# TEST REPORT

| | |
|---|---|
| **Report No.:** | 8336EU012611W1 |
| **Applicant:** | SANWA LIMITED |
| **Address:** | Room 1005, 10/F, Tower 2, Silvercord 30 Canton Road, Tsim Sha Tsui, Kowloon Hong Kong China |
| **Product Name:** | Lefthand Ergonomics Wireless Mouse 2.4G&Bluetooth |
| **Model No.:** | GMAERGWBT18WL (refer to clause 2.4) |
| **Trademark:** | SANWA |
| **FCC ID:** | 2AMSUGMAERGWBT18WL |
| **Test Standard(s):** | 47 CFR Part 15.247 |
| **Test Result:** | Pass |
| **Date of Receipt:** | Nov. 27, 2025 |
| **Test Date:** | Nov. 28, 2025 - Jan. 28, 2026 |
| **Date of Issue:** | Feb. 07, 2026 |

**ISSUED BY:**

SHENZHEN EU TESTING LABORATORY LIMITED

SHENZHEN EU TESTING LABORATORY LIMITED APPROVED

**Prepared by:** **Reviewed and Approved by:**

Landon Qiu/ Engineer

Sally Zhang/ Manager

# Revision Record

| Report Version | Issued Date | Description | Status |
|---|---|---|---|
| V0 | Feb. 07, 2026 | Original | Valid |
| | | | |
| | | | |


Address: 101, Building B1, Fuqiao Fourth Area, Qiaotou Community, Fuhai Subdistrict, Baoan District, Shenzhen, Guangdong, China
Website: www.eu-test.com
Tel: (86)-755-2357-9714 Email: Service@eu-test.com

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# 2 General Information

## 2.1 Applicant Information

| | |
|---|---|
| Applicant | SANWA LIMITED |
| Address | Room 1005, 10/F, Tower 2, Silvercord 30 Canton Road, Tsim Sha Tsui, Kowloon Hong Kong China |

## 2.2 Manufacturer Information

| | |
|---|---|
| Manufacturer | Dongguan Togran Electronics Technology Co., Ltd |
| Address | No., 110, Shidan Rd., the 3rd Industrial District, Juzhou, Shijie Town, Dongguan City, China |

## 2.3 Factory Information

| | |
|---|---|
| Factory | Dongguan Togran Electronics Technology Co., Ltd |
| Address | No., 110, Shidan Rd., the 3rd Industrial District, Juzhou, Shijie Town, Dongguan City, China |

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

| | |
|---|---|
| Product Name | Lefthand Ergonomics Wireless Mouse 2.4G&Bluetooth |
| Model No. Under Test | GMAERGWBT18WL |
| List Model No. | GMAERGWBT18BKL |
| Description of Model differentiation | All models are same with electrical parameters and internal circuit structure, but only differ in appearance color and model name.<br>(this information provided by the customer) |
| Rating(s) | Input: 5VDC, 0.3A<br>Battery Capacity: 3.7VDC, 300mAh, 1.11Wh |
| Product Type | ☐ Mobile<br>☒ Portable<br>☐ Fix Location |
| Test Sample No. | 8336EU012611W-1/2(Normal), 8336EU012611W-2/2(Engineering) |
| Hardware Version | A01 |
| Software Version | A01 |
| Remark | For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. |

## 2.5 Technical Information of E.U.T.

| | |
|---|---|
| Network and Wireless Connectivity | Bluetooth Low Energy (BLE): 2402-2480MHz<br>2.4G ISM Band (GFSK modulation): 2403-2480MHz |

The requirement for the following technical information of the EUT was tested in this report:

| | |
|---|---|
| Technology | Bluetooth |
| Operation Mode | BLE |
| Operating Frequency | 2402MHz to 2480MHz |
| Modulation Type | GFSK |
| Number of Channels | 40 |
| Antenna Type | PCB Antenna |
| Antenna Gain(Peak) | 0.81 dBi |
| Remark | The above information are declared by the applicant, EU-LAB is not responsible for the information accuracy provided by the applicant. |

All channels were listed on the following table:

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|---|---|---|---|
| 0 | 2402 | 10 | 2422 | 20 | 2442 | 30 | 2462 |
| 1 | 2404 | 11 | 2424 | 21 | 2444 | 31 | 2464 |
| 2 | 2406 | 12 | 2426 | 22 | 2446 | 32 | 2466 |
| 3 | 2408 | 13 | 2428 | 23 | 2448 | 33 | 2468 |
| 4 | 2410 | 14 | 2430 | 24 | 2450 | 34 | 2470 |
| 5 | 2412 | 15 | 2432 | 25 | 2452 | 35 | 2472 |
| 6 | 2414 | 16 | 2434 | 26 | 2454 | 36 | 2474 |
| 7 | 2416 | 17 | 2436 | 27 | 2456 | 37 | 2476 |
| 8 | 2418 | 18 | 2438 | 28 | 2458 | 38 | 2478 |
| 9 | 2420 | 19 | 2440 | 29 | 2460 | 39 | 2480 |

# 3 Test Summary

## 3.1 Test Standard

The tests were performed according to following standards:

**47 CFR Part 15.247:** Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

Remark:

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the emission/immunity should be checked to ensure compliance has been maintained.

## 3.2 Test Verdict

| Test Items | Standard | Method | Requirement | Results |
|---|---|---|---|---|
| Antenna requirement | 47 CFR Part 15.247 | --- | 47 CFR 15.203 | Pass |
| Conducted Emission at AC power line | 47 CFR Part 15.247 | ANSI C63.10-2020+Cor 1-2023 section 6.2 | 47 CFR 15.207(a) | Pass |
| 6dB Bandwidth | 47 CFR Part 15.247 | ANSI C63.10-2020+Cor 1-2023, section 11.8 KDB 558074 D01 15.247 Meas Guidance v05r02 | 47 CFR 15.247(a)(2) | Pass |
| Maximum Conducted Output Power | 47 CFR Part 15.247 | ANSI C63.10-2020+Cor 1-2023 section 11.9.1 KDB 558074 D01 15.247 Meas Guidance v05r02 | 47 CFR 15.247(b)(3) | Pass |
| Power Spectral Density | 47 CFR Part 15.247 | ANSI C63.10-2020+Cor 1-2023, section 11.10 KDB 558074 D01 15.247 Meas Guidance v05r02 | 47 CFR 15.247(e) | Pass |
| Emissions in non-restricted frequency bands | 47 CFR Part 15.247 | ANSI C63.10-2020+Cor 1-2023 section 11.11 KDB 558074 D01 15.247 Meas Guidance v05r02 | 47 CFR 15.247(d) | Pass |
| Band edge emissions (Radiated) | 47 CFR Part 15.247 | ANSI C63.10-2020+Cor 1-2023 section 6.10 KDB 558074 D01 15.247 Meas Guidance v05r02 | 47 CFR 15.247(d), 15.209, 15.205 | Pass |
| Emissions in frequency bands (below 1GHz) | 47 CFR Part 15.247 | ANSI C63.10-2020+Cor 1-2023 section 6.6.4 KDB 558074 D01 15.247 Meas Guidance v05r02 | 47 CFR 15.247(d), 15.209, 15.205 | Pass |

| | | | | |
|---|---|---|---|---|
| Emissions in frequency bands (above 1GHz) | 47 CFR Part 15.247 | ANSI C63.10-2020+Cor 1-2023 section 6.6.4 KDB 558074 D01 15.247 Meas Guidance v05r02 | 47 CFR 15.247(d), 15.209, 15.205 | Pass |
| Note:<br>(1) “N/A” denotes test is not applicable in this Test Report. | | | | |

## 3.3 Test Laboratory

| | |
|---|---|
| Test Laboratory | Shenzhen EU Testing Laboratory Limited |
| Address | 101, Building B1, Fuqiao Fourth Area, Qiaotou Community, Fuhai Subdistrict, Baoan District, Shenzhen, Guangdong, China |
| Designation Number | CN1368 |
| Test Firm Registration Number | 952583 |

# 4 Test Configuration

## 4.1 Test Environment

During the measurement, the normal environmental conditions were within the listed ranges:

| | | |
|---|---|---|
| Relative Humidity | 30% to 60% | |
| Atmospheric Pressure | 86 kPa to 106 kPa | |
| Temperature | NT (Normal Temperature) | +15℃ to +35℃ |
| Working Voltage of the EUT | NV (Normal Voltage) | 120VAC, 60Hz for adapter<br>3.7VDC battery inside |

## 4.2 Test Equipment

| **Conducted Emission at AC power line** | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model No** | **Serial No** | **Cal Date** | **Cal Due Date** |
| L.I.S.N. Artificial Mains Network | Rohde & Schwarz | ENV216 | EE-004 | 2026-01-07 | 2027-01-06 |
| EMI Test Receiver | Rohde & Schwarz | ESCI | EE-005 | 2026-01-07 | 2027-01-06 |
| Test Software | Farad | EZ-EMC | EE-014 | / | / |

| **6dB Bandwidth**<br>**Maximum Conducted Output Power**<br>**Power Spectral Density**<br>**Emissions in non-restricted frequency bands** | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model No** | **Serial No** | **Cal Date** | **Cal Due Date** |
| MXA Signal Analyzer | Agilent | N9020A | EE-011 | 2026-01-07 | 2027-01-06 |
| MXG RF Vector Signal Generator | Agilent | N5182A | EE-012 | 2026-01-07 | 2027-01-06 |
| MIMO Power Measurement Module | TSTPASS | TSPS 2023R | EE-016 | 2026-01-07 | 2027-01-06 |
| Wideband Radio Communication Tester | ROHDE & SCHWARZ | CMW500 | EE-402 | 2025-02-14 | 2026-02-13 |
| MXG RF Analog Signal Generator | Agilent | N5181A | EE-406 | 2025-02-14 | 2026-02-13 |
| Power Meter | Anritsu | ML2495A | EE-416 | 2025-02-14 | 2026-02-13 |
| Constant Temperature Humidity Chamber | Guangxin | GXP-401 | ES-002 | 2025-07-29 | 2026-07-28 |
| RF Test Software | TSTPASS | TS32893 V2.0 | EE-017 | / | / |

| Emissions in frequency bands (above 1GHz)<br>Band edge emissions (Radiated) | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model No** | **Serial No** | **Cal Date** | **Cal Due Date** |
| EMI Test Receiver | ROHDE & SCHWARZ | ESPI | EE-006 | 2026-01-07 | 2027-01-06 |
| Double Ridged Horn Antenna | A-INFOMW | LB-10180-NF | EE-008 | 2026-01-11 | 2029-01-10 |
| Pre-amplifier | Agilent | 8449B | EE-010 | 2026-01-07 | 2027-01-06 |
| MXG RF Vector Signal Generator | Agilent | N5182A | EE-012 | 2026-01-07 | 2027-01-06 |
| DRG Horn Antenna | SCHWARZBECK | BBHA 9170 | EE-410 | 2025-02-14 | 2026-02-13 |
| Pre-amplifier | SKET | LNPA-1840-50 | EE-411 | 2025-02-14 | 2026-02-13 |
| Test Software | Farad | EZ-EMC | EE-015 | / | / |

| Emissions in frequency bands (below 1GHz) | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model No** | **Serial No** | **Cal Date** | **Cal Due Date** |
| EMI Test Receiver | ROHDE & SCHWARZ | ESPI | EE-006 | 2026-01-07 | 2027-01-06 |
| Bilog Broadband Antenna | SCHWARZBECK | VULB 9163 | EE-007 | 2026-01-13 | 2029-01-12 |
| Loop Antenna | TESEQ | HLA6121 | EE-403 | 2025/02/14 | 2026/02/13 |
| Pre-amplifier | Agilent | 8447D | EE-009 | 2026-01-07 | 2027-01-06 |
| MXA Signal Analyzer | Agilent | N9020A | EE-011 | 2026-01-07 | 2027-01-06 |
| Test Software | Farad | EZ-EMC | EE-015 | / | / |


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## 4.3 Description of Support Unit

| No. | Title | Manufacturer | Model No. | Serial No. |
|---|---|---|---|---|
| 1 | Adapter | MI | A232-050200U-CN2 | EMC-PJ-004 |
| 2 | Lenovo Notebook | Lenovo | Xiaoxin Air 14ALC 2021 | EMC-PJ-052 |

## 4.4 Test Mode

| No. | Test Modes | Description |
|---|---|---|
| TM1 | BLE Mode-1M | Keep the EUT works in continuously transmitting mode with GFSK modulation with 1 Mbps rate at lowest, middle and highest channel. |
| TM2 | BLE Mode-2M | Keep the EUT works in continuously transmitting mode with GFSK modulation with 2 Mbps rate at lowest, middle and highest channel. |

## 4.5 Description of Calculation

### 4.5.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

**FS (dBuV/m) = RA (dBuV) + AF (dB/m) + CL (dB) – AG (dB)**

| | |
|---|---|
| Where FS = Field Strength | CL = Cable Attenuation Factor (Cable Loss) |
| RA = Reading Amplitude | AG = Amplifier Gain |
| AF = Antenna Factor | |

### 4.5.2 Disturbance Calculation

The AC mains conducted disturbance is calculated by adding the 10dB Pulse Limiter and Cable Factor and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

**CD (dBuV) = RA (dBuV) + PL (dB) + CL (dB)**

| | |
|---|---|
| Where CD = Conducted Disturbance | CL = Cable Attenuation Factor (Cable Loss) |
| RA = Reading Amplitude | PL = 10 dB Pulse Limiter Factor |

## 4.6 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

| Test Item | Measurement Uncertainty |
|---|---|
| Conducted Emission | 2.64 dB |
| Occupied Channel Bandwidth | 70 kHz |
| RF output power, conducted | 1.04 dB |
| Power Spectral Density, conducted | 0.91 dB |
| Unwanted Emissions, conducted | 2.72 dB |
| Radiated Emission (1GHz- 18GHz) | Ur = 3.50 dB (Horizontal)<br>Ur = 3.50 dB (Vertical) |
| Radiated Emission (9kHz- 30MHz) | Ur = 2.50 dB |
| Radiated Emission (30MHz- 1GHz) | Ur = 2.70 dB (Horizontal)<br>Ur = 2.70 dB (Vertical) |
| Radiated Emission (18GHz-40GHz) | Ur = 5.15 dB (Horizontal)<br>Ur = 5.24 dB (Vertical) |

## 4.7 Deviation from Standards

None

## 4.8 Abnormalities from Standard Condition

None


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# 5 Evaluation Results (Evaluation)

## 5.1 Antenna requirement

### 5.1.1 Test Specification

| | |
|---|---|
| Test Requirement: | Refer to 47 CFR Part 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. 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. |
| Test Method: | --- |

### 5.1.2 Test Data

**PASS.**

The Antenna Anti-Replacement as following method:

| Protected Method | Description |
|---|---|
| The antenna is embedded in the product. | An embedded-in antenna-design is used. |

| |
|---|
| The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit. |


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# 6 Radio Spectrum Matter Test Results (RF)

## 6.1 Conducted Emission at AC power line

### 6.1.1 Test Specification

| | |
|---|---|
| Test Requirement: | Refer to 47 CFR 15.207(a), Except as shown in paragraphs (b)and (c)of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). |
| Test Limit: | |

| Frequency of emission (MHz) | Conducted limit (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

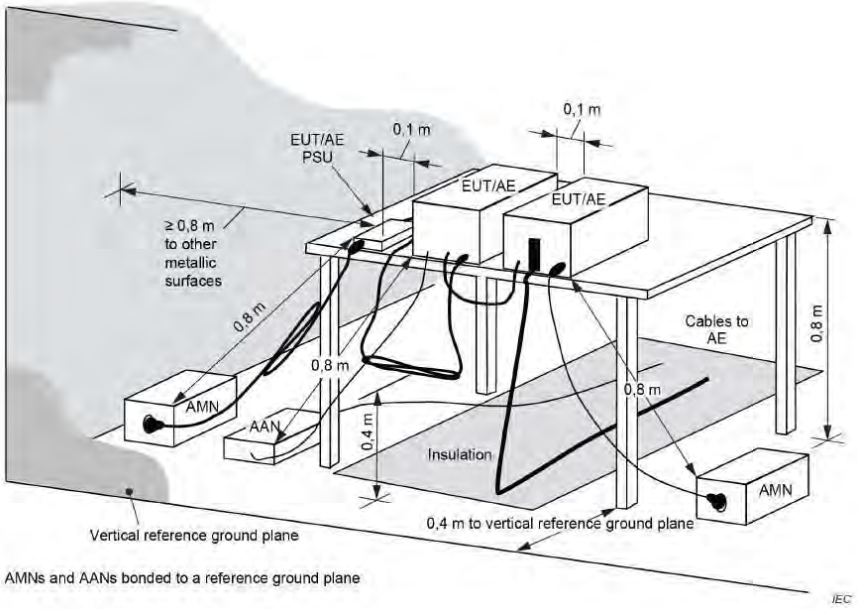
*Decreases with the logarithm of the frequency.

| | |
|---|---|
| Test Method: | ANSI C63.10-2020+Cor 1-2023 section 6.2 |
| Procedure: | Refer to ANSI C63.10-2020+Cor 1-2023 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices |

### 6.1.2 E.U.T. Operation

| | |
|---|---|
| Pre test mode: | TM1 |
| Final test mode: | TM1 |

### 6.1.3 Test Setup Diagram



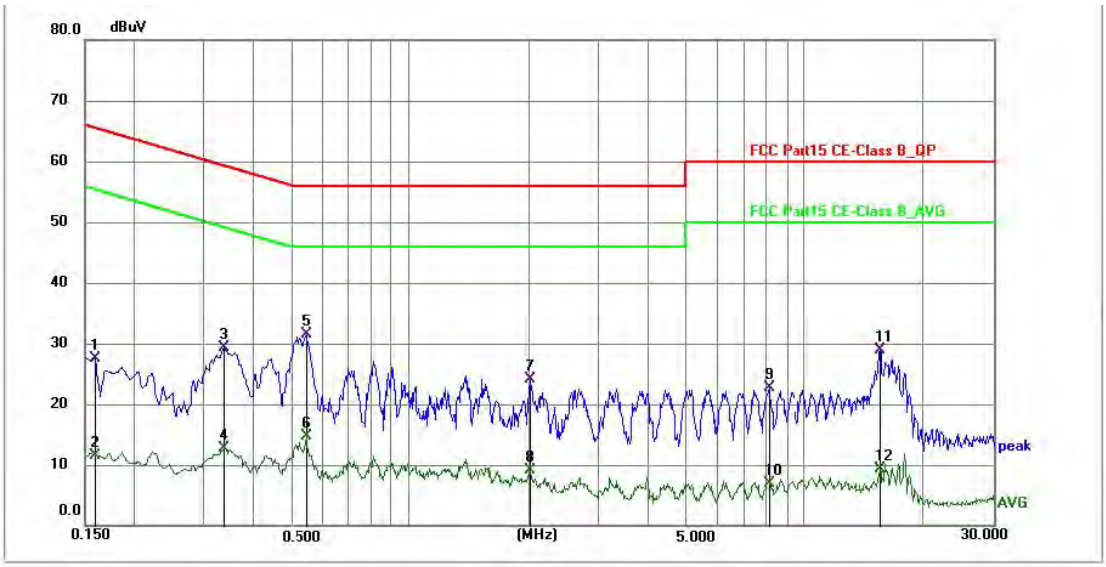

### 6.1.4 Test Data

**PASS.**

Only the worst case data was showed in the report, please to see the following pages.

**Conducted Emission at AC power line Test Data**

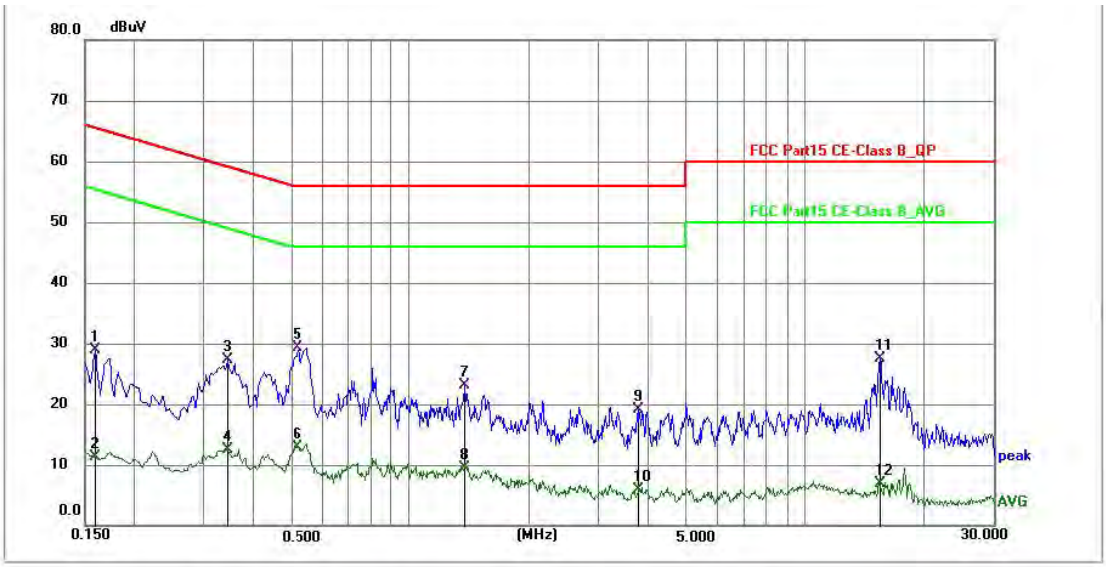
TM1 / Line: Line / Band: 2400-2483.5 MHz / BW: 1 / CH: L




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.1590 | 17.52 | 9.98 | 27.50 | 65.52 | -38.02 | QP | P | |
| 2 | 0.1590 | 1.57 | 9.98 | 11.55 | 55.52 | -43.97 | AVG | P | |
| 3 | 0.3345 | 19.25 | 10.02 | 29.27 | 59.34 | -30.07 | QP | P | |
| 4 | 0.3345 | 2.61 | 10.02 | 12.63 | 49.34 | -36.71 | AVG | P | |
| 5 * | 0.5460 | 21.37 | 10.07 | 31.44 | 56.00 | -24.56 | QP | P | |
| 6 | 0.5460 | 4.58 | 10.07 | 14.65 | 46.00 | -31.35 | AVG | P | |
| 7 | 2.0220 | 13.97 | 10.07 | 24.04 | 56.00 | -31.96 | QP | P | |
| 8 | 2.0220 | -0.90 | 10.07 | 9.17 | 46.00 | -36.83 | AVG | P | |
| 9 | 8.1015 | 12.77 | 10.02 | 22.79 | 60.00 | -37.21 | QP | P | |
| 10 | 8.1015 | -3.16 | 10.02 | 6.86 | 50.00 | -43.14 | AVG | P | |
| 11 | 15.4815 | 18.95 | 10.00 | 28.95 | 60.00 | -31.05 | QP | P | |
| 12 | 15.4815 | -0.70 | 10.00 | 9.30 | 50.00 | -40.70 | AVG | P | |

**Conducted Emission at AC power line Test Data**

TM1 / Line: Neutral / Band: 2400-2483.5 MHz / BW: 1 / CH: L




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.1590 | 18.89 | 9.96 | 28.85 | 65.52 | -36.67 | QP | P | |
| 2 | 0.1590 | 1.33 | 9.96 | 11.29 | 55.52 | -44.23 | AVG | P | |
| 3 | 0.3435 | 17.34 | 10.00 | 27.34 | 59.12 | -31.78 | QP | P | |
| 4 | 0.3435 | 2.58 | 10.00 | 12.58 | 49.12 | -36.54 | AVG | P | |
| 5 * | 0.5190 | 19.31 | 10.04 | 29.35 | 56.00 | -26.65 | QP | P | |
| 6 | 0.5190 | 2.91 | 10.04 | 12.95 | 46.00 | -33.05 | AVG | P | |
| 7 | 1.3785 | 12.99 | 10.03 | 23.02 | 56.00 | -32.98 | QP | P | |
| 8 | 1.3785 | -0.58 | 10.03 | 9.45 | 46.00 | -36.55 | AVG | P | |
| 9 | 3.7905 | 9.12 | 10.05 | 19.17 | 56.00 | -36.83 | QP | P | |
| 10 | 3.7905 | -4.21 | 10.05 | 5.84 | 46.00 | -40.16 | AVG | P | |
| 11 | 15.4995 | 17.56 | 9.98 | 27.54 | 60.00 | -32.46 | QP | P | |
| 12 | 15.4995 | -3.11 | 9.98 | 6.87 | 50.00 | -43.13 | AVG | P | |

## 6.2 6dB Bandwidth

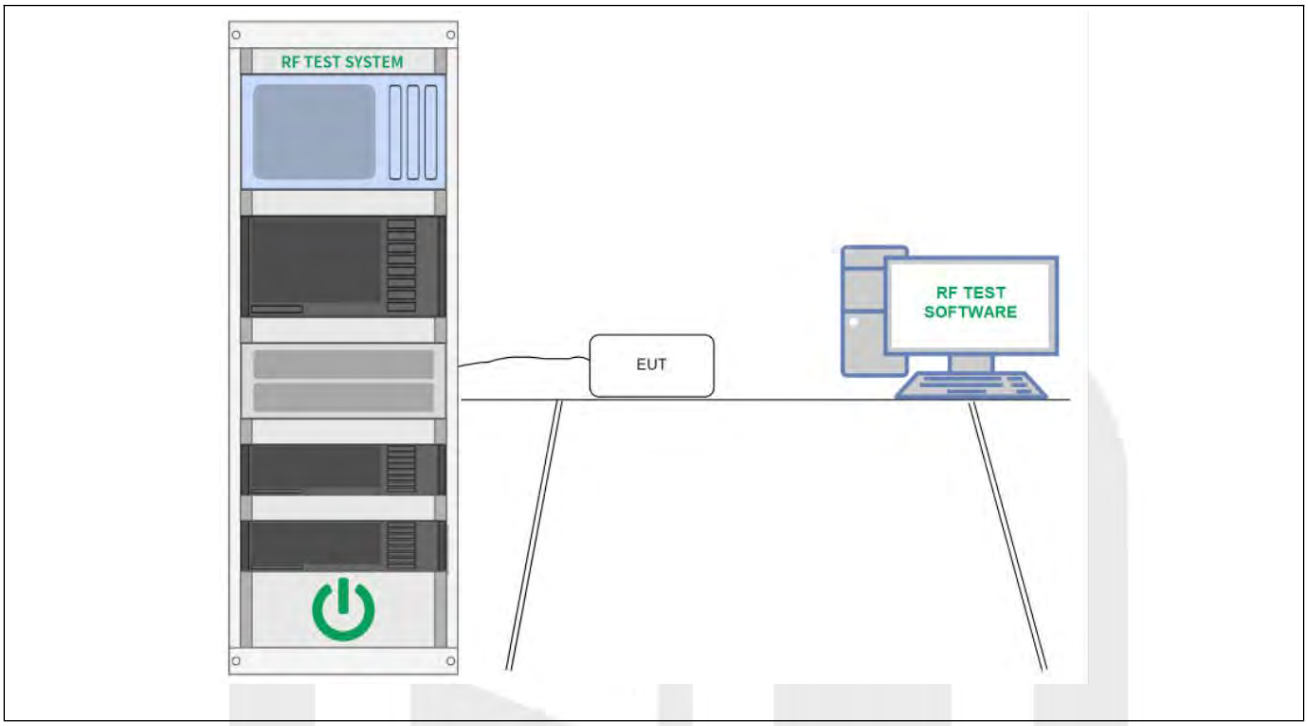
### 6.2.1 Test Specification

| | |
|---|---|
| Test Requirement: | 47 CFR 15.247(a)(2) |
| Test Limit: | Refer to 47 CFR 15.247(a)(2), Systems using digital modulation techniques may operate in the 902-928 MHz, and 2400-2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz. |
| Test Method: | ANSI C63.10-2020+Cor 1-2023, section 11.8<br>KDB 558074 D01 15.247 Meas Guidance v05r02 |
| Procedure: | 11.8.1 Option 1<br>The steps for the first option are as follows:<br>a) Set RBW = shall be in the range of 1% to 5% of the OBW but not less than 100 kHz.<br>b) Set the VBW ≥ [3 × RBW].<br>c) Detector = peak.<br>d) Trace mode = max-hold.<br>e) Sweep = No faster than coupled (auto) time.<br>f) Allow the trace to stabilize.<br>g) Measure the maximum width of the emission by placing 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 "−6 dB down amplitude". If a marker is below this "−6 dB down amplitude" value, then it shall be as close as possible to this value.<br><br>11.8.2 Option 2<br>The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described in 11.8.1 (i.e., RBW = 100 kHz, VBW ≥ 3 × RBW, and peak detector with maximum hold) is implemented by the instrumentation function.<br>When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB. |

### 6.2.2 E.U.T. Operation

| | |
|---|---|
| Pre test mode: | TM1, TM2 |
| Final test mode: | TM1, TM2 |

### 6.2.3 Test Setup Diagram




### 6.2.4 Test Data

**PASS.**

Please refer to Annex D for details.

## 6.3 Maximum Conducted Output Power

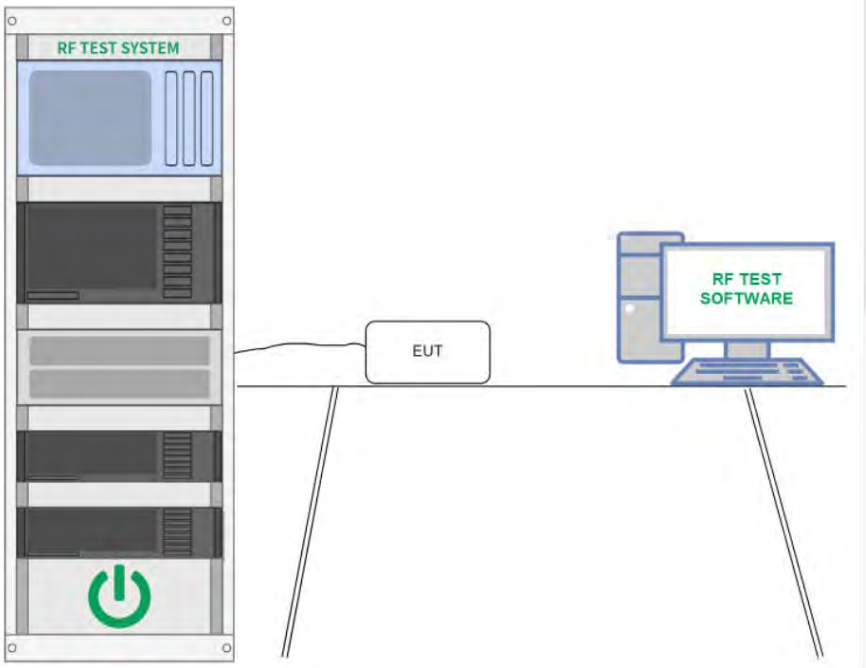
### 6.3.1 Test Specification

| | |
|---|---|
| Test Requirement: | 47 CFR 15.247(b)(3) |
| Test Limit: | Refer to 47 CFR 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. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode. |
| Test Method: | ANSI C63.10-2020+Cor 1-2023 section 11.9.1<br>KDB 558074 D01 15.247 Meas Guidance v05r02 |
| Procedure: | ANSI C63.10-2020+Cor 1-2023, section 11.9.1 Maximum peak conducted output power |

### 6.3.2 E.U.T. Operation

| | |
|---|---|
| Pre test mode: | TM1, TM2 |
| Final test mode: | TM1, TM2 |

### 6.3.3 Test Setup Diagram




### 6.3.4 Test Data

**PASS.**

Please refer to Annex D for details.

## 6.4 Power Spectral Density

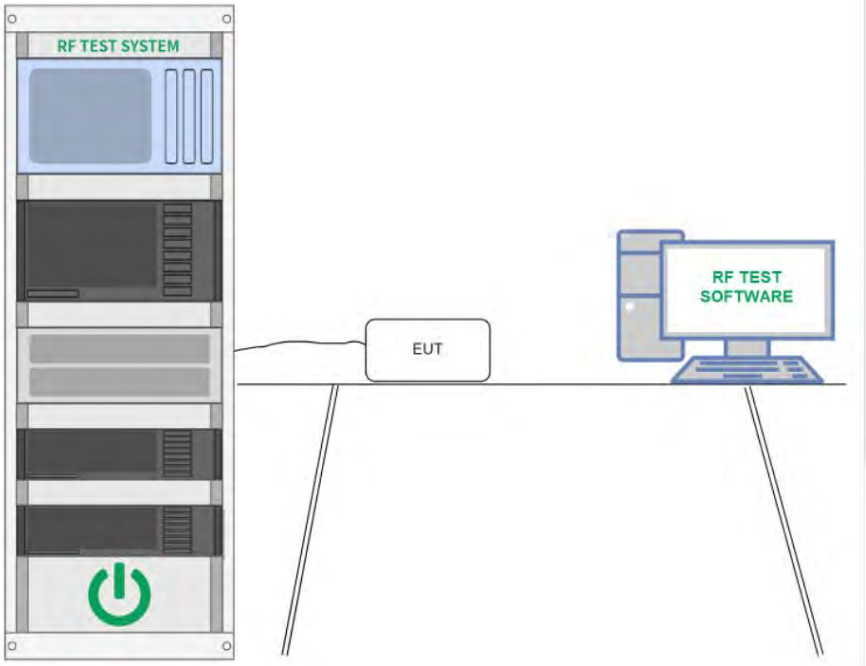
### 6.4.1 Test Specification

| | |
|---|---|
| Test Requirement: | 47 CFR 15.247(e) |
| Test Limit: | Refer to 47 CFR 15.247(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. 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+Cor 1-2023, section 11.10<br>KDB 558074 D01 15.247 Meas Guidance v05r02 |
| Procedure: | ANSI C63.10-2020+Cor 1-2023, section 11.10, Maximum power spectral density level in the fundamental emission |

### 6.4.2 E.U.T. Operation

| | |
|---|---|
| Pre test mode: | TM1, TM2 |
| Final test mode: | TM1, TM2 |

### 6.4.3 Test Setup Diagram




### 6.4.4 Test Data

**PASS.**

Please refer to Annex D for details.

## 6.5 Emissions in non-restricted frequency bands

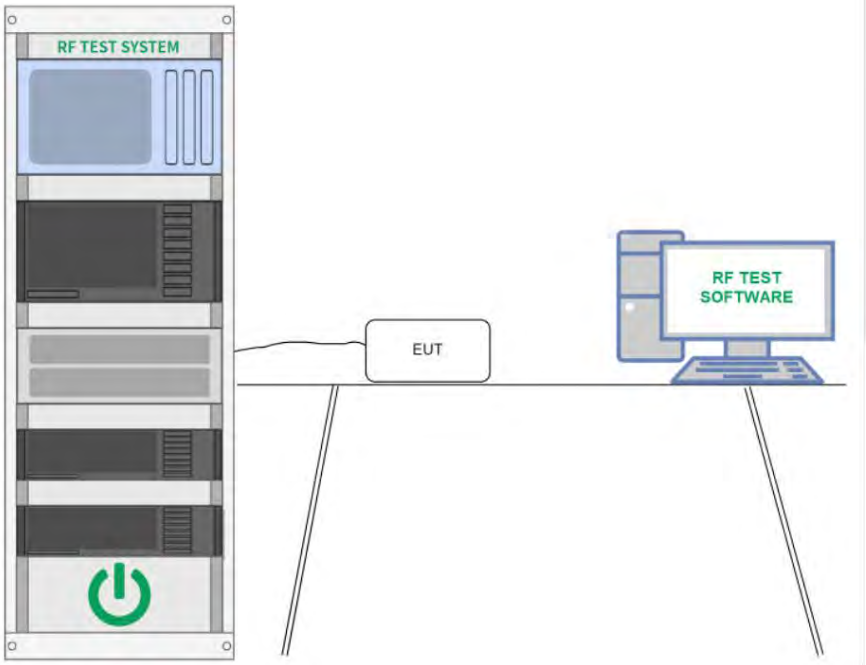
### 6.5.1 Test Specification

| | |
|---|---|
| Test Requirement: | 47 CFR 15.247(d) |
| Test Limit: | Refer to 47 CFR 15.247(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. 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 § 15.209(a) is not required. |
| Test Method: | ANSI C63.10-2020+Cor 1-2023 section 11.11<br>KDB 558074 D01 15.247 Meas Guidance v05r02 |
| Procedure: | ANSI C63.10-2020+Cor 1-2023<br>Section 11.11.1, Section 11.11.2, Section 11.11.3 |

### 6.5.2 E.U.T. Operation

| | |
|---|---|
| Pre test mode: | TM1, TM2 |
| Final test mode: | TM1, TM2 |

### 6.5.3 Test Setup Diagram




### 6.5.4 Test Data

**PASS.**

Please refer to Annex D for details.

## 6.6 Band edge emissions (Radiated)

### 6.6.1 Test Specification

| | |
|---|---|
| Test Requirement: | Refer to 47 CFR 15.247(d), In addition, 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)). |
| Test Limit: | |

| Frequency (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|---|---|---|
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30.0 | 30 | 30 |
| 30-88 | 100 ** | 3 |
| 88-216 | 150 ** | 3 |
| 216-960 | 200 ** | 3 |
| Above 960 | 500 | 3 |

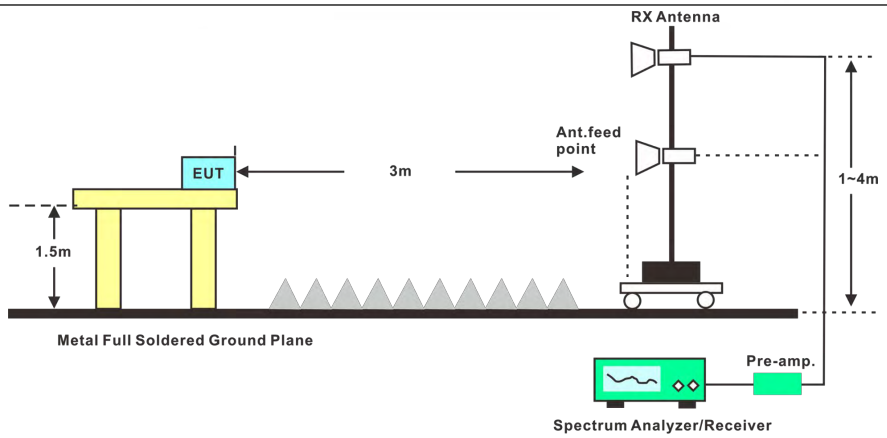
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

| | |
|---|---|
| Test Method: | ANSI C63.10-2020+Cor 1-2023 section 6.10<br>KDB 558074 D01 15.247 Meas Guidance v05r02 |
| Procedure: | ANSI C63.10-2020+Cor 1-2023 section 6.10.5.2 |

### 6.6.2 E.U.T. Operation

| | |
|---|---|
| Pre test mode: | TM1, TM2 |
| Final test mode: | TM1, TM2 |

### 6.6.3 Test Setup Diagram



### 6.6.4 Test Data

**PASS.**

Please refer to the following pages.


Address: 101, Building B1, Fuqiao Fourth Area, Qiaotou Community, Fuhai Subdistrict, Baoan District, Shenzhen, Guangdong, China
Website: www.eu-test.com
Tel: (86)-755-2357-9714 Email: Service@eu-test.com

**Band Edge Emissions (Restricted frequency bands):**

| Test Mode: GFSK-1M | | | | | CH Low: 2402 MHz | | | |
|---|---|---|---|---|---|---|---|---|
| Pol. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Emission level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector Type | Result |
| H | 2310.00 | 43.38 | -2.81 | 40.57 | 74.00 | -33.43 | PK | PASS |
| H | 2390.00 | 45.60 | -2.69 | 42.91 | 74.00 | -31.09 | PK | PASS |
| H | **2400.00 | 63.14 | -2.68 | 60.46 | 74.00 | -13.54 | PK | PASS |
| V | 2310.00 | 42.94 | -2.81 | 40.13 | 74.00 | -33.87 | PK | PASS |
| V | 2390.00 | 47.12 | -2.69 | 44.43 | 74.00 | -29.57 | PK | PASS |
| V | **2400.00 | 63.22 | -2.68 | 60.54 | 74.00 | -13.46 | PK | PASS |
| H | 2310.00 | 31.85 | -2.81 | 29.04 | 54.00 | -24.96 | AV | PASS |
| H | 2390.00 | 35.85 | -2.69 | 33.16 | 54.00 | -20.84 | AV | PASS |
| H | **2400.00 | 46.68 | -2.68 | 44.00 | 54.00 | -10.00 | AV | PASS |
| V | 2310.00 | 33.74 | -2.81 | 30.93 | 54.00 | -23.07 | AV | PASS |
| V | 2390.00 | 36.21 | -2.69 | 33.52 | 54.00 | -20.48 | AV | PASS |
| V | **2400.00 | 46.67 | -2.68 | 43.99 | 54.00 | -10.01 | AV | PASS |

| Test Mode: GFSK-1M | | | | | CH High: 2480 MHz | | | |
|---|---|---|---|---|---|---|---|---|
| Pol. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Emission level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector Type | Result |
| H | **2483.50 | 47.32 | -2.56 | 44.76 | 74.00 | -29.24 | PK | PASS |
| H | 2500.00 | 48.75 | -2.54 | 46.21 | 74.00 | -27.79 | PK | PASS |
| V | **2483.50 | 47.97 | -2.56 | 45.41 | 74.00 | -28.59 | PK | PASS |
| V | 2500.00 | 51.70 | -2.54 | 49.16 | 74.00 | -24.84 | PK | PASS |
| H | **2483.50 | 35.40 | -2.56 | 32.84 | 54.00 | -21.16 | AV | PASS |
| H | 2500.00 | 39.56 | -2.54 | 37.02 | 54.00 | -16.98 | AV | PASS |
| V | **2483.50 | 35.76 | -2.56 | 33.20 | 54.00 | -20.80 | AV | PASS |
| V | 2500.00 | 38.31 | -2.54 | 35.77 | 54.00 | -18.23 | AV | PASS |

Remark:

1. Emission Level = Reading + Factor, Margin= Emission Level – Limit.

**Band Edge Emissions (Restricted frequency bands):**

| Test Mode: GFSK-2M | | | | | CH Low: 2402 MHz | | | |
|---|---|---|---|---|---|---|---|---|
| Pol. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Emission level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector Type | Result |
| H | 2310.00 | 44.08 | -2.81 | 41.27 | 74.00 | -32.73 | PK | PASS |
| H | 2390.00 | 47.65 | -2.69 | 44.96 | 74.00 | -29.04 | PK | PASS |
| H | **2400.00 | 63.20 | -2.68 | 60.52 | 74.00 | -13.48 | PK | PASS |
| V | 2310.00 | 45.47 | -2.81 | 42.66 | 74.00 | -31.34 | PK | PASS |
| V | 2390.00 | 45.76 | -2.69 | 43.07 | 74.00 | -30.93 | PK | PASS |
| V | **2400.00 | 60.75 | -2.68 | 58.07 | 74.00 | -15.93 | PK | PASS |
| H | 2310.00 | 31.10 | -2.81 | 28.29 | 54.00 | -25.71 | AV | PASS |
| H | 2390.00 | 36.97 | -2.69 | 34.28 | 54.00 | -19.72 | AV | PASS |
| H | **2400.00 | 46.82 | -2.68 | 44.14 | 54.00 | -9.86 | AV | PASS |
| V | 2310.00 | 31.87 | -2.81 | 29.06 | 54.00 | -24.94 | AV | PASS |
| V | 2390.00 | 35.03 | -2.69 | 32.34 | 54.00 | -21.66 | AV | PASS |
| V | **2400.00 | 47.79 | -2.68 | 45.11 | 54.00 | -8.89 | AV | PASS |

| Test Mode: GFSK-2M | | | | | CH High: 2480 MHz | | | |
|---|---|---|---|---|---|---|---|---|
| Pol. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Emission level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector Type | Result |
| H | **2483.50 | 48.84 | -2.56 | 46.28 | 74.00 | -27.72 | PK | PASS |
| H | 2500.00 | 50.01 | -2.54 | 47.47 | 74.00 | -26.53 | PK | PASS |
| V | **2483.50 | 46.07 | -2.56 | 43.51 | 74.00 | -30.49 | PK | PASS |
| V | 2500.00 | 48.95 | -2.54 | 46.41 | 74.00 | -27.59 | PK | PASS |
| H | **2483.50 | 37.53 | -2.56 | 34.97 | 54.00 | -19.03 | AV | PASS |
| H | 2500.00 | 38.65 | -2.54 | 36.11 | 54.00 | -17.89 | AV | PASS |
| V | **2483.50 | 37.39 | -2.56 | 34.83 | 54.00 | -19.17 | AV | PASS |
| V | 2500.00 | 39.54 | -2.54 | 37.00 | 54.00 | -17.00 | AV | PASS |

Remark:
2. Emission Level = Reading + Factor, Margin= Emission Level – Limit.

## 6.7 Emissions in frequency bands (below 1GHz)

### 6.7.1 Test Specification

| | |
|---|---|
| Test Requirement: | Refer to 47 CFR 15.247(d), In addition, 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)). |
| Test Limit: | |

| Frequency (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|---|---|---|
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30.0 | 30 | 30 |
| 30-88 | 100 ** | 3 |
| 88-216 | 150 ** | 3 |
| 216-960 | 200 ** | 3 |
| Above 960 | 500 | 3 |

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

| | |
|---|---|
| Test Method: | ANSI C63.10-2020+Cor 1-2023 section 6.6.4<br>KDB 558074 D01 15.247 Meas Guidance v05r02 |
| Procedure: | ANSI C63.10-2020+Cor 1-2023 section 6.6.4 |

### 6.7.2 E.U.T. Operation

| | |
|---|---|
| Pre test mode: | TM1, TM2 |
| Final test mode: | TM1, TM2 |

### 6.7.3 Test Setup Diagram

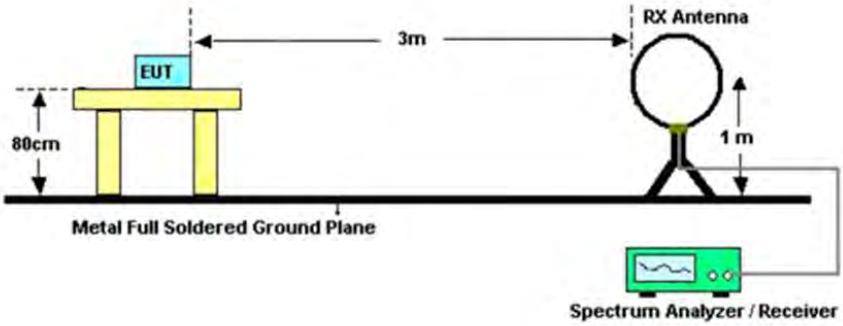



Figure 1. Below-30MHz

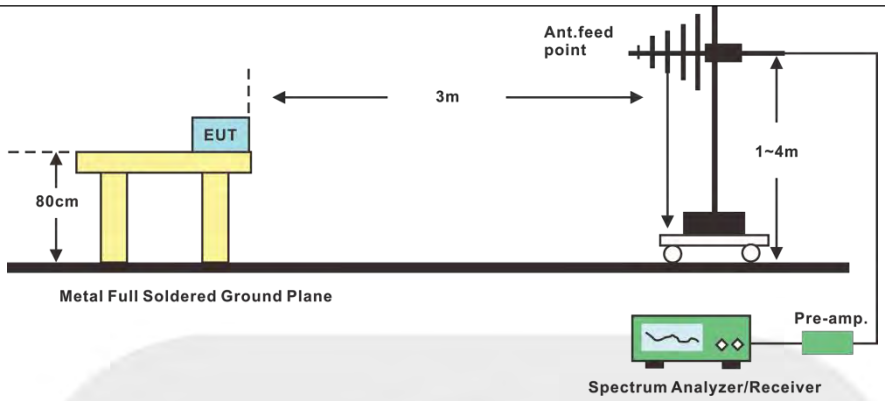



Figure 2. 30MHz to-1GHz-

### 6.7.4 Test Data

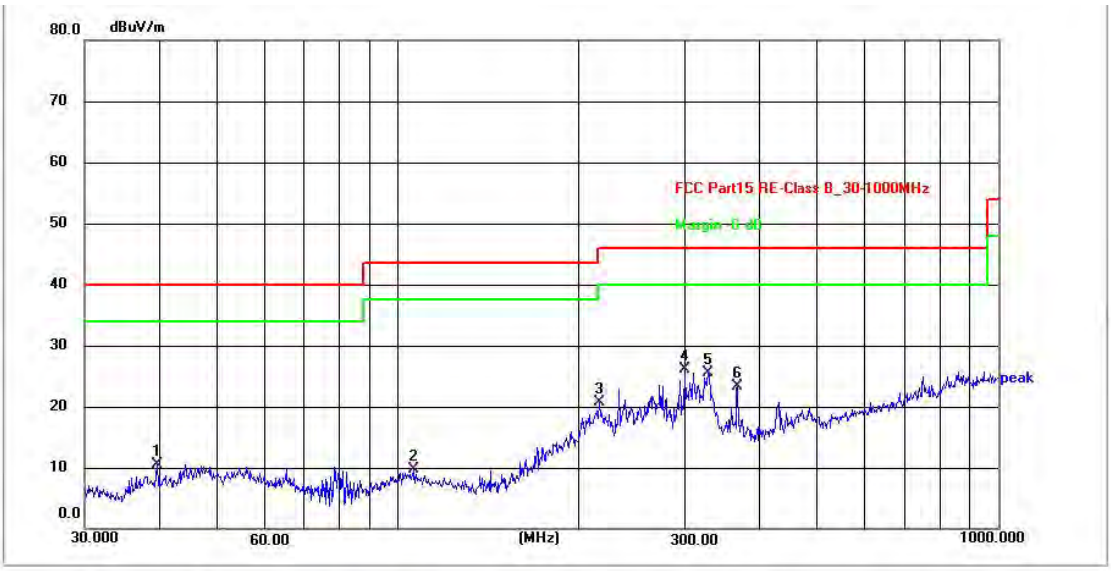
**PASS.**

The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.

During the test, for 30MHz to 1000MHz, pre-scan all modulations, and found the BLE 1M modulation Low channel which is the worst case, only the worst case is recorded in the report.

**Emissions in frequency bands (below 1GHz) Test Data**

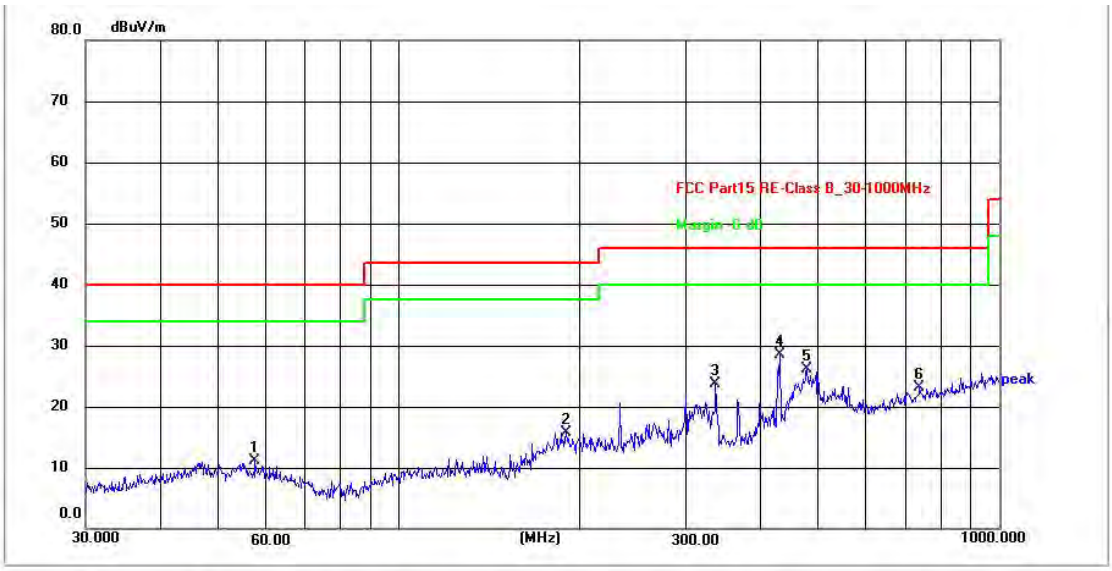
TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: L




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 39.5757 | 29.16 | -18.56 | 10.60 | 40.00 | -29.40 | QP | P | |
| 2 | 106.3850 | 28.64 | -18.99 | 9.65 | 43.50 | -33.85 | QP | P | |
| 3 | 216.0240 | 38.55 | -17.81 | 20.74 | 46.00 | -25.26 | QP | P | |
| 4 * | 299.3158 | 41.64 | -15.62 | 26.02 | 46.00 | -19.98 | QP | P | |
| 5 | 327.8873 | 40.32 | -14.80 | 25.52 | 46.00 | -20.48 | QP | P | |
| 6 | 366.8231 | 37.04 | -13.71 | 23.33 | 46.00 | -22.67 | QP | P | |

**Emissions in frequency bands (below 1GHz) Test Data**

TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: L




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 57.3923 | 29.14 | -18.12 | 11.02 | 40.00 | -28.98 | QP | P | |
| 2 | 189.7385 | 34.70 | -19.01 | 15.69 | 43.50 | -27.81 | QP | P | |
| 3 | 336.0351 | 38.29 | -14.57 | 23.72 | 46.00 | -22.28 | QP | P | |
| 4 * | 429.5228 | 40.72 | -12.15 | 28.57 | 46.00 | -17.43 | QP | P | |
| 5 | 478.8455 | 37.15 | -11.02 | 26.13 | 46.00 | -19.87 | QP | P | |
| 6 | 737.0712 | 29.68 | -6.49 | 23.19 | 46.00 | -22.81 | QP | P | |

## 6.8 Emissions in frequency bands (above 1GHz)

### 6.8.1 Test Specification

| | |
|---|---|
| Test Requirement: | Refer to 47 CFR 15.247(d), in addition, 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)). |
| Test Limit: | |

| Frequency (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|---|---|---|
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30.0 | 30 | 30 |
| 30-88 | 100 ** | 3 |
| 88-216 | 150 ** | 3 |
| 216-960 | 200 ** | 3 |
| Above 960 | 500 | 3 |

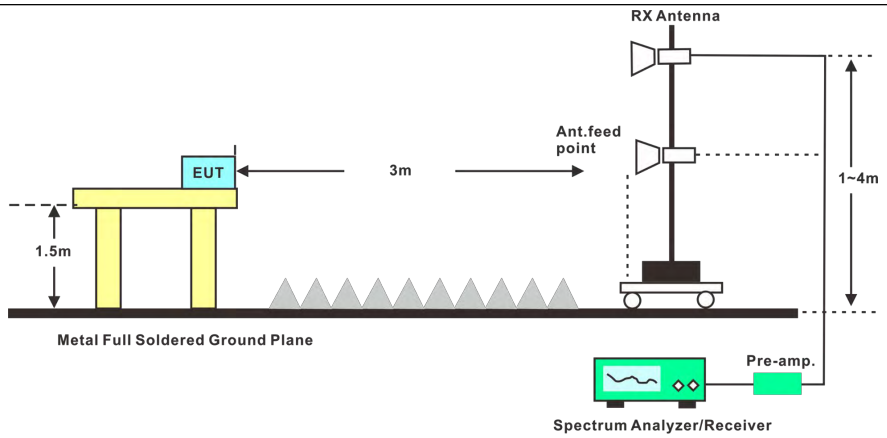
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

| | |
|---|---|
| Test Method: | ANSI C63.10-2020+Cor 1-2023 section 6.6.4<br>KDB 558074 D01 15.247 Meas Guidance v05r02 |
| Procedure: | ANSI C63.10-2020+Cor 1-2023 section 6.6.4 |

### 6.8.2 E.U.T. Operation

| | |
|---|---|
| Pre test mode: | TM1, TM2 |
| Final test mode: | TM1, TM2 |

### 6.8.3 Test Setup Diagram



### 6.8.4 Test Data

**PASS.**

During the test, for 1GHz- 25GHz, pre-scan all modulations, and found the BLE 1M modulation which is the worst case, only the worst case is recorded in the report.


Address: 101, Building B1, Fuqiao Fourth Area, Qiaotou Community, Fuhai Subdistrict, Baoan District, Shenzhen, Guangdong, China
Website: www.eu-test.com
Tel: (86)-755-2357-9714 Email: Service@eu-test.com

**Radiated Spurious Emission (1GHz-25GHz)**

| Test Mode: GFSK | | | | | CH Low: 2402 MHz | | | |
|---|---|---|---|---|---|---|---|---|
| Pol. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Emission level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector Type | Result |
| V | 4804.67 | 41.34 | 4.68 | 46.02 | 74.00 | -27.99 | PK | PASS |
| V | 7206.98 | 35.63 | 9.84 | 45.47 | 74.00 | -28.54 | PK | PASS |
| V | 9608.78 | 29.08 | 13.17 | 42.25 | 74.00 | -31.75 | PK | PASS |
| V | 12010.74 | * | * | * | 74.00 | * | PK | PASS |
| V | 14412.35 | * | * | * | 74.00 | * | PK | PASS |
| V | 16814.71 | * | * | * | 74.00 | * | PK | PASS |
| H | 4804.08 | 40.84 | 4.68 | 45.52 | 74.00 | -28.48 | PK | PASS |
| H | 7206.18 | 33.06 | 9.84 | 42.90 | 74.00 | -31.10 | PK | PASS |
| H | 9608.42 | 28.76 | 13.17 | 41.93 | 74.00 | -32.07 | PK | PASS |
| H | 12010.67 | * | * | * | 74.00 | * | PK | PASS |
| H | 14412.18 | * | * | * | 74.00 | * | PK | PASS |
| H | 16814.21 | * | * | * | 74.00 | * | PK | PASS |
| V | 4804.75 | 32.38 | 4.68 | 37.06 | 54.00 | -16.95 | AV | PASS |
| V | 7206.28 | 24.77 | 9.84 | 34.61 | 54.00 | -19.40 | AV | PASS |
| V | 9608.04 | 19.89 | 13.17 | 33.06 | 54.00 | -20.94 | AV | PASS |
| V | 12010.55 | * | * | * | 54.00 | * | AV | PASS |
| V | 14412.56 | * | * | * | 54.00 | * | AV | PASS |
| V | 16814.91 | * | * | * | 54.00 | * | AV | PASS |
| H | 4804.57 | 31.50 | 4.68 | 36.18 | 54.00 | -17.83 | AV | PASS |
| H | 7206.18 | 23.26 | 9.84 | 33.10 | 54.00 | -20.90 | AV | PASS |
| H | 9608.42 | 17.09 | 13.17 | 30.26 | 54.00 | -23.74 | AV | PASS |
| H | 12010.67 | * | * | * | 54.00 | * | AV | PASS |
| H | 14412.18 | * | * | * | 54.00 | * | AV | PASS |
| H | 16814.21 | * | * | * | 54.00 | * | AV | PASS |

Remark:

1. Emission Level = Reading + Factor, Margin= Emission Level – Limit.
2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

**Radiated Spurious Emission (1GHz-25GHz)**

| Test Mode: GFSK | | | | | CH Middle: 2440 MHz | | | |
|---|---|---|---|---|---|---|---|---|
| Pol. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Emission level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector Type | Result |
| V | 4880.19 | 41.11 | 4.92 | 46.03 | 74.00 | -27.97 | PK | PASS |
| V | 7320.44 | 35.68 | 9.83 | 45.51 | 74.00 | -28.49 | PK | PASS |
| V | 9760.40 | 28.43 | 13.22 | 41.65 | 74.00 | -32.36 | PK | PASS |
| V | 12200.14 | * | * | * | 74.00 | * | PK | PASS |
| V | 14640.66 | * | * | * | 74.00 | * | PK | PASS |
| V | 17080.21 | * | * | * | 74.00 | * | PK | PASS |
| H | 4880.20 | 41.27 | 4.92 | 46.19 | 74.00 | -27.81 | PK | PASS |
| H | 7320.23 | 35.31 | 9.83 | 45.14 | 74.00 | -28.87 | PK | PASS |
| H | 9760.52 | 28.90 | 13.22 | 42.12 | 74.00 | -31.88 | PK | PASS |
| H | 12200.72 | * | * | * | 74.00 | * | PK | PASS |
| H | 14640.96 | * | * | * | 74.00 | * | PK | PASS |
| H | 17080.86 | * | * | * | 74.00 | * | PK | PASS |
| V | 4880.83 | 32.42 | 4.92 | 37.34 | 54.00 | -16.66 | AV | PASS |
| V | 7320.98 | 24.06 | 9.83 | 33.89 | 54.00 | -20.11 | AV | PASS |
| V | 9760.22 | 18.82 | 13.22 | 32.04 | 54.00 | -21.96 | AV | PASS |
| V | 12200.89 | * | * | * | 54.00 | * | AV | PASS |
| V | 14640.09 | * | * | * | 54.00 | * | AV | PASS |
| V | 17080.81 | * | * | * | 54.00 | * | AV | PASS |
| H | 4880.20 | 31.24 | 4.92 | 36.16 | 54.00 | -17.84 | AV | PASS |
| H | 7320.23 | 23.97 | 9.83 | 33.80 | 54.00 | -20.21 | AV | PASS |
| H | 9760.52 | 18.97 | 13.22 | 32.19 | 54.00 | -21.81 | AV | PASS |
| H | 12200.72 | * | * | * | 54.00 | * | AV | PASS |
| H | 14640.96 | * | * | * | 54.00 | * | AV | PASS |
| H | 17080.86 | * | * | * | 54.00 | * | AV | PASS |

Remark:

1. Emission Level = Reading + Factor, Margin= Emission Level – Limit.
2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

**Radiated Spurious Emission (1GHz-25GHz)**

| Test Mode: GFSK | | | | | CH High: 2480 MHz | | | |
|---|---|---|---|---|---|---|---|---|
| Pol. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Emission level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector Type | Result |
| V | 4960.20 | 40.28 | 4.92 | 45.20 | 74.00 | -28.81 | PK | PASS |
| V | 7440.01 | 33.03 | 9.83 | 42.86 | 74.00 | -31.15 | PK | PASS |
| V | 9920.52 | 28.65 | 13.22 | 41.87 | 74.00 | -32.13 | PK | PASS |
| V | 12400.69 | * | * | * | 74.00 | * | PK | PASS |
| V | 14880.76 | * | * | * | 74.00 | * | PK | PASS |
| V | 17360.43 | * | * | * | 74.00 | * | PK | PASS |
| H | 4960.71 | 42.97 | 4.92 | 47.89 | 74.00 | -26.11 | PK | PASS |
| H | 7440.85 | 33.11 | 9.83 | 42.94 | 74.00 | -31.07 | PK | PASS |
| H | 9920.96 | 29.24 | 13.22 | 42.46 | 74.00 | -31.55 | PK | PASS |
| H | 12400.83 | * | * | * | 74.00 | * | PK | PASS |
| H | 14880.10 | * | * | * | 74.00 | * | PK | PASS |
| H | 17360.11 | * | * | * | 74.00 | * | PK | PASS |
| V | 4958.23 | 31.86 | 4.92 | 36.78 | 54.00 | -17.23 | AV | PASS |
| V | 7437.85 | 22.95 | 9.83 | 32.78 | 54.00 | -21.22 | AV | PASS |
| V | 9916.38 | 18.96 | 13.22 | 32.18 | 54.00 | -21.82 | AV | PASS |
| V | 12395.92 | * | * | * | 54.00 | * | AV | PASS |
| V | 14874.80 | * | * | * | 54.00 | * | AV | PASS |
| V | 17353.68 | * | * | * | 54.00 | * | AV | PASS |
| H | 4960.71 | 32.12 | 4.92 | 37.04 | 54.00 | -16.96 | AV | PASS |
| H | 7440.85 | 24.77 | 9.83 | 34.60 | 54.00 | -19.41 | AV | PASS |
| H | 9920.96 | 19.18 | 13.22 | 32.40 | 54.00 | -21.60 | AV | PASS |
| H | 12400.83 | * | * | * | 54.00 | * | AV | PASS |
| H | 14880.10 | * | * | * | 54.00 | * | AV | PASS |
| H | 17360.11 | * | * | * | 54.00 | * | AV | PASS |

Remark:

1. Emission Level = Reading + Factor, Margin= Emission Level – Limit.
2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

# ANNEX A TEST SETUP PHOTOS

Please refer to the document "8336EU012611W1-ANNEX A.PDF"

# ANNEX B EXTERNAL PHOTOS

Please refer to the document "8336EU012611W1-ANNEX B.PDF"

# ANNEX C INTERNAL PHOTOS

Please refer to the document "8336EU012611W1-ANNEX C.PDF"

# ANNEX D TEST DATA

1. Duty Cycle

1.1 Test Result

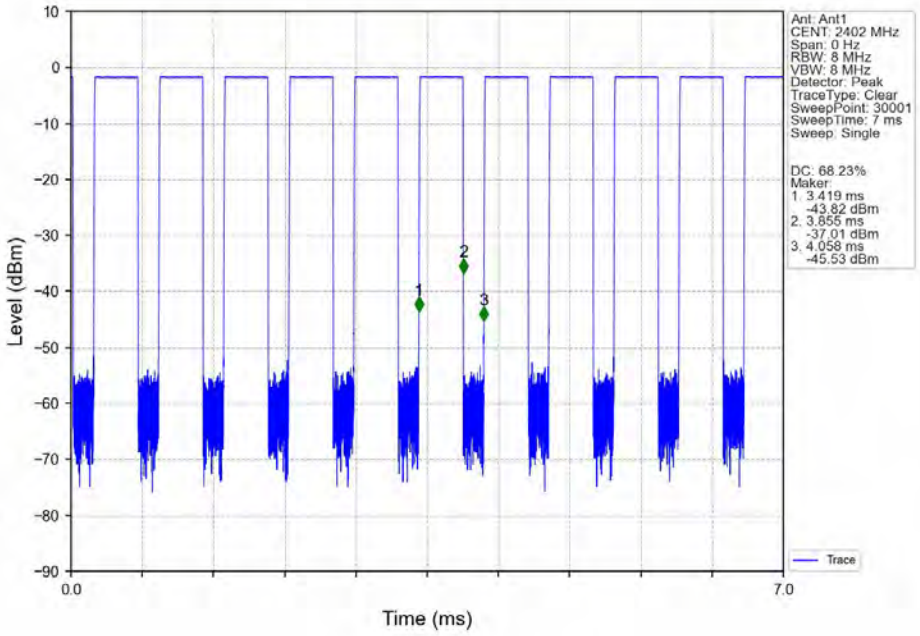
1.1.1 Ant1

| Ant1 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mode | TX Type | Frequency (MHz) | T_on (ms) | Period (ms) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | Max. DC Variation (%) |
| 1M | SISO | 2402 | 0.436 | 0.639 | 68.23 | 1.66 | 0.06 |
| | | 2440 | 0.437 | 0.640 | 68.28 | 1.66 | 0.05 |
| | | 2480 | 0.436 | 0.639 | 68.23 | 1.66 | 0.05 |
| 2M | SISO | 2402 | 0.437 | 0.640 | 68.28 | 1.66 | 0.05 |
| | | 2440 | 0.437 | 0.639 | 68.39 | 1.65 | 0.04 |
| | | 2480 | 0.437 | 0.640 | 68.28 | 1.66 | 0.05 |

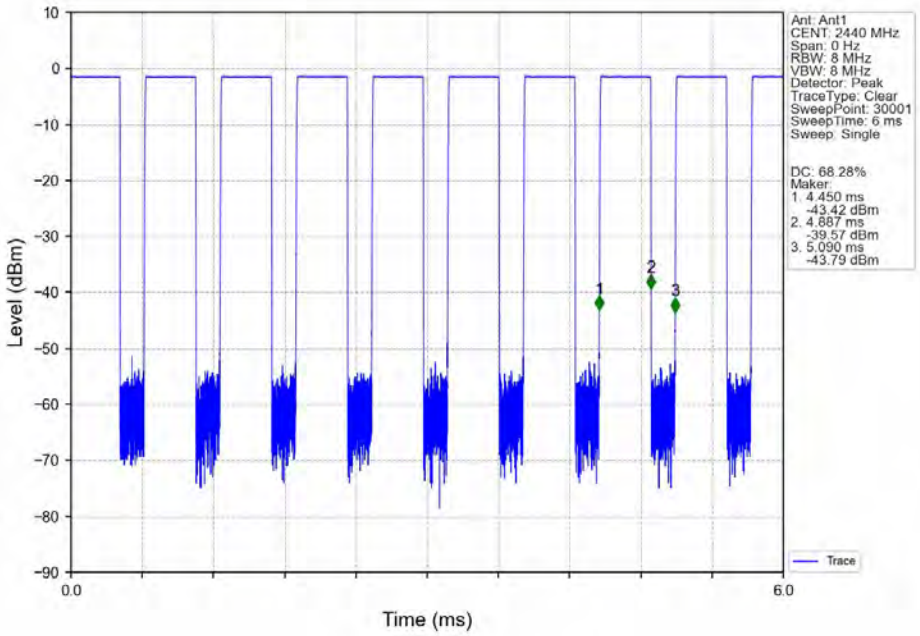
1.2 Test Graph

1.2.1 Ant1

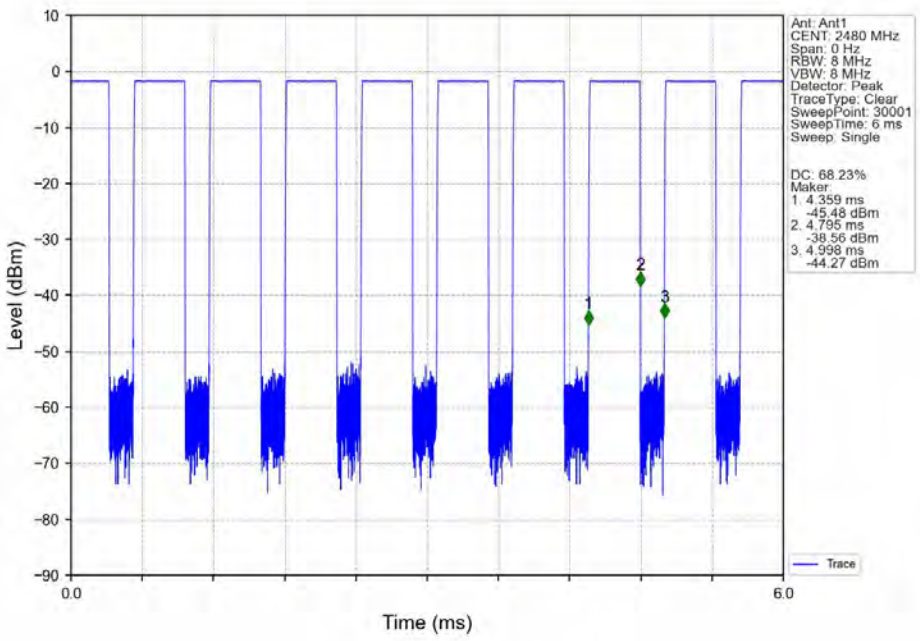
1M_LCH_2402MHz_Ant1_NTNV



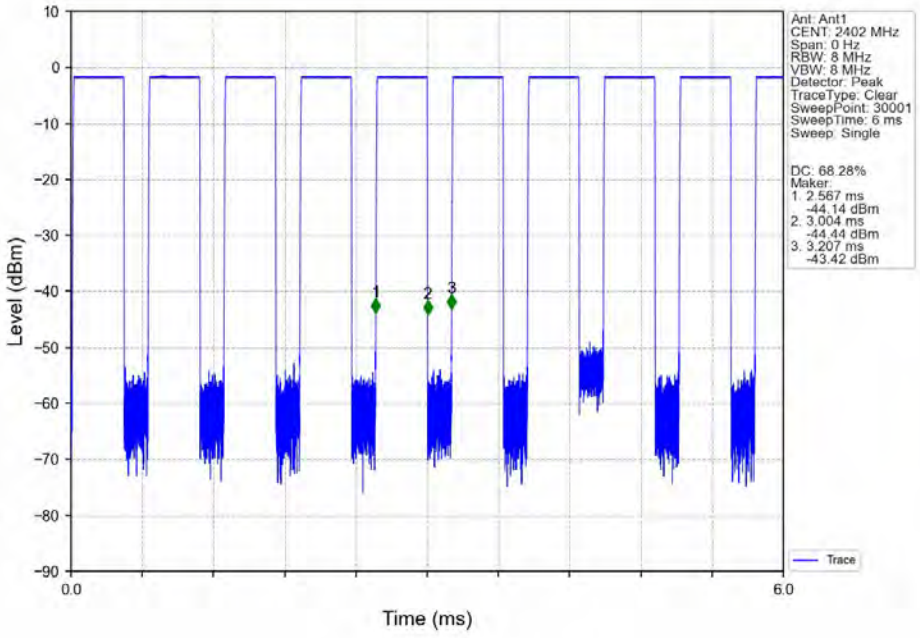

1M_MCH_2440MHz_Ant1_NTNV



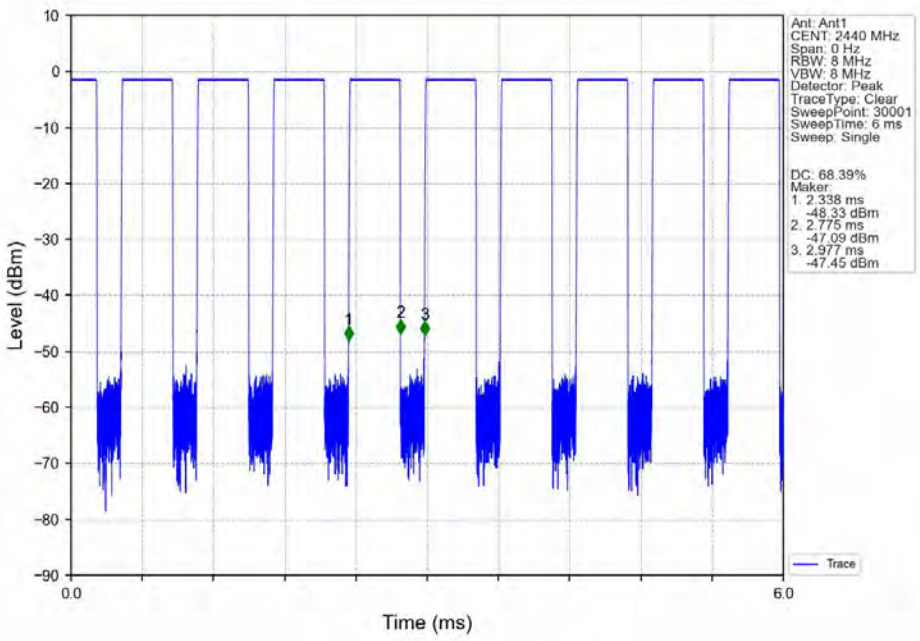
1M_HCH_2480MHz_Ant1_NTNV



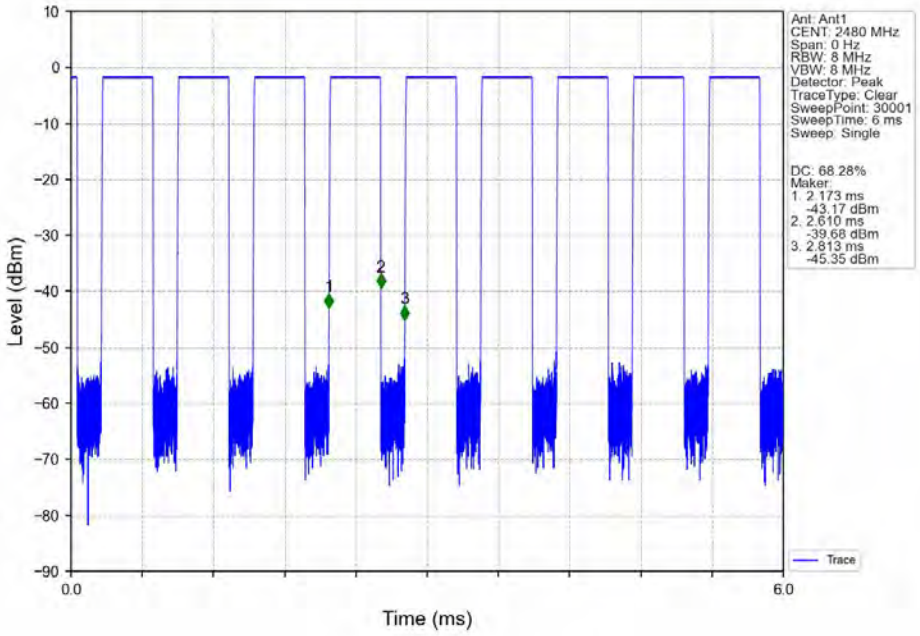

2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV




2M_HCH_2480MHz_Ant1_NTNV



2. Bandwidth

2.1 Test Result

2.1.1 OBW

| Mode | TX Type | Frequency (MHz) | ANT | 99% Occupied Bandwidth (MHz) | | Verdict |
|---|---|---|---|---|---|---|
| | | | | Result | Limit | |
| 1M | SISO | 2402 | 1 | 1.249 | / | Pass |
| | | 2440 | 1 | 1.259 | / | Pass |
| | | 2480 | 1 | 1.276 | / | Pass |
| 2M | SISO | 2402 | 1 | 2.269 | / | Pass |
| | | 2440 | 1 | 2.285 | / | Pass |
| | | 2480 | 1 | 2.301 | / | Pass |

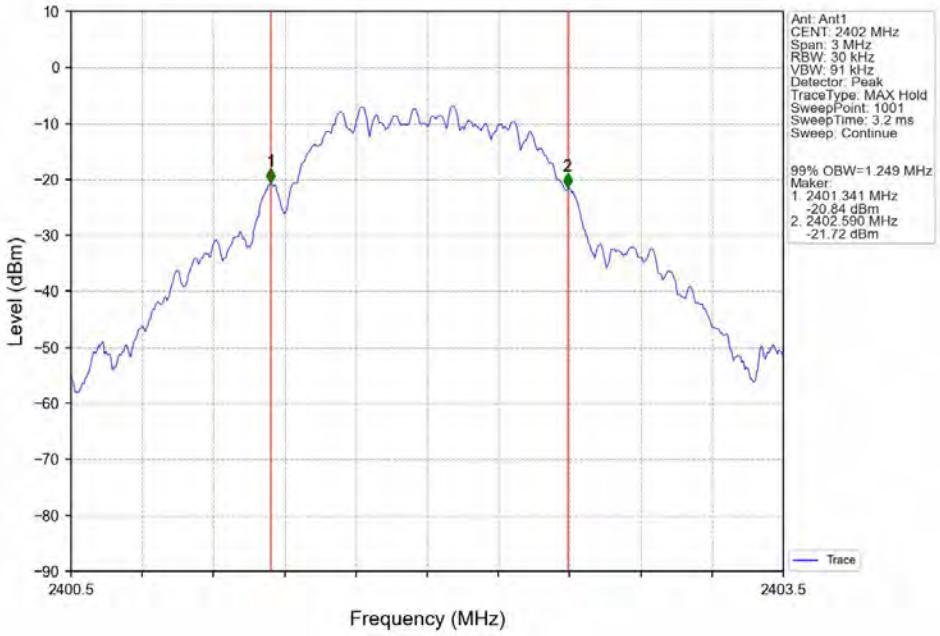
2.1.2 6dB BW

| Mode | TX Type | Frequency (MHz) | ANT | 6dB Bandwidth (MHz) | | Verdict |
|---|---|---|---|---|---|---|
| | | | | Result | Limit | |
| 1M | SISO | 2402 | 1 | 0.978 | >=0.5 | Pass |
| | | 2440 | 1 | 0.983 | >=0.5 | Pass |
| | | 2480 | 1 | 0.981 | >=0.5 | Pass |
| 2M | SISO | 2402 | 1 | 1.578 | >=0.5 | Pass |
| | | 2440 | 1 | 1.584 | >=0.5 | Pass |
| | | 2480 | 1 | 1.585 | >=0.5 | Pass |

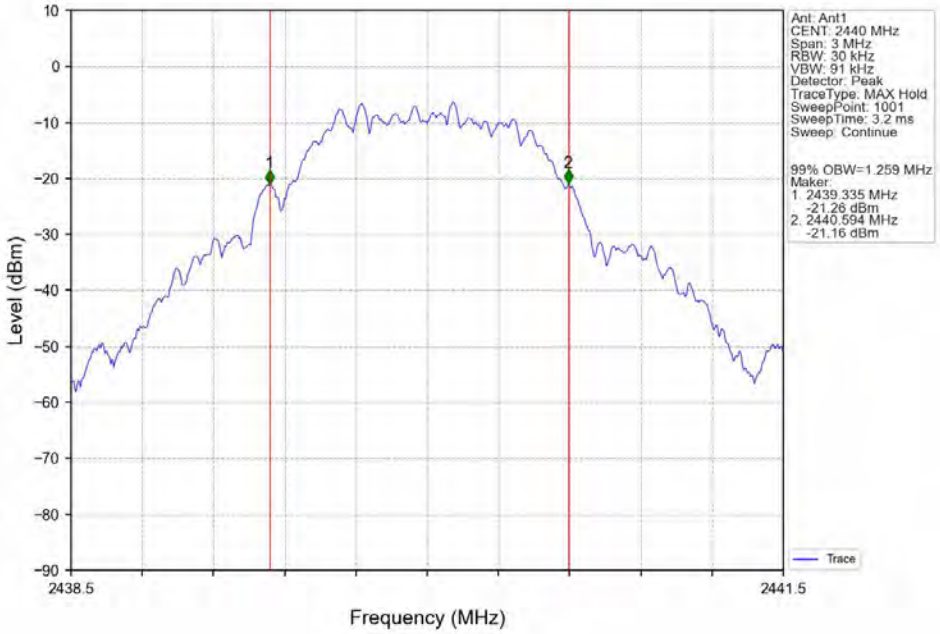
2.2 Test Graph

2.2.1 OBW

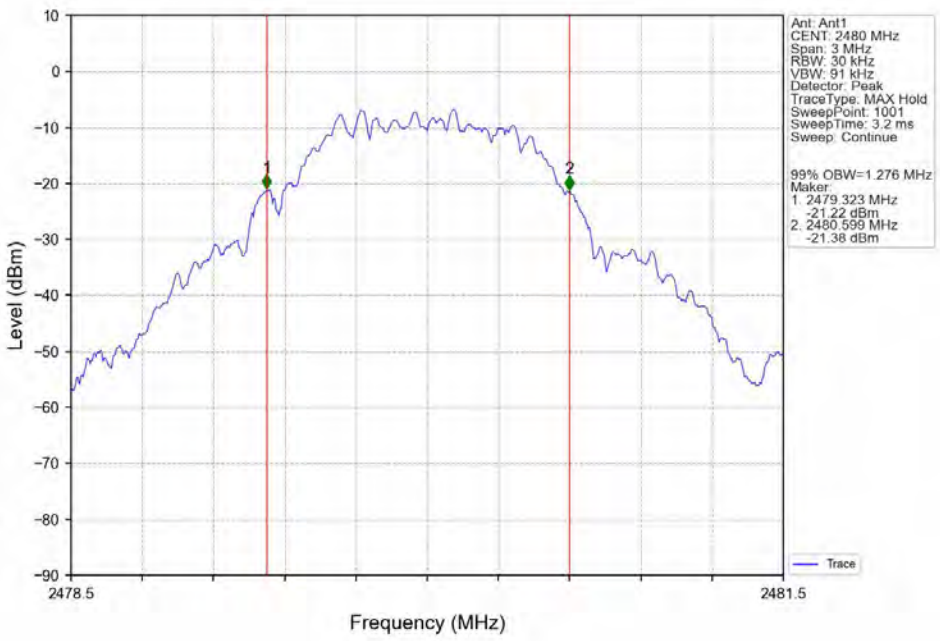
1M_LCH_2402MHz_Ant1_NTNV



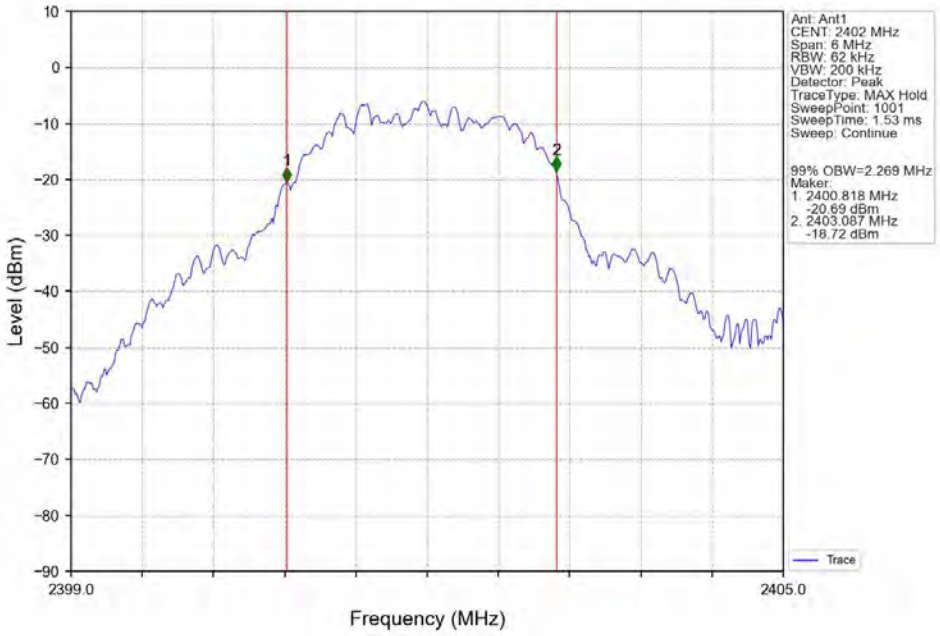

1M_MCH_2440MHz_Ant1_NTNV



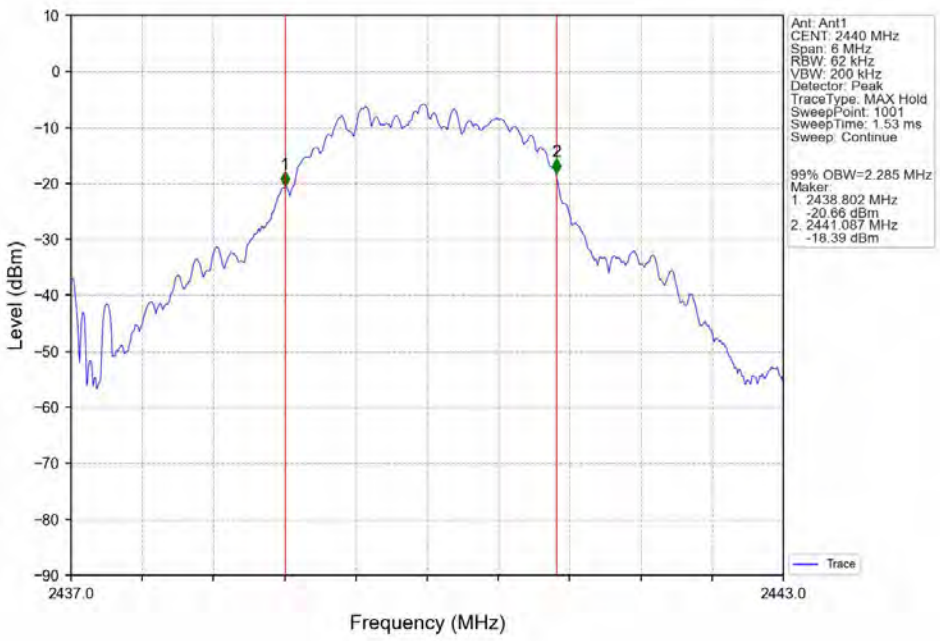
1M_HCH_2480MHz_Ant1_NTNV



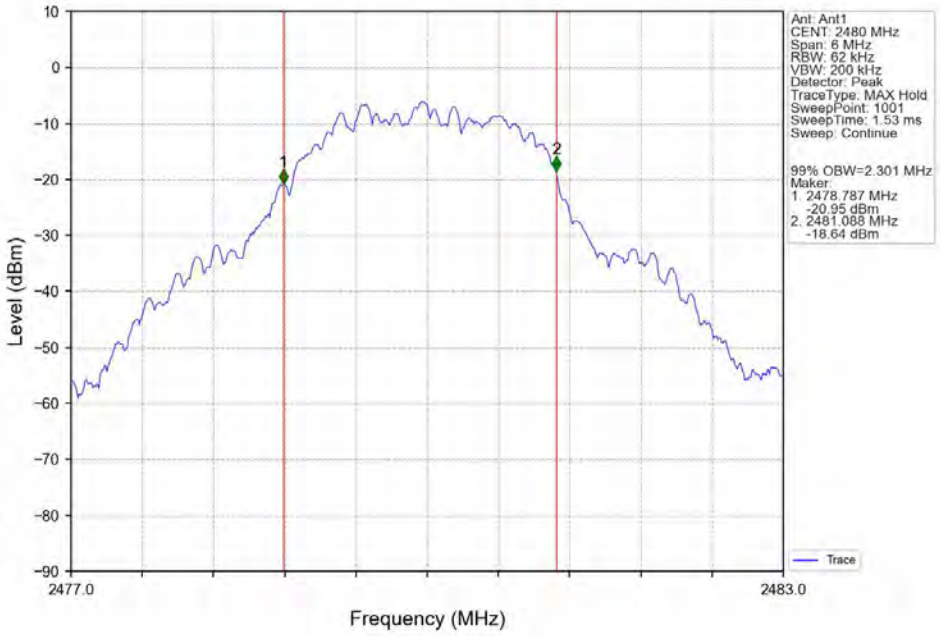

2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV

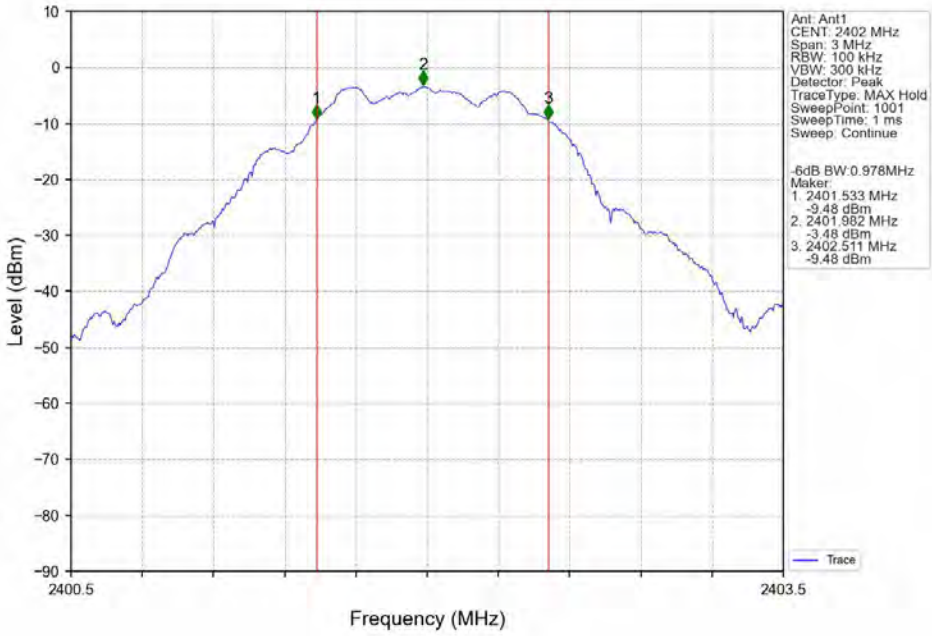



2M_HCH_2480MHz_Ant1_NTNV

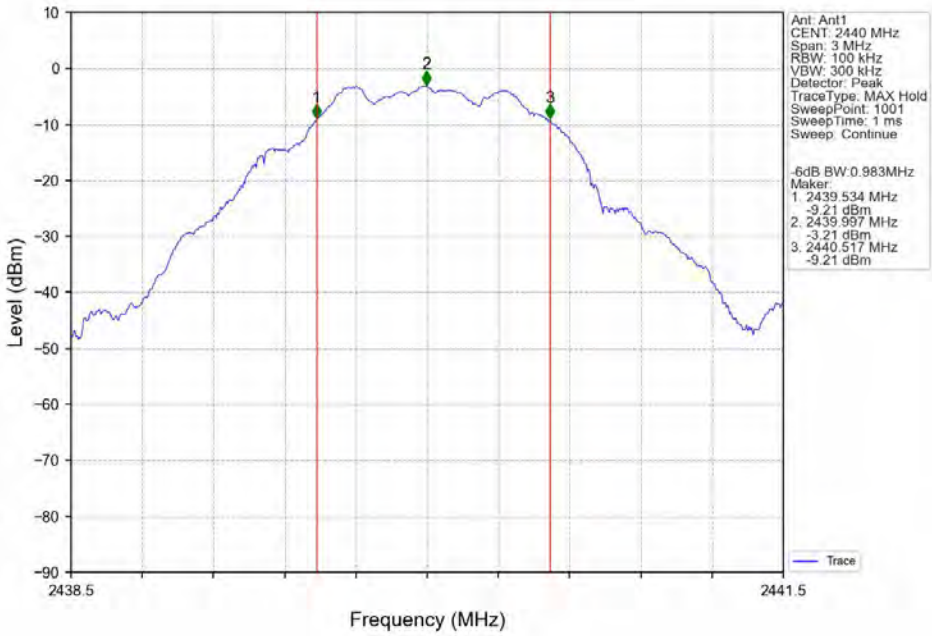


2.2.2 6dB BW

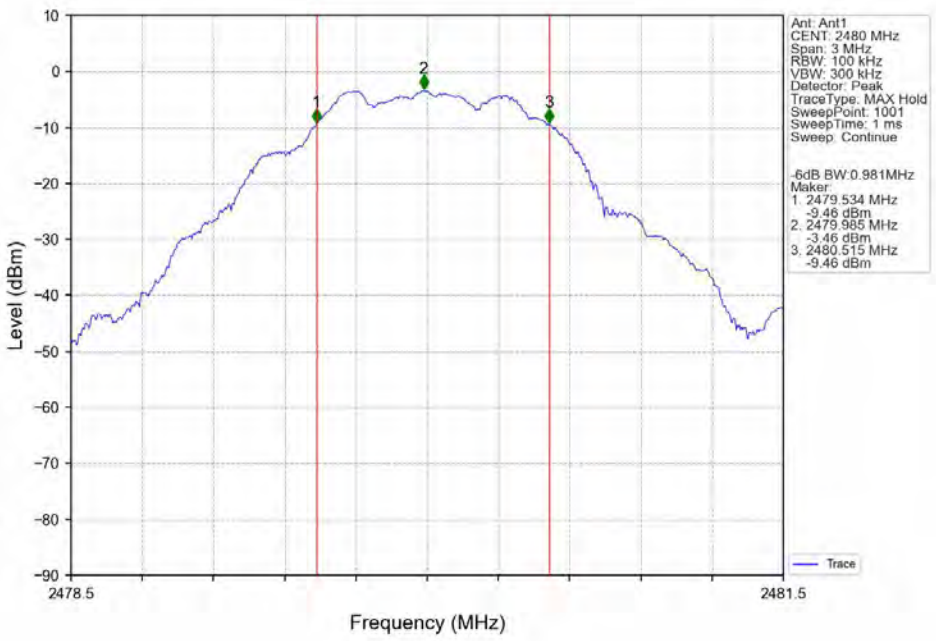
1M_LCH_2402MHz_Ant1_NTNV



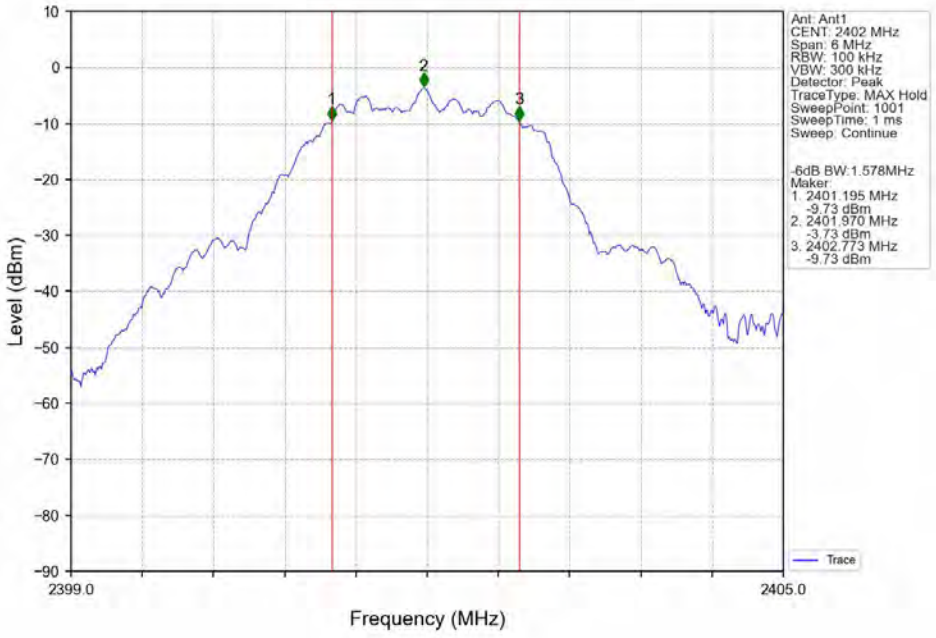

1M_MCH_2440MHz_Ant1_NTNV



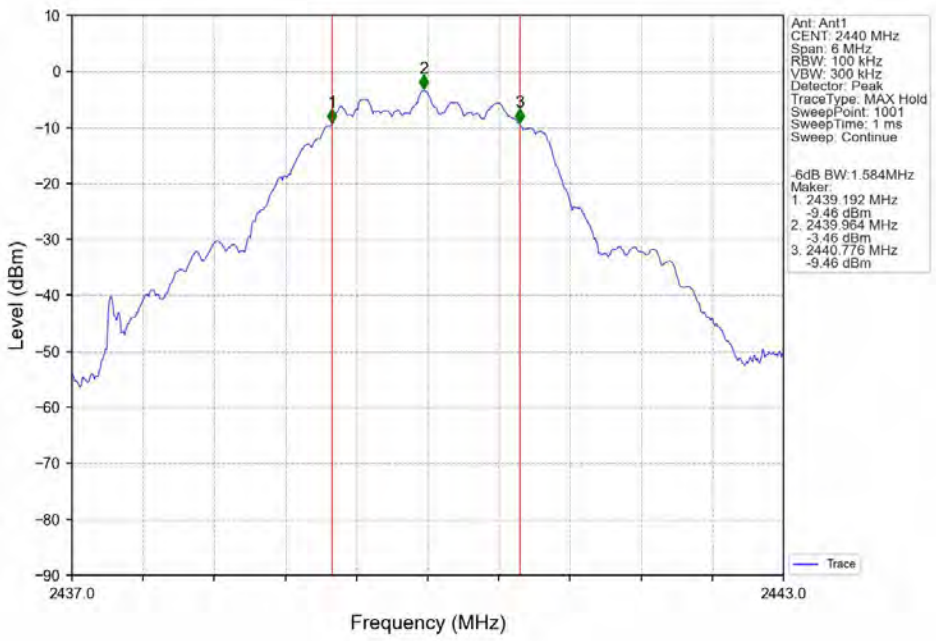
1M_HCH_2480MHz_Ant1_NTNV



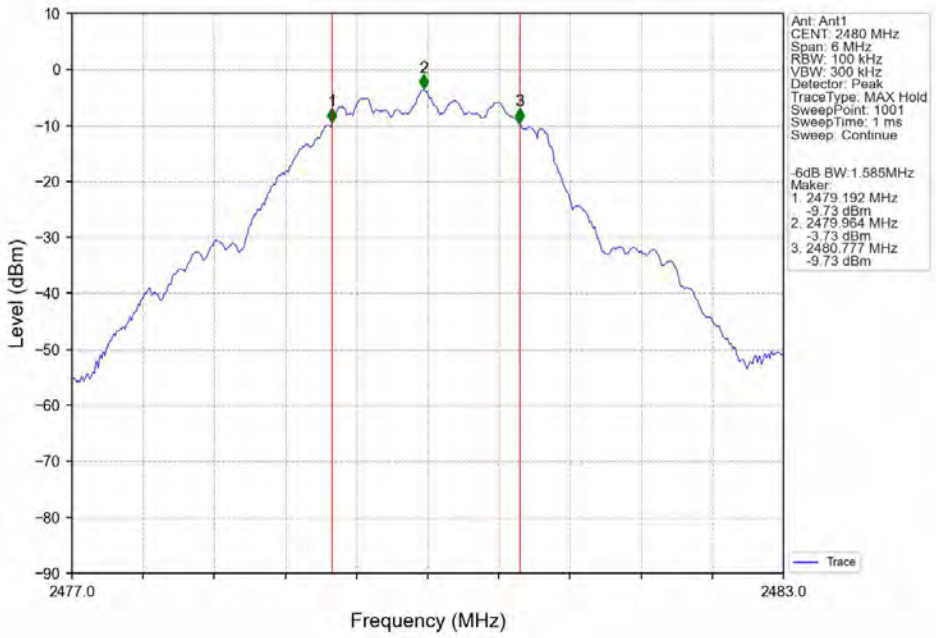

2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV




2M_HCH_2480MHz_Ant1_NTNV



3. Maximum Conducted Output Power

3.1 Test Result

3.1.1 Power

| Mode | TX Type | Frequency (MHz) | Maximum Peak Conducted Output Power (dBm) | | Verdict |
|---|---|---|---|---|---|
| | | | ANT1 | Limit | |
| 1M | SISO | 2402 | -1.72 | <=30 | Pass |
| | | 2440 | -1.40 | <=30 | Pass |
| | | 2480 | -1.73 | <=30 | Pass |
| 2M | SISO | 2402 | -1.68 | <=30 | Pass |
| | | 2440 | -1.22 | <=30 | Pass |
| | | 2480 | -1.71 | <=30 | Pass |

4. Maximum Power Spectral Density

4.1 Test Result

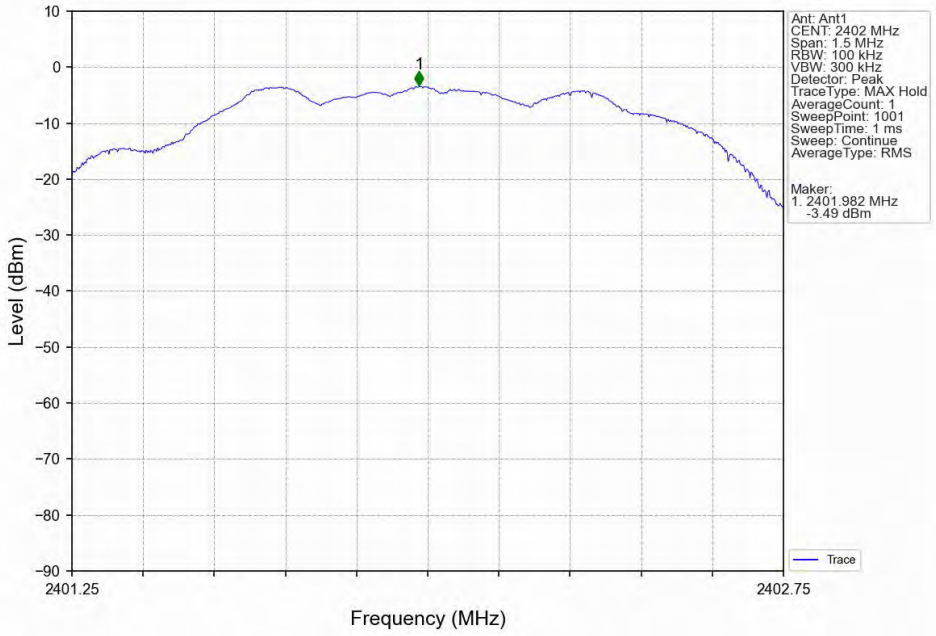
4.1.1 PSD

| Mode | TX Type | Frequency (MHz) | Maximum PSD (dBm) | | Verdict |
|---|---|---|---|---|---|
| | | | ANT1 | Limit | |
| 1M | SISO | 2402 | -3.49 | <=8 | Pass |
| | | 2440 | -3.20 | <=8 | Pass |
| | | 2480 | -3.49 | <=8 | Pass |
| 2M | SISO | 2402 | -3.84 | <=8 | Pass |
| | | 2440 | -3.58 | <=8 | Pass |
| | | 2480 | -3.83 | <=8 | Pass |

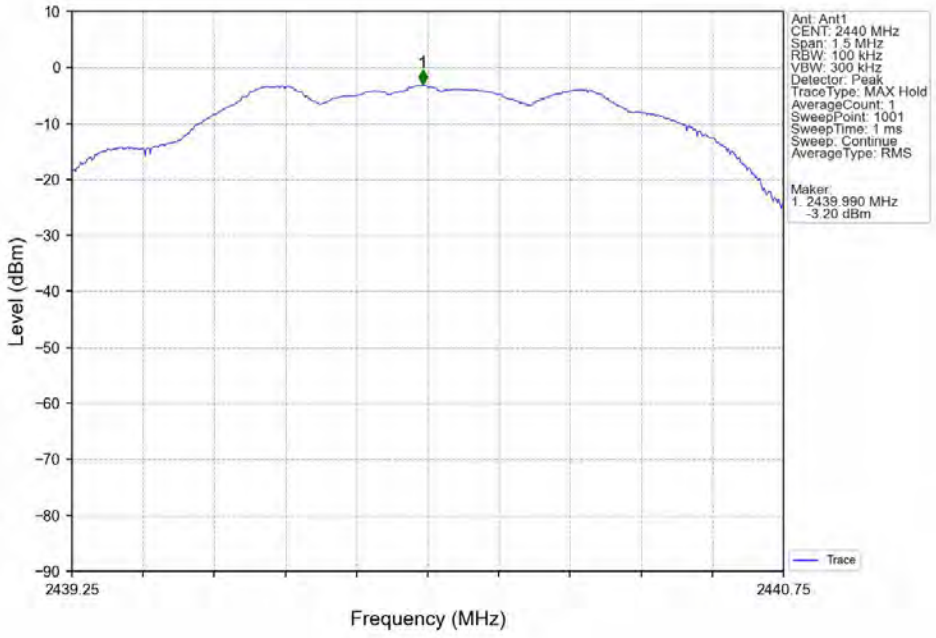
4.2 Test Graph

4.2.1 PSD

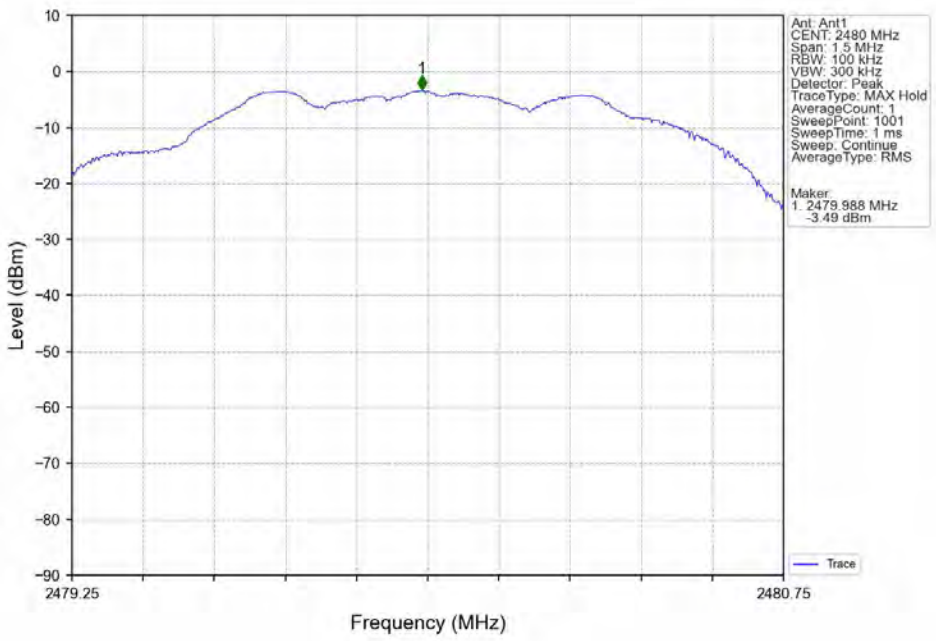
1M_LCH_2402MHz_Ant1_NTNV



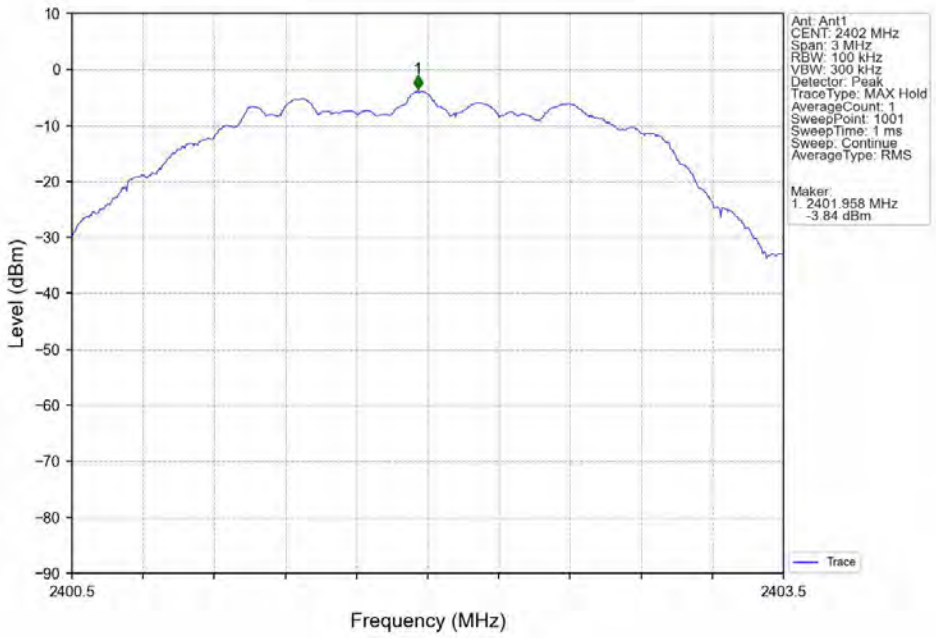

1M_MCH_2440MHz_Ant1_NTNV



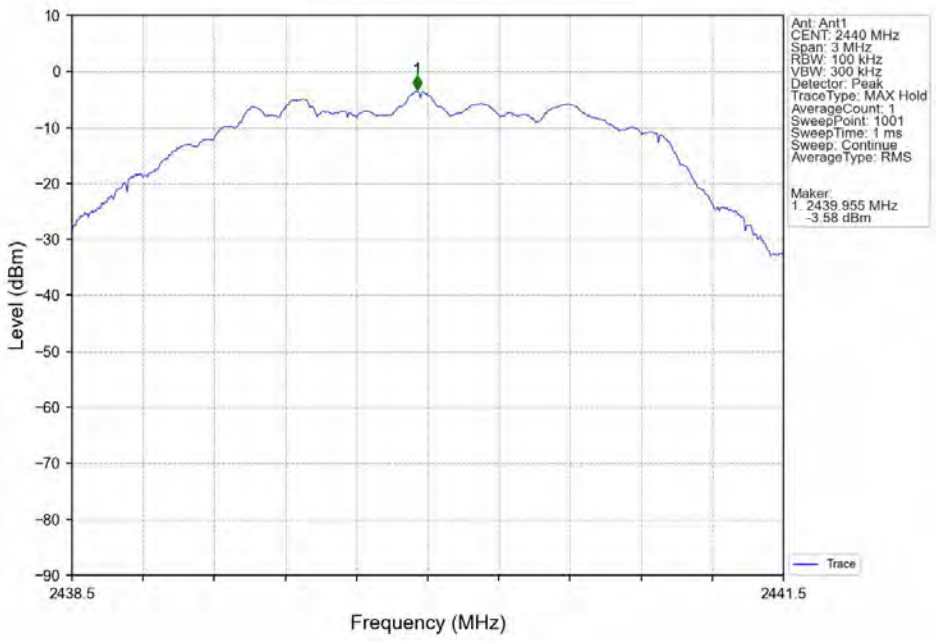
1M_HCH_2480MHz_Ant1_NTNV



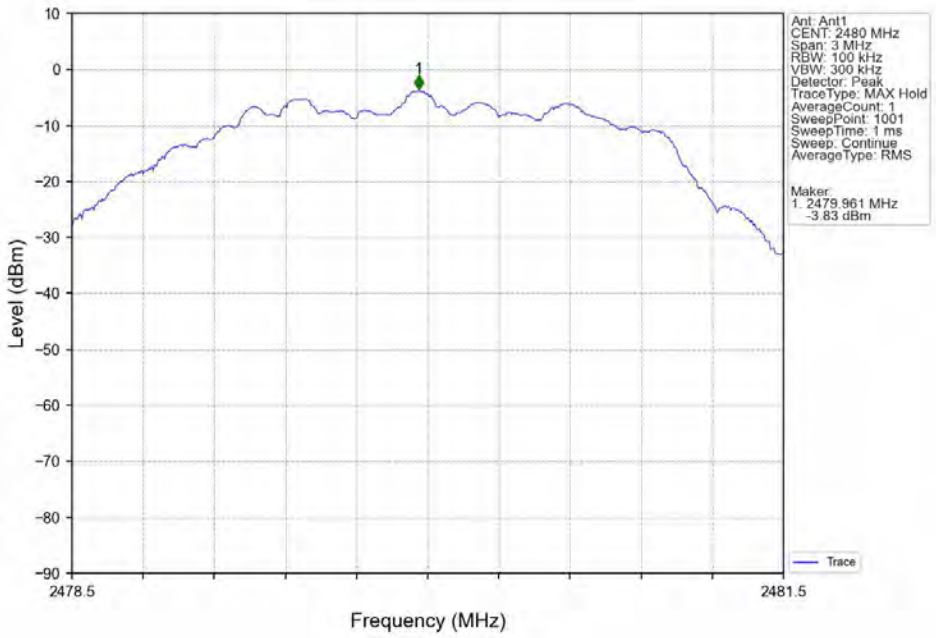

2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV




2M_HCH_2480MHz_Ant1_NTNV



5. Unwanted Emissions In Non-restricted Frequency Bands

5.1 Test Result

5.1.1 Ref

| Mode | TX Type | Frequency (MHz) | ANT | Level of Reference (dBm) |
|---|---|---|---|---|
| 1M | SISO | 2402 | 1 | -3.50 |
| | | 2440 | 1 | -3.21 |
| | | 2480 | 1 | -3.47 |
| 2M | SISO | 2402 | 1 | -3.84 |
| | | 2440 | 1 | -3.58 |
| | | 2480 | 1 | -3.85 |
| Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020+Cor 1-2023, the channel contains the maximum PSD level was used to establish the reference level. | | | | |

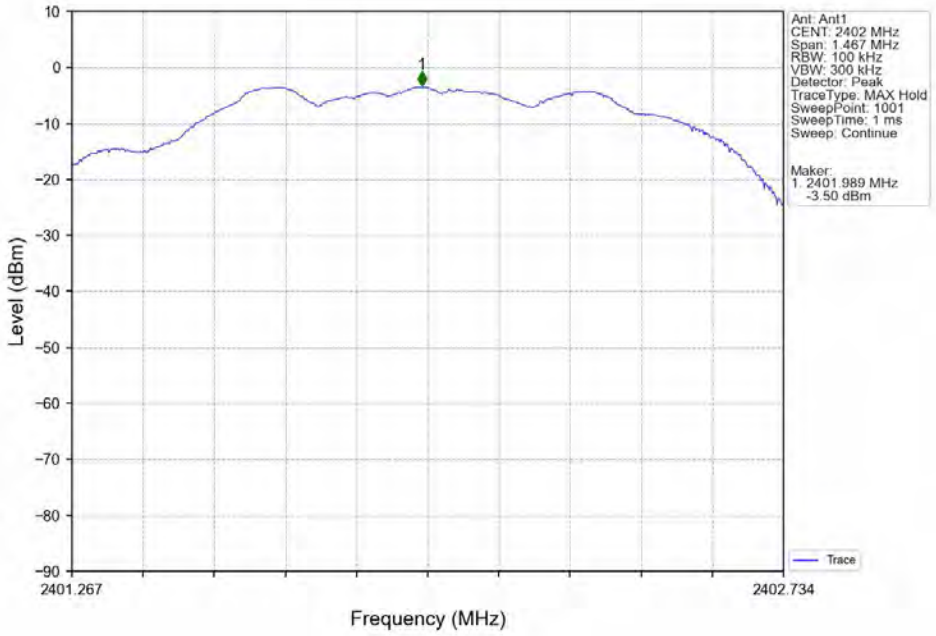
5.1.2 CSE

| Mode | TX Type | Frequency (MHz) | ANT | Level of Reference (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|
| 1M | SISO | 2402 | 1 | -3.50 | -23.50 | Pass |
| | | 2440 | 1 | -3.21 | -23.21 | Pass |
| | | 2480 | 1 | -3.47 | -23.47 | Pass |
| 2M | SISO | 2402 | 1 | -3.84 | -23.84 | Pass |
| | | 2440 | 1 | -3.58 | -23.58 | Pass |
| | | 2480 | 1 | -3.85 | -23.85 | Pass |
| Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020+Cor 1-2023, the channel contains the maximum PSD level was used to establish the reference level. | | | | | | |

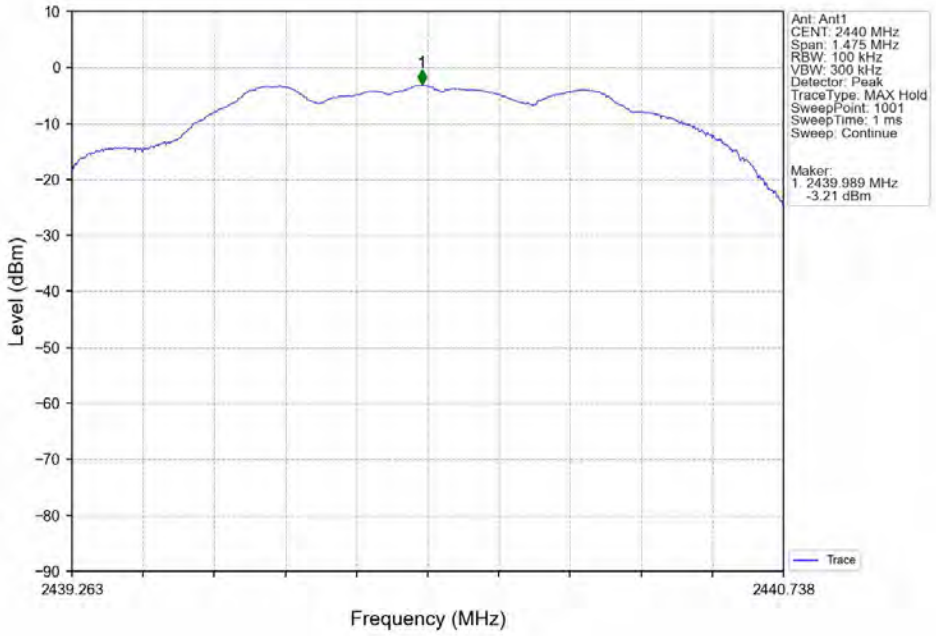
5.2 Test Graph

5.2.1 Ref

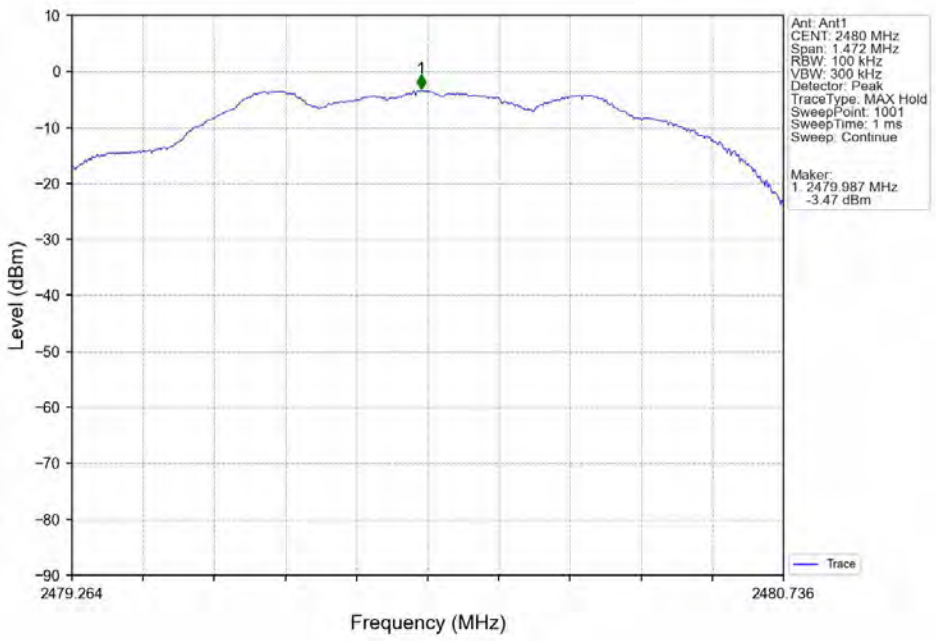
1M_LCH_2402MHz_Ant1_NTNV




1M_MCH_2440MHz_Ant1_NTNV



1M_HCH_2480MHz_Ant1_NTNV

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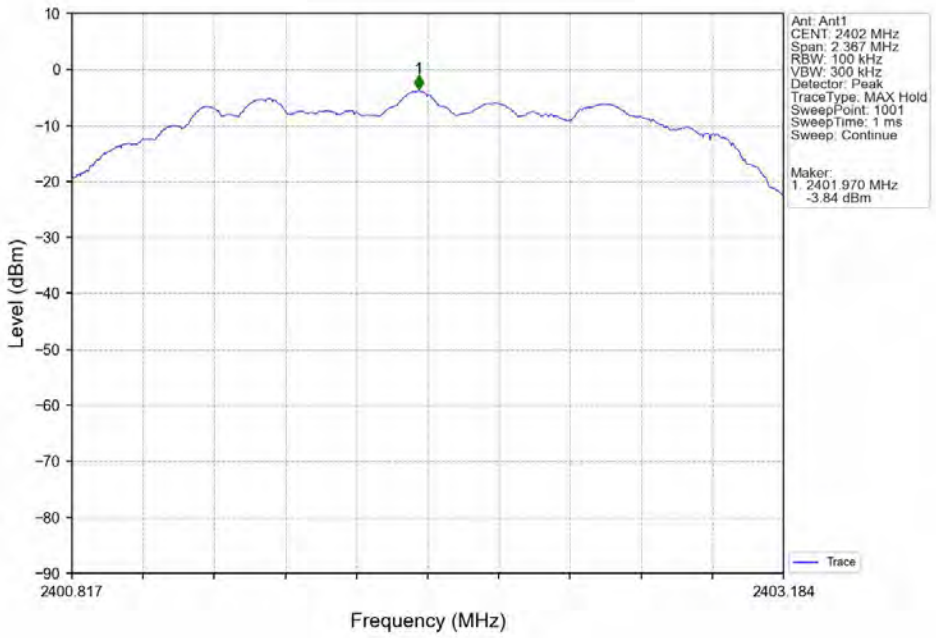

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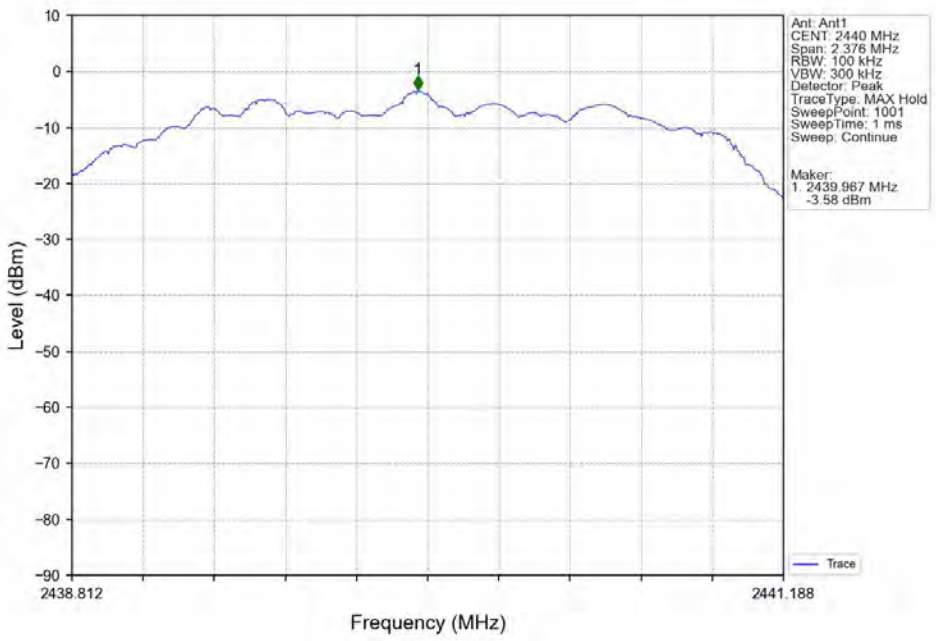


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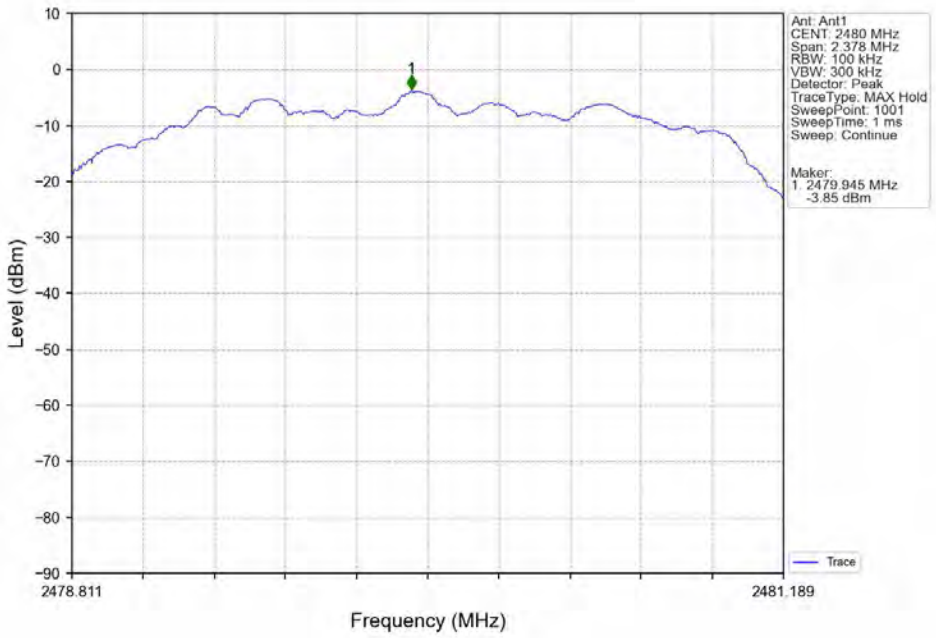

5.2.2 CSE

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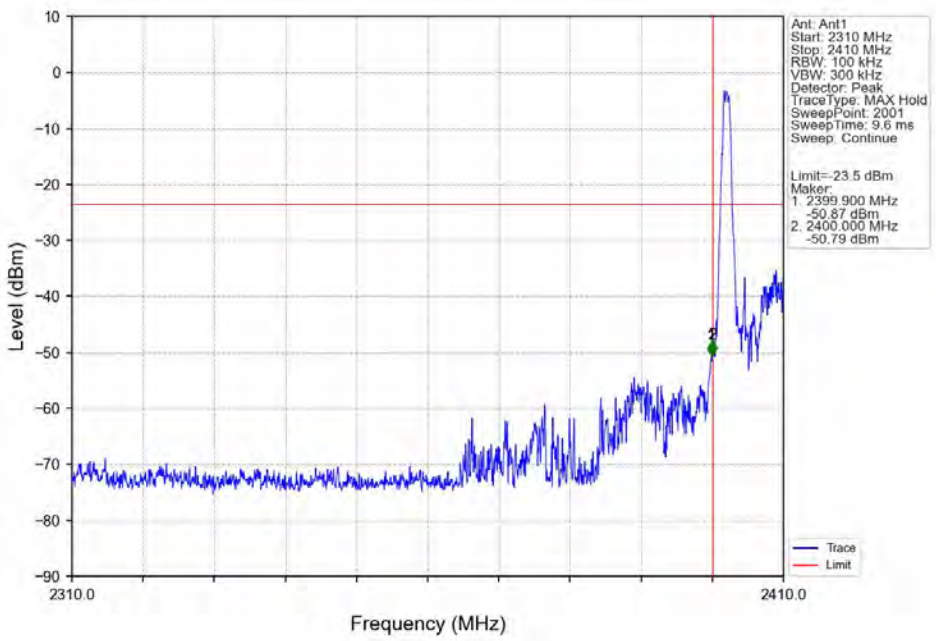


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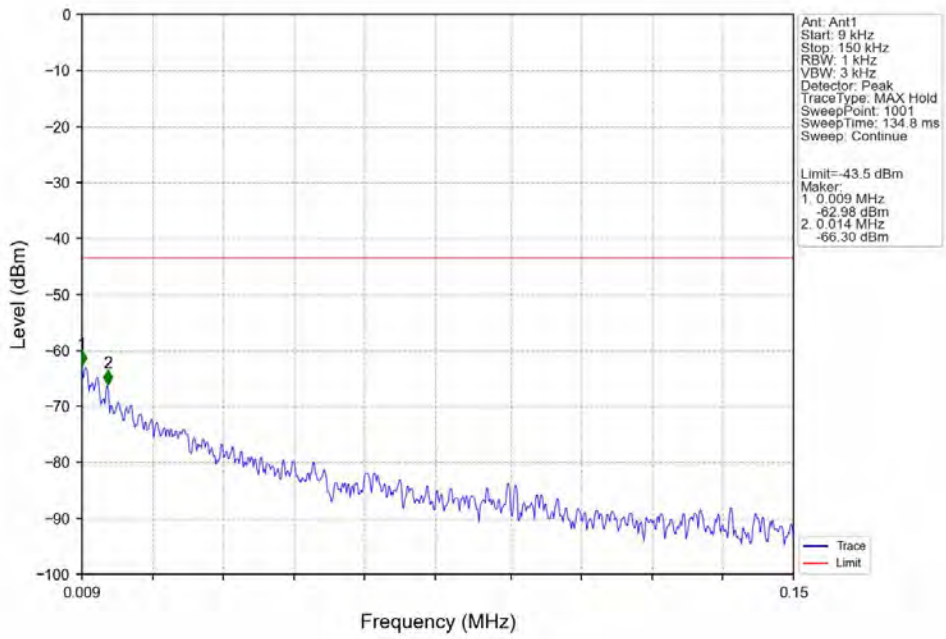

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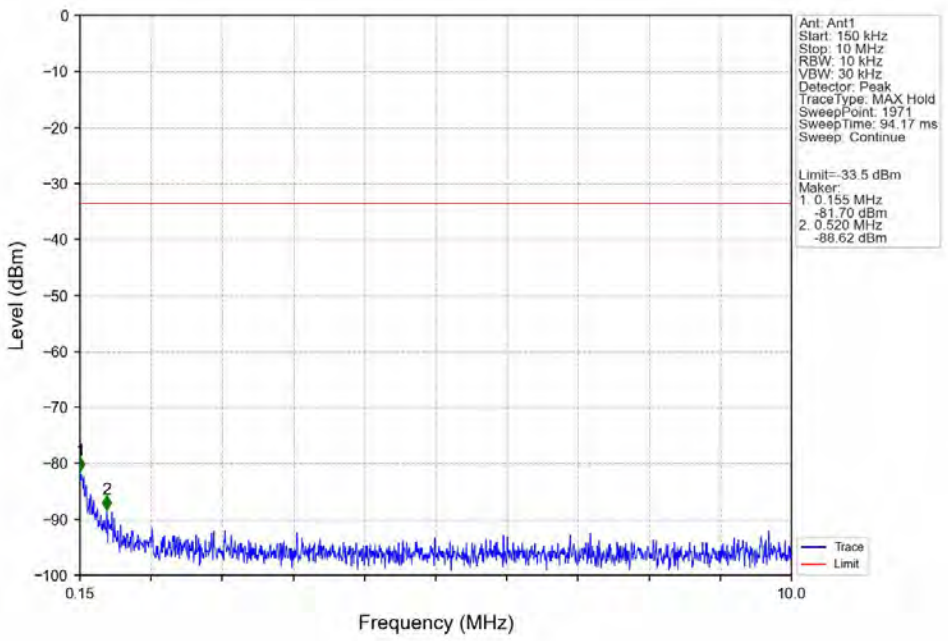


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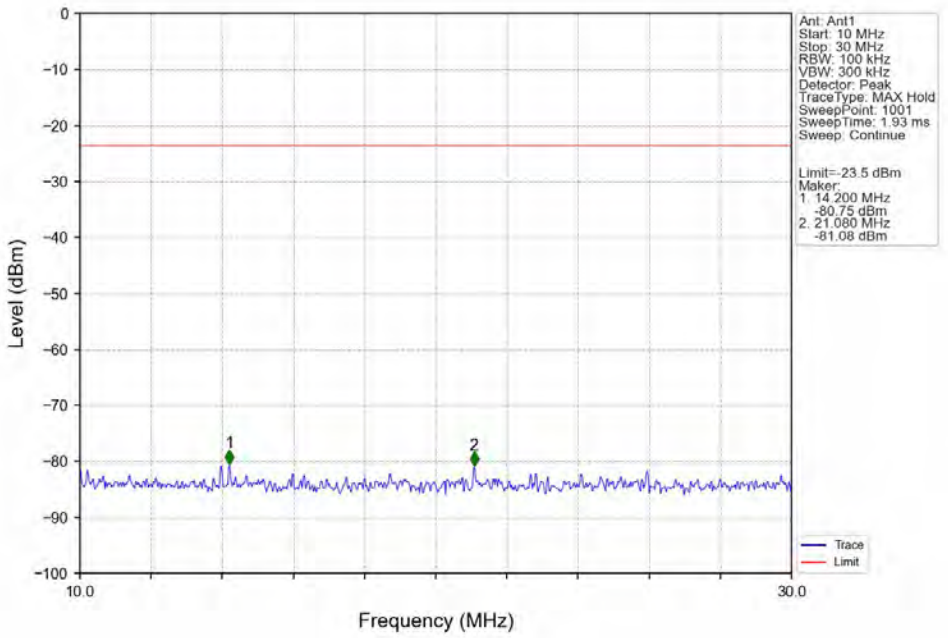

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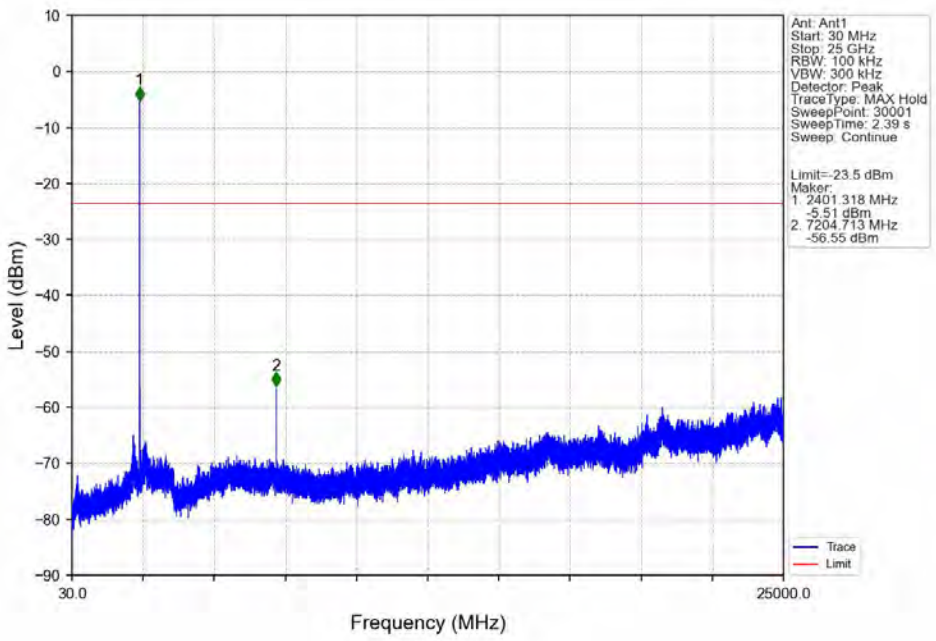


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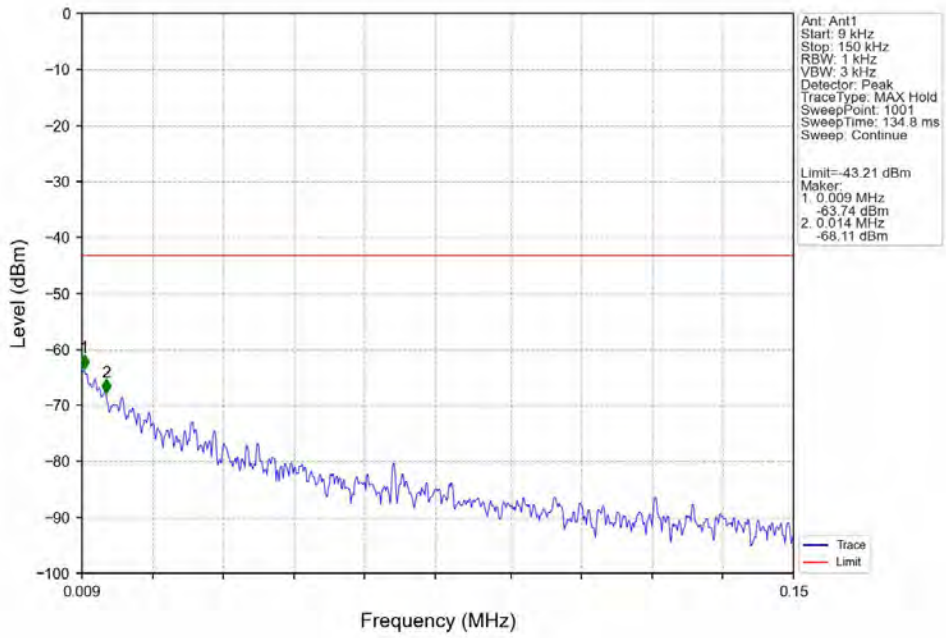

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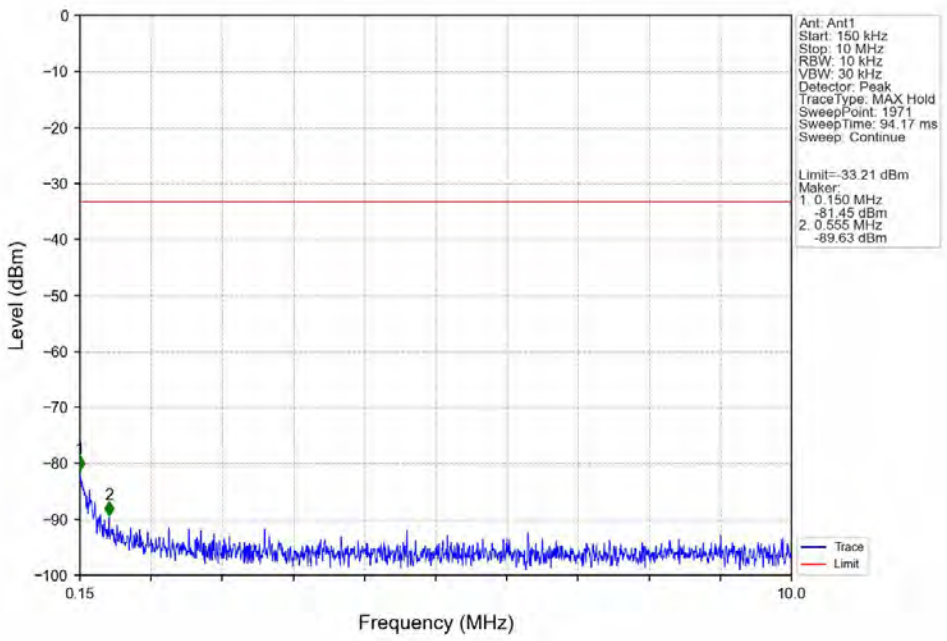


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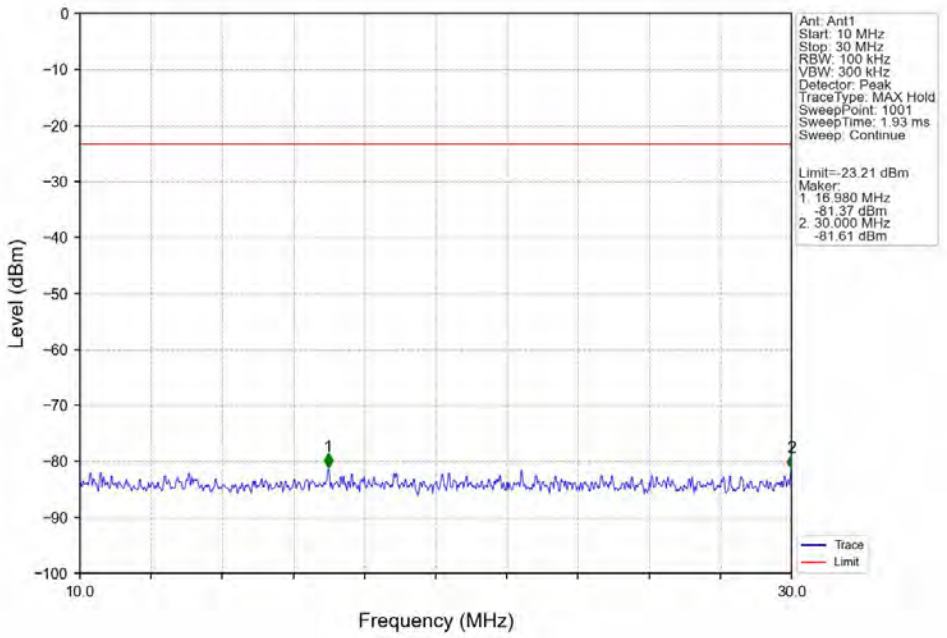

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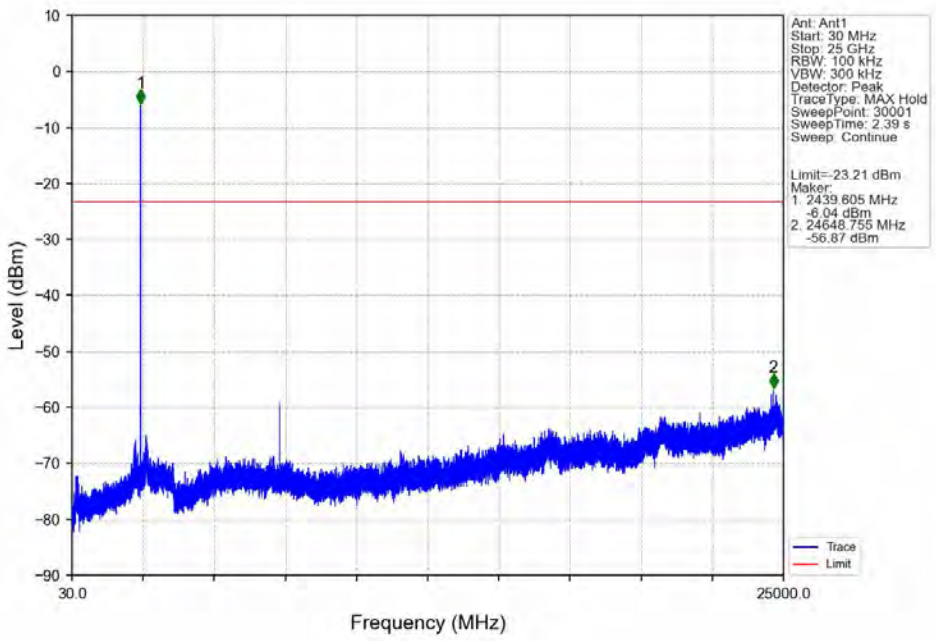
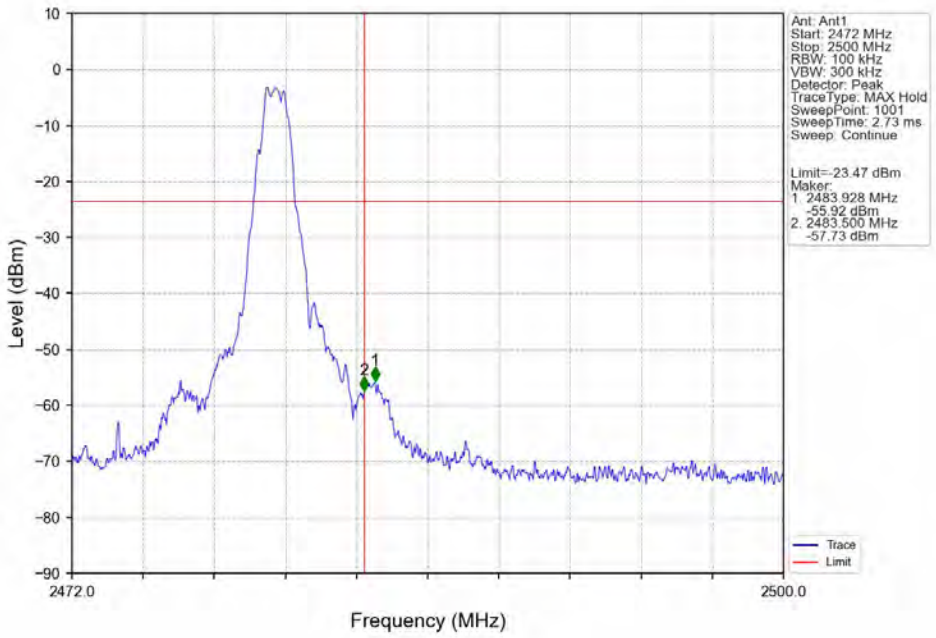



1M_HCH_2480MHz_Ant1_NTNV



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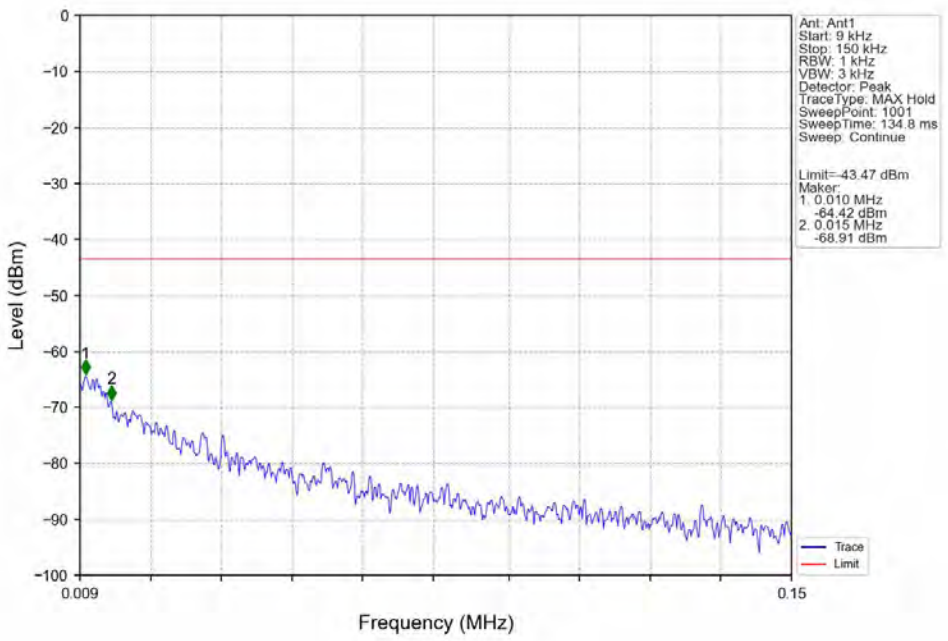


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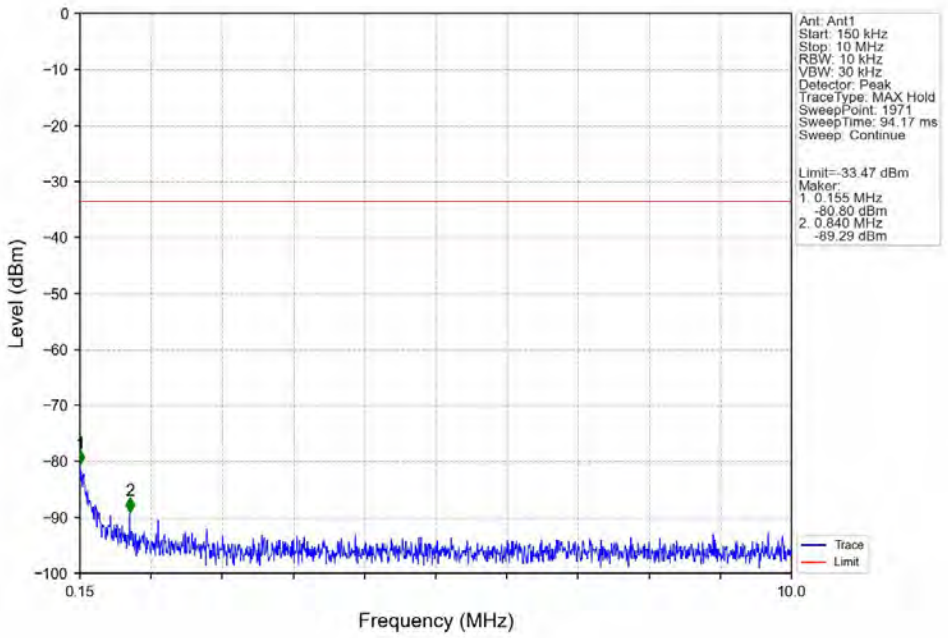

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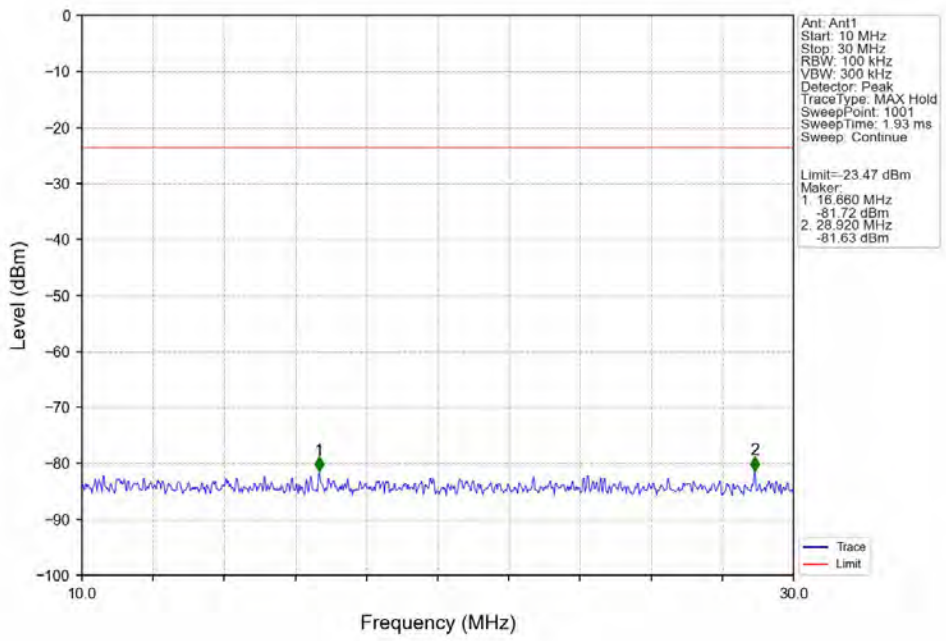


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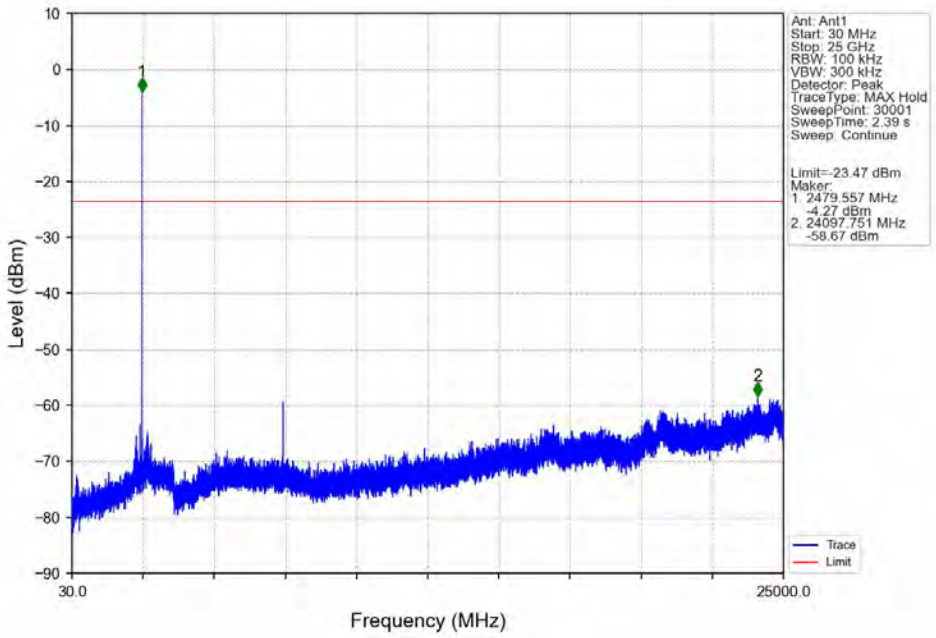
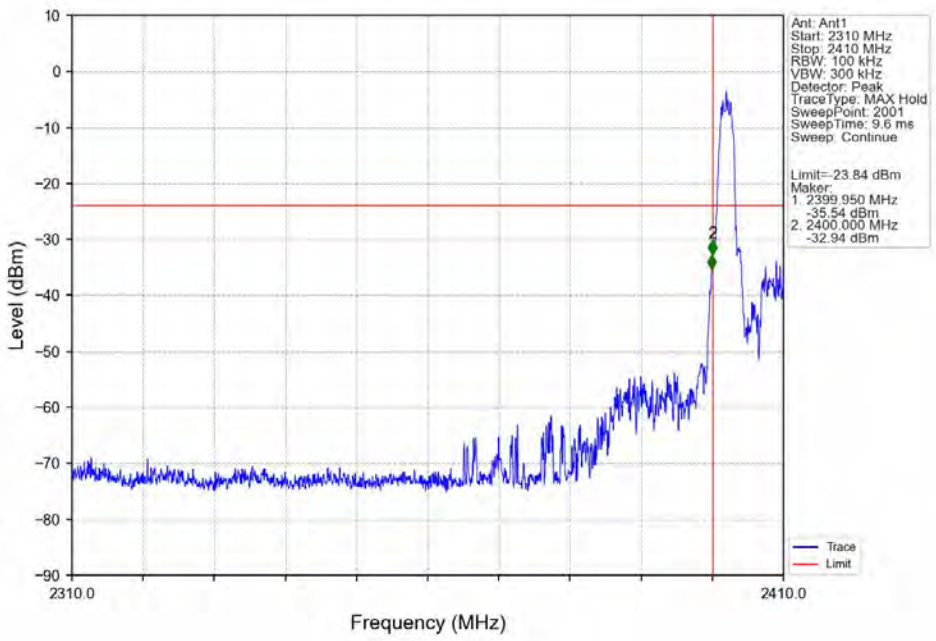


2M_LCH_2402MHz_Ant1_NTNV

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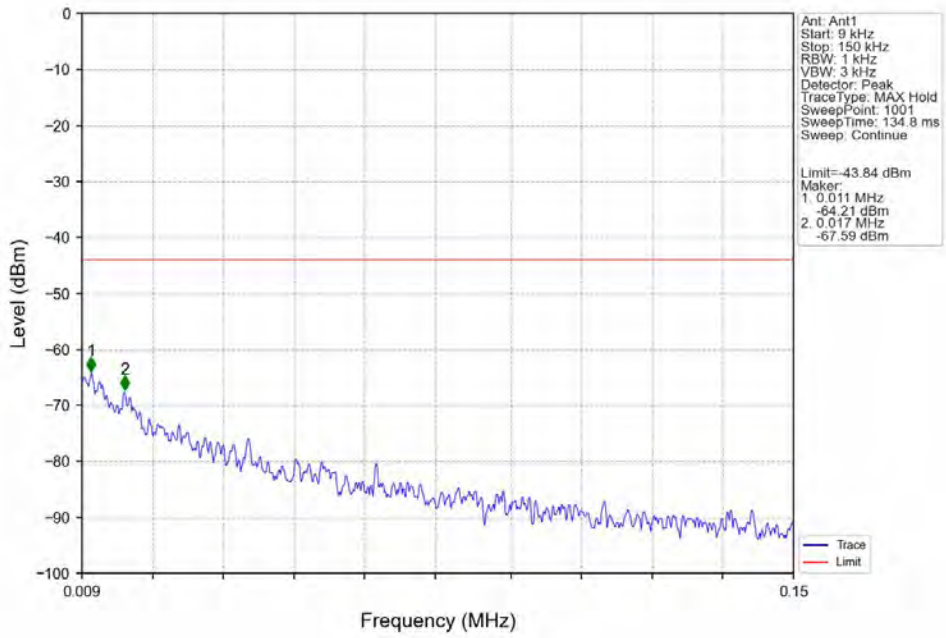

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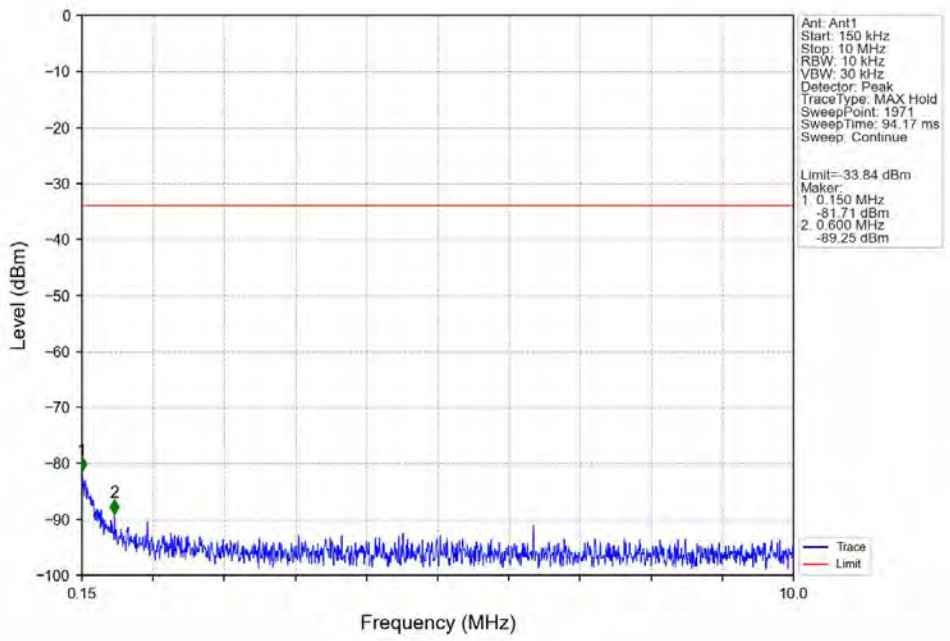


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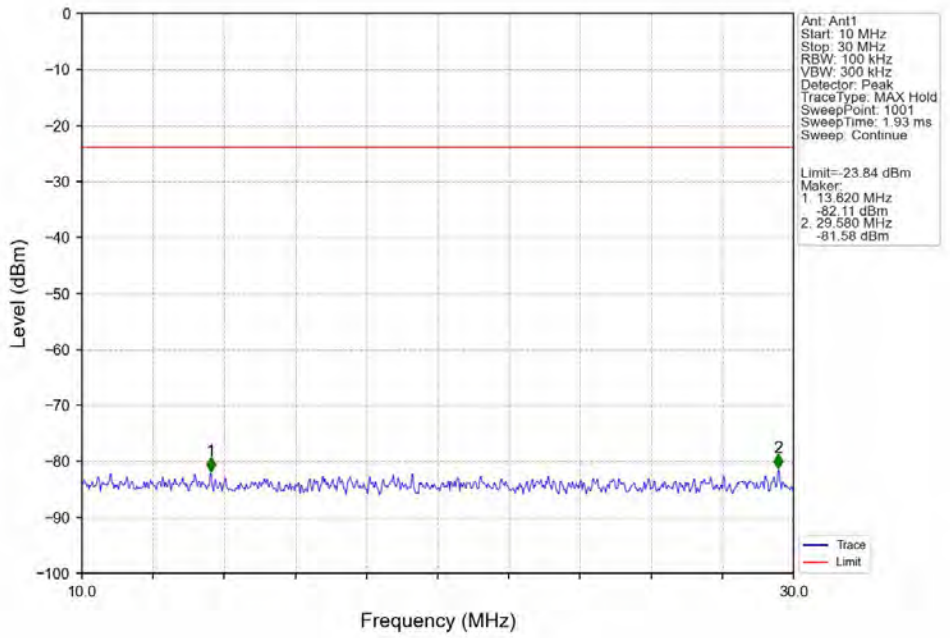

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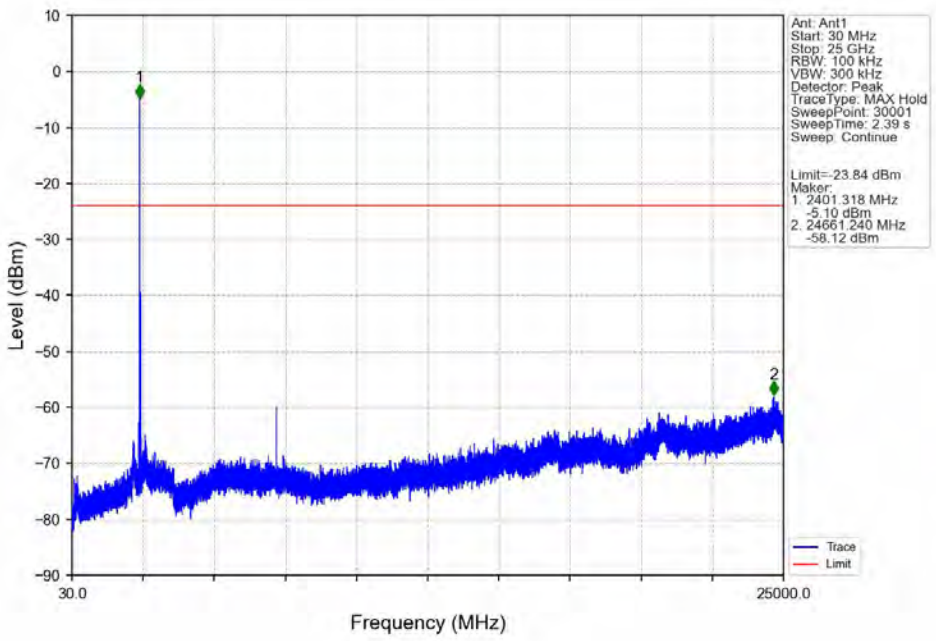


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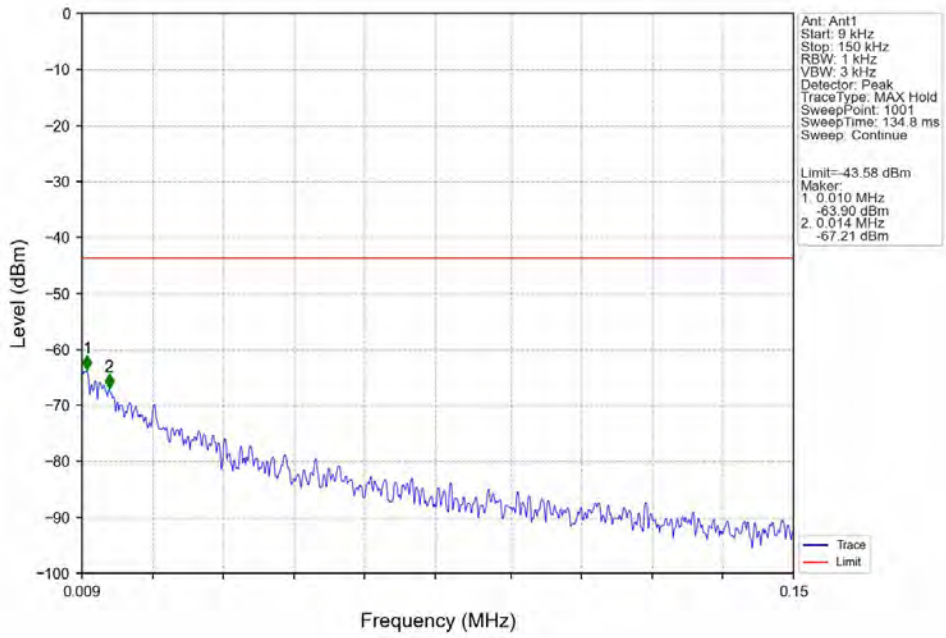

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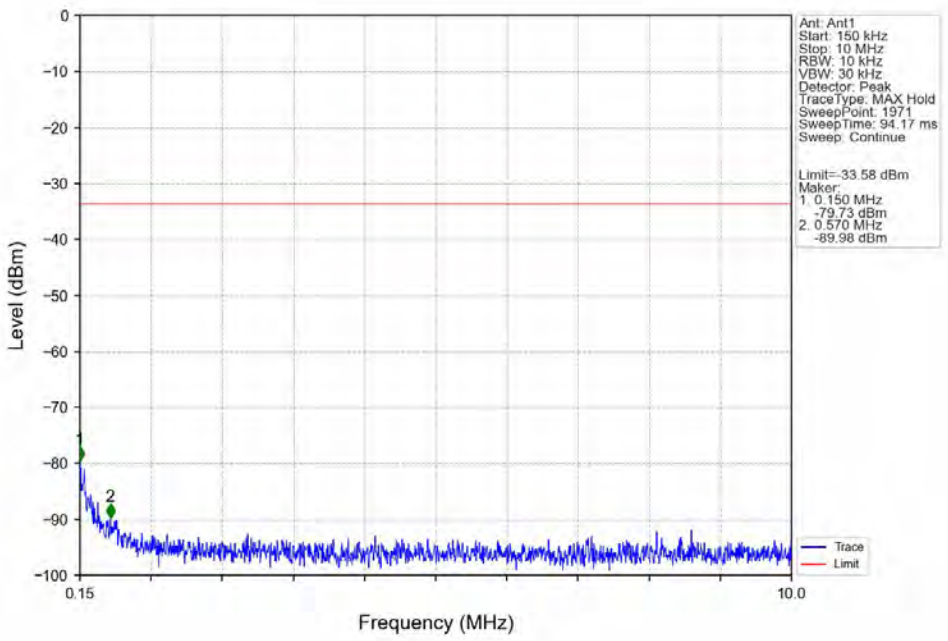


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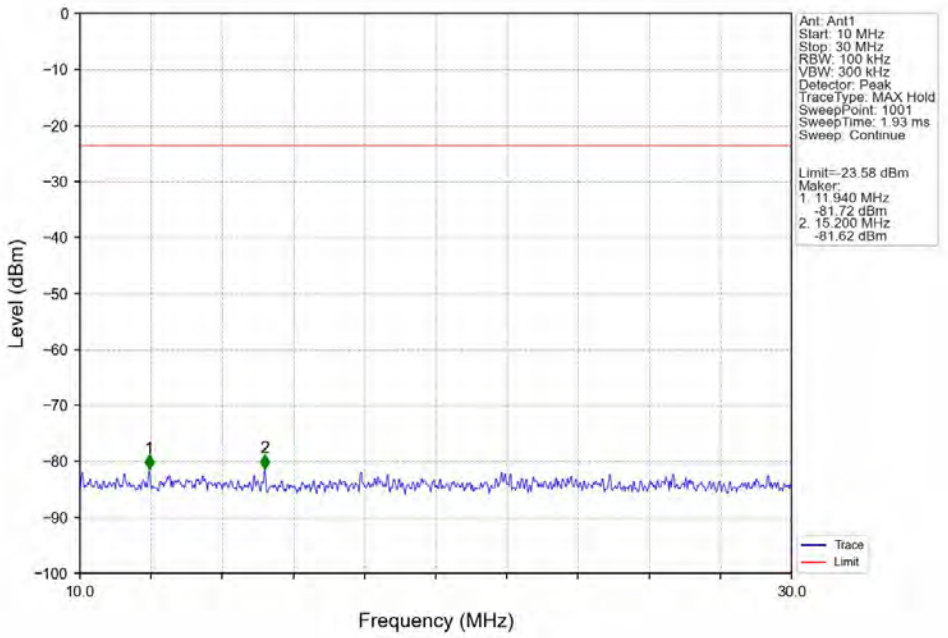

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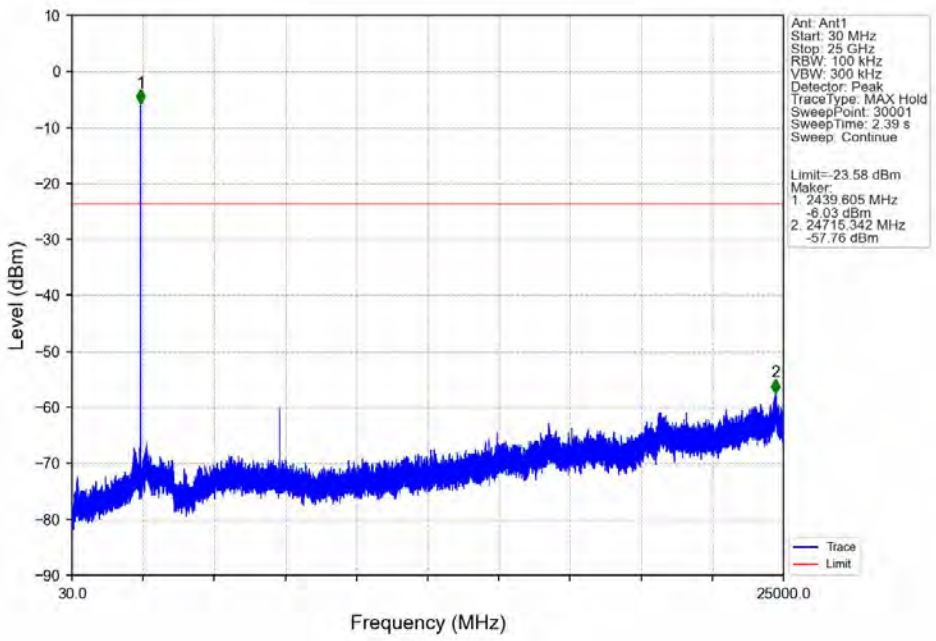


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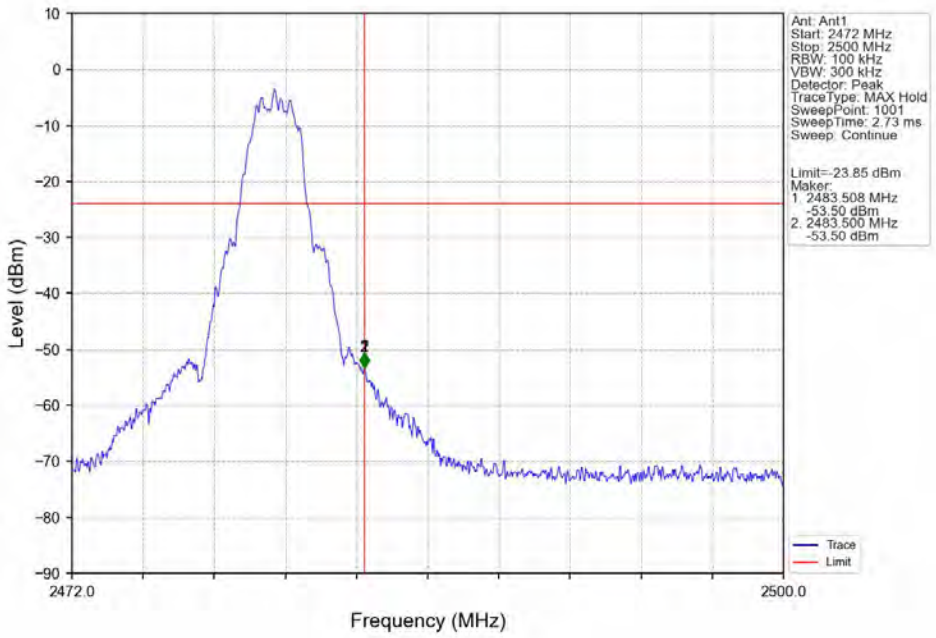

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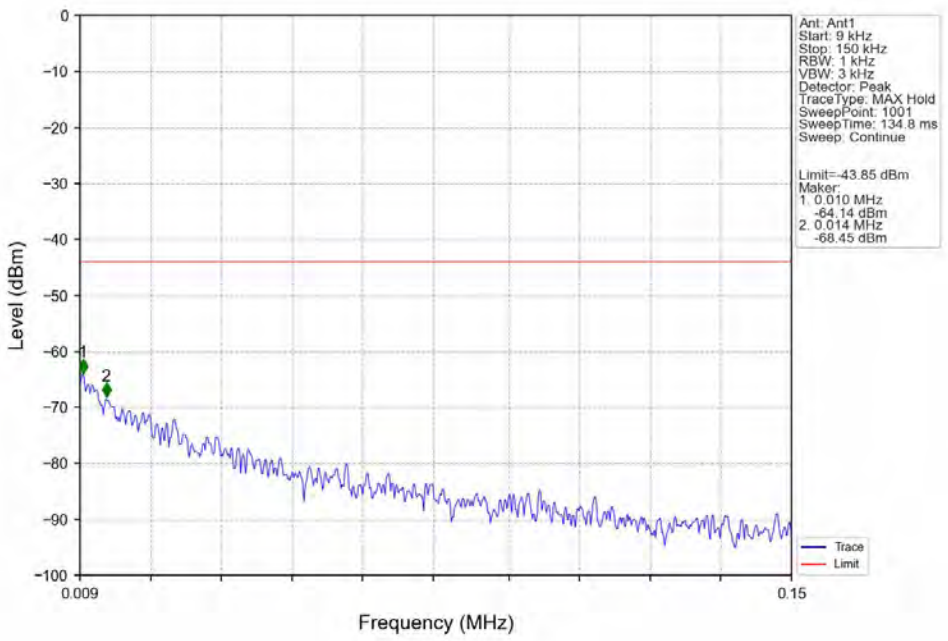


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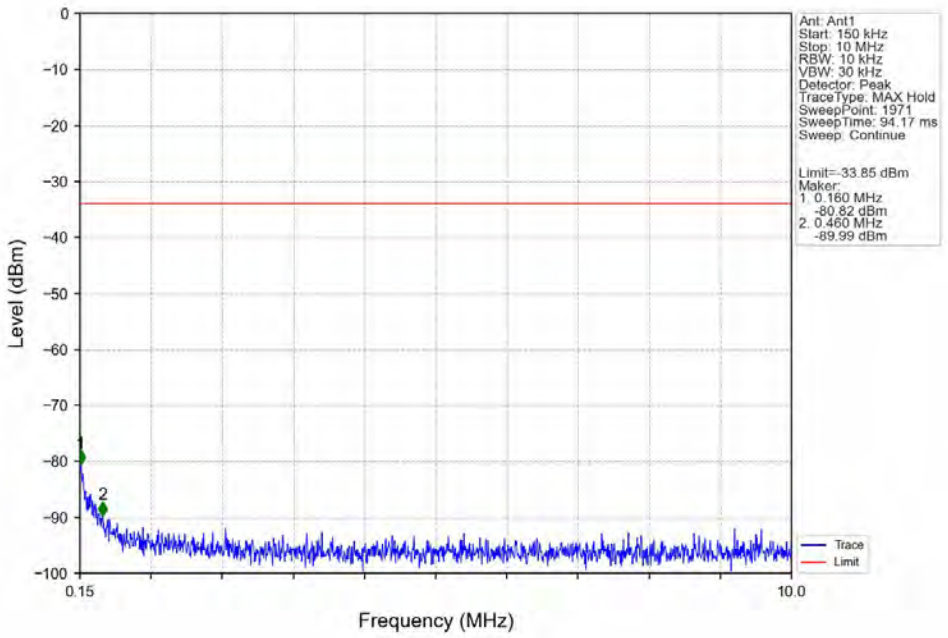

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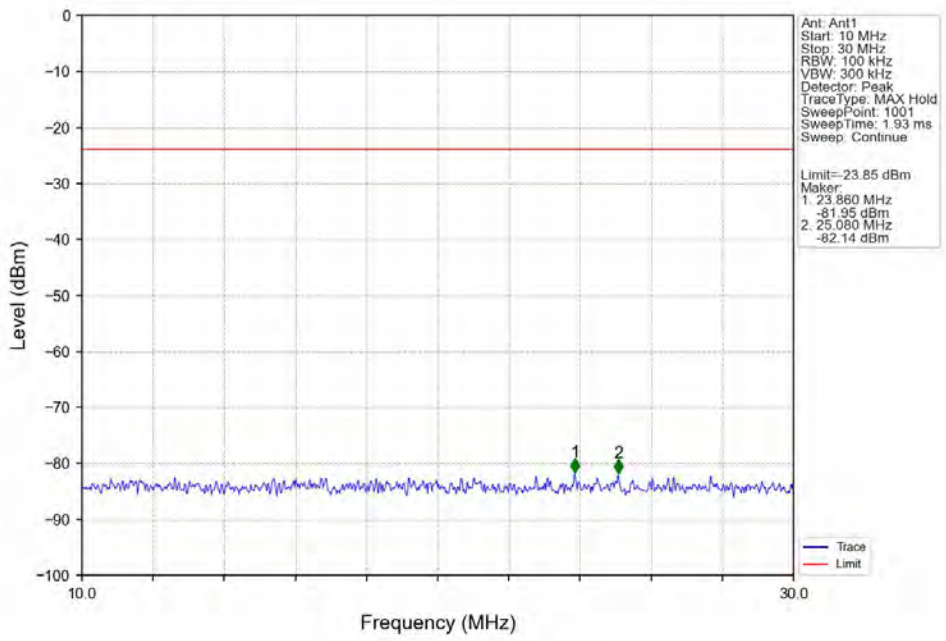


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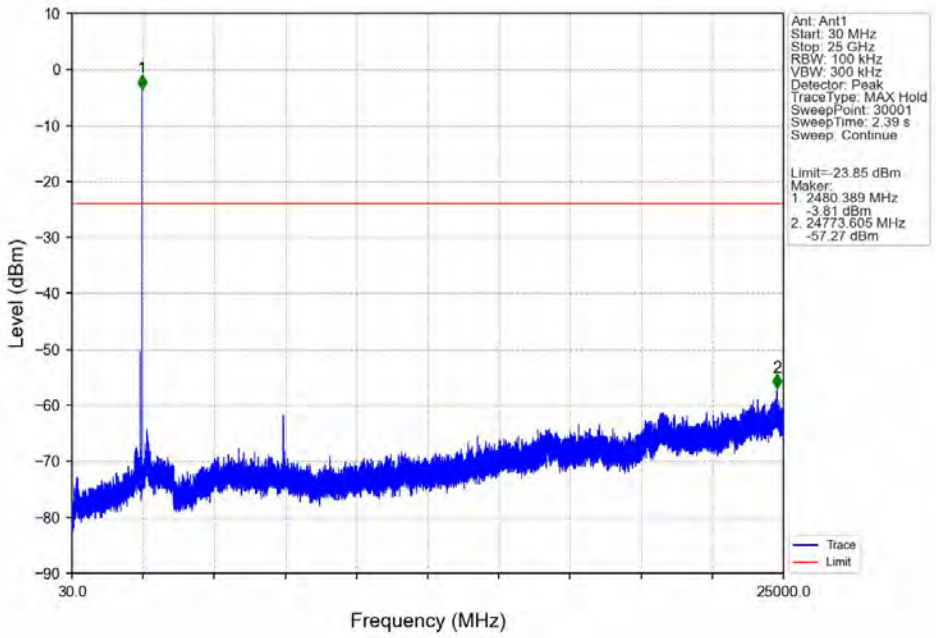

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Address: 101, Building B1, Fuqiao Fourth Area, Qiaotou Community, Fuhai Subdistrict, Baoan District, Shenzhen, Guangdong, China
Website: www.eu-test.com
Tel: (86)-755-2357-9714 Email: Service@eu-test.com