

EMC TEST REPORT  
for  
Shenzhen Joway Power Supply Co., Ltd.

Power Bank  
Model No.: JP108

Prepared for : Shenzhen Joway Power Supply Co., Ltd.

Address : Bldg D, Dejin Industrial Park, Fuyuan 1st Rd.,  
Heping Community, Fuyong Town,  
Bao'an Dist., Shenzhen, China

Prepared by : Shenzhen Anbotek Compliance Laboratory Limited  
Address : 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road,  
Nanshan District, Shenzhen, Guangdong, China  
Tel: (86) 755-26066544  
Fax: (86) 755-26014772

Report Number : R011609676E  
Date of Test : Sept. 22~25, 2016  
Date of Report : Sept. 25, 2016

## TABLE OF CONTENT

Description

Page

Test Report Verification

<b>1. GENERAL INFORMATION.....</b>	<b>4</b>
1.1. Description of Device (EUT).....	4
1.2. Description of Test Facility.....	5
1.3. Measurement Uncertainty.....	5
1.4. Test Summary.....	6
1.5. EMS Performance Criteria.....	7
<b>2. RADIATED EMISSION TEST.....</b>	<b>8</b>
2.1. Block Diagram of Test.....	8
2.2. Measuring Standard.....	8
2.3. Radiated Emission Limits.....	8
2.4. EUT Configuration on Test.....	9
2.5. Operating Condition of EUT.....	9
2.6. Test Procedure.....	9
2.7. Test Equipment.....	9
2.8. Measuring Results.....	9
<b>3. ELECTROSTATIC DISCHARGE IMMUNITY TEST.....</b>	<b>12</b>
3.1. Block Diagram of Test Setup.....	12
3.2. Measuring Standard.....	12
3.3. Severity Levels and Performance Criterion.....	12
3.4. EUT Configuration.....	12
3.5. Operating Condition of EUT.....	13
3.6. Test Procedure.....	13
3.7. Test Equipment.....	13
3.8. Measuring Results.....	13
<b>4. RF FIELD STRENGTH SUSCEPTIBILITY TEST.....</b>	<b>15</b>
4.1. Block Diagram of Test.....	15
4.2. Measuring Standard.....	15
4.3. Severity Levels and Performance Criterion.....	15
4.4. EUT Configuration on Test.....	16
4.5. Operating Condition of EUT.....	16
4.6. Test Procedure.....	16
4.7. Test Equipment.....	16
4.8. Measuring Results.....	16
<b>5. PHOTOGRAPHS.....</b>	<b>18</b>
5.1. Photo of Radiated Emission Test.....	18
5.2. Photo of Electrostatic Discharge Test.....	18
5.3. Photo of RF Field Strength susceptibility Test.....	19

APPENDIX I (Photos of the EUT) (4 pages)

## TEST REPORT VERIFICATION

Applicant : Shenzhen Joway Power Supply Co., Ltd.  
Manufacturer : Shenzhen Joway Power Supply Co., Ltd.  
EUT : Power Bank  
Model No. : JP108  
Rating : Input: DC 5V, 2A  
Output: DC 5V, 2.4A  
Trade Mark : **JOWAY**

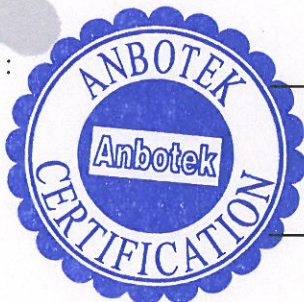
Measurement Procedure Used:  
EN 55032: 2015;  
EN 55024: 2010+A1: 2015;  
(IEC 61000-4-2; IEC 61000-4-3)

The device described above is tested by Shenzhen Anbotech Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotech Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the EN 55032 and EN 55024 requirements. The Project in IEC 61000-4-3 was tested in Shenzhen EMTEK Co., Ltd.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotech Compliance Laboratory Limited.

Date of Test : Sept. 22~25, 2016

Prepared by :



Baron Wen  
(Engineer/ Baron Wen)

Reviewer :

Oliay Yang  
(Project Manager/ Oliay Yang)

Approved & Authorized Signer :

Tom Chen  
(Manager/ Tom Chen)

## 1. GENERAL INFORMATION

### 1.1. Description of Device (EUT)

EUT : Power Bank

Model Number : JP108

Test Power Supply : DC 5V

Applicant : Shenzhen Joway Power Supply Co., Ltd.  
Address : Bldg D, Dejin Industrial Park, Fuyuan 1st Rd.,  
Heping Community, Fuyong Town,  
Bao'an Dist., Shenzhen, China

Manufacturer : Shenzhen Joway Power Supply Co., Ltd.  
Address : Bldg D, Dejin Industrial Park, Fuyuan 1st Rd.,  
Heping Community, Fuyong Town,  
Bao'an Dist., Shenzhen, China

Factory : Shenzhen Joway Power Supply Co., Ltd.  
Address : Bldg D, Dejin Industrial Park, Fuyuan 1st Rd.,  
Heping Community, Fuyong Town,  
Bao'an Dist., Shenzhen, China

Date of receipt : Sept. 22, 2016

Date of Test : Sept. 22~25, 2016

## 1.2. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

### **FCC-Registration No.: 752021**

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, July 06, 2016.

### **IC-Registration No.: 8058A-1**

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A-1, Jun. 13, 2016.

### **CNAS - LAB Code: L3503**

Shenzhen Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

### **Test Location**

All Emissions tests were performed  
Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

## 1.3. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 4.1dB (Horizontal) Ur = 4.3dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4dB



#### 1.4. Test Summary

For the EUT described above. The standards used were EN 55032 for Emissions & EN 55024 for Immunity.

Table 1 : Tests Carried Out Under EN 55032: 2015

Standard	Test Items	Status
EN 55032: 2015	Power Line Conducted Emission Test (150KHz To 30MHz)	x
EN 55032: 2015	Radiated Emission Test (30MHz To 1000MHz)	√

Table 2 : Tests Carried Out Under EN 55024: 2010+A1: 2015

Standard	Test Items	Status
EN 55024: 2010+A1: 2015	Electrostatic Full Load immunity Test	√
EN 55024: 2010+A1: 2015	RF Field Strength susceptibility Test	√
EN 55024: 2010+A1: 2015	Electrical Fast Transient/Burst Immunity Test	x
EN 55024: 2010+A1: 2015	Surge Immunity Test	x
EN 55024: 2010+A1: 2015	Injected Currents Susceptibility Test	x
EN 55024: 2010+A1: 2015	Magnetic Field Susceptibility Test	x
EN 55024: 2010+A1: 2015	Voltage Dips and Interruptions Test	x

- √ Indicates that the test is applicable  
x Indicates that the test is not applicable

### 1.5. EMS Performance Criteria

- √ A: Normal performance within the specification limits
- √ B: Temporary degradation or loss of function or performance which is self-recoverable
- √ C: Temporary degradation or loss of function or performance which requires operator intervention or system reset
- √ D: Degradation or loss of function which is not recoverable due to damage of equipment (components) or software, or loss of data

Note: The manufacturer's specification may define effects on the EUT which may be considered insignificant, and therefore acceptable.

This classification may be used as a guide in formulating performance criteria, by committees responsible for generic, product and product-family standards, or as a framework for the agreement on performance criteria between the manufacturer and the purchaser, for example where no suitable generic, product or product-family standard exists.

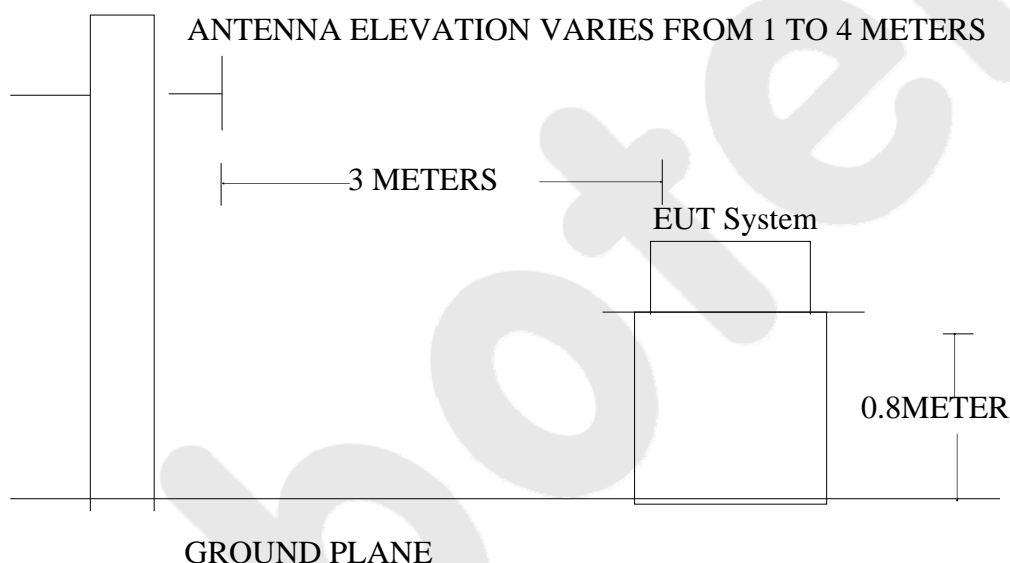
## 2. RADIATED EMISSION TEST

### 2.1. Block Diagram of Test

#### 2.1.1. Block diagram of connection between the EUT and simulators



#### 2.1.2. Block diagram of test setup (In chamber)



### 2.2. Measuring Standard

EN 55032: 2015

### 2.3. Radiated Emission Limits

#### 2.3.1. EN 55032: 2015

##### Radiated Emission Limits

All emanations from a EN 55032 device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMIT (dB $\mu$ V/m)
30 ~ 230	3	40
230 ~ 1000	3	47

- Note:
- (1) The smaller limit shall apply at the combination point between two frequency bands.
  - (2) Distance refers to the distance in meters between the



measuring instrument antenna and the closed point of any part of the EUT.

## 2.4. EUT Configuration on Test

The EN 55032 regulations test method must be used to find the maximum emission during radiated emission measurement.

## 2.5. Operating Condition of EUT

2.5.1. Turn on the power.

2.5.2. Let the EUT work in test mode (Full Load) and measure it.

## 2.6. Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Bilog antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna are set on test.

The bandwidth of the Receiver (ESCI) is set at 120kHz.

The EUT is tested in 9\*6\*6 Chamber.

The test results are listed in Section 2.8.

## 2.7. Test Equipment

The following test equipments are used during radiated emission measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 16, 2016	1 Year
2.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 19, 2016	1 Year
3.	Pre-amplifier	SONOMA	310N	186860	Apr. 16, 2016	1 Year

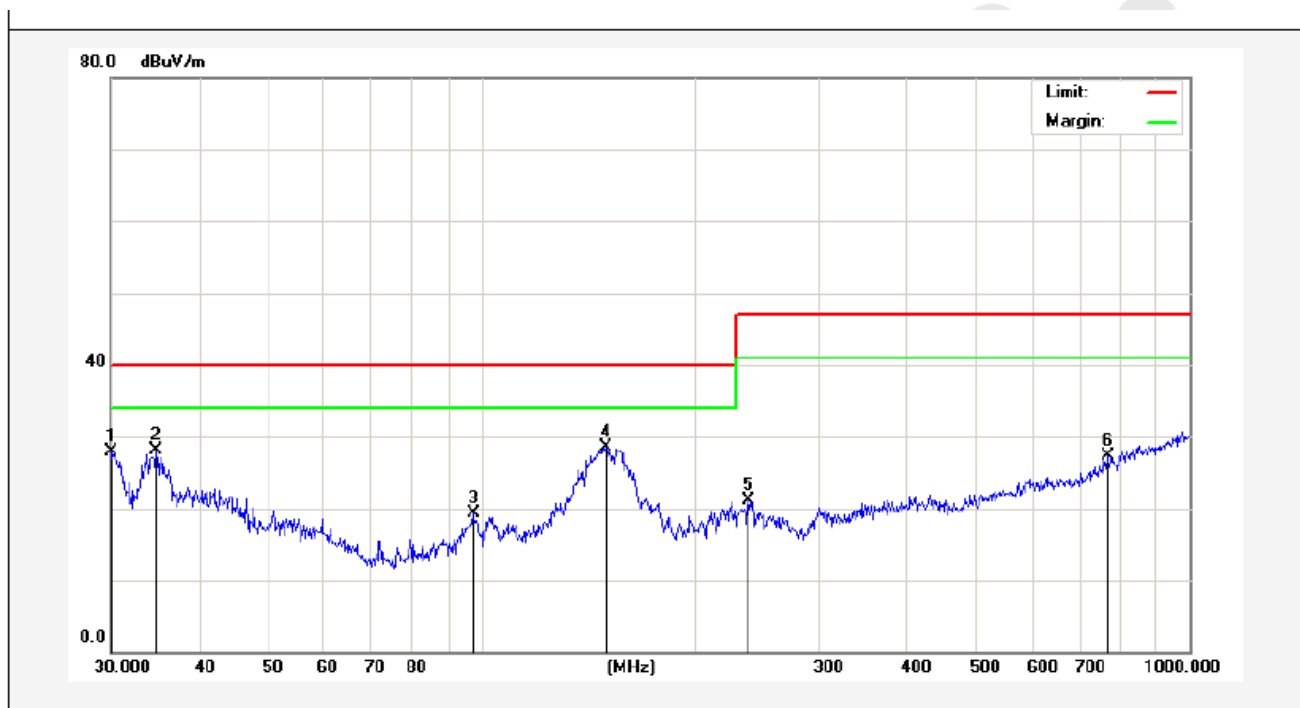
## 2.8. Measuring Results

**PASS**

The frequency range from 30MHz to 1000MHz is investigated.

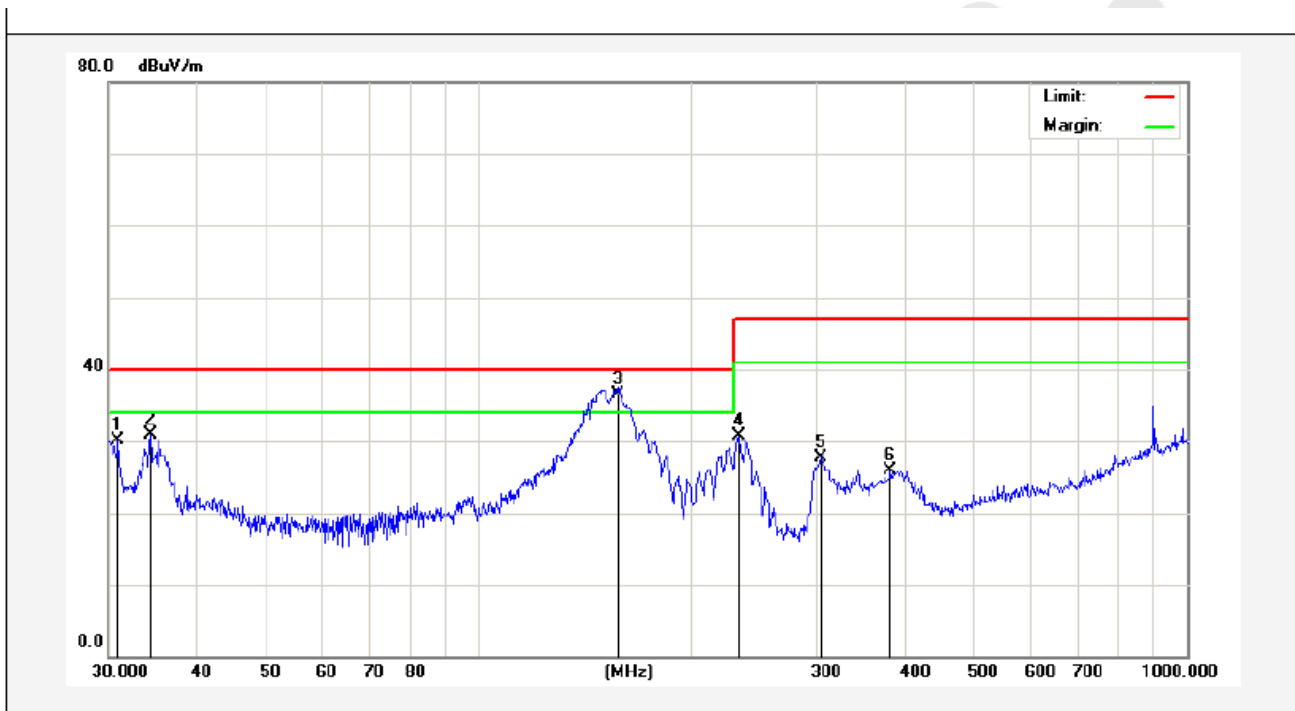
The test curves are shown in the following pages.

Job No.:	AT011609676E	Polarization:	Vertical
Standard:	(RE)EN 55032_3m	Power Source:	DC 5V
Test item:	Radiation Test	Temp.(°C)/Hum.(%RH):	24.3( °C)/55%RH
Note:	Full Load	Distance:	3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	30.1054	44.75	-16.89	27.86	40.00	-12.14	peak			
2	34.7602	42.52	-14.41	28.11	40.00	-11.89	peak			
3	97.4560	35.16	-15.89	19.27	40.00	-20.73	peak			
4	150.0108	46.80	-18.34	28.46	40.00	-11.54	peak			
5	238.3102	35.20	-14.18	21.02	47.00	-25.98	peak			
6	768.7481	33.81	-6.47	27.34	47.00	-19.66	peak			

Job No.:	AT011609676E	Polarization:	Horizontal
Standard:	(RE)EN 55032_3m	Power Source:	DC 5V
Test item:	Radiation Test	Temp.(°C)/Hum.(%RH):	24.3( °C)/55%RH
Note:	Full Load	Distance:	3m

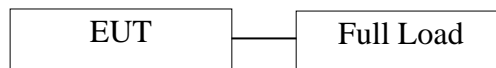


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	30.9619	46.48	-16.44	30.04	40.00	-9.96	peak			
2	34.3964	45.45	-14.61	30.84	40.00	-9.16	peak			
3	157.2689	59.52	-22.99	36.53	40.00	-3.47	QP	300	360	
4	232.5318	49.59	-18.85	30.74	47.00	-16.26	peak			
5	303.5437	44.98	-17.26	27.72	47.00	-19.28	peak			
6	381.2487	39.09	-13.25	25.84	47.00	-21.16	peak			

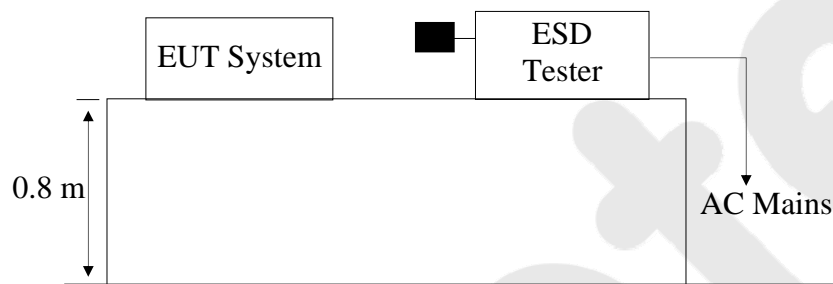
### 3. ELECTROSTATIC DISCHARGE IMMUNITY TEST

### 3.1. Block Diagram of Test Setup

### 3.1.1. Block diagram of connection between the EUT and simulators



### 3.1.2. Block diagram of test setup



### 3.2. Measuring Standard

EN 55024: 2010+A1: 2015

IEC 61000-4-2

Severity Level: 3 / Air Full Load:  $\pm 8\text{kV}$  Level: 2 / Contact Full Load:  $\pm 4\text{kV}$

### 3.3. Severity Levels and Performance Criterion

### 3.3.1. Severity level

Level	Test Voltage Contact Full Load (kV)	Test Voltage Air Full Load (kV)
1.	±2	±2
2.	±4	±4
3.	±6	±8
4.	±8	±15
X	Special	Special

### 3.3.2. Performance criterion: **B**

### 3.4. EUT Configuration

The following equipments are installed on electrostatic discharge immunity measurement to meet EN 55024 requirements and operating in a manner which

tends to maximize its emission characteristics in a normal application.

### 3.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 2.5 except the test set up replaced by Section 3.1.

### 3.6. Test Procedure

#### 3.6.1. Air Full Load:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 100 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

#### 3.6.2. Contact Full Load:

All the procedure shall be same as Section 3.6.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

#### 3.6.3. Indirect discharge for horizontal coupling plane

At least 50 single discharges shall be 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.

#### 3.6.4. Indirect discharge for vertical coupling plane

At least 50 single discharge shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Full Loads shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

### 3.7. Test Equipment

The following test equipments are used during the Electrostatic Full Load measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Simulators	3ctest	ESD-30T	ES0131505	Jun. 20, 2016	1 Year

### 3.8. Measuring Results

**PASS**

Please refer to the following pages

## Electrostatic Full Load Test Results

Shenzhen Anbotek Compliance Laboratory Limited

Test Mode : Full Load	Temperature : 22℃
Air discharge : ±8.0kV	Humidity : 58%
Contact discharge: ±4.0kV	Criterion required : B
Power Supply: DC 5V	Number of discharging : 10
Test Result: <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	

Location		Kind A-Air Full Load C-Contact Full Load	Result
Slot of the EUT	8 points	A	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
Others	4 points	A	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
Metal surface of EUT	8 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
HCP	4 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
VCP of front	4 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
VCP of rear	4 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
VCP of left	4 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
VCP of right	4 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D

Note: Full Load should be considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).



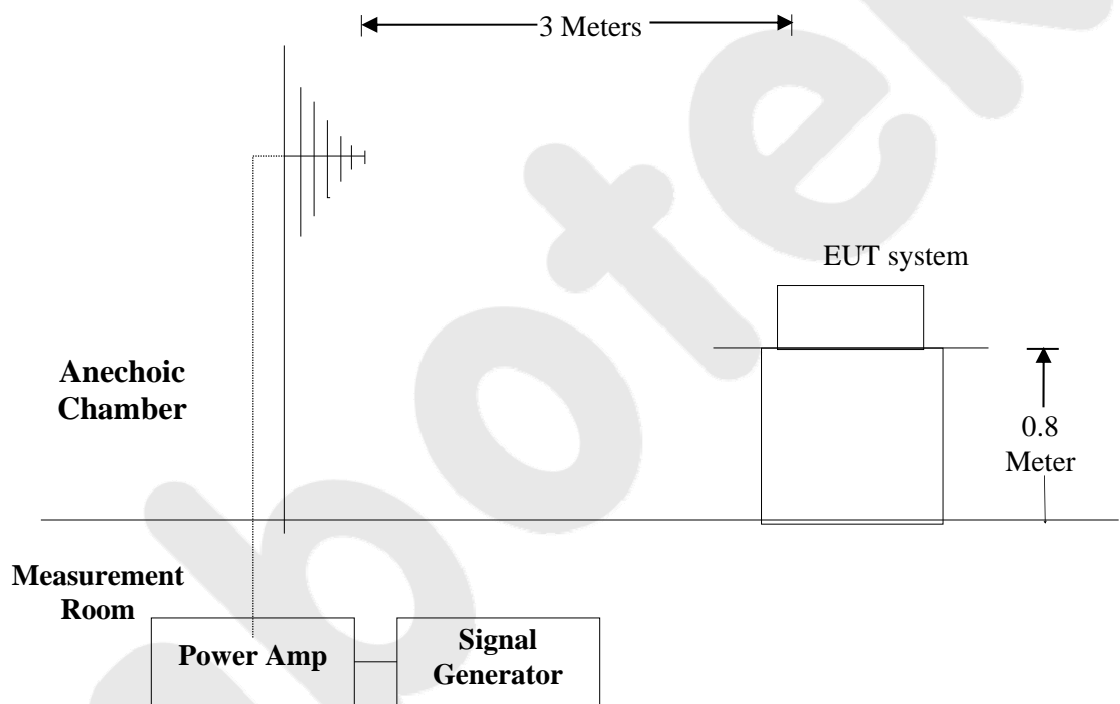
## 4. RF FIELD STRENGTH SUSCEPTIBILITY TEST

### 4.1. Block Diagram of Test

#### 4.1.1. Block diagram of connection between the EUT and simulators



#### 4.1.2. Block diagram of RS test setup



### 4.2. Measuring Standard

EN 55024: 2010+A1: 2015  
IEC 61000-4-3  
Severity Level: 2, 3V / m

### 4.3. Severity Levels and Performance Criterion

#### 4.3.1. Severity Levels

Level	Field Strength V/m
1.	1
2.	3
3.	10
X	Special

#### 4.3.2. Performance Criterion: A

#### 4.4. EUT Configuration on Test

The following equipments are installed on RF Field Strength susceptibility Measurement to meet EN 55024 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

#### 4.5. Operating Condition of EUT

Same as conducted emission measurement which is listed in Section 2.5. except the test setup replaced as Section 4.1.

#### 4.6. Test Procedure

The EUT are placed on a table which is 0.8 meter high above the ground. The EUT is set 3 meters away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of the EUT must be faced this transmitting antenna and measured individually.

In order to judge the EUT performance, a CCD camera is used to monitor its screen.

All the scanning conditions are as following:

Condition of Test	Remark
1. Fielded Strength	3V/m (Severity Level 2)
2. Radiated Signal	Unmodulated
3. Scanning Frequency	80-1000MHz
4. Sweep time of radiated	0.0015 Decade/s
2. Dwell Time	1 Sec.

#### 4.7. Test Equipment

The following test equipments are used during the R/S (Shenzhen EMTEK) measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	RF Power Meter. Dual Channel	BOONTON	4232A	10539	May 29, 2016	1 year
2.	50ohm Diode Power Sensor	BOONTON	51011EMC	34236/34238	May 29, 2016	1 year
3.	Broad-Band Horn Antenna	SCHWARZBECK	BBHA9120 L3F	332	May 29, 2016	1 year
4.	Power Amplifier	PRANA	AP32MT215	N/A	May 29, 2016	1 year
5.	Power Amplifier	MILMEGA	AS0102-55	N/A	May 29, 2016	1 year
6.	Signal Generator	AEROFLEX	2023B	N/A	May 29, 2016	1 year
7.	Field Strength Meter	HOLADAY	HI-6005	N/A	May 29, 2016	1 year
8.	RS232 Fiber Optic Modem	HOLADAY	HI-4413P	N/A	May 29, 2016	1 year
9.	Log.-Per. Antenna	SCHWARZBECK	VULP 9118E	N/A	May 29, 2016	1 year

#### 4.8. Measuring Results

**PASS**

Please refer to the following page.

## RF Field Strength Susceptibility Test Results

Shenzhen Anbotek Compliance Laboratory Limited

Test Mode : Full Load	Temperature : 25°C
Field Strength : 3 V/m	Humidity : 54%
Criterion : A	Frequency Range: 80.0 MHz to 1000 MHz
Power Supply : DC 5V	Criterion required : A

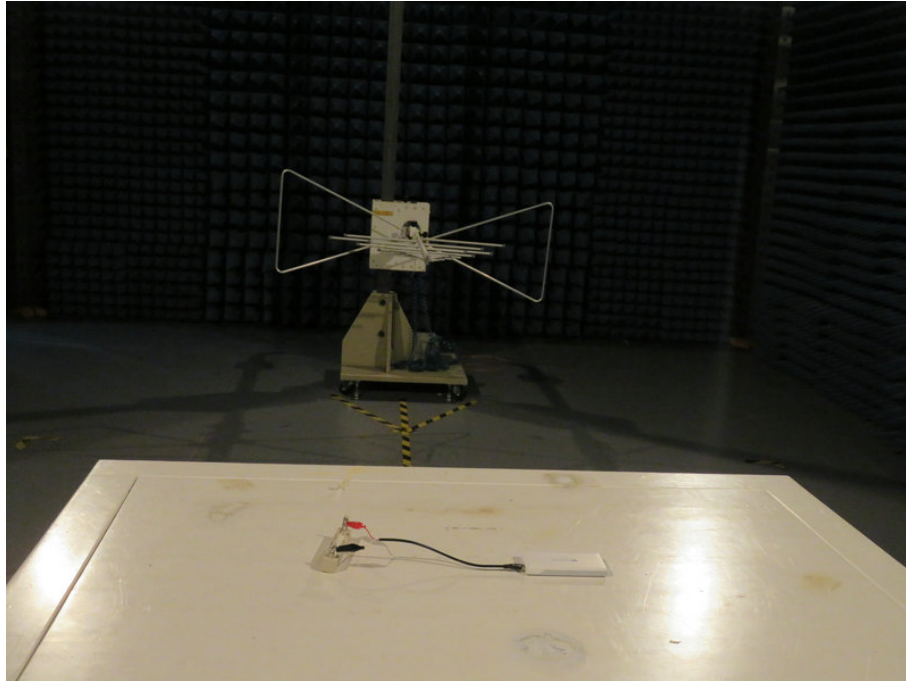
Test Result : ☒ Pass ☐ Fail

Modulation:	<input type="checkbox"/> None	<input type="checkbox"/> Pulse	<input checked="" type="checkbox"/> AM 1kHz 80%
	Frequency Rang 1: 3 V/m		Result
Steps	#	/ %	
	Horizontal	Vertical	
Front	3 V/m	3 V/m	
Right	3 V/m	3 V/m	
Rear	3 V/m	3 V/m	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
Left	3 V/m	3 V/m	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D

Note: Tested by EMTEK.

## 5. PHOTOGRAPHS

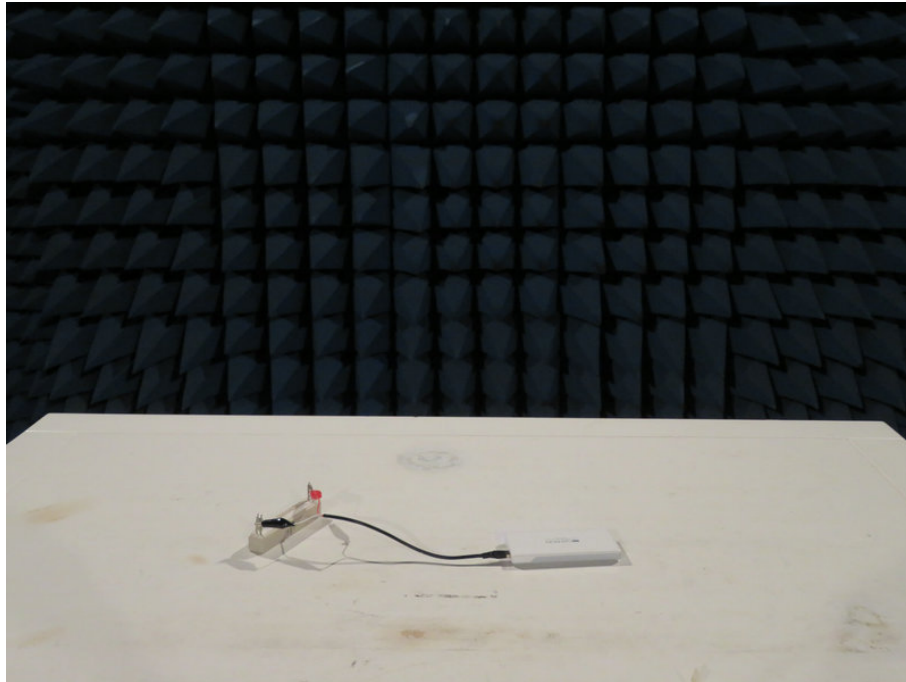
### 5.1. Photo of Radiated Emission Test



### 5.2. Photo of Electrostatic Discharge Test



### 5.3. Photo of RF Field Strength susceptibility Test



## APPENDIX I (Photos of EUT)



Figure 1  
The EUT- Front View



Figure 2  
The EUT- Back View



Figure 3  
The EUT- Side View



Figure 4  
The EUT- Inside View



Figure 5  
The EUT- Inside View

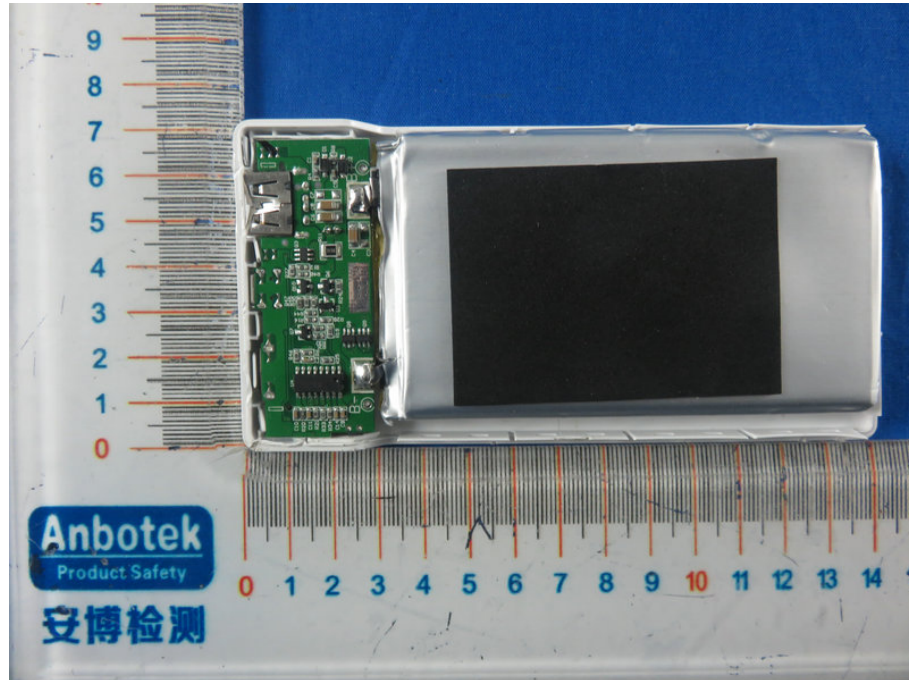


Figure 6  
PCB of The EUT- Front View

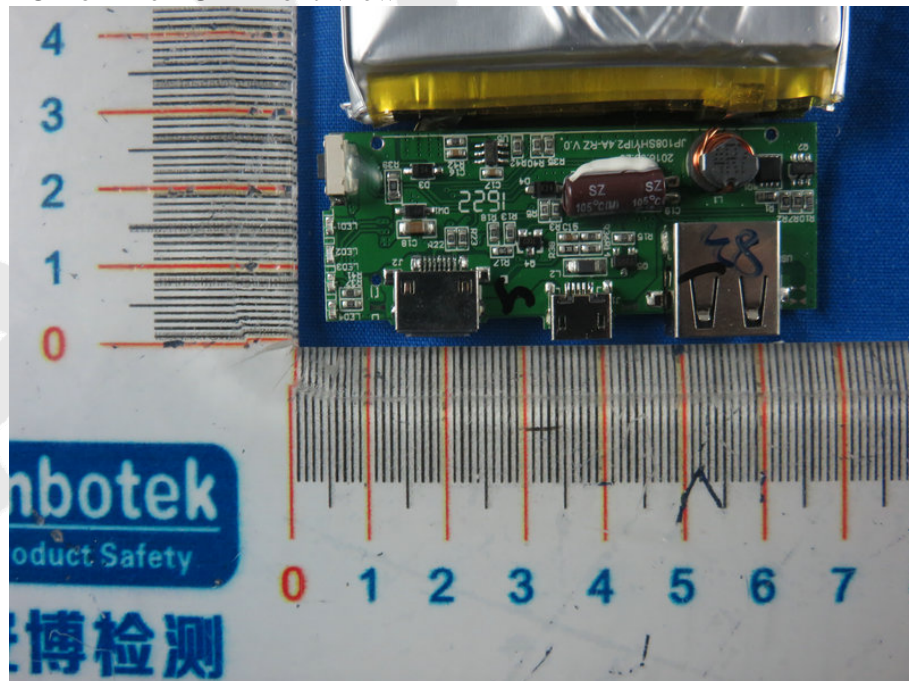
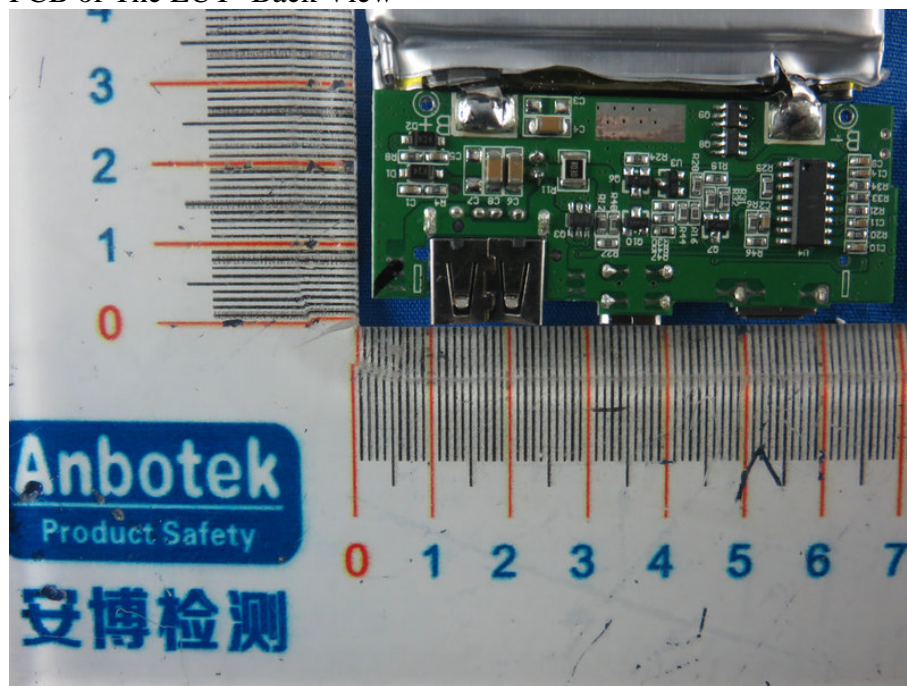




Figure 7  
PCB of The EUT- Back View



### **CE Label**

1. The CE conformity marking must consist of the initials 'CE' taking the following form:  
If the CE marking is reduced or enlarged, the proportions given in the above graduated drawing must be respected.
2. The CE marking must have a height of at least 5 mm except where this is not possible on account of the nature of the apparatus.
3. The CE marking must be affixed to the product or to its data plate. Additionally it must be affixed to the packaging, if any, and to the accompanying documents.
4. The CE marking must be affixed visibly, legibly and indelibly.  
It must have the same height as the initials 'CE'.