a

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Wireless charger

Model No.: RL568-1

Trademark: N/A

FCC ID: 2ATOERL568

Report No.: EA1906081F 01001

Issue Date: June 16, 2019

Prepared for

AEL LIGHTING CO.,LTD
No.268-5,ZhongXinJin Road,ShuiKou District,DaLangTown,DongGuan,Guangdong,China

Prepared by

Dong Guan Anci Electronic Technology Co., Ltd.

1-2 Floor, Building A, No.11, Headquarters 2 Road, Songshan, Lake Hi-tech Industrial Development Zone, Dongguan City, evelopment Zone, Dongguan City, Guangdong Pr., China.

VERIFICATION OF COMPLIANCE

Applicant:	AEL LIGHTING CO.,LTD No.268-5,ZhongXinJin Road,ShuiKou District, DaLangTown, DongGuan, Guangdong,China
Manufacturer:	AEL LIGHTING CO.,LTD No.268-5,ZhongXinJin Road,ShuiKou District, DaLangTown, DongGuan, Guangdong,China
Product Description:	Wireless charger
Trade Mark:	N/A
Model Number:	RL568-1

We hereby certify that:

The above equipment was tested by Dong Guan Anci Electronic Technology Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10-2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15C.

Date of Test : June 13, 2019 to June 16, 2019

Prepared by : Tomas Yang/Editor

Reviewer & Authorized Signer : Alan He/Manager

Modified Information

Version	Summary	Revision Date	Report No.
Ver.1.0	Original Report	/	EA1906081F 01001

Table of Contents

1 General Information

1.1 Product Description

Characteristics	Description
Product Name	Wireless charger
Model number	RL568-1
Operation Mode	Wireless Charging
Input Rating	AC 100-120V 50/60Hz 0.5A
Power Supply	AC120V/60Hz for adapter
Operating Frequency	110-205KHz
Wireless Charging Power	5W Max
Modulation Technique	ASK
Antenna Type	Induction coil

1.2 Related Submittal(s) / Grant(s)

This submittal(s) (test report) is intended for FCC ID: 2ATOERL568 filing to comply with the FCC Part 15, Subpart C Rules.

1.3 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

1.6 Test Facility

Site Description		
EMC Lab.	:	Accredited by CNAS, 2017.06.26 The certificate is valid until 2022.10.28 The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2005) The Certificate Registration Number is L0468. Accredited by A2LA, 2018.03.15 The Certificate Number is 4422.01.
Name of Firm	:	Dong Guan Anci Electronic Technology Co., Ltd.
Site Location	:	1-2 Floor, Building A, No.11, Headquarters 2 Road, Songshan, Lake Hi-tech Industrial Development Zone, Dongguan City,evelopment Zone, Dongguan City, Guangdong Pr., China.

2 System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the fixed in a particular direction according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013.

2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

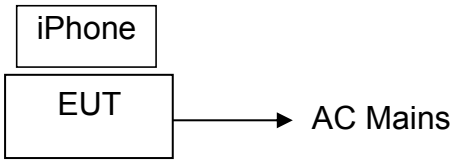


Table 2-1 Equipment Used in Tested System

Item	Equipment	Trade Mark	Model No.	FCC ID	Note
1.	Wireless charger	N/A	RL568-1	2ATOERL568	***EUT***
2.	Adapter	JML	JML-0500200-LW	N/A	***Support EUT***
3.	iPhone	Apple	A1863	N/A	***Support Equipment***

Note:

(1) Unless otherwise denoted as EUT in『Remark』column, device(s) used in tested system is a support equipment.

3 Summary of Test Results

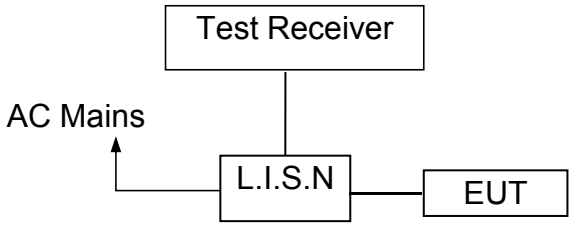
FCC Rules	Description Of Test	Result
§15.207	AC Power Conducted Emission	Compliant
§15.209	Radiated Emission	Compliant
§2.1049	20dB Bandwidth	Compliant
§15.203	Antenna Requirement	Compliant

4 Conducted Emissions Test

4.1 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

4.2 Test SET-UP (Block Diagram of Configuration)



4.3 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Calibrated until
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-669	2020-05-19
10 db attenuator	JFW	50FP-010-H4	4360846-427-1	2020-05-19
RF Cable	N/A	N/A	2#	2020-05-19
EMI Test Receiver	ROHDE&SCHWARZ	ESCI	101358	2020-05-19

4.4 Conducted Emission Limit

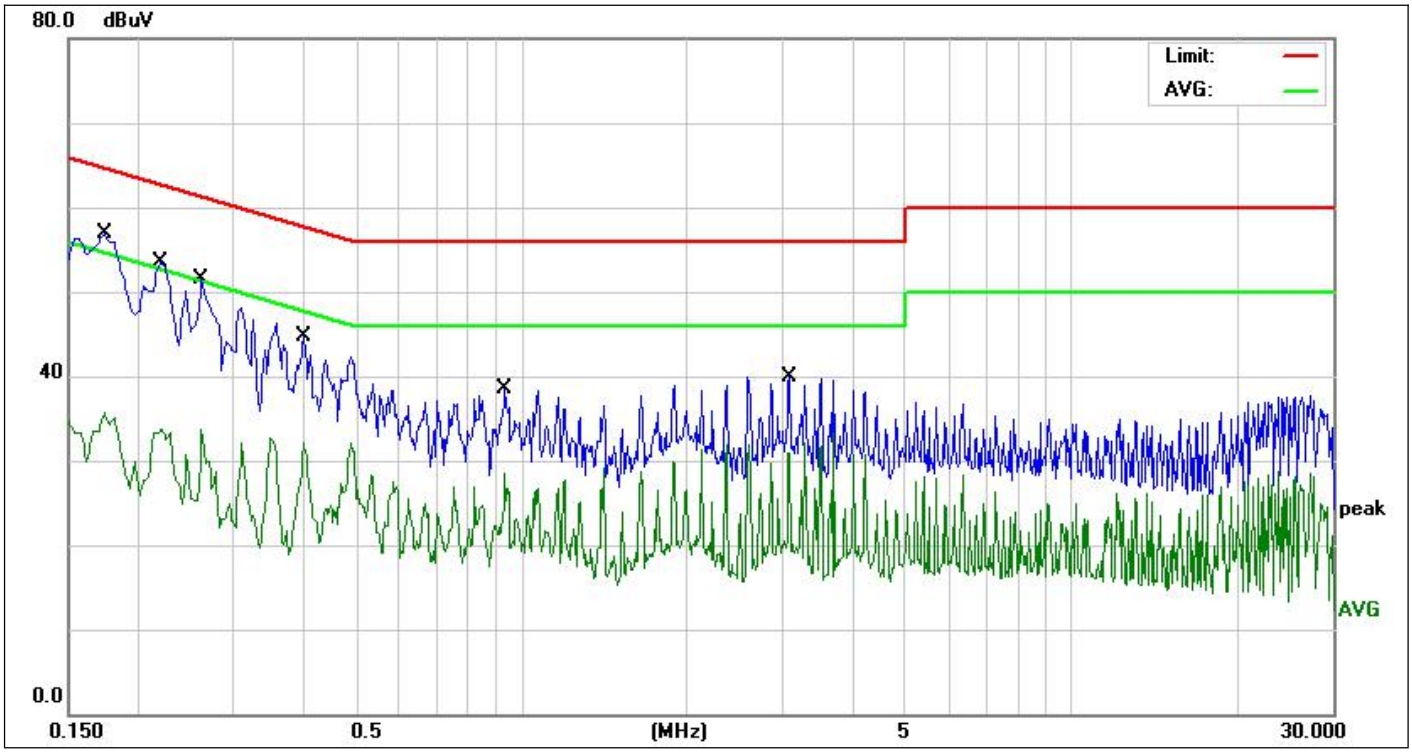
Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies

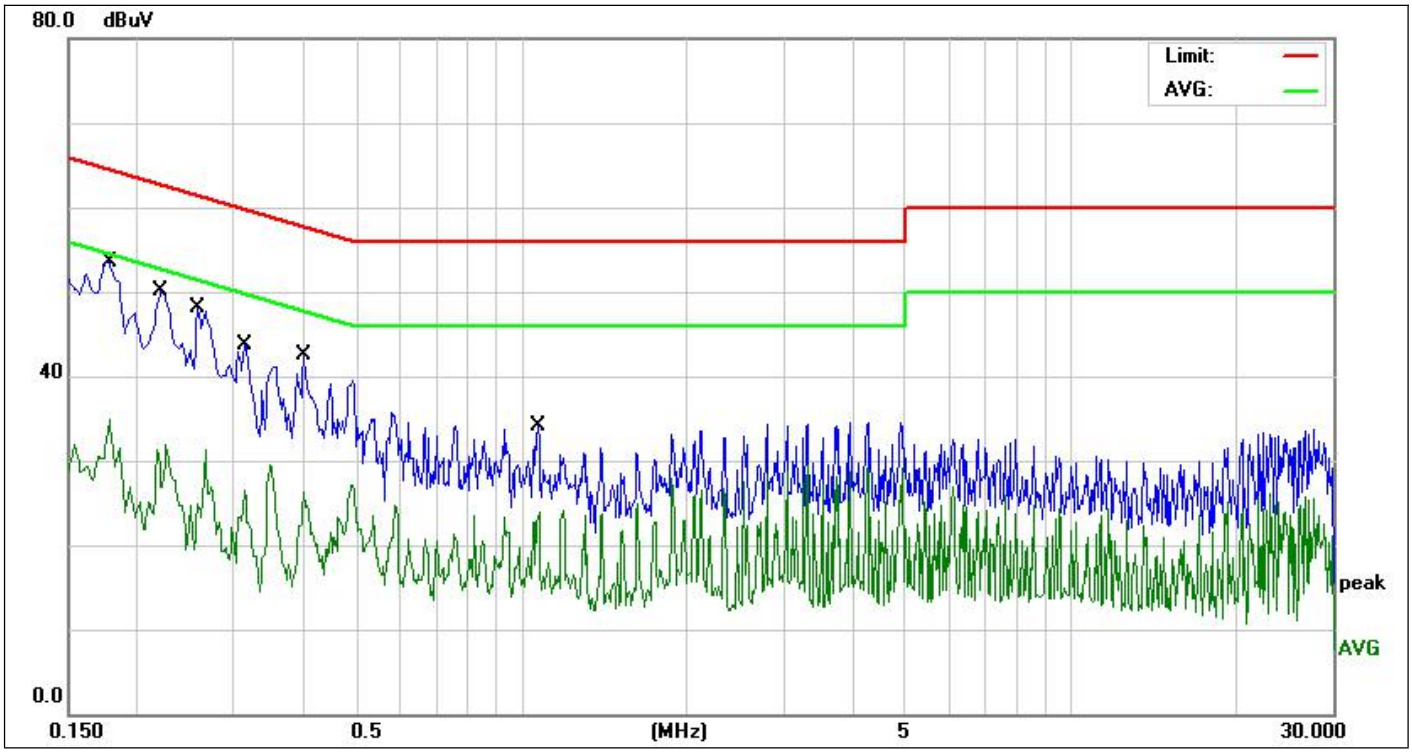
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.5 Measurement Result



Site:	**843**	**Phase:L1**	**Temperature(C):26(C)**
Limit:	**FCC Part 15 C Conduction(QP)**		**Humidity(%):60%**
EUT:	**Wireless Charger**	**Test Time:**	**2019-06-13 15:32:22**
M/N.:	**RL568-1**	**Power Rating:**	**AC 120V/60Hz**
Mode:	**Wireless Charging(5W)**	**Test Engineer:**	**Bast**
Note:			

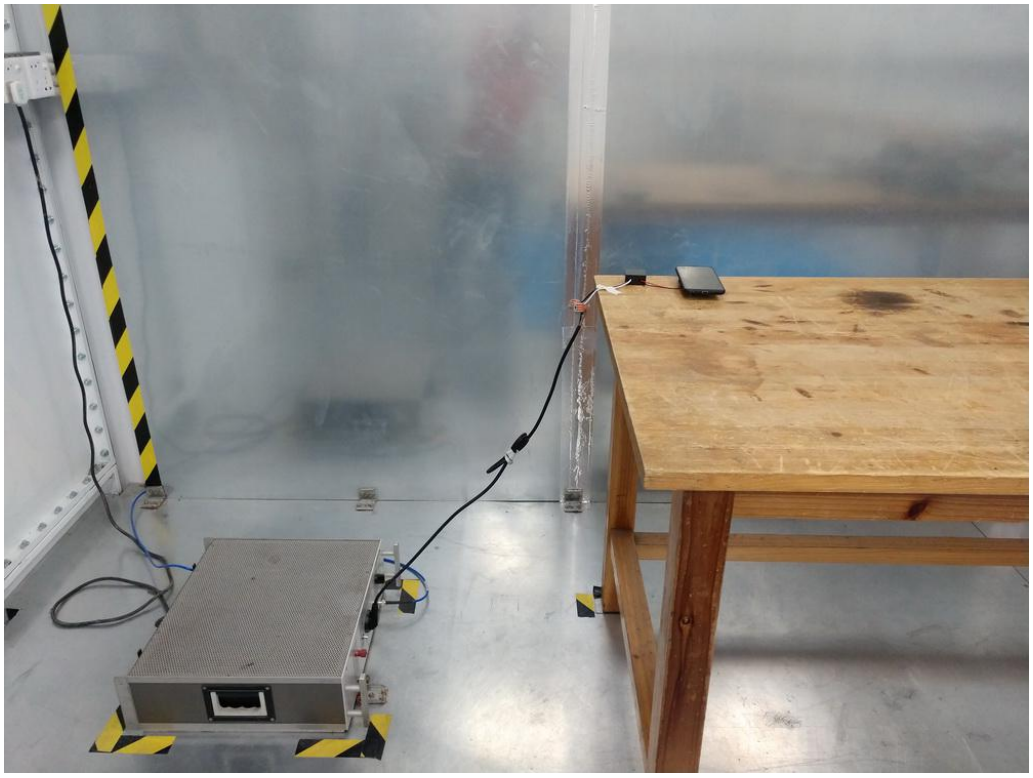
No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measure-ment(dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1 *	0.1740	40.04	10.08	50.12	64.76	-14.64	QP	
2	0.1740	23.08	10.08	33.16	54.76	-21.60	AVG	
3	0.2220	37.94	10.10	48.04	62.74	-14.70	QP	
4	0.2220	22.11	10.10	32.21	52.74	-20.53	AVG	
5	0.2620	32.77	10.11	42.88	61.36	-18.48	QP	
6	0.2620	17.34	10.11	27.45	51.36	-23.91	AVG	
7	0.4020	27.87	10.12	37.99	57.81	-19.82	QP	
8	0.4020	19.31	10.12	29.43	47.81	-18.38	AVG	
9	0.9340	23.11	10.11	33.22	56.00	-22.78	QP	
10	0.9340	15.40	10.11	25.51	46.00	-20.49	AVG	
11	3.0780	22.60	10.11	32.71	56.00	-23.29	QP	
12	3.0780	14.26	10.11	24.37	46.00	-21.63	AVG	



Site:	**843**	**Phase:N**	**Temperature(C):26(C)**
Limit:	**FCC Part 15 C Conduction(QP)**		**Humidity(%):60%**
EUT:	**Wireless Charger**	**Test Time:**	**2019-06-13 15:34:51**
M/N.:	**RL568-1**	**Power Rating:**	**AC 120V/60Hz**
Mode:	**Wireless Charging(5W)**	**Test Engineer:**	**Bast**
Note:			

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measure-ment(dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1 *	0.1780	37.69	10.09	47.78	64.57	-16.79	QP	
2	0.1780	20.26	10.09	30.35	54.57	-24.22	AVG	
3	0.2220	33.86	10.10	43.96	62.74	-18.78	QP	
4	0.2220	17.71	10.10	27.81	52.74	-24.93	AVG	
5	0.2580	27.08	10.11	37.19	61.49	-24.30	QP	
6	0.2580	10.82	10.11	20.93	51.49	-30.56	AVG	
7	0.3140	27.52	10.11	37.63	59.86	-22.23	QP	
8	0.3140	13.04	10.11	23.15	49.86	-26.71	AVG	
9	0.4020	24.42	10.12	34.54	57.81	-23.27	QP	
10	0.4020	14.61	10.12	24.73	47.81	-23.08	AVG	
11	1.0740	16.29	10.11	26.40	56.00	-29.60	QP	
12	1.0740	10.19	10.11	20.30	46.00	-25.70	AVG	

4.6 Conducted Measurement Photo



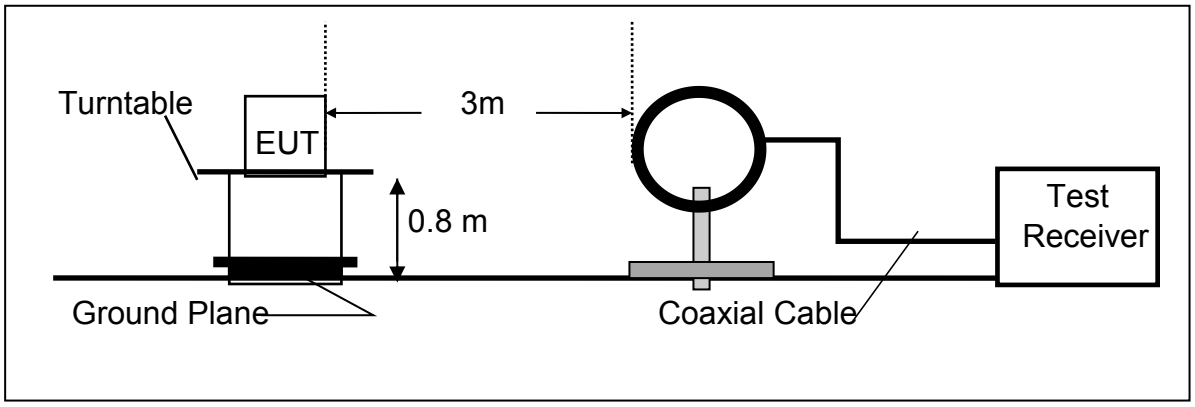
5 Radiated Emission Test

5.1 Measurement Procedure

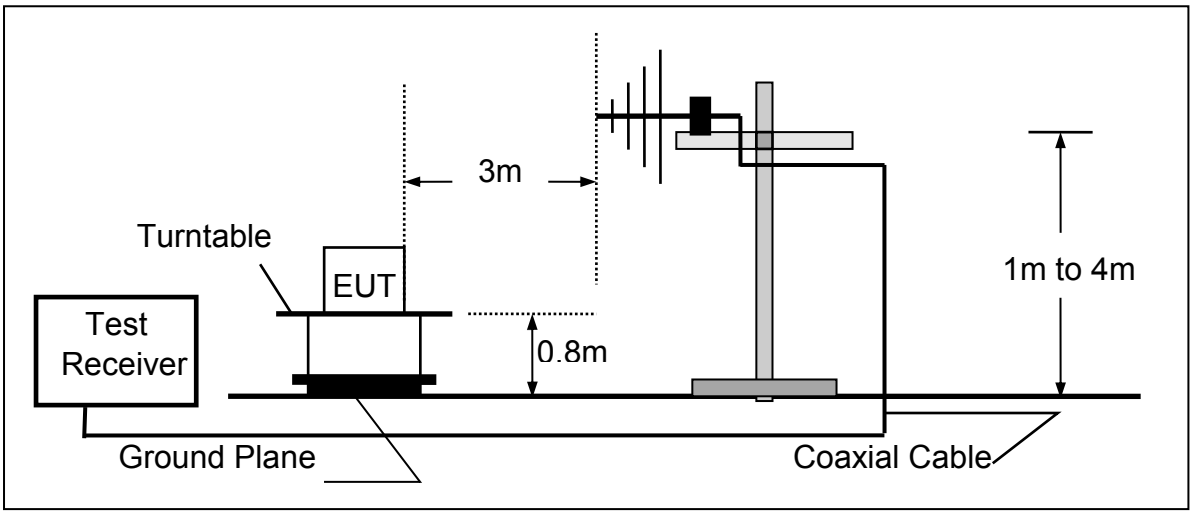
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

5.2 Test SET-UP (Block Diagram of Configuration)

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



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



5.3 Measurement Equipment Used

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1.	EMI Test Receiver	Rohde & Schwarz	ESPI	100502	2019-11-29
2.	Pre-Amplifier	HP	8447D	2727A06172	2020-05-19
3.	Bilog Antenna	Schwarzbeck	VULB9163	VULB9163-588	2020-05-19
4.	Loop Antenna	Schwarzbeck	FMZB 1516	1516-141	2020-01-04
5.	RF Cable	Gigalink Microwave	ZT40-2.92J-2.92J-2m	N/A	2020-03-12
6.	RF Cable	Gigalink Microwave	ZT40-2.92J-2.92J-0.3m	N/A	2020-03-12
7.	RF Cable	N/A	N/A	6#	2020-05-19
8.	3m Semi-anechoic Chamber	chengyu	9m*6m*6m	N/A	2020-05-19
9.	Test Software	Farad	EZ-EMC Ver:ANCI-3A1	N/A	N/A

5.4 Radiated Emission Limit

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table 15.209(a):

FCC Part 15.209				
Frequency (MHz)	Field Strength Limitation		Field Strength Limitation Frequency tion at 3m Measurement Dist	
	(uV/m)	Dist	(uV/m)	(dBuV/m)
0.009 – 0.490	2400 / F(KHz)	300m	10000 * 2400/F(KHz)	20log 2400/F(KHz) + 80
0.490 – 1.705	24000 / F(KHz)	30m	100 * 24000/F(KHz)	20log 24000/F(KHz) + 40
1.705 – 30.00	30	30m	100* 30	20log 30 + 40
30.0 – 88.0	100	3m	100	20log 100
88.0 – 216.0	150	3m	150	20log 150
216.0 – 960.0	200	3m	200	20log 200
Above 960.0	500	3m	500	20log 500

15.205 Restricted bands of operation

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])

Remark: 1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of ξ 15.205, and the emissions located in restricted bands also comply with 15.209 limit.

5.5 Measurement Result

Operation Mode:	Low frequency	Test Date :	June 13, 2019
Frequency Range:	9KHz~30MHz	Temperature :	20℃
Test Result:	PASS	Humidity :	55 %
Measured Distance:	3m	Test By:	Yaping Shen

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)	Note
0.146(F)	H	74.12	104.32	-30.2	PK
0.292	H	64.37	98.30	-33.93	PK
0.438	H	65.42	94.77	-29.35	PK
0.584	H	61.89	72.28	-10.39	PK
0.730	H	61.77	70.34	-15.04	PK
0.146(F)	V	74.32	104.32	-30	PK
0.292	V	63.54	98.30	-34.76	PK
0.438	V	63.72	94.77	-31.05	PK
0.584	V	65.88	72.28	-10.23	PK
0.730	V	62.15	70.34	-15.06	PK

Note: (1) All Readings are Peak Value.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) The average measurement was not performed when the peak measured data under the limit of average detection.
(4) EUT lying on the table position is the worst case result in the report.

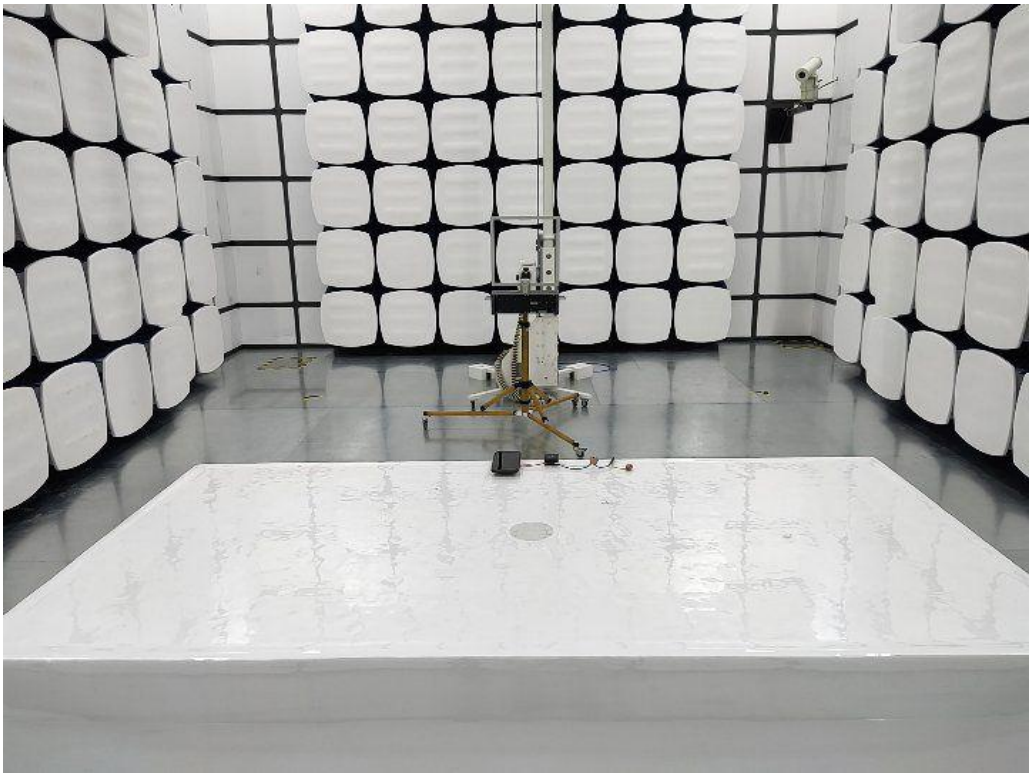
Site:	**LAB**	**Antenna::Horizontal**	**Temperature(C):26(C)**
Limit:	**FCC Part 15 C 3m Radiation**		**Humidity(%):60%**
EUT:	**Wireless Charger**	**Test Time:**	**2019/06/13 8:55:29**
M/N.:	**RL568-1**	**Power Rating:**	**AC 120V/60Hz**
Mode:	**Wireless charger**	**Test Engineer:**	**Ace**
Note:			

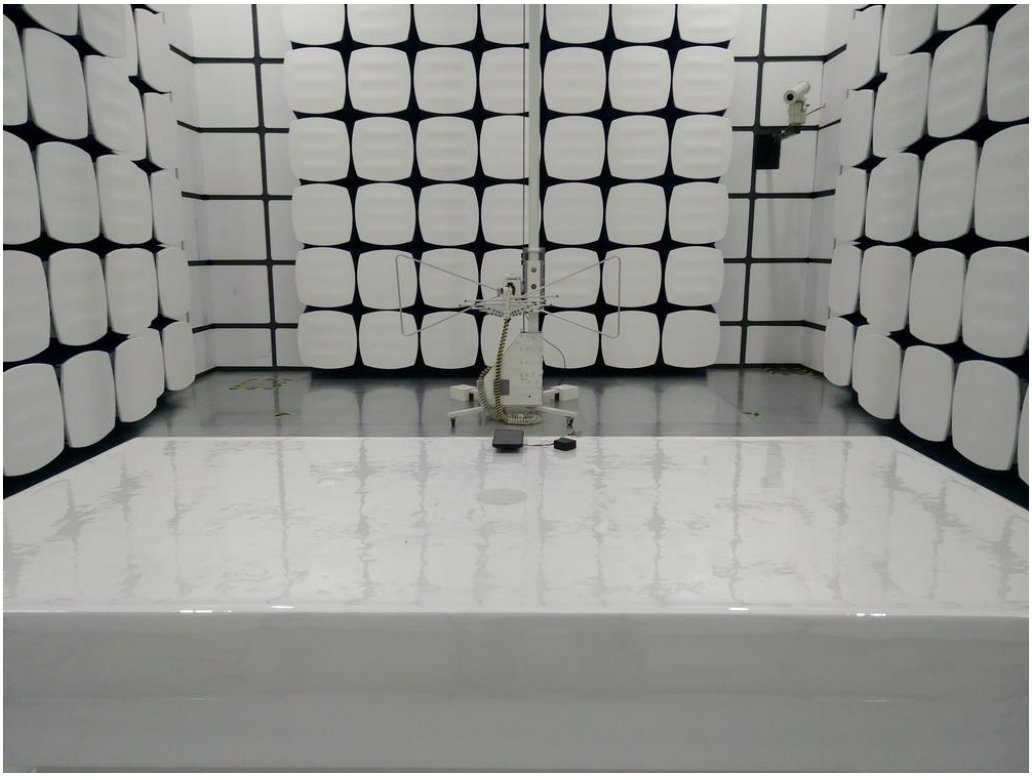
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Remark
1 *	44.1202	46.30	-15.87	30.43	40.00	-9.57	QP	
2	56.8914	41.02	-17.26	23.76	40.00	-16.24	QP	
3	135.5062	39.25	-12.51	26.74	43.50	-16.76	QP	
4	162.8959	38.35	-11.93	26.42	43.50	-17.08	QP	
5	245.9509	40.02	-13.86	26.16	46.00	-19.84	QP	
6	431.0316	35.74	-9.59	26.15	46.00	-19.85	QP	

Site:	**LAB**	**Antenna::Vertical**	**Temperature(C):26(C)**
Limit:	**FCC Part 15 C 3m Radiation**		**Humidity(%):60%**
EUT:	**Wireless Charger**	**Test Time:**	**2019/06/13 8:54:28**
M/N.:	**RL568-1**	**Power Rating:**	**AC 120V/60Hz**
Mode:	**Wireless charger**	**Test Engineer:**	**Ace**
Note:			

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Remark
1 *	44.5086	52.30	-15.86	36.44	40.00	-3.56	QP	
2	57.3923	49.26	-17.37	31.89	40.00	-8.11	QP	
3	59.4405	49.60	-17.78	31.82	40.00	-8.18	QP	
4	136.6993	41.23	-12.38	28.85	43.50	-14.65	QP	
5	245.9509	39.58	-13.86	25.72	46.00	-20.28	QP	
6	427.2695	36.58	-9.68	26.90	46.00	-19.10	QP	

5.6 Radiated Measurement Photos





6 20db Bandwidth

6.1 20dB Bandwidth Limit

None: for reporting purposed only.

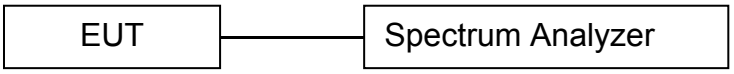
6.2 Test Instruments

Refer a test equipment and calibration data table in this test report.

6.3 Test Procedure

The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30Hz RBW and 100Hz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

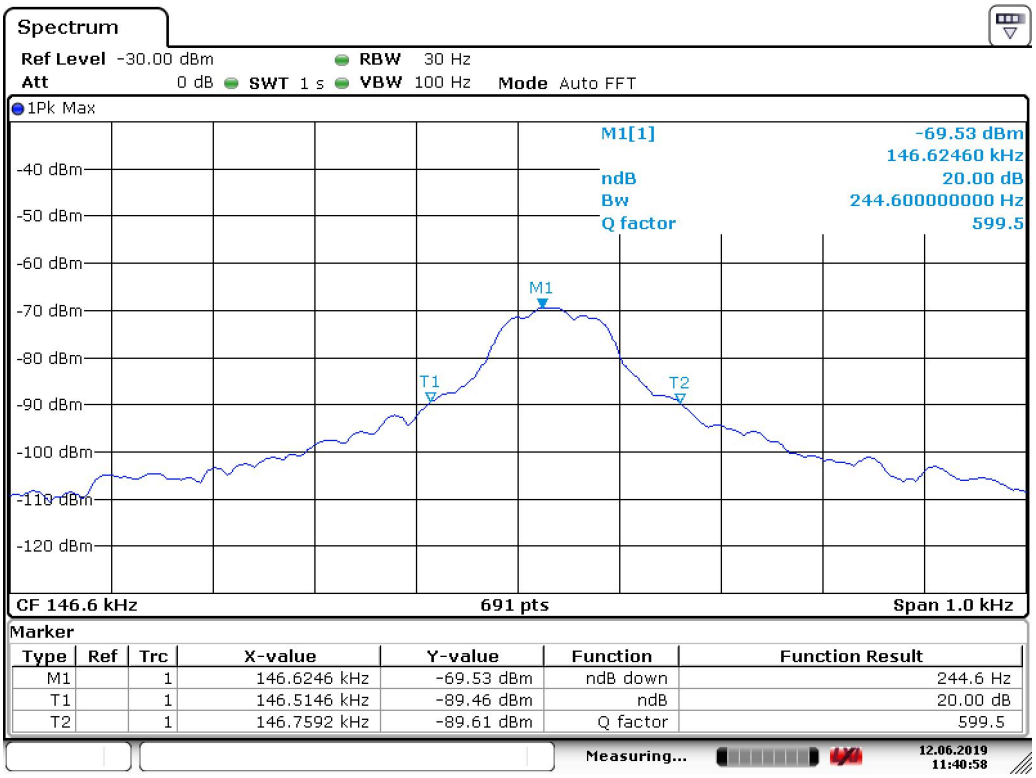
6.4 Test Setup



6.5 Test Result

Frequency (KHz)	20dB Bandwidth (Hz)	Results
146.6	244.6	PASS

20 dB Bandwidth Test plot



Date: 12.JUN.2019 11:40:57

7 Antenna Application

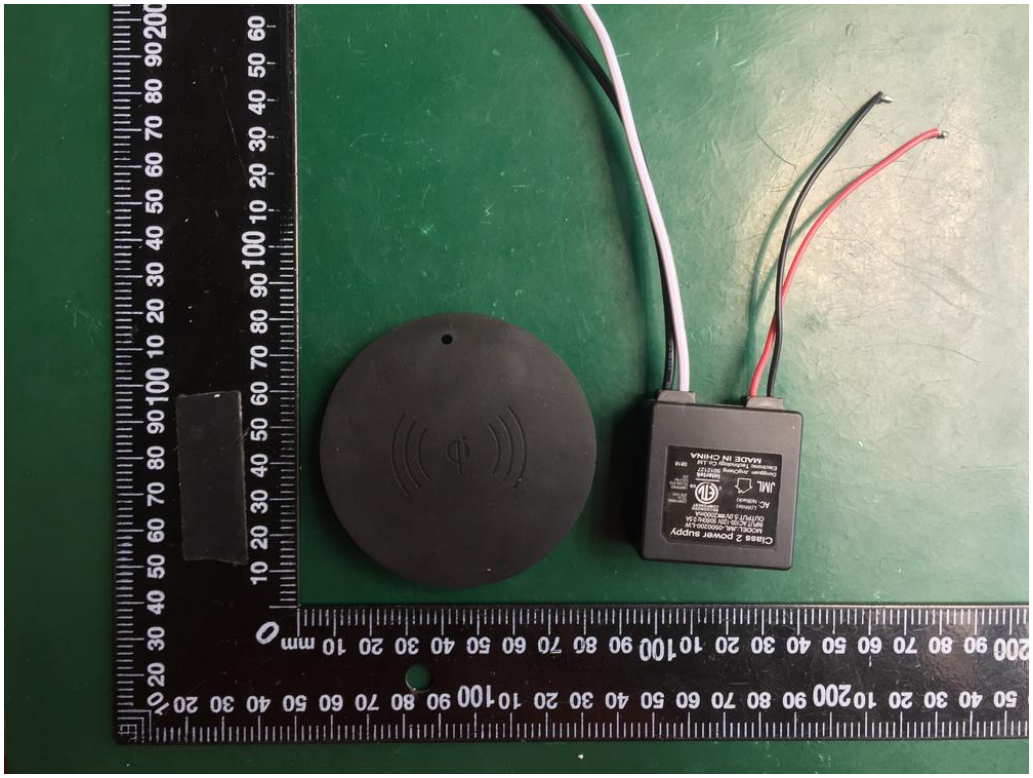
7.1 Antenna requirement

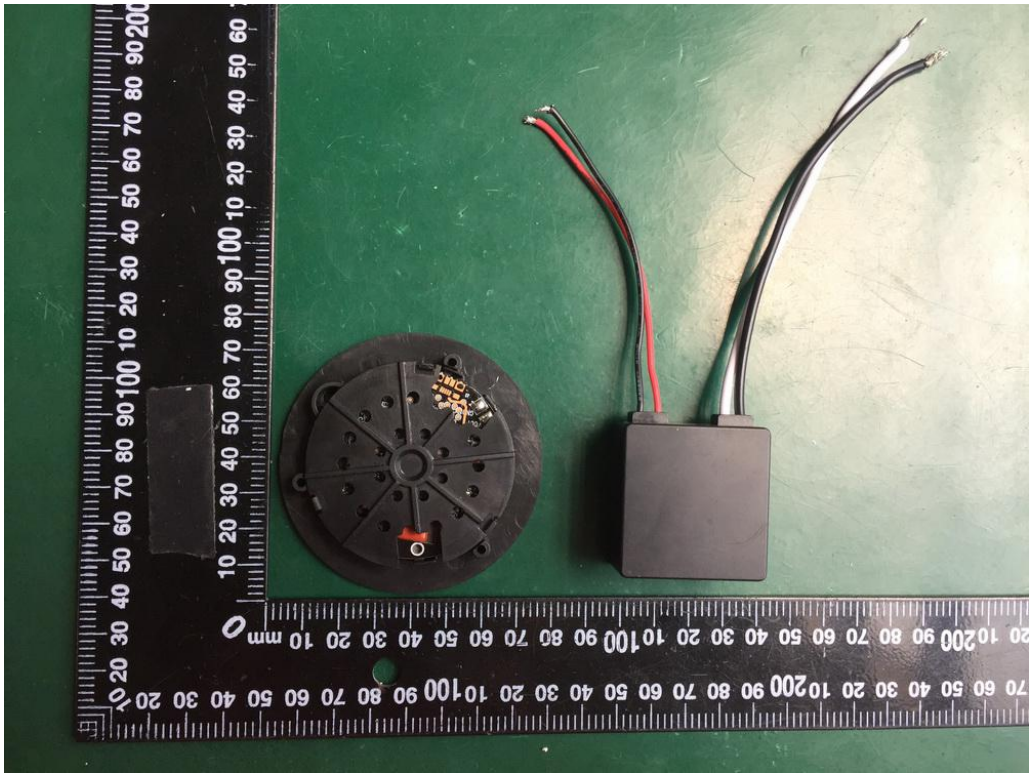
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

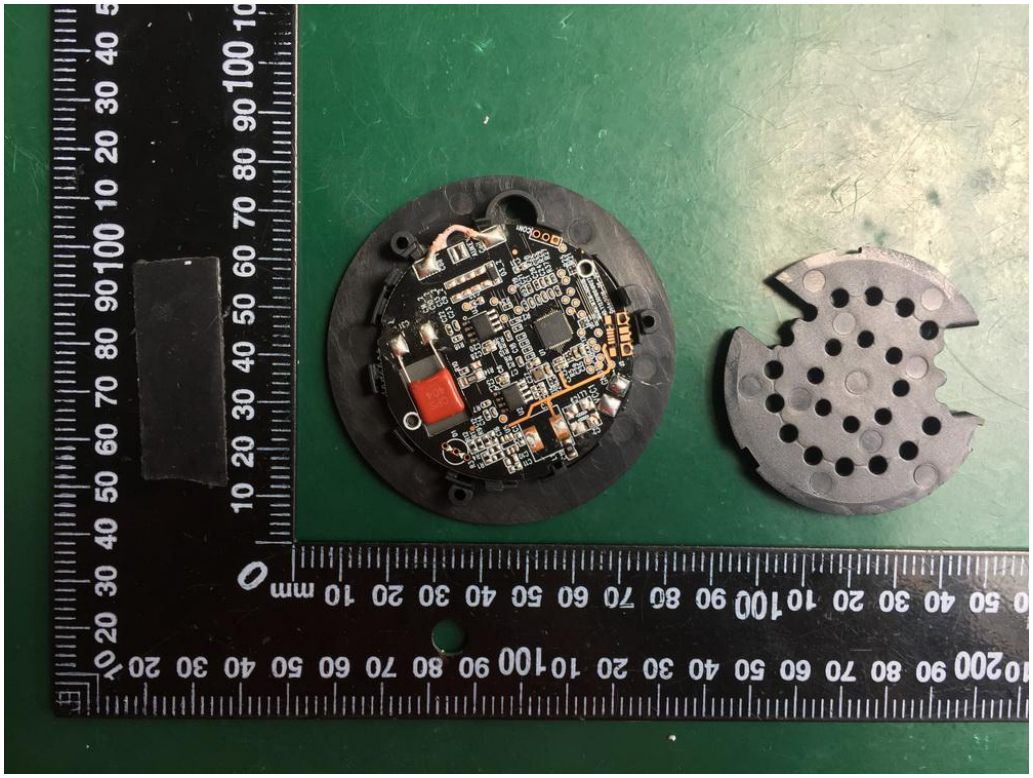
7.2 Result

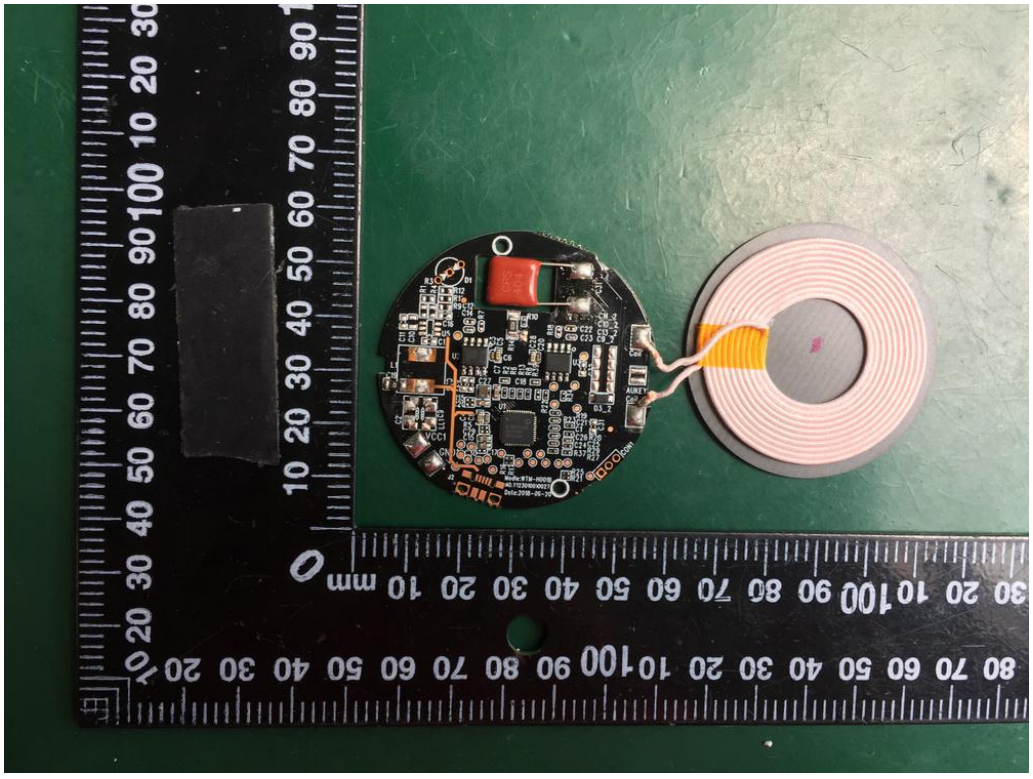
The EUT's antenna, permanent attached antenna, used an Induction coil and integrated on PCB, The antenna's gain meets the requirement.

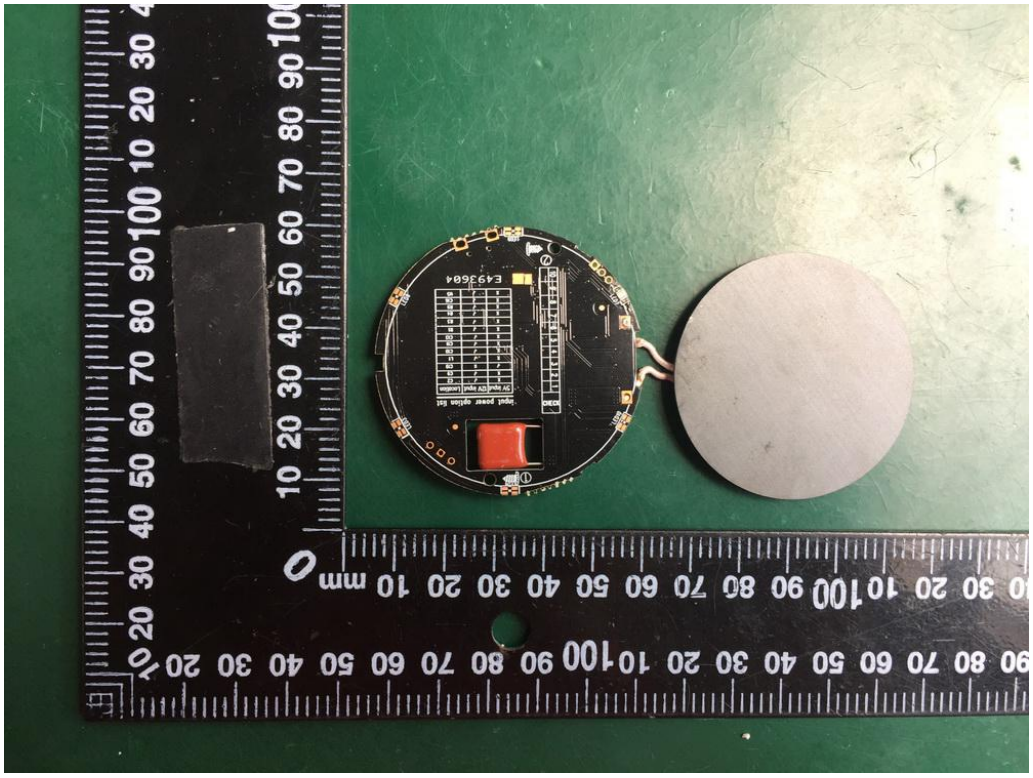
APPENDIX
(Photos of EUT)


Class 2 Power Supply
MADE IN CHINA









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