# FCC TEST REPORT

## FCC ID: 2BL8X-CT01-360

On Behalf of

KRCMORE INC

Lighted Christmas Tree

Model No.: CT01-360-LS1, CT01-480-LS1, CT01-600-LS1, EL-SDTL-12, EL-SDTL-16, EL-SDTL-20, EL-SDTL-12-1, EL-SDTL-16-1, EL-SDTL-20-1, JF-CT01-360, JF-CT01-480, JF-CT01-600, SDS-390-YW, SDS-480-YW, SDS-600-YW, SDS-390-F, SDS-480-F, SDS-600-F, SDS-12-T, SDS-16-T, SDS-20-T, CT-H1, CT-H2, CT-H3, CT-H4, CT-H5, CT-H6, CT-H7

| | | |
|---|---|---|
| Prepared for | : | KRCMORE INC |
| Address | : | 1401 21st ST STE R, Sacramento, CA, USA |

| | | |
|---|---|---|
| Prepared By | : | Shenzhen PSI Testing Co., Ltd. |
| Address | : | 1-2/F., Building 5, Yudafu Industrial Park, No.10, Xingye West Road, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China |

| | | |
|---|---|---|
| Report Number | : | psi2503036-C01-R01 |
| Date of Receipt | : | March 11, 2025 |
| Date of Test | : | March 12, 2025 –March 24, 2025 |
| Date of Report | : | May 14, 2025 |
| Version Number | : | V0 |

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# TEST REPORT DECLARATION

| | | |
|---|---|---|
| Applicant | : | KRCMORE INC |
| Address | : | 1401 21st ST STE R, Sacramento, CA, USA |
| Manufacturer | : | Ningbo Beilun Access Import and Export Company Limited |
| Address | : | No.36 Weisan Road, Beilun District, Ningbo, Zhejiang, China |
| EUT Description | : | Lighted Christmas Tree |
| | (A) Model No. | : CT01-360-LS1, CT01-480-LS1, CT01-600-LS1, EL-SDTL-12, EL-SDTL-16, EL-SDTL-20, EL-SDTL-12-1, EL-SDTL-16-1, EL-SDTL-20-1, JF-CT01-360, JF-CT01-480, JF-CT01-600, SDS-390-YW, SDS-480-YW, SDS-600-YW, SDS-390-F, SDS-480-F, SDS-600-F, SDS-12-T, SDS-16-T, SDS-20-T, CT-H1, CT-H2, CT-H3, CT-H4, CT-H5, CT-H6, CT-H7 |
| | (B) Trademark | : N/A |

Measurement Standard Used:

**FCC Rules and Regulations Part 15 Subpart C Section 15.247**

**ANSI C63.10-2013**

**Test Result: PASS**

The device described above is tested by Shenzhen PSI Testing Co., Ltd. To determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen PSI Testing Co., Ltd. Is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the FCC Part15 requirements.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen PSI Testing Co., Ltd.

| | | |
|---|---|---|
| Tested by (name + signature)…....……: | Jensen Wang<br>Test Engineer | Jensen Wang |
| Approved by (name + signature)…….: | Simple Guan<br>Project Manager | Sple Gu |
| Date of issue……..: | May 14, 2025 | |

# Revision History

| Revision | Issue Date | Revisions | Revised By |
|---|---|---|---|
| V0 | May 14, 2025 | Initial released Issue | Jensen Wang |

# 1. Summary Of Standards And Results

## 1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

| Test Item | Standards Paragraph | Result |
|---|---|---|
| Conducted Emissions | FCC Part 15: 15.207 | P |
| 6dB Bandwidth | FCC PART 15:15.247(a)(2) | P |
| Output Power | FCC Part 15: 15.247(b)(3) | P |
| Radiated Spurious Emission | FCC Part 15: 15.209, FCC Part 15: 15.205 | P |
| Out-of-band Emissions | FCC Part 15: 15.247(d) | P |
| Power Spectral Density | FCC PART 15:15.247(e) | P |
| Radiated Band Edge Emission | FCC Part 15: 15.247(d) | P |
| Antenna Requirement | FCC Part 15: 15.203 | P |

Note: 1. P is an abbreviation for Pass.

2. F is an abbreviation for Fail.

3. N/A is an abbreviation for Not Applicable.

4. Conclusion determination rules of this report: Unless there are clear provisions on measurement uncertainty in the standard or customer requirements, decision by actual test data without considering measurement uncertainty.

# 2. General Information

## 2.1. Description of Device (EUT)

| | | |
|---|---|---|
| Product Name | : | Lighted Christmas Tree |
| Model No. | : | CT01-360-LS1, CT01-480-LS1, CT01-600-LS1, EL-SDTL-12, EL-SDTL-16, EL-SDTL-20, EL-SDTL-12-1, EL-SDTL-16-1, EL-SDTL-20-1, JF-CT01-360, JF-CT01-480, JF-CT01-600, SDS-390-YW, SDS-480-YW, SDS-600-YW, SDS-390-F, SDS-480-F, SDS-600-F, SDS-12-T, SDS-16-T, SDS-20-T, CT-H1, CT-H2, CT-H3, CT-H4, CT-H5, CT-H6, CT-H7 |
| Diff | : | There is no difference except the name of the model and power. All tests are made with the CT01-360-LS1 model. |
| Power supply | : | AC120V/60Hz |
| Radio Technology | : | Bluetooth V5.2 BLE |
| Operation frequency | : | 2402-2480MHz |
| Channel No. | : | 40 channels |
| Channel Separation | : | 2MHz |
| Rate | : | 1Mbps |
| Modulation | : | GFSK |
| Antenna Type | : | Internal antenna, Maximum Gain is 1.3dBi. |
| Software version | : | V1.0 |
| Hardware version | : | V1.0 |
| Note | : | Antenna information is provided by applicant.<br>Testing lab is not responsible for the accuracy of the information. |

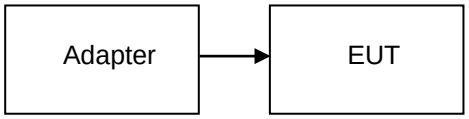
## 2.2. Accessories of Device (EUT)

| | | |
|---|---|---|
| Accessories 1 | : | CLASS 2 POWER SUPPLY |
| Manufacturer | : | CHANGZHOU JUTAI ELECTRONIC CO.,LTD. |
| Model | : | JT-DC050V5000-M2 |
| Input | : | 120V~ 60Hz 1.0A |
| Output | : | 5V⎓5.0A |

## 2.3. Tested Supporting System Details

| No. | Description | Manufacturer | Model | Serial Number |
|---|---|---|---|---|
| 1. | N/A | N/A | N/A | N/A |
| 2. | N/A | N/A | N/A | N/A |

## 2.4. Block Diagram of Connection Between EUT and Simulators



## 2.5. Test Mode Description

The test software was used to control EUT work in Continuous TX mode, and select test channel, wireless mode

| Tested mode, channel, and data rate information | | |
|---|---|---|
| Mode | Channel | Frequency (MHz) |
| GFSK Tx Mode 1Mbps | CH0 | 2402 |
| | CH19 | 2440 |
| | CH39 | 2480 |

| Channel list: | | | | | |
|---|---|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **Channel** | **Frequency (MHz)** | **Channel** | **Frequency (MHz)** |
| CH0 | 2402 | CH14 | 2430 | CH28 | 2458 |
| CH1 | 2404 | CH15 | 2432 | CH29 | 2460 |
| CH2 | 2406 | CH16 | 2434 | CH30 | 2462 |
| CH3 | 2408 | CH17 | 2436 | CH31 | 2464 |
| CH4 | 2410 | CH18 | 2438 | CH32 | 2466 |
| CH5 | 2412 | CH19 | 2440 | CH33 | 2468 |
| CH6 | 2414 | CH20 | 2442 | CH34 | 2470 |
| CH7 | 2416 | CH21 | 2444 | CH35 | 2472 |
| CH8 | 2418 | CH22 | 2446 | CH36 | 2474 |
| CH9 | 2420 | CH23 | 2448 | CH37 | 2476 |
| CH10 | 2422 | CH24 | 2450 | CH38 | 2478 |
| CH11 | 2424 | CH25 | 2452 | CH39 | 2480 |
| CH12 | 2426 | CH26 | 2454 | -- | -- |
| CH13 | 2428 | CH27 | 2456 | -- | -- |

## 2.6. Test Conditions

| Items | Required |
|---|---|
| Temperature range: | 15-35℃ |
| Humidity range: | 25-75% |
| Pressure range: | 86-106kPa |

## 2.7. Test Facility

Shenzhen PSI Testing Co., Ltd.

1-2/F., Building 5, Yudafu Industrial Park, No.10, Xingye West Road, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China

September 13, 2023 File on Federal Communication Commission
Registration Number: 916281

## 2.8. Measurement Uncertainty

(95% confidence levels, k=2)

| **Item** | **Uncertainty** |
|---|---|
| Uncertainty for Power Line Conducted Emissions Test | 2.17dB |
| Uncertainty for Radiation Emission test in 3m chamber (below 30MHz) | 3.5dB |
| Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz) | 2.74dB(Polarize: V) |
| | 2.76dB(Polarize: H) |
| Uncertainty for Radiation Emission test in 3m chamber (1GHz to 18GHz) | 4.29dB(Polarize: V) |
| | 4.82dB(Polarize: H) |
| Uncertainty for Radiation Emission test in 3m chamber (18GHz to 40GHz) | 4.31dB(Polarize: V) |
| | 4.30dB(Polarize: H) |
| Uncertainty for radio frequency | 48.24KHz |
| Uncertainty for conducted RF Power | 0.41dB |
| Uncertainty for Power Spectral Density | 0.39 dB |
| Occupied-Bandwidth | 968Hz |
| Conducted-Spurious Emission | 1.26dB |

## 2.9. Test Equipment List

| Item | Equipment | Manufacturer | Model No. | Serial No. | Firmware Version | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|---|
| 1. | 9*6*6 anechoic chamber | SKET | 9*6*6 | N/A | / | 2022.12.20 | 3 Year |
| 2. | Test Receiver | Rohde&Schwarz | ESCI 7 | 101032/003 | 4.42 SP3 | 2024.12.18 | 1 Year |
| 3. | L.I.S.N.#1 | Rohde&Schwarz | ENV216 | 102282 | / | 2024.12.18 | 1 Year |
| 4. | L.I.S.N.#2 | RFT | NNB111 | 13835240 | / | 2024.12.18 | 1 Year |
| 5. | Loop Antenna | Schwarz beck | FMZB 1519B | 00128 | / | 2025.01.02 | 2 Year |
| 6. | Bilog Antenna | Schwarz beck | VULB 9168 | 01448 | / | 2025.01.02 | 2 Year |
| 7. | Spectrum Analyzer | Rohde&Schwarz | FSV-40N | 101648 | 3.70 | 2024.12.18 | 1 Year |
| 8. | Horn Antenna | Schwarz beck | BBHA 9120 D | 02706 | / | 2025.01.02 | 2 Year |
| 9. | Amplifier | SKET | LAPA_01G18G-45dB | SK2022032901 | / | 2024.12.18 | 1 Year |
| 10. | Horn Antenna | Schwarz beck | BBHA 9170 | 00946 | / | 2022.12.31 | 2 Year |
| 11. | Amplifier | SKET | LNPA_0118G-45 | SK2020010801 | / | 2024.12.18 | 1 Year |
| 12 | RF Power Probe | Rohde&Schwarz | NRP-Z11 | 1138.3004.02-111533-Fz | / | 2024.12.18 | 1 Year |
| 13 | RF Sensor Unit | Tachoy | TR1029-2 | 20220428P008 | / | 2024.12.18 | 1 Year |
| 14 | Spectrum Analyzer | Agilent | N9020A | MY51281067 | A.14.03 | 2024.12.18 | 1 Year |
| 15 | Temp. & Humid Chamber | Auchno | 9606 | / | / | 2024.12.18 | 1 Year |
| 16 | Regulated DC Power Supply | Xinouhua | ADC120V10A | 202211251638 | | 2024.12.18 | 1 Year |

For Test Software Information

| Item | Software Name | Manufacturer | Version |
|---|---|---|---|
| RE | EZ_EMC | Farad | PSI-3A1 |
| CE | EZ_EMC | Farad | PSI-3A1 |
| RF | RTS | TACHOY | V1.0.0 |

# 3. Spurious Emission

## 3.1. Test Limits

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

15.205 Restricted frequency band

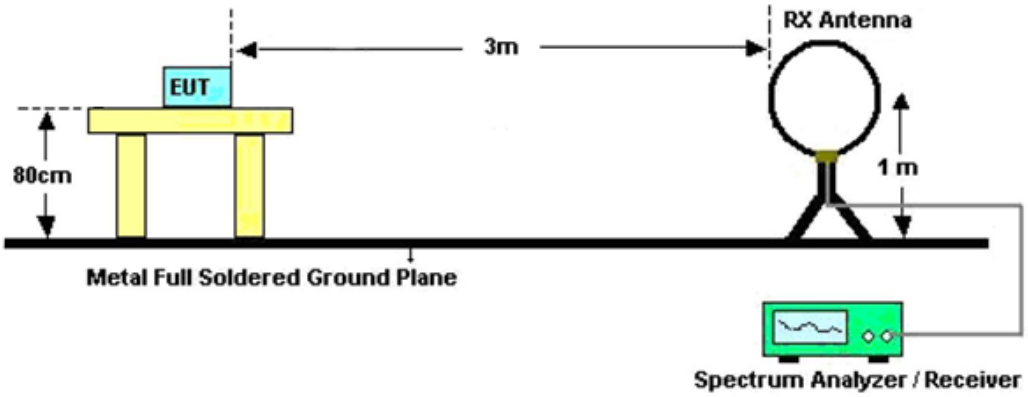
| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| [1]0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614 | 5.35 - 5.46 |
| 2.1735 - 2.1905 | 16.80425 - 16.80475 | 960 - 1240 | 7.25 - 7.75 |
| 4.125 - 4.128 | 25.5 - 25.67 | 1300 - 1427 | 8.025 - 8.5 |
| 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 - 156.52525 | 2483.5 - 2500 | 17.7 - 21.4 |
| 8.37625 - 8.38675 | 156.7 - 156.9 | 2690 - 2900 | 22.01 - 23.12 |
| 8.41425 - 8.41475 | 162.0125 - 167.17 | 3260 - 3267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 167.72 - 173.2 | 3332 - 3339 | 31.2 - 31.8 |
| 12.51975 - 12.52025 | 240 - 285 | 3345.8 - 3358 | 36.43 - 36.5 |
| 12.57675 - 12.57725 | 322 - 335.4 | 3600 - 4400 | ([2]) |

15.209 Limit

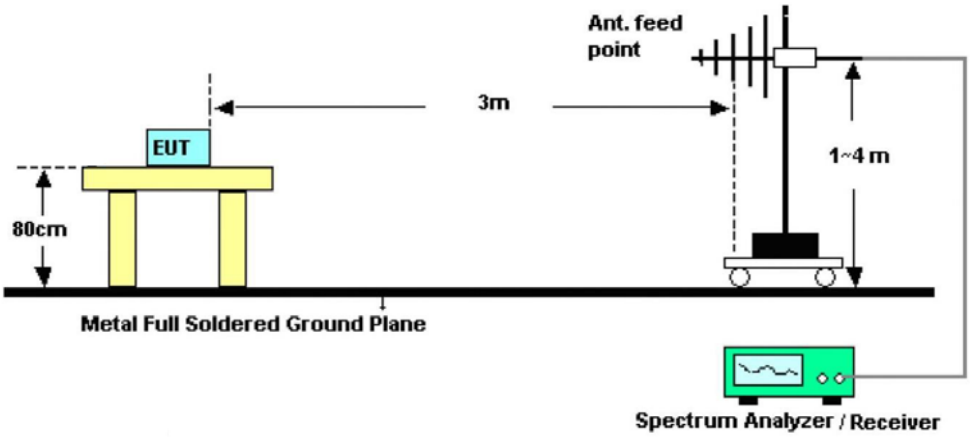
| FREQUENCY MHz | DISTANCE Meters | FIELD STRENGTHS LIMIT | |
|---|---|---|---|
| | | μV/m | dB(μV)/m |
| 0.009-0.490 | 300 | 2400/F(KHz) | / |
| 0.490-1.705 | 30 | 24000/F(KHz) | / |
| 1.705-30 | 30 | 30 | 29.5 |
| 30 ~ 88 | 3 | 100 | 40.0 |
| 88 ~ 216 | 3 | 150 | 43.5 |
| 216 ~ 960 | 3 | 200 | 46.0 |
| 960 ~ 1000 | 3 | 500 | 54.0 |
| Above 1000 | 3 | 74.0 dB(μV)/m (Peak)<br>54.0 dB(μV)/m (Average) | |
| Note 1: The peak limit is 20 dB higher than the average limit | | | |

## 3.2. Block Diagram of Test setup

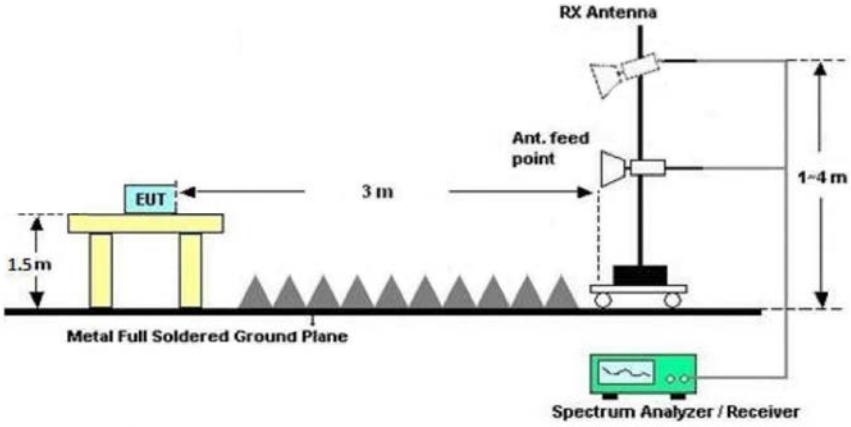
3.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 30MHz




3.2.2 In 3m Anechoic Chamber Test Setup Diagram for below 1GHz




3.2.3 In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



## 3.3. Test Procedure

(1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.

(2) Setup EUT and simulator

(3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.

(a) Change work frequency or channel of device if practicable.

(b) Change modulation type of device if practicable.

(c) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions

(4) Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated

(5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10:2013on Radiated Emission test.

(6) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RBW is set at 1MHz, VBW is set at 10Hz for Average measure.

st setup information:

| | | |
|---|---|---|
| 9KHz~150KHz | RBW200Hz | VBW1KHz |
| 150KHz~30MHz | RBW9KHz | VBW 30KHz |
| 30MHZ~1GHz | RBW120KHz | VBW 300KHz |
| Above1GHz | RBW1MHz | VBW 3MHz |

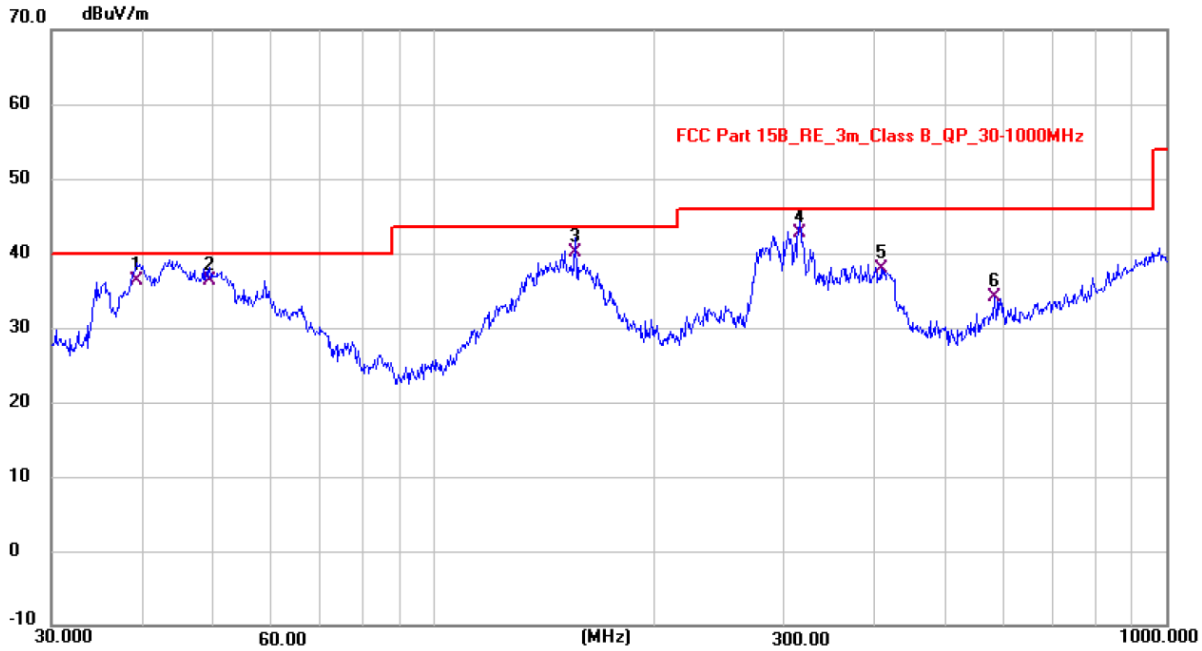
## 3.4. Test Results

We have scanned from 9kHz to the 10th harmonic of the EUT's highest frequency.
Detailed information please see the following page.

| From 9KHz to 30MHz: | | | | | |
|---|---|---|---|---|---|
| Test Date | : | 2025.3.18 | Temperature | : | 26℃ |
| Test Engineer | : | Jensen Wang | Humidity | : | 54% |
| Test Mode | : | GFSK mode | | | |
| Test Results | : | **PASS** | | | |
| Note: | The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported. | | | | |

| From 30MHz to 1000MHz: | | | | | |
|---|---|---|---|---|---|
| Test Date | : | 2025.3.18 | Temperature | : | 26℃ |
| Test Engineer | : | Jensen Wang | Humidity | : | 54% |
| Test Mode | : | GFSK mode | | | |
| Test Results | : | **PASS** | | | |
| Note: | 1. The test results are listed in next pages.<br>2. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out.<br>3. All modes have been tested, and only worst data of 1Mbps GFSK 2402MHz mode was listed in this report. | | | | |

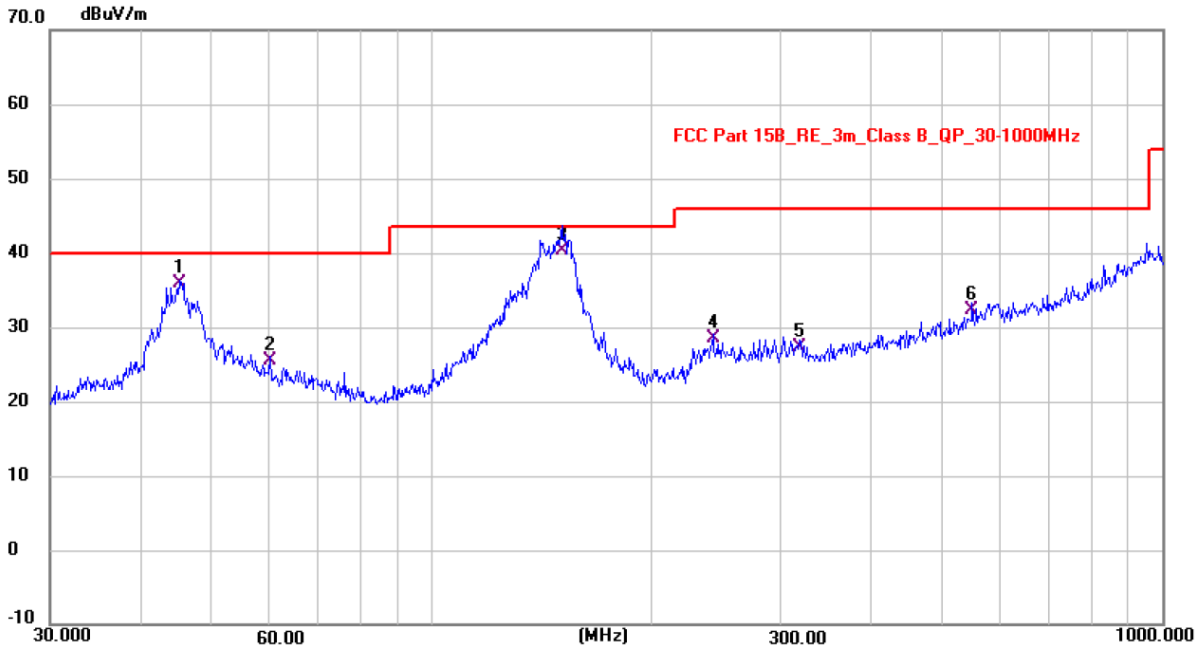
**Polarization: Vertical**




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 39.4198 | 21.74 | 14.49 | 36.23 | 40.00 | -3.77 | QP |
| 2 | 49.4460 | 22.05 | 14.17 | 36.22 | 40.00 | -3.78 | QP |
| 3 | 155.9781 | 25.86 | 14.26 | 40.12 | 43.50 | -3.38 | QP |
| 4 * | 316.3115 | 27.31 | 15.36 | 42.67 | 46.00 | -3.33 | QP |
| 5 | 408.5876 | 19.93 | 17.94 | 37.87 | 46.00 | -8.13 | QP |
| 6 | 582.9980 | 11.65 | 22.42 | 34.07 | 46.00 | -11.93 | QP |

Note: Level = Reading + Factor Margin = Level - Limit

**Polarization: Horizontal**




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 45.1770 | 21.49 | 14.35 | 35.84 | 40.00 | -4.16 | QP |
| 2 | 60.1745 | 12.41 | 13.10 | 25.51 | 40.00 | -14.49 | QP |
| 3 * | 150.6697 | 26.09 | 14.14 | 40.23 | 43.50 | -3.27 | QP |
| 4 | 243.3771 | 15.29 | 13.23 | 28.52 | 46.00 | -17.48 | QP |
| 5 | 318.9567 | 11.94 | 15.43 | 27.37 | 46.00 | -18.63 | QP |
| 6 | 550.7065 | 10.83 | 21.54 | 32.37 | 46.00 | -13.63 | QP |

Note: Level = Reading + Factor Margin = Level - Limit

| From 1GHz to 25GHz: | | | | | |
|---|---|---|---|---|---|
| Test Date | : | 2025.3.18 | Temperature | : | 26℃ |
| Test Engineer | : | Jensen Wang | Humidity | : | 54% |
| Test Mode | : | GFSK mode | | | |
| Test Results | : | **PASS** | | | |
| Note: | 1. The test results are listed in next pages.<br>2. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out.<br>3. If the limits for the measurement with the average detector are met when using a receiver with a quasi-peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out. | | | | |

1Mbps:

| Test Mode : GFSK TX Low | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Freq MHz | Polarity | Reading (dBuV/m) | Correct Factor | Result (dBuV/m) | Limit (dBuV/m) | Margin | Remark |
| 1 | 4804 | V | 57.15 | -13.25 | 43.90 | 74.00 | -30.10 | Peak |
| 2 | 4804 | V | 47.05 | -13.25 | 33.80 | 54.00 | -20.20 | Avg |
| 3 | 7206 | -- | -- | -- | -- | -- | -- | -- |
| 4 | 9608 | -- | -- | -- | -- | -- | -- | -- |
| 5 | 4804 | H | 56.42 | -13.25 | 43.17 | 74.00 | -30.83 | Peak |
| 6 | 4804 | H | 48.38 | -13.25 | 35.13 | 54.00 | -18.87 | Avg |
| 7 | 7206 | -- | -- | -- | -- | -- | -- | -- |
| 8 | 9608 | -- | -- | -- | -- | -- | -- | -- |
| Test Mode : GFSK TX Mid | | | | | | | | |
| 1 | 4880 | V | 57.08 | -12.98 | 44.10 | 74.00 | -29.90 | Peak |
| 2 | 4880 | V | 49.37 | -12.98 | 36.39 | 54.00 | -17.61 | Avg |
| 3 | 7320 | -- | -- | -- | -- | -- | -- | -- |
| 4 | 9760 | -- | -- | -- | -- | -- | -- | -- |
| 5 | 4880 | H | 58.04 | -12.98 | 45.06 | 74.00 | -28.94 | Peak |
| 6 | 4880 | H | 46.81 | -12.98 | 33.83 | 54.00 | -20.17 | Avg |
| 7 | 7320 | -- | -- | -- | -- | -- | -- | -- |
| 8 | 9760 | -- | -- | -- | -- | -- | -- | -- |
| Test Mode : GFSK TX High | | | | | | | | |
| 1 | 4960 | V | 56.52 | -12.70 | 43.82 | 74.00 | -30.18 | Peak |
| 2 | 4960 | V | 47.68 | -12.70 | 34.98 | 54.00 | -19.02 | Avg |
| 3 | 7440 | -- | -- | -- | -- | -- | -- | -- |
| 4 | 9920 | -- | -- | -- | -- | -- | -- | -- |
| 5 | 4960 | H | 56.56 | -12.70 | 43.86 | 74.00 | -30.14 | Peak |
| 6 | 4960 | H | 47.97 | -12.70 | 35.27 | 54.00 | -18.73 | Avg |
| 7 | 7440 | -- | -- | -- | -- | -- | -- | -- |
| 8 | 9920 | -- | -- | -- | -- | -- | -- | -- |
| Note: | 1. Means other frequency and mode comply with standard requirements and at least have 20dB margin.<br>2. Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain.<br>Result=Reading + Correct Factor. Margin= Result-Limit. | | | | | | | |

# 4. Power Line Conducted Emission

## 4.1. Test Limits

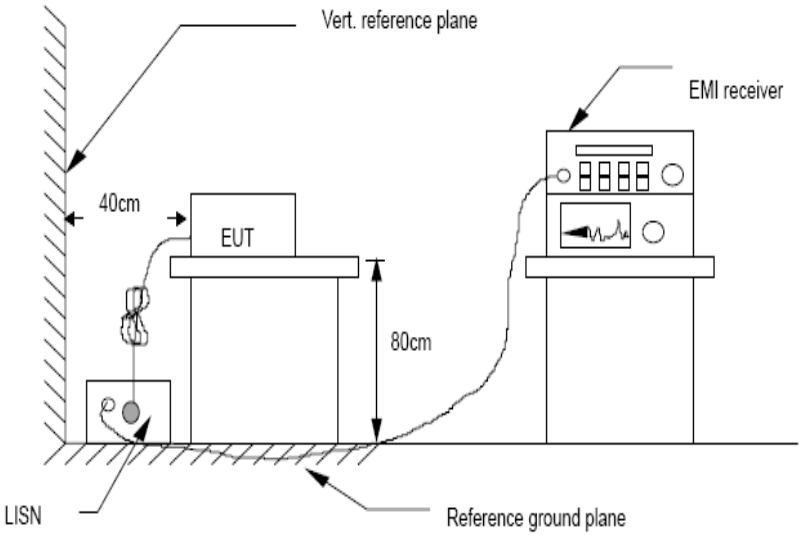
| Frequency | Limits dB(μV) | |
|---|---|---|
| MHz | Quasi-peak Level | Average Level |
| 0.15 -0.50 | 66 -56* | 56 - 46* |
| 0.50 -5.00 | 56 | 46 |
| 5.00 -30.00 | 60 | 50 |

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.
3. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

## 4.2. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs.
Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10:2013 on Conducted Emission Measurement.
The bandwidth of test receiver is set at 9 kHz.

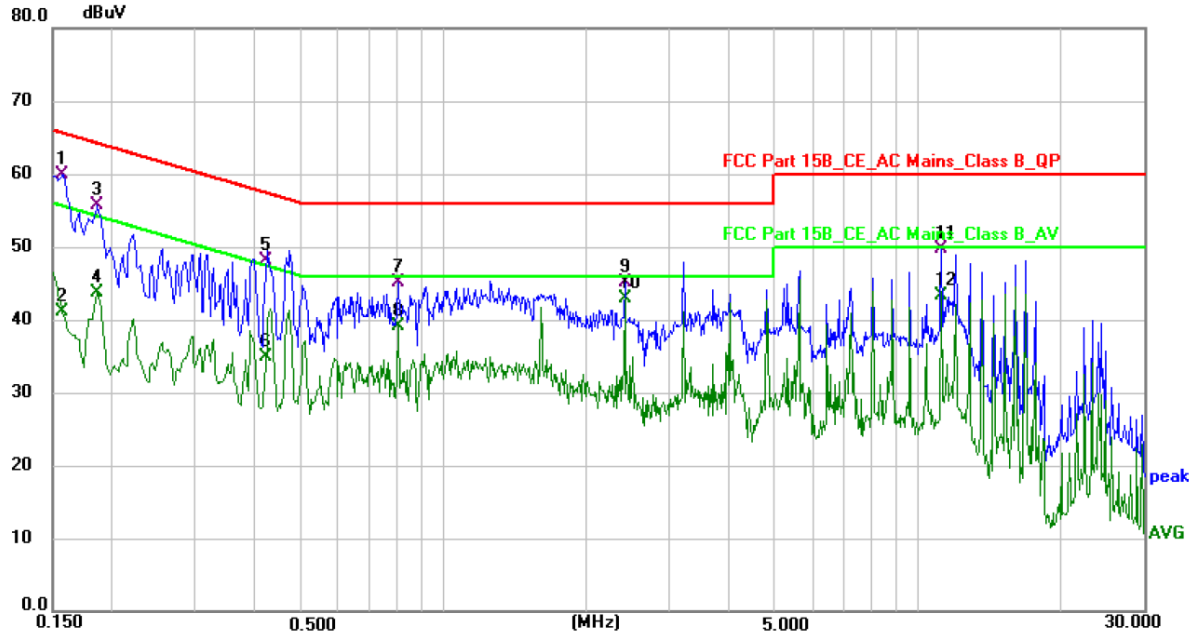
## 4.3. Test Setup



## 4.4. Test Results

| | | | | | |
|---|---|---|---|---|---|
| Test Date | : | 2025.3.18 | Temperature | : | 26℃ |
| Test Engineer | : | Jensen Wang | Humidity | : | 54% |
| Test Mode | : | GFSK mode | | | |
| Test Results | : | **PASS** | | | |
| Note: | 1. The test results are listed in next pages.<br>2. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out.<br>3. If the limits for the measurement with the average detector are met when using a receiver with a quasi-peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.<br>4. All modes have been tested, and only worst data of 1Mbps GFSK 2402MHz mode was listed in this report. | | | | |

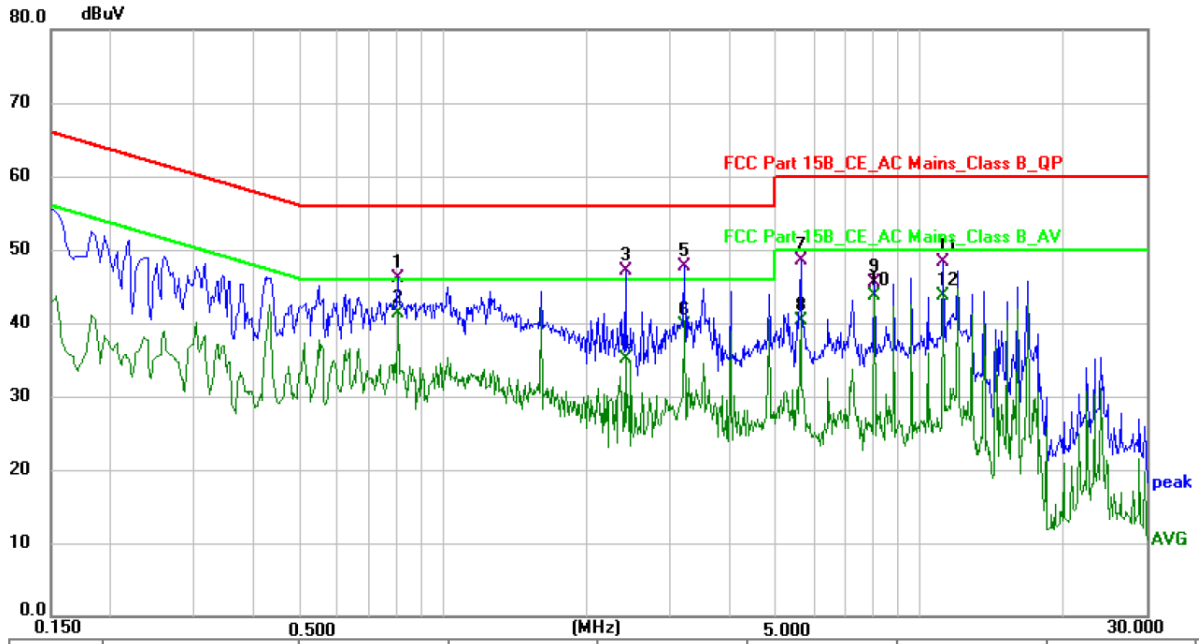
**Polarization: L**




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 0.1580 | 50.02 | 9.94 | 59.96 | 65.57 | -5.61 | QP |
| 2 | 0.1580 | 31.18 | 9.94 | 41.12 | 55.57 | -14.45 | AVG |
| 3 | 0.1860 | 45.66 | 9.95 | 55.61 | 64.21 | -8.60 | QP |
| 4 | 0.1860 | 33.78 | 9.95 | 43.73 | 54.21 | -10.48 | AVG |
| 5 | 0.4220 | 38.52 | 9.68 | 48.20 | 57.41 | -9.21 | QP |
| 6 | 0.4220 | 25.23 | 9.68 | 34.91 | 47.41 | -12.50 | AVG |
| 7 | 0.8020 | 35.62 | 9.42 | 45.04 | 56.00 | -10.96 | QP |
| 8 | 0.8020 | 29.78 | 9.42 | 39.20 | 46.00 | -6.80 | AVG |
| 9 | 2.4100 | 35.63 | 9.39 | 45.02 | 56.00 | -10.98 | QP |
| 10 * | 2.4100 | 33.58 | 9.39 | 42.97 | 46.00 | -3.03 | AVG |
| 11 | 11.2500 | 40.24 | 9.54 | 49.78 | 60.00 | -10.22 | QP |
| 12 | 11.2500 | 33.78 | 9.54 | 43.32 | 50.00 | -6.68 | AVG |

Note: Level = Reading + Factor Margin = Level - Limit

**Polarization: N**




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 0.8059 | 36.43 | 9.68 | 46.11 | 56.00 | -9.89 | QP |
| 2 * | 0.8059 | 31.61 | 9.68 | 41.29 | 46.00 | -4.71 | AVG |
| 3 | 2.4180 | 37.65 | 9.39 | 47.04 | 56.00 | -8.96 | QP |
| 4 | 2.4180 | 25.64 | 9.39 | 35.03 | 46.00 | -10.97 | AVG |
| 5 | 3.2180 | 38.24 | 9.56 | 47.80 | 56.00 | -8.20 | QP |
| 6 | 3.2180 | 30.17 | 9.56 | 39.73 | 46.00 | -6.27 | AVG |
| 7 | 5.6300 | 38.94 | 9.53 | 48.47 | 60.00 | -11.53 | QP |
| 8 | 5.6300 | 30.77 | 9.53 | 40.30 | 50.00 | -9.70 | AVG |
| 9 | 8.0380 | 36.06 | 9.45 | 45.51 | 60.00 | -14.49 | QP |
| 10 | 8.0380 | 34.32 | 9.45 | 43.77 | 50.00 | -6.23 | AVG |
| 11 | 11.2500 | 38.83 | 9.51 | 48.34 | 60.00 | -11.66 | QP |
| 12 | 11.2500 | 34.26 | 9.51 | 43.77 | 50.00 | -6.23 | AVG |

Note: Level = Reading + Factor Margin = Level - Limit

# 5. Out-of-band Emissions

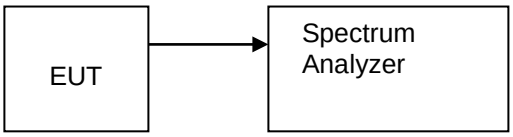
## 5.1. Test Limits

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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in FCC Part 15.209(a) is not required.

## 5.2. Test Procedure

Connect the transmitter ouput to spectrum analvzer using a low loss RF cable, and set the spectrum analvzer to RBW=100 kHz, VBW= 300 kHz, peak detector, and max hold. Measurements utilizing these setting are made of the in-band reference level, band edge and out-of-band emissions.

## 5.3. Test Setup




## 5.4. Test Results

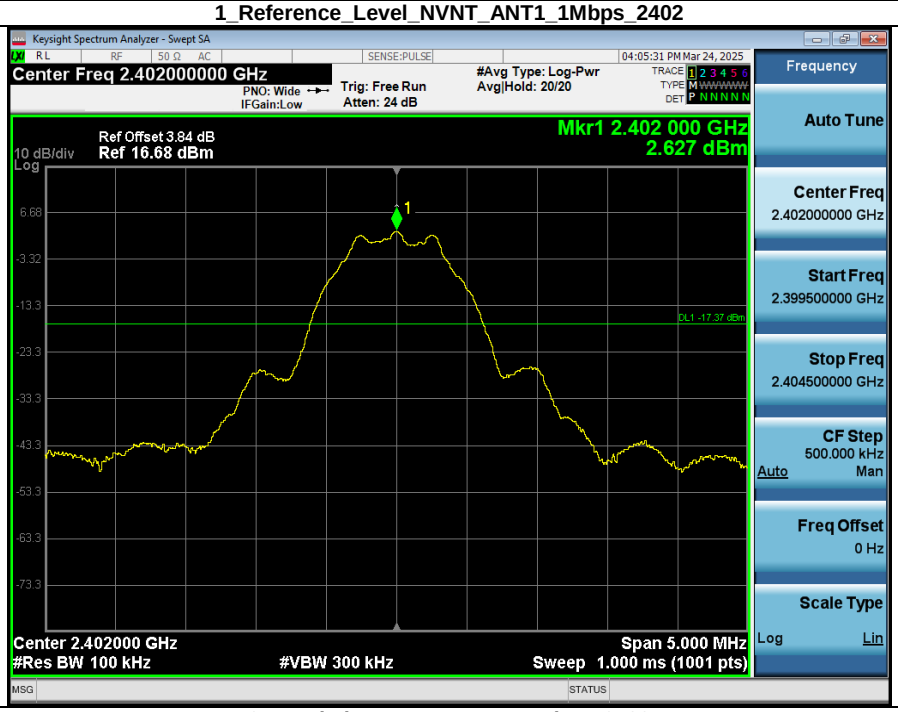
PASS.

The test results are listed in next pages.

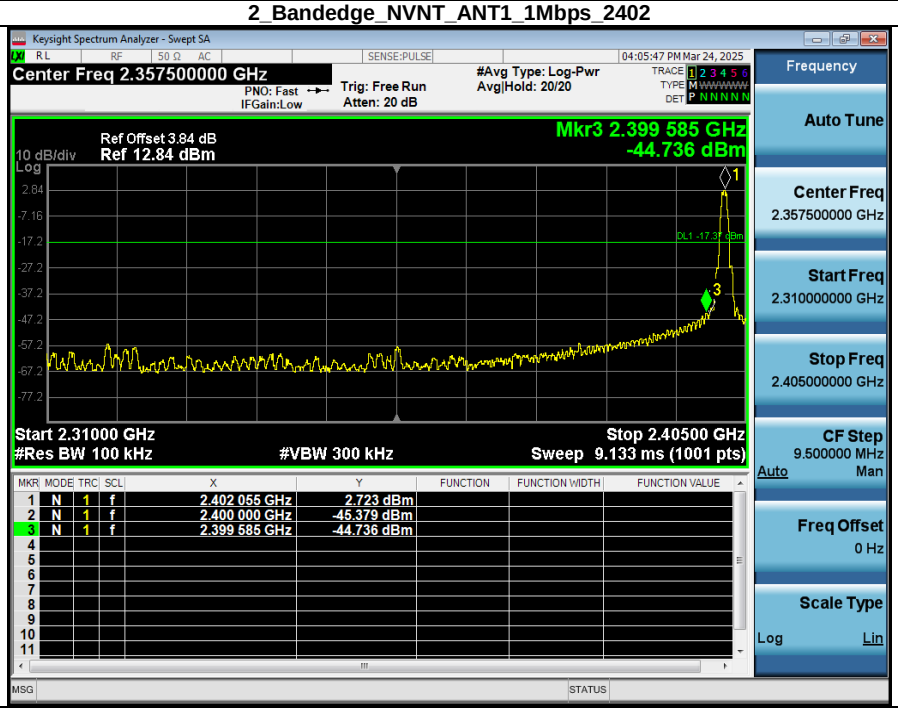
## Band edge: Pass

| Condition | Antenna | Rate | TX_Frequency (MHz) | Max. Mark Frequency (MHz) | Spurious level(dBm) | limit(dBm) | Result |
|---|---|---|---|---|---|---|---|
| NVNT | ANT1 | 1Mbps | 2402.00 | 2399.585 | -44.736 | -17.373 | Pass |
| NVNT | ANT1 | 1Mbps | 2480.00 | 2483.525 | -46.281 | -17.862 | Pass |

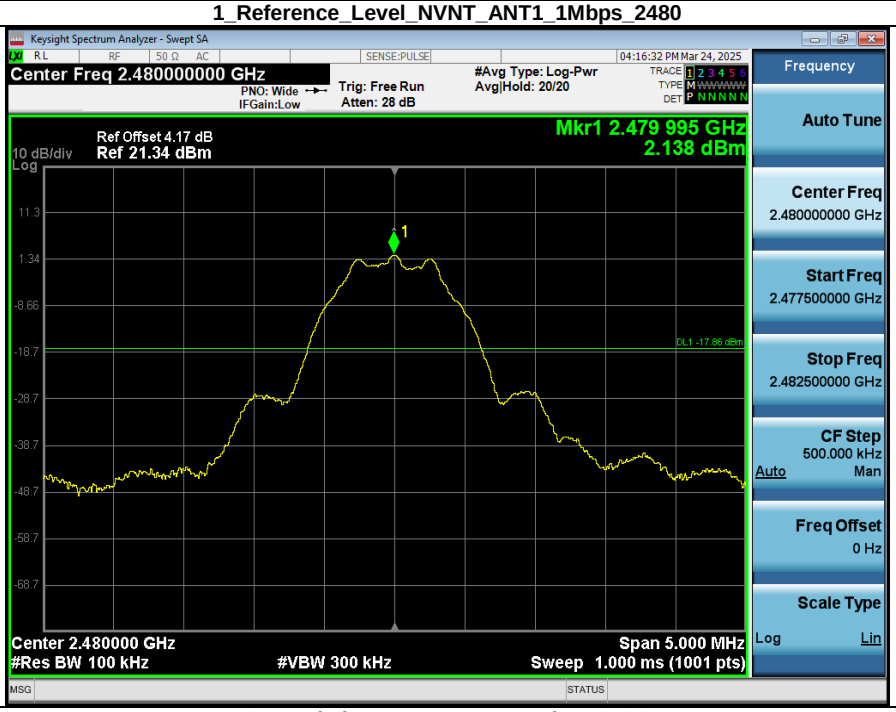
**1_Reference_Level_NVNT_ANT1_1Mbps_2402**



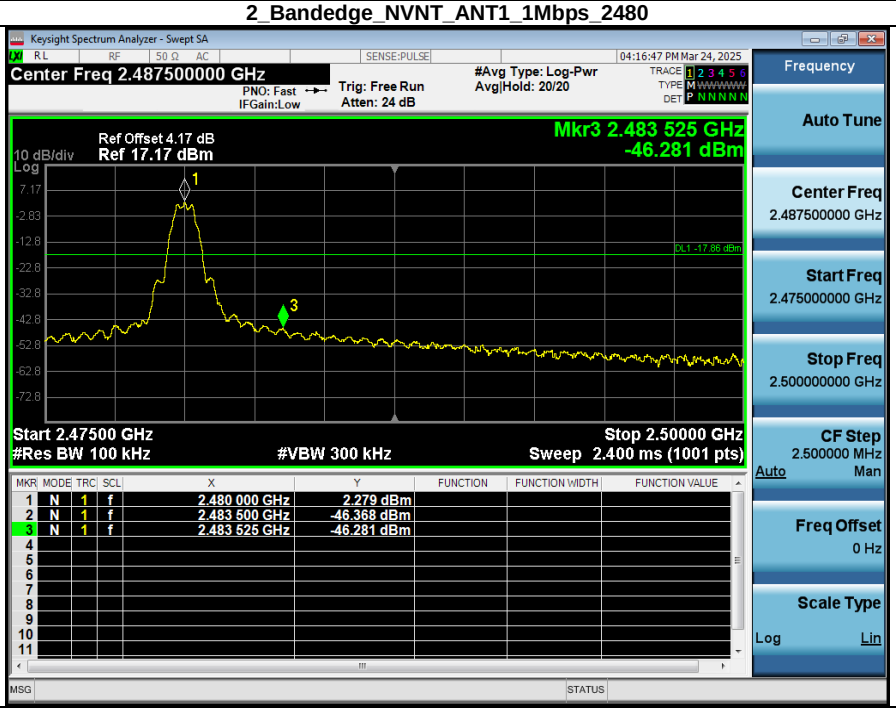

**2_Bandedge_NVNT_ANT1_1Mbps_2402**



**1_Reference_Level_NVNT_ANT1_1Mbps_2480**



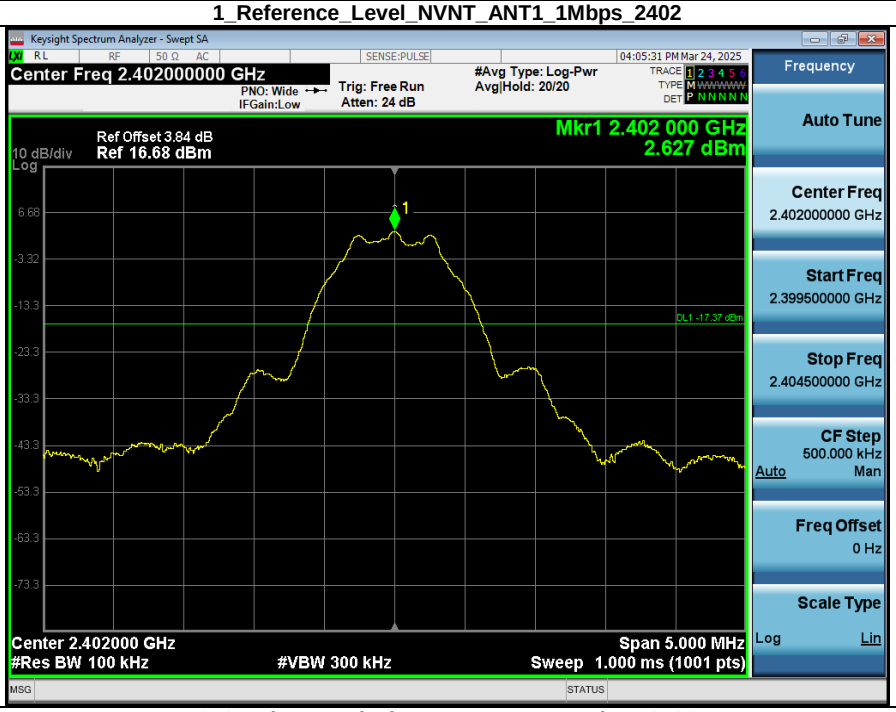

**2_Bandedge_NVNT_ANT1_1Mbps_2480**



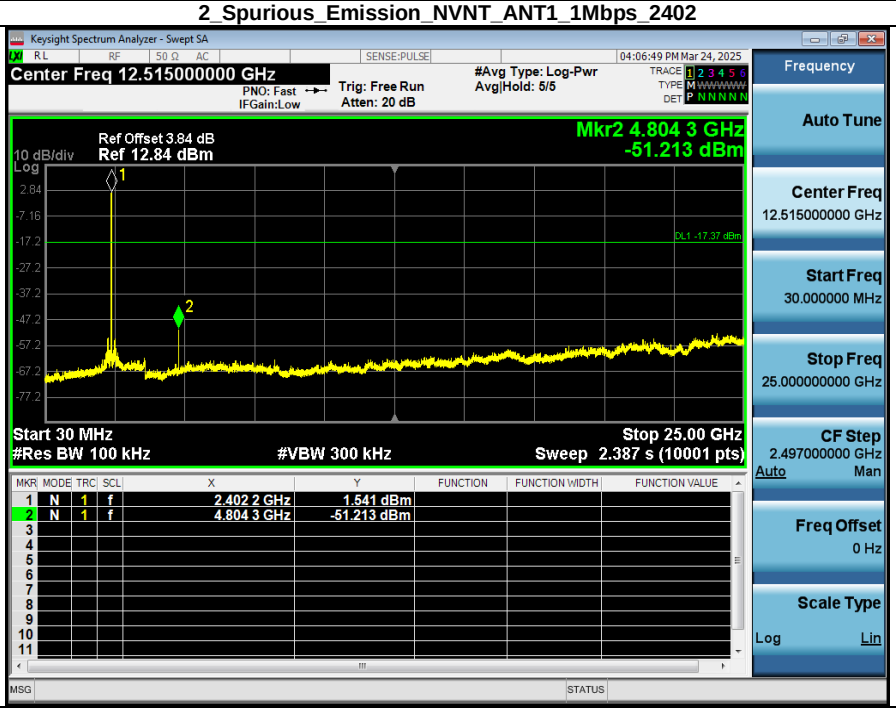
## Spurious Emission: Pass

| Condition | Antenna | Rate | TX_Frequency(MHz) | Spurious MAX.Value(dBm) | Limit | Result |
|---|---|---|---|---|---|---|
| NVNT | ANT1 | 1Mbps | 2402.00 | -51.213 | -17.373 | Pass |
| NVNT | ANT1 | 1Mbps | 2440.00 | -45.346 | -17.530 | Pass |
| NVNT | ANT1 | 1Mbps | 2480.00 | -41.870 | -17.862 | Pass |

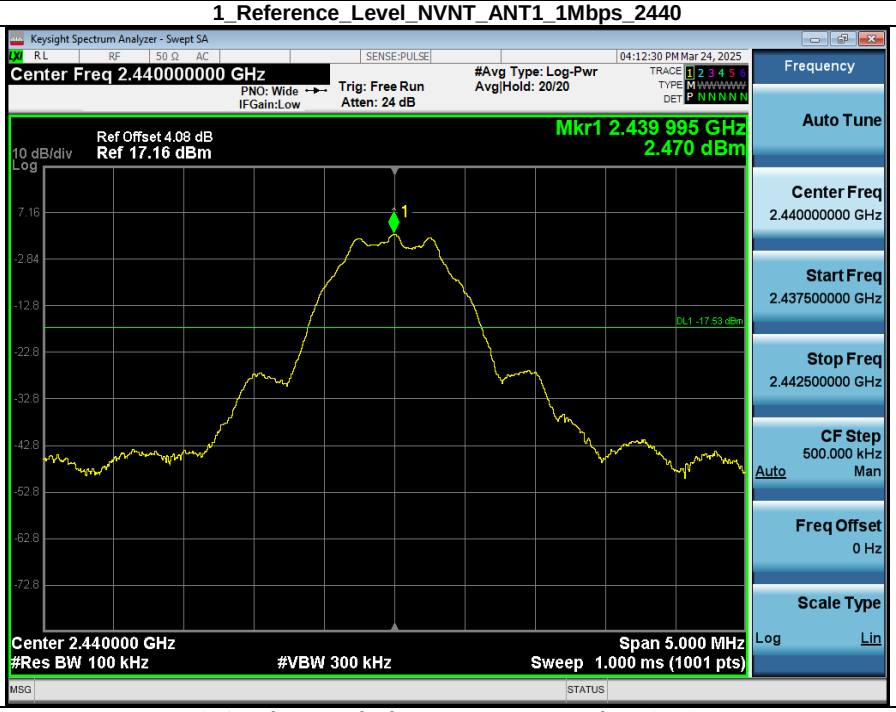
**1_Reference_Level_NVNT_ANT1_1Mbps_2402**



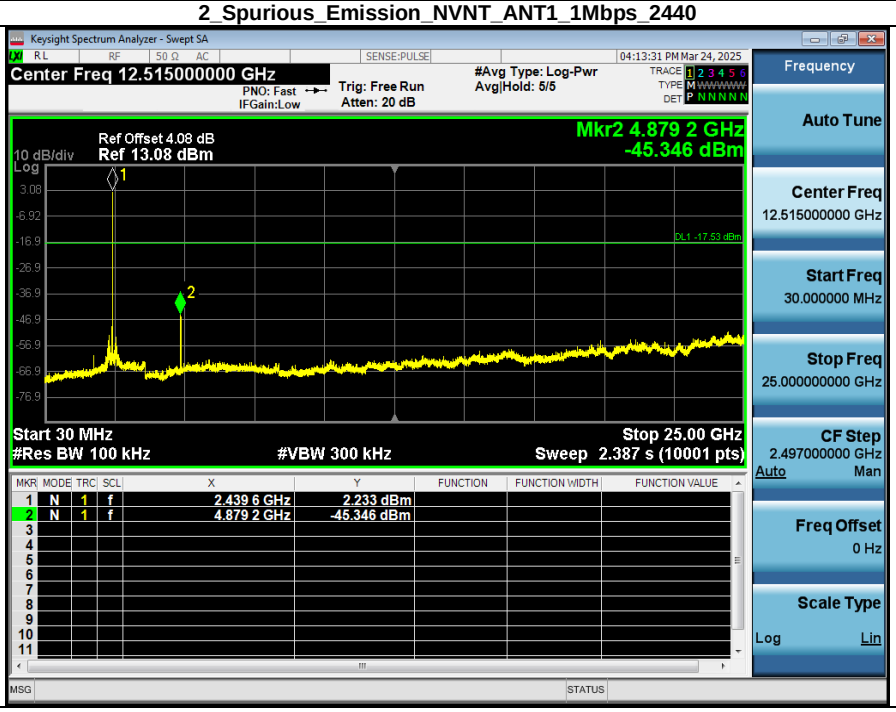

**2_Spurious_Emission_NVNT_ANT1_1Mbps_2402**



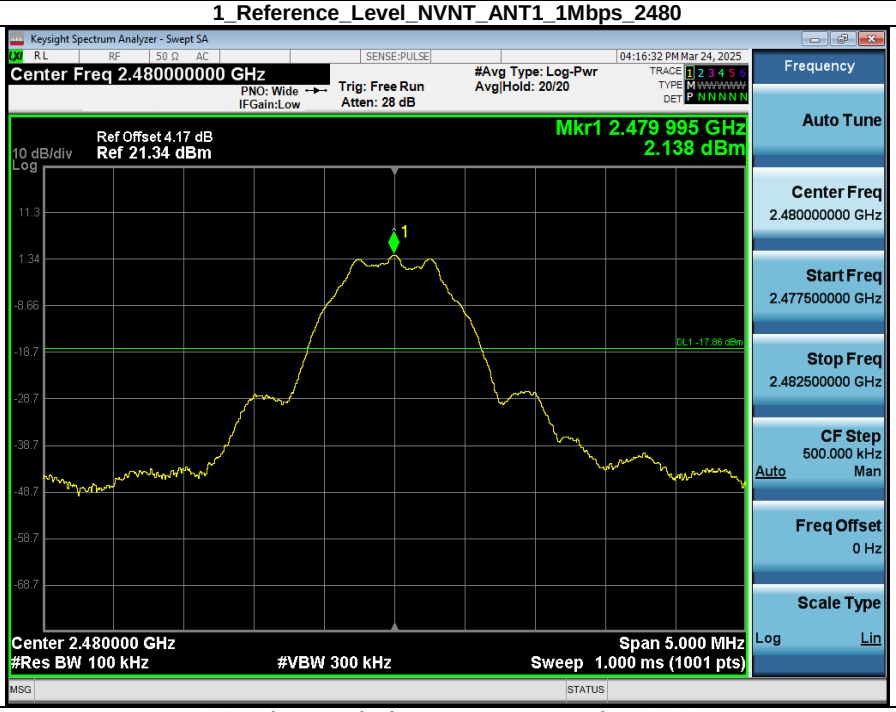
**1_Reference_Level_NVNT_ANT1_1Mbps_2440**



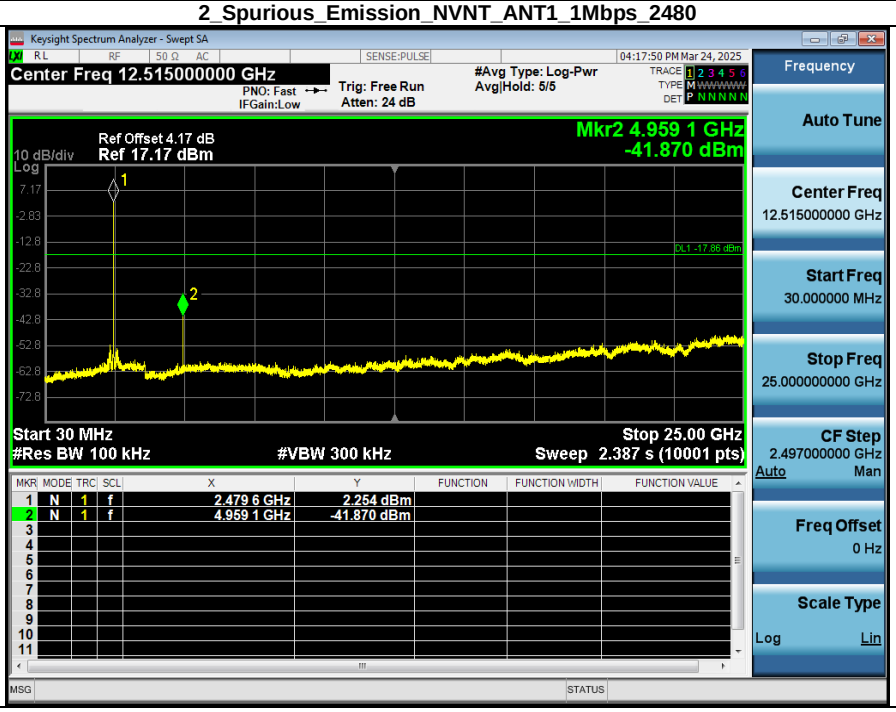

**2_Spurious_Emission_NVNT_ANT1_1Mbps_2440**



**1_Reference_Level_NVNT_ANT1_1Mbps_2480**




**2_Spurious_Emission_NVNT_ANT1_1Mbps_2480**



# 6. Conducted Maximum Output Power

## 6.1. Test limits

Please refer RSS-247 & FCC PART 15: 15.247.

Regulation 15.247(b) The limit of Maximum Peak Output Power Measurement is 1 W(30dBm)

## 6.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance v05r02

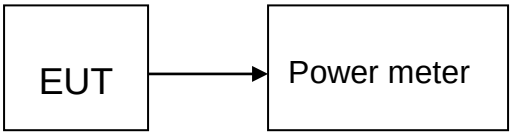
1 Place the EUT on the table and set it in transmitting mode.

2 Connected the EUT's antenna port to peak power meter by 20dB attenuator.

3 Measure out each mode and each bands Peak output power of EUT.

Note: The cable loss and attenuator loss were offset into measure device as amplitude offset.

## 6.3. Test Setup




## 6.4. Test Results

| Condition | Antenna | Rate | Frequency (MHz) | Max. Conducted Power(dBm) | Max. Conducted Power(mW) | Limit(mW) | Result |
|---|---|---|---|---|---|---|---|
| NVNT | ANT1 | 1Mbps | 2402.00 | **2.63** | 1.83 | 1000 | Pass |
| NVNT | ANT1 | 1Mbps | 2440.00 | 2.47 | 1.77 | 1000 | Pass |
| NVNT | ANT1 | 1Mbps | 2480.00 | 2.17 | 1.65 | 1000 | Pass |

# 7. Peak Power Spectral Density

## 7.1. Test limits

1 Please refer RSS-247 & FCC PART 15: 15.247.

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

3 The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

## 7.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance v05r02

1 Place the EUT on the table and set it in transmitting mode.

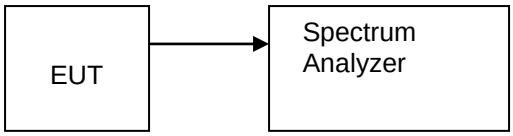
2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

3 Set the spectrum analyzer as RBW = 3kHz(Set the RBW to: 3 kHz≤RBW≤100 kHz.), VBW = 10kHz(Set the VBW≥3×RBW), span≥1.5×DTS bandwidth., detail see the test plot.

4 Record the max reading.

5 Repeat the above procedure until the measurements for all frequencies are completed.

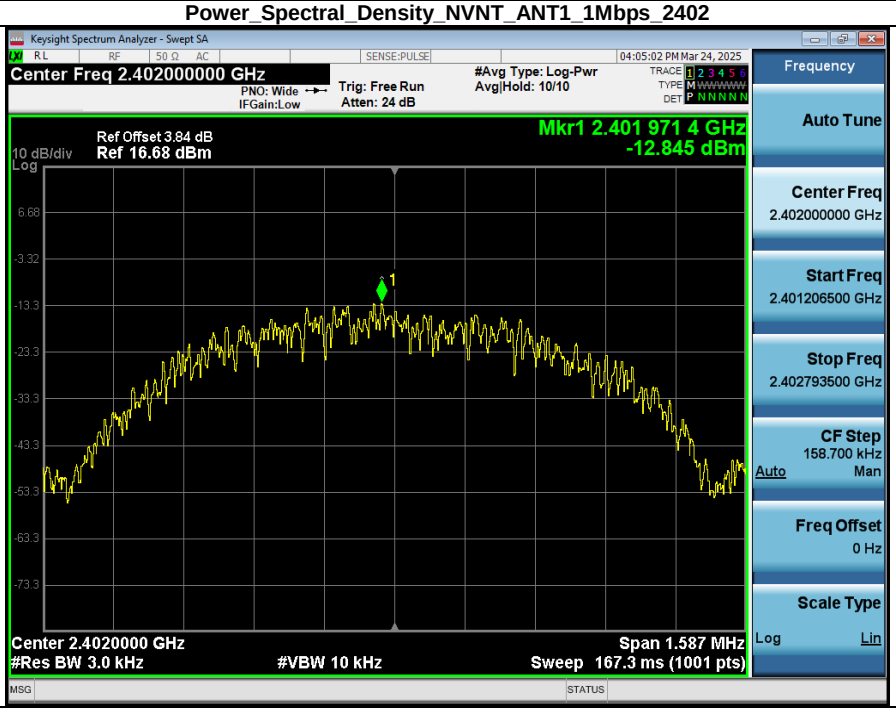
## 7.3. Test Setup



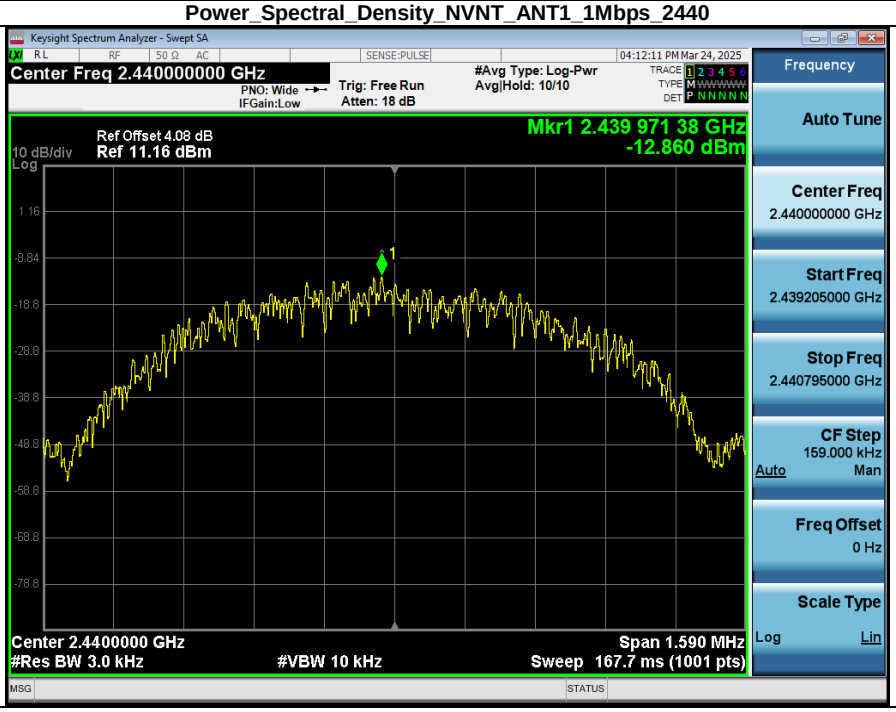

## 7.4. Test Results

| Condition | Antenna | Rate | Frequency (MHz) | Power Spectral Density(dBm) | Limit(dBm/3kHz) | Result |
|---|---|---|---|---|---|---|
| NVNT | ANT1 | 1Mbps | 2402.00 | -12.85 | 8 | Pass |
| NVNT | ANT1 | 1Mbps | 2440.00 | -12.86 | 8 | Pass |
| NVNT | ANT1 | 1Mbps | 2480.00 | -13.17 | 8 | Pass |

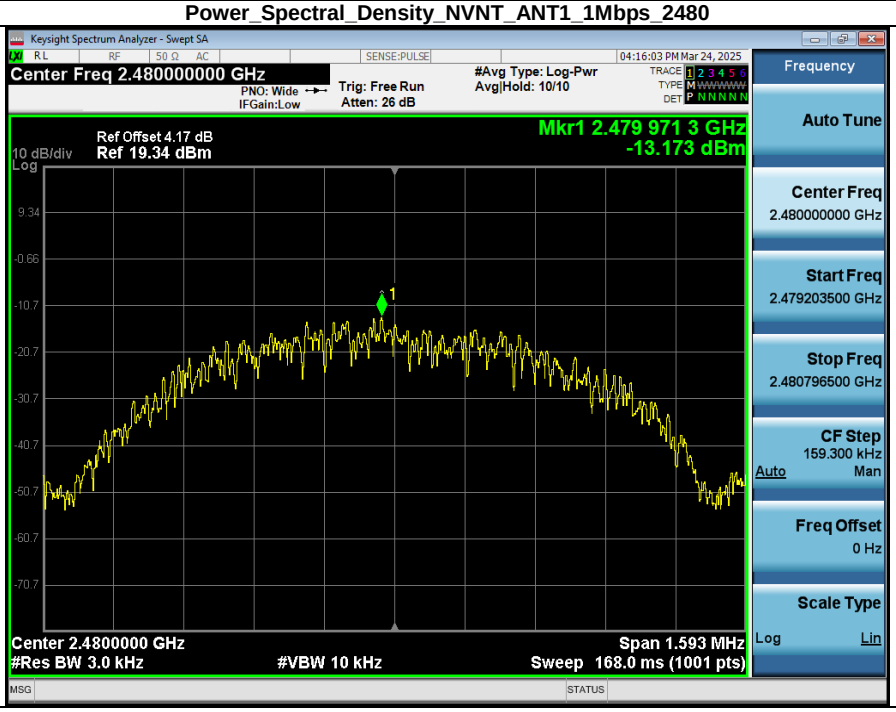
**Power_Spectral_Density_NVNT_ANT1_1Mbps_2402**




**Power_Spectral_Density_NVNT_ANT1_1Mbps_2440**



**Power_Spectral_Density_NVNT_ANT1_1Mbps_2480**



# 8. Bandwidth

## 8.1. Test limits

Please refer RSS-247 & FCC PART 15: 15.247
For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz.

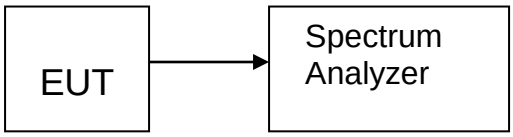
## 8.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance v05r02

a) The bandwidth is measured at an amplitude level reduced 6dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

b) The test receiver set RBW = 100kHz, VBW≥3*RBW =300kHz, Peak Detector, Sweep time set auto, detail see the test plot.

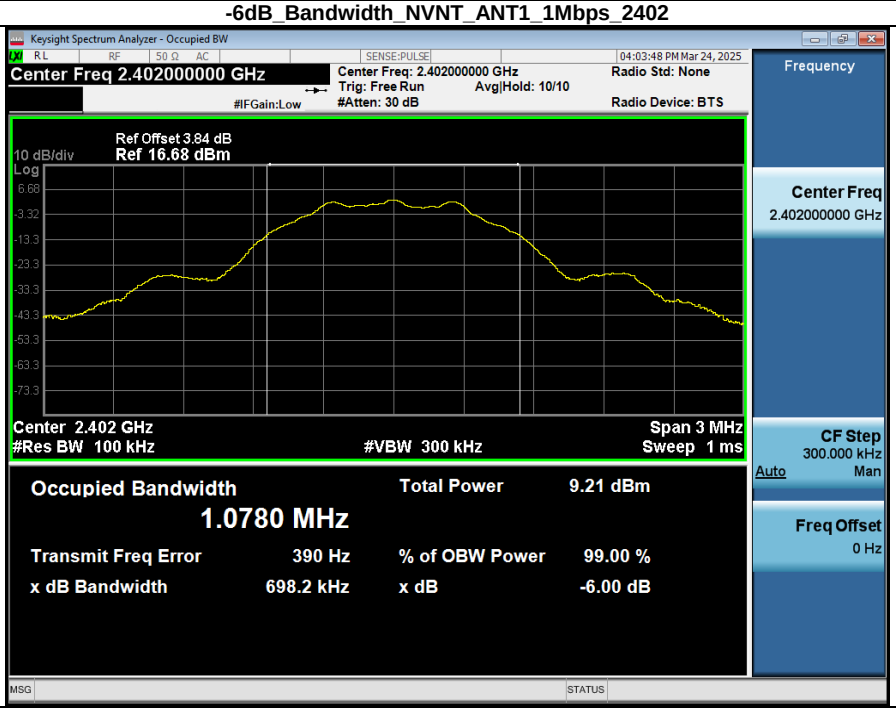
## 8.3. Test Setup



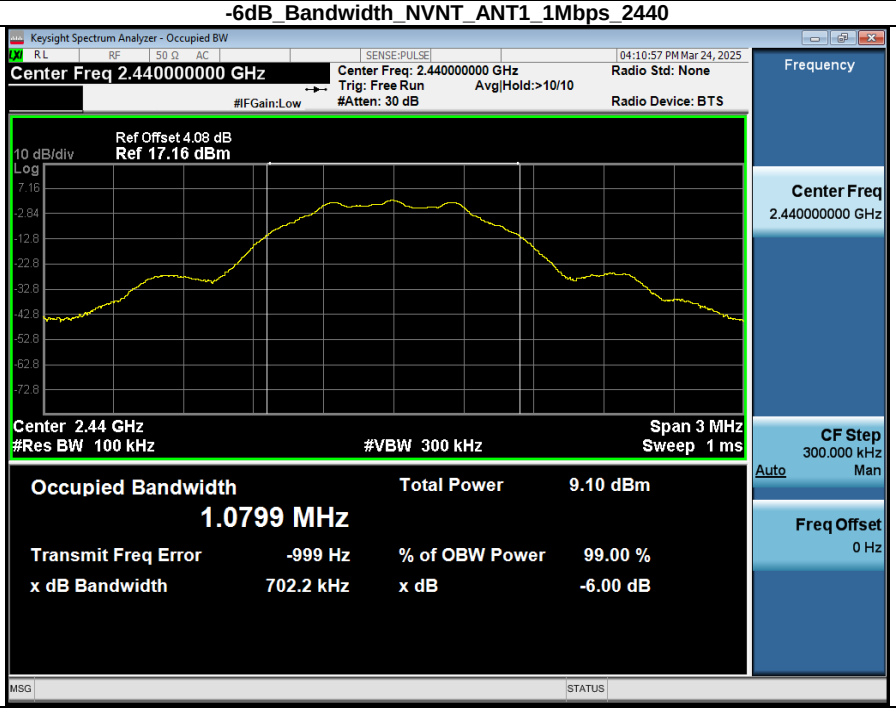

## 8.4. Test Results

| Condition | Antenna | Rate | Frequency (MHz) | -6dB BW(kHz) | limit(kHz) | Result |
|---|---|---|---|---|---|---|
| NVNT | ANT1 | 1Mbps | 2402.00 | 698.24 | 500 | Pass |
| NVNT | ANT1 | 1Mbps | 2440.00 | 702.25 | 500 | Pass |
| NVNT | ANT1 | 1Mbps | 2480.00 | 713.61 | 500 | Pass |

**-6dB_Bandwidth_NVNT_ANT1_1Mbps_2402**



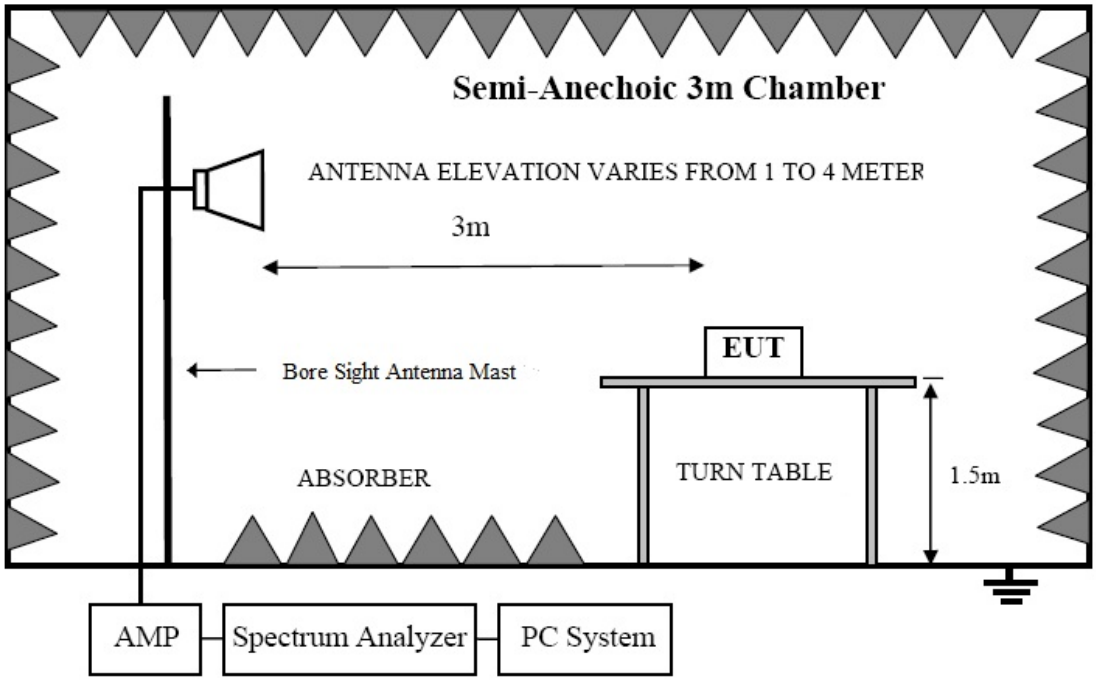

**-6dB_Bandwidth_NVNT_ANT1_1Mbps_2440**



**-6dB_Bandwidth_NVNT_ANT1_1Mbps_2480**

# 9. Band Edge Test

## 9.1. Block Diagram of Test Setup




## 9.2. Test Limit

radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c))

## 9.3. Test Procedure

Refer to ANSI C 63.10, Clause 6.10.
All restriction band and non- restriction band have been tested, only worse case is reported.
Details see the KDB558074 D01 Meas Guidance v05r02

9.2.1 Put the EUT on a 1.5m high table, power on the EUT. Emissions were scanned and measured rotating the EUT to 360 degrees, Find the maximum Emission
9.2.2 Check the spurious emissions out of band.
9.2.3 RBW 1MHz, VBW 3MHz, peak detector for peak value, RBW 1MHz, VBW 10Hz, RMS detector for AV value.

## 9.4. Test Results

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Test Date | : | 2025.3.18 | | | Temperature | : | 26℃ | |
| Test Engineer | : | Jensen Wang | | | Humidity | : | 54% | |
| Test Results | : | **PASS** | | | | | | |
| Frequency Range | : | **2310MHz~2410MHz** | | | | | | |
| Test Mode | : | 1Mbps: GFSK TX 2402MHz | | | | | | |
| No. | Freq MHz | Polarity | Reading (dBuV/m) | Correct Factor | Result (dBuV/m) | Limit (dBuV/m) | Margin | Remark |
| 1 | 2390 | H | 58.10 | -20.45 | 37.65 | 74.00 | -36.35 | Peak |
| 2 | 2390 | H | -- | -20.45 | -- | 54.00 | -- | Avg |
| 3 | 2400 | H | 62.12 | -20.41 | 41.71 | 74.00 | -32.29 | Peak |
| 4 | 2400 | H | -- | -20.41 | -- | 54.00 | -- | Avg |
| | | | | | | | | |
| 1 | 2390 | V | 60.50 | -20.45 | 40.05 | 74.00 | -33.95 | Peak |
| 2 | 2390 | V | -- | -20.45 | -- | 54.00 | -- | Avg |
| 3 | 2400 | V | 64.80 | -20.41 | 44.39 | 74.00 | -29.61 | Peak |
| 4 | 2400 | V | -- | -20.41 | -- | 54.00 | -- | Avg |
| | | | | | | | | |
| Frequency Range | : | **2450MHz~2550MHz** | | | | | | |
| Test Mode | : | 1Mbps: GFSK TX 2480MHz | | | | | | |
| 1 | 2483.5 | H | 63.58 | -20.15 | 43.43 | 74.00 | -30.57 | Peak |
| 2 | 2483.5 | H | -- | -20.15 | -- | 54.00 | -- | Avg |
| | | | | | | | | |
| 1 | 2483.5 | V | 65.88 | -20.15 | 45.73 | 74.00 | -28.27 | Peak |
| 2 | 2483.5 | V | -- | -20.15 | -- | 54.00 | -- | Avg |
| Note: | 1. Means other frequency and mode comply with standard requirements and at least have 20dB margin.<br>2. Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain.<br>Result=Reading + Correct Factor. Margin= Result-Limit.<br>3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out. | | | | | | | |

# 10. Antenna Requirement

## 10.1.Standard Requirement

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

## 10.2.Antenna Connected Construction

The antenna connector is unique antenna and no consideration of replacement. Please see EUT photo for details.

## 10.3.Results

The EUT antenna is internal antenna. It complies with the standard requirement.

# 11. Photos of test setup

Reference to the **appendix I Test Setup Photo** for details.

# 12. Photos of EUT

Reference to the **appendix II external photos** and **appendix III internal photos** for details.

**------ END OF REPORT------**