

Certificate of Test

April 2009

Promore Environment & Energy Co., Ltd

Product Type : Battery Charger
Model Number : CT-515
Test Report Number : 0903092E-01
Date of Test : March 25, 2009 – April 16, 2009

This Product was tested to the following standards at the laboratory of Global EMC Standard Tech. Corp., and found Compliance.

Standards:

EN 55014-1: 2006
EN 61000-3-2: 2006 & EN 61000-3-3: 1995 + A1: 2001 + A2: 2005
EN 55014-2: 1997 + A1: 2001, IEC 61000-4 Series

<http://www.gestek.com.tw>



Tonny Lin, President

GESTEK EMC LAB

N0. 3, Pau-Tou-Tsuo Valley, Chia-Pau Tsuen,
Lin Kou Hsiang, Taipei County, Taiwan, R.O.C.
TEL:886-2-2603-5321
FAX:886-2-2603-5325

Issue Date: April 21, 2009



Declaration of Conformity

We, Manufacturer/Importer
(full address)

declare that the product
(description of the apparatus, system, installation to which it refers)

EUT: Battery Charger

Model Number: CT-515

is in conformity with
(reference to the specification under which conformity is declared)
in accordance with 2004/108/EC -EMC Directive

- | | | | |
|---|--|---|---|
| <input type="checkbox"/> EN 55011 | Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) high frequency equipment | <input checked="" type="checkbox"/> EN 61000-3-2 | Disturbances in supply systems caused |
| <input type="checkbox"/> EN 55013 | Limits and methods of measurement Information Technology of radio disturbance characteristics of broadcast receivers and associated equipment | <input checked="" type="checkbox"/> EN 61000-3-3 | Disturbances in supply systems caused by household appliances and similar electrical equipment "Voltage fluctuations" |
| <input checked="" type="checkbox"/> EN 55014-1 | Limits and methods of measurement of radio disturbance characteristics of household electrical appliances, portable tools and similar electrical apparatus | <input type="checkbox"/> EN 55024 | Information Technology equipment-Immunity characteristics-Limits and methods of measurement |
| <input type="checkbox"/> EN 61000-6-3 | Generic standards-Emission standard for residential, commercial and light-industrial environments | <input type="checkbox"/> EN 61000-6-1 | Generic standards-Immunity for residential, commercial and light-industrial environments |
| <input type="checkbox"/> EN 61000-6-4 | Generic standards-Emission standard for industrial environments | <input type="checkbox"/> EN 61000-6-2 | Generic standards-Immunity for industrial environments |
| <input type="checkbox"/> EN 55015 | Limits and methods of measurement of radio disturbance characteristics of fluorescent lamps and luminaries | <input checked="" type="checkbox"/> EN 55014-2 | Immunity requirements for household appliances tools and similar apparatus |
| <input type="checkbox"/> EN 55022 | Limits and methods of measurement of radio disturbance characteristics of information technology equipment | <input type="checkbox"/> EN 50091- 2 | EMC requirements for uninterruptible power systems (UPS) |
| <input type="checkbox"/> DIN VDE 0855 | Cabled distribution systems; Equipment for receiving and/or distribution from sound and television signals | <input type="checkbox"/> EN 55020 | Immunity from radio interference of broadcast receivers and associated equipment |
| <input type="checkbox"/> part 10 | | <input type="checkbox"/> EN 61204-3 | Low voltage power supplies, d.c. output - Part 3: Electromagnetic compatibility. (EMC) |
| <input type="checkbox"/> part 12 | | | |

CE marking



The manufacturer also declares the conformity of above mentioned product with the actual required safety standards in accordance with LVD 2006/95/EC

- | | | | |
|--|---|--|---|
| <input type="checkbox"/> EN 60065 | Safety requirements for mains operated electronic and related apparatus for household and similar general use | <input type="checkbox"/> EN 60950 | Safety for information technology equipment including electrical business equipment |
| <input type="checkbox"/> EN 60335 | Safety of household and similar electrical appliances | <input type="checkbox"/> EN 50091-1 | General and Safety requirements for uninterruptible power systems (UPS) |


Manufacturer/Importer

(Stamp)

Date:

Signature: _____

Name: _____



**European Union [EU]
EMC Directive [2004/108/EC, As Amended]**

**EMC Test Report
For:**

Promore Environment & Energy Co., Ltd

EUT: Battery Charger

Model Number: CT-515

Prepared for:

Promore Environment & Energy Co., Ltd

No. 78, Sec. 3, Yunke Rd., Douliu City, Yunlin County 640, Taiwan (R.O.C.)

**Report By : Global EMC Standard Tech. Corp.
No.3 Pau-Tou-Tsuo Valley, Chia-Pau
Tsuen, Lin Kou Hsiang, Taipei County,
Taiwan, R.O.C.
Tel : 886-2-2603-5321
Fax: 886-2-2603-5325**

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1. CERTIFICATION

Applicant : Promore Environment & Energy Co., Ltd
 EUT Description : Battery Charger
 Model Number : CT-515
 Serial Number : N/A

STANDARDS OF TEST METHOD:

EN 55014-1: 2006 AND
EN 61000-3-2: 2006 & EN 61000-3-3: 1995 + A1: 2001 + A2: 2005
EN 55014-2: 1997 + A1: 2001 AND IEC 61000-4 SERIES REGULATIONS.

GENERAL REMARKS:

The tests were performed according to the technical requirement of EUT.

- Power test Emission Measurement (EN 55014-1)
- Electro-magnetic Conducted Emission Interference Measurement (EN 55014-1)
- Harmonic Current Emissions (EN 61000-3-2)
- Voltage Fluctuation and Flicker Measurement (EN 61000-3-3)
- ESD Immunity Test (IEC 61000-4-2)
- RF Field strength Susceptibility Test (IEC 61000-4-3)
- Electrical Fast Transient/Burst Immunity Test (IEC 61000-4-4)
- Surge Immunity Test (IEC 61000-4-5)
- Conducted disturbance Susceptibility Test (IEC 61000-4-6)
- Voltage Dips/Short Interruptions Test (IEC 61000-4-11)

Sample Received Data : March 25, 2009
Date of Test : March 25, 2009 – April 16, 2009
Issue Date : April 21, 2009

In order to ensure the quality and accuracy of this document, the contents have been thoroughly reviewed by the following qualified personnel from GesTek Lab.

Documented By:

Nico Hsu.

Nico Hsu / Adm. Dept. Technical Report Author

Tested By:

Jones Chang

Jones Chang / Eng. Dept. Engineer

Approved By:

Tony Tsai
 Tony Tsai / Eng. Dept. Manager

2. SUMMARY OF TEST RESULTS

STANDARD	TEST ITEM	TEST RESULT	REMARKS
EN 55014-1	Conducted emission (Mode 1)	PASS	The worst emission frequency is <u>0.5941</u> MHz. And minimum passing margin is <u>-0.52</u> dB. The measurement uncertainty is <u>3.6</u> dB.
	Power Test emission (Mode 1)	PASS	The worst emission frequency is <u>171.8209</u> MHz. And minimum passing margin is <u>-13.34</u> dB. The measurement uncertainty is <u>5.1</u> dB.
EN 61000-3-2: 2006	Harmonic Current Emissions	PASS	With regards to the EN 61000-3-2, the PC must be tested at full load in order to reach the assigned current of the Power supply. With Dummy Load Active Power > 75W (Note: EUT power level is below 75 Watts and therefore has no defined limits) The measurement uncertainty is 3.0 mA
EN 61000-3-3: 1995 + A1: 2001 + A2: 2005	Voltage Fluctuation and Flicker Measurement	PASS	The Value of Pst shall not be greater than 1.0 The measurement uncertainty under consideration
EN 55014-2 IEC 61000-4-2: 1995 + A1: 1998 + A2: 2000	Electrostatic Discharge(ESD)	PASS	Contact discharge up to <u>±4kV</u> . Air discharge up to <u>±8kV</u> .
EN 55014-2 IEC 61000-4-3: 2006	RF field strength Susceptibility	PASS	80-1000MHz (AM 80% @ 1KHz): 3V/m
EN 55014-2 IEC 61000-4-4: 2004	Electrical Fast Transients/Burst	PASS	±0.5kV, ±1kV(AC Input)
EN 55014-2 IEC 61000-4-5: 2005	Surge	PASS	±0.5kV, ±1kV(AC Input)
EN 55014-2 IEC 61000-4-6: 2003 + A1: 2004 + A2: 2006	Conducted Disturbance Susceptibility	PASS	0.15-80MHz (1kHz sinewave with 80% Amplitude Modulation: 3V)
EN 55014-2 IEC 61000-4-11: 2004	Voltage Dips	PASS	100% reduction, 10ms 30% reduction, 1000ms 60% reduction, 200ms

3. GENERAL INFORMATION

3.1 PRODUCT DESCRIPTION

Product Name : Battery Charger
Model Number : CT-515
Serial Number : N/A
Applicant : Promore Environment & Energy Co., Ltd
Address : No. 78, Sec. 3, Yunke Rd., Douliu City, Yunlin County 640, Taiwan (R.O.C.)
Manufacture : Promore Environment & Energy Co., Ltd
Address : No. 78, Sec. 3, Yunke Rd., Douliu City, Yunlin County 640, Taiwan (R.O.C.)
Power Supply : AC Input: 100-240V, 50-60Hz
Power Cord : 2Pins, 1.2m, Non-Shielded, Detachable

3.2 TEST MODES & EUT COMPONENTS DESCRIPTION

EUT: Battery Charger, M/N: CT-515	
Test Mode	Mode 1 – Charge Mode

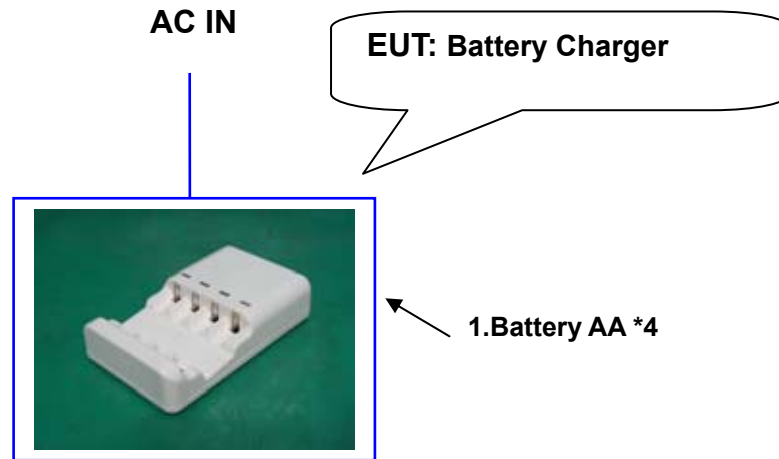
Note:

1. According to pre-scan data, we determine the data shown in this test report, which reflects the worst-case data for each operation mode.
2. Capacitor with yellow mylar tape: Main Testing Mother Board;
 Capacitor without yellow mylar tape: Photos only, not effect on testing results.

3.3 CONFIGURATION OF THE SYSTEM UNDER TEST

Item	Device	No.	Configuration
1	Battery AA (x4)	-----	Manufacturer : Panasonic Model Number : HHR-3MPA

3.4 BLOCK DIAGRAM OF CONNECTIONS BETWEEN EUT AND SIMULATORS



3.5 TEST FACILITY

Items	Requirement
Temperature (°C)	10-40
Humidity (%RH)	10-90
Barometric pressure (mbar)	860-1060

Site Description : December 31, 2011 File on NEMKO EMC Laboratory Authorization
 Gaustadalleen 30, Postbox 73 Blindern, 0314 Oslo, Aut. No.: ELA 126
 Accreditation on NVLAP effective through September 30, 2009.
 For CISPR 22, FCC Method and AS/NZS CISPR 22 Measurement.
 NVLAP Lab Code: 200085-0
 Registration on VCCI effective through June 25, 2011.
 Recognized by the Council of Taiwan Accreditation Foundation
 As an accredited laboratory and registration No.:1082.
 Registration on TAF effective through September 19, 2009.

Name of firm : Global EMC Standard Tech. Corp.

Site location : No. 3 Pau-Tou-Tsuo Valley, Chia-Pau Tsuen, Lin Kou Hsiang,
 Taipei County, Taiwan, R.O.C.



NVLAP LAB CODE 200085-0



4. CONDUCTED EMISSION MEASUREMENT

4.1 TEST EQUIPMENTS

Item	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
1	Test Receiver	R & S	ESCS30	825022/003	2009.06.01
2	L.I.S.N.(EUT)	R & S	ENV216	100006	2009.05.28
3	RF CABLE	GTK	N/A	GTK-E-A154-01	2010.01.15
4	50 Ohm Terminator	GTK	N/A	GTK-E-A130-01	N/A
5	Shielded Room	GTK	N/A	B5	N/A

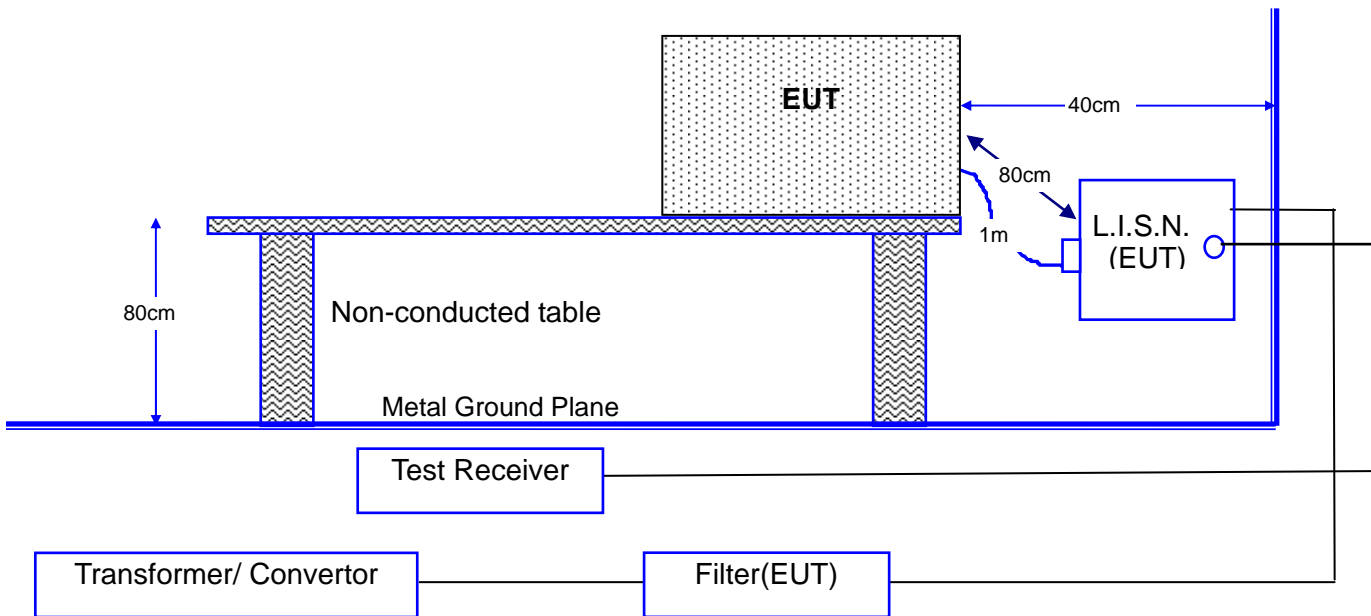
Note: All measurement critical items of test instrumentation were within their calibration period of 1 year.

4.2 TEST METHOD

According to EN 55014-1: 2006

4.3 BLOCK DIAGRAM OF TEST SETUP

4.3.1 TEST SETUP FOR EMISSION MEASUREMENT AT MAINS TERMINAL



Note: This is a representative setup diagram for Table-top EUT.

For Floor-standing EUT, the table will be removed with all others setup condition remain the same.

4.4 CONDUCTED EMISSION LIMITS

Frequency Range	At mains terminals	
	1	3
MHz	dB(uV) Quasi-peak	dB(uV) Average
0.15 to 0.50	Decreasing linearly with the logarithm of the frequency from: 65 to 56 59 to 46	
0.50 to 5.0	56	46
5.0 to 30	60	50

Remarks: In the Above Table, the tighter limit applies at the band edges.

4.5 EUT CONFIGURATION ON MEASUREMENT

The equipments, which are listed at 4.1, are installed on Conducted Emission Test to meet the Commission requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

The device under test, installed in a representative system as described in section 4.3, was placed on a non-conductive table whose total height equaled 80 cm. The EUT was powered through one L.I.S.N. whose the signal output was terminated to the receiver. The other peripherals were powered from another L.I.S.N. whose the signal output was terminated by 50 Ohms terminator.

4.6 CONDUCTED EMISSION DATA

The measurement range of conducted emission, which is from [0.15 MHz to 30 MHz](#), was investigated. The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range for all the test modes. Then the worst modes were reported the following data pages.

The final measurement equal to Receiver reading plus a Correction factor when AMN insertion loss bigger than 0.5dB, the receiver added the correction factor to the reading level automatically.

4.7 OPERATING CONDITIONS OF THE EUT

The exercise program used during conducted emission measurement was designed to exercise the EUT in a manner similar to a typical use. The exercise sequence is listed as below:

1. Setup the EUT and simulators as shown on 4.3.
2. Turn on the power of all equipments.
3. Start test.

4.8 CONDUCTED EMISSION MEASUREMENT RESULTS

Date of Test	April 16, 2009	Temperature	26 °C
EUT	Battery Charger	Humidity	60 %
Test Mode	Mode 1	Display Pattern	N/A
Test Power Supply	AC 230V/50Hz		

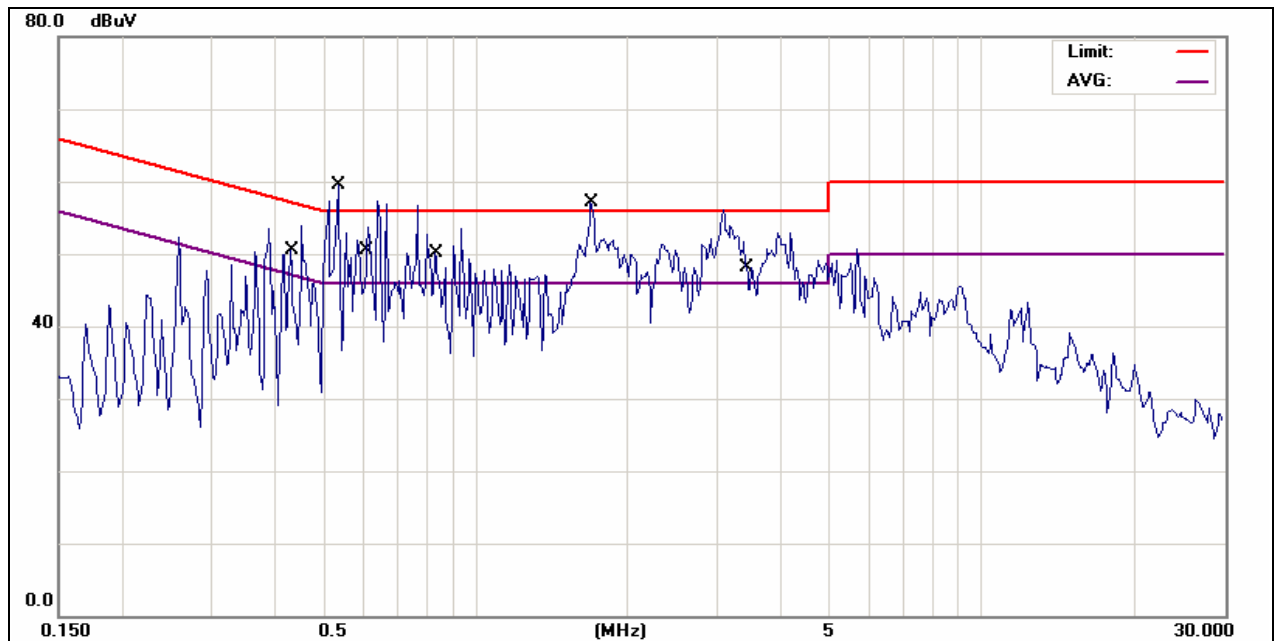
Line

No	Frequency MHz	Reading Level dBµV	Factor dB	Measurement dBµV	Limit dBµV	Over Limit dB	Detector
1	0.4337	29.00	9.92	38.92	57.18	-18.26	QP
2	0.4337	19.54	9.92	29.46	47.18	-17.72	AVG
3	0.5315	32.02	9.93	41.95	56.00	-14.05	QP
4	0.5315	22.46	9.93	32.39	46.00	-13.61	AVG
5	0.6037	40.26	9.94	50.20	56.00	-5.80	QP
6	0.6037	30.58	9.94	40.52	46.00	-5.48	AVG
7	0.8181	28.91	9.96	38.87	56.00	-17.13	QP
8	0.8181	19.25	9.96	29.21	46.00	-16.79	AVG
9	★1.7046	41.10	10.03	51.13	56.00	-4.87	QP
10	1.7046	29.98	10.03	40.01	46.00	-5.99	AVG
11	3.4548	27.00	10.11	37.11	56.00	-18.89	QP
12	3.4548	17.49	10.11	27.60	46.00	-18.40	AVG

Remarks :

1. All readings are Quasi-peak and Average values.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = L.I.S.N. insertion loss + cable loss
5. “ ★ ” means that this data is the worse case measurement level.
6. The measurement uncertainty is 3.6 dB.

Line



Remark: 1. The "Limit" in right-up corner in above diagram refers to Quasi-peak ; "AVG" refers to the limit of Average.

Date of Test	April 16, 2009	Temperature	26 °C
EUT	Battery Charger	Humidity	60 %
Test Mode	Mode 1	Display Pattern	N/A
Test Power Supply	AC 230V/50Hz		

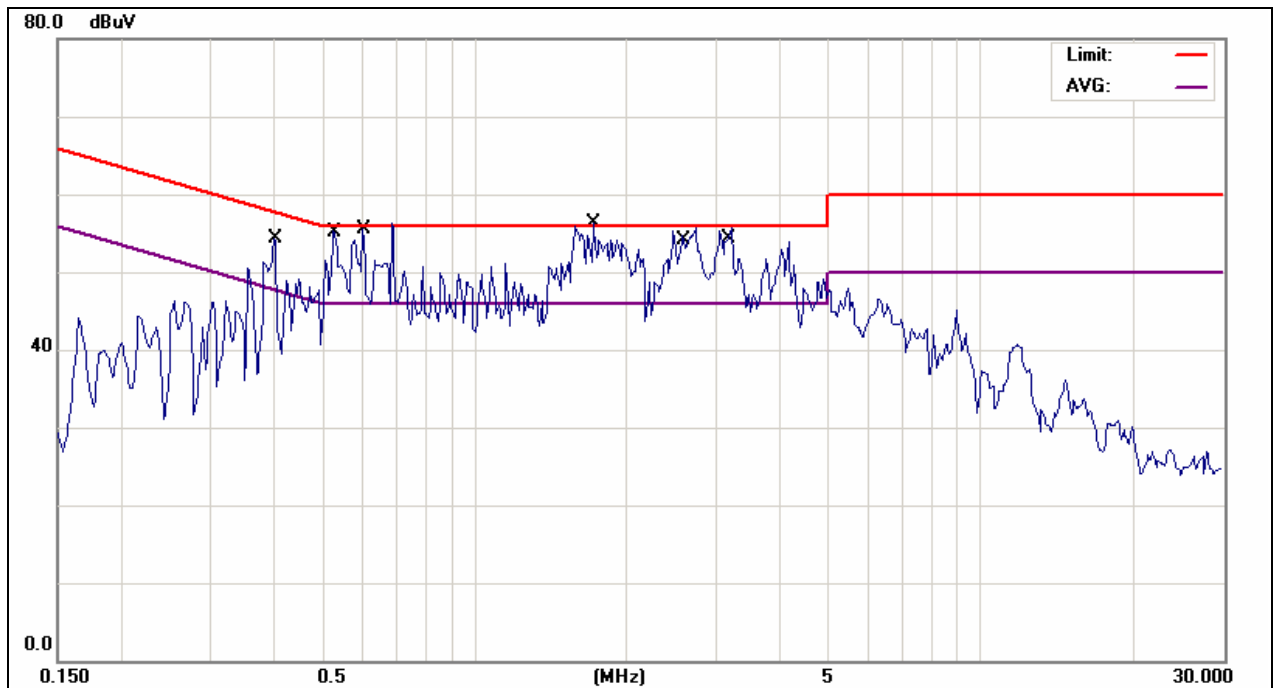
Neutral

No	Frequency MHz	Reading Level dBµV	Factor dB	Measurement dBµV	Limit dBµV	Over Limit dB	Detector
1	0.3989	43.08	9.77	52.85	57.88	-5.03	QP
2	0.3989	33.33	9.77	43.10	47.88	-4.78	AVG
3	0.5229	44.30	9.79	54.09	56.00	-1.91	QP
4	0.5229	33.43	9.79	43.22	46.00	-2.78	AVG
5	0.5941	41.70	9.79	51.49	56.00	-4.51	QP
6	★0.5941	35.69	9.79	45.48	46.00	-0.52	AVG
7	1.7342	41.11	9.88	50.99	56.00	-5.01	QP
8	1.7342	32.68	9.88	42.56	46.00	-3.44	AVG
9	2.6131	39.77	9.93	49.70	56.00	-6.30	QP
10	2.6131	30.54	9.93	40.47	46.00	-5.53	AVG
11	3.1336	40.14	9.95	50.09	56.00	-5.91	QP
12	3.1336	31.30	9.95	41.25	46.00	-4.75	AVG

Remarks :

- All readings are Quasi-peak and Average values.
- Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
- Over Limit (Margin Value)=Measurement level-Limit value.
- Factor = L.I.S.N. insertion loss + cable loss
- “ ★ ” means that this data is the worse case measurement level.
- The measurement uncertainty is 3.6 dB.

Neutral



Remark: 1. The "Limit" in right-up corner in above diagram refers to Quasi-peak ; "AVG" refers to the limit of Average.

5. POWER TEST EMISSION MEASUREMENT

5.1 TEST EQUIPMENT

The following test equipments are used during the radiated emission tests:

Radiated test was performed on:

Item	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
1	Receiver	R & S	ESCS30	825022/003	2009.06.01
2	Absorbing Clamp	SCHWARZBECK	MDS21	02822	2010.03.19
3	RF Cable	GTK	N/A	GTK-E-A153-01	2009.11.17
4	SHIELDING ROOM	GTK	N/A	A9	N/A

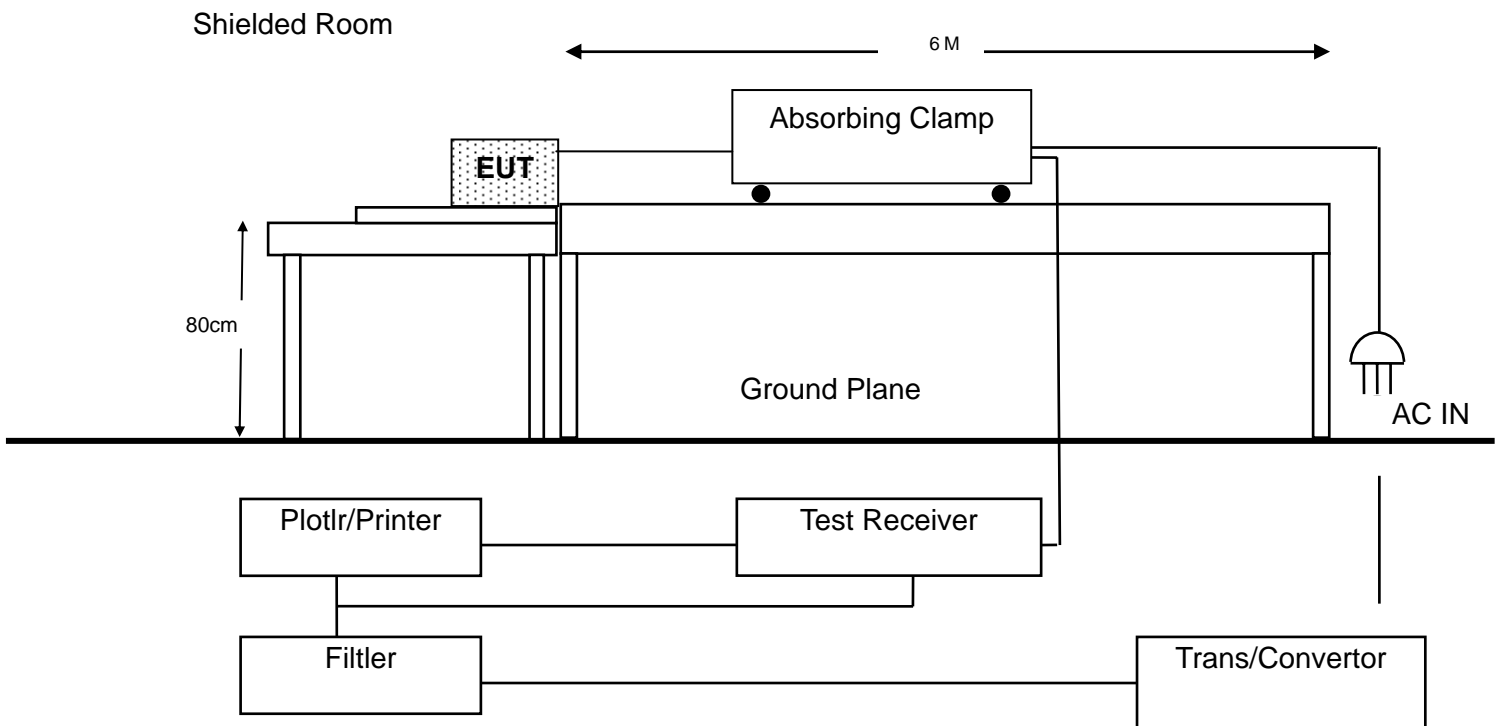
Note: All measurement critical items of test instrumentation were within their calibration period of 1 year.

5.2 TEST METHOD

According to EN 55014-1: 2006

5.3 BLOCK DIAGRAM OF TEST SETUP

5.3.1 TEST SETUP FOR EMISSION MEASUREMENT POWER TEST



5.4 POWER TEST EMISSION LIMIT

	Household and similar appliances	
1	2	3
Frequency range		
(MHz)	dB (pW) Quasi-Peak	dB (pW) Average
30 to 300	45 to 55	35 to 45

5.5 EUT CONFIGURATION

The equipments which is listed 5.3 are installed on Power Test Emission Test to meet the Commission requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

5.6 OPERATING CONDITION OF THE EUT

Same as conducted emission measurement, which is listed in 4.7

5.7 RADIATED POWER TEST DATA

The measurement range of radiated power test which is from **30 MHz to 300 MHz** was investigated. The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range for all the test modes. Then the worst modes were reported the following data pages .

5.8 POWER TEST EMISSIONS MEASUREMENT RESULTS

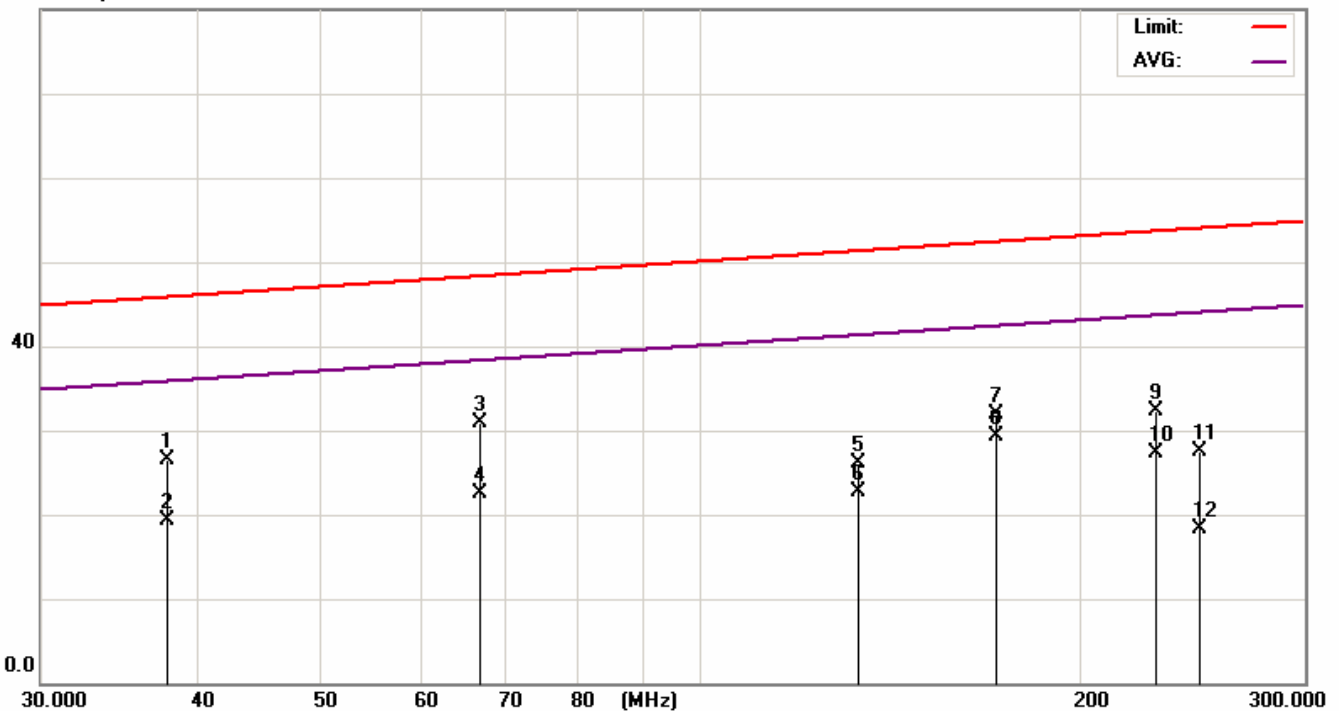
Date of Test	March 27, 2009	Temperature	24 deg/C
EUT	Battery Charger	Humidity	40 %RH
Working Cond.	Mode 1	Display Pattern	N/A
Antenna distance	N/A	Frequency Range	30-300MHz
Test Power Supply	AC 230V/50Hz		

No.	Frequency MHz	Reading Level dBuV	Factor dB	Measurement dBpW	Limit dBpW	Over Limit dB	Detector
1	37.8477	10.02	16.39	26.41	46.01	-19.60	QP
2	37.8477	3.00	16.39	19.39	36.01	-16.62	AVG
3	66.8222	14.45	16.40	30.85	48.48	-17.63	QP
4	66.8222	6.04	16.40	22.44	38.48	-16.04	AVG
5	133.6333	9.70	16.45	26.15	51.49	-25.34	QP
6	133.6333	6.25	16.45	22.70	41.49	-18.79	AVG
7	171.8209	15.34	16.56	31.90	52.58	-20.68	QP
8	★171.8209	12.68	16.56	29.24	42.58	-13.34	AVG
9	229.5751	15.49	16.77	32.26	53.84	-21.58	QP
10	229.5751	10.59	16.77	27.36	43.84	-16.48	AVG
11	248.8171	10.65	16.94	27.59	54.19	-26.60	QP
12	248.8171	1.38	16.94	18.32	44.19	-25.87	AVG

Remarks:

1. All readings are Quasi-peak and Average values.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. “★” means that this data is the worse case measurement level.
6. The measurement uncertainty is 5.1 dB.

80.0 dBpW



Remark: 1. The “Limit” in right-up corner in above diagram refers to Quasi-peak ; “AVG” refers to the limit of Average.

6. HARMONIC CURRENT EMISSIONS, VOLTAGE FLUCTUATIONS AND FLICKER MEASUREMENT

6.1 TEST EQUIPMENT

Item	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
1	Signal Conditioning Unit	SCHAFFNER	CCN1000-1	72282	2009.05.22
2	AC Power Source	PACIFIC	345AMX/UPC32	270	2009.12.21
3	SOFTWARE	SCHAFFNER	WIN2100 V3	N/A	N/A
4	Shielding Room	GTK	N/A	B7	N/A

Note: All measurement critical items of test instrumentation were within their calibration period of 1 year.

6.2 TEST METHOD

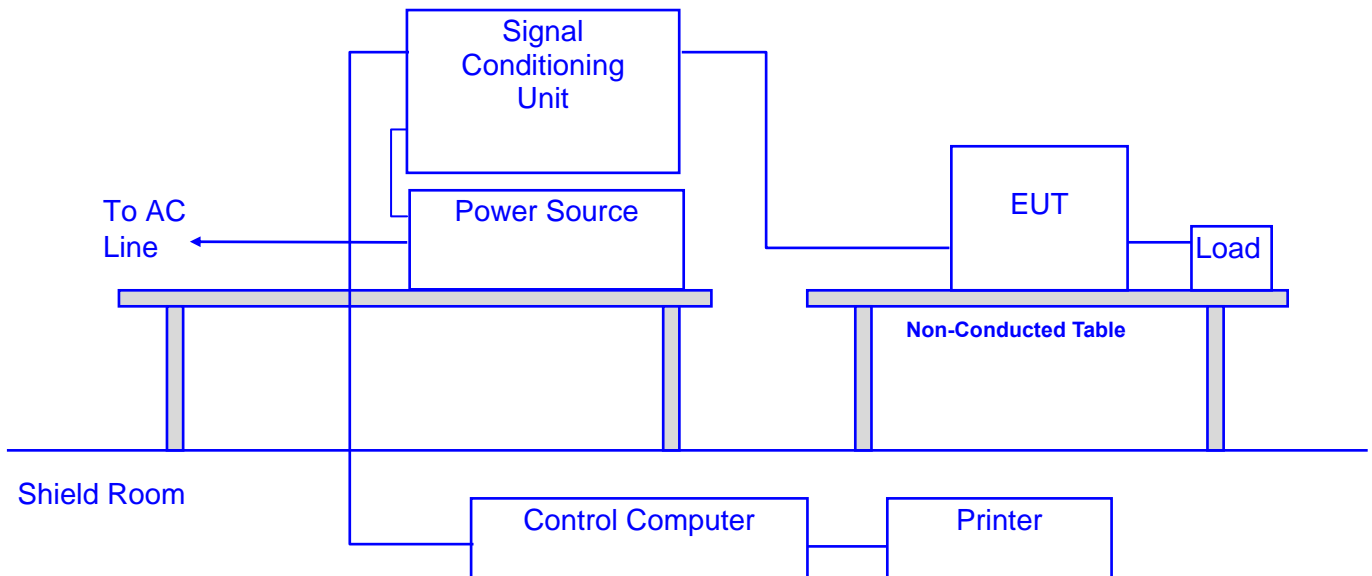
According to EN 61000-3-2: 2006 (Note: EUT power level is below 75 Watts and therefore has no defined limits)

EN 61000-3-3: 1995 + A1: 2001 + A2: 2005.

6.3 BLOCK DIAGRAM OF TEST SETUP

Note: This is a representative setup diagram for Table-top EUT.

For Floor-standing EUT, the table will be removed with all others setup condition remain the same.



6.4 LIMITS OF FLICKER MEASUREMENT

Flicker:

Limits	
P_{st}	1.0
P_{lt}	0.65
$d(t)$	3.3%
Time(ms)>dt	500ms
d_c	3.3%
d_{max}	4%

6.5 OPERATING CONDITIONS OF THE EUT

1. Setup the EUT and Test Equipment as shown on 6.3.
2. Power on the EUT. Acting performance checking program to allow EUT executing its usual operation mode during test.

6.6 TEST PROCEDURE

6.6.1 Flicker:

The test voltage supplied the EUT shall be maintained within $230V \pm 2\%$.

The frequency shall be $50Hz \pm 0.5\%$.

The observation period T_p :

-for P_{st} $T_p=10min$.

-for P_{lt} $T_p=2h$.

6.7 TEST RESULT

1. The measurement of the power harmonics and flicker, which test at the extremes of EUT's supply range was investigated, and the test result are reported the following data pages.
The measurement limits were met, and the EUT passed the test.
2. The Flicker measurement uncertainty under consideration.

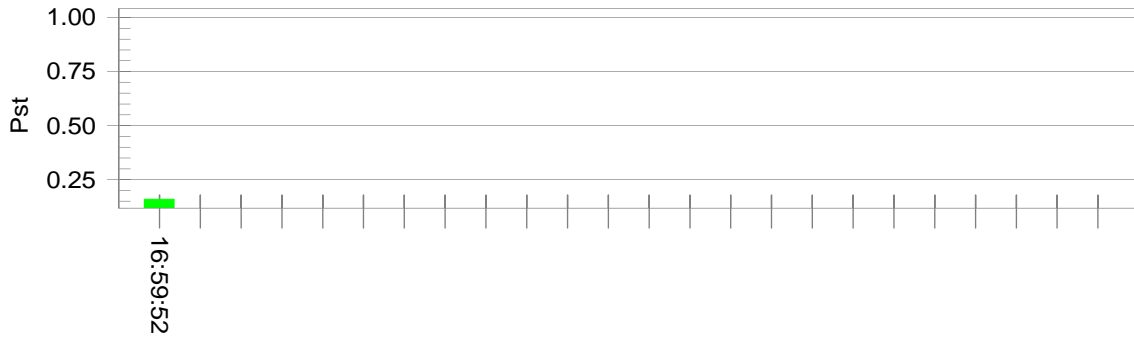
Flicker Test Summary per EN/IEC61000-3-3 (Run time)

EUT: Battery Charger Tested by: Jones
 Test category: All parameters (European limits) Test Margin: 100
 Test date: 2009/4/16 Start time: PM 04:49:32 End time: PM 04:59:52
 Test duration (min): 10 Data file name: F-000076.cts_data
 Comment: M/N: CT-515
 Customer: Promore Environment & Energy Co., Ltd

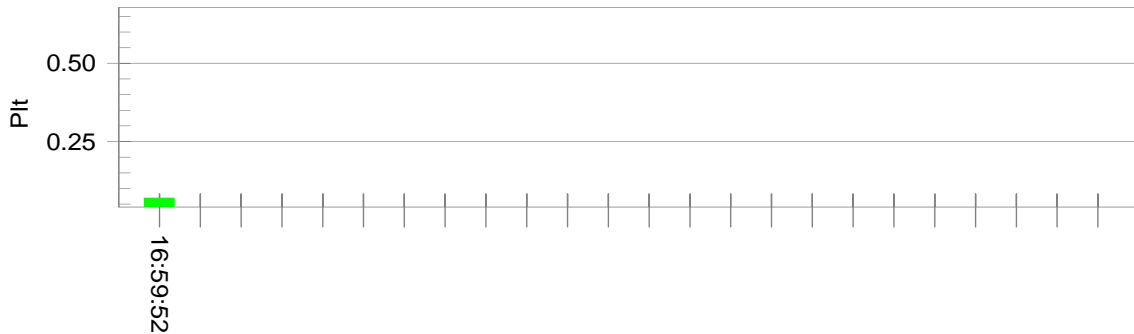
Test Result: Pass Status: Test Completed

Pst_i and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt): 228.21				
Highest dt (%):	0.00	Test limit (%):	3.30	Pass
Time(mS) > dt:	0.0	Test limit (mS):	500.0	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	0.00	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.160	Test limit:	1.000	Pass
Highest Plt (2 hr. period):	0.070	Test limit:	0.650	Pass

7. ESD IMMUNITY TEST

7.1 TEST EQUIPMENT

Item	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
1	ESD SIMULATOR SYSTEM	EM TEST	ESD 30C	0201-03	N/A
2	Shielded Room	GTK	N/A	B4	N/A

Note: All measurement critical items of test instrumentation were within their calibration period of 1 year.

7.2 TEST METHOD

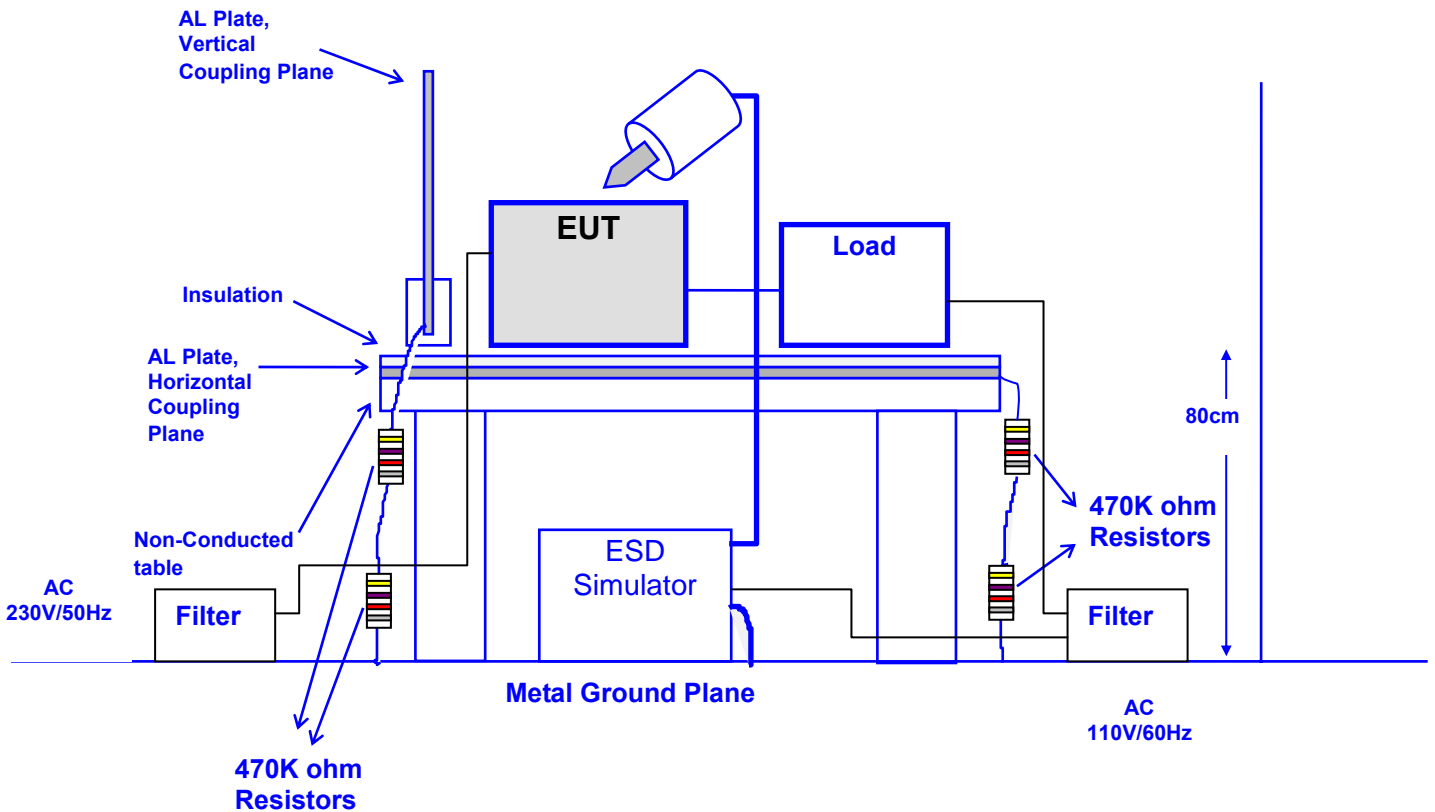
According to EN 55014-2: 1997 + A1: 2001

IEC 61000-4-2: 1995 + A1: 1998 + A2: 2000

7.3 BLOCK DIAGRAM OF TEST SETUP

Note: This is a representative setup diagram for Table-top EUT.

For Floor-standing EUT, the table will be removed with all others setup condition remain the same.



7.4 SEVERITY LEVELS

Required Performance Criteria : B
Level : $\pm 8\text{kV}$ and lower levels (Air Discharge)
 $\pm 4\text{kV}$ and lower levels (Contact Discharge)

7.5 OPERATING CONDITIONS OF THE EUT

1. Setup the EUT and Test Equipment as shown on 7.3.
2. Power on the EUT. Acting performance checking program to allow EUT executing its usual operation mode during test.

7.6 TEST PROCEDURE

Air Discharge:

This test was performed on non-conductive surfaces in accordance with IEC 61000-4-2: 1995 + A1: 1998 + A2: 2000

Single discharge at > 1-second interval, at least 10 positive & 10 negative discharges.

Air discharges to surfaces of the EUT.

Contact Discharge:

Single discharge at > 1-second interval, at least 25 positive & 25 negative discharges.

Horizontal Coupling Plane (HCP) under the EUT & Vertical Coupling Plane (VCP) beside the 4 sides of the EUT, with the sharp discharge electrode touching the coupling plane.

HCP discharge:

ESD was applied to the earth reference plane on each accessible side of the EUT.

VCP discharge:

Vertical Coupling Plane was positioned at a distance of 0.1m from the EUT.

The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points.

7.7 TEST RESULT

Date of Test	April 16, 2009	Temperature	20 °C
Test Mode	Mode 1	Humidity	60 %
Test Power Supply	AC 230V/50Hz		

Item	Amount of Discharge	Voltage	Required Criteria	Complied to Criteria (A, B, C)	Result
Air Direct Discharge	10	<input checked="" type="checkbox"/> +2kV <input checked="" type="checkbox"/> +4kV <input checked="" type="checkbox"/> +8kV	B	A	PASS
	10	<input checked="" type="checkbox"/> -2kV <input checked="" type="checkbox"/> -4kV <input checked="" type="checkbox"/> -8kV	B	A	PASS
Contact Direct Discharge	25	<input checked="" type="checkbox"/> +2kV <input checked="" type="checkbox"/> +4kV <input type="checkbox"/> +6kV	B	A	PASS
	25	<input checked="" type="checkbox"/> -2kV <input checked="" type="checkbox"/> -4kV <input type="checkbox"/> -6kV	B	A	PASS
Indirect Discharge (HCP)	25	<input checked="" type="checkbox"/> +2kV <input checked="" type="checkbox"/> +4kV <input type="checkbox"/> +6kV	B	A	PASS
	25	<input checked="" type="checkbox"/> -2kV <input checked="" type="checkbox"/> -4kV <input type="checkbox"/> -6kV	B	A	PASS
Indirect Discharge (VCP) (Front)	25	<input checked="" type="checkbox"/> +2kV <input checked="" type="checkbox"/> +4kV <input type="checkbox"/> +6kV	B	A	PASS
	25	<input checked="" type="checkbox"/> -2kV <input checked="" type="checkbox"/> -4kV <input type="checkbox"/> -6kV	B	A	PASS
Indirect Discharge (VCP) (Left)	25	<input checked="" type="checkbox"/> +2kV <input checked="" type="checkbox"/> +4kV <input type="checkbox"/> +6kV	B	A	PASS
	25	<input checked="" type="checkbox"/> -2kV <input checked="" type="checkbox"/> -4kV <input type="checkbox"/> -6kV	B	A	PASS
Indirect Discharge (VCP) (Back)	25	<input checked="" type="checkbox"/> +2kV <input checked="" type="checkbox"/> +4kV <input type="checkbox"/> +6kV	B	A	PASS
	25	<input checked="" type="checkbox"/> -2kV <input checked="" type="checkbox"/> -4kV <input type="checkbox"/> -6kV	B	A	PASS
Indirect Discharge (VCP) (Right)	25	<input checked="" type="checkbox"/> +2kV <input checked="" type="checkbox"/> +4kV <input type="checkbox"/> +6kV	B	A	PASS
	25	<input checked="" type="checkbox"/> -2kV <input checked="" type="checkbox"/> -4kV <input type="checkbox"/> -6kV	B	A	PASS

- Meet criteria A: Operate as intended during and after the test
 - Meet criteria B: Operate as intended after the test
 - Meet criteria C: Loss/Error of function
 - Additional Information
 - There was no observable degradation in performance.
 - No false alarms or other malfunctions were observed during or after the test.
- ★The green tag means the air discharge point. (see the report page 35)
 ★The red tag means the contact point. (see the report page 35)

8. RF FIELD STRENGTH SUSCEPTIBILITY TEST

8.1 TEST EQUIPMENT

Item	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
1	SIGNAL GENERATOR	R & S	SML03	101639	2009.06.01
2	AMPLIFIER	A & R	250W1000A	313023	N/A
3	Field Strength Meter	A & R	FM2000	16837	N/A
4	BILOG Antenna	R & S	ULTRALOG HL562	100282	N/A
5	CHAMBER	GTK	N/A	B3	2009.12.09
6	EMS Program Software	GesTek	GTK-E-S001-01 GTK-E-S004-01	N/A	N/A

Note: All measurement critical items of test instrumentation were within their calibration period of 1 year.

8.2 TEST METHOD

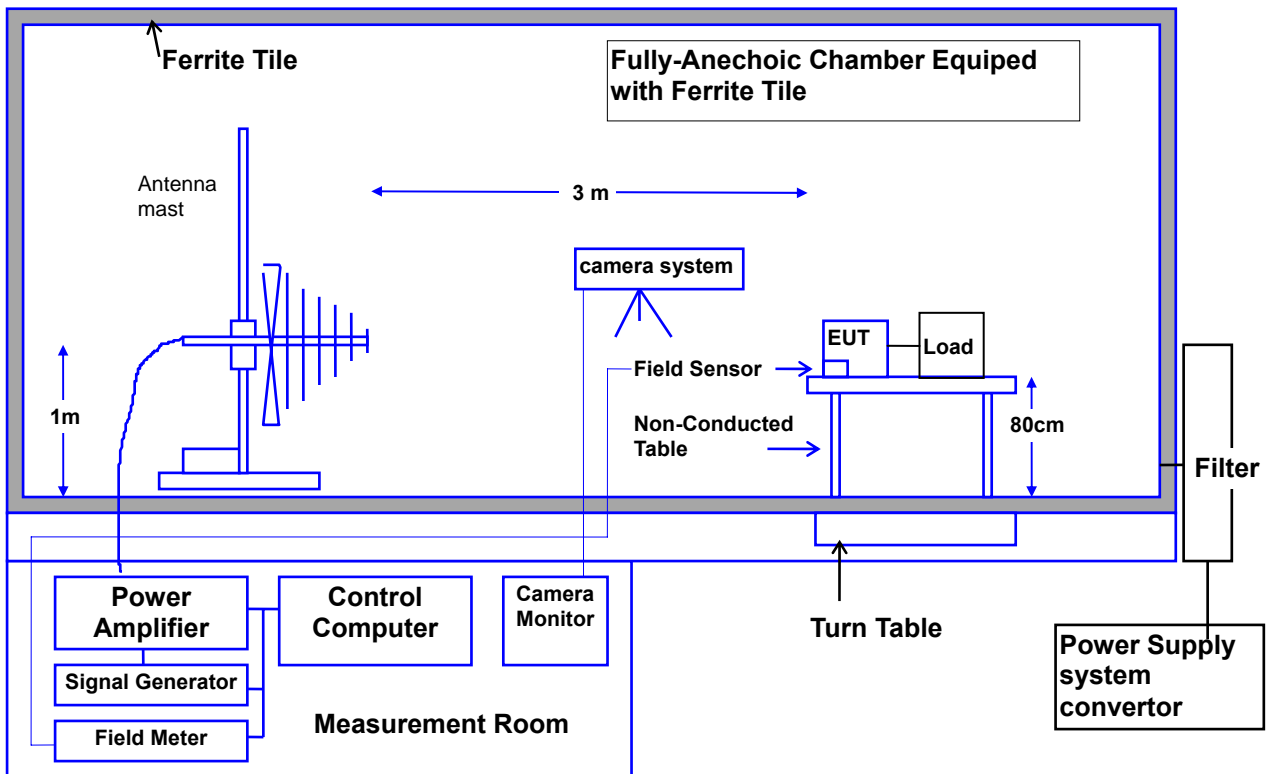
According to EN 55014-2: 1997 + A1: 2001

IEC 61000-4-3: 2006

8.3 BLOCK DIAGRAM OF TEST SETUP

Note: This is a representative setup diagram for Table-top EUT.

For Floor-standing EUT, the table will be removed with all others setup condition remain the same.



8.4 SEVERITY LEVELS

Required Performance Criteria : A
 Level : 80~1000MHz(1KHz sinewave with 80% Amplitude modulation): 3V/m.

8.5 OPERATING CONDITIONS OF THE EUT

1. Setup the EUT and Test Equipment as shown on 8.3.
2. Power on the EUT. Acting performance checking program to allow EUT executing its usual operation mode during test.

8.6 TEST PROCEDURE

The EUT and load were placed on a table, which was 0.8 meters high. The field sensor was also placed on the same table to monitor field strength from transmitting antenna. EUT was set 3 meters away from the transmitting antenna. The transmitting antenna was fixed at 1 meter above ground. Both horizontal and vertical polarizations of the antenna were used during testing. In order to judge the EUT performance, a CCD camera was used to monitor the EUT screen.

All the scanning conditions are as follows:

Condition of Test	Remarks
Field Strength	3V/m
Radiated Signal	80MHz-1000MHz (1KHz sinewave with 80% Amplitude modulation)
Frequency step size Δf :	$\Delta f = f (n-1) *1\%$
Where:	Δf = frequency step size $f (n-1)$ = previous test frequency

8.7 TEST RESULT

Date of Test	April 16, 2009	Temperature	22 °C
Test Mode	Mode 1	Humidity	60 %
Test Power Supply	AC 230V/50Hz		

Freq. Range (MHz)	Position (Angle)	Polarity (H or V)	Field Strength (V/m)	Performance Criteria Complied to	Results
<input type="checkbox"/> 26-80 MHz	0	H / V	3	A	PASS
<input checked="" type="checkbox"/> 80-1000 MHz	90	H / V	3	A	PASS
<input type="checkbox"/> 900 ± 5 MHz	180	H / V	3	A	PASS
	270	H / V	3	A	PASS

- Meet criteria A: Operate as intended during and after the test
- Meet criteria B: Operate as intended after the test
- Meet criteria C: Loss/Error of function
- Additional Information
 - There was no observable degradation in performance.
 - No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

9. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

9.1 TEST EQUIPMENT

Item	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
1	ULTRA COMPACT GENERATOR	EM TEST	UCS 500-M	0500-15	2009.04.27

Note: All measurement critical items of test instrumentation were within their calibration period of 1 year.

9.2 TEST METHOD

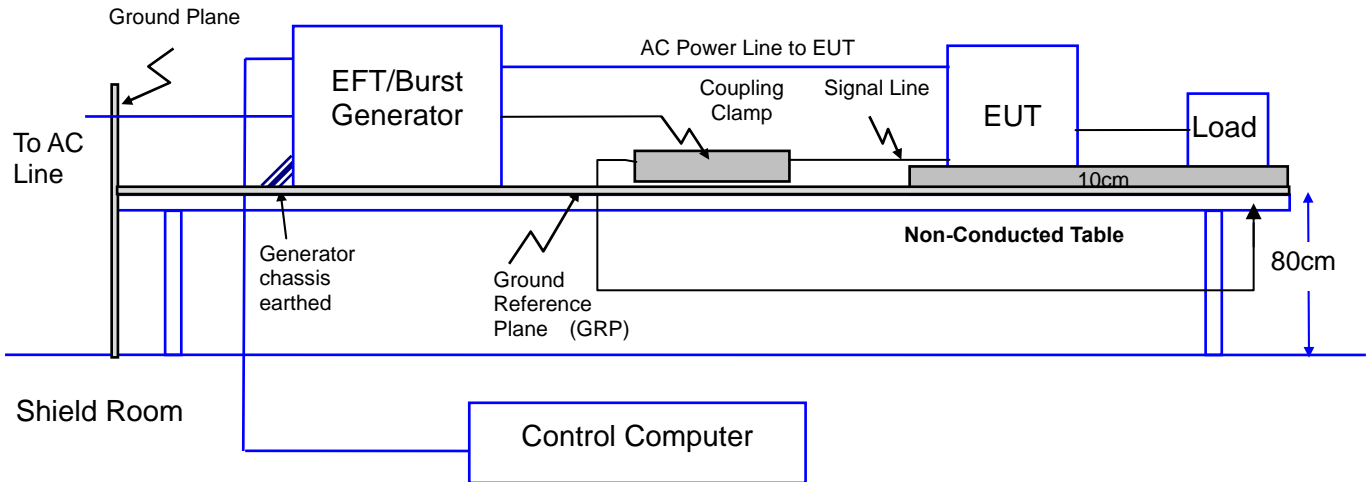
According to EN 55014-2: 1997 + A1: 2001

IEC 61000-4-4: 2004

9.3 BLOCK DIAGRAM OF TEST SETUP

Note: This is a representative setup diagram for Table-top EUT.

For Floor-standing EUT, the table will be removed with all others setup condition remain the same.



9.4 SEVERITY LEVELS

Required Performance Criteria : B
 Level : ±0.5kV, ±1.0kV for Power Lines

9.5 OPERATING CONDITIONS OF THE EUT

1. Setup the EUT and Test Equipment as shown on 9.3.
2. Power on the EUT. Acting performance checking program to allow EUT executing its usual operation mode during test.

The EUT and its load were placed on a table which was 0.8 meters above a metal ground plane measuring 2m by 2m and 0.65mm thick min, and projecting beyond the EUT by at least 0.1m on all sides. More then 0.5 meters separated the EUT from the walls of the shielded room.

Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance.

For AC Power lines test:

The EUT is connected to the power mains through a coupling/decoupling network that directly injected the transient energy. Bursts of pulse trains were injected onto the power line, in both positive and negative polarities. The test level was 0.5kV & 1.0kV. The Line, and Neutral, conductors were impressed with burst noise for one minute.

9.6 TEST RESULT

Date of Test	March 25, 2009	Temperature	22 °C
Test Mode	Mode 1	Humidity	60 %
Test Power Supply	AC 230V/50Hz		

Inject Place: Power Supply Line							
Inject Line	Polarity	Voltage KV	Inject time (minute)	Inject Method	Required Criteria	Complied to Criteria	Result
L	+	<input checked="" type="checkbox"/> 0.5	1	DIRECT	B	A	PASS
N		<input checked="" type="checkbox"/> 1.0	1	DIRECT	B	A	PASS
L+N		<input type="checkbox"/> 2.0	1	DIRECT	B	A	PASS
L	-	<input checked="" type="checkbox"/> 0.5	1	DIRECT	B	A	PASS
N		<input checked="" type="checkbox"/> 1.0	1	DIRECT	B	A	PASS
L+N		<input type="checkbox"/> 2.0	1	DIRECT	B	A	PASS

- Meet criteria A: Operate as intended during and after the test
- Meet criteria B: Operate as intended after the test
- Meet criteria C: Loss/Error of function
- Additional Information
 - There was no observable degradation in performance.
 - No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

10. SURGE IMMUNITY TEST

10.1 TEST EQUIPMENT

Item	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
1	ULTRA COMPACT GENERATOR	EM TEST	UCS 500-M	0500-15	2009.04.27

Note: All measurement critical items of test instrumentation were within their calibration period of 1 year.

10.2 TEST METHOD

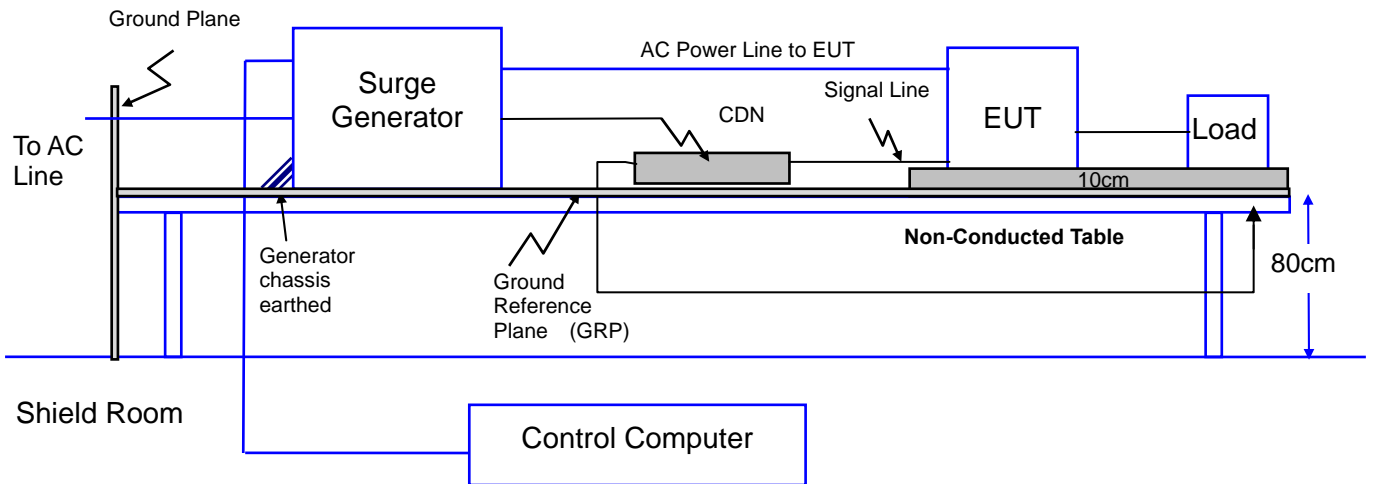
According to EN 55014-2: 1997 + A1: 2001

IEC 61000-4-5: 2005

10.3 BLOCK DIAGRAM OF TEST SETUP

Note: This is a representative setup diagram for Table-top EUT.

For Floor-standing EUT, the table will be removed with all others setup condition remain the same.



10.4 SEVERITY LEVELS

Open Circuit Output Test Voltage +/- 10%	
Level	On power supply lines
1	0.5KV
2	1KV
3	2KV
4	4KV
X	Special

10.5 OPERATING CONDITIONS OF THE EUT

1. Setup the EUT and Test Equipment as shown on 10.3.
2. Power on the EUT. Acting performance checking program to allow EUT executing its usual operation mode during test.

10.6 TEST PROCEDURE

A "combination wave" as specified in IEC 61000-4-5: 2005 was applied to the EUT. The amplitude was gradually increased using control software. Surges were initiated line synced. One surge per polarity and voltage level was applied in common and differential mode to the EUT at 0, 90, 180, 270, and 0 degree phase angles. The surges were applied at a rate of 1 surge per minute. The EUT was monitored for any degradation of performance. The AC test was conducted for differential mode at 0.5kV & 1.0kV. All tests were run in both the positive and negative polarity for differential and common modes.

10.7 TEST RESULT

Date of Test	April 16, 2009	Temperature	22 °C
Test Mode	Mode 1	Humidity	40 %
Test Power Supply	AC 230V/50Hz		

Inject Line	Voltage KV	Repetition Rate (minute)	Phase Angle	Surge applied Method	Number of tests	Required Criteria	Complied to Criteria	Result
L-N Differential mode	☒+0.5 ☒+1.0	1	0°	Coupling	5	B	A	PASS
		1	90°	Coupling	5	B	A	PASS
		1	180°	Coupling	5	B	A	PASS
		1	270°	Coupling	5	B	A	PASS
	☒-0.5 ☒-1.0	1	0°	Coupling	5	B	A	PASS
		1	90°	Coupling	5	B	A	PASS
		1	180°	Coupling	5	B	A	PASS
		1	270°	Coupling	5	B	A	PASS

- Meet criteria A: Operate as intended during and after the test
- Meet criteria B: Operate as intended after the test
- Meet criteria C: Loss/Error of function
- Additional Information
 - There was no observable degradation in performance.
 - No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

11. CONDUCTED DISTURBANCE SUSCEPTIBILITY TEST

11.1 TEST EQUIPMENT

Item	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
1	Continuous Wave Simulator	EM TEST	CWS 500 A	1099-01	2010.03.10
2	Dual Directional Couplor	A & R	DC-2600	20193	N/A
3	VOLTMETER	BOONTON	9200C	361501AA	2009.11.09
4	Injection Clamp	Liithi	EM101	35260	N/A
5	ATTENUATOR	BNOS	AT50-6-250	521926	N/A
6	CDN	Knorr Bremse	M2	12064	2010.01.19
7	CDN	Knorr Bremse	M3	12184	N/A

Note: All measurement critical items of test instrumentation were within their calibration period of 1 year.

11.2 TEST METHOD

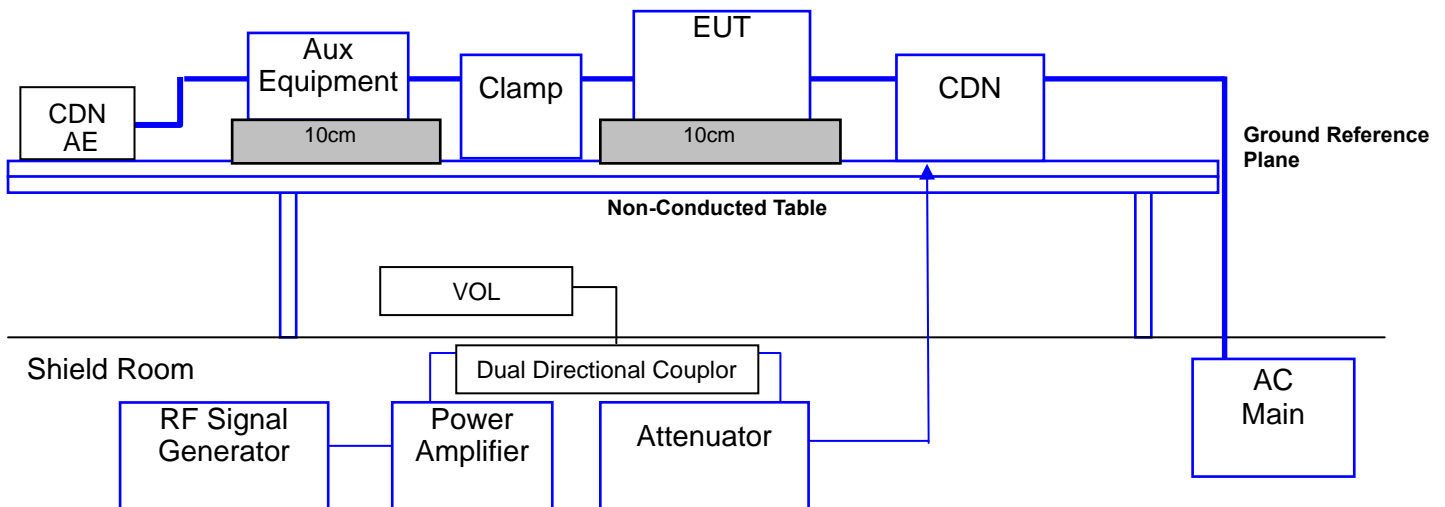
According to EN 55014-2: 1997 + A1: 2001

IEC 61000-4-6: 2003 + A1: 2004 + A2: 2006

11.3 BLOCK DIAGRAM OF TEST SETUP

Note: This is a representative setup diagram for Table-top EUT.

For Floor-standing EUT, the table will be removed with all others setup condition remain the same.



11.4 SEVERITY LEVELS

Test specification

Required Performance Criteria : A

Level : 1kHz sinewave with 80% Amplitude Modulation: 3V

Frequency range : 0.15-80MHz

11.5 OPERATING CONDITIONS OF THE EUT

1. Setup the EUT and Test Equipment as shown on 11.3.
2. Power on the EUT. Acting performance checking program to allow EUT executing its usual operation mode during test.

11.6 TEST PROCEDURE

The EUT and load were placed on a table, which was 0.1 meters high from a Ground reference plane. Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance. Also, prior to the start of the test, clamp injection (RF current probe) calibration measurements were performed as described in IEC 61000-4-6: 2003 + A1: 2004 + A2: 2006.

For AC Power line test & For Signal Lines and Control Lines test:

The disturbance signal is through a coupling and decoupling networks (CDN) or EM-clamp device couples to the signal and control lines of the EUT.

After completion of the test, a functional test was performed on the EUT to ensure proper operation.

11.7 TEST RESULT

Date of Test	April 16, 2009	Temperature	22 °C
Test Mode	Mode 1	Humidity	60 %
Test Power Supply	AC 230V/50Hz		

Frequency Range (MHz)	Inject Line	Field Strength	Inject Method	Required Criteria	Performance Criteria Complied To	Result
0.15~80	AC Line	3V	CDN	A	A	PASS

- Meet criteria A: Operate as intended during and after the test
- Meet criteria B: Operate as intended after the test
- Meet criteria C: Loss/Error of function
- Additional Information
 - There was no observable degradation in performance.
 - No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

12. VOLTAGE DIPS AND SHORT INTERRUPTIONS TEST

12.1 TEST EQUIPMENT

Item	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
1	DIPS GENERATOR	HAEFFELY	PLING1610	083690-07	2009.08.14

Note: All measurement critical items of test instrumentation were within their calibration period of 1 year.

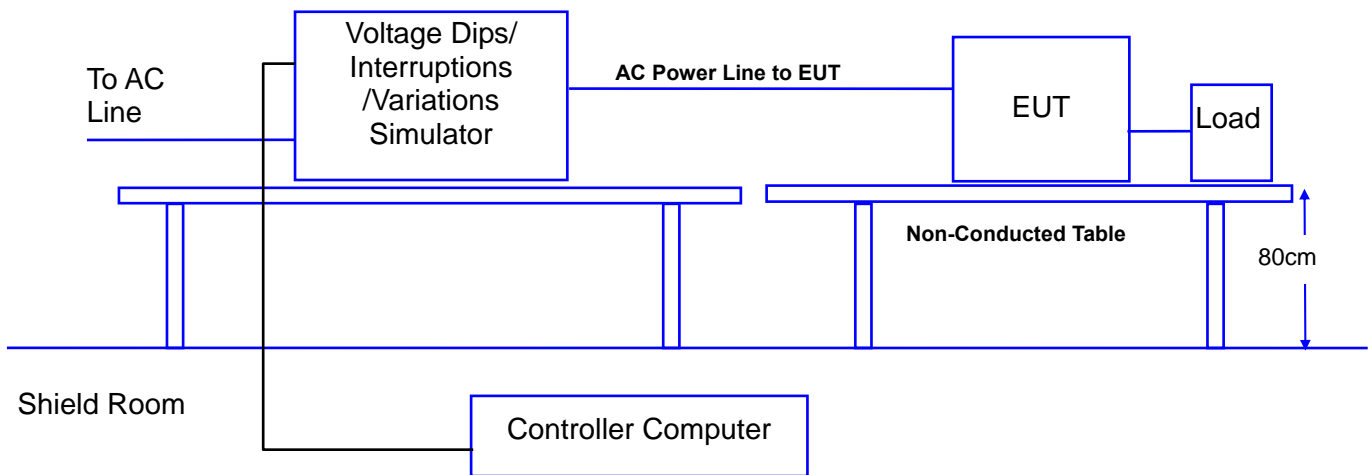
12.2 TEST METHOD

According to EN 55014-2: 1997 + A1: 2001
IEC 61000-4-11: 2004

12.3 BLOCK DIAGRAM OF TEST SETUP

Note: This is a representative setup diagram for Table-top EUT.

For Floor-standing EUT, the table will be removed with all others setup condition remain the same.



12.4 SEVERITY LEVELS

Voltage Dips Reduction(%)	Test Duration	Required Performance Criteria
60	200ms	C
30	1000ms	C
100	10ms	C

12.5 OPERATING CONDITIONS OF THE EUT

1. Setup the EUT and Test Equipment as shown on 12.3.
2. Power on the EUT. Acting performance checking program to allow EUT executing its usual operation mode during test.

12.6 TEST PROCEDURE

The EUT and its load were placed on a table which was 0.8 meters height.

For AC Power line test:

The EUT was connected to the power mains through a coupling device that directly couples to the Voltage Dips and Interruption Generator.

Voltage dips of 60% for 200ms, 30% for 1000ms and 100% for 100ms were applied to the EUT three times with 10 sec intervals between dips.

12.7 TEST RESULT

Date of Test	April 16, 2009	Temperature	22 °C
Test Mode	Mode 1	Humidity	60 %
Test Power Supply	AC 230V/50Hz		

Item	Phase Angle	Reduction (%)	Test Duration (ms)	Required Criteria	Complied to Criteria	Result
Voltage Dips	<input checked="" type="checkbox"/> 0	100%	10ms	C	A	PASS
	<input type="checkbox"/> 45			C	*	*
	<input type="checkbox"/> 90			C	*	*
	<input type="checkbox"/> 135			C	*	*
	<input checked="" type="checkbox"/> 180			C	A	PASS
	<input type="checkbox"/> 225			C	*	*
	<input type="checkbox"/> 270			C	*	*
	<input type="checkbox"/> 315			C	*	*
	<input checked="" type="checkbox"/> 0	60%	200ms	C	A	PASS
	<input type="checkbox"/> 45			C	*	*
	<input type="checkbox"/> 90			C	*	*
	<input type="checkbox"/> 135			C	*	*
	<input checked="" type="checkbox"/> 180			C	A	PASS
	<input type="checkbox"/> 225			C	*	*
	<input type="checkbox"/> 270			C	*	*
	<input type="checkbox"/> 315			C	*	*
	<input checked="" type="checkbox"/> 0	30%	1000ms	C	A	PASS
	<input type="checkbox"/> 45			C	*	*
	<input type="checkbox"/> 90			C	*	*
	<input type="checkbox"/> 135			C	*	*
	<input checked="" type="checkbox"/> 180			C	A	PASS
	<input type="checkbox"/> 225			C	*	*
	<input type="checkbox"/> 270			C	*	*
	<input type="checkbox"/> 315			C	*	*

- Meet criteria A: Operate as intended during and after the test
- Meet criteria B: Operate as intended after the test
- Meet criteria C: Loss of function, provided the function is self-recoverable, or can be restored by the operation of the controls
- Additional Information
 - There was no observable degradation in performance.
 - No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

13. PHOTOGRAPHS FOR TEST

13.1 TEST PHOTOGRAPHS FOR CONDUCTION

Mode 1



13.2 TEST PHOTOGRAPHS FOR POWER TEST

Mode 1



13.3 TEST PHOTOGRAPHS FOR HARMONIC/FLICKER

Mode 1



13.4 TEST PHOTOGRAPHS FOR ESD

Mode 1



13.5 TEST PHOTOGRAPHS FOR ESD TEST POINTS

Mode 1



13.6 TEST PHOTOGRAPHS FOR RS

Mode 1



13.7 TEST PHOTOGRAPHS FOR EFT

Mode 1



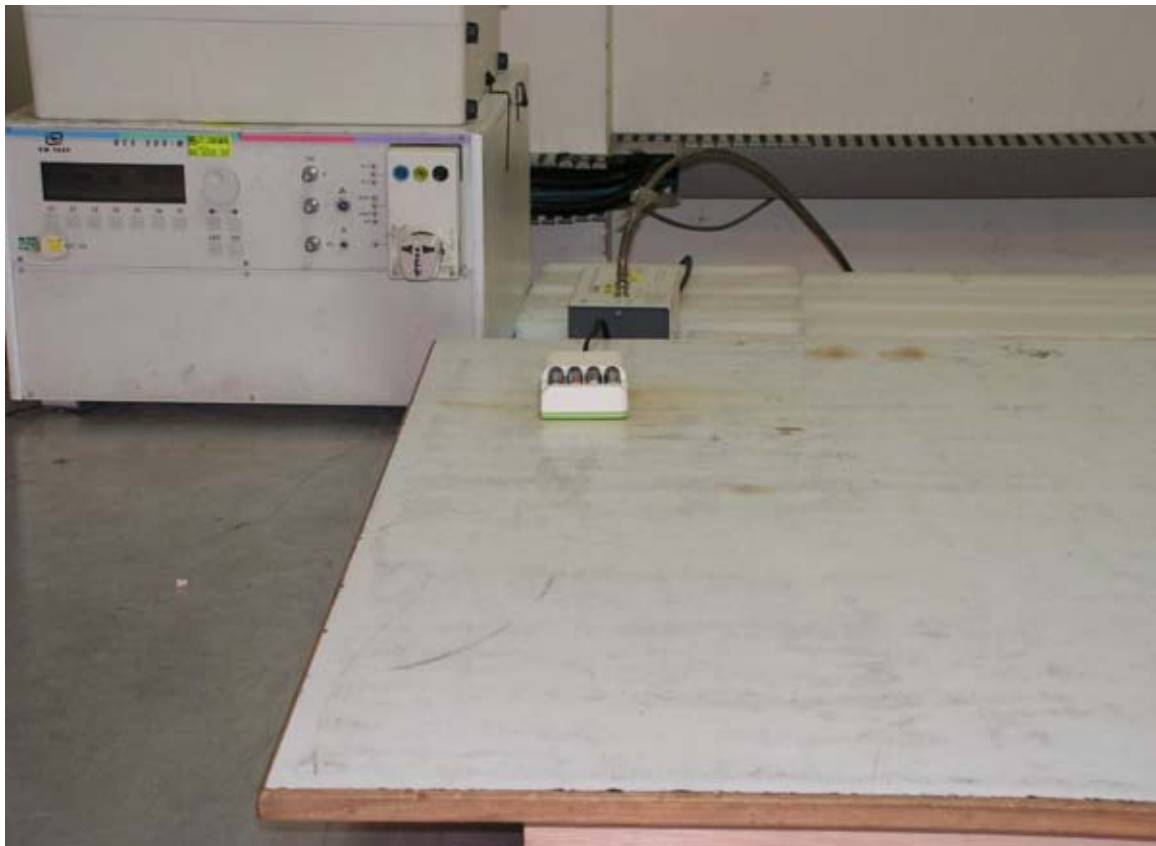
13.8 TEST PHOTOGRAPHS FOR SURGE

Mode 1



13.9 TEST PHOTOGRAPHS FOR CS

Mode 1



13.10 TEST PHOTOGRAPHS FOR DIPS

Mode 1



14. PHOTOGRAPHS FOR PRODUCT

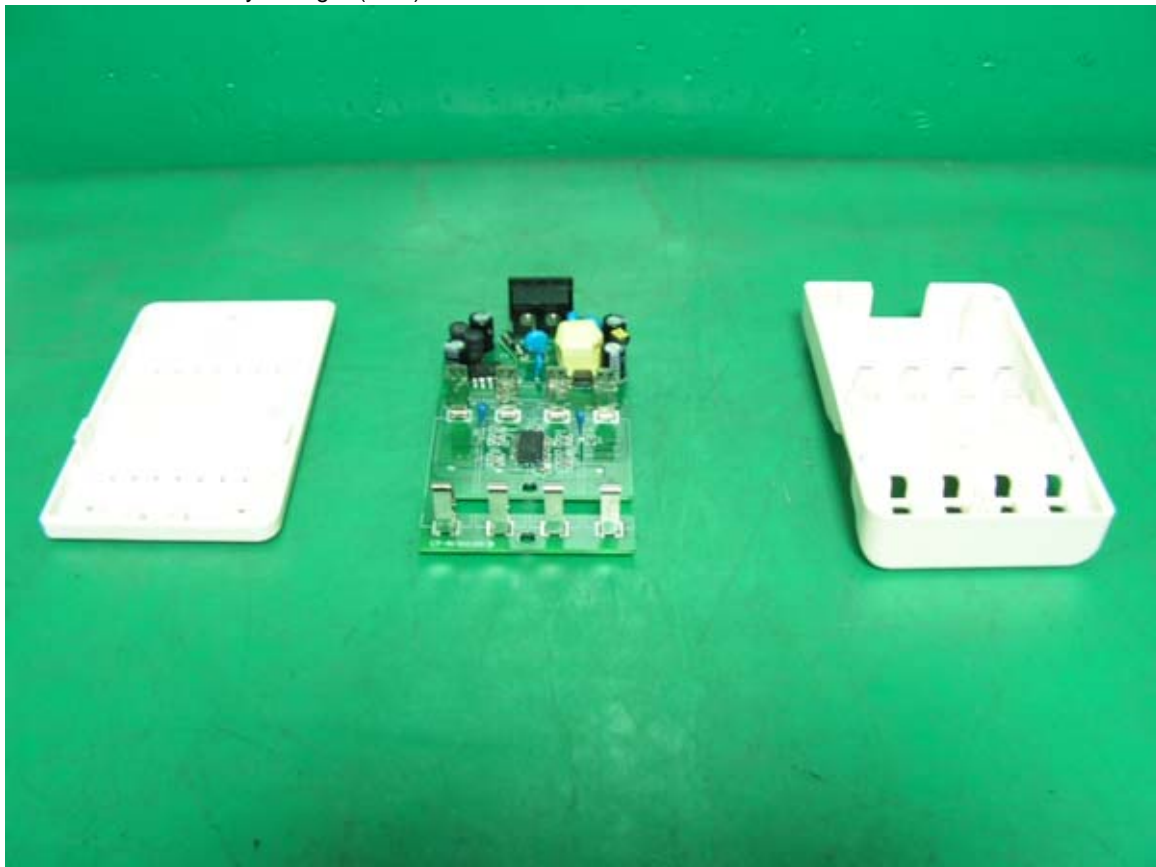
1. Front View Of Battery Charger (EUT)



- 2. Front View Of Battery Charger (EUT)
- 3. Back View Of Battery Charger (EUT)

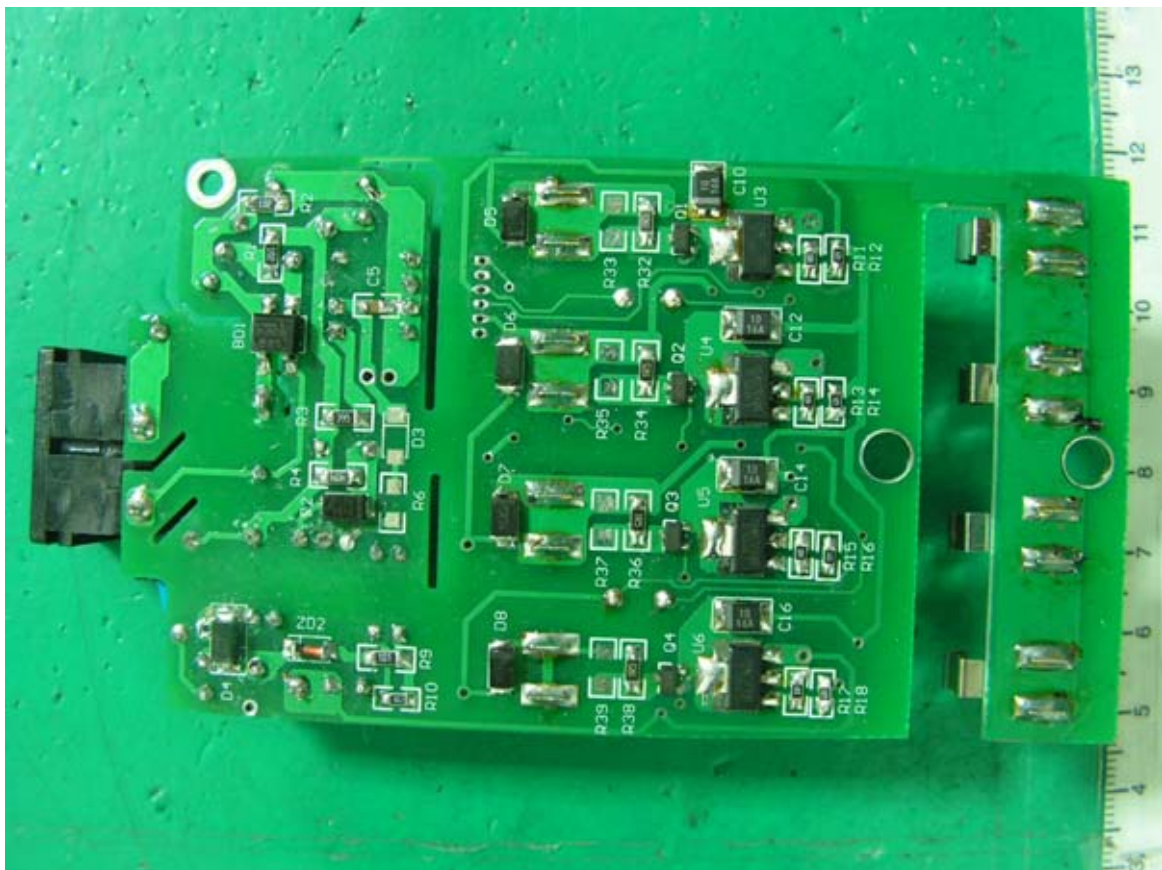
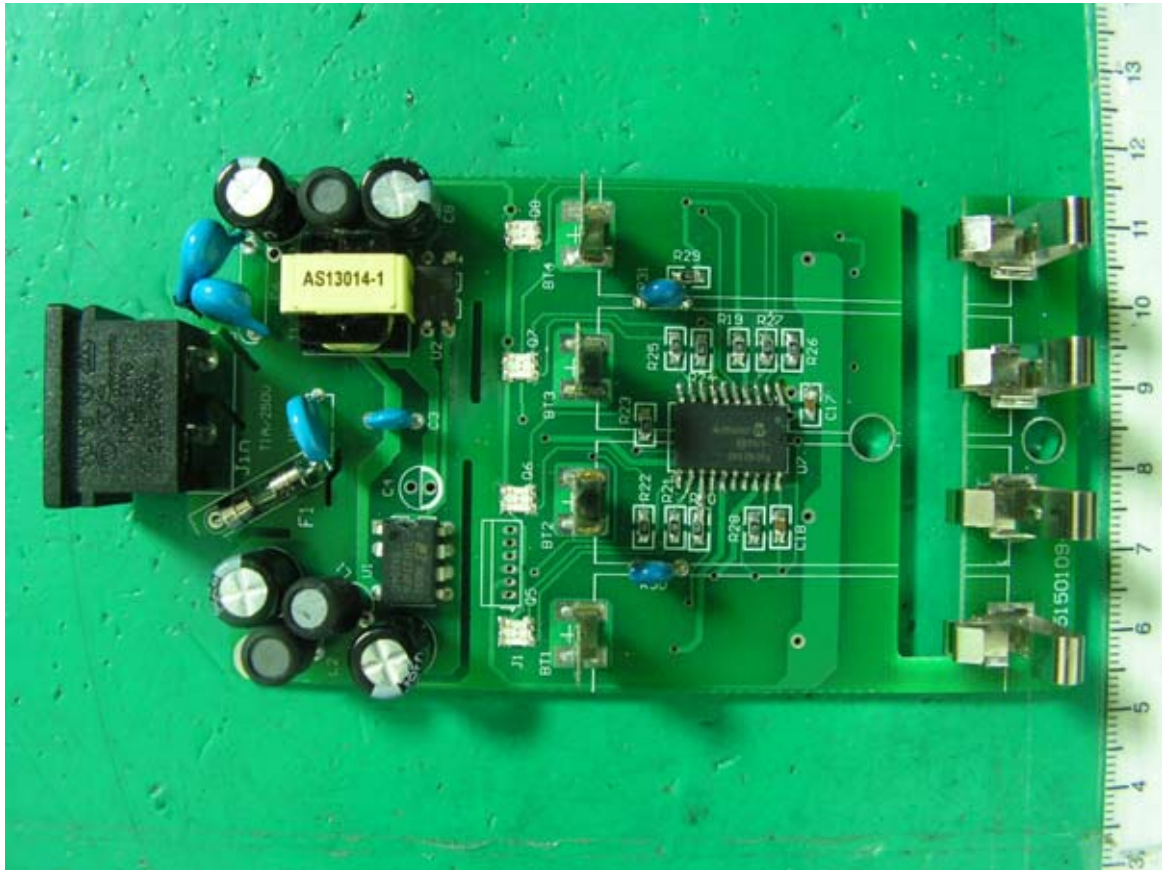


4. Inner View Of Battery Charger (EUT)



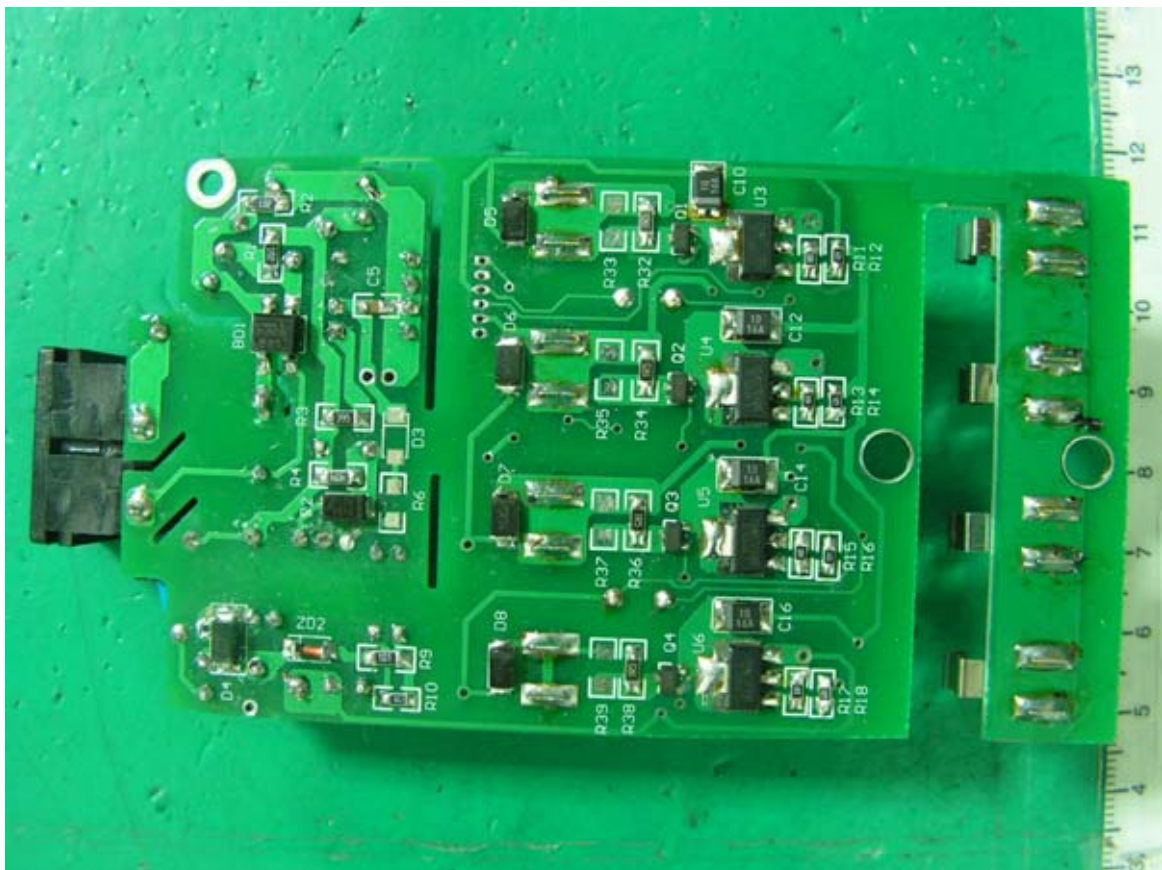
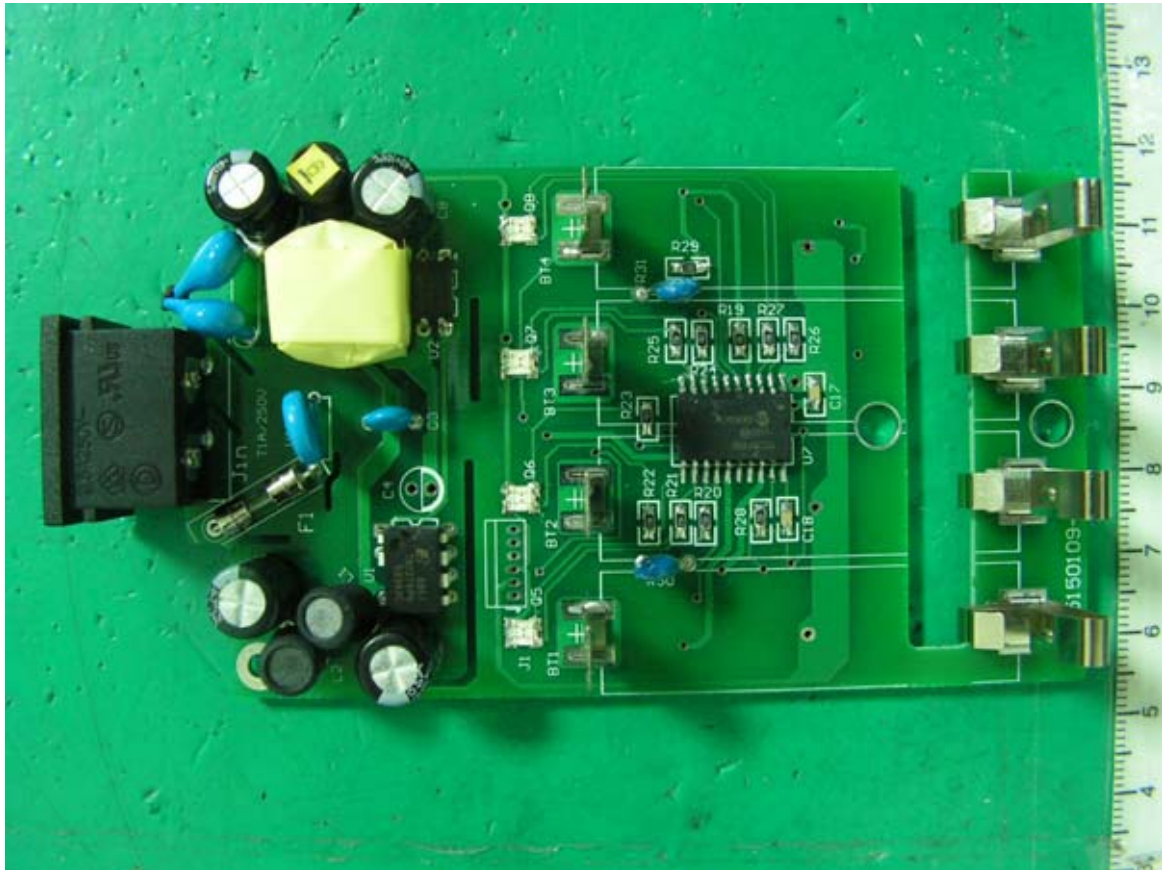
5. Component Side of Mother Board.

6. Solder Side of Mother Board.



7. Component Side of Mother Board.

8. Solder Side of Mother Board.



15. EMI/EMS REDUCTION METHOD DURING COMPLIANCE TESTING

No modification was made during testing.