

FCC Test Report

Client Name : Shenzhen Lingyi Innovation Tech Co., Ltd.

Address : 12 F, Block C, Central Avenue Building, Xixiang BLVD
West, Baoan District, Shenzhen, China

Product Name : Wireless Charging Case

Date : Oct. 29, 2019

Shenzhen Anbotech Compliance Laboratory Limited

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TEST REPORT

Applicant : Shenzhen Lingyi Innovation Tech Co., Ltd.
Manufacturer : Shenzhen Lingyi Innovation Tech Co., Ltd.
Product Name : Wireless Charging Case
Model No. : APM1001, APM1002
Trade Mark : N.A.
Rating(s) : Input: DC 5V, 0.5A
Output: DC 5V, 0.5A

Test Standard(s) : FCC Rules and Regulations Part 15 Subpart B: 2018

Test Method(s) : ANSI C63.4-2014

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited To determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart B Class B limits both radiated and conducted emissions. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited Is assumed full responsibility for the accuracy and completeness of these measurements.

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

Date of Receipt

Aug. 16, 2019

Date of Test

Aug. 16~Oct. 26, 2019

Prepared By



Dolly Mo

(Engineer / Dolly Mo)

Reviewer

Bibo Zhang

(Supervisor / Bibo Zhang)

Approved & Authorized Signer

Sally Zhang

(Manager / Sally Zhang)

1. General Information

1.1. Client Information

Applicant	:	Shenzhen Lingyi Innovation Tech Co., Ltd.
Address	:	12 F, Block C, Central Avenue Building, Xixiang BLVD West, Baoan District, Shenzhen, China
Manufacturer	:	Shenzhen Lingyi Innovation Tech Co., Ltd.
Address	:	12 F, Block C, Central Avenue Building, Xixiang BLVD West, Baoan District, Shenzhen, China
Factory	:	Shenzhen Lingyi Innovation Tech Co., Ltd.
Address	:	12 F, Block C, Central Avenue Building, Xixiang BLVD West, Baoan District, Shenzhen, China

1.2. Description of Device (EUT)

Product Name	:	Wireless Charging Case	
Model No.	:	APM1001, APM1002 (Note: All samples are the same except the model name, so we prepare "APM1001" for test only.)	
Trade Mark	:	N.A.	
Test Power Supply	:	AC 120V, 60Hz for adapter	
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)	
Product Description	:	Operation Frequency:	110.1-205KHz
		Modulation Type:	FSK
		Antenna Type:	Inductive loop coil Antenna
		Antenna Gain(Peak):	0 dBi
Product Description	:	Adapter:	N/A
Remark: (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.			

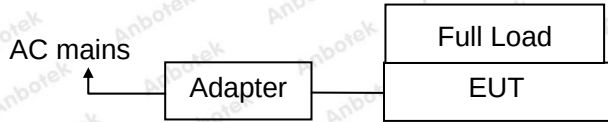
1.3. Auxiliary Equipment Used During Test

Adapter	:	Manufacturer: Anker Innovations Limited
		M/N: A2013
		Input: 100-240V 50-60Hz 0.7A
		Output: 3.6-6.5V=== 3A/ 6.5-9V=== 2A/ 9-12V=== 1.5A

1.4. Description of Test Mode

Pretest Mode	Description
Mode 1	Full load, Wireless charging module

Mode 1 Block Diagram of Test Setup



1.5. Test Summary

Test Items	Test Mode	Status
Power Line Conducted Emission Test (150KHz To 30MHz)	Mode 1	P
Radiated Emission Test (30MHz To 1000MHz)	Mode 1	P
P) Indicates “PASS”. N) Indicates “Not applicable”.		

1.6. Test Equipment List

Conducted Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	C/S Conducted Immunity Test System	FRANKONIA	CIT-10	126A1196/2012	Nov. 26, 2018	1 Year
2.	CDN	FRANKONIA	CDN - M2+ M3	A2210178/2012	Nov. 26, 2018	1 Year
3.	6dB Attenuator	FRANKONIA	DAM 26W	1172202	Nov. 05, 2018	1 Year
4.	CIT-10	FRANKONIA	Version1.1.7	N/A	N.A	N/A
5.	EM-Clamp	FRANKONIA	EMCL-20	18101728-0103	May.19,2019	1 Year

Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Nov. 05, 2018	1 Year
2.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 19, 2018	1 Year
3.	Pre-amplifier	SONOMA	310N	186860	Nov. 05, 2018	1 Year
4.	Software Name EZ-EMC	Ferrari Technology	ANB-03A	N/A	N/A	N/A

1.7. Description of Test Facility

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

FCC-Registration No.: 184111

Shenzhen Anbotech Compliance Laboratory Limited, 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. Registration No. 184111, September 27, 2019.

ISED-Registration No.: 8058A

Shenzhen Anbotech 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 Anbotech Compliance Laboratory Limited.

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

Shenzhen Anbotech Compliance Laboratory Limited

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Code:AB-EMC-04-a



Hotline
400-003-0500
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2. Power Line Conducted Emission Test

2.1. Test Standard and Limit

Test Standard	FCC Part 15 B Subpart 15.107
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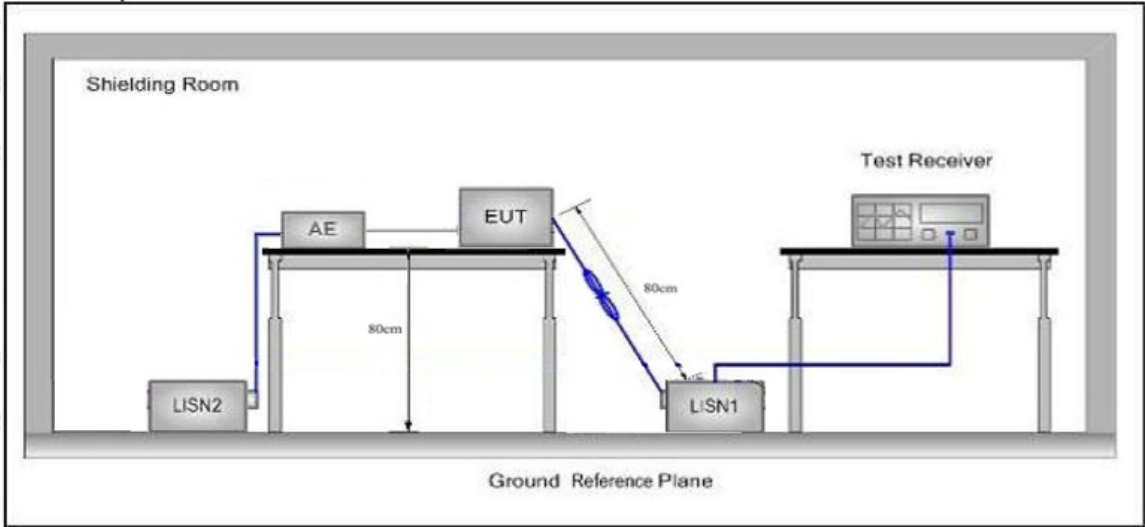
Power Line Conducted Emission Measurement Limits (FCC Part 15 Class B)

Test Limit	Frequency (MHz)	At mains terminals (dBμV)	
		Quasi-peak Level	Average Level
	0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
	0.50 ~ 5.00	56	46
	5.00 ~ 30.00	60	50

Remark: (1) The lower limit shall apply at the transition frequencies.

(2) * Decreasing linearly with logarithm of frequency.

2.2. Test Setup



2.3. EUT Configuration on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

2.4. Operating Condition of EUT

- 2.4.1. Setup the EUT as shown in Section 2.2.
- 2.4.2. Turn on the power of all equipments.
- 2.4.3. Let the EUT work in test mode and measure it.

2.5. 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 C63.4-2014 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9KHz.

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

All the test results are listed in Section 2.6.

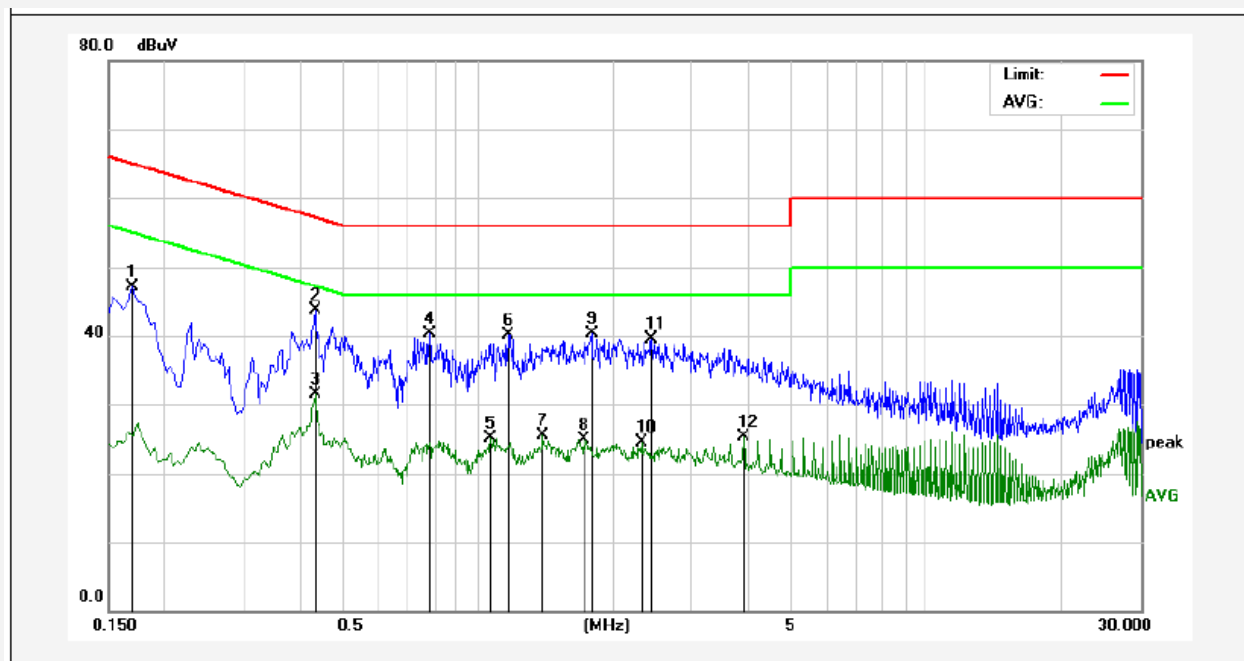
2.6. Test Results

PASS

The test curves are shown in the following pages.

Conducted Emission Test Data

Test Site: 1# Shielded Room
Test Specification: AC 120V, 60Hz for adapter
Comment: Live Line
Temp.: 23.3°C Hum.: 54%

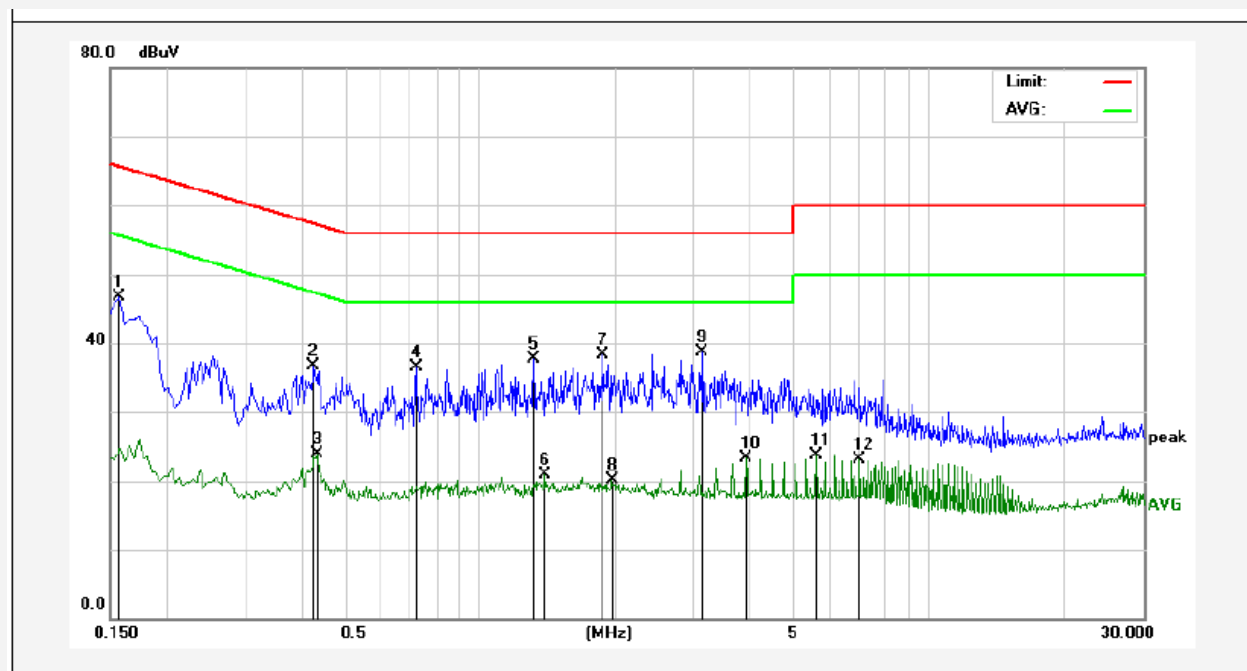


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1700	27.18	19.90	47.08	64.96	-17.88	QP	
2	0.4340	23.82	19.95	43.77	57.18	-13.41	QP	
3	0.4340	11.61	19.95	31.56	47.18	-15.62	AVG	
4	0.7820	20.16	20.06	40.22	56.00	-15.78	QP	
5	1.0700	4.90	20.12	25.02	46.00	-20.98	AVG	
6	1.1700	19.95	20.12	40.07	56.00	-15.93	QP	
7	1.3980	5.43	20.13	25.56	46.00	-20.44	AVG	
8	1.7220	4.68	20.13	24.81	46.00	-21.19	AVG	
9	1.7980	20.16	20.14	40.30	56.00	-15.70	QP	
10	2.3100	4.31	20.15	24.46	46.00	-21.54	AVG	
11	2.4380	19.36	20.15	39.51	56.00	-16.49	QP	
12	3.9220	5.04	20.18	25.22	46.00	-20.78	AVG	

Note: Result=Reading+Factor Over Limit=Result-Limit

Conducted Emission Test Data

Test Site: 1# Shielded Room
Test Specification: AC 120V, 60Hz for adapter
Comment: Neutral Line
Temp.: 23.3°C Hum.: 54%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1580	26.82	19.90	46.72	65.56	-18.84	QP	
2	0.4260	16.76	19.95	36.71	57.33	-20.62	QP	
3	0.4340	3.87	19.95	23.82	47.18	-23.36	AVG	
4	0.7220	16.50	20.05	36.55	56.00	-19.45	QP	
5	1.3220	17.63	20.13	37.76	56.00	-18.24	QP	
6	1.4020	0.80	20.13	20.93	46.00	-25.07	AVG	
7	1.8780	18.09	20.14	38.23	56.00	-17.77	QP	
8	1.9620	-0.01	20.14	20.13	46.00	-25.87	AVG	
9	3.1340	18.57	20.16	38.73	56.00	-17.27	QP	
10	3.9220	3.18	20.18	23.36	46.00	-22.64	AVG	
11	5.6020	3.54	20.22	23.76	50.00	-26.24	AVG	
12	7.0020	2.76	20.26	23.02	50.00	-26.98	AVG	

Note: Result=Reading+Factor Over Limit=Result-Limit

3. Radiated Emission Test

3.1. Test Standard and Limit

Test Standard	FCC Part 15 B Subpart 15.109
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Radiated Emission Test Limit (Subpart B Class B)

	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
Test Limit	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.

3.2. Test Setup

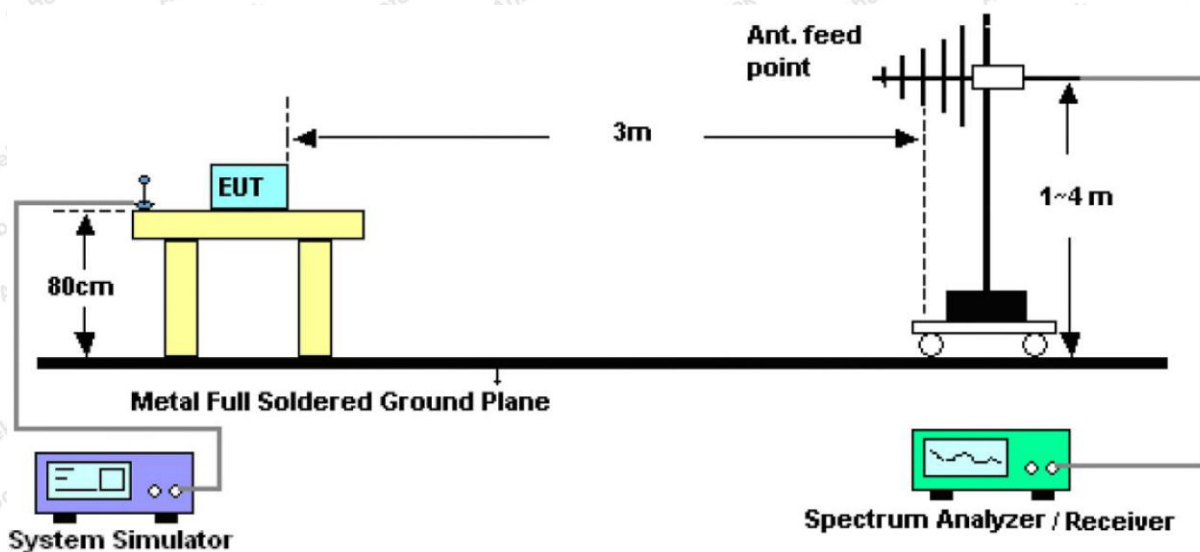


Figure 1. 30MHz to 1GHz

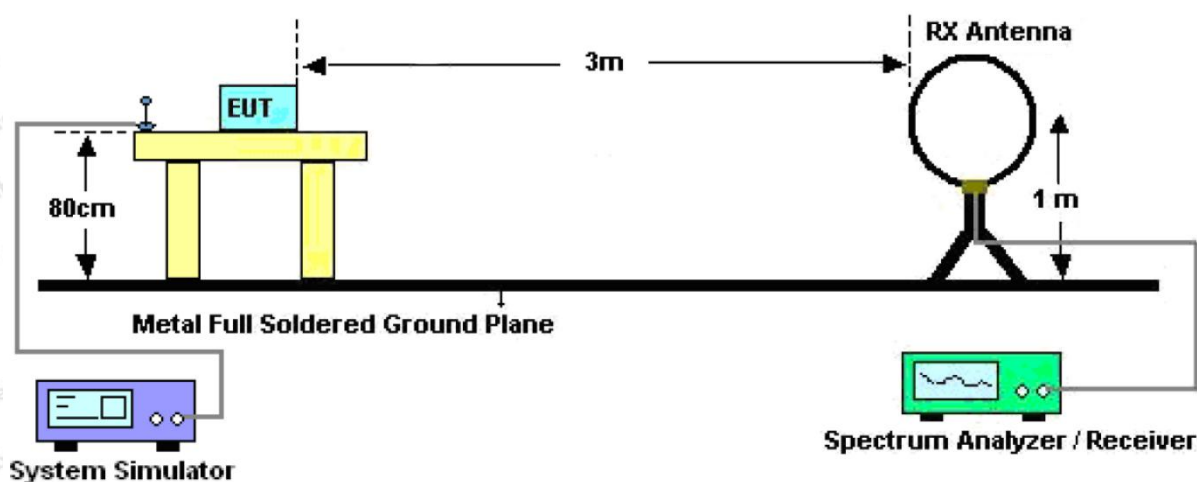


Figure 2. Below 30MHz

3.3. EUT Configuration on Measurement

The following equipments are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

3.4. Operating Condition of EUT

3.4.1. Setup the EUT as shown in Section 3.2.

3.4.2. Turn on the power of all equipments.

3.4.3. Let the EUT work in test mode and measure it.

3.5. Test Procedure

EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (Trilog Broadband Antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2014 on radiated emission measurement.

The bandwidth of the EMI test receiver (ESCI) is set at 120kHz.

The frequency range from 30MHz to 1000MHz is checked.

The test results are listed in Section 3.6.

3.6. Test Results

PASS

The test curves are shown in the following pages.

Test item: Radiation Test

Polarization:

Horizontal

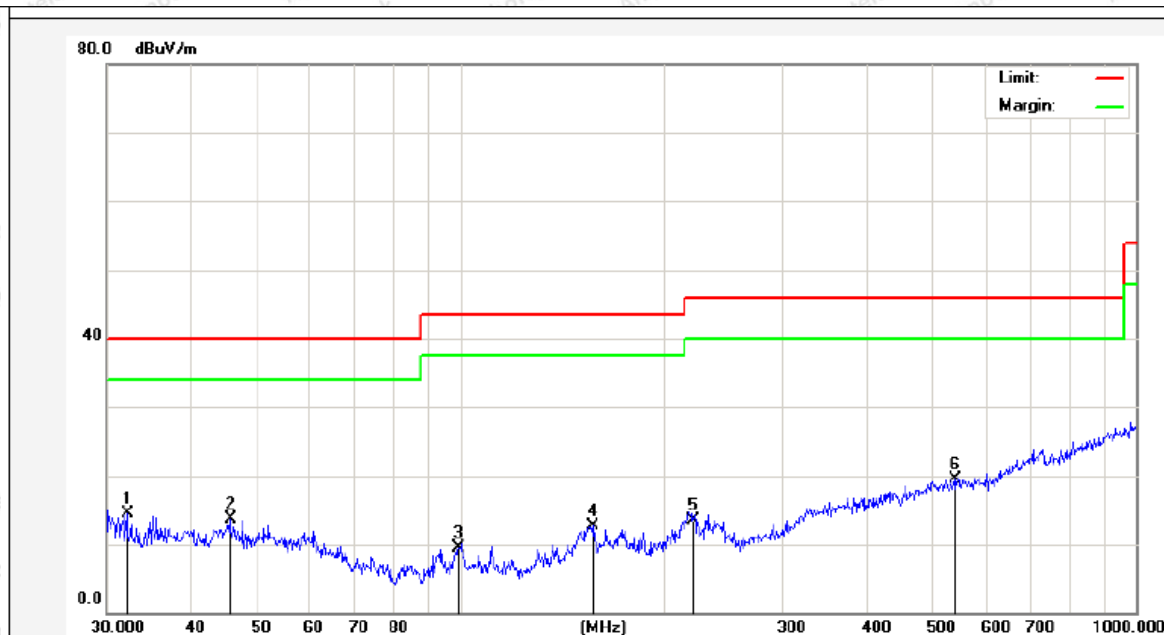
Standard: (RE)FCC Part 15 Subpart B

Power Source:

AC 120V, 60Hz for adapter

Distance: 3m

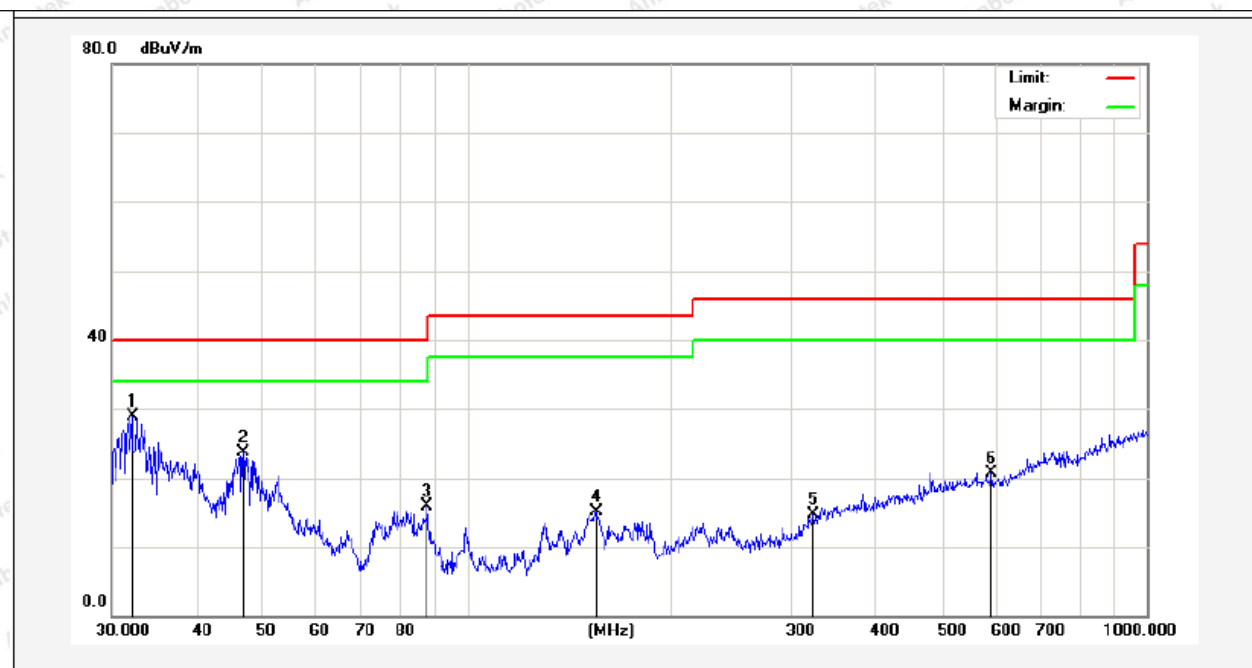
Temp.(°C)/Hum.(%RH): 23.1°C/50%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	32.1795	33.40	-18.92	14.48	40.00	-25.52	QP	100	0	
2	45.6948	31.28	-17.56	13.72	40.00	-26.28	QP	100	360	
3	99.5281	32.45	-22.93	9.52	43.50	-33.98	QP	100	120	
4	157.0074	35.59	-22.97	12.62	43.50	-30.88	QP	100	0	
5	220.6171	34.46	-20.91	13.55	46.00	-32.45	QP	100	0	
6	539.4775	31.84	-12.27	19.57	46.00	-26.43	QP	100	0	

Note: Result=Reading+Factor Over Limit=Result-Limit

Test item: Radiation Test Polarization: Vertical
Standard: (RE)FCC Part 15 Subpart B Power Source: AC 120V, 60Hz for adapter
Distance: 3m Temp.(°C)/Hum.(%RH): 23.1°C/50%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	32.1795	46.86	-17.92	28.94	40.00	-11.06	QP	100	120	
2	46.8303	40.36	-16.62	23.74	40.00	-16.26	QP	100	0	
3	87.4177	35.44	-19.57	15.87	40.00	-24.13	QP	100	120	
4	154.8204	34.21	-19.09	15.12	43.50	-28.38	QP	100	360	
5	323.3204	29.71	-15.05	14.66	46.00	-31.34	QP	100	0	
6	590.9737	31.01	-10.31	20.70	46.00	-25.30	QP	100	0	

Note: Result=Reading+Factor Over Limit=Result-Limit

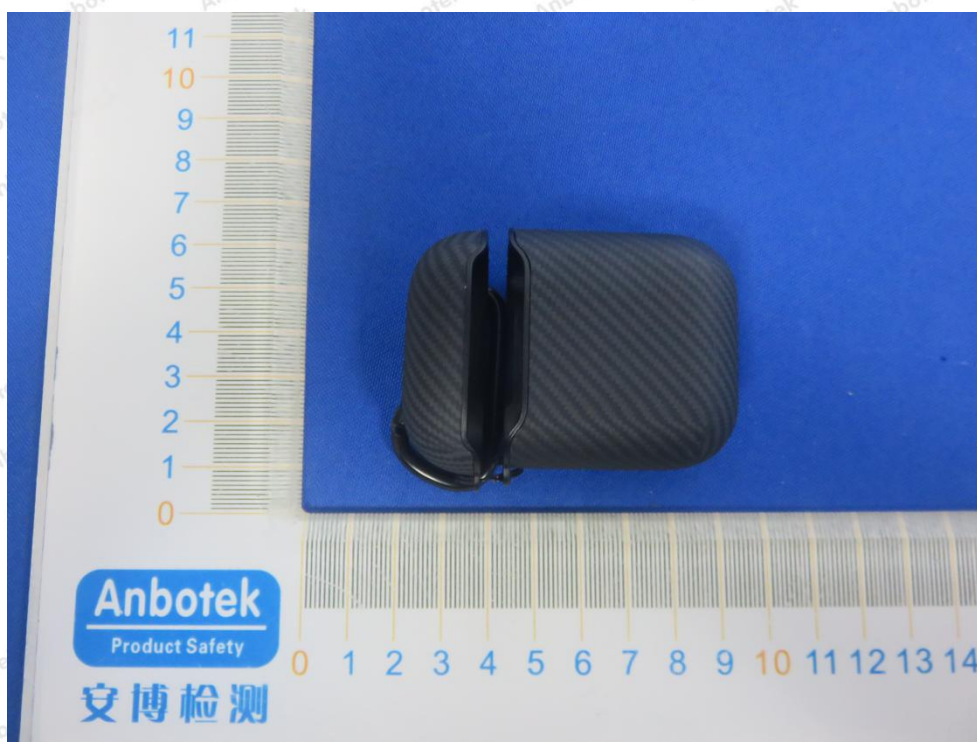
APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Conducted Emission Test



Photo of Radiation Emission Test

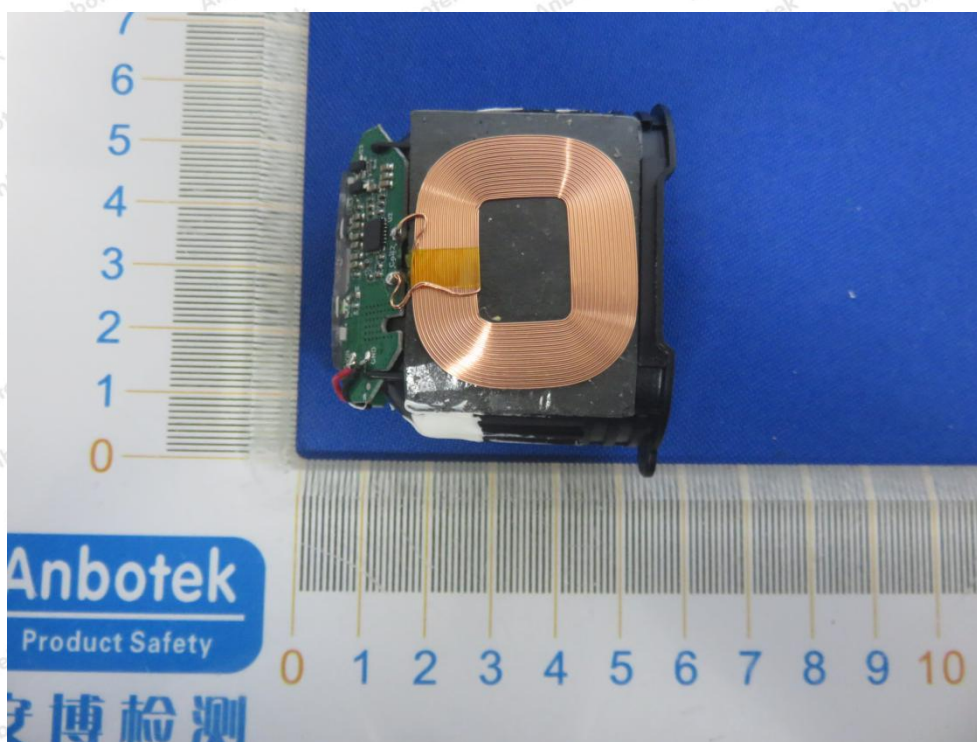


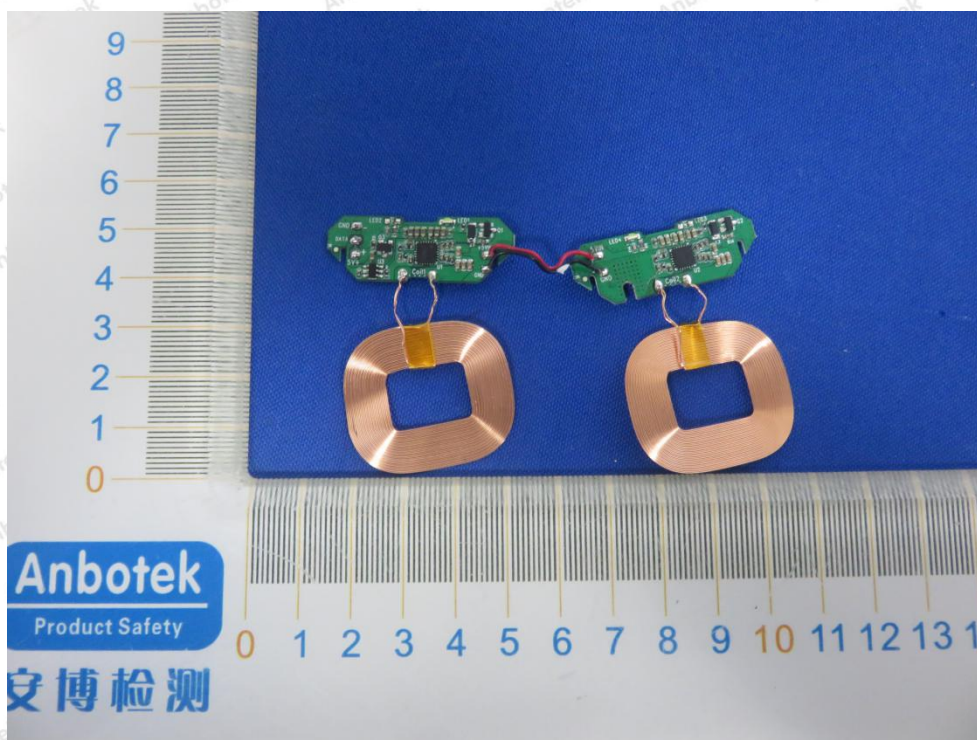
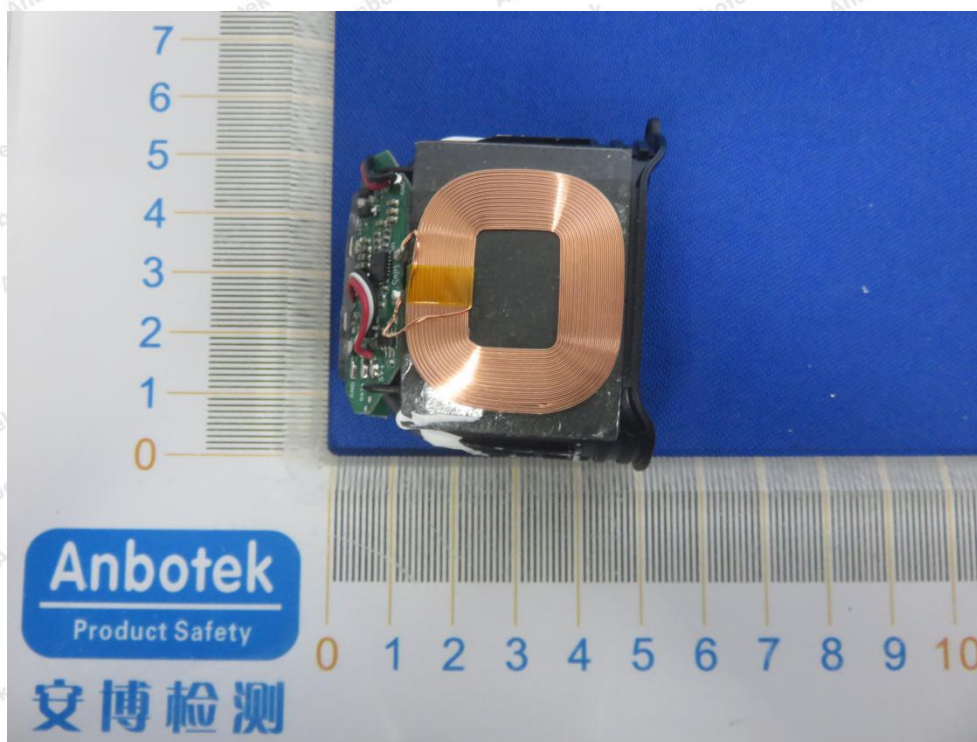
APPENDIX II -- EXTERNAL PHOTOGRAPH

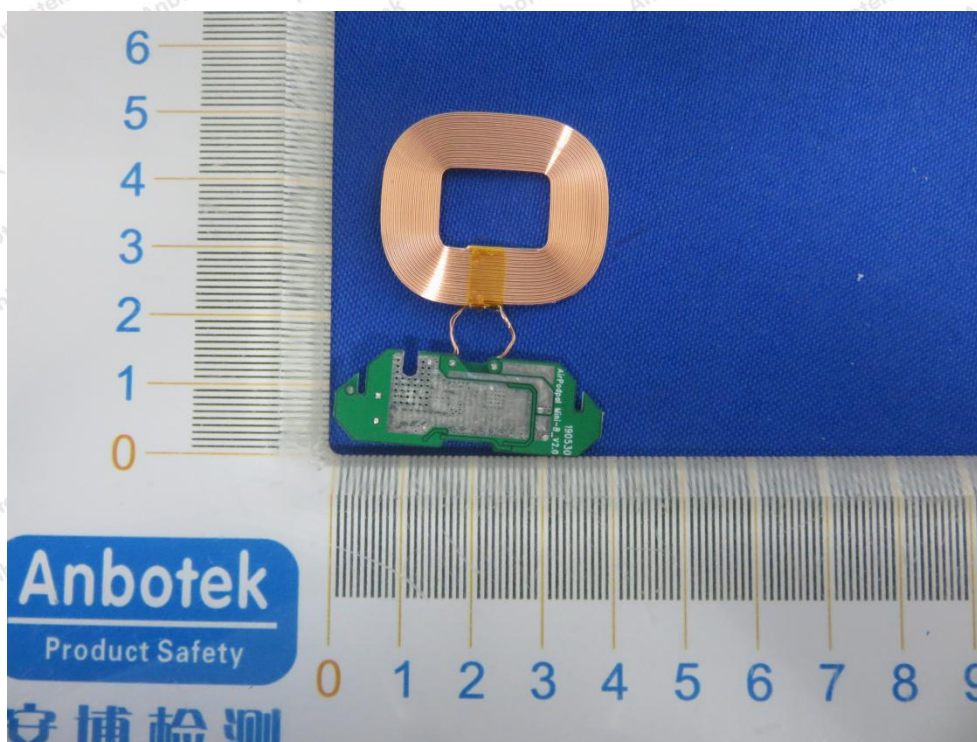
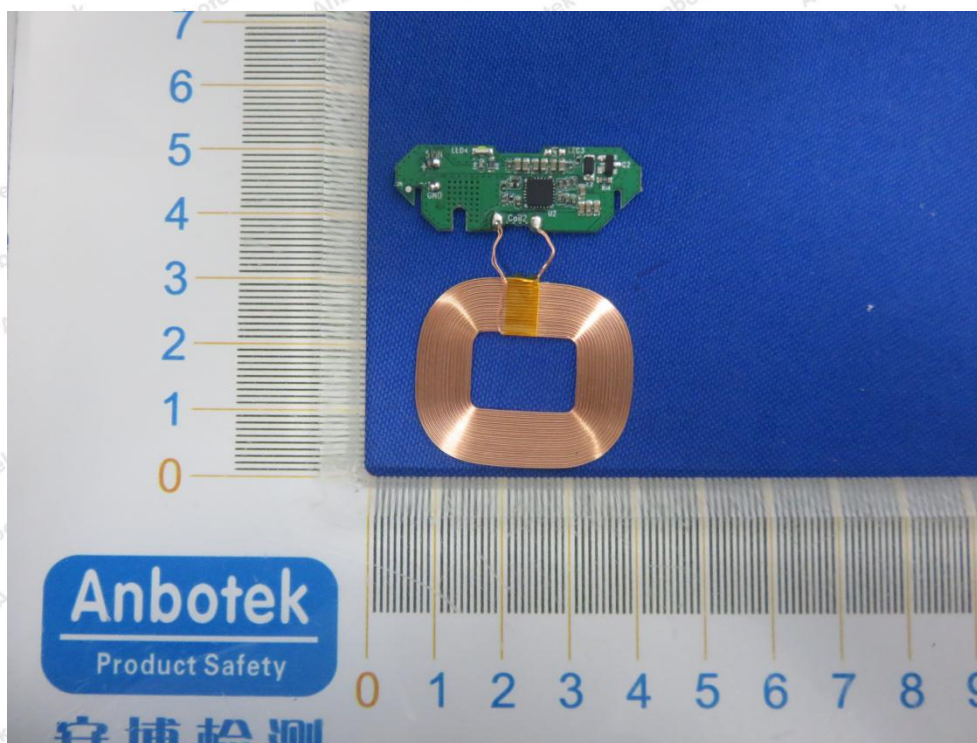


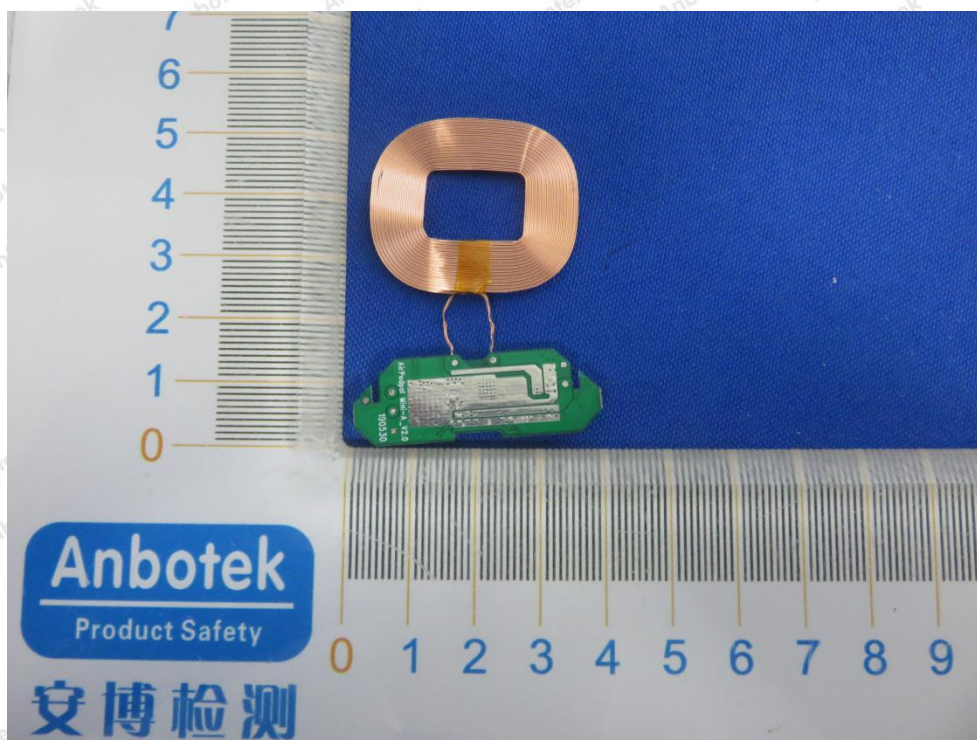
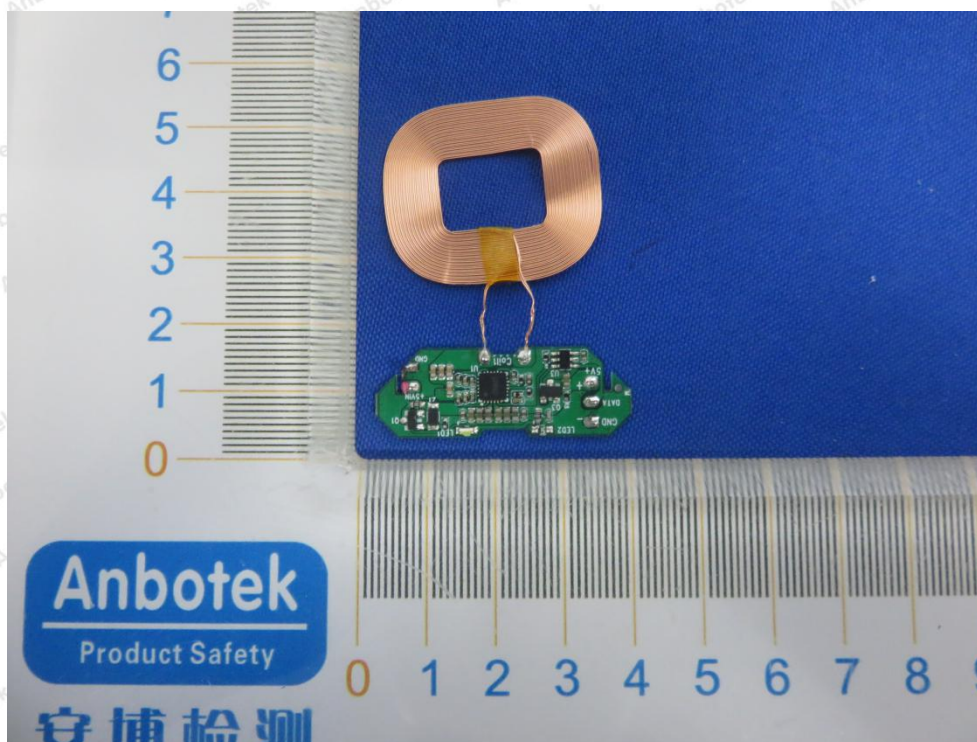




APPENDIX III -- INTERNAL PHOTOGRAPH







----- End of Report -----

