



TEST REPORT

FCC PART 15 SUBPART C

Test report
On Behalf of
Shenzhen Letsolar Technology Co.LTD
For
Wireless charging
Model No.: LP167

FCC ID: 2AU99-LP167

Prepared for : **Shenzhen Letsolar Technology Co.LTD**
Building D, Sanlian Industrial, Songbai Road, Shiyan Sub-district Office, Bao'an District, Shenzhen City, China

Prepared By : **Shenzhen HUAK Testing Technology Co., Ltd.**
1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China

Date of Test: **Nov. 30, 2019 ~ Dec. 13, 2019**

Date of Report: **Dec. 13, 2019**

Report Number: **HK1912063127-E**



TEST RESULT CERTIFICATION

Applicant's name: Shenzhen Letsolar Technology Co.LTD

Address: Building D, Sanlian Industrial, Songbai Road, Shiyan Sub-district Office, Bao'an District, Shenzhen City, China

Manufacturer's Name: Shenzhen Letsolar Technology Co.LTD

Address: Building D, Sanlian Industrial, Songbai Road, Shiyan Sub-district Office, Bao'an District, Shenzhen City, China

Product description

Trade Mark: N/A

Product name: Wireless charging

Model and/or type reference ..: LP167

Standards: **47 CFR FCC Part 15 Subpart C**

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Date of Test:

Date (s) of performance of tests: Nov. 30, 2019 ~ Dec. 13, 2019

Date of Issue: Dec. 13, 2019

Test Result: **Pass**

Prepared by:

Project Engineer

Reviewed by:

Project Supervisor

Approved by:

Technical Director

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1. SUMMARY

1.1. TEST STANDARDS

The tests were performed according to following standards:

[ANSI C63.10: 2013](#) : American National Standard for Testing Unlicensed Wireless Devices

[ANSI C63.4: 2014](#) : –American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz

1.2. Test Description

Part 15 C Section 15.207	AC Power Line Conducted Emission	PASS
Part 15 C Section 15.209	Radiated emission	PASS
Part 15 C Section 15.215 (c)	20dB Occupied Bandwidth	PASS
Part 15 C Section 15.203/15.247 (c)	Antenna Requirement	PASS



1.3. Test Facility

1.3.1 Address of the test laboratory

Shenzhen HUAK Testing Technology Co., Ltd.

Add.:1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 32/EN 55032 requirements.

1.3.2 Laboratory accreditation

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

IC Registration No.: 21210

The 3m alternate test site of Shenzhen HUAK Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 21210 on May 24, 2016.

1.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the Shenzhen HUAK Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for HUAK laboratory is reported:

Test	Measurement Uncertainty	Notes
Transmitter power conducted	±0.57 dB	(1)
Transmitter power Radiated	±2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	±2.20 dB	(1)
Occupied Bandwidth	±0.01ppm	(1)
Radiated Emission 30~1000MHz	±4.10dB	(1)
Radiated Emission Above 1GHz	±4.32dB	(1)
Conducted Disturbance 0.15~30MHz	±3.20dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



2. GENERAL INFORMATION

2.1. Environmental conditions

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

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2. General Description of EUT

Product Name:	Wireless charging
Model/Type reference:	LP167
Serial Model:	N/A
Trade Mark	N/A
FCC ID	2AU99-LP167
Hardware Version:	LP167B-A-WXC-R1
Software Version:	/
Operation frequency:	125KHz
Power supply:	DC 12V from adapter Output: 5W (5V-1A)

Note: For more details, refer to the user's manual of the EUT.

2.3. Description of Test Modes and Test Frequency

Normal working model (Output: 5W 5V-1A)

2.4. Related Submittal(s) / Grant (s)

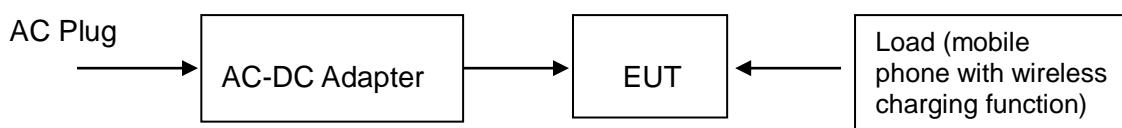
This submittal(s) (test report) is intended to comply with Section 15.207/209 of the FCC Part 15, Subpart C Rules , RSS Gen and RSS 247 Rules.

2.5. Modifications

No modifications were implemented to meet testing criteria.

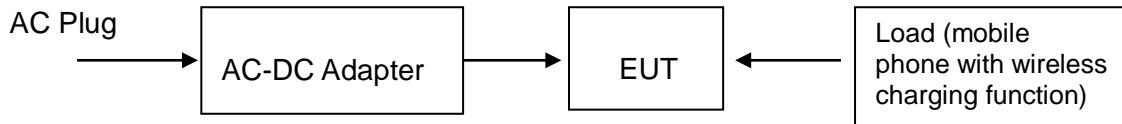
2.6. DESCRIPTION OF TEST SETUP

Operation of EUT during conducted testing:





Operation of EUT during Radiation and Above1GHz Radiation testing:



2.7. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Description	Information	Manufacturer	Remark	Certificate
AC-DC Adapter	Model: HW-050500DFQ Input: 100-240V~,50/60Hz, 0.5A Output: 12V DC	/	Provided by lab	SDOC
Mobile Phone	HUAWEI-MateS	HUAWEI	Provided by lab	ID
USB Cable	L:50cm	/	Provided by lab	SDOC

2.8. Equipments Used during the Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	R&S	ENV216	HKE-002	Dec. 27, 2018	1 Year
2.	Receiver	R&S	ESCI 7	HKE-010	Dec. 27, 2018	1 Year
3.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 27, 2018	1 Year
4.	Spectrum analyzer	R&S	FSP40	HKE-025	Dec. 27, 2018	1 Year
5.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 27, 2018	1 Year
6.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 27, 2018	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESCI 7	HKE-010	Dec. 27, 2018	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Dec. 27, 2018	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Dec. 27, 2018	1 Year
10.	Horn Antenna	Schwarzbeck	9120D	HKE-013	Dec. 27, 2018	1 Year
11.	Pre-amplifier	EMCI	EMC051845 SE	HKE-015	Dec. 27, 2018	1 Year
12.	Pre-amplifier	Agilent	83051A	HKE-016	Dec. 27, 2018	1 Year
13.	EMI Test Software EZ-EMC	Tonscend	JS1120-B Version	HKE-083	Dec. 27, 2018	N/A
14.	High Gain Antenna	Schwarzbeck	LB-180400K F	HKE-054	Dec. 27, 2018	1 Year

The calibration interval was one year

3. TEST CONDITIONS AND RESULTS

3.1. Conducted Emissions Test

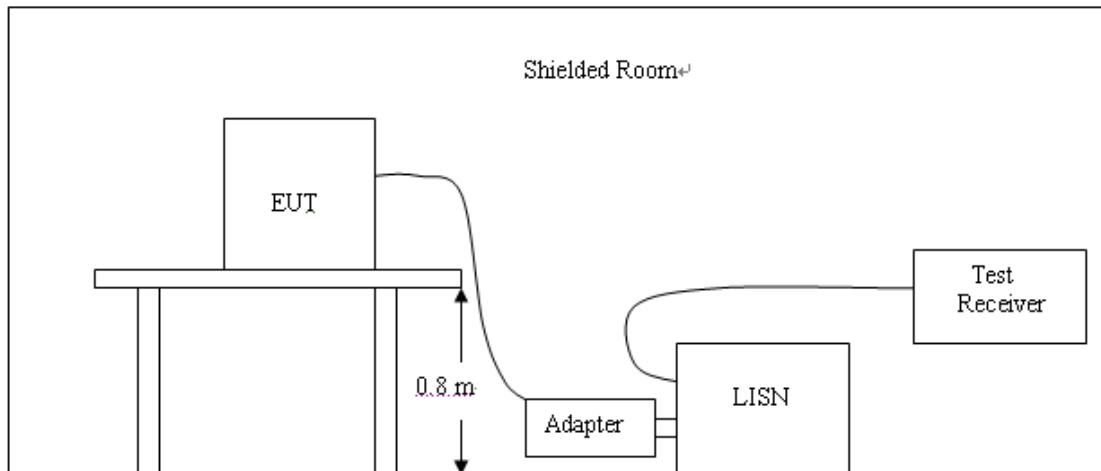
LIMIT

According to FCC CFR Title 47 Part 15 Subpart C Section 15.207 and RSS Gen 8.8, AC Power Line Conducted Emissions Limits for Licence-Exempt Radio Apparatus as below:

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION



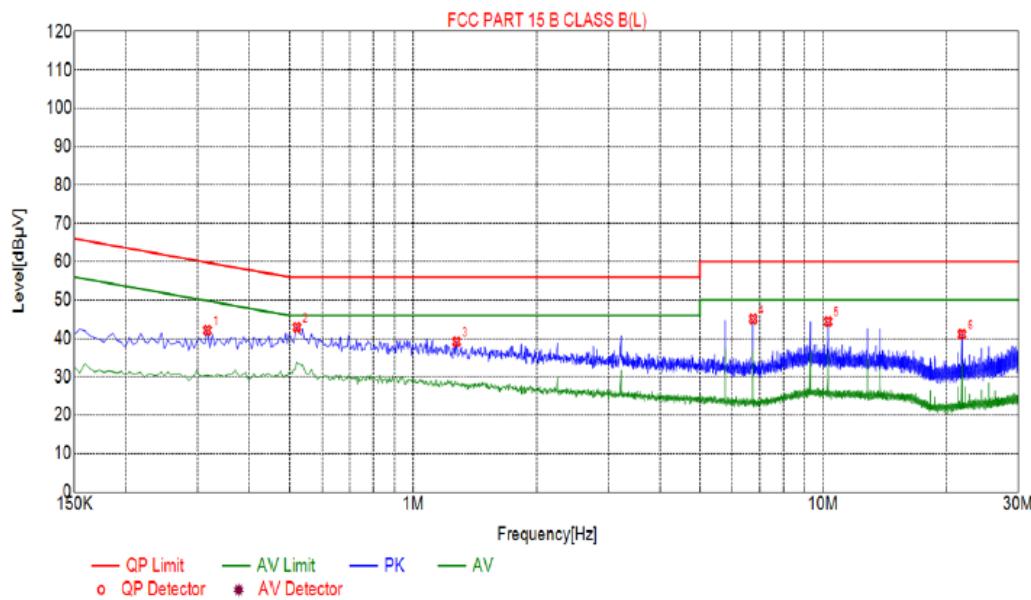
TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.
4. The 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.
8. During the above scans, the emissions were maximized by cable manipulation.



TEST RESULTS

Test Specification: Line



Suspected List

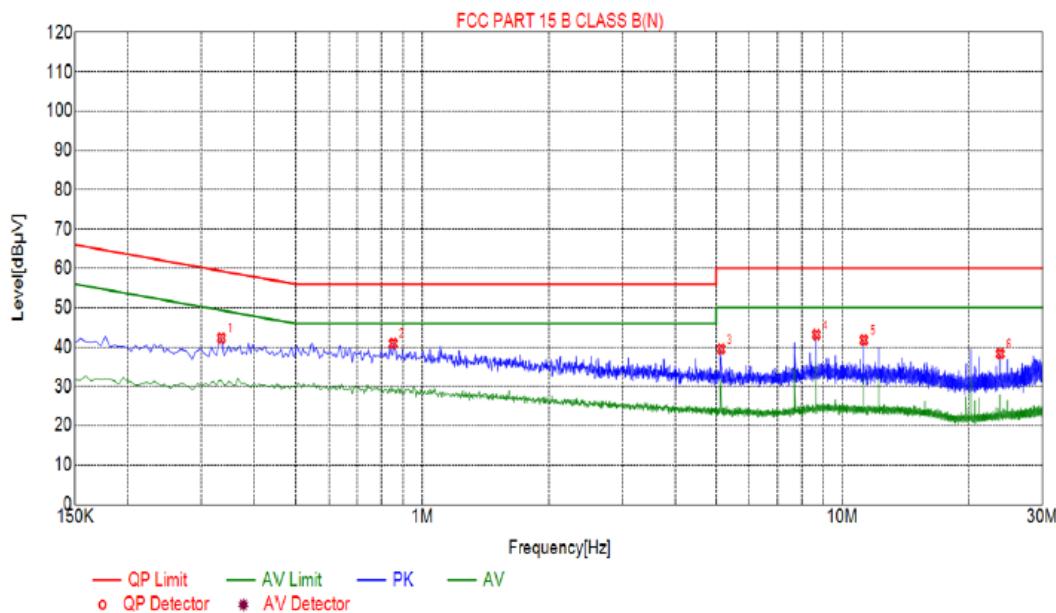
NO.	Freq. [MHz]	Level [dB μ V]	Factor [dB]	Limit [dB μ V]	Margin [dB]	Detector
1	0.3165	42.14	10.05	59.80	17.66	PK
2	0.5190	42.95	10.04	56.00	13.05	PK
3	1.2750	39.15	10.09	56.00	16.85	PK
4	6.7515	45.10	10.21	60.00	14.90	PK
5	10.2930	44.40	10.05	60.00	15.60	PK
6	21.8670	41.11	10.15	60.00	18.89	PK

Remark: Margin = Limit – Level

Correction factor = Cable loss + LISN insertion loss

Level=Test receiver reading + correction factor

Test Specification: Neutral



Suspected List						
NO.	Freq. [MHz]	Level [dB μ V]	Factor [dB]	Limit [dB μ V]	Margin [dB]	Detector
1	0.3345	42.33	10.04	59.34	17.01	PK
2	0.8520	40.93	10.06	56.00	15.07	PK
3	5.1450	39.55	10.26	60.00	20.45	PK
4	8.6820	43.18	10.12	60.00	16.82	PK
5	11.2560	41.80	10.00	60.00	18.20	PK
6	23.7975	38.30	10.21	60.00	21.70	PK

Remark: Margin = Limit – Level

Correction factor = Cable loss + LISN insertion loss

Level=Test receiver reading + correction factor

3.2. 20dB Bandwidth

Limit

N/A

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 1% to 5% of the OBW RBW and approximately 3 X RBW on VBW.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth:

RBW=1% to 5% of the OBW

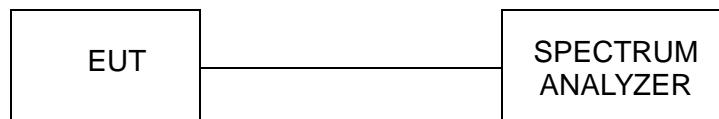
VBW=approximately 3 X RBW

Detector=Peak

Trace Mode: Max Hold

Use the 99% power bandwidth function of the instrument to measure the Occupied Bandwidth and recorded.

Test Configuration



Test Results

Frequency(KHz)	20dB Bandwidth (KHz)	Limit (kHz)	Results
125	35.00	/	PASS



3.3. Radiated Emissions

Limit

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

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

Except when the requirements applicable to a given device state otherwise, emissions from licence-exempt transmitters shall comply with the field strength limits shown in table below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission

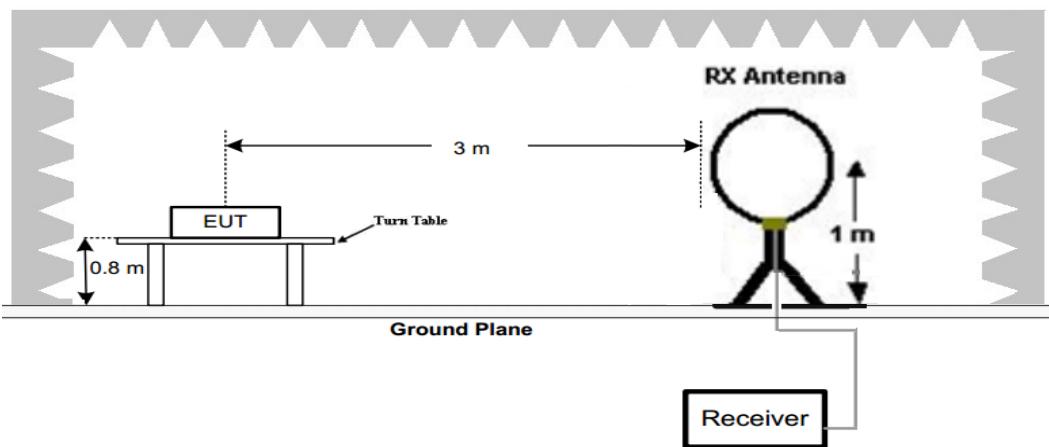
Unwanted emissions that fall into restricted bands shall comply with the limits specified in RSS-Gen; and Unwanted emissions that do not fall within the restricted frequency bands shall comply either with the limits specified in the applicable RSS or with those specified in this RSS-Gen.

Radiated emission limits

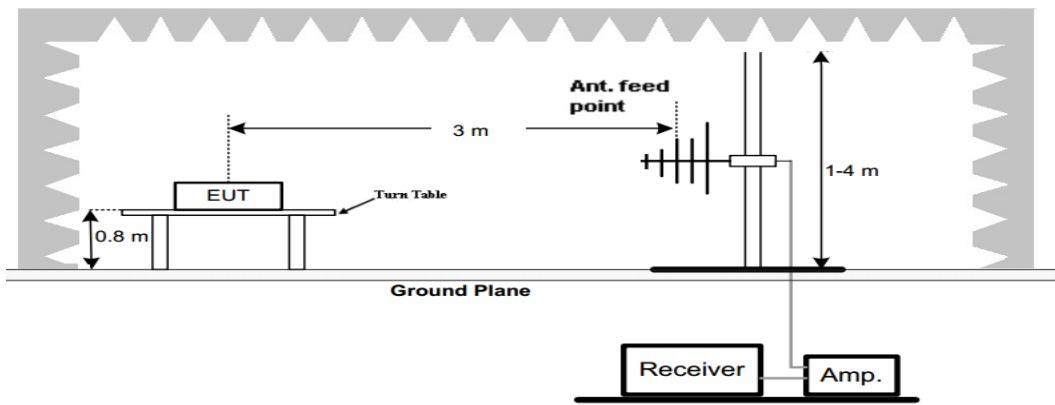
Frequency (MHz)	Distance (Meters)	Radiated (dB μ V/m)	Radiated (μ V/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30)+40\log(30/3)$	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

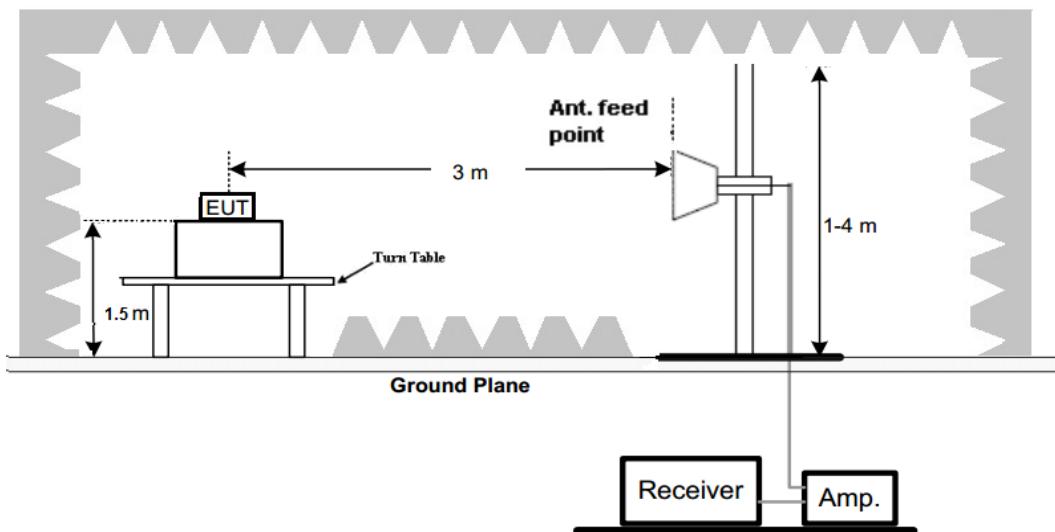
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



Test Procedure

- 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

Note: For the radiated emission test above 1GHz: Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement 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 measurement antenna elevation shall be that which maximizes the emissions. The measurement 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 EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be



stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Test the EUT in the lowest channel, the middle channel, the Highest channel

The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case. Repeat above procedures until all frequencies measured was complete.

TEST RESULTS

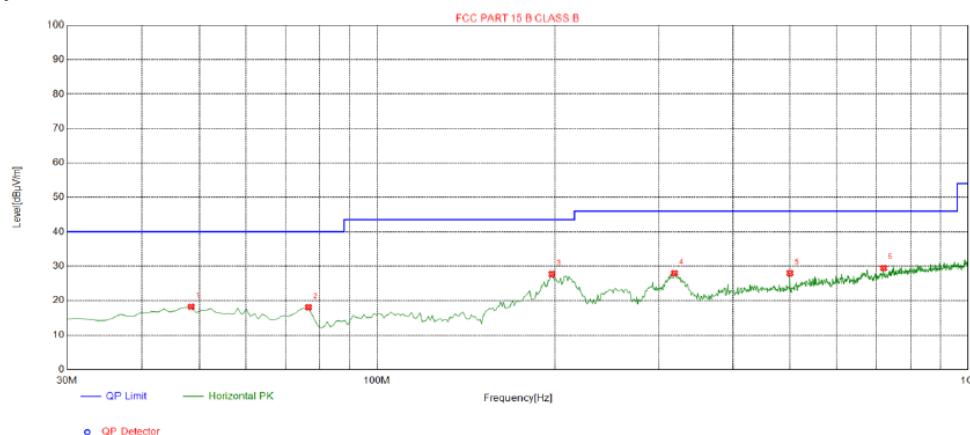
Remark:

1. Radiated Emission measured from 9 KHz to 10th harmonic of fundamental.
2. There is no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report (Radiated emission in 9kHz to 30MHz is more than 20dB below the limit).
3. For above 1GHz, The highest frequency of the internal sources of the EUT is below 108 MHz, so no test needed

Below 1GHz Test Results:

Antenna polarity: H

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	48.4300	18.22	-13.65	40.00	21.78	100	160	Horizontal
2	76.5600	18.08	-18.85	40.00	21.92	100	350	Horizontal
3	197.810	27.68	-15.27	43.50	15.82	100	325	Horizontal
4	319.060	27.94	-12.15	46.00	18.06	100	99	Horizontal
5	500.450	27.96	-8.29	46.00	18.04	100	309	Horizontal
6	720.640	29.41	-4.70	46.00	16.59	100	211	Horizontal

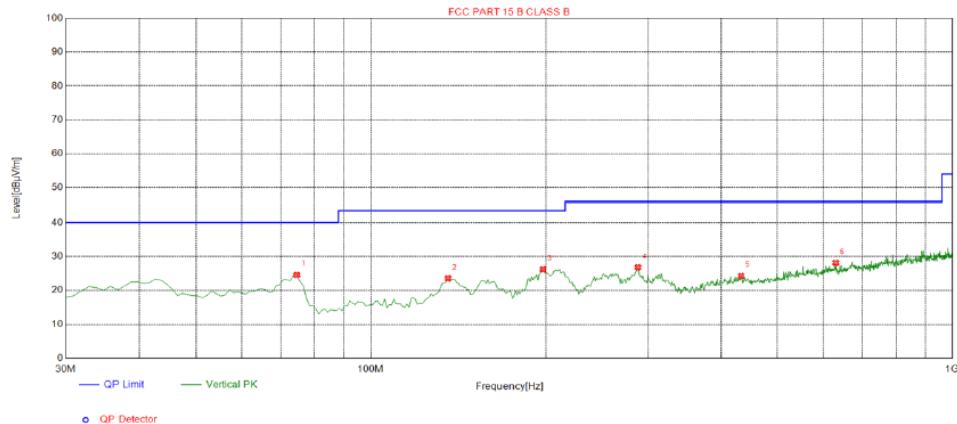
Remark: Margin = Limit – Level

Correction Factor = Antenna Factor + Cable loss – Pre-amplifier

Level = Test receiver reading + correction factor

Antenna polarity: V

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	74.6200	24.60	-18.50	40.00	15.40	100	172	Vertical
2	135.730	23.52	-18.92	43.50	19.98	100	258	Vertical
3	197.810	26.23	-15.27	43.50	17.27	100	155	Vertical
4	288.020	26.82	-12.92	46.00	19.18	100	246	Vertical
5	433.520	24.31	-9.70	46.00	21.69	100	152	Vertical
6	630.430	28.15	-5.49	46.00	17.85	100	274	Vertical

Remark: Margin = Limit – Level

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

Level=Test receiver reading + correction factor

3.4. ANTENNA REQUIREMENT

Standard Applicable

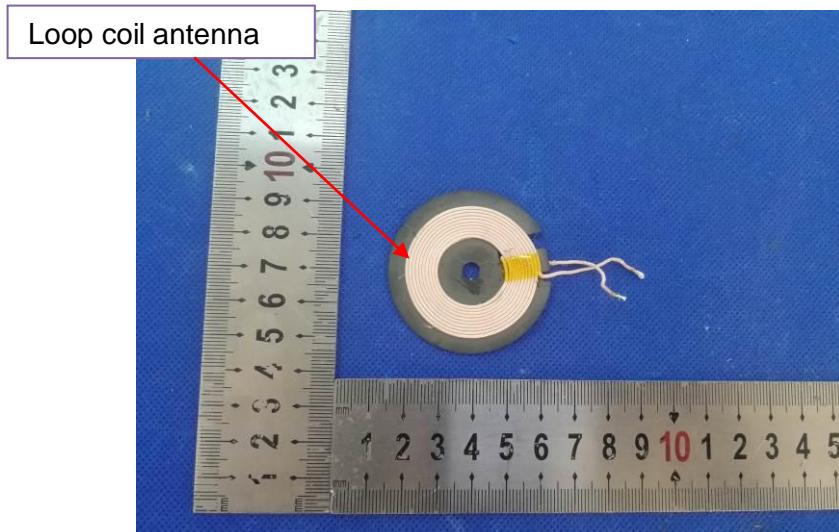
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247, if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, 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.

Antenna Connected Construction

The antenna used in this product is a Loop coil antenna. The directional gains of antenna used for transmitting is 0dBi.



4. Test Setup Photos of the EUT

Below 30MHz



30MHz-1000MHz



Conducted Emission



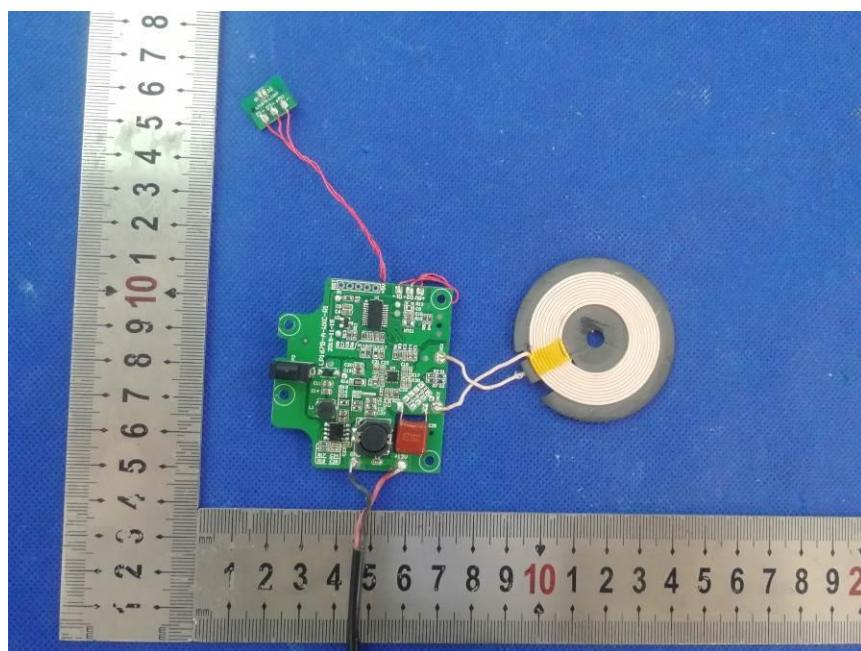
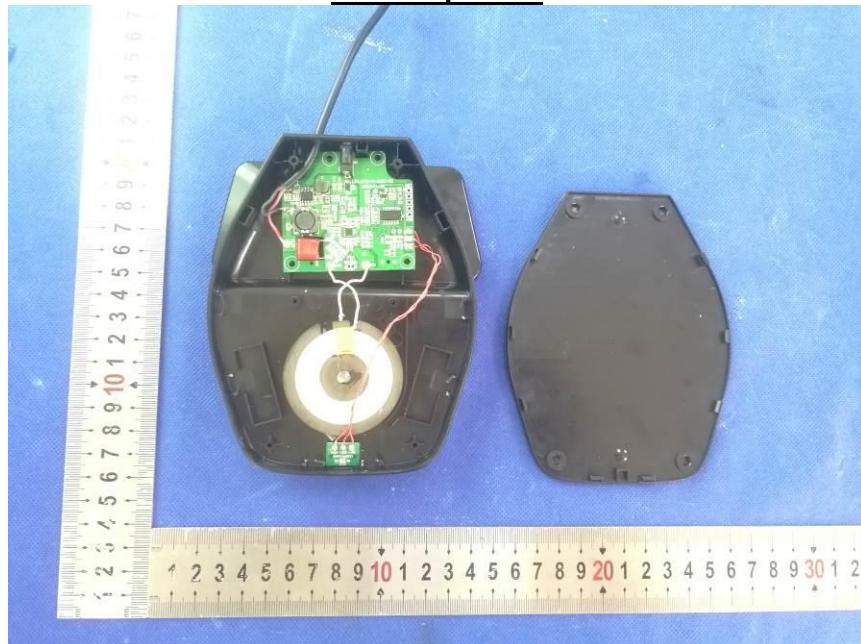
5. PHOTOS OF THE EUT

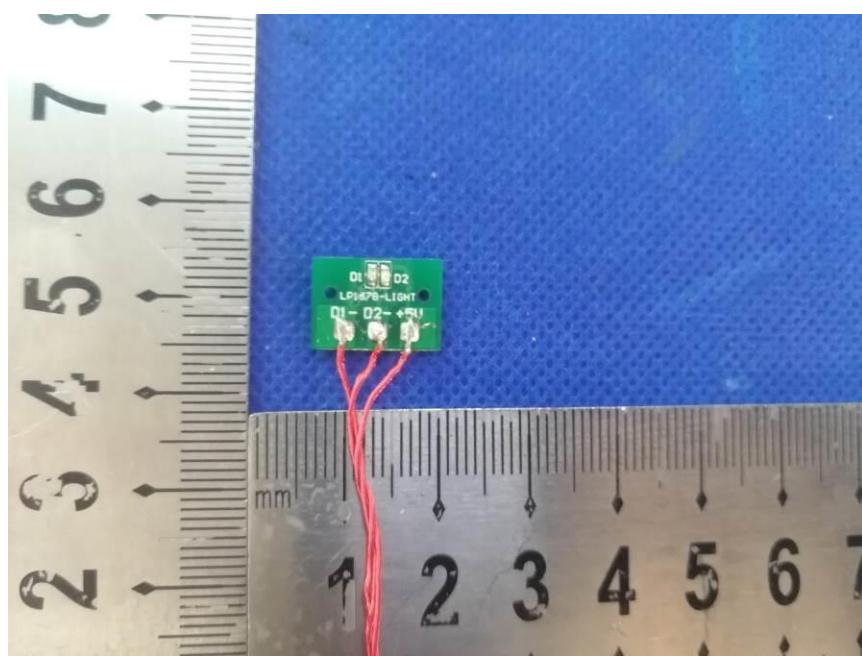
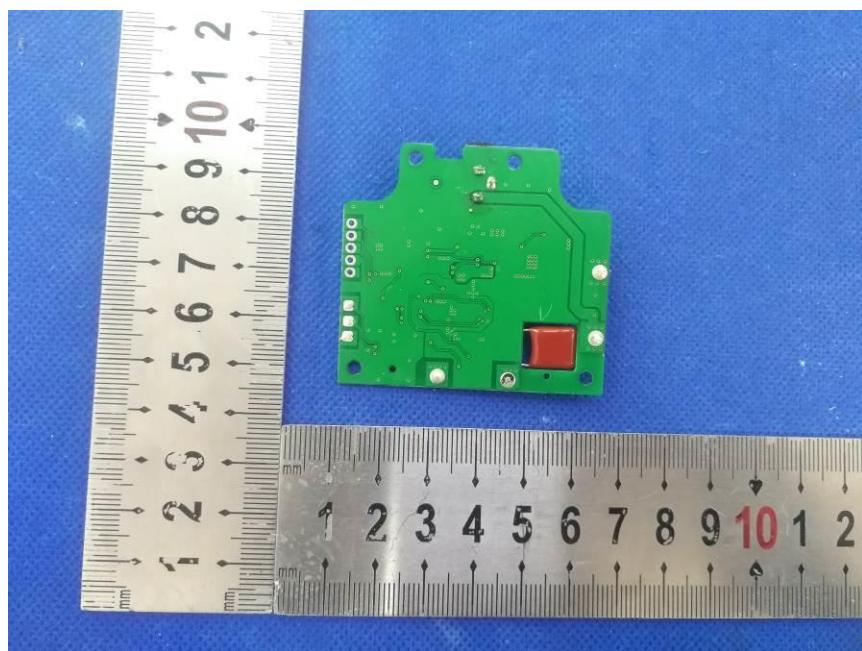
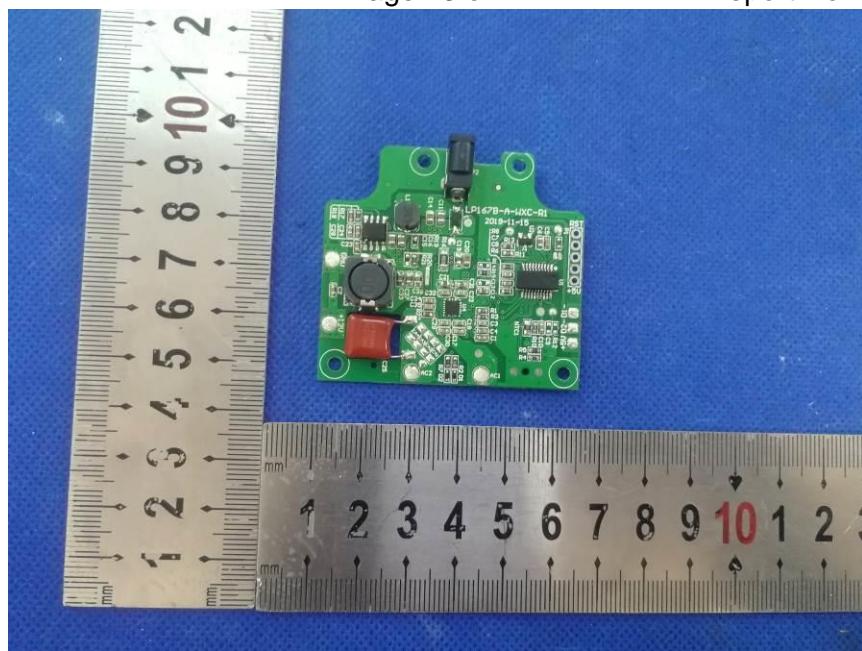
External photos

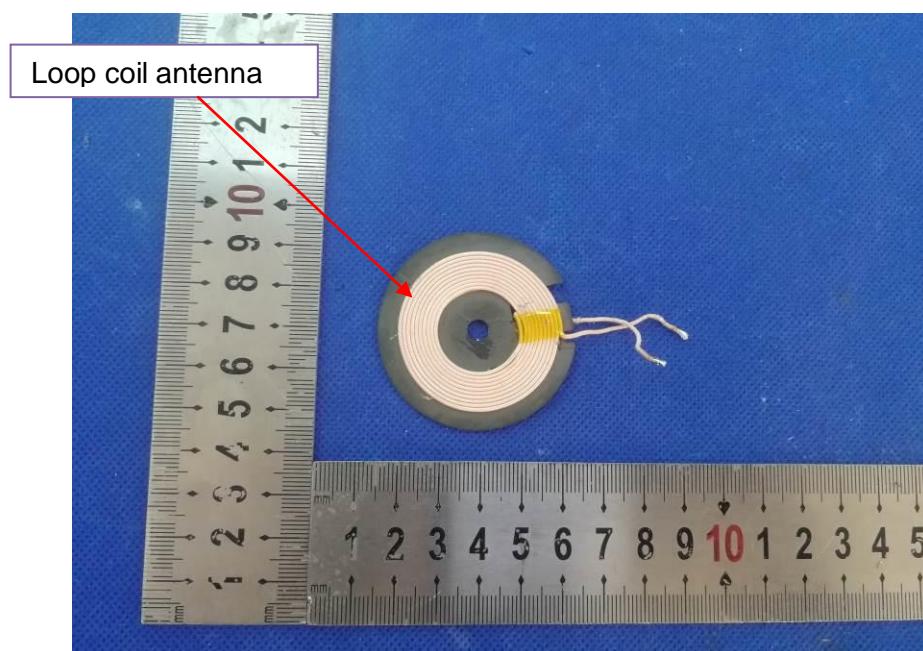
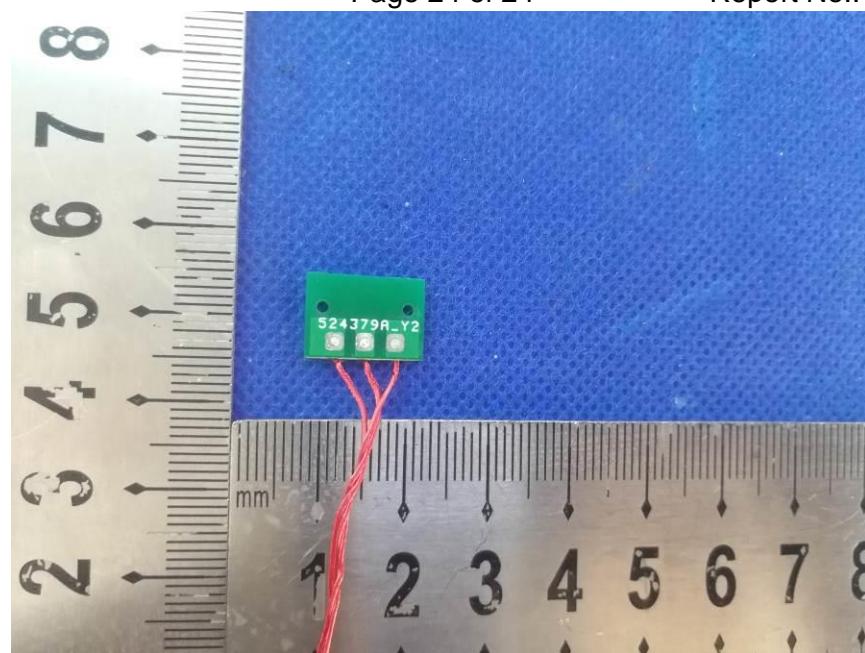






Internal photos





END