

EMC Test Report

Report No.: AGC00924141001EE01

TEST NAME : EMC Directive 2004/108/EC for CE Marking
PRODUCT DESIGNATION : Power bank
BRAND NAME :
MODEL NAME : AF-PB07
CLIENT :
DATE OF ISSUE : Nov.08,2014
STANDARD(S) : EN 55022:2010
: EN 55024:2010
REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Nov.08,2014	Valid	Original Report

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1. VERIFICATION OF CONFORMITY

Applicant	
Address	
Manufacturer	
Address	
Product Designation	Power bank
Brand Name	
Test Model	AF-PB07
Date of test	Nov.5~Nov.7, 2014
Deviation	None
Condition of Test Sample	Normal
Report Template	AGCRT-EC-IT/DC(2013-03-01)

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in EMC Directive 2004/108/EC and the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Prepared By

Max Zhang

Max Zhang

Nov.08,2014

Checked By

Kidd Yang

Kidd Yang

Nov.08,2014

Authorized By

Solger Zhang

Solger Zhang

Nov.08,2014

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2. SYSTEM DESCRIPTION

TEST MODE DESCRIPTION		
NO.	TEST MODE DESCRIPTION	WORST
1	Discharging	V
2	Charging	--
Note: 1. V means EMI worst mode 2. Only worst mode data recorded in the test report.		

3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in measurement" (GUM) published by ISO.

- Uncertainty of Conducted Emission, $U_c = \pm 2.75\text{dB}$
- Uncertainty of Radiated Emission, $U_c = \pm 3.2\text{ dB}$

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4. PRODUCT INFORMATION

Housing Type	Metal and Plastic
EUT Input Rating	DC 5V/1A
EUT Output Rating	DC 5V/1A

I/O Port Information (☒ Applicable ☐ Not Applicable)

I/O Port of EUT			
I/O Port Type	Number	Cable Description	Tested With
Micro USB	1	0.4m Unshielded	1
USB	1	0.4m Unshielded	1

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5. SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
PC	Apple Inc	Macbook Pro	N/A	N/A	0.4m Unshielded

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6. TEST FACILITY

Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	B112-B113 , Building 12, Baoan Building Materials Center, No.1 of Xixiang Inner Ring Road, Baoan District, Shenzhen, Guangdong, P.R.China

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
SPECTRUM ANALYZER	AGILENT	E4440A	US41421290	07/17/2014	07/16/2015
ANTENNA	SCHWARZBECK	VULB9168	VULB9168-494	08/17/2014	08/16/2015
POSITIONING CONTROLLER	MF	MF-7802	N/A	--	--

TEST EQUIPMENT OF ESD TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
ELECTROSTATIC IMMUNITY TESTER	LIONCEL	ESD-203A	ESD02301005	07/26/2014	07/25/2015

TEST EQUIPMENT OF RS IMMUNITY TEST

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Signal Generator	R&S	SML03	102525	08/17/2014	08/16/2015
ANTENNA	EMCO	3142C	60447	08/17/2014	08/16/2015
Power Sensor	R&S	URV5-Z4	100124	07/30/2014	07/29/2015
Power Meter	R&S	NRVD	832378/027	07/30/2014	07/29/2015
Power Amplifier	KALMUS	7100C	N/A	07/17/2014	07/16/2015
RF Amplifier	Milmega	AS01004-55_55	1004793	07/17/2014	07/16/2015
Directional Couple	Werlatone	C5571-10	99463	07/17/2014	07/16/2015
Directional Couple	Werlatone	C6026-10	99482	07/17/2014	07/16/2015

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7. EN 55022 RADIATED EMISSION TEST

7.1. LIMITS OF RADIATED DISTURBANCES

AT 10M DISTANCES

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBuV/m Q.P.)
30-230	10	30.00
230-1000	10	37.00

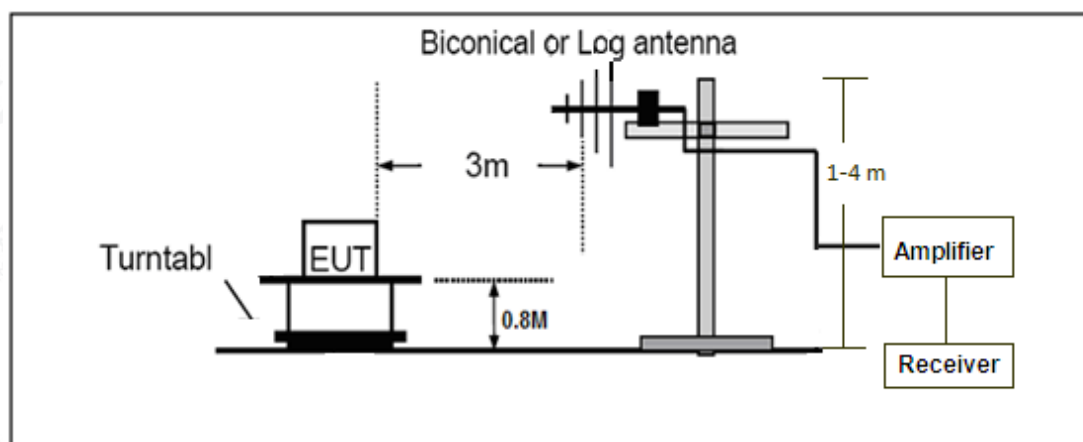
AT 3M DISTANCES

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBuV/m Q.P.)
30-230	3	40.00
230-1000	3	47.00

Note: The lower limit shall apply at the transition frequency.

7.2. BLOCK DIAGRAM OF TEST SETUP

System Diagram of Connections between EUT and Simulators



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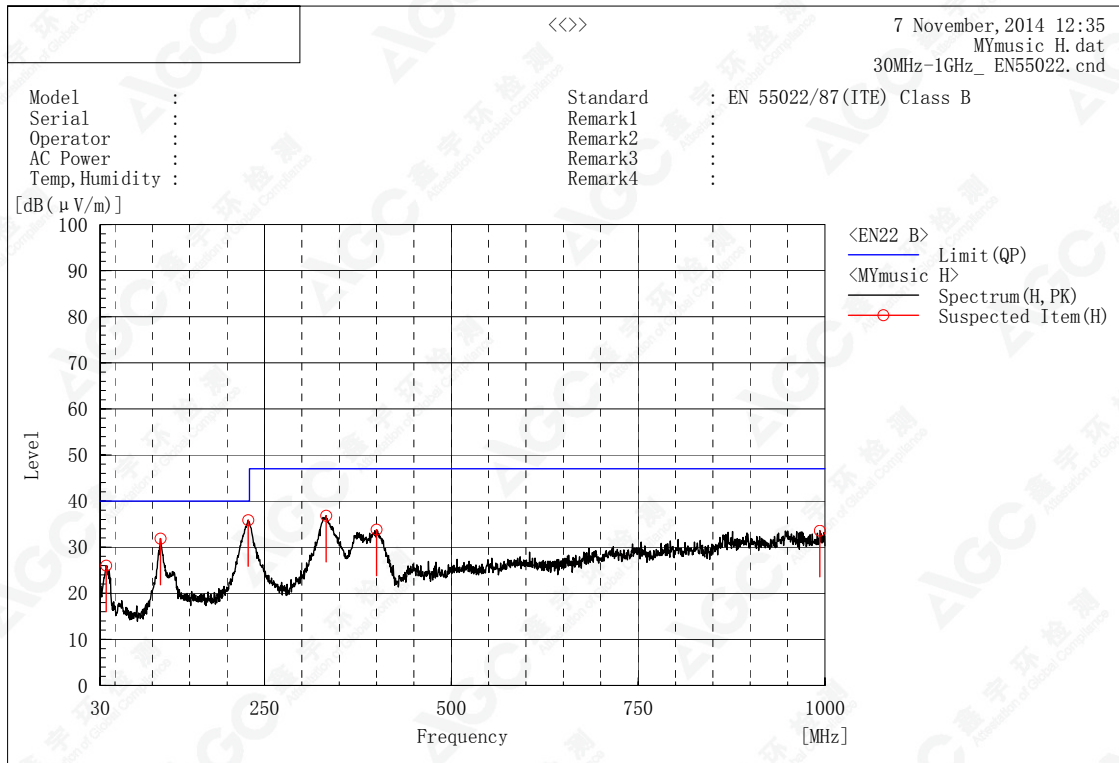
7.3. PROCEDURE OF RADIATED EMISSION TEST

- (1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per EN 55022 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- (2) Support equipment, if needed, was placed as per EN 55022.
- (3) All I/O cables were positioned to simulate typical actual usage as per EN 55022.
- (4) The EUT received DC 5V from PC which received AC230V/50Hz power through the outlet socket under the turntable. All support equipments received AC230V/50Hz power from socket under the turntable, if any.
- (5) The antenna was placed at 3 meter away from the EUT as stated in EN 55022. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
- (6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- (7) The test mode(s) were scanned during the test:
- (8) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P./Peak reading is presented.

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7.4. TEST RESULT OF RADIATED EMISSION TEST

Radiated Emission Test at 3m Distance-Horizontal



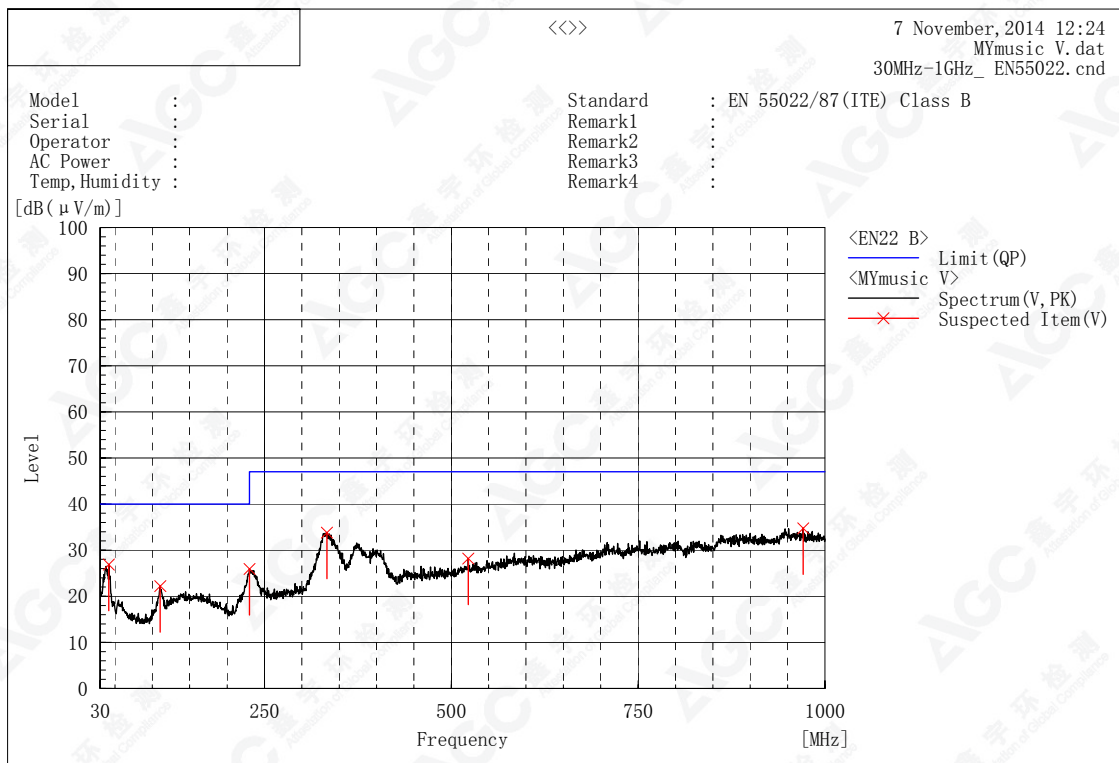
Suspected List:

Frequency MHz	Polarization	Reading dB(μV)	Factor dB (1/m)	Level dB(μV/m) PK	Limit dB(μV/m) QP	Margin dB	Pass/Fail	Height cm	Angle deg
38.245	H	4.8	21.2	26.0	40.0	14.0	Pass	100.0	251.9
110.995	H	20.6	11.3	31.9	40.0	8.1	Pass	200.0	106.9
228.365	H	23.2	12.7	35.9	40.0	4.1	Pass	100.0	287.7
332.640	H	19.4	17.4	36.8	47.0	10.2	Pass	100.0	287.7
400.055	H	15.1	18.7	33.8	47.0	13.2	Pass	200.0	33.3
993.210	H	5.2	28.4	33.6	47.0	13.4	Pass	100.0	251.9

RESULT: PASS

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Radiated Emission Test at 3m Distance-Vertical



Suspected List:

Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) QP	Margin dB	Pass/Fail	Height cm	Angle deg
41.640	V	7.9	19.0	26.9	40.0	13.1	Pass	100.1	35.2
110.510	V	11.0	11.2	22.2	40.0	17.8	Pass	200.0	337.1
229.820	V	12.9	13.0	25.9	40.0	14.1	Pass	150.0	37.4
333.610	V	16.4	17.4	33.8	47.0	13.2	Pass	150.0	283.0
970.900	V	6.3	28.5	34.8	47.0	12.2	Pass	200.0	205.6
522.760	V	6.7	21.5	28.2	47.0	18.8	Pass	150.0	182.6

RESULT: PASS

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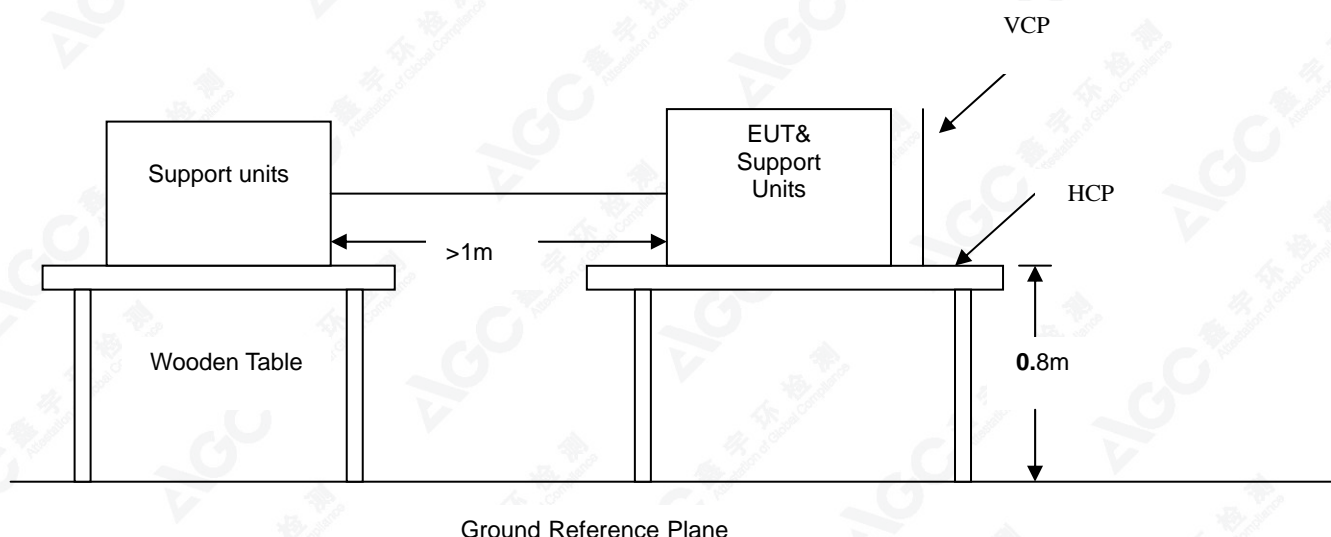
8. IEC 61000-4-2 ESD IMMUNITY TEST

ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

Port	Enclosure
Basic Standard	IEC 61000-4-2
Test Level	± 8.0 kV (Air Discharge) ± 4.0 kV (Contact Discharge) ± 4.0 kV (Indirect Discharge)
Standard require	B
Tester	Max
Temperature	20°C
Humidity	50%

8.1. BLOCK DIAGRAM OF TEST SETUP

(The 470 k ohm resistors are installed per standard requirement)



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8.2. TEST PROCEDURE

The EUT was located 0.1 m minimum from all side of the HCP.

The support units were located 1 m minimum away from the EUT.

EUT worked with resistance load, and make sure EUT worked normally.

Active the communication function if the EUT with such port(s).

As per the requirement of EN 55024; applying direct contact discharge at the sides other than front of EUT at minimum 50 discharges (25 positive and 25 negative) if applicable, can't be applied direct contact discharge side of EUT then the indirect discharge shall be applied. One of the test points shall be subjected to at least 50 indirect discharge (contact) to the front edge of horizontal coupling plane.

Other parts of EUT where it is not possible to perform contact discharge then selecting appropriate points of EUT for air discharge, a minimum of 10 single air discharges shall be applied.

The application of ESD to the contact of open connectors is not required.

Note: As per the A2 to IEC 61000-4-2, a bleed resistor cable is connected between the EUT and HCP during the test.

The electrostatic discharges were applied as follows:

Voltage	Coupling	Test Performance	Result (Pass/Fail)
±4kV	Contact Discharge	No function loss	Pass
±4kV	Indirect Discharge HCP (Front)	No function loss	Pass
±4kV	Indirect Discharge HCP (Left)	No function loss	Pass
±4kV	Indirect Discharge HCP (Back)	No function loss	Pass
±4kV	Indirect Discharge HCP (Right)	No function loss	Pass
±4kV	Indirect Discharge VCP (Front)	No function loss	Pass
±4kV	Indirect Discharge VCP (Left)	No function loss	Pass
±4kV	Indirect Discharge VCP (Back)	No function loss	Pass
±4kV	Indirect Discharge VCP (Right)	No function loss	Pass
±8kV	Air Discharge	No function loss	Pass

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8.3. PERFORMANCE & RESULT

<input checked="" type="checkbox"/> Criteria A:	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
<input type="checkbox"/> Criteria B:	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS**

 ☐ **FAIL**

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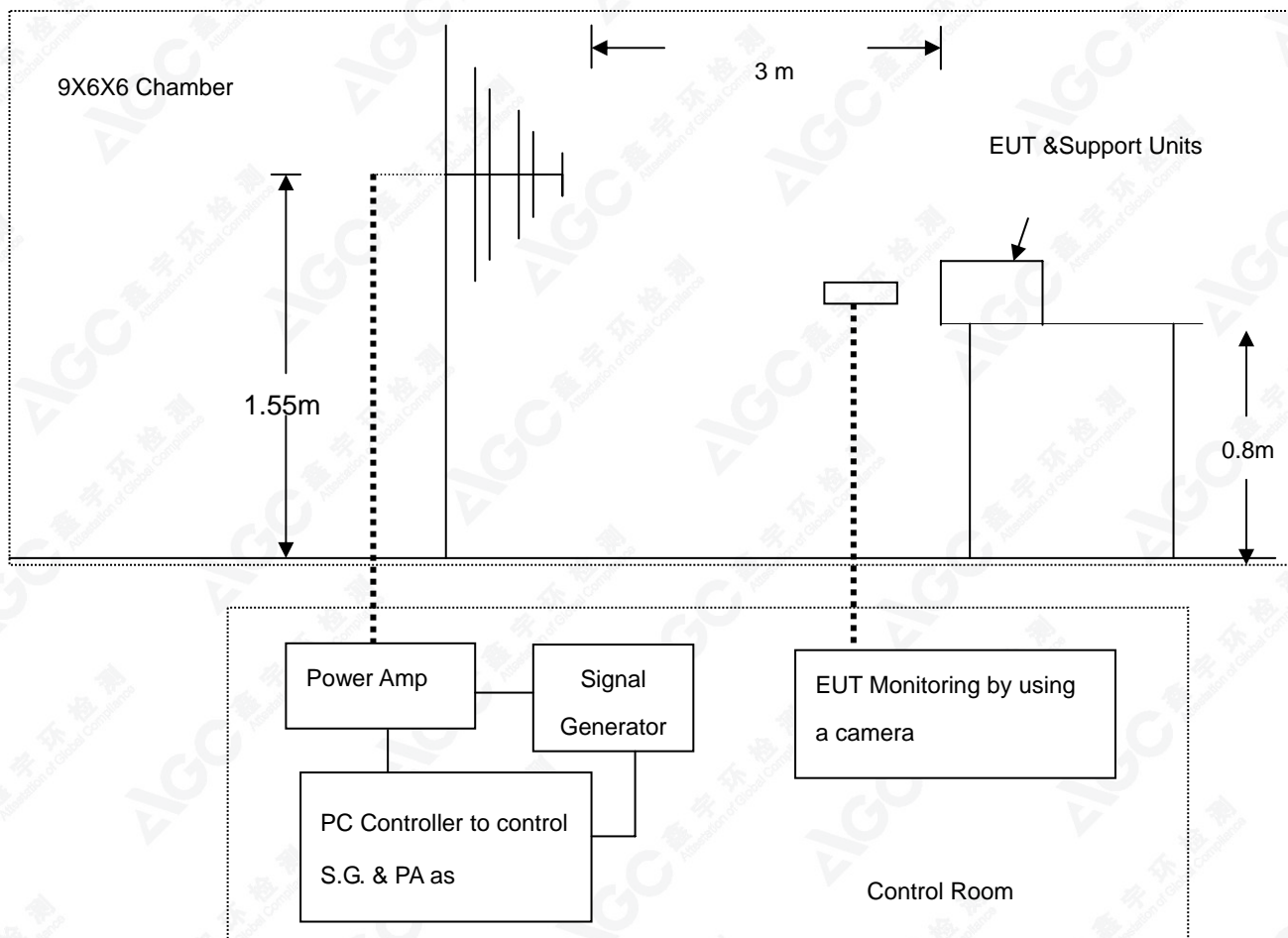


9. IEC 61000-4-3 RS IMMUNITY TEST

RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

Port	Enclosure
Basic Standard	IEC 61000-4-3
Test Level:	3V/m with 80% AM. 1kHz Modulation.
Standard require	A
Tester	Max
Temperature	25°C
Humidity	55%

9.1. BLOCK DIAGRAM OF TEST SETUP



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9.2. TEST PROCEDURE

The EUT was located at the edge of supporting table keep 3 meter away from transmitting antenna, it just the calibrated square area of field uniformity. The support units were located outside of the uniformity area, but the cable(s) connected with EUT were exposed to the calibrated field as per IEC 61000-4-3.

EUT worked with resistance load, and make sure EUT worked normally.

Setting the testing parameters of RS test software per IEC 61000-4-3.

Performing the test at each side of with specified level (3V/m) at 1% steps and test frequency from 80MHz to 1000MHz

Recording the test result in following table.

IEC 61000-4-3 Final test conditions:

Test level: 3V/m

Steps: 1 % of fundamental

Dwell Time: 1 sec

Range (MHz)	Field	Modulation	Polarity	Position	Test Performance	Result (Pass/Fail)
80-1000	3V/m	AM	H	Front	No function loss	Pass
80-1000	3V/m	AM	H	Left	No function loss	Pass
80-1000	3V/m	AM	H	Back	No function loss	Pass
80-1000	3V/m	AM	H	Right	No function loss	Pass
80-1000	3V/m	AM	V	Front	No function loss	Pass
80-1000	3V/m	AM	V	Left	No function loss	Pass
80-1000	3V/m	AM	V	Back	No function loss	Pass
80-1000	3V/m	AM	V	Right	No function loss	Pass

9.3. PERFORMANCE & RESULT

<input checked="" type="checkbox"/> Criteria A:	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
<input type="checkbox"/> Criteria B:	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS**
☐ **FAIL**

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APPENDIX A: PHOTOGRAPHS OF TEST SETUP
EN 55022 RADIATED EMISSION TEST SETUP

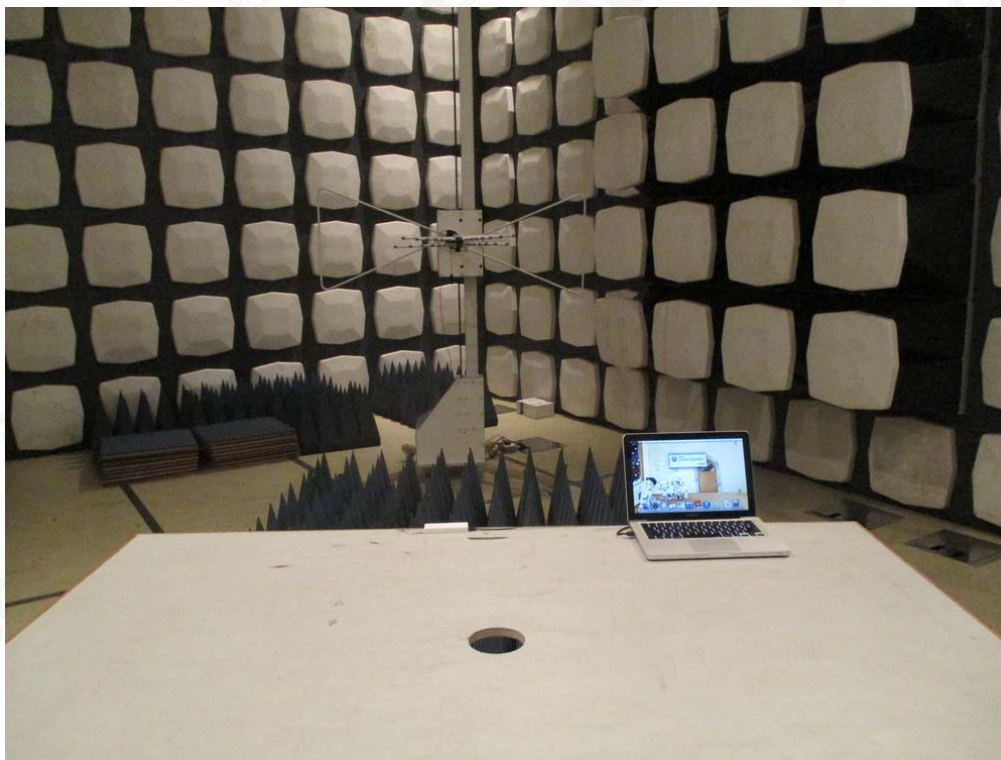


IEC 61000-4-2 ESD IMMUNITY TEST SETUP



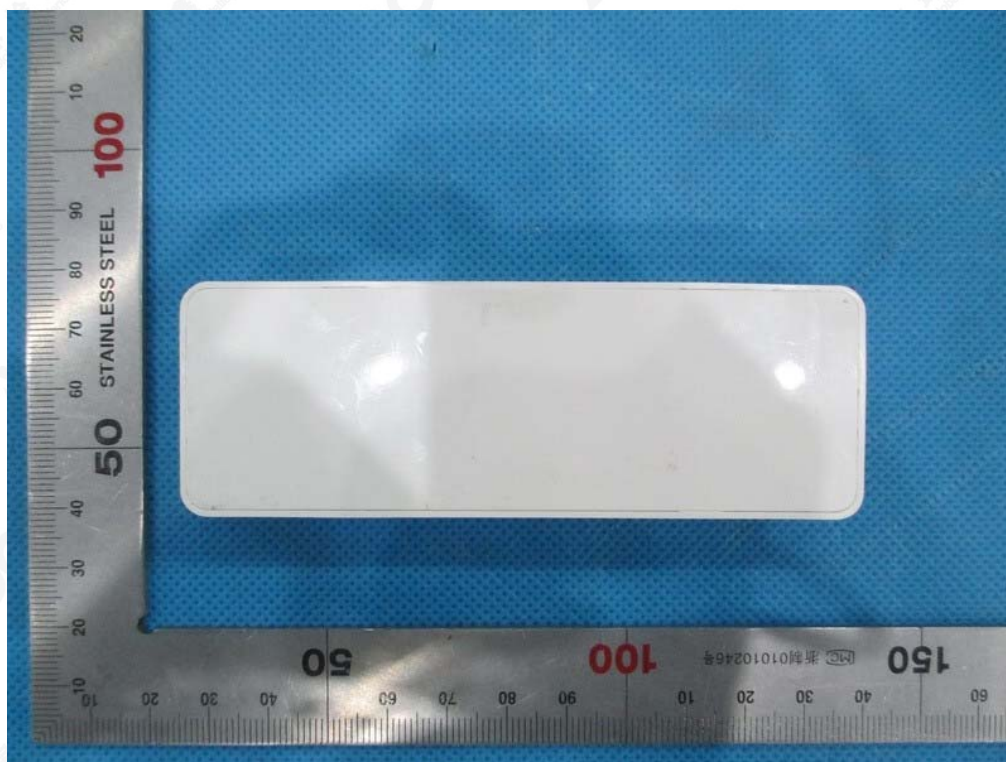
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IEC 61000-4-3 RS IMMUNITY TEST SETUP



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APPENDIX B: PHOTOGRAPHS OF EUT
TOP VIEW OF EUT



BOTTOM VIEW OF EUT

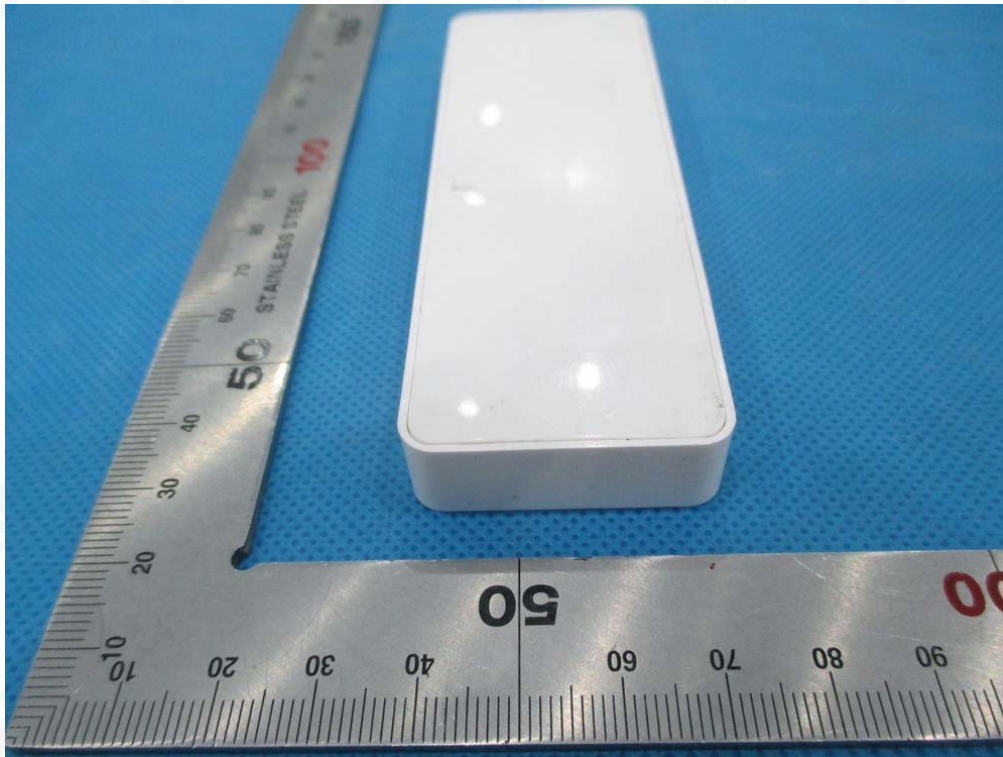


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FRONT VIEW OF EUT

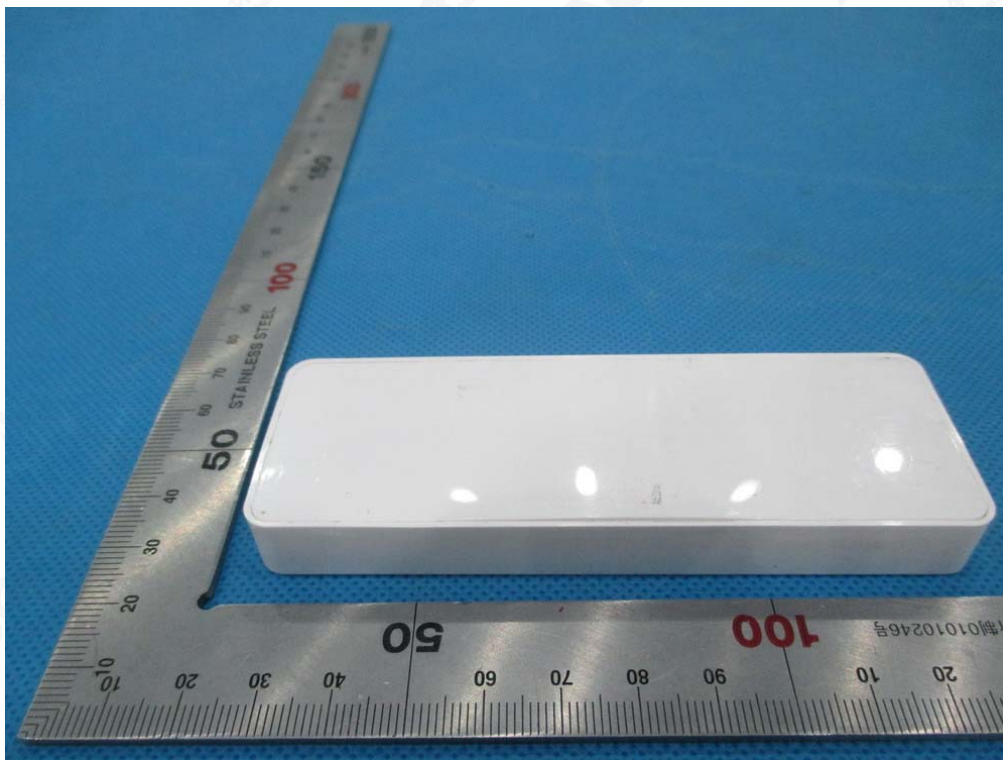


BACK VIEW OF EUT

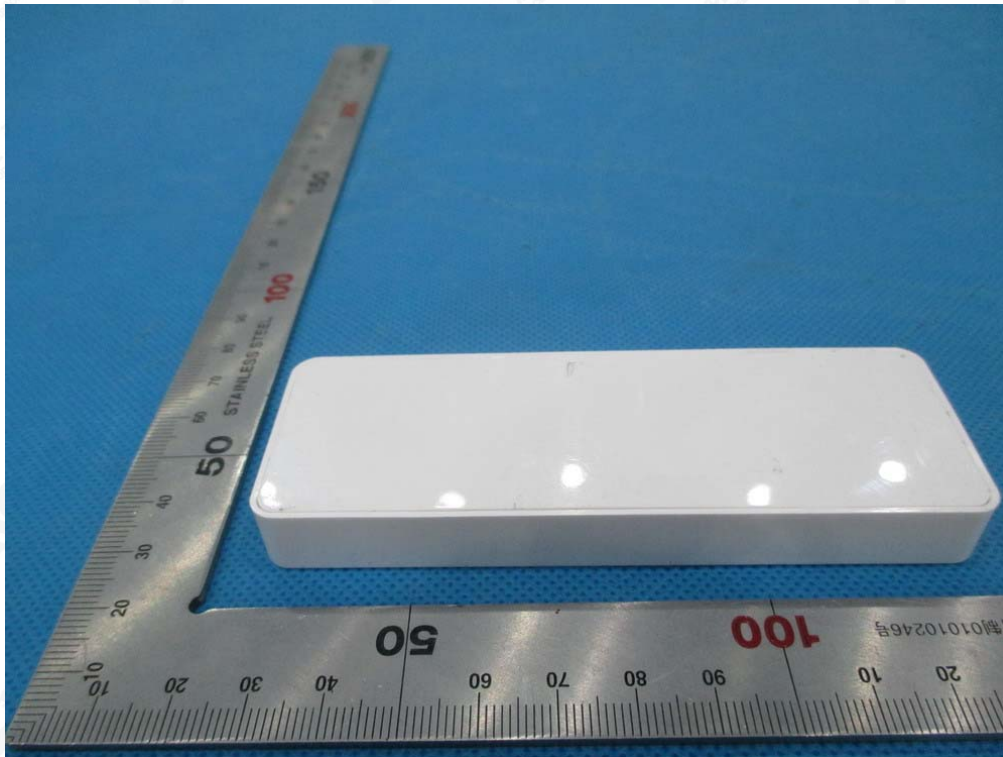


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LEFT VIEW OF EUT

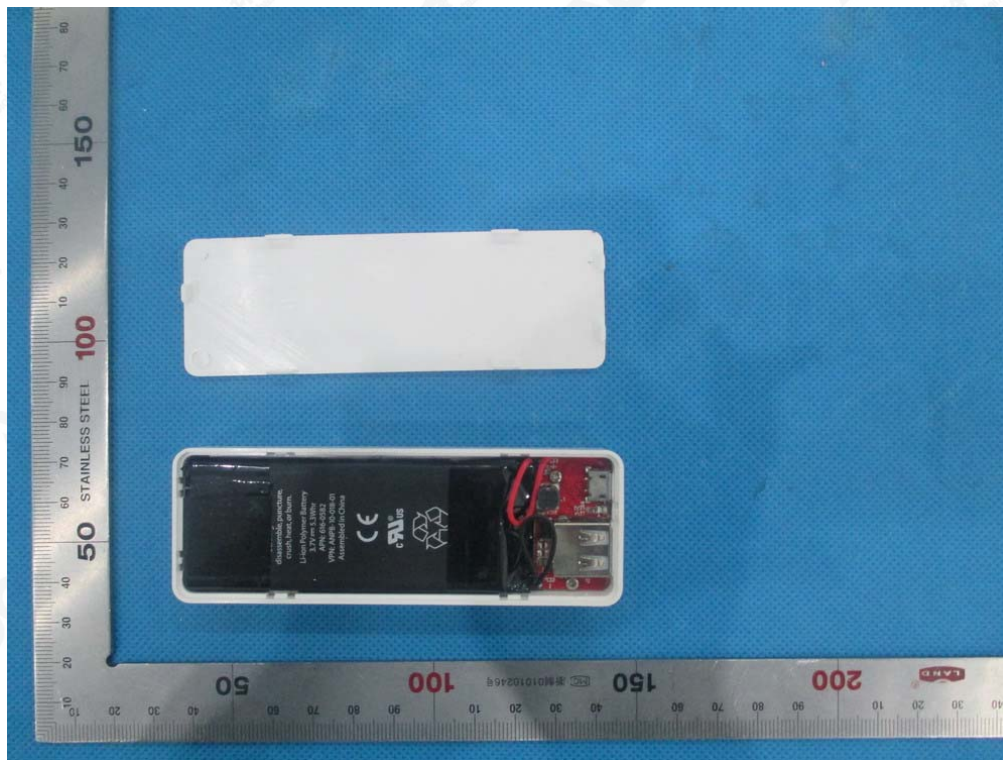


RIGHT VIEW OF EUT

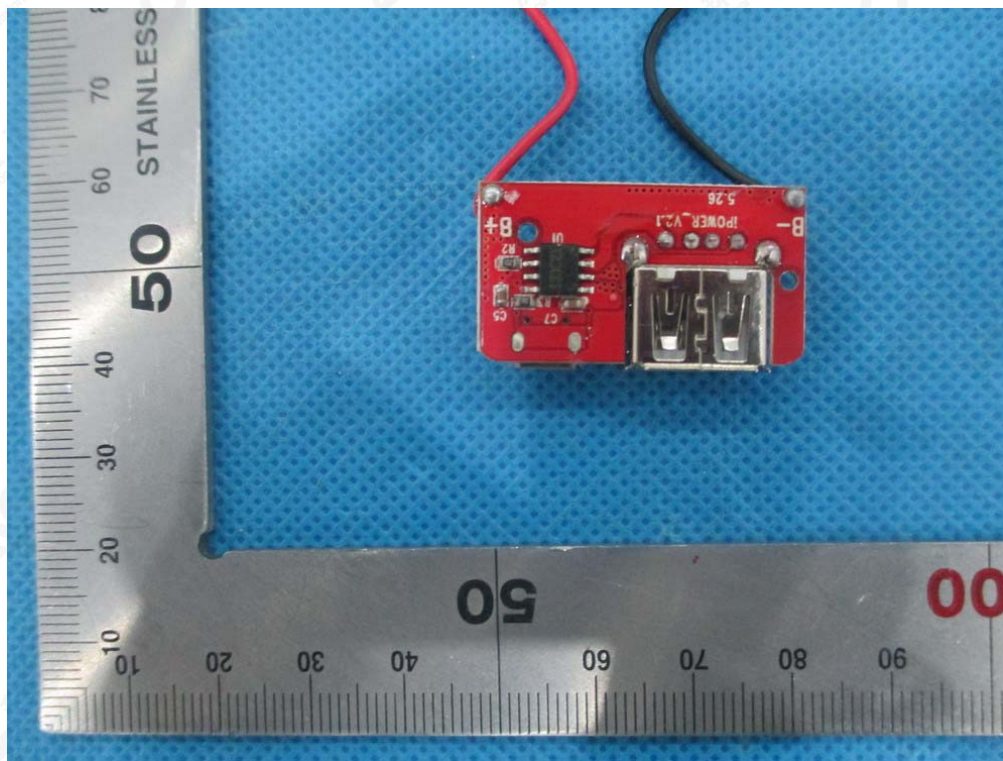


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OPEN VIEW OF EUT

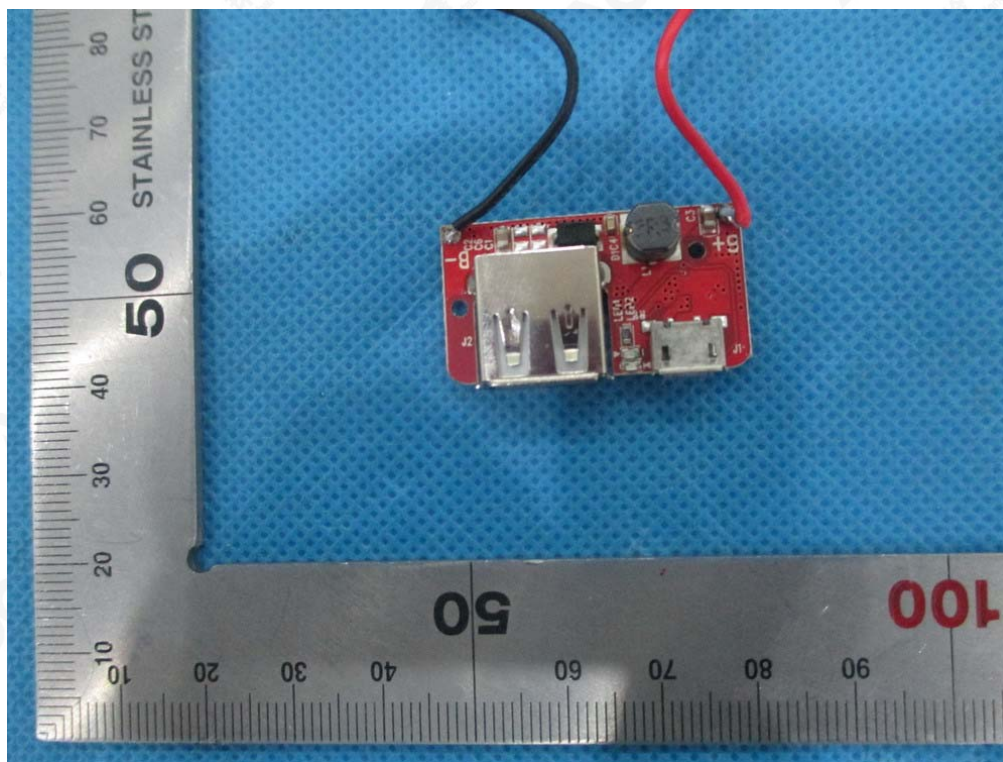


INTERNAL VIEW OF EUT-1



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INTERNAL VIEW OF EUT-2



-----END OF REPORT-----

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