

ISED CABid: ES1909

Test Report No:

NIE: 70193RRF.001

Test Report

USA FCC Part 15.247, 15.209

CANADA RSS-247, RSS-Gen

(*) Identification of item tested	Rechargeable wireless hearing instrument
(*) Trademark	ReSound, Beltone, Interton, GN Hearing
(*) Model and /or type reference	CARR1
Other identification of the product	HW version: PCBA,CAMBR RHI FEM,V3.A,C6.0 SW version: Dooku 3 FCC ID: X26CARR1 IC: 6941C-CARR1
(*) Features	Audio amplification, proprietary 2.4 GHz wireless functionality(Proximity), Bluetooth 5.0 and 10.667 MHz wireless magnetic induction functionality. Wireless rechargeability at 333 kHz.
Manufacturer	GN HEARING A/S Lautrupbjerg 7, 2750 Ballerup, Denmark.
Test method requested, standard	USA FCC Part 15.247 (10-1-20 Edition): Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. USA FCC Part 15.209 (10-1-20 Edition): Radiated emission limits; general requirements. CANADA RSS-247 Issue 2 (February 2017). CANADA RSS-Gen Issue 5 amendment 1 (March 2019). Guidance for Performing Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid Systems Devices Operating Under Section 15.247 of the FCC Rules. 558074 D01 Meas Guidance v05r02 dated April 2, 2019. ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Rafael López Martín EMC Consumer & RF Lab. Manager
Date of issue	2022-06-28
Report template No	FDT08_24 (*) "Data provided by the client"

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Acronyms

Acronym ID	Acronym Description
	Emission 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
Peak Power	Maximum Peak Conducted Output Power
Pol	Polarization
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.

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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 rechargeable wireless hearing aid.

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 N°	Date of Reception	Application
S/01	70193E_123	Hearing aid (RF Radiated)	HI,RT961-DRWC	2100818652	2022-03-21	Element Under Test
S/02	70193E_130	Hearing aid (RF Conducted)	--	--	2022-03-21	Element Under Test
S/02	70193E_190	Audio Cable	CS 44 HIPRO CABLE	--	2022-03-22	Auxiliary Element

Id	Control Number	Description	Model	Serial N°	Date of Reception	Application
S/02	70193E_77	Speedlink	--	2181059641	2022-03-21	Auxiliary Element
S/02	70193E_78	USB Cable	--	--	2022-03-21	Auxiliary Element

Notes referenced to samples during the project:

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

Test sample description

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

Ports..... :	Port name and description	Cable					
		Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾		
	---	---	---	---	---		
Supplementary information to the ports..... :							
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
		AC:					
		AC:					
	X	DC: Internal rechargeable battery					
	DC:						
Rated Power	3.7V						
Clock frequencies.....	2.48GHz and 10.667MHz						
Other parameters	---						
Software version	Dooku 2						
Hardware version	---						
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: Placed behind ear					

Modules/parts.....:	Module/parts of test item	Type	Manufacturer
	---	---	---
Accessories (not part of the test item)	Description	Type	Manufacturer
	Computer	Certified according to IEC 60950-1, IEC 62368-1 or equivalent standard	
Documents as provided by the applicant.....:	Description	File name	Issue date
	---	---	---

⁽³⁾ Only for Medical Equipment

Identification of the client

GN HEARING A/S
Lautrupbjerg 7, 2750 Ballerup, Denmark.

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2022-04-04
Date (finish)	2022-05-24

Document history

Report number	Date	Description
70193RRF.001	2022-06-22	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: Daniel Mejías Herrera, Miguel Angel Torres Camara and Victoria Olmedo Villalba.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
7817	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2023-12-30
7763	HORN ANTENNA 1-18GHz	BBHA 9120D	SCHWARZBECK MESS-ELEKTRONIK	2022-11-15
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
7769	PREAMPLIFIER 30dB 500MHz-18GHz	BBV 9718 C	SCHWARZBECK	2023-03-25
8130	SEMIANECHOIC ABSORBER LINED CHAMBER	P29419	ALBATROSS	N/A
8661	SHIELDED ROOM	-	SIEPEL	N/A
8134	SHIELDED ROOM	P29419	ALBATROSS PROJECTS GMBH	N/A
8835	SIGNAL AND SPECTRUM ANALYZER 2Hz-50GHz	FSW50	ROHDE AND SCHWARZ	2023-07-29
4761	SIGNAL GENERATOR 9kHz-6GHz	SMB100A	ROHDE AND SCHWARZ	2023-11-05
7826	ULTRALOG ANTENNA 30MHz-6GHz	HL562E_UPG	ROHDE AND SCHWARZ	2022-10-15
4848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	N/A
7798	SOFTWARE FOR EMC/RF TESTING	WMS32	ROHDE AND SCHWARZ	N/A
7040	EXTENSION FOR OPEN SWITCH UNIT UP TO 40GHz	OSP-B157Wx	ROHDE AND SCHWARZ	2023-03-23

Testing verdicts

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

Summary

Bluetooth Low Energy 5.0 (2M, 1M) and Proximity

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

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

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FCC 47 CFR PART 15.247 / RSS-247	16
RSS-247 5.2 (a) / FCC 15.247 (a) (2) [6dBw] 6 dB Bandwidth	16
RSS-247 5.2 (b) / FCC 15.247 (e) [Psd] Power spectral density	22
RSS-247 5.4 (d) / FCC 15.247 (b) (3) [Pkcp] Maximum Peak Conducted output power	28
RSS-247 5.5 / FCC 15.247 (d) [Bndedge] Band-edge emissions compliance (Transmitter)	38
RSS-247 5.5 / FCC 15.247 (d) [RSE] Emission limitations radiated (Transmitter)	42
99dBw Occupied Channel Bandwidth 99%	68

TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal:	3.7 VDC
Type of Power Supply:	Internal non-rechargeable battery

ANTENNA (*):

Type of Antenna:	Internal
Maximum Declared Antenna Gain for Bluetooth LE:	-14.43 dBi
Maximum Declared Antenna Gain for Proprietary protocol 2.4 GHz:	-14.43 dBi

TEST FREQUENCIES (*):

Proprietary protocol 2.4 GHz / DTS

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

Bluetooth Low Energy 5.0 (2M, 1M) / DTS

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).

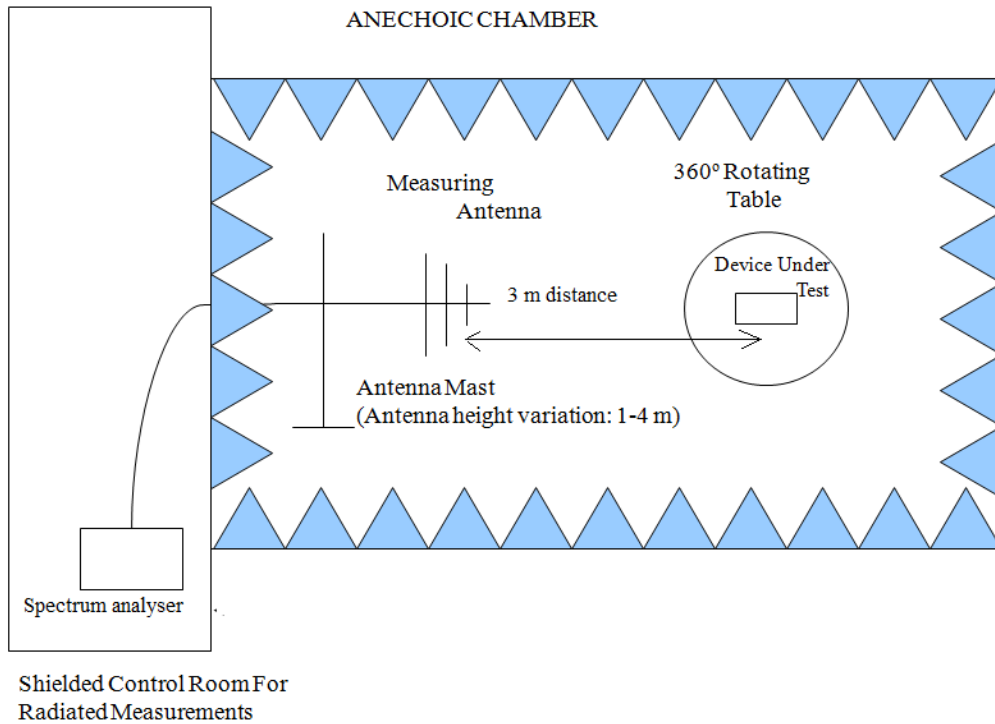
For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

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.

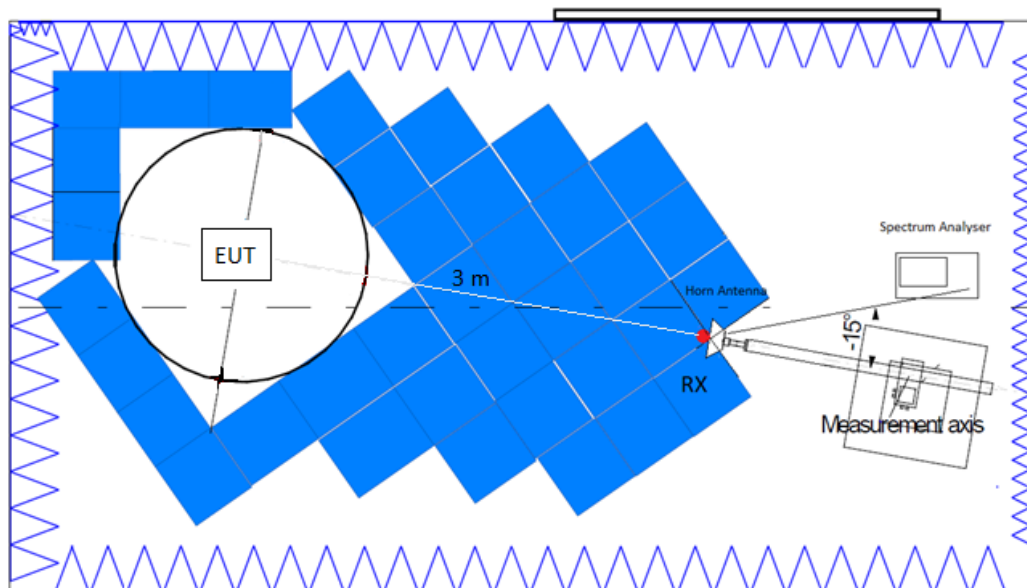
Measurements were made in both horizontal and vertical planes of polarization.

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.

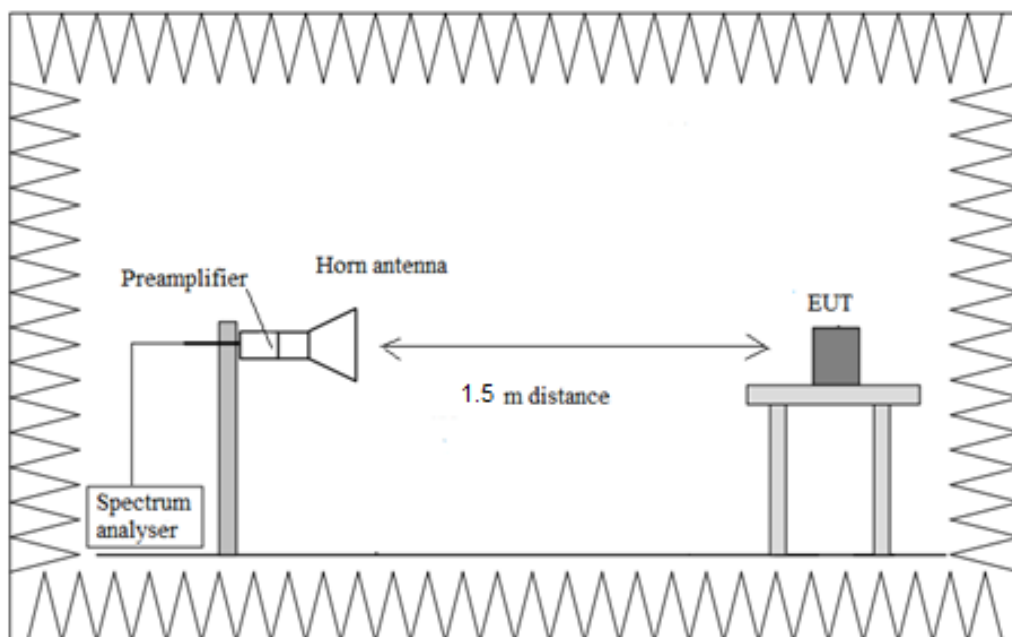
Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup $f > 17$ GHz:



TEST CASES DETAILS

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: Proximity

Results

Freq (MHz)	Emission Bandwidth (MHz)
2402.00000	0.71
2440.00000	0.79
2480.00000	0.63

Verdict

Pass

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Results

Freq (MHz)	Emission Bandwidth (MHz)
2402.00000	0.79
2440.00000	0.79
2480.00000	0.77

Verdict

Pass

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Results

Freq (MHz)	Emission Bandwidth (MHz)
2402.00000	1.11
2440.00000	1.39
2480.00000	0.79

Verdict

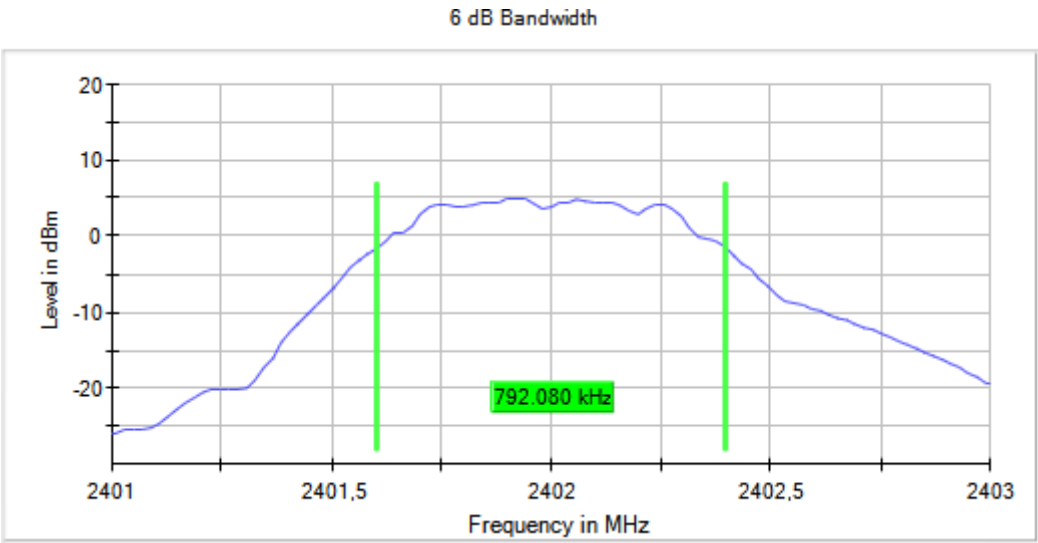
Pass

Attachments

Setting	Instrument Value
Span	2.000 MHz
RBW	100.000 kHz
VBW	300.000 kHz
SweepPoints	101
SweepTime	41.830 µs
Reference Level	0.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamp	off
Stablemode	Trace
Stablevalue	0.50 dB
Run	20 / max. 150
Stable	5 / 5
Max Stable Difference	0.31 dB

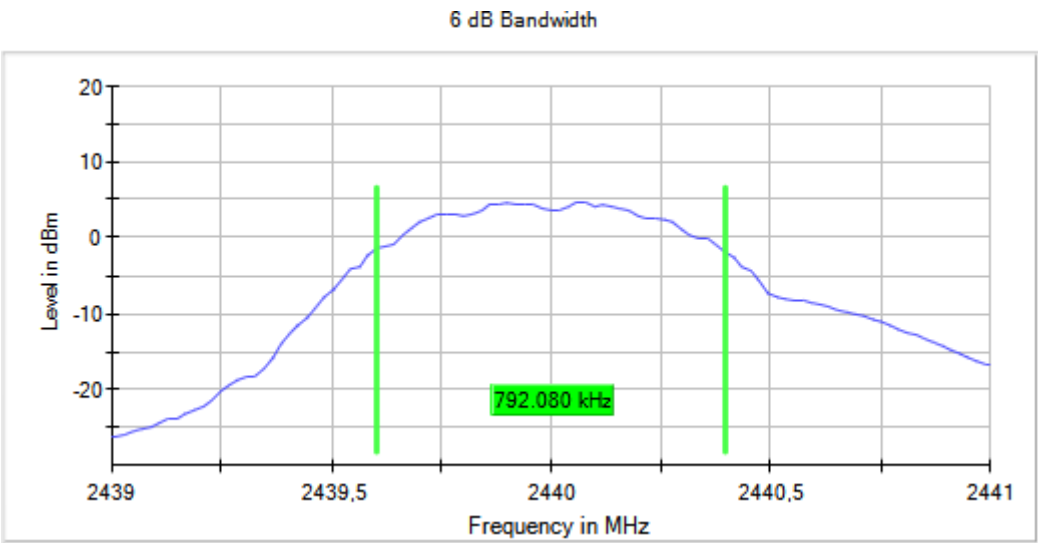
Frequency MHz = 2402.00000, Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Images:



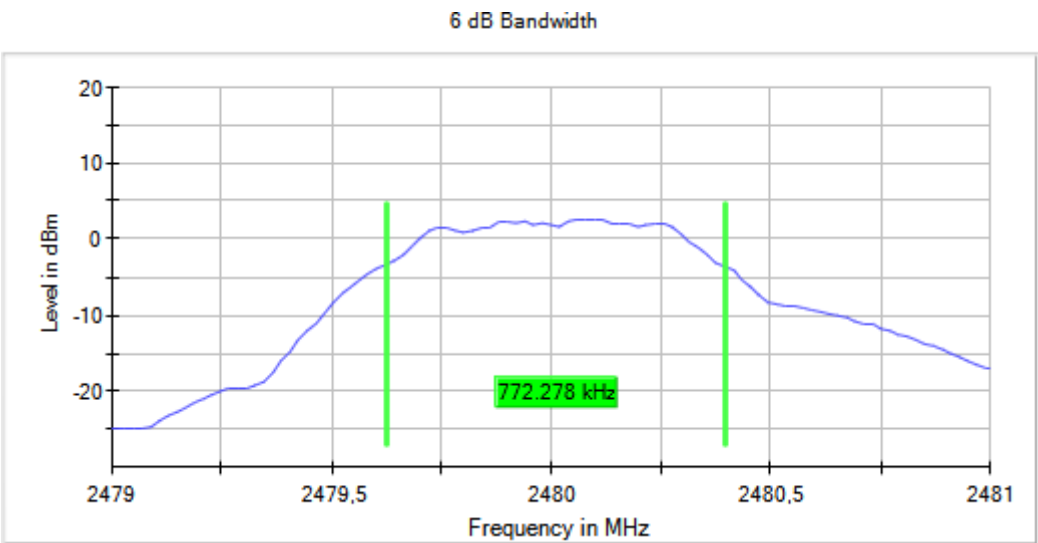
Frequency MHz = 2440.00000, Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Images:



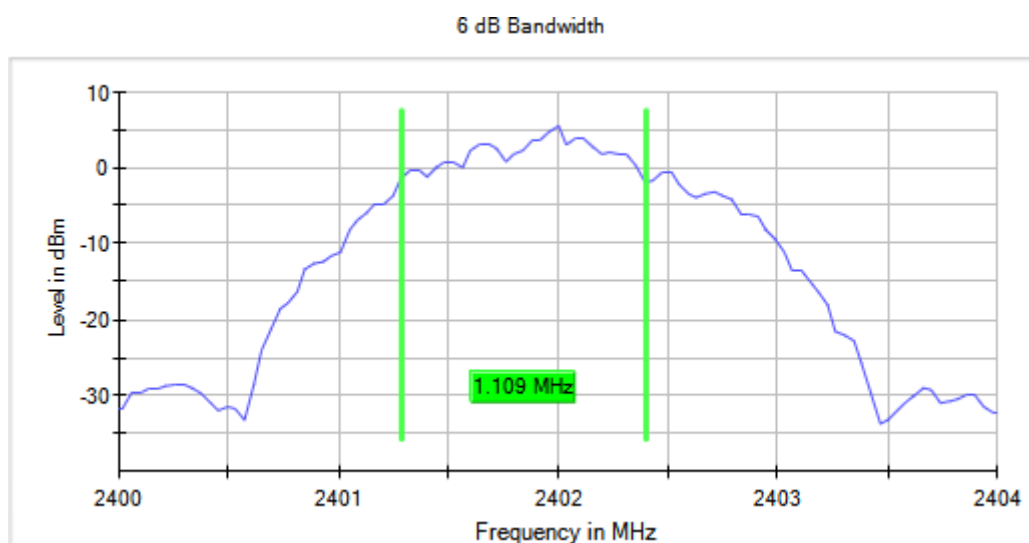
Frequency MHz = 2480.00000, Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Images:



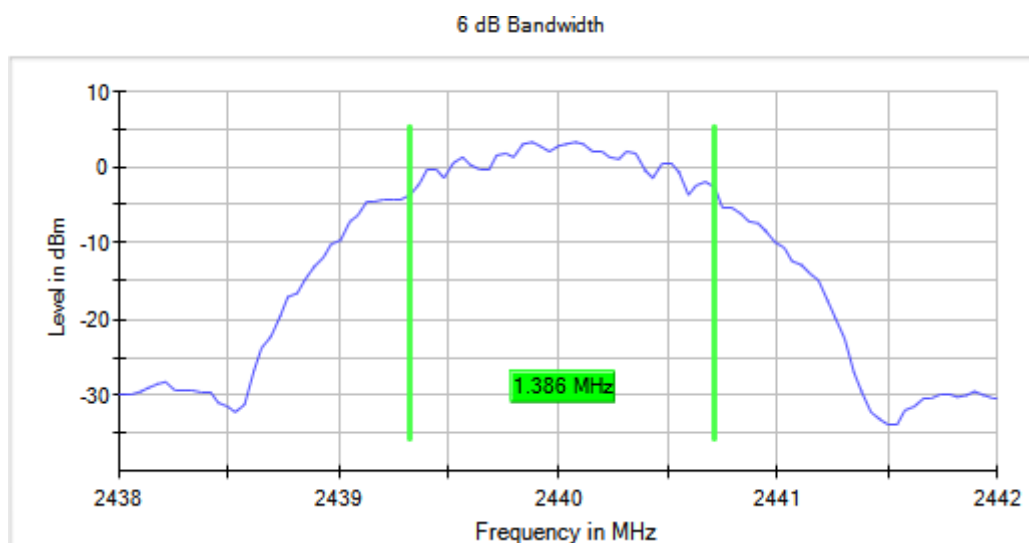
Frequency MHz = 2402.00000, Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Images:



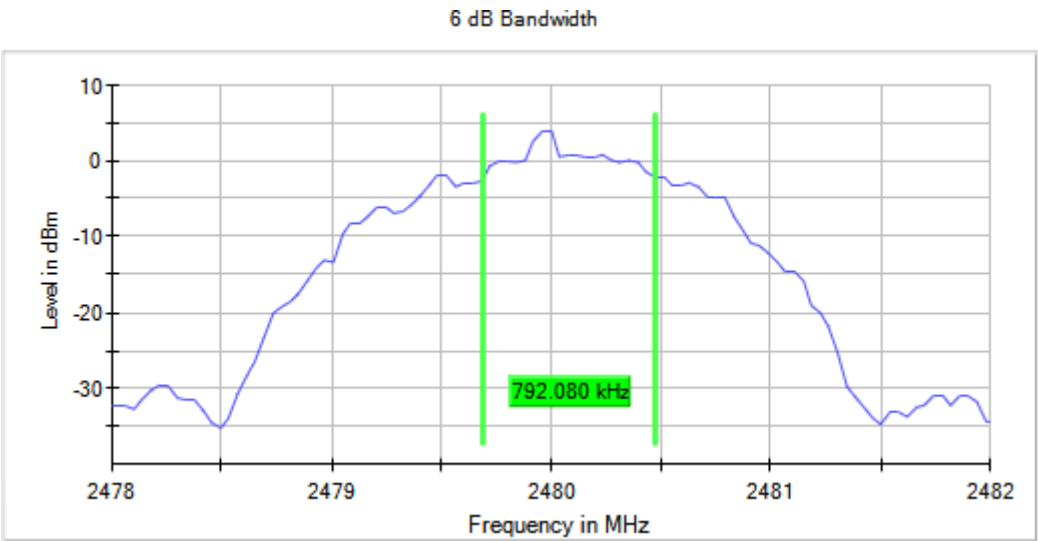
Frequency MHz = 2440.00000, Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Images:



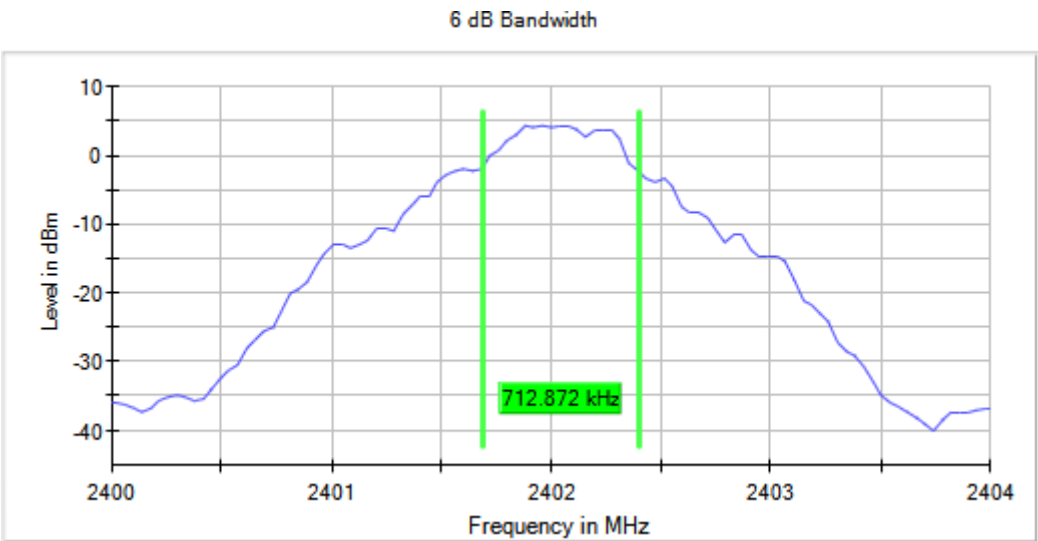
Frequency MHz = 2480.00000, Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Images:



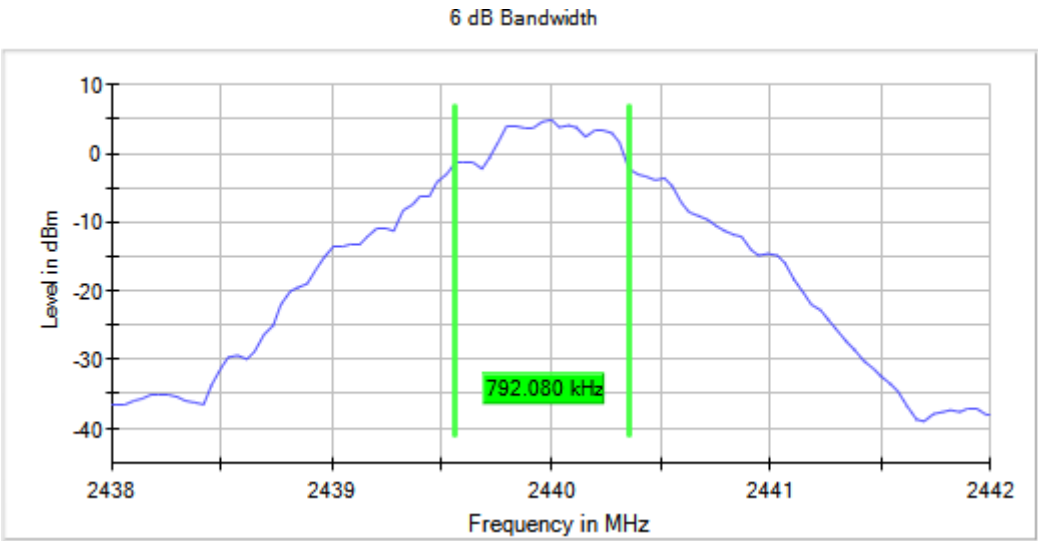
Frequency MHz = 2402.00000, Modulation = Proximity

Images:



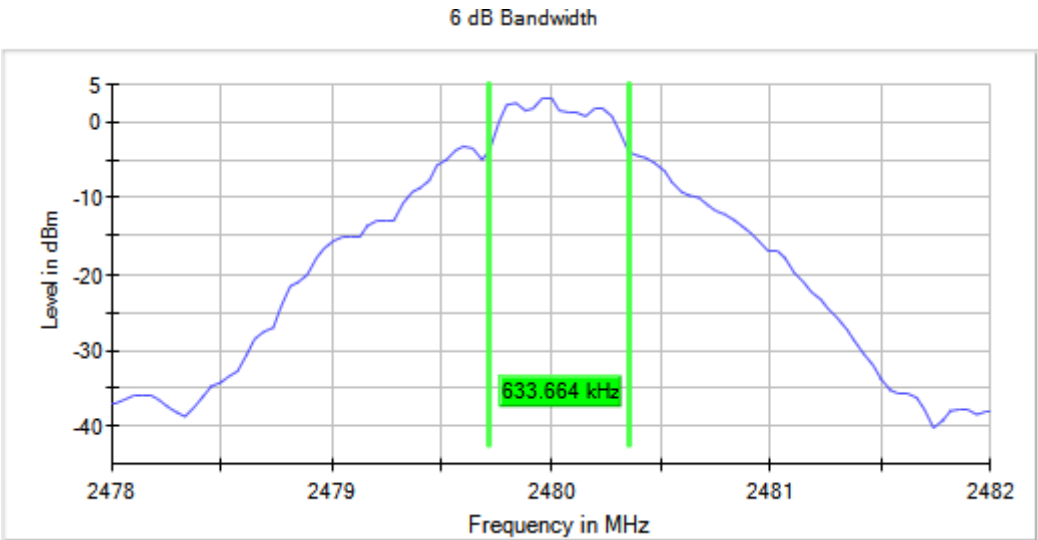
Frequency MHz = 2440.00000, Modulation = Proximity

Images:



Frequency MHz = 2480.00000, Modulation = Proximity

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: Proximity

Results

Freq (MHz)	PSD (dBm)
2402.00000	-2.88
2440.00000	-3.05
2480.00000	-4.78

Verdict

Pass

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Results

Freq (MHz)	PSD (dBm)
2402.00000	-2.51
2440.00000	-2.42
2480.00000	-3.78

Verdict

Pass

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Results

Freq (MHz)	PSD (dBm)
2402.00000	-3.37
2440.00000	-4.61
2480.00000	-5.88

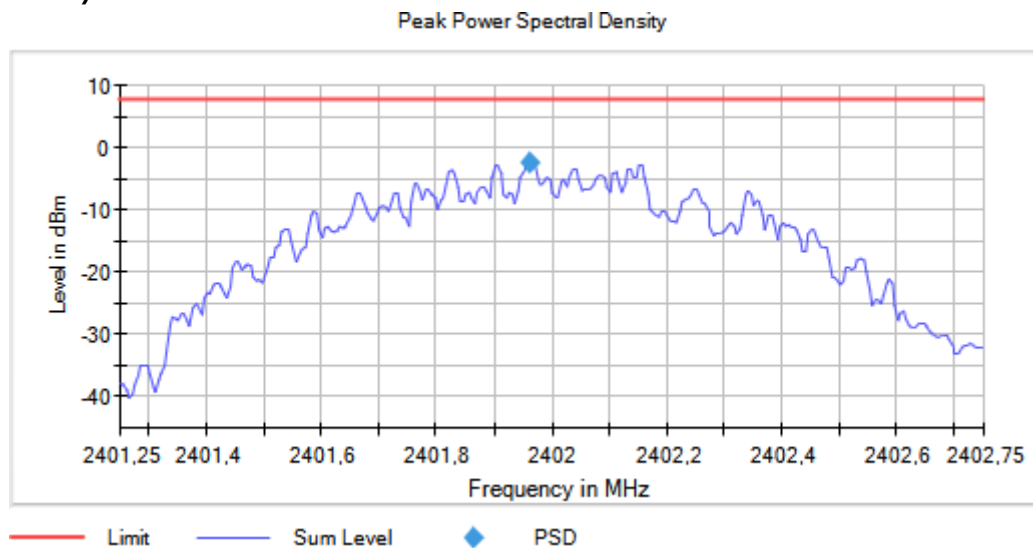
Verdict

Pass

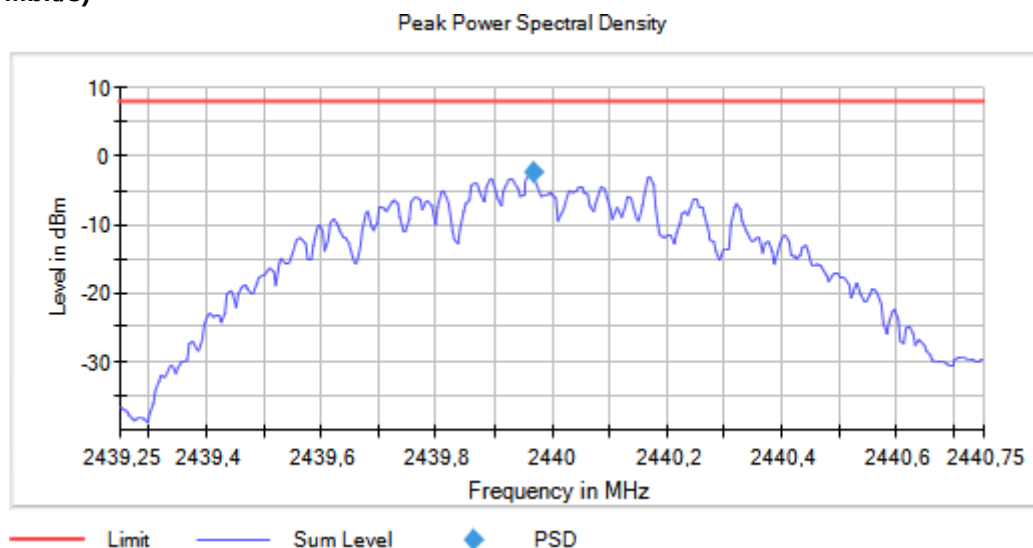
Attachments

Setting	Instrument Value
Span	1.500 MHz
RBW	10.000 kHz
VBW	30.000 kHz
SweepPoints	300
Sweptime	1.500 ms
Reference Level	0.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
Sweeptype	Sweep
Preamplifier	off
Stablemode	Trace
Stablevalue	0.50 dB

Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

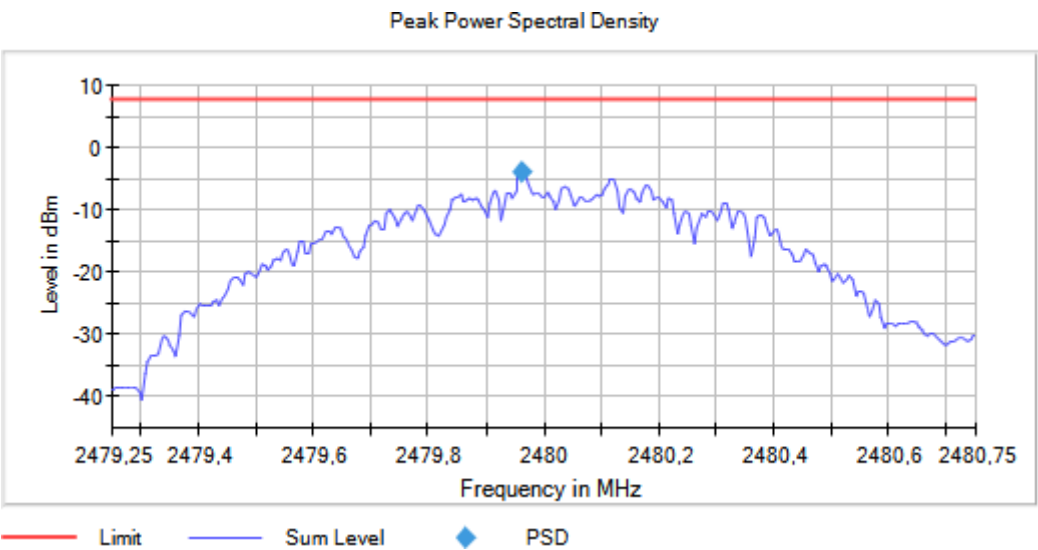


Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s)



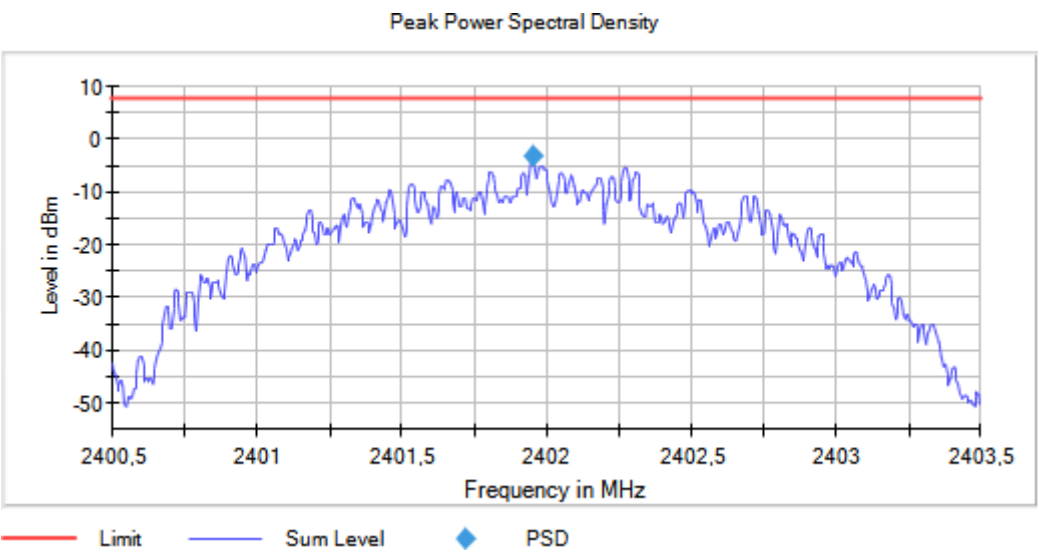
Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Images:



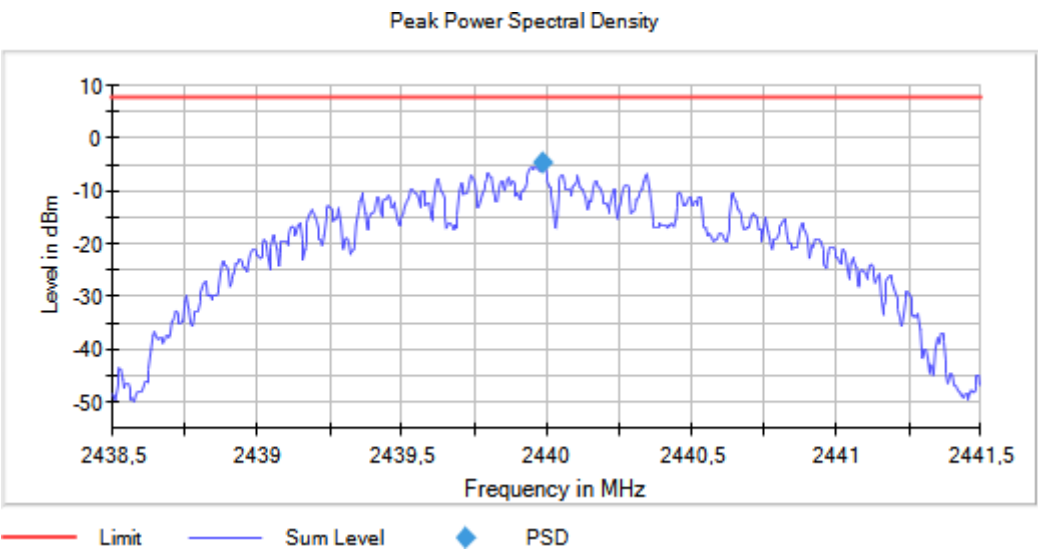
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Images:



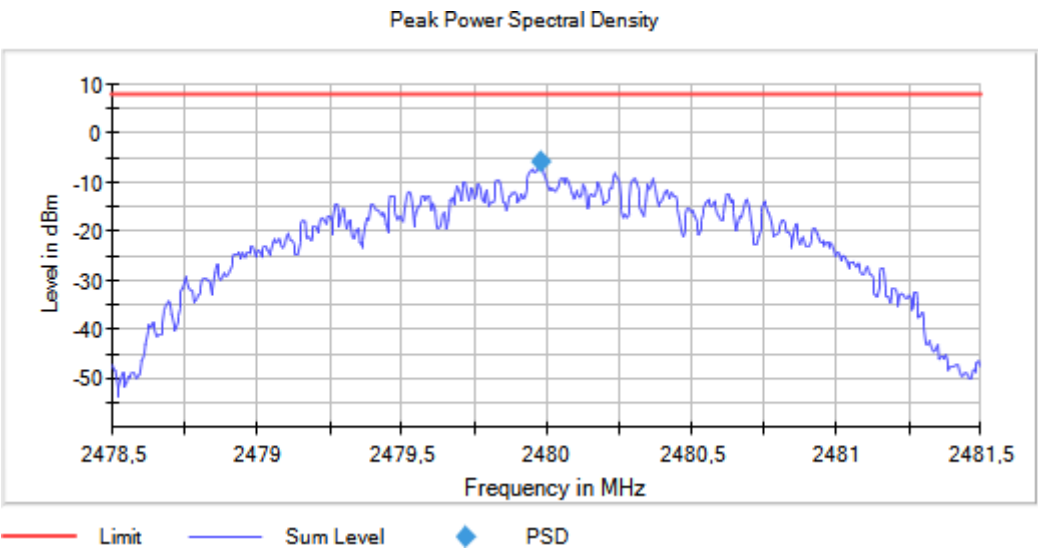
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Images:



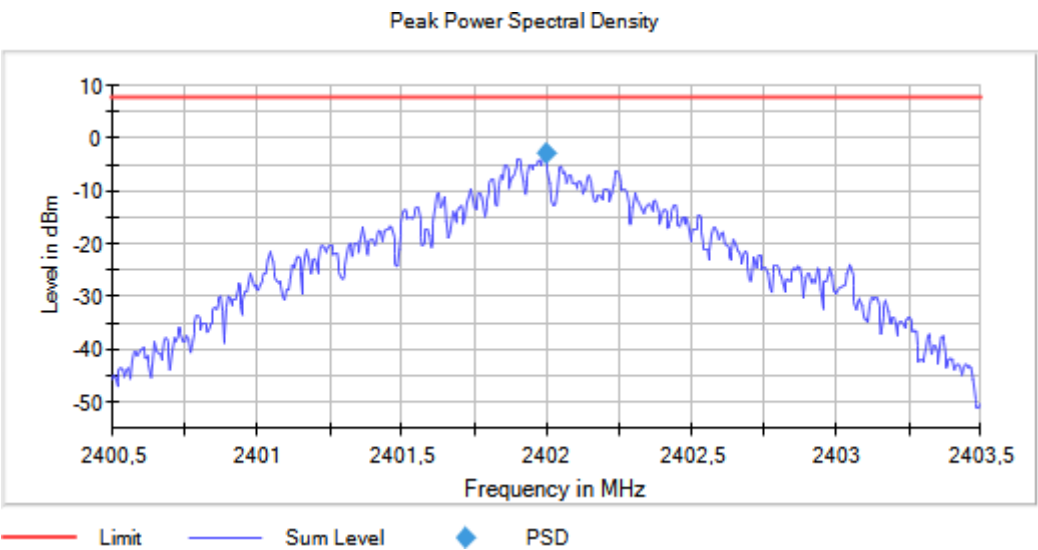
Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Images:



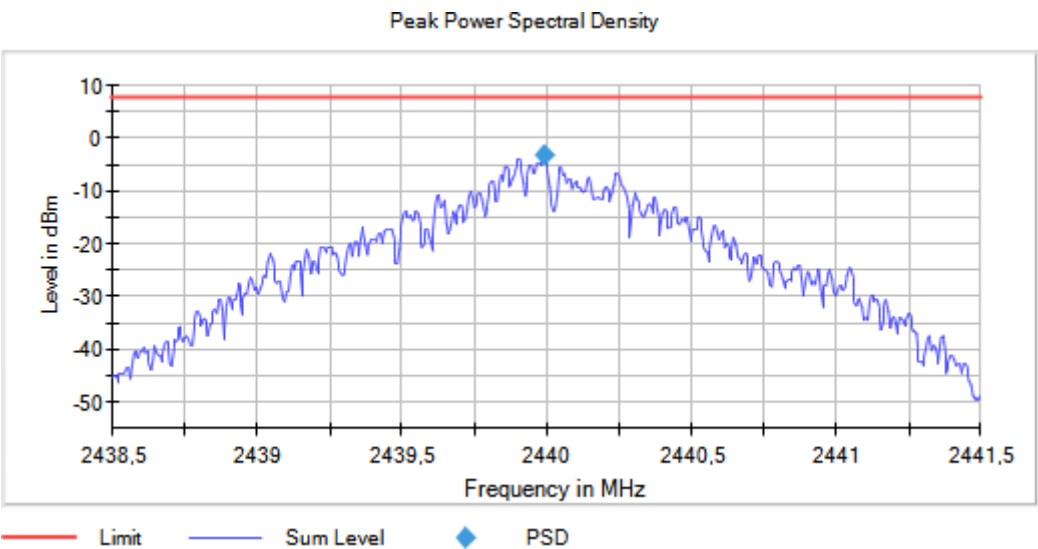
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = Proximity

Images:



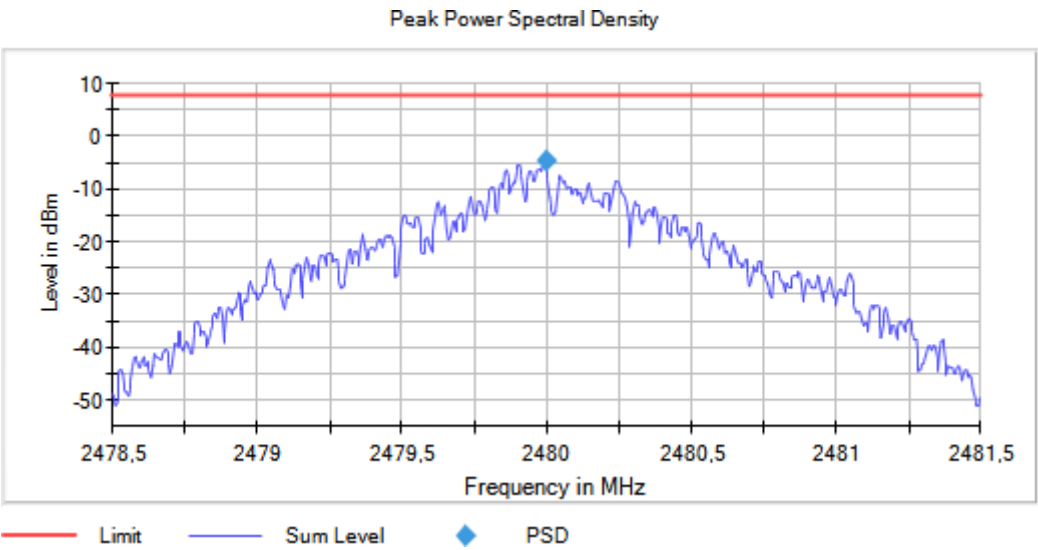
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = Proximity

Images:



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

Images:



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

Limits

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

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

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

Maximum Declared Antenna Gain: -14.43 dBi

Modulation: Proximity

Results

Freq (MHz)	Peak Power (dBm)	Maximum EIRP Power (dBm)
2402.00000	6.3	-8,2
2440.00000	6.3	-8,2
2480.00000	4.4	-10,1

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Results

Freq (MHz)	Peak Power (dBm)	Maximum EIRP Power (dBm)
2402.00000	6.4	-8,1
2440.00000	6.1	-8,4
2480.00000	4.4	-10,1

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Results

Freq (MHz)	Peak Power (dBm)	Maximum EIRP Power (dBm)
2402.00000	6.6	-7,9
2440.00000	6.4	-8,1
2480.00000	4.5	-10

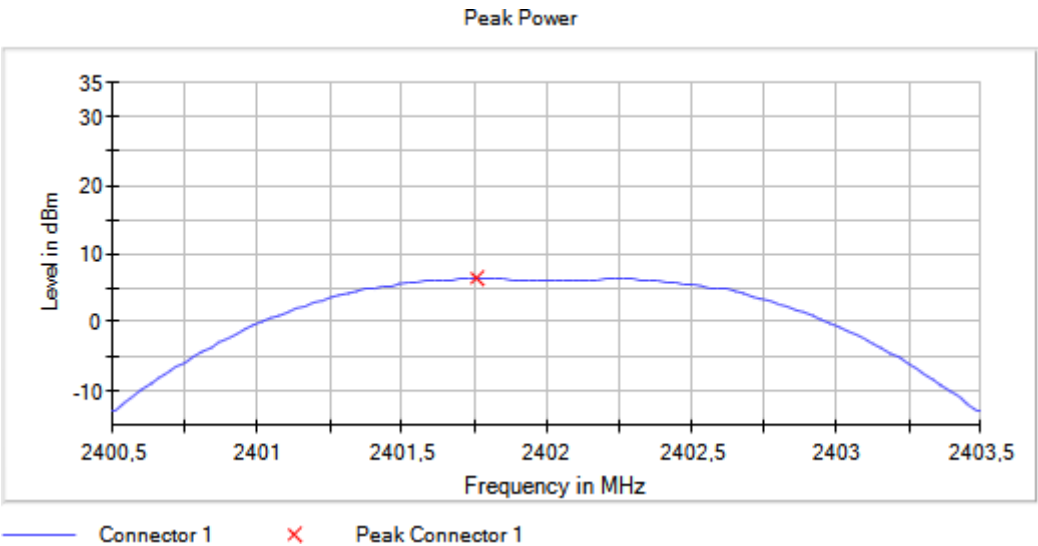
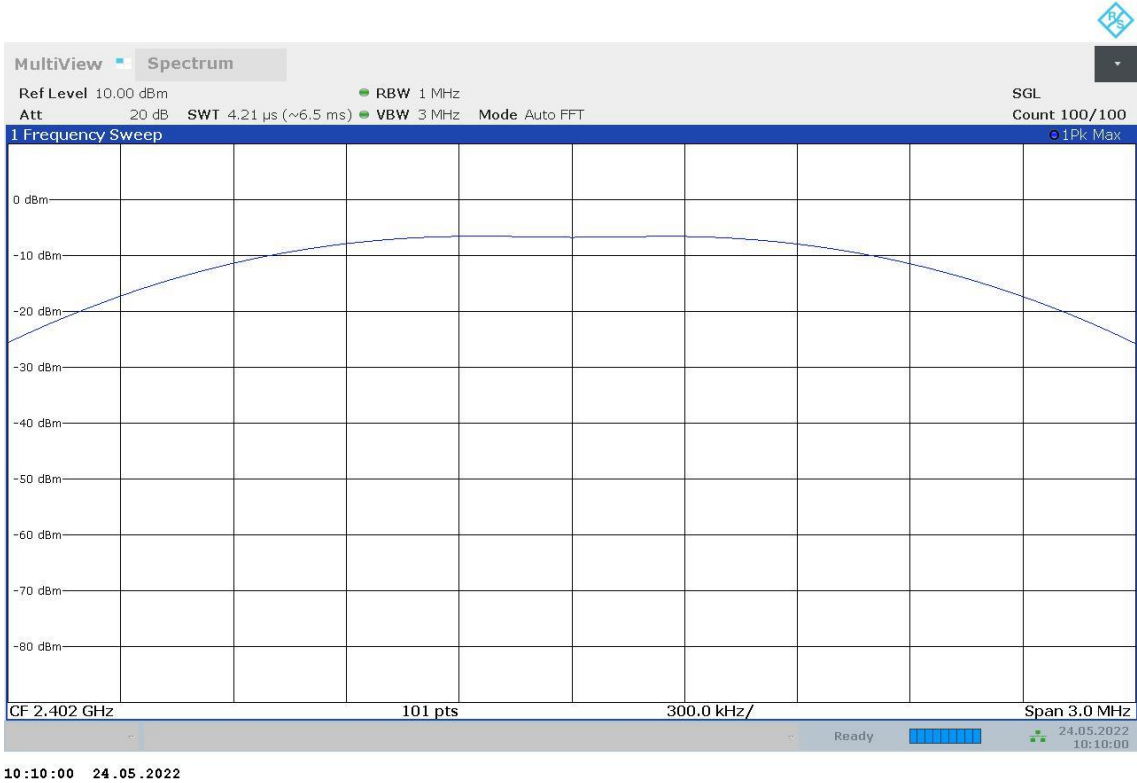
Verdict

Pass

Attachments

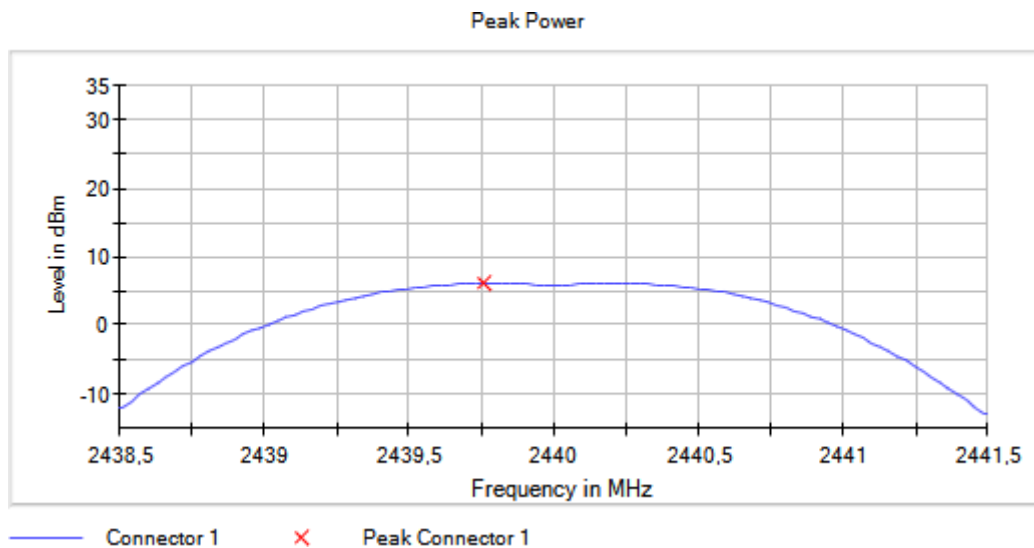
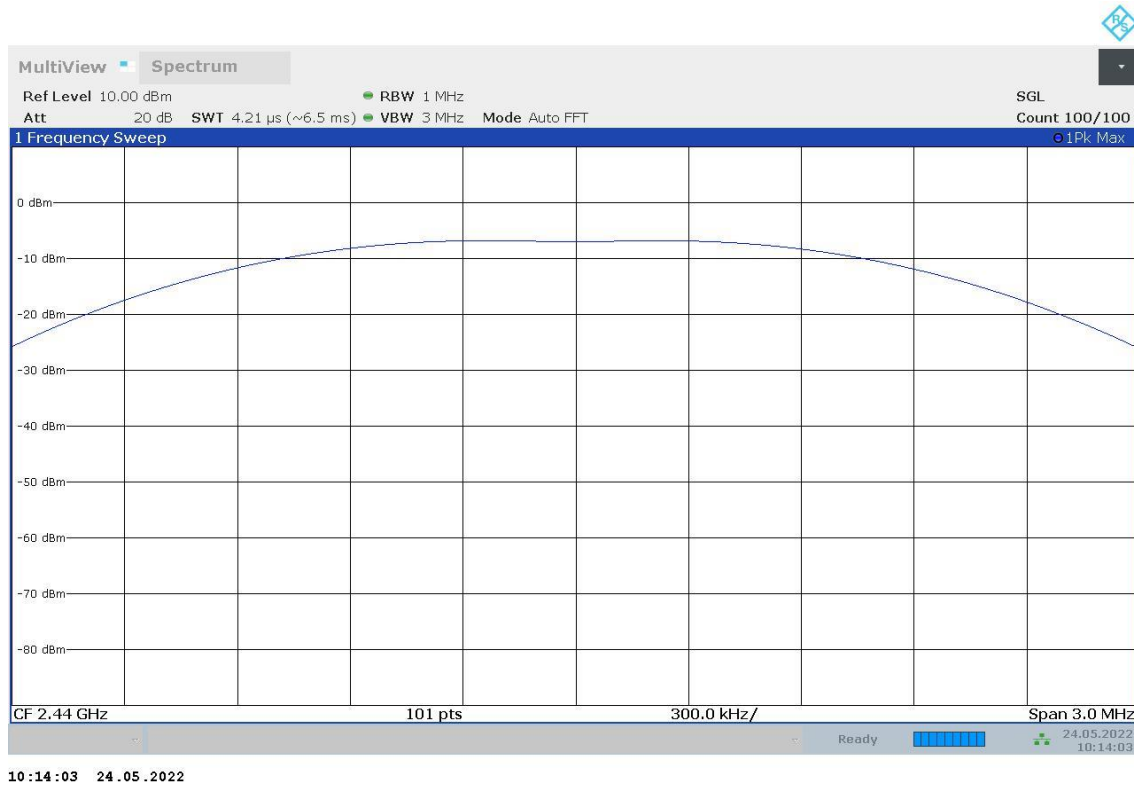
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Images:



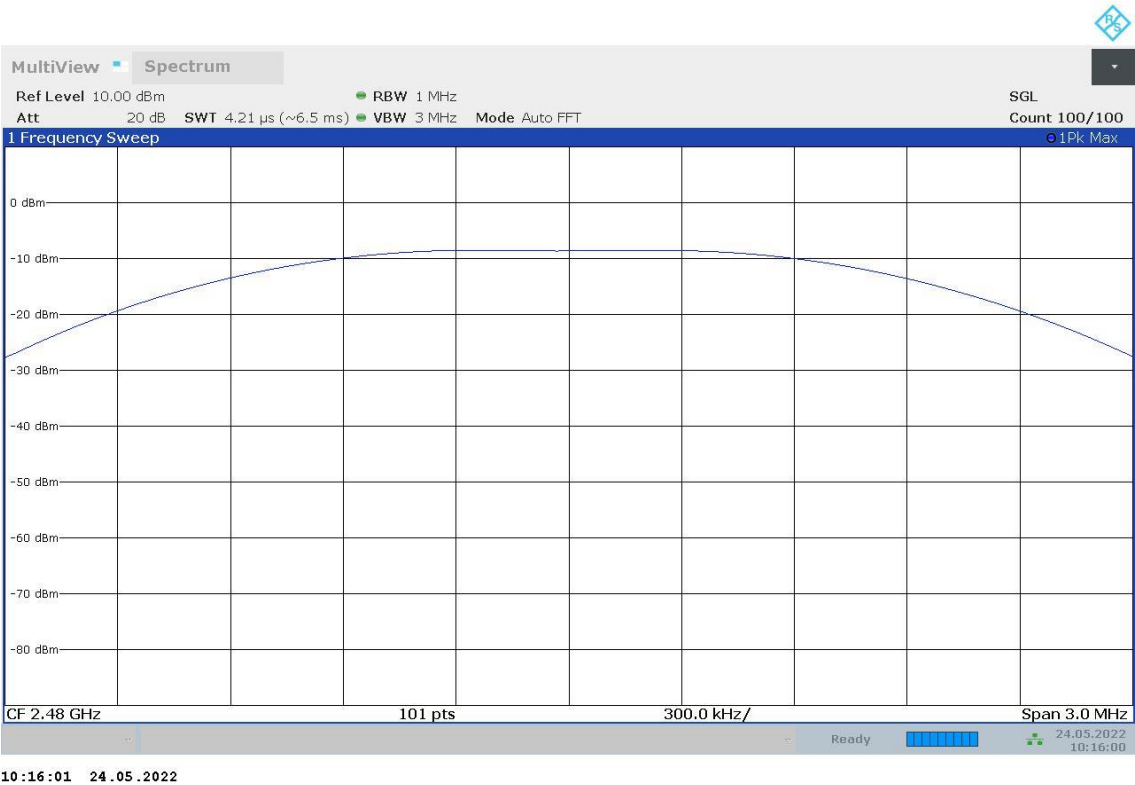
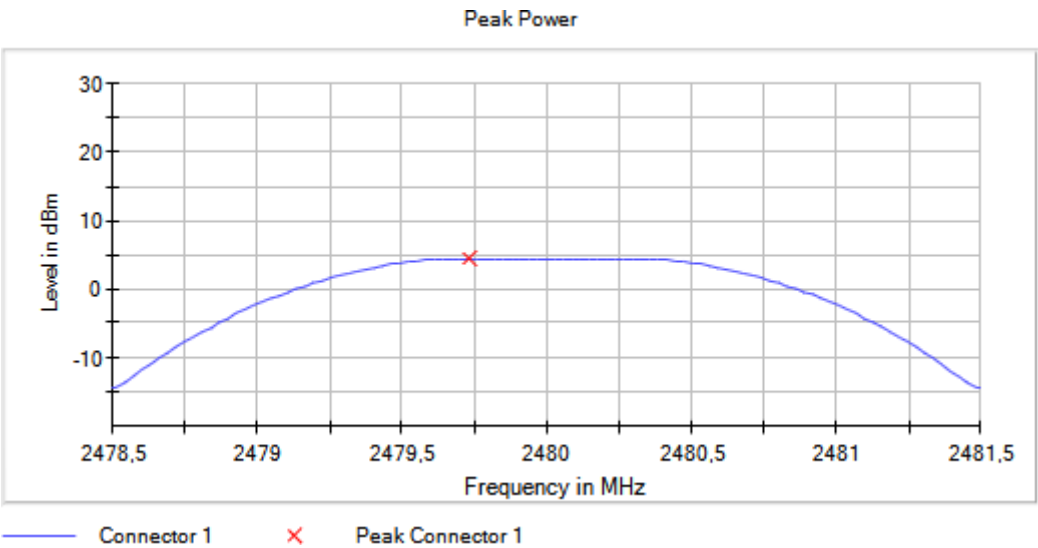
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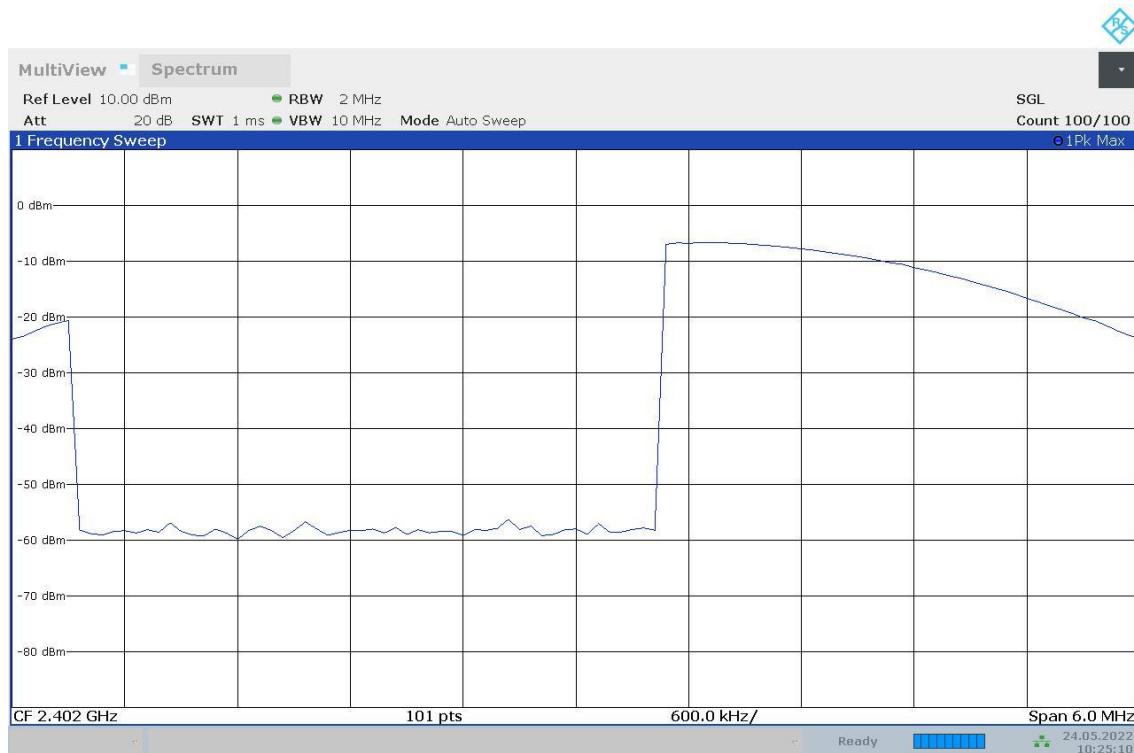
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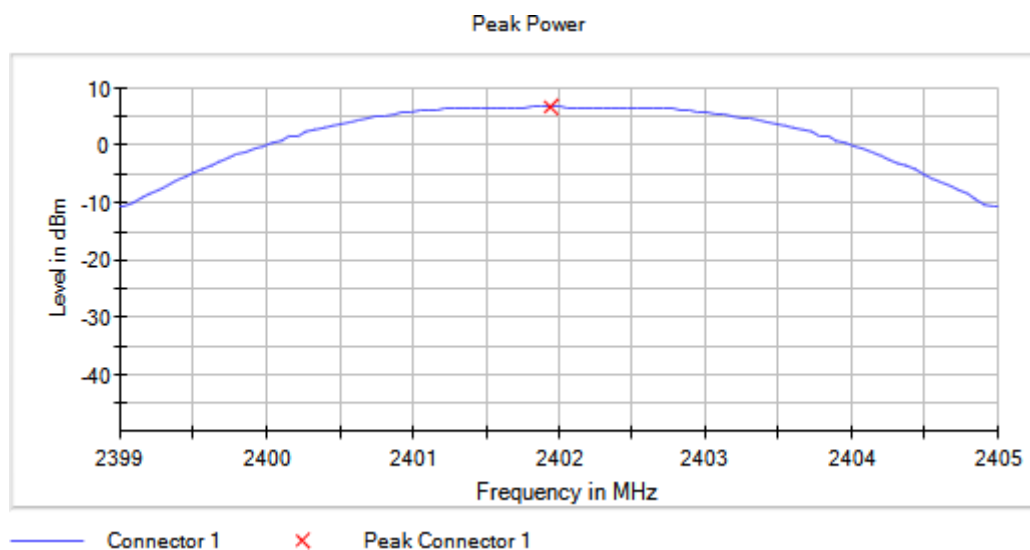
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Images:



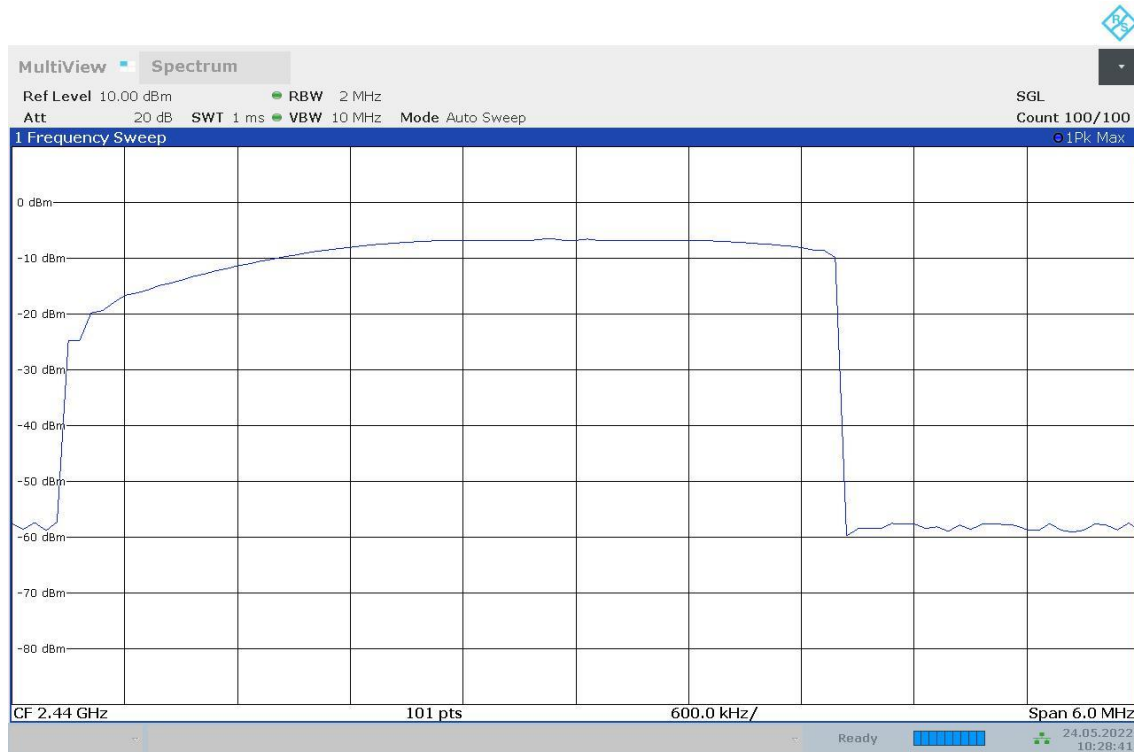


10:25:11 24.05.2022

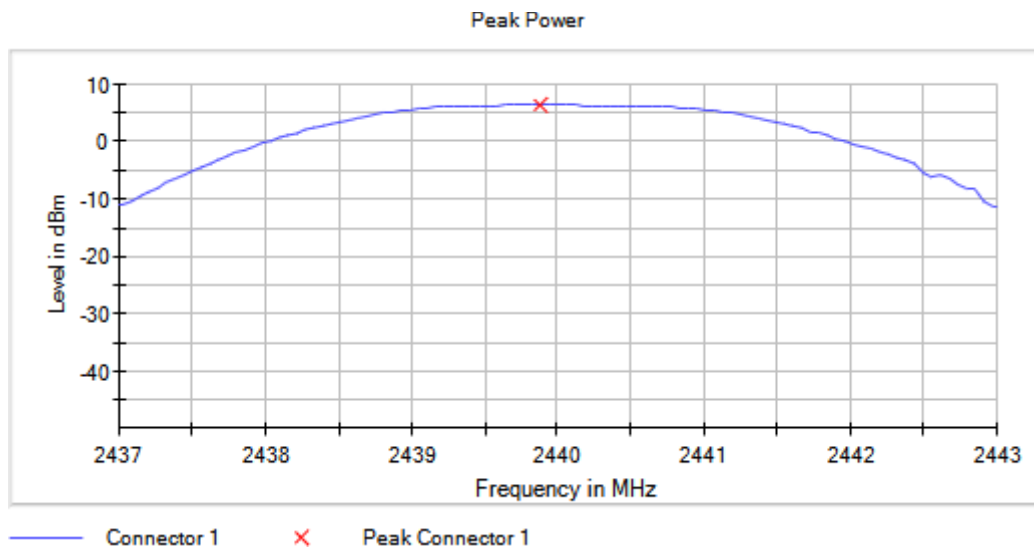


Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Images:

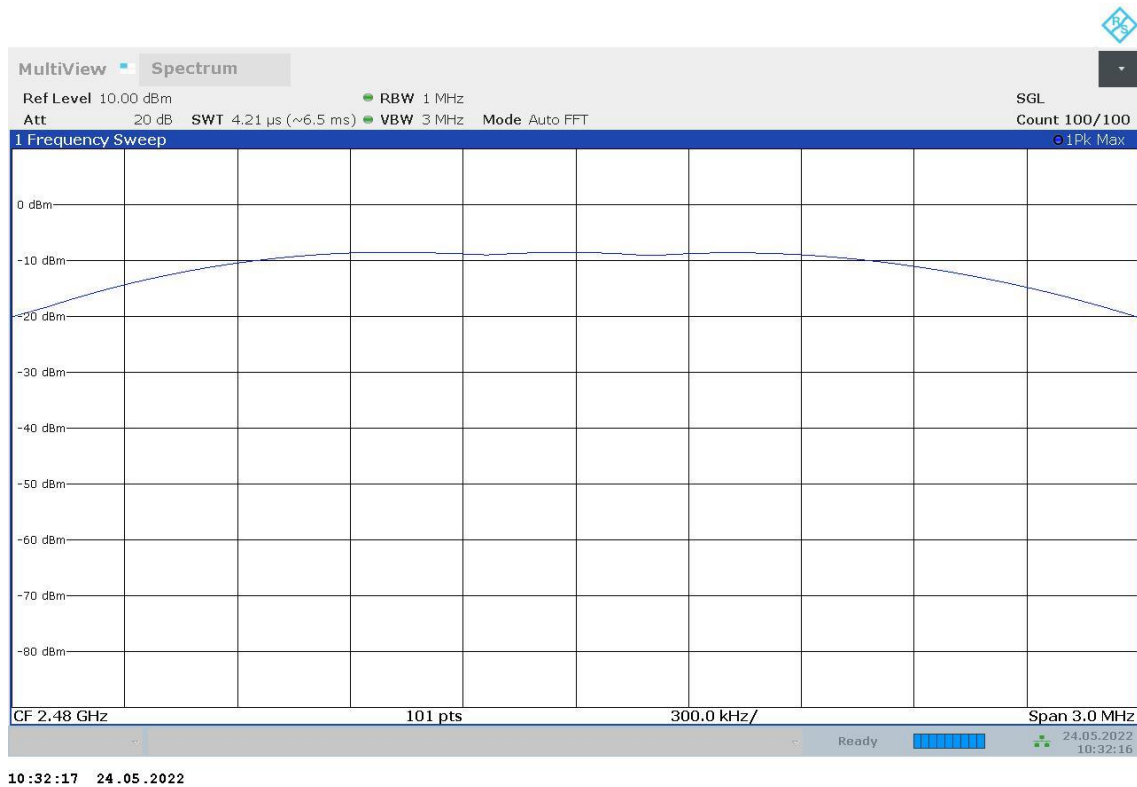
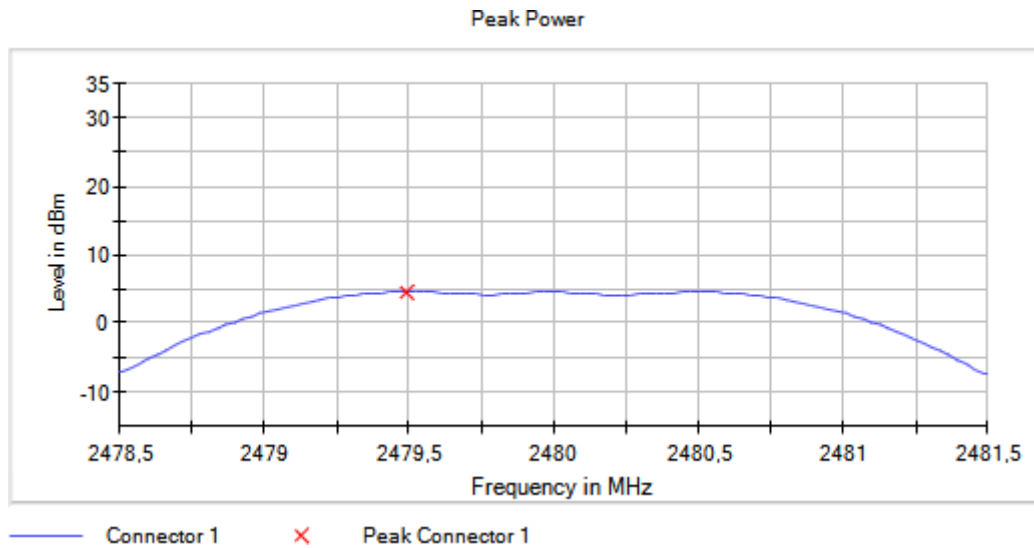


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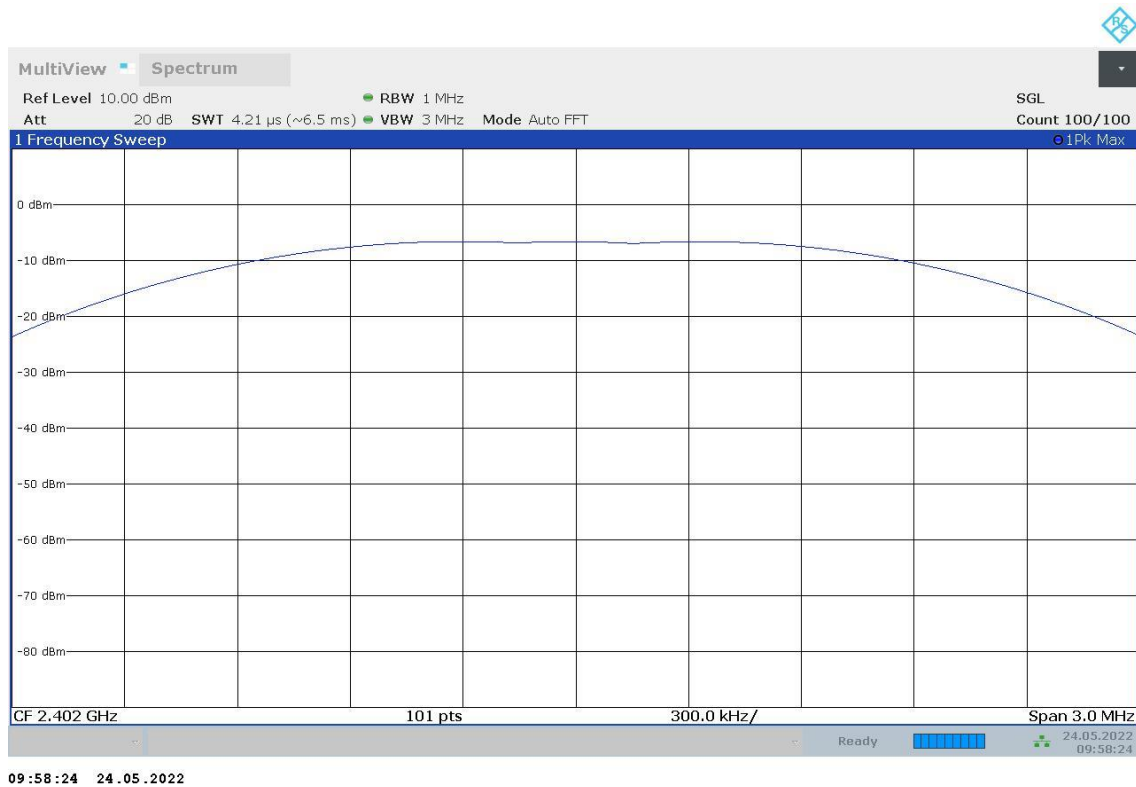
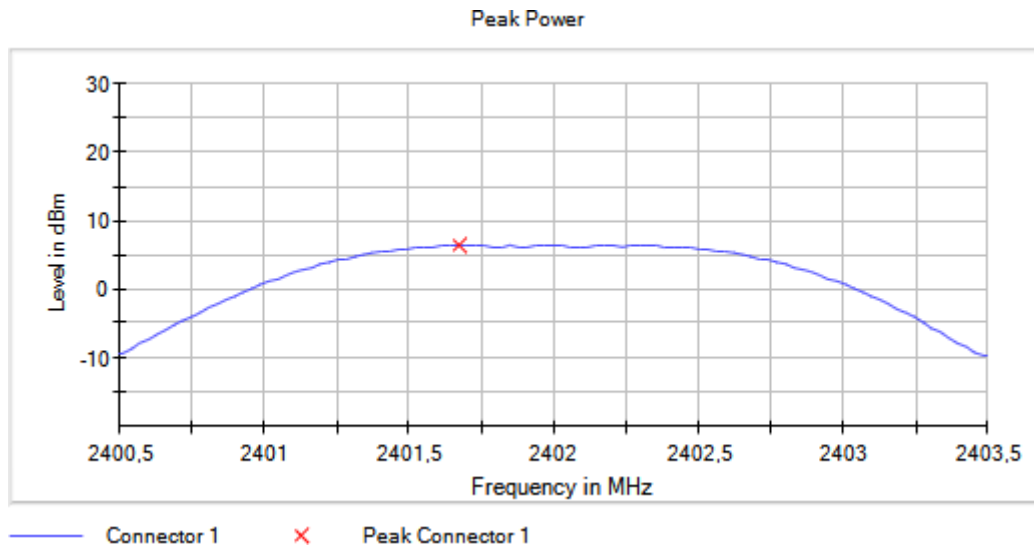
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Images:



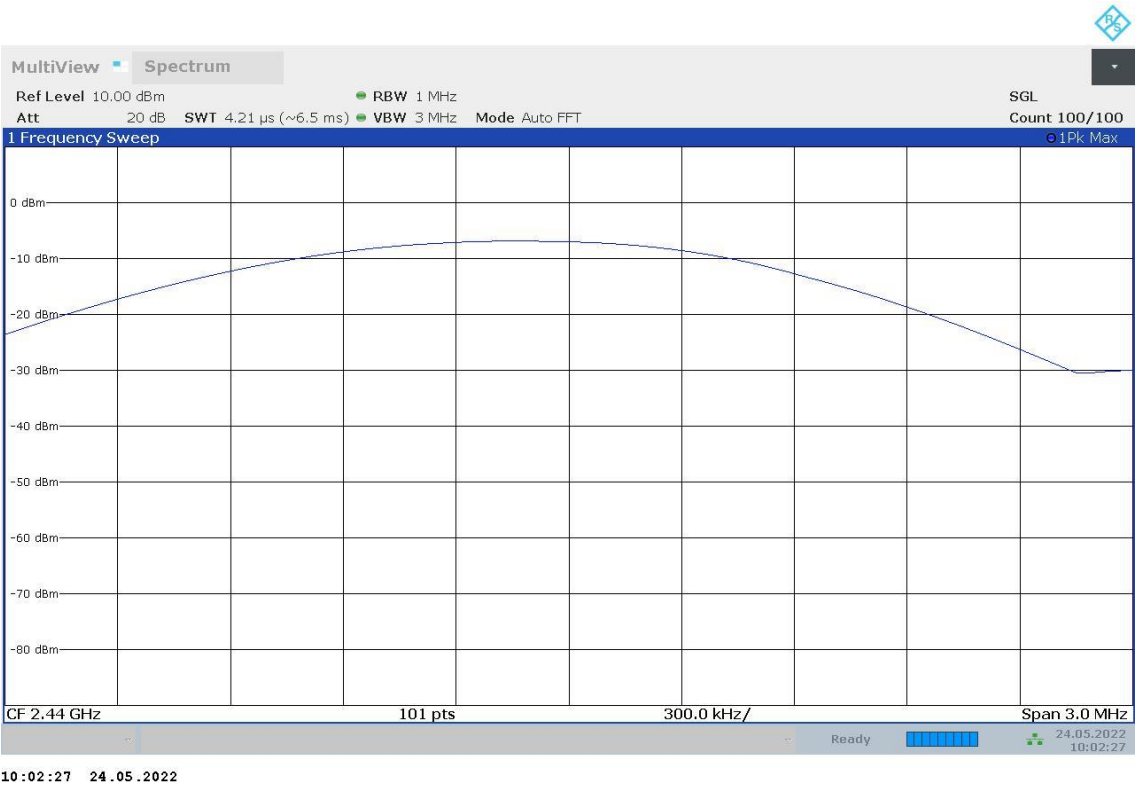
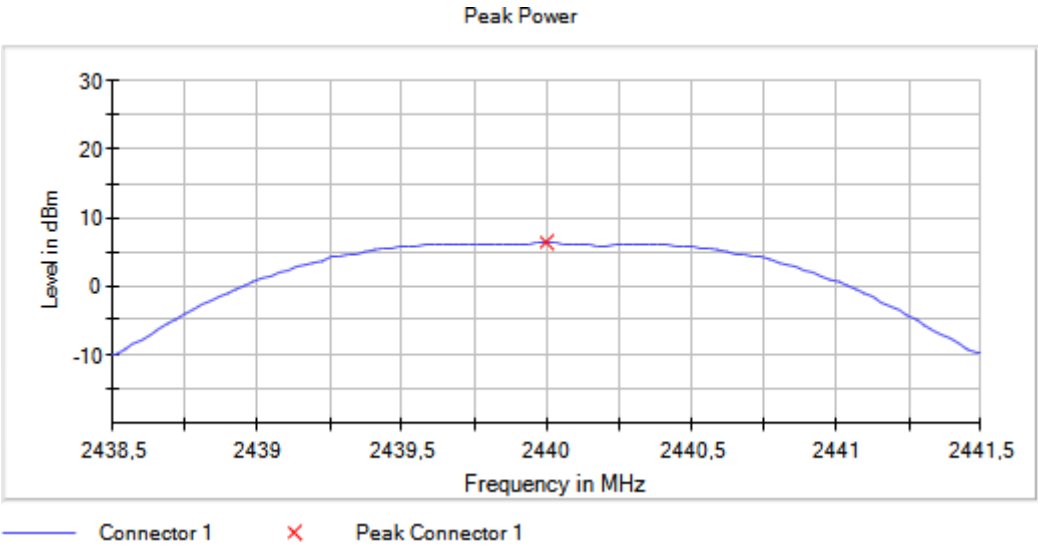
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = Proximity

Images:



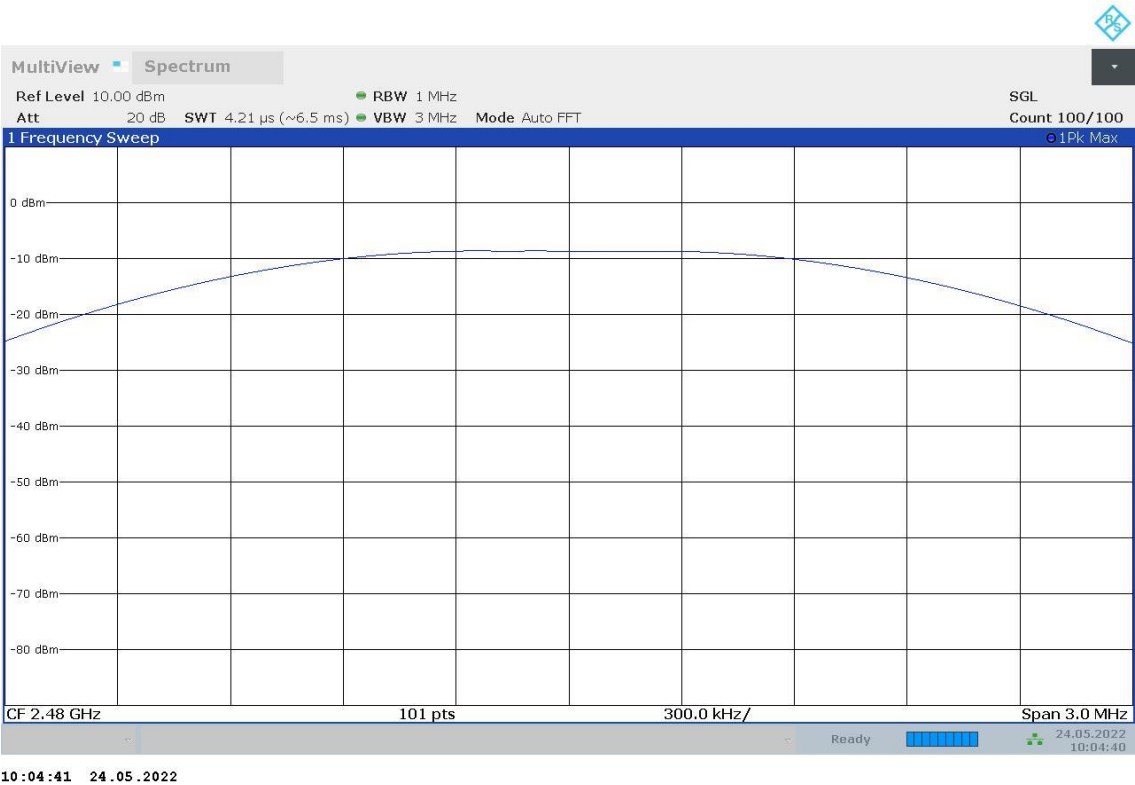
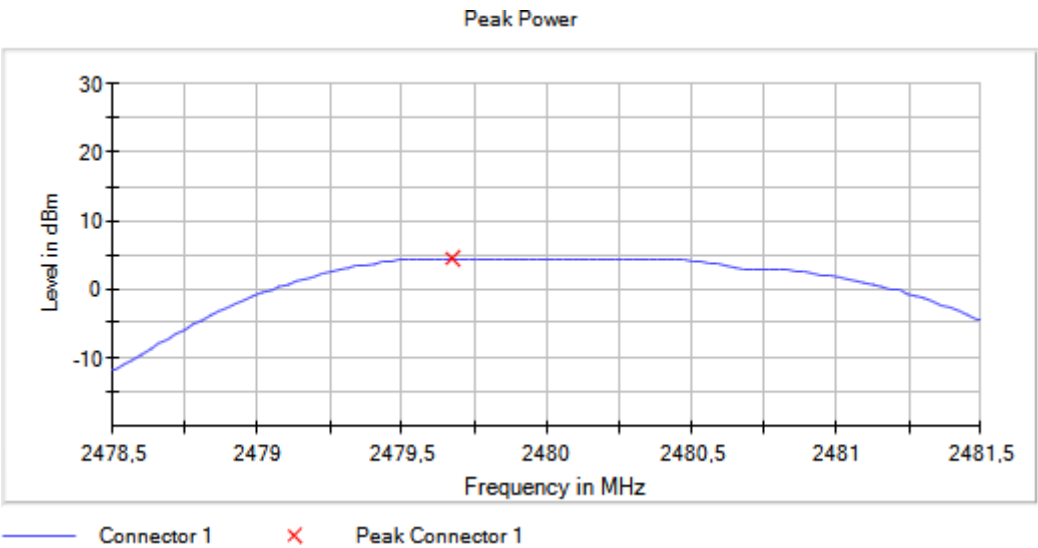
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = Proximity

Images:



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

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.

Modulation: Proximity

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.

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

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.

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

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

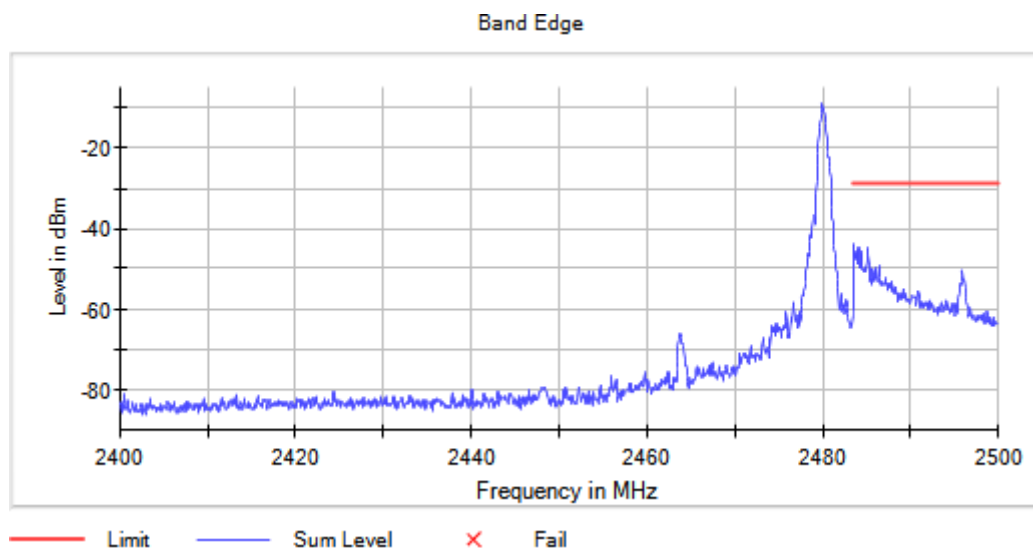
Pass

Attachments

Setting	Instrument Value
Span	90.000 MHz
RBW	100.000 kHz
VBW	300.000 kHz
SweepPoints	1800
SweepTime	1.800 ms
Reference Level	10.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
SweepType	Sweep
Preamp	off
Stablemode	Trace

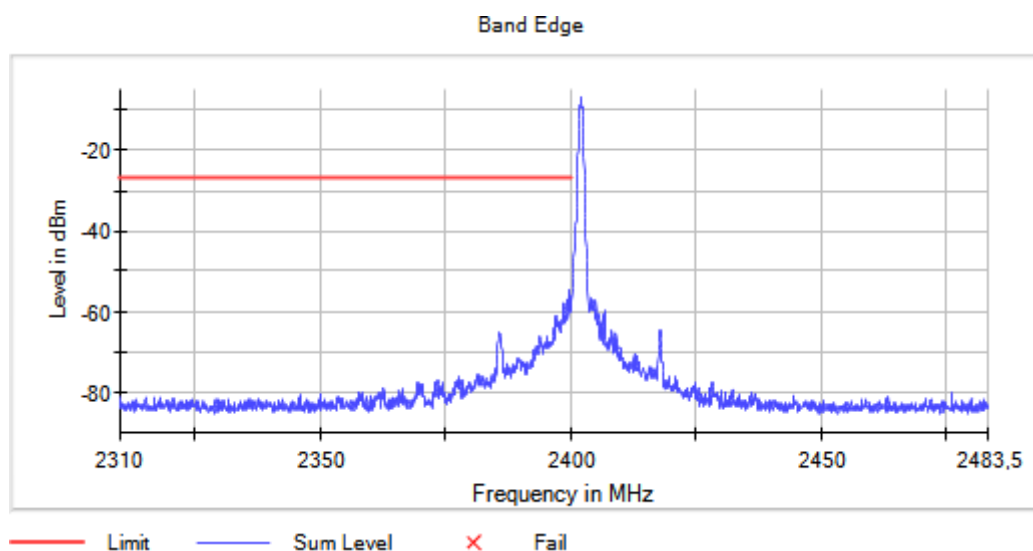
**Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s),
 Measurement Point = 1**

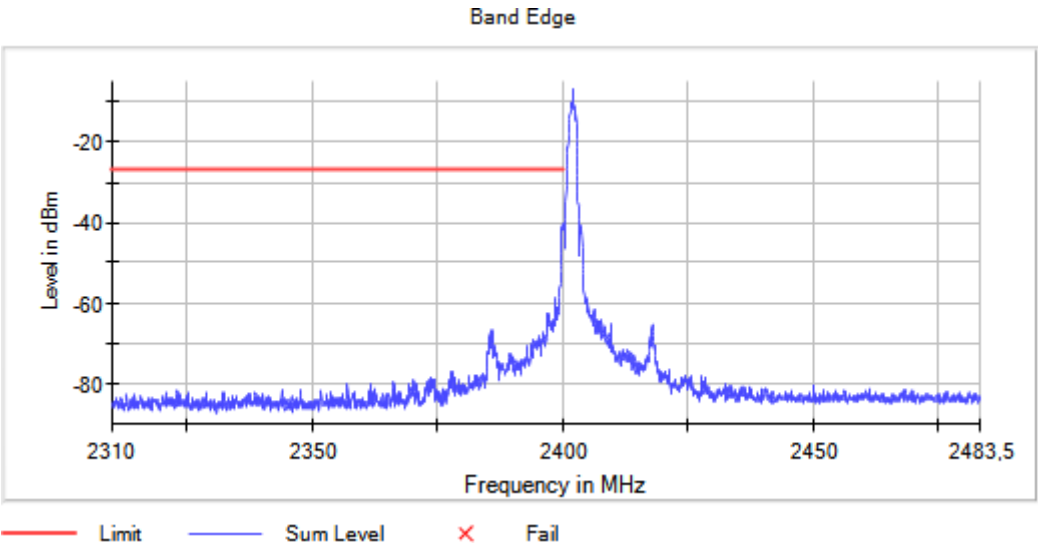
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**Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s),
 Measurement Point = 1**

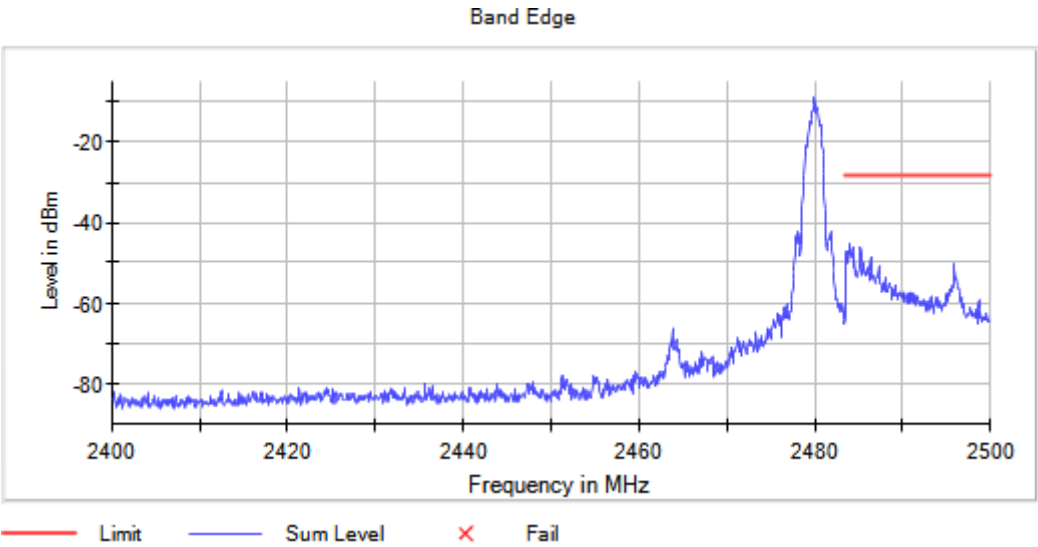
Images:





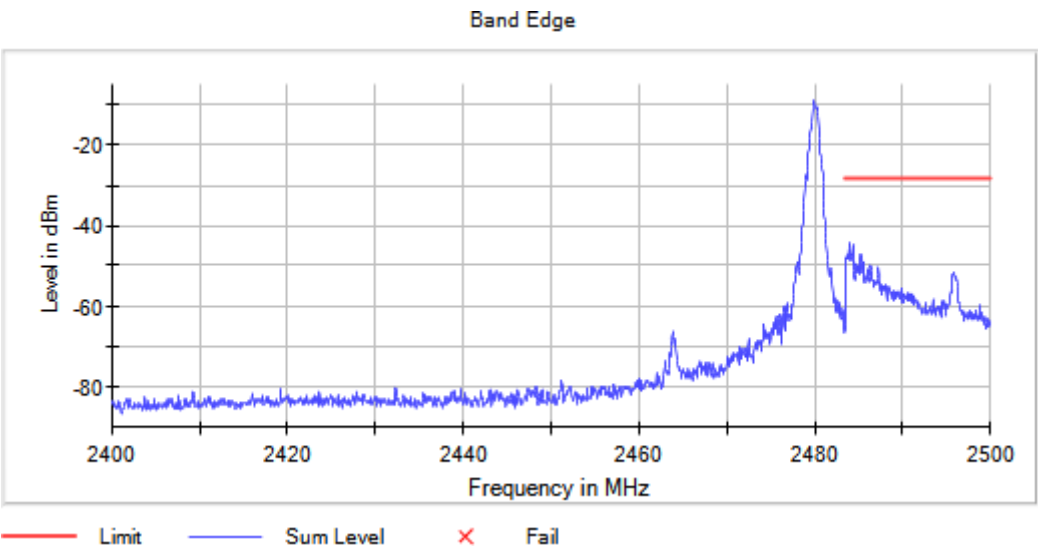
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Measurement Point = 1

Images:



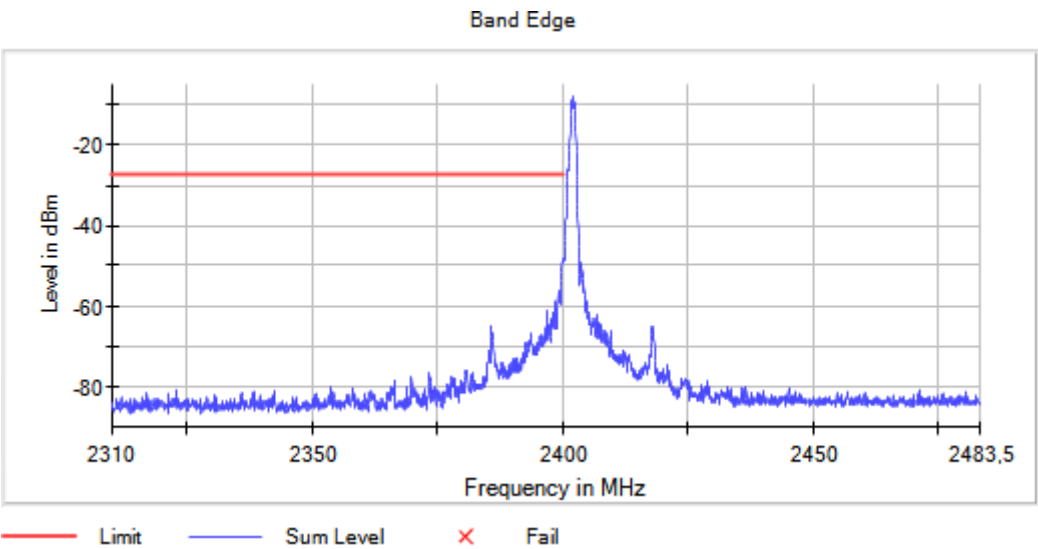
Equipment Type = Digital Transmission System (DTS), Modulation = Proximity, Measurement Point = 1

Images:



Equipment Type = Digital Transmission System (DTS), Modulation = Proximity, Measurement Point = 1

Images:



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 ($\mu\text{V/m}$)	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.

Modulation: Proximity

Results

Freq (MHz)	Equipment	Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl ($\text{dB}\mu\text{V/m}$)	Pol	Detector
2402.00000	Digital Transmission System (DTS)	[3, 17]	4804.030	49.93	V	PK
			4804.030	39.59	V	AVG
2440.00000			4879.990	52.81	V	PK
			4879.990	42.55	V	AVG
2480.00000			4960.000	58.01	V	PK
			4960.000	35.68	V	AVG

Verdict

Pass

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Results

Freq (MHz)	Equipment	Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
2402.00000	Digital Transmission System (DTS)	[3, 17]	4804.000	51.54	V	PK
			4804.000	41.37	V	AVG
2440.00000			4880.000	52.24	V	PK
			4880.000	42.44	V	AVG
2480.00000			4960.000	57.26	V	PK
			4960.000	39.78	V	AVG

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Results

Freq (MHz)	Equipment	Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBμV/m)	Pol	Detector
2402.00000	Digital Transmission System (DTS)	[3, 17]	4803.840	50.76	V	PK
			4803.840	38.86	V	AVG
2440.00000			4879.960	53.27	V	PK
			4879.960	41.82	V	AVG
2480.00000			4960.500	57.40	V	PK
			4960.500	45.55	V	AVG

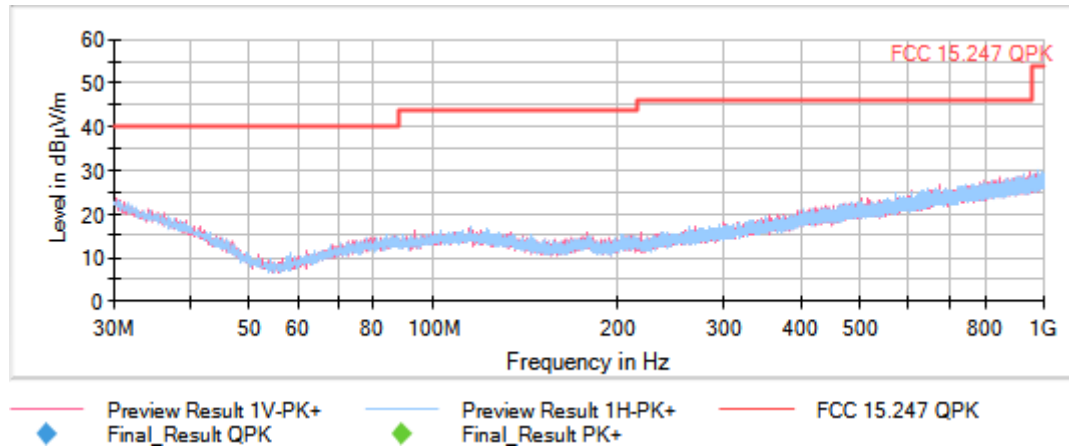
Verdict

Pass

Attachments

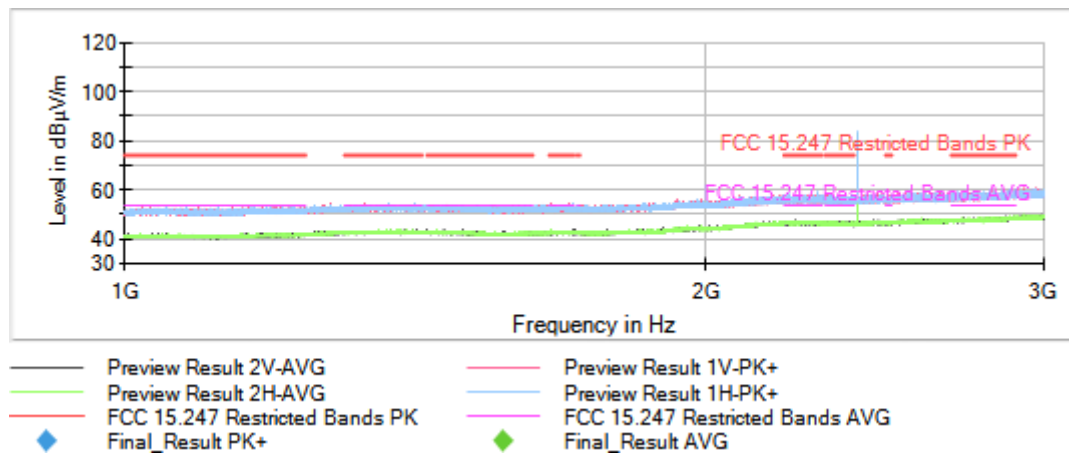
Frequency MHz = The spurious frequencies detected do not depend neither on the operating channel,
Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency
Range GHz = [0.03, 1], Measurement Point = 1

Images:

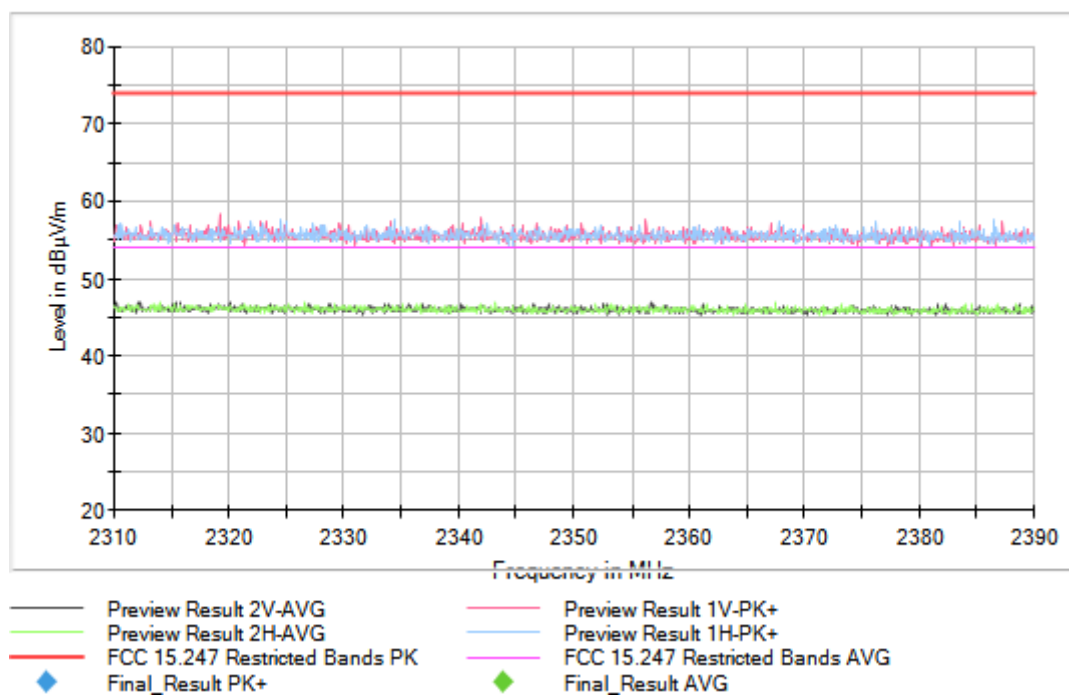


Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [1, 3], Measurement Point = 1

Images:



Full Spectrum

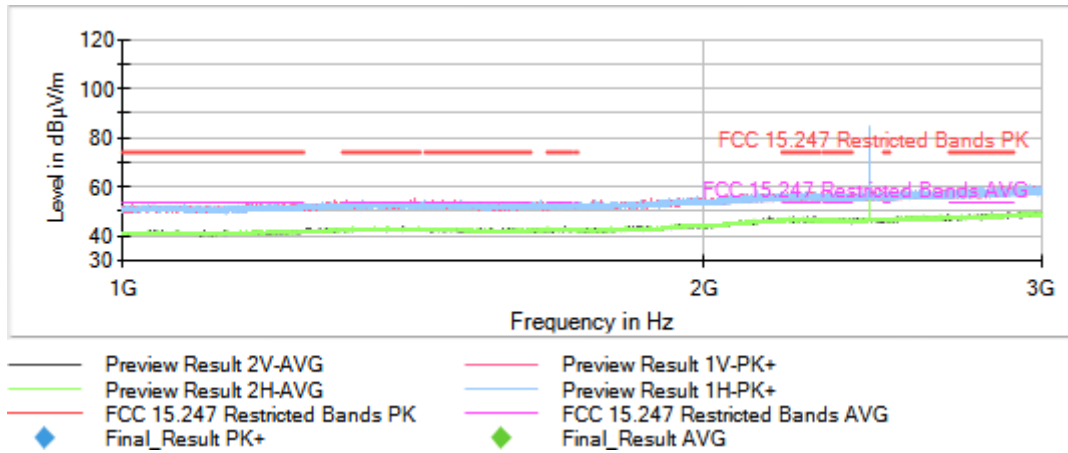


Full Spectrum

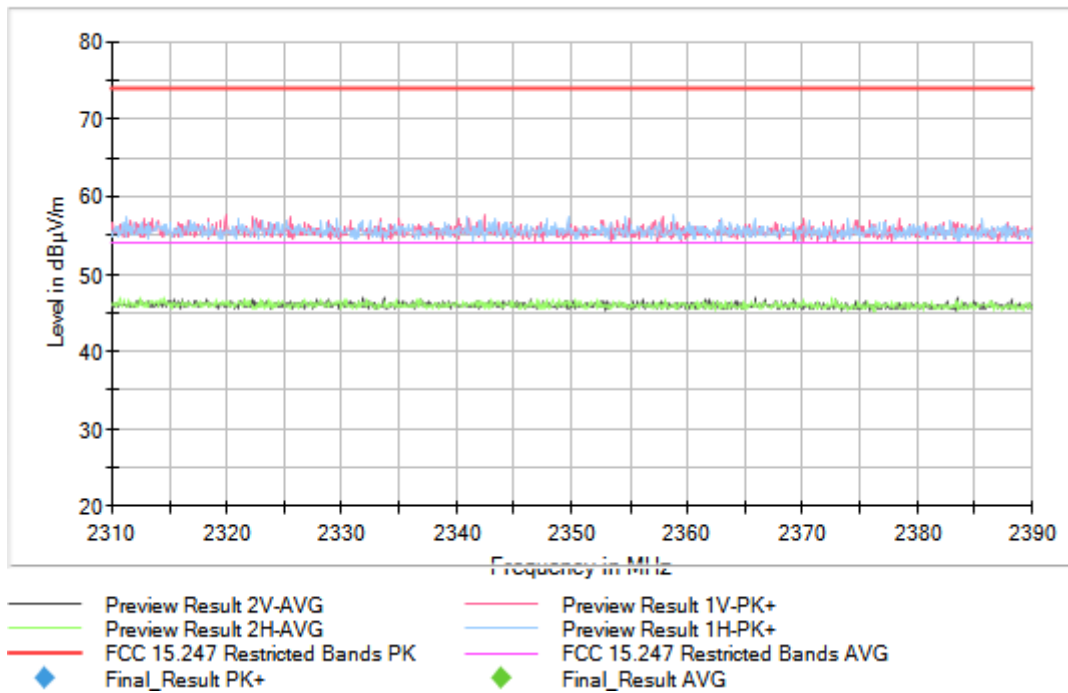


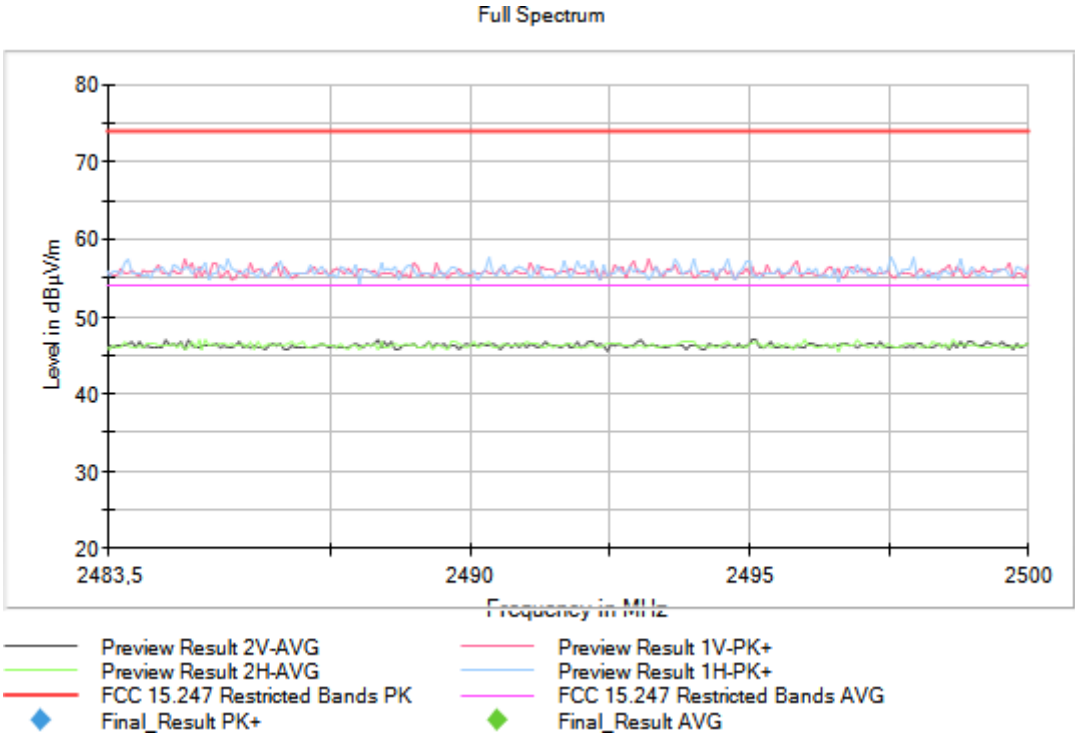
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Images:



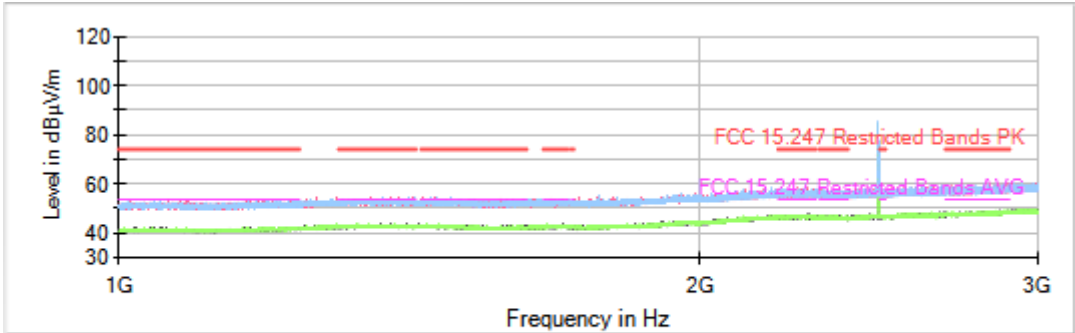
Full Spectrum



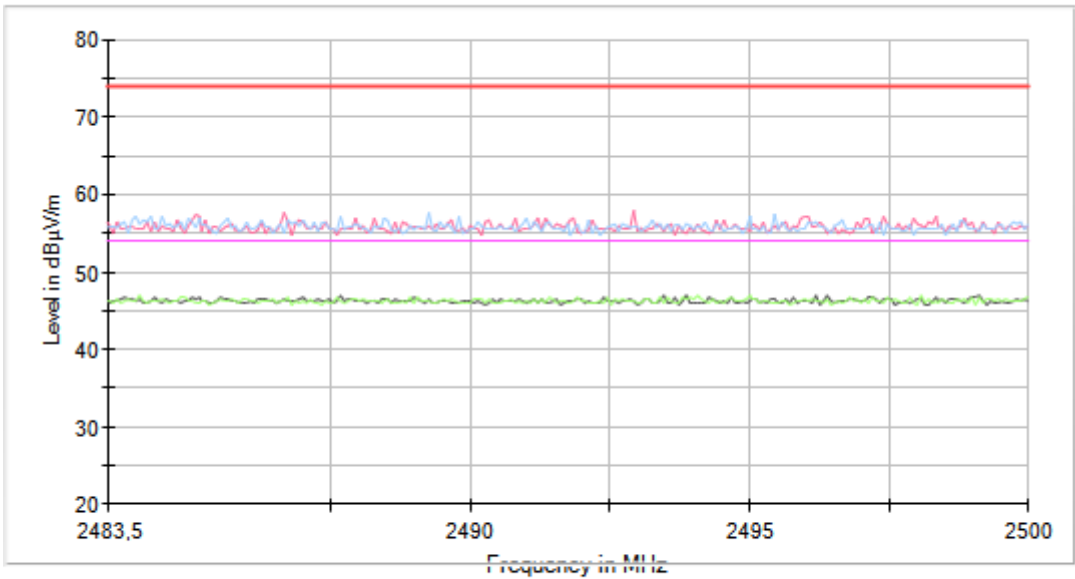


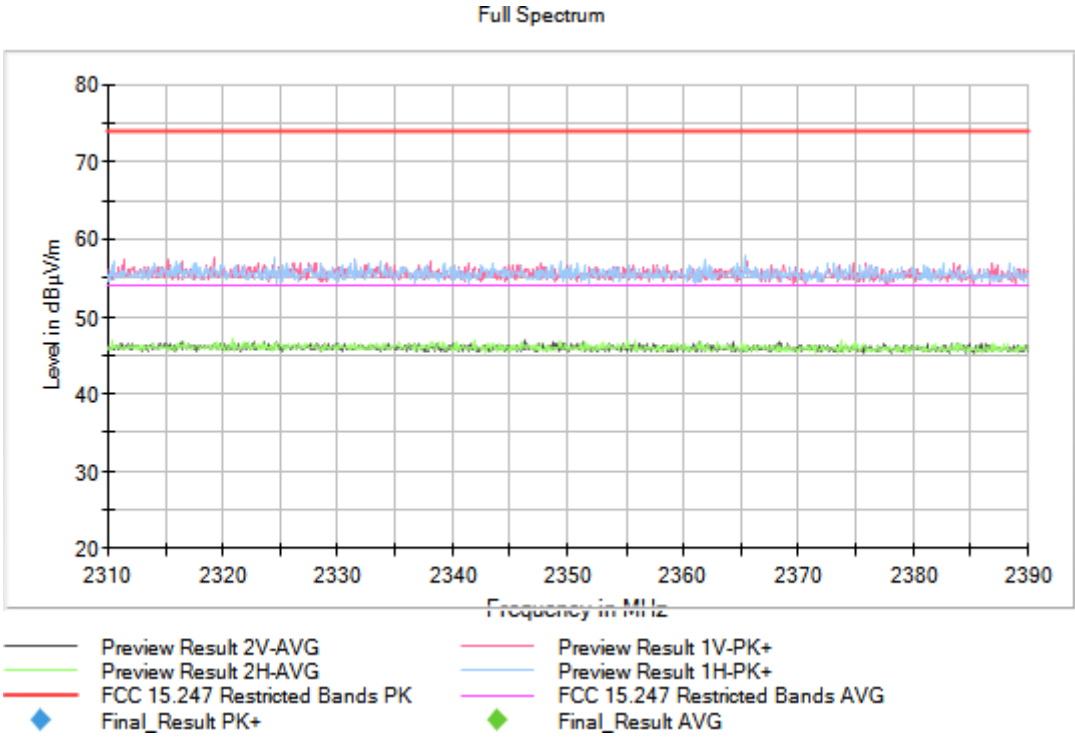
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Images:



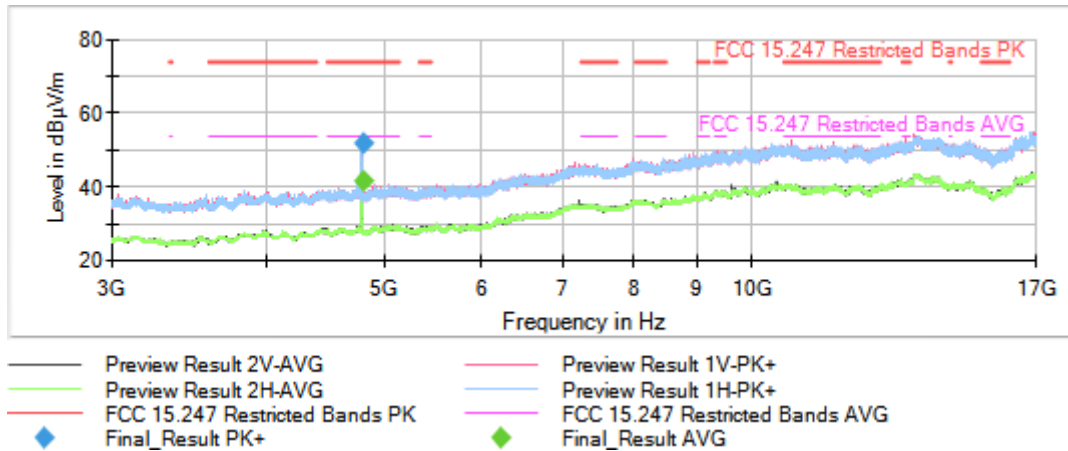
Full Spectrum





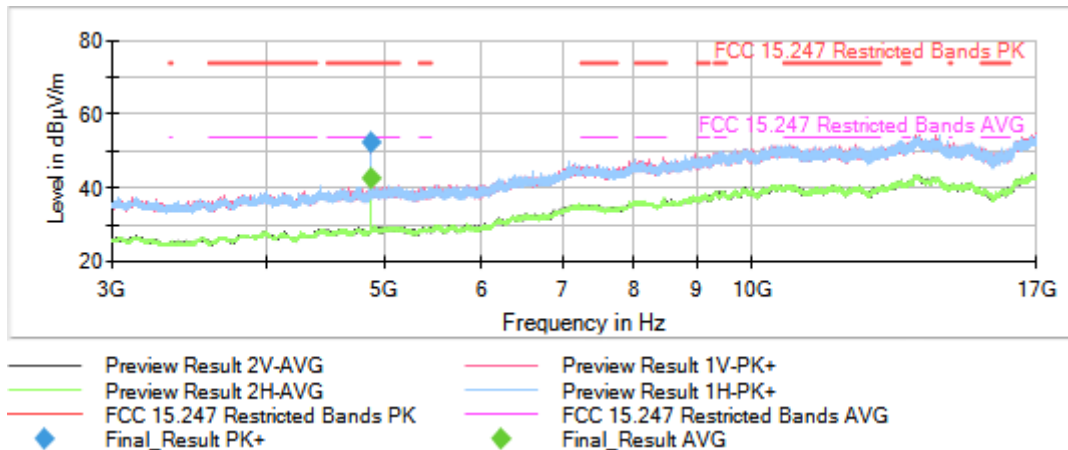
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Images:



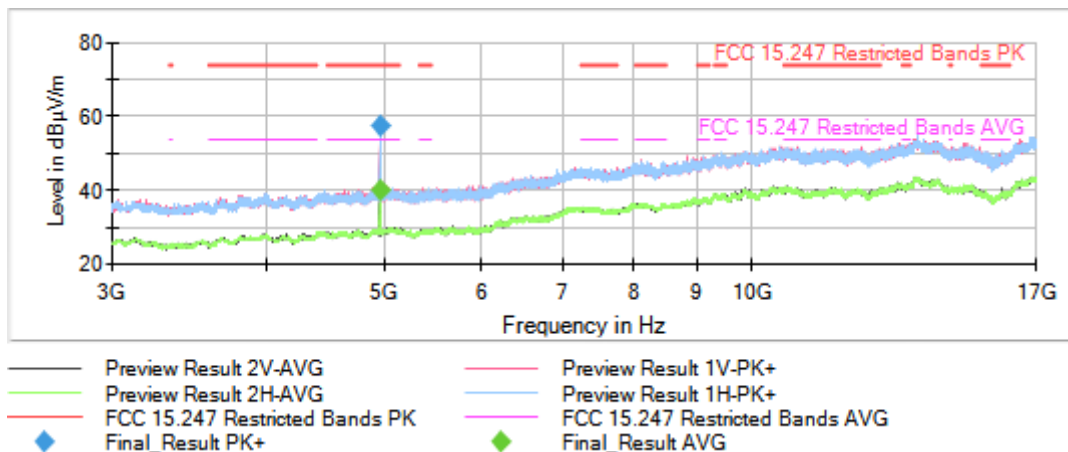
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [3, 17], Measurement Point = 1

Images:



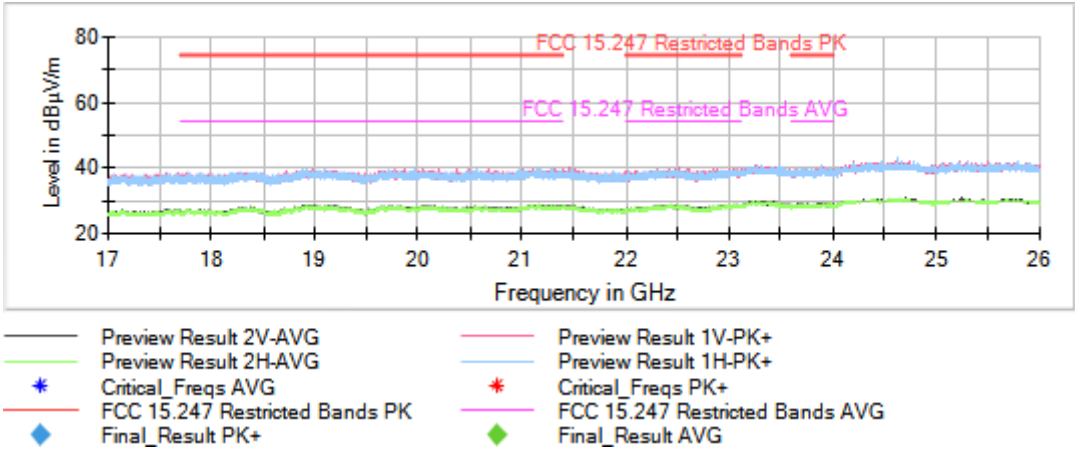
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Frequency MHz = The spurious frequencies detected do not depend neither on the operating channel,
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Range GHz = [17, 26], Measurement Point = 1

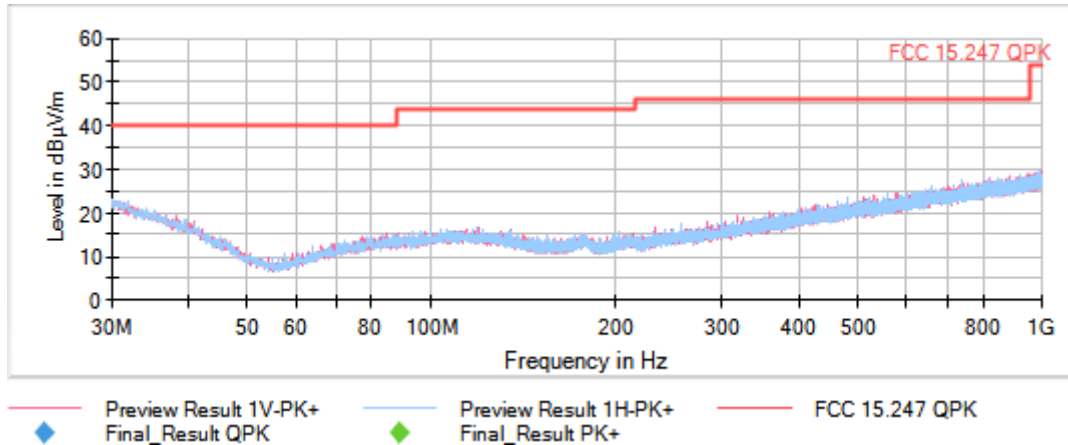
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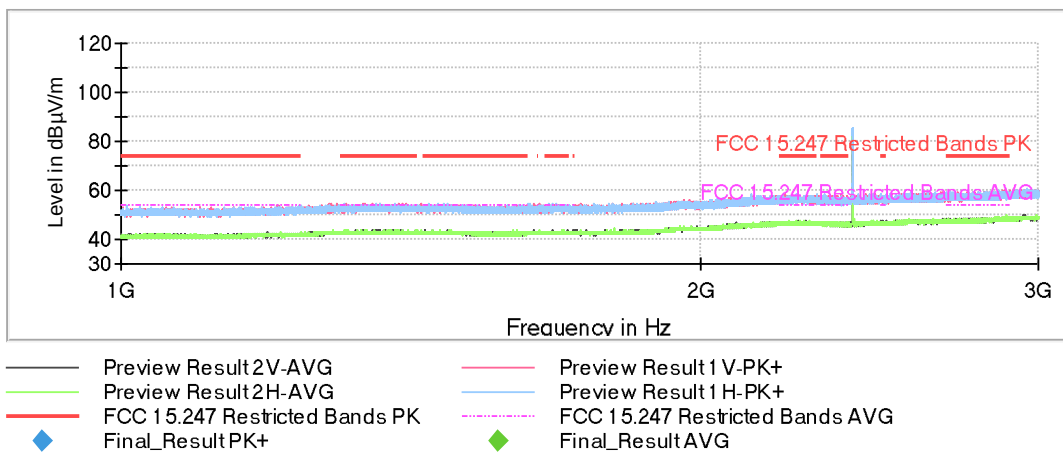
Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

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Range GHz = [0.03, 1], Measurement Point = 1

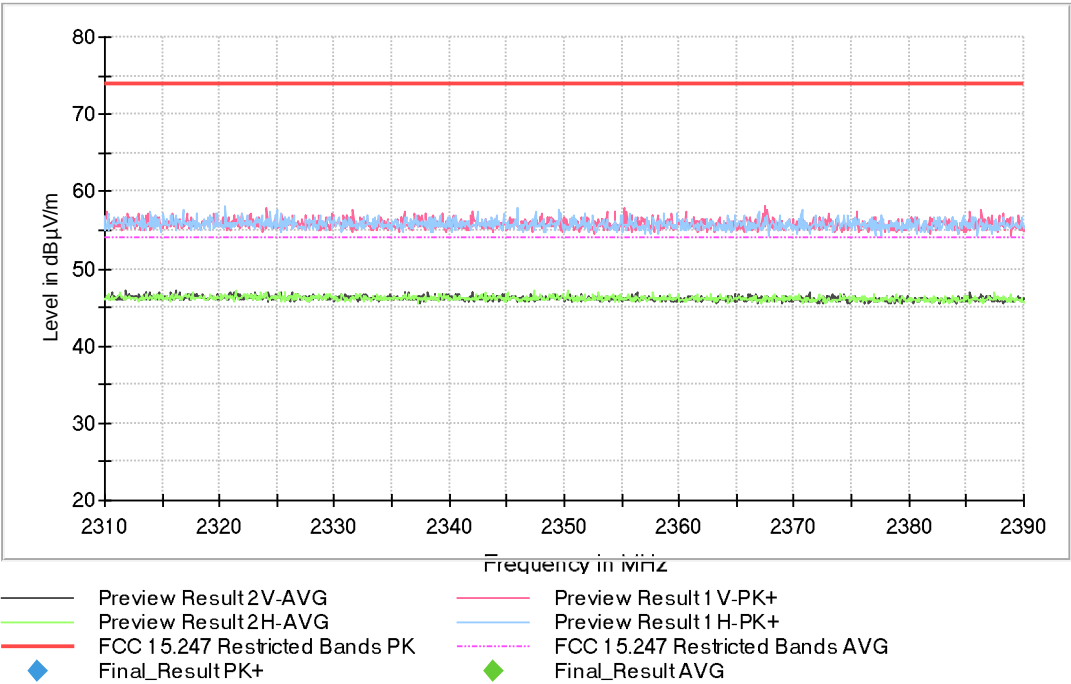
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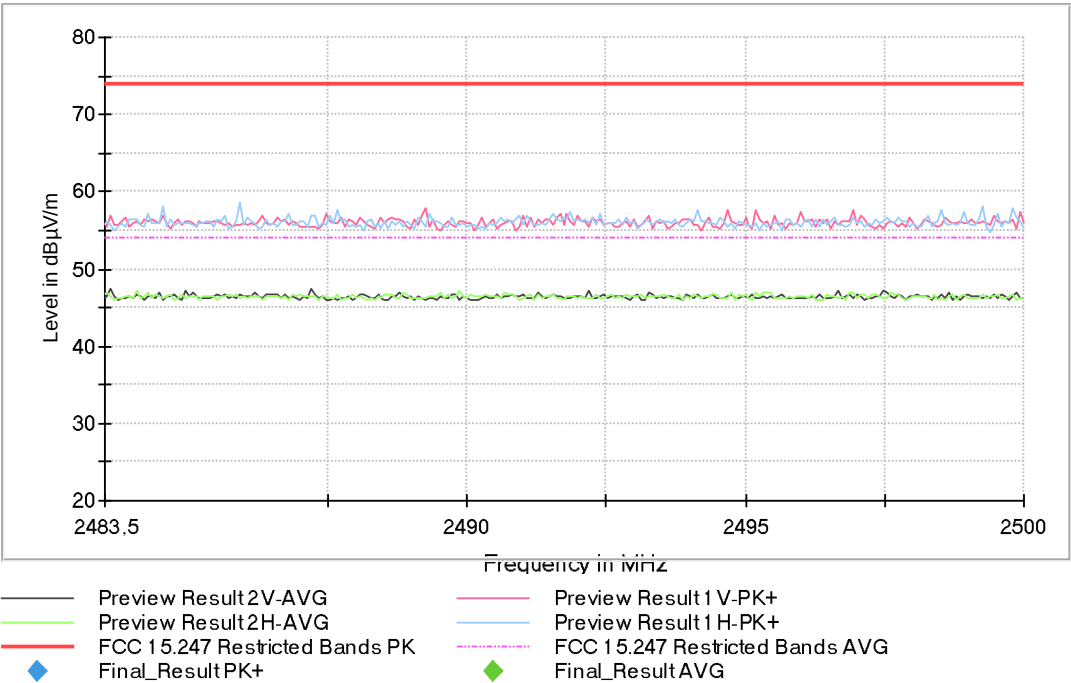
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5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [1, 3], Measurement Point = 1



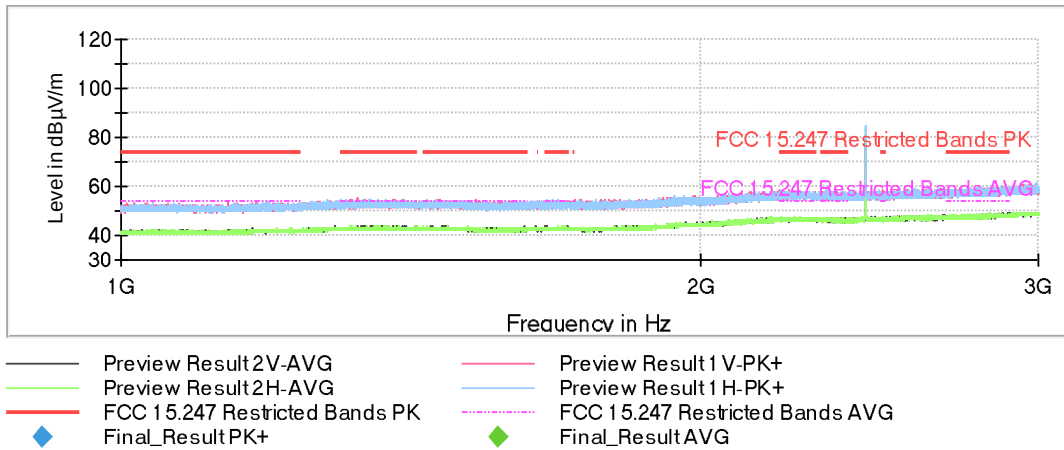
Full Spectrum



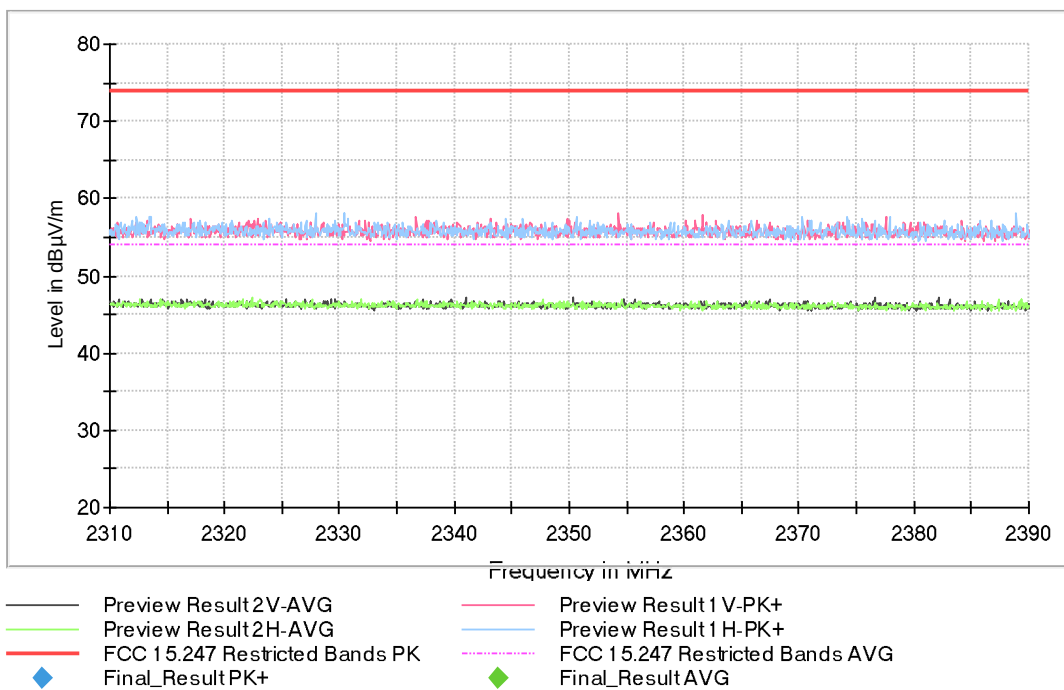
Full Spectrum



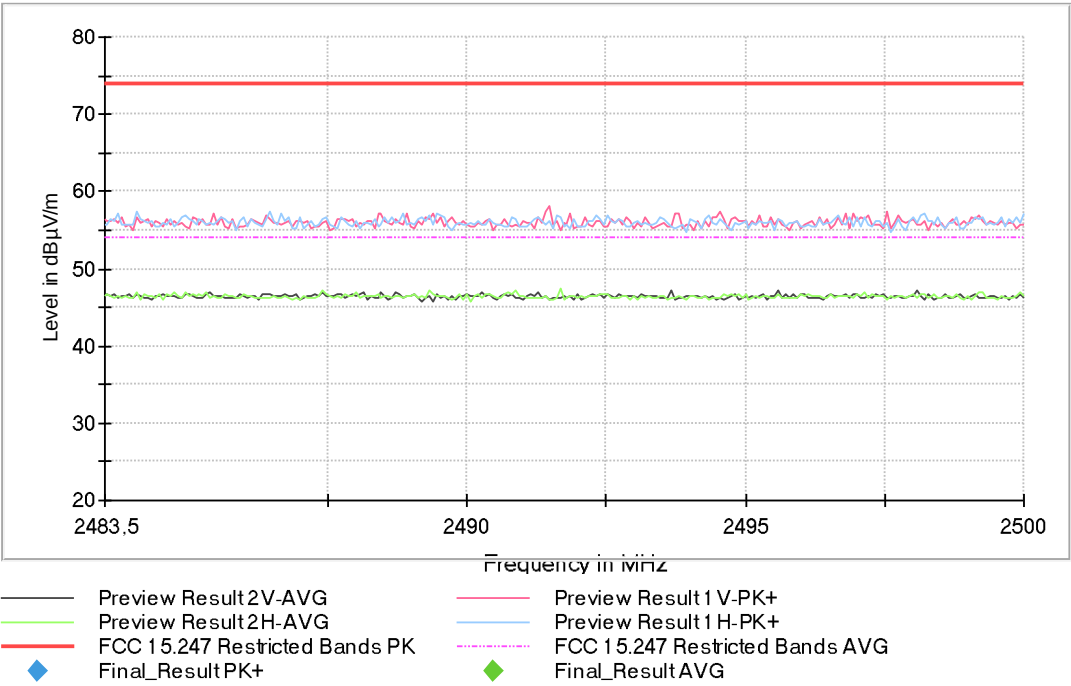
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5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [1, 3], Measurement Point = 1



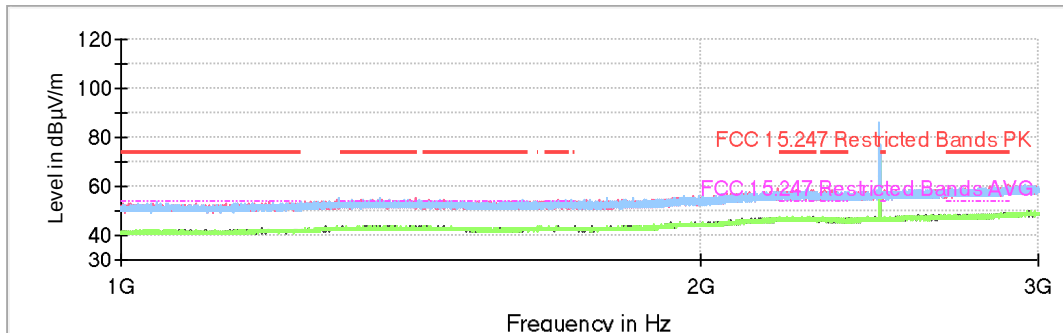
Full Spectrum



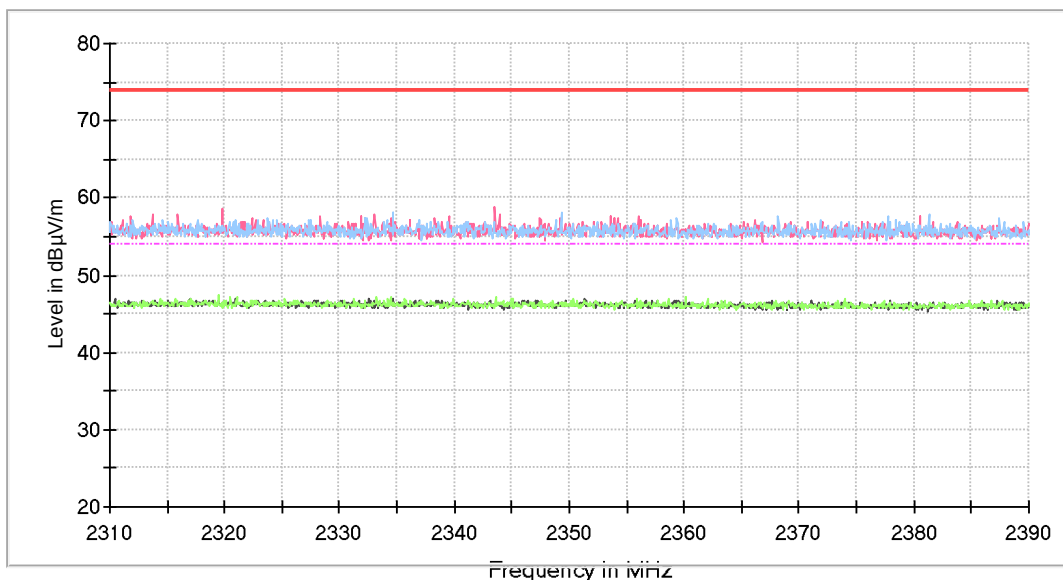
Full Spectrum



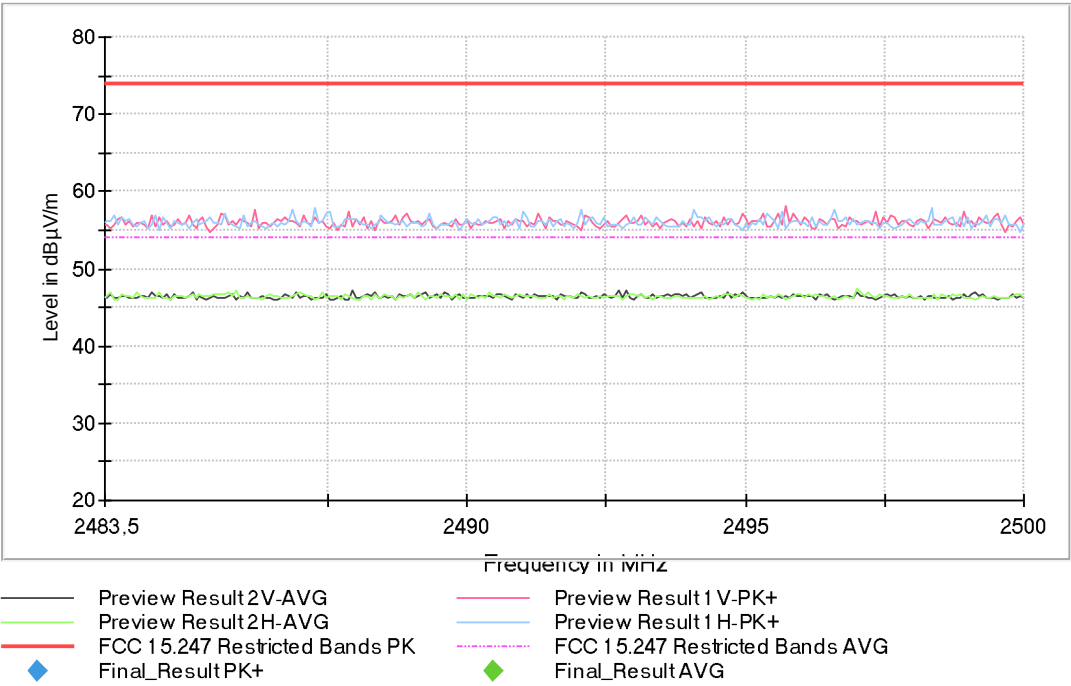
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Full Spectrum

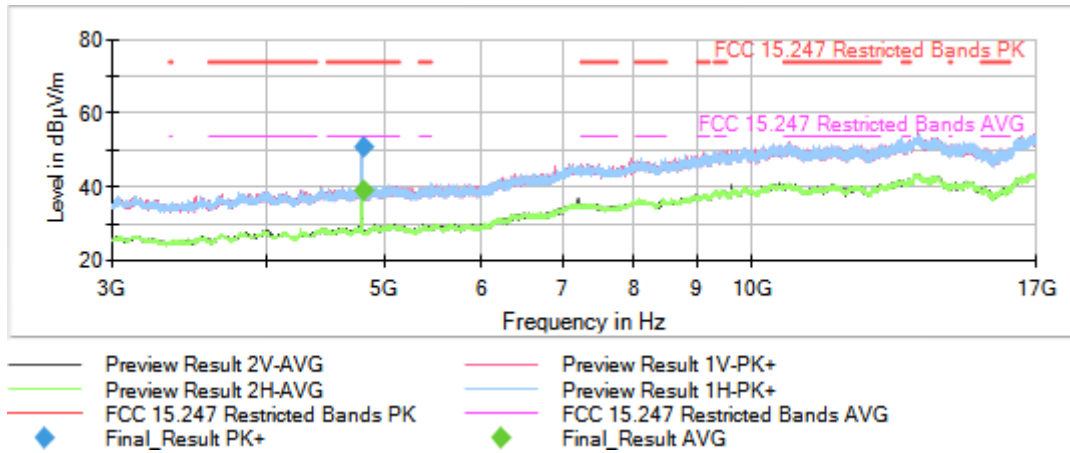


Full Spectrum

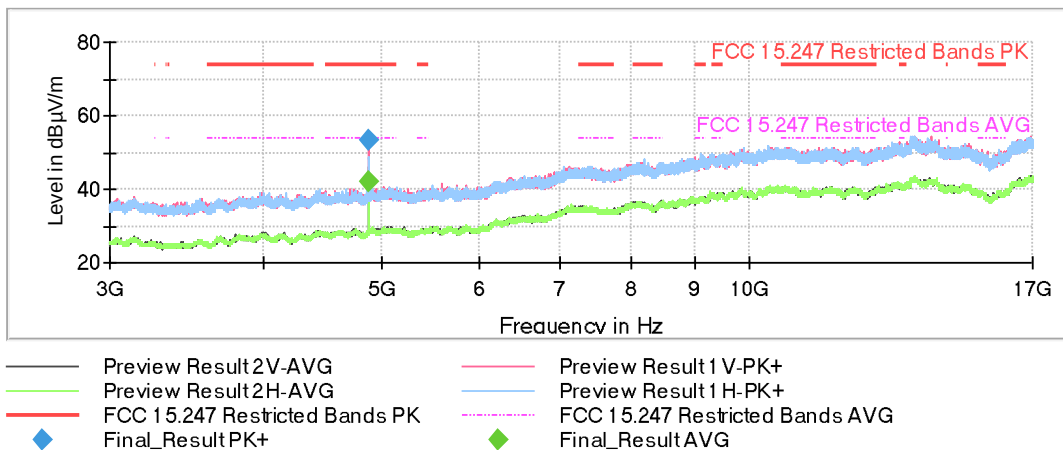


Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [3, 17], Measurement Point = 1

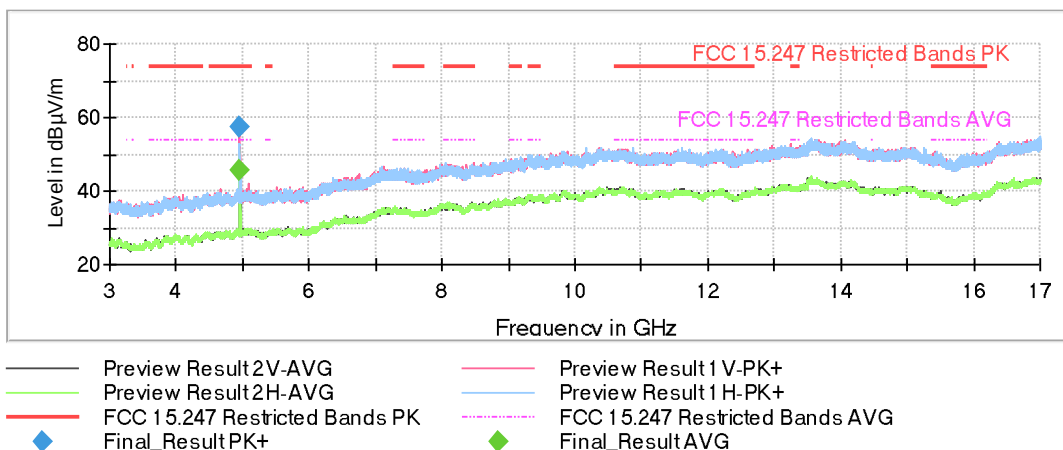
Images:



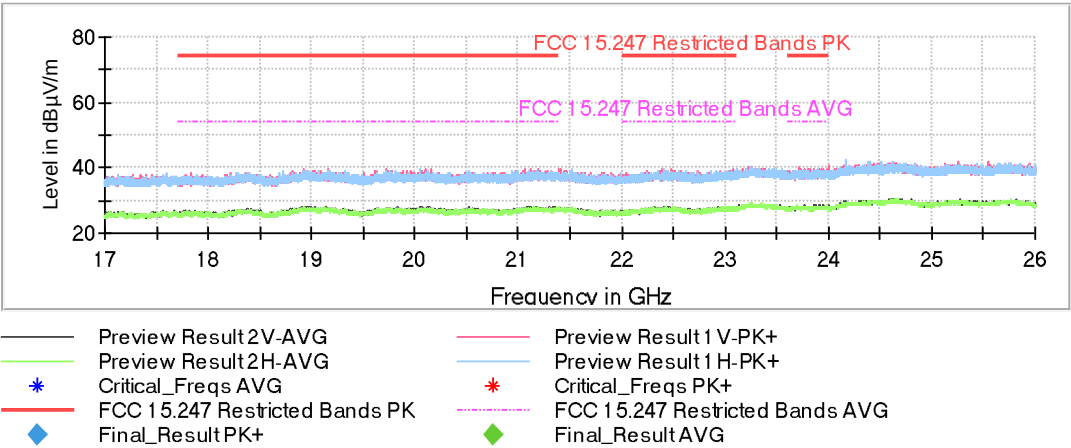
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [3, 17], Measurement Point = 1



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



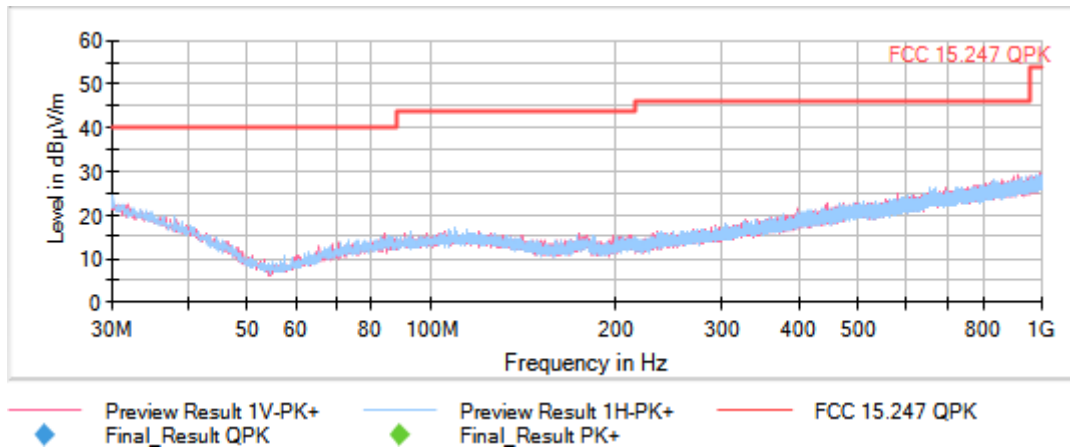
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Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency
Range GHz = [3, 17], Measurement Point = 1



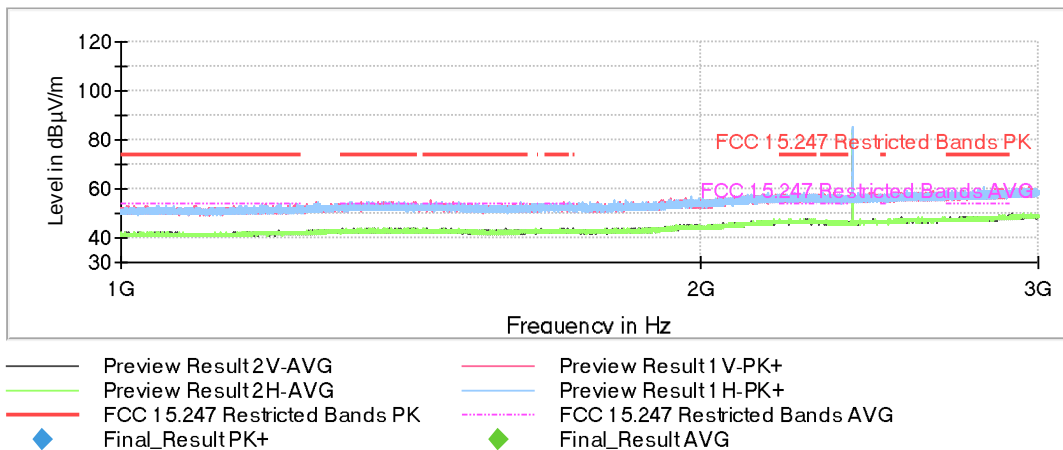
Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Frequency MHz = The spurious frequencies detected do not depend neither on the operating channel,
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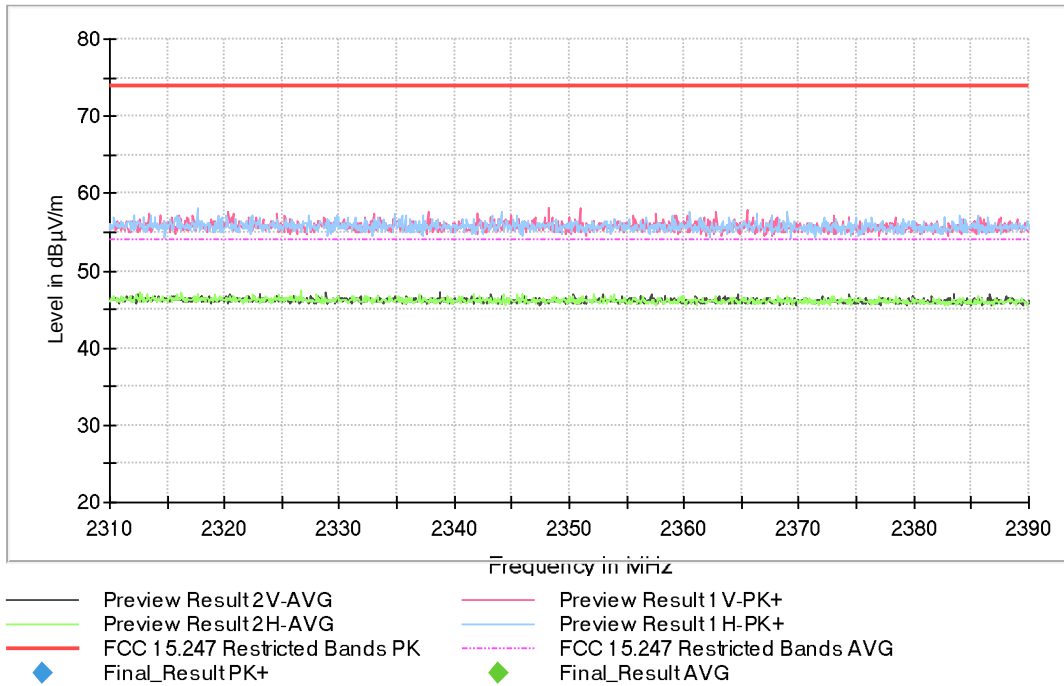
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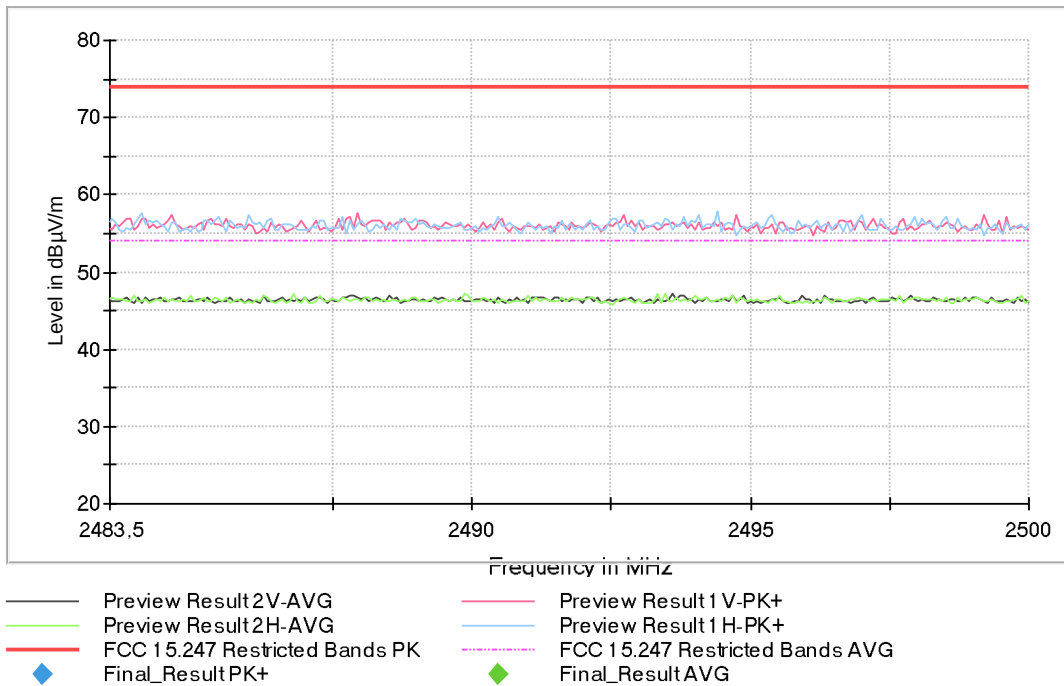
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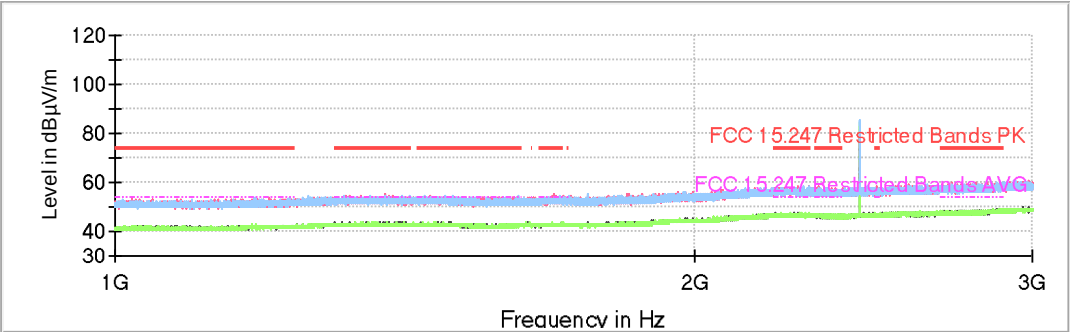
Full Spectrum



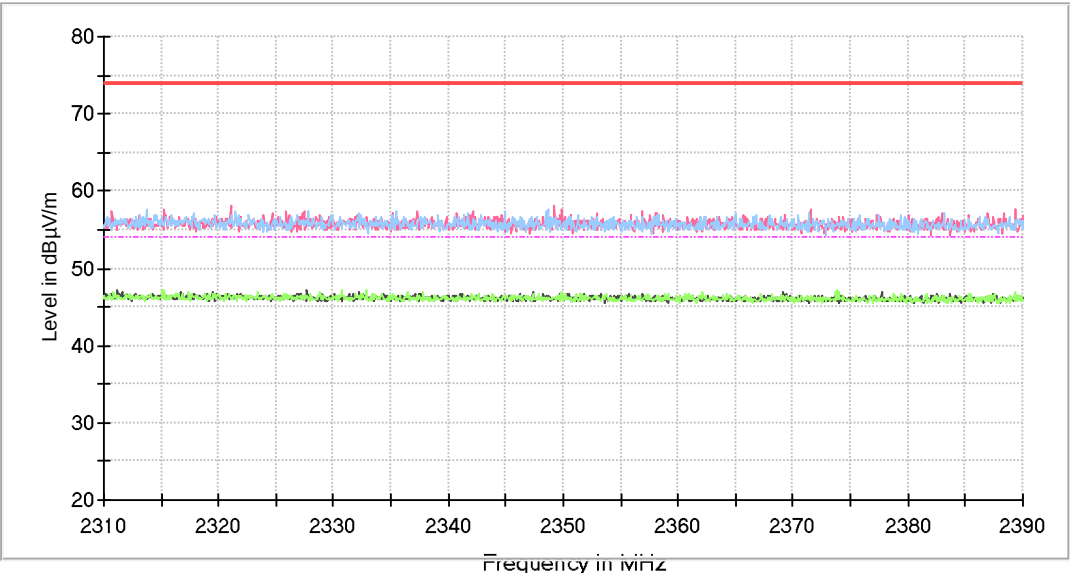
Full Spectrum



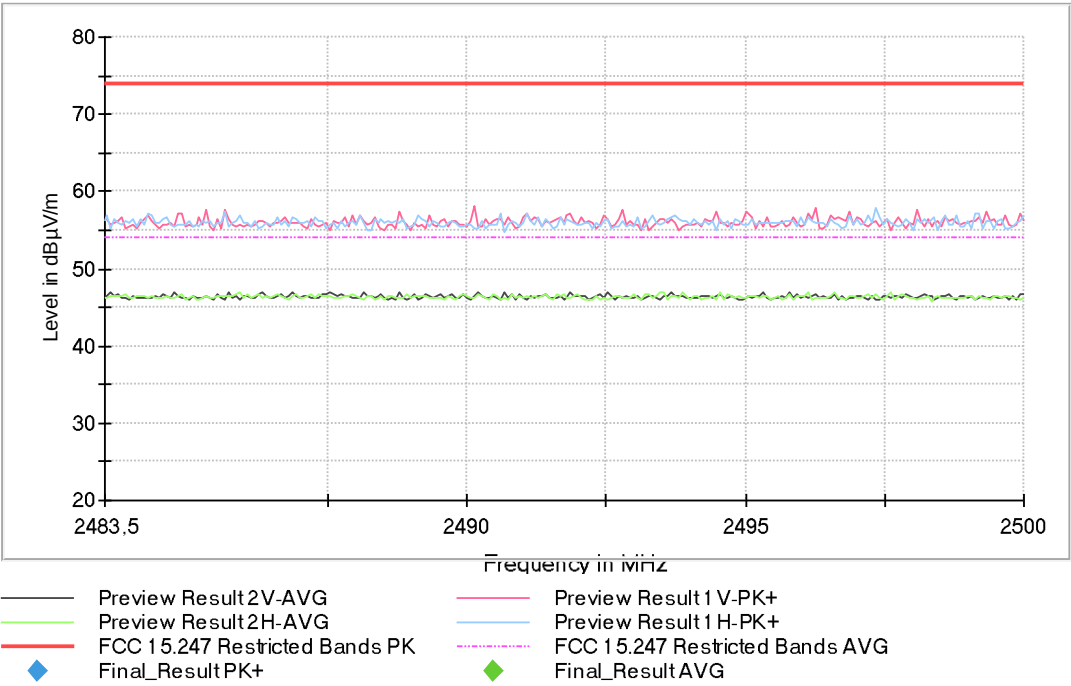
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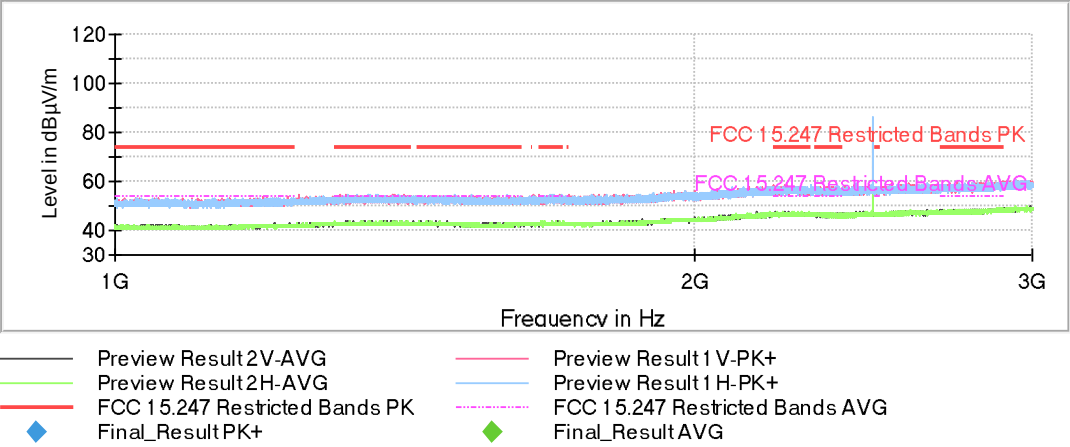
Full Spectrum



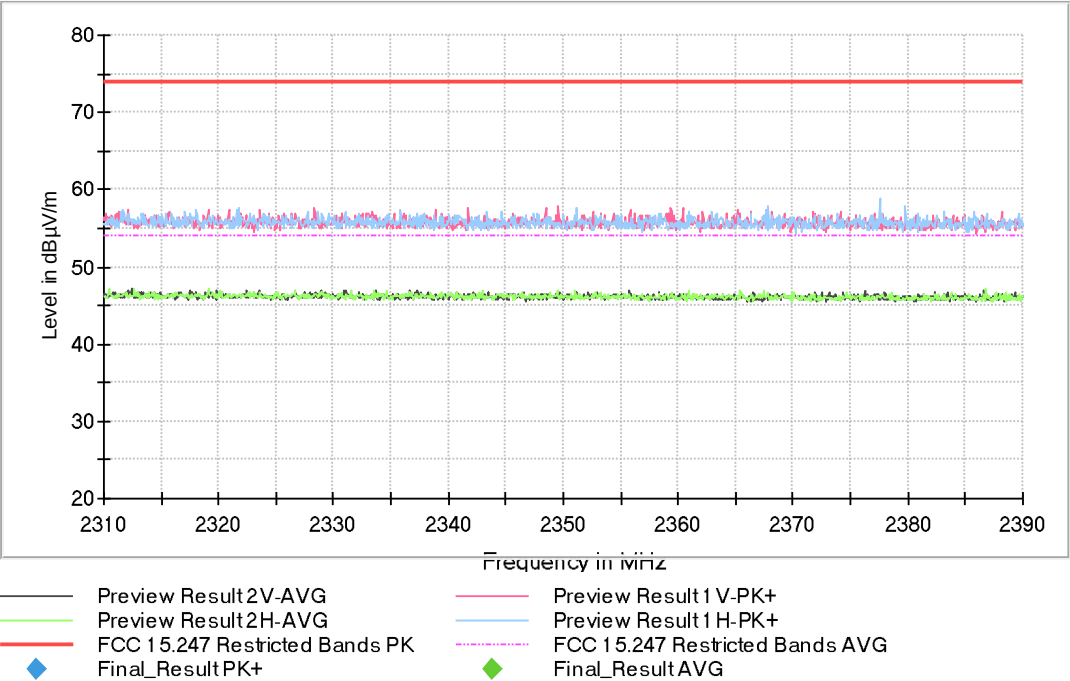
Full Spectrum



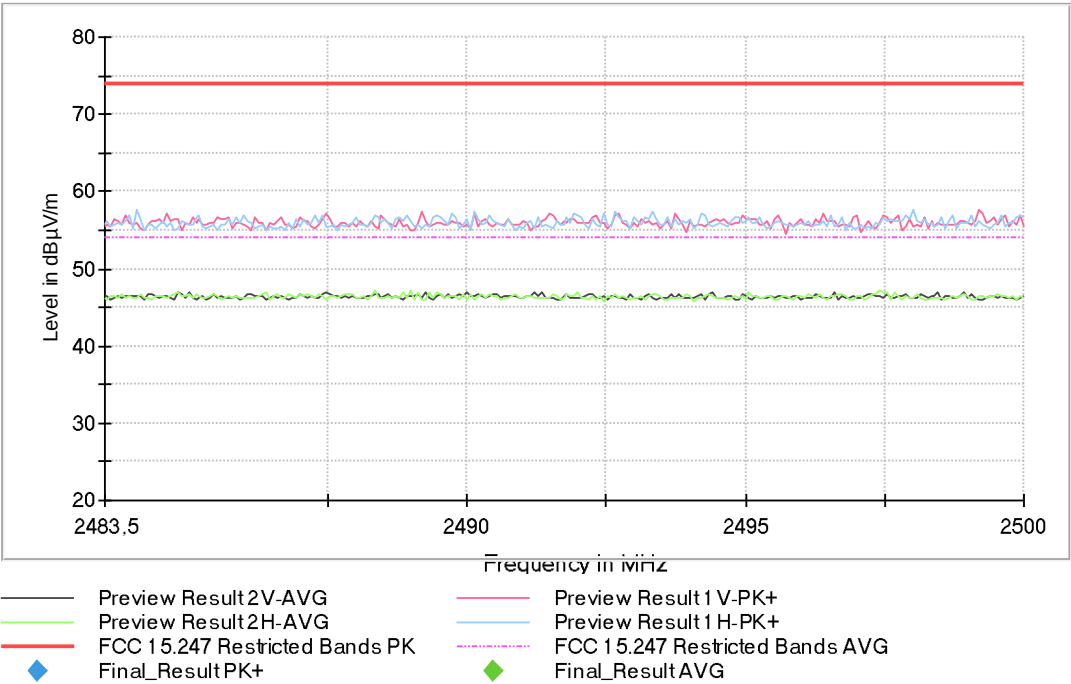
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Full Spectrum

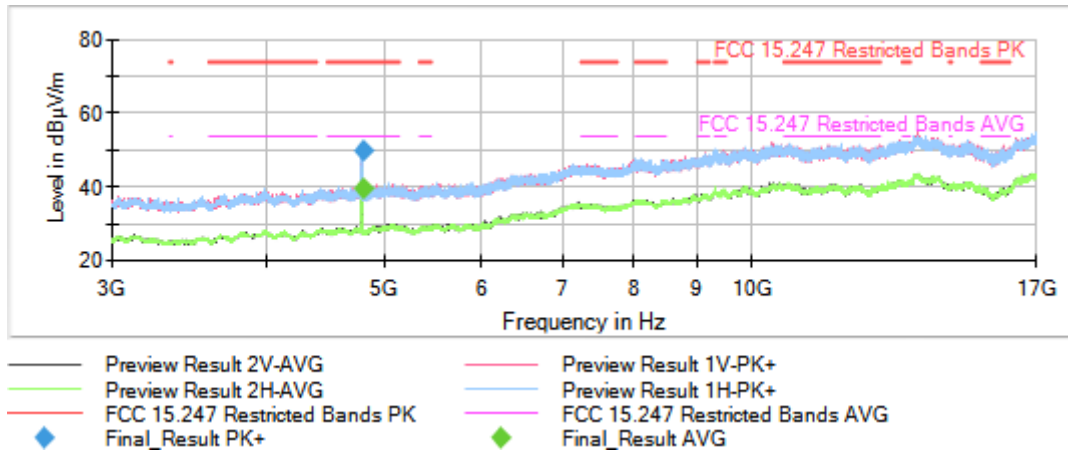


Full Spectrum



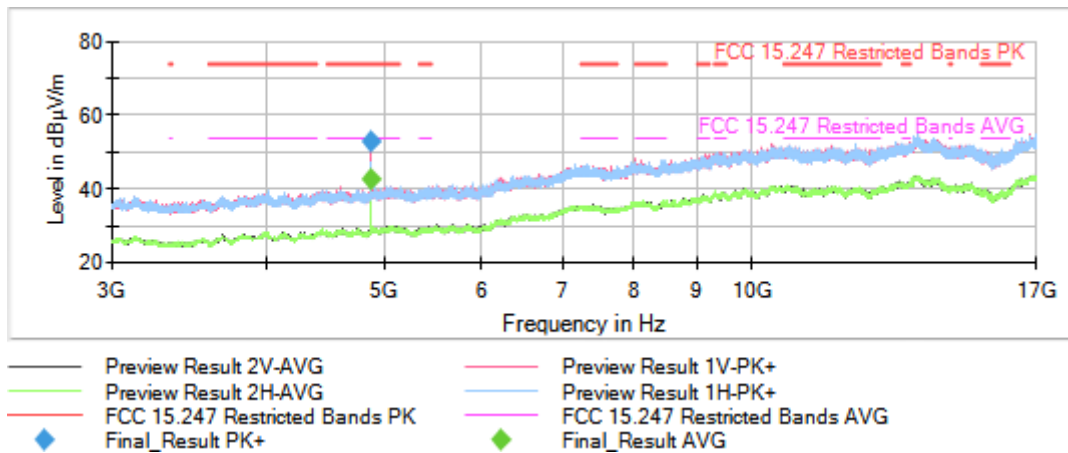
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = Proximity, Frequency Range GHz = [3, 17], Measurement Point = 1

Images:



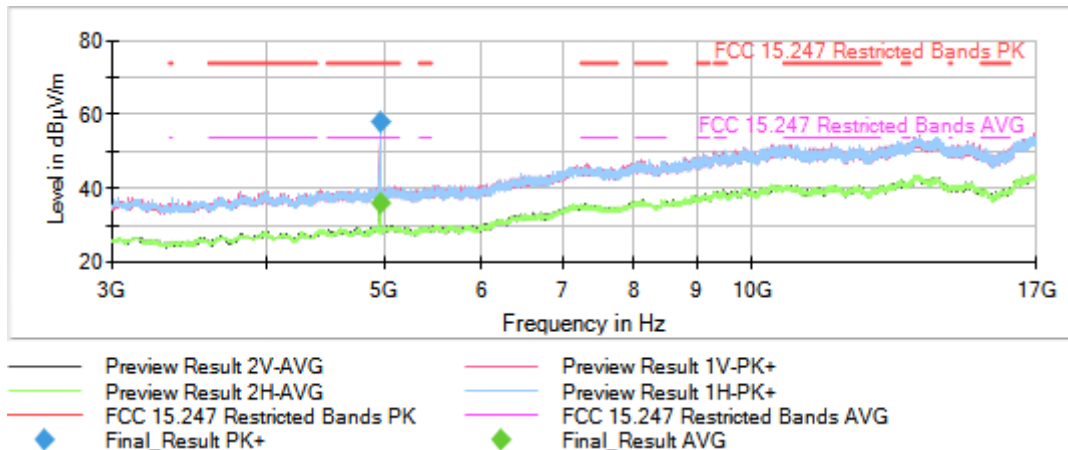
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = Proximity, Frequency Range GHz = [3, 17], Measurement Point = 1

Images:



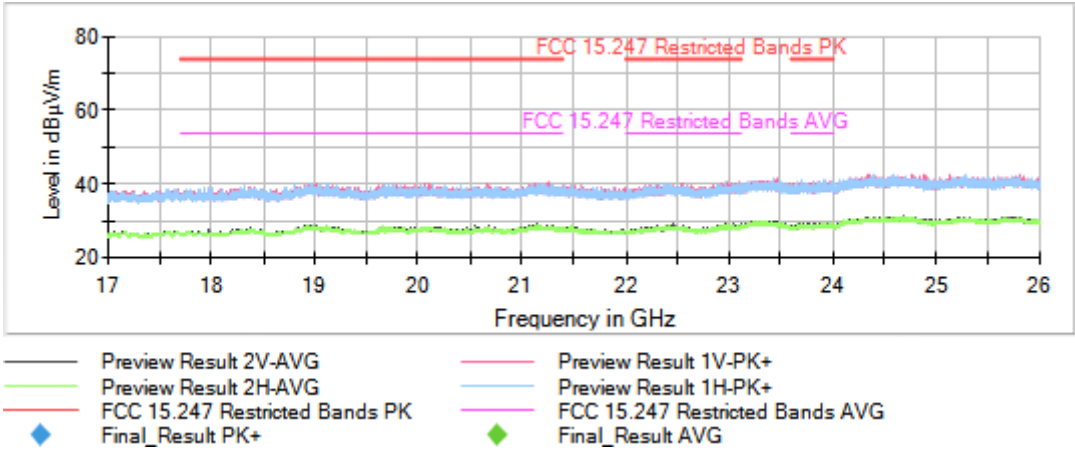
Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Modulation = Proximity, Frequency Range GHz = [3, 17], Measurement Point = 1

Images:



Frequency MHz = The spurious frequencies detected do not depend neither on the operating channel,
Equipment Type = Digital Transmission System (DTS), Modulation = Proximity, Frequency Range GHz =
[17, 26], Measurement Point = 1

Images:



99dBw Occupied Channel Bandwidth 99%

Modulation: Proximity

Results

Freq (MHz)	Occ Ch BW (MHz)
2402.00000	1.710
2440.00000	1.710
2480.00000	1.710

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Results

Freq (MHz)	Occ Ch BW (MHz)
2402.00000	1.050
2440.00000	1.060
2480.00000	1.065

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Results

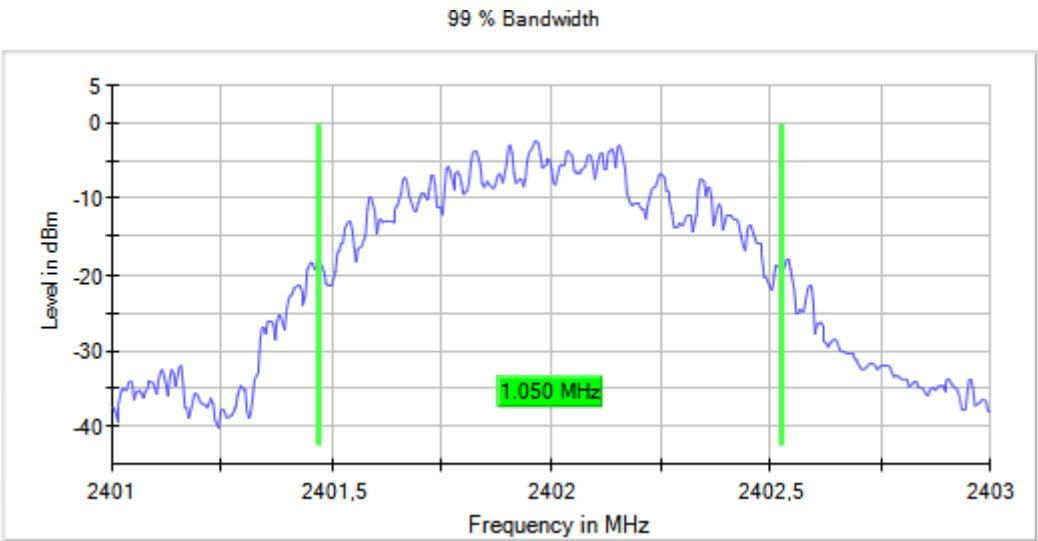
Freq (MHz)	Occ Ch BW (MHz)
2402.00000	2.030
2440.00000	2.030
2480.00000	2.020

Attachments

Setting	Instrument Value
Span	2.000 MHz
RBW	10.000 kHz
VBW	30.000 kHz
SweepPoints	400
SweepTime	419.000 µs
Reference Level	0.000 dBm
Attenuation	10.000 dB
Detector	MaxPeak
SweepCount	100
Filter	3 dB
Trace Mode	Max Hold
SweepType	FFT
Preamp	off
Stablemode	Trace

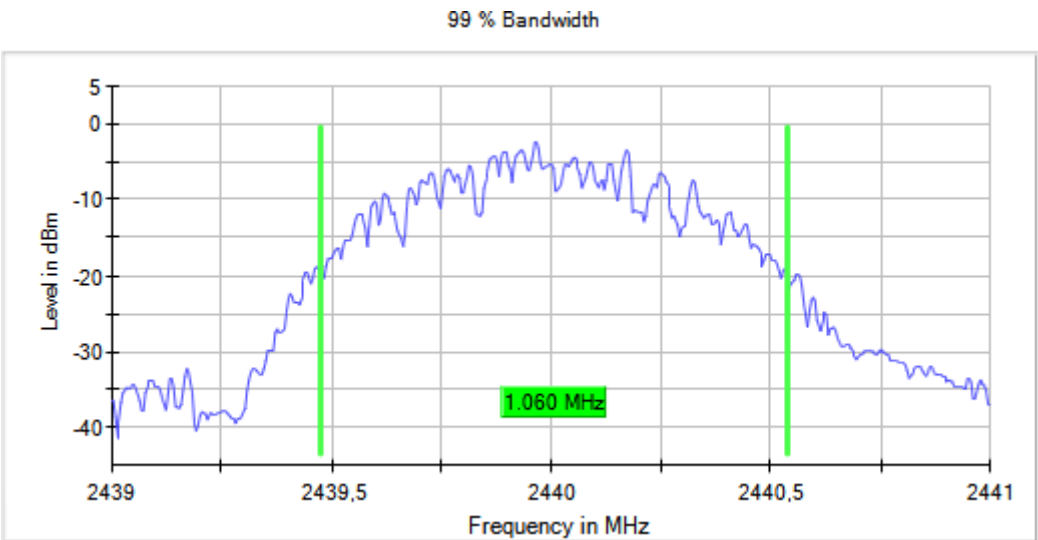
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Images:



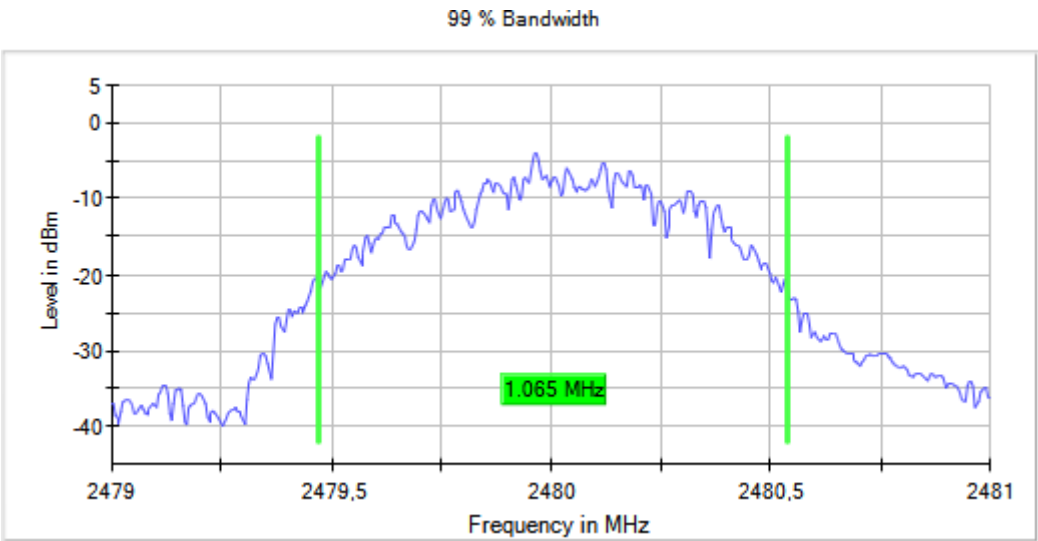
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Images:



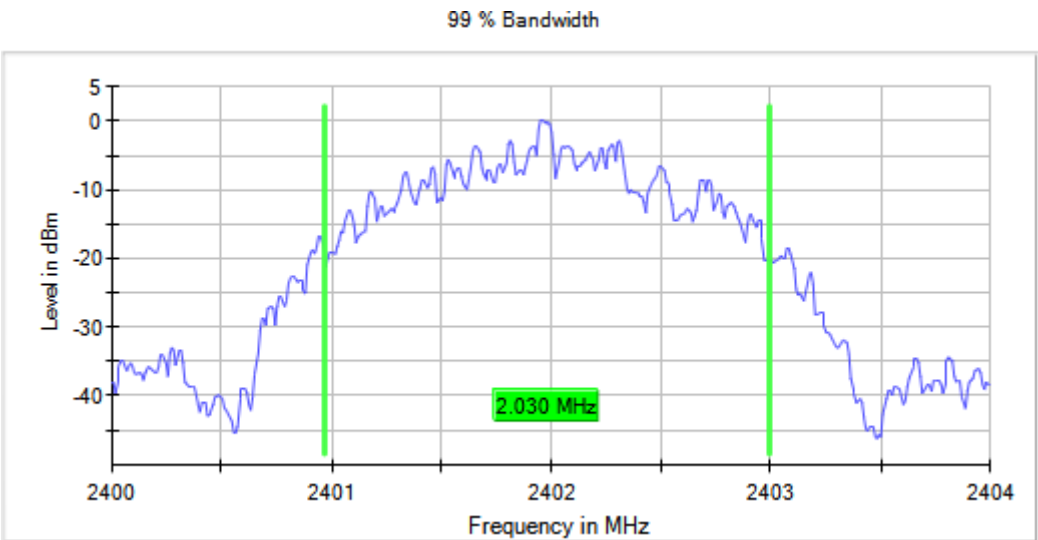
Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Images:



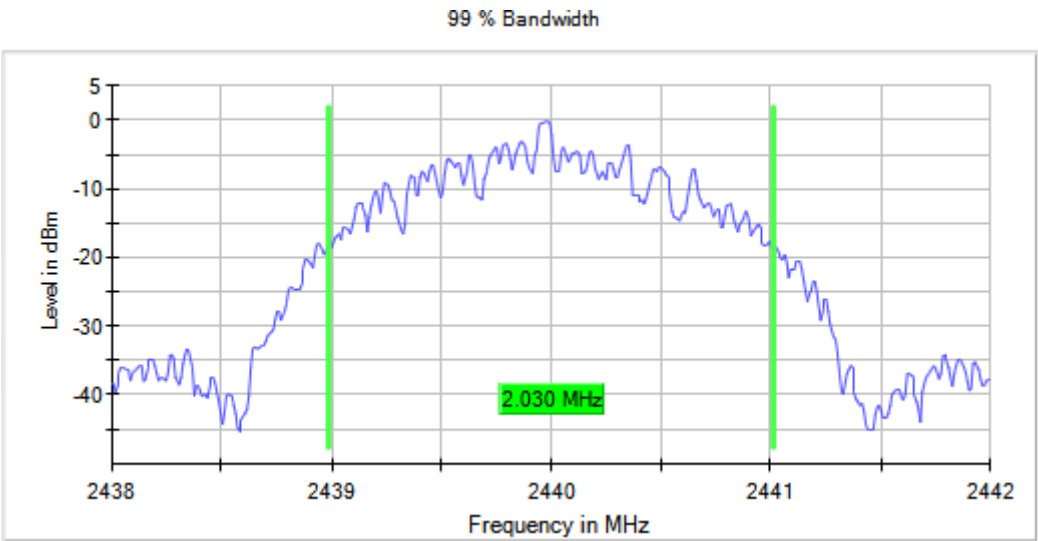
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Images:



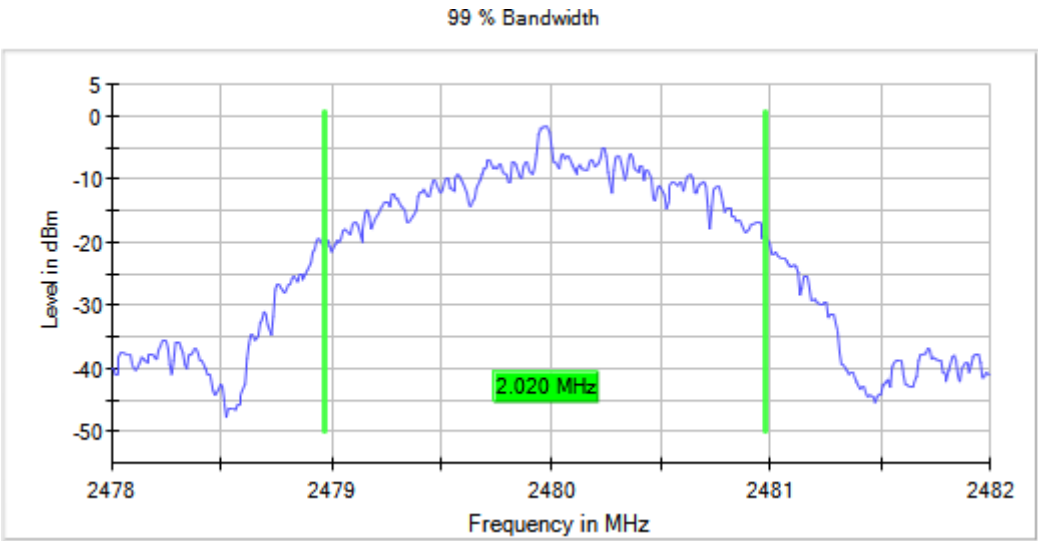
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Images:



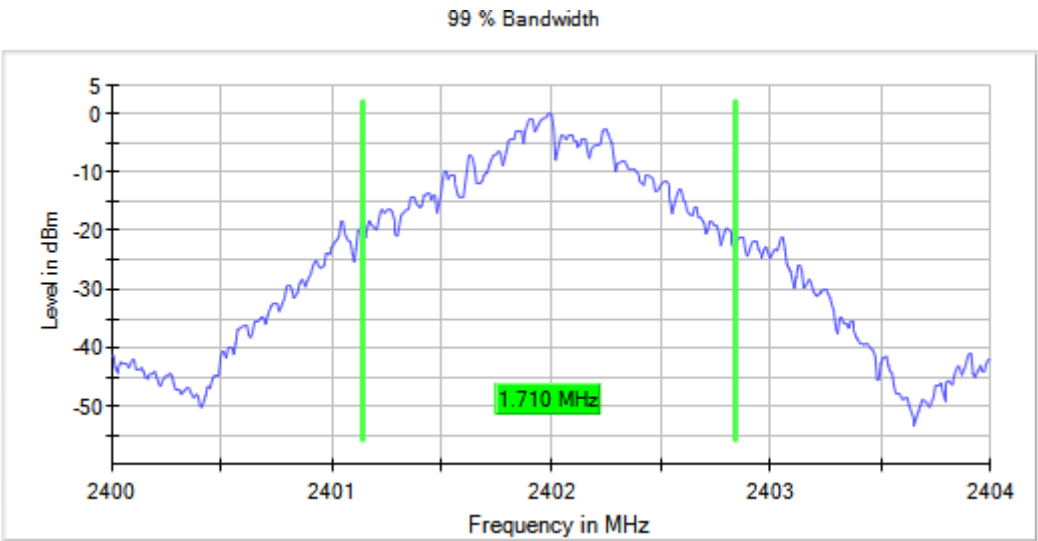
Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Images:



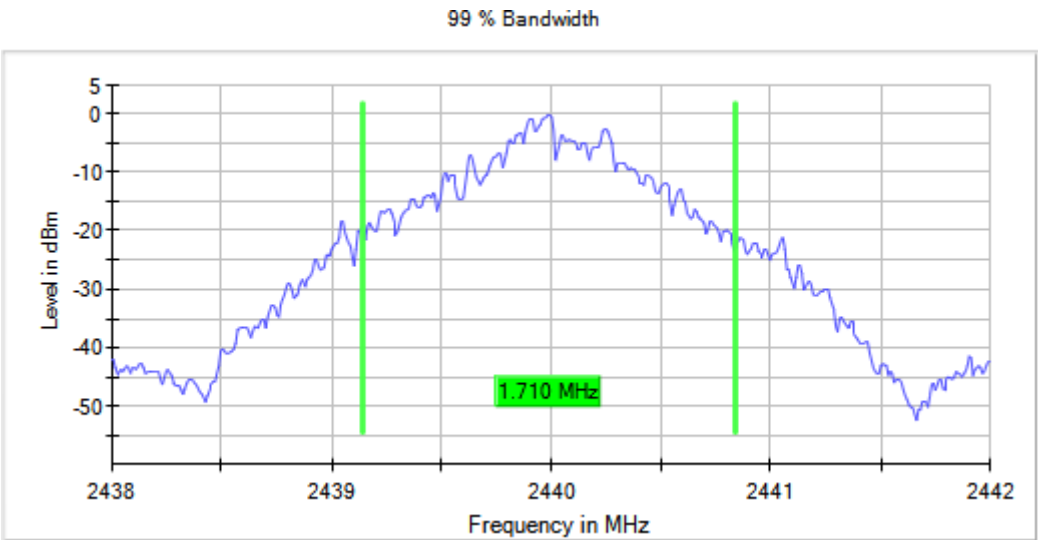
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = Proximity

Images:



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

Images:



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

Images:

