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TESTING
CNAS L3503

EMC TEST REPORT
for

Shenzhen Joway Power Supply Co., Ltd

BATTERY CHARGER
Model No.: JP-96

Prepared for : Shenzhen Joway Power Supply Co., Ltd

Address : 1-5 Floor, Building D, Dejin Industrial Park, No 40 Fuyuan 1st Road, Heping Community, Fuyong Town, Bao'an District, Shenzhen City

Prepared by : Shenzhen Anbotek Compliance Laboratory Limited

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Report Number : R0317100104E

Date of Test : Sept. 05~09, 2017

Date of Report : Sept. 09, 2017

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TEST REPORT VERIFICATION


Applicant : Shenzhen Joway Power Supply Co., Ltd

Manufacturer : Shenzhen Joway Power Supply Co., Ltd

EUT : BATTERY CHARGER

Model No. : JP-96

Rating : Input: DC 5V/1A
Output: DC 5V/1A
Capacity: 2600mAh
(With DC 3.7V Battery Inside)

Trade Mark :  CANYON

Measurement Procedure Used:

EN 55032: 2015;

EN 55024: 2010+A1: 2015;

(IEC 61000-4-2; IEC 61000-4-3)

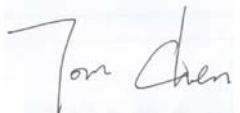
The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek 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, 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 Anbotek Compliance Laboratory Limited.

Date of Test : Sept. 05~09, 2017

Prepared by : 
(Engineer/ Baron Wen)

Reviewer : 
(Project Manager/ Oliay Yang)

Approve & Authorized Signer : 
(Manager/ Tom Chen)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT : BATTERY CHARGER

Model Number : JP-96

Test Power Supply : DC 5V for adapter / DC 3.7V by battery

Applicant : Shenzhen Joway Power Supply Co., Ltd

Address : 1-5 Floor, Building D, Dejin Industrial Park, No 40 Fuyuan 1st Road, Heping Community, Fuyong Town, Bao'an District, Shenzhen City

Manufacturer : Shenzhen Joway Power Supply Co., Ltd

Address : 1-5 Floor, Building D, Dejin Industrial Park, No 40 Fuyuan 1st Road, Heping Community, Fuyong Town, Bao'an District, Shenzhen City

Factory : Shenzhen Joway Power Supply Co., Ltd

Address : 1-5 Floor, Building D, Dejin Industrial Park, No 40 Fuyuan 1st Road, Heping Community, Fuyong Town, Bao'an District, Shenzhen City

1.2. Auxiliary Equipment Used during Test

N/A

1.3. Description of Test Facility

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

FCC-Registration No.: 184111

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 No. 184111, July 31, 2017.

ISED-Registration No.: 8058A-1

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A-1, June 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

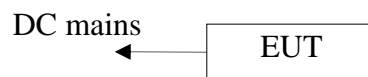
1.4. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 4.1dB (Horizontal) Ur = 4.3dB (Vertical)
Conduction Uncertainty	:	Uc =3.4 dB
Disturbance Uncertainty	:	Ud = 2.6 dB

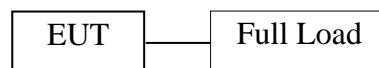
1.5. Description of Test Modes

Pretest Modes	Descriptions
Mode 1	Charging
Mode 2	Full Load

For Mode 1 Block Diagram of Test Setup



For Mode 2 Block Diagram of Test Setup



1.6. Test Summary

Test Items	Test Modes	Status
Power Line Conducted Emission Test (150KHz To 30MHz)	/	N
Radiated Emission Test (30MHz To 1000MHz)	Mode 1 Mode 2	P
Electrostatic Discharge immunity Test	Mode 1 Mode 2	P
RF Field Strength susceptibility Test	Mode 1 Mode 2	P
Electrical Fast Transient/Burst Immunity Test	/	N
Surge Immunity Test	/	N
Injected Currents Susceptibility Test	/	N
Magnetic Field Susceptibility Test	/	N
Voltage Dips and Interruptions Test	/	N

P) Indicates that the through the test.

N) Don't test.

1.7. 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

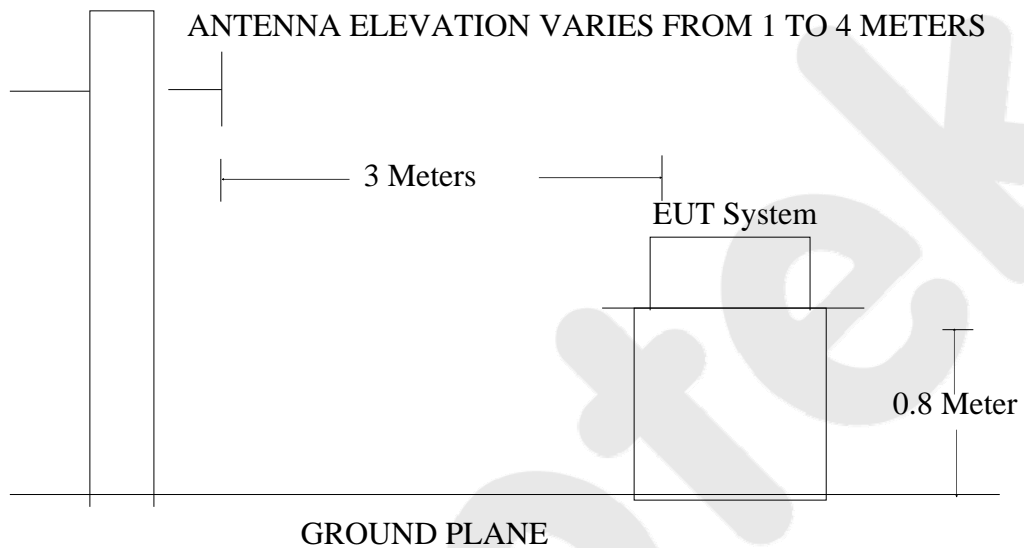
Note: The manufacturer's specification may define effects on the EUT which may be considered insignificant, and therefore acceptable.

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 test setup (In chamber)



2.2. Measuring Standard

EN 55032

2.3. Radiated Emission Limits

All emanations from an 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 (dBμV/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.
 - (3) $3M \text{ Limit} = 10M \text{ Limit} + k$ $k = 20 \log(D1/D2) = 10$
 $3M \text{ Limit} = 10M \text{ Limit} + 10$
 $(D1 = 10M \quad D2 = 3M)$

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 measuring mode 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	May 27, 2017	1 Year
2.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	May 31, 2017	1 Year
3.	Pre-amplifier	SONOMA	310N	186860	May 27, 2017	1 Year
4.	Software Name EZ-EMC	Ferrari Tcchnology	ANB-03A	N/A	N/A	N/A

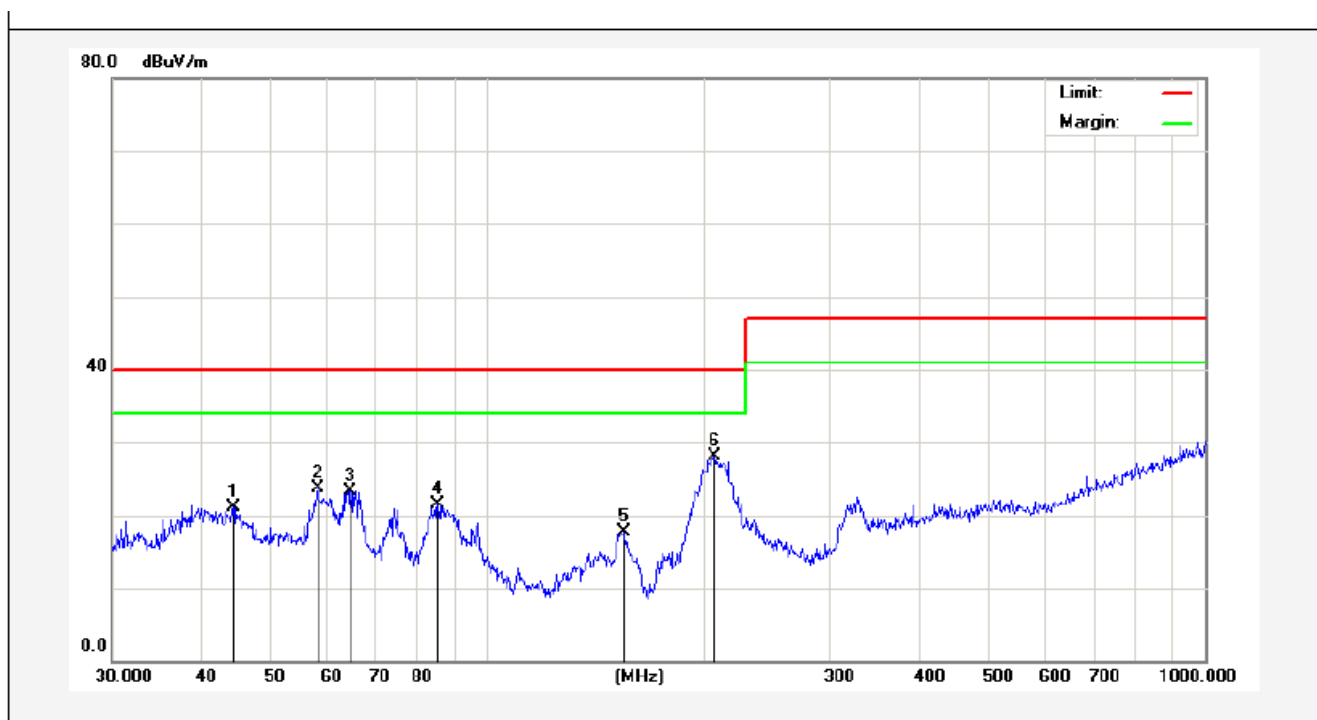
2.8. Measuring Results

PASS

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

The test curves are shown in the following page.

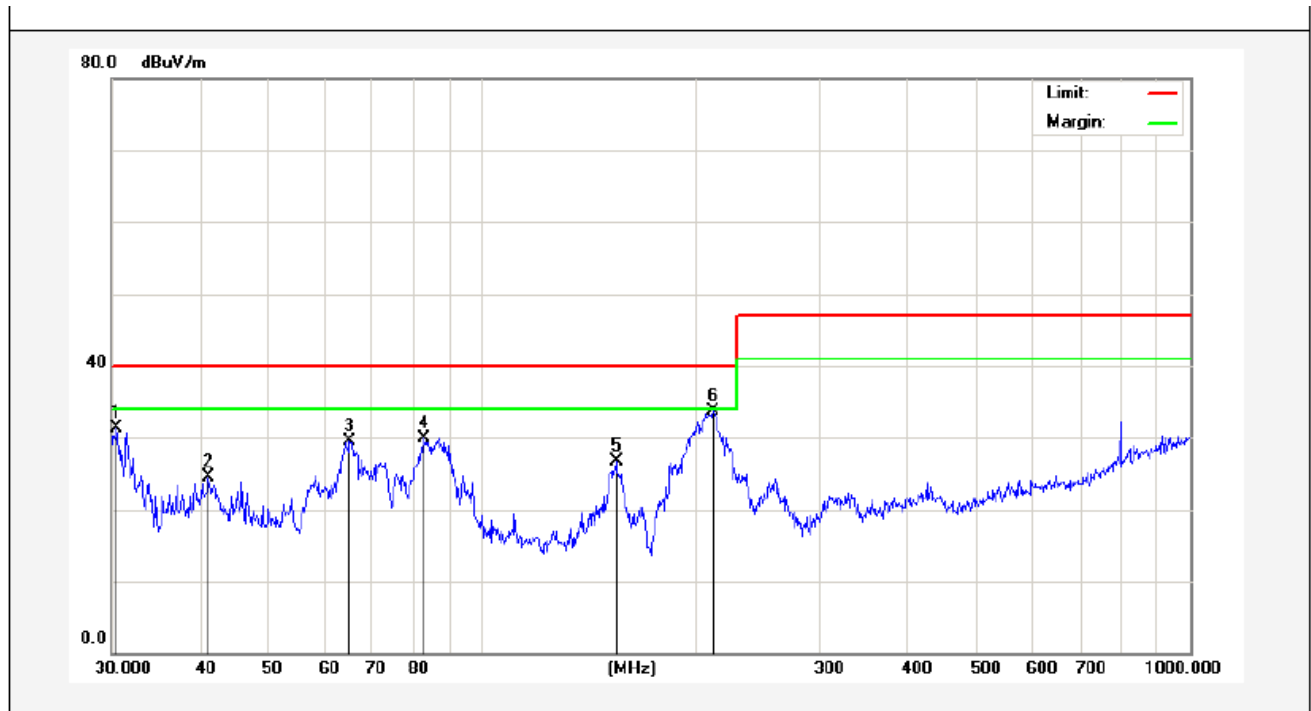
Test item:	Radiation Test	Polarization:	Horizontal
Standard:	(RE)EN 55032	Power Source:	DC 5V for adapter
Distance:	3m	Temp.(°C)/Hum.(%RH):	24.3(°C)/55%RH
Test Mode:	Charging		



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	44.2752	33.50	-12.34	21.16	40.00	-18.84	peak			
2	57.9993	38.95	-15.21	23.74	40.00	-16.26	peak			
3	64.4331	40.59	-17.24	23.35	40.00	-16.65	peak			
4	85.2980	41.94	-20.49	21.45	40.00	-18.55	peak			
5	154.8204	40.87	-23.11	17.76	40.00	-22.24	peak			
6	207.1226	48.61	-20.60	28.01	40.00	-11.99	peak			

Note: Result=Reading+Factor Over Limit=Result-Limit

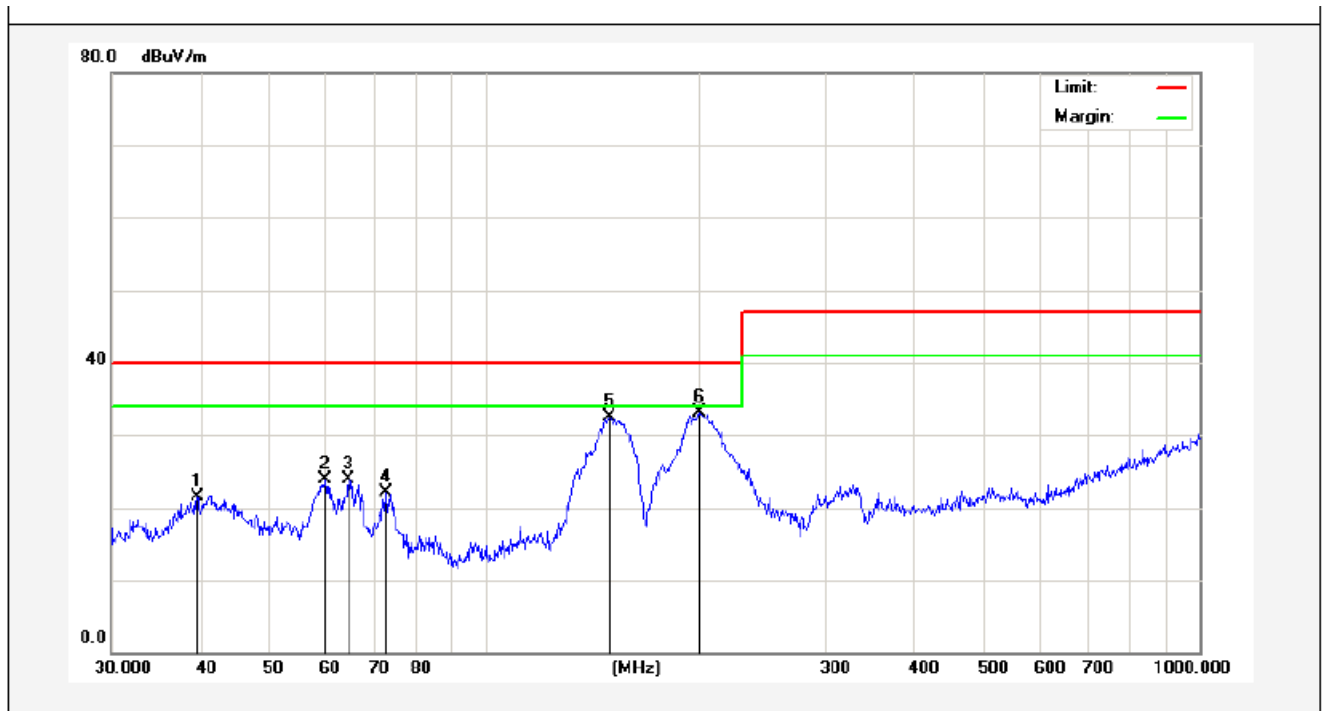
Test item:	Radiation Test	Polarization:	Vertical
Standard:	(RE)EN 55032	Power Source:	DC 5V for adapter
Distance:	3m	Temp.(°C)/Hum.(%RH):	24.3(°C)/55%RH
Test Mode:	Charging		



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	30.5306	47.95	-16.69	31.26	40.00	-8.74	peak			
2	41.1320	35.77	-11.26	24.51	40.00	-15.49	peak			
3	65.1145	46.93	-17.52	29.41	40.00	-10.59	peak			
4	82.9385	48.98	-19.02	29.96	40.00	-10.04	peak			
5	154.8204	44.88	-18.11	26.77	40.00	-13.23	peak			
6	212.2695	49.17	-15.40	33.77	40.00	-6.23	peak			

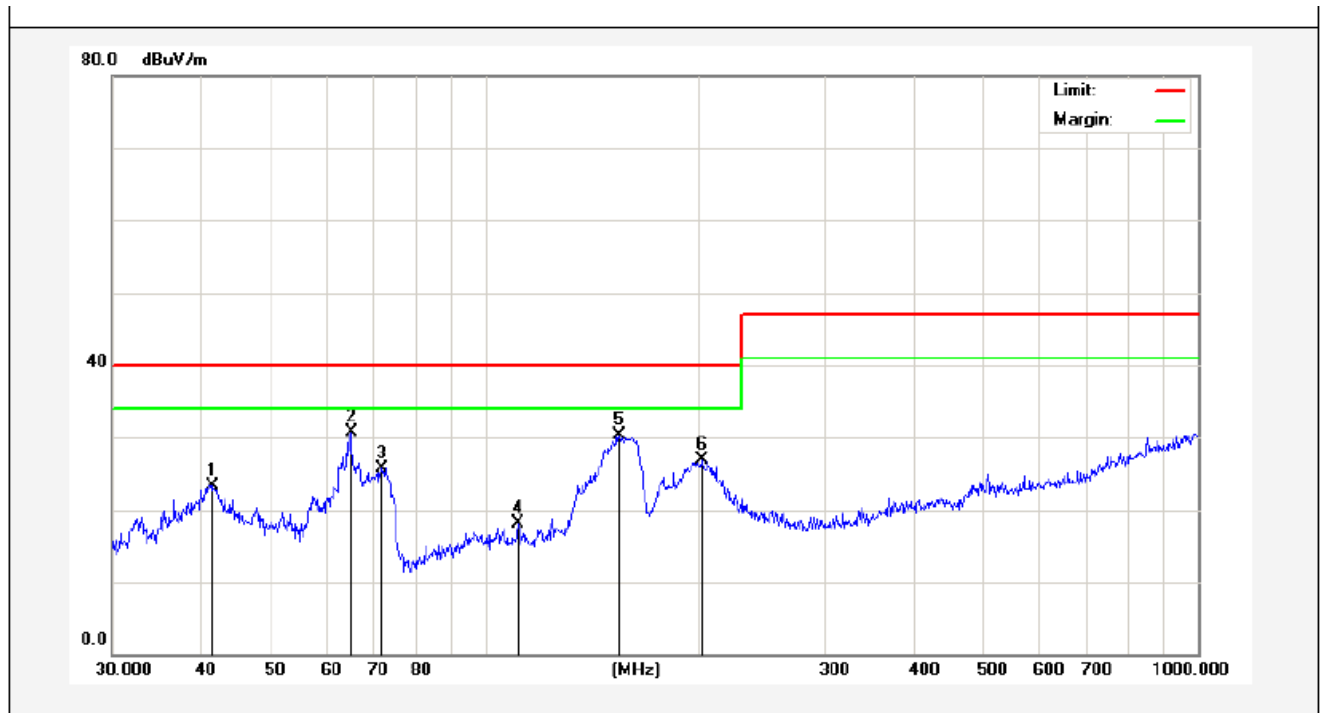
Note: Result=Reading+Factor Over Limit=Result-Limit

Test item:	Radiation Test	Polarization:	Horizontal
Standard:	(RE)EN 55032	Power Source:	DC 3.7V by battery
Distance:	3m	Temp.(°C)/Hum.(%RH):	24.3(°C)/55%RH
Test Mode:	Full Load		



Note: Result=Reading+Factor Over Limit=Result-Limit

Test item:	Radiation Test	Polarization:	Vertical
Standard:	(RE)EN 55032	Power Source:	DC 3.7V by battery
Distance:	3m	Temp.(°C)/Hum.(%RH):	24.3(°C)/55%RH
Test Mode:	Full Load		



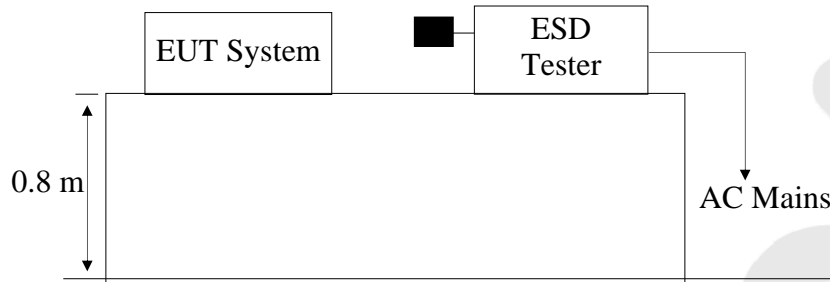
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	41.5670	34.77	-11.41	23.36	40.00	-16.64	peak			
2	64.8864	48.12	-17.43	30.69	40.00	-9.31	peak			
3	71.8319	45.76	-19.98	25.78	40.00	-14.22	peak			
4	111.3468	33.74	-15.72	18.02	40.00	-21.98	peak			
5	154.2786	48.51	-18.14	30.37	40.00	-9.63	peak			
6	201.3930	42.75	-15.82	26.93	40.00	-13.07	peak			

Note: Result=Reading+Factor Over Limit=Result-Limit

3. ELECTROSTATIC DISCHARGE IMMUNITY TEST

3.1. Block Diagram of Test Setup

3.1.1. Block diagram of test setup



3.2. Measuring Standard

EN 55024 (IEC 61000-4-2)

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

3.3. Severity Levels and Performance Criterion

3.3.1. Severity level

Level	Test Voltage Contact Discharge (kV)	Test Voltage Air Discharge (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 Discharge:

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 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

3.6.2. Contact Discharge:

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. Discharges 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 Discharge measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Simulators	3Ctest	ESD-30T	ES0131505	May 27, 2017	1 Year

3.8. Measuring Results

PASS

Please refer to the following pages.

Electrostatic Discharge Test Results

Shenzhen Anbotek Compliance Laboratory Limited

Air discharge : $\pm 8.0\text{kV}$ Temperature : 23.9°C
Contact discharge: $\pm 4.0\text{kV}$ Humidity : 51%
Power Supply : DC 5V for adapter /
DC 3.7V by battery Criterion required : B
Number of discharge : 25 Test Result: ☒ Pass ☐ Fail

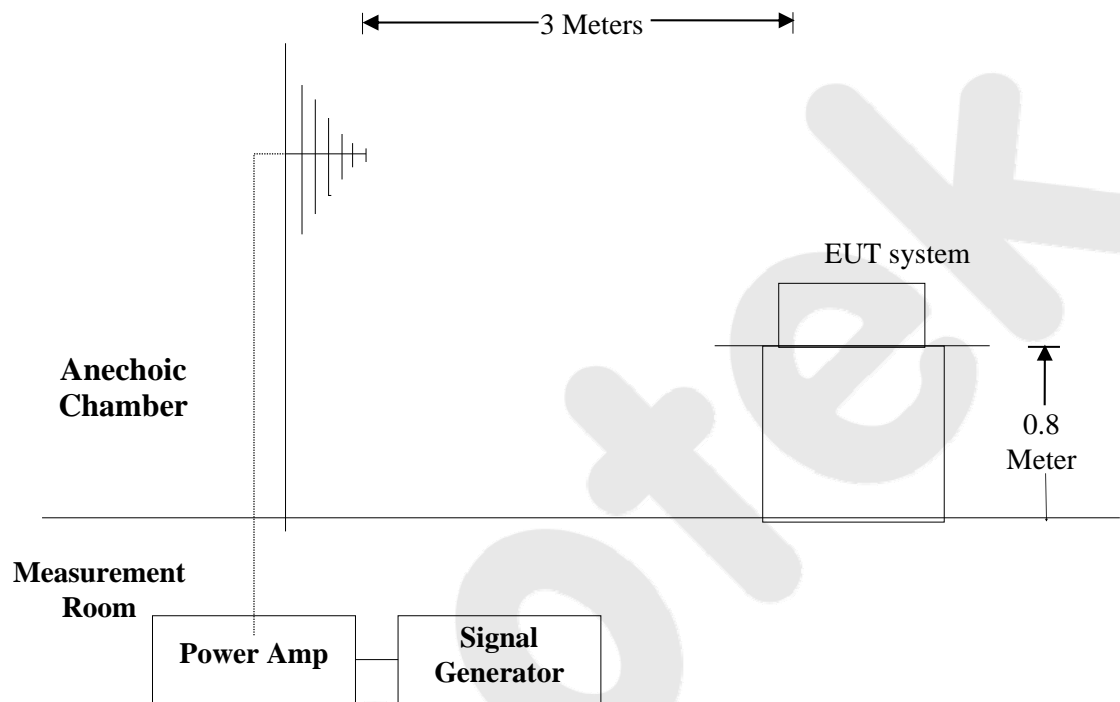
Location		Kind A-Air Discharge C-Contact Discharge	Result
Slot of the EUT	10 points	A	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
Others	8 points	A	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
USB Ports	4 points	A	<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: Discharge 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 RS test setup



4.2. Measuring Standard

EN 55024 (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 20, 2017	1 year
2	50ohm Diode Power Sensor	BOONTON	51011EMC	34236/36164	May 20, 2017	1 year
3	Broad-Band Horn Antenna	SCHWARZBECK	BBHA9120 L3F	332	May 20, 2017	1 year
4	Power Amplifier (0.08-1G)	MILMEGA	80RF1000-175	1059345	May 20, 2017	1 year
5	Power Amplifier (1-2G)	MILMEGA	AS0102-55	1018770	May 20, 2017	1 year
6	Power Amplifier (2-6G)	MILMEGA	AS1860-50	1059346	May 20, 2017	1 year
7	Signal Generator	Agilent	N5181A	MY50145187	May 20, 2017	1 year
8	Field Strength Meter	HOLADAY	HI-6005	N/A	May 20, 2017	1 year
9	RS232 Fiber Optic Modem	HOLADAY	HI-4413P	N/A	May 20, 2017	1 year
10	Log.-Per. Antenna	SCHWARZBECK	VULP 9118E	N/A	May 20, 2017	1 year

4.8. Measuring Results

PASS

Please refer to the following page.

RF Field Strength Susceptibility Test Results

Shenzhen Anbotek Compliance Laboratory Limited

Temperature:	25°C	Humidity	:	54%
Field Strength :	3 V/m	Criterion required	:	A
Power Supply:	DC 5V for adapter / DC 3.7V by battery	Frequency Range:	80 MHz to 1000 MHz	

Test Result : ☒ Pass ☐ Fail

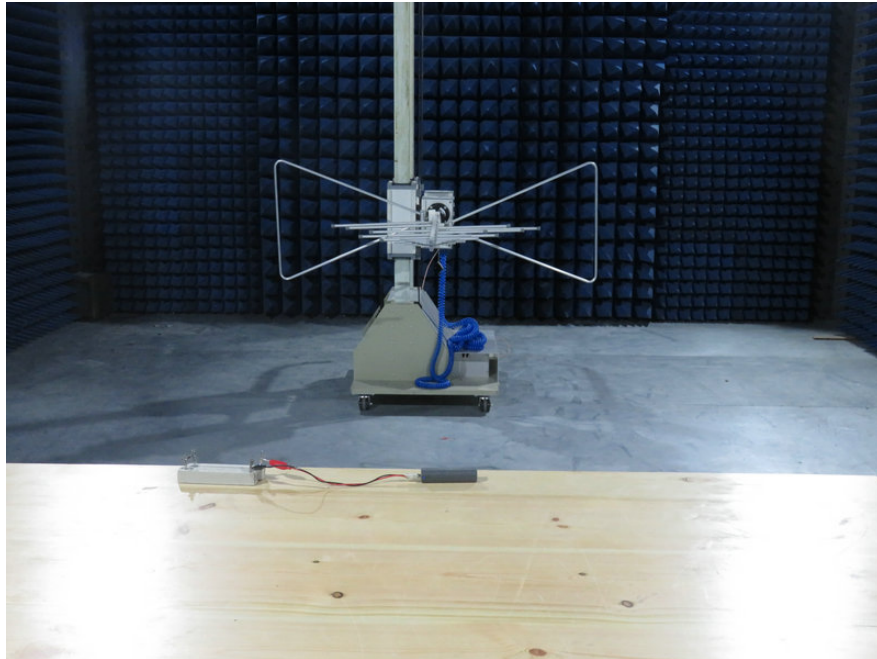
Modulation:	<input type="checkbox"/> None	<input type="checkbox"/> Pulse	<input checked="" type="checkbox"/> AM 1KHz 80%
-------------	-------------------------------	--------------------------------	---

Steps	#	/	%	Result
	Horizontal		Vertical	
Front	3 V/m		3 V/m	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
Right	3 V/m		3 V/m	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
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

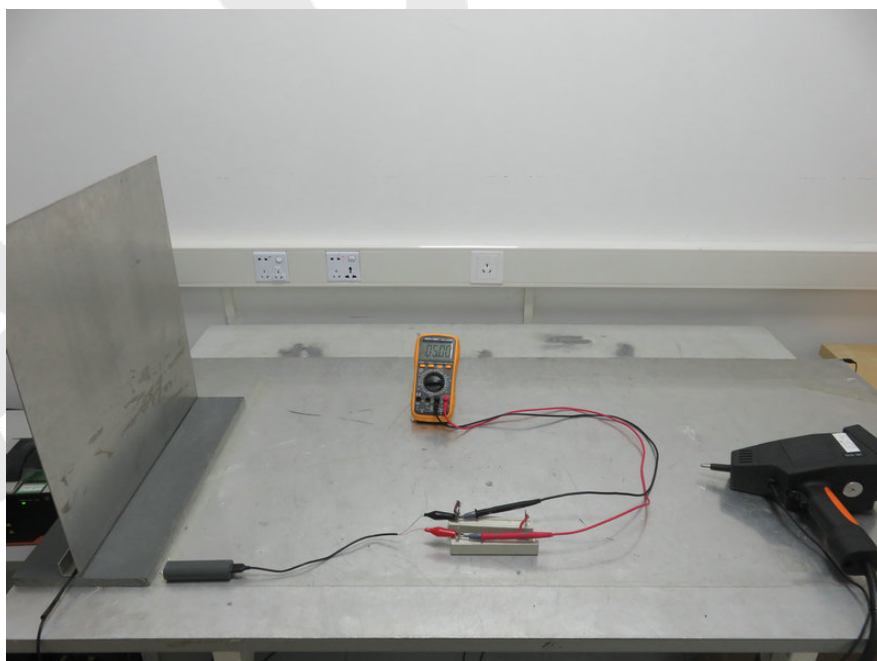
Note: Tested by EMTEK.

5. PHOTOGRAPHS

5.1. Photo of Radiated Emission Test



5.2. Photo of Electrostatic Discharge Immunity Test



5.3. Photo of RF Field Strength Susceptibility Test



APPENDIX I (Photos of EUT)

Figure 1
The EUT- Top View

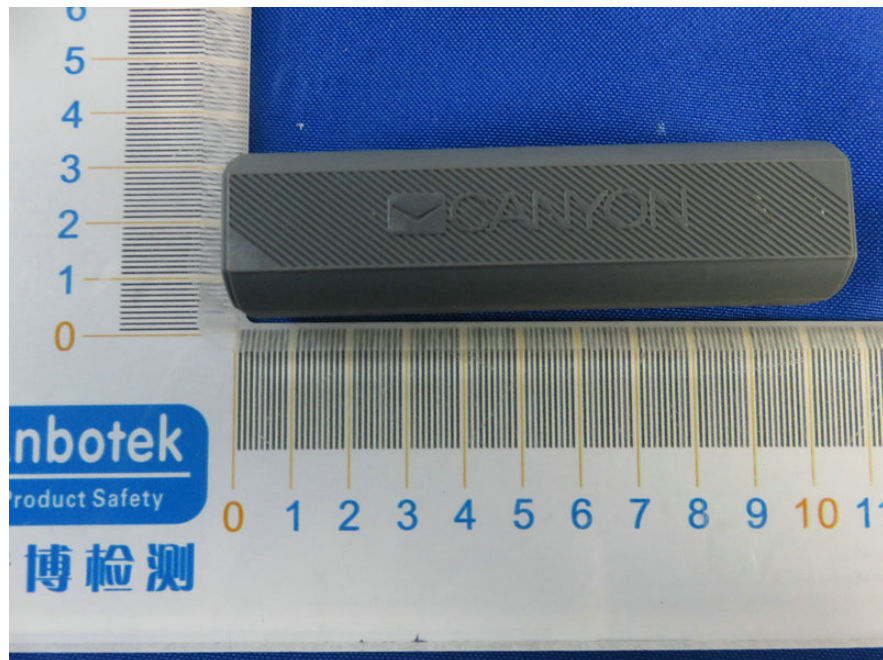


Figure 2
The EUT- Side View

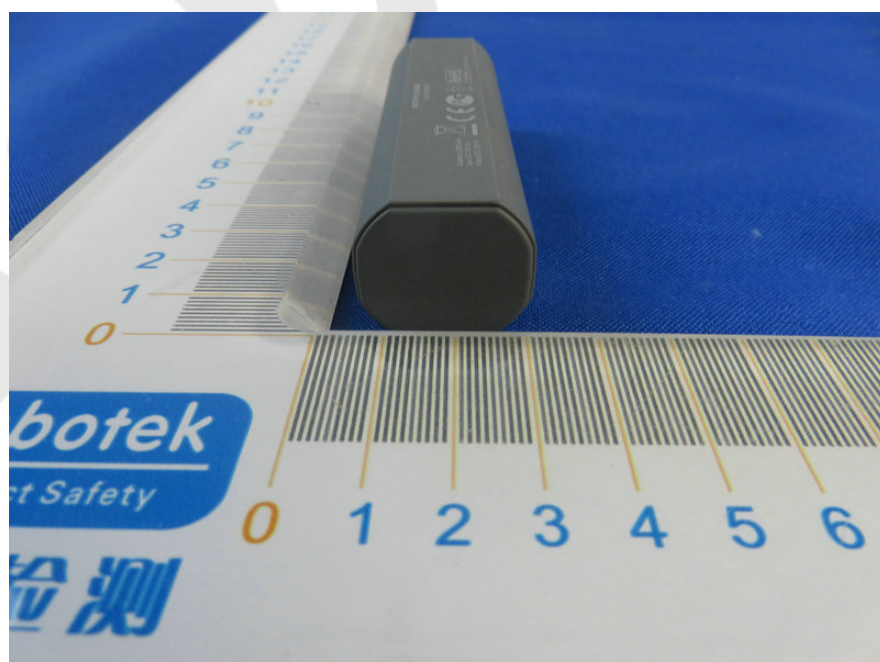


Figure 3
The EUT- Side View

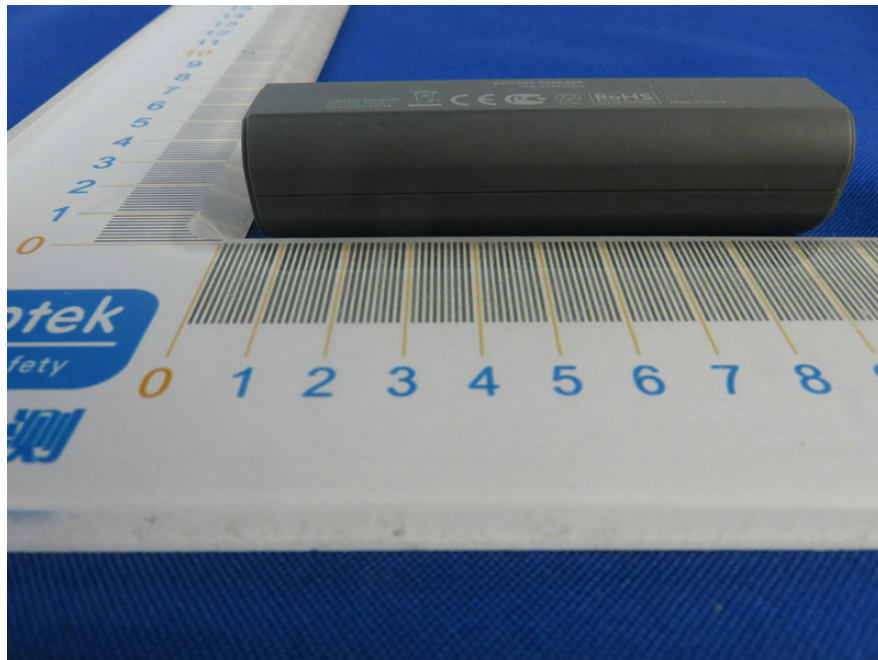


Figure 4
The EUT- Side View

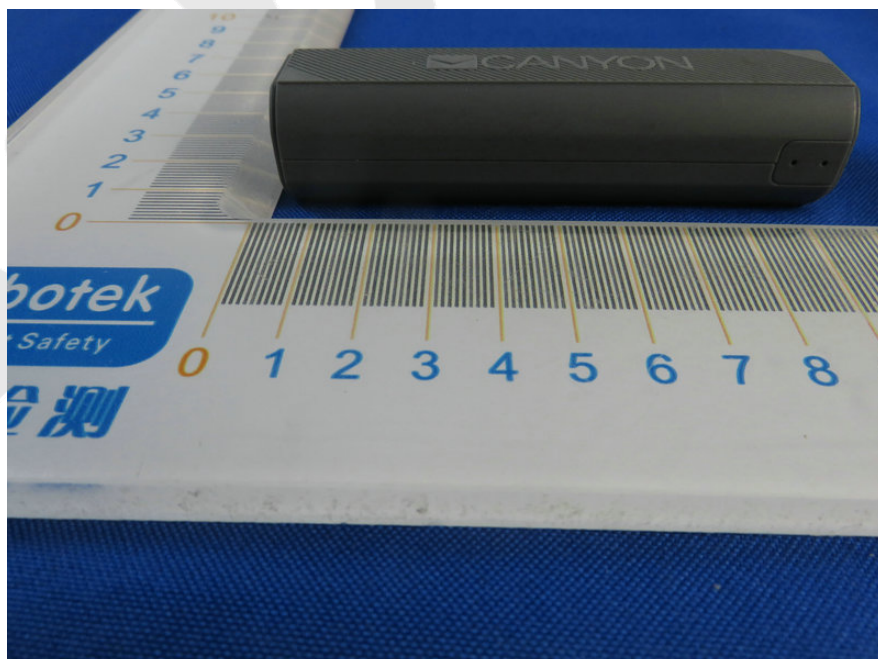


Figure 5
The EUT- Inside View



Figure 6
PCB of The EUT View

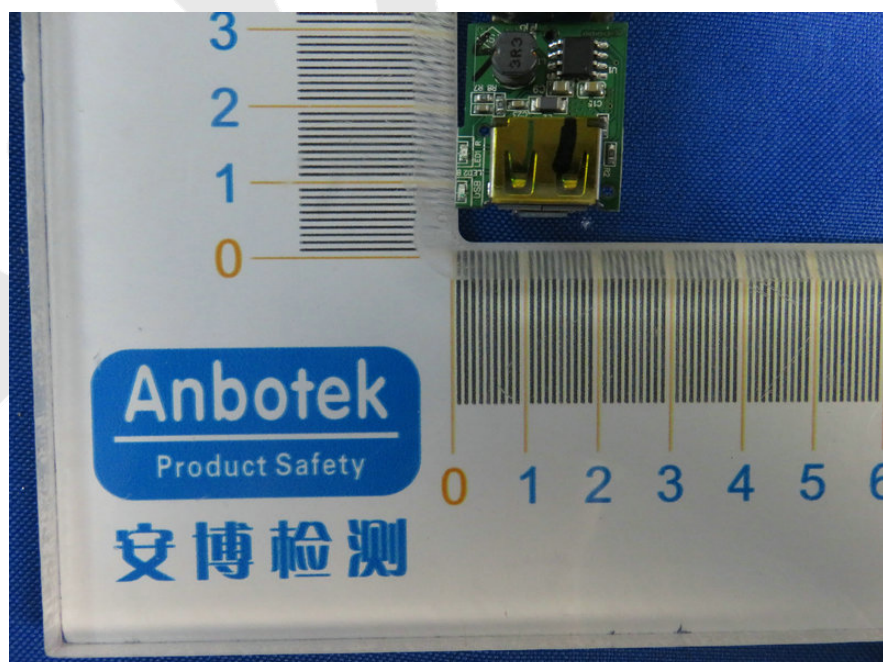
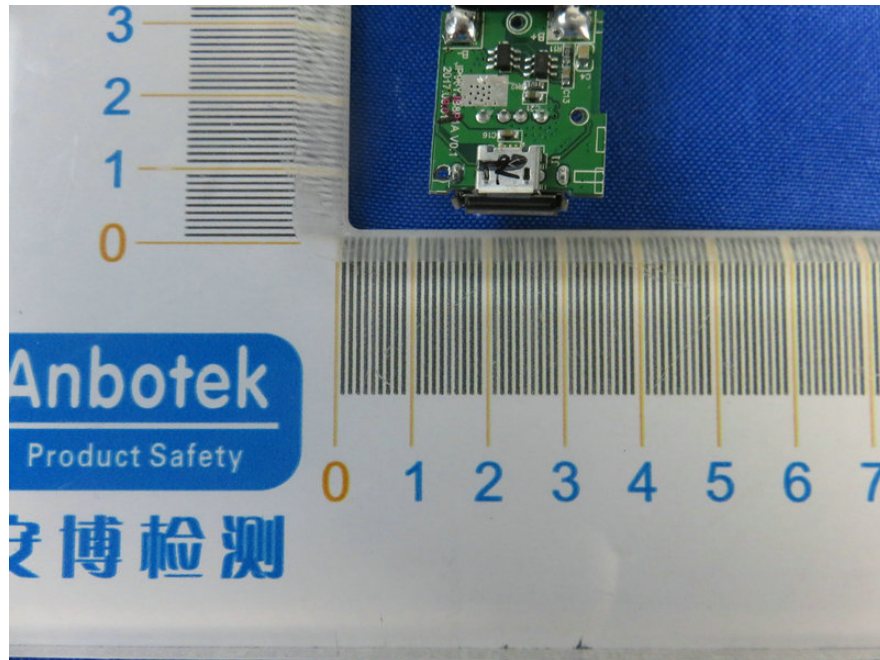


Figure 7
PCB of The EUT View



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'.

----- End of Report -----