

## TEST REPORT

**Applicant:** Fujian Newland Payment Technology Co.,Ltd.

**Address:** No. B602, Building #1, Haixia Jingmao Plaza, Fuzhou Bonded Area 350015, Fujian, China

**Product Name:** WiFi & Bluetooth Module

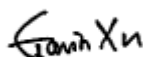
**FCC ID:** 2AM6U-FCS950U

**Standard(s):** 47 CFR Part 15, Subpart C(15.247)  
ANSI C63.10-2013  
KDB 558074 D01 15.247 Meas Guidance v05r02

**Report Number:** XMDN240122-04868E-RF-00F

**Report Date:** 2024/4/17

The above device has been tested and found compliant with the requirement of the relative standards by Bay Area Compliance Laboratories Corp. (Dongguan).



**Reviewed By:** Gavin Xu  
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**DOCUMENT REVISION HISTORY**

| Revision Number | Report Number            | Description of Revision           | Date of Revision |
|-----------------|--------------------------|-----------------------------------|------------------|
| 1.0             | XMDN240122-04868E-RF-00F | Class II Permissive Change Report | 2024/4/17        |

## 1. GENERAL INFORMATION

### 1.1 General Description of Equipment under Test

|                                               |                                                                                                  |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>EUT Name:</b>                              | WiFi & Bluetooth Module                                                                          |
| <b>EUT Model:</b>                             | FCS950U                                                                                          |
| <b>Operation Frequency:</b>                   | 2402-2480 MHz                                                                                    |
| <b>Maximum Peak Output Power (Conducted):</b> | 11.08 dBm                                                                                        |
| <b>Modulation Type:</b>                       | GFSK, $\pi/4$ -DQPSK, 8DPSK                                                                      |
| <b>Rated Input Voltage:</b>                   | DC 3.3V                                                                                          |
| <b>Serial Number:</b>                         | 2GZ2-1(Radiated Spurious Emission/AC Line Conducted Emission Test)<br>2GZ2-3 (RF Conducted Test) |
| <b>EUT Received Date:</b>                     | 2024/1/24                                                                                        |
| <b>EUT Received Status:</b>                   | Good                                                                                             |

### 1.2 Accessory Information

| Accessory Description | Manufacturer | Model | Parameters |
|-----------------------|--------------|-------|------------|
| /                     | /            | /     | /          |

### 1.3 Antenna Information Detail ▲

| Antenna Manufacturer                                                                                                                                             | Antenna Type | input impedance (Ohm) | Frequency Range | Antenna Gain |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------|-----------------|--------------|
| ZHONGTIAN XUN<br>Communication Technology<br>Co.,Ltd                                                                                                             | FPC          | 50                    | 2.4~2.5GHz      | 1.04 dBi     |
| <b>The design of compliance with §15.203:</b>                                                                                                                    |              |                       |                 |              |
| <input checked="" type="checkbox"/> Unit uses a permanently attached antenna.                                                                                    |              |                       |                 |              |
| <input type="checkbox"/> Unit uses a unique coupling to the intentional radiator.                                                                                |              |                       |                 |              |
| <input type="checkbox"/> Unit was professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit. |              |                       |                 |              |

### 1.4 Equipment Modifications

No modifications are made to the EUT during all test items.

## 2. SUMMARY OF TEST RESULTS

| FCC Rules                        | Description of Test                      | Result    | Note |
|----------------------------------|------------------------------------------|-----------|------|
| FCC §15.207(a)                   | AC Line Conducted Emissions              | Compliant | /    |
| FCC §15.205, §15.209, §15.247(d) | Radiated Spurious Emissions              | Compliant | /    |
| FCC §15.247(a)(1)                | 20 dB Emission Bandwidth                 | /         | *    |
| FCC §15.247(a)(1)                | Channel Separation                       | /         | *    |
| FCC §15.247(a)(1)(iii)           | Number Of Hopping Frequency              | /         | *    |
| FCC §15.247(a)(1)(iii)           | Time Of Occupancy (dwell time)           | /         | *    |
| FCC §15.247(b)(1)                | Maximum Conducted Output Power           | Reporting | /    |
| FCC §15.247(d)                   | 100 kHz Bandwidth Of Frequency Band Edge | /         | *    |
| FCC §15.203                      | Antenna Requirement                      | Compliant | /    |

**Note 1:**

This is Class II permissive change application based on the Change ID device, model: FCS950U, FCC ID: 2AM6U-FCS950U. The Change ID device based on the original device, model: FCS950U, FCC ID:XMR2023FCS950U, which was tested by Sporton International Inc. (Kunshan). The change between the original equipment and the current equipment is stated and guaranteed by the applicant, as following:

1. Change the antenna.

Per Spot check with RF output power, the RF parameters are identical with the original device. Therefore, AC line conducted emissions and Radiated Spurious Emissions was tested based on the change.

\*:Please refer to Report No: FR2D0802B.

The Bay Area Compliance Laboratories Corp. (Dongguan) is responsible for all the information provided in this report, except when information is provided by the customer as identified in this report.

Note 2: For AC line conducted emissions, the maximum output power channel was tested.

Note 3: For Radiated Spurious Emissions 9kHz~ 1GHz, the maximum output power channel was tested.

### 3. DESCRIPTION OF TEST CONFIGURATION

#### 3.1 Operation Frequency Detail

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 0       | <b>2402</b>     | 40      | 2442            |
| 1       | 2403            | 41      | 2443            |
| ...     | ...             | ...     | ...             |
| ...     | ...             | ...     | ...             |
| ...     | ...             | 78      | <b>2480</b>     |
| 39      | <b>2441</b>     | /       | /               |

Note: tested with the frequencies in bold .

#### 3.2 EUT Operation Condition

The EUT was configured for testing in Engineering Mode, which was provided by the manufacturer. The EUT configuration as below:

|                                                                                                                               |                     |        |         |
|-------------------------------------------------------------------------------------------------------------------------------|---------------------|--------|---------|
| The EUT Configuration as below:                                                                                               |                     |        |         |
| EUT Exercise Software:                                                                                                        | cmd                 |        |         |
| The software was provided by manufacturer. The maximum power was configured as below, that was provided by the manufacturer▲: |                     |        |         |
| Test Modes                                                                                                                    | Power Level Setting |        |         |
|                                                                                                                               | Lowest              | Middle | Highest |
| GFSK                                                                                                                          | 9                   | 9      | 9       |
| $\pi/4$ -DQPSK                                                                                                                | 9                   | 9      | 9       |
| 8DPSK                                                                                                                         | 9                   | 9      | 9       |

#### 3.3 Support Equipment List and Details

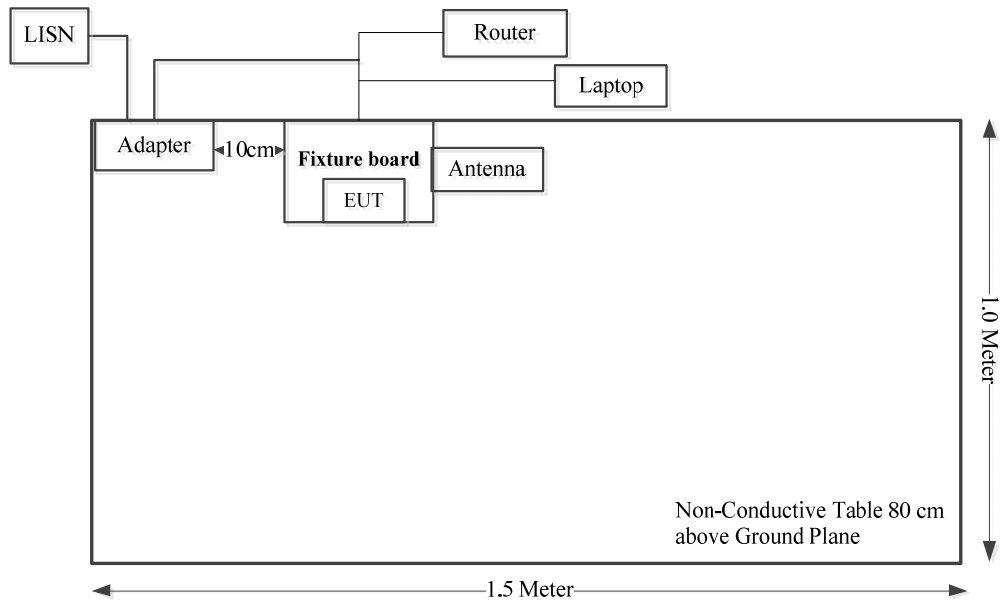
| Manufacturer                               | Description   | Model          | Serial Number              |
|--------------------------------------------|---------------|----------------|----------------------------|
| TOTO Link                                  | Router        | LR1200         | 190924004S1                |
| Lenovo                                     | Laptop        | T430           | 00331-10000-00001-AA887 02 |
| Fujian Newland Payment Technology Co.,Ltd. | Fixture board | NXG-GC76WN5528 | 2GZ2-1                     |

#### 3.4 Support Cable List and Details

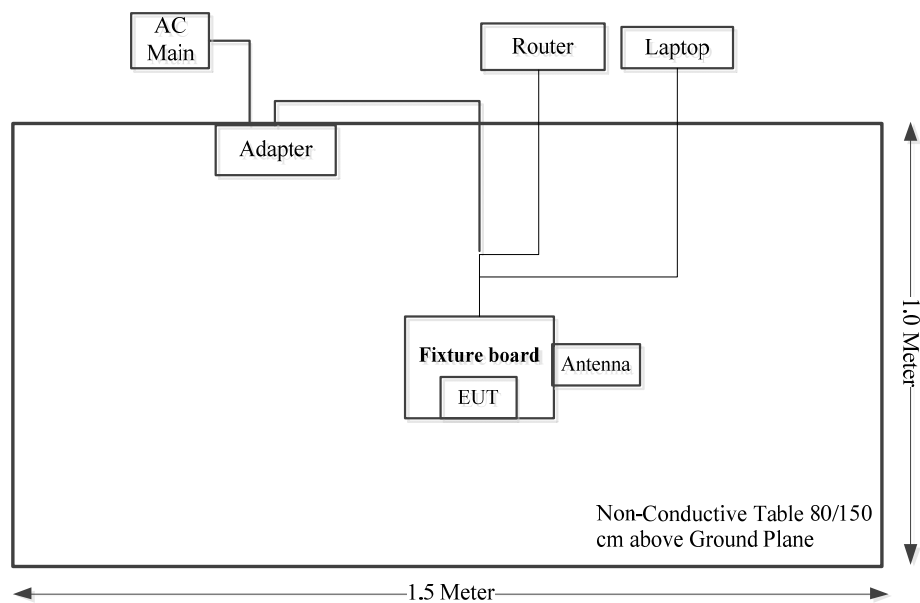
| Cable Description                        | Shielding Type | Ferrite Core | Length (m) | From Port                                            | To            |
|------------------------------------------|----------------|--------------|------------|------------------------------------------------------|---------------|
| DB9+RJ45+TypeA+Power multifunction cable | no             | no           | 3          | Adapter/ Router/ Laptop serial port/ Laptop USB port | Fixture board |

### 3.5 Block Diagram of Test Setup

AC Power Lines Conducted Emission:



Radiated Spurious Emissions:



### 3.6 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 829273, the FCC Designation No. : CN5044.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

### 3.7 Measurement Uncertainty

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

| Parameter                         | Measurement Uncertainty                                                                                                                                     |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Occupied Channel Bandwidth        | ±5 %                                                                                                                                                        |
| RF output power, conducted        | ±0.61dB                                                                                                                                                     |
| Power Spectral Density, conducted | ±0.61 dB                                                                                                                                                    |
| Unwanted Emissions, radiated      | 9kHz~30MHz: 3.3dB, 30MHz~200MHz: 4.55 dB,<br>200MHz~1GHz: 5.92 dB, 1GHz~6GHz: 4.98 dB, 6GHz~18GHz:<br>5.89 dB, 18GHz~26.5GHz:5.47 dB, 26.5GHz~40GHz:5.63 dB |
| Unwanted Emissions, conducted     | ±2.47 dB                                                                                                                                                    |
| Temperature                       | ±1 °C                                                                                                                                                       |
| Humidity                          | ±5%                                                                                                                                                         |
| DC and low frequency voltages     | ±0.4%                                                                                                                                                       |
| Duty Cycle                        | 1%                                                                                                                                                          |
| AC Power Lines Conducted Emission | 3.11 dB (150 kHz to 30 MHz)                                                                                                                                 |

## 4. REQUIREMENTS AND TEST PROCEDURES

### 4.1 AC Line Conducted Emissions

#### 4.1.1 Applicable Standard

FCC§15.207(a).

(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  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

| Frequency of emission (MHz) | Conducted limit (dB $\mu$ V) |           |
|-----------------------------|------------------------------|-----------|
|                             | 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.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

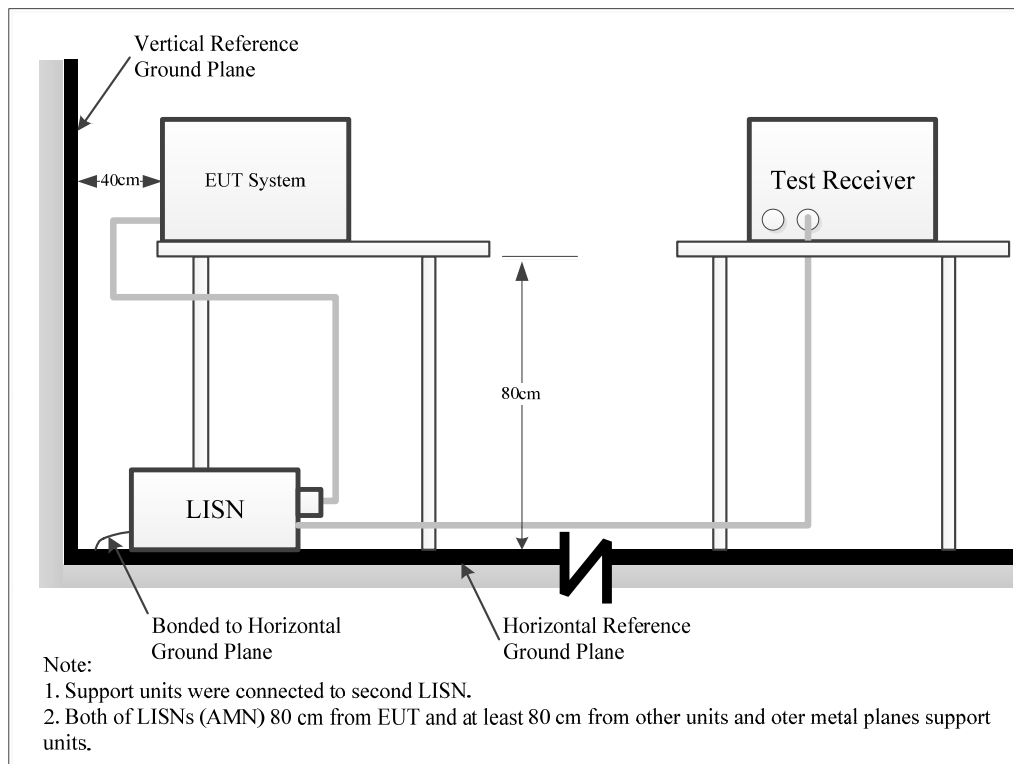
(1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000  $\mu$ V within the frequency band 535-1705 kHz, as measured using a 50  $\mu$ H/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits in §15.205, §15.209, §15.221, §15.223, or §15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

#### 4.1.2 EUT Setup



The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter or EUT was connected to the main LISN with a 120 V/60 Hz AC power source.

#### 4.1.3 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

| Frequency Range  | IF B/W |
|------------------|--------|
| 150 kHz – 30 MHz | 9 kHz  |

#### 4.1.4 Test Procedure

The frequency and amplitude of the six highest ac power-line conducted emissions relative to the limit, measured over all the current-carrying conductors of the EUT power cords, and the operating frequency or frequency to which the EUT is tuned (if appropriate), should be reported, unless such emissions are more than 20 dB below the limit. AC power-line conducted emissions measurements are to be separately carried out only on each of the phase (“hot”) line(s) and (if used) on the neutral line(s), but not on the ground [protective earth] line(s). If less than six emission frequencies are within 20 dB of the limit, then the noise level of the measuring instrument at representative frequencies should be reported. The specific conductor of the power-line cord for each of the reported emissions should be identified. Measure the six highest emissions with respect to the limit on each current-carrying conductor of each power cord associated with the EUT (but not the power cords of associated or peripheral equipment that are part of the test configuration). Then, report the six highest emissions with respect to the limit from among all the measurements identifying the frequency and specific current-carrying conductor identified with the emission. The six highest emissions should be reported for each of the current-carrying conductors, or the six highest emissions may be reported over all the current-carrying conductors.

#### 4.1.5 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor

Factor = attenuation caused by cable loss + voltage division factor of AMN

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

#### 4.1.6 Test Result

Please refer to section 5.1.

## 4.2 Radiated Spurious Emissions

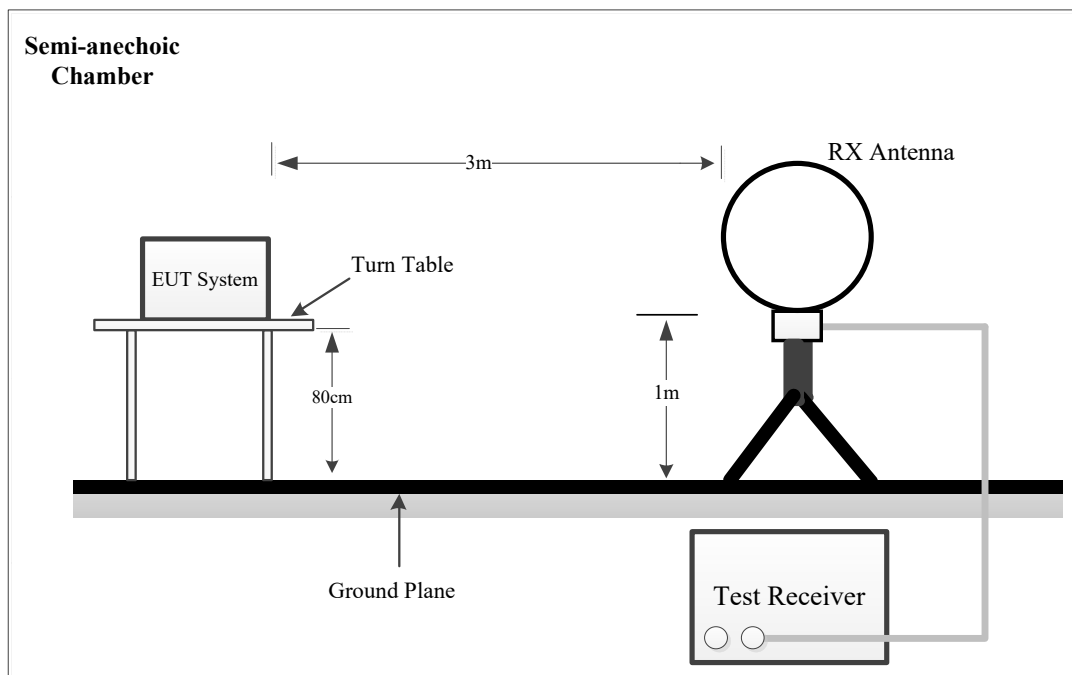
### 4.2.1 Applicable Standard

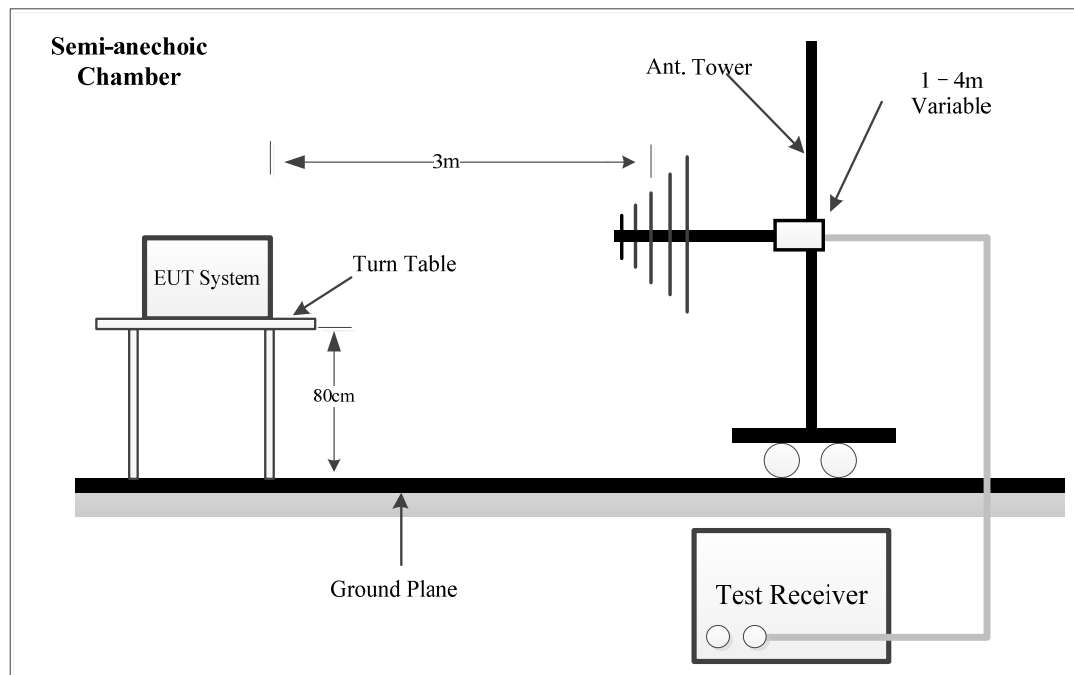
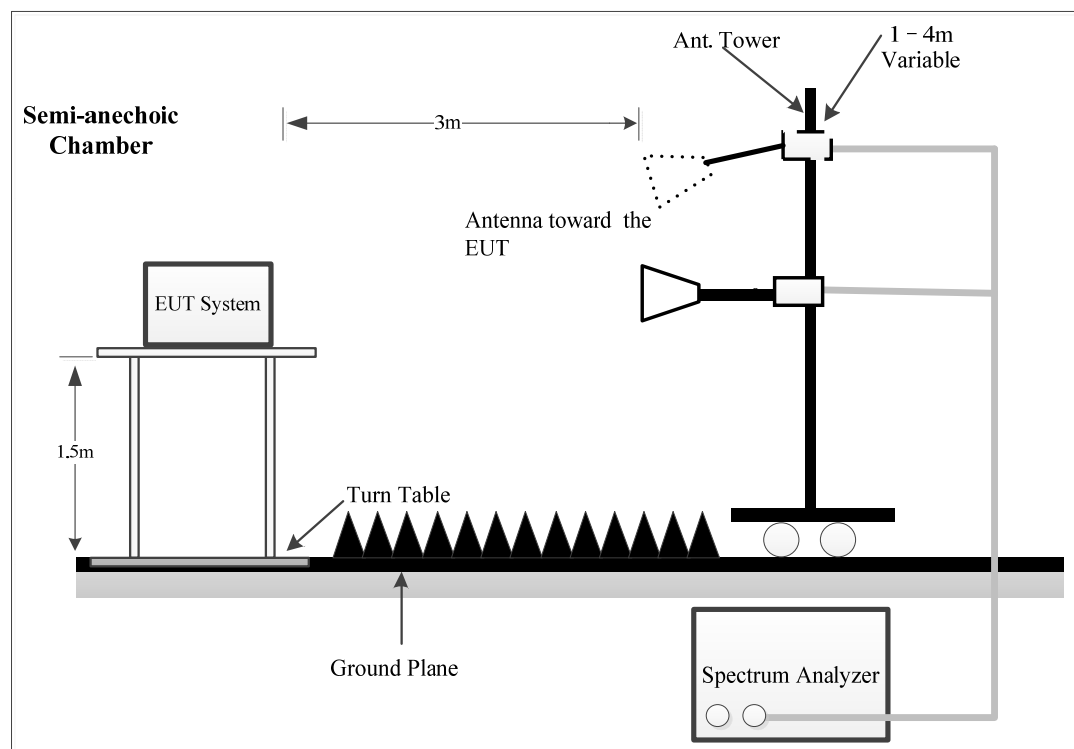
FCC §15.247 (d);

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. 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)).

### 4.2.2 EUT Setup

9kHz~30MHz:



**30MHz~1GHz:****Above 1GHz:**

The radiated emissions were performed in the 3 meters distance, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

For 9kHz-30MHz test, the lowest height of the magnetic antenna shall be 1 m above the ground and three antenna orientations (parallel, perpendicular, and ground-parallel) shall be measured.

#### 4.2.3 EMI Test Receiver & Spectrum Analyzer Setup

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

| Frequency Range   | RBW     | Video B/W | IF B/W  | Measurement |
|-------------------|---------|-----------|---------|-------------|
| 9 kHz – 150 kHz   | 200 Hz  | 1 kHz     | 200 Hz  | QP/AV       |
| 150 kHz – 30 MHz  | 9 kHz   | 30 kHz    | 9 kHz   | QP/AV       |
| 30 MHz – 1000 MHz | 100 kHz | 300 kHz   | /       | PK          |
|                   | /       | /         | 120 kHz | QP          |
| Above 1 GHz       | 1MHz    | 3 MHz     | /       | PK          |
|                   | 1MHz    | 10 Hz     | /       | AV          |

If the maximized peak measured value complies with under the QP limit more than 6dB, then it is unnecessary to perform an QP measurement.

If the maximized peak measured value complies with under the Average limit, then it is unnecessary to perform an Average measurement.

#### 4.2.4 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 9 kHz-1 GHz except 9-90 kHz, 110-490 kHz, employing an average detector, peak and Average detection modes for frequencies above 1 GHz.

#### 4.2.5 Corrected Result & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor

Factor = Antenna Factor + Cable Loss - Amplifier Gain

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

#### 4.2.6 Test Result

Please refer to section 5.2.

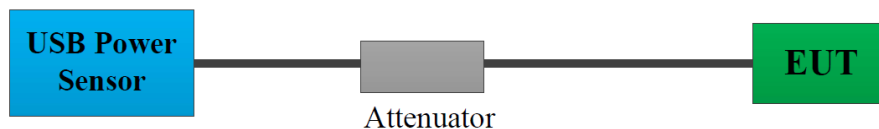
### 4.3 Maximum Conducted Output Power

#### 4.3.1 Applicable Standard

FCC §15.247 (b)(1)

For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt.  
For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts

#### 4.3.2 EUT Setup



A short RF cable with low cable loss connected to the EUT antenna port, which was provided by manufacturer. The cable loss of this RF cable was offset into the setting of test equipment, which was provided by manufacturer▲.

#### 4.3.3 Test Procedure

According to ANSI C63.10-2013 Section 7.8.5

This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation, Offset the Insertion loss of the RF cable, DC Block/ Attenuator into the spectrum analyzer. The hopping shall be disabled for this test:

- a) Use the following spectrum analyzer settings:
  - 1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
  - 2) RBW > 20 dB bandwidth of the emission being measured.
  - 3) VBW  $\geq$  RBW.
  - 4) Sweep: Auto.
  - 5) Detector function: Peak.
  - 6) Trace: Max hold.
- b) Allow trace to stabilize.
- c) Use the marker-to-peak function to set the marker to the peak of the emission.
- d) The indicated level is the peak output power, after any corrections for external attenuators and cables.
- e) A plot of the test results and setup description shall be included in the test report.

NOTE—A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.

#### 4.3.4 Test Result

Please refer to section 5.3.

## **4.4 Antenna Requirement**

### **4.4.1 Applicable Standard**

FCC §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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

### **4.4.2 Judgment**

**Compliant.** Please refer to the Antenna Information detail in Section 1.3.

## 5. TEST DATA AND RESULTS

### 5.1 AC Line Conducted Emissions

|                |            |              |              |
|----------------|------------|--------------|--------------|
| Serial Number: | 2GZ2-1     | Test Date:   | 2024/3/26    |
| Test Site:     | CE         | Test Mode:   | Transmitting |
| Tester:        | Wright Lai | Test Result: | Pass         |

#### Environmental Conditions:

|                      |      |                              |    |                        |       |
|----------------------|------|------------------------------|----|------------------------|-------|
| Temperature:<br>(°C) | 25.2 | Relative<br>Humidity:<br>(%) | 71 | ATM Pressure:<br>(kPa) | 101.9 |
|----------------------|------|------------------------------|----|------------------------|-------|

#### Test Equipment List and Details:

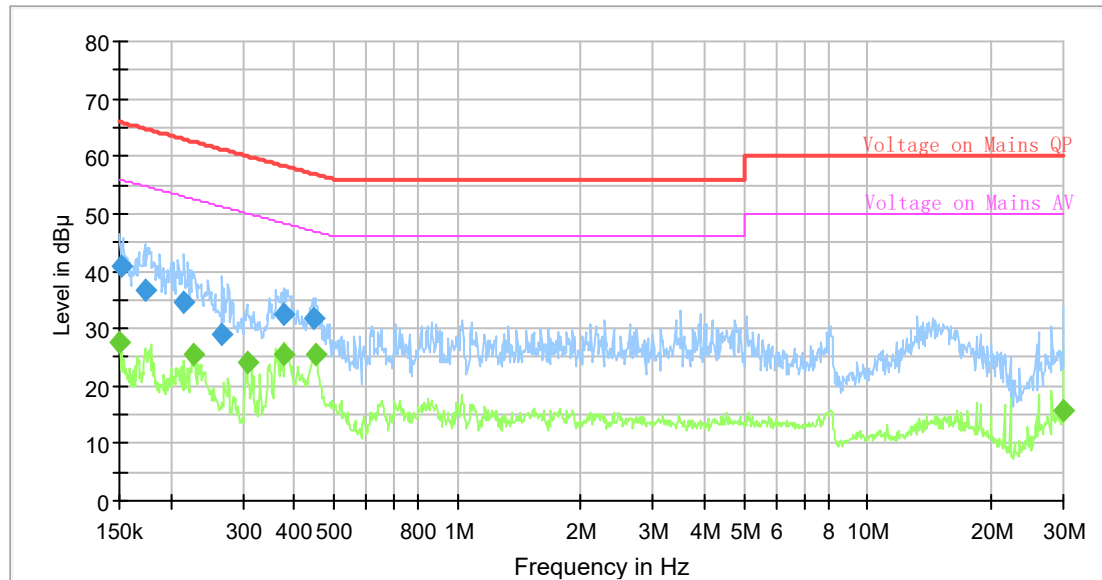
| Manufacturer | Description          | Model     | Serial<br>Number | Calibration Date | Calibration Due<br>Date |
|--------------|----------------------|-----------|------------------|------------------|-------------------------|
| R&S          | LISN                 | ENV216    | 101614           | 2023/10/18       | 2024/10/17              |
| MICRO-COAX   | Coaxial<br>Cable     | C-NJNJ-50 | C-0200-01        | 2023/9/5         | 2024/9/4                |
| R&S          | EMI Test<br>Receiver | ESCI      | 100035           | 2023/8/18        | 2024/8/17               |
| R&S          | Test<br>Software     | EMC32     | V9.10.00         | N/A              | N/A                     |

*\* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

#### Test Data:

Note: the maximum output power channel was tested.

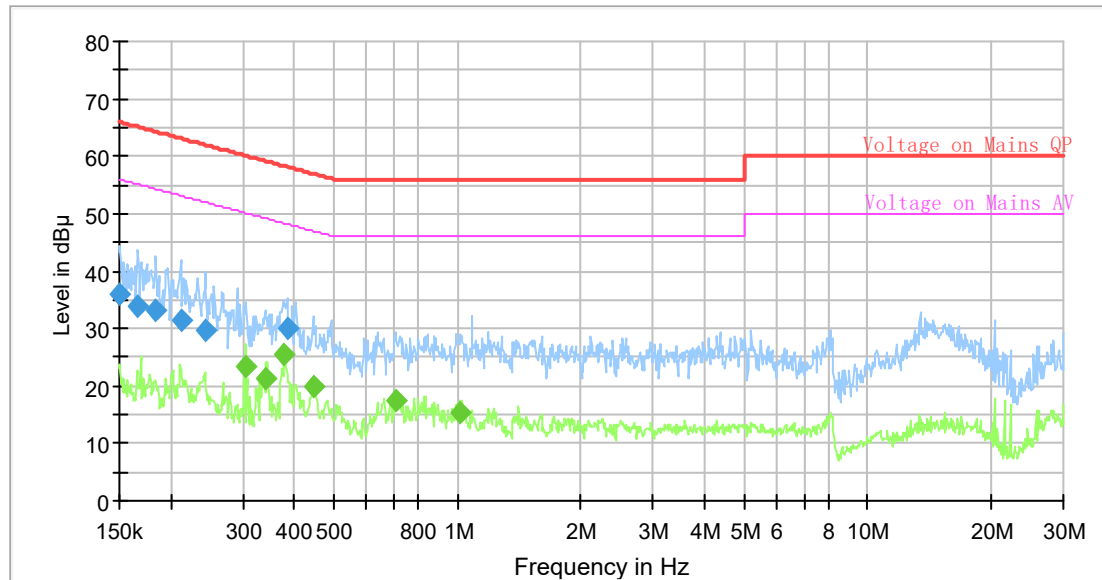
Project No: XMDN240122-04868E-RF  
Test Engineer: Wright Lai  
Test Date: 2024-3-26  
Port: L  
Test Mode: Transmitting  
Power Source: AC 120V/60Hz  
Note: 8DPSK Low Channel



## Final Result

| Frequency (MHz) | QuasiPeak (dB $\mu$ V) | Average (dB $\mu$ V) | Limit (dB $\mu$ V) | Margin (dB) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------------|----------------------|--------------------|-------------|-----------------|------|------------|
| 0.150750        | ---                    | 27.68                | 55.96              | 28.28       | 9.000           | L1   | 10.8       |
| 0.152261        | 40.73                  | ---                  | 65.88              | 25.15       | 9.000           | L1   | 10.8       |
| 0.173343        | 36.54                  | ---                  | 64.80              | 28.26       | 9.000           | L1   | 10.8       |
| 0.215881        | 34.42                  | ---                  | 62.98              | 28.56       | 9.000           | L1   | 10.8       |
| 0.228055        | ---                    | 25.39                | 52.52              | 27.13       | 9.000           | L1   | 10.8       |
| 0.267519        | 28.88                  | ---                  | 61.19              | 32.31       | 9.000           | L1   | 10.8       |
| 0.307613        | ---                    | 24.13                | 50.03              | 25.90       | 9.000           | L1   | 10.8       |
| 0.379296        | 32.51                  | ---                  | 58.29              | 25.78       | 9.000           | L1   | 10.8       |
| 0.379296        | ---                    | 25.38                | 48.29              | 22.91       | 9.000           | L1   | 10.8       |
| 0.444931        | 31.63                  | ---                  | 56.97              | 25.34       | 9.000           | L1   | 10.8       |
| 0.451638        | ---                    | 25.34                | 46.84              | 21.50       | 9.000           | L1   | 10.8       |
| 30.000000       | ---                    | 15.81                | 50.00              | 34.19       | 9.000           | L1   | 10.9       |

Project No: XMDN240122-04868E-RF  
Test Engineer: Wright Lai  
Test Date: 2024-3-26  
Port: N  
Test Mode: Transmitting  
Power Source: AC 120V/60Hz  
Note: 8DPSK Low Channel



## Final Result

| Frequency (MHz) | QuasiPeak (dB $\mu$ V) | Average (dB $\mu$ V) | Limit (dB $\mu$ V) | Margin (dB) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------------|----------------------|--------------------|-------------|-----------------|------|------------|
| 0.150750        | 35.91                  | ---                  | 65.96              | 30.05       | 9.000           | N    | 10.9       |
| 0.166563        | 33.74                  | ---                  | 65.13              | 31.39       | 9.000           | N    | 10.9       |
| 0.184035        | 33.06                  | ---                  | 64.30              | 31.24       | 9.000           | N    | 10.9       |
| 0.211616        | 31.46                  | ---                  | 63.14              | 31.68       | 9.000           | N    | 10.8       |
| 0.243332        | 29.84                  | ---                  | 61.98              | 32.14       | 9.000           | N    | 10.8       |
| 0.304559        | ---                    | 23.58                | 50.12              | 26.54       | 9.000           | N    | 10.8       |
| 0.341579        | ---                    | 21.25                | 49.16              | 27.91       | 9.000           | N    | 10.8       |
| 0.379296        | ---                    | 25.44                | 48.29              | 22.85       | 9.000           | N    | 10.8       |
| 0.385014        | 30.16                  | ---                  | 58.17              | 28.01       | 9.000           | N    | 10.8       |
| 0.444931        | ---                    | 19.74                | 46.97              | 27.23       | 9.000           | N    | 10.8       |
| 0.707516        | ---                    | 17.34                | 46.00              | 28.66       | 9.000           | N    | 10.8       |
| 1.013195        | ---                    | 15.32                | 46.00              | 30.68       | 9.000           | N    | 10.9       |

**5.2 Radiated Spurious Emissions**

|                |                        |              |                                               |
|----------------|------------------------|--------------|-----------------------------------------------|
| Serial Number: | 2GZ2-1                 | Test Date:   | Below 1GHz: 2024/4/7<br>Above 1GHz: 2024/4/12 |
| Test Site:     | Chamber 10m, Chamber B | Test Mode:   | Transmitting                                  |
| Tester:        | Zoo Zou, Leo Xiao      | Test Result: | Pass                                          |

**Environmental Conditions:**

|                      |           |                              |       |                        |             |
|----------------------|-----------|------------------------------|-------|------------------------|-------------|
| Temperature:<br>(°C) | 22.1~24.4 | Relative<br>Humidity:<br>(%) | 44~58 | ATM Pressure:<br>(kPa) | 100.4~100.7 |
|----------------------|-----------|------------------------------|-------|------------------------|-------------|

**Test Equipment List and Details:**

| Manufacturer          | Description           | Model                     | Serial Number     | Calibration Date | Calibration Due Date |
|-----------------------|-----------------------|---------------------------|-------------------|------------------|----------------------|
| 9kHz~1000MHz          |                       |                           |                   |                  |                      |
| EMCO                  | Passive Loop Antenna  | 6512                      | 9706-1206         | 2023/10/21       | 2026/10/20           |
| Sunol Sciences        | Hybrid Antenna        | JB3                       | A060611-1         | 2023/9/6         | 2026/9/5             |
| Narda                 | Coaxial Attenuator    | 779-6dB                   | 04269             | 2023/9/6         | 2026/9/5             |
| Unknown               | Coaxial Cable         | C-NJNJ-50                 | C-1000-01         | 2023/8/1         | 2024/7/31            |
| Unknown               | Coaxial Cable         | C-NJNJ-50                 | C-0400-04         | 2023/8/1         | 2024/7/31            |
| Unknown               | Coaxial Cable         | C-NJNJ-50                 | C-0530-01         | 2023/8/1         | 2024/7/31            |
| Sonoma                | Amplifier             | 310N                      | 185914            | 2023/8/1         | 2024/7/31            |
| R&S                   | EMI Test Receiver     | ESCI                      | 101121            | 2023/10/18       | 2024/10/17           |
| Farad                 | Test Software         | EZ-EMC                    | V1.1.4.2          | N/A              | N/A                  |
| Above 1GHz            |                       |                           |                   |                  |                      |
| ETS-Lindgren          | Horn Antenna          | 3115                      | 000 527 35        | 2023/9/7         | 2024/9/6             |
| R&S                   | Spectrum Analyzer     | FSV40                     | 101944            | 2023/10/18       | 2024/10/17           |
| Xinhang Macrowave     | Coaxial Cable         | XH750A-N/J-SMA/J-10M      | 20231117004 #0001 | 2023/11/17       | 2024/11/16           |
| Audix                 | Test Software         | E3                        | 191218 (V9)       | N/A              | N/A                  |
| AH                    | Preamplifier          | PAM-0118P                 | 469               | 2023/8/19        | 2024/8/18            |
| Ducommun Technologies | Horn Antenna          | ARH-4223-02               | 1007726-03 1304   | 2023/2/22        | 2026/2/21            |
| Xinhang Macrowave     | Coaxial Cable         | XH360A-2.92/J-2.92/J-6M-A | 20231208001 #0001 | 2023/12/11       | 2024/12/10           |
| AH                    | Preamplifier          | PAM-1840VH                | 191               | 2023/9/7         | 2024/9/6             |
| E-Microwave           | Band Rejection Filter | OBSF-2400-2483.5-S        | OE01601525        | 2024/2/21        | 2025/2/20            |
| Micro-tronics         | High Pass Filter      | HPM50111                  | G217              | 2023/12/1        | 2024/11/30           |

\* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

**Test Data:**

Please refer to the below table and plots.

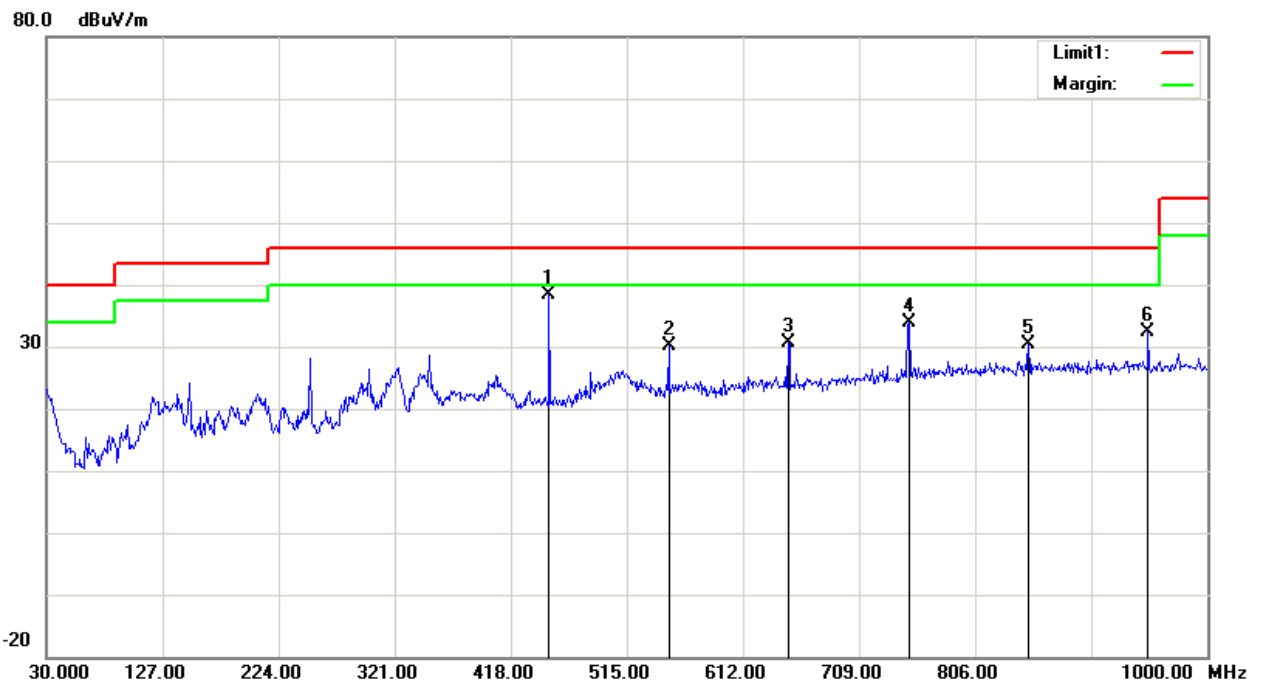
After pre-scan in the X, Y and Z axes of orientation, the worst case is below:

**1) 9kHz~30MHz**

The 3EDR Low channel was tested. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

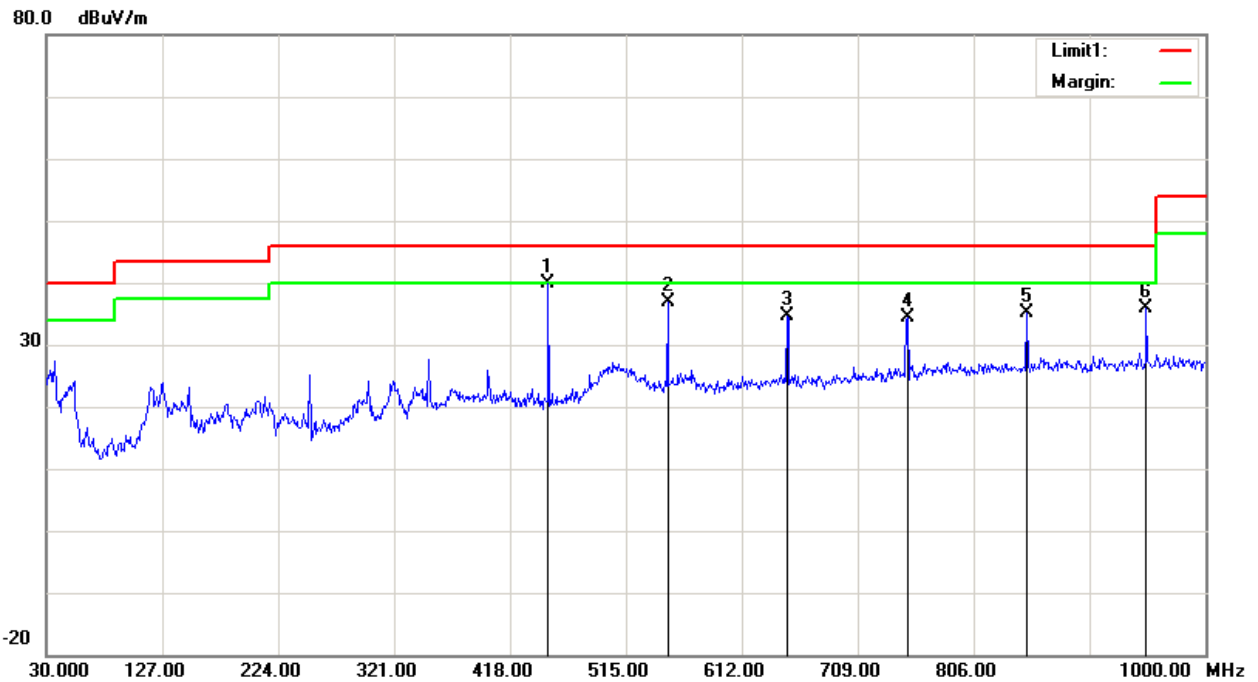
**2) 30MHz-1GHz**

Project No: XMDN240122-04868E-RF  
Test Engineer: Zoo Zou  
Test Date: 2024-4-7  
Polarization: Horizontal  
Test Mode: Transmitting  
Power Source: AC 120V/60Hz  
Note:



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Detector | Factor<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) |
|-----|--------------------|-------------------|----------|------------------|--------------------|-------------------|----------------|
| 1   | 450.0100           | 43.96             | peak     | -5.47            | 38.49              | 46.00             | 7.51           |
| 2   | 549.9200           | 33.63             | peak     | -3.43            | 30.20              | 46.00             | 15.80          |
| 3   | 649.8300           | 32.47             | peak     | -1.88            | 30.59              | 46.00             | 15.41          |
| 4   | 750.7100           | 34.18             | peak     | -0.31            | 33.87              | 46.00             | 12.13          |
| 5   | 850.6200           | 29.57             | peak     | 0.90             | 30.47              | 46.00             | 15.53          |
| 6   | 950.5300           | 30.28             | peak     | 2.04             | 32.32              | 46.00             | 13.68          |

Project No: XMDN240122-04868E-RF  
Test Engineer: Zoo Zou  
Test Date: 2024-4-7  
Polarization: Vertical  
Test Mode: Transmitting  
Power Source: AC 120V/60Hz  
Note:



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Detector | Factor<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) |
|-----|--------------------|-------------------|----------|------------------|--------------------|-------------------|----------------|
| 1   | 450.0100           | 45.42             | peak     | -5.47            | 39.95              | 46.00             | 6.05           |
| 2   | 549.9200           | 40.34             | peak     | -3.43            | 36.91              | 46.00             | 9.09           |
| 3   | 649.8300           | 36.43             | peak     | -1.88            | 34.55              | 46.00             | 11.45          |
| 4   | 750.7100           | 34.60             | peak     | -0.31            | 34.29              | 46.00             | 11.71          |
| 5   | 850.6200           | 34.22             | peak     | 0.90             | 35.12              | 46.00             | 10.88          |
| 6   | 950.5300           | 33.74             | peak     | 2.04             | 35.78              | 46.00             | 10.22          |

**3) 1-25GHz:****BDR\_low channel****Frequency 2402 MHz**

| Frequency | Reading | Detector | Rx Antenna |        | Cable loss | Amplifier Gain | Corrected Amplitude | Limit  | Margin |
|-----------|---------|----------|------------|--------|------------|----------------|---------------------|--------|--------|
|           |         |          | Polar      | Factor |            |                |                     |        |        |
| MHz       | dBμV    | PK/QP/AV | H/V        | dB/m   | dB         | dB             | dBμV/m              | dBμV/m | dB     |
| 2390.00   | 25.02   | PK       | H          | 27.64  | 0.93       | 0.00           | 53.59               | 74.00  | 20.41  |
| 2390.00   | 15.28   | AV       | H          | 27.64  | 0.93       | 0.00           | 43.85               | 54.00  | 10.15  |
| 2390.00   | 25.35   | PK       | V          | 27.64  | 0.93       | 0.00           | 53.92               | 74.00  | 20.08  |
| 2390.00   | 15.18   | AV       | V          | 27.64  | 0.93       | 0.00           | 43.75               | 54.00  | 10.25  |
| 4804.00   | 49.66   | PK       | H          | 32.84  | 1.38       | 37.30          | 46.58               | 74.00  | 27.42  |
| 4804.00   | 41.22   | AV       | H          | 32.84  | 1.38       | 37.30          | 38.14               | 54.00  | 15.86  |
| 4804.00   | 48.48   | PK       | V          | 32.84  | 1.38       | 37.30          | 45.40               | 74.00  | 28.60  |
| 4804.00   | 40.45   | AV       | V          | 32.84  | 1.38       | 37.30          | 37.37               | 54.00  | 16.63  |
| 7206.00   | 46.10   | PK       | H          | 35.99  | 2.39       | 36.61          | 47.87               | 74.00  | 26.13  |
| 7206.00   | 37.44   | AV       | H          | 35.99  | 2.39       | 36.61          | 39.21               | 54.00  | 14.79  |
| 7206.00   | 46.37   | PK       | V          | 35.99  | 2.39       | 36.61          | 48.14               | 74.00  | 25.86  |
| 7206.00   | 36.78   | AV       | V          | 35.99  | 2.39       | 36.61          | 38.55               | 54.00  | 15.45  |

**BDR\_middle channel****Frequency 2441 MHz**

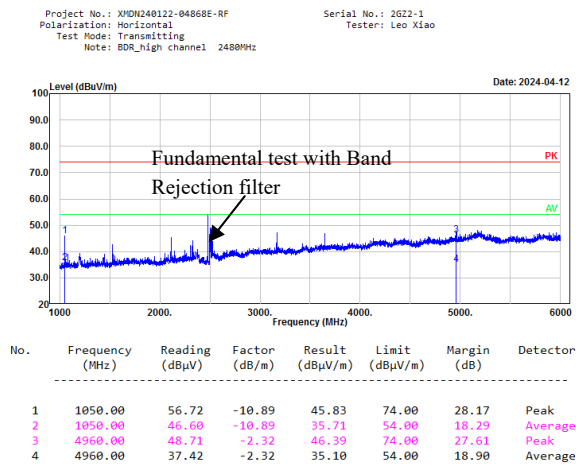
| Frequency | Reading | Detector | Rx Antenna |        | Cable loss | Amplifier Gain | Corrected Amplitude | Limit  | Margin |
|-----------|---------|----------|------------|--------|------------|----------------|---------------------|--------|--------|
|           |         |          | Polar      | Factor |            |                |                     |        |        |
| MHz       | dBμV    | PK/QP/AV | H/V        | dB/m   | dB         | dB             | dBμV/m              | dBμV/m | dB     |
| 4882.00   | 49.45   | PK       | H          | 32.91  | 1.38       | 37.01          | 46.73               | 74.00  | 27.27  |
| 4882.00   | 38.76   | AV       | H          | 32.91  | 1.38       | 37.01          | 36.04               | 54.00  | 17.96  |
| 4882.00   | 48.78   | PK       | V          | 32.91  | 1.38       | 37.01          | 46.06               | 74.00  | 27.94  |
| 4882.00   | 38.99   | AV       | V          | 32.91  | 1.38       | 37.01          | 36.27               | 54.00  | 17.73  |
| 7323.00   | 46.43   | PK       | H          | 36.28  | 2.46       | 36.53          | 48.64               | 74.00  | 25.36  |
| 7323.00   | 36.73   | AV       | H          | 36.28  | 2.46       | 36.53          | 38.94               | 54.00  | 15.06  |
| 7323.00   | 46.30   | PK       | V          | 36.28  | 2.46       | 36.53          | 48.51               | 74.00  | 25.49  |
| 7323.00   | 36.69   | AV       | V          | 36.28  | 2.46       | 36.53          | 38.90               | 54.00  | 15.10  |

**BDR\_high channel****Frequency 2480 MHz**

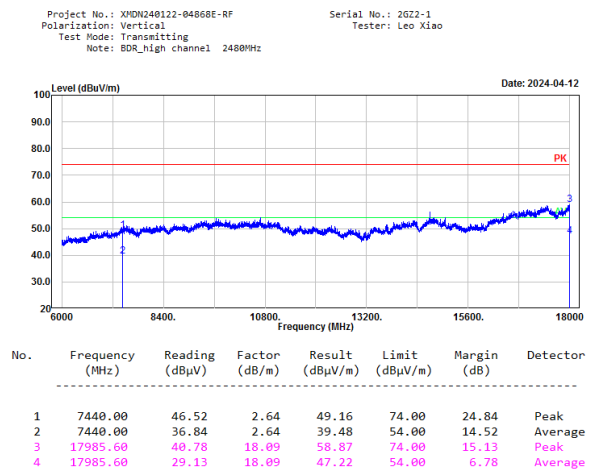
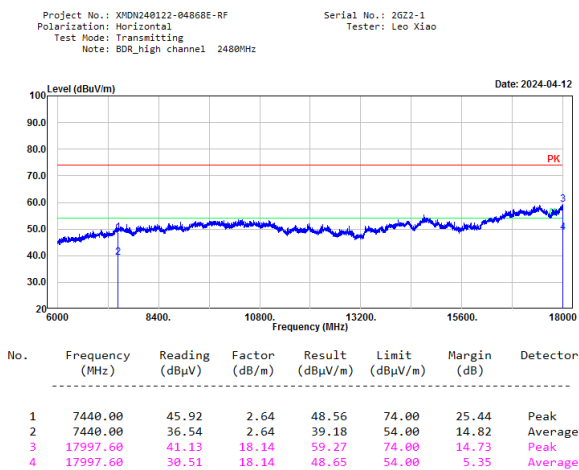
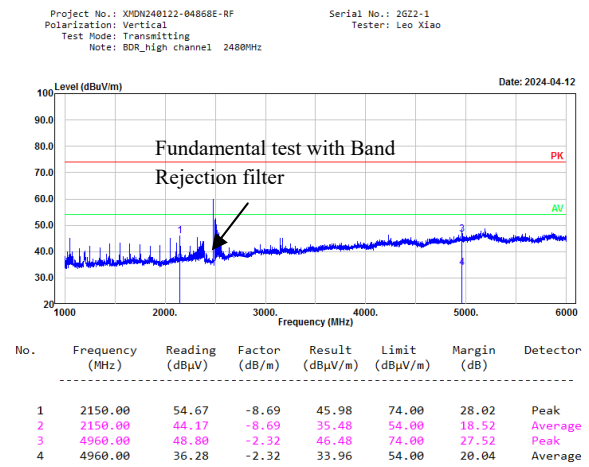
| Frequency | Reading | Detector | Rx Antenna |        | Cable loss | Amplifier Gain | Corrected Amplitude | Limit  | Margin |
|-----------|---------|----------|------------|--------|------------|----------------|---------------------|--------|--------|
|           |         |          | Polar      | Factor |            |                |                     |        |        |
| MHz       | dBμV    | PK/QP/AV | H/V        | dB/m   | dB         | dB             | dBμV/m              | dBμV/m | dB     |
| 2483.50   | 30.48   | PK       | H          | 28.03  | 0.92       | 0.00           | 59.43               | 74.00  | 14.57  |
| 2483.50   | 16.64   | AV       | H          | 28.03  | 0.92       | 0.00           | 45.59               | 54.00  | 8.41   |
| 2483.50   | 33.23   | PK       | V          | 28.03  | 0.92       | 0.00           | 62.18               | 74.00  | 11.82  |
| 2483.50   | 17.49   | AV       | V          | 28.03  | 0.92       | 0.00           | 46.44               | 54.00  | 7.56   |
| 4960.00   | 48.71   | PK       | H          | 32.97  | 1.42       | 36.71          | 46.39               | 74.00  | 27.61  |
| 4960.00   | 37.42   | AV       | H          | 32.97  | 1.42       | 36.71          | 35.10               | 54.00  | 18.90  |
| 4960.00   | 48.80   | PK       | V          | 32.97  | 1.42       | 36.71          | 46.48               | 74.00  | 27.52  |
| 4960.00   | 36.28   | AV       | V          | 32.97  | 1.42       | 36.71          | 33.96               | 54.00  | 20.04  |
| 7440.00   | 45.92   | PK       | H          | 36.56  | 2.53       | 36.45          | 48.56               | 74.00  | 25.44  |
| 7440.00   | 36.54   | AV       | H          | 36.56  | 2.53       | 36.45          | 39.18               | 54.00  | 14.82  |
| 7440.00   | 46.52   | PK       | V          | 36.56  | 2.53       | 36.45          | 49.16               | 74.00  | 24.84  |
| 7440.00   | 36.84   | AV       | V          | 36.56  | 2.53       | 36.45          | 39.48               | 54.00  | 14.52  |

## Worst Channel plots:

## GFSK, High Channel, Horizontal



## GFSK, High Channel, Vertical

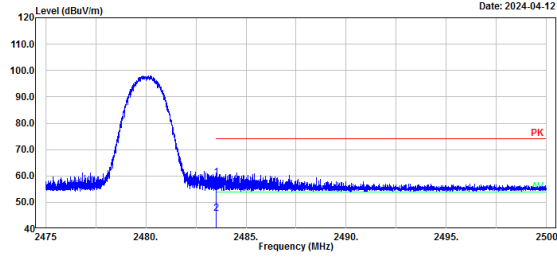


## GFSK, High Channel, Bandedge, Horizontal

Project No.: XMDN240122-04868E-RF  
Polarization: Horizontal  
Test Mode: Transmitting  
Note: BDR\_high channel 2480MHz

Serial No.: 2622-1  
Tester: Leo Xiao

Date: 2024-04-12



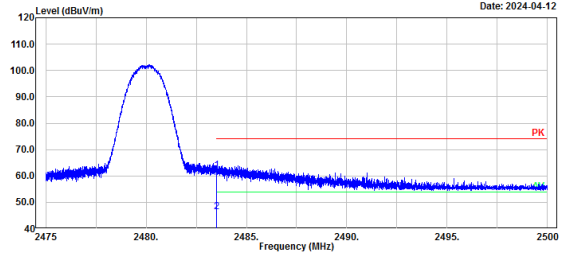
| No. | Frequency<br>(MHz) | Reading<br>(dBμV) | Factor<br>(dB/m) | Result<br>(dBμV/m) | Limit<br>(dBμV/m) | Margin<br>(dB) | Detector |
|-----|--------------------|-------------------|------------------|--------------------|-------------------|----------------|----------|
| 1   | 2483.50            | 30.48             | 28.95            | 59.43              | 74.00             | 14.57          | Peak     |
| 2   | 2483.50            | 16.64             | 28.95            | 45.59              | 54.00             | 8.41           | Average  |

## GFSK, High Channel, Bandedge, Vertical

Project No.: XMDN240122-04868E-RF  
Polarization: Vertical  
Test Mode: Transmitting  
Note: BDR\_high channel 2480MHz

Serial No.: 2622-1  
Tester: Leo Xiao

Date: 2024-04-12

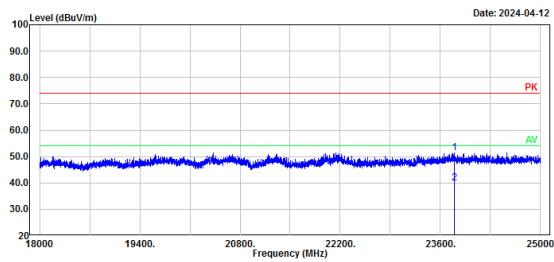


| No. | Frequency<br>(MHz) | Reading<br>(dBμV) | Factor<br>(dB/m) | Result<br>(dBμV/m) | Limit<br>(dBμV/m) | Margin<br>(dB) | Detector |
|-----|--------------------|-------------------|------------------|--------------------|-------------------|----------------|----------|
| 1   | 2483.50            | 33.23             | 28.95            | 62.18              | 74.00             | 11.82          | Peak     |
| 2   | 2483.50            | 17.49             | 28.95            | 46.44              | 54.00             | 7.56           | Average  |

## GFSK, High Channel, Horizontal

Project No.: XMDN240122-04868E-RF  
Polarization: Horizontal  
Test Mode: Transmitting  
Note: BDR\_high channel 2480Hz

Serial No.: 2622-1  
Tester: Leo Xiao

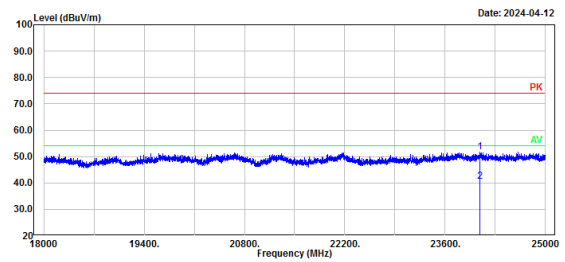


| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|-----------------|----------------|-------------|----------|
| 1   | 23790.40        | 41.61          | 9.69          | 51.30           | 74.00          | 22.70       | Peak     |
| 2   | 23790.40        | 30.10          | 9.69          | 39.79           | 54.00          | 14.21       | Average  |

## GFSK, High Channel, Vertical

Project No.: XMDN240122-04868E-RF  
Polarization: Vertical  
Test Mode: Transmitting  
Note: BDR\_high channel 2480Hz

Serial No.: 2622-1  
Tester: Leo Xiao



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|-----------------|----------------|-------------|----------|
| 1   | 24088.60        | 42.78          | 9.05          | 51.83           | 74.00          | 22.17       | Peak     |
| 2   | 24088.60        | 31.39          | 9.05          | 40.44           | 54.00          | 13.56       | Average  |

### 5.3 Spot Check With Maximum Conducted Output Power

|             |           |              |              |
|-------------|-----------|--------------|--------------|
| Serial No.: | 2GZ2-3    | Test Date:   | 2024/4/11    |
| Test Site:  | RF        | Test Mode:   | Transmitting |
| Tester:     | Alice Tan | Test Result: | Pass         |

#### Environmental Conditions:

|                      |    |                              |    |                           |     |
|----------------------|----|------------------------------|----|---------------------------|-----|
| Temperature:<br>(°C) | 27 | Relative<br>Humidity:<br>(%) | 48 | ATM<br>Pressure:<br>(kPa) | 101 |
|----------------------|----|------------------------------|----|---------------------------|-----|

#### Test Equipment List and Details:

| Manufacturer | Description               | Model           | Serial Number | Calibration Date | Calibration Due Date |
|--------------|---------------------------|-----------------|---------------|------------------|----------------------|
| Agilent      | USB Wideband Power Sensor | U2022XA         | MY54170006    | 2023/10/18       | 2024/10/17           |
| Eastsheep    | Coaxial Attenuator        | 5W-N-JK-6G-10dB | F-08-EM488    | 2023/9/10        | 2024/9/9             |

\* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

#### Test Data:

| Test Modes                 | Test Frequency (MHz) | Peak Conducted Output Power (dBm) | Limits (dBm) |
|----------------------------|----------------------|-----------------------------------|--------------|
| BDR Mode (GFSK)            | 2402                 | 9.15                              | 21           |
|                            | 2441                 | 8.66                              | 21           |
|                            | 2480                 | 8.73                              | 21           |
| EDR Mode ( $\pi/4$ -DQPSK) | 2402                 | 10.79                             | 21           |
|                            | 2441                 | 9.74                              | 21           |
|                            | 2480                 | 9.92                              | 21           |
| EDR Mode (8DPSK)           | 2402                 | 11.08                             | 21           |
|                            | 2441                 | 9.94                              | 21           |
|                            | 2480                 | 9.95                              | 21           |

## **APPENDIX A - EUT PHOTOGRAPHS**

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Please refer to the attachment XMDN240122-04868E-RF-EXP EUT external photographs and XMDN240122-04868E-RF-INP EUT internal photographs.

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## **APPENDIX B - TEST SETUP PHOTOGRAPHS**

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Please refer to the attachment XMDN240122-04868E-RF-00F-TSP test setup photographs.

## APPENDIX C - RF EXPOSURE EVALUATION

### Applicable Standard

According to subpart §1.1310,15.247(i) systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

| (B) Limits for General Population/Uncontrolled Exposure |                               |                               |                                     |                          |
|---------------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| Frequency Range (MHz)                                   | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Averaging Time (minutes) |
| 0.3–1.34                                                | 614                           | 1.63                          | *(100)                              | 30                       |
| 1.34–30                                                 | 824/f                         | 2.19/f                        | *(180/f <sup>2</sup> )              | 30                       |
| 30–300                                                  | 27.5                          | 0.073                         | 0.2                                 | 30                       |
| 300–1500                                                | /                             | /                             | f/1500                              | 30                       |
| 1500–100,000                                            | /                             | /                             | 1.0                                 | 30                       |

f = frequency in MHz; \* = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

### Calculation formula:

Prediction of power density at the distance of the applicable MPE limit

$S = PG/4\pi R^2$  = power density (in appropriate units, e.g. mW/cm<sup>2</sup>);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

**Calculated Data:**

| Operation Mode | Frequency (MHz) | Antenna Gain |           | Conducted output power including Tune-up Tolerance |       | Evaluation Distance (cm) | Power Density (mW/cm <sup>2</sup> ) | MPE Limit (mW/cm <sup>2</sup> ) |
|----------------|-----------------|--------------|-----------|----------------------------------------------------|-------|--------------------------|-------------------------------------|---------------------------------|
|                |                 | (dBi)        | (numeric) | (dBm)                                              | (mW)  |                          |                                     |                                 |
| Bluetooth      | 2402-2480       | 1.04         | 1.27      | 10                                                 | 10.00 | 20.00                    | 0.00253                             | 1.0                             |
| 2.4G Wifi      | 2412-2462       | 1.04         | 1.27      | 18                                                 | 63.10 | 20.00                    | 0.01596                             | 1.0                             |
| 5G Wifi        | 5150-5250       | 0.35         | 1.08      | 18                                                 | 63.10 | 20.00                    | 0.01361                             | 1.0                             |
|                | 5250-5350       | 1.61         | 1.45      | 18                                                 | 63.10 | 20.00                    | 0.01819                             | 1.0                             |
|                | 5470-5725       | 2.39         | 1.73      | 18                                                 | 63.10 | 20.00                    | 0.02177                             | 1.0                             |
|                | 5725-5850       | 0.3          | 1.07      | 18                                                 | 63.10 | 20.00                    | 0.01346                             | 1.0                             |

Note:

The Conducted output power including Tune-up Tolerance provided by manufacturer.

The Bluetooth BDR/EDR / BLE /2.4G Wifi / 5G Wifi can't transmit simultaneously.

**Result: Compliant.** The devices meet FCC MPE at 20 cm distance

\*\*\*\*\* **END OF REPORT** \*\*\*\*\*