



FCC TEST REPORT
FCC ID: 2AP2N-BOX10000W

On Behalf of

Shenzhen Esorun Technology Co., LTD

Wireless Power Bank

Model No.: BOX10000W

Prepared for : Shenzhen Esorun Technology Co., LTD
Address : 425(E02), No. 5 Golf Avenue, Guangpei Community, Guanlan
Street, Longhua District, Shenzhen, China

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.
Address : Building i, No.2, Lixin Road, Fuyong Street, Bao'an District,
518103, Shenzhen, Guangdong, China

Report Number : A1911163-C01-R02
Date of Receipt : November 25, 2019
Date of Test : November 25-April 24, 2020
Date of Report : April 24, 2020
Version Number : V0

TABLE OF CONTENTS

1. Test Result Summary	5
2. General Information.....	6
2.1. DESCRIPTION OF DEVICE (EUT).....	6
2.2. ACCESSORIES OF DEVICE (EUT).....	7
2.3. TESTED SUPPORTING SYSTEM DETAILS	7
2.4. BLOCK DIAGRAM OF CONNECTION BETWEEN EUT AND SIMULATORS	7
2.5. DESCRIPTION OF TEST MODES.....	7
2.6. TEST CONDITIONS	7
2.7. TEST FACILITY	8
2.8. MEASUREMENT UNCERTAINTY	8
2.9. TEST EQUIPMENT LIST.....	9
3. Test Results and Measurement Data	10
3.1. CONDUCTED EMISSION	10
3.2. RADIATED SPURIOUS EMISSION MEASUREMENT	14
3.3. OCCUPIED BANDWIDTH	21
4. Photos of test setup	23
5. Photographs of EUT	25

TEST REPORT DECLARATION

Applicant : Shenzhen Esorun Technology Co., LTD
Address : 425(E02), No. 5 Golf Avenue, Guangpei Community, Guanlan
Street, Longhua District, Shenzhen, China
Manufacturer : Shenzhen Esorun Technology Co., LTD
Address : 425(E02), No. 5 Golf Avenue, Guangpei Community, Guanlan
Street, Longhua District, Shenzhen, China
EUT
Description : Wireless Power Bank
(A) Model No. : BOX10000W
(B) Trademark : ESORUN

Measurement Standard Used:

FCC CFR Title 47 Part 15 Subpart C Section 15.209

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the FCC CFR Title 47 Part 15 Subpart C Section 15.209 requirements.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....: Lucas Pang
Project Engineer



Approved by (name + signature).....: Simple Guan
Project Manager



Date of issue.....: April 24, 2020

Revision History

Revision	Issue Date	Revisions	Revised By
V0	April 24, 2020	Initial released Issue	Simple Guan

1. Test Result Summary

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203	PASS
AC Power Line Conducted Emission	§15.207	PASS
Spurious Emission	§15.209(a)(f)	PASS
Occupied Bandwidth	§15.215 (c)	PASS

Note:

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

2. General Information

2.1. Description of Device (EUT)

EUT Name	:	Wireless Power Bank
Model No.	:	BOX10000W
DIFF.	:	N/A
Trademark	:	ESORUN
Power supply	:	Type-C Input: 9V/2A, 5V/2.5A Micro USB Input: 9V/2A, 5V/2A USB Output: 5V/3.1A, 9V/2A, 12V/1.5A Type-C Output: 5V/3.1A, 9V/2A, 12V/1.5A QI Output: 9V/1.12A(10W), 9V/0.83A(7.5W), 5V/1A(5W)
Test voltage	:	DC 3.7V from battery, DC 5V/9V/12V from adapter.
Operation frequency	:	125-205KHz
Modulation	:	MSK
Antenna Type	:	Coil Antenna, Maximum Gain is 4dBi
Software version	:	V3.01
Hardware version	:	V3
Note	:	N/A

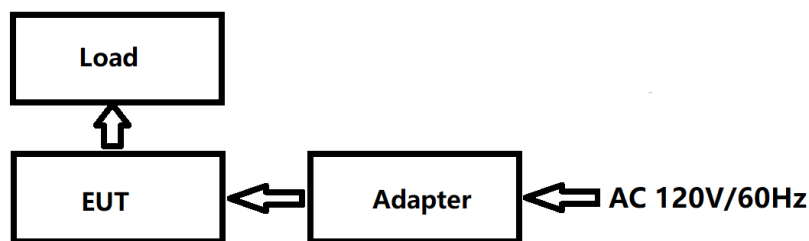
2.2. Accessories of Device (EUT)

Accessories1 : /
 Manufacturer : /
 Model : /
 Ratings : /

2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification
1	Load	--	--	--	--
2	Adapter	YIBOYUAN	QC08	--	--

2.4. Block Diagram of connection between EUT and simulators



2.5. Description of Test Modes

Channel	Frequency (KHz)	Channel	Frequency (KHz)	Channel	Frequency (KHz)	Channel	Frequency (KHz)
1	125	6	150	11	175	16	200
2	130	7	155	12	180	17	205
3	135	8	160	13	185	18	
4	140	9	165	14	190	19	
5	145	10	170	15	195	20	

Note: Pre-San all output power mode, and only worst data listed in report (DC 5V/1A).

2.6. Test Conditions

Items	Required	Actual
Temperature range:	15-35°C	26°C
Humidity range:	25-75%	54%
Pressure range:	86-106kPa	980kPa

2.7. Test Facility

Shenzhen Alpha Product Testing Co., Ltd

Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission

Registration Number: 293961

September 15, 2019 Certificated by IC

Registration Number: CN0085

2.8. Measurement Uncertainty

(95% confidence levels, k=2)

Item	MU	Remark
Uncertainty for Conducted Emission Test	2.74dB	
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.77dB	Polarize: V
	3.80dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.13dB	Polarize: H
	4.16dB	Polarize: V
Uncertainty for radio frequency	5.4×10^{-8}	
Uncertainty for conducted RF Power	0.37dB	

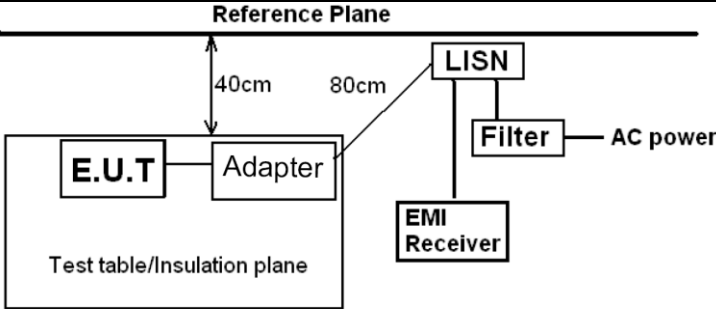
2.9. Test Equipment List

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	N/A	2019.09.06	1Year
Spectrum analyzer	ROHDE&SCHWARZ	FSU	1166.1660.26	2019.09.06	1Year
Spectrum analyzer	Agilent	N9020A	MY499100060	2019.09.05	1Year
Receiver	ROHDE&SCHWARZ	ESR	1316.3003K03-102082-Wa	2019.09.06	1Year
Receiver	R&S	ESCI	101165	2019.09.05	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2020.04.12	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2020.04.12	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00059	2018.09.26	2Year
Cable	Resenberger	N/A	No.1	2019.09.05	1Year
Cable	Resenberger	N/A	No.2	2019.09.05	1Year
Cable	Resenberger	N/A	No.3	2019.09.05	1Year
Pre-amplifier	HP	HP8347A	2834A00455	2019.09.05	1Year
Pre-amplifier	Agilent	8449B	3008A02664	2019.09.05	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126-466	2019.09.05	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2019.09.05	1 Year
20db Attenuator	ICPROBING	IATS1	82347	2019.09.20	1 Year
Horn Antenna	A-INFOMW	LB-180100-KF	J211020657	2019.09.20	2 Year
Preamplifier	SKET	LNPA_1840-50	SK2018101801	2019.09.05	1 Year
Power Meter	Agilent	E9300A	MY41496625	2019.09.06	1 Year
Temp. & Humid. Chamber	Wei Huang	WHTH-1000-40-880	100631	2019.09.10	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	20140927-6	2019.09.10	1 Year

3. Test Results and Measurement Data

3.1. Conducted Emission

3.1.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.207														
Test Method:	ANSI C63.10:2013														
Frequency Range:	150 kHz to 30 MHz														
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto														
Limits:	<table><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></tr><tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr><tr><td>0.5-5</td><td>56</td><td>46</td></tr><tr><td>5-30</td><td>60</td><td>50</td></tr></table>	Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)														
	Quasi-peak	Average													
0.15-0.5	66 to 56*	56 to 46*													
0.5-5	56	46													
5-30	60	50													
Test Setup:	<div><p>Reference Plane</p><p>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p></div>														
Test Mode:	Charging + Transmitting Mode														
Test Procedure:	<div><div>1. The E.U.T is connected to an adapter through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.</div><div>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</div><div>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.</div></div>														
Test Result:	PASS														

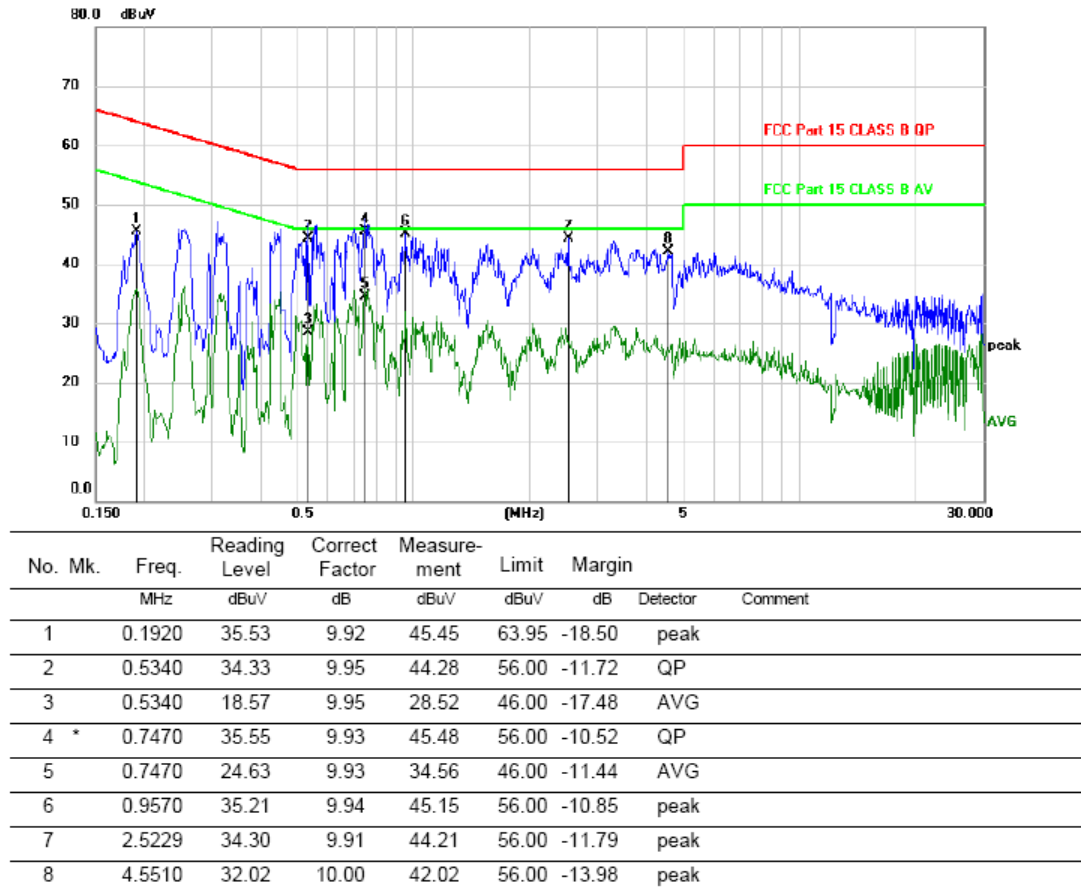
3.1.2. Test data

Please refer to following diagram for individual

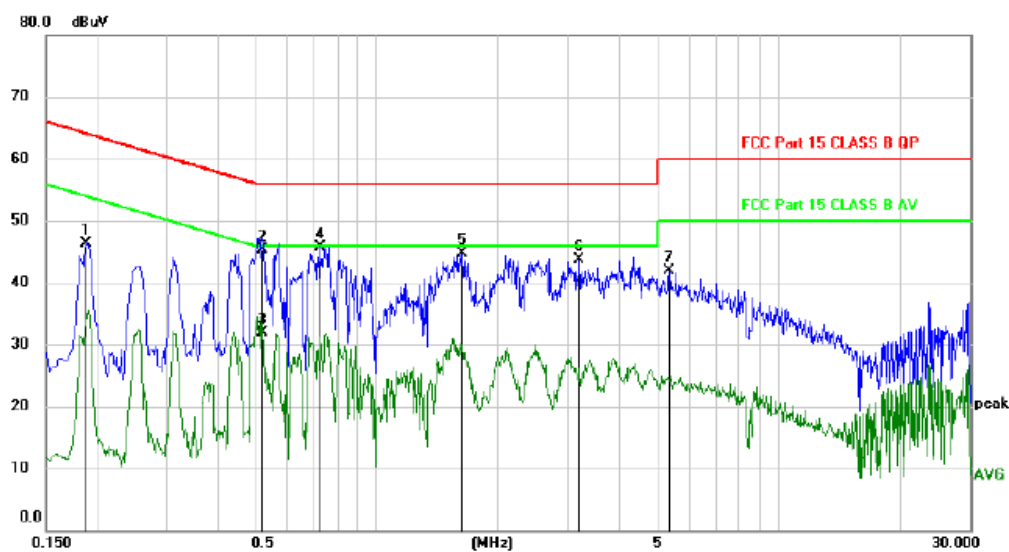
Test Mode	: Full load
Test Results	: PASS
Note:	<p>The test results are listed in next pages.</p> <p>This mode is worst case mode, so this report only reflected the worst mode.</p> <p>If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out.</p> <p>If the limits for the measurement with the average detector are met when using a receiver with a quasi-peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.</p>

Test result for Channel 125kHz, AC 120V/ 60Hz(Full Load Mode).

Line:



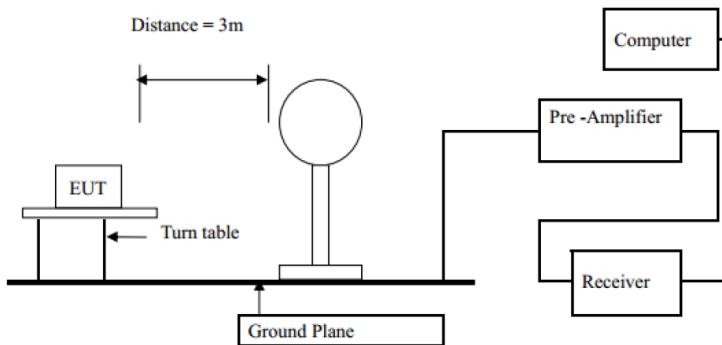
Neutral:



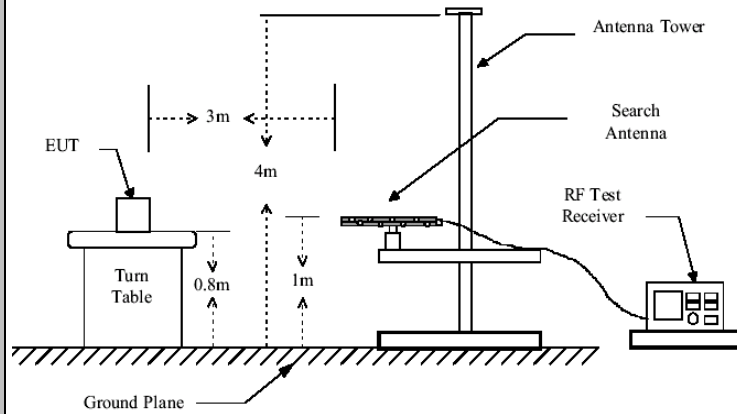
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.1890	36.44	9.92	46.36	64.08	-17.72	peak	
2	0.5190	35.29	9.95	45.24	56.00	-10.76	QP	
3	0.5190	21.90	9.95	31.85	46.00	-14.15	AVG	
4 *	0.7200	35.87	9.93	45.80	56.00	-10.20	peak	
5	1.6289	34.86	9.90	44.76	56.00	-11.24	peak	
6	3.1948	33.67	9.96	43.63	56.00	-12.37	peak	
7	5.3550	31.90	10.05	41.95	60.00	-18.05	peak	

3.2. Radiated Spurious Emission Measurement

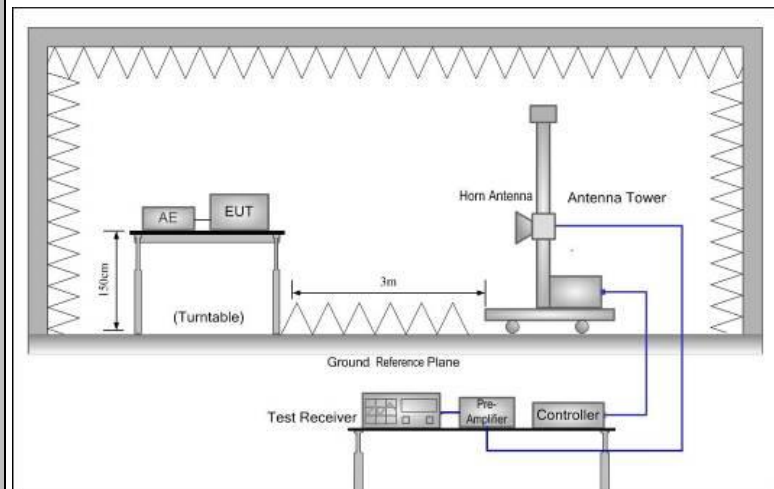
3.2.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.209			
Test Method:	ANSI C63.10: 2013			
Frequency Range:	9 kHz to 25 GHz			
Measurement Distance:	3 m			
Antenna Polarization:	Horizontal & Vertical			
Operation mode:	Refer to item 4.1			
Receiver Setup:	Frequency	Detector	RBW	VBW
	9kHz- 150kHz	Quasi-peak	200Hz	1kHz
	150kHz- 30MHz	Quasi-peak	9kHz	30kHz
	30MHz-1GHz	Quasi-peak	100KHz	300KHz
	Above 1GHz	Peak	1MHz	3MHz
Limit:	Remark			
	Quasi-peak Value			
	Quasi-peak Value			
	Quasi-peak Value			
	Peak Value			
	Average Value			
	Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)	
	0.009-0.490	2400/F(KHz)	300	
	0.490-1.705	24000/F(KHz)	30	
	1.705-30	30	30	
Test setup:	Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)	Detector
	Above 1GHz	500	3	Average
		5000	3	Peak
	For radiated emissions below 30MHz			
	 <p>Distance = 3m</p> <p>EUT</p> <p>Turn table</p> <p>Ground Plane</p> <p>Computer</p> <p>Pre -Amplifier</p> <p>Receiver</p>			

30MHz to 1GHz



Above 1GHz

**Test Procedure:**

1. For the radiated emission test below 1GHz:
The EUT was placed on a turntable with 0.8 meter above ground. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high PASS filter are used for the test in order to get better signal level.
For the radiated emission test above 1GHz:
Place the measurement antenna on a turntable with 1.5 meter above ground, which is away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which

	<p>maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.</p> <p>2. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level</p> <p>3. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.</p> <p>4. Use the following spectrum analyzer settings:</p> <p>(1) Span shall wide enough to fully capture the emission being measured;</p> <p>(2) Set RBW=100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold;</p> <p>(3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.</p> <p>For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.</p>
Test mode:	Refer to section 4.1 for details
Test results:	PASS

3.2.2. Test Data

Please refer to following diagram for individual

Frequency Range	: 9KHz~30MHz
Test Mode	: TX: channel low, channel mid, channel high
Test Results	: PASS
Note: 1. The test results are listed in next pages. 2. This mode is worst case mode, so this report only reflected the worst mode. 3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the quasi-peak detector need not be carried out.	

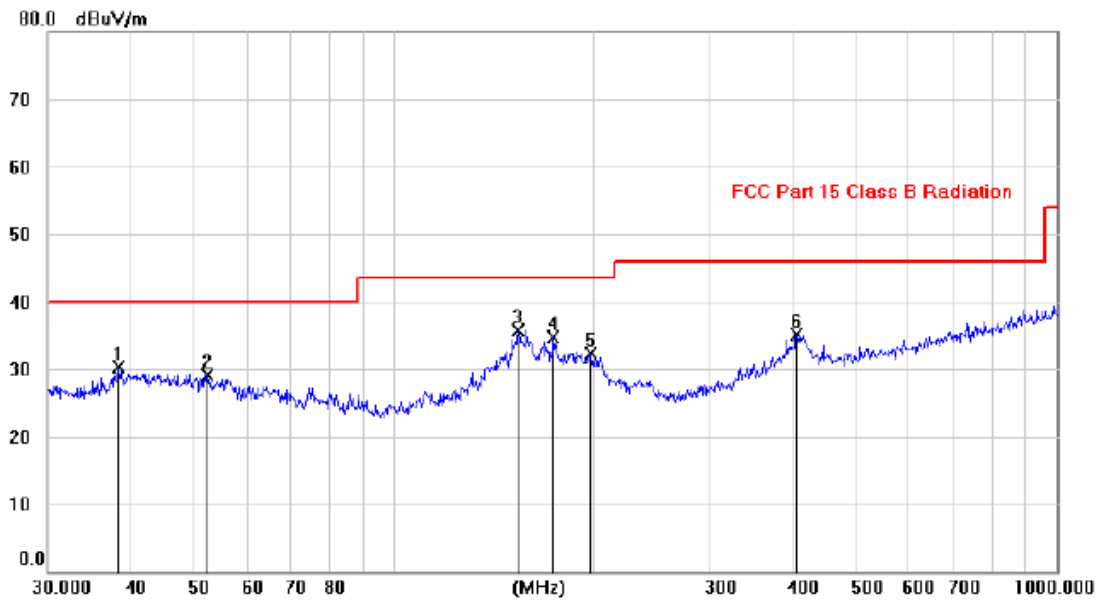
Freq.	Reading	Antenna Factor	Cable loss	Amp Factor	Result	Limit	Margin	Detector	State
(MHz)	(dBuV/m)	dB/m	dB	dB	(dBuV/m)	(dBuV/m) at 3 m	(dB)		P/F
0.125	23.91	48.34	0.16	29.87	42.54	126.67	-84.13	PK	PASS
0.125	19.07	48.34	0.16	29.87	37.70	106.67	-68.97	AV	PASS
0.175	92.44	48.34	0.16	29.87	111.07	122.74	-11.67	PK	PASS
0.175	68.88	48.34	0.16	29.87	87.51	102.74	-15.23	AV	PASS
0.205	48.81	48.38	0.17	29.89	67.47	121.37	-53.90	PK	PASS
0.205	46.07	48.38	0.17	29.89	64.73	101.37	-36.64	AV	PASS
0.350	44.50	48.44	0.19	29.89	63.24	116.72	-53.48	PK	PASS
0.350	42.36	48.44	0.19	29.89	61.10	96.72	-35.62	AV	PASS
0.450	45.40	48.47	0.19	29.89	64.17	114.54	-50.37	PK	PASS
0.450	42.35	48.47	0.19	29.89	61.12	94.54	-33.42	AV	PASS
1.928	18.49	49.12	0.20	29.94	37.87	69.54	-31.67	QP	PASS
1.920	21.77	49.12	0.20	29.94	41.15	69.54	-28.39	QP	PASS

Frequency Range	: 30MHz~1000MHz
Test Mode	: Full load, Half load, Empty load
Test Results	: PASS
Note: 1. The test results are listed in next pages. 2. This mode is worst case mode, so this report only reflected the worst mode. (Full load is the worst mode) 3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the quasi-peak detector need not be carried out.	

Frequency Range	: Above 1GHz	
EUT	: /	Test Date : /
M/N	: /	Temperature : /
Test Engineer	: /	Humidity : /
Test Mode	: /	
Test Results	: N/A	
Note: 1. The highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. So the frequency rang above 1GHz radiation test not applicable.		

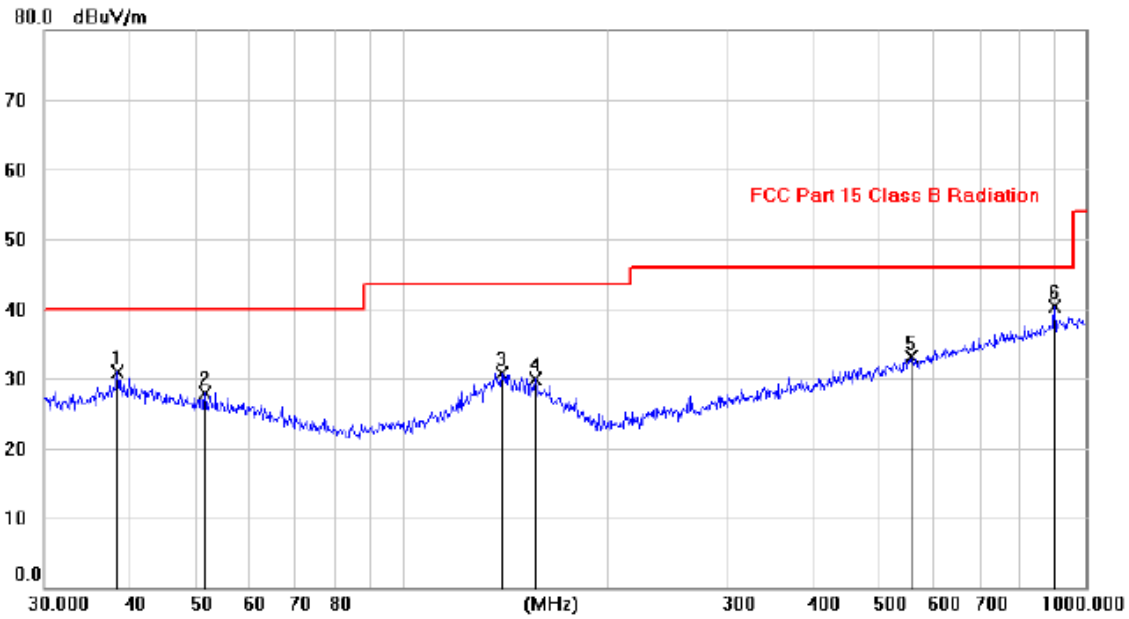
Test result for Channel 125KHz, AC 120V/ 60Hz (Full Load Mode)
30MHz-1GHz

Horizontal:



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		38.3964	16.07	14.26	30.33	40.00	-9.67	peak		
2		52.2306	15.32	13.80	29.12	40.00	-10.88	peak		
3	*	153.9406	20.78	14.99	35.77	43.50	-7.73	peak		
4		174.3474	21.20	13.43	34.63	43.50	-8.87	peak		
5		198.1530	21.38	10.98	32.36	43.50	-11.14	peak		
6		405.3765	18.72	16.34	35.06	46.00	-10.94	peak		

Vertical:




No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		38.3964	16.73	14.26	30.99	40.00	-9.01	peak		
2		51.6388	14.05	13.84	27.89	40.00	-12.11	peak		
3		139.8506	16.41	14.29	30.70	43.50	-12.80	peak		
4		156.6636	14.89	15.00	29.89	43.50	-13.61	peak		
5		554.8252	13.77	19.28	33.05	46.00	-12.95	peak		
6	*	900.1472	16.10	24.24	40.34	46.00	-5.66	peak		

Note:

Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

3.3. Occupied bandwidth

3.3.1. Test Specification

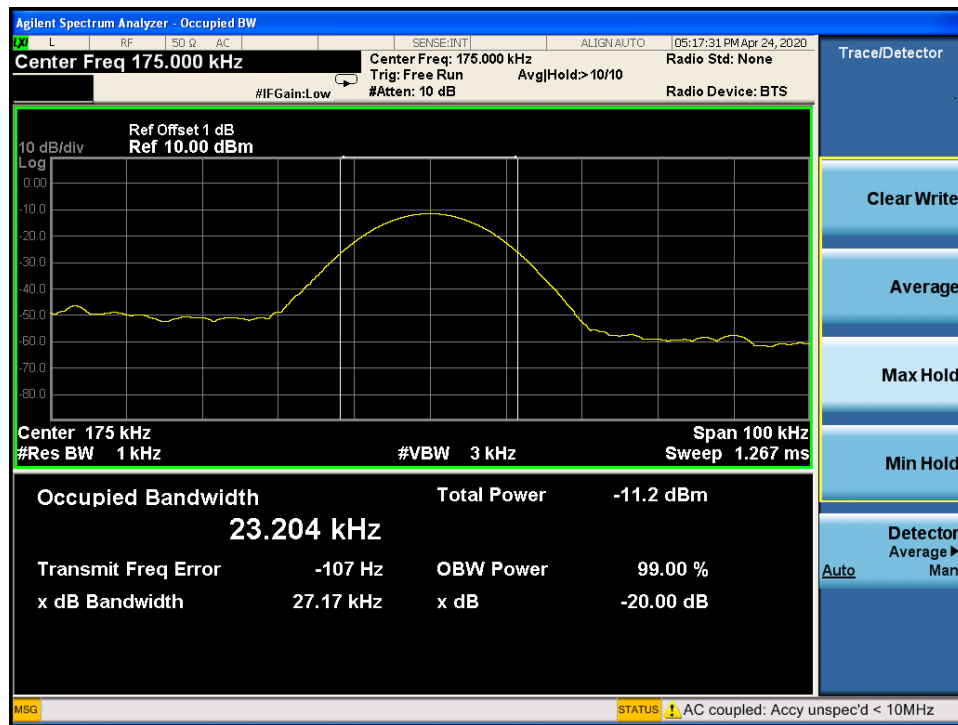
Test Requirement:	FCC Part15 C Section 15.215(c)
Test Method:	ANSI C63.10: 2013
Limit:	N/A
Test Procedure:	<ol style="list-style-type: none"> 1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT. 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. Use the following spectrum analyzer settings for 20dB Bandwidth measurement. Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel; $RBW \geq 1\%$ of the 20 dB bandwidth; $VBW \geq RBW$; Sweep = auto; Detector function = peak; Trace = max hold. 4. Measure and record the results in the test report.
Test setup:	 <p style="text-align: center;">Spectrum Analyzer EUT</p>
Test Mode:	Refer to section 4.1 for details
Test results:	PASS

3.3.2. Test data

Frequency(KHz)	20dB Occupy Bandwidth (kHz)	Limit (kHz)	Conclusion
175.0	27.17	---	PASS

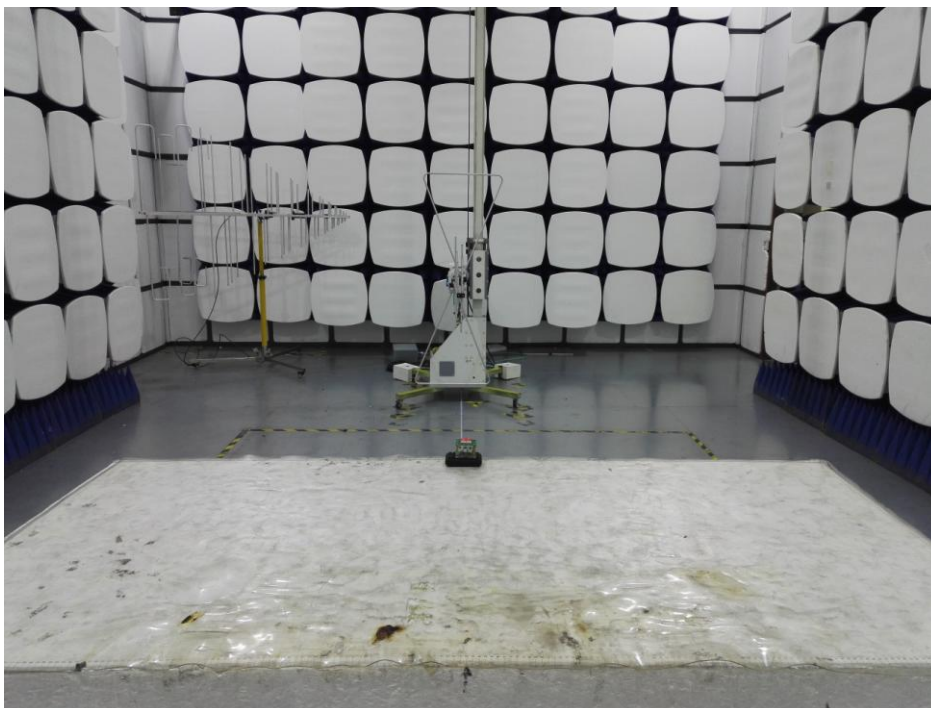
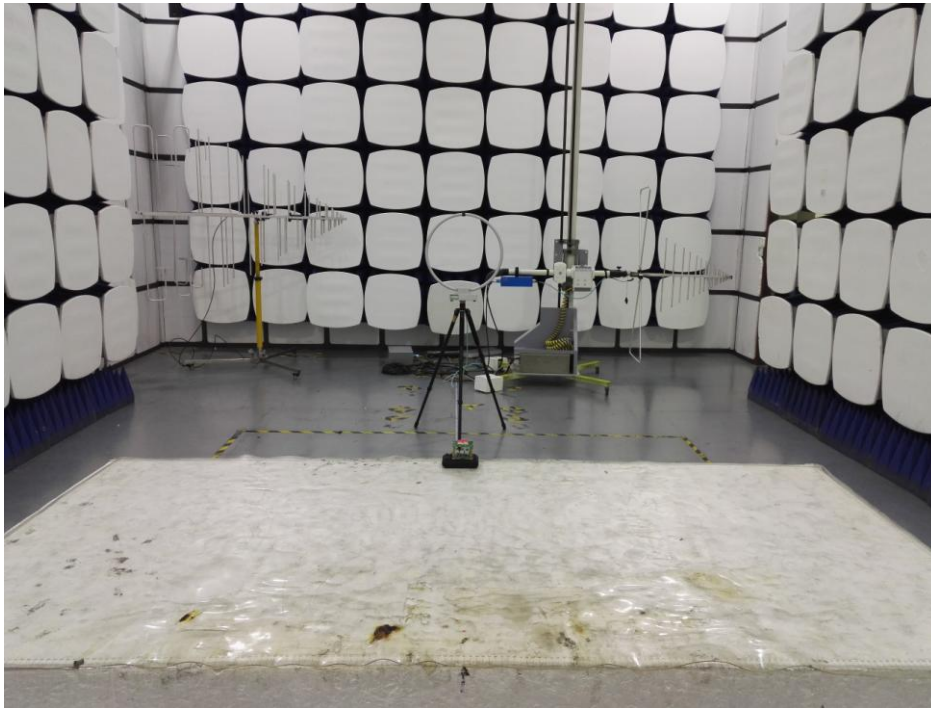
Test plots as follows:

Mid channel

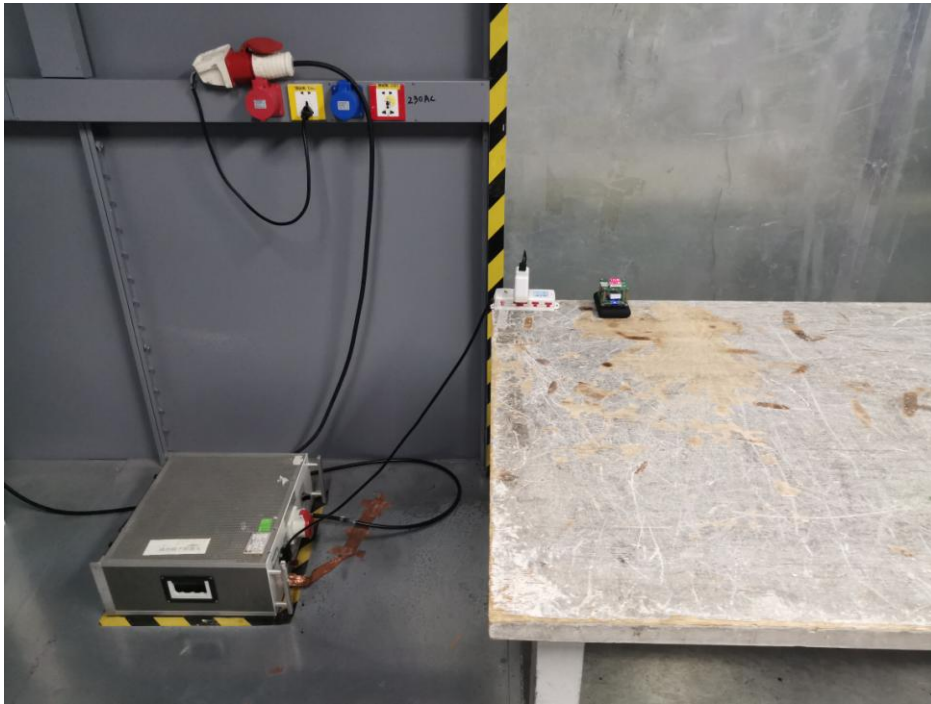


4. Photos of test setup

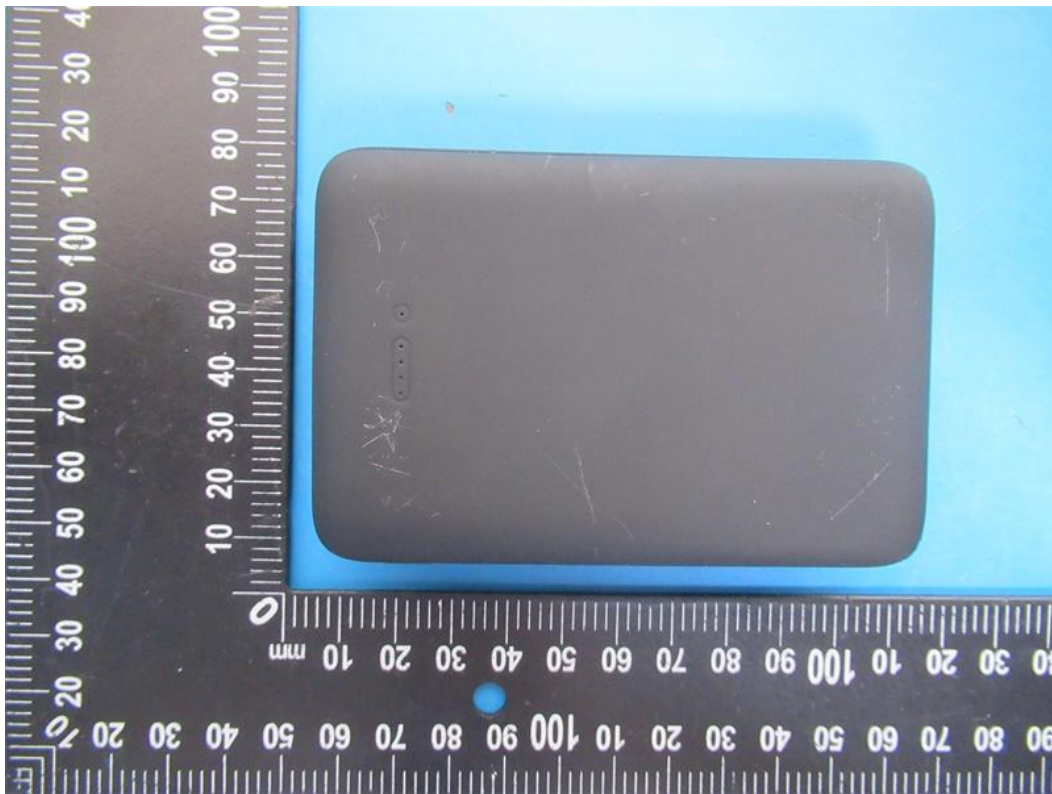
Radiated Emission



Conducted Emission

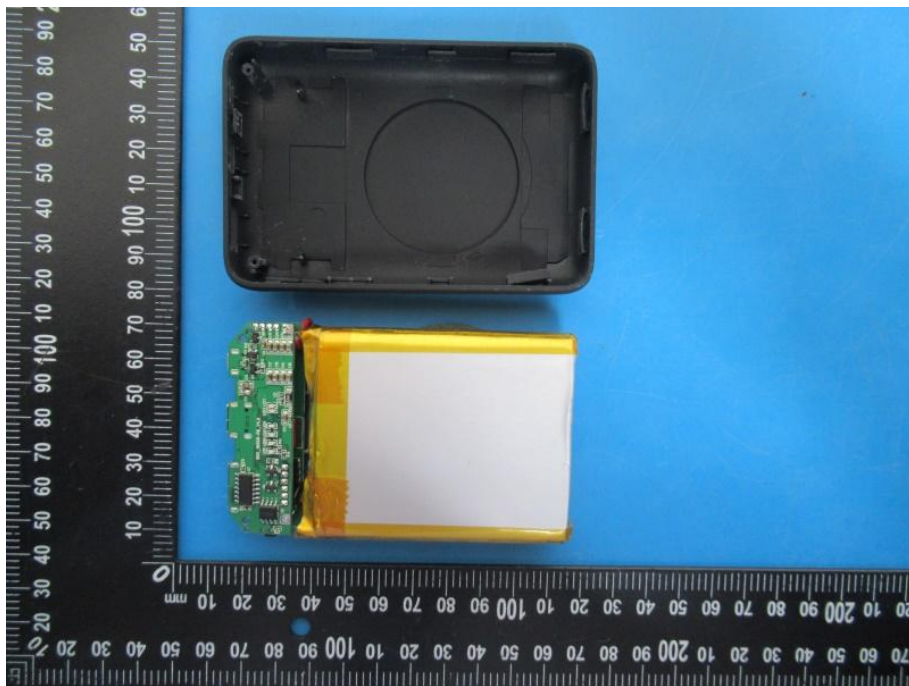
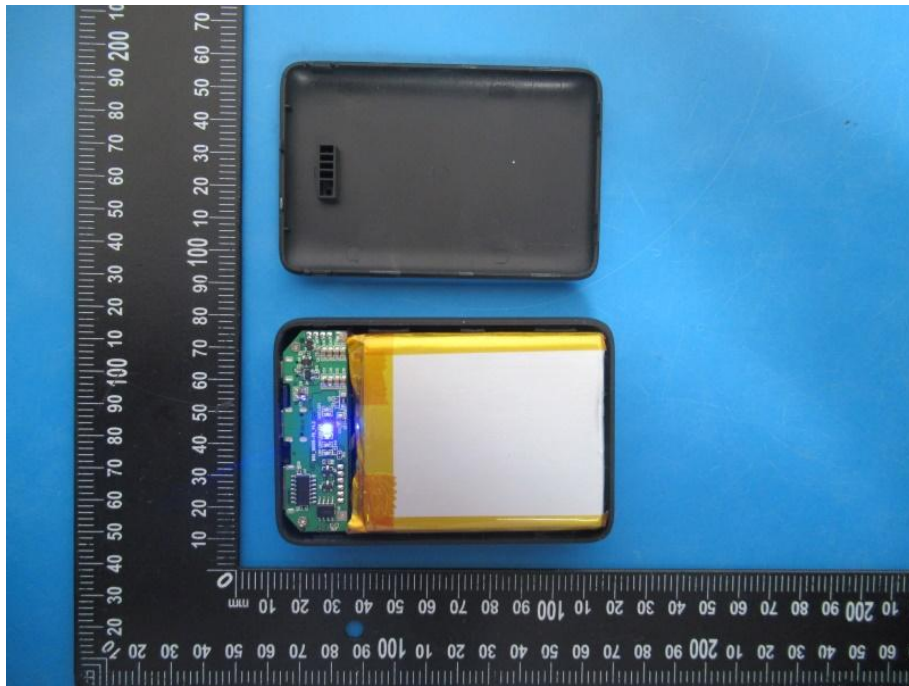


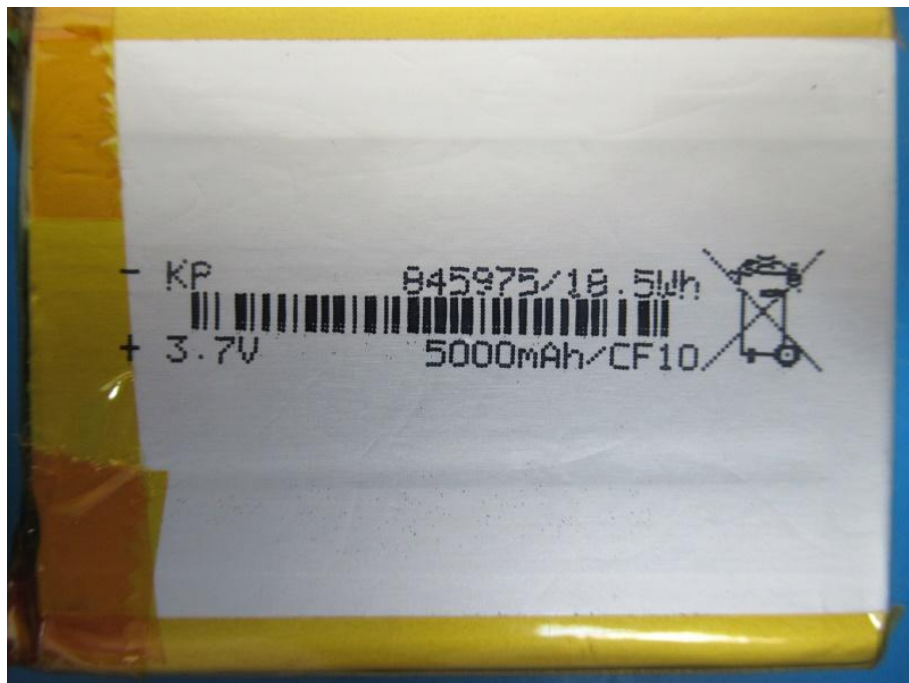
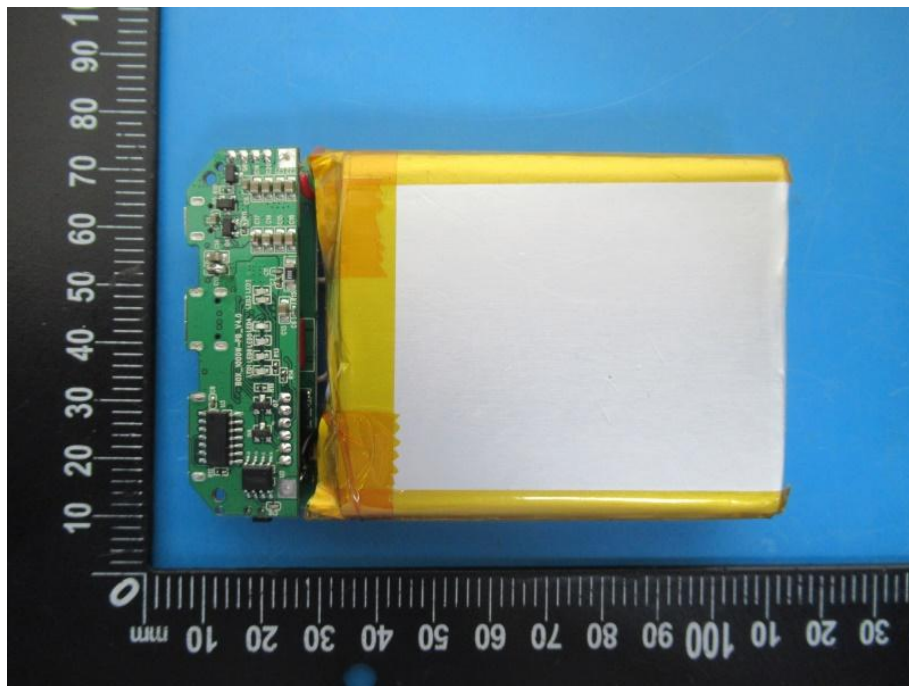
5. Photographs of EUT

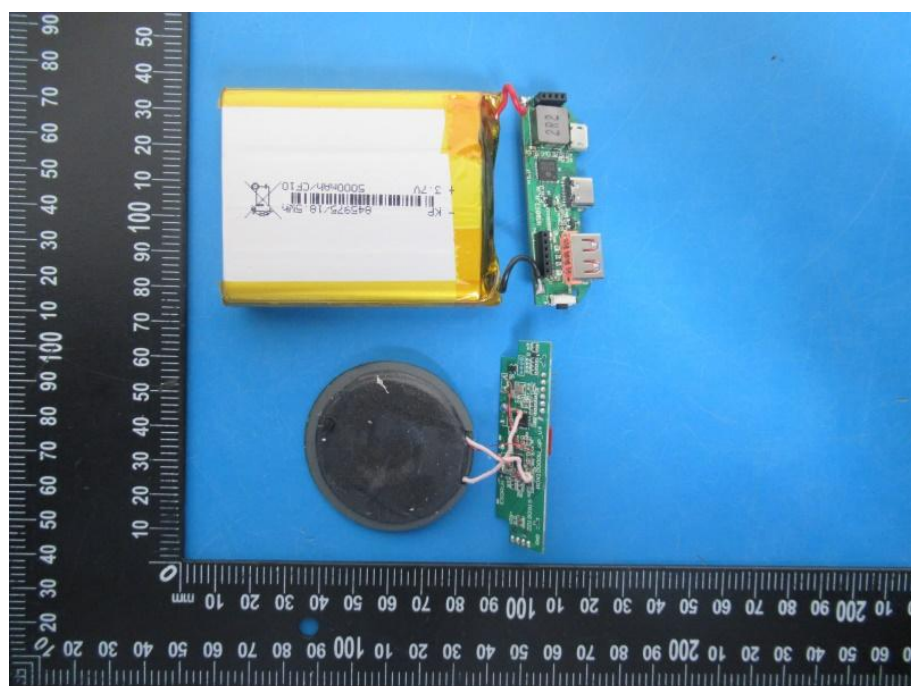


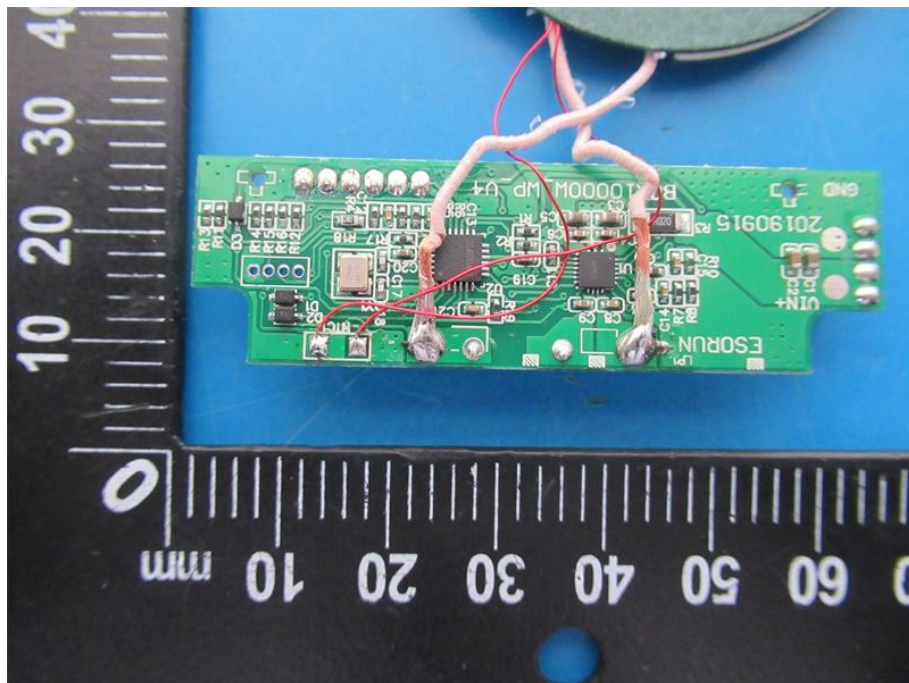
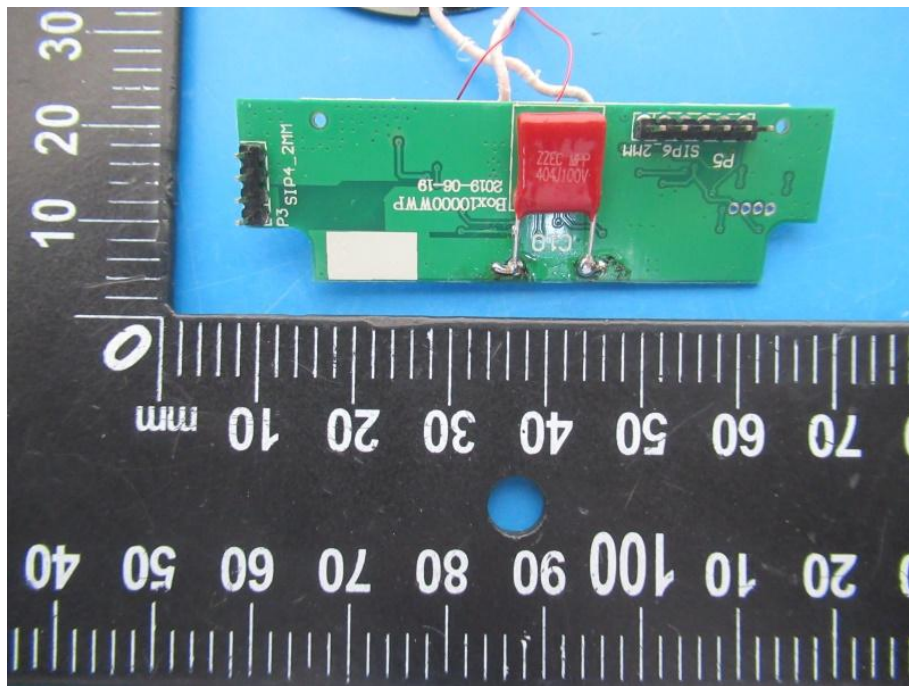


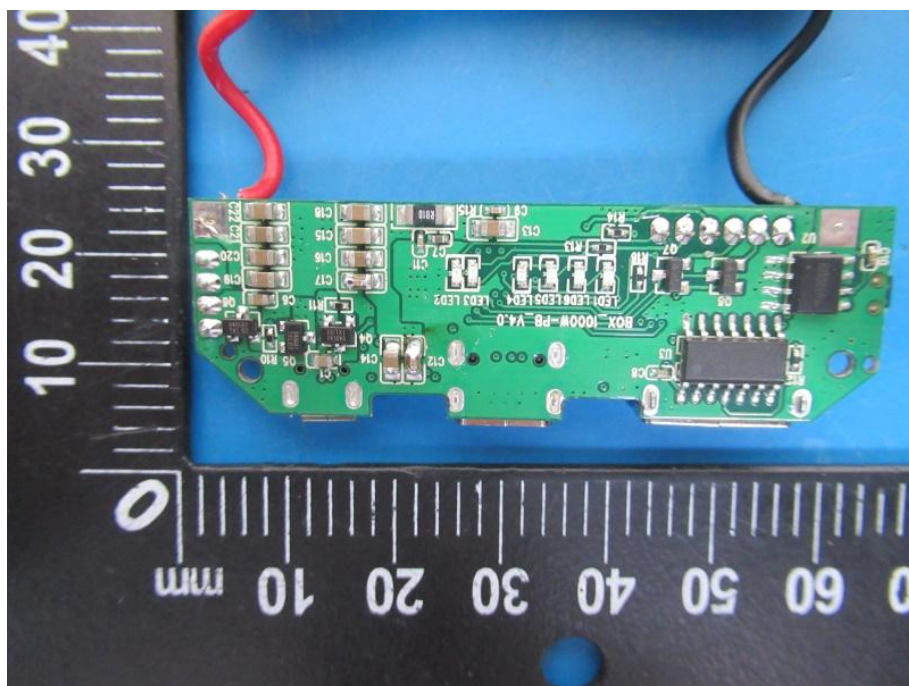
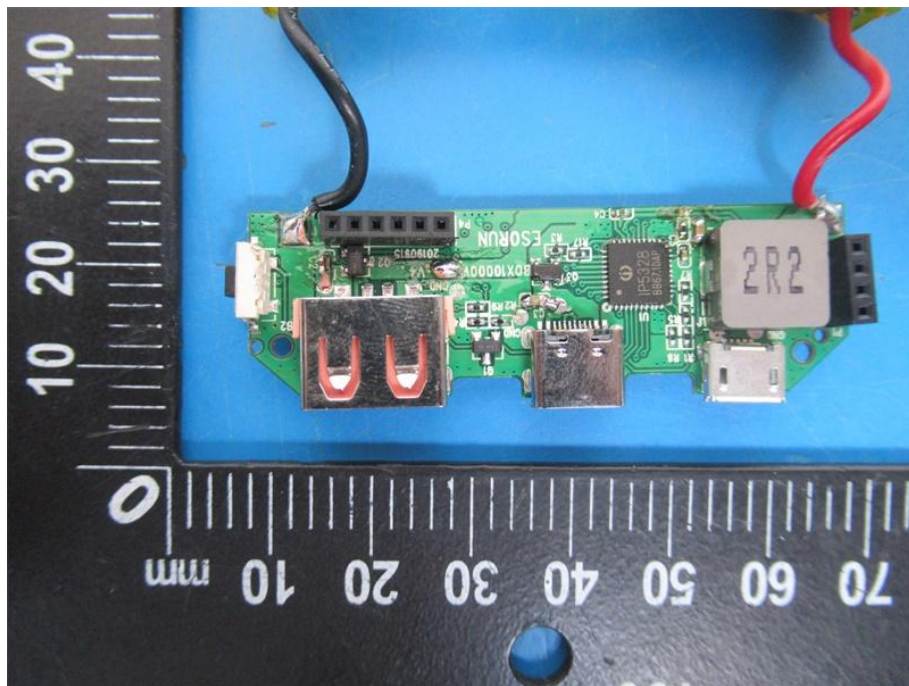












-----End-----