

EMC TEST REPORT

Report Reference No......: **ZKT-2019124407E**

Date of issue.....: Jan. 06, 2020

Total number of pages.....: 19

Testing Laboratory.....: **Shenzhen ZKT Technology Co., Ltd.**

Address.....: 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

Applicant's name.....:

Address.....:

Test specification:Standards.....: EN 55032:2015
EN 61000-3-2:2014, EN 61000-3-3:2013
EN 55035:2017

Test procedure.....: N/A

Non-standard test method.....: N/A

Test Report Form No......: --

Test Report Form(s) Originator.....: ZKT Testing

Master TRF.....: Dated: 2017-06

This test report is specially limited to the above client company and product model only. It may not be duplicated without prior written consent of ZKT Test.**Test item description**.....: **Power Bank**

Trade Mark.....: N/A

Manufacturer.....: JMTek Industries(Shenzhen) co., Ltd

Address.....: 14G, Innovation Tech Building, Quanzhi Science and Technology innovation Park, ShaJing Street, Bao'an District, ShenZhen, China

Model/Type reference.....: PB30

Ratings.....: INPUT: DC 5V, 1A
OUTPUT: DC 5V, 1A

Testing procedure and testing location:

Testing Laboratory.....: Shenzhen ZKT Technology Co., Ltd.

**Address.....: 1/F, No. 101, Building B, No. 6, Tangwei Community
Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen,
China**

Date of Test.....: Jan. 02, 2020 – Jan. 06, 2020

Tested by (name + signature).....: Peter Huang

Peter Huang

Reviewer (name + signature).....: Simon Gong

Simon Gong

Approved (name + signature).....: Awen He



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1. GENERAL INFORMATION

1.1 Description of Device (EUT)

EUT : Power Bank

Model Number : PB30

Model Difference : N/A

The highest frequency of the internal sources of the EUT is (less than 108)MHz: ☒ less than 108 MHz, the measurement shall only be made up to 1 GHz.

☐ between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.

☐ between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz.

☐ above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less.

1.2 Tested System Details

None.

1.3 Test Uncertainty

Conducted Emission Uncertainty : ± 1.82 dB

Radiated Emission Uncertainty : ± 2.51 dB

1.4 Test Facility

Site Description

Name of Firm : Shenzhen ZKT Technology Co., Ltd.

1/F, No. 101, Building B, No. 6, Tangwei Community
Industrial Avenue, Fuhai Street, Bao'an District,
Shenzhen, China

2. TEST SUMMARY

The Product has been tested according to the following specifications:

EMISSION		
Standard	Test Item	Test
EN 55032	Conducted emissions from the AC mains power ports	N/A ⁵
EN 55032	Asymmetric mode conducted emissions	N/A ¹
EN 55032	Conducted differential voltage emissions	N/A ²
EN 55032	Radiated emissions	Yes
EN 61000-3-2	Harmonic current emission(H)	N/A ⁵
EN 61000-3-3	Voltage fluctuations & flicker(F)	N/A ⁵

IMMUNITY (EN 55035)		
Standard	Test Item	Test
IEC 61000-4-2	Electrostatic discharge (ESD)	Yes
IEC 61000-4-3	Continuous RF electromagnetic field disturbances(RS)	Yes
IEC 61000-4-4	Electrical fast transients/burst (EFT)	N/A ⁵
IEC 61000-4-5	Surges	N/A ⁵
IEC 61000-4-6	Continuous induced RF disturbances (CS)	N/A ⁵
IEC 61000-4-6	Broadband impulse noise disturbances, repetitive	N/A ³
IEC 61000-4-6	Broadband impulse noise disturbances, isolated	N/A ³
IEC 61000-4-8	Power frequency magnetic field (PFMF)	N/A ⁴
IEC 61000-4-11	Voltage dips and interruptions (DIPS)	N/A ⁵

Remark:

1. Applicable to ports listed above and intended to connect to cables longer than 3 m.
2. The Product has no antenna port.
3. Applicable only to CPE xDSL ports.
4. The Product doesn't contain any device susceptible to magnetic fields.
5. The EUT is powered by the DC only.

3. TEST INSTRUMENT USED

Radiated emissions Test (966 chamber)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
966 chamber	ChengYu	966 Room	966	Aug. 25, 2019	Aug. 24, 2020
Receiver	R&S	ESRP	101154	Aug. 14, 2019	Aug. 13, 2020
Amplifier	Schwarzbeck	BBV9718	9718-309	Aug. 14, 2019	Aug. 13, 2020
Amplifier	Schwarzbeck	BBV9744	9744-003 7	Aug. 14, 2019	Aug. 13, 2020
TRILOG Broadband Antenna	schwarzbeck	VULB 9163	VULB916 3-942	Aug. 13, 2019	Aug. 12, 2020
Horn Antenna	SCHWARZBECK	BBHA9120 D	1201	Aug. 16, 2019	Aug. 15, 2020

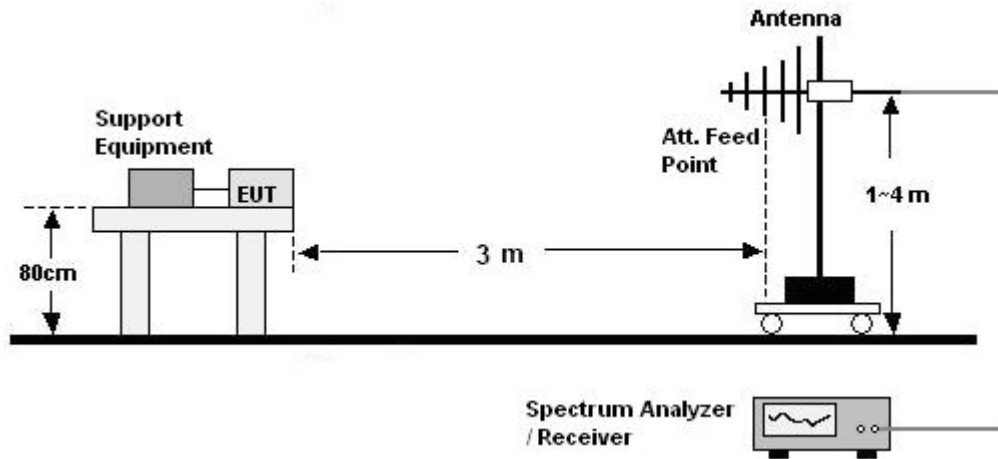
Electrostatic discharge Test					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
ESD Tester	3C TEST	EDS 30V	ES01216 14	Aug. 16, 2019	Aug. 15, 2020

Continuous RF electromagnetic field disturbances Test (SMQ --- site)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Signal Generator	HP	8648A	3625U00 573	Sep. 26, 2019	Sep. 26, 2020
Amplifier	A&R	500A100	17034	Sep. 26, 2019	Sep. 26, 2020
Amplifier	A&R	100W/1000 M1	17028	Sep. 26, 2019	Sep. 26, 2020
Audio Analyzer (20Hz~1GHz)	Panasonic	2023B	202301/4 28	Sep. 26, 2019	Sep. 26, 2020
Isotropic Field Probe	A&R	FP2000	16755	Sep. 26, 2019	Sep. 26, 2020
Antenna	EMCO	3108	9507-253 4	Sep. 26, 2019	Sep. 26, 2020
Log-periodic Antenna	A&R	AT1080	16812	Sep. 26, 2019	Sep. 26, 2020

4. RADIATED EMISSIONS TEST

4.1 Block Diagram Of Test Setup

30MHz ~ 1GHz:



4.2 Limits

Limits for radiated disturbance of Class B MME

Frequency (MHz)	Quasi-peak limits at 3m dB(μV/m)
30-230	40
230-1000	47

4.3 Test Procedure

30MHz ~ 1GHz:

- The Product was placed on the nonconductive turntable 0.8 m above the ground at a chamber.
- Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.



4.4 Test Results

Radiated Emissions Test Data			
Temperature:	26°C	Relative Humidity:	54%
Pressure:	1009hPa	Phase :	Horizontal
Test Voltage :	DC 5V	Test Mode:	Charging



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Antenna Height cm	Table Degree	Comment
1		53.6931	30.96	-14.56	16.40	40.00	-23.60	QP		
2		78.1389	41.13	-19.24	21.89	40.00	-18.11	QP		
3	*	111.3468	52.00	-15.97	36.03	40.00	-3.97	QP		
4		156.4578	46.81	-19.04	27.77	40.00	-12.23	QP		
5		268.4853	46.82	-14.94	31.88	47.00	-15.12	QP		
6		362.9844	38.20	-12.18	26.02	47.00	-20.98	QP		

Radiated Emissions Test Data			
Temperature:	26°C	Relative Humidity:	54%
Pressure:	1009hPa	Phase :	Vertical
Test Voltage :	DC 5V	Test Mode:	Charging



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1	40.8446	48.10	-14.61	33.49	40.00	-6.51	QP		
2	52.2079	39.05	-14.32	24.73	40.00	-15.27	QP		
3 *	118.1862	51.84	-17.14	34.70	40.00	-5.30	QP		
4	159.7844	40.18	-19.08	21.10	40.00	-18.90	QP		
5	239.9874	44.36	-15.52	28.84	47.00	-18.16	QP		
6	576.6443	25.61	-7.05	18.56	47.00	-28.44	QP		

Radiated Emissions Test Data			
Temperature:	26°C	Relative Humidity:	54%
Pressure:	1009hPa	Phase :	Horizontal
Test Voltage :	DC 3.7V	Test Mode:	Discharge



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		53.3179	30.92	-14.49	16.43	40.00	-23.57	QP		
2		69.6005	31.60	-17.51	14.09	40.00	-25.91	QP		
3	*	177.5092	48.35	-18.20	30.15	40.00	-9.85	QP		
4		295.1469	29.27	-13.72	15.55	47.00	-31.45	QP		
5		472.1760	28.69	-10.55	18.14	47.00	-28.86	QP		
6		903.3094	25.75	-2.28	23.47	47.00	-23.53	QP		

Radiated Emissions Test Data			
Temperature:	26°C	Relative Humidity:	54%
Pressure:	1009hPa	Phase :	Vertical
Test Voltage :	DC 3.7V	Test Mode:	Discharge



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		44.5868	35.57	-14.10	21.47	40.00	-18.53	QP		
2	*	68.1514	41.76	-17.22	24.54	40.00	-15.46	QP		
3		118.1862	36.41	-17.14	19.27	40.00	-20.73	QP		
4		160.9089	40.10	-19.03	21.07	40.00	-18.93	QP		
5		438.6554	25.29	-10.76	14.53	47.00	-32.47	QP		
6		827.4934	24.56	-3.58	20.98	47.00	-26.02	QP		

5. IMMUNITY TEST OF GENERAL THE PERFORMANCE CRITERIA

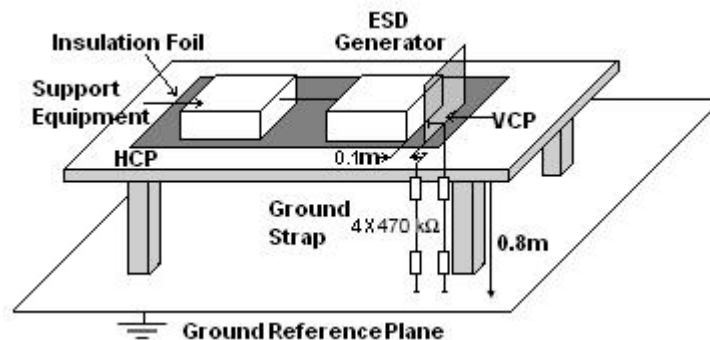
Product Standard	EN 55035:2017 clause 5
CRITERION A	<p>The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
CRITERION B	<p>During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.</p> <p>After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.</p> <p>If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
CRITERION C	<p>Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed.</p> <p>Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.</p>

6. ELECTROSTATIC DISCHARGE (ESD)

6.1 Test Specification

Test Port	: Enclosure port
Discharge Impedance	: 330 ohm / 150 pF
Discharge Mode	: Single Discharge
Discharge Period	: one second between each discharge

6.2 Block Diagram of Test Setup



6.3 Test Procedure

- Electrostatic discharges were applied only to those points and surfaces of the Product that are accessible to users during normal operation.
- The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- The time interval between two successive single discharges was at least 1 second.
- The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the Product.
- Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- Air discharges were applied with the round discharge tip of the discharge electrode approaching the Product as fast as possible (without causing mechanical damage) to touch the Product. After each discharge, the ESD generator was removed from the Product and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
- At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the Product were completely illuminated. The VCP (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the Product.

6.4 Test Results

Electrostatic Discharge Test Data					
Temperature:		25.1℃	Humidity:		55%
Power Supply :		DC 5V	Test Mode:		Charging + Discharge
Discharge Method	Discharge Position	Voltage (±kV)	Min. No. of Discharge per polarity (Each Point)	Required Level	Performance Criterion
Contact Discharge	Conductive Surfaces	2, 4	25	B	A
	Indirect Discharge HCP	2, 4	25	B	A
	Indirect Discharge VCP	2, 4	25	B	A
Air Discharge	Slots, Apertures, and Insulating Surfaces	2, 4, 8	10	B	A
Note: N/A					

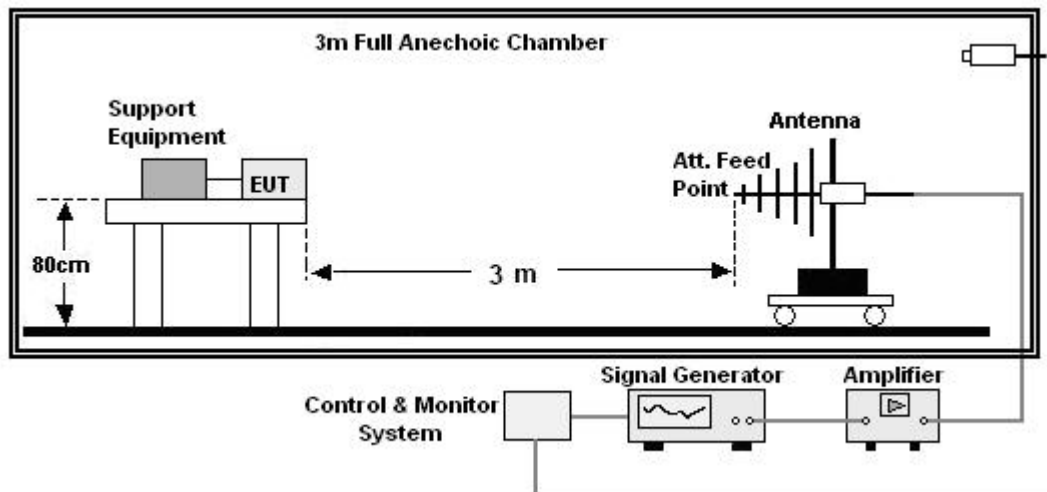
7. CONTINUOUS RF ELECTROMAGNETIC FIELD DISTURBANCES(RS)

7.1 Test Specification

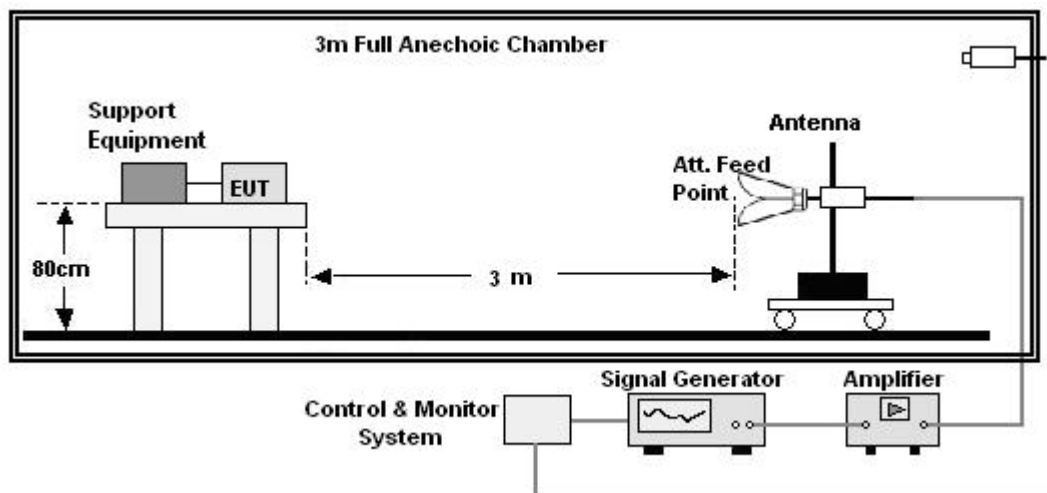
Test Port	: Enclosure port
Step Size	: 1%
Modulation	: 1kHz, 80% AM
Dwell Time	: 1 second
Polarization	: Horizontal & Vertical

7.2 Block Diagram of Test Setup

Below 1GHz:



Above 1GHz:



7.3 Test Procedure

- The testing was performed in a fully-anechoic chamber. The transmit antenna was located at a distance of 3 meters from the Product.
- The frequency range is swept from 80MHz to 1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz, with the signal 80% amplitude modulated with a 1 kHz sine wave, and the step size was 1%.
- The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to be able to respond, but should not exceed 5 s at each of the frequencies during the scan.
- The test was performed with the Product exposed to both vertically and horizontally polarized fields on each of the four sides.
- For Broadcast reception function: Group 2 not apply in this test.

7.4 Test Results

Radio Frequency Electromagnetic Fields Test Data				
Temperature:	25.1℃	Humidity:	55%	
Power Supply :	DC 5V	Test Mode:	Charging + Discharge	
Frequency	Position	Field Strength (V/m)	Required Level	Performance Criterion
80 - 1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz	Front, Right, Back, Left	3	A	A
Note: N/A				

8. EUT PHOTOGRAPHS

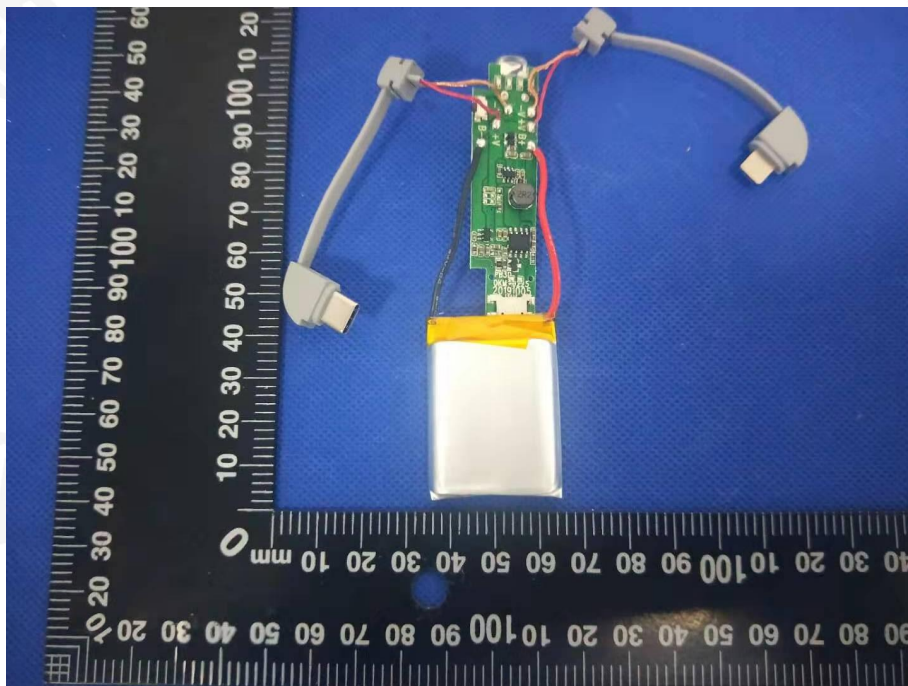
EUT Photo 1



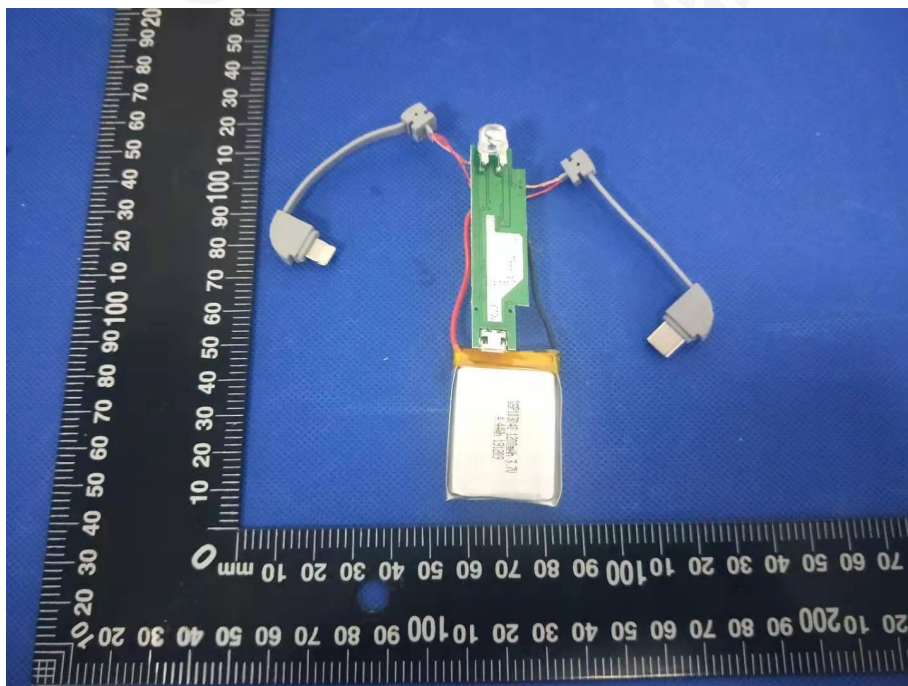
EUT Photo 2



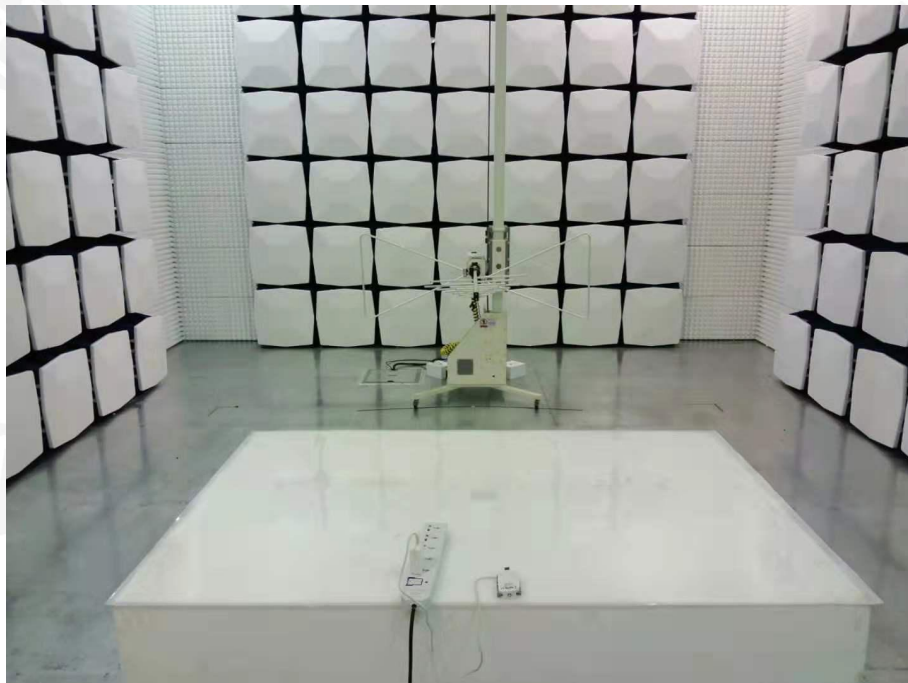
EUT Photo 3



EUT Photo 4



9. EUT TEST PHOTOGRAPHS



***** END OF REPORT *****