EMC TEST REPORT

CE

For Electromagnetic Interference of

Report Reference No. ..... :	ATSP1512072A 11
Date of issue ..... :	2015-12-23
Testing Laboratory ..... :	
Address ..... :	
Applicant's name ..... :	
Address ..... :	
Manufacturer ..... :	
Test specification:	
Test item description ..... :	POWER BANK
Trade Mark ..... :	--
Model/Type reference ..... :	P324.203;PD001
Ratings ..... :	O/P: 5Vdc;1A

Responsible Engineer

Vera Wang

（Vera Wang / Engineer）

Approved by

（Simon Zeng /EMC Manager）

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1. CERTIFICATION

Testing Laboratory :	ATS Electronic Technology Co., Ltd.
Address :	3/F, Building A, No. 1 Hedong Three Road, Jinxia Communityt, Changan Town, DongGuan City, GuangDong, P.R.China
Applicant's name :	
Address :	
Manufacturer :	
Address……:	
Factory……:	
Address……:	
Test specification:	
Test item description :	POWER BANK
Trade Mark :	--
Model/Type reference :	P324.203;PD001
Test Sample:	P324.203
Ratings :	O/P: 5Vdc;1A
Tested Power:	5Vdc
Standards :	EN 55022:2010+AC:2011 EN 55024:2010

The device described above was tested by ATS Product Service Co., Ltd to determine the maximum emission levels emanated from the device and severity levels of the device endure and it performance criterion. The measurement results are contained in this test report and ATS Product Service Co., Ltd assumes full responsibility for the accuracy and completeness of these measurements. This report shows the EUT is technically compliance with the above official standards.

This report applies to the above sample only and shall not be reproduced in part without written approval of ATS Product Service Co., Ltd.

1.1. Model differences

1. 2 SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
EN 55022:2010+AC:2011	Conducted Emission	Class B	N/A	
	Radiated Emission	Class B	PASS	
EN61000-3-2:2006+A1:2009+A2:2009	Harmonic Current Emission	Class A	N/A	**(2)**
EN61000-3-3:2013	Voltage Fluctuations & Flicker	------	N/A	
EMC Immunity (EN 55024:2010)				
Section	Test Item	Performance Criteria	Judgment	Remark
EN 61000-4-2:2009	Electrostatic Discharge	B	PASS	
EN 61000-4-3: 2006+A1:2008+A2:2010	RF electromagnetic field	A	PASS	
EN 61000-4-4: 2012	Fast transients	B	N/A	
EN 61000-4-5: 2006	Surges	B	N/A	
EN 61000-4-6: 2009	Injected Current	A	N/A	
EN 61000-4-8: 2010	Power Frequency Magnetic Field	A	N/A	**(1)**
EN 61000-4-11:2004	Volt. Interruptions Volt. Dips	B / C / C	N/A	**(3)**

REMARK:

(1)" N/A" denotes test is not applicable in this Test Report

(2) The power consumption of EUT is less than 75W and no Limits apply.

(3) Voltage dip: ＞95% reduction – Performance Criteria **B**

Voltage dip: 30% reduction – Performance Criteria **C**

Voltage Interruption: ＞95% reduction – Performance Criteria **C**

1 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %.

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U，(dB)	NOTE
C01	ANSI	150 KHz ~ 30MHz	2.44	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U，(dB)	NOTE
R03	ANSI	30MHz ~ 200MHz	V	3.42	
	ANSI	30MHz ~ 200MHz	H	3.52	
	ANSI	200MHz ~ 1,000MHz	V	3.52	
	ANSI	200MHz ~ 1,000MHz	H	3.54	

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Working

For Radiated Test	
Final Test Mode	Description
Mode 1	Working

For EMS Test	
Final Test Mode	Description
Mode 1	Working

2.3 EQUIPMENT USED DURING TESTING:

Product Type*	Device	Manufacturer	Model No.	Comments
AE	Dummy load	/	/	/

*Note: Use abbreviations:

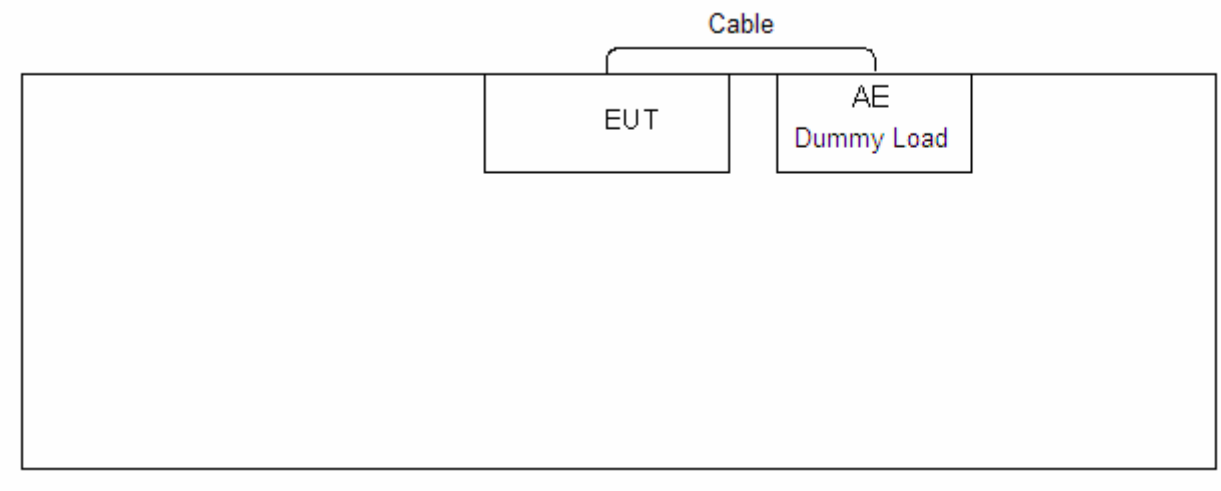
EUT - Equipment Under Test,

AE - Auxiliary/Associated Equipment, or

SIM - Simulator (Not Subjected to Test)

CABL – Connecting cables

2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



1. EMC EMISSION TEST

1.1 RADIATED EMISSION MEASUREMENT

1.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT (Below 1000MHz)

FREQUENCY (MHz)	Field strengths limits at 10m Measuring distance: dBuV/m	Field strengths limits at 3m Measuring distance: dBuV/m
30 – 230	30	40
230 – 1000	37	47

Notes:

(1) The limit for radiated test was performed according to as following: EN55022.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

(4) The higest internal source of the EUT is less than108 MHz,the measurement shall only be Made up to 1GHz.

1.1.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Log-Bicon Antenna	SCHWARZBECK	VULB9168	VULB9168-192	12/26/2015
2	Pre-Amplifier	HP	8447F	3113A05680	12/26/2015
3	EMI Test Receiver	R&S	ESCI	101307	12/26/2015
4	Spectrum Analyzer	Agilent	E4407B	US40240708	07/13/2016
5	Horn Antenna	SCHWARZBECK	BBHA 9120D	BBHA 9120D 1065	12/26/2015
6	Pre-Amplifier	CY	EMC011830	980136	12/26/2015
7	Turn Table	UC	UC3000	N/A	N/A
8	Antenna Mast	UC	UC3000	N/A	N/A

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

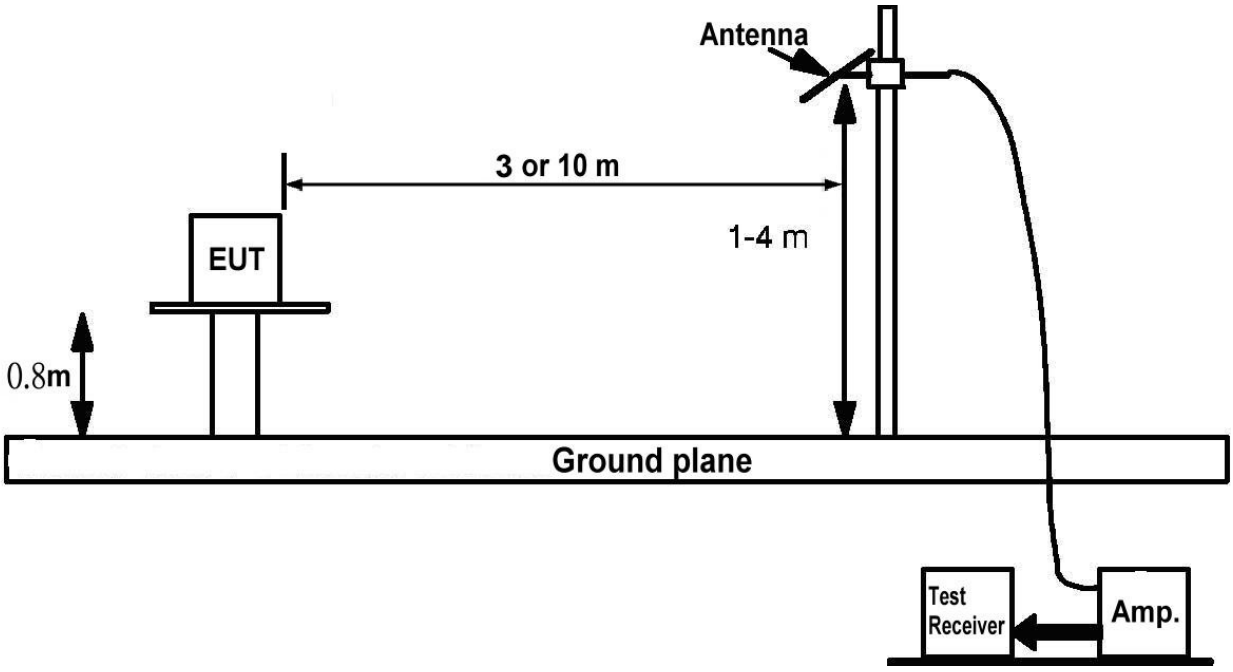
1.1.3 TEST PROCEDURE

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m or 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

1.1.4 DEVIATION FROM TEST STANDARD

No deviation

1.1.5 TEST SETUP



1.1.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.2** Unless otherwise a special operating condition is specified in the follows during the testing.

1.1.7 **TEST RESULTS**

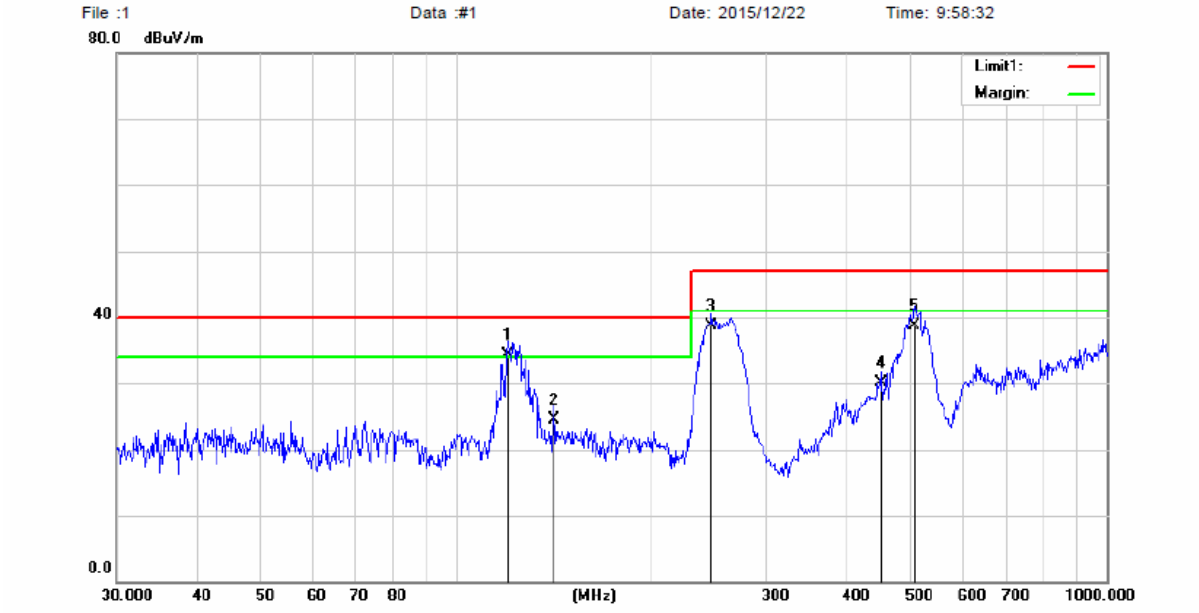
EUT：	POWER BANK	**Model No. ：**	P324.203
Temperature：	24 ℃	**Relative Humidity：**	55 %
Pressure：	1009 hPa	**Test Power ：**	5Vdc
Test Mode ：	Working		

Remark：

(1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz；SPA setting in RBW=120KHz, VBW =120KHz, Sweep. Time = 0.3 sec./MHz.
(2) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
(3) Measuring frequency range from 30MHz to 1000MHz.
(4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.
(5) Measurement Result = Reading + Correct

EUT:	POWER BANK	Model No.:	P324.203
Temperature:	24 ℃	Relative Humidity:	55%
Distance:	3m	Test Power:	AC 230V/50Hz
Polarization:	Vertical	Test Result:	Pass
Standard:	(RE)EN55022_Class B_3m	Test By:	Steven
Test Mode:	Working		

Radiated Emission Measurement



Site : ATS Radiated Emission Test
Limit: EN55022 ClassB 3M Radiation
Polarization: *Vertical*
Power:
Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	Comment
1	*	119.8555	23.27	10.99	34.26	40.00	-5.74	QP	
2		141.3298	12.26	12.33	24.59	40.00	-15.41	QP	
3		246.8146	27.21	11.44	38.65	47.00	-8.35	QP	
4		449.5557	13.86	16.29	30.15	47.00	-16.85	QP	
5		506.4791	21.32	17.45	38.77	47.00	-8.23	QP	

*:Maximum data x:Over limit !:over margin

EUT:	POWER BANK	Model No.:	P324.203
Temperature:	24 ℃	Relative Humidity:	55%
Distance:	3m	Test Power:	AC 230V/50Hz
Polarization:	Horizontal	Test Result:	Pass
Standard:	(RE)EN55022_Class B_3m	Test By:	Steven
Test Mode:	Working		

Radiated Emission Measurement

Site : ATS Radiated Emission Test
Limit: EN55022 ClassB 3M Radiation
Polarization: *Horizontal*
Power:
Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	Comment
1	*	123.6984	24.32	11.24	35.56	40.00	-4.44	QP	
2		139.8505	13.39	12.29	25.68	40.00	-14.32	QP	
3		215.2675	17.32	9.93	27.25	40.00	-12.75	QP	
4		261.0581	28.39	11.75	40.14	47.00	-6.86	QP	
5		434.0649	17.50	15.98	33.48	47.00	-13.52	QP	
6		508.2581	23.29	17.49	40.78	47.00	-6.22	QP	

*:Maximum data x:Over limit !:over margin

2. EMC IMMUNITY TEST

2.1 STANDARD COMPLIANCE/SERVRITY LEVEL/CRITERIA

Tests Standard No.	TEST SPECIFICATION Level	Test Mode Test Ports	Perform. Criteria	Remark
1. ESD IEC/EN 61000-4-2	±8KV air discharge ±4KV contact discharge	Direct Mode	B	
	±4KV HCP discharge ±4KV VCP discharge	Indirect Mode	B	
2. RS IEC/EN 61000-4-3	80 MHz to 1000 MHz 3V/m(rms), 1 KHz, 80%, AM modulated	Enclosure	A	

2.2 GENERAL PERFORMANCE CRITERIA

According to **EN55024** standard, the general performance criteria as following:

Criterion A	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. 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 product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criterion B	After the test, the equipment shall continue to operate as intended without operator Intervention. No degradation of performance or loss of function is allowed, after the application of the phenomenon 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. During the test, degradation of performance is allowed. However, no change of operating state if stored data allowed to persist after the test. 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.
Criterion C	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. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

2.3 GENERAL PERFORMANCE CRITERIA TEST SETUP

The EUT tested system was configured as the statements of **4.2** Unless otherwise a special operating condition is specified in the follows during the testing.

2.4 ESD TESTING

2.4.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Required Performance	B
Discharge Voltage:	Air Discharge：±2kV/±4kV/±8kV (Direct) Contact Discharge：±2kV/±4kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: min. 25 times at each test point Contact Discharge: min. 200 times in total
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

2.4.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Electrostatic Discharge Simulator	Noiseken	ESS-2002	ESS0625214	12/26/2015

2.4.3 TEST PROCEDURE

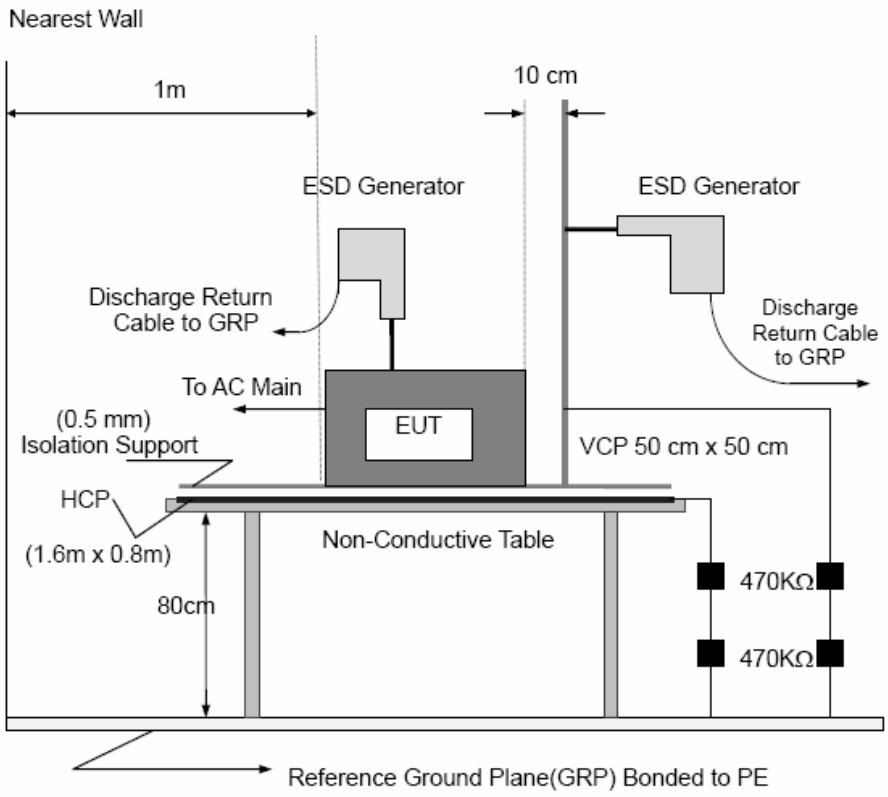
The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

a. Contact discharge was applied to conductive surfaces and coupling planes of the EUT.
   During the test, it was performed with single discharges. For the single discharge time between successive single discharges was at least 1 second. The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges.
   If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.
   Vertical Coupling Plane (VCP):
   The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the Discharge Electrode touching the coupling plane.
   The four faces of the EUT will be performed with electrostatic discharge.
   Horizontal Coupling Plane (HCP):
   The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane.
   The four faces of the EUT will be performed with electrostatic discharge.
b. Air discharges at insulation surfaces of the EUT.
   It was at least ten single discharges with positive and negative at the same selected point.
c. For the actual test configuration, please refer to the related Item –EUT Test Photos.

2.4.4 DEVIATION FROM TEST STANDARD

No deviation

2.4.5 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC /EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC/EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

2.4.6 TEST RESULTS

EUT：	POWER BANK	**Model No. ：**	P324.203
Temperature：	24 ℃	**Relative Humidity：**	55 %
Pressure：	1007 hPa	**Test Power ：**	5Vdc
Test Mode ：	Working		

Mode	**Air Discharge**								**Contact Discharge**							
	±2KV		**±4KV**		**±8KV**		**±12KV**		**±2KV**		**±4KV**		**±6KV**		**±8KV**	
Location	P	N	P	N	P	N	P	N	P	N	P	N	P	N	P	N
LED	A	A	A	A	A	A										
Slot	A	A	A	A	A	A										
Enclosure	A	A	A	A	A	A										
Criteria	**B**								**B**							
Result	**B**								**N/A**							
Judgment	**PASS**								**N/A**							

Mode	**HCP Discharge**								**VCP Discharge**							
	±2KV		**±4KV**		**±6KV**		**±8KV**		**±2KV**		**±4KV**		**±6KV**		**±8KV**	
Location	P	N	P	N	P	N	P	N	P	N	P	N	P	N	P	N
Front	A	A	A	A					A	A	A	A				
Rear	A	A	A	A					A	A	A	A				
Left	A	A	A	A					A	A	A	A				
Right	A	A	A	A					A	A	A	A				
Criteria	**B**								**B**							
Result	**A**								**A**							
Judgment	**PASS**								**PASS**							

Note:

1) P/N denotes the Positive/Negative polarity of the output voltage.
2) Test condition:
   Direct / Indirect (HCP/VCP) discharges: Minimum 50 times (Positive/Negative) at each point. Air discharges: Minimum 50 times (Positive/Negative) at each point.
3) Test location(s) in which discharge (Air and contact discharge) to be applied illustrated by photos shown in next page(s)
4) The Indirect (HCP/VCP) discharges description of test point as following:
   1.left side 2.right side 3.front side 4.rear side
5) N/A - denotes test is not applicable in this test report
6) Criteria B: The EUT function loss during the test, but self-recoverable after the test.

2.5 RS TESTING

2.5.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-3
Required Performance	A
Frequency Range:	80 MHz - 1000 MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Dwell Time:	at least 3 seconds

2.5.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Signal Generator	Aglilet	N517113-50B	MY53050160	10/29/2016
2	Amplifier	A&R	150W1000M3	313157	10/29/2016
3	Log-periodic Antenna	Schwarzbeck	STLP 9128E	9128E-012	10/29/2016
4	Isotropic Field Probe	A&R	FL7006	0342652	11/20/2016
5	Amplifier	A&R	50SIG6M2	0342835	10/29/2016
6	Antenna	Schwarzbeck	STLP9149	9149.222	10/29/2016

2.5.3 TEST PROCEDURE

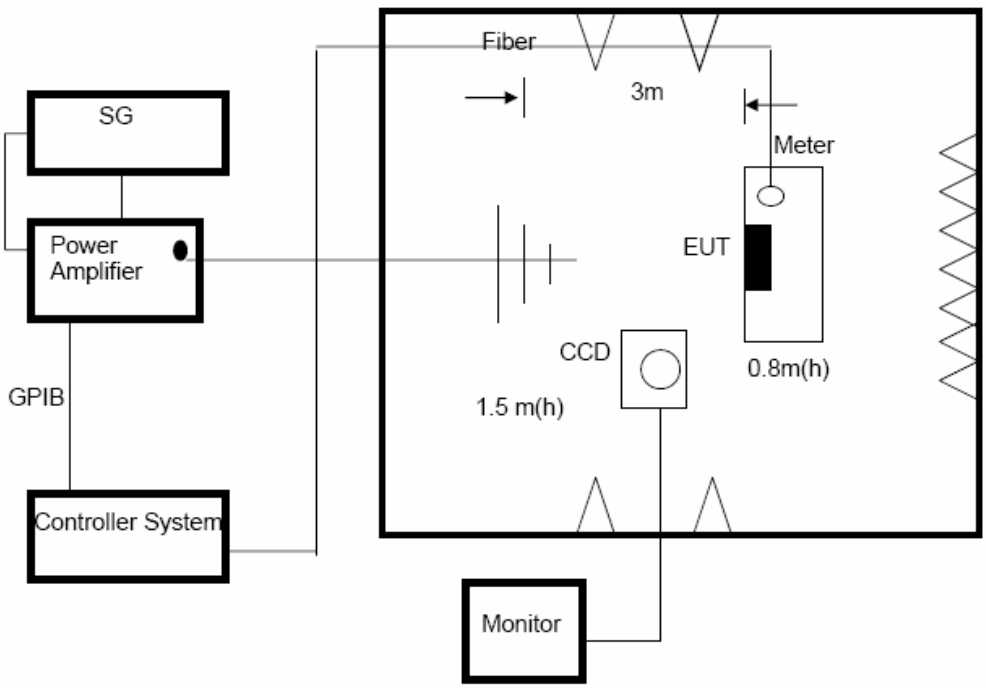
The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber.
The testing distance from antenna to the EUT was 3 meters.
The other condition as following manner:

a. The field strength level was 3V/m.
b. The frequency range is swept from 80 MHz to 1000 MHz, with the signal 80%amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed 1.5x 10-3 decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
d. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

2.5.4 DEVIATION FROM TEST STANDARD

No deviation

2.5.5 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

2.5.6 TEST RESULTS

EUT：	POWER BANK	**Model No. ：**	P324.203
Temperature：	24 ℃	**Relative Humidity：**	55 %
Pressure：	1004 hPa	**Test Power ：**	5Vdc
Test Mode ：	Working		

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Perform. Criteria	Results	Judgment
80MHz - 1000MHz	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	0	**A**	**A**	**PASS**
			90			
			180			
			270			

Note:

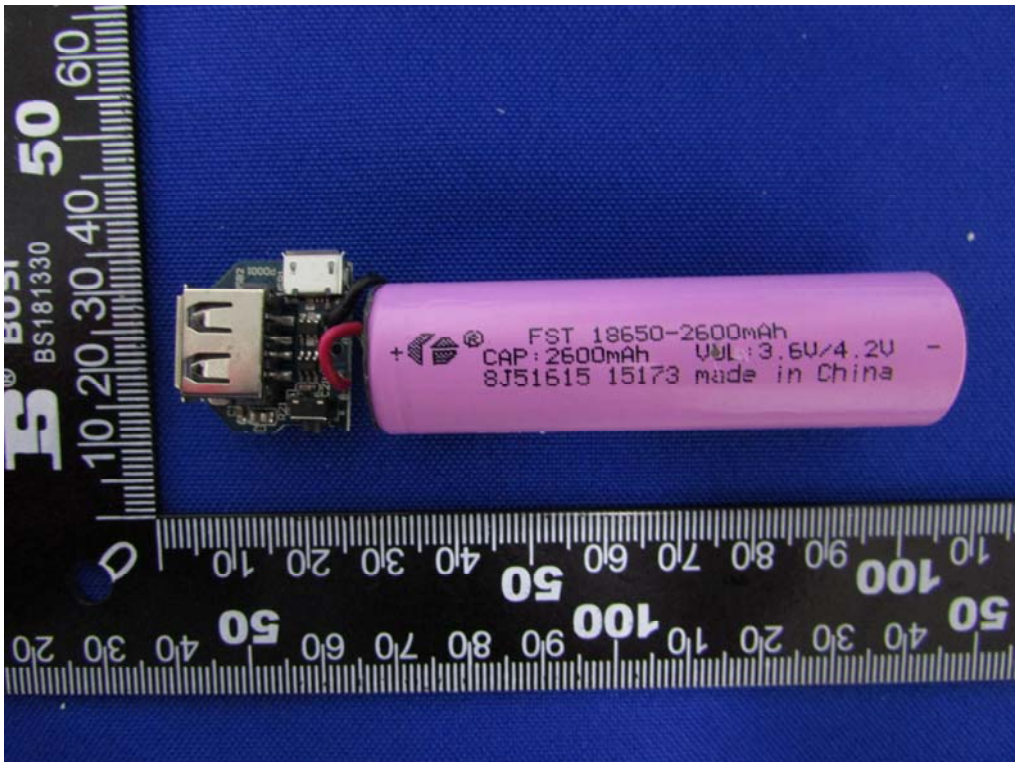
1) H/V denotes the Horizontal/Vertical polarity of the RF field.
2) Criteria A: There was no change operated with initial operating during the test.
3) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
4) Criteria C: The system shut down during the test.

3. EUT TEST PHOTO

Radiated Measurement Photos

ESD Measurement Photos

EUT Photo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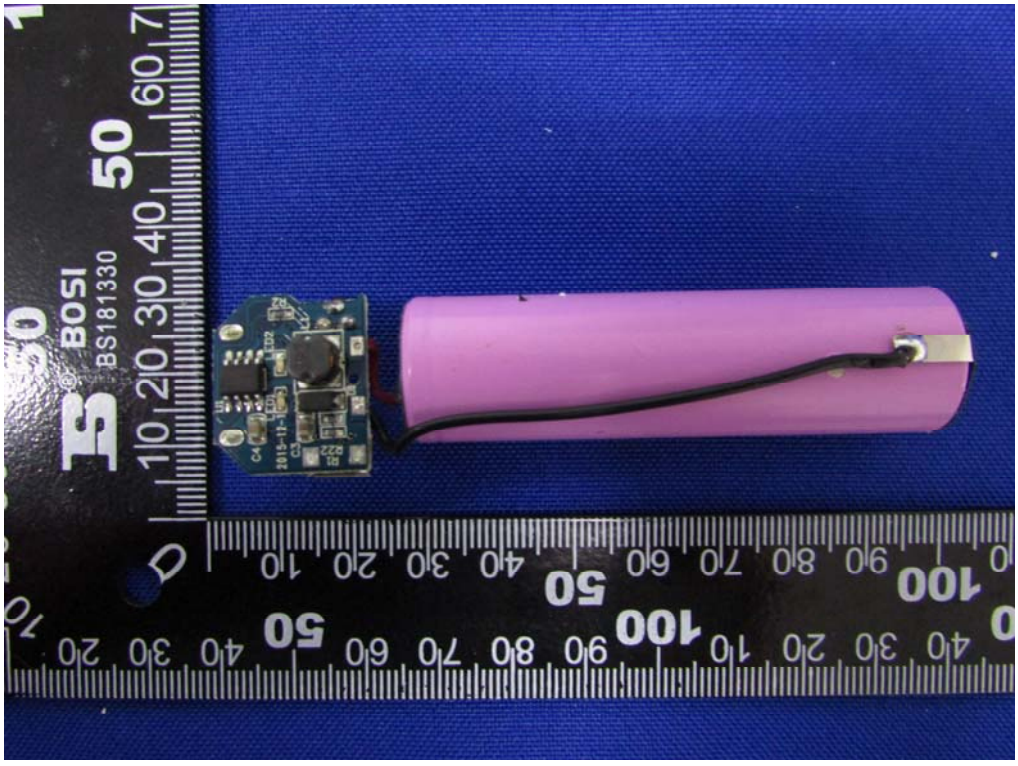
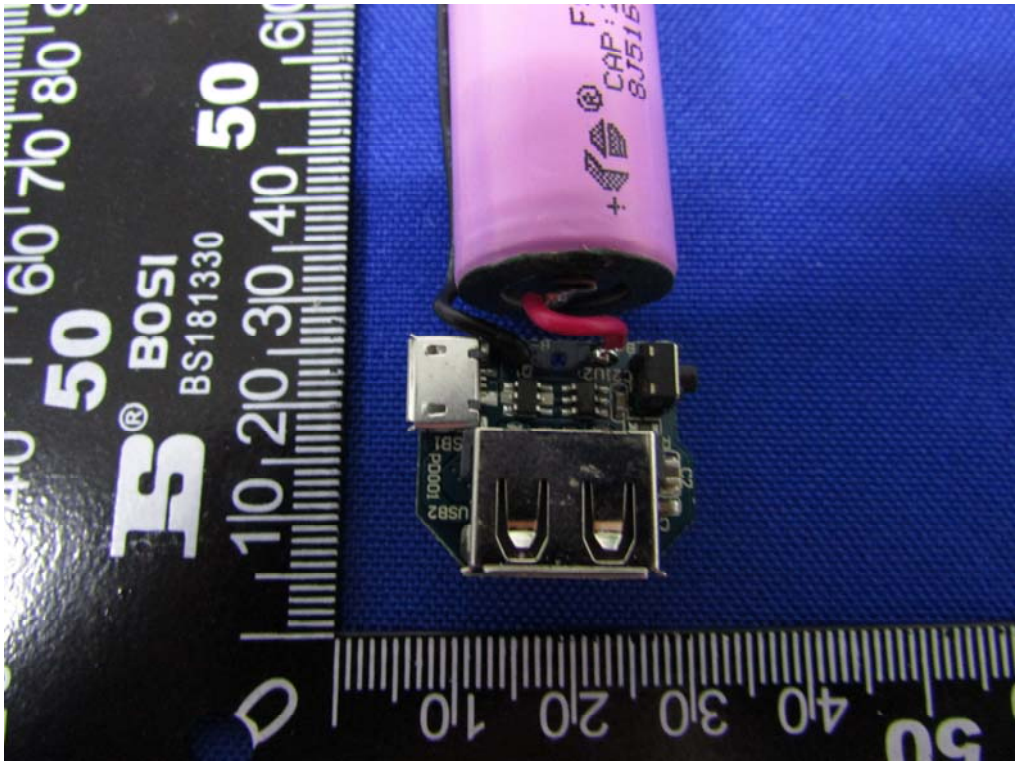
CAP:2600mAh
8J51615 15173 made in China

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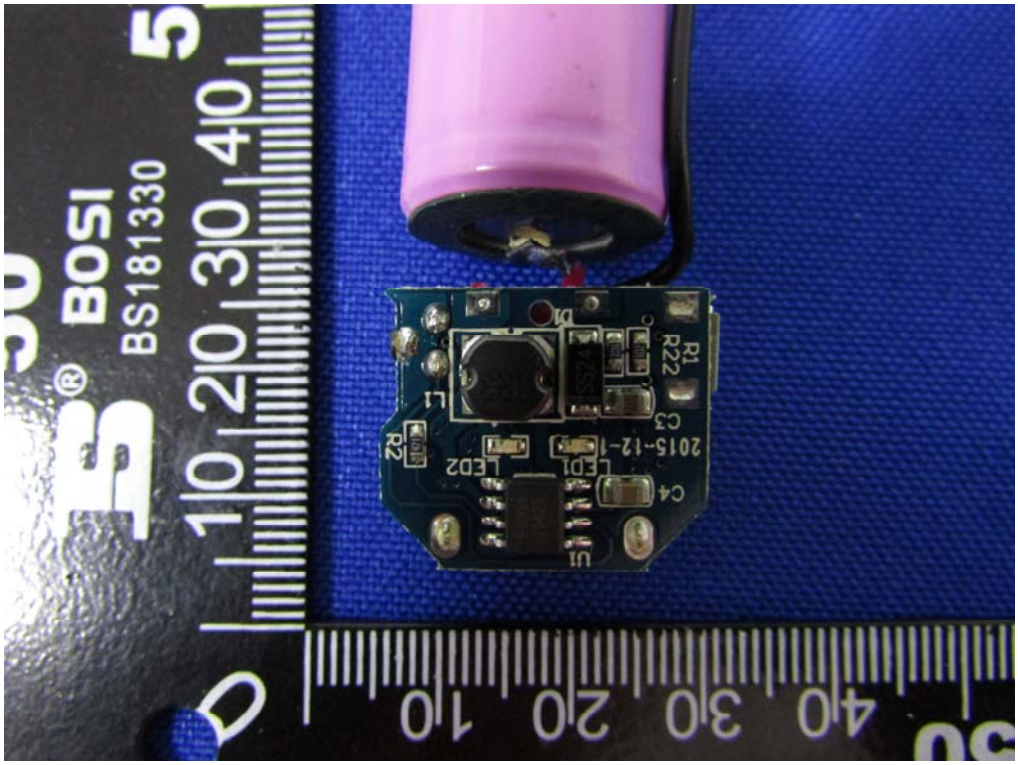
USB2
SB1


BOSI
BS181330
R1
R2
C3
C4
L1
R2
LED2
FD1
U1
2015-12-1