# TEST REPORT

| | | |
|---|---|---|
| **APPLICANT** | : | ShenZhen Mossloo Industrial Co., Ltd |
| **PRODUCT NAME** | : | Wireless Power Bank |
| **MODEL NAME** | : | MSL-W195Q |
| **BRAND NAME** | : | N/A |
| **FCC ID** | : | 2AN8F-MSLW195Q |
| **STANDARD(S)** | : | 47 CFR Part 15 Subpart C |
| **TEST DATE** | : | 2018-11-05 to 2018-11-06 |
| **ISSUE DATE** | : | 2018-11-08 |

Tested by: Wang Dalong

Wang Dalong(Test Engineer)

Approved by: Andy Yeh

Andy Yeh(Technical Director)

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| Change History | | |
|---|---|---|
| **Issue** | **Date** | **Reason for change** |
| 1.0 | 2018-11-08 | First edition |
| | | |

# 1. Technical Information

**Note:** Provide by applicant.

## 1.1. Applicant and Manufacturer Information

| | |
|---|---|
| **Applicant:** | ShenZhen Mossloo Industrial Co., Ltd |
| **Applicant Address:** | Road One No.4, Science Industrial Park,Shangxue Village, Bantian Street, Longgang District, Shenzhen, China |
| **Manufacturer:** | ShenZhen Mossloo Industrial Co., Ltd |
| **Manufacturer Address:** | Road One No.4, Science Industrial Park,Shangxue Village, Bantian Street, Longgang District, Shenzhen, China |

## 1.2. Equipment Under Test (EUT) Description

| | | |
|---|---|---|
| **EUT Type:** | Wireless Power Bank | |
| **Serial No:** | (N/A, marked #1 by test site) | |
| **Hardware Version:** | N/A | |
| **Software Version:** | N/A | |
| **Frequency Range:** | 115kHz ~ 205kHz | |
| **Input:** | DC5V/2A | |
| **Output:** | DC5V/1A | |
| **Ancillary Equipment:** | **Battery** | |
| | Brand Name: | N/A |
| | Model No.: | 606090 |
| | Serial No.: | (N/A, marked #1 by test site) |
| | Capacity: | 10000mAh |
| | Rated Voltage: | 3.7V |
| | Charge Limit: | 4.25V |
| | **USB Cable** | |
| | 80cm black USB Cable supply by Shenzhen XZB Electronics Co., Ltd. | |

**Note:**

1. The EUT is a Wireless Power Bank which supports 115 kHz ~ 205 kHz.

2. For a more detailed description, please refer to specification or user's manual supplied by the applicant and/or manufacturer.

## 1.3. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C (110 kHz-148kHz Band) for the EUT FCC ID Certification:

| No | Identity | Document Title |
|---|---|---|
| 1 | 47 CFR Part 15 | Radio Frequency Devices |

Test detailed items/section required by FCC rules and results are as below:

| No. | Section | Description | Test Date | Test Engineer | Result |
|---|---|---|---|---|---|
| 1 | 15.203 | Antenna Requirement | N/A | N/A | PASS |
| 2 | 15.207 | Conducted Emission | 2018.11.05 | Wang Dalong | PASS |
| 3 | 15.209 | Radiated Emission | 2018.11.05 | Wang Dalong | PASS |
| 4 | 15.215(c) | 20dB Bandwidth | 2018.11.06 | Wang Dalong | PASS |

**Note 1:** The tests were performed according to the method of measurements prescribed in ANSIC63.10-2013.

## 1.4. Environmental Conditions

During the measurement, the environmental conditions were within the listed ranges:

| | |
|---|---|
| Temperature (°C): | 15 - 35 |
| Relative Humidity (%): | 30 -60 |
| Atmospheric Pressure (kPa): | 86-106 |

# 2. 47 CFR Part 15C Requirements

## 2.1. Conducted Emission

### 2.1.1. Requirement

According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN).

| Frequency range (MHz) | Conducted Limit (dBμV) | |
|---|---|---|
| | Quai-peak | Average |
| 0.15 - 0.50 | 66 to 56 | 56 to 46 |
| 0.50 - 5 | 56 | 46 |
| 5 - 30 | 60 | 50 |

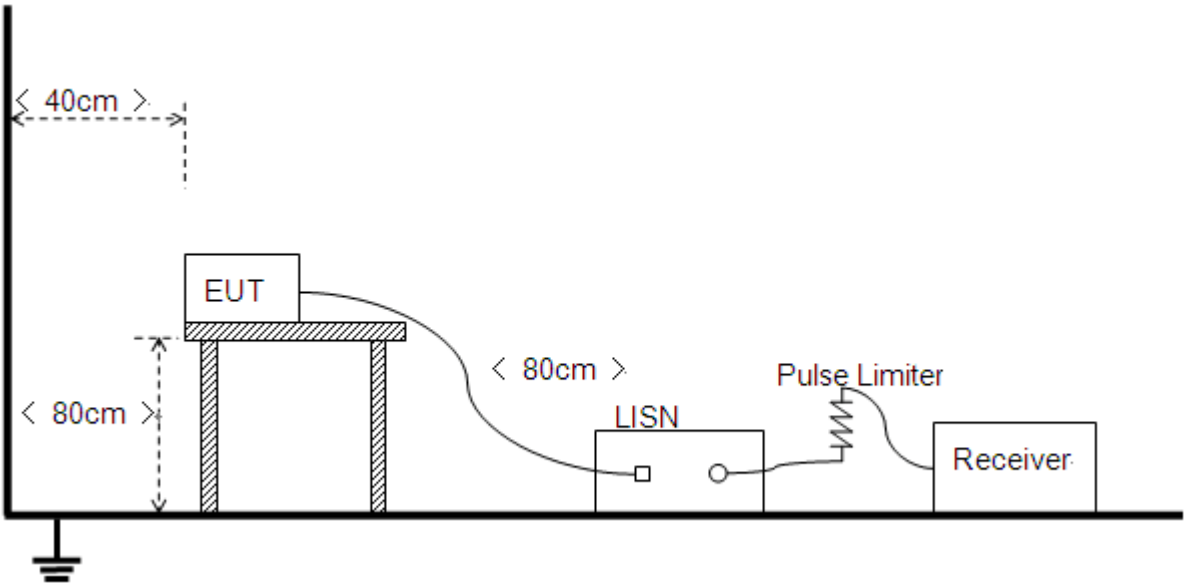
NOTE:

(a) The lower limit shall apply at the band edges.

(b) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

### 2.1.2. Test Description

**A. Test Setup:**




The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.10: 2013.

**B. Equipments List:**

Please reference ANNEX A(1.5).

### 2.1.3. Test Result

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

**A. Test setup:**

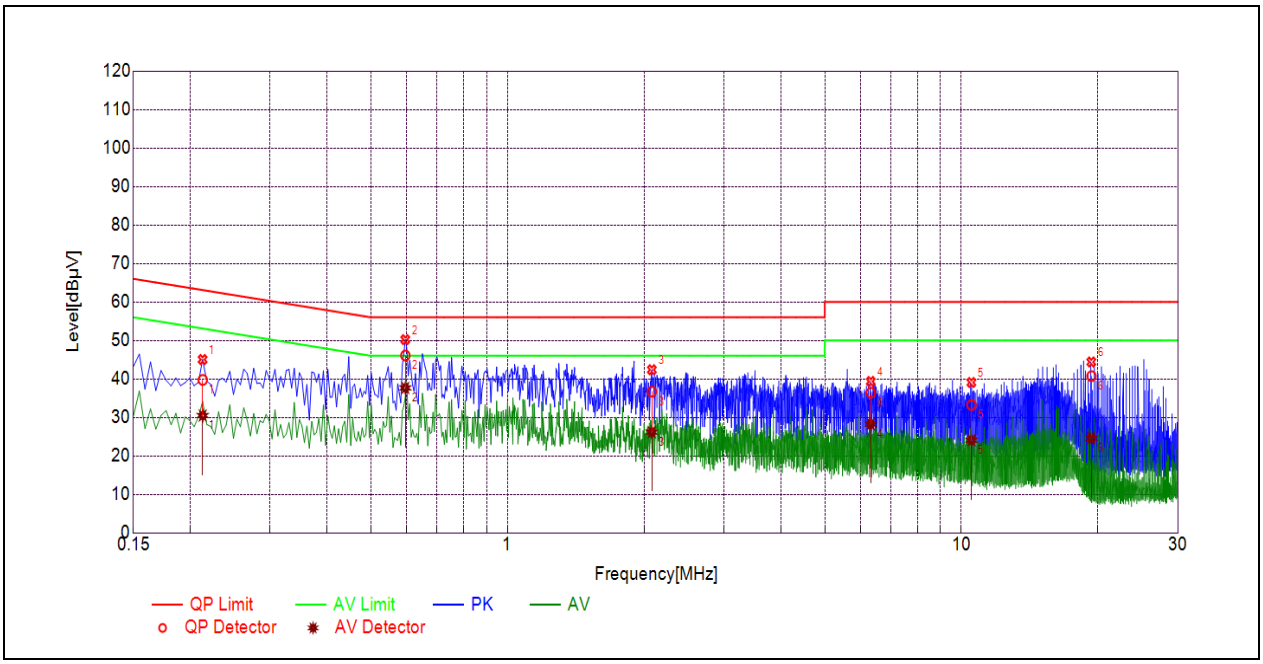
Mode 1: EUT + Adapter + Load

Mode 2: EUT + Adapter

**Note 1:** The above test modes have been tested, only the worst case (Mode1) was reported in this report.

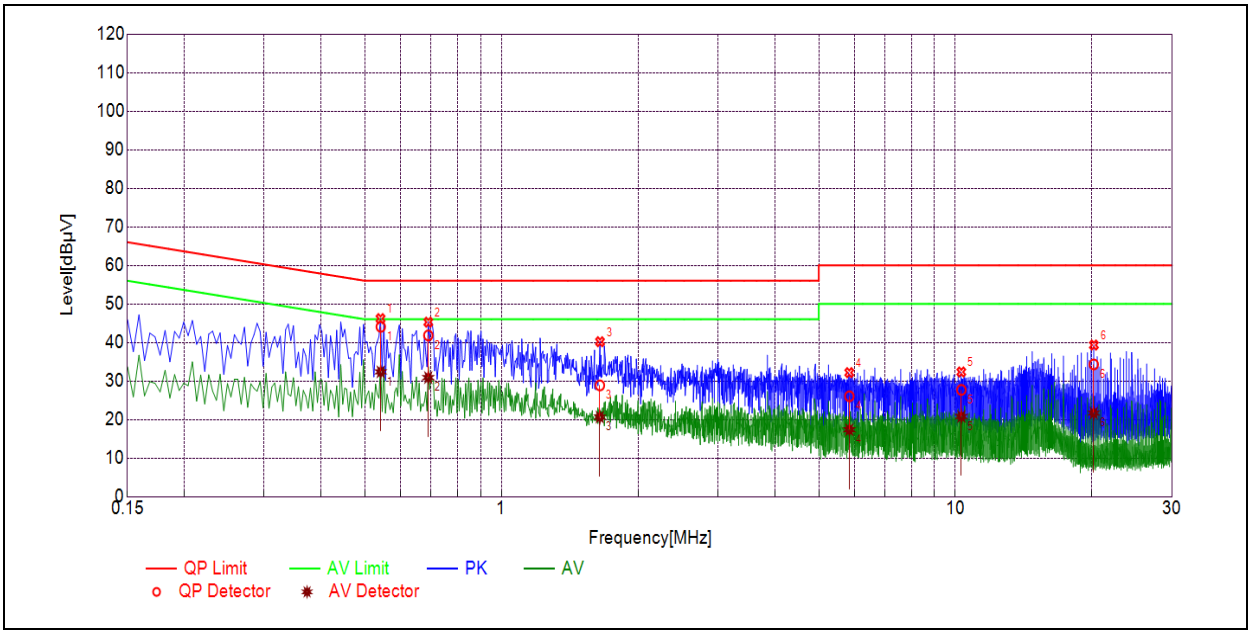
**Note 2:** The test voltage is AC 120V/60Hz.

**B. Test Plots:**




(Plot A: L Phase)

| NO. | Fre. (MHz) | Emission Level (dBµV) | | Limit (dBµV) | | Power-line | Verdict |
|---|---|---|---|---|---|---|---|
| | | Quai-peak | Average | Quai-peak | Average | | |
| 1 | 0.2131 | 39.75 | 30.47 | 63.08 | 53.08 | Line | PASS |
| 2 | 0.5957 | 46.09 | 37.65 | 56.00 | 46.00 | | PASS |
| 3 | 2.0792 | 36.70 | 26.16 | 56.00 | 46.00 | | PASS |
| 4 | 6.3163 | 36.41 | 28.25 | 60.00 | 50.00 | | PASS |
| 5 | 10.5260 | 33.22 | 24.06 | 60.00 | 50.00 | | PASS |
| 6 | 19.3432 | 40.72 | 24.60 | 60.00 | 50.00 | | PASS |




(Plot B: N Phase)

| NO. | Fre. (MHz) | Emission Level (dBµV) | | Limit (dBµV) | | Power-line | Verdict |
|---|---|---|---|---|---|---|---|
| | | Quai-peak | Average | Quai-peak | Average | | |
| 1 | 0.5420 | 44.06 | 32.37 | 56.00 | 46.00 | Neutral | PASS |
| 2 | 0.6898 | 41.82 | 30.88 | 56.00 | 46.00 | | PASS |
| 3 | 1.6470 | 28.87 | 20.64 | 56.00 | 46.00 | | PASS |
| 4 | 5.8394 | 26.04 | 17.36 | 60.00 | 50.00 | | PASS |
| 5 | 10.3067 | 27.70 | 20.78 | 60.00 | 50.00 | | PASS |
| 6 | 20.1747 | 34.30 | 21.67 | 60.00 | 50.00 | | PASS |

## 2.2. Radiated Emission

### 2.2.1. Requirement

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 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 (μV/m) | Measurement Distance (m) |
|---|---|---|
| 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 |

Note:

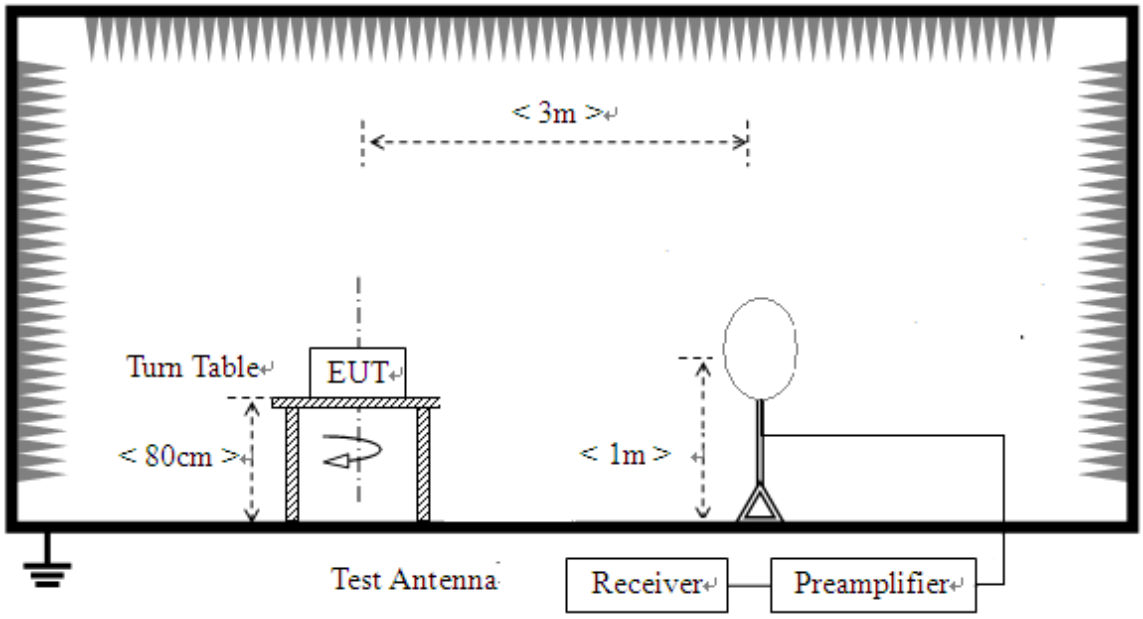
1. For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
2. For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK)

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table)

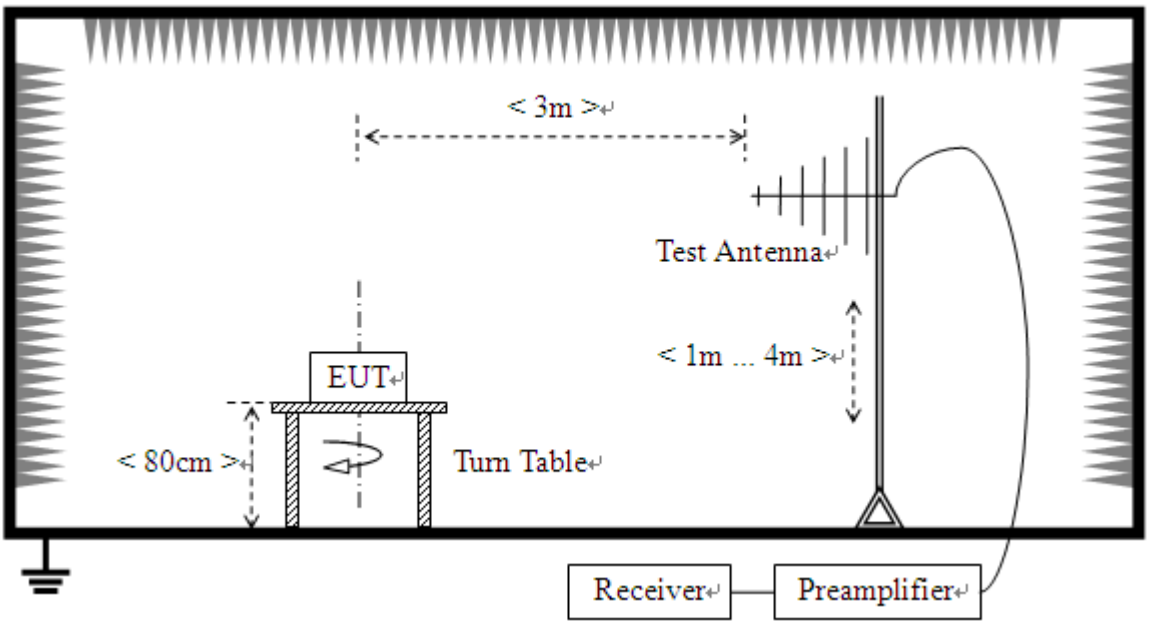
### 2.2.2. Test Description

**A. Test Setup:**

1) For radiated emissions from 9kHz to 30MHz




2) For radiated emissions from 30MHz to1GHz



The RF absorbing material used on the reference ground plane and on the turntable have a maximum height (thickness) of 30 cm (12 in) and have a minimum-rated attenuation of 20 dB at all frequencies from 1 GHz to 18 GHz. Test site have a minimum area of the ground plane covered with RF absorbing material as specified in Figure 6 of ANSI C63.4: 2014.

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.10:2013. For radiated emissions below or equal to 1GHz, The EUT was set-up on insulator 80cm above the Ground Plane, For radiated emissions above 1GHz, The EUT was set-up on insulator 150cm above the Ground Plane. The set-up and test methods were according to ANSI C63.10:2013.

The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading. All radiated emission tests were performed in three antenna orientations (parallel, perpendicular, and ground-parallel) only the worst orientation (parallel) was recorded in this test report.

For the Test Antenna:

(a) In the frequency range of 9kHz to 30MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
(b) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) is used. Place the test antenna at 3m away from area of the EUT, while keeping the test antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The test antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final test antenna elevation shall be that which maximizes the emissions. The test antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. The emission levels at both horizontal and vertical polarizations should be tested.

**B. Equipments List:**

Please reference ANNEX A(1.5).

### 2.2.3. Test Result

According to ANSI C63.10, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak limit, it is unnecessary to perform an quasi-peak measurement.

The measurement results are obtained as below:

$E$ [dBμV/m] $= U_R + A_T + A_{Factor}$ [dB]; $A_T = L_{Cable\ loss}$ [dB]$-G_{preamp}$ [dB]

$A_T$: Total correction Factor except Antenna

$U_R$: Receiver Reading

$G_{preamp}$: Preamplifier Gain

$A_{Factor}$: Antenna Factor at 3m

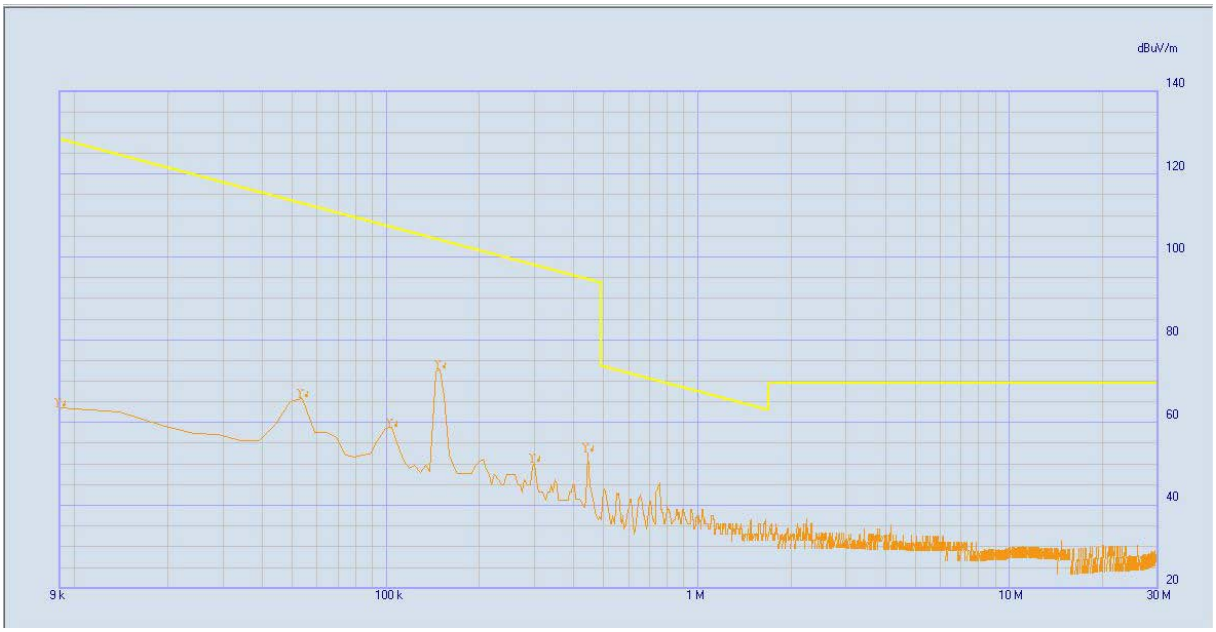
During the test, the total correction Factor $A_T$ and $A_{Factor}$ were built in test software.

**Note:**

All radiated emission tests were performed in full charging mode and 10% charging mode, only the worst mode（10% charging mode） was recorded in this test report. And all of the three antenna orientations(parallel, perpendicular and ground-parallel)were tested, the worst case (perpendicular) was reported

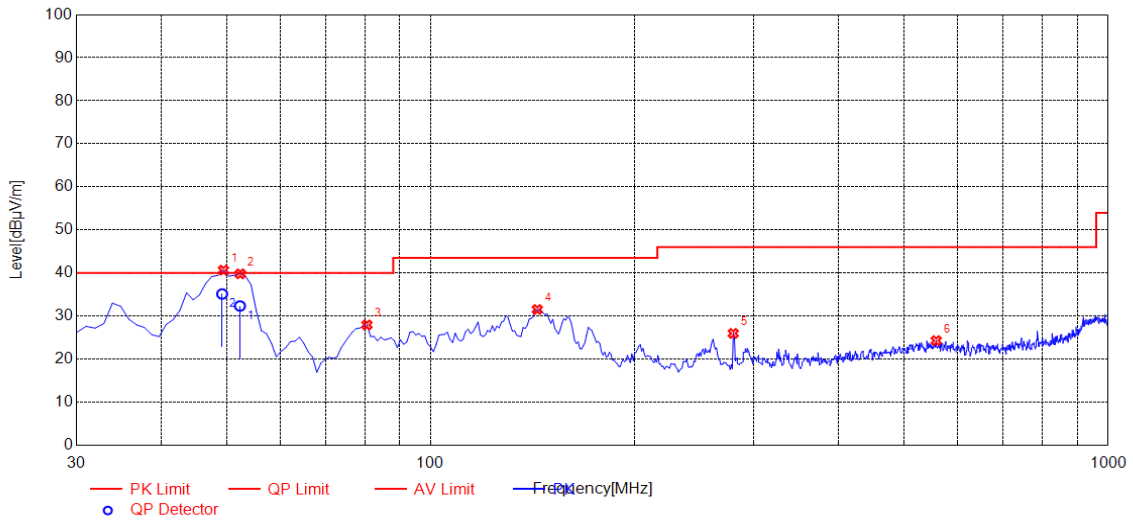
## A. Test Plots for the Whole Measurement Frequency Range:

**Wireless Power Transmitting**



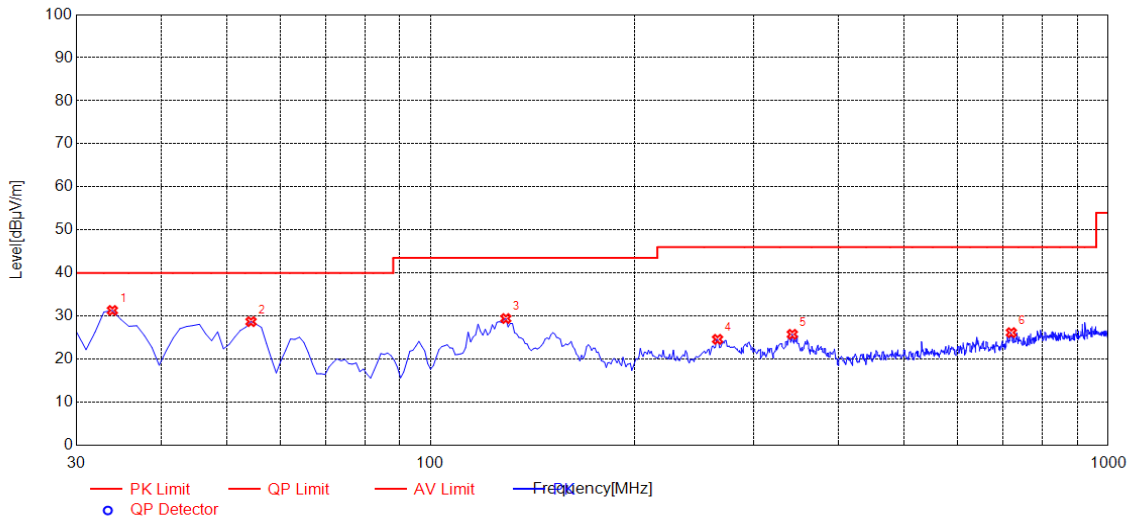

| Fre. (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Verdict |
|---|---|---|---|
| 0.009 | 63.59 | 128.52 | PASS |
| 0.054 | 65.89 | 112.96 | PASS |
| 0.104 | 58.72 | 107.26 | PASS |
| 0.149 | 72.62 | 104.14 | PASS |
| 0.299 | 50.13 | 98.09 | PASS |
| 0.444 | 52.57 | 94.66 | PASS |

(9kHz to 30MHz)




| Fre. (MHz) | Pk (dBµV/m) | QP (dBµV/m) | AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-QP (dBµV/m) | Limit-AV (dBµV/m) | Antenna | Verdict |
|---|---|---|---|---|---|---|---|---|
| 49.1980 | 40.67 | 35.14 | N/A | N/A | 40.00 | N/A | Vertical | PASS |
| 52.2603 | 39.82 | 32.36 | N/A | N/A | 40.00 | N/A | Vertical | PASS |
| 80.4905 | 27.96 | N/A | N/A | N/A | 40.00 | N/A | Vertical | PASS |
| 143.6036 | 31.54 | N/A | N/A | N/A | 43.50 | N/A | Vertical | PASS |
| 279.5395 | 25.99 | N/A | N/A | N/A | 46.00 | N/A | Vertical | PASS |
| 557.2372 | 24.31 | N/A | N/A | N/A | 46.00 | N/A | Vertical | PASS |

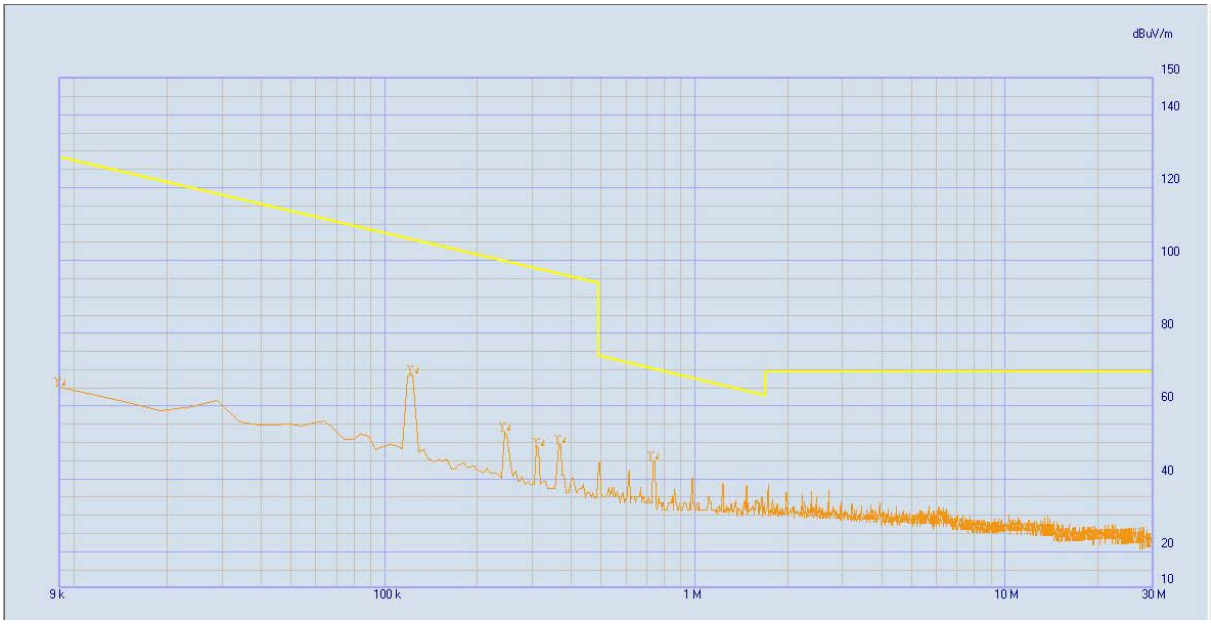
(Antenna Vertical, 30MHz to 1GHz)




| Fre. (MHz) | Pk (dBµV/m) | QP (dBµV/m) | AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-QP (dBµV/m) | Limit-AV (dBµV/m) | Antenna | Verdict |
|---|---|---|---|---|---|---|---|---|
| 33.8839 | 31.32 | N/A | N/A | N/A | 40.00 | N/A | Horizontal | PASS |
| 54.2743 | 28.72 | N/A | N/A | N/A | 40.00 | N/A | Horizontal | PASS |
| 129.0390 | 29.44 | N/A | N/A | N/A | 43.50 | N/A | Horizontal | PASS |
| 264.9750 | 24.61 | N/A | N/A | N/A | 46.00 | N/A | Horizontal | PASS |
| 341.6817 | 25.78 | N/A | N/A | N/A | 46.00 | N/A | Horizontal | PASS |
| 719.3894 | 26.17 | N/A | N/A | N/A | 46.00 | N/A | Horizontal | PASS |

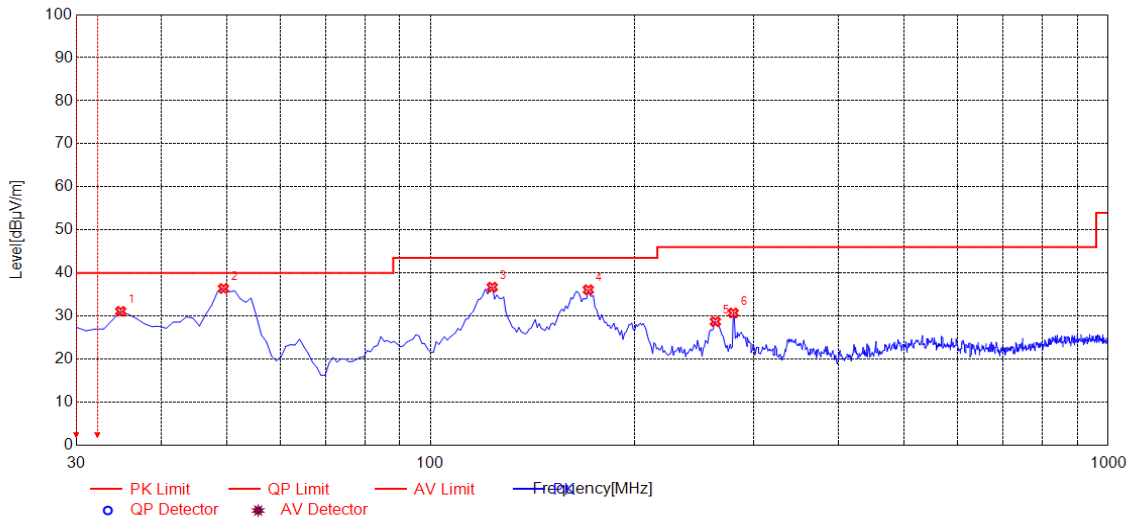
(Antenna Horizontal, 30MHz to 1GHz)

**Wireless Power Receiving**



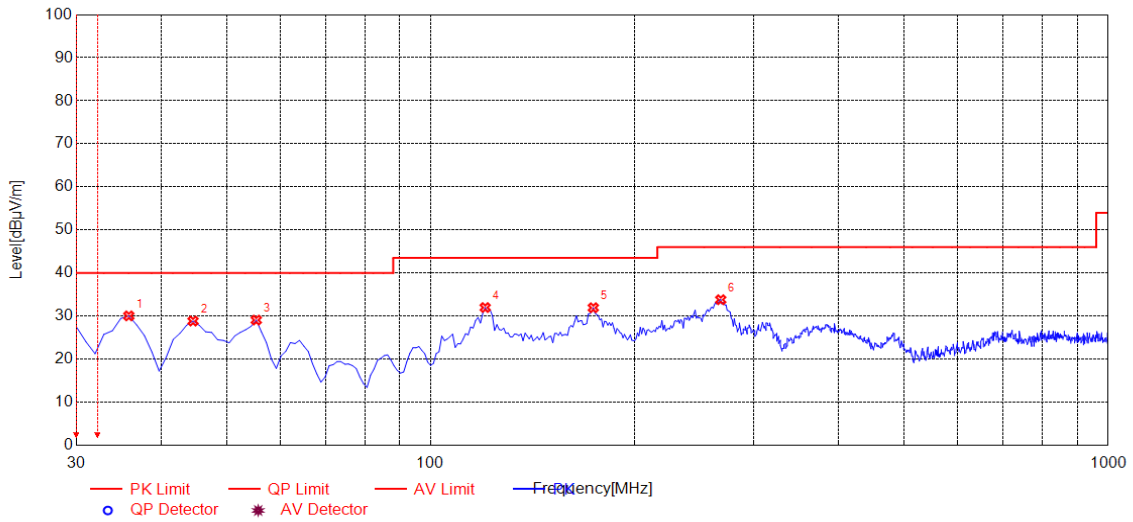

| Fre. (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Verdict |
|---|---|---|---|
| 0.009 | 65.30 | 128.52 | PASS |
| 0.124 | 68.67 | 105.74 | PASS |
| 0.244 | 52.93 | 99.86 | PASS |
| 0.314 | 48.55 | 97.67 | PASS |
| 0.369 | 49.42 | 96.26 | PASS |
| 0.739 | 45.03 | 70.23 | PASS |

(9kHz to 30MHz)




| Fre. (MHz) | Pk (dBµV/m) | QP (dBµV/m) | AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-QP (dBµV/m) | Limit-AV (dBµV/m) | Antenna | Verdict |
|---|---|---|---|---|---|---|---|---|
| 34.8549 | 31.10 | N/A | N/A | N/A | 40.00 | N/A | Vertical | PASS |
| 49.4194 | 36.41 | N/A | N/A | N/A | 40.00 | N/A | Vertical | PASS |
| 123.2132 | 36.72 | N/A | N/A | N/A | 43.50 | N/A | Vertical | PASS |
| 170.7908 | 36.12 | N/A | N/A | N/A | 43.50 | N/A | Vertical | PASS |
| 263.0330 | 28.71 | N/A | N/A | N/A | 46.00 | N/A | Vertical | PASS |
| 279.5395 | 30.73 | N/A | N/A | N/A | 46.00 | N/A | Vertical | PASS |

(Antenna Vertical, 30MHz to 1GHz)




| Fre. (MHz) | Pk (dBµV/m) | QP (dBµV/m) | AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-QP (dBµV/m) | Limit-AV (dBµV/m) | Antenna | Verdict |
|---|---|---|---|---|---|---|---|---|
| 35.8258 | 30.05 | N/A | N/A | N/A | 40.00 | N/A | Horizontal | PASS |
| 44.5646 | 28.85 | N/A | N/A | N/A | 40.00 | N/A | Horizontal | PASS |
| 55.2452 | 29.08 | N/A | N/A | N/A | 40.00 | N/A | Horizontal | PASS |
| 120.3003 | 31.99 | N/A | N/A | N/A | 43.50 | N/A | Horizontal | PASS |
| 173.7037 | 31.95 | N/A | N/A | N/A | 43.50 | N/A | Horizontal | PASS |
| 267.8879 | 33.81 | N/A | N/A | N/A | 46.00 | N/A | Horizontal | PASS |

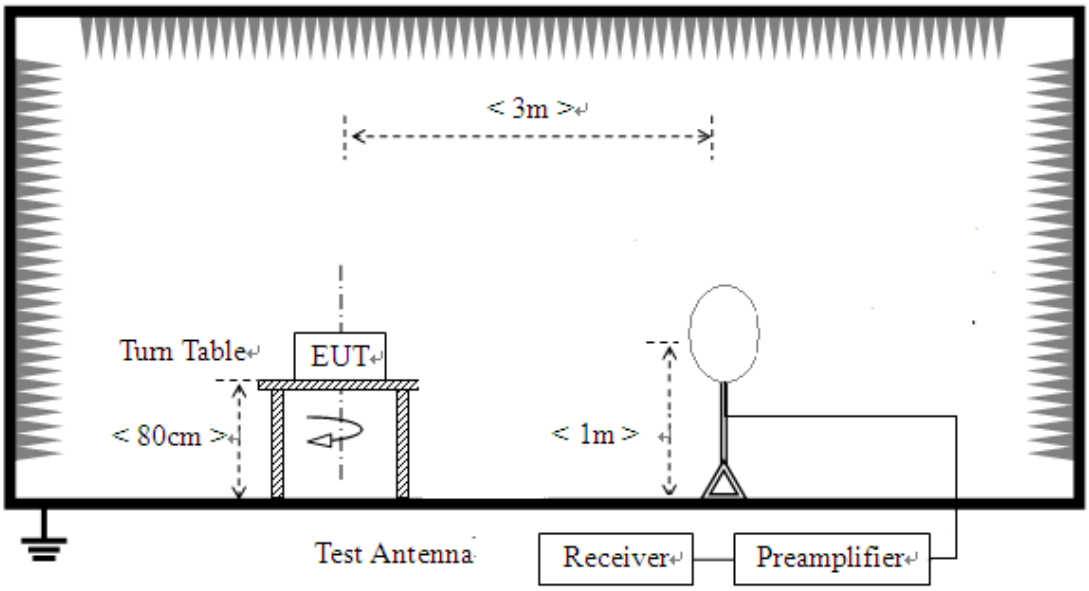
(Antenna Horizontal, 30MHz to 1GHz)

## 2.3. 20dB Bandwidth

### 2.3.1. Standard Applicable

According to FCC section 15.215(c), the 20dB bandwidth should be contained within the frequency band designated in the rule section under which the EUT is operated, it was measured with a spectrum analyzer connected the EUT while the EUT is operating in transmission mode.

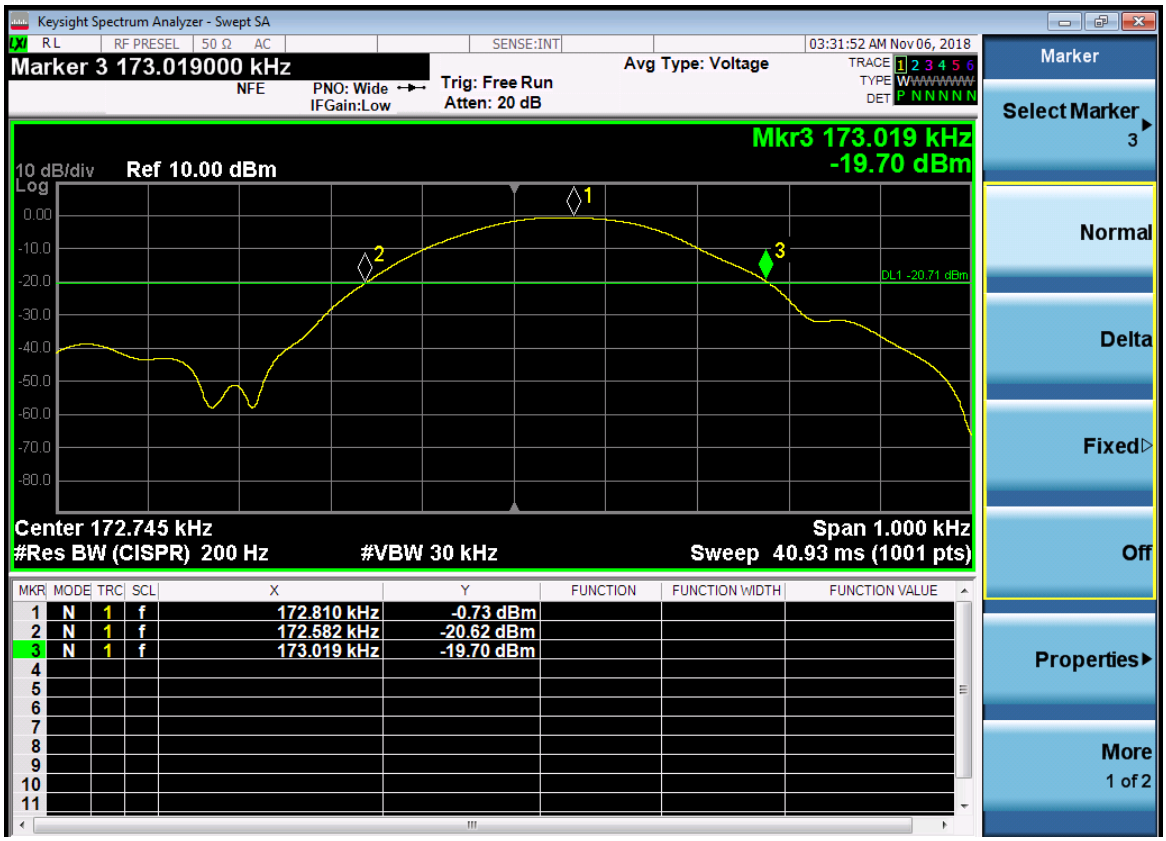
### 2.3.2. Test Setup



### 2.3.3. Test Result

| 20dB Bandwidth (kHz) | Verdict |
|---|---|
| 0.437 | Pass |

Please refer to the following plot:



# Annex A Test Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

Uncertainty of Conducted Emission Measurement

| | | |
|---|---|---|
| Measuring Uncertainty for a Level of Confidence of 95%(U=2Uc(y)) | 9kHz-150kHz | ±4.1 dB |
| | 150kHz-30MHz | ±3.7dB |

Uncertainty of Radiated Emission Measurement

| | | |
|---|---|---|
| Measuring Uncertainty for a Level of Confidence of 95%(U=2Uc(y)) | 9KHz-30MHz | ±5.16dB |
| | 30MHz-200MHz | ±5.06dB |
| | 200MHz-1000MHz | ±5.24dB |
| | 1GHz-6GHz | ±5.18dB |
| | 6GHz-18GHz | ±5.48dB |

# Annex B Testing Laboratory Information

## 1. Identification of the Responsible Testing Laboratory

| | |
|---|---|
| **Company Name:** | Shenzhen Morlab Communications Technology Co., Ltd. |
| **Department:** | Morlab Laboratory |
| **Address:** | FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China |
| **Responsible Test Lab Manager:** | Mr. Su Feng |
| **Telephone:** | +86 755 36698555 |
| **Facsimile:** | +86 755 36698525 |

## 2. Identification of the Responsible Testing Location

| | |
|---|---|
| **Name:** | Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory |
| **Address:** | FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China |

## 3. Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013 and CISPR Publication 22; the FCC designation number is CN1192. Test firm registration number is 226174.

## 4. Test Equipments Utilized

### 4.1 Conducted Emission Test Equipments

| Description | Manufacturer | Model | Serial No. | Cal. Date | Due. Date |
|---|---|---|---|---|---|
| Test Receiver | R&S | ESPI | 101052 | 2018.08.04 | 2019.08.03 |
| LISN | Schwarzbeck | NSLK 8127 | 812744 | 2018.05.08 | 2019.05.07 |
| Pulse Limiter (20dB) | VTSD | 9561D | 9537 | 2018.05.08 | 2019.05.07 |
| Coaxial cable(BNC) (30MHz-26GHz) | Morlab | EMC01 | CB01 | N/A | N/A |

### 4.2 Radiated Test Equipments

| Description | Manufacturer | Model | Serial No. | Cal. Date | Due. Date |
|---|---|---|---|---|---|
| MXE EMI Receiver | Agilent | N9038A | MY54130016 | 2018.08.04 | 2019.08.03 |
| Test Antenna - Bi-Log | Schwarzbeck | VULB 9163 | 9163-519 | 2018.05.08 | 2019.05.07 |
| Test Antenna - Loop | Schwarzbeck | FMZB1519 | 1519-022 | 2018.03.03 | 2019.03.02 |
| Coaxial cable (N male) (9KHz-30MHz) | Morlab | EMC04 | CB04 | N/A | N/A |
| Coaxial cable (N male) (30MHz-26GHz) | Morlab | EMC02 | CB02 | N/A | N/A |
| Coaxial cable(N male) (30MHz-26GHz) | Morlab | EMC03 | CB03 | N/A | N/A |
| Semi-Anechoic Chamber | CRT | 9m*6m*6m | N/A | 2017.01.12 | 2020.01.11 |
| Adapter | ViVo | HKC0055010 -3E | N/A | N/A | N/A |

END OF REPORT