FCC TEST REPORT

Client Name	:	Case-Mate.Inc.
Address	:	7000 Central Pkwy., Ste. 1050 Atlanta GA 30328-4590 United States
Product Name	:	Power Disc Wireless Charger
Date	:	Apr. 13, 2020

Shenzhen Anbotek Compliance Laboratory Limited

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TEST REPORT

Applicant	:	Case-Mate.Inc.
Manufacturer	:	Dongguan Tyjin Electronics Co., Ltd.
Product Name	:	Power Disc Wireless Charger
Model No.	:	CM042200, C-077, C-129
Trade Mark	:	CASE MATE , , TYJIN
Rating(s)	:	Input: DC 5V, 2A/DC 12V, 1.5A(via adapter input:AC 100~240V,50/60Hz ,0.5A;output:12V 1.5A) Wireless output: 5W/7.5W/10W
Test Standard(s)	**:**	**FCC Part15 Subpart C 2019, Paragraph 15.209**
Test Method(s)	**:**	**ANSI C63.10: 2013**

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Receipt	Feb. 28, 2020
Date of Test	Feb. 28~Mar. 16, 2020
Prepared By	(Engineer / Dolly Mo)
Reviewer	(Supervisor / Bibo Zhang)
Approved & Authorized Signer	(Manager / Tom Chen)

1. General Information

1.1. Client Information

Applicant	:	Case-Mate.Inc.
Address	:	7000 Central Pkwy., Ste. 1050 Atlanta GA 30328-4590 United States
Manufacturer	:	Dongguan Tyjin Electronics Co., Ltd.
Address	:	Shitouling Industrial Zone, Wulian Village, Fenggang Town, Dongguan, China
Factory	:	Dongguan Tyjin Electronics Co., Ltd.
Address	:	Shitouling Industrial Zone, Wulian Village, Fenggang Town, Dongguan, China

1.2. Description of Device (EUT)

Product Name	:	Power Disc Wireless Charger	
Model No.	:	CM042200, C-077, C-129 (Note: All samples are the same except the model appearance, so we prepare "CM042200" for test only.)	
Trade Mark	:	CASE MATE , , TYJIN	
Test Power Supply	:	AC 120V, 60Hz for adapter	
Test Sample No.	:	1-2-1(Normal Sample), 1-2-1(Engineering Sample)	
Product Description	:	Operation Frequency:	110.1-205KHz
		Modulation Type:	ASK
		Antenna Type:	Inductive loop coil Antenna
		Antenna Gain(Peak):	0 dBi
Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.			

1.3. Auxiliary Equipment Used During Test

Adapter	:	Tyjin
		M/N: C-040 S/N: 201202102100876 Input: 100-240V~ 50/60Hz, 0.5A Output: DC 3.6-6V, 3A/DC 6-9V, 2A/DC 9-12V, 1.5A

1.4. 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	Full load, Wireless charger module

For Conducted Emission	
Final Test Mode	Description
Mode 1	Full load, Wireless charger module

For Radiated Emission	
Final Test Mode	Description
Mode 1	Full load, Wireless charger module

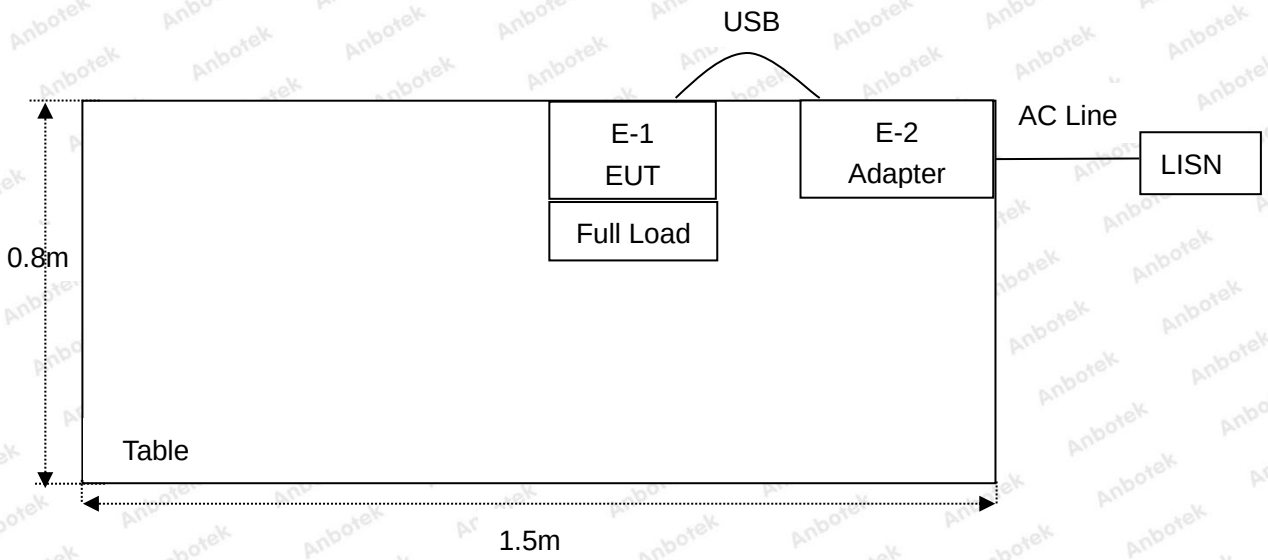
Note: (1)Test channel is 0.1250MHz.

(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.

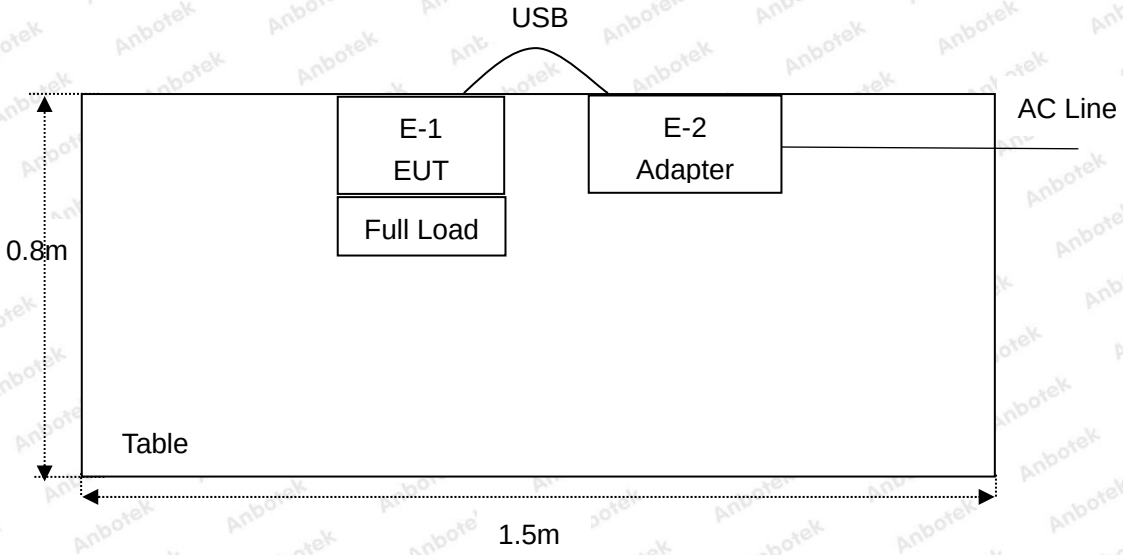
(3)5W/7.5W/10W All modes have been tested. This report only show the test result of the worst case(Full load 10W).

1.5. Description Of Test Setup

CE



RE



1.6. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	Nov. 04, 2019	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESPI3	101604	Nov. 04, 2019	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Nov. 04, 2019	1 Year
4.	MAX Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 04, 2019	1 Year
5.	Preamplifier	SKET Electronic	BK1G18G30D	KD17503	Nov. 04, 2019	1 Year
6.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 01, 2019	1 Year
7.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 01, 2019	1 Year
8.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Nov. 01, 2019	1 Year
9.	Horn Antenna	A-INFO	LB-180400-KF	J211060628	Nov. 01, 2019	1 Year
10.	Pre-amplifier	SONOMA	310N	186860	Nov. 04, 2019	1 Year
11.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
12.	RF Test Control System	YIHENG	YH3000	2017430	Nov. 04, 2019	1 Year
13.	Power Sensor	DAER	RPR3006W	15I00041SN045	Nov. 04, 2019	1 Year
14.	Power Sensor	DAER	RPR3006W	15I00041SN046	Nov. 04, 2019	1 Year
15.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 04, 2019	1 Year
16.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Nov. 04, 2019	1 Year
17.	Signal Generator	Agilent	E4421B	MY41000743	Nov. 04, 2019	1 Year
18.	DC Power Supply	LW	TPR-6420D	374470	Nov. 04, 2019	1 Year
19.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80B	N/A	Nov. 04, 2019	1 Year

1.7. Measurement Uncertainty

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

1.8. Description of Test Facility

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

FCC-Registration No.: 184111

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registed and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 184111, September 27, 2019.

ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A, March 07, 2019.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.
1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102

2. Summary of Test Results

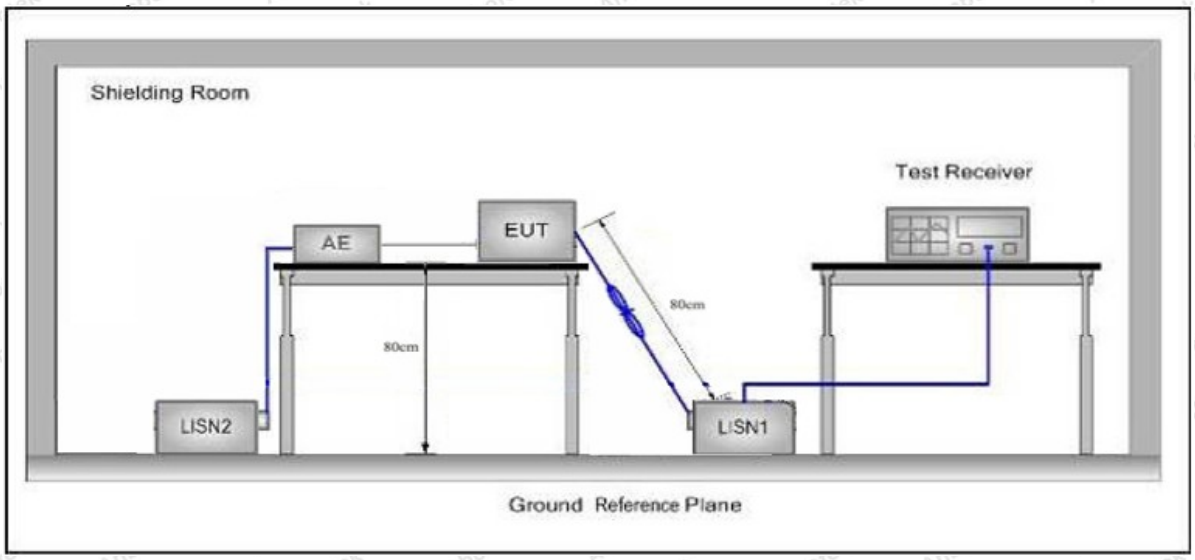
Standard Section	Test Item	Result
FCC Part 15, Paragraph 15.207	Conducted Emission Test	PASS
FCC Part 15, Paragraph 15.209(a)(f)	Spurious Emission	PASS
Part 15.203	Antenna Requirement	PASS

3. Conducted Emission Test

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

3.2. Test Setup



3.3. 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.

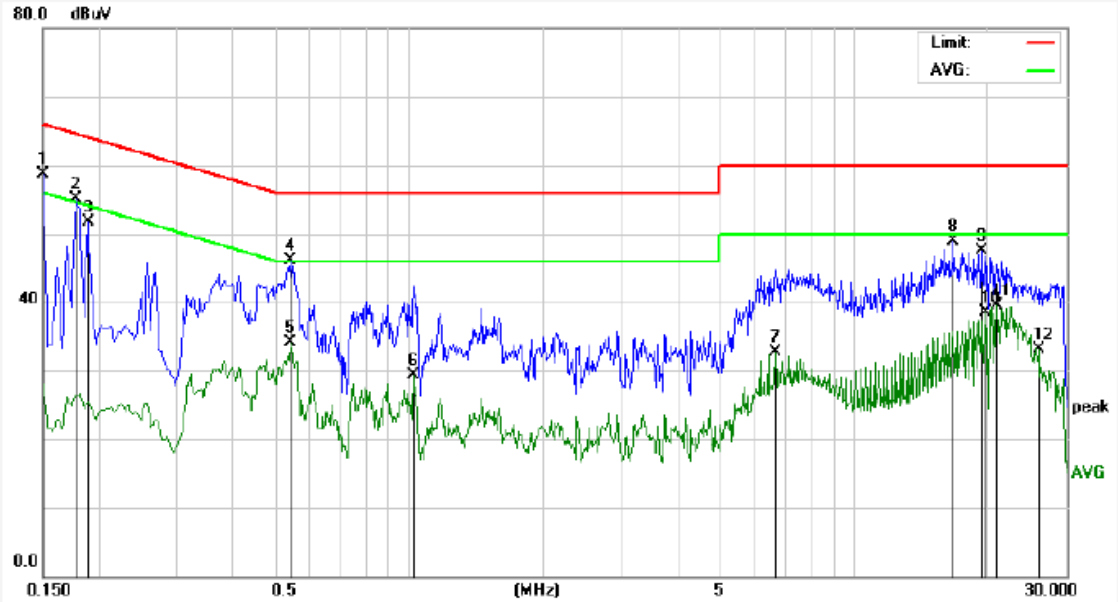
The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

Please to see the following pages

Conducted Emission Test Data

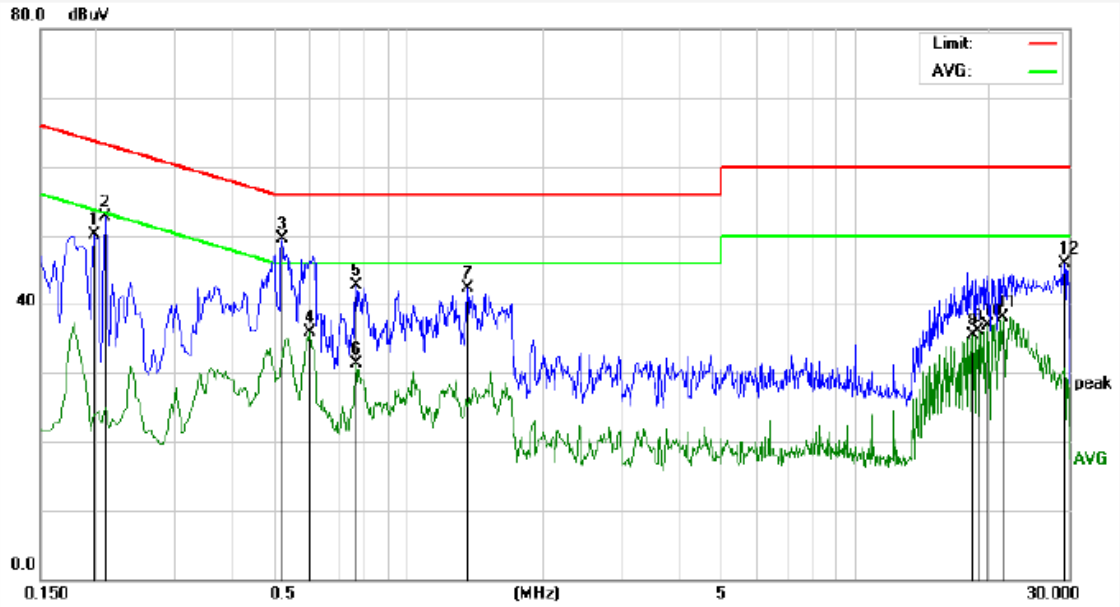
Test Site: 1# Shielded Room
Operating Condition: Mode 1
Test Specification: AC 120V, 60Hz for adapter
Comment: Live Line
Tem.: 22℃ Hum.: 51%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1500	38.77	19.90	58.67	65.99	-7.32	QP	
2	0.1780	35.21	19.90	55.11	64.57	-9.46	QP	
3	0.1900	31.85	19.90	51.75	64.03	-12.28	QP	
4	0.5420	26.17	19.99	46.16	56.00	-9.84	QP	
5	0.5420	14.17	19.99	34.16	46.00	-11.84	AVG	
6	1.0220	9.19	20.12	29.31	46.00	-16.69	AVG	
7	6.6460	12.42	20.25	32.67	50.00	-17.33	AVG	
8	16.7460	28.59	20.29	48.88	60.00	-11.12	QP	
9	19.3020	27.18	20.33	47.51	60.00	-12.49	QP	
10	19.8100	18.11	20.34	38.45	50.00	-11.55	AVG	
11	20.8340	19.15	20.33	39.48	50.00	-10.52	AVG	
12	25.9420	12.86	20.28	33.14	50.00	-16.86	AVG	

Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: Mode 1
Test Specification: AC 120V, 60Hz for adapter
Comment: Neutral Line
Tem.: 22℃ Hum.: 51%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1980	30.11	19.90	50.01	63.69	-13.68	QP	
2	0.2100	32.83	19.90	52.73	63.20	-10.47	QP	
3	0.5220	29.51	19.99	49.50	56.00	-6.50	QP	
4	0.6020	15.97	20.01	35.98	46.00	-10.02	AVG	
5	0.7660	22.63	20.06	42.69	56.00	-13.31	QP	
6	0.7660	11.25	20.06	31.31	46.00	-14.69	AVG	
7	1.3540	22.21	20.13	42.34	56.00	-13.66	QP	
8	18.2740	15.20	20.31	35.51	50.00	-14.49	AVG	
9	18.7860	15.80	20.32	36.12	50.00	-13.88	AVG	
10	19.8100	16.62	20.34	36.96	50.00	-13.04	AVG	
11	21.3420	17.88	20.32	38.20	50.00	-11.80	AVG	
12	29.2620	25.54	20.27	45.81	60.00	-14.19	QP	

4. Radiation Spurious Emission and Band Edge

4.1. 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.

4.2. Test Setup

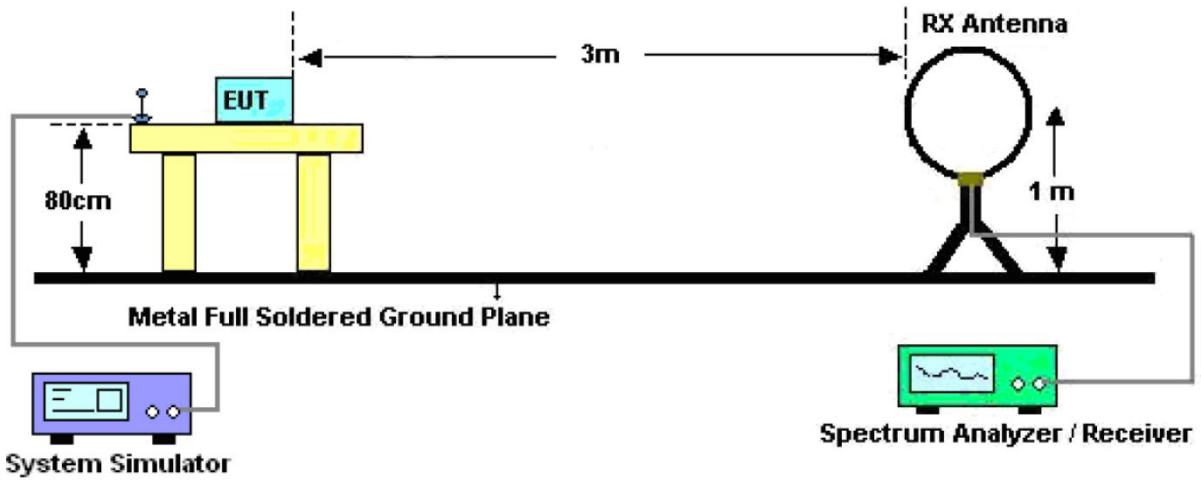


Figure 1. Below 30MHz

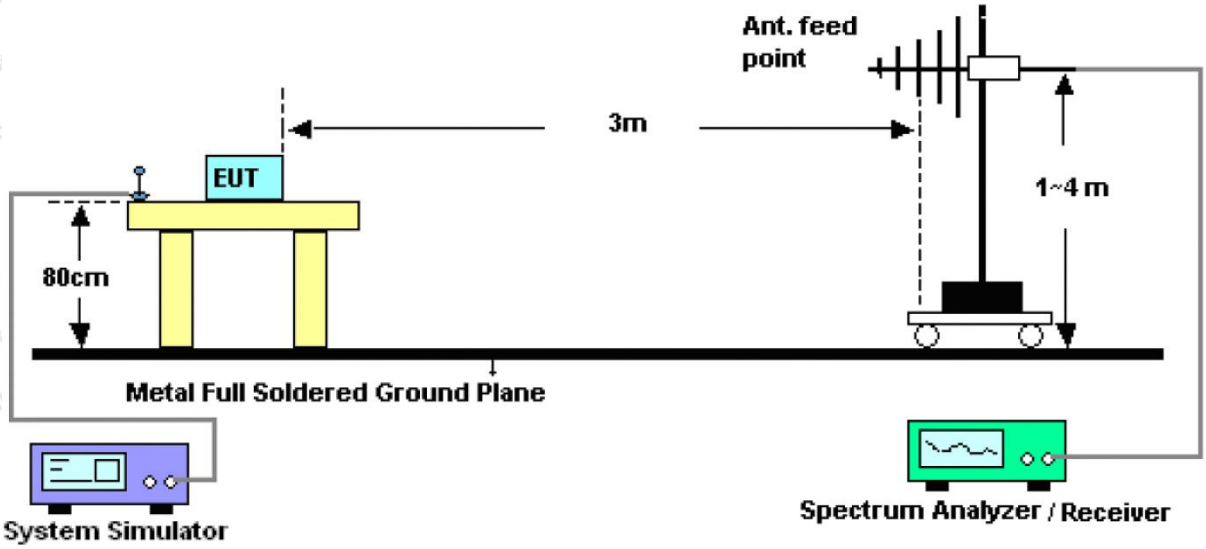


Figure 2. 30MHz to 1GHz

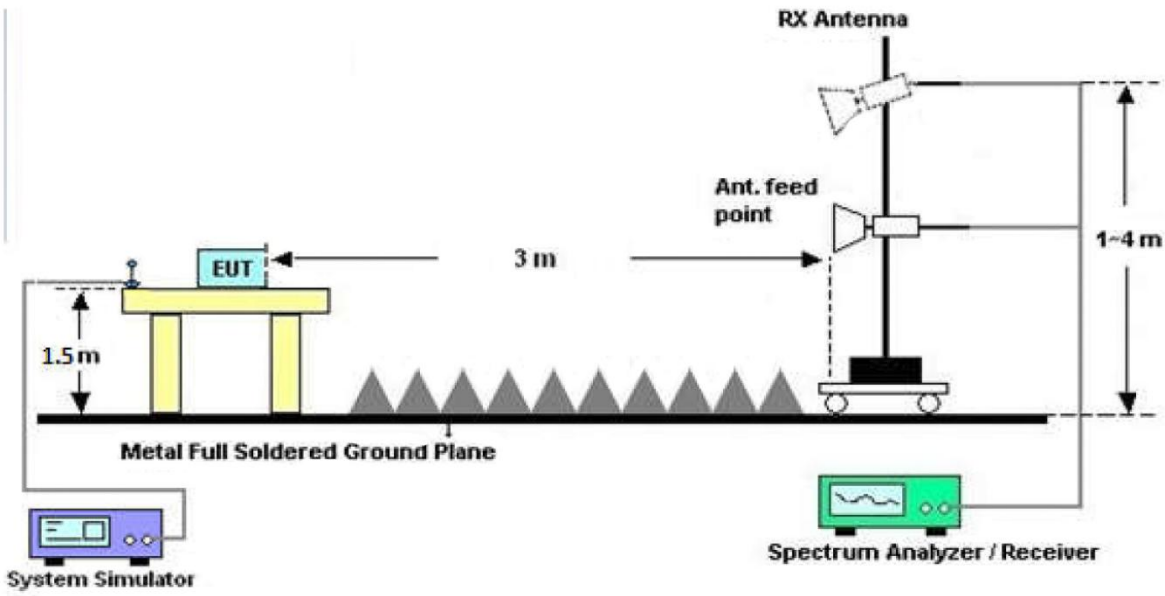


Figure 3. Above 1 GHz

4.3. 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.

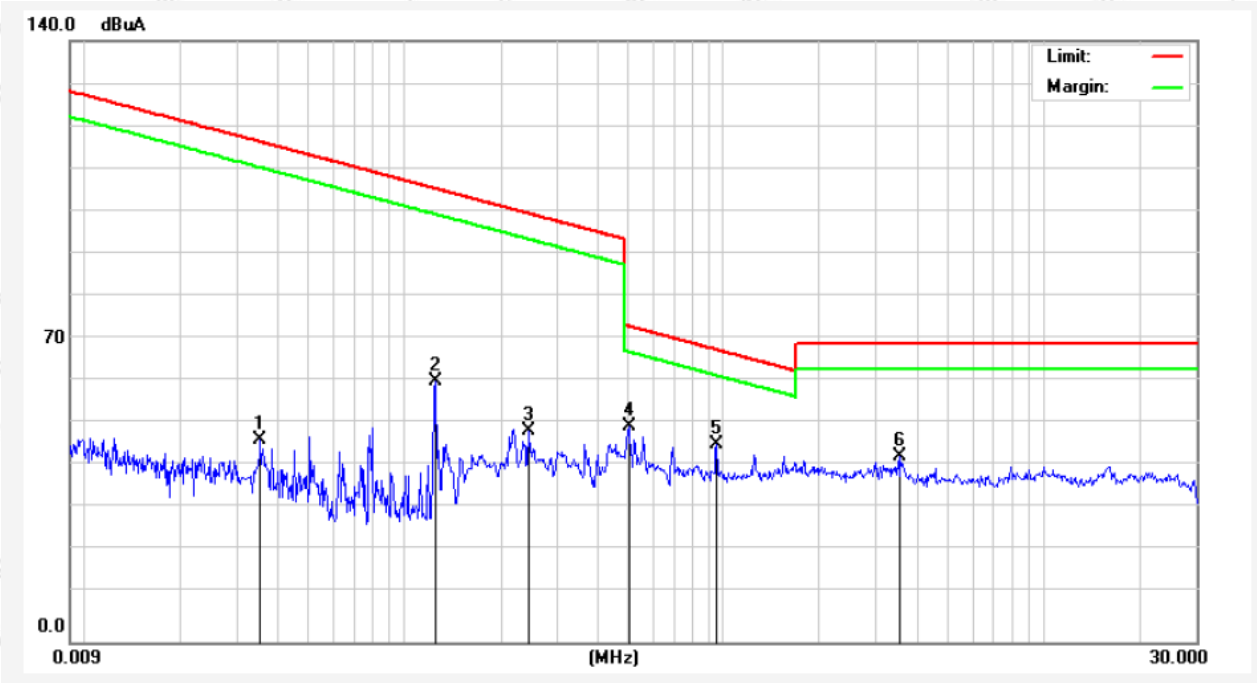
4.4. Test Data

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

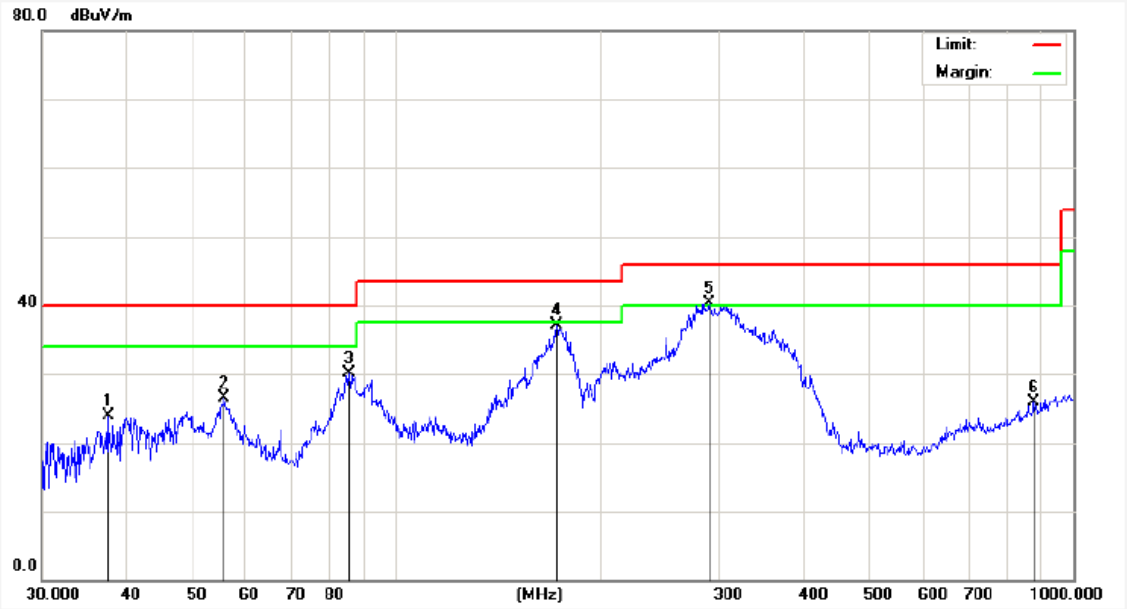


Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	degree (dge)
0.0354	34.67	19.28	2.53	0	56.48	136.50	-80.02	Peak	351
0.0354	25.22	19.28	2.53	0	47.03	116.50	-69.47	AV	351
0.1250	48.00	19.30	2.54	0	69.84	125.60	-55.76	Peak	217
0.1250	38.73	19.30	2.54	0	60.57	105.60	-45.03	AV	217
0.2459	36.65	19.30	2.54	0	58.49	119.75	-61.26	Peak	281
0.2459	27.22	19.30	2.54	0	49.06	99.75	-50.69	AV	281
0.5060	28.04	19.53	2.59	0	50.16	73.52	-23.36	QP	317
0.9495	23.93	19.53	2.59	0	46.05	68.05	-22.00	QP	29
3.5659	21.07	19.53	2.59	0	43.19	69.54	-26.35	QP	173

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)

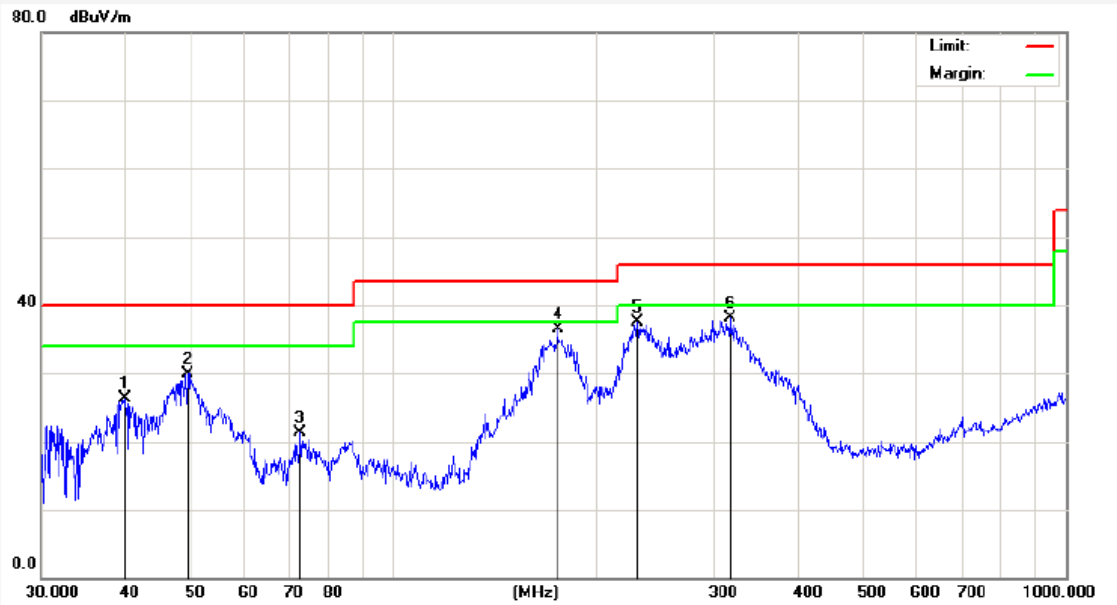
Test Mode:	Mode 1
Power Source:	AC 120V, 60Hz for adapter
Polarization:	Vertical
Temp.(℃)/Hum.(%RH):	24.7℃/51%RH
Distance:	3m



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	37.5479	42.30	-18.46	23.84	40.00	-16.16	QP	100	360	
2	55.8047	44.68	-18.25	26.43	40.00	-13.57	QP	100	0	
3	85.2980	52.70	-22.67	30.03	40.00	-9.97	QP	100	360	
4	172.5988	60.06	-23.03	37.03	43.50	-6.47	QP	100	0	
5	290.0172	60.34	-19.97	40.37	46.00	-5.63	QP	100	360	
6	875.2470	32.92	-6.92	26.00	46.00	-20.00	QP	100	0	

Test Results (30~1000MHz)

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



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	39.9942	44.02	-17.77	26.25	40.00	-13.75	peak			
2	49.5328	48.06	-18.07	29.99	40.00	-10.01	peak			
3	72.8466	44.22	-22.87	21.35	40.00	-18.65	peak			
4	175.6516	59.62	-23.08	36.54	43.50	-6.96	peak			
5	230.9068	58.67	-21.13	37.54	46.00	-8.46	peak			
6	316.5890	55.83	-17.75	38.08	46.00	-7.92	peak			

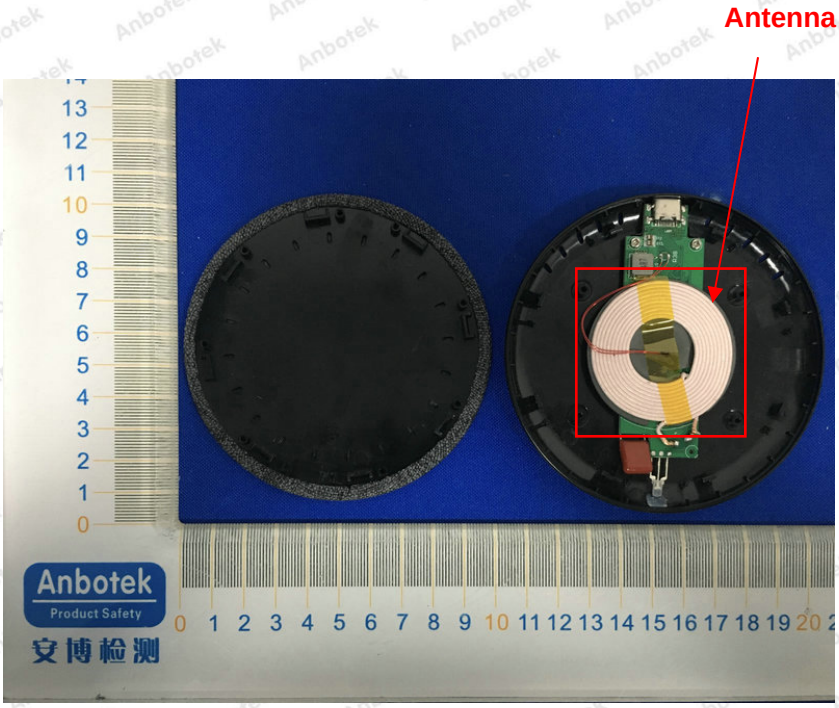
5. Antenna Requirement

5.1. 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

5.2. 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.



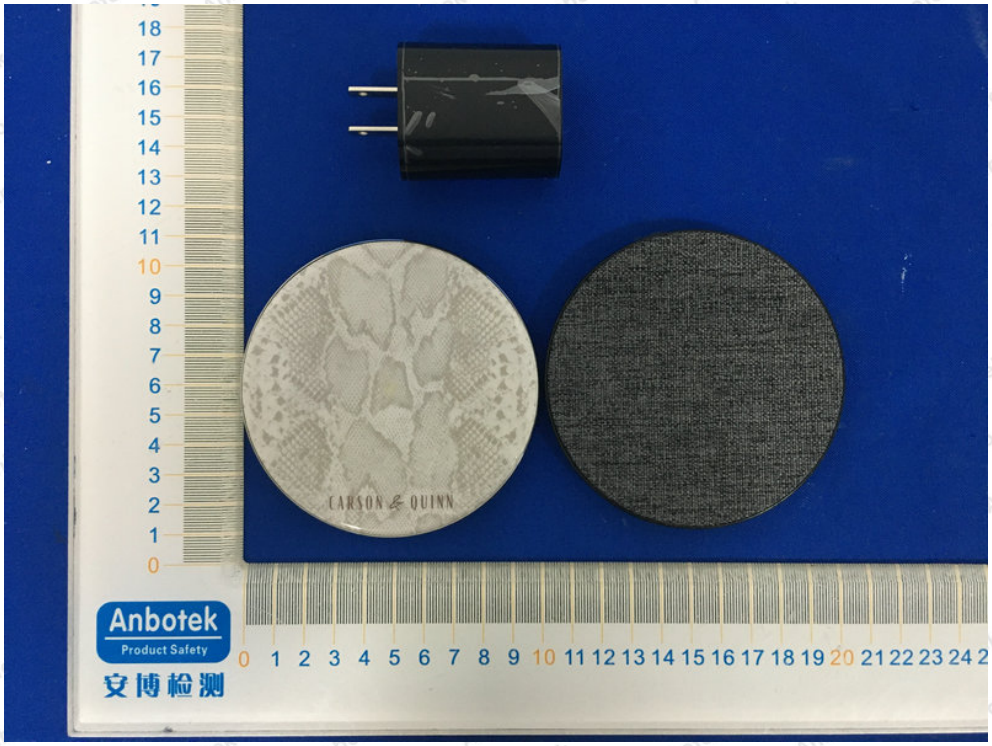
APPENDIX I -- TEST SETUP PHOTOGRAPH

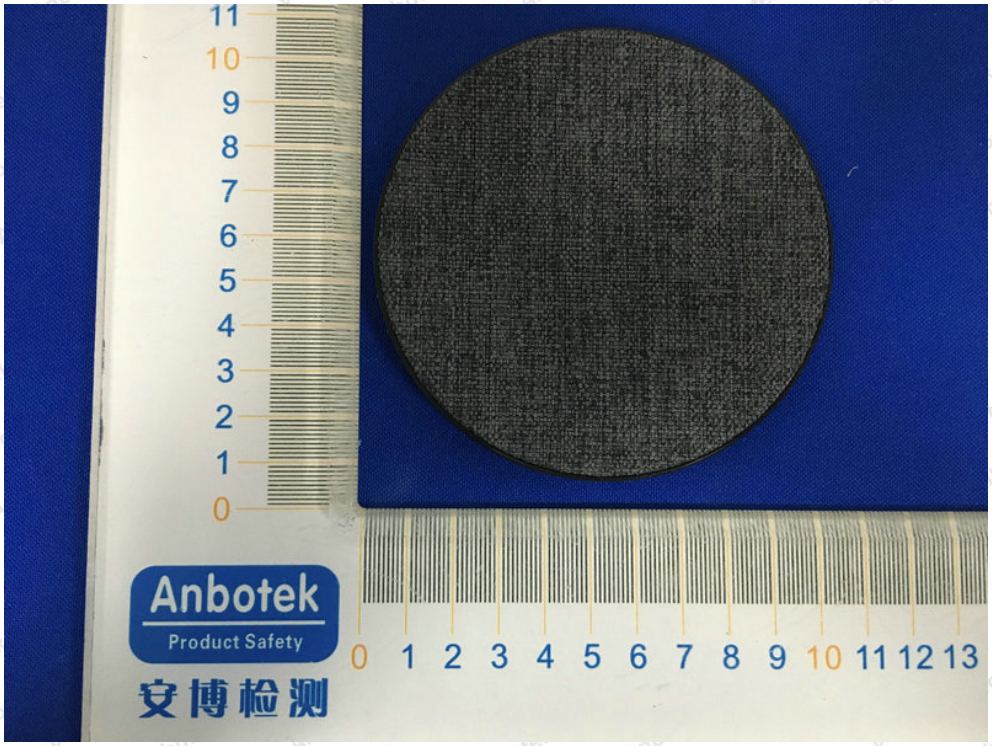
Photo of Conducted Emission Measurement

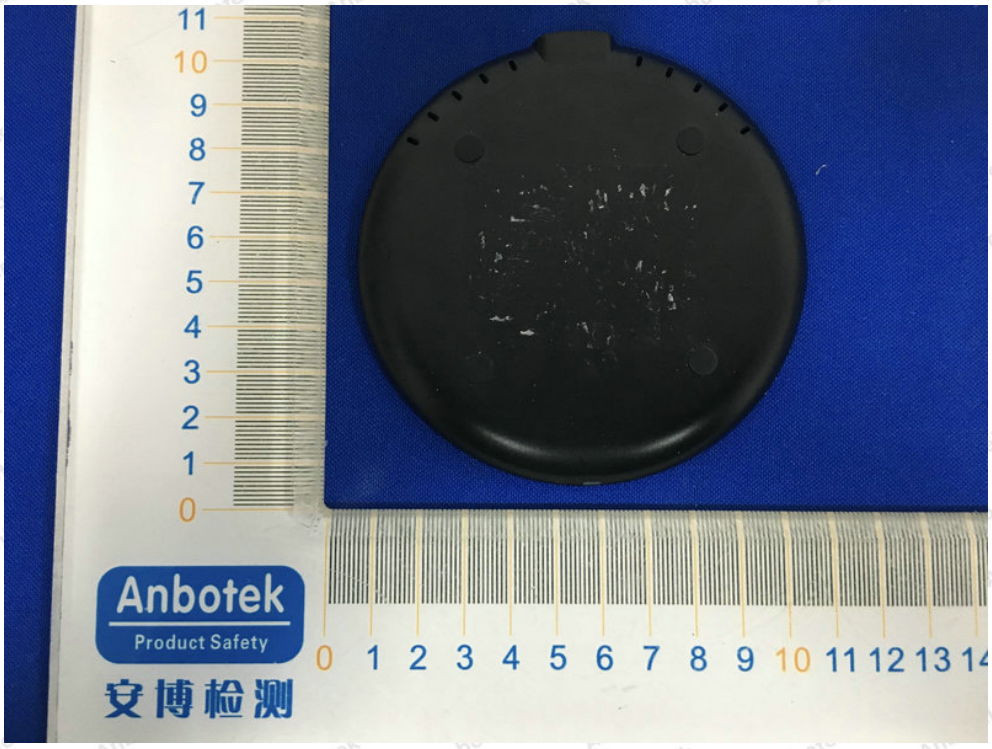
Photo of Radiation Emission Test

Product Safety

APPENDIX II -- EXTERNAL PHOTOGRAPH



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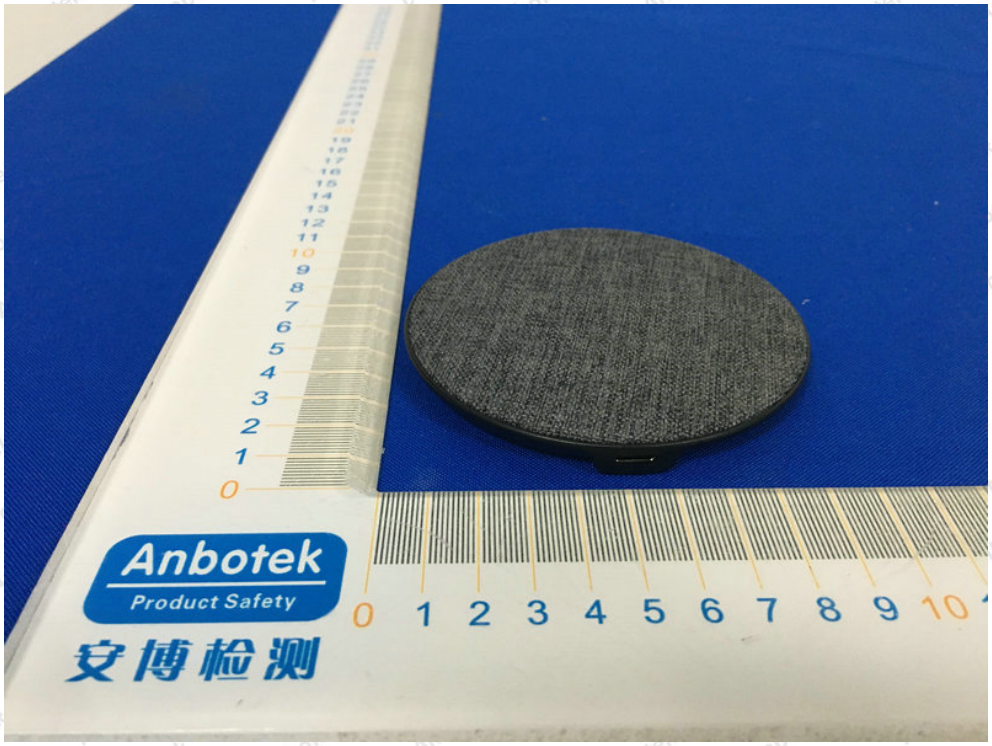
Product Safety
安博检测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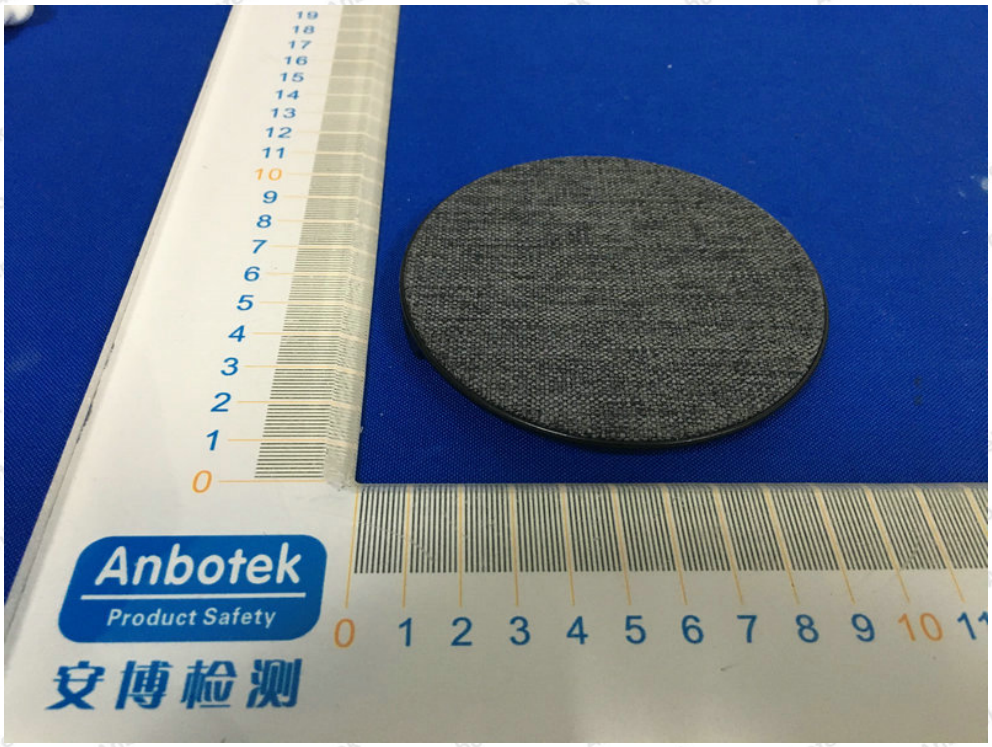
Product Safety
安博检测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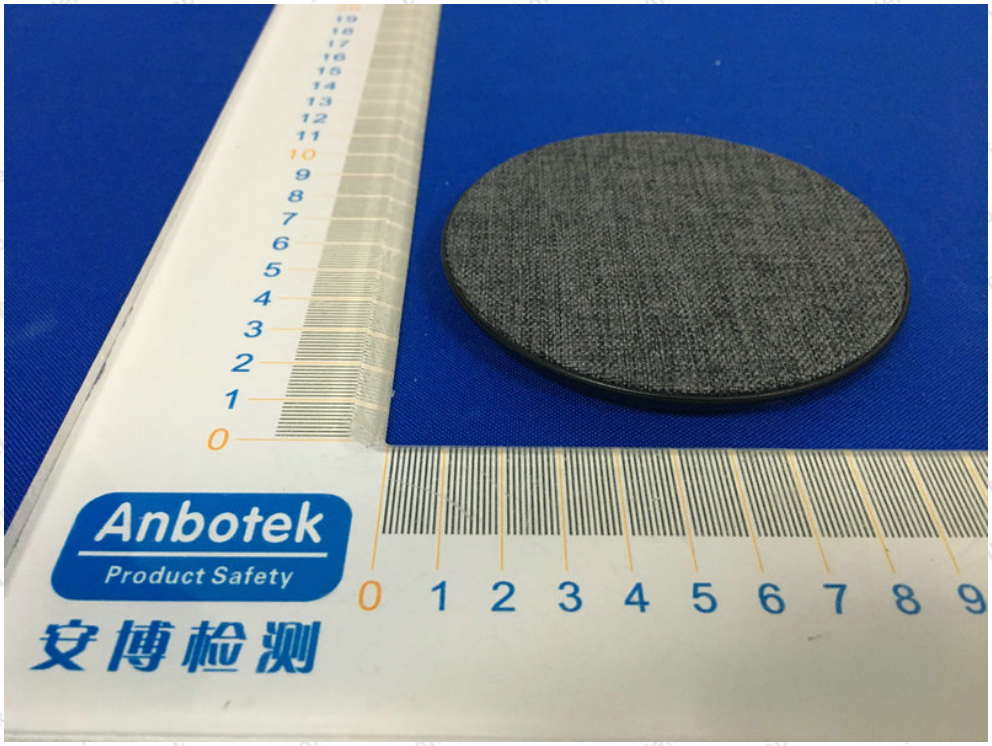
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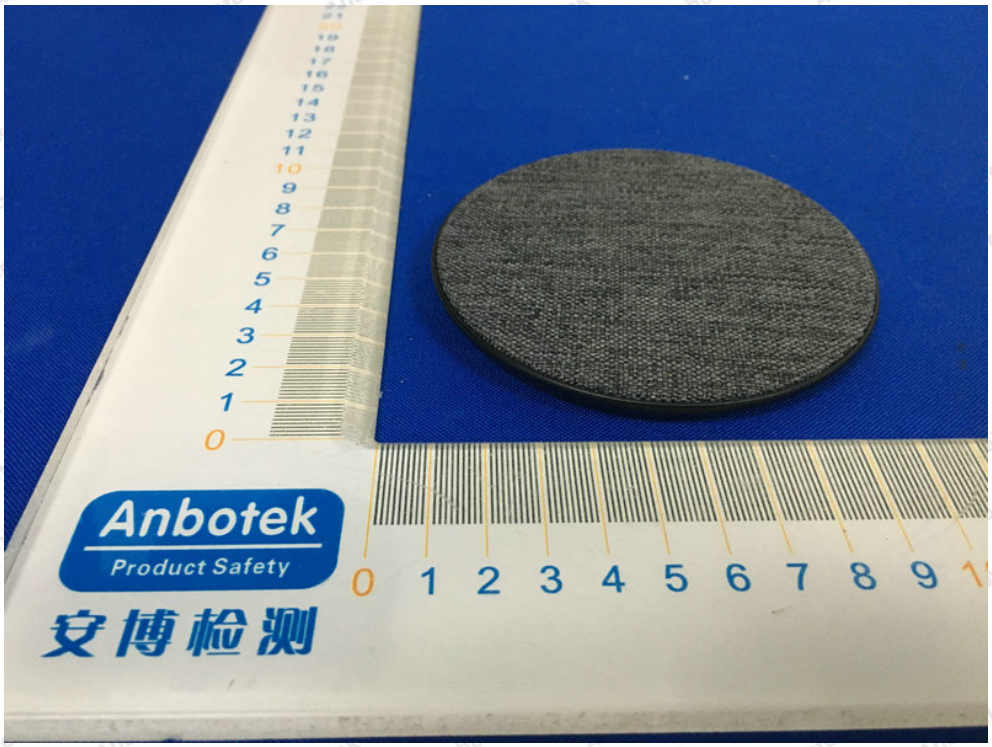
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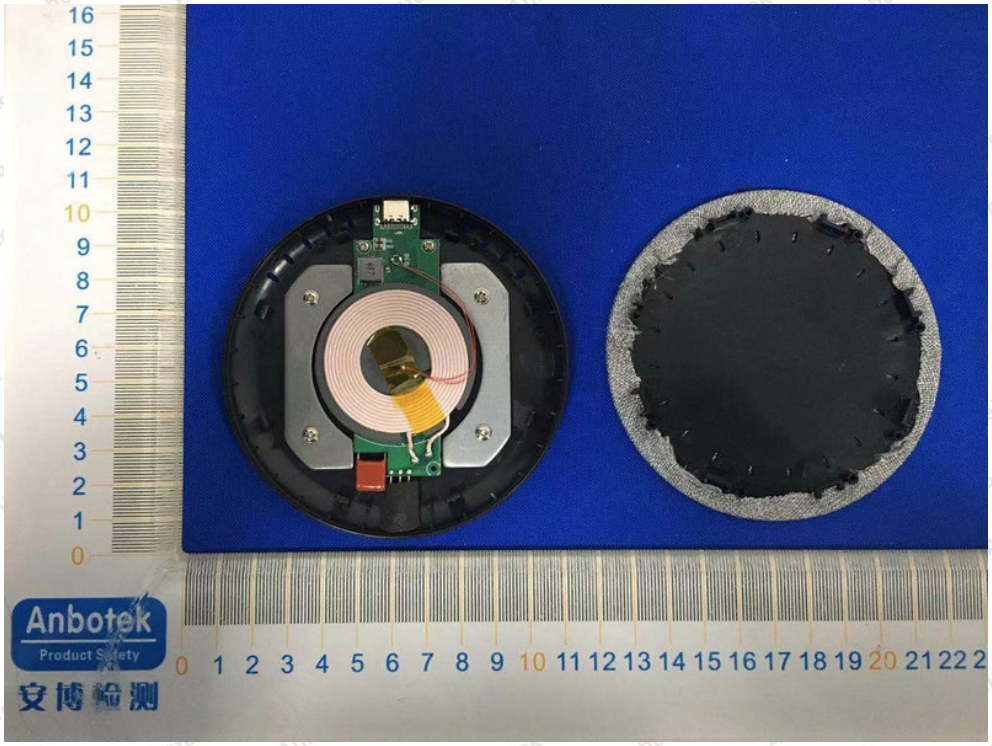
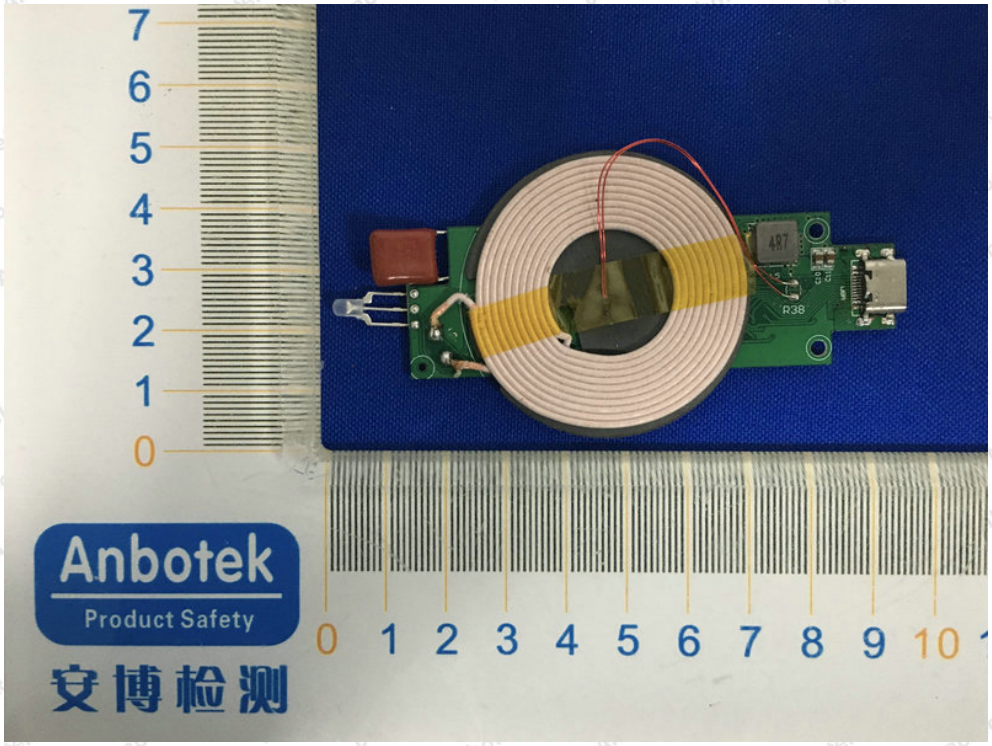
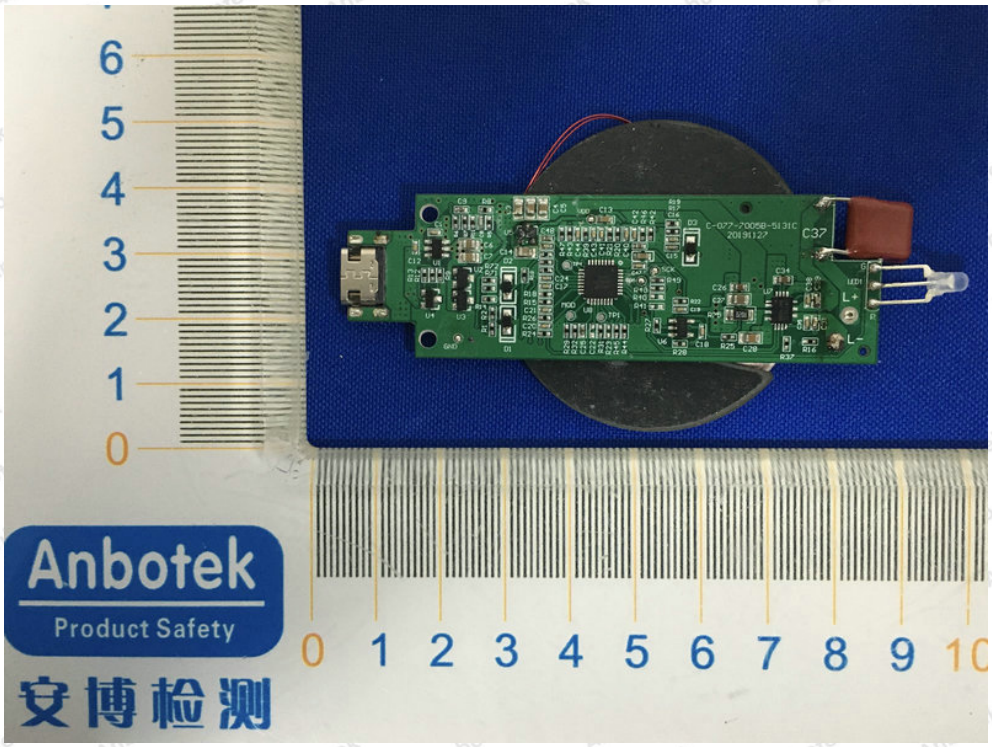
APPENDIX III -- INTERNAL PHOTOGRAPH



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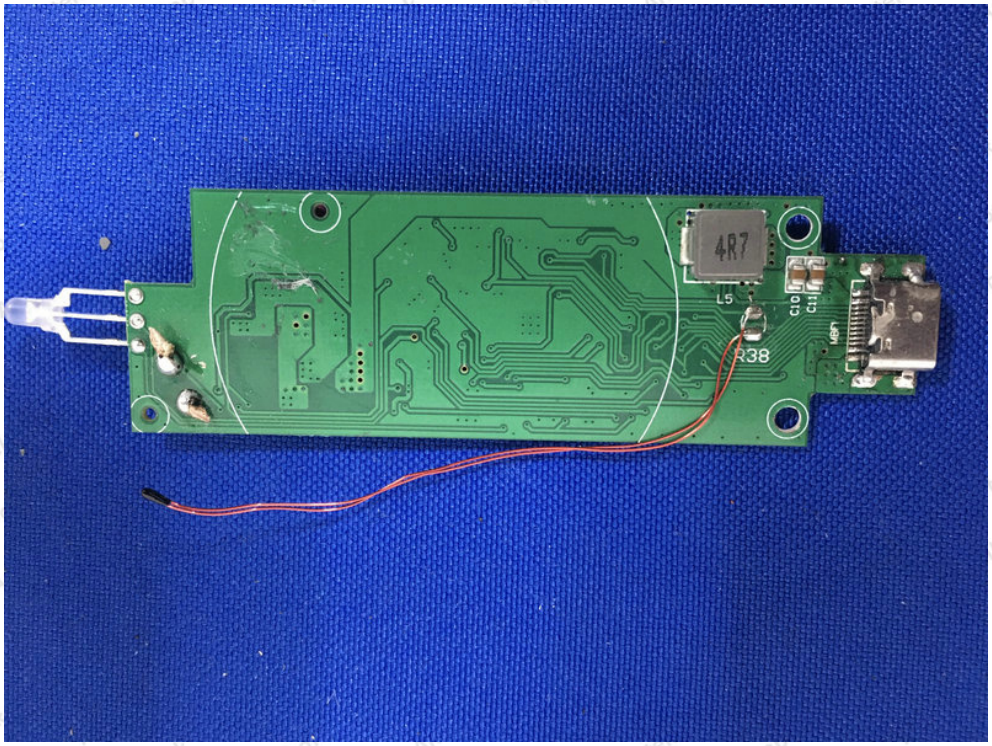
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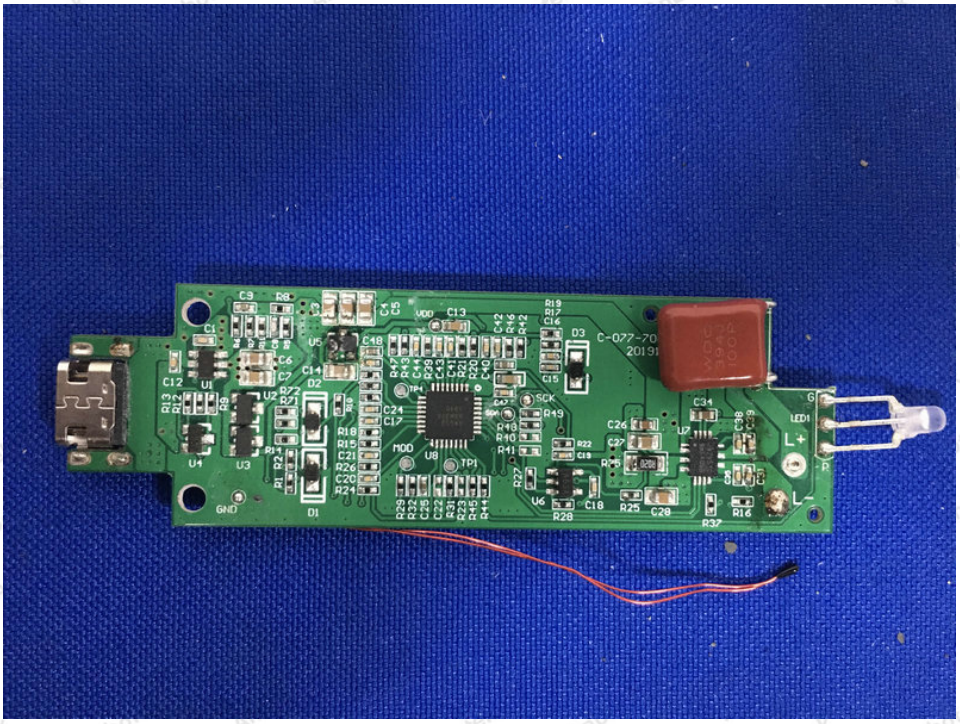

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