



# TEST REPORT

No.25T04N000894-001-BLE

for

**Shanghai Sunmi Technology Co.,Ltd.**

**Wireless data POS System**

**Model Name: T5F1A**

with

**Hardware Version: SM03\_MB\_V1.1**

**Software Version: QSC625VPBCJ10R01A03\_BA01BP01GLM03V01**

**FCC ID: 2AH25T5F1A**

**Issued Date: 2025-05-20**

**Designation Number: CN1210**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

**Test Laboratory:**

**SAICT, Shenzhen Academy of Information and Communications Technology**

Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen,  
Guangdong, P. R. China 518000.

Tel:+86(0)755-33322000, Fax:+86(0)755-33322001

Email: yewu@caict.ac.cn. [www.saict.ac.cn](http://www.saict.ac.cn)



No.25T04N000894-001-BLE

## **REPORT HISTORY**

| Report Number        | Revision | Description | Issue Date |
|----------------------|----------|-------------|------------|
| 25T04N000894-001-BLE | Rev.0    | 1st edition | 2025-05-20 |

Note: the latest revision of the test report supersedes all previous versions.

## **CONTENTS**

|                                                                         |           |
|-------------------------------------------------------------------------|-----------|
| <b>CONTENTS .....</b>                                                   | <b>3</b>  |
| <b>1. SUMMARY OF TEST REPORT .....</b>                                  | <b>4</b>  |
| 1.1. TEST ITEMS .....                                                   | 4         |
| 1.2. TEST STANDARDS .....                                               | 4         |
| 1.3. TEST RESULT .....                                                  | 4         |
| 1.4. TESTING LOCATION .....                                             | 4         |
| 1.5. PROJECT DATA .....                                                 | 4         |
| 1.6. SIGNATURE .....                                                    | 4         |
| <b>2. CLIENT INFORMATION .....</b>                                      | <b>5</b>  |
| 2.1. APPLICANT INFORMATION .....                                        | 5         |
| 2.2. MANUFACTURER INFORMATION .....                                     | 5         |
| <b>3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE) .....</b> | <b>6</b>  |
| 3.1. ABOUT EUT .....                                                    | 6         |
| 3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST .....          | 6         |
| 3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST .....           | 6         |
| 3.4. GENERAL DESCRIPTION .....                                          | 6         |
| <b>4. REFERENCE DOCUMENTS .....</b>                                     | <b>8</b>  |
| 4.1. DOCUMENTS SUPPLIED BY APPLICANT .....                              | 8         |
| 4.2. REFERENCE DOCUMENTS FOR TESTING .....                              | 8         |
| <b>5. TEST RESULTS .....</b>                                            | <b>9</b>  |
| 5.1. TESTING ENVIRONMENT .....                                          | 9         |
| 5.2. TEST RESULTS .....                                                 | 9         |
| 5.3. STATEMENTS .....                                                   | 9         |
| <b>6. TEST EQUIPMENTS UTILIZED .....</b>                                | <b>10</b> |
| <b>7. LABORATORY ENVIRONMENT .....</b>                                  | <b>11</b> |
| <b>8. MEASUREMENT UNCERTAINTY .....</b>                                 | <b>12</b> |
| <b>ANNEX A: DETAILED TEST RESULTS .....</b>                             | <b>13</b> |
| TEST CONFIGURATION .....                                                | 13        |
| A.0 ANTENNA REQUIREMENT .....                                           | 16        |
| A.1 MAXIMUM PEAK OUTPUT POWER .....                                     | 17        |
| A.2 PEAK POWER SPECTRAL DENSITY .....                                   | 18        |
| A.3 6DB BANDWIDTH .....                                                 | 21        |
| A.4 BAND EDGES COMPLIANCE .....                                         | 24        |
| A.5 TRANSMITTER SPURIOUS EMISSION - CONDUCTED .....                     | 26        |
| A.6 TRANSMITTER SPURIOUS EMISSION - RADIATED .....                      | 29        |
| A.7 AC POWER LINE CONDUCTED EMISSION .....                              | 35        |



## 1. Summary of Test Report

### 1.1. Test Items

|                     |                                    |
|---------------------|------------------------------------|
| Description         | Wireless data POS System           |
| Model Name          | T5F1A                              |
| Applicant's name    | Shanghai Sunmi Technology Co.,Ltd. |
| Manufacturer's Name | Shanghai Sunmi Technology Co.,Ltd. |

### 1.2. Test Standards

FCC Part15-2023; ANSI C63.10-2013.

### 1.3. Test Result

**Pass**

Please refer to "5.2. Test Results"

### 1.4. Testing Location

Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road,  
Futian District, Shenzhen, Guangdong, P. R. China 51800

### 1.5. Project data

Testing Start Date: 2024-11-07  
Testing End Date: 2024-12-10

### 1.6. Signature

Lin Zechuang

(Prepared this test report)

An Ran

(Reviewed this test report)

Feng Zhifang

(Approved this test report)



## **2. Client Information**

### **2.1. Applicant Information**

Company Name: Shanghai Sunmi Technology Co.,Ltd.  
Address: Room 505, NO.388 Song Hu Road, Yang Pu District, Shanghai  
200433, China  
Contact Person Emma Yang  
E-Mail chan.yang@sunmi.com  
Telephone: 13510126210  
Fax: /

### **2.2. Manufacturer Information**

Company Name: Shanghai Sunmi Technology Co.,Ltd.  
Address: Room 505, NO.388 Song Hu Road, Yang Pu District, Shanghai  
200433, China  
Contact Person Emma Yang  
E-Mail chan.yang@sunmi.com  
Telephone: 13510126210  
Fax: /



### **3. Equipment Under Test (EUT) and Ancillary Equipment (AE)**

#### **3.1. About EUT**

|                              |                              |
|------------------------------|------------------------------|
| Description                  | Wireless data POS System     |
| Model Name                   | T5F1A                        |
| Frequency Range              | ISM 2400MHz~2483.5MHz        |
| Equipment type               | Bluetooth® Low Energy        |
| Type of Modulation           | GFSK                         |
| PHY                          | LE 1M                        |
| Number of Channels           | 40                           |
| Antenna Type                 | Integrated antenna           |
| Antenna Gain                 | -0.18dBi                     |
| Power Supply                 | 7.7V DC by Battery           |
| FCC ID                       | 2AH25T5F1A                   |
| Condition of EUT as received | No abnormality in appearance |

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Shenzhen Academy of Information and Communications Technology.

#### **3.2. Internal Identification of EUT used during the test**

| EUT ID* | SN or IMEI      | HW Version   | SW Version      | Date of Receipt |
|---------|-----------------|--------------|-----------------|-----------------|
|         |                 |              | QSC625VPBCJ10R  |                 |
| UT13aa  | 869233070014219 | SM03_MB_V1.1 | 01A03_BA01BP01G | 2024-11-06      |
|         |                 |              | LM03V01         |                 |
|         |                 |              | QSC625VPBCJ10R  |                 |
| UT01aa  | 869233070014896 | SM03_MB_V1.1 | 01A03_BA01BP01G | 2024-11-04      |
|         |                 |              | LM03V01         |                 |

\*EUT ID: is used to identify the test sample in the lab internally.

UT13aa is used for conduction test, UT01aa is used for radiation test and AC Power line Conducted Emission test.

#### **3.3. Internal Identification of AE used during the test**

| AE No. | Description | AE ID* |
|--------|-------------|--------|
| AE1    | /           | /      |

\*AE ID and AE Label: is used to identify the test sample in the lab internally.

#### **3.4. General Description**

The Equipment under Test (EUT) is a model of Wireless data POS System with integrated antenna and battery.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.



No.25T04N000894-001-BLE

According to the customer's description, T5F1A has the following modified configuration products.

| Description     | Front Camera | NFC | Scanner | Fingerprint | LCD                                    | CPU  |
|-----------------|--------------|-----|---------|-------------|----------------------------------------|------|
| Configuration 1 | Y            | Y   | Y       | Y           | Y(Original Original &secondary source) | 6225 |
| Configuration 2 | N            | Y   | Y       | Y           | Y(Original supplier)                   | 4325 |
| Configuration 3 | N            | N   | N       | N           | Y(Original supplier)                   | 4325 |

The differences do not affect the following test cases. All results were from the initial model. For detail information please check the declaration provided by the manufacturer. The initial model report number is 24T04N002645-006-BLE.



## **4. Reference Documents**

### **4.1. Documents supplied by applicant**

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

### **4.2. Reference Documents for testing**

The following documents listed in this section are referred for testing.

| <b>Reference</b> | <b>Title</b>                                                                                                                                                                                                              | <b>Version</b> |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| FCC Part 15      | FCC CFR 47, Part 15, Subpart C:<br>15.205 Restricted bands of operation;<br>15.209 Radiated emission limits, general requirements;<br>15.247 Operation within the bands 902–928MHz,<br>2400–2483.5 MHz, and 5725–5850 MHz | 2023           |
| ANSI C63.10      | American National Standard of Procedures for Compliance<br>Testing of Unlicensed Wireless Devices                                                                                                                         | 2013           |

## 5. Test Results

### 5.1. Testing Environment

Normal Temperature: 15~35°C

Relative Humidity: 20~75%

### 5.2. Test Results

| No | Test cases                                | Sub-clause of Part 15C | Verdict  |
|----|-------------------------------------------|------------------------|----------|
| 0  | Antenna Requirement                       | 15.203                 | <b>P</b> |
| 1  | Maximum Peak Output Power                 | 15.247 (b)             | <b>P</b> |
| 2  | Peak Power Spectral Density               | 15.247 (e)             | <b>P</b> |
| 3  | 6dB Bandwidth                             | 15.247 (a)             | <b>P</b> |
| 4  | Band Edges Compliance                     | 15.247 (d)             | <b>P</b> |
| 5  | Transmitter Spurious Emission - Conducted | 15.247 (d)             | <b>P</b> |
| 6  | Transmitter Spurious Emission - Radiated  | 15.247, 15.205, 15.209 | <b>P</b> |
| 7  | AC Power line Conducted Emission          | 15.107, 15.207         | <b>P</b> |

See **ANNEX A** for details.

### 5.3. Statements

SAICT has evaluated the test cases requested by the applicant/manufacture as listed in section 5.2 of this report, for the EUT specified in section 3, according to the standards or reference documents listed in section 4.2.

Disclaimer:

A. After confirmation with the customer, the sample information provided by the customer may affect the validity of the measurement results in this report, and the impact and consequences arising therefrom shall be borne by the customer.

B. The samples in this report are provided by the customer, and the test results are only applicable to the samples received.

## 6. Test Equipments Utilized

### Conducted test system

| No. | Equipment              | Model    | Serial Number | Manufacturer    | Calibration Due date | Calibration Period |
|-----|------------------------|----------|---------------|-----------------|----------------------|--------------------|
| 1   | Vector Signal Analyzer | FSV40    | 100903        | Rohde & Schwarz | 2024-12-27           | 1 year             |
| 2   | Power Sensor           | U2021XA  | MY55430013    | Keysight        | 2024-12-27           | 1 year             |
| 3   | RF Control Unit        | JS0806-2 | 21C8060398    | Tonscend        | 2025-05-06           | 1 year             |
| 4   | Shielding Room         | S81      | CT000986-1344 | ETS-Lindgren    | 2026-09-12           | 5 years            |

### Radiated test system

| No. | Equipment         | Model                 | Serial Number | Manufacturer    | Calibration Due date | Calibration Period |
|-----|-------------------|-----------------------|---------------|-----------------|----------------------|--------------------|
| 1   | Test Receiver     | ESR7                  | 101676        | Rohde & Schwarz | 2025-11-21           | 1 year             |
| 2   | Hybrid Antenna    | VULB 9163             | 330           | Schwarzbeck     | 2027-04-21           | 3 years            |
| 3   | Horn Antenna      | 3117                  | 00066577      | ETS-Lindgren    | 2025-04-17           | 3 years            |
| 4   | Anechoic Chamber  | FACT3-2.0             | 1285          | ETS-Lindgren    | 2025-05-28           | 2 years            |
| 5   | Spectrum Analyzer | FSV40                 | 101192        | Rohde & Schwarz | 2025-01-12           | 1 year             |
| 6   | Loop Antenna      | HLA6120               | 35779         | TESEQ           | 2025-05-10           | 3 years            |
| 7   | Horn Antenna      | QSH-SL-1<br>8-26-S-20 | 17013         | Q-par           | 2026-02-01           | 3 years            |
| 8   | Test Receiver     | ESCI                  | 100702        | Rohde & Schwarz | 2025-01-10           | 1 year             |
| 9   | LISN              | ENV216                | 102067        | Rohde & Schwarz | 2024-10-07           | 1 year             |

### Test software

| No. | Equipment | Manufacturer    | Version  |
|-----|-----------|-----------------|----------|
| 1   | JS1120-3  | Tonscend        | 3.5      |
| 2   | EMC32     | Rohde & Schwarz | 10.50.40 |

EUT is engineering software provided by the customer to control the transmitting signal.  
The EUT was programmed to be in continuously transmitting mode.

## 7. Laboratory Environment

### Shielded room

|                          |                                           |
|--------------------------|-------------------------------------------|
| Temperature              | Min. = 15 °C, Max. = 35 °C                |
| Relative humidity        | Min. = 20 %, Max. = 75 %                  |
| Shielding effectiveness  | 0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB |
| Electrical insulation    | > 2M $\Omega$                             |
| Ground system resistance | < 4 $\Omega$                              |

### Anechoic chamber

|                                    |                                                 |
|------------------------------------|-------------------------------------------------|
| Temperature                        | Min. = 15 °C, Max. = 35 °C                      |
| Relative humidity                  | Min. = 20 %, Max. = 75 %                        |
| Shielding effectiveness            | 0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB       |
| Electrical insulation              | > 2M $\Omega$                                   |
| Ground system resistance           | < 4 $\Omega$                                    |
| Normalised site attenuation (NSA)  | < $\pm 4$ dB, 3 m distance, from 30 to 1000 MHz |
| Voltage Standing Wave Ratio (VSWR) | $\leq 6$ dB, from 1 to 18 GHz, 3m distance      |
| Uniformity of field strength       | Between 0 and 6 dB, from 80 to 6000 MHz         |

## 8. Measurement Uncertainty

| Test Name                                    | Uncertainty ( $k=2$ )                    |        |
|----------------------------------------------|------------------------------------------|--------|
| 1. Maximum Peak Output Power                 | 1.32dB                                   |        |
| 2. Peak Power Spectral Density               | 1.32dB                                   |        |
| 3. 6dB Bandwidth                             | 4.56kHz                                  |        |
| 4. Band Edges Compliance                     | 1.92dB                                   |        |
| 5. Transmitter Spurious Emission - Conducted | $30\text{MHz} \leq f < 1\text{GHz}$      | 1.41dB |
|                                              | $1\text{GHz} \leq f < 7\text{GHz}$       | 1.92dB |
|                                              | $7\text{GHz} \leq f < 13\text{GHz}$      | 2.31dB |
|                                              | $13\text{GHz} \leq f \leq 26\text{GHz}$  | 2.61dB |
| 6. Transmitter Spurious Emission - Radiated  | $9\text{kHz} \leq f < 30\text{MHz}$      | 1.70dB |
|                                              | $30\text{MHz} \leq f < 1\text{GHz}$      | 4.80dB |
|                                              | $1\text{GHz} \leq f < 18\text{GHz}$      | 4.82dB |
|                                              | $18\text{GHz} \leq f \leq 40\text{GHz}$  | 2.90dB |
| 7. AC Power line Conducted Emission          | $150\text{kHz} \leq f \leq 30\text{MHz}$ | 2.68dB |

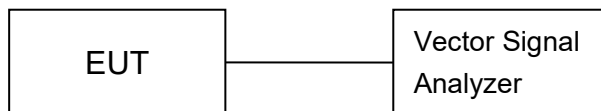
## **ANNEX A: Detailed Test Results**

### **Test Configuration**

The measurement is made according to ANSI C63.10.

#### **1) Conducted Measurements**

1. Connect the EUT to the test system correctly.
2. Set the EUT to the required work mode.
3. Set the EUT to the required channel.
4. Set the spectrum analyzer to start measurement.
5. Record the values.



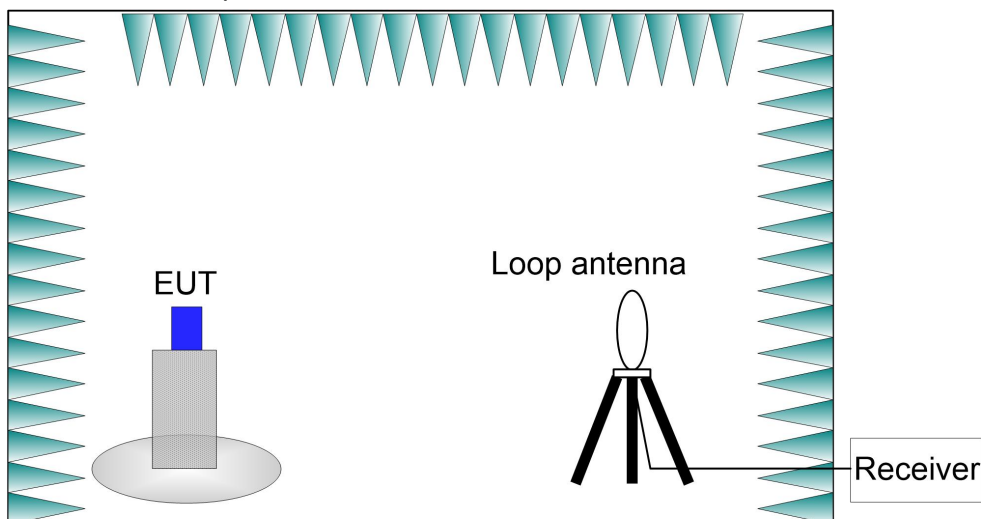
#### **2) Radiated Measurements**

**Test setup:**

**9kHz-30MHz:**

The EUT are measured in a anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving loop antenna is 1.0 meter above the ground. The test setup refers to figure below.

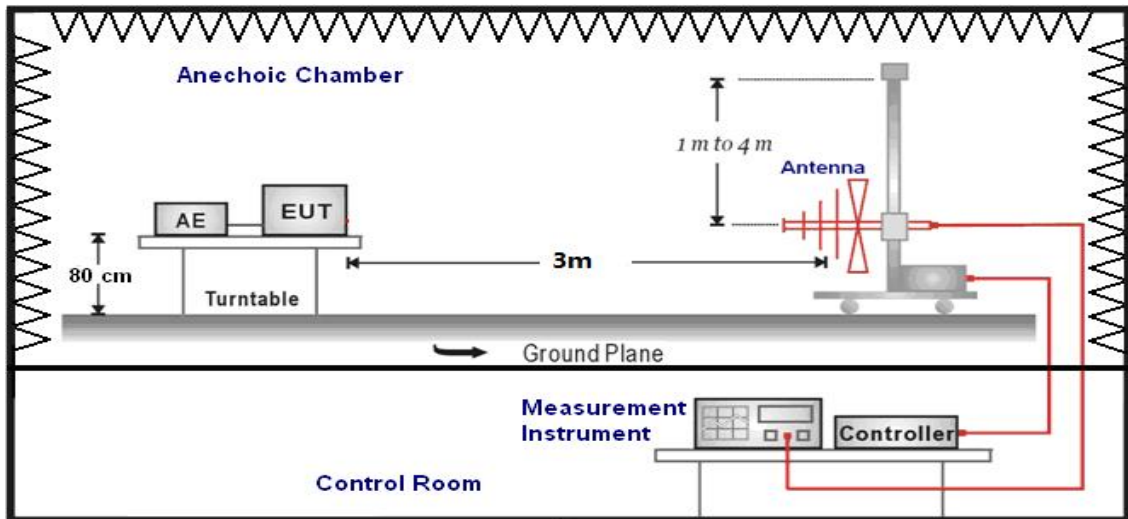
Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiver antenna polarization.



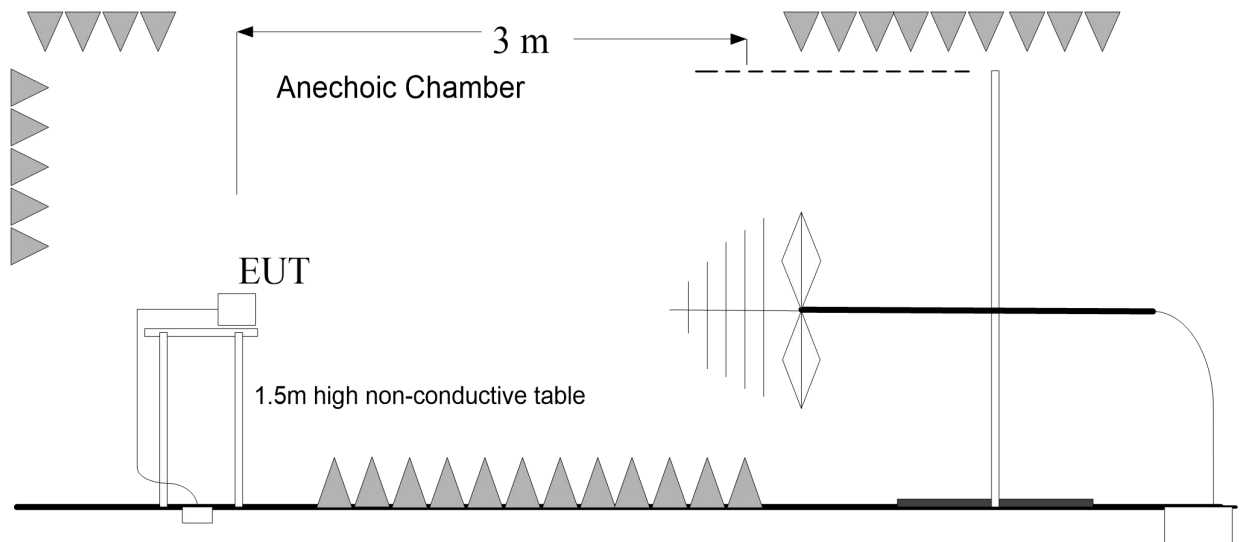
### 30MHz-26.5GHz:

The EUT are measured in a anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving antenna is 1.0 meter to 4.0 meter above the ground. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiver antenna polarization.

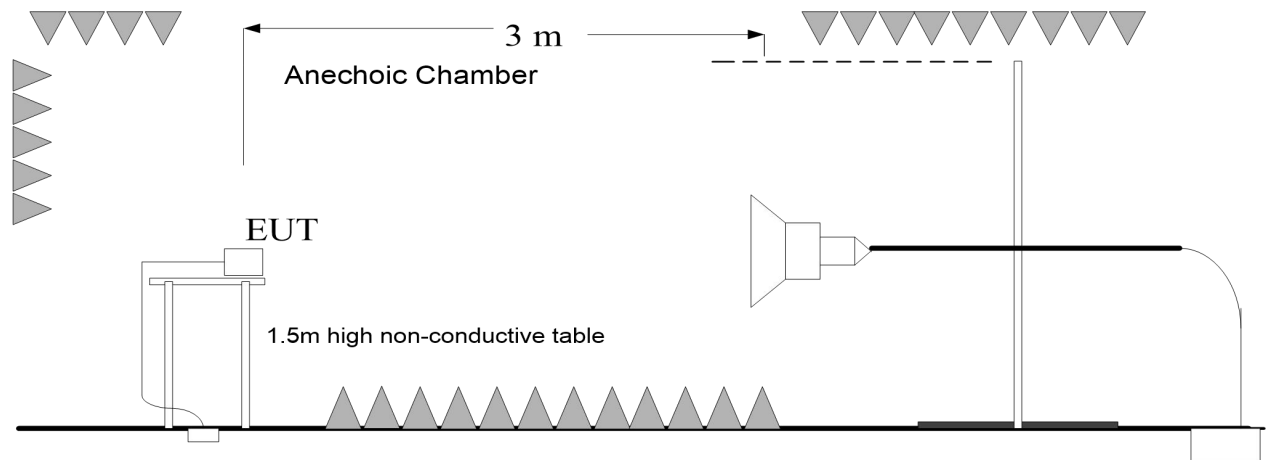
### 30MHz-1GHz:



### 1GHz-3GHz:

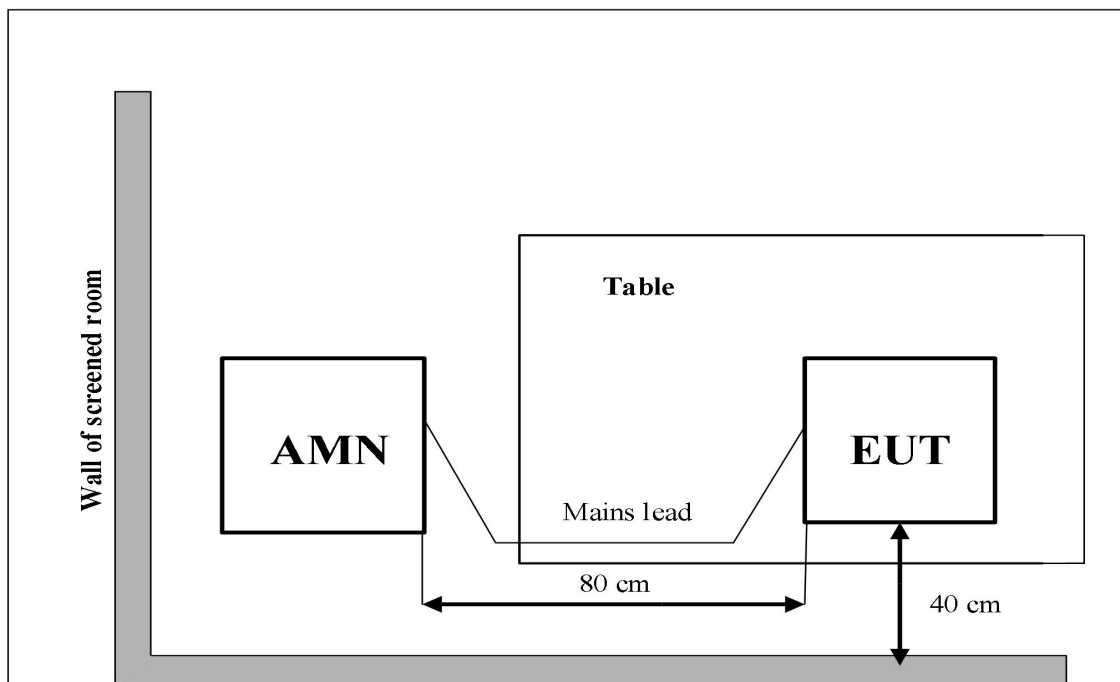


### 3GHz-26.5GHz:



### 3) AC Power line Conducted Emission Measurement

For Bluetooth LE, the EUT is working under test mode. The EUT is commanded to operate at maximum transmitting power.



## A.0 Antenna requirement

### Measurement Limit:

| Standard            | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FCC CRF Part 15.203 | An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. 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, or §15.221. 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. |

**Conclusion: The Directional gains of antenna used for transmitting is -0.18dBi.**

**The RF transmitter uses an integrate antenna without connector.**

**A.1 Maximum Peak Output Power****Method of Measurement: See ANSI C63.10-clause 11.9.1.3.**

The maximum peak conducted output power may be measured using a broadband peak RF power meter.

**Measurement Limit:**

| Standard                  | Limit (dBm) |
|---------------------------|-------------|
| FCC 47 CRF Part 15.247(b) | < 30        |

**Measurement Results:**

| Mode  | Frequency (MHz) | RF output power (dBm) | Conclusion |
|-------|-----------------|-----------------------|------------|
| LE 1M | 2402(CH0)       | 5.09                  | <b>P</b>   |
|       | 2440(CH19)      | 5.05                  | <b>P</b>   |
|       | 2480(CH39)      | 5.19                  | <b>P</b>   |

**Conclusion: Pass**

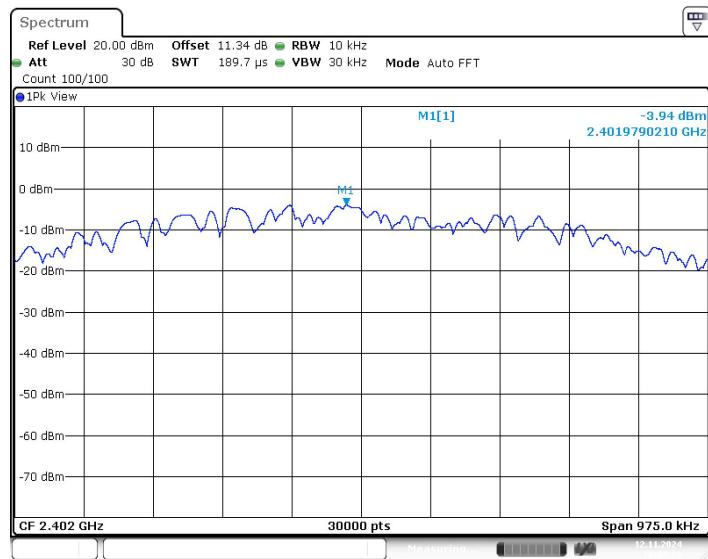
**A.2 Peak Power Spectral Density****Method of Measurement: See ANSI C63.10-clause 11.10.2.****Measurement Limit:**

| Standard                  | Limit (dBm/3 kHz) |
|---------------------------|-------------------|
| FCC 47 CRF Part 15.247(e) | < 8               |

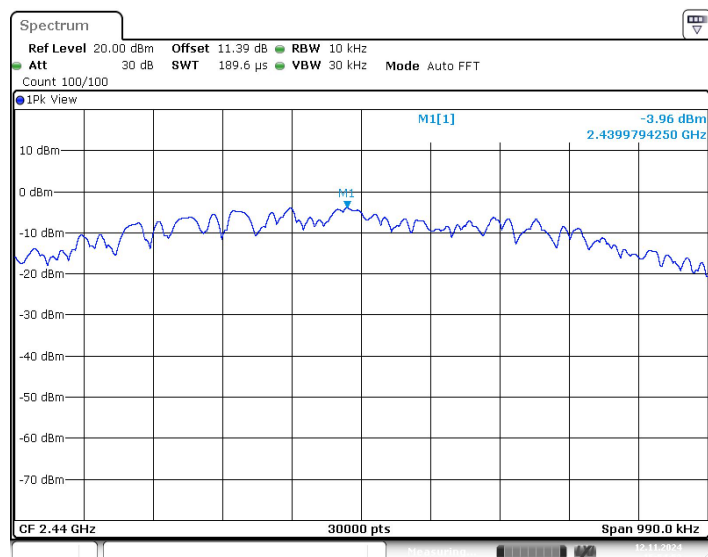
**Measurement Results:**

| Mode  | Frequency (MHz) | Peak Power Spectral Density<br>(dBm/10 kHz) |       | Conclusion |
|-------|-----------------|---------------------------------------------|-------|------------|
| LE 1M | 2402(CH0)       | Fig.1                                       | -3.94 | <b>P</b>   |
|       | 2440(CH19)      | Fig.2                                       | -3.96 | <b>P</b>   |
|       | 2480(CH39)      | Fig.3                                       | -3.92 | <b>P</b>   |

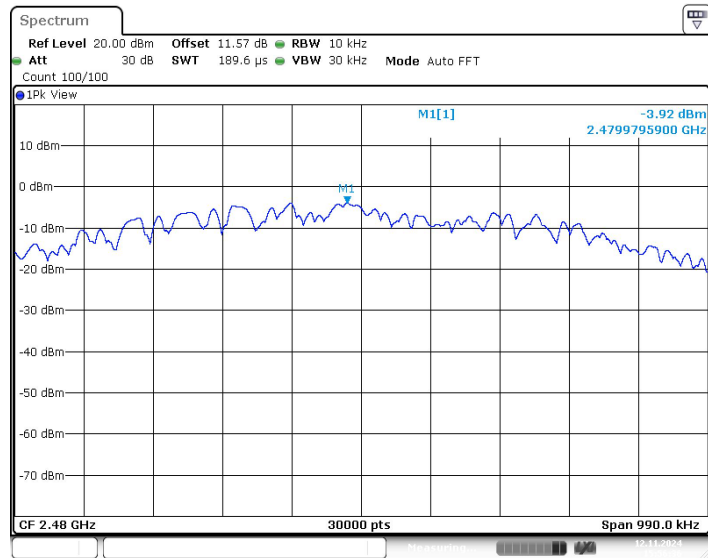
**See below for test graphs.****Conclusion: PASS**



**Fig.1 Power Spectral Density (CH0), LE 1M**



**Fig.2 Power Spectral Density (CH19), LE 1M**



**Fig.3 Power Spectral Density (CH39), LE 1M**

**A.3 6dB Bandwidth****Method of Measurement: See ANSI C63.10-clause 11.8.****Measurement Limit:**

| Standard                   | Limit (MHz) |
|----------------------------|-------------|
| FCC 47 CFR Part 15.247 (a) | $\geq 0.5$  |

**Measurement Result:**

| Mode  | Frequency (MHz) | Test Results (MHz) |      | Conclusion |
|-------|-----------------|--------------------|------|------------|
| LE 1M | 2402(CH0)       | Fig.4              | 0.65 | <b>P</b>   |
|       | 2440(CH19)      | Fig.5              | 0.66 | <b>P</b>   |
|       | 2480(CH39)      | Fig.6              | 0.66 | <b>P</b>   |

**See below for test graphs.****Conclusion: PASS**

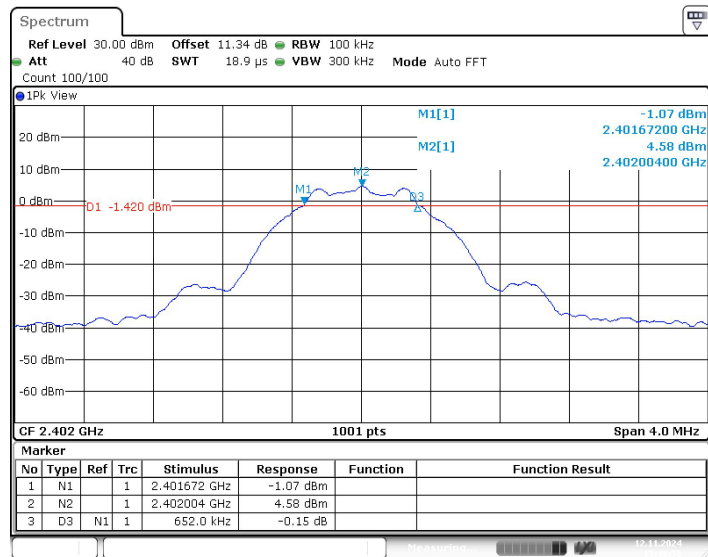


Fig.4 6dB Bandwidth (CH0), LE 1M

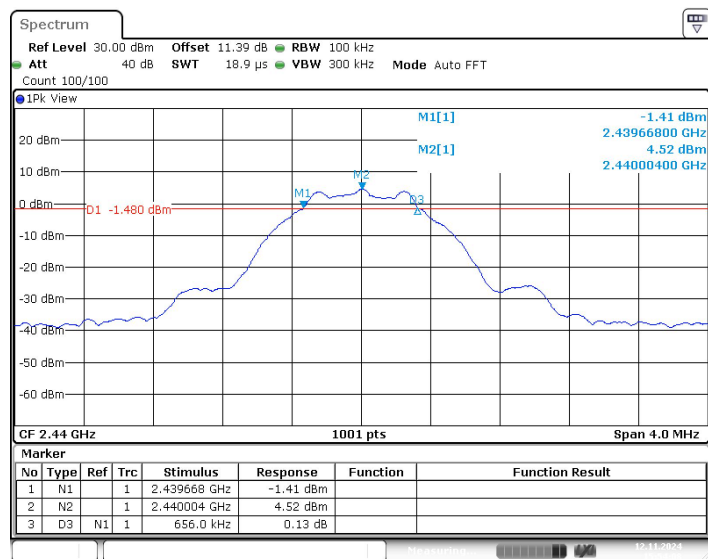


Fig.5 6dB Bandwidth (CH19), LE 1M

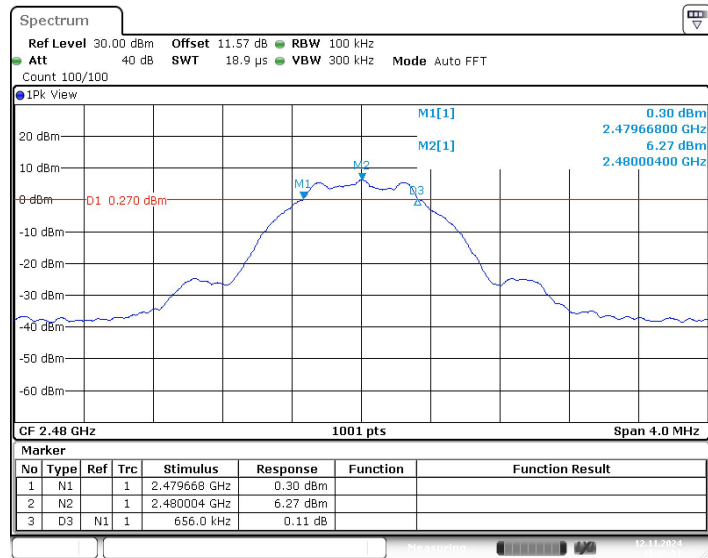


Fig.6 6dB Bandwidth (CH39), LE 1M

**A.4 Band Edges Compliance****Method of Measurement: See ANSI C63.10-clause 11.13.3.****Measurement Limit:**

| Standard                   | Limit (dBc) |
|----------------------------|-------------|
| FCC 47 CFR Part 15.247 (d) | > 20        |

**Measurement Result:**

| Mode  | Frequency (MHz) | Test Results (dBc) |       | Conclusion |
|-------|-----------------|--------------------|-------|------------|
| LE 1M | 2402(CH0)       | Fig.7              | 49.70 | <b>P</b>   |
|       | 2480(CH39)      | Fig.8              | 51.63 | <b>P</b>   |

**See below for test graphs.****Conclusion: PASS**

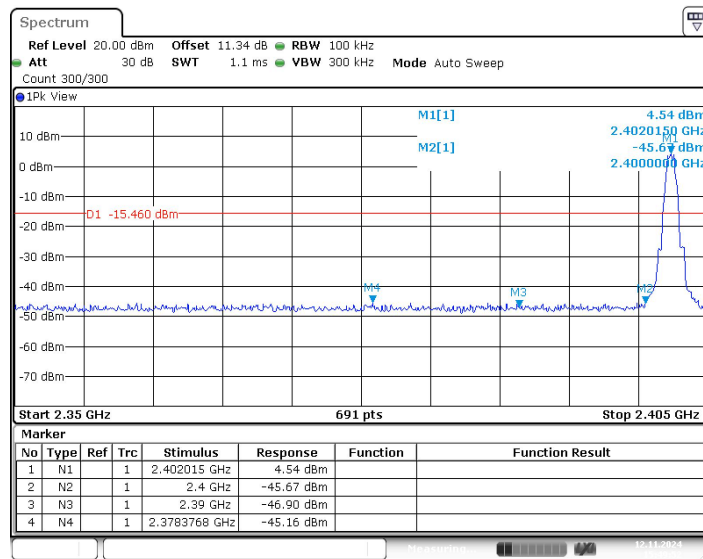


Fig.7 Band Edges (CH0), LE 1M

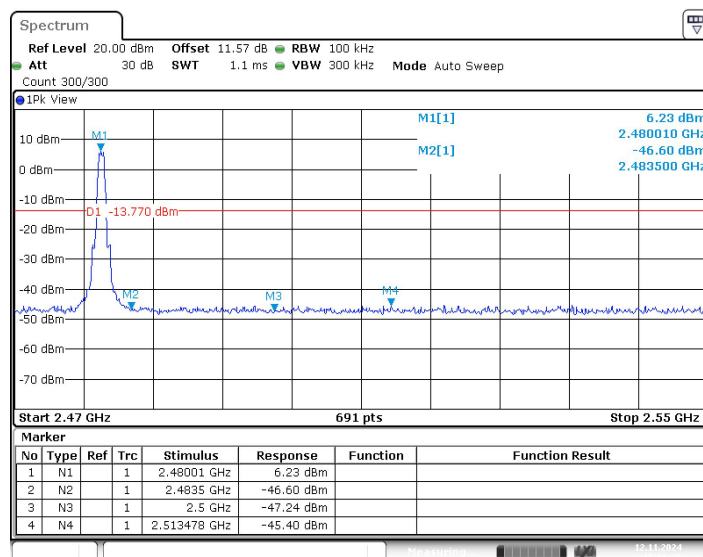


Fig.8 Band Edges (CH39), LE 1M

## A.5 Transmitter Spurious Emission - Conducted

Method of Measurement: See ANSI C63.10-clause 11.11.

Measurement Limit:

| Standard                   | Limit (dBm)                                        |
|----------------------------|----------------------------------------------------|
| FCC 47 CFR Part 15.247 (d) | 20dBm below peak output power in 100 kHz bandwidth |

Measurement Results:

| Mode  | Frequency (MHz) | Frequency Range | Test Results | Conclusion |
|-------|-----------------|-----------------|--------------|------------|
| LE 1M | 2402(CH0)       | 1GHz-26.5GHz    | Fig.9        | P          |
|       | 2440(CH19)      | 1GHz-26.5GHz    | Fig.10       | P          |
|       | 2480(CH39)      | 1GHz-26.5GHz    | Fig.11       | P          |
| /     | All channels    | 30MHz -1GHz     | Fig.12       | P          |

See below for test graphs.

Conclusion: Pass

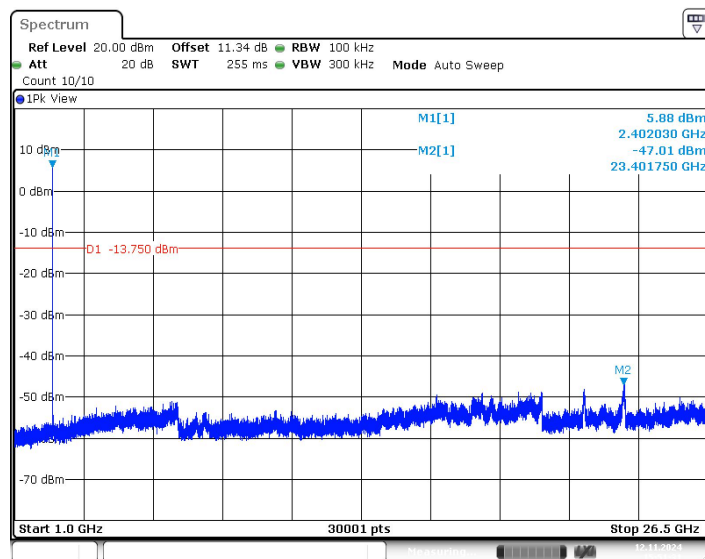
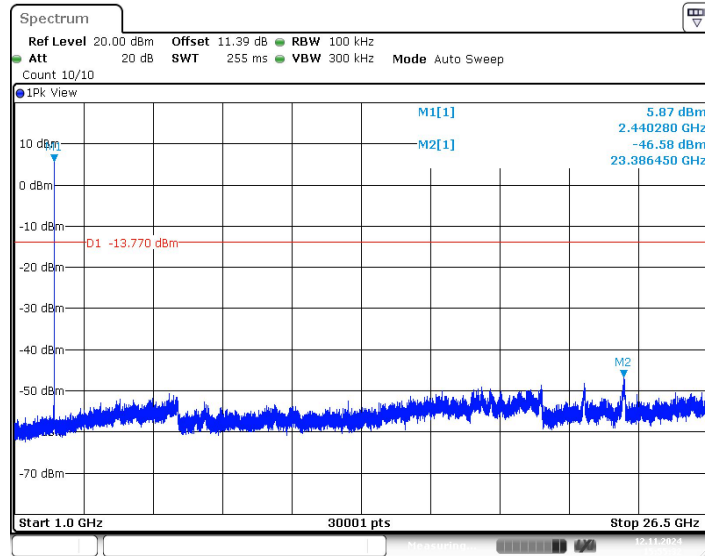
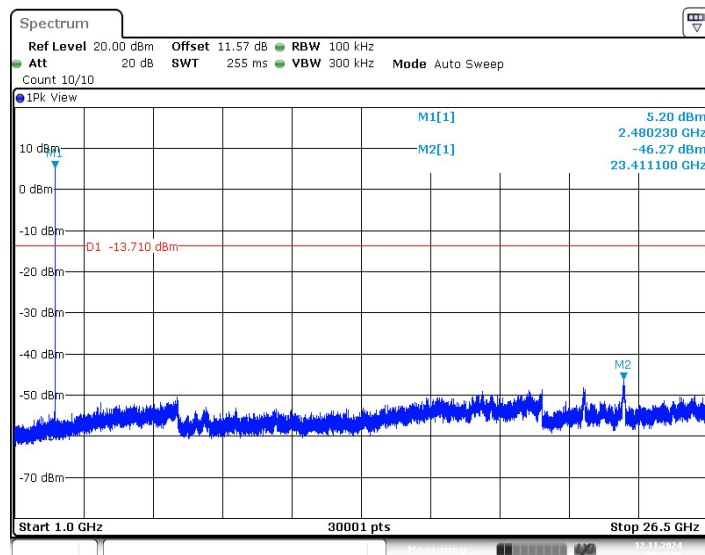


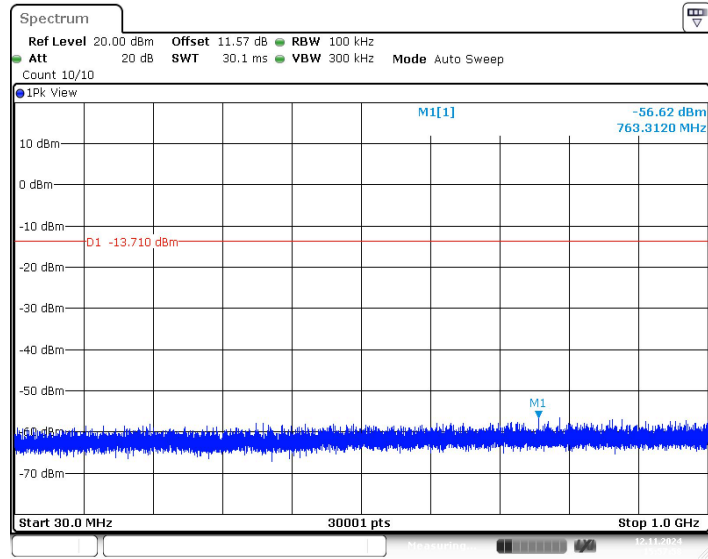
Fig.9 Conducted Spurious Emission (CH0, 1GHz-26.5GHz), LE 1M



**Fig.10 Conducted Spurious Emission (CH19, 1GHz-26.5GHz), LE 1M**



**Fig.11 Conducted Spurious Emission (CH39, 1GHz-26.5GHz), LE 1M**



**Fig.12 Conducted Spurious Emission (All Channels, 30MHz -1GHz)**

## A.6 Transmitter Spurious Emission - Radiated

**Method of Measurement:** See ANSI C63.10-clause 11.11&11.12.

**Measurement Limit:**

| Standard                               | Limit (dBm)                   |
|----------------------------------------|-------------------------------|
| FCC 47 CFR Part 15.247, 15.205, 15.209 | 20dBm below peak output power |

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)).

**Limit in restricted band:**

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

**Test Condition:**

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

| Frequency of emission (MHz) | RBW/VBW       | Sweep Time(s) |
|-----------------------------|---------------|---------------|
| 30-1000                     | 120kHz/300kHz | 5             |
| 1000-4000                   | 1MHz/3MHz     | 15            |
| 4000-18000                  | 1MHz/3MHz     | 40            |
| 18000-26500                 | 1MHz/3MHz     | 20            |

**Note:** According to the performance evaluation, the radiated emission margin of EUT is over 20dB in the band from 9kHz to 30MHz. Therefore, the measurement starts from 30MHz to tenth harmonic. The measurement results include the horizontal polarization and vertical polarization measurements. For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases were recorded in this report.

**Measurement Results:**

| Mode  | Frequency (MHz)       | Frequency Range     | Test Results | Conclusion |
|-------|-----------------------|---------------------|--------------|------------|
| LE 1M | 2402(CH0)             | 1 GHz ~18 GHz       | Fig.13       | <b>P</b>   |
|       | 2440(CH19)            | 1 GHz ~18 GHz       | Fig.14       | <b>P</b>   |
|       | 2480(CH39)            | 1 GHz ~18 GHz       | Fig.15       | <b>P</b>   |
|       | Restricted Band(CH0)  | 2.38 GHz ~ 2.45 GHz | Fig.16       | <b>P</b>   |
|       | Restricted Band(CH39) | 2.45 GHz ~ 2.5 GHz  | Fig.17       | <b>P</b>   |
| /     | All channels          | 9 kHz ~30 MHz       | Fig.18       | <b>P</b>   |
|       |                       | 30 MHz ~1 GHz       | Fig.19       | <b>P</b>   |
|       |                       | 18 GHz ~ 26.5 GHz   | Fig.20       | <b>P</b>   |

**Worst Case Result:**

For LE 1M:

CH39 (1-18GHz)

| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Pol | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-----|--------------|
| 14226.000000    | 48.07            | 74.00          | 25.93       | H   | 11.2         |
| 15032.142857    | 50.22            | 74.00          | 23.78       | V   | 12.7         |
| 15874.714286    | 52.15            | 74.00          | 21.85       | H   | 14.0         |
| 16567.714286    | 54.20            | 74.00          | 19.80       | V   | 16.7         |
| 17129.571429    | 54.33            | 74.00          | 19.67       | H   | 18.4         |
| 17908.714286    | 55.07            | 74.00          | 18.93       | H   | 18.9         |

| Frequency (MHz) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Pol | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-----|--------------|
| 14226.000000    | 36.21            | 54.00          | 17.79       | H   | 11.2         |
| 15032.142857    | 37.94            | 54.00          | 16.06       | V   | 12.7         |
| 15874.714286    | 40.02            | 54.00          | 13.98       | H   | 14.0         |
| 16567.714286    | 41.56            | 54.00          | 12.44       | V   | 16.7         |
| 17129.571429    | 42.32            | 54.00          | 11.68       | H   | 18.4         |
| 17908.714286    | 42.55            | 54.00          | 11.45       | H   | 18.9         |

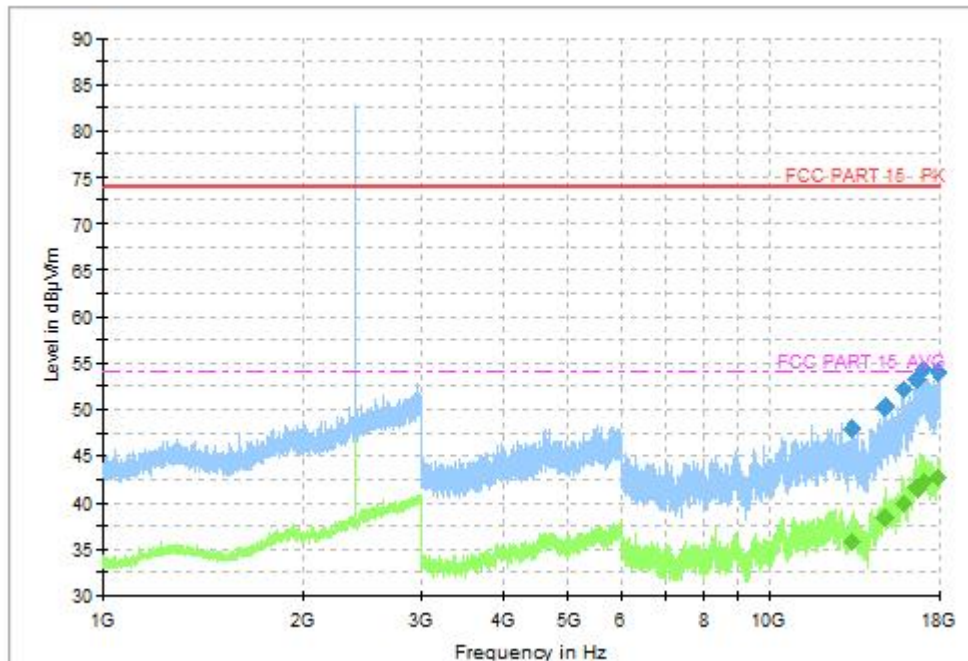
**Note:**

A "reference path loss" is established and the  $A_{Rpl}$  is the attenuation of "reference path loss", and Antenna Factor, the gain of the preamplifier, the cable loss.  $P_{Mea}$  is the field strength recorded from the instrument.

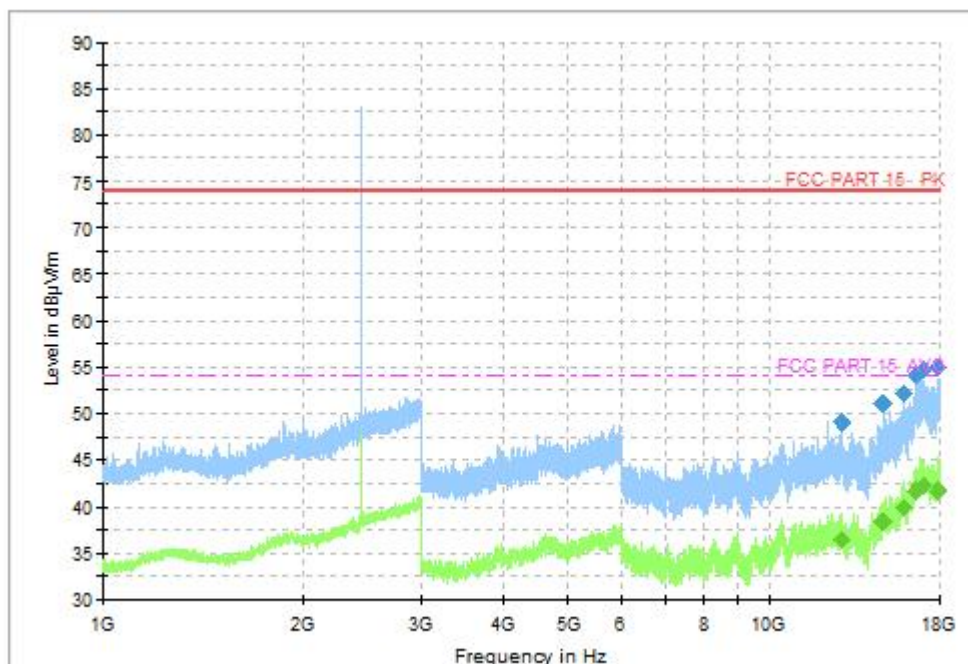
The measurement results are obtained as described below:

Result=  $P_{Mea}$  +Cable Loss +Antenna Factor-Gain of the preamplifier.

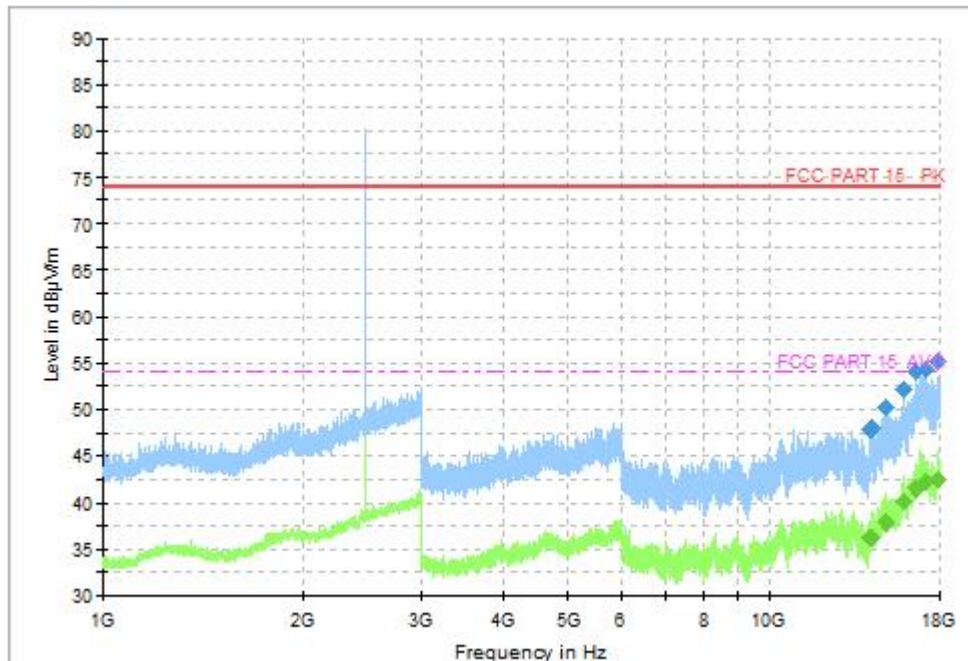
**See below for test graphs.**
**Conclusion: Pass**



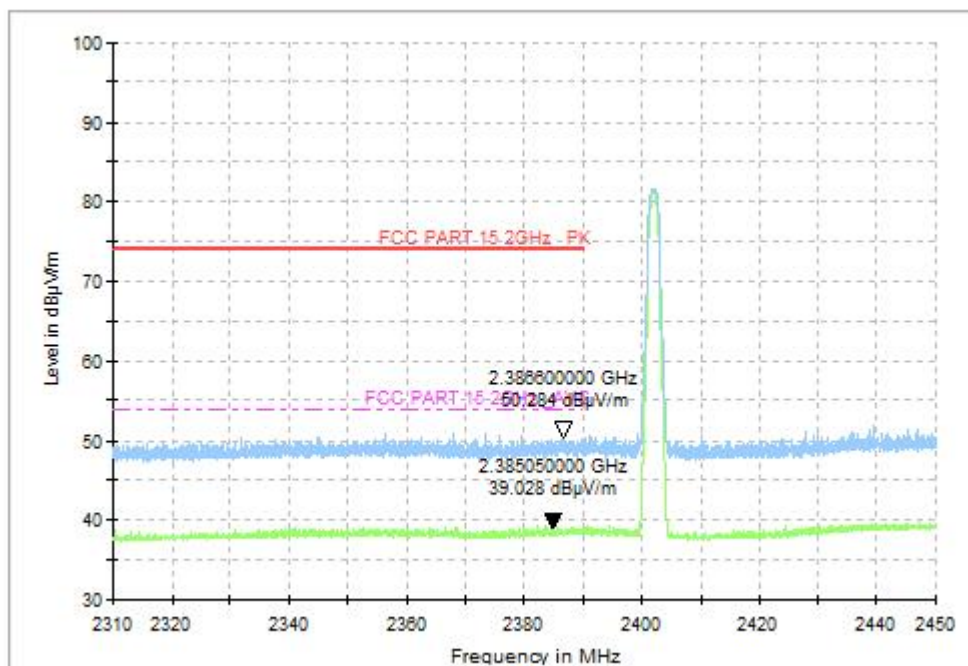
**Fig.13 Radiated Spurious Emission (CH0, 1GHz ~18GHz), LE 1M**



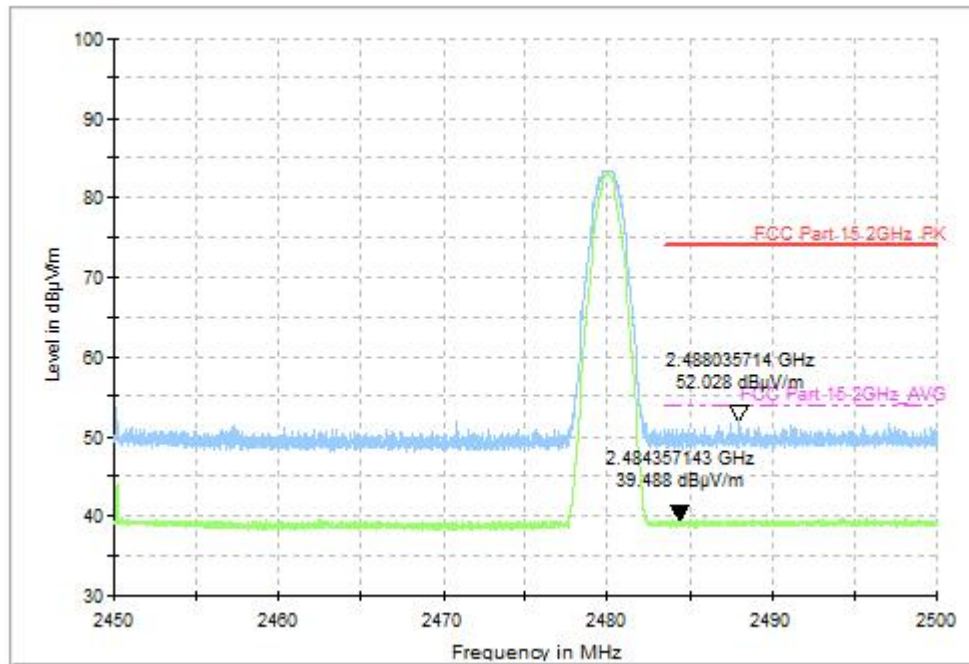
**Fig.14 Radiated Spurious Emission (CH19, 1GHz ~18GHz), LE 1M**



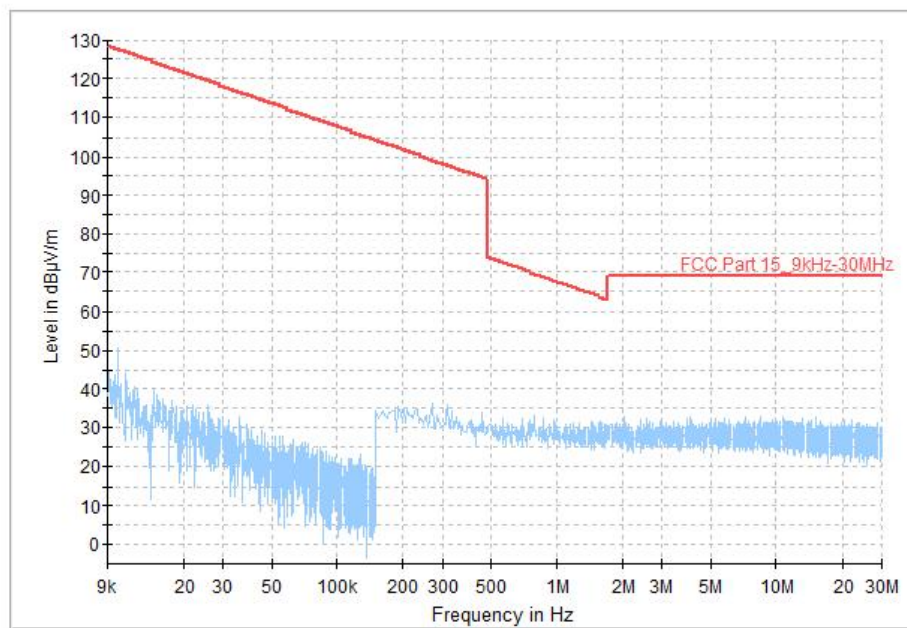
**Fig.15 Radiated Spurious Emission (CH39, 1GHz ~18GHz), LE 1M**



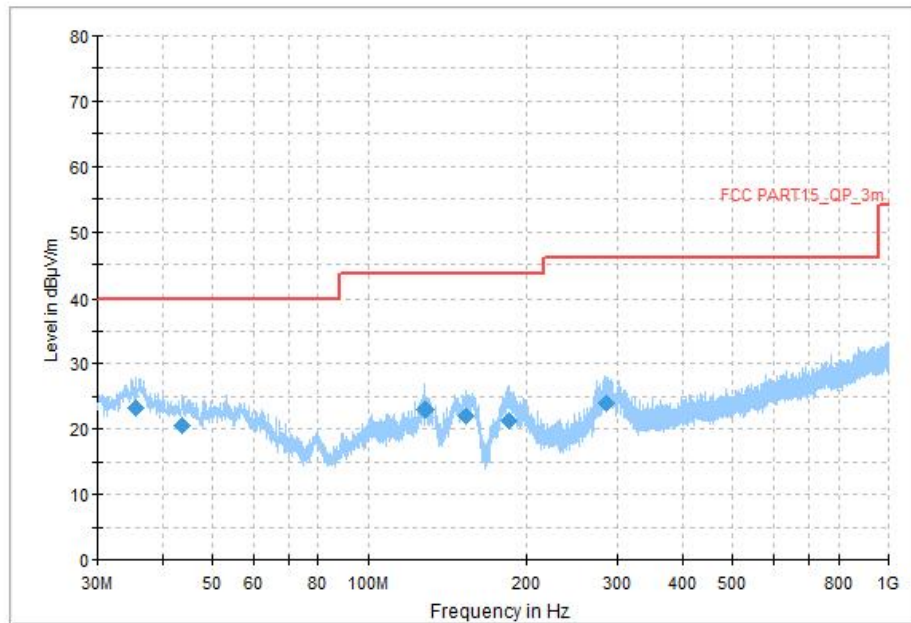
**Fig.16 Radiated Band Edges (CH0, 2.38GHz~2.45GHz), LE 1M**



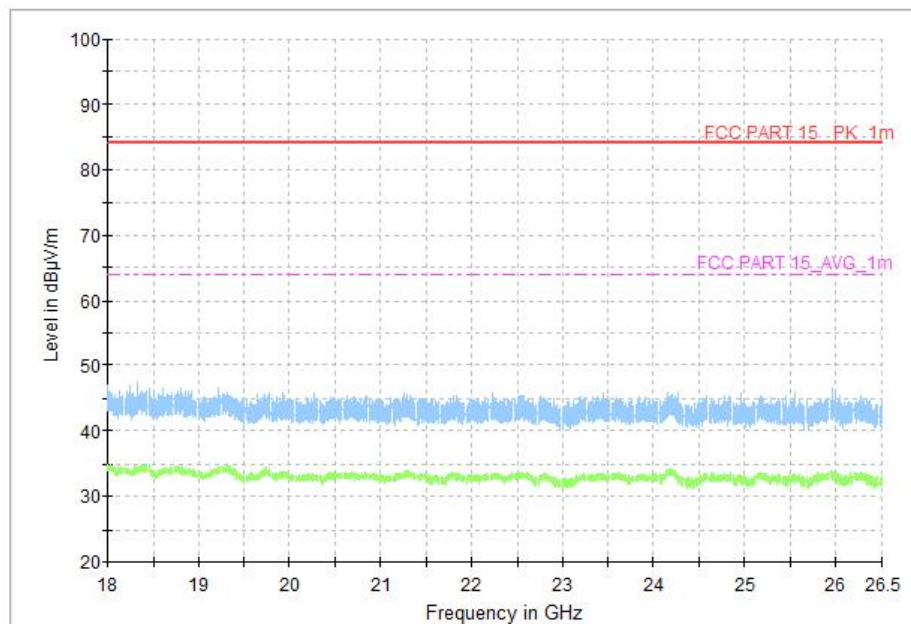
**Fig.17 Radiated Band Edges (CH39, 2.45GHz~2.50GHz), LE 1M**



**Fig.18 Radiated Spurious Emission (All Channels, 9kHz-30MHz)**



**Fig.19 Radiated Spurious Emission (All Channels, 30MHz-1GHz)**



**Fig.20 Radiated Spurious Emission (All Channels, 18GHz-26.5 GHz)**

**A.7 AC Power line Conducted Emission****Method of Measurement: See ANSI C63.10-clause 6.2.****Test Condition:**

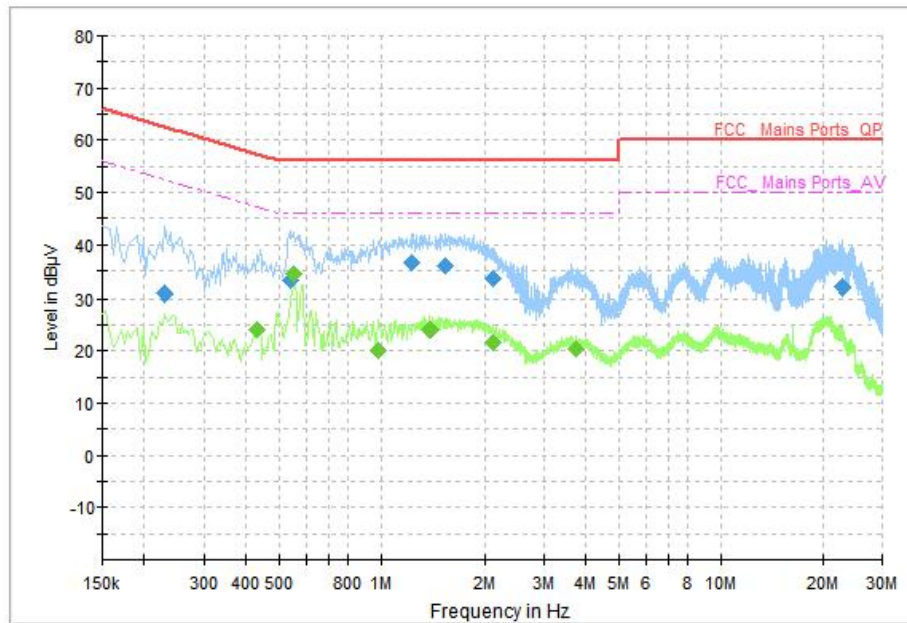
| Voltage (V) | Frequency (Hz) |
|-------------|----------------|
| 120         | 60             |

**Measurement Result and limit:**

| Frequency range<br>(MHz) | Quasi-peak<br>Limit (dBμV) | Average-peak<br>Limit (dBμV) | Result (dBμV) |        | Conclusion |
|--------------------------|----------------------------|------------------------------|---------------|--------|------------|
|                          |                            |                              | Traffic       | Idle   |            |
| 0.15 to 0.5              | 66 to 56                   | 56 to 46                     | Fig.21        | Fig.22 | <b>P</b>   |
| 0.5 to 5                 | 56                         | 46                           |               |        |            |
| 5 to 30                  | 60                         | 50                           |               |        |            |

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

**Note:** The measurement results include the L1 and N measurements.**See below for test graphs.****Conclusion: Pass**



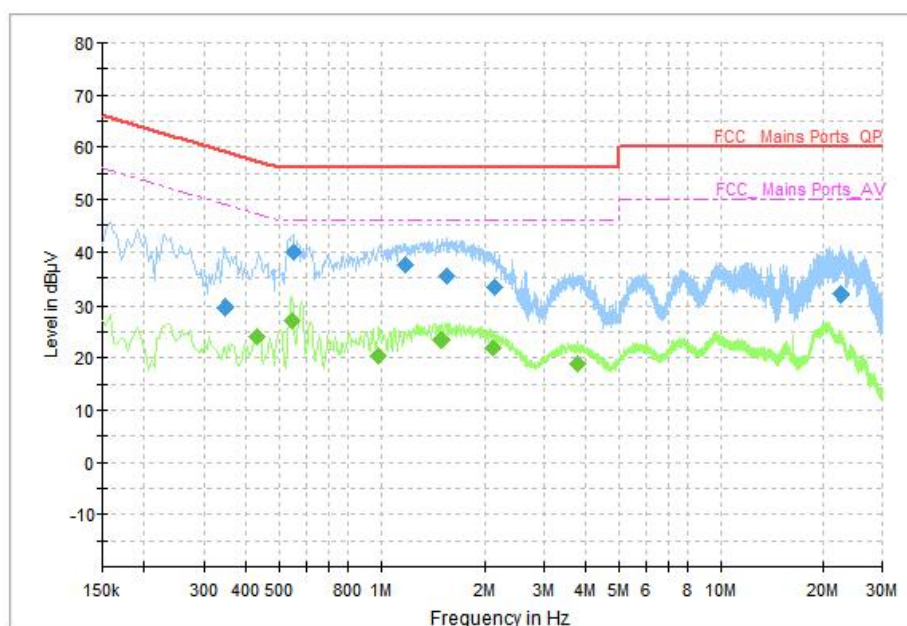
**Fig.21 AC Power line Conducted Emission (Traffic)**

#### Measurement Results: Quasi Peak

| Frequency (MHz) | Quasi Peak (dBμV) | Limit (dBμV) | Margin (dB) | Line | Filter | Corr. (dB) |
|-----------------|-------------------|--------------|-------------|------|--------|------------|
| 0.230000        | 30.68             | 62.45        | 31.77       | N    | ON     | 10         |
| 0.542000        | 33.20             | 56.00        | 22.80       | N    | ON     | 10         |
| 1.226000        | 36.45             | 56.00        | 19.55       | N    | ON     | 10         |
| 1.538000        | 36.07             | 56.00        | 19.93       | N    | ON     | 10         |
| 2.122000        | 33.43             | 56.00        | 22.57       | N    | ON     | 10         |
| 22.862000       | 31.93             | 60.00        | 28.07       | N    | ON     | 10         |

#### Measurement Results: Average

| Frequency (MHz) | Average (dBμV) | Limit (dBμV) | Margin (dB) | Line | Filter | Corr. (dB) |
|-----------------|----------------|--------------|-------------|------|--------|------------|
| 0.430000        | 23.95          | 47.25        | 23.30       | N    | ON     | 10         |
| 0.554000        | 34.53          | 46.00        | 11.47       | L1   | ON     | 10         |
| 0.986000        | 20.05          | 46.00        | 25.95       | N    | ON     | 10         |
| 1.386000        | 24.18          | 46.00        | 21.82       | N    | ON     | 10         |
| 2.122000        | 21.52          | 46.00        | 24.48       | N    | ON     | 10         |
| 3.722000        | 20.45          | 46.00        | 25.55       | N    | ON     | 10         |



**Fig.22 AC Power line Conducted Emission (Idle)**

#### Measurement Results: Quasi Peak

| Frequency (MHz) | Quasi Peak (dBμV) | Limit (dBμV) | Margin (dB) | Line | Filter | Corr. (dB) |
|-----------------|-------------------|--------------|-------------|------|--------|------------|
| 0.346000        | 29.66             | 59.06        | 29.40       | N    | ON     | 10         |
| 0.550000        | 39.92             | 56.00        | 16.08       | L1   | ON     | 10         |
| 1.186000        | 37.37             | 56.00        | 18.63       | L1   | ON     | 10         |
| 1.542000        | 35.49             | 56.00        | 20.51       | N    | ON     | 10         |
| 2.134000        | 33.12             | 56.00        | 22.88       | N    | ON     | 10         |
| 22.738000       | 32.06             | 60.00        | 27.94       | L1   | ON     | 10         |

#### Measurement Results: Average

| Frequency (MHz) | Average (dBμV) | Limit (dBμV) | Margin (dB) | Line | Filter | Corr. (dB) |
|-----------------|----------------|--------------|-------------|------|--------|------------|
| 0.430000        | 24.19          | 47.25        | 23.07       | N    | ON     | 10         |
| 0.546000        | 27.13          | 46.00        | 18.87       | N    | ON     | 10         |
| 0.986000        | 20.31          | 46.00        | 25.69       | L1   | ON     | 10         |
| 1.498000        | 23.43          | 46.00        | 22.57       | L1   | ON     | 10         |
| 2.126000        | 21.88          | 46.00        | 24.12       | L1   | ON     | 10         |
| 3.766000        | 18.72          | 46.00        | 27.28       | N    | ON     | 10         |

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