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

ISED CABid: ES1909
Lab. Company Number: 4621A

Test Report No:
74801RRF.003

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

(*) Identification of item tested	RIE - Receiver In the Ear Hearing Aid
(*) Trademark	ReSound, Beltone
(*) Model and /or type reference	DURR1
Other identification of the product	FCC ID: X26DURR1 IC: 6941C-DURR1
(*) Features	BLE(1 & 2 MBit+Proximity), MI, Magnetic charging @135k, rechargeable battery HW version: C6.0DREHYB,V1.D,C6.0 SW version: Dooku3
Applicant	GN Hearing A/S Lautrupbjerg 7, 2750 Ballerup, Denmark
Test method requested, standard	USA FCC Part 15.247 (10-1-21 Edition): Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. USA FCC Part 15.209 (10-1-21 Edition): Radiated emission limits; general requirements. CANADA RSS-247 Issue 2 (February 2017). CANADA RSS-Gen Issue 5 amendment 2 (February 2021). Guidance for Performing Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid Systems Devices Operating Under Section 15.247 of the FCC Rules. 558074 D01 Meas Guidance v05r02 dated April 2, 2019. ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	José Manuel Gómez Galván EMC Consumer & RF Lab. Manager Firmado digitalmente por 53680346W JOSE MANUEL GOMEZ (C:A29507456)
Date of issue	2023-06-26
Report template No	FDT08_24 (*) "Data provided by the client"

Index

Acronyms

Acronym ID	Acronym Description
# of Tx Chains	Number of Transmission Chains
BW	Bandwidth
Detector	Detector used
Ebw	Emission Bandwidth
Equipment	Equipment Type
Freq	Frequency
Freq Rng	Frequency Range
Inband Peak Lvl	Inband Peak Level
Lvl	Level
MP	Measurement Point
Mod	Modulation
Occ Ch BW	Occupied Channel Bandwidth
PSD	Power Spectrum Density
PeakPower	Maximum Peak Conducted Output Power
Pol	Polarization
Port	Active Port
Unwanted Freq	Unwanted Emissions Frequency
Unwanted Lvl	Unwanted Emissions Level

Competences and guarantees

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

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

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

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 ≤ ± 5.15 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 ≤ ± 4.28 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 ≤ ± 4.89 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 ≤ ± 1,14 %
Occupied Channel Bandwidth: Measurement uncertainty ≤ ± 1,40 %
Conducted Band-edge spurious emissions: Measurement uncertainty ≤ ± 1,76 dB
Accumulated Dwell Time: Measurement uncertainty ≤ ± 0,16 %
Minimum Frequency Occupation Time: Measurement uncertainty ≤ ± 0,53 %
Hopping Frequency Separation: Measurement uncertainty ≤ ± 1,74 %

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 model DURR1 consists of a hearing aid that features a sound amplification of the sound received by the microphone.

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	74801E_58.1	RIE - Receiver In the Ear Hearing Aid	DURR1	2300803037	2023-04-19	Element Under Test
S/02	74801E_50.1	RIE - Receiver In the Ear Hearing Aid	DURR1	-	2023-04-19	Equipment Under Test

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

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:					
	X	DC: 3.7 V rechargeable battery					
Rated Power .....:	3.7V, 18.5mAh					
Clock frequencies.....:	CPU XTAL: 32MHz					
Other parameters.....:	N/A					
Software version .....:	Dooku3					
Hardware version.....:	C6.0DREHYB,V1.D,C6.0					
Dimensions in cm (W x H x D)....:	up to 0.7 x 1.2 x 2.7					
Mounting position.....:		Table top equipment				

		Wall/Ceiling mounted equipment		
		Floor standing equipment		
		Hand-held equipment		
	X	Other: Receiver in the ear, HA behind the ear		
Modules/parts .....:	Module/parts of test item		Type	Manufacturer
	Dundee		DURR1	GN Hearing A/S
Accessories (not part of the test item) .....:	Description		Type	Manufacturer
	Charger		C-1	GN Hearing A/S
	Charger		C-2	GN Hearing A/S
	Charger		C-3	GN Hearing A/S
	Power adapter, type: A806A-050100U-EU1		-	Aohai Technology
	Power adapter, type: A18A-50100U-US2		-	Aohai Technology
Documents as provided by the applicant .....:	Description		File name	Issue date
	See ftp-server		-	-

(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)	2023-04-27
Date (finish)	2023-05-02

Document history

Report number	Date	Description
74801RRF.003	2023-06-26	First release.

Environmental conditions

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

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

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

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

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

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

Remarks and comments

The tests have been performed by the technical personnel: Antonio Manuel Sánchez, Rubén Mora.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
7040	EXTENSION FOR OPEN SWITCH UNIT UP TO 40GHz	OSP-B157Wx	Rohde&Schwarz	2025-04-19
7763	HORN ANTENNA 1-18GHz	BBHA 9120D	SCHWARZBECK MESS-ELEKTRONIK	2026-01-16
6495	HORN ANTENNA 18-40GHz	BBHA 9170	SCHWARZBECK	2024-03-19
2932	HYBRID BILOG ANTENNA 30MHz-6GHz	JB6	SUNOL SCIENCES CORPORATION	2023-10-29
7862	PRE-AMPLIFIER G>30dB 18-40GHz	BLMA 1840-3G	BONN ELEKTRONIK	2024-03-14
7769	PREAMPLIFIER 30dB 500MHz-18GHz	BBV 9718 C	SCHWARZBECK	2024-02-15
8130	SEMIANECHOIC ABSORBER LINED CHAMBER	P29419	ALBATROSS	--
8661	SHIELDED ROOM	-	SIEPEL	--
8134	SHIELDED ROOM	P29419	ALBATROSS PROJECTS GMBH	--
6158	SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2023-10-22
8835	SIGNAL AND SPECTRUM ANALYZER 2Hz-50GHz	FSW50	ROHDE AND SCHWARZ	2025-02-08
4848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	--
7552	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2024-05-02
7549	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2024-05-02
7550	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2024-05-02
5862	EMI TEST RECEIVER 9kHz-7GHz	ESR7	ROHDE AND SCHWARZ	2025-02-15

Testing verdicts

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

Summary

BLE (1M, 2M):

FCC PART 15 PARAGRAPH/ RSS-247			
Requirement – Test case		**Verdict**	**Remark**
FCC 15.247 (a) (1) / RSS-247 5.1 (b)	20 dB Bandwidth	N/A	
FCC 15.247 (a) (1) (iii) / RSS-247 5.1 (d)	Time of Occupancy (Dwell Time)	N/A	
/ FCC 15.247 (a) (1) (iii) / RSS-247 5.1 (d)	Number of hopping channels	N/A	
FCC 15.247 (a) (2) / RSS-247 5.2. (a)	6 dB Bandwidth	P	
FCC 15.247 (b) / RSS-247 5.4. (d)	Maximum output power and antenna gain	P	
FCC 15.247 (d) / RSS-247 5.5.	Band-edge emissions compliance (Transmitter)	P	
FCC 15.247 (e) / RSS-247 5.2. (b)	Power spectral density	P	
FCC 15.247 (d) / RSS-247 5.5.	Emission limitations radiated (Transmitter)	P	
Supplementary information and remarks: None.			

Proximity:

FCC PART 15 PARAGRAPH/ RSS-247			
Requirement – Test case		**Verdict**	**Remark**
FCC 15.247 (a) (1) / RSS-247 5.1 (b)	20 dB Bandwidth	N/A	
FCC 15.247 (a) (1) (iii) / RSS-247 5.1 (d)	Time of Occupancy (Dwell Time)	N/A	
/ FCC 15.247 (a) (1) (iii) / RSS-247 5.1 (d)	Number of hopping channels	N/A	
FCC 15.247 (a)(2) / RSS-247 5.2. (a)	6 dB Bandwidth	P	
FCC 15.247 (b) / RSS-247 5.4. (d)	Maximum output power and antenna gain	P	
FCC 15.247 (d) / RSS-247 5.5.	Band-edge emissions compliance (Transmitter)	P	
FCC 15.247 (e) / RSS-247 5.2. (b)	Power spectral density	P	
FCC 15.247 (d) / RSS-247 5.5.	Emission limitations radiated (Transmitter)	P	
Supplementary information and remarks: None.			

Appendix A: Test results. BLE (1M, 2M)

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TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal:	3.7 Vdc
Type of Power Supply:	Rechargeable battery.

ANTENNA (*):

Type of Antenna – BLE (2M, 1M):	Integral
Maximum Declared Antenna Gain - Proximity:	-16 dBi

TEST FREQUENCIES (*):

Modulation	Data rates	Low Channel:	Middle Channel	High Channel
BTLE GFSK	1M 1 Mbit/s	2402 MHz	2440 MHz	2480 MHz
BTLE GFSK	2M 2 Mbit/s	2402 MHz	2440 MHz	2480 MHz

During transmitter test the EUT was controlled by a SW tool provided by the client to operate in a continuous transmit mode on the modulation schemes and test channels as required.

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).

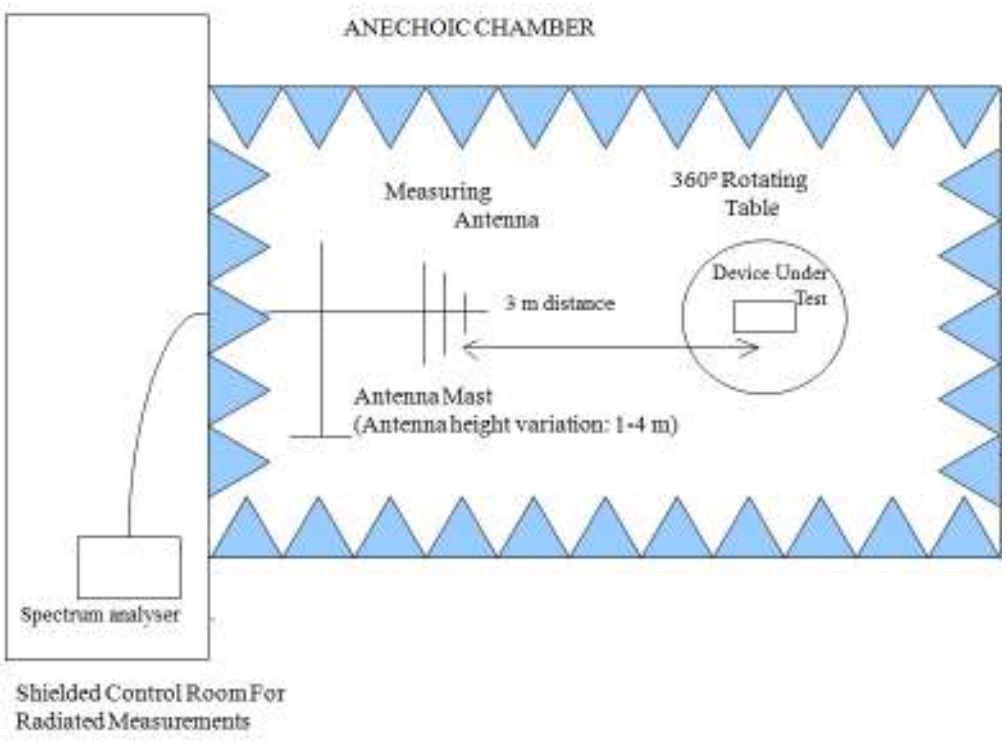
For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

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.

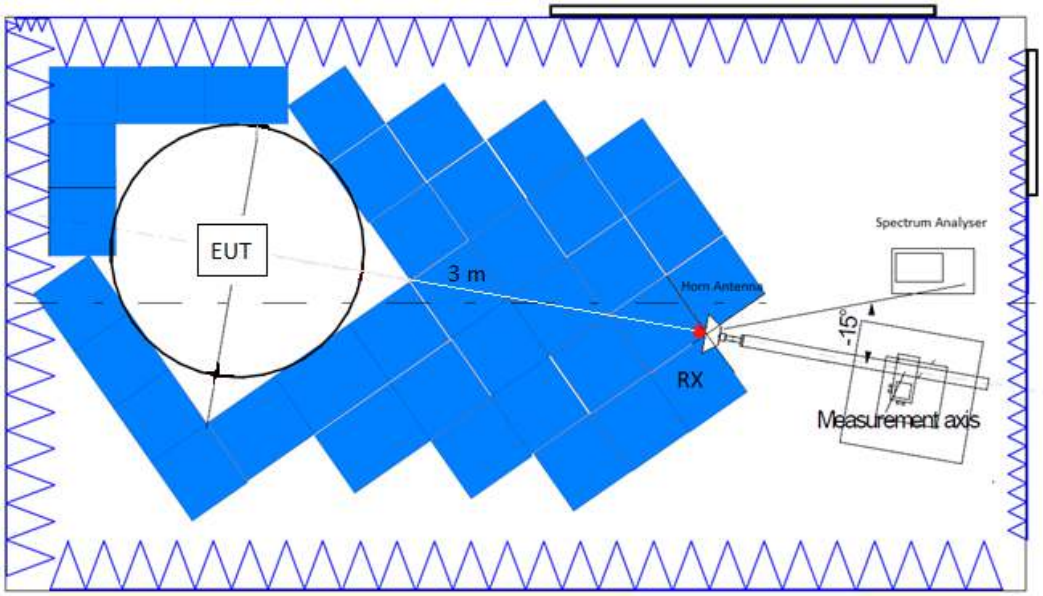
Measurements were made in both horizontal and vertical planes of polarization.

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.

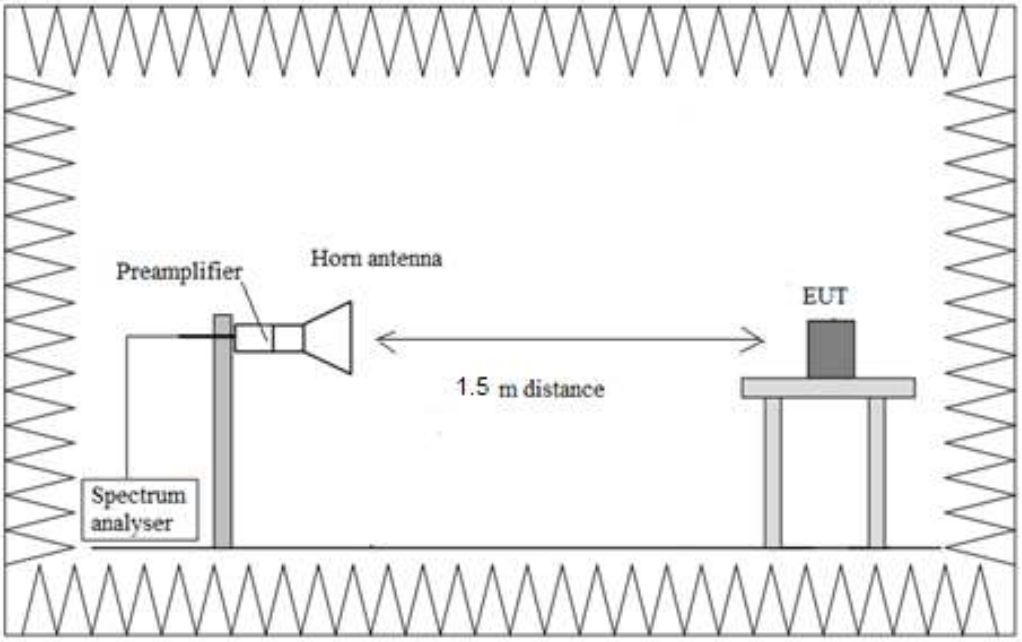
Radiated measurements setup from 30 MHz to 1 GHz:



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

99dBw Occupied Channel Bandwidth 99%

Limits

RSS-Gen 6.7 Occupied bandwidth (or 99% emission bandwidth) and x dB bandwidth:

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Results

Equipment	BW (MHz)	Freq (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
Digital Transmission System (DTS)	1	2402.00000	1	1	1.040
		2440.00000			1.040
		2480.00000			1.030

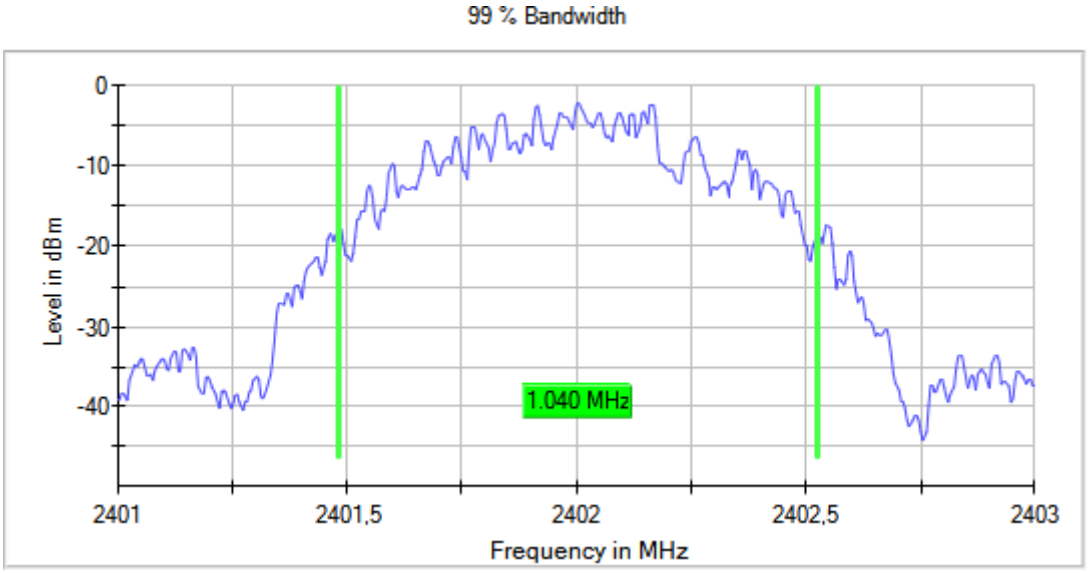
Verdict

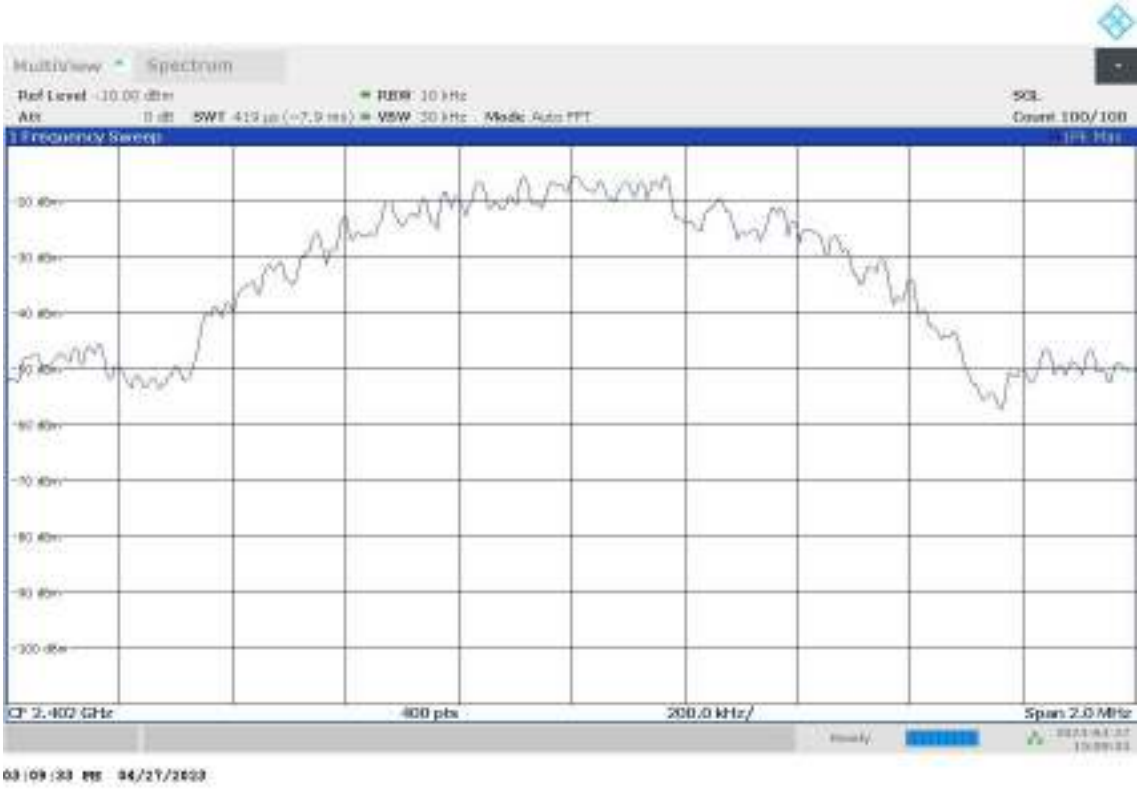
Pass

Attachments

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

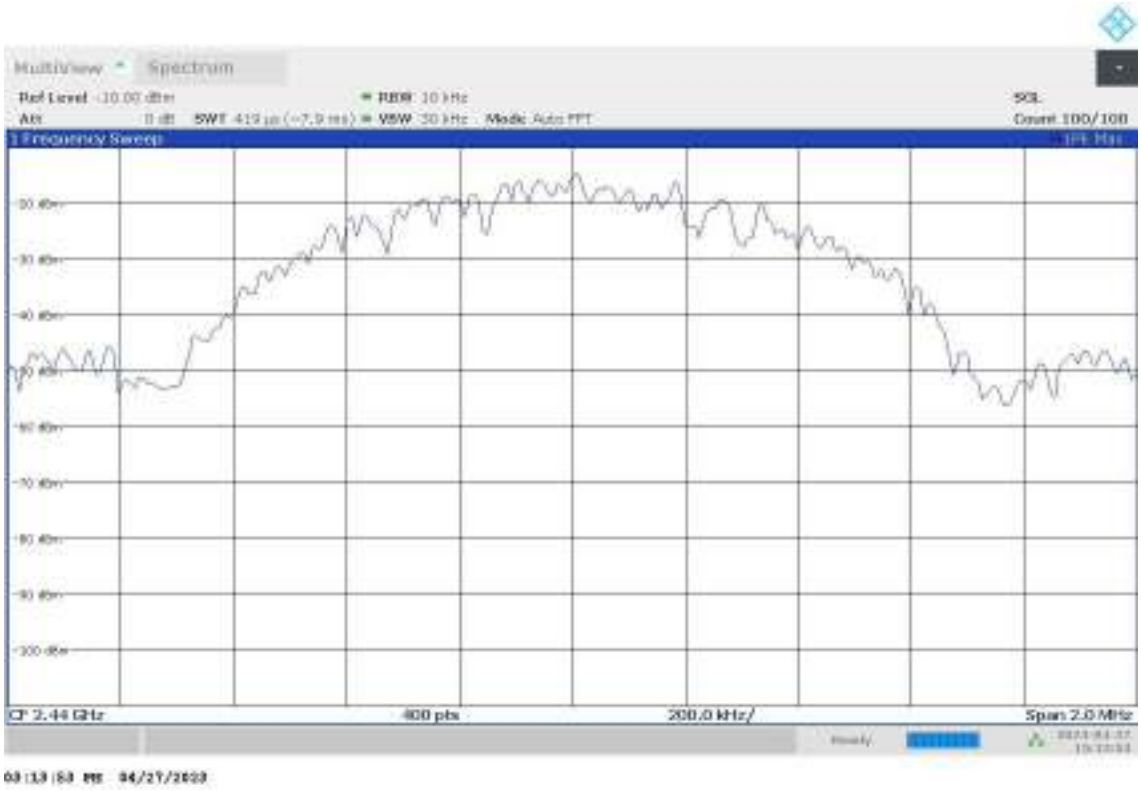
Images:

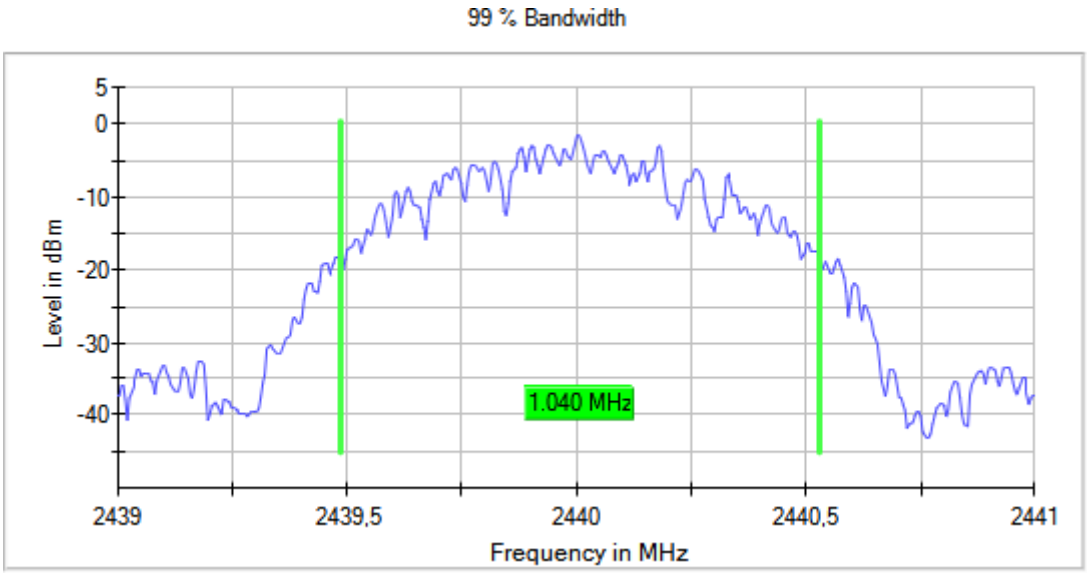




Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 1
Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
Frequency MHz = 2440.00000
Number of Transmission Chains = 1
Active Port = 1

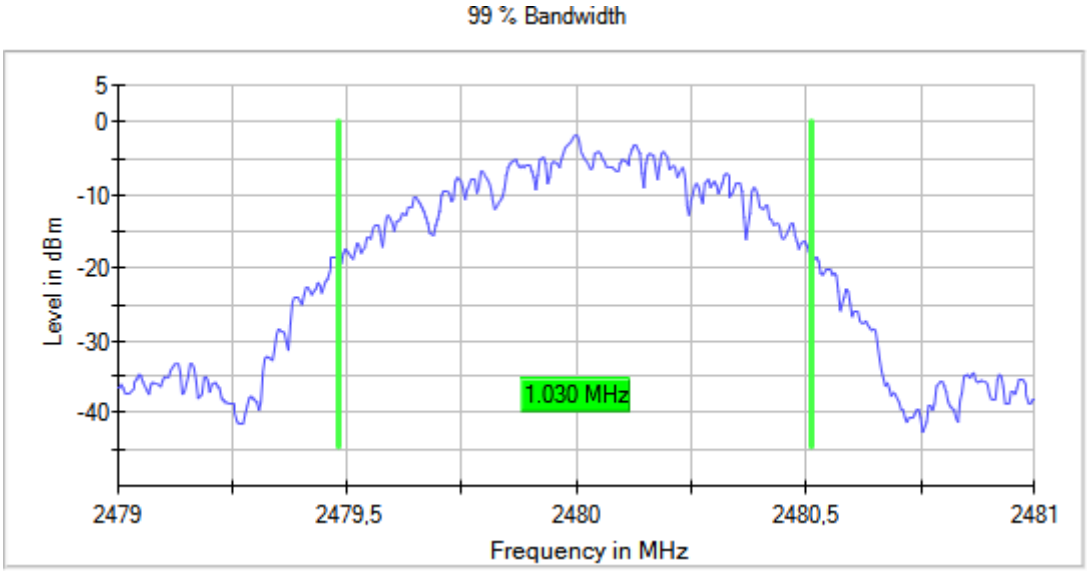
Images:

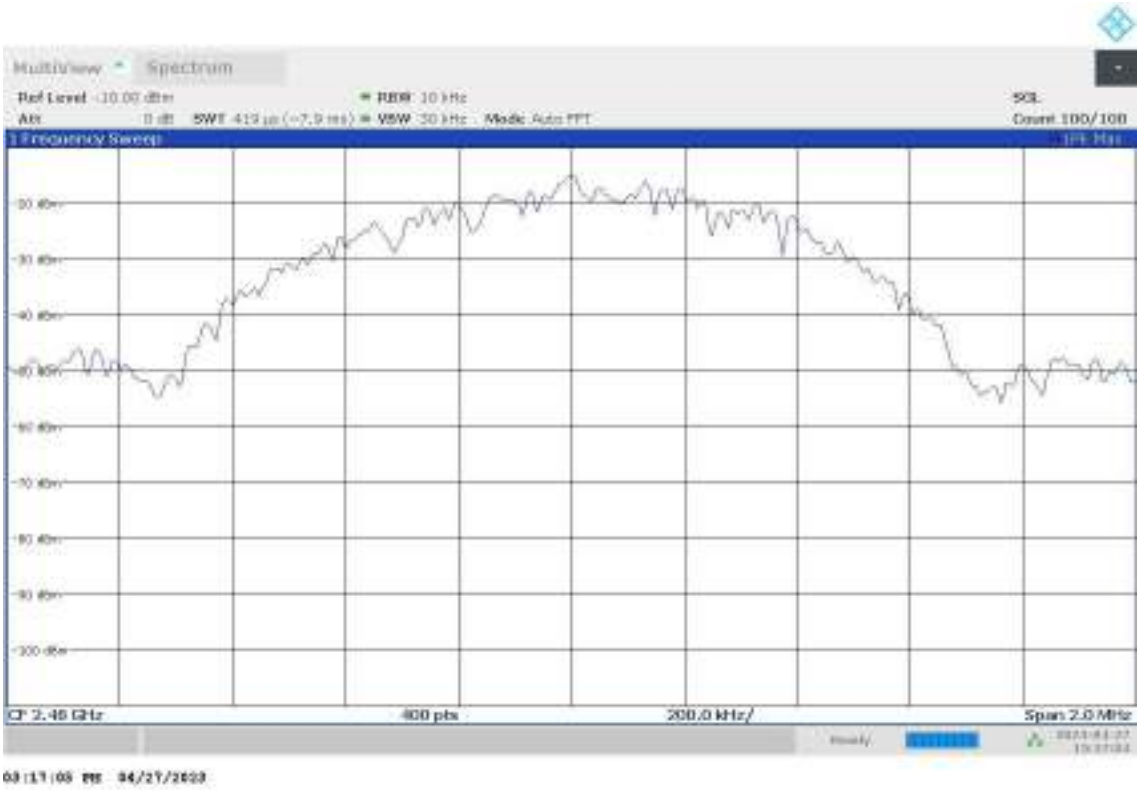




Equipment Type = Digital Transmission System (DTS)	Bandwidth MHz = 1
Modulation = BTLE 5.0 (GFSK 1 Mbit/s)	Frequency MHz = 2480.00000
Number of Transmission Chains = 1	Active Port = 1

Images:





Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Results

Equipment	BW (MHz)	Freq (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
Digital Transmission System (DTS)	2	2402.00000	1	1	2.020
		2440.00000			2.040
		2480.00000			2.010

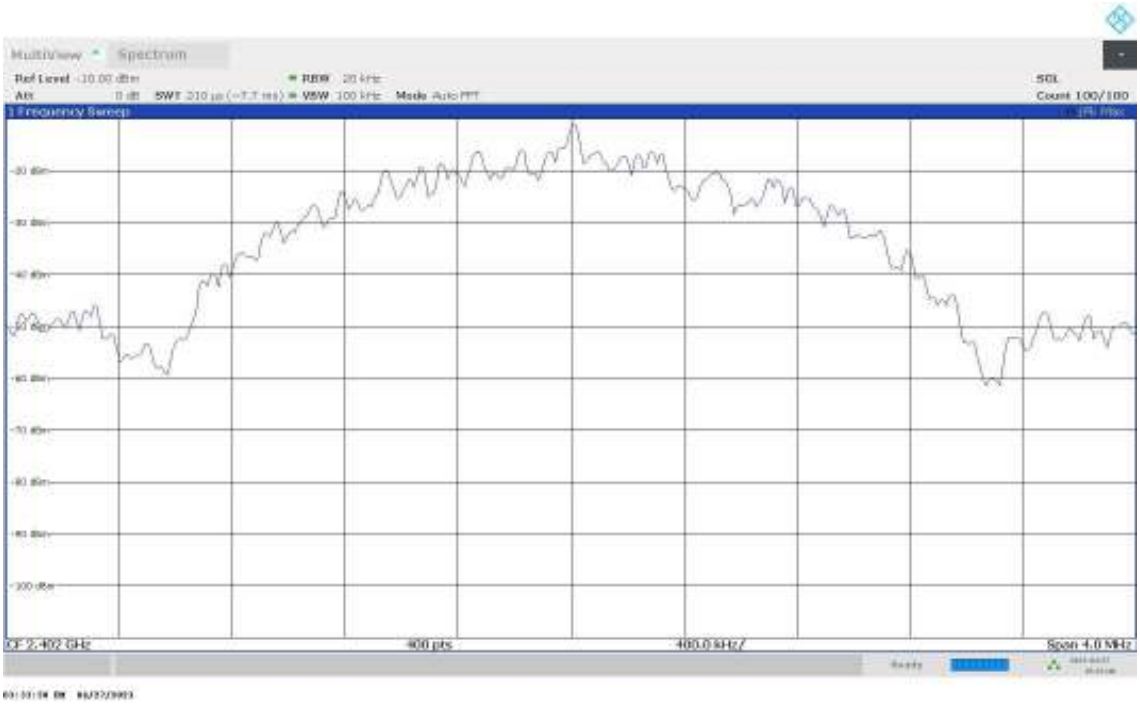
Verdict

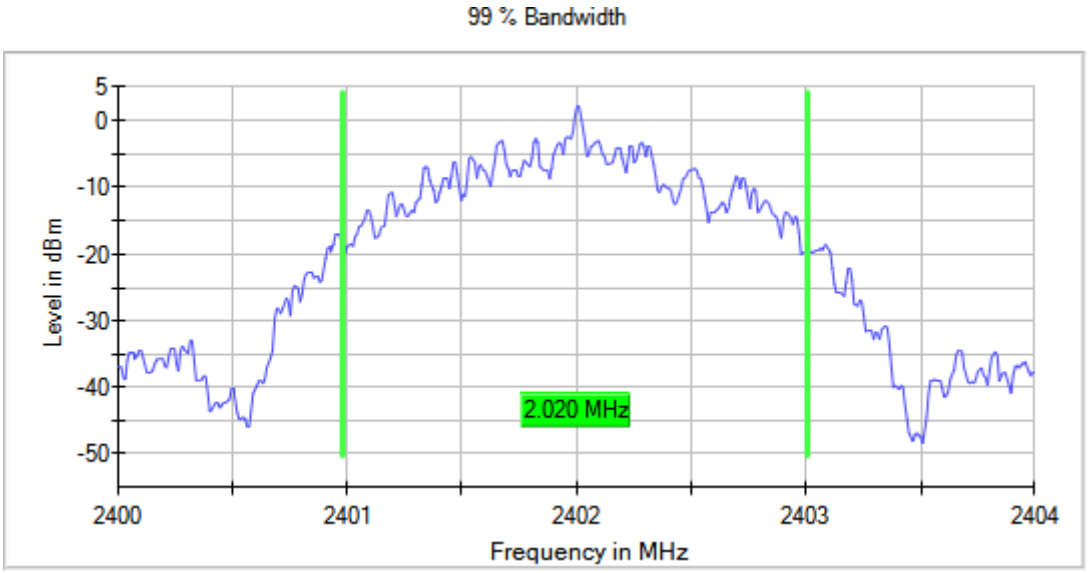
Pass

Attachments

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

Images:



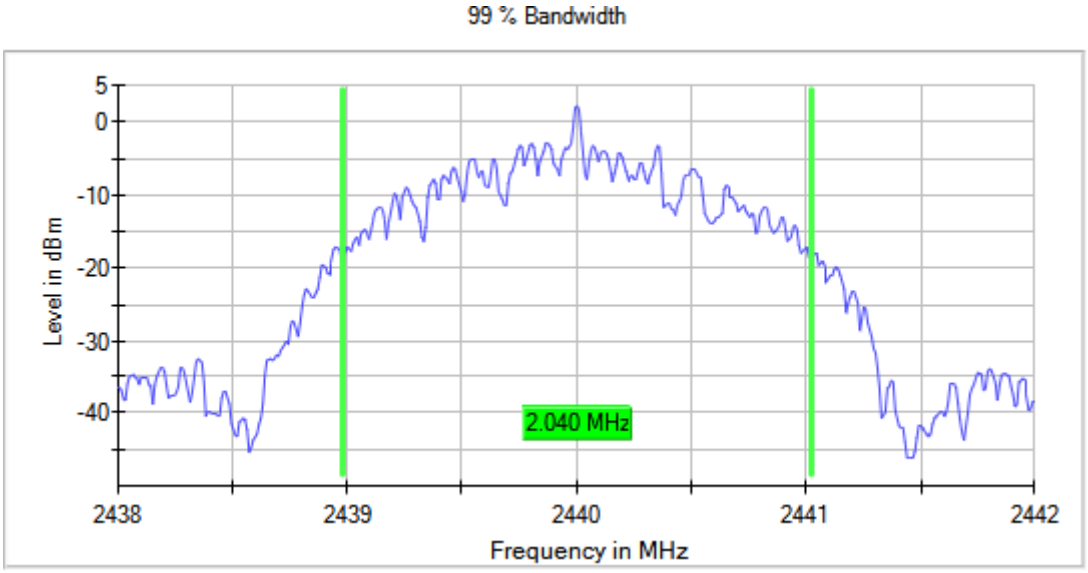


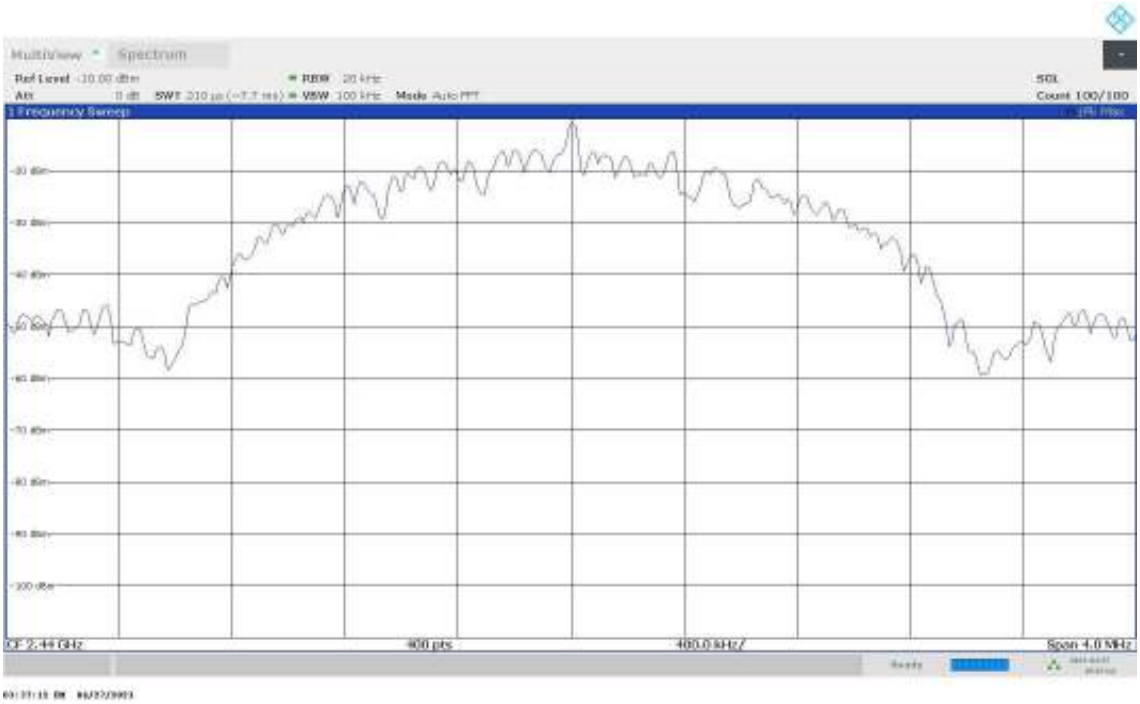
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 2

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

Number of Transmission Chains = 1 Active Port = 1

Images:



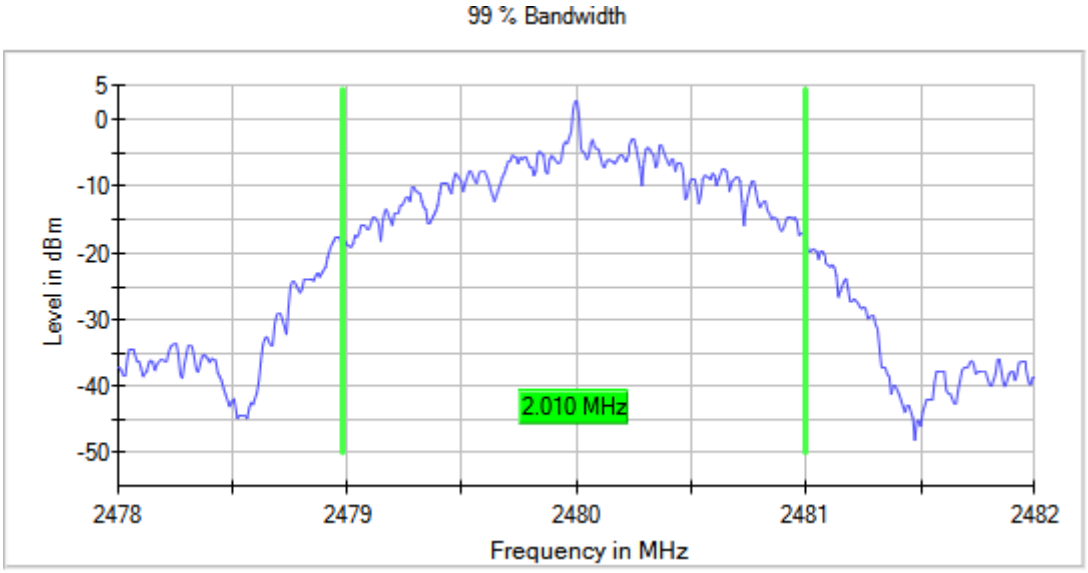


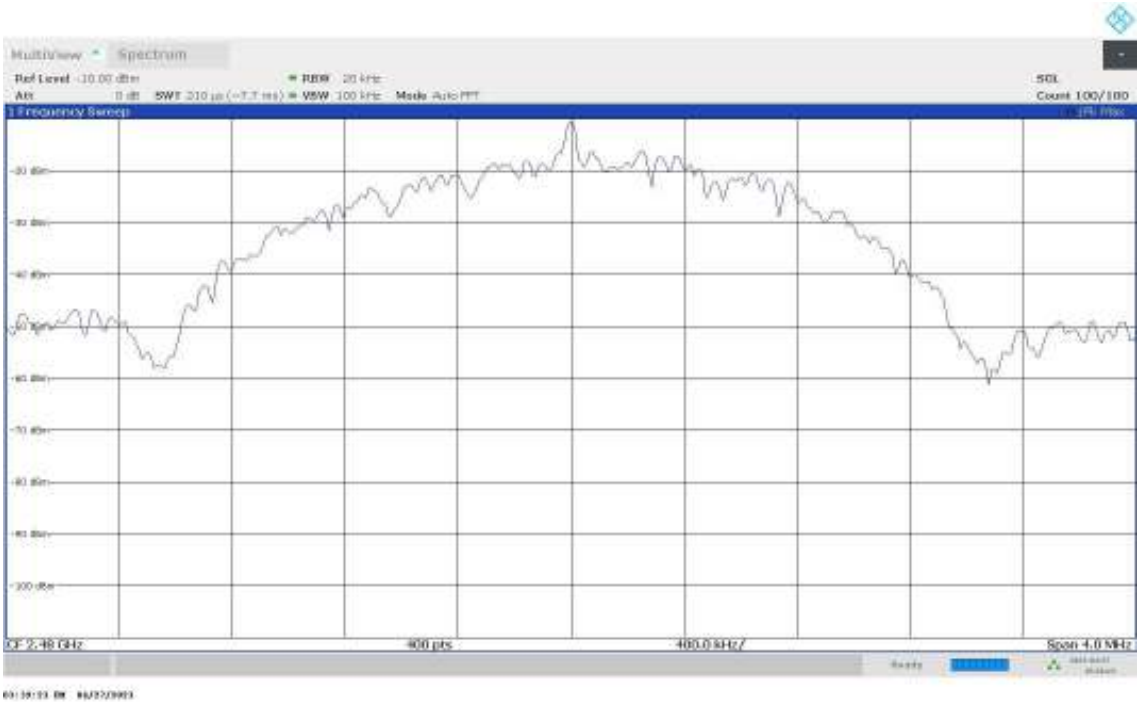
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 2

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

Number of Transmission Chains = 1 Active Port = 1

Images:





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

BW (MHz)	Freq (MHz)	# of Tx Chains	Port	Ebw (MHz)
1	2402.00000	1	1	0.772
	2440.00000			0.792
	2480.00000			0.713

Verdict

Pass

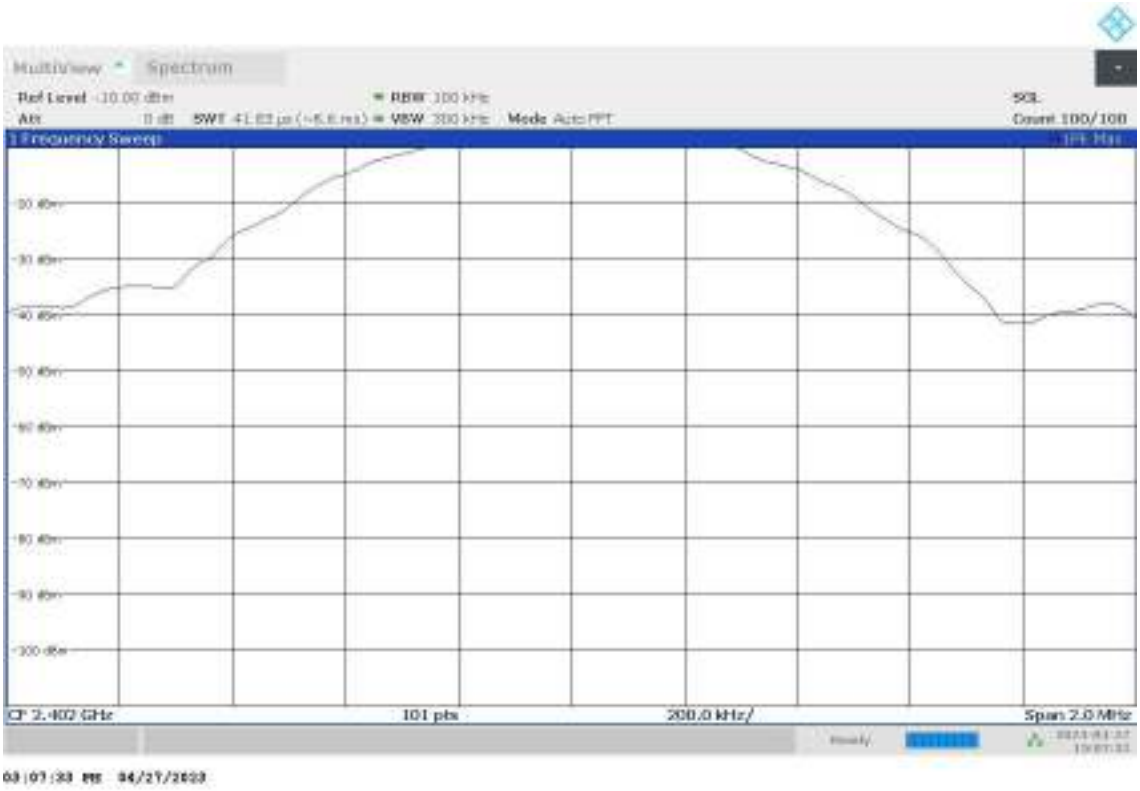
Attachments

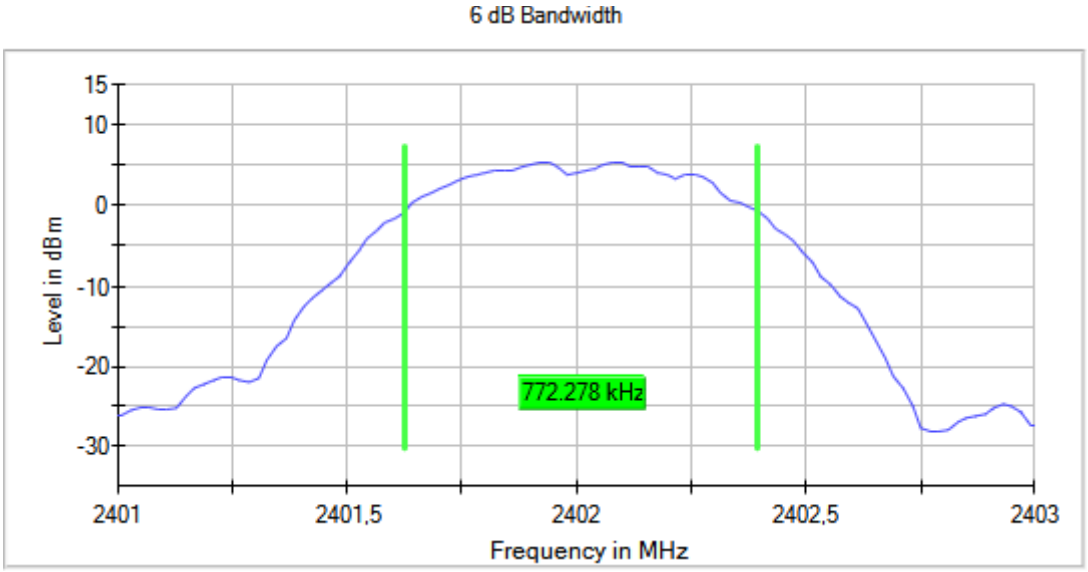
Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Frequency MHz = 2402.00000 Number of Transmission Chains = 1

Active Port = 1

Images:



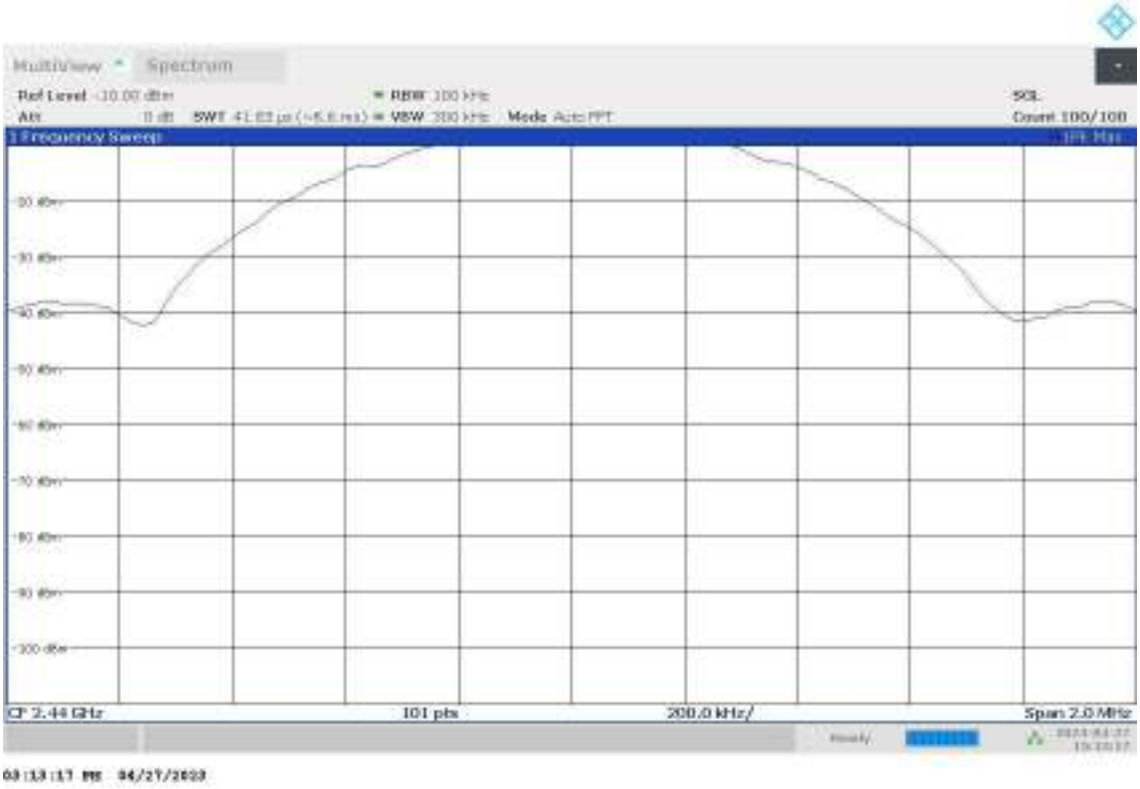


Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

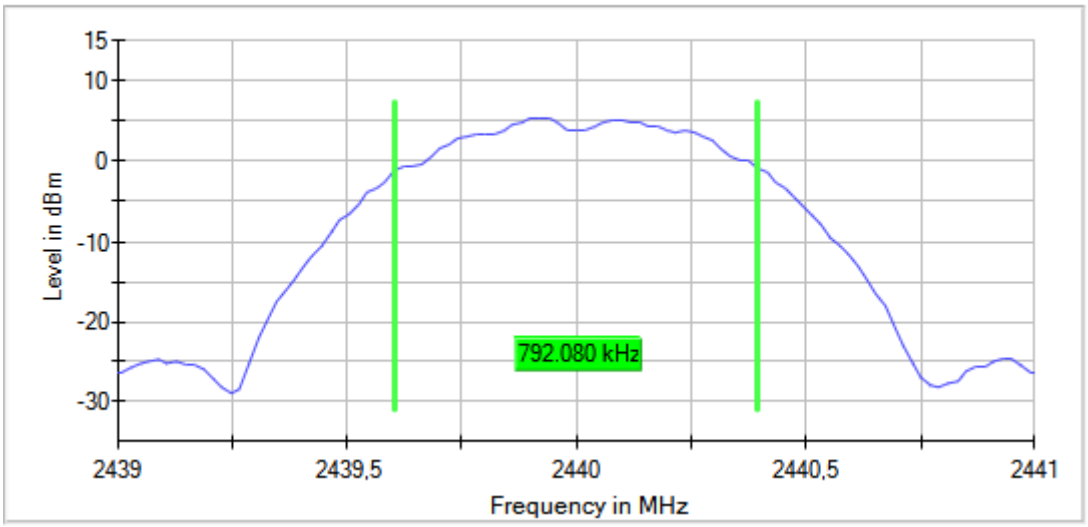
Frequency MHz = 2440.00000 Number of Transmission Chains = 1

Active Port = 1

Images:



6 dB Bandwidth

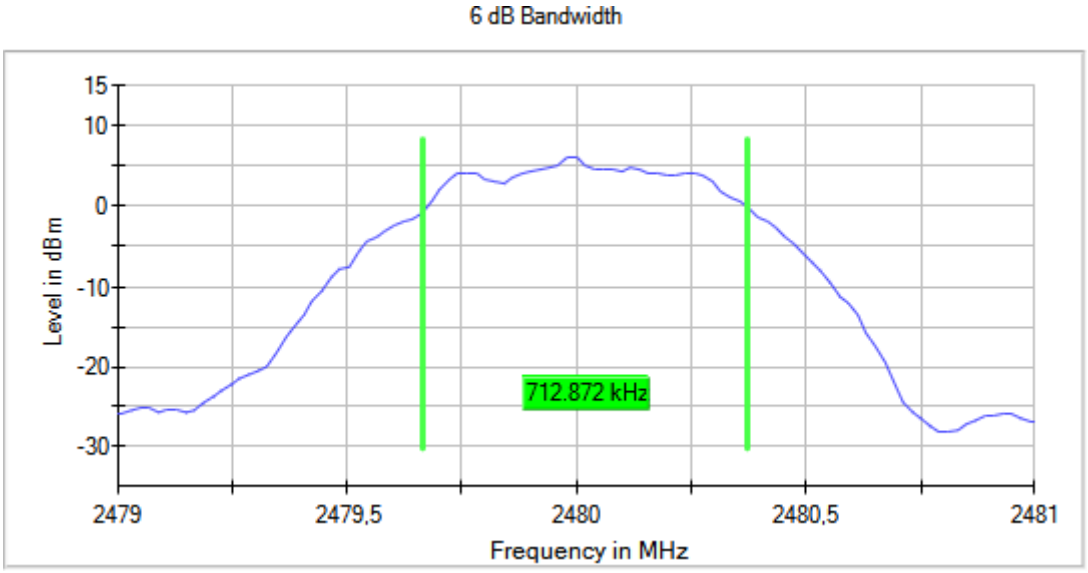


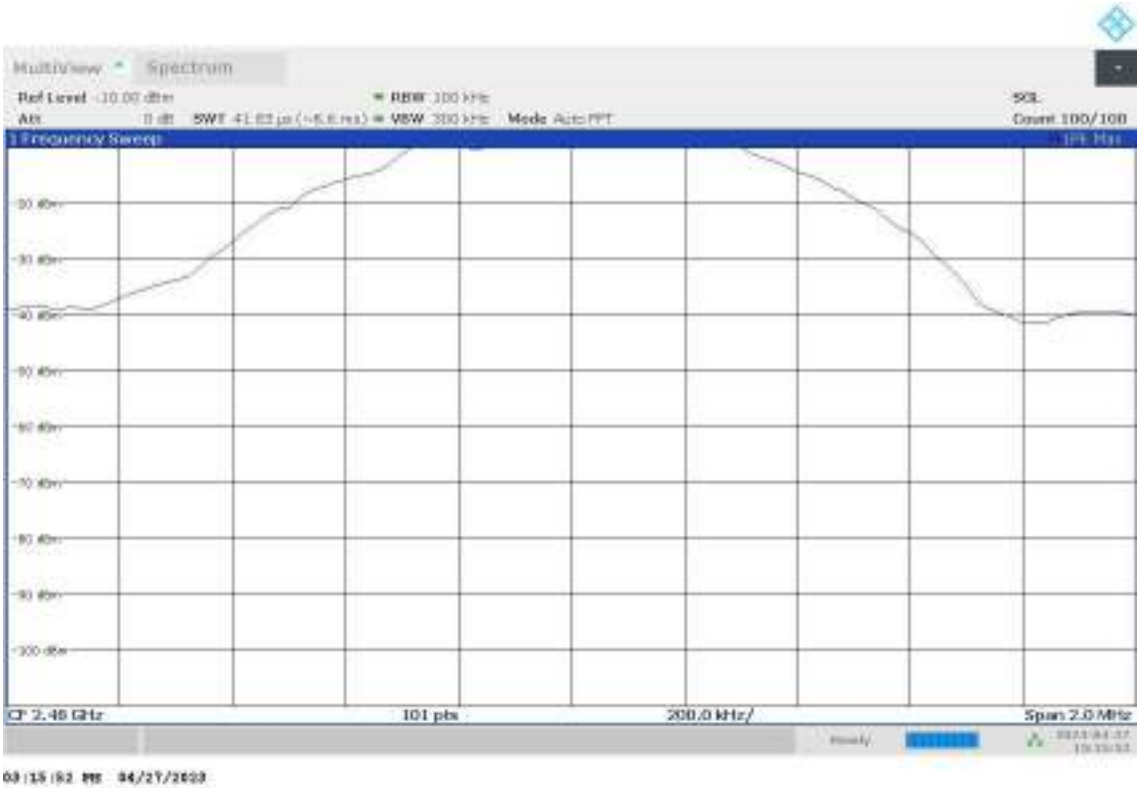
Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Frequency MHz = 2480.00000 Number of Transmission Chains = 1

Active Port = 1

Images:





Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Results

BW (MHz)	Freq (MHz)	# of Tx Chains	Port	Ebw (MHz)
2	2402.00000	1	1	1.347
	2440.00000			1.386
	2480.00000			0.990

Verdict

Pass

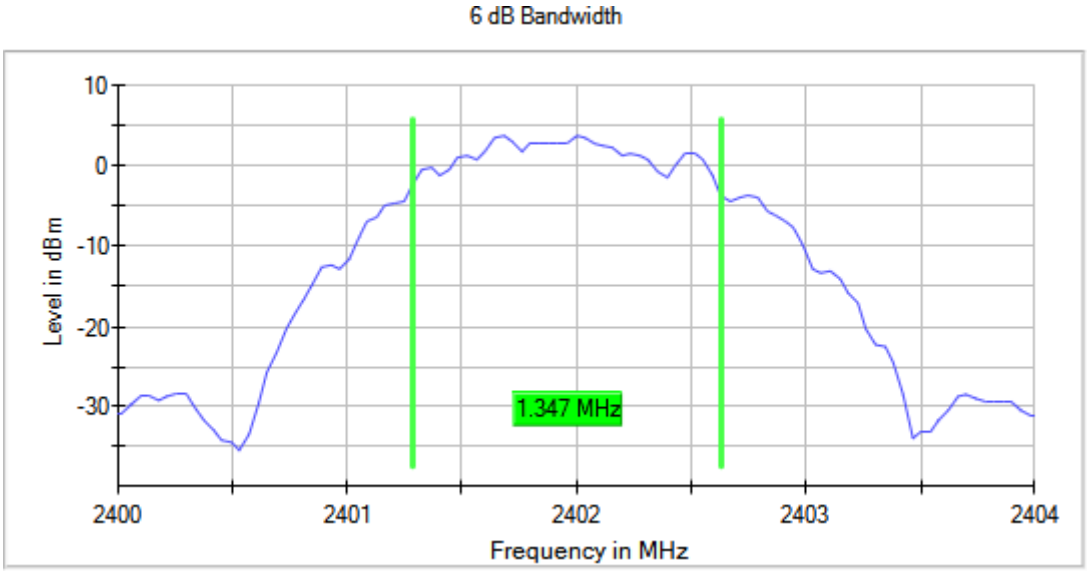
Attachments

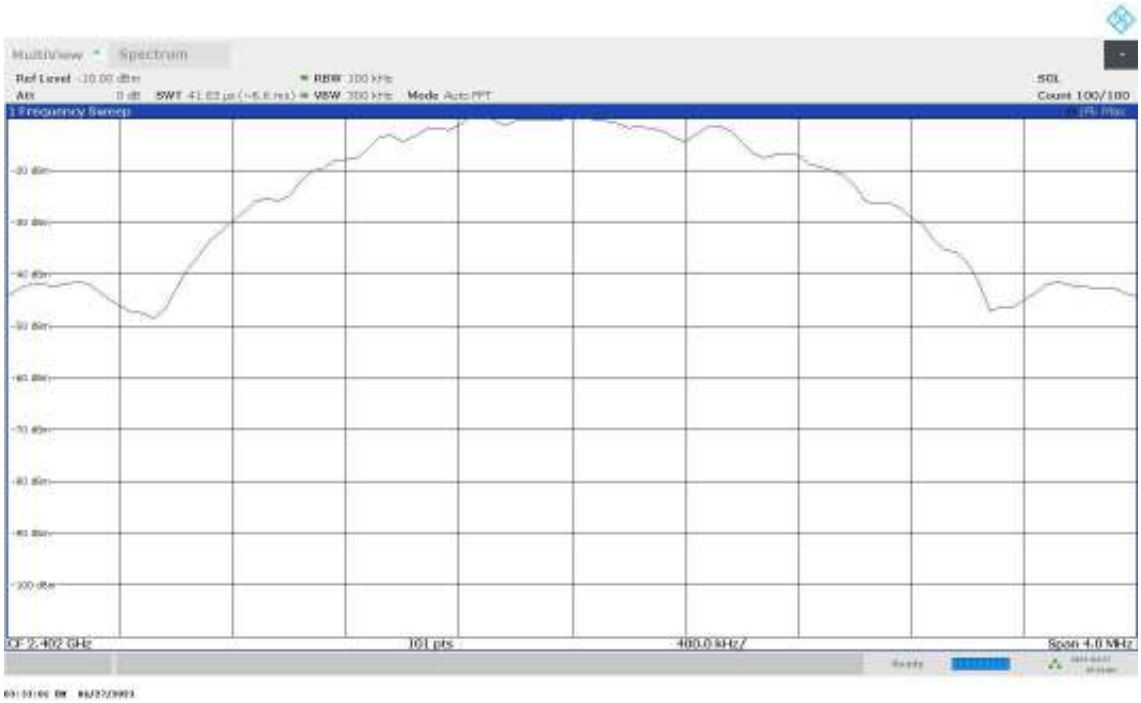
Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Frequency MHz = 2402.00000 Number of Transmission Chains = 1

Active Port = 1

Images:



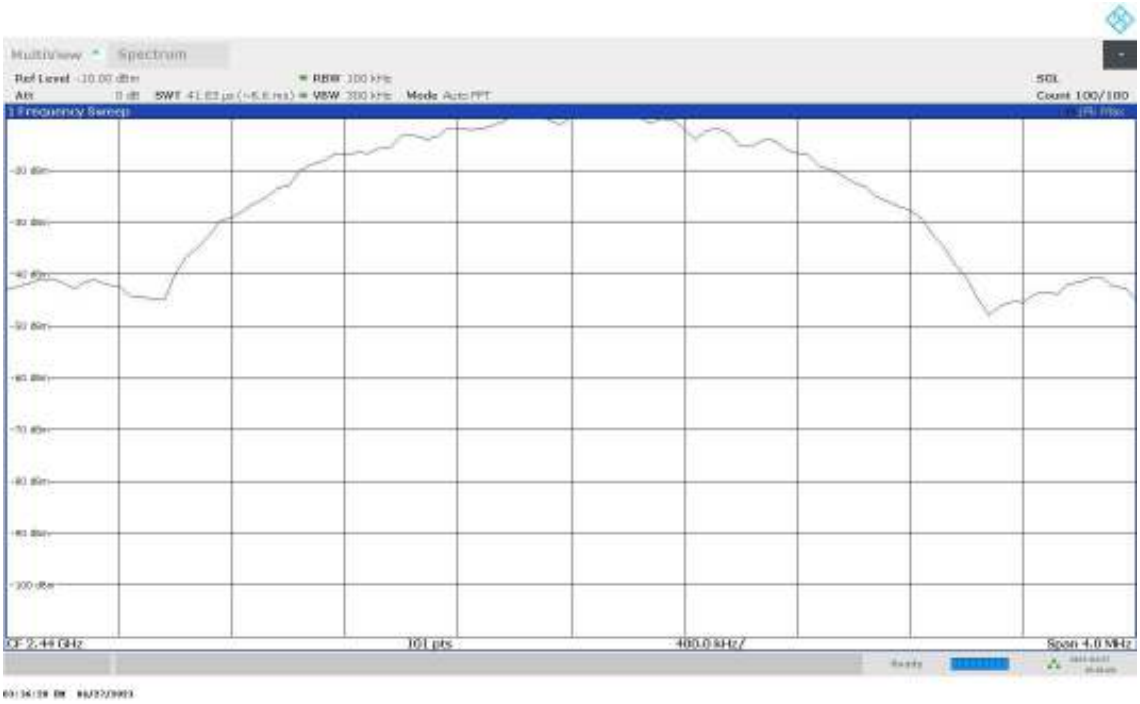


Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

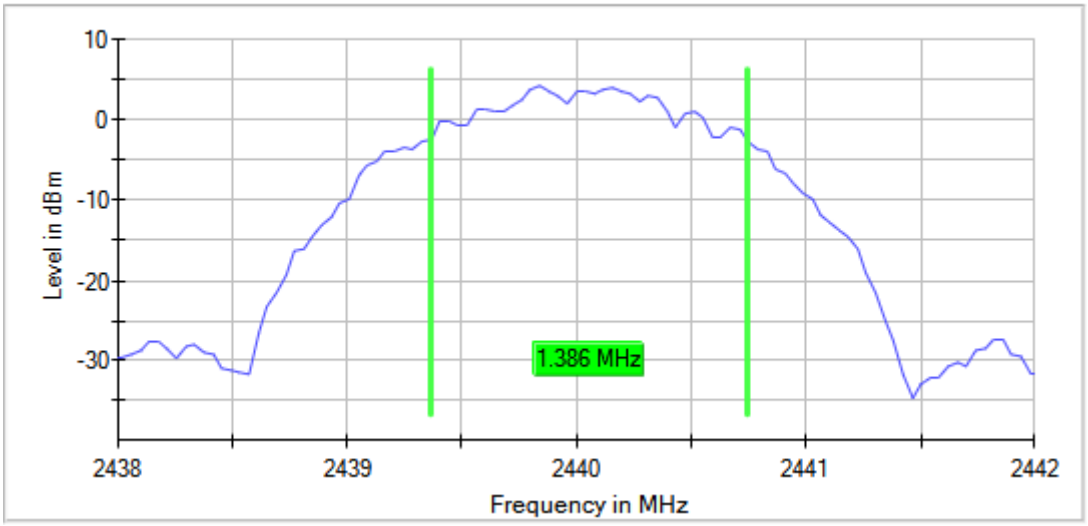
Frequency MHz = 2440.00000 Number of Transmission Chains = 1

Active Port = 1

Images:



6 dB Bandwidth

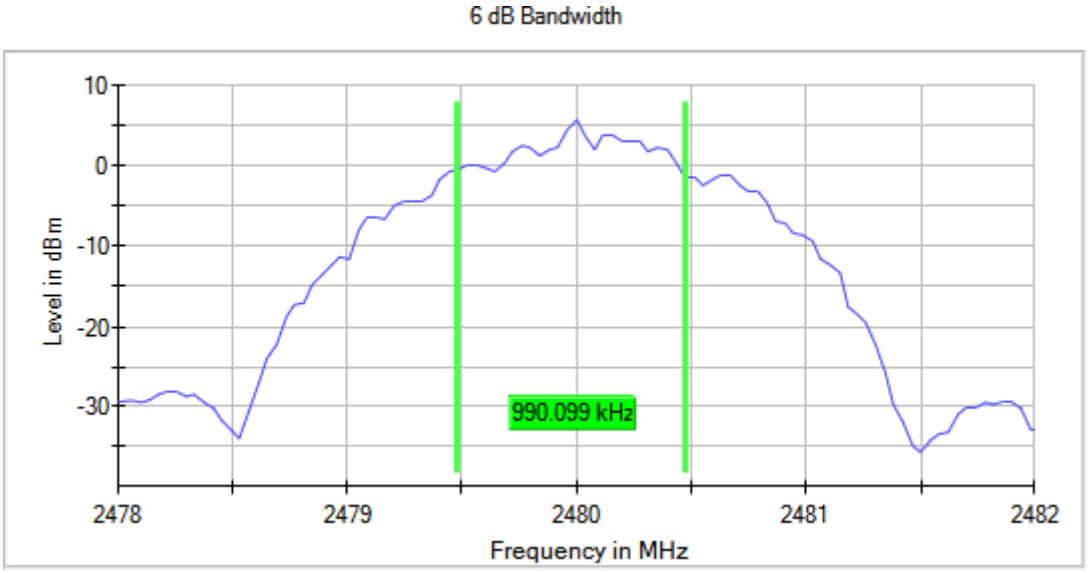


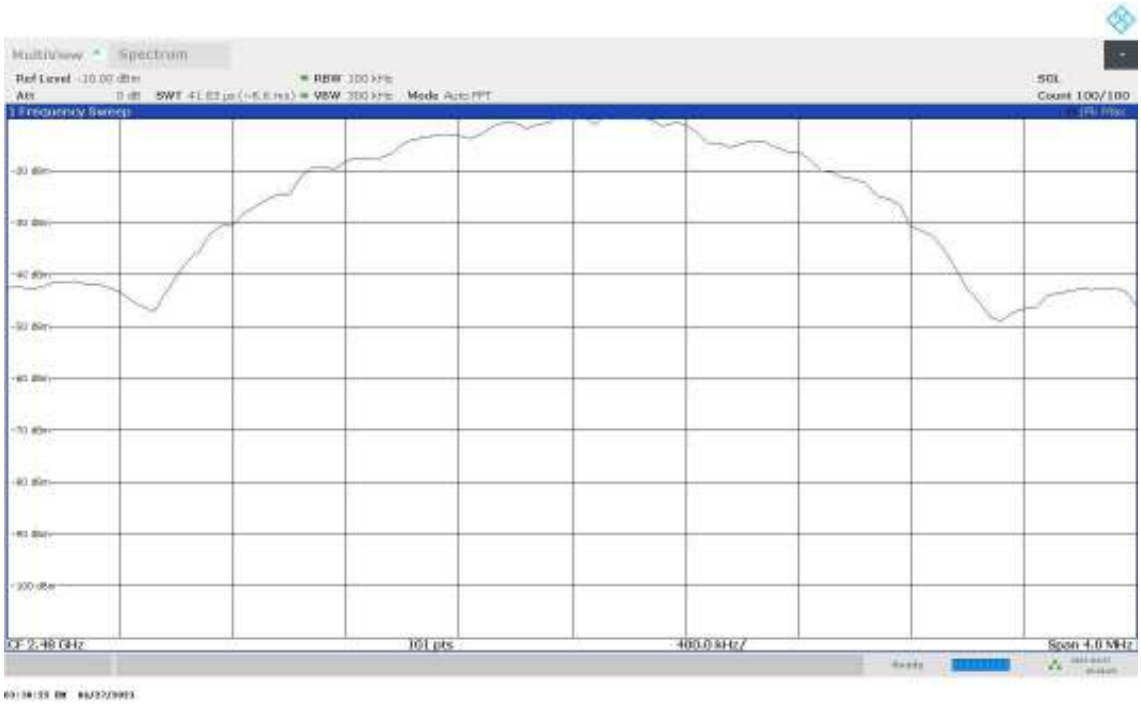
Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Frequency MHz = 2480.00000 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

Equipment	BW (MHz)	Freq (MHz)	# of Tx Chains	Port	PSD (dBm)
Digital Transmission System (DTS)	1	2402.00000	1	1	-2.28
		2440.00000			-1.54
		2480.00000			-1.69

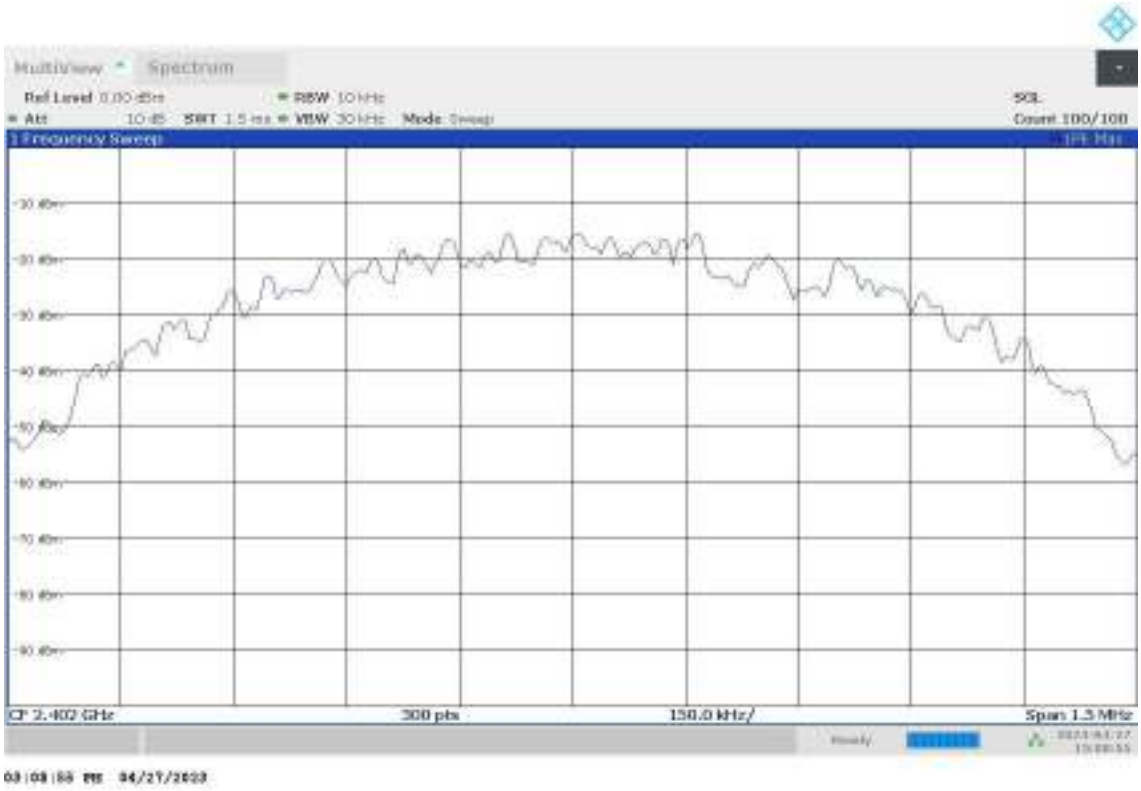
Verdict

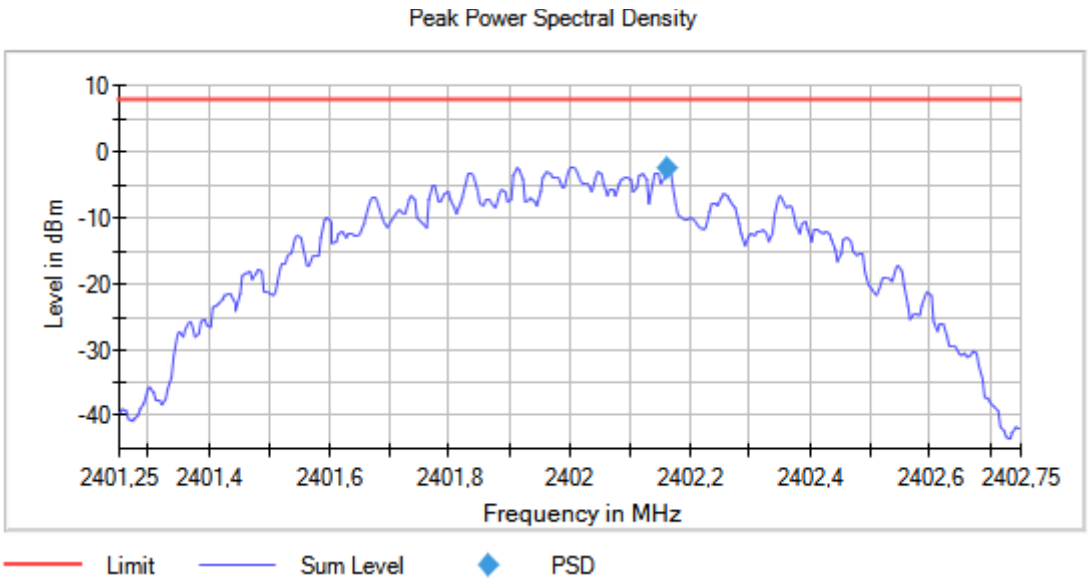
Pass

Attachments

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

Images:



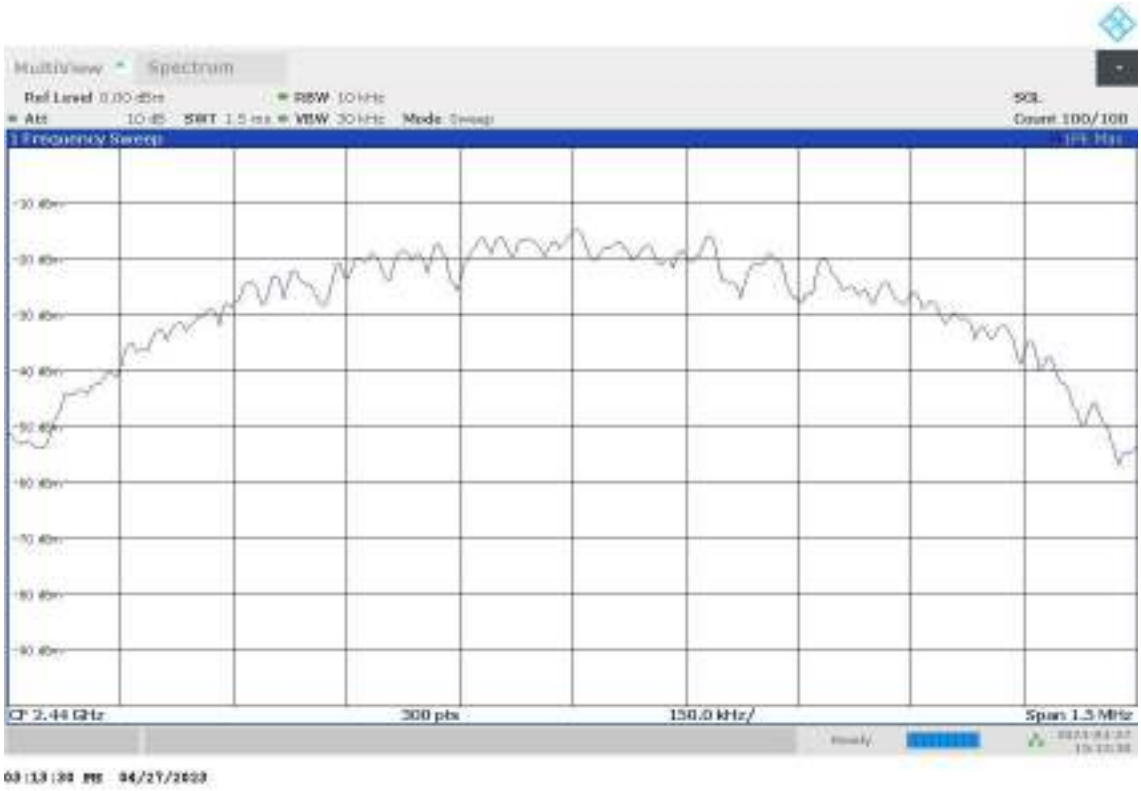


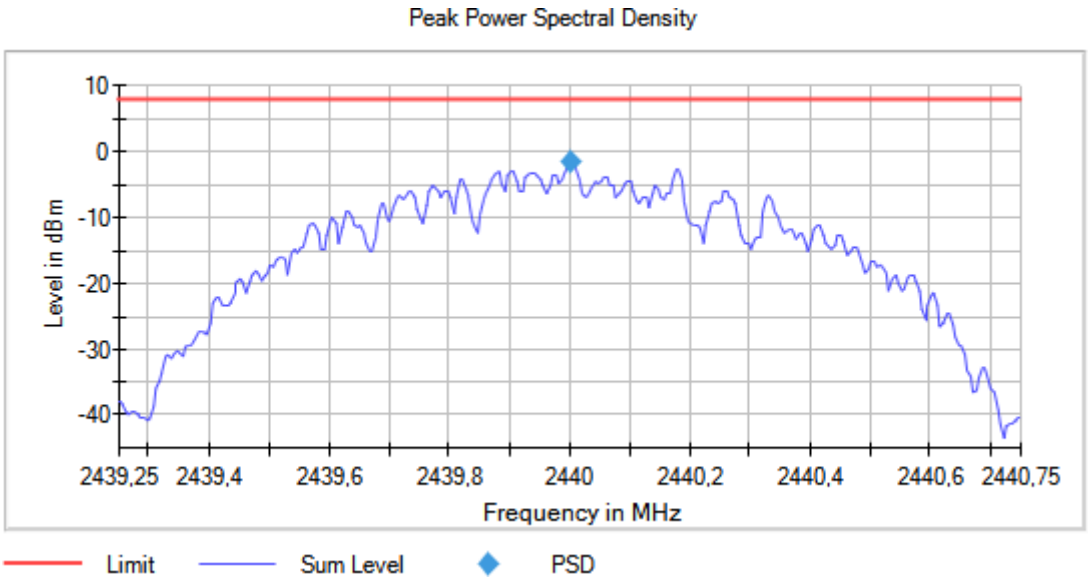
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 1

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

Number of Transmission Chains = 1 Active Port = 1

Images:



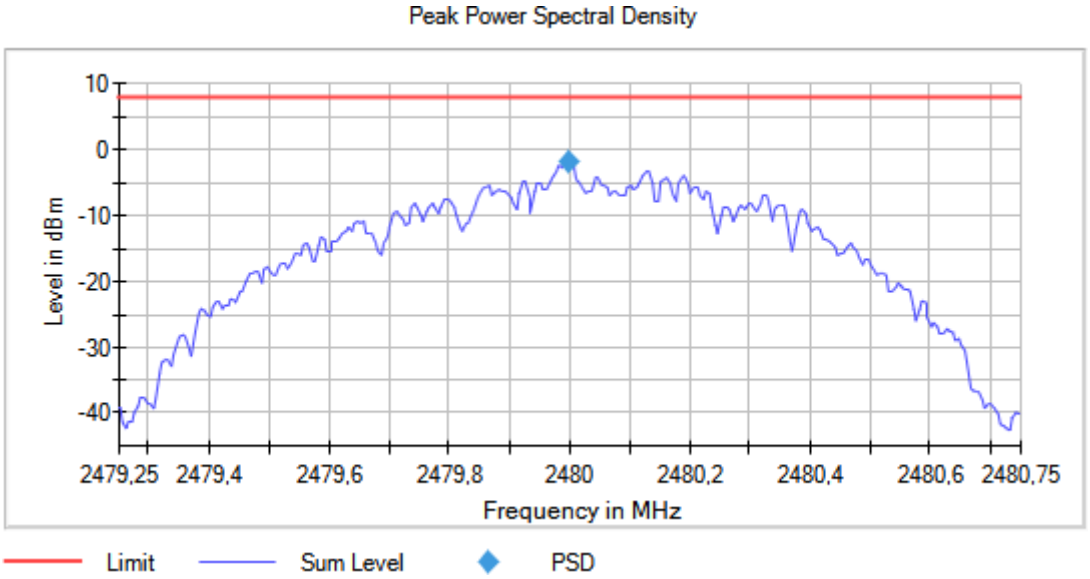


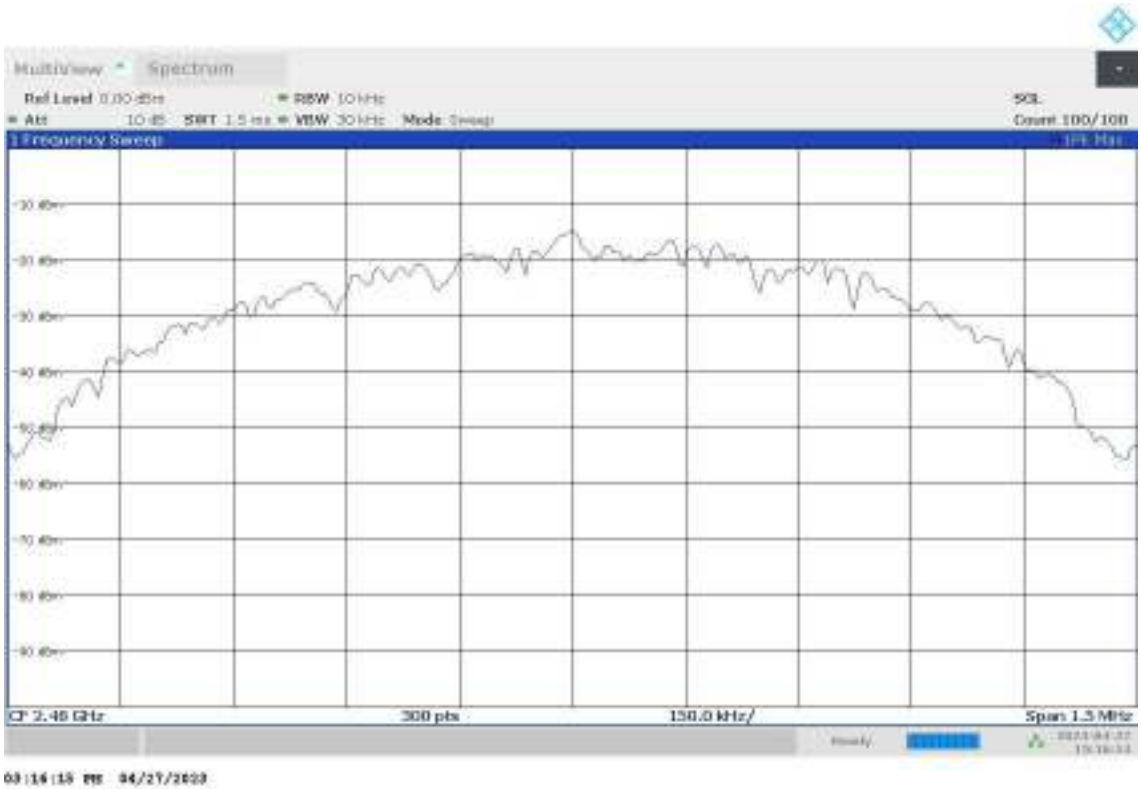
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 1

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

Number of Transmission Chains = 1 Active Port = 1

Images:





Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Results

Equipment	BW (MHz)	Freq (MHz)	# of Tx Chains	Port	PSD (dBm)
Digital Transmission System (DTS)	2	2402.00000	1	1	-2.67
		2440.00000			-1.55
		2480.00000			-1.44

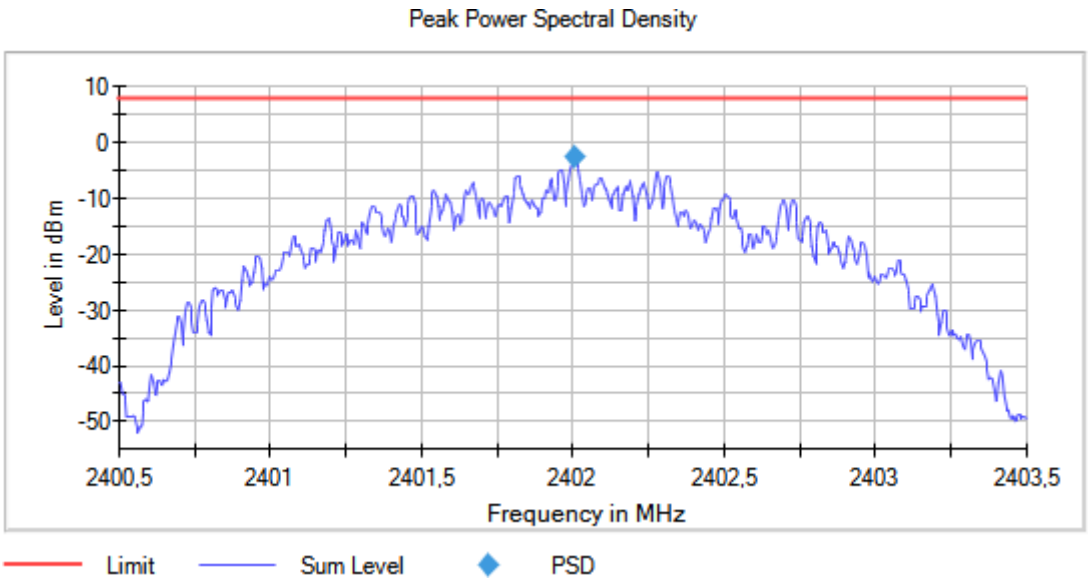
Verdict

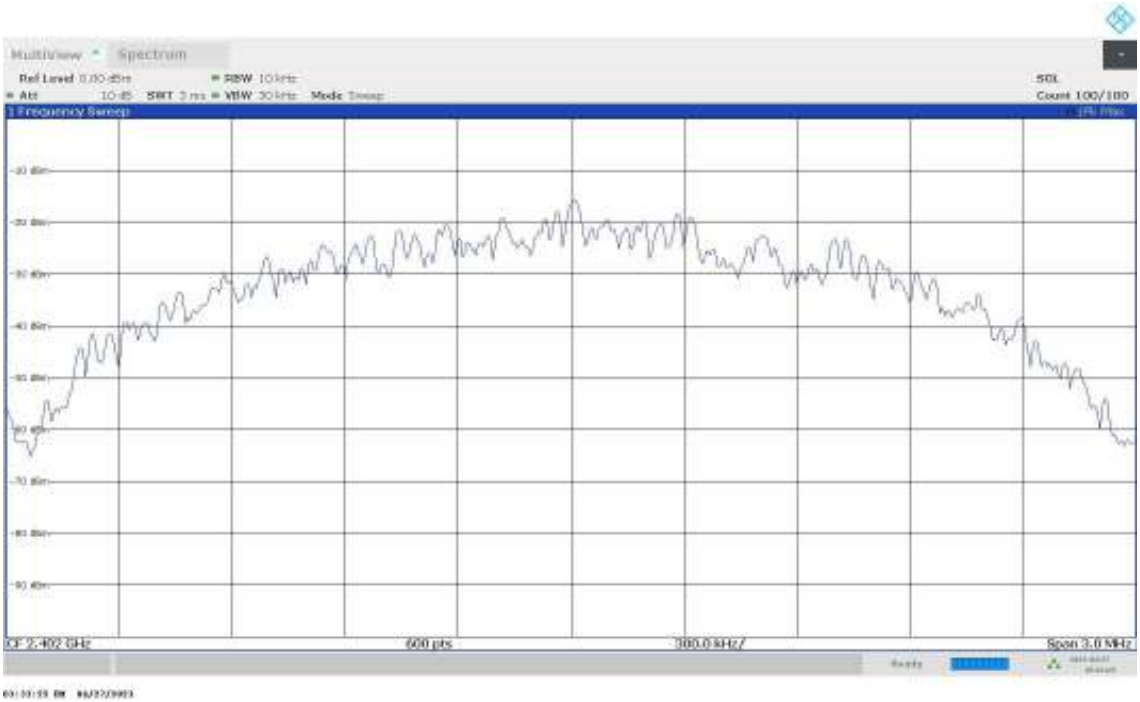
Pass

Attachments

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

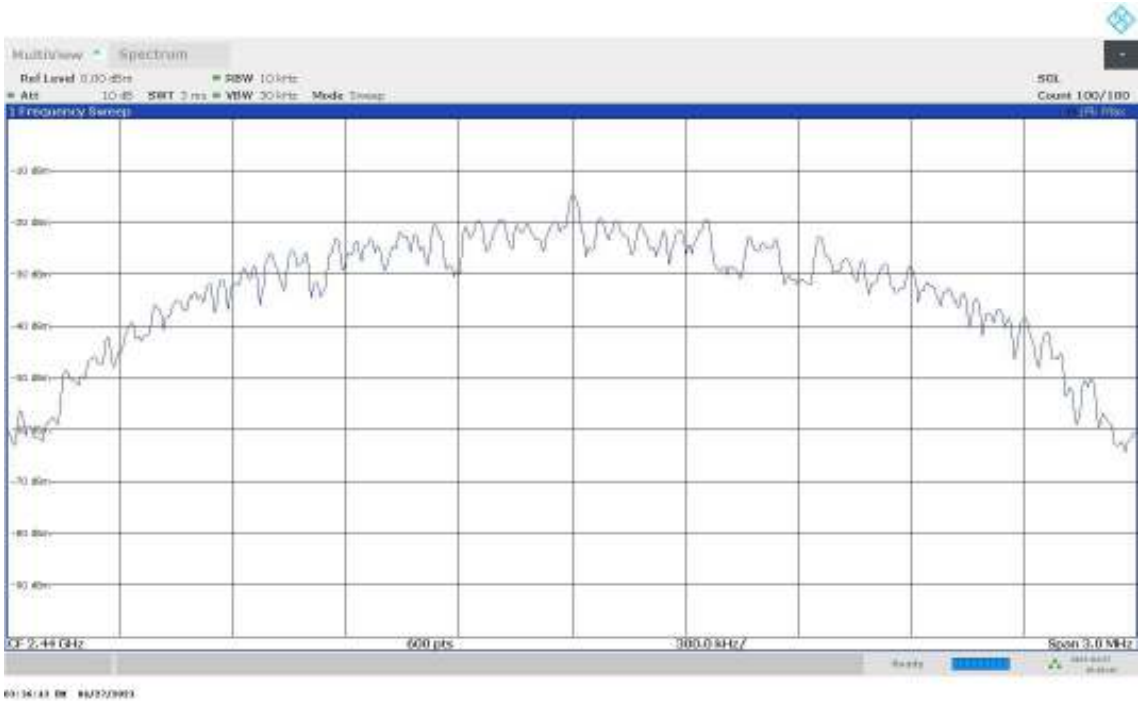
Images:

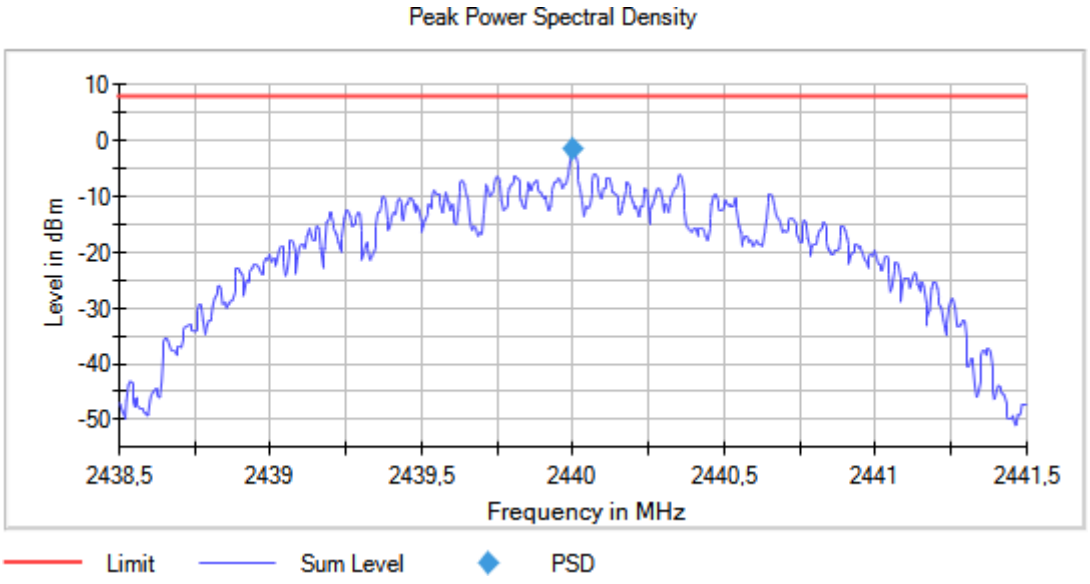




Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 2
Modulation = BTLE 5.0 (GFSK 2 Mbit/s)
Frequency MHz = 2440.00000
Number of Transmission Chains = 1
Active Port = 1

Images:



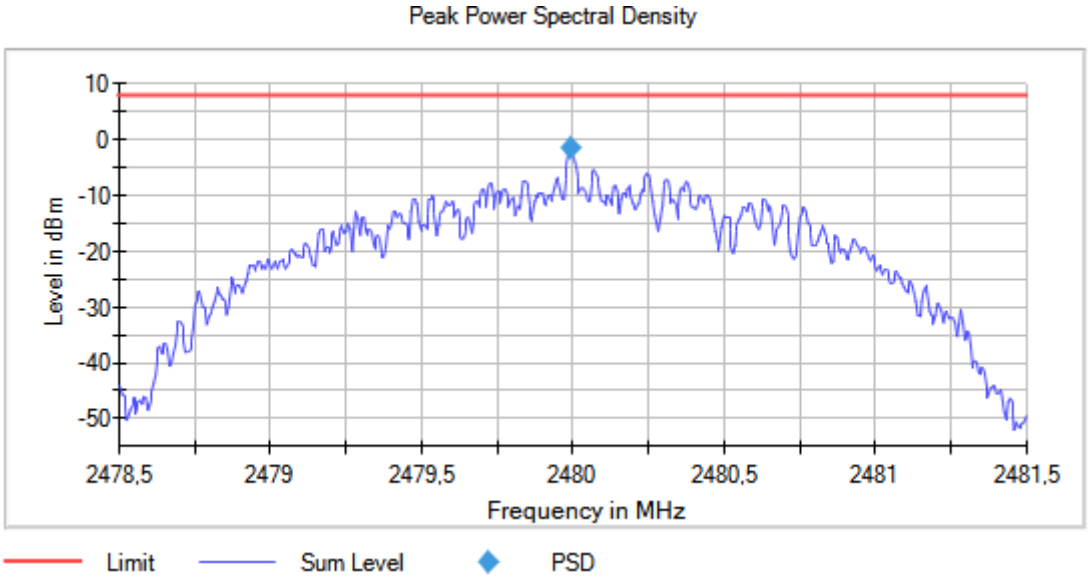


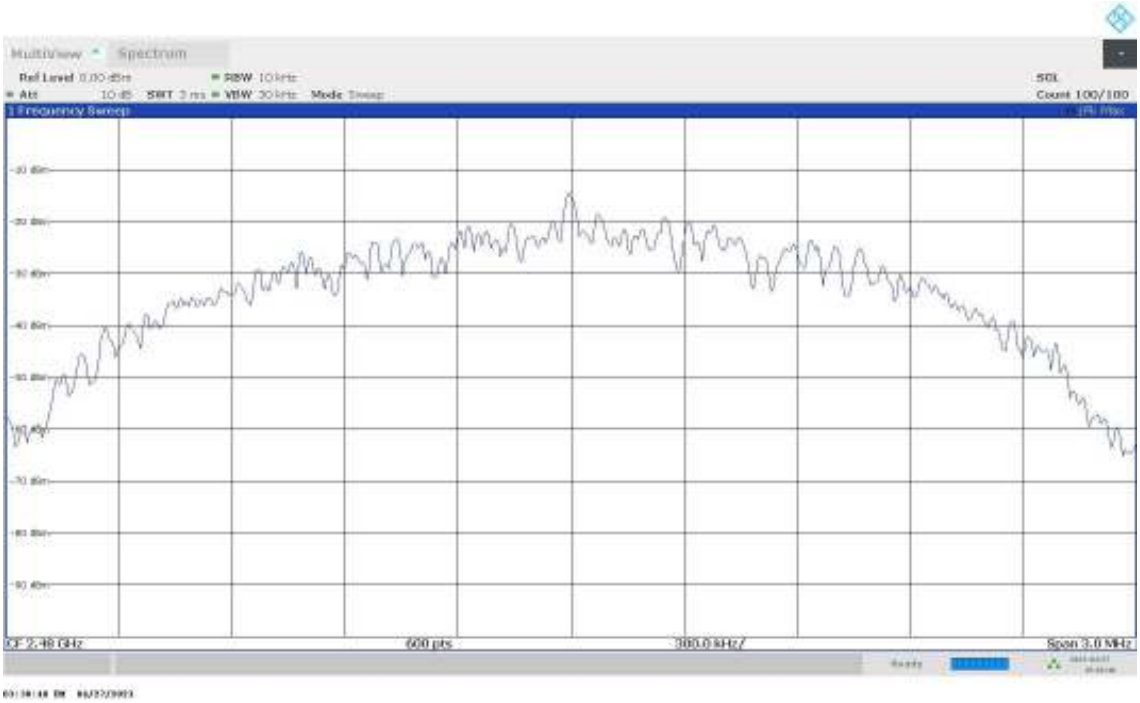
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 2

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

Number of Transmission Chains = 1 Active Port = 1

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 ≥ DTS bandwidth” of ANSI C.63.10-2013.

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Results

Equipment	BW (MHz)	Freq (MHz)	# of Tx Chains	Port	PeakPower (dBm)	Maximum EIRP Power (dBm)
Digital Transmission System (DTS)	1	2402.00000	1	1	6.7460	-9.254
Digital Transmission System (DTS)	1	2440.00000	1	1	6.7670	-9.233
Digital Transmission System (DTS)	1	2480.00000	1	1	7.6880	-8.312

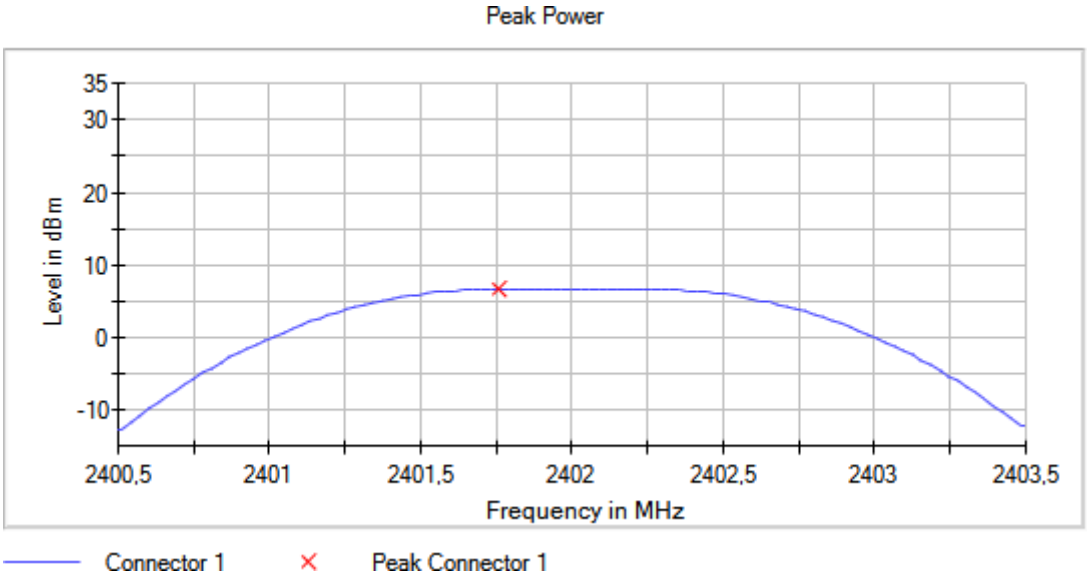
Verdict

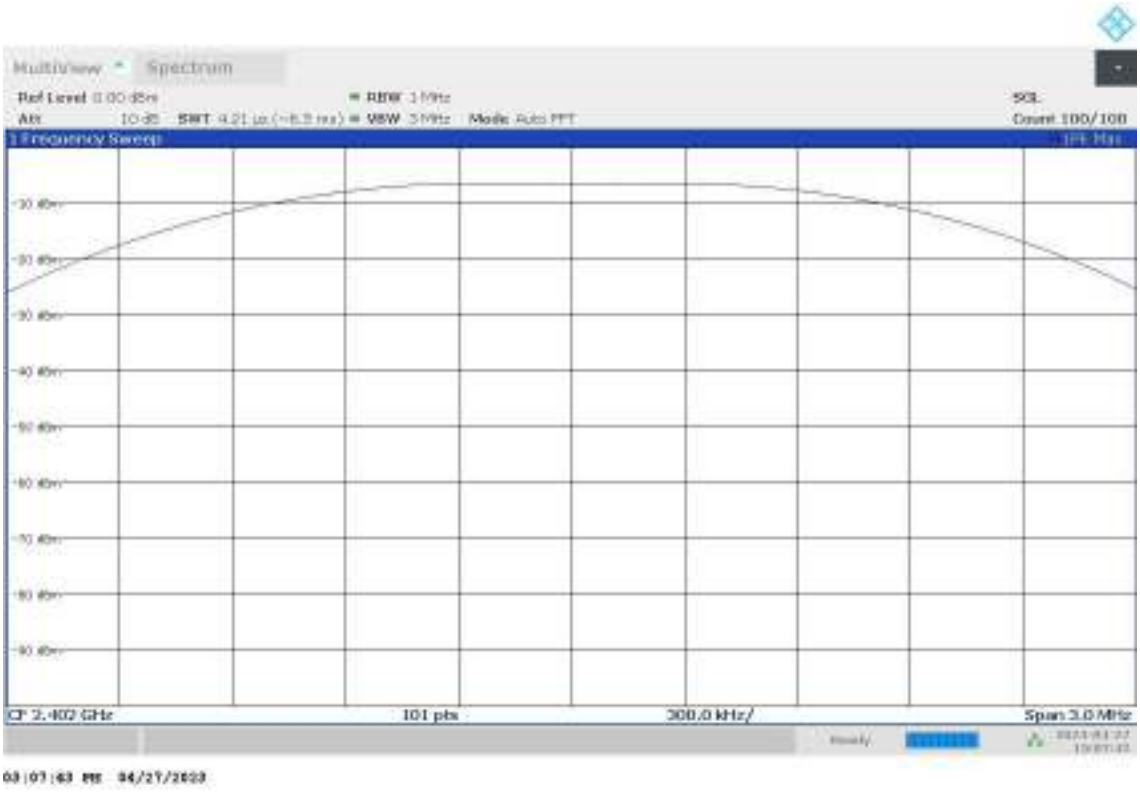
Pass

Attachments

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

Images:



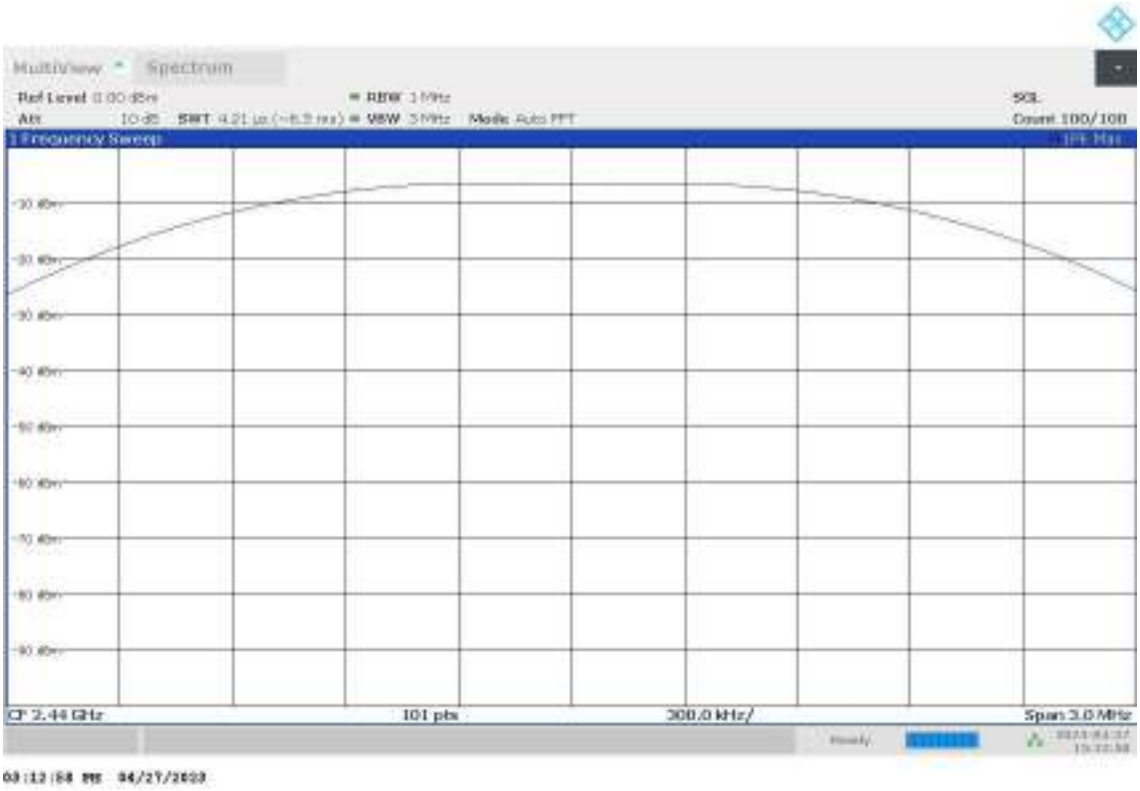


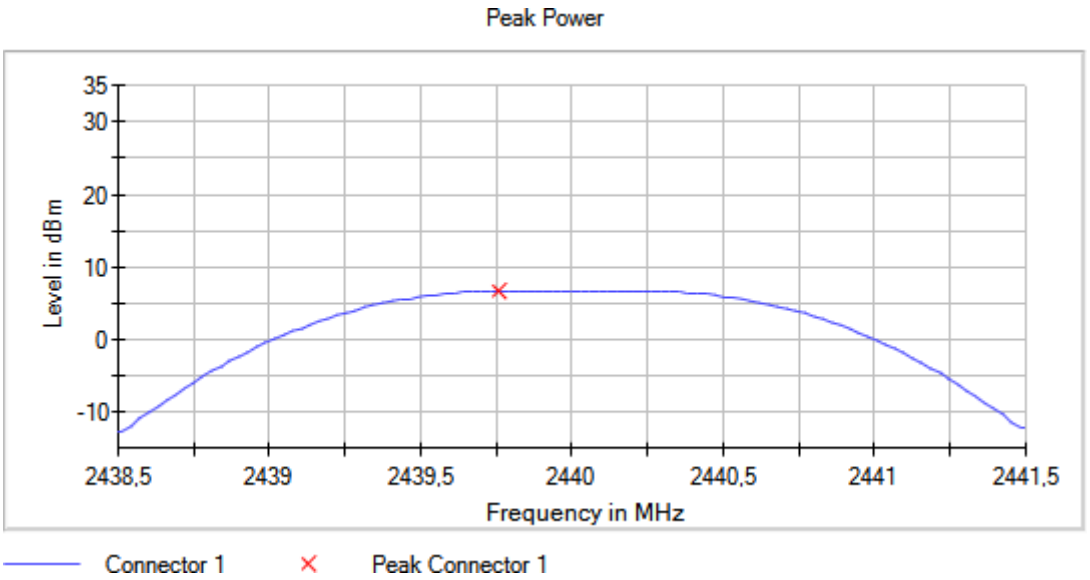
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 1

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

Number of Transmission Chains = 1 Active Port = 1

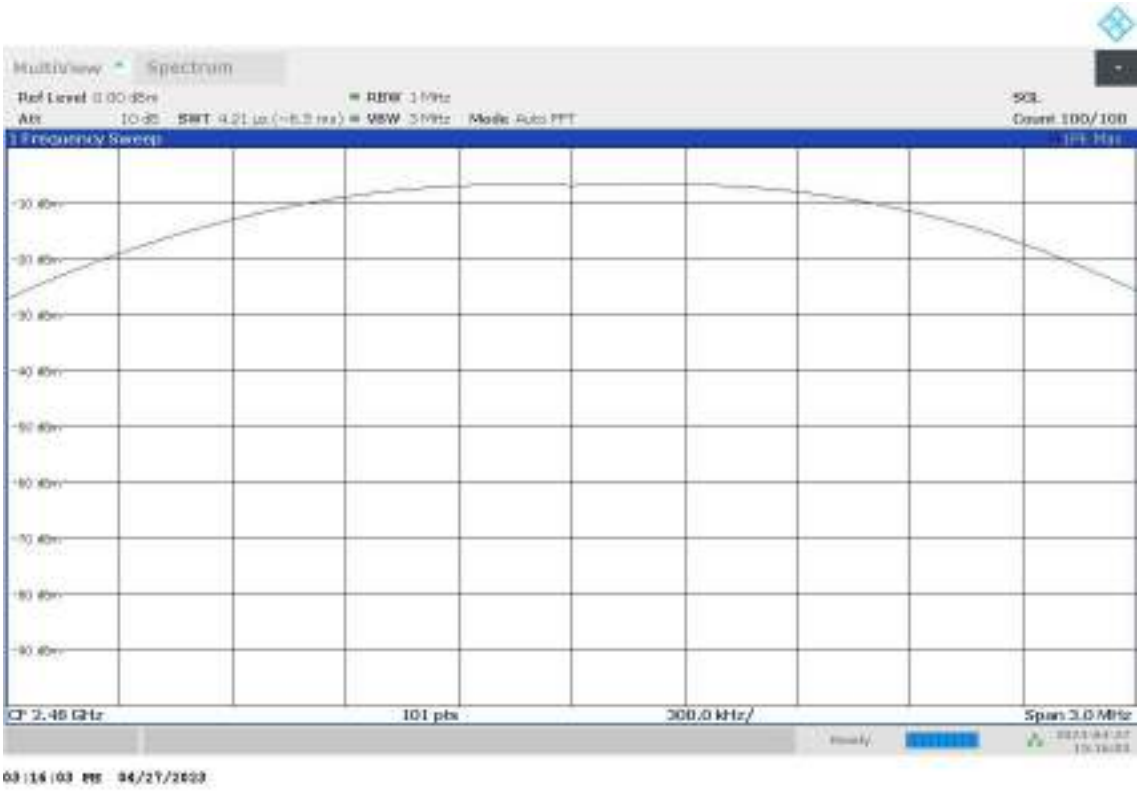
Images:

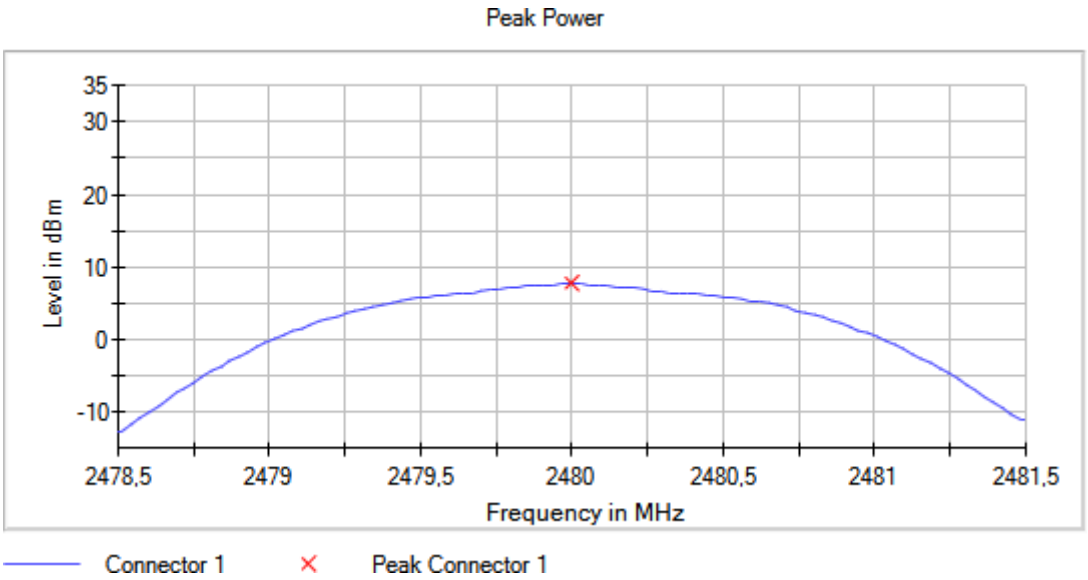




Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 1
Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
Frequency MHz = 2480.00000
Number of Transmission Chains = 1
Active Port = 1

Images:





Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Results

Equipment	BW (MHz)	Freq (MHz)	# of Tx Chains	Port	PeakPower (dBm)	Maximum EIRP Power (dBm)
Digital Transmission System (DTS)	2	2402.00000	1	1	8.0000	-8.000
Digital Transmission System (DTS)	2	2440.00000	1	1	7.9740	-8.026
Digital Transmission System (DTS)	2	2480.00000	1	1	6.5110	-9.489

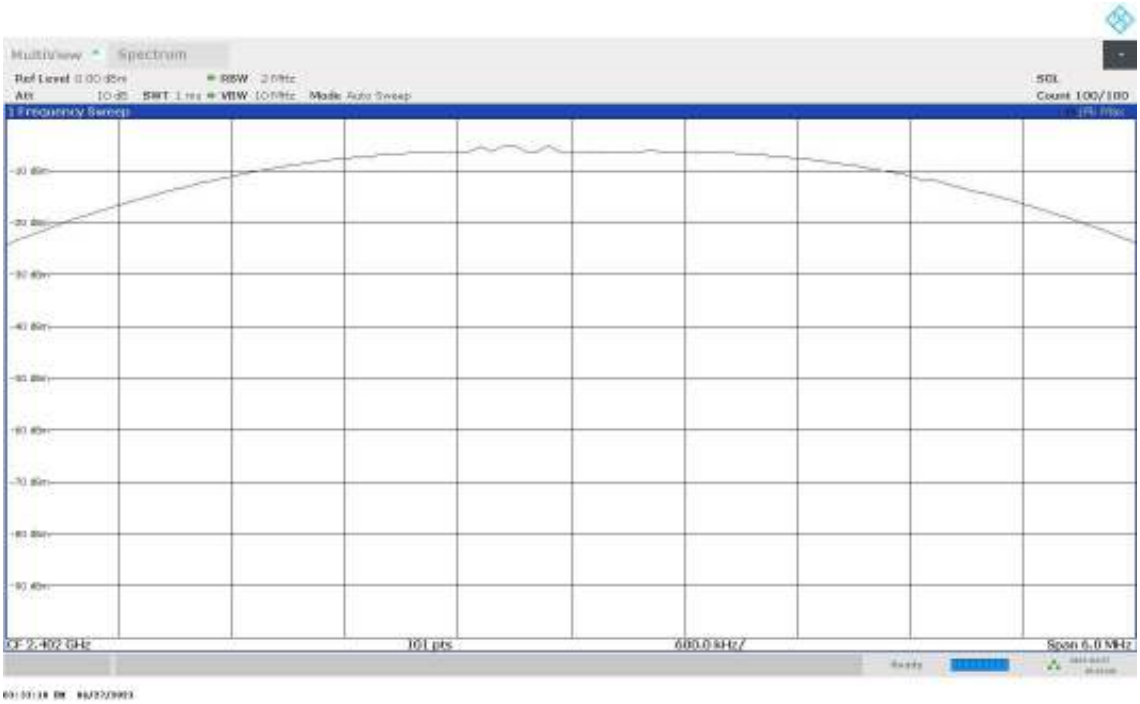
Verdict

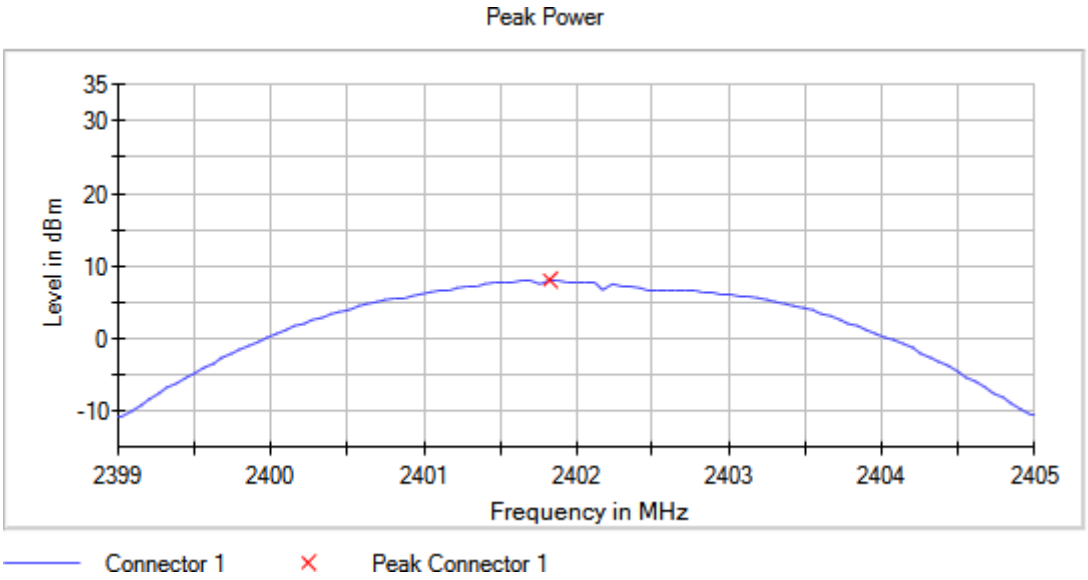
Pass

Attachments

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

Images:



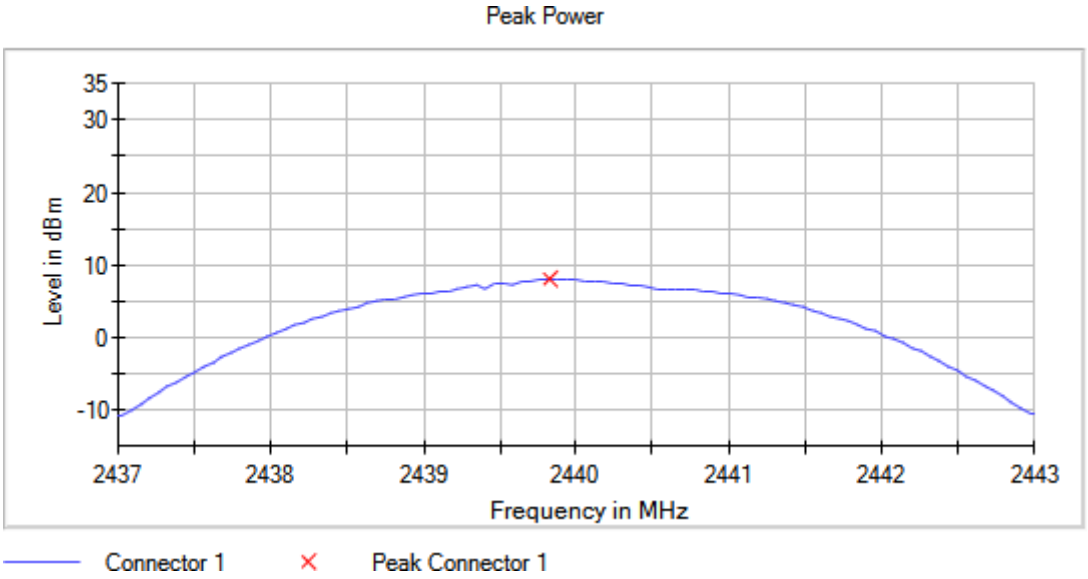


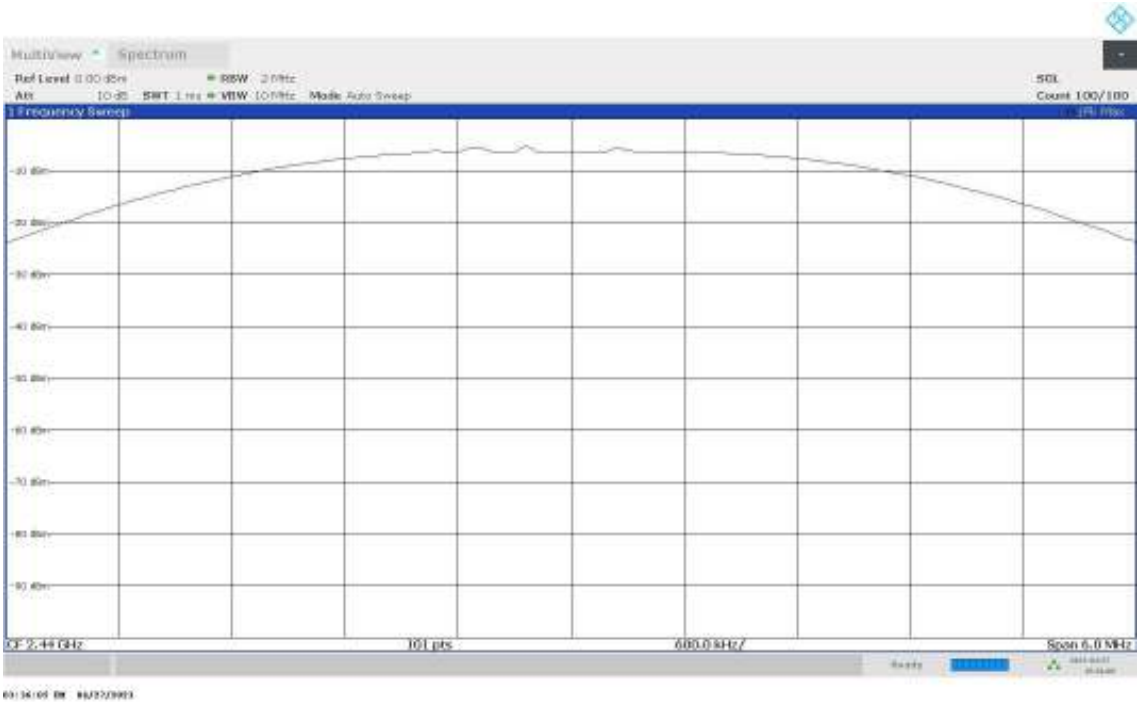
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 2

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

Number of Transmission Chains = 1 Active Port = 1

Images:



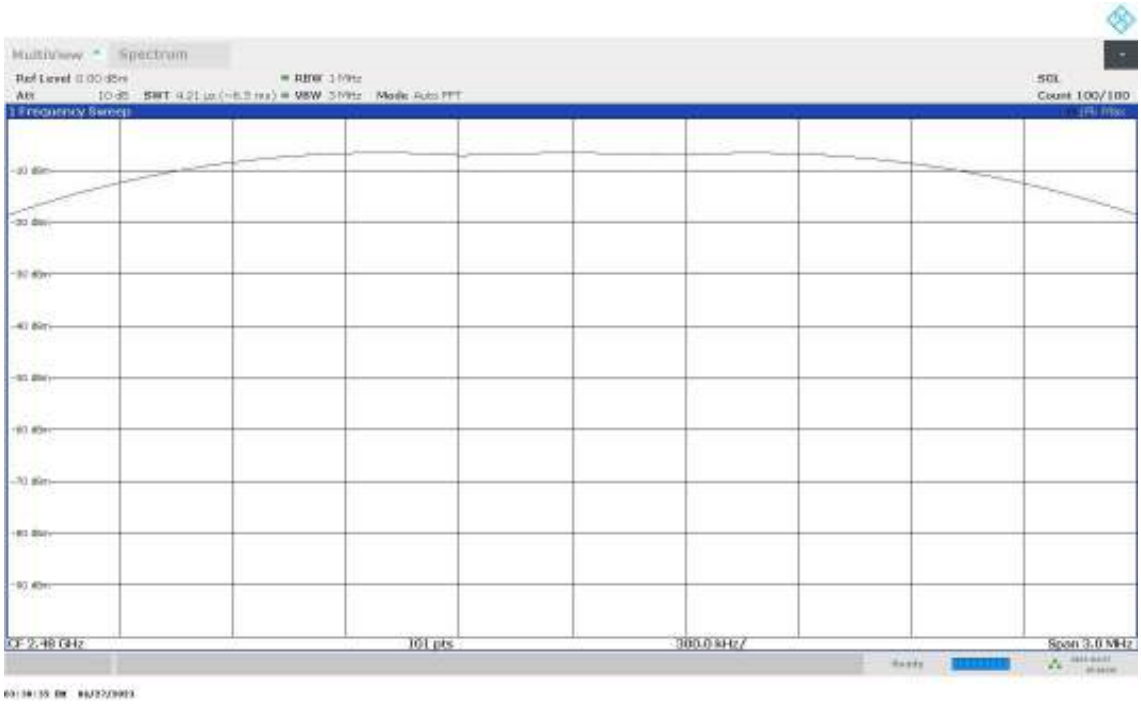


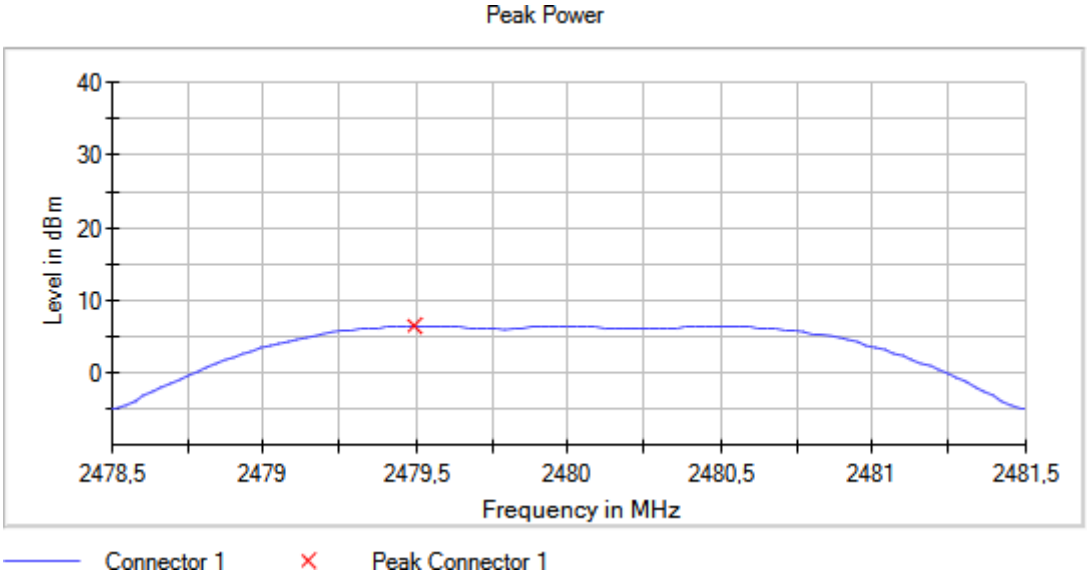
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 2

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

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.

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Results

Equipment	BW (MHz)	Freq (MHz)	# of Tx Chains	Port	Inband Peak Lvl Limit (dBm)	Freq (MHz)	Lvl (dBm)
Digital Transmission System (DTS)	1	2402.00000	1	1	-28.809	2399.975000	-58.7
					-28.809	2399.925000	-58.8
					-28.809	2398.875000	-59.4
					-28.809	2398.825000	-59.5
					-28.809	2399.575000	-60.1
					-28.809	2399.525000	-60.3
					-28.809	2399.375000	-60.5
					-28.809	2398.475000	-60.6
					-28.809	2398.675000	-60.7
					-28.809	2399.025000	-60.7
					-28.809	2399.875000	-60.9
					-28.809	2399.825000	-60.9
					-28.809	2398.725000	-60.9
					-28.809	2399.775000	-60.9
					-28.809	2399.625000	-60.9
		2480.00000			-28.456	2483.575000	-61.0
					-28.456	2483.975000	-61.3
					-28.456	2484.025000	-61.4
					-28.456	2484.125000	-61.8
					-28.456	2483.625000	-61.8
					-28.456	2483.525000	-61.8
					-28.456	2484.075000	-61.9
					-28.456	2484.575000	-62.4
					-28.456	2484.425000	-62.6
					-28.456	2484.525000	-63.0
					-28.456	2484.375000	-63.0
					-28.456	2485.375000	-63.0
					-28.456	2485.325000	-63.1

Equipment	BW (MHz)	Freq (MHz)	# of Tx Chains	Port	Inband Peak Lvl Limit (dBm)	Freq (MHz)	Lvl (dBm)
					-28.456	2484.175000	-63.1
					-28.456	2483.775000	-63.2

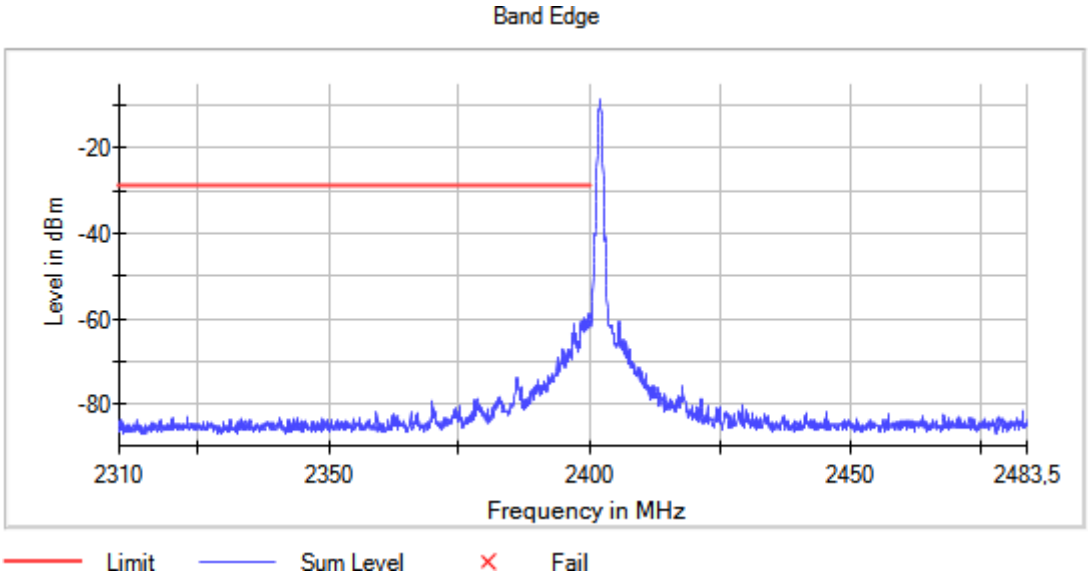
Verdict

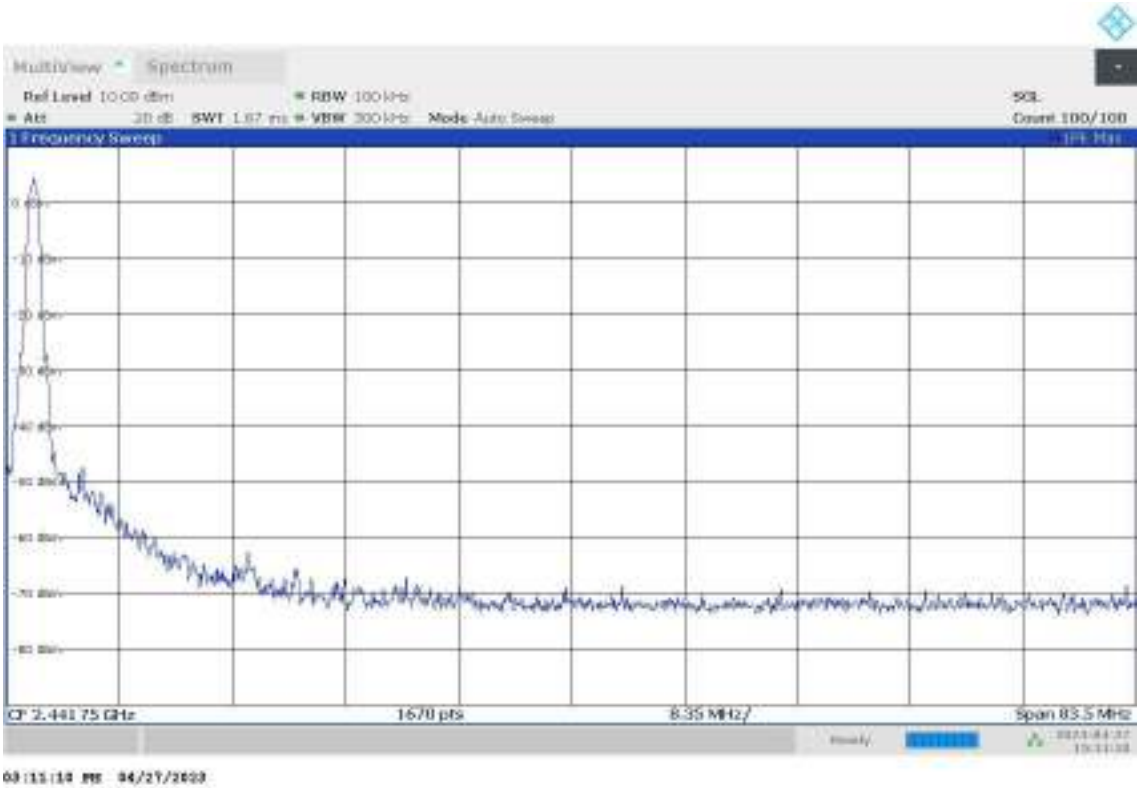
Pass

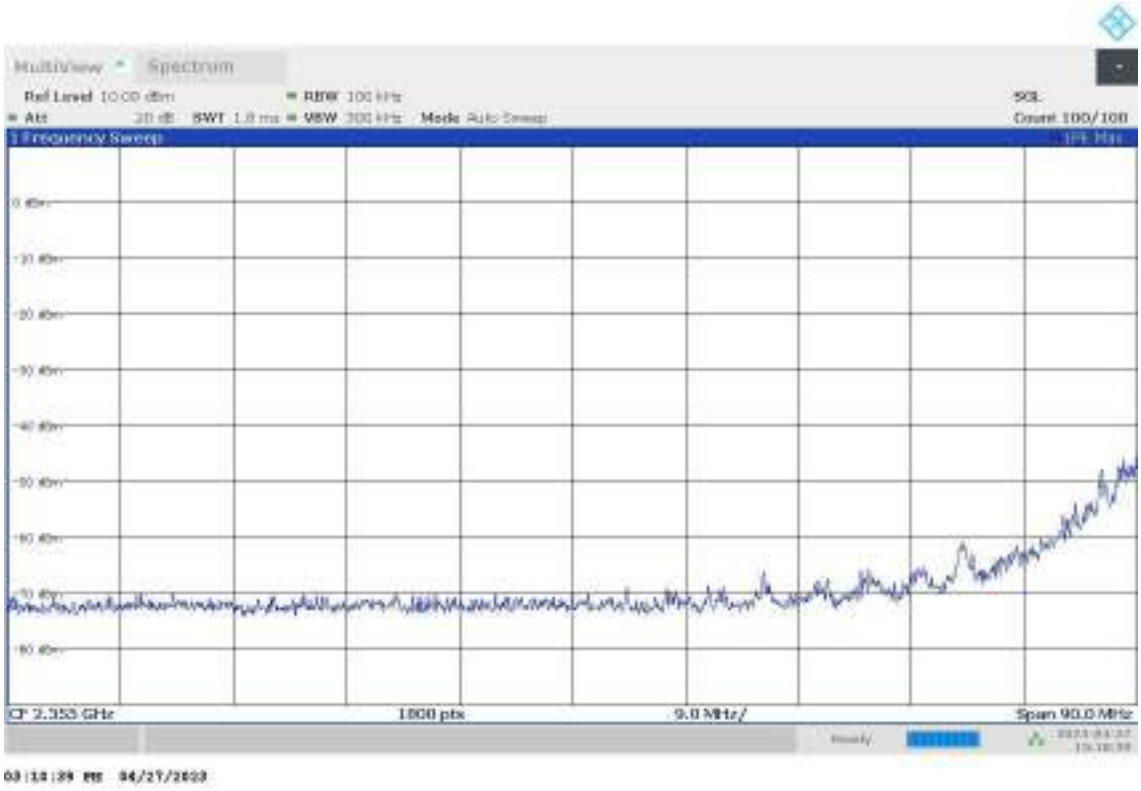
Attachments

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

Images:

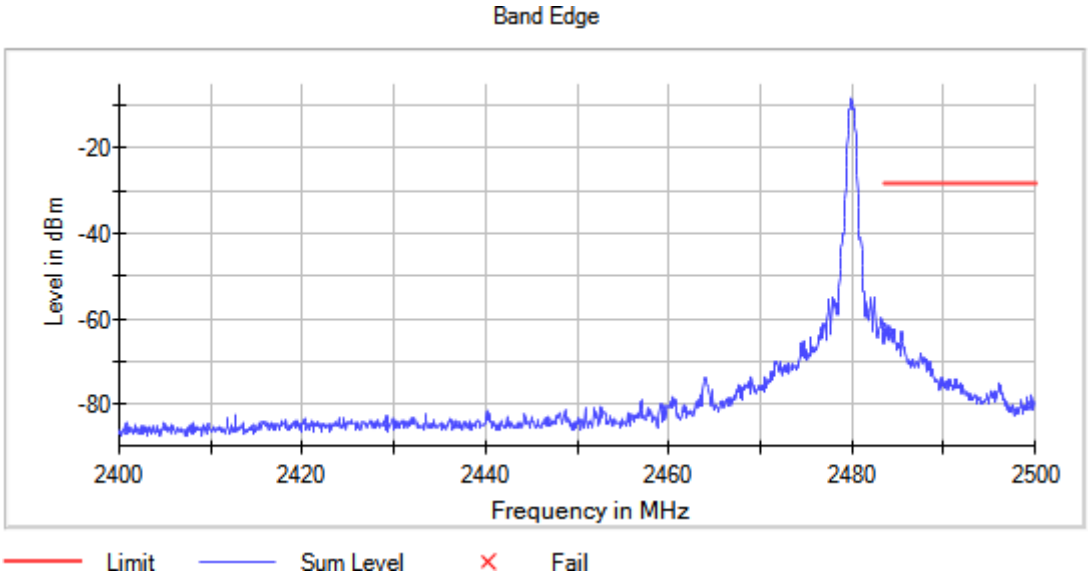


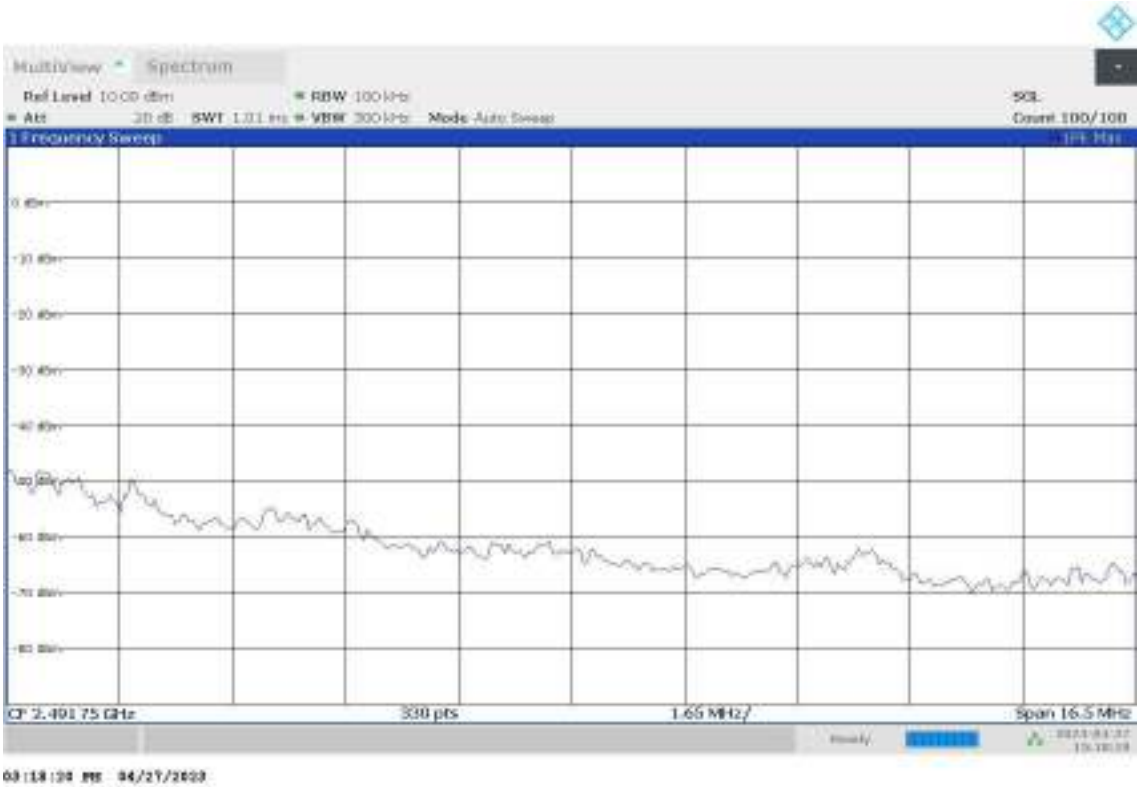


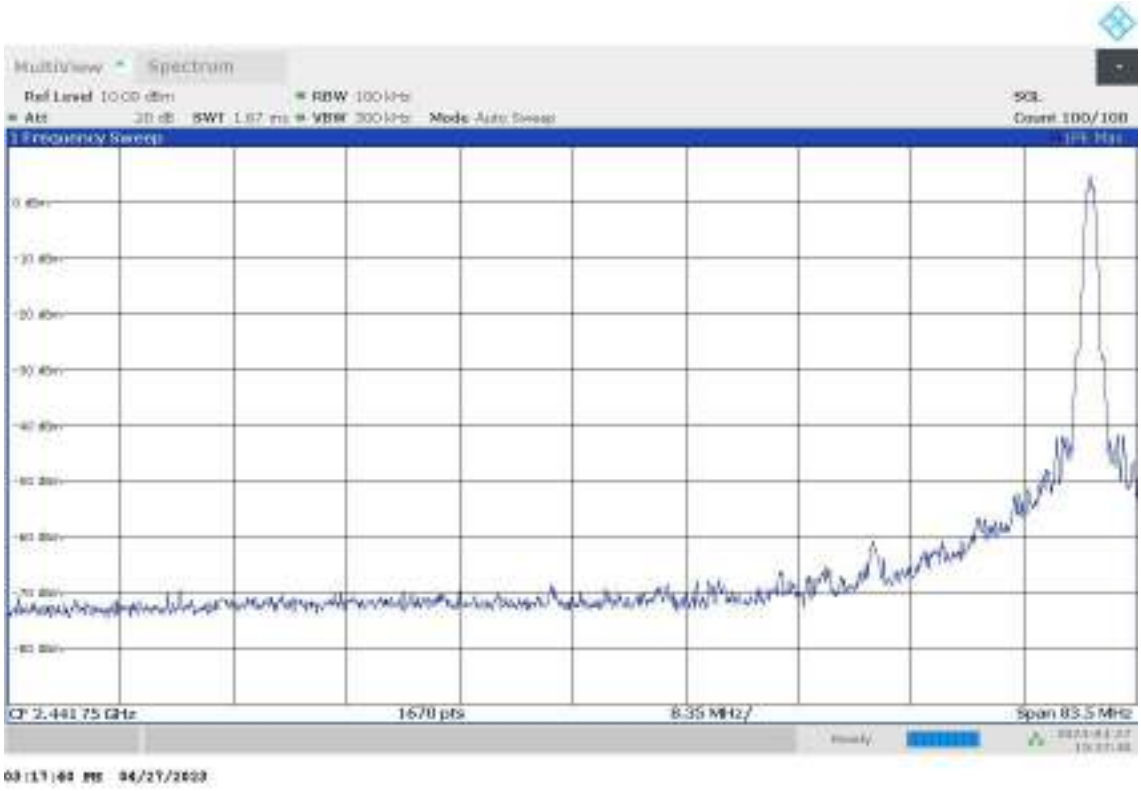

Spectrum
Ref Level
RBW
Att
SWT
VBW
Mode
SGL
Count 100/100
1 Frequency Sweep
CF 2.355 GHz
1000 pts
9.0 MHz/
Span 90.0 MHz

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

Images:






MultiView
Spectrum
Ref Level 10.00 dBm
RBW 100 kHz
Att 20 dB
SWT 1.67 ms
VBW 300 kHz
Mode Auto Sweep
SGL
Count 100/100
1 Frequency Sweep
1Pk Max
CF 2.441 75 GHz
1670 pts
8.35 MHz/
Span 83.5 MHz
03:17:40 PM 04/27/2023

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Results

Equipment	BW (MHz)	Freq (MHz)	# of Tx Chains	Port	Inband Peak Lvl Limit (dBm)	Freq (MHz)	Lvl (dBm)
Digital Transmission System (DTS)	2	2402.00000	1	1	-28.575	2399.975000	-40.9
					-28.575	2399.925000	-43.3
					-28.575	2399.875000	-49.2
					-28.575	2399.825000	-51.5
					-28.575	2399.775000	-51.6
					-28.575	2399.725000	-52.8
					-28.575	2399.675000	-54.6
					-28.575	2399.625000	-56.5
					-28.575	2399.575000	-57.9
					-28.575	2398.825000	-59.9
					-28.575	2399.525000	-59.9
					-28.575	2398.775000	-60.0
					-28.575	2399.375000	-60.5
					-28.575	2398.875000	-60.9
					-28.575	2399.425000	-61.0
		2480.00000			-28.581	2484.025000	-61.4
					-28.581	2483.975000	-61.4
					-28.581	2484.075000	-61.5
					-28.581	2484.125000	-61.8
					-28.581	2484.375000	-63.8
					-28.581	2485.375000	-63.9
					-28.581	2484.425000	-64.0
					-28.581	2483.525000	-64.1
					-28.581	2483.925000	-64.1
					-28.581	2484.325000	-64.4
					-28.581	2485.425000	-64.4
					-28.581	2484.725000	-64.7
					-28.581	2484.675000	-64.7
					-28.581	2485.325000	-65.0
					-28.581	2483.875000	-65.3

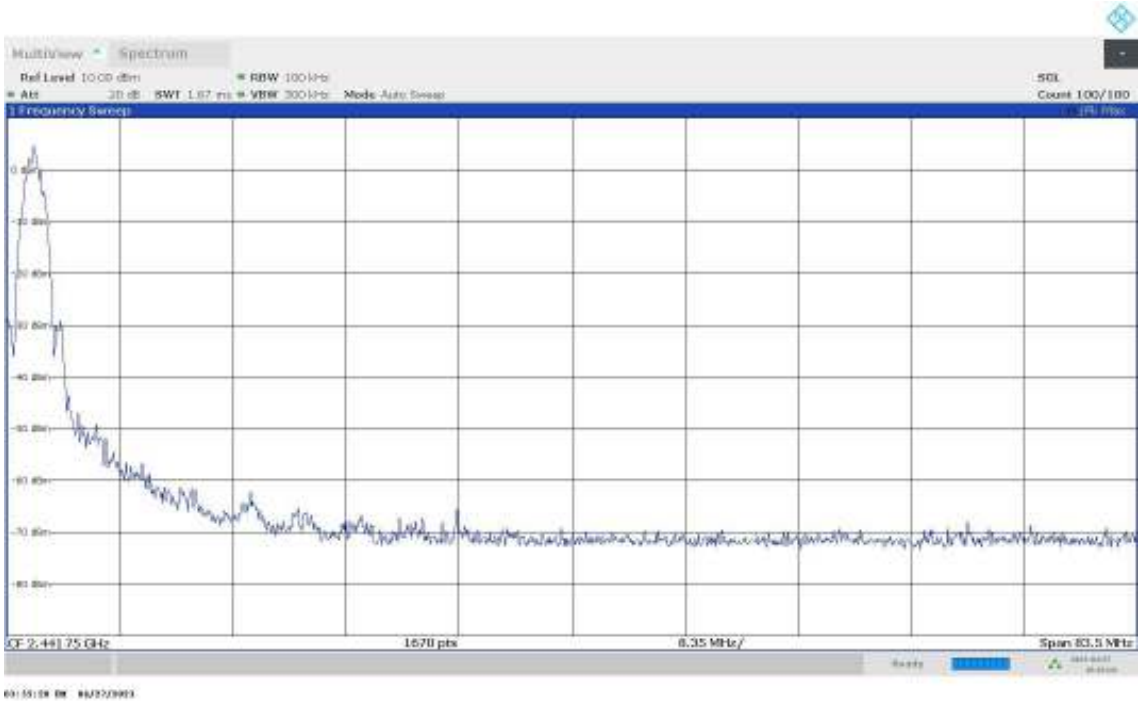
Verdict

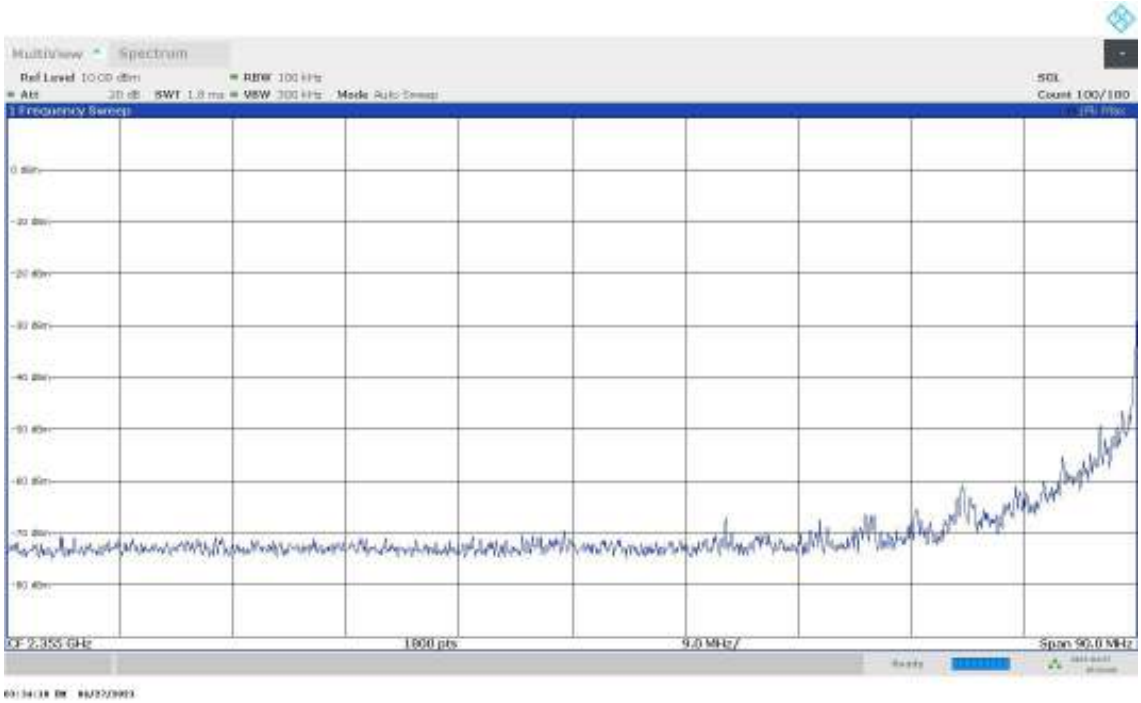
Pass

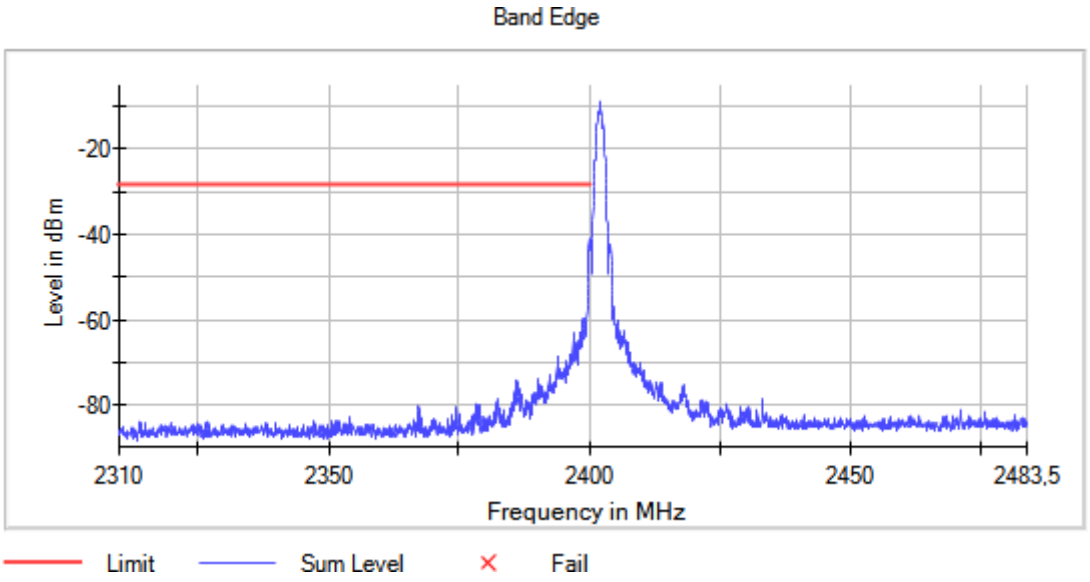
Attachments

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

Images:



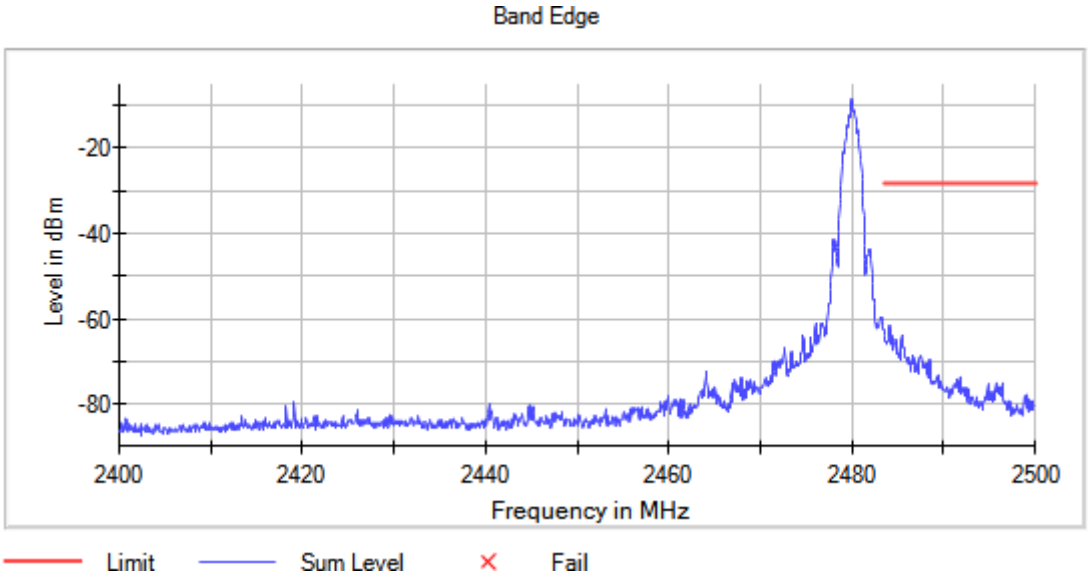

Multiview
Spectrum
Ref Level
Att
SWT
RBW
VBW
Mode
SGL
Count 100/100
1 Frequency Sweep
CF 2.355 GHz
1000 pts
9.0 MHz/
Span 90.0 MHz

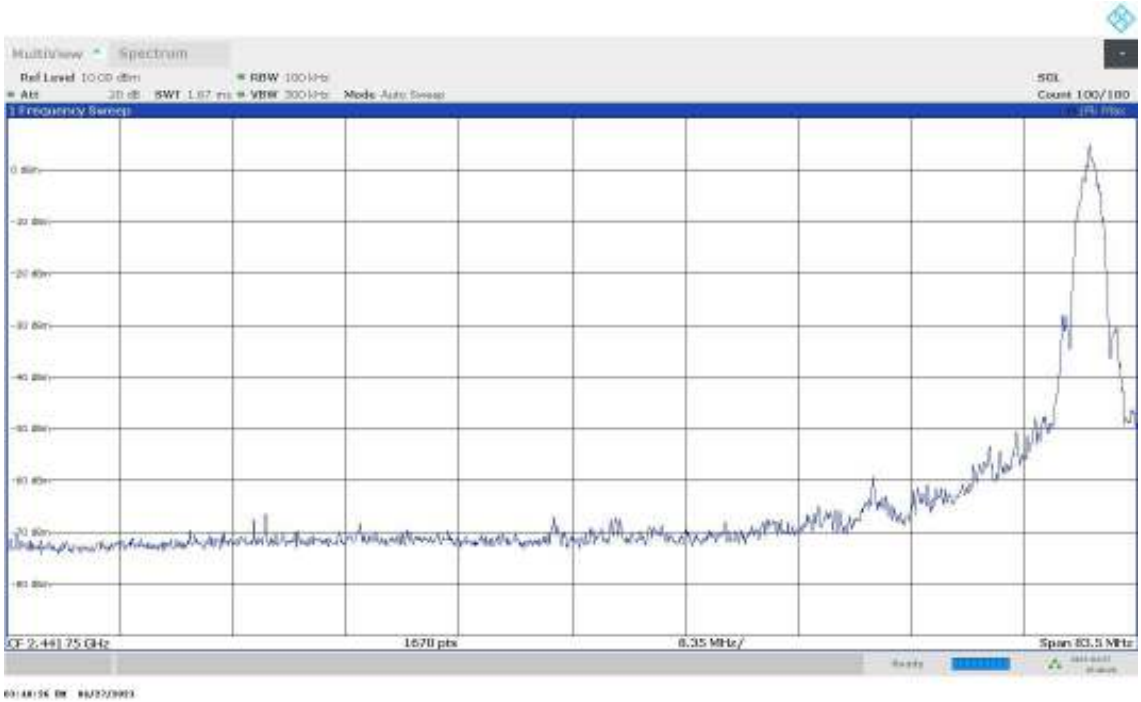

Band Edge
Level in dBm
-20
-40
-60
-80
2310
2350
2400
2450
2483,5
Frequency in MHz
Limit
Sum Level
Fail

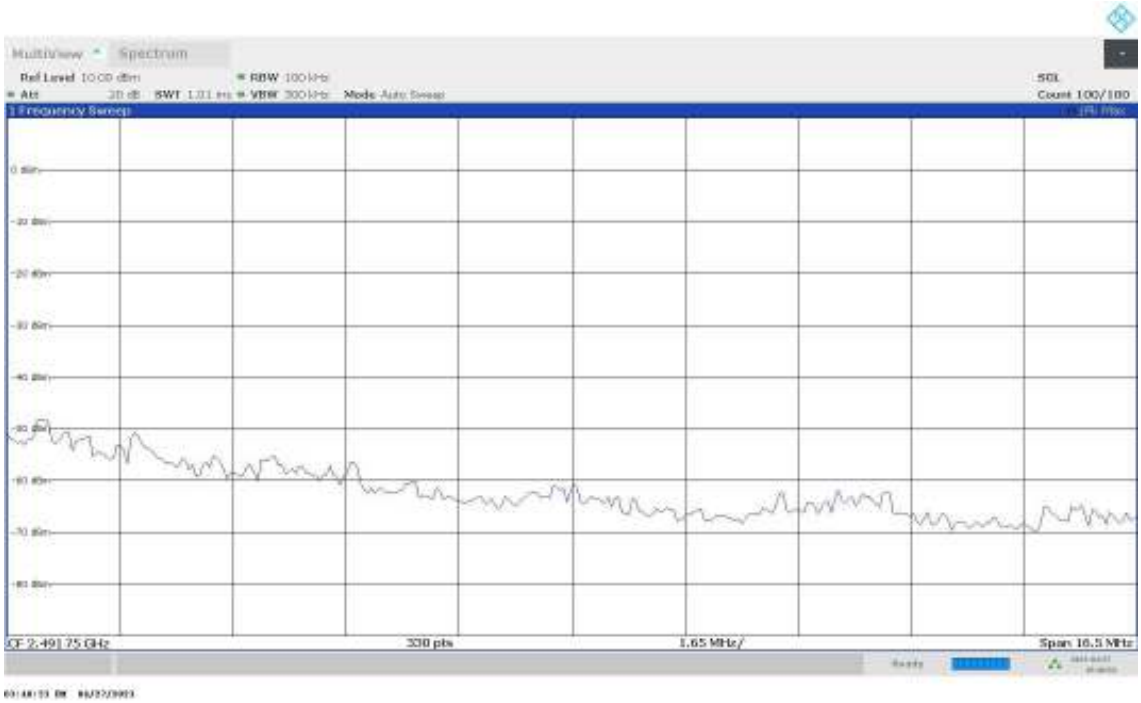
Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE 5.0 (GFSK 2 Mbit/s)
Number of Transmission Chains = 1
Active Port = 1

Bandwidth MHz = 2
Frequency MHz = 2480.00000
Measurement Point = 1

Images:






Multiview
Spectrum
Ref Level 10.00 dBm
RBW 100 kHz
Att 20 dB SWT 1.01 ms VBW 300 kHz Mode Auto Sweep
SGL
Count 100/100
1 Frequency Sweep
CF 2.491 75 GHz
300 pts
1.65 MHz/
Span 16.5 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 Rng (GHz)	Equipment	Freq (MHz)	# of Tx Chains	Port	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
[3, 17]	Digital Transmission System (DTS)	2402.00000	1	1	4803.500	43.59	V	PK
		2440.00000			4879.500	42.14	V	PK
		2480.00000			4959.500	42.28	V	PK

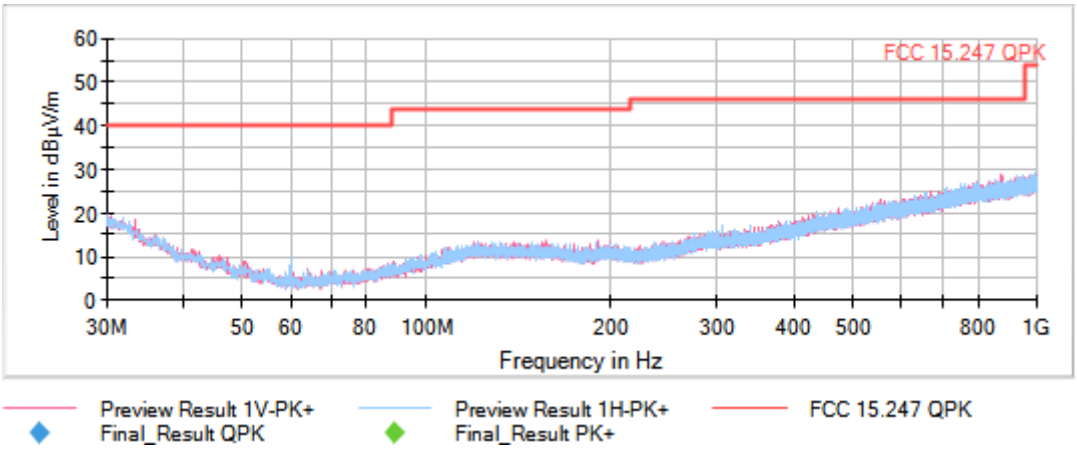
Verdict

Pass

Attachments

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

Images:



Tables:

Spectrum Analyzer Parameters

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

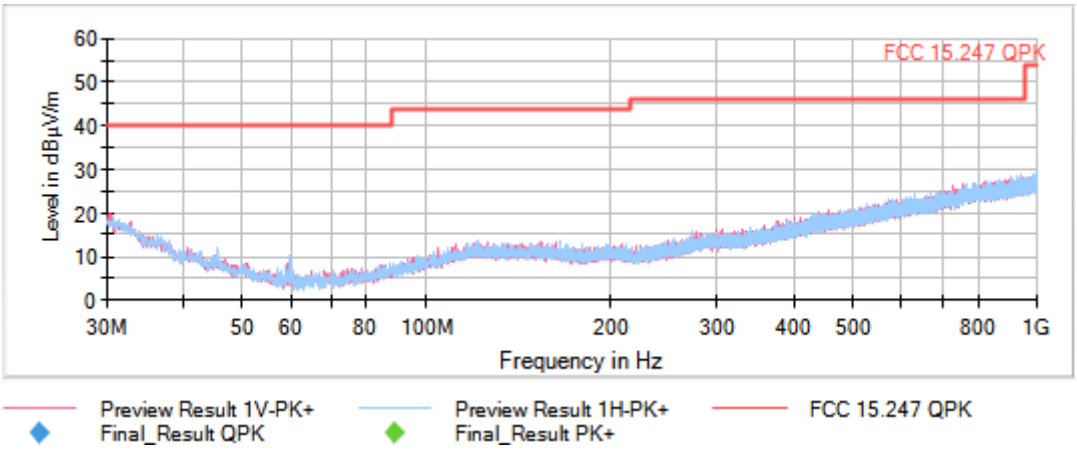
Frequency Range GHz = [0.03, 1] Equipment Type = Digital Transmission System (DTS)

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

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



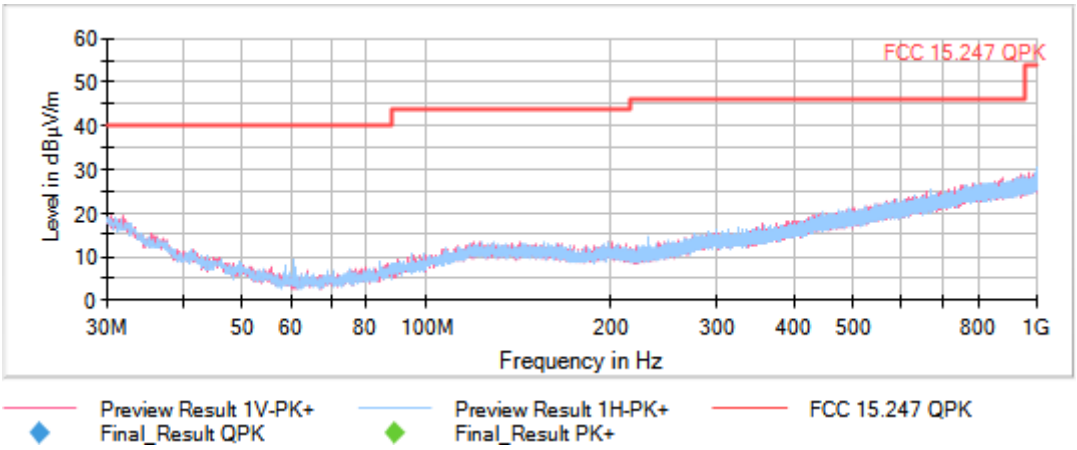
Tables:

Spectrum Analyzer Parameters

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

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

Images:



Tables:
Spectrum Analyzer Parameters

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

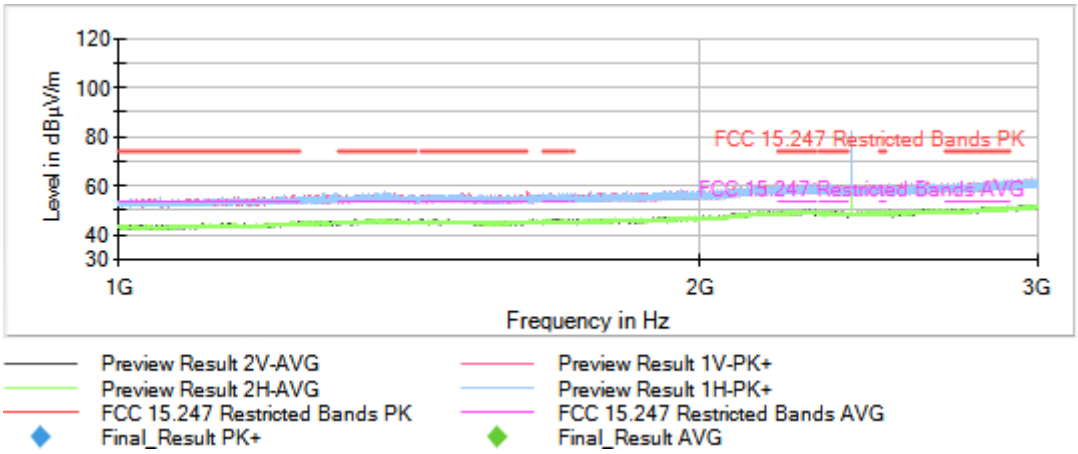
Frequency Range GHz = [1, 3] Equipment Type = Digital Transmission System (DTS)

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

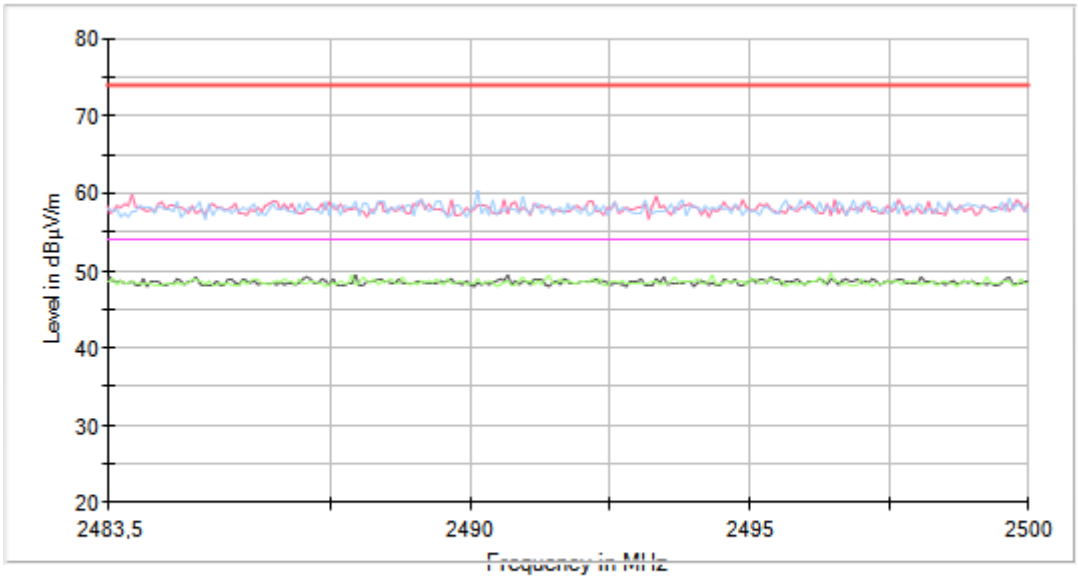
Number of Transmission Chains = 1 Measurement Point = 1

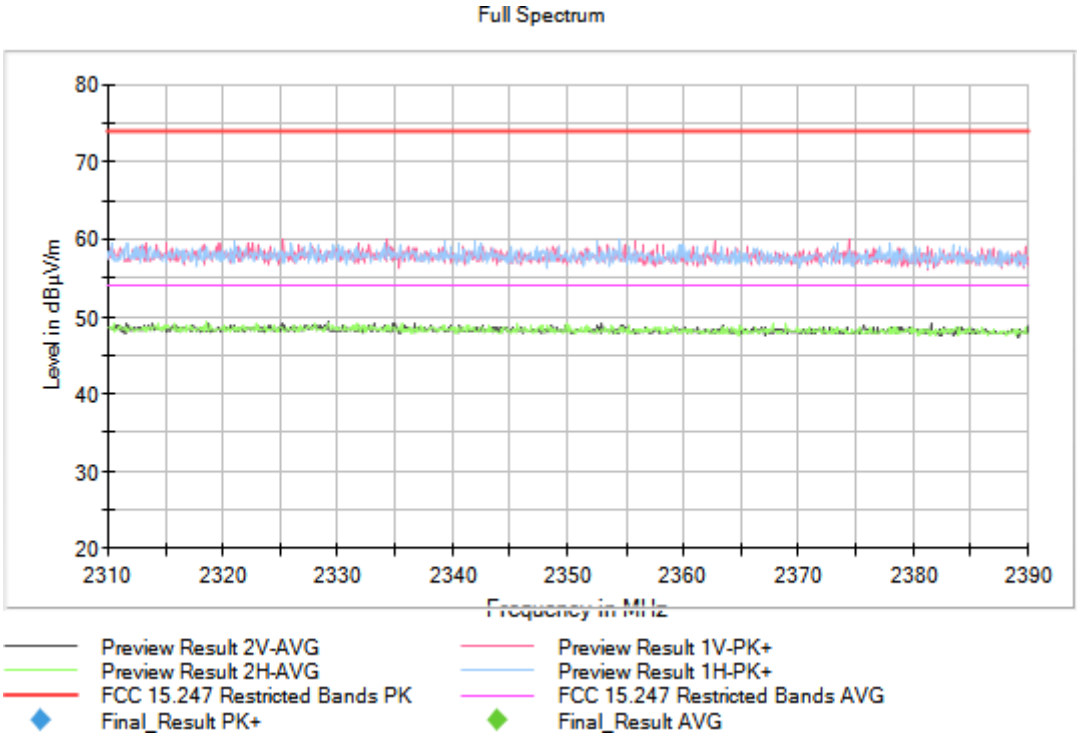
Active Port = 1

Images:



Full Spectrum





Tables:
Spectrum Analyzer Parameters

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

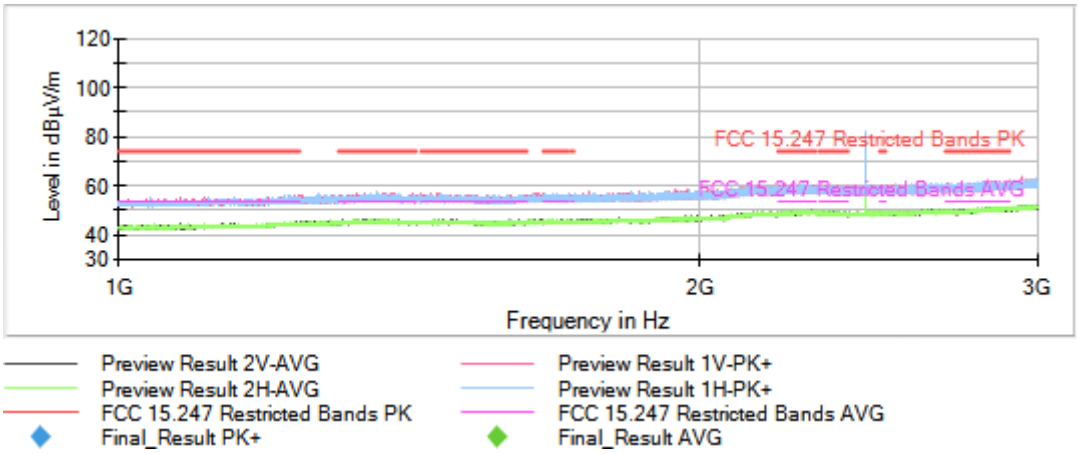
Frequency Range GHz = [1, 3] Equipment Type = Digital Transmission System (DTS)

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

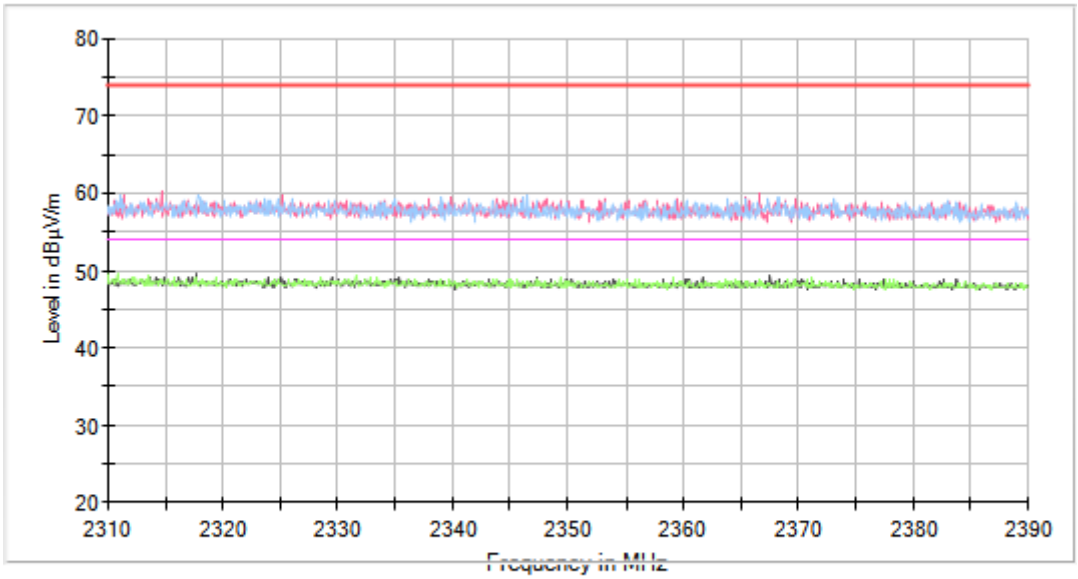
Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Full Spectrum



Tables:
Spectrum Analyzer Parameters

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

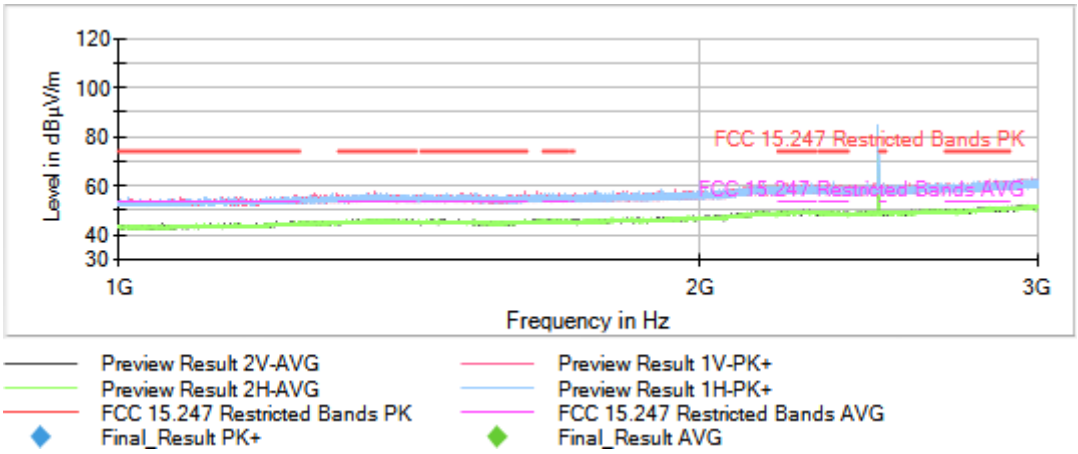
Frequency Range GHz = [1, 3] Equipment Type = Digital Transmission System (DTS)

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

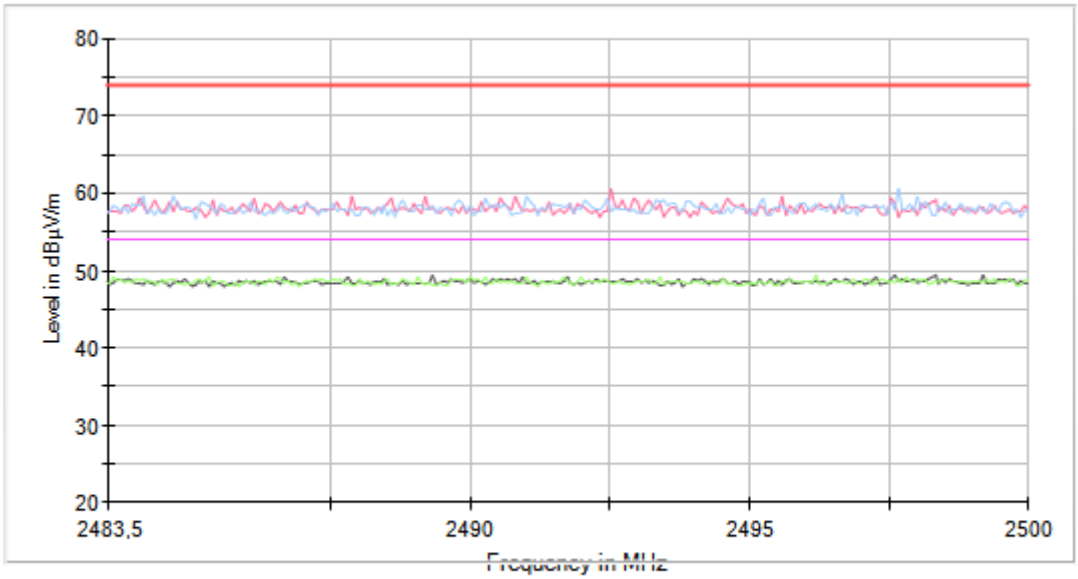
Number of Transmission Chains = 1 Measurement Point = 1

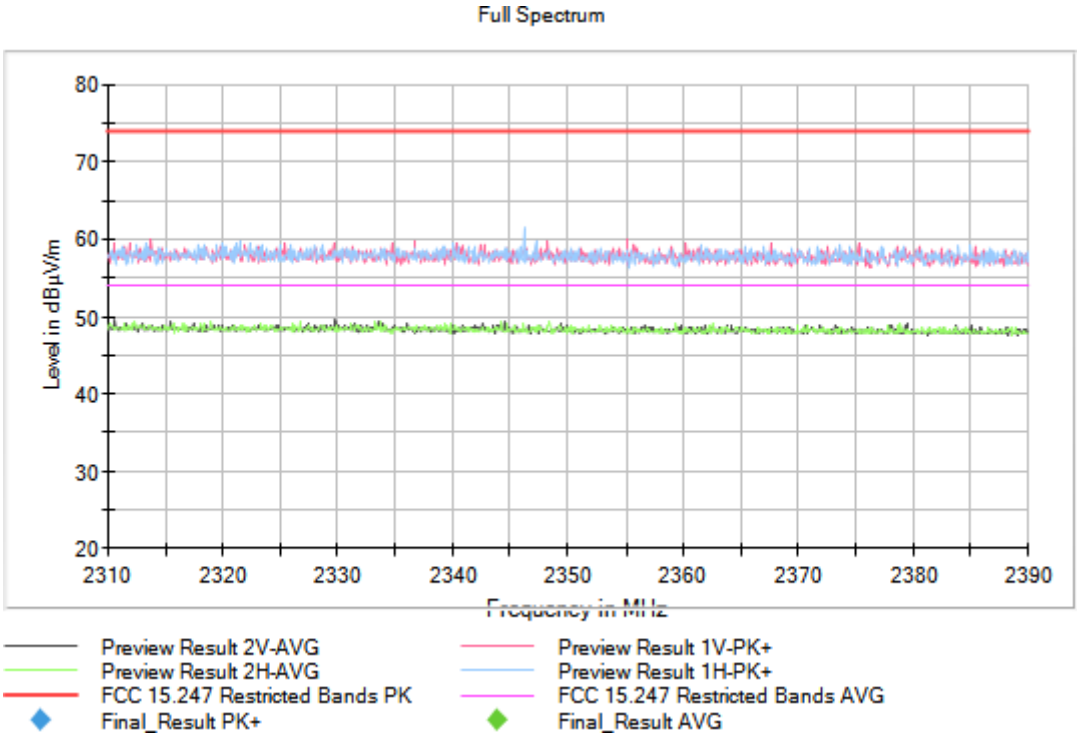
Active Port = 1

Images:



Full Spectrum



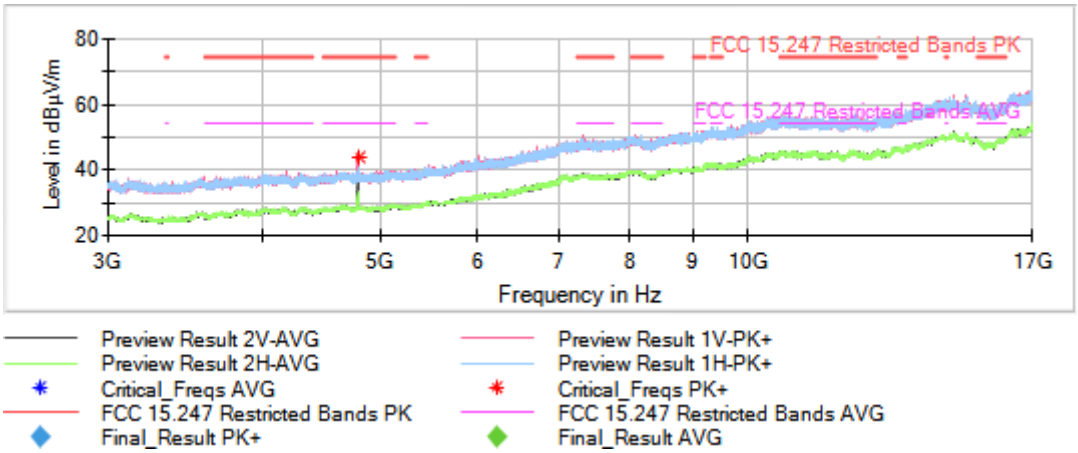


Tables:
Spectrum Analyzer Parameters

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

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

Images:

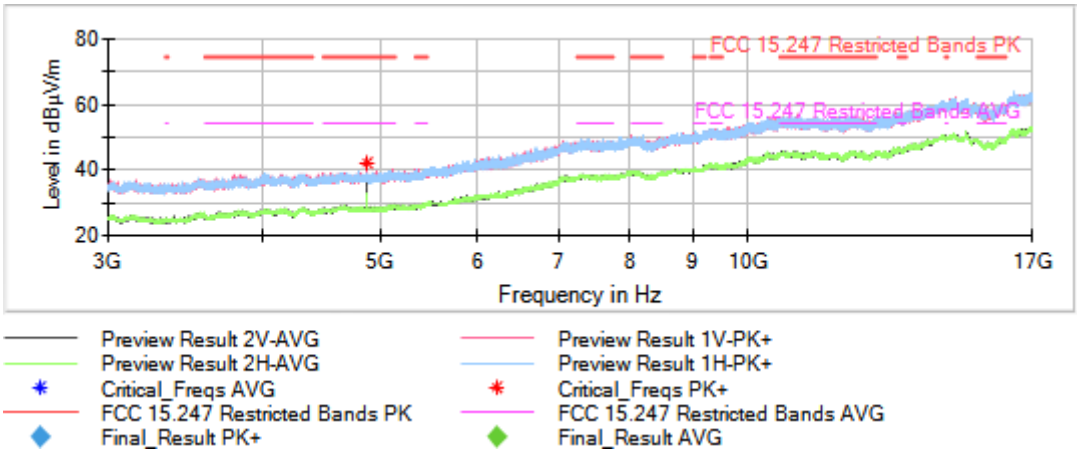


Tables:
Spectrum Analyzer Parameters

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

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

Images:

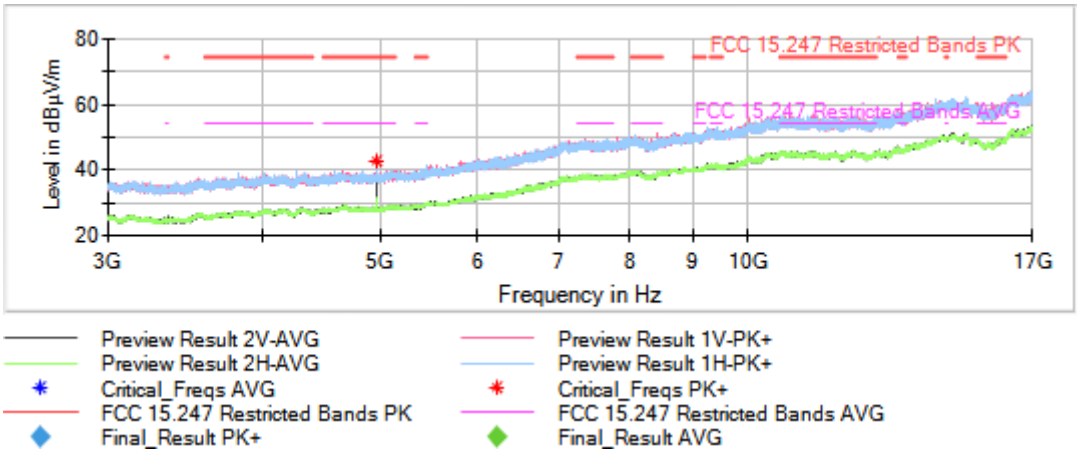


Tables:
Spectrum Analyzer Parameters

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

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

Images:



Tables:
Spectrum Analyzer Parameters

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

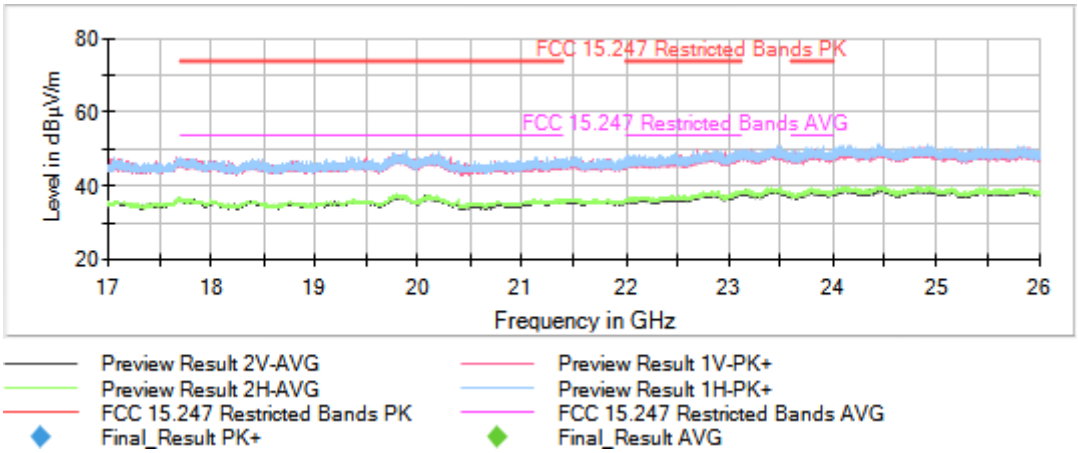
Frequency Range GHz = [17, 26] Equipment Type = Digital Transmission System (DTS)

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

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters

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

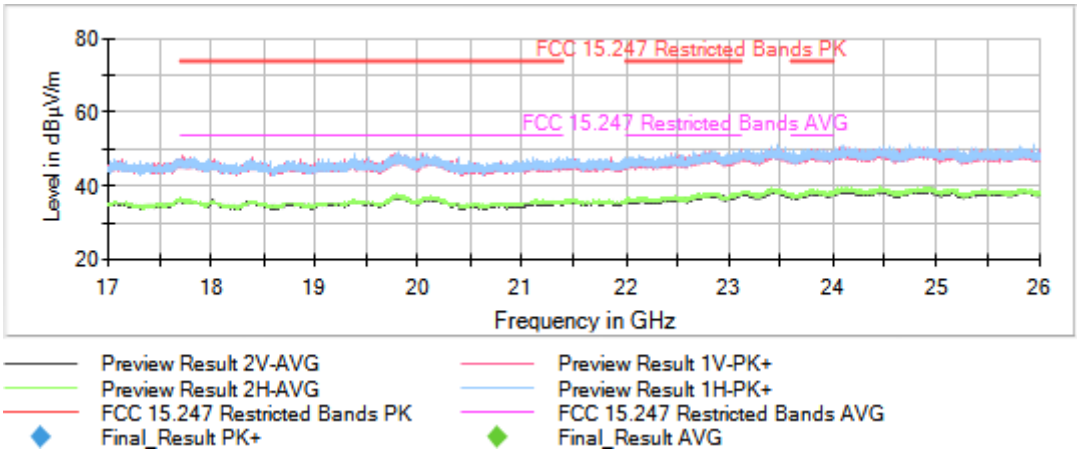
Frequency Range GHz = [17, 26] Equipment Type = Digital Transmission System (DTS)

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

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



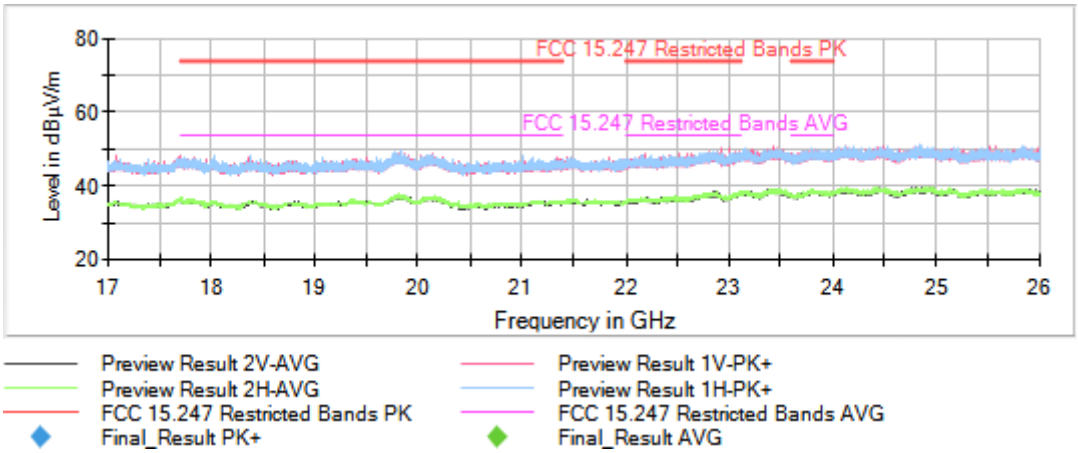
Tables:

Spectrum Analyzer Parameters

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

Frequency Range GHz = [17, 26]
Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
Frequency MHz = 2480.00000
Number of Transmission Chains = 1
Measurement Point = 1
Active Port = 1

Images:



Tables:
Spectrum Analyzer Parameters

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

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

Results

Freq Rng (GHz)	Equipment	Freq (MHz)	# of Tx Chains	Port	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
[3, 17]	Digital Transmission System (DTS)	2402.00000	1	1	4803.000	42.62	V	PK
		2440.00000			4881.000	42.37	V	PK
		2480.00000			4960.000	44.01	V	PK

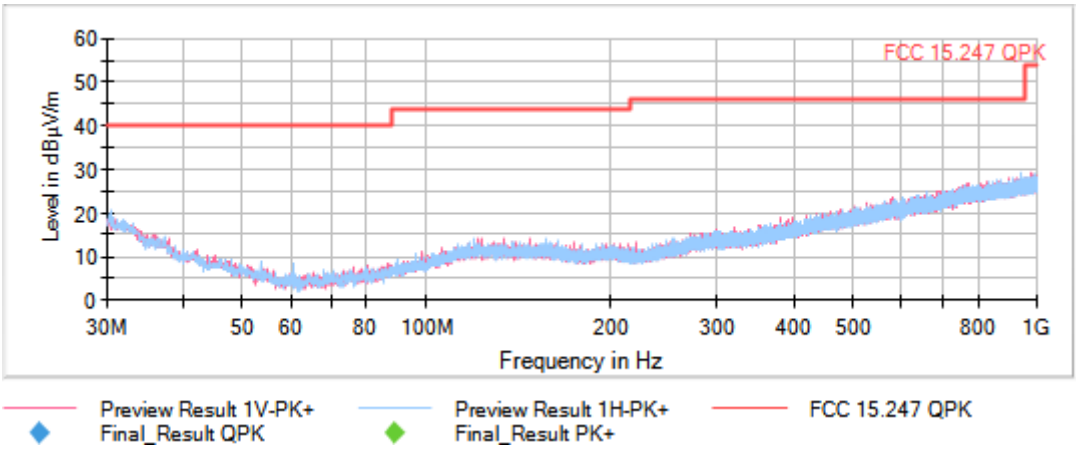
Verdict

Pass

Attachments

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

Images:



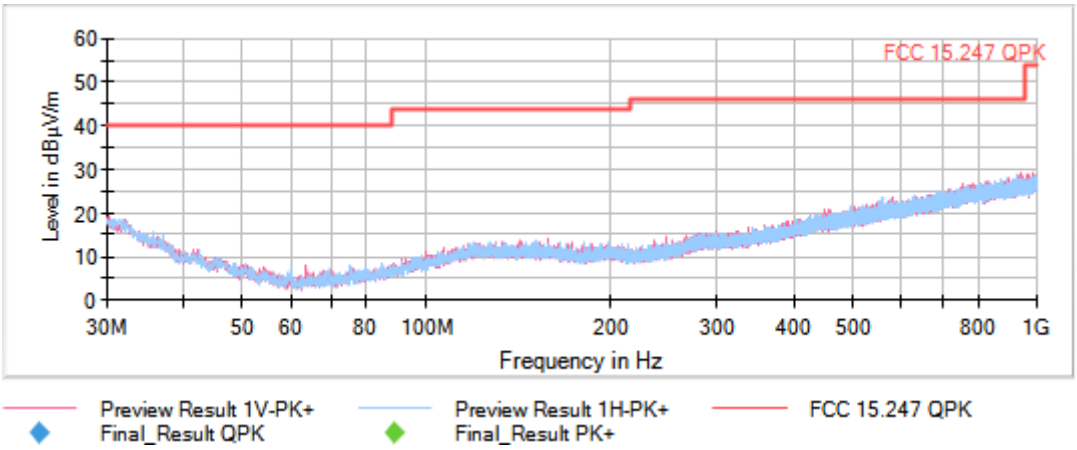
Tables:

Spectrum Analyzer Parameters

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

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

Images:

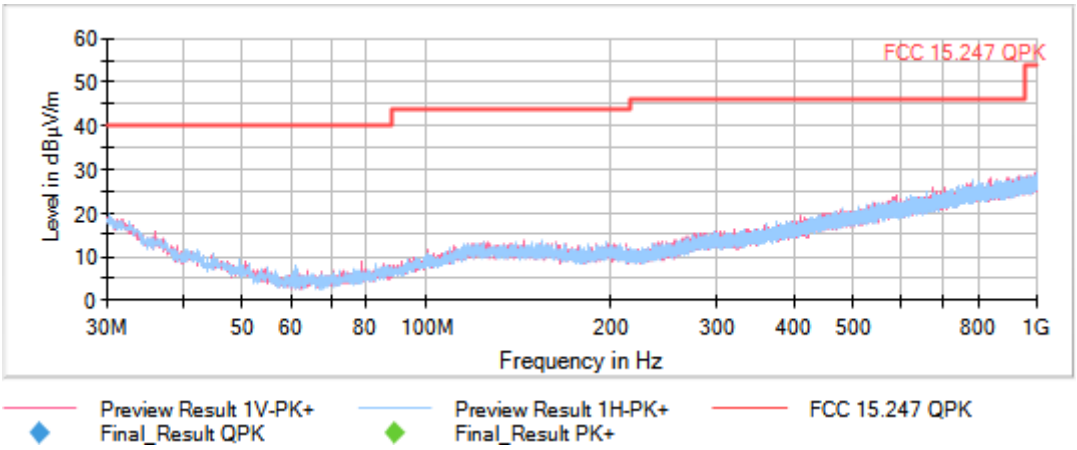


Tables:
Spectrum Analyzer Parameters

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

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

Images:



Tables:
Spectrum Analyzer Parameters

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

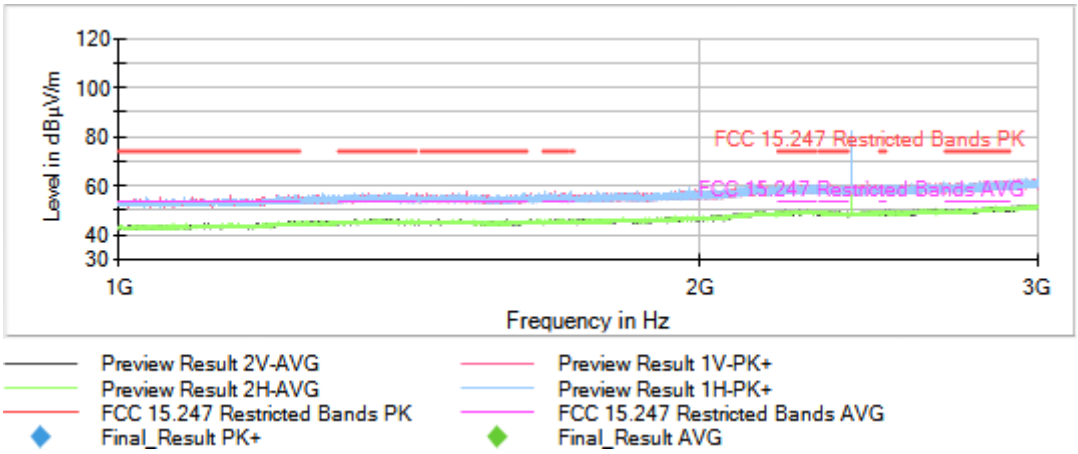
Frequency Range GHz = [1, 3] Equipment Type = Digital Transmission System (DTS)

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

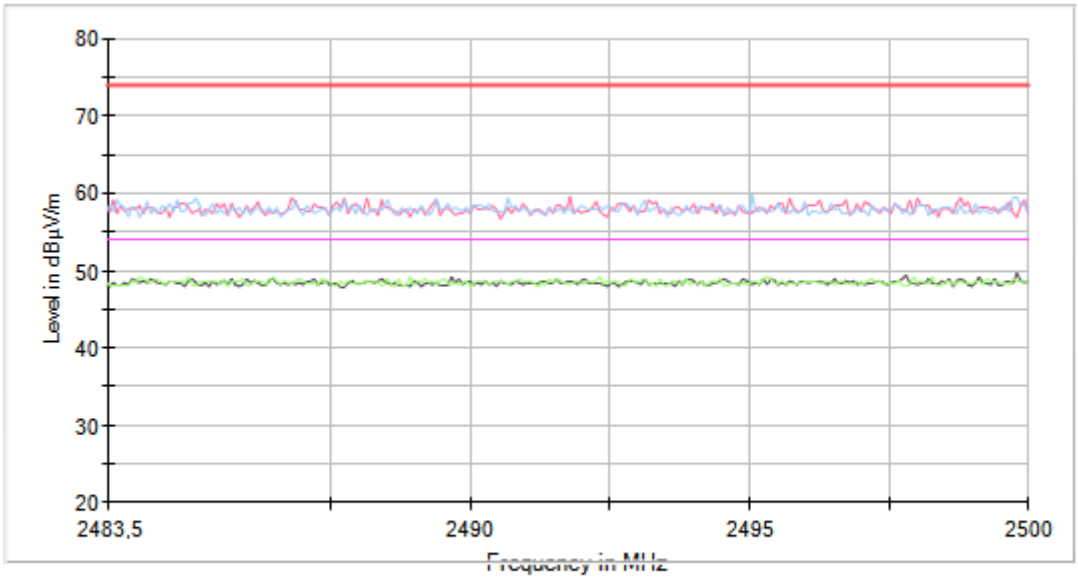
Number of Transmission Chains = 1 Measurement Point = 1

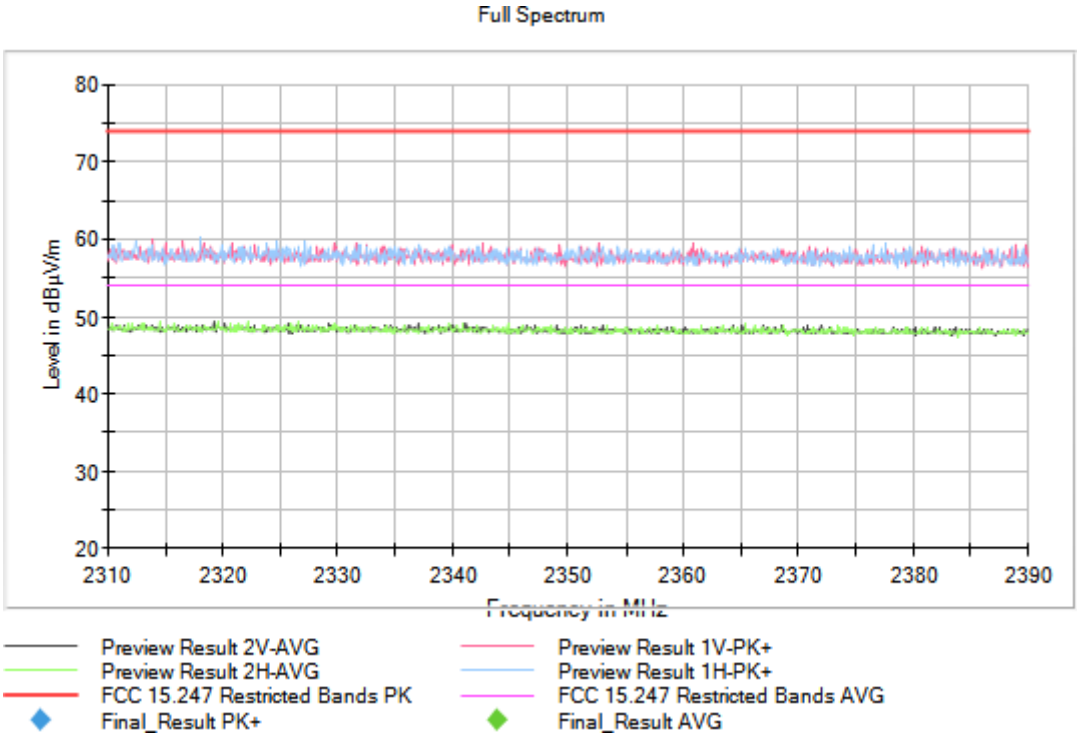
Active Port = 1

Images:



Full Spectrum





Tables:
Spectrum Analyzer Parameters

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

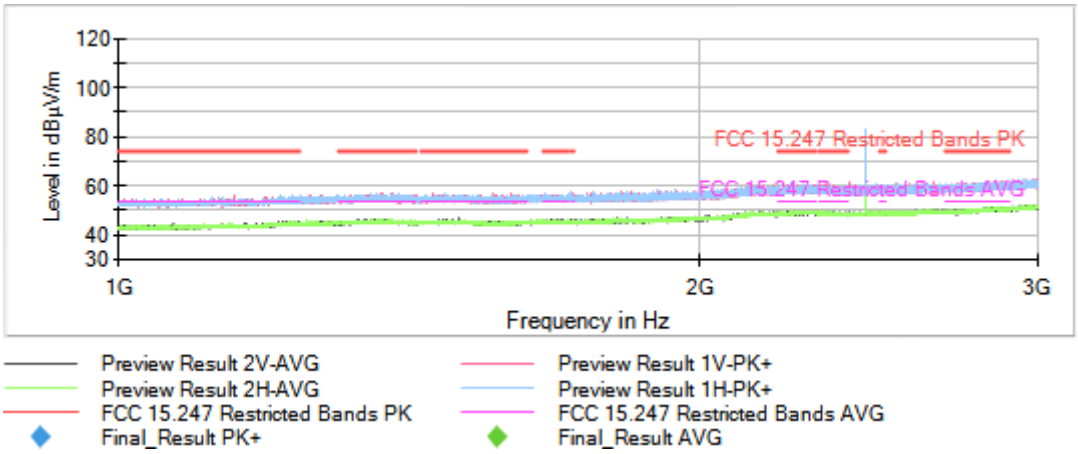
Frequency Range GHz = [1, 3] Equipment Type = Digital Transmission System (DTS)

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

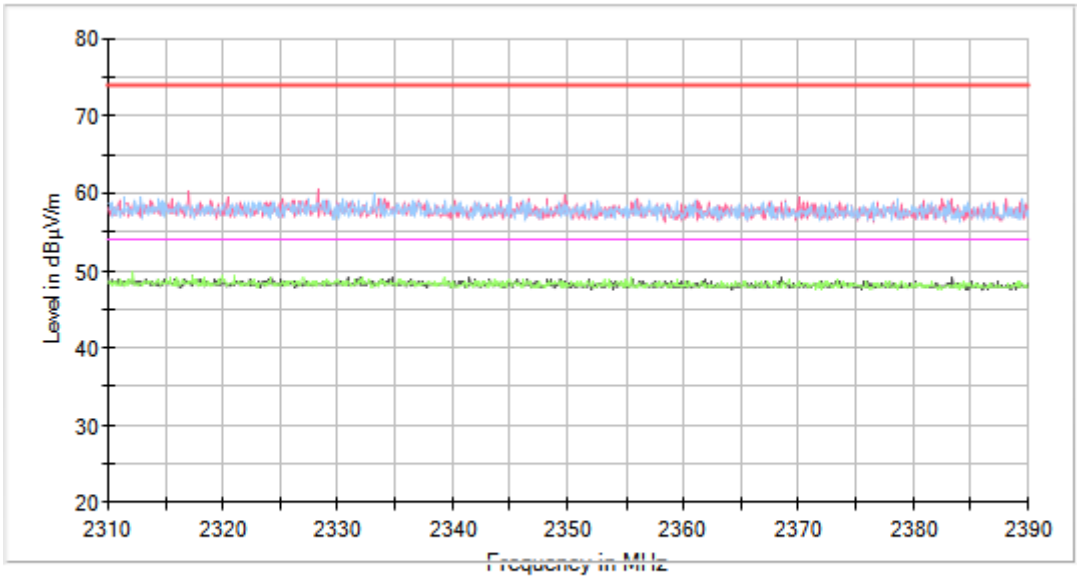
Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Full Spectrum



Tables:
Spectrum Analyzer Parameters

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

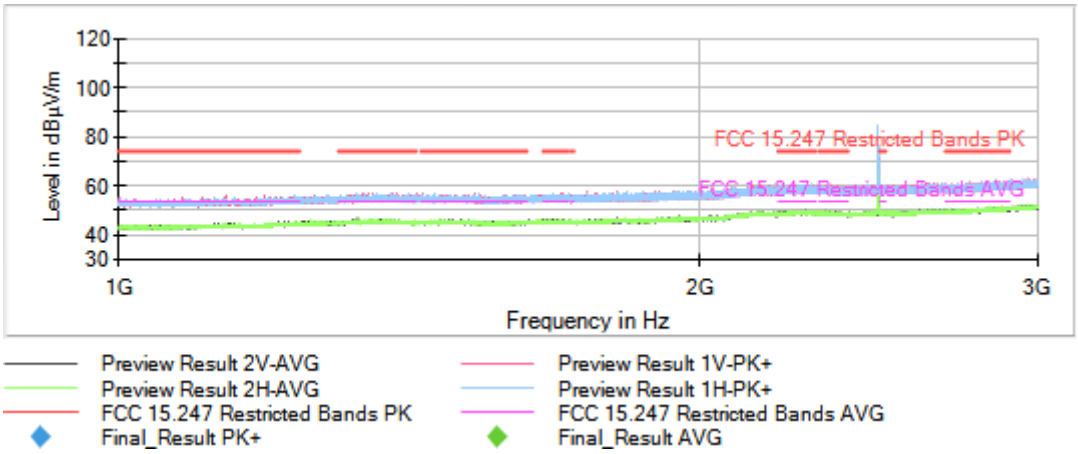
Frequency Range GHz = [1, 3] Equipment Type = Digital Transmission System (DTS)

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

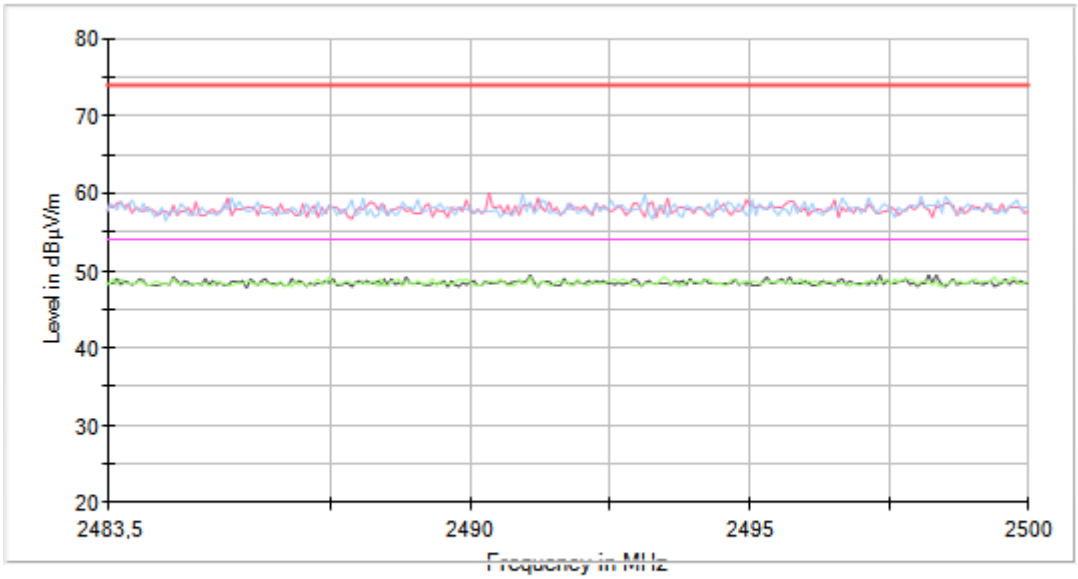
Number of Transmission Chains = 1 Measurement Point = 1

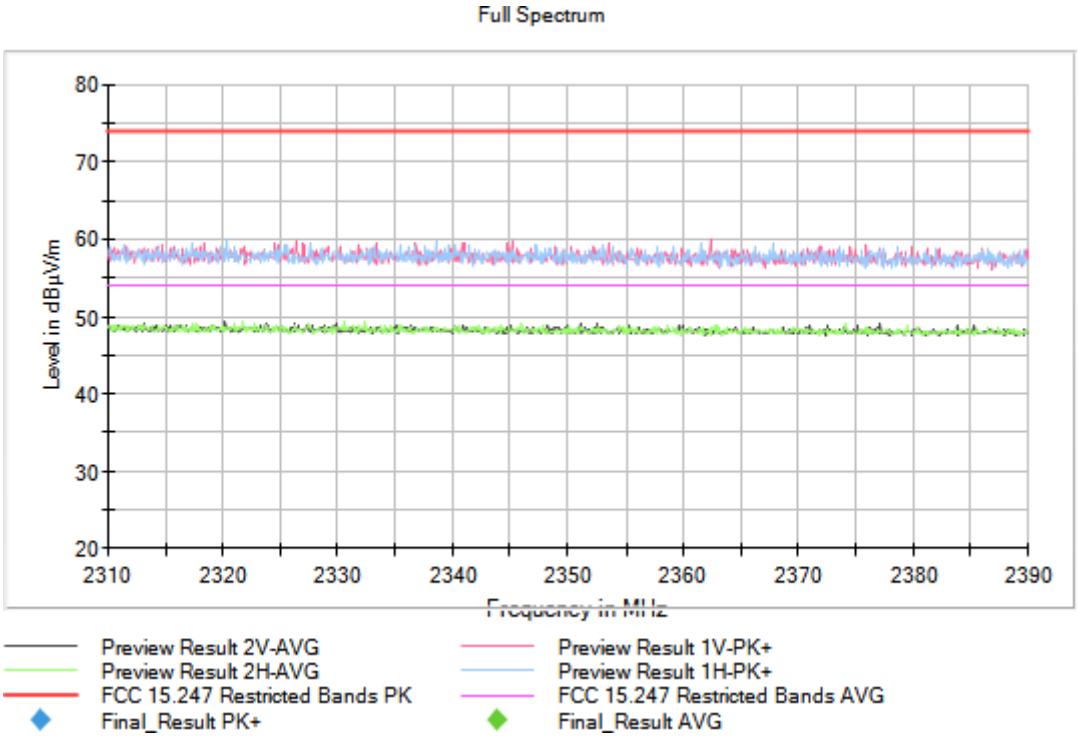
Active Port = 1

Images:



Full Spectrum





Tables:
Spectrum Analyzer Parameters

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

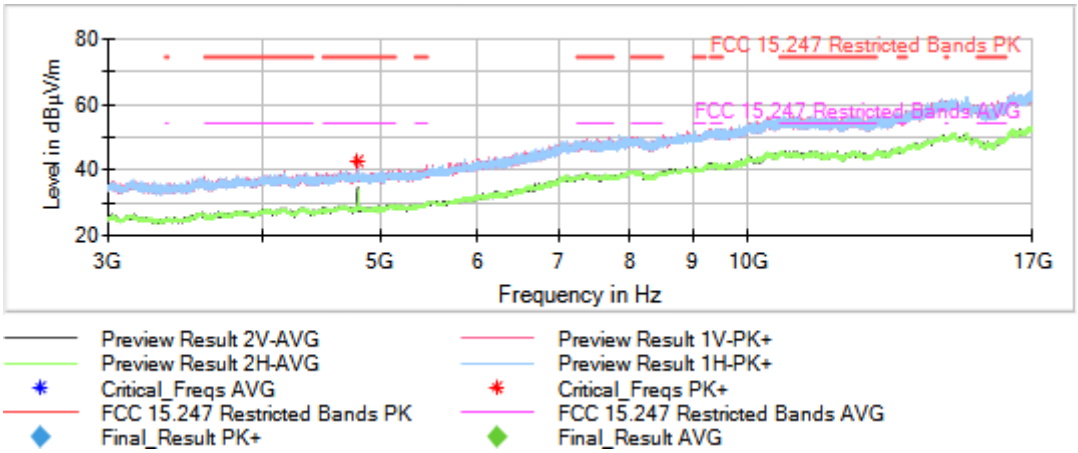
Frequency Range GHz = [3, 17] Equipment Type = Digital Transmission System (DTS)

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

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



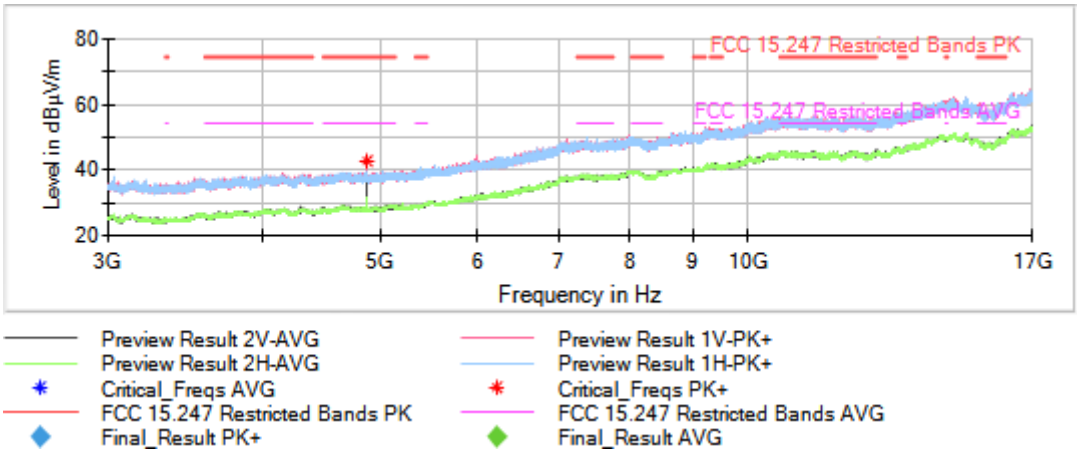
Tables:

Spectrum Analyzer Parameters

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

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

Images:

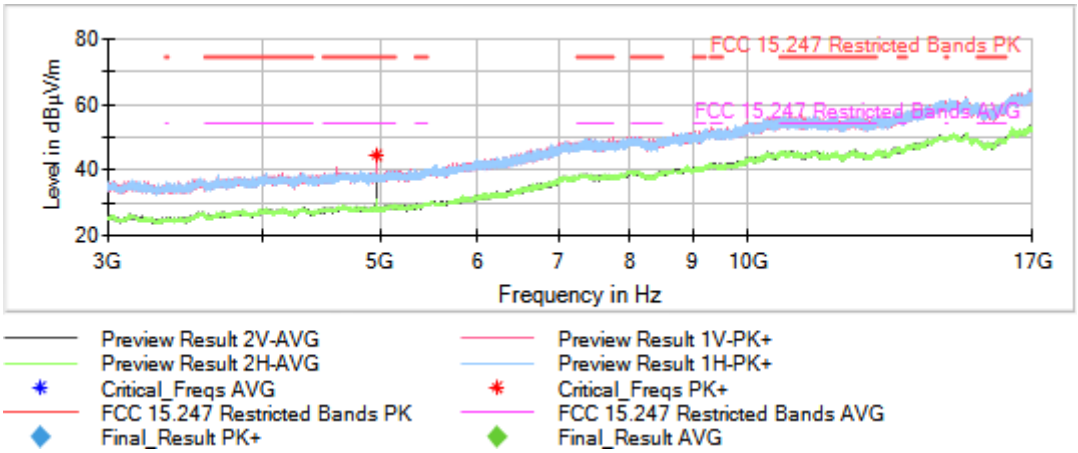


Tables:
Spectrum Analyzer Parameters

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

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

Images:



Tables:
Spectrum Analyzer Parameters

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

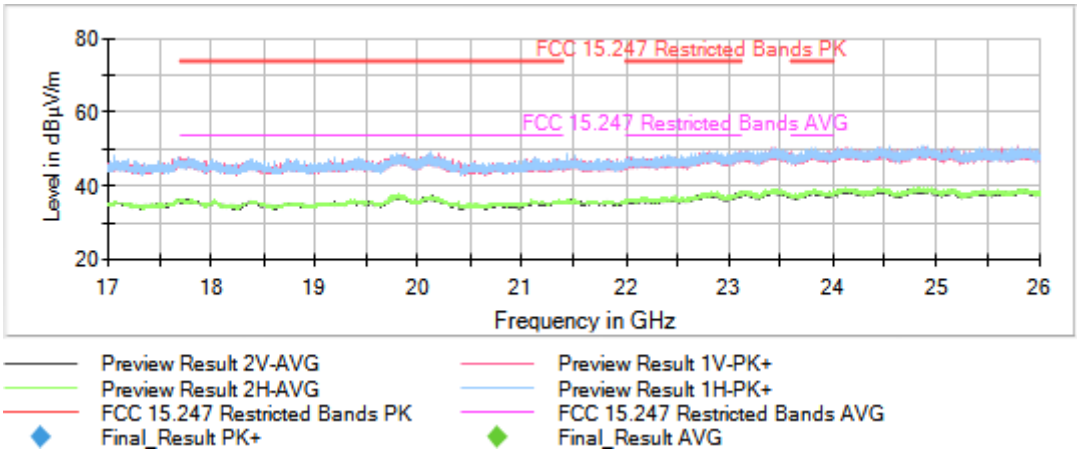
Frequency Range GHz = [17, 26] Equipment Type = Digital Transmission System (DTS)

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

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters

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

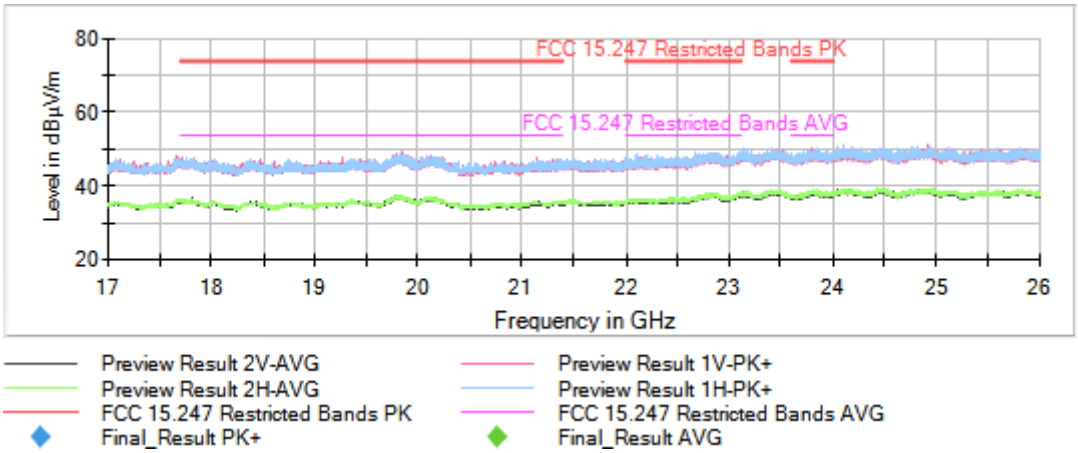
Frequency Range GHz = [17, 26] Equipment Type = Digital Transmission System (DTS)

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

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters

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

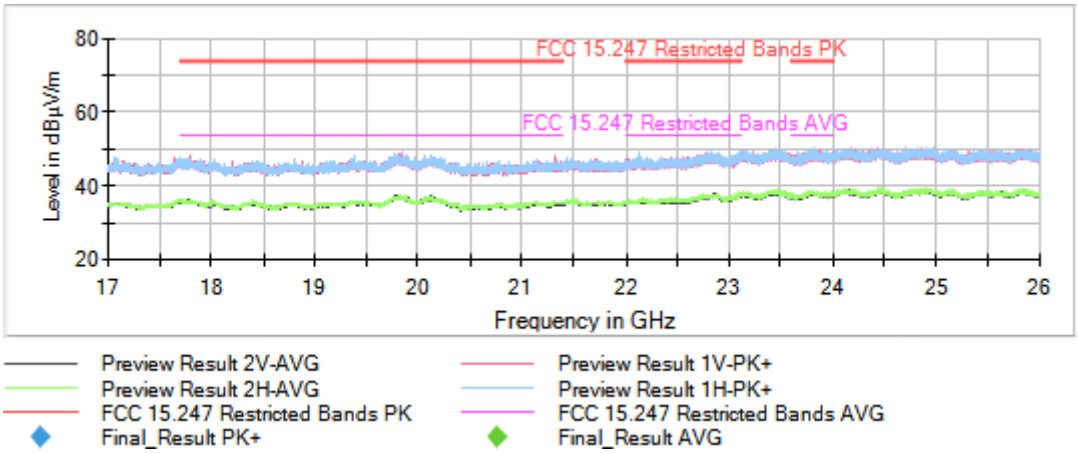
Frequency Range GHz = [17, 26] Equipment Type = Digital Transmission System (DTS)

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

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters

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

Appendix B: Test results. Proximity

INDEX

TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal:	3.7 Vdc
Type of Power Supply:	Rechargeable battery.

ANTENNA (*):

Type of Antenna - Proximity:	Integral
Maximum Declared Antenna Gain - Proximity:	-16 dBi

TEST FREQUENCIES (*):

Modulation	Data rates	Low Channel:	Middle Channel	High Channel
Proximity	2M 2 Mbit/s	2402 MHz	2440 MHz	2480 MHz

During transmitter test the EUT was controlled by a SW tool provided by the client to operate in a continuous transmit mode on the modulation schemes and test channels as required.

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).

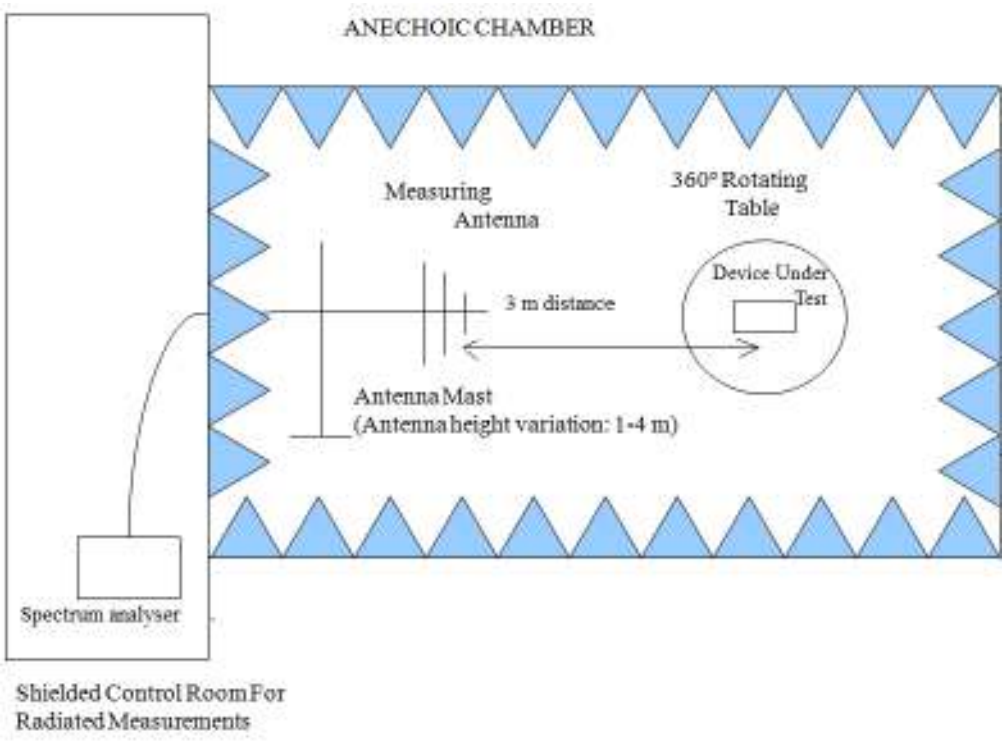
For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

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.

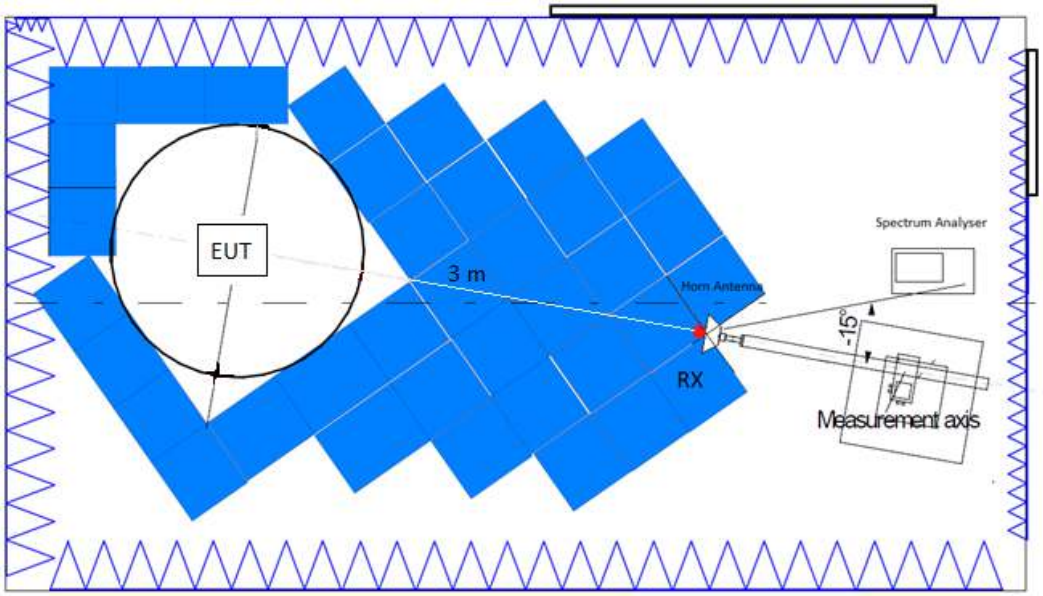
Measurements were made in both horizontal and vertical planes of polarization.

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.

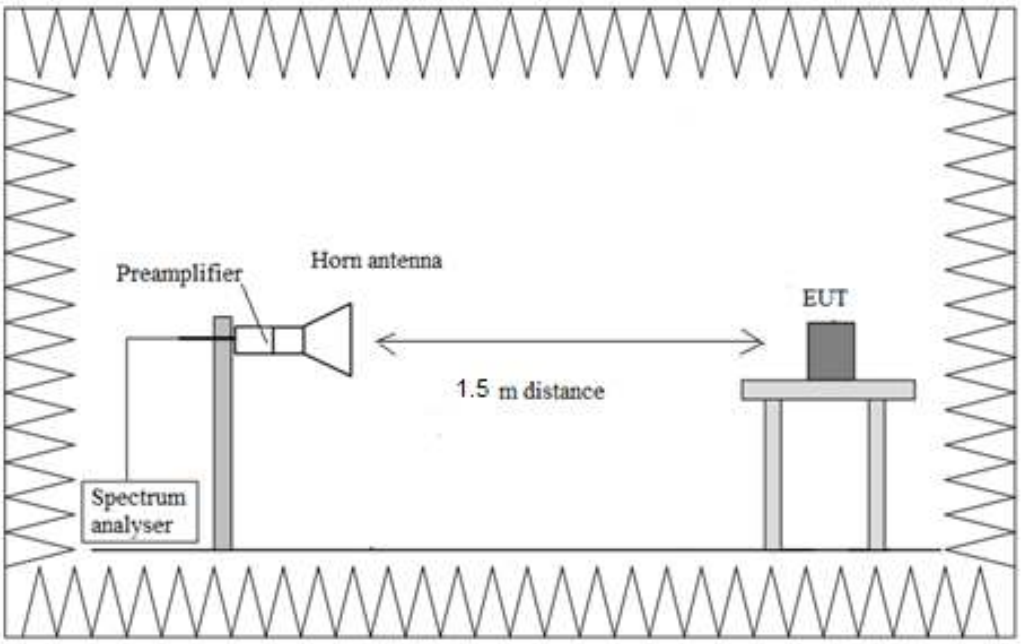
Radiated measurements setup from 30 MHz to 1 GHz:



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

99dBw Occupied Channel Bandwidth 99%

Limits

RSS-Gen 6.7 Occupied bandwidth (or 99% emission bandwidth) and x dB bandwidth:

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

Modulation: Proximity

Results

Equipment	BW (MHz)	Freq (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
Digital Transmission System (DTS)	2	2402.00000	1	1	1.700
		2440.00000			1.700
		2480.00000			1.700

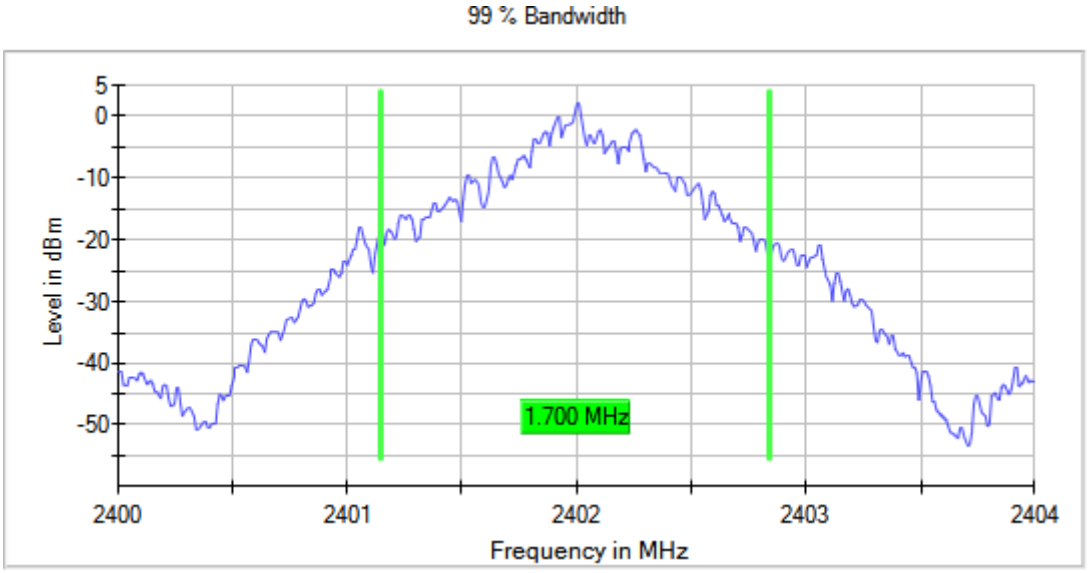
Verdict

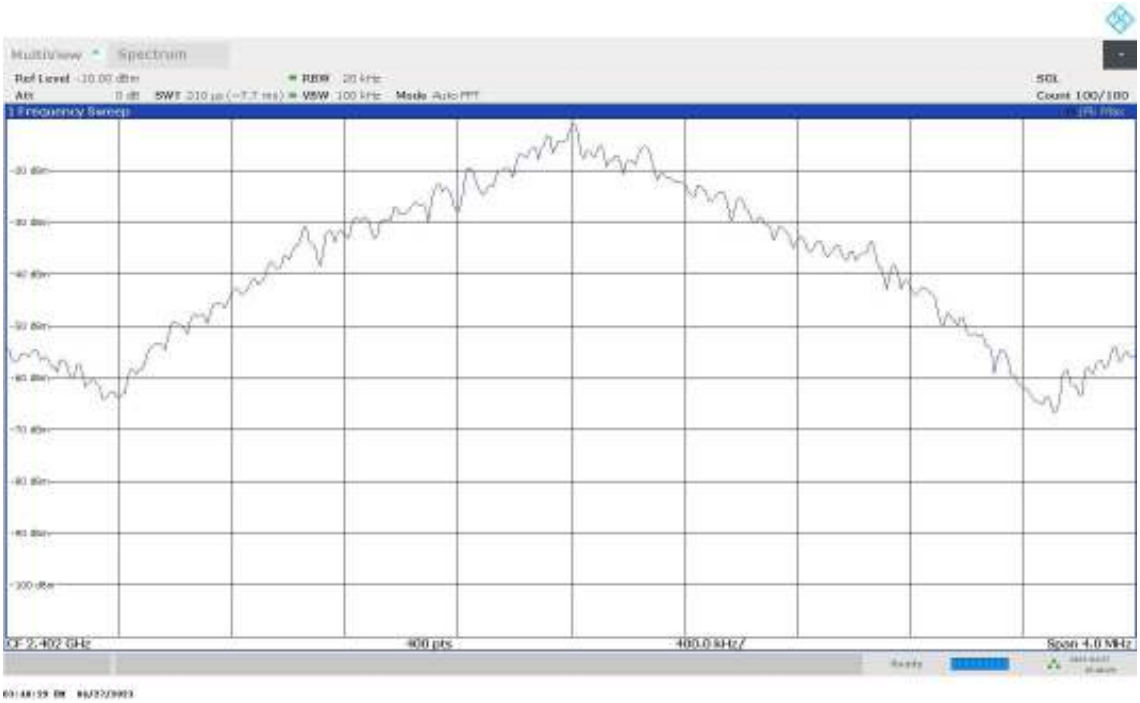
Pass

Attachments

Equipment Type = Digital Transmission System (DTS)	Bandwidth MHz = 2
Modulation = Proximity	Frequency MHz = 2402.00000
Number of Transmission Chains = 1	Active Port = 1

Images:



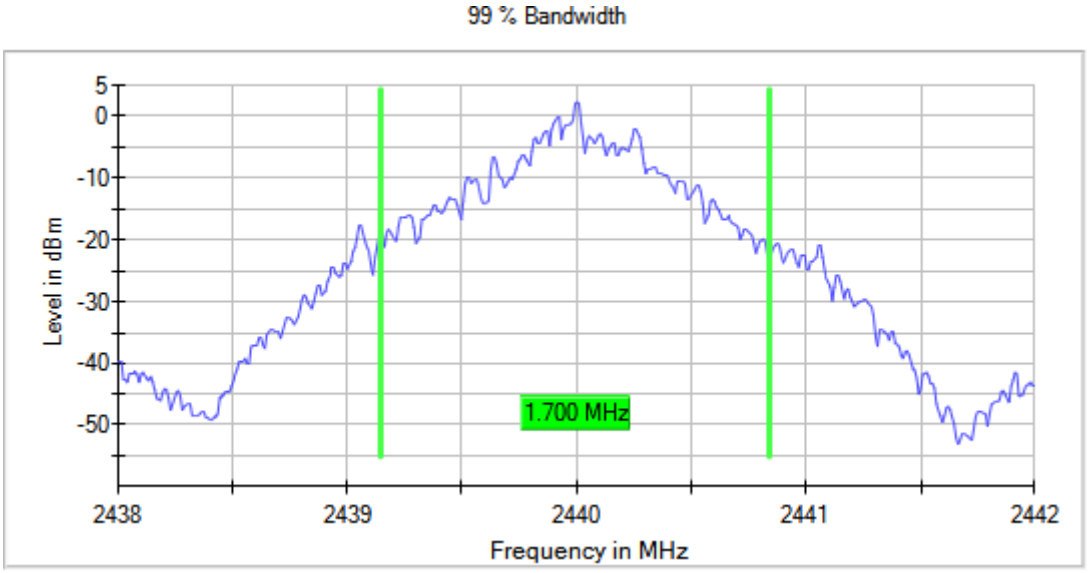


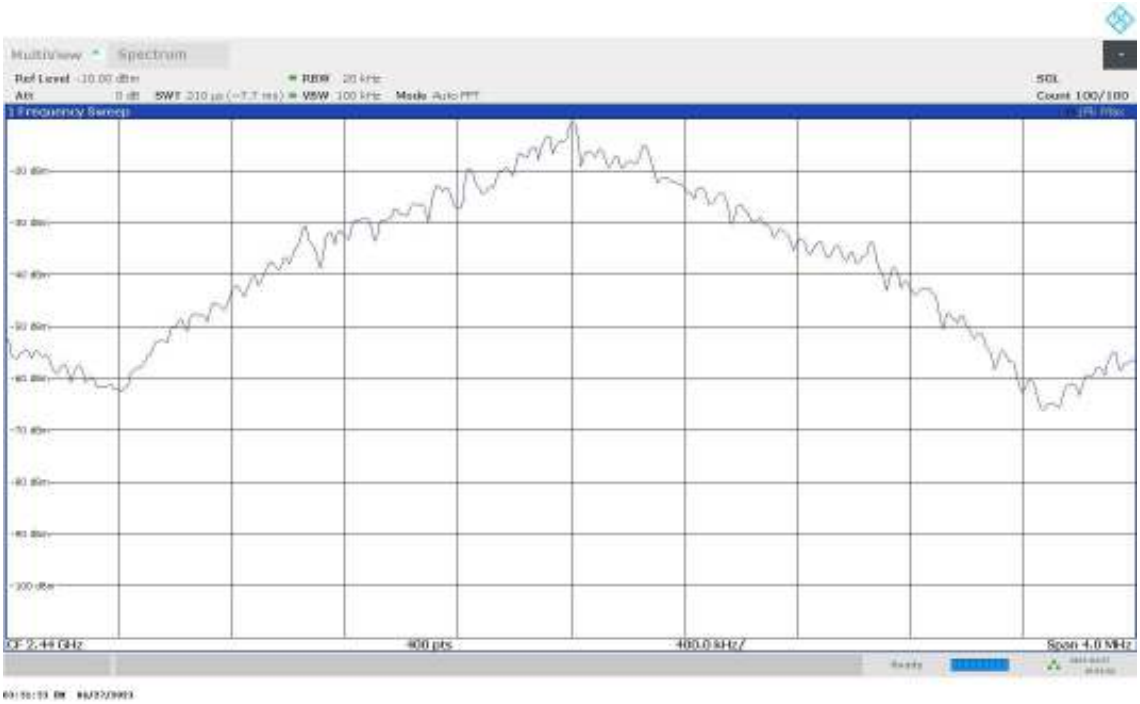
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 2

Modulation = Proximity Frequency MHz = 2440.00000

Number of Transmission Chains = 1 Active Port = 1

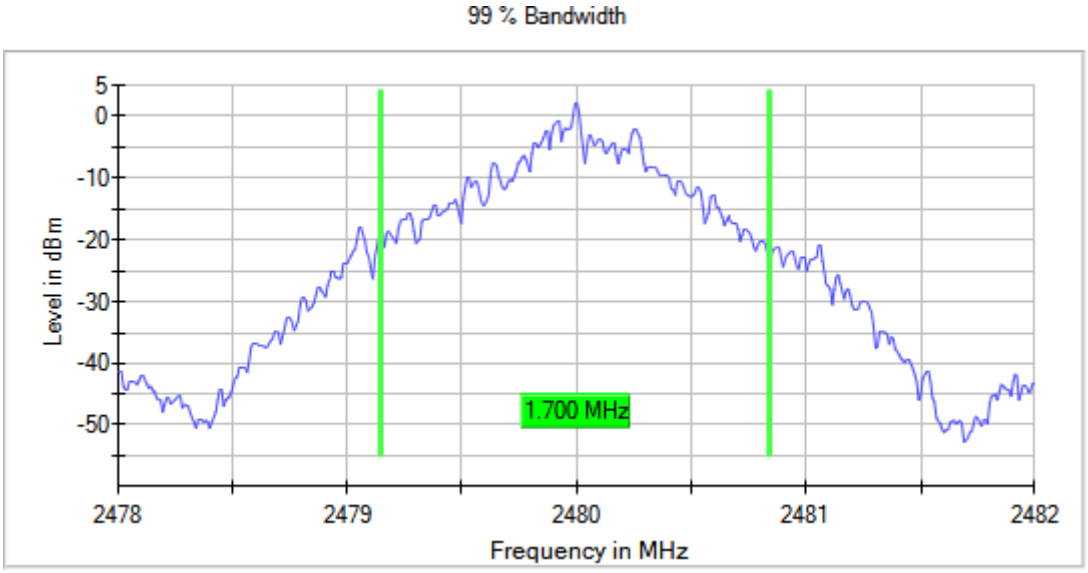
Images:

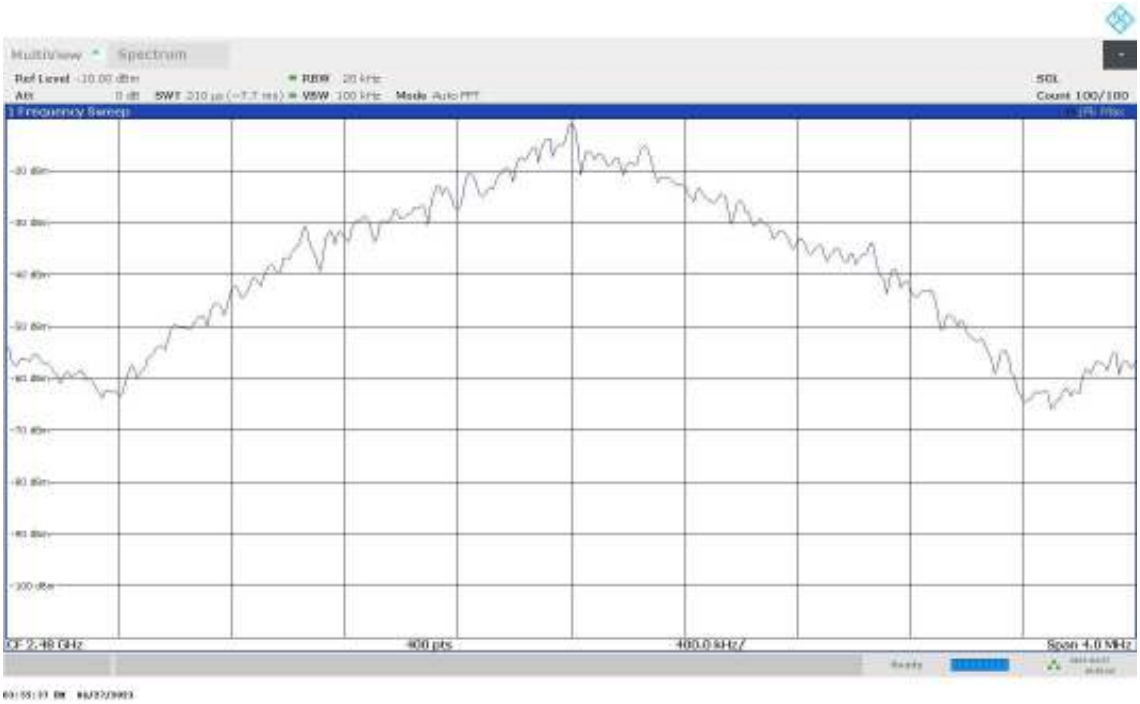




Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 2
Modulation = Proximity
Frequency MHz = 2480.00000
Number of Transmission Chains = 1
Active Port = 1

Images:





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

BW (MHz)	Freq (MHz)	# of Tx Chains	Port	Ebw (MHz)
2	2402.00000	1	1	0.871
	2440.00000			0.871
	2480.00000			0.752

Verdict

Pass

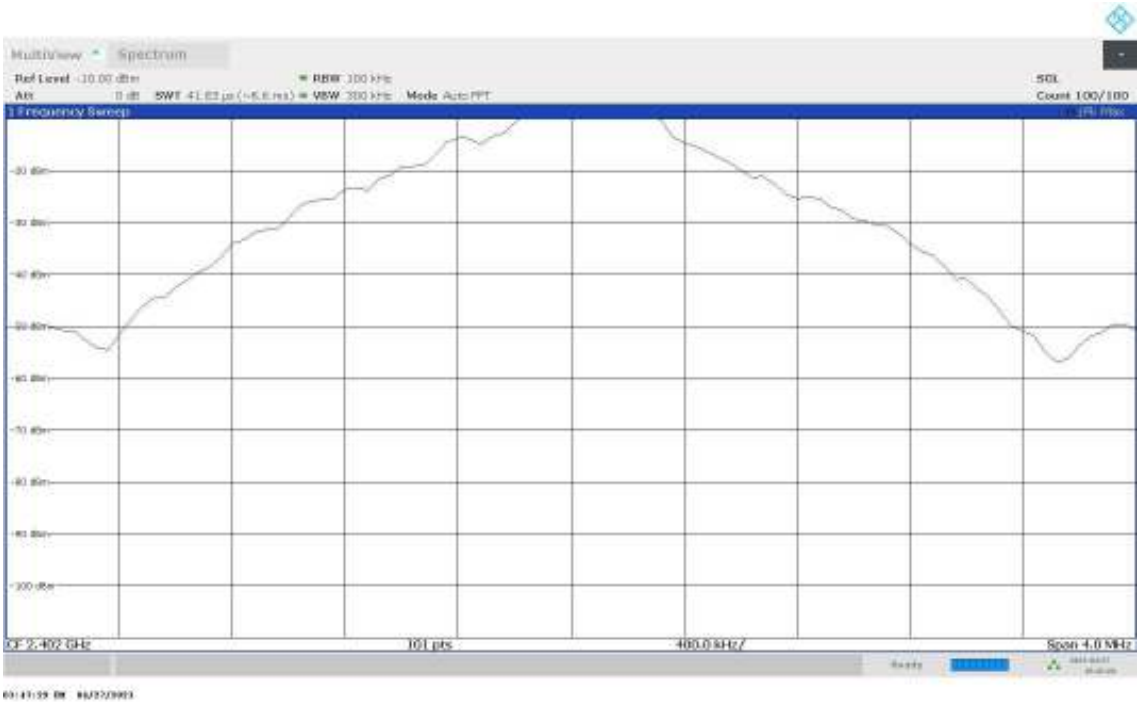
Attachments

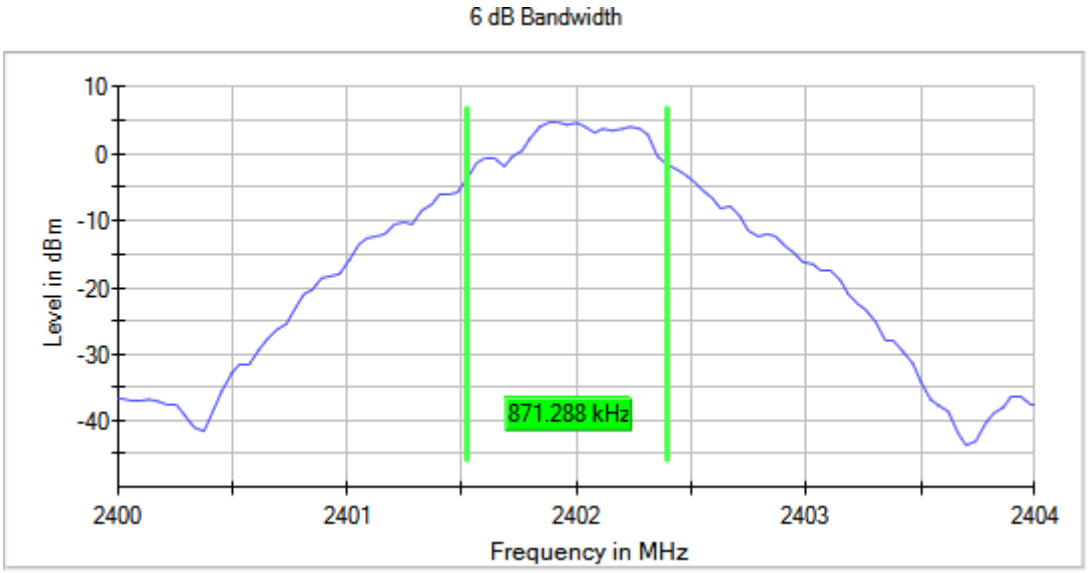
Bandwidth MHz = 2 Modulation = Proximity

Frequency MHz = 2402.00000 Number of Transmission Chains = 1

Active Port = 1

Images:



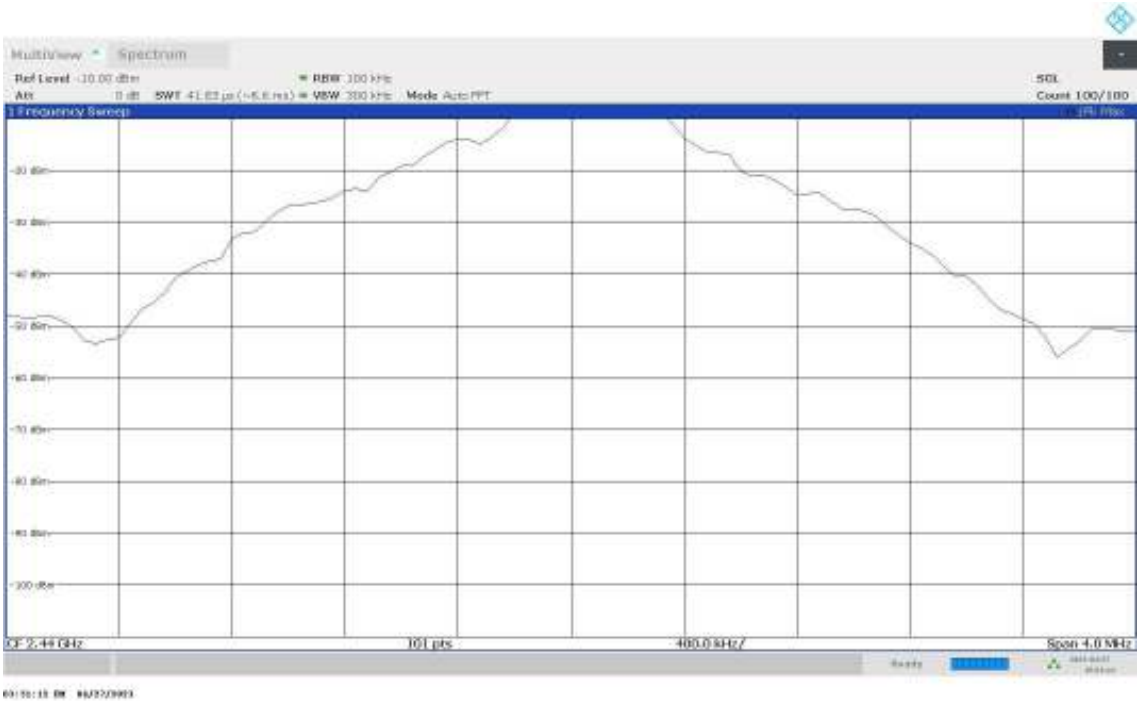


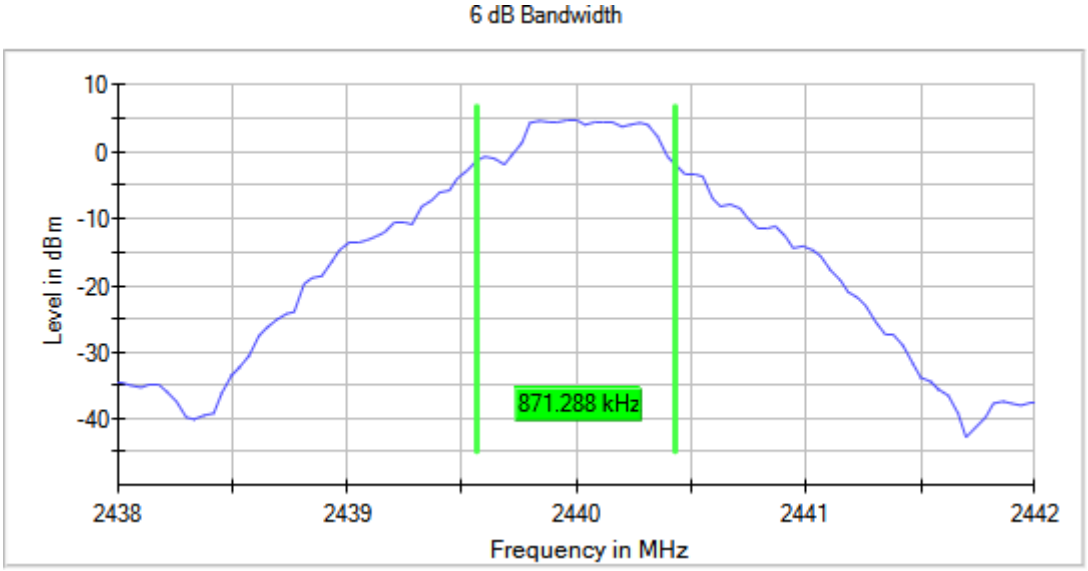
Bandwidth MHz = 2 Modulation = Proximity

Frequency MHz = 2440.00000 Number of Transmission Chains = 1

Active Port = 1

Images:



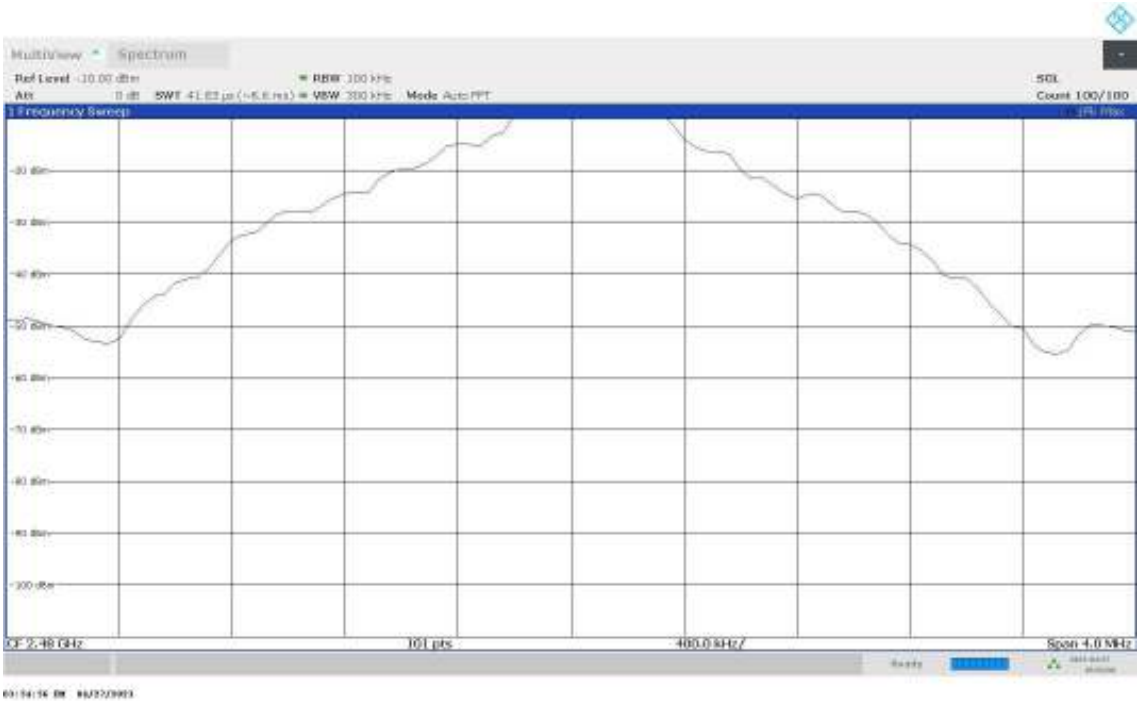


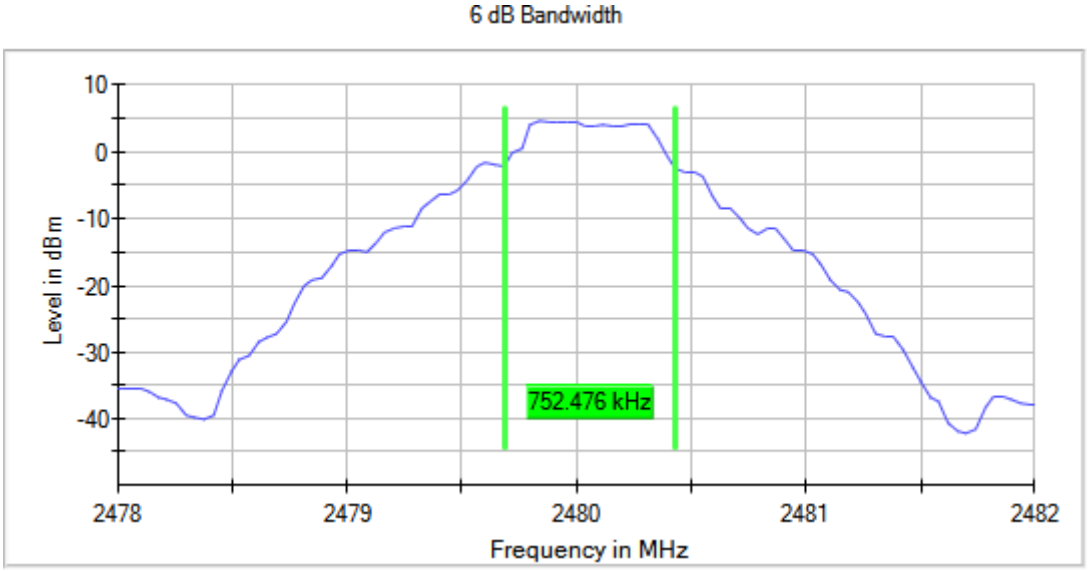
Bandwidth MHz = 2 Modulation = Proximity

Frequency MHz = 2480.00000 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: Proximity

Results

Equipment	BW (MHz)	Freq (MHz)	# of Tx Chains	Port	PSD (dBm)
Digital Transmission System (DTS)	2	2402.00000	1	1	-2.03
		2440.00000			-1.52
		2480.00000			-1.37

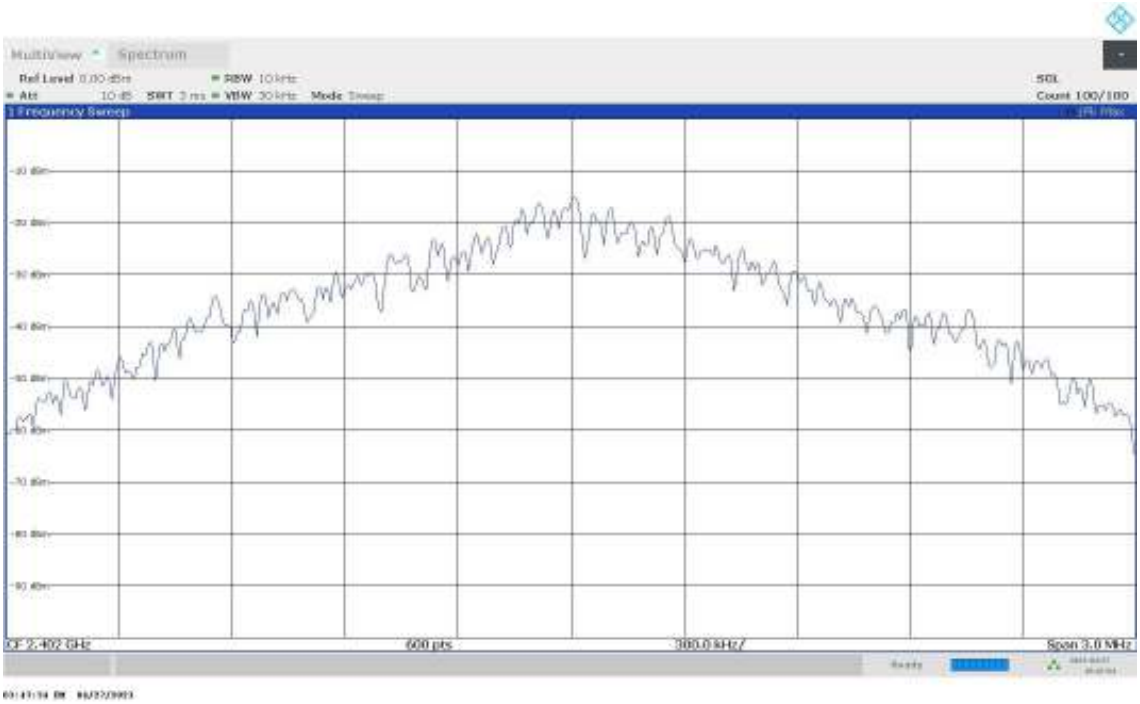
Verdict

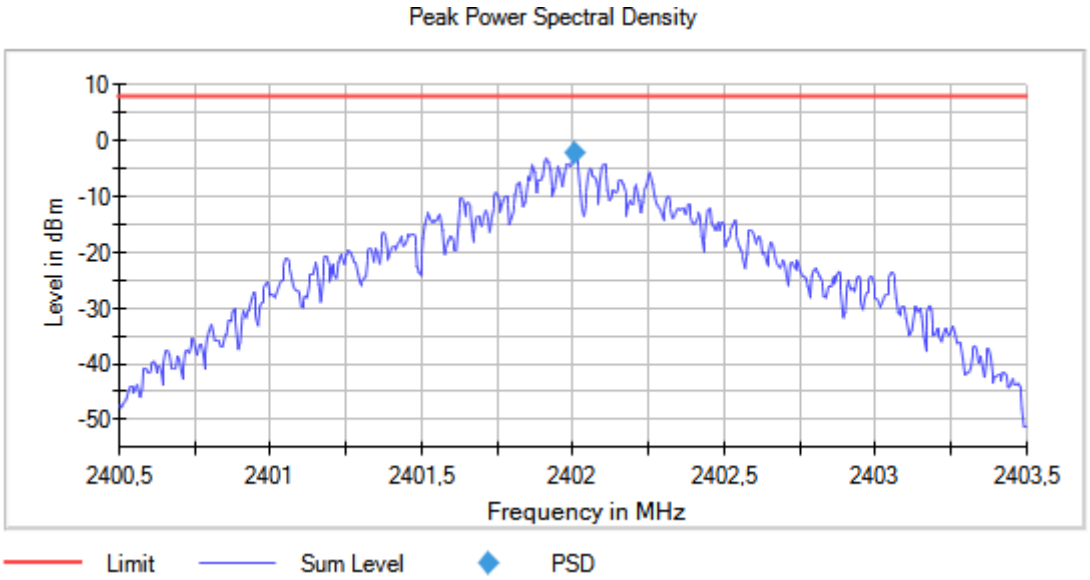
Pass

Attachments

Equipment Type = Digital Transmission System (DTS)	Bandwidth MHz = 2
Modulation = Proximity	Frequency MHz = 2402.00000
Number of Transmission Chains = 1	Active Port = 1

Images:



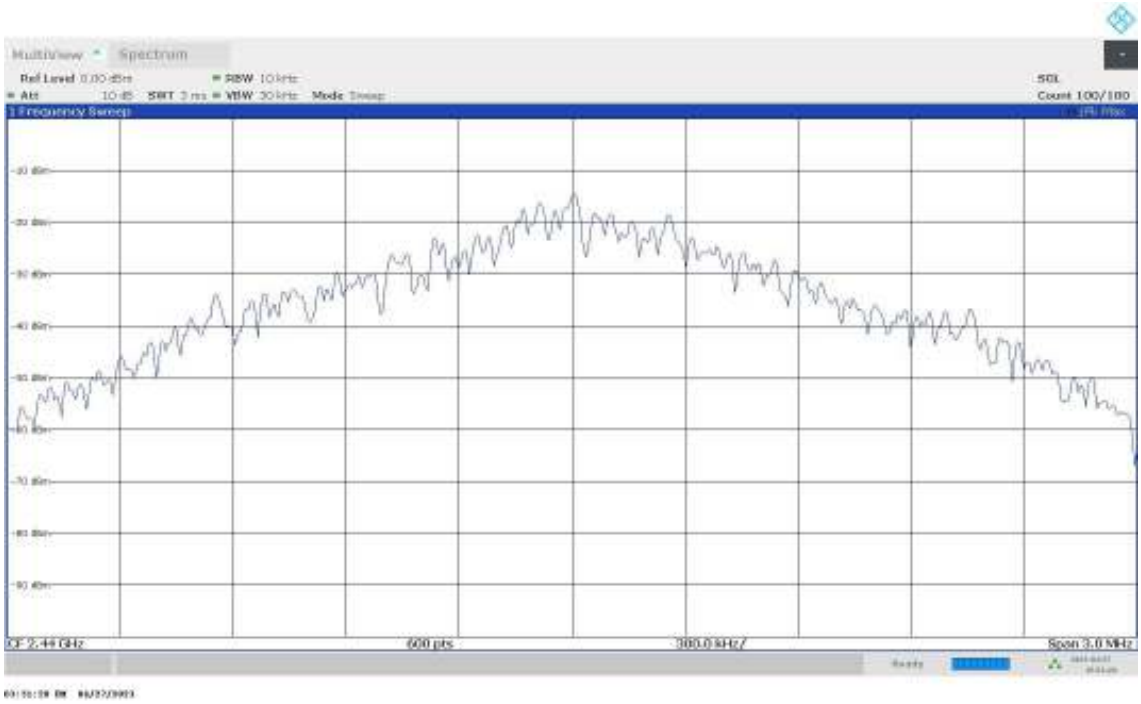


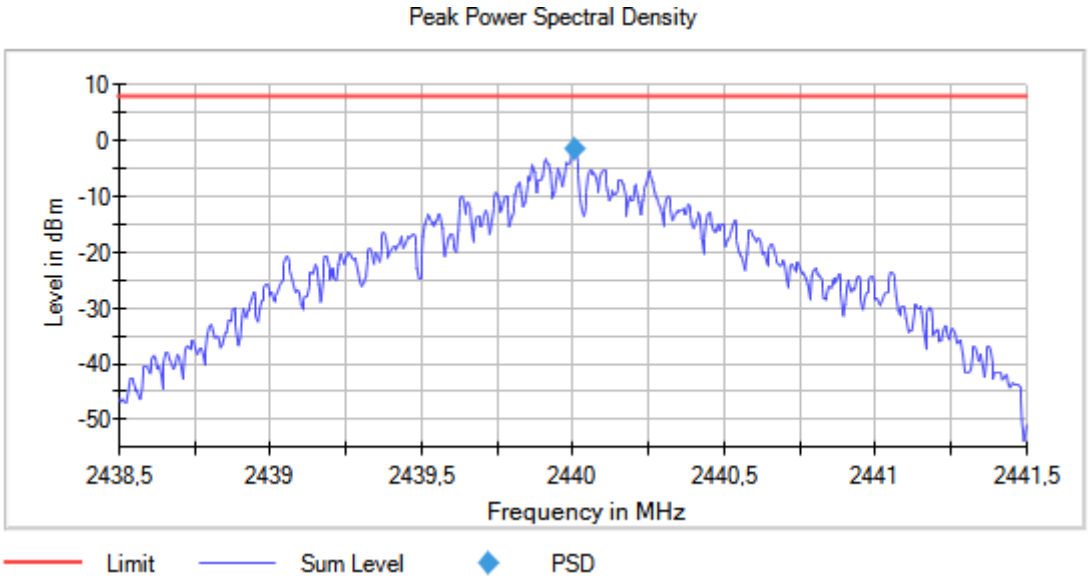
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 2

Modulation = Proximity Frequency MHz = 2440.00000

Number of Transmission Chains = 1 Active Port = 1

Images:



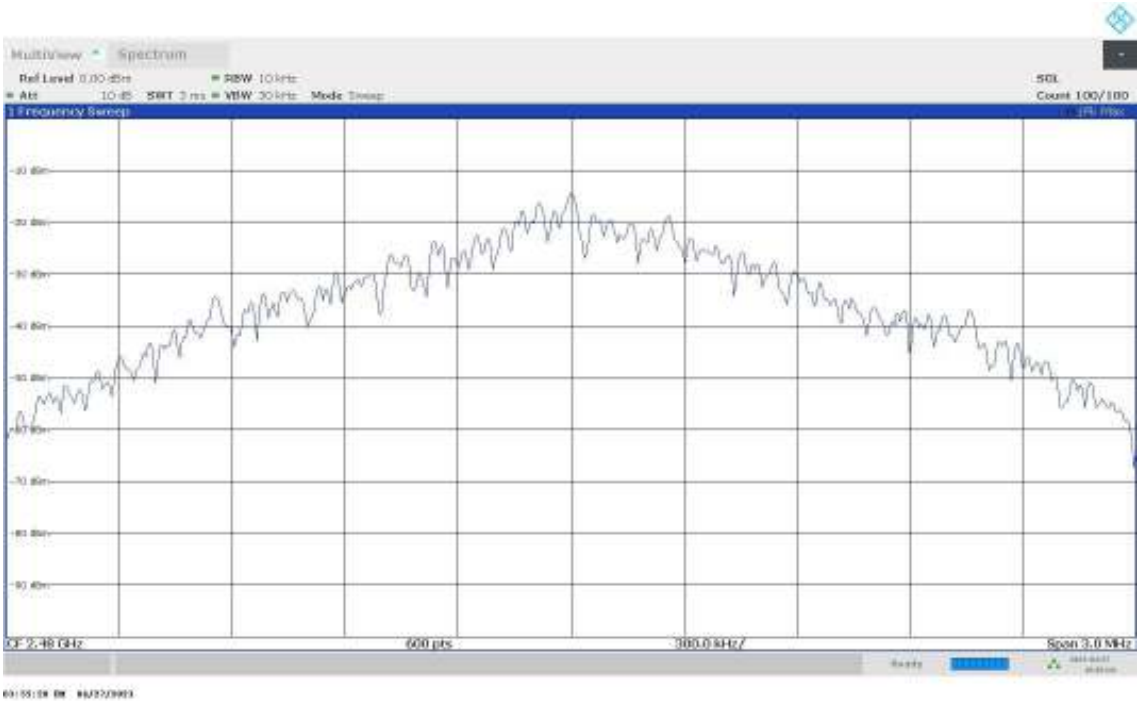


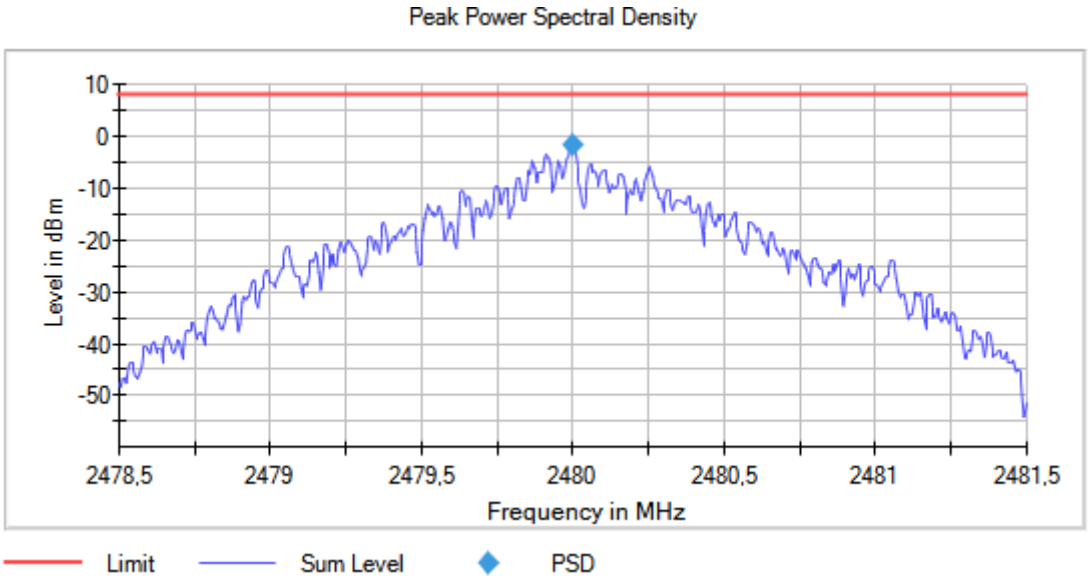
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 2

Modulation = Proximity Frequency MHz = 2480.00000

Number of Transmission Chains = 1 Active Port = 1

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 ≥ DTS bandwidth” of ANSI C.63.10-2013.

Modulation: Proximity

Results

Equipment	BW (MHz)	Freq (MHz)	# of Tx Chains	Port	PeakPower (dBm)	Maximum EIRP Power (dBm)
Digital Transmission System (DTS)	2	2402.00000	1	1	7.3580	-8.642
Digital Transmission System (DTS)	2	2440.00000	1	1	6.7100	-9.29
Digital Transmission System (DTS)	2	2480.00000	1	1	6.5420	-9.458

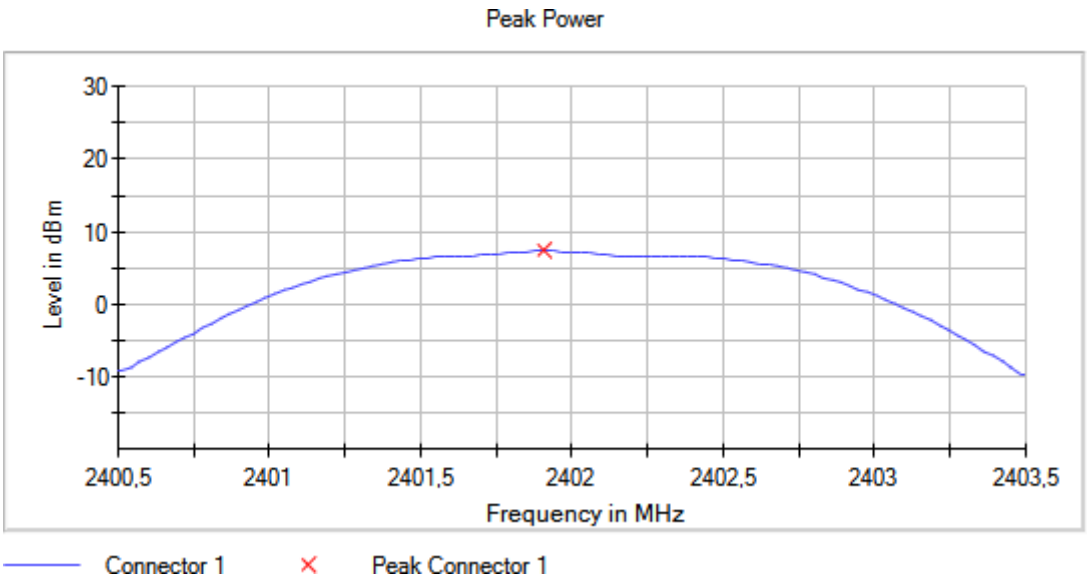
Verdict

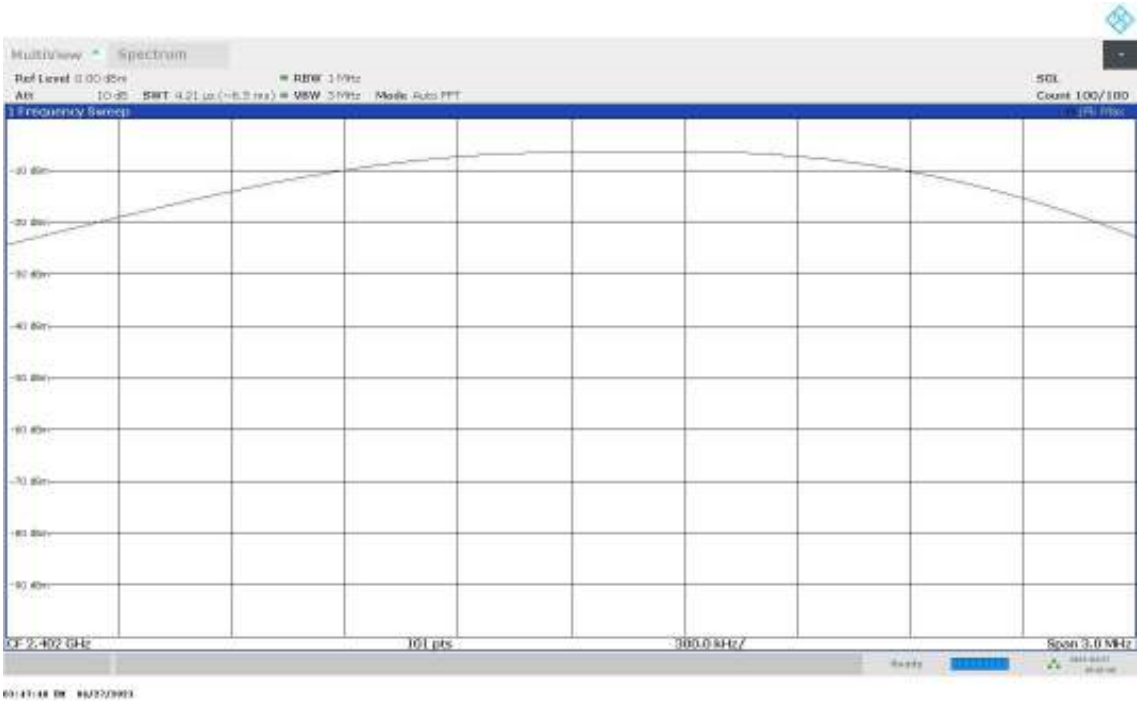
Pass

Attachments

Equipment Type = Digital Transmission System (DTS)	Bandwidth MHz = 2
Modulation = Proximity	Frequency MHz = 2402.00000
Number of Transmission Chains = 1	Active Port = 1

Images:



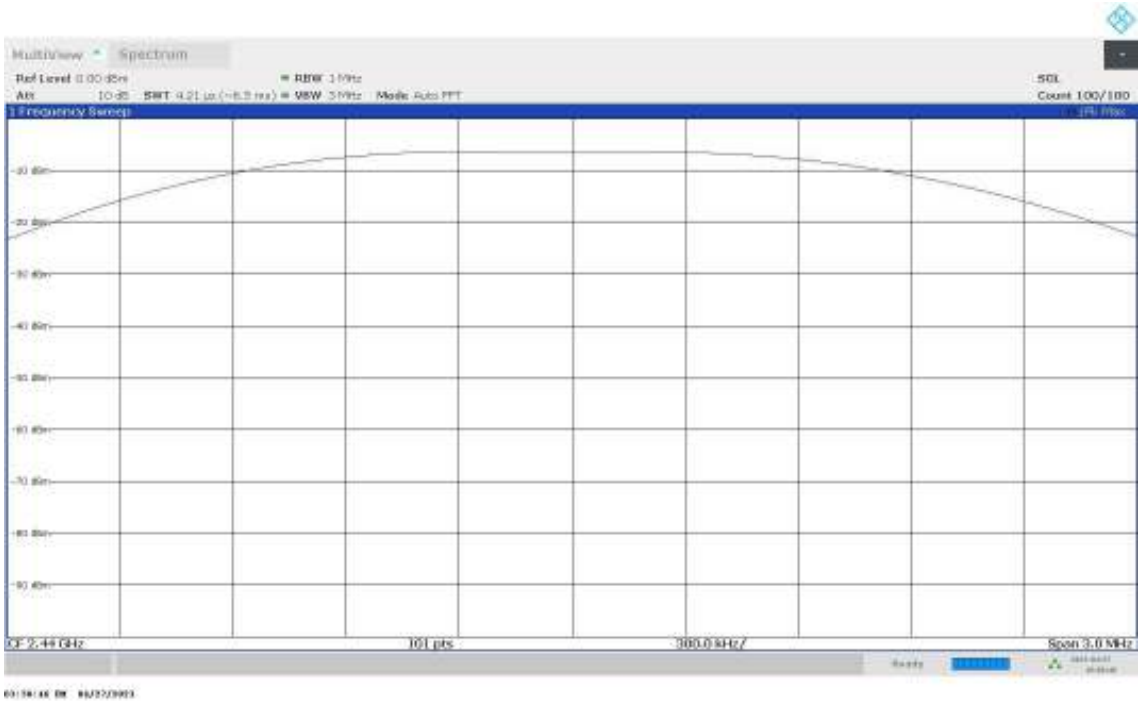


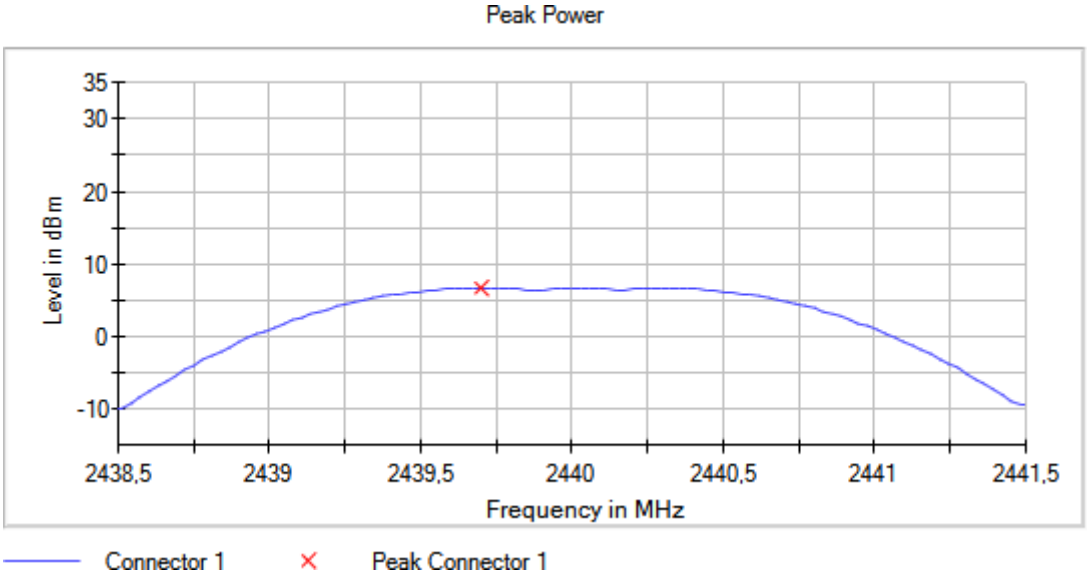
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 2

Modulation = Proximity Frequency MHz = 2440.00000

Number of Transmission Chains = 1 Active Port = 1

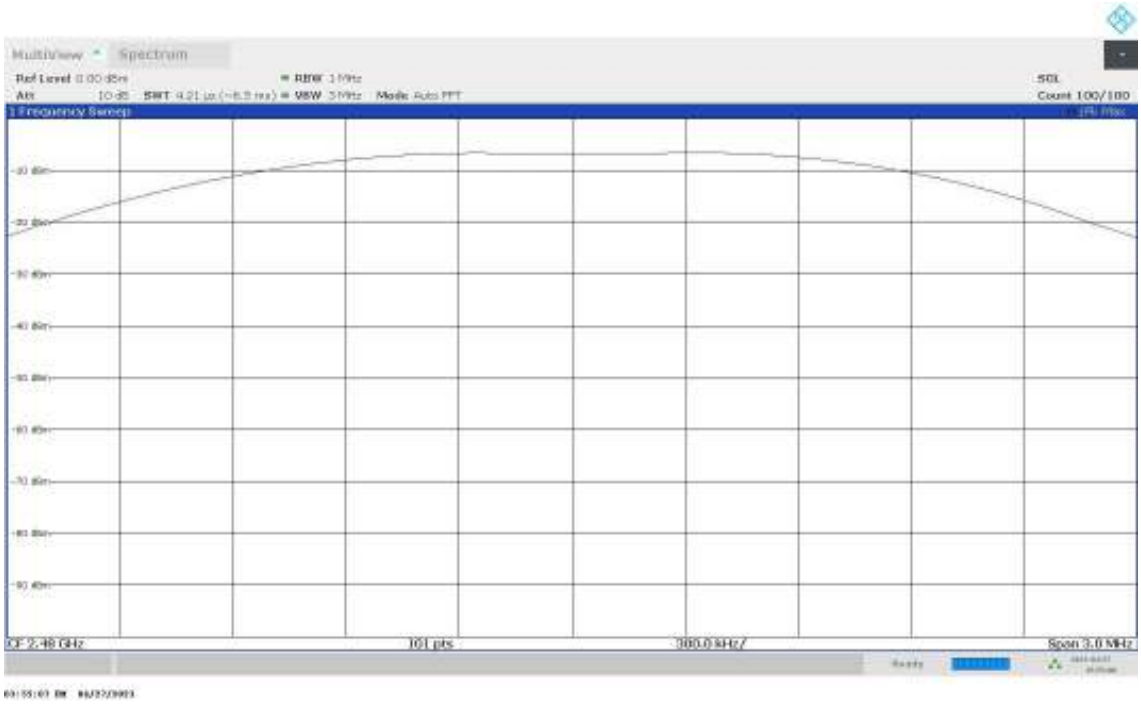
Images:

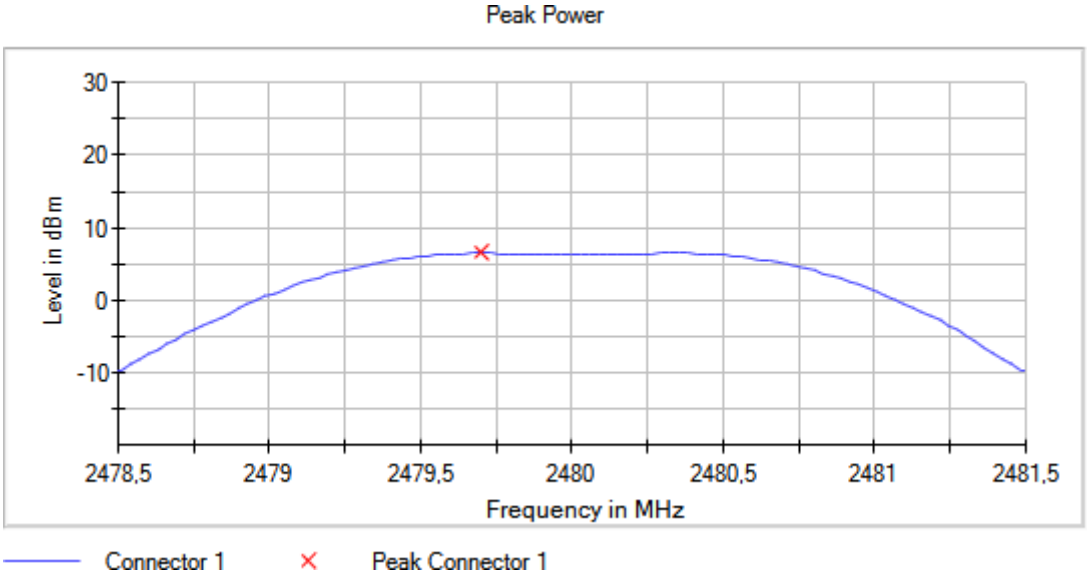




Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 2
Modulation = Proximity
Frequency MHz = 2480.00000
Number of Transmission Chains = 1
Active Port = 1

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.

Modulation: Proximity

Results

Equipment	BW (MHz)	Freq (MHz)	# of Tx Chains	Port	Inband Peak Lvl Limit (dBm)	Freq (MHz)	Lvl (dBm)
Digital Transmission System (DTS)	2	2402.00000	1	1	-28.369	2399.975000	-49.3
					-28.369	2399.925000	-50.0
					-28.369	2399.875000	-54.6
					-28.369	2399.825000	-55.5
					-28.369	2399.575000	-56.9
					-28.369	2399.525000	-57.0
					-28.369	2399.775000	-57.4
					-28.369	2399.475000	-57.6
					-28.369	2399.725000	-59.0
					-28.369	2399.625000	-60.3
					-28.369	2399.425000	-60.5
					-28.369	2396.775000	-61.0
					-28.369	2396.825000	-61.4
					-28.369	2399.675000	-61.9
					-28.369	2397.025000	-62.0
		2480.00000			-28.397	2484.075000	-61.3
					-28.397	2484.025000	-62.1
					-28.397	2484.125000	-62.5
					-28.397	2483.525000	-63.6
					-28.397	2485.325000	-64.2
					-28.397	2485.375000	-64.2
					-28.397	2484.625000	-64.5
					-28.397	2484.575000	-65.1
					-28.397	2484.375000	-65.2
					-28.397	2483.975000	-65.3
					-28.397	2483.625000	-65.3
					-28.397	2484.425000	-65.3
					-28.397	2483.875000	-65.3

Equipment	BW (MHz)	Freq (MHz)	# of Tx Chains	Port	Inband Peak Lvl Limit (dBm)	Freq (MHz)	Lvl (dBm)
					-28.397	2483.575000	-65.4
					-28.397	2483.825000	-65.5

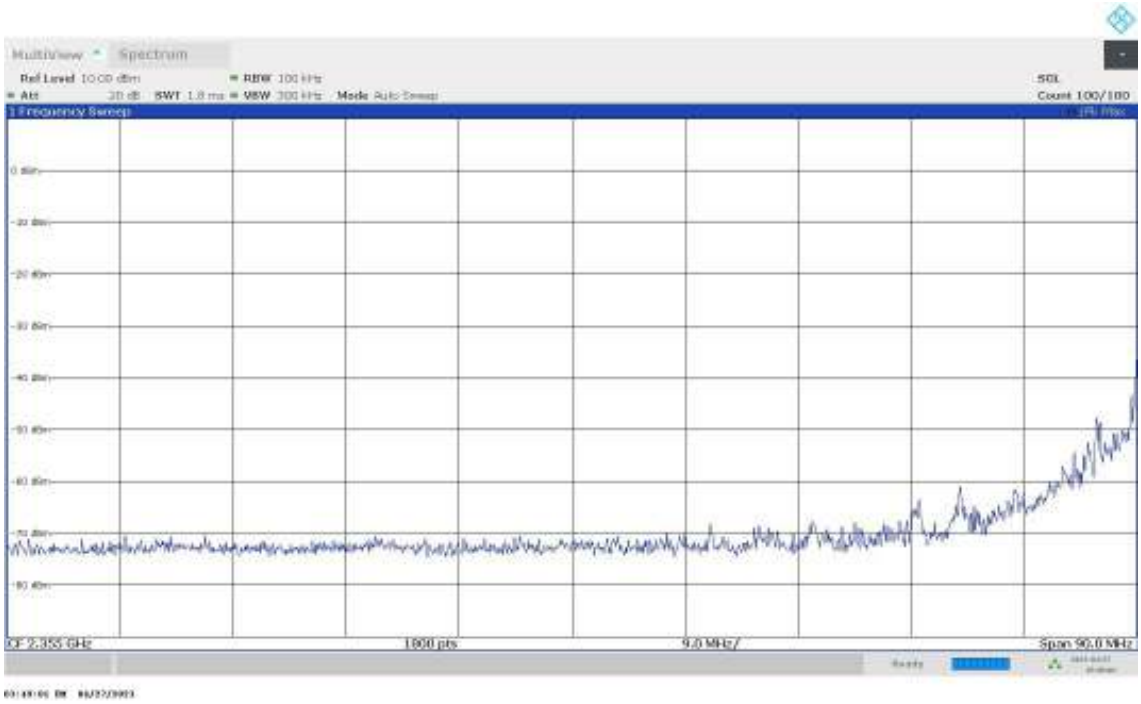
Verdict

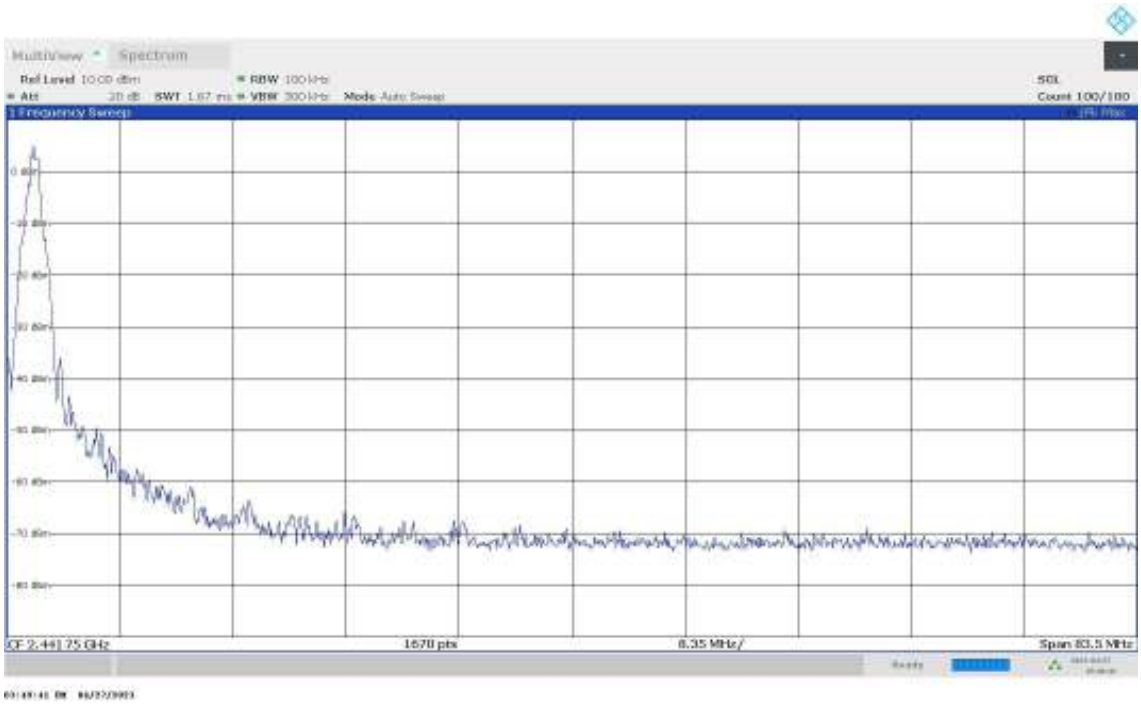
Pass

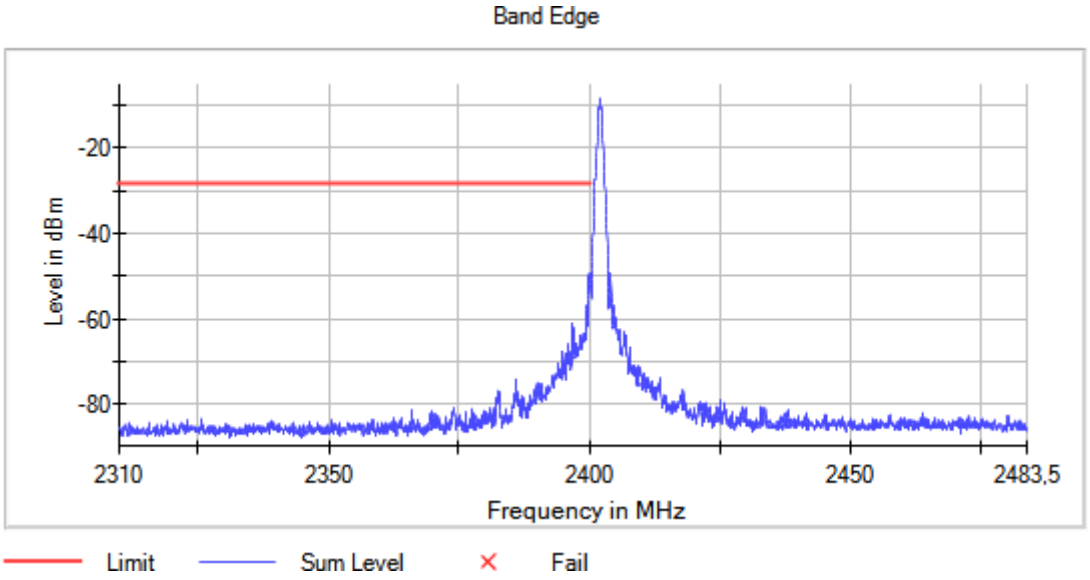
Attachments

Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 2
Modulation = Proximity
Frequency MHz = 2402.00000
Number of Transmission Chains = 1
Measurement Point = 1
Active Port = 1

Images:



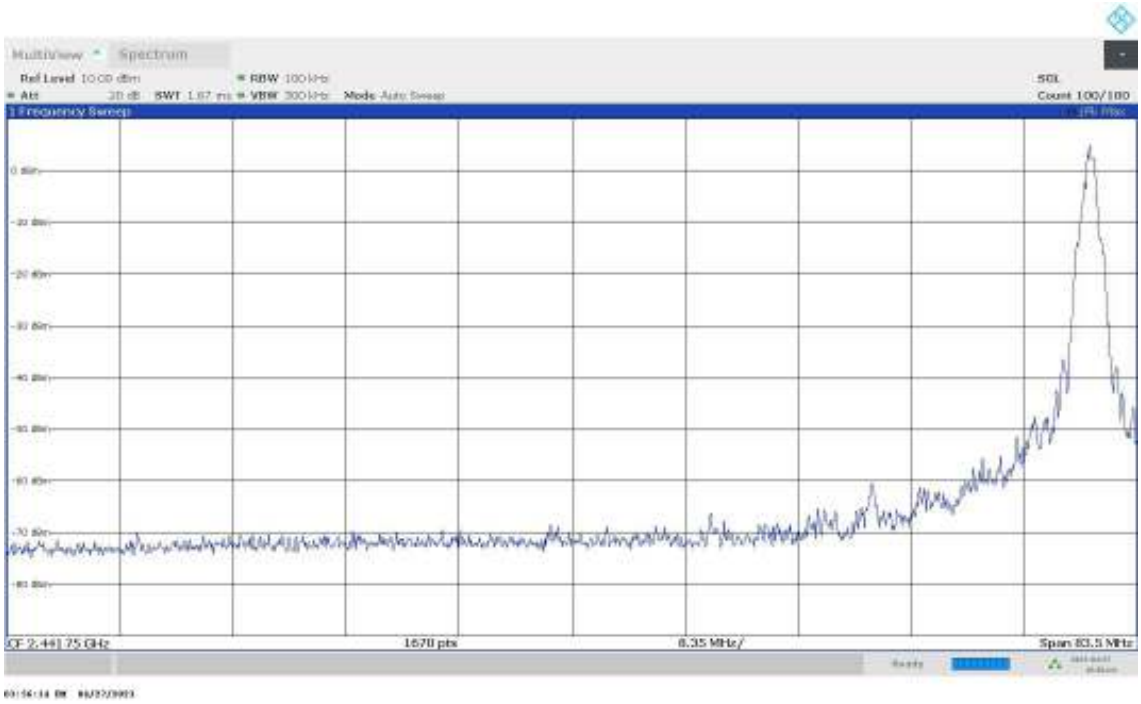


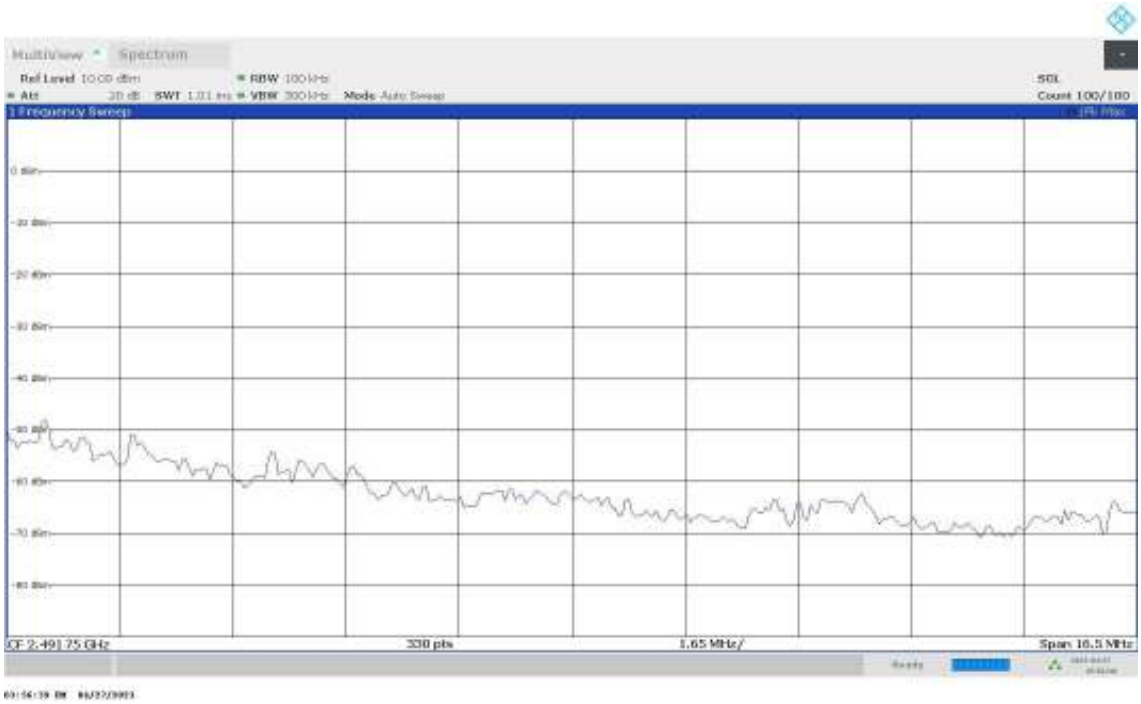

Band Edge
-20
-40
-60
-80
Level in dBm
2310
2350
2400
2450
2483,5
Frequency in MHz
Limit
Sum Level
Fail

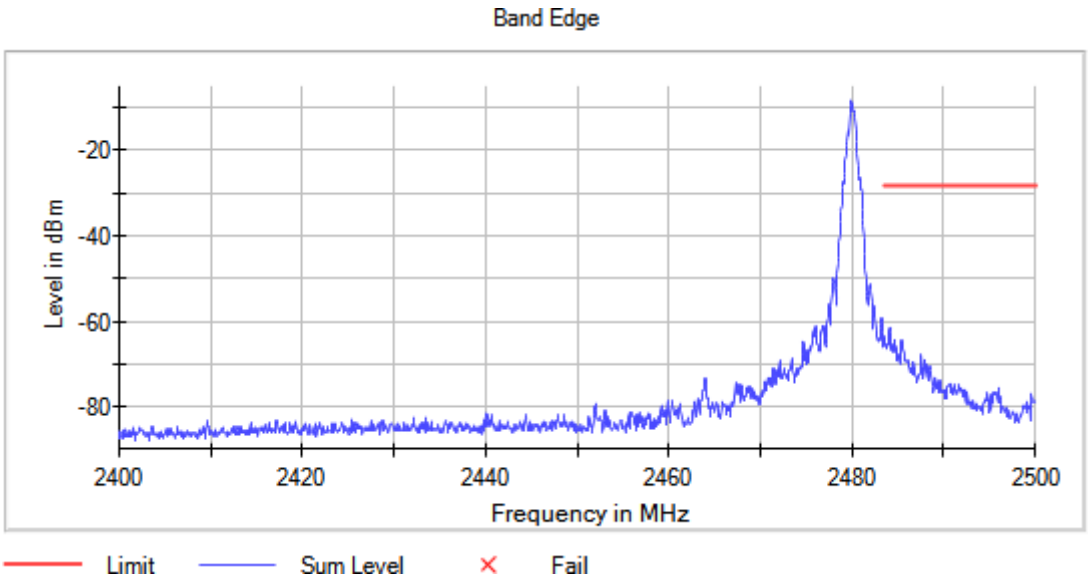
Equipment Type = Digital Transmission System (DTS)
Modulation = Proximity
Number of Transmission Chains = 1
Active Port = 1

Bandwidth MHz = 2
Frequency MHz = 2480.00000
Measurement Point = 1

Images:






Band Edge
-20
-40
-60
-80
Level in dBm
2400
2420
2440
2460
2480
2500
Frequency in MHz
Limit
Sum Level
Fail

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: Proximity

Results

Freq Rng (GHz)	Equipment	Freq (MHz)	# of Tx Chains	Port	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
[3, 17]	Digital Transmission System (DTS)	2402.00000	1	1	4804.000	39.85	V	PK
		2440.00000			4881.000	41.46	V	PK
		2480.00000			4955.000	44.23	V	PK

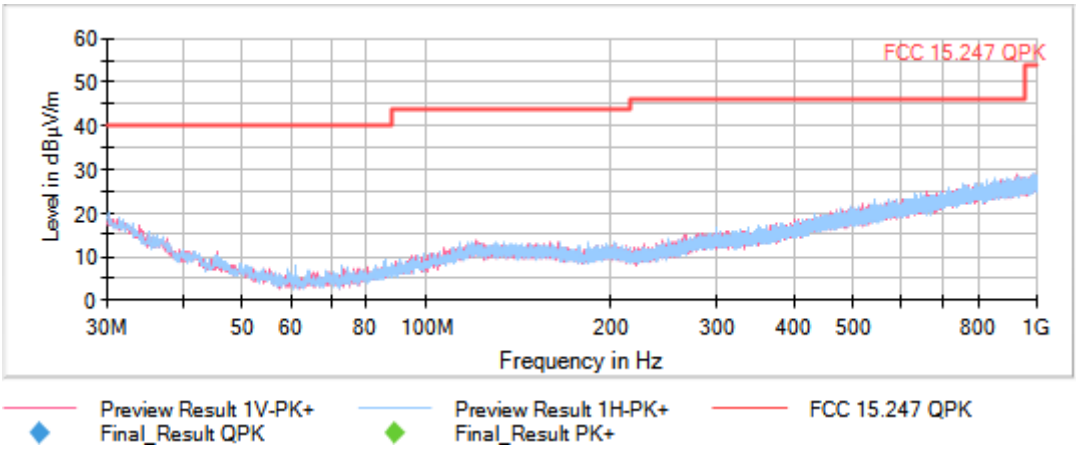
Verdict

Pass

Attachments

Frequency Range GHz = [0.03, 1]
Equipment Type = Digital Transmission System (DTS)
Modulation = Proximity
Frequency MHz = 2402.00000
Number of Transmission Chains = 1
Measurement Point = 1
Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters

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

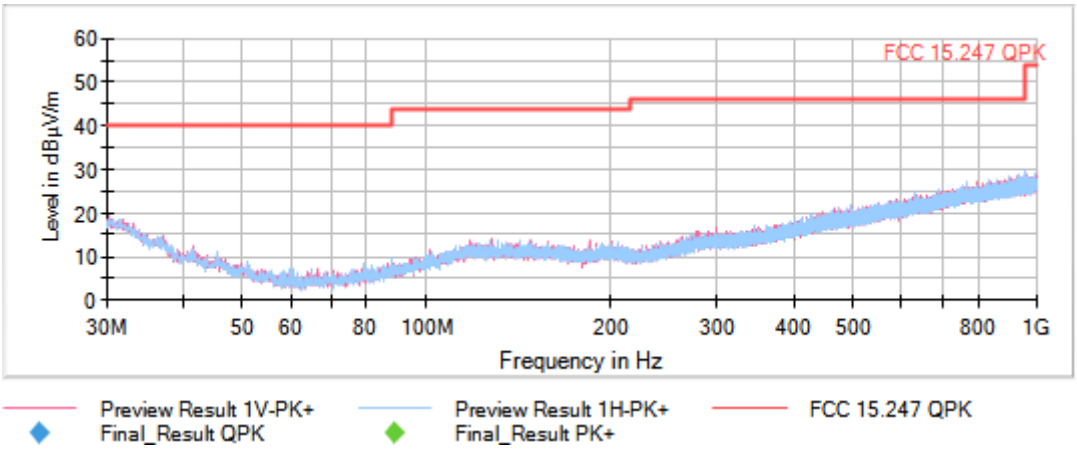
Frequency Range GHz = [0.03, 1] Equipment Type = Digital Transmission System (DTS)

Modulation = Proximity Frequency MHz = 2440.00000

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters

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

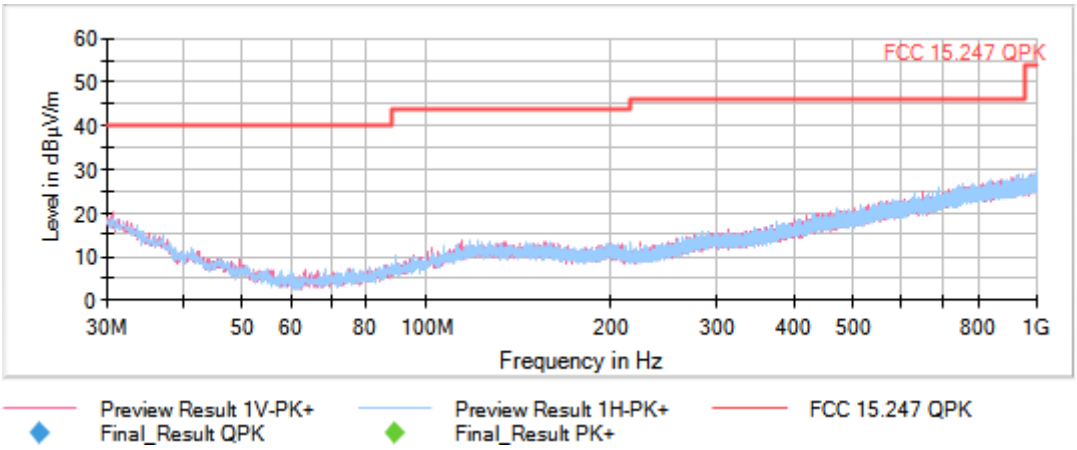
Frequency Range GHz = [0.03, 1] Equipment Type = Digital Transmission System (DTS)

Modulation = Proximity Frequency MHz = 2480.00000

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters

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

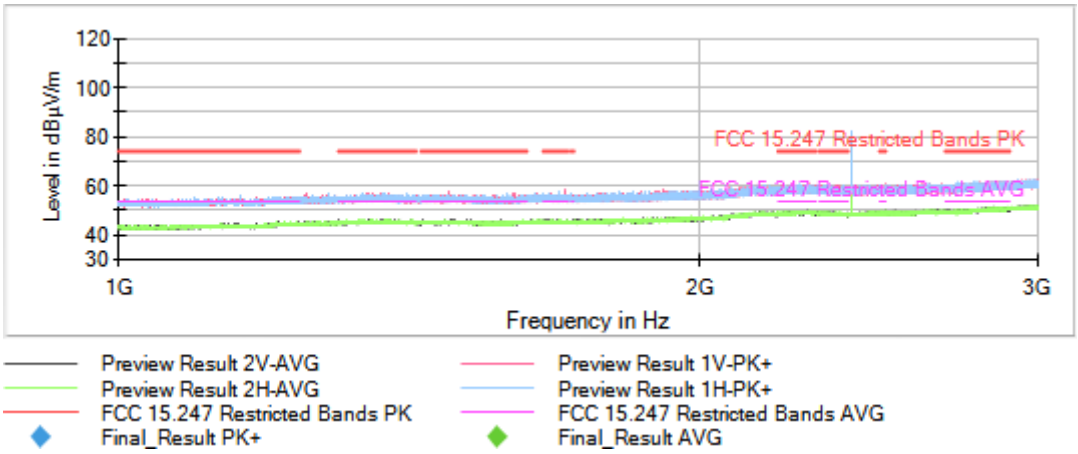
Frequency Range GHz = [1, 3] Equipment Type = Digital Transmission System (DTS)

Modulation = Proximity Frequency MHz = 2402.00000

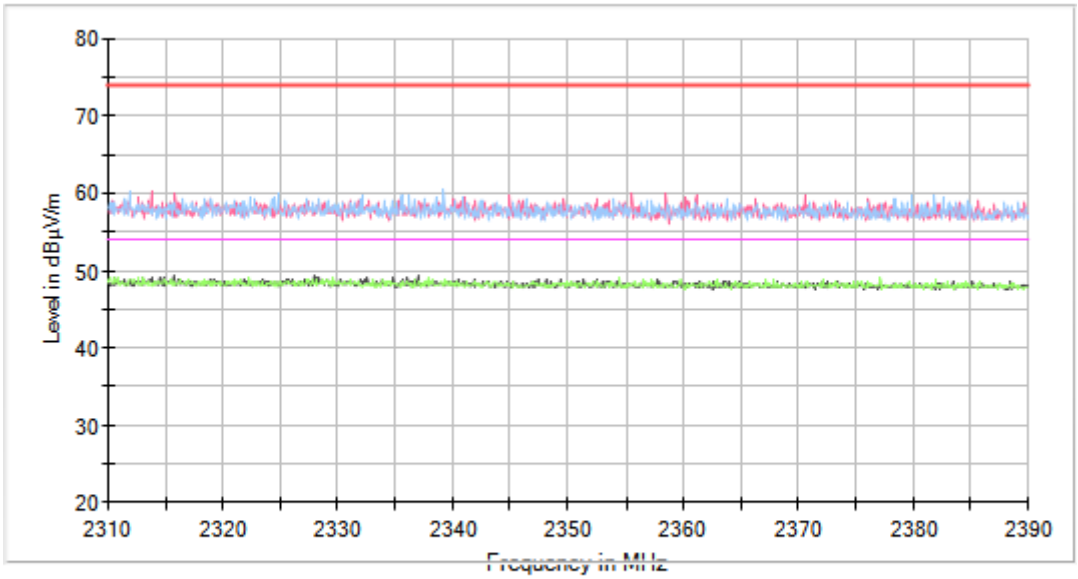
Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Full Spectrum



Tables:
Spectrum Analyzer Parameters

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

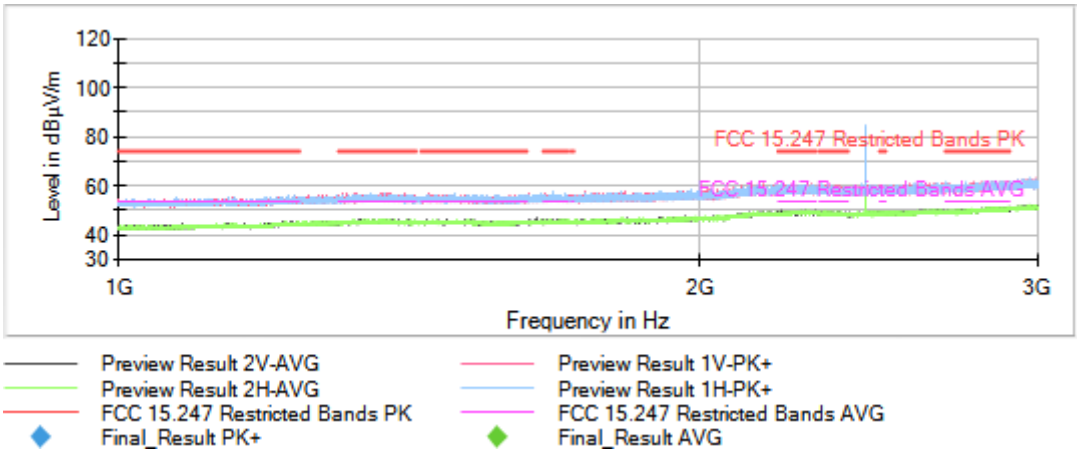
Frequency Range GHz = [1, 3] Equipment Type = Digital Transmission System (DTS)

Modulation = Proximity Frequency MHz = 2440.00000

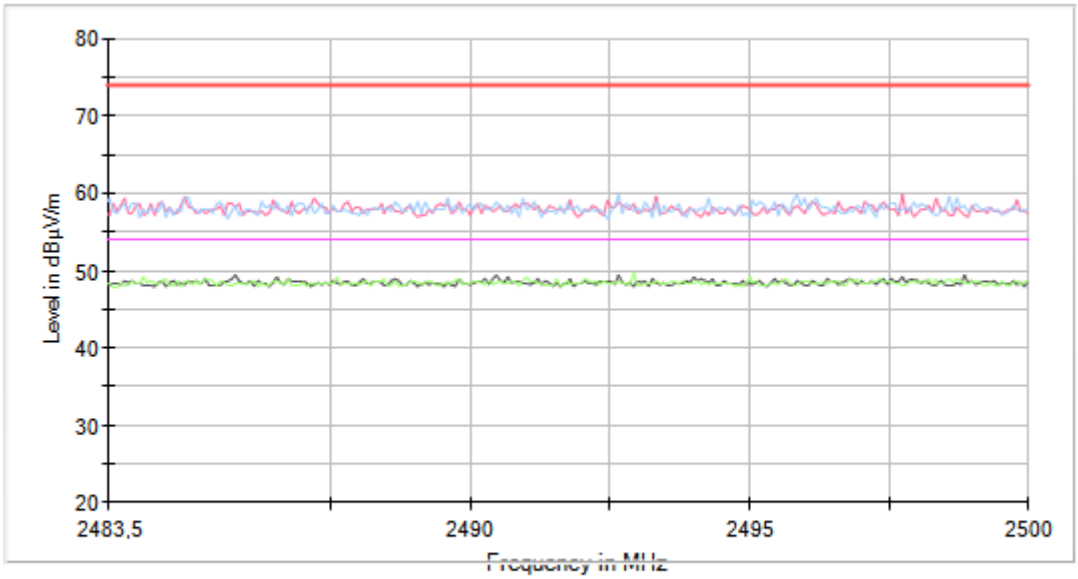
Number of Transmission Chains = 1 Measurement Point = 1

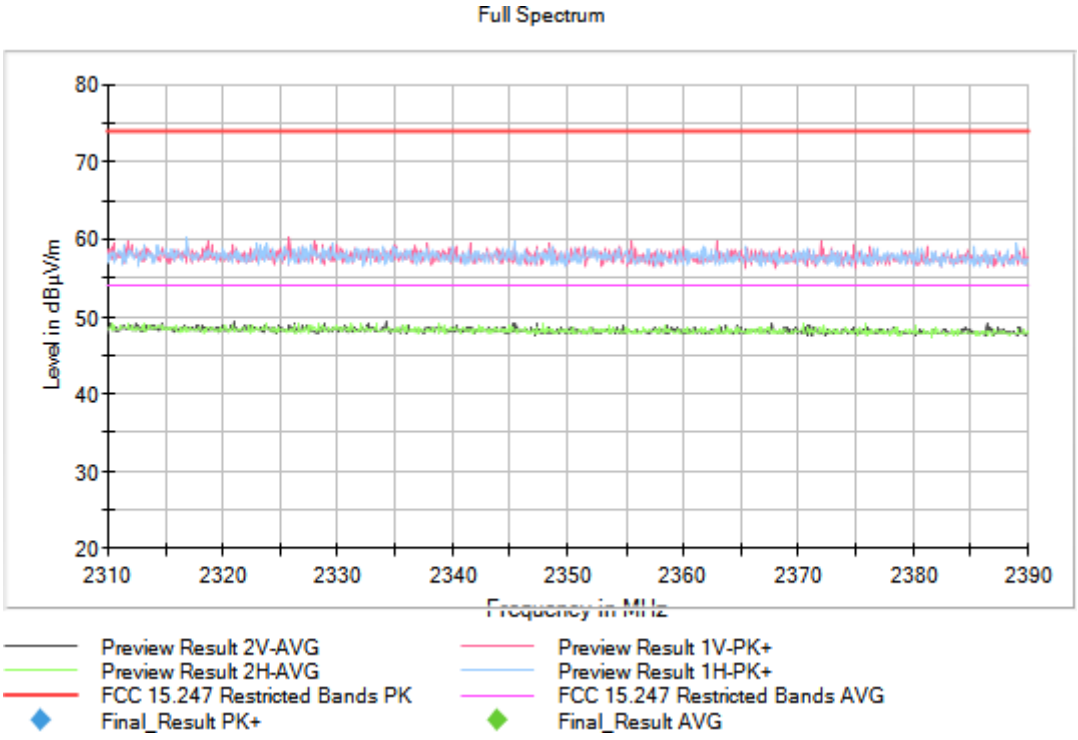
Active Port = 1

Images:



Full Spectrum





Tables:
Spectrum Analyzer Parameters

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

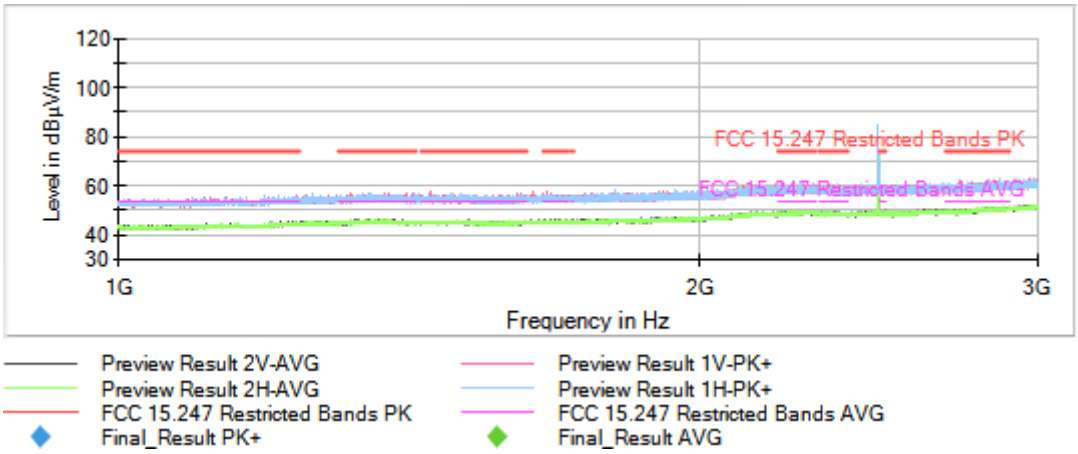
Frequency Range GHz = [1, 3] Equipment Type = Digital Transmission System (DTS)

Modulation = Proximity Frequency MHz = 2480.00000

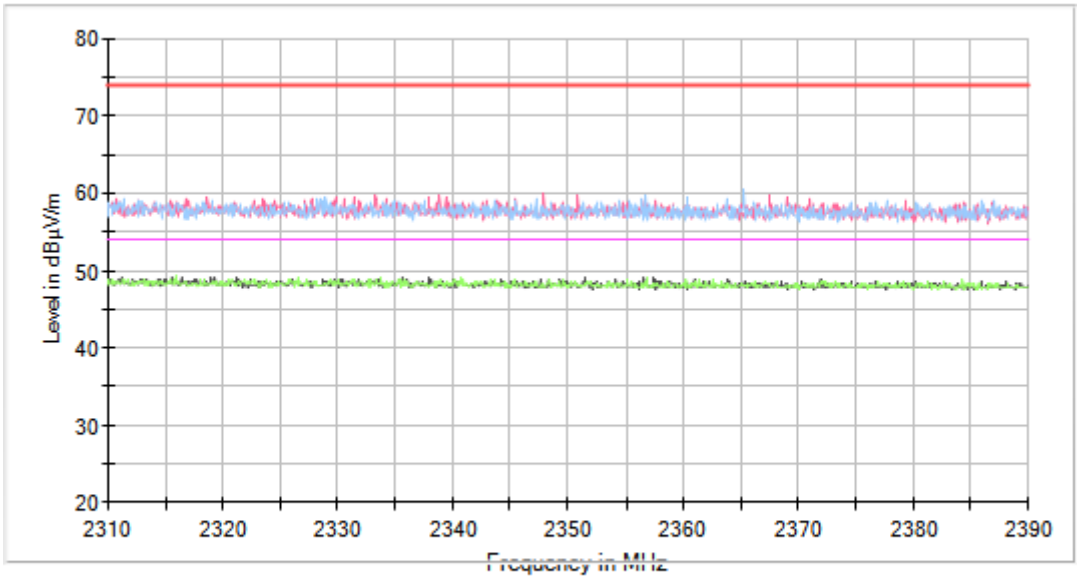
Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Full Spectrum

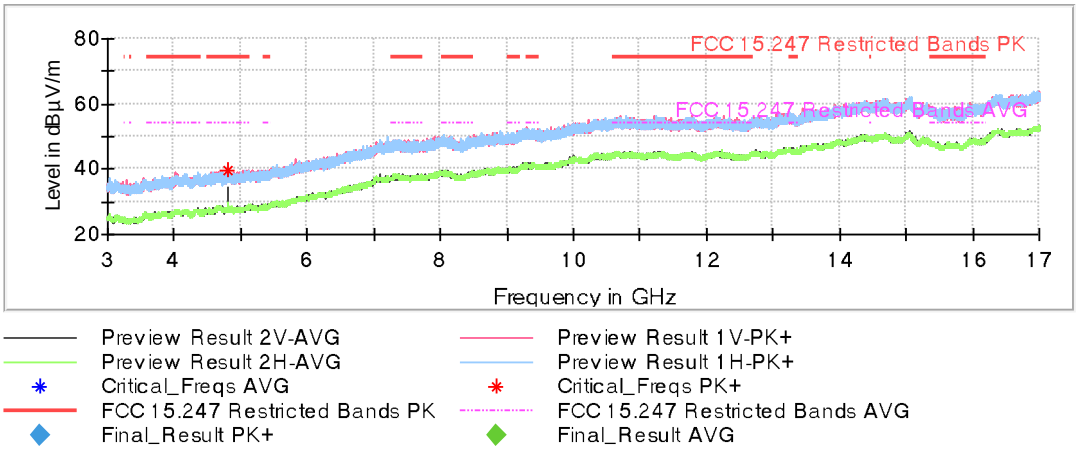


Tables:
Spectrum Analyzer Parameters

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

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

Images:



Tables:
Spectrum Analyzer Parameters

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

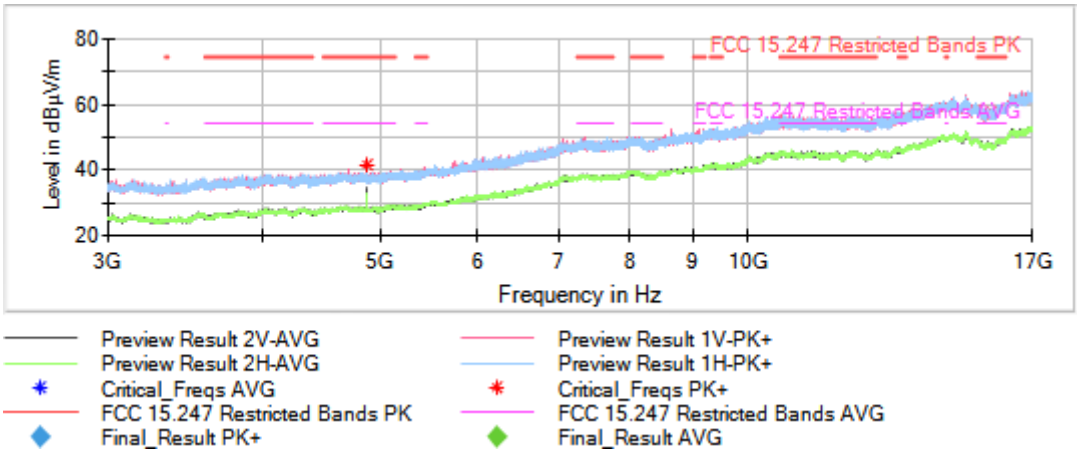
Frequency Range GHz = [3, 17] Equipment Type = Digital Transmission System (DTS)

Modulation = Proximity Frequency MHz = 2440.00000

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters

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

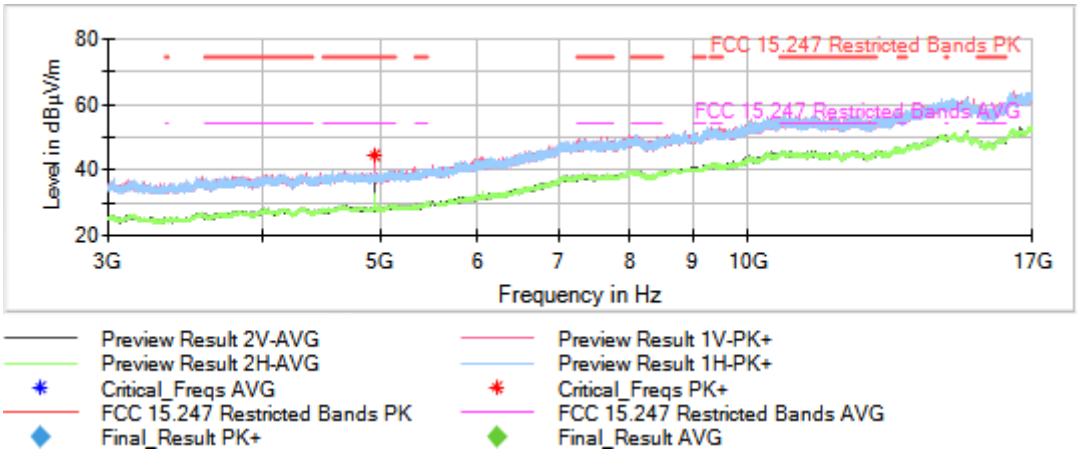
Frequency Range GHz = [3, 17] Equipment Type = Digital Transmission System (DTS)

Modulation = Proximity Frequency MHz = 2480.00000

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters

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

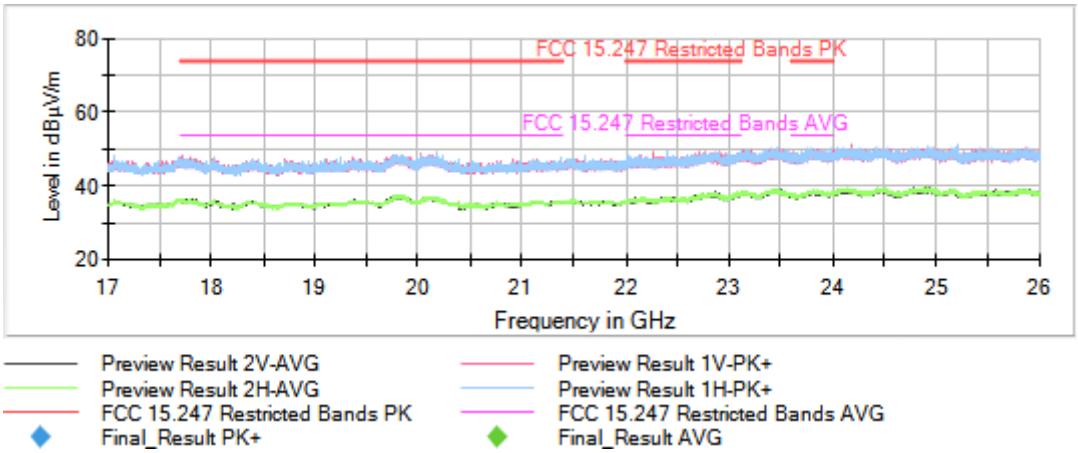
Frequency Range GHz = [17, 26] Equipment Type = Digital Transmission System (DTS)

Modulation = Proximity Frequency MHz = 2402.00000

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters

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

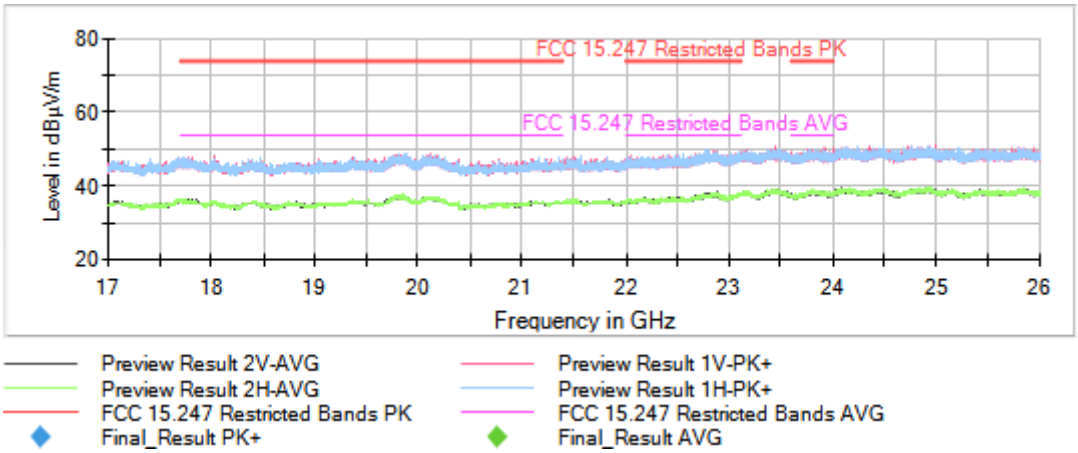
Frequency Range GHz = [17, 26] Equipment Type = Digital Transmission System (DTS)

Modulation = Proximity Frequency MHz = 2440.00000

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters

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

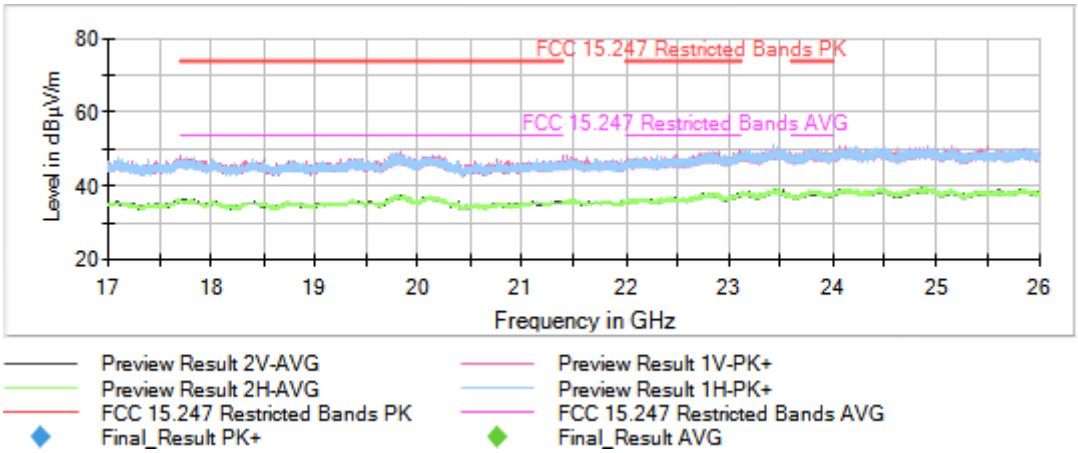
Frequency Range GHz = [17, 26] Equipment Type = Digital Transmission System (DTS)

Modulation = Proximity Frequency MHz = 2480.00000

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters

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