

FCC TEST REPORT

For

Shenzhen ZBYD technology CO LTD(XPNDBLS)

Wireless Power Bank

Model No.: BW-WF02

Prepared For : Shenzhen ZBYD technology CO LTD(XPNDBLS)
Address : B207 Room, T1 building, silicon valley compound QingQuan road,
LongHua district, ShenZhen China

Prepared By : Shenzhen Anbotech Compliance Laboratory Limited
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Report Number : SZAWW180918002-01
Date of Receipt : Sept. 18, 2018
Date of Test : Sept. 18~26, 2018
Date of Report : Nov. 09, 2018

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TEST REPORT

Applicant : Shenzhen ZBYD technology CO LTD(XPNDBLS)
Manufacturer : Shenzhen ZBYD technology CO LTD(XPNDBLS)
Product Name : Wireless Power Bank
Model No. : BW-WF02
Trade Mark : ROKFORM
Rating(s) : WIRELESS INPUT: 5W
INPUT: 5V--- 2A / 9V--- 2A
WIRELESS OUTPUT: 10W
OUTPUT: 5V--- 3.1A / 9V--- 2A / 12V--- 1.5A
Capacity: 3.7V, 4000mAh

Test Standard(s) : FCC Part15 Subpart C 2017, 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 Test

Sept. 18~26, 2018

Prepared by



Oliay Yang

(Engineer / Oliay Yang)

Reviewer

Snowy Meng

(Supervisor / Snowy Meng)

Approved & Authorized Signer

Sally Zhang

(Manager / Sally Zhang)

1. General Information

1.1. Client Information

Applicant	:	Shenzhen ZBYD technology CO LTD(XPNDBLS)
Address	:	B207 Room, T1 building, silicon valley compound QingQuan road, LongHua district, ShenZhen China
Manufacturer	:	Shenzhen ZBYD technology CO LTD(XPNDBLS)
Address	:	B207 Room, T1 building, silicon valley compound QingQuan road, LongHua district, ShenZhen China
Factory	:	Shenzhen ZBYD technology CO LTD(XPNDBLS)
Address	:	B207 Room, T1 building, silicon valley compound QingQuan road, LongHua district, ShenZhen China

1.2. Description of Device (EUT)

Product Name	:	Wireless Power Bank
Model No.	:	BW-WF02
Trade Mark	:	ROKFORM
Test Power Supply	:	AC 120V, 60Hz for adapter / AC 240V, 60Hz for adapter/ DC 3.7V battery inside
Test Sample No.	:	S1(Normal Sample), S2(Engineering Sample)
Product Description	Operation Frequency:	111-205KHz
	Modulation Type:	MSK
	Antenna Type:	Loop 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	:	Model: A2013 Input: 100-240V 50-60Hz 0.7A Output: 3.6-6.5V--- 3A/ 6.5-9V--- 2A/ 9-12V--- 1.5A
Mobile Phone	:	Samsung

1.4. Description of Test Modes

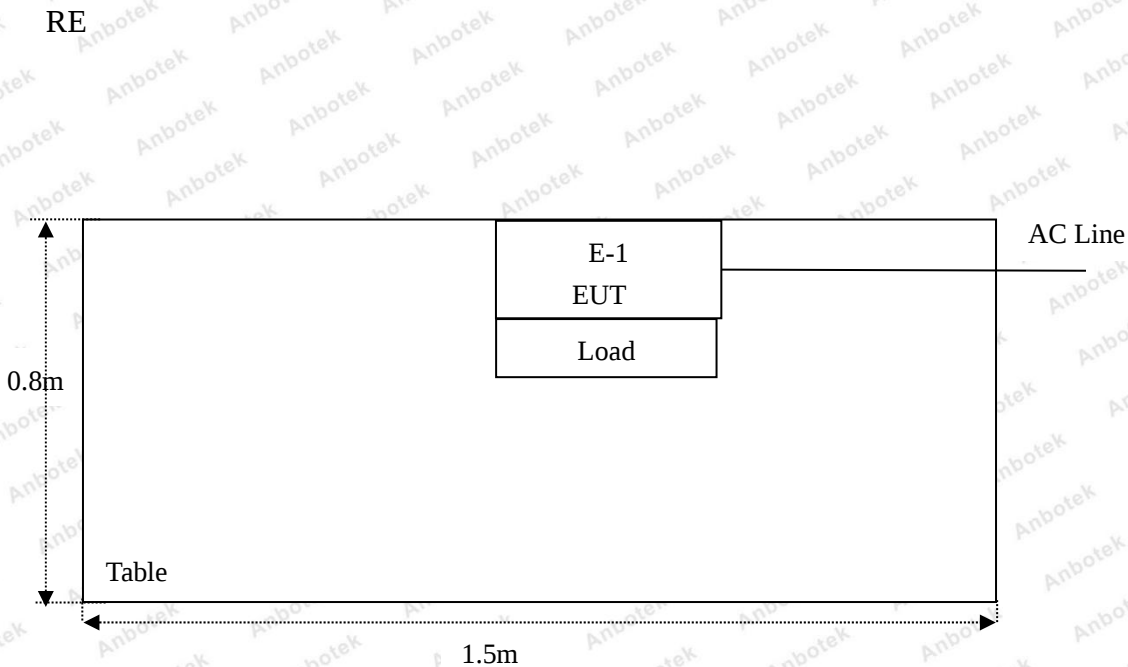
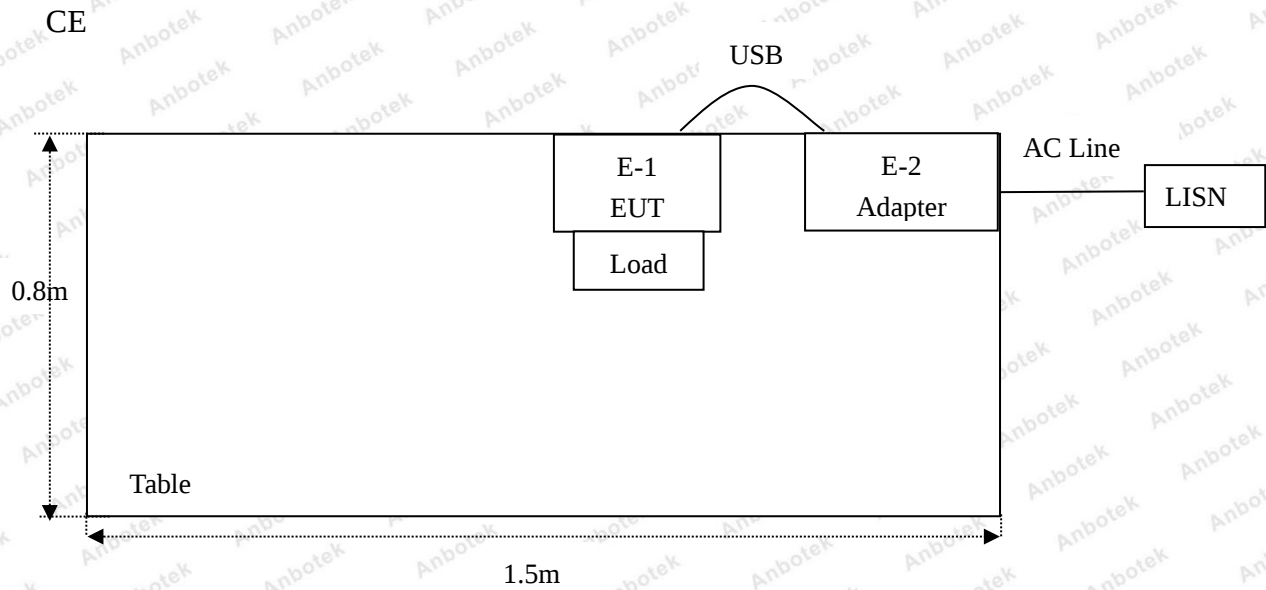
To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	TX mode

For Conducted Emission	
Final Test Mode	Description
Mode 1	TX mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	TX mode

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. 17, 2017	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Nov. 17, 2017	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Nov. 17, 2017	1 Year
4.	Spectrum Analysis	Agilent	E4407B	US39390582	Nov. 17, 2017	1 Year
5.	MAX Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 18, 2017	1 Year
6.	Preamplifier	SKET Electronic	BK1G18G30D	KD17503	Nov. 17, 2017	1 Year
7.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 20, 2017	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 20, 2017	1 Year
9.	Loop Antenna	Schwarzbeck	HFH2-Z2	100047	Nov. 17, 2017	1 Year
10.	Horn Antenna	Schwarzbeck	BBHA9170	9170-375	Nov. 17, 2017	1 Year
11.	Pre-amplifier	SONOMA	310N	186860	Nov. 17, 2017	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. 18, 2017	1 Year
14.	Power Sensor	DAER	RPR3006W	15I00041SN045	Nov. 17, 2017	1 Year
15.	Power Sensor	DAER	RPR3006W	15I00041SN046	Nov. 17, 2017	1 Year
16.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 18, 2017	1 Year
17.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Nov. 18, 2017	1 Year
18.	Signal Generator	Agilent	E4421B	MY41000743	Nov. 18, 2017	1 Year
19.	DC Power Supply	LW	TPR-6410D	349315	Nov. 01, 2017	1 Year
20.	Constant Temperature Humidity Chamber	Sertep	ZJ-HWHS80B	ZJ-17042804	Nov. 01, 2017	1 Year

1.7. 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 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 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-1, June 13, 2016.

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

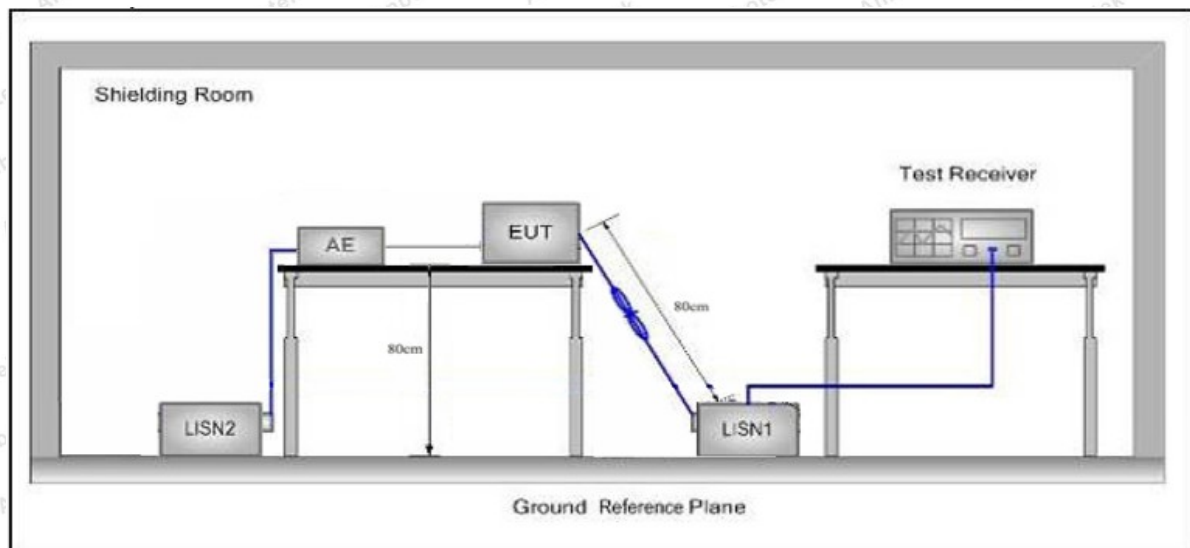
Standard Section	Test Item	Result
FCC Part 15, Paragraph 15.207	Conducted Emission Test	PASS
FCC Part 15, Paragraph 15.209(a)(f)	Spurious Emission	PASS
Part 15.203	Antenna Requirement	PASS

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.

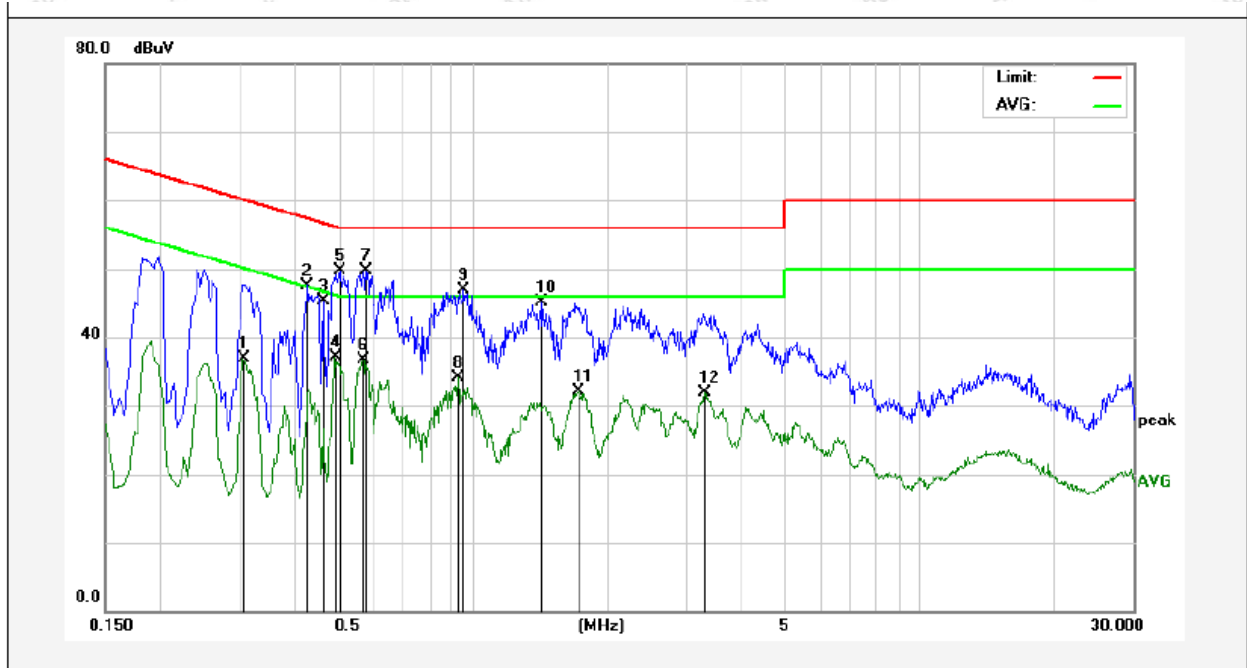
The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

Please to see the following pages

Conducted Emission Test Data

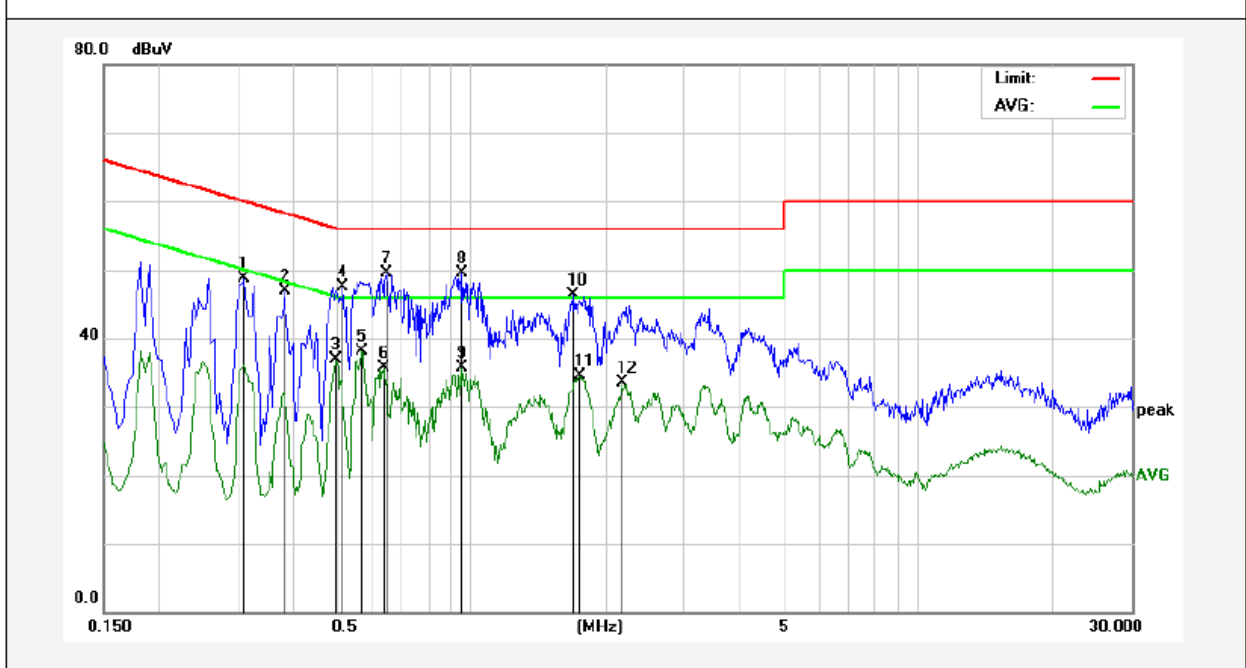
Test Site: 1# Shielded Room
Operating Condition: TX mode
Test Specification: AC 240V, 60Hz for adapter
Comment: Live Line
Tem.: 23.8°C Hum.: 54%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.3060	16.92	19.89	36.81	50.08	-13.27	AVG	
2	0.4260	27.65	19.95	47.60	57.33	-9.73	QP	
3	0.4620	25.31	19.96	45.27	56.66	-11.39	QP	
4	0.4900	17.11	19.98	37.09	46.17	-9.08	AVG	
5	0.5020	29.71	19.98	49.69	56.00	-6.31	QP	
6	0.5700	16.69	20.00	36.69	46.00	-9.31	AVG	
7	0.5780	29.62	20.00	49.62	56.00	-6.38	QP	
8	0.9260	13.94	20.10	34.04	46.00	-11.96	AVG	
9	0.9580	26.78	20.11	46.89	56.00	-9.11	QP	
10	1.4299	24.91	20.13	45.04	56.00	-10.96	QP	
11	1.7180	11.97	20.13	32.10	46.00	-13.90	AVG	
12	3.3020	11.79	20.17	31.96	46.00	-14.04	AVG	

Conducted Emission Test Data

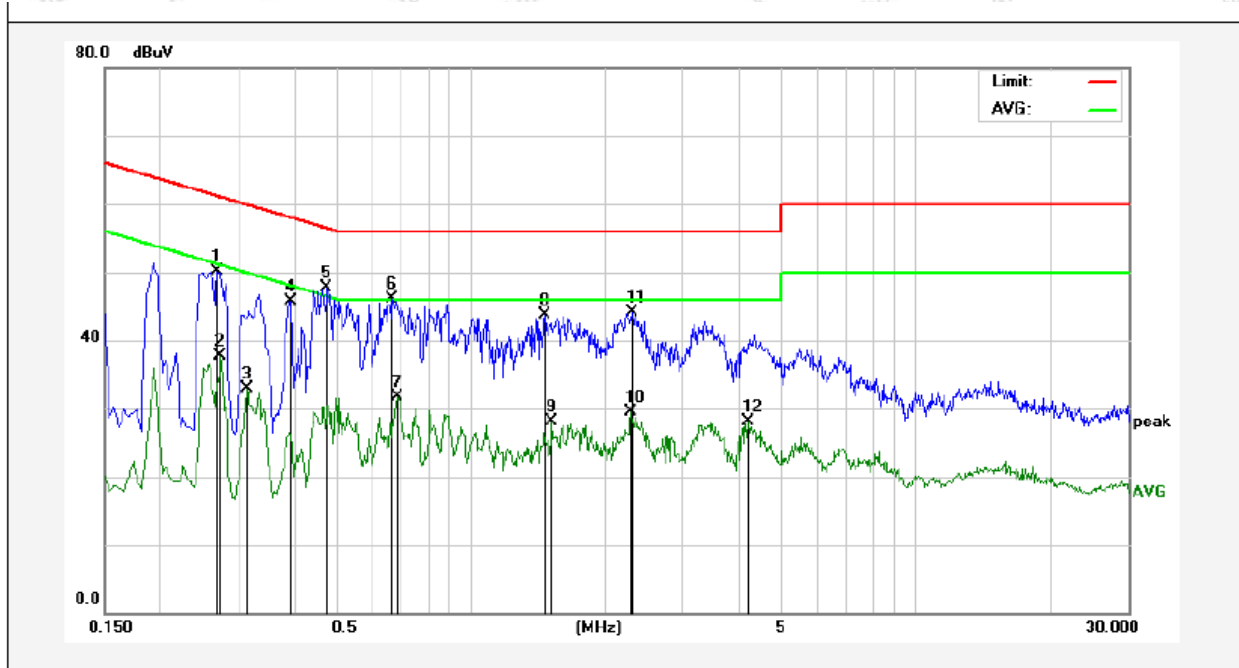
Test Site: 1# Shielded Room
Operating Condition: TX mode
Test Specification: AC 240V, 60Hz for adapter
Comment: Neutral Line
Tem.: 23.8°C Hum.: 54%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.3100	28.72	19.89	48.61	59.97	-11.36	QP	
2	0.3820	26.99	19.93	46.92	58.23	-11.31	QP	
3	0.4980	16.91	19.98	36.89	46.03	-9.14	AVG	
4	0.5180	27.43	19.99	47.42	56.00	-8.58	QP	
5	0.5700	18.01	20.00	38.01	46.00	-7.99	AVG	
6	0.6340	15.63	20.02	35.65	46.00	-10.35	AVG	
7	0.6460	29.47	20.02	49.49	56.00	-6.51	QP	
8	0.9540	29.48	20.11	49.59	56.00	-6.41	QP	
9	0.9540	15.64	20.11	35.75	46.00	-10.25	AVG	
10	1.6900	26.24	20.13	46.37	56.00	-9.63	QP	
11	1.7500	14.43	20.13	34.56	46.00	-11.44	AVG	
12	2.1740	13.35	20.14	33.49	46.00	-12.51	AVG	

Conducted Emission Test Data

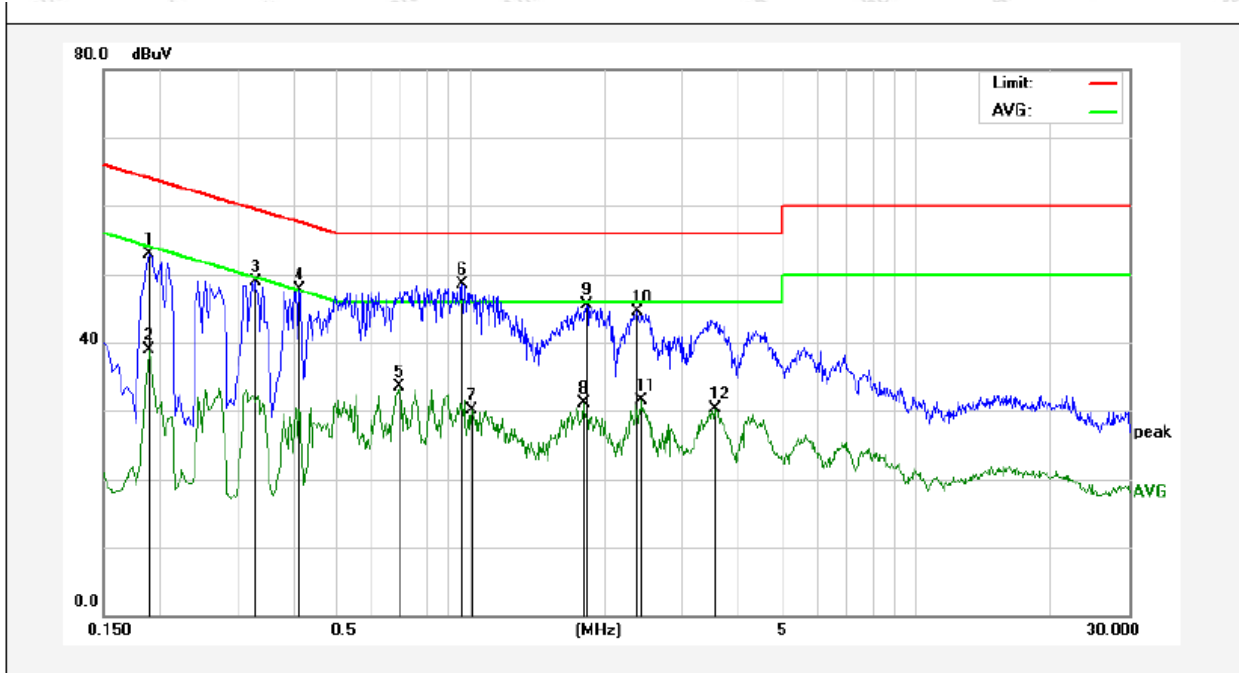
Test Site: 1# Shielded Room
Operating Condition: TX mode
Test Specification: AC 120V, 60Hz for adapter
Comment: Live Line
Tem.: 23.8°C Hum.: 54%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.2700	30.22	19.89	50.11	61.12	-11.01	QP	
2	0.2740	17.73	19.89	37.62	50.99	-13.37	AVG	
3	0.3140	13.00	19.90	32.90	49.86	-16.96	AVG	
4	0.3940	25.85	19.93	45.78	57.98	-12.20	QP	
5	0.4740	27.69	19.97	47.66	56.44	-8.78	QP	
6	0.6660	26.01	20.03	46.04	56.00	-9.96	QP	
7	0.6860	11.58	20.04	31.62	46.00	-14.38	AVG	
8	1.4660	23.50	20.13	43.63	56.00	-12.37	QP	
9	1.5260	8.03	20.13	28.16	46.00	-17.84	AVG	
10	2.2900	9.31	20.15	29.46	46.00	-16.54	AVG	
11	2.2980	23.89	20.15	44.04	56.00	-11.96	QP	
12	4.1860	7.96	20.18	28.14	46.00	-17.86	AVG	

Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: TX mode
Test Specification: AC 120V, 60Hz for adapter
Comment: Neutral Line
Tem.: 23.8°C Hum.: 54%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1900	33.06	19.90	52.96	64.03	-11.07	QP	
2	0.1900	19.08	19.90	38.98	54.03	-15.05	AVG	
3	0.3300	29.09	19.90	48.99	59.45	-10.46	QP	
4	0.4140	27.84	19.94	47.78	57.57	-9.79	QP	
5	0.6900	13.53	20.04	33.57	46.00	-12.43	AVG	
6	0.9620	28.34	20.11	48.45	56.00	-7.55	QP	
7	1.0100	10.06	20.12	30.18	46.00	-15.82	AVG	
8	1.7980	10.89	20.14	31.03	46.00	-14.97	AVG	
9	1.8220	25.43	20.14	45.57	56.00	-10.43	QP	
10	2.3620	24.36	20.15	44.51	56.00	-11.49	QP	
11	2.4260	11.33	20.15	31.48	46.00	-14.52	AVG	
12	3.5380	10.20	20.17	30.37	46.00	-15.63	AVG	

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

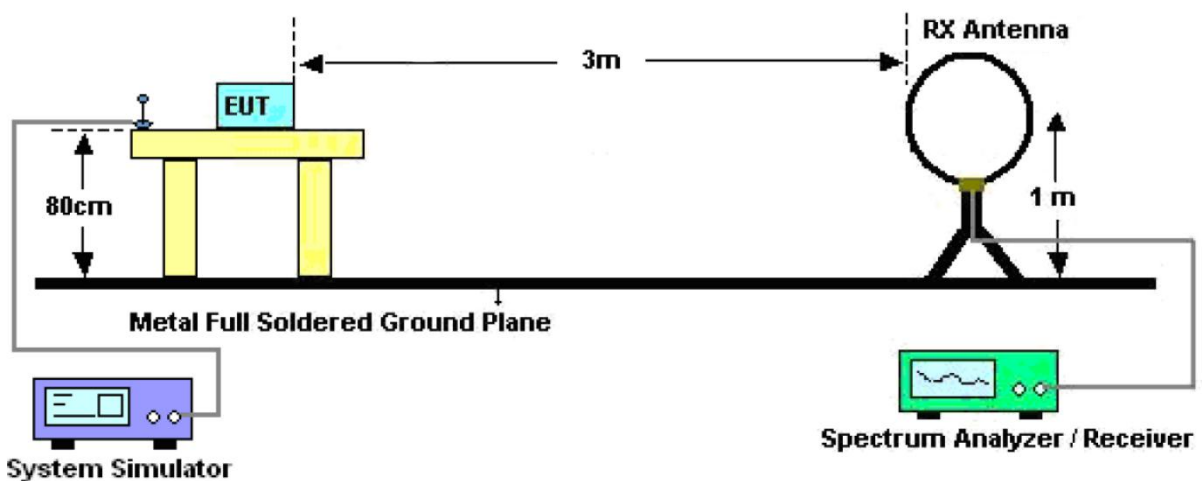


Figure 1. Below 30MHz

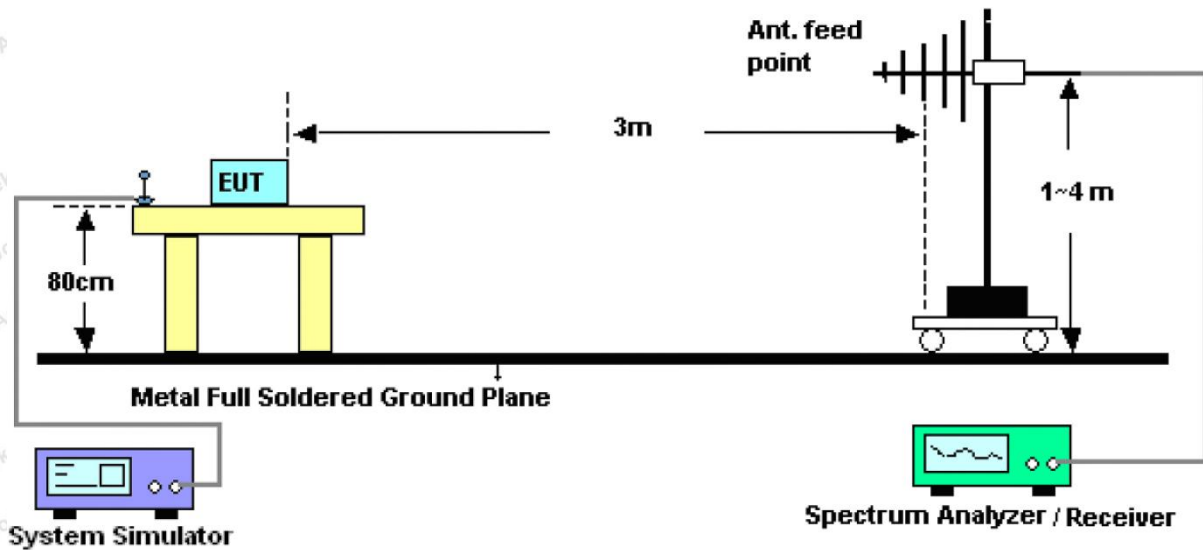


Figure 2. 30MHz to 1GHz

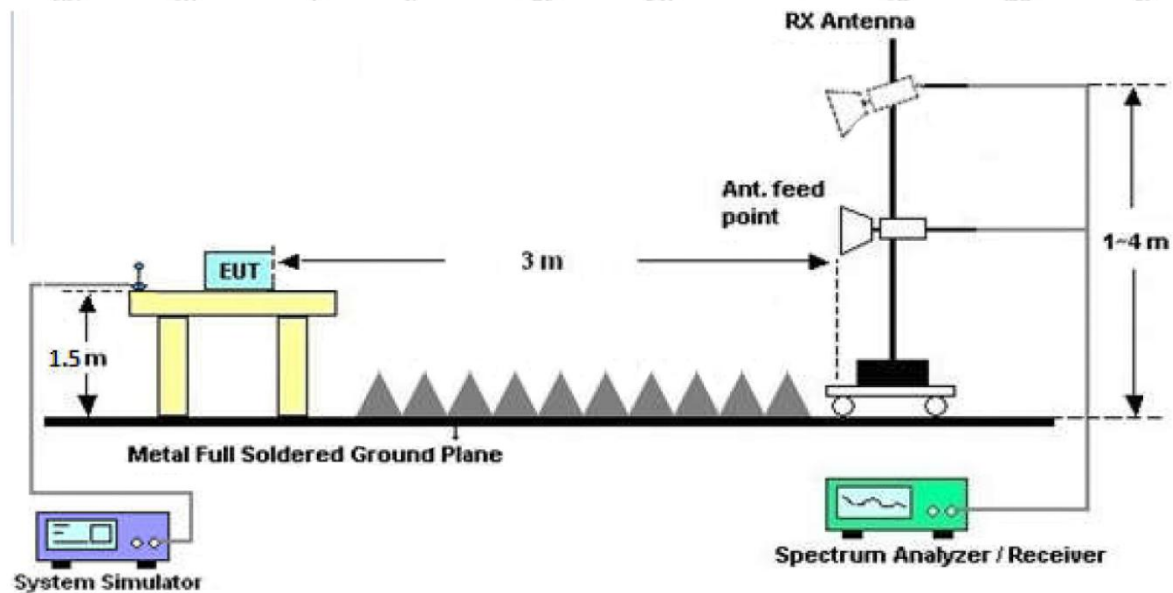


Figure 3. Above 1 GHz

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.

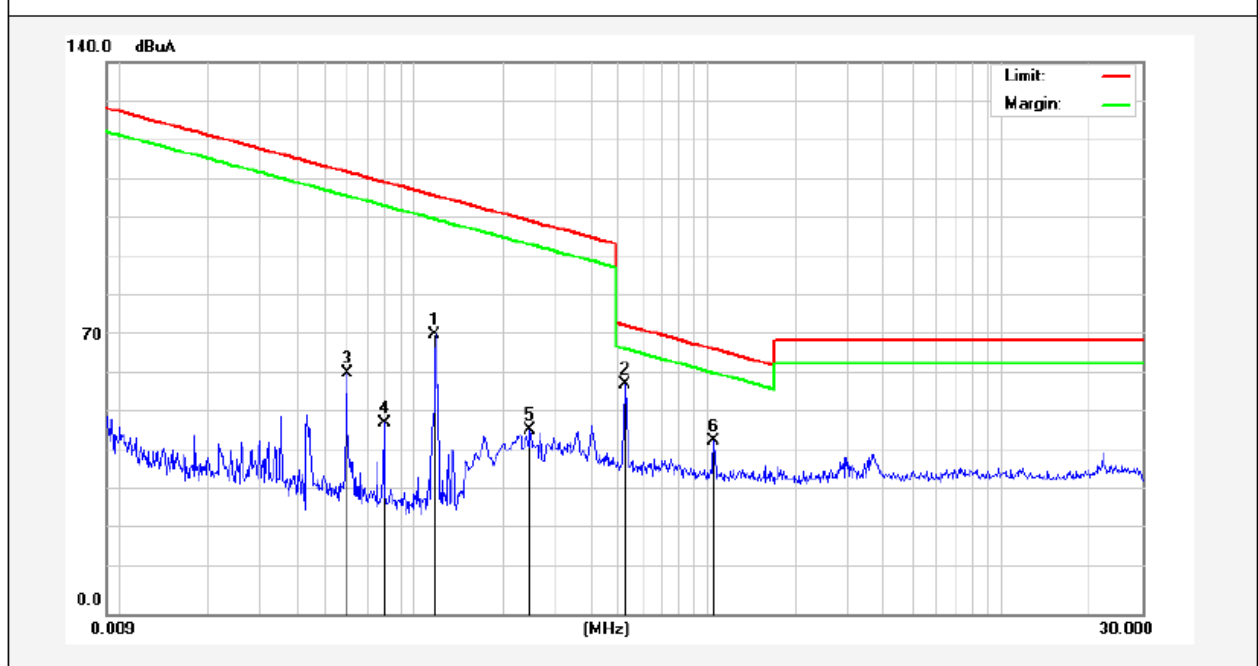
4.4. Test Data

PASS

Test Results

(Between 9KHz – 30MHz)

Job No.:	SZAWW180918002-01	Power Source:	AC 120V, 60Hz for adapter
Standard:	FCC PART15 C _3m	Temp.(C)/Hum.(%RH):	24.7(C)/51%RH
Test item:	Radiation Test	Distance:	3m
Test Mode:	Mode 1		

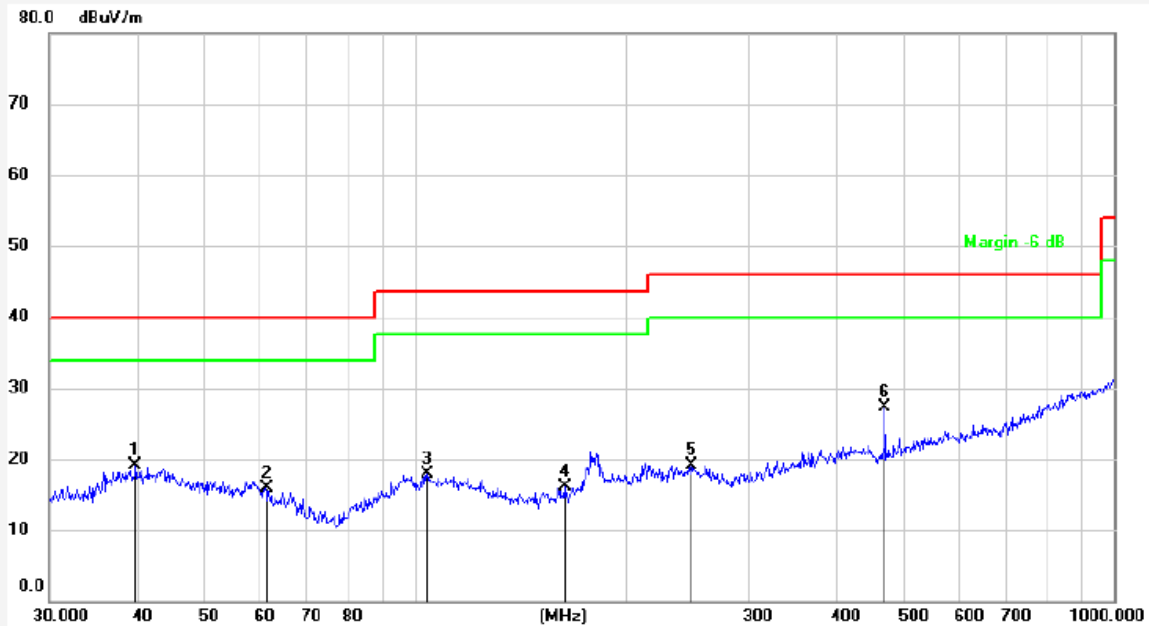


Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	degree (dgc)
0.1184	59.73	19.28	2.53	0	81.54	126.07	-44.53	Peak	41
0.1184	48.91	19.28	2.53	0	70.72	106.07	-35.35	AV	41
0.5260	36.47	19.40	2.55	0	58.42	73.18	-14.76	QP	0
0.0592	50.27	19.32	2.55	0	72.14	132.05	-59.91	Peak	89
0.0592	39.01	19.32	2.62	0	60.95	112.05	-51.10	AV	89
0.0792	46.98	19.34	2.62	0	68.94	129.54	-60.60	Peak	140
0.0792	26.44	19.34	2.63	0	48.41	109.54	-61.13	AV	140
0.2500	44.76	19.38	2.63	0	66.77	119.61	-52.84	Peak	108
0.2500	24.85	19.38	2.64	0	46.87	99.61	-52.74	AV	108
1.0500	21.80	19.50	2.65	0	43.95	67.18	-23.23	QP	180

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.

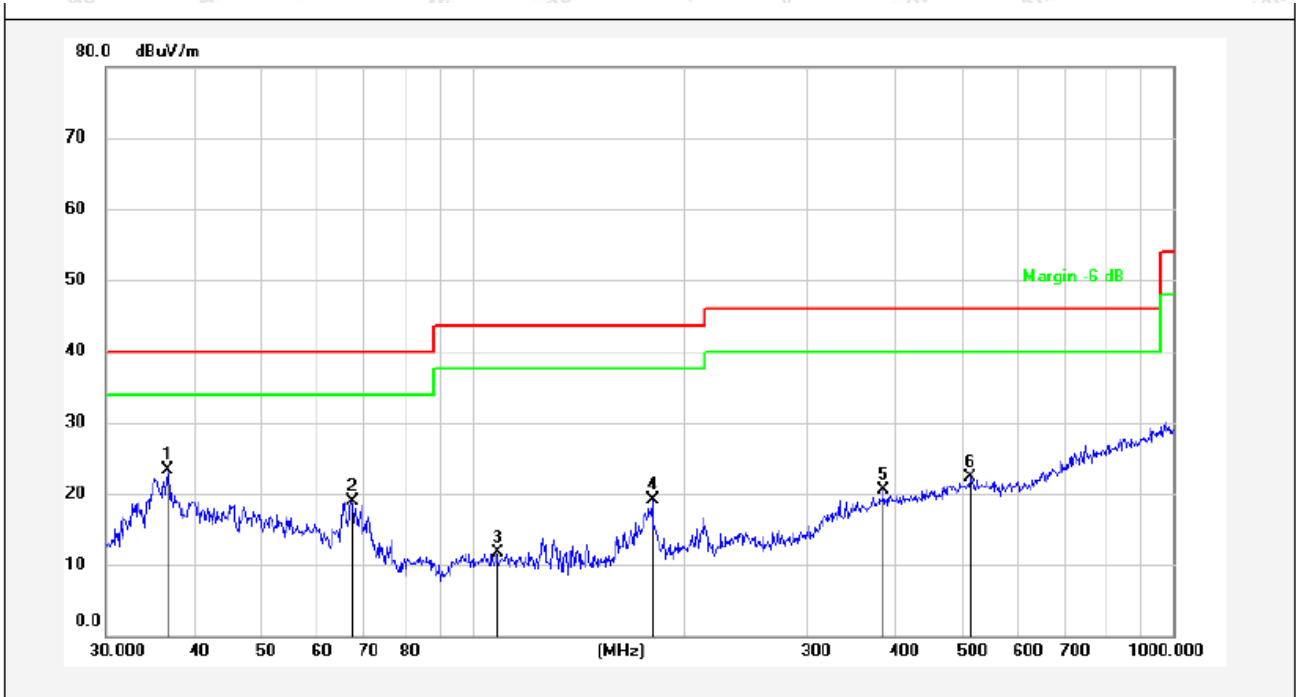
(Between 30MHz -1000 MHz)

Job No.:	SZAWW180918002-01	Polarization:	Horizontal
Standard:	FCC PART15 C _3m	Power Source:	AC 120V, 60Hz for adapter
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	22.4(C)/54%RH
Test Mode:	Mode 1	Distance:	3m



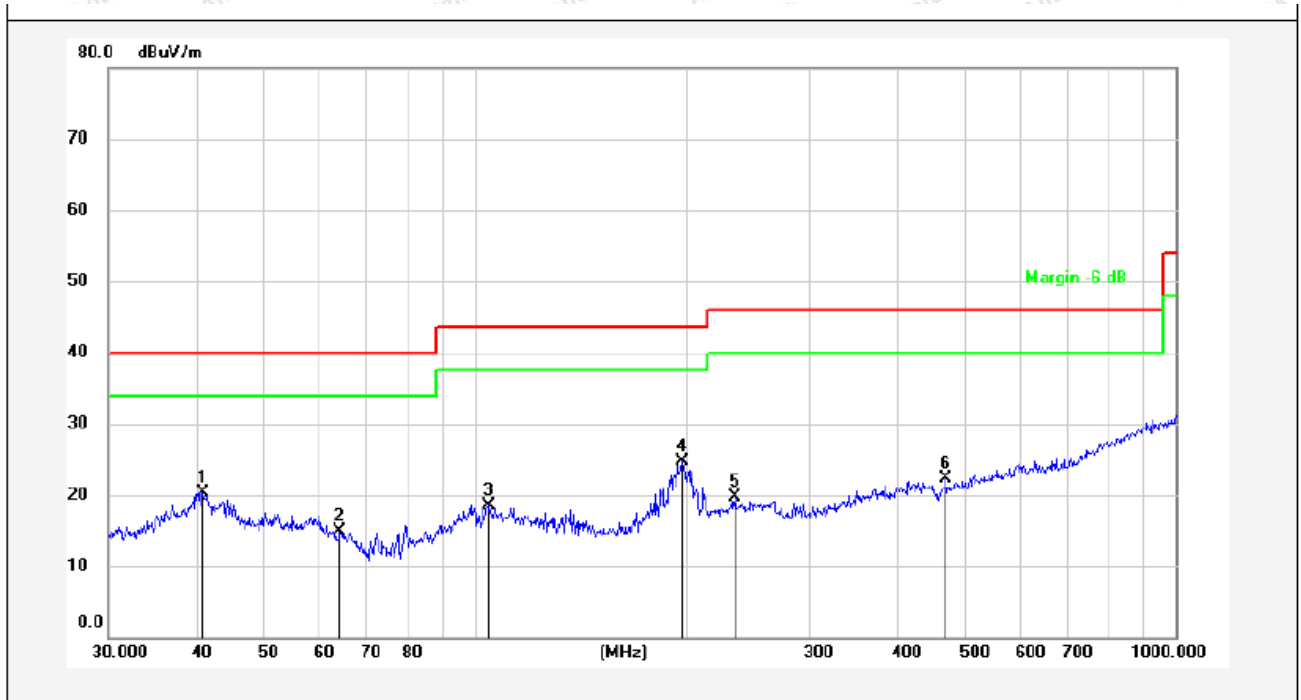
No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	39.8542	33.51	-14.45	19.06	40.00	-20.94	QP	300	0	
2	61.1316	33.42	-17.43	15.99	40.00	-24.01	QP	300	36	
3	104.1701	38.61	-20.70	17.91	43.50	-25.59	QP	300	154	
4	163.7550	36.57	-20.37	16.20	43.50	-27.30	QP	300	210	
5	247.6819	37.11	-17.92	19.19	46.00	-26.81	QP	300	299	
6	470.5232	39.18	-11.81	27.37	46.00	-18.63	QP	300	360	

Job No.:	SZAWW180918002-01	Polarization:	Vertical
Standard:	FCC PART15 C _3m	Power Source:	AC 120V, 60Hz for adapter
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	22.4(C)/54%RH
Test Mode:	Mode 1	Distance:	3m



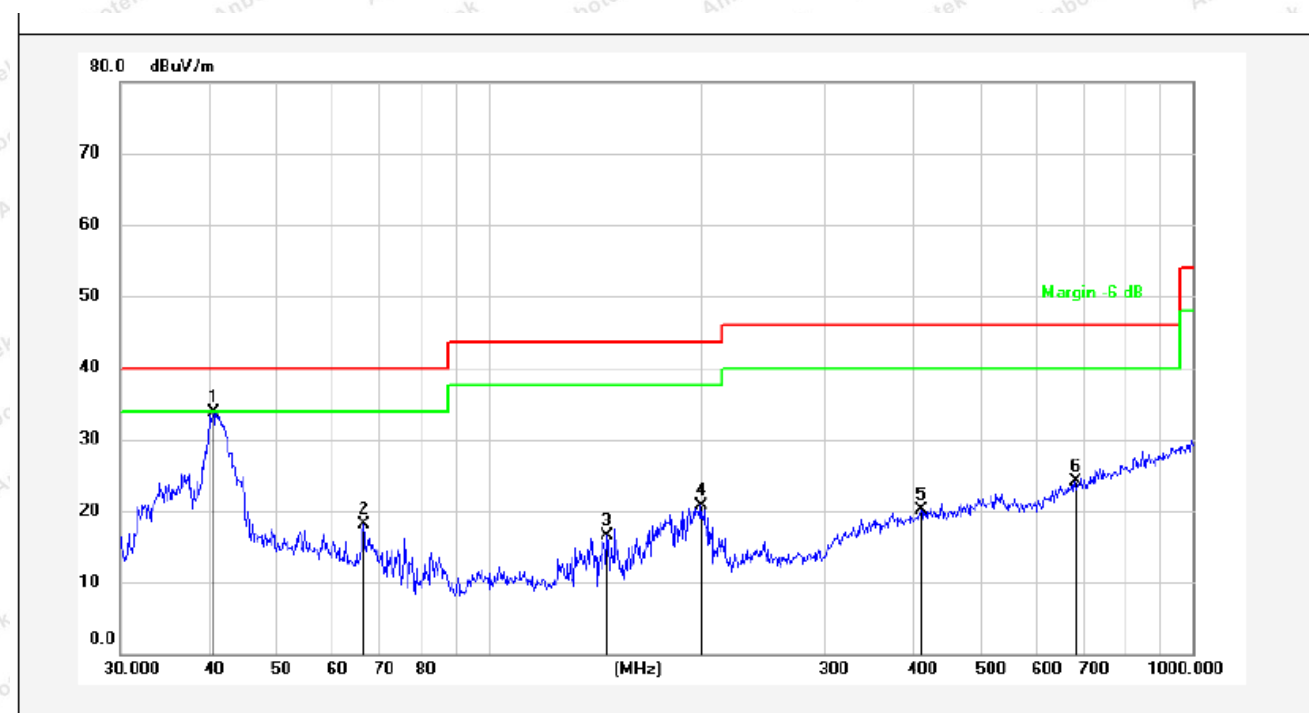
No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	36.7661	38.51	-15.14	23.37	40.00	-16.63	QP	300	0	
2	67.2022	37.56	-18.74	18.82	40.00	-21.18	QP	300	47	
3	108.2667	26.29	-14.65	11.64	43.50	-31.86	QP	300	141	
4	180.6487	34.82	-15.79	19.03	43.50	-24.47	QP	300	244	
5	386.6338	32.72	-12.14	20.58	46.00	-25.42	QP	300	300	
6	513.6331	33.04	-10.72	22.32	46.00	-23.68	QP	300	360	

Job No.:	SZAWW180918002-01	Polarization:	Horizontal
Standard:	FCC PART15 C _3m	Power Source:	AC 240V, 60Hz for adapter
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	22.4(C)/54%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	40.8446	34.89	-14.54	20.35	40.00	-19.65	QP	300	0	
2	64.2074	33.52	-18.58	14.94	40.00	-25.06	QP	300	63	
3	104.5361	39.18	-20.69	18.49	43.50	-25.01	QP	300	177	
4	197.8928	43.70	-19.09	24.61	43.50	-18.89	QP	300	220	
5	234.9909	37.69	-17.95	19.74	46.00	-26.26	QP	300	296	
6	470.5232	34.15	-11.81	22.34	46.00	-23.66	QP	300	360	

Job No.: SZAWW180918002-01
Standard: FCC PART15 C_3m
Test item: Radiation Test
Test Mode: Mode 1
Polarization: Vertical
Power Source: AC 240V, 60Hz for adapter
Temp.(C)/Hum.(%RH): 22.4(C)/54%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	40.7016	47.17	-13.50	33.67	40.00	-6.33	QP	300	0	
2	66.4989	36.53	-18.46	18.07	40.00	-21.93	QP	300	24	
3	147.4036	33.90	-17.38	16.52	43.50	-26.98	QP	300	141	
4	199.9856	35.62	-14.87	20.75	43.50	-22.75	QP	300	220	
5	411.8240	31.60	-11.52	20.08	46.00	-25.92	QP	300	263	
6	679.9600	32.74	-8.63	24.11	46.00	-21.89	QP	300	360	

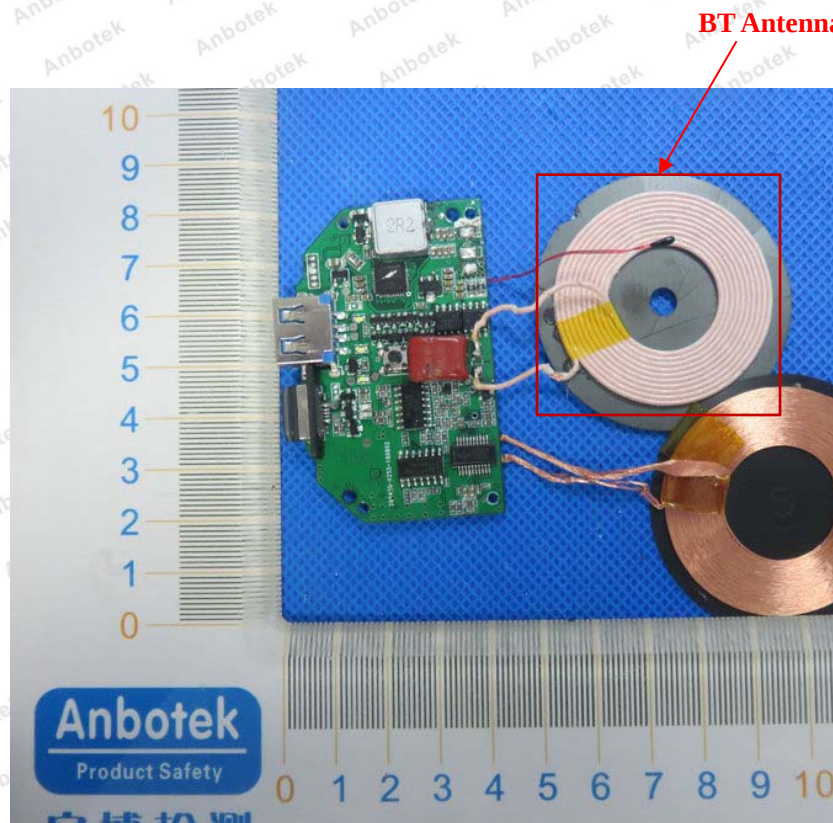
5. Antenna Requirement

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

5.2. Antenna Connected Construction

The bluetooth antenna is a Loop Antenna which permanently attached, and the best case gain of the antenna is 0 dBi. It complies with the standard requirement.

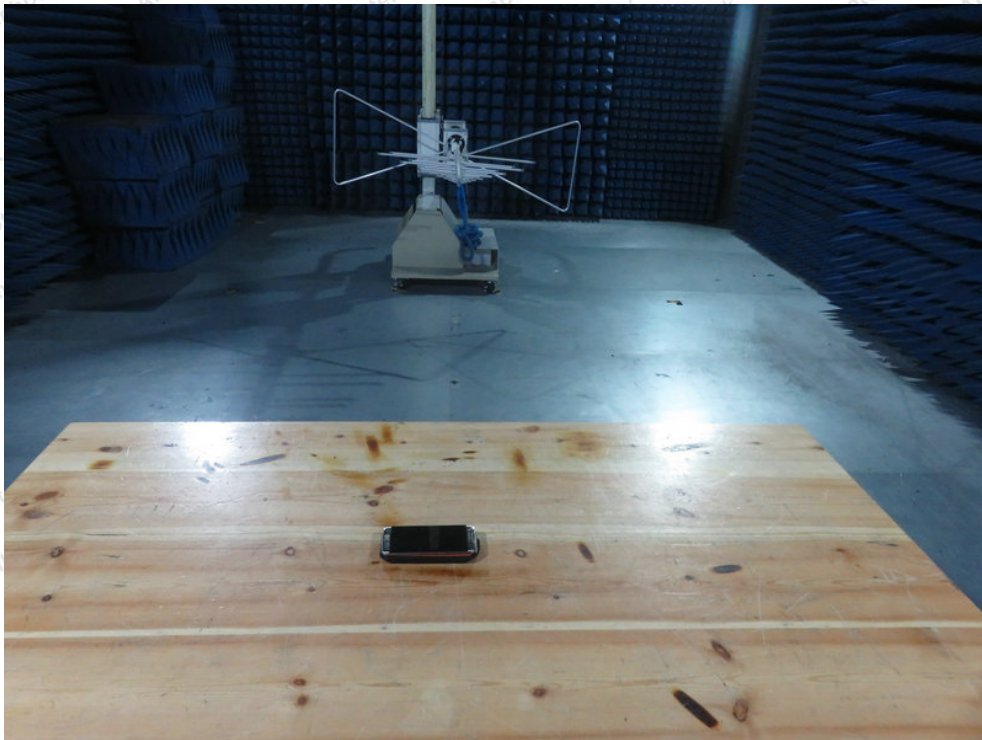


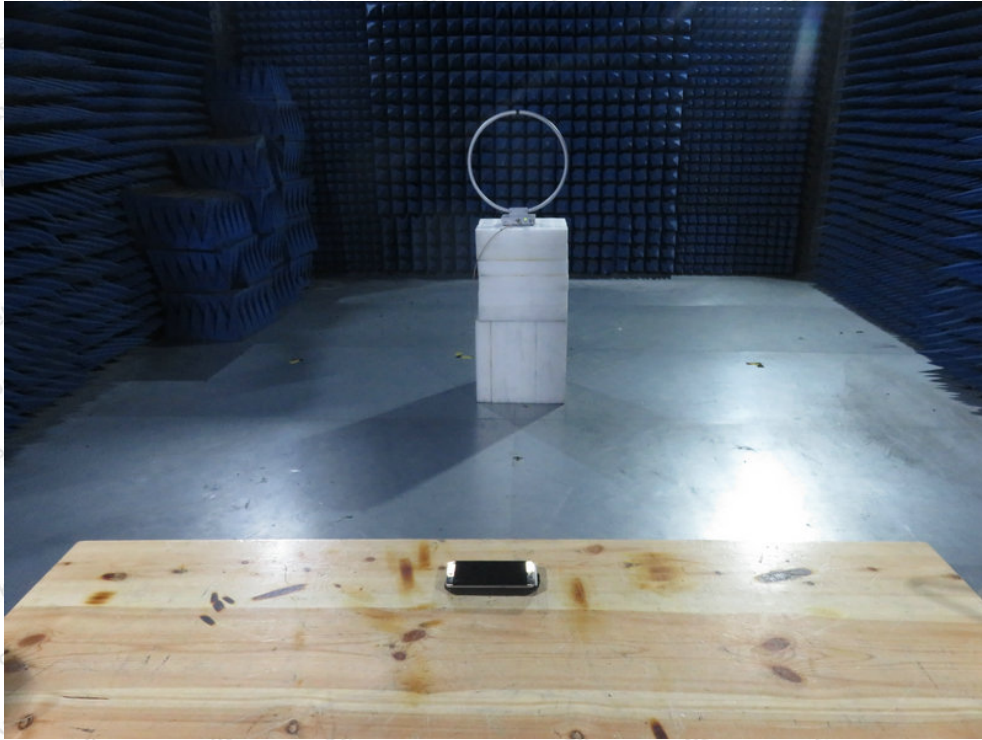
APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Conducted Emission Measurement

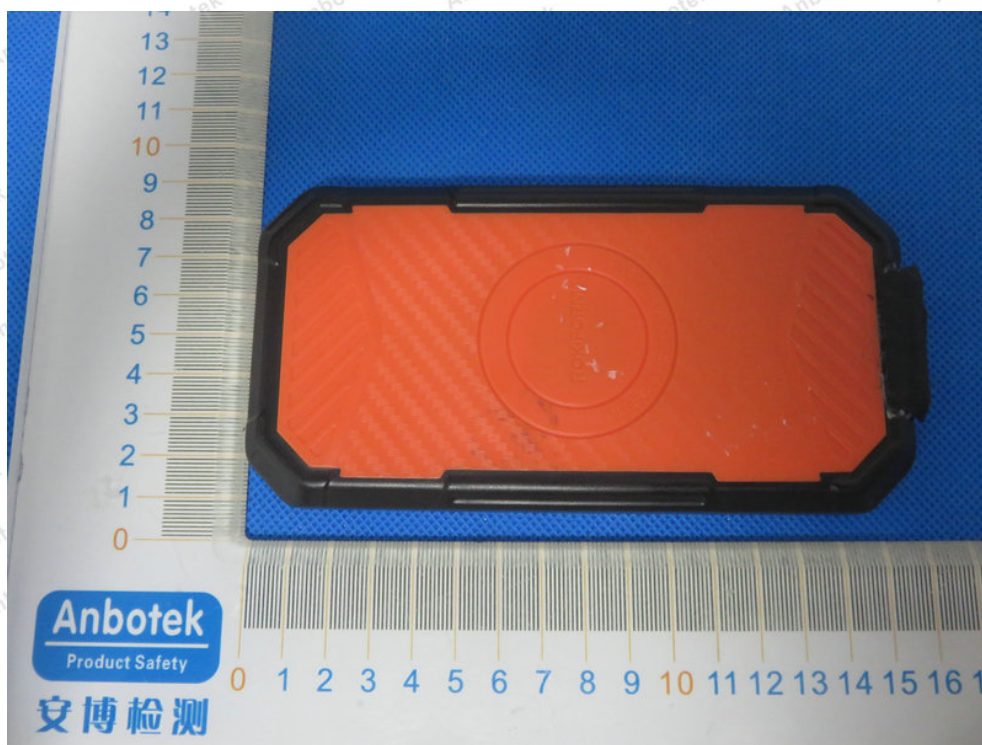


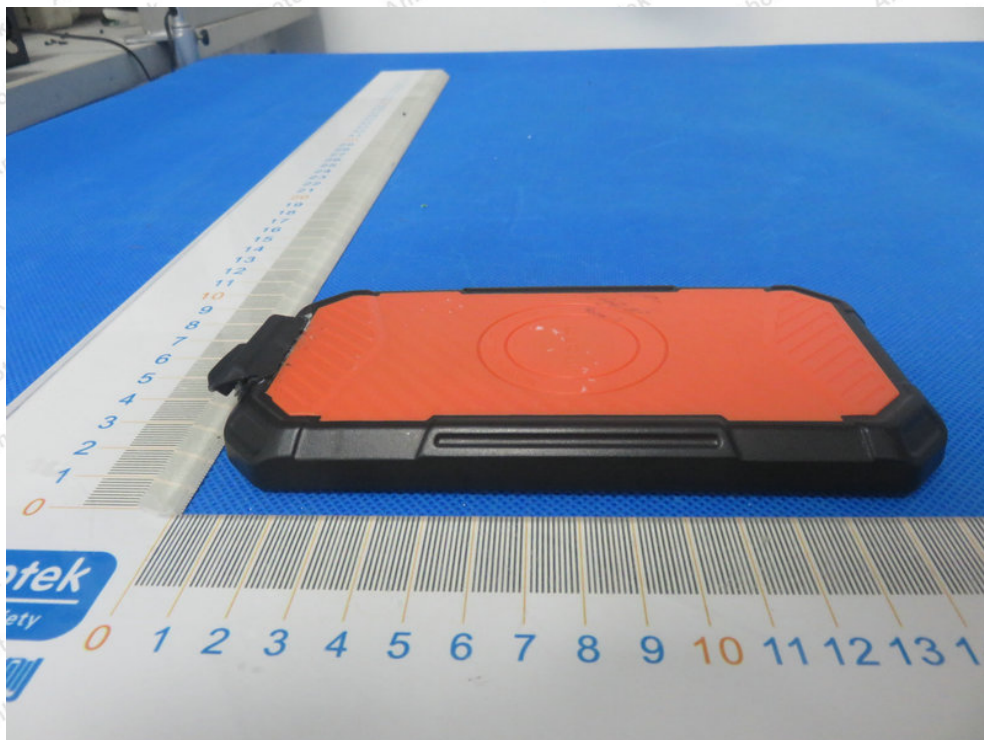
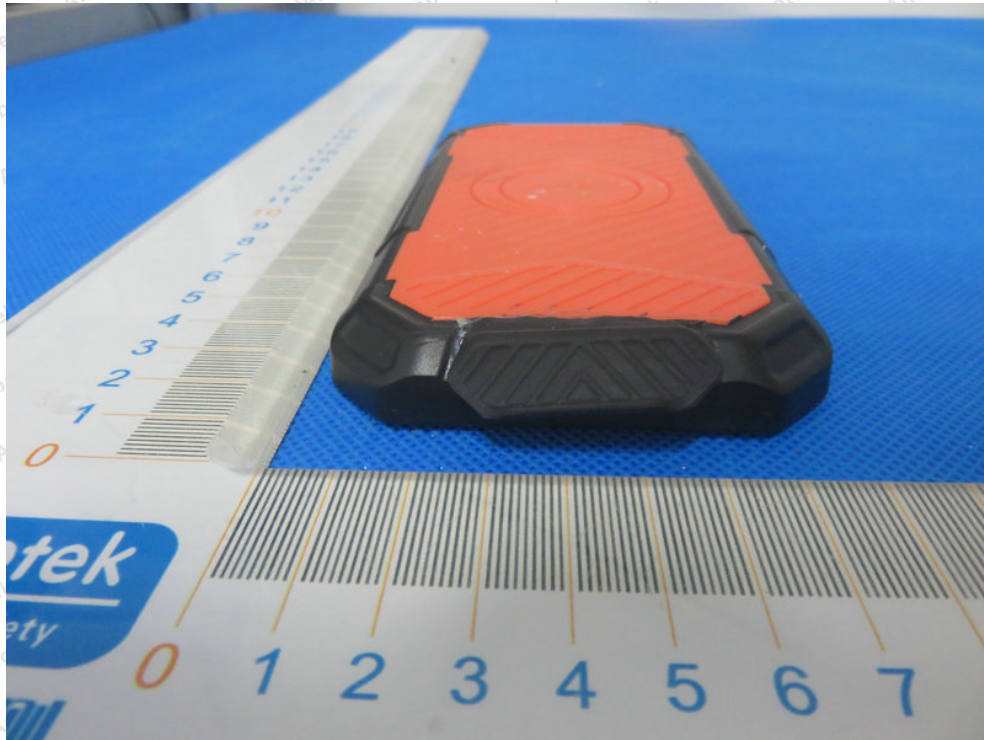
Photo of Radiation Emission Test

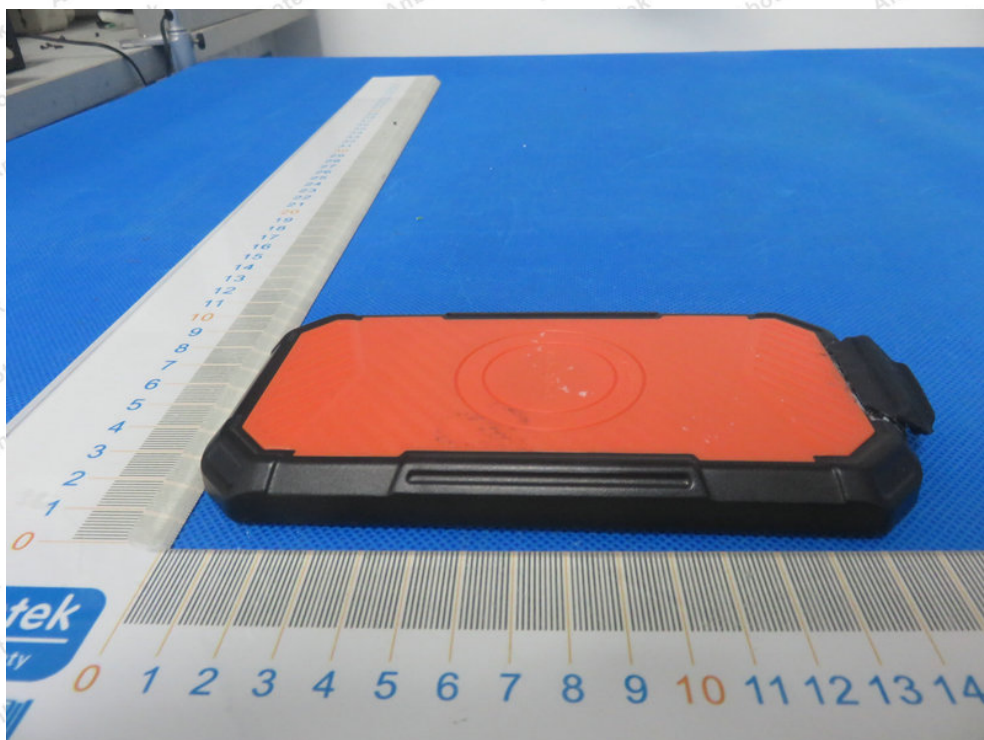




APPENDIX II -- EXTERNAL PHOTOGRAPH

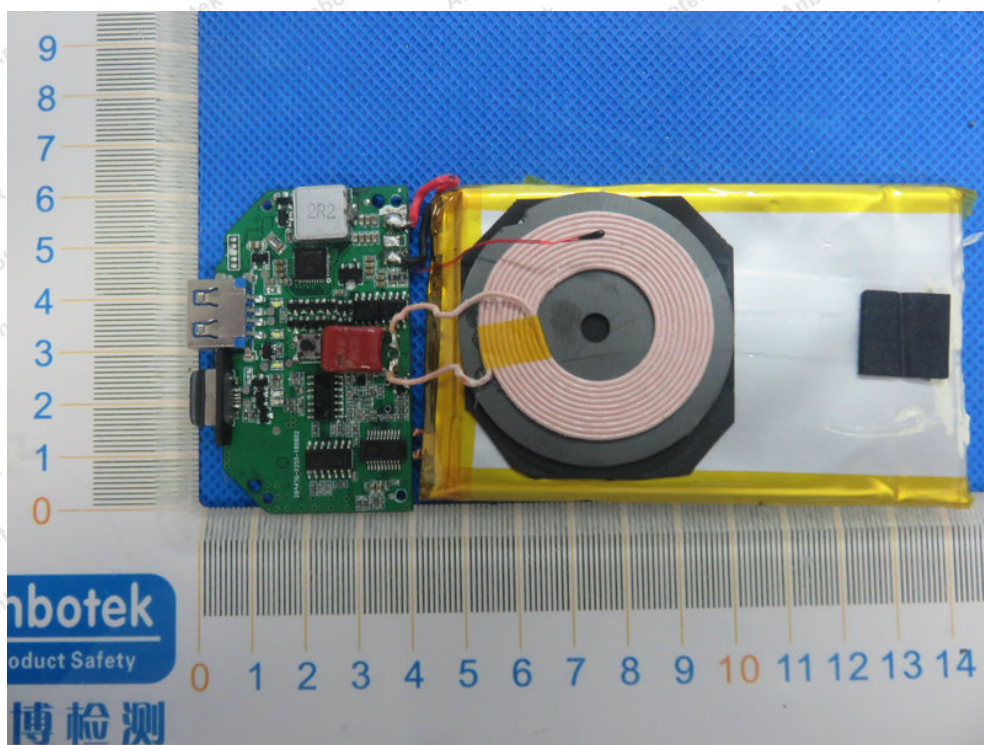
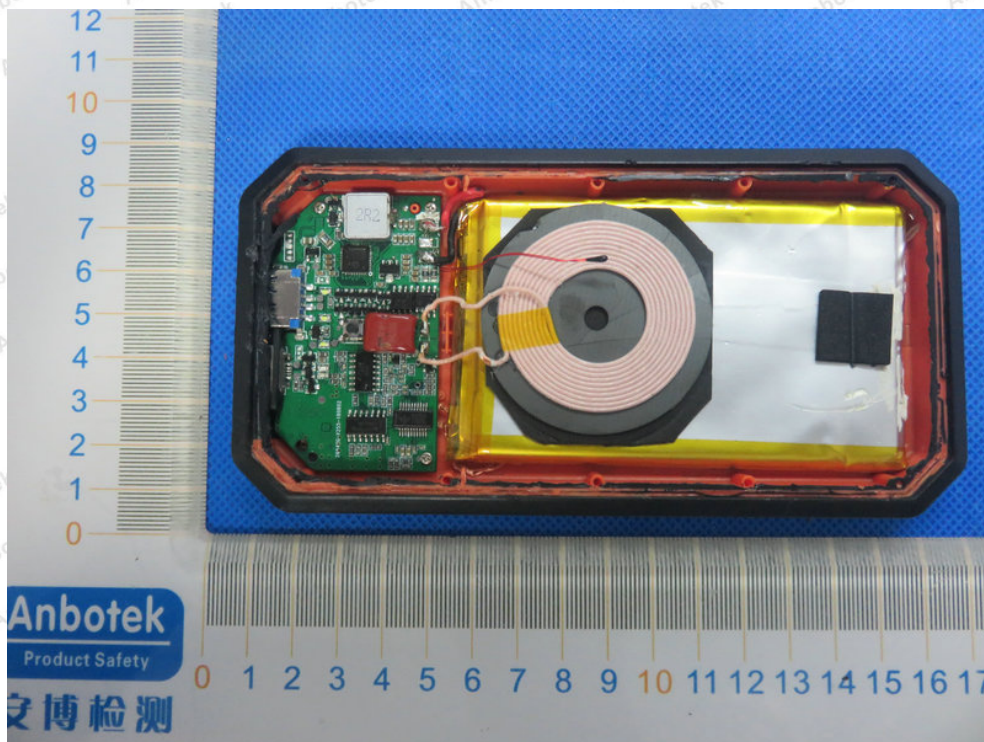


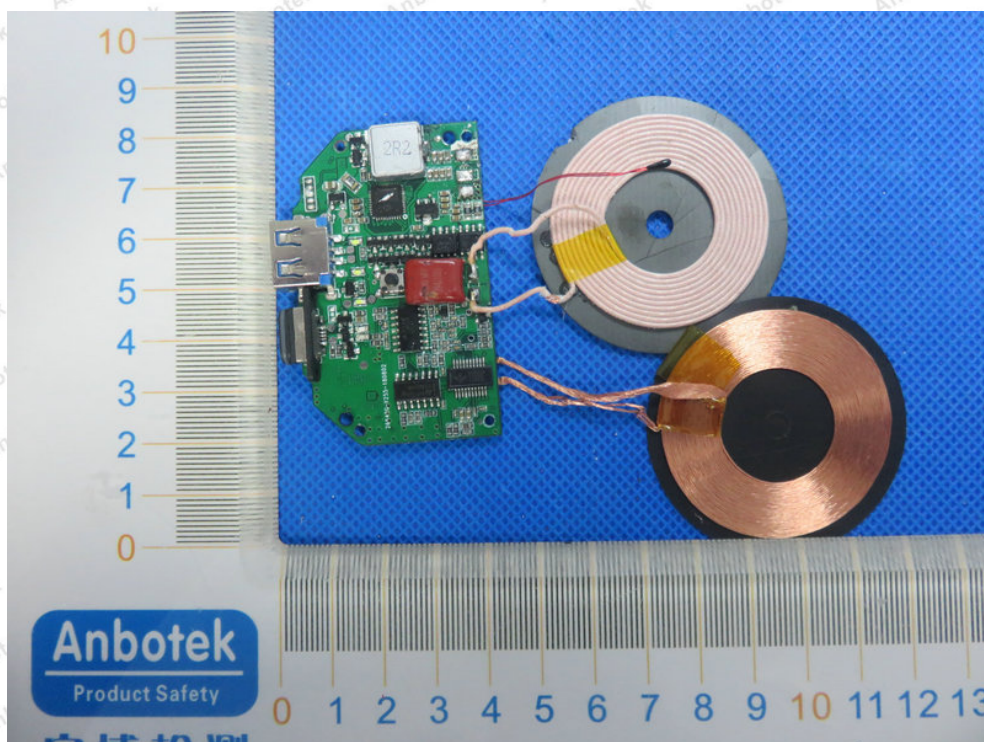
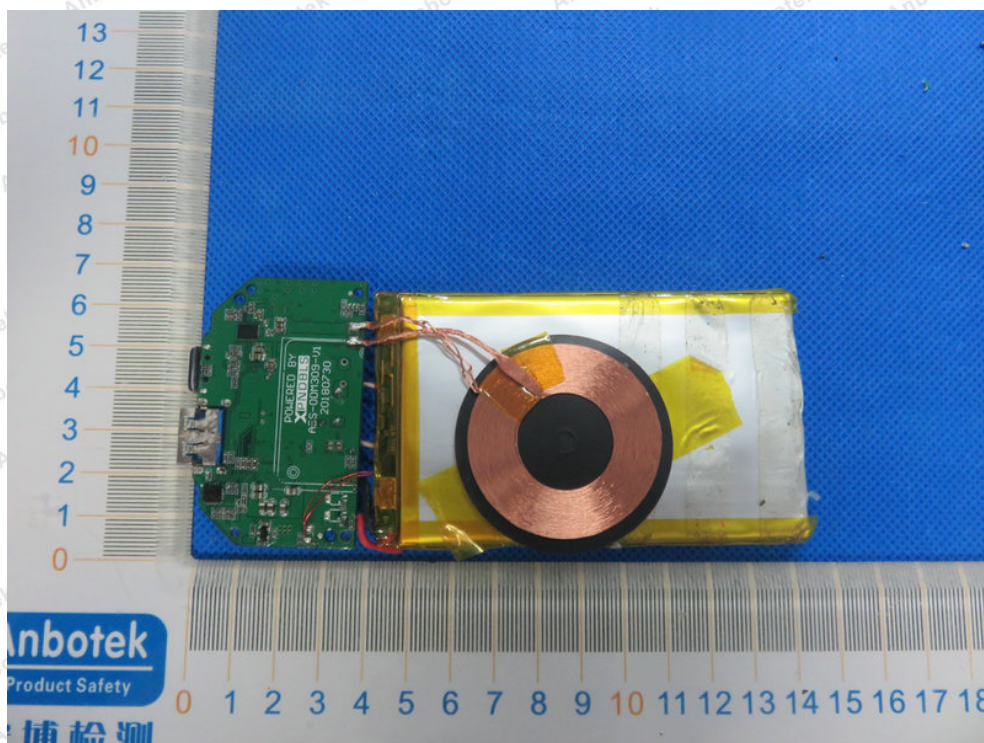


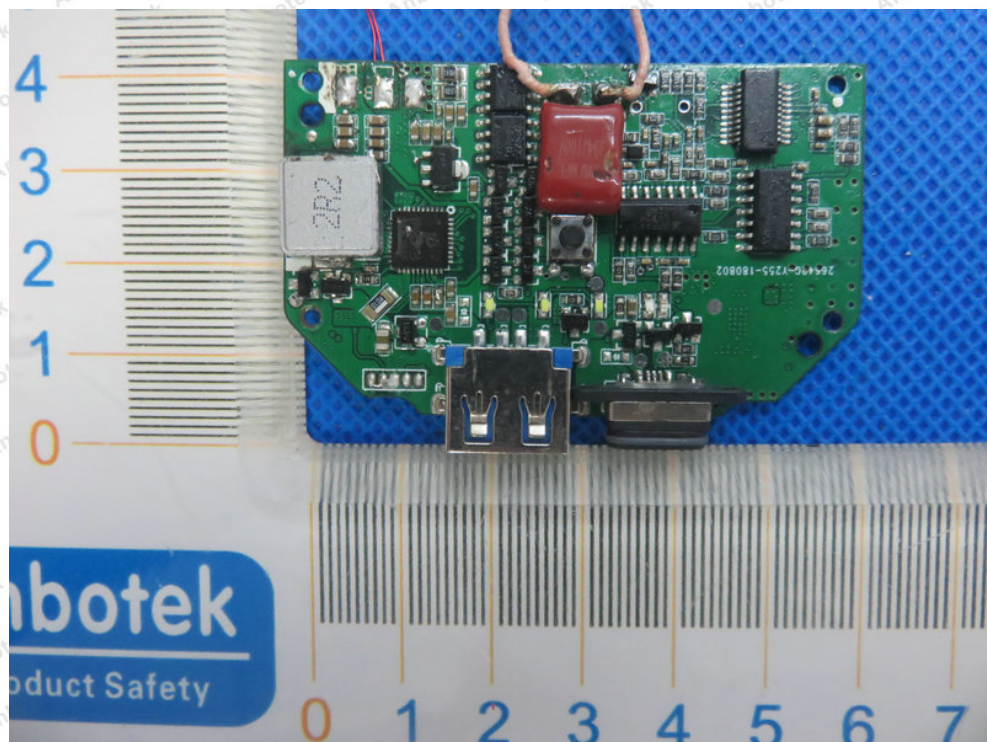
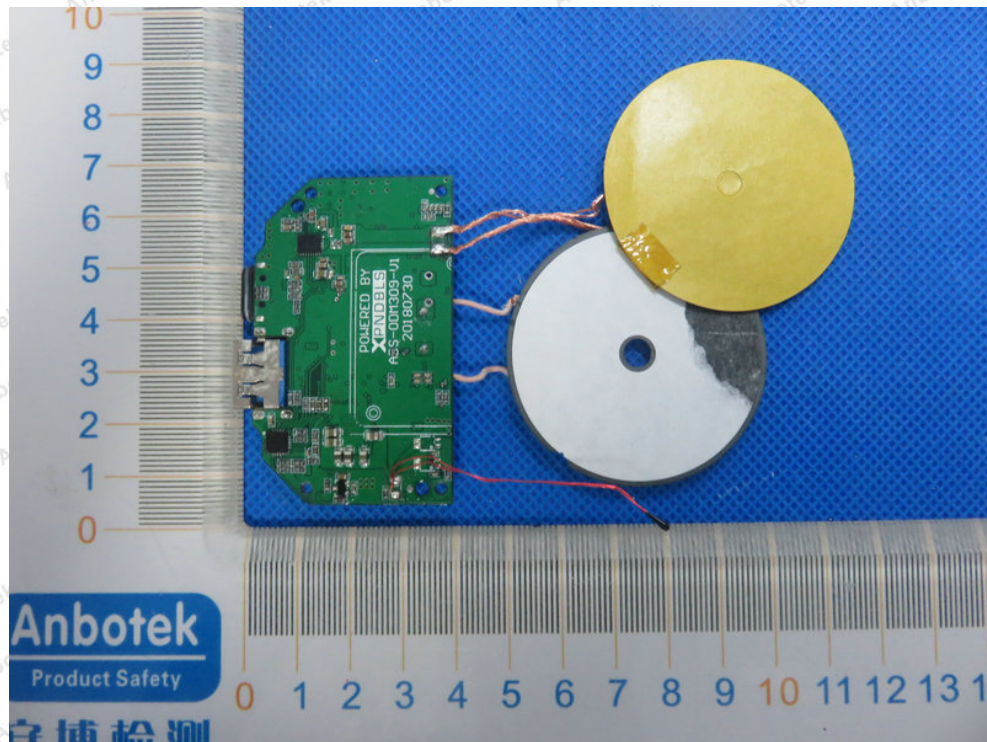


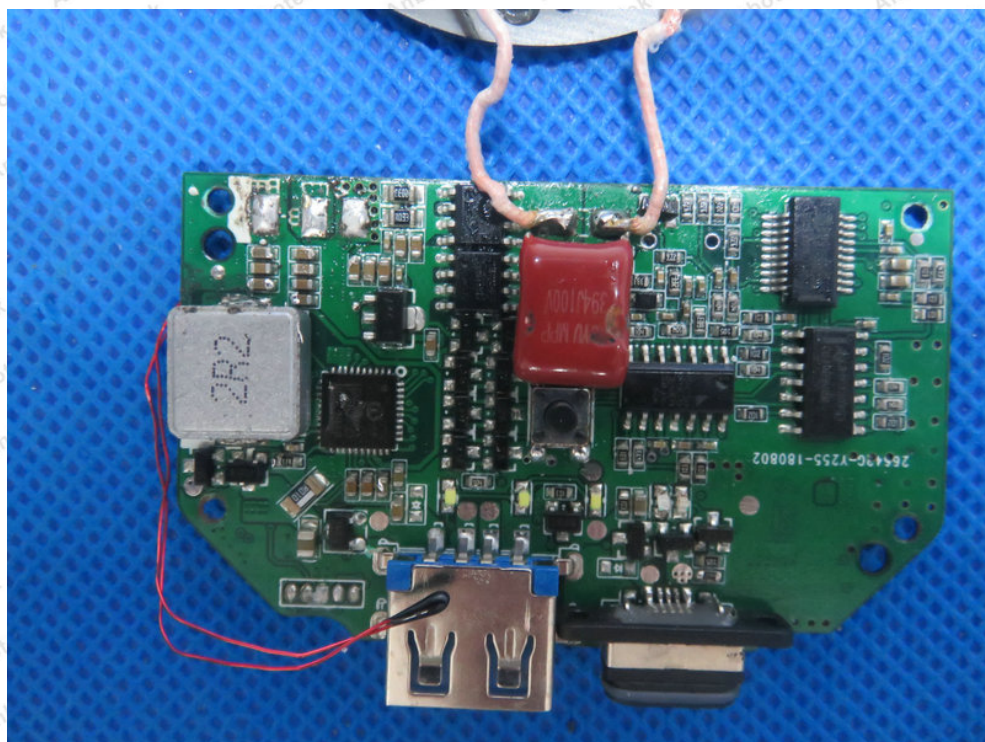
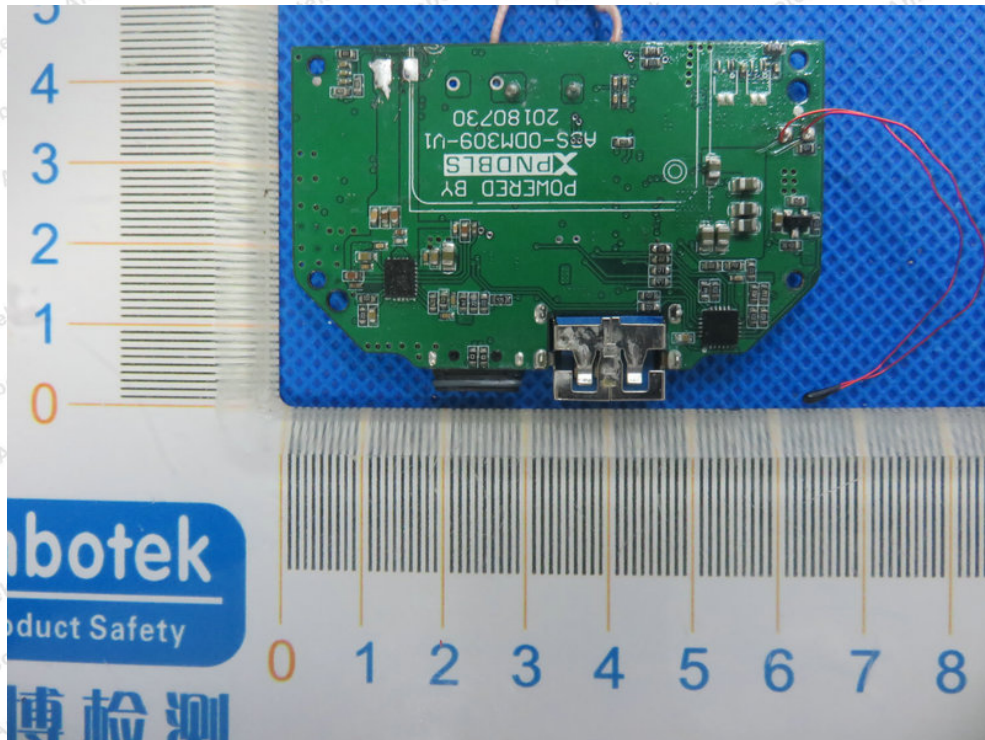


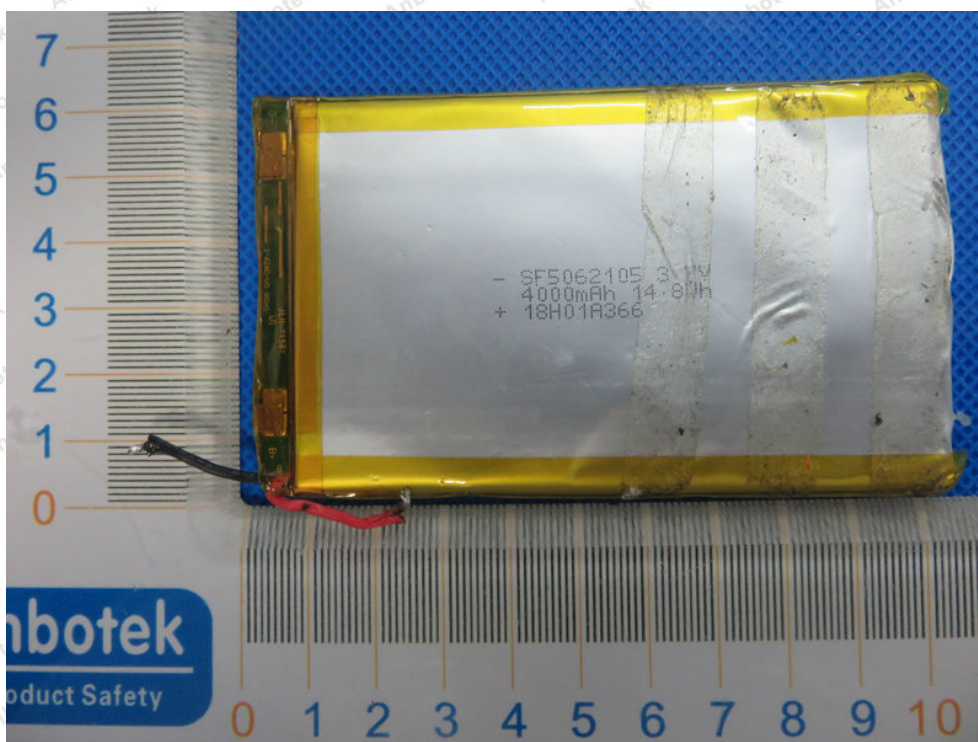
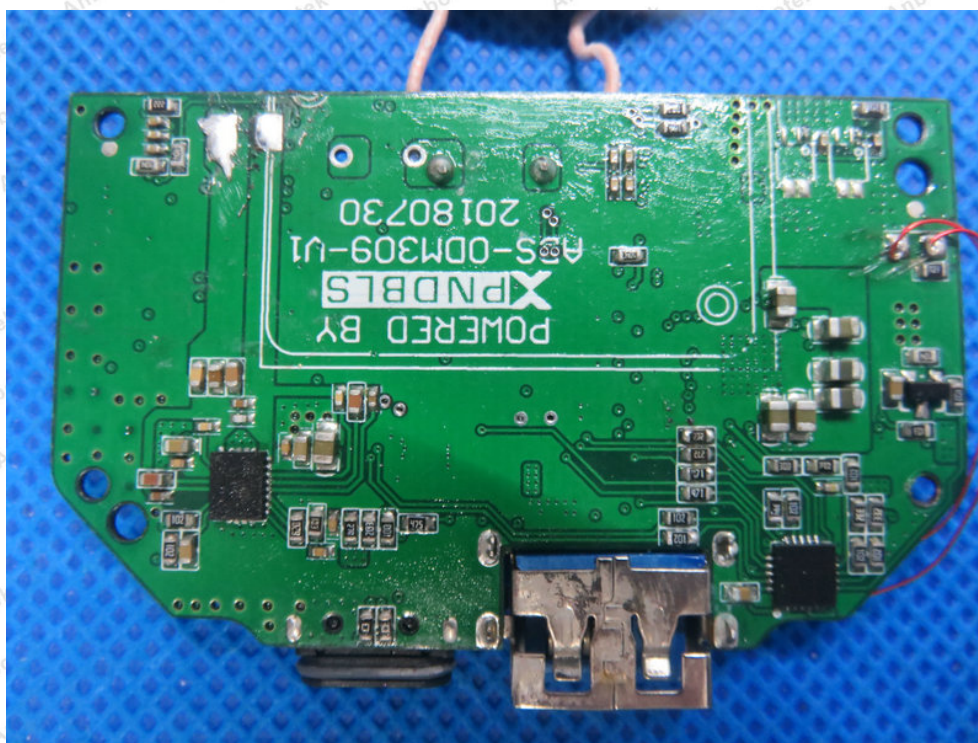
APPENDIX III -- INTERNAL PHOTOGRAPH











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