**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: 67242RRF.002

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

| | |
|---|---|
| (*) Identification of item tested | Device used as remote microphone/audio for hearing aid |
| (*) Trademark | Widex |
| (*) Model and /or type reference | Sound Assist |
| Other identification of the product | -- |
| (*) Features | Bluetooth LE<br>HW version: P2.1b<br>SW version: v0.11.136<br>FCC ID: 2AXDT-WSA<br>IC: 26428-WSA |
| Applicant | WSAUD A/S<br>Nymøllevej 6 DK-3540 Lynge, Denmark |
| Test method requested, standard | USA FCC Part 15.247 (10-1-20 Edition): Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz.<br>USA FCC Part 15.209 (10-1-20 Edition): Radiated emission limits; general requirements.<br>CANADA RSS-247 Issue 2 (February 2017).<br>CANADA RSS-Gen Issue 5 amendment 1 (March 2019).<br>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.<br>558074 D01 Meas Guidance v05r02 dated April 2, 2019.<br>ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices. |
| Summary | IN COMPLIANCE |
| Approved by (name / position & signature) | Rafael López Martín<br>EMC Consumer & RF Lab. Manager<br>2022.10.28 12:12:13 +02'00' |
| Date of issue | 2022-10-28 |
| Report template No | FDT08_24<br>(*) "Data provided by the client" |

# Index

# Acronyms

| Acronym ID | Acronym Description |
|---|---|
| # of Tx Chains | Number of Transmission Chains |
| 26Ebw | Emission Bandwidth |
| BW | Bandwidth |
| Detector | Detector used |
| Equipment | Equipment Type |
| Freq | Frequency |
| Freq Rng | Frequency Range |
| Inband Peak Lvl | Inband Peak Level |
| Lvl | Level |
| MP | Measurement Point |
| Mod | Modulation |
| Occ Ch BW | Occupied Channel Bandwidth |
| PSD | Power Spectrum Density |
| 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 is a FCC-recognized accredited testing laboratory with appropriate scope of accreditation that covers the performed tests in this report.

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

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

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

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

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

# General conditions

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

# Uncertainty

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

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

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

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

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

# Data provided by the client

The following data has been provided by the client:

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

2. The sample consists of a Device used as remote microphone/audio for hearing aid.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

# Usage of samples

Samples under test have been selected by: The client.

| Id | Control Number | Description | Model | Serial Nº | Date of Reception | Application |
|---|---|---|---|---|---|---|
| S/01 | 67242E_39.1 | Widex Sound Assist device | DK-3540 | | 2022-07-08 | Element Under Test |
| | 67242E_35.1 | USB cable | -- | -- | 2022-07-08 | Element Under Test |
| S/02 | 67242E_39.1 | Widex Sound Assist device | DK-3540 | | 2022-07-08 | Element Under Test |
| | 67242E_35.1 | USB cable | -- | -- | 2022-07-08 | Element Under Test |
| | 67242E_56.1 | SMA cable | -- | -- | 2022-09-22 | Auxiliary Element |
| S/03 | 67242E_50.1 | Widex Sound Assist device | DK-3540 | -- | 2022-09-22 | Element Under Test |
| | 67242E_55.1 | USB cable | -- | -- | 2022-09-28 | Element Under Test |
| | 67242E_57.1 | AC/DC adapter | ADS-6RH-06N | -- | 2022-09-28 | Element Under Test |
| | 67242E_46.1 | USB cable | -- | | 2022-08-30 | Auxiliary Element |
| | 67242E_47.1 | Ethernet cable | -- | | 2022-08-30 | Auxiliary Element |
| | 67242E_48.1 | USB-SPI converter | 1324 USB-SPI | 373627 | 2022-08-30 | Auxiliary Element |
| | 67242E_51.1 | PCB Ethernet | M1616V2 | -- | 2022-09-22 | Auxiliary Element |
| S/04 | 67242E_54.1 | Widex Sound Assist device | DK-3540 | -- | 2022-09-22 | Element Under Test |
| | 67242E_52.1 | USB cable | -- | -- | 2022-09-22 | Element Under Test |
| | 67242E_57.1 | AC/DC adapter | ADS-6RH-06N | -- | 2022-09-28 | Element Under Test |
| | 67242E_46.1 | USB cable | -- | | 2022-08-30 | Auxiliary Element |
| | 67242E_47.1 | Ethernet cable | -- | | 2022-08-30 | Auxiliary Element |
| | 67242E_48.1 | USB-SPI converter | 1324 USB-SPI | 373627 | 2022-08-30 | Auxiliary Element |
| | 67242E_51.1 | PCB Ethernet | M1616V2 | -- | 2022-09-22 | Auxiliary Element |
| | 67242E_56.1 | Micro-SMA cable | -- | -- | 2022-09-22 | Auxiliary Element |

| Id | Control Number | Description | Model | Serial Nº | Date of Reception | Application |
|---|---|---|---|---|---|---|
| S/05 | 67242E_60.1 | Widex Sound Assist device | DK-3540 | -- | 2022-09-22 | Element Under Test |
| | 67242E_52.1 | USB cable | -- | -- | 2022-09-22 | Element Under Test |
| | 67242E_57.1 | AC/DC adapter | ADS-6RH-06N | -- | 2022-09-28 | Element Under Test |
| | 67242E_46.1 | USB cable | -- | | 2022-08-30 | Auxiliary Element |
| | 67242E_47.1 | Ethernet cable | -- | | 2022-08-30 | Auxiliary Element |
| | 67242E_48.1 | USB-SPI converter | 1324 USB-SPI | 373627 | 2022-08-30 | Auxiliary Element |
| | 67242E_51.1 | PCB Ethernet | M1616V2 | -- | 2022-09-22 | Auxiliary Element |
| | 67242E_56.1 | Micro-SMA cable | -- | -- | 2022-09-22 | Auxiliary Element |

Notes referenced to samples during the project:

| Id | Type |
|---|---|
| S/01 | Radiated sample for BLE testing |
| S/02 | Conducted sample for BLE testing |
| S/03 | Radiated sample for BT EDR testing |
| S/04 and S/05 | Conducted samples for BT EDR testing |

# Test sample description

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ports..... : | Port name and description | | Cable | | | | |
| | | | Max length [m] | Attached during test | Shielded | Coupled to patient(3) | |
| | USB-C | | 2m | [X] | [ ] | [ ] | |
| Supplementary information to the ports..... : | ..... | | | | | | |
| Rated power supply .....: | Voltage and Frequency | | Reference poles | | | | |
| | | | L1 | L2 | L3 | N | PE |
| | [ ] | AC: ..... | [ ] | [ ] | [ ] | [ ] | [ ] |
| | [X] | DC: 5V | | | | | |
| Rated Power .....: | 5W using supplied power supply brick. | | | | | | |
| Clock frequencies.....: | ..... | | | | | | |
| Other parameters .....: | ..... | | | | | | |
| Software version .....: | v0.11.136 | | | | | | |
| Hardware version .....: | P2.1b | | | | | | |
| Dimensions in cm (W x H x D) ....: | ..... | | | | | | |
| Mounting position .....: | [X] | Table top equipment | | | | | |
| | [ ] | Wall/Ceiling mounted equipment | | | | | |
| | [ ] | Floor standing equipment | | | | | |
| | [X] | Hand-held equipment | | | | | |
| | [X] | Other: Worn around neck. | | | | | |
| Modules/parts.....: | Module/parts of test item | | Type | | Manufacturer | | |
| | AG5 device | | ..... | | ..... | | |
| | USB-C cable | | ..... | | ..... | | |
| | Power Supply Brick | | ..... | | ..... | | |
| Accessories (not part of the test item) .....: | Description | | Type | | Manufacturer | | |
| | Wall brick Charger, EU | | ADS-6RH-06N 05050EPG | | Honor | | |
| | Wall brick Charger, US/Japan/Taiwan | | ADS-6RA-06 05050EPCU | | Honor | | |
| | Wall brick Charger, China | | ADS-6RA-06 05050EPCN | | Honor | | |
| | Wall brick Charger, UK | | ADS-6RH-06N 05050EPB | | Honor | | |
| | Note: All chargers use same schematic. | | ..... | | ..... | | |
| Documents as provided by the applicant.....: | Description | | File name | | Issue date | | |
| | | | ..... | | ..... | | |

(3) Only for Medical Equipment

# Identification of the client

WSAUD A/S
Nymøllevej 6 DK-3540 Lynge, Denmark

# Testing period and place

| | |
|---|---|
| **Test Location** | DEKRA Testing and Certification S.A.U. |
| **Date (start)** | 2022-07-20 |
| **Date (finish)** | 2022-10-21 |

# Document history

| Report number | Date | Description |
|---|---|---|
| 67242RRF.002 | 2022-10-27 | First release. |

# Environmental conditions

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

| | |
|---|---|
| **Temperature** | Min. = 15 ºC<br>Max. = 35 ºC |
| **Relative humidity** | Min. = 20 %<br>Max. = 75 % |

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

| | |
|---|---|
| **Temperature** | Min. = 15 ºC<br>Max. = 35 ºC |
| **Relative humidity** | Min. = 20 %<br>Max. = 75 % |

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

| | |
|---|---|
| **Temperature** | Min. = 15 ºC<br>Max. = 35 ºC |
| **Relative humidity** | Min. = 20 %<br>Max. = 75 % |

# Remarks and comments

The tests have been performed by the technical personnel: Daniel Mejías Herrera, Fernando Chito Solis and Jia Hao Luo Chen, Antonio Manuel Sánchez Carrizo, José Arturo Chica Arnedo and Victoria Olmedo Villalba.

Used instrumentation:

| Control No. | Equipment | Model | Manufacturer | Next Calibration |
|---|---|---|---|---|
| 5862 | EMI TEST RECEIVER 9kHz-7GHz | ESR7 | ROHDE AND SCHWARZ | 2022-12-12 |
| 7796 | EXTENSION FOR OPEN SWITCH UNIT UP TO 40GHz | OSP-B157Wx | ROHDE AND SCHWARZ | 2024-03-16 |
| 7763 | HORN ANTENNA 1-18GHz | BBHA 9120D | SCHWARZBECK MESS-ELEKTRONIK | 2022-11-15 |
| 6495 | HORN ANTENNA 18-40GHz | BBHA 9170 | SCHWARZBECK | 2024-03-19 |
| 8848 | OPEN SWITCH UNIT UP TO 7.5 GHz | OSP-B157W8 PLUS | ROHDE & SCHWARZ | 2023-08-20 |
| 0922 | POWER SUPPLY DC 40 V / 40 A | NGPE 40/40 | ROHDE AND SCHWARZ | -- |
| 7862 | PRE-AMPLIFIER G>30dB 18-40GHz | BLMA 1840-3G | BONN ELEKTRONIK | 2023-02-15 |
| 7769 | PREAMPLIFIER 30dB 500MHz-18GHz | BBV 9718 C | SCHWARZBECK | 2023-03-25 |
| 8130 | SEMIANECHOIC ABSORBER LINED CHAMBER | P29419 | ALBATROSS | -- |
| 8134 | SHIELDED ROOM | P29419 | ALBATROSS PROJECTS GMBH | -- |
| 6793 | SHIELDED ROOM | S101 | ETS LINDGREN | -- |
| 6158 | SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz | FSV40 | ROHDE AND SCHWARZ | 2023-10-22 |
| 7794 | SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz | FSV40 | ROHDE AND SCHWARZ | 2023-02-26 |
| 7791 | SIGNAL GENERATOR 8kHz-6GHz | SMB100B | ROHDE AND SCHWARZ | 2023-11-03 |
| 4848 | SOFTWARE FOR EMC/RF TESTING | EMC32 | ROHDE AND SCHWARZ | -- |
| 7550 | TEMPERATURE AND HUMIDITY PROBE | HWg-STE | HW GROUP | 2023-05-09 |
| 7549 | TEMPERATURE AND HUMIDITY PROBE | HWg-STE | HW GROUP | 2023-05-09 |
| 6611 | TEMPERATURE AND HUMIDITY PROBE | HWg-STE | HW GROUP | 2023-05-04 |
| 7826 | ULTRALOG ANTENNA 30MHz-6GHz | HL562E_UPG | ROHDE AND SCHWARZ | 2022-10-15 |
| 7795 | WIRELESS CONNECTIVITY TESTER BW 160 MHz | CMW270 | ROHDE AND SCHWARZ | 2022-11-30 |

| Control No. | Equipment | Model | Manufacturer | Next Calibration |
|---|---|---|---|---|
| 8848 | OPEN SWITCH UNIT UP TO 7.5 GHz | OSP-B157W8 PLUS | ROHDE & SCHWARZ | 2023-08-20 |
| 7798 | WMS32 | WMS32 | ROHDE AND SCHWARZ | -- |

# Testing verdicts

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

# Summary

## 1. Bluetooth Low Energy 5.0 (2M, 1M). Appendix A.

| 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:<br>None | | | |

## 2. Bluetooth EDR. Appendix B.

| Requirement – Test case | **FCC PART 15 PARAGRAPH/ RSS-247** | Verdict | Remark |
|---|---|---|---|
| FCC 15.247 (a) (1) 20 dB Bandwidth and Carrier frequency separation<br>RSS-247 5.1. (b) | | P | -- |
| FCC 15.247 (a) (1) (iii) Time of Occupancy (Dwell Time)<br>RSS-247 5.1. (d) | | P | -- |
| FCC 15.247 (b) Maximum peak output power and antenna gain<br>RSS-247 5.4. (b) | | P | -- |
| FCC 15.247 (a) (1) (iii) Number of hopping channels<br>RSS-247 5.1 (d) | | P | -- |
| FCC 15.247 (d) Band-edge emissions compliance (Transmitter)<br>RSS-247 5.5. | | P | -- |
| FCC 15.247 (d) Emission limitations radiated (Transmitter)<br>RSS-247 5.5. | | P | -- |
| Supplementary information and remarks:<br>None. | | | |

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

# INDEX

# TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

| | |
|---|---|
| Vnominal: | 5Vdc |
| Type of Power Supply: | External power supply |

ANTENNA (*):

| | |
|---|---|
| Type of Antenna: | Internal |
| Maximum Declared Antenna Gain: | 1.3dBi |

TEST FREQUENCIES (*):

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

CONDUCTED MEASUREMENTS:

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


RADIATED MEASUREMENTS:

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Bilog antenna for the range between 30 MHz to 1000 MHz and 1 GHz-17 GHz Double ridge horn antenna) is situated at a distance of 3 m and at a distance of 1.5 m for the frequency range 17 GHz-26 GHz (17 GHz-40 GHz horn antenna).

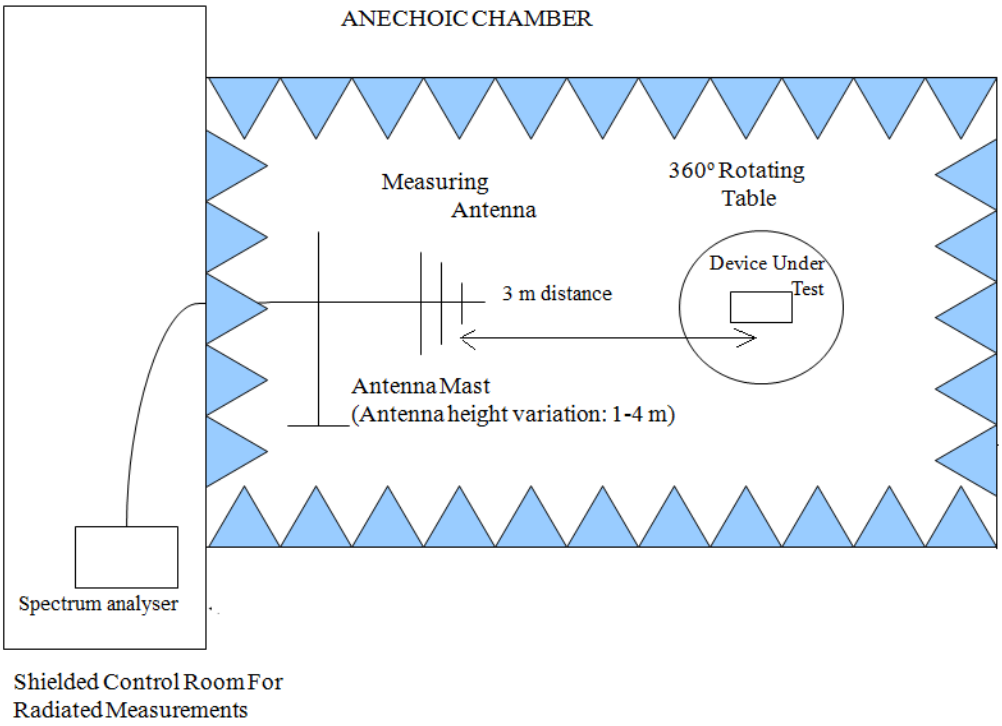
For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height (Bilog antenna and Double ridge horn antenna) was varied from 1 to 4 meters to find the maximum radiated emission.

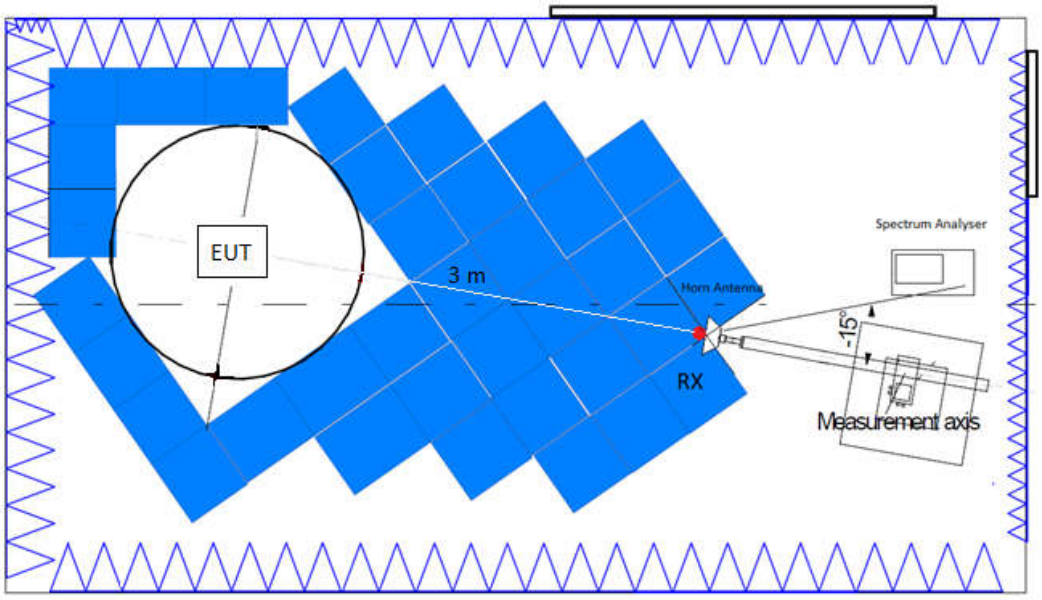
Measurements were made in both horizontal and vertical planes of polarization.

A resolution bandwidth/video bandwidth of 100 kHz / 300 kHz was used for frequencies below 1 GHz and 1 MHz / 3 MHz for frequencies above 1 GHz.

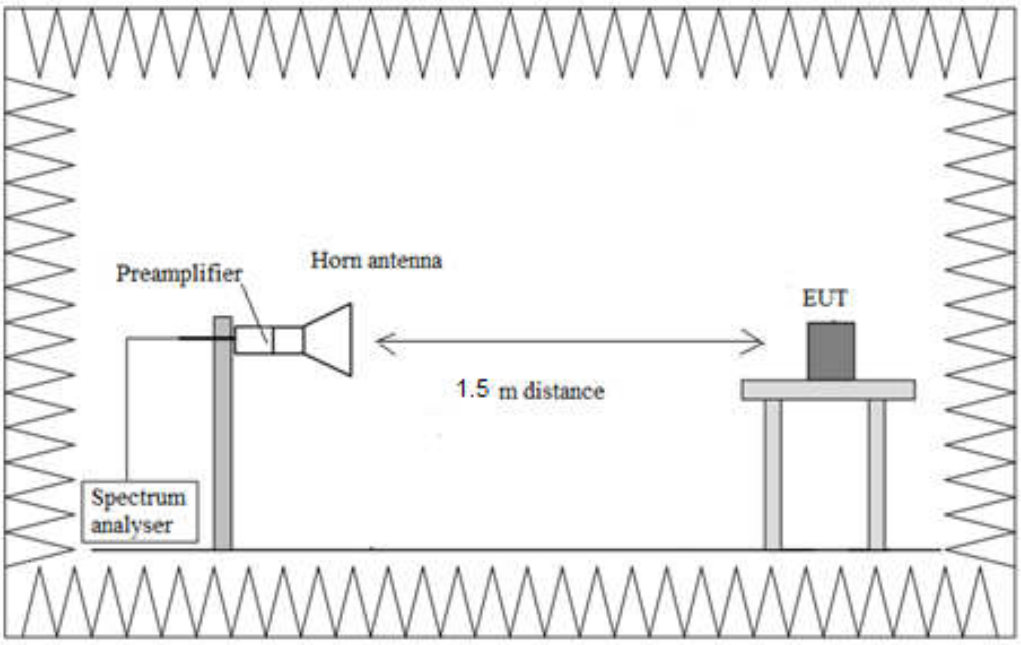
Radiated measurements setup from 30 MHz to 1 GHz:




Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup f > 17 GHz:



# TEST CASES DETAILS

## FCC 47 CFR Part 15.247 / RSS-247

## 99dBw Occupied Channel Bandwidth 99%

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

***Results***

| Freq (MHz) | Equipment | BW (MHz) | # of Tx Chains | Port | Occ Ch BW (MHz) |
|---|---|---|---|---|---|
| 2402.00000 | Digital Transmission System (DTS) | 1 | 1 | 1 | 1.050 |
| 2440.00000 | Digital Transmission System (DTS) | 1 | 1 | 1 | 1.060 |
| 2480.00000 | Digital Transmission System (DTS) | 1 | 1 | 1 | 1.055 |

***Verdict***

Pass

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

***Results***

| Freq (MHz) | Equipment | BW (MHz) | # of Tx Chains | Port | Occ Ch BW (MHz) |
|---|---|---|---|---|---|
| 2402.00000 | Digital Transmission System (DTS) | 2 | 1 | 1 | 2.030 |
| 2440.00000 | Digital Transmission System (DTS) | 2 | 1 | 1 | 2.040 |
| 2480.00000 | Digital Transmission System (DTS) | 2 | 1 | 1 | 2.020 |

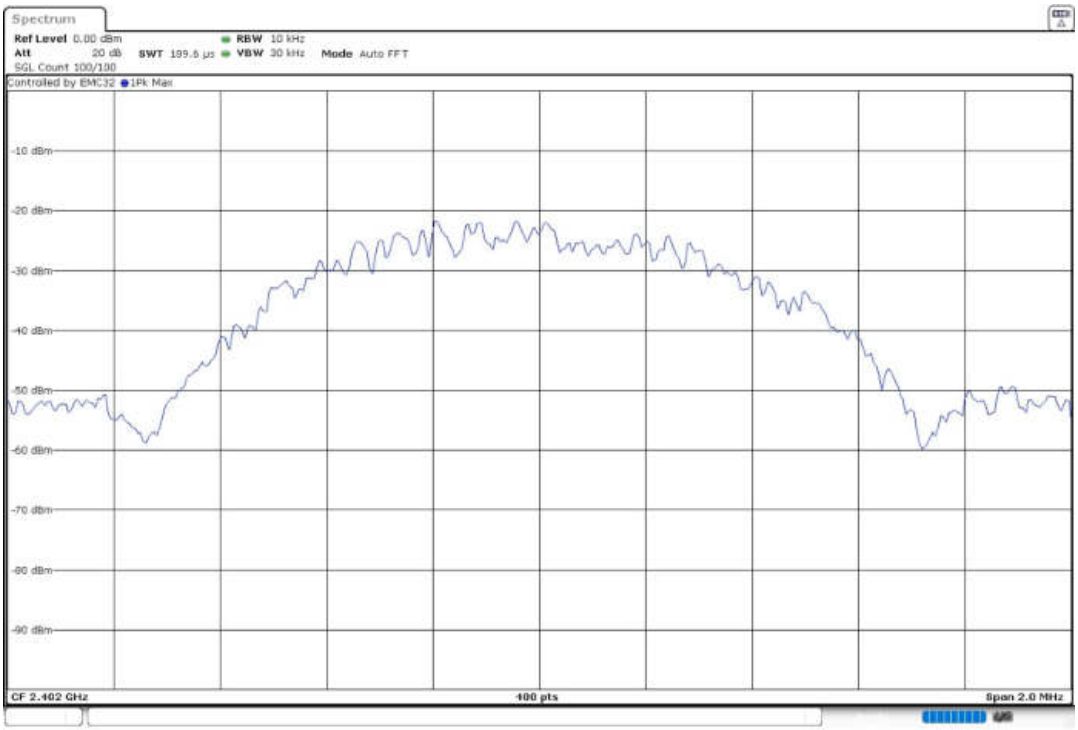
***Verdict***

Pass

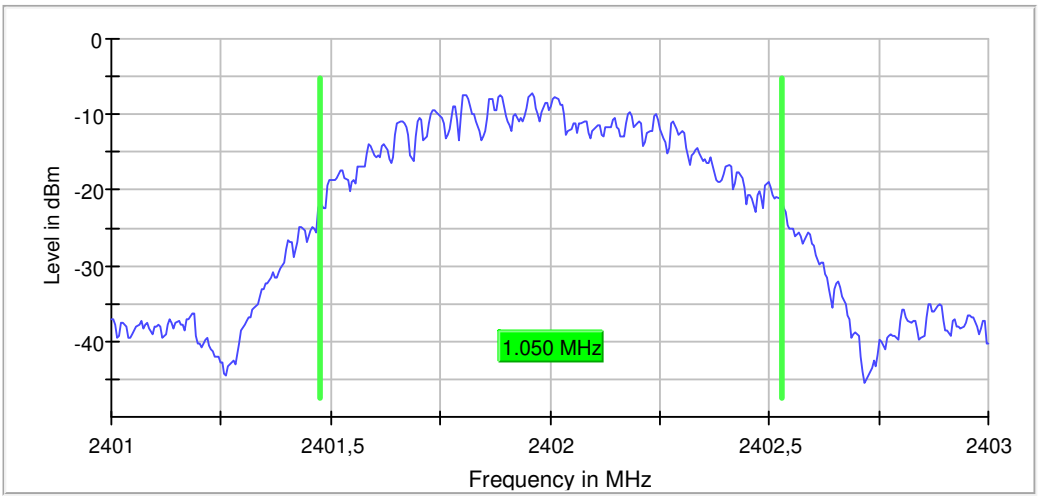
### *Attachments*

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

**Images:**

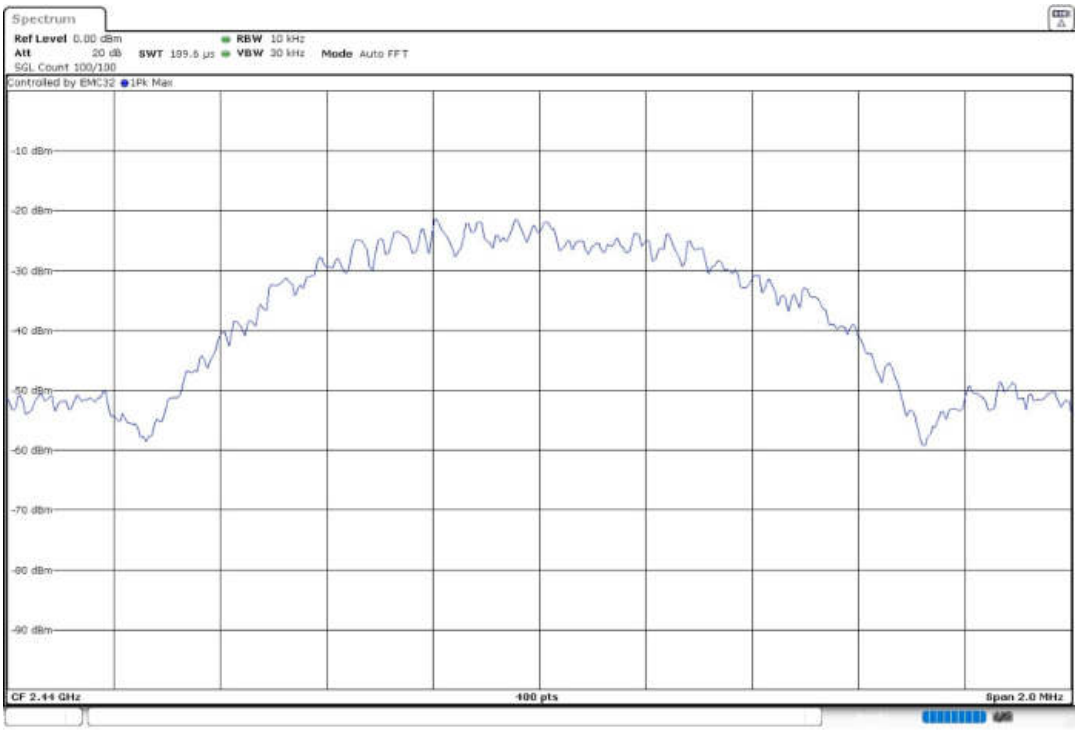



99 % Bandwidth

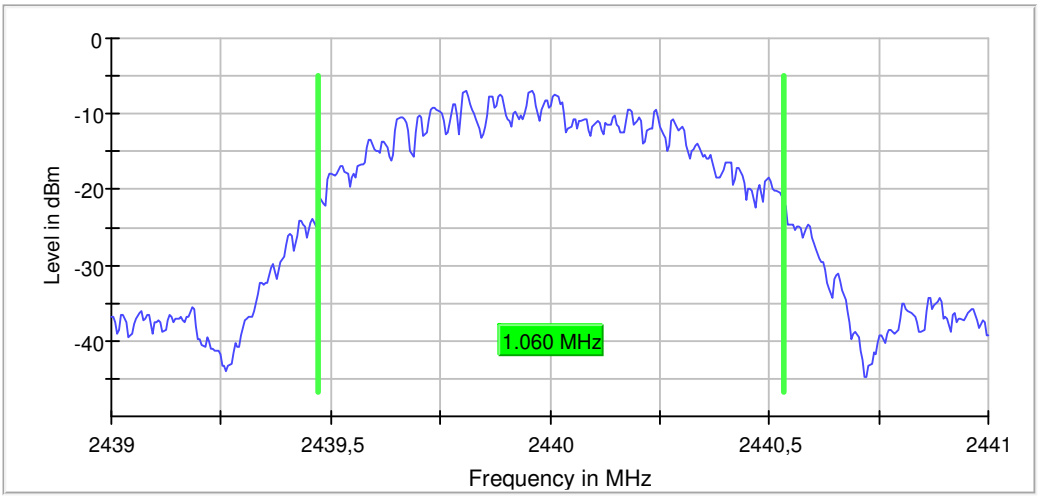


**Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1**

**Images:**

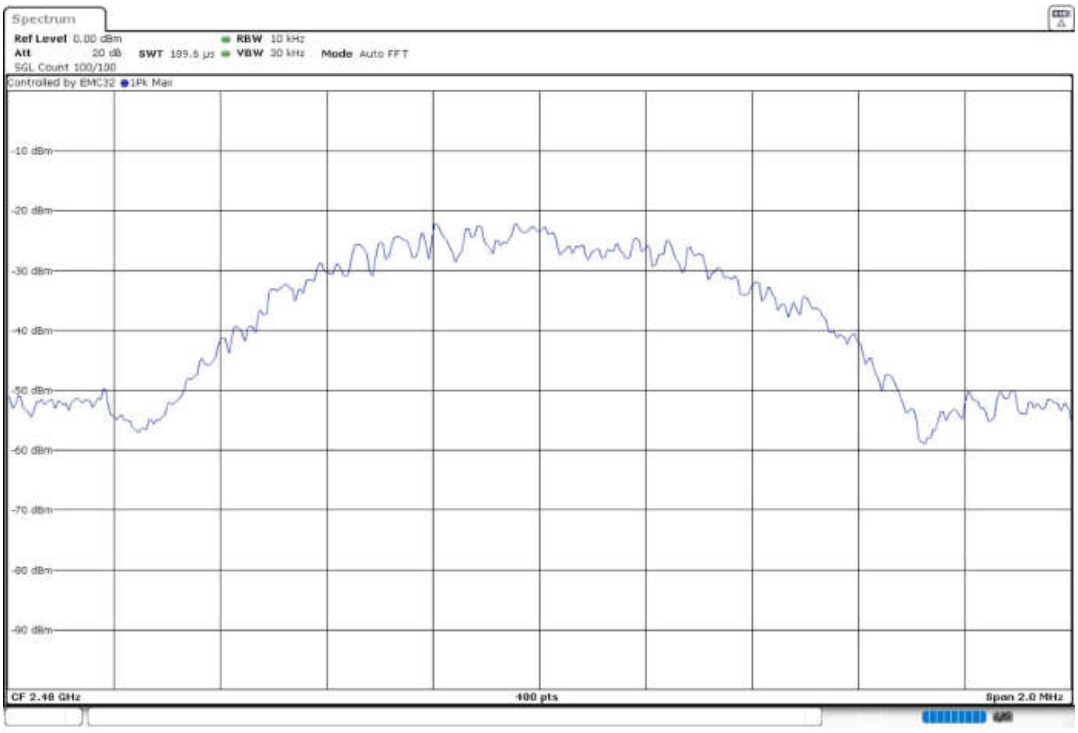



99 % Bandwidth

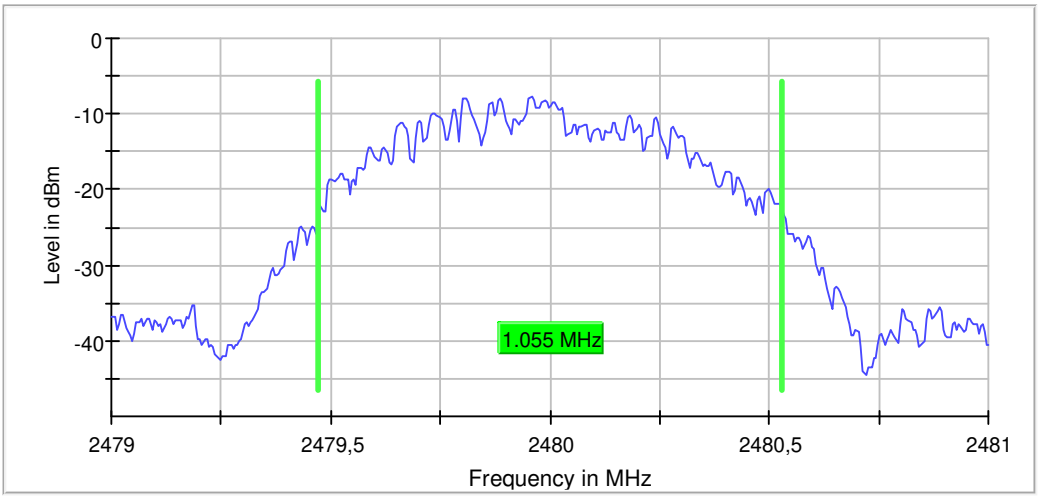


**Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1**

**Images:**



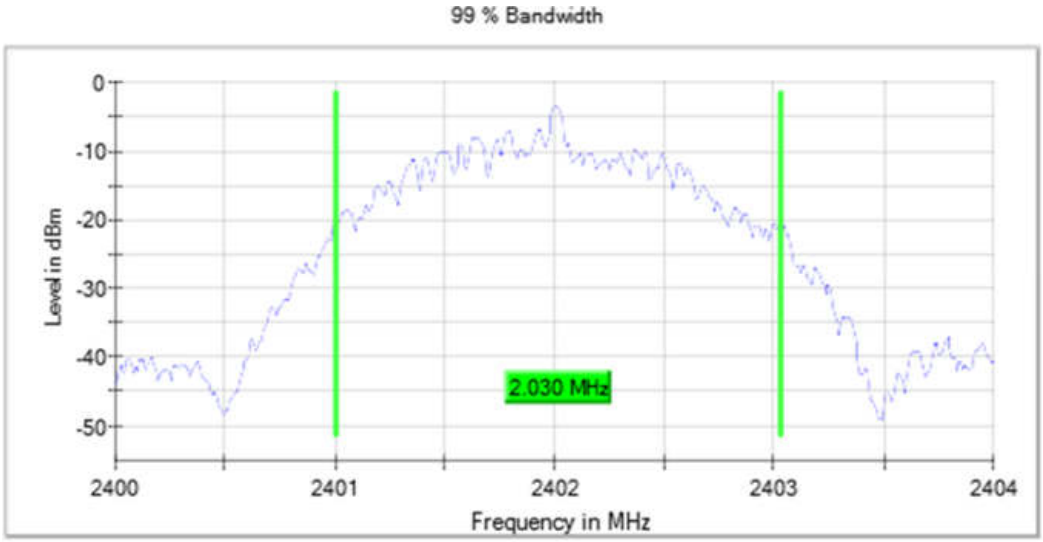

99 % Bandwidth

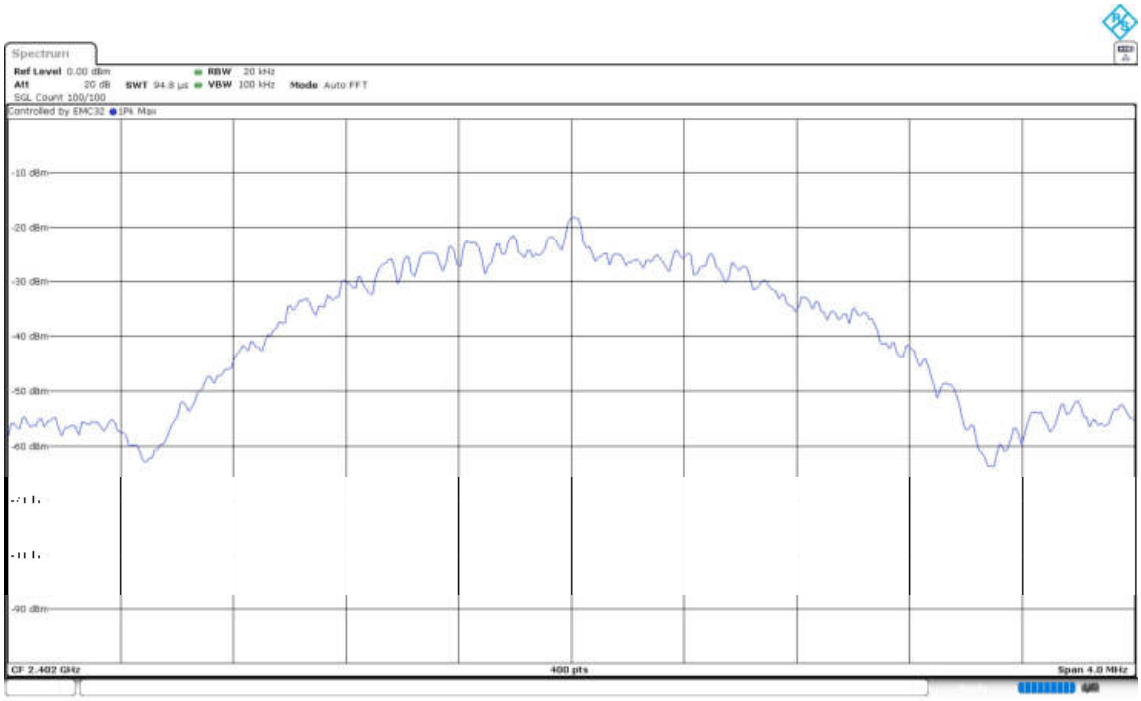


### *Attachments*

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

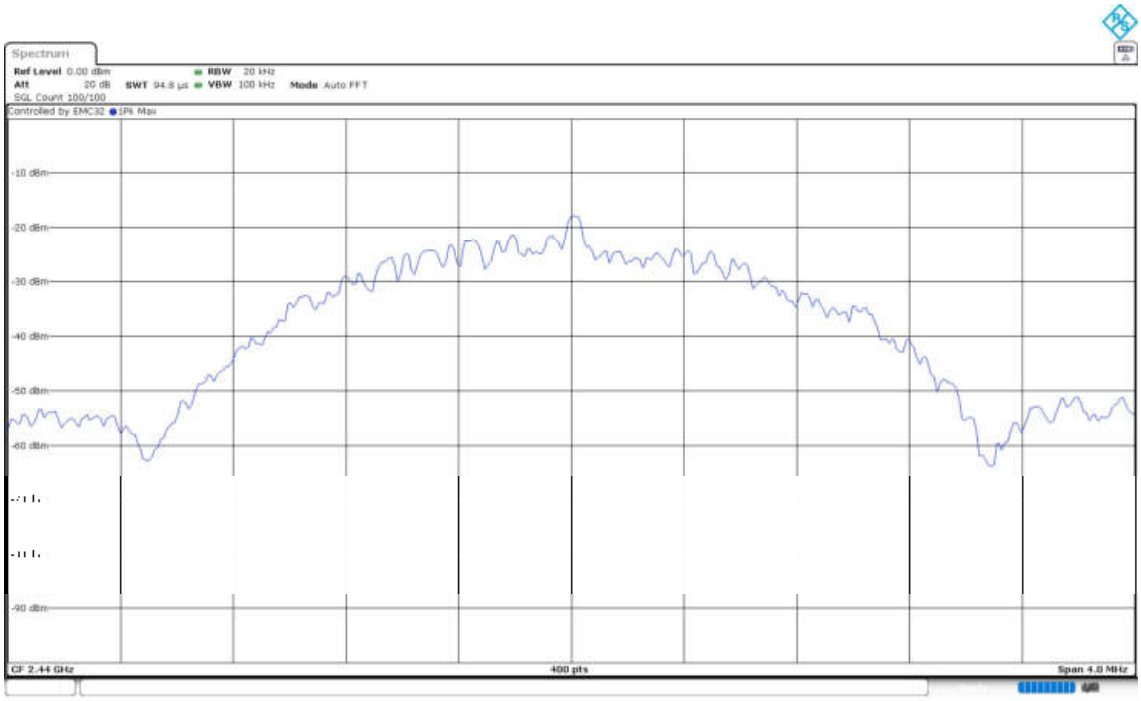
**Images:**

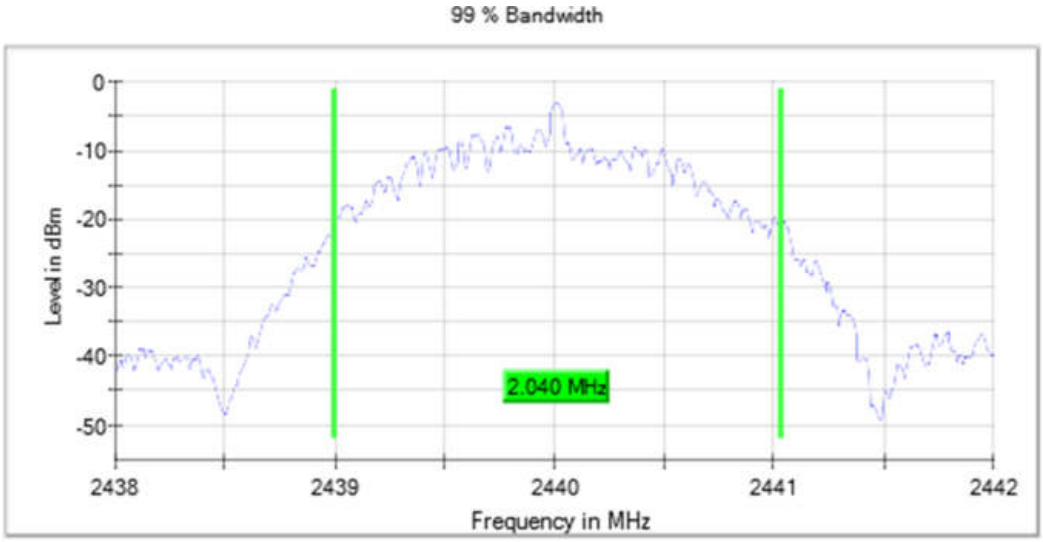


**Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1**

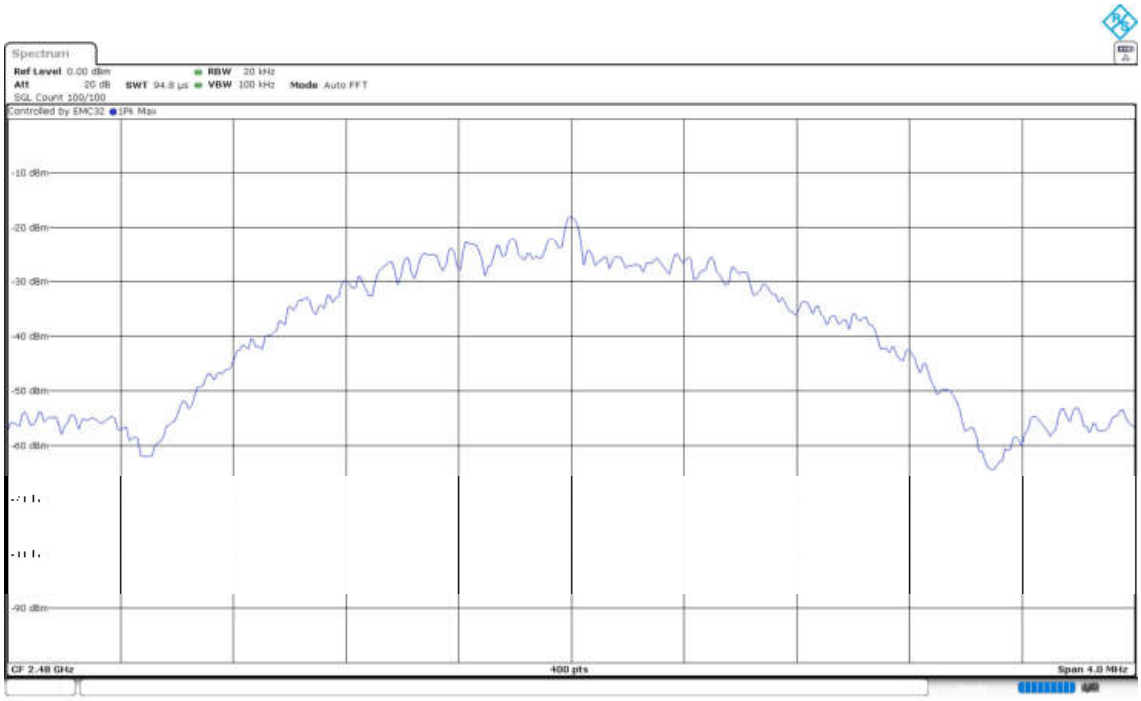
**Images:**

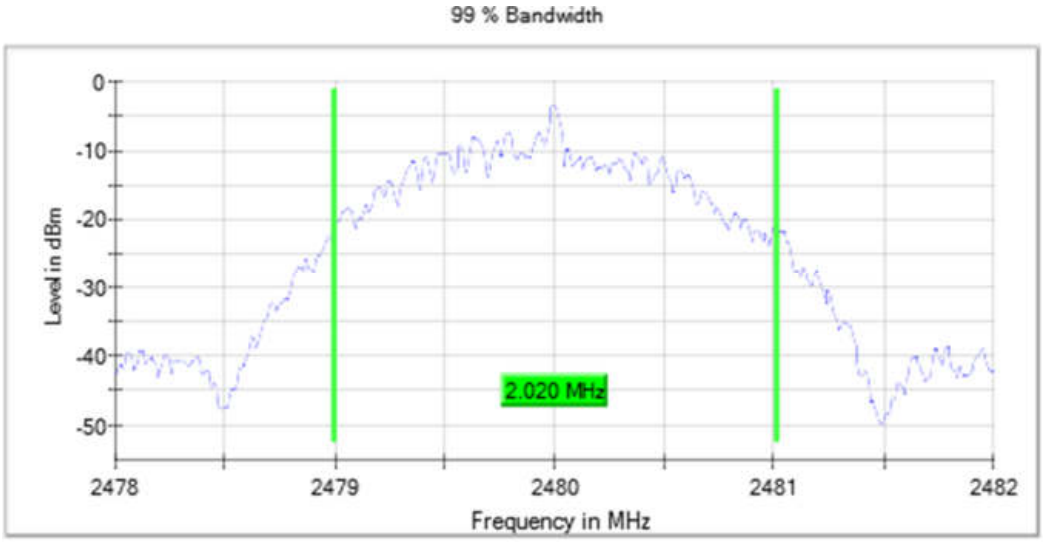


**Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1**

**Images:**



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

***Limits***

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

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

***Results***

| Freq (MHz) | BW (MHz) | # of Tx Chains | Port | 6Ebw (MHz) |
|---|---|---|---|---|
| 2402.00000 | 1 | 1 | 1 | 0.733 |
| 2440.00000 | 1 | 1 | 1 | 0.733 |
| 2480.00000 | 1 | 1 | 1 | 0.733 |

***Verdict***

Pass

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

***Results***

| Freq (MHz) | BW (MHz) | # of Tx Chains | Port | 26Ebw (MHz) |
|---|---|---|---|---|
| 2402.00000 | 2 | 1 | 1 | 1.188 |
| 2440.00000 | 2 | 1 | 1 | 1.188 |
| 2480.00000 | 2 | 1 | 1 | 1.188 |

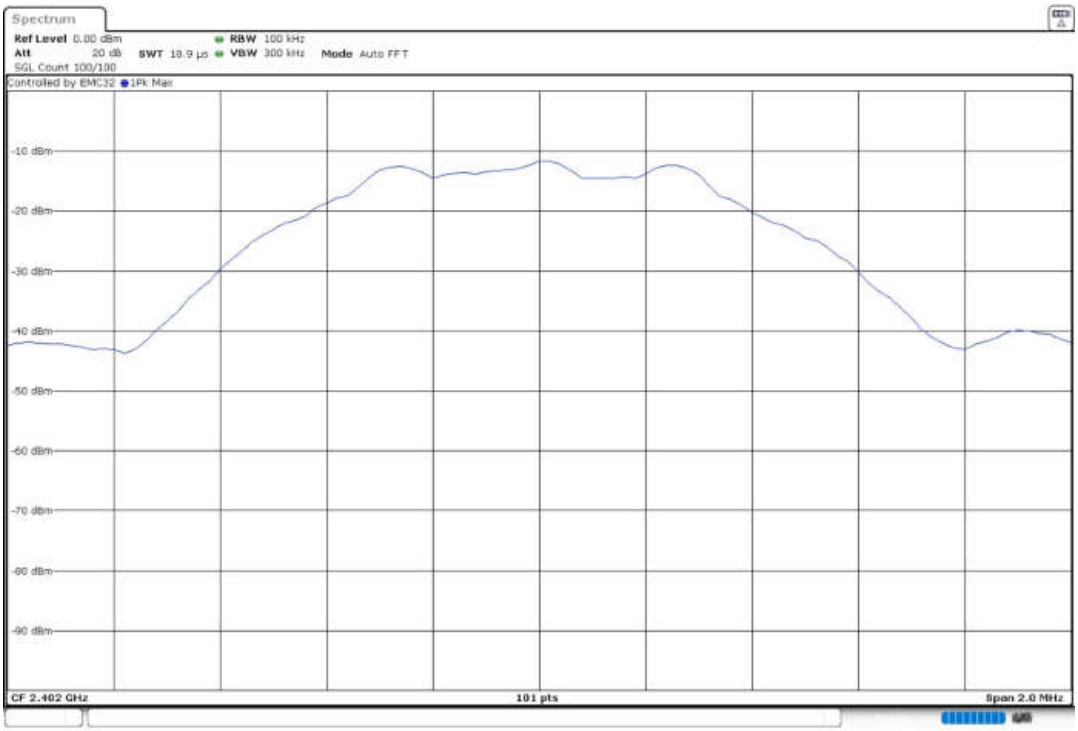
***Verdict***

Pass

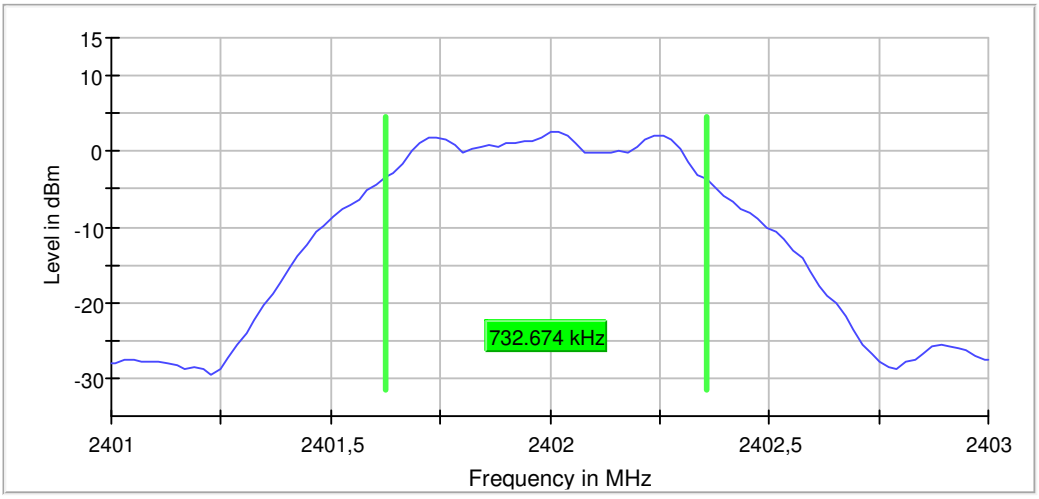
***Attachments***

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

**Images:**



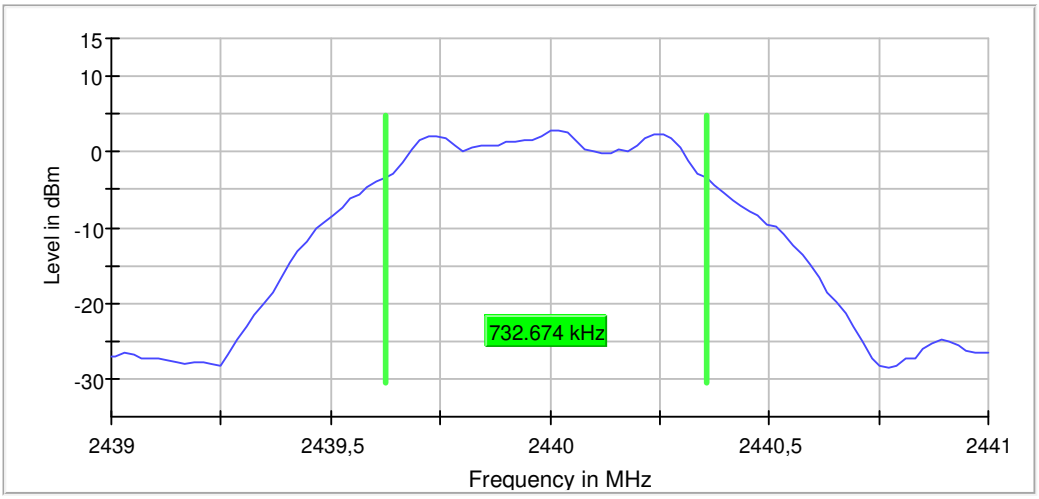

6 dB Bandwidth

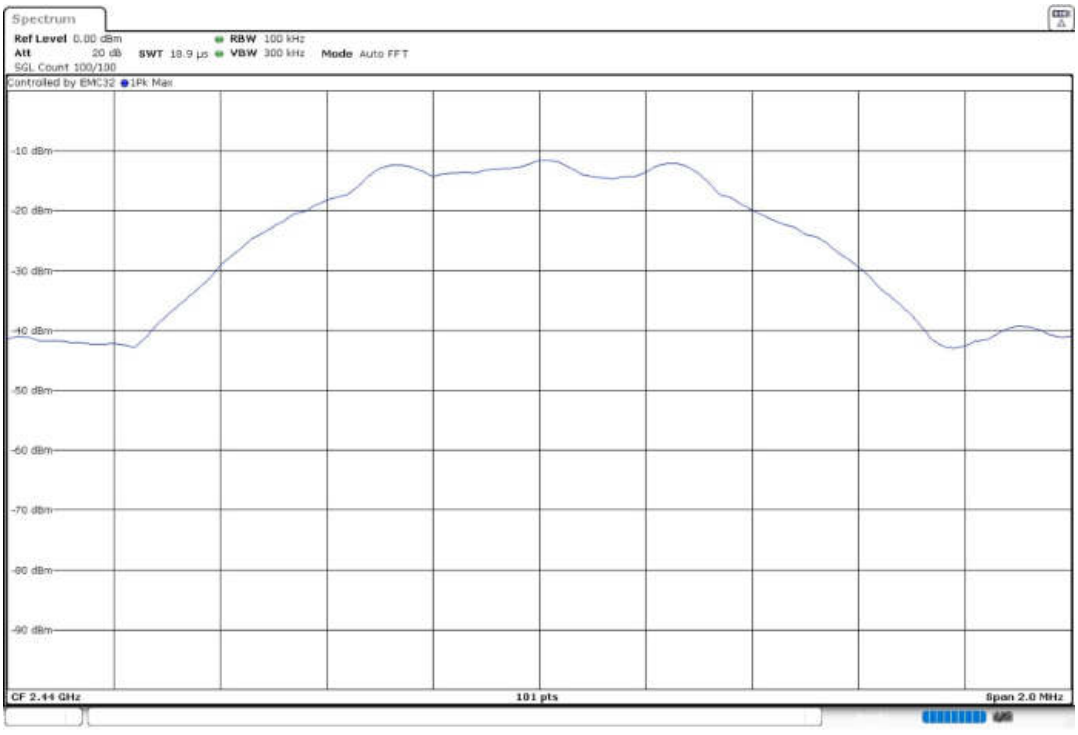


**Frequency MHz = 2440.00000, Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1**

**Images:**

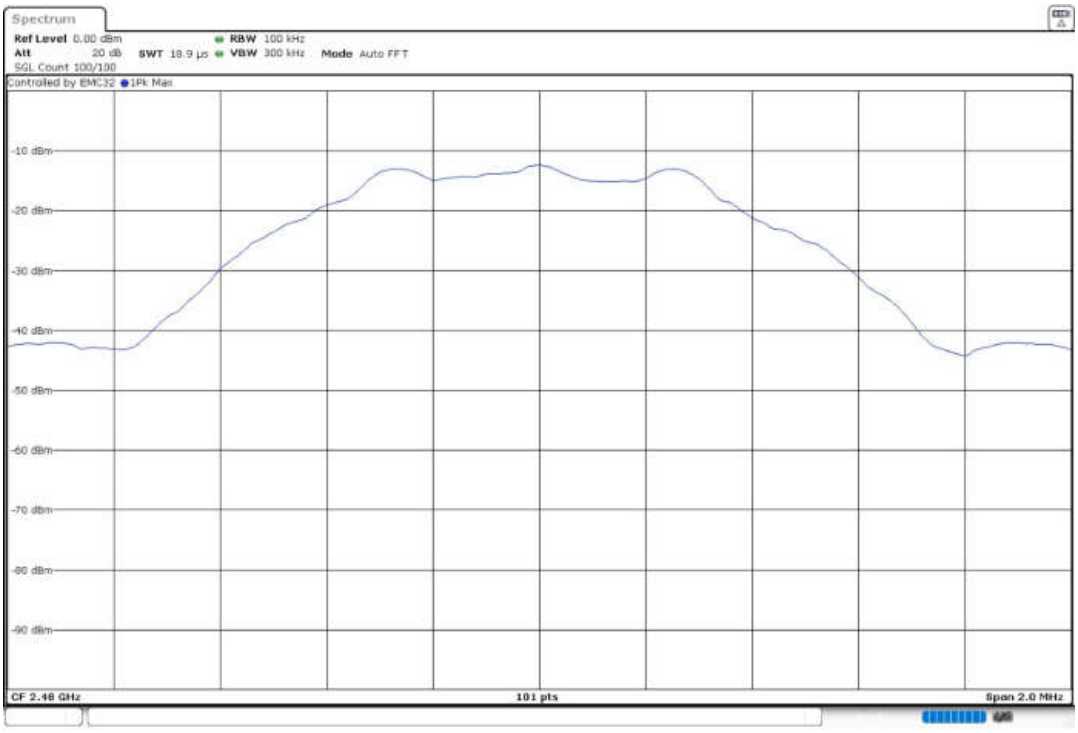
6 dB Bandwidth



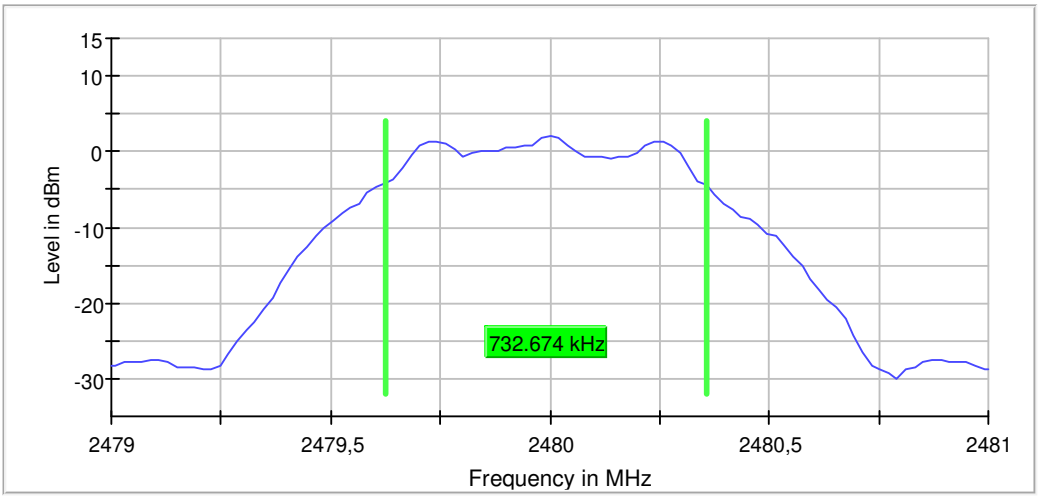



**Frequency MHz = 2480.00000, Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1**

**Images:**



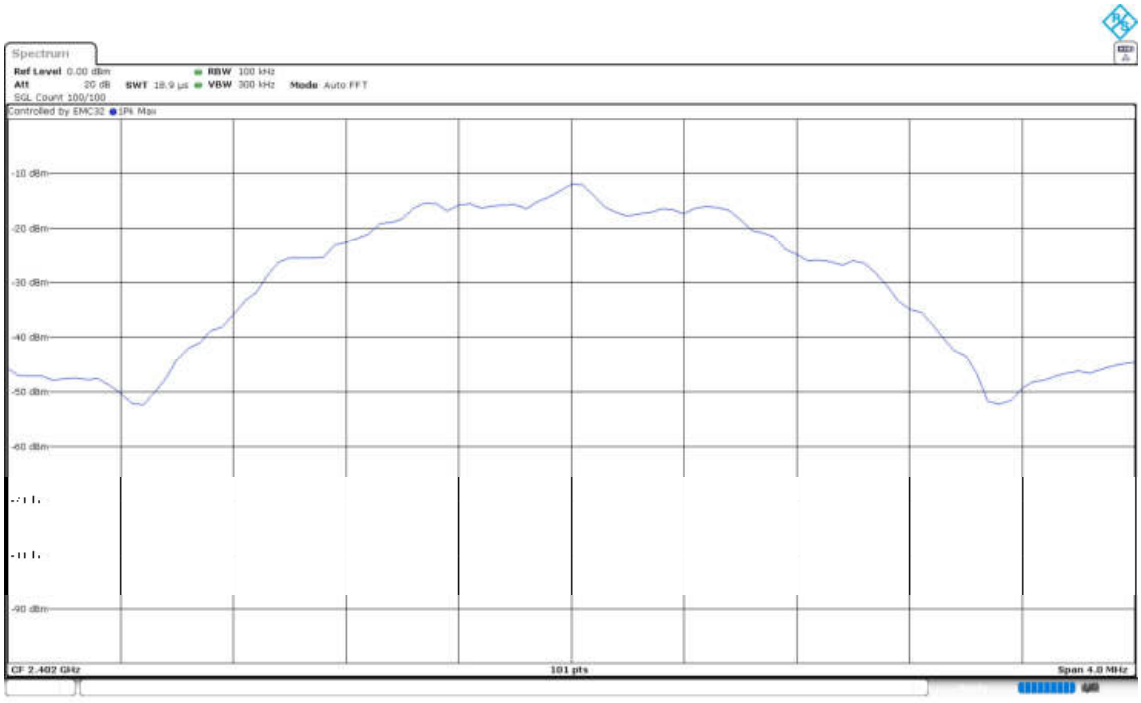

6 dB Bandwidth

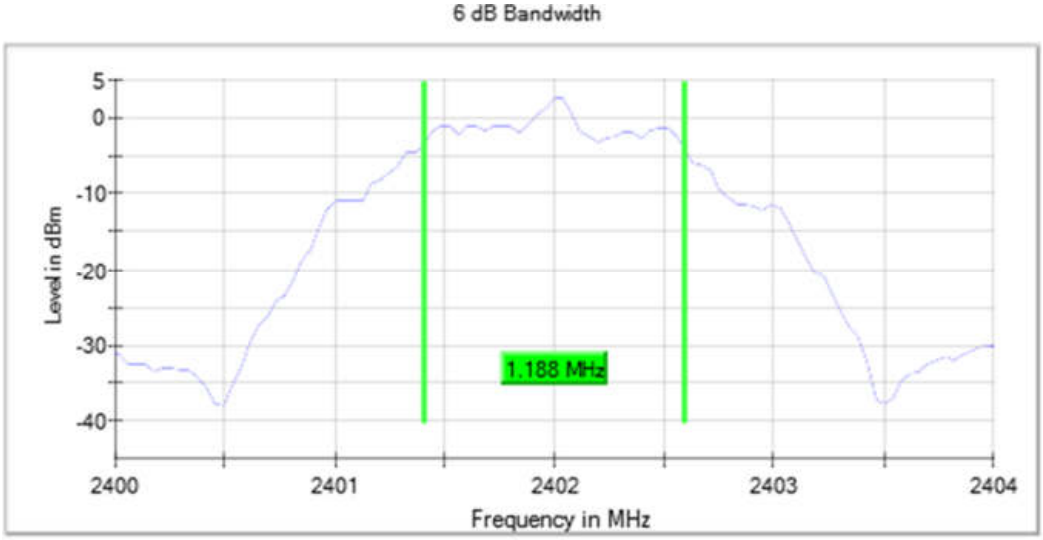


***Attachments***

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

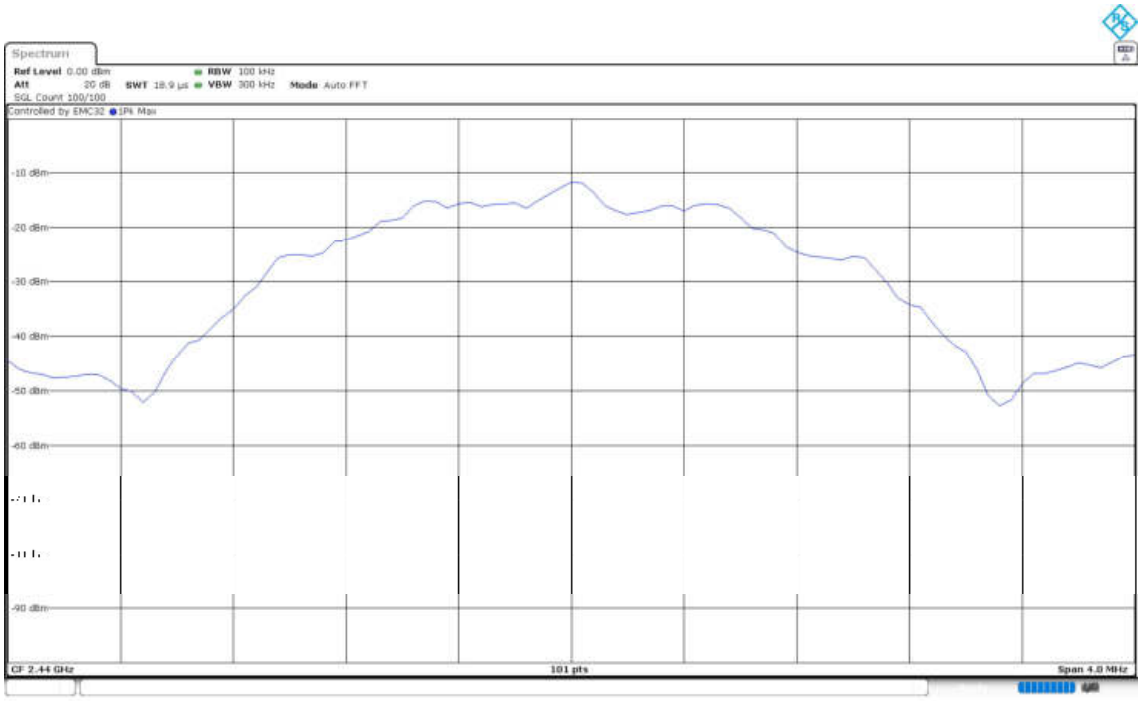
**Images:**

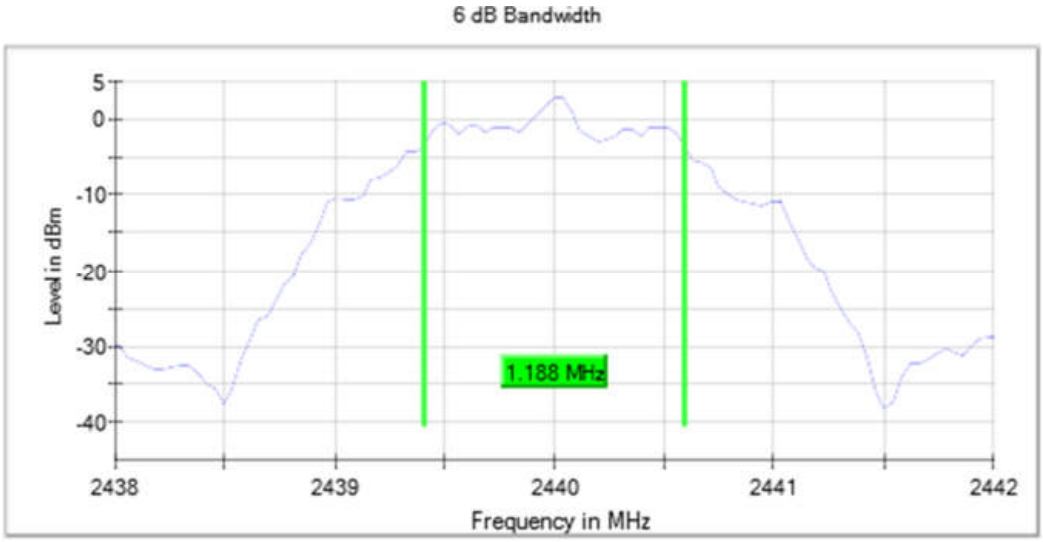


**Frequency MHz = 2440.00000, Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1**

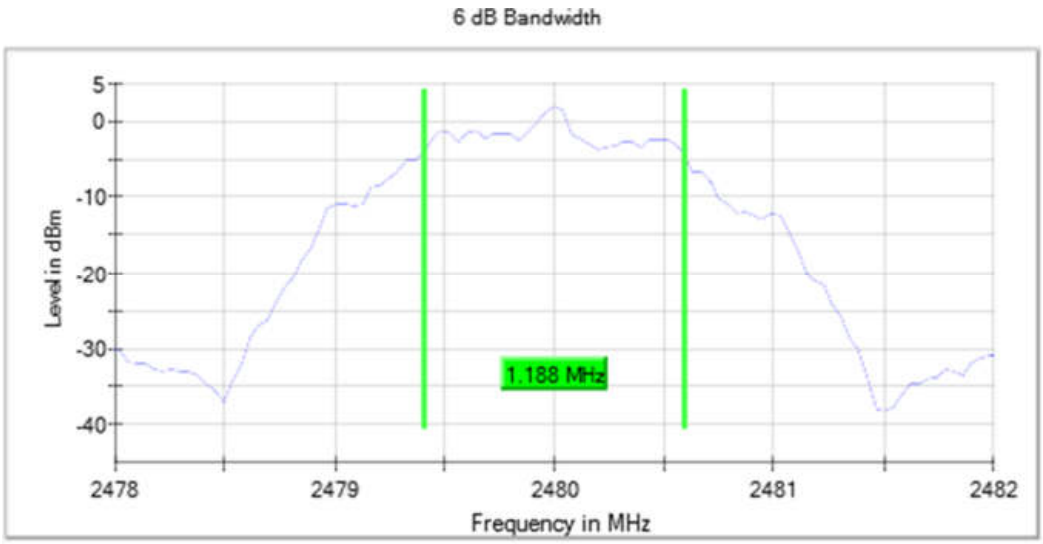
**Images:**

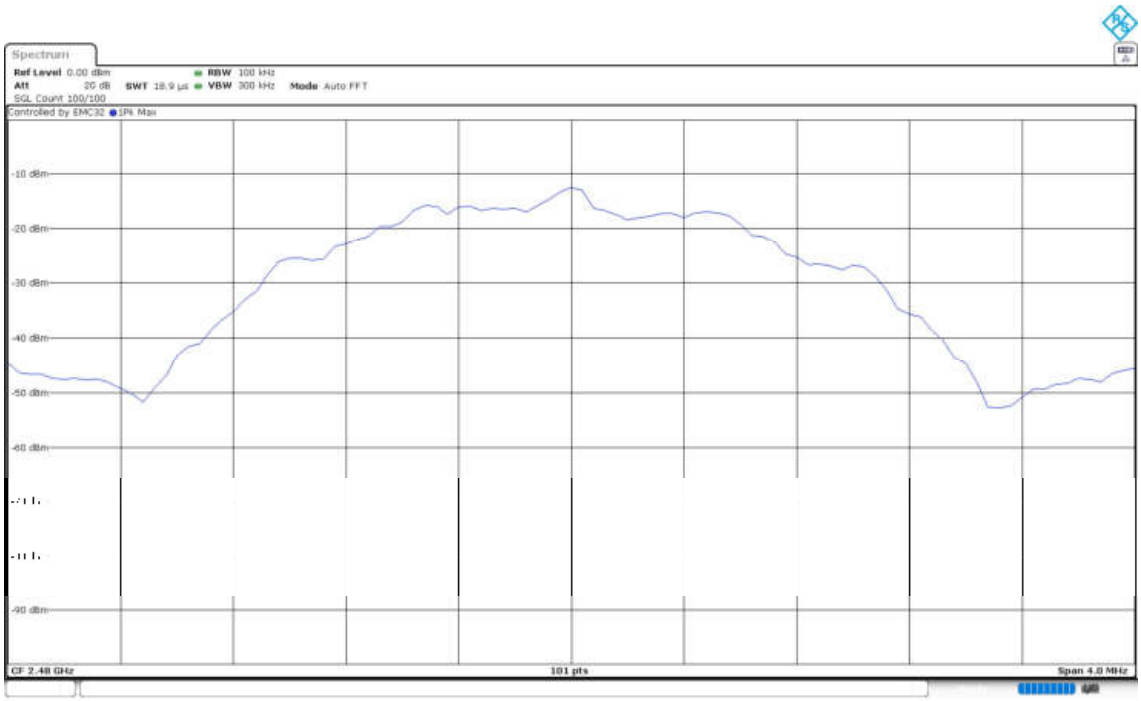


**Frequency MHz = 2480.00000, Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1**

**Images:**



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

***Limits***

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

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

***Results***

| Freq (MHz) | Equipment | BW (MHz) | # of Tx Chains | Port | PSD (dBm) |
|---|---|---|---|---|---|
| 2402.00000 | Digital Transmission System (DTS) | 1 | 1 | 1 | -7.126 |
| 2440.00000 | Digital Transmission System (DTS) | 1 | 1 | 1 | -6.864 |
| 2480.00000 | Digital Transmission System (DTS) | 1 | 1 | 1 | -7.597 |

***Verdict***

Pass

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

***Results***

| Freq (MHz) | Equipment | BW (MHz) | # of Tx Chains | Port | PSD (dBm) |
|---|---|---|---|---|---|
| 2402.00000 | Digital Transmission System (DTS) | 2 | 1 | 1 | -8.45 |
| 2440.00000 | Digital Transmission System (DTS) | 2 | 1 | 1 | -8.27 |
| 2480.00000 | Digital Transmission System (DTS) | 2 | 1 | 1 | -8.08 |

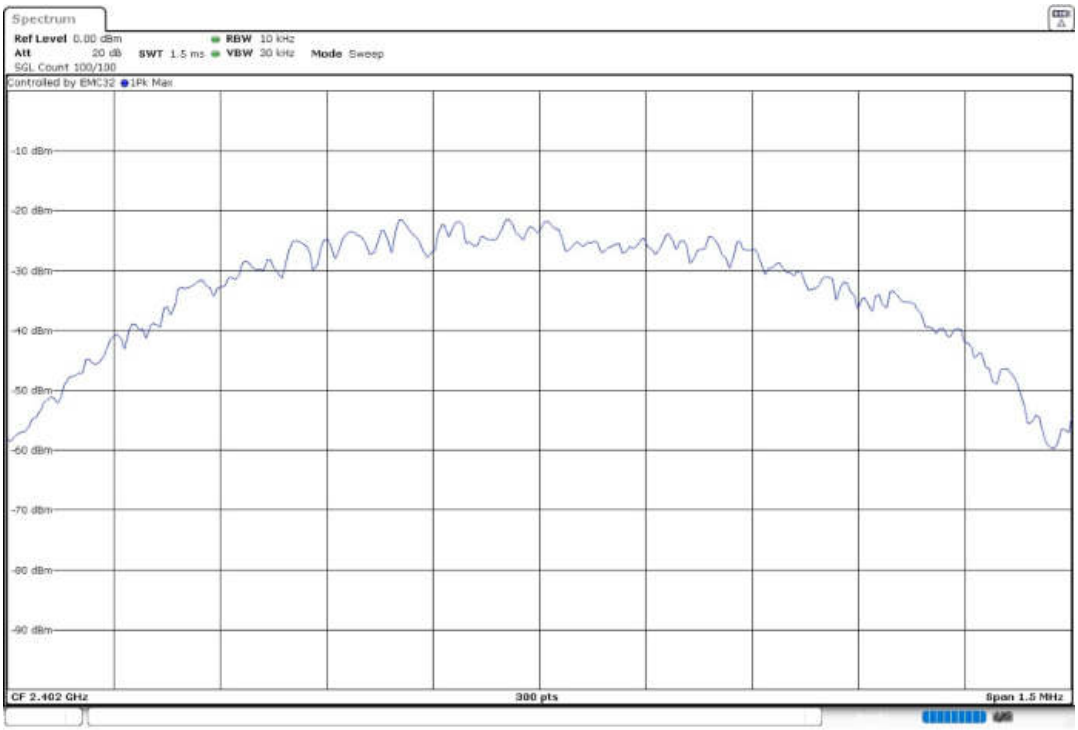
***Verdict***

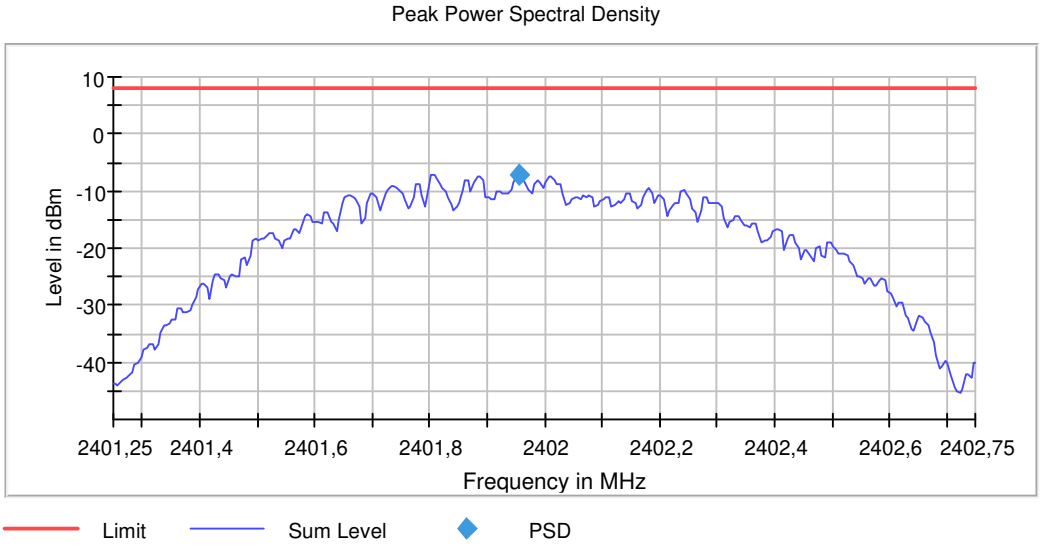
Pass

### *Attachments*

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

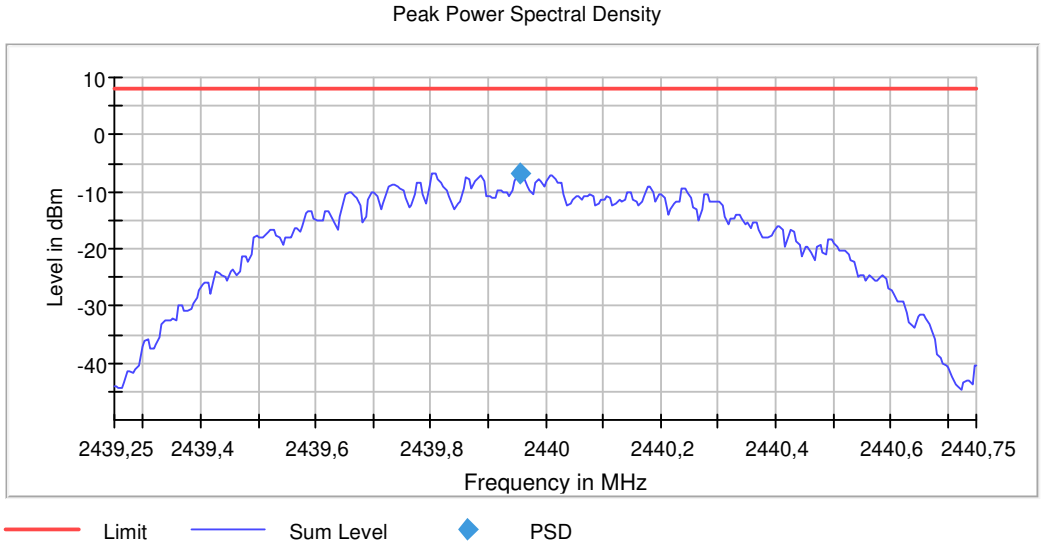
**Images:**

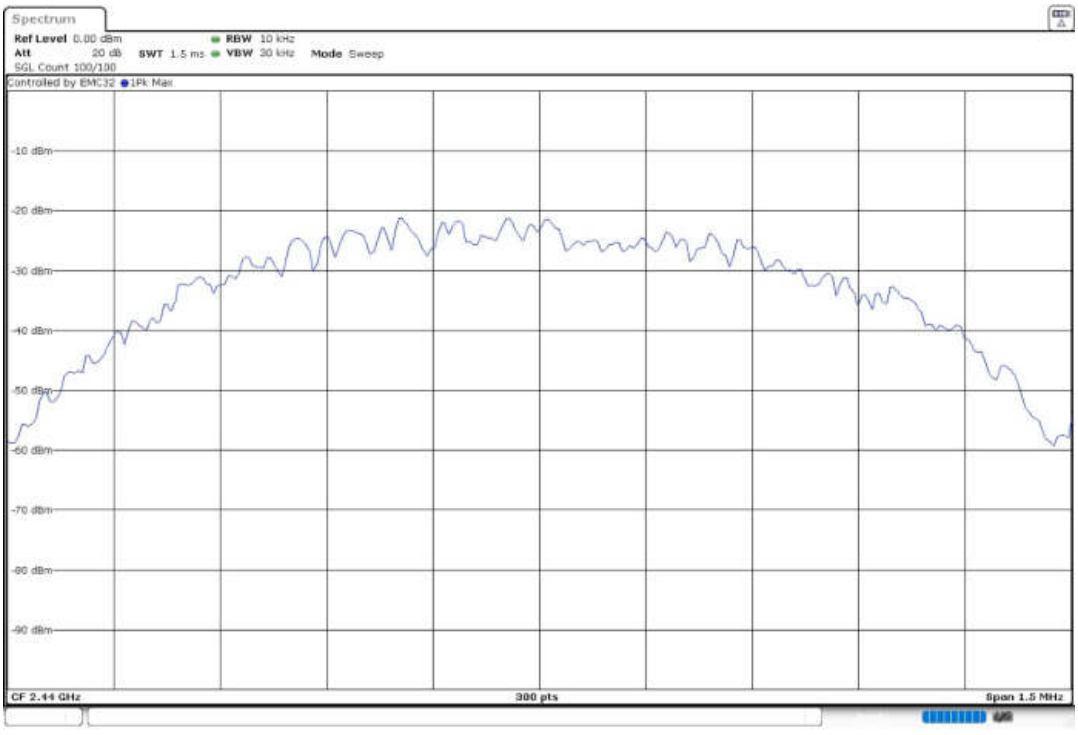


**Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1**

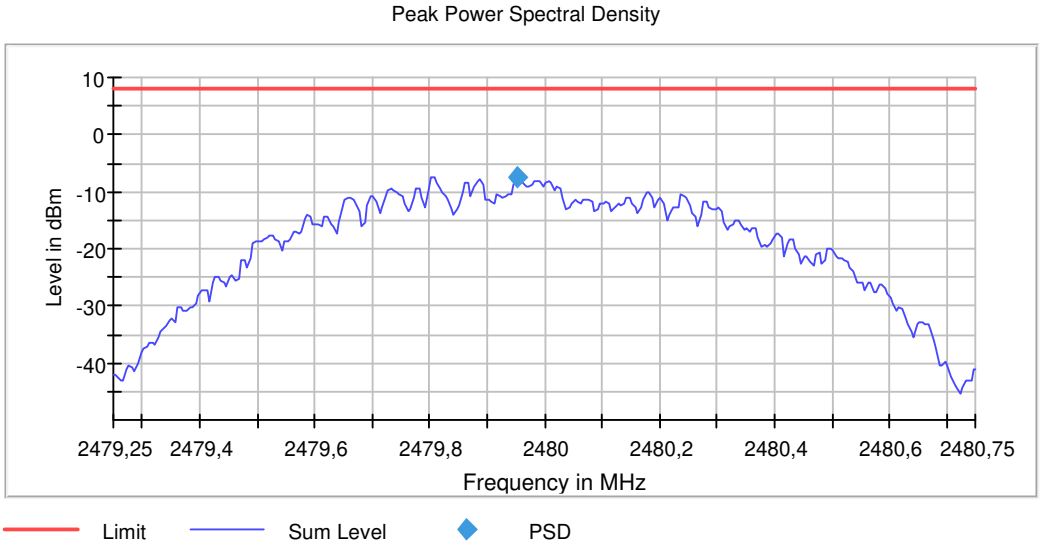
**Images:**

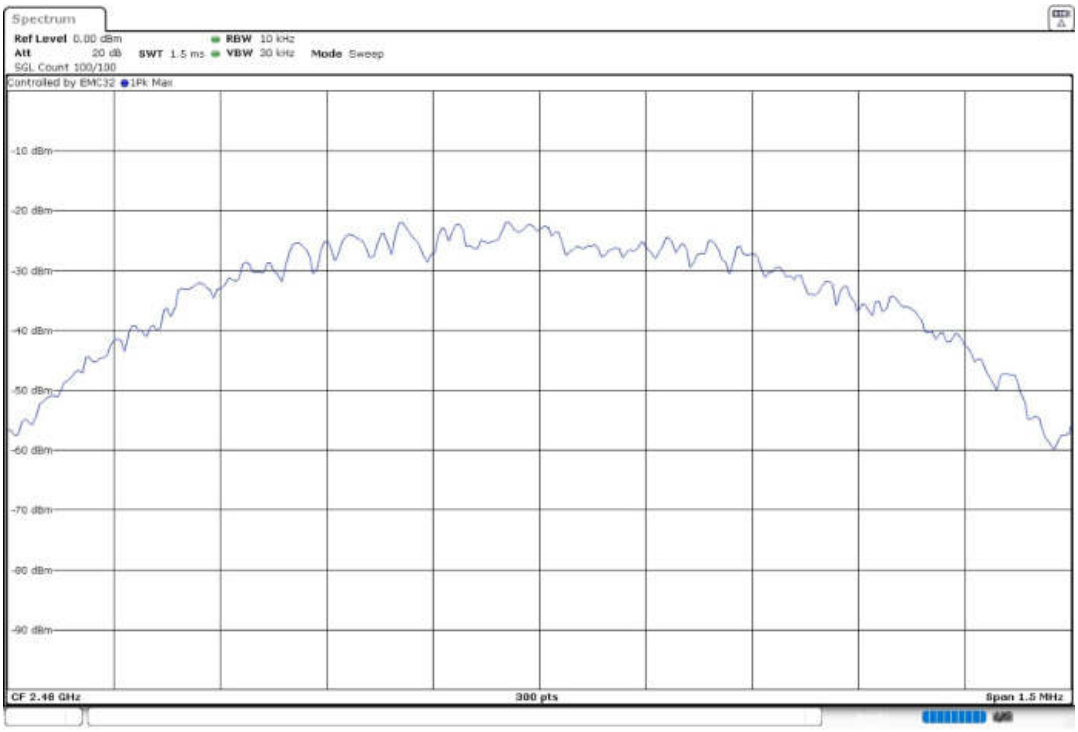


**Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1**

**Images:**

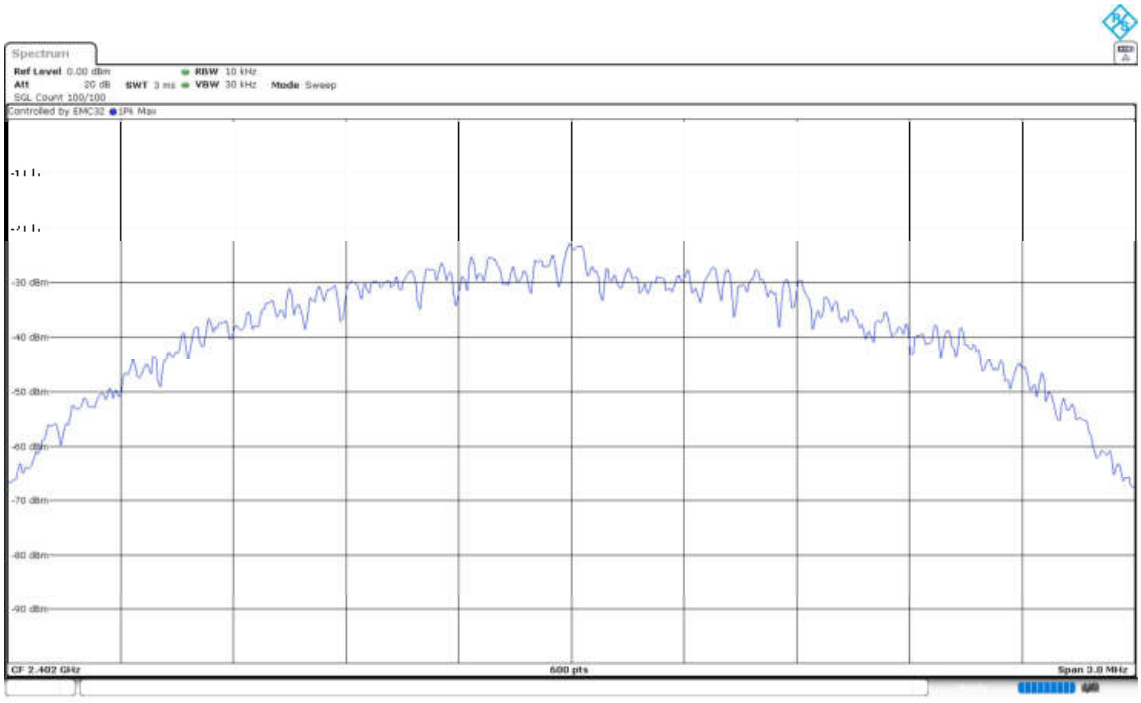


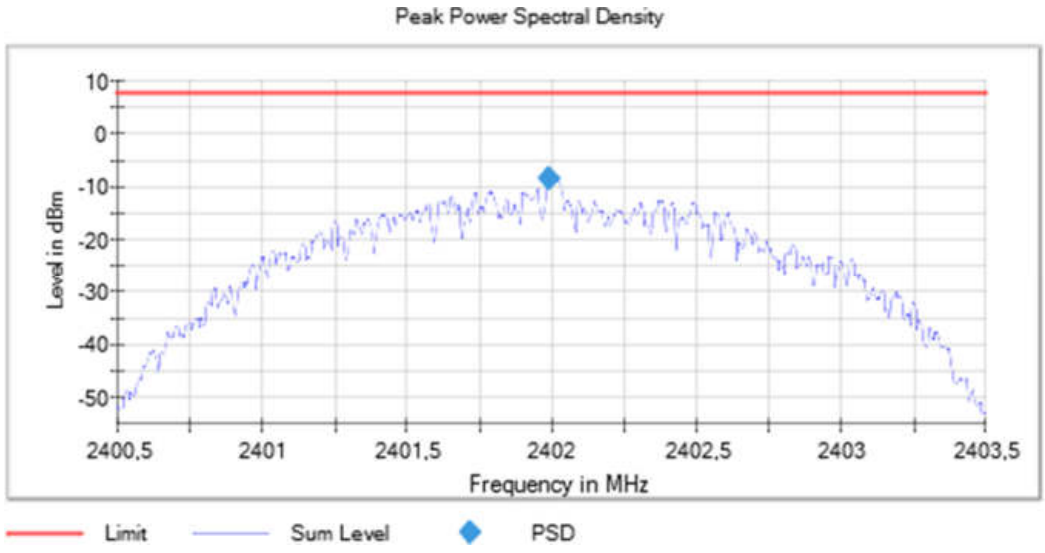



### *Attachments*

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

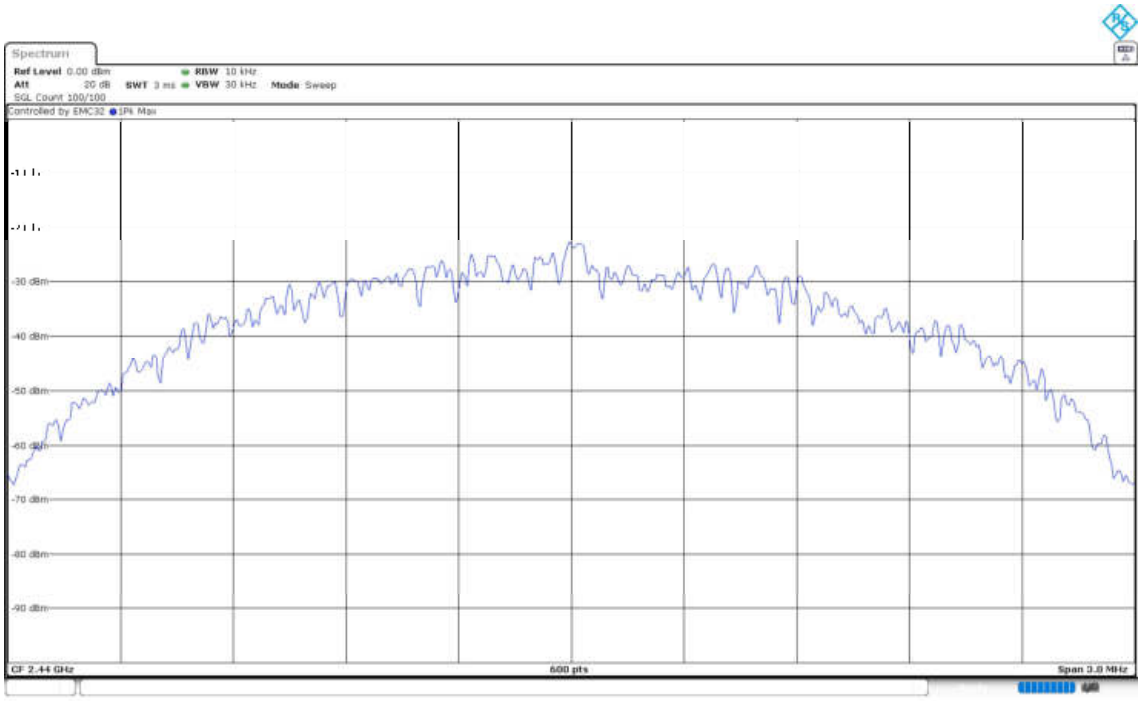
**Images:**

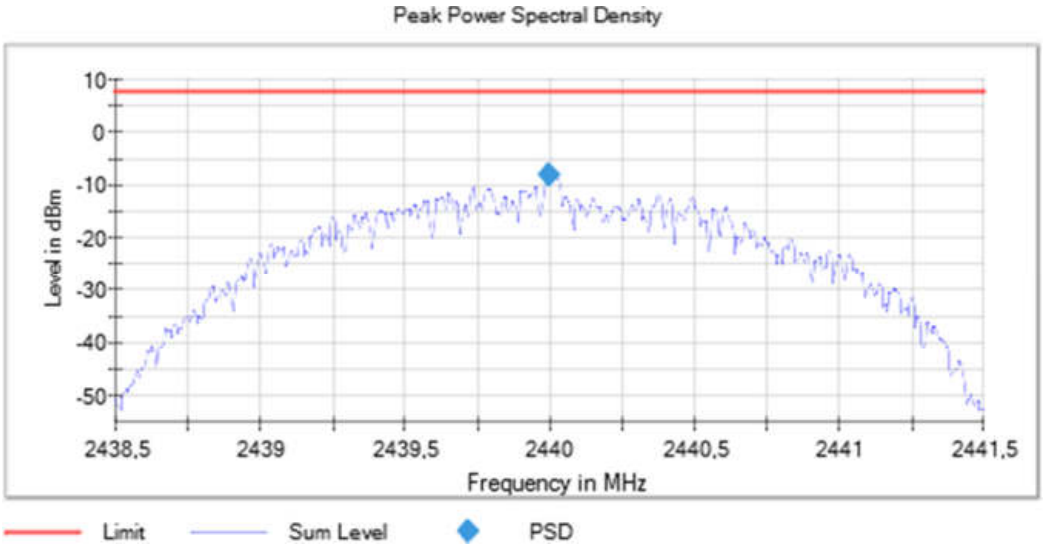


**Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1**

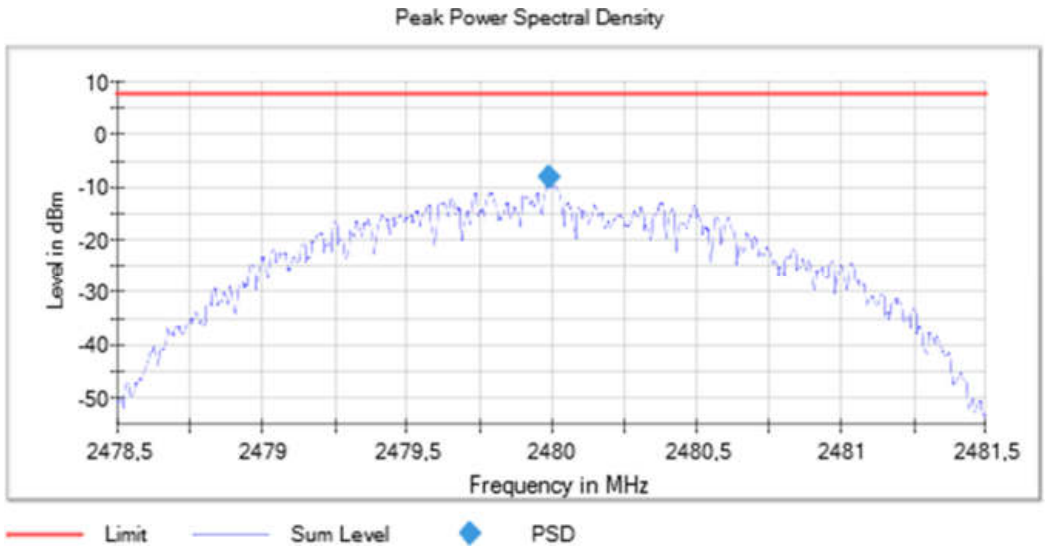
**Images:**

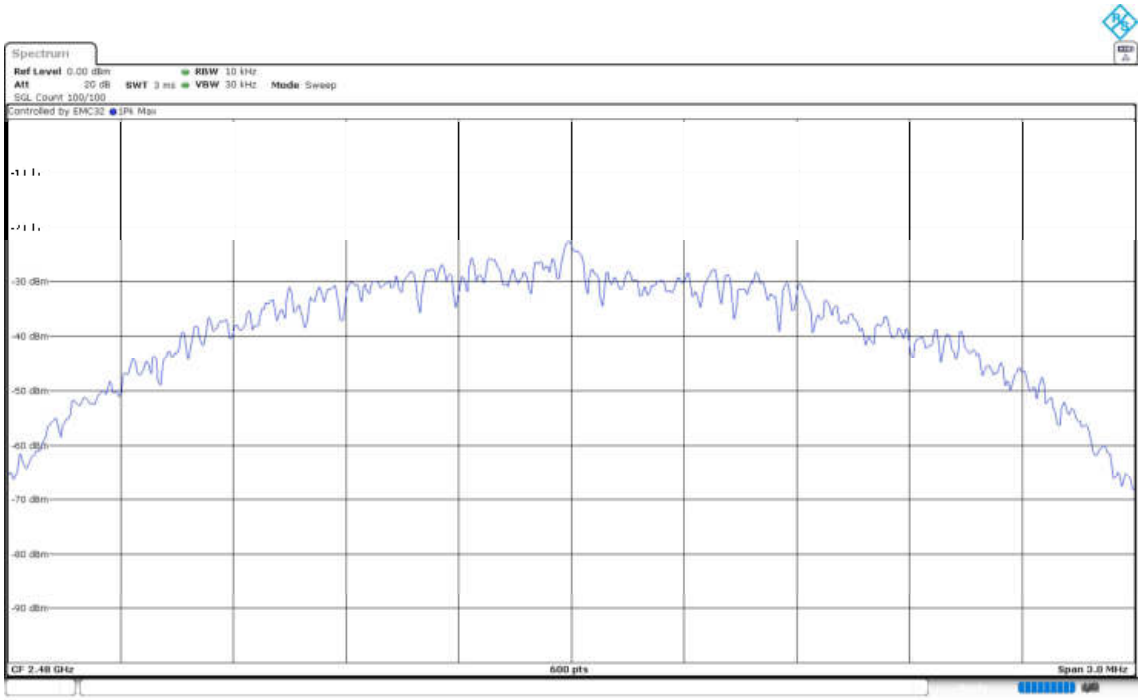


**Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1**

**Images:**



# 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 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: 1.3 dBi

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

***Results***

| Freq (MHz) | Equipment | BW (MHz) | # of Tx Chains | Port | Peak Power (dBm) | EIRP power (dBm) |
|---|---|---|---|---|---|---|
| 2402.00000 | Digital Transmission System (DTS) | 1 | 1 | 1 | 2.8 | 4.1 |
| 2440.00000 | Digital Transmission System (DTS) | 1 | 1 | 1 | 3.1 | 4.4 |
| 2480.00000 | Digital Transmission System (DTS) | 1 | 1 | 1 | 2.4 | 3.7 |

***Verdict***

Pass

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

***Results***

| Freq (MHz) | Equipment | BW (MHz) | # of Tx Chains | Port | Peak Power (dBm) | EIRP power (dBm) |
|---|---|---|---|---|---|---|
| 2402.00000 | Digital Transmission System (DTS) | 2 | 1 | 1 | 2.8 | 4.1 |
| 2440.00000 | Digital Transmission System (DTS) | 2 | 1 | 1 | 3.1 | 4.4 |
| 2480.00000 | Digital Transmission System (DTS) | 2 | 1 | 1 | 2.5 | 3.8 |

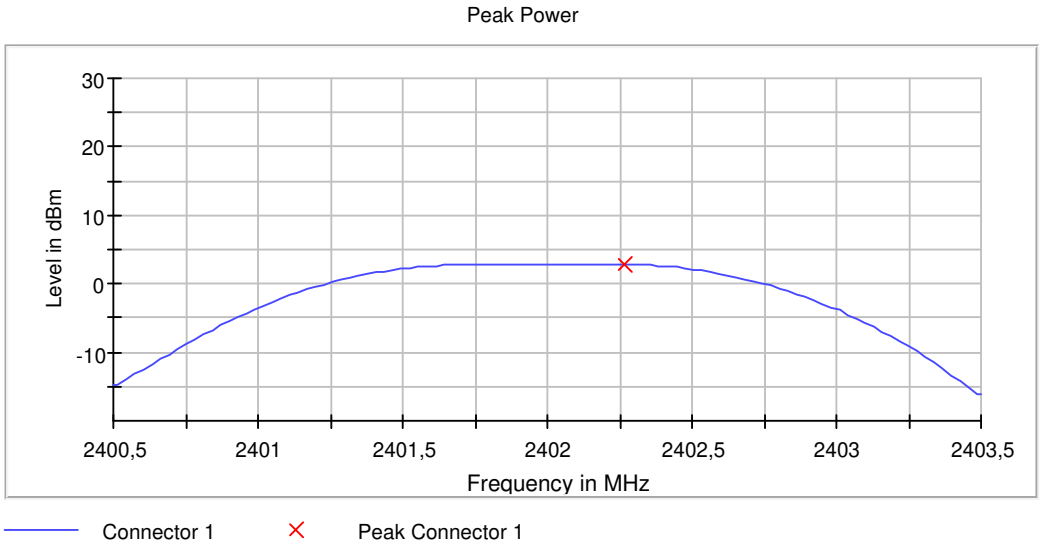
***Verdict***

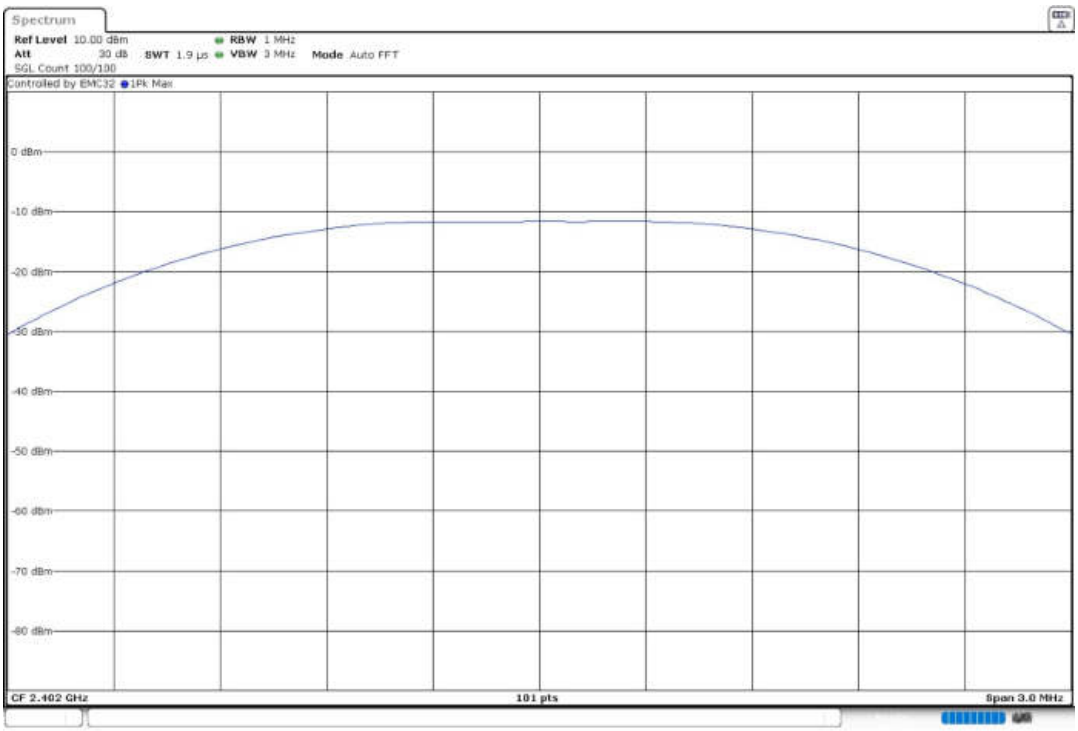
Pass

### *Attachments*

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

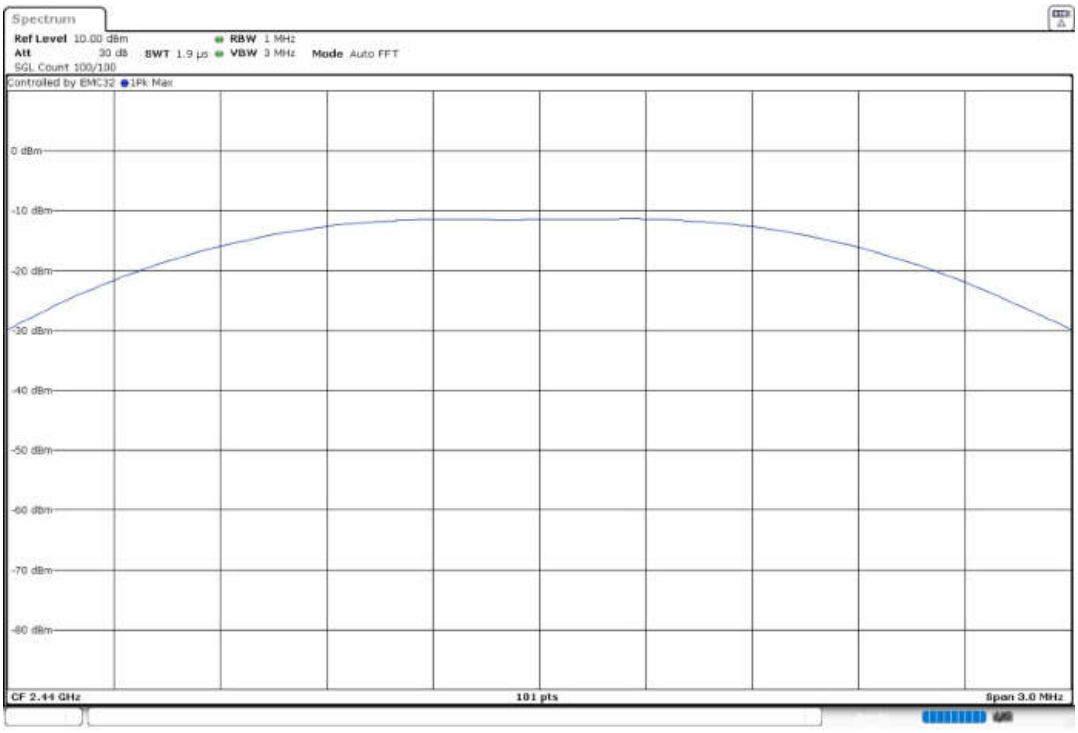
**Images:**



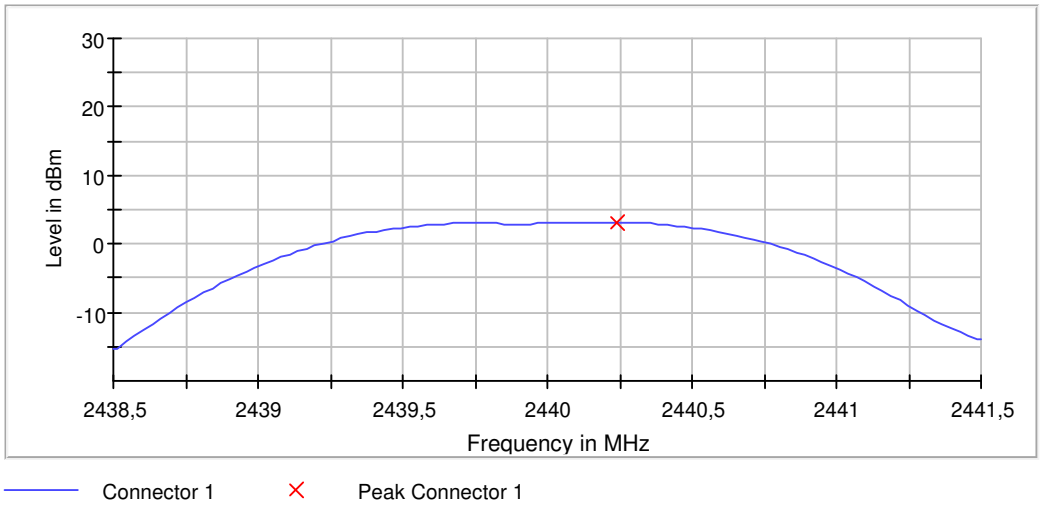



**Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1**

**Images:**

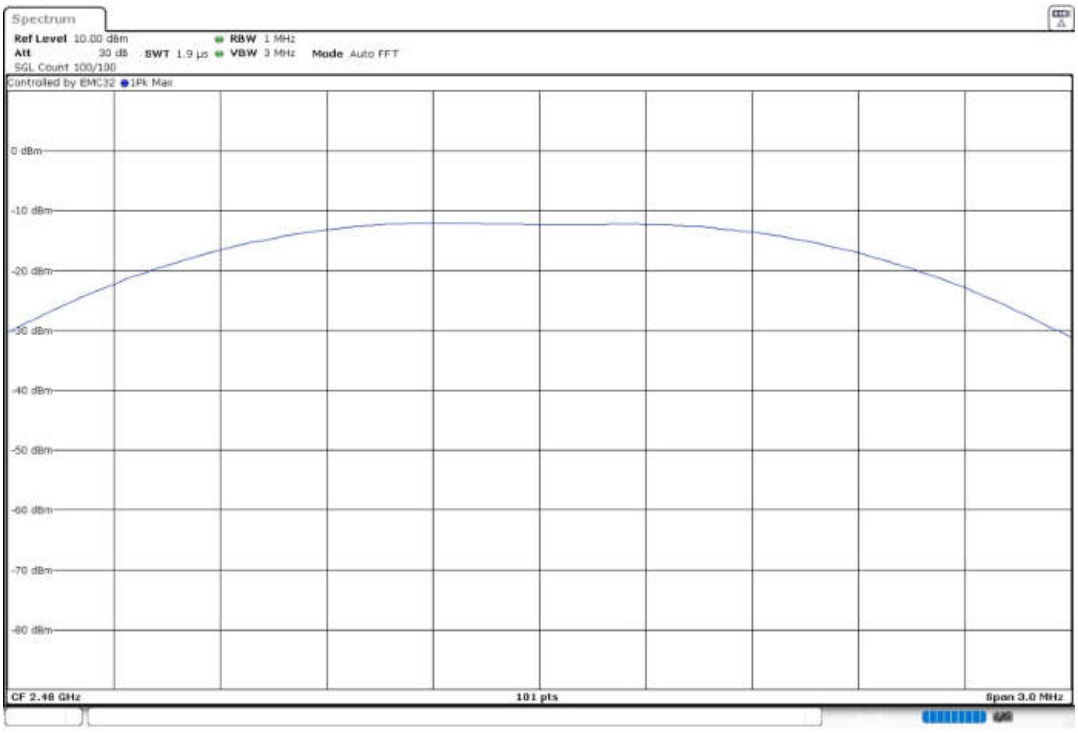



Peak Power

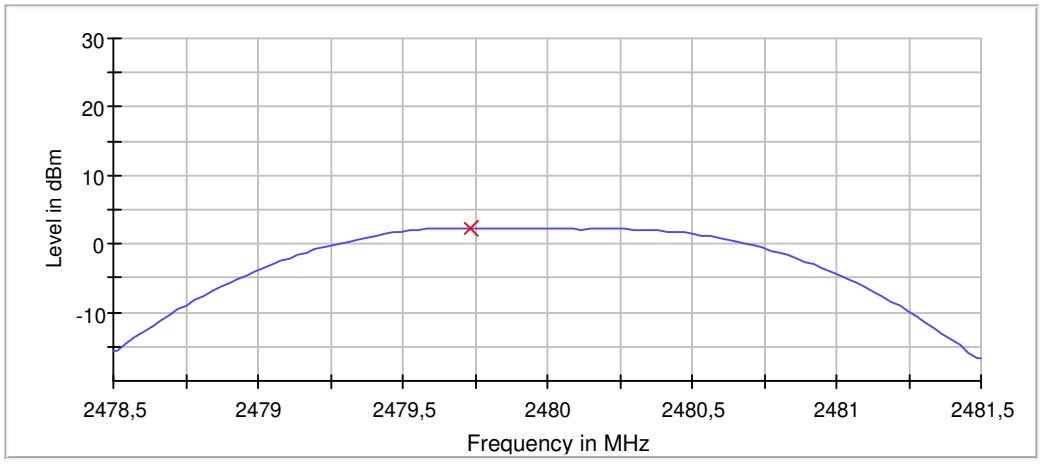


**Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Active Port = 1**

**Images:**




Peak Power

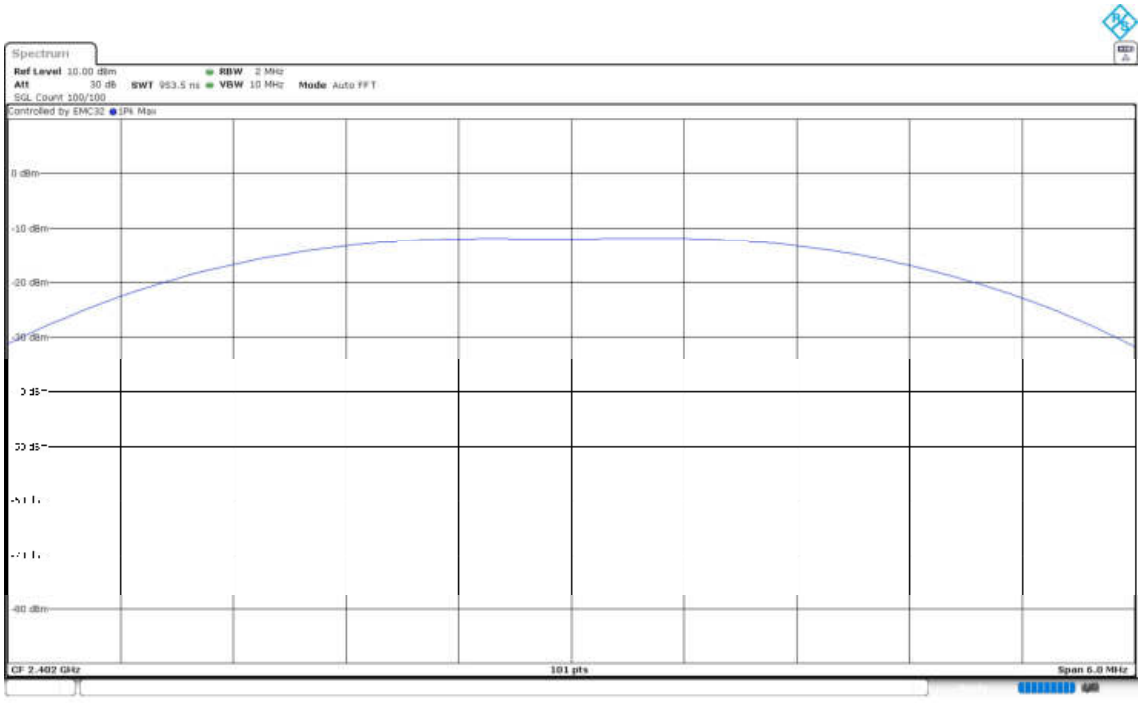


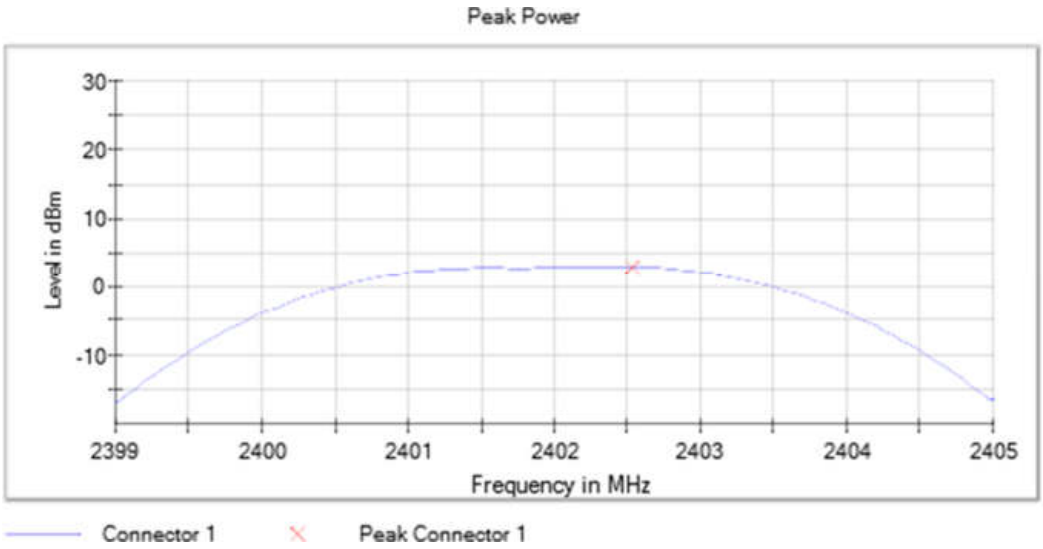

Connector 1 Peak Connector 1

### *Attachments*

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

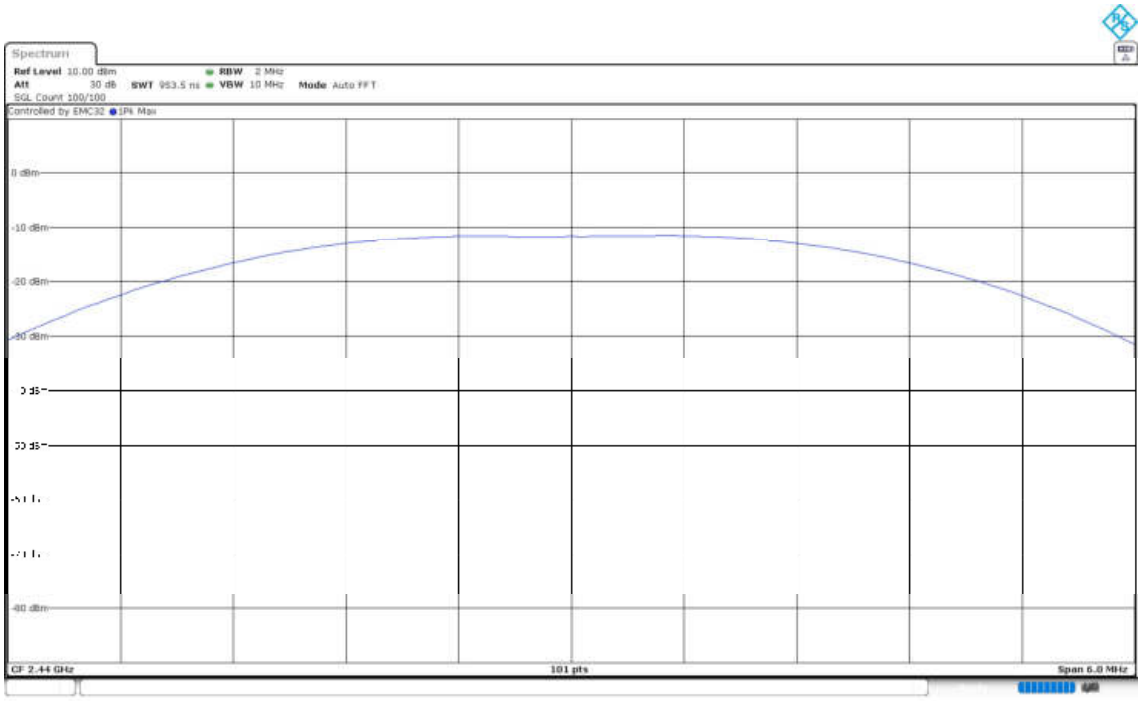
**Images:**

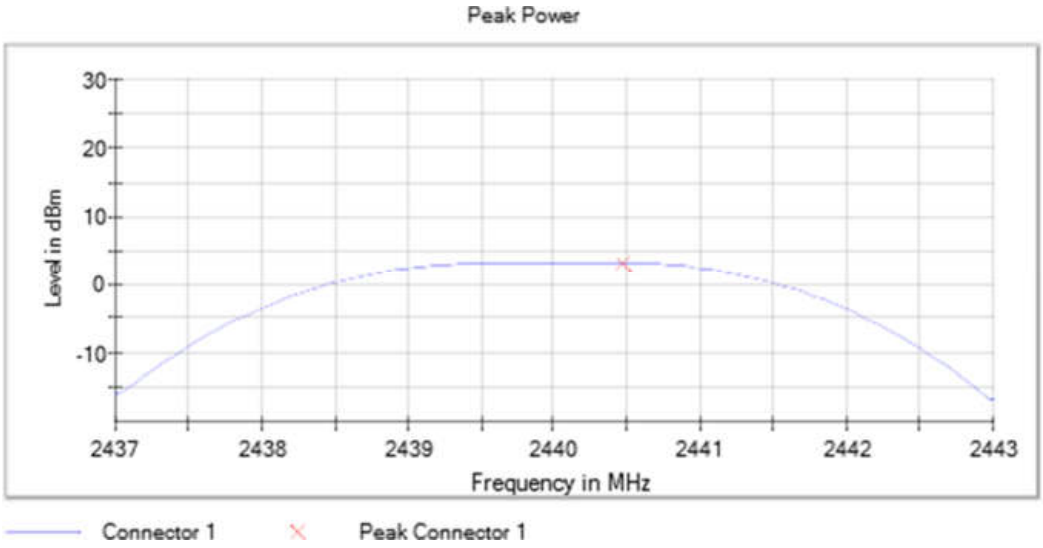


**Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1**

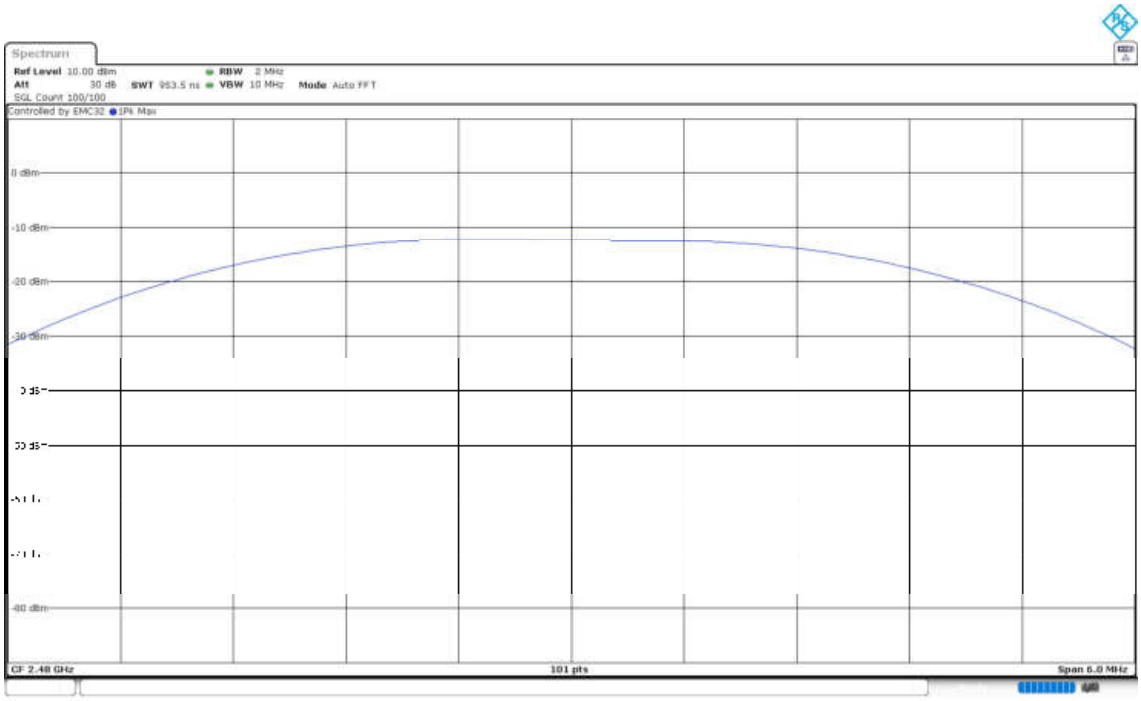
**Images:**

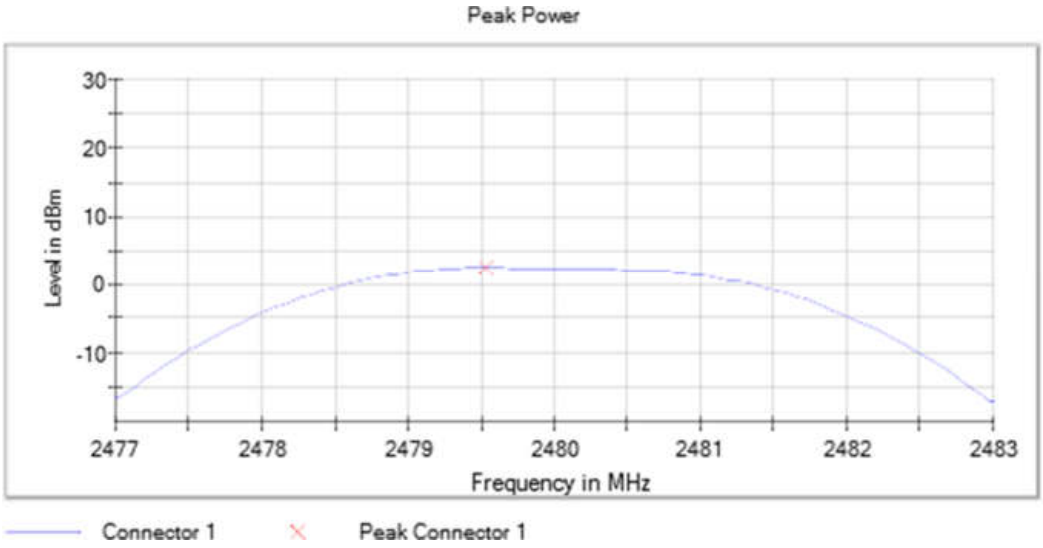


**Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1**

**Images:**



# RSS-247 5.5 / 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.

Operation Band: [2400, 2483.5]

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

***Results***

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

***Verdict***

Pass

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

***Results***

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

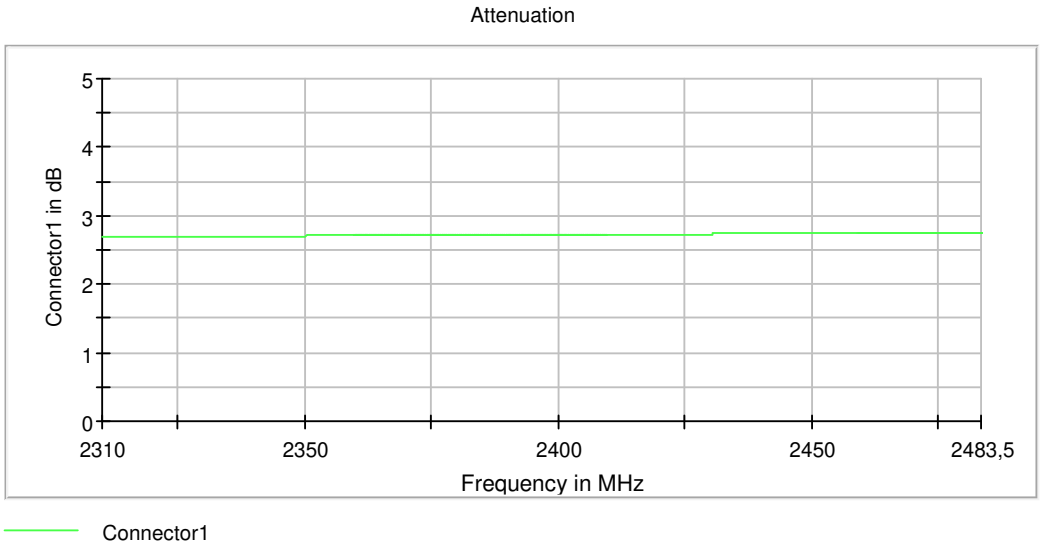
***Verdict***

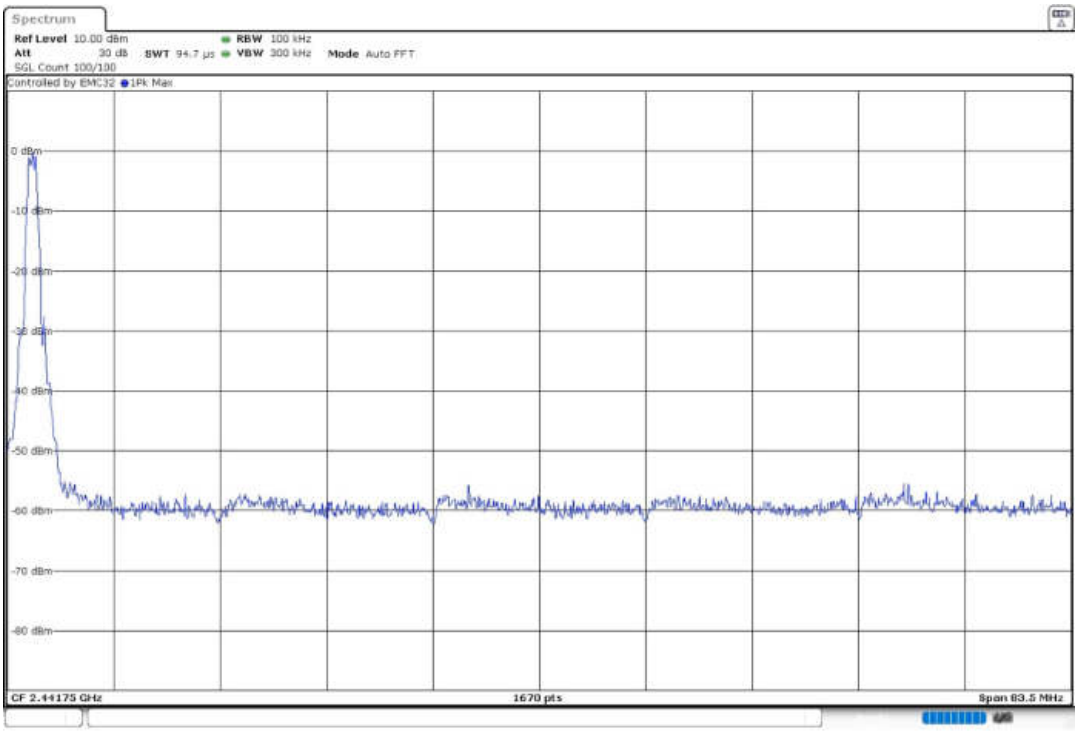
Pass

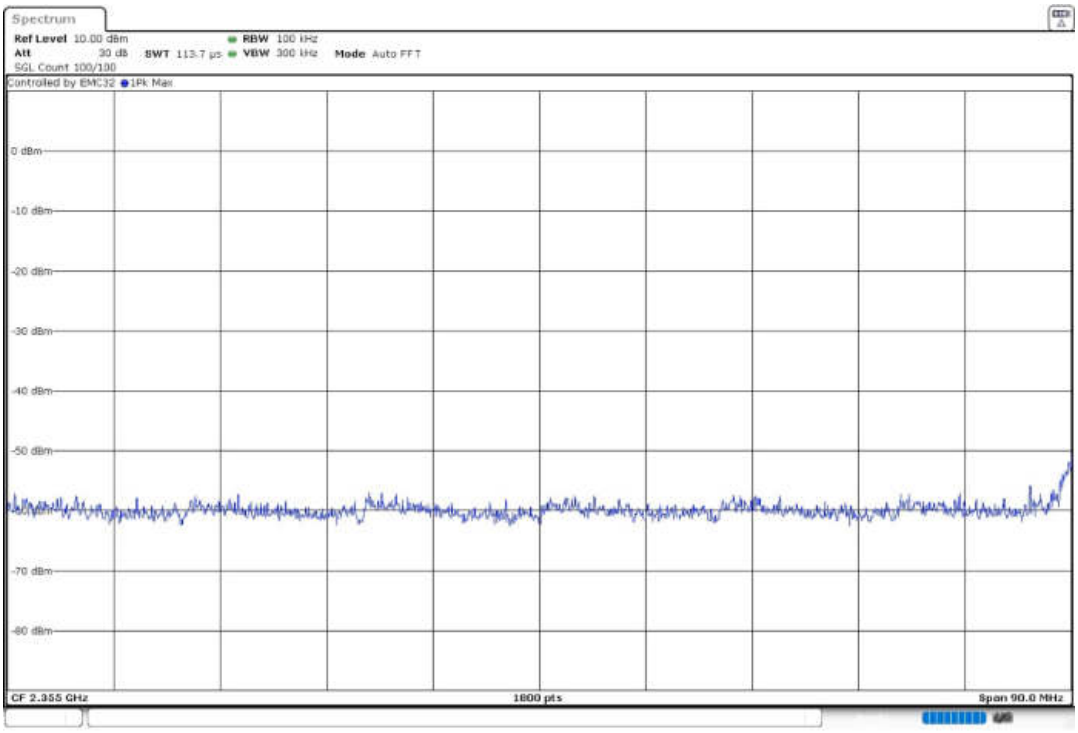
### *Attachments*

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

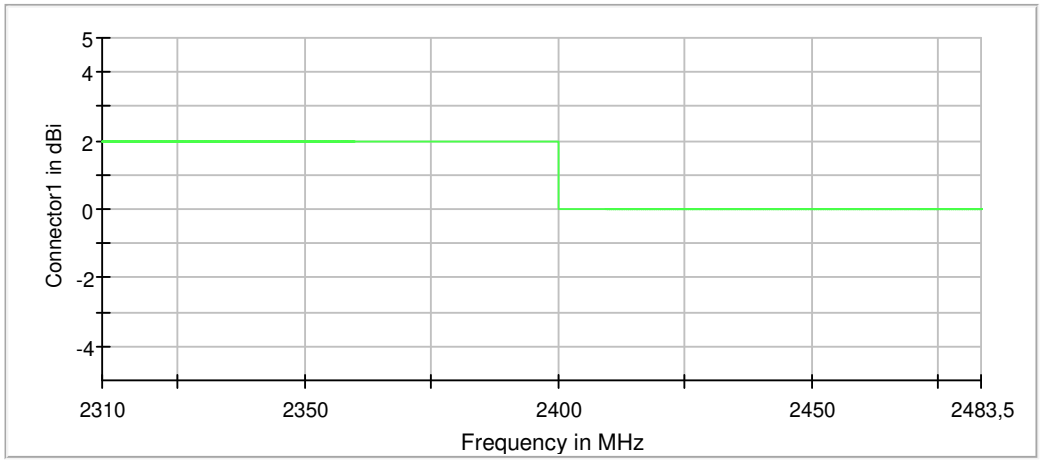
**Images:**



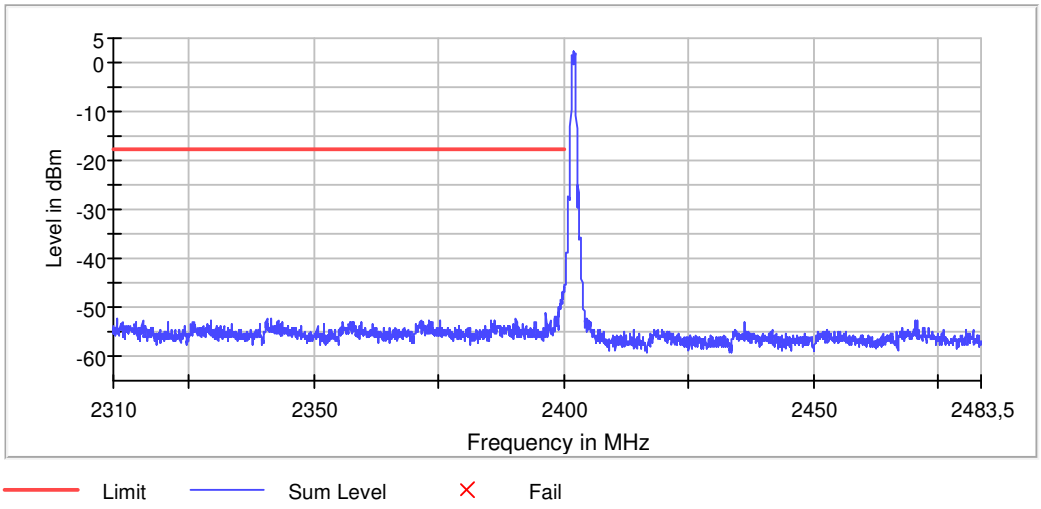



Gain



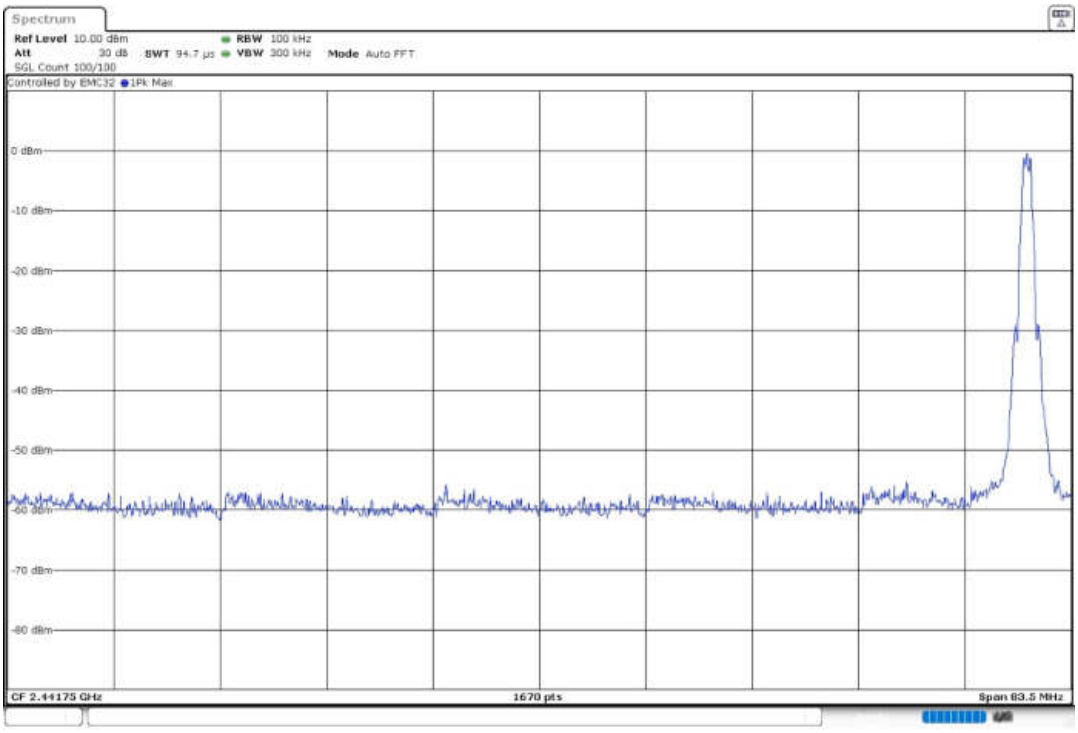

Connector1

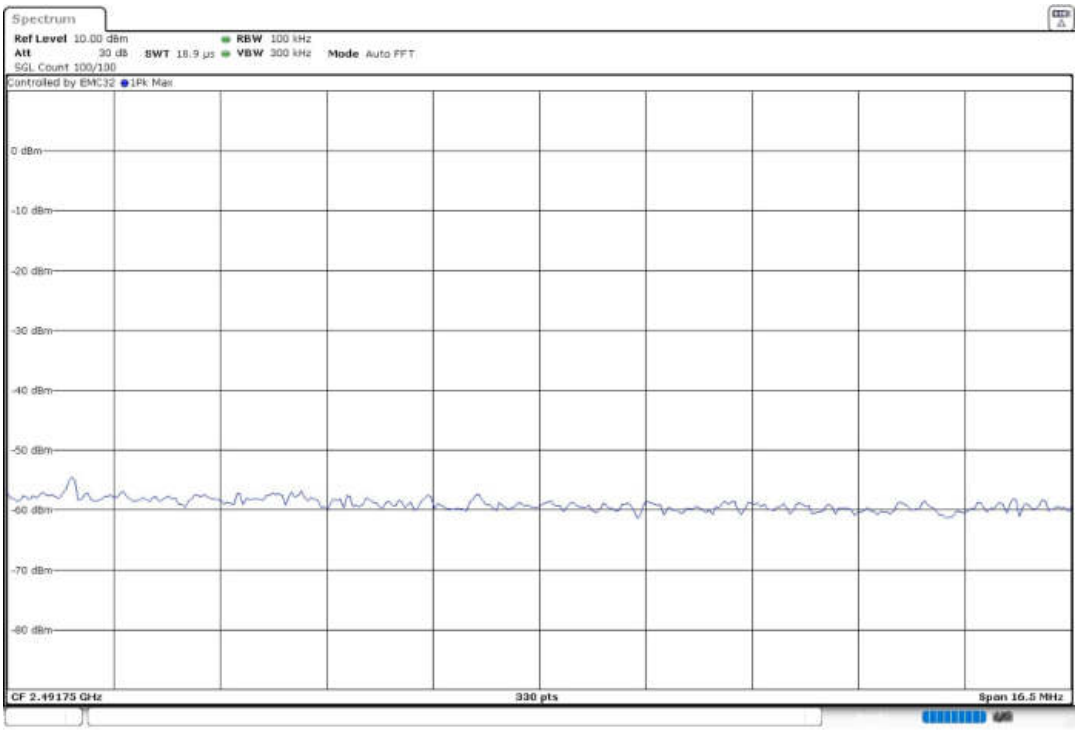
Band Edge


5
0
-10
-20
-30
-40
-50
-60
Level in dBm
2310
2350
2400
2450
2483,5
Frequency in MHz
Limit
Sum Level
Fail

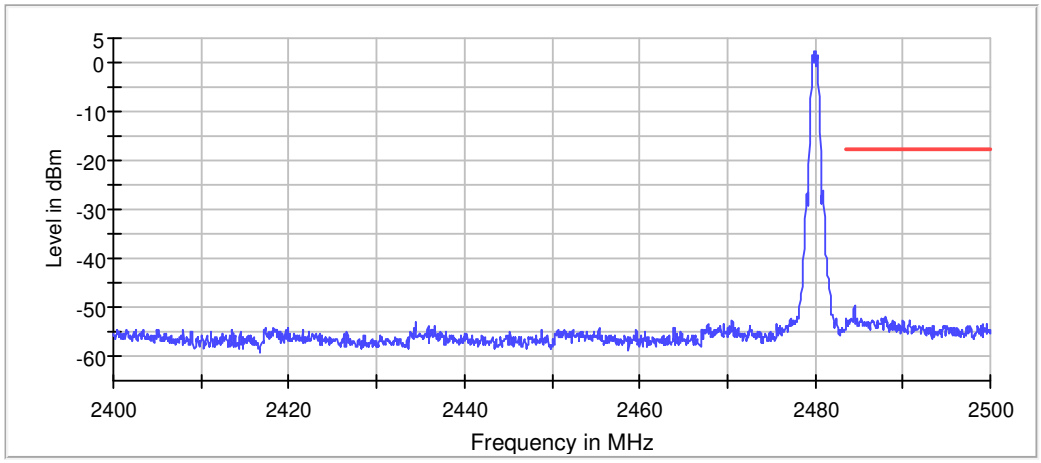
**Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1**

**Images:**



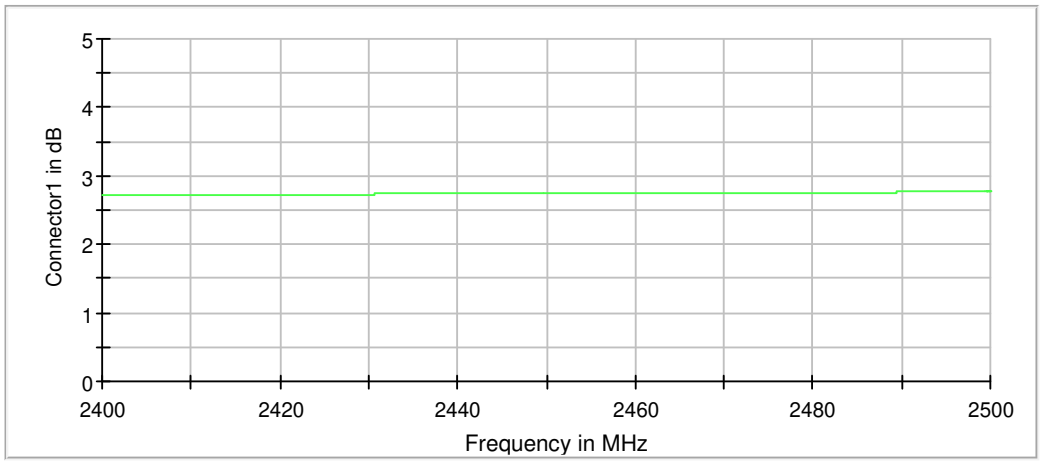



Band Edge



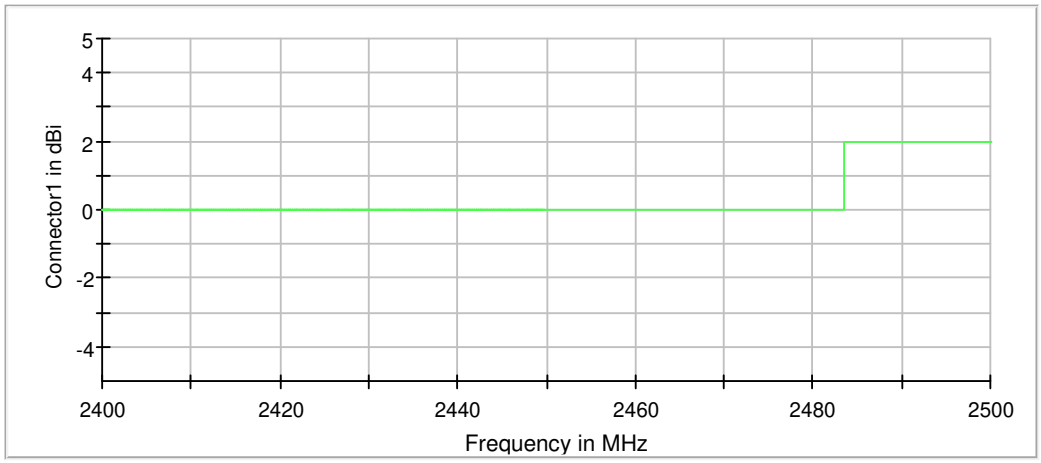

Limit Sum Level Fail

Attenuation




Connector1

Gain

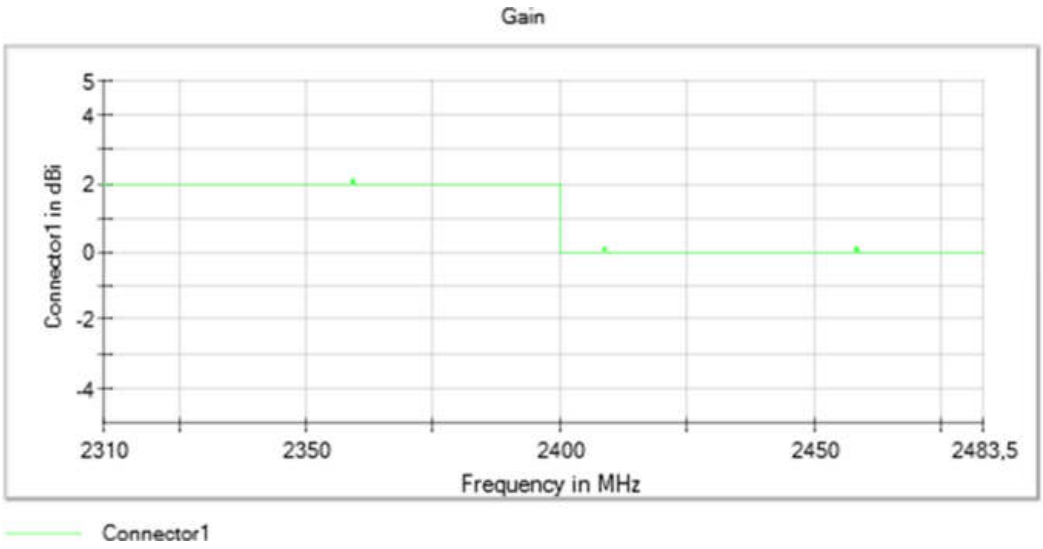


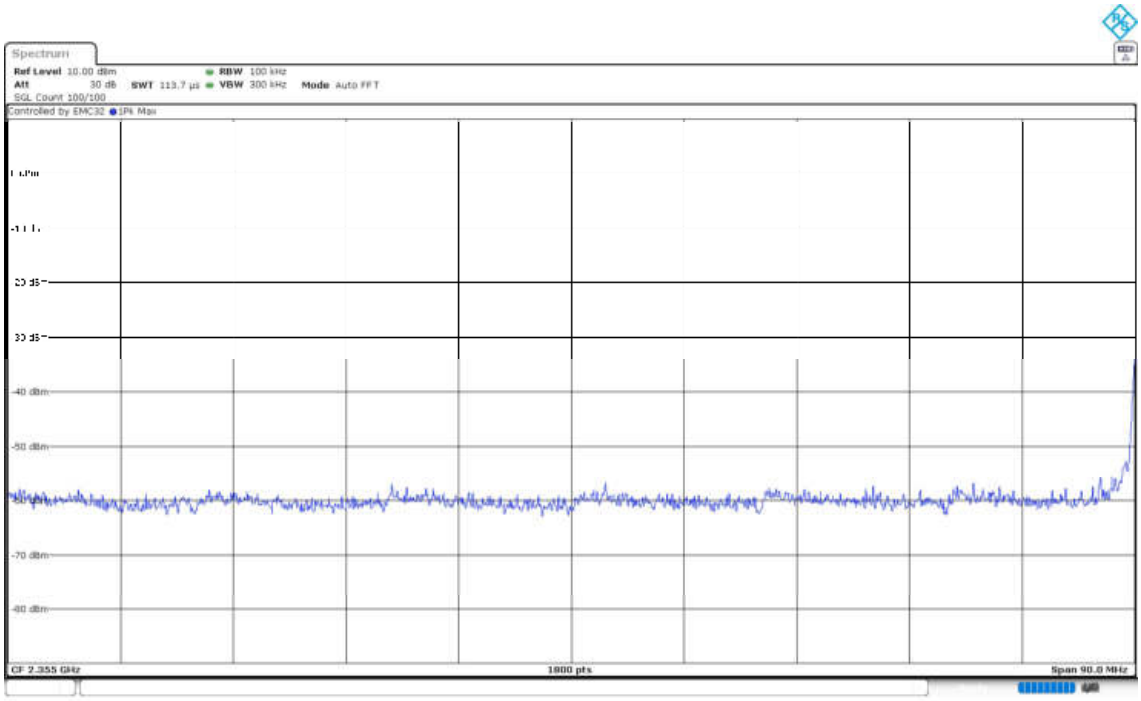

Connector1

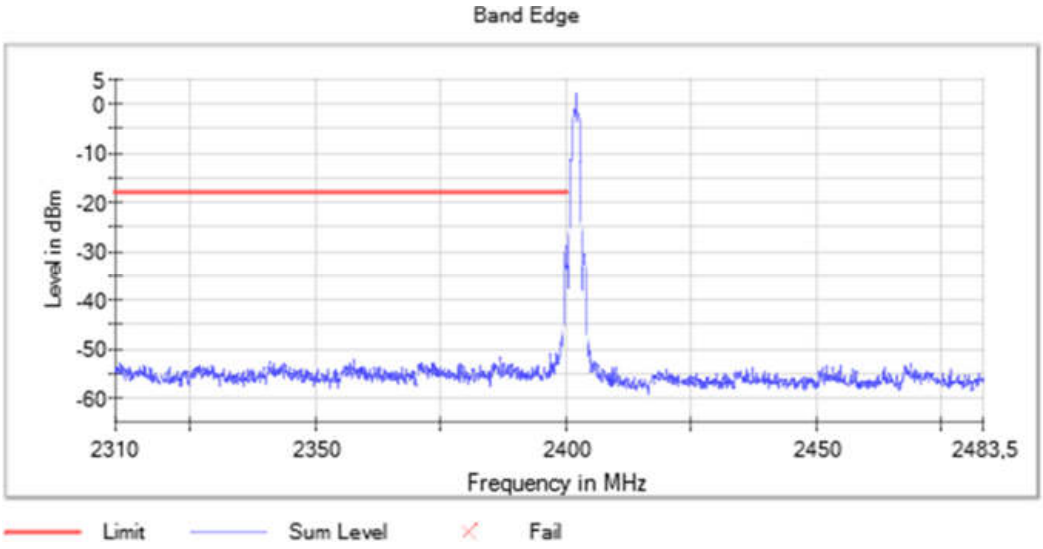
### *Attachments*

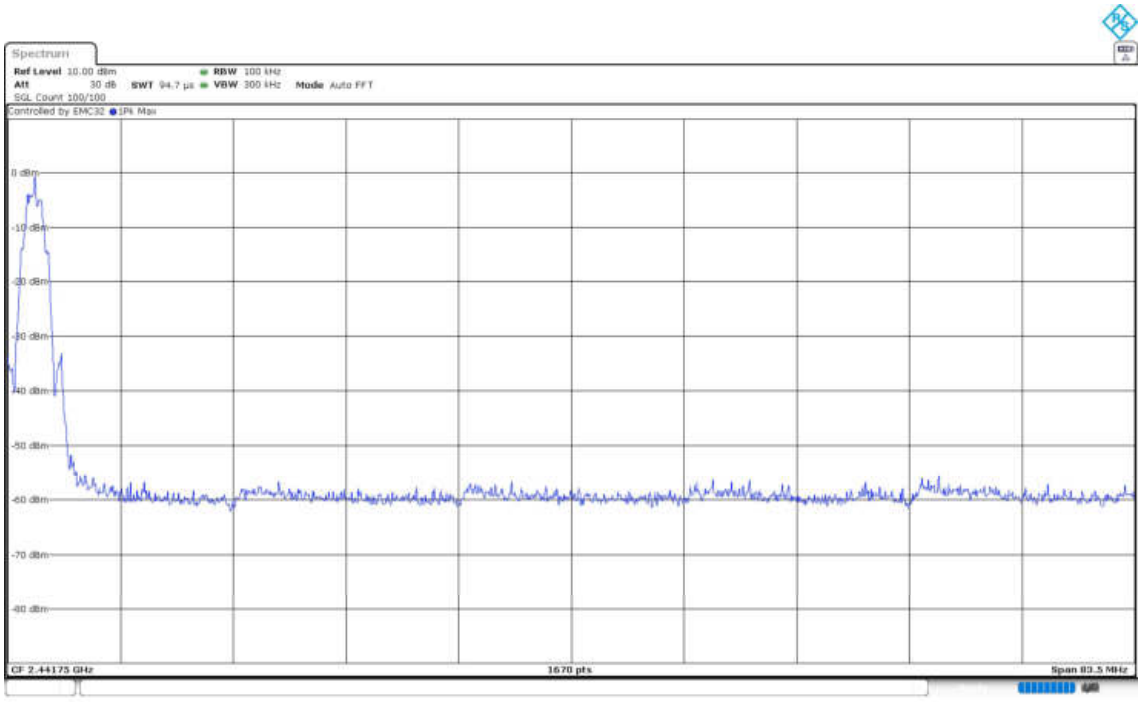
**Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1**

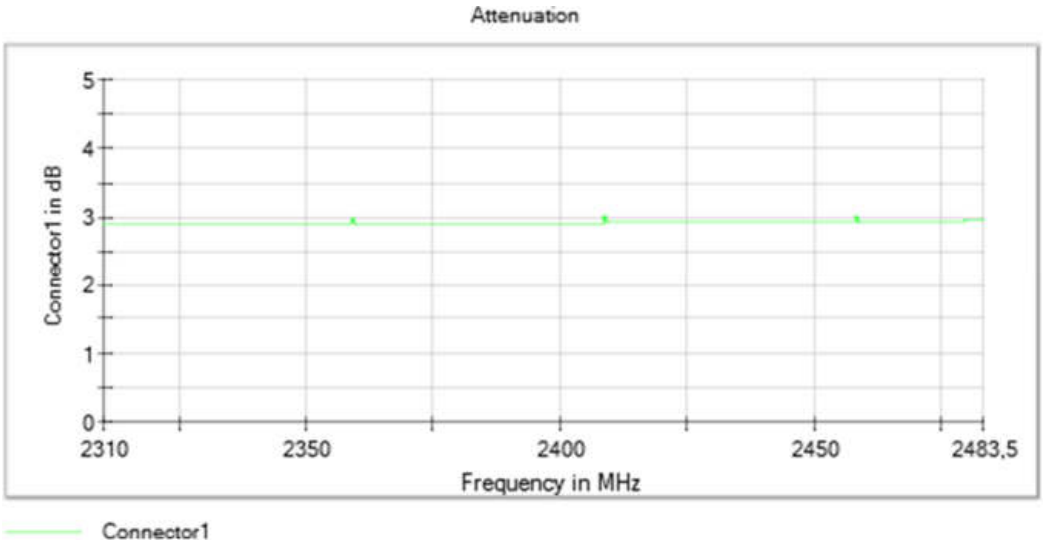
**Images:**



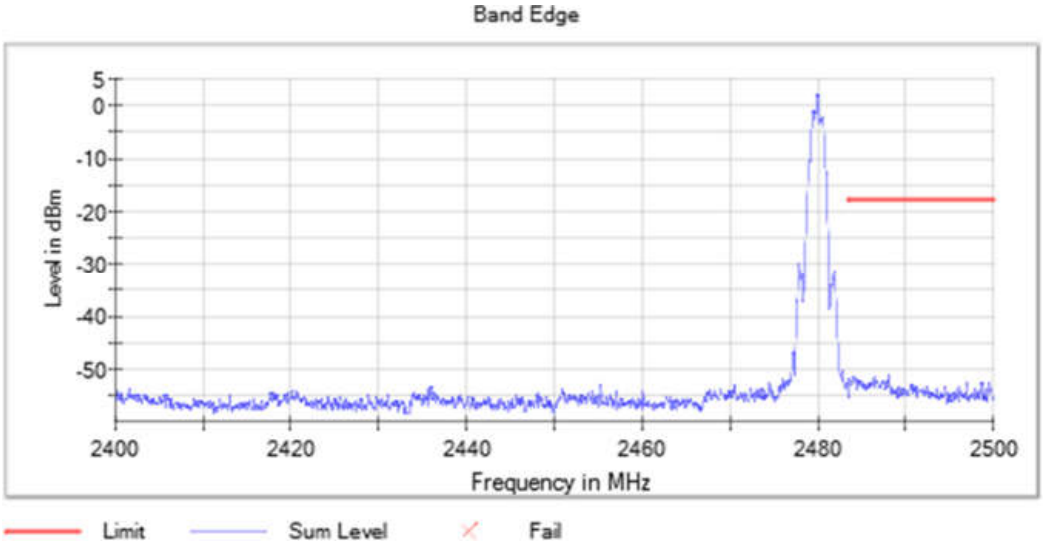

Band Edge
Level in dBm
5
0
-10
-20
-30
-40
-50
-60
2310
2350
2400
2450
2483,5
Frequency in MHz
Limit
Sum Level
Fail

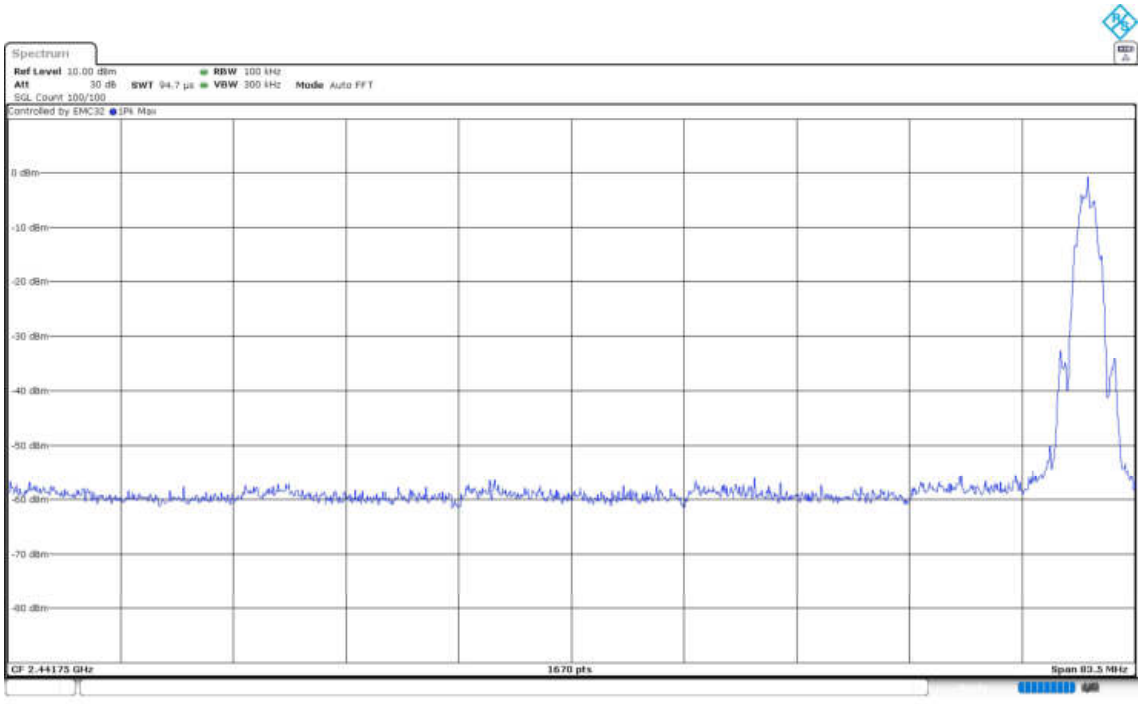

Spectrum
Ref Level 10.00 dBm
RBW 100 kHz
Att 30 dB
SWT 94.7 µs
VBW 300 kHz
Mode Auto FFT
SGL Count 100/100
Controlled by EMC32
1Pk Max
CF 2.44175 GHz
1670 pts
Span 83.5 MHz

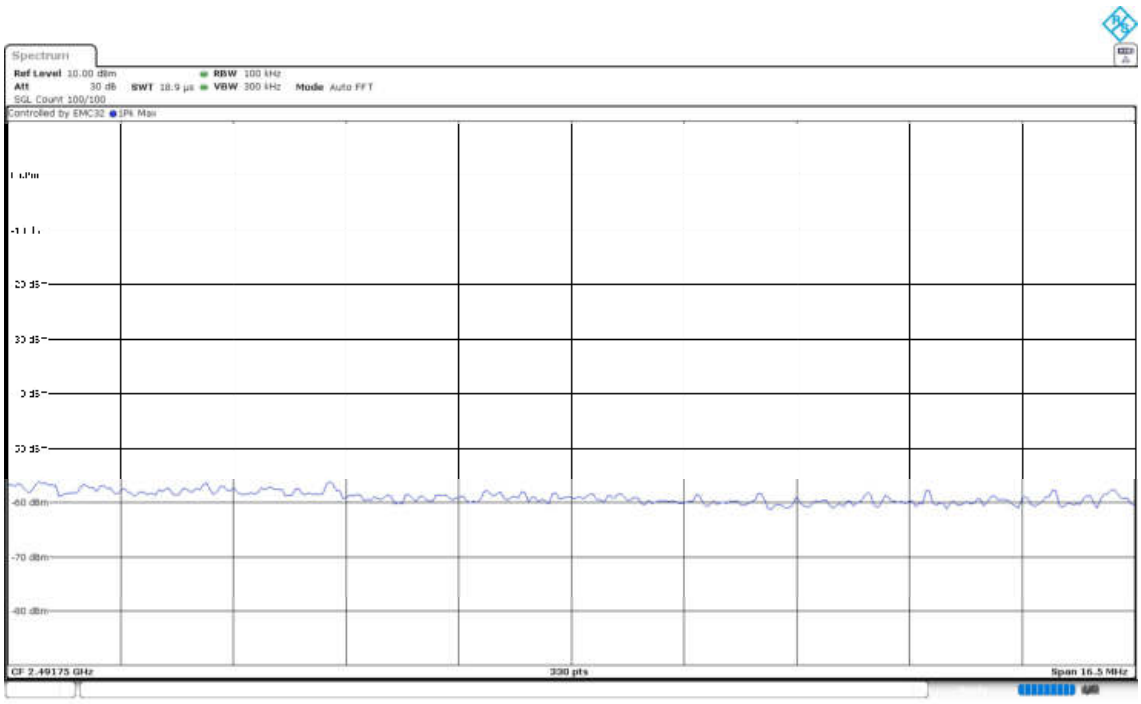

Attenuation
Connector1 in dB
5
4
3
2
1
0
2310
2350
2400
2450
2483,5
Frequency in MHz
Connector1

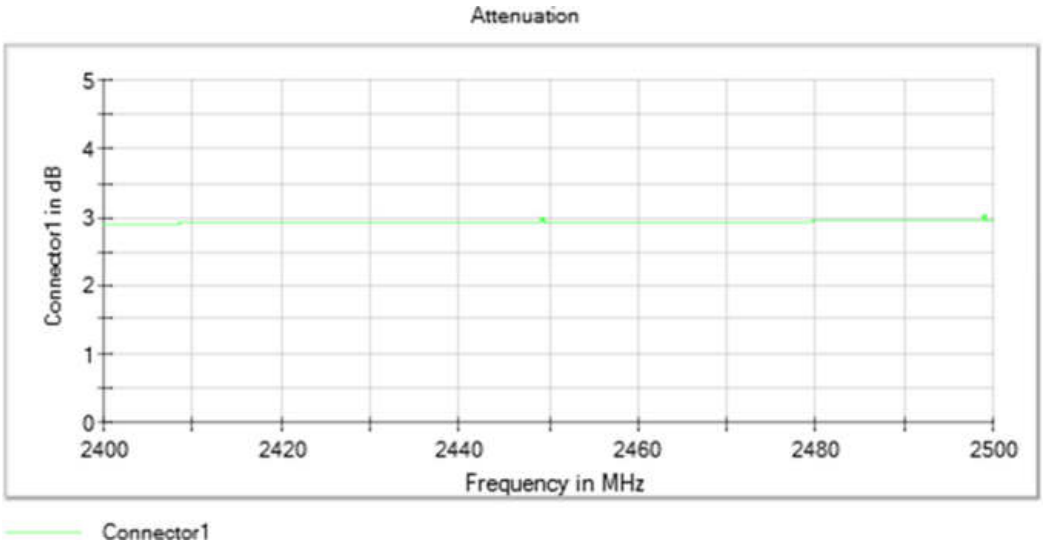
**Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1**

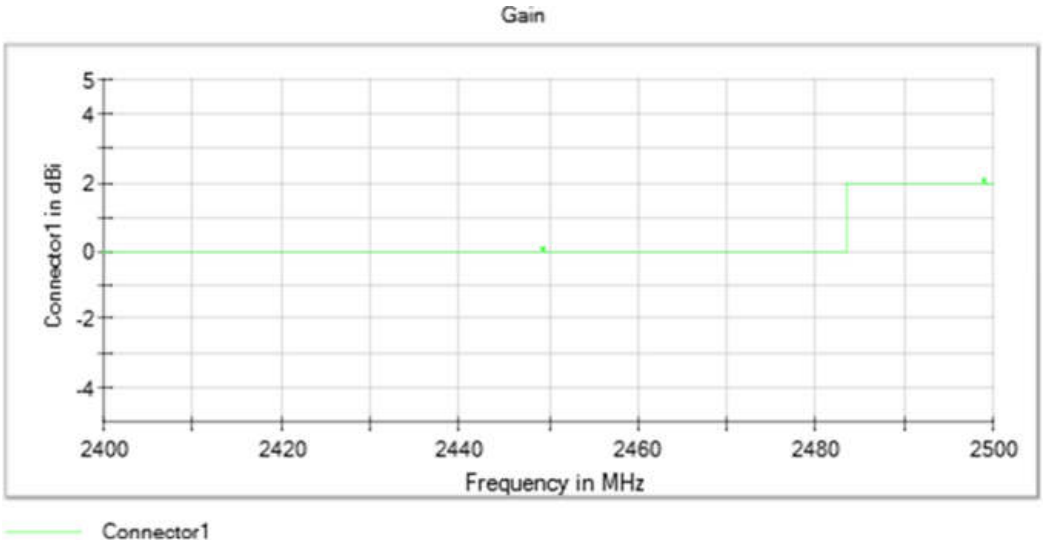
**Images:**




Spectrum
Ref Level 10.00 dBm
RBW 100 kHz
Att 30 dB
SWT 18.9 µs
VBW 300 kHz
Mode Auto FFT
SGL Count 100/100
Controlled by EMC32
1Pk Max
-60 dBm
-70 dBm
-80 dBm
CF 2.49175 GHz
330 pts
Span 16.5 MHz


Attenuation
Connector1 in dB
5
4
3
2
1
0
2400
2420
2440
2460
2480
2500
Frequency in MHz
Connector1


Gain
5
4
2
0
-2
-4
Connector1 in dBi
2400
2420
2440
2460
2480
2500
Frequency in MHz
Connector1

# 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)):

| 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.

# Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

### Frequency range 30 MHz – 1 GHz:

Spurious frequencies detected within 20 dB of the limit:

### Low channel: 2402.00000 MHz

| Frequency (MHz) | QuasiPeak (dBµV/m) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|
| 30.727500 | --- | 30.27 | --- | --- |
| 30.727500 | 27.15 | --- | 40.00 | 12.85 |
| 34.801500 | 22.90 | --- | 40.00 | 17.10 |
| 34.801500 | --- | 26.48 | --- | --- |
| 38.875500 | 20.40 | --- | 40.00 | 19.60 |
| 38.875500 | --- | 23.90 | --- | --- |
| 42.998000 | --- | 25.64 | --- | --- |
| 42.998000 | 23.60 | --- | 40.00 | 16.40 |
| 47.945000 | 33.10 | --- | 40.00 | 6.90 |
| 47.945000 | --- | 34.65 | --- | --- |
| 51.146000 | --- | 28.36 | --- | --- |
| 51.146000 | 23.27 | --- | 40.00 | 16.73 |
| 55.268500 | --- | 26.46 | --- | --- |
| 55.268500 | 22.94 | --- | 40.00 | 17.06 |
| 57.014500 | --- | 29.34 | --- | --- |
| 57.014500 | 26.41 | --- | 40.00 | 13.59 |
| 63.028500 | 25.76 | --- | 40.00 | 14.24 |
| 63.028500 | --- | 28.39 | --- | --- |
| 68.994000 | --- | 31.09 | --- | --- |
| 68.994000 | 29.52 | --- | 40.00 | 10.48 |
| 71.952500 | 29.18 | --- | 40.00 | 10.82 |
| 71.952500 | --- | 31.48 | --- | --- |
| 96.008500 | 30.55 | --- | 43.50 | 12.95 |
| 96.008500 | --- | 32.64 | --- | --- |
| 143.975000 | 24.57 | --- | 43.50 | 18.93 |
| 143.975000 | --- | 27.44 | --- | --- |
| 168.031000 | --- | 29.37 | --- | --- |
| 168.031000 | 27.19 | --- | 43.50 | 16.31 |
| 192.232500 | 24.45 | --- | 43.50 | 19.05 |
| 192.232500 | --- | 26.97 | --- | --- |
| 204.163500 | --- | 28.17 | --- | --- |
| 204.163500 | 15.73 | --- | 43.50 | 27.77 |

### Mid channel: 2440.00000 MHz

| Frequency (MHz) | QuasiPeak (dBµV/m) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|
| 44.986500 | --- | 22.63 | --- | --- |
| 44.986500 | 18.34 | --- | 40.00 | 21.66 |
| 47.993500 | 33.29 | --- | 40.00 | 6.71 |
| 47.993500 | --- | 34.57 | --- | --- |
| 50.952000 | 27.89 | --- | 40.00 | 12.11 |
| 50.952000 | --- | 31.09 | --- | --- |
| 56.966000 | 25.94 | --- | 40.00 | 14.06 |
| 56.966000 | --- | 30.00 | --- | --- |
| 62.980000 | --- | 31.12 | --- | --- |
| 62.980000 | 28.40 | --- | 40.00 | 11.60 |
| 68.994000 | --- | 31.50 | --- | --- |
| 68.994000 | 30.09 | --- | 40.00 | 9.91 |
| 72.001000 | --- | 32.21 | --- | --- |
| 72.001000 | 30.74 | --- | 40.00 | 9.26 |
| 75.008000 | 32.54 | --- | 40.00 | 7.46 |
| 75.008000 | --- | 34.06 | --- | --- |
| 80.973500 | 29.28 | --- | 40.00 | 10.72 |
| 80.973500 | --- | 32.04 | --- | --- |
| 86.987500 | --- | 31.26 | --- | --- |

| | | | | |
|---|---|---|---|---|
| 86.987500 | 29.05 | --- | 40.00 | 10.95 |
| 92.953000 | --- | 28.42 | --- | --- |
| 92.953000 | 24.43 | --- | 43.50 | 19.07 |
| 95.960000 | 30.06 | --- | 43.50 | 13.44 |
| 95.960000 | --- | 32.61 | --- | --- |
| 98.967000 | 25.09 | --- | 43.50 | 18.41 |
| 98.967000 | --- | 28.46 | --- | --- |
| 117.057500 | --- | 29.15 | --- | --- |
| 117.057500 | 24.69 | --- | 43.50 | 18.81 |
| 144.023500 | --- | 28.71 | --- | --- |
| 144.023500 | 26.43 | --- | 43.50 | 17.07 |
| 168.079500 | --- | 28.25 | --- | --- |
| 168.079500 | 25.77 | --- | 43.50 | 17.73 |
| 192.087000 | 24.50 | --- | 43.50 | 19.00 |
| 192.087000 | --- | 26.99 | --- | --- |

## High channel: 2480.00000 MHz

| Frequency (MHz) | QuasiPeak (dBµV/m) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|
| 30.679000 | --- | 27.66 | --- | --- |
| 30.679000 | 23.33 | --- | 40.00 | 16.67 |
| 34.753000 | --- | 22.70 | --- | --- |
| 34.753000 | 17.04 | --- | 40.00 | 22.96 |
| 38.875500 | --- | 23.57 | --- | --- |
| 38.875500 | 19.99 | --- | 40.00 | 20.01 |
| 42.998000 | 23.28 | --- | 40.00 | 16.72 |
| 42.998000 | --- | 25.64 | --- | --- |
| 47.993500 | 32.97 | --- | 40.00 | 7.03 |
| 47.993500 | --- | 34.43 | --- | --- |
| 51.000500 | --- | 34.21 | --- | --- |
| 51.000500 | 31.64 | --- | 40.00 | 8.36 |
| 55.268500 | 24.76 | --- | 40.00 | 15.24 |
| 55.268500 | --- | 28.06 | --- | --- |
| 56.966000 | 26.55 | --- | 40.00 | 13.45 |
| 56.966000 | --- | 29.63 | --- | --- |
| 59.391000 | 21.81 | --- | 40.00 | 18.19 |
| 59.391000 | --- | 25.59 | --- | --- |
| 62.980000 | --- | 31.05 | --- | --- |
| 62.980000 | 27.88 | --- | 40.00 | 12.12 |
| 68.994000 | 30.59 | --- | 40.00 | 9.41 |
| 68.994000 | --- | 32.27 | --- | --- |
| 72.001000 | --- | 32.84 | --- | --- |
| 72.001000 | 30.90 | --- | 40.00 | 9.10 |
| 75.008000 | 32.41 | --- | 40.00 | 7.59 |
| 75.008000 | --- | 34.12 | --- | --- |
| 80.973500 | --- | 31.89 | --- | --- |
| 80.973500 | 29.01 | --- | 40.00 | 10.99 |
| 86.987500 | --- | 31.66 | --- | --- |
| 86.987500 | 29.54 | --- | 40.00 | 10.46 |
| 93.001500 | --- | 30.14 | --- | --- |
| 93.001500 | 28.04 | --- | 43.50 | 15.46 |
| 96.008500 | 30.53 | --- | 43.50 | 12.97 |
| 96.008500 | --- | 32.56 | --- | --- |
| 99.015500 | --- | 29.70 | --- | --- |
| 99.015500 | 27.34 | --- | 43.50 | 16.16 |
| 128.940000 | 19.02 | --- | 43.50 | 24.48 |
| 128.940000 | --- | 24.89 | --- | --- |
| 134.954000 | 20.33 | --- | 43.50 | 23.17 |
| 134.954000 | --- | 25.20 | --- | --- |
| 140.968000 | 20.78 | --- | 43.50 | 22.72 |
| 140.968000 | --- | 24.95 | --- | --- |
| 144.072000 | --- | 27.80 | --- | --- |
| 144.072000 | 24.72 | --- | 43.50 | 18.78 |
| 146.982000 | --- | 24.52 | --- | --- |
| 146.982000 | 21.55 | --- | 43.50 | 21.95 |
| 167.982500 | 26.35 | --- | 43.50 | 17.15 |
| 167.982500 | --- | 29.22 | --- | --- |
| 191.990000 | 23.89 | --- | 43.50 | 19.61 |
| 191.990000 | --- | 26.39 | --- | --- |

| | | | | |
|---|---|---|---|---|
| **203.872500** | **16.21** | **---** | **43.50** | **27.29** |
| **203.872500** | **---** | **26.23** | **---** | **---** |

All the quasi-peak maximizations are below the limit.

***Verdict***

Pass

**Frequency range 1 – 3 GHz:**

No spurious frequencies detected at less than 20 dB below the limit.

***Verdict***

Pass

**Frequency range 3 – 17 GHz:**

No spurious frequencies detected at less than 20 dB below the limit.

***Verdict***

Pass

**Frequency range 17 – 26 GHz:**

The spurious frequencies detected do not depend on either the modulation or the operating channel.

No spurious frequencies detected at less than 20 dB below the limit.

***Verdict***

Pass

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

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

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

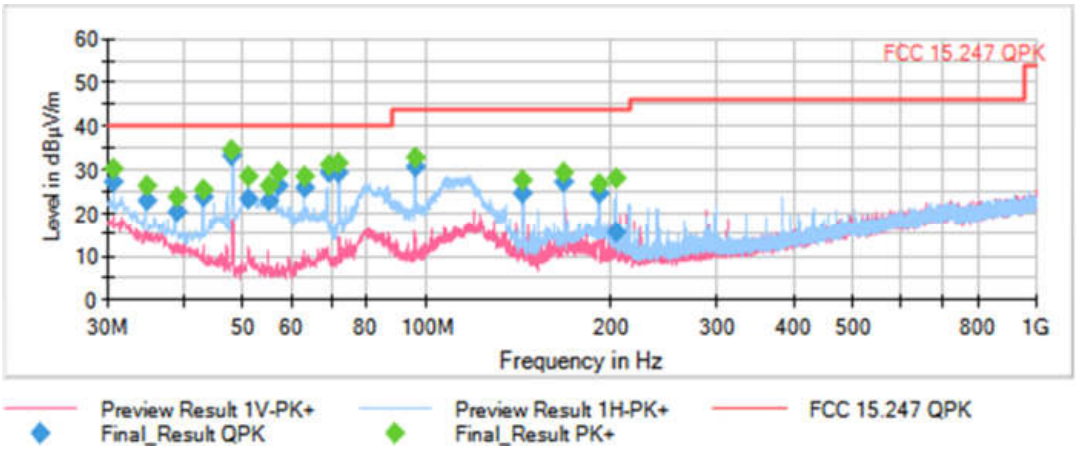
| Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|---|---|---|---|---|---|
| Receiver: [FSV 40] | | | | | |
| 3 GHz - 17 GHz | 500 kHz | PK+ ; AVG | 1 MHz | 1 s | 30 dB |

| Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|---|---|---|---|---|---|
| Receiver: [FSV 40] | | | | | |
| 17 GHz - 26 GHz | 500 kHz | PK+ ; AVG | 1 MHz | 1 s | 30 dB |

***Attachments***

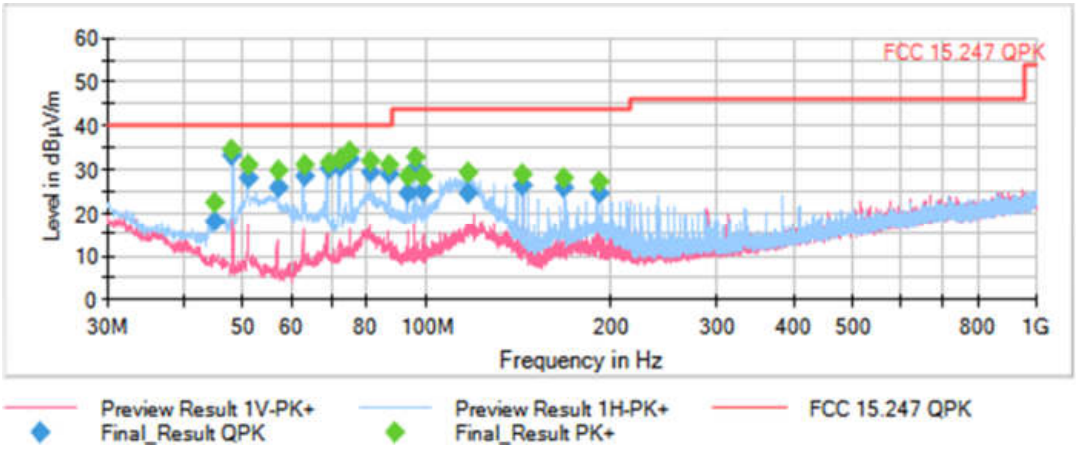
**Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [0.03, 1], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1**

**Images:**



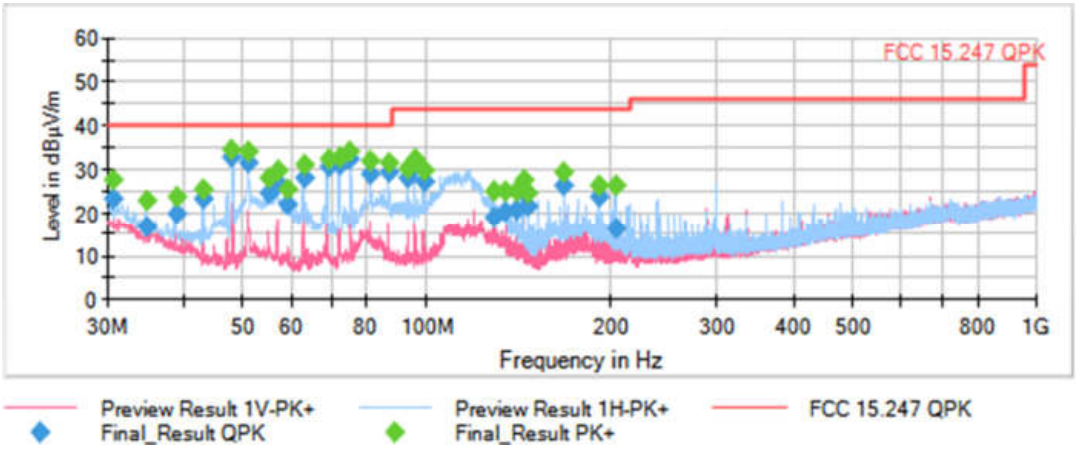
**Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [0.03, 1], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1**

**Images:**



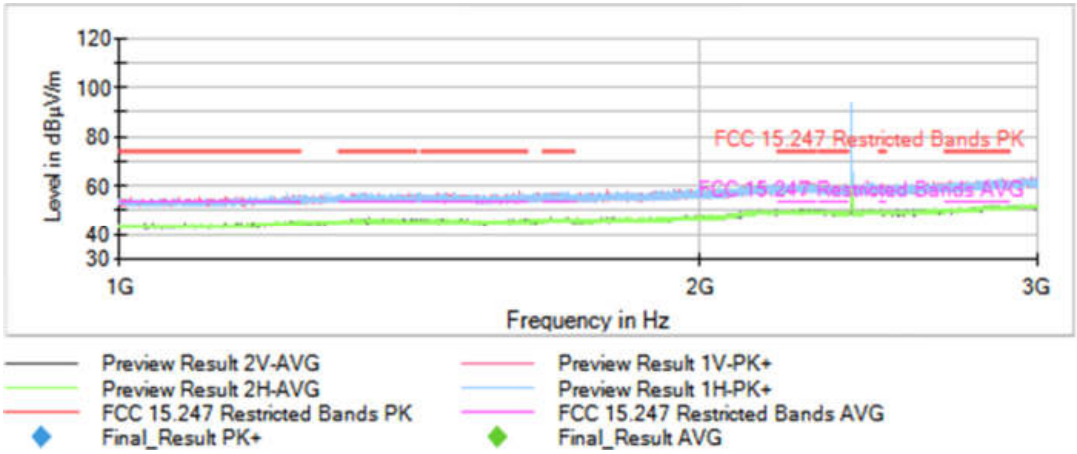
**Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [0.03, 1], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1**

**Images:**



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

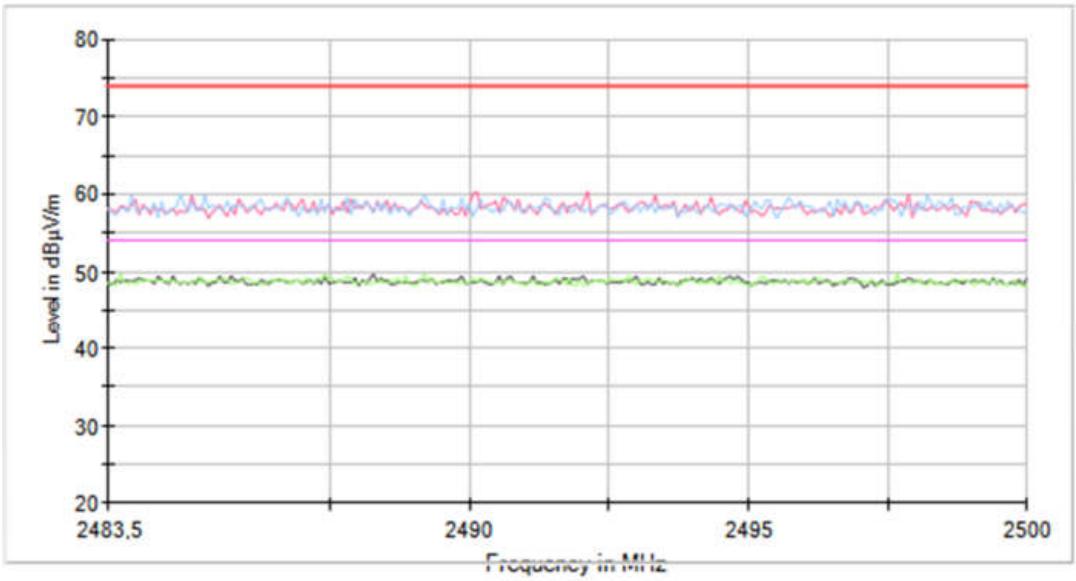
**Images:**

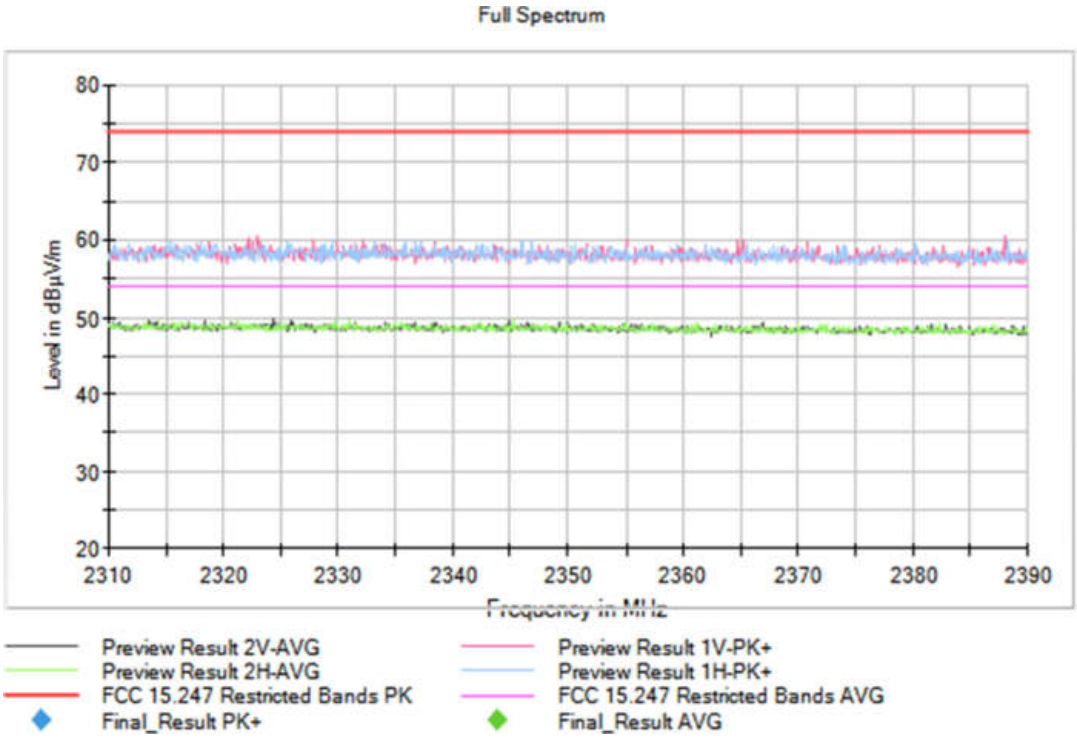






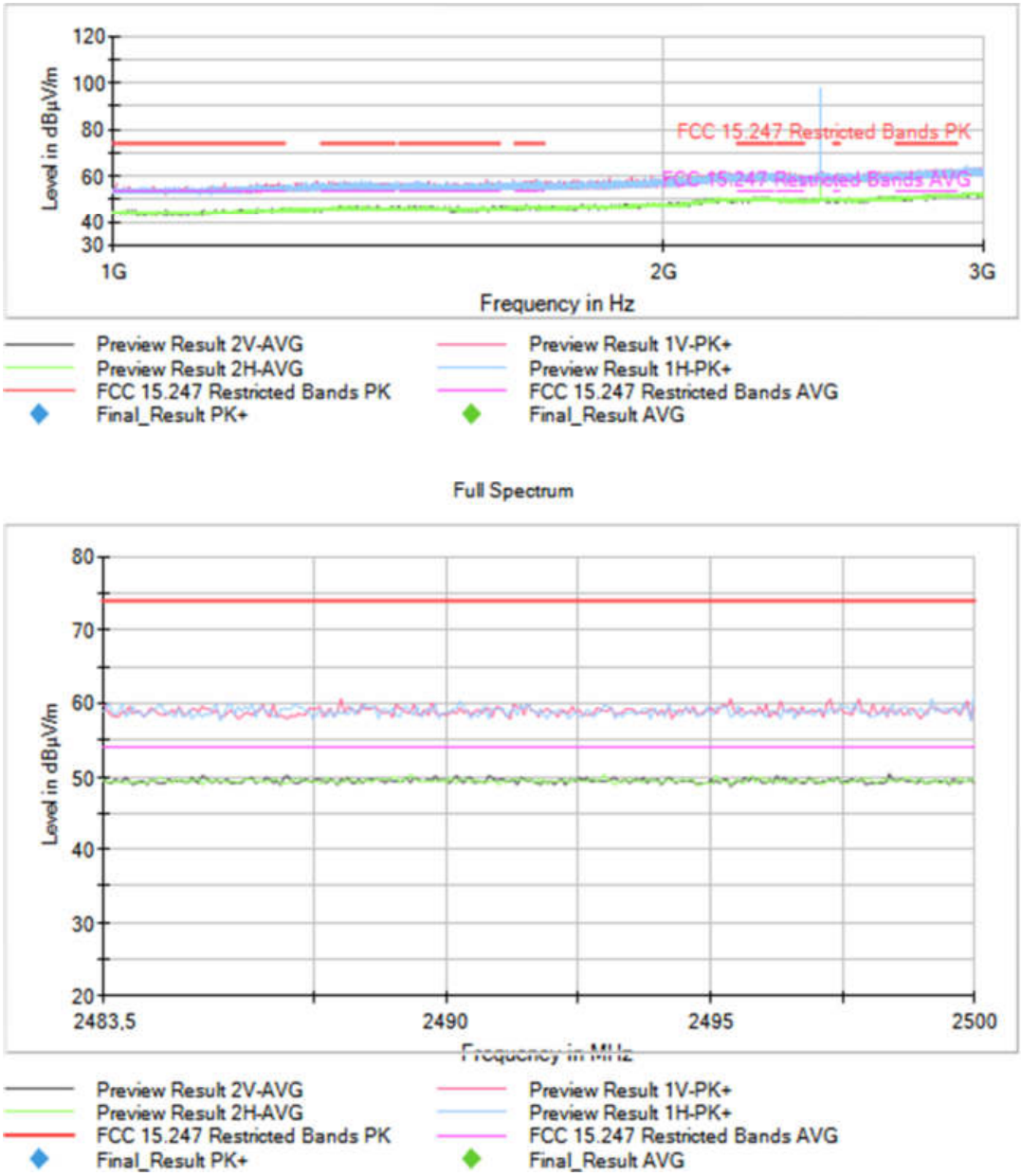
Full Spectrum



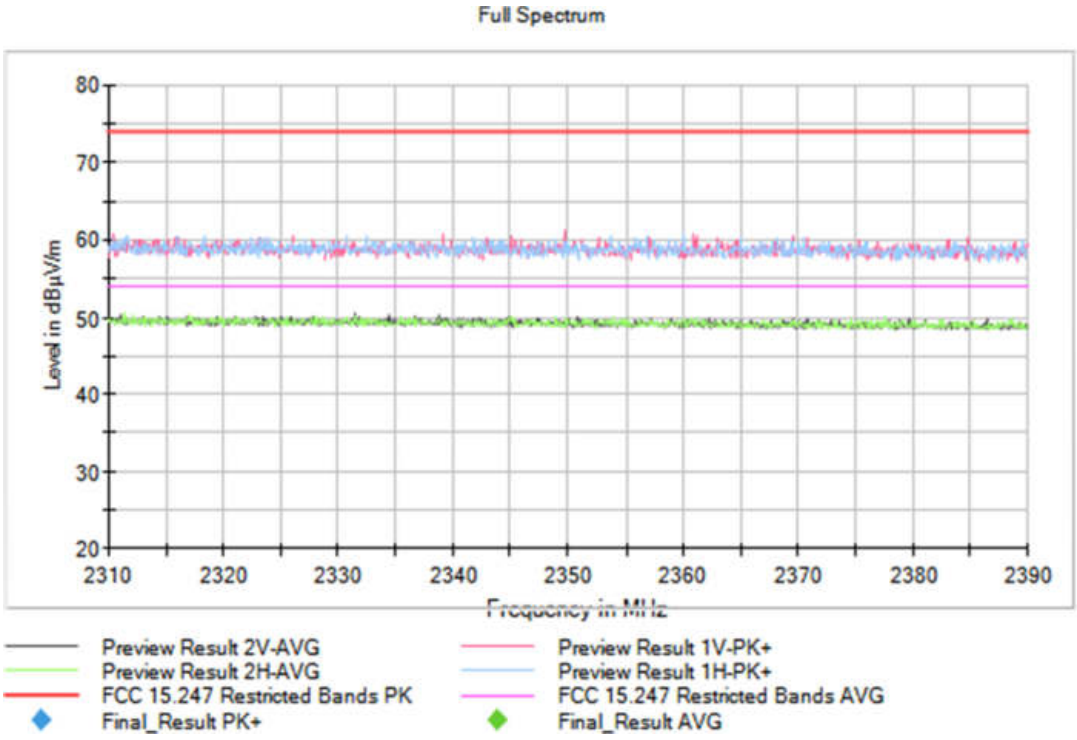


Full Spectrum
Level in dBµV/m
80
70
60
50
40
30
20
2310
2320
2330
2340
2350
2360
2370
2380
2390
Frequency in MHz
Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 Restricted Bands PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

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

**Images:**

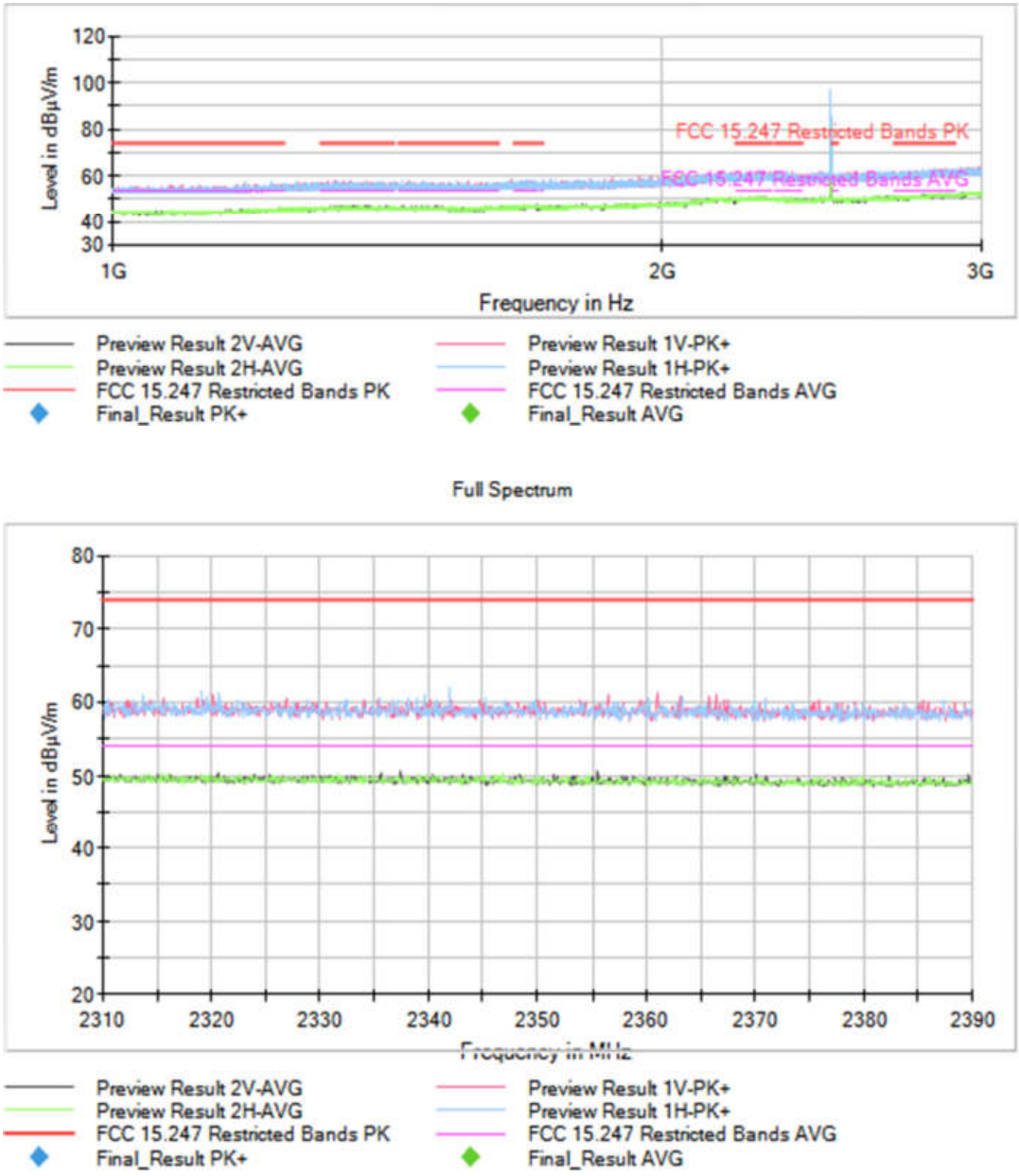



Full Spectrum

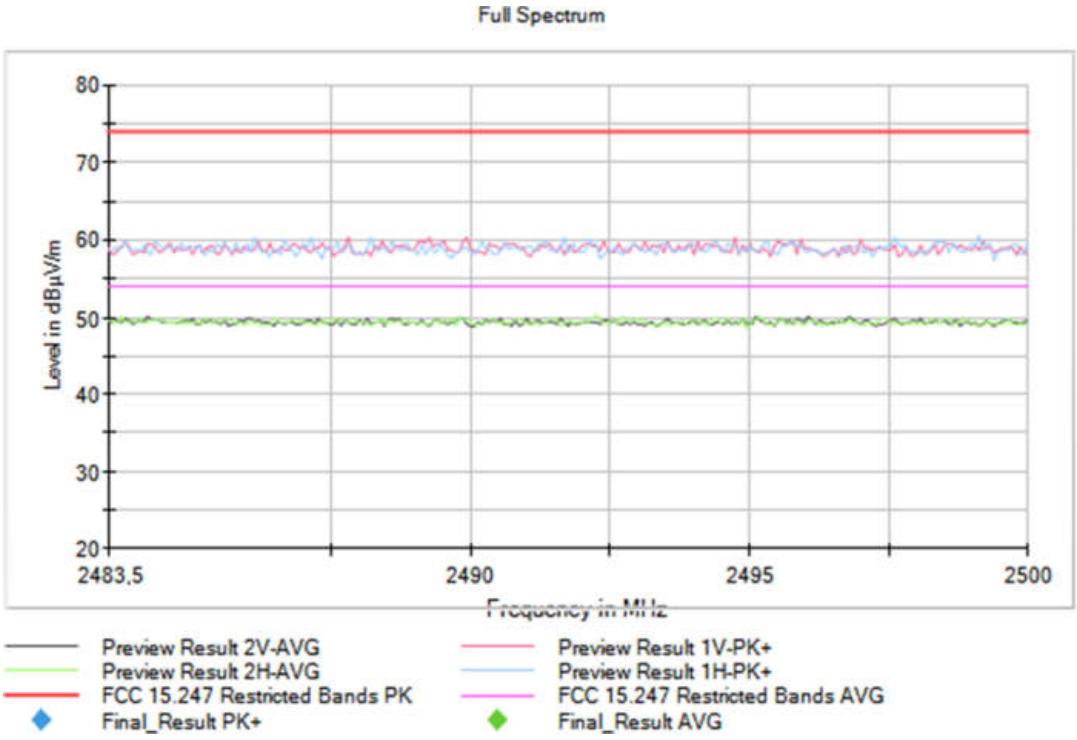

Full Spectrum
Level in dBµV/m
80
70
60
50
40
30
20
2310
2320
2330
2340
2350
2360
2370
2380
2390
Frequency in MHz
Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 Restricted Bands PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

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

**Images:**

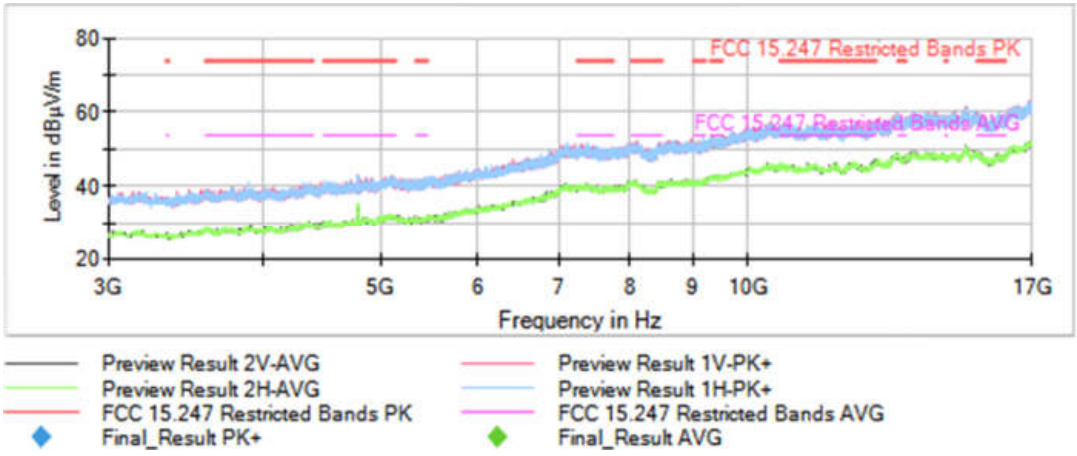



Full Spectrum


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

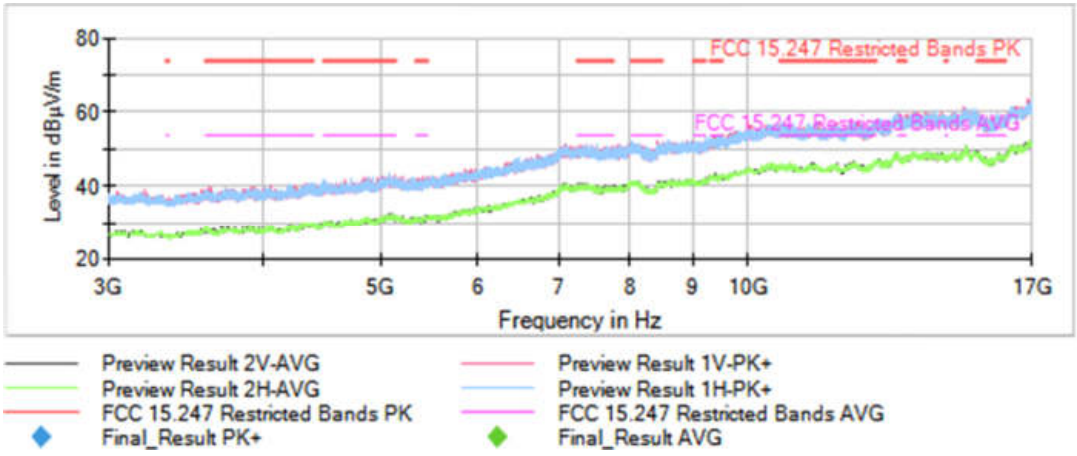
**Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1**

**Images:**



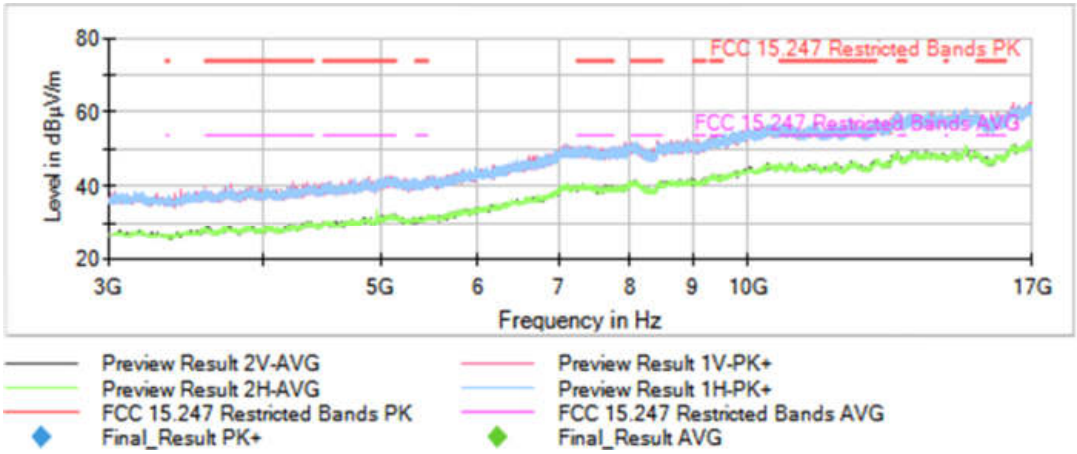
**Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1**

**Images:**



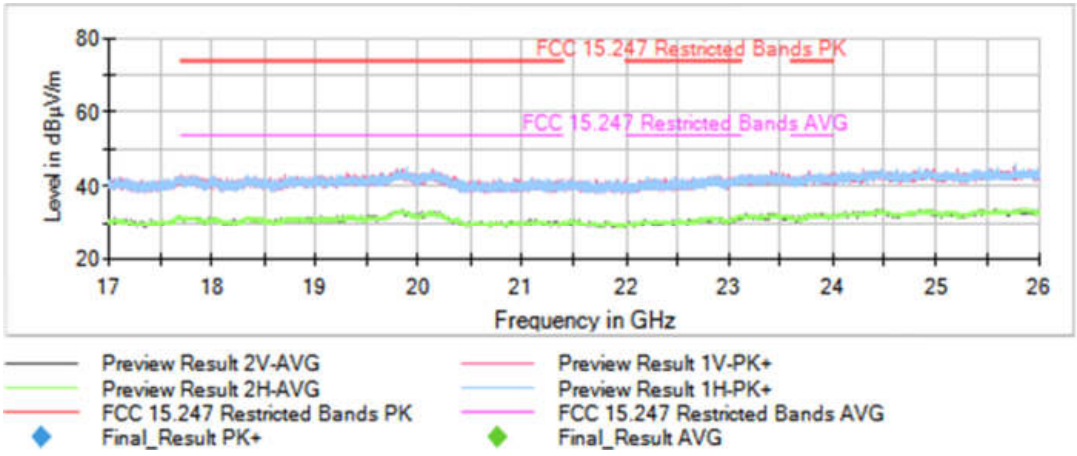
**Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1**

**Images:**



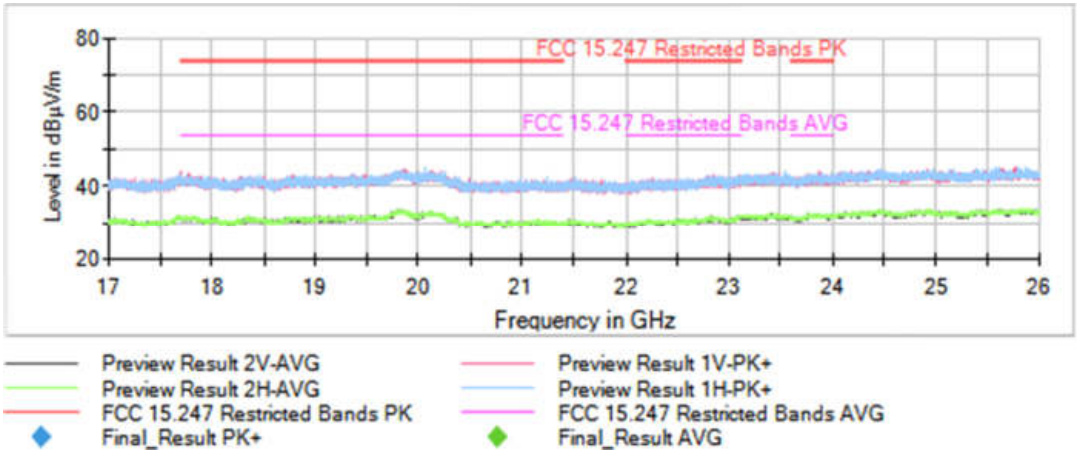
**Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range GHz = [17, 26], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1**

**Images:**



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

**Images:**



# Modulation: BTLE 5.0 (GFSK 2 Mbit/s)

**Frequency range 30 MHz – 1 GHz:**

The spurious frequencies detected do not depend on either the modulation or the operating channel.

Spurious frequencies detected within 20 dB of the limit:

**Low channel: 2402.00000 MHz**

| Frequency (MHz) | QuasiPeak (dBµV/m) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|
| 44.986500 | 18.97 | --- | 40.00 | 21.03 |
| 44.986500 | --- | 23.49 | --- | --- |
| 48.042000 | --- | 34.46 | --- | --- |
| 48.042000 | 32.95 | --- | 40.00 | 7.05 |
| 51.000500 | --- | 34.54 | --- | --- |
| 51.000500 | 32.38 | --- | 40.00 | 7.62 |
| 56.966000 | --- | 29.81 | --- | --- |
| 56.966000 | 26.61 | --- | 40.00 | 13.39 |
| 62.980000 | 29.23 | --- | 40.00 | 10.77 |
| 62.980000 | --- | 31.62 | --- | --- |
| 68.994000 | 31.31 | --- | 40.00 | 8.69 |
| 68.994000 | --- | 32.64 | --- | --- |
| 72.001000 | 30.73 | --- | 40.00 | 9.27 |
| 72.001000 | --- | 32.33 | --- | --- |
| 74.959500 | 30.57 | --- | 40.00 | 9.43 |
| 74.959500 | --- | 33.65 | --- | --- |
| 80.973500 | --- | 33.34 | --- | --- |
| 80.973500 | 30.86 | --- | 40.00 | 9.14 |
| 86.987500 | --- | 31.98 | --- | --- |
| 86.987500 | 29.95 | --- | 40.00 | 10.05 |
| 92.953000 | --- | 30.04 | --- | --- |
| 92.953000 | 26.18 | --- | 43.50 | 17.32 |
| 95.960000 | 29.99 | --- | 43.50 | 13.51 |
| 95.960000 | --- | 32.49 | --- | --- |
| 99.015500 | 28.57 | --- | 43.50 | 14.93 |
| 99.015500 | --- | 30.82 | --- | --- |
| 104.981000 | 25.70 | --- | 43.50 | 17.80 |
| 104.981000 | --- | 28.70 | --- | --- |
| 110.995000 | 24.97 | --- | 43.50 | 18.53 |
| 110.995000 | --- | 28.52 | --- | --- |
| 116.960500 | --- | 29.45 | --- | --- |
| 116.960500 | 24.98 | --- | 43.50 | 18.52 |
| 128.988500 | --- | 27.93 | --- | --- |
| 128.988500 | 25.01 | --- | 43.50 | 18.49 |
| 134.954000 | --- | 26.39 | --- | --- |
| 134.954000 | 21.27 | --- | 43.50 | 22.23 |
| 144.023500 | --- | 28.94 | --- | --- |
| 144.023500 | 26.41 | --- | 43.50 | 17.09 |
| 167.982500 | --- | 28.92 | --- | --- |
| 167.982500 | 26.48 | --- | 43.50 | 17.02 |
| 192.087000 | 23.93 | --- | 43.50 | 19.57 |
| 192.087000 | --- | 26.48 | --- | --- |

**Mid channel: 2440.00000 MHz**

| Frequency (MHz) | QuasiPeak (dBµV/m) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|
| 44.986500 | --- | 23.80 | --- | --- |
| 44.986500 | 20.21 | --- | 40.00 | 19.79 |
| 47.993500 | --- | 35.67 | --- | --- |
| 47.993500 | 34.51 | --- | 40.00 | 5.49 |
| 50.952000 | 28.52 | --- | 40.00 | 11.48 |
| 50.952000 | --- | 31.64 | --- | --- |

| | | | | |
|---|---|---|---|---|
| 56.966000 | --- | 29.77 | --- | --- |
| 56.966000 | 26.39 | --- | 40.00 | 13.61 |
| 62.980000 | 28.70 | --- | 40.00 | 11.30 |
| 62.980000 | --- | 31.45 | --- | --- |
| 68.994000 | --- | 32.59 | --- | --- |
| 68.994000 | 31.16 | --- | 40.00 | 8.84 |
| 71.904000 | --- | 32.73 | --- | --- |
| 71.904000 | 30.81 | --- | 40.00 | 9.19 |
| 75.008000 | --- | 35.23 | --- | --- |
| 75.008000 | 33.64 | --- | 40.00 | 6.36 |
| 80.973500 | --- | 32.23 | --- | --- |
| 80.973500 | 29.67 | --- | 40.00 | 10.33 |
| 86.987500 | 28.19 | --- | 40.00 | 11.81 |
| 86.987500 | --- | 30.45 | --- | --- |
| 93.001500 | 28.52 | --- | 43.50 | 14.98 |
| 93.001500 | --- | 30.48 | --- | --- |
| 95.960000 | 28.51 | --- | 43.50 | 14.99 |
| 95.960000 | --- | 31.34 | --- | --- |
| 99.015500 | --- | 29.37 | --- | --- |
| 99.015500 | 27.49 | --- | 43.50 | 16.01 |
| 105.029500 | --- | 28.50 | --- | --- |
| 105.029500 | 24.46 | --- | 43.50 | 19.04 |
| 117.009000 | --- | 29.88 | --- | --- |
| 117.009000 | 25.92 | --- | 43.50 | 17.58 |
| 122.974500 | --- | 27.86 | --- | --- |
| 122.974500 | 23.96 | --- | 43.50 | 19.54 |
| 135.051000 | --- | 26.22 | --- | --- |
| 135.051000 | 23.16 | --- | 43.50 | 20.34 |
| 141.016500 | 24.86 | --- | 43.50 | 18.64 |
| 141.016500 | --- | 27.15 | --- | --- |
| 143.975000 | --- | 26.64 | --- | --- |
| 143.975000 | 23.57 | --- | 43.50 | 19.93 |
| 146.982000 | 23.12 | --- | 43.50 | 20.38 |
| 146.982000 | --- | 26.05 | --- | --- |
| 152.996000 | 20.70 | --- | 43.50 | 22.80 |
| 152.996000 | --- | 23.73 | --- | --- |
| 167.740000 | 24.40 | --- | 43.50 | 19.10 |
| 167.740000 | --- | 27.88 | --- | --- |
| 191.990000 | 23.58 | --- | 43.50 | 19.92 |
| 191.990000 | --- | 26.02 | --- | --- |

**High channel: 2480.00000 MHz**

The spurious frequencies detected do not depend on either the modulation or the operating channel.

All the quasi-peak maximizations are below the limit.

***Verdict***

Pass

**Frequency range 1 – 3 GHz:**

No spurious frequencies detected at less than 20 dB below the limit.

***Verdict***

Pass

**Frequency range 3 – 17 GHz:**

No spurious frequencies detected at less than 20 dB below the limit.

***Verdict***

Pass

**Frequency range 17 – 26 GHz:**

The spurious frequencies detected do not depend on either the modulation or the operating channel.

No spurious frequencies detected at less than 20 dB below the limit.

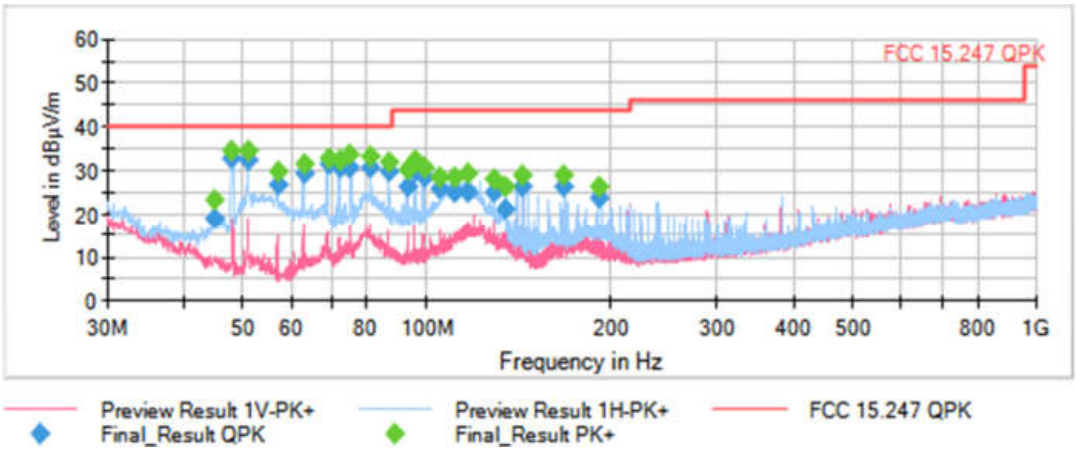
***Verdict***

Pass

***Attachments***

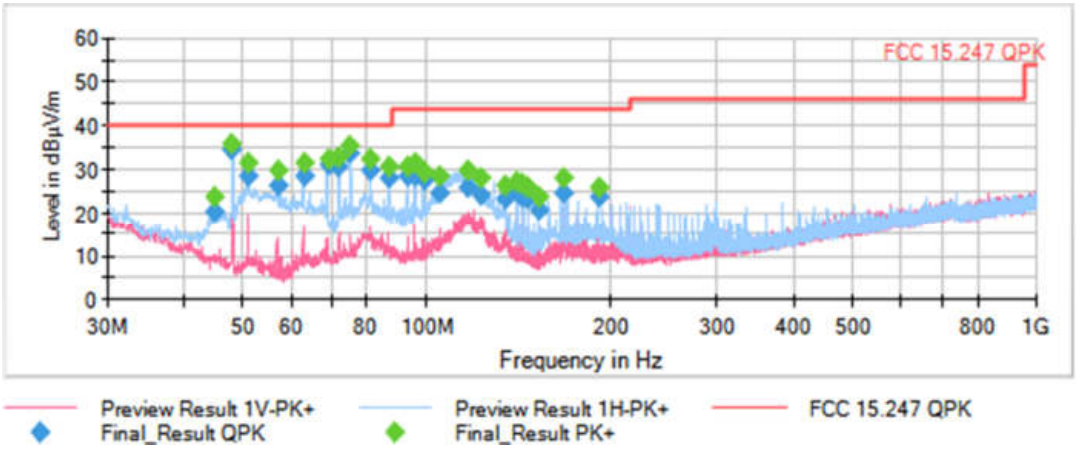
**Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [0.03, 1], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1**

**Images:**



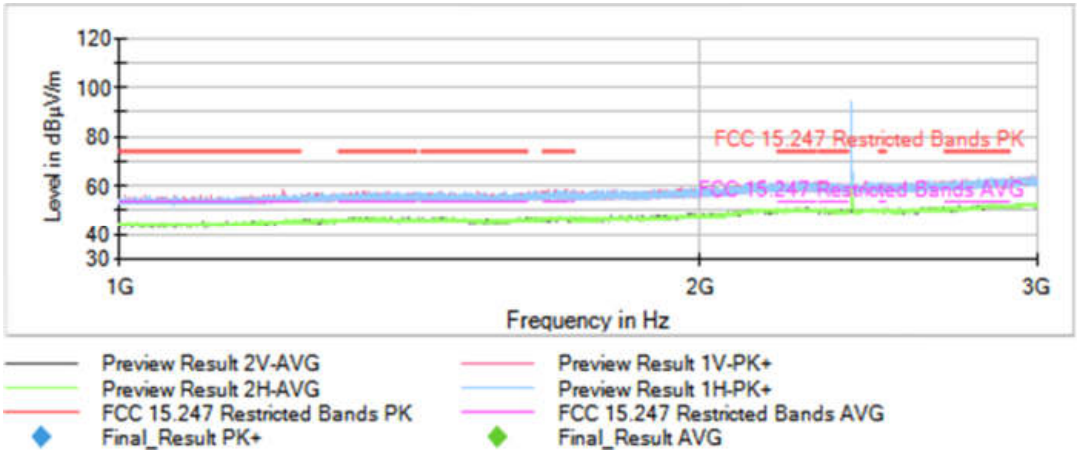
**Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [0.03, 1], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1**

**Images:**



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

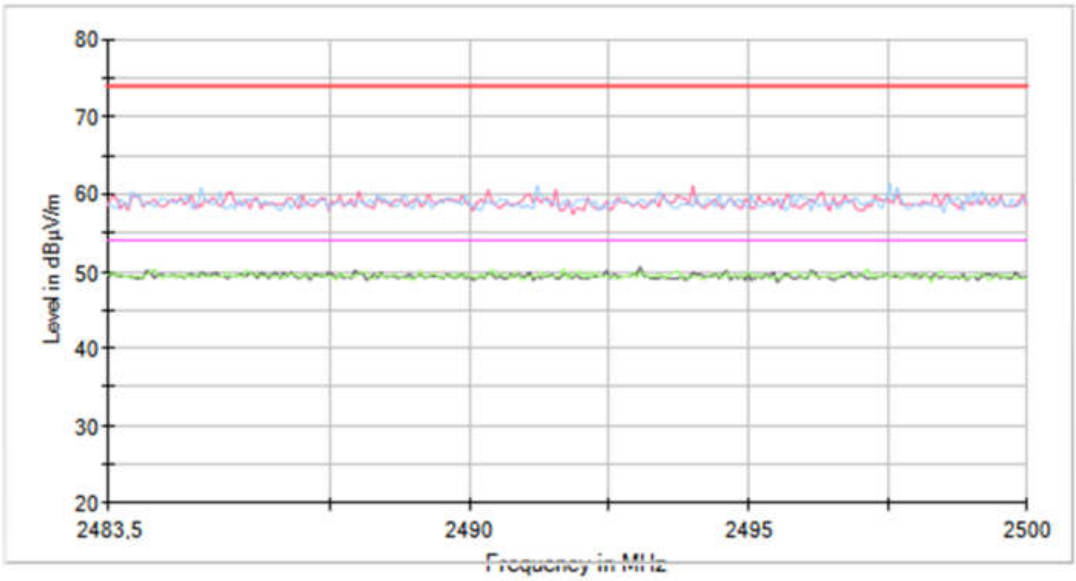
**Images:**

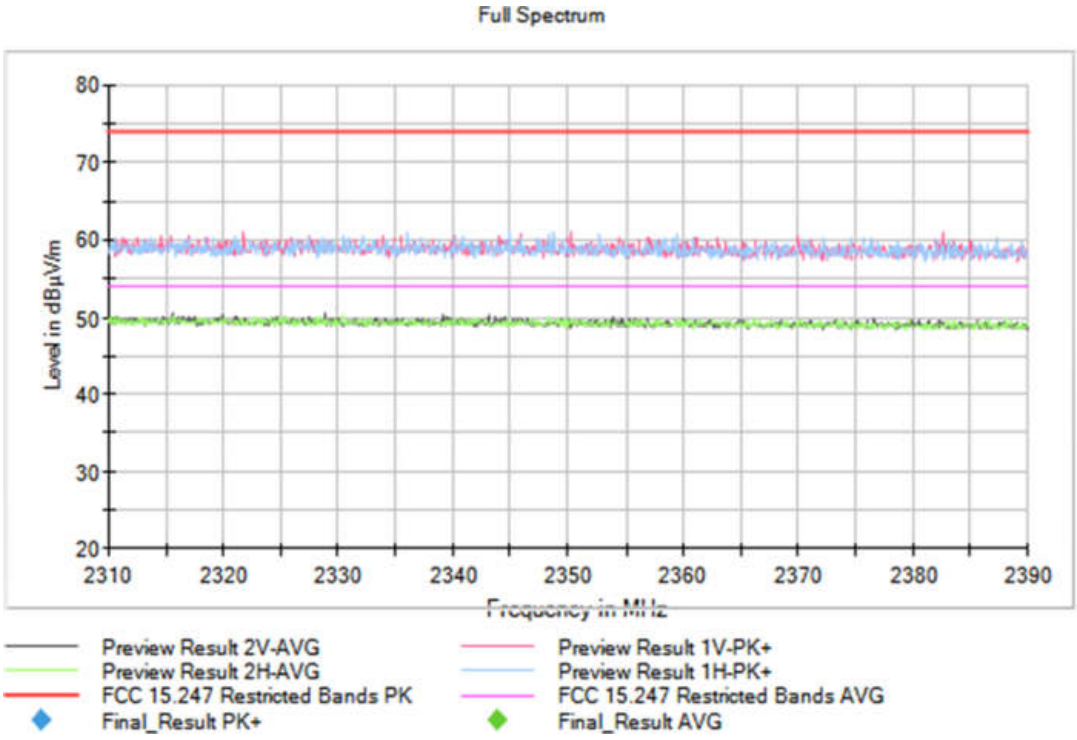






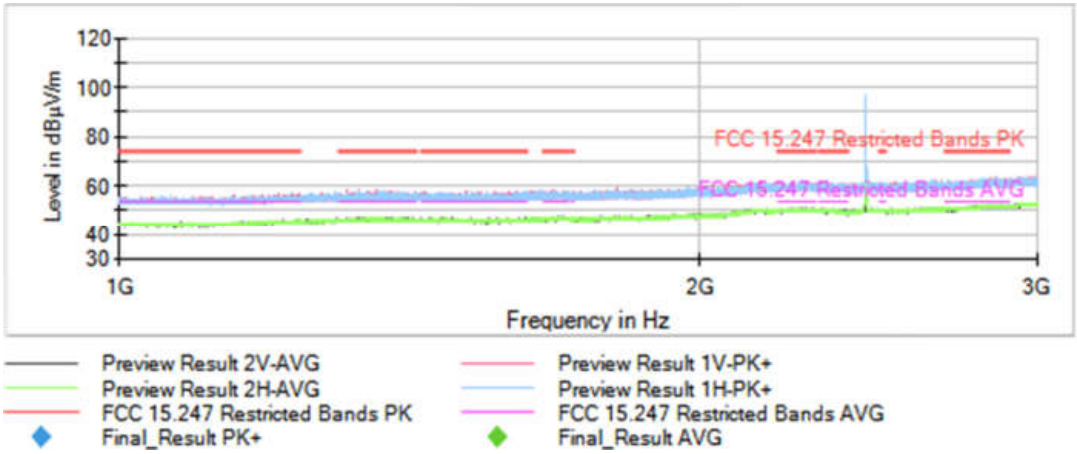
Full Spectrum



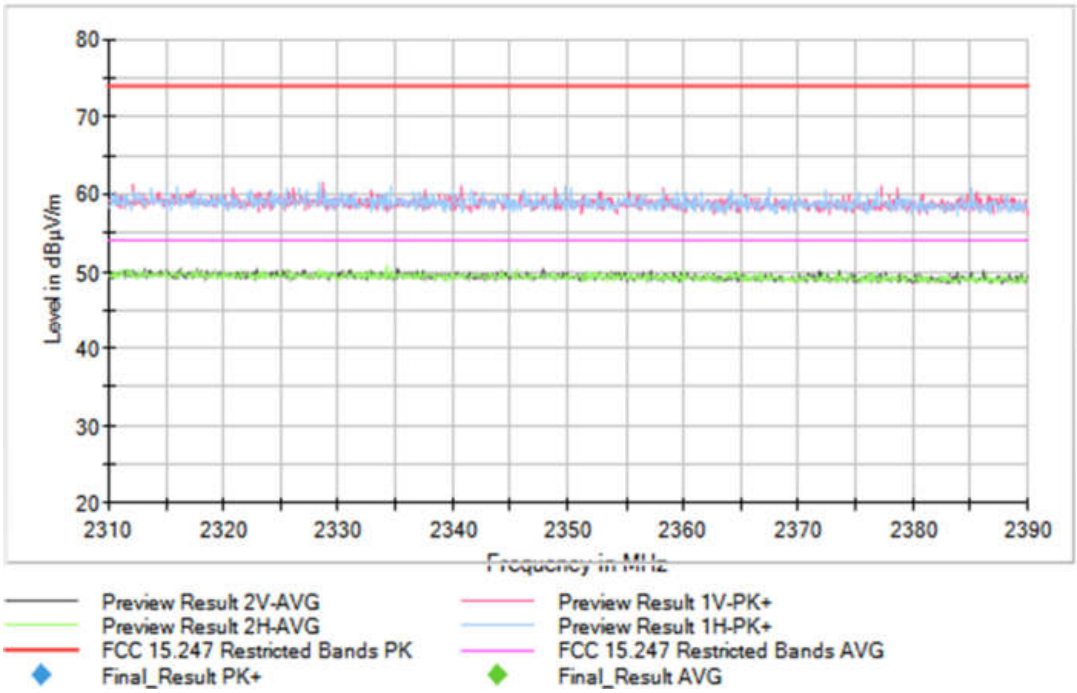


Full Spectrum
Level in dBµV/m
80
70
60
50
40
30
20
2310
2320
2330
2340
2350
2360
2370
2380
2390
Frequency in MHz
Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 Restricted Bands PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

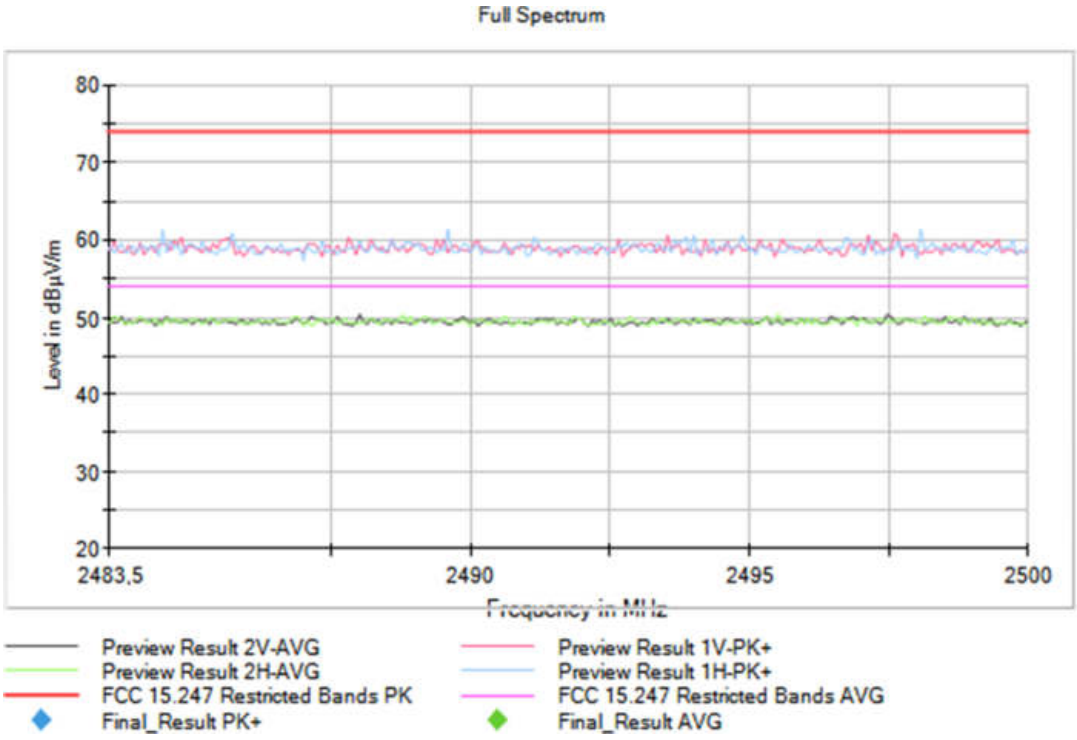
**Frequency MHz = 2440.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [1, 3], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1**

**Images:**



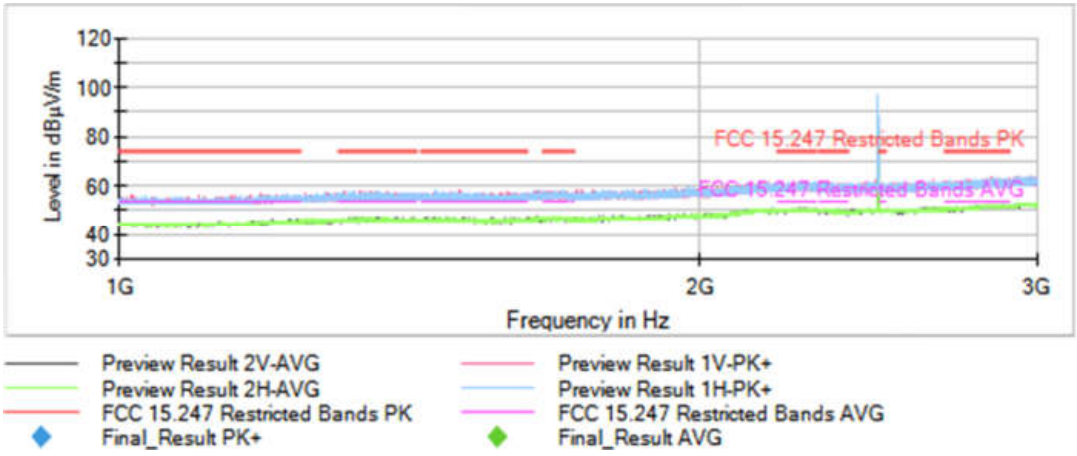

Full Spectrum



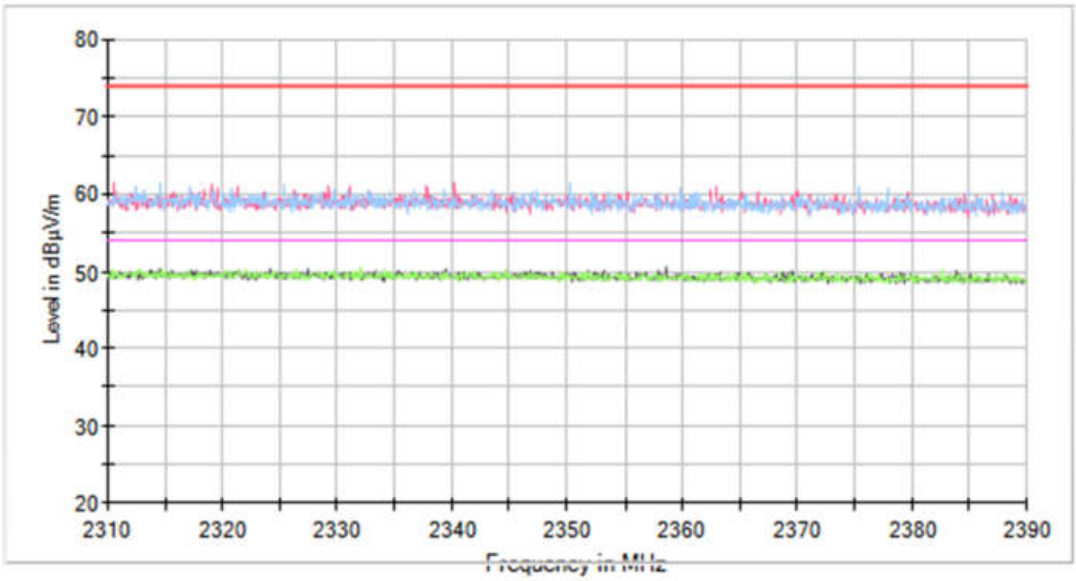

Full Spectrum
80
70
60
50
40
30
20
Level in dBµV/m
2483,5
2490
2495
2500
Frequency in MHz
Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 Restricted Bands PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

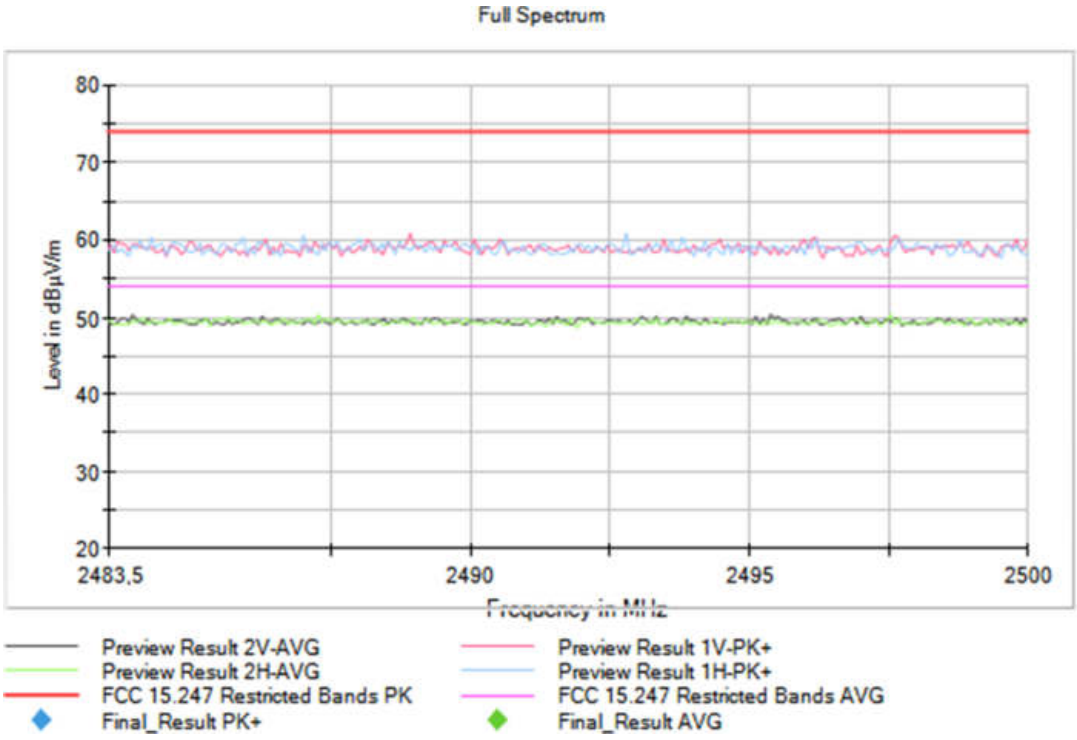
**Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [1, 3], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1**

**Images:**



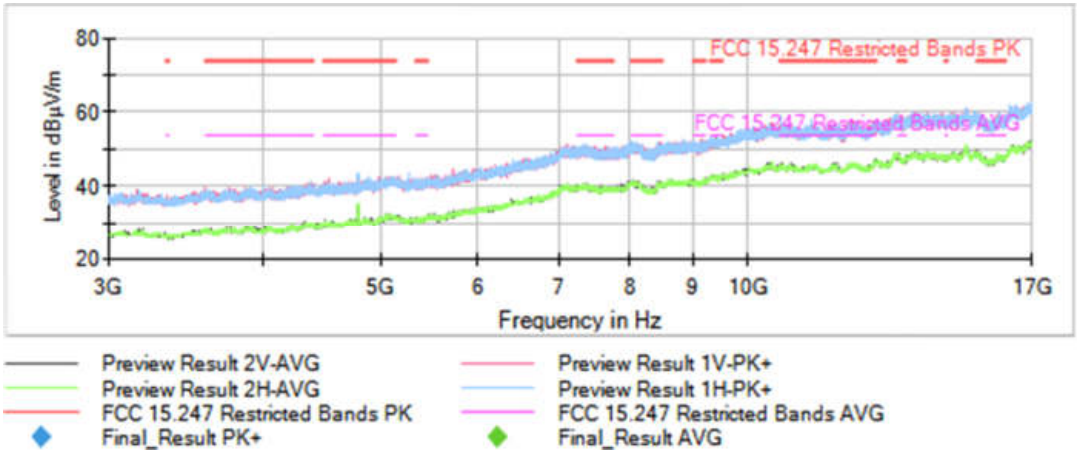

Full Spectrum




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

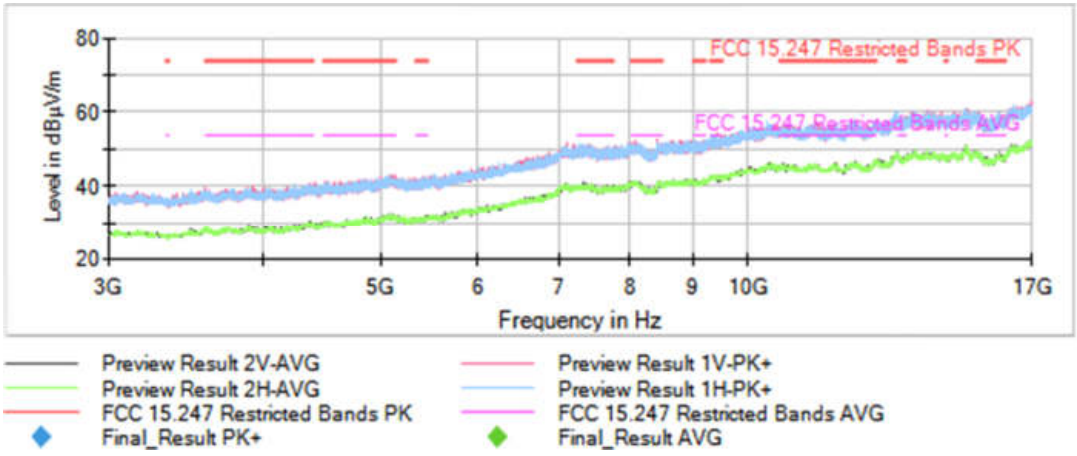
**Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1**

**Images:**



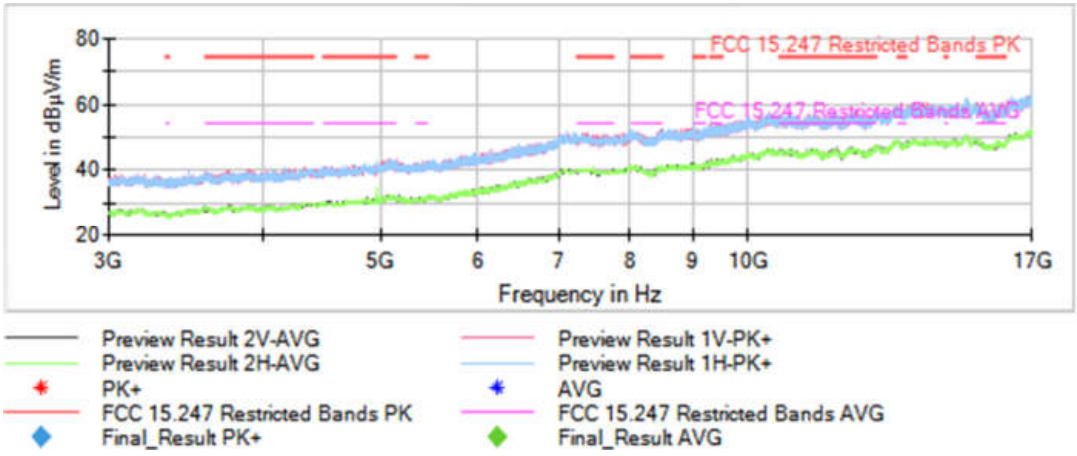
**Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1**

**Images:**



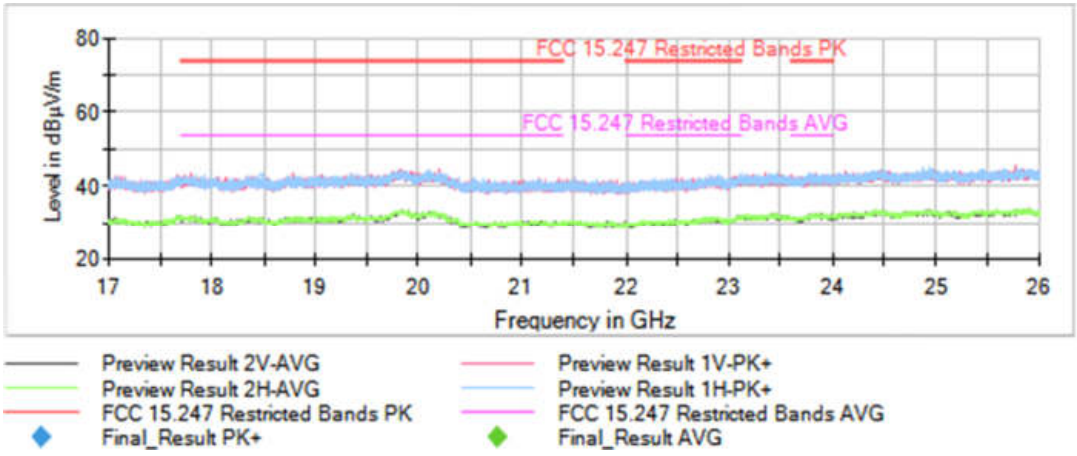
**Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [3, 17], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1**

**Images:**



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

**Images:**



**Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Modulation = BTLE 5.0 (GFSK 2 Mbit/s), Frequency Range GHz = [17, 26], Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1**

**Images:**