# FCC RADIO TEST REPORT

## FCC ID: 2AQLV-QP6000

**Product：** LED lamp with wireless charging station

**Trade Name：** QIPOWER

**Model Name：** QP-QI6000

**Serial Model：** iH-Qi6000, iH-Qi6000w, QP6000

**Report No.：** UNIA2018071218-1FR-01

### Prepared for

Qi Power Electronic Technology Co., Ltd

8F, Jinlian Business Center, No.2 JinXiu Road, Changan, Dongguan China

### Prepared by

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# TEST RESULT CERTIFICATION

**Applicant's name** ..... : Qi Power Electronic Technology Co., Ltd

Address ..... : 8F, Jinlian Business Center, No.2 JinXiu Road, Changan, Dongguan China

**Manufacture's Name** ..... : Qi Power Electronic Technology Co., Ltd

Address ..... : 8F, Jinlian Business Center, No.2 JinXiu Road, Changan, Dongguan China

**Product description**

Product name ..... : LED lamp with wireless charging station

Trade Mark ..... : QIPOWER

Model and/or type reference . : QP-QI6000, iH-Qi6000, iH-Qi6000w, QP6000

**Standards** ..... : FCC Rules and Regulations Part 15 Subpart C Section 15.209
ANSI C63.10: 2013

This device described above has been tested by Shenzhen United Testing Technology Co., Ltd., 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.

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**Date of Test** ..... :

Date (s) of performance of tests ..... : Jul. 12, 2018 ~ Sep. 01, 2018

Date of Issue ..... : Sep. 01, 2018

Test Result ..... : Pass

Prepared by: Kahn.Yang

Kahn yang/Editor

Reviewer: Sherwin Qian

Sherwin Qian/Supervisor

Approved & Authorized Signer: liuze

Liuze/Manager

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# 1 TEST SUMMARY

## 1.1 TEST PROCEDURES AND RESULTS

| DESCRIPTION OF TEST | RESULT |
|---|---|
| CONDUCTED EMISSION TEST | COMPLIANT |
| RADIA TED EMISSION TEST | COMPLIANT |
| OCCUPIED BANDWIDTH | COMPLIANT |
| ANTENNA REQUIREMENT | COMPLIANT |

## 1.2 TEST FACILITY

Test Firm : Shenzhen United Testing Technology Co., Ltd.

Address : 2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang Community, Xixiang Str, Bao'an District, Shenzhen, China

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAS-LAB Code: L6494

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of testing Laboratories.

Designation Number: CN1227

Test Firm Registration Number: 674885

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files.

## 1.3 MEASUREMENT UNCERTAINTY

Measurement Uncertainty

| | | |
|---|---|---|
| Conducted Emission Expanded Uncertainty | = | 2.23dB, k=2 |
| Radiated emission expanded uncertainty(9kHz-30MHz) | = | 3.08dB, k=2 |
| Radiated emission expanded uncertainty(30MHz-1000MHz) | = | 4.42dB, k=2 |
| Radiated emission expanded uncertainty(Above 1GHz) | = | 4.06dB, k=2 |

# 2 GENERAL INFORMATION

## 2.1 GENERAL DESCRIPTION OF EUT

| | |
|---|---|
| Equipment | LED lamp with wireless charging station |
| Trade Mark | QIPOWER |
| Model Name | QP-QI6000 |
| Serial No. | iH-Qi6000, iH-Qi6000w, QP6000 |
| Model Difference | All model's the function, software and electric circuit are the same, only with a product color and model named different. Test sample model: QP-QI6000. |
| FCC ID | 2AQLV-QP6000 |
| Antenna Type | Coil Antenna |
| Antenna Gain | 0dBi |
| Operation frequency | 125KHz |
| Number of Channels | 1CH |
| Modulation Type | ASK |
| Battery | N/A |
| Power Source | DC 12V from adapter with AC 120(240)V/60Hz |
| Adapter Model | M/N: SAW65-120-3700U<br>Input: 100-240V~50/60Hz 1.5A Max<br>Output: DC 12V, 3700mA |

## 2.2 Carrier Frequency of Channels

| Operation Frequency each of channel | |
|---|---|
| Channel | Frequency |
| 01 | 125KHz |

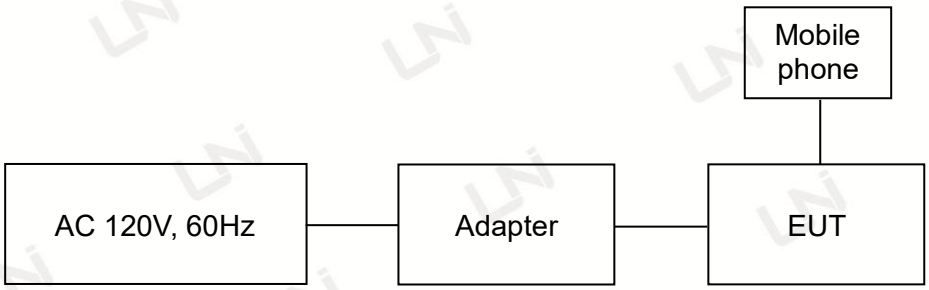
## 2.3 Operation of EUT during testing

Operating Mode
The mode is used:

| | | |
|---|---|---|
| AC 120V | Mode 1 | Charging mode (less than 1% battery status of client device) |
| | Mode 2 | less than 50% battery status of client device |
| | Mode 3 | 100% battery status of client device |
| AC 240V | Mode 4 | Charging mode (less than 1% battery status of client device) |
| | Mode 5 | less than 50% battery status of client device |
| | Mode 6 | 100% battery status of client device |

## 2.4 DESCRIPTION OF TEST SETUP

Operation of EUT during testing:




Setup: Transmission mode

Table for auxiliary equipment

| Equipment Description | Manufacturer | Model | Calibration Due Date |
|---|---|---|---|
| Mobile phone | Haixin | M30T | N/A |

## 2.5 MEASUREMENT INSTRUMENTS LIST

| Item | Equipment | Manufacturer | Model No. | Serial No. | Calibrated until |
|---|---|---|---|---|---|
| CONDUCTED EMISSIONS TEST | | | | | |
| 1 | AMN | Schwarzbeck | NNLK8121 | 8121370 | 2018.9.9 |
| 2 | AMN | ETS | 3810/2 | 00020199 | 2018.9.9 |
| 3 | EMI TEST RECEIVER | Rohde&Schwarz | ESCI | 101210 | 2018.9.9 |
| 4 | AAN | TESEQ | T8-Cat6 | 38888 | 2018.9.9 |
| RADIATED EMISSION TEST | | | | | |
| 1 | Horn Antenna | Sunol | DRH-118 | A101415 | 2018.9.29 |
| 2 | BicoNILog Antenna | Sunol | JB1 Antenna | A090215 | 2018.9.29 |
| 3 | PREAMP | HP | 8449B | 3008A00160 | 2018.9.9 |
| 4 | PREAMP | HP | 8447D | 2944A07999 | 2018.9.9 |
| 5 | EMI TEST RECEIVER | Rohde&Schwarz | ESR3 | 101891 | 2018.9.9 |
| 6 | VECTOR Signal Generator | Rohde&Schwarz | SMU200A | 101521 | 2018.9.28 |
| 7 | Signal Generator | Agilent | E4421B | MY4335105 | 2018.9.28 |
| 8 | MXA Signal Analyzer | Agilent | N9020A | MY50510140 | 2018.9.28 |
| 9 | MXA Signal Analyzer | Agilent | N9020A | MY51110104 | 2018.9.9 |
| 10 | ANT Tower&Turn table Controller | Champro | EM 1000 | 60764 | 2018.9.28 |
| 11 | Anechoic Chamber | Taihe Maorui | 9m*6m*6m | 966A0001 | 2018.9.9 |
| 12 | Shielding Room | Taihe Maorui | 6.4m*4m*3m | 643A0001 | 2018.9.9 |
| 13 | RF Power sensor | DARE | RPR3006W | 15I00041SNO88 | 2019.3.14 |
| 14 | RF Power sensor | DARE | RPR3006W | 15I00041SNO89 | 2019.3.14 |
| 15 | RF power divider | Anritsu | K241B | 992289 | 2018.9.28 |
| 16 | Wideband radio communication tester | Rohde&Schwarz | CMW500 | 154987 | 2018.9.28 |
| 17 | Biconical antenna | Schwarzbeck | VHA 9103 | 91032360 | 2018.9.8 |
| 18 | Biconical antenna | Schwarzbeck | VHA 9103 | 91032361 | 2018.9.8 |
| 19 | Broadband Hybrid Antennas | Schwarzbeck | VULB9163 | VULB9163#958 | 2018.9.8 |
| 20 | Horn Antenna | Schwarzbeck | BBHA9120D | 9120D-1680 | 2019.1.12 |
| 21 | Active Receive Loop Antenna | Schwarzbeck | FMZB 1919B | 00023 | 2018.11.02 |
| 22 | Horn Antenna | Schwarzbeck | BBHA 9170 | BBHA9170651 | 2019.03.14 |
| 23 | Microwave Broadband Preamplifier | Schwarzbeck | BBV 9721 | 100472 | 2018.10.24 |
| 24 | Active Loop Antenna | Com-Power | AL-130R | 10160009 | 2019.05.10 |
| 25 | Power Meter | KEYSIGHT | N1911A | MY50520168 | 2019.05.10 |

# 3 CONDUCTED EMISSION TEST

## 3.1 Conducted Power Line Emission Limit

For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following

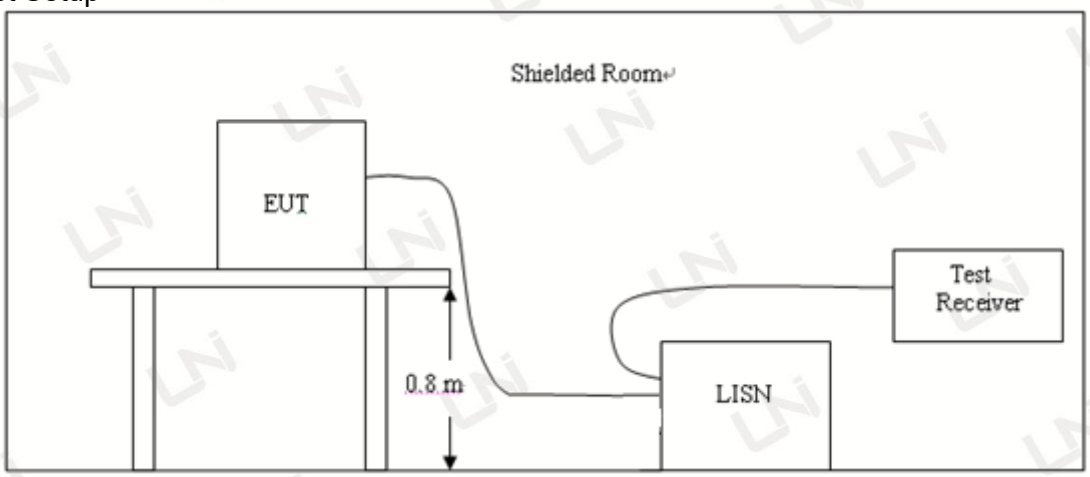
| Frequency (MHz) | Maximum RF Line Voltage(dBμV) | | | |
|---|---|---|---|---|
| | CLASS A | | CLASS B | |
| | Q.P. | Ave. | Q.P. | Ave. |
| 0.15~0.50 | 79 | 66 | 66~56* | 56~46* |
| 0.50~5.00 | 73 | 60 | 56 | 46 |
| 5.00~30.0 | 73 | 60 | 60 | 50 |

*

Decreasing linearly with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

## 3.2 Test Setup




## 3.3 Test Procedure

1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. A wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
2, Support equipment, if needed, was placed as per ANSI C63.10.
3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4, If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5, All support equipments received AC power from a second LISN, if any.
6, The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7, Analyzer/Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

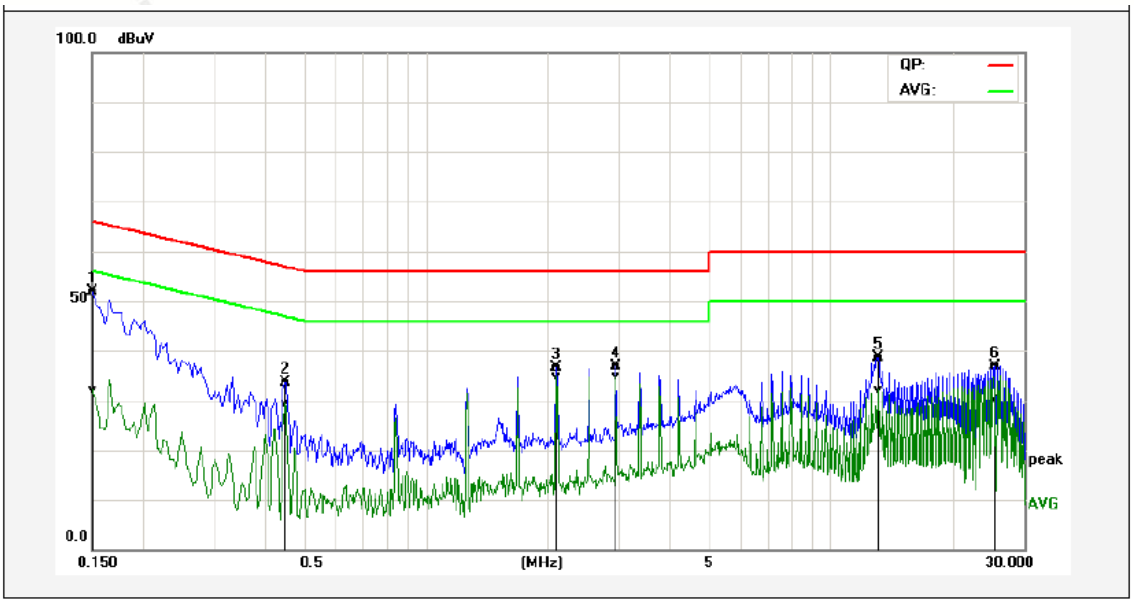
## 3.4 Test Result

PSSS

Remark:

1. All modes were tested, only the worst result of mode1 was reported.

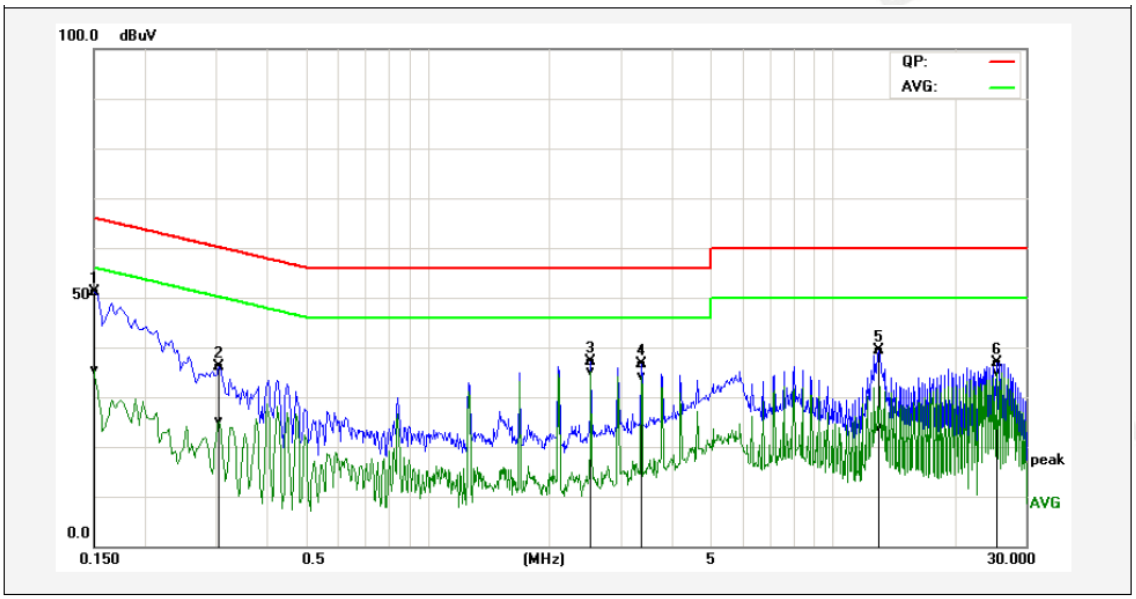
| | | | |
|---|---|---|---|
| Temperature: | 25℃ | Relative Humidity: | 47% |
| Test Date: | Aug. 22, 2018 | Pressure: | 1030hPa |
| Test Voltage: | AC 120V, 60Hz | Phase: | Line |
| Test Mode: | Mode1 | | |




| No. | Frequency (MHz) | QuasiPeak reading (dBuV) | Average reading (dBuV) | Correction factor (dB) | QuasiPeak result (dBuV) | Average result (dBuV) | QuasiPeak limit (dBuV) | Average limit (dBuV) | QuasiPeak margin (dB) | Average margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1P | 0.1500 | 43.83 | 24.09 | 8.04 | 51.87 | 32.13 | 65.99 | 56.00 | -14.12 | -23.87 | Pass |
| 2P | 0.4500 | 23.74 | 19.53 | 9.92 | 33.66 | 29.45 | 56.87 | 46.88 | -23.21 | -17.43 | Pass |
| 3* | 2.1099 | 26.56 | 24.80 | 10.08 | 36.64 | 34.88 | 56.00 | 46.00 | -19.36 | -11.12 | Pass |
| 4P | 2.9539 | 26.72 | 24.77 | 10.08 | 36.80 | 34.85 | 56.00 | 46.00 | -19.20 | -11.15 | Pass |
| 5P | 13.0820 | 28.53 | 22.04 | 10.20 | 38.73 | 32.24 | 60.00 | 50.00 | -21.27 | -17.76 | Pass |
| 6P | 25.3220 | 26.21 | 19.83 | 10.62 | 36.83 | 30.45 | 60.00 | 50.00 | -23.17 | -19.55 | Pass |

Remark: Factor = Insertion Loss + Cable Loss, Result=Reading + Factor, Margin=Result – Limit.

| | | | |
|---|---|---|---|
| Temperature: | 25℃ | Relative Humidity: | 47% |
| Test Date: | Jun. 28, 2018 | Pressure: | 1030hPa |
| Test Voltage: | AC 120V, 60Hz | Phase: | Neutral |
| Test Mode: | Mode1 | | |



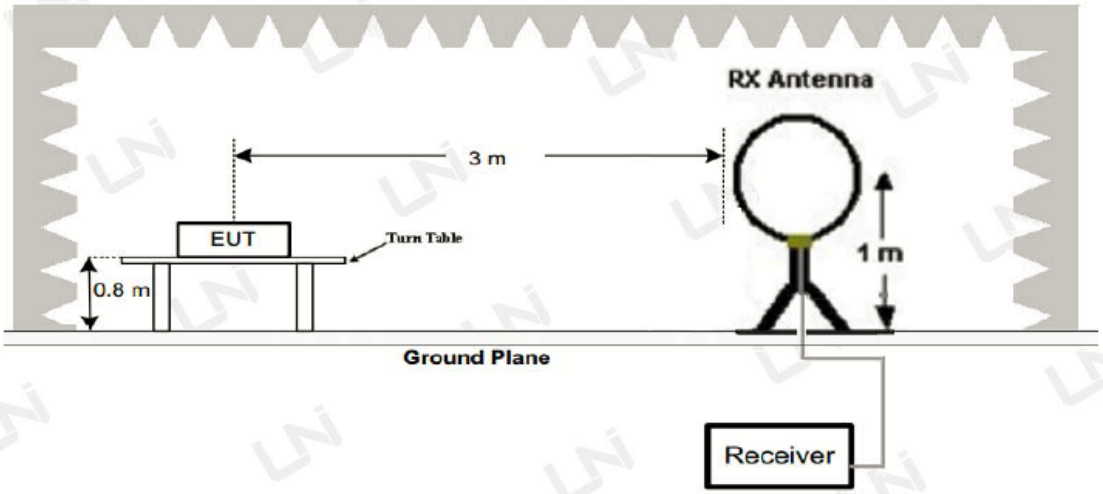

| No. | Frequency (MHz) | QuasiPeak reading (dBuV) | Average reading (dBuV) | Correction factor (dB) | QuasiPeak result (dBuV) | Average result (dBuV) | QuasiPeak limit (dBuV) | Average limit (dBuV) | QuasiPeak margin (dB) | Average margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1P | 0.1500 | 43.18 | 27.26 | 8.04 | 51.22 | 35.30 | 65.99 | 56.00 | -14.77 | -20.70 | Pass |
| 2P | 0.3060 | 26.29 | 15.14 | 9.94 | 36.23 | 25.08 | 60.08 | 50.08 | -23.85 | -25.00 | Pass |
| 3* | 2.5340 | 27.00 | 25.02 | 10.08 | 37.08 | 35.10 | 56.00 | 46.00 | -18.92 | -10.90 | Pass |
| 4P | 3.3780 | 26.52 | 24.03 | 10.06 | 36.58 | 34.09 | 56.00 | 46.00 | -19.42 | -11.91 | Pass |
| 5P | 13.0140 | 29.09 | 13.69 | 10.20 | 39.29 | 23.89 | 60.00 | 50.00 | -20.71 | -26.11 | Pass |
| 6P | 25.3260 | 26.32 | 24.14 | 10.62 | 36.94 | 34.76 | 60.00 | 50.00 | -23.06 | -15.24 | Pass |

Remark: Factor = Insertion Loss + Cable Loss, Result=Reading + Factor, Margin=Result – Limit.

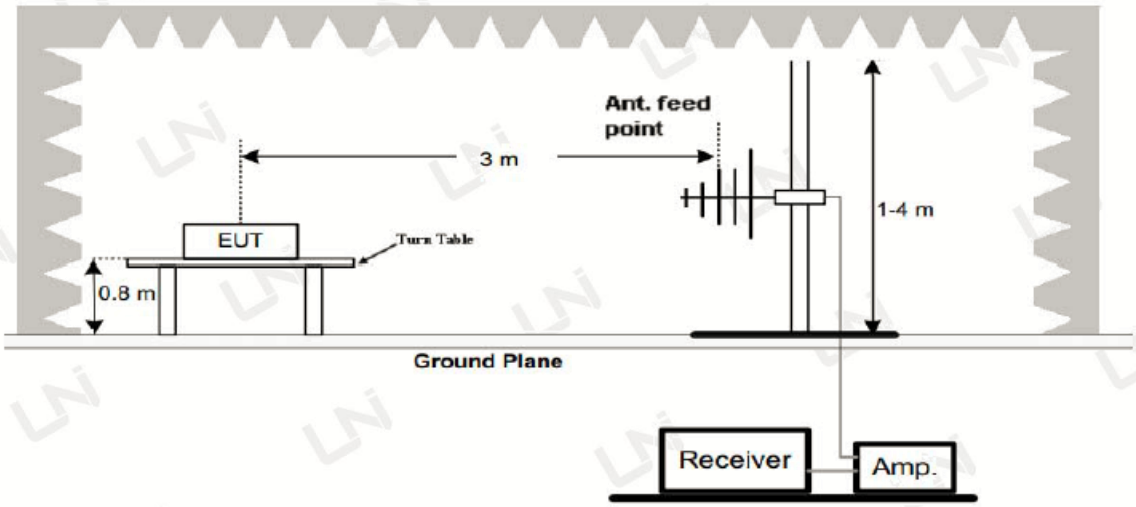
# 4 RADIATED EMISSION TEST

## 4.1 Test Setup

1. Radiated Emission Test-Up Frequency Below 30MHz




2. Radiated Emission Test-Up Frequency 30MHz~1GHz



## 4.2 Rules and specifications

CFR 47 Part 15, section 15.205

Only spurious emissions are permitted in any of the frequency bands listed the tables in these sections.

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090-0.110 | 16.42-16.423 | 399.9-410 | 4.5-5.15 |
| \1\ 0.495-0.505 | 16.69475-16.69525 | 608-614 | 5.35-5.46 |
| 2.1735-2.1905 | 16.80425-16.80475 | 960-1240 | 7.25-7.75 |
| 4.125-4.128 | 25.5-25.67 | 1300-1427 | 8.025-8.5 |
| 4.17725-4.17775 | 37.5-38.25 | 1435-1626.5 | 9.0-9.2 |
| 4.20725-4.20775 | 73-74.6 | 1645.5-1646.5 | 9.3-9.5 |
| 6.215-6.218 | 74.8-75.2 | 1660-1710 | 10.6-12.7 |
| 6.26775-6.26825 | 108-121.94 | 1718.8-1722.2 | 13.25-13.4 |
| 6.31175-6.31225 | 123-138 | 2200-2300 | 14.47-14.5 |
| 8.291-8.294 | 149.9-150.05 | 2310-2390 | 15.35-16.2 |
| 8.362-8.366 | 156.52475-156.52525 | 2483.5-2500 | 17.7-21.4 |
| 8.37625-8.38675 | 156.7-156.9 | 2690-2900 | 22.01-23.12 |
| 8.41425-8.41475 | 162.0125-167.17 | 3260-3267 | 23.6-24.0 |
| 12.29-12.293. | 167.72-173.2 | 3332-3339 | 31.2-31.8 |
| 12.51975-12.52025 | 240-285 | 3345.8-3358 | 36.43-36.5 |
| 12.57675-12.57725 | 322-335.4 | 3600-4400 | (\2\) |
| 13.36-13.41 | | | |

CFR 47 Part 15, section 15.209

The emissions from an intentional radiator shall not exceed the limits in the tables in these sections using an average detector

| 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 |

Limit calculation and transfer to 3m distance as showed in the following table:

| Frequency (MHz) | Limit (dBuV/m) | Distance (m) |
|---|---|---|
| 0.009-0.490 | 20log(2400/F(KHz))+40log(300/3) | 3 |
| 0.490-1.705 | 20log(24000/F(KHz))+40log(30/3) | 3 |
| 1.705-30.0 | 69.5 | 3 |
| 30-88 | 40.0 | 3 |
| 88-216 | 43.5 | 3 |
| 216-960 | 46.0 | 3 |
| Above 960 | 54.0 | 3 |

CFR 47 Part 15, section 15.35

When average radiated emission measurements are specified, the limit on the peak level of the radio Frequency emission is 20dB above the maximum permitted average emission limit.

| Transmitter Spurious Emissions 9KHz-30MHz | | | |
|---|---|---|---|
| | 9-150KHz | 150-490KHz | 490KHz-30MHz |
| Resolution Bandwidth | 200Hz | 9KHz | 9KHz |
| Video Bandwidth | 2KHz | 100KHz | 100KHz |
| Detector | Peak | Peak | Peak |
| Trace Mode | Max Hold | Max Hold | Max Hold |
| Sweep Time | Auto | Auto | Auto |

## 4.3 Test Procedure

Measurement distance is 3m.
For the measurement range up to 30MHz in the following plots the field strength result from 3m Distance measurement are extrapolated to 300m and 30m distance respectively, by 40dB/decade, According to part 15.31(f)(2), per antenna factor scaling.
Measurements below 1000MHz are performed with a peak detector and compared to average limits, Measurements with an average detector are not required.
Note:
For battery operated equipment, the equipment tests shall be performed using a new battery.

## 4.4 Test Result

PASS

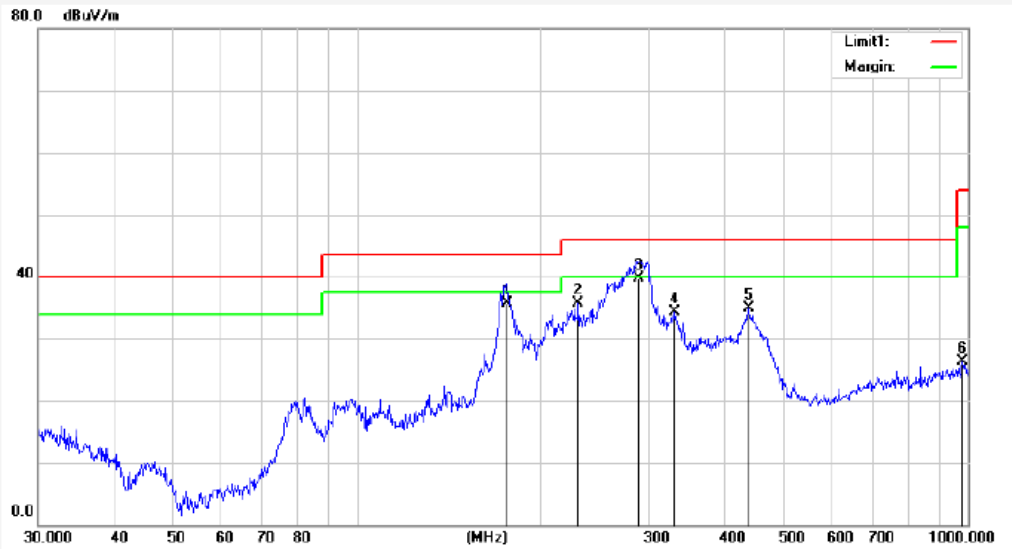
1. All modes were tested, only the worst result of mode1 was reported.

For 9KHz-30MHz Test Results:

| Freq. (MHz) | Detector Mode (PK/QP) | Reading (dBuV) | Factor (dB) | Actual FS (dBuV/m) | Limits 3m (dBuV/m) | Margin (dBuV/m) |
|---|---|---|---|---|---|---|
| 0.125 | Peak | 55.75 | 15.20 | 70.95 | 105.67 | -34.72 |
| 0.130 | Peak | 49.33 | 15.28 | 64.61 | 105.33 | -40.72 |
| 0.163 | Peak | 43.81 | 15.28 | 59.09 | 103.17 | -44.08 |
| 0.394 | Peak | 46.48 | 14.75 | 61.23 | 95.69 | -34.46 |
| 0.412 | Peak | 49.69 | 14.75 | 64.44 | 95.31 | -30.87 |

For 30MHz-1GHz Test Results:

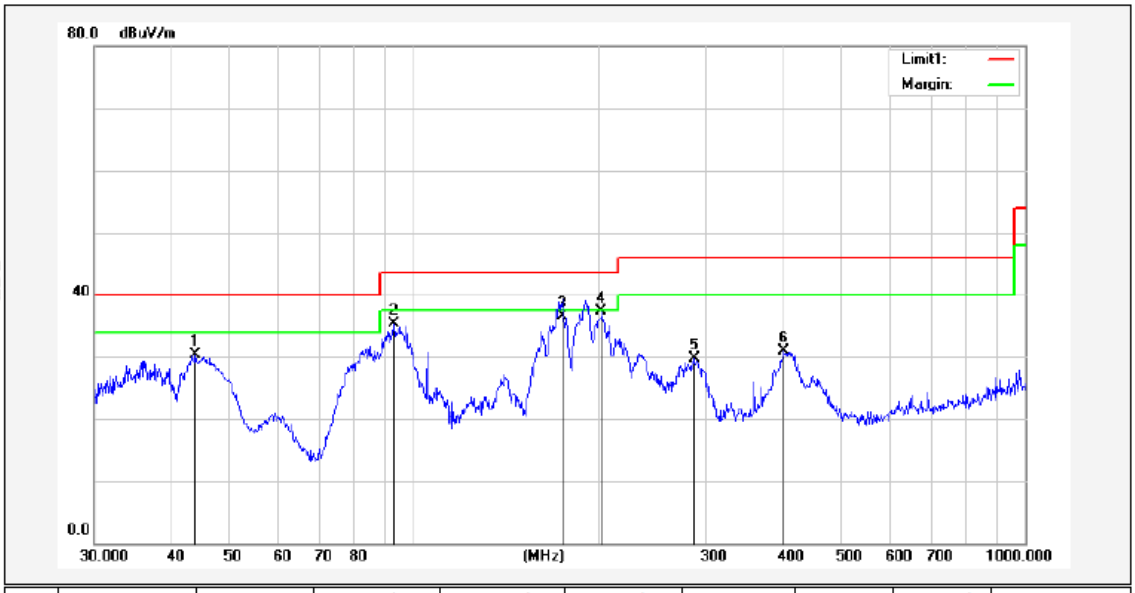
| | | | |
|---|---|---|---|
| Temperature: | 25℃ | Relative Humidity: | 50% |
| Test Date: | Aug. 28, 2018 | Pressure: | 1030hPa |
| Test Voltage: | AC 120V, 60Hz | Polarization: | Horizontal |
| Test Mode: | Mode1 | | |




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Degree (deg.) | Height (cm) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 175.0600 | 48.62 | -12.82 | 35.80 | 43.50 | -7.70 | | | QP |
| 2 | 230.0985 | 49.70 | -14.07 | 35.63 | 46.00 | -10.37 | | | peak |
| 3* | 289.0100 | 52.06 | -12.36 | 39.70 | 46.00 | -6.30 | | | QP |
| 4 | 330.1950 | 46.32 | -11.94 | 34.38 | 46.00 | -11.62 | | | peak |
| 5 | 437.1200 | 44.68 | -9.77 | 34.91 | 46.00 | -11.09 | | | peak |
| 6 | 979.1804 | 26.97 | -0.66 | 26.31 | 54.00 | -27.69 | | | peak |

Remark: Absolute Level= Reading Level+ Factor, Margin= Absolute Level – Limit
Factor=Ant. Factor + Cable Loss – Pre-amplifier

| | | | |
|---|---|---|---|
| Temperature: | 25℃ | Relative Humidity: | 50% |
| Test Date: | Aug. 28, 2018 | Pressure: | 1030hPa |
| Test Voltage: | AC 120V, 60Hz | Polarization: | Vertical |
| Test Mode: | Mode1 | | |



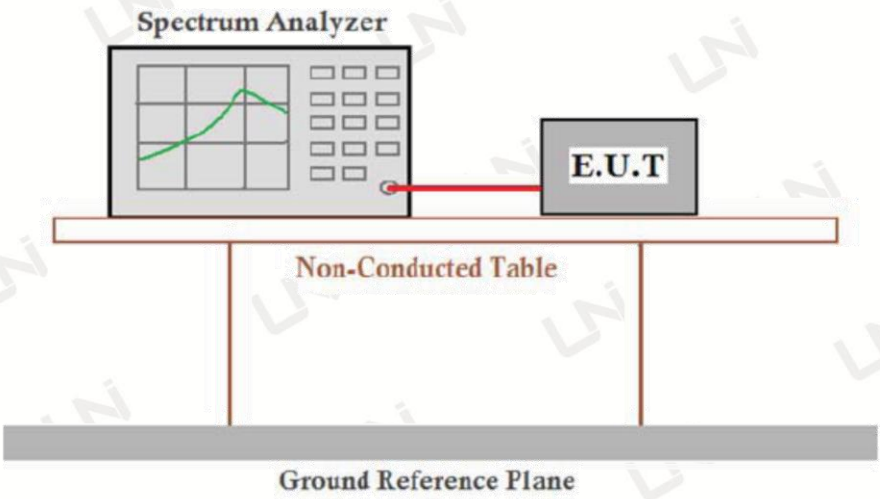

| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Degree (deg.) | Height (cm) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 43.9658 | 50.97 | -20.59 | 30.38 | 40.00 | -9.62 | | | peak |
| 2 | 92.7871 | 53.36 | -17.99 | 35.37 | 43.50 | -8.13 | | | peak |
| 3 | 175.0300 | 49.32 | -12.82 | 36.50 | 43.50 | -7.00 | | | QP |
| 4* | 202.8104 | 50.09 | -12.76 | 37.33 | 43.50 | -6.17 | | | peak |
| 5 | 286.9823 | 42.11 | -12.37 | 29.74 | 46.00 | -16.26 | | | peak |
| 6 | 403.2500 | 41.56 | -10.63 | 30.93 | 46.00 | -15.07 | | | peak |

Remark: Absolute Level= Reading Level+ Factor, Margin= Absolute Level – Limit
Factor=Ant. Factor + Cable Loss – Pre-amplifier

Remark：
(1) Measuring frequencies from 9 KHz to the 1 GHz, Radiated emission test from 9KHz to 30MHz was verified, and no any emission was found except system noise floor.
(2) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
(3) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

# 5 Occupied Bandwidth

## 5.1 Block Diagram of Test Setup




## 5.2 Rules and specifications

CFR 47 Part 15.215(c)

ANSI C63.10: 2013

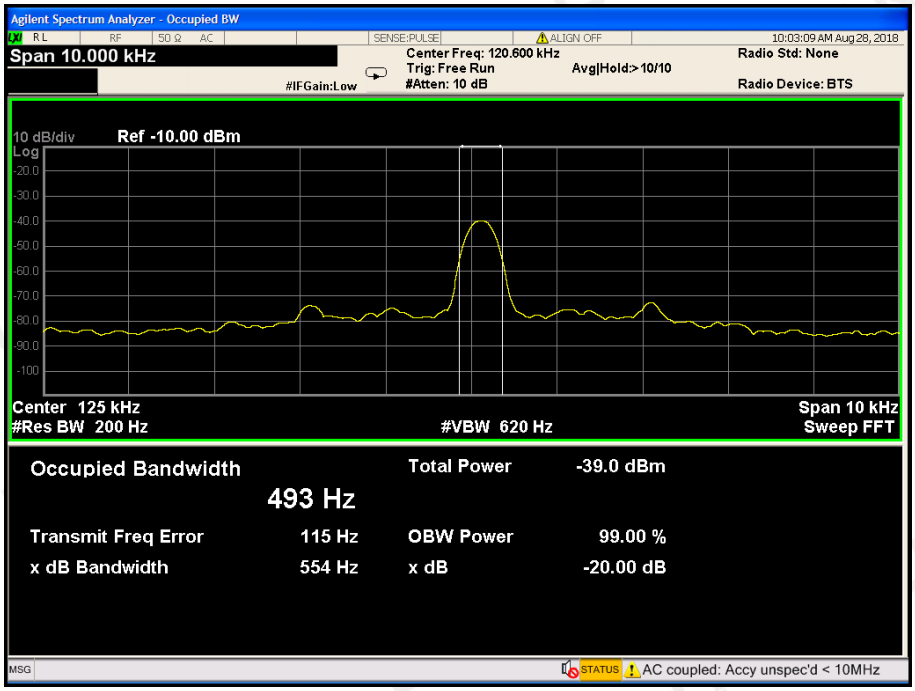
## 5.3 Test Procedure

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 20dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equip compliance with the 20dB attenuation specification may base on measurement at the intentional radiator's antenna output terminal unless the intentional radiator uses a permanently attached antenna, in which case compliance shall be deomonstrated by measuring the radiated emissions.

## 5.4 Test Result

PASS

| Mode | Frequency (kHz) | 20dB Bandwidth (kHz) | Limit (kHz) | Conclusion |
|---|---|---|---|---|
| TX | 125 | 0.554 | / | PASS |

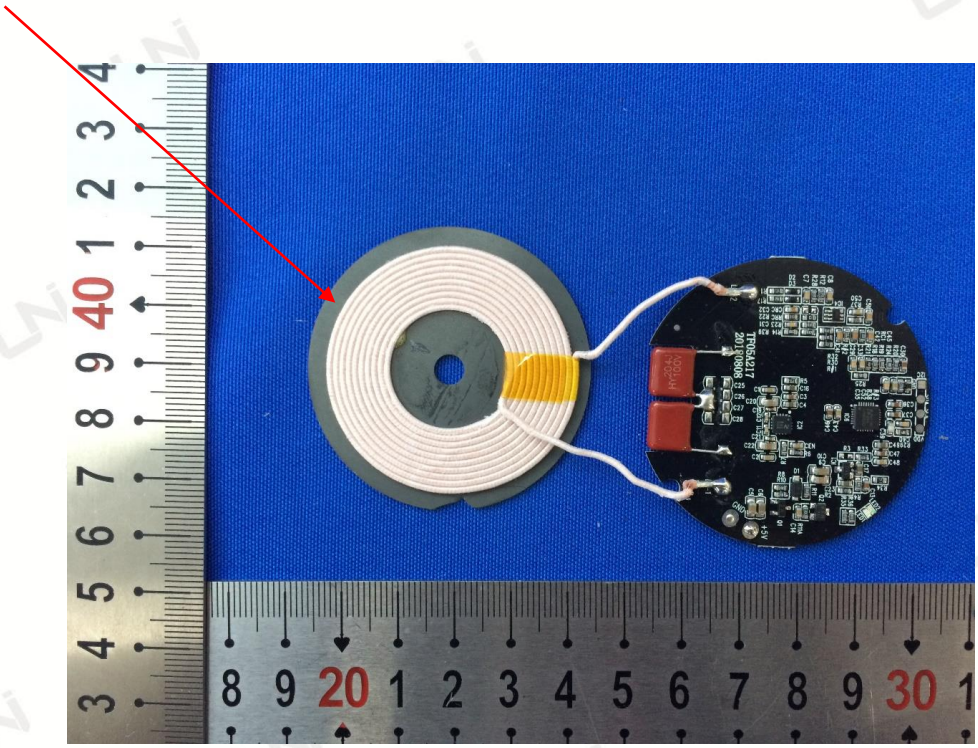


# 6 ANTENNA REQUIREMENT

Standard Applicable:
For intentional device, according to FCC 47 CFR Section 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.

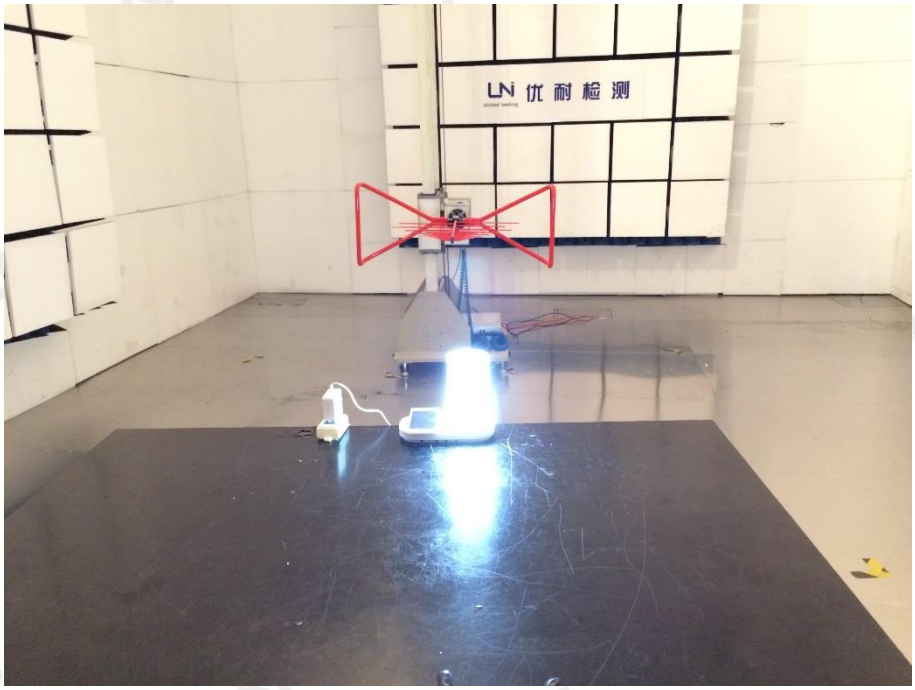
Antenna Connected Construction
The antenna used in this product is a Coil Antenna, the directional gains of antenna used for transmitting is 0dBi.

ANTENNA



# 7 PHOTOGRAPH OF TEST

## 7.1 Radiated Emission



7.2 Conducted Emission

***End of Report***