

*i*TEST REPORT

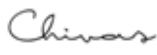
|                                 |                                                                  |
|---------------------------------|------------------------------------------------------------------|
| <b>Applicant:</b>               | SparkFun Electronics                                             |
| <b>Address of Applicant:</b>    | 6333 Dry Creek Parkway, Niwot, Colorado 80503, United States     |
| <b>Manufacturer:</b>            | Shanghai Limosa Info Tech Co.Ltd                                 |
| <b>Address of Manufacturer:</b> | Bd.1-307,No.99,Lane.215,Road Gaoguang, Qingpu District, Shanghai |
| <b>Product name:</b>            | GNSS Receiver                                                    |
| <b>Model(s):</b>                | Torch X2, RTK Torch, Torch X2T, Torch X2i, ES980 Pro             |
| <b>Rating(s):</b>               | USB-C 4.5~5.5V, 3A max                                           |
| <b>Trademark:</b>               | /                                                                |
| <b>Standards:</b>               | 47 CFR PART 15 Subpart C section 15.247                          |
| <b>FCC ID:</b>                  | 2ASW8-SPNTTX2                                                    |
| <b>Data of Receipt:</b>         | 2025-12-23                                                       |
| <b>Date of Test:</b>            | 2025-12-23~2026-01-05                                            |
| <b>Date of Issue:</b>           | 2026-01-05                                                       |
| <b>Test Result</b>              | <b>Pass*</b>                                                     |

\* In the configuration tested, the test item complied with the standards specified above.

**Authorized for issue by:****Test by:**

Jan.05, 2026

Chivas Tsang



Project Engineer

Date

Name/Position

Signature

**Reviewed by:**

Jan.05, 2026

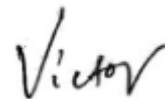
Victor Meng

Project Manager

Date

Name/Position

Signature



**Testing Laboratory information:**

Testing Laboratory Name .....: ITL Co., Ltd

Address : No. 8, Jinqianling Street 5, Huangjiang Town, Dongguan, Guangdong, China

Testing location : Same as above

Tel : 0086-769-39001678

Fax : 0086-20-62824387

E-mail : itl@i-testlab.com

**Possible test case verdicts:**

- test case does not apply to the test object . : N/A
- test object does meet the requirement ..... : P (Pass)
- test object does not meet the requirement . : F (Fail)

**General remarks:**

**The test results presented in this report relate only to the object tested.**

**The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.**

This report would be invalid test report without all the signatures of testing technician and approver.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

**General product information:**

This family of GNSS RTK devices, including models ES980 Pro, RTK Torch, Torch X2, Torch X2T, and Torch X2i, shares identical electrical circuit design, RF characteristics, and antenna systems. The differences between these models are solely related to firmware features and functional enhancements, as described below: ES980 Pro VS RTK Torch: no difference. RTK Torch vs. Torch X2: The primary difference lies in the built-in GNSS positioning algorithms and regional support. The two models utilize different firmware configurations to accommodate varying regional requirements and performance optimizations. Torch X2T: This model builds upon the RTK Torch/Torch X2 platform by adding tilt measurement functionality, enabling accurate positioning even when the device is not perfectly level. Torch X2i: Based on the Torch X2T, this model further incorporates an integrated laser rangefinder, providing additional distance measurement capability. All other hardware and RF components remain consistent across the series. These variations do not affect RF compliance or operating parameters.

All listed variants are therefore electrically and functionally equivalent to the certified model Torch X2.

## 1 Test Summary

| Test                                                     | Test Requirement                                          | Test method                                               | Result |
|----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|--------|
| Antenna Requirement                                      | FCC PART 15 C<br>section 15.247 (c) and<br>Section 15.203 | FCC PART 15 C<br>section 15.247 (c) and<br>Section 15.203 | PASS   |
| Occupied Bandwidth                                       | FCC PART 15 C<br>section 15.247 (a)(2)                    | ANSI C63.10:2020                                          | PASS   |
| Maximum Conducted Output<br>Power                        | FCC PART 15 C<br>section 15.247(b)(3)                     | ANSI C63.10:2020                                          | PASS   |
| Power Spectral Density                                   | FCC PART 15 C<br>section 15.247(e)                        | ANSI C63.10:2020                                          | PASS   |
| Conducted Spurious Emission<br>(30MHz to 25GHz)          | FCC PART 15 C<br>section 15.209&15.247(d)                 | ANSI C63.10:2020                                          | PASS   |
| Radiated Spurious Emission<br>(30 MHz to 25 GHz)         | FCC PART 15 C<br>section 15.209&15.247(d)                 | ANSI C63.10:2020                                          | PASS   |
| Radiated Emissions which fall in<br>the restricted bands | FCC PART 15 C<br>section 15.209                           | ANSI C63.10:2020                                          | PASS   |
| Band Edges Measurement                                   | FCC PART 15 C<br>section 15.209&15.247(d)                 | ANSI C63.10:2020                                          | PASS   |
| Conducted Emissions at Mains<br>Terminals                | FCC PART 15 C<br>section 15.207                           | ANSI C63.10:2020                                          | PASS   |

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### 3 General Information

#### 3.1 Client Information

Applicant: SparkFun Electronics  
Address of Applicant: 6333 Dry Creek Parkway, Niwot, Colorado 80503, United States

#### 3.2 General Description of E.U.T.

Name: GNSS Receiver  
Model No.: Torch X2  
Operating Frequency: 2402 MHz to 2480 MHz for Bluetooth  
40 channels with 2MHz step

Channels:

| channel | Frequency | channel | Frequency | channel | Frequency | channel | Frequency |
|---------|-----------|---------|-----------|---------|-----------|---------|-----------|
| 1       | 2402      | 11      | 2422      | 21      | 2442      | 31      | 2462      |
| 2       | 2404      | 12      | 2424      | 22      | 2444      | 32      | 2464      |
| 3       | 2406      | 13      | 2426      | 23      | 2446      | 33      | 2466      |
| 4       | 2408      | 14      | 2428      | 24      | 2448      | 34      | 2468      |
| 5       | 2410      | 15      | 2430      | 25      | 2450      | 35      | 2470      |
| 6       | 2412      | 16      | 2432      | 26      | 2452      | 36      | 2472      |
| 7       | 2414      | 17      | 2434      | 27      | 2454      | 37      | 2474      |
| 8       | 2416      | 18      | 2436      | 28      | 2456      | 38      | 2476      |
| 9       | 2418      | 19      | 2438      | 29      | 2458      | 39      | 2478      |
| 10      | 2420      | 20      | 2440      | 30      | 2460      | 40      | 2480      |

Type of Modulation: GFSK  
Antenna Type: RG1.13 Antenna with 2.78 dBi peak gain  
Function: GNSS Receiver

#### 3.3 Details of E.U.T.

EUT Power Supply: USB-C 4.5~5.5V, 3A max  
Test mode: The program used to control the EUT for staying in continuous transmitting and receiving mode is programmed. Channel lowest (2402MHz), middle (2440MHz) and highest (2480MHz) are chosen for full testing.

#### 3.4 Description of Support Units

The EUT has been tested as an independent unit for fixed frequency by testing lab.

#### 3.5 Test Location

All the tests were performed in ITL Co., Ltd. Which is located at No. 8, Jinqianling Street 5, Huangjiang Town, Dongguan, Guangdong, China.  
Tel: 0086-769-39001678, Fax: 0086-20-62824387  
No tests were sub-contracted.

#### 3.6 Deviation from Standards

None.

### 3.7 Abnormalities from Standard Conditions

None.

### 3.8 Other Information Requested by the Customer

None.

### 3.9 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- CNAS Lab code:L9342
- FCC Designation No.:CN5035
- IC Registration NO.: 12593A
- NVLAP LAB CODE: 600199-0

### 3.10 Measurement Uncertainty

The below measurement uncertainties given below are based on a 95% confidence level (base on a coverage factor ( $k=2$ )).

| Parameter                     | Uncertainty               |
|-------------------------------|---------------------------|
| Radio frequency               | 2.25%                     |
| total RF power, conducted     | $\pm 1.34$ dB             |
| RF power density , conducted  | $\pm 1.49$ dB             |
| All emissions, radiated       | $\pm 2.72$ dB             |
| Temperature                   | $\pm 5.02$ dB             |
| Humidity                      | $\pm 0.8^{\circ}\text{C}$ |
| DC and low frequency voltages | $\pm 1.5$ %               |

#### 4 Instruments Used during Test

| No.        | Test Equipment                      | Manufacturer         | Model                       | Serial No.       | Cal Data   | Due Date   |
|------------|-------------------------------------|----------------------|-----------------------------|------------------|------------|------------|
| DGITL-115  | 50Ω Coaxial Cable                   | Mini-circuits        | CBL                         | C001             | 2025.03.14 | 2026.03.14 |
| DGITL-182  | Test software                       | 2.0.0.0              | MTS 8310                    | /                | /          | /          |
| DGITL-190  | Filter                              | COM-MW               | K6-2400-2483.5-100S5010-007 | 12230496         | 2025.01.10 | 2026.01.09 |
| DGITL-191  | Filter                              | COM-MW               | K6-5150-5850-100S5010-003   | 12234382         | 2025.01.10 | 2026.01.09 |
| DGITL- 301 | Semi-Anechoic chamber               | ETS•Lindgren         | 9*6*6                       | CT000874-1181    | 2023.08.02 | 2026.08.02 |
| DGITL- 307 | EMI test receiver                   | SCHWARZBECK          | ESVS10                      | 833616/003       | 2025.03.14 | 2026.03.14 |
| DGITL-376  | Wideband Radio Communication Tester | SCHWARZBECK          | CMW500                      | LR114195         | 2025.03.14 | 2026.03.14 |
| DGITL-349a | Vector Signal Generator             | ROHDE&SCHWARZ        | SMBV100A                    | 259268           | 2025.03.14 | 2026.03.14 |
| DGITL- 306 | Spectrum Analyzer                   | Agilent Technologies | N9010A                      | MY54200334       | 2025.03.14 | 2026.03.14 |
| DGITL- 352 | Pre Amplifier                       | Mini-Circuits        | ZFC-1000HX                  | SN292801110      | 2025.03.14 | 2026.03.14 |
| DGITL-375  | Spectrum Analyzer                   | SCHWARZBECK          | FSV40-N                     | 6625-01-588-5515 | 2025.03.14 | 2026.03.14 |
| DGITL-309  | Horn Antenna                        | ETS Lindgren         | 3117                        | SN00152265       | 2025.05.13 | 2027.05.14 |
| DGITL-308  | Bilog Antenna                       | ETS· Lindgren        | 3142E                       | 156975           | 2025.05.13 | 2027.05.14 |
| DGITL-350  | Wideband Amplifier Super Ultra      | Mini-Circuits        | ZVA-183X-S+                 | SN986401426      | 2025.03.14 | 2026.03.14 |
| DGITL-371  | Pre Amplifier                       | teramicrowave        | TALA-0040G35                | 18081001         | 2025.03.14 | 2026.03.14 |
| DGITL-363  | Active Loop Antenna                 | SCHWARZBECK          | FMZB1519B                   | 00062            | 2024.05.15 | 2026.05.11 |

## 5 Test Results

### 5.1 E.U.T. test conditions

**Test Voltage:** AC 120V, 60Hz

**Temperature:** 23.2 -25.0 °C

**Humidity:** 38-50 % RH

**Atmospheric Pressure:** 1000 -1010 mbar

**Requirements:** **15.31(e):** For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

**15.32:** Power supplies and CPU boards used with personal computers and for which separate authorizations are required to be obtained shall be tested as follows: Testing shall be in accordance with the procedures specified in Section 15.31 of this part.

**Test frequencies and frequency range:**

According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

According to the 15.33 (a) For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 KHz, up to at least the frequency shown in the following table:

**Number of fundamental frequencies to be tested in EUT transmit band**

| Frequency range in which device operates | Number of frequencies | Location in frequency range of operation    |
|------------------------------------------|-----------------------|---------------------------------------------|
| 1 MHz or less                            | 1                     | Middle                                      |
| 1 MHz to 10 MHz                          | 2                     | 1 near top and 1 near bottom                |
| More than 10 MHz                         | 3                     | 1 near top, 1 near middle and 1 near bottom |

**Frequency range of radiated emission measurements**

| <b>Lowest frequency generated<br/>in the device</b> | <b>Upper frequency range of measurement</b>                                                                    |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| 9 KHz to below 10 GHz                               | 10th harmonic of highest fundamental frequency or to 40 GHz,<br>whichever is lower                             |
| At or above 10 GHz to below<br>30 GHz               | 5th harmonic of highest fundamental frequency or to 100 GHz,<br>whichever is lower                             |
| At or above 30 GHz                                  | 5th harmonic of highest fundamental frequency or to 200 GHz,<br>whichever is lower, unless otherwise specified |

EUT channels and frequencies list:

| channel | Frequency | channel | Frequency | channel | Frequency | channel | Frequency |
|---------|-----------|---------|-----------|---------|-----------|---------|-----------|
| 1       | 2402      | 11      | 2422      | 21      | 2442      | 31      | 2462      |
| 2       | 2404      | 12      | 2424      | 22      | 2444      | 32      | 2464      |
| 3       | 2406      | 13      | 2426      | 23      | 2446      | 33      | 2466      |
| 4       | 2408      | 14      | 2428      | 24      | 2448      | 34      | 2468      |
| 5       | 2410      | 15      | 2430      | 25      | 2450      | 35      | 2470      |
| 6       | 2412      | 16      | 2432      | 26      | 2452      | 36      | 2472      |
| 7       | 2414      | 17      | 2434      | 27      | 2454      | 37      | 2474      |
| 8       | 2416      | 18      | 2436      | 28      | 2456      | 38      | 2476      |
| 9       | 2418      | 19      | 2438      | 29      | 2458      | 39      | 2478      |
| 10      | 2420      | 20      | 2440      | 30      | 2460      | 40      | 2480      |

Test frequencies are the lowest channel: 1 channel (2402MHz), middle channel: 20 channel (2440 MHz) and highest channel: 40 channel (2480 MHz)

Test the EUT in continuous transmission mode, duty cycle > 98%.

## 5.2 Antenna Requirement

### Standard requirement

15.203 requirement:

For intentional device. According to 15.203. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz bands that are used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

### 5.2.1 Test Result (Antenna Requirement)

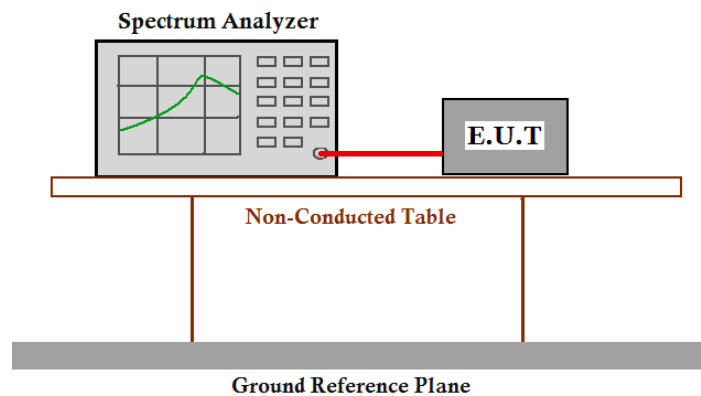
The antenna is a RG 1.13 Antenna and no consideration of replacement. The best-case gain of the antenna is 2.78 dBi.

**Test Result: The unit does meet the FCC requirements.**

### 5.3 Occupied Bandwidth

|                   |                                                                                                                                                                                                                                                                                  |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part 15 C section 15.247<br>(a)(2) Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 KHz.                                                                |
| Test Method:      | ANSI C63.10:2020                                                                                                                                                                                                                                                                 |
| Test Status:      | Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, channels and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below. |

#### 5.3.1 Test Configuration



#### Test Procedure:

1. The testing follows the Measurement Procedure of ANSI C63.10:2020 Section 11.8 and 6.9.3.
2. For 6dB EBW :
  - a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.
  - b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be at least three times RBW, unless otherwise specified by the applicable requirement.
  - c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than  $[10 \log (OBW/RBW)]$  below the reference level. Specific guidance is given in 4.1.6.2.
  - d) Steps a) through c) might require iteration to adjust within the specified tolerances.
  - e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target “-xx dB down” requirement; that is, if the requirement calls for measuring the -20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value.
  - f) Set detection mode to peak and trace mode to max-hold.
  - g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).

h) Determine the “-xx dB down amplitude” using [(reference value) - xx]. Alternatively, this calculation may be made by using the marker-delta function of the instrument.

i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j).

j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “-xx dB down amplitude” determined in step h). If a marker is below this “-xx dB down amplitude” value, then it shall be as close as possible to this value.

k) The dBc bandwidth shall be reported by providing spectral plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

3. For 99% OBW:

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.

b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be at least three times RBW, unless otherwise specified by the applicable requirement.

c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than  $[10 \log (OBW/RBW)]$  below the reference level. Specific guidance is given in 4.1.6.2.

d) Steps a) through c) might require iteration to adjust within the specified range.

e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max-hold mode (until the trace stabilizes) shall be used.

f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.

g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.

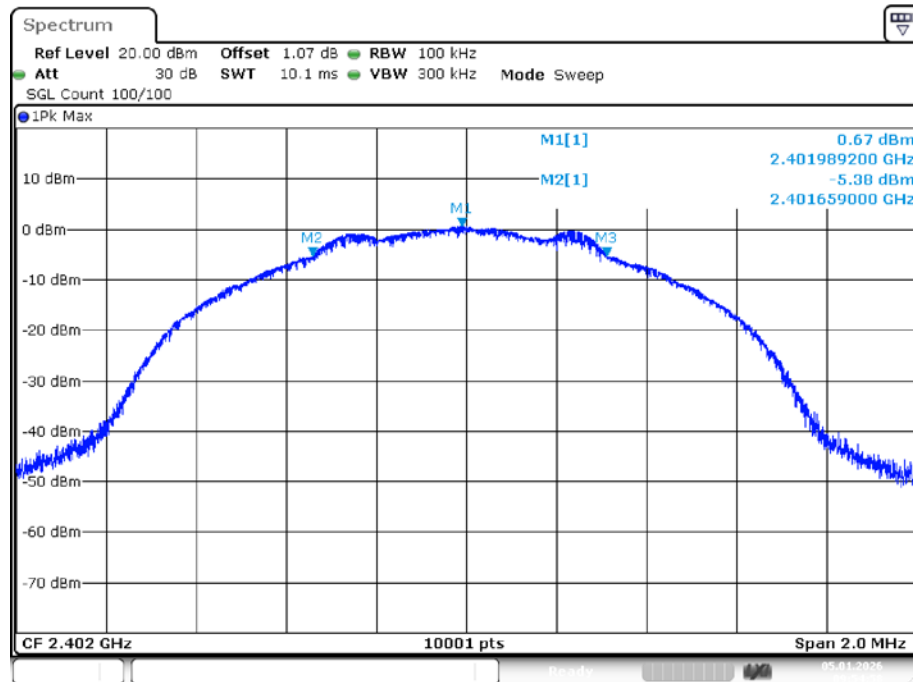
h) The occupied bandwidth shall be reported by providing spectral plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

**5.3.2 Test Result (-6dB bandwidth)**

| Test mode | Test Frequency (MHz) | -6db bandwidth (MHz) | Limit for -6 dB Bandwidth (MHz) | Test Result |
|-----------|----------------------|----------------------|---------------------------------|-------------|
| BLE 1M    | 2402                 | 0.652                | 0.5                             | Pass        |
|           | 2440                 | 0.661                | 0.5                             | Pass        |
|           | 2480                 | 0.637                | 0.5                             | Pass        |
| BLE 2M    | 2402                 | 1.31                 | 0.5                             | Pass        |
|           | 2440                 | 1.315                | 0.5                             | Pass        |
|           | 2480                 | 1.271                | 0.5                             | Pass        |

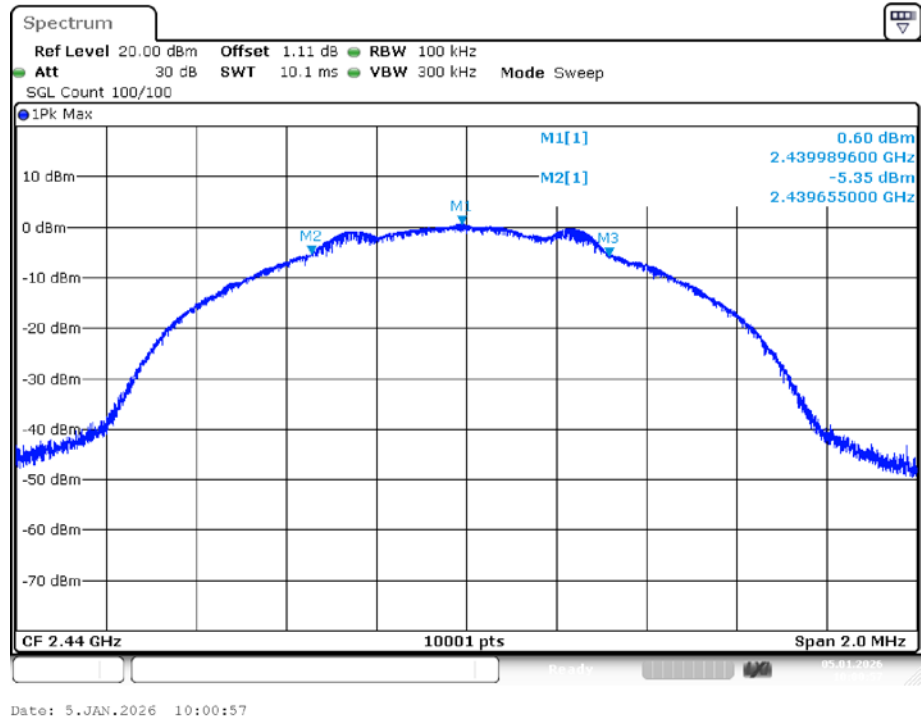
-6db bandwidth:

Result plot as follows:

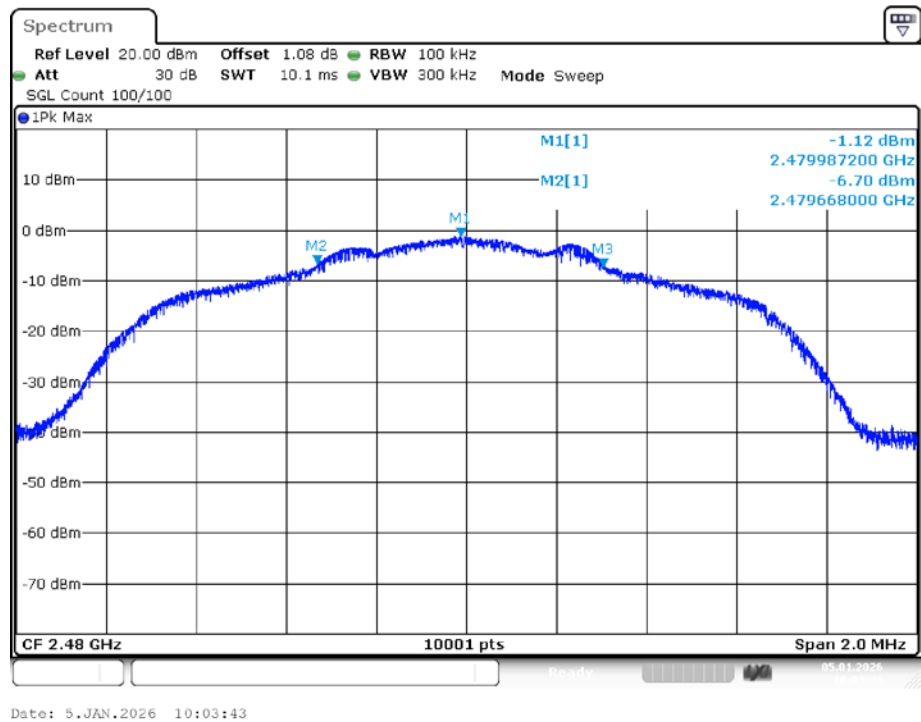


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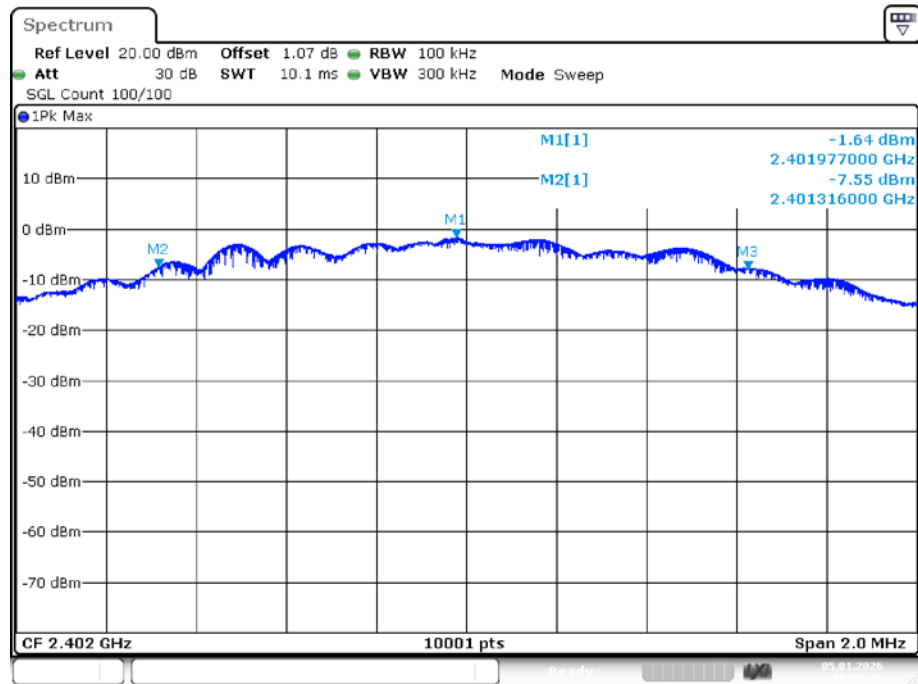
-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



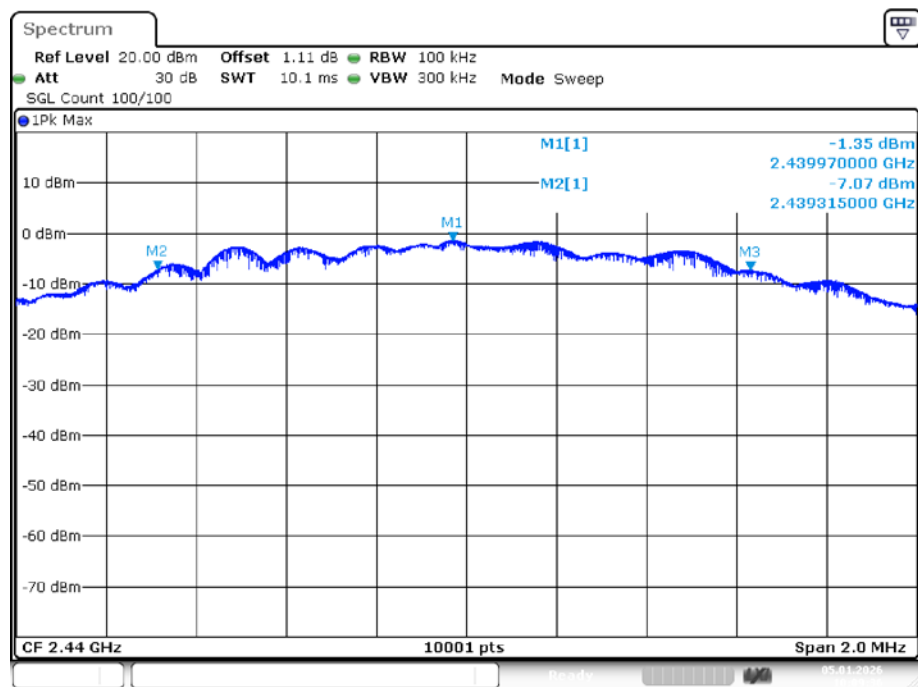
-6dB Bandwidth NVNT BLE 1M 2440MHz Ant1



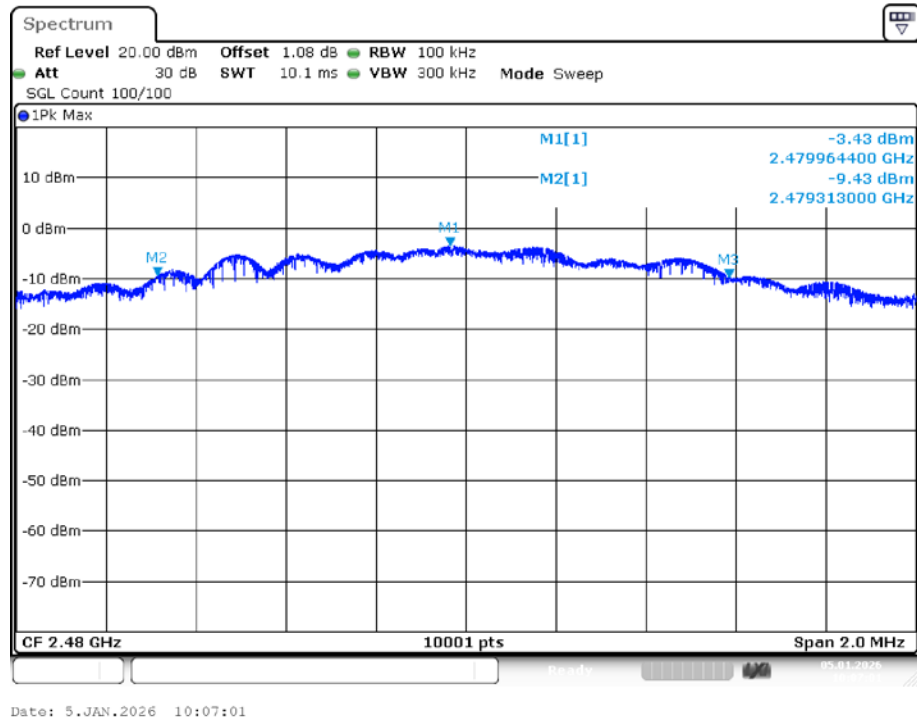
-6dB Bandwidth NVNT BLE 1M 2480MHz Ant1



-6dB Bandwidth NVNT BLE 2M 2402MHz Ant1



-6dB Bandwidth NVNT BLE 2M 2440MHz Ant1



-6dB Bandwidth NVNT BLE 2M 2480MHz Ant1

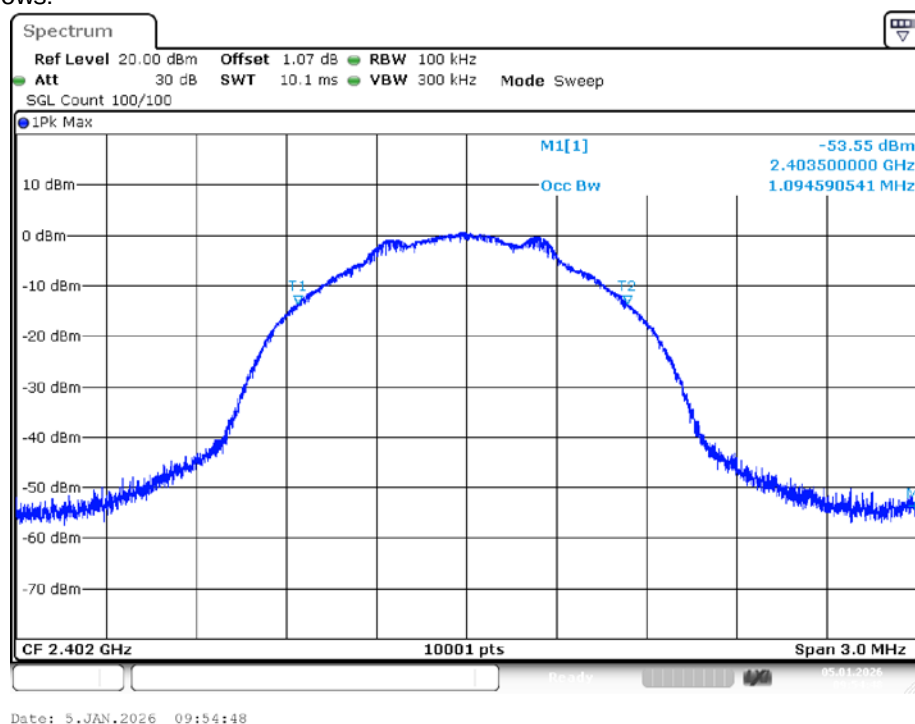
**Test Result: The unit does meet the FCC requirements.**

### 5.3.3 Test Result (99% power bandwidth)

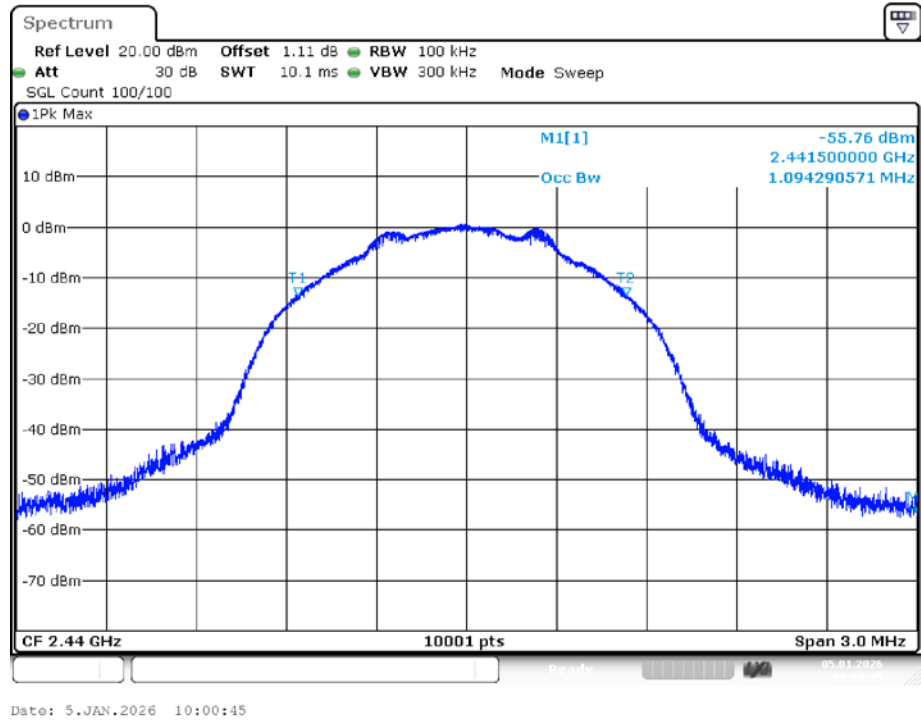
| Test mode | Test Frequency (MHz) | 99% bandwidth (MHz) | Test Result |
|-----------|----------------------|---------------------|-------------|
| BLE 1M    | 2402                 | 1.095               | Pass        |
|           | 2440                 | 1.094               | Pass        |
|           | 2480                 | 1.33                | Pass        |
| BLE 2M    | 2402                 | 2.102               | Pass        |
|           | 2440                 | 2.103               | Pass        |
|           | 2480                 | 2.579               | Pass        |

99% power bandwidth:

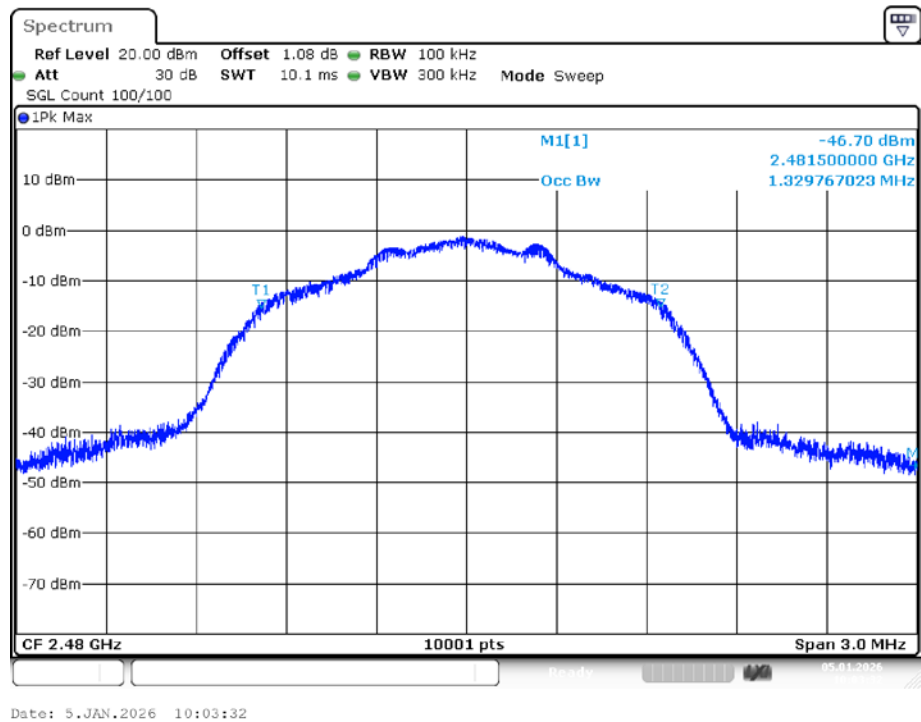
Result plot as follows:



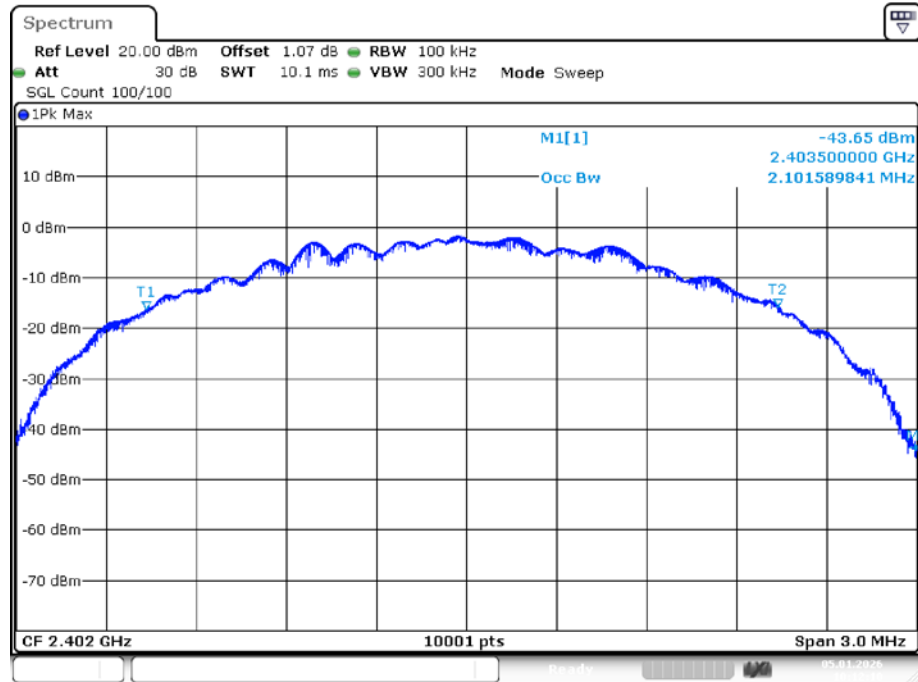
OBW NVNT BLE 1M 2402MHz Ant1



OBW NVNT BLE 1M 2440MHz Ant1

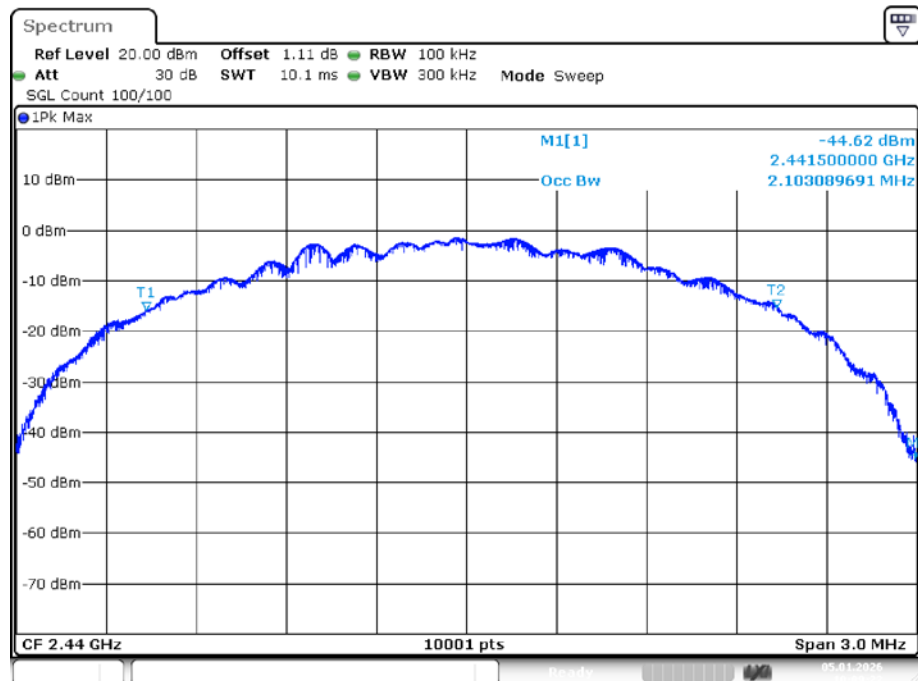


OBW NVNT BLE 1M 2480MHz Ant1



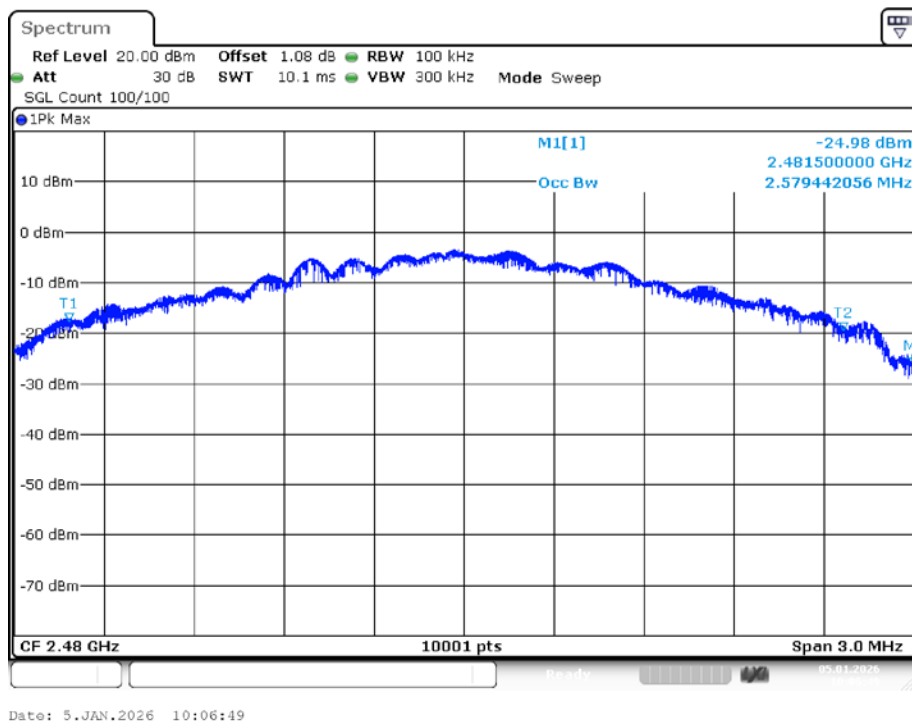
Date: 5.JAN.2026 10:12:09

OBW NVNT BLE 2M 2402MHz Ant1



Date: 5.JAN.2026 10:09:22

OBW NVNT BLE 2M 2440MHz Ant1



OBW NVNT BLE 2M 2480MHz Ant1

Test Result: The unit does meet the FCC requirements.

## 5.4 Maximum Conducted Output Power

Test Requirement: FCC Part 15 C section 15.247

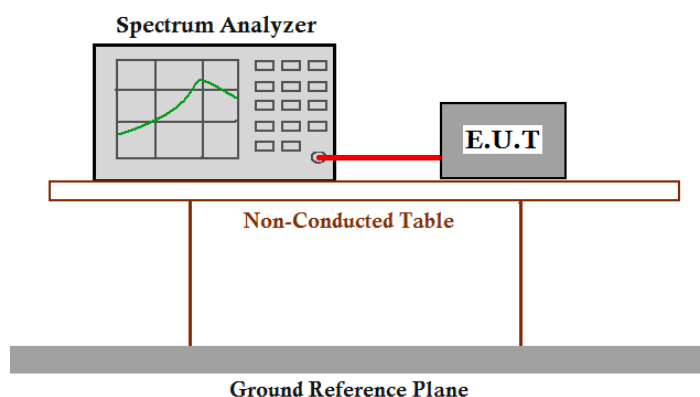
(b)(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands: 1 Watt.

Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b) (1), (b) (2), and (b) (3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test Method: ANSI C63.10:2020

Test Status: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, channels and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

### 5.4.1 Test Configuration

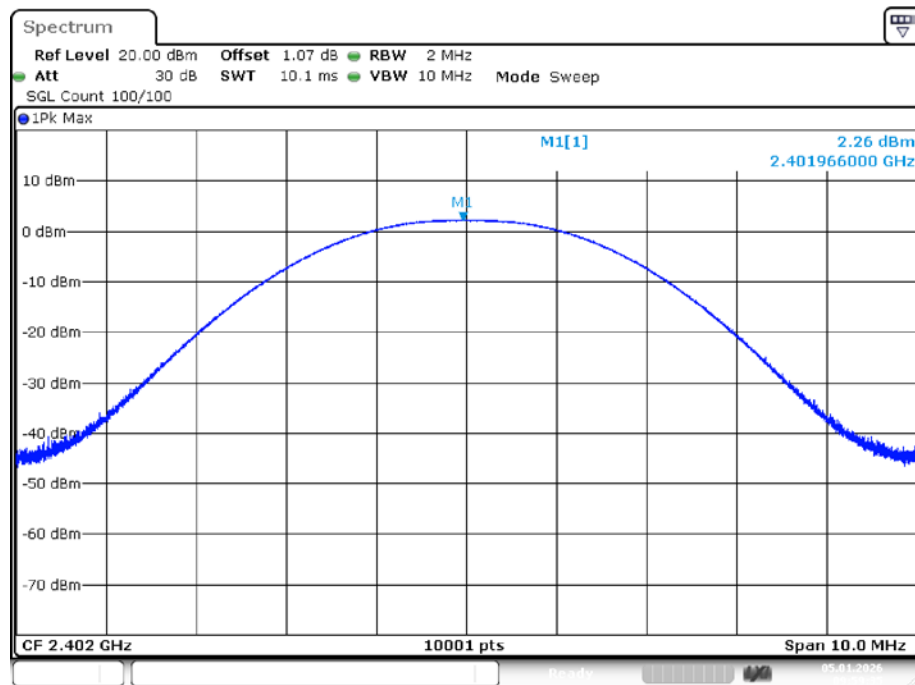


#### Test Procedure:

1. The testing follows the Measurement Procedure of ANSI C63.10:2020 Section 11.9.2.2.4.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings:  
Set instrument center frequency to DS channel center frequency/Set span to at least 1.5 times the OBW /  
RBW = 1% to 5% of the OBW, not to exceed 1 MHz. / Set VBW  $\geq$  [3 x RBW]. / Detector: RMS / Sweep time:  
Auto / Trace mode: Average / Trace average at least 100 traces in power averaging(rms) mode.
5. Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges.
6. Add  $[10 \log (1 / D)]$ , where D is the duty cycle), to the measured PSD to compute the average PSD during the actual transmission time.
7. Record the measurement results in the test report.

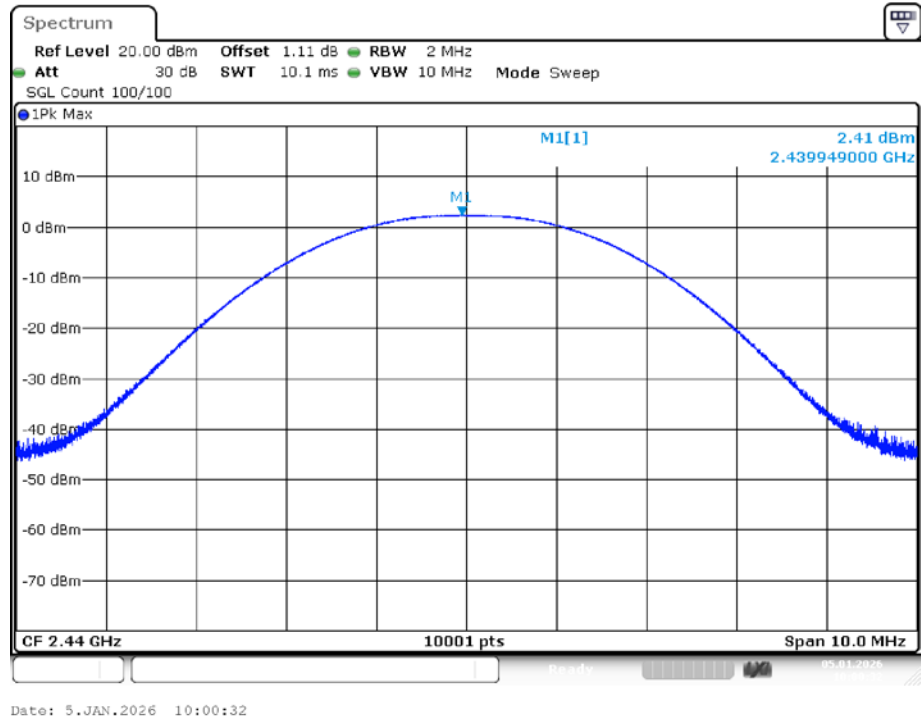
## 5.4.2 Test Result (Maximum Conducted Output Power)

| Test mode | Test Frequency (MHz) | Conducted Power (dBm) | Limit (dBm) | Test Result |
|-----------|----------------------|-----------------------|-------------|-------------|
| BLE 1M    | 2402                 | 2.265                 | 30          | Pass        |
|           | 2440                 | 2.413                 | 30          | Pass        |
|           | 2480                 | 1.524                 | 30          | Pass        |
| BLE 2M    | 2402                 | 1.739                 | 30          | Pass        |
|           | 2440                 | 1.974                 | 30          | Pass        |
|           | 2480                 | 0.673                 | 30          | Pass        |

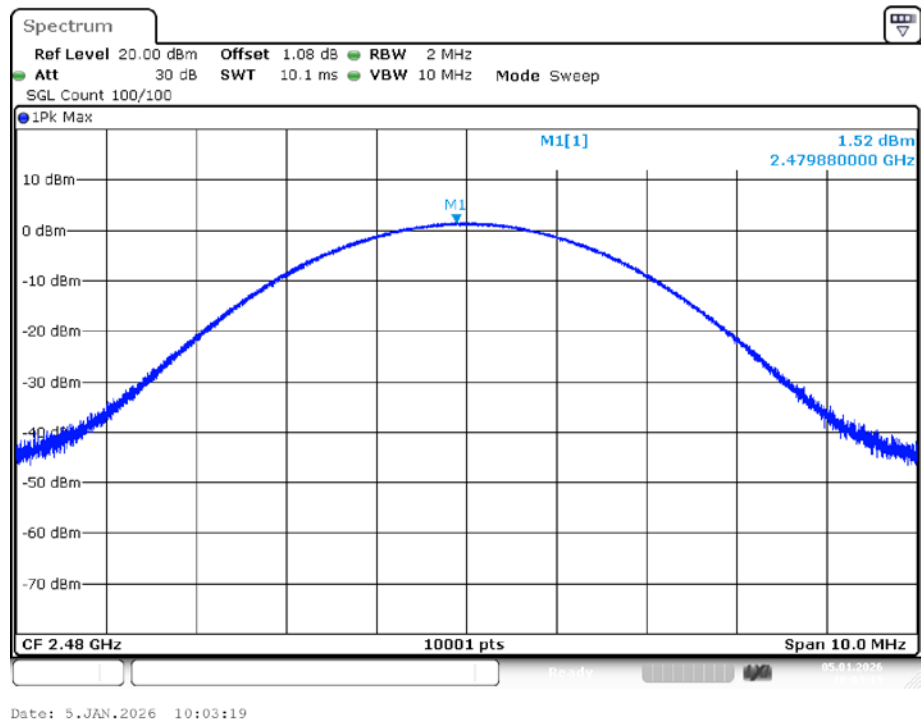


Date: 5.JAN.2026 09:59:35

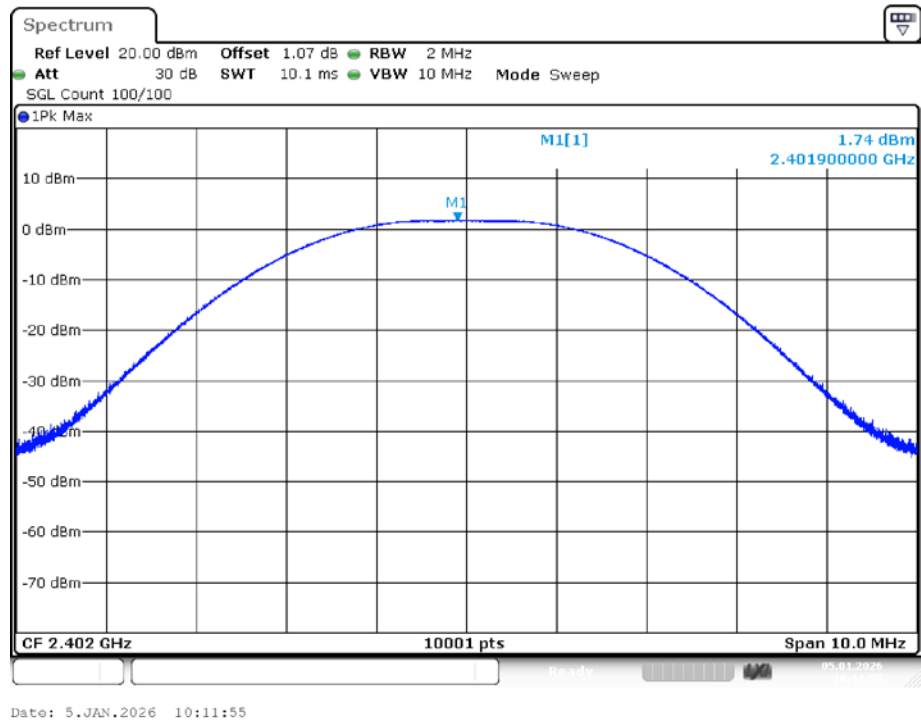
Power NVNT BLE 1M 2402MHz Ant1



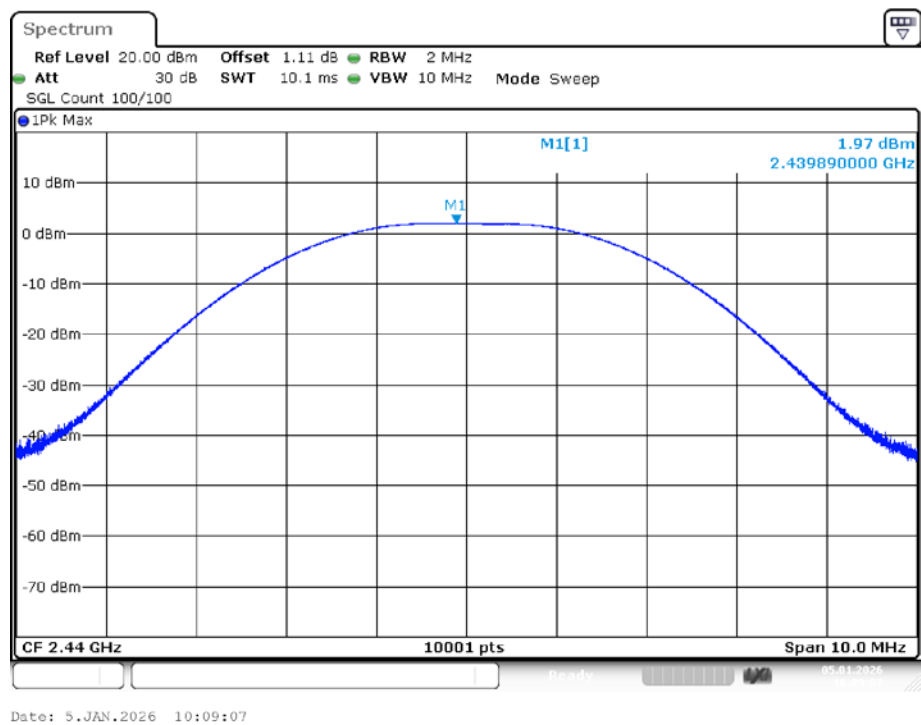
Power NVNT BLE 1M 2440MHz Ant1



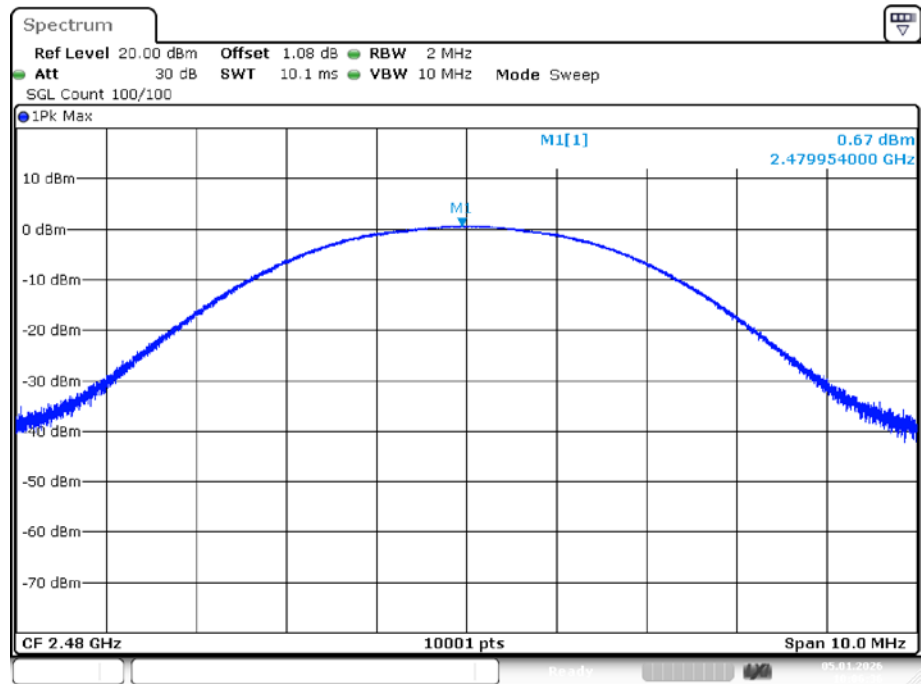
Power NVNT BLE 1M 2480MHz Ant1



Power NVNT BLE 2M 2402MHz Ant1



Power NVNT BLE 2M 2440MHz Ant1



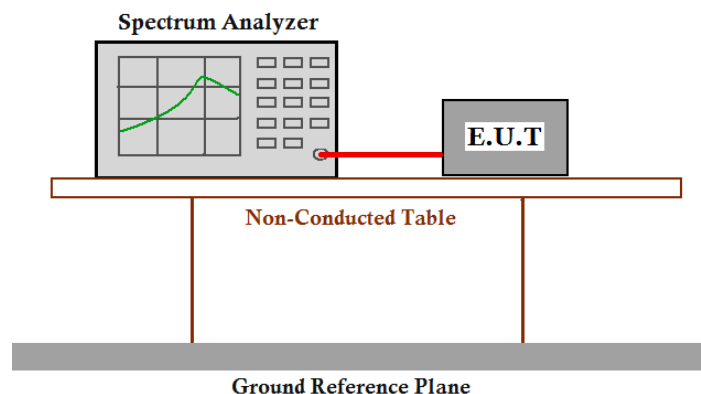
Date: 5.JAN.2026 10:06:35

Power NVNT BLE 2M 2480MHz Ant1

## 5.5 Power Spectral Density

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part 15 C section 15.247<br>(e) 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.<br>This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density. |
| Test Method:      | ANSI C63.10:2020                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Test Status:      | Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, channel and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.                                                                                                                                                                                                                       |

### 5.5.1 Test Configuration



#### Test Procedure:

1. The testing follows the Measurement Procedure of ANSI C63.10:2020 Section 11.10.5.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.  
The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings:

Set instrument center frequency to DTS channel center frequency / Set the span to 1.5 times the DTS bandwidth

Set the RBW to  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$  ; Set the VBW to:  $10 \text{ kHz} \leq \text{RBW} \leq 300 \text{ kHz}$ ;

Detector: RMS / Sweep time: Auto couple / Trace mode: Average / Employ trace averaging (rms) mode over a minimum of 100 traces / Use the peak marker function to determine the maximum power level.

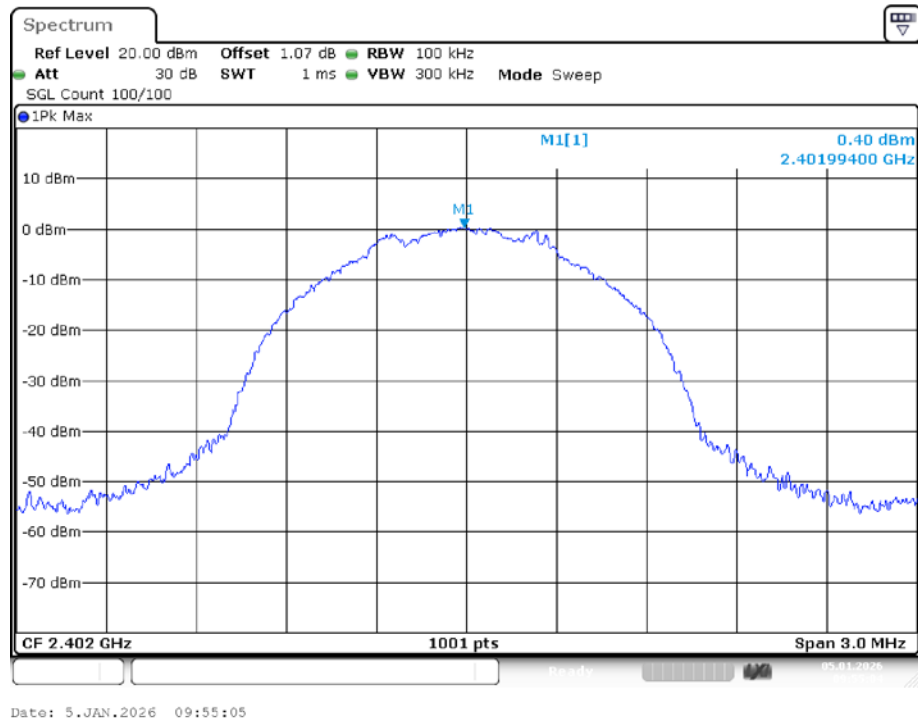
5. Add  $[10 \log (1 / D)]$ , where D is the duty cycle), to the measured PSD to compute the average PSD during the actual transmission time.

6. Record the measurement results in the test report.

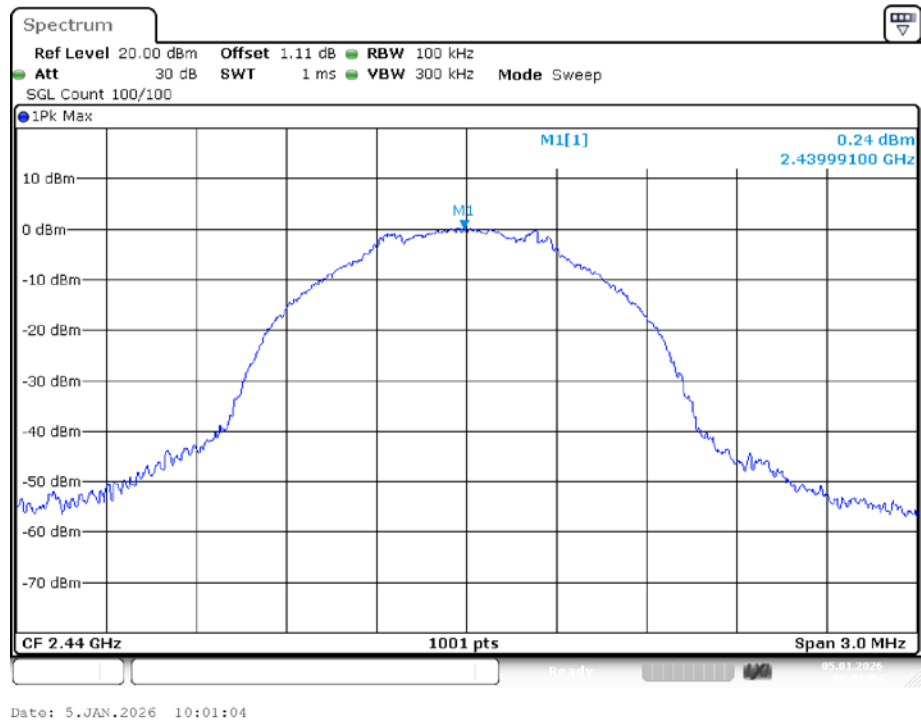
**5.5.2 Test Result (Power Spectral Density)**

| Test mode | Test Frequency (MHz) | Max PSD (dBm/100KHz) | Limit (dBm/3KHz) | Test Result |
|-----------|----------------------|----------------------|------------------|-------------|
| BLE 1M    | 2402                 | 0.397                | 8                | Pass        |
|           | 2440                 | 0.238                | 8                | Pass        |
|           | 2480                 | -1.36                | 8                | Pass        |
| BLE 2M    | 2402                 | -1.846               | 8                | Pass        |
|           | 2440                 | -1.404               | 8                | Pass        |
|           | 2480                 | -3.28                | 8                | Pass        |

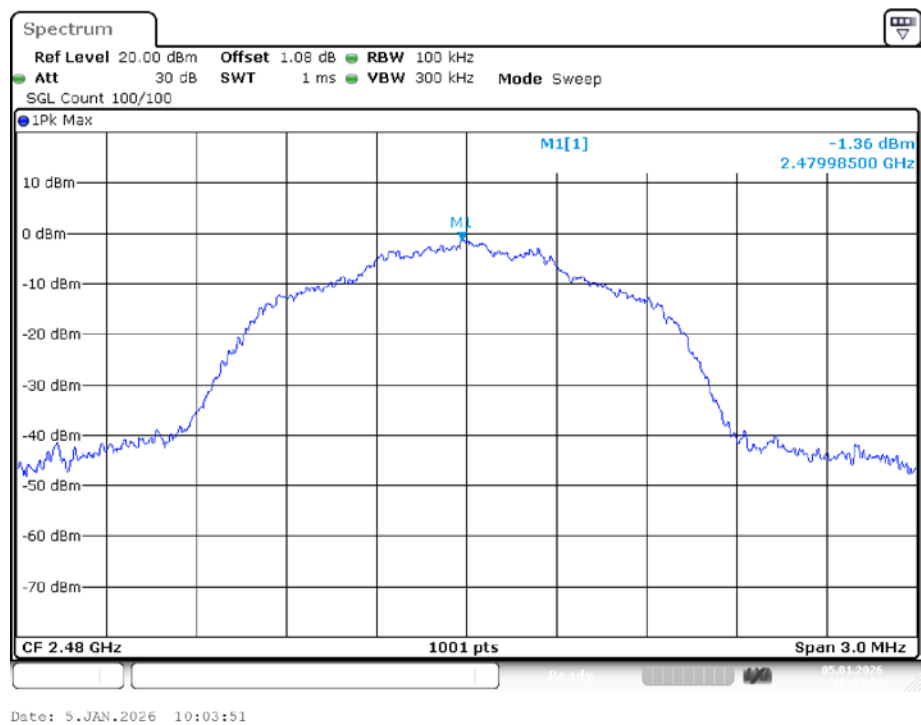
Result plot as follows:



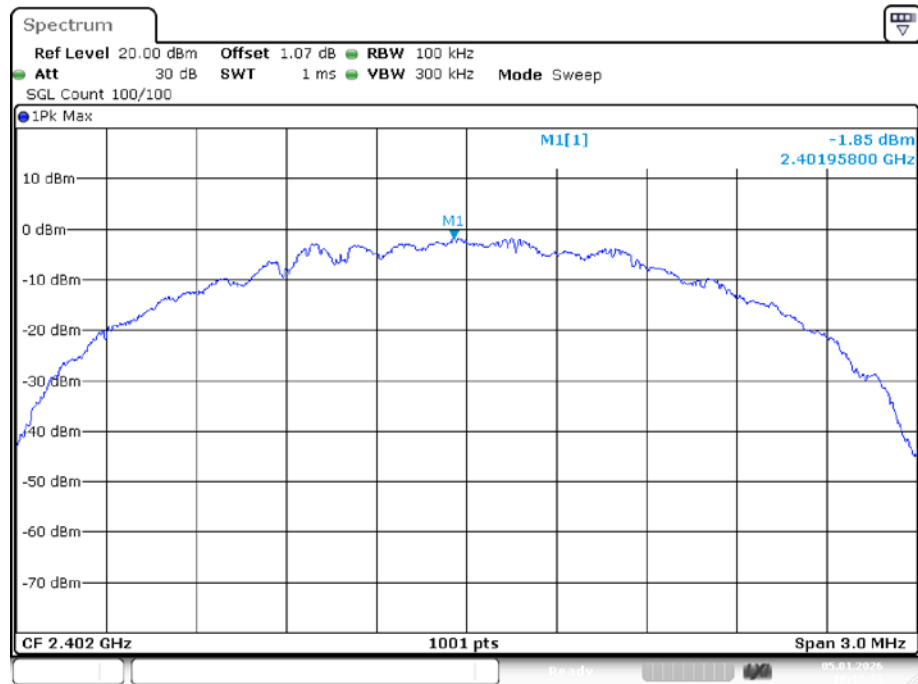
PSD NVNT BLE 1M 2402MHz Ant1



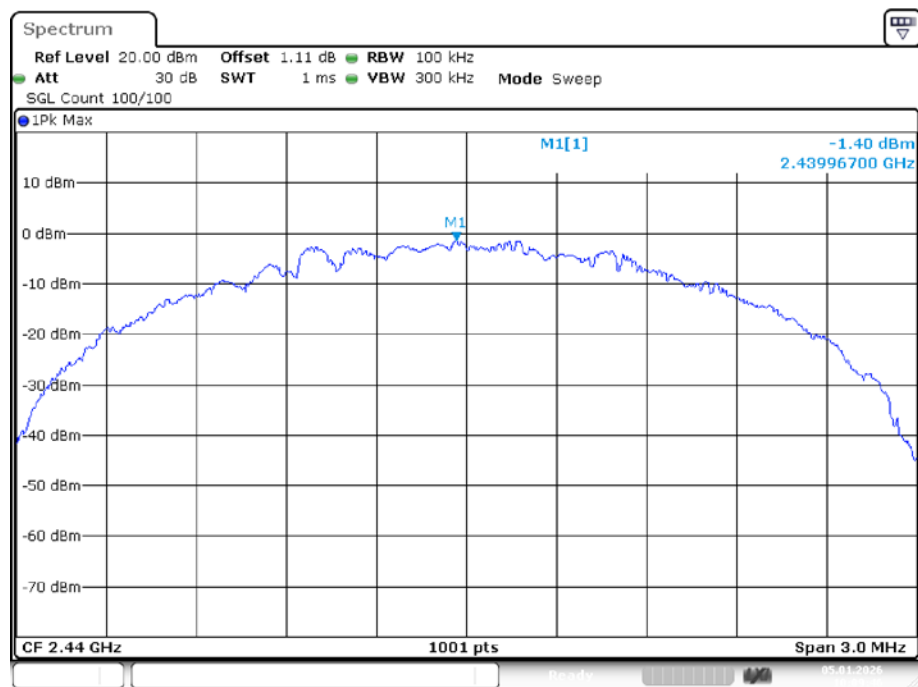
PSD NVNT BLE 1M 2440MHz Ant1



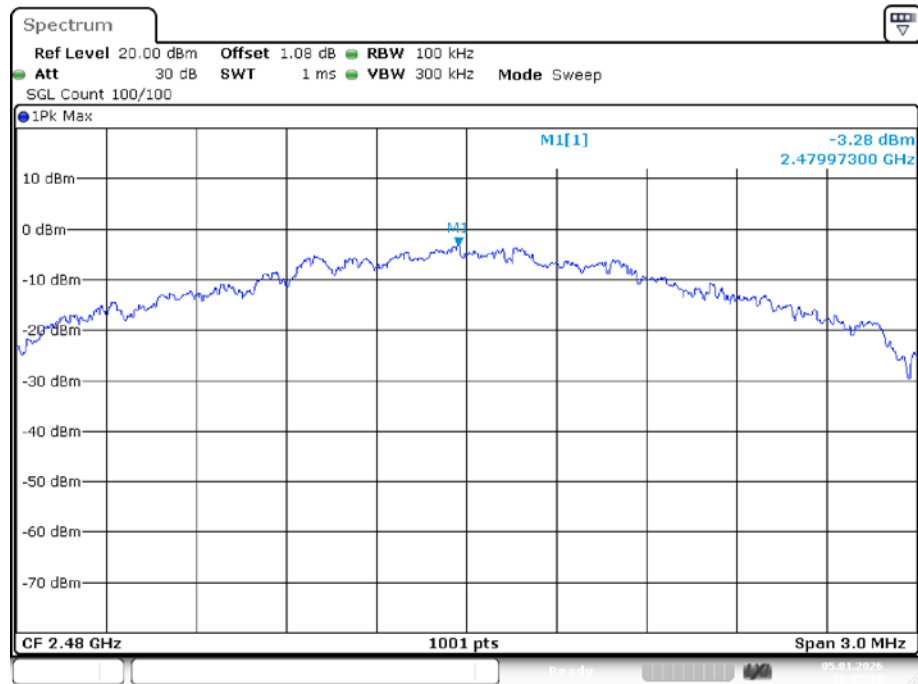
PSD NVNT BLE 1M 2480MHz Ant1



PSD NVNT BLE 2M 2402MHz Ant1



PSD NVNT BLE 2M 2440MHz Ant1



Date: 5.JAN.2026 10:07:10

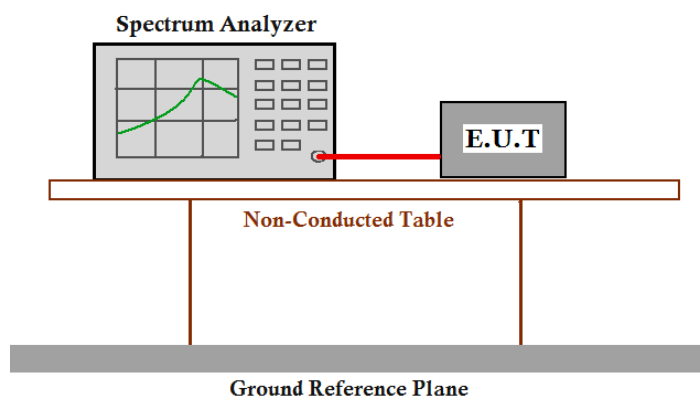
PSD NVNT BLE 2M 2480MHz Ant1

Test Result: The unit does meet the FCC requirements.

## 5.6 Conducted Spurious Emissions

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part 15 C section 15.247<br><br>(d) In any 100 KHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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. |
| Test Method:      | ANSI C63.10:2020                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Test Status:      | Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, channel and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.                                                                                                                                                                                                                                                               |

### 5.6.1 Test Configuration



#### Test Procedure:

1. The testing follows the Measurement Procedure of ANSI C63.10:2020 Section 11.11 and 11.13
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings

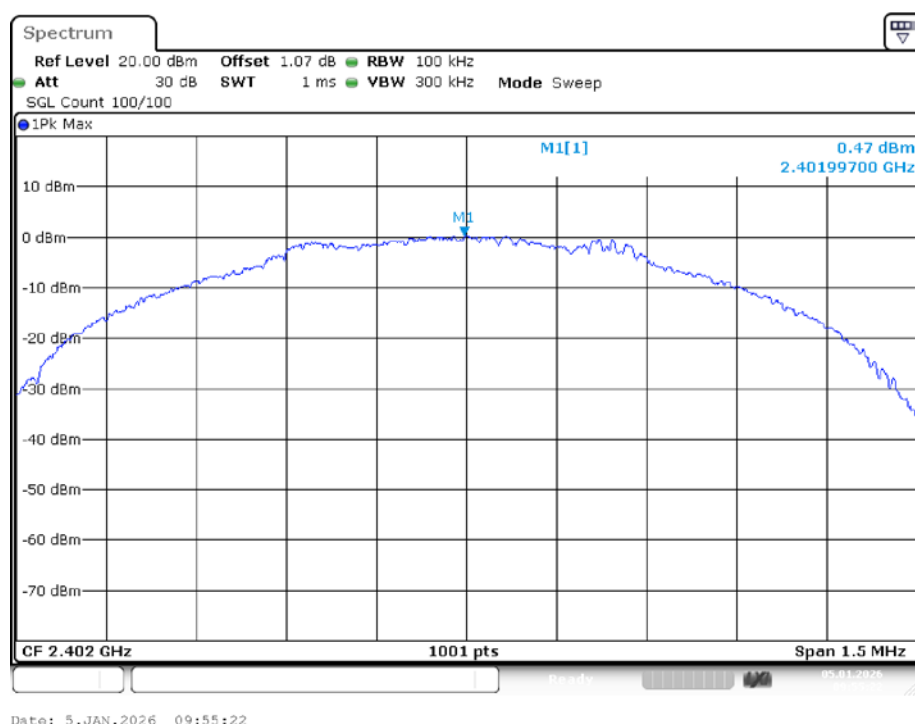
Reference level measurement: Set spectrum analyzer center frequency to DTS channel center frequency / Set the span to >1.5 times the DTS bandwidth /RBW: 100KHz/VBW: 300KHz/Detector: Peak / Sweep time: Auto couple / Trace mode: Max hold / Allow trace to fully stabilize Use the peak marker function to determine the maximum PSD level and attenuate it by 20dB.Emission level measurement: Set the center frequency and span to encompass frequency range to be measured /RBW: 100KHz/VBW: 300KHz/ Detector:

Peak / Sweep time: Auto couple / Trace mode: Max hold / Allow trace to fully stabilize / Use the peak marker function to determine the maximum amplitude level.

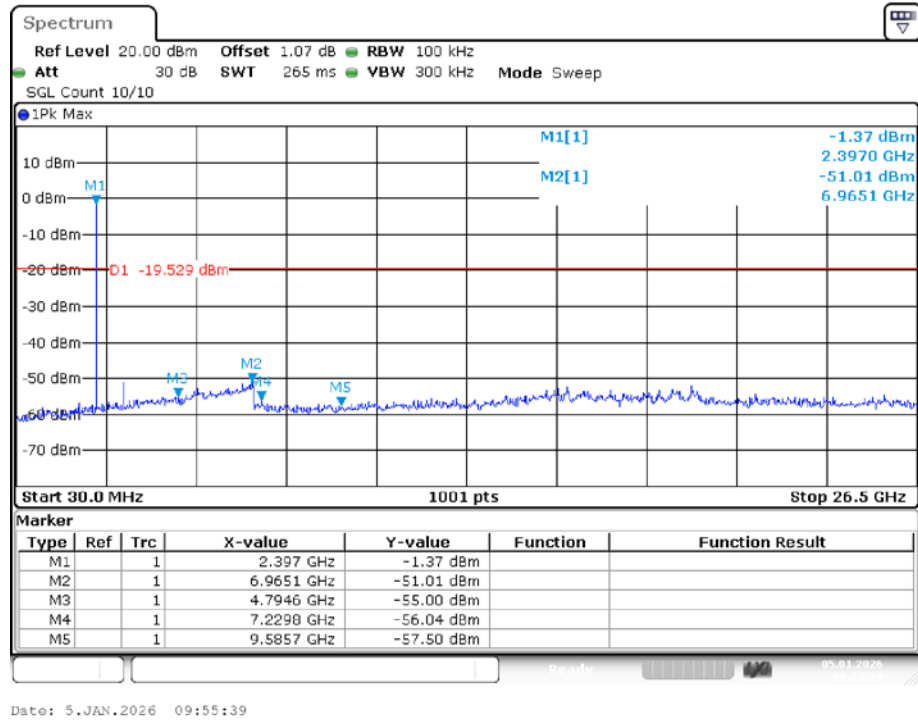
5. Record the measurement results in the test report.

### 5.6.2 Test Result (Conducted Spurious Emissions)

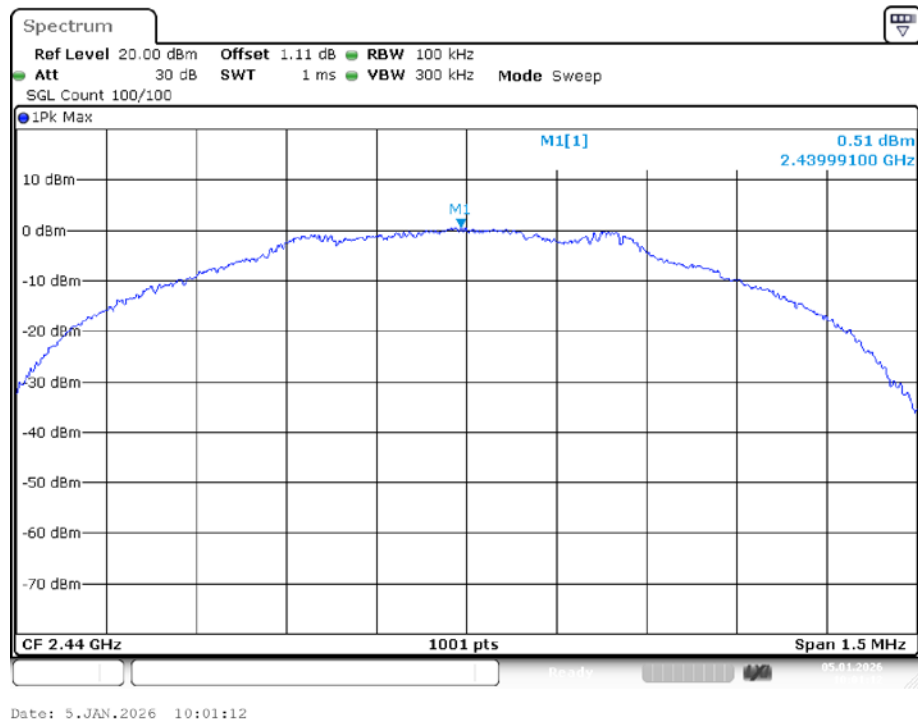
| Test mode | Test Frequency (MHz) | Max Value (dBc) | Limit (dBc) | Test Result |
|-----------|----------------------|-----------------|-------------|-------------|
| BLE 1M    | 2402                 | -46.5           | -20         | Pass        |
|           | 2440                 | -47.13          | -20         | Pass        |
|           | 2480                 | -49.61          | -20         | Pass        |
| BLE 2M    | 2402                 | -47.79          | -20         | Pass        |
|           | 2440                 | -48.23          | -20         | Pass        |
|           | 2480                 | -50.7           | -20         | Pass        |



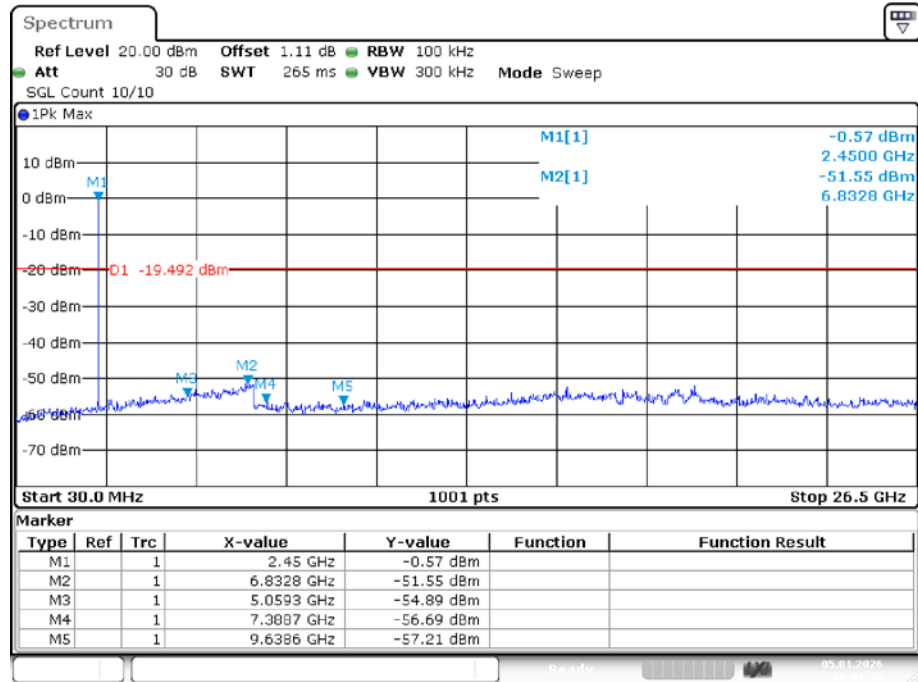
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



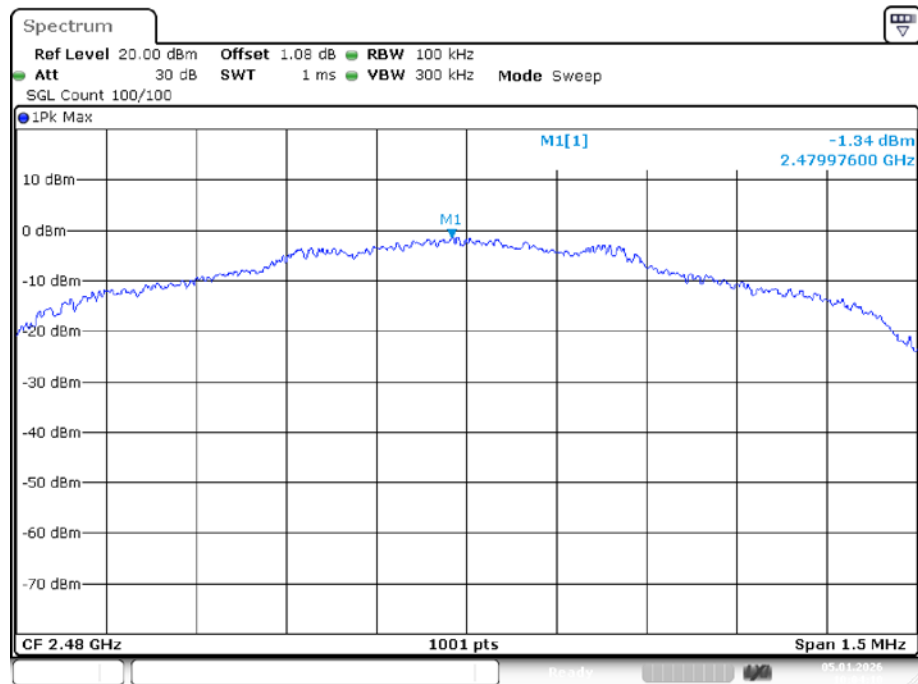
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission



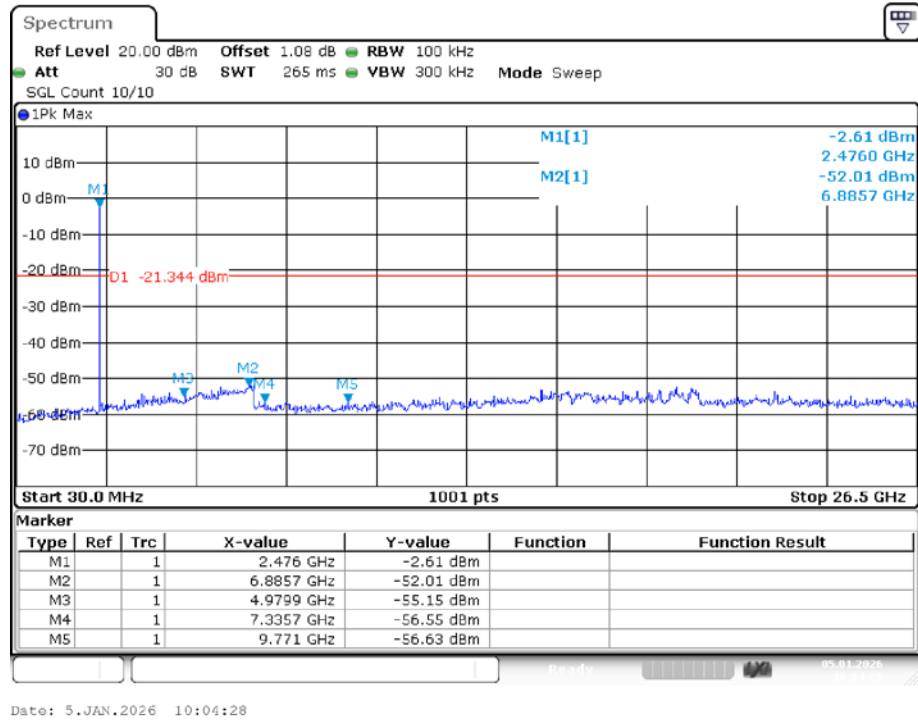
Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref



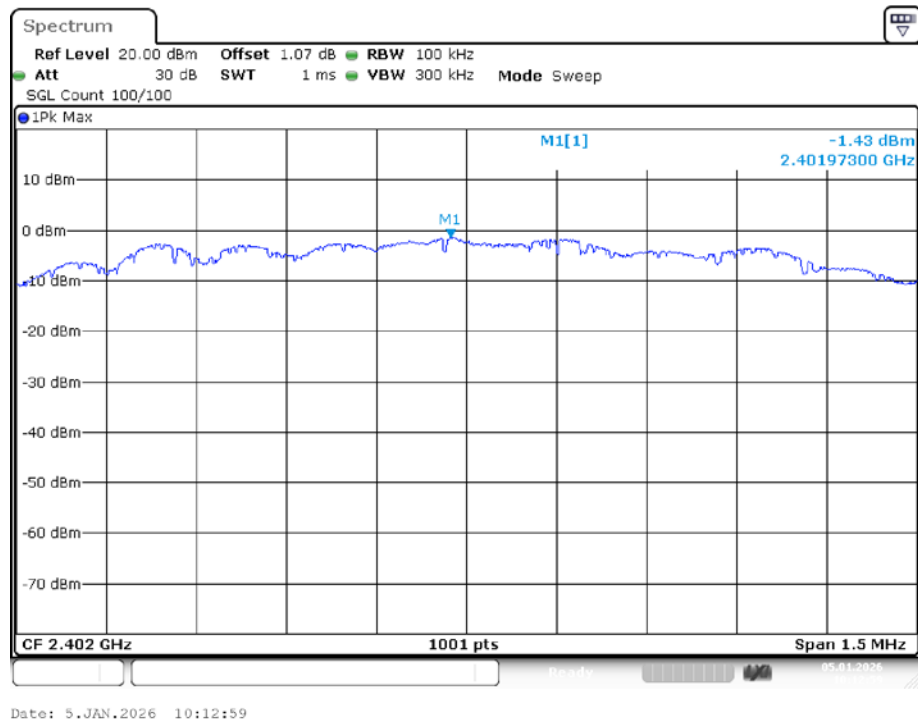
Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission



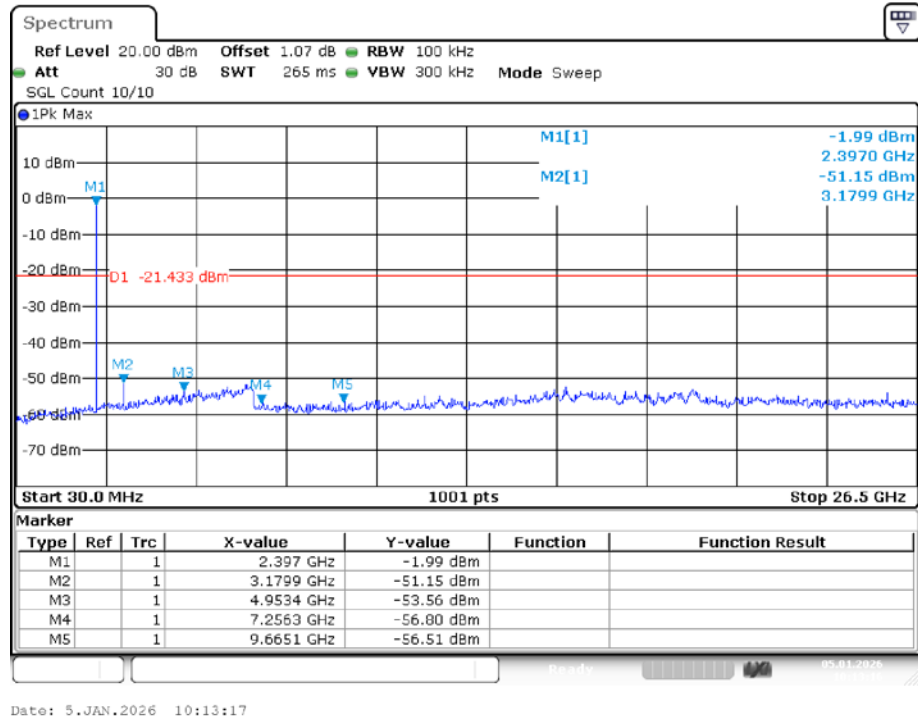
Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref



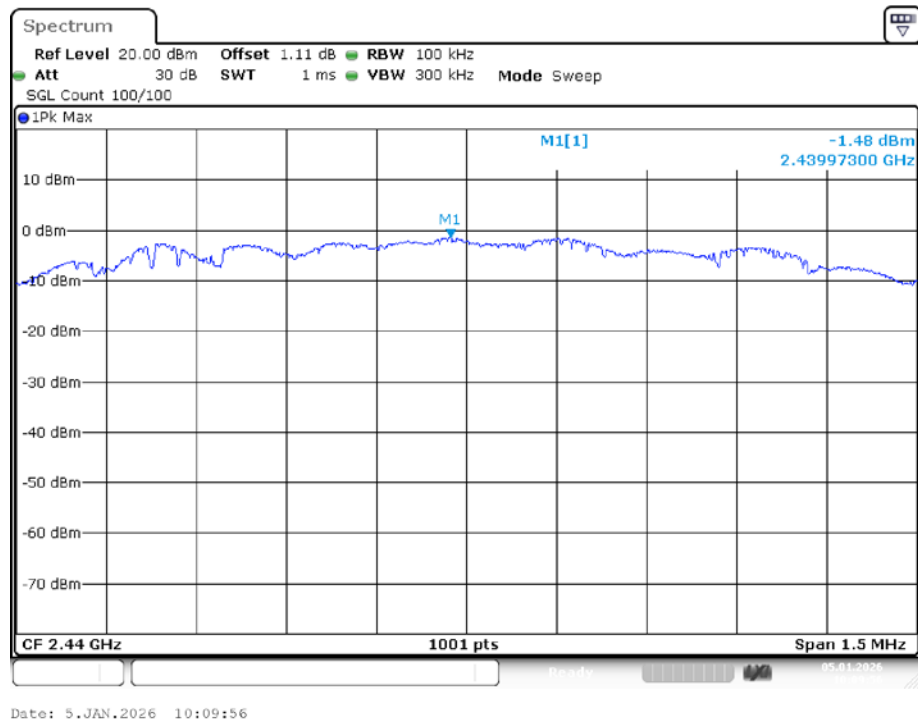
Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Emission



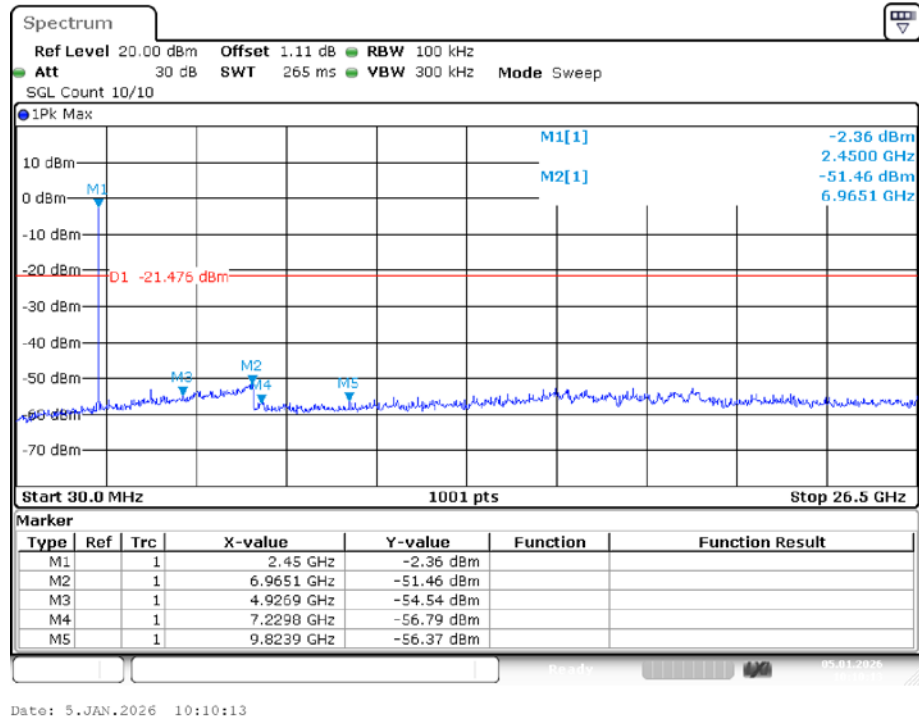
Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Ref



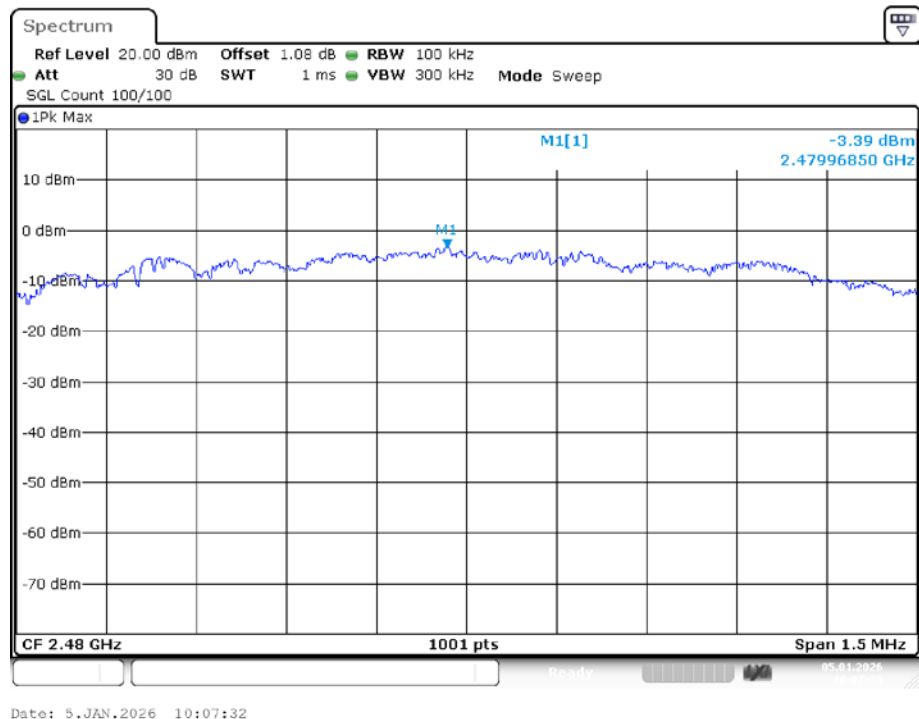
Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Emission



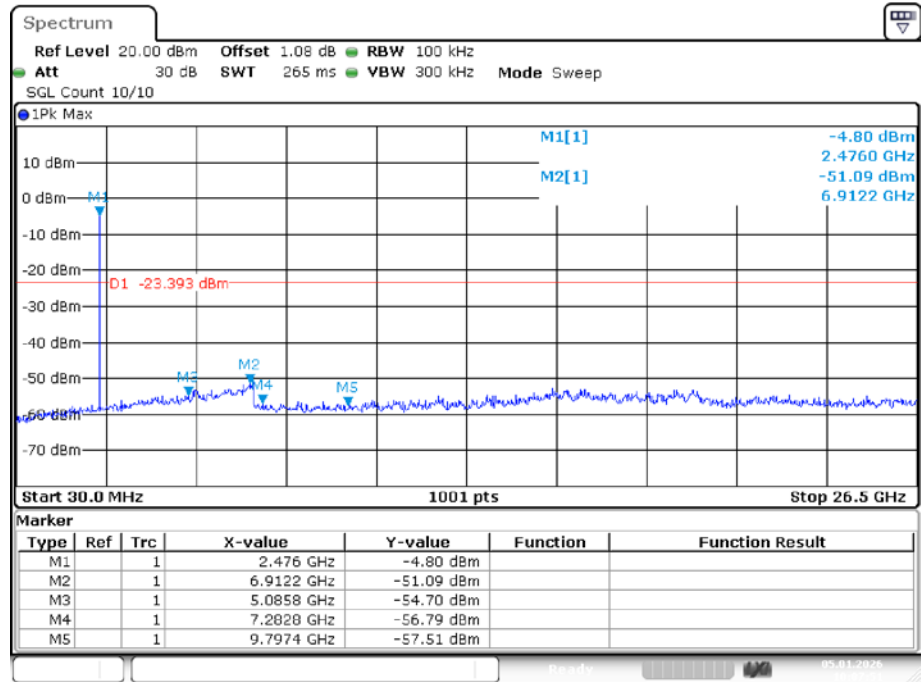
Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Ref



Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Emission



Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Ref



Date: 5.JAN.2026 10:07:51

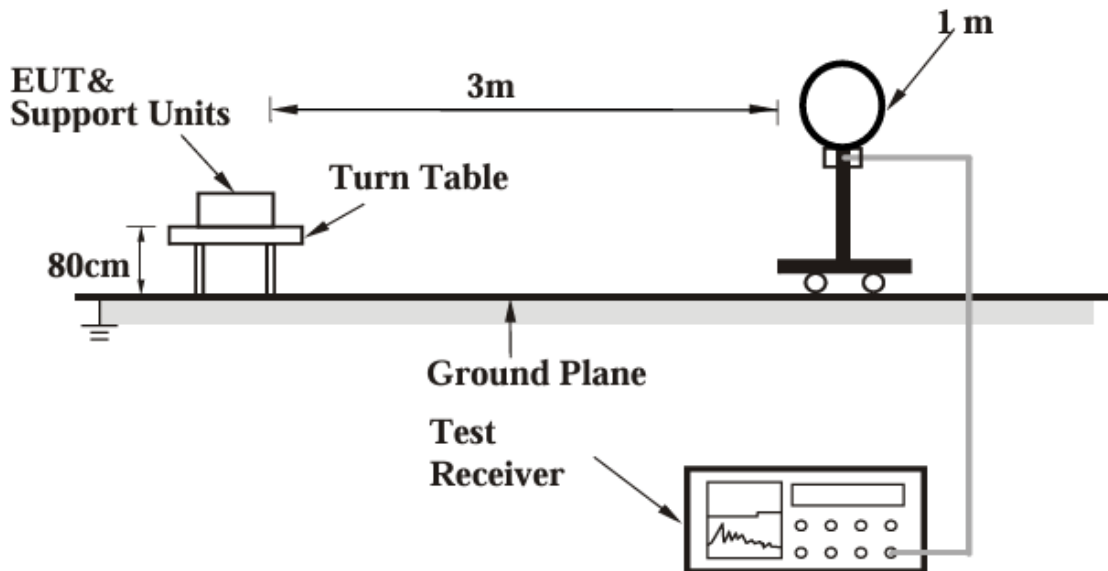
Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Emission

## 5.7 Radiated Spurious Emissions

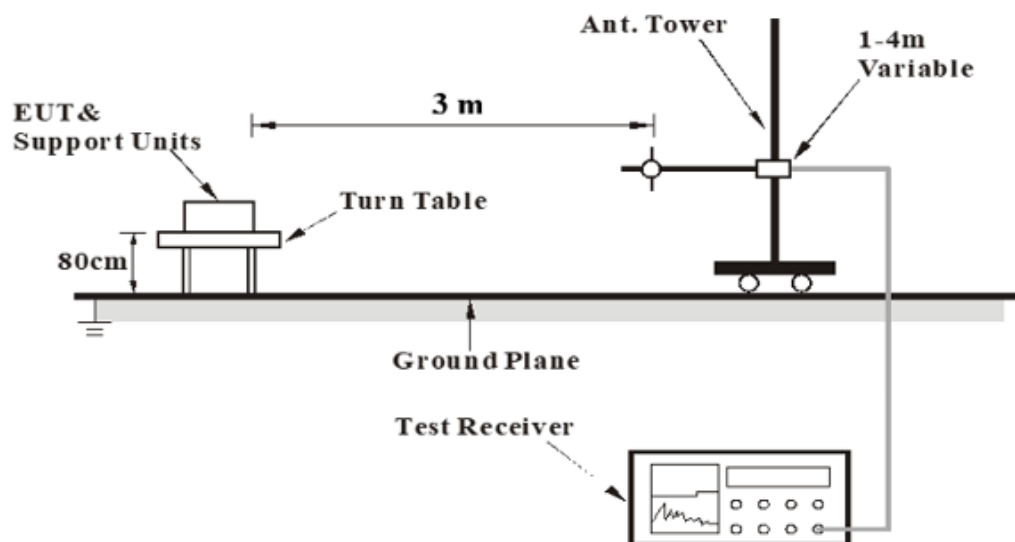
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part 15 C section 15.247<br>(d) In any 100 KHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, and provided the transmitter demonstrates compliance with the peak conducted power limits. |
| Test Method:      | ANSI C63.10:2020                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Test Status:      | Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, channels and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.                                                                                                                                                                                                                                                              |
| Detector:         | For PK value:<br><br>RBW = 1 MHz for $f \geq 1$ GHz, 100 KHz for $f < 1$ GHz<br>VBW $\geq$ RBW Sweep<br>= auto<br><br>Detector function = peak<br><br>Trace = max hold<br><br>For AV value:<br><br>RBW = 1 MHz for $f \geq 1$ GHz, 100 KHz for $f < 1$ GHz, 9KHz for $< 30$ MHz<br>VBW = 10 Hz<br><br>Sweep = auto<br><br>Detector function = peak<br><br>Trace = max hold                                                                                                                                                                    |
| Limit:            | 40.0 dB $\mu$ V/m between 30 MHz & 88 MHz<br><br>43.5 dB $\mu$ V/m between 88 MHz & 216 MHz<br><br>46.0 dB $\mu$ V/m between 216 MHz & 960 MHz<br><br>54.0 dB $\mu$ V/m above 960 MHz                                                                                                                                                                                                                                                                                                                                                         |

### 5.7.1 Test Configuration

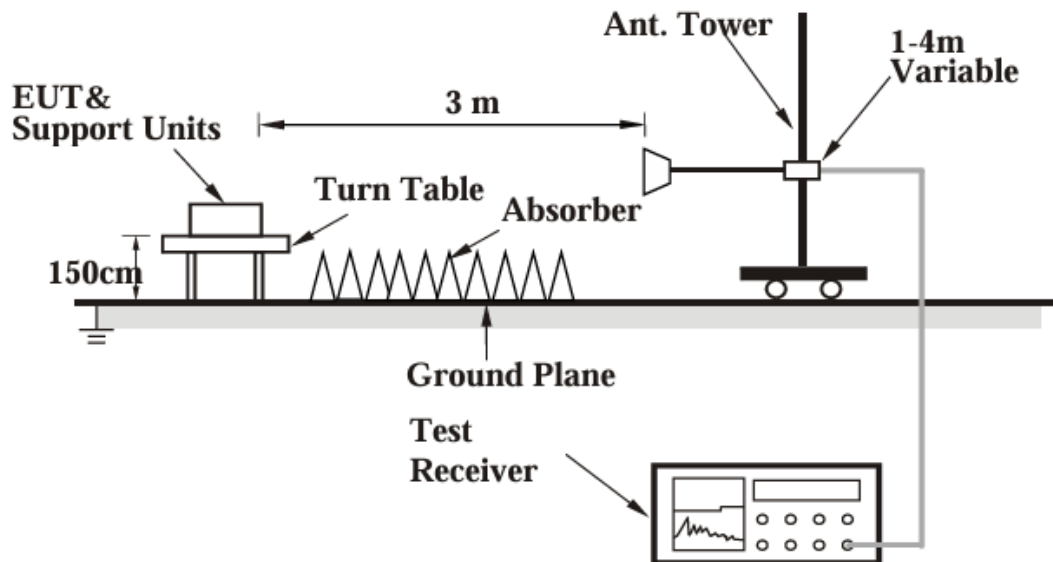
1) 9KHz to 30MHz emissions:



2) 30 MHz to 1 GHz emissions:



## 3) 1 GHz to 40 GHz emissions:



**Test Procedure: (1)** The receiver was scanned from 0.009MHz to 25GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only. The worst case emissions were reported.

**(2)** Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from  $20\log(\text{dwell time}/100 \text{ ms})$ , in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

**(3)** Pre-test under all modes below 1GHz, choose the worst case mode record On the report.

## 5.7.2 Harmonic and other spurious emissions

### 5.7.3 Test Result (Radiated Spurious Emissions 30 MHz~1 GHz)

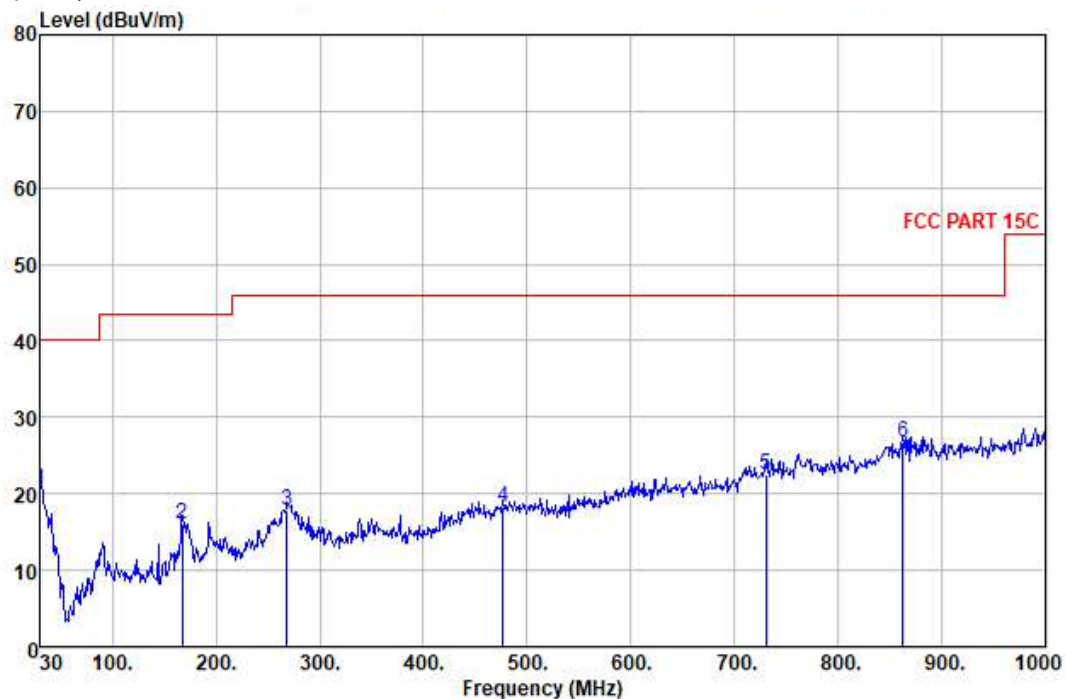
Worst case mode BLE 2M 2402 MHz

The Low frequency, which started from 9 KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report.

Horizontal:

Peak scan

Level (dB $\mu$ V/m)



| No. | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dBuV/m | Limit<br>Line<br>dBuV/m | Over<br>Limit<br>dB | Pol/Phase  | Remark |
|-----|-------------|-----------------------|-------------------------|---------------------|------------------------|-----------------|-------------------------|---------------------|------------|--------|
| 1   | 30.000      | 24.73                 | 23.60                   | 0.63                | 28.50                  | 20.46           | 40.00                   | -19.54              | HORIZONTAL | QP     |
| 2   | 167.740     | 34.14                 | 8.85                    | 1.55                | 28.41                  | 16.13           | 43.50                   | -27.37              | HORIZONTAL | QP     |
| 3   | 268.620     | 30.62                 | 12.54                   | 2.00                | 27.25                  | 17.91           | 46.00                   | -28.09              | HORIZONTAL | QP     |
| 4   | 477.170     | 27.20                 | 16.76                   | 2.71                | 28.44                  | 18.23           | 46.00                   | -27.77              | HORIZONTAL | QP     |
| 5   | 730.340     | 26.47                 | 20.31                   | 3.40                | 27.58                  | 22.60           | 46.00                   | -23.40              | HORIZONTAL | QP     |
| 6   | 862.260     | 28.51                 | 21.85                   | 3.71                | 27.40                  | 26.67           | 46.00                   | -19.33              | HORIZONTAL | QP     |

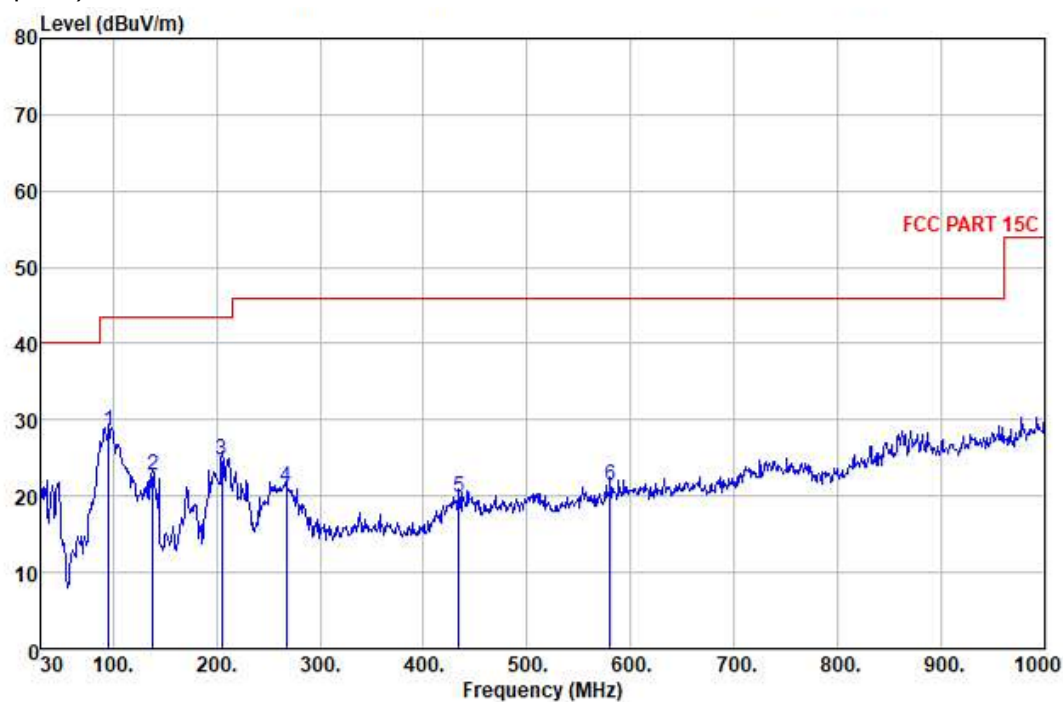
Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Quasi-peak measurement

Vertical:

Peak scan

Level (dB $\mu$ V/m)



| No. | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dBuV/m | Limit<br>Line<br>dBuV/m | Over<br>Limit<br>dB | Pol/Phase | Remark |
|-----|-------------|-----------------------|-------------------------|---------------------|------------------------|-----------------|-------------------------|---------------------|-----------|--------|
| 1   | 95.960      | 47.29                 | 8.70                    | 1.14                | 28.64                  | 28.49           | 43.50                   | -15.01              | VERTICAL  | QP     |
| 2   | 138.640     | 40.76                 | 8.77                    | 1.40                | 28.23                  | 22.70           | 43.50                   | -20.80              | VERTICAL  | QP     |
| 3   | 205.570     | 40.26                 | 10.45                   | 1.73                | 27.67                  | 24.77           | 43.50                   | -18.73              | VERTICAL  | QP     |
| 4   | 267.650     | 33.78                 | 12.63                   | 2.00                | 27.29                  | 21.12           | 46.00                   | -24.88              | VERTICAL  | QP     |
| 5   | 434.490     | 29.90                 | 15.71                   | 2.57                | 28.29                  | 19.89           | 46.00                   | -26.11              | VERTICAL  | QP     |
| 6   | 579.990     | 28.21                 | 18.80                   | 3.00                | 28.60                  | 21.41           | 46.00                   | -24.59              | VERTICAL  | QP     |

Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Quasi-peak measurement

### 5.7.4 Test Result (Radiated Spurious Emissions above 1GHz)

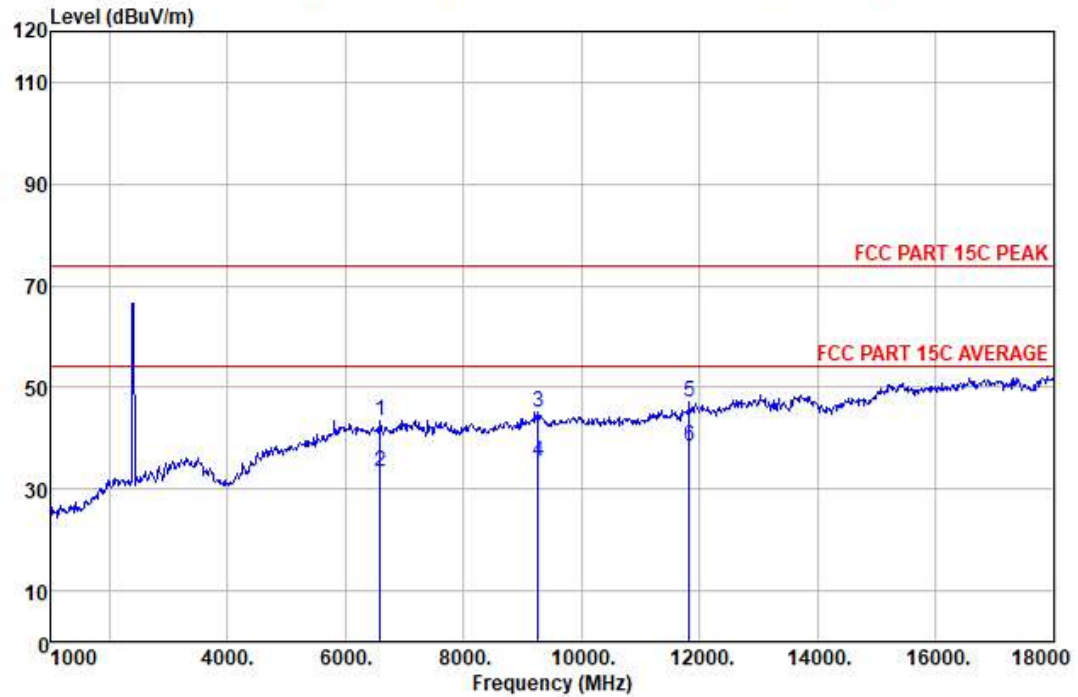
Worst case mode BLE 2M

Test at low Channel in transmitting status

Horizontal:

Peak scan

Level (dBμV/m)



| No. | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dBuV/m | Limit<br>Line<br>dBuV/m | Over<br>Limit<br>dB | Pol/Phase  | Remark  |
|-----|-------------|-----------------------|-------------------------|---------------------|------------------------|-----------------|-------------------------|---------------------|------------|---------|
| 1   | 6593.000    | 23.61                 | 35.67                   | 11.51               | 27.36                  | 43.43           | 74.00                   | -30.57              | HORIZONTAL | Peak    |
| 2   | 6593.000    | 13.62                 | 35.67                   | 11.51               | 27.36                  | 33.44           | 54.00                   | -20.56              | HORIZONTAL | Average |
| 3   | 9262.000    | 19.48                 | 38.80                   | 14.13               | 27.18                  | 45.23           | 74.00                   | -28.77              | HORIZONTAL | Peak    |
| 4   | 9262.000    | 9.62                  | 38.80                   | 14.13               | 27.18                  | 35.37           | 54.00                   | -18.63              | HORIZONTAL | Average |
| 5   | 11829.000   | 18.16                 | 39.60                   | 16.22               | 26.88                  | 47.10           | 74.00                   | -26.90              | HORIZONTAL | Peak    |
| 6   | 11829.000   | 9.63                  | 39.60                   | 16.22               | 26.88                  | 38.57           | 54.00                   | -15.43              | HORIZONTAL | Average |

Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

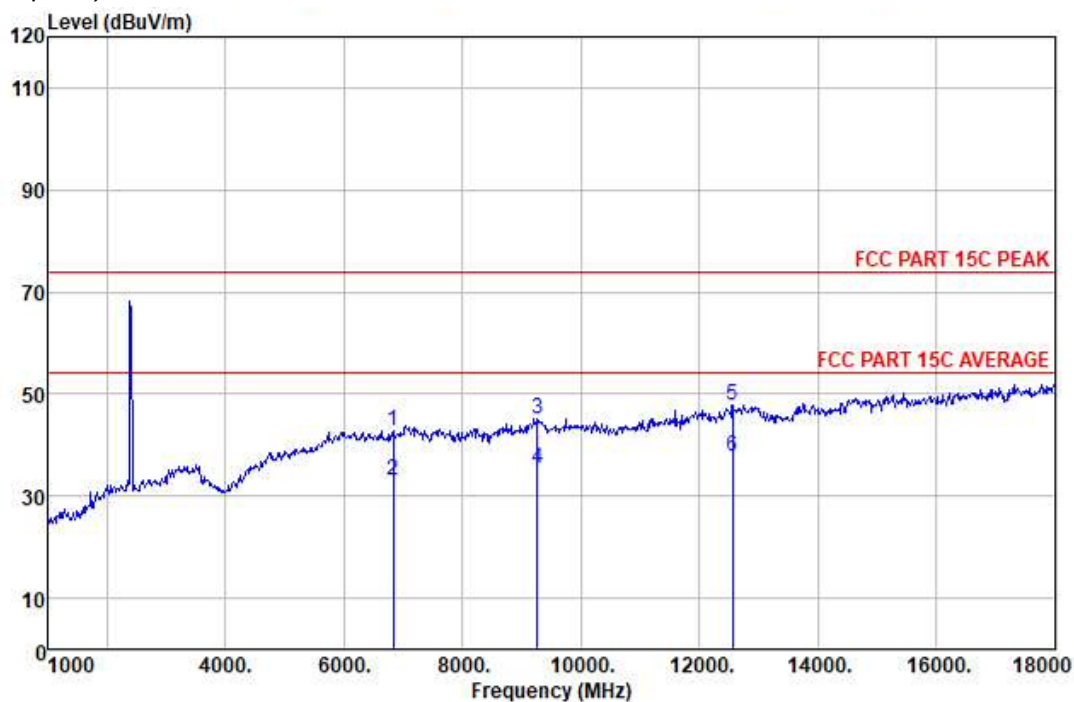
Peak and Average Measurement

Note: The emission above limit is fundamental emission, which is not subject to the limit.

Vertical:

Peak scan

Level (dBμV/m)



| No. | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dBuV/m | Limit<br>Line<br>dBuV/m | Over<br>Limit<br>dB | Pol/Phase | Remark  |
|-----|-------------|-----------------------|-------------------------|---------------------|------------------------|-----------------|-------------------------|---------------------|-----------|---------|
| 1   | 6831.000    | 22.33                 | 36.10                   | 11.76               | 27.35                  | 42.84           | 74.00                   | -31.16              | VERTICAL  | Peak    |
| 2   | 6831.000    | 12.61                 | 36.10                   | 11.76               | 27.35                  | 33.12           | 54.00                   | -20.88              | VERTICAL  | Average |
| 3   | 9262.000    | 19.40                 | 38.80                   | 14.13               | 27.18                  | 45.15           | 74.00                   | -28.85              | VERTICAL  | Peak    |
| 4   | 9262.000    | 9.62                  | 38.80                   | 14.13               | 27.18                  | 35.37           | 54.00                   | -18.63              | VERTICAL  | Average |
| 5   | 12560.000   | 17.95                 | 39.64                   | 16.83               | 26.66                  | 47.76           | 74.00                   | -26.24              | VERTICAL  | Peak    |
| 6   | 12560.000   | 7.96                  | 39.64                   | 16.83               | 26.66                  | 37.77           | 54.00                   | -16.23              | VERTICAL  | Average |

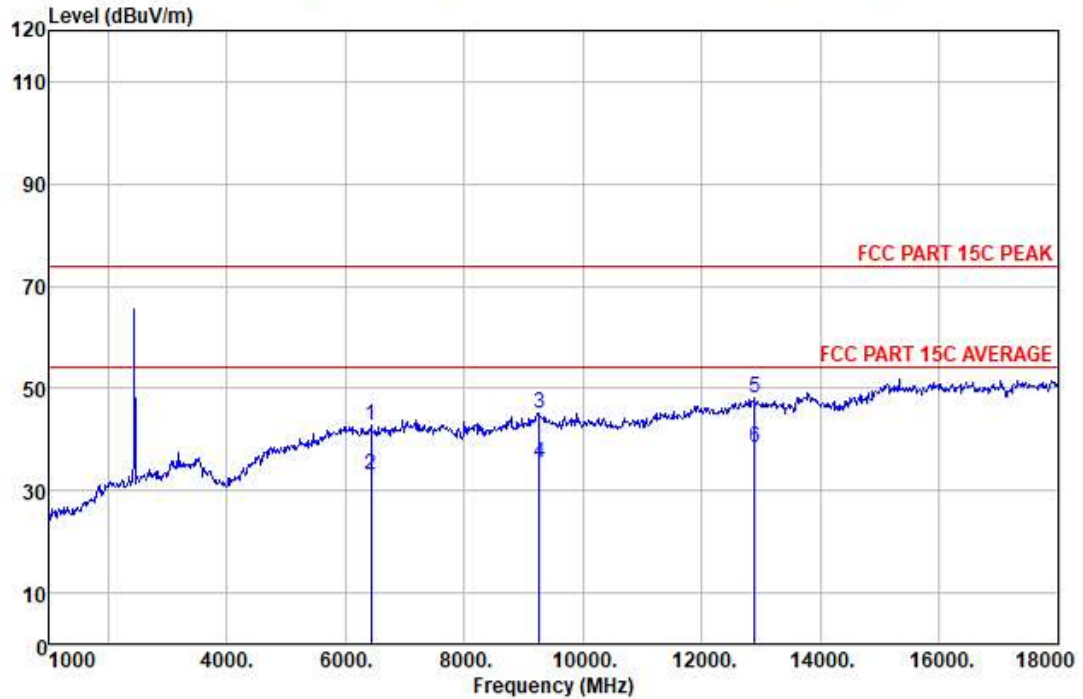
Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Peak and Average Measurement

Note: The emission above limit is fundamental emission, which is not subject to the limit.

**Test at Middle Channel in transmitting status****Horizontal:**

Peak scan

Level (dB $\mu$ V/m)

| No. | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dBuV/m | Limit<br>Line<br>dBuV/m | Over<br>Limit<br>dB | Pol/Phase  | Remark  |
|-----|-------------|-----------------------|-------------------------|---------------------|------------------------|-----------------|-------------------------|---------------------|------------|---------|
| 1   | 6423.000    | 23.25                 | 35.58                   | 11.34               | 27.38                  | 42.79           | 74.00                   | -31.21              | HORIZONTAL | Peak    |
| 2   | 6423.000    | 13.62                 | 35.58                   | 11.34               | 27.38                  | 33.16           | 54.00                   | -20.84              | HORIZONTAL | Average |
| 3   | 9262.000    | 19.48                 | 38.80                   | 14.13               | 27.18                  | 45.23           | 74.00                   | -28.77              | HORIZONTAL | Peak    |
| 4   | 9262.000    | 9.62                  | 38.80                   | 14.13               | 27.18                  | 35.37           | 54.00                   | -18.63              | HORIZONTAL | Average |
| 5   | 12883.000   | 17.25                 | 40.42                   | 17.09               | 26.53                  | 48.23           | 74.00                   | -25.77              | HORIZONTAL | Peak    |
| 6   | 12883.000   | 7.62                  | 40.42                   | 17.09               | 26.53                  | 38.60           | 54.00                   | -15.40              | HORIZONTAL | Average |

**Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor**

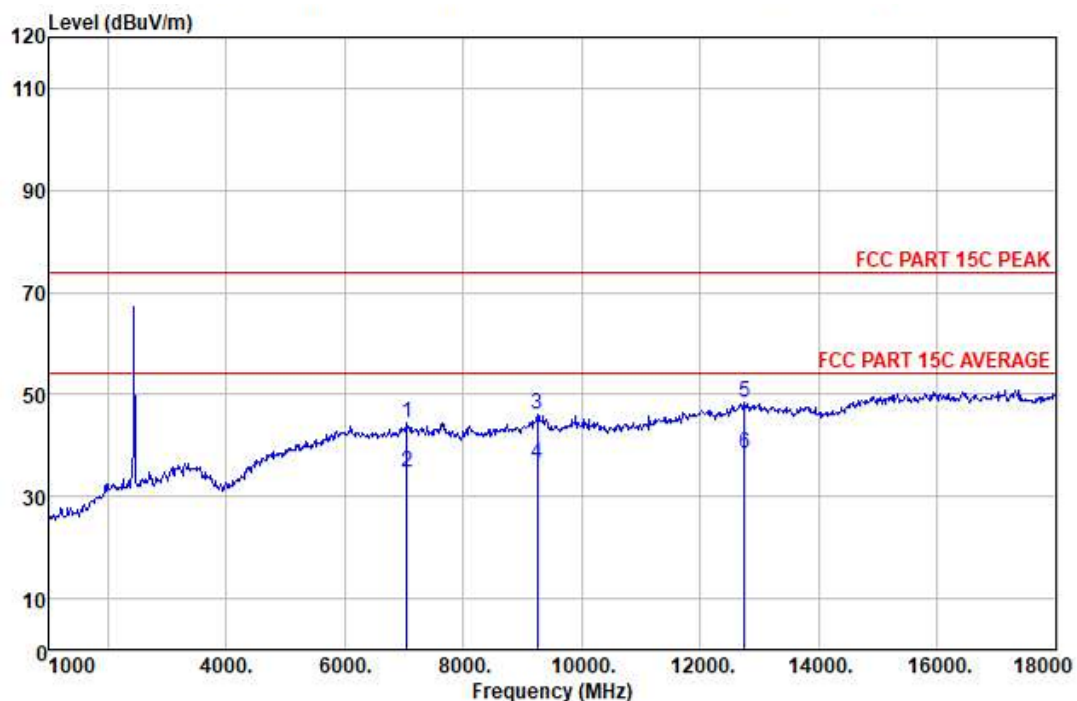
Peak and Average Measurement

**Note: The emission above limit is fundamental emission, which is not subject to the limit.**

Vertical:

Peak scan

Level (dB $\mu$ V/m)



| No. | Freq<br>MHz | Read<br>Level<br>dB $\mu$ V | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dB $\mu$ V/m | Limit<br>Line<br>dB $\mu$ V/m | Over<br>Limit<br>dB | Pol/Phase | Remark  |
|-----|-------------|-----------------------------|-------------------------|---------------------|------------------------|-----------------------|-------------------------------|---------------------|-----------|---------|
| 1   | 7052.000    | 23.35                       | 36.48                   | 11.98               | 27.34                  | 44.47                 | 74.00                         | -29.53              | VERTICAL  | Peak    |
| 2   | 7052.000    | 13.63                       | 36.48                   | 11.98               | 27.34                  | 34.75                 | 54.00                         | -19.25              | VERTICAL  | Average |
| 3   | 9245.000    | 20.34                       | 38.80                   | 14.11               | 27.18                  | 46.07                 | 74.00                         | -27.93              | VERTICAL  | Peak    |
| 4   | 9245.000    | 10.62                       | 38.80                   | 14.11               | 27.18                  | 36.35                 | 54.00                         | -17.65              | VERTICAL  | Average |
| 5   | 12747.000   | 17.85                       | 40.09                   | 16.98               | 26.58                  | 48.34                 | 74.00                         | -25.66              | VERTICAL  | Peak    |
| 6   | 12747.000   | 7.96                        | 40.09                   | 16.98               | 26.58                  | 38.45                 | 54.00                         | -15.55              | VERTICAL  | Average |

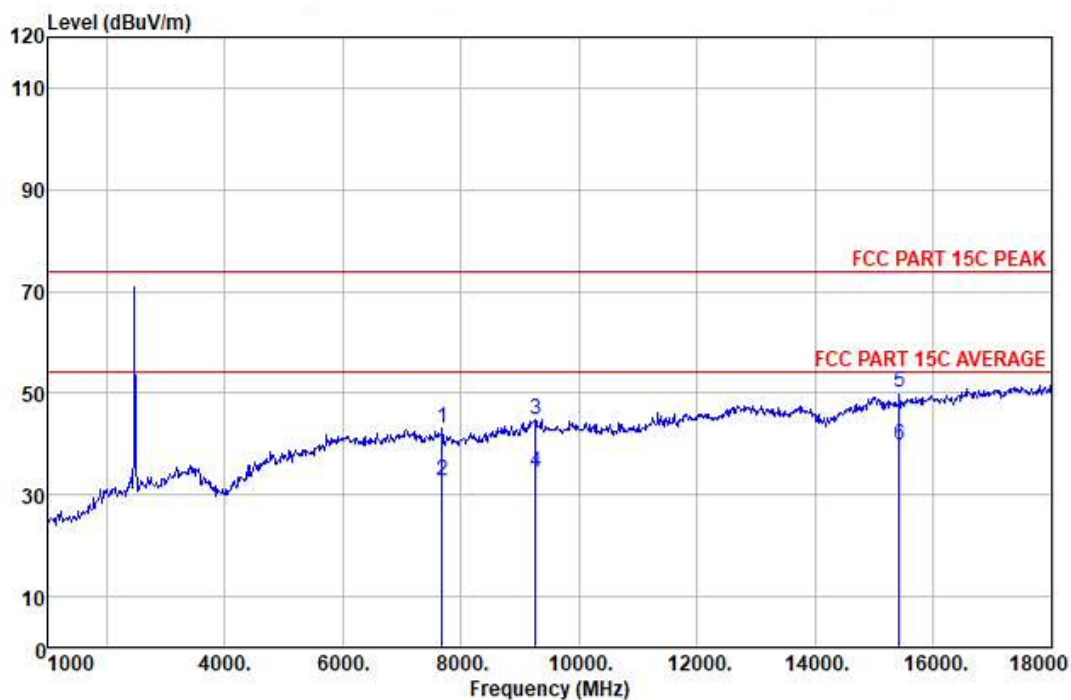
Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Peak and Average Measurement

Note: The emission above limit is fundamental emission, which is not subject to the limit.

**Test at high Channel in transmitting status****Horizontal:**

Peak scan

Level (dB $\mu$ V/m)

| No. | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dBuV/m | Limit<br>Line<br>dBuV/m | Over<br>Limit<br>dB | Pol/Phase  | Remark  |
|-----|-------------|-----------------------|-------------------------|---------------------|------------------------|-----------------|-------------------------|---------------------|------------|---------|
| 1   | 7681.000    | 20.56                 | 37.13                   | 12.60               | 27.31                  | 42.98           | 74.00                   | -31.02              | HORIZONTAL | Peak    |
| 2   | 7681.000    | 10.25                 | 37.13                   | 12.60               | 27.31                  | 32.67           | 54.00                   | -21.33              | HORIZONTAL | Average |
| 3   | 9262.000    | 19.00                 | 38.80                   | 14.13               | 27.18                  | 44.75           | 74.00                   | -29.25              | HORIZONTAL | Peak    |
| 4   | 9262.000    | 8.62                  | 38.80                   | 14.13               | 27.18                  | 34.37           | 54.00                   | -19.63              | HORIZONTAL | Average |
| 5   | 15416.000   | 17.68                 | 39.52                   | 19.07               | 26.00                  | 50.27           | 74.00                   | -23.73              | HORIZONTAL | Peak    |
| 6   | 15416.000   | 7.26                  | 39.52                   | 19.07               | 26.00                  | 39.85           | 54.00                   | -14.15              | HORIZONTAL | Average |

**Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor**

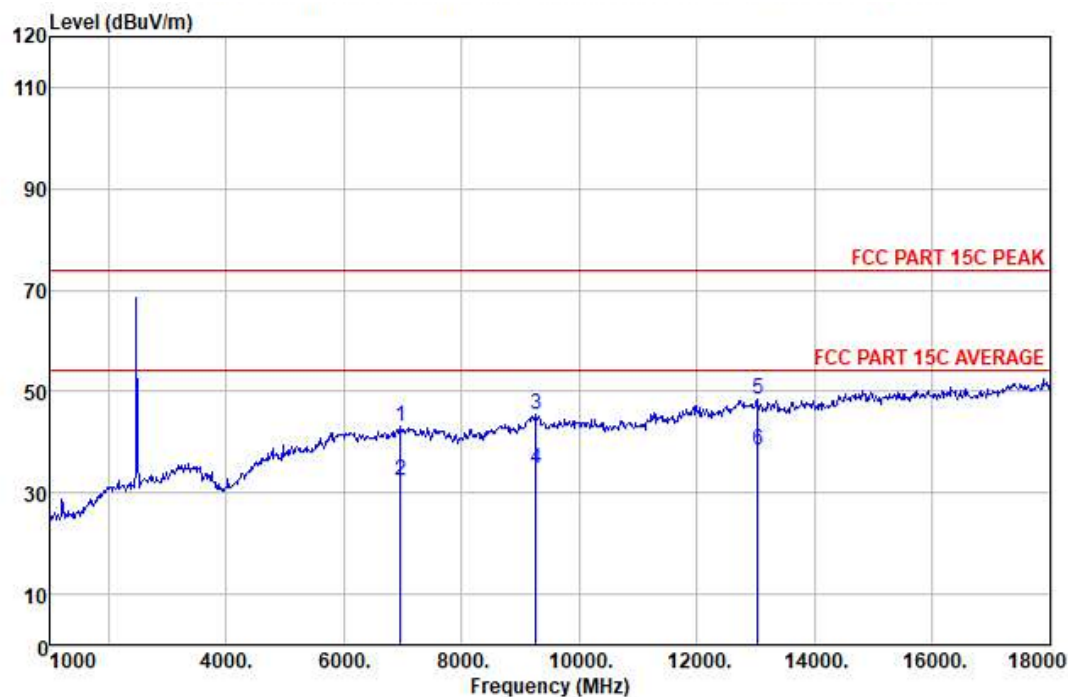
Peak and Average Measurement

**Note: The emission above limit is fundamental emission, which is not subject to the limit.**

Vertical:

Peak scan

Level (dB $\mu$ V/m)



| No. | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dBuV/m | Limit<br>Line<br>dBuV/m | Over<br>Limit<br>dB | Pol/Phase | Remark  |
|-----|-------------|-----------------------|-------------------------|---------------------|------------------------|-----------------|-------------------------|---------------------|-----------|---------|
| 1   | 6967.000    | 22.22                 | 36.34                   | 11.90               | 27.34                  | 43.12           | 74.00                   | -30.88              | VERTICAL  | Peak    |
| 2   | 6967.000    | 11.61                 | 36.34                   | 11.90               | 27.34                  | 32.51           | 54.00                   | -21.49              | VERTICAL  | Average |
| 3   | 9262.000    | 19.76                 | 38.80                   | 14.13               | 27.18                  | 45.51           | 74.00                   | -28.49              | VERTICAL  | Peak    |
| 4   | 9262.000    | 9.15                  | 38.80                   | 14.13               | 27.18                  | 34.90           | 54.00                   | -19.10              | VERTICAL  | Average |
| 5   | 13036.000   | 17.05                 | 40.65                   | 17.21               | 26.47                  | 48.44           | 74.00                   | -25.56              | VERTICAL  | Peak    |
| 6   | 13036.000   | 7.15                  | 40.65                   | 17.21               | 26.47                  | 38.54           | 54.00                   | -15.46              | VERTICAL  | Average |

Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Peak and Average Measurement

Note: The emission above limit is fundamental emission, which is not subject to the limit.

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor.

No any other emissions level which are attenuated less than 20dB below the limit.

According to 15.31(o), the amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part.

Hence there no other emissions have been reported.

Remark:

- 1) .For this intentional radiator operates below 25 GHz. The spectrum shall be investigated to the tenth harmonics of the highest fundamental frequency. And above the third harmonic of this intentional radiator, the disturbance is very low. So the test result only displays to 3<sup>rd</sup> harmonic.
- 2). As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.
- 3). The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.

**Test Result: The unit does meet the FCC requirements.**

## 5.8 Radiated Emissions which fall in the restricted bands

|                   |                                                                                                                                                                                                                                                                                  |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part 15 C section 15.247<br><br>(d) In addition, 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)).                          |
| Test Method:      | ANSI C63.10:2020                                                                                                                                                                                                                                                                 |
| Test Status:      | Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, channels and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below. |
| Test site:        | Measurement Distance: 3m (Semi-Anechoic Chamber)                                                                                                                                                                                                                                 |
| Limit:            | 40.0 dB $\mu$ V/m between 30MHz & 88MHz;<br>43.5 dB $\mu$ V/m between 88MHz & 216MHz;<br>46.0 dB $\mu$ V/m between 216MHz & 960MHz;<br>54.0 dB $\mu$ V/m above 960MHz                                                                                                            |

### 5.8.1 Test Configuration

|           |                                                                                                                                                                                                                                                                                                                                                  |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Detector: | For PK value:<br><br>RBW = 1 MHz for $f \geq 1$ GHz, 100 KHz for $f < 1$ GHz<br>VBW $\geq$ RBW<br>Sweep = auto<br><br>Detector function = peak<br><br>Trace = max hold<br><br>For AV value:<br><br>RBW = 1 MHz for $f \geq 1$ GHz, 100 KHz for $f < 1$ GHz<br>VBW = 10Hz<br>Sweep = auto<br><br>Detector function = peak<br><br>Trace = max hold |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Section 15.205 Restricted bands of operation.

(a) Except as shown in paragraph (d) of this section. Only spurious emissions are permitted in any of the frequency bands listed below:

| MHz                        | MHz                 | MHz             | GHz           |
|----------------------------|---------------------|-----------------|---------------|
| 0.090 - 0.110              | 16.42 - 16.423      | 399.9 - 410     | 4.5 - 5.15    |
| <sup>1</sup> 0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614       | 5.35 - 5.46   |
| 2.1735 - 2.1905            | 16.80425 - 16.80475 | 960 - 1240      | 7.25 - 7.75   |
| 4.125 - 4.128              | 25.5 - 25.67        | 1300 - 1427     | 8.025 - 8.5   |
| 4.17725 - 4.17775          | 37.5 - 38.25        | 1435 - 1626.5   | 9.0 - 9.2     |
| 4.20725 - 4.20775          | 73 - 74.6           | 1645.5 - 1646.5 | 9.3 - 9.5     |
| 6.215 - 6.218              | 74.8 - 75.2         | 1660 - 1710     | 10.6 - 12.7   |
| 6.26775 - 6.26825          | 108 - 121.94        | 1718.8 - 1722.2 | 13.25 - 13.4  |
| 6.31175 - 6.31225          | 123 - 138           | 2200 - 2300     | 14.47 - 14.5  |
| 8.291 - 8.294              | 149.9 - 150.05      | 2310 - 2390     | 15.35 - 16.2  |
| 8.362 - 8.366              | 156.52475 -         | 2483.5 - 2500   | 17.7 - 21.4   |
| 8.37625 - 8.38675          | 156.52525           | 2655 - 2900     | 22.01 - 23.12 |
| 8.41425 - 8.41475          | 156.7 - 156.9       | 3260 - 3267     | 23.6 - 24.0   |
| 12.29 - 12.293             | 162.0125 - 167.17   | 3332 - 3339     | 31.2 - 31.8   |
| 12.51975 - 12.52025        | 167.72 - 173.2      | 3345.8 - 3358   | 36.43 - 36.5  |
| 12.57675 - 12.57725        | 240 - 285           | 3600 - 4400     |               |
| 13.36 - 13.41              | 322 - 335.4         |                 |               |

## 5.8.2 Test Result (Radiated Emissions which fall in the restricted bands)

Worst case mode BLE 2M 2402 MHz

| Frequency (MHz) | Reading Level (dB $\mu$ V/m) | Correct (dB/m) | Emission Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Antenna polarization | Detector |
|-----------------|------------------------------|----------------|-------------------------------|----------------------|-------------|----------------------|----------|
| Low Channel     |                              |                |                               |                      |             |                      |          |
| 2310.000        | 32.96                        | 6.54           | 37.06                         | 74.00                | -36.94      | H                    | PK       |
| 2310.000        | 23.15                        | 6.54           | 26.39                         | 54.00                | -27.61      | H                    | AV       |
| 2390.000        | 33.15                        | 6.61           | 37.2                          | 74.00                | -36.8       | V                    | PK       |
| 2390.000        | 22.15                        | 6.61           | 25.71                         | 54.00                | -28.29      | V                    | AV       |
| High Channel    |                              |                |                               |                      |             |                      |          |
| 2483.500        | 32.96                        | 6.54           | 37.44                         | 74.00                | -36.56      | H                    | PK       |
| 2483.500        | 23.12                        | 6.54           | 25.13                         | 54.00                | -28.87      | H                    | AV       |
| 2500.000        | 34.15                        | 6.61           | 38.77                         | 74.00                | -35.23      | V                    | PK       |
| 2500.000        | 22.15                        | 6.61           | 26.92                         | 54.00                | -27.08      | V                    | AV       |

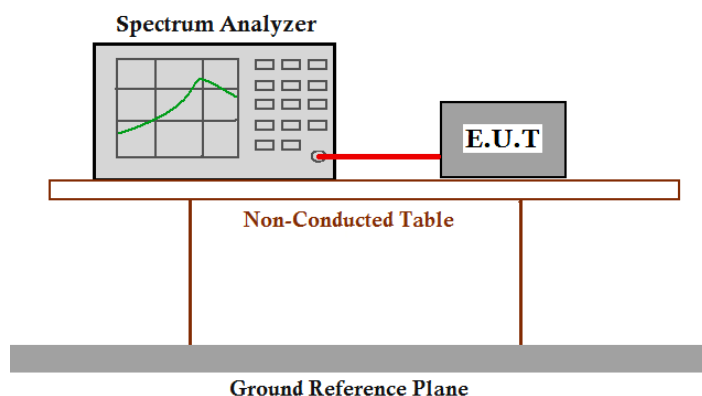
Remark: No any other emission which falls in restricted bands can be detected and be reported.

**Test Result: The unit does meet the FCC requirements.**

## 5.9 Band Edges Requirement

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part 15 C section 15.247<br>(d) In any 100 KHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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. |
| Frequency Band:   | 2400 MHz to 2483.5 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Test Method:      | ANSI C63.10:2020                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Test Status:      | Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, channels and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.                                                                                                                                                                                                                                                          |

### 5.9.1 Test Configuration



#### Test Procedure:

1. The testing follows the Measurement Procedure of ANSI C63.10:2020 Section 11.12.2.2.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings  
Reference level measurement: Set spectrum analyzer center frequency to DTS channel center frequency / Set the span to >1.5 times the DTS bandwidth / RBW: 100KHz/VBW: 300KHz/Detector: Peak / Sweep time: Auto couple / Trace mode: Max hold / Allow trace to fully stabilize Use the peak marker function to determine the maximum PSD level and attenuate it by 20dB.Emission level measurement: Set the center frequency and span to encompass frequency range to be measured

/RBW: 100KHz/VBW: 300KHz/ Detector: Peak / Sweep time: Auto couple / Trace mode: Max hold /

Allow trace to fully stabilize / Use the peak marker function to determine the maximum amplitude level.

5. Record the measurement results in the test report.

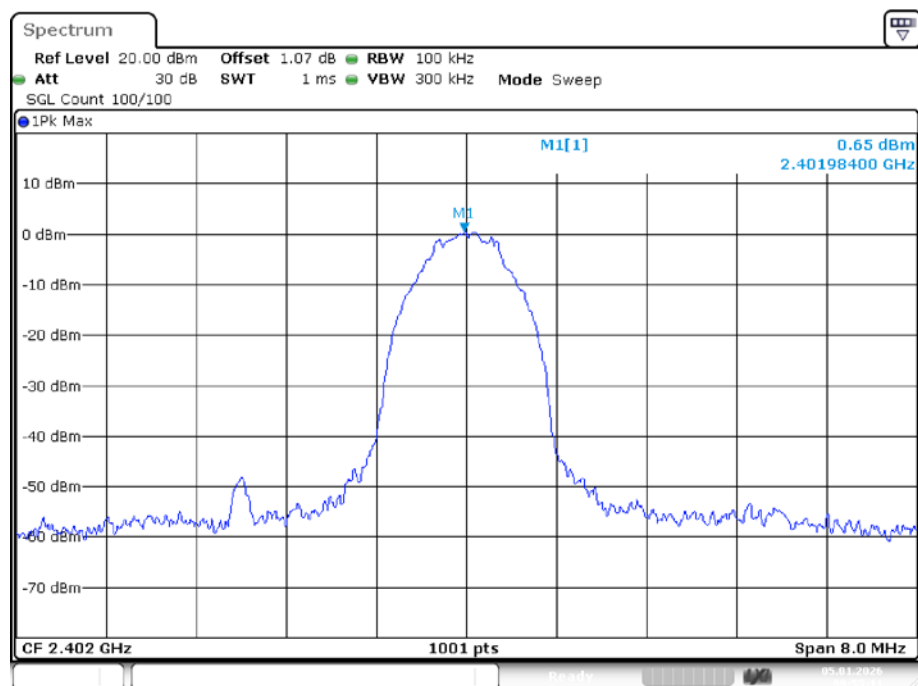
### 5.9.2 Test Result (Band Edges)

The band edges was measured and recorded Result:

The Lower Edges attenuated more than 20dB.

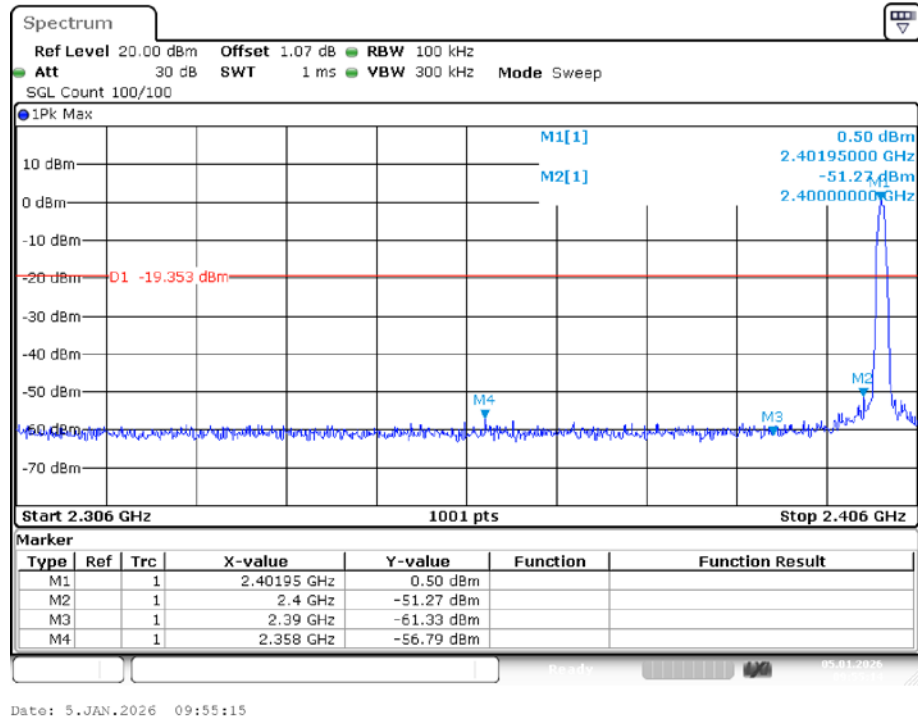
The Upper Edges attenuated more than 20dB.

| Test mode | Test Frequency (MHz) | Max Value (dBc) | Limit (dBc) |
|-----------|----------------------|-----------------|-------------|
| BLE 1M    | 2402                 | -57.44          | -20         |
|           | 2480                 | -54.88          | -20         |
| BLE 2M    | 2402                 | -56.24          | -20         |
|           | 2480                 | -50.36          | -20         |

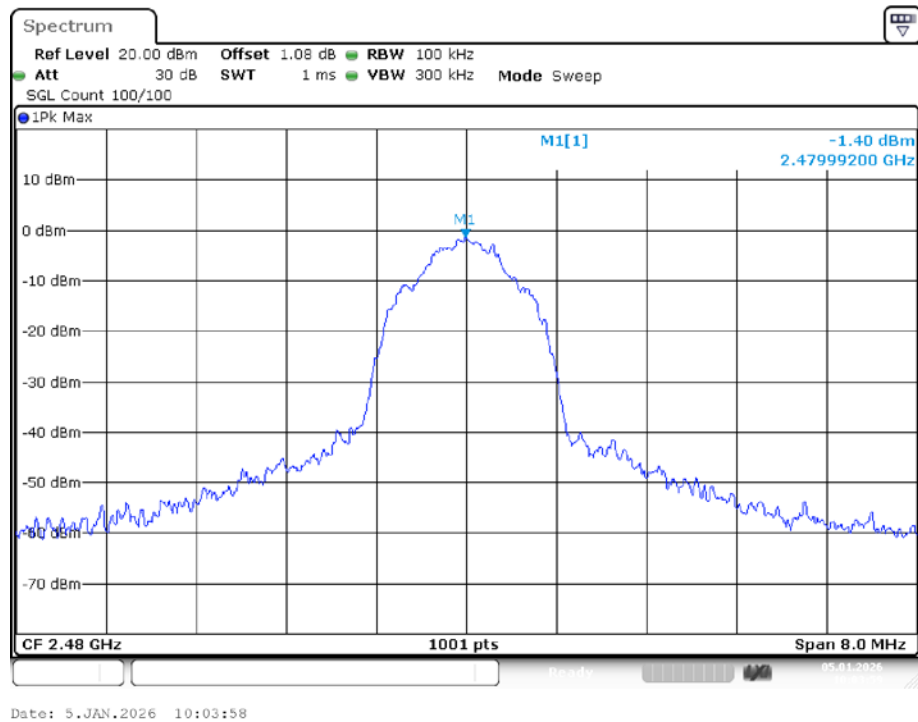


Date: 5.JAN.2026 09:55:11

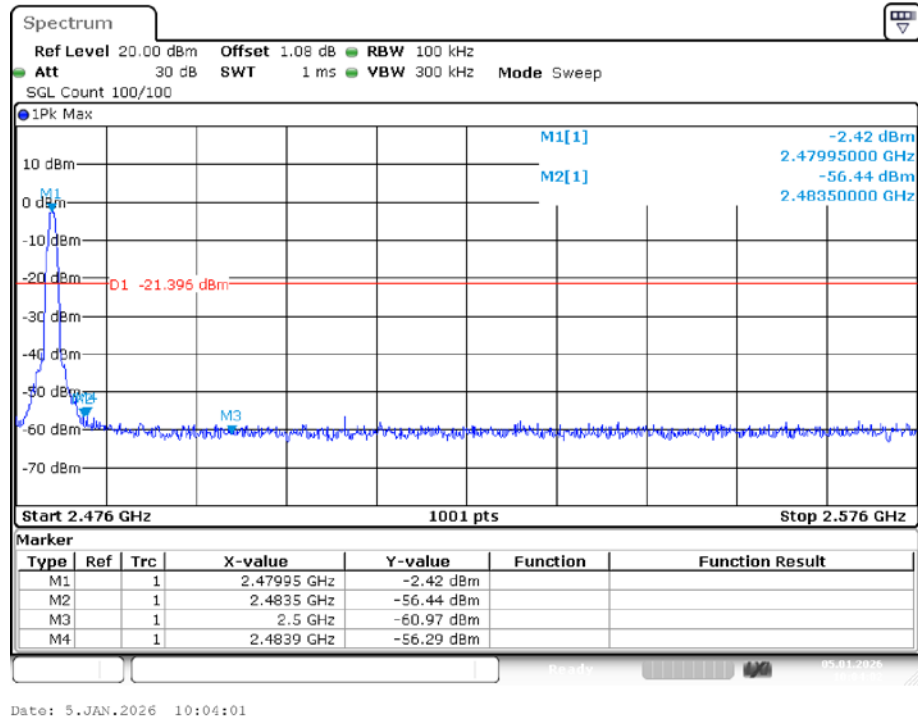
Band Edge NVNT BLE 1M 2402MHz Ant1 Ref



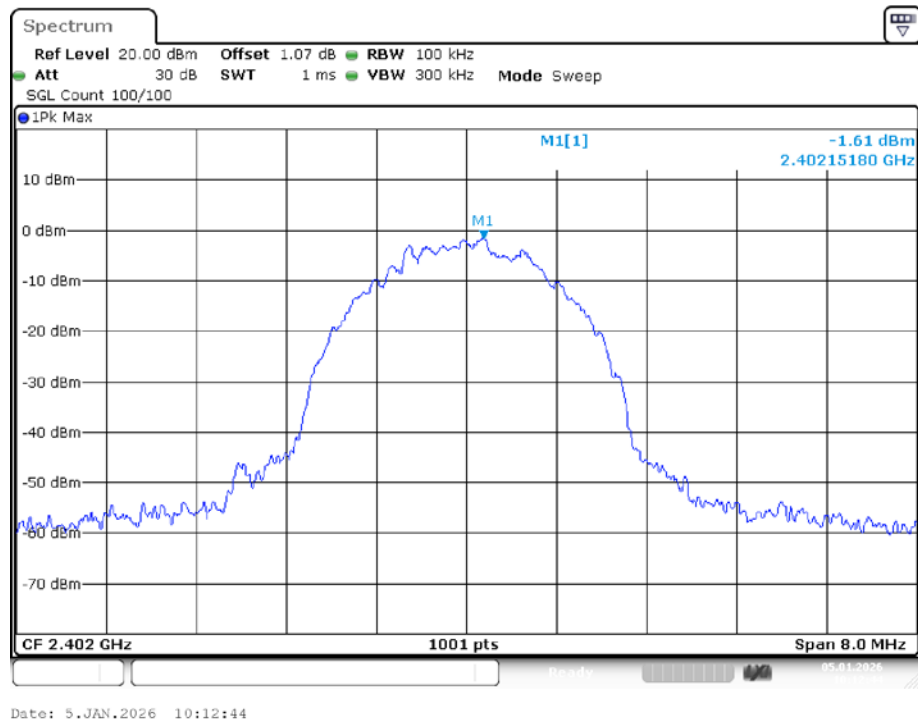
Band Edge NVNT BLE 1M 2402MHz Ant1 Emission



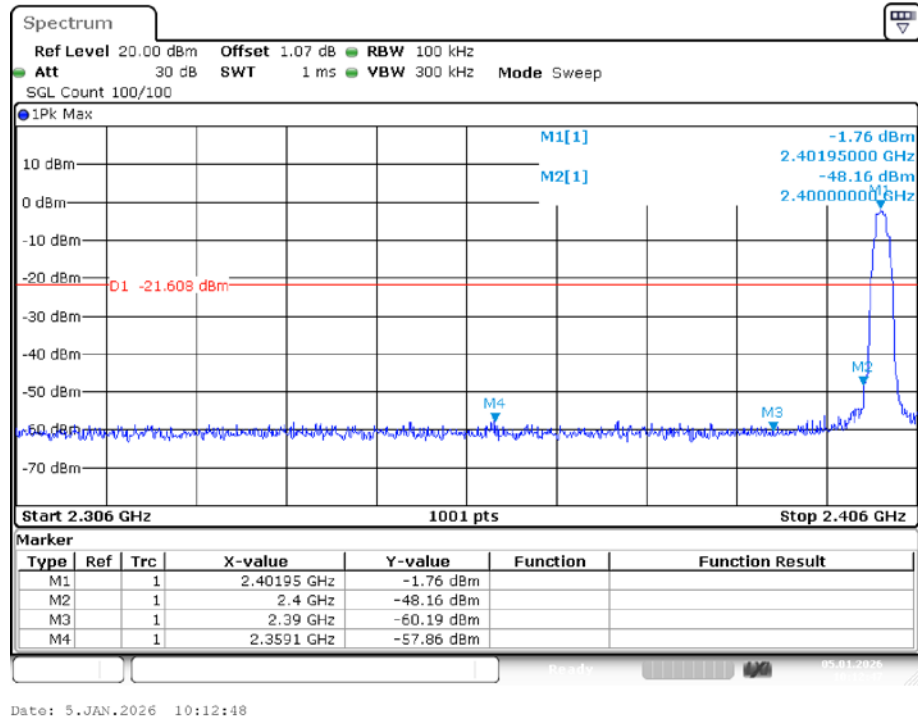
Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



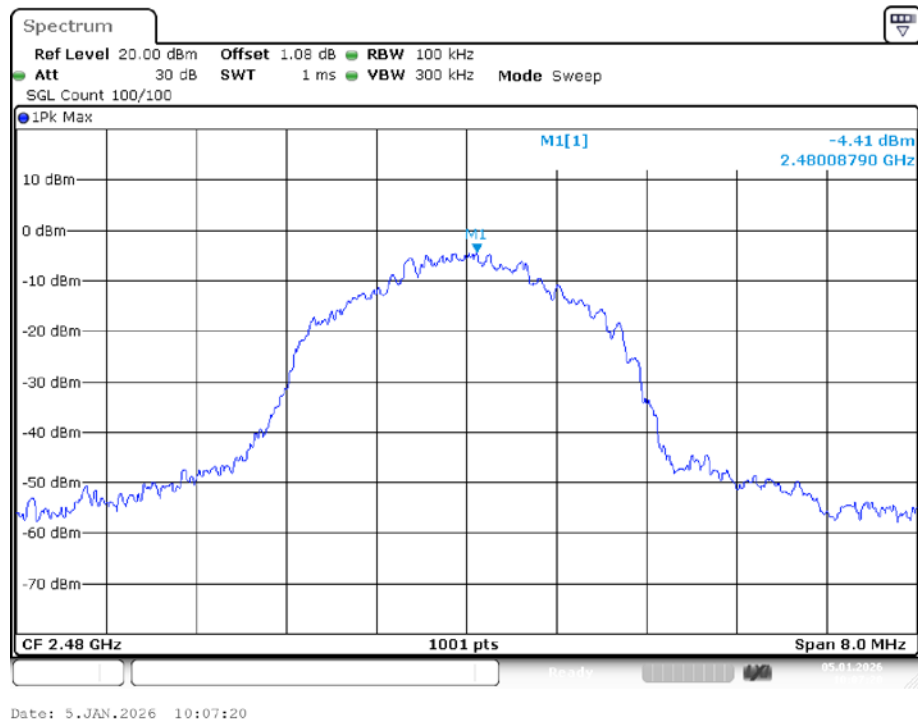
Band Edge NVNT BLE 1M 2480MHz Ant1 Emission



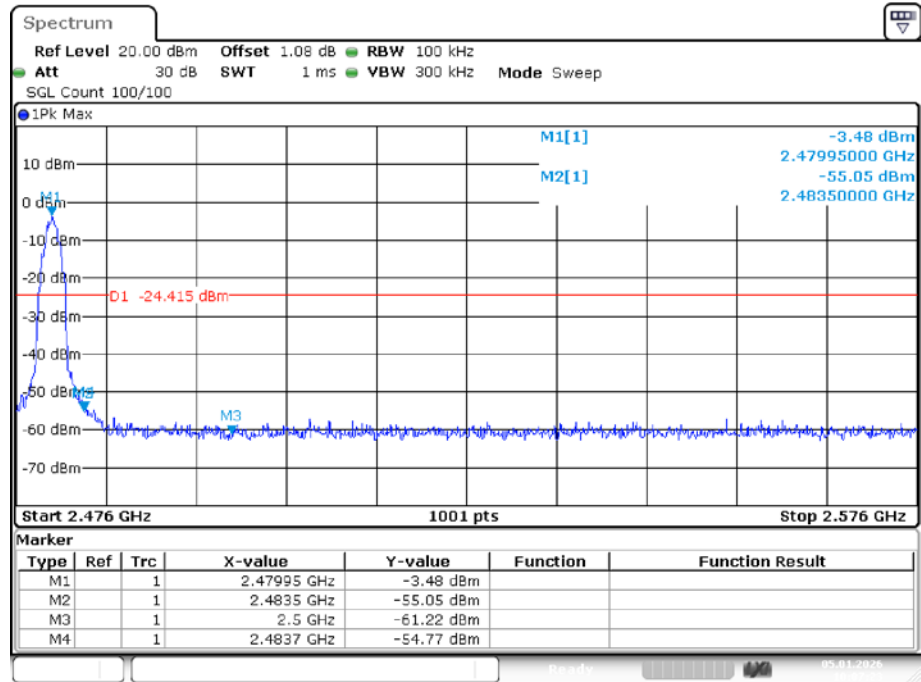
Band Edge NVNT BLE 2M 2402MHz Ant1 Ref



Band Edge NVNT BLE 2M 2402MHz Ant1 Emission



Band Edge NVNT BLE 2M 2480MHz Ant1 Ref



Date: 5.JAN.2026 10:07:23

Band Edge NVNT BLE 2M 2480MHz Ant1 Emission

**5.10 Conducted Emissions at Mains Terminals 150 KHz to 30MHz**

|                          |                                                |
|--------------------------|------------------------------------------------|
| <b>Test Requirement:</b> | FCC Part 15 C section 15.207                   |
| <b>Test Voltage:</b>     | AC 120V, 60Hz                                  |
| <b>Test Method:</b>      | ANSI C63.10:2020 Section 6.2                   |
| <b>Frequency Range:</b>  | 150 KHz to 30 MHz                              |
| <b>Detector:</b>         | Peak for pre-scan (9 KHz Resolution Bandwidth) |
| <b>Test Limit:</b>       |                                                |

**Limits for conducted disturbance at the mains ports of class B**

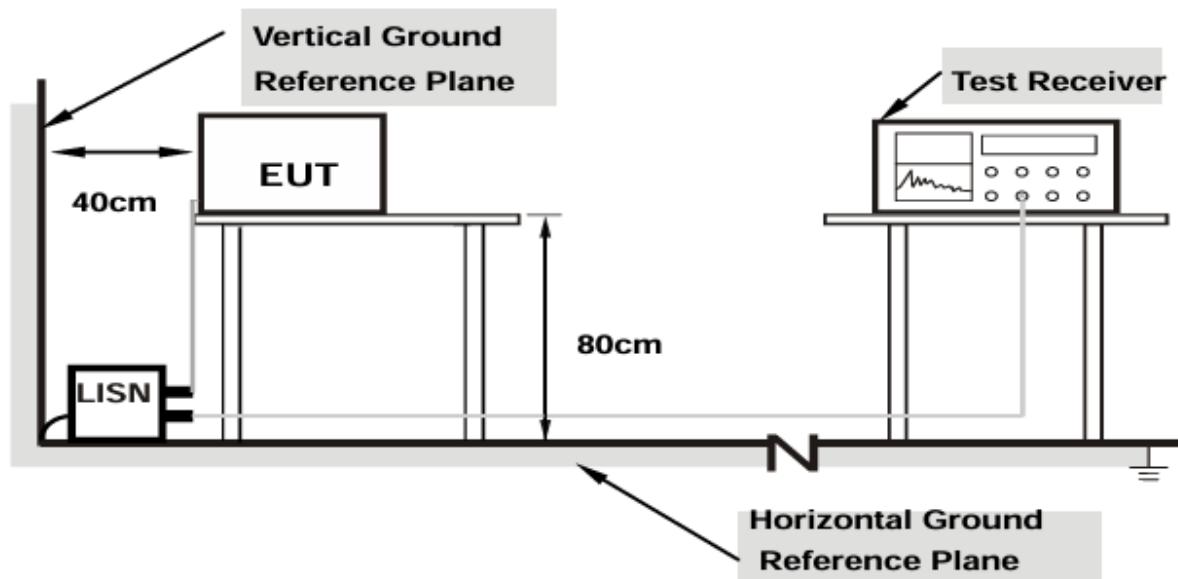
| Frequency Range                                                                                            | Class B Limit dB( $\mu$ V) |          |
|------------------------------------------------------------------------------------------------------------|----------------------------|----------|
|                                                                                                            | Quasi-peak                 | Average  |
| 0.15 to 0.50                                                                                               | 66 to 56                   | 56 to 46 |
| 0.50 to 5                                                                                                  | 56                         | 46       |
| 5 to 30                                                                                                    | 60                         | 50       |
| NOTE 1 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz. |                            |          |

**EUT Operation:**

Test in normal operating mode. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, channels and antenna ports (if EUT with antenna diversity architecture).

### 5.10.1 Test Configuration



#### Test procedure:

1. The mains terminal disturbance voltage test was conducted in a shielded room.
2. The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a  $50\Omega/50\mu\text{H} + 5\Omega$  linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0,4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0,8 m from the LISN 2.

### 5.10.2 Test Result (Conducted Emissions at Mains Terminals 150 KHz to 30 MHz)

An initial pre-scan was performed on the live and neutral lines with peak detector.

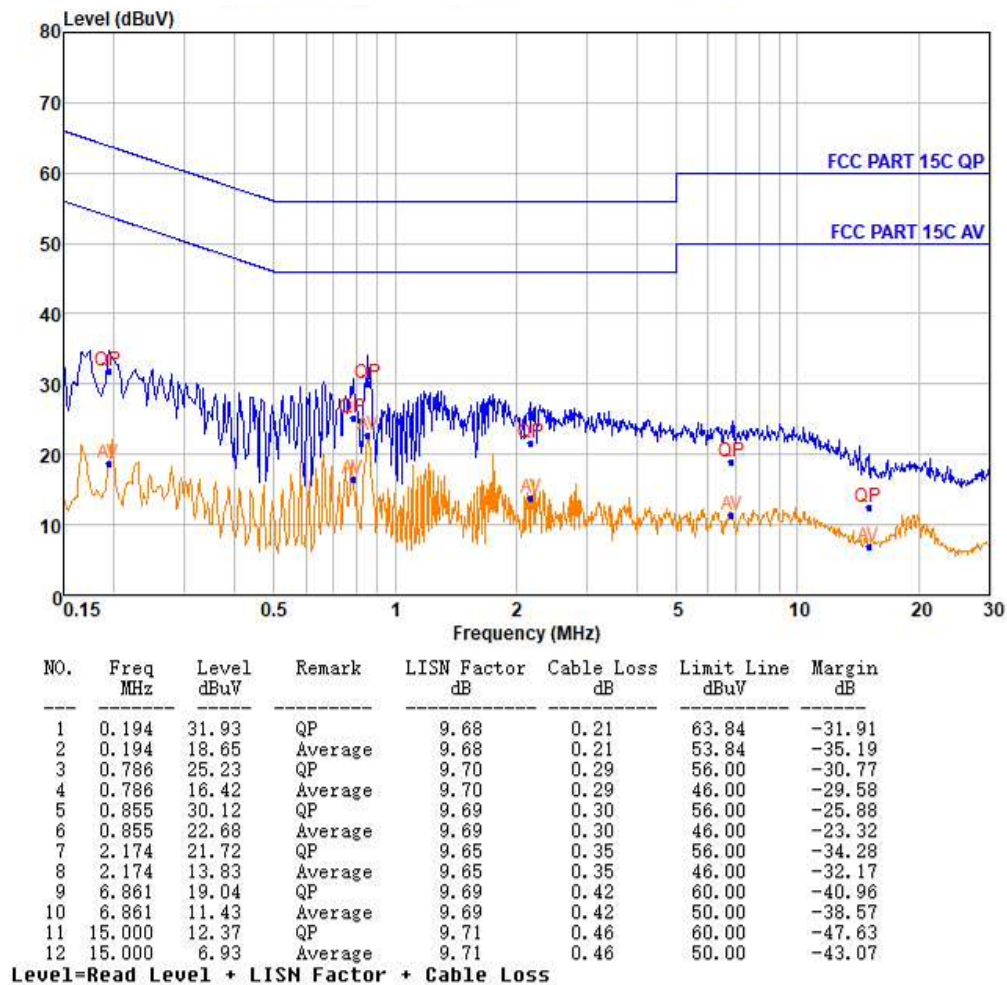
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected. For EUT the mode BLE 2M 2402 was worst case mode.

The following Quasi-Peak and Average measurements were performed on the EUT

Live Line:

Peak scan:

Level (dBμV)

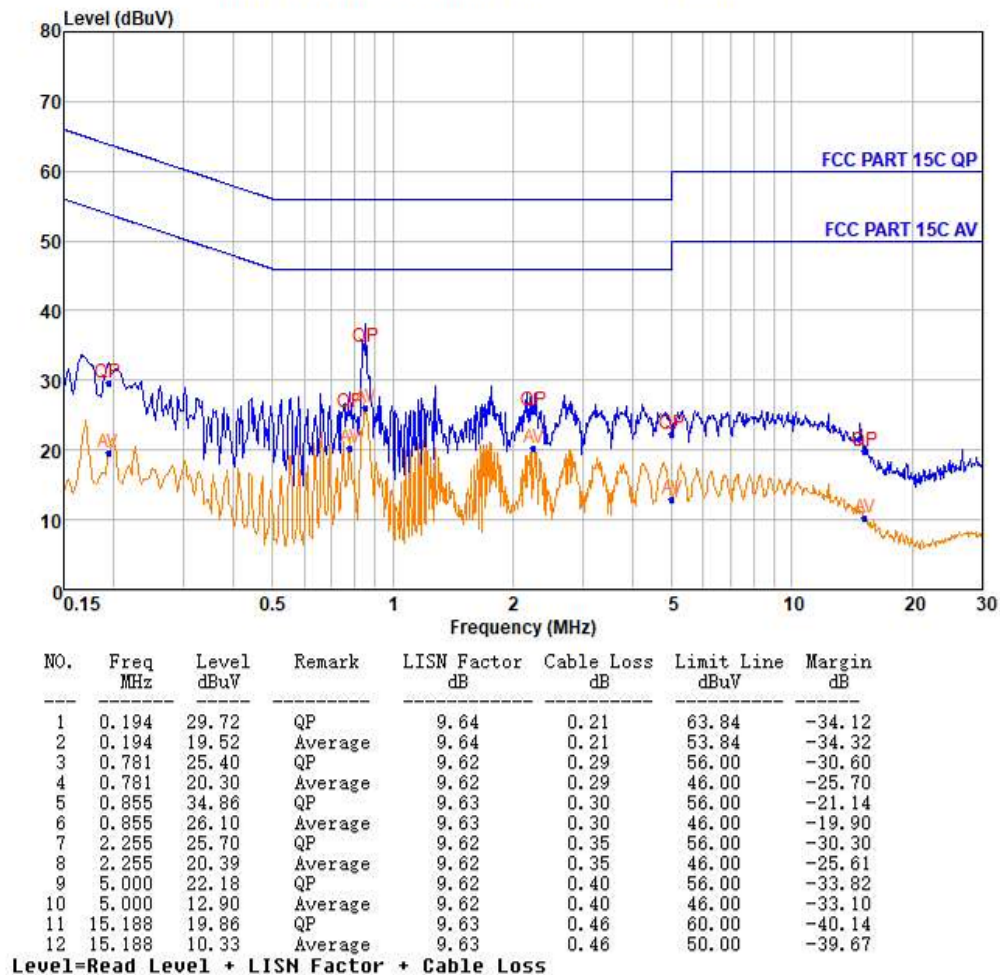


Quasi-peak and Average measurement

Neutral Line:

Peak Scan:

Level (dB  $\mu$  V)



Quasi-peak and Average measurement

Test Result: The unit does meet the FCC requirements.

-- End of test report --