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

ISED CABid: ES1909

Test Report No:
NIE: 69323RRF.002

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

(*) Identification of item tested	TCAM: Telematics and Connectivity Antenna Module
(*) Trademark	Continental
(*) Model and /or type reference	TCAM1NA2
Other identification of the product	HW version: E4.4 SW version: 11.16.11 FCC ID: KR5TCAM1NA2 IC: 7812D-TCAM1NA2
(*) Features	2G, 3G, LTE, GNSS, WLAN, BLE, ISM Receiver
Manufacturer	Continental Automotive GmbH Siemensstrasse 12, 93055 Regensburg, Germany
Test method requested, standard	USA FCC Part 15.247 (10-1-20 Edition): Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. USA FCC Part 15.209 (10-1-20 Edition): Radiated emission limits; general requirements. CANADA RSS-247 Issue 2 (February 2017). CANADA RSS-Gen Issue 5 amendment 1 (March 2019). Guidance for Performing Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid Systems Devices Operating Under Section 15.247 of the FCC Rules. 558074 D01 Meas Guidance v05r02 dated April 2, 2019. ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Rafael López EMC Consumer & RF Lab. Manager 2021.11.04 13:41:33 +01'00'
Date of issue	2021-11-04
Report template No	FDT08_23 (*) "Data provided by the client"

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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.

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

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

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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.
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Uncertainty

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

Data provided by the client

The following data has been provided by the client:

Identification of item tested	TCAM: Telematics and Connectivity Antenna Module
Trademark (Brand name)	Continental
Model name	TCAM1NA2
Detailed description of product:	TCAM1NA2: The TCAM is a vehicle antenna module for telematic and connectivity purposes. It consists of a fin antenna with integrated telematics transceivers for different wireless services as well as several interfaces to the vehicle. The TCAM1NA2 main parts are: Antennas for cellular, WLAN, BLE, ISM receiver (RKE), SDARS with LNA GNSS with LNA for Navigation: Beidou, Galileo, GPS, Glonass Antenna selection via RF switches TCAM

	internal antennas (all are TCAM internal, no extern antenna connections): Tel1 ant: 2G, 3G, 4G/LTE1 (vehicle outside) Tel2 ant: LTE2 (Rx only) (vehicle outside) MIMO with LTE1- and LTE2-antenna. LTE2 is Rx only Backup telephone antenna: 2G, 3G, 4G/LTE (vehicle inside) Wi-Fi internal antenna (vehicle inside) Wi-Fi external antenna (vehicle outside) BLE antenna (vehicle outside) Stacked patch antenna featuring GNSS ISM receiver antenna SDARS antenna CAT4 NAD with 2G/3G/4G/LTE and GNSS, FCC certified VoLTE ISM receiver module (434MHz) for: RKE (Remote Keyless Entry), PASE (Passive Start and Entry, TPMS (Tire Pressure Monitoring System), FCC tested Wi-Fi chip BLE chip 1st internal embedded Sim-IC Service calls External interfaces: Main power supply External backup battery External SIM card slot (2nd private customer SIM, optional) External microphone in the OHC (Overhead Compartment) A2B External backup speaker BroadR-Reach CEM connection (K-Line) Infotainment CAN Airbag input Debug interfaces (USB, UART)

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.

- Sample S/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
69323/015	Telematics and Connectivity Antenna Module	TCAM1NA2	00076370	2021/07/30
59830B/225	Harness	--	--	2021/02/24

Sample S/01 has undergone the following test(s): All RADIATED tests indicated in Appendix A.

- Sample S/02 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
69323/038	Telematics and Connectivity Antenna Module	TCAM1NA2	00076375	2021/09/10
59830B/225	Harness	--	--	2021/02/24

Sample S/02 has undergone the following test(s): All CONDUCTED tests indicated in Appendix A.

Test sample description

<table>
<tr><td rowspan="5">Ports…… :</td><td rowspan="2">Port name and description</td><td colspan="4">Cable</td></tr>
<tr><td>Specified max length [m]</td><td>Attached during test</td><td>Shielded</td><td>Coupled to patient(3)</td></tr>
<tr><td>USB diagnostic</td><td>~3m</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>UART diagnostic</td><td>~3m</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>BRR diagnostic</td><td>~3m</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>Supplementary information to the ports…… :</td><td colspan="5">---</td></tr>
<tr><td rowspan="3">Rated power supply .....:</td><td colspan="2" rowspan="2">Voltage and Frequency</td><td colspan="4">Reference poles</td></tr>
<tr><td>L1</td><td>L2</td><td>L3</td><td>N</td><td>PE</td></tr>
<tr><td>☐</td><td>AC:</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>☒</td><td colspan="5">DC: 12V</td></tr>
<tr><td>Rated Power .....:</td><td colspan="5">4.2 W dc (cellular, Wi-Fi, BLE, GNSS active)</td></tr>
</table>

Clock frequencies.....:	32.768kHz, 16MHz, 19.2MHz, 24MHz, 25MHz, 27.6MHz, 48MHz		
Other parameters .....:	Operating temperature Range: -10°C to 55°C Supply Voltage Range: 8 V to 16 V DC		
Software version .....:	11.16.11		
Hardware version .....:	E4.4		
Dimensions in cm (W x H x D) ....:	10.5cm x 15.5cm x 9cm		
Mounting position .....:	☐	Table top equipment	
	☐	Wall/Ceiling mounted equipment	
	☐	Floor standing equipment	
	☐	Hand-held equipment	
	☒	Other: Vehicular environment equipment	
Modules/parts.....:	Module/parts of test item	Type	Manufacturer
	Network Access Device (NAD), (cellular, GNSS)	Model: BL28NA-RD1	Continental Automotive Systems
	ISM/RKE 434 MHz RF receiver module	Model: A2C38291300	Continental Automotive Systems
Accessories (not part of the test item) .....:	Description	Type	Manufacturer
	1-2 x test harnesses with USB 1 x test harness without USB (if necessary)		Continental
	Laptop (if necessary)	Elite Book	HP
	BLE eval board (if necessary)		TI
	Load boxes (if necessary)	Multiple	Multiple
Documents as provided by the applicant.....:	Description	File name	Issue date
	RF guide	21cw12_TCAM_Country_RF_Manual	
	Functional Guide	User Guide for Functional Testing on Component Level 2	
	Additional Guides (if necessary)	multiple	

(3) Only for Medical Equipment

Identification of the client

Continental Automotive GmbH
Siemensstrasse 12, 93055 Regensburg, Germany

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2021-08-02
Date (finish)	2021-09-15

Document history

Report number	Date	Description
69323RRF.002	2021-11-04	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: Alfonso Gutiérrez Martínez, Cristina Calle Villarrazo and Javier Miguel Nadales Lisbona.

Used instrumentation:

Conducted Measurements

		Last Calibration	Due Calibration
1.	Shielded Room ETS LINDGREN S101	N/A	N/A
2.	Signal and Spectrum Analyzer 10 Hz - 40 GHz ROHDE AND SCHWARZ FSV40	2021/02	2023/02
3.	Open Switch Unit up to 7.5GHz ROHDE AND SCHWARZ OSP-B157W8 PLUS	2021/08	2023/08
4.	Open Switch Unit up to 40 GHz ROHDE AND SCHWARZ OSP-B157Wx	2019/10	2021/10
5.	Analog Power Supply DC 40V/40A ROHDE AND SCHWARZ NGPE 40/40	N/A	N/A
6.	Digital Multimeter FLUKE 175	2020/11	2021/11

Radiated Measurements:

		Last Calibration	Due Calibration
1.	Semianechoic Absorber Lined Chamber ETS LINDGREN FACT 3 200 STP	N/A	N/A
2.	Shielded Room ETS LINDGREN S101	N/A	N/A
3.	Biconical/Log Antenna 30 MHz - 6 GHz ETS LINDGREN 3142E	2020/04	2023/04
4.	Preamplifier G>40dB 10MHz-6GHz, BONN ELEKTRONIK, BLNA 0160-01N	2021/03	2022/03
5.	EMI Test Receiver, 9kHz-7GHz, ROHDE AND SCHWARZ ESR7	2020/12	2022/12
6.	Horn Antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2019/11	2022/11
7.	RF Preamplifier, G>40 dB ,1-18 GHz BONN ELEKTRONIK BLMA 0118-1M	2021/06	2022/06
8.	Horn Antenna 18-40 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9170	2020/05	2023/05
9	RF Preamplifier, G>30 dB ,18-40 GHz BONN ELEKTRONIK BLMA 1840-3G	2019/11	2021/11
10.	Spectrum Analyzer ROHDE AND SCHWARZ FSW50	2020/07	2022/07
11.	DC Power Supply, 30V/5A KEYSIGHT TECHNOLOGIES U8002A	N/A	N/A
12.	Digital Multimeter FLUKE 175	2020/11	2021/11

Testing verdicts

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

Summary

Bluetooth Low Energy 5.0 (1M)

Requirement – Test case	FCC PART 15 PARAGRAPH / RSS-247	Verdict	Remark
RSS-247 5.2 (a) / FCC 15.247 (a) (2) 6 dB Bandwidth		Pass	
RSS-247 5.4 (d) / FCC 15.247 (b) (3) Maximum Peak Conducted output power		Pass	
RSS-247 5.5 / FCC 15.247 (d) Band-edge emissions compliance (Transmitter)		Pass	
RSS-247 5.5 / FCC 15.247 (d) Emission limitations radiated (Transmitter)		Pass	
99dBw Occupied Channel Bandwidth 99%		Pass	
Supplementary information and remarks: None			

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

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TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal:	12 V DC
Type of Power Supply:	Power supply

ANTENNA (*):

Type of Antenna:	Integral
Maximum Declared Antenna Gain:	2.1dBi

TEST FREQUENCIES (*):

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

CONDUCTED MEASUREMENTS:

The equipment under test was set up in a shielded room and it is connected to the TS8997 using a low loss RF cable. The reading of the spectrum analyser is corrected taking into account the cable loss.

RADIATED MEASUREMENTS:

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Bilog antenna for the range between 30 MHz to 1000 MHz and 1 GHz-17 GHz Double ridge horn antenna) is situated at a distance of 3 m and at a distance of 1 m for the frequency range 17 GHz-26 GHz (antenna and 18 GHz-40 GHz horn antenna).

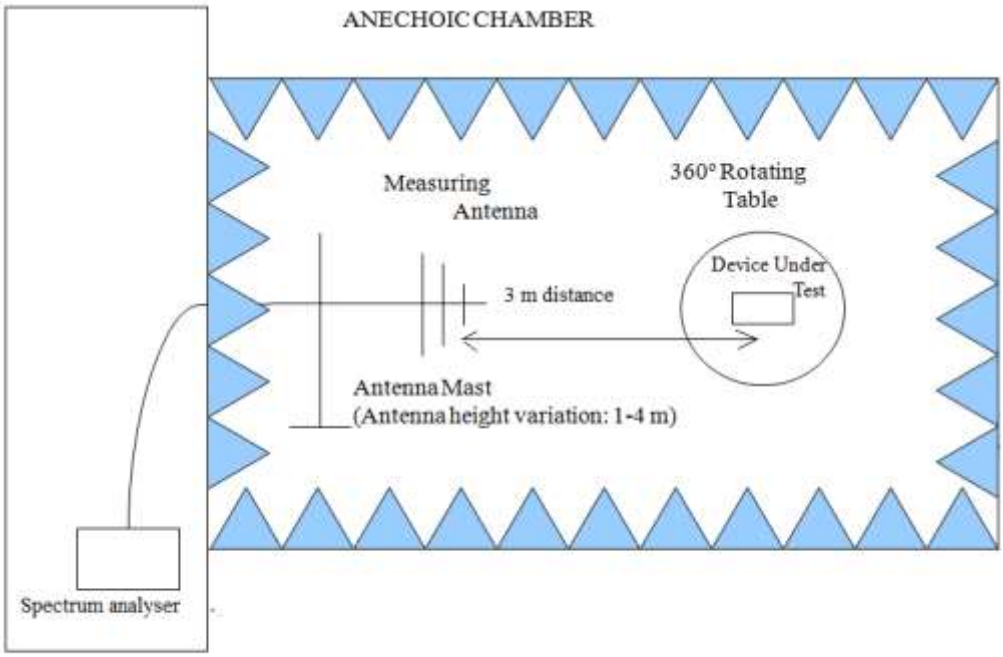
For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

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.

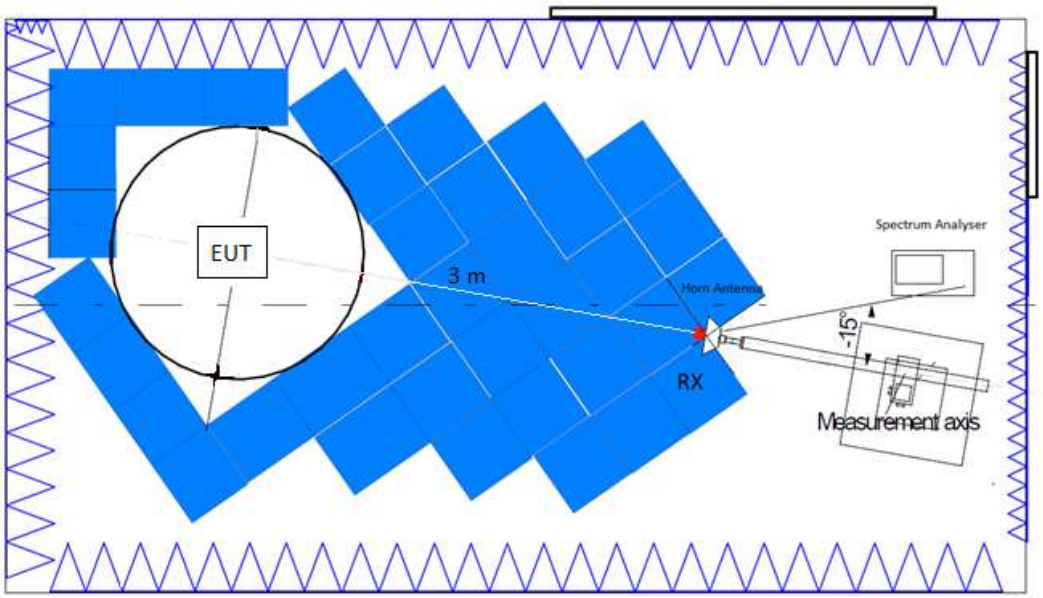
Measurements were made in both horizontal and vertical planes of polarization.

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.

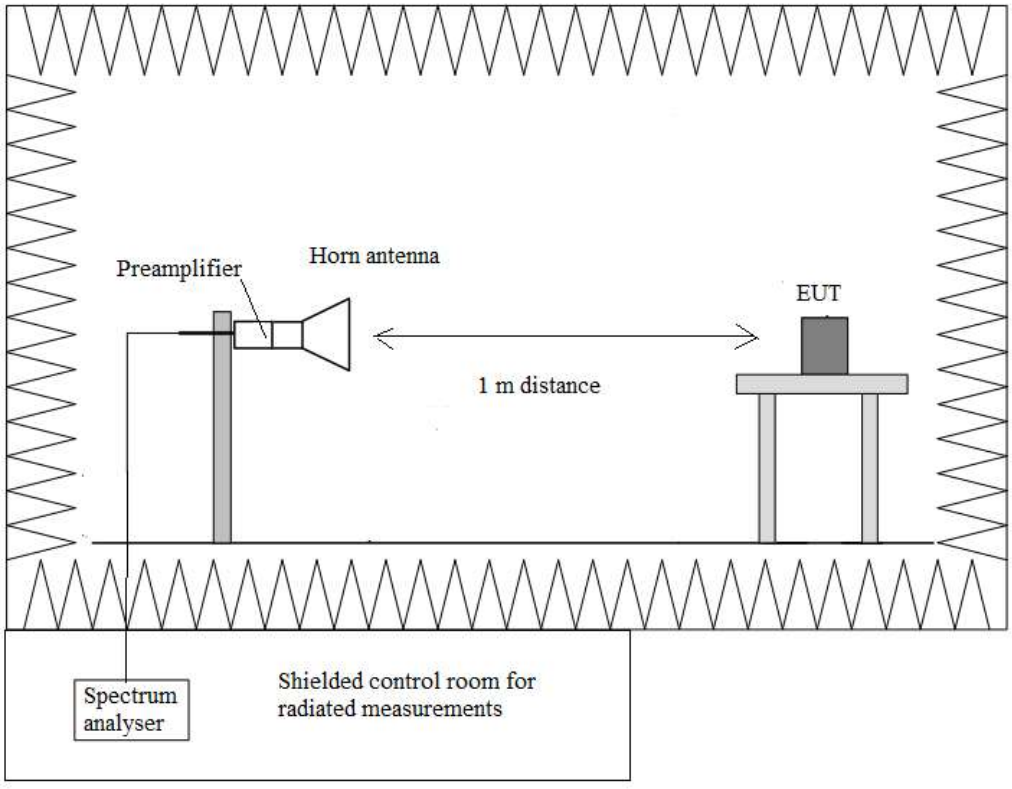
Radiated measurements setup from 30 MHz to 1 GHz:


ANECHOIC CHAMBER
Measuring Antenna
360° Rotating Table
Device Under Test
3 m distance
Antenna Mast
(Antenna height variation: 1-4 m)
Spectrum analyser
Shielded Control Room For Radiated Measurements

Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup f > 17 GHz:



TEST CASES DETAILS

FCC 47 CFR Part 15.247 / RSS-247

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

Limits

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

Results

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Operation Band (MHz)	Equipment	Freq (MHz)	6dBw (MHz)
[2400, 2483.5]	Digital Transmission System (DTS)	2402.00	0.732674
[2400, 2483.5]	Digital Transmission System (DTS)	2440.00	0.732674
[2400, 2483.5]	Digital Transmission System (DTS)	2480.00	0.772278

Verdict

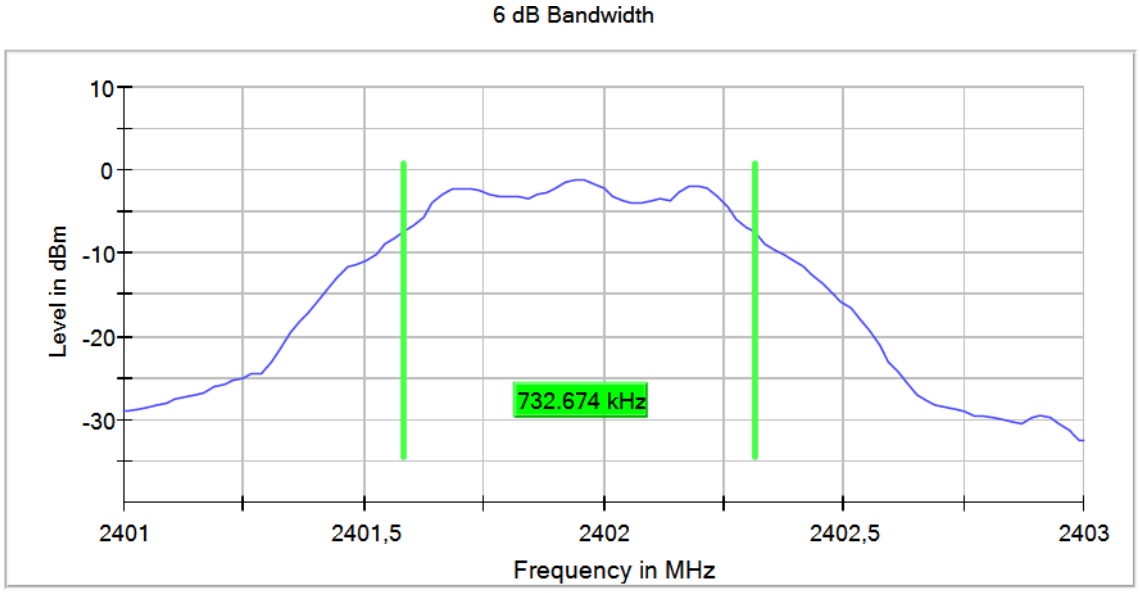
Pass

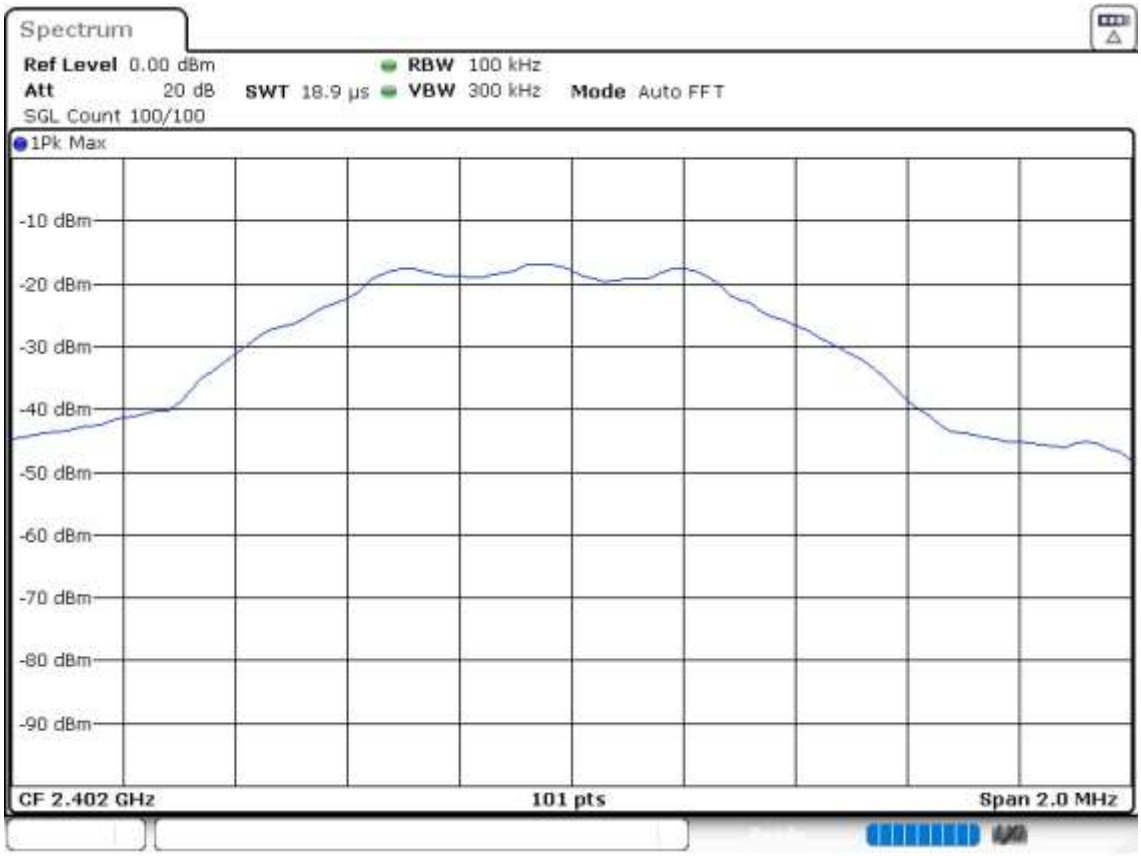
Uncertainty 1.40%

Attachments

Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2402.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Available Number of Channels = 1

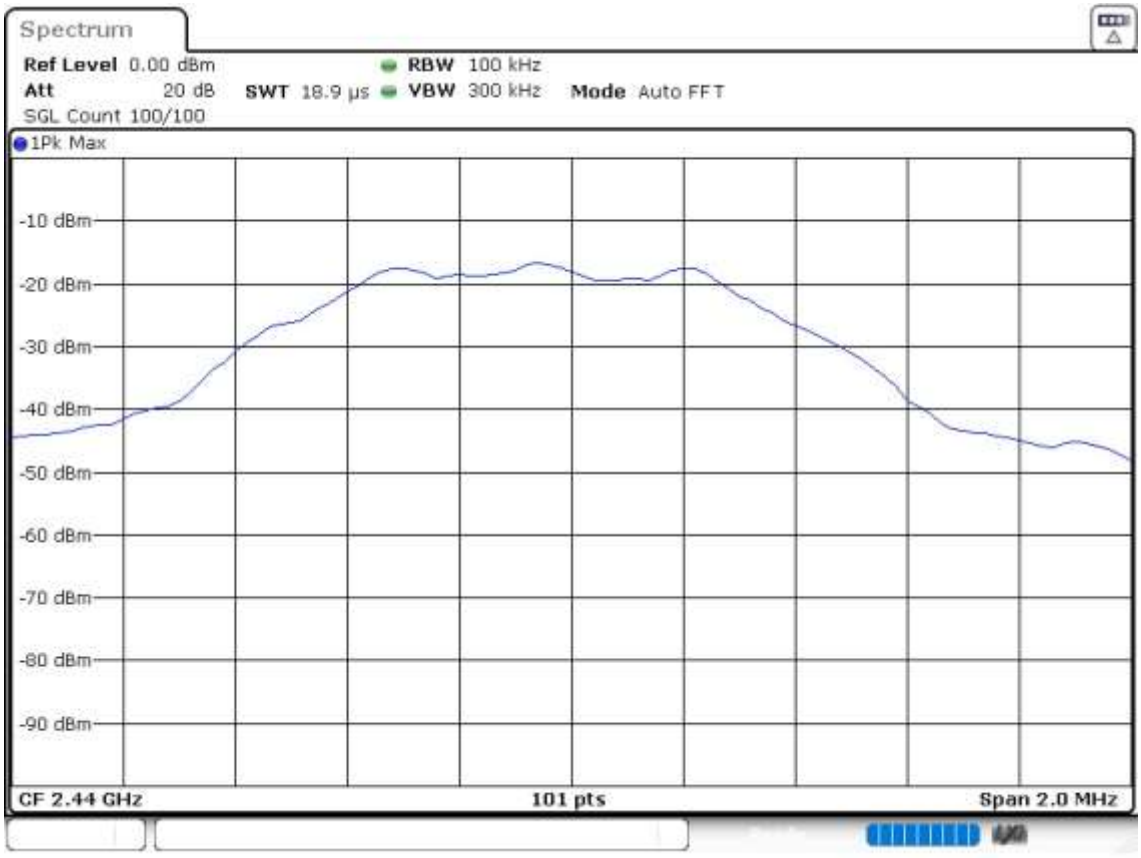
Images:



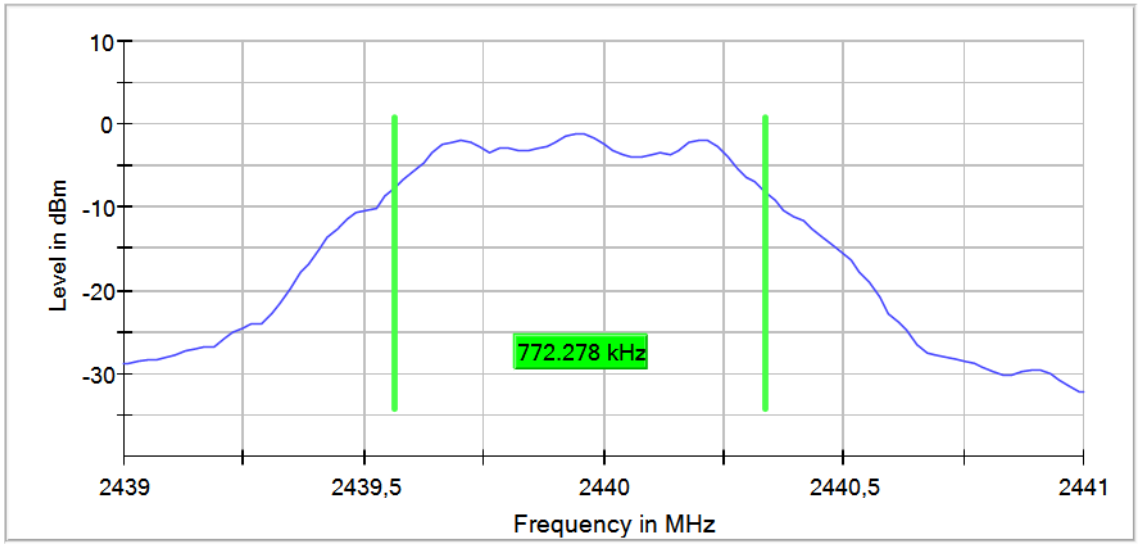


Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2440.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Available Number of Channels = 1

Images:

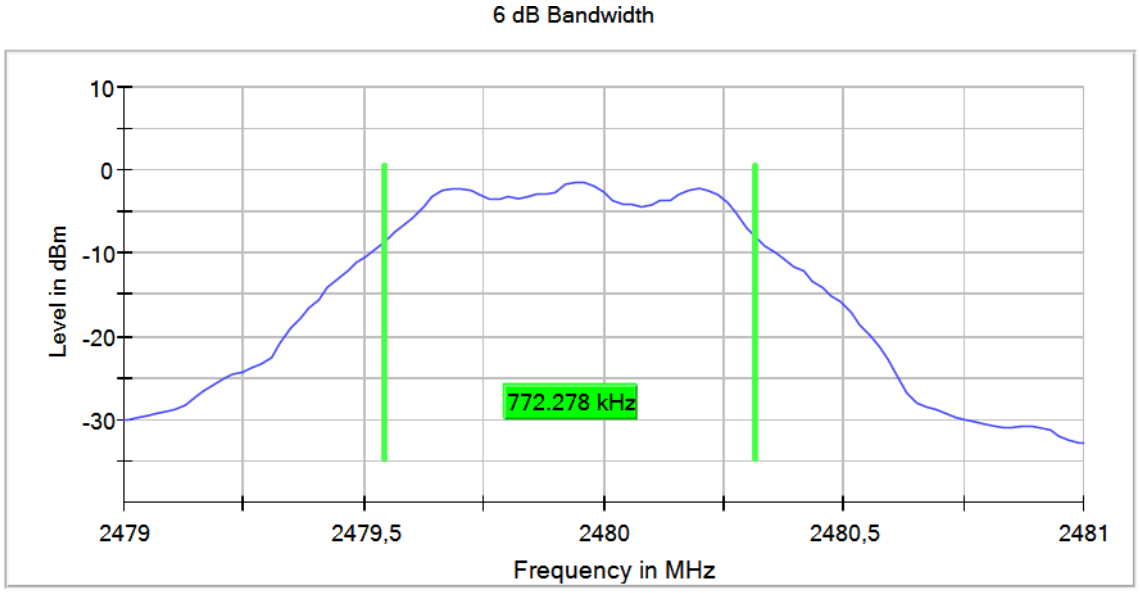


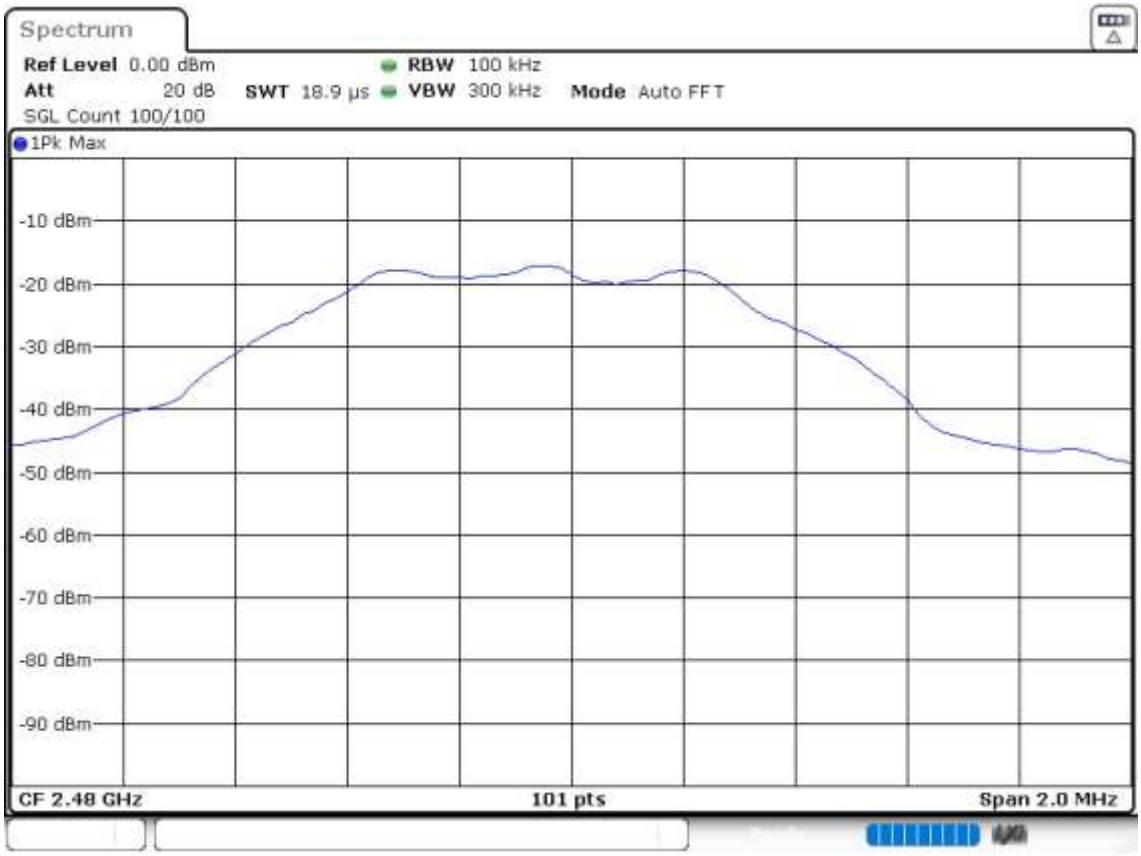
6 dB Bandwidth



Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2480.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Available Number of Channels = 1

Images:





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

Limits

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

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

Results

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

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

Maximum Declared Antenna Gain: 2.1 dBi

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Operation Band (MHz)	Equipment	Freq (MHz)	Max Conducted Power (dBm)	Max E.I.R.P (dBm)
[2400, 2483.5]	Digital Transmission System (DTS)	2402.00	-1.0	1.1
[2400, 2483.5]	Digital Transmission System (DTS)	2440.00	-1.0	1.1
[2400, 2483.5]	Digital Transmission System (DTS)	2480.00	-1.1	1

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

Verdict

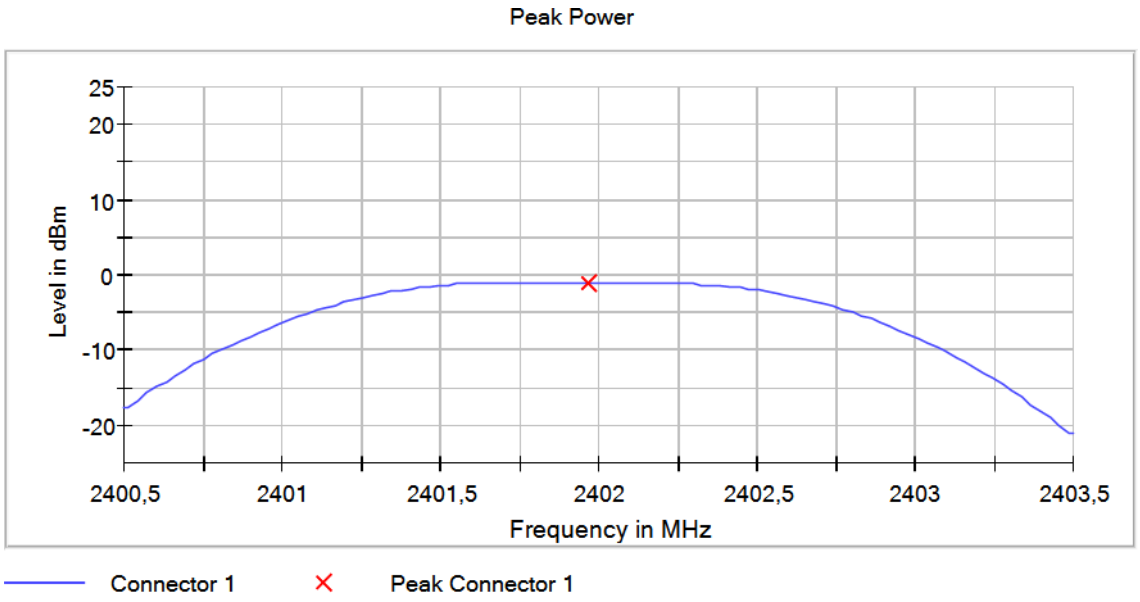
Pass

Uncertainty 0.99dB

Attachments

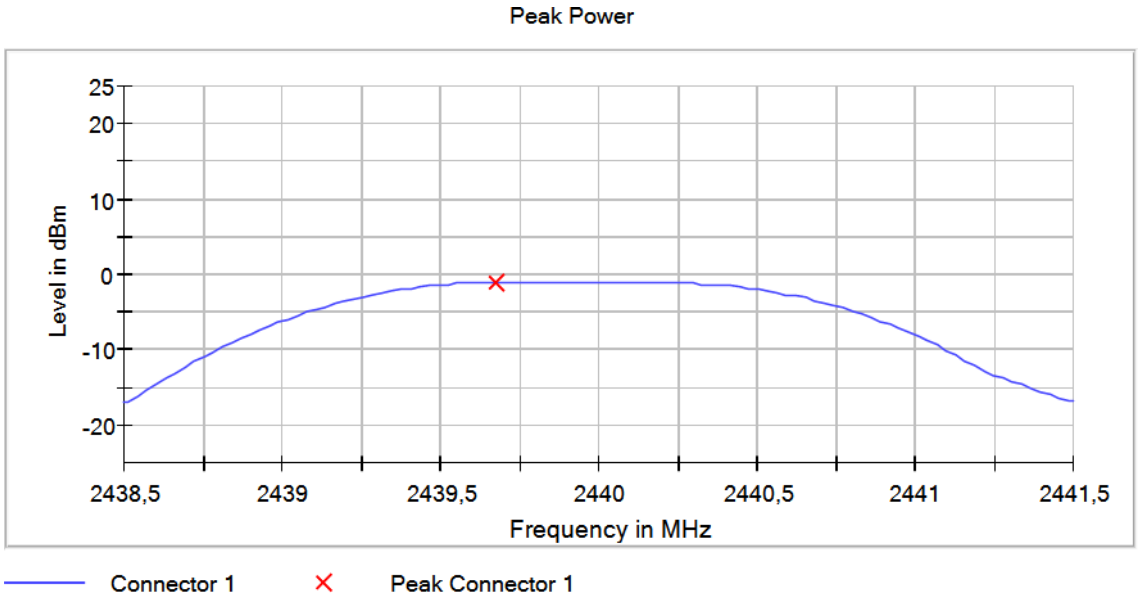
Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2402.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Available Number of Channels = 1

Images:



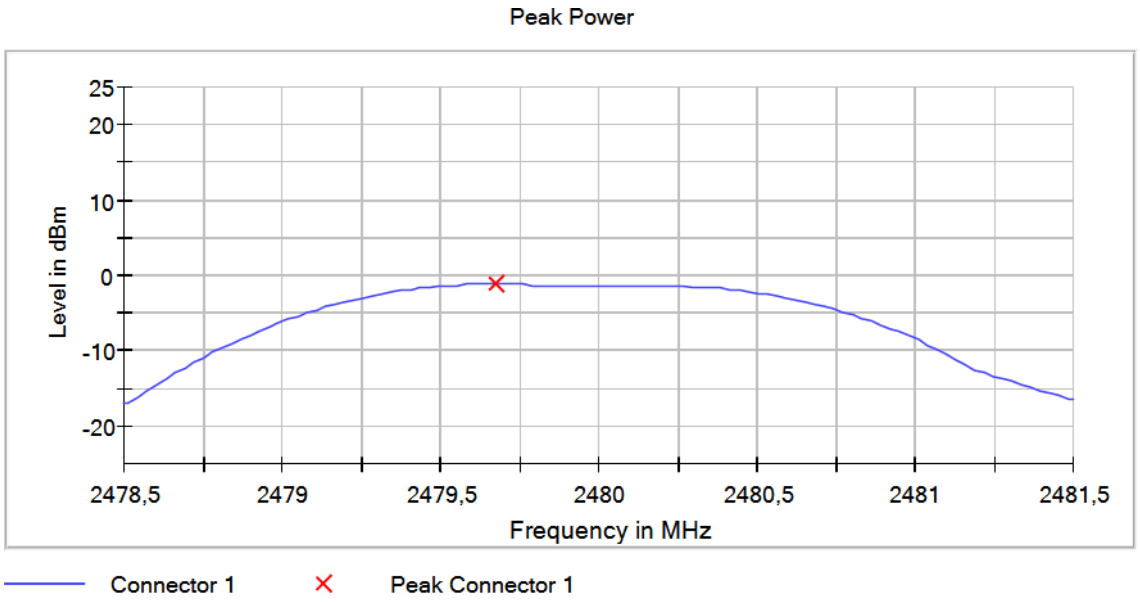
Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2440.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Available Number of Channels = 1

Images:



Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2480.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Available Number of Channels = 1

Images:



RSS-247 5.2 (b) / FCC 15.247 (e) Power Spectral Density

Limits

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

Results

The maximum power spectral density level in the fundamental emission was measured using the method according to point 11.10.2." Method PKPSD (peak PSD)" of ANSI C.63.10-2013.

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Operation Band (MHz)	Equipment	Freq (MHz)	Power Spectral Density (dBm)
[2400, 2483.5]	Digital Transmission System (DTS)	2402.00	-6.89
[2400, 2483.5]	Digital Transmission System (DTS)	2440.00	-6.94
[2400, 2483.5]	Digital Transmission System (DTS)	2480.00	-7.37

Verdict

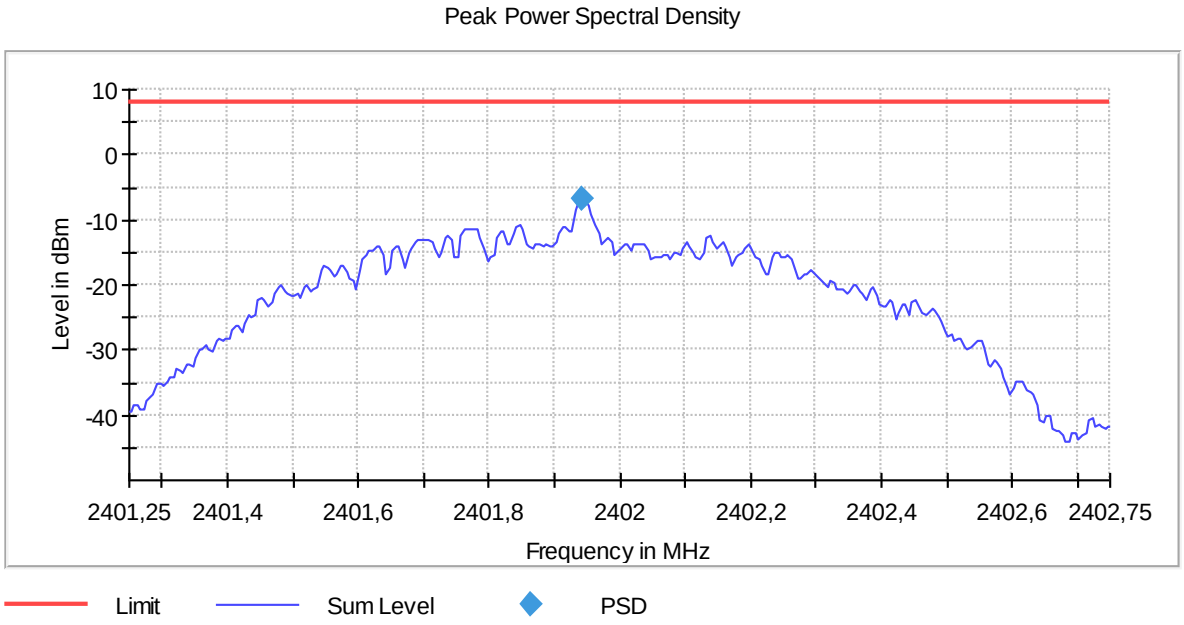
Pass

Uncertainty 0.99dB

Attachments

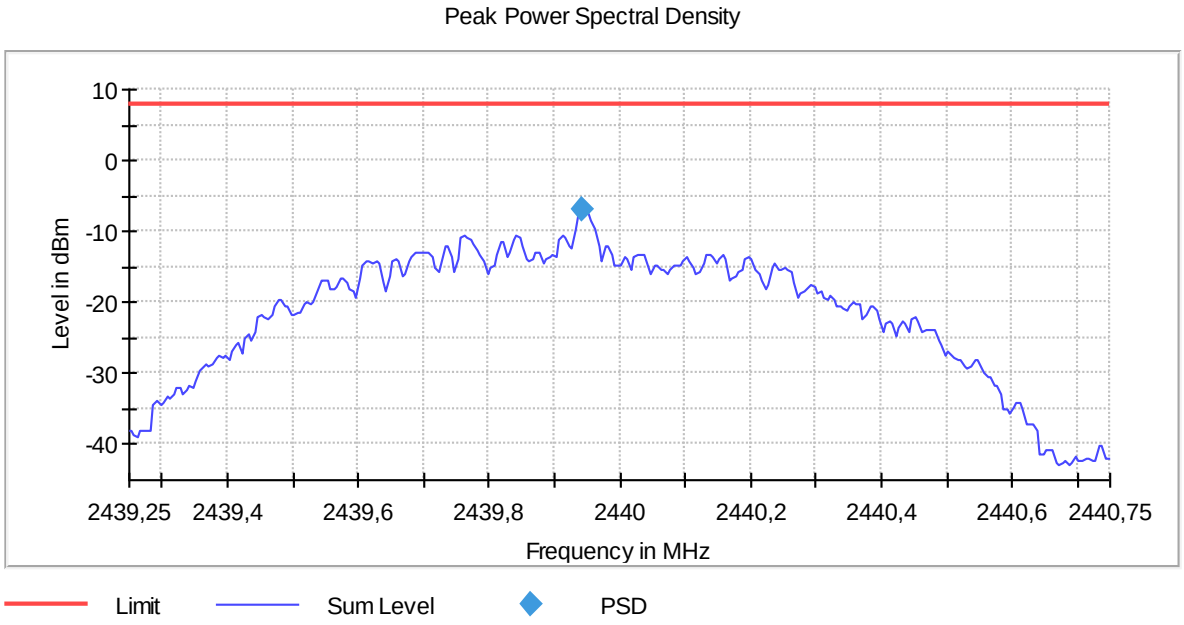
Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2402.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Available Number of Channels = 1

Images:



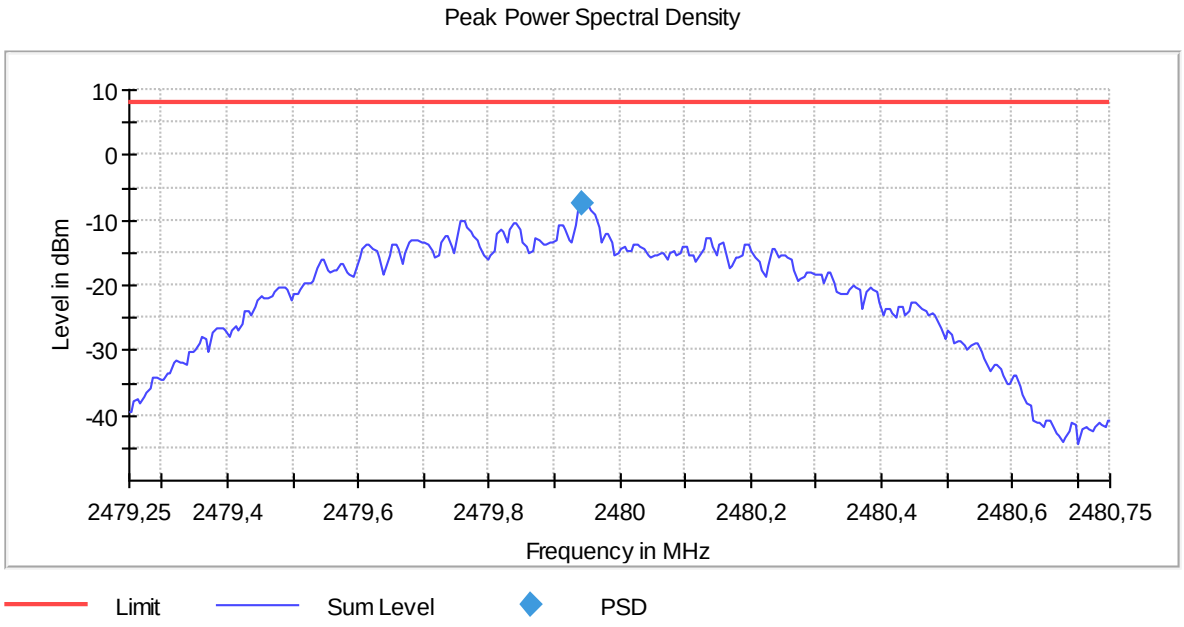
Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2440.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Available Number of Channels = 1

Images:



Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2480.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Available Number of Channels = 1

Images:



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

Limits

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

Results

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Verdict

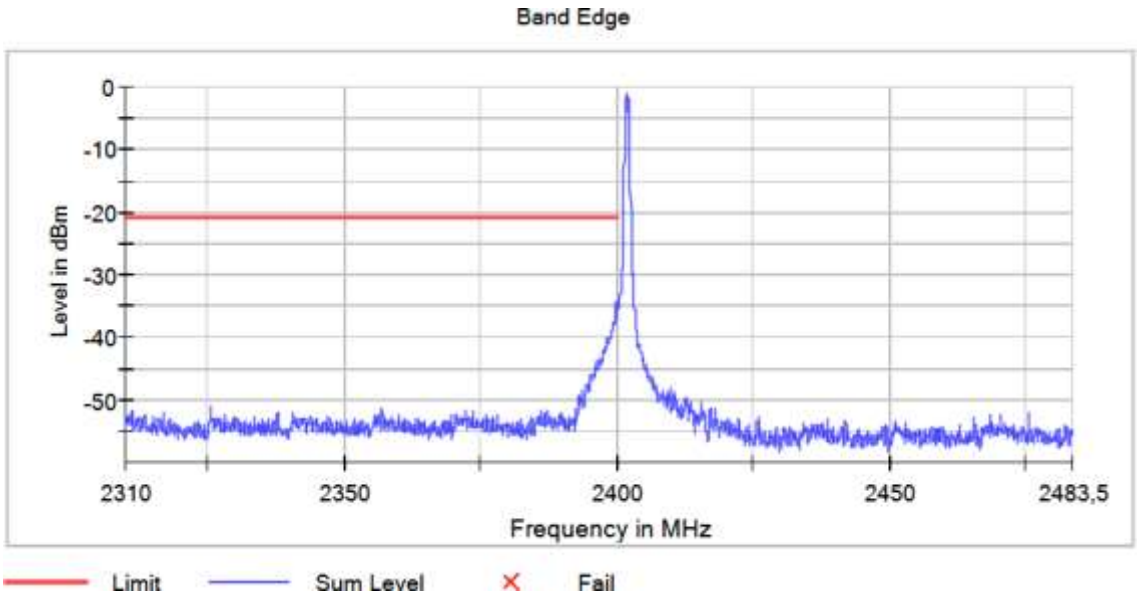
Pass

Uncertainty 0.89dB

Attachments

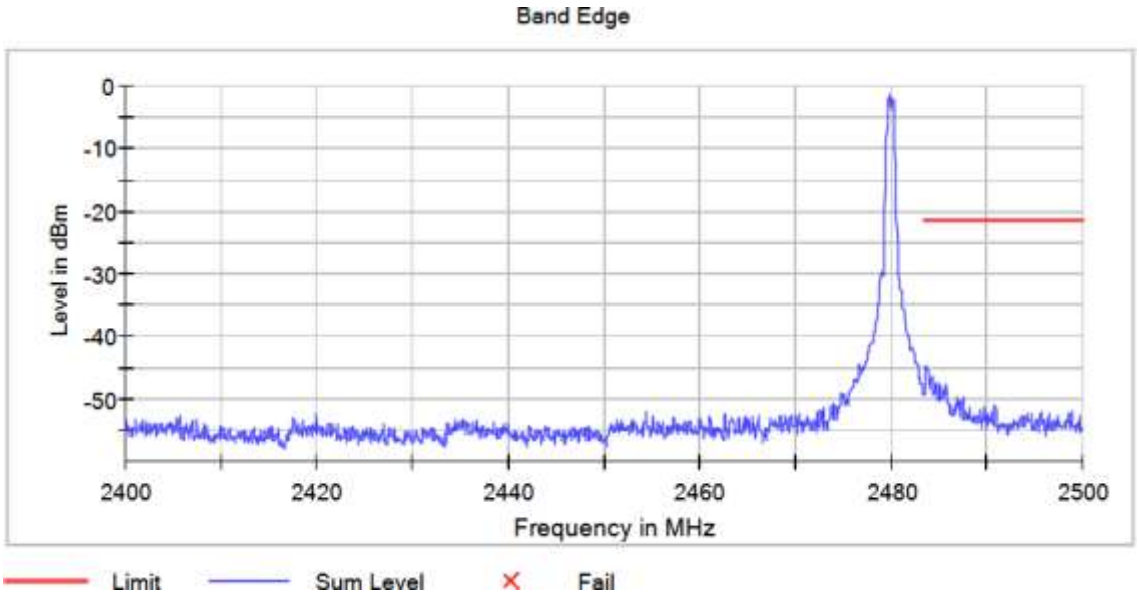
Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2402.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Available Number of Channels = 1, Measurement Point = 1

Images:



Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2480.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Available Number of Channels = 1, Measurement Point = 1

Images:



RSS-247 5.5 / FCC 15.247 (d) Emission limitations radiated (Transmitter)

Limits

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)/RSS-Gen):

Frequency Range (MHz)	Field strength (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
960 - 10000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RSS-247: Attenuation below the general field strength limits specified in RSS-Gen is not required.

Results

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

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

All tests were performed in a semi-anechoic chamber at a distance of 3m for the frequency range 30 MHz-17 GHz and a distance of 1m for frequency range 17 GHz-26 GHz.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Frequency range 30 MHz - 1 GHz

The spurious emissions below 1 GHz do not depend on either the operating channel or the modulation mode selected in the EUT.

Spurious frequencies detected at less than 20 dB below the limit.

Spurious frequency (MHz)	Emission Level (dBµV/m)	Polarization	Detector
287.971500	31.54	H	Quasi-Peak
384.001500	29.43	H	Quasi-Peak
687.514500	27.59	H	Quasi-Peak
959.987500	27.25	V	Quasi-Peak

Frequency range 1 - 26 GHz

The results in the next tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

Spurious frequencies with peak levels above the average limit (54 dBµV/m at 3 m) are measured with average detector for checking compliance with the average limit.

- **Mode BLE 1Mbps**

- LOW CHANNEL. Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector
2.3892	58.74	H	Peak
	45.70		Avg
2.4966	59.47	H	Peak
	46.51		Avg
4.8030	44.64	V	Peak
7.2065	51.96	H	Peak

- MIDDLE CHANNEL. Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector
2.3894	58.59	H	Peak
	45.73		Avg
2.4932	59.74	H	Peak
	46.50		Avg
4.8795	45.15	V	Peak

- HIGH CHANNEL. Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector
2.3758	58.92	H	Peak
	45.72		Avg
2.4835	66.37	V	Peak
	46.61		Avg
2.4840	65.64	V	Peak
	46.58		Avg
4.9595	41.90	V	Peak
7.4405	52.06	V	Peak

Verdict

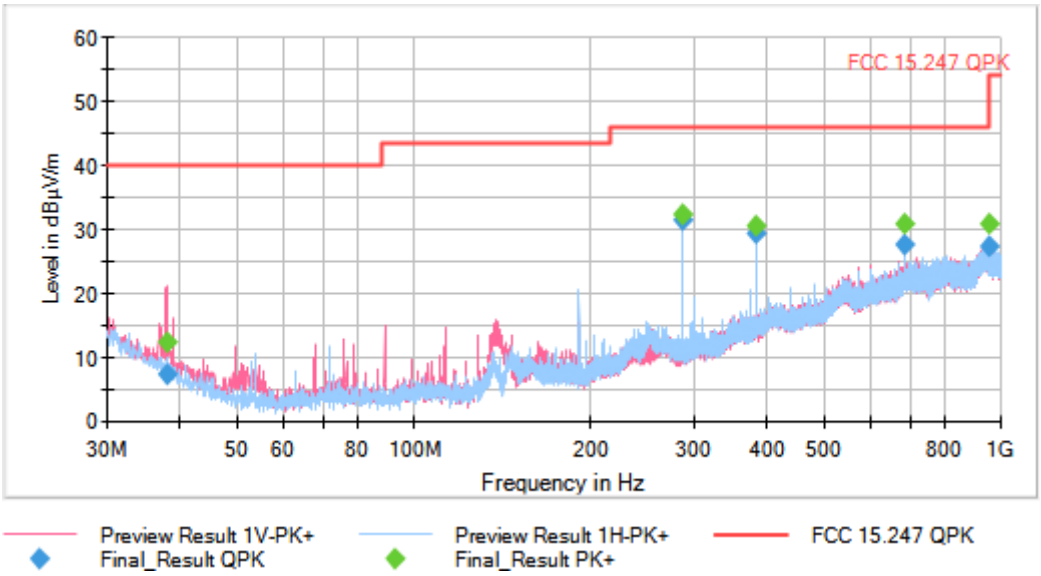
Pass

Measurement Uncertainty (dB) 30MHz to 1GHz <±4.99
1GHz to 17GHz<±4.98
17GHz to 26GHz <±5.08
26GHz to 40GHz <±5.13

Attachments

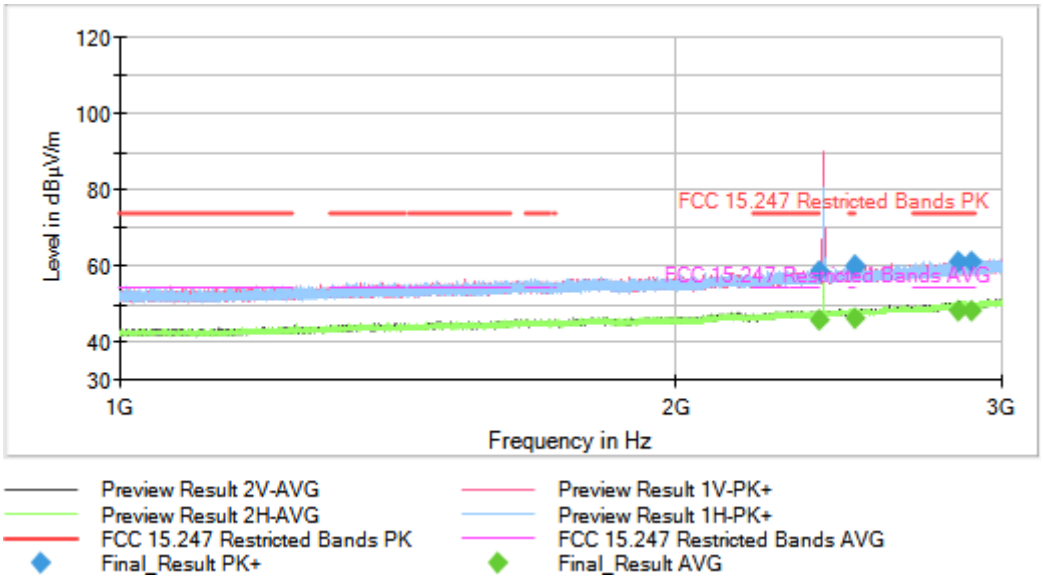
Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [0.03, 1], Number of Transmission Chains = 1, Available Number of Channels = 1, Detector used = QP, Measurement Point = 1

Images:

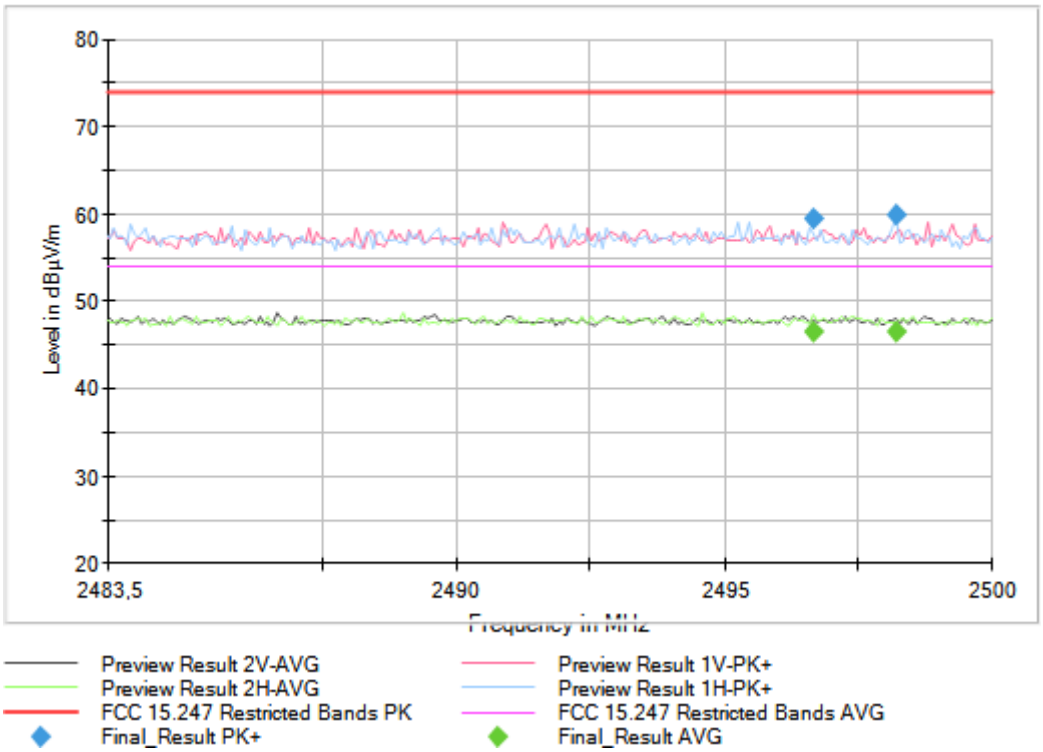


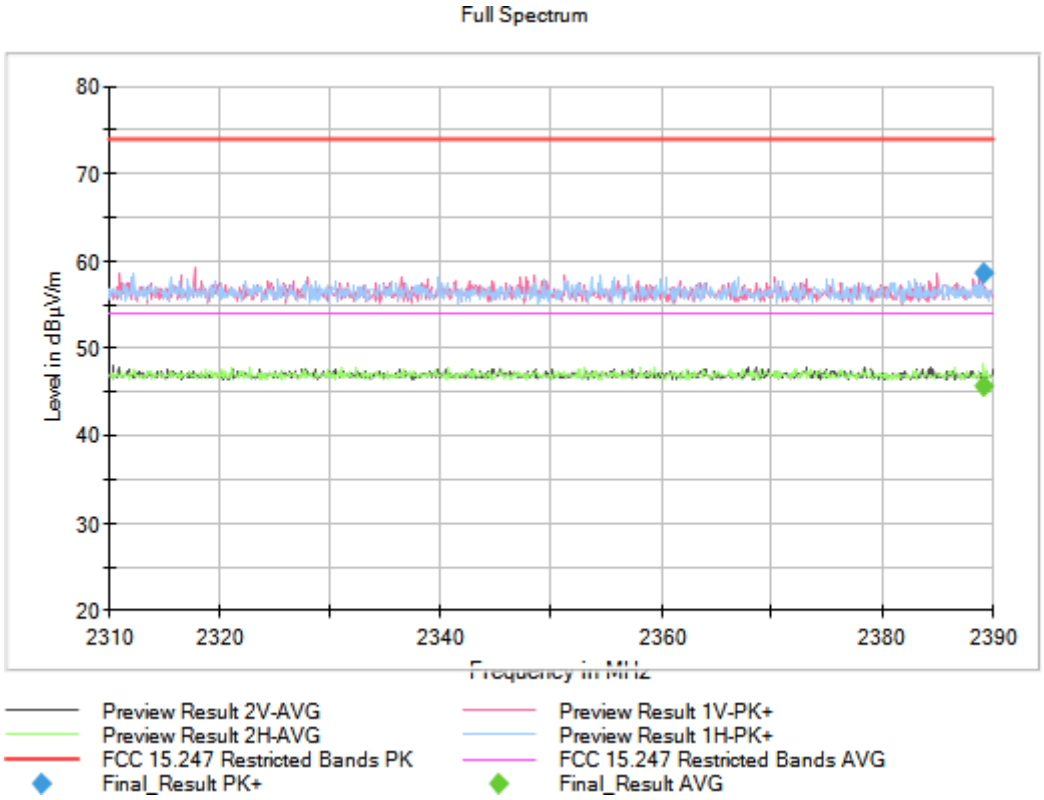
Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2402.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [1, 3], Number of Transmission Chains = 1, Available Number of Channels = 1, Detector used = AVG, Measurement Point = 1

Images:

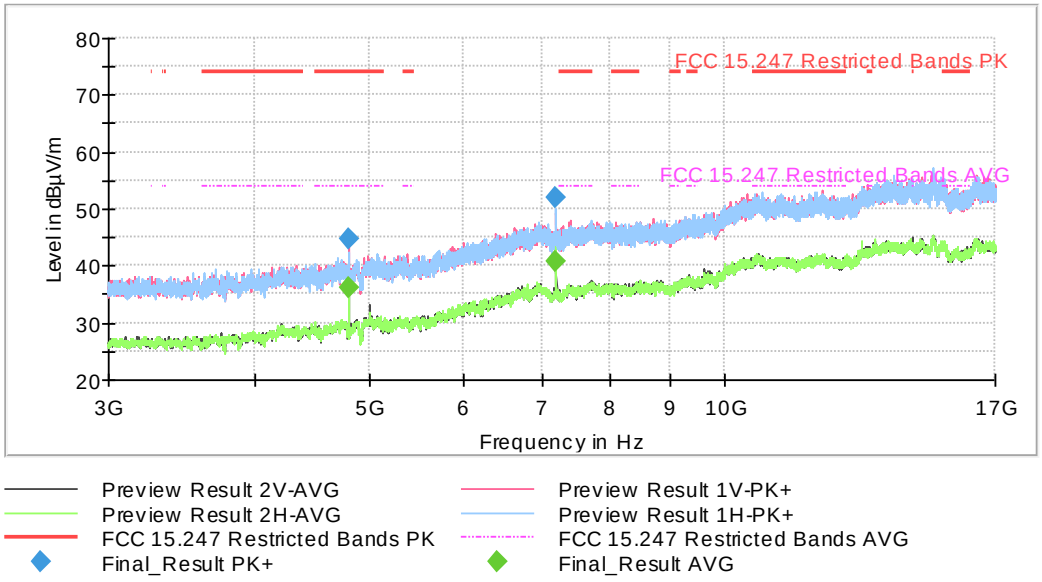


Full Spectrum



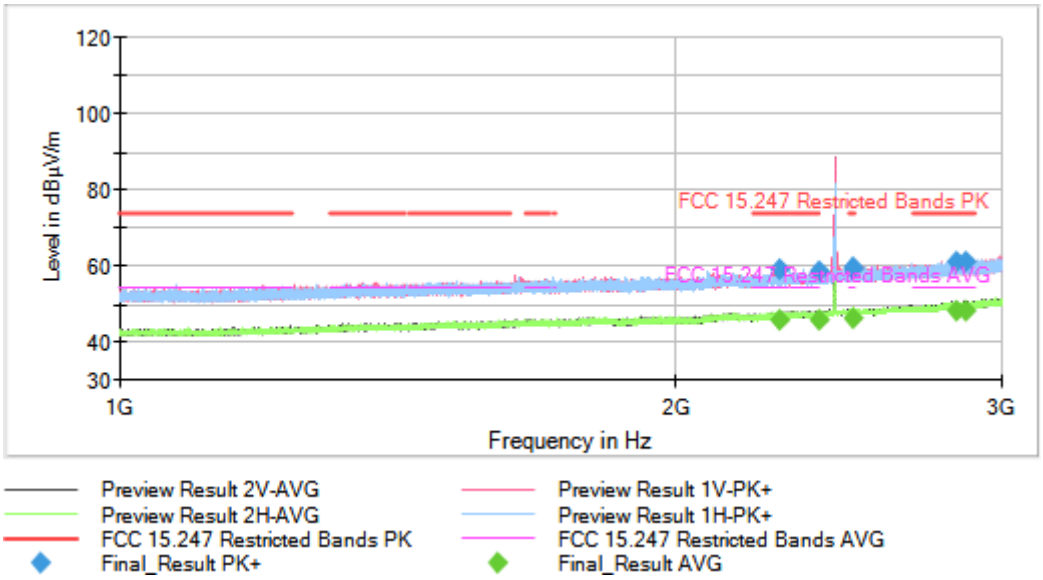


Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2402.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1, Available Number of Channels = 1, Detector used = AVG, Measurement Point = 1

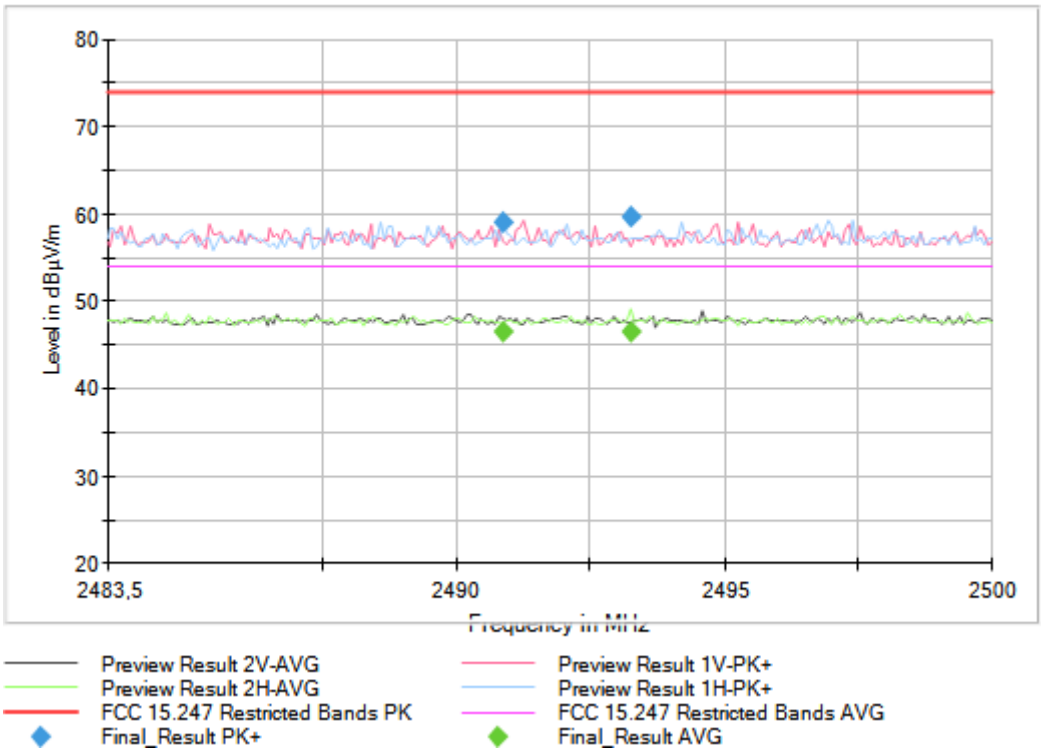


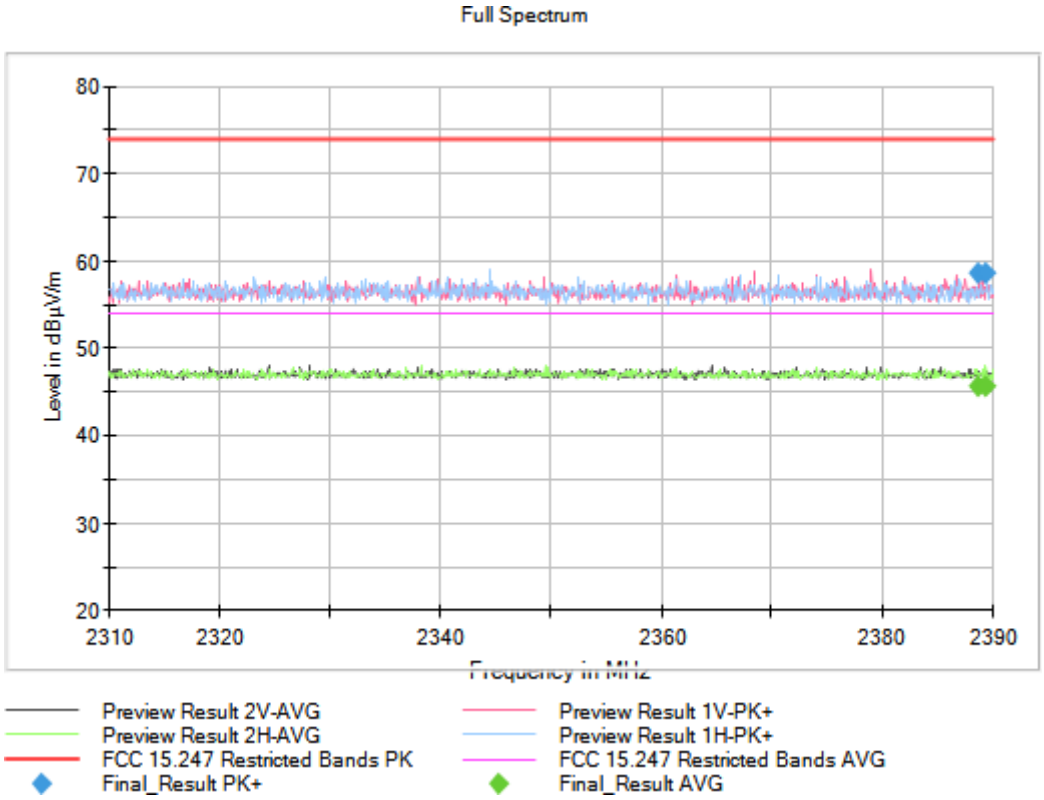
Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2440.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [1, 3], Number of Transmission Chains = 1, Available Number of Channels = 1, Detector used = AVG, Measurement Point = 1

Images:

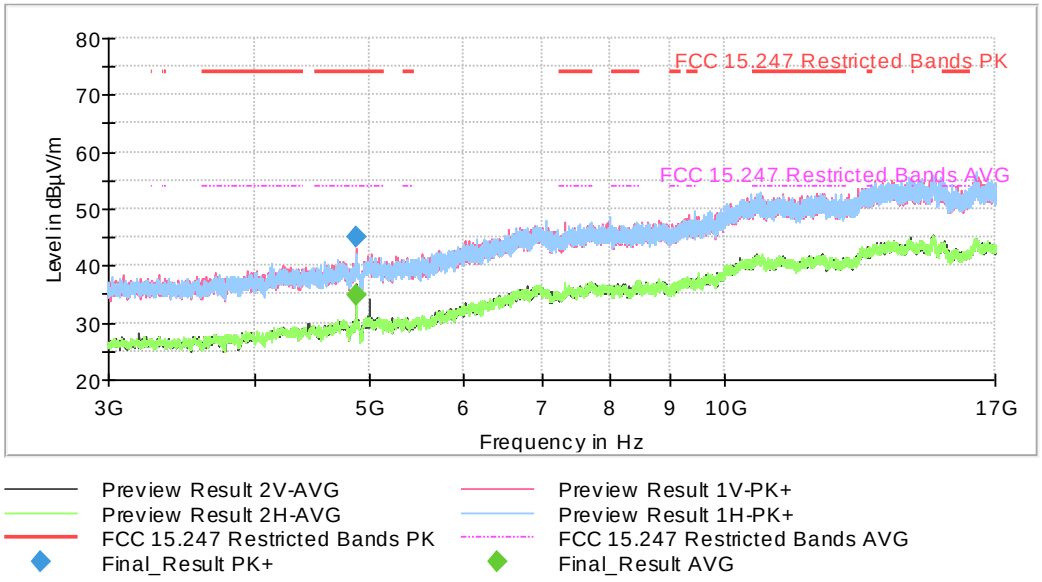


Full Spectrum



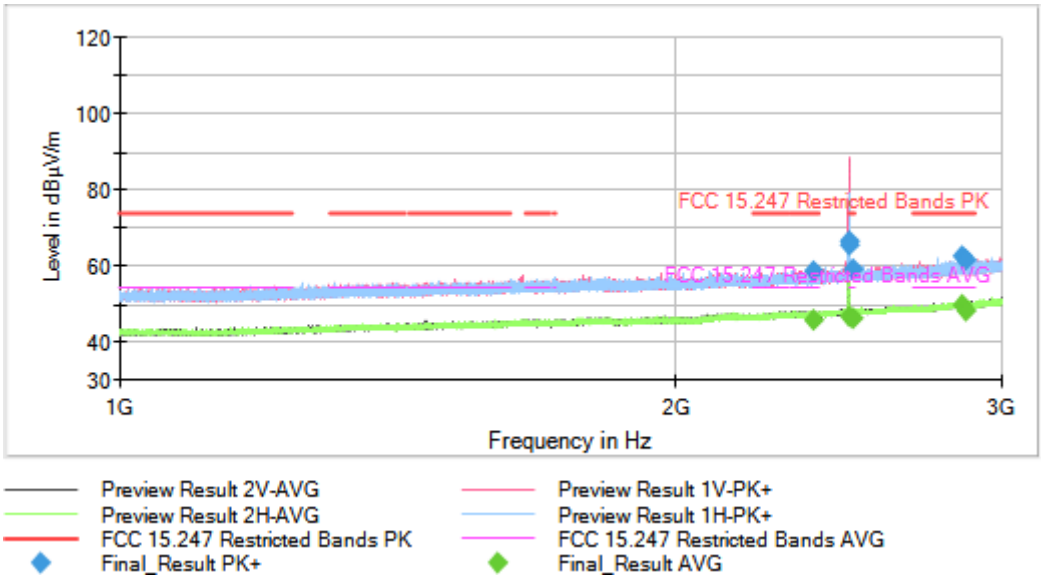


Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2440.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1, Available Number of Channels = 1, Detector used = AVG, Measurement Point = 1

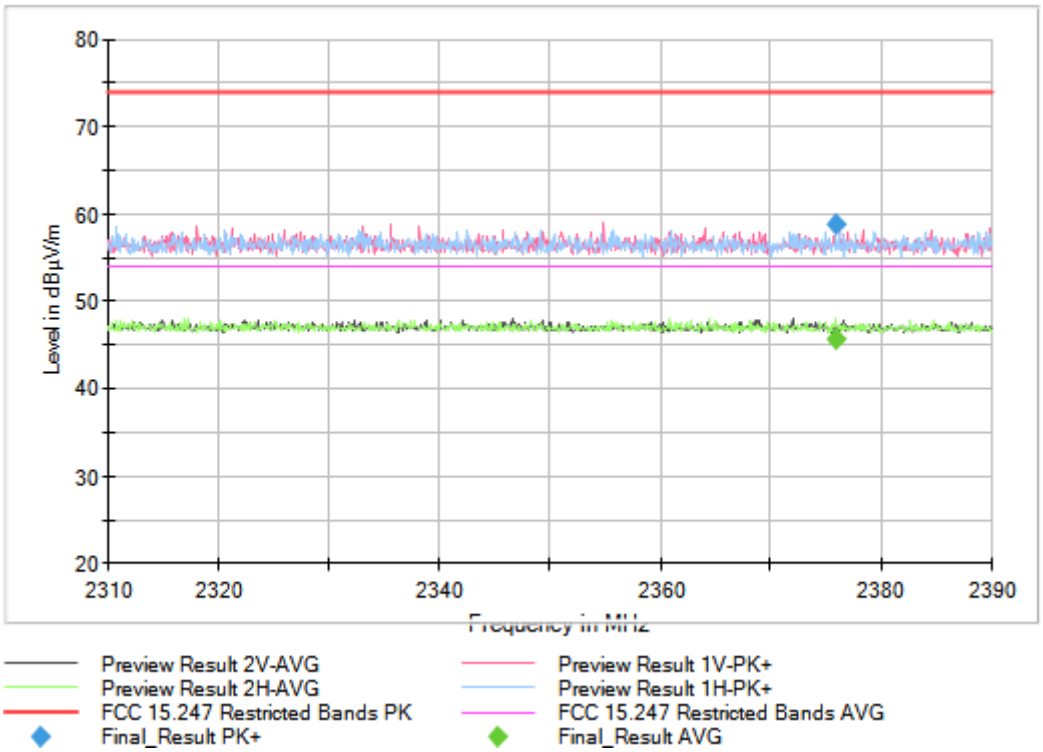


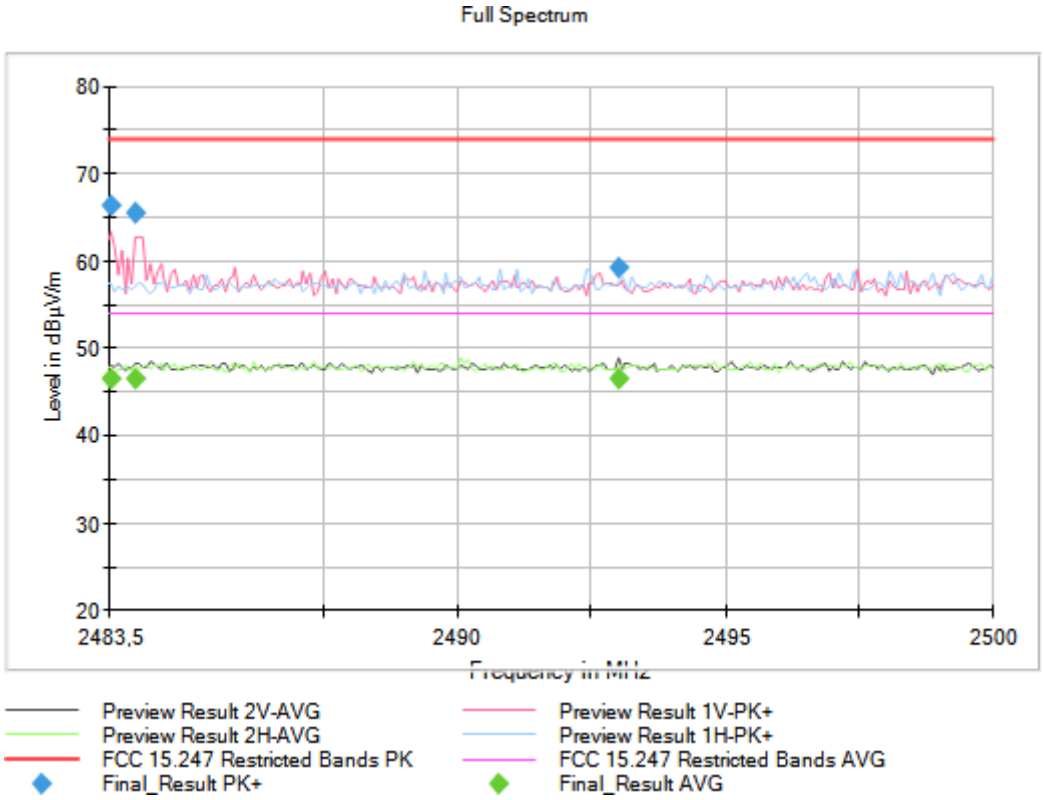
Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2480.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [1, 3], Number of Transmission Chains = 1, Available Number of Channels = 1, Detector used = AVG, Measurement Point = 1

Images:

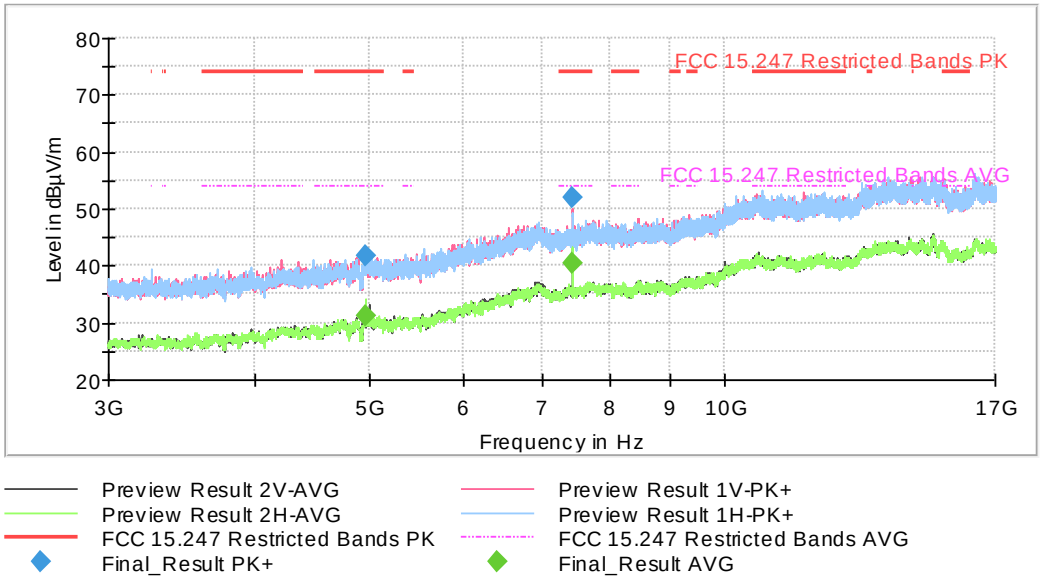


Full Spectrum

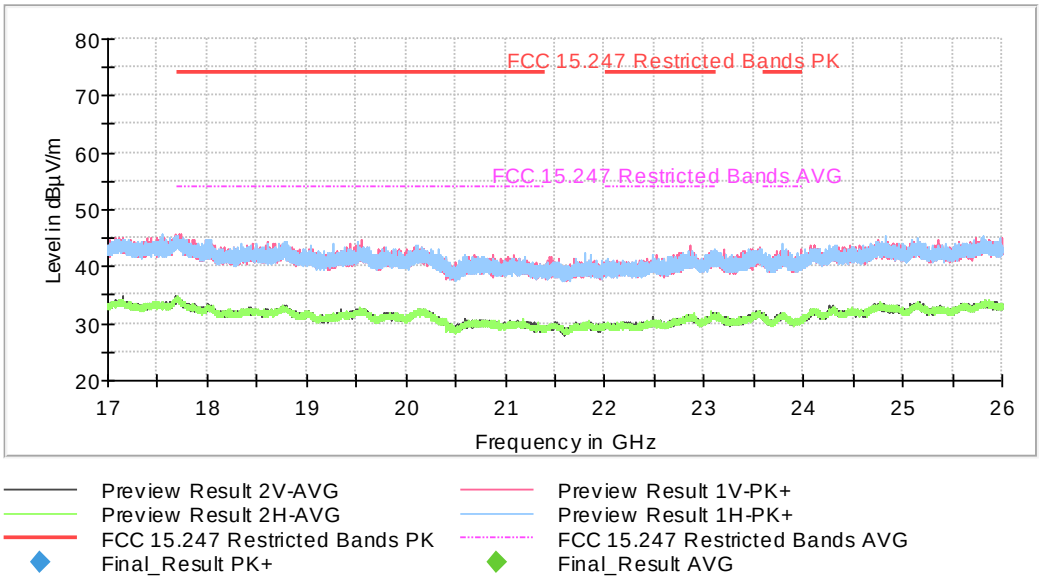




Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2480.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1, Available Number of Channels = 1, Detector used = AVG, Measurement Point = 1



Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [17, 26], Number of Transmission Chains = 1, Available Number of Channels = 1, Detector used = AVG, Measurement Point = 1



Occupied Channel Bandwidth 99%

Results

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Operation Band (MHz)	Freq (MHz)	Occ Ch BW (MHz)
[2400, 2483.5]	2402.00	1.060000
[2400, 2483.5]	2440.00	1.060000
[2400, 2483.5]	2480.00	1.070000

Verdict

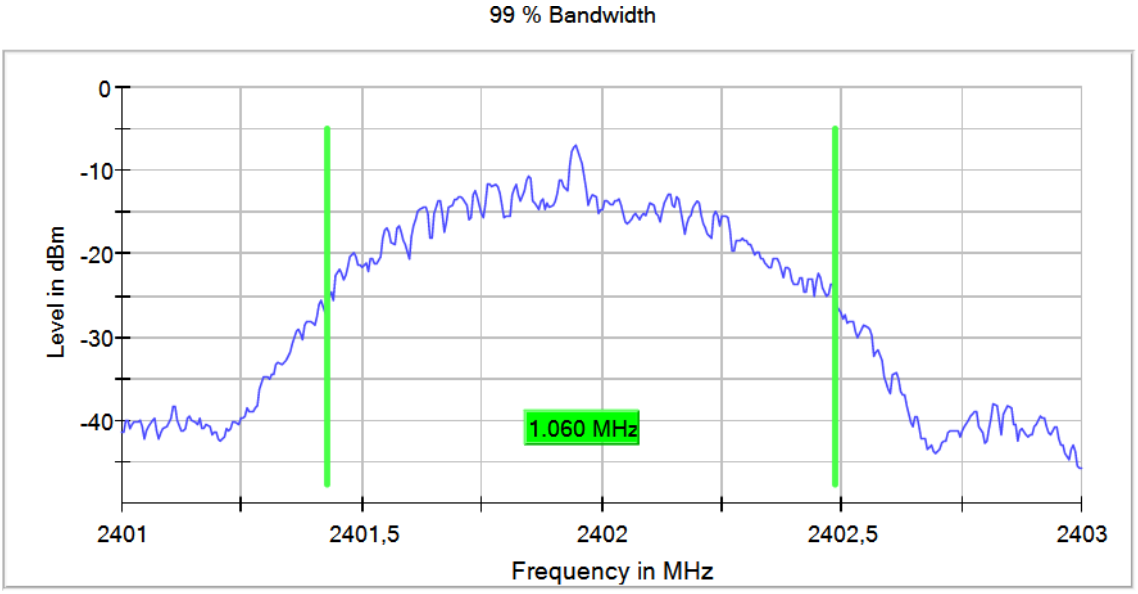
Pass

Uncertainty 1.40%

Attachments

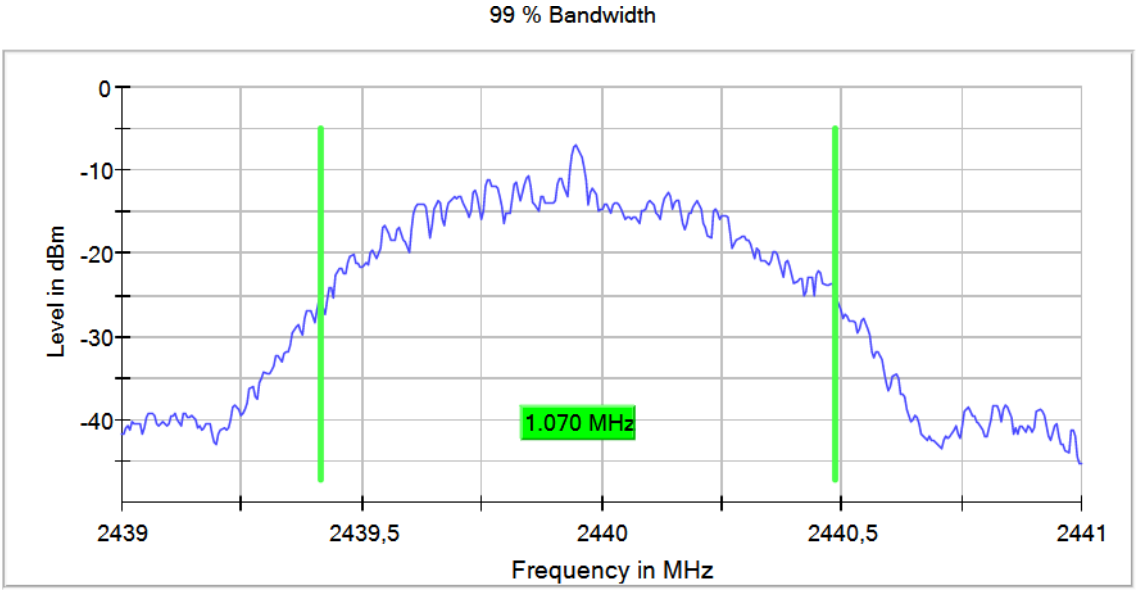
Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2402.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Available Number of Channels = 1

Images:



Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2440.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Available Number of Channels = 1

Images:



Operation Band MHz = [2400, 2483.5], Equipment Type = Digital Transmission System (DTS), Frequency MHz = 2480.00, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Available Number of Channels = 1

Images: