

# TEST REPORT

Applicant Name: Promethean Ltd  
Address: Promethean House, Lower Philips Rd Blackburn United Kingdom BB1 5TH  
Report Number: 2401X62977E-RF-00B  
FCC ID: QAM027

## Test Standard (s)

FCC Part 15C

## Sample Description

Product Type: ActivPen 2  
Model No.: AP-ActivPen-2  
Multiple Model(s) No.: N/A  
Trade Mark: Promethean  
Date Received: 2024/09/10  
Issue Date: 2024/11/26

Test Result:

Pass▲

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

## Prepared and Checked By:

*Bruce Lin*

Bruce Lin  
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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DOCUMENT REVISION HISTORY

| Revision Number | Report Number      | Description of Revision | Date of Revision |
|-----------------|--------------------|-------------------------|------------------|
| 0               | 2401X62977E-RF-00B | Original Report         | 2024/11/26       |

## GENERAL INFORMATION

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

|                       |                                     |
|-----------------------|-------------------------------------|
| Product               | ActivPen 2                          |
| Tested Model          | AP-ActivPen-2                       |
| Multiple Model(s)     | N/A                                 |
| Frequency Range       | 111-150kHz                          |
| Antenna Type          | Coil                                |
| Modulation            | FSK                                 |
| Input Voltage         | DC 5V from USB Port                 |
| Wireless Output Power | 5Watts                              |
| Sample serial number  | 2RGU10 (Assigned by BACL, Shenzhen) |
| Sample/EUT Status     | Good condition                      |
| Adapter Information   | N/A                                 |
|                       |                                     |

### Objective

This test report is in accordance with Part 2, Subpart J, and Part 15, Subparts A and C of the Federal Communications Commission's rules.

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

### Test Methodology

All tests and measurements indicated in this document were performed in accordance ANSI C63.10-2013.

And KDB 680106 D01 Wireless Power Transfer v04

Each test item follows test standards and with no deviation.

## Measurement Uncertainty

| Parameter                             |                             | Uncertainty                          |
|---------------------------------------|-----------------------------|--------------------------------------|
| AC Power Lines<br>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%                                |
| H-Field                               |                             | 0.74dB(k=2, 95% level of confidence) |
| E-Field                               |                             | 1.14dB(k=2, 95% level of confidence) |

*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.

Each test item follows test standards and with no deviation.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in a test mode.

### EUT Exercise Software

No software used in test.

### Local Support Equipment

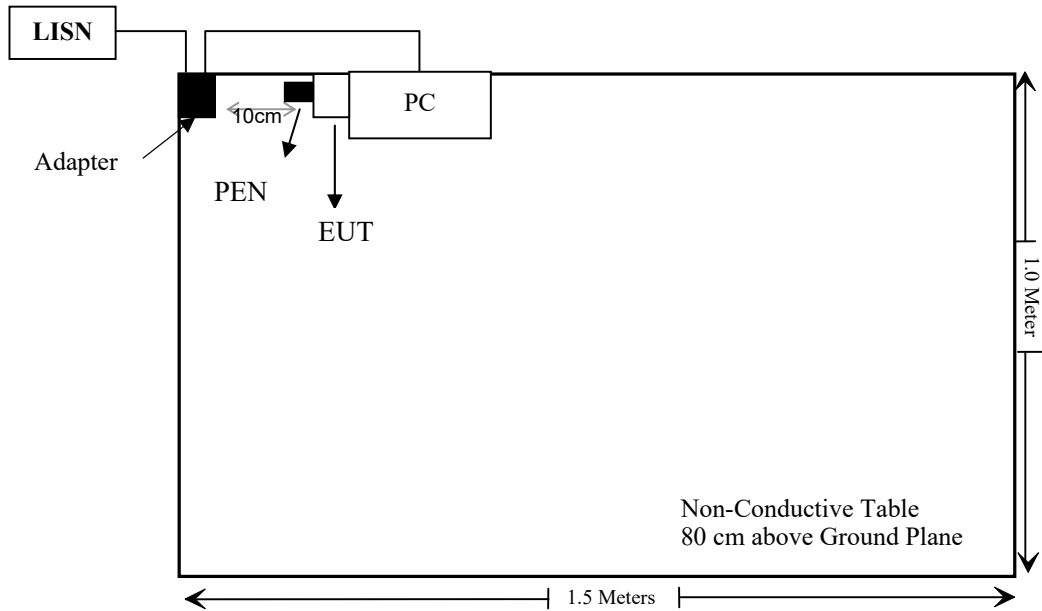
| Manufacturer       | Description | Model          | Serial Number |
|--------------------|-------------|----------------|---------------|
| DELL               | Notebook    | Latitude E6410 | 11429208685   |
| Promethean Limited | Pen         | AP-ActivPen-2  | Unknown       |
| DELL               | Adapter     | DA90PE1-00     | ADP-90VH B    |

### External I/O Cable

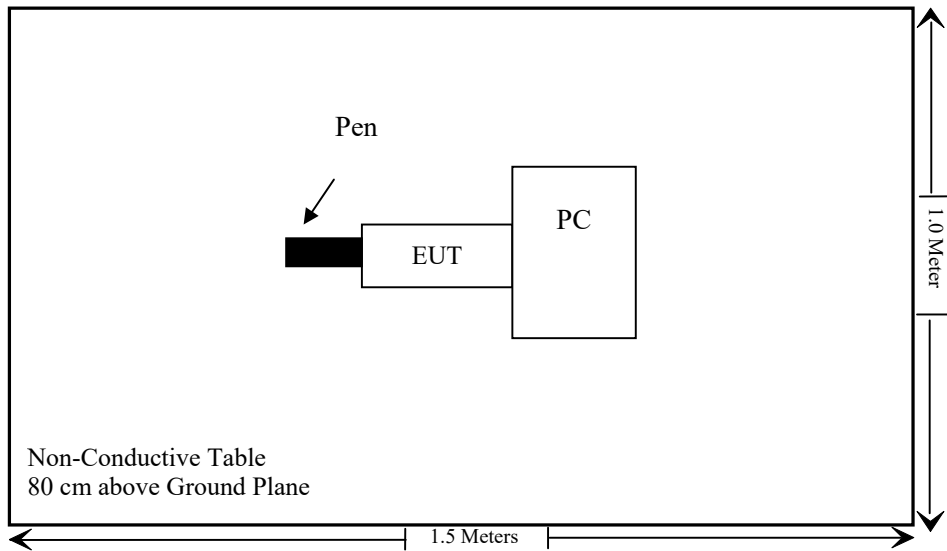
| Cable Description | Length (m) | From Port | To |
|-------------------|------------|-----------|----|
| /                 | /          | /         | /  |

Block Diagram of Test Setup

For Conducted Emission:



For Radiated Emission:



**SUMMARY OF TEST RESULTS**

| FCC Rules               | Description of Test               | Result    |
|-------------------------|-----------------------------------|-----------|
| FCC§1.1310 &<br>§2.1091 | Maximum Permissible Exposure(MPE) | Compliant |
| FCC§15.203              | Antenna Requirement               | Compliant |
| FCC§15.207              | AC Line Conducted Emission        | Compliant |
| §15.209 §15.205         | Radiated Emission Test            | Compliant |
| §15.215 (c)             | 20dB 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>RF Radiated 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           |
| Audix                           | EMI Test software       | E3                | 19821b(V9)             | NCR              | NCR                  |
| <b>MPE</b>                      |                         |                   |                        |                  |                      |
| SPEAG                           | Probe                   | MAGPy-8H3D-E3D    | 3106                   | 2024/03/04       | 2025/03/03           |
| SPEAG                           | Data Acquisition System | MAPGPY-DAS        | 3089                   | 2024/03/04       | 2025/03/03           |

\* **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).

## **FCC§15.203 - ANTENNA REQUIREMENT**

---

### **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 coil antenna arrangement which was permanently attached, fulfill the requirement of this section. Please refer to the EUT photos.

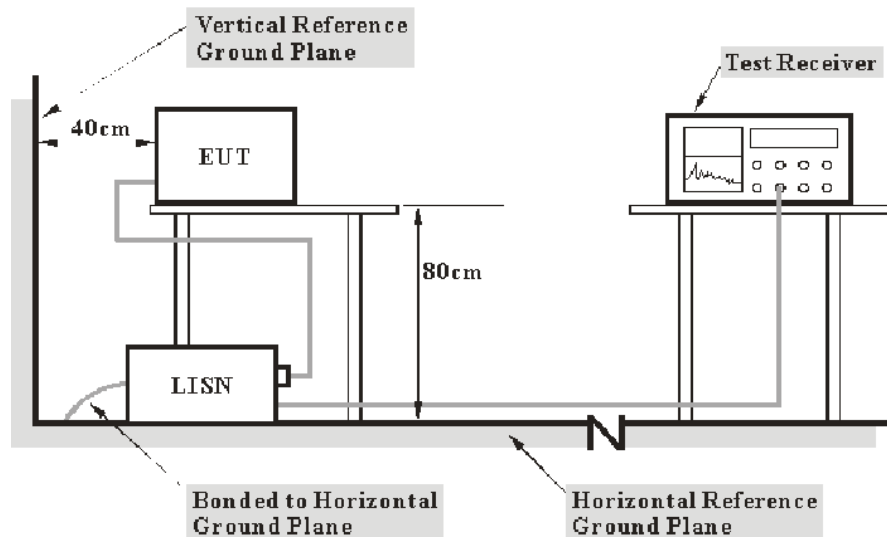
**Result: Compliant.**

## 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 limits.

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 30 MHz.

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

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

## Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

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:

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

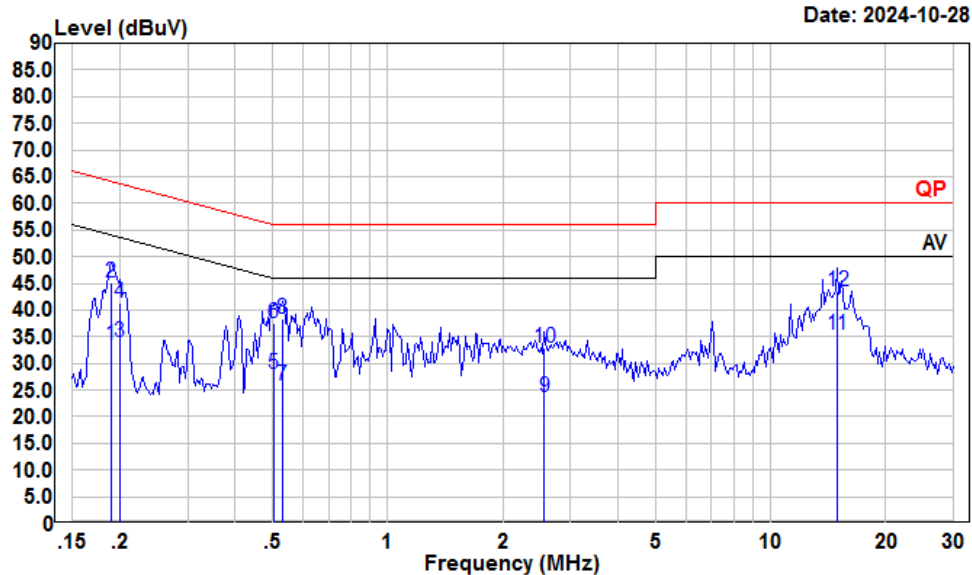
Note: The term "cable loss" refers to the combination of a cable and a 10dB transient limiter (attenuator).

## Test Data

### Environmental Conditions

|                           |         |
|---------------------------|---------|
| <b>Temperature:</b>       | 26 °C   |
| <b>Relative Humidity:</b> | 51 %    |
| <b>ATM Pressure:</b>      | 101 kPa |

*The testing was performed by Macy Shi on 2024-10-28.*

*Test Mode: Wireless Charging***AC 120 V/60 Hz, Line**

Condition: Line

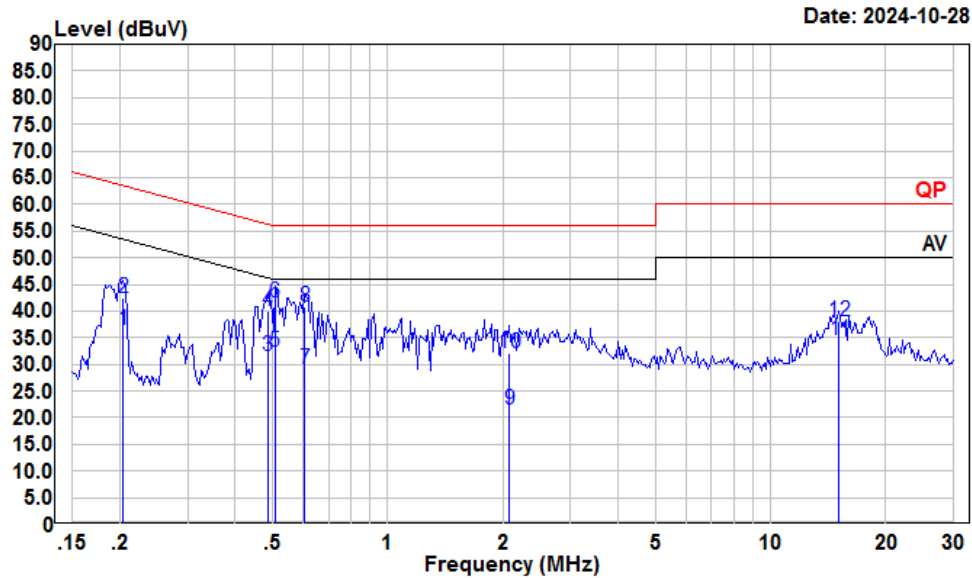
Project : 2401X62977E-RF

tester : Macy.shi

Note : WIRELESS CHARGE

|    | Freq   | Read Level | LISN Level | LISN Factor | Cable Loss | Limit Line | Over Limit | Remark  |
|----|--------|------------|------------|-------------|------------|------------|------------|---------|
|    | MHz    | dBuV       | dBuV       | dB          | dB         | dBuV       | dB         |         |
| 1  | 0.189  | 13.02      | 33.51      | 10.40       | 10.09      | 54.06      | -20.55     | Average |
| 2  | 0.189  | 24.64      | 45.13      | 10.40       | 10.09      | 64.06      | -18.93     | QP      |
| 3  | 0.200  | 13.45      | 33.94      | 10.40       | 10.09      | 53.62      | -19.68     | Average |
| 4  | 0.200  | 20.78      | 41.27      | 10.40       | 10.09      | 63.62      | -22.35     | QP      |
| 5  | 0.502  | 7.66       | 28.00      | 10.20       | 10.14      | 46.00      | -18.00     | Average |
| 6  | 0.502  | 17.17      | 37.51      | 10.20       | 10.14      | 56.00      | -18.49     | QP      |
| 7  | 0.529  | 5.47       | 25.83      | 10.23       | 10.13      | 46.00      | -20.17     | Average |
| 8  | 0.529  | 17.91      | 38.27      | 10.23       | 10.13      | 56.00      | -17.73     | QP      |
| 9  | 2.567  | 3.13       | 23.64      | 10.34       | 10.17      | 46.00      | -22.36     | Average |
| 10 | 2.567  | 12.50      | 33.01      | 10.34       | 10.17      | 56.00      | -22.99     | QP      |
| 11 | 14.907 | 14.81      | 35.33      | 10.30       | 10.22      | 50.00      | -14.67     | Average |
| 12 | 14.907 | 22.98      | 43.50      | 10.30       | 10.22      | 60.00      | -16.50     | QP      |

## AC 120V/ 60 Hz, Neutral



Condition: Neutral

Project : 2401X62977E-RF

tester : Macy.shi

Note : WIRELESS CHARGE

|    | Freq   | Read Level | LISN Level | LISN Factor | Cable Loss | Limit Line | Over Limit | Remark  |
|----|--------|------------|------------|-------------|------------|------------|------------|---------|
|    | MHz    | dBuV       | dBuV       | dB          | dB         | dBuV       | dB         |         |
| 1  | 0.204  | 15.64      | 36.33      | 10.60       | 10.09      | 53.45      | -17.12     | Average |
| 2  | 0.204  | 21.82      | 42.51      | 10.60       | 10.09      | 63.45      | -20.94     | QP      |
| 3  | 0.486  | 10.71      | 31.63      | 10.79       | 10.13      | 46.23      | -14.60     | Average |
| 4  | 0.486  | 19.16      | 40.08      | 10.79       | 10.13      | 56.23      | -16.15     | QP      |
| 5  | 0.507  | 11.43      | 32.36      | 10.79       | 10.14      | 46.00      | -13.64     | Average |
| 6  | 0.507  | 20.63      | 41.56      | 10.79       | 10.14      | 56.00      | -14.44     | QP      |
| 7  | 0.608  | 8.37       | 29.12      | 10.63       | 10.12      | 46.00      | -16.88     | Average |
| 8  | 0.608  | 20.17      | 40.92      | 10.63       | 10.12      | 56.00      | -15.08     | QP      |
| 9  | 2.077  | 1.24       | 21.55      | 10.12       | 10.19      | 46.00      | -24.45     | Average |
| 10 | 2.077  | 11.68      | 31.99      | 10.12       | 10.19      | 56.00      | -24.01     | QP      |
| 11 | 15.066 | 13.87      | 34.49      | 10.40       | 10.22      | 50.00      | -15.51     | Average |
| 12 | 15.066 | 17.43      | 38.05      | 10.40       | 10.22      | 60.00      | -21.95     | QP      |

## FCC §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

### Applicable Standard

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

### Limits for Maximum Permissible Exposure (MPE)

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

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

According with 680106 D01 Wireless Power Transfer v04 clause 3.2

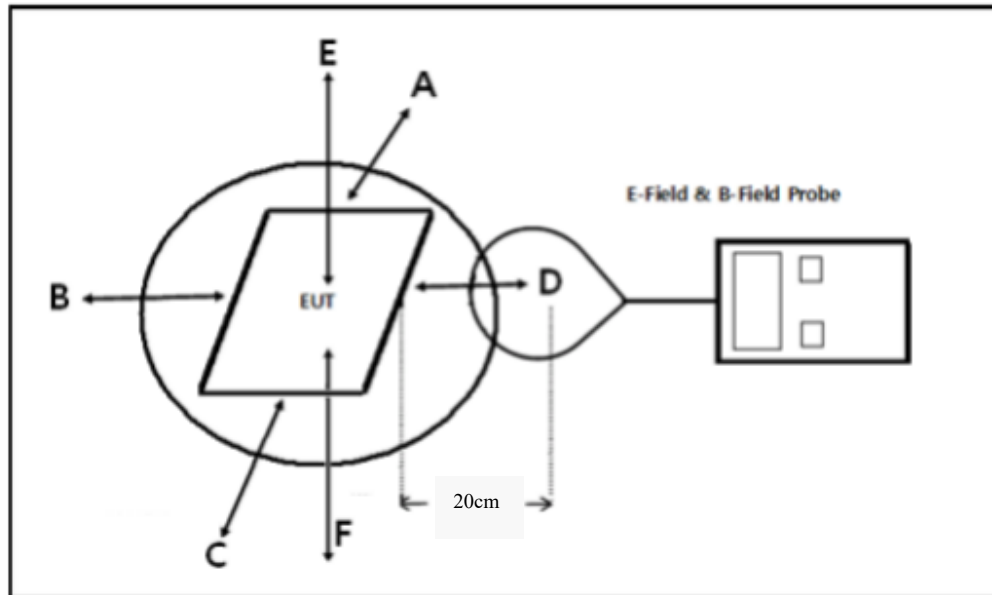
Accordingly, for § 2.1091-Mobile devices, the MPE limits between 100 kHz to 300 kHz are to be considered the same as those at 300 kHz in Table 1 of § 1.1310, that is, 614 V/m and 1.63 A/m, for the electric field and magnetic field, respectively. For § 2.1093-Portable devices below 4 MHz and down to 100 kHz, the MPE limits in § 1.1310 (with the 300 kHz limit applicable all the way down to 100 kHz) can be used for the purpose of equipment authorization in lieu of SAR evaluations.

There might be situations where the WPT RF emissions are limited enough that even operations in a “crowded” environment, where many similar WPT devices are present, do not pose significant EMC and RF exposure concerns. In this scenario, and for devices operating within a one-meter distance from the receiver, as defined above, a manufacturer will not have to submit an “Equipment Compliance Review” KDB, and receive FCC concurrence before proceeding with equipment authorization. This exception to the requirement of submitting the ECR to obtain FCC concurrence only applies when all the following criteria (1) through (6) are met:

- (1) The power transfer frequency is below 1 MHz.
- (2) The output power from each transmitting element (e.g., coil) is less than or equal to 15 watts.
- (3) A client device providing the maximum permitted load is placed in physical contact with the transmitter (i.e., the surfaces of the transmitter and client device enclosures need to be in physical contact)
- (4) Only § 2.1091-Mobile exposure conditions apply (i.e., this provision does not cover § 2.1093-Portable exposure conditions).
- (5) The E-field and H-field strengths, at and beyond 20 cm surrounding the device surface, are demonstrated to be less than 50% of the applicable MPE limit, per KDB 447498, Table 1. These measurements shall be taken along the principal axes of the device, with one axis oriented along the direction of the estimated maximum field strength, and for three points per axis or until a 1/d (inverse distance from the emitter structure) field strength decay is observed. Symmetry considerations may be used for test reduction purposes. The device shall be operated in documented worst-case compliance scenarios (i.e., the ones that lead to the maximum field components), and while all the radiating structures (e.g., coils or antennas) that by design can simultaneously transmit are energized at their nominal maximum power.
- (6) For systems with more than one radiating structure, the conditions specified in (5) must be met when the system is fully loaded (i.e., clients absorbing maximum power available), and with all the radiating structures operating at maximum power at the same time, as per design conditions. If the design allows one or more radiating structures to be powered at a higher level while other radiating

structures are not powered, then those cases must be tested as well. For instance, a device may use three RF coils powered at 5 W, or one coil powered at 15 W: in this case, both scenarios shall be tested.

### Block Diagram of Test Setup



### Test Procedures

- 1) Perform H-field and E-field measurements for each all sides of the EUT at 20cm, along all the principal axes defined with respect to the orientation of the transmitting element (e.g., coil or antenna).
- 2) The highest emission level was recorded and compared with limit.
- 3) The EUT was measured according to 680106 D01 Wireless Power Transfer v04.

### Test Data

#### Environmental Conditions

|                    |         |
|--------------------|---------|
| Temperature:       | 26 °C   |
| Relative Humidity: | 52 %    |
| ATM Pressure:      | 101 kPa |

*The testing was performed by Raonbiw Zhu on 2024-09-30.*

*Test mode: Wireless charging*

**H-Field Strength**

| Test Frequency (kHz) | Position A (A/m) | Position B (A/m) | Position C (A/m) | Position D (A/m) | Position E (A/m) | Position F (A/m) | 50% Limit (A/m) | Limit (A/m) |
|----------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------|-------------|
| 111-150              | 0.03             | 0.03             | 0.03             | 0.03             | 0.03             | 0.10             | 0.815           | 1.63        |

**E-Field Strength**

| Test Frequency (kHz) | Position A (V/m) | Position B (V/m) | Position C (V/m) | Position D (V/m) | Position E (V/m) | Position F (V/m) | 50% Limit (V/m) | Limit (V/m) |
|----------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------|-------------|
| 111-150              | 5.50             | 7.33             | 2.34             | 3.97             | 2.23             | 1.91             | 307             | 614         |

Note: Test with 20cm distance from the center of the probe(s) to the edge of the device.

- (1) The power transfer frequency is below 1 MHz.

The operation frequency is 111-150 kHz.

- (2) The output power from each transmitting element (e.g., coil) is less than or equal to 15 watts.

The maximum output power is 5 watts.

- (3) A client device providing the maximum permitted load is placed in physical contact with the transmitter (i.e., the surfaces of the transmitter and client device enclosures need to be in physical contact)

The load is physical contact with the EUT.

- (4) Only § 2.1091-Mobile exposure conditions apply (i.e., this provision does not cover § 2.1093-Portable exposure conditions).

The EUT is used in the mobile exposure condition.

- (5) The E-field and H-field strengths, at and beyond 20 cm surrounding the device surface, are demonstrated to be less than 50% of the applicable MPE limit, per KDB 447498, Table 1. These measurements shall be taken along the principal axes of the device, with one axis oriented along the direction of the estimated maximum field strength, and for three points per axis or until a 1/d (inverse distance from the emitter structure) field strength decay is observed. Symmetry considerations may be used for test reduction purposes. The device shall be operated in documented worst-case compliance scenarios (i.e., the ones that lead to the maximum field components), and while all the radiating structures (e.g., coils or antennas) that by design can simultaneously transmit are energized at their nominal maximum power.

The E-field and H-field strengths are less than 50% of the limit.

- (6) For systems with more than one radiating structure, the conditions specified in (5) must be met when the system is fully loaded (i.e., clients absorbing maximum power available), and with all the radiating structures operating at maximum power at the same time, as per design conditions. If the design allows one or more radiating structures to be powered at a higher level while other radiating structures are not powered, then those cases must be tested as well. For instance, a device may use three RF coils powered at 5 W, or one coil powered at 15 W: in this case, both scenarios shall be tested.

The EUT has only one coil.

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

### Applicable Standard

As per FCC Part 15.209

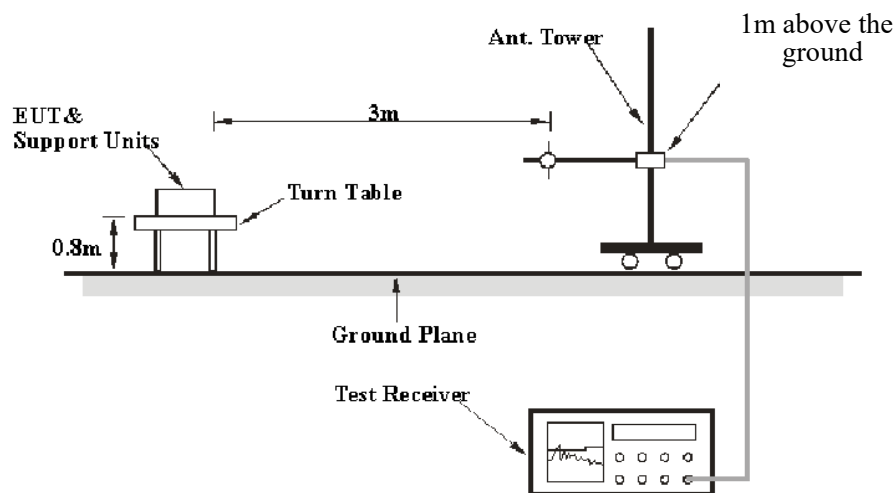
(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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

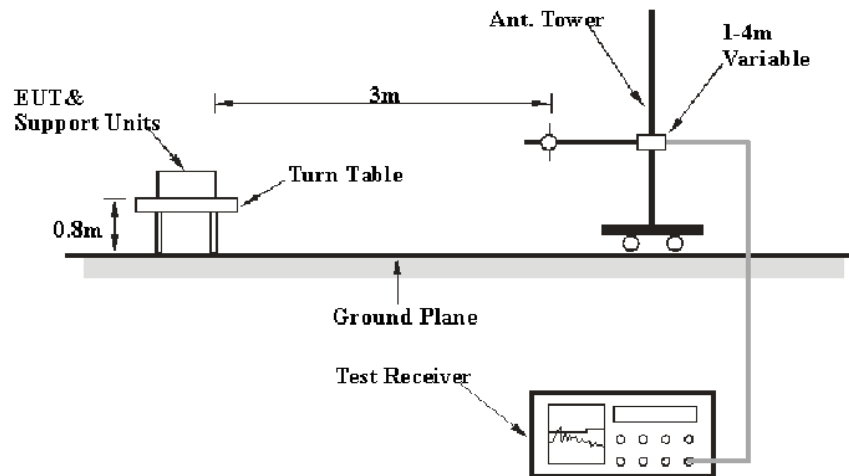
\*\*Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.

### EUT Setup

9 kHz-30MHz:



30MHz-1GHz:



The radiated emission tests were performed in the 3-meter chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC Part Subpart C limits.

The spacing between the peripherals was 10 cm.

### EMI Test Receiver Setup

The system was investigated from 9 kHz to 1000MHz.

| 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          |

Note 1: For the frequency bands 9–90 kHz, 110–490 kHz are based on measurements employing an average detector.

Note 2: If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

For 9 kHz-30MHz, the report shall list the six emissions with the smallest margin relative to the limit, for each of the three antenna orientations (parallel, perpendicular, and ground-parallel) unless the margin is greater than 20 dB.

## Factor & Over Limit/Margin Calculation

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

$$\text{Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Over Limit/Margin**” 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:

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

## Test Data

### Environmental Conditions

|                    |         |
|--------------------|---------|
| Temperature:       | 22 °C   |
| Relative Humidity: | 54 %    |
| ATM Pressure:      | 101 kPa |

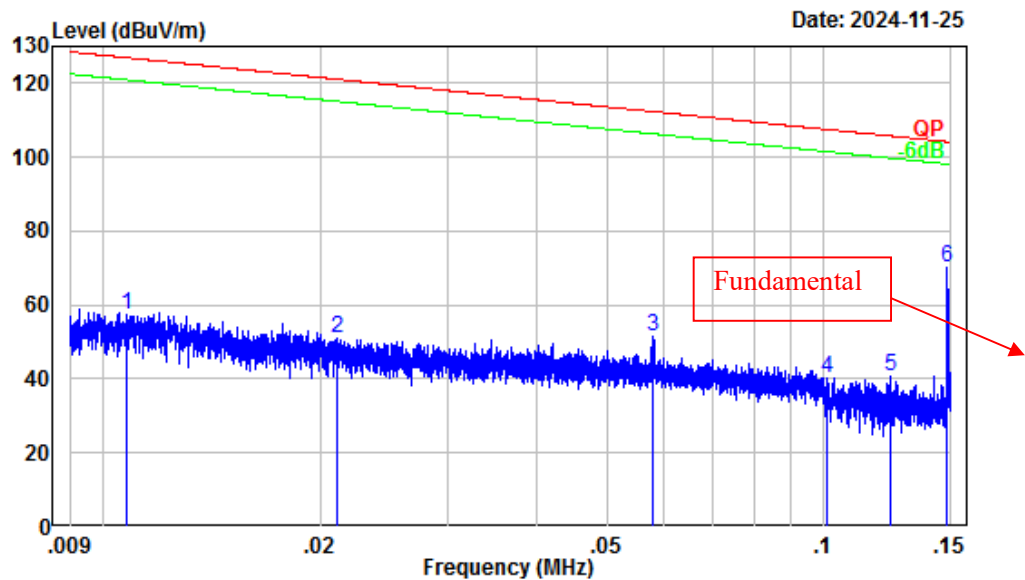
*The testing was performed by Anson Su on 2024-09-30 to 2024-11-25.*

*Test Mode: Wireless Charging*

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

Parallel:

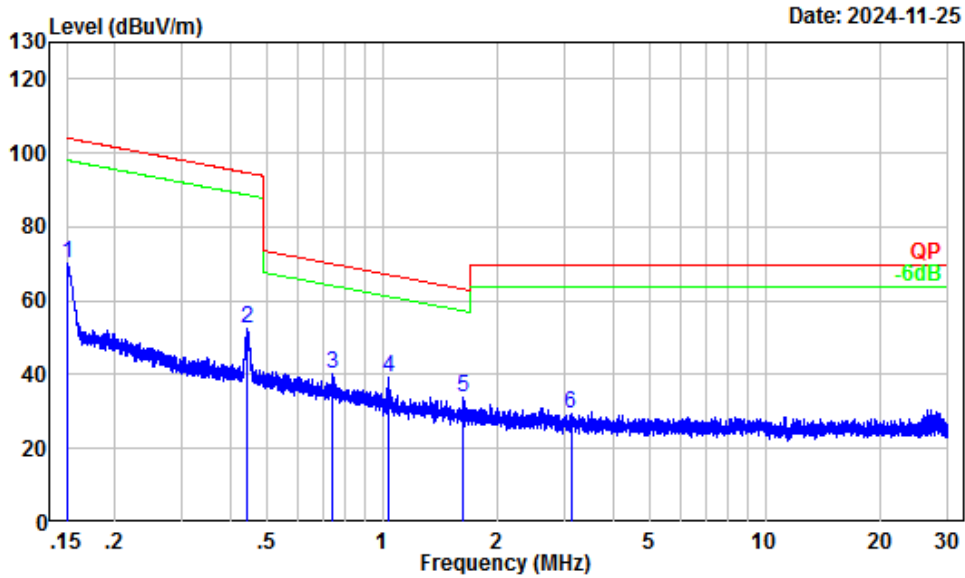
9 kHz~150 kHz



Site : Chamber A  
Condition : 3m  
Project Number: 2401X62977E-RF  
Test Mode : Transmitting  
Note : Parallel  
Tester : Anson Su

|   | Freq | Factor | Read Level | Level  | Limit  | Over Limit | Remark |
|---|------|--------|------------|--------|--------|------------|--------|
|   | MHz  | dB/m   | dBuV       | dBuV/m | dBuV/m | dB         |        |
| 1 | 0.01 | 37.28  | 20.01      | 57.29  | 126.93 | -69.64     | Peak   |
| 2 | 0.02 | 32.01  | 19.10      | 51.11  | 121.11 | -70.00     | Peak   |
| 3 | 0.06 | 22.00  | 29.63      | 51.63  | 112.35 | -60.72     | Peak   |
| 4 | 0.10 | 17.01  | 23.33      | 40.34  | 107.53 | -67.19     | Peak   |
| 5 | 0.12 | 15.95  | 24.72      | 40.67  | 105.77 | -65.10     | Peak   |
| 6 | 0.15 | 14.80  | 55.33      | 70.13  | 104.18 | -34.05     | Peak   |

150 kHz~30 MHz

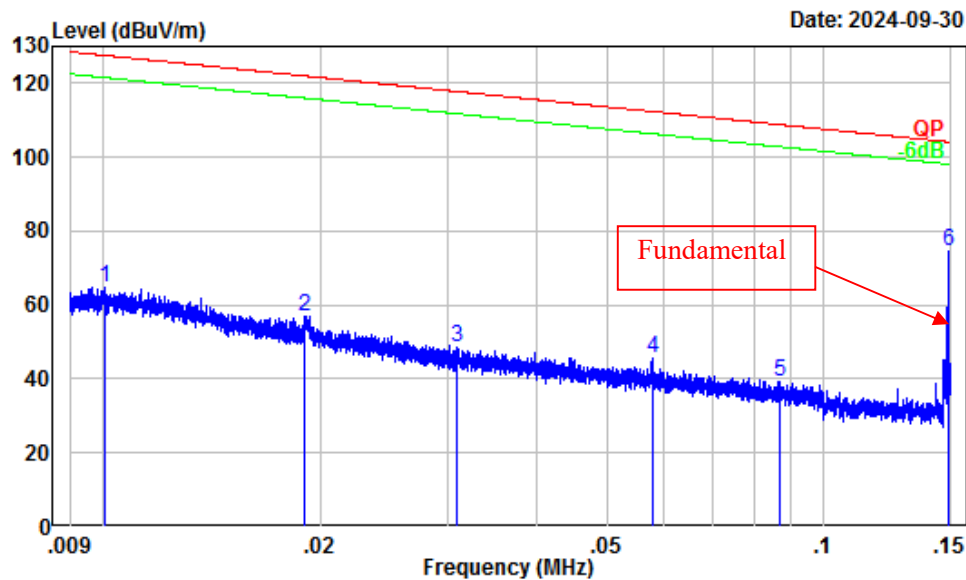


Site : Chamber A  
Condition : 3m  
Project Number: 2401X62977E-RF  
Test Mode : Transmitting  
Note : Parallel  
Tester : Anson Su

|   | Freq | Factor | Read<br>Level | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|------|--------|---------------|--------|---------------|---------------|--------|
|   | MHz  | dB/m   | dBuV          | dBuV/m | dBuV/m        | dB            |        |
| 1 | 0.15 | 14.70  | 55.61         | 70.31  | 104.06        | -33.75        | Peak   |
| 2 | 0.44 | 4.67   | 48.05         | 52.72  | 94.66         | -41.94        | Peak   |
| 3 | 0.74 | 0.59   | 39.49         | 40.08  | 70.12         | -30.04        | Peak   |
| 4 | 1.04 | -1.72  | 41.18         | 39.46  | 67.15         | -27.69        | Peak   |
| 5 | 1.63 | -3.79  | 37.85         | 34.06  | 63.13         | -29.07        | Peak   |
| 6 | 3.11 | -6.00  | 35.22         | 29.22  | 69.54         | -40.32        | Peak   |

Ground-parallel:

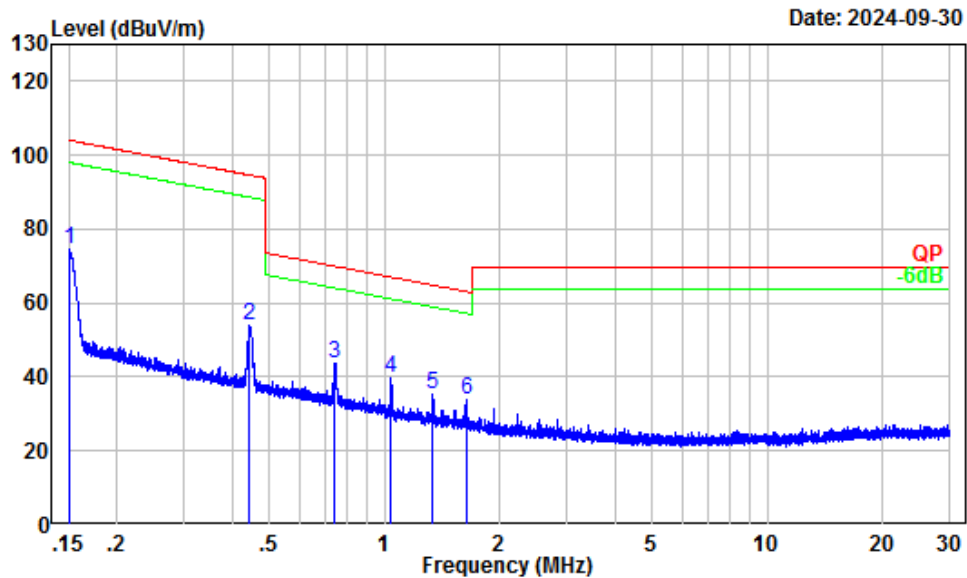
9 kHz~150 kHz



Site : Chamber A  
Condition : 3m  
Project Number: 2401X62977E-RF  
Test Mode : 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 | 0.01 | 37.64  | 27.30      | 64.94  | 127.53     | -62.59     | Peak   |
| 2 | 0.02 | 33.05  | 23.86      | 56.91  | 121.99     | -65.08     | Peak   |
| 3 | 0.03 | 27.27  | 21.33      | 48.60  | 117.79     | -69.19     | Peak   |
| 4 | 0.06 | 22.02  | 23.69      | 45.71  | 112.36     | -66.65     | Peak   |
| 5 | 0.09 | 18.35  | 21.05      | 39.40  | 108.83     | -69.43     | Peak   |
| 6 | 0.15 | 14.77  | 59.74      | 74.51  | 104.15     | -29.64     | Peak   |

150 kHz~30 MHz

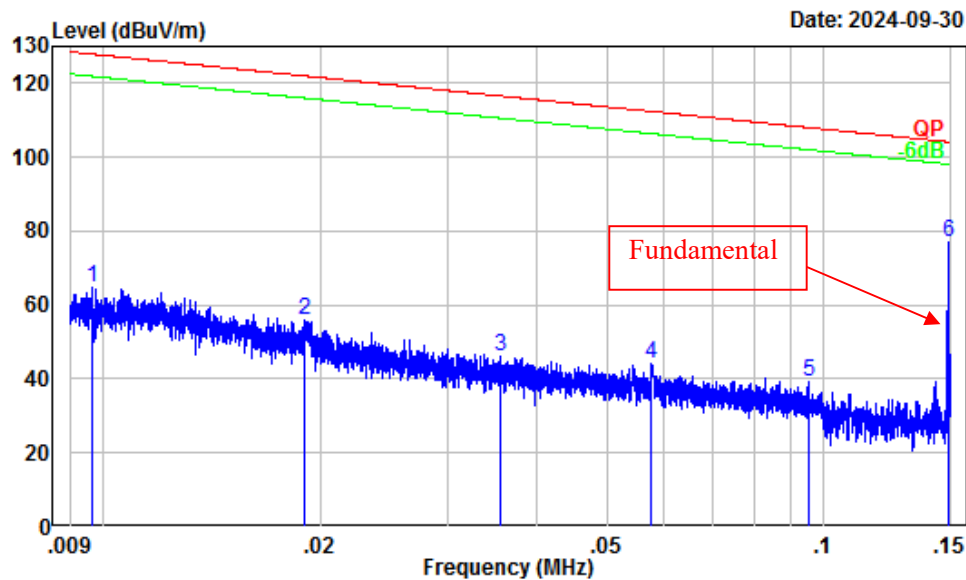


Site : Chamber A  
Condition : 3m  
Project Number: 2401X62977E-RF  
Test Mode : Transmitting  
Note : Ground-parallel  
Tester : Anson Su

|   | Freq | Factor | Read<br>Level | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|------|--------|---------------|--------|---------------|---------------|--------|
|   | MHz  | dB/m   | dBuV          | dBuV/m | dBuV/m        | dB            |        |
| 1 | 0.15 | 14.71  | 60.06         | 74.77  | 104.07        | -29.30        | Peak   |
| 2 | 0.45 | 4.65   | 49.30         | 53.95  | 94.64         | -40.69        | Peak   |
| 3 | 0.74 | 0.57   | 43.28         | 43.85  | 70.11         | -26.26        | Peak   |
| 4 | 1.04 | -1.73  | 41.25         | 39.52  | 67.13         | -27.61        | Peak   |
| 5 | 1.34 | -2.77  | 37.88         | 35.11  | 64.88         | -29.77        | Peak   |
| 6 | 1.64 | -3.81  | 37.75         | 33.94  | 63.09         | -29.15        | Peak   |

Perpendicular:

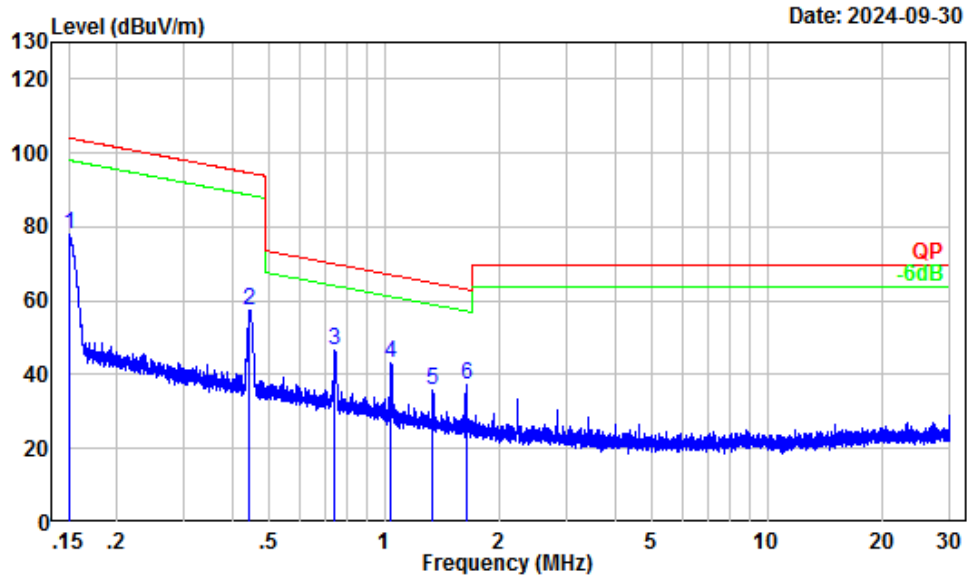
9 kHz~150 kHz



Site : Chamber A  
Condition : 3m  
Project Number: 2401X62977E-RF  
Test Mode : Transmitting  
Note : Perpendicular  
Tester : Anson Su

|   | Freq | Factor | Read Level | Level  | Limit  | Over Limit | Remark |
|---|------|--------|------------|--------|--------|------------|--------|
|   | MHz  | dB/m   | dBuV       | dBuV/m | dBuV/m | dB         |        |
| 1 | 0.01 | 37.97  | 26.66      | 64.63  | 127.92 | -63.29     | Peak   |
| 2 | 0.02 | 33.05  | 22.85      | 55.90  | 121.99 | -66.09     | Peak   |
| 3 | 0.04 | 26.24  | 20.06      | 46.30  | 116.57 | -70.27     | Peak   |
| 4 | 0.06 | 22.03  | 22.13      | 44.16  | 112.38 | -68.22     | Peak   |
| 5 | 0.10 | 17.54  | 21.65      | 39.19  | 108.04 | -68.85     | Peak   |
| 6 | 0.15 | 14.77  | 62.36      | 77.13  | 104.15 | -27.02     | Peak   |

150 kHz~30 MHz



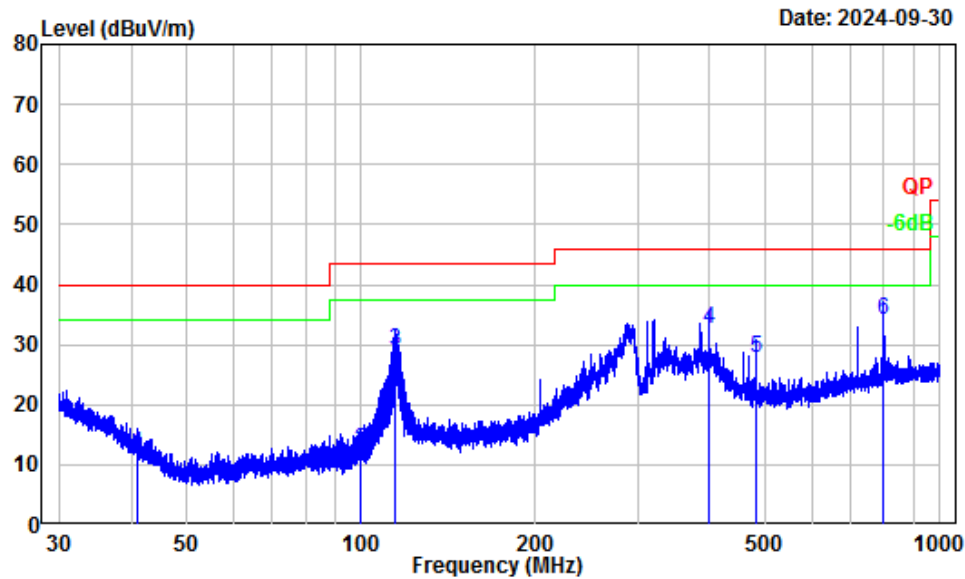
Site : Chamber A  
Condition : 3m  
Project Number: 2401X62977E-RF  
Test Mode : Transmitting  
Note : Perpendicular  
Tester : Anson Su

|   | Freq | Factor | Read<br>Level | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|------|--------|---------------|--------|---------------|---------------|--------|
|   | MHz  | dB/m   | dBuV          | dBuV/m | dBuV/m        | dB            |        |
| 1 | 0.15 | 14.71  | 63.32         | 78.03  | 104.08        | -26.05        | Peak   |
| 2 | 0.45 | 4.63   | 53.01         | 57.64  | 94.62         | -36.98        | Peak   |
| 3 | 0.74 | 0.57   | 46.11         | 46.68  | 70.10         | -23.42        | Peak   |
| 4 | 1.04 | -1.73  | 45.06         | 43.33  | 67.12         | -23.79        | Peak   |
| 5 | 1.34 | -2.77  | 38.74         | 35.97  | 64.89         | -28.92        | Peak   |
| 6 | 1.64 | -3.80  | 41.31         | 37.51  | 63.11         | -25.60        | Peak   |

30MHz~1GHz:

Note: when the result of Peak below the limit of QP more than 6dB, just the peak value was record

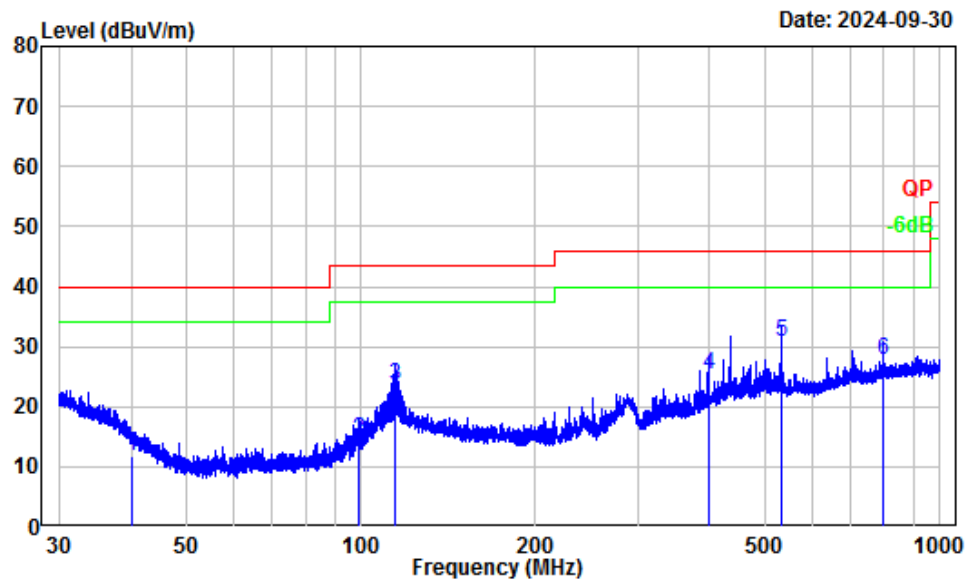
Horizontal



Site : Chamber A  
Condition : 3m Horizontal  
Project Number: 2401X62977E-RF  
Test Mode : Transmitting  
Tester : Anson Su

|   | Freq   |        | Read  |        | Limit  | Over   | Remark |
|---|--------|--------|-------|--------|--------|--------|--------|
|   | MHz    | Factor | Level | Level  | Line   | Limit  |        |
|   | MHz    | dB/m   | dBuV  | dBuV/m | dBuV/m | dB     |        |
| 1 | 41.04  | -13.11 | 25.02 | 11.91  | 40.00  | -28.09 | QP     |
| 2 | 99.97  | -15.90 | 28.16 | 12.26  | 43.50  | -31.24 | QP     |
| 3 | 114.56 | -12.22 | 41.32 | 29.10  | 43.50  | -14.40 | QP     |
| 4 | 400.08 | -8.41  | 41.07 | 32.66  | 46.00  | -13.34 | QP     |
| 5 | 480.11 | -6.34  | 34.19 | 27.85  | 46.00  | -18.15 | QP     |
| 6 | 800.03 | -2.14  | 36.23 | 34.09  | 46.00  | -11.91 | QP     |

Vertical



Site : Chamber A  
Condition : 3m Vertical  
Project Number: 2401X62977E-RF  
Test Mode : Transmitting  
Tester : Anson Su

|   | Freq Factor |        | Read Level | Level  | Limit  | Over   | Remark |
|---|-------------|--------|------------|--------|--------|--------|--------|
|   | MHz         | dB/m   | dBuV       | dBuV/m | dBuV/m | dB     |        |
| 1 | 40.13       | -12.46 | 24.15      | 11.69  | 40.00  | -28.31 | QP     |
| 2 | 99.09       | -16.17 | 30.53      | 14.36  | 43.50  | -29.14 | QP     |
| 3 | 114.62      | -12.21 | 35.81      | 23.60  | 43.50  | -19.90 | QP     |
| 4 | 400.08      | -8.41  | 33.83      | 25.42  | 46.00  | -20.58 | QP     |
| 5 | 531.03      | -5.78  | 36.53      | 30.75  | 46.00  | -15.25 | QP     |
| 6 | 800.03      | -2.14  | 29.86      | 27.72  | 46.00  | -18.28 | QP     |

## FCC §15.215 (c) - 20 dB EMISSION BANDWIDTH

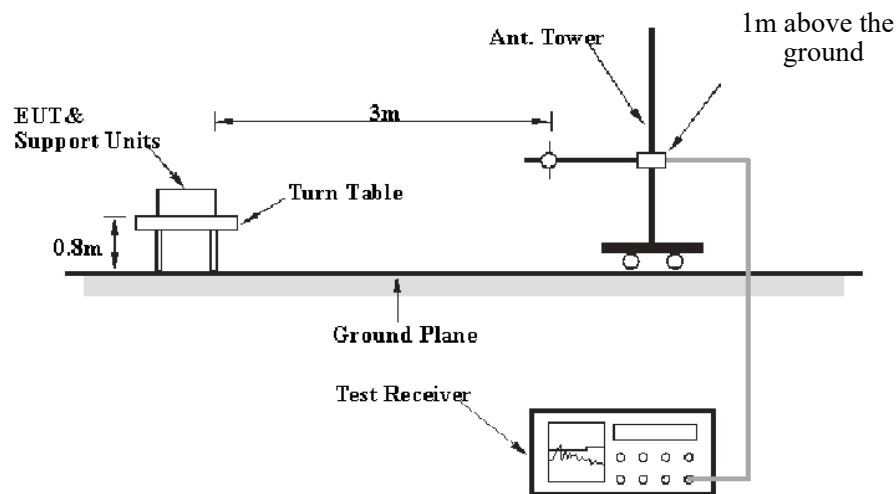
### Applicable Standard

According to § 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. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. 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

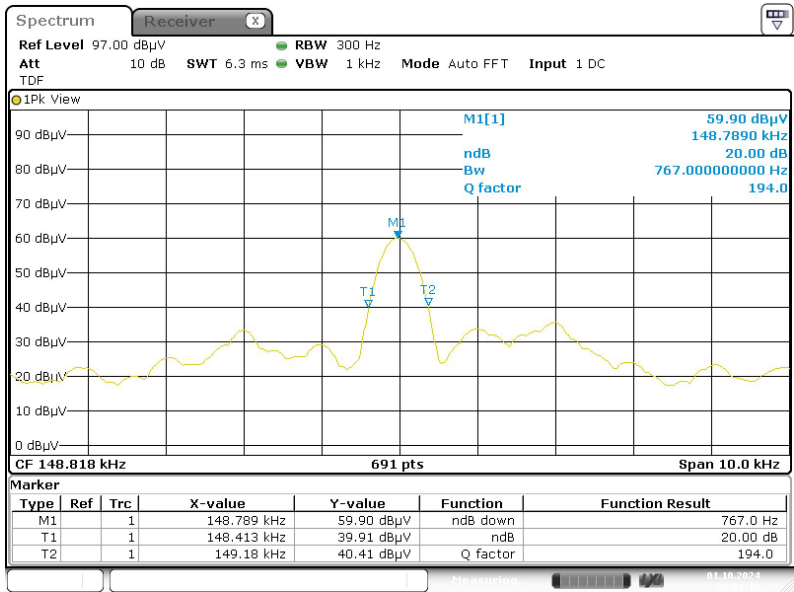
|                    |         |
|--------------------|---------|
| Temperature:       | 22 °C   |
| Relative Humidity: | 54 %    |
| ATM Pressure:      | 101 kPa |

The testing was performed by Anson Su on 2024-10-01.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to following table and plot.

| Frequency (kHz) | 20 dB Emission Bandwidth (Hz) |
|-----------------|-------------------------------|
| 148.8           | 767                           |



ProjectNo.:2401X62977E-RF Tester:Anson Su  
Date: 1.OCT.2024 00:01:18

## **EUT PHOTOGRAPHS**

Please refer to the attachment 2401X62977E-RF External photo and 2401X62977E-RF Internal photo.

## **TEST SETUP PHOTOGRAPHS**

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Please refer to the attachment 2401X62977E-RFB Test Setup photo.

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