



APPLICATION FOR ELECTROMAGNETIC COMPATIBILITY DIRECTIVE

On Behalf of

Car Charger

Model No.: YC690

Prepared for :

Address :

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.

Address : Building B, East Area of Nanchang Second Industrial Zone,
Gushu 2nd Road, Bao'an District, Shenzhen 518126, P.R. China

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TEST REPORT VERIFICATION

Applicant :
Manufacturer :
EUT Description : Car Charger

(A) Model No. :YC690
(B) Trademark :N/A
(C) Ratings Supply :DC 12-24V
(D) Test Voltage :DC 24V From Battery

Measurement Standard Used:

EN 55022:2010 (Class B)
EN 55024:2010
(IEC 61000-4-2:2008; IEC 61000-4-3:2006 + A1:2007 + A2:2010)

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 55022 and EN 55024 requirements.

This report applies to above tested sample only.

Tested by (name + signature).....: Moon Hu
Test Engineer

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

Date of issue.....: July 06, 2015



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
Conducted disturbance at mains terminals	EN 55022:2010	Class B		N/A
Conducted disturbance at telecommunication port	EN 55022:2010	Class B		N/A
Radiated disturbance	EN 55022:2010	Class B		PASS
Harmonic current emissions	EN61000-3-2:2014	Class A		N/A
Voltage fluctuations & flicker	EN 61000-3-3:2013	Section 5		N/A
IMMUNITY (EN 55024: 2010)				
Description of Test Item	Basic Standard	Performance Criteria	Observation Criteria	Results
Electrostatic discharge (ESD)	IEC 61000-4-2:2008	B	A	PASS
Radio-frequency, Continuous radiated disturbance	IEC 61000-4-3:2006 + A1:2007 + A2:2010	A	A	PASS
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
N/A is an abbreviation for Not Applicable.				

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

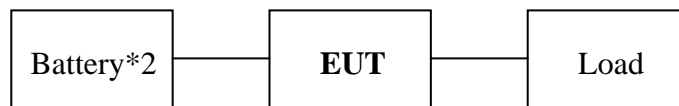
Description	:	Car Charger
Classification	:	Class III
Model Number	:	YC690
EUT Information	:	Input: DC 12-24V; Output: DC 5V/0.8A
Trademark	:	N/A
Applicant Address	:	
Manufacturer Address	:	
Sample Type	:	Prototype production

2.2. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number
1.	Battery*2	HUIFENG	6-DZM-20	N/A
3.	Load	N/A	N/A	N/A

2.3. Block Diagram of connection between EUT and simulators

For EMI Tests



For EMS Tests



※ **EUT: Car Charger**

2.4. Test Facility

2.4.1. Laboratory Name:

Shenzhen Alpha Product Testing Co., Ltd.

2.4.2. Site Location :

Building B, East Area of Nanchang Second Industrial Zone,
Gushu 2nd Road, Bao'an District, Shenzhen 518126, P.R. China

2.4.3. Test facility:

August 11, 2014 File on Federal Communication Commission
Registration Number: 203110

July 18, 2014 Certificated by IC
Registration Number: 12135A

2.5. Measurement Uncertainty

(95% confidence levels, k=2)

Test Item	Uncertainty	U _{cispr}
Uncertainty for Conduction emission test	2.70dB	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)	4.16 dB (Distance: 3m Polarize: V)	5.2 dB
	4.28 dB (Distance: 3m Polarize: H)	

2.6. Test mode Description

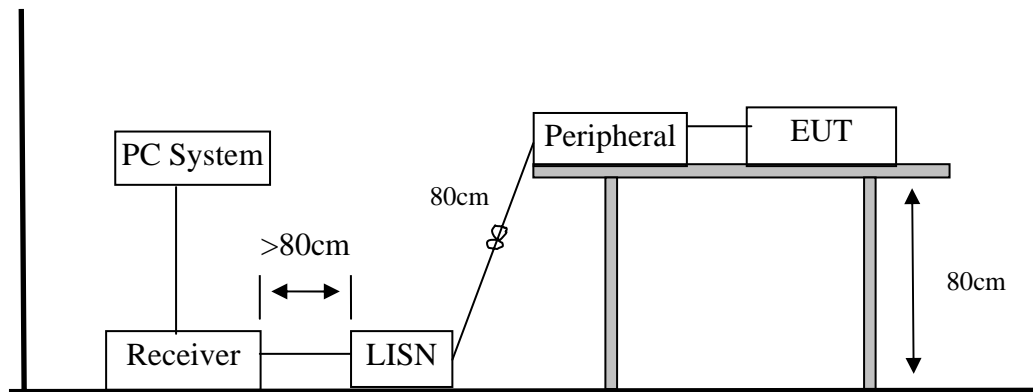
No.	Test Mode
※1.	Full Load With input DC 24V
2.	Half Load With input DC 24V
3.	No Load With input DC 24V
4.	Full Load With input DC 12V
5.	Half Load With input DC 12V
6.	No Load With input DC 12V
Note: 1.※is worst case mode, so this report only reflected the worst mode. 2. The worst mode incarnate with “full load” test mode for this report.	

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	2016.01.18	1 Year
2.	L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2016.01.18	1 Year
3.	L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2016.01.18	1 Year
4.	Pulse Limiter	Schwarzbeck	9516F	9618	2016.01.18	1 Year

3.2. Block Diagram of Test Setup



3.3. Test Standard

EN 55022:2010, Class B

3.4. Power Line Conducted Disturbance at Mains Terminals Limit

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

Notes: 1. Emission level=Read level+LISN factor-Preamp factor+Cable loss

2 * Decreasing linearly with logarithm of frequency.

3. The lower limit shall apply at the transition frequencies.

3.5. EUT Configuration on Test

The following equipments are installed on Conducted Emission Test to meet EN 55022 requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

3.5.1. Support Equipment : As Tested Supporting System Detail, in Section 2.2.

3.6. Operating Condition of EUT

3.6.1. Setup the EUT and simulator as shown as Section 3.2.

3.6.2. Turned on the power of all equipment.

3.6.3. Let Car Charger (EUT) work in test mode (Full Load) and measure it.

3.7. Test Procedure

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 55022 Class B on conducted Disturbance test.

The bandwidth of test receiver (R & S ESHS20) is set at 10kHz.

The frequency range from 150kHz to 30MHz is checked. The test results are reported and test results for Conducted Disturbance Test on Section 3.8.

3.8. Conducted Disturbance at Mains Terminals Test Results

EUT Supply by Battery, so it not applicable.

4. RADIATED DISTURBANCE TEST

4.1. Test Equipments

4.1.1. For frequency range 30MHz~1000MHz (At Semi Anechoic Chamber)

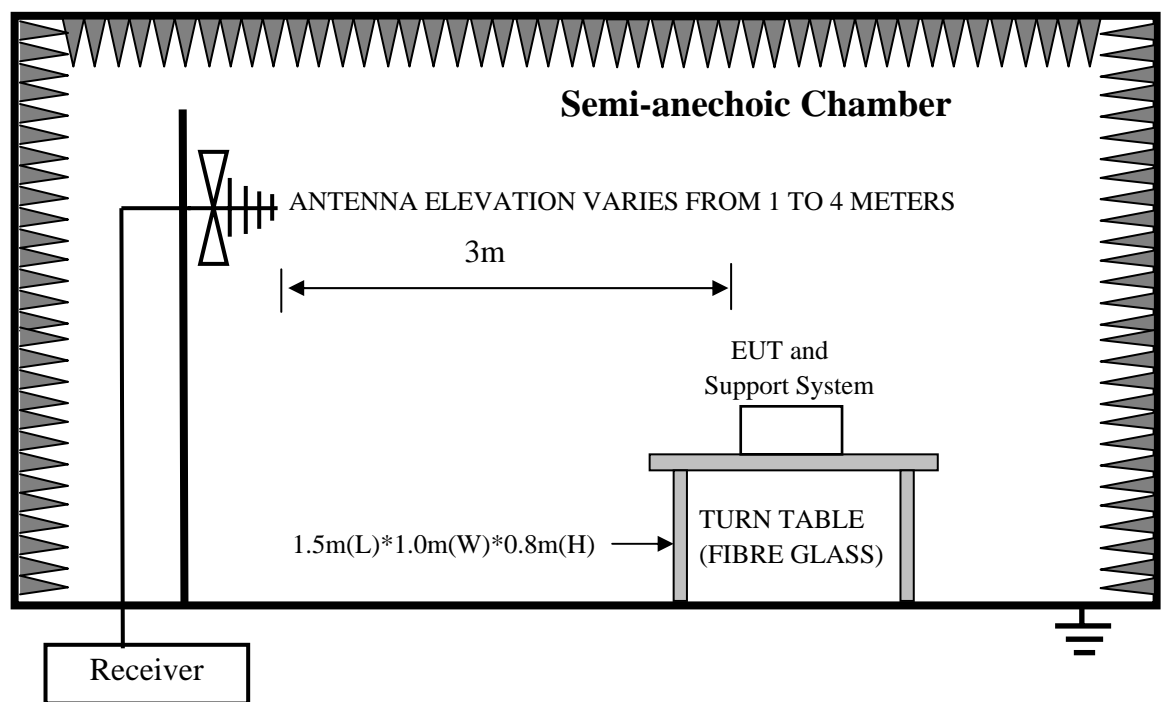
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Test Receiver	Rohde&Schwarz	ESCI	101165	2016.01.18	1 Year
2	Amplifier	HP	HP8347A	2834A00455	2016.03.20	1 Year
3	Bilog Antenna	Schwarzbeck	VULB 9168	9168-438	2016.01.21	2 Year

4.1.2. For frequency range 1GHz~6GHz (At Semi Anechoic Chamber)

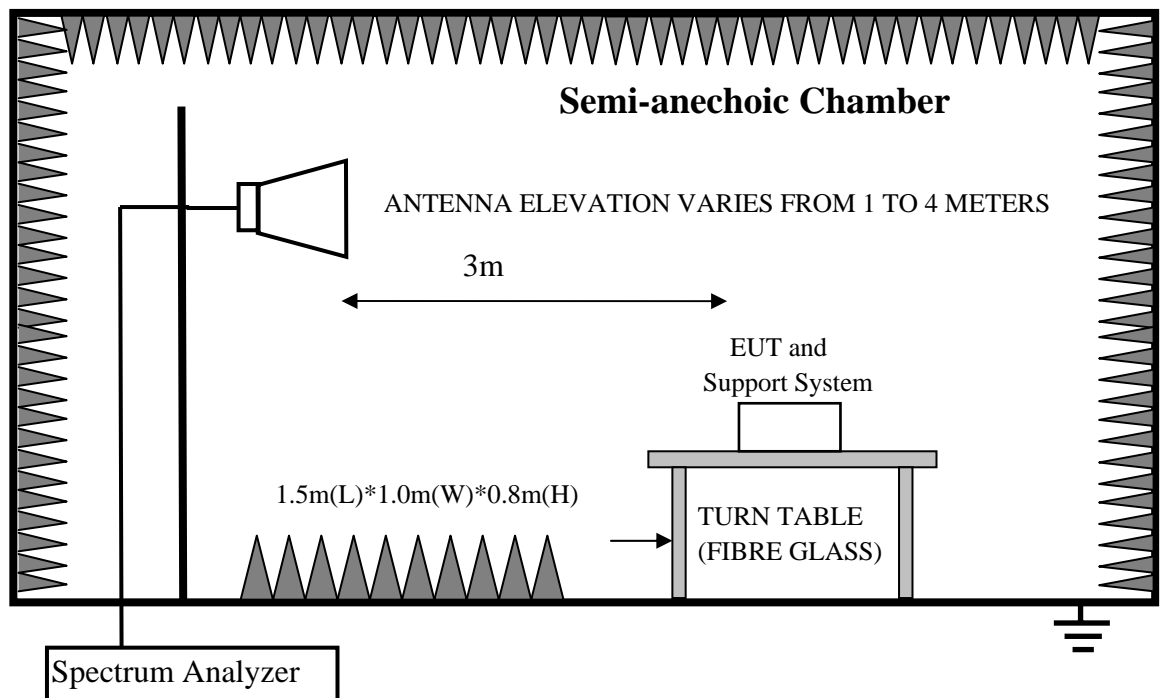
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	E4407B	MY49510055	2016.01.18	1 Year
2	Horn Antenna	Schwarzbeck	BBHA 9120 D	BBHA 9120 D(1201)	2017.01.20	2 Year
3	Amplifier	Agilent	8449B	3008A02664	2016.03.20	1 Year

4.2. Block Diagram of Test Setup

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



4.2.2. In Semi Anechoic Chamber (3m) Test Setup Diagram for 1-6GHz



4.3. Test Standard

EN 55022:2010, Class B

4.4. Radiated Disturbance Limit

All emanations from a Class B computing devices 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 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)

Note:

- (1) Emission level = Read level+Antenna Factor-Preamplifier Factor +Cable Loss
- (2) The lower limit shall apply at the transition frequencies.
- (3) Distance refers to the distance in meters between the test instrument antenna and the closed point of any part of the E.U.T.

4.5. EUT Configuration on Test

The EN 55022 Class B regulations test method must be used to find the maximum emission during Radiated Disturbance test. The configuration of EUT is same as used in Conducted Disturbance test. Please refer to Section 3.5.

4.6. Operating Condition of EUT

- 4.6.1. Setup the EUT and simulator as shown as Section 4.2.
- 4.6.2. Turned on the power of all equipment.
- 4.6.3. Let Car Charger (EUT) work in test mode (Full Load) and measure it.

4.7. Test Procedure

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 & 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 55022 Class B on Radiated Disturbance test.

The bandwidth setting on the test receiver (ROHDE&SCHWARZ TEST RECEIVER ESCI) is 120 kHz.

The resolution bandwidth of the Agilent Spectrum Analyzer E4407B was set at 1MHz. (For above 1GHz)

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.

The frequency range from 1GHz to 6GHz was checked with peak and average detector, measurement distance is 3m in 3m chamber.

Finally, selected operating situations at Semi Anechoic Chamber measurement, all the test results are listed in section 4.8.

4.8. Radiated Disturbance Test Results

PASS. (All emissions not reported below are too low against the prescribed limits.)

The EUT with the following test mode was tested and read Peak values. The test results are listed in next pages.

Temperature: 24.2°C Humidity: 54%

The details of test mode is as follows :

No.	Test Mode
1.	Full Load

For frequency range 1GHz~6GHz

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.

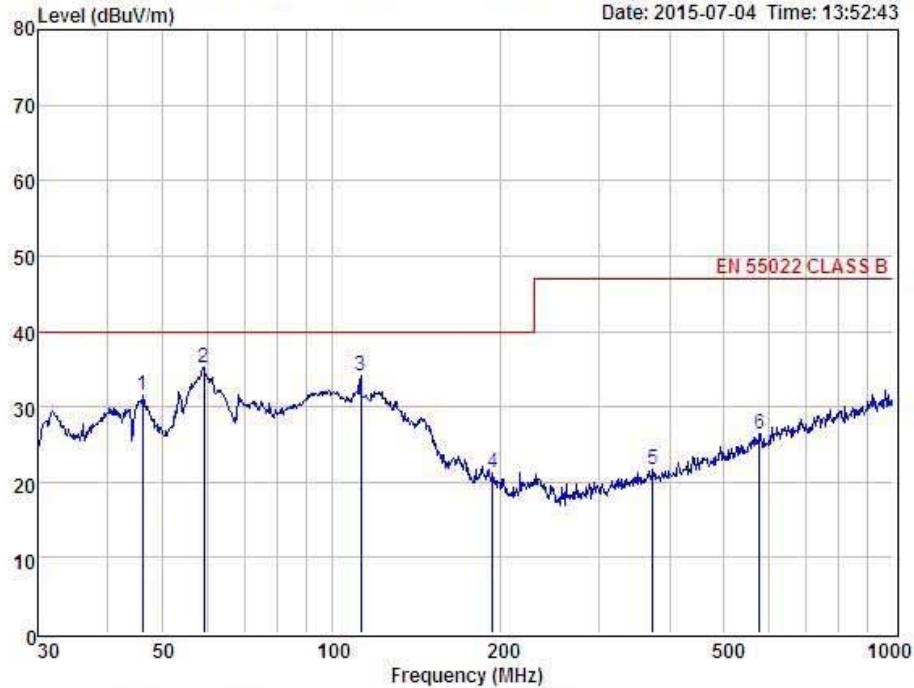


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Data: 5

File: D:\REPORT DATA\YUYUAYO\YC690.EM6 (8)

Date: 2015-07-04 Time: 13:52:43



Condition : EN 55022 CLASS B 3m POL: HORIZONTAL
 EUT : Car Charger
 Model No : YC690
 Test Mode : FULL LOAD
 Power : DC 24V from Battery
 Test Engineer : Moon
 Remark :
 Temp : 24.2℃
 Hum : 54%

Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	46.02	49.65	13.65	31.85	0.06	31.51	40.00	-8.49	Peak
2	59.23	53.89	12.75	31.75	0.32	35.21	40.00	-4.79	Peak
3	112.92	53.47	11.50	31.33	0.47	34.11	40.00	-5.89	Peak
4	193.77	41.32	10.24	30.96	0.55	21.15	40.00	-18.85	Peak
5	373.31	36.64	14.28	30.43	1.09	21.58	47.00	-25.42	Peak
6	578.67	36.96	17.89	29.44	1.07	26.48	47.00	-20.52	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

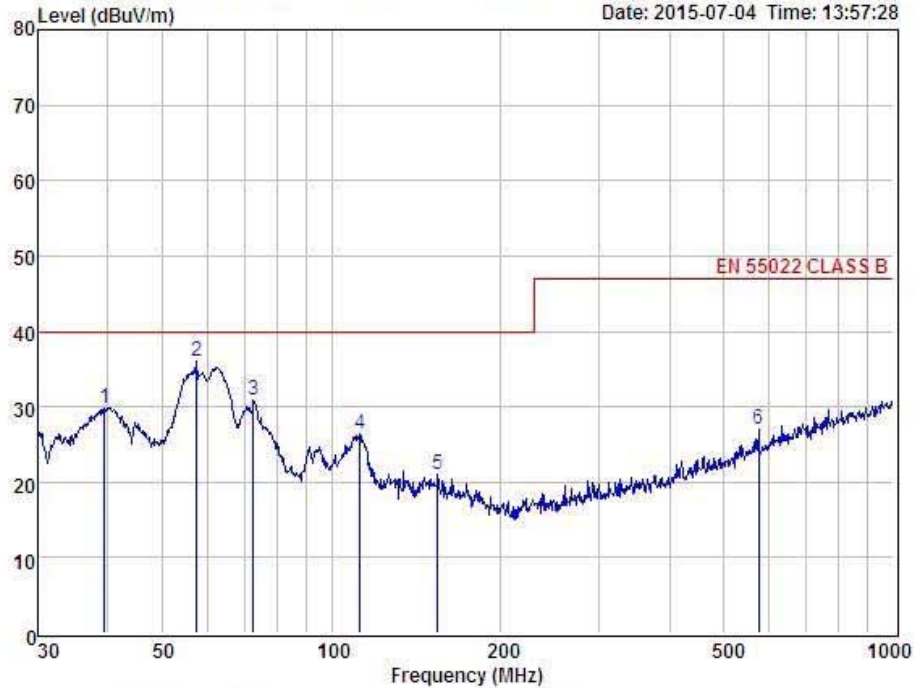


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Data: 6

File: D:\REPORT DATA\YUYU\YAO\YC690.EM6 (8)

Date: 2015-07-04 Time: 13:57:28



Condition : EN 55022 CLASS B 3m POL: VERTICAL
 EUT : Car Charger
 Model No : YC690
 Test Mode : FULL LOAD
 Power : DC 24V from Battery
 Test Engineer : Moon
 Remark :
 Temp : 24.2℃
 Hum : 54%

Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamplifier Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	39.44	47.55	14.07	31.89	0.17	29.90	40.00	-10.10	Peak
2	57.59	54.70	12.91	31.77	0.14	35.98	40.00	-4.02	Peak
3	72.59	52.18	10.21	31.69	0.21	30.91	40.00	-9.09	Peak
4	112.52	45.76	11.50	31.34	0.47	26.39	40.00	-13.61	Peak
5	154.28	37.55	14.15	31.18	0.40	20.92	40.00	-19.08	Peak
6	576.64	37.51	17.85	29.44	1.17	27.09	47.00	-19.91	Peak

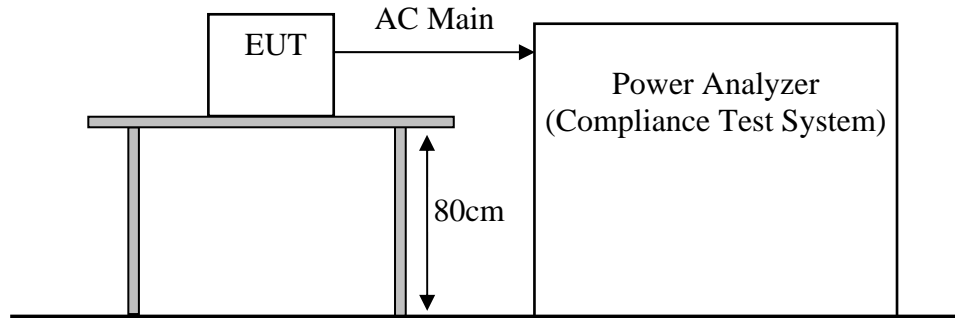
Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

5. HARMONIC CURRENT TEST

5.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Harmonics Flicker Analyser	Voltech	PM6000	200006700495	2016.01.18	1 Year

5.2. Block Diagram of Test Setup



5.3. Test Standard

EN 61000-3-2:2014; Class A

5.4. Limits of Harmonic Current

Limits for Class D Equipment		
Harmonic order (n)	Maximum permissible harmonic current per watt (mA/W)	Maximum permissible harmonic current (A)
3	3.4	0.23
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
13	0.30	0.21
15 ≤ n ≤ 39 (odd harmonic only)	3.85/n	0.15 × 15/n

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
$8 \leq n \leq 40$	$0,23 \frac{8}{n}$

Limits for Class C equipment	
Harmonic order n	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %
2	2
3	$30 \cdot \lambda *$
5	10
7	7
9	5
$11 \leq n \leq 39$ (odd harmonics only)	3
* λ is the circuit power factor	

5.5. Operating Condition of EUT

Same as Section 3.6. except the test setup replaced by Section 5.2.

5.6. Test Procedure

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.

5.7. Test Results

EUT Supply by Battery, so it not applicable.

6. VOLTAGE FLUCTUATIONS & FLICKER TEST

6.1. Test Equipment

Same as Section 5.1.

6.2. Block Diagram of Test Setup

Same as Section 5.2.

6.3. Test Standard

EN 61000-3-3:2013

6.4. Limits of Voltage Fluctuation and Flick

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%	d_c means relative steady-state voltage change.

6.5. Operating Condition of EUT

Same as Section 5.5.

6.6. Test Procedure

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.

6.7. Test Results

EUT Supply by Battery, so it not applicable.

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

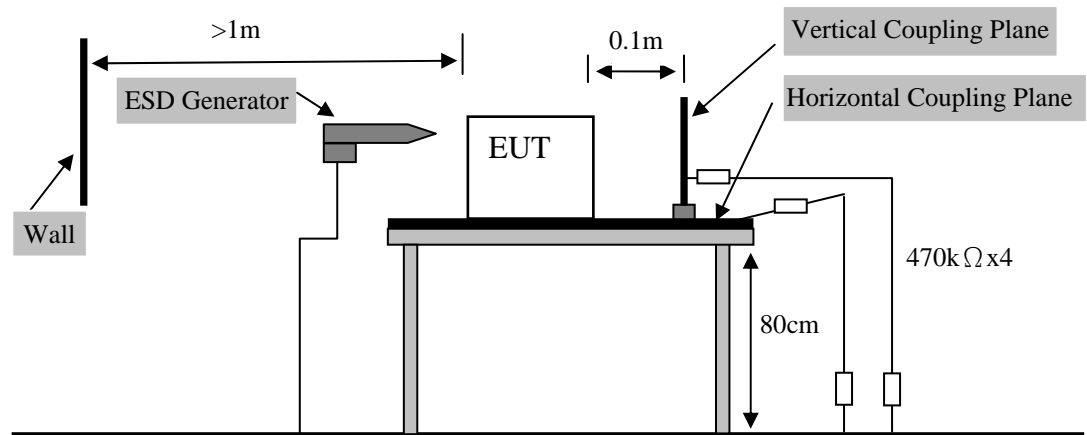
Failures which are not self-recovered after removal of the external disturbance, but which can be recovered to normal operation by reset or reboot are permissible.

8. ELECTROSTATIC DISCHARGE IMMUNITY TEST

8.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Tester	HAEFELY	PESD1610	H310546	2016.01.20	1 Year

8.2. Block Diagram of Test Setup



8.3. Test Standard

EN 55024:2010(IEC 61000-4-2:2008)
 (Severity Level 1 & 2 & 3 for Air Discharge at 2 kV & 4 kV & 8kV,
 Severity Level 1 & 2 for Contact Discharge at 2 kV & 4kV)

8.4. Severity Levels and Performance Criterion

8.4.1. 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

8.4.2. Performance criterion : **B**

8.5. EUT Configuration

The configurations of EUT are listed in Section 3.5.

8.6. Operating Condition of EUT

Same as Conducted Emission test that is listed in Section 3.6. except the test set up replaced by Section 8.2.

8.7. Test Procedure

8.7.1. 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 for each pre-selected test point. This procedure was repeated until all the air discharge completed

8.7.2. Contact Discharge:

All the procedure was same as Section 8.7.1. 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.

8.7.3. Indirect discharge for horizontal coupling plane:

At least 20 single discharges 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.

8.7.4. Indirect discharge for vertical coupling plane:

At least 20 single discharges 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.

8.8. Test Results

PASS.

The EUT was tested and all the test results are listed in next page.

Electrostatic Discharge Test Results

Applicant	:		Test Date	:	July 04, 2015
EUT	:	Car Charger	Temperature	:	22°C
M/N	:	YC690	Humidity	:	54%
Test Voltage	:	DC 24V From Battery	Test Mode	:	Full Load
Test Engineer	:	Moon Hu	Pressure	:	101.3KPa
Required Performance	:	B	Actual Performance	:	A

Air Discharge: $\pm 2\text{kV}$ $\pm 4\text{kV}$ $\pm 8\text{kV}$ # For Air Discharge each Point Positive 25 times and negative 25 times discharge.

Contact Discharge: $\pm 2\text{kV}$ $\pm 4\text{kV}$ # For Contact Discharge each point positive 25 times and negative 25 times discharge

For the time interval between successive single discharges an initial value of one second.

Discharge Voltage (kV)	Type of discharge	Dischargeable Points	Performance		Result (Pass/Fail)
			Required	Observation	
± 2	Contact	1	B	A	Pass
± 4	Contact	1	B	A	Pass
± 2	Air	2	B	A	Pass
± 4	Air	2	B	A	Pass
± 8	Air	2	B	A	Pass
± 2	HCP-Bottom	Edge of the HCP	B	A	Pass
± 2	VCP-Front	Center of the VCP	B	A	Pass
± 2	VCP-Left	Center of the VCP	B	A	Pass
± 2	VCP-Back	Center of the VCP	B	A	Pass
± 2	VCP-Right	Center of the VCP	B	A	Pass
± 4	HCP-Bottom	Edge of the HCP	B	A	Pass
± 4	VCP-Front	Center of the VCP	B	A	Pass
± 4	VCP-Left	Center of the VCP	B	A	Pass
± 4	VCP-Back	Center of the VCP	B	A	Pass
± 4	VCP-Right	Center of the VCP	B	A	Pass

Discharge Points Description

<u>1</u>	Metal	<u>5</u>	
<u>2</u>	Slots	<u>6</u>	
<u>3</u>		<u>7</u>	
<u>4</u>		<u>8</u>	

Test Equipment: ESD Tester (PESD1610)

Remark: Class A is no function loss.

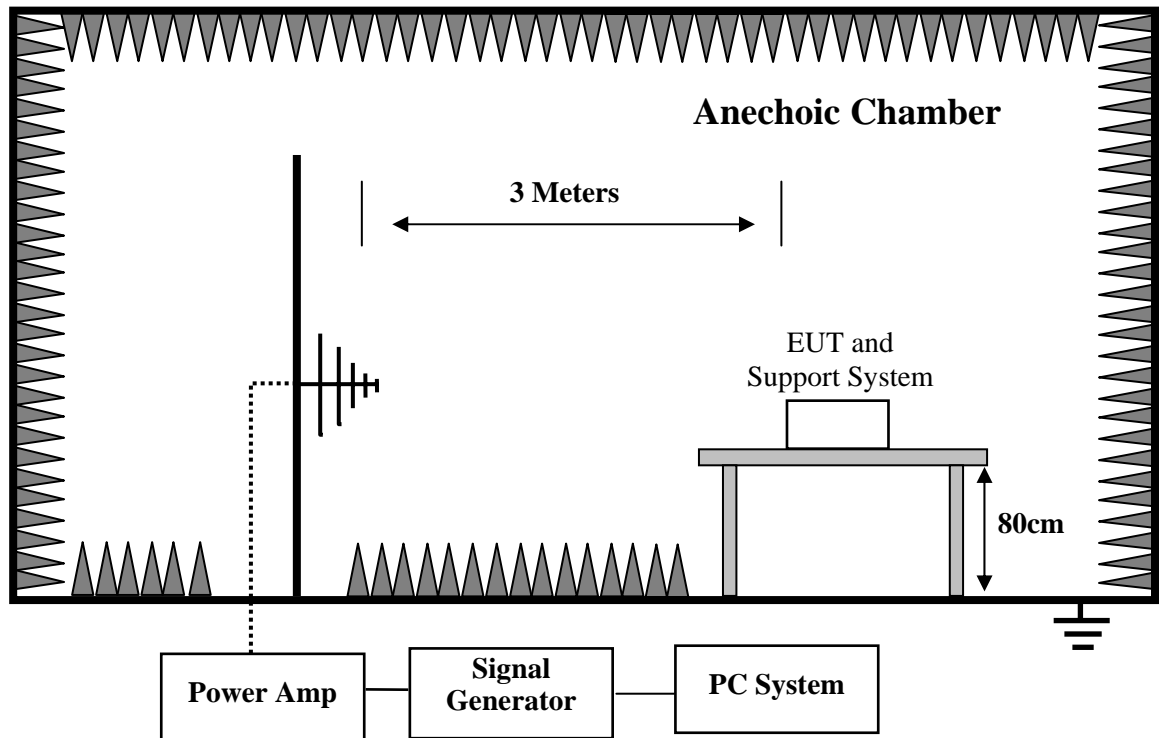
Discharge was considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).

9. RF FIELD STRENGTH SUSCEPTIBILITY TEST

9.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	R&S	SMB100A	105942	2015.09.16	1 Year
2.	Amplifier	A&R	100W/1000M1	17028	N/A	N/A
3.	Isotropic Field Monitor	A&R	FM7004	0325983	N/A	N/A
4.	RF Power Amplifier	R&S	BLWA0830-160/100/40D	128740	2015.09.28	1 Year
5.	Laser Probe Interface	A&R	FL7000	325430	N/A	N/A
6.	Power Meter	R&S	NRP2	102031	2015.09.16	1 Year
7.	Gestockte Breitband (Stacked) Log-perAntenna	R&S	STLP9128D	043	2015.09.16	1 Year
8.	Log-periodic Antenna	A&R	AT1080	16512	N/A	N/A

9.2. Block Diagram of Test Setup



9.3. Test Standard

EN 55024:2010(IEC 61000-4-3:2006 + A1:2007 + A2:2010)
(Severity Level: 2 at 3V / m)

9.4. Severity Levels and Performance Criterion

9.4.1. Severity level

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

9.4.2. Performance criterion: A

9.5. EUT Configuration

The configurations of EUT are listed in Section 3.5.

9.6. Operating Condition of EUT

Same as Conducted Emission test that is listed in Section 3.6. except the test set up replaced by Section 9.2.

9.7. Test Procedure

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. 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. 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.

All the scanning conditions are as follows:

Condition of Test	Remarks
1. Test Fielded Strength	3 V/m (Severity Level 2)
2. Radiated Signal	80% amplitude modulated with a 1kHz sine wave
3. Scanning Frequency	80 - 1000 MHz
4. Sweeping time of radiated	0.0015 decade/s
5. Dwell Time	3 Sec.

9.8. Test Results

PASS.

The EUT was tested and all the test results are listed in next page.

RF Field Strength Susceptibility Test Results

Applicant	:		Test Date	:	July 04, 2015
EUT	:	Car Charger	Temperature	:	21°C
M/N	:	YC690	Humidity	:	53%
Test Voltage	:	DC 24V From Battery	Pressure	:	101.3KPa
Test Engineer	:	Moon Hu	Test Mode	:	Full Load
Frequency Range	:	80 MHz -1000MHz	Field Strength	:	3V/m
Required Performance	:	A	Actual Performance	:	A

Modulation:	<input checked="" type="checkbox"/> AM	<input type="checkbox"/> Pulse	<input type="checkbox"/> none	1 kHz	80%
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	Frequency Rang :80 MHz -1000MHz
--	---------------------------------

Steps	1%
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	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

Test Equipment : 1. Signal Generator : Marconi 2031B 2. Power Amplifier : A&R 500A/100;100W/1000M. 3. Power Antenna : A&R AT-1080. 4. Field Monitor : A&R FM7004.
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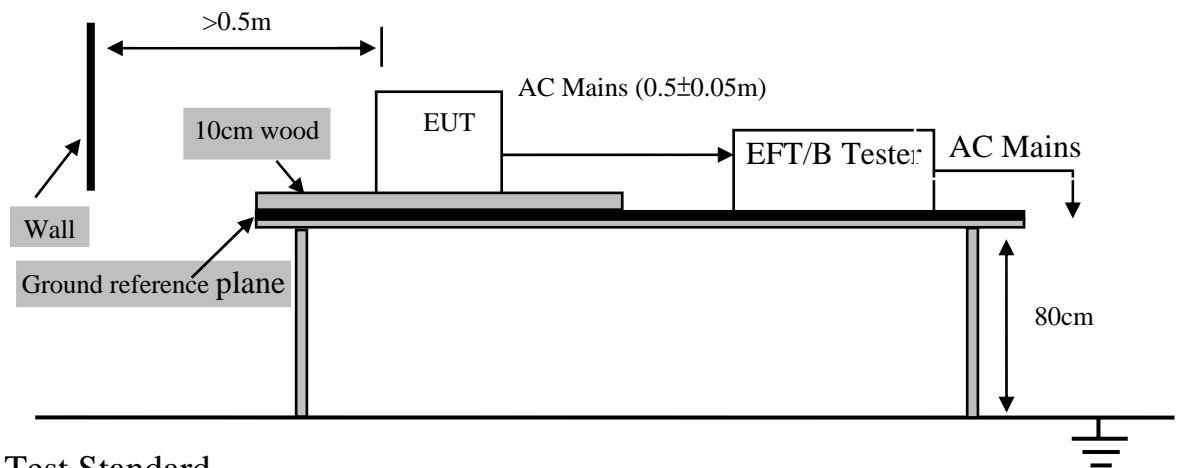
Remark: Class A is no function loss

10. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

10.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EFT Equipment	3ctest	EFT-4001G	EC0461015	2016.01.18	1 Year
2.	Capacitive Coupling	3ctest	EFTC	EC0441049	2016.01.18	1 Year

10.2. Block Diagram of Test Setup



10.3. Test Standard

EN 55024:2010(IEC 61000-4-4:2012)
(Severity Level 2 at 1kV)

10.4. Severity Levels and Performance Criterion

10.4.1. Severity level

Open Circuit Output Test Voltage $\pm 10\%$		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1.	0.5 kV	0.25 kV
2.	1 kV	0.5 kV
3.	2 kV	1 kV
4.	4 kV	2 kV
X	Special	Special

10.4.2. Performance criterion : **B**

10.5. EUT Configuration

The configurations of EUT are listed in Section 3.5.

10.6. Operating Condition of EUT

Same as Conducted Emission test that is listed in Section 3.6. except the test set up replaced by Section 10.2.

10.7. Test Procedure

The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support $0.1\text{m} \pm 0.01\text{m}$ thick. The ground reference plane was $1\text{m} \times 1\text{m}$ metallic sheet with 0.65mm minimum thickness. This reference ground plane was project 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.

10.7.1. 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.

10.7.2. For signal lines and control lines ports:

It's unnecessary to test.

10.7.3. For DC input and DC output power ports:

It's unnecessary to test.

10.8. Test Results

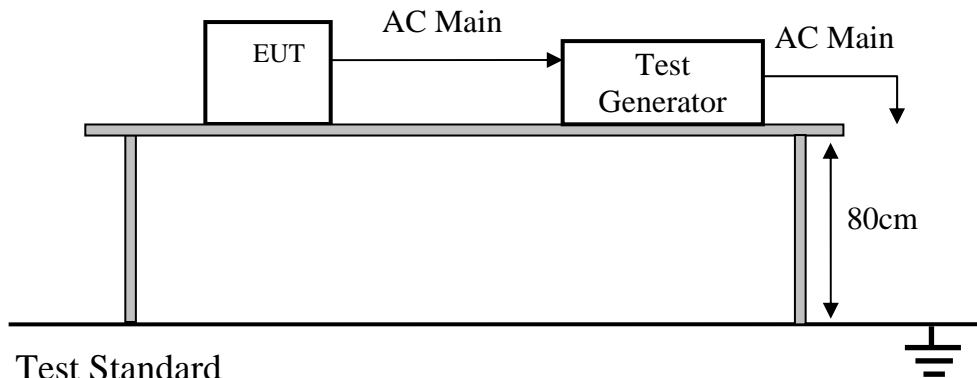
EUT Supply by Battery, so it not applicable.

11. SURGE TEST

11.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge CDN	3ctest	SGN-5010G	EC5591004	2016.01.18	1 Year
2.	Surge Generator	3ctest	SG-5006G	EC5581006	2016.01.18	1 Year

11.2. Block Diagram of Test Setup



11.3. Test Standard

EN 55024:2010 (IEC 61000-4-5:2014)
(Severity Level: Line to Line was Level 2 at 1kV)

11.4. Severity Levels and Performance Criterion

11.4.1. Severity level

Severity Level	Open-Circuit Test Voltage kV
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

11.4.2. Performance criterion: **B**

11.5. EUT Configuration

The configurations of EUT are listed in Section 3.5.

11.6. Operating Condition of EUT

Same as Conducted Emission test that is listed in Section 3.6. except the test set up replaced by Section 11.2

11.7. Test Procedure

- 1) Set up the EUT and test generator as shown on Section 11.2.
- 2) 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.
- 3) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test.
- 4) Different phase angles are done individually.
- 5) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

11.8. Test Results

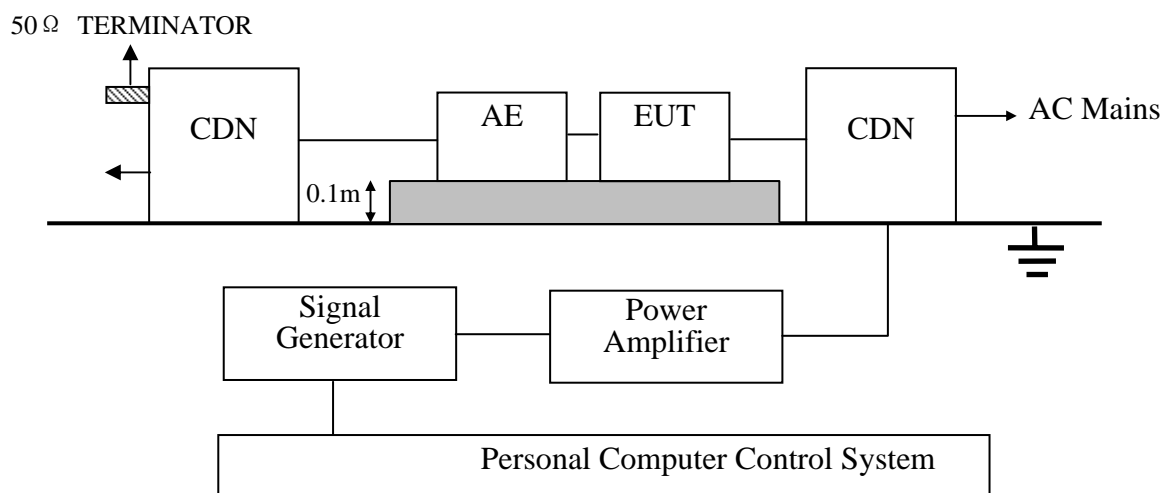
EUT Supply by Battery, so it not applicable.

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	2016.01.18	1 Year
2.	Fixed Coaxial Attenuator (6dB Attenuation)	CD	ATT-0675	120540086	2016.01.18	1 Year
3.	coupling-decoupling network (CDN)	CD	CDN M2/M3	2302	2016.01.18	1 Year
4.	Electromagnetic Injection Clamp (EMC-Clamp)	CD	EM-Clamp	0513A031201	2016.01.18	1 Year

12.2. Block Diagram of Test Setup



12.3. Test Standard

EN 55024:2010 (IEC61000-4-6:2013)

(Severity Level 2 at 3V (r.m.s.) and frequency is from 0.15MHz to 80MHz)

12.4. Severity Levels and Performance Criterion

12.4.1. Severity level

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

12.4.2. Performance criterion: A

12.5. EUT Configuration

The configurations of EUT are listed in Section 3.5.

12.6. Operating Condition of EUT

Same as Conducted Emission test that is listed in Section 3.6. except the test set up replaced by Section 12.2.

12.7. Test Procedure

- 1) Set up the EUT, CDN and test generators as shown on Section 12.2.
- 2) Let the EUT work in test mode and test it.
- 3) The EUT are placed on an insulating support 0.1m high above a ground reference plane. 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).
- 4) The disturbance signal described below is injected to EUT through CDN.
- 5) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- 6) 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.
- 7) The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
- 8) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

12.8. Test Results

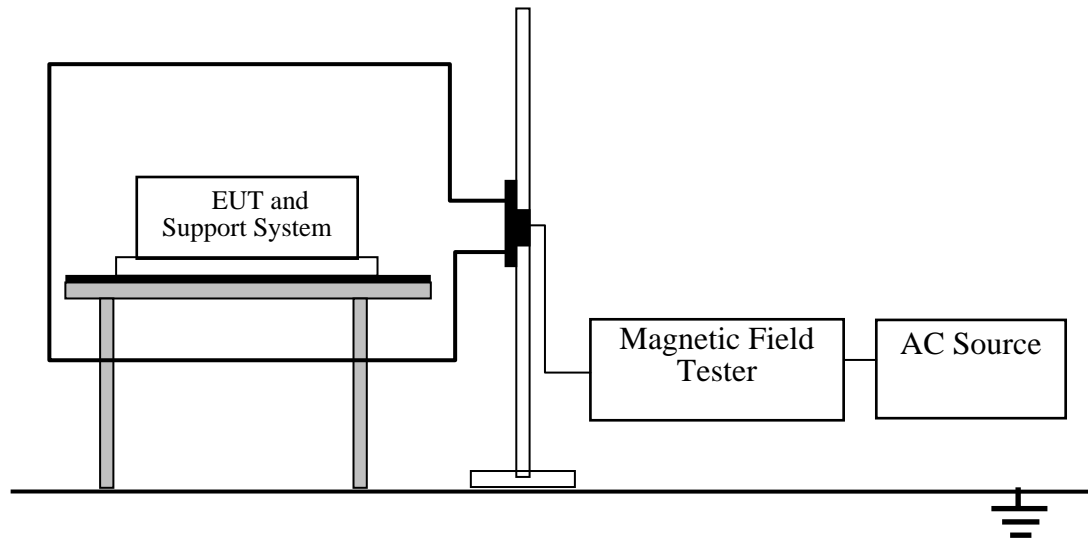
EUT Supply by Battery, so it not applicable.

13. MAGNETIC FIELD IMMUNITY TEST

13.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Magnetic Field Tester	HEAFELY	MAG100.1	083858-10	2016.01.18	1 Year

13.2. Block Diagram of Test Setup



13.3. Test Standard

EN 55024:2010 (IEC 61000-4-8:2009)
(Severity Level 1 at 1A/m)

13.4. Severity Levels and Performance Criterion

13.4.1. Severity level

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

13.4.2. Performance criterion : A

13.5. EUT Configuration on Test

The configurations of EUT are listed in Section 3.5.

13.6. Operating Condition of EUT

Same as Conducted Emission test that is listed in Section 3.6. except the test set up replaced by Section 13.2.

13.7. Test Procedure

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

13.8. Test Results

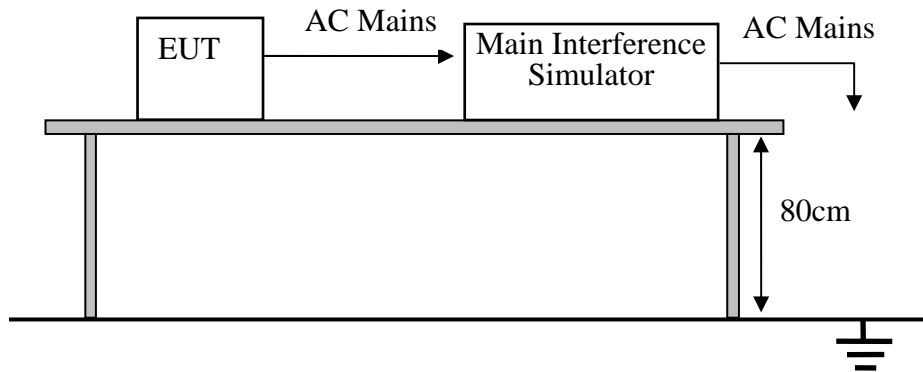
The EUT not containing devices susceptible to magnetic fields, and Power-frequency magnetic field test applicable only to EUT containing devices susceptible to magnetic fields, so the test not applicable.

14. VOLTAGE DIPS AND INTERRUPTIONS TEST

14.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Main Interference Simulator	3ctest	VDG-1105G	EC0171002	2016.01.18	1 Year

14.2. Block Diagram of Test Setup



14.3. Test Standard

EN 55024:2010 (IEC 61000-4-11:2004)

14.4. Severity Levels and Performance Criterion

14.4.1. Severity level

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
70	30	C	25

14.4.2. Performance criterion : **B & C**

14.5. EUT Configuration

The configurations of EUT are listed in Section 3.5.

14.6. Operating Condition of EUT

Same as Conducted Emission test that is listed in Section 3.6. except the test set up replaced by Section 14.2.

14.7. Test Procedure

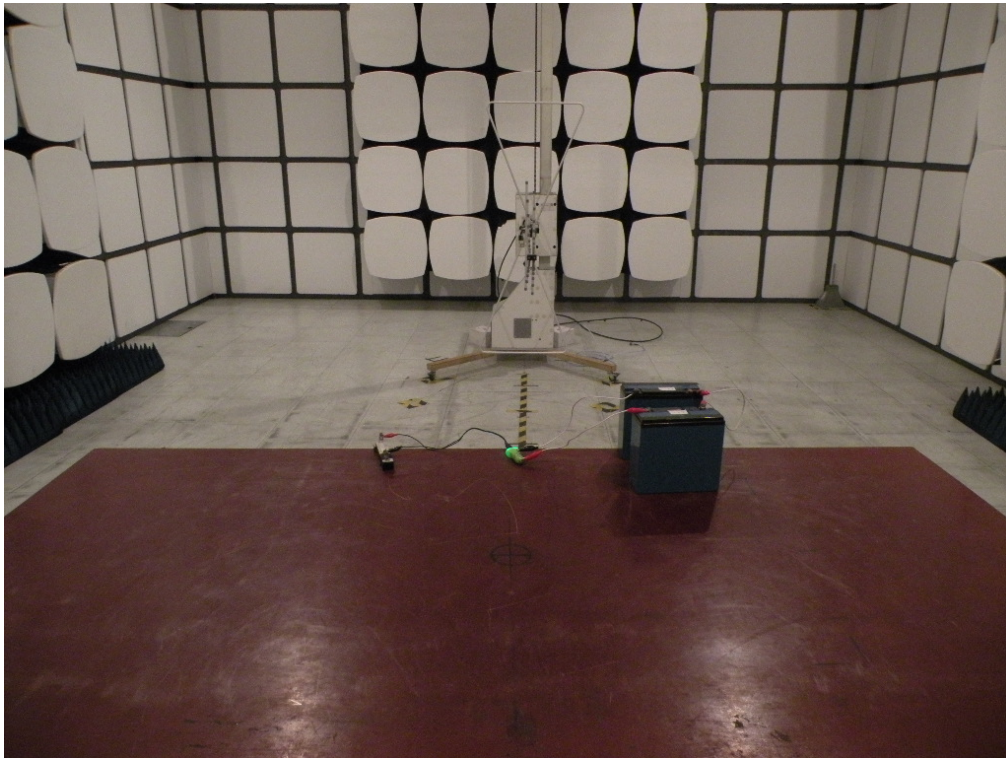
- 1) The EUT and test generator were setup as shown on Section 14.2.
- 2) The interruption is introduced at selected phase angles with specified duration.
- 3) Record any degradation of performance.

14.8. Test Results

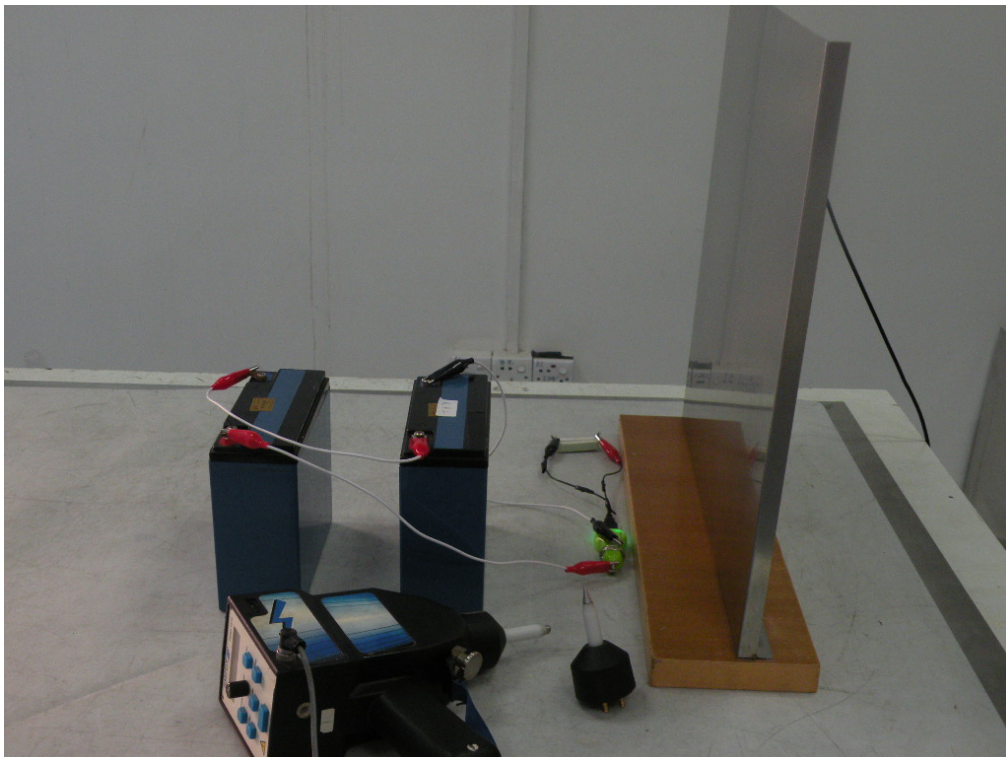
EUT Supply by Battery, so it not applicable.

15. PHOTOGRAPHS

15.1. Photos of Radiated Emission Test (In Anechoic Chamber)



15.2. Photos of Electrostatic Discharge Immunity Test



16. PHOTOS OF THE EUT



Full View



Front View



Rear View



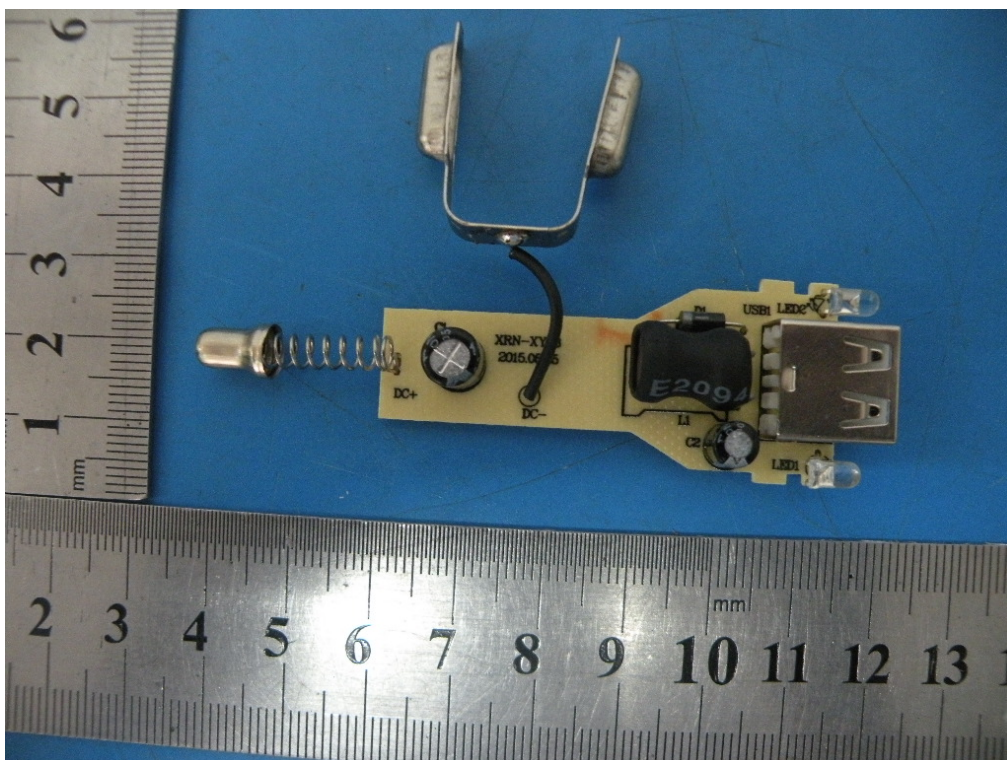
Top View

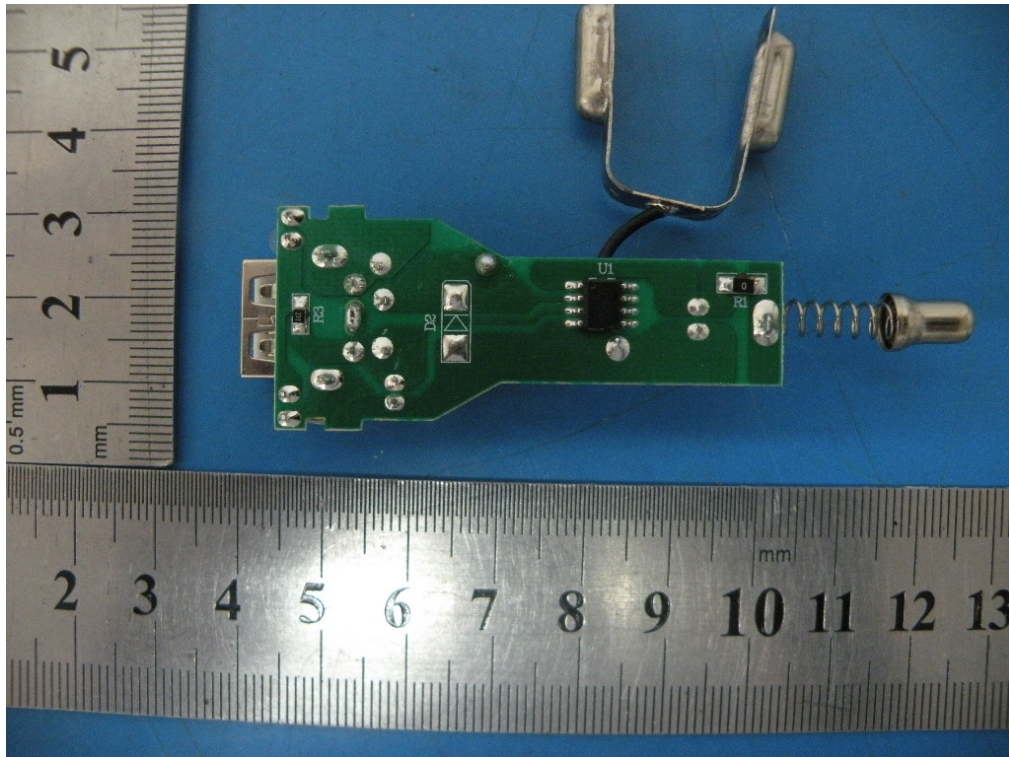


Bottom View



Left View

**Right View****Inside View**



Inside View

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