DEKRA Testing and Certification, S.A.U.
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C.I.F. A29507456

ISED CABid: ES1909

Lab. Company Number: 4621A

Test Report No:
79354RRF.003

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

(*) Identification of item tested	Stand-alone Wi-Fi 6 multiradio modules
(*) Trademark	u-blox
(*) Model and /or type reference	NORA-W401-00B
Other identification of the product	FCC ID: XPYNORAW4 IC: 8595A-NORAW4
(*) Features	BLE, Wi-Fi 6 (2.4 GHz) HW version: 04 SW version: v5.2.3
Applicant	u-blox AG Zürcherstrasse 68, 8800 Thalwil, Switzerland
Test method requested, standard	USA FCC Part 15.247 (10-1-23 Edition): Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. USA FCC Part 15.209 (10-1-23 Edition): Radiated emission limits; general requirements. CANADA RSS-247 Issue 3 (August 2023). 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	2025-03-13
Report template No	FDT08_25 (*) "Data provided by the client"

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Acronyms

Acronym ID	Acronym Description
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
Mode	MIMO Mode
Occ Ch BW	Occupied Channel Bandwidth
PSD	Power Spectral Density
Peak Power	Maximum Peak Conducted Output Power
Pol	Polarization
Port	Active Port
Unwanted Freq	Unwanted Emissions Frequency
Unwanted Lvl	Unwanted Emissions Level

Competences and guarantees

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

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

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

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

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

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

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

General conditions

1. This report is only referred to the item that has undergone the test.

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

Uncertainty

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

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

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

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

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

Data provided by the client

The following data has been provided by the client:

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

2. The sample consists of a Stand-alone Wi-Fi 6 multiradio modules.

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. The laboratory is not responsible for such information and it is not covered by accreditation.

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 & S/02	79354_12.1	Antenna on plastic	PRO IS 299	-	2024-08-21	Element Under Test
S/01	79354_46.1	Evaluation board	NORA-W401-00B	PT3#24	2024-08-21	Element Under Test
S/02	79354_50.1	Evaluation board	NORA-W401-00B	PT3#41	2025-02-13	Element Under Test

Notes referenced to samples during the project:

Id	Type
S/01	Samples used for all tests with lower output power configuration
S/02	Sample used for all test with higher output power configuration

Test sample description

Ports..... :	**Port name and description**		**Cable**				
			Specified max length [m]		**Attached during test**		**Shielded**
	-		-		-		-
Supplementary information to the ports..... :	-						
Rated power supply .....:	**Voltage and Frequency**		**Reference poles**				
			L1	**L2**	**L3**	**N**	**PE**
		AC:					
		AC:					
	X	DC: 3.0V - 3.6V					
		DC:					
Rated Power .....:	-						
Clock frequencies.....:	-						
Other parameters .....:	-						
Software version .....:	v5.2.3						
Hardware version .....:	04						
Dimensions in cm (W x H x D) ....:	10.4mm x 14.3mm x 1.9mm						
Mounting position .....:		Table top equipment					
		Wall/Ceiling mounted equipment					
		Floor standing equipment					
		Hand-held equipment					
		Other:					
Modules/parts.....:	**Module/parts of test item**				**Type**		**Manufacturer**
	-				-		-
Accessories (not part of the test item) .....:	**Description**				**Type**		**Manufacturer**
	-				-		-
Documents as provided by the applicant.....:	**Description**				**File name**		**Issue date**
	-				-		-

Identification of the client

u-blox AG
Zürcherstrasse 68, 8800 Thalwil, Switzerland

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2024-08-29
Date (finish)	2024-12-19

Document history

Report number	Date	Description
79354RRF.003	2025-03-13	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: Sergio Carrasco, Álvaro Gutiérrez Naranjo, Carmen Vázquez Perez, Pablo Redondo Reyes, Valentin Andarias Diaz, Rafael Fernandez Martin.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
07445	DC POWER SUPPLY 30V/5A	U8002A	KEYSIGHT TECHNOLOGIES	N/A
07760	DIGITAL MULTIMETER	175	FLUKE	2025-11-07
05850	DIGITAL MULTIMETER	179	FLUKE	2025-11-04
07817	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2026-07-01
06609	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2025-04-22
06615	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2025-04-04
04953	HIGH PASS FILTER 1.1-8GHz	WHK10-990-1100-8000-40SS	WAINWRIGHT INSTRUMENTS	2025-02-14
09029	HIGH PASS FILTER 17-40 GHZ	STHP-17-40G-92	TEMSTRON/TEMWELL	2025-03-29
08770	HIGH PASS FILTER 3-18 GHZ	ST-3GA2833-HS	TEMSTRON/TEMWELL	2025-08-02
06496	HORN ANTENNA 1-18GHz	BBHA 9120 D	SCHWARZBECK	2026-12-01
04657	HORN ANTENNA 18-40GHz	BBHA 9170	SCHWARZBECK	2026-06-12
06143	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2027-01-22
07656	LOW PASS FILTER TEMSTRON/TEMWELL DC - 1 GHZ	ST-1GA3250-LS	TEMSTRON/TEMWELL	2025-02-02
07193	MULTI-DEVICE CONTROLLER	CO3000	INNCO	N/A
08848	OPEN SWITCH UNIT UP TO 7.5 GHz	OSP-B157W8 PLUS	ROHDE & SCHWARZ	2026-12-30
00922	POWER SUPPLY DC 40 V / 40 A	NGPE 40/40	ROHDE AND SCHWARZ	2027-10-02
08856	PRE-AMPLIFIER G>30dB 18-40GHz	BLMA 1840-4A	BONN ELEKTRONIK	2025-02-27
03783	PRE-AMPLIFIER G>30dB 1GHz-18GHz	BLMA 0118-3A	BONN ELEKTRONIK	2025-03-15
06142	PRE-AMPLIFIER G>38dB 30MHz-6GHz	BLNA 0360-01N	BONN ELEKTRONIK	2025-07-25
06144	PRE-AMPLIFIER G>40dB 10MHz-6GHz	BLNA 0160-01N	BONN ELEKTRONIK	2025-07-22

Control No.	Equipment	Model	Manufacturer	Next Calibration
06791	SEMIANECHOIC ABSORBER LINED CHAMBER IV	FACT 3 200 STP	ETS LINDGREN	N/A
06793	SHIELDED ROOM	S101	ETS LINDGREN	N/A
07794	SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2025-04-21
07791	SIGNAL GENERATOR 8kHz-6GHz	SMB100B	ROHDE AND SCHWARZ	2026-03-15
07793	SIGNAL GENERATOR 8kHz-6GHz	SMBV100B	ROHDE AND SCHWARZ	2026-03-11
04848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	N/A
06611	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2025-04-04
08847	VECTOR SIGNAL GENERATOR 100kHz-7.5GHz	SMW200A	ROHDE AND SCHWARZ	2025-09-29
07795	WIRELESS CONNECTIVITY TESTER BW 160 MHz	CMW270	ROHDE AND SCHWARZ	2025-03-13
07798	WMS32	WMS32	ROHDE AND SCHWARZ	N/A

Testing verdicts

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

Summary

Bluetooth Low Energy (2M, 1M):

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

802.11 bgnax 1x1:

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

ZigBee:

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

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

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TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal: 3.3 V

Type of Power Supply: DC internal.

ANTENNA (*):

Chain #	Antenna Gain (dBi)
PRO-EX-333	3,6dBi
PRO-EX-296	3,0dBi
PRO-IS-237	3,0dBi
PRO-IS-299	2,5dBi

Radiated testing has been performed with the antenna PRO-IS-299 after a preliminary RSE testing

Conducted EIPR has been calculated using the highest antenna gain.

Modulation	Data rates	Low Channel:	Power adjustment	Middle Channel	Power adjustment	High Channel (1)	Power adjustment	High Channel (2)	Power adjustment
BTLE GFSK	1M 1 Mbit/s	2402 MHz	15	2440 MHz	15	2478 MHz	15	2480 MHz	14
BTLE GFSK	2M 2 Mbit/s	2402 MHz	15	2440 MHz	15	2478 MHz	15	2480 MHz	14

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. Power adjustment correspond to the parameter value configured in the SW tool.

All channels with frequencies above High Channel (1) will be configured at the same power adjustment as high Channel (2)

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).

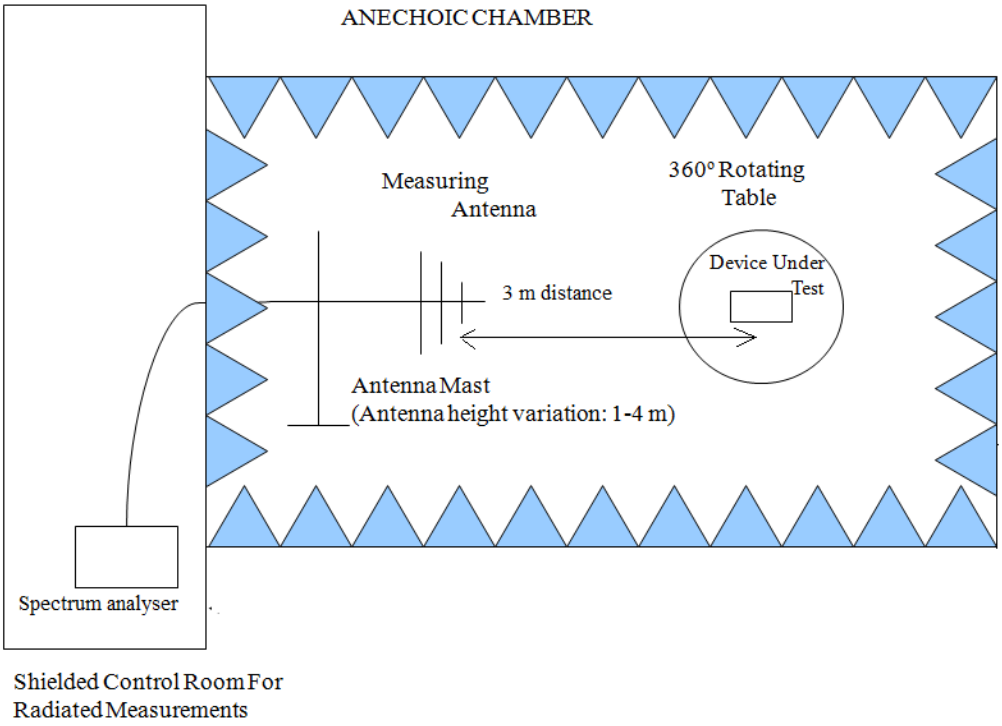
For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

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.

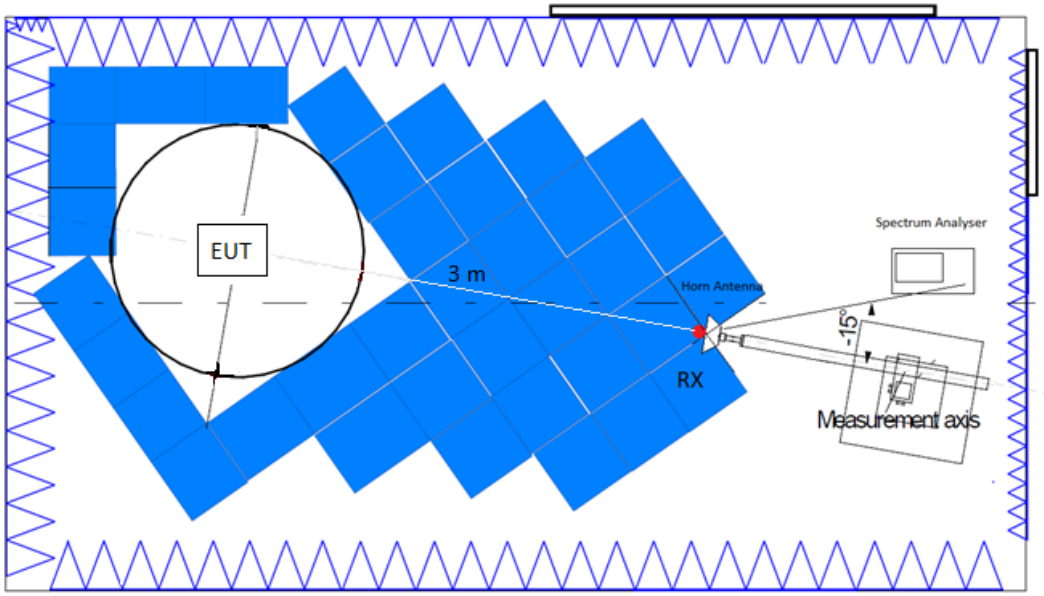
Measurements were made in both horizontal and vertical planes of polarization.

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.

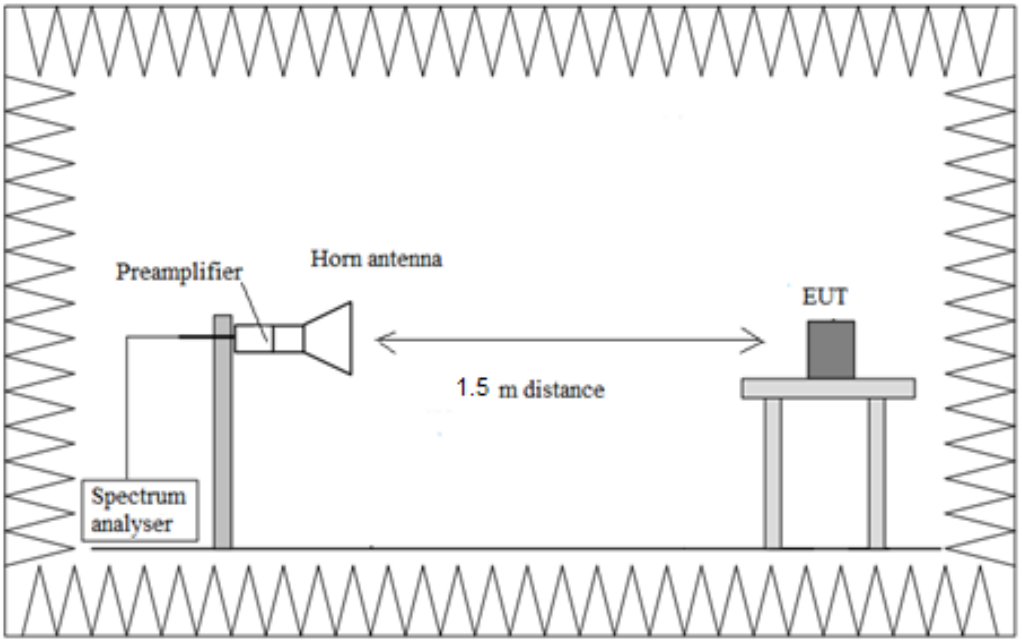
Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup f > 17 GHz:



TEST CASES DETAILS

99dBw Occupied Channel Bandwidth 99%

Limits

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.

Results

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

MIMO Mode: SISO

Equipment	BW (MHz)	Freq (MHz)	Port	Occ Ch BW (MHz)
Digital Transmission System (DTS)	1	2402.00000	1	1.053
		2440.00000		1.053
		2478.00000		1.038
		2480.00000		1.030

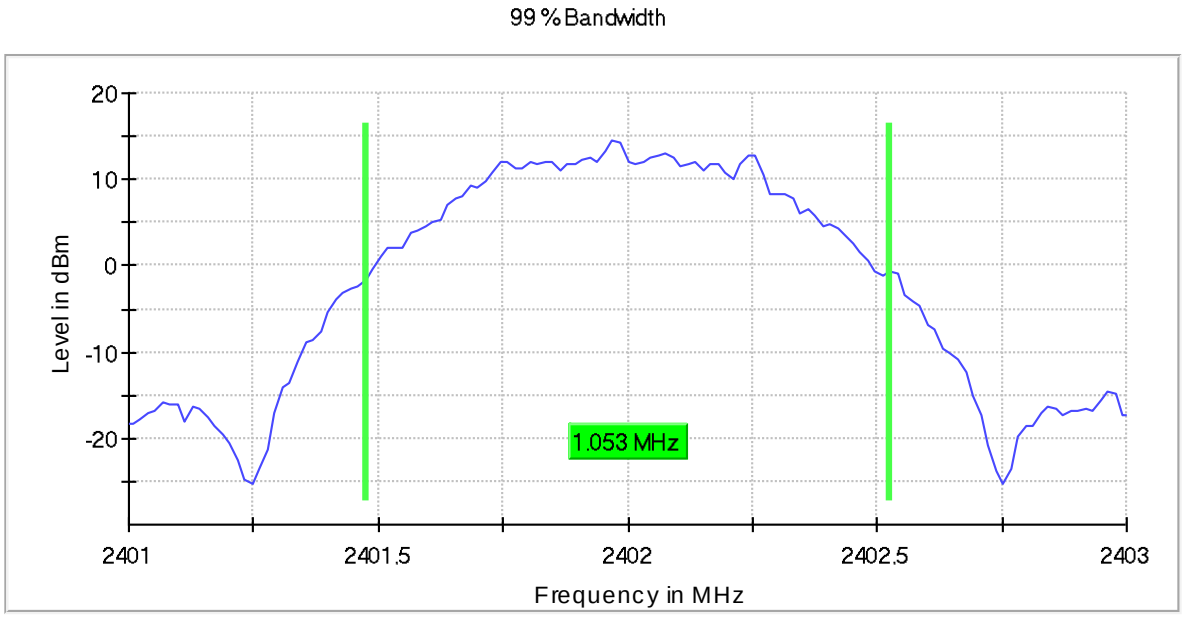
Verdict

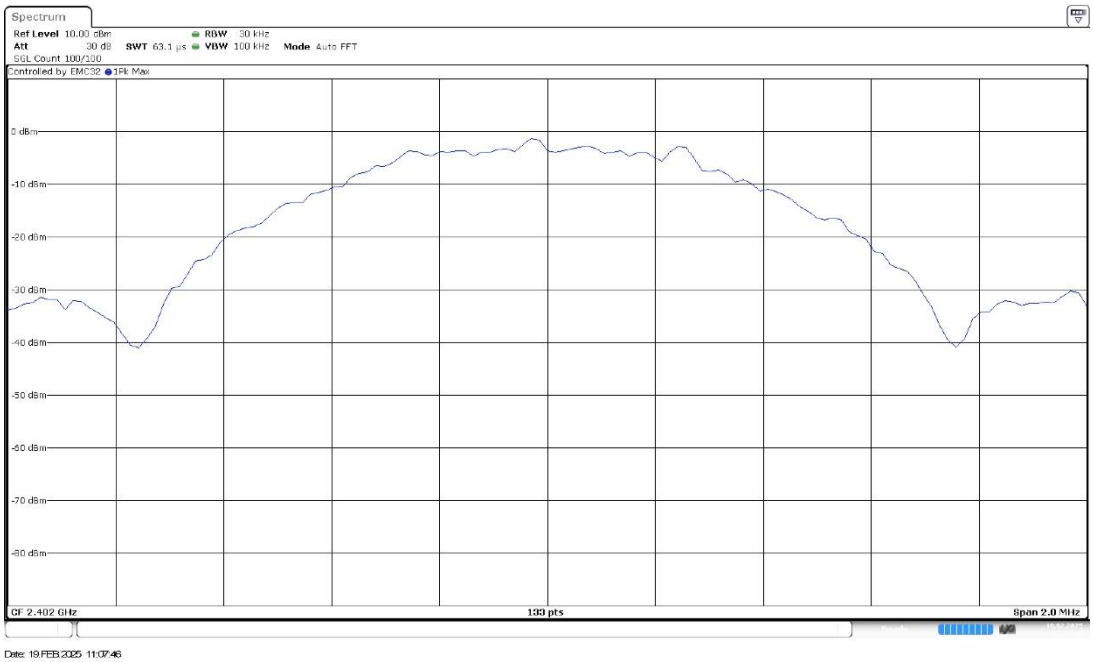
Pass

Attachments

Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 1
Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
Frequency MHz = 2402.00000
MIMO Mode = SISO
Active Port = 1

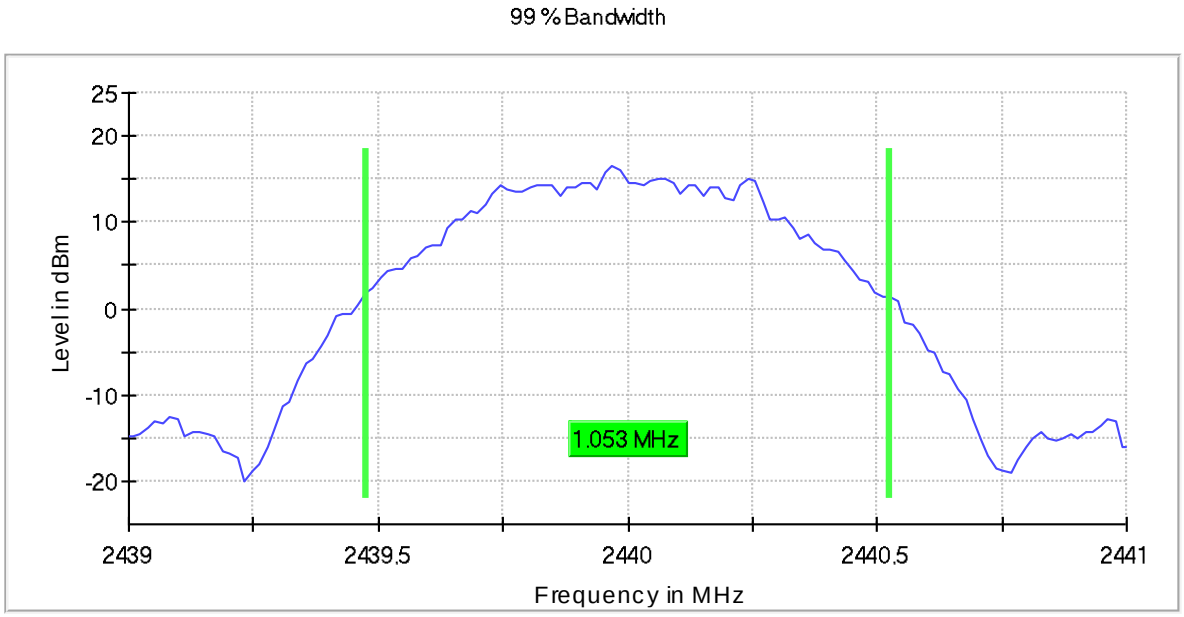
Images:

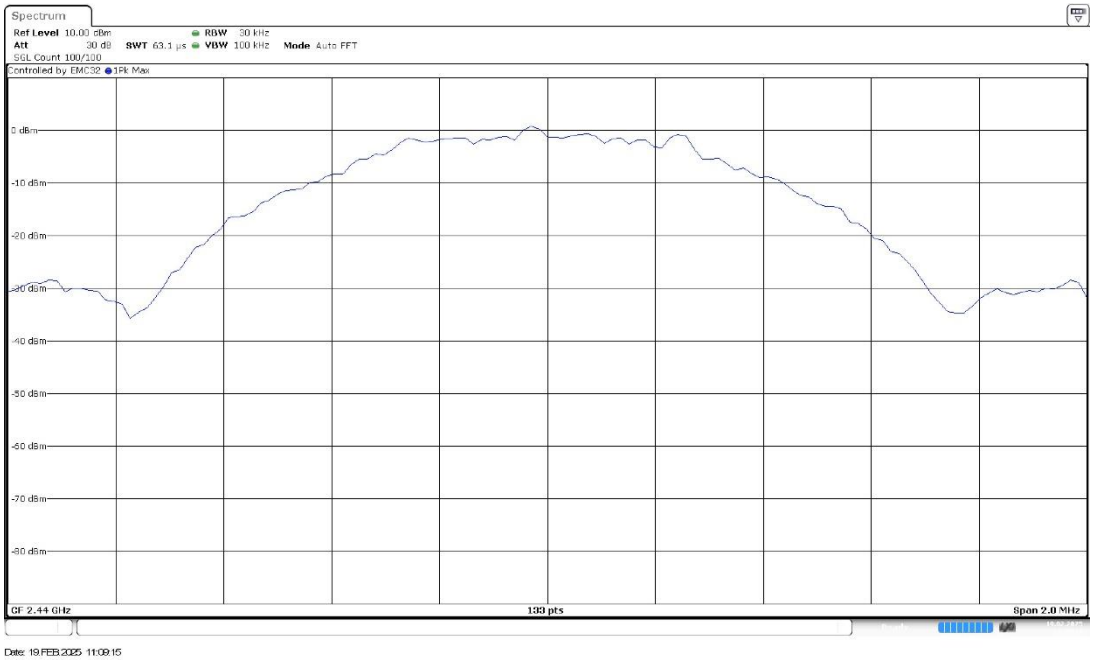




Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 1
Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
Frequency MHz = 2440.00000
MIMO Mode = SISO
Active Port = 1

Images:



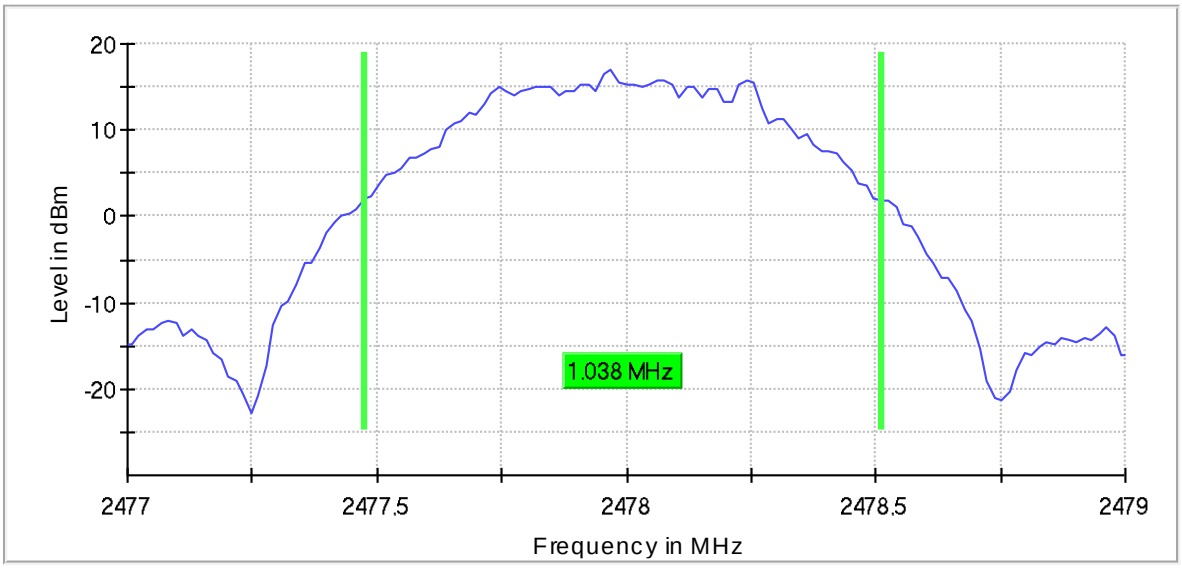


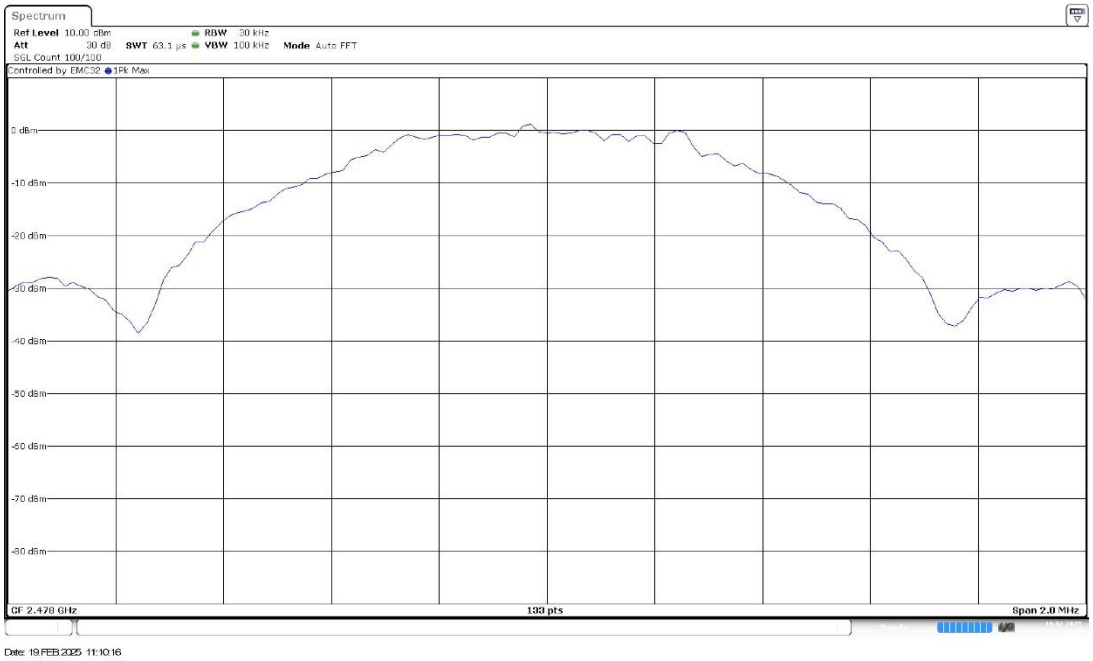
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 1

Modulation = BTLE 5.0 (GFSK 1 Mbit/s) Frequency MHz = 2478.00000

MIMO Mode = SISO Active Port = 1

99 % Bandwidth



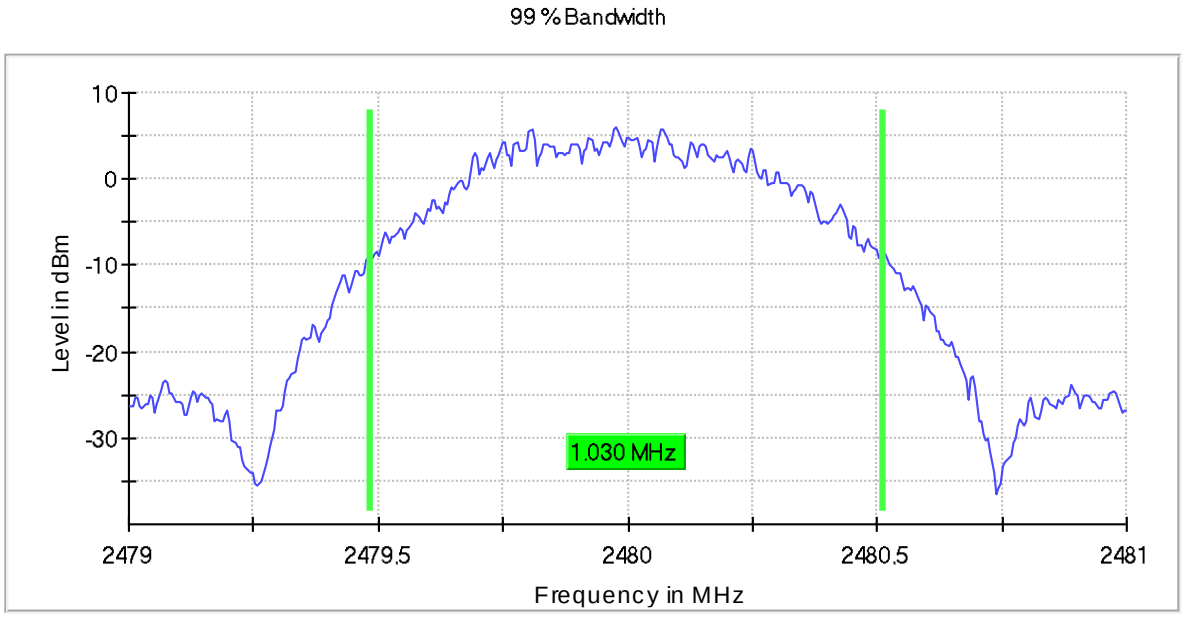


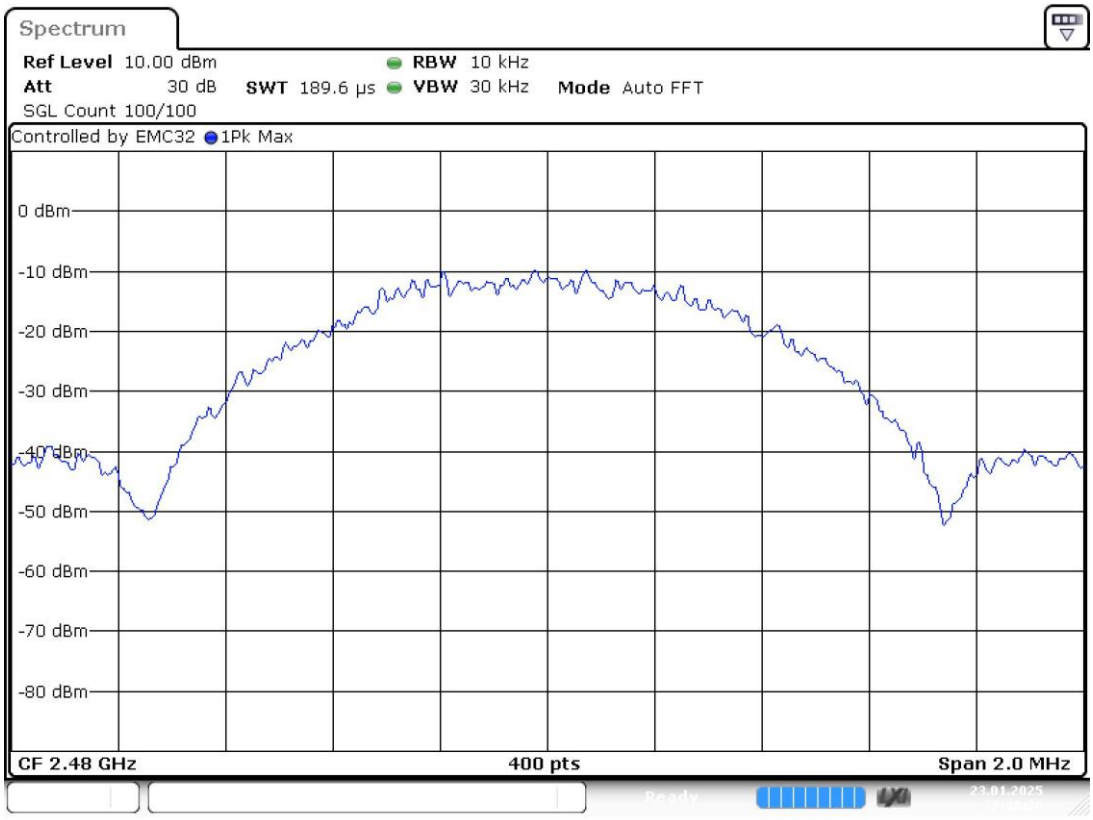
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 1

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

MIMO Mode = SISO Active Port = 1

Images:





Date: 23.JAN.2025 17:38:21

Results

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

MIMO Mode: SISO

Equipment	BW (MHz)	Freq (MHz)	Port	Occ Ch BW (MHz)
Digital Transmission System (DTS)	2	2402.00000	1	2.059
		2440.00000		2.099
		2478.00000		2.099
		2480.00000		1.850

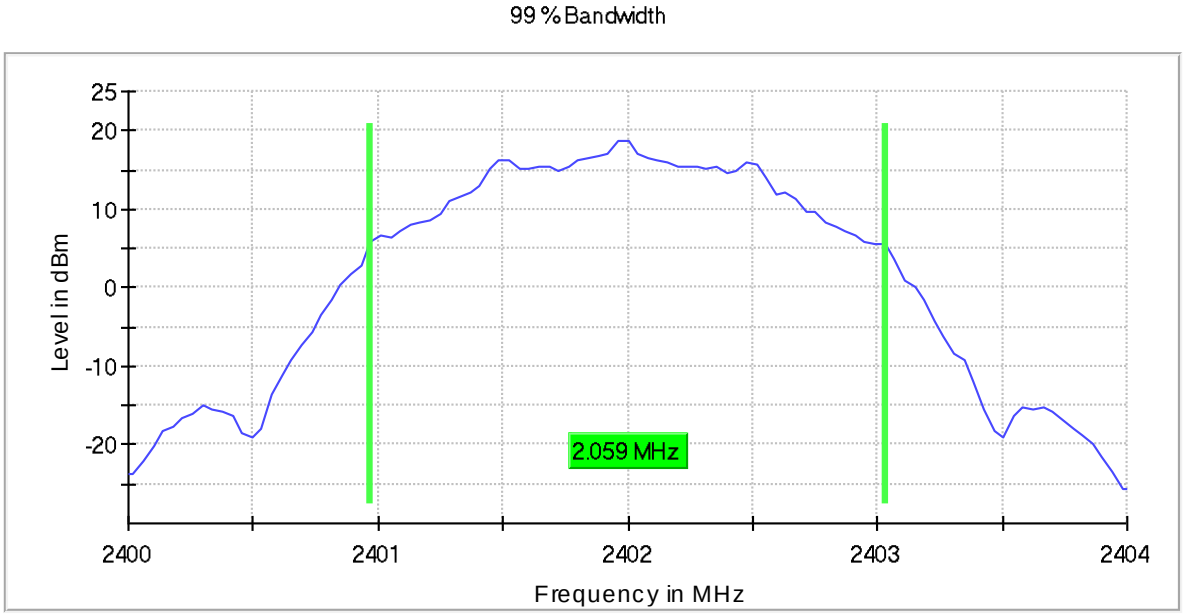
Verdict

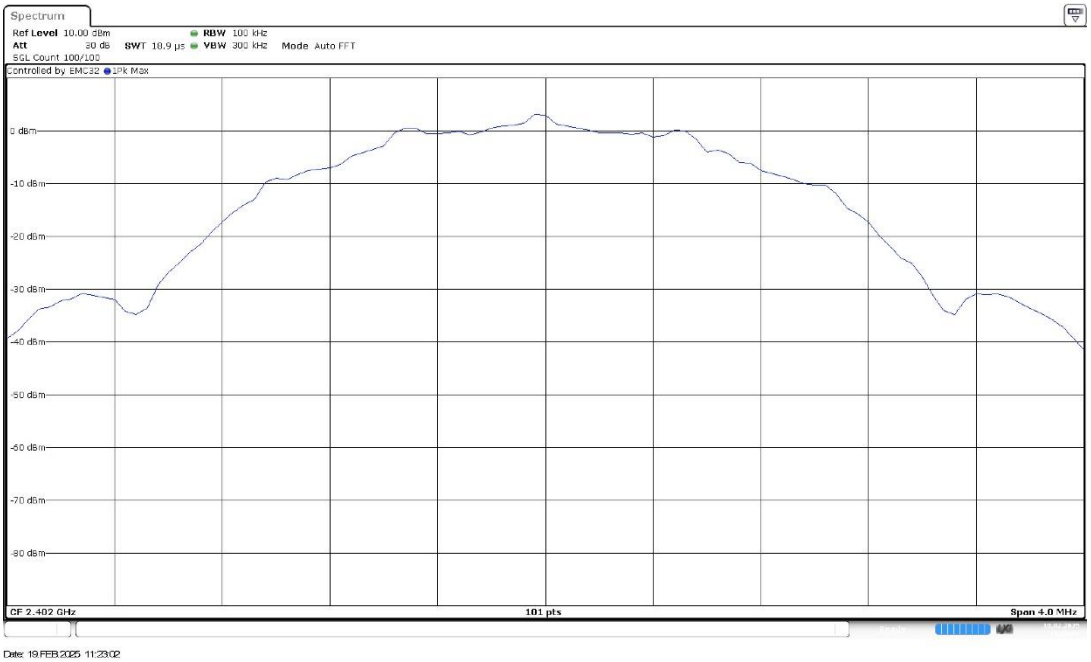
Pass

Attachments

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

Images:



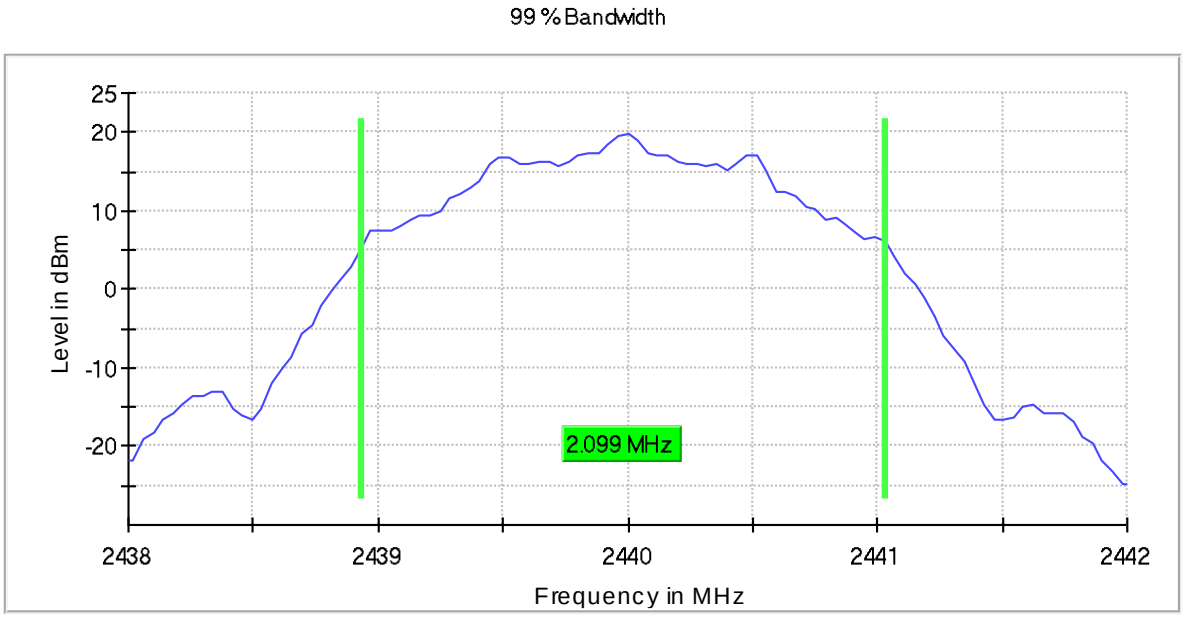


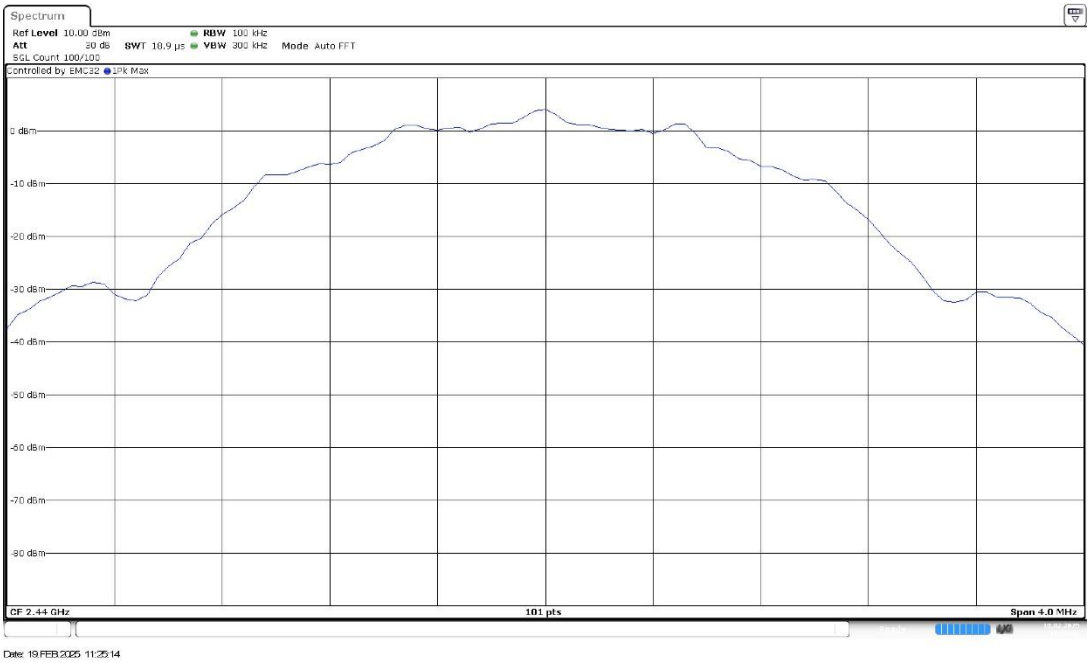
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 2

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

MIMO Mode = SISO Active Port = 1

Images:



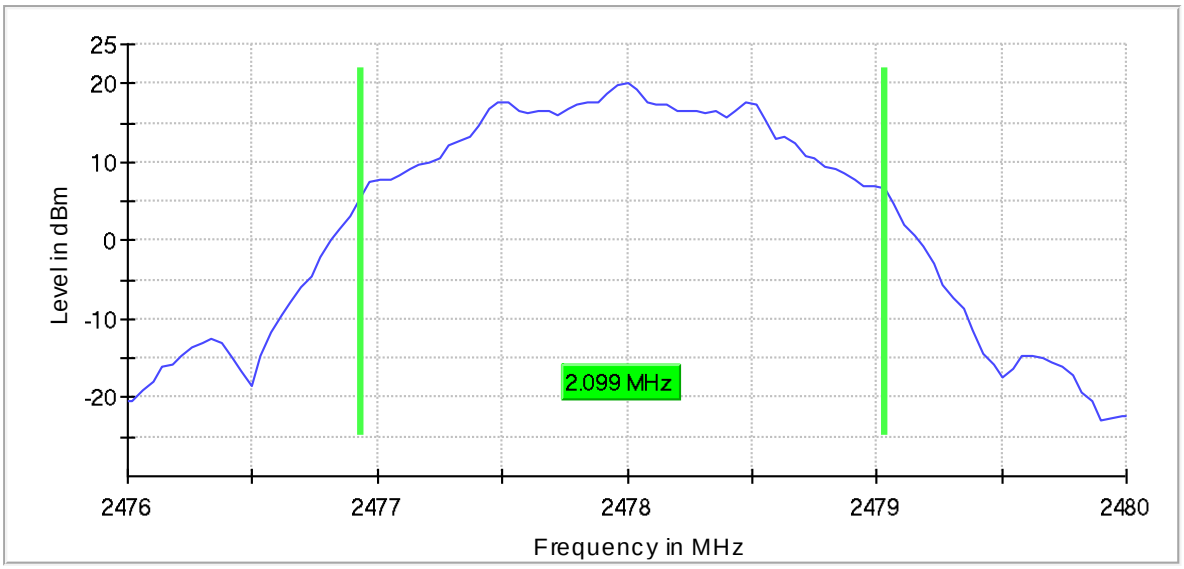


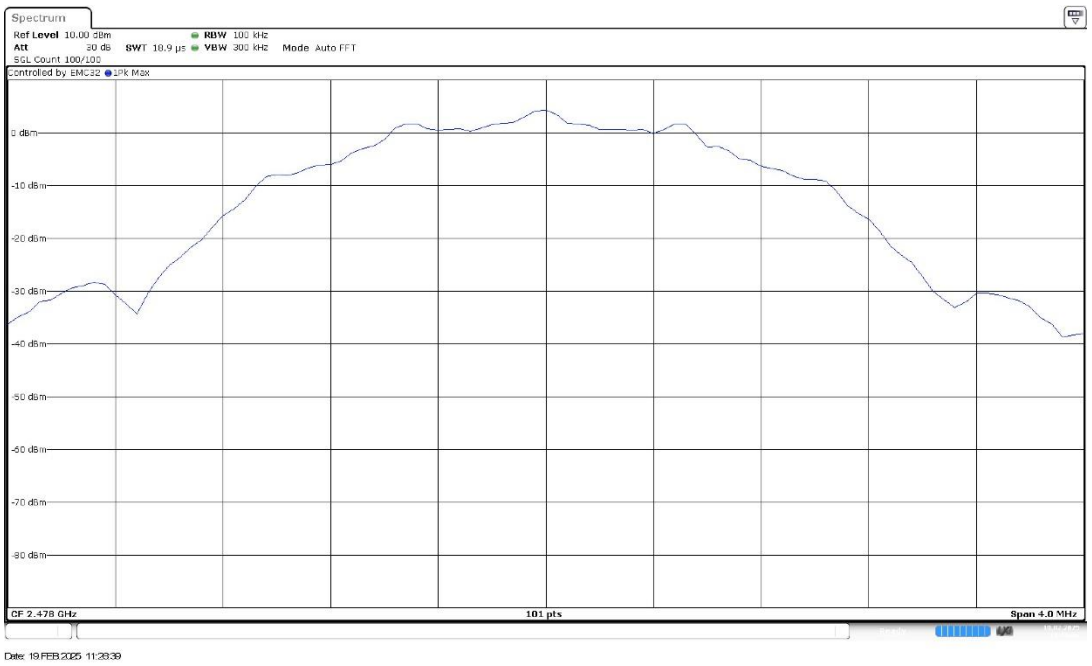
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 2

Modulation = BTLE 5.0 (GFSK 2 Mbit/s) Frequency MHz = 2478.00000

MIMO Mode = SISO Active Port = 1

99 % Bandwidth



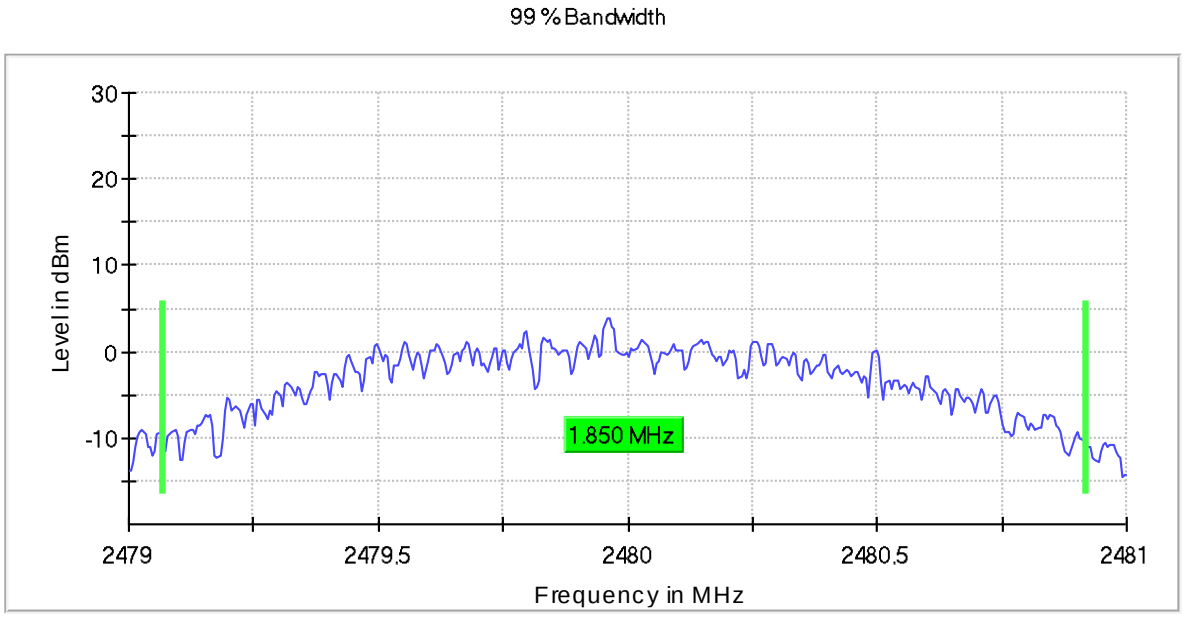


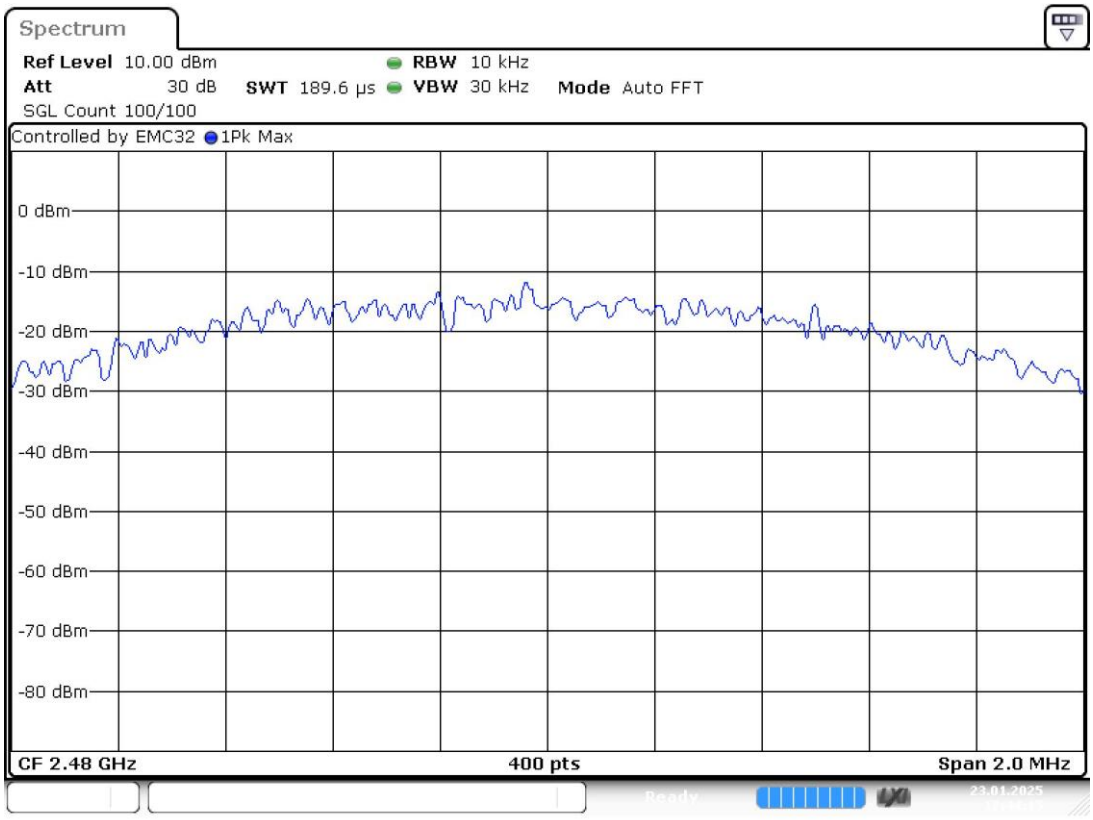
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 2

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

MIMO Mode = SISO Active Port = 1

Images:





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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.

Results

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

MIMO Mode: SISO

BW (MHz)	Freq (MHz)	Port	Ebw (MHz)
1	2402.00000	1	0.673
	2440.00000		0.713
	2478.00000		0.693
	2480.00000		0.693

Verdict

Pass

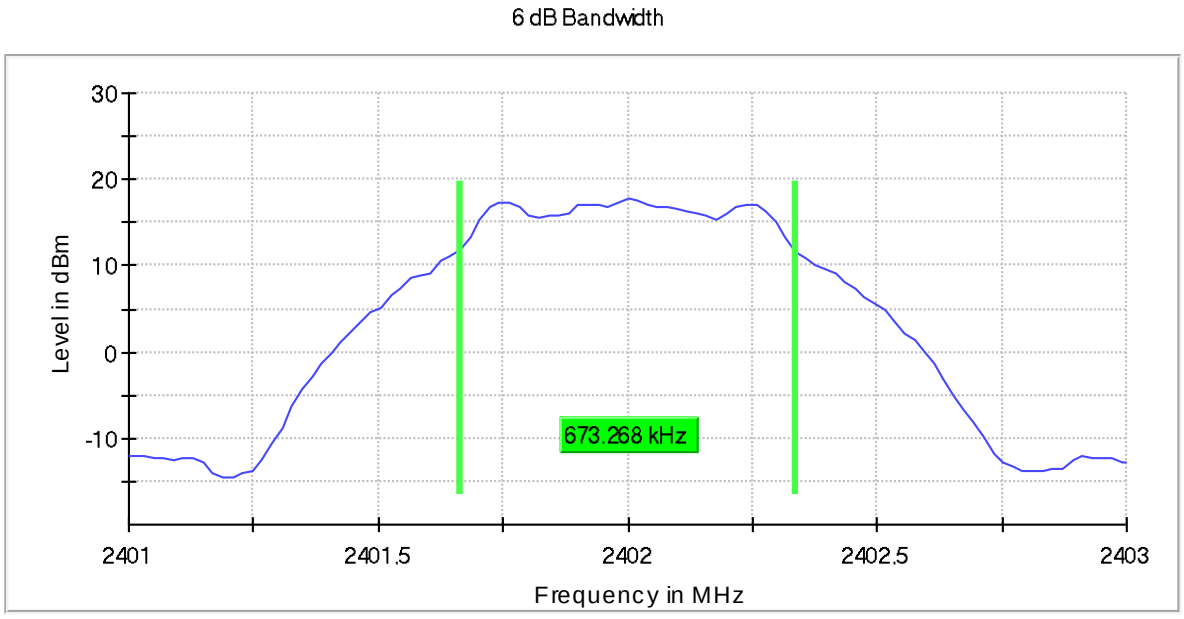
Attachments

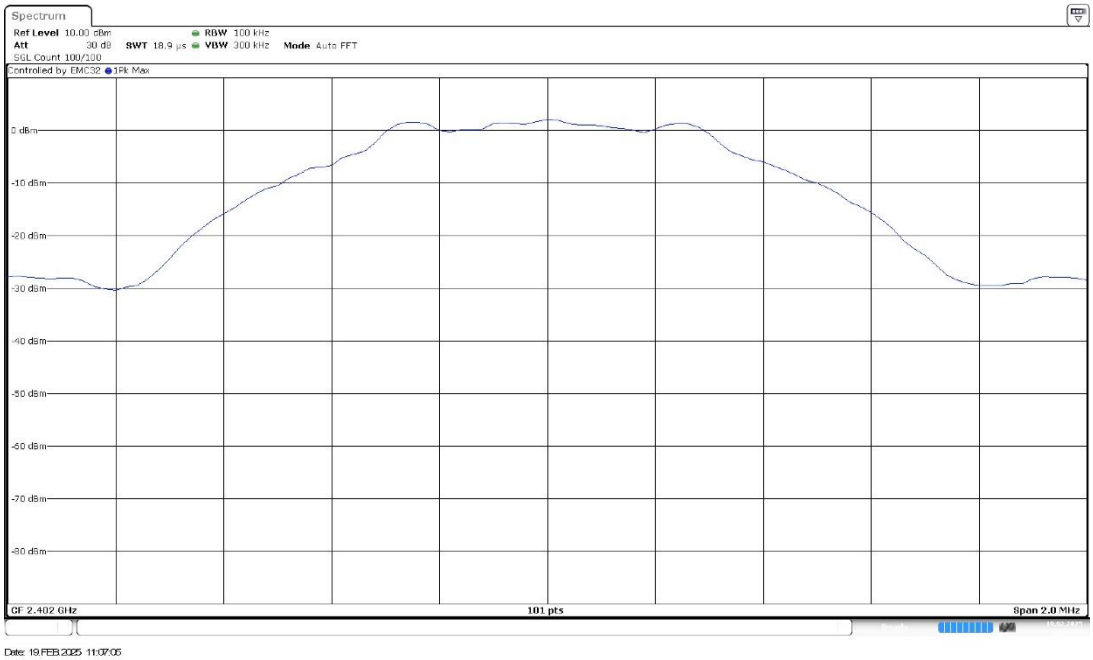
Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Frequency MHz = 2402.00000 MIMO Mode = SISO

Active Port = 1

Images:



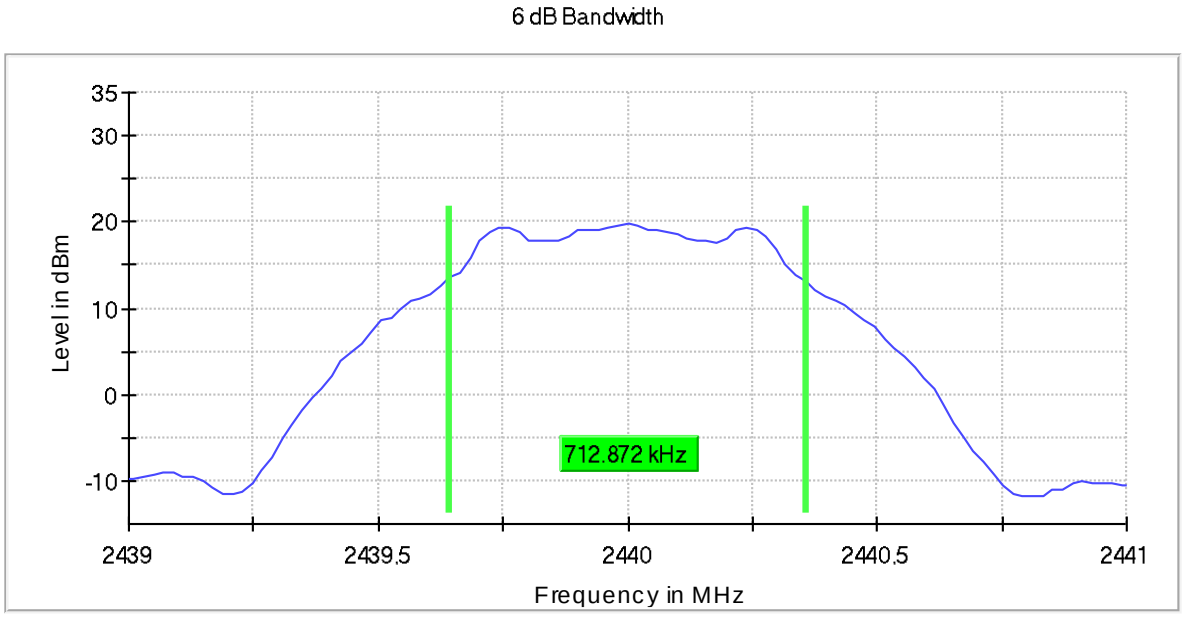


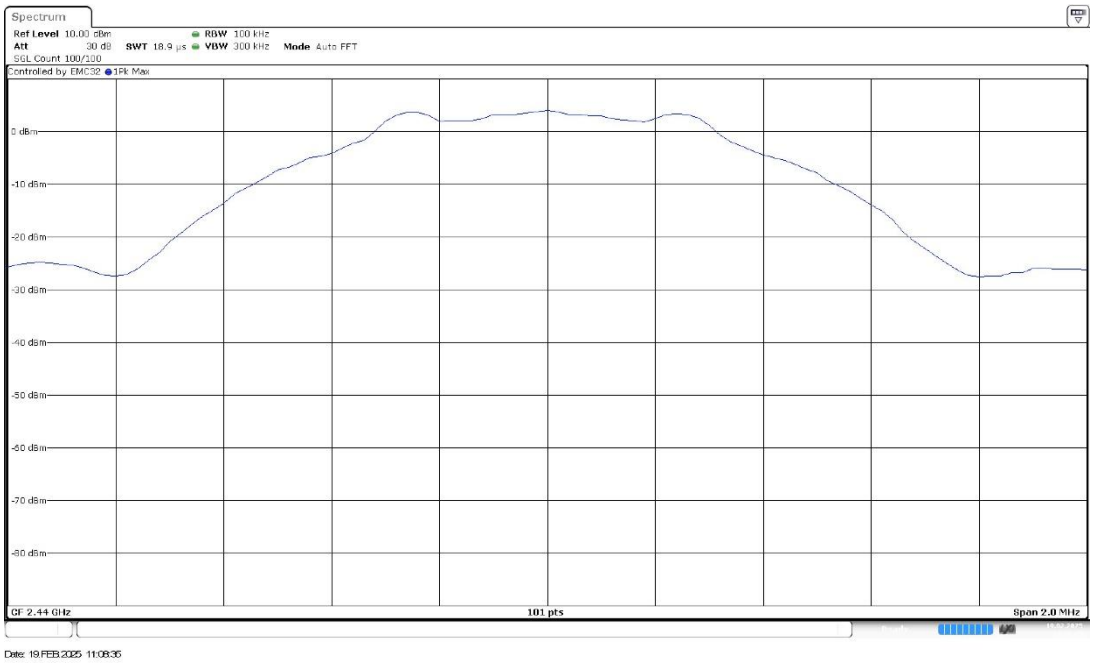
Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Frequency MHz = 2440.00000 MIMO Mode = SISO

Active Port = 1

Images:



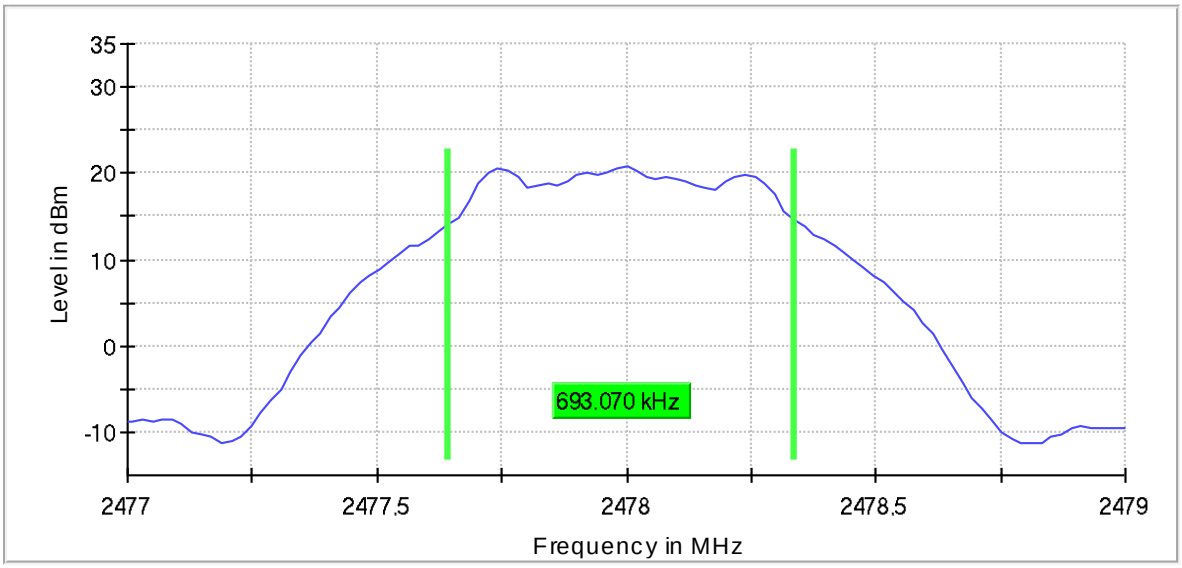


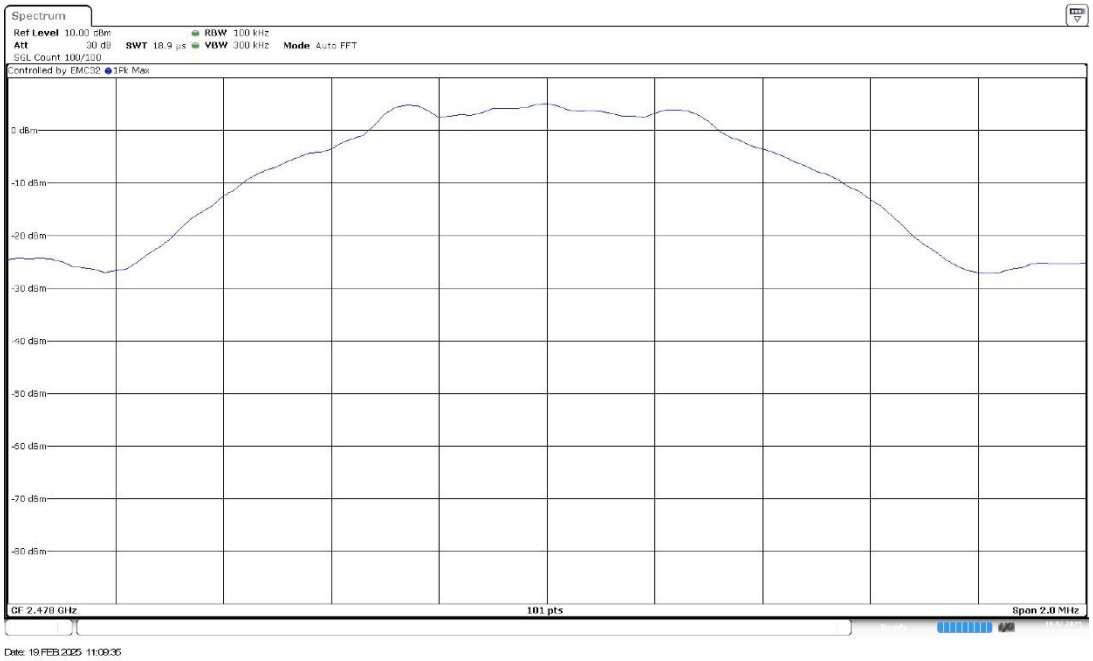
Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Frequency MHz = 2478.00000 MIMO Mode = SISO

Active Port = 1

6 dB Bandwidth



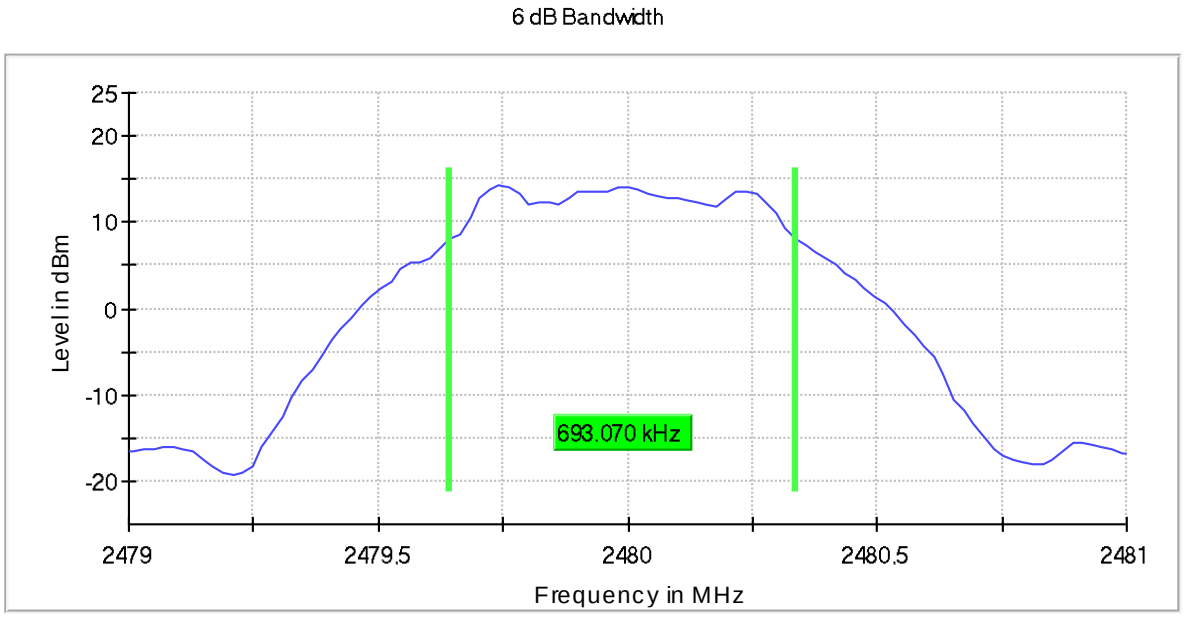


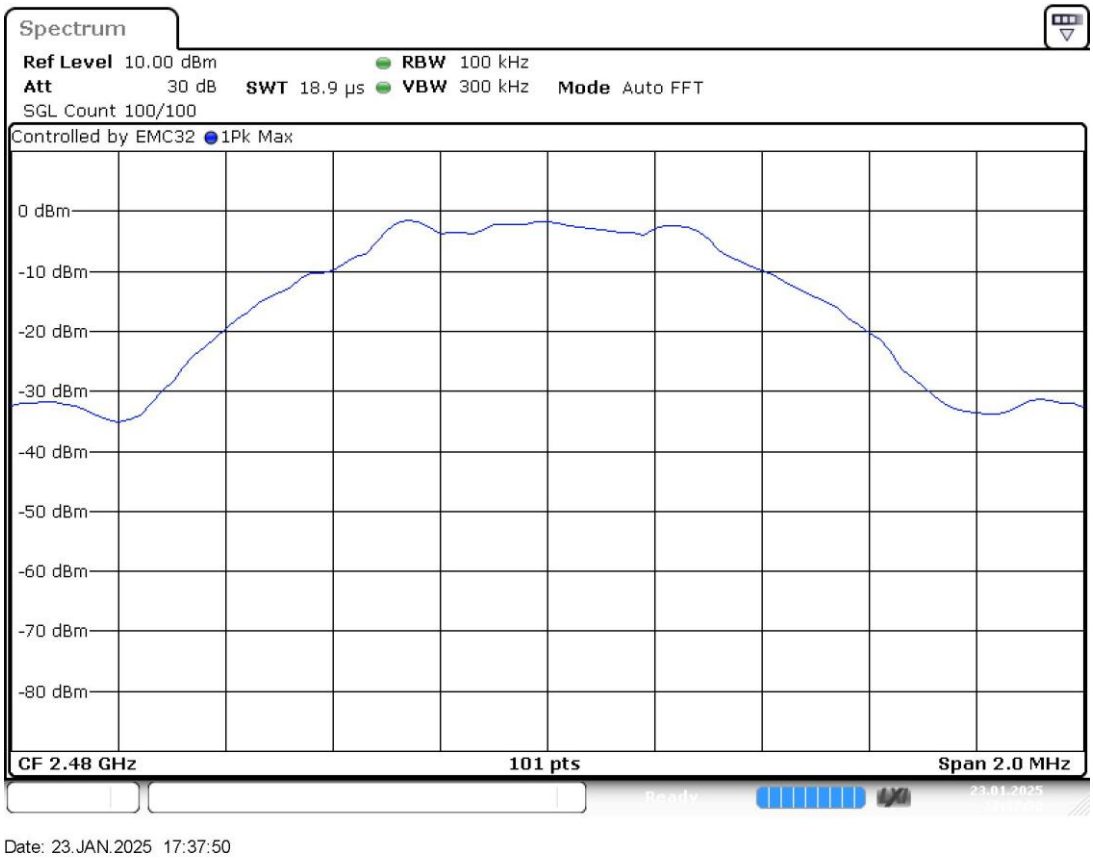
Bandwidth MHz = 1 Modulation = BTLE 5.0 (GFSK 1 Mbit/s)

Frequency MHz = 2480.00000 MIMO Mode = SISO

Active Port = 1

Images:





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Results

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

MIMO Mode: SISO

BW (MHz)	Freq (MHz)	Port	Ebw (MHz)
2	2402.00000	1	1.188
	2440.00000		1.228
	2440.00000		1.228
	2480.00000		1.168

Verdict

Pass

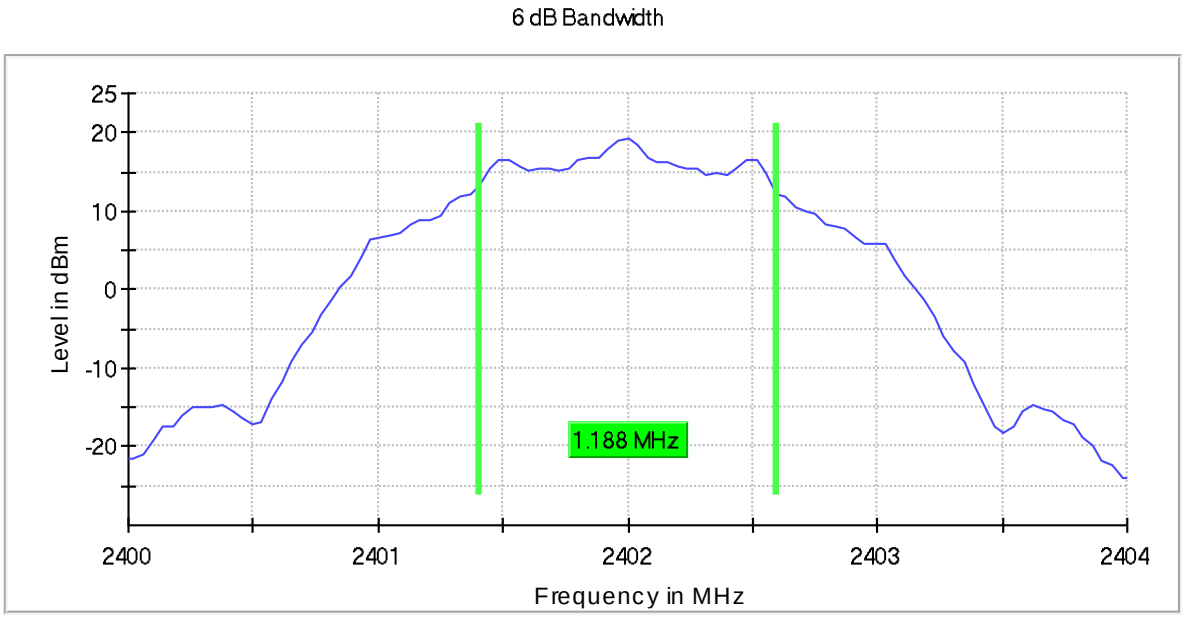
Attachments

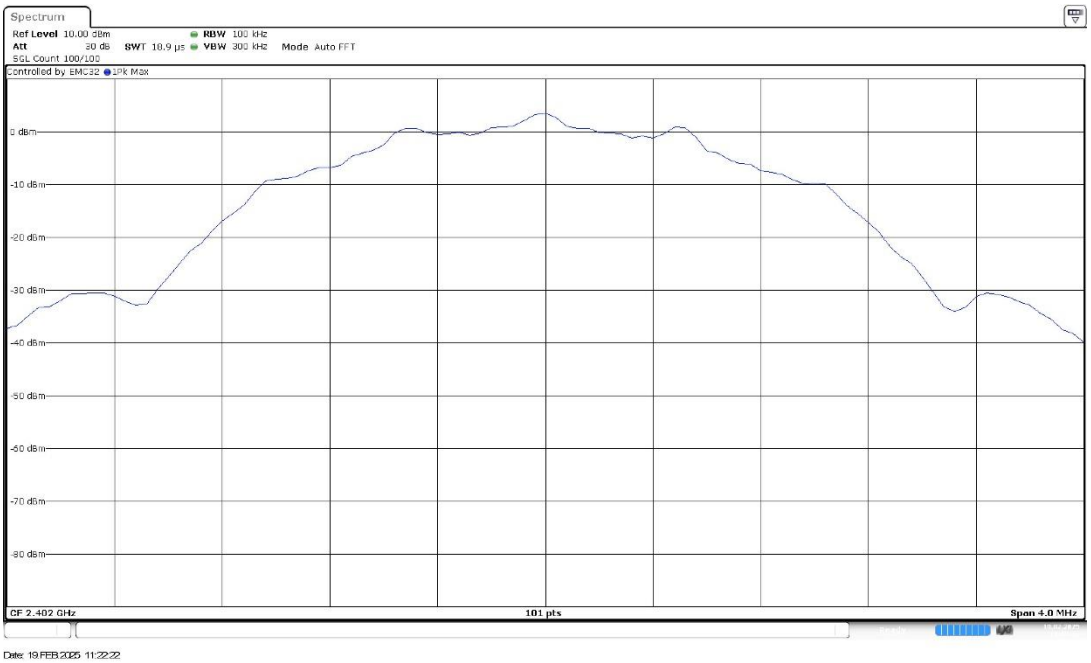
Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Frequency MHz = 2402.00000 MIMO Mode = SISO

Active Port = 1

Images:



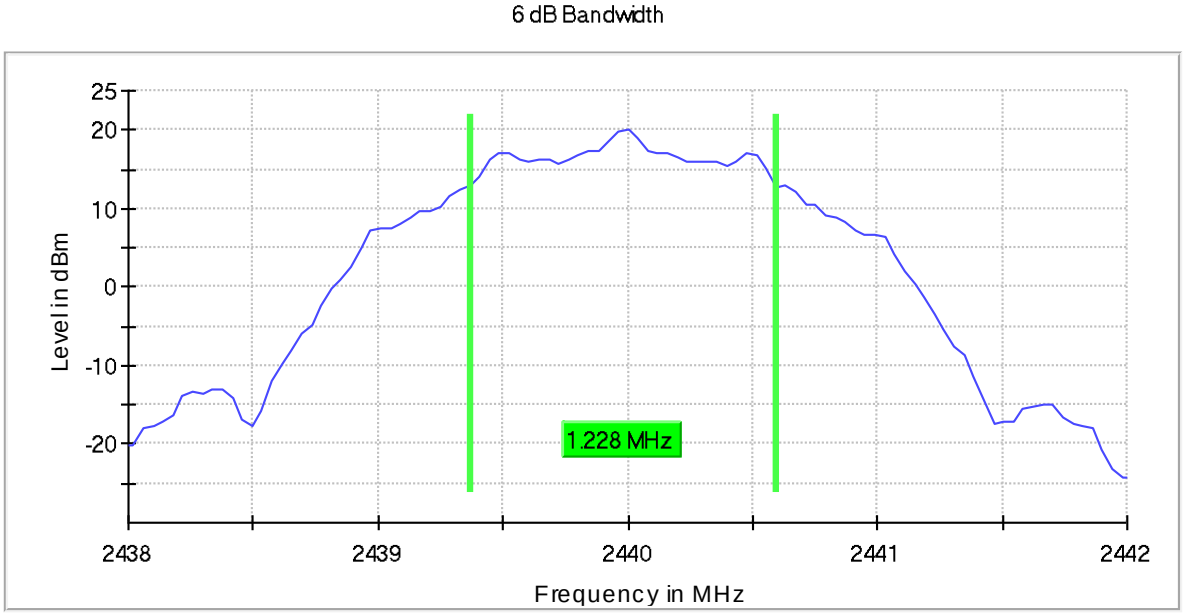


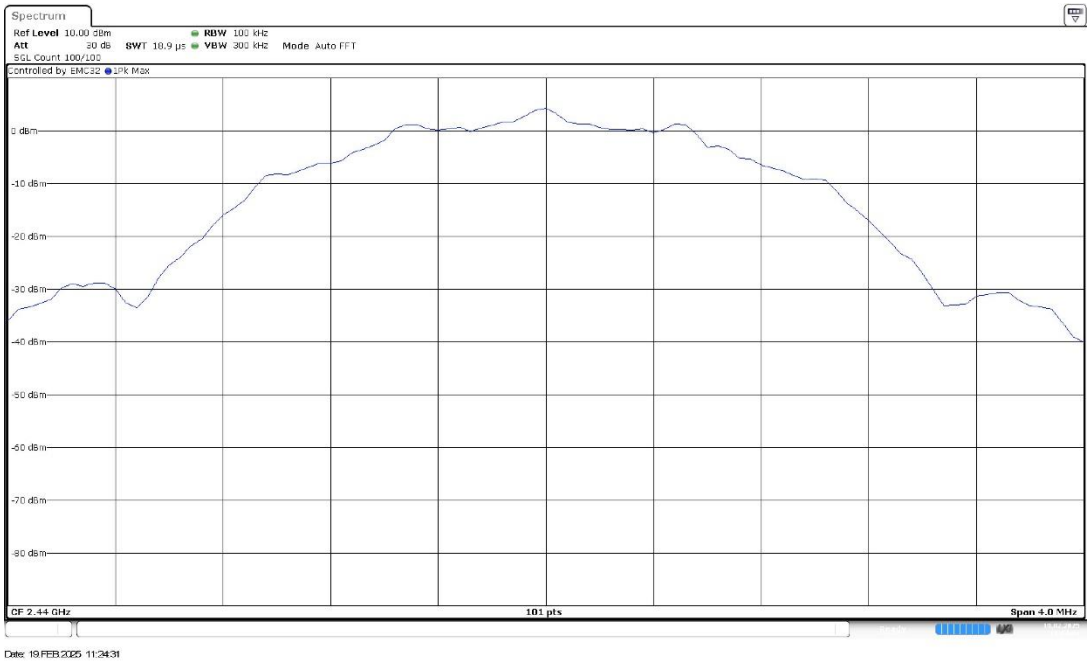
Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Frequency MHz = 2440.00000 MIMO Mode = SISO

Active Port = 1

Images:



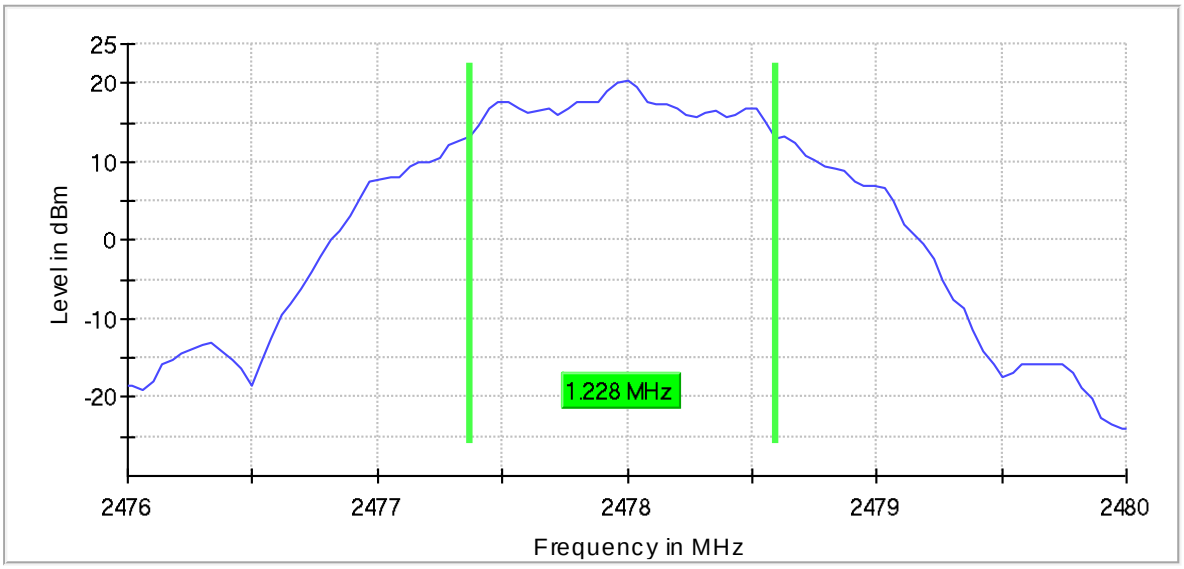


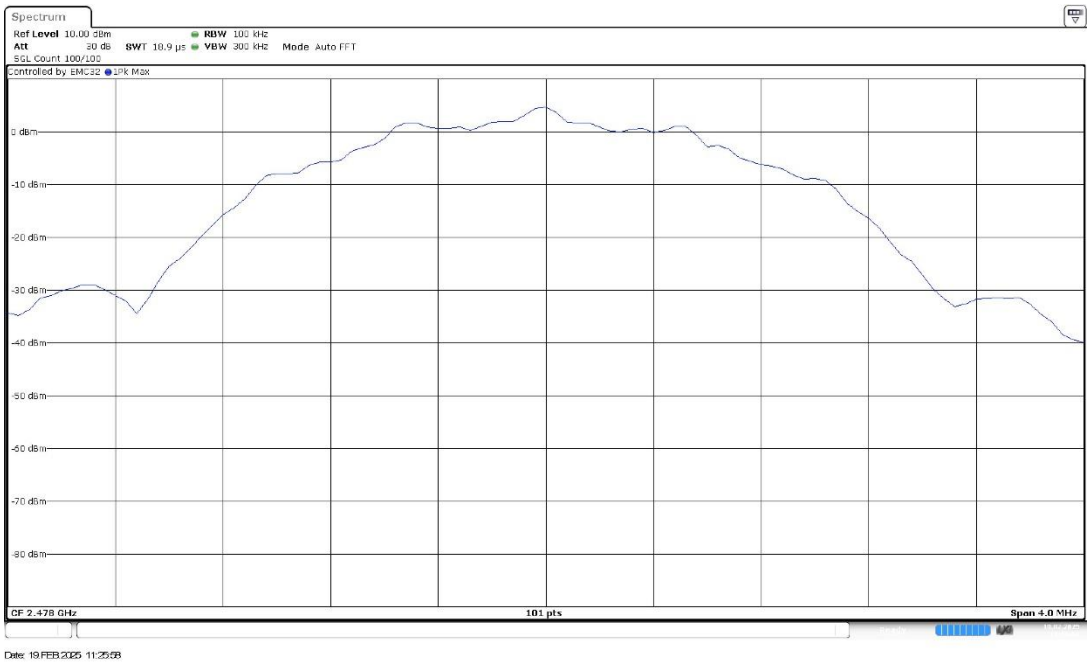
Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Frequency MHz = 2478.00000 MIMO Mode = SISO

Active Port = 1

6 dB Bandwidth



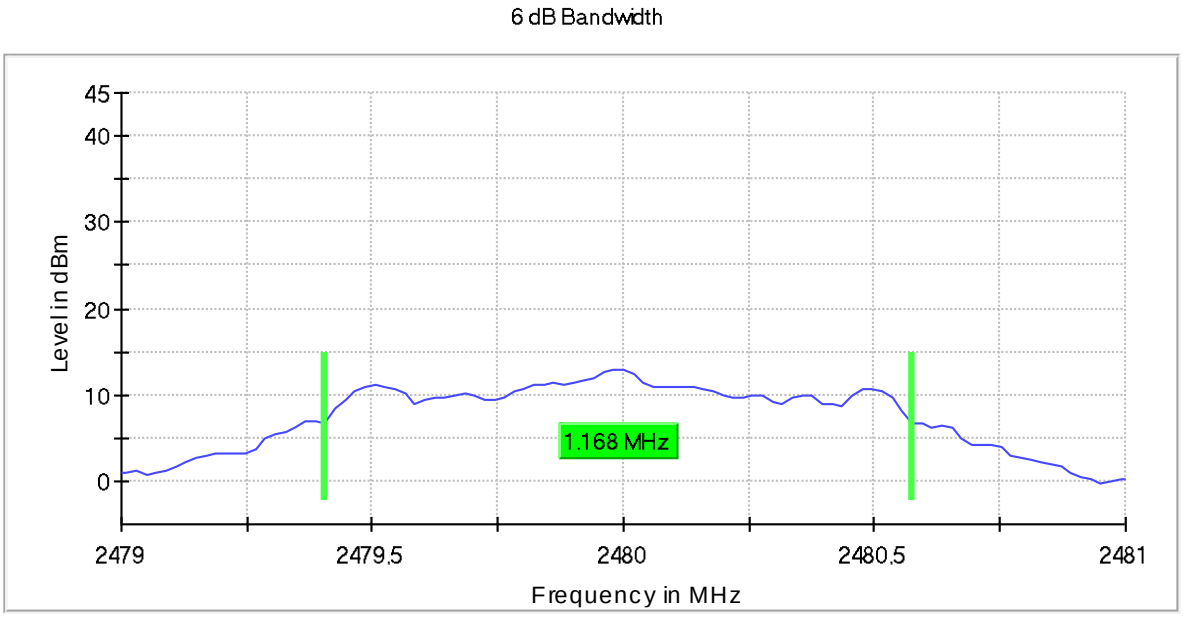


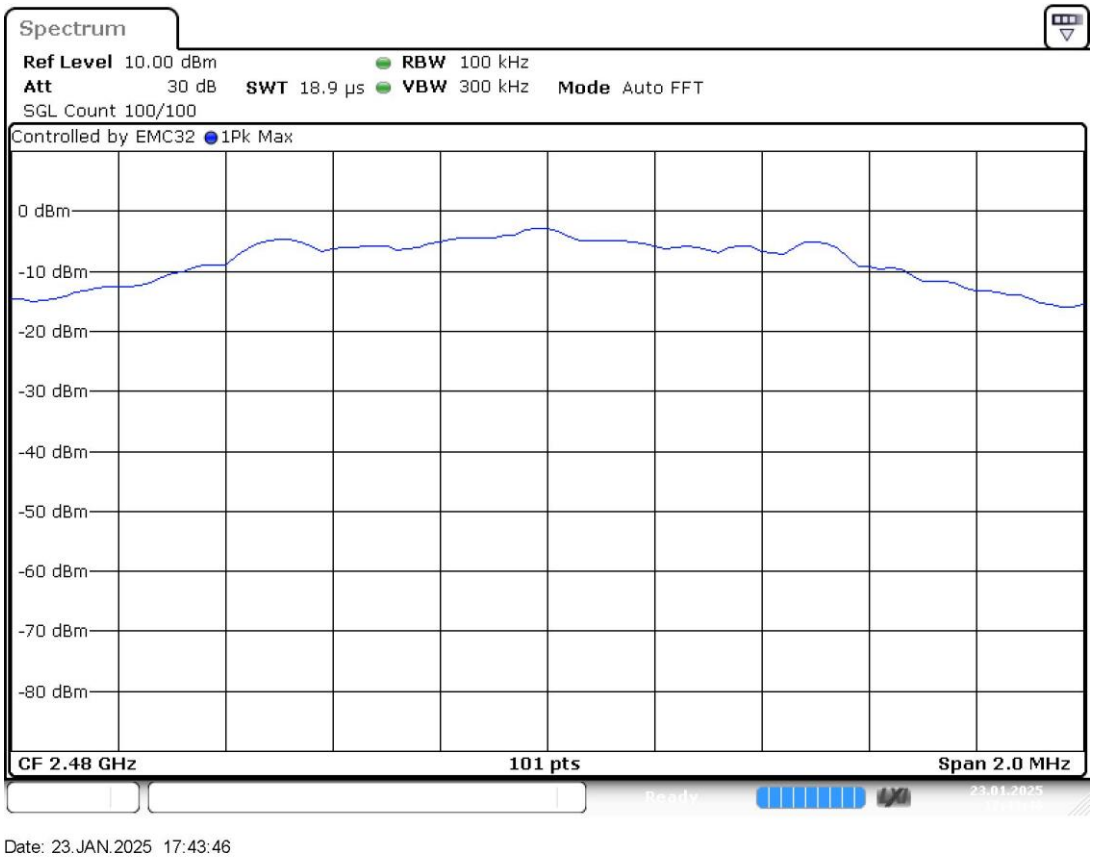
Bandwidth MHz = 2 Modulation = BTLE 5.0 (GFSK 2 Mbit/s)

Frequency MHz = 2480.00000 MIMO Mode = SISO

Active Port = 1

Images:





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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.

Results

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

MIMO Mode: SISO

Equipment	BW (MHz)	Freq (MHz)	Port	PSD (dBm)
Digital Transmission System (DTS)	1	2402.00000	1	4.976
		2440.00000		6.623
		2478.00000		7.960
		2480.00000		6.150

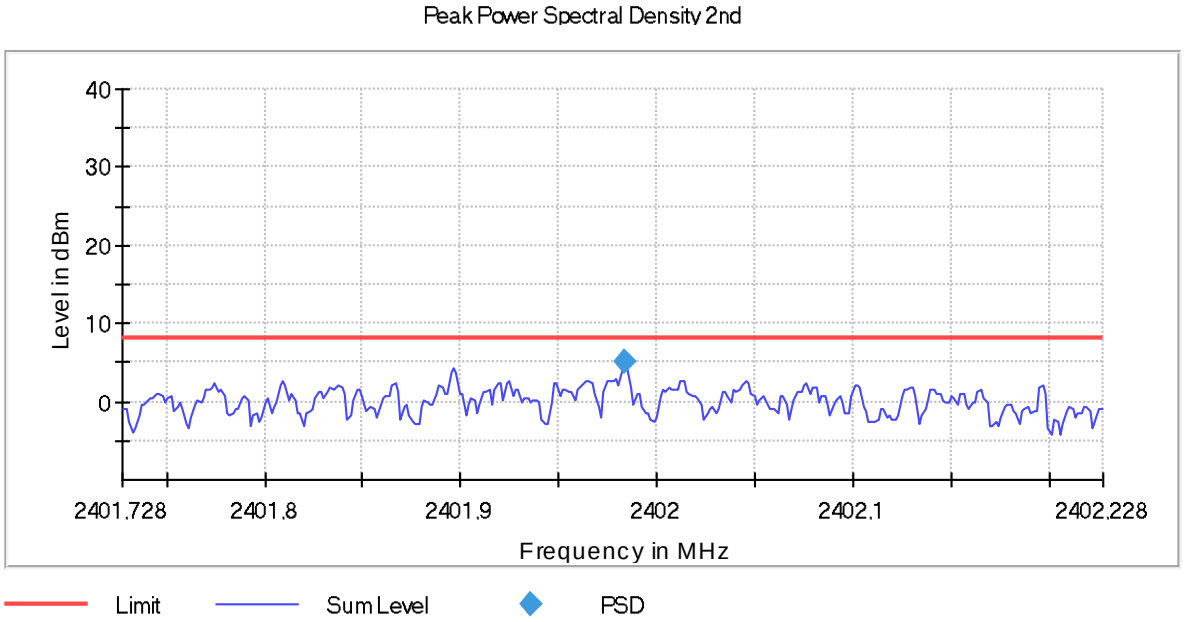
Verdict

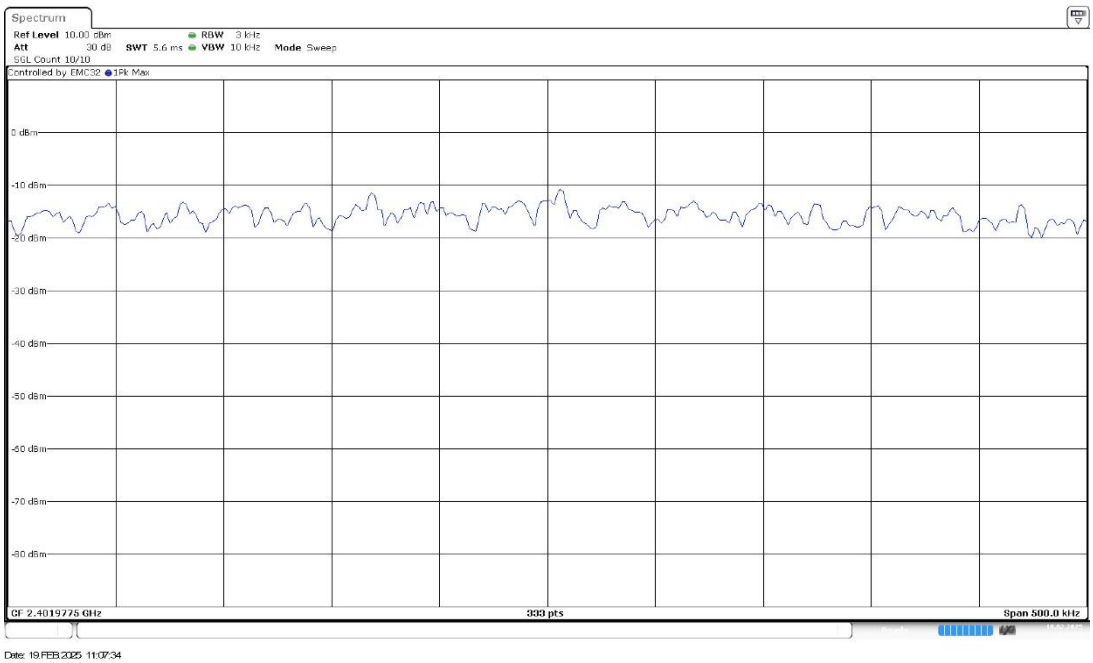
Pass

Attachments

Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
MIMO Mode = SISO
Bandwidth MHz = 1
Frequency MHz = 2402.00000
Active Port = 1

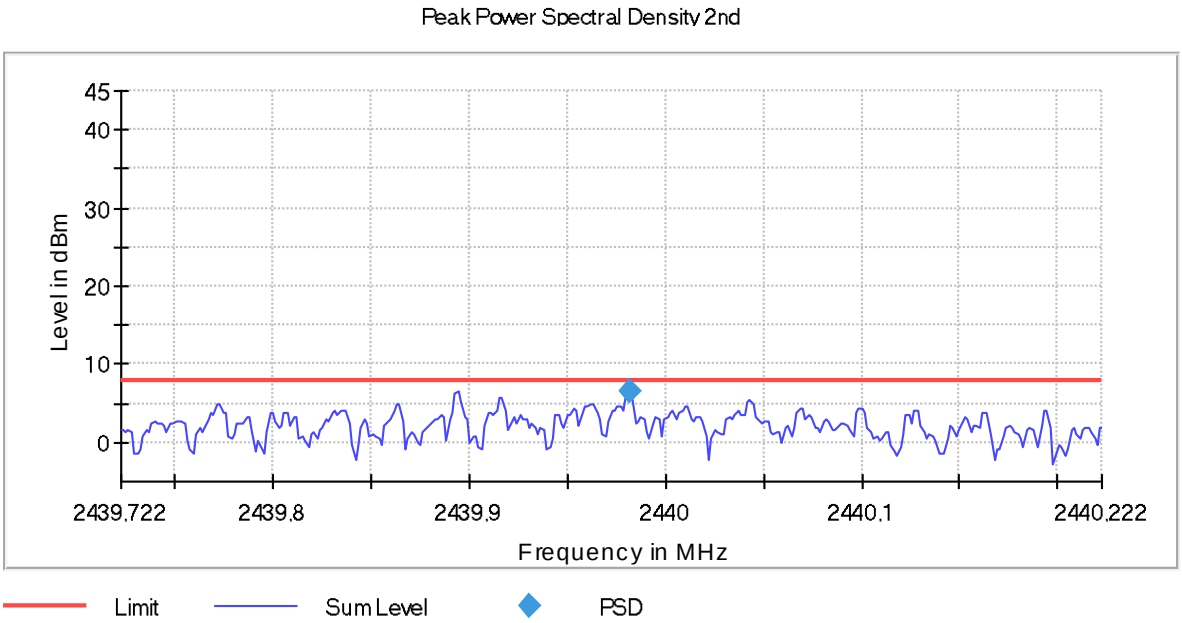
Images:

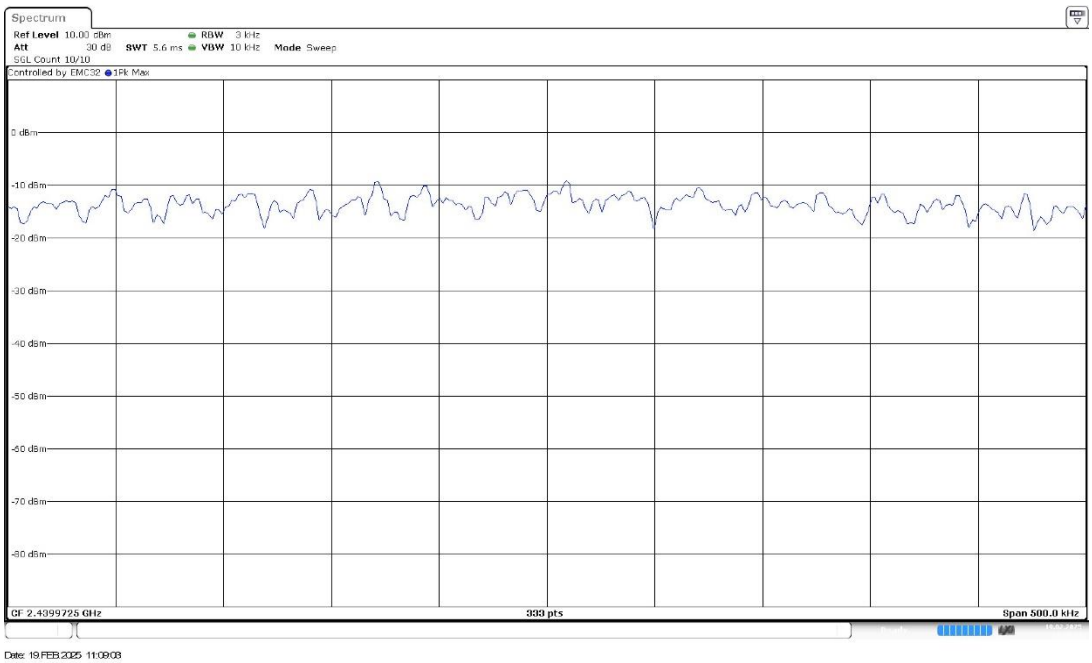




Equipment Type = Digital Transmission System (DTS)	Bandwidth MHz = 1
Modulation = BTLE 5.0 (GFSK 1 Mbit/s)	Frequency MHz = 2440.00000
MIMO Mode = SISO	Active Port = 1

Images:



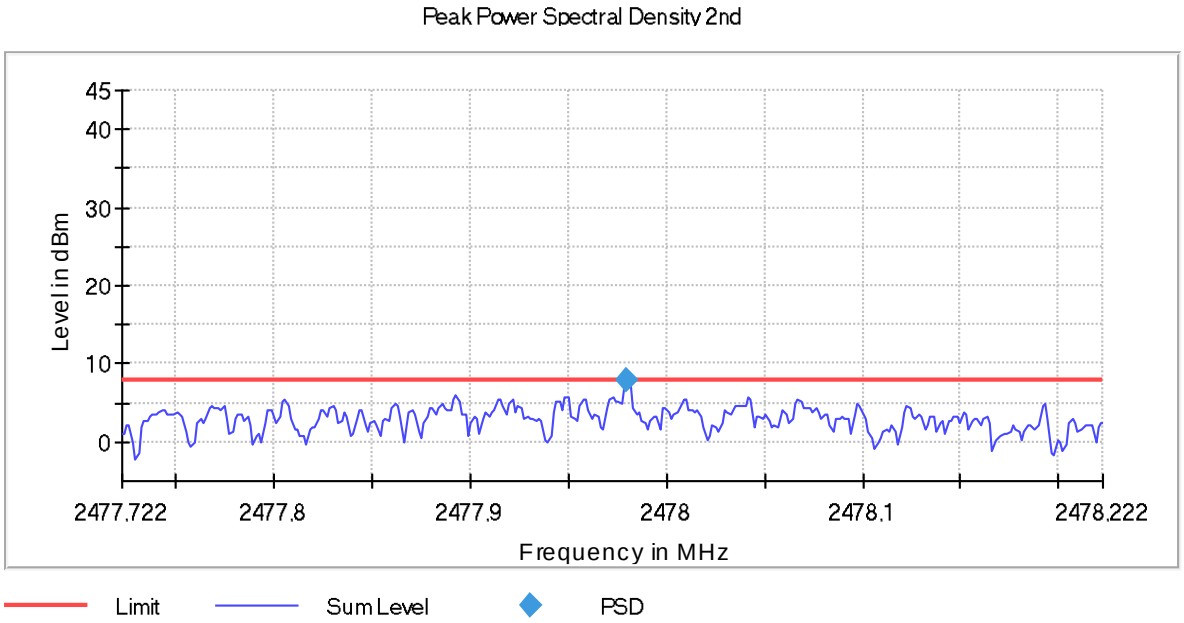


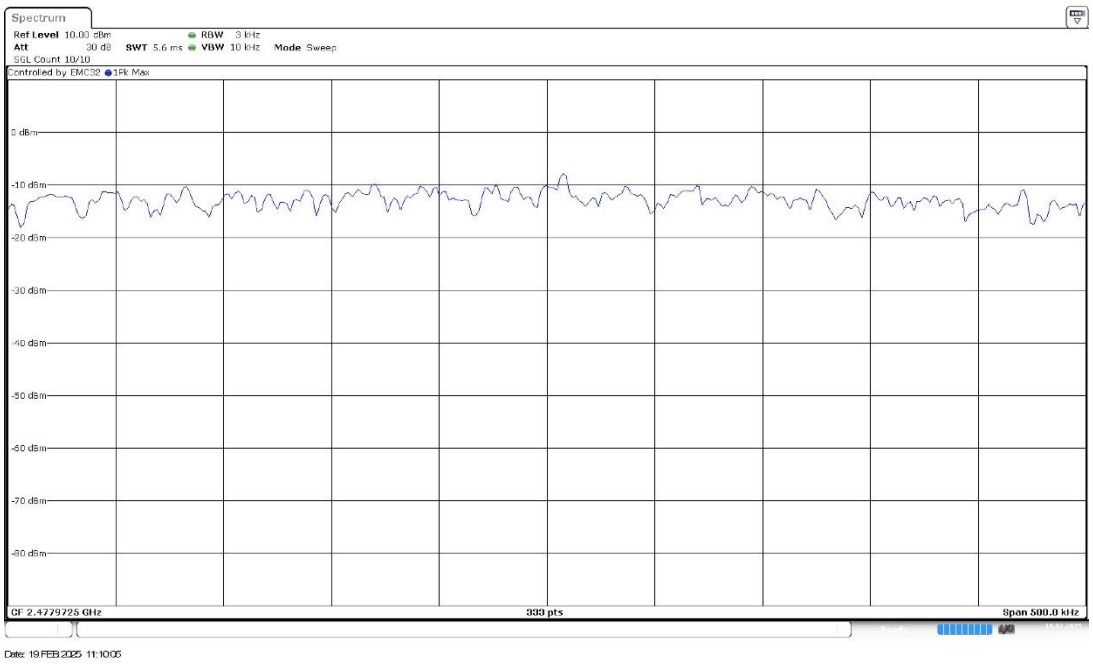
Equipment Type = Digital Transmission System (DTS) | Bandwidth MHz = 1

Modulation = BTLE 5.0 (GFSK 1 Mbit/s) | Frequency MHz = 2478.00000

MIMO Mode = SISO | Active Port = 1

Images:



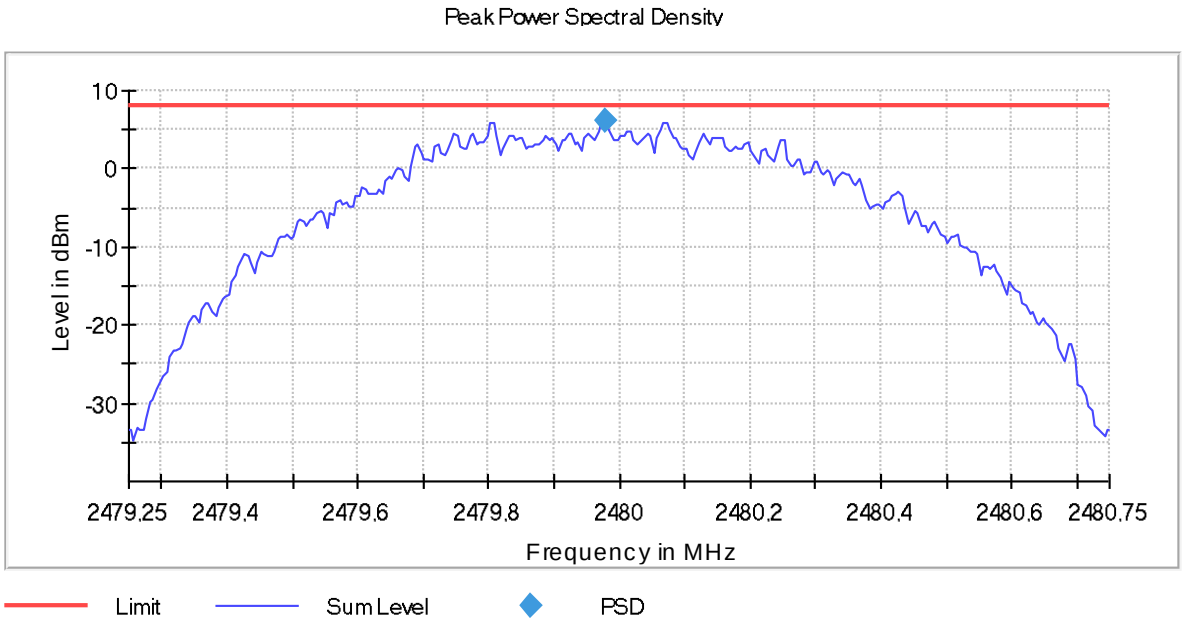


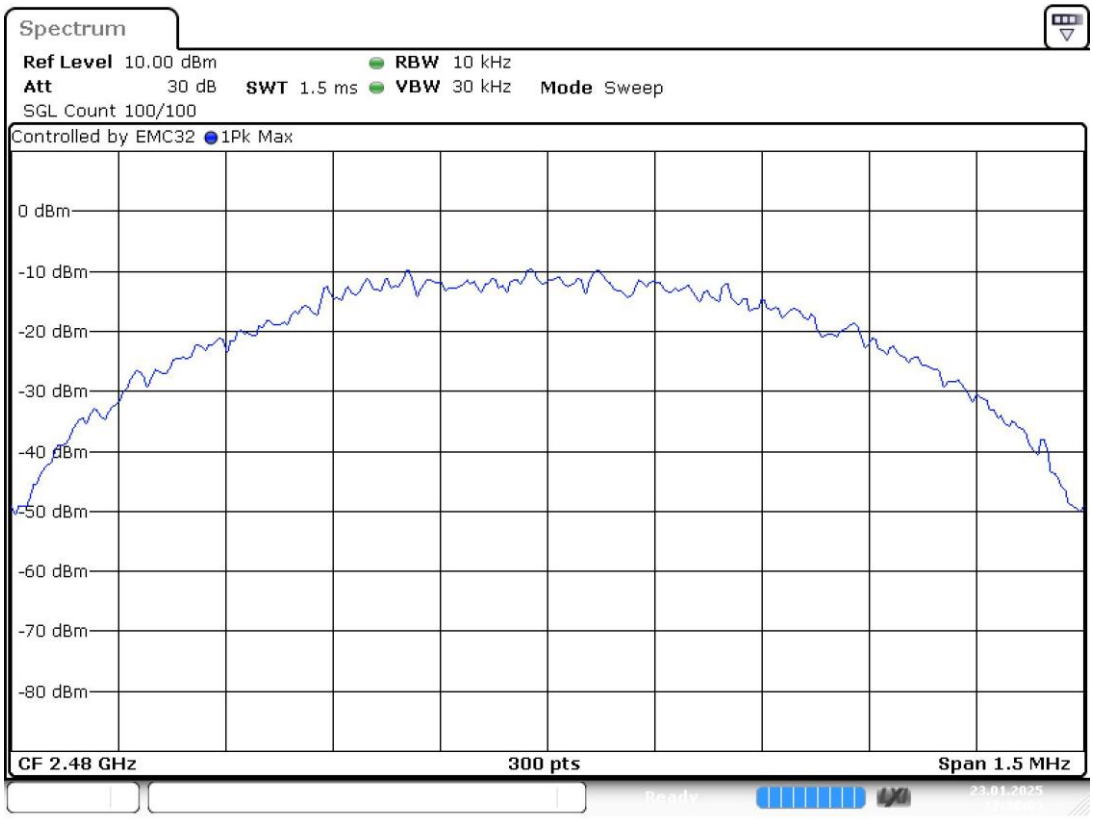
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 1

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

MIMO Mode = SISO Active Port = 1

Images:





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Results

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

MIMO Mode: SISO

Equipment	BW (MHz)	Freq (MHz)	Port	PSD (dBm)
Digital Transmission System (DTS)	2	2402.00000	1	4.127
		2440.00000		4.808
		2478.00000		4.843
		2480.00000		3.950

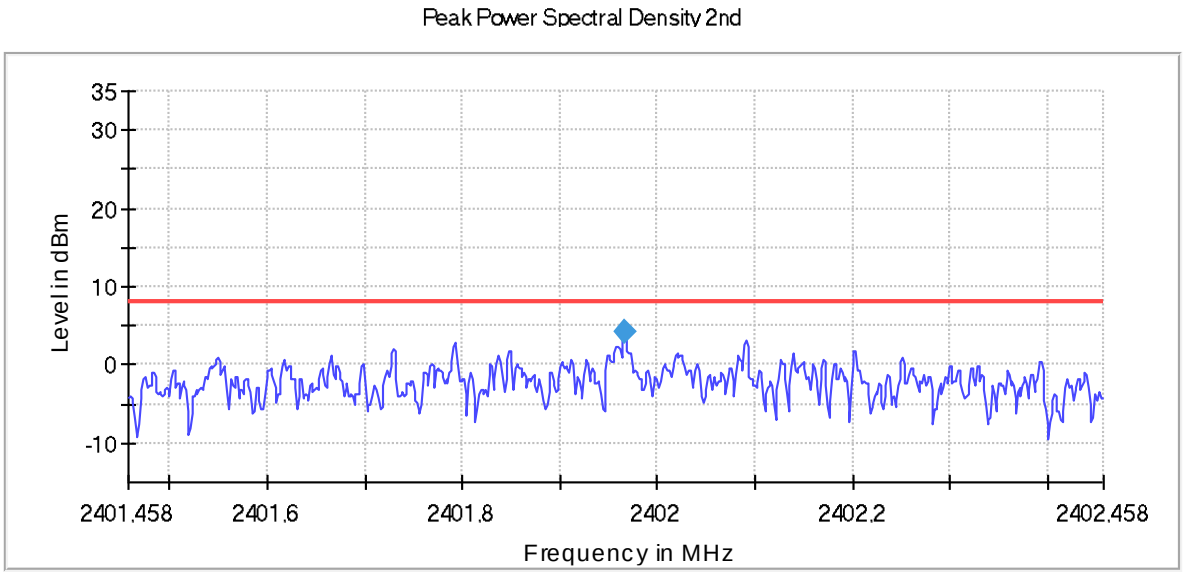
Verdict

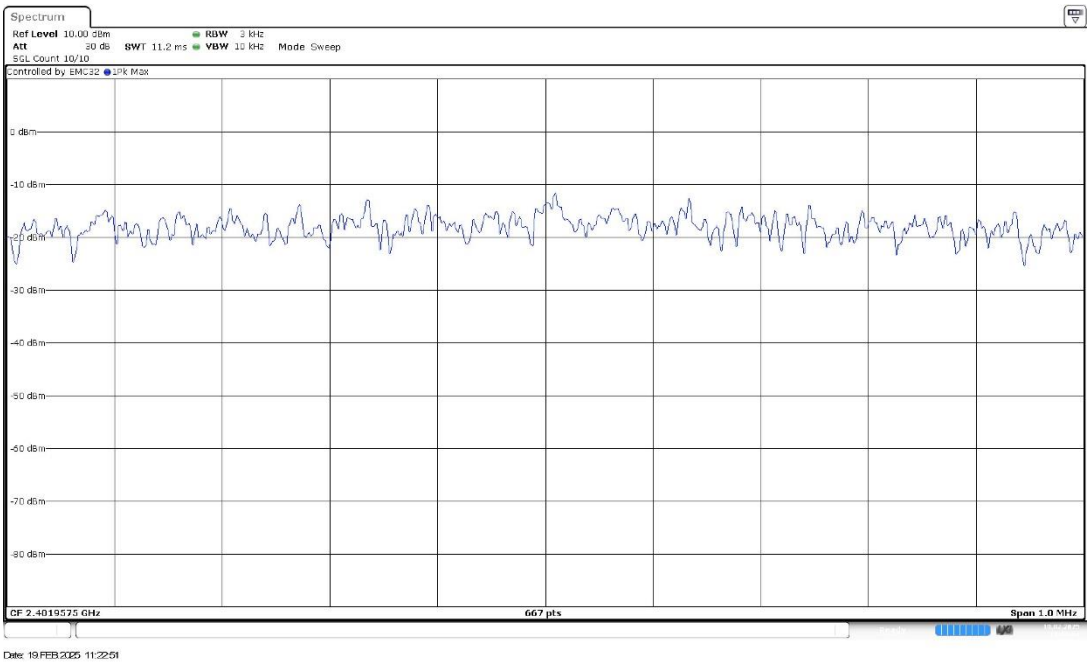
Pass

Attachments

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

Images:



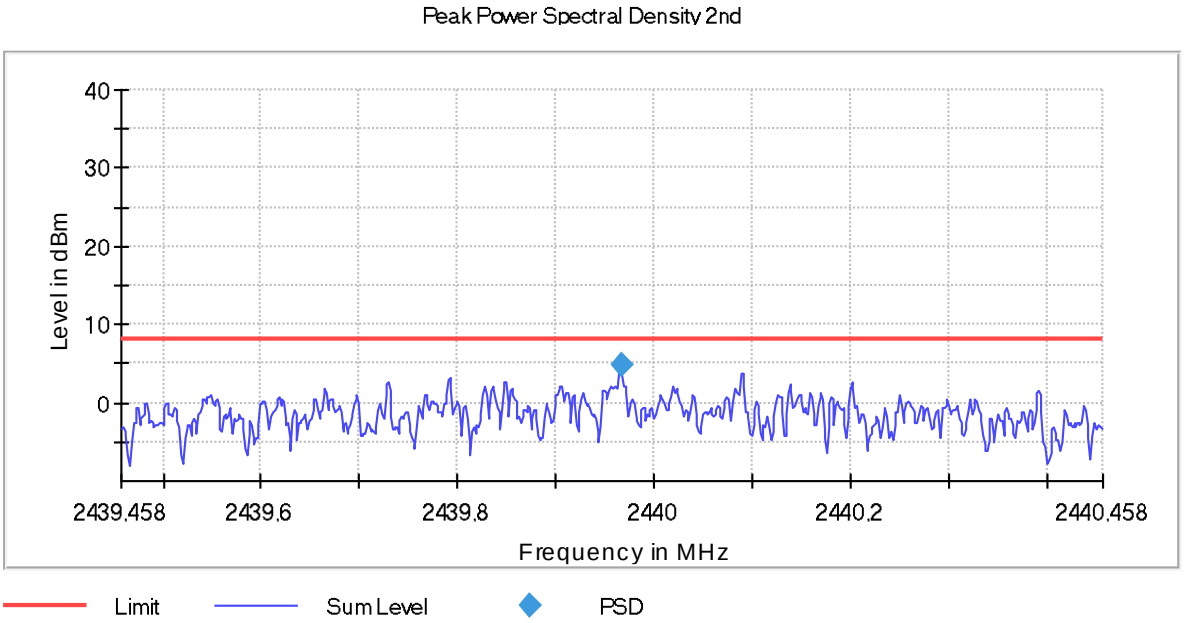


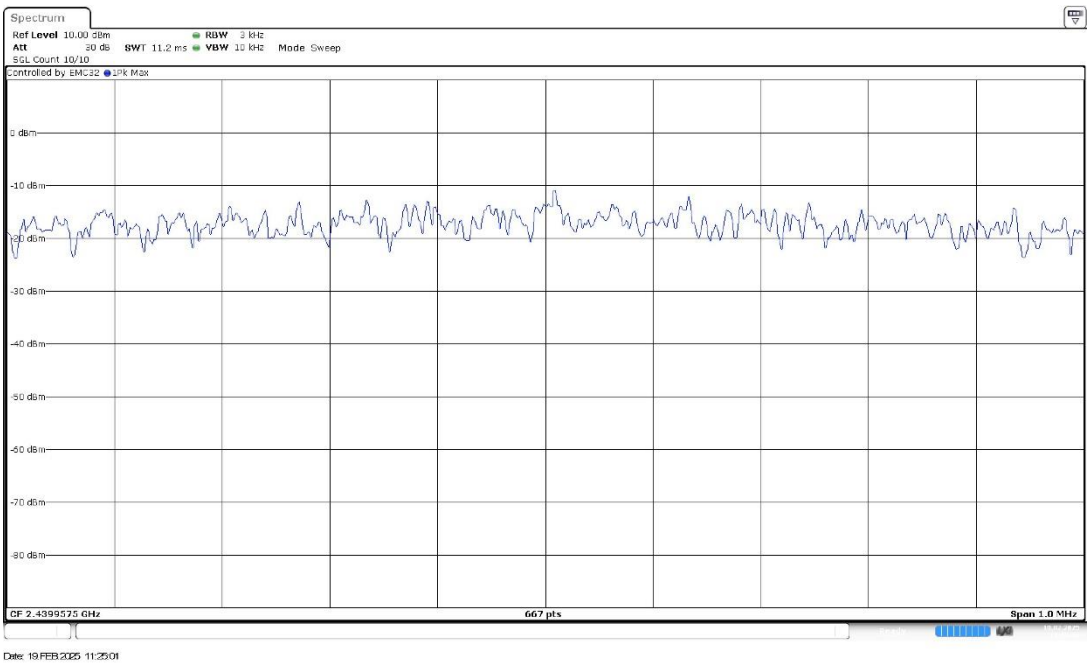
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 2

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

MIMO Mode = SISO Active Port = 1

Images:



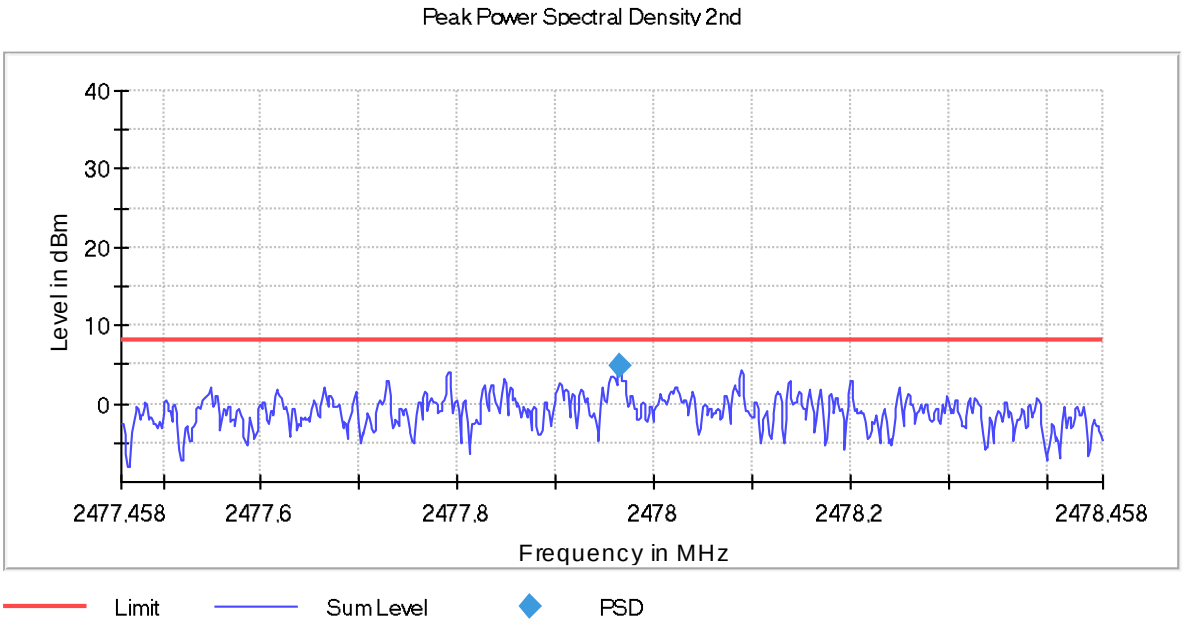


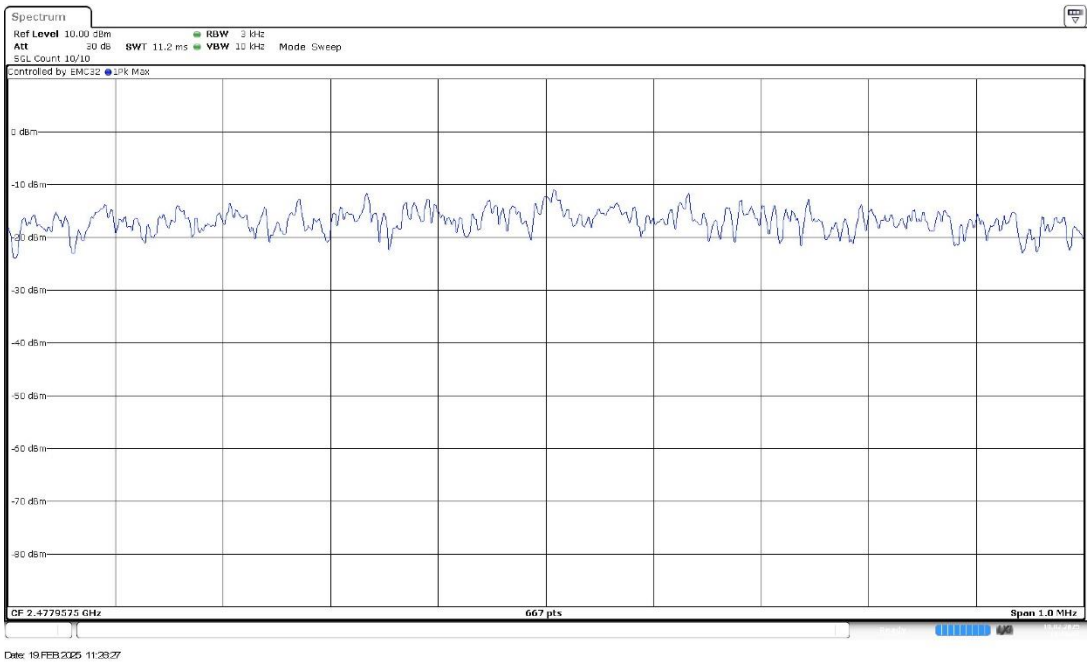
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 2

Modulation = BTLE 5.0 (GFSK 2 Mbit/s) Frequency MHz = 2478.00000

MIMO Mode = SISO Active Port = 1

Images:



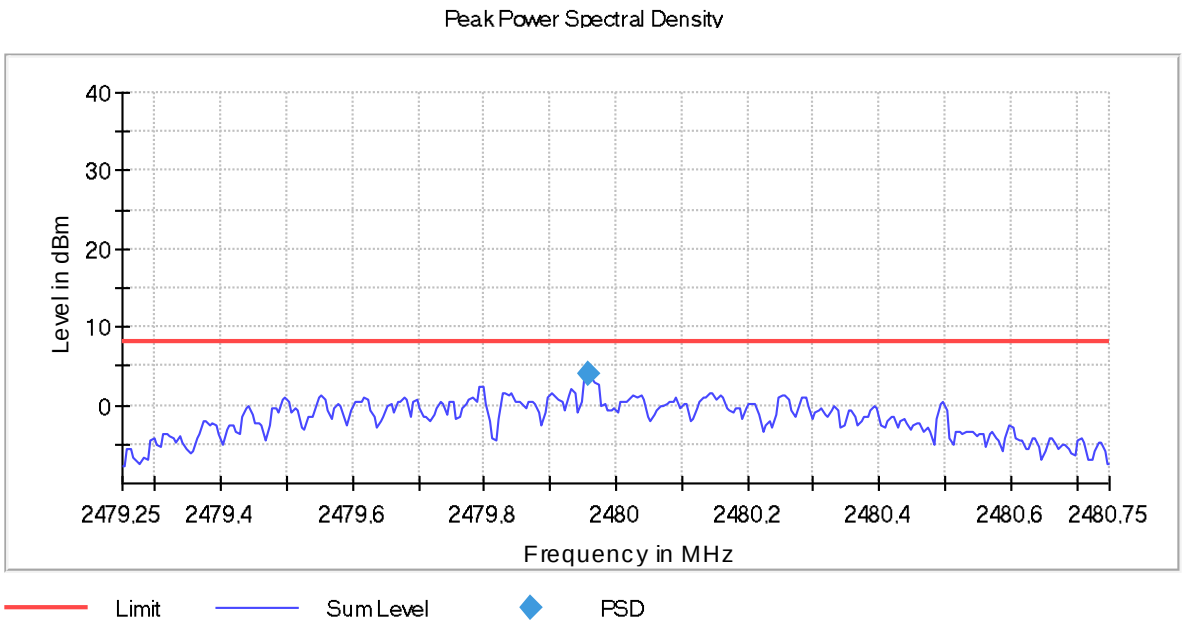


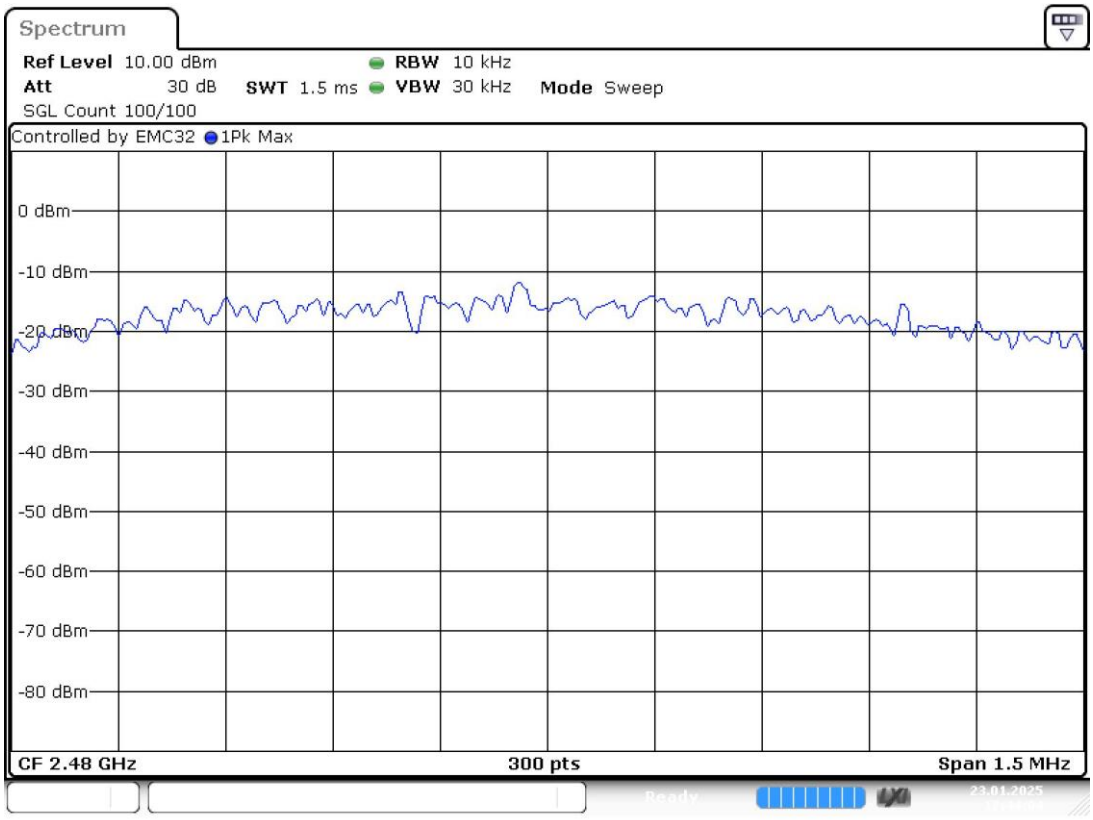
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 2

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

MIMO Mode = SISO Active Port = 1

Images:





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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).

Results

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

MIMO Mode: SISO

Equipment	BW (MHz)	Freq (MHz)	Port	Peak Power (dBm)	EIRP Power (dBm)
Digital Transmission System (DTS)	1	2402.00000	1	14.884	18.484
Digital Transmission System (DTS)	1	2440.00000	1	17.057	20.657
Digital Transmission System (DTS)	1	2478.00000		17.727	21.327
Digital Transmission System (DTS)	1	2480.00000	1	11.295	14.895

Verdict

Pass

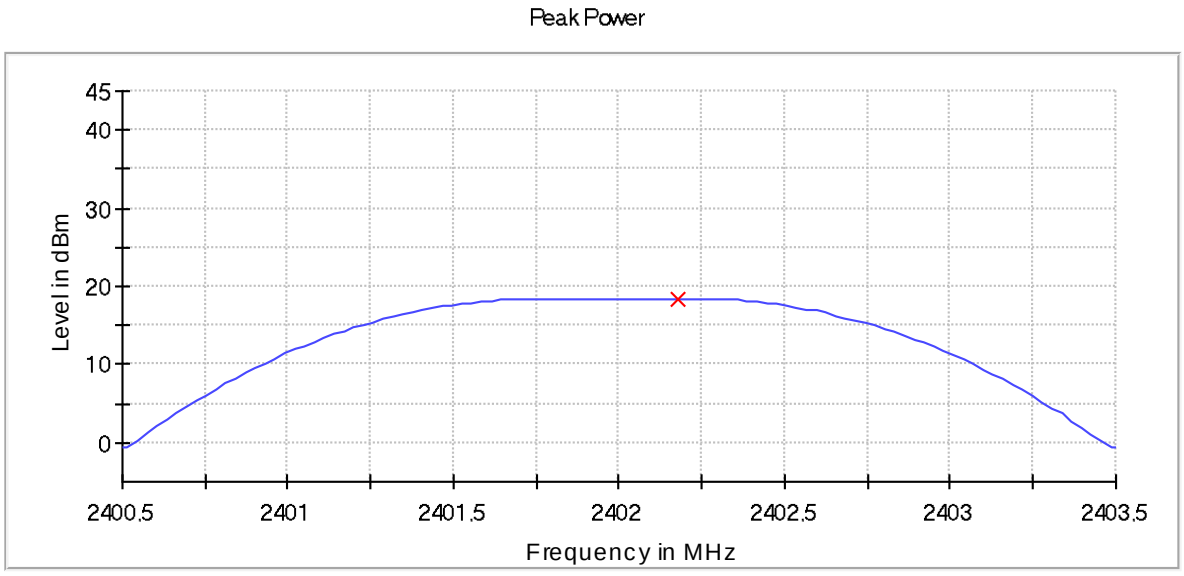
Attachments

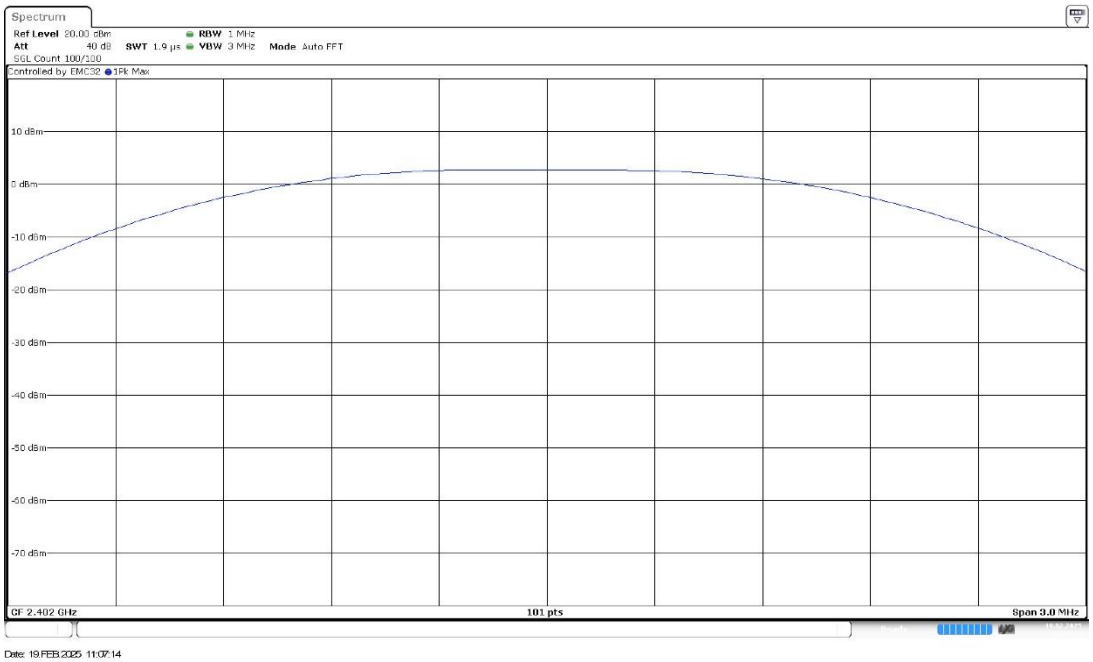
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 1

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

MIMO Mode = SISO Active Port = 1

Images:



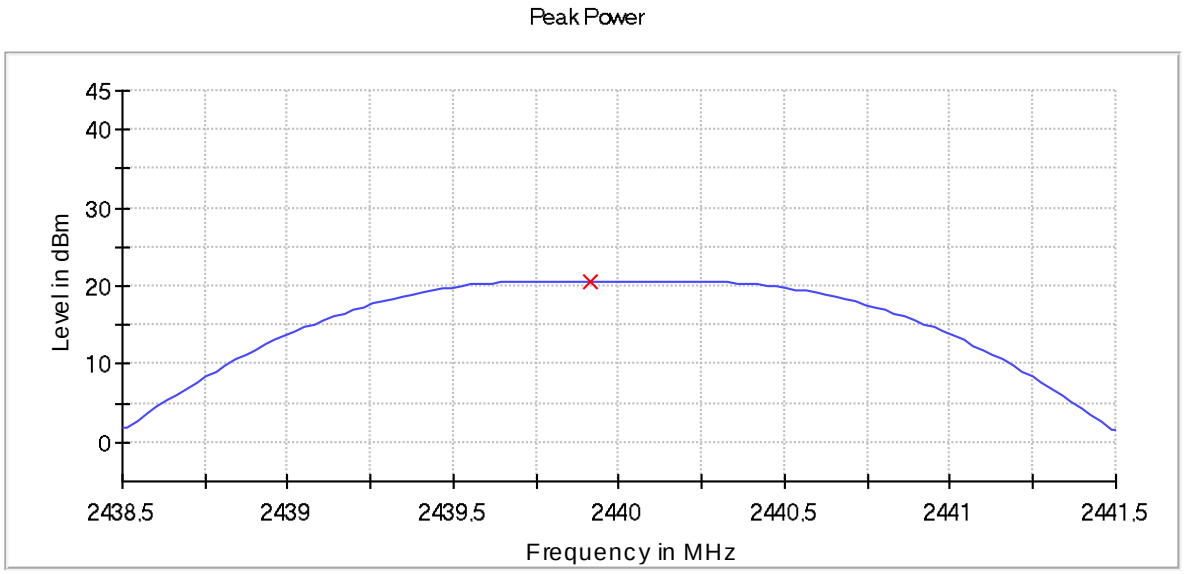


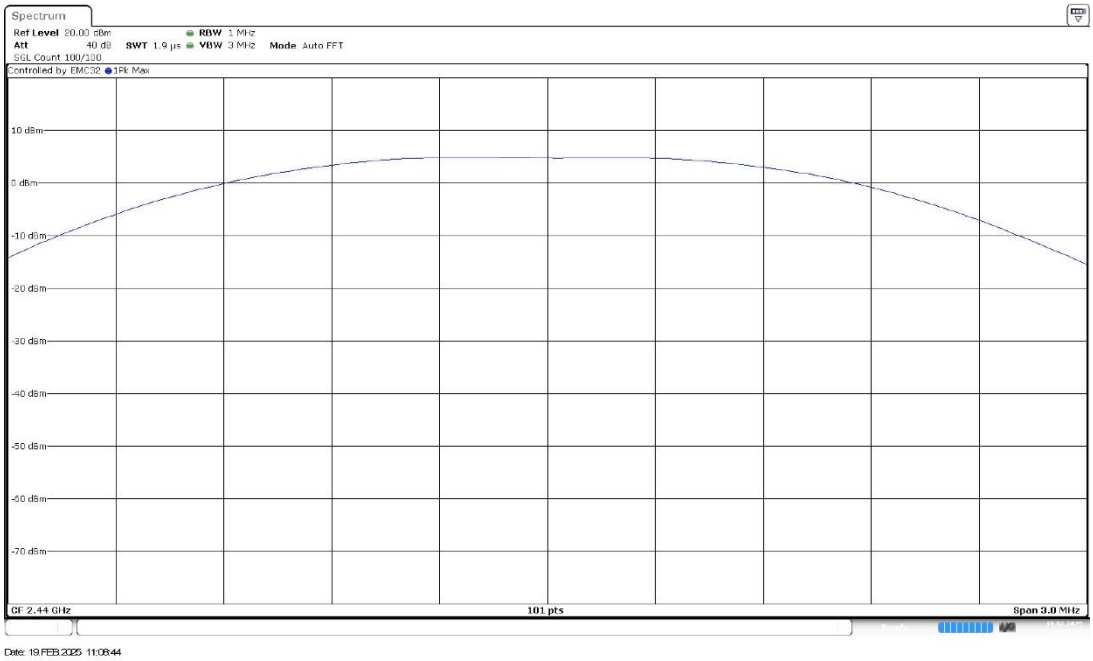
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 1

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

MIMO Mode = SISO Active Port = 1

Images:



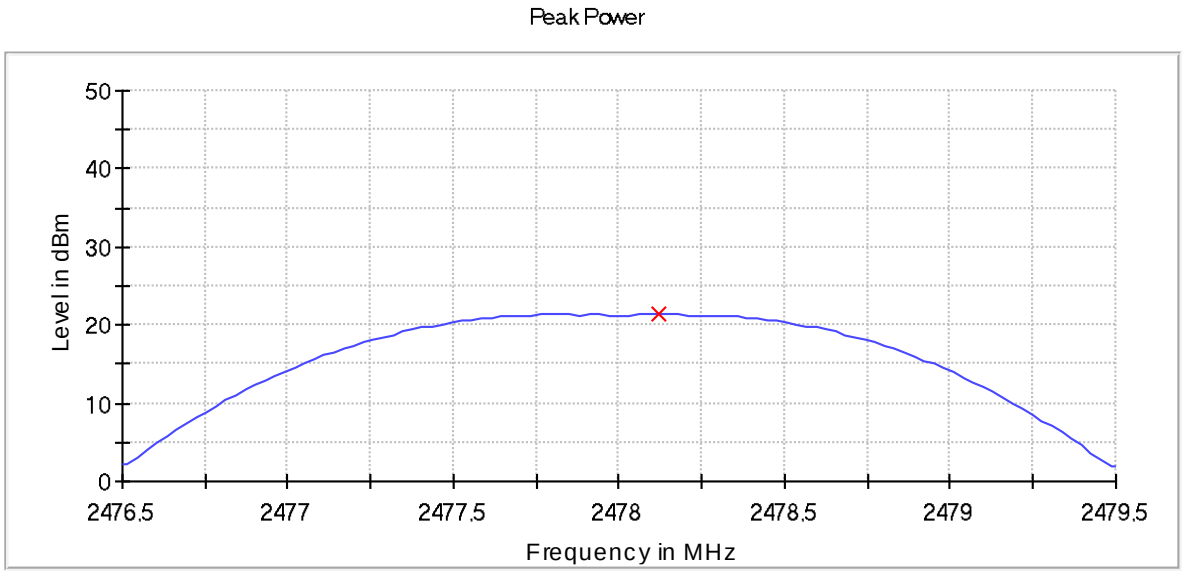


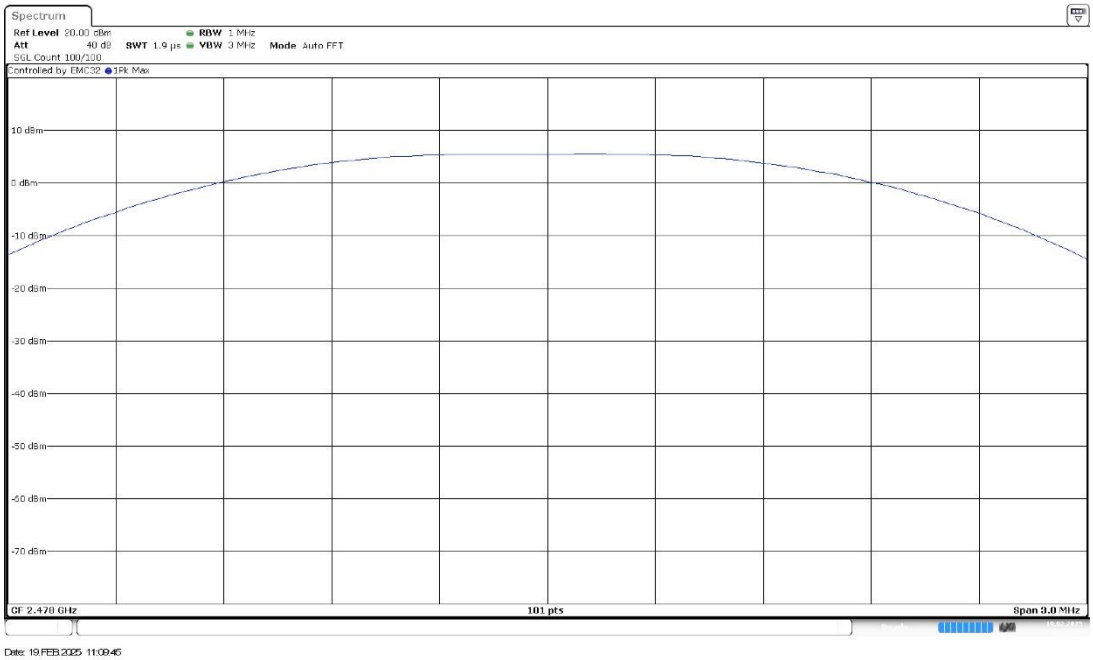
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 1

Modulation = BTLE 5.0 (GFSK 1 Mbit/s) Frequency MHz = 2478.00000

MIMO Mode = SISO Active Port = 1

Images:



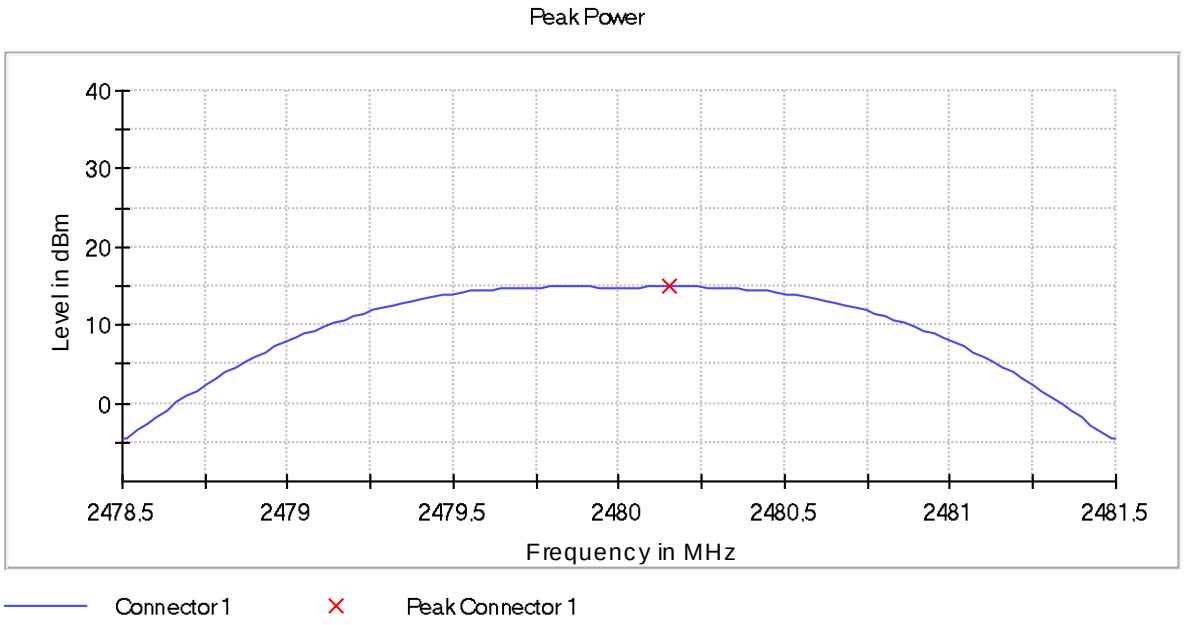


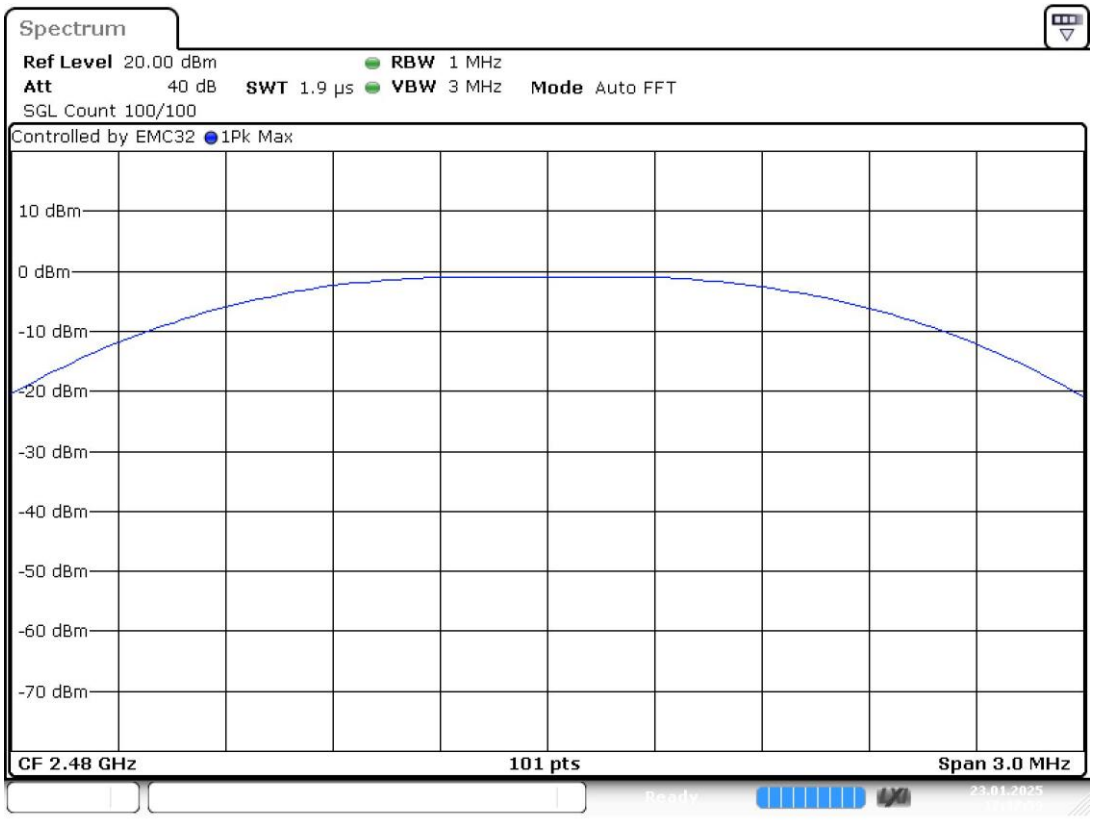
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 1

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

MIMO Mode = SISO Active Port = 1

Images:





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Results

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

MIMO Mode: SISO

Equipment	BW (MHz)	Freq (MHz)	Port	Peak Power (dBm)	EIRP Power (dBm)
Digital Transmission System (DTS)	2	2402.00000	1	16.663	20.263
Digital Transmission System (DTS)	2	2440.00000	1	17.210	20.810
Digital Transmission System (DTS)	2	2478.00000	1	17.735	21.335
Digital Transmission System (DTS)	2	2480.00000	1	11.330	14.930

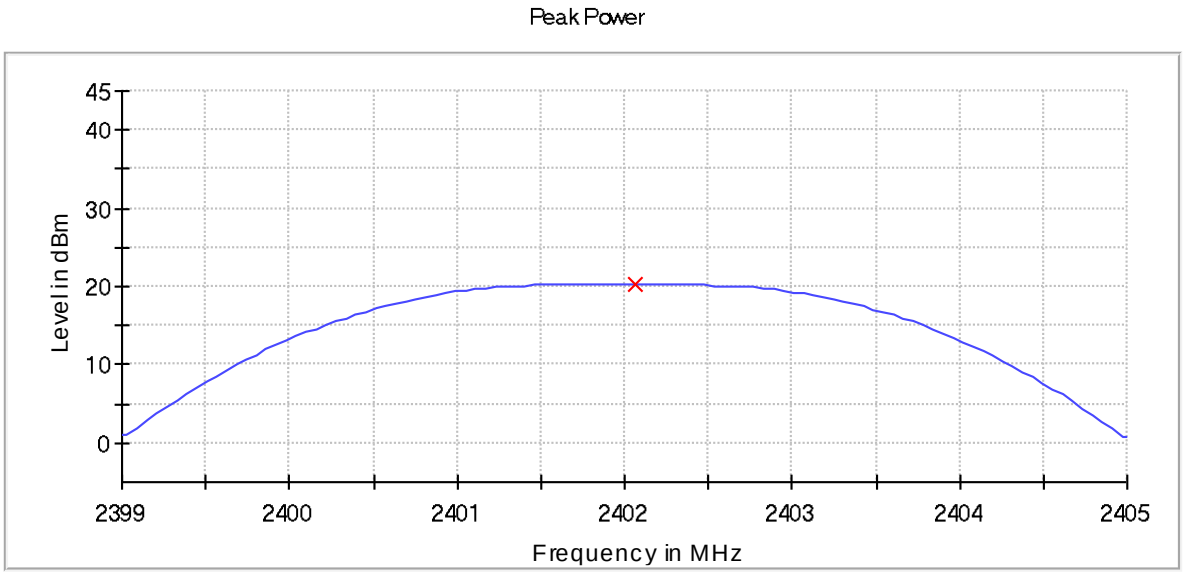
Verdict

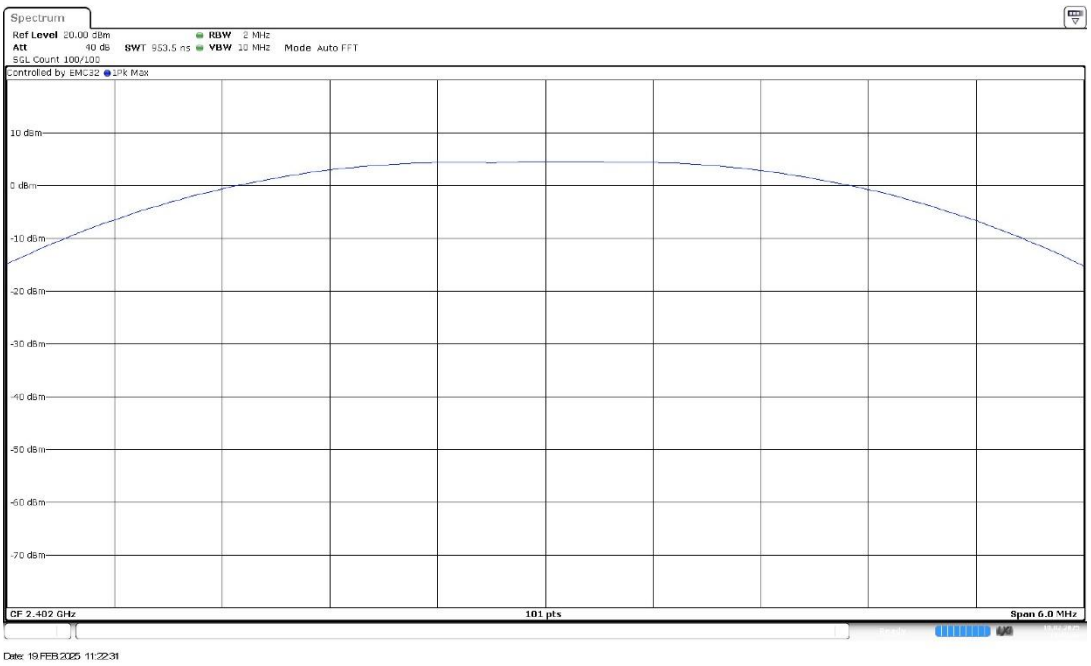
Pass

Attachments

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

Images:



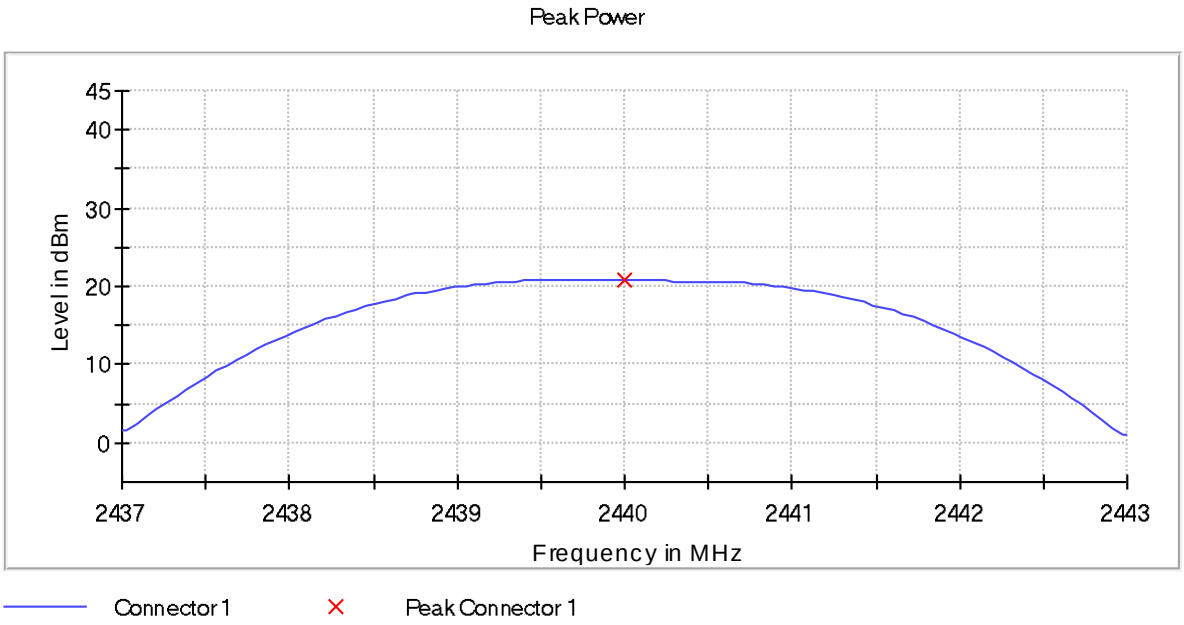


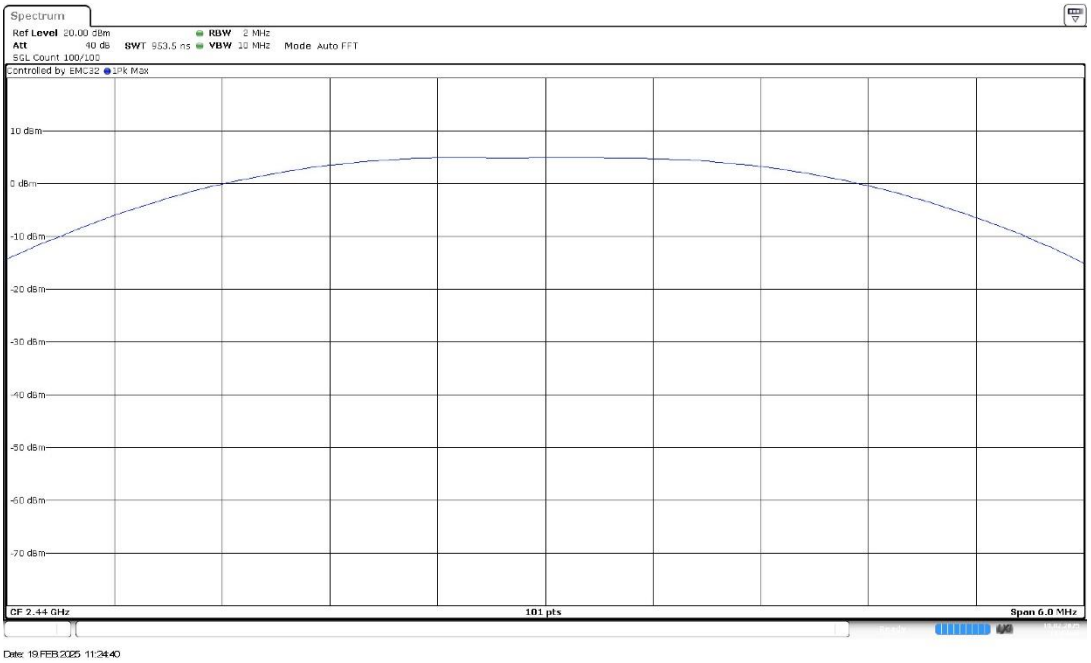
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 2

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

MIMO Mode = SISO Active Port = 1

Images:



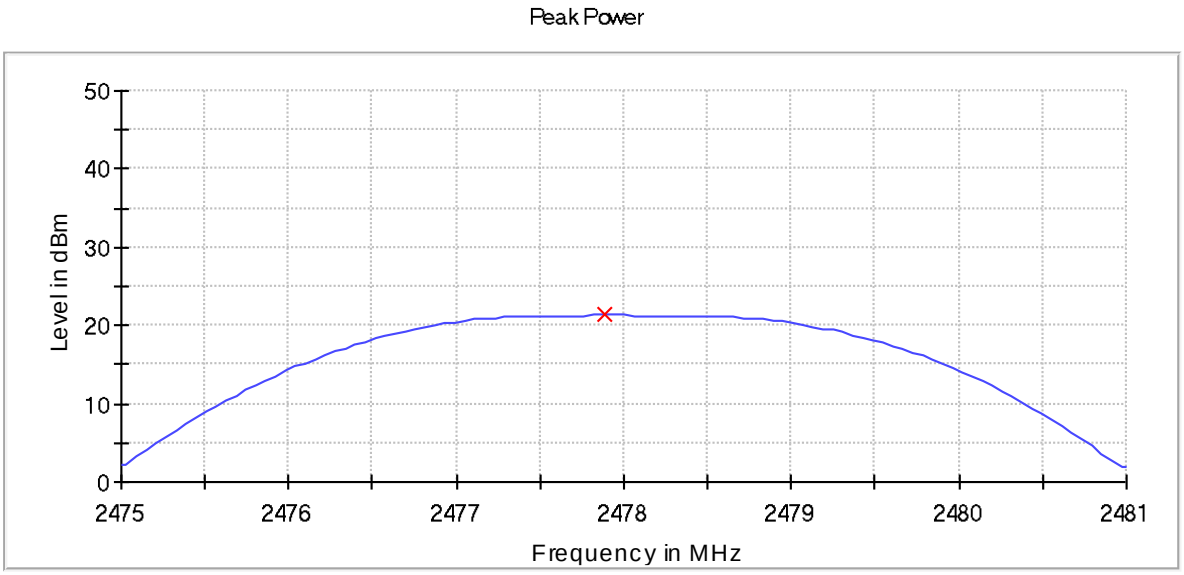


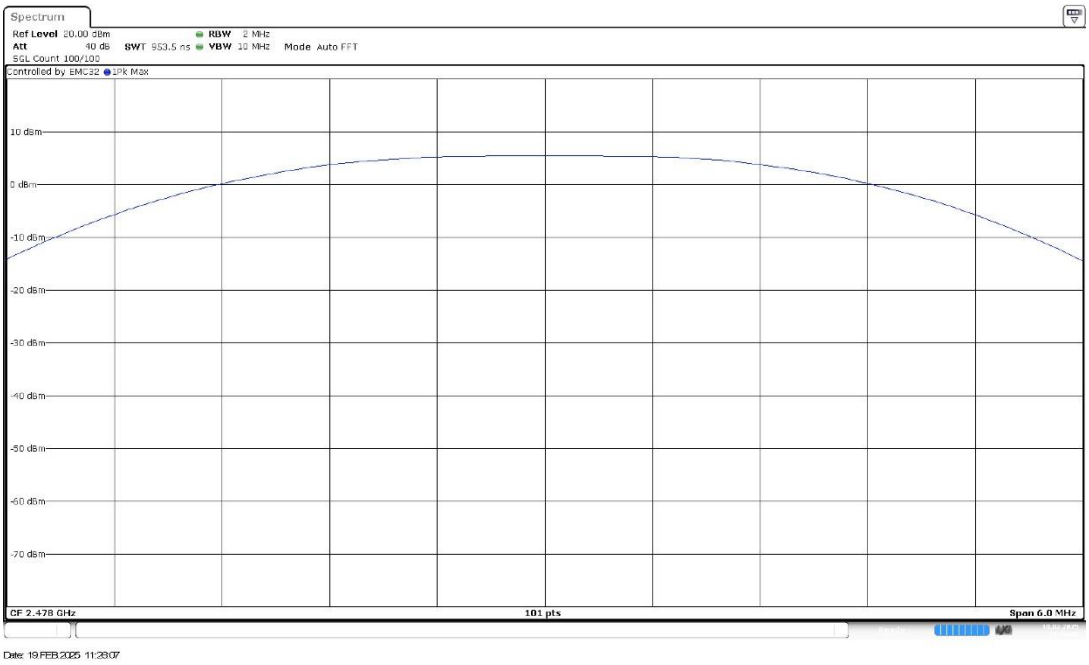
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 2

Modulation = BTLE 5.0 (GFSK 2 Mbit/s) Frequency MHz = 2478.00000

MIMO Mode = SISO Active Port = 1

Images:



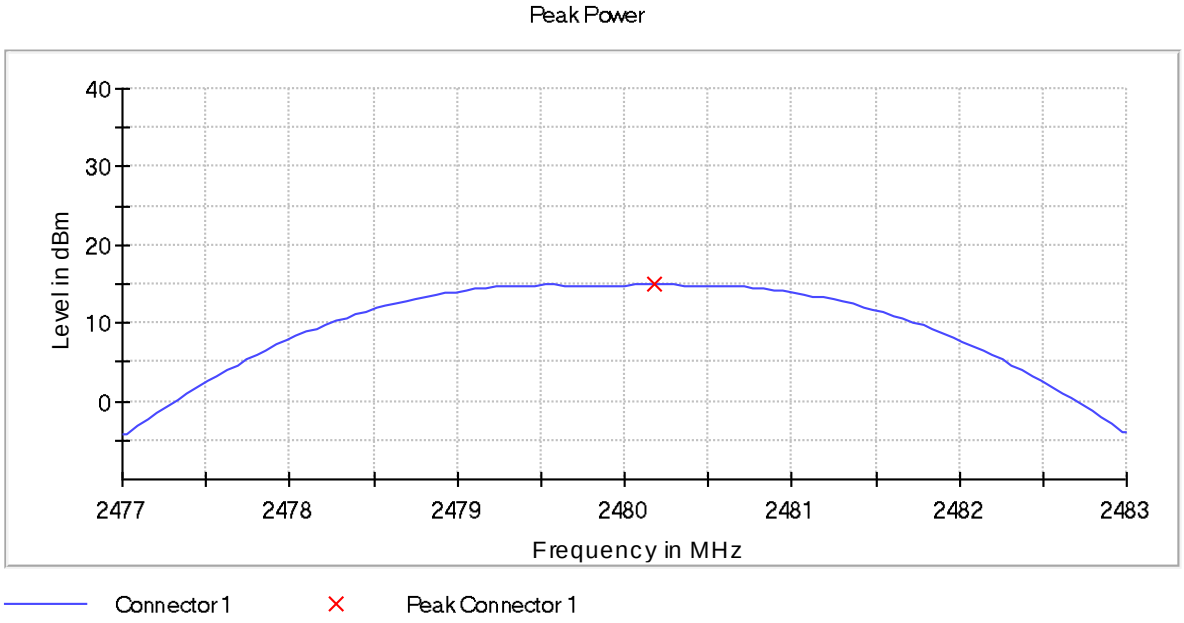


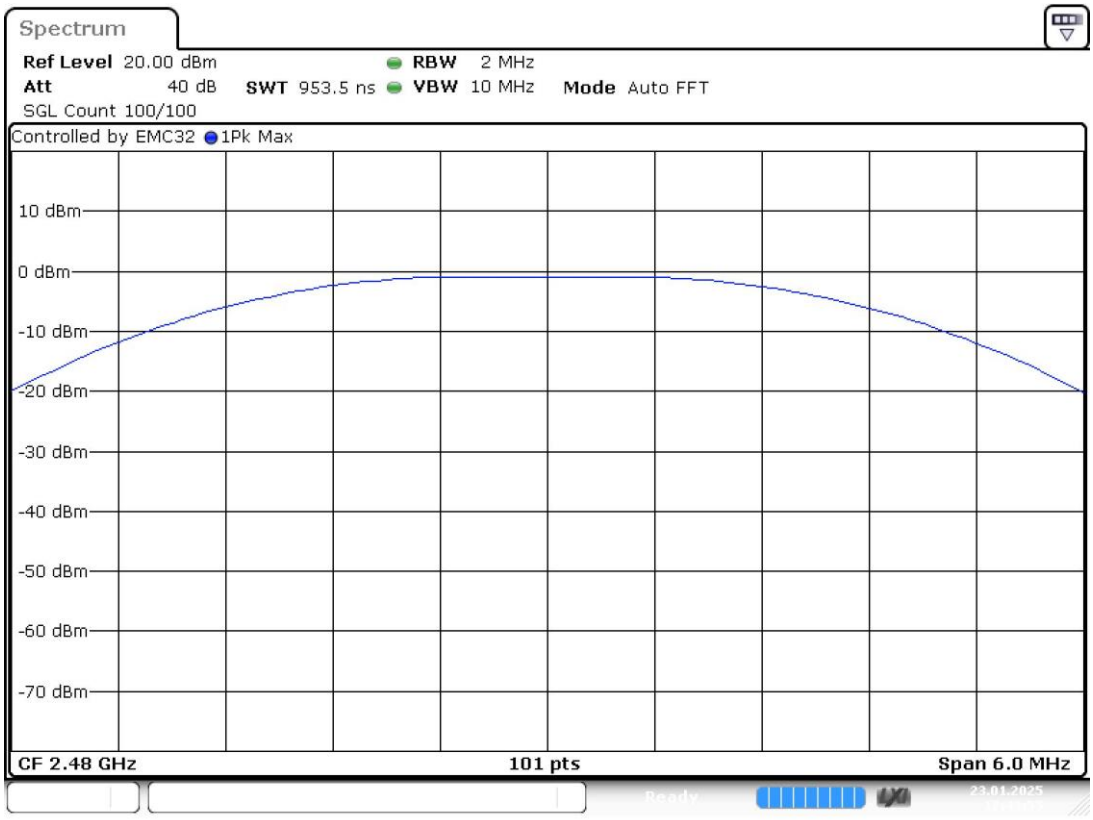
Equipment Type = Digital Transmission System (DTS) Bandwidth MHz = 2

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

MIMO Mode = SISO Active Port = 1

Images:





Date: 23.JAN.2025 17:43:55

RSS-247 5.5 / FCC 15.247 (d) [Bndedge] Band-edge emissions compliance (Transmitter)

Limits

In any 100 kHz bandwidths outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Results

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

MIMO Mode: SISO

Equipment	BW (MHz)	Freq (MHz)	Port	Freq (MHz)	Lvl (dBm)
Digital Transmission System (DTS)	1	2402.00000	1	2399.975000	-32.940
Digital Transmission System (DTS)	1	2402.00000	1	2399.925000	-33.737
Digital Transmission System (DTS)	1	2402.00000	1	2399.875000	-37.461
Digital Transmission System (DTS)	1	2402.00000	1	2398.925000	-38.208
Digital Transmission System (DTS)	1	2402.00000	1	2398.875000	-38.321
Digital Transmission System (DTS)	1	2402.00000	1	2399.175000	-38.420
Digital Transmission System (DTS)	1	2402.00000	1	2399.625000	-38.643
Digital Transmission System (DTS)	1	2402.00000	1	2399.825000	-38.672
Digital Transmission System (DTS)	1	2402.00000	1	2399.125000	-38.719
Digital Transmission System (DTS)	1	2402.00000	1	2399.575000	-38.807
Digital Transmission System (DTS)	1	2402.00000	1	2399.775000	-38.915
Digital Transmission System (DTS)	1	2402.00000	1	2399.375000	-39.065
Digital Transmission System (DTS)	1	2402.00000	1	2398.975000	-39.145
Digital Transmission System (DTS)	1	2402.00000	1	2399.525000	-39.171
Digital Transmission System (DTS)	1	2402.00000	1	2399.225000	-39.245
Digital Transmission System (DTS)	1	2478.00000	1	2483.875000	-39.025
Digital Transmission System (DTS)	1	2478.00000	1	2483.925000	-39.034
Digital Transmission System (DTS)	1	2478.00000	1	2485.825000	-39.036
Digital Transmission System (DTS)	1	2478.00000	1	2485.775000	-39.096
Digital Transmission System (DTS)	1	2478.00000	1	2484.225000	-39.655
Digital Transmission System (DTS)	1	2478.00000	1	2484.375000	-39.820
Digital Transmission System (DTS)	1	2478.00000	1	2483.975000	-39.895
Digital Transmission System (DTS)	1	2478.00000	1	2490.575000	-39.996
Digital Transmission System (DTS)	1	2478.00000	1	2484.475000	-40.116
Digital Transmission System (DTS)	1	2478.00000	1	2484.925000	-40.185

Equipment	BW (MHz)	Freq (MHz)	Port	Freq (MHz)	Lvl (dBm)
Digital Transmission System (DTS)	1	2478.00000	1	2484.175000	-40.188
Digital Transmission System (DTS)	1	2478.00000	1	2484.325000	-40.257
Digital Transmission System (DTS)	1	2478.00000	1	2490.525000	-40.293
Digital Transmission System (DTS)	1	2478.00000	1	2484.975000	-40.301
Digital Transmission System (DTS)	1	2478.00000	1	2489.375000	-40.350
Digital Transmission System (DTS)	1	2480.00000	1	2483.725000	-38.642
Digital Transmission System (DTS)	1	2480.00000	1	2483.775000	-38.658
Digital Transmission System (DTS)	1	2480.00000	1	2483.625000	-39.735
Digital Transmission System (DTS)	1	2480.00000	1	2483.525000	-40.050
Digital Transmission System (DTS)	1	2480.00000	1	2483.675000	-40.095
Digital Transmission System (DTS)	1	2480.00000	1	2483.825000	-40.156
Digital Transmission System (DTS)	1	2480.00000	1	2483.575000	-40.192
Digital Transmission System (DTS)	1	2480.00000	1	2483.875000	-40.374
Digital Transmission System (DTS)	1	2480.00000	1	2488.625000	-40.731
Digital Transmission System (DTS)	1	2480.00000	1	2488.675000	-40.741
Digital Transmission System (DTS)	1	2480.00000	1	2485.375000	-40.880
Digital Transmission System (DTS)	1	2480.00000	1	2485.425000	-40.976
Digital Transmission System (DTS)	1	2480.00000	1	2483.925000	-41.029
Digital Transmission System (DTS)	1	2480.00000	1	2484.075000	-41.040
Digital Transmission System (DTS)	1	2480.00000	1	2485.075000	-41.110

Verdict

Pass

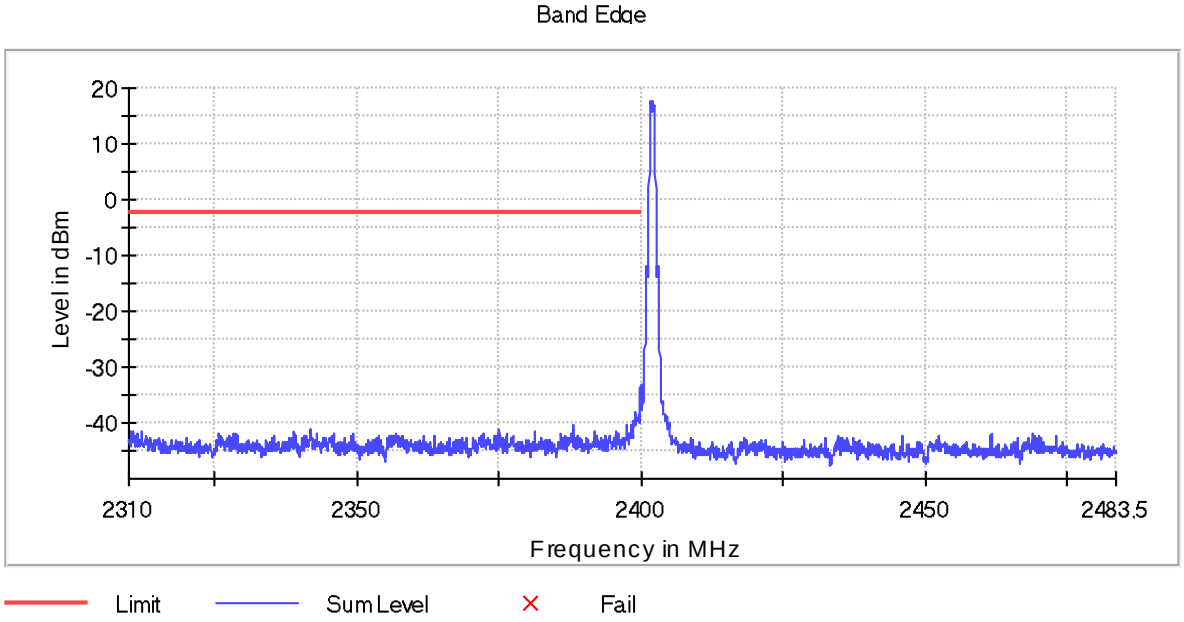
Attachments

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

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

MIMO Mode = SISO Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters 1

Setting	Instrument Value	Target Value
Start Frequency	2.31000 GHz	2.31000 GHz
Stop Frequency	2.40000 GHz	2.40000 GHz
Span	90.000 MHz	90.000 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1800	~ 1800
Sweeptime	113.672 µs	AUTO
Reference Level	20.000 dBm	20.000 dBm
Attenuation	40.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	7 / max. 150	max. 150

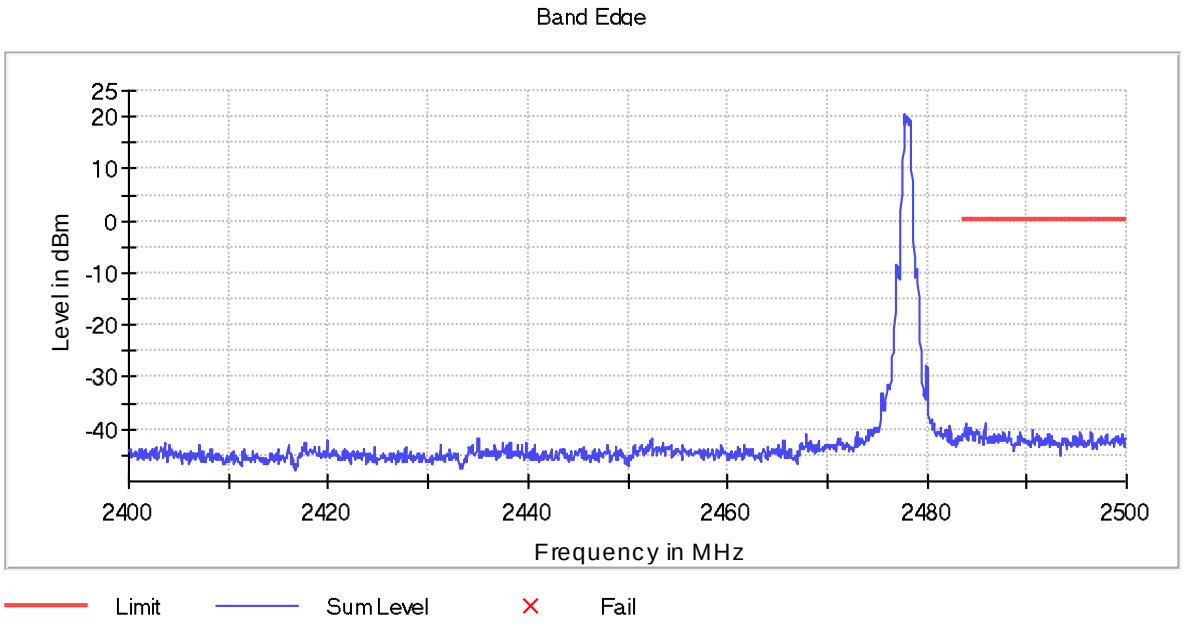
Setting	Instrument Value	Target Value
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

Spectrum Analyzer Parameters 2

Setting	Instrument Value	Target Value
Start Frequency	2.40000 GHz	2.40000 GHz
Stop Frequency	2.48350 GHz	2.48350 GHz
Span	83.500 MHz	83.500 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
Sweeptime	94.727 µs	AUTO
Reference Level	20.000 dBm	20.000 dBm
Attenuation	40.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	8 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.15 dB	0.50 dB

Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 1
Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
Frequency MHz = 2478.00000
MIMO Mode = SISO
Active Port = 1

Images:



Tables:
Spectrum Analyzer Parameters 1

Setting	Instrument Value	Target Value
Start Frequency	2.31000 GHz	2.31000 GHz
Stop Frequency	2.40000 GHz	2.40000 GHz
Span	90.000 MHz	90.000 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1800	~ 1800
Sweeptime	113.672 µs	AUTO
Reference Level	20.000 dBm	20.000 dBm
Attenuation	40.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	7 / max. 150	max. 150
Stable	3 / 3	3

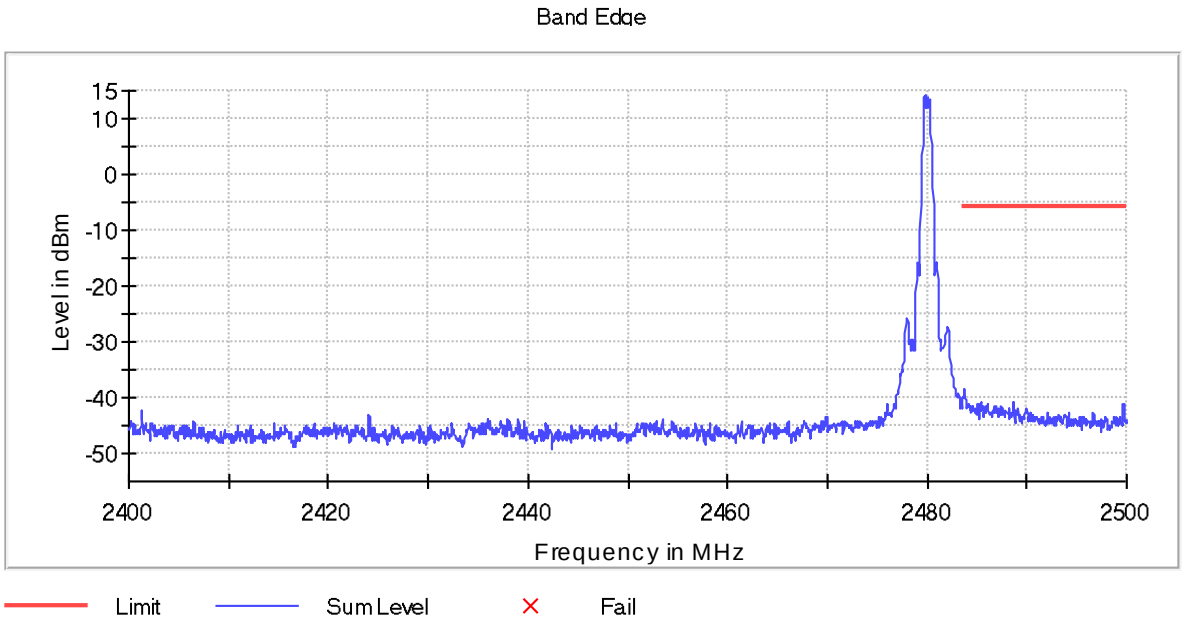
Setting	Instrument Value	Target Value
Max Stable Difference	0.00 dB	0.50 dB

Spectrum Analyzer Parameters 2

Setting	Instrument Value	Target Value
Start Frequency	2.40000 GHz	2.40000 GHz
Stop Frequency	2.48350 GHz	2.48350 GHz
Span	83.500 MHz	83.500 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
Sweeptime	94.727 µs	AUTO
Reference Level	20.000 dBm	20.000 dBm
Attenuation	40.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	8 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.15 dB	0.50 dB

Equipment Type = Digital Transmission System (DTS)
Bandwidth MHz = 1
Modulation = BTLE 5.0 (GFSK 1 Mbit/s)
Frequency MHz = 2480.00000
MIMO Mode = SISO
Active Port = 1

Images:



Tables:
Spectrum Analyzer Parameters 1

Setting	Instrument Value	Target Value
Start Frequency	2.31000 GHz	2.31000 GHz
Stop Frequency	2.40000 GHz	2.40000 GHz
Span	90.000 MHz	90.000 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1800	~ 1800
Sweeptime	113.672 µs	AUTO
Reference Level	20.000 dBm	20.000 dBm
Attenuation	40.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	7 / max. 150	max. 150
Stable	3 / 3	3

Setting	Instrument Value	Target Value
Max Stable Difference	0.00 dB	0.50 dB

Spectrum Analyzer Parameters 2

Setting	Instrument Value	Target Value
Start Frequency	2.40000 GHz	2.40000 GHz
Stop Frequency	2.48350 GHz	2.48350 GHz
Span	83.500 MHz	83.500 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
Sweeptime	94.727 µs	AUTO
Reference Level	20.000 dBm	20.000 dBm
Attenuation	40.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	8 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.15 dB	0.50 dB

Results

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

MIMO Mode: SISO

Equipment	BW (MHz)	Freq (MHz)	Port	Freq (MHz)	Lvl (dBm)
Digital Transmission System (DTS)	2	2402.00000	1	2399.975000	-20.368
Digital Transmission System (DTS)	2	2402.00000	1	2399.925000	-21.781
Digital Transmission System (DTS)	2	2402.00000	1	2399.875000	-25.923
Digital Transmission System (DTS)	2	2402.00000	1	2399.825000	-28.204
Digital Transmission System (DTS)	2	2402.00000	1	2399.675000	-28.875
Digital Transmission System (DTS)	2	2402.00000	1	2399.625000	-29.084
Digital Transmission System (DTS)	2	2402.00000	1	2399.725000	-30.080
Digital Transmission System (DTS)	2	2402.00000	1	2399.775000	-30.133
Digital Transmission System (DTS)	2	2402.00000	1	2399.575000	-30.526
Digital Transmission System (DTS)	2	2402.00000	1	2399.525000	-30.827
Digital Transmission System (DTS)	2	2402.00000	1	2399.475000	-30.935
Digital Transmission System (DTS)	2	2402.00000	1	2399.425000	-32.553
Digital Transmission System (DTS)	2	2402.00000	1	2399.375000	-32.963
Digital Transmission System (DTS)	2	2402.00000	1	2399.325000	-33.675
Digital Transmission System (DTS)	2	2402.00000	1	2399.275000	-33.702
Digital Transmission System (DTS)	2	2478.00000	1	2483.975000	-38.770
Digital Transmission System (DTS)	2	2478.00000		2484.025000	-38.948
Digital Transmission System (DTS)	2	2478.00000		2485.825000	-39.125
Digital Transmission System (DTS)	2	2478.00000		2484.225000	-39.162
Digital Transmission System (DTS)	2	2478.00000		2486.125000	-39.238
Digital Transmission System (DTS)	2	2478.00000		2484.175000	-39.245
Digital Transmission System (DTS)	2	2478.00000		2483.775000	-39.326
Digital Transmission System (DTS)	2	2478.00000		2483.725000	-39.332
Digital Transmission System (DTS)	2	2478.00000		2483.825000	-39.456
Digital Transmission System (DTS)	2	2478.00000		2486.175000	-39.485
Digital Transmission System (DTS)	2	2478.00000		2483.575000	-39.506
Digital Transmission System (DTS)	2	2478.00000		2485.775000	-39.747
Digital Transmission System (DTS)	2	2478.00000		2485.875000	-39.781
Digital Transmission System (DTS)	2	2478.00000		2484.325000	-39.783
Digital Transmission System (DTS)	2	2478.00000		2485.075000	-39.864
Digital Transmission System (DTS)	2	2480.00000	1	2484.025000	-39.472
Digital Transmission System (DTS)	2	2480.00000	1	2483.975000	-39.613
Digital Transmission System (DTS)	2	2480.00000	1	2483.525000	-39.650

Equipment	BW (MHz)	Freq (MHz)	Port	Freq (MHz)	Lvl (dBm)
Digital Transmission System (DTS)	2	2480.00000	1	2483.575000	-39.722
Digital Transmission System (DTS)	2	2480.00000	1	2483.625000	-39.916
Digital Transmission System (DTS)	2	2480.00000	1	2483.825000	-39.988
Digital Transmission System (DTS)	2	2480.00000	1	2484.675000	-40.076
Digital Transmission System (DTS)	2	2480.00000	1	2484.975000	-40.095
Digital Transmission System (DTS)	2	2480.00000	1	2484.625000	-40.125
Digital Transmission System (DTS)	2	2480.00000	1	2484.925000	-40.193
Digital Transmission System (DTS)	2	2480.00000	1	2486.425000	-40.407
Digital Transmission System (DTS)	2	2480.00000	1	2483.925000	-40.409
Digital Transmission System (DTS)	2	2480.00000	1	2485.875000	-40.432
Digital Transmission System (DTS)	2	2480.00000	1	2486.475000	-40.484
Digital Transmission System (DTS)	2	2480.00000	1	2483.875000	-40.497

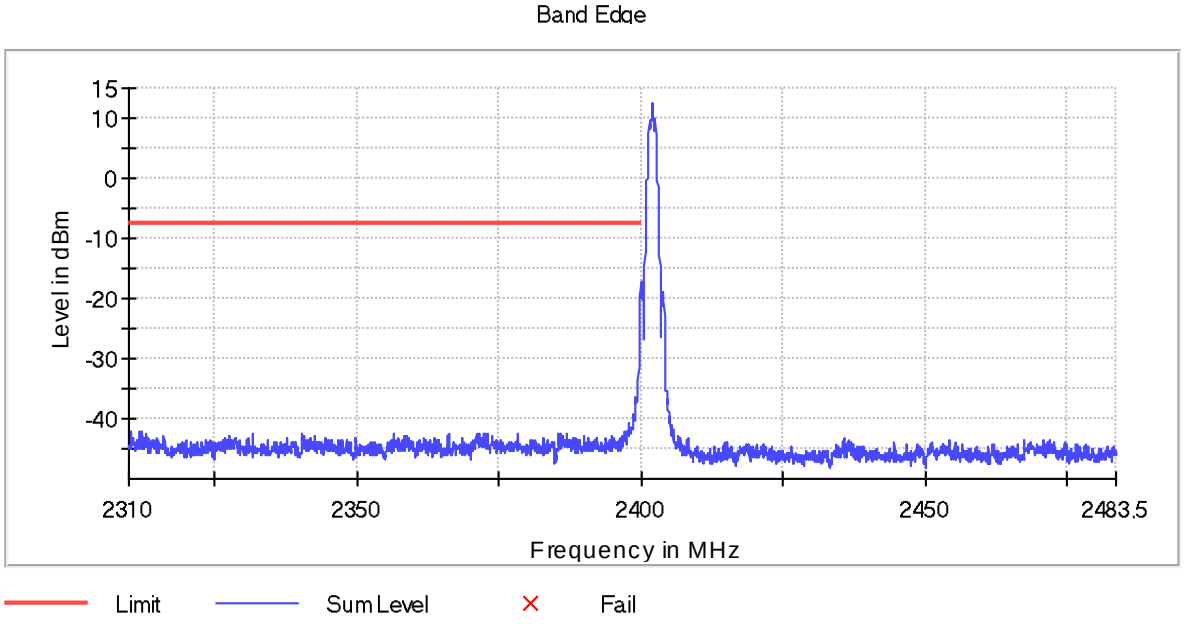
Verdict

Pass

Attachments

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

Images:



Tables:

Spectrum Analyzer Parameters 1

Setting	Instrument Value	Target Value
Start Frequency	2.31000 GHz	2.31000 GHz
Stop Frequency	2.40000 GHz	2.40000 GHz
Span	90.000 MHz	90.000 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1800	~ 1800
Sweeptime	113.672 µs	AUTO
Reference Level	20.000 dBm	20.000 dBm
Attenuation	40.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.22 dB	0.50 dB

Spectrum Analyzer Parameters 2

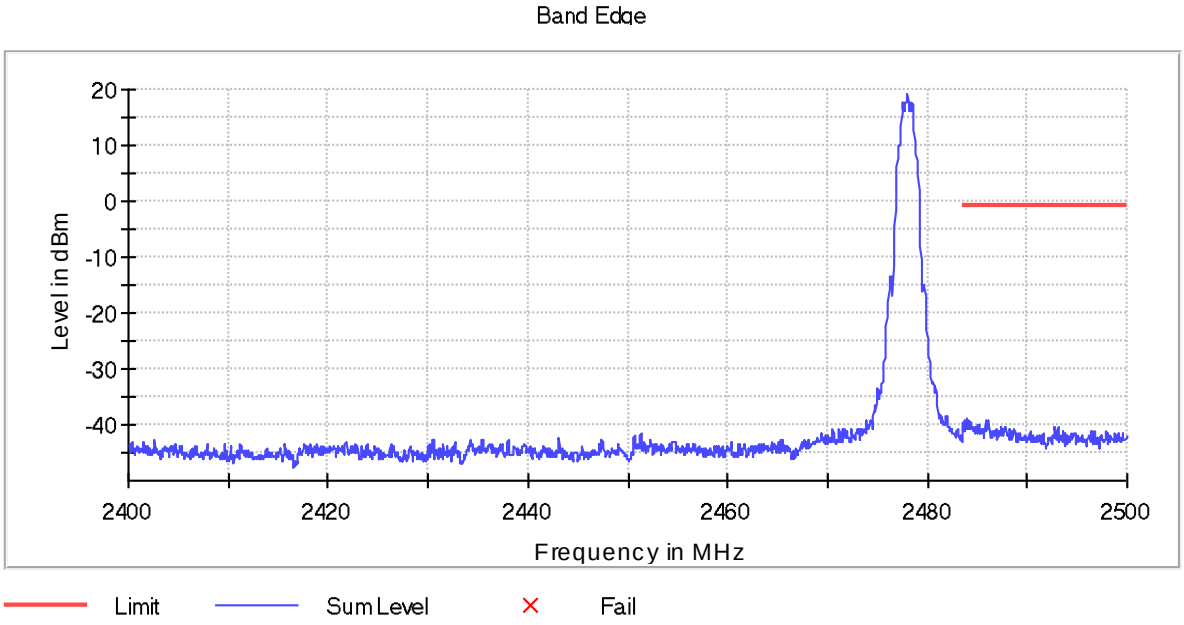
Setting	Instrument Value	Target Value
Start Frequency	2.40000 GHz	2.40000 GHz
Stop Frequency	2.48350 GHz	2.48350 GHz
Span	83.500 MHz	83.500 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
Sweeptime	94.727 µs	AUTO
Reference Level	20.000 dBm	20.000 dBm
Attenuation	40.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	15 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.07 dB	0.50 dB

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

Modulation = BTLE 5.0 (GFSK 2 Mbit/s) Frequency MHz = 2478.00000

MIMO Mode = SISO Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters 1

Setting	Instrument Value	Target Value
Start Frequency	2.31000 GHz	2.31000 GHz
Stop Frequency	2.40000 GHz	2.40000 GHz
Span	90.000 MHz	90.000 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1800	~ 1800
Sweeptime	113.672 µs	AUTO
Reference Level	20.000 dBm	20.000 dBm
Attenuation	40.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3

Setting	Instrument Value	Target Value
Max Stable Difference	0.22 dB	0.50 dB

Spectrum Analyzer Parameters 2

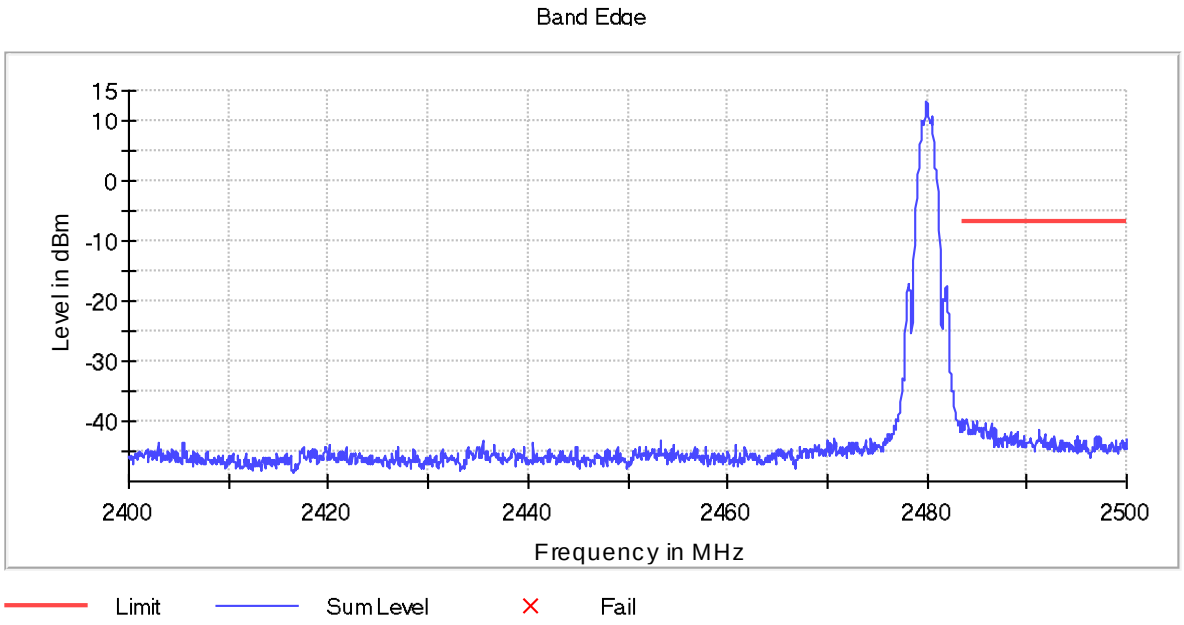
Setting	Instrument Value	Target Value
Start Frequency	2.40000 GHz	2.40000 GHz
Stop Frequency	2.48350 GHz	2.48350 GHz
Span	83.500 MHz	83.500 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
Sweeptime	94.727 µs	AUTO
Reference Level	20.000 dBm	20.000 dBm
Attenuation	40.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	15 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.07 dB	0.50 dB

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

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

MIMO Mode = SISO Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters 1

Setting	Instrument Value	Target Value
Start Frequency	2.31000 GHz	2.31000 GHz
Stop Frequency	2.40000 GHz	2.40000 GHz
Span	90.000 MHz	90.000 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1800	~ 1800
Sweeptime	113.672 µs	AUTO
Reference Level	20.000 dBm	20.000 dBm
Attenuation	40.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3

Setting	Instrument Value	Target Value
Max Stable Difference	0.22 dB	0.50 dB

Spectrum Analyzer Parameters 2

Setting	Instrument Value	Target Value
Start Frequency	2.40000 GHz	2.40000 GHz
Stop Frequency	2.48350 GHz	2.48350 GHz
Span	83.500 MHz	83.500 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
Sweeptime	94.727 µs	AUTO
Reference Level	20.000 dBm	20.000 dBm
Attenuation	40.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	15 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.07 dB	0.50 dB

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.

Frequency range tested for Radiated emissions:

Start frequency: no radiofrequency signal generated in the device found below 10th sub-harmonic, no further investigation required.
Stop frequency: it has been performed the radiated spurious emissions until 10th harmonic.

Verdict

Pass

Results

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

MIMO Mode: SISO

Attachments

Spectrum analyzer parameter:

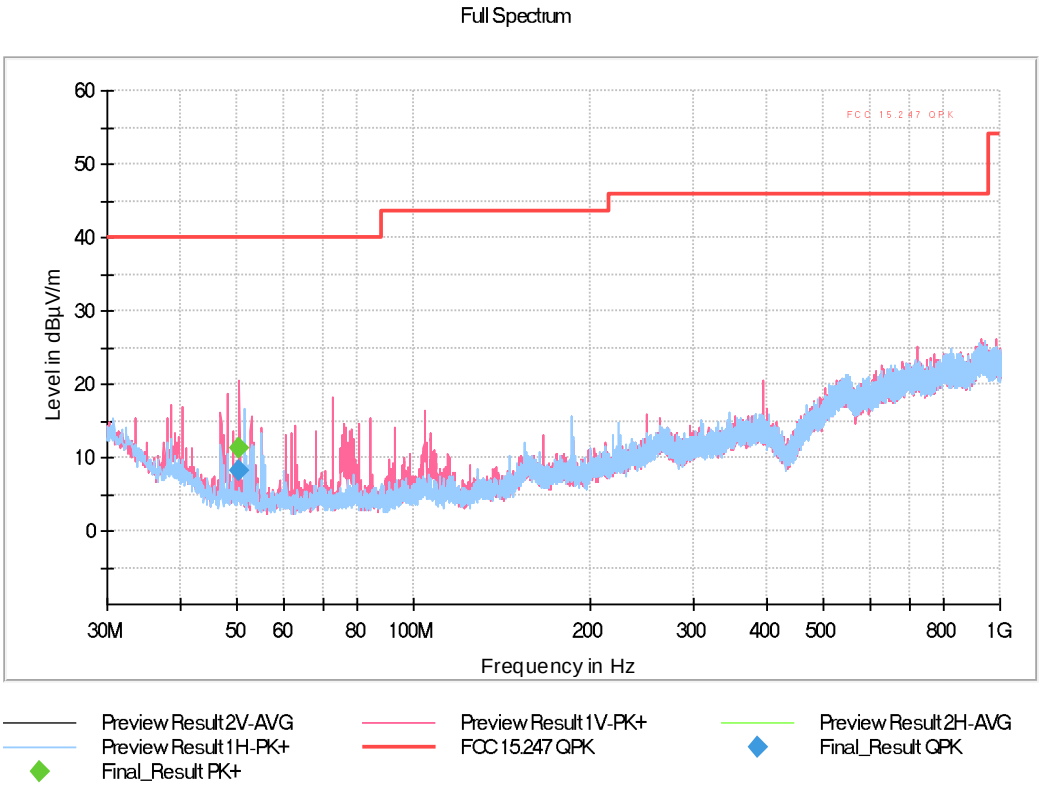
Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [ESW 44]					
30 MHz - 1 GHz	9,7 kHz	PK+	100 kHz	1 s	0 dB
1 GHz - 3 GHz	20 kHz	PK+ ; AVG	1 MHz	1 s	0 dB
3 GHz - 17 GHz	140 kHz	PK+ ; AVG	1 MHz	1 s	0 dB
17 GHz - 26 GHz	300 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

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

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

MIMO Mode = SISO Active Port = 1

Images:

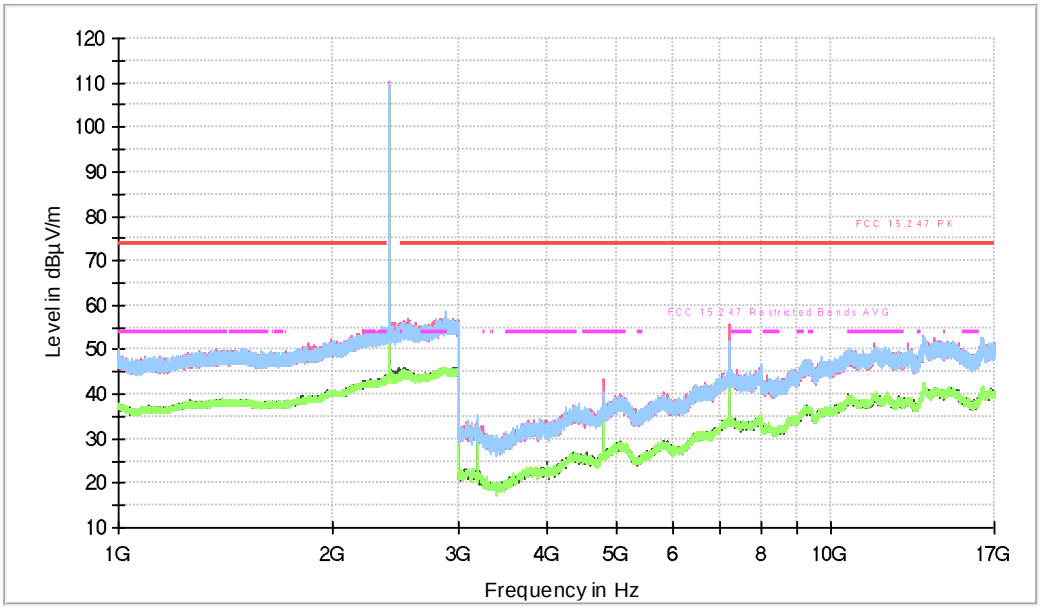


Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
50.467000	8.21	---	40.00	31.79	100.0	V	49.0
50.467000	---	11.40	---	---	100.0	V	49.0

Frequency Range GHz = [1, 17]	Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE 5.0 (GFSK 1 Mbit/s)	Frequency MHz = 2402.00000
MIMO Mode = SISO	Active Port = 1

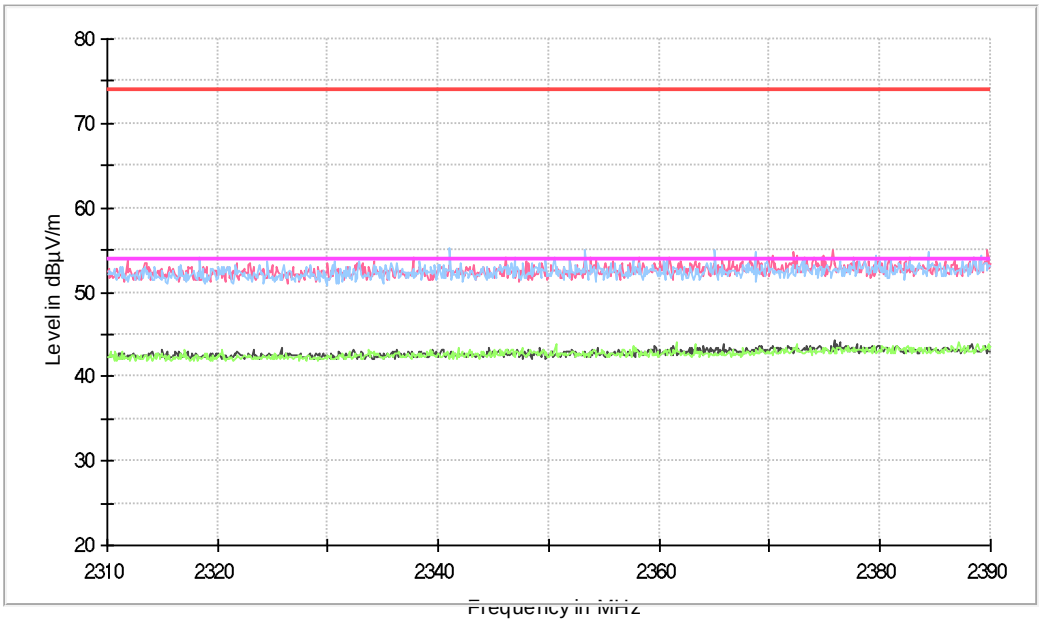
Images:

Full Spectrum



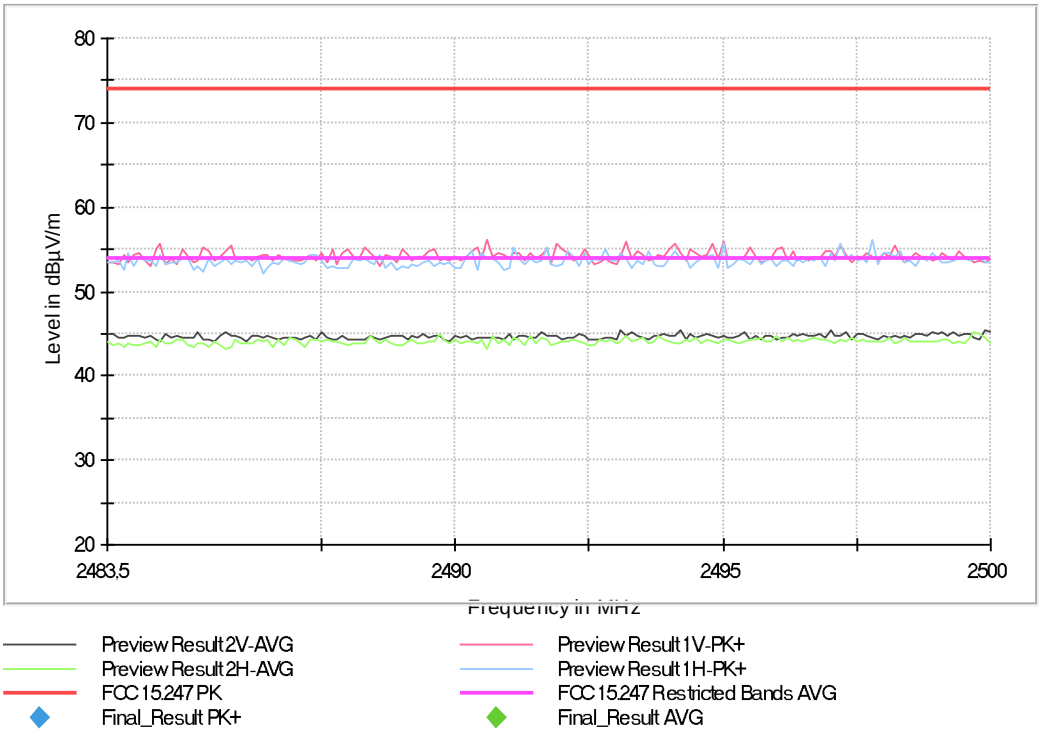
Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

Full Spectrum



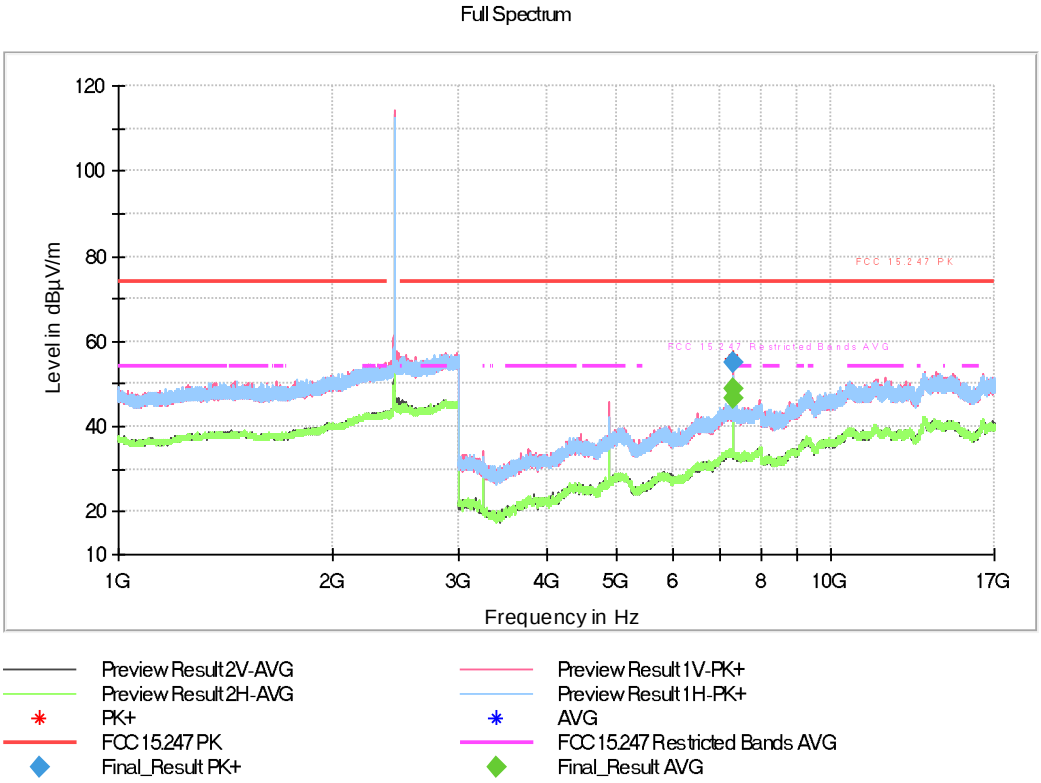
Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

Full Spectrum



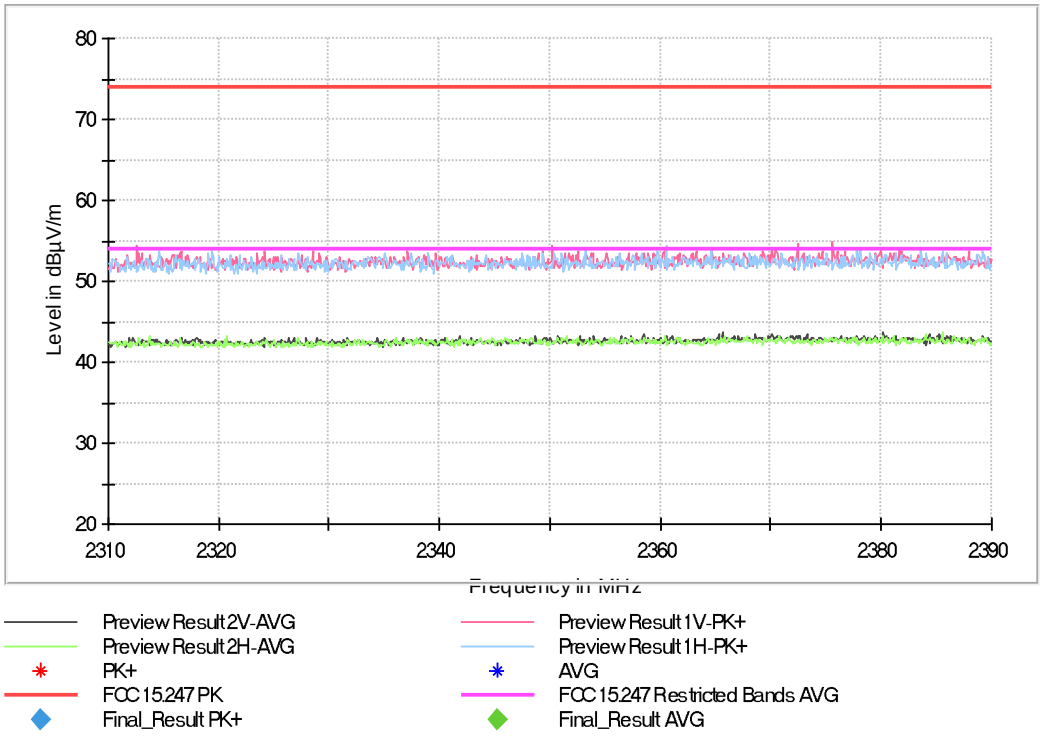
Frequency Range GHz = [1, 17]	Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE 5.0 (GFSK 1 Mbit/s)	Frequency MHz = The spurious frequencies detected do not depend on the transmission channel
MIMO Mode = SISO	Active Port = 1

Images:



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
7320.400000	---	48.91	54.00	5.09	1000.000	208.0	V	285.0
7320.400000	55.00	46.69	74.00	19.00	1000.000	208.0	V	285.0

Full Spectrum



Full Spectrum