

# TEST REPORT

Applicant Name: YEALINK(XIAMEN) NETWORK TECHNOLOGY CO.,LTD.  
Address: No.666 Hu'an Rd,Huli District Xiamen City, Fujian, P.R. China  
Report Number: 2401W50954E-RF-00B  
FCC ID: T2C-ROOMPANELE2

## Test Standard (s)

FCC PART 15.225

## Sample Description

Product Type: Room Scheduling Panel  
Model No.: RoomPanel E2  
Multiple Model(s) No.: N/A  
Trade Mark: **Yealink**  
Date Received: 2024/08/08  
Issue Date: 2024/09/25

Test Result:

Pass<sup>▲</sup>

▲ In the configuration tested, the EUT complied with the standards above.

## Prepared and Checked By:

*Gala Liu*

Gala Liu  
RF Engineer

## Approved By:

*Nancy Wang*

Nancy Wang  
RF Supervisor

Note: The information marked # is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.

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## Bay Area Compliance Laboratories Corp. (Shenzhen)

5F(B-West), 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China

Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

## **TABLE OF CONTENTS**

|                                                                         |           |
|-------------------------------------------------------------------------|-----------|
| <b>DOCUMENT REVISION HISTORY .....</b>                                  | <b>4</b>  |
| <b>GENERAL INFORMATION .....</b>                                        | <b>5</b>  |
| PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....                | 5         |
| OBJECTIVE .....                                                         | 5         |
| TEST METHODOLOGY .....                                                  | 5         |
| MEASUREMENT UNCERTAINTY .....                                           | 6         |
| TEST FACILITY .....                                                     | 6         |
| <b>SYSTEM TEST CONFIGURATION .....</b>                                  | <b>7</b>  |
| DESCRIPTION OF TEST CONFIGURATION .....                                 | 7         |
| EUT EXERCISE SOFTWARE .....                                             | 7         |
| EQUIPMENT MODIFICATIONS .....                                           | 7         |
| SUPPORT EQUIPMENT LIST AND DETAILS .....                                | 7         |
| EXTERNAL I/O CABLE .....                                                | 7         |
| BLOCK DIAGRAM OF TEST SETUP .....                                       | 8         |
| <b>SUMMARY OF TEST RESULTS .....</b>                                    | <b>9</b>  |
| <b>TEST EQUIPMENT LIST .....</b>                                        | <b>10</b> |
| <b>FCC§15.203 - ANTENNA REQUIREMENT .....</b>                           | <b>11</b> |
| APPLICABLE STANDARD .....                                               | 11        |
| ANTENNA CONNECTED CONSTRUCTION .....                                    | 11        |
| <b>FCC §1.1307 (B) &amp; §2.1091- MPE-BASED EXEMPTION .....</b>         | <b>12</b> |
| APPLICABLE STANDARD .....                                               | 12        |
| RESULT .....                                                            | 13        |
| <b>FCC §15.207 - AC LINE CONDUCTED EMISSION .....</b>                   | <b>14</b> |
| APPLICABLE STANDARD .....                                               | 14        |
| EUT SETUP .....                                                         | 14        |
| EMI TEST RECEIVER SETUP .....                                           | 14        |
| TEST PROCEDURE .....                                                    | 15        |
| FACTOR & OVER LIMIT CALCULATION .....                                   | 15        |
| TEST DATA .....                                                         | 15        |
| <b>FCC§15.225, §15.205&amp; §15.209 - RADIATED EMISSIONS TEST .....</b> | <b>18</b> |
| APPLICABLE STANDARD .....                                               | 18        |
| EUT SETUP .....                                                         | 18        |
| EMI TEST RECEIVER SETUP .....                                           | 19        |
| FACTOR & OVER LIMIT/MARGIN CALCULATION .....                            | 20        |
| TEST DATA .....                                                         | 20        |
| <b>FCC§15.225(E) - FREQUENCY STABILITY .....</b>                        | <b>32</b> |
| APPLICABLE STANDARD .....                                               | 32        |
| TEST PROCEDURE .....                                                    | 32        |
| TEST DATA .....                                                         | 32        |
| <b>FCC§15.215(C) - 20DBEMISSION BANDWIDTH .....</b>                     | <b>34</b> |
| REQUIREMENT .....                                                       | 34        |
| TEST PROCEDURE .....                                                    | 34        |
| TEST DATA .....                                                         | 35        |

EUT PHOTOGRAPHS.....36

TEST SETUP PHOTOGRAPHS .....37

DOCUMENT REVISION HISTORY

| Revision Number | Report Number      | Description of Revision | Date of Revision |
|-----------------|--------------------|-------------------------|------------------|
| 0               | 2401W50954E-RF-00B | Original Report         | 2024/09/25       |

## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

|                                                                                                                                                                                       |                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Product                                                                                                                                                                               | Room Scheduling Panel                                                        |
| Tested Model                                                                                                                                                                          | RoomPanel E2                                                                 |
| Multiple Model(s)                                                                                                                                                                     | N/A                                                                          |
| Frequency Range                                                                                                                                                                       | 13.56 MHz                                                                    |
| E-field Strength                                                                                                                                                                      | 67.73dBuV/m@3m                                                               |
| Modulation Technique                                                                                                                                                                  | ASK                                                                          |
| Voltage Range                                                                                                                                                                         | DC 12V from adapter or DC 48V from POE                                       |
| Sample serial number                                                                                                                                                                  | 2POY-5 (Assigned by BACL, Shenzhen)                                          |
| Sample/EUT Status                                                                                                                                                                     | Good condition                                                               |
| Adapter Information                                                                                                                                                                   | Model: YLPS121250C1-US<br>Input: 100-240V~50/60Hz 0.5A<br>Output: 12V, 1.25A |
| Note: The EUT powered by adapter or POE, the worst case power supply was selected to test for AC line conducted and radiated emission below 1GHz according to DSS report test result. |                                                                              |

### Objective

This Type approval report is in accordance with Part 2- Subpart J, and Part 15-Subparts A and C of the Federal Communication Commissions rules.

The objective is to determine the compliance of the EUT with FCC rules, section 15.203, 15.205, 15.207, 15.209 and 15.225.

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Each test item follows test standards and with no deviation.

**Measurement Uncertainty**

| Parameter                          |                             | Uncertainty                             |
|------------------------------------|-----------------------------|-----------------------------------------|
| Occupied Channel Bandwidth         |                             | ±5%                                     |
| RF Frequency                       |                             | 213.55 Hz(k=2, 95% level of confidence) |
| AC Power Lines Conducted Emissions | 9kHz-150kHz                 | 3.94dB(k=2, 95% level of confidence)    |
|                                    | 150kHz-30MHz                | 3.84dB(k=2, 95% level of confidence)    |
| Radiated Emissions                 | 9kHz - 30MHz                | 3.30dB(k=2, 95% level of confidence)    |
|                                    | 30MHz~200MHz (Horizontal)   | 4.48dB(k=2, 95% level of confidence)    |
|                                    | 30MHz~200MHz (Vertical)     | 4.55dB(k=2, 95% level of confidence)    |
|                                    | 200MHz~1000MHz (Horizontal) | 4.85dB(k=2, 95% level of confidence)    |
|                                    | 200MHz~1000MHz (Vertical)   | 5.05dB(k=2, 95% level of confidence)    |
| Temperature                        |                             | ±1°C                                    |
| Humidity                           |                             | ±1%                                     |
| Supply voltages                    |                             | ±0.4%                                   |

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

**Test Facility**

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, 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. : 715558, the FCC Designation No. : CN5045.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

### EUT Exercise Software

No Exercise Software was used.

### Equipment Modifications

No modification on the EUT.

### Support Equipment List and Details

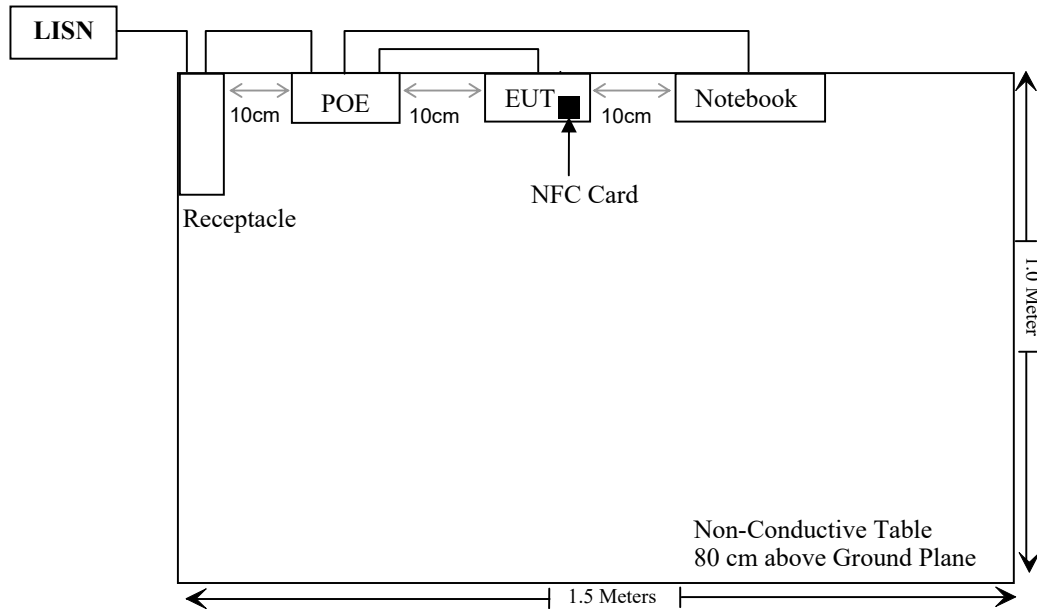
| Manufacturer | Description | Model          | Serial Number    |
|--------------|-------------|----------------|------------------|
| Unknown      | Receptacle  | Unknown        | Unknown          |
| DELL         | Notebook    | Latitude E6410 | 11429208685      |
| Grandstream  | Router      | GWN7664        | 20VXSV2M7262C104 |
| TP-LINK      | POE         | TL-POE2412G    | T240050-2-PoE    |
| Unknown      | Card        | Unknown        | Unknown          |

### External I/O Cable

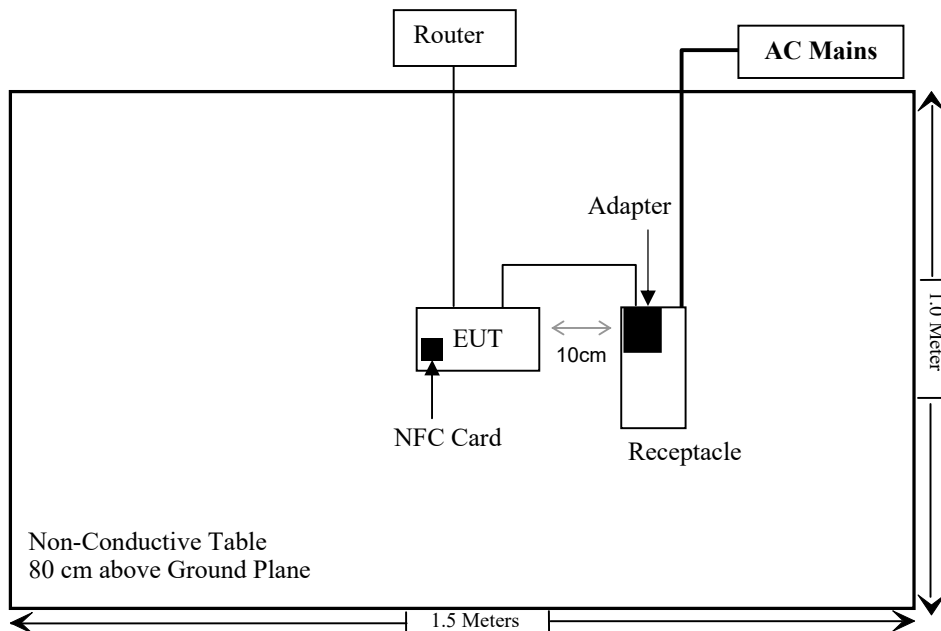
| Cable Description                   | Length (m) | From Port  | To            |
|-------------------------------------|------------|------------|---------------|
| Un-shielding Un-Detachable AC Cable | 1.5        | Receptacle | LISN/AC Mains |
| Un-shielding Detachable AC Cable    | 1.0        | Receptacle | POE           |
| Un-shielding Detachable RJ45 Cable  | 1.0        | POE        | EUT           |
| Un-shielding Detachable RJ45 Cable  | 2.0        | POE        | Notebook      |
| Un-shielding Un-Detachable DC Cable | 2.0        | Adapter    | EUT           |
| Un-shielding Detachable RJ45 Cable  | 8.0        | EUT        | Router        |

## Block Diagram of Test Setup

For Conducted Emission:



For Radiated Emissions



**SUMMARY OF TEST RESULTS**

| FCC Rules                 | Description of Test        | Result    |
|---------------------------|----------------------------|-----------|
| §15.203                   | Antenna Requirement        | Compliant |
| §1.1307 (b) & §2.1091     | MPE-Based Exemption        | Compliant |
| §15.207                   | AC Line Conducted Emission | Compliant |
| §15.225<br>§15.209§15.205 | Radiated Emission Test     | Compliant |
| §15.225(e)                | Frequency Stability        | Compliant |
| §15.215(c)                | 20dB Emission Bandwidth    | Compliant |

**TEST EQUIPMENT LIST**

| Manufacturer                    | Description                    | Model             | Serial Number          | Calibration Date | Calibration Due Date |
|---------------------------------|--------------------------------|-------------------|------------------------|------------------|----------------------|
| <b>Conducted Emissions Test</b> |                                |                   |                        |                  |                      |
| Rohde & Schwarz                 | EMI Test Receiver              | ESCI              | 101120                 | 2024/01/16       | 2025/01/15           |
| Rohde & Schwarz                 | LISN                           | ENV216            | 101613                 | 2024/01/16       | 2025/01/15           |
| Rohde & Schwarz                 | Transient Limiter              | ESH3Z2            | DE25985                | 2024/05/21       | 2025/05/20           |
| Unknown                         | CE Cable                       | Unknown           | UF A210B-1-0720-504504 | 2024/05/21       | 2025/05/20           |
| Audix                           | EMI Test software              | E3                | 191218(V9)             | NCR              | NCR                  |
| <b>Radiated Emission Test</b>   |                                |                   |                        |                  |                      |
| Rohde & Schwarz                 | EMI Test Receiver              | ESR3              | 102455                 | 2024/01/16       | 2025/01/15           |
| Sonoma instrument               | Pre-amplifier                  | 310 N             | 186238                 | 2024/05/21       | 2025/05/20           |
| Sunol Sciences                  | Broadband Antenna              | JB1               | A040904-1              | 2023/07/20       | 2026/07/19           |
| Unknown                         | Cable                          | Chamber A Cable 1 | N/A                    | 2024/06/18       | 2025/06/17           |
| Unknown                         | Cable                          | XH500C            | J-10M-A                | 2024/06/18       | 2025/06/17           |
| BACL                            | Active Loop Antenna            | 1313-1A           | 4031911                | 2024/05/14       | 2027/05/13           |
| Unknown                         | Cable                          | 2Y194             | 0735                   | 2024/05/21       | 2025/05/20           |
| Unknown                         | Cable                          | PNG214            | 1354                   | 2024/05/21       | 2025/05/20           |
| Audix                           | EMI Test software              | E3                | 19821b(V9)             | NCR              | NCR                  |
| <b>Frequency Stability</b>      |                                |                   |                        |                  |                      |
| Rohde & Schwarz                 | EMI Test Receiver              | ESR3              | 102455                 | 2024/01/16       | 2025/01/15           |
| BACL                            | Active Loop Antenna            | 1313-1A           | 4031911                | 2024/05/14       | 2027/05/13           |
| BACL                            | Temperature & Humidity Chamber | BTH-150-40        | 30145                  | 2024/01/16       | 2025/01/15           |
| Fluke                           | Digital Multimeter             | 287               | 19000011               | 2024/05/21       | 2025/05/20           |
| HELLVIAO                        | Contact voltage regulator      | TDGC2-5KVA        | Unknown                | NCR              | NCR                  |

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

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**FCC§15.203 - ANTENNA REQUIREMENT**

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**Applicable Standard**

According to 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.

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.

**Antenna Connected Construction**

The EUT has one internal antenna arrangement for NFC which was permanently attached; fulfill the requirement of this section. Please refer to the EUT photos.

**Result: Compliant.**

## FCC §1.1307 (B) & §2.1091- MPE-BASED EXEMPTION

### Applicable Standard

According to subpart 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

According to KDB 447498 D04 Interim General RF Exposure Guidance

MPE-Based Exemption:

General frequency and separation-distance dependent MPE-based effective radiated power (ERP) thresholds are in Table B.1 [Table 1 of § 1.1307(b)(1)(i)(C)] to support an exemption from further evaluation from 300 kHz through 100 GHz.

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

| RF Source frequency (MHz) | Threshold ERP (watts) |
|---------------------------|-----------------------|
| 0.3-1.34                  | $1,920 R^2$ .         |
| 1.34-30                   | $3,450 R^2/f^2$ .     |
| 30-300                    | $3.83 R^2$ .          |
| 300-1,500                 | $0.0128 R^2f$ .       |
| 1,500-100,000             | $19.2R^2$ .           |

For multiple RF sources: Multiple RF sources are exempt if:

in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation:

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

**Result**

| Mode       | Frequency (MHz) | Tune up conducted power <sup>#</sup> | Antenna Gain <sup>#</sup> |       | ERP   |        | Evaluation Distance (m) | ERP Limit (mW) |
|------------|-----------------|--------------------------------------|---------------------------|-------|-------|--------|-------------------------|----------------|
|            |                 | (dBm)                                | (dBi)                     | (dBd) | (dBm) | (mW)   |                         |                |
| BT         | 2402-2480       | 8.0                                  | 2.52                      | 0.37  | 8.37  | 6.87   | 0.2                     | 768            |
| BLE        | 2402-2480       | 6.0                                  | 2.52                      | 0.37  | 6.37  | 4.34   | 0.2                     | 768            |
| 2.4G Wi-Fi | 2412-2462       | 24.0                                 | 2.52                      | 0.37  | 24.37 | 273.53 | 0.2                     | 768            |
| 5.2G Wi-Fi | 5180-5240       | 17.0                                 | 3.73                      | 1.58  | 18.58 | 72.11  | 0.2                     | 768            |
| 5.3G Wi-Fi | 5260-5320       | 16.5                                 | 3.73                      | 1.58  | 18.08 | 64.27  | 0.2                     | 768            |
| 5.6G Wi-Fi | 5500-5700       | 15.0                                 | 3.73                      | 1.58  | 16.58 | 45.50  | 0.2                     | 768            |
| 5.8G Wi-Fi | 5745-5825       | 15.0                                 | 3.73                      | 1.58  | 16.58 | 45.50  | 0.2                     | 768            |

Note: 1. The tune up conducted power and antenna gain was declared by the applicant.  
 2. The BT, 2.4G Wi-Fi and 5G Wi-Fi cannot transmit at same time.  
 3. 0dBd=2.15dBi

**NFC:**

| Mode | Frequency (MHz) | Maximum E-Field (dBuV/m@3m) | Maximum EIRP (dBm) | ERP    |        | Evaluation Distance (m) | ERP Limit (mW) |
|------|-----------------|-----------------------------|--------------------|--------|--------|-------------------------|----------------|
|      |                 |                             |                    | (dBm)  | (mW)   |                         |                |
| NFC  | 13.56           | 67.73                       | -27.47             | -29.62 | 0.0011 | 0.2                     | 751            |

Note: EIRP = E-Field – 95.2 @3m, ERP = EIRP-2.15

Simultaneous transmitting consideration (worst case):

The ratio=  $ERP_{2.4G\ Wi-Fi}/limit + ERP_{NFC}/limit = 273.53/768 + 0.0011/751 = 0.356 < 1.0$

So simultaneous exposure is compliant.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

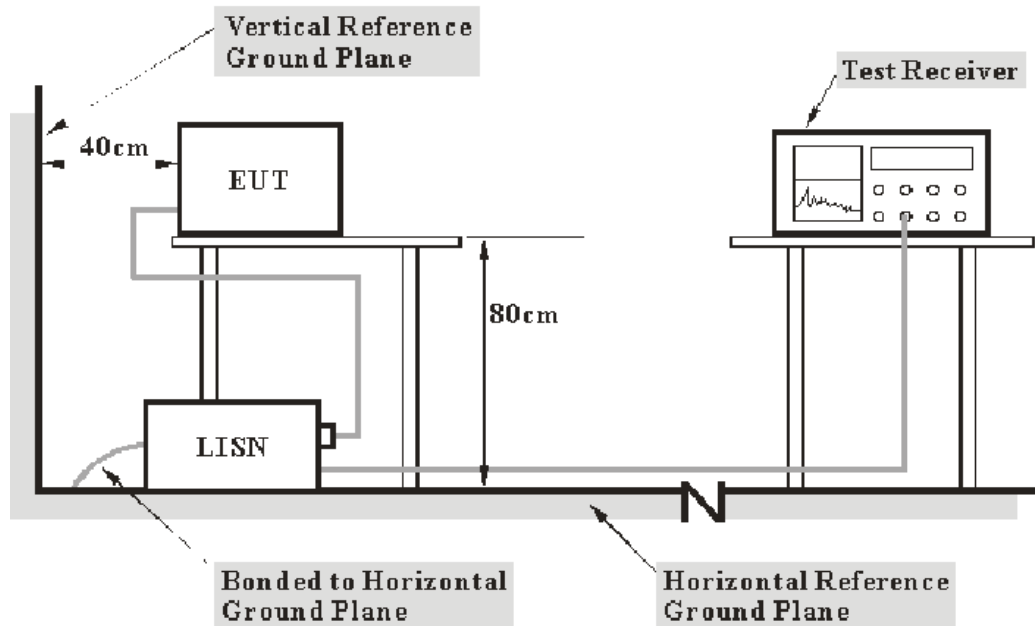
**Result: Compliant**

## FCC §15.207 - AC LINE CONDUCTED EMISSION

### Applicable Standard

FCC§15.207

### EUT Setup



- Note: 1. Support units were connected to second LISN.  
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

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

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.

### EMI Test Receiver Setup

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

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

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

## Test Procedure

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

## Factor & Over Limit Calculation

The factor is calculated by adding LISN VDF (Voltage Division Factor) and Cable Loss. The basic equation is as follows:

$$\text{Factor} = \text{LISN VDF} + \text{Cable Loss}$$

The “**Over limit**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over limit of -7 dB means the emission is 7 dB below the limit. The equation for calculation is as follows:

$$\begin{aligned}\text{Over Limit} &= \text{Level} - \text{Limit} \\ \text{Level} &= \text{Read Level} + \text{Factor}\end{aligned}$$

Note: The term "cable loss" refers to the combination of a cable and a 10dB transient limiter (attenuator).

## Test Data

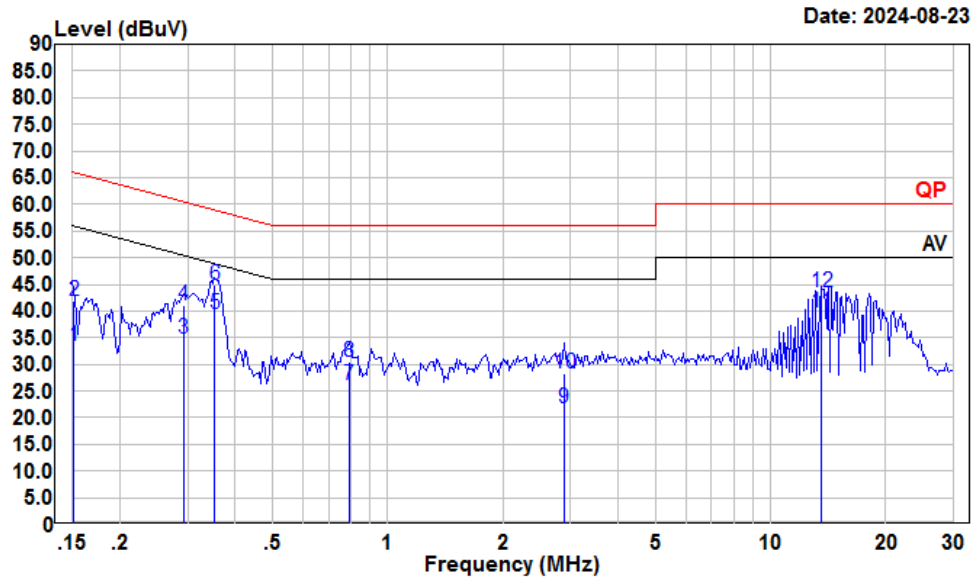
### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 25 °C     |
| Relative Humidity: | 74 %      |
| ATM Pressure:      | 101.0 kPa |

*The testing was performed by Macy Shi on 2024-08-23.*

*Test mode: Transmitting (Worst case is PoE Power Supply)*

## AC 120 V/60 Hz, Line



Condition: Line

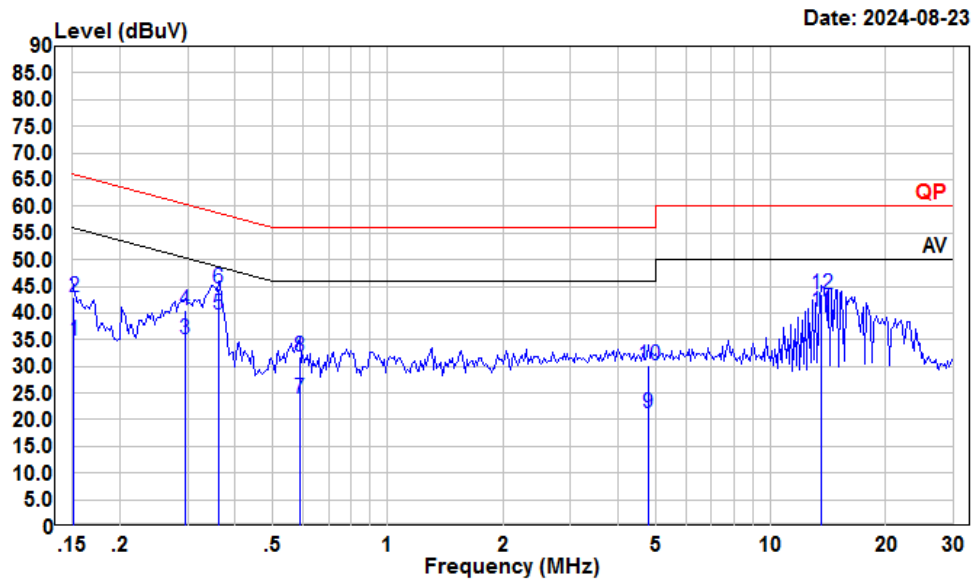
Project : 2401W50954E-RF

tester : Macy.shi

Note : NFC

|    | Freq   | Read Level | LISN Level | LISN Factor | Cable Loss | Limit Line | Over Limit | Remark  |
|----|--------|------------|------------|-------------|------------|------------|------------|---------|
|    | MHz    | dBuV       | dBuV       | dB          | dB         | dBuV       | dB         |         |
| 1  | 0.152  | 12.50      | 33.53      | 10.90       | 10.13      | 55.91      | -22.38     | Average |
| 2  | 0.152  | 20.83      | 41.86      | 10.90       | 10.13      | 65.91      | -24.05     | QP      |
| 3  | 0.292  | 13.90      | 34.69      | 10.68       | 10.11      | 50.46      | -15.77     | Average |
| 4  | 0.292  | 20.15      | 40.94      | 10.68       | 10.11      | 60.46      | -19.52     | QP      |
| 5  | 0.354  | 18.63      | 39.36      | 10.61       | 10.12      | 48.87      | -9.51      | Average |
| 6  | 0.354  | 24.25      | 44.98      | 10.61       | 10.12      | 58.87      | -13.89     | QP      |
| 7  | 0.792  | 5.48       | 26.07      | 10.47       | 10.12      | 46.00      | -19.93     | Average |
| 8  | 0.792  | 9.84       | 30.43      | 10.47       | 10.12      | 56.00      | -25.57     | QP      |
| 9  | 2.884  | 1.09       | 21.71      | 10.44       | 10.18      | 46.00      | -24.29     | Average |
| 10 | 2.884  | 7.64       | 28.26      | 10.44       | 10.18      | 56.00      | -27.74     | QP      |
| 11 | 13.560 | 19.00      | 39.82      | 10.60       | 10.22      | 50.00      | -10.18     | Average |
| 12 | 13.560 | 22.80      | 43.62      | 10.60       | 10.22      | 60.00      | -16.38     | QP      |

## AC 120V/ 60 Hz, Neutral



Condition: Neutral  
Project : 2401W50954E-RF  
tester : Macy.shi  
Note : NFC

|    | Freq   | Read Level | LISN Level | LISN Factor | Cable Loss | Limit Line | Over Limit | Remark  |
|----|--------|------------|------------|-------------|------------|------------|------------|---------|
|    | MHz    | dBuV       | dBuV       | dB          | dB         | dBuV       | dB         |         |
| 1  | 0.152  | 14.00      | 34.72      | 10.59       | 10.13      | 55.91      | -21.19     | Average |
| 2  | 0.152  | 22.18      | 42.90      | 10.59       | 10.13      | 65.91      | -23.01     | QP      |
| 3  | 0.296  | 14.51      | 35.15      | 10.53       | 10.11      | 50.37      | -15.22     | Average |
| 4  | 0.296  | 19.98      | 40.62      | 10.53       | 10.11      | 60.37      | -19.75     | QP      |
| 5  | 0.361  | 18.96      | 39.67      | 10.59       | 10.12      | 48.69      | -9.02      | Average |
| 6  | 0.361  | 23.92      | 44.63      | 10.59       | 10.12      | 58.69      | -14.06     | QP      |
| 7  | 0.589  | 3.11       | 23.93      | 10.70       | 10.12      | 46.00      | -22.07     | Average |
| 8  | 0.589  | 10.88      | 31.70      | 10.70       | 10.12      | 56.00      | -24.30     | QP      |
| 9  | 4.797  | 0.66       | 21.35      | 10.50       | 10.19      | 46.00      | -24.65     | Average |
| 10 | 4.797  | 9.53       | 30.22      | 10.50       | 10.19      | 56.00      | -25.78     | QP      |
| 11 | 13.560 | 19.10      | 40.12      | 10.80       | 10.22      | 50.00      | -9.88      | Average |
| 12 | 13.560 | 22.60      | 43.62      | 10.80       | 10.22      | 60.00      | -16.38     | QP      |

## FCC§15.225, §15.205& §15.209 - RADIATED EMISSIONS TEST

### Applicable Standard

As per FCC Part 15.225

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

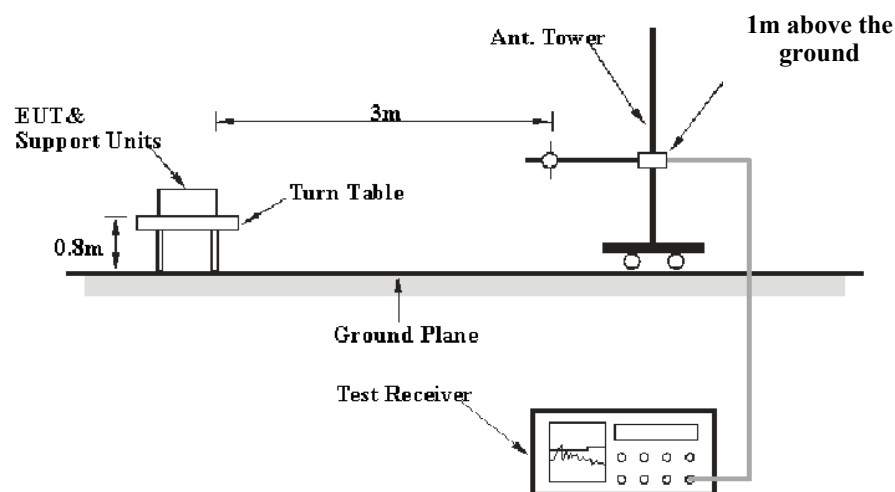
(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

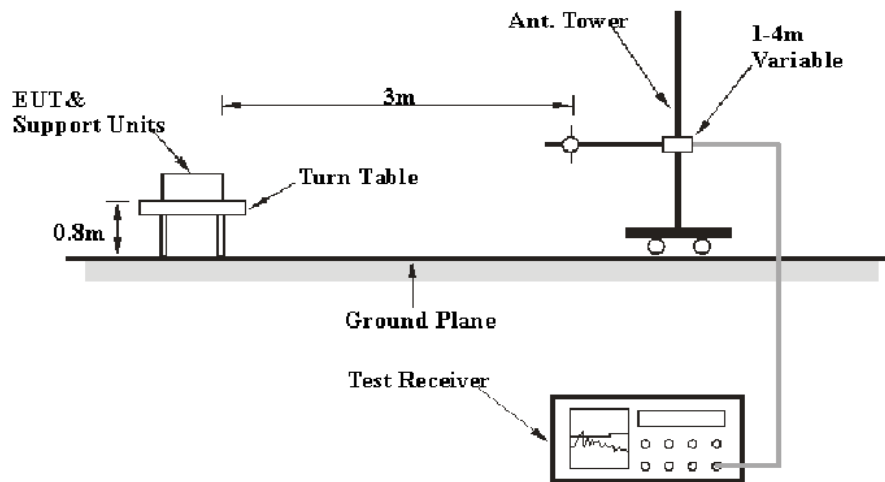
(d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

### EUT Setup

9 kHz-30MHz:



Note: Antenna is set up at 1m during test for below 30MHz.

**30MHz-1GHz:**

The radiated emission tests were performed in the 3-meter chamber a test site, using the setup accordance with the ANSI C63.10-2013.

**EMI Test Receiver Setup**

According to FCC Rules, 47 CFR 15.33, the EUT emissions were investigated up to 1000 MHz.

During the radiated emission test, the EMI test Receiver was set with the following configurations:

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

All final data was recorded in Quasi-peak detection mode except for the frequency bands 9–90 kHz, 110–490 kHz, average detection modes for frequency bands 9–90 kHz and 110–490 kHz.

For 9k-30MHz, if the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform QP/Average measurement.

## Factor & Over Limit/Margin Calculation

The Level is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\begin{aligned}\text{Factor} &= \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain} \\ \text{Level} &= \text{Read Level} + \text{Factor}\end{aligned}$$

The “**Over Limit**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit/margin of -7dB means the emission is 7dB below the limit. The equation for calculation is as follows:

$$\text{Over Limit} = \text{Level} - \text{Limit}$$

## Test Data

### Environmental Conditions

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 22 °C     |
| <b>Relative Humidity:</b> | 54 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

*The testing was performed by Anson Su on 2024-08-29 and 2024-09-20.*

*Test mode: Transmitting (Worst case is Adapter Power Supply)*

*Note: Pre-scan in the X, Y and Z axes of orientation, the worst case Y-axis of orientation was recorded.*

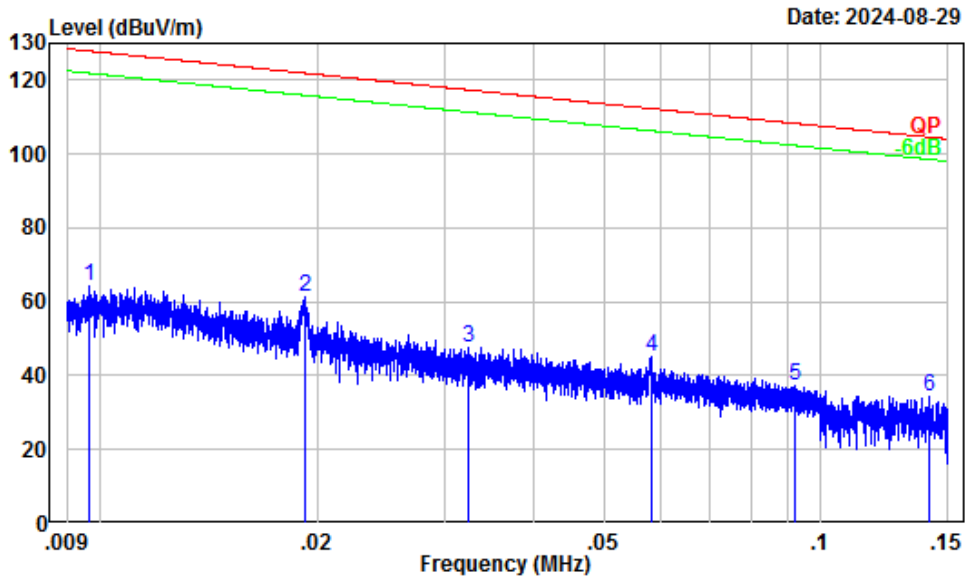
1) Spurious Emissions (9 kHz~30 MHz):

Part 15 Section 15.31(f)(2) (9kHz-30MHz)

Limit @ 3m=Limit @ 300m-40\*log(3(m)/300(m))

Limit @ 3m=Limit @ 30m-40\*log(3(m)/30(m))

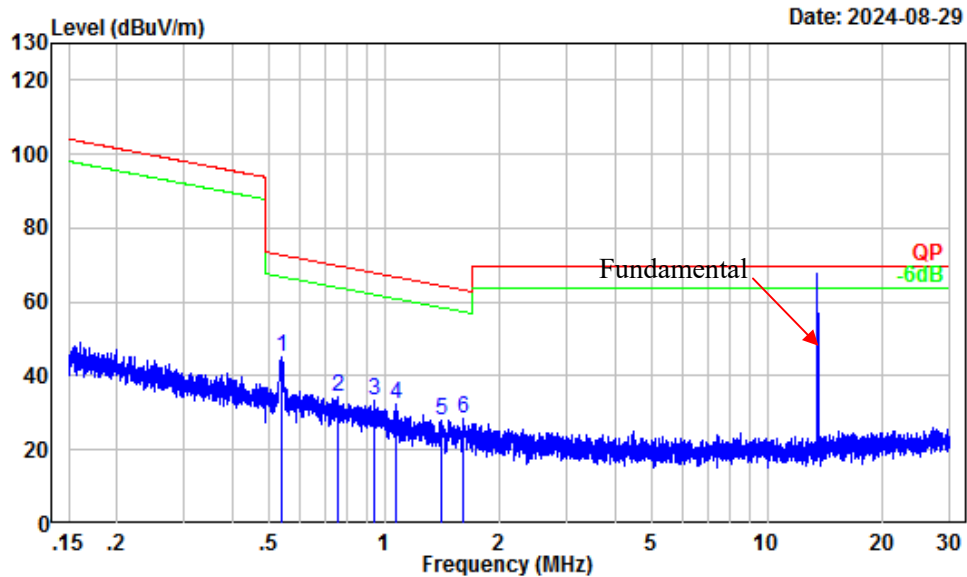
Ground-parallel  
9 kHz~150 kHz



Site : Chamber A  
Condition : 3m  
Project Number: 2401W50954E-RF  
Test Mode : NFC Transmitting  
Note : Ground-parallel  
Tester : Anson Su

|   | Freq | Factor | Read<br>Level | Limit<br>Level | Limit<br>Line | Over<br>Limit | Remark |
|---|------|--------|---------------|----------------|---------------|---------------|--------|
|   | MHz  | dB/m   | dBuV          | dBuV/m         | dBuV/m        | dB            |        |
| 1 | 0.01 | 37.94  | 26.35         | 64.29          | 127.89        | -63.60        | Peak   |
| 2 | 0.02 | 32.95  | 28.39         | 61.34          | 121.90        | -60.56        | Peak   |
| 3 | 0.03 | 26.94  | 20.75         | 47.69          | 117.38        | -69.69        | Peak   |
| 4 | 0.06 | 21.97  | 23.34         | 45.31          | 112.31        | -67.00        | Peak   |
| 5 | 0.09 | 17.84  | 19.62         | 37.46          | 108.32        | -70.86        | Peak   |
| 6 | 0.14 | 15.13  | 19.05         | 34.18          | 104.60        | -70.42        | Peak   |

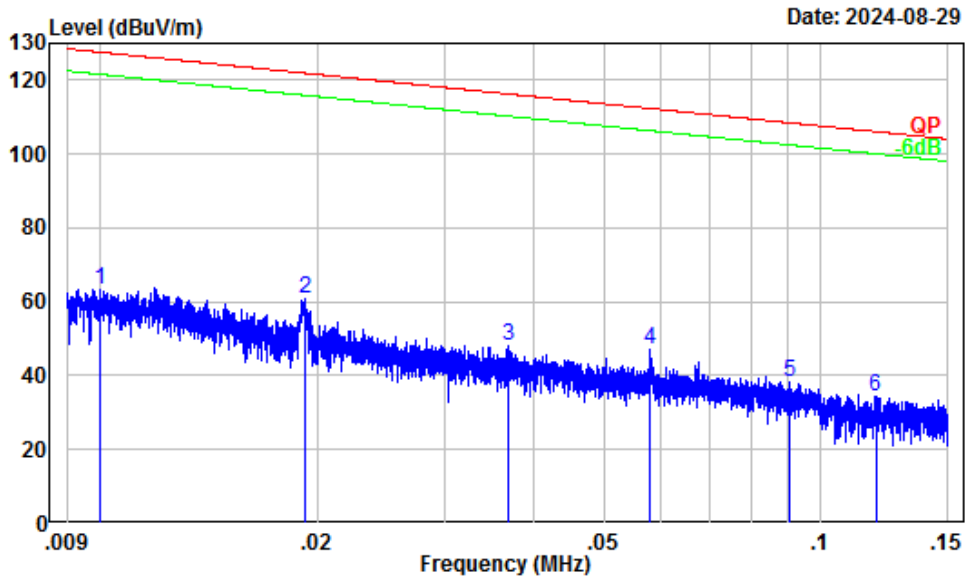
150 kHz~30 MHz



Site : Chamber A  
Condition : 3m  
Project Number: 2401W50954E-RF  
Test Mode : NFC Transmitting  
Note : Ground-parallel  
Tester : Anson Su

|   | Freq | Factor | Read<br>Level | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|------|--------|---------------|--------|---------------|---------------|--------|
|   | MHz  | dB/m   | dBuV          | dBuV/m | dBuV/m        | dB            |        |
| 1 | 0.54 | 3.01   | 42.11         | 45.12  | 72.94         | -27.82        | Peak   |
| 2 | 0.75 | 0.44   | 33.68         | 34.12  | 69.98         | -35.86        | Peak   |
| 3 | 0.94 | -1.15  | 34.38         | 33.23  | 68.02         | -34.79        | Peak   |
| 4 | 1.08 | -1.86  | 34.26         | 32.40  | 66.81         | -34.41        | Peak   |
| 5 | 1.41 | -3.01  | 31.21         | 28.20  | 64.43         | -36.23        | Peak   |
| 6 | 1.61 | -3.73  | 32.27         | 28.54  | 63.23         | -34.69        | Peak   |

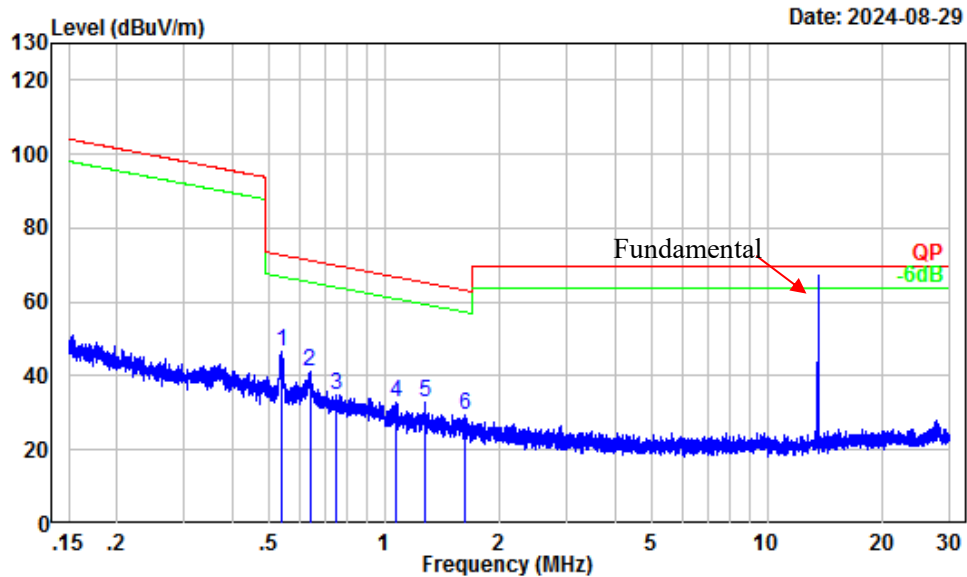
Perpendicular  
9 kHz~150 kHz



Site : Chamber A  
Condition : 3m  
Project Number: 2401W50954E-RF  
Test Mode : NFC Transmitting  
Note : Perpendicular  
Tester : Anson Su

|   | Freq | Factor | Read<br>Level | Limit<br>Level | Limit<br>Line | Over<br>Limit | Remark |
|---|------|--------|---------------|----------------|---------------|---------------|--------|
|   | MHz  | dB/m   | dBuV          | dBuV/m         | dBuV/m        | dB            |        |
| 1 | 0.01 | 37.70  | 25.57         | 63.27          | 127.61        | -64.34        | Peak   |
| 2 | 0.02 | 32.97  | 27.69         | 60.66          | 121.92        | -61.26        | Peak   |
| 3 | 0.04 | 25.99  | 22.28         | 48.27          | 116.30        | -68.03        | Peak   |
| 4 | 0.06 | 22.00  | 25.12         | 47.12          | 112.34        | -65.22        | Peak   |
| 5 | 0.09 | 17.98  | 20.26         | 38.24          | 108.46        | -70.22        | Peak   |
| 6 | 0.12 | 16.16  | 18.12         | 34.28          | 106.08        | -71.80        | Peak   |

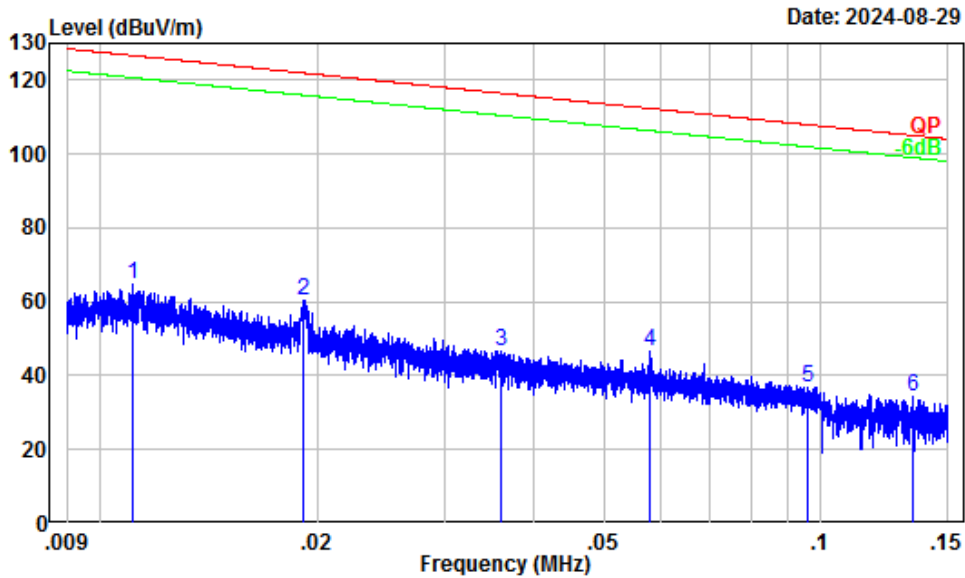
150 kHz~30 MHz



Site : Chamber A  
Condition : 3m  
Project Number: 2401W50954E-RF  
Test Mode : NFC Transmitting  
Note : Perpendicular  
Tester : Anson Su

|   | Freq | Factor | Read Level | Level  | Limit Line | Over Limit | Remark |
|---|------|--------|------------|--------|------------|------------|--------|
|   | MHz  | dB/m   | dBuV       | dBuV/m | dBuV/m     | dB         |        |
| 1 | 0.54 | 3.03   | 43.68      | 46.71  | 72.98      | -26.27     | Peak   |
| 2 | 0.64 | 1.82   | 39.49      | 41.31  | 71.45      | -30.14     | Peak   |
| 3 | 0.75 | 0.49   | 34.33      | 34.82  | 70.03      | -35.21     | Peak   |
| 4 | 1.08 | -1.86  | 34.97      | 33.11  | 66.81      | -33.70     | Peak   |
| 5 | 1.27 | -2.54  | 35.37      | 32.83  | 65.34      | -32.51     | Peak   |
| 6 | 1.62 | -3.74  | 33.02      | 29.28  | 63.20      | -33.92     | Peak   |

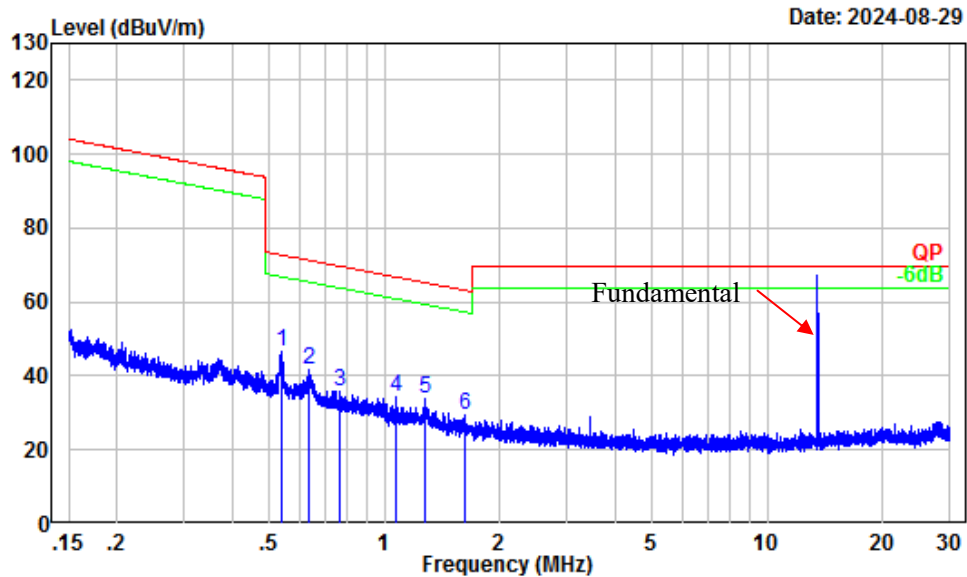
Parallel  
9 kHz~150 kHz



Site : Chamber A  
Condition : 3m  
Project Number: 2401W50954E-RF  
Test Mode : NFC Transmitting  
Note : Parallel  
Tester : Anson Su

|   | Freq | Factor | Read<br>Level | Limit<br>Level | Limit<br>Line | Over<br>Limit | Remark |
|---|------|--------|---------------|----------------|---------------|---------------|--------|
|   | MHz  | dB/m   | dBuV          | dBuV/m         | dBuV/m        | dB            |        |
| 1 | 0.01 | 37.13  | 27.46         | 64.59          | 126.70        | -62.11        | Peak   |
| 2 | 0.02 | 33.00  | 27.21         | 60.21          | 121.94        | -61.73        | Peak   |
| 3 | 0.04 | 26.14  | 20.35         | 46.49          | 116.46        | -69.97        | Peak   |
| 4 | 0.06 | 21.99  | 24.48         | 46.47          | 112.34        | -65.87        | Peak   |
| 5 | 0.10 | 17.44  | 19.53         | 36.97          | 107.96        | -70.99        | Peak   |
| 6 | 0.13 | 15.45  | 18.70         | 34.15          | 105.04        | -70.89        | Peak   |

150 kHz~30 MHz

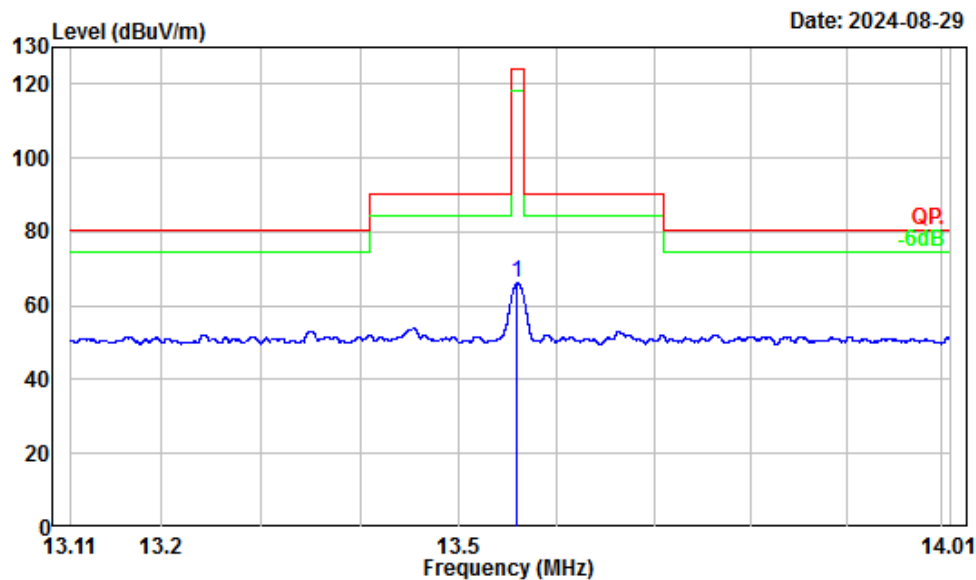


Site : Chamber A  
Condition : 3m  
Project Number: 2401W50954E-RF  
Test Mode : NFC Transmitting  
Note : Parallel  
Tester : Anson Su

|   | Freq | Factor | Read Level | Level  | Limit Line | Over Limit | Remark |
|---|------|--------|------------|--------|------------|------------|--------|
|   | MHz  | dB/m   | dBuV       | dBuV/m | dBuV/m     | dB         |        |
| 1 | 0.54 | 3.02   | 43.36      | 46.38  | 72.96      | -26.58     | Peak   |
| 2 | 0.64 | 1.86   | 39.75      | 41.61  | 71.50      | -29.89     | Peak   |
| 3 | 0.77 | 0.27   | 35.47      | 35.74  | 69.81      | -34.07     | Peak   |
| 4 | 1.08 | -1.85  | 35.97      | 34.12  | 66.82      | -32.70     | Peak   |
| 5 | 1.27 | -2.55  | 36.22      | 33.67  | 65.32      | -31.65     | Peak   |
| 6 | 1.62 | -3.74  | 33.40      | 29.66  | 63.20      | -33.54     | Peak   |

2) Emission Mask & Fundamental:

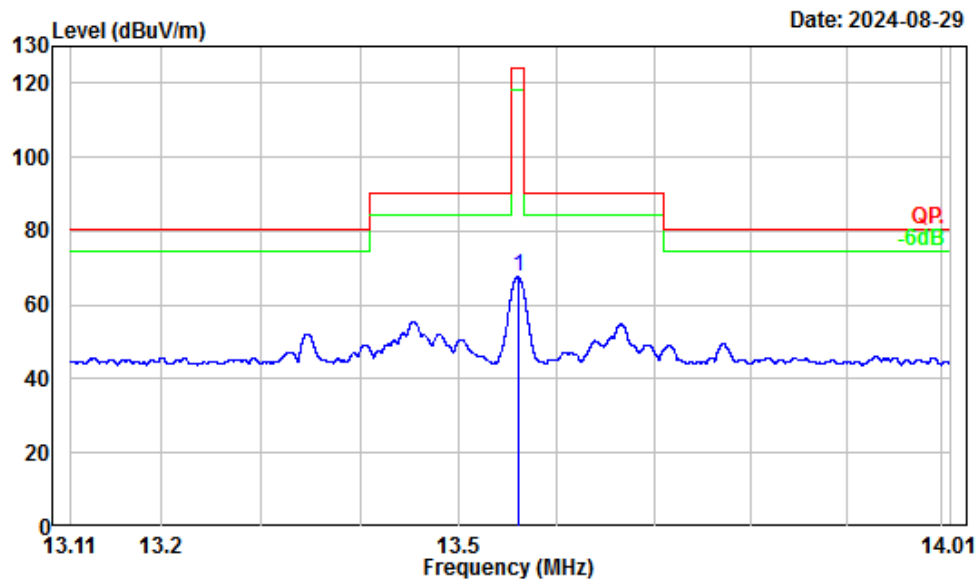
Ground-parallel



Site : Chamber A  
Condition : 3m  
Project Number: 2401W50954E-RF  
Test Mode : NFC Transmitting  
Note : Ground-parallel  
Tester : Anson Su

| Freq |       | Factor | Read Level | Level  | Limit Line | Over Limit | Remark |
|------|-------|--------|------------|--------|------------|------------|--------|
|      | MHz   | dB/m   | dBuV       | dBuV/m | dBuV/m     | dB         |        |
| 1    | 13.56 | -5.69  | 71.76      | 66.07  | 124.00     | -57.93     | Peak   |

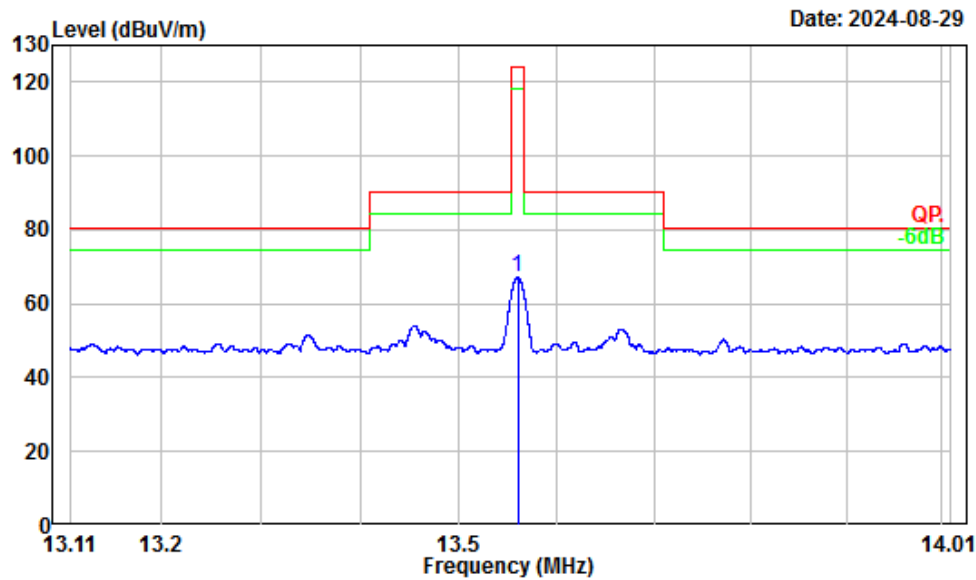
Perpendicular



Site : Chamber A  
Condition : 3m  
Project Number: 2401W50954E-RF  
Test Mode : NFC Transmitting  
Note : Perpendicular  
Tester : Anson Su

|   | Freq Factor |       | Read Level |        | Limit  | Over   | Remark |
|---|-------------|-------|------------|--------|--------|--------|--------|
|   | MHz         | dB/m  | dBuV       | dBuV/m | dBuV/m | dB     |        |
| 1 | 13.56       | -5.69 | 73.42      | 67.73  | 124.00 | -56.27 | Peak   |

Parallel

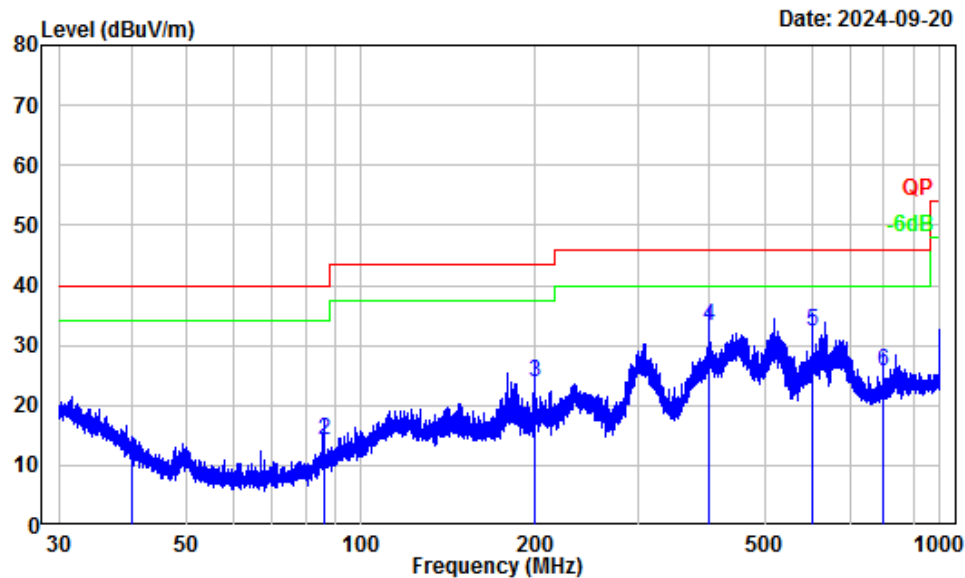


Site : Chamber A  
Condition : 3m  
Project Number: 2401W50954E-RF  
Test Mode : NFC Transmitting  
Note : Parallel  
Tester : Anson Su

|   | Freq  |        | Read  |        | Limit  | Over   | Remark |
|---|-------|--------|-------|--------|--------|--------|--------|
|   | MHz   | Factor | Level | Level  | Line   | Limit  |        |
|   | MHz   | dB/m   | dBuV  | dBuV/m | dBuV/m | dB     |        |
| 1 | 13.56 | -5.69  | 72.87 | 67.18  | 124.00 | -56.82 | Peak   |

3) Spurious Emissions (30 MHz~1GHz):

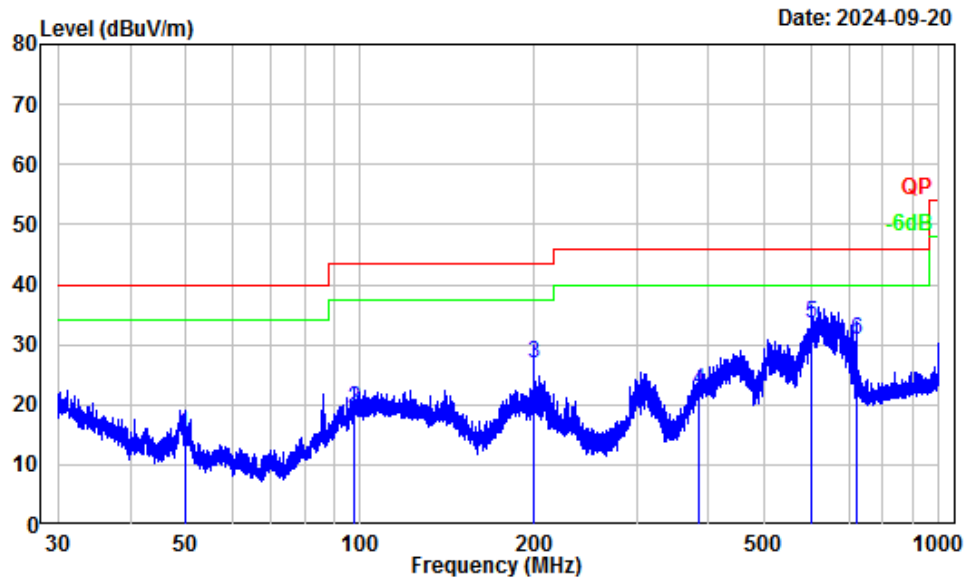
Horizontal



Site : Chamber A  
Condition : 3m Horizontal  
Project Number: 2401W50954E-RF  
Test Mode : NFC Transmitting  
Tester : Anson Su

|   | Freq Factor |        | Read Level | Limit Level | Limit Line | Over Limit | Remark |
|---|-------------|--------|------------|-------------|------------|------------|--------|
|   | MHz         | dB/m   | dBuV       | dBuV/m      | dBuV/m     | dB         |        |
| 1 | 40.01       | -13.21 | 24.01      | 10.80       | 40.00      | -29.20     | QP     |
| 2 | 86.01       | -18.76 | 32.96      | 14.20       | 40.00      | -25.80     | QP     |
| 3 | 199.90      | -12.49 | 36.47      | 23.98       | 43.50      | -19.52     | QP     |
| 4 | 400.08      | -10.94 | 44.07      | 33.13       | 46.00      | -12.87     | QP     |
| 5 | 600.11      | -8.44  | 40.77      | 32.33       | 46.00      | -13.67     | QP     |
| 6 | 800.03      | -5.11  | 30.76      | 25.65       | 46.00      | -20.35     | QP     |

## Vertical



Site : Chamber A  
Condition : 3m Vertical  
Project Number: 2401W50954E-RF  
Test Mode : NFC Transmitting  
Tester : Anson Su

|   | Freq   | Factor | Read<br>Level | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|--------|--------|---------------|--------|---------------|---------------|--------|
|   | MHz    | dB/m   | dBuV          | dBuV/m | dBuV/m        | dB            |        |
| 1 | 49.66  | -18.68 | 33.81         | 15.13  | 40.00         | -24.87        | QP     |
| 2 | 97.71  | -17.35 | 36.66         | 19.31  | 43.50         | -24.19        | QP     |
| 3 | 199.99 | -12.49 | 39.32         | 26.83  | 43.50         | -16.67        | QP     |
| 4 | 385.62 | -11.37 | 33.83         | 22.46  | 46.00         | -23.54        | QP     |
| 5 | 600.11 | -8.44  | 41.98         | 33.54  | 46.00         | -12.46        | QP     |
| 6 | 722.36 | -6.14  | 36.84         | 30.70  | 46.00         | -15.30        | QP     |

## FCC§15.225(e) - FREQUENCY STABILITY

### Applicable Standard

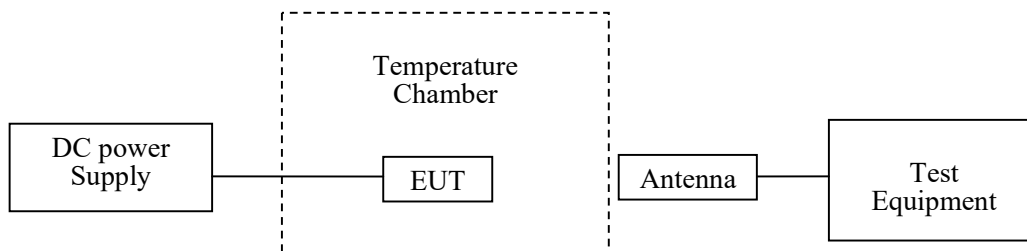
The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency over a temperature variation of  $-20$  degrees to  $+50$  degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

### Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and inductive antenna was connected to a Spectrum Analyzer. The EUT was placed inside the temperature chamber.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the Spectrum Analyzer.

Frequency Stability vs. Voltage: An external DC power supply Source. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the end point. The output frequency was recorded for each voltage.



### Test Data

#### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 26 °C     |
| Relative Humidity: | 55 %      |
| ATM Pressure:      | 101.0 kPa |

*The testing was performed by Anson Su on 2024-08-29.*

*Test Mode: Transmitting*

**Test Result: Pass**

| Test Item                           | Temperature (°C) | Voltage (V <sub>AC</sub> ) | Measured Frequency (MHz) | Frequency Error (%) | Part 15.225 Limit (%) |
|-------------------------------------|------------------|----------------------------|--------------------------|---------------------|-----------------------|
| Frequency Stability vs. Temperature | -20              | 120                        | 13.56111                 | 0.0082              | ±0.01                 |
|                                     | -10              | 120                        | 13.56107                 | 0.0079              | ±0.01                 |
|                                     | 0                | 120                        | 13.56105                 | 0.0077              | ±0.01                 |
|                                     | 10               | 120                        | 13.56119                 | 0.0088              | ±0.01                 |
|                                     | 20               | 120                        | 13.56117                 | 0.0086              | ±0.01                 |
|                                     | 30               | 120                        | 13.56108                 | 0.0080              | ±0.01                 |
|                                     | 40               | 120                        | 13.56102                 | 0.0075              | ±0.01                 |
|                                     | 50               | 120                        | 13.56114                 | 0.0084              | ±0.01                 |
| Frequency Stability vs. Voltage     | 20               | 102                        | 13.56113                 | 0.0083              | ±0.01                 |
|                                     | 20               | 138                        | 13.56128                 | 0.0094              | ±0.01                 |

Note: the extreme voltage was declared by the applicant.

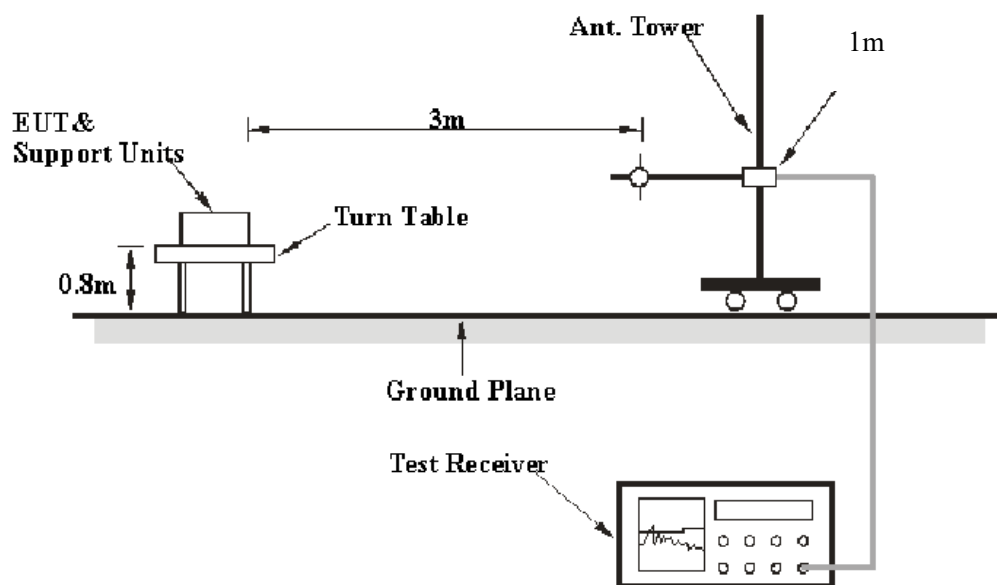
## FCC§15.215(c) - 20dBEMISSION BANDWIDTH

### Requirement

Per 15.215 (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

### Test Procedure

Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.



Test Data

Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 22 °C     |
| Relative Humidity: | 54 %      |
| ATM Pressure:      | 101.0 kPa |

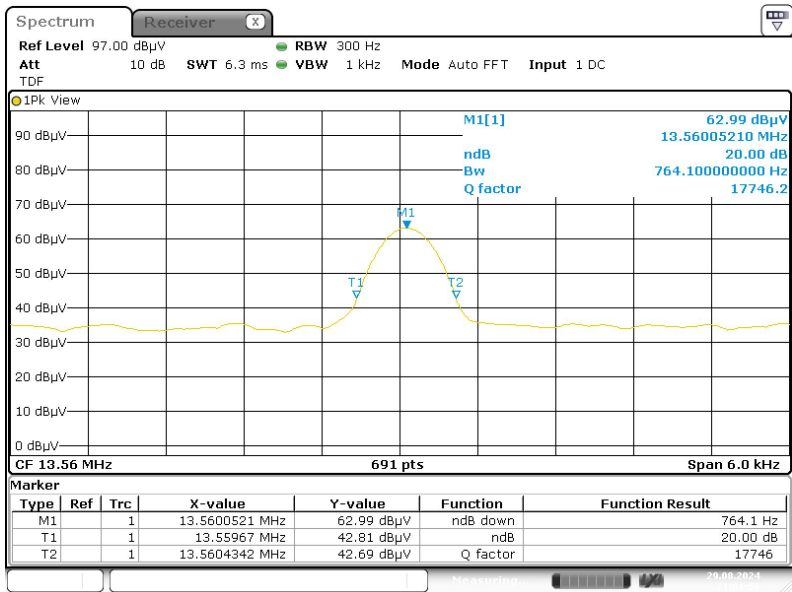
The testing was performed by Anson Su on 2024-08-29.

Test Mode: Transmitting

Test Result: Pass

|                         |                         |
|-------------------------|-------------------------|
| Test Frequency<br>(MHz) | 20dB Bandwidth<br>(kHz) |
| 13.56                   | 0.7641                  |

20 dB Emission Bandwidth



ProjectNo.:2401W50954E-RF Tester:Anson Su  
Date: 29.AUG.2024 21:01:56

## **EUT PHOTOGRAPHS**

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Please refer to the attachment 2401W50954E-RF External photo and 2401W50954E-RF Internal photo.

## **TEST SETUP PHOTOGRAPHS**

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Please refer to the attachment 2401W50954E-RFD Test Setup photo.

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