



APPLICATION FOR ELECTROMAGNETIC COMPATIBILITY DIRECTIVE

On Behalf of

Dongguan DG-TIME Industry Company., Limited

Power bank

Model No.: T49C, CNE-CPBP20XX

Prepared for : Dongguan DG-TIME Industry Company., Limited
Address : 6th Floor, B1 Building, Yuxiang Industrial Park, NO46 Fumin
Road, Jinxiao Tang. Fenggang Town, Dongguan, 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 : A1909150-C01-R14
Date of Receipt : October 28, 2019
Date of Test : October 28-31, 2019
Date of Report : November 01, 2019
Version Number : V0

TABLE OF CONTENTS

Description	Page
1. Summary Of Standards And Results	7
1.1. Description of Standards and Results	7
2. General Information	8
2.1. Description of Device (EUT)	8
2.2. Accessories of Device (EUT)	8
2.3. Tested Supporting System Details	9
2.4. Block Diagram of connection between EUT and simulators.....	9
2.5. Test Mode Description.....	10
2.6. Test Facility	11
2.7. Measurement Uncertainty	11
3. Conducted Disturbance At Mains Terminals Test.....	12
3.1. Test Equipment	12
3.2. Block Diagram of Test Setup.....	12
3.3. Power Line Conducted Emission Test Limits	12
3.4. Configuration of EUT on Test	13
3.5. Operating Condition of EUT	13
3.6. Test Procedure	13
3.7. Conducted Disturbance at Mains Terminals Test Results	14
4. Radiated Disturbance Test	15
4.1. Test Equipment	15
4.2. Block Diagram of Test Setup.....	15
4.3. Test Limit.....	17
4.4. Configuration of EUT on Test	18
4.5. Operating Condition of EUT	18
4.6. Test Procedure	18
4.7. Radiated Disturbance Test Results	19
5. Harmonic Current Test	23
5.1. Test Equipment	23
5.2. Block Diagram of Test Setup.....	23
5.3. Harmonic Current Test Limits	23
5.4. Configuration of EUT on Test	24
5.5. Operating Condition of EUT	24
5.6. Test Procedure	24
5.7. Harmonic Current Test Results.....	25
6. Voltage Fluctuations & Flicker Test.....	26
6.1. Test Equipment	26
6.2. Block Diagram of Test Setup.....	26
6.3. Voltage Fluctuation and Flicker Test Limits	26
6.4. Configuration of EUT on Test	27
6.5. Operating Condition of EUT	27
6.6. Test Procedure	27

6.7. Voltage Fluctuation and Flicker Test Results	28
7. IMMUNITY PERFORMANCE CRITERIA.....	29
8. Electrostatic Discharge Test	30
8.1. Test Equipment	30
8.2. Block Diagram of Test Setup.....	30
8.3. Electrostatic Discharge Test Limits	30
8.4. Configuration of EUT on Test	31
8.5. Operating Condition of EUT	31
8.6. Test Procedure	31
8.7. Electrostatic Discharge Test Results.....	32
9. RF Field Strength Susceptibility Test.....	33
9.1. Test Equipment	33
9.2. Block Diagram of Test Setup.....	33
9.3. RF Field Strength susceptibility Test Limits	34
9.4. Configuration of EUT on Test	34
9.5. Operating Condition of EUT	34
9.6. Test Procedure	34
9.7. RF Field Strength Susceptibility Test Results	35
10. Electrical Fast Transient/Burst immunity Test	36
10.1. Test Equipment	36
10.2. Block Diagram of Test Setup.....	36
10.3. Electrical Fast Transient/Burst Test Limits	37
10.4. Configuration of EUT on Test	37
10.5. Operating Condition of EUT	37
10.6. Test Procedure	37
10.7. Electrical Fast Transient/Burst immunity Test Results.....	38
11. SURGE Test.....	39
11.1. Test Equipments.....	39
11.2. Block Diagram of Test Setup.....	39
11.3. Surge Test Limits	40
11.4. Configuration of EUT on Test	40
11.5. Operating Condition of EUT	40
11.6. Test Procedure	40
11.7. Surge Test Results.....	41
12. Injected currents susceptibility test	42
12.1. Test Equipments.....	42
12.2. Block Diagram of Test Setup.....	42
12.3. Injected currents susceptibility Test Limits	43
12.4. Configuration of EUT on Test	43
12.5. Operating Condition of EUT	43
12.6. Test Procedure	43
12.7. Injected currents susceptibility Test Results	44
13. magnetic field immunity test	45
13.1. Test Equipments.....	45
13.2. Block Diagram of Test Setup.....	45

13.3. magnetic field Test Limits	46
13.4. Configuration of EUT on Test	46
13.5. Operating Condition of EUT	46
13.6. Test Procedure	46
13.7. Magnetic field immunity Test Results	47
14. Voltage dips and interruptions test.....	48
14.1. Test Equipments.....	48
14.2. Block Diagram of Test Setup.....	48
14.3. Voltage dips and interruptions Test Limits.....	49
14.4. Configuration of EUT on Test	49
14.5. Operating Condition of EUT	49
14.6. Test Procedure	49
14.7. Voltage dips and interruptions Test Results	50
15. Photograph.....	51
15.1. Photos of Radiated Disturbance Test (In Semi Anechoic Chamber).....	51
15.2. Photos of Electrostatic Discharge Test	51
15.3. Photos of RF Field Strength Susceptibility Test.....	52
16. Photos Of The EUT	53

TEST REPORT DECLARATION

Applicant : Dongguan DG-TIME Industry Company., Limited
Address : 6th Floor, B1 Building, Yuxiang Industrial Park, NO46 Fumin Road,
Jinxiao Tang, Fenggang Town, Dongguan, China
Manufacturer : Dongguan DG-TIME Industry Company., Limited
Address : 6th Floor, B1 Building, Yuxiang Industrial Park, NO46 Fumin Road,
Jinxiao Tang, Fenggang Town, Dongguan, China
EUT Description : Power bank
(A) Model No. : T49C, CNE-CPBP20XX
(B) Trademark : N/A

Measurement Standard Used:

EN 55032:2015

EN 55024:2010+A1 :2015

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 EN 55032 and EN 55024 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).....: Korol Zhong
Project Engineer

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

Date of issue.....: November 01, 2019



Revision History

Revision	Issue Date	Revisions	Revised By
V0	November 01, 2019	Initial released Issue	Korol Zhong

1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

EMISSION				
Description of Test Item	Standard	Limits	Results	
Radiated Emissions	EN 55032:2015	Class B	P	
Radiated Emissions From FM Receivers	EN 55032:2015	Class B	N/A	
Conducted Emissions From The AC Mains Power Ports	EN 55032:2015	Class B	N/A	
Conducted Emissions From Asymmetric Mode	EN 55032:2015	Class B	N/A	
Conducted Differential Voltage Emissions	EN 55032:2015	Class B	N/A	
Harmonic current emissions	EN 61000-3-2:2014	Class A	N/A	
Voltage fluctuations & flicker	EN 61000-3-3:2013	Section 5	N/A	
IMMUNITY (EN 55024:2010+A1:2015)				
Description of Test Item	Standard	Performan ce Criteria	Observation Criteria	Results
Electrostatic discharge (ESD)	IEC 61000-4-2:2008	B	A	P
Radio-frequency, Continuous radiated disturbance	IEC 61000-4-3:2006+ A1:2007 + A2:2010	A	A	P
Electrical fast transient (EFT)	IEC 61000-4-4:2012	B	N/A	N/A
Surge (Input a.c. power port)	IEC 61000-4-5:2014	B	N/A	N/A
Surge(Telecommunication port)		B	N/A	N/A
Radio-frequency, Continuous conducted disturbance	IEC 61000-4-6:2013	A	N/A	N/A
Power frequency magnetic field	IEC 61000-4-8:2009	A	N/A	N/A
Voltage dips, >95% reduction	IEC 61000-4-11:2004	B	N/A	N/A
Voltage dips, 30% reduction		C	N/A	N/A
Voltage interruptions		C	N/A	N/A
Note: 1. P is an abbreviation for Pass. 2. F is an abbreviation for Fail. 3. N/A is an abbreviation for Not Applicable.				

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Description : Power bank

Model Number : T49C, CNE-CPBP20XX

Diff : There is no difference except the name of the model. All tests are made with the T49C model.

Test Voltage : DC 3.7V From Battery, DC 5V From DC Power

EUT information : Input: DC 5V

Highest Frequency : Less than 108MHz

Trademark : N/A

Software version : N/A

Hardware version : N/A

2.2. Accessories of Device (EUT)

Power Source : N/A

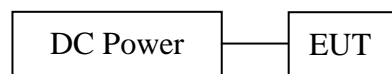
2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number
1.	DC Power	JUNKE	JK12010S	20140927-6
2.	Load	/	/	/

2.4. Block Diagram of connection between EUT and simulators

For test

For Charging Mode



For Load Mode



Signal Cable Description of the above Support Units					
No.	Port Name	Cable	Length	Shielded (Yes or No)	Detachable (Yes or No)
(a)	N/A	N/A	N/A	N/A	N/A
(b)	N/A	N/A	N/A	N/A	N/A

2.5.Test Mode Description

For EMI&EMS Tests		
No.	Test Mode	Test Voltage
※1.	Full Load(USB 1#5V/2.1A)	DC 3.7V From Battery
2.	Full Load(USB 2#5V/2.1A)	DC 3.7V From Battery
3.	Full Load(USB 1#5V/1.05A+ USB 2#5V/1.05A)	DC 3.7V From Battery
4.	No Load	DC 3.7V From Battery
5.	Charging(Type C)	DC 5V From DC Power
6.	Charging(Micro USB)	DC 5V From DC Power
Note: ※1 is worst case mode tests, so this report only reflected the worst mode in each part.		

2.6. Test Facility

Shenzhen Alpha Product Testing Co., Ltd.

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

2.7. Measurement Uncertainty

(95% confidence levels, k=2)

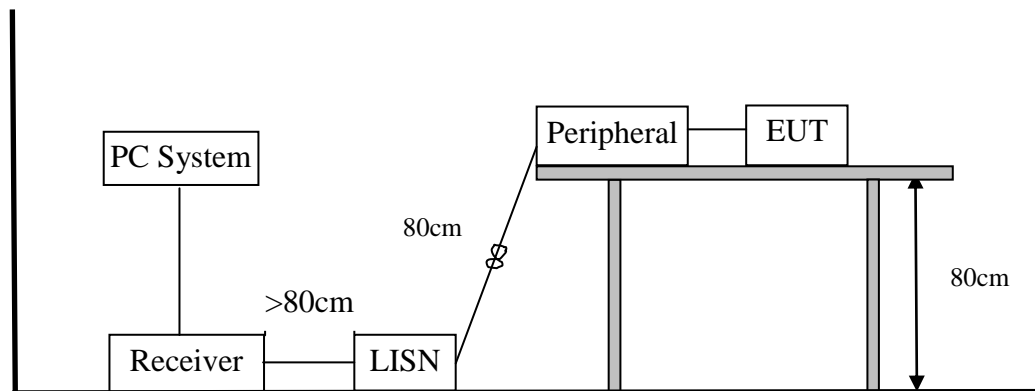
Test Item	Uncertainty	U _{cispr}
Uncertainty for Conduction emission test	2.71dB	3.8 dB
Uncertainty for Radiation Emission test	3.90 dB (Distance: 3m Polarize: V)	5.2 dB
	3.92 dB (Distance: 3m Polarize: H)	
Uncertainty for Radiation Emission test (1GHz-18GHz)	4.26 dB (Distance: 3m Polarize: V)	5.2 dB
	4.28 dB (Distance: 3m Polarize: H)	

3. CONDUCTED DISTURBANCE AT MAINS TERMINALS TEST

3.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	101165	2019.09.05	1 Year
2.	L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2019.09.05	1 Year
3.	L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2019.09.05	1 Year
4.	Pulse Limiter	Schwarzbeck	9516F	9618	2019.09.05	1 Year

3.2. Block Diagram of Test Setup



3.3. Power Line Conducted Emission Test Limits

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μ V)	Average Level dB(μ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

- Notes:
1. Emission level=Read level + LISN factor-Preamplifier factor + Cable loss
 2. * Decreasing linearly with logarithm of frequency.
 3. The lower limit shall apply at the transition frequencies.

3.4.Configuration of EUT on Test

The following equipment are installed on conducted disturbance at mains terminals to meet the EN 55032 requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

3.5.Operating Condition of EUT

- (1) Setup the EUT as shown as Section 3.2.
- (2) Turn on the power of all equipment.
- (3) Let the EUT work in test mode and 15 minutes before taking the test.

3.6.Test Procedure

- (1) The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#). This provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N.#2). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to EN 55032 on Conducted Disturbance at Mains Terminals test.
- (2) The frequency range from 150kHz to 30MHz is checked, the bandwidth of test receiver (R&S TEST RECEIVER ESCI) is set at 9kHz.
- (3) The test results are reported on Section 3.7.

3.7. Conducted Disturbance at Mains Terminals Test Results

EUT	: Power bank	Test Date	: N/A
M/N	: T49C	Temperature	: N/A
Test Engineer	: N/A	Humidity	: N/A
Test Voltage	: N/A	Pressure	: N/A
Test Mode	: N/A		
Test Results	: N/A		
Note: Not applicable for equipment operated with PC, battery, or Power Supply.			

4. RADIATED DISTURBANCE TEST

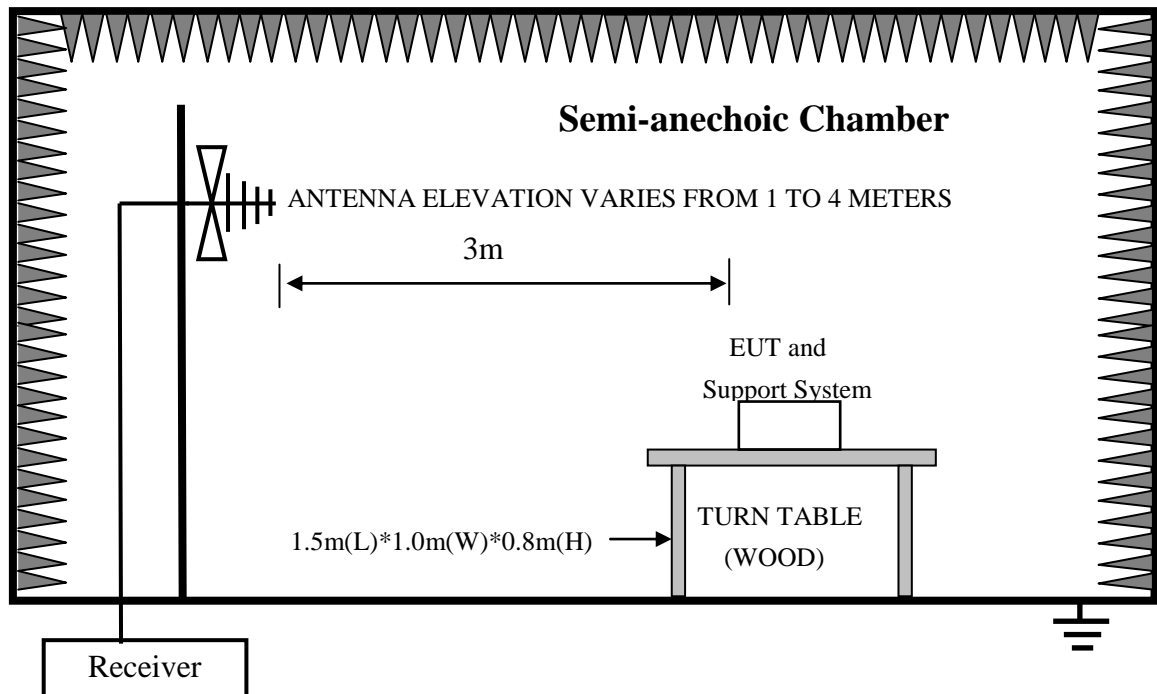
4.1. Test Equipment

For frequency range 30MHz~1GHz (At Semi Anechoic Chamber)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Test Receiver	Rohde&Schwarz	ESR	1316.3003K03-102082-Wa	2019.09.06	1 Year
2	Bilog Antenna	Schwarzbeck	VULB 9168	9168-438	2018.04.13	2 Year

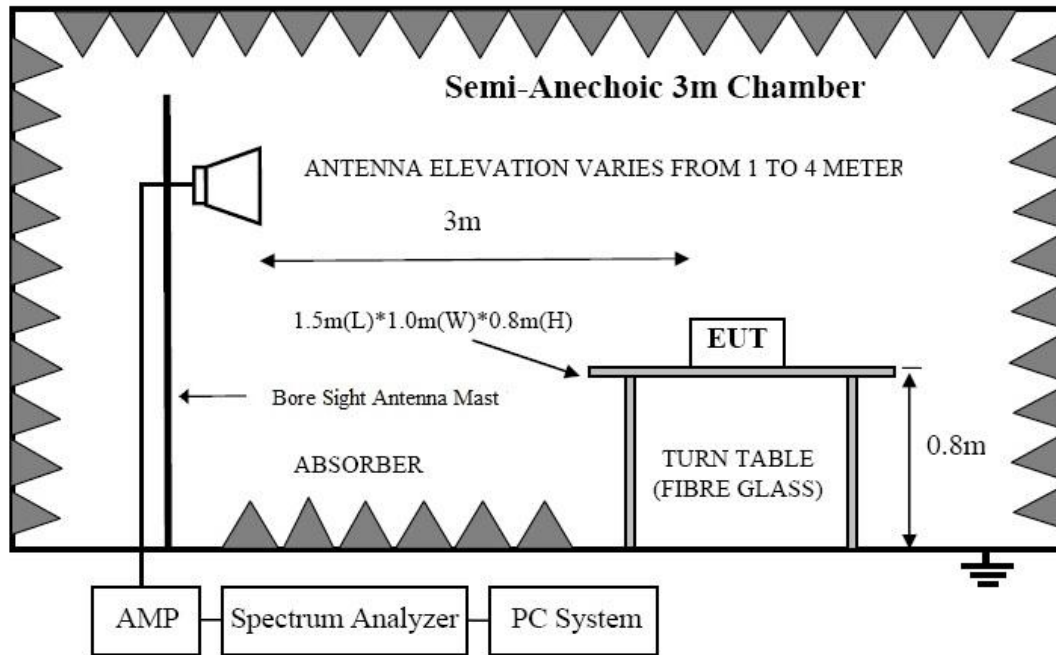
For frequency range above 1GHz (At Semi Anechoic Chamber)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	E4407B	MY49510055	2019.09.06	1 Year
2	Horn Antenna	Schwarzbeck	BBHA 9120 D	BBHA 9120 D(1201)	2018.04.13	2 Year
3	Amplifier	Agilent	8449B	3008A02664	2019.09.06	1 Year

4.2. Block Diagram of Test Setup

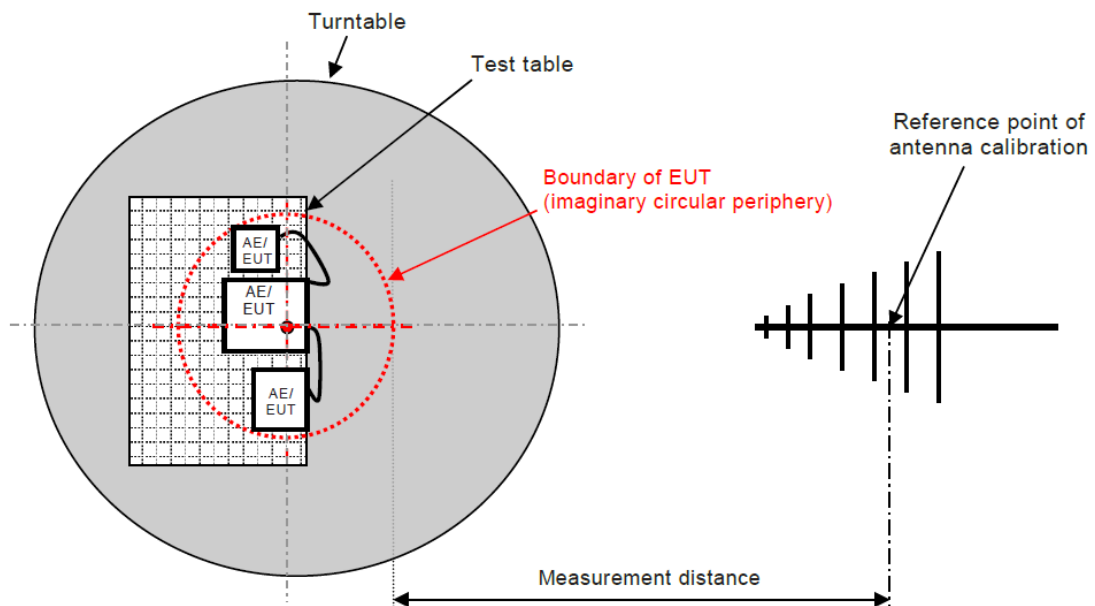
In Semi Anechoic Chamber (3m) Test Setup Diagram for 30MHz~1000MHz



In Semi Anechoic Chamber (3m) Test Setup Diagram for Above 1GHz



For 3m distance description:



4.3. Test Limit

Frequency MHz	Distance (Meters)	Field Strengths Limits dB(μ V)/m
30 ~ 230	3	40
230 ~ 1000	3	47
1000 ~ 3000	3	70(Peak) 50(Average)
3000 ~ 6000	3	74(Peak) 54(Average)

- Notes:
1. Emission level = Read level + Antenna Factor - Preamp Factor + Cable Loss
 2. The smaller limit shall apply at the cross point between two frequency bands.
 3. Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.
 4. Frequency range of radiated measurements:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 6 GHz, whichever is lower.

4.4.Configuration of EUT on Test

The following equipment are installed on Radiated Emission Test to meet the EN 55032 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

4.5.Operating Condition of EUT

- (1) Setup the EUT as shown as Section 4.2.
- (2) Turn on the power of all equipment.
- (3) Let the EUT work in test mode and 15 minutes before taking the test.

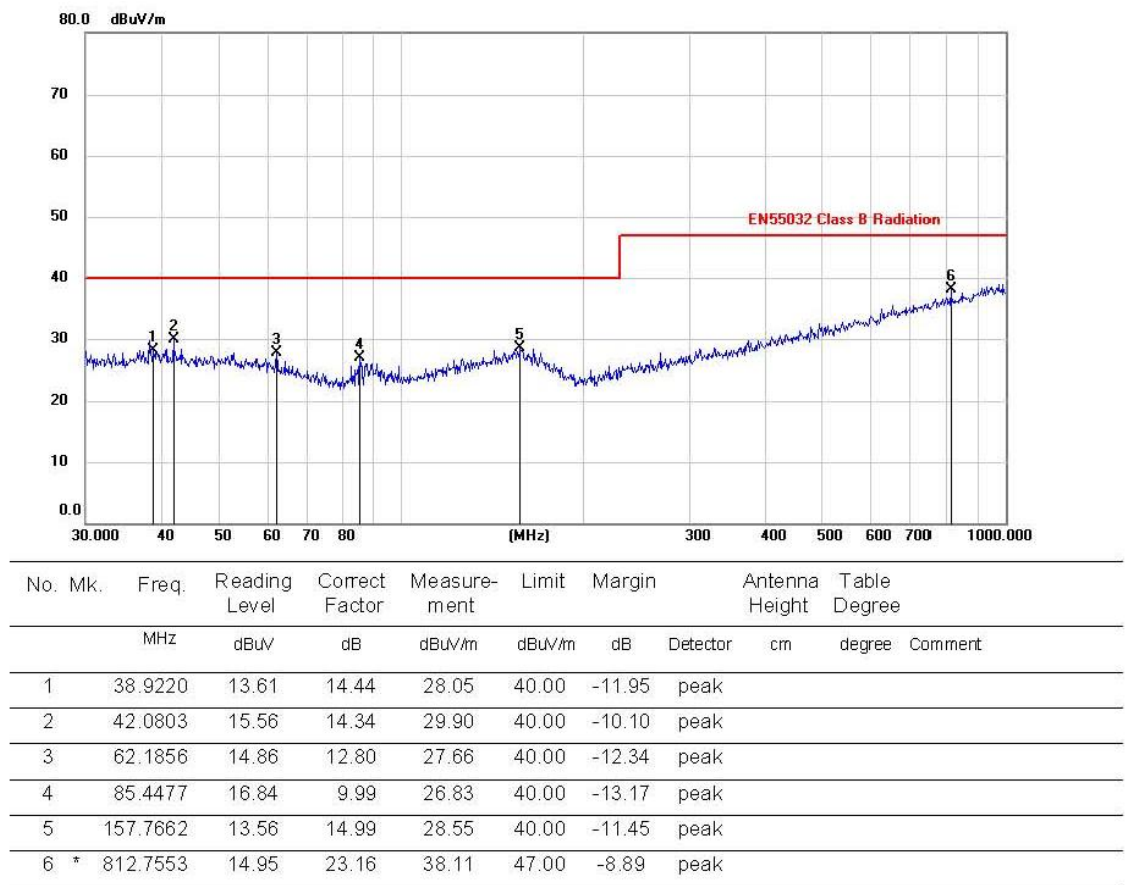
4.6.Test Procedure

- (1) The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. An antenna was located 3m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all the interface cables were changed according to EN 55032 on Radiated Disturbance test.
- (2) The frequency range from 30MHz to 1000MHz is checked, the bandwidth of test receiver (R&S TEST RECEIVER ESCI) is set at 120kHz.
- (3) The frequency range from 30MHz to 1000MHz was pre-scanned with a peak detector and all final readings of measurement from Test Receiver are Quasi-Peak values, all measurement distance is 3m in 3m semi anechoic chamber.
- (4) The test results are reported on Section 4.7.

4.7.Radiated Disturbance Test Results

EUT	: Power bank	Test Date	: 2019.10.29
M/N	: T49C	Temperature	: 24℃
Test Engineer	: Korol Zhong	Humidity	: 56%
Test Voltage	: DC 3.7V From Battery	Pressure	: 101.3kPa
Test Mode	Full Load(USB 1#5V/2.1A)		
Test Results	: Pass		
Note: 1. The test results are listed in next pages. 2. If the limits for the measurement with the quasi-peak 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.			

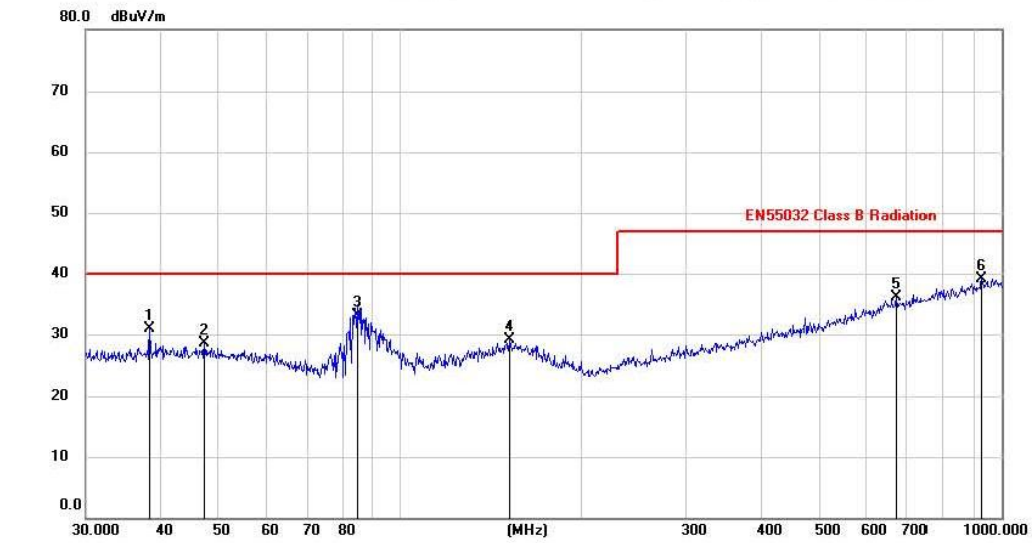
Polarization: Vertical



Note:1. *:Maximum data; x:Over limit; !:over margin.

2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Polarization: Horizontal



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	dBuV	Factor	ment			Height	Degree	
					dBuV/m	dBuV/m	dB	Detector	cm	degree
1		38.3967	16.60	14.26	30.86	40.00	-9.14	peak		
2		47.4502	14.37	14.04	28.41	40.00	-11.59	peak		
3	*	84.8506	23.02	9.99	33.01	40.00	-6.99	QP		
4		152.4635	14.02	14.99	29.01	40.00	-10.99	peak		
5		672.8444	14.78	21.41	36.19	47.00	-10.81	peak		
6		928.6011	14.41	24.64	39.05	47.00	-7.95	peak		

Note: 1. *: Maximum data; x: Over limit; l: over margin.

2. Measurement = Reading Level + Correct Factor; Correct Factor = Antenna Factor + Cable Loss.

For above 1G radiated disturbance test result:

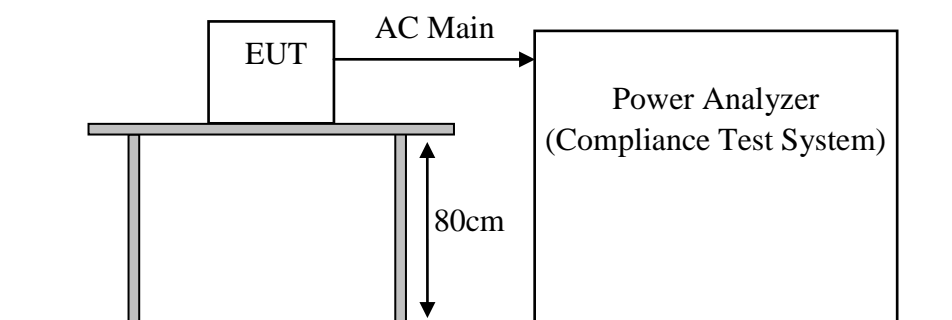
EUT	: Power bank	Test Date	: N/A
M/N	: T49C	Temperature	: N/A
Test Engineer	: N/A	Humidity	: N/A
Test Voltage	: N/A	Pressure	: N/A
Test Mode	: N/A		
Test Results	: N/A		
Note: The highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. So the frequency rang 1GHz-6GHz radiation test not applicable.			

5. HARMONIC CURRENT TEST

5.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Harmonics Flicker Analyser	Voltech	PM6000	20000670049 5	2019.09.06	1 Year

5.2. Block Diagram of Test Setup



5.3. Harmonic Current Test Limits

For Class A equipment:

Harmonic order n	Maximum permissible harmonic current A
Odd harmonics	
3	2,30
5	1,14
7	0,77
9	0,40
11	0,33
13	0,21
$15 \leq n \leq 39$	$0,15 \frac{15}{n}$
Even harmonics	
2	1,08
4	0,43
6	0,30
$8 \leq n \leq 40$	$0,23 \frac{8}{n}$

for Class B equipment:

The harmonics of the input current shall not exceed the values given in Class A equipment limit multiplied by a factor of 1,5.

5.4.Configuration of EUT on Test

The following equipment are installed on Harmonic Current Test to meet the EN61000-3-2 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

5.5.Operating Condition of EUT

- (1) Setup the EUT as shown as Section 5.2.
- (2) Turn on the power of all equipment.
- (3) Let the EUT work in test mode and 15 minutes before taking the test.

5.6.Test Procedure

- (1) The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the necessary for the EUT to be exercised.
- (2) The test results are reported on Section 5.7.

5.7.Harmonic Current Test Results

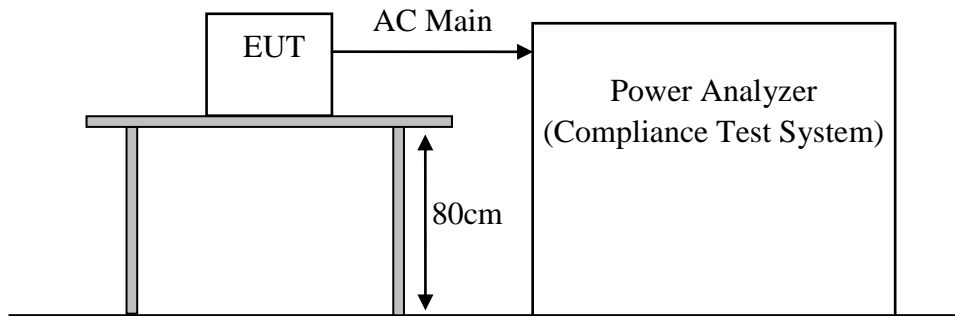
EUT : Power bank	Test Date : N/A
M/N : T49C	Temperature : N/A
Test Engineer : N/A	Humidity : N/A
Test Voltage : N/A	Pressure : N/A
Test Mode : N/A	
Test Results : N/A	
Note: Not applicable for equipment operated with battery power supply.	

6. VOLTAGE FLUCTUATIONS & FLICKER TEST

6.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Harmonics Flicker Analyser	Voltech	PM6000	20000670049 5	2019.09.06	1 Year

6.2. Block Diagram of Test Setup



6.3. Voltage Fluctuation and Flicker Test Limits

Test Item	Limit	Note
P_{st}	1.0	P_{st} means Short-term flicker indicator
P_{lt}	0.65	P_{lt} means long-term flicker indicator
T_{dt}	0.2	T_{dt} means maximum time that dt exceeds 3%
$d_{max}(\%)$	4%	d_{max} means maximum relative voltage change.
$d_c(\%)$	3.3%	d_c means relative steady-state voltage change.

6.4.Configuration of EUT on Test

The following equipment are installed on Harmonic Current Test to meet the EN61000-3-3 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

6.5.Operating Condition of EUT

- (1) Setup the EUT as shown as Section 6.2.
- (2) Turn on the power of all equipment.
- (3) Let the EUT work in test mode and 15 minutes before taking the test.

6.6.Test Procedure

- (1) The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal conditions During the flick measurement; the measure time shall include that part of whole operation changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.
- (2) The test results are reported on Section 6.7.

6.7.Voltage Fluctuation and Flicker Test Results

EUT	: Power bank	Test Date	: N/A
M/N	: T49C	Temperature	: N/A
Test Engineer	: N/A	Humidity	: N/A
Test Voltage	: N/A	Pressure	: N/A
Test Mode	: N/A		
Test Results	: N/A		
Note: Not applicable for equipment operated with battery power supply.			

7. IMMUNITY PERFORMANCE CRITERIA

Performance Level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level by its manufacturer or the requestor of the test, or the agreed between the manufacturer and the purchaser of the product.

Definition related to the performance level:

1. Based on the used product standard
2. Based on the declaration of the manufacturer, requestor or purchaser

Performance criterion A

When seen from the normal viewing distance, the EUT shall operate with no change beyond the manufacturer's specification, in flicker, colour, focus and jitter (except for the power frequency magnetic field test).

Power frequency magnetic field test

For CRT monitors, the following also applies:

The jitter shall be measured using a measuring microscope as specified in 6.6.14 of ISO 9241-3.

The jitter (in mm) shall not exceed the value $\frac{(\text{character height in mm} + 0,3) \times 2,5}{33,3}$ when the CRT

monitor is immersed in a continuous magnetic field of 1A/m (r.m.s.) at one of the power frequencies of 50Hz.

Alternatively, a field of 50A/m may be applied, and a transparent graduated mask used to assess the jitter. In that case, the jitter shall not exceed 50 times the value in the above formula.

NOTE-This test level is used to simplify the measurement of jitter. Lesser values of the test level may be used if non-linearity is experienced, due to, for example, saturation of screening material.

The EUT shall be tested in two positions, both perpendicular to the magnetic field.

Performance criterion B

Screen disturbances during the application of the test are permissible.

Performance criterion C

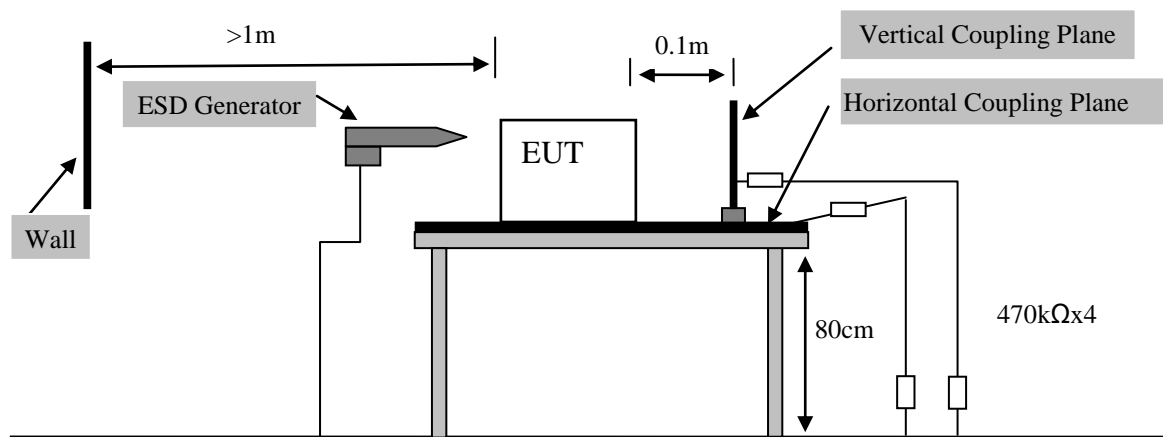
Failures which are not self-recovered after removal of the external disturbance, but which can be recovered to normal operation by reset or reboot are permissible.

8. ELECTROSTATIC DISCHARGE TEST

8.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	ESD Tester	HAEFELY	PESD1610	T49C10546	2019.09.12	1 Year

8.2. Block Diagram of Test Setup



8.3. Electrostatic Discharge Test Limits

Test Type	Test Level	Performance Criterion
Air Discharge	8KV	B
Contact Discharge	4KV	B

Notes: 1. Test set-up reference IEC 61000-4-2:2008

8.4.Configuration of EUT on Test

The following equipment are installed on Electrostatic Discharge Test to meet the IEC 61000-4-2 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

8.5.Operating Condition of EUT

- (1) Setup the EUT as shown as Section 8.2.
- (2) Turn on the power of all equipment.
- (3) Let the EUT work in test mode and 15 minutes before taking the test.

8.6.Test Procedure

- (1) Air Discharge:

The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 20 times (10 with positive and 10 negative with positive) for each pre-selected test point. This procedure was repeated until all the air discharge completed.

- (2) Contact Discharge:

All the procedure was same as Section 8.6.1. Except that the generator was re-triggered for a new single discharge and repeated 50 times for each pre-selected test point. The tip of the discharge electrode was touching the EUT before the discharge switch was operated.

- (3) Indirect discharge for horizontal coupling plane:

At least 50 single discharges (25 with positive and 25 negative with positive) were applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

- (4) Indirect discharge for vertical coupling plane:

At least 50 single discharge (25 with positive and 25 negative with positive) were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

8.7.Electrostatic Discharge Test Results

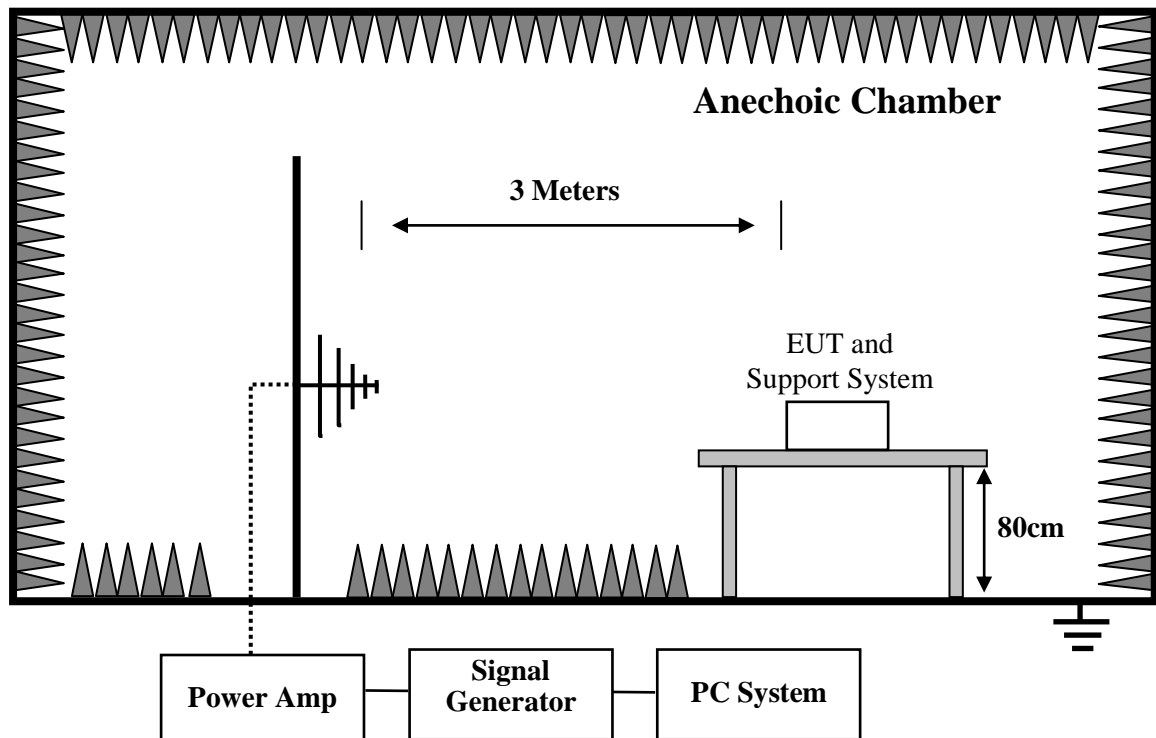
EUT : Power bank			Test Date : 2019.10.31	
M/N : T49C			Temperature : 24℃	
Test Engineer : Korol Zhong			Humidity : 56%	
Test Voltage DC 3.7V From Battery		Pressure 101.3KPa		
Test Mode : Full Load(USB 1#5V/2.1A)				
Test Results : PASS				
Discharge Voltage (kV)	Type Of Discharge	Dischargeable Points	Performance	
			Required	Observation
±2	Contact	1	B	A
±4	Contact	1	B	A
±2	Air	2, 3	B	A
±4	Air	2, 3	B	A
±8	Air	2, 3	B	A
±2	HCP-Bottom	Edge of the HCP	B	A
±4	HCP-Bottom	Edge of the HCP	B	A
±2	VCP-Front	Center of the VCP	B	A
±4	VCP-Front	Center of the VCP	B	A
±2	VCP-Left	Center of the VCP	B	A
±4	VCP-Left	Center of the VCP	B	A
±2	VCP-Back	Center of the VCP	B	A
±4	VCP-Back	Center of the VCP	B	A
±2	VCP-Right	Center of the VCP	B	A
±4	VCP-Right	Center of the VCP	B	A
Discharge Points Description				
<u>1</u>	Port	<u>4</u>		
<u>2</u>	Gap	<u>5</u>		
<u>3</u>	Button	<u>6</u>		
<u>7</u>				
Note: <div>1. For the time interval between successive single discharges an initial value of one second.</div> <div>2. For Air Discharge each Point Positive 10 times and negative 10 times discharge.</div> <div>3. For Contact Discharge each point positive 25 times and negative 25 times discharge.</div> <div>4. Class A is no function loss.</div>				

9. RF FIELD STRENGTH SUSCEPTIBILITY TEST

9.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	vector Signal Generator	Agilent	E4438C	US44271917	2019.09.06	1 Year
2.	Power meter	Agilent	E4419B	GB40202122	2019.09.06	1 Year
3.	Power Sensor	Agilent	E9300A	MY41496625	2019.09.06	1 Year
4.	RF power Amplifier	OPHIR	5225R	1045	N/A	NCR
5.	RF power Amplifier	OPHIR	5273R	1018	N/A	NCR
6.	Antenna	SCHWARZBECK	STLP9128E-special	STLP9128Es#139	N/A	NCR
7.	Antenna	SCHWARZBECK	STLP9128E-special	STLP 9149 #456	N/A	NCR

9.2. Block Diagram of Test Setup



9.3.RF Field Strength susceptibility Test Limits

Test Specifications	Test Level	Performance Criterion
80MHz-1000MHz	3V/m (r.m.s.)	A

Notes: 1. Test set-up reference IEC 61000-4-3:2006 + A1:2007 + A2:2010

9.4.Configuration of EUT on Test

The following equipment are installed on RF Field Strength susceptibility Test to meet the IEC 61000-4-3 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

9.5.Operating Condition of EUT

- (1) Setup the EUT as shown as Section 9.2.
- (2) Turn on the power of all equipment.
- (3) Let the EUT work in test mode and 15 minutes before taking the test.

9.6.Test Procedure

- (1) Testing was performed in a Fully anechoic chamber as recommended by IEC 61000-4-3. The EUT was placed on an 80 cm high non-conductive table located in the area of field uniformity. The radiating antenna was placed 3m in front of the EUT and Support system, and dwell time of the radiated interference was controlled by an automated, computer-controlled system.
- (2) The signal source was stepped through the applicable frequency range at a rate no faster than 1% of the fundamental. The signal was amplitude modulated 80% over the frequency range 80 MHz to 1GHz at a level of 3 V/m. The dwell time was set at 3 s. Field presence was monitored during testing via a field probe placed in close proximity to the EUT.
- (3) Throughout testing, the EUT was closely monitored for signs of susceptibility. The test was performed with the antennae oriented in both a horizontal and vertical polarization.
- (4) All the scanning conditions are as follows:

Condition of Test	Require of Test
Test Fielded Strength	3 V/m
Radiated Signal	80% amplitude modulated with a 1kHz sine wave
Scanning Frequency	80 - 1000 MHz
Sweeping time of radiated	0.0015 decade/s
Dwell Time	1 Sec.

9.7.RF Field Strength Susceptibility Test Results

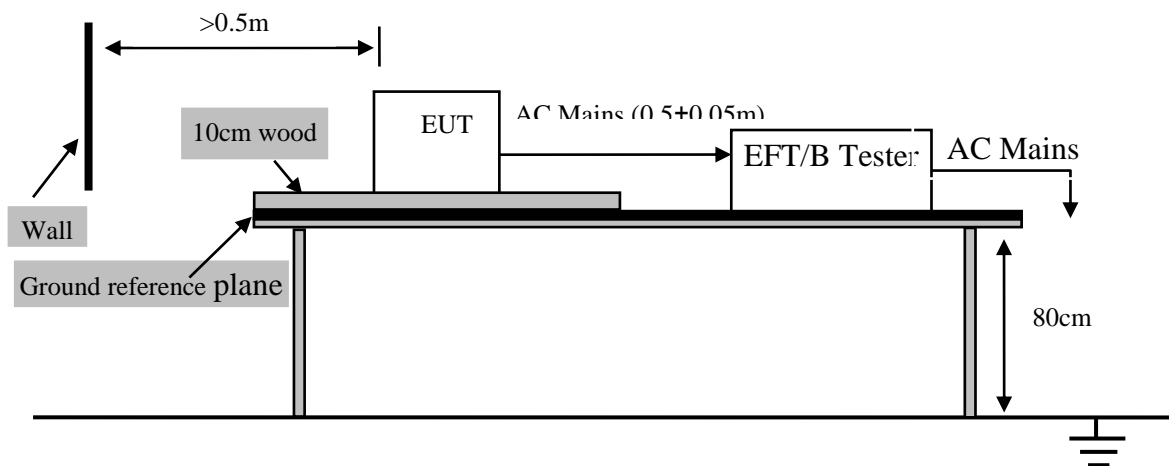
EUT	: Power bank	Test Date	: 2019.10.31		
M/N	: T49C	Temperature	: 24°C		
Test Engineer	: Korol Zhong	Humidity	: 56%		
Test Voltage	DC 3.7V From Battery	Pressure	101.3KPa		
Test Mode	: Full Load(USB 1#5V/2.1A)				
Test Results	: PASS				
Field Strength	: 3V/m				
Modulation:	<input checked="" type="checkbox"/> AM <input type="checkbox"/> Pulse <input type="checkbox"/> none 1 kHz 80%				
	Frequency Range :80 MHz -1000MHz				
Steps	1%				
	Horizontal		Vertical	Result	
	Required	Observation	Required	Observation	(Pass / Fail)
Front	A	A	A	A	Pass
Right	A	A	A	A	Pass
Rear	A	A	A	A	Pass
Left	A	A	A	A	Pass
Remark: Class A is no function loss					

10.ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

10.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Multifunctional Compact Immunity Test system	3ctest	CCS 600	ES0801655	2019.09.05	1 Year
2.	Surge&EFT Coupling Decoupling Network	3ctest	SEPN 3832T	ES0951601	2019.09.05	1 Year
3.	Voltage variation and PF magnetic field regulating device	3ctest	VMT2216S	ES0441601	2019.09.06	1 Year
4.	Capacitive Coupling Clamp	3ctest	CCC 100	EC0441660	2019.09.06	1 Year

10.2.Block Diagram of Test Setup



10.3.Electrical Fast Transient/Burst Test Limits

Test Specifications	Test Level	Performance Criterion
1.	2	2
2.	4	4
3.	6	8
4.	8	15
X	Special	Special

Notes: 1. Test set-up reference IEC 61000-4-4:2012

10.4.Configuration of EUT on Test

The following equipment are installed on Electrical Fast Transient/Burst Test to meet the IEC 61000-4-4 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

10.5.Operating Condition of EUT

- (1) Setup the EUT as shown as Section 10.2.
- (2) Turn on the power of all equipment.
- (3) Let the EUT work in test mode and 15 minutes before taking the test.

10.6.Test Procedure

The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m + 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. This reference ground plane was project

- (1) beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables.

10.6.1. For input and AC power ports:

The EUT was connected to the power mains by using a coupling device that couples the EFT interference signal to AC power lines. Both positive transients and negative transients of test voltage were applied during compliance test and the duration of the test can't less than 1min.

10.6.2. For signal lines and control lines ports:

It's unnecessary to test.

10.6.3. For DC input and DC output power ports:

It's unnecessary to test.

10.7.Electrical Fast Transient/Burst immuNity Test Results

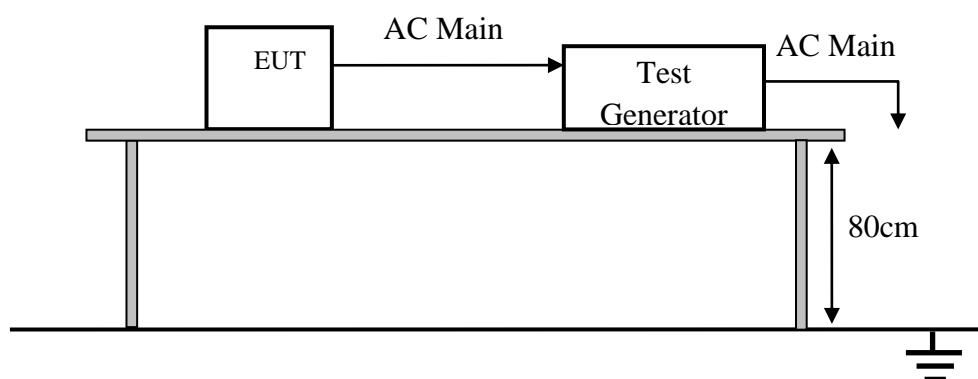
EUT	: Power bank	Test Date	: N/A
M/N	: T49C	Temperature	: N/A
Test Engineer	: N/A	Humidity	: N/A
Test Voltage	: N/A	Pressure	: N/A
Test Mode	: N/A		
Test Results	: N/A		
Note: Not applicable for equipment operated with battery power supply.			

11.SURGE TEST

11.1.Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Multifunctional Compact Immunity Test system	3ctest	CCS 600	ES0801655	2019.09.05	1 Year
2.	Surge&EFT Coupling Decoupling Network	3ctest	SEPN 3832T	ES0951601	2019.09.05	1 Year
3.	Voltage variation and PF magnetic field regulating device	3ctest	VMT2216S	ES0441601	2019.09.06	1 Year
4.	Capacitive Coupling Clamp	3ctest	CCC 100	EC0441660	2019.09.06	1 Year

11.2.Block Diagram of Test Setup



11.3.Surge Test Limits

Severity Level	Open-Circuit Test Voltage (kV)
1	0.5
2	1
3	2
4	4
*	Special

Notes: 1. Test set-up reference IEC 61000-4-5:2014

11.4.Configuration of EUT on Test

The following equipment are installed on Surge Test to meet the IEC 61000-4-5 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

11.5.Operating Condition of EUT

- (1) Setup the EUT as shown as Section 11.2.
- (2) Turn on the power of all equipment.
- (3) Let the EUT work in test mode and 15 minutes before taking the test.

11.6.Test Procedure

- (1) For line-to-line coupling mode, provide a 1kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral lines to ground are same except test level is 2kV.
- (2) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test.
- (3) Different phase angles are done individually.
- (4) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

11.7.Surge Test Results

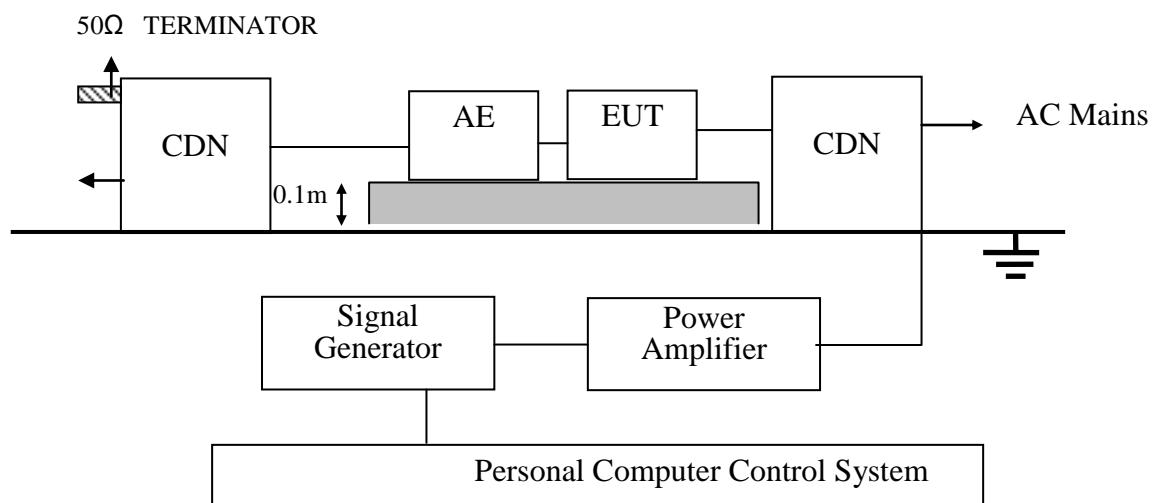
EUT : Power bank	Test Date : N/A
M/N : T49C	Temperature : N/A
Test Engineer : N/A	Humidity : N/A
Test Voltage : N/A	Pressure : N/A
Test Mode : N/A	
Test Results : N/A	
Note: Not applicable for equipment operated with battery power supply.	

12.INJECTED CURRENTS SUSCEPTIBILITY TEST

12.1.Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	CONDUCTED IMMUNITY TEST SYSTEM (RF-Generator)	Frankonia	CIT-10/75	12681247/2013	2019.09.05	1 Year
2.	Fixed Coaxial Attenuator (6dB Attenuation)	CD	ATT-0675	120540086	2019.09.06	1 Year
3.	coupling-decoupling network (CDN)	CD	CDN M2/M3	2302	2019.09.06	1 Year
4.	Electromagnetic Injection Clamp (EMC-Clamp)	CD	EM-Clamp	0513A031201	2019.09.05	1 Year

12.2.Block Diagram of Test Setup



12.3. Injected currents susceptibility Test Limits

Level	Voltage Level (e.m.f.) V
1	1
2	3
3	10
X	Special

Notes: 1. Test set-up reference IEC 61000-4-6:2013

12.4. Configuration of EUT on Test

The following equipment are installed on Injected currents susceptibility Test to meet the IEC 61000-4-6 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

12.5. Operating Condition of EUT

- (1) Setup the EUT as shown as Section 12.2.
- (2) Turn on the power of all equipment.
- (3) Let the EUT work in test mode and 15 minutes before taking the test.

12.6. Test Procedure

- (1) Let the EUT work in test mode and test it.
The EUT are placed on an insulating support 0.1m high above a ground reference plane.
- (2) CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 10 and 30 mm (where possible).
- (3) The disturbance signal described below is injected to EUT through CDN.
- (4) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- (5) The frequency range is swept from 0.150MHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.
The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept
- (6) incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
- (7) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

12.7. Injected currents susceptibility Test Results

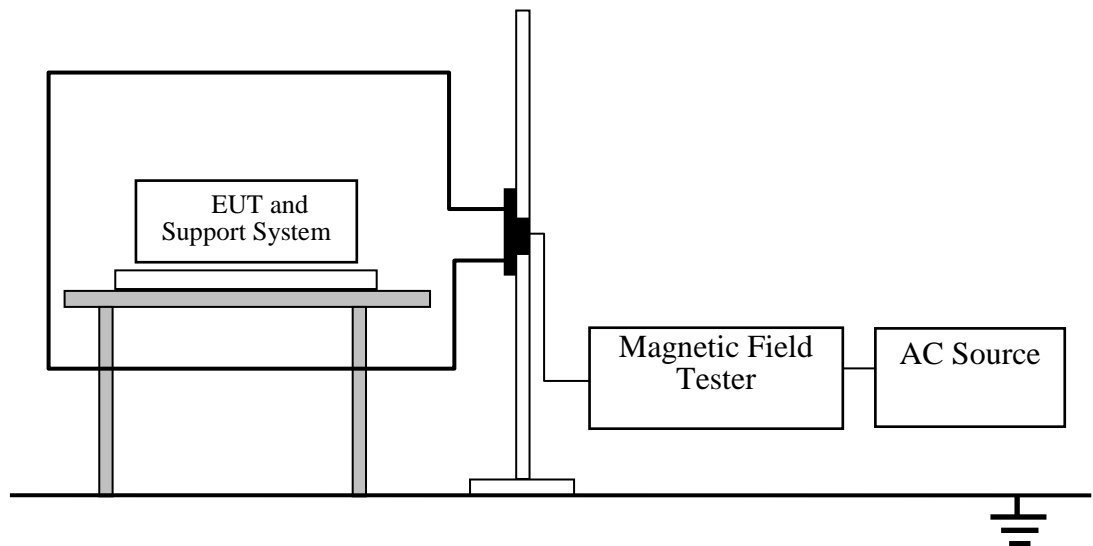
EUT	: Power bank	Test Date	: N/A
M/N	: T49C	Temperature	: N/A
Test Engineer	: N/A	Humidity	: N/A
Test Voltage	: N/A	Pressure	: N/A
Test Mode	: N/A		
Test Results	: N/A		
Note: Not applicable for equipment operated with battery power supply.			

13.MAGNETIC FIELD IMMUNITY TEST

13.1.Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Multifunctional Compact Immunity Test system	3ctest	CCS 600	ES0801655	2019.09.05	1 Year
2.	Surge&EFT Coupling Decoupling Network	3ctest	SEPN 3832T	ES0951601	2019.09.05	1 Year
3.	Voltage variation and PF magnetic field regulating device	3ctest	VMT2216S	ES0441601	2019.09.06	1 Year
4.	Capacitive Coupling Clamp	3ctest	CCC 100	EC0441660	2019.09.06	1 Year

13.2.Block Diagram of Test Setup



13.3.magnetic field Test Limits

Level	Magnetic Field Strength A/m
1	1
2	3
3	10
4	30
5	100
X	Special

Notes: 1. Test set-up reference IEC 61000-4-8:2009

13.4.Configuration of EUT on Test

The following equipment are installed on magnetic field Test to meet the IEC 61000-4-8 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

13.5.Operating Condition of EUT

- (1) Setup the EUT as shown as Section 13.2.
- (2) Turn on the power of all equipment.
- (3) Let the EUT work in test mode and 15 minutes before taking the test.

13.6.Test Procedure

The EUT was subjected to the test magnetic field by using the induction coil of standard

- (1) dimensions (1m*1m) and shown in Section 13.2. The induction coil was then rotated by 90° in order to expose the EUT to the test field with different orientations.

13.7.Magnetic field immunity Test Results

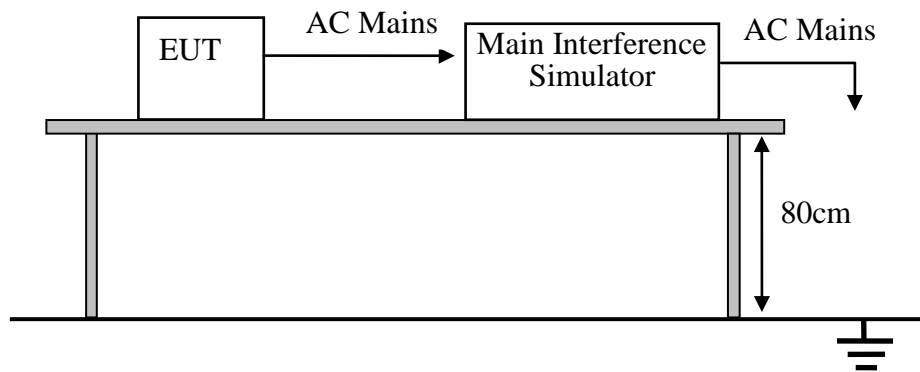
EUT	: Power bank	Test Date	: N/A
M/N	: T49C	Temperature	: N/A
Test Engineer	: N/A	Humidity	: N/A
Test Voltage	: N/A	Pressure	: N/A
Test Mode	: N/A		
Test Results	: N/A		
Note: The EUT not containing devices susceptible to magnetic fields, and Power-frequency magnetic field test applicable only to EUT containing devices susceptible to magnetic fields, so the test not applicable.			

14. VOLTAGE DIPS AND INTERRUPTIONS TEST

14.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Multifunctional Compact Immunity Test system	3ctest	CCS 600	ES0801655	2019.09.05	1 Year
2.	Surge&EFT Coupling Decoupling Network	3ctest	SEPN 3832T	ES0951601	2019.09.05	1 Year
3.	Voltage variation and PF magnetic field regulating device	3ctest	VMT2216S	ES0441601	2019.09.06	1 Year
4.	Capacitive Coupling Clamp	3ctest	CCC 100	EC0441660	2019.09.06	1 Year

14.2. Block Diagram of Test Setup



14.3.Voltage dips and interruptions Test Limits

Test Level % U _T	Voltage dip and short interruptions % U _T	Performance Criterion	Duration (in period)
0	100	C	250
0	100	B	0.5
30	70	C	25

Notes: 1. Test set-up reference IEC 61000-4-11:2004

14.4.Configuration of EUT on Test

The following equipment are installed on Voltage dips and interruptions Test to meet the IEC 61000-4-11 requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

14.5.Operating Condition of EUT

- (1) Setup the EUT as shown as Section 14.2.
- (2) Turn on the power of all equipment.
- (3) Let the EUT work in test mode and 15 minutes before taking the test.

14.6.Test Procedure

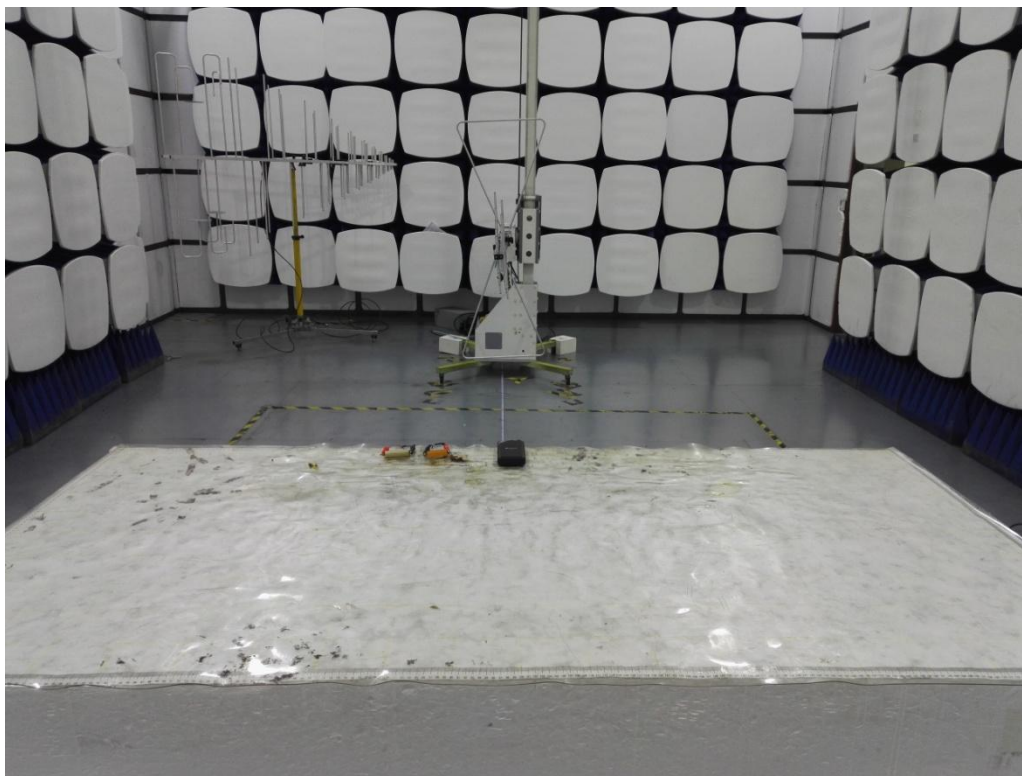
- (1) The interruption is introduced at selected phase angles with specified duration.
- (2) Record any degradation of performance.

14.7.Voltage dips and interruptions Test Results

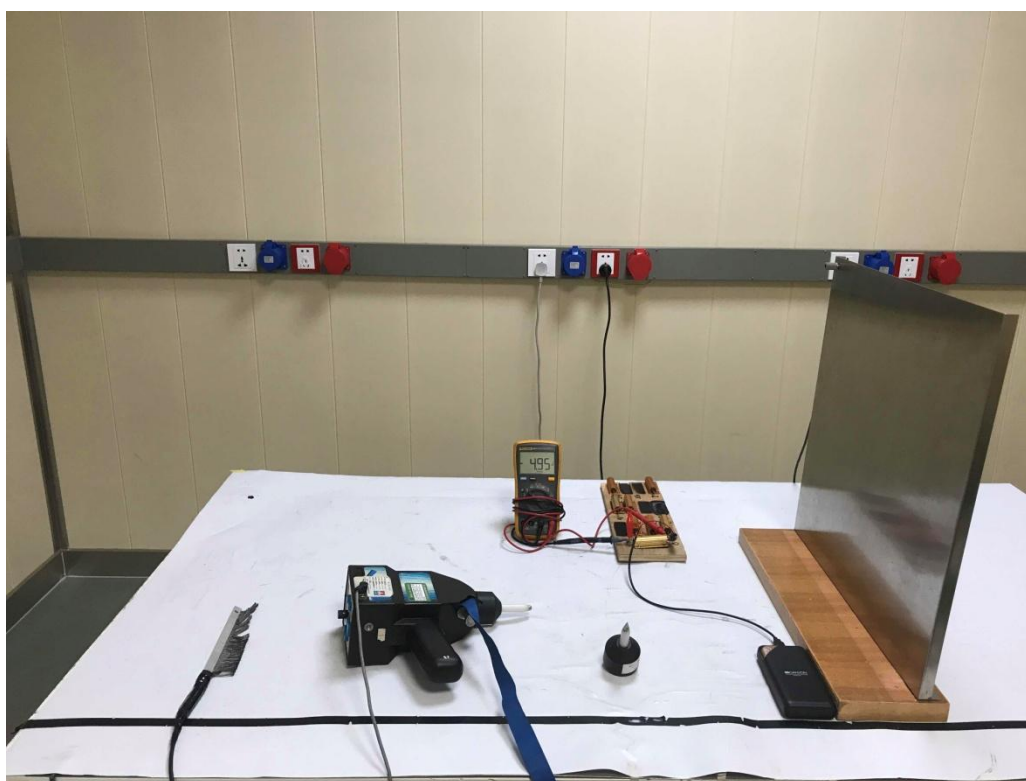
EUT	: Power bank	Test Date	: N/A
M/N	: T49C	Temperature	: N/A
Test Engineer	: N/A	Humidity	: N/A
Test Voltage	: N/A	Pressure	: N/A
Test Mode	: N/A		
Test Results	: N/A		
Note: Not applicable for equipment operated with battery power supply.			

15. PHOTOGRAPH

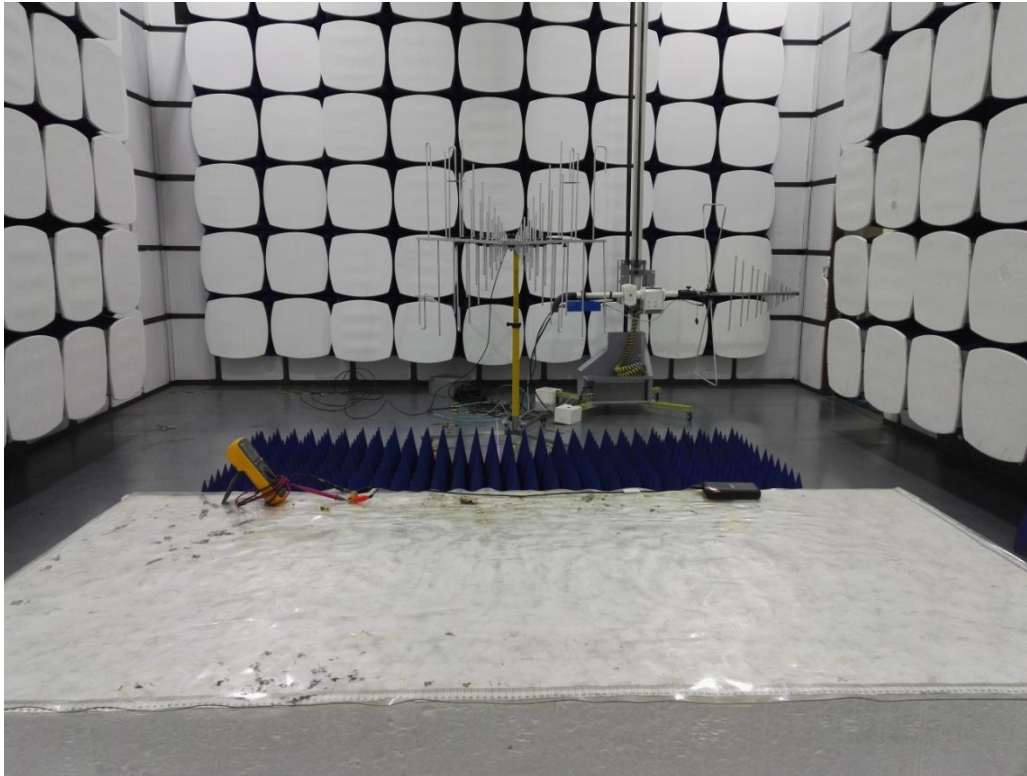
15.1. Photos of Radiated Disturbance Test (In Semi Anechoic Chamber)



15.2. Photos of Electrostatic Discharge Test



15.3.Photos of RF Field Strength Susceptibility Test



16. PHOTOS OF THE EUT



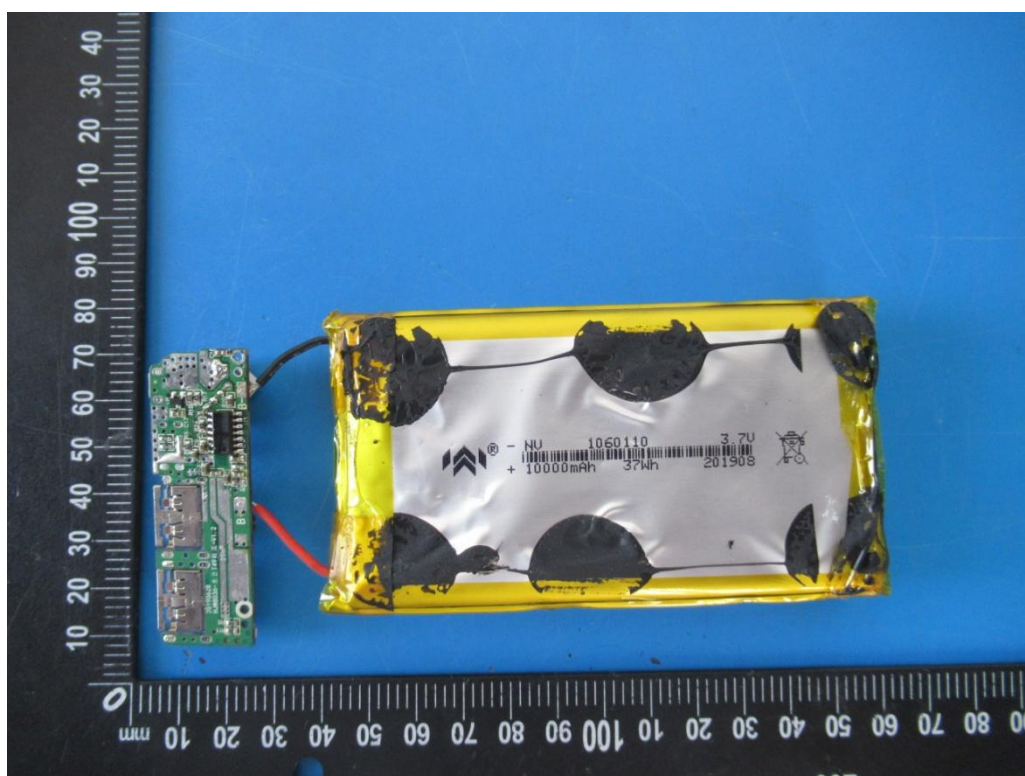
EUT View

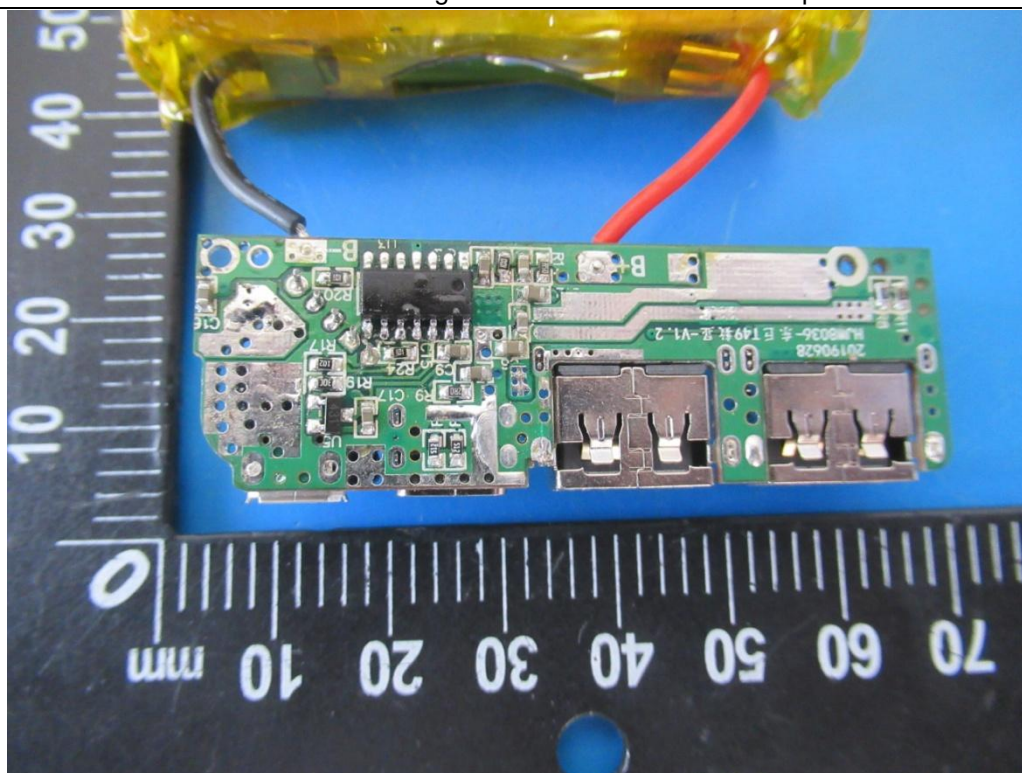
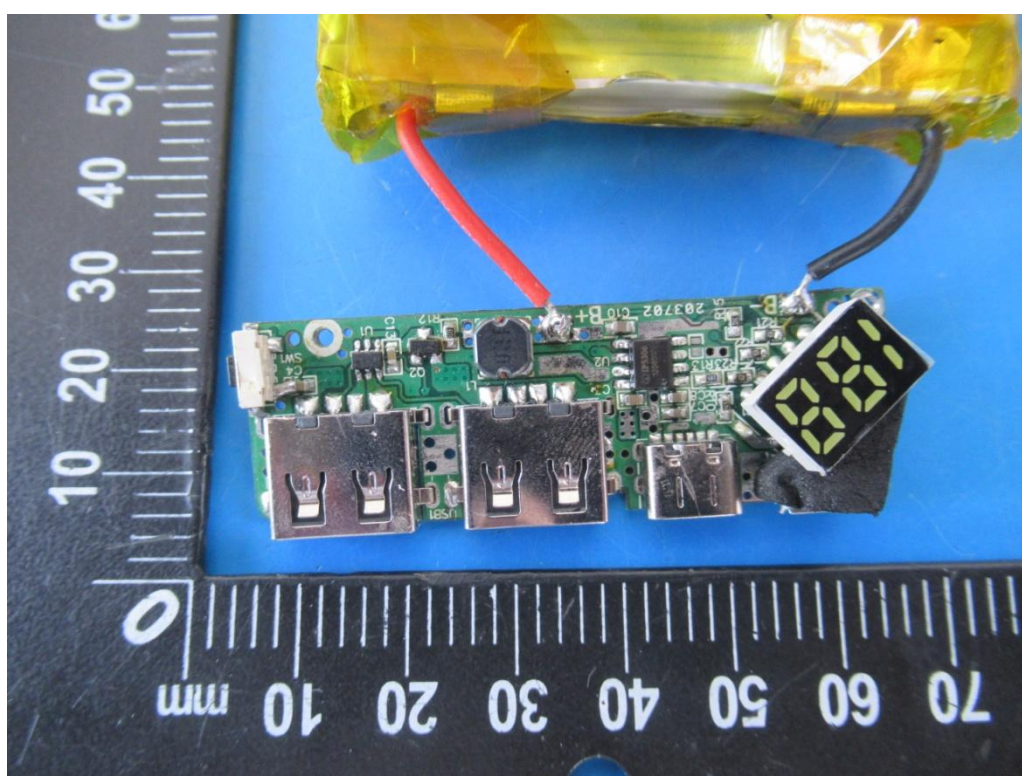


EUT View

**EUT View****EUT View**

**EUT View****EUT View**

**EUT View****EUT View**

**EUT View****EUT View**

-----End of report-----