

# FCC RADIO TEST REPORT

**FCC ID: 2A30C-NUROMOD0**

**Product :** NURO

**Trade Name :** N/A

**Model Name :** NURO Mod 0

**Serial Model :** N/A

**Report No. :** UNIA21111516-02

## Prepared for

Building Shooters Technology llc.

PO Box 159, Silver Point, TN, United States 38582

## Prepared by

Shenzhen United Testing Technology Co., Ltd.

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## TEST RESULT CERTIFICATION

**Applicant's name** ..... : Building Shooters Technology llc.  
**Address** ..... : PO Box 159, Silver Point, TN, United States 38582  
**Manufacture's Name** ..... : Building Shooters Technology llc.  
**Address** ..... : PO Box 159, Silver Point, TN, United States 38582

### Product description

**Product name** ..... : NURO  
**Trade Mark** ..... : N/A  
**Model and/or type reference** : NURO Mod 0  
**Standards** ..... : FCC Rules and Regulations Part 15 Subpart C Section 15.247  
 ANSI C63.10: 2013

This device described above has been tested by Shenzhen United Testing Technology Co., Ltd., and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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**Date of Test** ..... :  
**Date (s) of performance of tests** ..... : Oct. 13, 2021 ~ Nov. 10, 2021  
**Date of Issue** ..... : Nov. 10, 2021  
**Test Result** ..... : Pass

Prepared by:

*Bob Liao*

Bob Liao/Editor

Reviewer:

*kahn.yang*

Kahn yang/Supervisor

Approved & Authorized Signer:

*Liuze*

Liuze/Manager

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## 1. TEST SUMMARY

### 1.1 TEST PROCEDURES AND RESULTS

| DESCRIPTION OF TEST         | STANDARD              | RESULT    |
|-----------------------------|-----------------------|-----------|
| CONDUCTED EMISSION          | FCC Part 15.207       | N/A       |
| RADIATED EMISSION           | FCC Part 15.209(a)    | COMPLIANT |
| OCCUPIED BANDWIDTH          | FCC Part 15.247(a)(2) | COMPLIANT |
| POWER SPECTRAL DENSITY      | FCC Part 15.247(e)    | COMPLIANT |
| PEAK OUTPUT POWER           | FCC Part 15.247(b)    | COMPLIANT |
| OUT OF BAND EMISSIONS       | FCC Part 15.247(d)    | COMPLIANT |
| CONDUCTED SPURIOUS EMISSION | FCC Part 15.247(d)    | COMPLIANT |
| ANTENNA REQUIREMENT         | FCC Part 15.203       | COMPLIANT |

### 1.2 TEST FACILITY

Test Firm : Shenzhen United Testing Technology Co., Ltd.  
Address : 2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang Community, Xixiang Str, Bao'an District, Shenzhen, China

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19. The testing quality system of our laboratory meets with ISO/IEC-17025 requirements. This approval result is accepted by MRA of APLAC.

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

A2LA Certificate Number: 4747.01

The EMC Laboratory has been accredited by A2LA, and in compliance with ISO/IEC 17025:2017 General Requirements for testing Laboratories.

FCC Registration Number: 674885

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission.

IC Registration Number: 21947

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada.



### 1.3 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %.

#### Measurement Uncertainty

|                                                       |   |             |
|-------------------------------------------------------|---|-------------|
| Conducted Emission Expanded Uncertainty               | = | 2.23dB, k=2 |
| Radiated emission expanded uncertainty(9kHz-30MHz)    | = | 3.08dB, k=2 |
| Radiated emission expanded uncertainty(30MHz-1000MHz) | = | 4.42dB, k=2 |
| Radiated emission expanded uncertainty(Above 1GHz)    | = | 4.06dB, k=2 |

## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

|                    |                    |
|--------------------|--------------------|
| Equipment          | NURO               |
| Trade Mark         | N/A                |
| Model Name         | NURO Mod 0         |
| Serial No.         | N/A                |
| Model Difference   | N/A                |
| FCC ID             | 2A3OC-NUROMOD0     |
| Antenna Type       | PCB Antenna        |
| Antenna Gain       | 1.0dBi             |
| Frequency Range    | 2402~2480 MHz      |
| Number of Channels | 40                 |
| Modulation Type    | GFSK               |
| Power Source       | DC24V from battery |
| Adapter            | N/A                |

## 2.2 Carrier Frequency of Channels

| Description of Channel: |                 |         |                 |
|-------------------------|-----------------|---------|-----------------|
| Channel                 | Frequency (MHz) | Channel | Frequency (MHz) |
| 01                      | 2402            | 21      | 2442            |
| 02                      | 2404            | 22      | 2444            |
| 03                      | 2406            | 23      | 2446            |
| 04                      | 2408            | 24      | 2448            |
| 05                      | 2410            | 25      | 2450            |
| 06                      | 2412            | 26      | 2452            |
| 07                      | 2414            | 27      | 2454            |
| 08                      | 2416            | 28      | 2456            |
| 09                      | 2418            | 29      | 2458            |
| 10                      | 2420            | 30      | 2460            |
| 11                      | 2422            | 31      | 2462            |
| 12                      | 2424            | 32      | 2464            |
| 13                      | 2426            | 33      | 2466            |
| 14                      | 2428            | 34      | 2468            |
| 15                      | 2430            | 35      | 2470            |
| 16                      | 2432            | 36      | 2472            |
| 17                      | 2434            | 37      | 2474            |
| 18                      | 2436            | 38      | 2476            |
| 19                      | 2438            | 39      | 2478            |
| 20                      | 2440            | 40      | 2480            |

## 2.3 Operation of EUT during testing

Operating Mode

The mode is used:

Transmitting mode for TX running at 2402MHz, 2440MHz, 2480MHz



## 2.4 DESCRIPTION OF TEST SETUP

Operation of EUT during Radiation and Above1GHz Radiation testing:



Table for auxiliary equipment:

| Equipment Description | Manufacturer | Model | Calibration Due Date |
|-----------------------|--------------|-------|----------------------|
| N/A                   | N/A          | N/A   | N/A                  |

## 2.5 MEASUREMENT INSTRUMENTS LIST

| Item                     | Equipment                       | Manufacturer  | Model No.   | Serial No.    | Calibrated until |
|--------------------------|---------------------------------|---------------|-------------|---------------|------------------|
| CONDUCTED EMISSIONS TEST |                                 |               |             |               |                  |
| 1                        | AMN                             | Schwarzbeck   | NNLK8121    | 8121370       | 2022.9.9         |
| 2                        | AMN                             | ETS           | 3810/2      | 00020199      | 2022.9.9         |
| 3                        | EMI TEST RECEIVER               | Rohde&Schwarz | ESCI        | 101210        | 2022.9.9         |
| 4                        | AAN                             | TESEQ         | T8-Cat6     | 38888         | 2022.9.9         |
| RADIATED EMISSION TEST   |                                 |               |             |               |                  |
| 1                        | Horn Antenna                    | Sunol         | DRH-118     | A101415       | 2022.9.9         |
| 2                        | BicoNILog Antenna               | Sunol         | JB1 Antenna | A090215       | 2022.9.9         |
| 3                        | PREAMP                          | HP            | 8449B       | 3008A00160    | 2022.9.9         |
| 4                        | PREAMP                          | HP            | 8447D       | 2944A07999    | 2022.9.9         |
| 5                        | EMI TEST RECEIVER               | Rohde&Schwarz | ESR3        | 101891        | 2022.9.9         |
| 6                        | VECTOR Signal Generator         | Rohde&Schwarz | SMU200A     | 101521        | 2022.9.28        |
| 7                        | Signal Generator                | Agilent       | E4421B      | MY4335105     | 2022.9.28        |
| 8                        | MXA Signal Analyzer             | Agilent       | N9020A      | MY50510140    | 2022.9.28        |
| 9                        | MXA Signal Analyzer             | Agilent       | N9020A      | MY51110104    | 2022.9.9         |
| 10                       | ANT Tower&Turn table Controller | Champro       | EM 1000     | 60764         | 2022.9.28        |
| 11                       | Anechoic Chamber                | Taihe Maorui  | 9m*6m*6m    | 966A0001      | 2022.9.9         |
| 12                       | Shielding Room                  | Taihe Maorui  | 6.4m*4m*3m  | 643A0001      | 2022.9.9         |
| 13                       | RF Power sensor                 | DARE          | RPR3006W    | 15I00041SNO88 | 2022.3.14        |

|     |                                     |               |            |               |            |
|-----|-------------------------------------|---------------|------------|---------------|------------|
| 14  | RF Power sensor                     | DARE          | RPR3006W   | 15I00041SNO89 | 2022.3.14  |
| 15  | RF power divider                    | Anritsu       | K241B      | 992289        | 2022.9.28  |
| 16  | Wideband radio communication tester | Rohde&Schwarz | CMW500     | 154987        | 2022.9.28  |
| 17  | Biconical antenna                   | Schwarzbeck   | VHA 9103   | 91032360      | 2022.9.8   |
| 18  | Biconical antenna                   | Schwarzbeck   | VHA 9103   | 91032361      | 2022.9.8   |
| 19  | Broadband Hybrid Antennas           | Schwarzbeck   | VULB9163   | VULB9163#958  | 2022.9.8   |
| 20  | Horn Antenna                        | Schwarzbeck   | BBHA9120D  | 9120D-1680    | 2022.1.12  |
| 21  | Active Receive Loop Antenna         | Schwarzbeck   | FMZB 1919B | 00023         | 2022.9.8   |
| 22  | Horn Antenna                        | Schwarzbeck   | BBHA 9170  | BBHA9170651   | 2022.03.14 |
| 23  | Microwave Broadband Preamplifier    | Schwarzbeck   | BBV 9721   | 100472        | 2022.9.8   |
| 24  | Active Loop Antenna                 | Com-Power     | AL-130R    | 10160009      | 2022.05.10 |
| 25  | Power Meter                         | KEYSIGHT      | N1911A     | MY50520168    | 2022.05.10 |
| 26  | Frequency Meter                     | VICTOR        | VC2000     | 997406086     | 2022.05.10 |
| 27  | DC Power Source                     | HYELEC        | HY5020E    | 055161818     | 2022.05.10 |
| 24* | Active Loop Antenna                 | Com-Power     | AL-130R    | 10160009      | 2022.05.09 |
| 25* | Power Meter                         | KEYSIGHT      | N1911A     | MY50520168    | 2022.05.09 |
| 26* | Frequency Meter                     | VICTOR        | VC2000     | 997406086     | 2022.05.09 |
| 27* | DC Power Source                     | HYELEC        | HY5020E    | 055161818     | 2022.05.09 |

### 3. CONDUCTED EMISSIONS TEST

#### 3.1 Conducted Power Line Emission Limit

For unintentional device, according to § 15.207(a) Line Conducted Emission Limits is as following

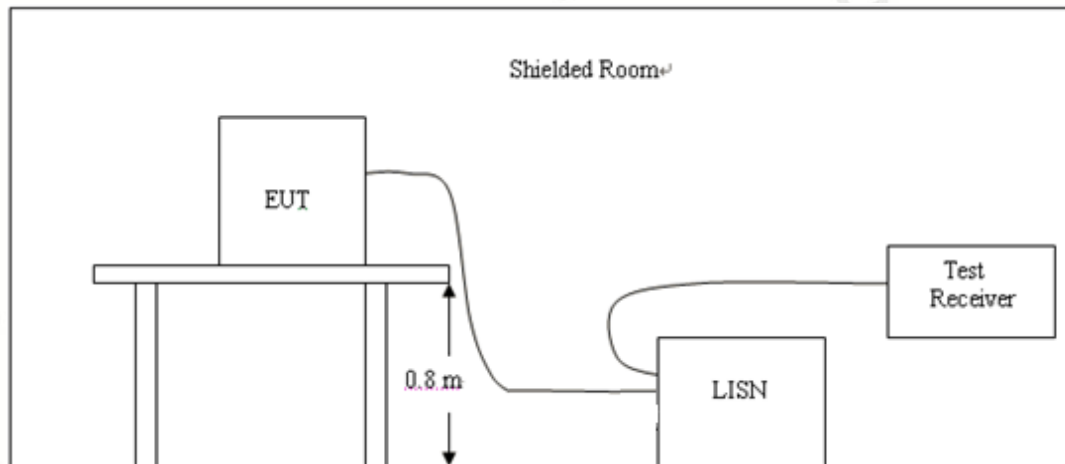
| Frequency<br>(MHz) | Maximum RF Line Voltage(dB V) |      |         |        |
|--------------------|-------------------------------|------|---------|--------|
|                    | CLASS A                       |      | CLASS B |        |
|                    | Q.P.                          | Ave. | Q.P.    | Ave.   |
| 0.15~0.50          | 79                            | 66   | 66~56*  | 56~46* |
| 0.50~5.00          | 73                            | 60   | 56      | 46     |
| 5.00~30.0          | 73                            | 60   | 60      | 50     |

\*

Decreasing linearly with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

#### 3.2 Test Setup



#### 3.3 Test Procedure

- 1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. A wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
- 2, Support equipment, if needed, was placed as per ANSI C63.10.
- 3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4, If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5, All support equipments received AC power from a second LISN, if any.
- 6, The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

#### 3.4 Test Result

N/A

## 4 RADIATED EMISSION TEST

### 4.1 Radiation Limit

For unintentional device, according to § 15.209(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

| Frequency         | Field strength<br>(microvolt/meter) | Limit<br>(dBuV/m ) | Remark     | Measurement<br>distance (m) |
|-------------------|-------------------------------------|--------------------|------------|-----------------------------|
| 0.009MHz-0.490MHz | 2400/F (kHz)                        | -                  | Quasi-peak | 300                         |
| 0.490MHz-1.705MHz | 24000/F (kHz)                       | -                  | Quasi-peak | 30                          |
| 1.705MHz-30MHz    | 30                                  | -                  | Quasi-peak | 30                          |
| 30MHz-88MHz       | 100                                 | 40.0               | Quasi-peak | 3                           |
| 88MHz-216MHz      | 150                                 | 43.5               | Quasi-peak | 3                           |
| 216MHz-960MHz     | 200                                 | 46.0               | Quasi-peak | 3                           |
| 960MHz-1GHz       | 500                                 | 54.0               | Quasi-peak | 3                           |
| Above 1GHz        | 500                                 | 54.0               | Average    | 3                           |
|                   |                                     | 74.0               | Peak       | 3                           |

Limit calculation and transfer to 3m distance as showed in the following table:

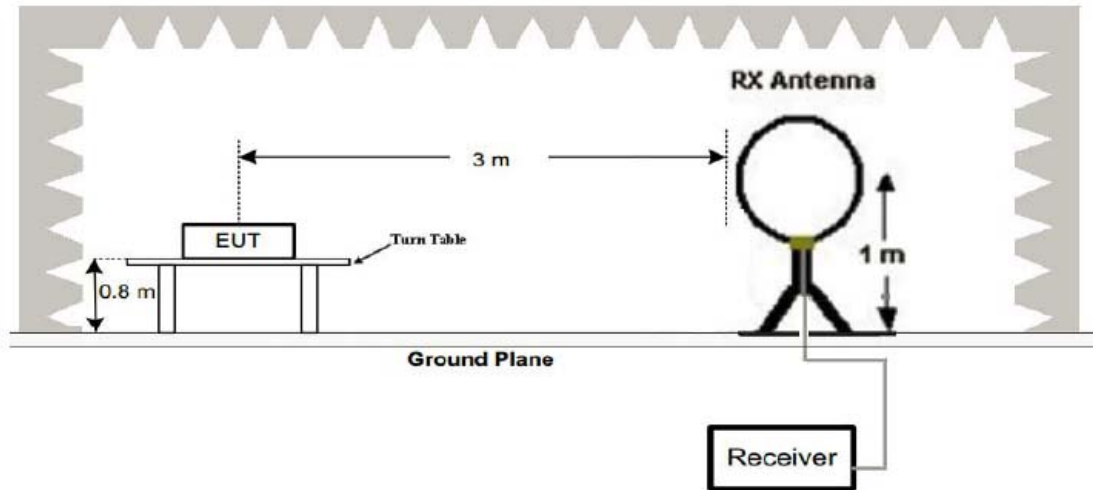
| Frequency<br>(MHz) | Limit<br>(dBuV/m)                   | Distance<br>(m) |
|--------------------|-------------------------------------|-----------------|
| 0.009-0.490        | $20\log(2400/F(KHz))+40\log(300/3)$ | 3               |
| 0.490-1.705        | $20\log(24000/F(KHz))+40\log(30/3)$ | 3               |
| 1.705-30.0         | 69.5                                | 3               |
| 30-88              | 40.0                                | 3               |
| 88-216             | 43.5                                | 3               |
| 216-960            | 46.0                                | 3               |
| Above 960          | 54.0                                | 3               |

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

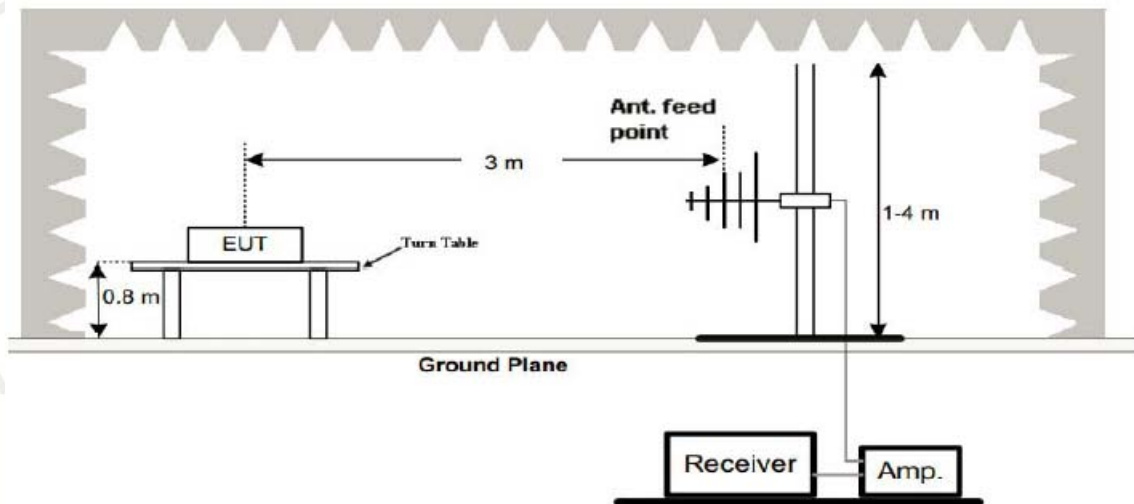
### 4.2 Test Setup



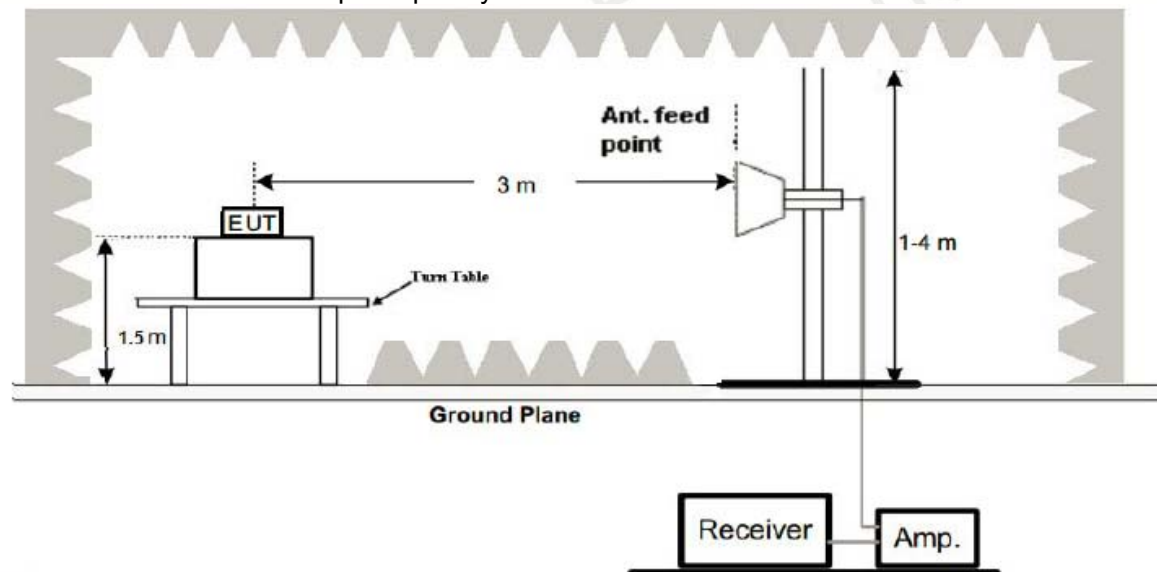
### 1. Radiated Emission Test-Up Frequency Below 30MHz



### 2. Radiated Emission Test-Up Frequency 30MHz~1GHz



### 3. Radiated Emission Test-Up Frequency Above 1GHz



#### 4.3 Test Procedure

1. Below 1GHz measurement the EUT is placed on turntable which is 0.8m above ground plane. And above 1GHz measurement EUT was placed on low permittivity and low tangent turn table which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The test frequency range from 9KHz to 25GHz per FCC PART 15.33(a).

Note:

For battery operated equipment, the equipment tests shall be performed using a new battery.

#### 4.4 Test Result

PASS

Remark:

1. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "Z axis" position was the worst, and test data recorded in this report.

##### Below 30M

|               |                    |                    |            |
|---------------|--------------------|--------------------|------------|
| Temperature:  | 22°C               | Relative Humidity: | 48%        |
| Test Date:    | 2021-11-02         | Pressure:          | 1010hPa    |
| Test Voltage: | DC24V from battery | Polarization:      | Horizontal |
| Test Mode:    | TX                 |                    |            |

| Freq. | Reading  | Limit    | Margin | State |
|-------|----------|----------|--------|-------|
| (MHz) | (dBuV/m) | (dBuV/m) | (dB)   | P/F   |
| --    | --       | --       | --     | P     |
| --    | --       | --       | --     | P     |

Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

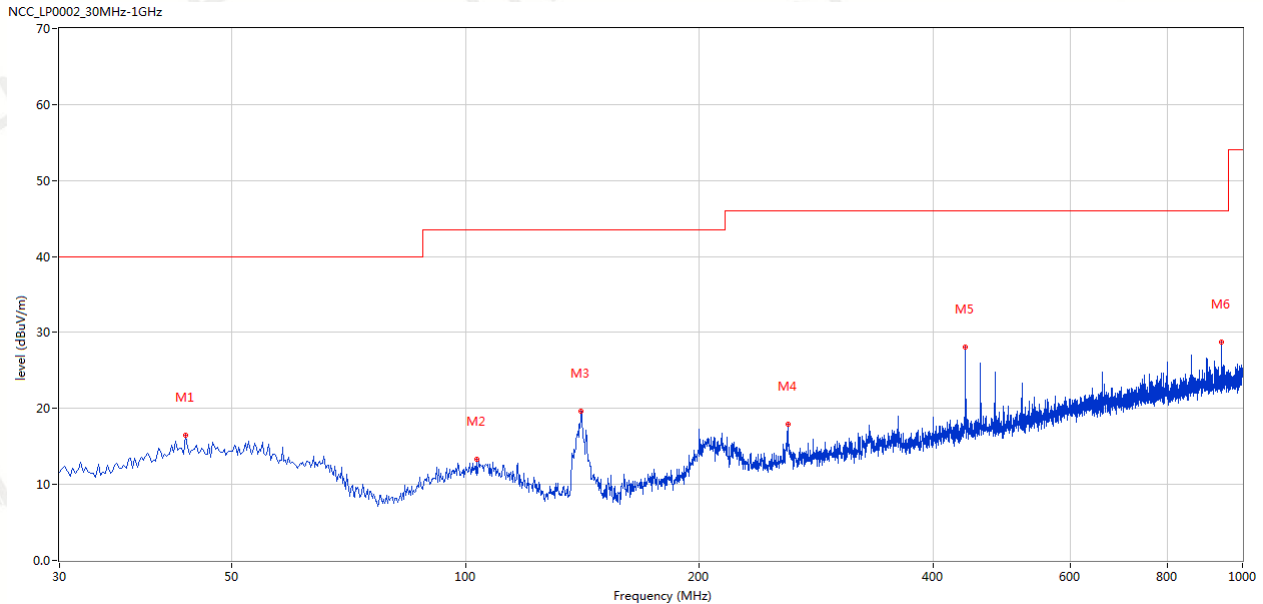
Distance extrapolation factor =  $20 \log (\text{specific distance/test distance})$ (dB);

Limit line = specific limits(dBuv) + distance extrapolation factor



### Below 1GHz Test Results:

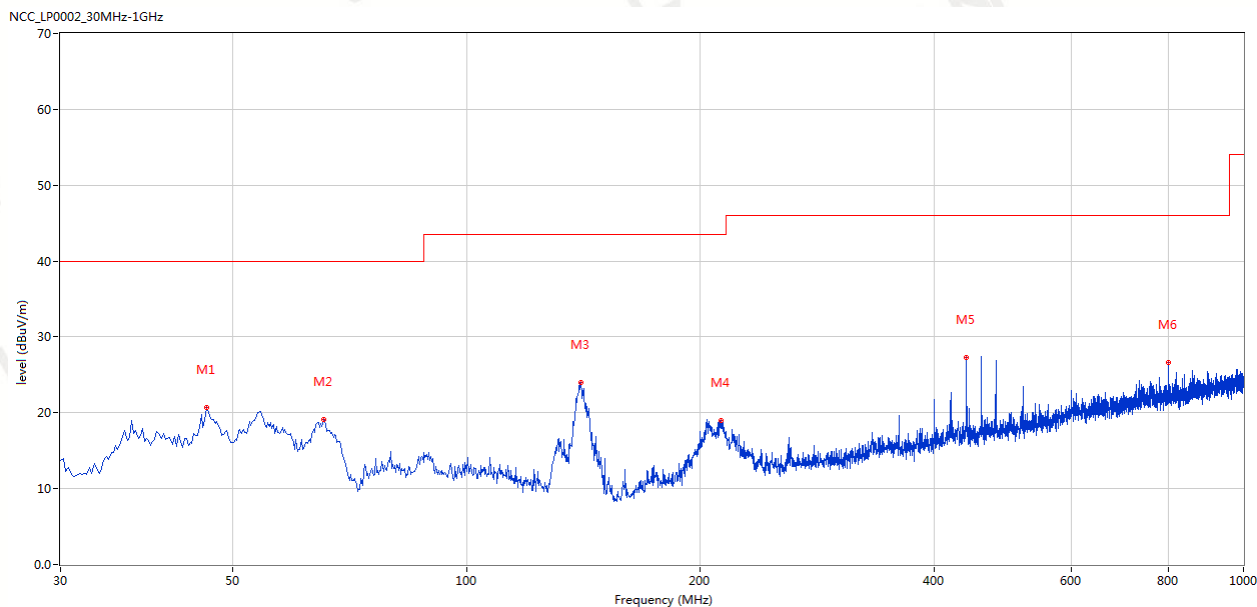
|               |                    |                    |            |
|---------------|--------------------|--------------------|------------|
| Temperature:  | 22°C               | Relative Humidity: | 48%        |
| Test Date:    | 2021-11-02         | Pressure:          | 1010hPa    |
| Test Voltage: | DC24V from battery | Polarization:      | Horizontal |
| Test Mode:    | TX                 |                    |            |



| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | ANT        | Verdict |
|-----|-----------------|------------------|-------------|----------------|-----------------|----------|------------|---------|
| 1   | 43.577          | 16.47            | -11.49      | 40.0           | -23.53          | Peak     | Horizontal | Pass    |
| 2   | 103.217         | 13.34            | -13.37      | 43.5           | -30.16          | Peak     | Horizontal | Pass    |
| 3   | 140.795         | 18.74            | -17.25      | 43.5           | -24.76          | Peak     | Horizontal | Pass    |
| 4   | 259.833         | 17.88            | -11.85      | 46.0           | -28.12          | Peak     | Horizontal | Pass    |
| 5   | 439.965         | 28.14            | -8.08       | 46.0           | -17.86          | Peak     | Horizontal | Pass    |
| 6   | 939.875         | 28.80            | -1.76       | 46.0           | -17.20          | Peak     | Horizontal | Pass    |

Remark: Absolute Level = Reading Level + Factor, Margin = Absolute Level – Limit  
Factor = Ant. Factor + Cable Loss – Pre-amplifier

|               |                    |                    |          |
|---------------|--------------------|--------------------|----------|
| Temperature:  | 22°C               | Relative Humidity: | 48%      |
| Test Date:    | 2021-11-02         | Pressure:          | 1010hPa  |
| Test Voltage: | DC24V from battery | Polarization:      | Vertical |
| Test Mode:    | TX                 |                    |          |



| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | ANT      | Verdict |
|-----|-----------------|------------------|-------------|----------------|-----------------|----------|----------|---------|
| 1   | 46.243          | 20.65            | -11.41      | 40.0           | -19.35          | Peak     | Vertical | Pass    |
| 2   | 65.396          | 19.05            | -13.71      | 40.0           | -20.95          | Peak     | Vertical | Pass    |
| 3   | 140.310         | 24.01            | -17.22      | 43.5           | -19.49          | Peak     | Vertical | Pass    |
| 4   | 212.314         | 19.00            | -13.67      | 43.5           | -24.50          | Peak     | Vertical | Pass    |
| 5   | 439.965         | 27.34            | -8.08       | 46.0           | -18.66          | Peak     | Vertical | Pass    |
| 6   | 799.988         | 26.66            | -2.96       | 46.0           | -19.34          | Peak     | Vertical | Pass    |

Remark: Absolute Level = Reading Level + Factor, Margin = Absolute Level – Limit  
Factor = Ant. Factor + Cable Loss – Pre-amplifier

Remark:

- (1) Measuring frequencies from 9 KHz to the 1 GHz, Radiated emission test from 9KHz to 30MHz was verified, and no any emission was found except system noise floor.
- (2) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (3) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

### Above 1 GHz Test Results:

|                      |                                            |                    |                    |
|----------------------|--------------------------------------------|--------------------|--------------------|
| EUT:                 | NURO                                       | Model Name :       | NURO Mod 0         |
| Temperature:         | 25 °C                                      | Test Date:         | 2021-11-02         |
| Pressure:            | 1010 hPa                                   | Relative Humidity: | 60%                |
| Test Mode :          | TX                                         | Test Voltage :     | DC24V from battery |
| Measurement Distance | 3 m                                        | Frenqucy Range     | 1GHz to 25GHz      |
| RBW/VBW              | 1MHz/1MHz for Peak, 1MHz/10Hz for Average. |                    |                    |

| Frequency (MHz)                                                              | Reading (dBμV) | Factor (dB) | Corrected Amplitude (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Polar (H/V) |
|------------------------------------------------------------------------------|----------------|-------------|------------------------------|----------------|-------------|--------|-------------|
| Low Channel (2402 MHz)-Above 1G                                              |                |             |                              |                |             |        |             |
| 4804.215                                                                     | 57.15          | -3.64       | 60.79                        | 74.00          | -13.21      | Pk     | Vertical    |
| 4804.215                                                                     | 39.51          | -3.64       | 43.15                        | 54.00          | -10.85      | AV     | Vertical    |
| 7206.136                                                                     | 57.61          | -0.95       | 58.56                        | 74.00          | -15.44      | Pk     | Vertical    |
| 7206.136                                                                     | 37.06          | -0.95       | 38.01                        | 54.00          | -15.99      | AV     | Vertical    |
| 4804.211                                                                     | 56.08          | -3.64       | 59.72                        | 74.00          | -14.28      | Pk     | Horizontal  |
| 4804.211                                                                     | 40.21          | -3.64       | 43.85                        | 54.00          | -10.15      | AV     | Horizontal  |
| 7206.302                                                                     | 55.24          | -0.95       | 56.19                        | 74.00          | -17.81      | Pk     | Horizontal  |
| 7206.302                                                                     | 37.09          | -0.95       | 38.04                        | 54.00          | -15.96      | AV     | Horizontal  |
| Mid Channel (2440 MHz)-Above 1G                                              |                |             |                              |                |             |        |             |
| 4880.147                                                                     | 58.04          | -3.68       | 61.72                        | 74.00          | -12.28      | Pk     | Vertical    |
| 4880.147                                                                     | 40.1           | -3.68       | 43.78                        | 54.00          | -10.22      | AV     | Vertical    |
| 7320.207                                                                     | 57.41          | -0.82       | 58.23                        | 74.00          | -15.77      | Pk     | Vertical    |
| 7320.207                                                                     | 40.13          | -0.82       | 40.95                        | 54.00          | -13.05      | AV     | Vertical    |
| 4880.174                                                                     | 57.51          | -3.68       | 61.19                        | 74.00          | -12.81      | Pk     | Horizontal  |
| 4880.174                                                                     | 42.06          | -3.68       | 45.74                        | 54.00          | -8.26       | AV     | Horizontal  |
| 7320.088                                                                     | 57.49          | -0.82       | 58.31                        | 74.00          | -15.69      | Pk     | Horizontal  |
| 7320.088                                                                     | 37.31          | -0.82       | 38.13                        | 54.00          | -15.87      | AV     | Horizontal  |
| High Channel (2480MHz)- Above 1G                                             |                |             |                              |                |             |        |             |
| 4960.268                                                                     | 57.67          | -3.59       | 61.26                        | 74.00          | -12.74      | Pk     | Vertical    |
| 4960.268                                                                     | 40.81          | -3.59       | 44.40                        | 54.00          | -9.60       | AV     | Vertical    |
| 7440.031                                                                     | 56.49          | -0.68       | 57.17                        | 74.00          | -16.83      | Pk     | Vertical    |
| 7440.031                                                                     | 40.51          | -0.68       | 41.19                        | 54.00          | -12.81      | AV     | Vertical    |
| 4960.144                                                                     | 57.31          | -3.59       | 60.90                        | 74.00          | -13.10      | Pk     | Horizontal  |
| 4960.144                                                                     | 40.5           | -3.59       | 44.09                        | 54.00          | -9.91       | AV     | Horizontal  |
| 7440.247                                                                     | 59.73          | -0.68       | 60.41                        | 74.00          | -13.59      | Pk     | Horizontal  |
| 7440.247                                                                     | 37.56          | -0.68       | 38.24                        | 54.00          | -15.76      | AV     | Horizontal  |
| Remark: Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit |                |             |                              |                |             |        |             |

Remark :

- (1) Measuring frequencies from 1 GHz to the 25 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) Data of measurement within this frequency range shown "----" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
- (6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.



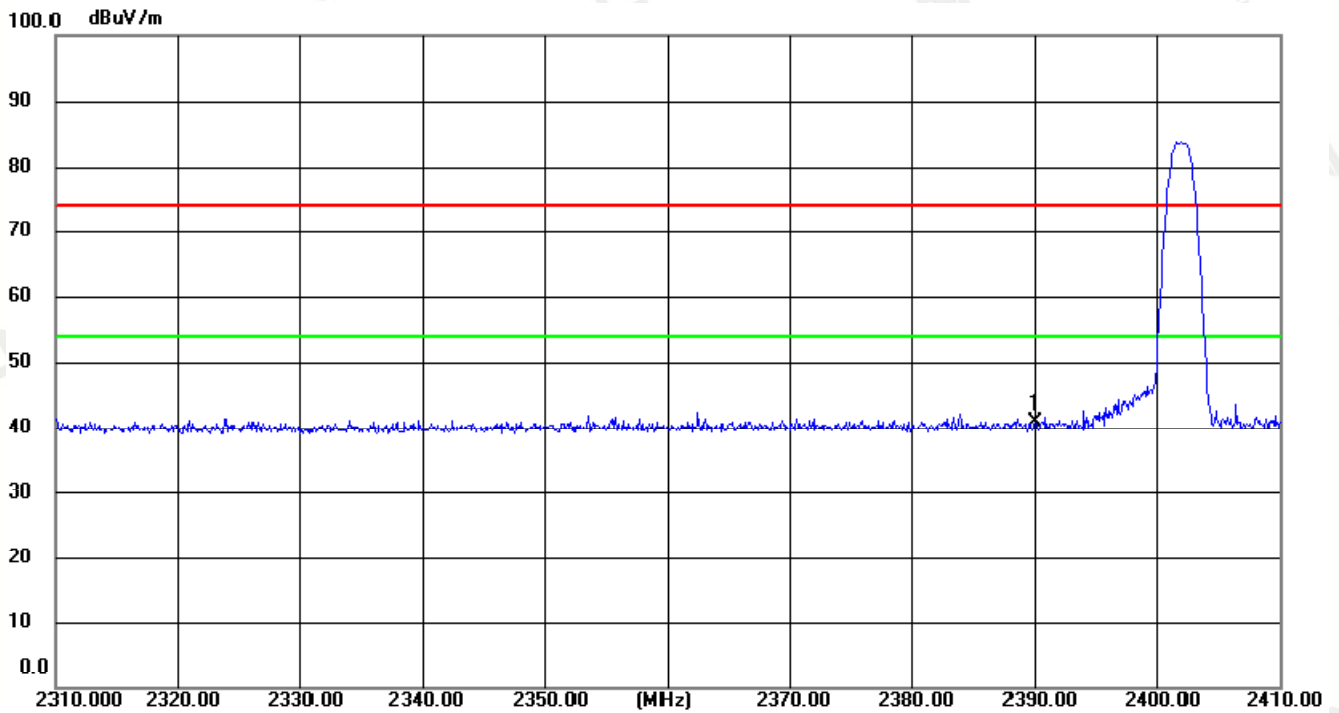
## Operation Mode: TX Mode

| Freq.<br>(MHz) | Ant.Pol.<br>H/V | Reading        |              | Ant/CF<br>CF(dB) | Act              |                | Limit            |                | Note |
|----------------|-----------------|----------------|--------------|------------------|------------------|----------------|------------------|----------------|------|
|                |                 | Peak<br>(dBuv) | AV<br>(dBuv) |                  | Peak<br>(dBuv/m) | AV<br>(dBuv/m) | Peak<br>(dBuv/m) | AV<br>(dBuv/m) |      |
| 2390.00        | H               | 46.66          | --           | -5.79            | 40.87            | --             | 74.00            | 54.00          | CH01 |
| 2390.00        | V               | 45.71          | --           | -5.79            | 39.92            | --             | 74.00            | 54.00          | CH01 |
| 2483.50        | H               | 45.71          | --           | -4.98            | 40.73            | --             | 74.00            | 54.00          | CH01 |
| 2483.50        | V               | 44.64          | --           | -4.98            | 39.66            | --             | 74.00            | 54.00          | CH01 |

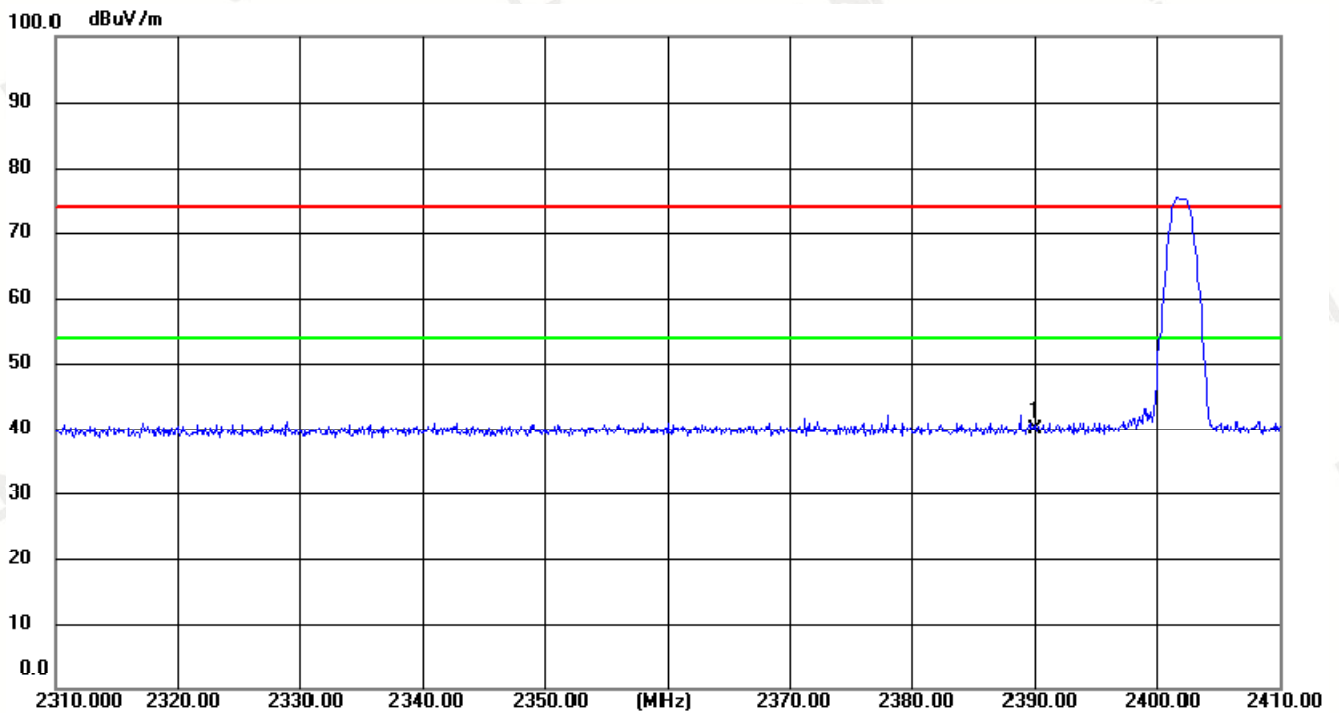
Corr.Factor = Antenna Factor + Cable Loss – Pre-amplifier.



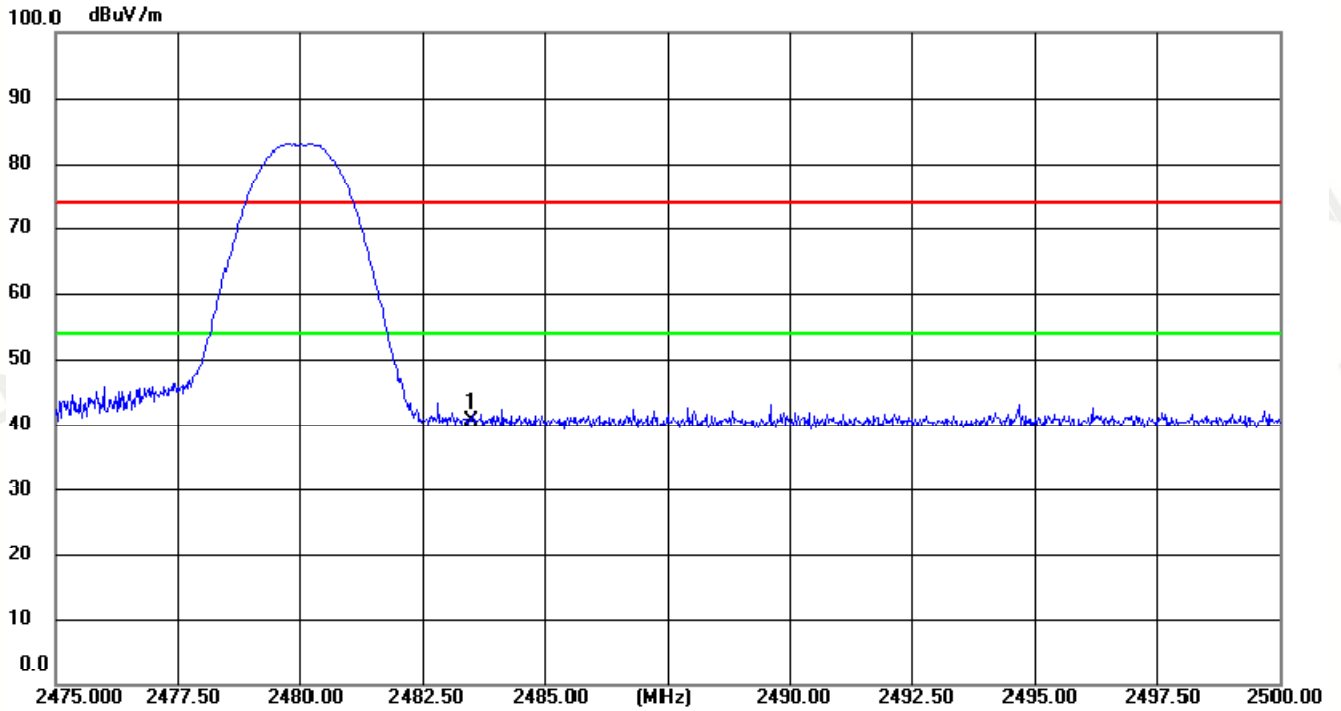
### Horizontal



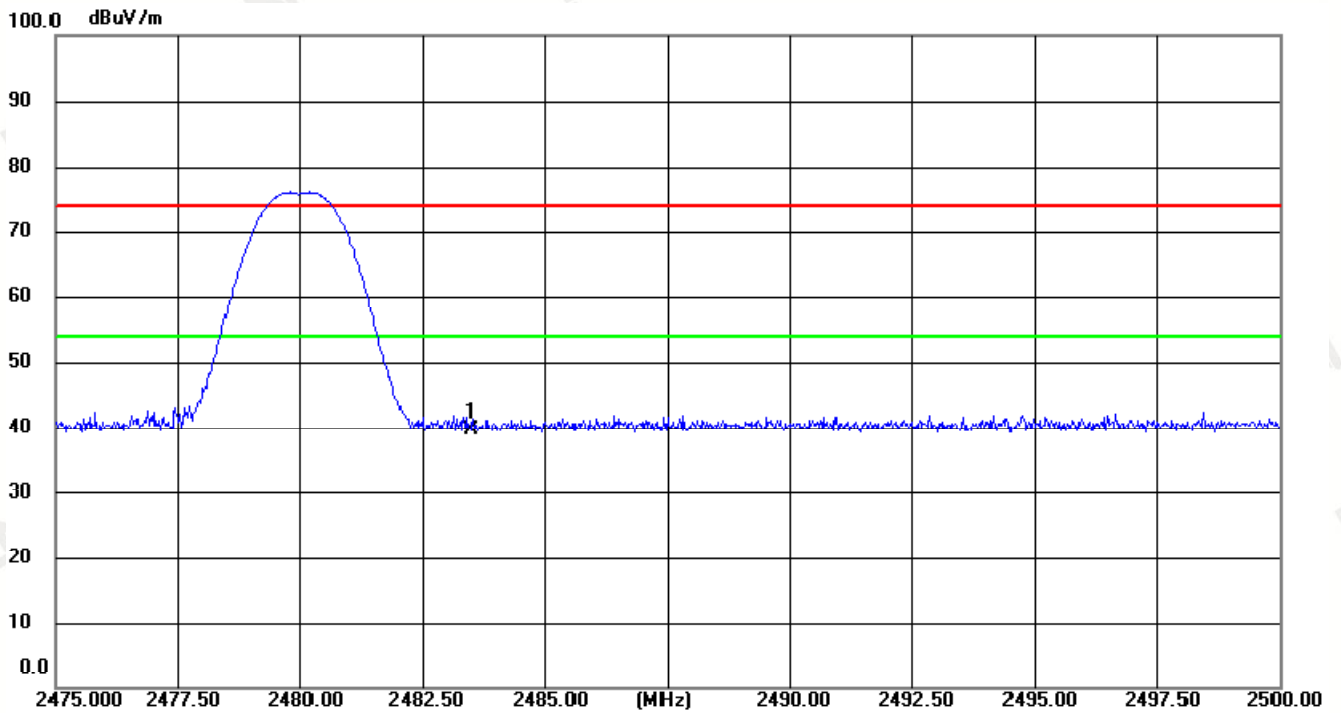
### Vertical



### Horizontal



### Vertical



## 5 OCCUPIED BANDWIDTH MEASUREMENT

### 5.1 Test Limit

| FCC Part15(15.247), Subpart C |           |                                         |                       |        |
|-------------------------------|-----------|-----------------------------------------|-----------------------|--------|
| Section                       | Test Item | Limit                                   | Frequency Range (MHz) | Result |
| 15.247(a)(2)                  | Bandwidth | $\geq 500\text{KHz}$<br>(6dB bandwidth) | 2400-2483.5           | PASS   |

### 5.2 Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
2. Spectrum Setting: RBW= 100KHz, VBW=300KHz, Sweep time = Auto, Span=6MHz.

### 5.3 TEST SETUP

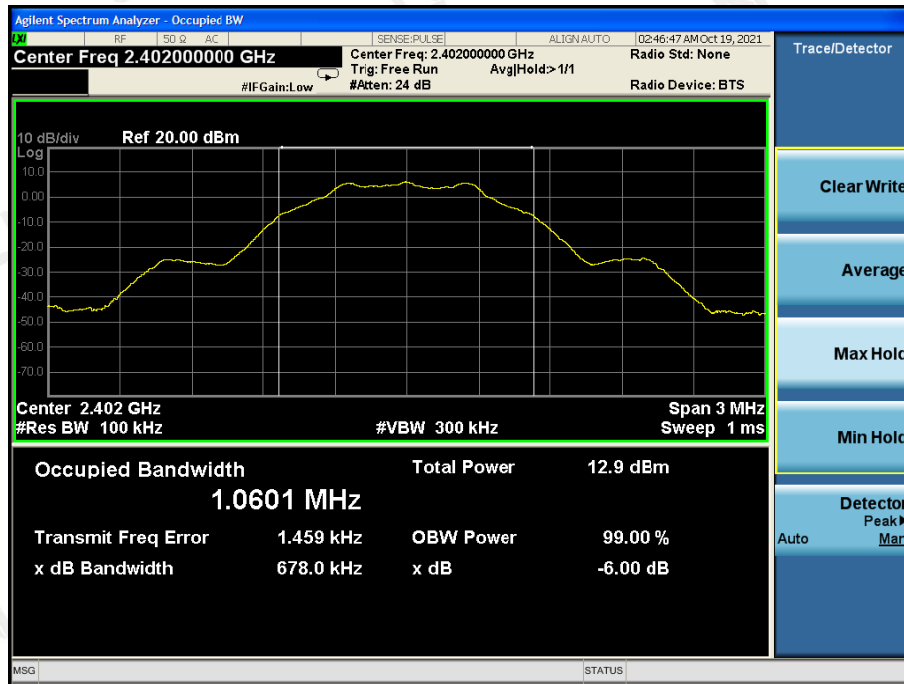


### 5.4 Test Result

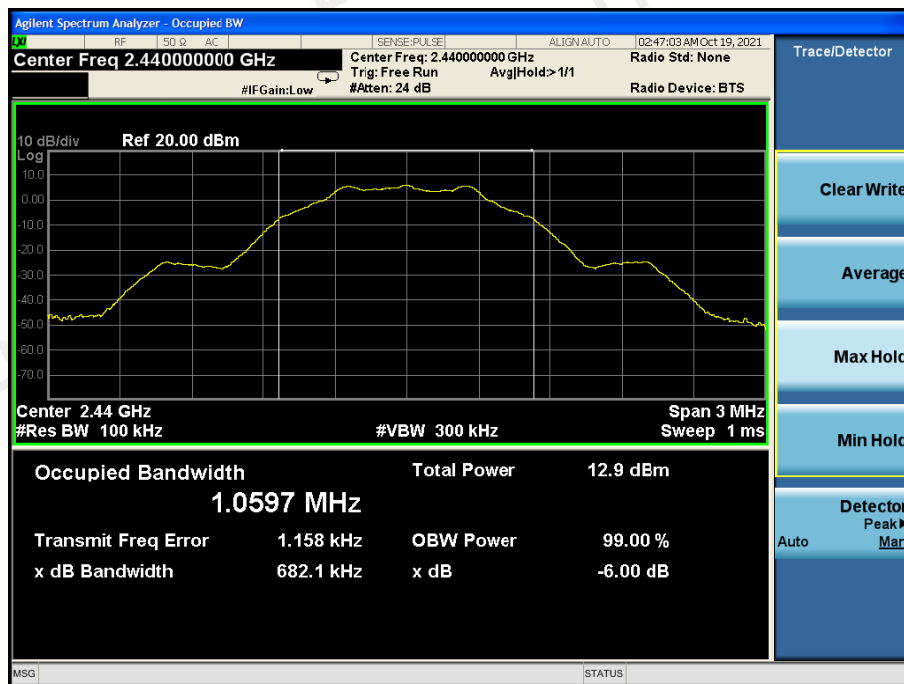
PASS

| Mode | Freq  | 6dB   | 99%OBW | Conclusion |
|------|-------|-------|--------|------------|
|      | (MHz) | (kHz) | (MHz)  |            |
| TX   | 2402  | 678.0 | --     | PASS       |
|      | 2440  | 682.1 | --     | PASS       |
|      | 2480  | 675.6 | --     | PASS       |

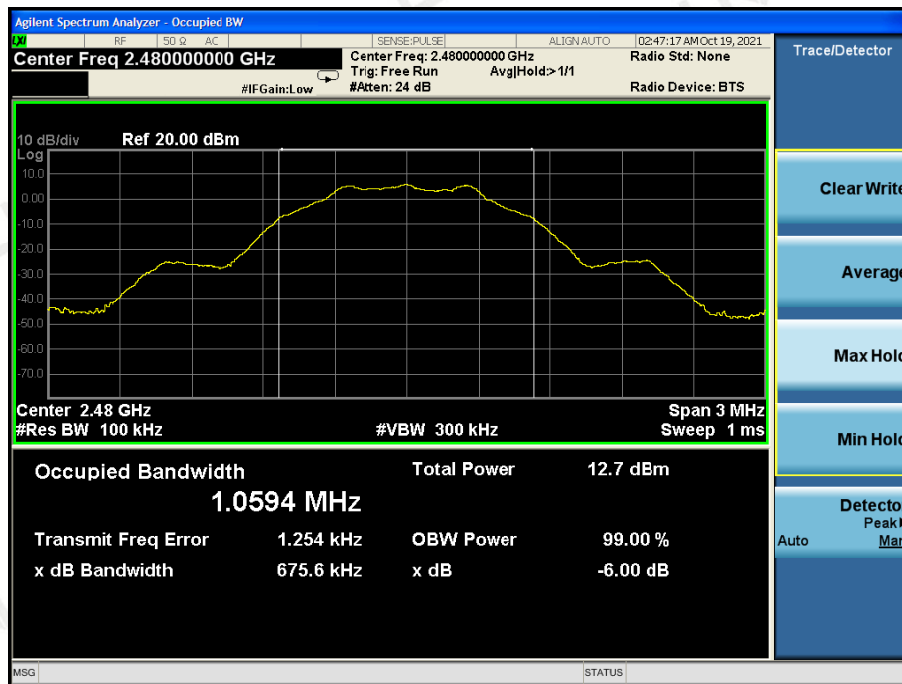
## 2402 MHZ



## 2440 MHZ



# 2480 MHZ





## 6 POWER SPECTRAL DENSITY

### 6.1 TEST LIMIT

| FCC Part15(15.247), Subpart C |                        |                     |                       |        |
|-------------------------------|------------------------|---------------------|-----------------------|--------|
| Section                       | Test Item              | Limit               | Frequency Range (MHz) | Result |
| 15.247                        | Power Spectral Density | 8 dBm (in any 3kHz) | 2400-2483.5           | PASS   |

### 6.2 TEST PROCEDURE

1. The EUT was directly connected to the spectrum analyzer.
2. Set EUT as normal operation.
3. Based on FCC Part15 C Section 15.247: RBW=3kHz, VBW=10kHz.
4. Set detected by the spectrum analyzer with peak detector.

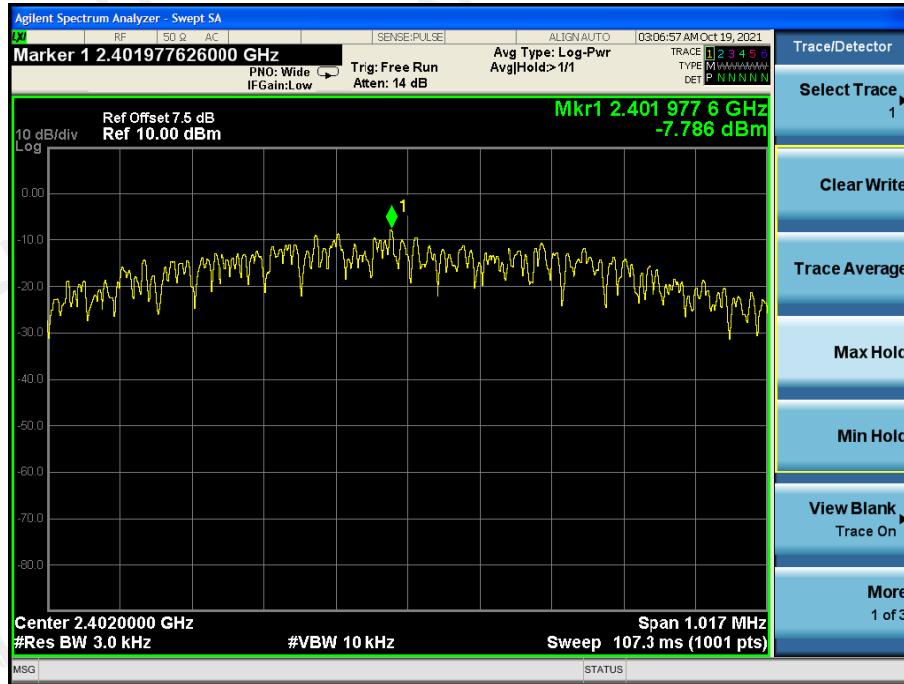
### 6.3 TEST SETUP



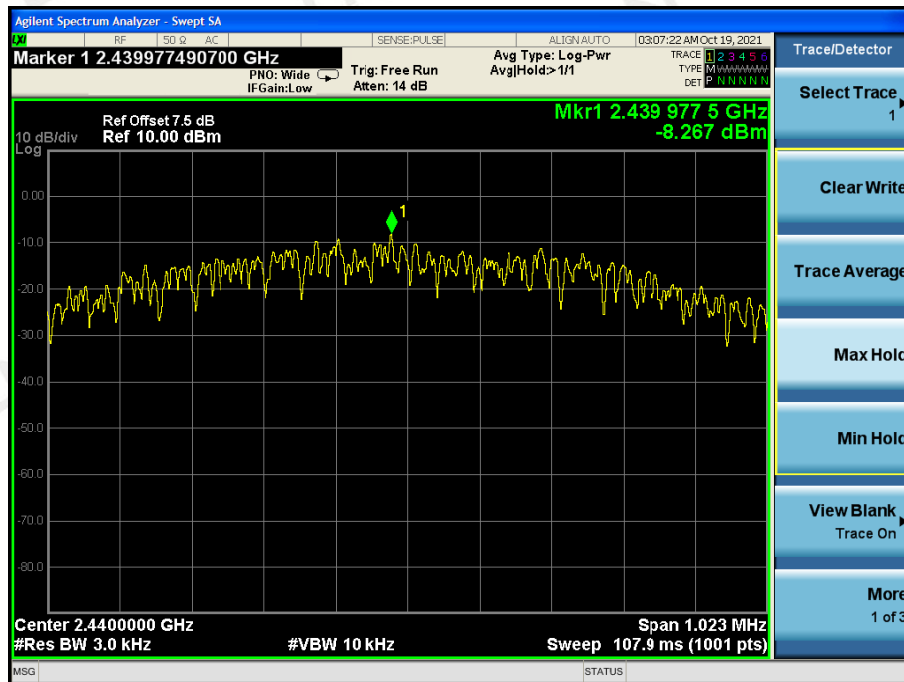
### 6.4 TEST RESULT

PASS

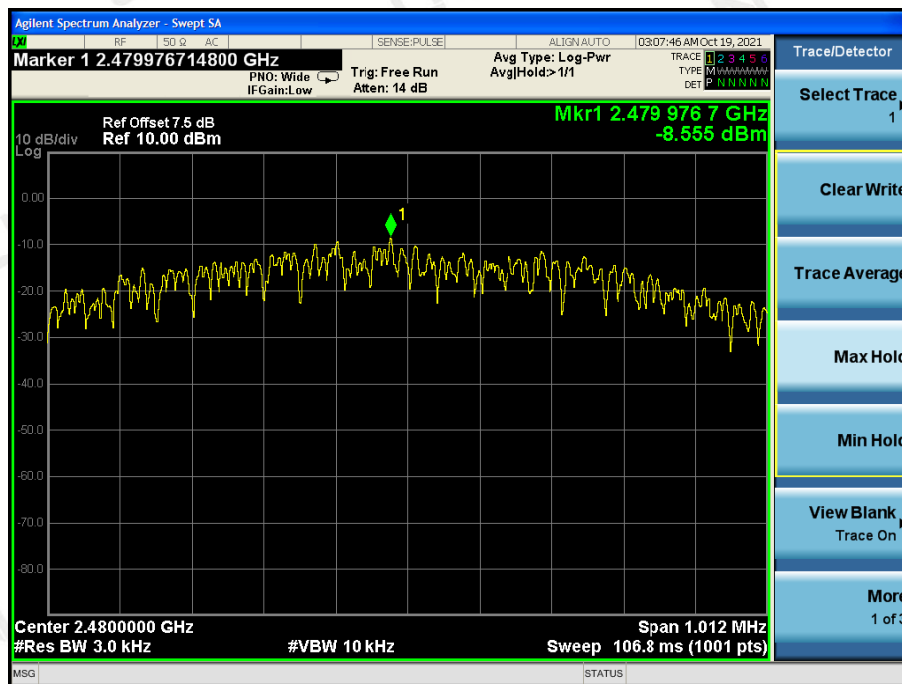
| Mode | Freq  | Power Density | Limit      | Result |
|------|-------|---------------|------------|--------|
|      | (MHz) | (dBm/3kHz)    | (dBm/3kHz) |        |
| TX   | 2402  | -7.786        | 8          | PASS   |
|      | 2440  | -8.267        | 8          | PASS   |
|      | 2480  | -8.555        | 8          | PASS   |



2440 MHZ



## 2480 MHZ



## 7 PEAK OUTPUT POWER

### 7.1 TEST LIMIT

| FCC Part15(15.247), Subpart C |                   |                 |                       |        |
|-------------------------------|-------------------|-----------------|-----------------------|--------|
| Section                       | Test Item         | Limit           | Frequency Range (MHz) | Result |
| 15.247(b)(3)                  | Peak Output Power | 1 watt or 30dBm | 2400-2483.5           | PASS   |

### 7.2 TEST PROCEDURE

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
2. Spectrum Setting : RBW= 1 MHz, VBW= 3 MHz, Span=3MHz,Detector=Peak,Trace mode= Max Hold ,Sweep time = Auto.

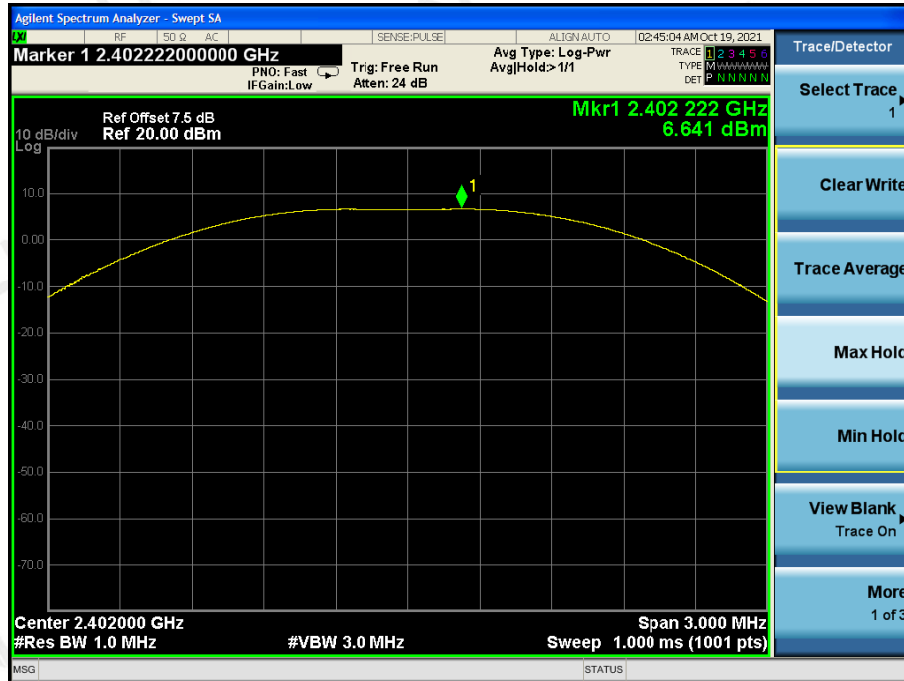
### 7.3 TEST SETUP



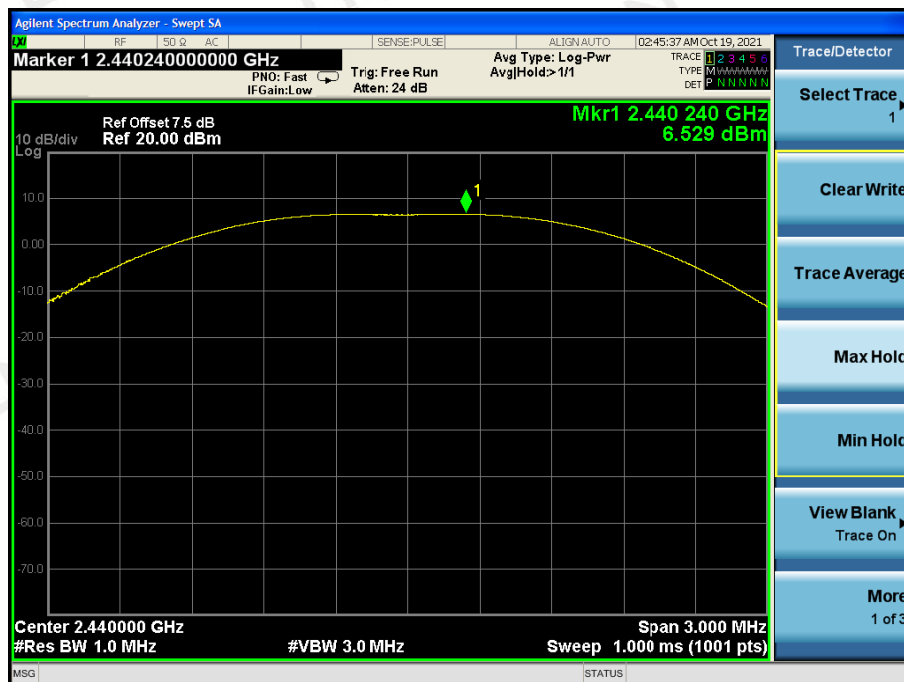
### 7.4 TEST RESULT

PASS

| Test Mode | Frequency (MHz) | Maximum Peak Conducted Output Power (dBm) | LIMIT (dBm) |
|-----------|-----------------|-------------------------------------------|-------------|
| TX        | 2402            | 6.641                                     | 30          |
|           | 2440            | 6.529                                     | 30          |
|           | 2480            | 6.354                                     | 30          |

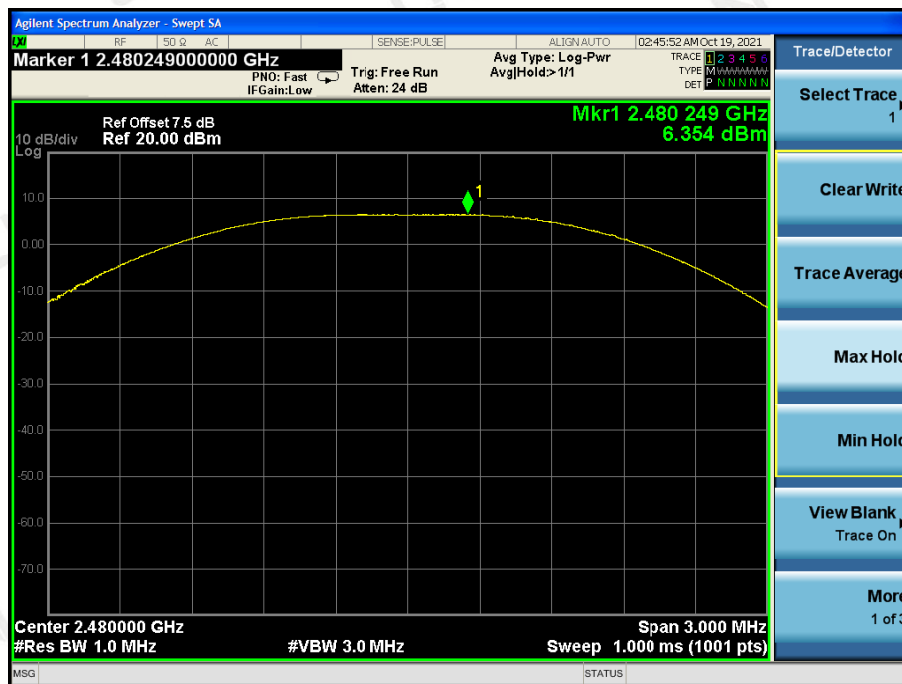


2440 MHz





2480 MHz

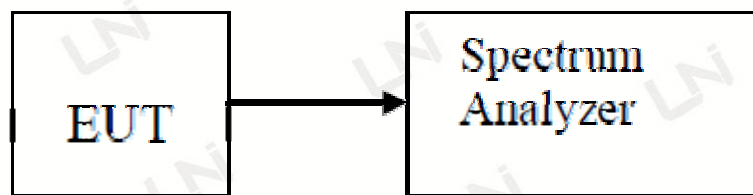


## 8 OUT OF BAND EMISSIONS

### 8.1 TEST LIMIT

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.

### 8.2 TEST SETUP



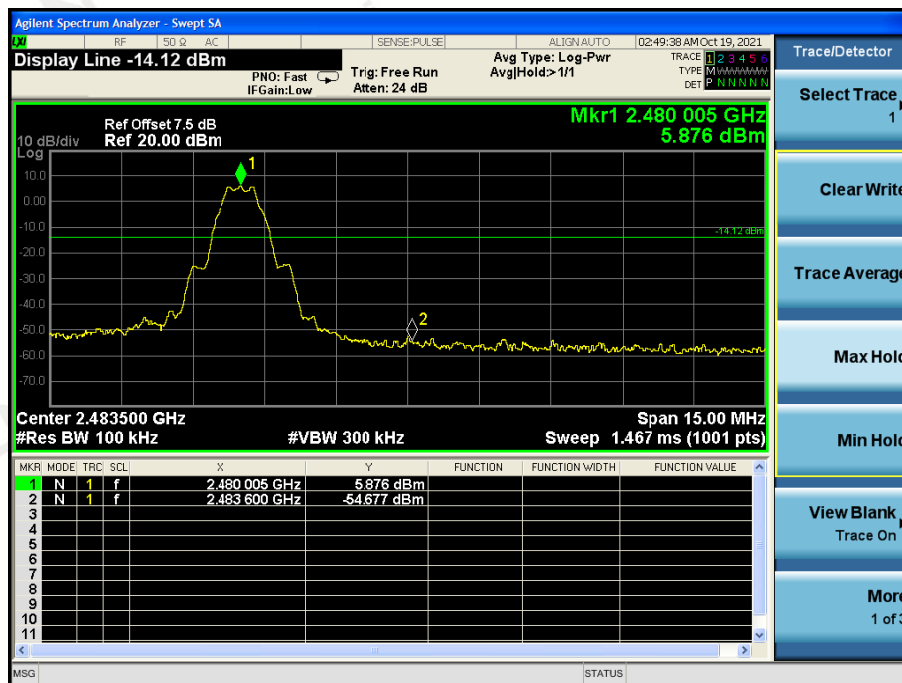
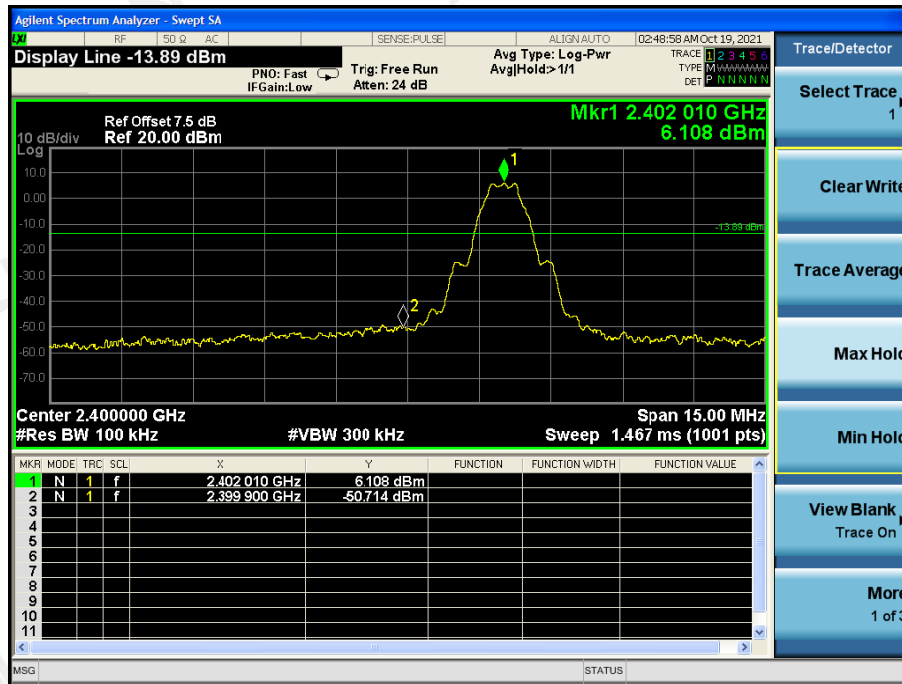
### 8.3 TEST PROCEDURE

1. Set EUT as TX operation and connect directly to the spectrum analyzer.
2. Based on FCC Part15 C Section 15.247: RBW=100kHz, VBW=300kHz.
3. Set detected by the spectrum analyzer with peak detector.

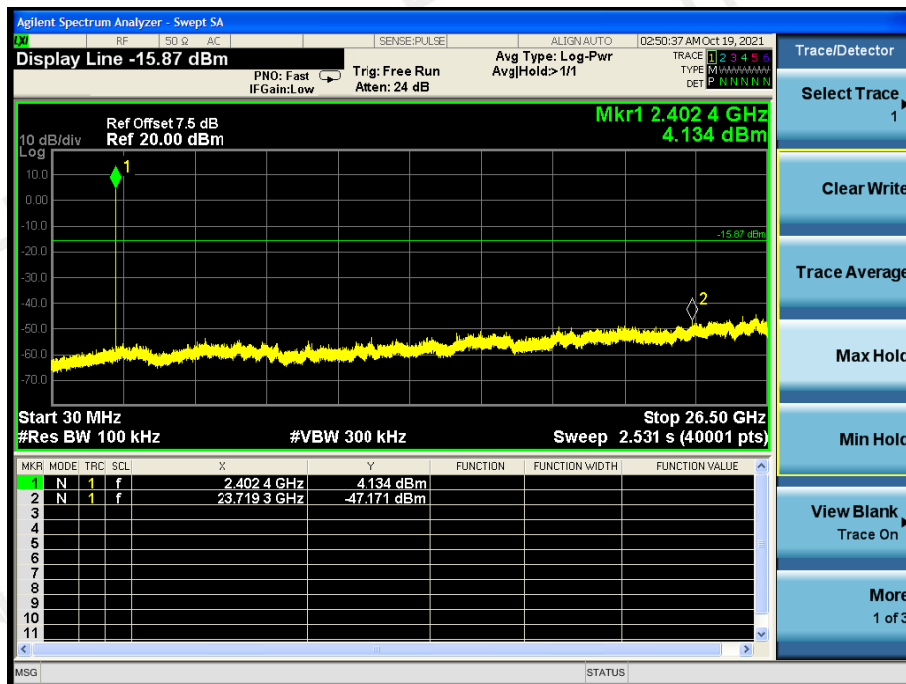
### 8.4 TEST RESULT

PASS

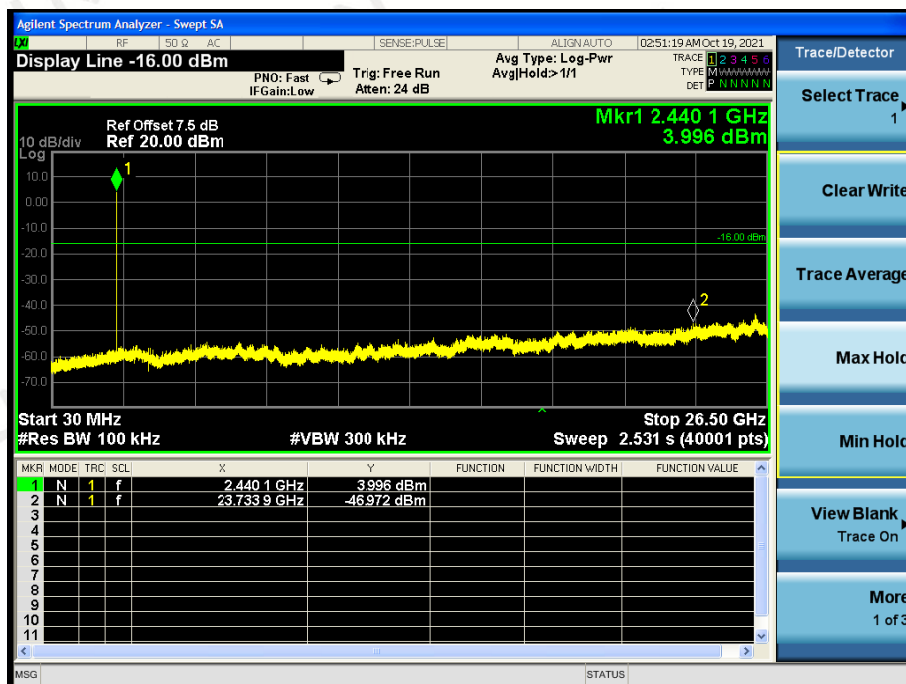
| Frequency Band | Delta Peak to band emission (dBc) | > Limit (dBc) | Result |
|----------------|-----------------------------------|---------------|--------|
| 2400           | 56.822                            | 20            | Pass   |
| 2483.5         | 60.553                            | 20            | Pass   |



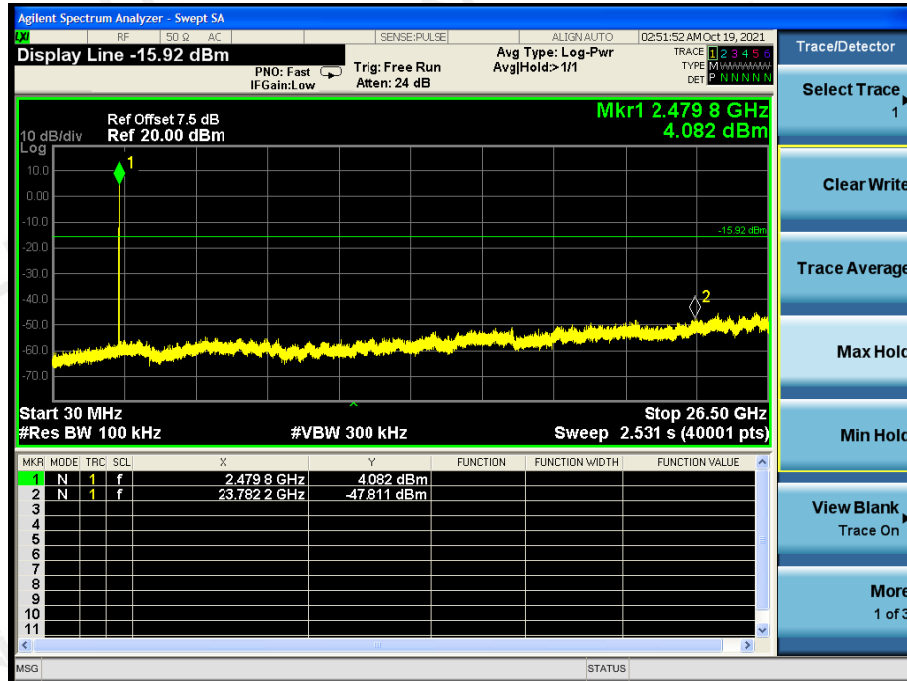
## 2402MHz



## 2440MHz



## 2480MHz





## 9 ANTENNA REQUIREMENT

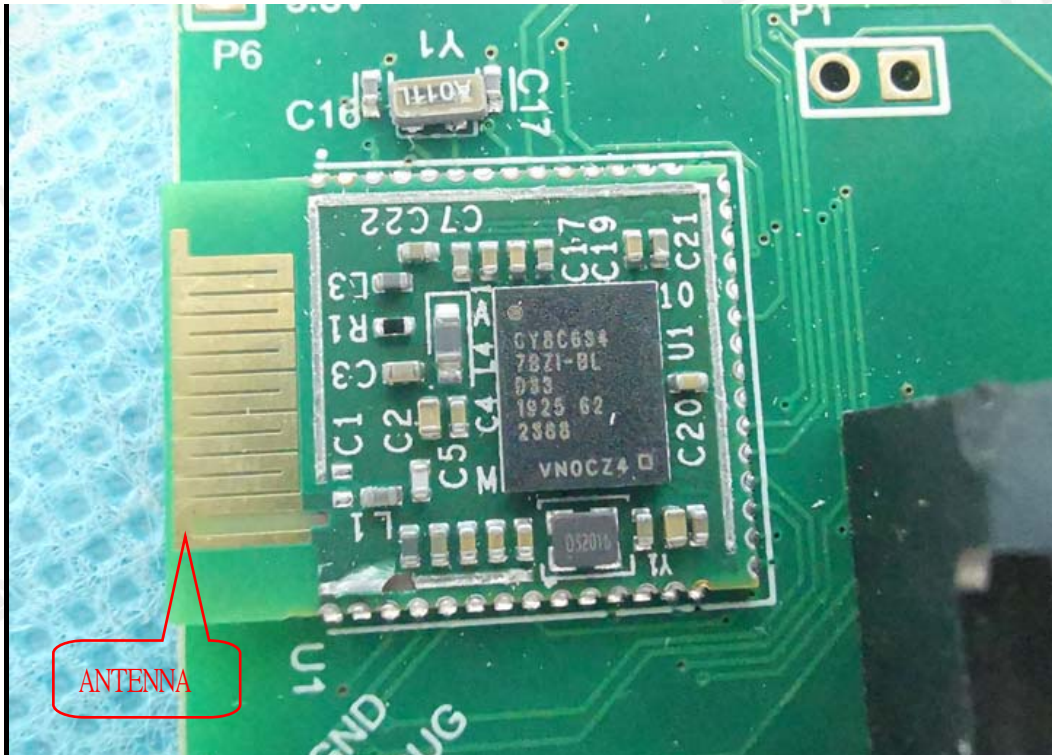
### Standard Applicable:

For intentional device, according to FCC 47 CFR Section 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.

### Antenna Connected Construction

The antenna used in this product is a PCB Antenna, The directional gains of antenna used for transmitting is 1.0dBi.

### ANTENNA:





## 10 PHOTO OF TEST

### 10.1 RADIATED EMISSION



\*\*\*End of Report\*\*\*