

FCC TEST REPORT

Client Name : SUNVALLEYTEK INTERNATIONAL, INC.

Address : 46724 Lakeview Blvd, Fremont, California, United States
94538-6529

Product Name : Wireless Charging External Battery Pack

Date : Jul. 09, 2019

Shenzhen Anbotech Compliance Laboratory Limited

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TEST REPORT

Applicant : SUNVALLEYTEK INTERNATIONAL, INC.
Manufacturer : Shenzhen NearbyExpress Technology Development Company Limited
Product Name : Wireless Charging External Battery Pack
Model No. : JCBATTERY, RP-PB167
Trade Mark : JUMPCHARGE RAVPOWER
Input: AC 120V, 60Hz for DC Power Supply, 2A
USB-A Output: 5Vdc, 2.4A
Rating(s) : Type-C Output: 5Vdc, 3A/ 9Vdc, 3A/ 15Vdc, 2A/ 20Vdc, 1.5A(Max)
Wireless Output: 10W Max
(with DC 5V, 24000mAh Battery inside)
Test Standard(s) : FCC Part15 Subpart C 2018, Paragraph 15.209
Test Method(s) : ANSI C63.10: 2013

The device described above is tested by Shenzhen Anbotech 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 Anbotech 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 Anbotech Compliance Laboratory Limited.

Date of Receipt

Jun. 12, 2019

Date of Test

Jun. 12~28, 2019

Prepared By



Oliay Yang

(Engineer / Oliay Yang)

Reviewer

Snowy Meng

(Supervisor / Snowy Meng)

Approved & Authorized Signer

Sally Zhang

(Manager / Sally Zhang)

Shenzhen Anbotech Compliance Laboratory Limited

Code:AB-RF-05-a

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

Tel:(86)755-26066440 Fax:(86)755-26014772 Email:service@anbotech.com



Hotline

400-003-0500

www.anbotech.com

1. General Information

1.1. Client Information

Applicant	:	SUNVALLEYTEK INTERNATIONAL, INC.
Address	:	46724 Lakeview Blvd, Fremont, California, United States 94538-6529
Manufacturer	:	Shenzhen NearbyExpress Technology Development Company Limited
Address	:	333 Bulong Road, Jialianda Industrial Park, Building 1, Bantian, Longgang District, Shenzhen, China
Factory	:	Shenzhen NearbyExpress Technology Development Company Limited
Address	:	333 Bulong Road, Jialianda Industrial Park, Building 1, Bantian, Longgang District, Shenzhen, China

1.2. Description of Device (EUT)

Product Name	:	Wireless Charging External Battery Pack
Model No.	:	JCBATTERY, RP-PB167 (Note: All samples are the same except the model number, so we prepare "JCBATTERY" for test only.)
Trade Mark	:	 RAVPOWER
Test Power Supply	:	AC 120V, 60Hz for DC Power Supply / DC 5V battery inside
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Product Description	Operation Frequency:	111-205KHz
	Modulation Type:	MSK
	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

N/A	
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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

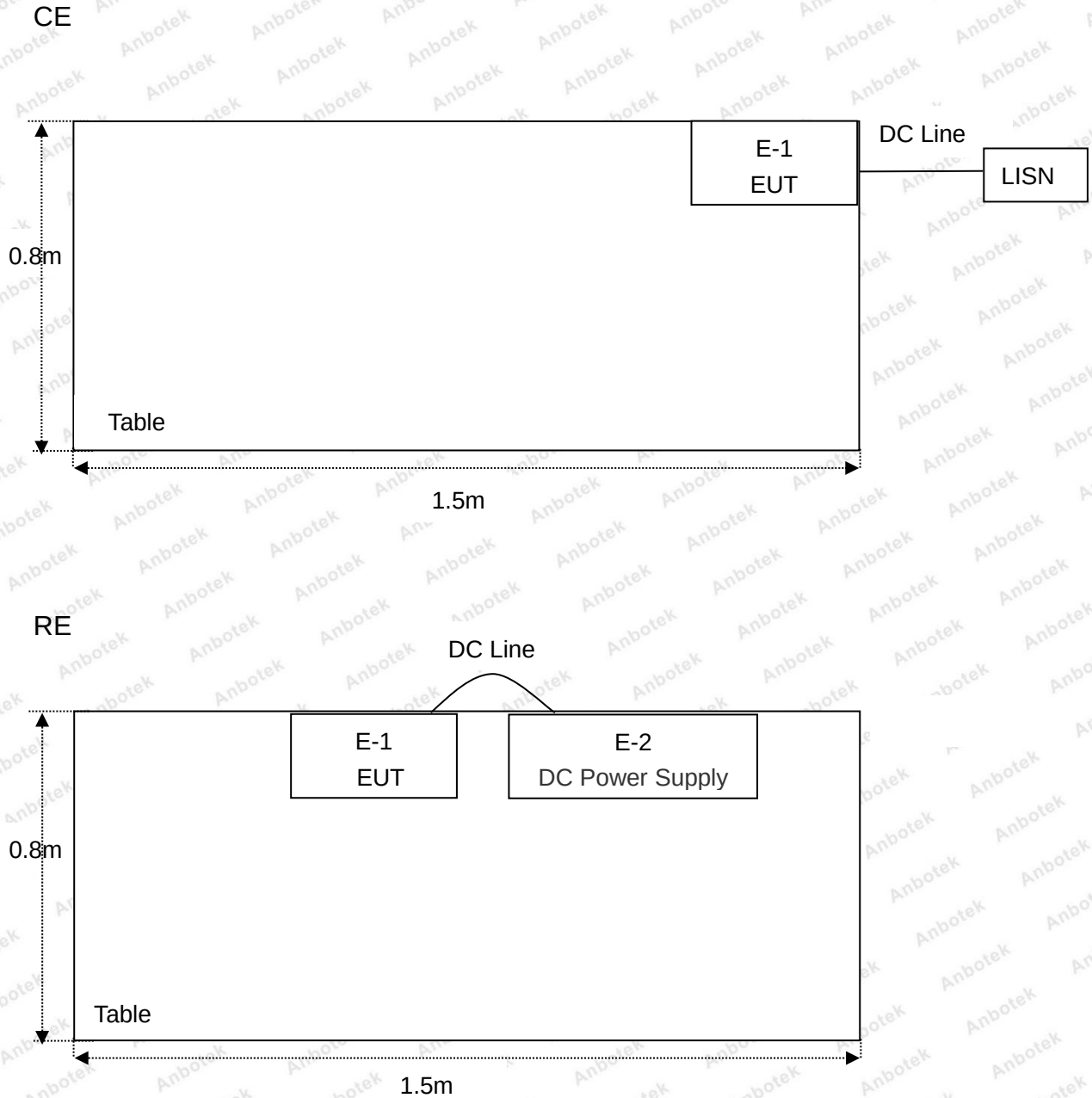
For Conducted Emission	
Final Test Mode	Description
Mode 1	Full load, wireless charger module

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

Note: (1)Test channel is 0.1259MHz.

(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.

1.5. Description Of Test Setup



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. 26, 2018	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESPI3	101604	Nov. 05, 2018	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Nov. 05, 2018	1 Year
4.	Spectrum Analysis	Agilent	E4407B	US39390582	Nov. 05, 2018	1 Year
5.	MAX Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 05, 2018	1 Year
6.	Preamplifier	SKET Electronic	BK1G18G30 D	KD17503	Nov. 05, 2018	1 Year
7.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 20, 2018	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 19, 2018	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Nov. 20, 2018	1 Year
10.	Horn Antenna	A-INFO	LB-180400- KF	J211060628	Nov. 20, 2018	1 Year
11.	Pre-amplifier	SONOMA	310N	186860	Nov. 05, 2018	1 Year
12.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
13.	RF Test Control System	YIHENG	YH3000	2017430	Nov. 05, 2018	1 Year
14.	Power Sensor	DAER	RPR3006W	15I00041SN045	Nov. 05, 2018	1 Year
15.	Power Sensor	DAER	RPR3006W	15I00041SN046	Nov. 05, 2018	1 Year
16.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 05, 2018	1 Year
17.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Nov. 05, 2018	1 Year
18.	Signal Generator	Agilent	E4421B	MY41000743	Nov. 05, 2018	1 Year
19.	DC Power Supply	LW	TPR-6420D	374470	Oct. 31, 2018	1 Year
20.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80 B	N/A	Nov. 01, 2018	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 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, July 31, 2017.

ISED-Registration No.: 8058A-1

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-1, June 13, 2016.

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

2. Summary of Test Results

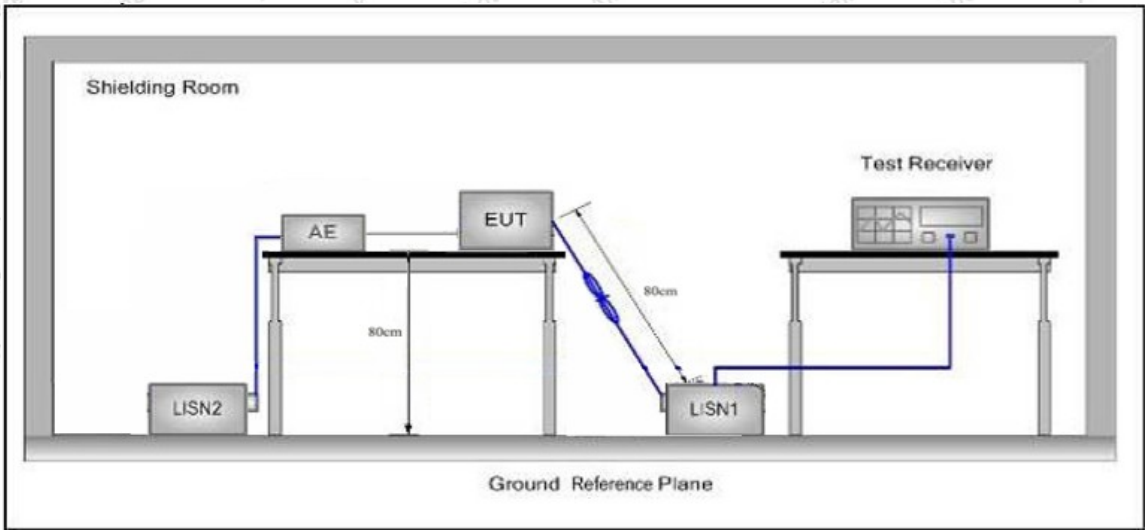
Standard Section	Test Item	Result
FCC Part 15, Paragraph 15.207	Conducted Emission Test	PASS
FCC Part 15, Paragraph 15.209(a)(f)	Spurious Emission	PASS
Part 15.203	Antenna Requirement	PASS

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.

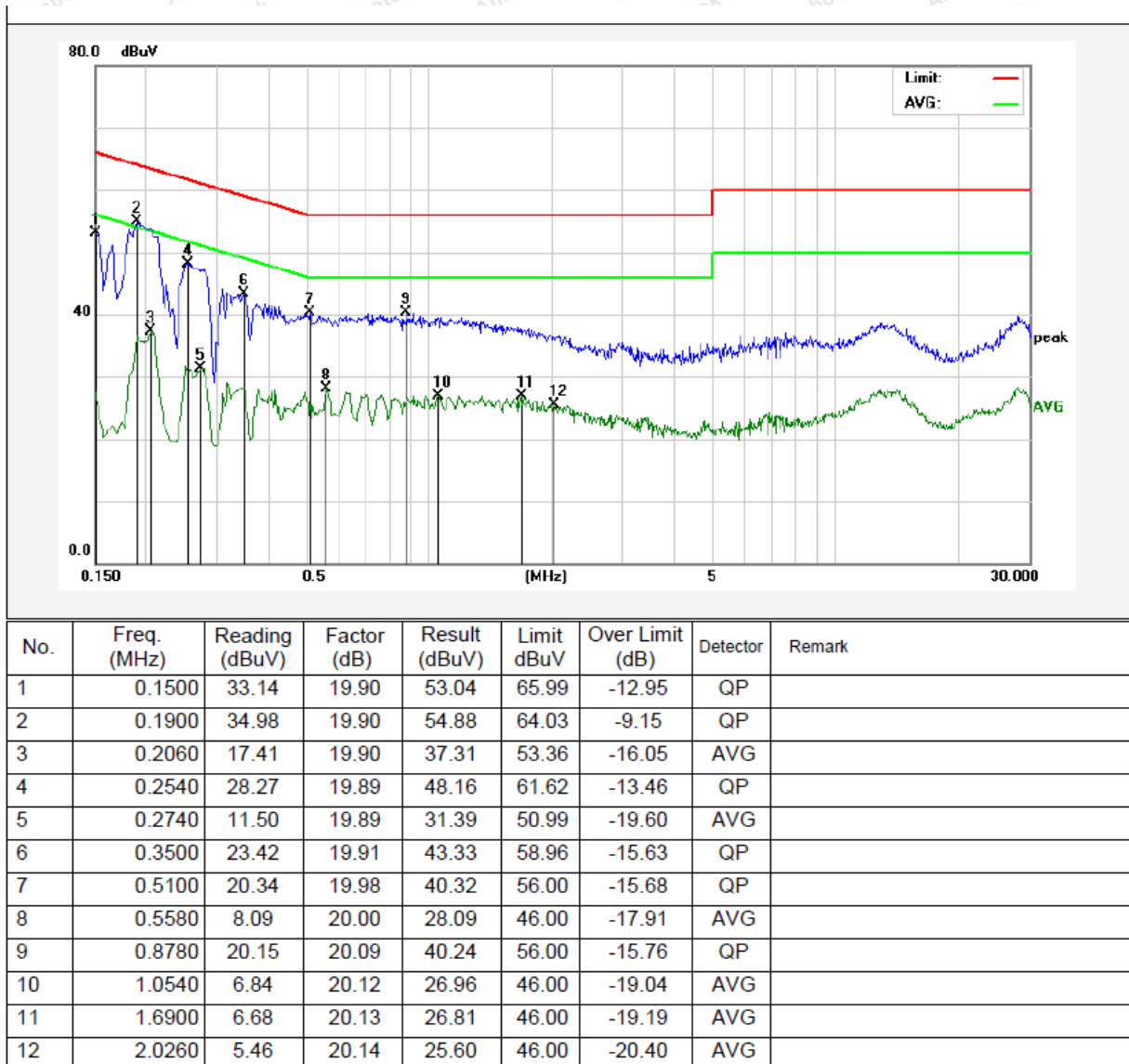
The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

Please to see the following pages

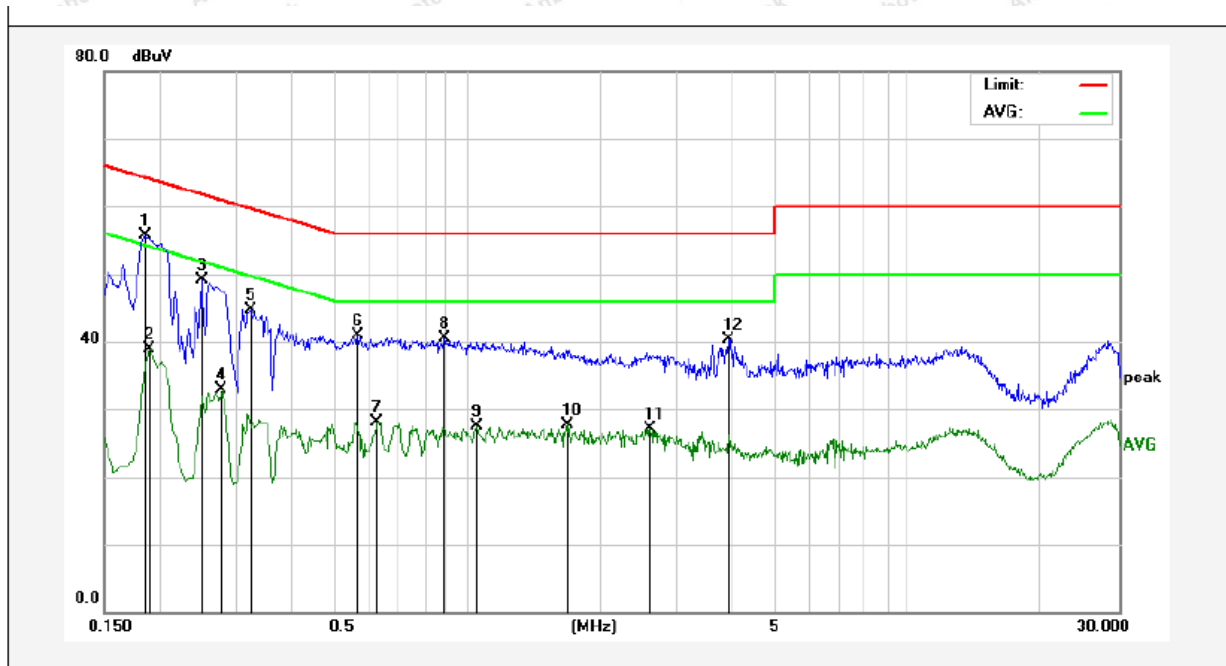
Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: Mode 1
Test Specification: AC 120V, 60Hz for DC Power Supply
Comment: Live Line
Tem.: 21.9°C Hum.: 56%



Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: Mode 1
Test Specification: AC 120V, 60Hz for DC Power Supply
Comment: Neutral Line
Tem.: 21.9°C Hum.: 56%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1860	35.84	19.90	55.74	64.21	-8.47	QP	
2	0.1900	19.04	19.90	38.94	54.03	-15.09	AVG	
3	0.2500	29.18	19.89	49.07	61.75	-12.68	QP	
4	0.2779	13.02	19.89	32.91	50.88	-17.97	AVG	
5	0.3220	24.83	19.90	44.73	59.65	-14.92	QP	
6	0.5660	20.84	20.00	40.84	56.00	-15.16	QP	
7	0.6260	8.11	20.02	28.13	46.00	-17.87	AVG	
8	0.8860	20.36	20.09	40.45	56.00	-15.55	QP	
9	1.0540	7.35	20.12	27.47	46.00	-18.53	AVG	
10	1.6900	7.60	20.13	27.73	46.00	-18.27	AVG	
11	2.6060	6.86	20.15	27.01	46.00	-18.99	AVG	
12	3.9060	20.20	20.18	40.38	56.00	-15.62	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

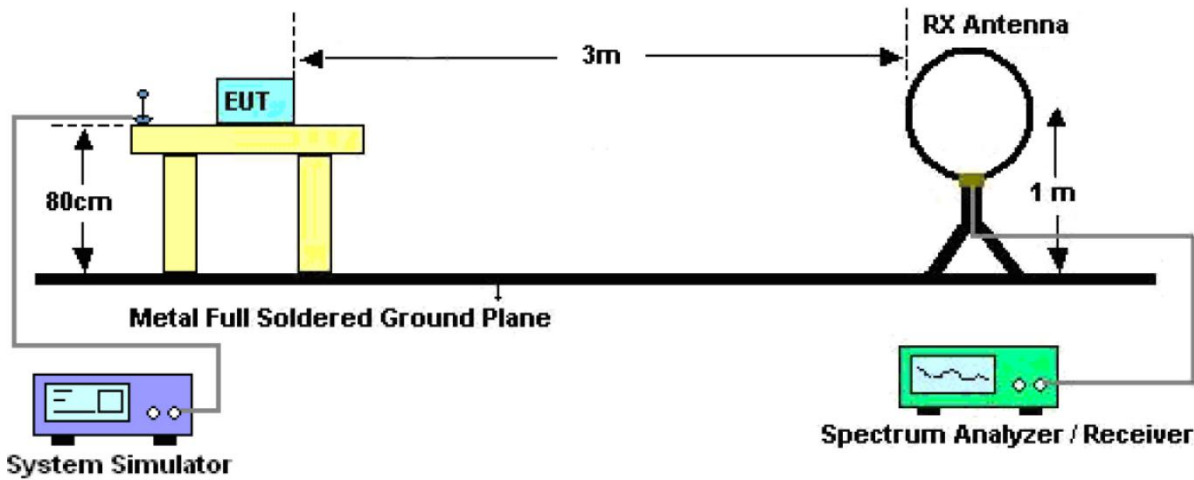


Figure 1. Below 30MHz

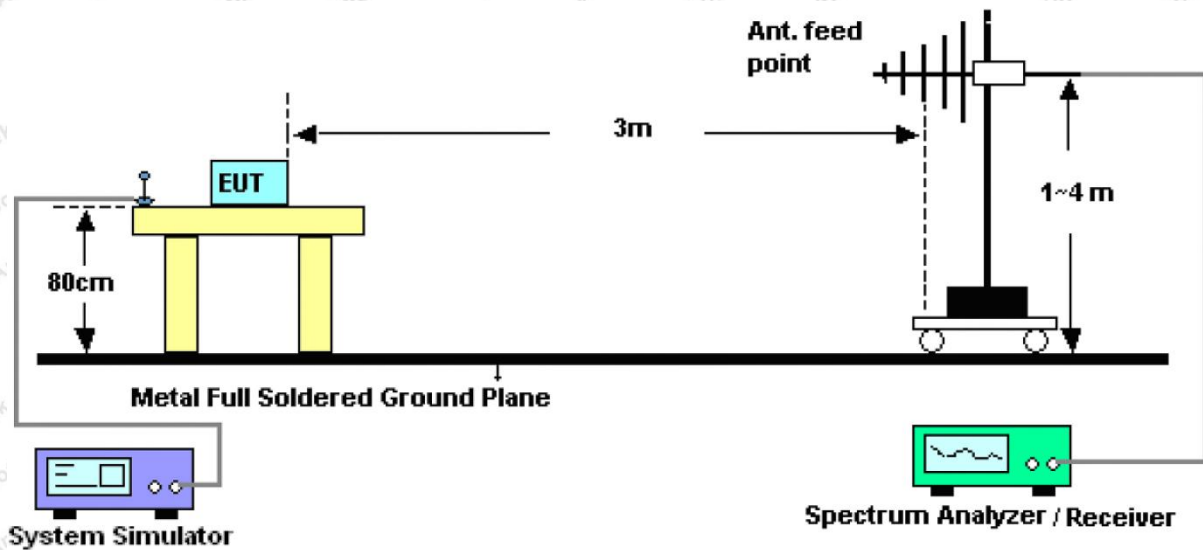


Figure 2. 30MHz to 1GHz

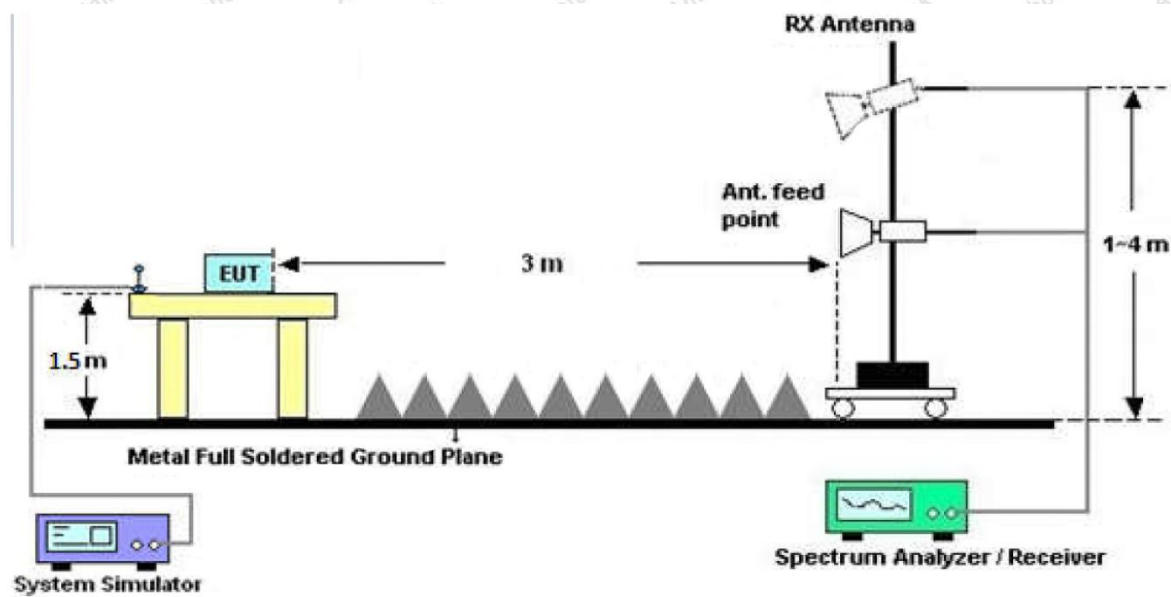


Figure 3. Above 1 GHz

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+ Charging mode, and this is the worst mode.

Test Results

(Between 9KHz – 30MHz)

Job No.: SZAWW190612004-01

Standard: FCC PART15 C_3m

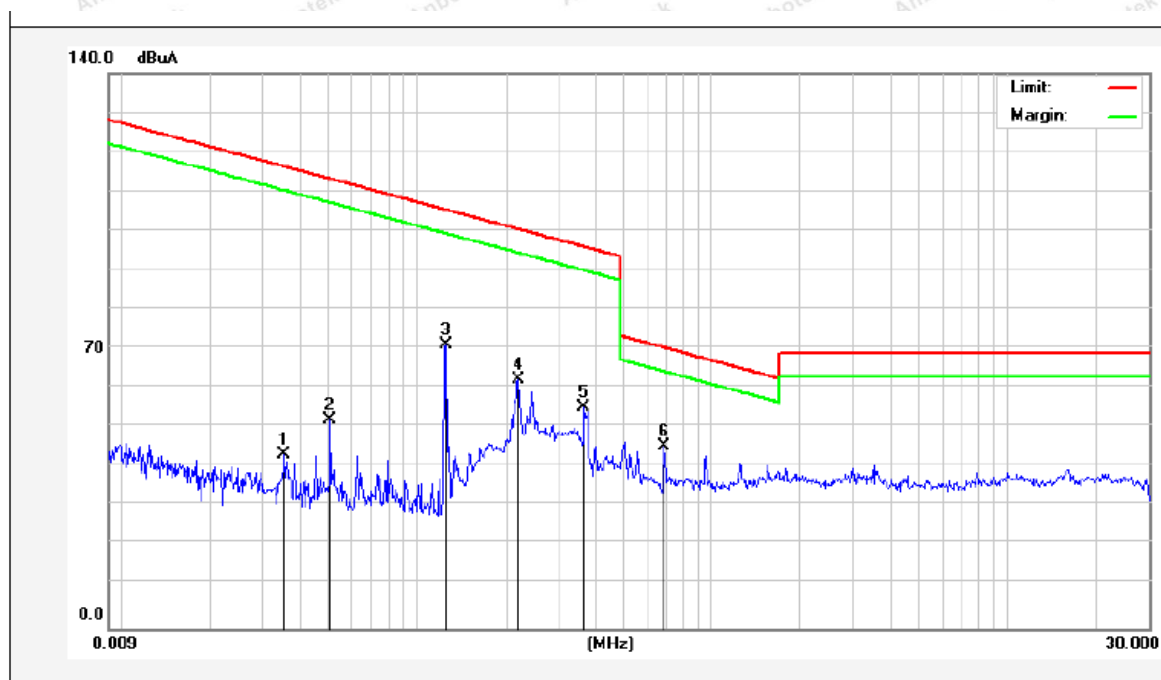
Power Source: AC 120V, 60Hz for DC Power Supply

Test item: Radiation Test

Temp.(C)/Hum.(%RH): 24.7°C/51%RH

Test Mode: Mode 1

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 (dgc)
0.0354	48.06	19.28	2.53	0	69.87	136.50	-66.63	Peak	46
0.0354	22.22	19.28	2.53	0	44.03	116.50	-72.47	AV	46
0.0509	57.61	19.38	2.55	0	79.54	133.36	-53.82	Peak	92
0.0509	30.79	19.38	2.55	0	52.72	113.36	-60.64	AV	92
0.1259	68.30	19.40	2.57	0	90.27	125.54	-35.28	Peak	154
0.1259	49.64	19.40	2.57	0	71.61	105.54	-33.93	AV	154
0.2199	56.22	19.40	2.60	0	78.22	120.72	-42.50	Peak	258
0.2199	40.96	19.40	2.60	0	62.96	100.72	-37.76	AV	258
0.3664	48.13	19.50	2.61	0	70.24	116.31	-46.07	Peak	99
0.3664	33.80	19.50	2.61	0	55.91	96.31	-40.40	AV	99
0.6895	23.86	19.50	2.64	0	46.00	70.83	-24.83	QP	60

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.

(Between 30MHz –1000 MHz)

Job No.: SZAWW190612004-01

Polarization:

Horizontal

Standard: FCC PART15 C_3m

Power Source:

AC 120V, 60Hz for DC Power Supply

Test item: Radiation Test

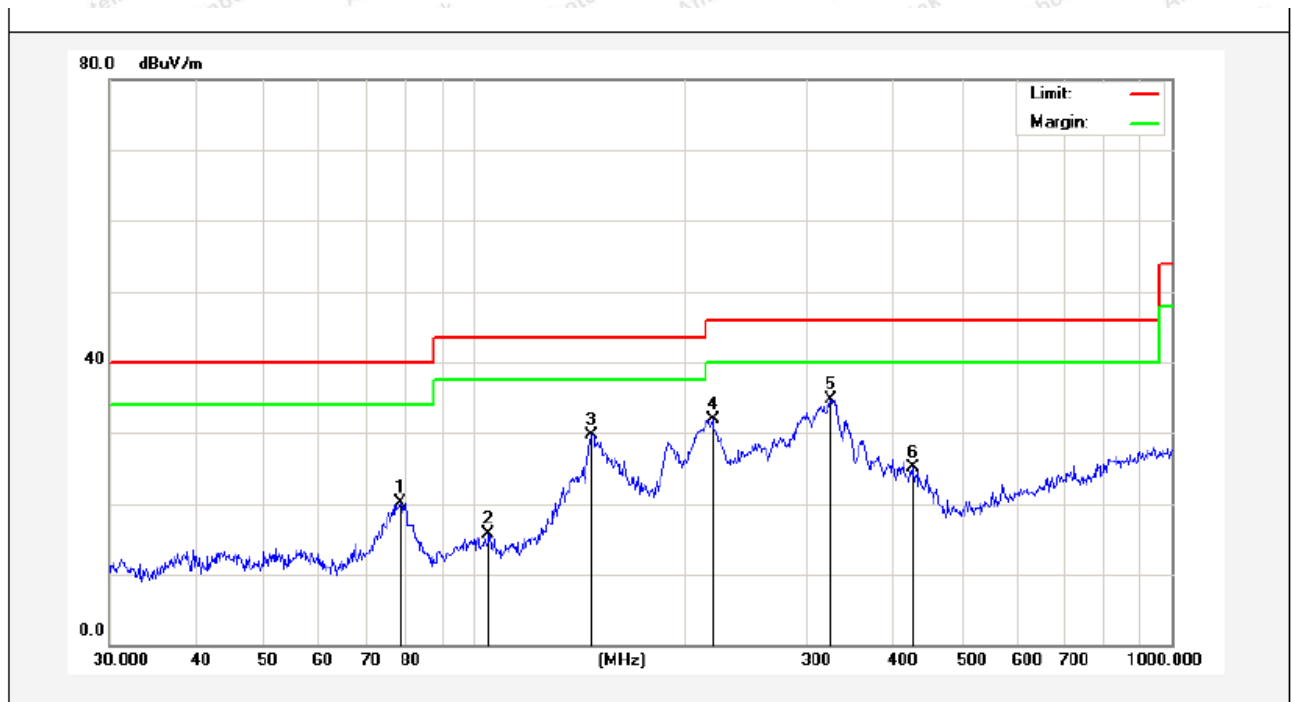
Temp.(C)/Hum.(%RH):

23.7°C/51%RH

Test Mode: Mode 1

Distance:

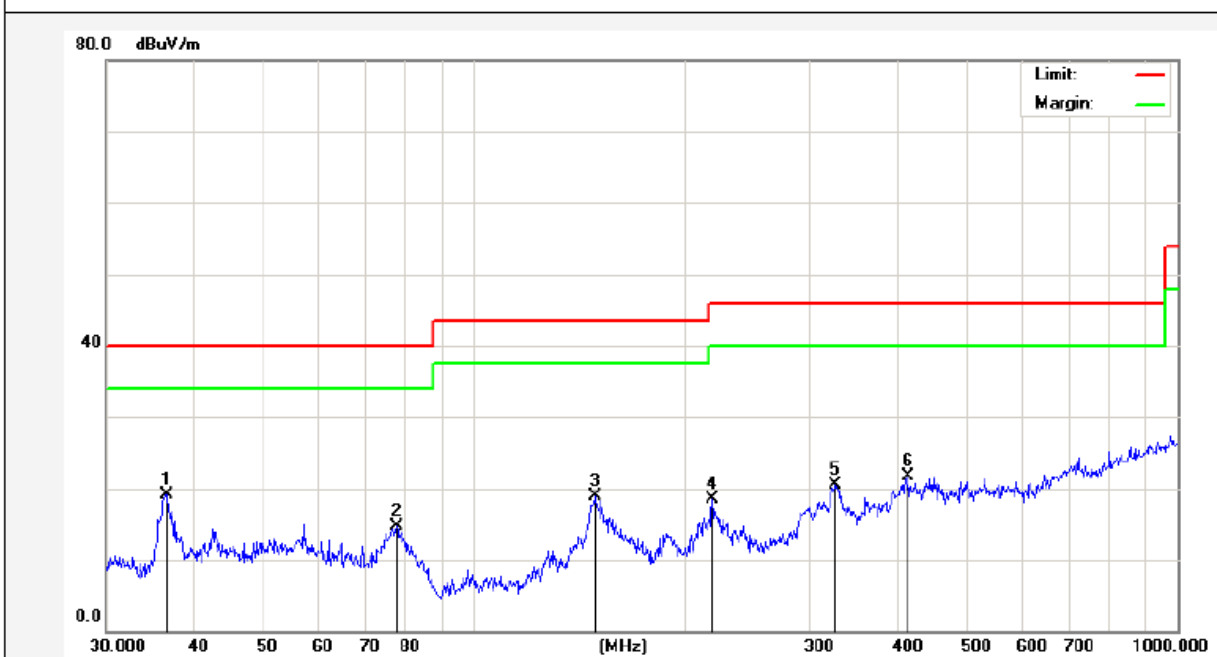
3m



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	78.4133	44.40	-24.22	20.18	40.00	-19.82	QP	300	360	
2	104.9033	38.49	-22.81	15.68	43.50	-27.82	QP	300	300	
3	147.4036	53.11	-23.38	29.73	43.50	-13.77	QP	300	210	
4	219.8449	52.87	-20.97	31.90	46.00	-14.10	QP	300	200	
5	324.4561	50.69	-16.00	34.69	46.00	-11.31	QP	300	144	
6	426.5210	38.77	-13.63	25.14	46.00	-20.86	QP	300	100	



Job No.: SZAWW190612004-01 Polarization: Vertical
Standard: FCC PART15 C_3m Power Source: AC 120V, 60Hz for DC Power Supply
Test item: Radiation Test Temp.(C)/Hum.(%RH): 23.7°C/51%RH
Test Mode: Mode 1 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	36.5092	36.57	-17.49	19.08	40.00	-20.92	QP	300	360	
2	77.5928	36.63	-21.98	14.65	40.00	-25.35	QP	300	244	
3	148.4410	38.31	-19.36	18.95	43.50	-24.55	QP	300	120	
4	218.3085	34.44	-16.03	18.41	46.00	-27.59	QP	300	255	
5	326.7395	35.45	-14.90	20.55	46.00	-25.45	QP	300	300	
6	414.7223	34.40	-12.73	21.67	46.00	-24.33	QP	300	177	

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 be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

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

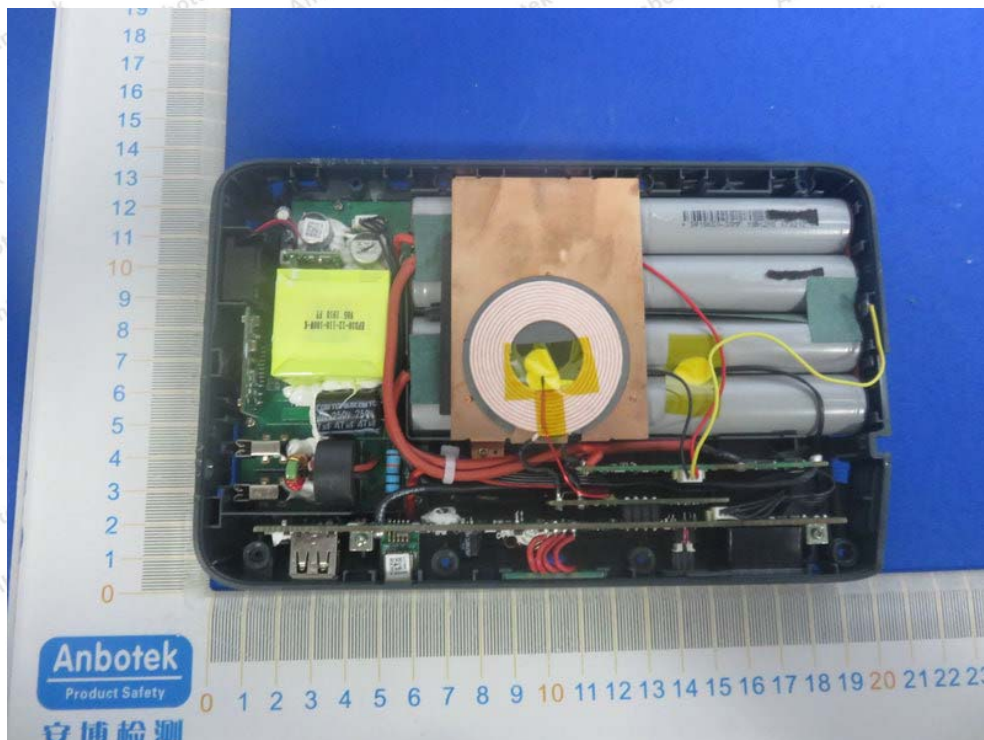


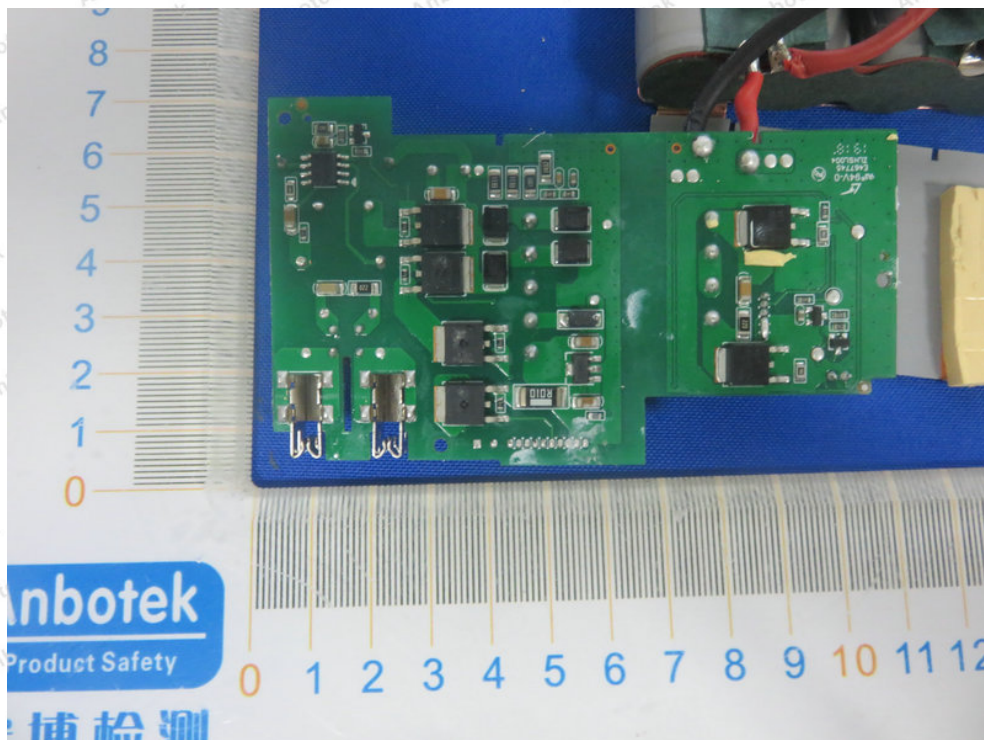


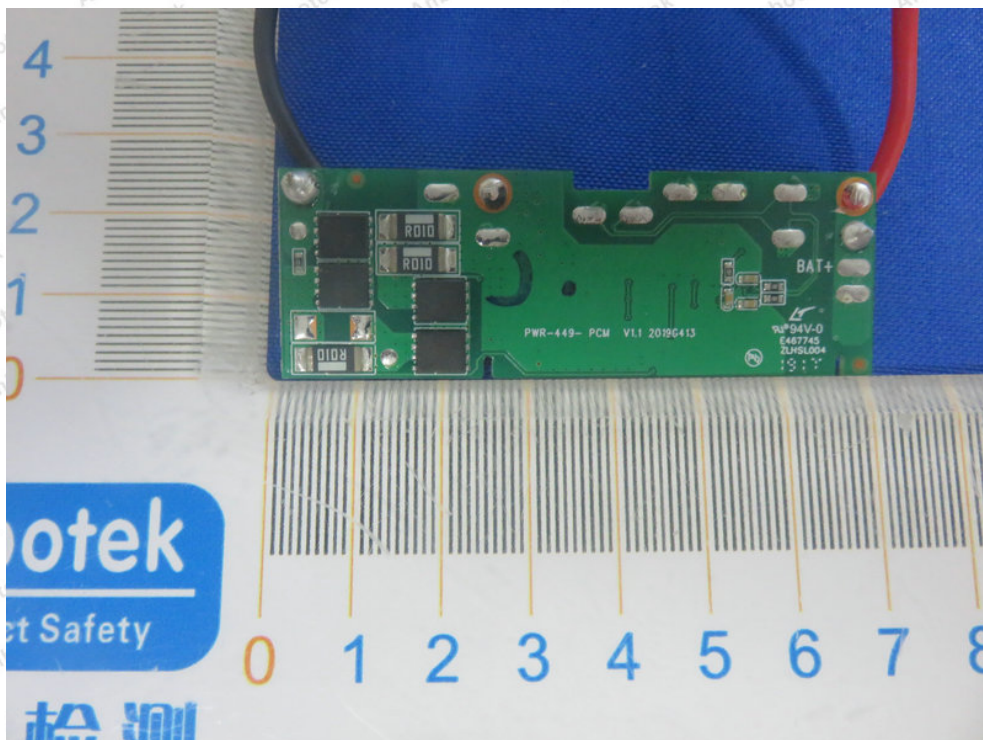
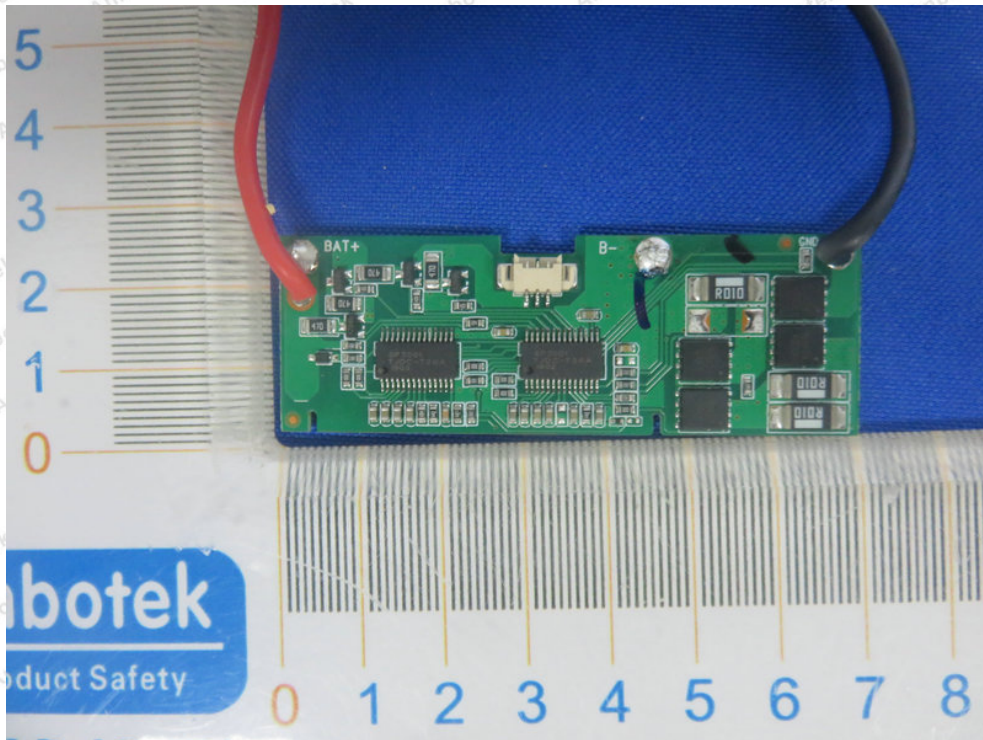
APPENDIX II -- EXTERNAL PHOTOGRAPH

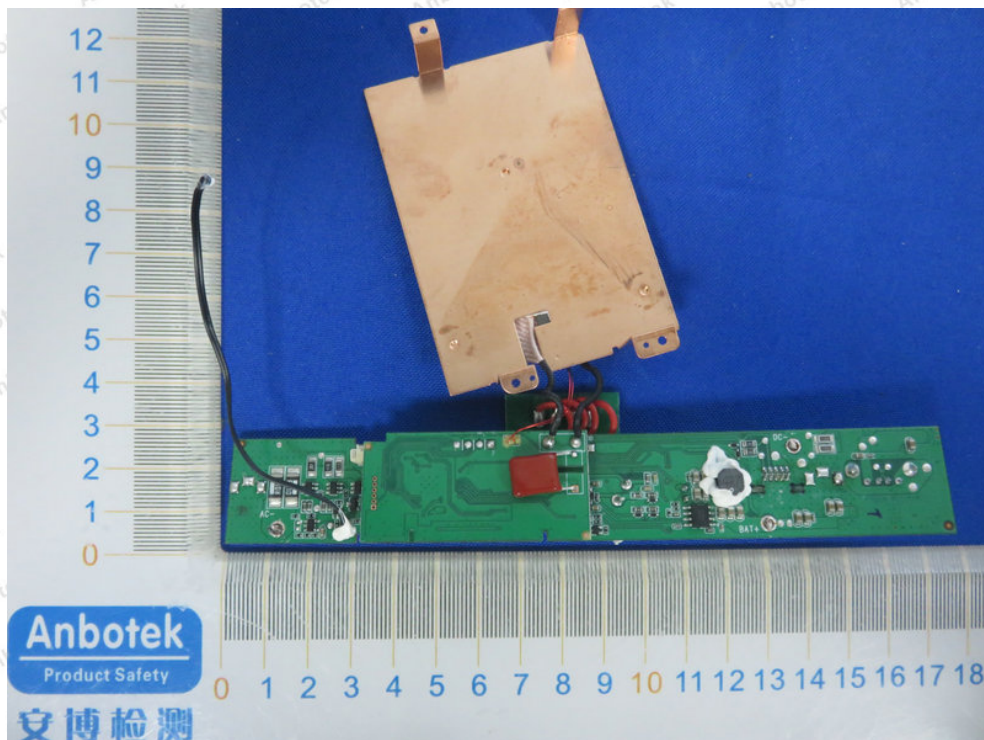
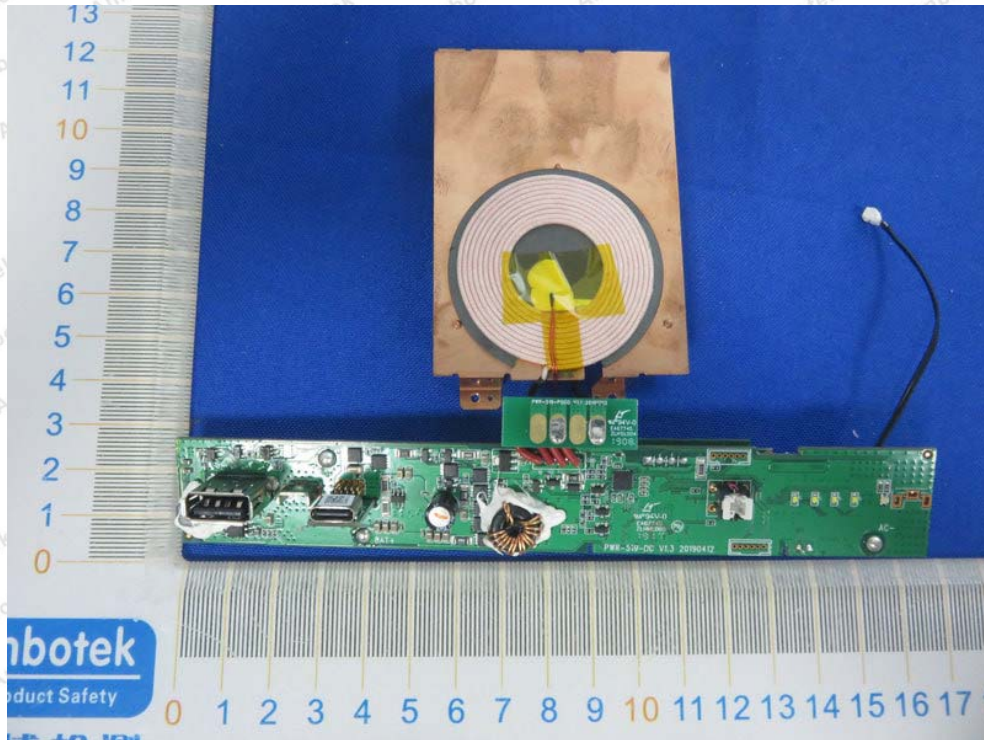


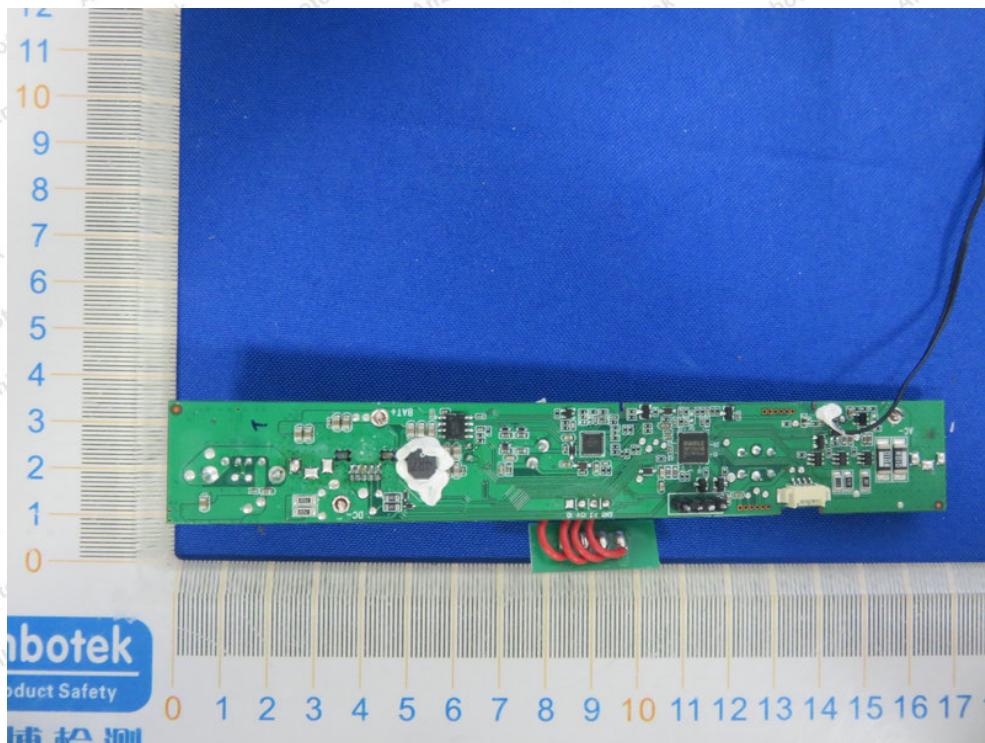
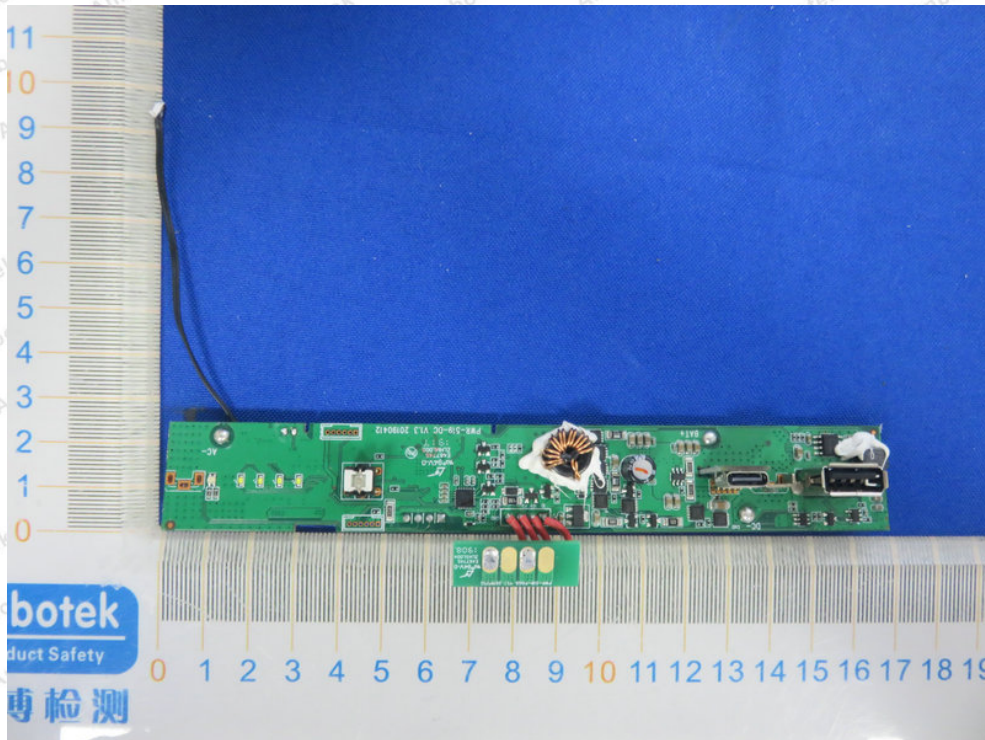


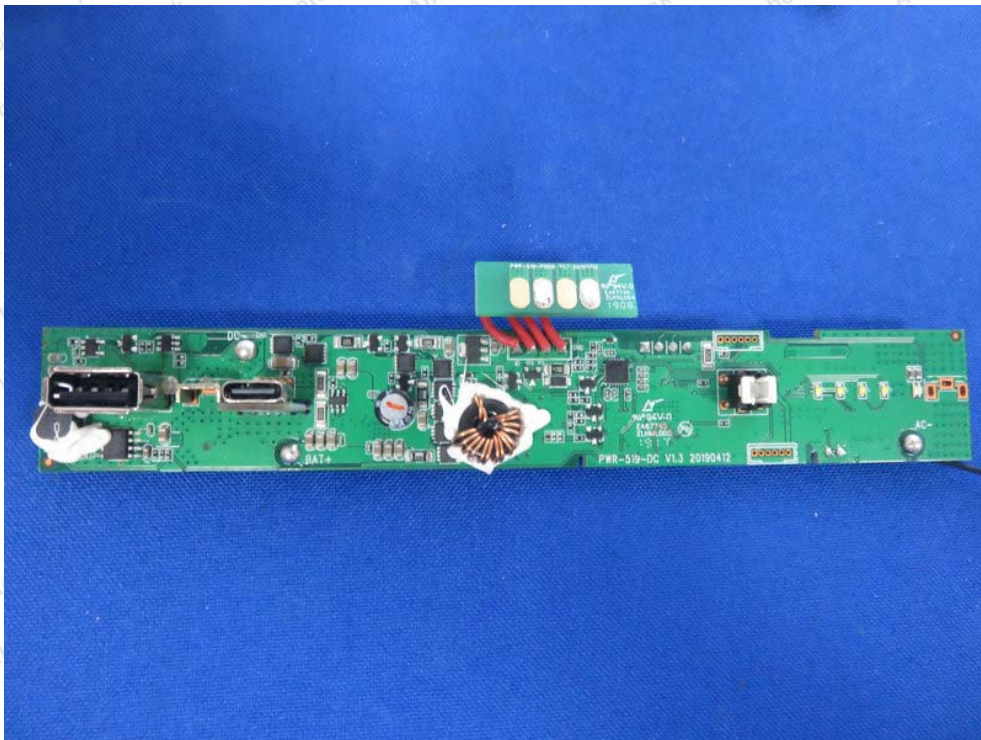
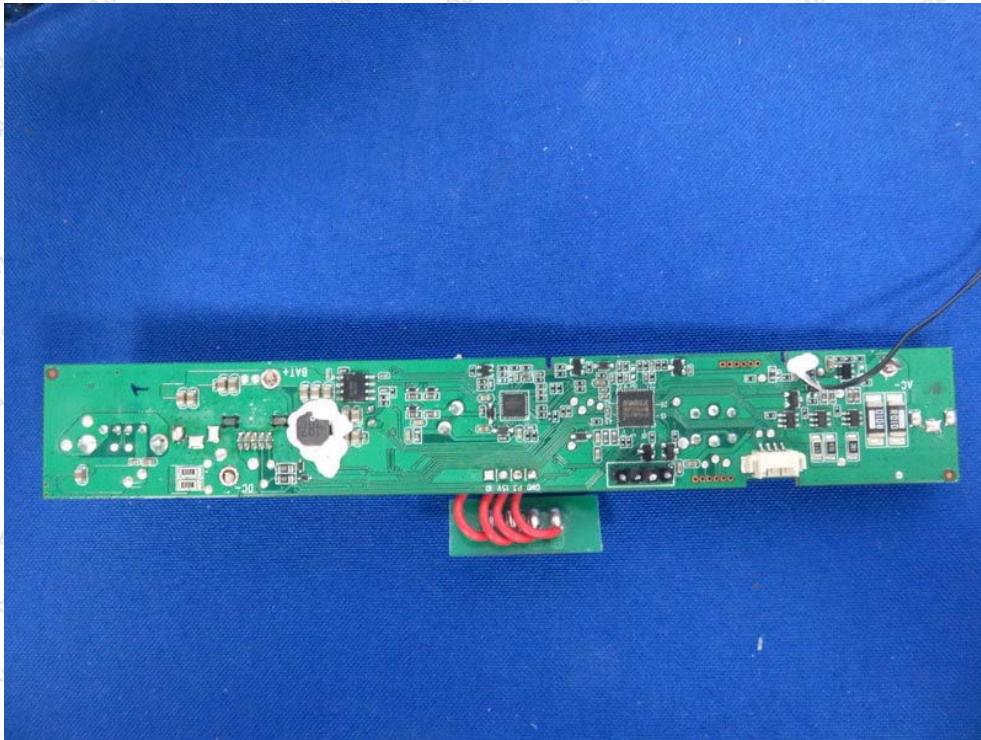
APPENDIX III -- INTERNAL PHOTOGRAPH

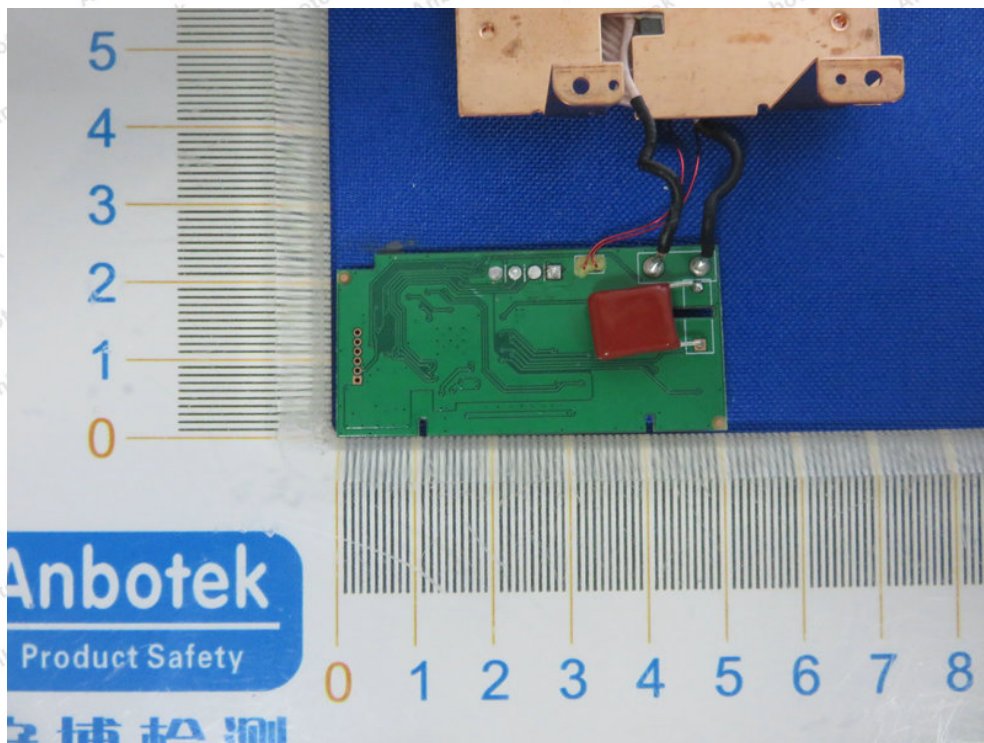
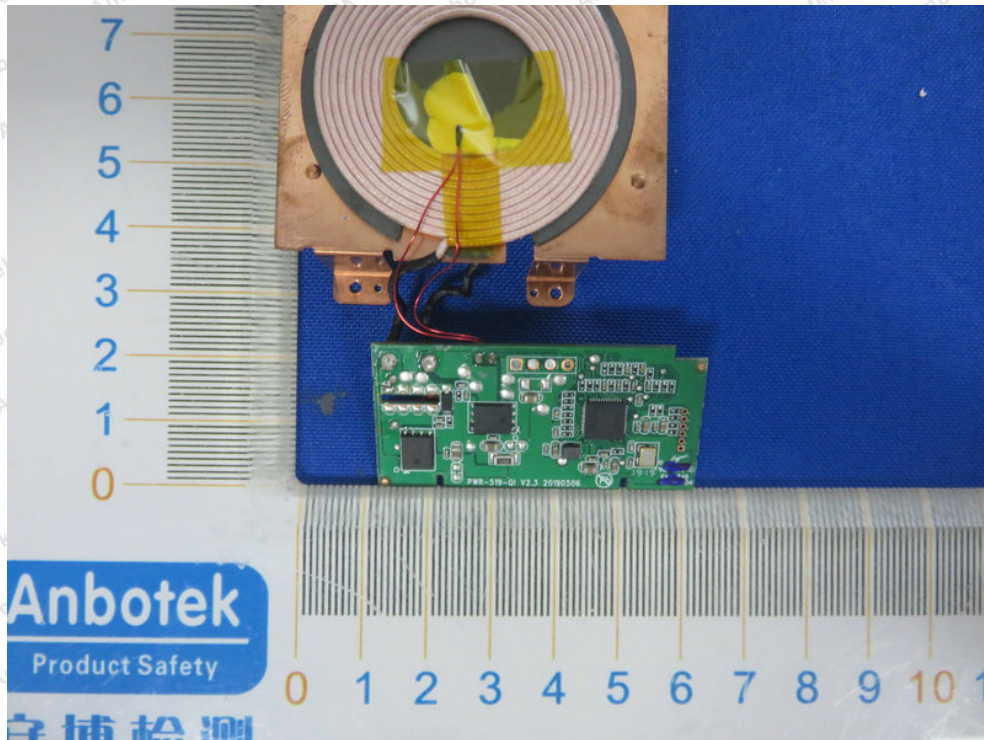


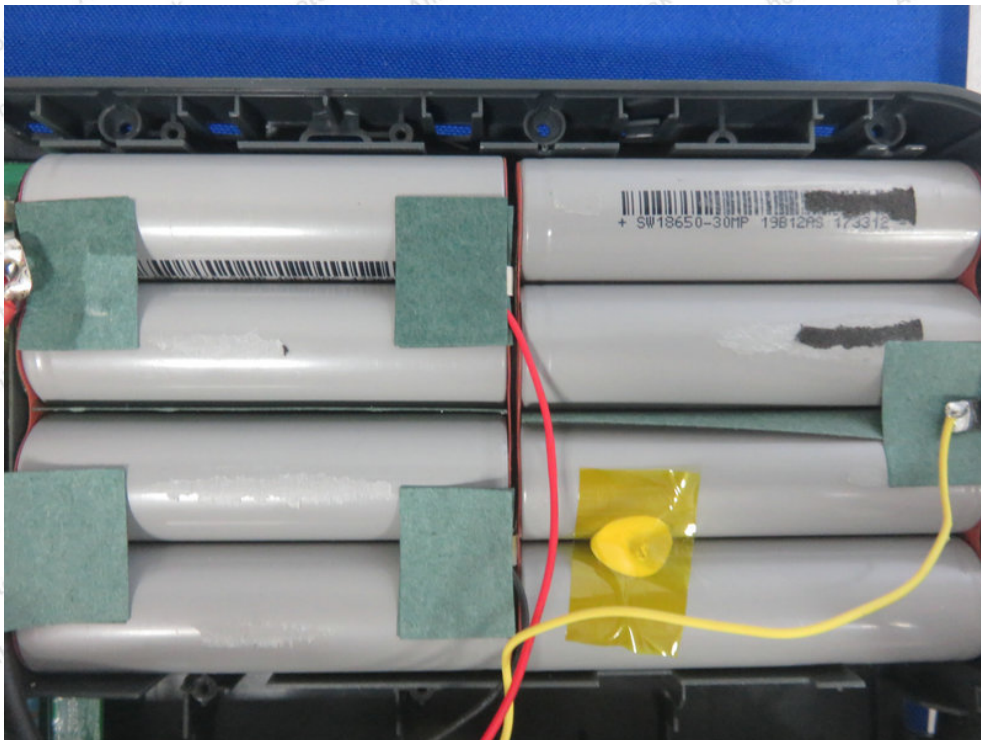
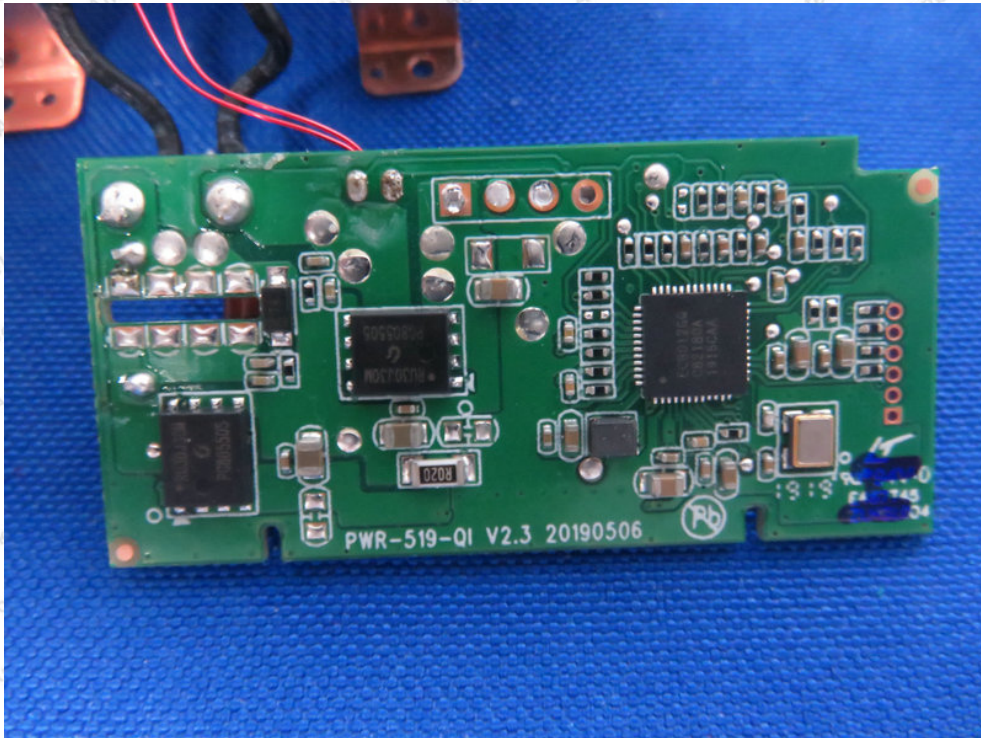














----- End of Report -----