# FCC TEST REPORT

# FCC ID: 2AZG4-JRWIRELESSCH

| | | |
|---|---|---|
| Product | : | Wireless Charger |
| Model Name | : | JR-CHARG-BLKWAL,JR-CHARG-WHTRUB |
| Brand | : | N/A |
| Report No. | : | PTC20101402901E-FC01 |

## Prepared for

Joy Resolve Ltd.

115 Mare Street,Keltan House (WeWork) London,E8 4RU

## Prepared by

Precise Testing & Certification Co., Ltd.

Building 1, No. 6, Tongxin Road, Dongcheng Street, Dongguan, Guangdong, China

# 1 TEST RESULT CERTIFICATION

| | | |
|---|---|---|
| Applicant's name | : | Joy Resolve Ltd. |
| Address | : | 115 Mare Street,Keltan House (WeWork) London,E8 4RU |
| Manufacture's name | : | Power System Electronic Technology Co., Ltd. |
| Address | : | No.1 Shangbian Road, Puxin Industrial District, Shipai Town, Dongguan City, Guangdong, China |
| Product name | : | Wireless Charger |
| Model name | : | JR-CHARG-BLKWAL,JR-CHARG-WHTRUB |
| Standards | : | FCC Part15 Subpart C |
| Test procedure | : | ANSI C63.10:2013 |
| Test Date | : | Oct 28, 2020 to Nov 23, 2020 |
| Date of Issue | : | Nov 23, 2020 |
| Test Result | : | Pass |

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

This report shall not be reproduced except in full, without the written approval of PTC, this document may be altered or revised by PTC, personal only, and shall be noted in the revision of the document.

Test Engineer:

Leo Yang / Engineer

Technical Manager:

Chris Du / Manager

# Contents

# 2 Test Summary

| Standard Section | Test Item | Result |
|---|---|---|
| FCC Part 15, Paragraph 15.207 | Conducted Emission Test | PASS |
| FCC Part 15, Paragraph 15.209(a)(f) | Spurious Emission | PASS |
| Part 15.203 | Antenna Requirement | PASS |

# 3 General Information

## 3.1 General Description of E.U.T.

| | | |
|---|---|---|
| Product Name | : | Wireless Charger |
| Model Name | : | JR-CHARG-BLKWAL,JR-CHARG-WHTRUB<br>Note:The appearance color is different, the others are the same |
| Operation Frequency | : | 110.1-205KHz |
| Type of Modulation | : | ASK |
| Antenna installation | : | Inductive loop coil Antenna |
| Antenna Gain | : | 0 dBi |
| Power supply | : | Input: 100-240V~ 50/60Hz,<br>Output: 10W |
| Hardware Version | : | N/A |
| Software Version | : | N/A |

## 3.2 Description of Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

| Pretest Mode | Description |
|---|---|
| Mode 1 | Wireless Charging Mode |

| For Conducted Emission | |
|---|---|
| Final Test Mode | Description |
| Mode 1 | Wireless Charging Mode |

| For Radiated Emission | |
|---|---|
| Final Test Mode | Description |
| Mode 1 | Wireless Charging Mode |

Note: (1)Test channel is 0.1250MHz.

(2)All the situation(full load, half load and empty load) has been tested,only the worst situation (full load) was recorded in the report.

(3)5W/7.5W/10W All modes have been tested. This report only show the test result of the worst case(Full load 10W).

## 3.3 Test Site

Precise Testing & Certification Co., Ltd.

Building 1, No. 6, Tongxin Road, Dongcheng Street, Dongguan, Guangdong, China

FCC Registration Number: 790290

A2LA Certificate No.: 4408.01

IC Registration Number: 12191A-1

# 4 Equipment During Test

## 4.1 Equipments List

RF Conducted Test

| Name of Equipment | Manufacturer | Model | Serial No. | Characteristics | Calibration Due |
|---|---|---|---|---|---|
| MXG Signal Analyzer | Agilent | N9020A | MY56070279 | 10Hz-30GHz | Aug. 21, 2021 |
| Coaxial Cable | CDS | 79254 | 46107086 | 10Hz-30GHz | Aug. 21, 2021 |

Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

Radiated Emissions

| Name of Equipment | Manufacturer | Model | Serial No. | Characteristics | Calibration Due |
|---|---|---|---|---|---|
| EMI Test Receiver | Rohde&Schwarz | ESCI | 101417 | 9KHz-3GHz | Aug. 21, 2021 |
| Loop Antenna | Schwarzbeck | FMZB 1519 | 012 | 9 KHz -30MHz | Aug. 21, 2021 |
| Bilog Antenna | SCHWARZBECK | VULB9160 | 9160-3355 | 25MHz-2GHz | Aug. 21, 2021 |
| Preamplifier (low frequency) | SCHWARZBECK | BBV 9475 | 9745-0013 | 1MHz-1GHz | Aug. 21, 2021 |
| Cable | Schwarzbeck | PLF-100 | 549489 | 9KHz-3GHz | Aug. 21, 2021 |
| Spectrum Analyzer | Agilent | E4407B | MY45109572 | 9KHz-40GHz | Aug. 21, 2021 |
| Horn Antenna | SCHWARZBECK | 9120D | 9120D-1246 | 1GHz-18GHz | Aug. 21, 2021 |
| Power Amplifier | LUNAR EM | LNA1G18-40 | J10100000081 | 1GHz-26.5GHz | Aug. 21, 2021 |
| Cable | H+S | CBL-26 | N/A | 1GHz-26.5GHz | Aug. 21, 2021 |

Conducted Emissions

| Name of Equipment | Manufacturer | Model | Serial No. | Characteristics | Calibration Due |
|---|---|---|---|---|---|
| EMI Test Receiver | Rohde&Schwarz | ESCI | 101417 | 9KHz-3GHz | Aug. 19, 2021 |
| Artificial Mains Network | Rohde&Schwarz | ENV216 | 102453 | 9KHz-300MHz | Aug. 19, 2021 |
| Artificial Mains Network | Rohde&Schwarz | ENV216 | 101342 | 9KHz-300MHz | Aug. 19, 2021 |

## 4.2 Measurement Uncertainty

| | | |
|---|---|---|
| Radiation Uncertainty | : | Ur = 3.9 dB (Horizontal) |
| | | Ur = 3.8 dB (Vertical) |
| | | |
| Conduction Uncertainty | : | Uc = 3.4 dB |

## 4.3 Description of Support Units

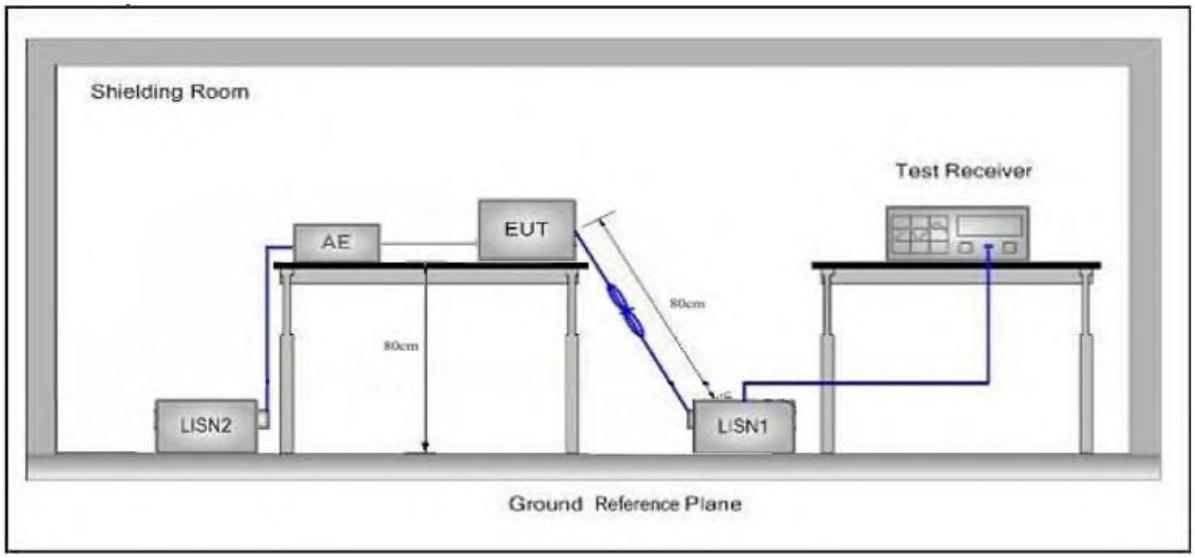
| Equipment | Model No. | Series No. |
|---|---|---|
| iPhone | Input: 100-240V~ 50/60Hz,<br>Output: 10W | N/A |

| Equipment | Model No. | Series No. |
|---|---|---|
| Adapter | Input: 100-240V~ 50/60Hz,<br>DC 5V 2A<br>Output: 10W | N/A |

## 5 Test Standard and Limit

| Test Standard | FCC Part15 Section 15.207 | | |
|---|---|---|---|
| Test Limit | Frequency | Maximum RF Line Voltage (dBuV) | |
| | | Quasi-peak Level | Average Level |
| | 150kHz~500kHz | 66 ~ 56 * | 56 ~ 46 * |
| | 500kHz~5MHz | 56 | 46 |
| | 5MHz~30MHz | 60 | 50 |
| **Remark:** (1) *Decreasing linearly with logarithm of the frequency.<br>(2) The lower limit shall apply at the transition frequency. | | | |

### 5.1 Test Setup




### 5.2 Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions

of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10-2013 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

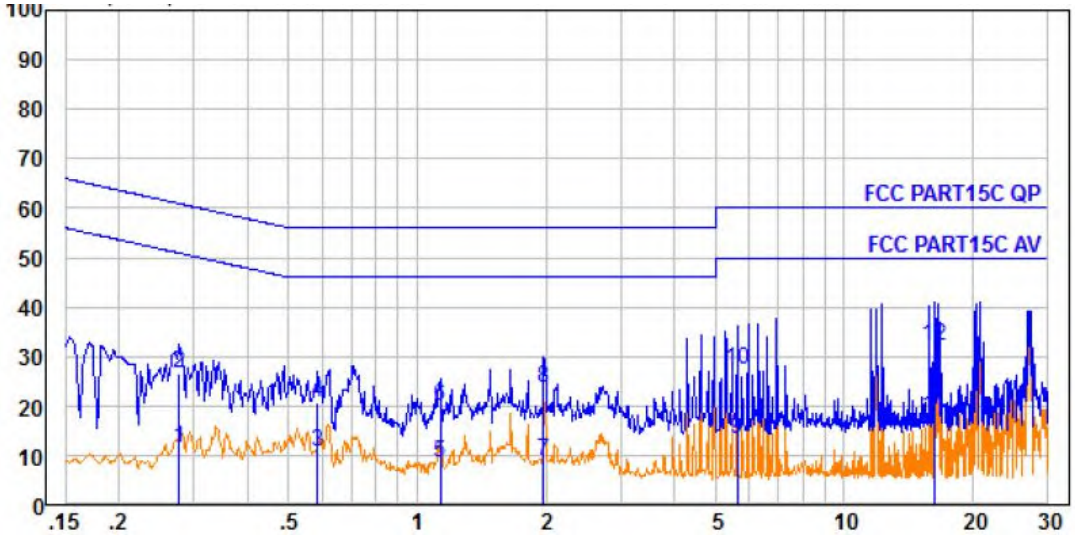
## 5.3. Test Data

Please to see the following pages

Note:During the test, pre-scan 120Vac/60Hz and 240Vac/60Hz of the Power supply, found 120Vac/60Hz was worse case,mode, the report only reflects the worst mode.

**Conducted Emission Test Data**

| | |
|---|---|
| Operating Condition: | Mode 1 |
| Test Specification: | AC 120V, 60Hz for adapter |
| Comment: | Live Line |
| | Tem.: 22℃ Hum.: 51% |



| No. | Freq MHz | Cable Loss dB | AMN Factor dB | Receiver Reading dBµV | Emission Level dBµV | Limit dBµV | Over Limit dB | Remark |
|---|---|---|---|---|---|---|---|---|
| 1. | 0.277 | 0.35 | 9.66 | 1.56 | 11.57 | 50.90 | -39.33 | Average |
| 2. | 0.277 | 0.35 | 9.66 | 16.57 | 26.58 | 60.90 | -34.32 | QP |
| 3. | 0.585 | 0.43 | 9.79 | 0.60 | 10.82 | 46.00 | -35.18 | Average |
| 4. | 0.585 | 0.43 | 9.79 | 10.42 | 20.64 | 56.00 | -35.36 | QP |
| 5. | 1.135 | 0.46 | 9.83 | -1.91 | 8.38 | 46.00 | -37.62 | Average |
| 6. | 1.135 | 0.46 | 9.83 | 9.49 | 19.78 | 56.00 | -36.22 | QP |
| 7. | 1.980 | 0.47 | 9.85 | -1.57 | 8.75 | 46.00 | -37.25 | Average |
| 8. | 1.980 | 0.47 | 9.85 | 13.46 | 23.78 | 56.00 | -32.22 | QP |
| 9. | 5.623 | 0.52 | 9.94 | 2.83 | 13.29 | 50.00 | -36.71 | Average |
| 10. | 5.623 | 0.52 | 9.94 | 16.67 | 27.13 | 60.00 | -32.87 | QP |
| 11. | 16.226 | 0.51 | 9.96 | 7.41 | 17.88 | 50.00 | -32.12 | Average |
| 12. | 16.226 | 0.51 | 9.96 | 21.49 | 31.96 | 60.00 | -28.04 | QP |

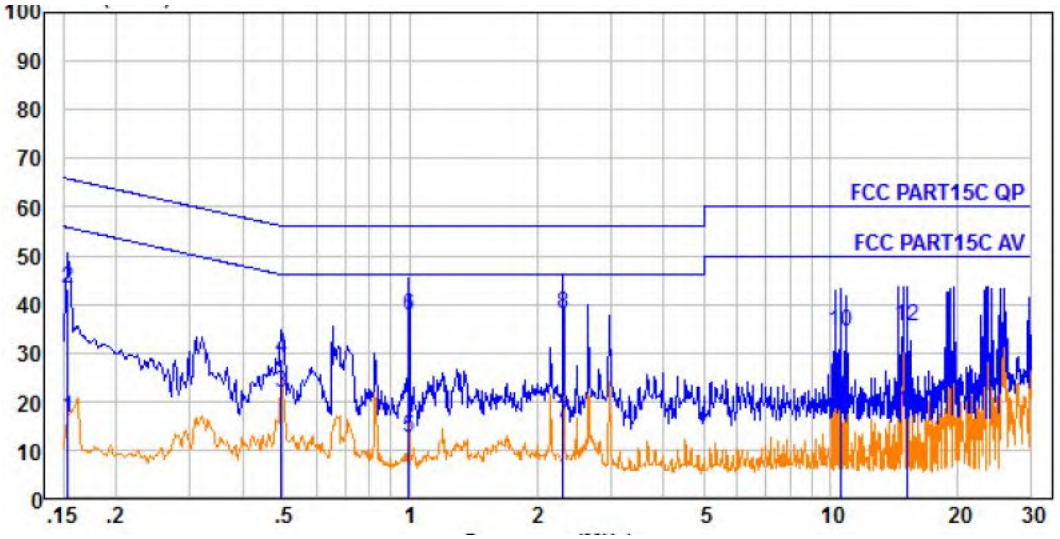
**Conducted Emission Test Data**

Operating Condition: Mode 1

Test Specification: AC 120V, 60Hz for adapter

Comment: Neutral Line

Tem.: 22℃ Hum.: 51%




| No. | Freq MHz | Cable Loss dB | AMN Factor dB | Receiver Reading dBµV | Emission Level dBµV | Limit dBµV | Over Limit dB | Remark |
|---|---|---|---|---|---|---|---|---|
| 1. | 0.154 | 0.21 | 9.53 | 6.78 | 16.52 | 55.78 | -39.26 | Average |
| 2. | 0.154 | 0.21 | 9.53 | 33.31 | 43.05 | 65.78 | -22.73 | QP |
| 3. | 0.494 | 0.43 | 9.81 | 11.57 | 21.81 | 46.10 | -24.29 | Average |
| 4. | 0.494 | 0.43 | 9.81 | 18.64 | 28.88 | 56.10 | -27.22 | QP |
| 5. | 0.994 | 0.46 | 9.85 | 2.06 | 12.37 | 46.00 | -33.63 | Average |
| 6. | 0.994 | 0.46 | 9.85 | 27.22 | 37.53 | 56.00 | -18.47 | QP |
| 7. | 2.309 | 0.47 | 9.89 | 5.23 | 15.59 | 46.00 | -30.41 | Average |
| 8. | 2.309 | 0.47 | 9.89 | 27.68 | 38.04 | 56.00 | -17.96 | QP |
| 9. | 10.564 | 0.56 | 10.01 | 10.45 | 21.02 | 50.00 | -28.98 | Average |
| 10. | 10.564 | 0.56 | 10.01 | 23.90 | 34.47 | 60.00 | -25.53 | QP |
| 11. | 15.226 | 0.55 | 10.07 | 7.09 | 17.71 | 50.00 | -32.29 | Average |
| 12. | 15.226 | 0.55 | 10.07 | 24.62 | 35.24 | 60.00 | -24.76 | QP |

# 6 Radiation Spurious Emission and Band Edge

## 6.1 Test Standard and Limit

| Test Standard | FCC Part15 C Section 15.209 and 15.205 | | | | |
|---|---|---|---|---|---|
| Test Limit | Frequency (MHz) | Field strength (microvolt/meter) | Limit (dBuV/m) | Remark | Measurement distance (m) |
| | 0.009MHz~0.490MHz | 2400/F(kHz) | - | - | 300 |
| | 0.490MHz-1.705MHz | 24000/F(kHz) | - | - | 30 |
| | 1.705MHz-30MHz | 30 | - | - | 30 |
| | 30MHz~88MHz | 100 | 40.0 | Quasi-peak | 3 |
| | 88MHz~216MHz | 150 | 43.5 | Quasi-peak | 3 |
| | 216MHz~960MHz | 200 | 46.0 | Quasi-peak | 3 |
| | 960MHz~1000MHz | 500 | 54.0 | Quasi-peak | 3 |
| | Above 1000MHz | 500 | 54.0 | Average | 3 |
| | | - | 74.0 | Peak | 3 |

**Remark:**

(1)The lower limit shall apply at the transition frequency.

(2) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

## 6.2 Test Setup

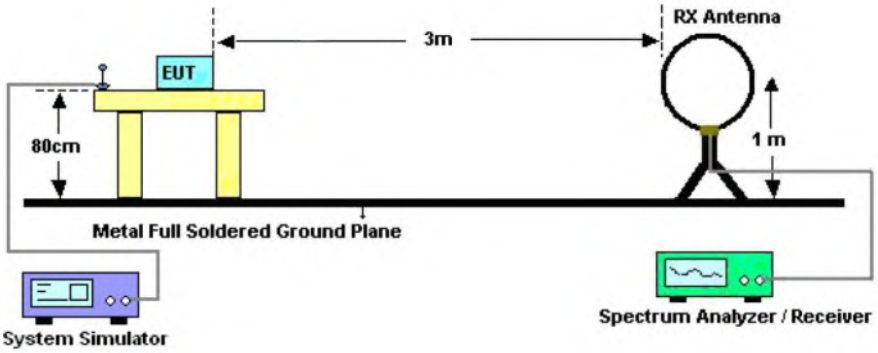



Figure 1. Below 30MHz

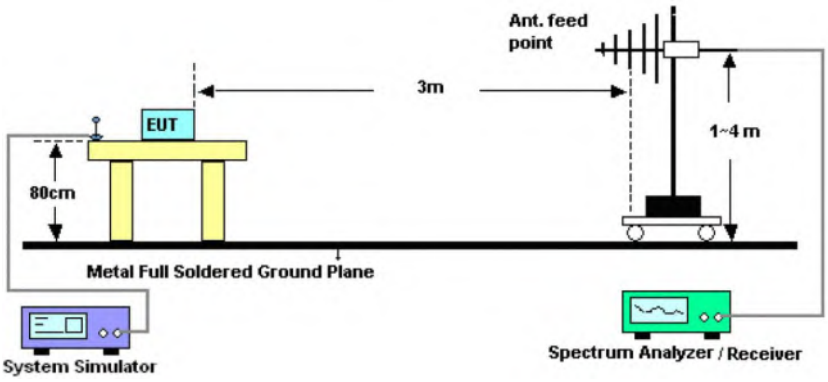



Figure 2. 30MHz to 1GHz

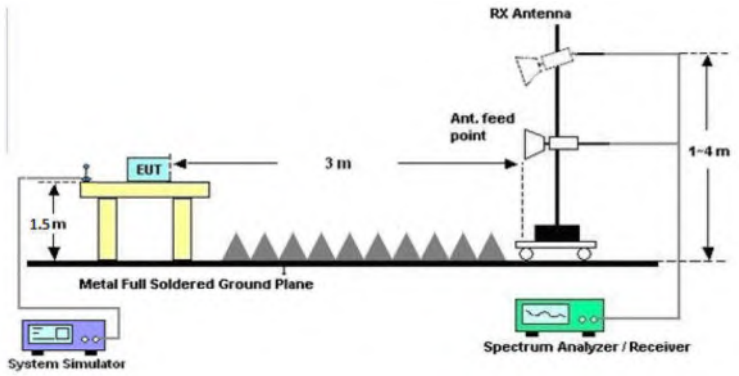



Figure 3. Above 1 GHz

## 6.3 Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.

For above 1GHz: The EUT is placed on a turntable, which is 1.5m above the ground plane.

The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal and vertical polarization of the antenna are set on test. The EUT is tested in 9*6*6 Chamber. The device is evaluated in xyz orientation.

For 9kHz to 150kHz, Set the spectrum analyzer as:

RBW = 200Hz, VBW =1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:

RBW = 9KHz, VBW =30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 30MHz to 1000MHz, Set the spectrum analyzer as:

RBW = 100kHz, VBW =300kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

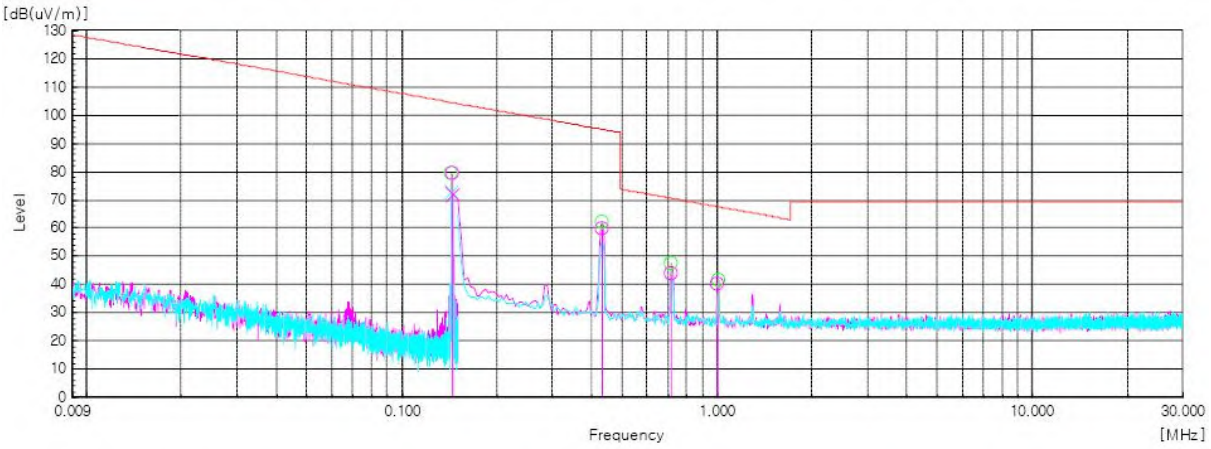
## 6.4 Test Data

**PASS**

Note: The data is in TX mode, and this is the worst mode.

**Test Results (9K~30MHz)**

| | |
|---|---|
| Test Mode: | Mode 1 |
| Power Source: | AC 120V, 60Hz for adapter |
| Temp.(℃)/Hum.(%RH): | 24.7℃/51%RH |
| Distance: | 3m |

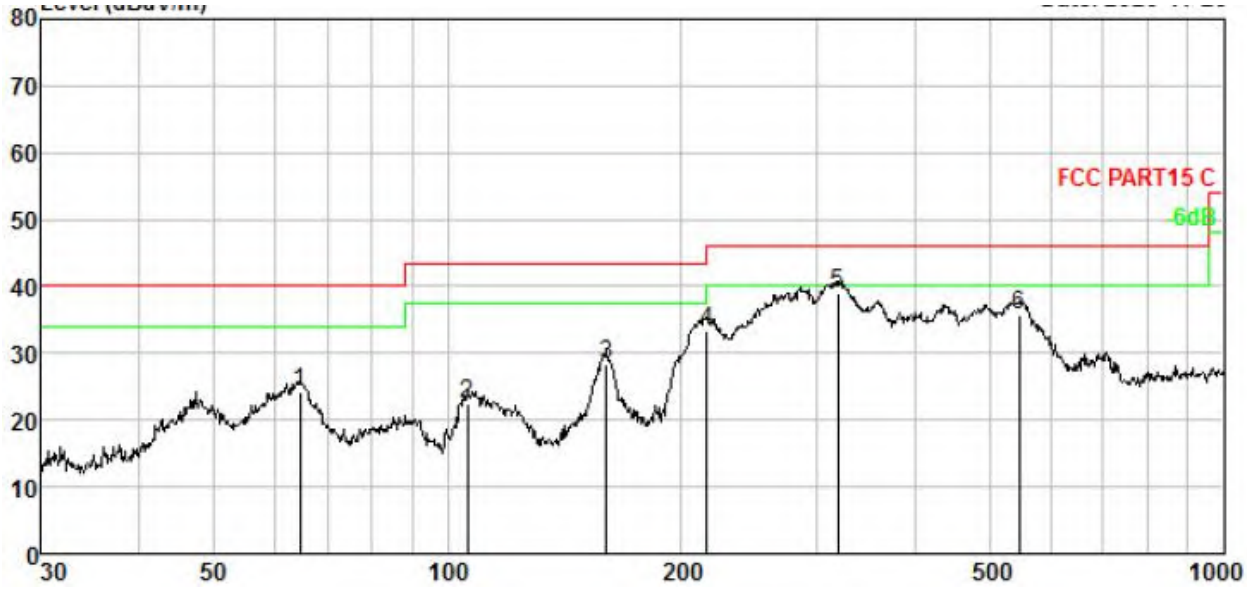



| Fre (MHz) | Reading [dB(uV)] | Pol V/H | Cable Loss (dB) | Amp Gain (dB) | Antenna Factor (dB) | Factor (dB) | 3m Field Strength [dB(uV/m)] | Limit At 3m [dB(uV/m)] | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 0.125 | 97.20 | H | 0.55 | -32.76 | 19.91 | -12.30 | 84.90 | 105.67 | 20.77 |
| 0.430 | 72.30 | H | 0.58 | -32.73 | 19.76 | -12.40 | 59.80 | 94.93 | 35.13 |
| 0.717 | 56.20 | H | 0.70 | -32.73 | 19.73 | -12.30 | 43.90 | 60.49 | 16.59 |
| 1.004 | 52.40 | H | 0.82 | -32.72 | 19.70 | -12.20 | 40.20 | 77.57 | 27.37 |
| Note: Factor=Cable loss+ Amp gain+ Antenna factor | | | | | | | | | |

**Remark**：According to FCC PART 15.209 (d), the emission limits for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz, Radiated emission limits in these three bands are based on measurements employing an average detector.

**Test Results (30~1000MHz)**

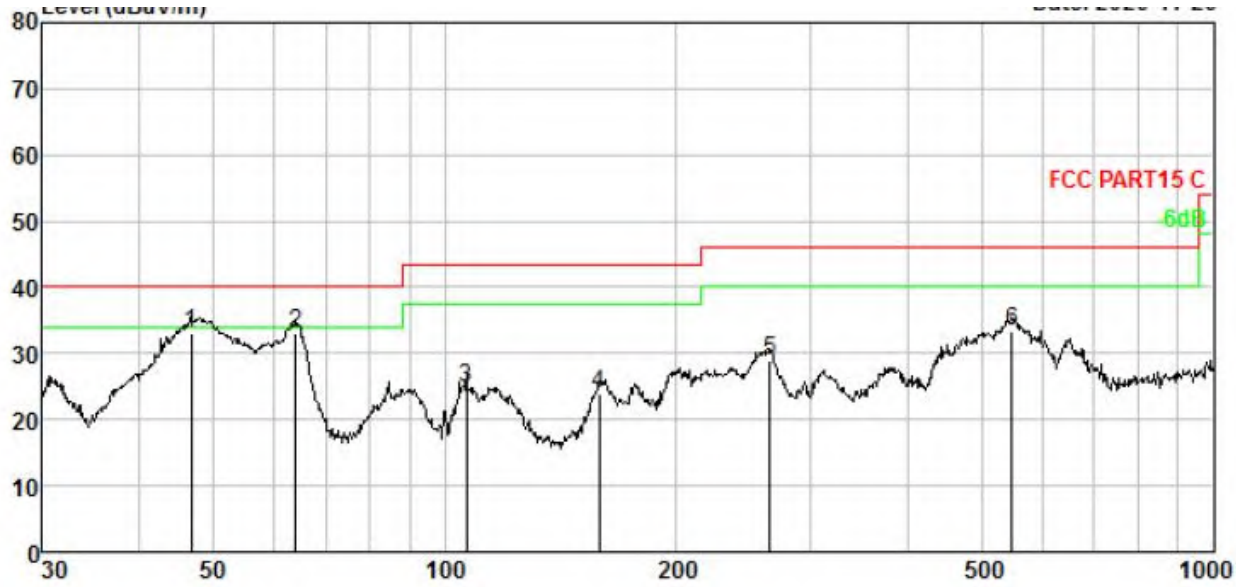
| | |
|---|---|
| Test Mode: | Mode 1 |
| Power Source: | AC 120V, 60Hz for adapter |
| Polarization: | Vertical |
| Temp.(℃)/Hum.(%RH): | 24.3℃/54%RH |
| Distance: | 3m |




| No. | Freq MHz | Cable Loss dB | ANT Factor dB/m | Receiver Reading dBuV | Preamp Factor dB | Emission Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1. | 64.659 | 2.52 | 11.05 | 40.49 | 29.95 | 24.11 | 40.00 | -15.89 | QP |
| 2. | 106.013 | 3.37 | 10.34 | 38.66 | 29.99 | 22.38 | 43.50 | -21.12 | QP |
| 3. | 160.346 | 4.08 | 14.07 | 40.15 | 30.02 | 28.28 | 43.50 | -15.22 | QP |
| 4. | 216.024 | 4.59 | 11.52 | 47.40 | 30.09 | 33.42 | 46.00 | -12.58 | QP |
| 5. | 318.817 | 5.27 | 13.67 | 50.29 | 30.40 | 38.83 | 46.00 | -7.17 | QP |
| 6. | 545.183 | 6.19 | 18.37 | 42.04 | 30.95 | 35.65 | 46.00 | -10.35 | QP |

**Test Results (30~1000MHz)**

| | |
|---|---|
| Test Mode: | Mode 1 |
| Power Source: | AC 120V, 60Hz for adapter |
| Polarization: | Horizontal |
| Temp.(℃)/Hum.(%RH): | 24.3℃/54%RH |
| Distance: | 3m |




| No. | Freq MHz | Cable Loss dB | ANT Factor dB/m | Receiver Reading dBuV | Preamp Factor dB | Emission Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1. | 46.830 | 1.97 | 12.22 | 48.71 | 29.92 | 32.98 | 40.00 | -7.02 | QP |
| 2. | 63.983 | 2.50 | 11.14 | 49.37 | 29.94 | 33.07 | 40.00 | -6.93 | QP |
| 3. | 106.759 | 3.38 | 10.42 | 41.05 | 29.99 | 24.86 | 43.50 | -18.64 | QP |
| 4. | 158.668 | 4.07 | 14.05 | 35.88 | 30.02 | 23.98 | 43.50 | -19.52 | QP |
| 5. | 264.746 | 4.94 | 12.72 | 41.42 | 30.23 | 28.85 | 46.00 | -17.15 | QP |
| 6. | 547.098 | 6.19 | 18.42 | 39.65 | 30.95 | 33.31 | 46.00 | -12.69 | QP |

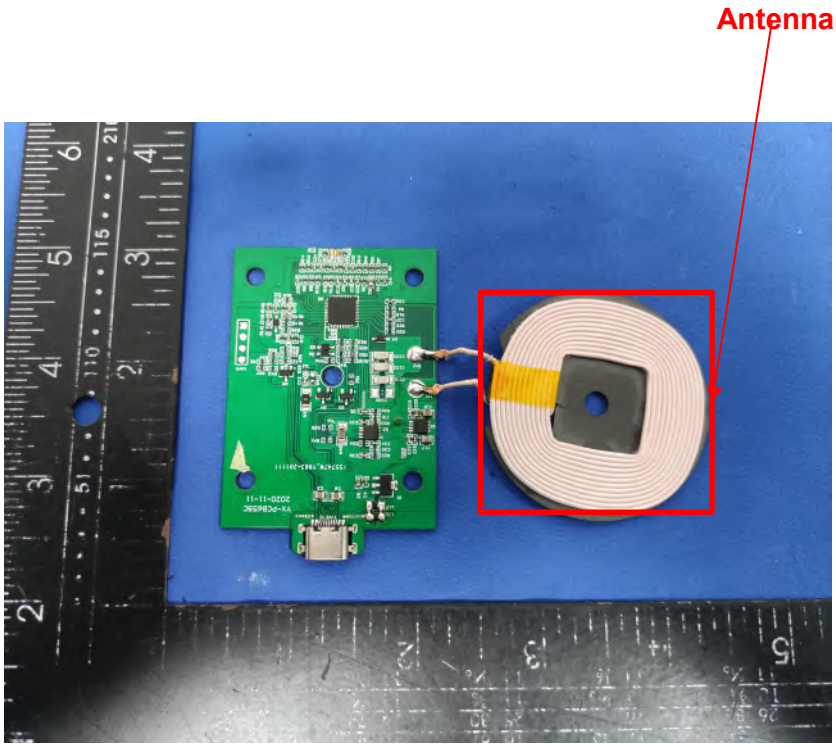
# 7 Antenna Requirement

## 7.1 Test Standard and Requirement

| | |
|---|---|
| Test Standard | FCC Part15 Section 15.203 |
| Requirement | 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, 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. |

## 7.2 Antenna Connected Construction

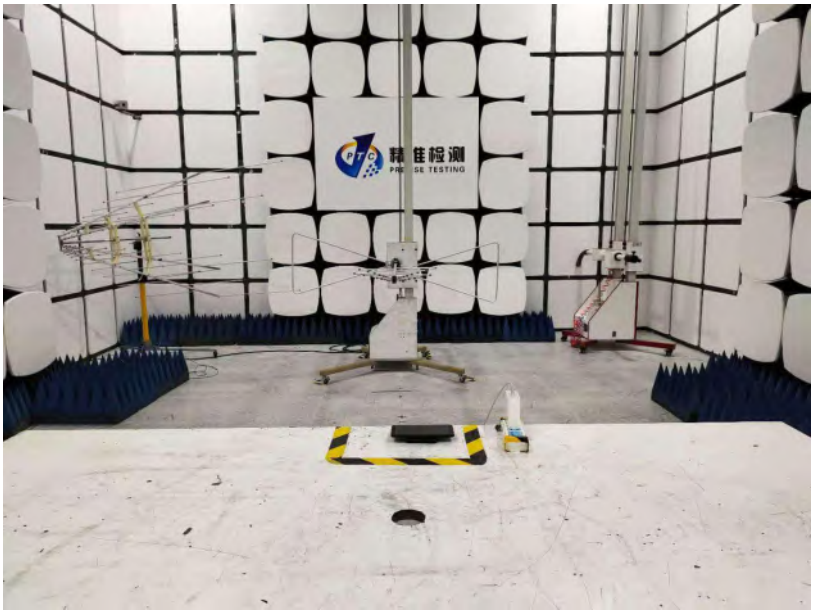
The antenna is a Inductive loop coil Antenna which permanently attached, and the best case gain of the antenna is 0 dBi. It complies with the standard requirement.



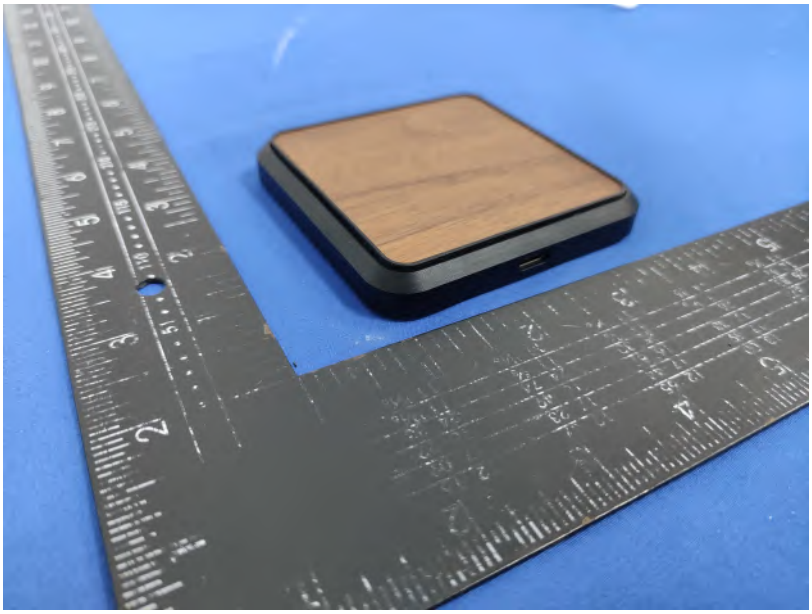
# APPENDIX I -- TEST SETUP PHOTOGRAPH

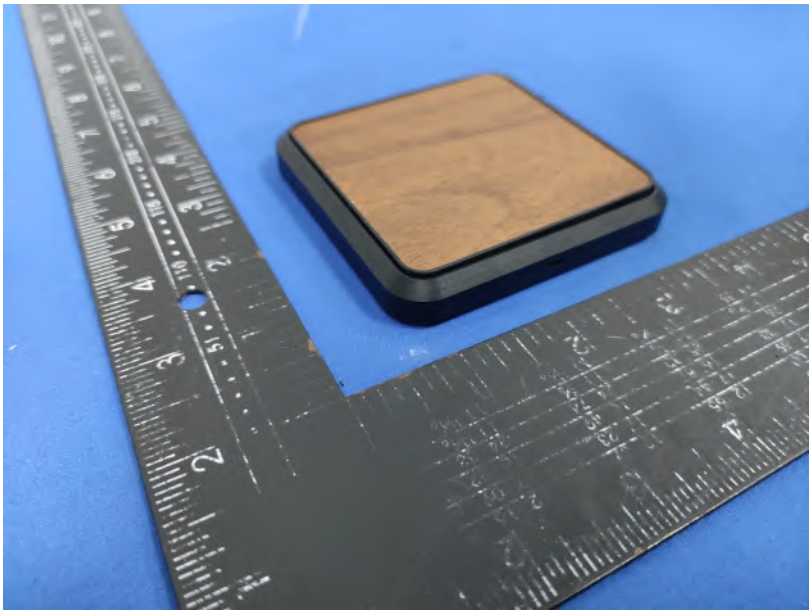
Photo of Conducted Emission Measurement

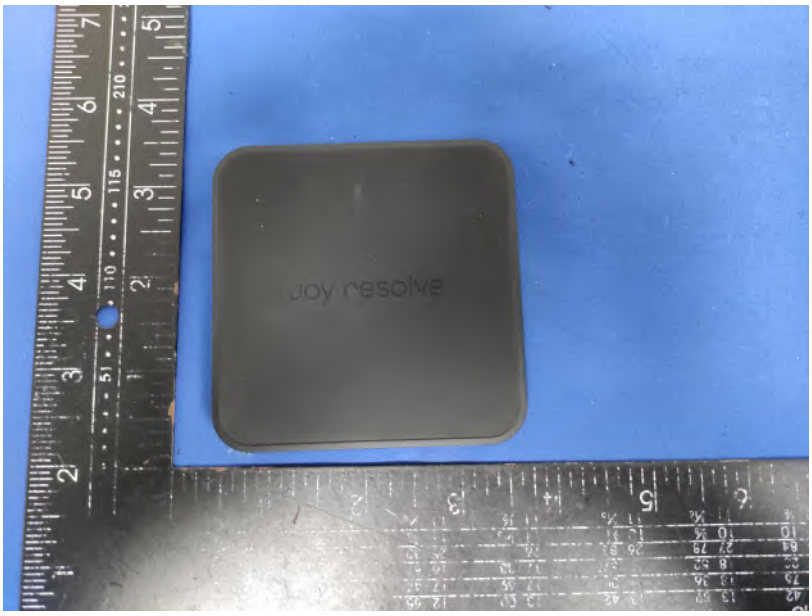
Photo of Radiation Emission Test

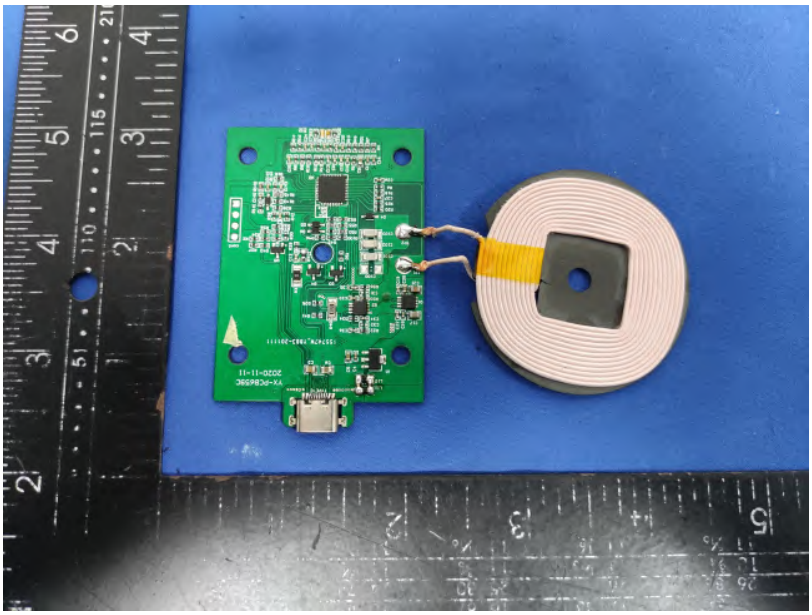


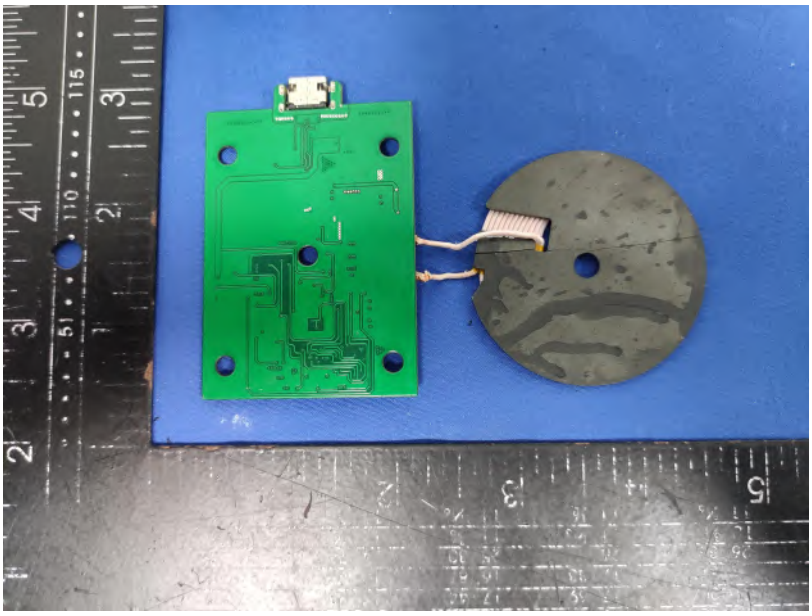
# APPENDIX II -- EXTERNAL PHOTOGRAPH






joy resolve





********THE END REPORT********