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

Test Report No:
NIE: 72548RRF.003A1

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

(*) Identification of item tested	GPS fitness watch
(*) Trademark	Polar
(*) Model and /or type reference	5J
Other identification of the product	FCC ID: INW5J IC: 6248A-5J
(*) Features	Bluetooth LE, GNSS: GPS, Galileo Glonass, SBAS HW version: 007106064 SW version: 0.6.0
Manufacturer	Polar Electro Oy Professorintie 5, 90440 Kempele, FINLAND
Test method requested, standard	USA FCC Part 15.247 (10-1-20 Edition): Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. USA FCC Part 15.209 (10-1-20 Edition): Radiated emission limits; general requirements. CANADA RSS-247 Issue 2 (February 2017). CANADA RSS-Gen Issue 5 amendment 2 (February2021). 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)	Rafael López Martín EMC Consumer & RF Lab. Manager 2022.10.10 13:10:52 +02'00'
Date of issue	2022-10-10
Report template No	FDT08_24 (*) "Data provided by the client"

Index

Acronyms

Acronym ID	Acronym Description
EbW	Emission Bandwidth
# of Tx Chains	Number of Transmission Chains
Avg Power	Maximum Average Conducted Output Power
BW	Bandwidth
Detector	Detector used
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
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 is a FCC-recognized accredited testing laboratory with appropriate scope of accreditation that covers the performed tests in this report.

DEKRA Testing and Certification is an ISED-recognized accredited testing laboratory, CABid: ES1909, 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.

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
RF Average Output Power: Measurement uncertainty ≤ ± 0,99 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 GPS fitness watch. GPS fitness watch with Bluetooth low-energy connectivity and wrist-based optical heart rate.

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	72548B_1	Smart watch (conducted)	WR 30M (SCARLET)	F2205J0400493	2022-07-12	Element Under Test
S/02	72548B_14	USB charging cable	--	--	2022-07-12	Auxiliary Element
S/02	72548B_4	Smart watch	WR 30M (SCARLET)	F2205J0400474	2022-07-12	Element Under Test

Notes referenced to samples during the project:

Id	Type
S/01	Sample used for Conducted testing
S/02	Sample used for Radiated testing

Test sample description

<table>
<tr><td rowspan="4">Ports…… :</td><td colspan="2" rowspan="2">Port name and description</td><td colspan="4">Cable</td></tr>
<tr><td>Specified max length [m]</td><td>Attached during test</td><td>Shielded</td><td>Coupled to patient(3)</td></tr>
<tr><td colspan="2">USB port</td><td>0.6</td><td>[X]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td colspan="2">.....</td><td>.....</td><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>Supplementary information to the ports…… :</td><td colspan="6">.....</td></tr>
<tr><td rowspan="4">Rated power supply .....:</td><td colspan="2" rowspan="2">Voltage and Frequency</td><td colspan="5">Reference poles</td></tr>
<tr><td>L1</td><td>L2</td><td>L3</td><td>N</td><td>PE</td></tr>
<tr><td>[ ]</td><td>AC: .....</td><td>[ ]</td><td>[ ]</td><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>[X]</td><td colspan="5">DC: 3,87 Vdc</td></tr>
<tr><td>Rated Power .....:</td><td colspan="6">0,9 W</td></tr>
<tr><td>Clock frequencies.....:</td><td colspan="6">32 MHz, 26 MHz, 24 MHz, 32,768 kHz</td></tr>
<tr><td>Other parameters .....:</td><td colspan="6">.....</td></tr>
<tr><td>Software version .....:</td><td colspan="6">0.6.0</td></tr>
<tr><td>Hardware version .....:</td><td colspan="6">007106064</td></tr>
<tr><td>Dimensions in cm (W x H x D) ....:</td><td colspan="6">.....</td></tr>
<tr><td rowspan="5">Mounting position .....:</td><td>[ ]</td><td colspan="5">Table top equipment</td></tr>
<tr><td>[ ]</td><td colspan="5">Wall/Ceiling mounted equipment</td></tr>
<tr><td>[ ]</td><td colspan="5">Floor standing equipment</td></tr>
<tr><td>[X]</td><td colspan="5">Hand-held equipment</td></tr>
<tr><td>[ ]</td><td colspan="5">Other: .....</td></tr>
<tr><td rowspan="2">Modules/parts.....:</td><td colspan="4">Module/parts of test item</td><td>Type</td><td>Manufacturer</td></tr>
<tr><td colspan="4">.....</td><td>.....</td><td>.....</td></tr>
<tr><td rowspan="2">Accessories (not part of the test item) .....:</td><td colspan="4">Description</td><td>Type</td><td>Manufacturer</td></tr>
<tr><td colspan="4">.....</td><td>.....</td><td>.....</td></tr>
<tr><td rowspan="2">Documents as provided by the applicant.....:</td><td colspan="4">Description</td><td>File name</td><td>Issue date</td></tr>
<tr><td colspan="4">.....</td><td>.....</td><td>.....</td></tr>
</table>

(3) Only for Medical Equipment

Identification of the client

Polar Electro Oy
Professorintie 5, 90440 Kempele, FINLAND

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2022-07-19
Date (finish)	2022-07-28

Document history

Report number	Date	Description
72548RRF.003	2022-08-11	First release.
72548RRF.003A1	2022-10-10	Second release. This report is modified due to typo detected in RSS-247 5.5 / FCC 15.247 (d) This modification test report cancels and replaces the test report 72548RRF003

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: Alfonso Gutiérrez Martínez and Rafael Fernandez Martin.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
4611	HORN ANTENNA 1-18GHz	BBHA 9120 D	SCHWARZBECK MESS-ELEKTRONIK	2022-11-18
4657	HORN ANTENNA 18-40GHz	BBHA 9170	SCHWARZBECK	2023-05-05
4578	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2023-04-30
8856	PRE-AMPLIFIER G>30dB 18-40GHz	BLMA 1840-4A	BONN ELEKTRONIK	2022-09-08
5705	PRE-AMPLIFIER G>40dB 1-18 GHz	BLMA 0118-1M	BONN ELEKTRONIK	2023-07-21
4825	SEMIANECHOIC ABSORBER LINED CHAMBER	FACT 3 200 STP	ETS LINDGREN	N/A
4848	SHIELDED ROOM	S101	ETS LINDGREN	N/A
6668	SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2024-05-19
4848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	N/A
7794	SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2023-02-26
7796	EXTENSION FOR OPEN SWITCH UNIT	OSP-B157W8	ROHDE AND SCHWARZ	2024-03-16
7798	SOFTWARE FOR EMC/RF TESTING	WMS32	ROHDE AND SCHWARZ	N/A
0922	POWER SUPPLY DC 40V / 40 A	NGPE 40/40	ROHDE AND SCHWARZ	N/A
5850	DIGITAL MULTIMETER	179	FLUKE	2022-10-19

Testing verdicts

Fail	F
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 Average Conducted Output Power	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)

INDEX

TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal:	3,87 Vdc V
Type of Power Supply:	Battery

ANTENNA (*):

Type of Antenna:	Integral
Maximum Declared Antenna Gain:	-2,7dBi

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).

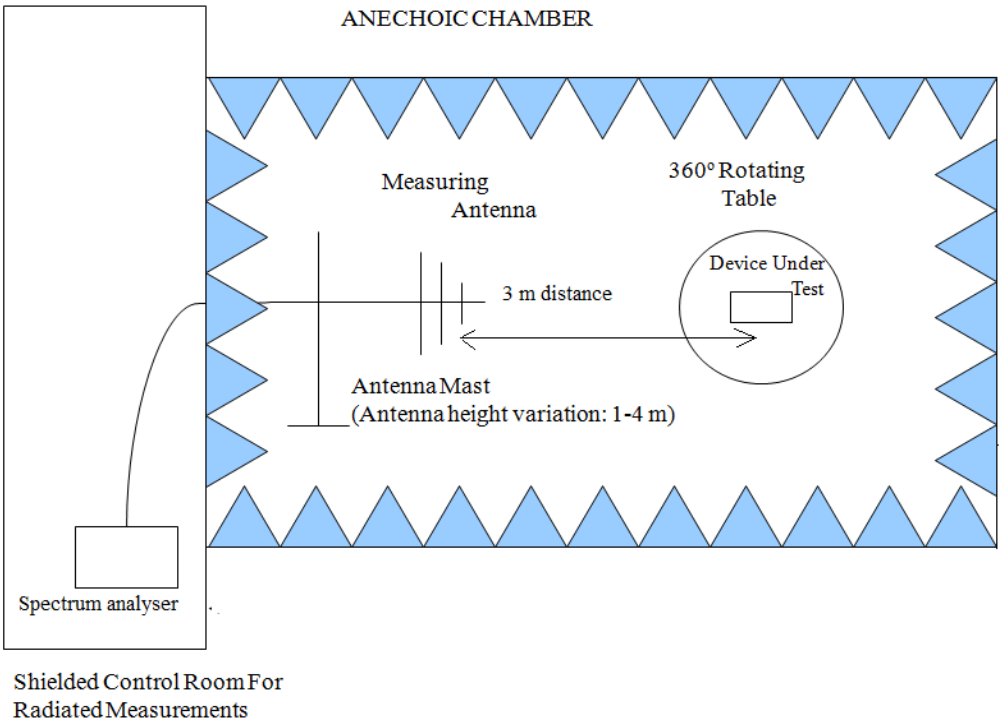
For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

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 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.

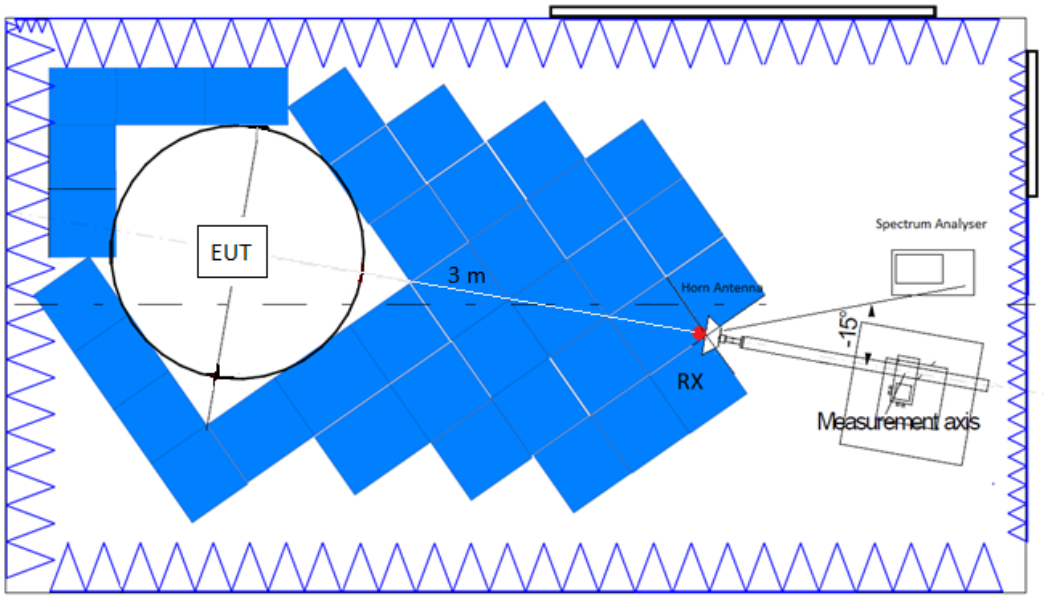
Measurements were made in both horizontal and vertical planes of polarization.

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.

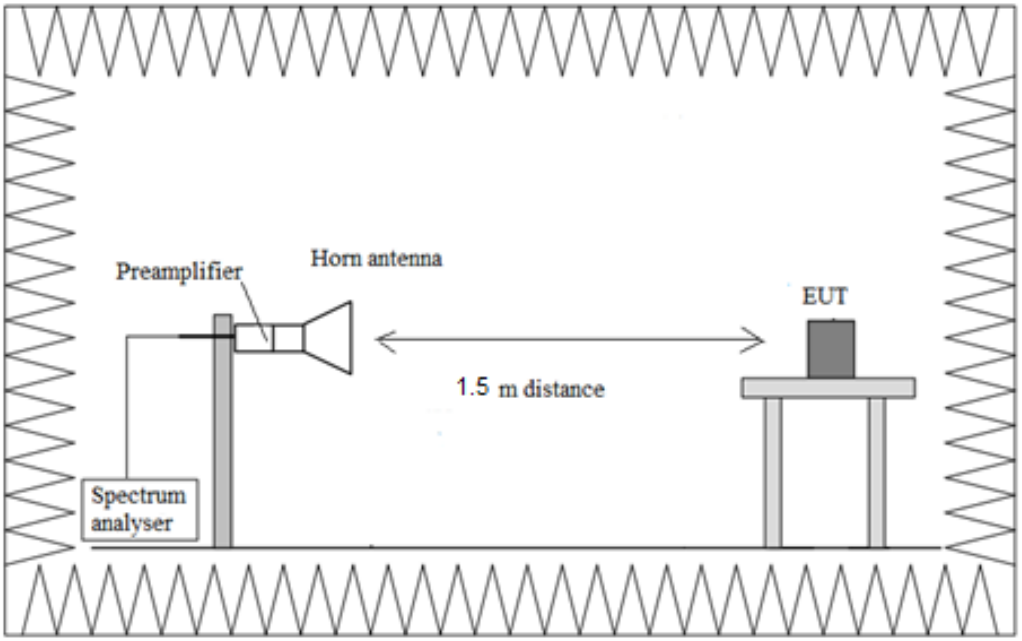
Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup f > 17 GHz:



TEST CASES DETAILS

FCC 47 CFR Part 15.247 / RSS-247

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

Limits

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

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Results

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

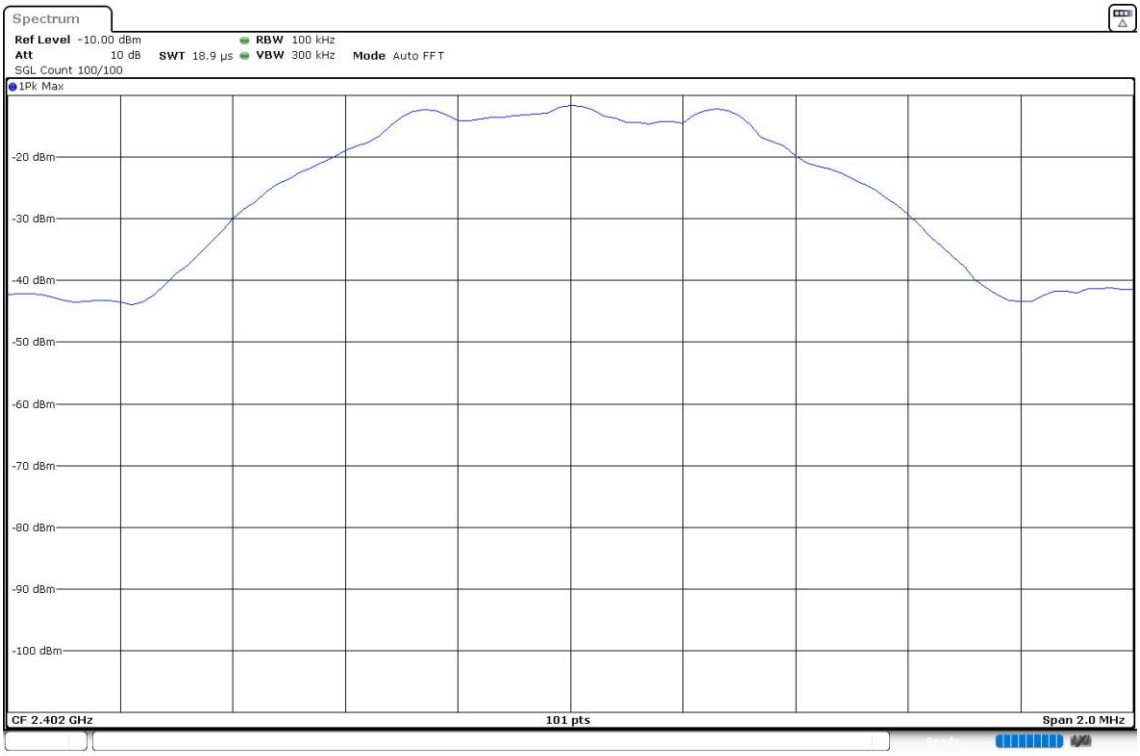
Verdict

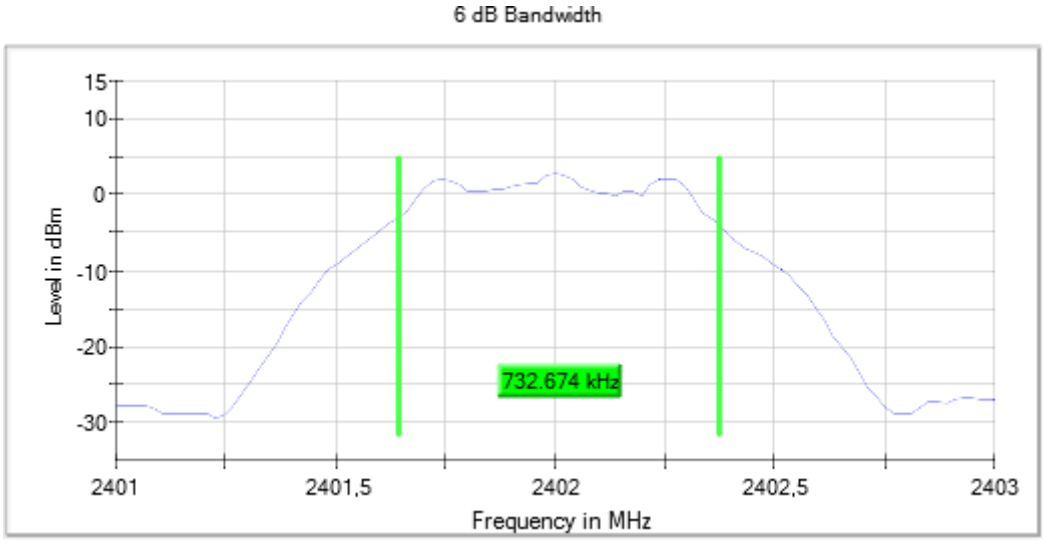
Pass

Attachments

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

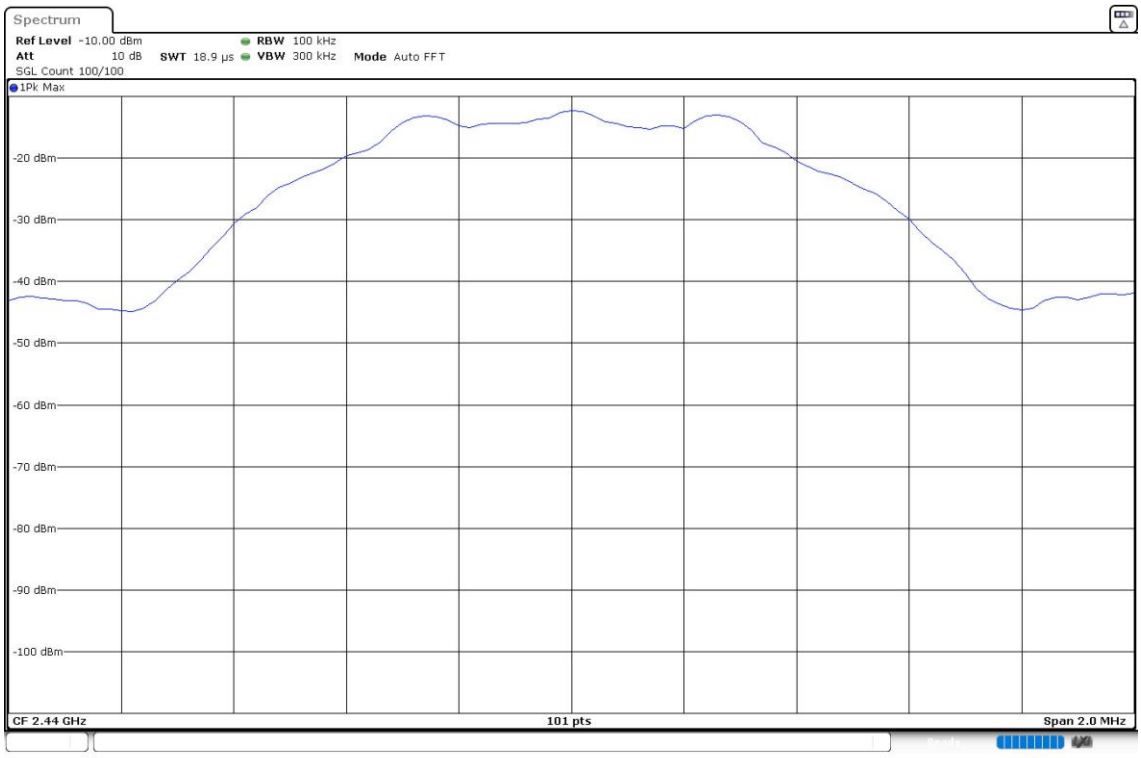
Images:

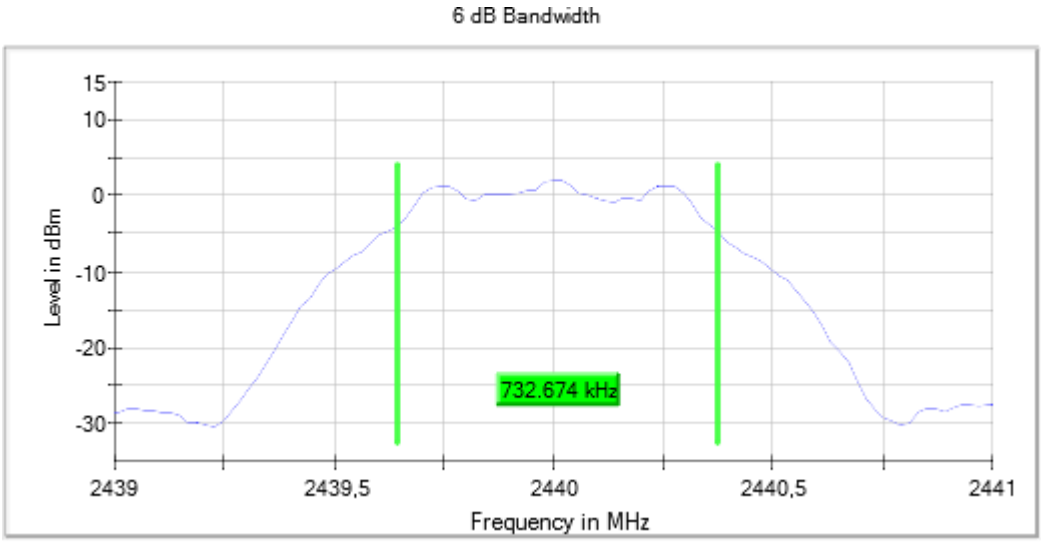




Frequency MHz = 2440.00000, Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

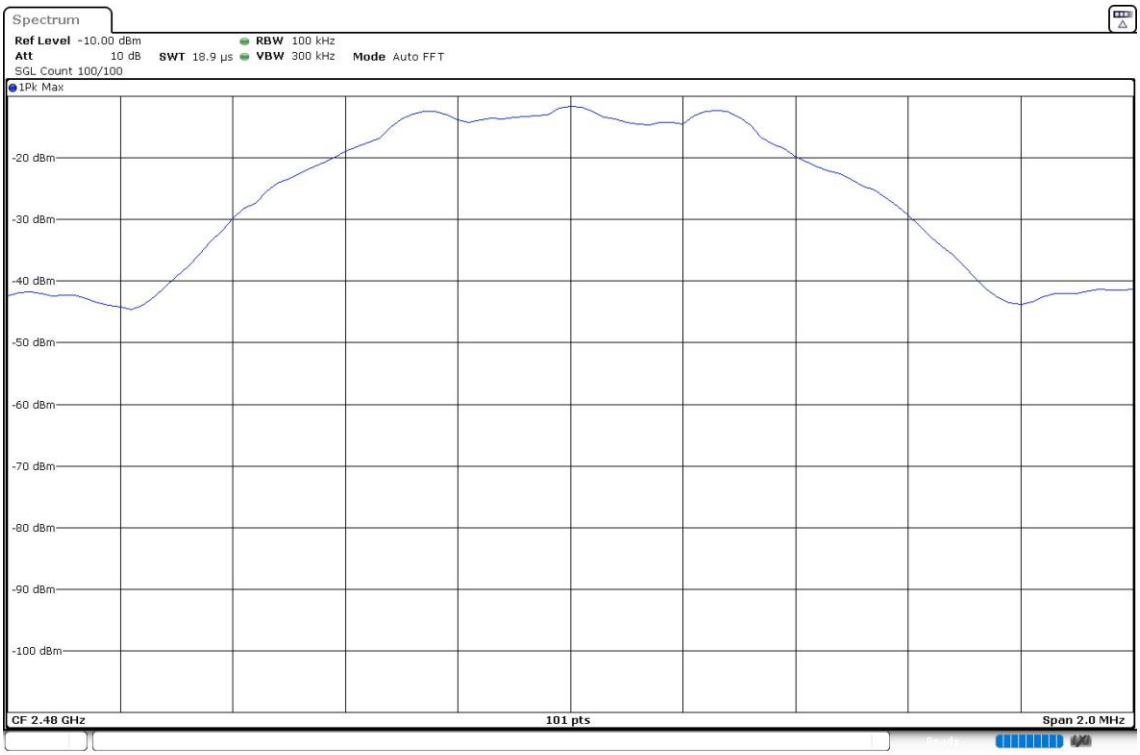
Images:

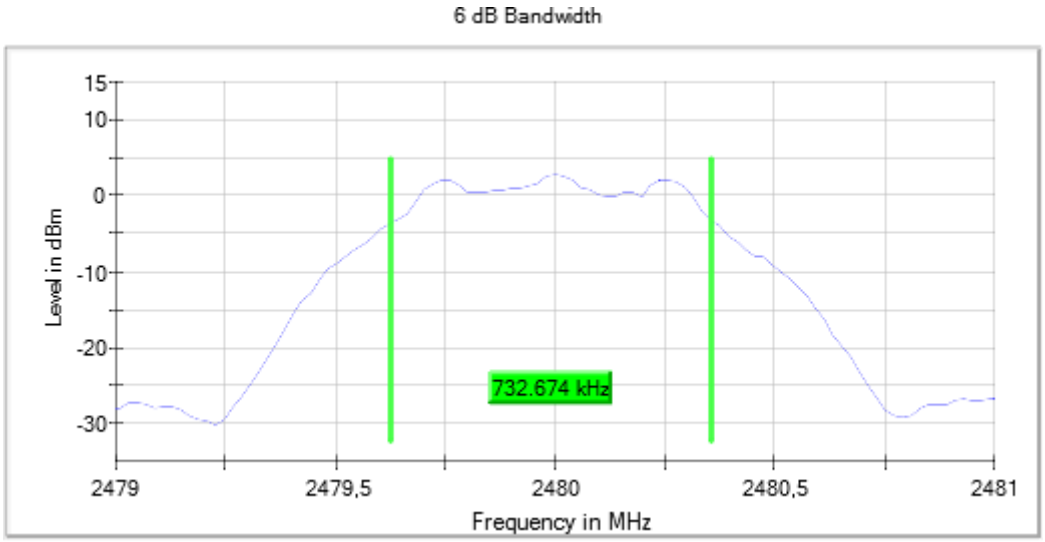




Frequency MHz = 2480.00000, Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:





Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Results

Freq (MHz)	Emission Bandwidth (MHz)
2402.00000	1.188
2440.00000	1.188
2480.00000	1.188

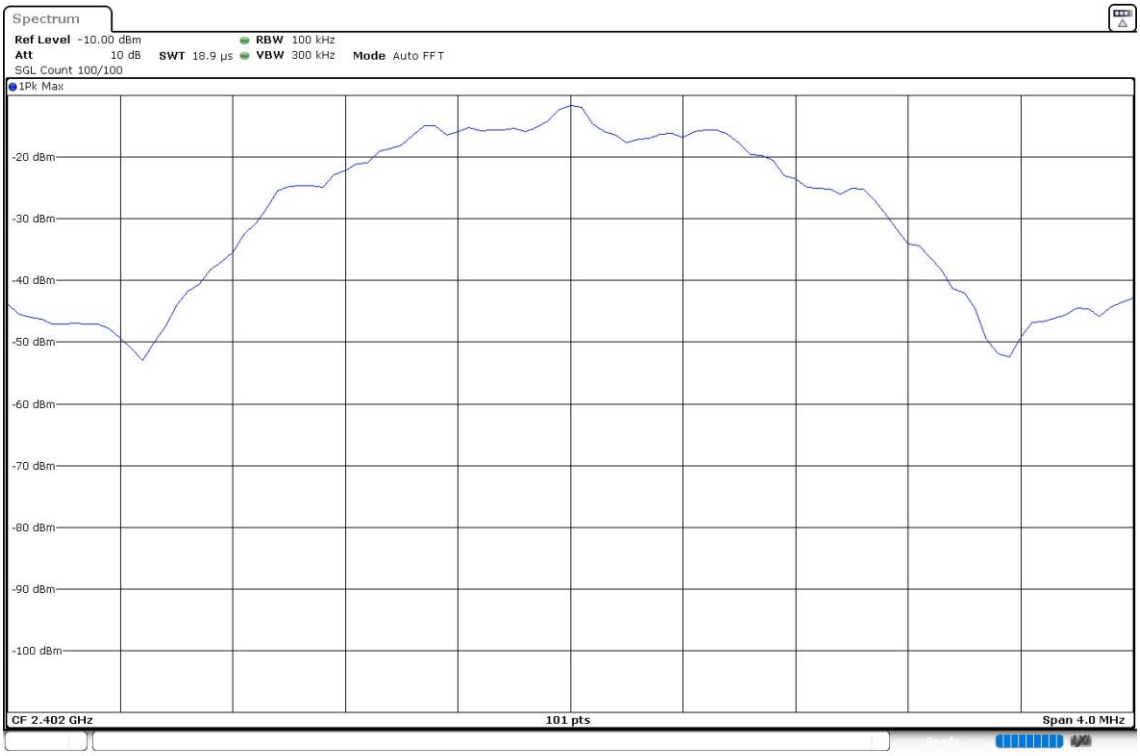
Verdict

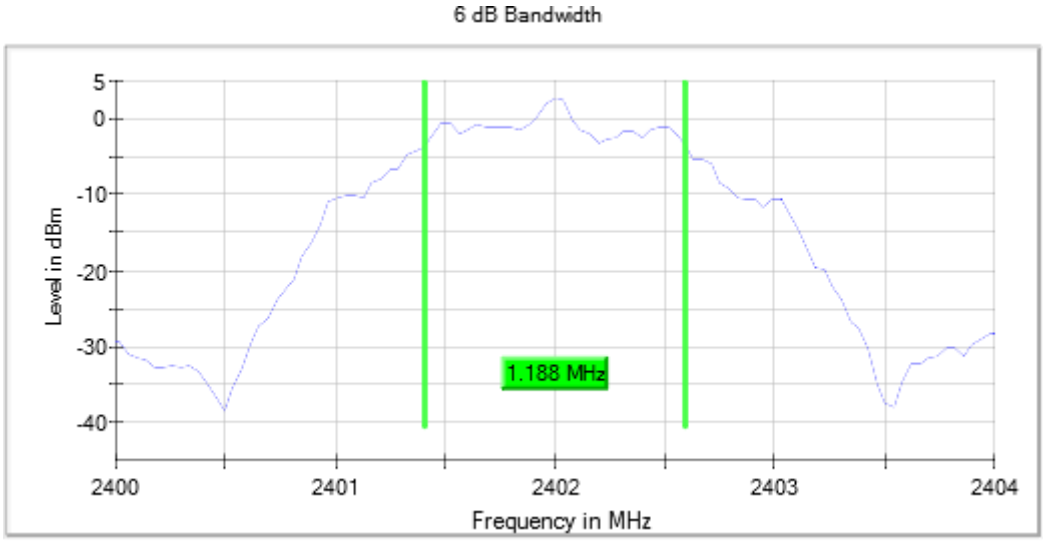
Pass

Attachments

Frequency MHz = 2402.00000, Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

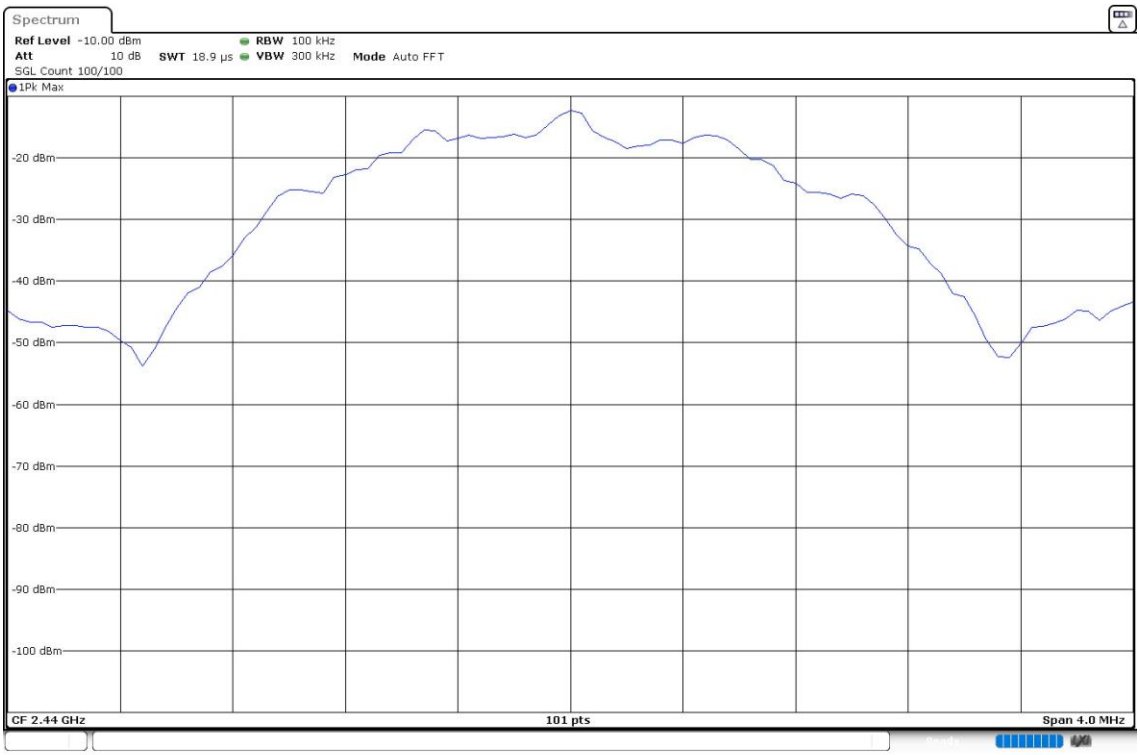
Images:

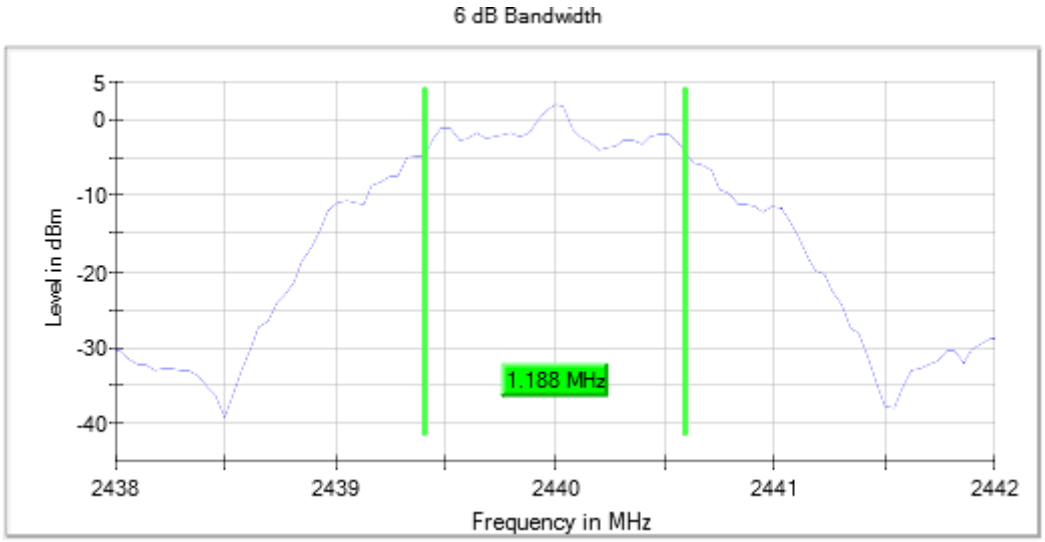




Frequency MHz = 2440.00000, Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

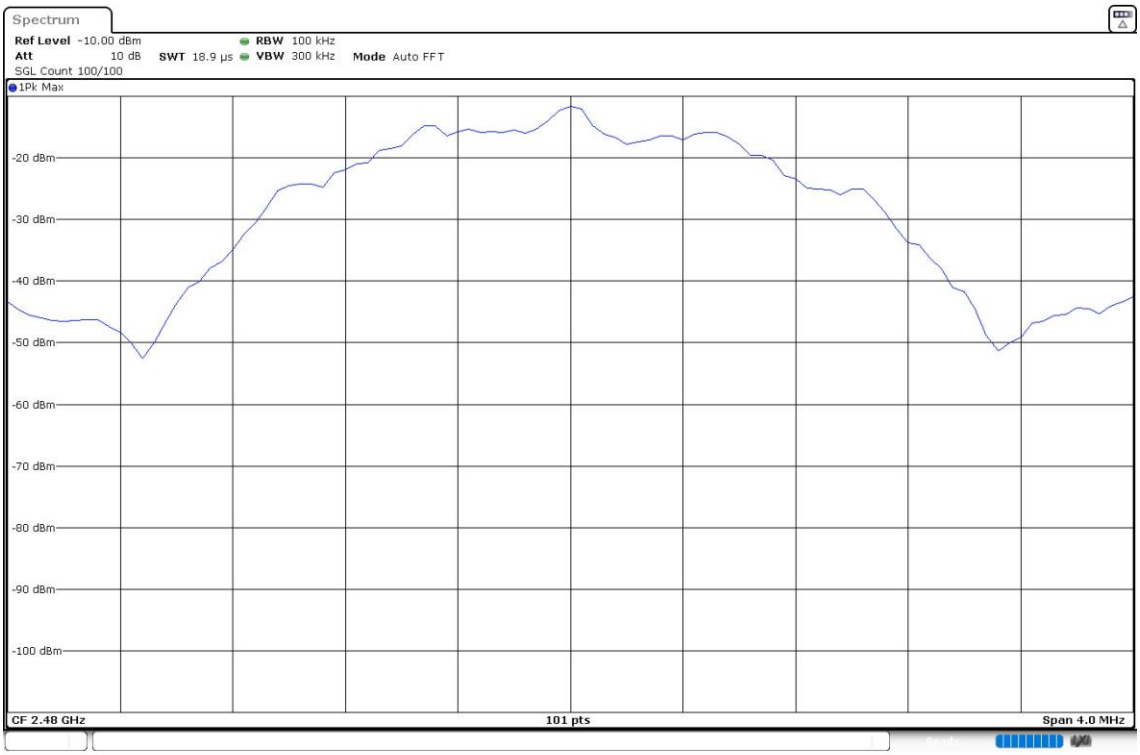
Images:

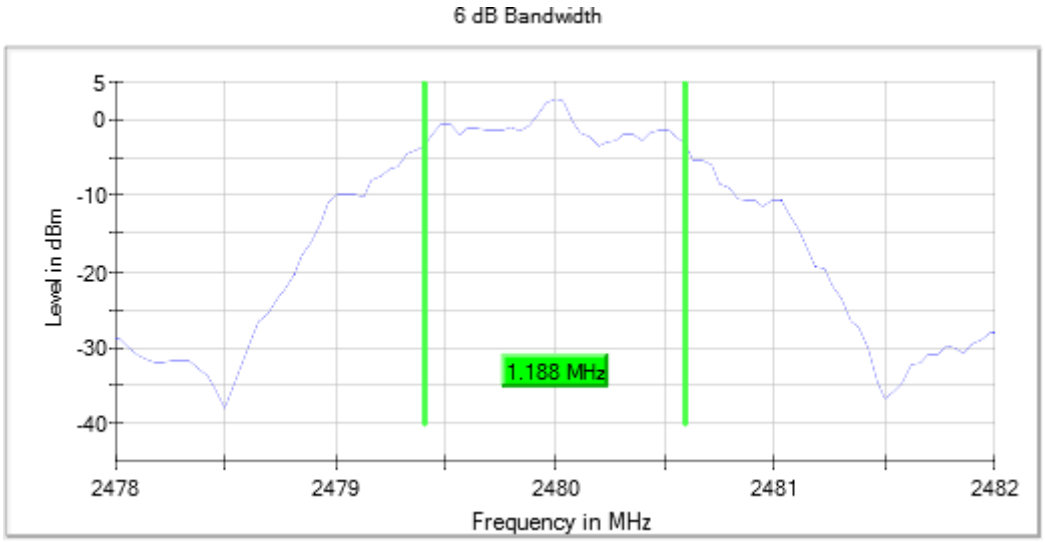




Frequency MHz = 2480.00000, Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:





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

Limits

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

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Results

Freq (MHz)	PSD (dBm)
2402.00000	-14.24
2440.00000	-14.44
2480.00000	-13.73

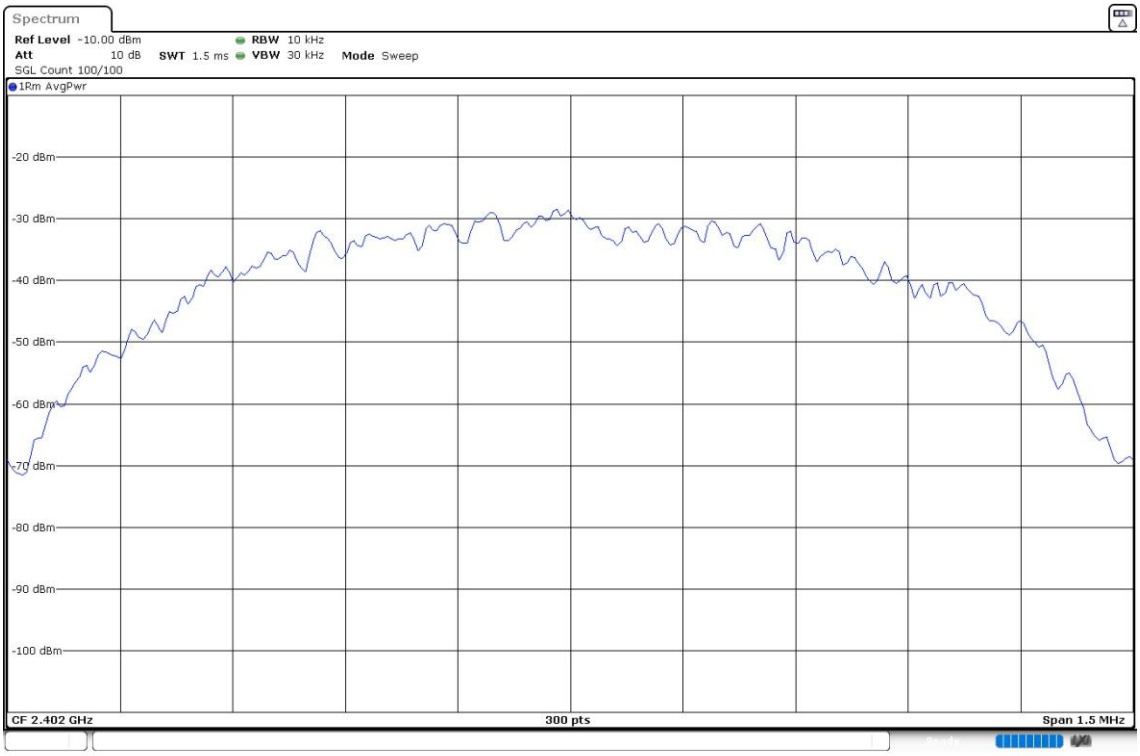
Verdict

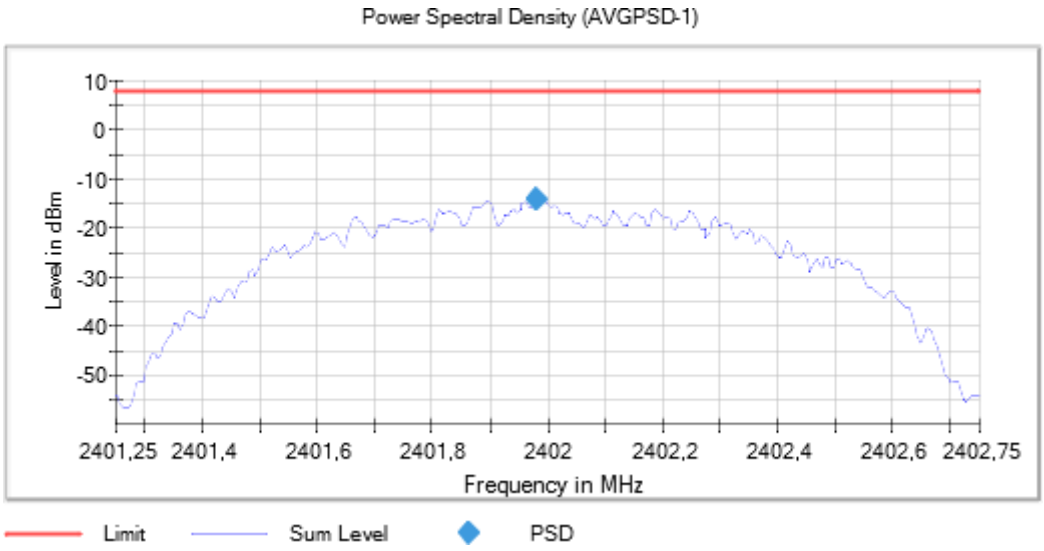
Pass

Attachments

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

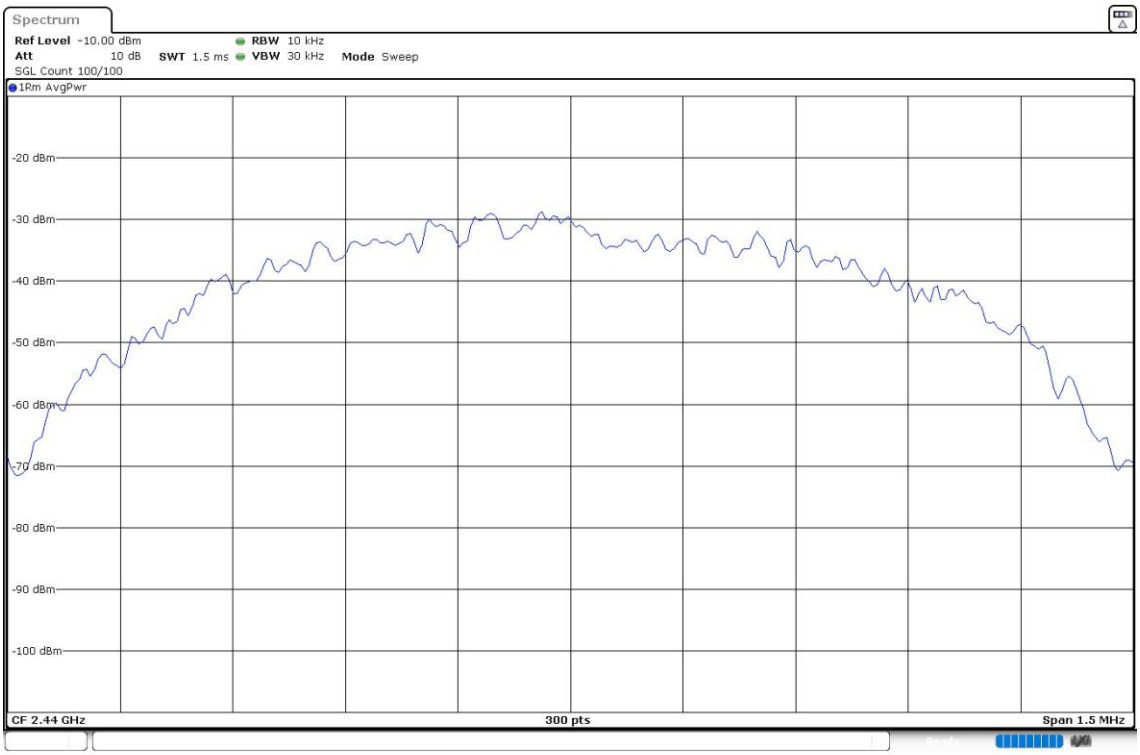
Images:

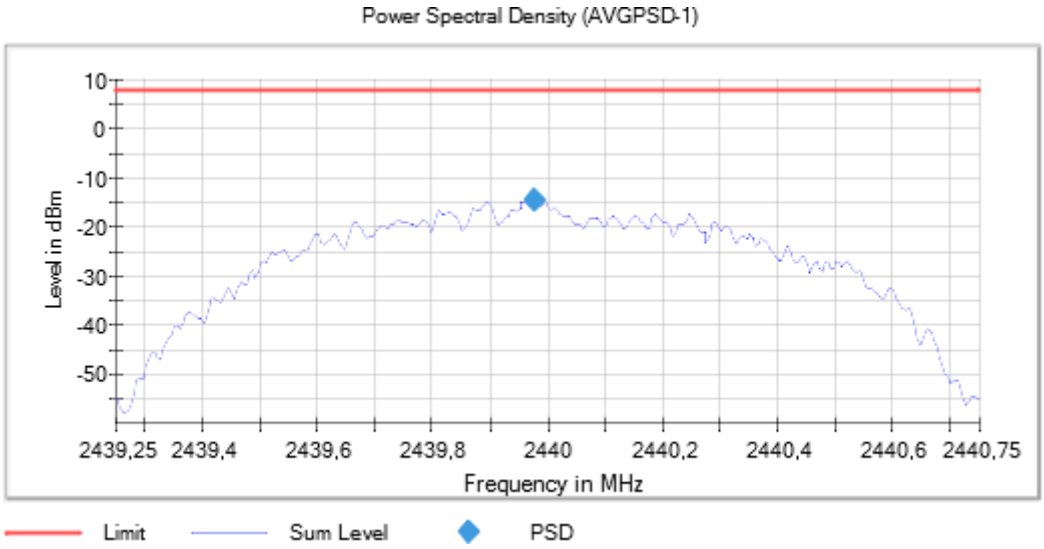




Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

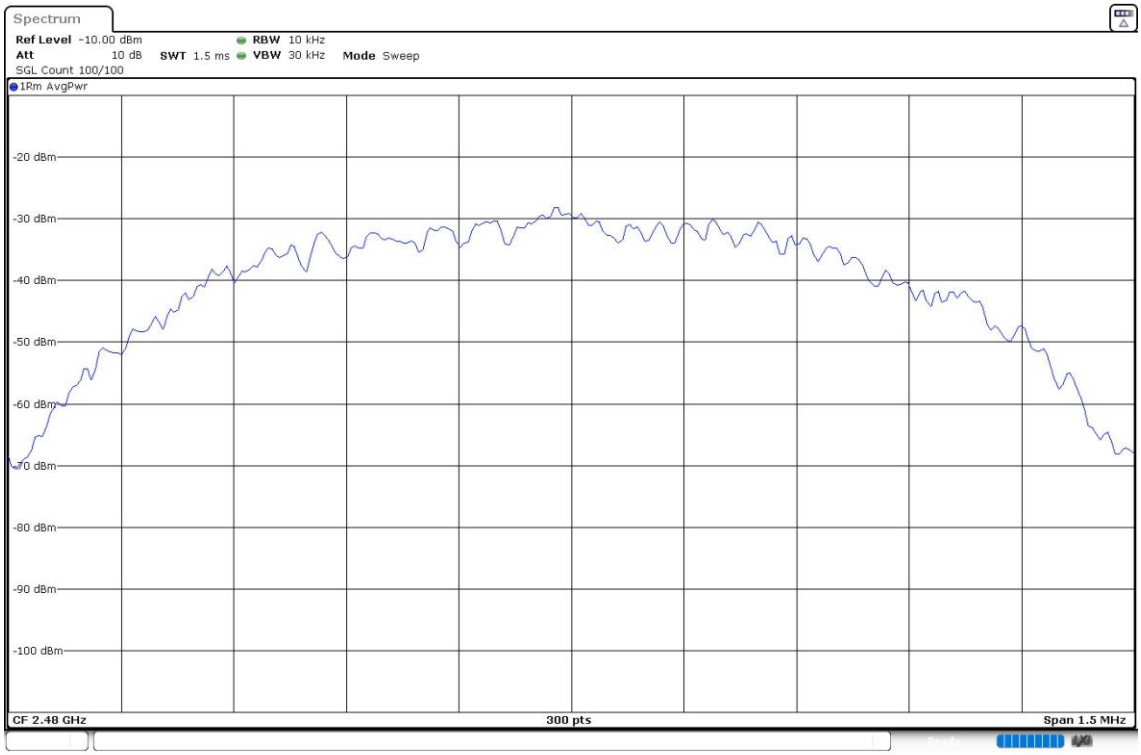
Images:

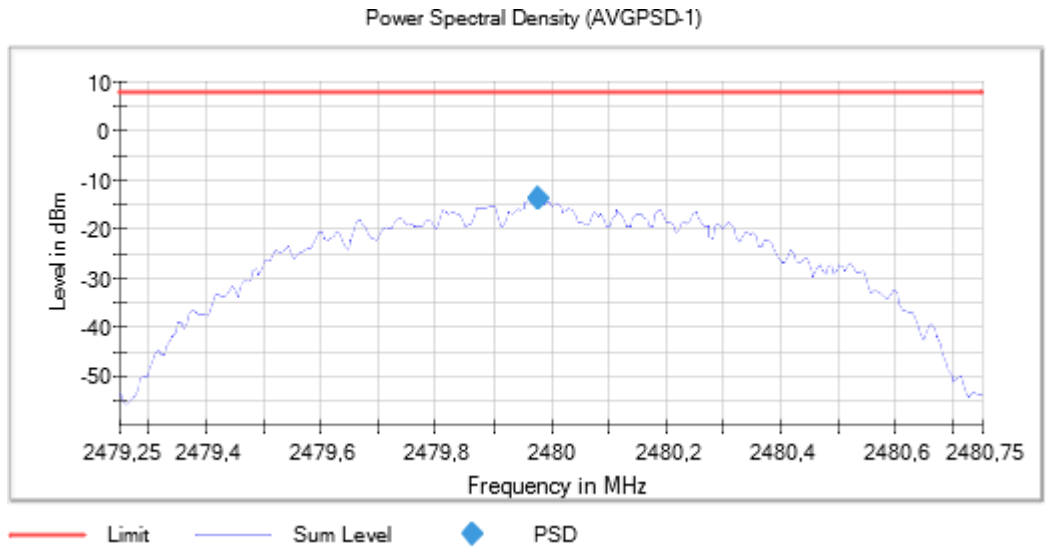




Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:





Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Results

Freq (MHz)	PSD (dBm)
2402.00000	-16.87
2440.00000	-17.82
2480.00000	-17.00

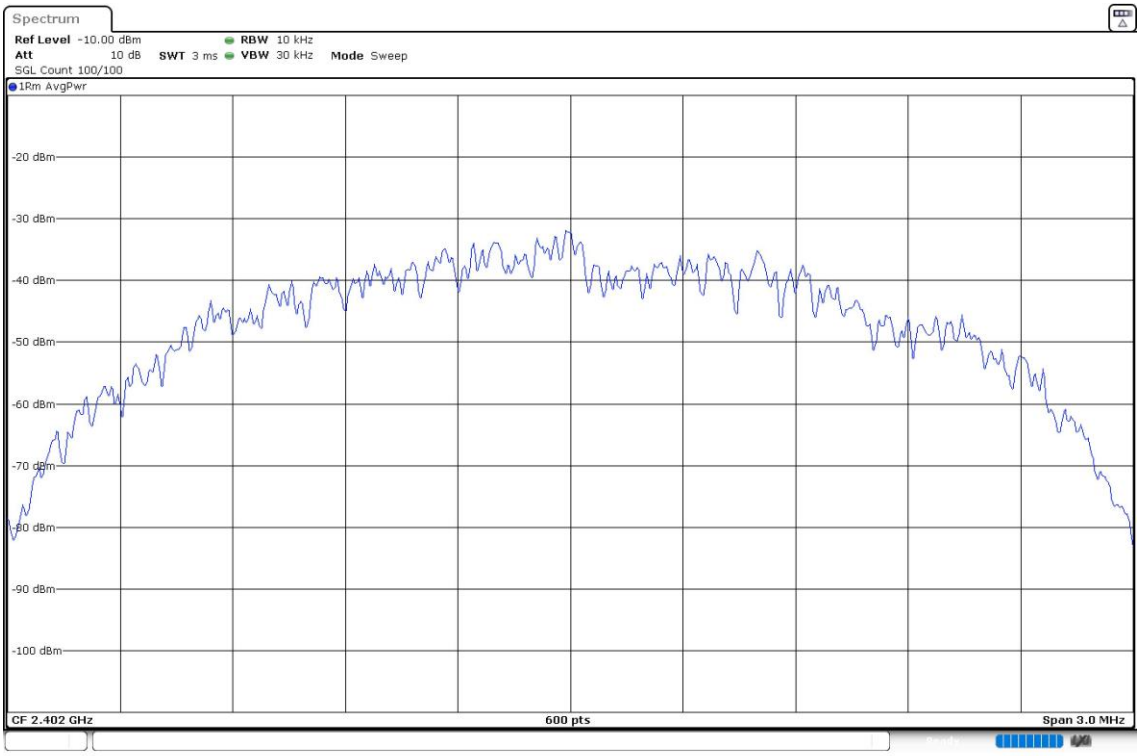
Verdict

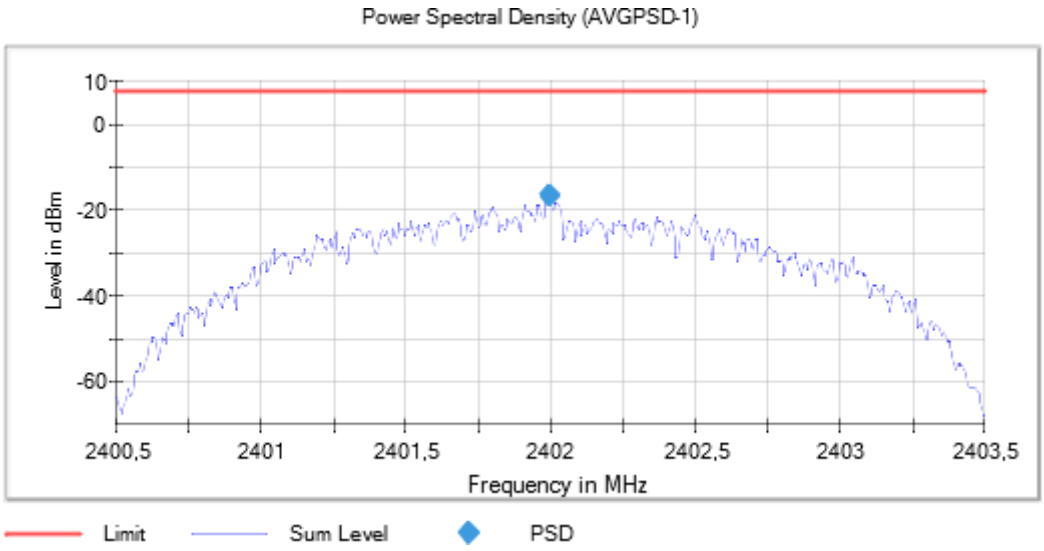
Pass

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, Active Port = 1

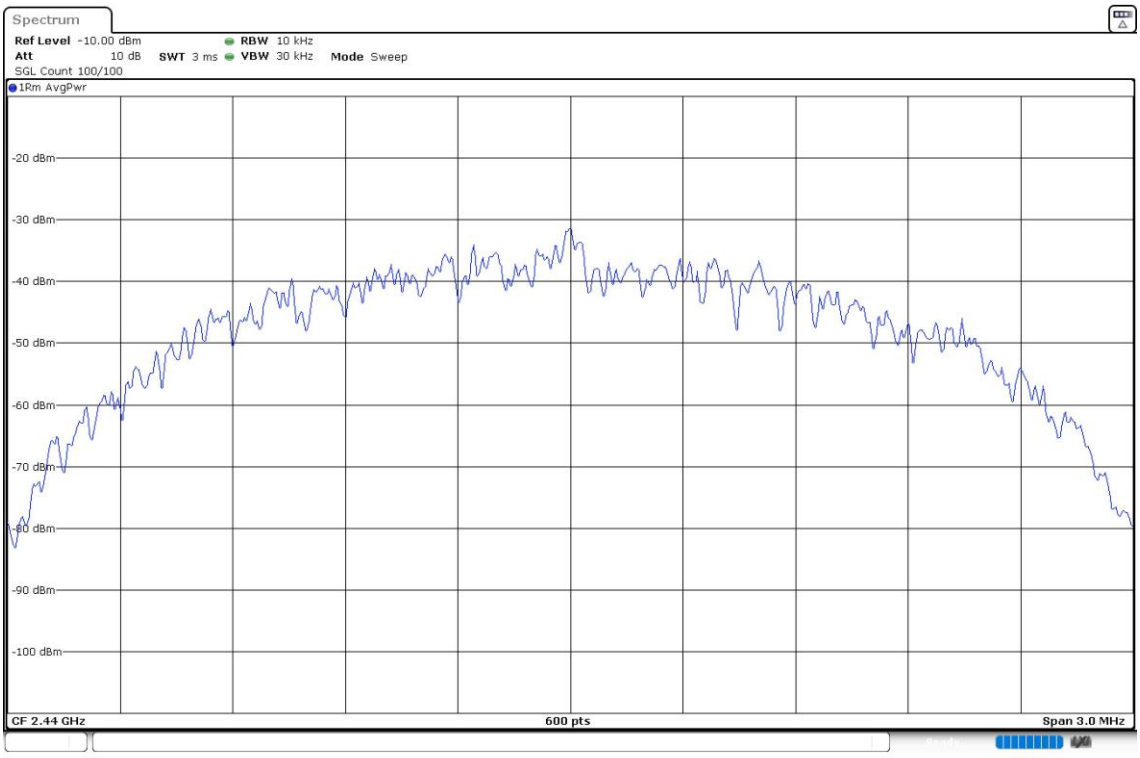
Images:

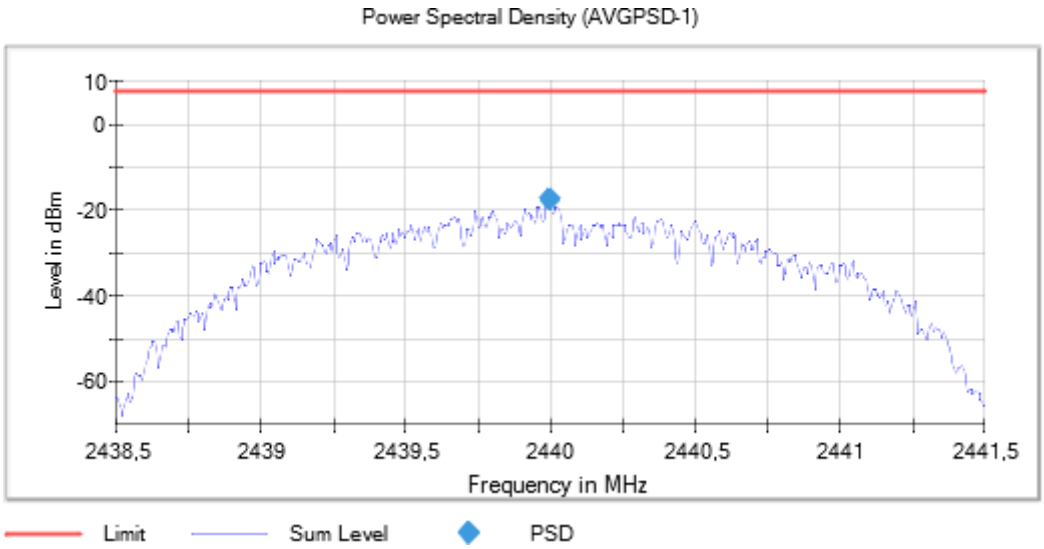




Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

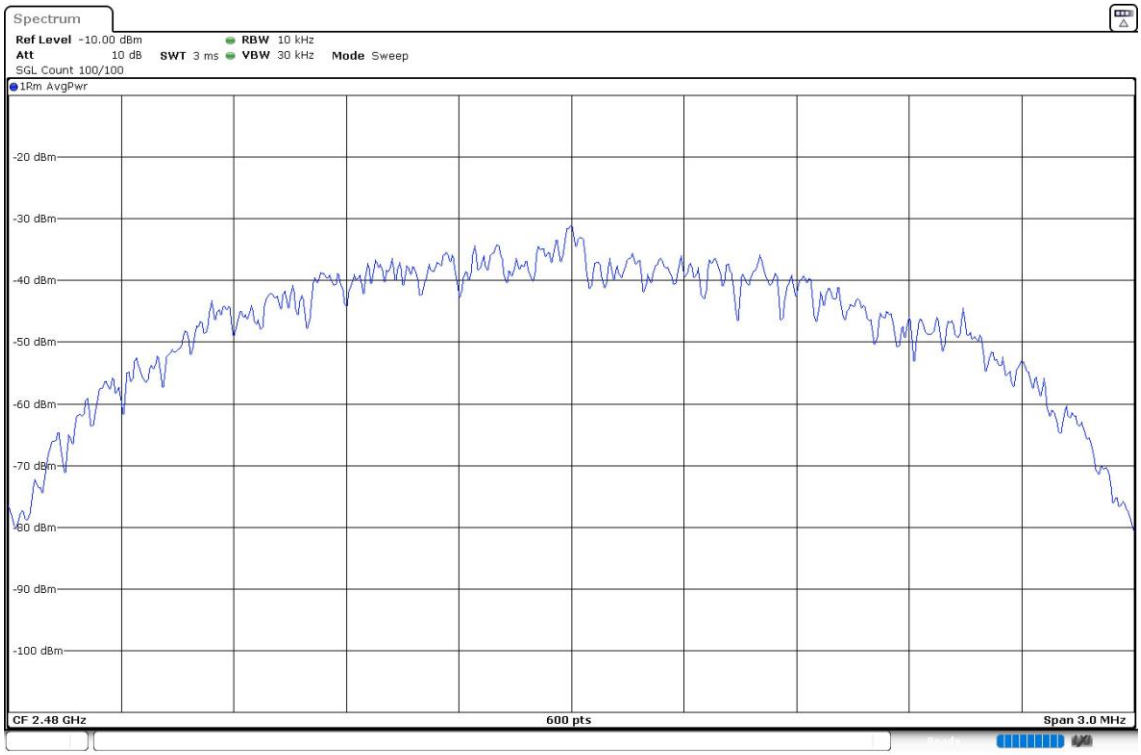
Images:

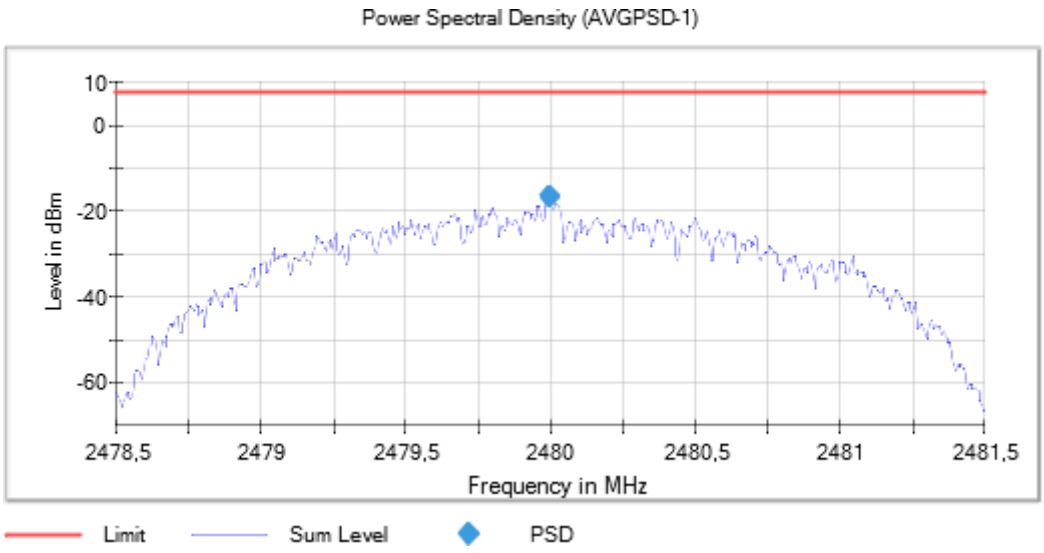




Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:





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

Limits

For systems using digital modulation in the 2400-2483.5 MHz band: 1 watt (30 dBm).
The e.i.r.p. shall not exceed 4 W (36 dBm) (RSS-247).

Results

The maximum conducted output power level of the fundamental emission was measured according to clause ANSI C63.10-2013 11.9.2.3.2

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

The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

Maximum Declared Antenna Gain: -2.7 dBi

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Freq (MHz)	Equipment	Gated RMS (dBm)	Power E.I.R.P (dBm)
2402.00000	Digital Transmission System (DTS)	2.835	0.135
2440.00000	Digital Transmission System (DTS)	2.016	-0.684
2480.00000	Digital Transmission System (DTS)	2.671	-0.029

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Freq (MHz)	Equipment	Peak Power (dBm)	Peak Power E.I.R.P (dBm)
2402.00000	Digital Transmission System (DTS)	2.803	0.103
2440.00000	Digital Transmission System (DTS)	1.997	-0.703
2480.00000	Digital Transmission System (DTS)	2.644	-0.056

Verdict

Pass

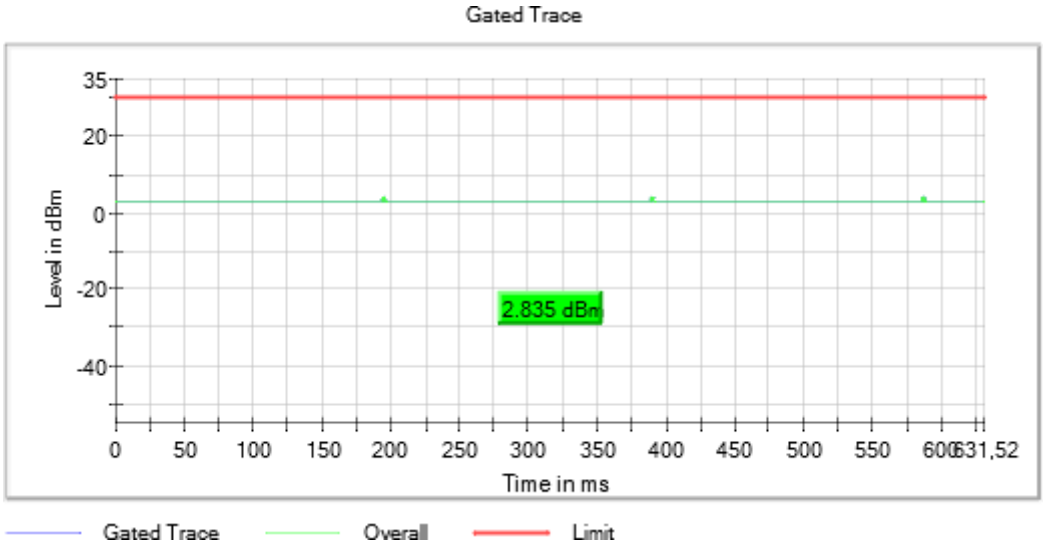
Attachments

OSP PowerMeter settings

Setting	Instrument Value
Measurement Time	**1.000 s**
Points	**1000000**
Time resolution	**1.000 µs**

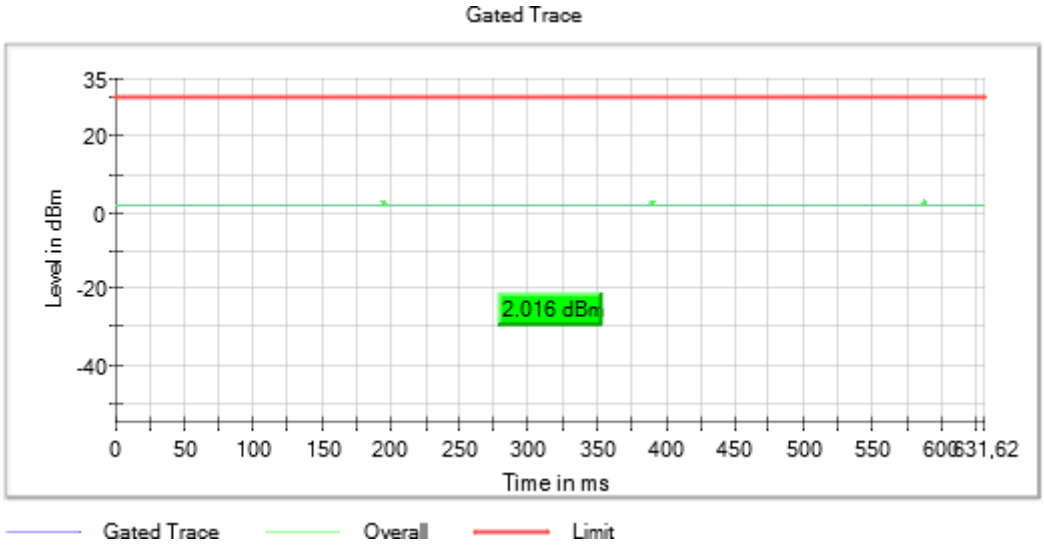
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



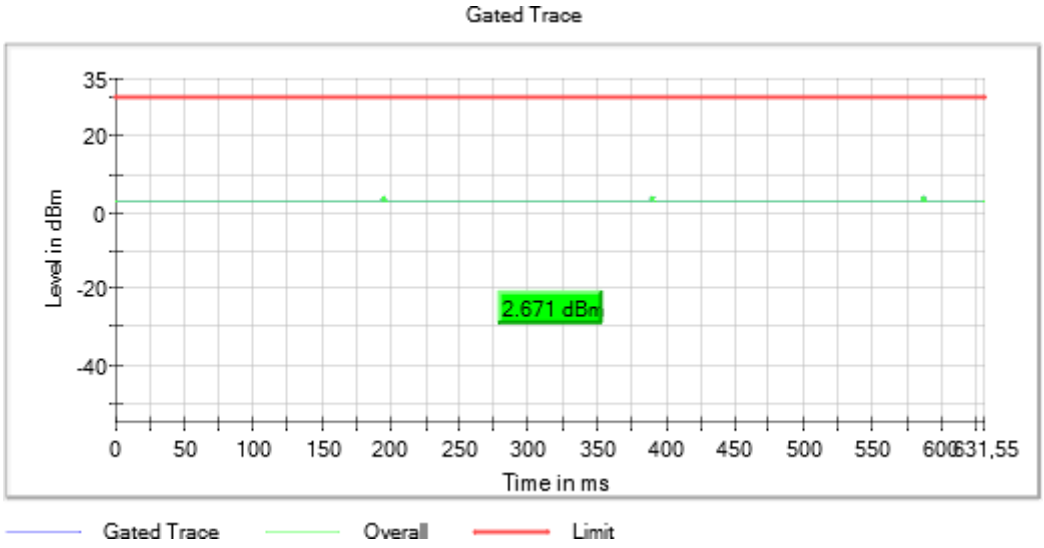
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



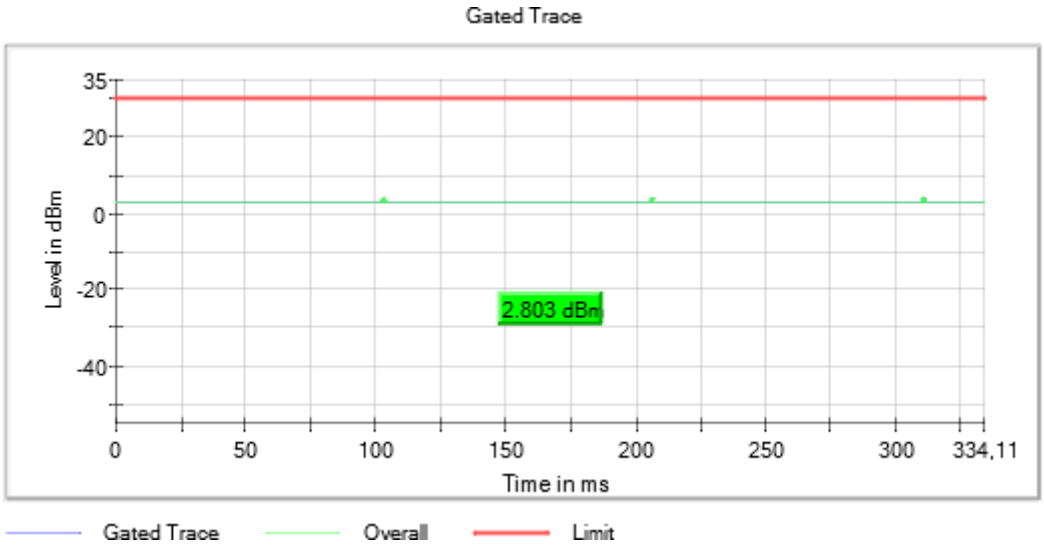
Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



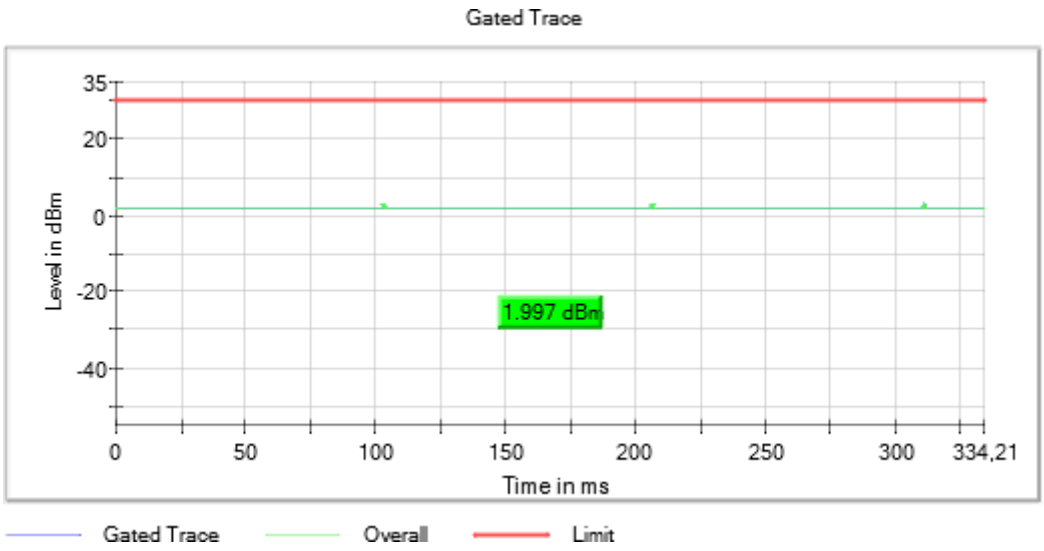
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



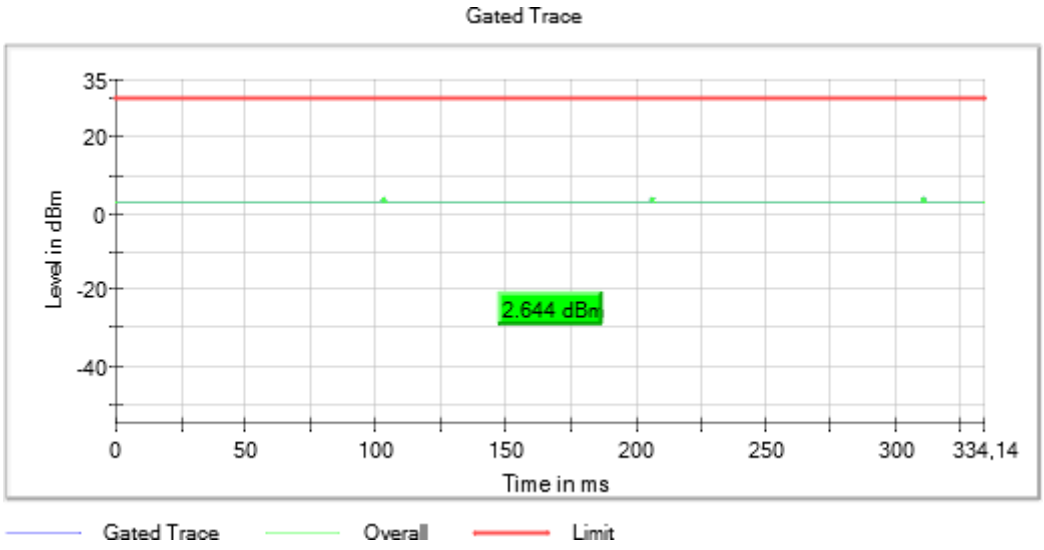
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



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

Images:



RSS-247 5.5 / FCC 15.247 (d) [Bndedge] 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

Radiated measurements were used to show compliance with the limits in the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

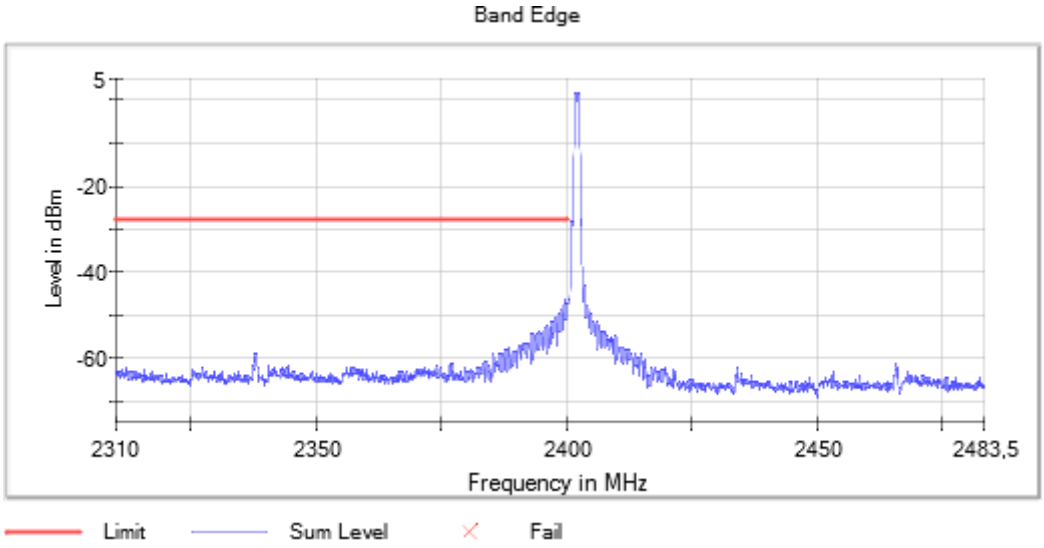
Verdict

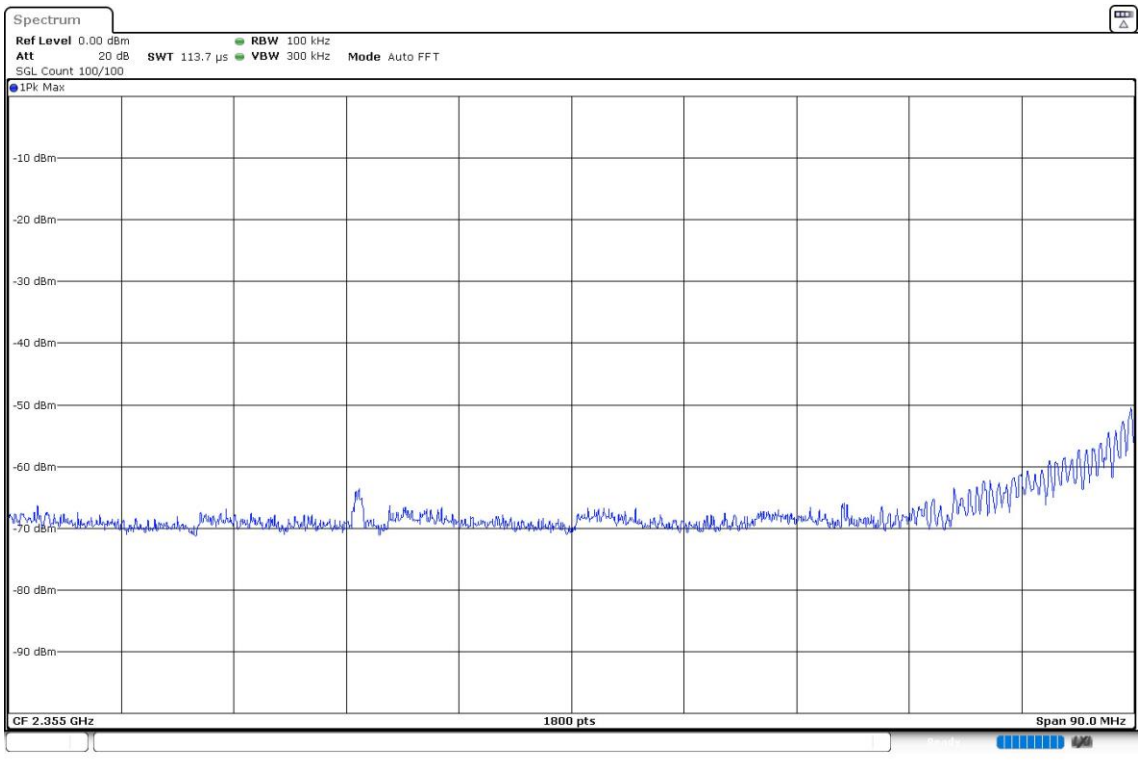
Pass

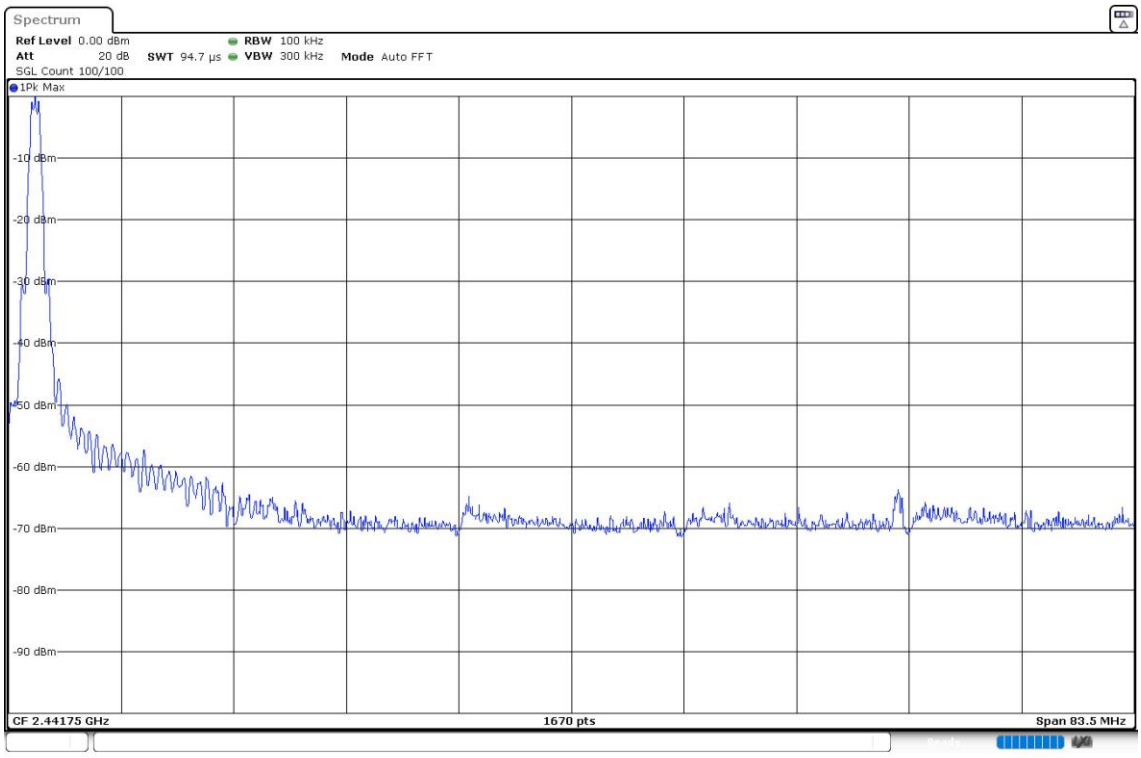
Attachments

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

Images:

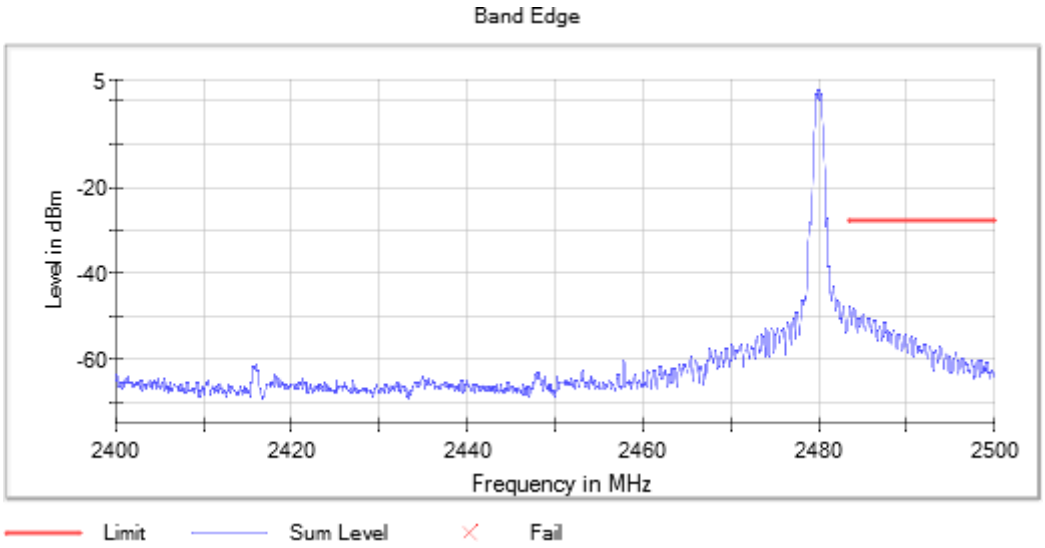


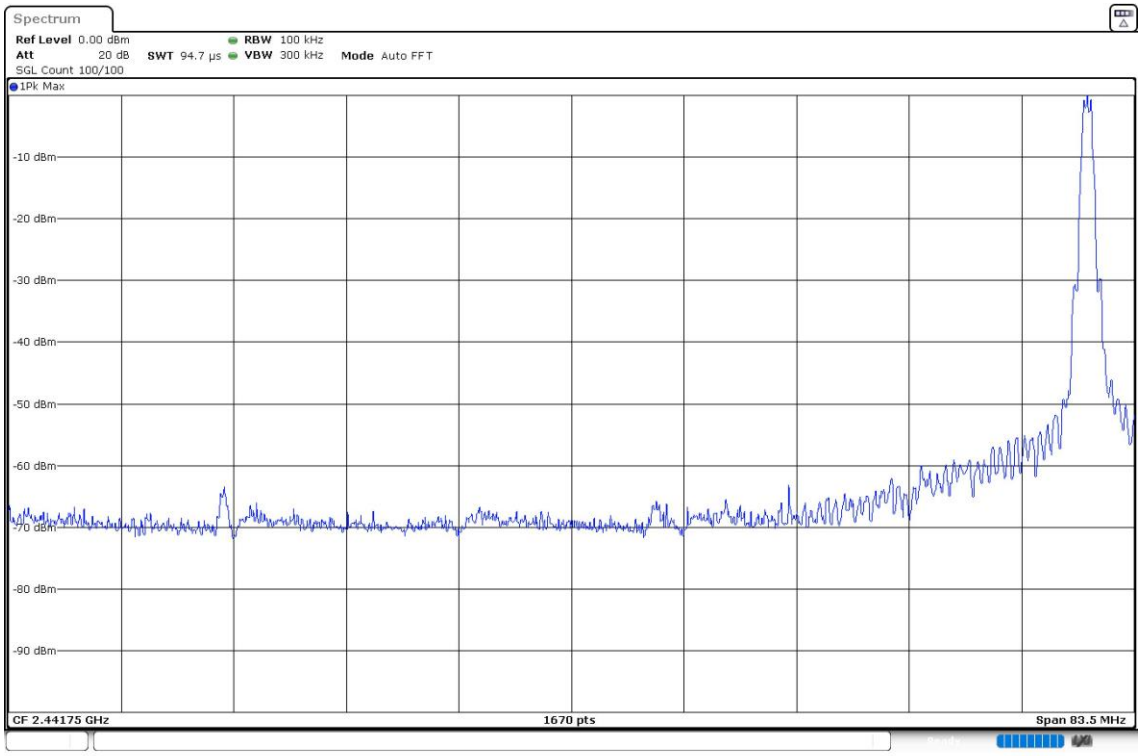


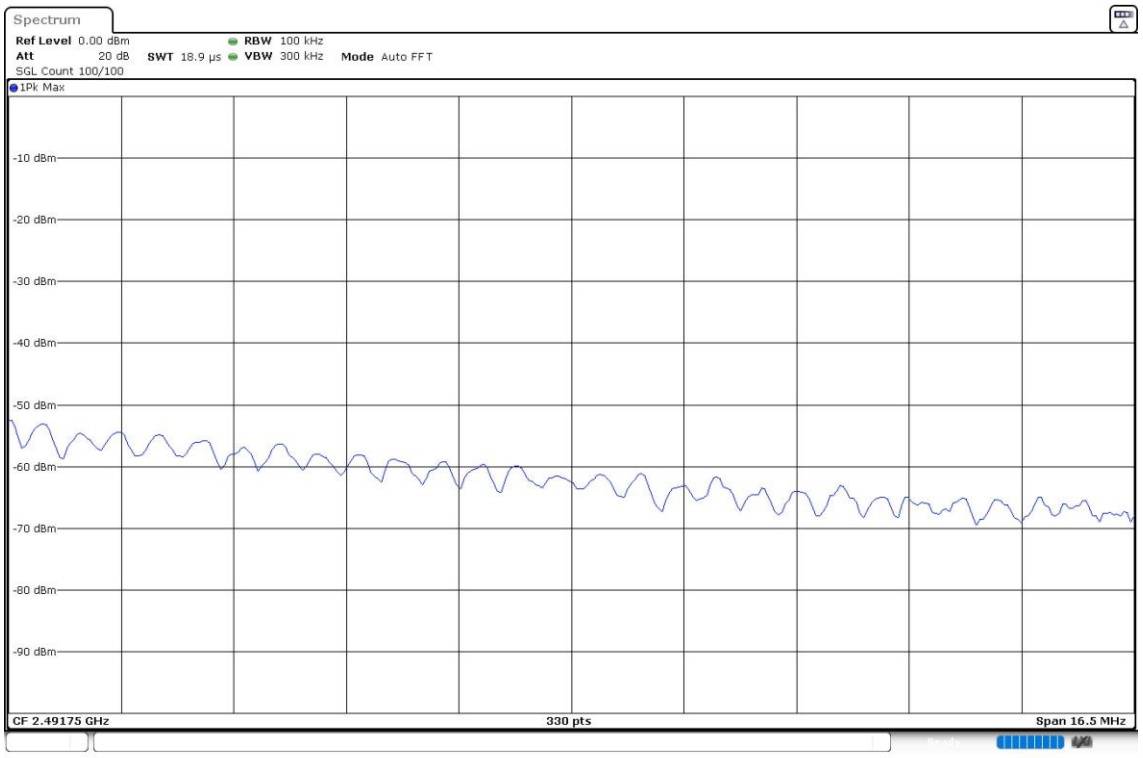

Spectrum
Ref Level 0.00 dBm
RBW 100 kHz
Att 20 dB
SWT 94.7 µs
VBW 300 kHz
Mode Auto FFT
SGL Count 100/100
1Pk Max
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
CF 2.44175 GHz
1670 pts
Span 83.5 MHz

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

Images:





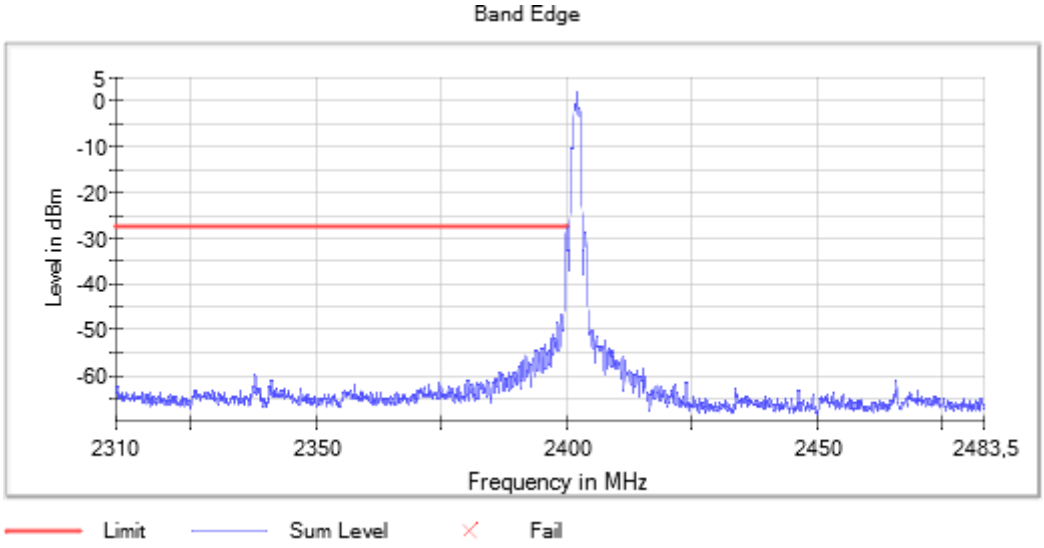

Spectrum
Ref Level 0.00 dBm
RBW 100 kHz
Att 20 dB
SWT 18.9 µs
VBW 300 kHz
Mode Auto FFT
SGL Count 100/100
1Pk Max
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
CF 2.49175 GHz
330 pts
Span 16.5 MHz

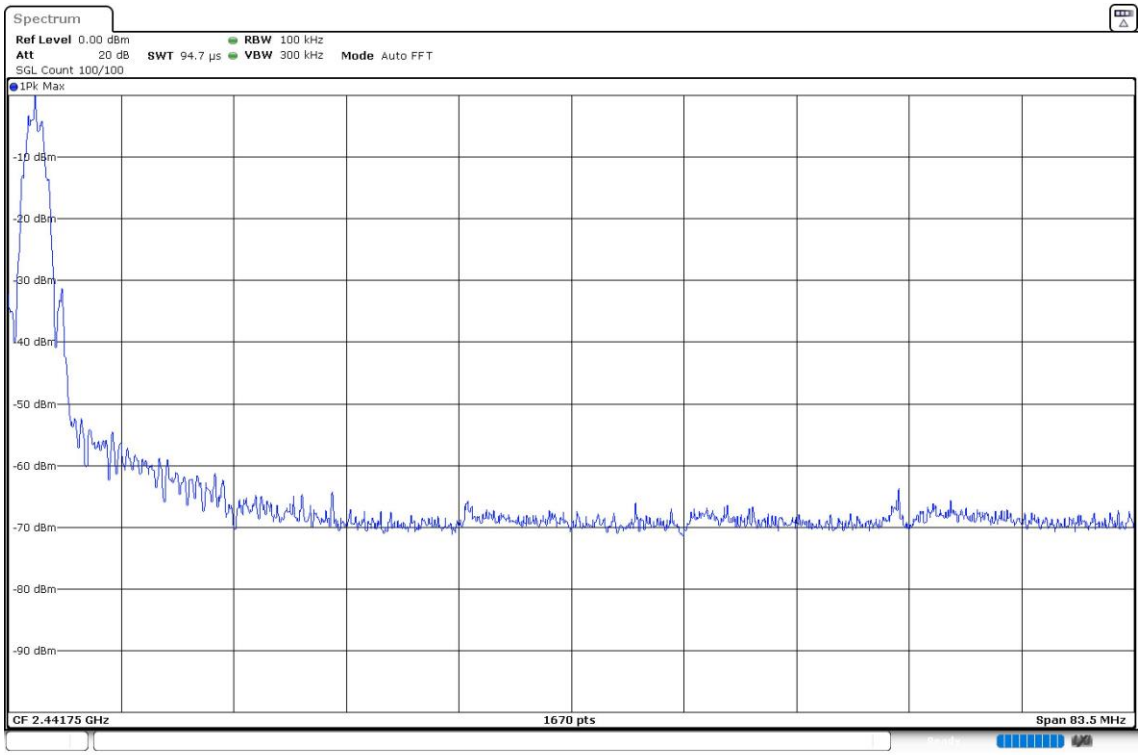
Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

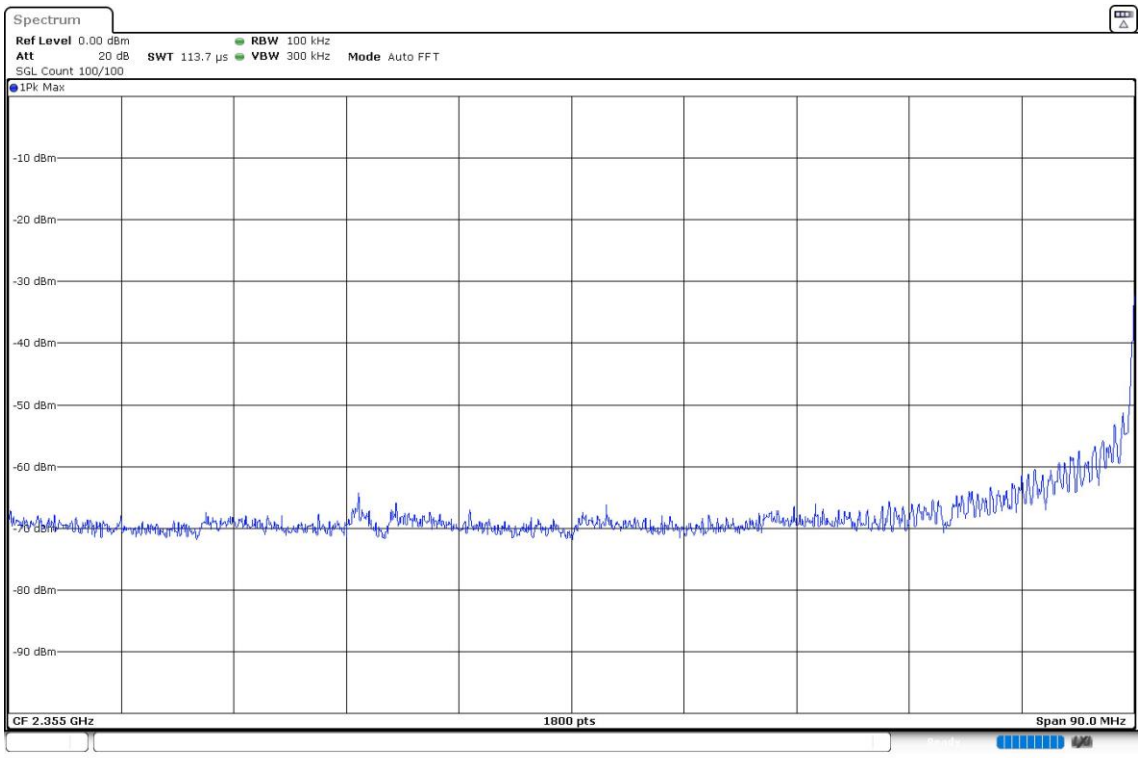
Attachments

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

Images:

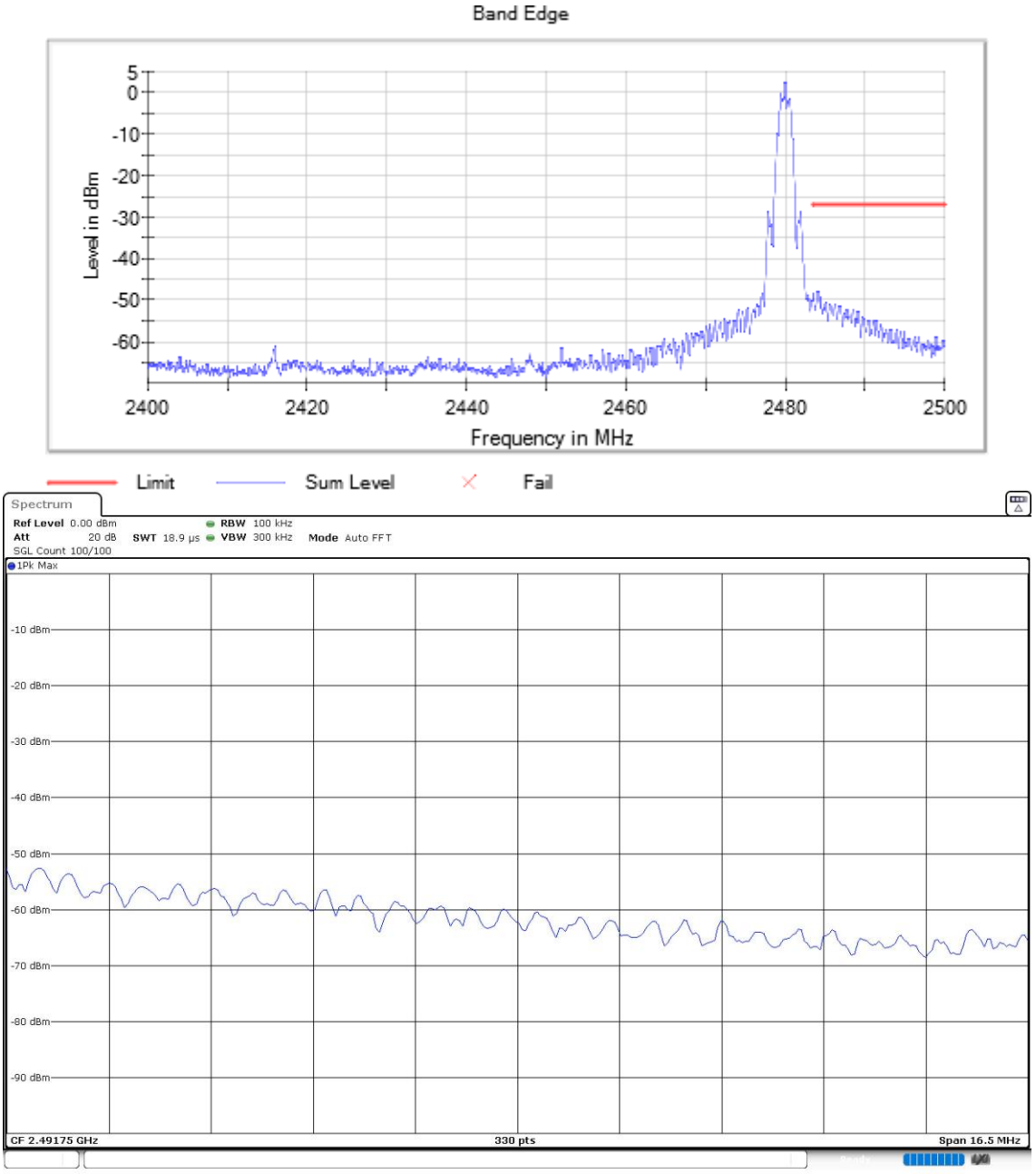


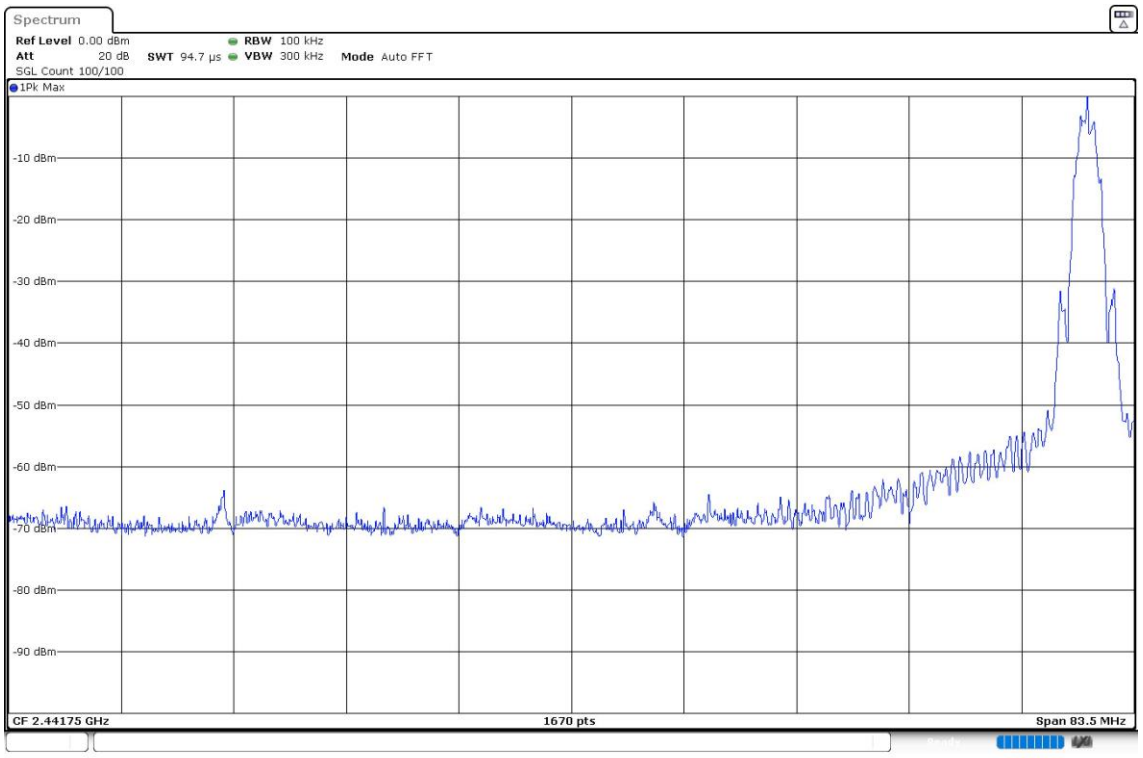



Spectrum
Ref Level 0.00 dBm
RBW 100 kHz
Att 20 dB
SWT 113.7 µs
VBW 300 kHz
Mode Auto FFT
SGL Count 100/100
1Pk Max
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
CF 2.355 GHz
1800 pts
Span 90.0 MHz

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

Images:




Spectrum
Ref Level 0.00 dBm
RBW 100 kHz
Att 20 dB
SWT 94.7 µs
VBW 300 kHz
Mode Auto FFT
SGL Count 100/100
1Pk Max
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
CF 2.44175 GHz
1670 pts
Span 83.5 MHz

RSS-247 5.5 / FCC 15.247 (d) [RSE] 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.

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Results

Freq (MHz)	Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
2480.00000	[1, 3]	2483.600	65.08	H	PK
2480.00000		2483.600	48.77	H	AVG
2480.00000		2484.600	65.04	H	PK
2480.00000		2484.600	48.84	H	AVG
2402.00000	[3, 17]	4803.929	55.60	H	PK
2402.00000		4803.929	52.37	H	AVG
2440.00000		4879.907	56.28	V	PK
2440.00000		4879.907	52.33	V	AVG
2480.00000		4959.896	56.89	H	PK
2480.00000		4959.896	52.24	H	AVG

Verdict

Pass

Attachments

The setting for each range of frequency is indicated in the following tables:

Subrange	**Step Size**	**Detectors**	**Bandwidth**	**Sweep Time**	**Preamp**
Receiver: [ESR 7]					
30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	0 dB

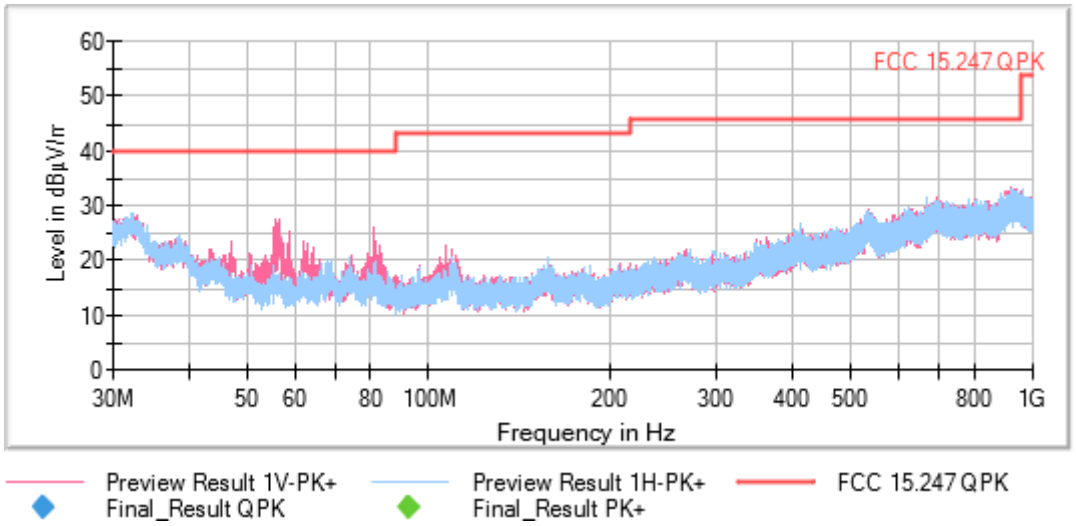
Subrange	**Step Size**	**Detectors**	**Bandwidth**	**Sweep Time**	**Preamp**
Receiver: [FSW 50]					
1 GHz - 3 GHz	200 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

Subrange	**Step Size**	**Detectors**	**Bandwidth**	**Sweep Time**	**Preamp**
Receiver: [FSW 50]					
3 GHz - 17 GHz	140 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

Subrange	**Step Size**	**Detectors**	**Bandwidth**	**Sweep Time**	**Preamp**
Receiver: [FSW 50]					
17 GHz - 26 GHz	90 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

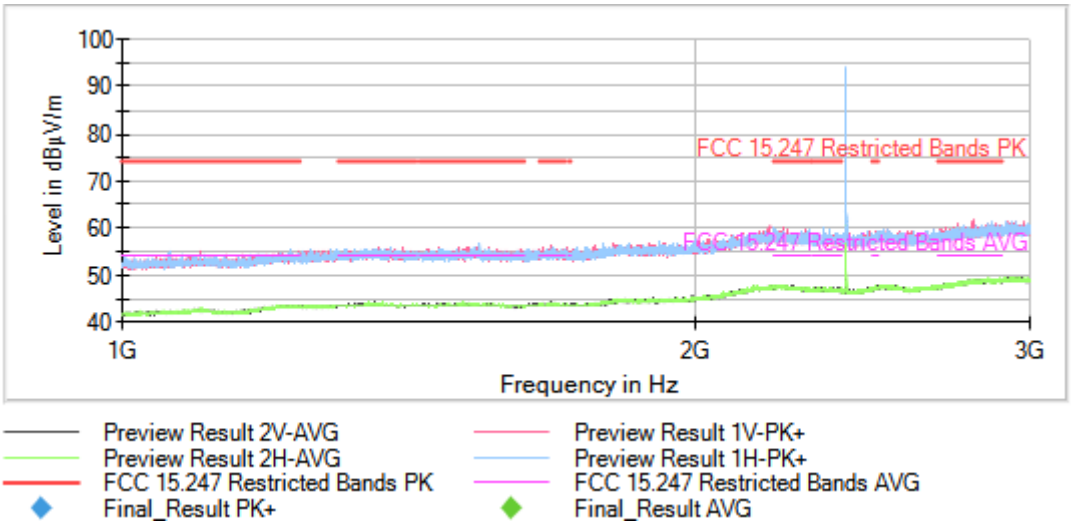
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [0.03, 1], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:

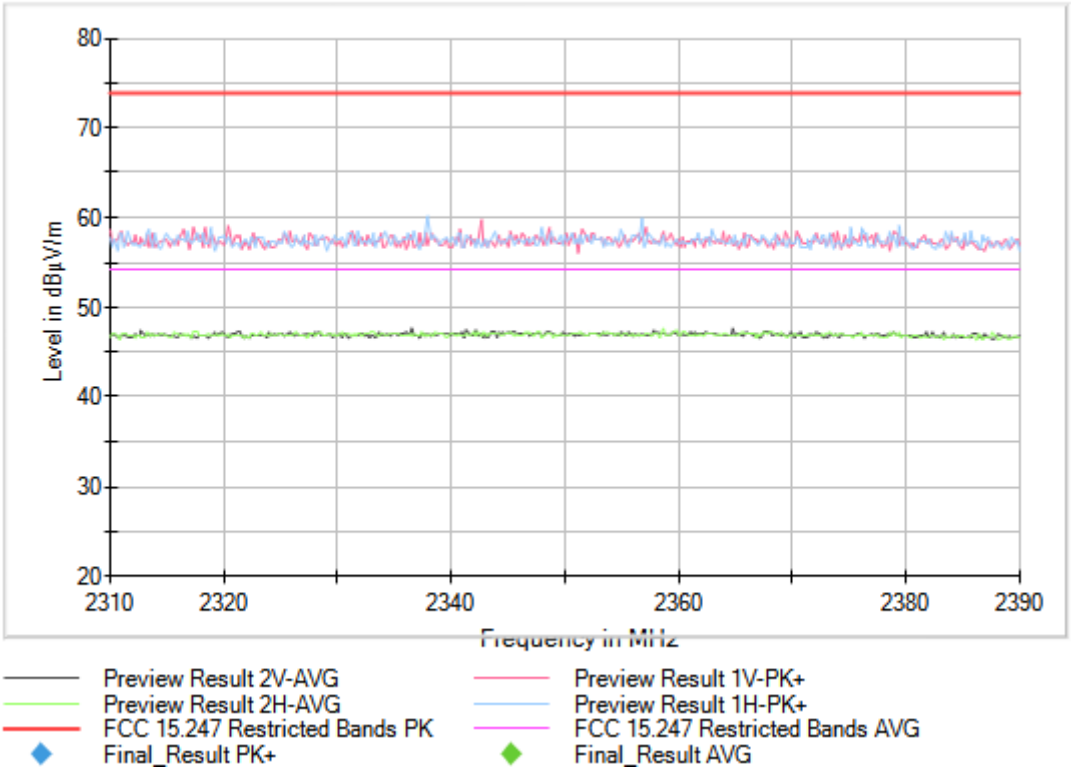


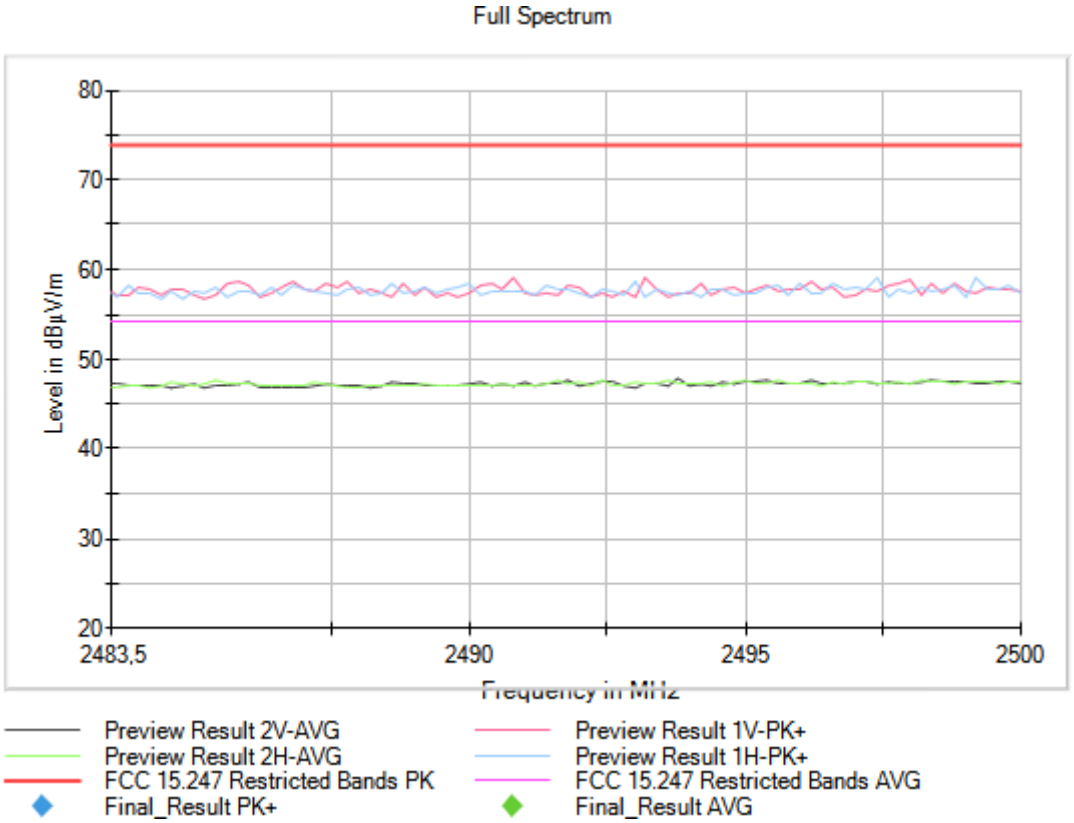
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [1, 3], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



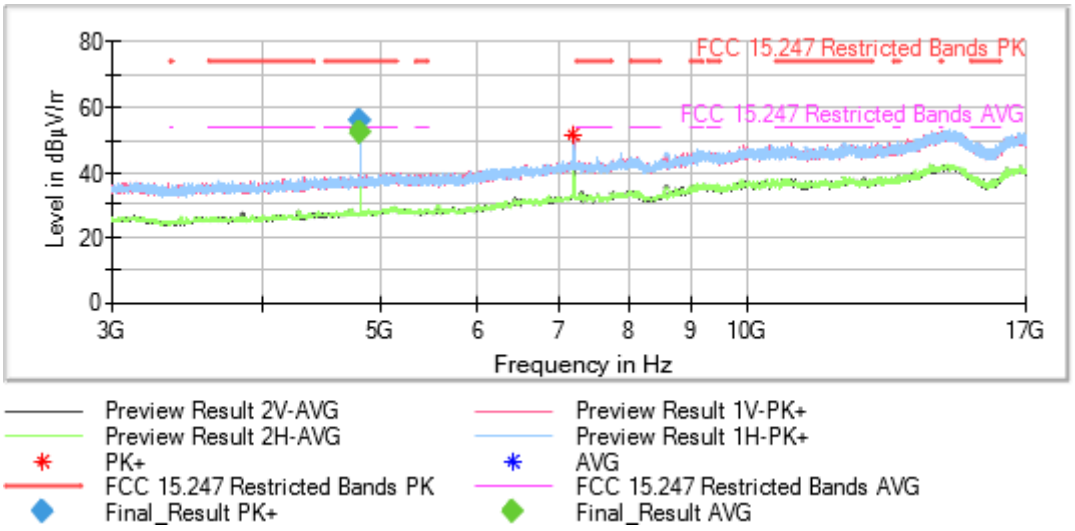
Full Spectrum





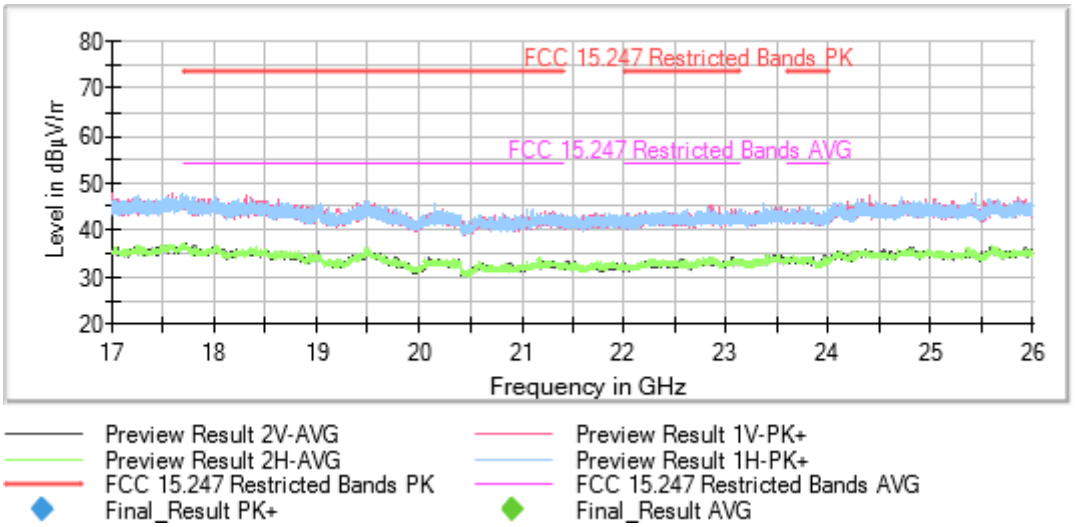
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



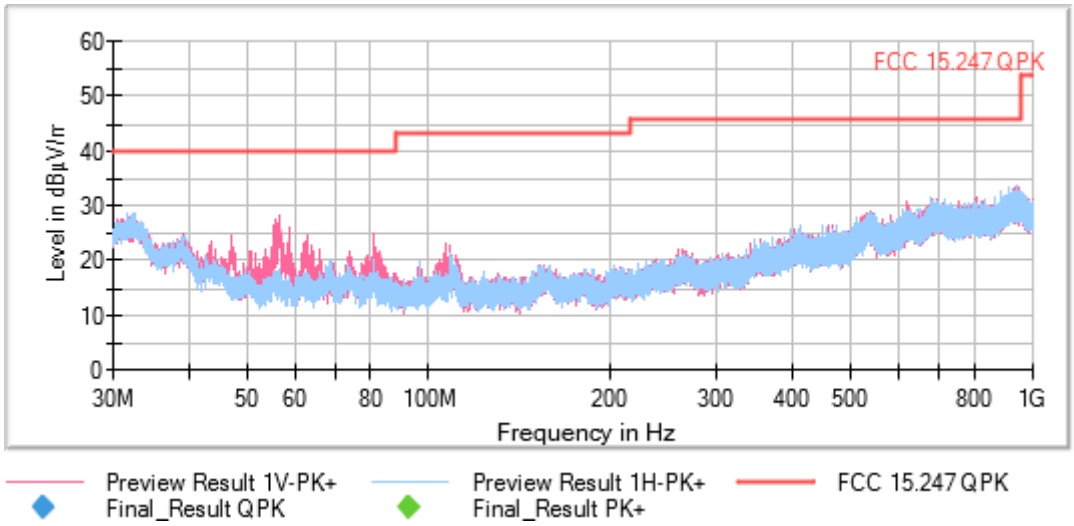
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [17, 26], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



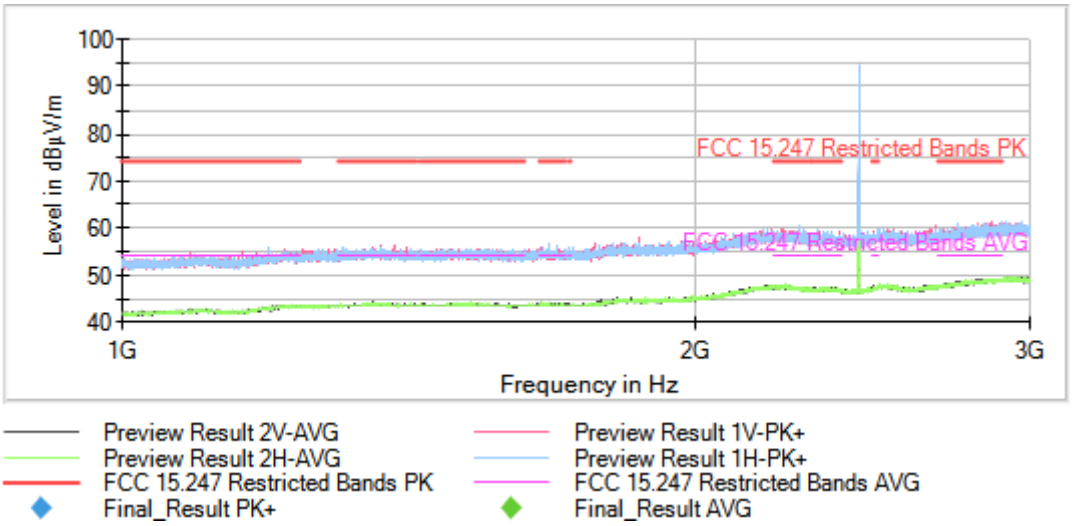
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [0.03, 1], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:

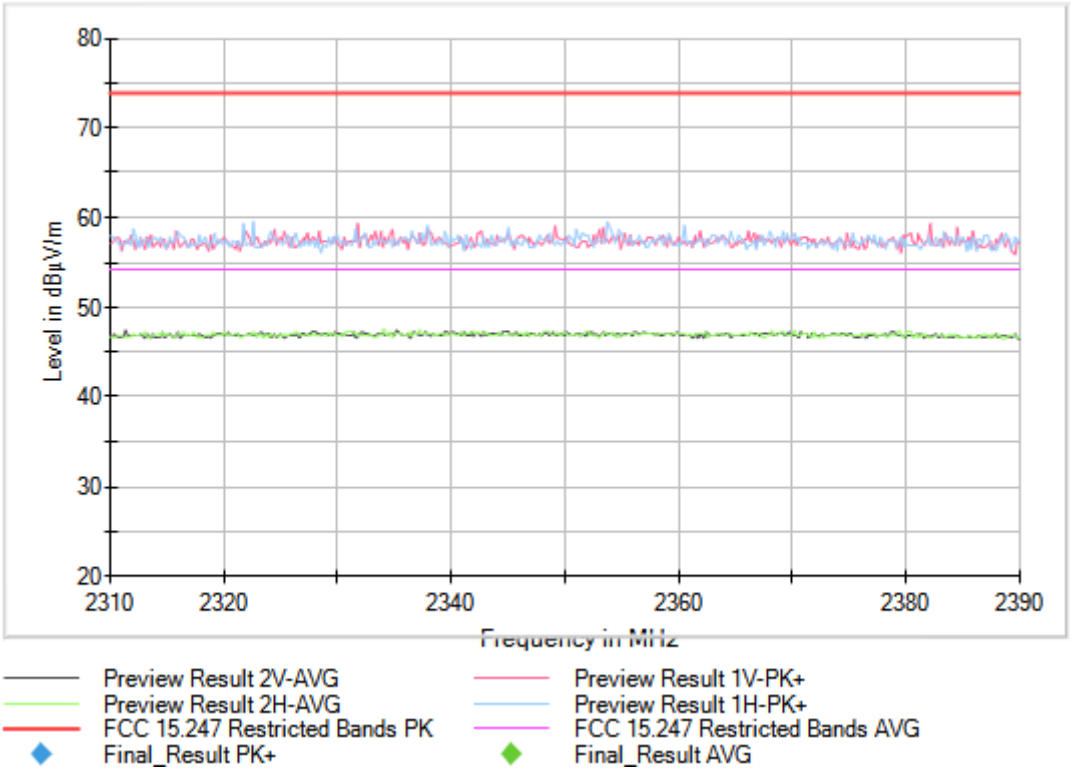


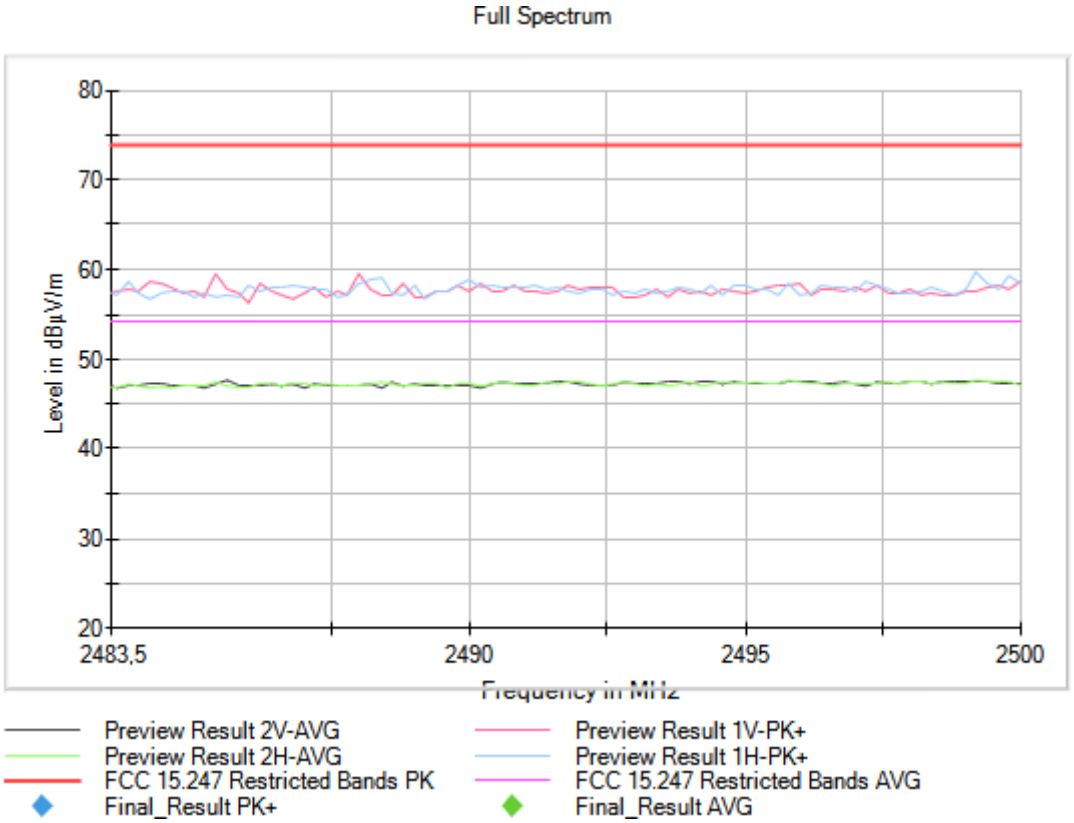
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [1, 3], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



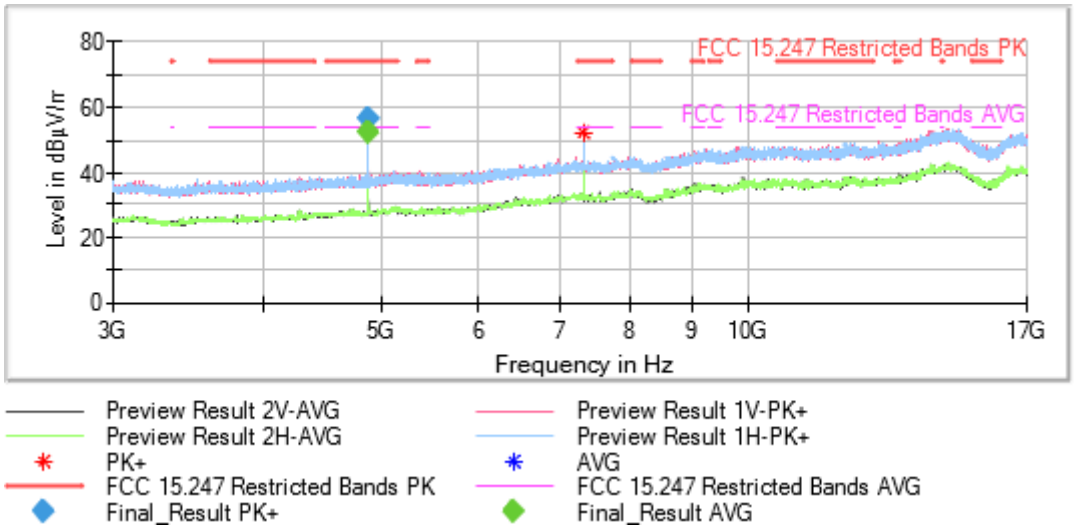
Full Spectrum




Full Spectrum
80
70
60
50
40
30
20
Level in dBµV/m
2483,5
2490
2495
2500
Frequency in MHz
Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 Restricted Bands PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

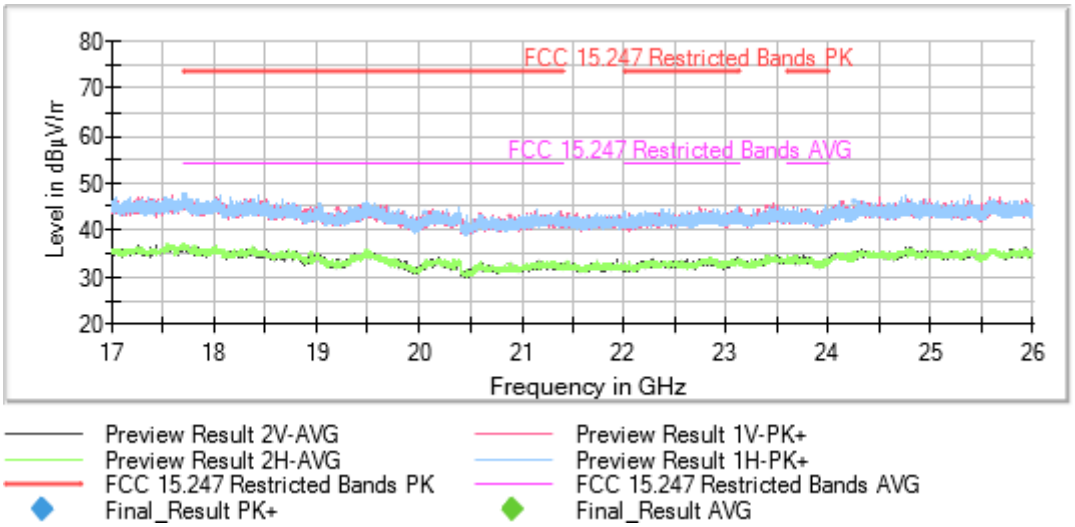
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



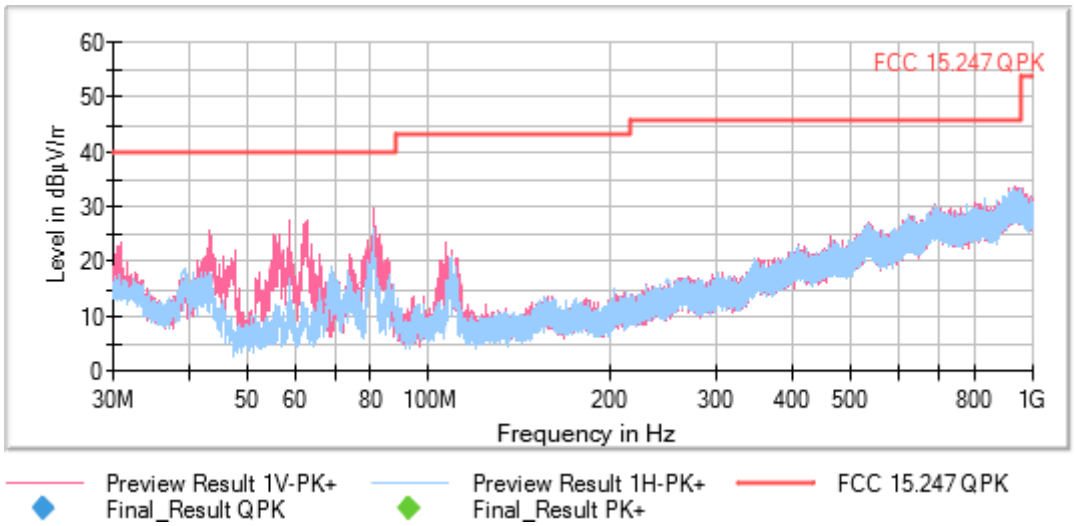
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [17, 26], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



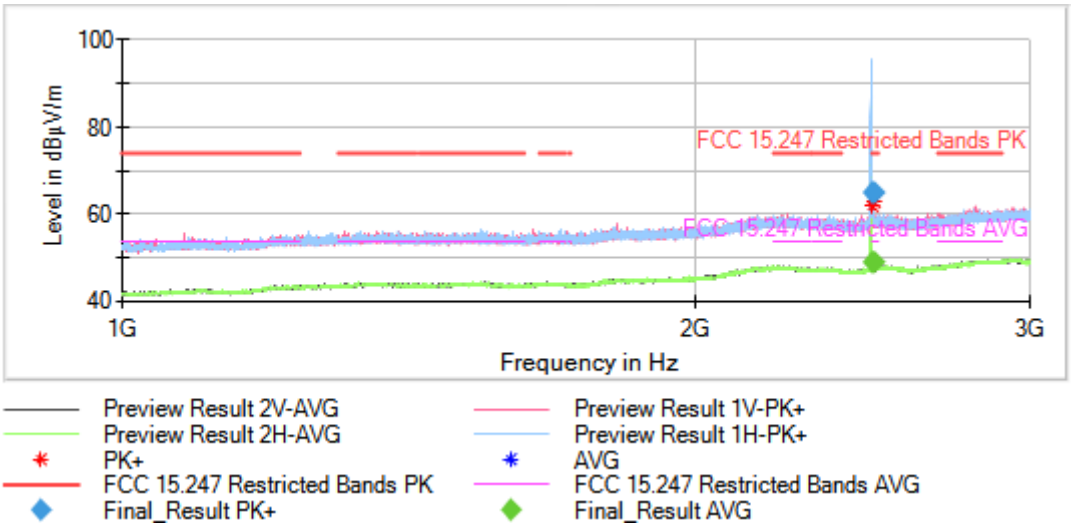
Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [0.03, 1], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:

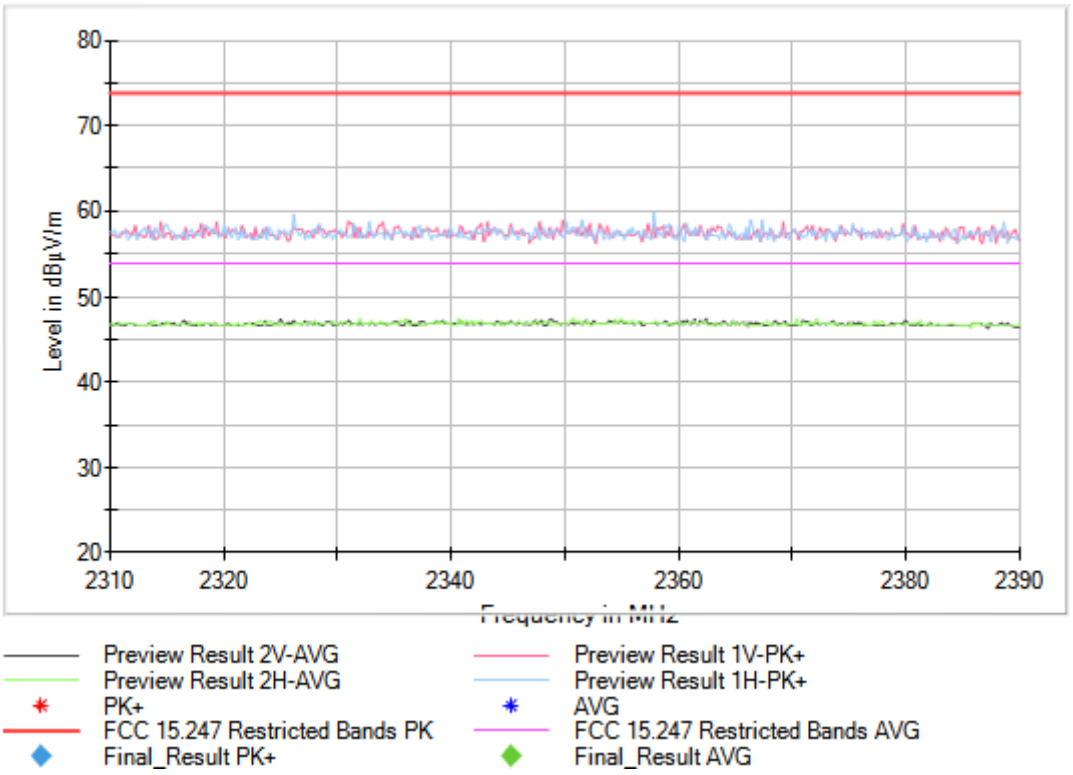


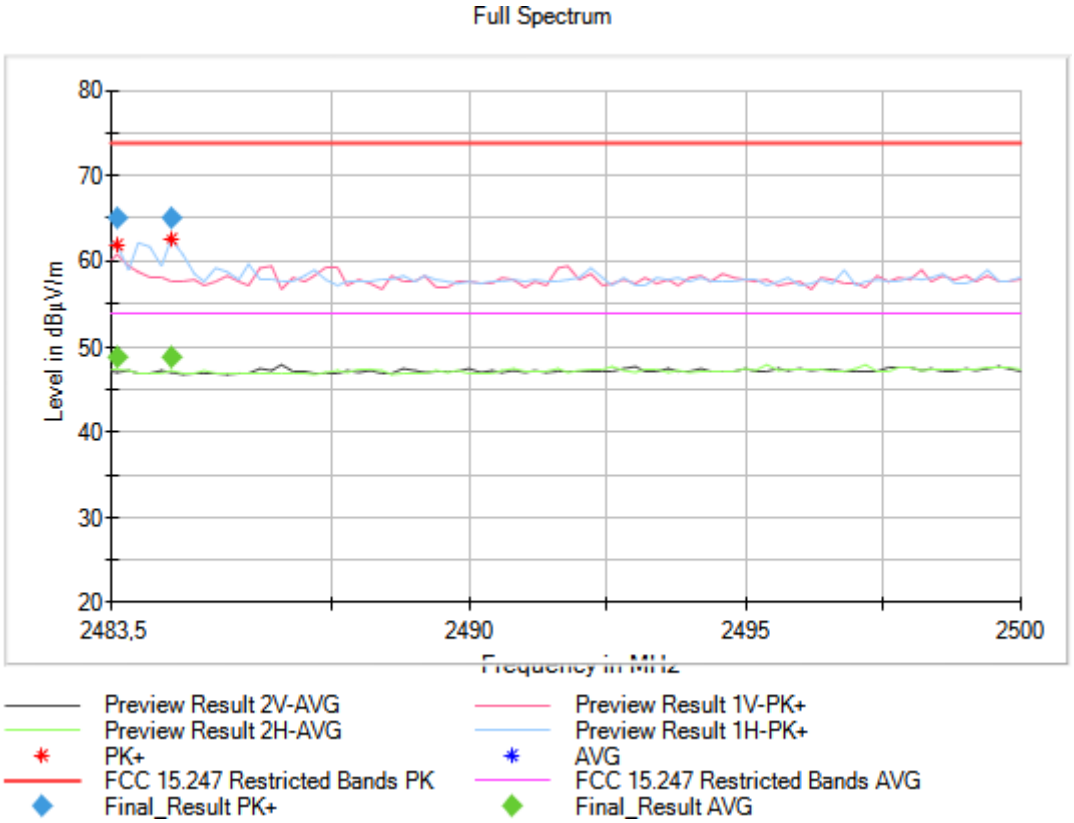
Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [1, 3], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



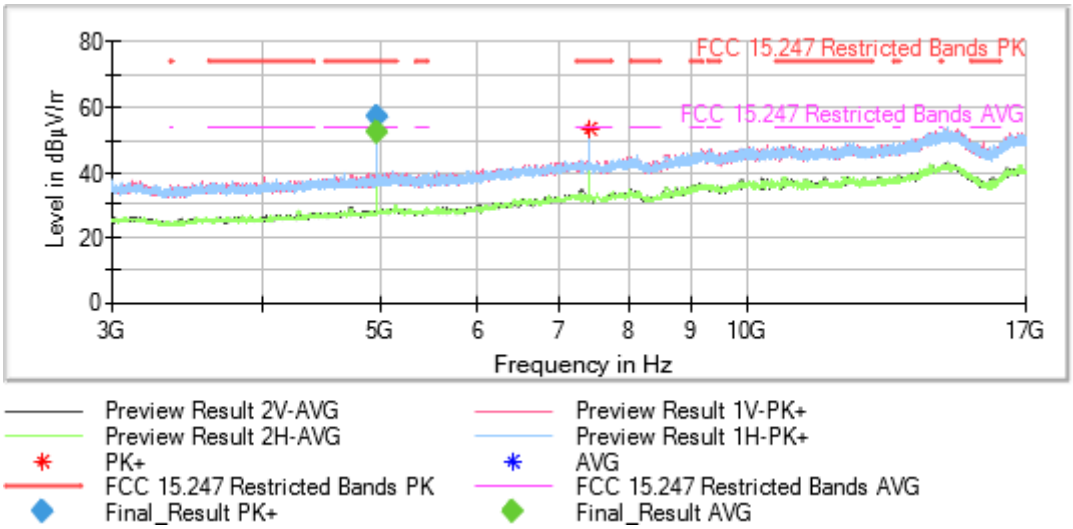
Full Spectrum




Full Spectrum
80
70
60
50
40
30
20
Level in dBµV/m
2483,5
2490
2495
2500
Preview Result 2V-AVG
Preview Result 2H-AVG
PK+
FCC 15.247 Restricted Bands PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
AVG
FCC 15.247 Restricted Bands AVG
Final_Result AVG

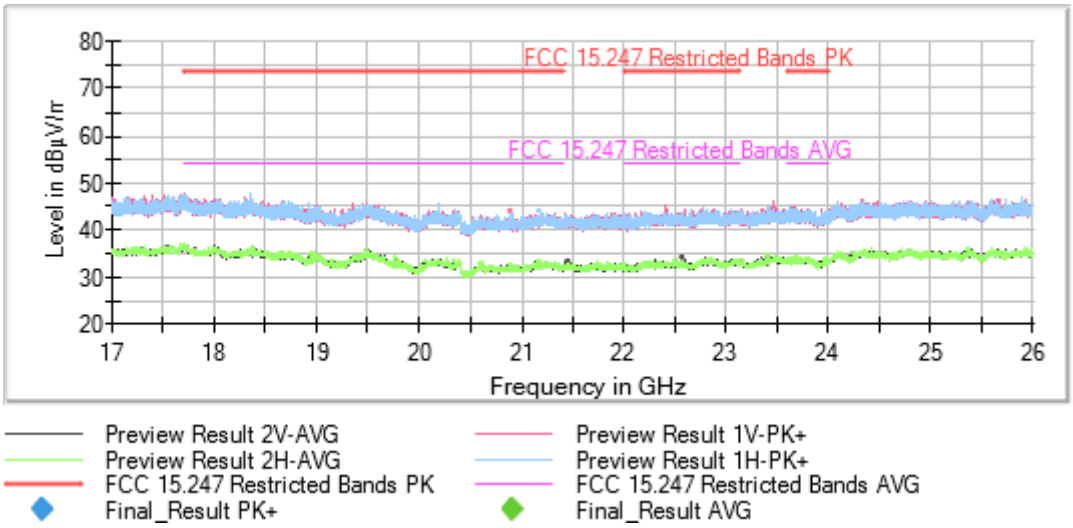
Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, 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

Images:



Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Results

Freq (MHz)	Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
2480.00000	[1, 3]	2483.600	64.83	H	PK
2480.00000	[1, 3]	2483.600	53.08	H	AVG
2402.00000	[3, 17]	4804.017	55.03	V	PK
2402.00000	[3, 17]	4804.017	50.29	V	AVG
2440.00000	[3, 17]	4879.997	56.59	V	PK
2440.00000	[3, 17]	4879.997	50.66	V	AVG
2480.00000	[3, 17]	4959.896	58.47	V	PK
2480.00000	[3, 17]	4959.896	51.59	V	AVG

Verdict

Pass

Attachments

The setting for each range of frequency is indicated in the following tables:

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [ESR 7]					
30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	0 dB

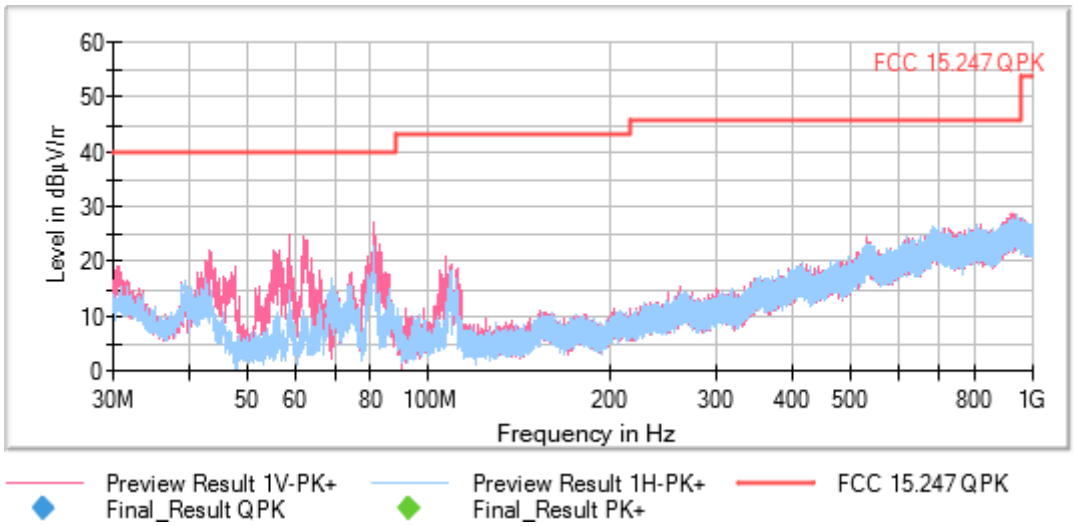
Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [FSW 50]					
1 GHz - 3 GHz	200 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [FSW 50]					
3 GHz - 17 GHz	140 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [FSW 50]					
17 GHz - 26 GHz	90 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

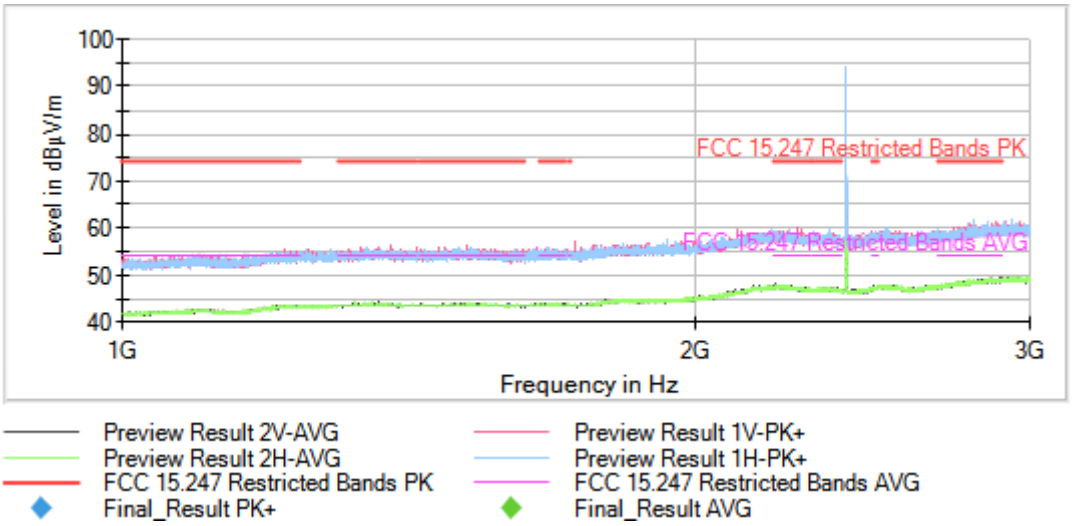
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [0.03, 1], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:

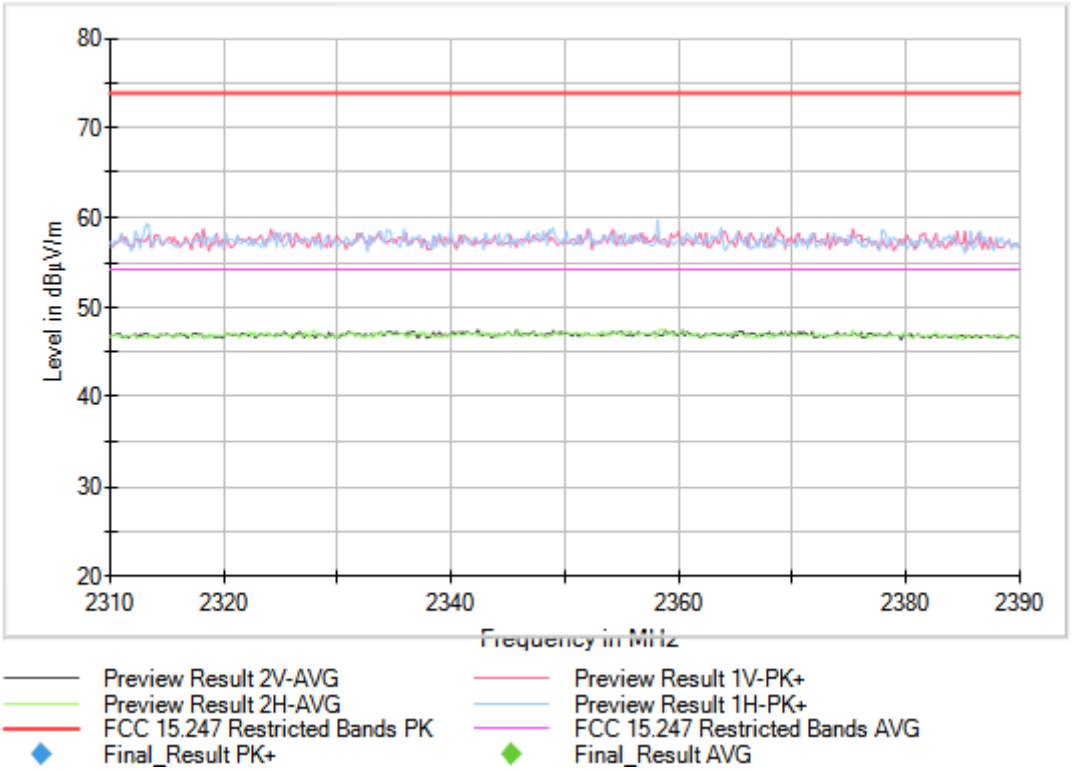


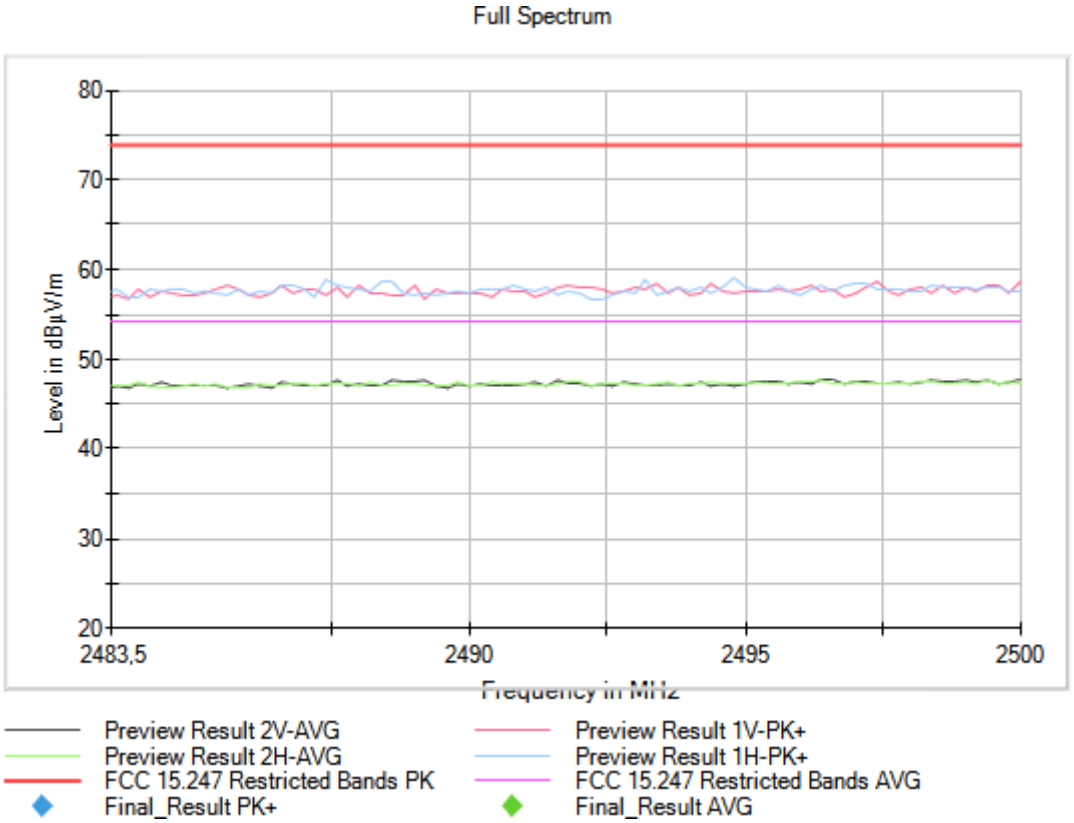
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [1, 3], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:

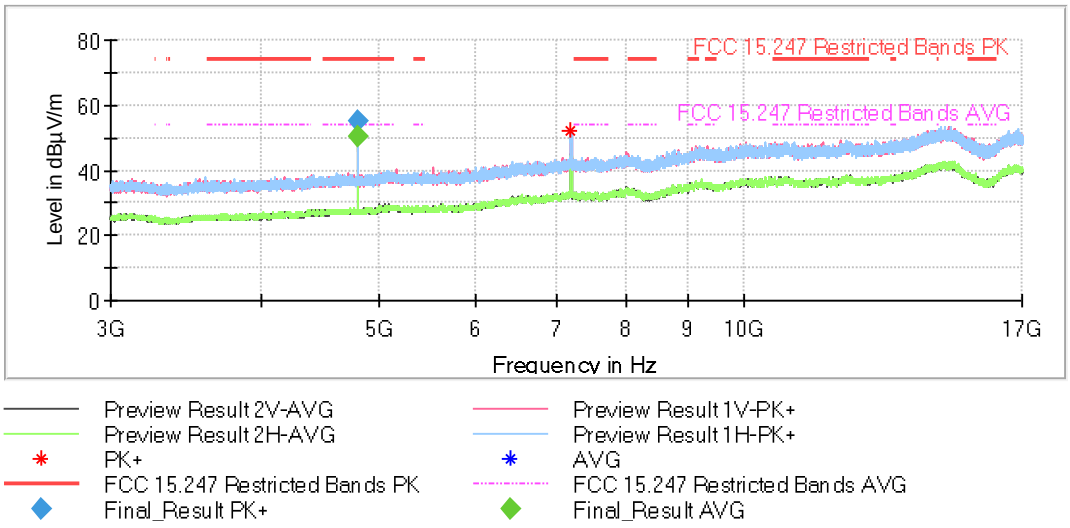


Full Spectrum



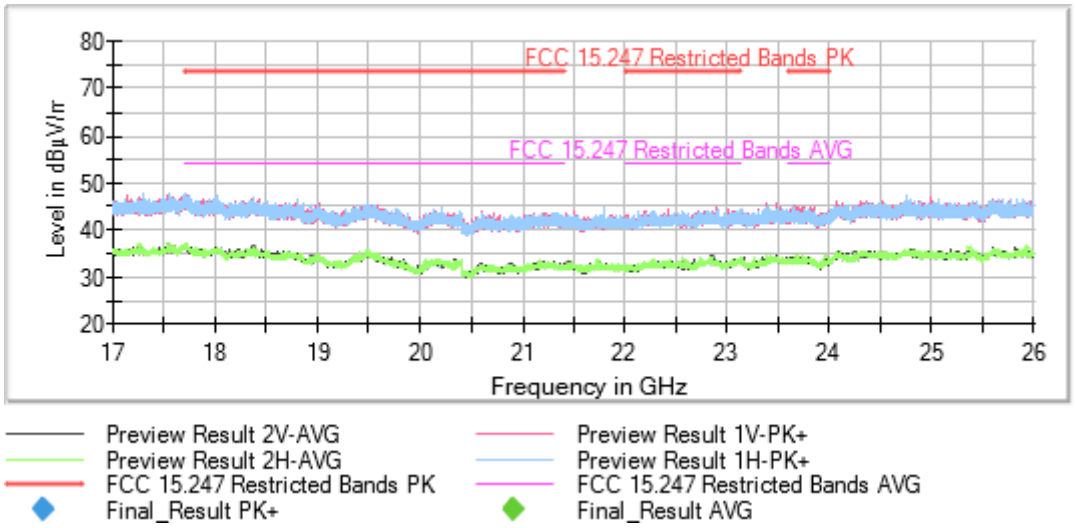


Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [3,17], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1



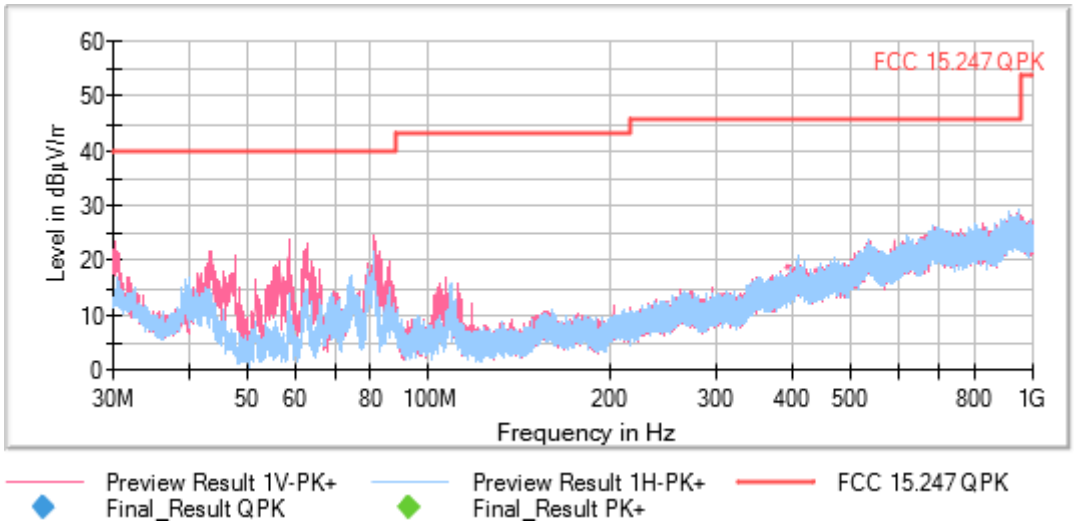
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [17, 26], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



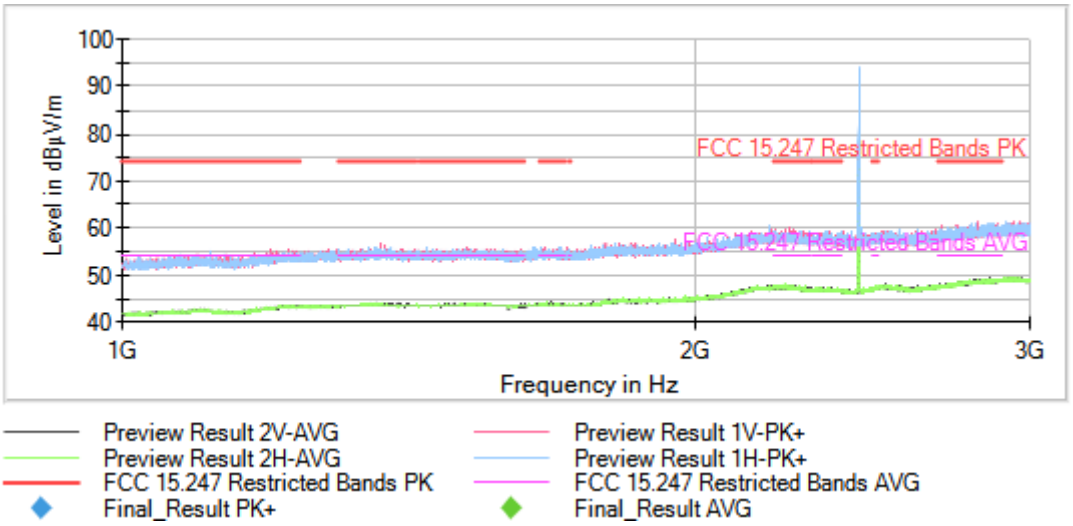
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [0.03, 1], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:

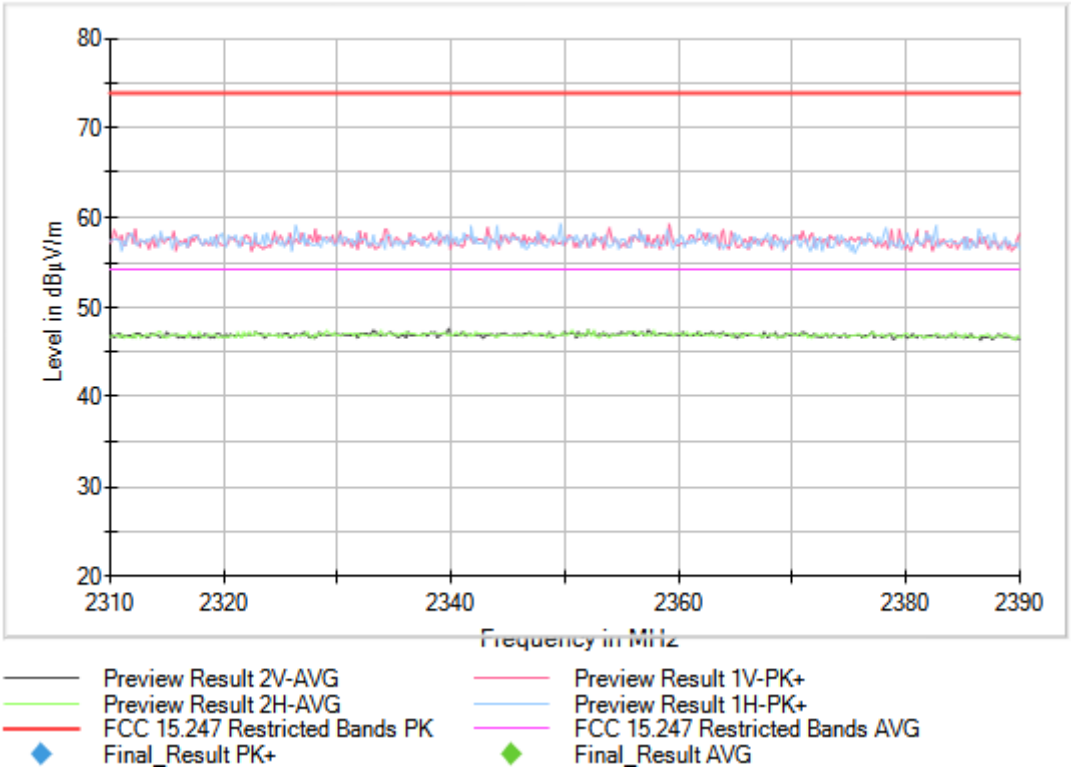


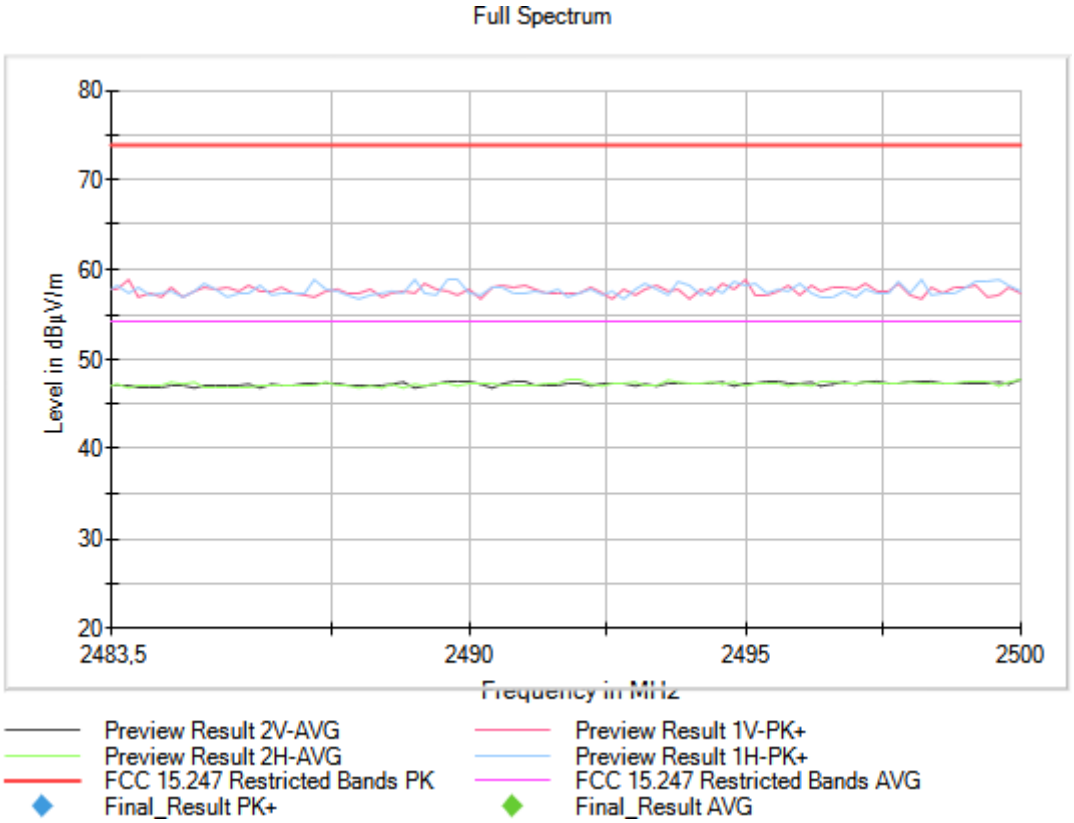
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [1, 3], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:

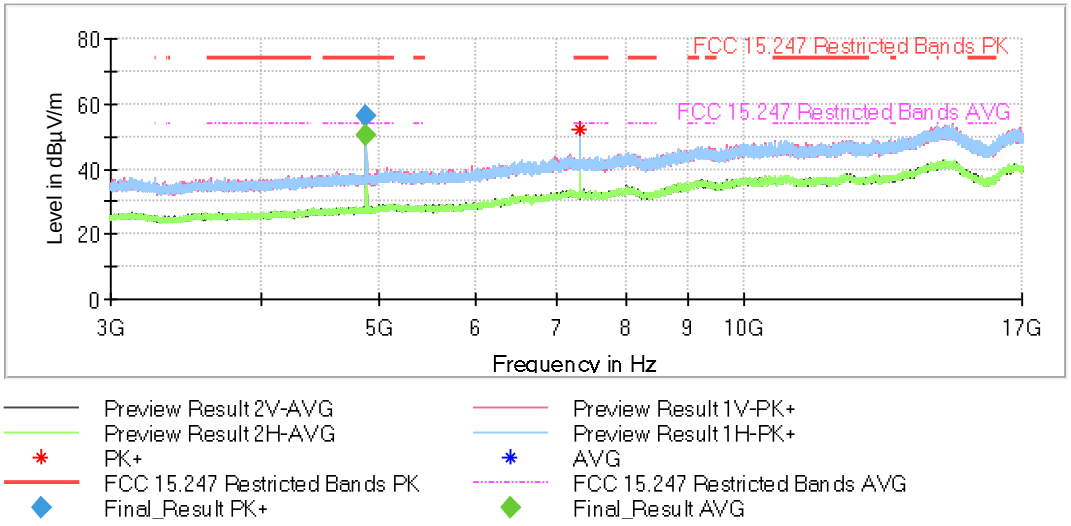


Full Spectrum



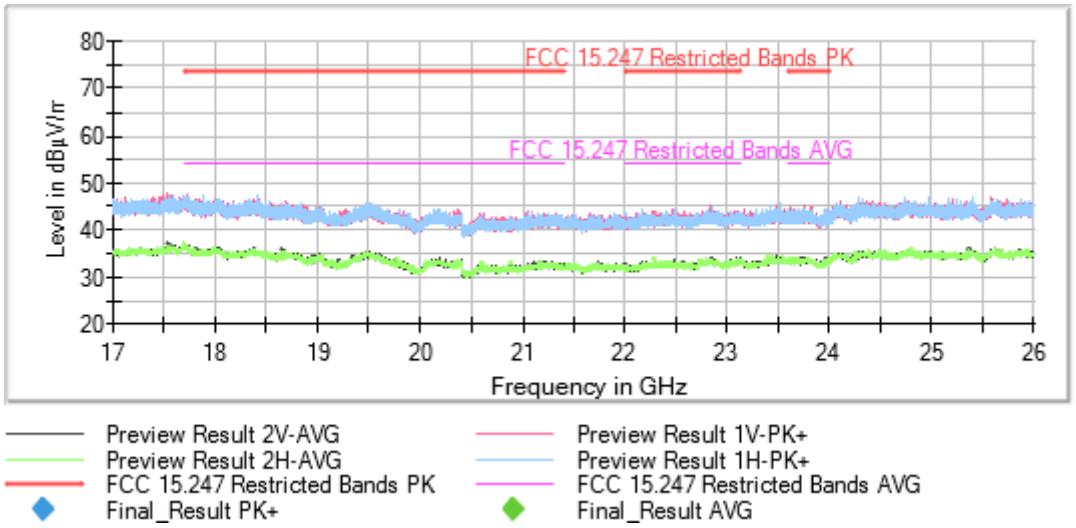


Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1



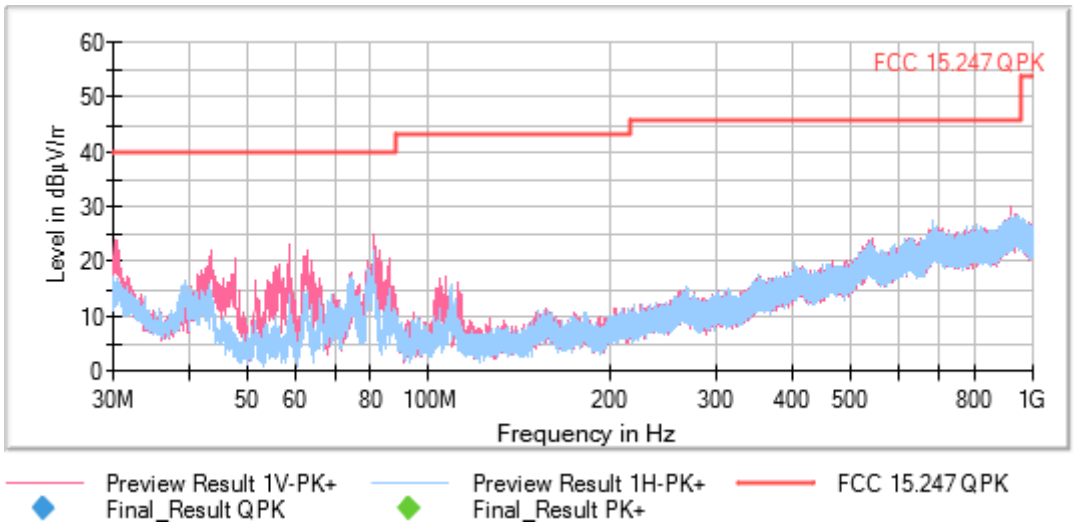
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [17, 26], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



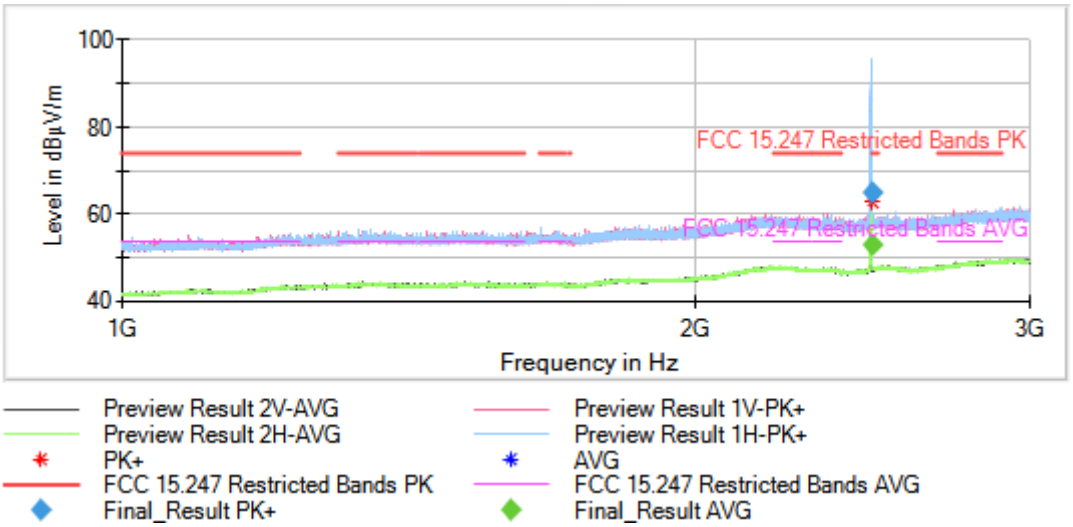
Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [0.03, 1], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:

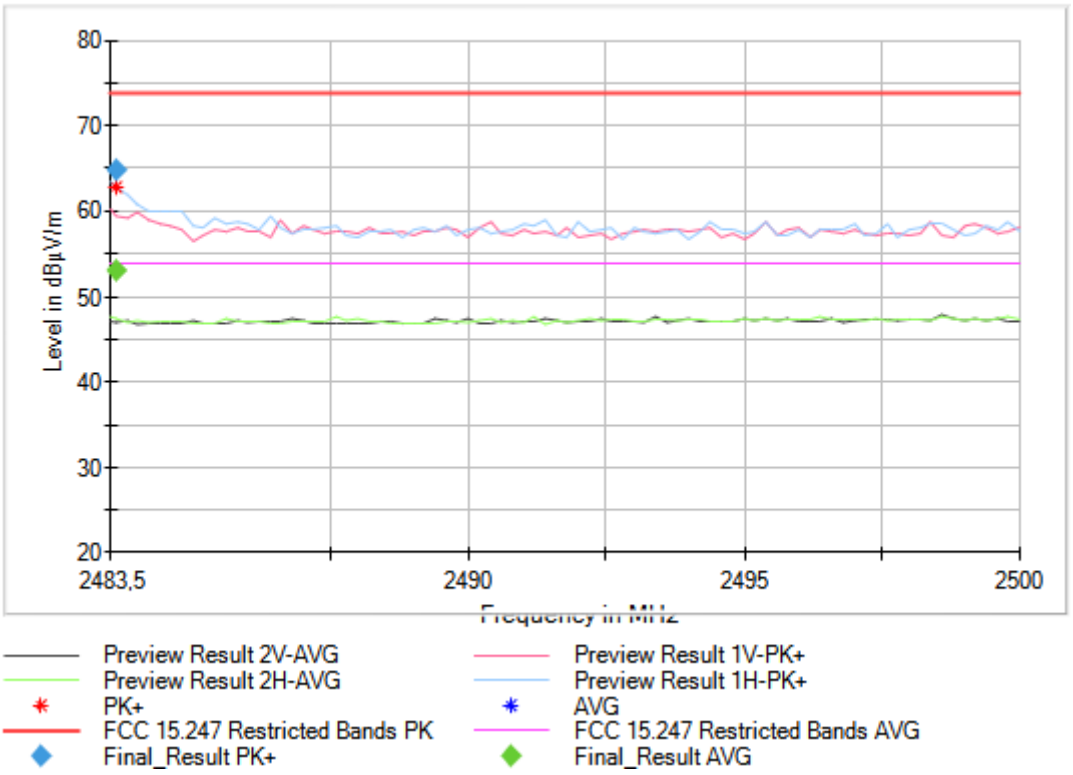


Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [1, 3], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

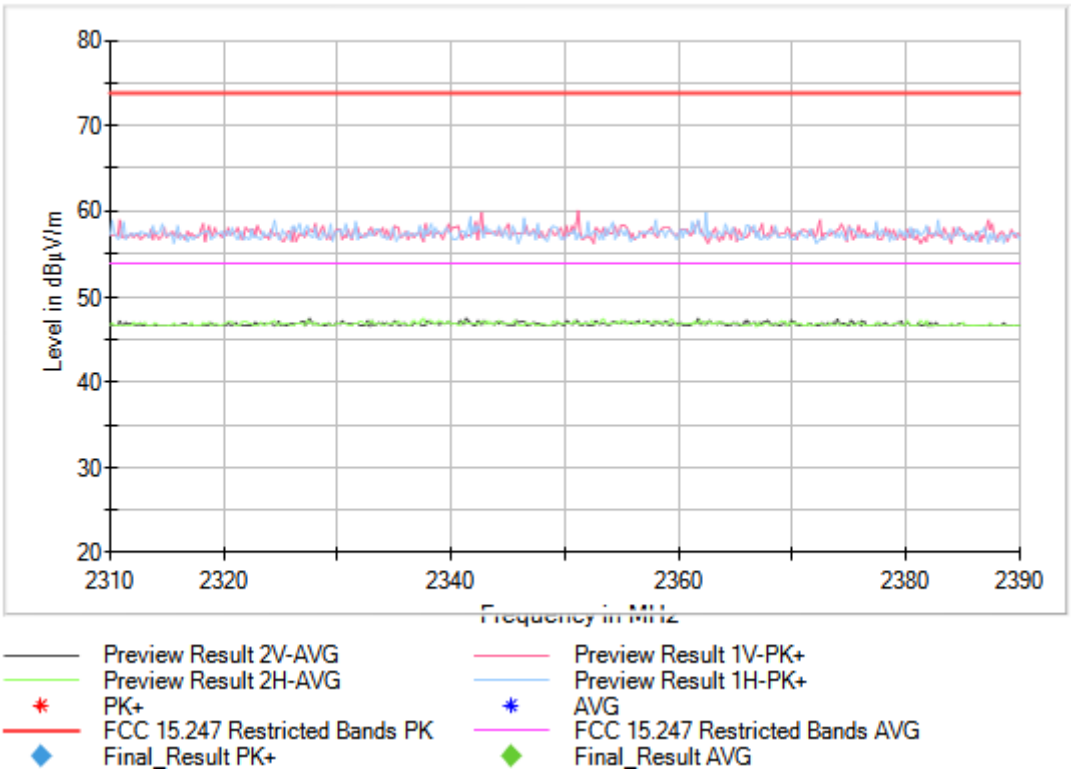
Images:



Full Spectrum

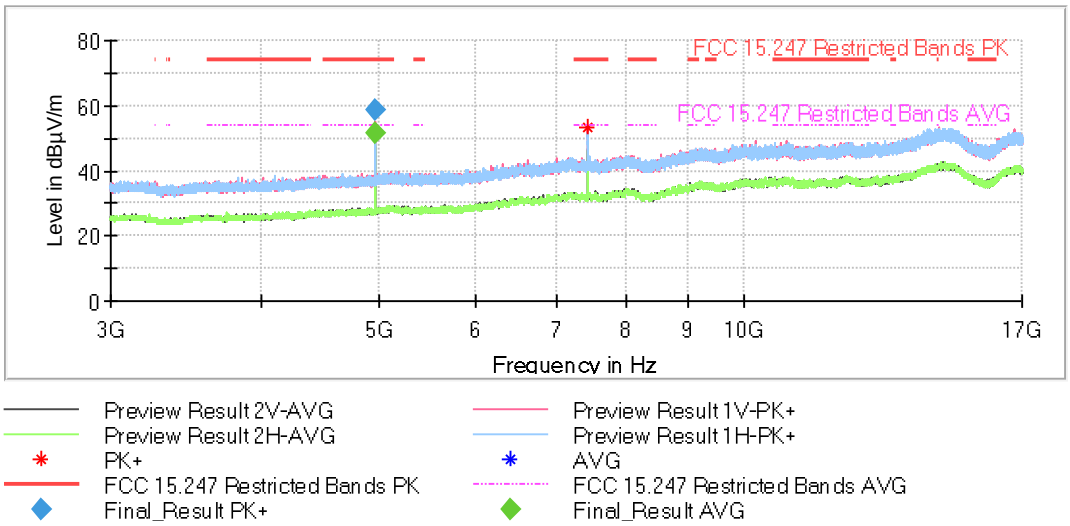


Full Spectrum



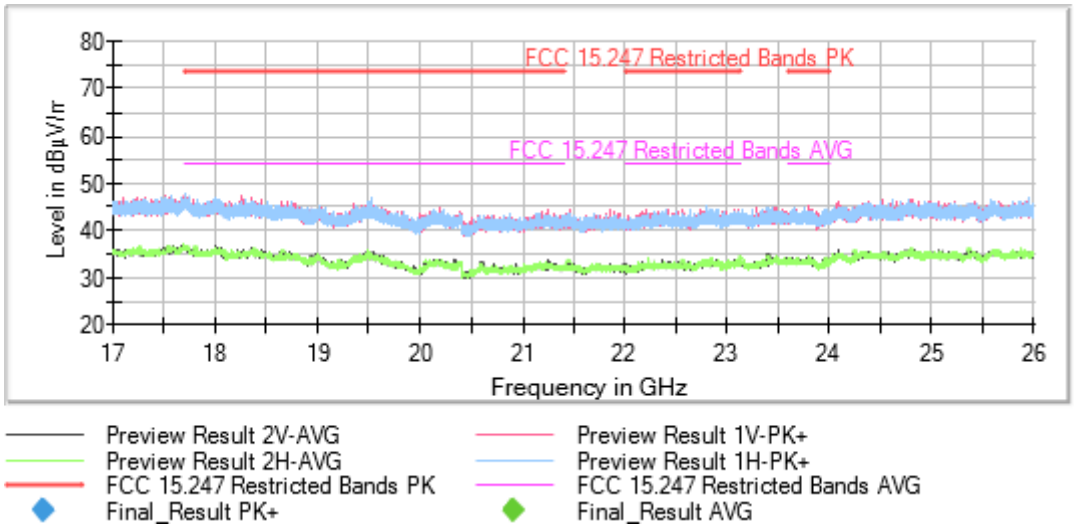
Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, 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

Images:



99dBw Occupied Channel Bandwidth 99%

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Results

Freq (MHz)	Occ Ch BW (MHz)
2402.00000	1.050
2440.00000	1.050
2480.00000	1.050

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Freq (MHz)	Occ Ch BW (MHz)
2402.00000	2.040
2440.00000	2.040
2480.00000	2.060

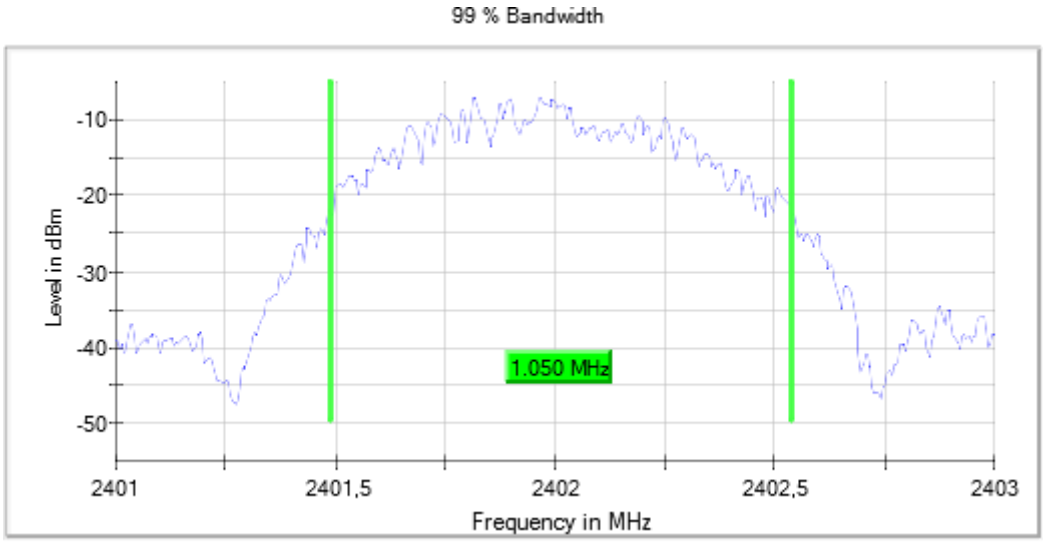
Verdict

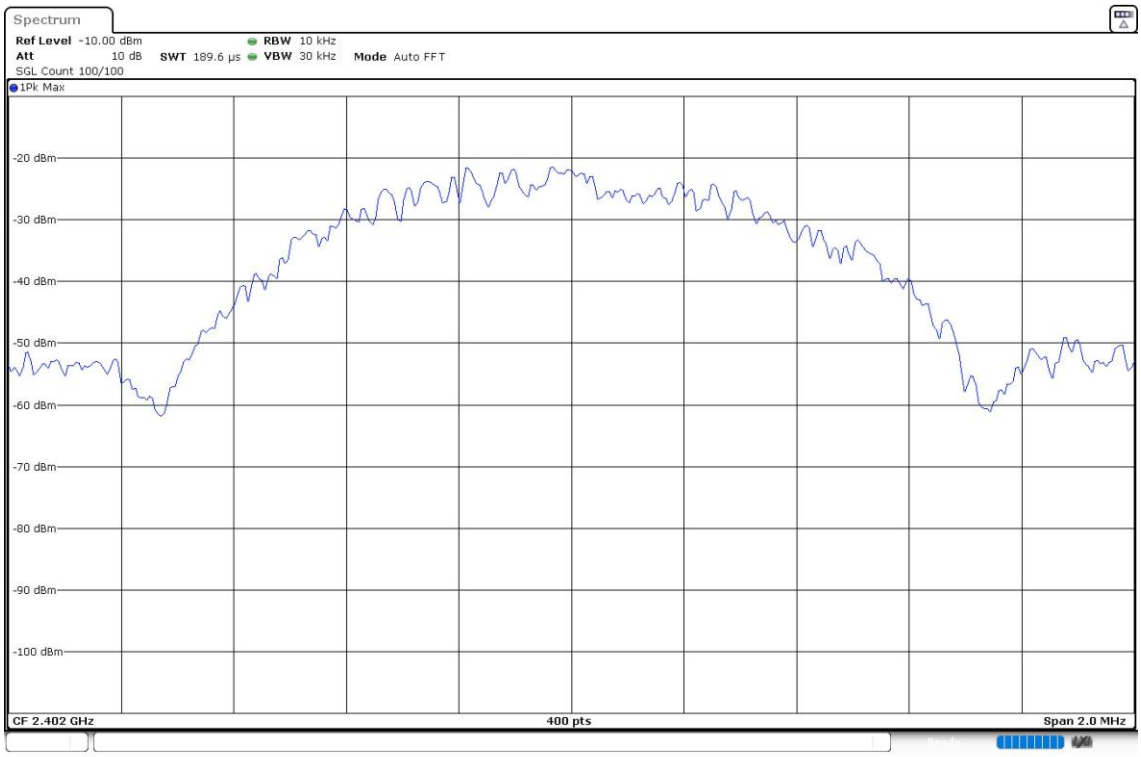
Pass

Attachments

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

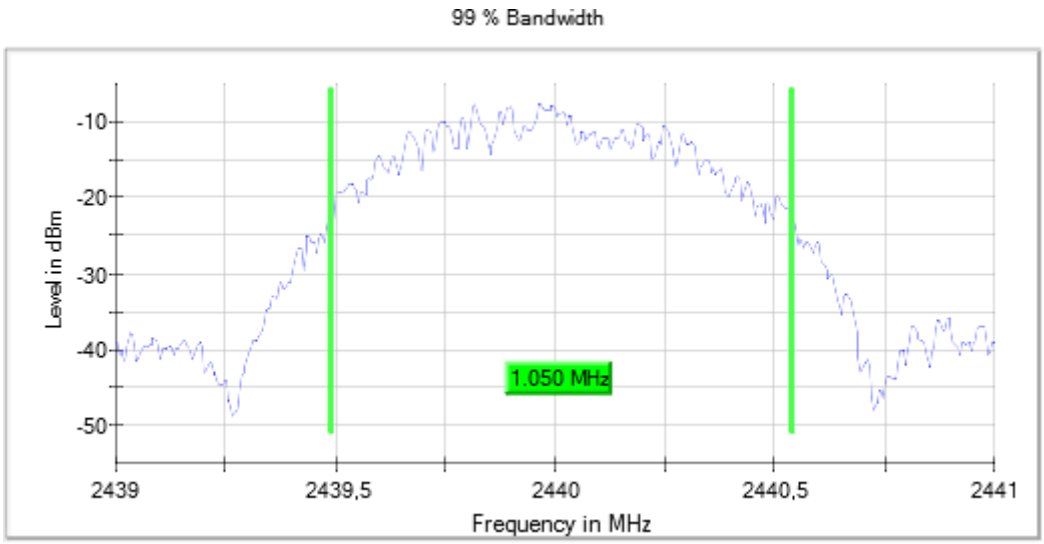
Images:

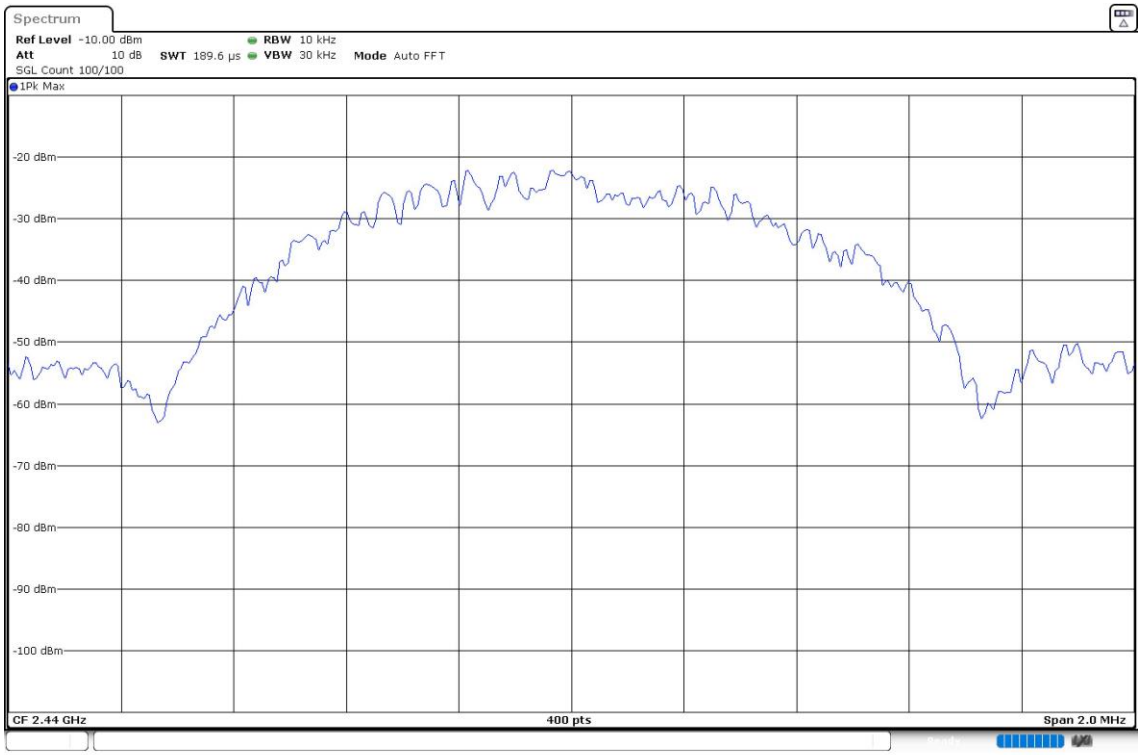




Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

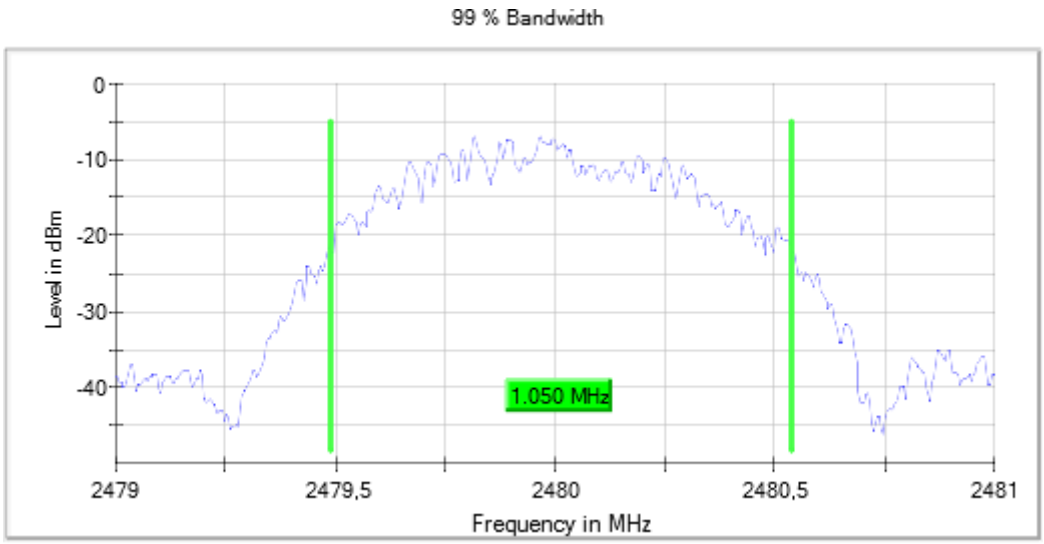
Images:

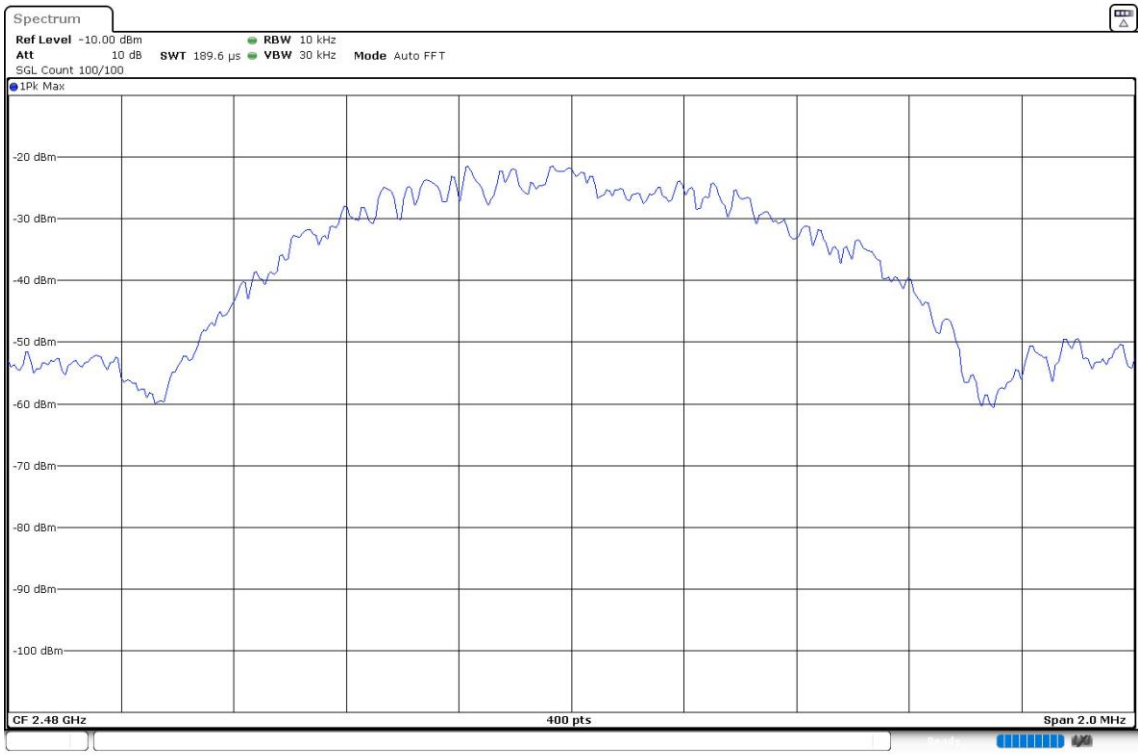




Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:

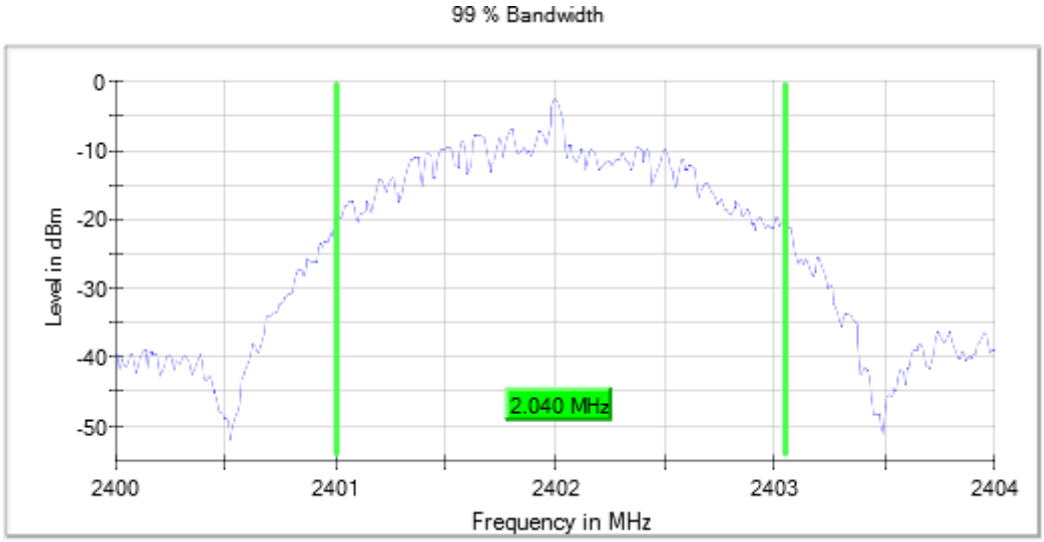


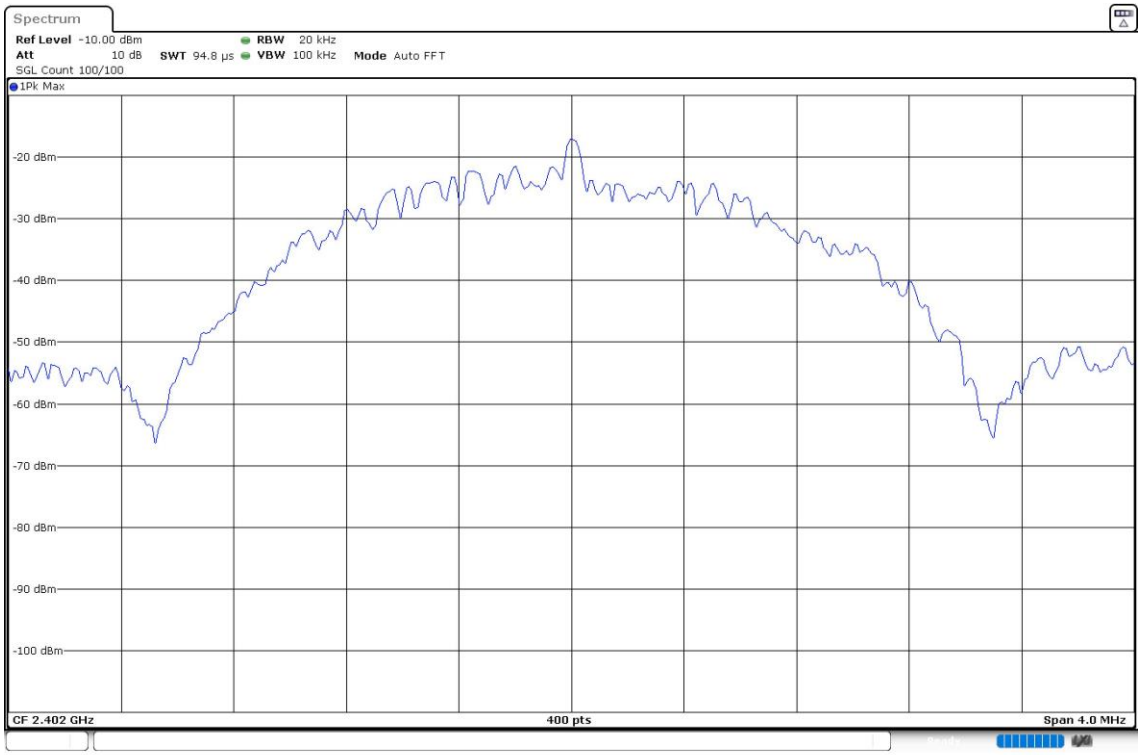


Attachments

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, Active Port = 1

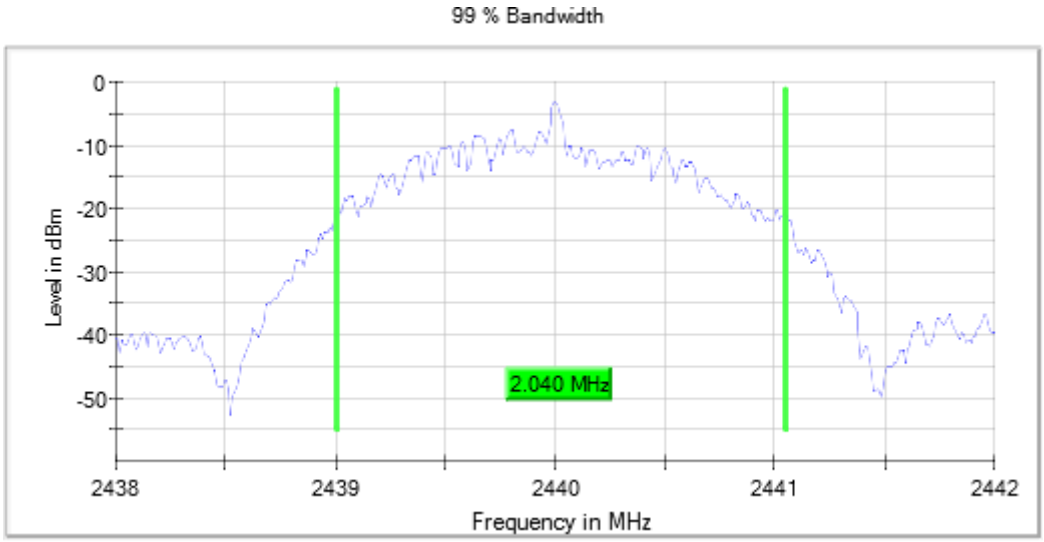
Images:

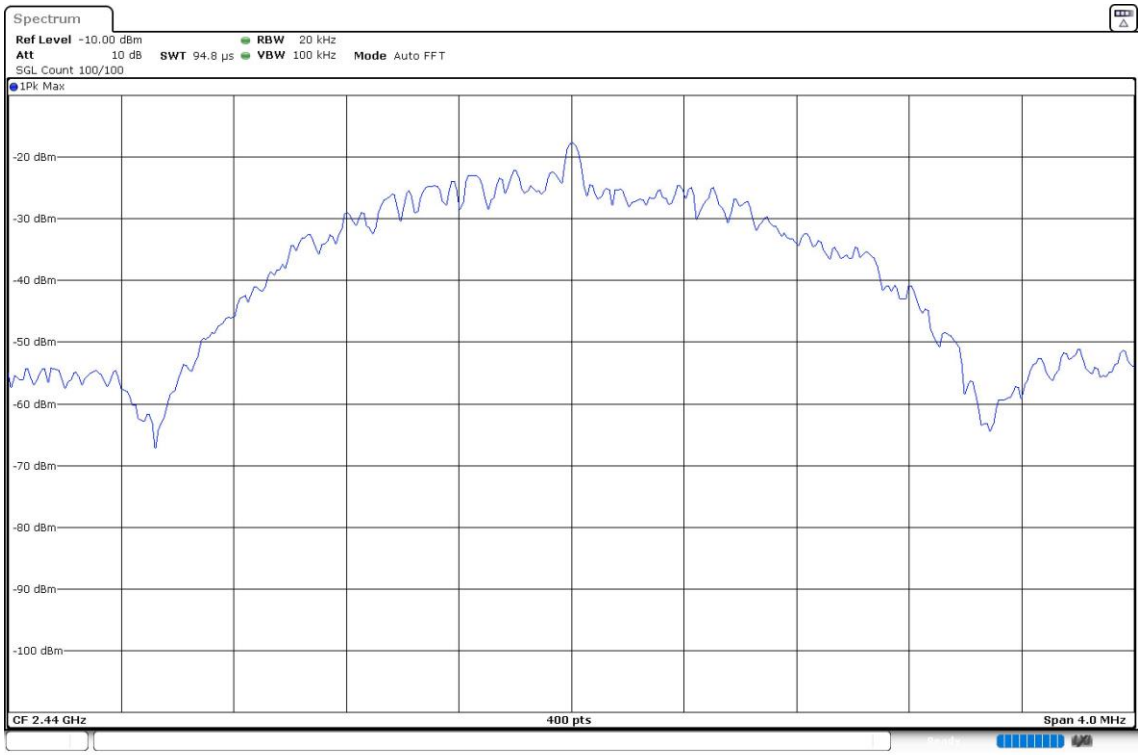




Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:





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

Images: