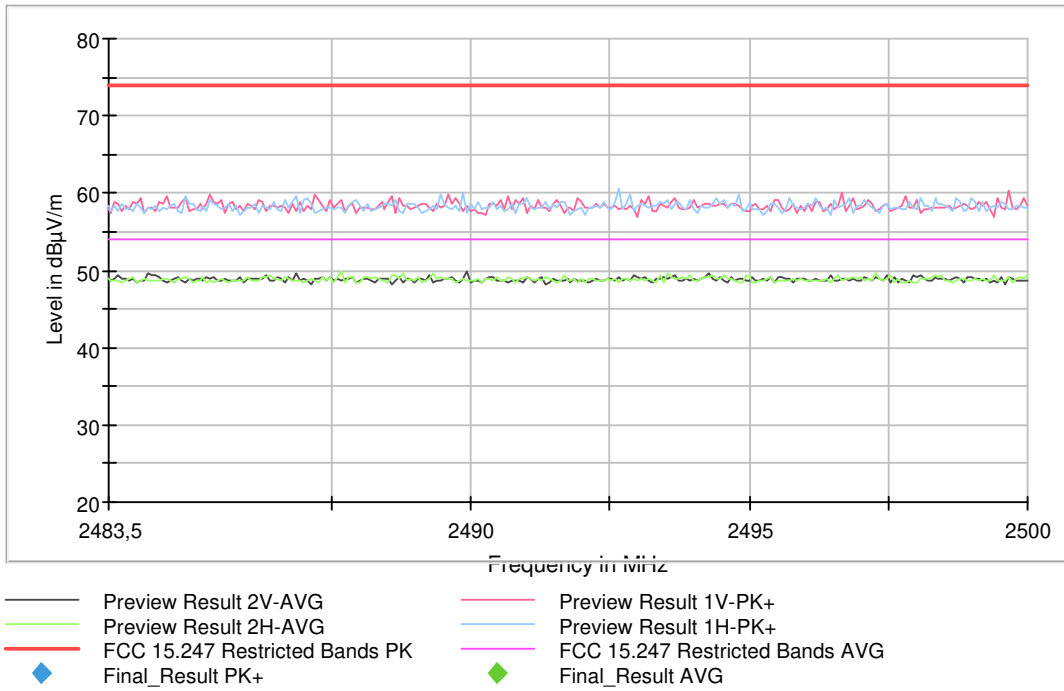
Plots:



Full Spectrum



Full Spectrum



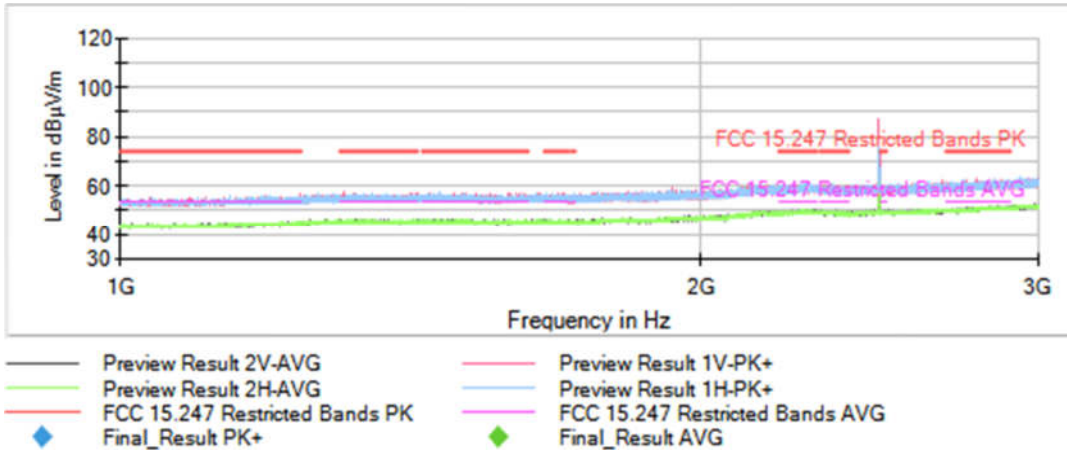
Tables:

Spectrum Analyzer Parameters

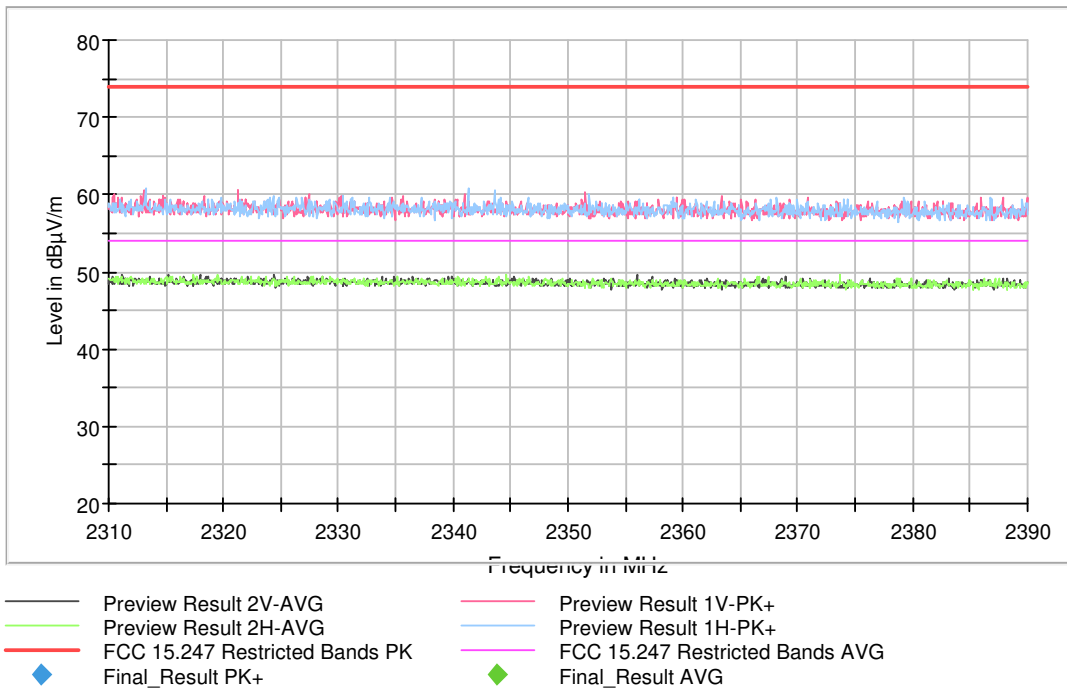
	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [FSV 40]					
	1 GHz - 3 GHz	66,667 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

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

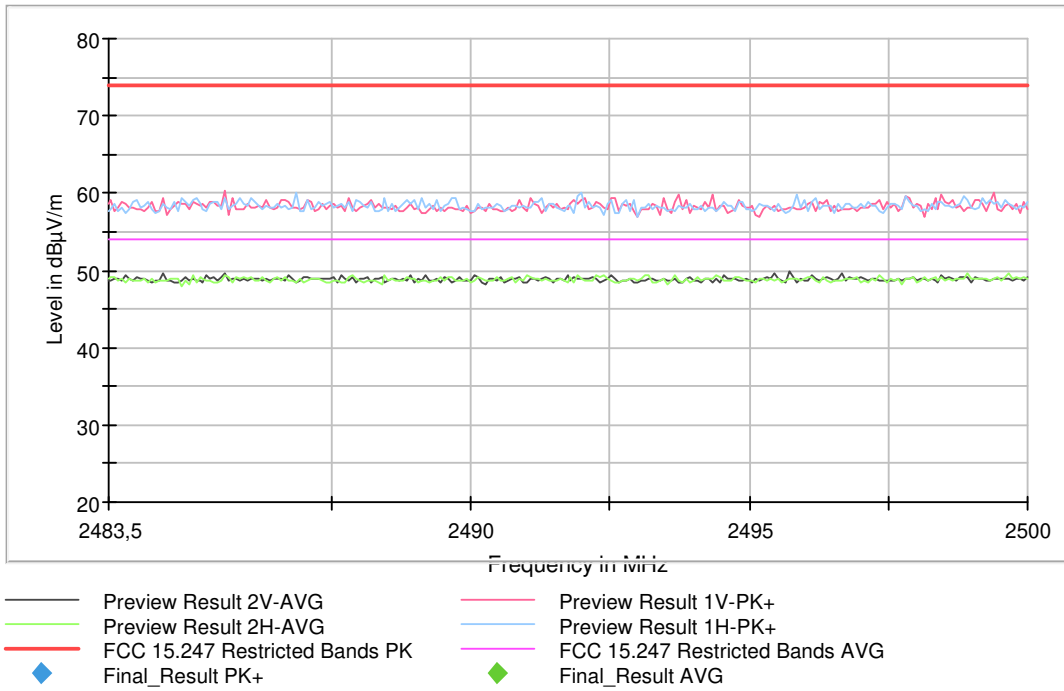
Plots:



Full Spectrum



Full Spectrum



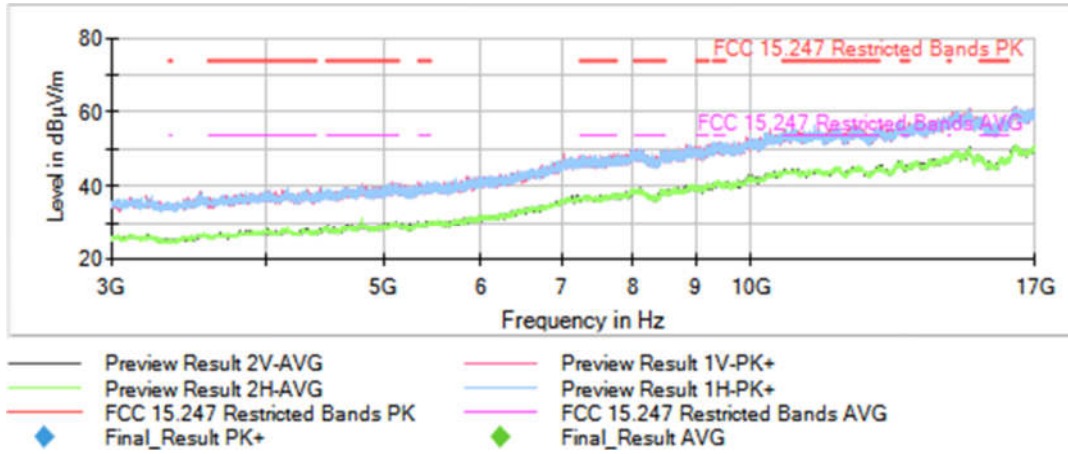
Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [FSV 40]					
	1 GHz - 3 GHz	66,667 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

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:



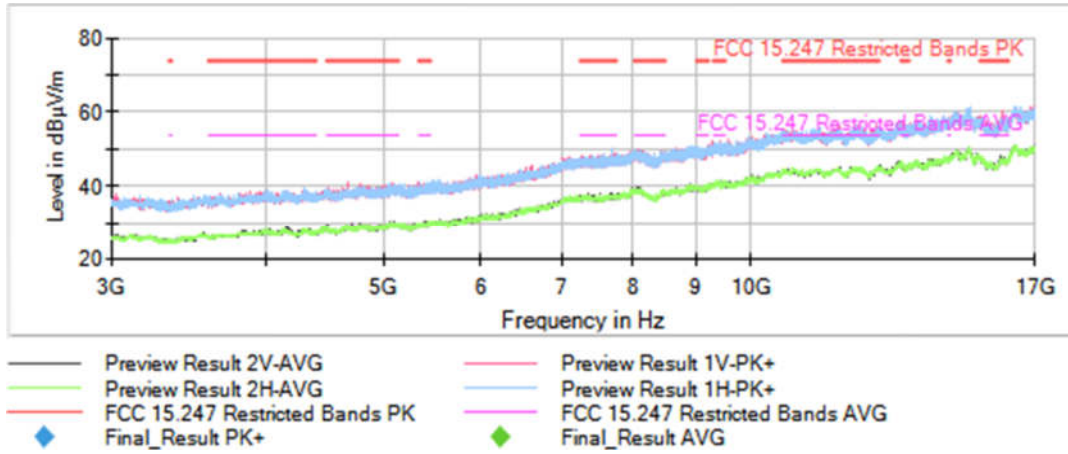
Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [FSV 40]					
	3 GHz - 17 GHz	500 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

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:



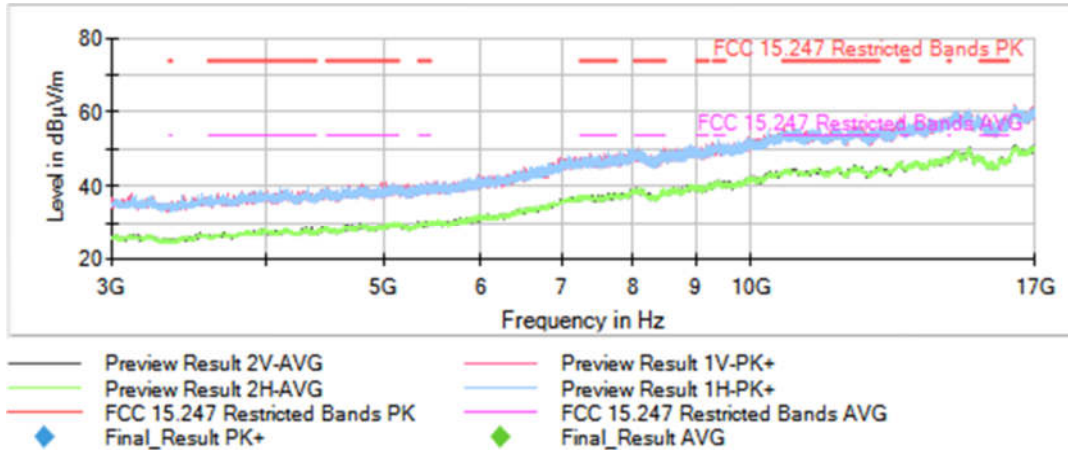
Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [FSV 40]					
	3 GHz - 17 GHz	500 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

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:



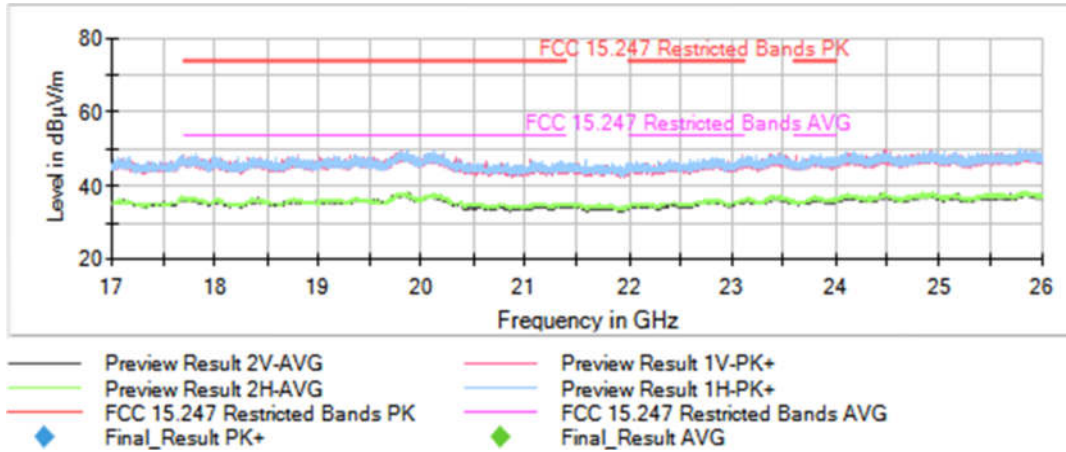
Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [FSV 40]					
	3 GHz - 17 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) Frequency Range GHz = [17, 26]
 Number of Transmission Chains = 1 Measurement Point = 1
 Active Port = 1

Plots:



This plot is valid for all channel

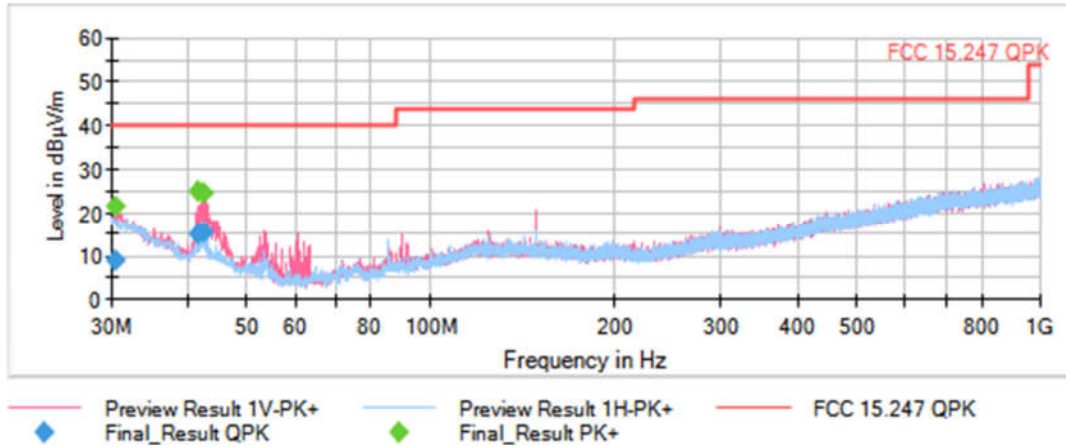
Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	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 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 channel

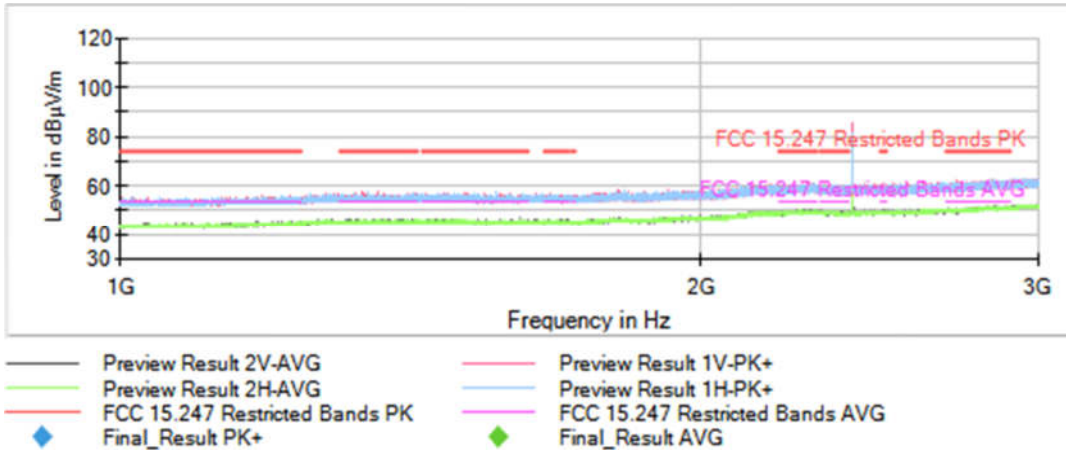
Tables:

Spectrum Analyzer Parameters

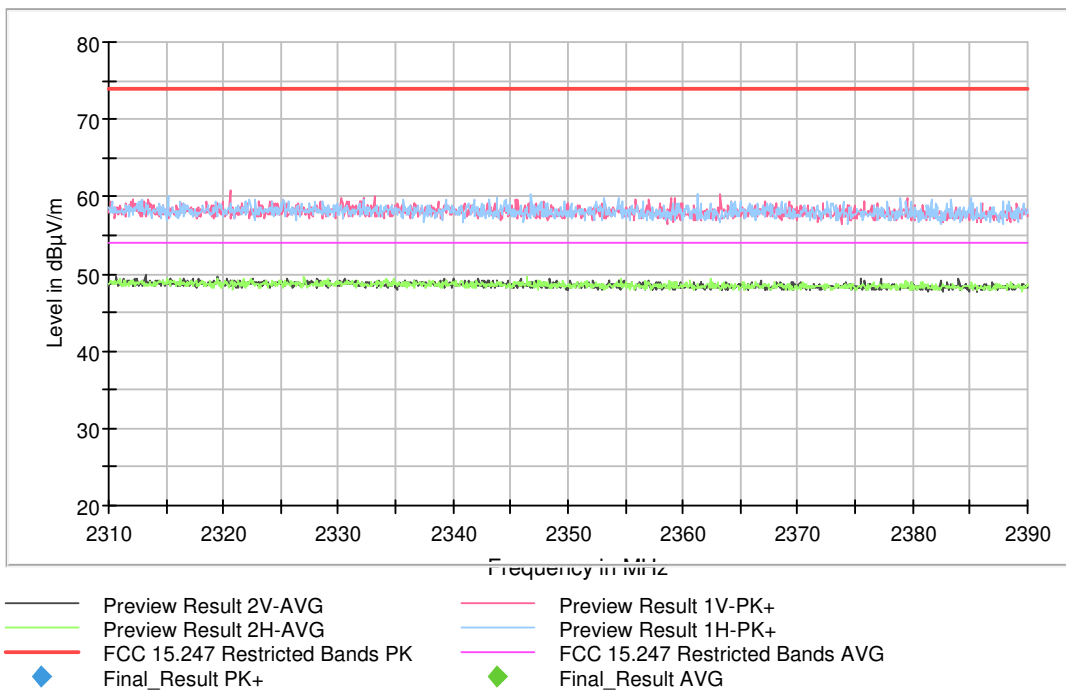
	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESR 7]					
	30 MHz - 1 GHz	48,5 kHz	PK+	100 kHz	1 s	20 dB

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

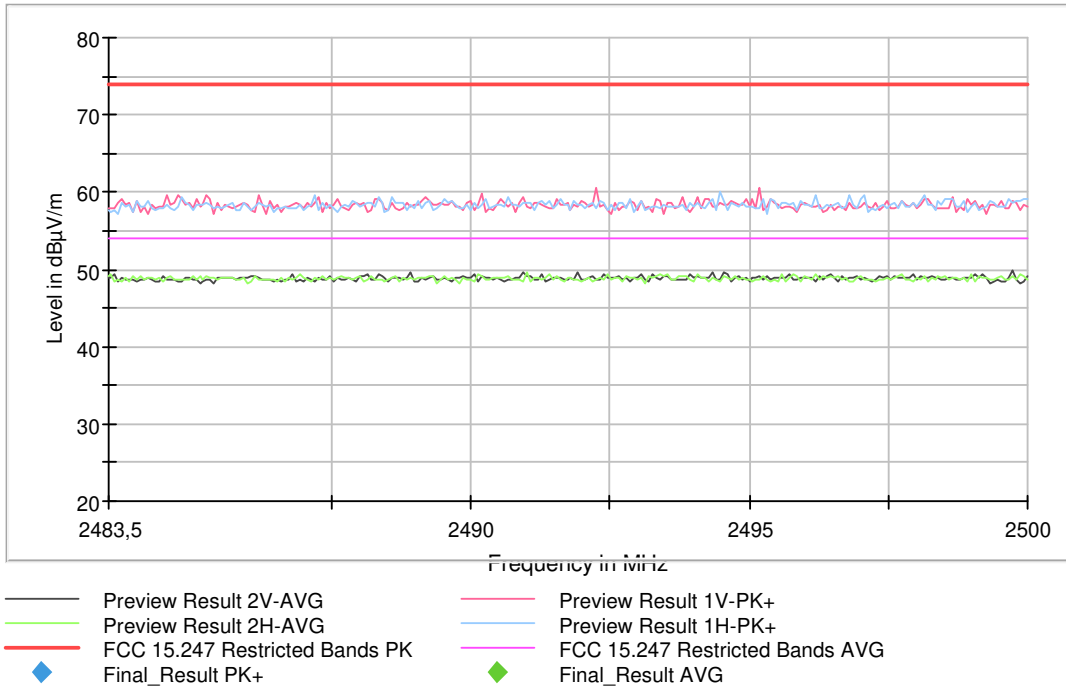
Plots:



Full Spectrum



Full Spectrum



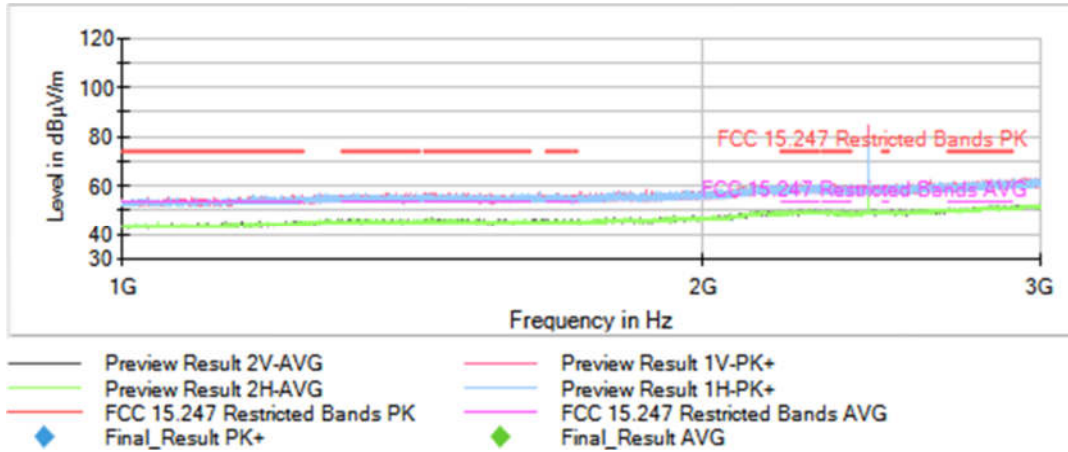
Tables:

Spectrum Analyzer Parameters

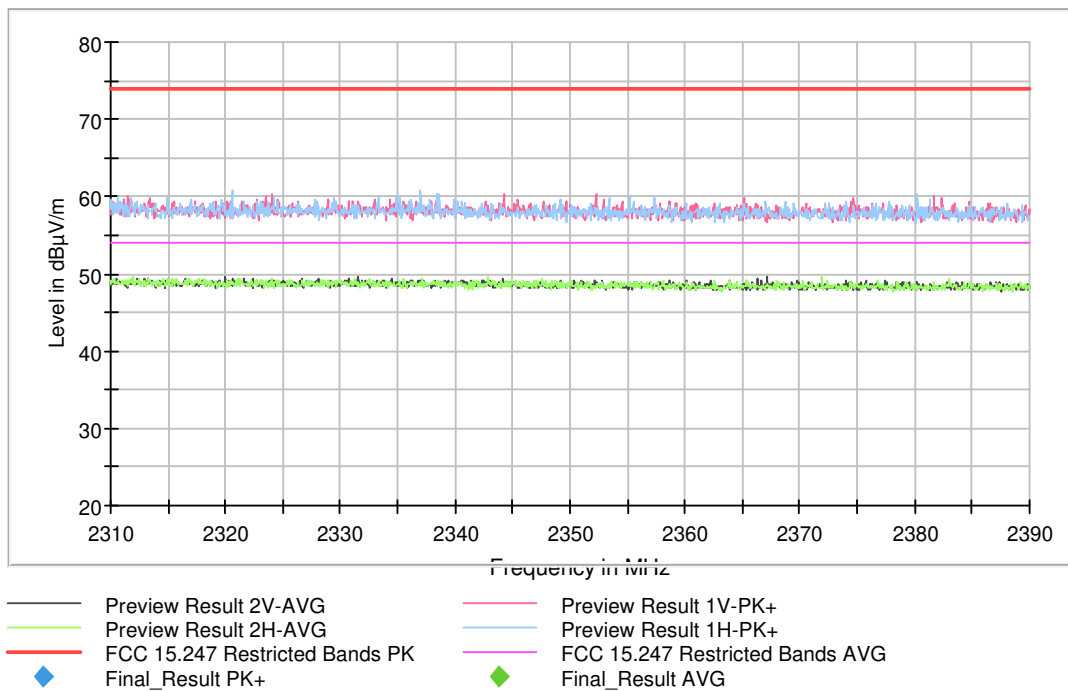
	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [FSV 40]					
	1 GHz - 3 GHz	66,667 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

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

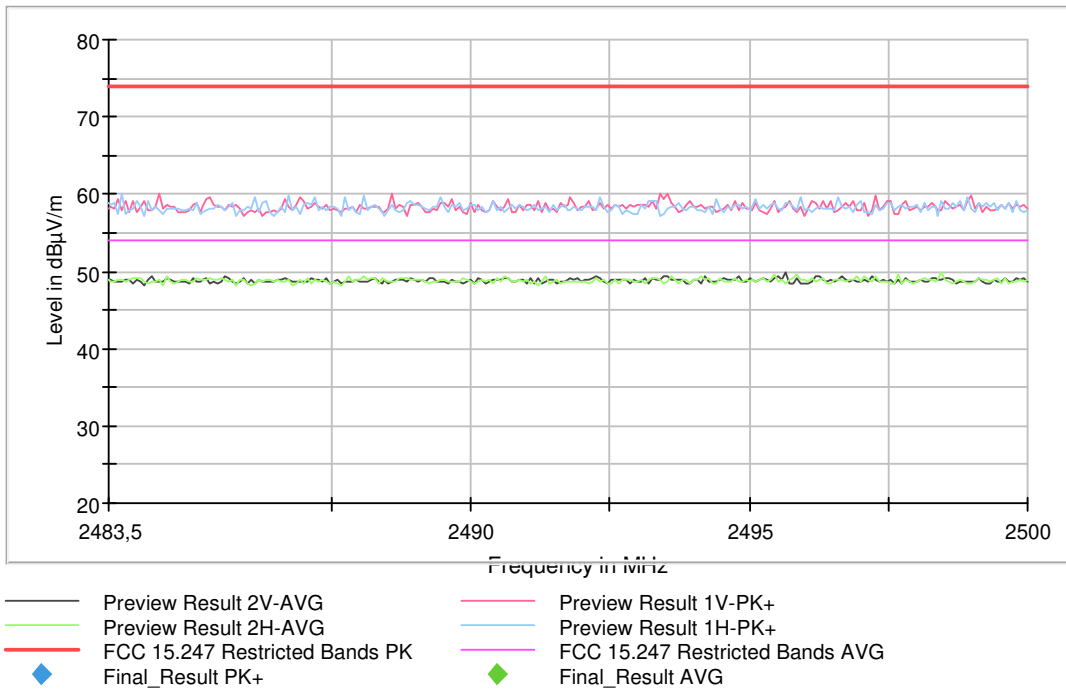
Plots:



Full Spectrum



Full Spectrum



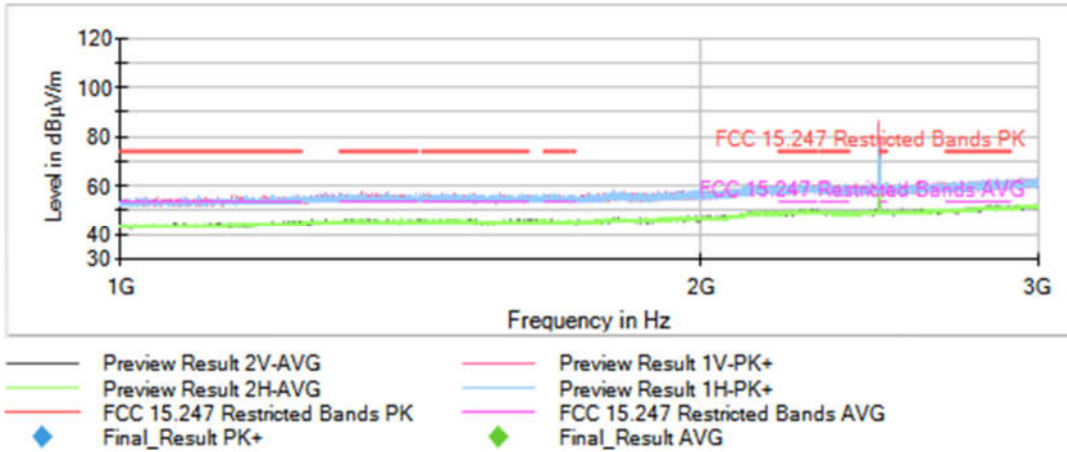
Tables:

Spectrum Analyzer Parameters

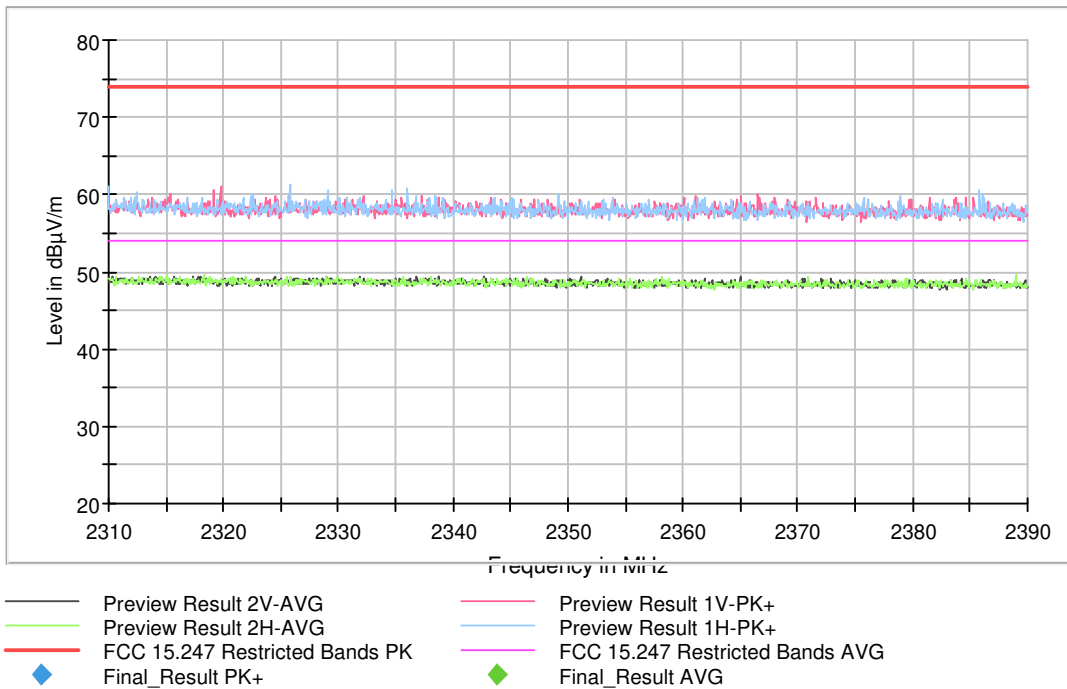
	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [FSV 40]					
	1 GHz - 3 GHz	66,667 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

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

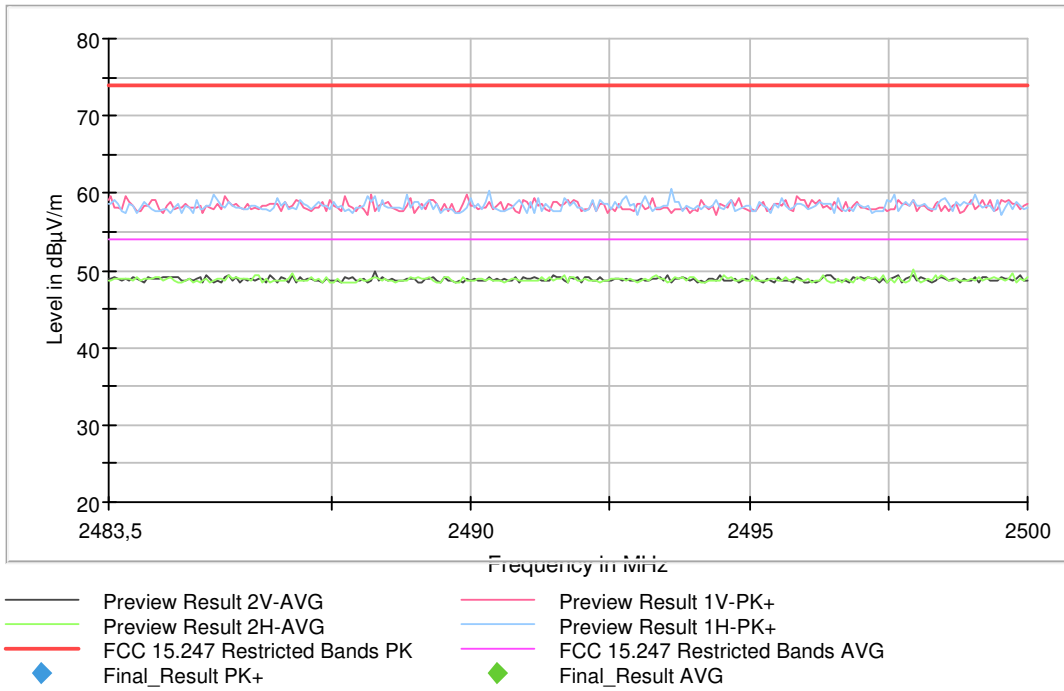
Plots:



Full Spectrum



Full Spectrum



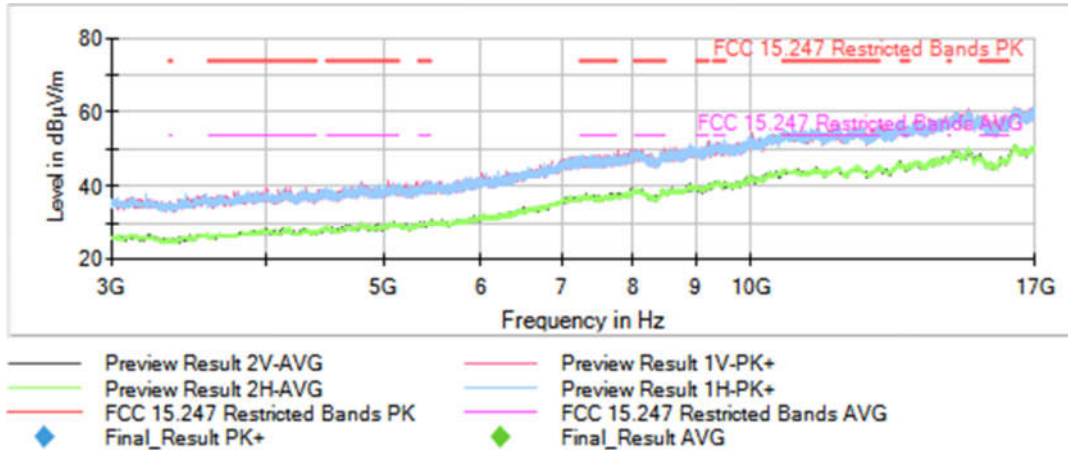
Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [FSV 40]					
	1 GHz - 3 GHz	66,667 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

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:



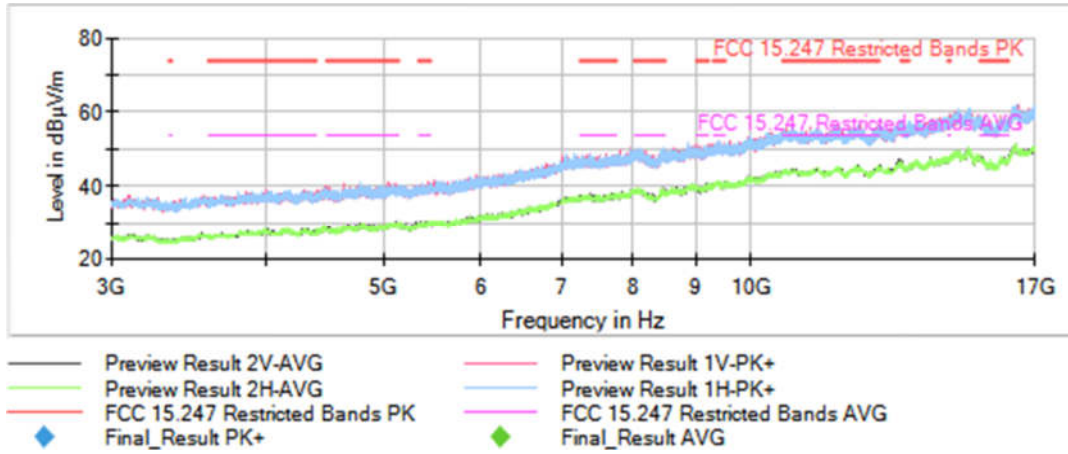
Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [FSV 40]					
	3 GHz - 17 GHz	500 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

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:



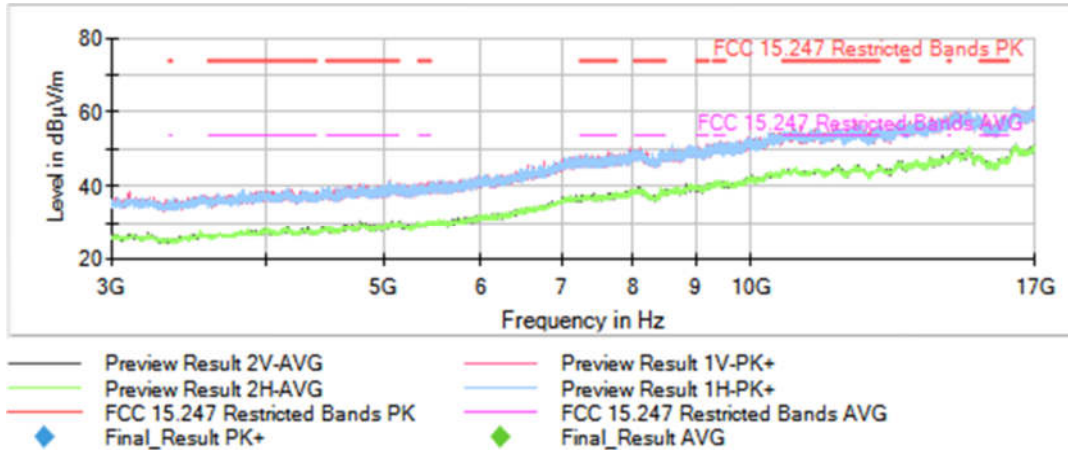
Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [FSV 40]					
	3 GHz - 17 GHz	500 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

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:



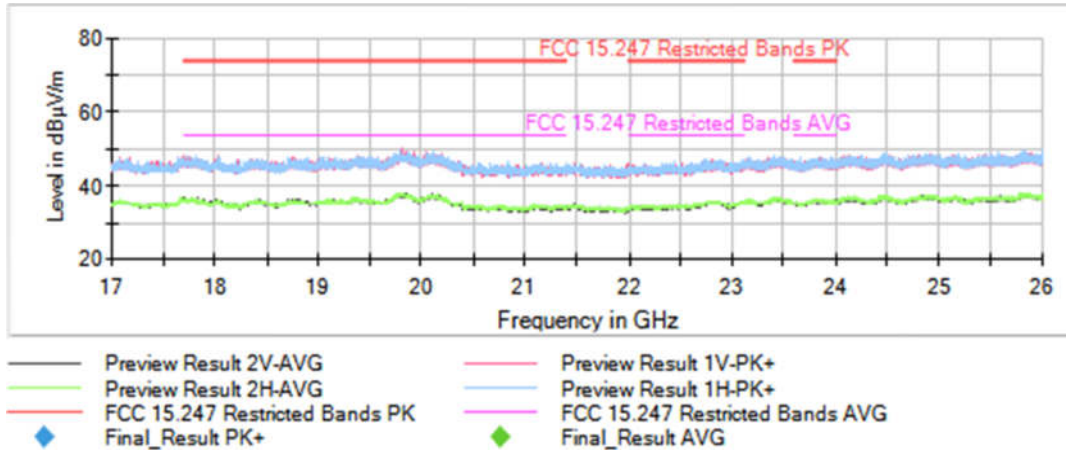
Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [FSV 40]					
	3 GHz - 17 GHz	500 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

Equipment Type = Digital Transmission System (DTS)
 Modulation = BTLE 5.0 (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

Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [FSV 40]					
	17 GHz - 26 GHz	500 kHz	PK+ ; AVG	1 MHz	1 s	0 dB