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Report No.: SHEM130100008902  
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**1 Cover Page**

# TEST REPORT

Application No.:	SHEM1301000089LM
Applicant:	SHANGHAI WINSUN ELECTRONICS CO., LTD
Manufacturer:	SHANGHAI WINSUN ELECTRONICS CO., LTD
Factory:	SHANGHAI WINSUN ELECTRONICS CO., LTD
Product Name:	Dimmable LED Driver
Model No.(EUT):	LD-D24350
Add Model No.:	LD-D12350, LD-D12350A, LD-D24350A
Standards:	AS/NZS CISPR 15: 2011
Date of Receipt:	January 18, 2013
Date of Test:	February 22, 2013
Date of Issue:	March 07, 2013
Test Result :	<b>Pass*</b>

\* In the configuration tested, the EUT (Equipment under test) complied with the standards specified above.

**Tony Wu**  
**E&E Section Manager**  
**SGS-CSTC (Shanghai) Co., Ltd.**

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

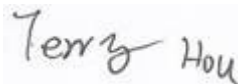

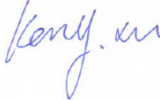
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## 2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		February 26, 2013		Original

Authorized for issue by:				
Engineer		Terry Hou _____ Print Name		 _____ Date: (February 22, 2013)
Clerk		Susie Liu _____ Print Name		 _____ Date: (February 26, 2013)
Reviewer		Kenx Xu _____ Print Name		 _____ Date: (February 26, 2013)

### 3 Test Summary

<b>ELECTROMAGNETIC INTERFERENCE (EMI)</b>				
<b>Test</b>	<b>Test Requirement</b>	<b>Test Method</b>	<b>Class / Severity</b>	<b>Result</b>
Conducted Emissions on mains terminals, 9 kHz to 30 MHz	AS/NZS CISPR 15: 2011	AS/NZS CISPR 15: 2011	Table 2a	PASS
Radiated Emission (30MHz to 1GHz)	AS/NZS CISPR 15: 2011	CISPR 16-2-3:2006	Table 3	PASS
Radiated Electromagnetic Disturbance 9 KHz to 30 MHz	AS/NZS CISPR 15: 2011	AS/NZS CISPR 15: 2011	Table 3a	PASS
EUT IN THIS WHOLE REPORT EUT MEANS EQUIPMENT UNDER TEST.				
Note: There are 4 models mentioned in this report, and they are the similar in electrical and electronic characters. So we just have the typical models LD-D24350 tested.				

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## 5 General Information

### 5.1 Client Information

Applicant: SHANGHAI WINSUN ELECTRONICS CO., LTD  
 Address of Applicant: No.3266, Jin Du Road, Min Hang District, Shanghai, China  
 Manufacturer: SHANGHAI WINSUN ELECTRONICS CO., LTD  
 Address of Manufacturer: No.3266, Jin Du Road, Min Hang District, Shanghai, China  
 Factory: SHANGHAI WINSUN ELECTRONICS CO., LTD  
 Address of Factory: No.3266, Jin Du Road, Min Hang District, Shanghai, China

### 5.2 General Description of E.U.T.

Product Name: Dimmable LED Driver  
 Model No.(EUT): LD-D24350  
 Add Model No.: LD-D12350, LD-D12350A, LD-D24350A

### 5.3 Details of E.U.T.

Power Supply: AC 100-240V, 50/60Hz  
 Cable Type: About 130 cm Length (2 wires) AC Cable (Supplied by SGS)  
 Radiated Power: 17-21W  
 Functions/Modes: Lighting mode  
 Lighting mode: Keep EUT lighting continually.

### 5.4 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.
LED light	Manufacturer by client	N/A

### 5.5 Deviation from Standards

None.

### 5.6 Abnormalities from Standard Conditions

None.

### 5.7 Modification/Retest Record

None.

## 5.8 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab

No.588 West Jindu Road, Songjiang District, Shanghai, China. 201612.

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

No tests were sub-contracted.

## 5.9 Test Facility

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2014-07-26.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2015-05-22.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A. Expiry Date: 2014-09-20.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-3868 and C-4336 respectively. Date of Registration: 2012-05-29. Date of Expiry: 2015-05-28.

## 5.10 Measurement Uncertainty

According to CISPR 16-4-2.

Test Item	Frequency Range	Measurement Uncertainty	U <sub>CISPR</sub>
Conducted Emission at mains port using AMN	9kHz-150kHz	3.2dB	3.8dB
Conducted Emission at mains port using AMN	150kHz-30MHz	2.6dB	3.4dB
Conducted Emission at mains port using VP	9kHz-30MHz	3.9dB	2.9dB
Conducted Emission at telecommunication port using AAN	150kHz-30MHz	4.5dB	5.0dB
Radiated Emission	30MHz-1000MHz	4.3dB	6.3dB
Radiated Emission	1GHz-18GHz	4.5dB	5.2dB(1GHz-6GHz)
			5.5dB(6GHz-18GHz)
Disturbance Power	30MHz-300MHz	2.6dB	4.5dB
Remark: AMN – Artificial Mains Network VP – Voltage Probe ANN – Asymmetric Artificial Network			

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

## 6 Equipment list

### Conducted Emission

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
1	EMI test receiver	Rohde & Schwarz	ESCS30	100086	2012-04-13	2013-04-12
2	Line impedance stabilization network	SCHWARZBE CK	NSLK812 7	8127-490	2012-03-15	2013-03-14
3	Line impedance stabilization network	ETS	3816/2	00034161	2012-03-15	2013-03-14

### Radiated Emission

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
1	EMI test receiver	Rohde & Schwarz	ESU40	100109	2012-06-02	2013-06-01
2	Antenna	SCHWARZBE CK	VULB916 8	9168-313	2012-03-15	2013-03-14
3	CONTROLLER	INNCO	CO200	474	/	/
4	Antenna	SCHWARZBE CK	BBHA912 0D	9120D-67 9	2012-03-15	2013-03-14
5	Antenna	SCHWARZBE CK	BBHA917 0	9170-373	2012-03-15	2013-03-14
6	Low noise amplifier	LNA6900	TESEQ	71033	2012-03-15	2013-03-14



**Radiated Electromagnetic Disturbance**

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
1	3-dimensional large loop	SCHWARZBE CK	HXYZ917 0	HXYZ917 0-136	2012-05-15	2013-03-14
2	EMI test receiver	Rohde & Schwarz	ESCS30	100086	2012-04-13	2013-04-12

**General Equipment**

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
1	Digital pressure meter	YONGZHI	DYM3-01	101012	2013-01-16	2014-01-14
2	Digital Multimeter	FLUKE	17B	10560713	2012-08-24	2013-08-22
3	Temperature & humidity recorder	ShangHai weather meter work	ZJ 1-2B	0804081 0802150 0805126	2012-07-25	2013-07-23
4	Digital illuminance meter	TES electrical electronic Corp.	TES-1330 A	05060221 9	2012-10-17	2013-10-15

## 7 Emission Test Results

### 7.1 Conducted Emissions on mains terminals, 9 kHz to 30 MHz

Test Requirement:	AS/NZS CISPR 15
Test Method:	AS/NZS CISPR 15
Test Date:	February 22, 2013
Test Voltage:	AC 240V 50Hz
Frequency Range:	9 kHz to 30 MHz
Class/Severity:	Table 2a of AS/NZS CISPR 15
Detector:	Peak for pre-scan Quasi-Peak and Average for final test 200 Hz resolution bandwidth between 9 kHz & 150 kHz 9 kHz resolution bandwidth between 150 kHz & 30 MHz

Limit:

Frequency range MHz	Limits dB (µV) <sup>a</sup>	
	Quasi-peak	Average
0.009 to 0.05	110	---
0.05 to 0.150	90-80 <sup>b</sup>	---
0.150 to 0.5	66-56 <sup>b</sup>	56-46 <sup>b</sup>
0.5 to 5.0	56 <sup>c</sup>	46 <sup>c</sup>
5.0 to 30	60	50

<sup>a</sup> At the transition frequency, the lower limit applies.

<sup>b</sup> The limit decreases linearly with the logarithm of the frequency in the ranges 50 kHz to 150 kHz and 150 kHz to 0.5 MHz.

<sup>c</sup> For electrodeless lamps and luminaires, the limit in the frequency range of 2.51 MHz to 3.0 MHz is 73 dB(µV) quasi-peak and 63 dB(µV) average.

#### 7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25.0 °C      Humidity: 56.0% RH      Atmospheric Pressure: 101.9 kPa

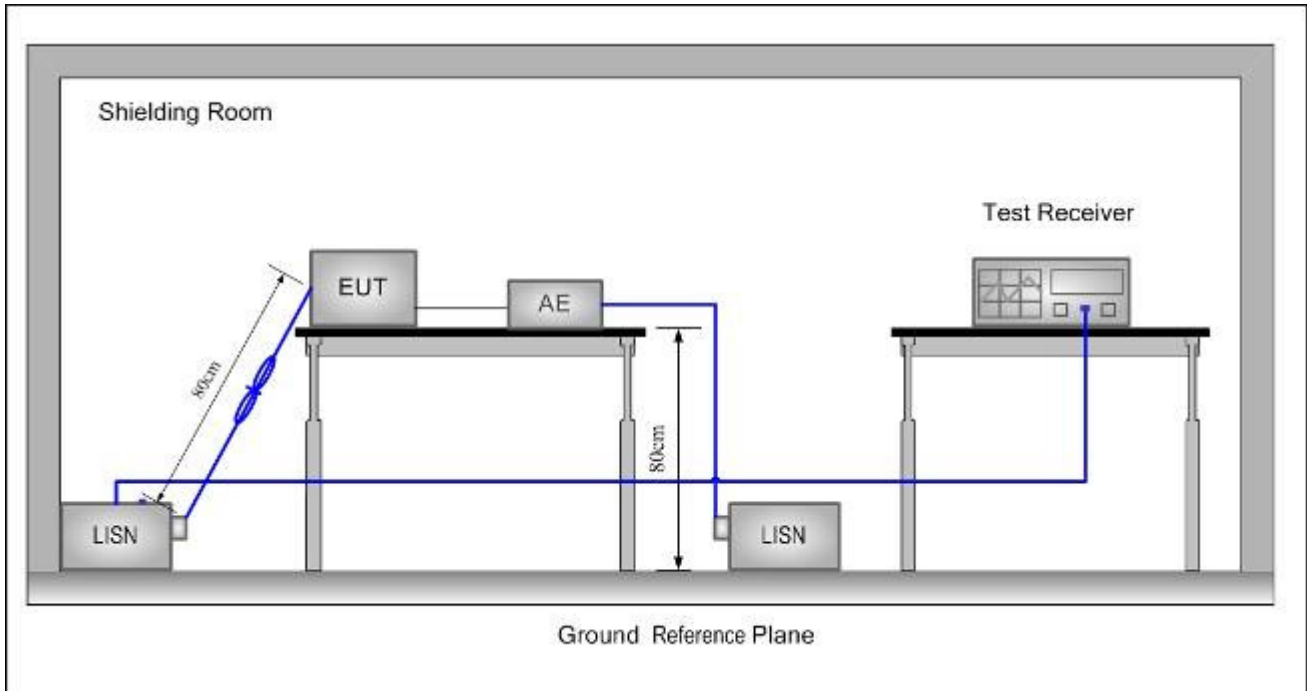
Test mode: Lighting mode

Pre-scan was performed with peak detected on all ports, Quasi-peak & average measurements were performed at the frequencies at which maximum peak emission level were detected.

Please see the attached Quasi-peak and Average test results.

Level = Read Level + LISN/ISN Factor + Cable Loss.

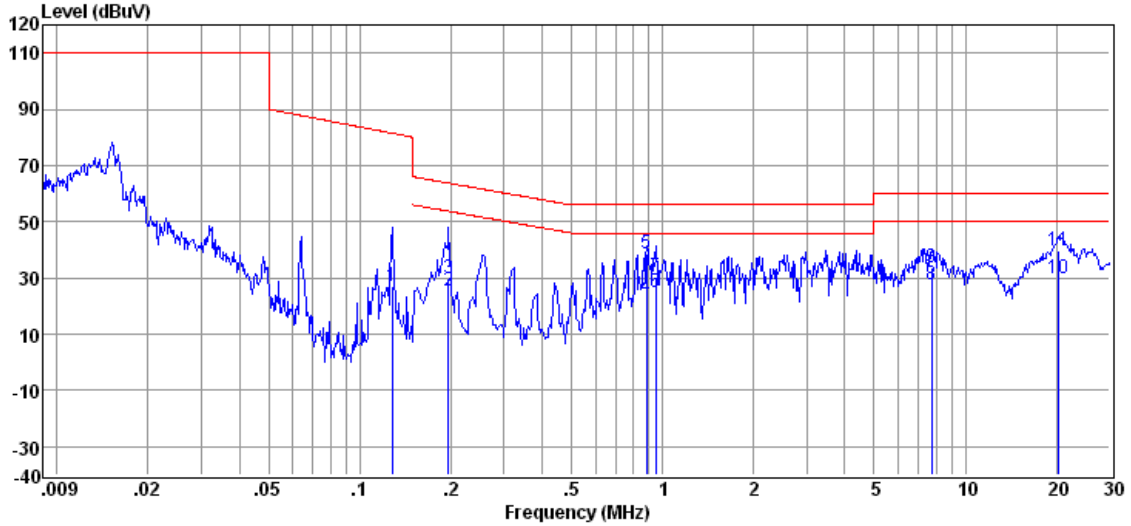
### 7.1.2 Test Setup and Procedure



1. The mains terminal disturbance voltage test was conducted in a shielded room.
2. The EUT was connected to AC power source through a LISN (Line Impedance Stabilization Network) which provides a  $50\Omega/50\mu\text{H} + 5\Omega$  linear impedance.
3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. The EUT kept a distance of at least 0.8m from any other earthed conducting surface. The Artificial Mains Network was situated at a distance of 0.8m from the EUT. The mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m.

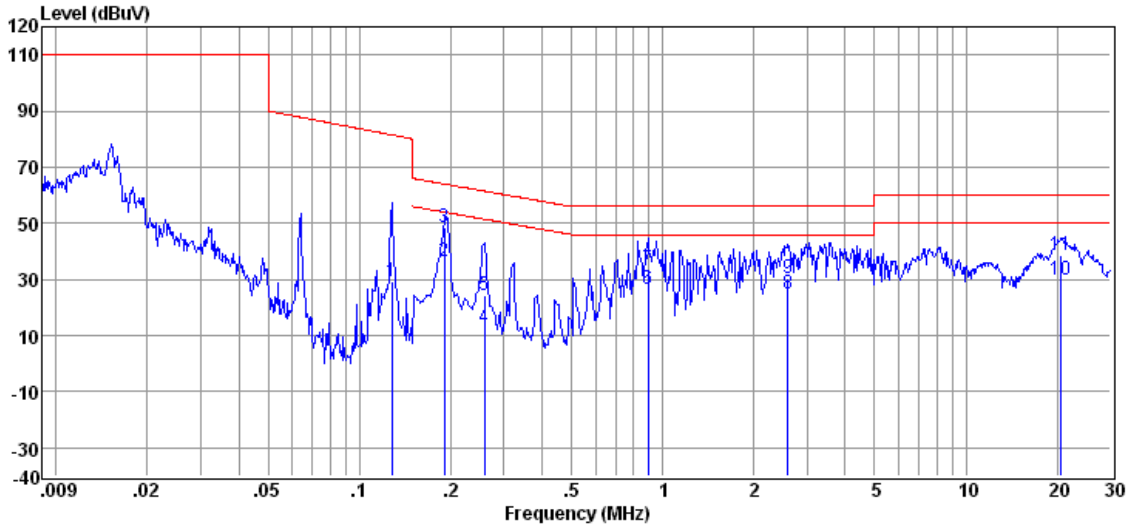
### 7.1.3 Measurement Data

Live Line:



Item	Freq.	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)	
1	0.128	26.52	0.20	0.10	26.82	81.46	-54.64	QP
2	0.196	25.11	0.11	0.10	25.32	53.77	-28.45	Average
3	0.196	29.75	0.11	0.10	29.96	63.77	-33.81	QP
4	0.888	22.73	0.20	0.10	23.03	46.00	-22.97	Average
5	0.888	38.27	0.20	0.10	38.57	56.00	-17.43	QP
6	0.947	24.67	0.20	0.10	24.97	46.00	-21.03	Average
7	0.947	29.92	0.20	0.10	30.22	56.00	-25.78	QP
8	7.741	26.93	0.37	0.18	27.48	50.00	-22.52	Average
9	7.741	33.11	0.37	0.18	33.66	60.00	-26.34	QP
10	20.325	28.83	0.61	0.20	29.64	50.00	-20.36	Average
11	20.325	39.04	0.61	0.20	39.85	60.00	-20.15	QP

Neutral Line



Item	Freq.	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dB $\mu$ V)	(dB)	(dB)	(dB $\mu$ V)	(dB $\mu$ V)	(dB)	
1	0.128	28.99	0.20	0.10	29.29	81.46	-52.17	QP
2	0.190	36.22	0.12	0.10	36.44	54.03	-17.59	Average
3	0.190	48.41	0.12	0.10	48.63	64.03	-15.40	QP
4	0.259	12.46	0.12	0.10	12.68	51.47	-38.79	Average
5	0.259	24.36	0.12	0.10	24.58	61.47	-36.89	QP
6	0.895	26.35	0.20	0.10	26.65	46.00	-19.35	Average
7	0.895	33.40	0.20	0.10	33.70	56.00	-22.30	QP
8	2.589	24.30	0.30	0.12	24.72	46.00	-21.28	Average
9	2.589	30.13	0.30	0.12	30.55	56.00	-25.45	QP
10	20.657	28.95	0.63	0.20	29.78	50.00	-20.22	Average
11	20.657	37.91	0.63	0.20	38.74	60.00	-21.26	QP

## 7.2 Radiated Electromagnetic Disturbance Test: 9 kHz -30 MHz

Test Requirement:	AS/NZS CISPR 15
Test Method:	AS/NZS CISPR 15
Test Voltage:	AC 240V 50Hz
Test Date:	February 22, 2013
Frequency Range:	9 kHz to 30 MHz
Class/Severity:	Table 3a of AS/NZS CISPR 15
Detector:	Peak for pre-scan Quasi-Peak for final test 200 Hz resolution bandwidth between 9 kHz & 150 kHz 9 kHz resolution bandwidth between 150 kHz & 30 MHz

Limit:

Frequency range MHz	Limits for loop diameter limits 2m dB (μA) <sup>a</sup>
0.009 to 0.070	88
0.070 to 0.150	88 to 58 <sup>b</sup>
0.150 to 3.0	58 to 22 <sup>b</sup>
3.0 to 30.0	22

<sup>a</sup> At the transition frequency, the lower limit applies.

<sup>b</sup> Decreasing linearly with the logarithm of the frequency. For electrodeless lamps and luminaires, the limit in the frequency range of 2.2 MHz to 3.0 MHz is 58 dB(μA) for 2 m loop diameter.

### 7.2.1 E.U.T. Operation

Operating Environment:

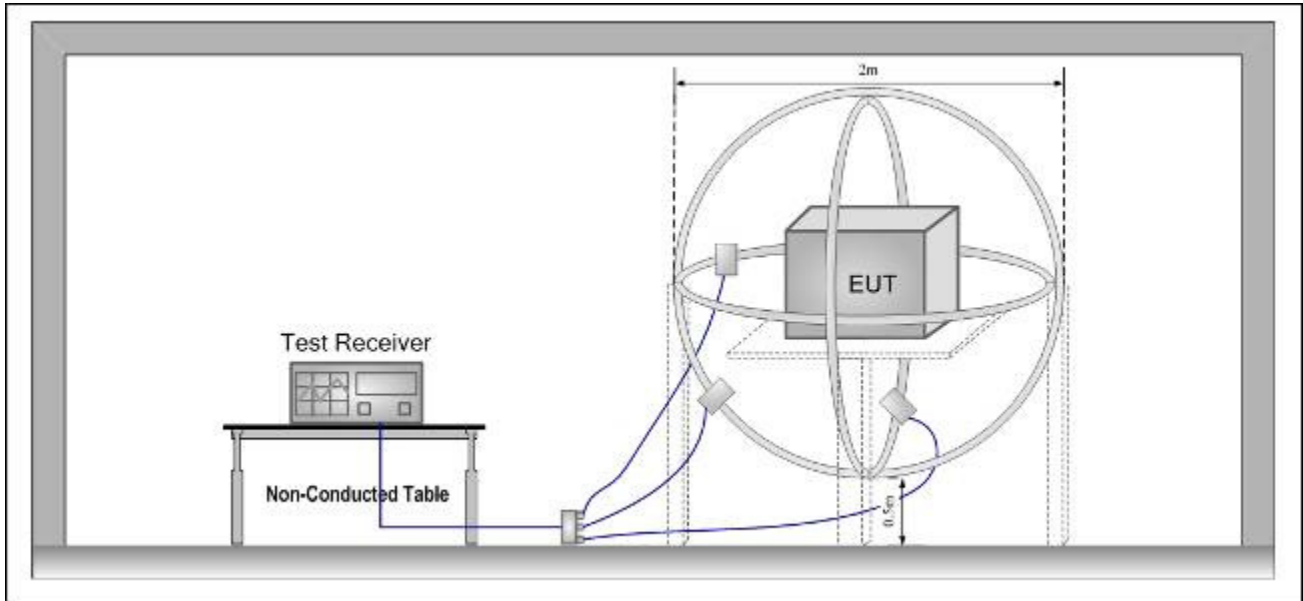
Temperature: 25.0 °C      Humidity: 56.0% RH      Atmospheric Pressure: 101.9 kPa  
Test mode: Lighting mode

Pre-scan was performed with peak detected on all ports, Quasi-peak measurements were performed at the frequencies at which maximum peak emission level were detected.

Please see the attached Quasi-peak test results.

Level = Read Level + Loop Antenna Factor + Cable Loss.

## 7.2.2 Test Setup and Procedure



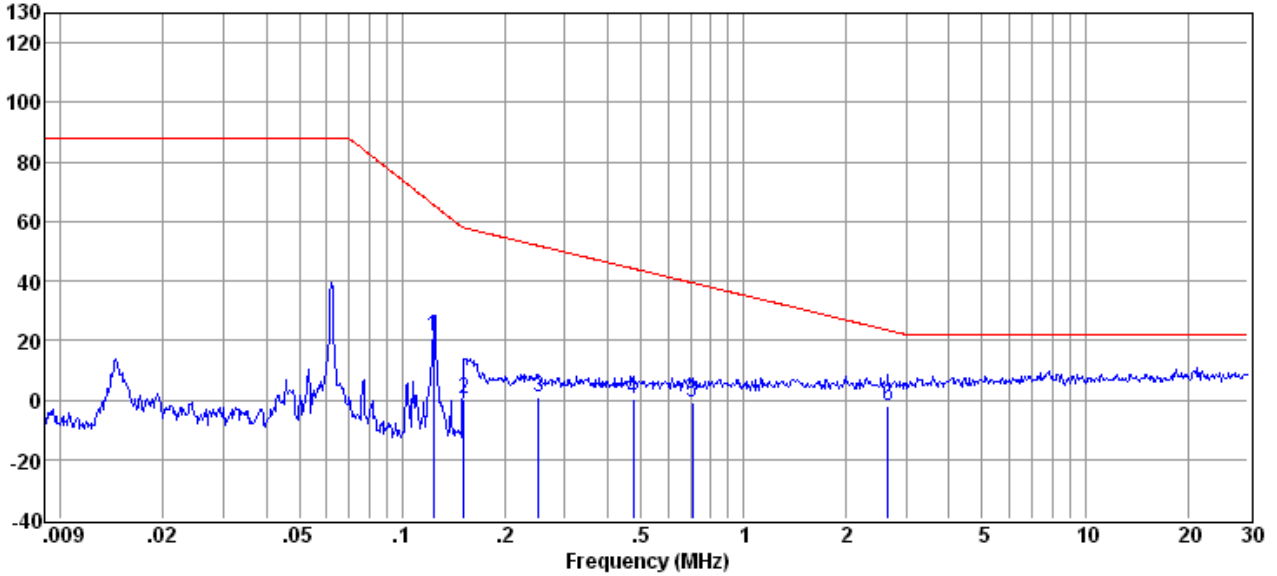
1. The magnetic component was measured by means of a loop antenna. The lighting equipment was placed in the centre of the antenna. The position of the mains lead was optimized for maximum current induction.
2. The induced current in the loop antenna was measured by means of a current probe (1 V/A) and the CISPR measuring receiver. During the measurements the EUT remains in a fixed position. By means of a coaxial switch, The currents in the three large loop antennas, originating from the three mutually orthogonal magnetic field components, were measured in sequence. Each value was fulfill the requirements given.
3. There were no special instructions for the supply wiring.
4. The distance between the outer perimeter of the LAS(Loop Antenna System) and nearby objects, such as floor and walls, was at least 0.5 m.
5. To avoid unwanted capacitive coupling between the EUT and the LAS, the maximum dimensions of the EUT allowed a distance of at least 0.20 m between the EUT and the standardized 2 m large loop antennas of the LAS.

## 7.2.3 Measurement Data

An initial pre-scan was performed in the 2 m loop antenna using the spectrum analyser in peak detection mode. The EUT was measured for X(A), Y(B), Z(C) polarities. (EN 55015 Table 3a column 2).

X:

Level (dBuA)

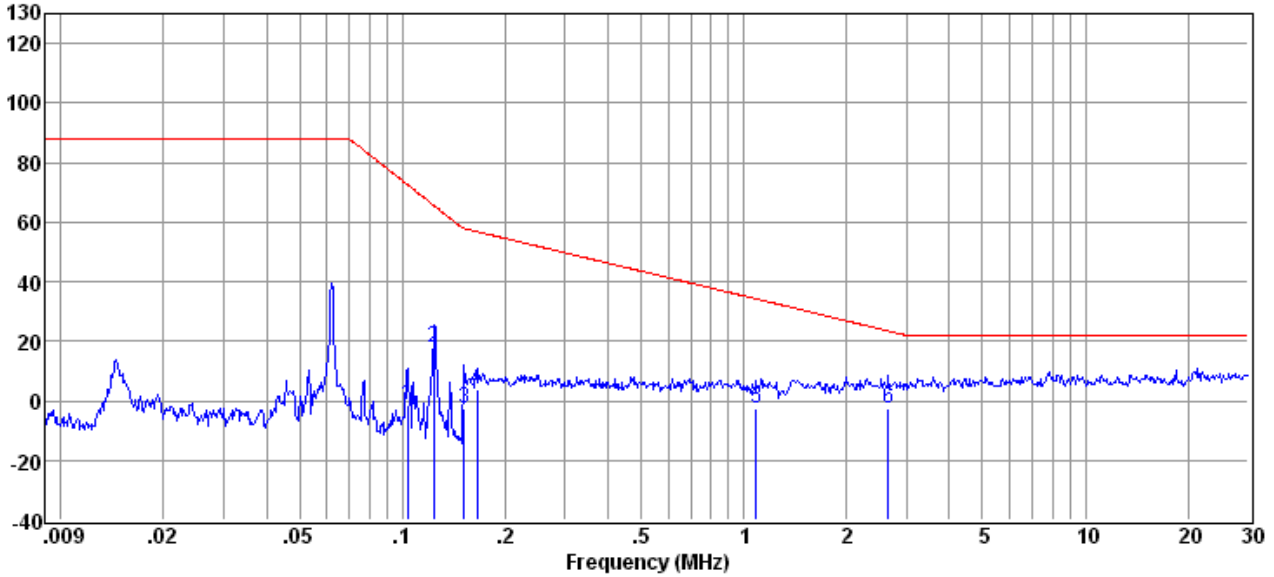


Item	Freq.	Read Level	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB)	(dBuA)	(dBuA)	(dB)	
1	0.124	21.22	0.30	21.52	65.61	-44.09	QP
2	0.151	0.00	0.30	0.30	57.89	-57.59	QP
3	0.250	0.37	0.30	0.67	51.84	-51.17	QP
4	0.475	-0.28	0.30	0.02	44.14	-44.12	QP
5	0.707	-1.27	0.30	-0.97	39.37	-40.34	QP
6	2.653	-2.50	0.32	-2.18	23.48	-25.66	QP



Y:

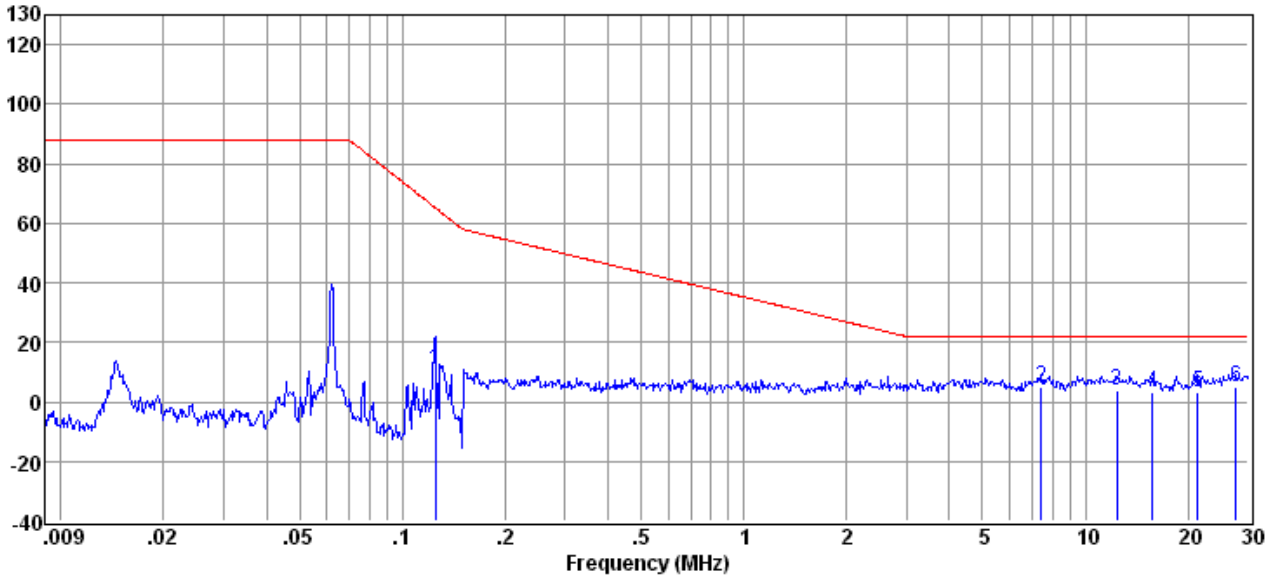
Level (dBuA)



Item	Freq.	Read Level	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB)	(dBuA)	(dBuA)	(dB)	
1	0.103	-2.00	0.30	-1.70	72.63	-74.33	QP
2	0.124	17.80	0.30	18.10	65.61	-47.51	QP
3	0.151	-3.00	0.30	-2.70	57.89	-60.59	QP
4	0.166	3.61	0.30	3.91	56.81	-52.90	QP
5	1.087	-3.12	0.30	-2.82	34.20	-37.02	QP
6	2.653	-2.70	0.32	-2.38	23.48	-25.86	QP

Z:

Level (dBuA)



Item	Freq.	Read Level	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB)	(dBuA)	(dBuA)	(dB)	
1	0.125	10.79	0.30	11.09	65.29	-54.20	QP
2	7.433	4.54	0.50	5.04	22.00	-16.96	QP
3	12.373	3.16	0.50	3.66	22.00	-18.34	QP
4	15.694	2.65	0.53	3.18	22.00	-18.82	QP
5	21.307	2.28	0.73	3.01	22.00	-18.99	QP
6	27.646	4.43	0.80	5.23	22.00	-16.77	QP

### 7.3 Radiated Emissions, 30 MHz to 300 MHz

Test Requirement: AS/NZS CISPR 15  
 Test Method: AS/NZS CISPR 15  
 Test Voltage: AC 240V, 50Hz  
 Test Date: February 22, 2013  
 Frequency Range: 30 MHz to 300 MHz  
 Measurement Distance: 3 m  
 Detector: Peak for pre-scan (120 kHz resolution bandwidth)  
 Quasi-Peak for final test (120 kHz resolution bandwidth)

Limit:

For 3m

Frequency range MHz	Quasi-peak limits dB (µV/m)
30 to 230	40
230 to 300	47

At transitional frequencies the lower limit applies.

#### 7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 22.0 °C      Humidity: 55.0% RH      Atmospheric Pressure: 99.8 kPa

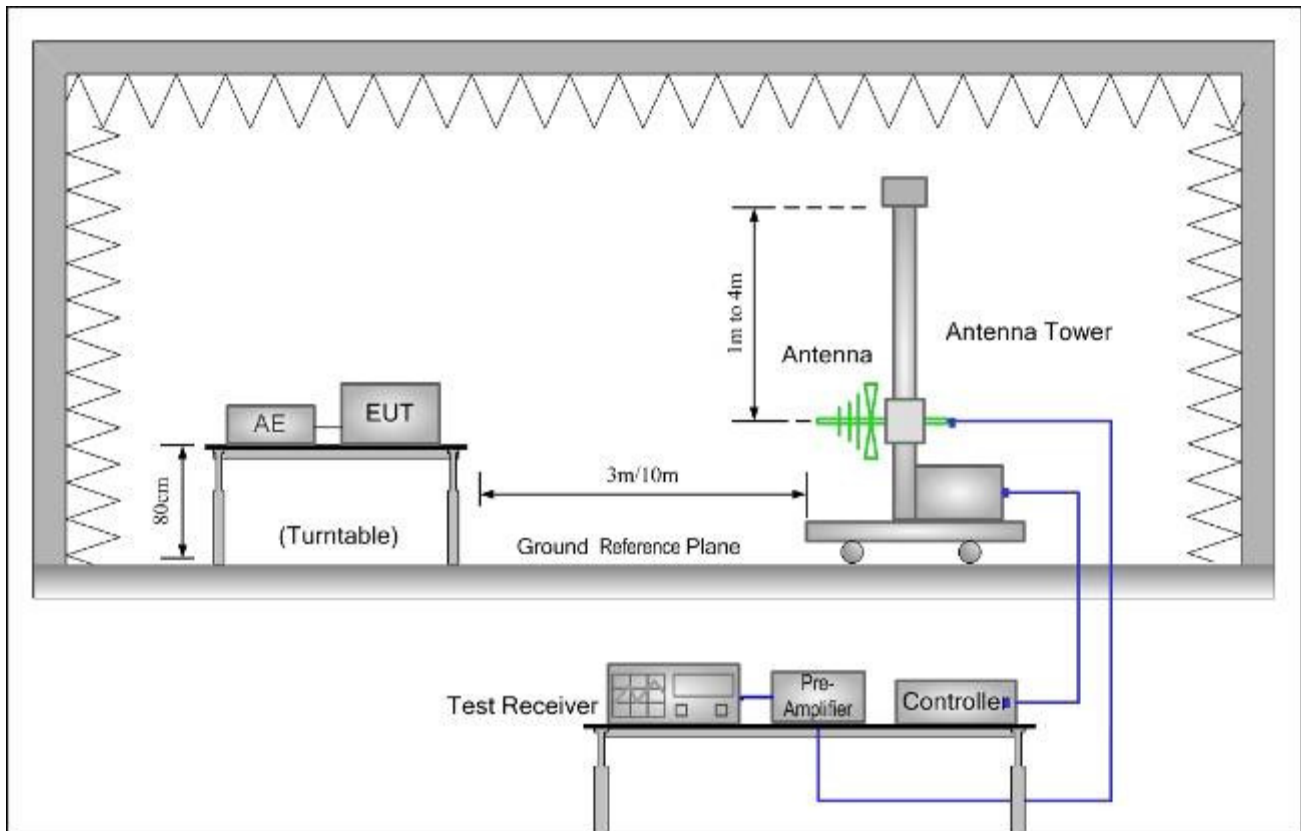
Test mode: Lighting mode

Pre-scan was performed with peak detected on all ports, Quasi-peak measurements was performed at the frequencies at which maximum peak emission level were detected.

Please see the attached Quasi-peak test results.

For radiated emission: Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor.

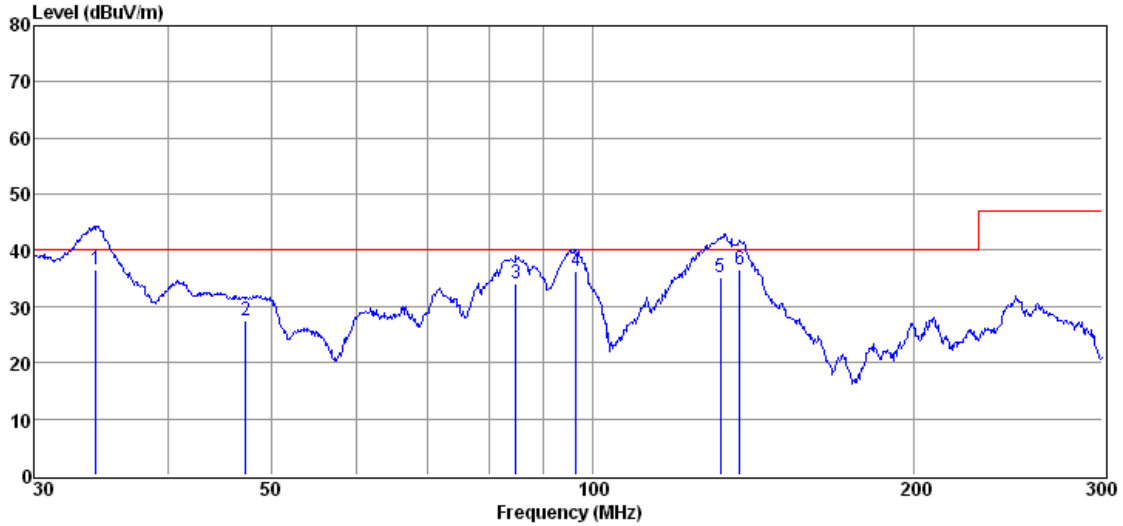
### 7.3.2 Test Setup and Procedure



1. The radiated emissions test was conducted in a semi-anechoic chamber.
2. The EUT was connected to AC power source through a mains power outlet which was bonded to the ground reference plane; The mains cables shall drape to the ground reference plane.
3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emission spectrum signature data plots of the EUT.
5. The frequencies of maximum emission were determined in the final radiated emissions measurement, The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.

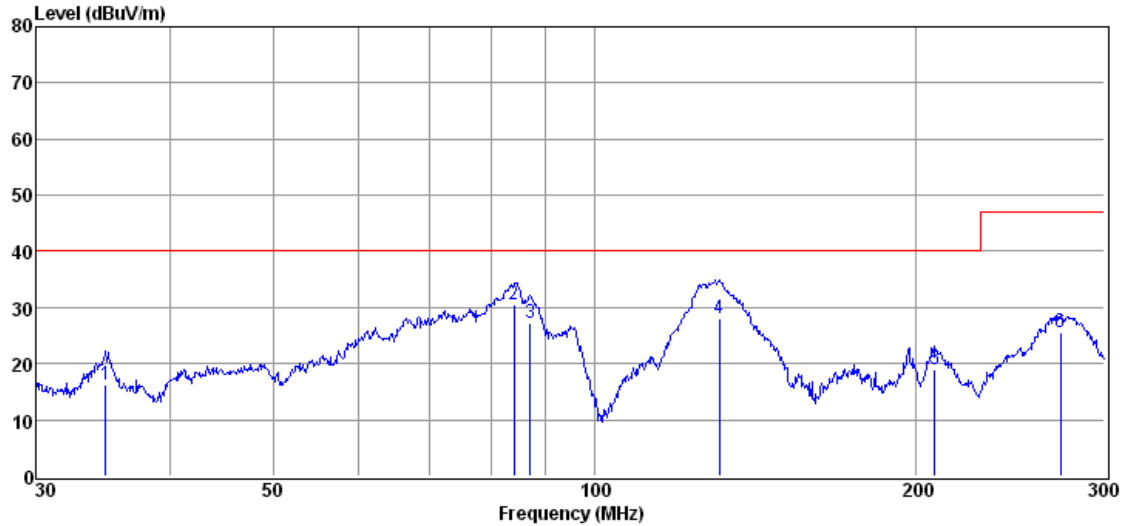
### 7.3.3 Measurement Data

Vertical:



Item	Freq.	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1	34.25	48.33	12.35	24.70	0.48	36.46	40.00	-3.54	QP
2	47.33	38.52	12.96	24.70	0.62	27.40	40.00	-12.60	QP
3	84.75	49.24	8.66	24.70	0.91	34.11	40.00	-5.89	QP
4	96.41	50.91	8.95	24.70	1.01	36.17	40.00	-3.83	QP
5	131.61	47.74	10.84	24.70	1.19	35.07	40.00	-4.93	QP
6	137.13	48.47	11.67	24.70	1.22	36.66	40.00	-3.34	QP

Horizontal:



Item	Freq.	Read Level	Antenna Factor	Preamplifier Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1	34.84	27.97	12.39	24.70	0.49	16.15	40.00	-23.85	QP
2	83.97	45.59	8.68	24.70	0.90	30.47	40.00	-9.53	QP
3	86.92	42.31	8.59	24.70	0.93	27.13	40.00	-12.87	QP
4	130.65	39.89	11.63	24.70	1.18	28.00	40.00	-12.00	QP
5	208.03	32.87	9.22	24.60	1.54	19.03	40.00	-20.97	QP
6	272.97	36.57	11.60	24.50	1.83	25.50	47.00	-21.50	QP

## 8 Photographs (Test Setup For the EUT)

### 8.1 Conducted Emissions on Mains Terminals Test Setup



### 8.2 Radiated Electromagnetic Disturbance Test Setup



### 8.3 Radiated Emissions Test Setup



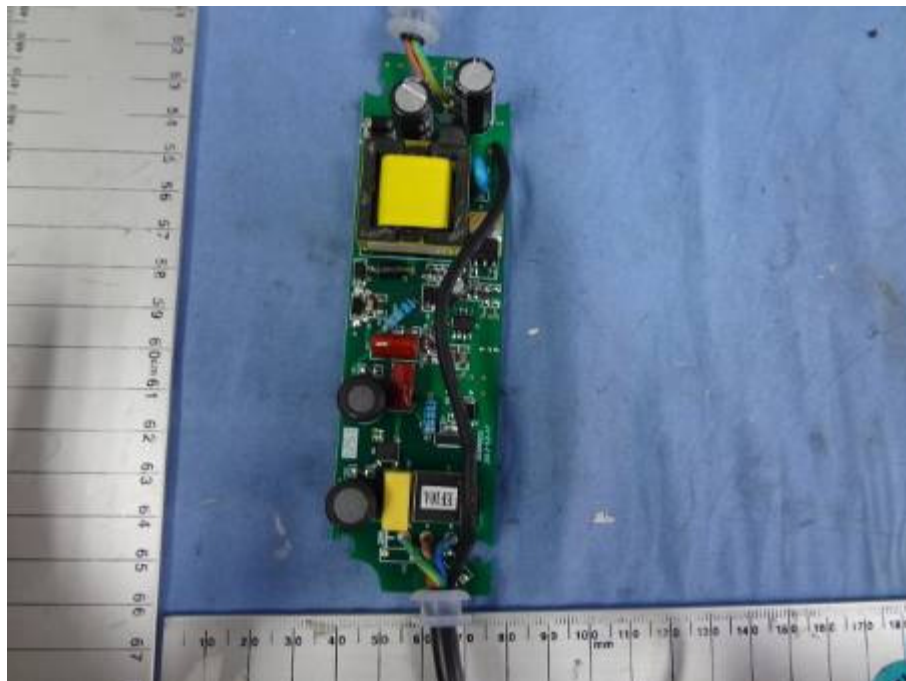


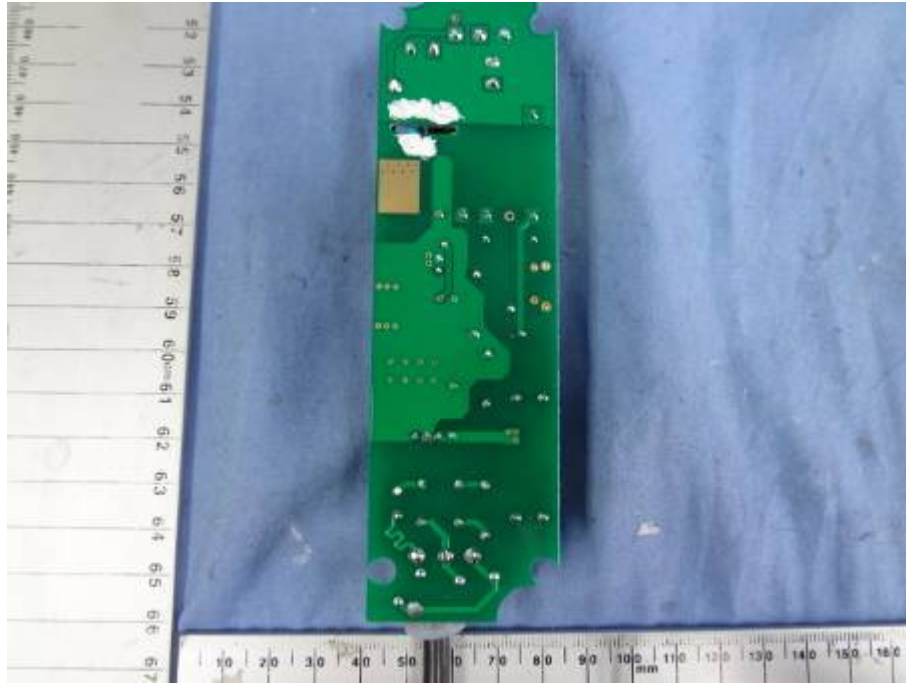
## 9 EUT Constructional Details

### 9.1 Exterior of EUT



### 9.2 Interior of EUT





### 9.3 Photo of Add model

Model No.: LD-D24350A



Model No.: LD-D12350A



Model No.: LD-D12350



**--End of the Report--**