BV LCIE CHINA Number TZS-18MA0321LTSPB-V

ATTESTATION
of conformity with European Directives

Product	:	**Lighting chain for indoor and outdoor use**
Reference	:	**refer to model list of report TZS-18MA0321LTSPB in page 3**
Issued to	:	
Address	:	
Manufacturer	:	
Technical characteristics	:	**180-240V~, 50/60Hz for adaptor** **3-36V DC & 4.5-36V AC 50Hz for lighting chain**

The submitted sample of the above equipment has been tested for CE marking according to following European Directive and following standards:

Electromagnetic Compatibility Directive 2014/30/EU

Standards	*Report number*	*Report date*
EN 55015:2013+A1:2015 **EN 61547:2009** **EN 61000-3-2:2014** **EN 61000-3-3:2013**	**TZS-18MA0321LTSPB**	**16/03/2018**

The referred test report(s) show that the product complies with standard(s) recognized as giving presumption of compliance with the essential requirements in the specified European Directive

This verification does not imply assessment of the production of the product
The CE marking may be affixed if all relevant and effective European Directives with CE are applicable

Shanghai (P.R. China), Mar 16, 2018.

Zhaoqian YU
Expert

CE

LCIE China Company Limited
必维欧亚电气技术咨询服务(上海)有限公司
Version 8/2018.1.20

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

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China
Telephone: +86 (0) 21 6191 5666
Fax: +86 (0) 21 6191 5678
ee.shanghai@sgs.com

TEST REPORT

Application No.:	SHEM1706003846LM
Applicant:	Changzhou Jutai Electronic Co., Ltd
Address of Applicant:	No. 8 Longfa Road, Xinbei District, Changzhou 213031, Jiangsu, China
Manufacturer:	Changzhou Jutai Electronic Co., Ltd
Address of Manufacturer:	No. 8 Longfa Road, Xinbei District, Changzhou 213031, Jiangsu, China
Factory:	Changzhou Jutai Electronic Co., Ltd
Address of Factory:	No. 8 Longfa Road, Xinbei District, Changzhou 213031, Jiangsu, China
Equipment Under Test (EUT):	
EUT Name:	Power Supply
Model No.:	JT-DC40V7.2W-E1-IP44, JT-DC4.8V7.2W-E1-IP44, JT-DCxVyW-E1, JT-DCxVyW-E1-IP44¤
¤	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade mark:	CZJUTAI/TUMI
Standards:	EN 55015:2013 +A1:2015, EN 61000-3-2:2014 EN 61000-3-3:2013, EN 61547:2009
Date of Receipt:	2017-06-21
Date of Test:	2017-06-21 to 2017-06-27
Date of Issue:	2017-08-11
Test Result :	**Pass***

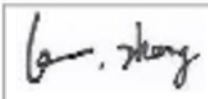
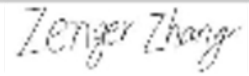
* In the configuration tested, the EUT complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EU Declaration of Conformity and compliance with all relevant EU Directives.

Parlam Zhan
E&E Section Manager

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. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00	/	2017-08-11	/	Original

Authorized for issue by:				
Tested By		 **Lemon_zhang /Project Engineer**		2017-06-29 **Date**
Checked By		 **Zenger_zhang /Reviewer**		2017-06-29 **Date**

2 Test Summary

Emission Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Conducted Emissions at Mains Terminals (9kHz-30MHz)	EN 55015:2013 +A1:2015	EN 55015:2013+A1:2015	N/A	Pass
Radiated Emissions (30MHz-300MHz)	EN 55015:2013 +A1:2015	CISPR 32:2015	N/A	Pass
Radiated Emissions (Magnetic field Induced Current)(9kHz-30MHz)	EN 55015:2013 +A1:2015	EN 55015:2013+A1:2015	N/A	Pass
Harmonic Current Emission	EN 61000-3-2:2014	EN 61000-3-2:2014	Class C	N/A*
Voltage Fluctuations and Flicker	EN 61000-3-3:2013	EN 61000-3-3:2013	Clause 5 of EN 61000-3-3	Pass
Immunity Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Electrostatic Discharge	EN 61547:2009	EN 61000-4-2:2009	4kV Contact Discharge 8kV Air Discharge	Pass
Radiated Immunity (80MHz-1GHz)	EN 61547:2009	EN 61000-4-3:2006 +A1:2008+A2:2010	3V/m, 80%, 1kHz Amp. Mod.	Pass
Electrical Fast Transients/Burst at Power Port	EN 61547:2009	EN 61000-4-4:2012	1kV 5/50ns Tr/Td 5kHz Repetition Frequency	Pass
Surge at Power Port	EN 61547:2009	EN 61000-4-5:2014	1.2/50μs Tr/Td 0.5kV Line to Line 1kV Line to Ground	Pass
Conducted Immunity at Power Port (150kHz-80MHz)	EN 61547:2009	EN 61000-4-6:2014	3Vrms (emf),80%,1kHz Amp. Mod.	Pass
Voltage Dips and Interruptions	EN 61547:2009	EN 61000-4-11:2004	0 % UT for 0.5per 70 % UT for 10per UT is Supply Voltage	Pass

N/A: Not applicable

N/A*: Please refer to Section 6.4 of this report for details.

Declaration of EUT Family Grouping:

There are series models mentioned in this report and they are the similar in electrical and electronic characters. Only the model JT-DC40V7.2W-E1-IP44, JT-DC4.8V7.2W-E1-IP44 was tested since their differences are IP grade.

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	Input: AC 220-240V, 50-60Hz / 230V-240V, 50Hz / 100-240V, 50-60Hz Output: DC 40V 7.2W
Rated power:	7.2W
Test voltage:	AC 230V 50Hz
Cable:	0.2m for DC output cable.

4.2 Description of Support Units

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conducted Emission at mains port using AMN	3.2dB (9kHz to 150kHz)
		3.0dB (150kHz to 30MHz)
	Conducted Emission at mains port using VP	1.9 dB(9kHz to 30MHz)
	Conducted Emission at telecommunication port using AAN	2.4 dB(150kHz to 30MHz)
2	Radiated Power	3.5dB
3	Radiated emission	4.4dB (30MHz-1GHz)
		4.6dB (1GHz-6GHz)
4	Radiated Immunity	1.64dB
5	Conducted Immunity	0.96dB
6	ESD	6 %
7	EFT (Electrical Fast Transients)	5 %
8	Surge Immunity	5 %
9	Voltage Dips and Interruptions	4 %
10	20 system	1.5dB
11	Temperature test	1℃
12	Humidity test	3%
13	DC power test	0.5 %

4.4 Standards Applicable for Testing

Table 1 : Tests Carried Out Under EN 55015:2013 +A1:2015

Item	Status
Conducted Emissions at Mains Terminals (9kHz-30MHz)	√
Conducted Emissions at Load Terminals (150kHz-30MHz)	×
Radiated Emissions (30MHz-300MHz)	√
Radiated Emissions (Magnetic field Induced Current)(9kHz-30MHz)	√
Insertion Loss	×
Conducted Emissions at Control Terminals (150kHz-30MHz)	×
Conducted RF Emission Test for CDN method	×

Table 2 : Tests Carried Out Under EN 61000-3-2:2014

Item	Status
Harmonic Current Emission	×

Table 3 : Tests Carried Out Under EN 61000-3-3:2013

Item	Status
Voltage Fluctuations and Flicker	√

Table 4 : Tests Carried Out Under EN 61547:2009

Item	Status
Electrostatic Discharge	√
Radiated Immunity (80MHz-1GHz)	√
Electrical Fast Transients/Burst at Power Port	√
Electrical Fast Transients/Burst at Signal Port	×
Surge at Power Port	√
Conducted Immunity at Power Port (150kHz-80MHz)	√
Conducted Immunity at Signal Port (150kHz-80MHz)	×
Power Frequency Magnetic Field	×
Voltage Dips and Interruptions	√
Electrical Fast Transients/Burst at DC port	×
Conducted Immunity at DC Port (150kHz-80MHz)	×

× Indicates that the test is not applicable
√ Indicates that the test is applicable

4.5 Test Location

All tests were performed at:
SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab
588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666 Fax: +86 21 6191 5678
No tests were sub-contracted.

4.6 Test Facility

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

- **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.

- **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-1.

- **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,C-4336,T-2221,G-830 respectively.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None

4.9 Monitoring of EUT for All Immunity Test

Visual: Working status of the EUT,
Audio: None.

5 Equipment List

Conducted Emissions at Mains Terminals (9kHz-30MHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EMI test receiver	Rohde & Schwarz	ESR7	SHEM162-1	2016-12-29	2017-12-28
Line impedance stabilization network	SCHWARZBECK	NSLK8127	SHEM061-1	2016-12-29	2017-12-28
Line impedance stabilization network	EMCO	3816/2	SHEM019-1	2016-12-29	2017-12-28
Pulse limiter	Rohde & Schwarz	ESH3-Z2	SHEM029-1	2016-08-12	2017-08-11
Shielding Room	ZHONGYU	8*4*3M	SHEM079-2	2016-08-17	2017-08-16

Radiated Emissions (30MHz-300MHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EMI test receiver	Rohde & Schwarz	ESU40	SHEM051-1	2016-08-12	2017-08-11
CONTROLLER	INNCO	CO200	SHEM047-1	N/A	N/A
ANTENNA MAST	INNCO	MA400-EP	SHEM047-2	N/A	N/A
TURN DEVICE	INNCO	DE 3600-RH	SHEM047-3	N/A	N/A
Broadband UHF-VHF ANTENNA	SCHWARZBECK	VULB9168	SHEM048-1	2016-12-29	2017-12-28
Low Frequency Amplifier	CLAVIIO	BDLNA-0001-412010	SHEM164-1	2016-08-12	2017-08-11
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2016-08-17	2017-08-16

Radiated Emissions (Magnetic field Induced Current)(9kHz-30MHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EMI test receiver	Rohde & Schwarz	ESR7	SHEM162-1	2016-12-29	2017-12-28
3-dimensional large loop antenna,diam.2m.acc	Rohde & Schwarz	HXYZ9170	SHEM017-1	2017-01-14	2018-01-13
Pulse limiter	Rohde & Schwarz	ESH3-Z2	SHEM029-1	2016-08-12	2017-08-11
Shielding Room	ZHONGYU	8*4*3M	SHEM079-2	2016-08-17	2017-08-16

Voltage Fluctuations and Flicker					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Harmonic&Flicker analyzer	AMETEK	PACS-1	SHEM024-2	2016-09-06	2017-09-05
AC Power Source 5KVA	AMETEK	5001iX	SHEM025-2	2016-09-06	2017-09-05

Electrostatic Discharge					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Electrostatic Discharge Simulator	TESEQ	NSG 437	SHEM041-1	2016-08-15	2017-08-14

Radiated Immunity (80MHz-1GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Signal generator	Rohde & Schwarz	SMJ100A	SHEM141-1	2016-12-29	2017-12-28
Power Meter	Rohde & Schwarz	NRP	SHEM057-1	2016-12-29	2017-12-28
Power meter sensor	Rohde & Schwarz	NRP-Z91	SHEM057-2	2016-12-29	2017-12-28
Antenna	SCHWARZBECK	STLP9128D	SHEM130-1	N/A	N/A
Amplifier	MILMEGA	AS0840-55-55	SHEM133-1	N/A	N/A
Power meter sensor	Rohde & Schwarz	NRP-Z22	SHEM136-1	2016-08-12	2017-08-11
ElectroMagnetic Field Probe	ETS-Lindgren	HI-6113	SHEM134-1	2016-08-12	2017-08-11
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2016-08-17	2017-08-16

Electrical Fast Transients/Burst at Power Port					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Immunity Test System	EMC PARTNER	TRA3000 F-S-D-V	SHEM163-1	2016-12-29	2017-12-28
Matching resistors for EFT/burst generators	EM test	KW50	SHEM026-4	2016-12-29	2017-12-28
Matching resistors for EFT/burst generators	EM test	KW1000	SHEM026-5	2016-12-29	2017-12-28

Surge at Power Port					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Immunity Test System	EMC PARTNER	TRA3000 F-S-D-V	SHEM163-1	2016-12-29	2017-12-28

Conducted Immunity at Power Port (150kHz-80MHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Signal generator	Rohde & Schwarz	SMJ100A	SHEM141-1	2016-12-29	2017-12-28
PAMP Conducted RF test system	HAEFFLY	PAMP250	SHEM023-1	2016-12-29	2017-12-28
6dB Attenuator	HUAXIANG	TST-150-761	SHEM151-1	N/A	N/A
Coupling clamp	LIITHI	EM 101	SHEM027-1	2016-12-29	2017-12-28
CDN impedance and K-factor	LUTHI	L-801 M1	SHEM023-5	2016-12-29	2017-12-28
CDN impedance and K-factor	LUTHI	L-801 M2/M3	SHEM023-6	2017-01-14	2018-01-13
Shielding Room	ZHONGYU	5*5*3M	SHEM079-6	2016-08-17	2017-08-16

Voltage Dips and Interruptions					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Immunity Test System	EMC PARTNER	TRA3000 F-S-D-V	SHEM163-1	2016-12-29	2017-12-28

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Digital pressure meter	YONGZHI	DYM3-01	SHEM082-1	2017-03-03	2018-03-02
Temperature&humidity recorder	ShangHai weather meter work	ZJ 1-2B	SHEM042-1~6	2016-08-19	2017-08-18
Digital Multimeter	FLUKE	17B	SHEM043-5	2016-08-15	2017-08-14
Autoformer regulator	Guangzhou bao de	TDGC2-5KVA	SHEM150-1	N/A	N/A
Multi-purpose tong tester	FLUKE	316	SHEM001-1	2017-01-29	2018-01-28

6 Emission Test Results

6.1 Conducted Emissions at Mains Terminals (9kHz-30MHz)

Test Requirement:	EN 55015:2013 +A1:2015
Test Method:	EN 55015:2013+A1:2015
Frequency Range:	9kHz to 30MHz
Limit:	
0.009MHz – 0.05MHz	110dB(μV) quasi-peak
0.05MHz – 0.15MHz	90dB(μV)-80dB(μV) quasi-peak
0.15MHz – 0.5MHz	66dB(μV)-56dB(μV) quasi-peak, 56dB(μV)-46dB(μV) average
0.5MHz – 5MHz	56dB(μV) quasi-peak, 46dB(μV) average
5MHz – 30MHz	60dB(μV) quasi-peak, 50dB(μV) average
Detector:	Peak for pre-scan (200Hz resolution bandwidth) 0.009M to 0.15MHz
	Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

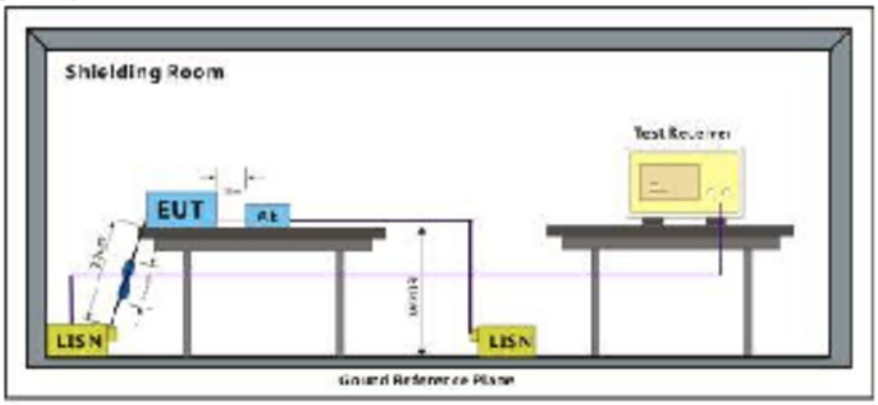
6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode a:Working mode: Keep the EUT working on max output power continuously.

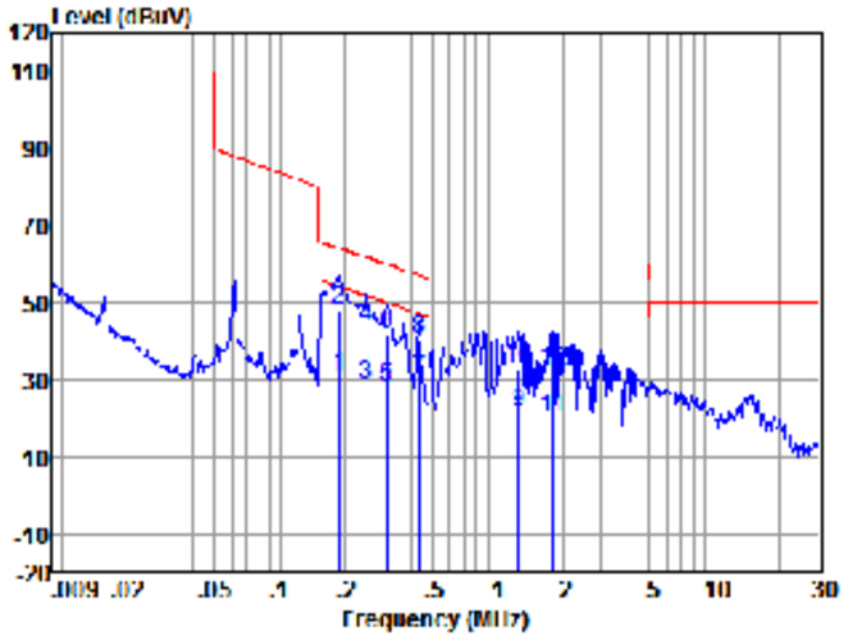
6.1.2 Test Setup Diagram



6.1.3 Measurement Data

An initial pre-scan was performed with peak detector.Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.

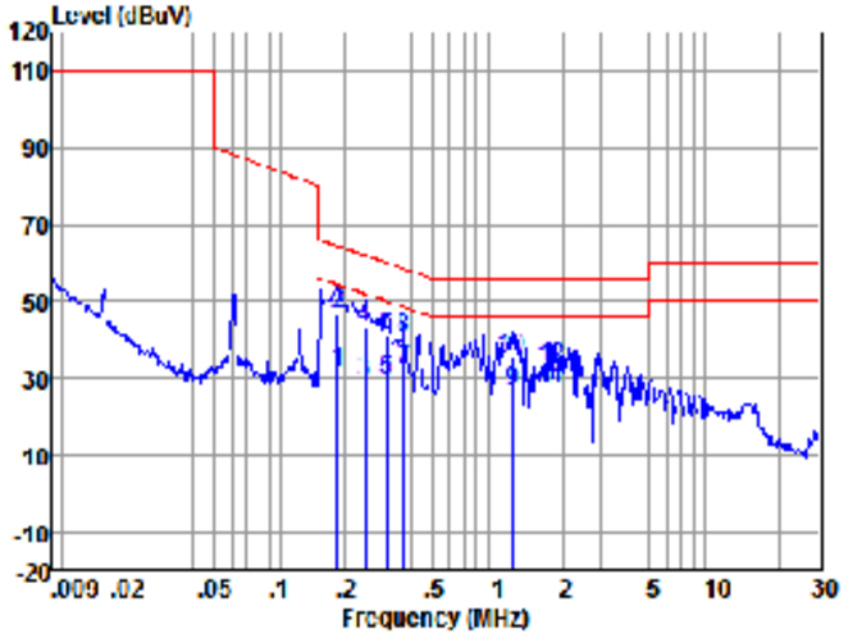
Mode:a; Line:Live Line



Site : chamber
Condition : LISN-L-2016
LOT/Project No: J846LM
Mode No. : a

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.187	20.74	0.08	9.81	30.63	54.17	-23.54	Average
2	0.187	38.43	0.08	9.81	48.32	64.17	-15.85	QP
3	0.250	18.50	0.09	9.81	28.40	51.74	-23.28	Average
4	0.250	33.84	0.09	9.81	43.74	61.74	18.00	QP
5	0.309	18.10	0.09	9.81	28.00	49.99	-21.99	Average
6	0.309	31.44	0.09	9.81	41.34	59.99	-18.65	QP
7	0.435	20.14	0.10	9.82	30.06	47.16	17.10	Average
8	0.435	30.61	0.10	9.82	40.53	57.16	-16.63	QP
9	1.248	11.44	0.08	9.84	21.36	46.00	24.64	Average
10	1.248	22.63	0.08	9.84	32.55	56.00	-23.45	QP
11	1.798	9.71	0.08	9.85	19.64	46.00	-26.36	Average
12	1.798	22.38	0.08	9.85	32.31	56.00	23.69	QP

Mode:a; Line:Neutral Line



Site : chamber
Condition : LISN-N-2010
FUT/Project No: 38461 M
Mode No. : a

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.184	21.62	0.05	9.81	31.48	54.30	22.82	Average
2	0.184	36.97	0.05	9.81	46.83	64.30	-17.47	QP
3	0.246	19.27	0.05	9.81	29.13	51.88	-22.75	Average
4	0.246	32.91	0.05	9.81	42.77	61.88	-19.11	QP
5	0.309	19.93	0.05	9.81	29.79	49.99	-20.20	Average
6	0.309	31.10	0.05	9.81	40.96	59.99	19.03	QP
7	0.370	22.48	0.04	9.81	32.33	48.51	-16.18	Average
8	0.370	30.35	0.04	9.81	40.20	58.51	-18.31	QP
9	1.169	16.40	0.05	9.84	26.29	46.00	19.71	Average
10	1.169	25.37	0.05	9.84	35.26	56.00	-20.74	QP
11	1.783	17.28	0.06	9.85	27.19	46.00	18.81	Average
12	1.783	22.60	0.06	9.85	32.51	56.00	-23.49	QP

6.2 Radiated Emissions (30MHz-300MHz)

Test Requirement:	EN 55015:2013 +A1:2015
Test Method:	CISPR 32:2015
Frequency Range:	30MHz to 300MHz
Measurement Distance:	3m
Limit:	
30MHz-230MHz	40dB(μV/m) quasi-peak
230MHz-300MHz	47dB(μV/m) quasi-peak
Detector:	Peak for pre-scan (120kHz resolution bandwidth) 30M to 300MHz

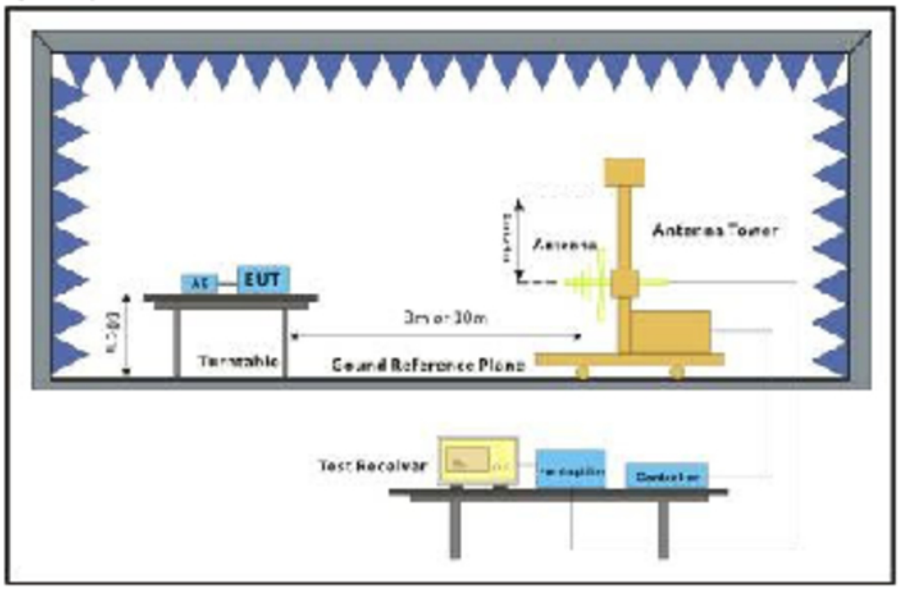
6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 20 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode a:Working mode: Keep the EUT working on max output power continuously.

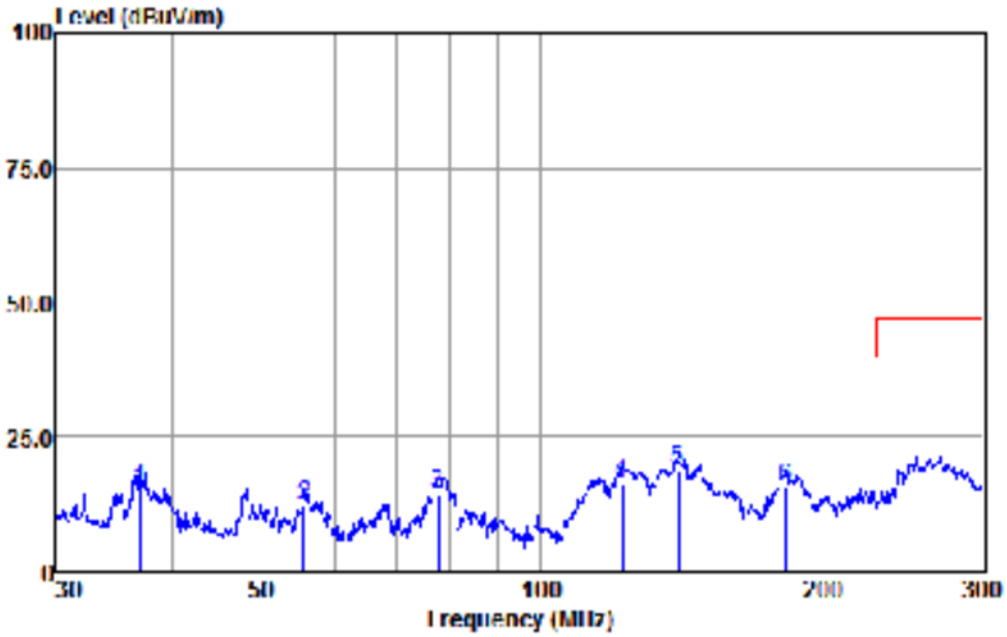
6.2.2 Test Setup Diagram



6.2.3 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

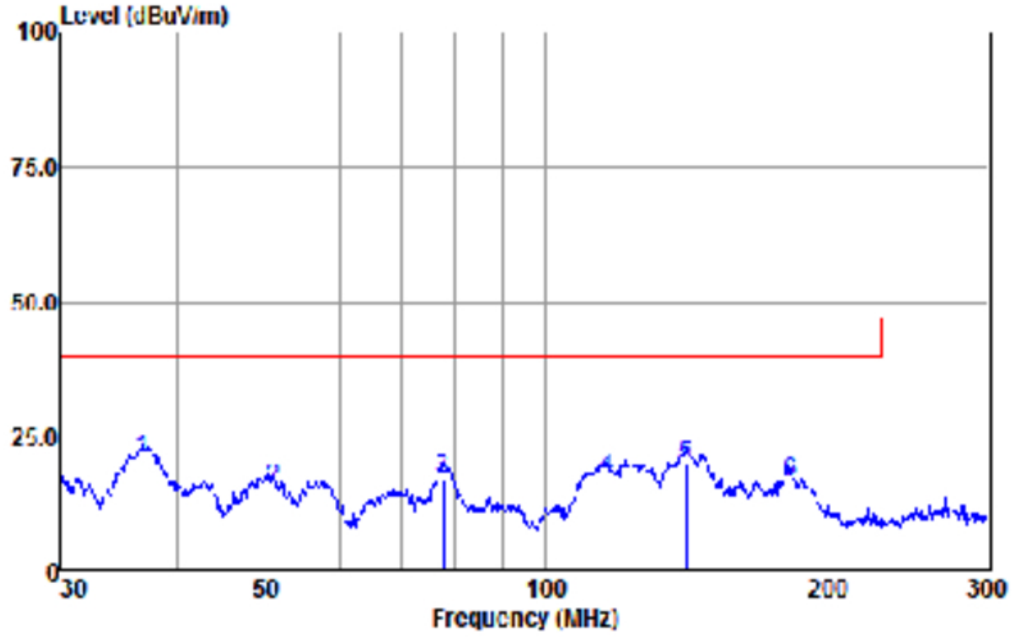
Mode:a; Polarization:Horizontal



Condition : HORIZONTAL
EUT/Project: 3846LM
Test Mode : a

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	36.91	41.59	16.82	0.71	42.68	15.14	40.00	-24.86	QP
2	55.48	42.84	11.72	0.28	42.69	12.15	40.00	27.85	QP
3	77.47	48.83	8.81	0.37	42.69	14.52	40.00	-25.48	QP
4	122.50	47.80	10.73	0.55	42.66	16.42	40.00	-23.58	QP
5	140.64	49.30	11.36	0.61	42.59	18.68	40.00	-21.32	QP
6	183.71	46.83	11.25	0.67	42.52	15.44	40.00	-24.56	QP

Mode:a; Polarization:Vertical



Condition : VERTICAL
LUI/Project: 3846LM
Test Mode : a

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	36.74	47.14	16.01	0.21	42.68	20.68	40.00	19.32	QP
2	50.95	46.58	10.79	0.26	42.68	14.95	40.00	-25.05	QP
3	77.47	50.48	8.81	0.37	42.69	16.97	40.00	-23.03	QP
4	116.45	49.15	9.87	0.53	42.68	16.87	40.00	23.13	QP
5	141.95	50.17	11.42	0.61	42.59	19.61	40.00	-20.39	QP
6	184.13	46.84	11.26	0.67	42.52	16.25	40.00	-23.75	QP

6.3 Radiated Emissions (Magnetic field Induced Current)(9kHz-30MHz)

Test Requirement:	EN 55015:2013 +A1:2015
Test Method:	EN 55015:2013+A1:2015
Frequency Range:	9kHz to 30MHz
Limit:	
0.009MHz-0.07MHz	88dB(μA) quasi-peak
0.07MHz-0.15MHz	88dB(μA)-58dB(μA) quasi-peak
0.15MHz-3MHz	58dB(μA)-22dB(μA) quasi-peak
3MHz-30MHz	22dB(μA) quasi-peak
Detector:	Peak for pre-scan (200Hz resolution bandwidth) 0.009M to 0.15MHz
	Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

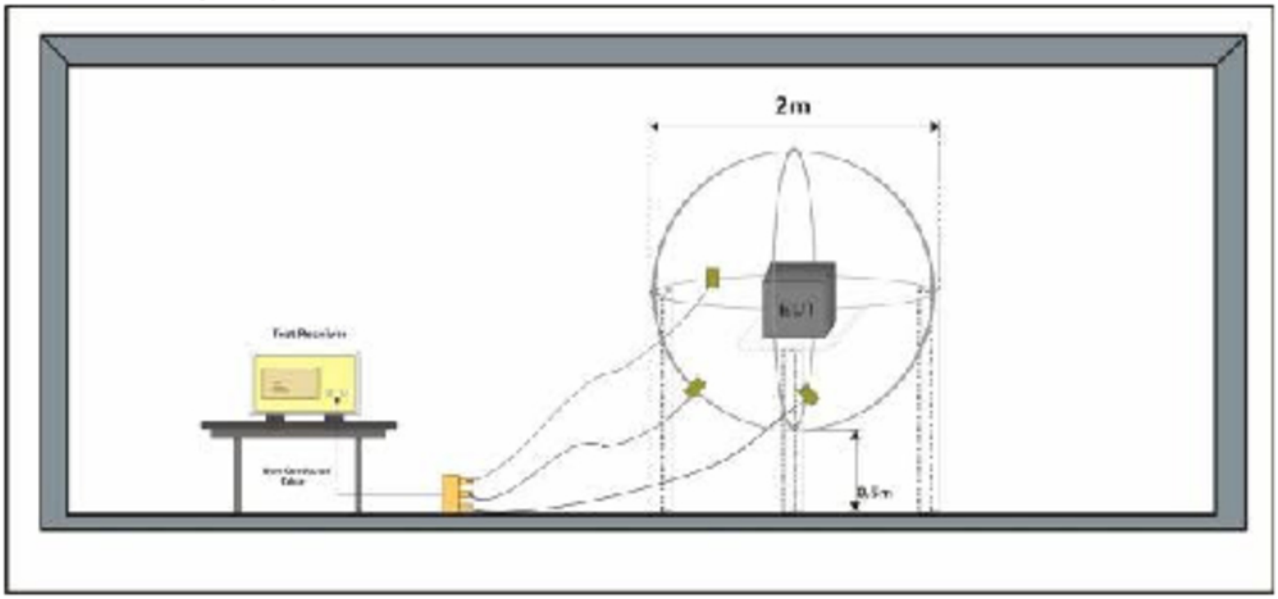
6.3.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode a:Working mode: Keep the EUT working on max output power continuously.

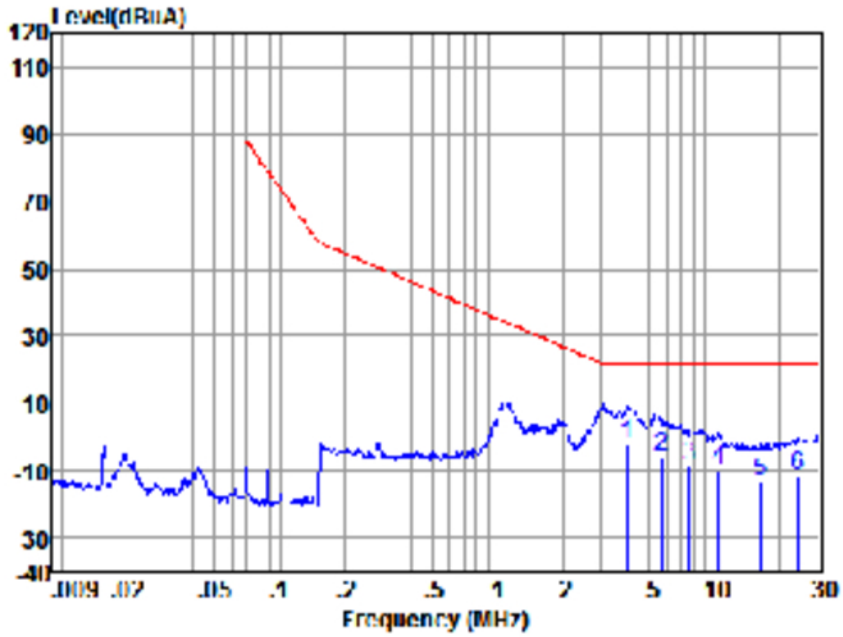
6.3.2 Test Setup Diagram



6.3.3 Measurement Data

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

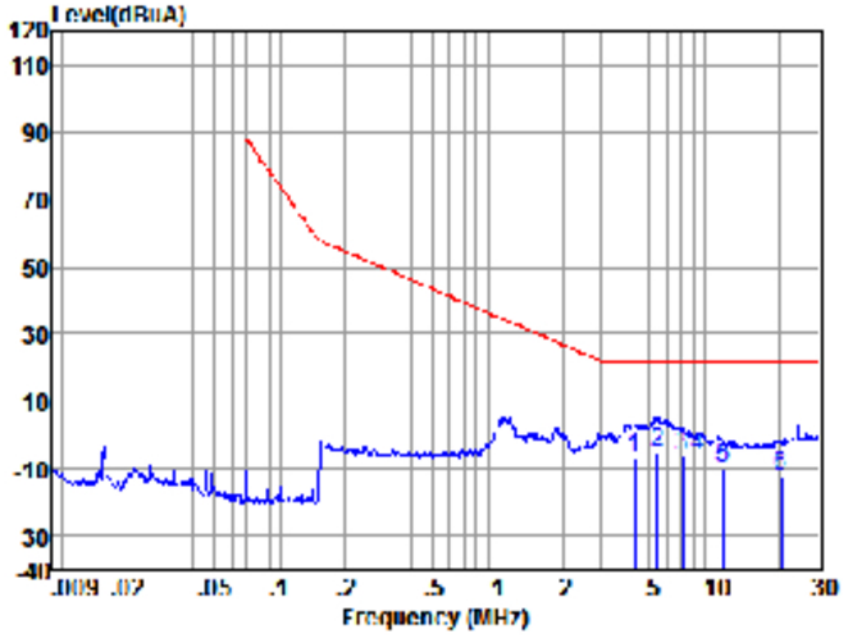
Mode:a; Axial:X



Site : chamber
Condition : 55015_LOOP
LOT/Project No: J846LM
Test mode : a
: X

	Freq	Read Level	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuA	dB	dBuA	dBuA	dB	
1	3.948	2.22	0.28	1.94	22.00	23.94	QP
2	5.734	-6.23	0.35	-5.88	22.00	-27.88	QP
3	7.616	-9.25	0.43	-8.82	22.00	-30.82	QP
4	10.451	-10.41	0.53	-9.88	22.00	-31.88	QP
5	15.195	-14.82	0.66	-13.36	22.00	-35.36	QP
6	24.099	12.24	0.62	11.62	22.00	33.62	QP

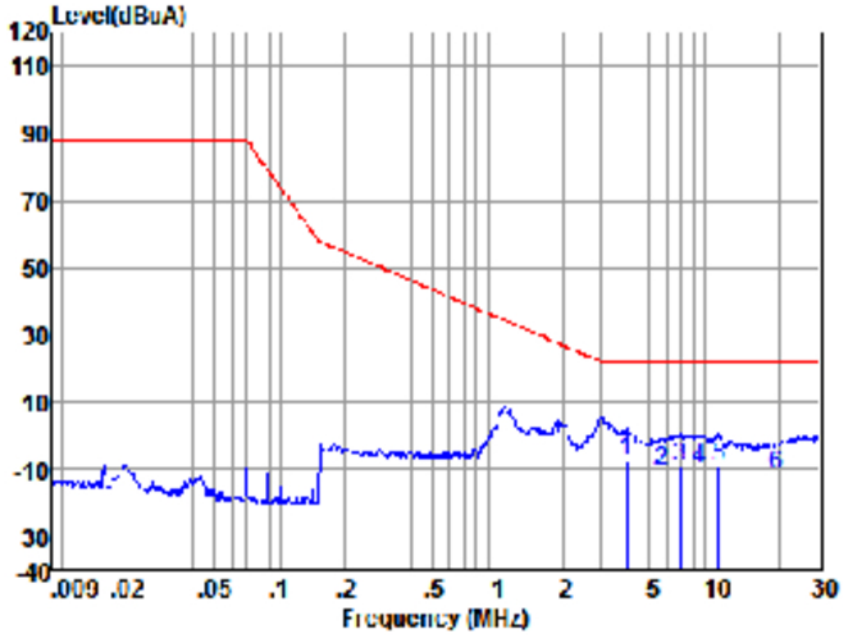
Mode:a; Axial:Y



Site : chamber
Condition : 55015_LOOP
LOT/Project No: J846LM
Test mode : a
: Y

	Freq	Read Level	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuA	dB	dBuA	dBuA	dB	
1	4.247	6.98	0.29	6.69	22.00	28.69	QP
2	5.417	-5.29	0.33	-4.96	22.00	-26.96	QP
3	7.080	-6.66	0.41	-6.25	22.00	-28.25	QP
4	8.327	-7.04	0.45	-6.59	22.00	-28.59	QP
5	10.972	-10.19	0.53	-9.66	22.00	-31.66	QP
6	20.160	12.41	0.39	12.02	22.00	-34.02	QP

Mode:a; Axial:Z



Site : chamber
Condition : 55015 LOOP
EUT/Project No: 38461 M
Test mode : a
: Z

	Freq	Read Level	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuA	dB	dBuA	dBuA	dB	
1	3.916	-7.82	0.28	-7.54	22.00	-29.54	QP
2	5.642	-10.68	0.35	-10.33	22.00	-32.33	QP
3	6.910	9.59	0.40	9.19	22.00	-31.19	QP
4	8.464	-10.15	0.46	-9.69	22.00	-31.69	QP
5	10.451	-9.97	0.53	-9.44	22.00	-31.44	QP
6	19.203	-12.30	0.43	-11.87	22.00	-33.87	QP

6.4 Harmonic Current Emission

Test Requirement:	EN 61000-3-2:2014
Test Method:	EN 61000-3-2:2014
Frequency Range:	100Hz to 2kHz

6.4.1 Measurement Data

There is no need for Harmonics test to be performed on this LED lighting with rated power less than 25W since it is not the discharge lighting (active input power <=25W) in accordance with EN 61000-3-2.

6.5 Voltage Fluctuations and Flicker

Test Requirement: EN 61000-3-3:2013
Test Method: EN 61000-3-3:2013

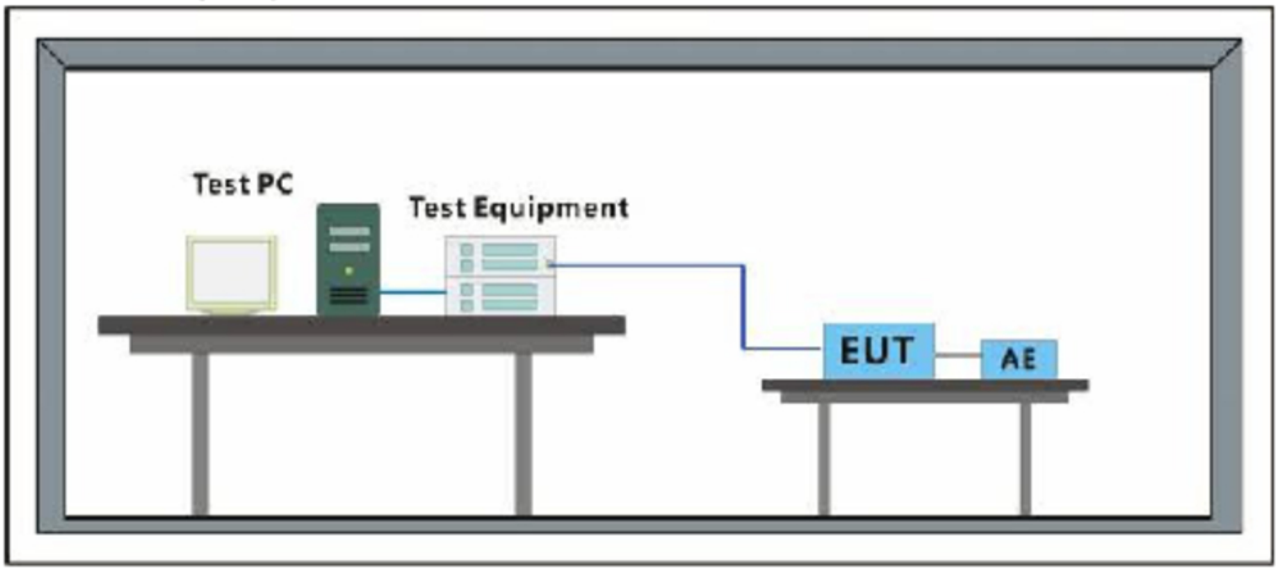
6.5.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode a:Working mode: Keep the EUT working on max output power continuously.

6.5.2 Test Setup Diagram



6.5.3 Measurement Data

Mode:a

Vrms at the end of test (Volt):	229.97			
T-max (mS):	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

7 Immunity Test Results

7.1 Performance Criteria Description in EN 61547:2009

Criterion A During the test no change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended.

Criterion B During the test the luminous intensity may change to any value. After the test the luminous intensity shall be restored to its initial value within 1 min.

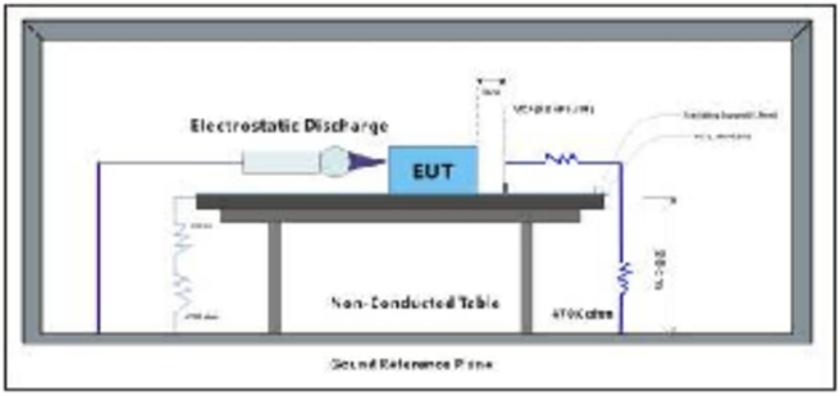
Regulating controls need not function during the test, but after the test the mode of the control shall be the same as before the test provided that during the test no mode changing commands were given.

Criterion C During and after the test any change of the luminous intensity is allowed and the lamp(s) may be extinguished. After the test, within 30 min, all functions shall return to normal if necessary by temporary interruption of the mains supply and/or operating the regulating control.

7.2 Electrostatic Discharge

Test Requirement:	EN 61547:2009
Test Method:	EN 61000-4-2:2009
Performance Criterion:	B
Discharge Impedance:	330Ω/150pF
Number of Discharge:	Minimum 10 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

7.2.1 Test Setup Diagram



7.2.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 51 % RH Atmospheric Pressure: 1002 mbar

Test mode: a:Working mode: Keep the EUT working on max output power continuously.

7.2.3 Test Results:

Observations: Test Point:

1. All insulated enclosure and seams.
2. All accessible metal parts of the enclosure.
3. All side

Discharge type	Level (kV)	Polarity	Test Point	Result / Observations
Air Discharge	2,4,8	+	1	A
Air Discharge	2,4,8	-	1	A
Horizontal Coupling	4	+	3	A
Horizontal Coupling	4	-	3	A
Vertical Coupling	4	+	3	A
Vertical Coupling	4	-	3	A

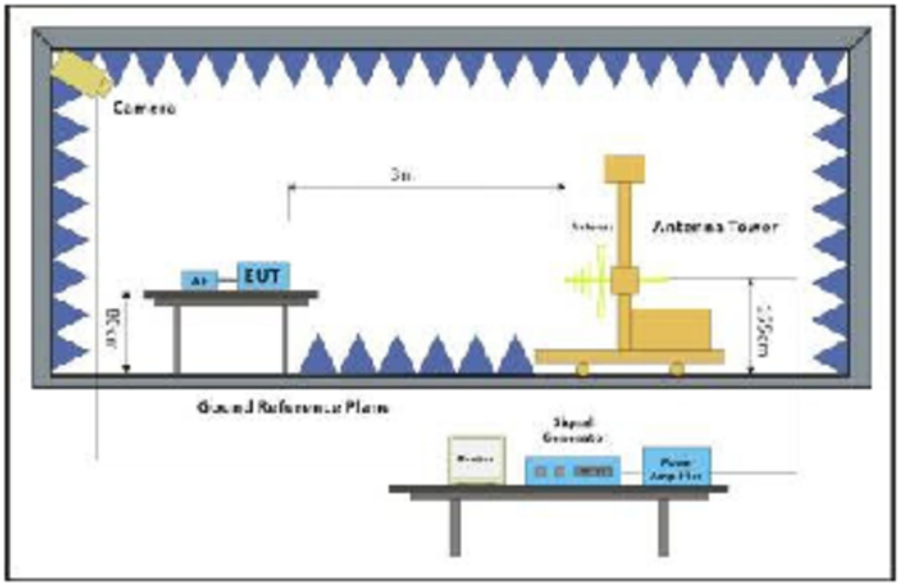
Results:

A: No degradation in the performance of the EUT was observed.

7.3 Radiated Immunity (80MHz-1GHz)

Test Requirement:	EN 61547:2009
Test Method:	EN 61000-4-3:2006 +A1:2008+A2:2010
Performance Criterion:	A
Frequency Range:	80MHz to 1GHz
Antenna Polarisation:	Vertical and Horizontal
Modulation	1kHz,80% Amp. Mod,1% increment

7.3.1 Test Setup Diagram



7.3.2 E.U.T. Operation

Operating Environment:

Temperature: 20 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode: a:Working mode: Keep the EUT working on max output power continuously.

7.3.3 Test Results:

Frequency	Level (V/m)	EUT Face	Dwell time	Result / Observations
80MHz-1GHz	3	Front	2s	A
80MHz-1GHz	3	Back	2s	A
80MHz-1GHz	3	Left	2s	A
80MHz-1GHz	3	Right	2s	A
80MHz-1GHz	3	Top	2s	A
80MHz-1GHz	3	Underside	2s	A

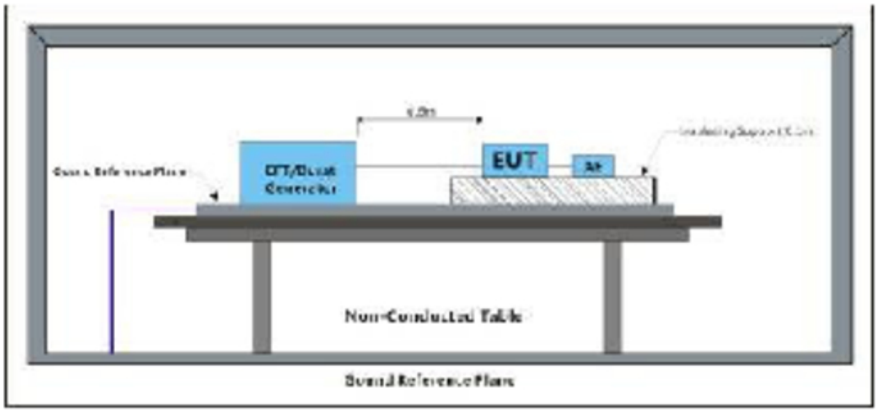
Results:

A: No degradation in the performance of the EUT was observed.

7.4 Electrical Fast Transients/Burst at Power Port

Test Requirement:	EN 61547:2009
Test Method:	EN 61000-4-4:2012
Performance Criterion:	B
Repetition Frequency:	5kHz
Burst Period:	300ms
Test Duration:	2 minute per level & polarity

7.4.1 Test Setup Diagram



7.4.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 51 % RH Atmospheric Pressure: 1002 mbar

Test mode: a:Working mode: Keep the EUT working on max output power continuously.

7.4.3 Test Results:

Test Line	Level (kV)	Polarity	CDN/Clamp	Result / Observations
AC power port	1	+	CDN	A
AC power port	1	-	CDN	A

Results:

A: No degradation in the performance of the EUT was observed.

7.5 Surge at Power Port

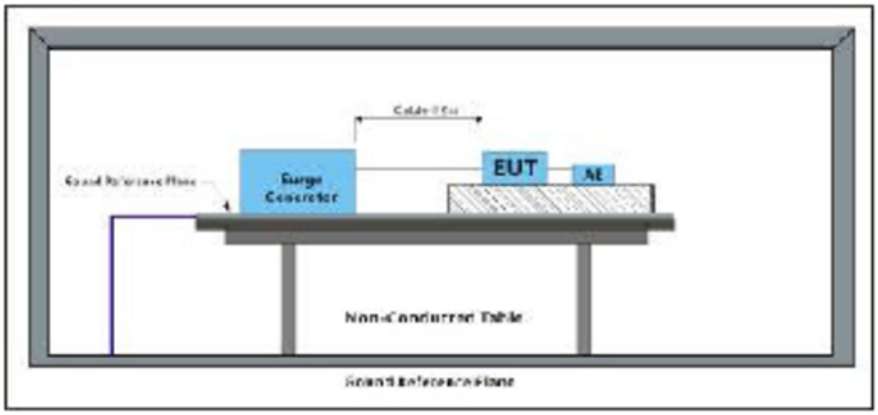
Test Requirement: EN 61547:2009

Test Method: EN 61000-4-5:2014

Performance Criterion: C

No. of surges: 5 positive at 90°, 5 negative at 270°.

7.5.1 Test Setup Diagram



7.5.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 51 % RH Atmospheric Pressure: 1002 mbar

Test mode: a:Working mode: Keep the EUT working on max output power continuously.

7.5.3 Test Results:

Test Line	Level (kV)	Polarity	Phase (deg)	Result / Observations
L-N	0.5	+	90°	A
L-N	0.5	-	270°	A

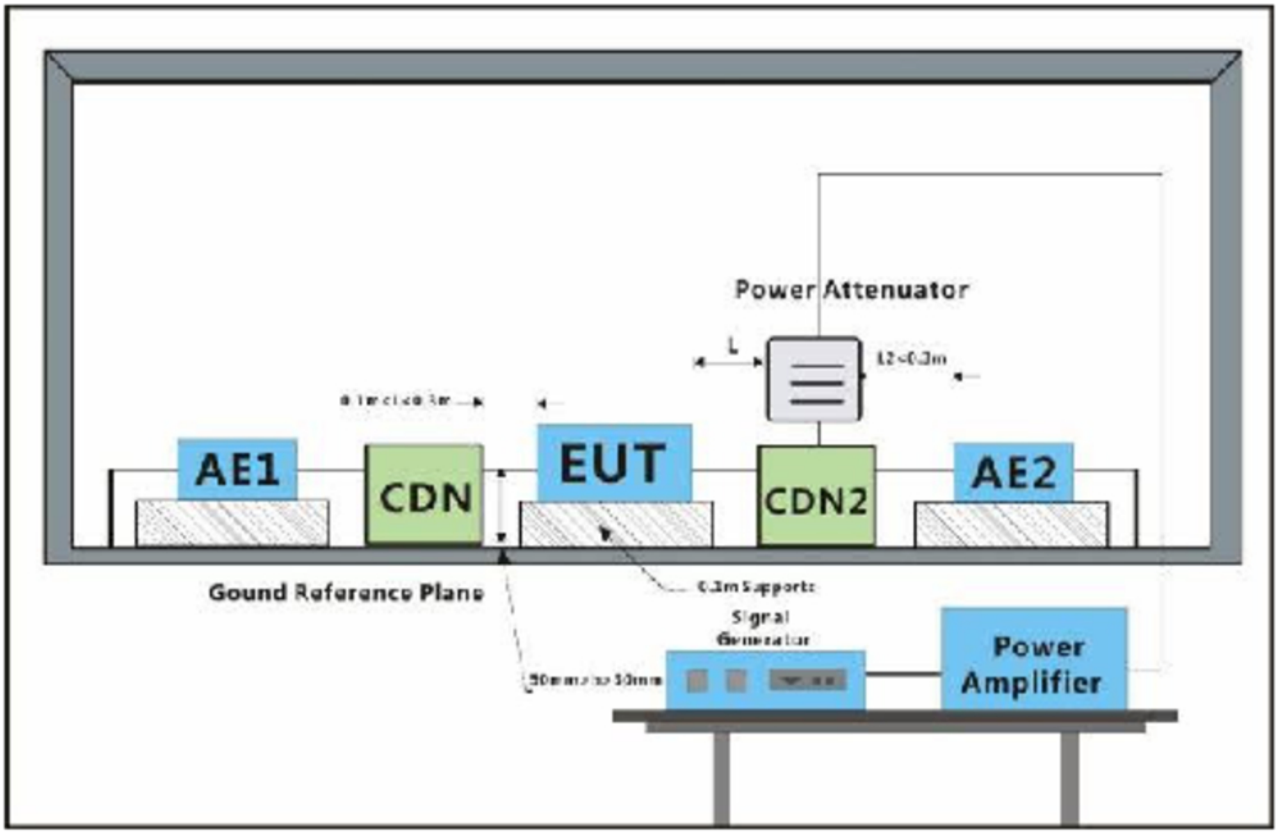
Results:

A: No degradation in the performance of the EUT was observed.

7.6 Conducted Immunity at Power Port (150kHz-80MHz)

Test Requirement:	EN 61547:2009
Test Method:	EN 61000-4-6:2014
Performance Criterion:	A
Frequency Range:	0.15MHz to 80MHz
Modulation:	80%, 1kHz Amplitude Modulation
Step Size	1%

7.6.1 Test Setup Diagram



7.6.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

Test mode: a:Working mode: Keep the EUT working on max output power continuously.

7.6.3 Test Results:

Cable port	Level (Vrms)	CDN/Clamp	Dwell time	Result / Observations
AC power port	3	CDN	3s	A

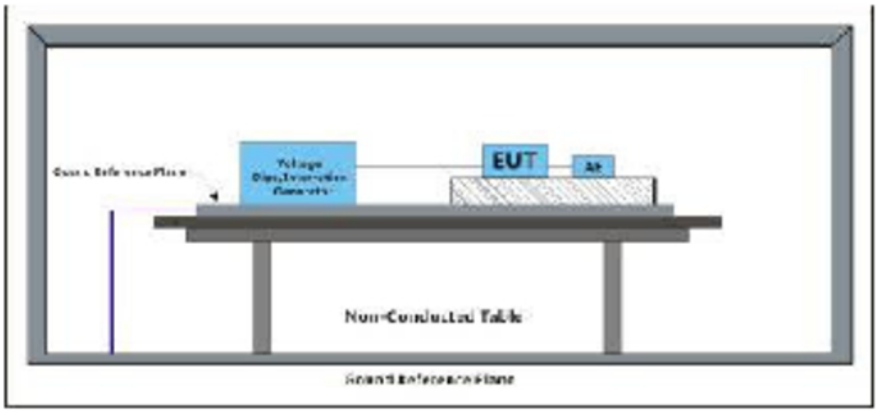
Results:

A: No degradation in the performance of the EUT was observed.

7.7 Voltage Dips and Interruptions

Test Requirement:	EN 61547:2009
Test Method:	EN 61000-4-11:2004
Performance Criterion:	0% of UT (Supply Voltage) for 0.5 Periods:B; 70 % of UT for 10 Periods:C
No. of Dips / Interruptions:	3 per Level
Time between dropout	10s

7.7.1 Test Setup Diagram



7.7.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 51 % RH Atmospheric Pressure: 1002 mbar

Test mode: a:Working mode: Keep the EUT working on max output power continuously.

7.7.3 Test Results:

Level % UT	Phase (deg)	Duration	No. of Dips / Interruptions	Result / Observations
0	0°	0.5 Cycles	3	A
0	180°	0.5 Cycles	3	A
70	0°	10 Cycles	3	B
70	180°	10 Cycles	3	B

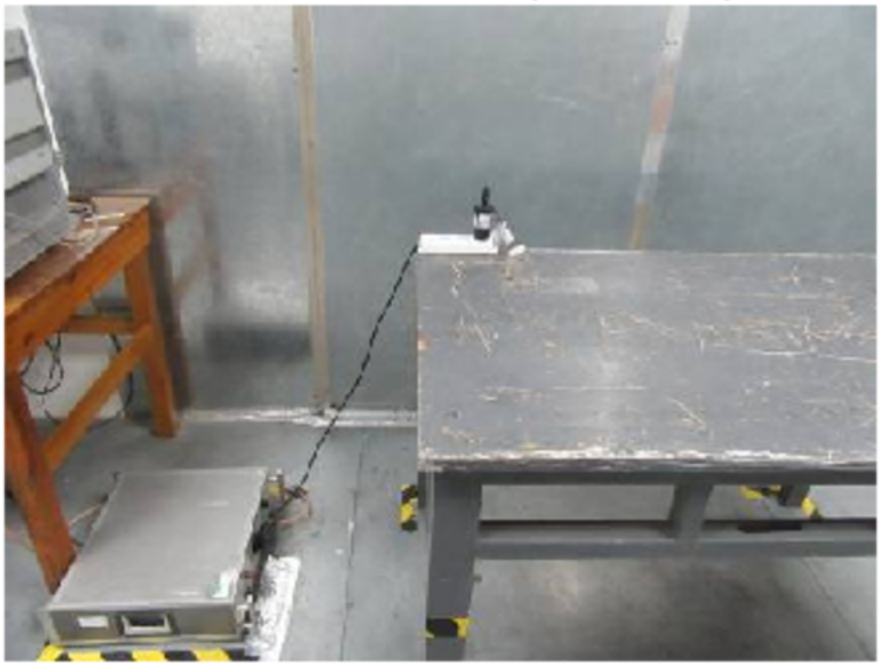
Results:

A: No degradation in the performance of the EUT was observed.

B: During the test, the EUT would flicker

8 Photographs

8.1 Conducted Emissions at Mains Terminals (9kHz-30MHz) Test Setup



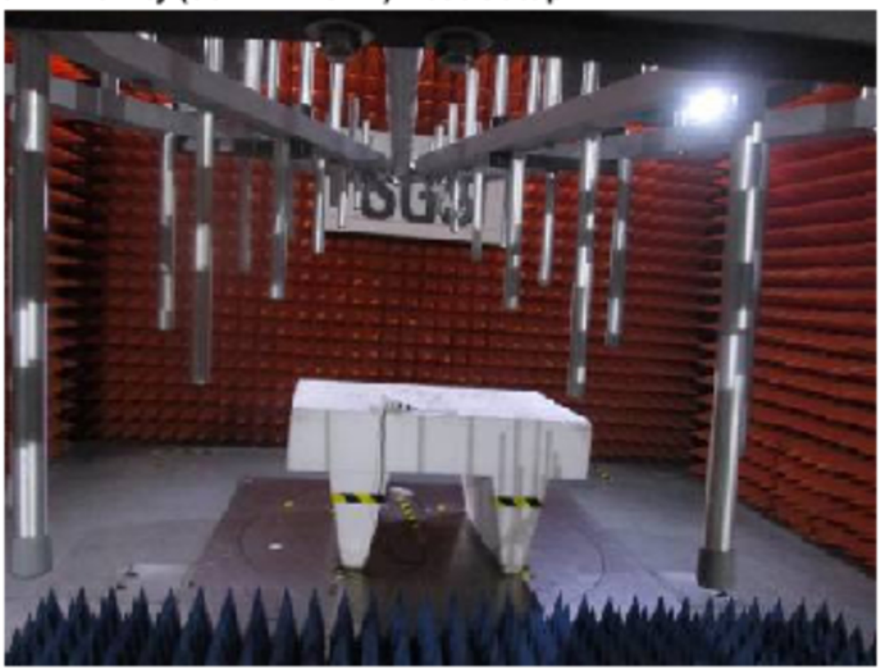
8.2 Radiated Emissions (30MHz-300MHz) Test Setup

8.3 Radiated Emissions (Magnetic field Induced Current)(9kHz-30MHz) Test Setup

8.4 Voltage Fluctuations and Flicker Test Setup

8.5 Electrostatic Discharge Test Setup

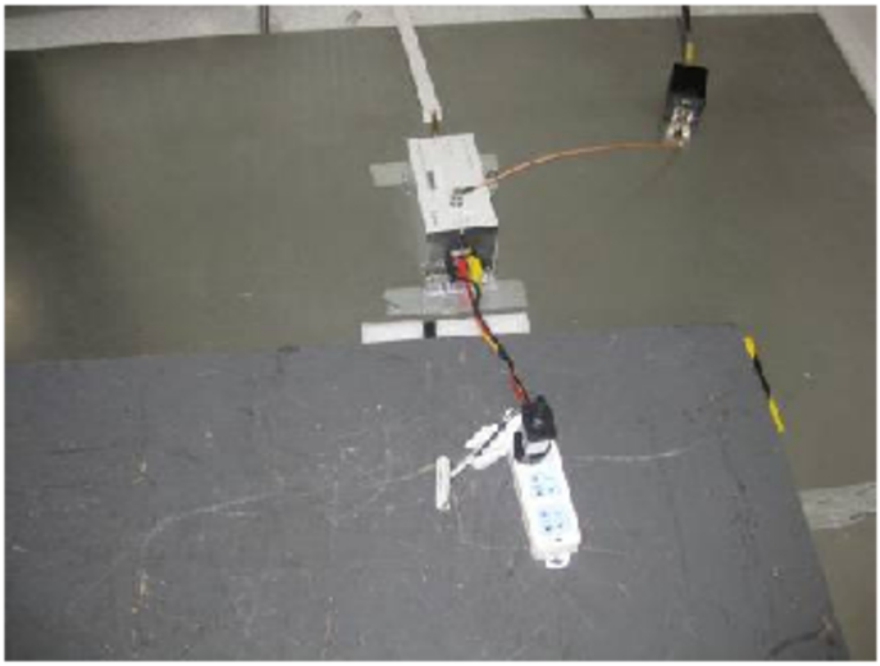
8.6 Radiated Immunity (80MHz-1GHz) Test Setup



8.7 Electrical Fast Transients/Burst at Power Port Test Setup

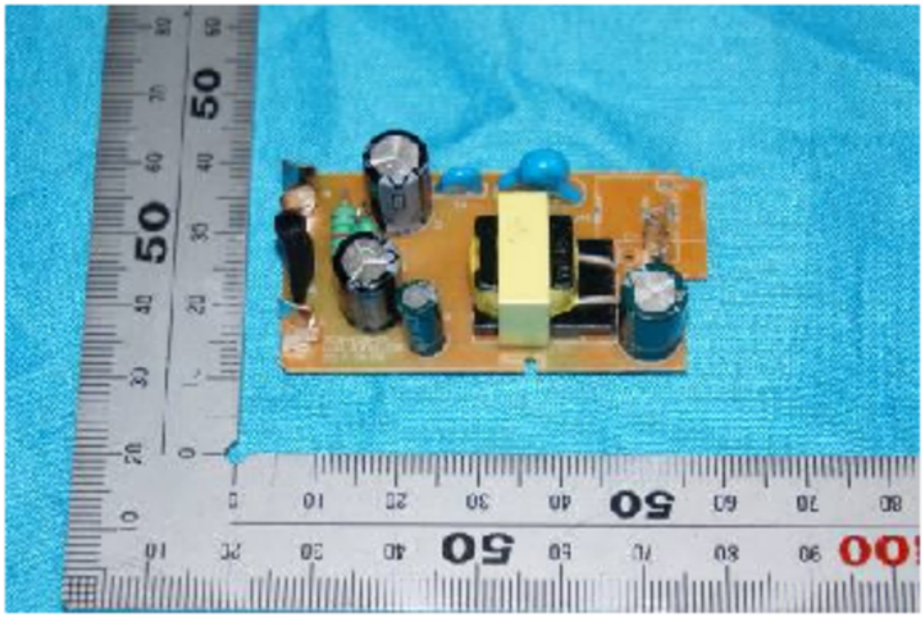
8.8 Surge at Power Port Test Setup

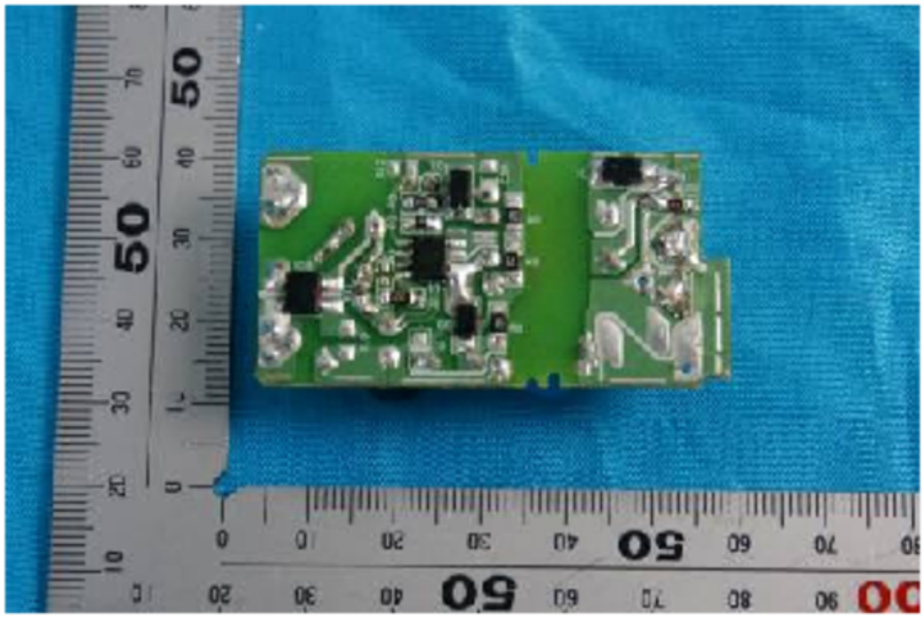
8.9 Conducted Immunity at Power Port (150kHz-80MHz) Test Setup

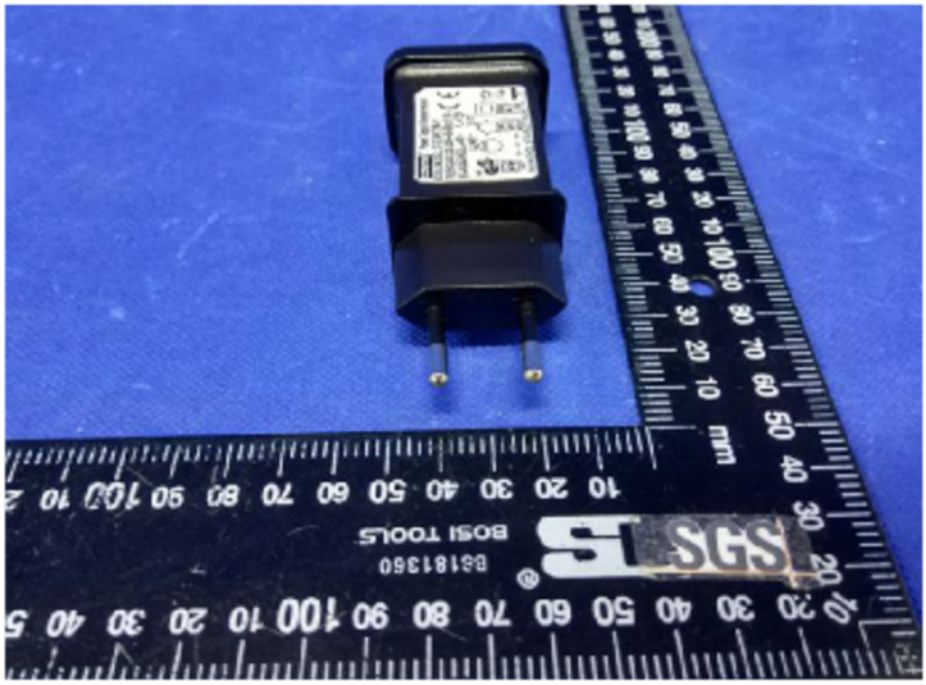


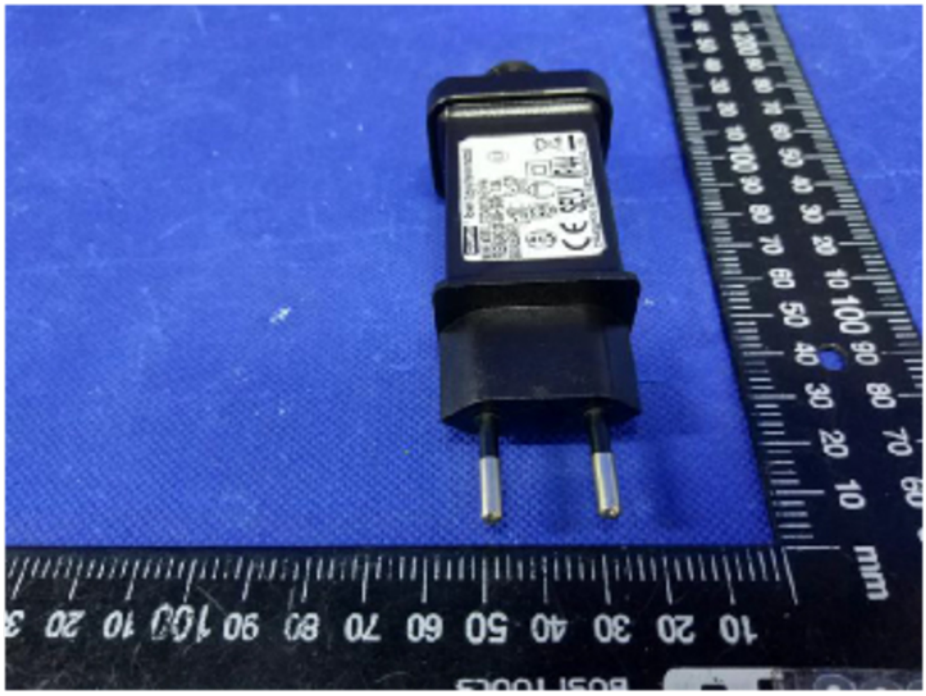
8.10 Voltage Dips and Interruptions Test Setup

8.11 EUT Constructional Details









--End of the Report--

L C I E

TEST REPORT N°: TZS-18MA0321LTSPB

EMC TEST REPORT

To :		Fax :	--
Attn :	--	Email :	--
Address :			
Cc :	--	Fax/Email	--
Attn :	--		
This document includes : 14 pages		Test date :	Mar 12, to Mar. 16, 2018

FACTORY NAME :	
ADDRESS :	
PRODUCT :	Lighting chain for indoor and outdoor use
TYPE REFERENCE :	refer to model list
RATED VOLTAGE :	180-240V~, 50/60Hz for adaptor 3-36V DC & 4.5-36V AC 50Hz for lighting chain
RATED INPUT POWER :	Refer to model list
PROTECTION CLASS :	II for adaptor III for lighting chain
TESTS REALISED :	On 1 sample of TTDL-IP-0336L36DC18056CW-C

STANDARDS USED(DATE) :	EN 55015:2013+A1:2015 EN 61547:2009 EN 61000-3-2:2014 EN 61000-3-3:2013
CLAUSES EXAMINED :	All Clauses Relevant

Test Location: Building C, No. 829, Xin Zhuan Road, Shanghai, CHINA

CONCLUSION :	**The samples do satisfy the clauses examined .**
Test done by, **Project Engineer** John Qiao. Name : John QIAO Date : Mar 16, 2018	**Approved by,** **Project Manager** LCIE CHINA COMPANY LIMITED Name : Jammy GE Date : Mar 16, 2018

1 TESTING PROGRAM

The tests have been carried out according to the requirements of the following standards:

Emission standard EN 55015:2013+A1:2015

- Measurement of the continuous conducted emission levels.
- Measurement of the radiated emission levels.

Immunity standard EN 61547:2009

- Immunity to electrostatic discharges - publication IEC 61000-4-2.
- Immunity to fast transients/bursts - publication IEC 61000-4-4.
- Immunity to conducted disturbances induced by radio-frequency fields - publication IEC 61000-4-6.
- Immunity to radiated radio-frequency electromagnetic field with amplitude modulation - publication IEC 61000-4-3.
- Immunity to surges - publication IEC 61000-4-5.
- Immunity to voltage dips -publication IEC 61000-4-11.
- Immunity to voltage interruptions - publication IEC 61000-4-11.

Emission standard EN 61000-3-2:2014

- Measurement of the harmonic currents.

Emission standard EN 61000-3-3:2013

- Measurement of the voltage fluctuations.

Special Comment : We choose the model with controller and transformer: HJ36 36-G-BD as the representative model to apply on the full tests.

2 HISTORY OF FAILURE

None.

3 EQUIPMENT CHARACTERISTICS

3.1 Model list

Model name: TTDL-IP-!@@@@LXDCY$$$%-& TTDL-IP-!@@@@LXACY$$$%
"IP" mean the IP degree of lighting chain, it can be blank(IP20),IP(IP44)
"!"mean the shape of lighting chain, it can be blank(Normal),D(Decoration),C(curtain), N(Net, B(Icicle)
"@@@@"means the quantity of LED, from 0001(1 LED) to 6000(6000 LED)
"X" means the supply voltage of LED lighting chain, from 3V to 36V ,0.1V for each step, for example: 4.5V, X=4.5 ; 9V,X=09
"DC" means the supply voltage is DC,"AC" means the supply voltage is AC.
"Y" means the current of each group, from 0.1(0.1mA) to 20(20mA), 0.1mA for each step, for example: 1.9mA, Y=1.9; 5mA,Y=05
"$$$" quantity of parallel connected, from 001to 500
"%" means the colour of LED, it can be R(Red), O(Orange), Y(Yellow), B(Blue), G(Green), PI(Pink)CW(Cool white),W(White),WW(Warm White),
PG(Pure Green),PU(Purple),WG(Warm Gold) and M(multi)
"&" can be blank (without controller or without can be connected),C(with controller),P(with can be connected),CP(with controller and can be connected)
3-36V DC for TTDL-IP-!@@@@LXDCY$$$%-&
4.5-36V AC for TTDL-IP-!@@@@LXACY$$$%-& Max.36W for TTDL-IP-!@@@@LXDCY$$$%-& Max.15W for TTDL-IP-!@@@@LXACY$$$%-&
About the lighting chain which can be connected, the minimum power of each LED bulbs is 0.006W(3V*0.002A), max quantity of LED=the rating power of the transformer/0.006.
total power of lightingchain= "X" * "Y" * "$$$"

4 OPERATING CONDITIONS

The apparatus was placed in a shielded room, full or semi anechoic chamber, and was powered with an alternative current source through filters mounted on the shielded room wall. The apparatus was worked continuously.

Ambient conditions :	Temperature	:	20~30 ℃
	Relative humidity	:	40~60 %
	Atmospheric pressure	:	101kPa

5 PERFORMANCE CRITERIA

Criterion A : During the test no change of the luminous intensity shall be observed, if any, shall operate during the test as intended.

Criterion B : During the test the luminous intensity may change to any value. After the test the luminous intensity shall be restored to its initial value within 1 min.

Criterion C : During and after the test any change of the luminous intensity is allowed and the lamp may be extinguished. After the test, within 30 min, all functions shall return to normal if necessary by temporary interruption of the mains supply.

6 TEST RESULTS

6.1 EMISSION STANDARD EN 55015:2013+A1:2015

Article	TEST	TEST SPECIFICATION	RESULTS			
			P	F	NA	Rem
4.3	**Disturbance Voltage**	Operating conditions : according to the article 6				
4.3.1	Mains terminals Frequency range: 0,009 to 30 MHz	Port(s) : • AC mains port • Diagram(s) No. <1>	[X] [ ]	[ ] [ ]	[ ] [ ]	[ ] [ ]
4.3.2	Load and control terminals Frequency range : 0,009 to 30 MHz	• Load and control terminals • Diagram(s) No. <>	[ ] [ ]	[ ] [ ]	[X] [ ]	[1] [ ]
4.4	**Radiated Electromagnetic Disturbance**	Operating conditions : according to the article 6				
4.4.1	Frequency range : 0,009 to 30 MHz	• 2 m Loop antenna • Diagram (s) No. <2>	[X] [ ]	[ ] [ ]	[ ] [ ]	[ ] [ ]
4.42	**Radiated disturbance limit** Frequency range: 30 to 300 MHz	Operating conditions : according to the article 6 Port(s) : Enclosure Measurement distance: 3 m Antenna Position • Vertical • Horizontal Diagram(s) No. <3>	 [X] [X]	 [ ] [ ]	 [ ] [ ]	 [ ] [ ]

P : pass - F : Fail - NA : not applicable - Rem : remark

6.2 IMMUNITY STANDARD EN 61547:2009

☒ For lighting equipment containing active electronic components which e.g. convert or regulate the operating voltage and/or the frequency of the light source.

Article	TEST	TEST SPECIFICATION	RESULTS			
			P	F	NA	Rem
5.2	**Electrostatic discharges** Table 1 Enclosure Performance criteria B	Contact discharges Level : ± 4 kV Application points : • horizontal coupling plane • vertical coupling plane •	[X] [X] [ ]	[ ] [ ] [ ]	[ ] [ ] [ ]	[2] [2] [ ]
	Performance criteria B	Air discharges Level : ± 8 kV Application points : • enclosure	[X] [ ]	[ ] [ ]	[ ] [ ]	[2] [ ]
5.3	**Radio-frequency electromagnetic fields 80 to 1000 MHz** Table 2 Enclosure Performance criteria A	Test field strength : 3 V/m (unmodulated signal) Modulation frequency : 1 kHz Modulation depth : 80 % Frequency Step : 1% Dwell Time : 2 s Logperiodic antenna : - horizontal position - vertical position	[X] [X]	[ ] [ ]	[ ] [ ]	[2] [2]
5.4	**Power Frequency Magnetic Field** Table 1 Enclosure Performance criteria A	Field frequency : 50/60 Hz Level : 3 A/m	[ ]	[ ]	[X]	[6]
5.5	**Fast transients/bursts** Table 6 Alternative current power input and output ports Performance criteria B	Level : ± 1 kV Rise time/hold time : 5/50 ns Repetition rate : 5 kHz Testing time : 2 min Port(s) : • AC mains	[X]	[ ]	[ ]	[2]

P : pass - F : Fail - NA : not applicable - Rem : remark

Article	TEST	TEST SPECIFICATION	RESULTS			
			P	F	NA	Rem
5.5	**<u>Injected current 0,15 to 80 MHz</u>** <u>Table 9</u> Alternative current power input and output ports Performance criterion A	Voltage level : 3 V (unmodulated signal) Modulation frequency : 1 kHz Modulation depth : 80 % Frequency Step : 1% Dwell Time: 2 s Application with CND-M2 Port(s) : • AC mains •	[X]	[ ]	[ ]	[2]
5.6	**<u>Surges</u>** <u>Table 10</u> Alternative current power input and output ports Performance criterion C	Tr/Th(µs) : 1.2/50 (8/20) Number of surges : 5 positive and 5 negative Phase angles : 90° and 270° Level : ± 1 kV Port(s) : • power input, between lines and neutral	[X]	[ ]	[ ]	[5]
	Performance criterion C	Level : ± 2 Kv Port(s) : • power input, between lines and earth • power input, between neutral and earth	[X] [X]	[ ] [ ]	[ ] [ ]	[5] [5]
5.7	**<u>Voltage dips and voltage interruptions</u>** <u>Table 12</u> Alternative current power input and output port(s) Performance criterion B	<u>Voltage interruptions</u> Test level : 0 % Ut-> 0 V Duration : 10 ms Phase angles : 0° and 180° Port(s) : • AC mains	[X]	[ ]	[ ]	[5]
	<u>Table 11</u> Alternative current power input and output port (s) Performance criterion C	<u>Voltage dips</u> Test level : 70 % Ut-> 161 V Duration : 200 ms Phase angles : 0° Port(s) : • AC mains	[X]	[ ]	[ ]	[5]

P : pass - F : Fail - NA : not applicable - Rem : remark

6.3 EMISSION STANDARD EN 61000-3-2:2014

TEST	TEST SPECIFICATION	RESULTS			
		P	F	NA	Rem
Limits for harmonic currents emission	Frequency range: 0 to 2 kHz Class of the apparatus : C Table 1 limit applied Rated input power : ☒ ≤ 25W ☐ > 25W Table(s) No. <1>	[X]	[ ]	[ ]	[]

P : pass – F : Fail – NA : not applicable – Rem : remark

6.4 EMISSION STANDARD EN 61000-3-3:2013

TEST	TEST SPECIFICATION	RESULTS			
		P	F	NA	Rem
Limitation of voltage fluctuations and flicker in low-voltage supply systems	Frequency range: 0 to 2 kHz Table(s) No. <>	[X]	[ ]	[ ]	[3]

P : pass – F : Fail – NA : not applicable – Rem : remark

Remark(s) :

1 : There is no load and control terminals.
2 : During test, no change of operation state.
3 : Since the products are LED luminaires less than 200W. So according to A.2 of the standard, the EUT is deeme to comply with this standard without further testing
4 The rated input power of this LED lamp is less than 25W, the limits are not specified by this standard.
5 : During the test, there was instantaneous loss of the light, but after the test, the change was self-recovered.
6 : As there are no components in the EUT susceptible to magnetic fields, so it is not needed to perform this test.

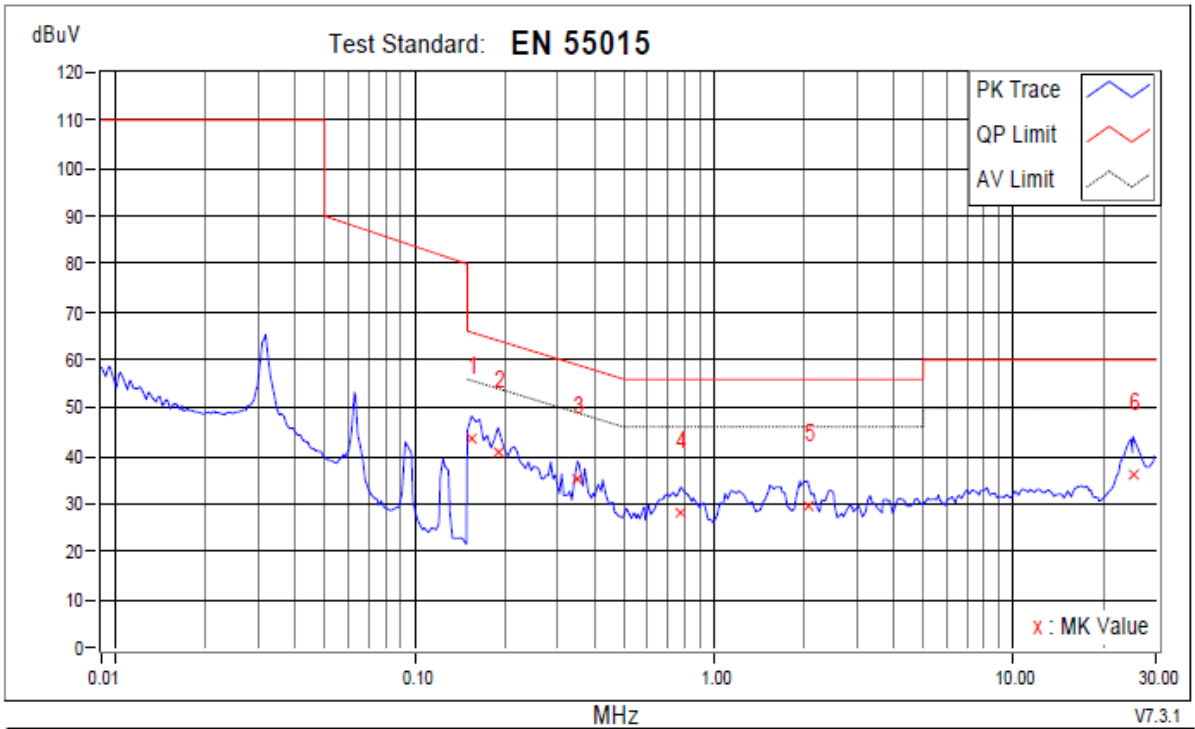
7 CONCLUSION

The apparatus Lighting chain for indoor and outdoor use and models refer to model list are in compliance with the requirements of the standards EN 55015:2013+A1:2015, EN 61547:2009, EN 61000-3-2:2014 and EN 61000-3-3:2013.

Diagram No. 1

Location: Conduction 1 Date: 3/14/2018 Time: 10:58:22 AM Phase L1

Temperatuer (C): 21 Humidity (%): 54 Approved by:

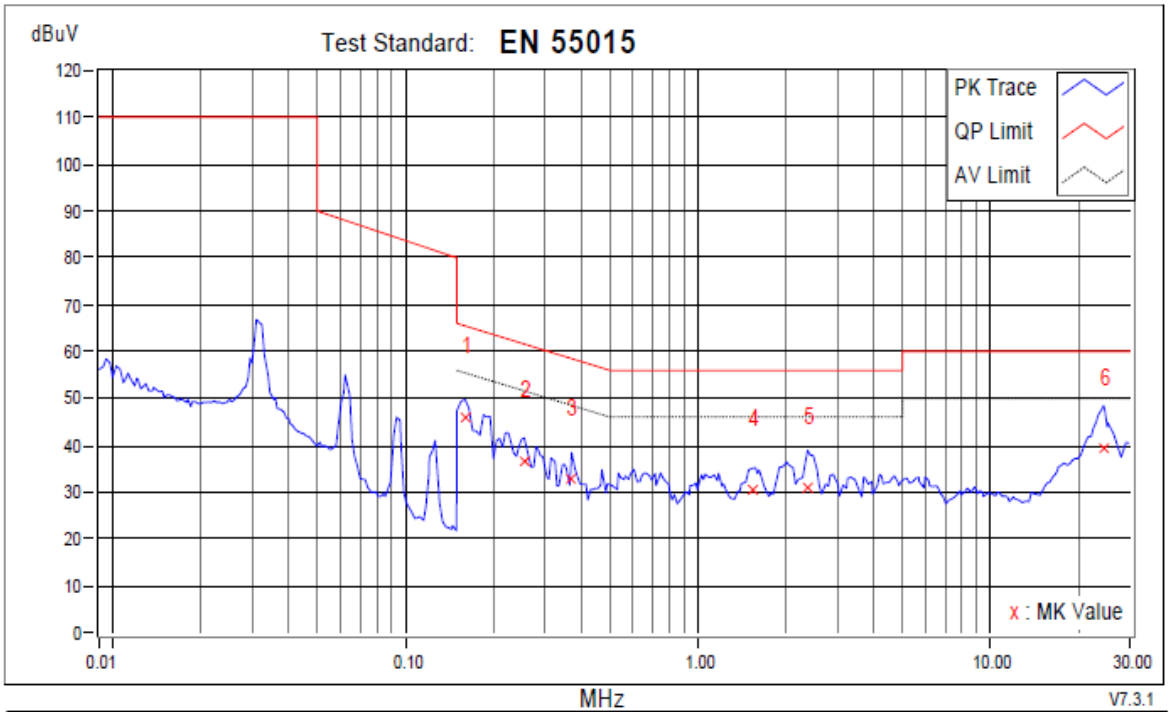


No.	Frequency MHz	Corr. Factor dB	Reading dBuV QP	Reading dBuV AV	Emission dBuV QP	Emission dBuV AV	Limit dBuV QP	Limit dBuV AV	Margins dB QP	Margins dB AV	Notes
+1	0.15500	9.61	34.15	19.88	43.76	29.49	65.73	55.73	-21.97	-26.24	
2	0.19000	9.61	31.22	18.02	40.83	27.63	64.04	54.04	-23.21	-26.41	
3	0.35000	9.62	25.38	15.20	35.00	24.82	58.96	48.96	-23.97	-24.15	
4	0.77500	9.61	18.43	10.28	28.04	19.89	56.00	46.00	-27.96	-26.11	
5	2.05500	9.63	19.72	9.70	29.35	19.33	56.00	46.00	-26.65	-26.67	
6	25.04000	9.91	26.17	17.09	36.08	27.00	60.00	50.00	-23.92	-23.00	

Continued

Location: Conduction 1 Date: 3/14/2018 Time: 10:49:58 AM Phase N

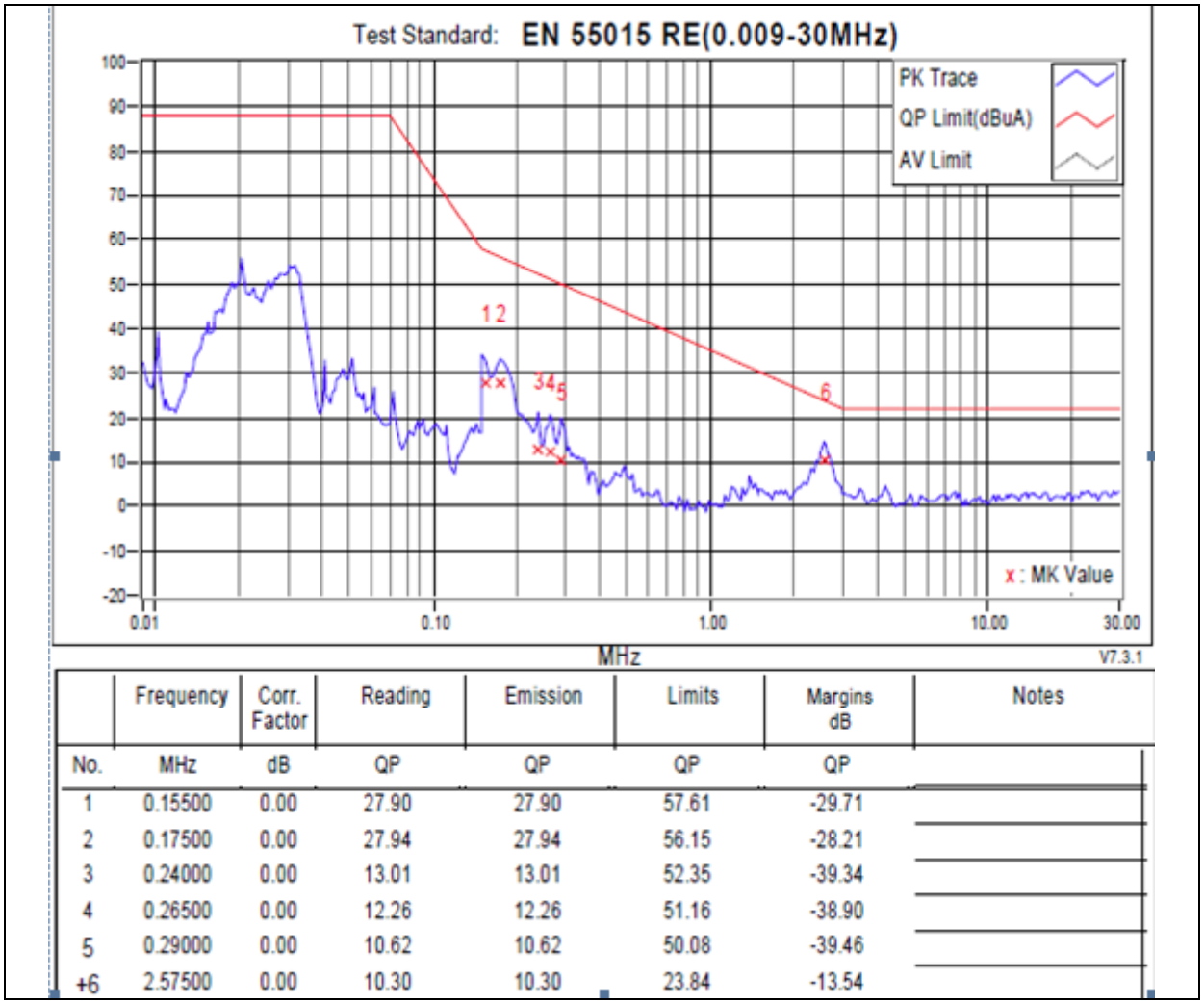
Temperatuer (C): 21 Humidity (%): 54 Approved by:



	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
No.	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
1	0.16000	9.61	36.54	26.53	46.15	36.14	65.46	55.46	-19.31	-19.32	
2	0.25500	9.61	26.79	20.41	36.40	30.02	61.59	51.59	-25.19	-21.57	
3	0.37000	9.62	23.05	9.51	32.67	19.13	58.50	48.50	-25.83	-29.37	
4	1.55000	9.61	20.85	11.57	30.46	21.18	56.00	46.00	-25.54	-24.82	
5	2.37000	9.64	21.33	11.30	30.97	20.94	56.00	46.00	-25.03	-25.06	
+6	24.30500	10.05	29.39	21.77	39.44	31.82	60.00	50.00	-20.56	-18.18	

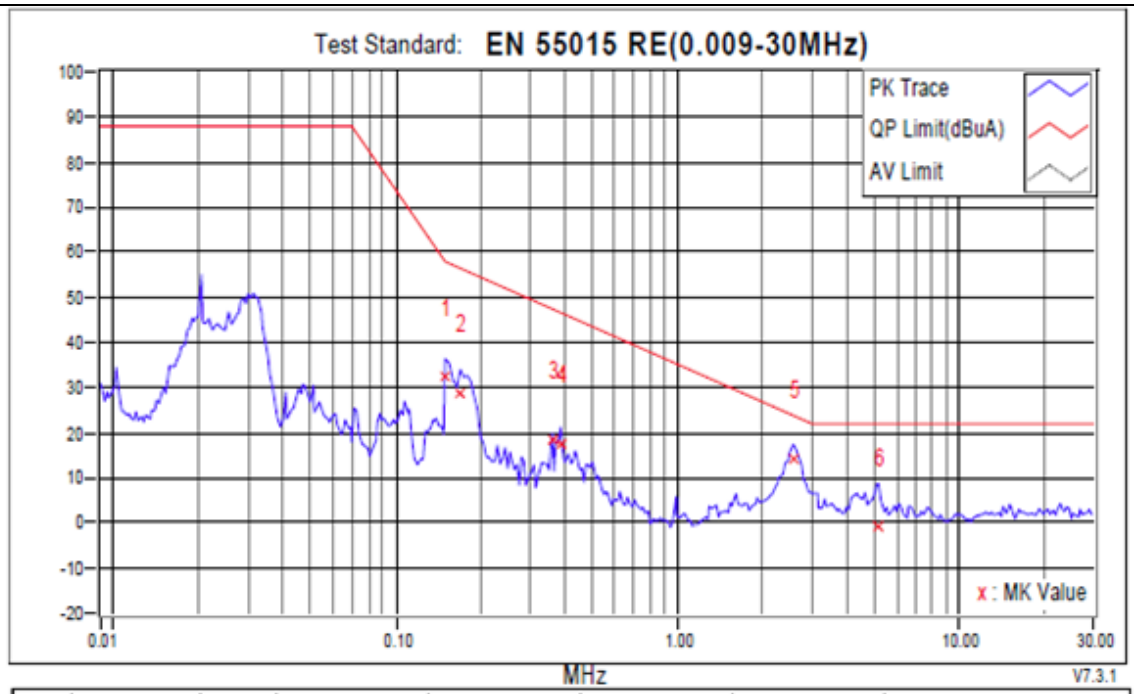
Diagram No. 2

X



No.	Frequency MHz	Corr. Factor dB	Reading QP	Emission QP	Limits QP	Margins dB QP	Notes
1	0.15500	0.00	27.90	27.90	57.61	-29.71	
2	0.17500	0.00	27.94	27.94	56.15	-28.21	
3	0.24000	0.00	13.01	13.01	52.35	-39.34	
4	0.26500	0.00	12.26	12.26	51.16	-38.90	
5	0.29000	0.00	10.62	10.62	50.08	-39.46	
+6	2.57500	0.00	10.30	10.30	23.84	-13.54	

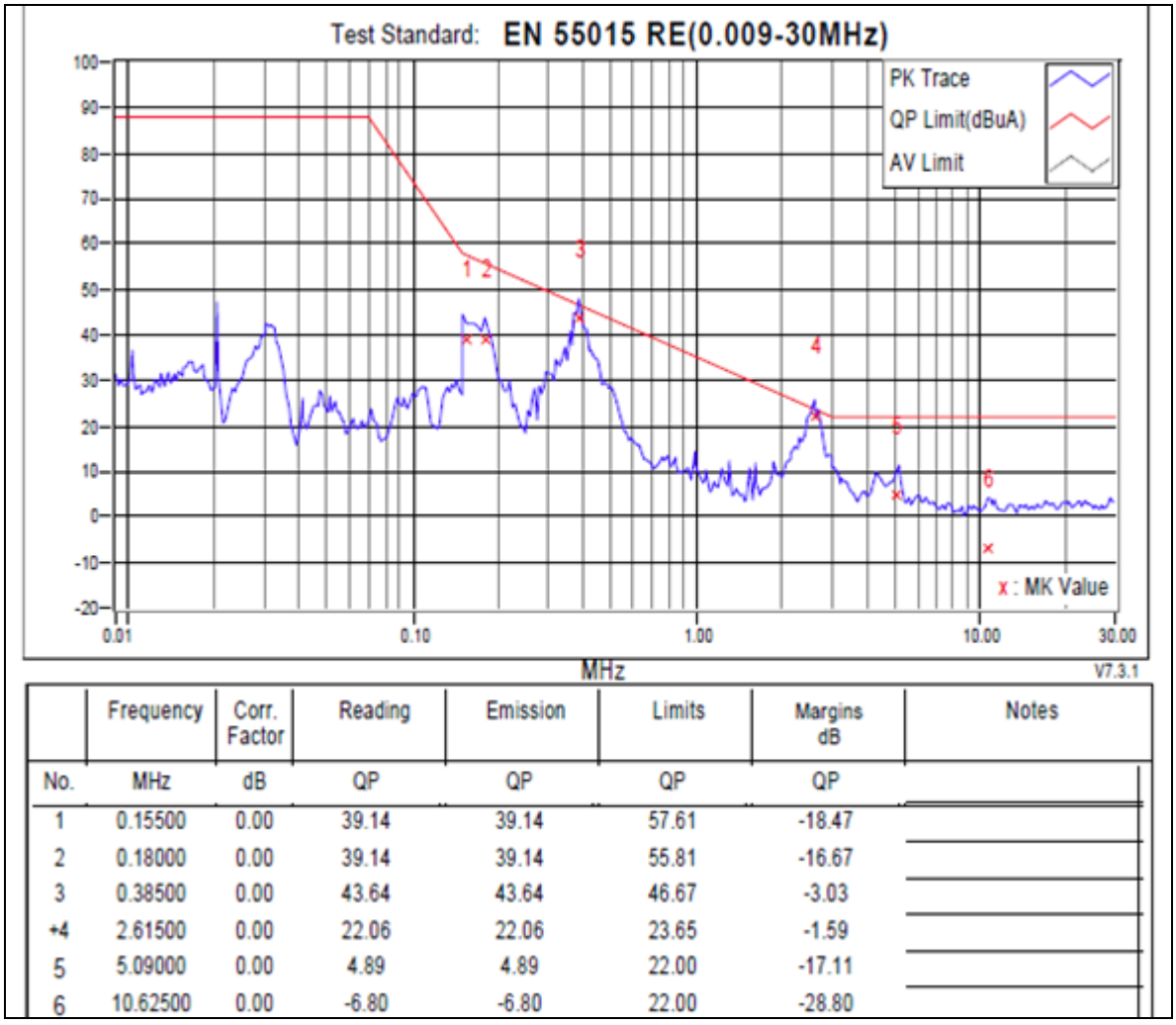
Continued
Y



No.	Frequency MHz	Corr. Factor dB	Reading QP	Emission QP	Limits QP	Margins dB QP	Notes
1	0.15000	0.00	32.66	32.66	58.00	-25.34	
2	0.17000	0.00	28.60	28.60	56.50	-27.90	
3	0.36000	0.00	18.48	18.48	47.48	-29.00	
4	0.38500	0.00	17.65	17.65	46.67	-29.02	
+5	2.57500	0.00	14.00	14.00	23.84	-9.84	
6	5.17000	0.00	-0.70	-0.70	22.00	-22.70	

Continued

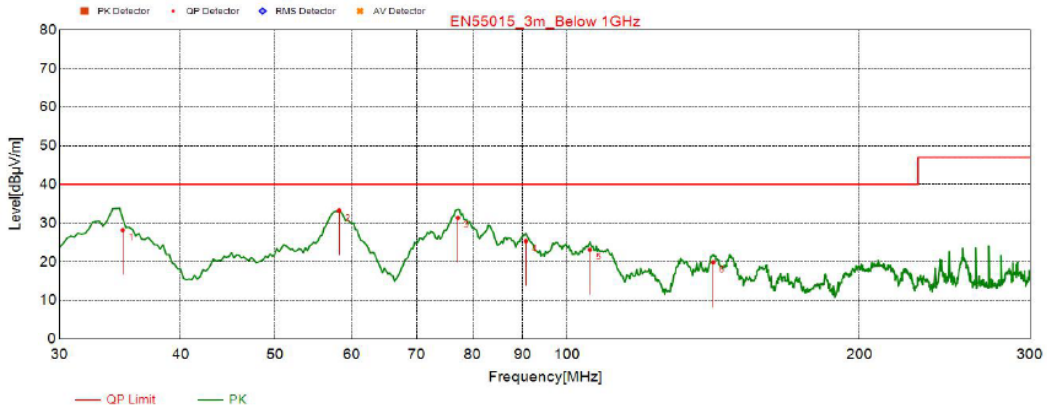
Z



No.	Frequency MHz	Corr. Factor dB	Reading QP	Emission QP	Limits QP	Margins dB QP	Notes
1	0.15500	0.00	39.14	39.14	57.61	-18.47	
2	0.18000	0.00	39.14	39.14	55.81	-16.67	
3	0.38500	0.00	43.64	43.64	46.67	-3.03	
+4	2.61500	0.00	22.06	22.06	23.65	-1.59	
5	5.09000	0.00	4.89	4.89	22.00	-17.11	
6	10.62500	0.00	-6.80	-6.80	22.00	-28.80	

Diagram No. 3

Test Graph

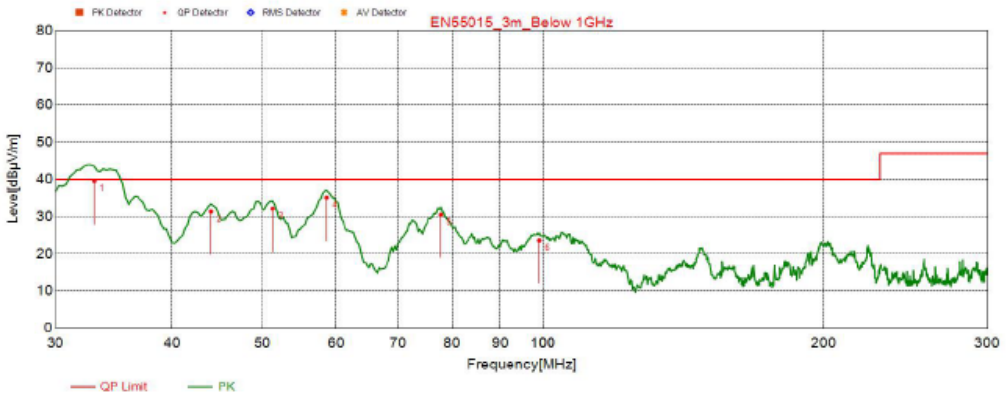


Final Data List

NO.	Freq. [MHz]	QP Value [dBµV]	Factor [dB]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	34.851	28.21	-16.06	40	11.79	359.1	168.3	Horizontal
2	58.222	33.26	-16.36	40	6.74	374.3	158.4	Horizontal
3	77.209	31.37	-18.40	40	8.63	257.9	244.1	Horizontal
4	90.750	25.33	-19.46	40	14.67	200	239	Horizontal
5	105.600	23.10	-18.03	40	16.90	200	27	Horizontal
6	141.510	19.87	-15.57	40	20.13	200	219	Horizontal

Continued

Test Graph



Final Data List								
NO.	Freq. [MHz]	QP Value [dBµV]	Factor [dB]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	32.998	39.56	-16.05	40	0.44	124.2	111.9	Vertical
2	44.040	31.36	-15.76	40	8.64	100	52	Vertical
3	51.330	32.14	-15.51	40	7.86	100	27	Vertical
4	58.620	35.13	-16.41	40	4.87	100	47	Vertical
5	77.790	30.56	-18.52	40	9.44	100	282	Vertical
6	99.120	23.62	-18.56	40	16.38	100	68	Vertical

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

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China
Telephone: +86 (0) 21 6191 5666
Fax: +86 (0) 21 6191 5678
ee.shanghai@sgs.com

TEST REPORT

Application No.:	SHEM1706003846LM
Applicant:	Changzhou Jutai Electronic Co., Ltd
Address of Applicant:	No. 8 Longfa Road, Xinbei District, Changzhou 213031, Jiangsu, China
Manufacturer:	Changzhou Jutai Electronic Co., Ltd
Address of Manufacturer:	No. 8 Longfa Road, Xinbei District, Changzhou 213031, Jiangsu, China
Factory:	Changzhou Jutai Electronic Co., Ltd
Address of Factory:	No. 8 Longfa Road, Xinbei District, Changzhou 213031, Jiangsu, China
Equipment Under Test (EUT):	
EUT Name:	Power Supply
Model No.:	JT-DC40V7.2W-E1-IP44, JT-DC4.8V7.2W-E1-IP44, JT-DCxVyW-E1, JT-DCxVyW-E1-IP44¤
¤	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade mark:	CZJUTAI/TUMI
Standards:	EN 55015:2013 +A1:2015, EN 61000-3-2:2014 EN 61000-3-3:2013, EN 61547:2009
Date of Receipt:	2017-06-21
Date of Test:	2017-06-21 to 2017-06-27
Date of Issue:	2017-08-11
Test Result :	**Pass***

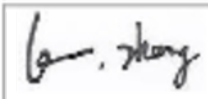
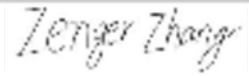
* In the configuration tested, the EUT complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EU Declaration of Conformity and compliance with all relevant EU Directives.

Parlam Zhan
E&E Section Manager

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. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00	/	2017-08-11	/	Original

Authorized for issue by:				
Tested By		 **Lemon_zhang /Project Engineer**		2017-06-29 **Date**
Checked By		 **Zenger_zhang /Reviewer**		2017-06-29 **Date**

2 Test Summary

Emission Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Conducted Emissions at Mains Terminals (9kHz-30MHz)	EN 55015:2013 +A1:2015	EN 55015:2013+A1:2015	N/A	Pass
Radiated Emissions (30MHz-300MHz)	EN 55015:2013 +A1:2015	CISPR 32:2015	N/A	Pass
Radiated Emissions (Magnetic field Induced Current)(9kHz-30MHz)	EN 55015:2013 +A1:2015	EN 55015:2013+A1:2015	N/A	Pass
Harmonic Current Emission	EN 61000-3-2:2014	EN 61000-3-2:2014	Class C	N/A*
Voltage Fluctuations and Flicker	EN 61000-3-3:2013	EN 61000-3-3:2013	Clause 5 of EN 61000-3-3	Pass
Immunity Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Electrostatic Discharge	EN 61547:2009	EN 61000-4-2:2009	4kV Contact Discharge 8kV Air Discharge	Pass
Radiated Immunity (80MHz-1GHz)	EN 61547:2009	EN 61000-4-3:2006 +A1:2008+A2:2010	3V/m, 80%, 1kHz Amp. Mod.	Pass
Electrical Fast Transients/Burst at Power Port	EN 61547:2009	EN 61000-4-4:2012	1kV 5/50ns Tr/Td 5kHz Repetition Frequency	Pass
Surge at Power Port	EN 61547:2009	EN 61000-4-5:2014	1.2/50μs Tr/Td 0.5kV Line to Line 1kV Line to Ground	Pass
Conducted Immunity at Power Port (150kHz-80MHz)	EN 61547:2009	EN 61000-4-6:2014	3Vrms (emf),80%,1kHz Amp. Mod.	Pass
Voltage Dips and Interruptions	EN 61547:2009	EN 61000-4-11:2004	0 % UT for 0.5per 70 % UT for 10per UT is Supply Voltage	Pass

N/A: Not applicable

N/A*: Please refer to Section 6.4 of this report for details.

Declaration of EUT Family Grouping:

There are series models mentioned in this report and they are the similar in electrical and electronic characters. Only the model JT-DC40V7.2W-E1-IP44, JT-DC4.8V7.2W-E1-IP44 was tested since their differences are IP grade.

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	Input: AC 220-240V, 50-60Hz / 230V-240V, 50Hz / 100-240V, 50-60Hz Output: DC 40V 7.2W
Rated power:	7.2W
Test voltage:	AC 230V 50Hz
Cable:	0.2m for DC output cable.

4.2 Description of Support Units

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conducted Emission at mains port using AMN	3.2dB (9kHz to 150kHz)
		3.0dB (150kHz to 30MHz)
	Conducted Emission at mains port using VP	1.9 dB(9kHz to 30MHz)
	Conducted Emission at telecommunication port using AAN	2.4 dB(150kHz to 30MHz)
2	Radiated Power	3.5dB
3	Radiated emission	4.4dB (30MHz-1GHz)
		4.6dB (1GHz-6GHz)
4	Radiated Immunity	1.64dB
5	Conducted Immunity	0.96dB
6	ESD	6 %
7	EFT (Electrical Fast Transients)	5 %
8	Surge Immunity	5 %
9	Voltage Dips and Interruptions	4 %
10	20 system	1.5dB
11	Temperature test	1℃
12	Humidity test	3%
13	DC power test	0.5 %

4.4 Standards Applicable for Testing

Table 1 : Tests Carried Out Under EN 55015:2013 +A1:2015

Item	Status
Conducted Emissions at Mains Terminals (9kHz-30MHz)	√
Conducted Emissions at Load Terminals (150kHz-30MHz)	×
Radiated Emissions (30MHz-300MHz)	√
Radiated Emissions (Magnetic field Induced Current)(9kHz-30MHz)	√
Insertion Loss	×
Conducted Emissions at Control Terminals (150kHz-30MHz)	×
Conducted RF Emission Test for CDN method	×

Table 2 : Tests Carried Out Under EN 61000-3-2:2014

Item	Status
Harmonic Current Emission	×

Table 3 : Tests Carried Out Under EN 61000-3-3:2013

Item	Status
Voltage Fluctuations and Flicker	√

Table 4 : Tests Carried Out Under EN 61547:2009

Item	Status
Electrostatic Discharge	√
Radiated Immunity (80MHz-1GHz)	√
Electrical Fast Transients/Burst at Power Port	√
Electrical Fast Transients/Burst at Signal Port	×
Surge at Power Port	√
Conducted Immunity at Power Port (150kHz-80MHz)	√
Conducted Immunity at Signal Port (150kHz-80MHz)	×
Power Frequency Magnetic Field	×
Voltage Dips and Interruptions	√
Electrical Fast Transients/Burst at DC port	×
Conducted Immunity at DC Port (150kHz-80MHz)	×

× Indicates that the test is not applicable
√ Indicates that the test is applicable

4.5 Test Location

All tests were performed at:
SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab
588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666 Fax: +86 21 6191 5678
No tests were sub-contracted.

4.6 Test Facility

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

- **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.

- **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-1.

- **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,C-4336,T-2221,G-830 respectively.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None

4.9 Monitoring of EUT for All Immunity Test

Visual: Working status of the EUT,
Audio: None.

5 Equipment List

Conducted Emissions at Mains Terminals (9kHz-30MHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EMI test receiver	Rohde & Schwarz	ESR7	SHEM162-1	2016-12-29	2017-12-28
Line impedance stabilization network	SCHWARZBECK	NSLK8127	SHEM061-1	2016-12-29	2017-12-28
Line impedance stabilization network	EMCO	3816/2	SHEM019-1	2016-12-29	2017-12-28
Pulse limiter	Rohde & Schwarz	ESH3-Z2	SHEM029-1	2016-08-12	2017-08-11
Shielding Room	ZHONGYU	8*4*3M	SHEM079-2	2016-08-17	2017-08-16

Radiated Emissions (30MHz-300MHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EMI test receiver	Rohde & Schwarz	ESU40	SHEM051-1	2016-08-12	2017-08-11
CONTROLLER	INNCO	CO200	SHEM047-1	N/A	N/A
ANTENNA MAST	INNCO	MA400-EP	SHEM047-2	N/A	N/A
TURN DEVICE	INNCO	DE 3600-RH	SHEM047-3	N/A	N/A
Broadband UHF-VHF ANTENNA	SCHWARZBECK	VULB9168	SHEM048-1	2016-12-29	2017-12-28
Low Frequency Amplifier	CLAVIIO	BDLNA-0001-412010	SHEM164-1	2016-08-12	2017-08-11
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2016-08-17	2017-08-16

Radiated Emissions (Magnetic field Induced Current)(9kHz-30MHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EMI test receiver	Rohde & Schwarz	ESR7	SHEM162-1	2016-12-29	2017-12-28
3-dimensional large loop antenna,diam.2m.acc	Rohde & Schwarz	HXYZ9170	SHEM017-1	2017-01-14	2018-01-13
Pulse limiter	Rohde & Schwarz	ESH3-Z2	SHEM029-1	2016-08-12	2017-08-11
Shielding Room	ZHONGYU	8*4*3M	SHEM079-2	2016-08-17	2017-08-16

Voltage Fluctuations and Flicker					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Harmonic&Flicker analyzer	AMETEK	PACS-1	SHEM024-2	2016-09-06	2017-09-05
AC Power Source 5KVA	AMETEK	5001iX	SHEM025-2	2016-09-06	2017-09-05

Electrostatic Discharge					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Electrostatic Discharge Simulator	TESEQ	NSG 437	SHEM041-1	2016-08-15	2017-08-14

Radiated Immunity (80MHz-1GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Signal generator	Rohde & Schwarz	SMJ100A	SHEM141-1	2016-12-29	2017-12-28
Power Meter	Rohde & Schwarz	NRP	SHEM057-1	2016-12-29	2017-12-28
Power meter sensor	Rohde & Schwarz	NRP-Z91	SHEM057-2	2016-12-29	2017-12-28
Antenna	SCHWARZBECK	STLP9128D	SHEM130-1	N/A	N/A
Amplifier	MILMEGA	AS0840-55-55	SHEM133-1	N/A	N/A
Power meter sensor	Rohde & Schwarz	NRP-Z22	SHEM136-1	2016-08-12	2017-08-11
ElectroMagnetic Field Probe	ETS-Lindgren	HI-6113	SHEM134-1	2016-08-12	2017-08-11
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2016-08-17	2017-08-16

Electrical Fast Transients/Burst at Power Port					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Immunity Test System	EMC PARTNER	TRA3000 F-S-D-V	SHEM163-1	2016-12-29	2017-12-28
Matching resistors for EFT/burst generators	EM test	KW50	SHEM026-4	2016-12-29	2017-12-28
Matching resistors for EFT/burst generators	EM test	KW1000	SHEM026-5	2016-12-29	2017-12-28

Surge at Power Port					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Immunity Test System	EMC PARTNER	TRA3000 F-S-D-V	SHEM163-1	2016-12-29	2017-12-28

Conducted Immunity at Power Port (150kHz-80MHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Signal generator	Rohde & Schwarz	SMJ100A	SHEM141-1	2016-12-29	2017-12-28
PAMP Conducted RF test system	HAEFFLY	PAMP250	SHEM023-1	2016-12-29	2017-12-28
6dB Attenuator	HUAXIANG	TST-150-761	SHEM151-1	N/A	N/A
Coupling clamp	LIITHI	EM 101	SHEM027-1	2016-12-29	2017-12-28
CDN impedance and K-factor	LUTHI	L-801 M1	SHEM023-5	2016-12-29	2017-12-28
CDN impedance and K-factor	LUTHI	L-801 M2/M3	SHEM023-6	2017-01-14	2018-01-13
Shielding Room	ZHONGYU	5*5*3M	SHEM079-6	2016-08-17	2017-08-16

Voltage Dips and Interruptions					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Immunity Test System	EMC PARTNER	TRA3000 F-S-D-V	SHEM163-1	2016-12-29	2017-12-28

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Digital pressure meter	YONGZHI	DYM3-01	SHEM082-1	2017-03-03	2018-03-02
Temperature&humidity recorder	ShangHai weather meter work	ZJ 1-2B	SHEM042-1~6	2016-08-19	2017-08-18
Digital Multimeter	FLUKE	17B	SHEM043-5	2016-08-15	2017-08-14
Autoformer regulator	Guangzhou bao de	TDGC2-5KVA	SHEM150-1	N/A	N/A
Multi-purpose tong tester	FLUKE	316	SHEM001-1	2017-01-29	2018-01-28

6 Emission Test Results

6.1 Conducted Emissions at Mains Terminals (9kHz-30MHz)

Test Requirement:	EN 55015:2013 +A1:2015
Test Method:	EN 55015:2013+A1:2015
Frequency Range:	9kHz to 30MHz
Limit:	
0.009MHz – 0.05MHz	110dB(μV) quasi-peak
0.05MHz – 0.15MHz	90dB(μV)-80dB(μV) quasi-peak
0.15MHz – 0.5MHz	66dB(μV)-56dB(μV) quasi-peak, 56dB(μV)-46dB(μV) average
0.5MHz – 5MHz	56dB(μV) quasi-peak, 46dB(μV) average
5MHz – 30MHz	60dB(μV) quasi-peak, 50dB(μV) average
Detector:	Peak for pre-scan (200Hz resolution bandwidth) 0.009M to 0.15MHz
	Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

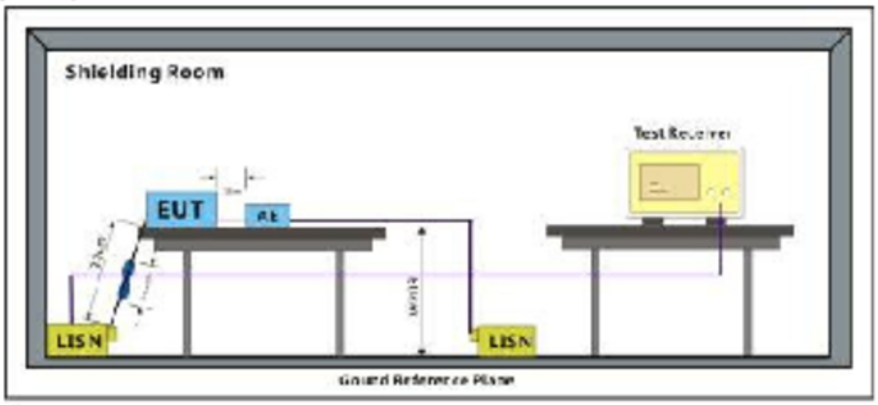
6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode a:Working mode: Keep the EUT working on max output power continuously.

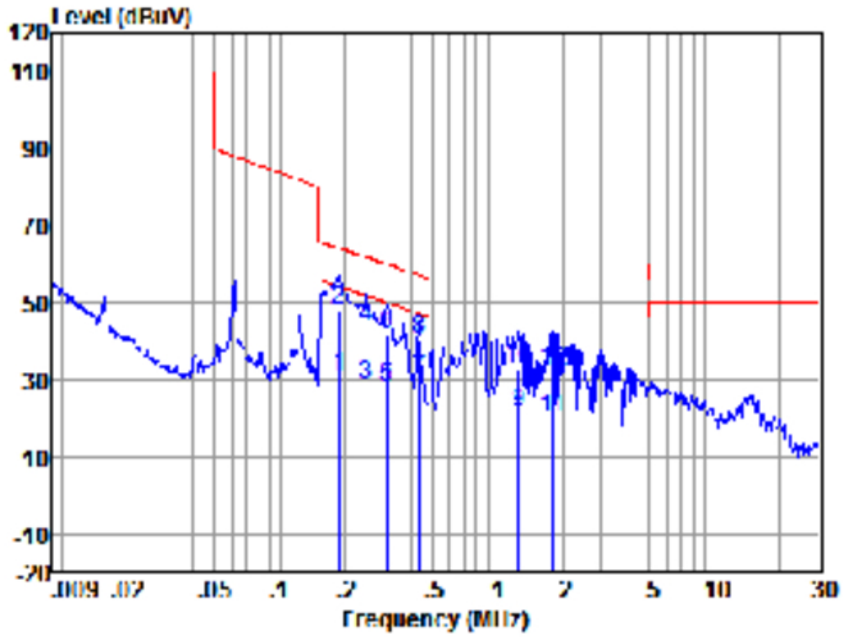
6.1.2 Test Setup Diagram



6.1.3 Measurement Data

An initial pre-scan was performed with peak detector.Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.

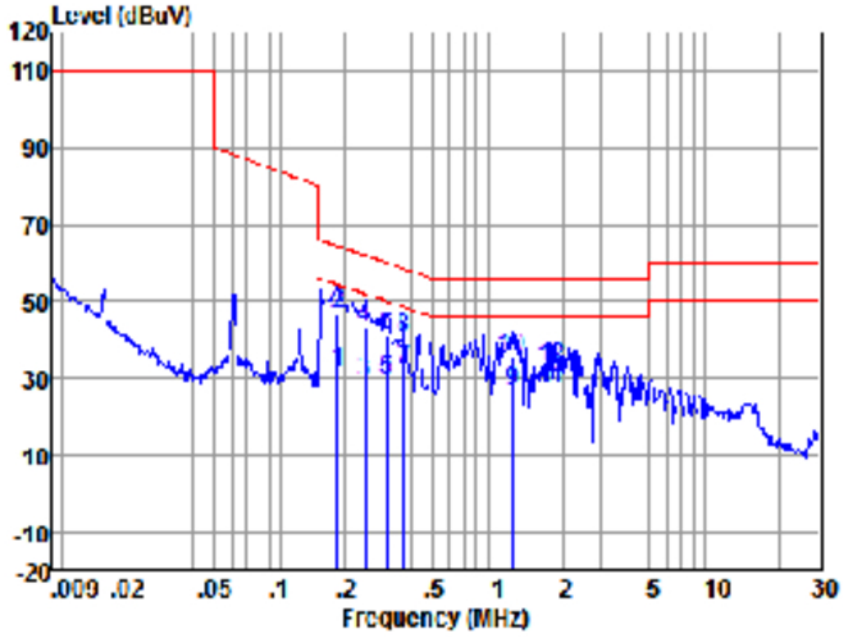
Mode:a; Line:Live Line



Site : chamber
Condition : LISN-L-2016
LOT/Project No: J846LM
Mode No. : a

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.187	20.74	0.08	9.81	30.63	54.17	-23.54	Average
2	0.187	38.43	0.08	9.81	48.32	64.17	-15.85	QP
3	0.250	18.50	0.09	9.81	28.40	51.74	-23.28	Average
4	0.250	33.84	0.09	9.81	43.74	61.74	18.00	QP
5	0.309	18.10	0.09	9.81	28.00	49.99	-21.99	Average
6	0.309	31.44	0.09	9.81	41.34	59.99	-18.65	QP
7	0.435	20.14	0.10	9.82	30.06	47.16	17.10	Average
8	0.435	30.61	0.10	9.82	40.53	57.16	-16.63	QP
9	1.248	11.44	0.08	9.84	21.36	46.00	24.64	Average
10	1.248	22.63	0.08	9.84	32.55	56.00	-23.45	QP
11	1.798	9.71	0.08	9.85	19.64	46.00	-26.36	Average
12	1.798	22.38	0.08	9.85	32.31	56.00	23.69	QP

Mode:a; Line:Neutral Line



Site : chamber
Condition : LISN-N-2010
FUT/Project No: 38461 M
Mode No. : a

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.184	21.62	0.05	9.81	31.48	54.30	22.82	Average
2	0.184	36.97	0.05	9.81	46.83	64.30	-17.47	QP
3	0.246	19.27	0.05	9.81	29.13	51.88	-22.75	Average
4	0.246	32.91	0.05	9.81	42.77	61.88	-19.11	QP
5	0.309	19.93	0.05	9.81	29.79	49.99	-20.20	Average
6	0.309	31.10	0.05	9.81	40.96	59.99	19.03	QP
7	0.370	22.48	0.04	9.81	32.33	48.51	-16.18	Average
8	0.370	30.35	0.04	9.81	40.20	58.51	-18.31	QP
9	1.169	16.40	0.05	9.84	26.29	46.00	19.71	Average
10	1.169	25.37	0.05	9.84	35.26	56.00	-20.74	QP
11	1.783	17.28	0.06	9.85	27.19	46.00	18.81	Average
12	1.783	22.60	0.06	9.85	32.51	56.00	-23.49	QP

6.2 Radiated Emissions (30MHz-300MHz)

Test Requirement:	EN 55015:2013 +A1:2015
Test Method:	CISPR 32:2015
Frequency Range:	30MHz to 300MHz
Measurement Distance:	3m
Limit:	
30MHz-230MHz	40dB(μV/m) quasi-peak
230MHz-300MHz	47dB(μV/m) quasi-peak
Detector:	Peak for pre-scan (120kHz resolution bandwidth) 30M to 300MHz

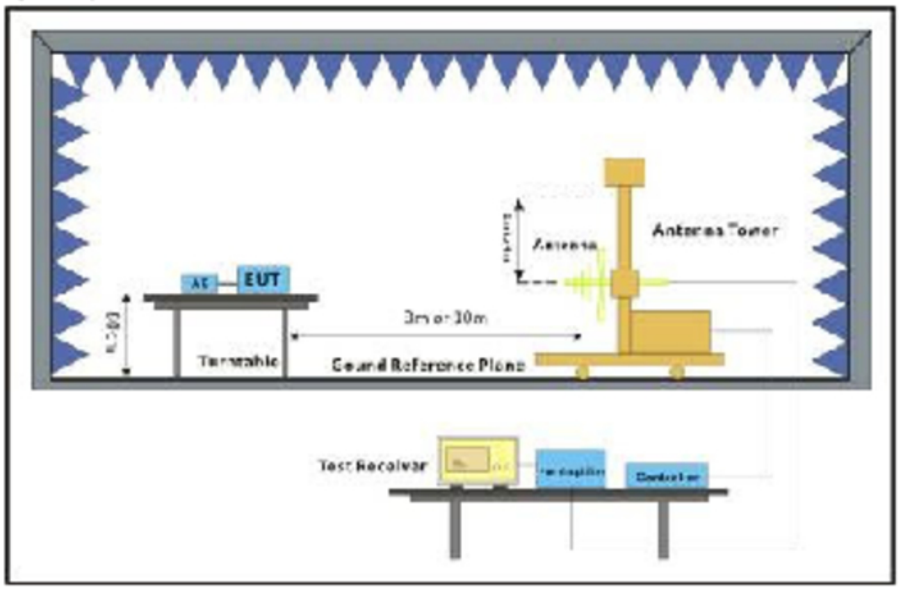
6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 20 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode a:Working mode: Keep the EUT working on max output power continuously.

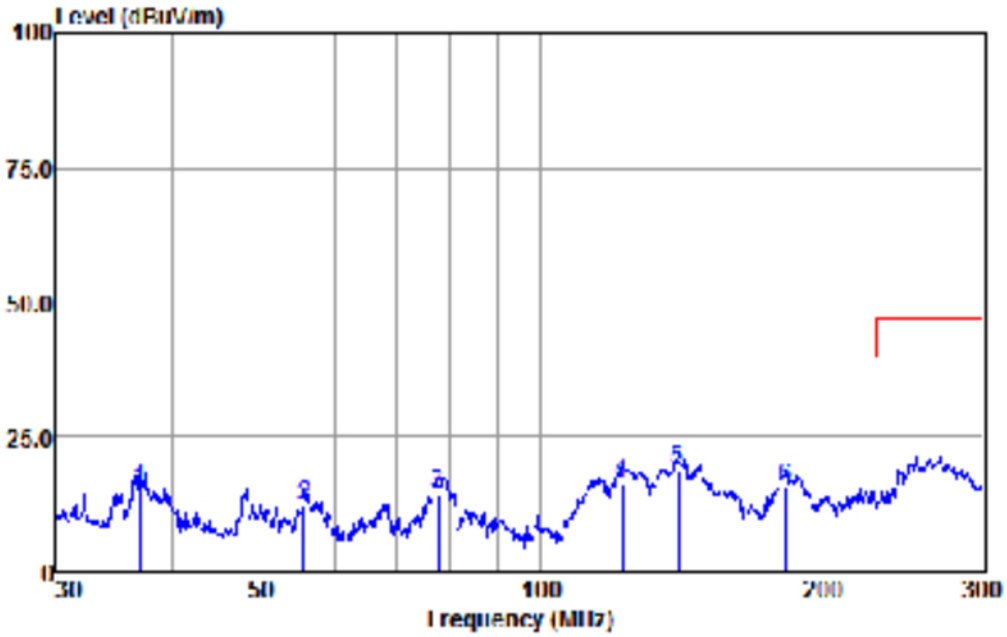
6.2.2 Test Setup Diagram



6.2.3 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

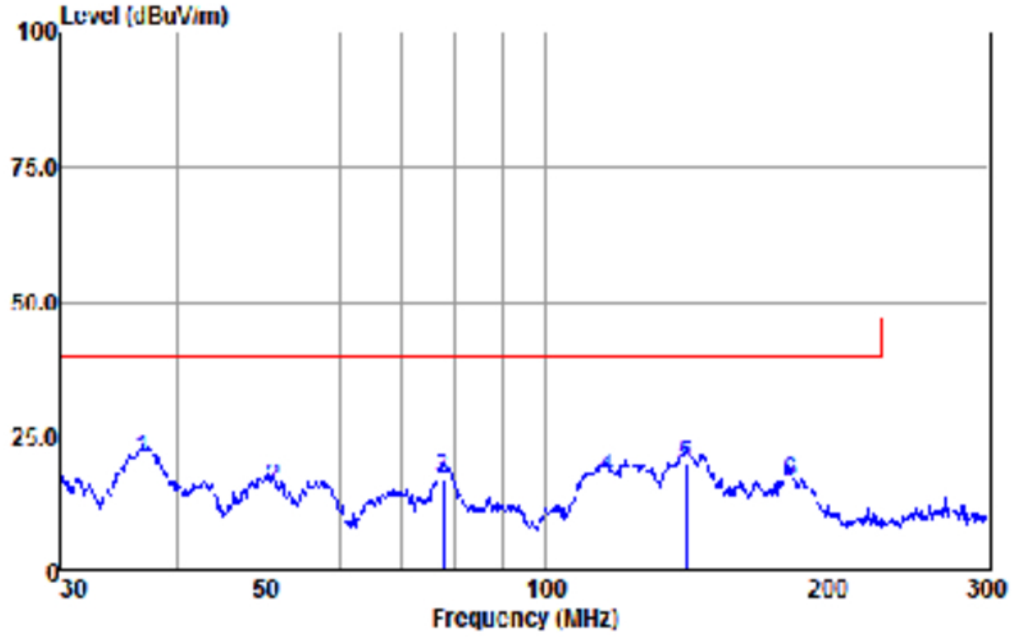
Mode:a; Polarization:Horizontal



Condition : HORIZONTAL
EUT/Project: 3846LM
Test Mode : a

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	36.91	41.59	16.82	0.71	42.68	15.14	40.00	-24.86	QP
2	55.48	42.84	11.72	0.28	42.69	12.15	40.00	27.85	QP
3	77.47	48.83	8.81	0.37	42.69	14.52	40.00	-25.48	QP
4	122.50	47.80	10.73	0.55	42.66	16.42	40.00	-23.58	QP
5	140.64	49.30	11.36	0.61	42.59	18.68	40.00	-21.32	QP
6	183.71	46.83	11.25	0.67	42.52	15.44	40.00	-24.56	QP

Mode:a; Polarization:Vertical



Condition : VERTICAL
LUI/Project: 3846LM
Test Mode : a

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	36.74	47.14	16.01	0.21	42.68	20.68	40.00	19.32	QP
2	50.95	46.58	10.79	0.26	42.68	14.95	40.00	-25.05	QP
3	77.47	50.48	8.81	0.37	42.69	16.97	40.00	-23.03	QP
4	116.45	49.15	9.87	0.53	42.68	16.87	40.00	23.13	QP
5	141.95	50.17	11.42	0.61	42.59	19.61	40.00	-20.39	QP
6	184.13	46.84	11.26	0.67	42.52	16.25	40.00	-23.75	QP

6.3 Radiated Emissions (Magnetic field Induced Current)(9kHz-30MHz)

Test Requirement:	EN 55015:2013 +A1:2015
Test Method:	EN 55015:2013+A1:2015
Frequency Range:	9kHz to 30MHz
Limit:	
0.009MHz-0.07MHz	88dB(μA) quasi-peak
0.07MHz-0.15MHz	88dB(μA)-58dB(μA) quasi-peak
0.15MHz-3MHz	58dB(μA)-22dB(μA) quasi-peak
3MHz-30MHz	22dB(μA) quasi-peak
Detector:	Peak for pre-scan (200Hz resolution bandwidth) 0.009M to 0.15MHz
	Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

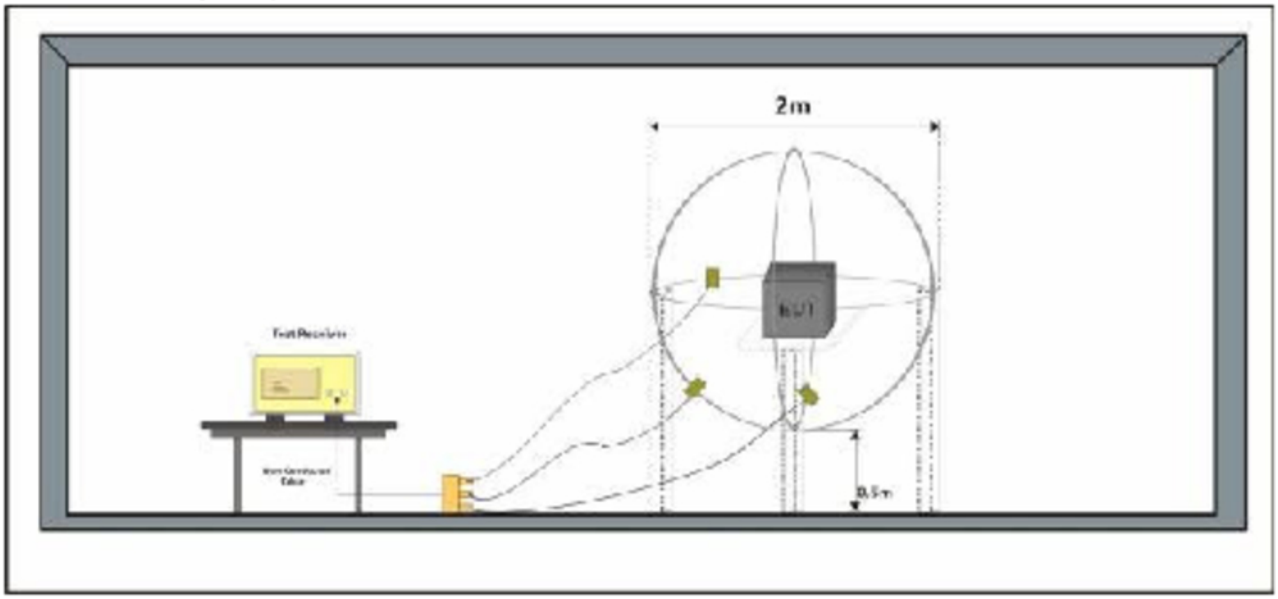
6.3.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode a:Working mode: Keep the EUT working on max output power continuously.

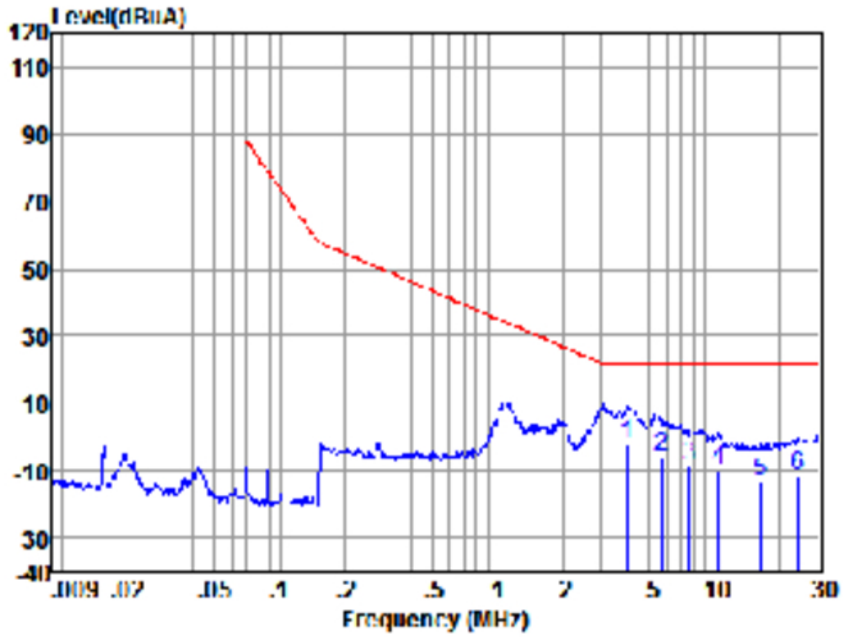
6.3.2 Test Setup Diagram



6.3.3 Measurement Data

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

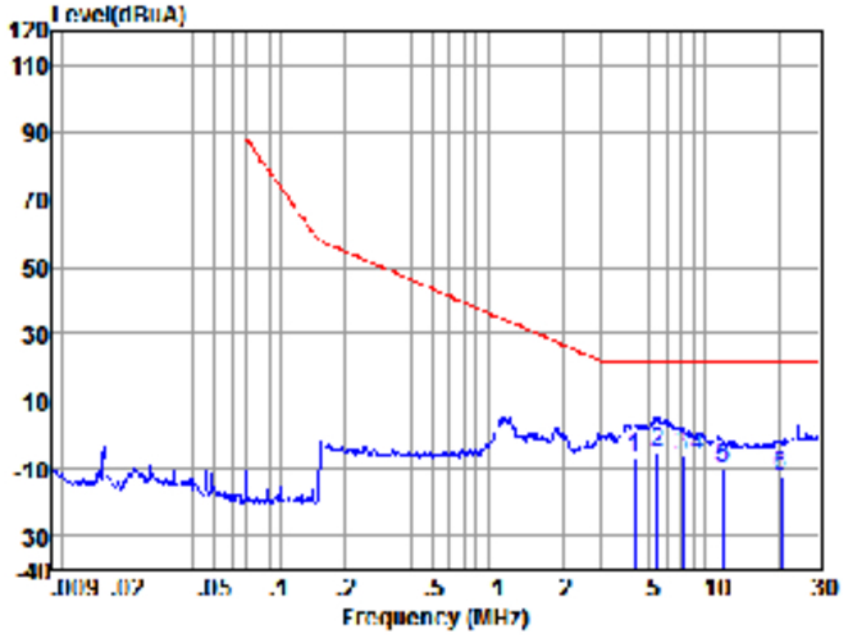
Mode:a; Axial:X



Site : chamber
Condition : 55015_LOOP
LOT/Project No: J846LM
Test mode : a
: X

	Freq	Read Level	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuA	dB	dBuA	dBuA	dB	
1	3.948	2.22	0.28	1.94	22.00	23.94	QP
2	5.734	-6.23	0.35	-5.88	22.00	-27.88	QP
3	7.616	-9.25	0.43	-8.82	22.00	-30.82	QP
4	10.451	-10.41	0.53	-9.88	22.00	-31.88	QP
5	15.195	-14.82	0.66	-13.36	22.00	-35.36	QP
6	24.099	12.24	0.62	11.62	22.00	33.62	QP

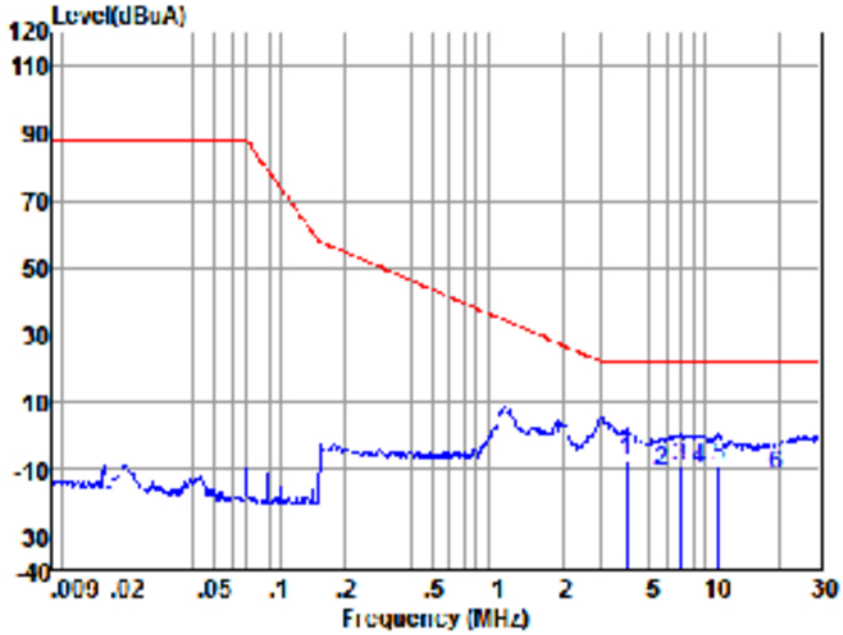
Mode:a; Axial:Y



Site : chamber
Condition : 55015_LOOP
LOT/Project No: J846LM
Test mode : a
: Y

	Freq	Read Level	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuA	dB	dBuA	dBuA	dB	
1	4.247	6.98	0.29	6.69	22.00	28.69	QP
2	5.417	-5.29	0.33	-4.96	22.00	-26.96	QP
3	7.080	-6.66	0.41	-6.25	22.00	-28.25	QP
4	8.327	-7.04	0.45	-6.59	22.00	-28.59	QP
5	10.972	-10.19	0.53	-9.66	22.00	-31.66	QP
6	20.160	12.41	0.39	12.02	22.00	-34.02	QP

Mode:a; Axial:Z



Site : chamber
Condition : 55015 LOOP
EUT/Project No: 38461 M
Test mode : a
: Z

	Freq	Read Level	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuA	dB	dBuA	dBuA	dB	
1	3.916	-7.82	0.28	-7.54	22.00	-29.54	QP
2	5.642	-10.68	0.35	-10.33	22.00	-32.33	QP
3	6.910	9.59	0.40	9.19	22.00	-31.19	QP
4	8.464	-10.15	0.46	-9.69	22.00	-31.69	QP
5	10.451	-9.97	0.53	-9.44	22.00	-31.44	QP
6	19.203	-12.30	0.43	-11.87	22.00	-33.87	QP

6.4 Harmonic Current Emission

Test Requirement:	EN 61000-3-2:2014
Test Method:	EN 61000-3-2:2014
Frequency Range:	100Hz to 2kHz

6.4.1 Measurement Data

There is no need for Harmonics test to be performed on this LED lighting with rated power less than 25W since it is not the discharge lighting (active input power <=25W) in accordance with EN 61000-3-2.

6.5 Voltage Fluctuations and Flicker

Test Requirement: EN 61000-3-3:2013
Test Method: EN 61000-3-3:2013

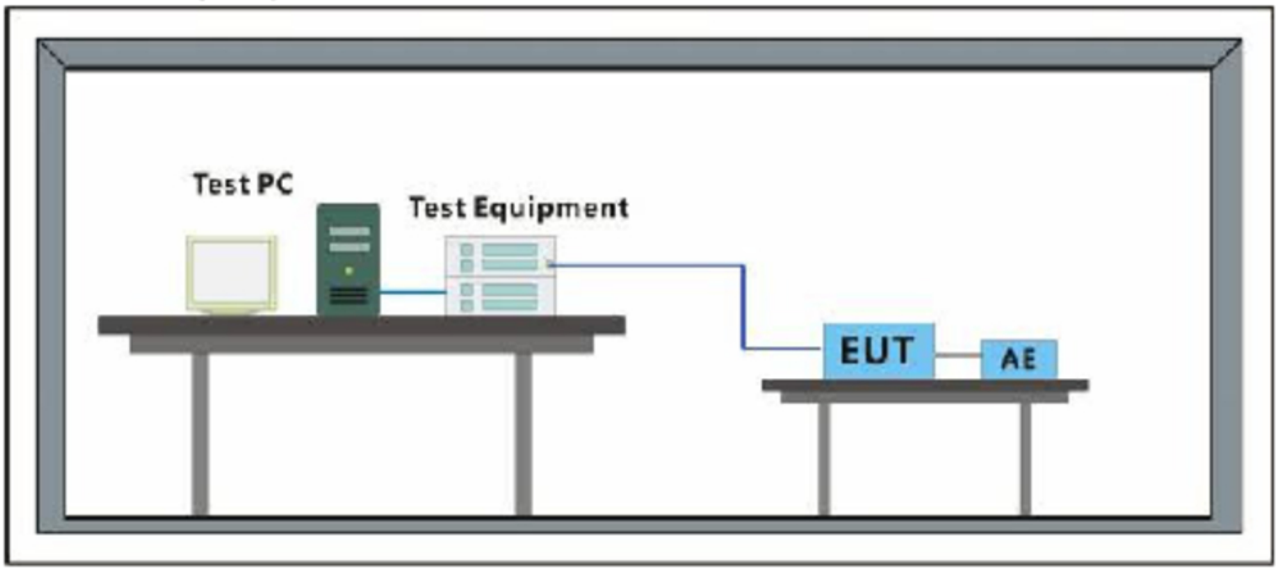
6.5.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode a:Working mode: Keep the EUT working on max output power continuously.

6.5.2 Test Setup Diagram



6.5.3 Measurement Data

Mode:a

Vrms at the end of test (Volt):	229.97			
T-max (mS):	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

7 Immunity Test Results

7.1 Performance Criteria Description in EN 61547:2009

Criterion A During the test no change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended.

Criterion B During the test the luminous intensity may change to any value. After the test the luminous intensity shall be restored to its initial value within 1 min.

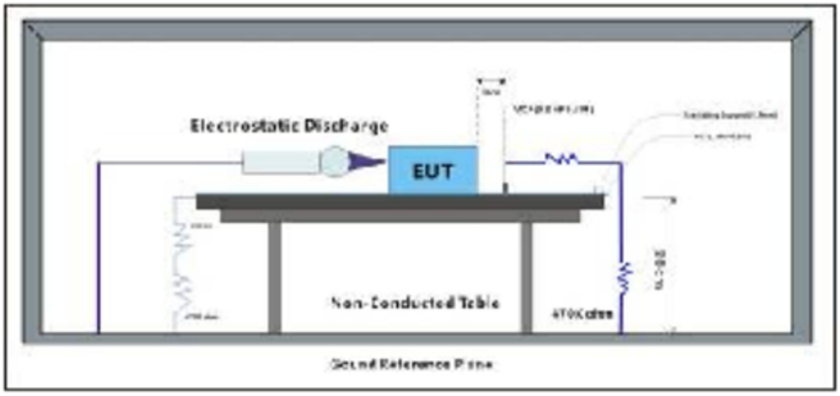
Regulating controls need not function during the test, but after the test the mode of the control shall be the same as before the test provided that during the test no mode changing commands were given.

Criterion C During and after the test any change of the luminous intensity is allowed and the lamp(s) may be extinguished. After the test, within 30 min, all functions shall return to normal if necessary by temporary interruption of the mains supply and/or operating the regulating control.

7.2 Electrostatic Discharge

Test Requirement:	EN 61547:2009
Test Method:	EN 61000-4-2:2009
Performance Criterion:	B
Discharge Impedance:	330Ω/150pF
Number of Discharge:	Minimum 10 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

7.2.1 Test Setup Diagram



7.2.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 51 % RH Atmospheric Pressure: 1002 mbar

Test mode: a:Working mode: Keep the EUT working on max output power continuously.

7.2.3 Test Results:

Observations: Test Point:

1. All insulated enclosure and seams.
2. All accessible metal parts of the enclosure.
3. All side

Discharge type	Level (kV)	Polarity	Test Point	Result / Observations
Air Discharge	2,4,8	+	1	A
Air Discharge	2,4,8	-	1	A
Horizontal Coupling	4	+	3	A
Horizontal Coupling	4	-	3	A
Vertical Coupling	4	+	3	A
Vertical Coupling	4	-	3	A

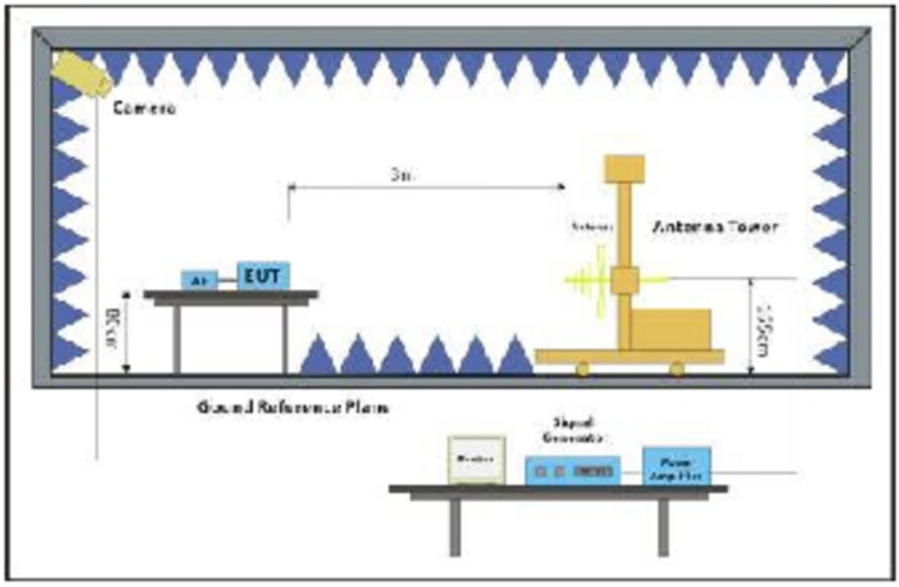
Results:

A: No degradation in the performance of the EUT was observed.

7.3 Radiated Immunity (80MHz-1GHz)

Test Requirement:	EN 61547:2009
Test Method:	EN 61000-4-3:2006 +A1:2008+A2:2010
Performance Criterion:	A
Frequency Range:	80MHz to 1GHz
Antenna Polarisation:	Vertical and Horizontal
Modulation	1kHz,80% Amp. Mod,1% increment

7.3.1 Test Setup Diagram



7.3.2 E.U.T. Operation

Operating Environment:

Temperature: 20 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode: a:Working mode: Keep the EUT working on max output power continuously.

7.3.3 Test Results:

Frequency	Level (V/m)	EUT Face	Dwell time	Result / Observations
80MHz-1GHz	3	Front	2s	A
80MHz-1GHz	3	Back	2s	A
80MHz-1GHz	3	Left	2s	A
80MHz-1GHz	3	Right	2s	A
80MHz-1GHz	3	Top	2s	A
80MHz-1GHz	3	Underside	2s	A

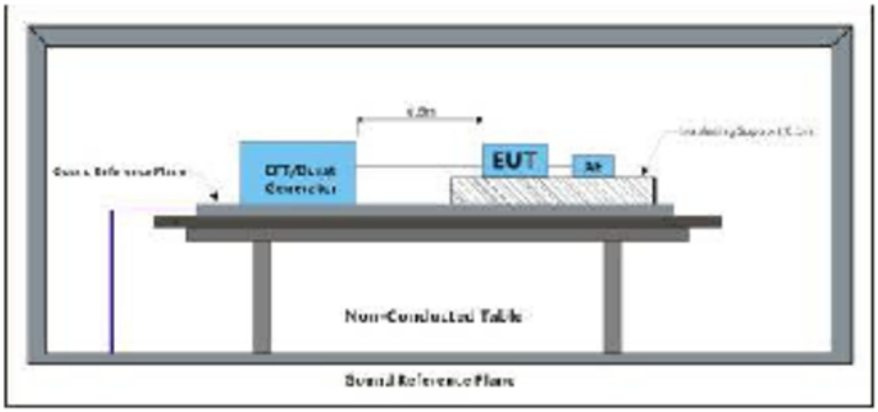
Results:

A: No degradation in the performance of the EUT was observed.

7.4 Electrical Fast Transients/Burst at Power Port

Test Requirement:	EN 61547:2009
Test Method:	EN 61000-4-4:2012
Performance Criterion:	B
Repetition Frequency:	5kHz
Burst Period:	300ms
Test Duration:	2 minute per level & polarity

7.4.1 Test Setup Diagram



7.4.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 51 % RH Atmospheric Pressure: 1002 mbar

Test mode: a:Working mode: Keep the EUT working on max output power continuously.

7.4.3 Test Results:

Test Line	Level (kV)	Polarity	CDN/Clamp	Result / Observations
AC power port	1	+	CDN	A
AC power port	1	-	CDN	A

Results:

A: No degradation in the performance of the EUT was observed.

7.5 Surge at Power Port

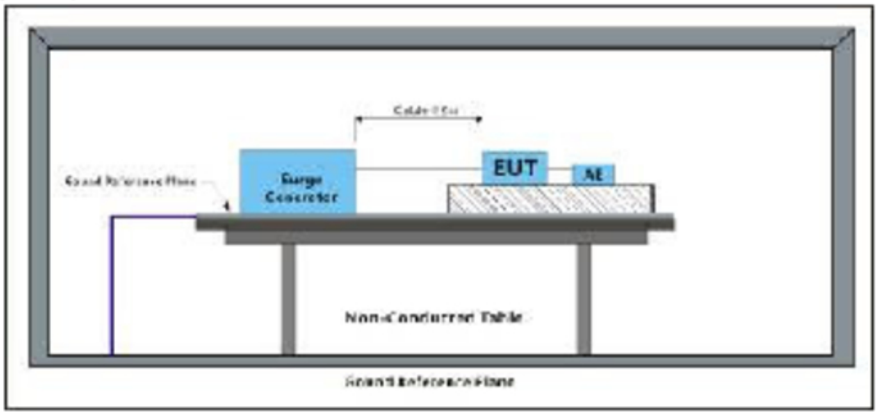
Test Requirement: EN 61547:2009

Test Method: EN 61000-4-5:2014

Performance Criterion: C

No. of surges: 5 positive at 90°, 5 negative at 270°.

7.5.1 Test Setup Diagram



7.5.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 51 % RH Atmospheric Pressure: 1002 mbar

Test mode: a:Working mode: Keep the EUT working on max output power continuously.

7.5.3 Test Results:

Test Line	Level (kV)	Polarity	Phase (deg)	Result / Observations
L-N	0.5	+	90°	A
L-N	0.5	-	270°	A

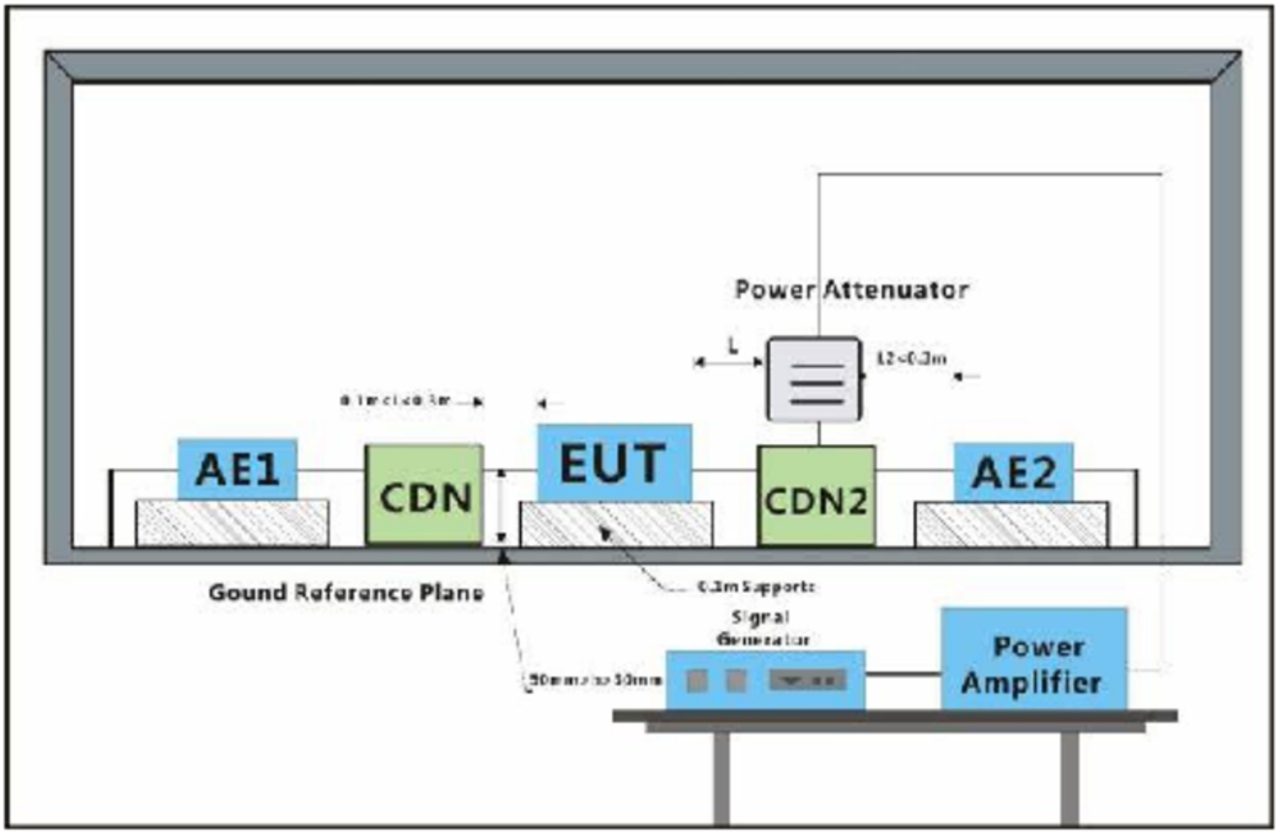
Results:

A: No degradation in the performance of the EUT was observed.

7.6 Conducted Immunity at Power Port (150kHz-80MHz)

Test Requirement:	EN 61547:2009
Test Method:	EN 61000-4-6:2014
Performance Criterion:	A
Frequency Range:	0.15MHz to 80MHz
Modulation:	80%, 1kHz Amplitude Modulation
Step Size	1%

7.6.1 Test Setup Diagram



7.6.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

Test mode: a:Working mode: Keep the EUT working on max output power continuously.

7.6.3 Test Results:

Cable port	Level (Vrms)	CDN/Clamp	Dwell time	Result / Observations
AC power port	3	CDN	3s	A

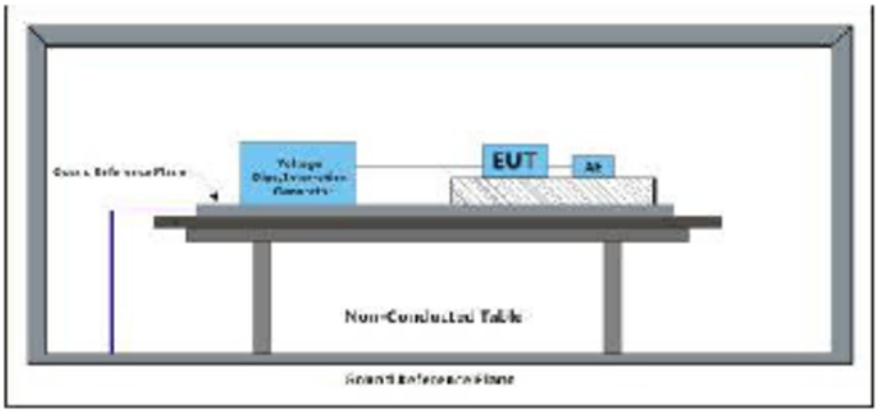
Results:

A: No degradation in the performance of the EUT was observed.

7.7 Voltage Dips and Interruptions

Test Requirement:	EN 61547:2009
Test Method:	EN 61000-4-11:2004
Performance Criterion:	0% of UT (Supply Voltage) for 0.5 Periods:B; 70 % of UT for 10 Periods:C
No. of Dips / Interruptions:	3 per Level
Time between dropout	10s

7.7.1 Test Setup Diagram



7.7.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 51 % RH Atmospheric Pressure: 1002 mbar

Test mode: a:Working mode: Keep the EUT working on max output power continuously.

7.7.3 Test Results:

Level % UT	Phase (deg)	Duration	No. of Dips / Interruptions	Result / Observations
0	0°	0.5 Cycles	3	A
0	180°	0.5 Cycles	3	A
70	0°	10 Cycles	3	B
70	180°	10 Cycles	3	B

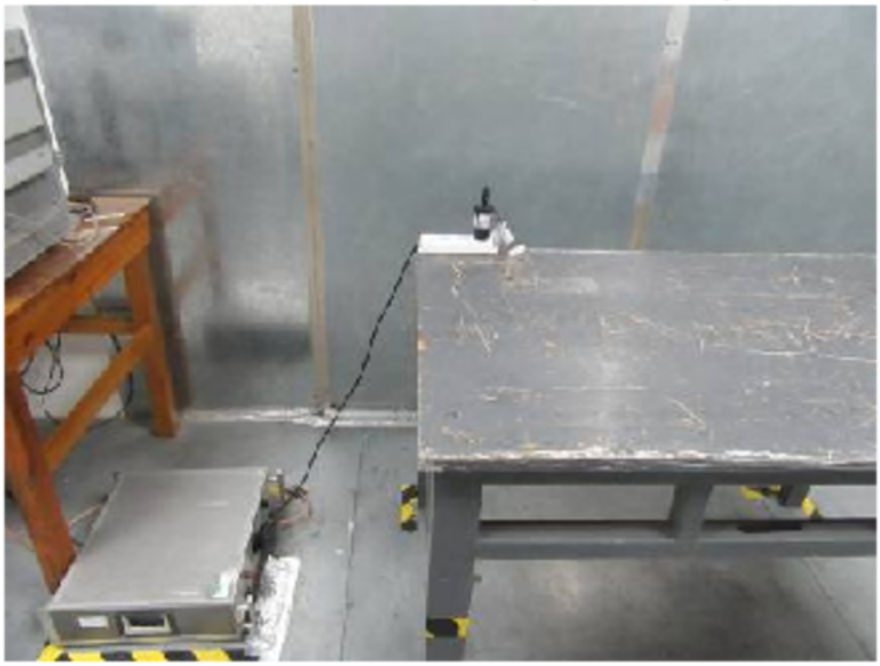
Results:

A: No degradation in the performance of the EUT was observed.

B: During the test, the EUT would flicker

8 Photographs

8.1 Conducted Emissions at Mains Terminals (9kHz-30MHz) Test Setup



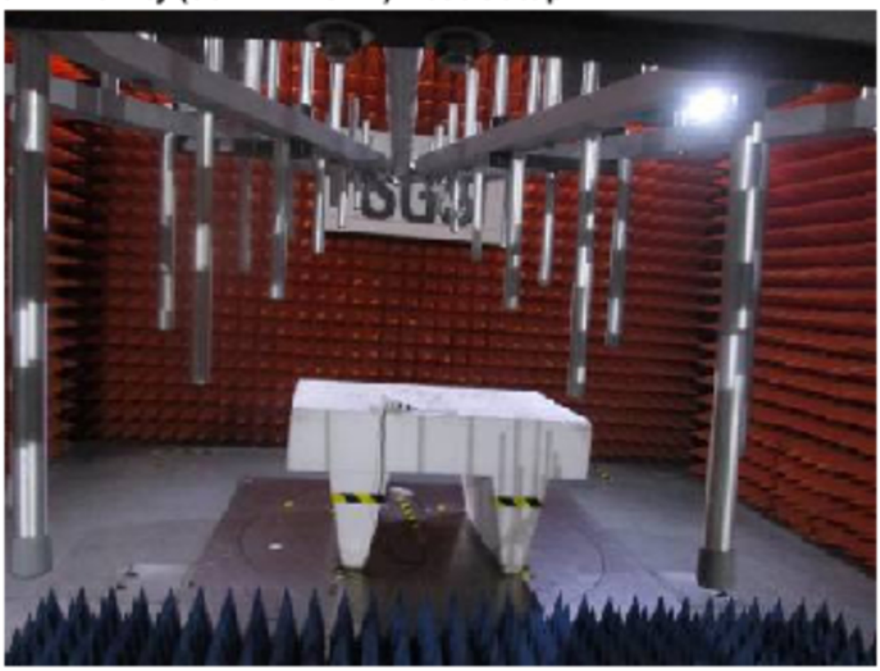
8.2 Radiated Emissions (30MHz-300MHz) Test Setup

8.3 Radiated Emissions (Magnetic field Induced Current)(9kHz-30MHz) Test Setup

8.4 Voltage Fluctuations and Flicker Test Setup

8.5 Electrostatic Discharge Test Setup

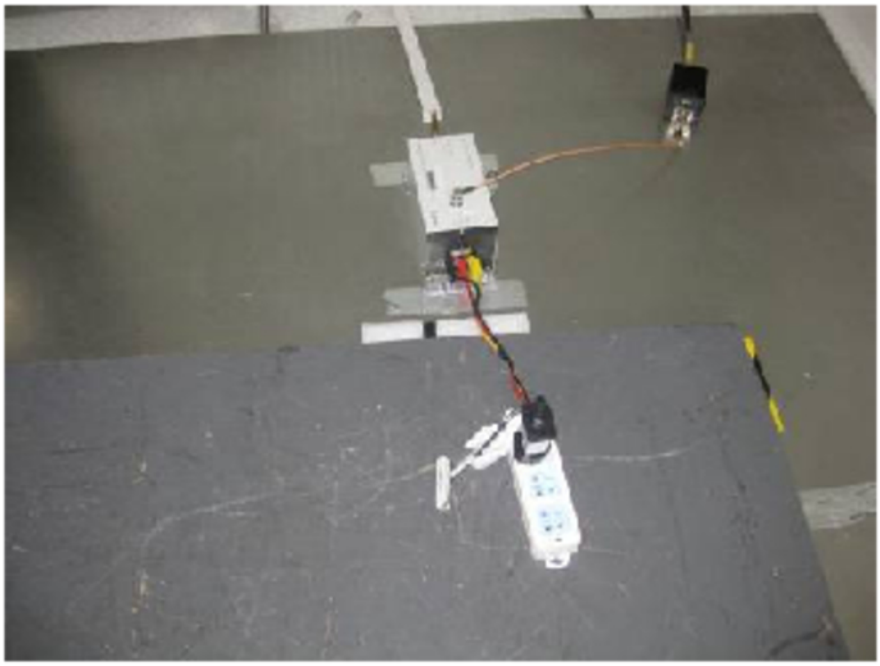
8.6 Radiated Immunity (80MHz-1GHz) Test Setup



8.7 Electrical Fast Transients/Burst at Power Port Test Setup

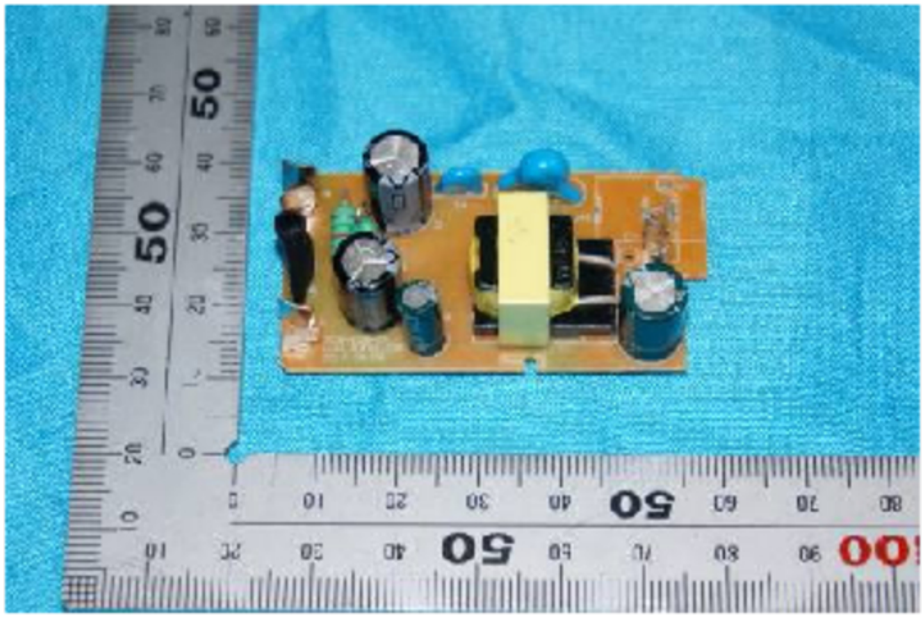
8.8 Surge at Power Port Test Setup

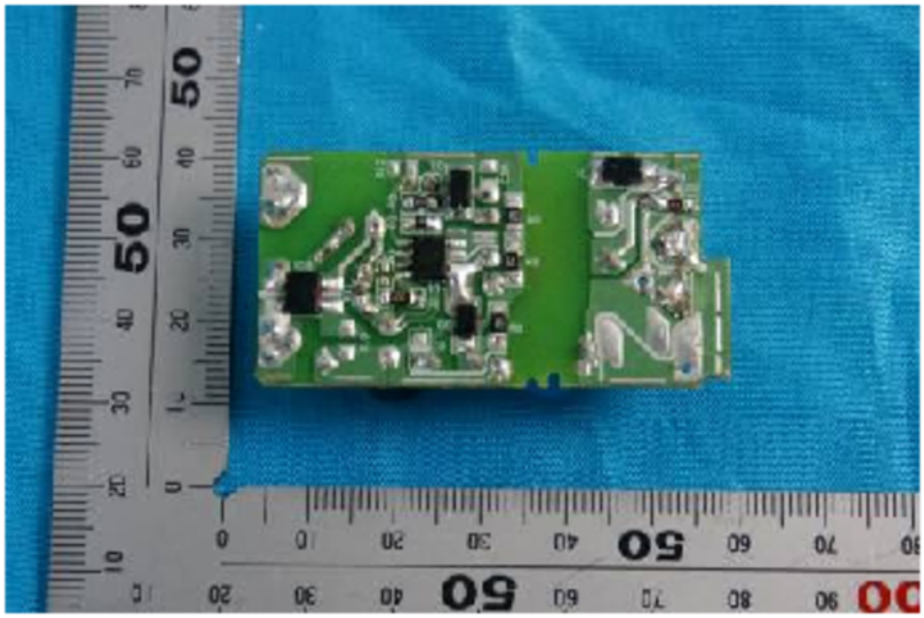
8.9 Conducted Immunity at Power Port (150kHz-80MHz) Test Setup

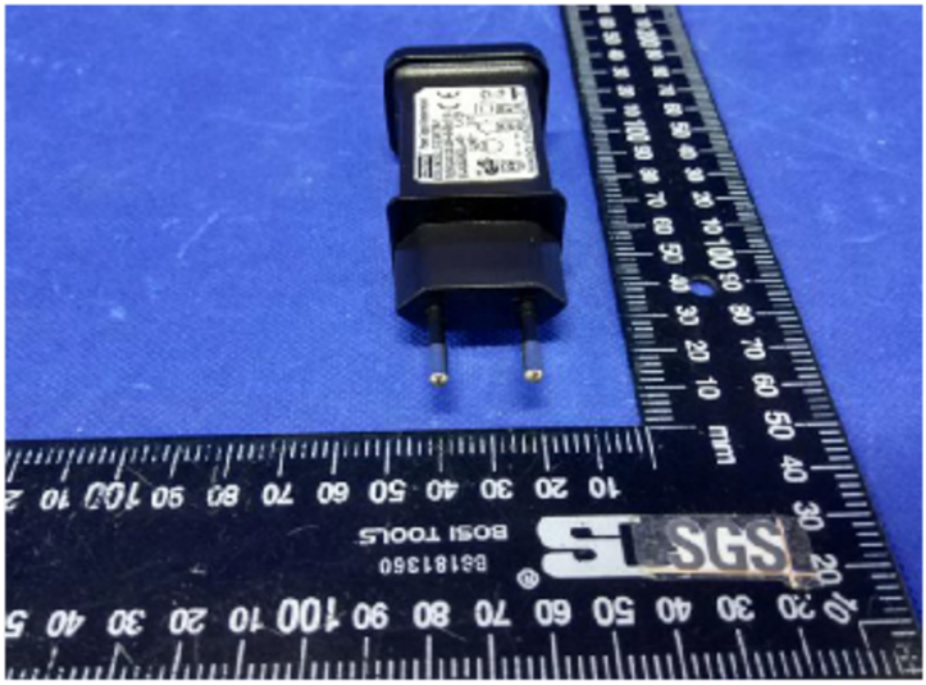


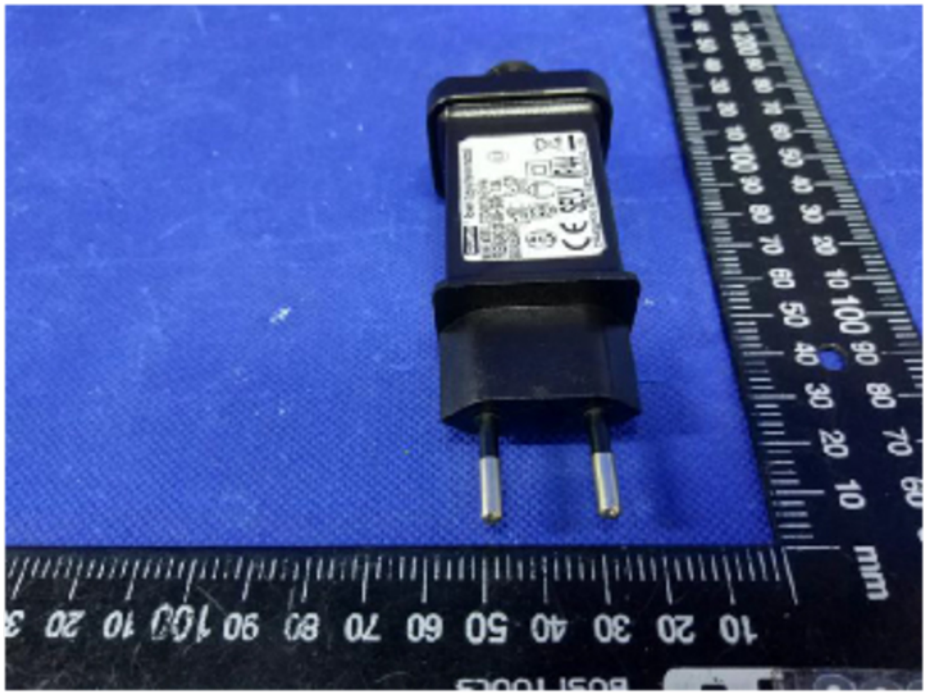
8.10 Voltage Dips and Interruptions Test Setup

8.11 EUT Constructional Details









--End of the Report--

Test Report issued under the responsibility of:

DEKRA

TEST REPORT
IEC TR 62778
Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires

Report Number. ..... :	3191075.50P
Date of issue ..... :	2016-07-21
Total number of pages ..... :	46
Name of Testing Laboratory preparing the Report ..... :	DEKRA Testing and Certification (Shanghai) Ltd. 3/F, #250, Jiangchangsan Road building 16 Headquater Economy Park Shibei Hi-Tech Park, Zhabei District, Shanghai, P.R.C 200436
Applicant's name ..... :	ZHEJIANG NEWDAY PHOTOELECTRIC TECHNOLOGY CO.,LTD
Address..... :	Xiashatu Village, Datian Zone, Linhai, Zhejiang, China
Test specification:	
Standard ..... :	IEC TR 62778:2014 (Second Edition)
Test procedure..... :	Type Test
Non-standard test method..... :	N/A
Test Report Form No. ..... :	IEC62778A
Test Report Form(s) Originator.... :	TÜV SÜD Product Service GmbH
Master TRF ..... :	Dated 2016-02

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description ..... :	LED bulb
Trade Mark ..... :	--
Manufacturer ..... :	Zhejiang Tiantian Electronic Co., Ltd. Datianliu Village, Datian Zone, 317004 Linhai, Zhejiang
Model/Type reference ..... :	ND-def (d means the colour of LED insulation, D:the same colour with LED, T: transparent) (e means the colour of the lamp, Y: yellow R: red G: green PU: purple, PI: pink, PG: pure green, B: blue, WW: warm white, CW: cool white, O: orange, M2: two colour, M4: four colour, M7: seven colour) (f: can be blank (steady),S(slow falsh),F(fast flash))
Ratings ..... :	ND-TO, ND-TY, ND-TR: 1,8-2,2 Vdc, 20 mA ND-TG, ND-TB, ND-TPG, ND-TPI, ND-TPU, ND-TWW, ND-TCW: 2,8-3,6 Vdc, 20 mA

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

☒	**CB Testing Laboratory:**	DEKRA Testing and Certification (Shanghai) Ltd.	
Testing location/ address ..... :		3/F, #250, Jiangchangsan Road building 16 Headquater Economy Park Shibei Hi-Tech Park, Zhabei District, Shanghai, P.R.C 200436	
☐	~~Associated CB Testing Laboratory:~~		
~~Testing location/ address ..... :~~			
Tested by (name, function, signature) ..... :		Zhijun Wang	
Approved by (name, function, signature) ... :		Hanson Zhang	
☐	~~Testing procedure: CTF Stage 1:~~		
~~Testing location/ address ..... :~~			
~~Tested by (name, function, signature) ..... :~~			
~~Approved by (name, function, signature) ..... :~~			
☐	~~Testing procedure: CTF Stage 2:~~		
~~Testing location/ address ..... :~~			
~~Tested by (name + signature) ..... :~~			
~~Witnessed by (name, function, signature) ..... :~~			

~~Approved by (name, function, signature).....:~~		
☐	~~Testing procedure: CTF Stage 3:~~	
☐	~~Testing procedure: CTF Stage 4:~~	
~~Testing location/ address.....:~~		
~~Tested by (name, function, signature).....:~~		
~~Witnessed by (name, function, signature) .....:~~		
~~Approved by (name, function, signature).....:~~		
~~Supervised by (name, function, signature) .....:~~		

List of Attachments (including a total number of pages in each attachment):

- Appendix 1: Photo Documentation
- Appendix 2: Relative Spectrum Of Tested Sample(s)
- Appendix 3: Table 6.1 Based On IEC 62471:2006
- Appendix 4: Table 6.1 Based On EN62471:2008, Attachment To IEC 62471 European Group Differences And National Differences

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
These tests fulfil the requirements of standard ISO/IEC 17025. When determining the test conclusion, the Measurement Uncertainty of test has been considered. The tested sample of ND-TO, ND-TY, ND-TR, ND-TG, ND-TPG, ND-TPI, ND-TWW Have been tested according to the IEC 62471(first edition, 2006-07) at 200mm and been classified as **Risk 0.** Have been tested according to the EN 62471:2008 at 200mm and been classified as **Risk 0**. Have been tested according to the IEC/TR 62778:2014 and been classified as **Risk 0 Unlimited for blue light hazard.** The tested sample of ND-TB, ND-TPU, ND-TCW Have been tested according to the IEC 62471(first edition, 2006-07) **at 200mm** and been classified as **Risk 1.** Have been tested according to the EN 62471:2008 **at 200mm** and been classified as **Risk 1.** Have been tested according to the IEC/TR 62778:2014 and been classified as **Risk 1 Unlimited for blue light hazard**.	DEKRA Testing and Certification (Shanghai) Ltd. 3/F, #250, Jiangchangsan Road building 16 Headquater Economy Park Shibei Hi-Tech Park, Zhabei District, Shanghai, P.R.C 200436

Summary of compliance with National Differences (List of countries addressed): EN Standards

EN 62471:2008

☒ **The product fulfills the requirements**

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

N/A

Test item particulars.....:	
Product evaluated.....:	☒ **LED package** ☐ **LED module** ☐ **Lamp** ☐ **Luminaire**
Rated voltage (V) .....:	ND-TO, ND-TY, ND-TR: 1,8-2,2 Vdc ND-TG, ND-TB, ND-TPG, ND-TPI, ND-TPU, ND-TWW, ND-TCW: 2,8-3,6 Vdc
Rated current (mA) .....:	ND-TO, ND-TY, ND-TR, ND-TG, ND-TB, ND-TPG, ND-TPI, ND-TPU, ND-TWW, ND-TCW: 20 mA
Rated CCT (K).....:	--
Rated Luminance (Mcd/m^2) .....:	--
Component report data used .....:	☒ **Not applicable** ☐ **LED package** ☐ **LED module** ☐ **Lamp** Report number: --
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	--
Date of receipt of test item .....:	2016-07-01
Date (s) of performance of tests.....:	2016-07-01 to 2016-07-20

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☒ comma / ☐ point is used as the decimal separator.

The product complied with the following standards:

☒IEC 62471:2006
☒EN 62471:2008
☐IEC/TR 62471-2:2009
☒IEC/TR 62778:2014

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☐ **Yes** ☒**Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) ..... :	Zhejiang Tiantian Electronic Co., Ltd. Datianliu Village, Datian Zone, 317004 Linhai, Zhejiang

General product information:

Full tests were performed on model ND-TO, ND-TY, ND-TR, ND-TG, ND-TB, ND-TPG, ND-TPI, ND-TPU, ND-TWW, ND-TCW

The products considered as worst case which should be evaluated at 200mm.

The sample of ND-TCW was tested at 200mm from the light source. CCT of spectral irradiance was found at 26204 K.
The sample of ND-TG was tested at 200mm from the light source. CCT of spectral irradiance was found at 9740 K
The sample of ND-TO was tested at 200mm from the light source. CCT of spectral irradiance was found at 1257 K.
The sample of ND-TPG was tested at 200mm from the light source. CCT of spectral irradiance was found at 9315 K.
The sample of ND-TPI was tested at 200mm from the light source. CCT of spectral irradiance was found at 1266 K
The sample of ND-TR was tested at 200mm from the light source. CCT of spectral irradiance was found at 780 K.
The sample of ND-TWW was tested at 200mm from the light source. CCT of spectral irradiance was found at 2948 K.
The sample of ND-TY was tested at 200mm from the light source. CCT of spectral irradiance was found at 2054 K.

Type test was performed according to IEC 62471:2006 procedure.

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

7	**MEASUREMENT INFORMATION FLOW**		**P**
7.1	**Basic flow**		**P**
	'Law of conservation of luminance' applied		N/A
	Use of only true luminance/radiance values		P
	In case of luminaire: The light source is operated in the luminaire under similar conditions as when tested as a component		N/A
	In case E_{thr} value for RG2 was established the peak value was derived from angular light distribution		N/A
7.2	**Conditions for the radiance measurement**		**P**
	Standard condition applied (200mm distance, 0,011rad field of view)		P
	Non-standard condition applied		N/A
7.3	**Special cases (I): Replacement by a lamp or LED module of another type**		**N/A**
	Light source is a white light source		N/A
	Evaluation done based on highest luminance		N/A
	Evaluation done based on CCT value		N/A
7.4	**Special cases (II): Arrays and clusters of primary light sources**		**N/A**
	LED package is evaluated as ..... :	☐RG0 unlimited ☐ RG1 unlimited	N/A
	E_{thr} of LED package applies to array		N/A
8	**RISK GROUP CLASSIFICATION**		**P**
	Risk group achieved:		P
	- .. Risk Group 0 unlimited		P
	- .. Risk Group 1 unlimited		P
	- E_{thr} ..... (lx) : Distance to reach RG1 ..... (m) :		N/A

	TABLE:Spectroradiometric measurement		
	Measurement performed on:	☒ **LED package** ☐ **LED module** ☐ **Lamp** ☐ **Luminaire**	
	Model number.....	ND-TB	
	Test voltage (V)	3,6Vdc	—
	Test current (mA)	20 mA	—
	Test frequency (Hz).....	--	—
	Ambient, t(°C)	25**°C**	—
	Measurement distance.....	☒ 20 cm ☐ ... cm	—
	Source size	☒ Non-small ☐ Small :	—
	Field of view	☐ 100 mrad ☒ 11 mrad ☐ 1,7 mrad (for small sources)	—

Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	--	
x/y colour coordinates			--	
Blue light hazard radiance	L_B	$W/(m^2 \cdot sr^1)$	9,73E+02	@11mrad
Blue light hazard irradiance	E_B	W/m^2	--	
Luminance	L	cd/m^2	3,64E+04	@11mrad
Illuminance	E	lx	2,69+00	

Supplementary information:

	TABLE:Spectroradiometric measurement		
	Measurement performed on:	☒ **LED package** ☐ **LED module** ☐ **Lamp** ☐ **Luminaire**	
	Model number.....	ND-TCW	
	Test voltage (V)	3,6Vdc	—
	Test current (mA)	20 mA	—
	Test frequency (Hz).....	--	—
	Ambient, t(°C)	25**°C**	—
	Measurement distance.....	☒ 20 cm ☐ ... cm	—
	Source size	☒ Non-small ☐ Small :	—
	Field of view	☐ 100 mrad ☒ 11 mrad ☐ 1,7 mrad (for small sources)	—

Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	26204	
x/y colour coordinates			0,2528 / 0,2505	
Blue light hazard radiance	L_B	$W/(m^2 \cdot sr^1)$	3,25E+02	@11mrad
Blue light hazard irradiance	E_B	W/m^2	--	
Luminance	L	cd/m^2	1,81E+04	@11mrad
Illuminance	E	lx	1,51+01	
Supplementary information:				

	TABLE:Spectroradiometric measurement		
	Measurement performed on:	☒ **LED package** ☐ **LED module** ☐ **Lamp** ☐ **Luminaire**	
	Model number.....	ND-TG	
	Test voltage (V)	3,6Vdc	—
	Test current (mA)	20 mA	—
	Test frequency (Hz).....	--	—
	Ambient, t(°C)	25**°C**	—
	Measurement distance.....	☒ 20 cm ☐ ... cm	—
	Source size	☒ Non-small ☐ Small :	—
	Field of view	☐ 100 mrad ☒ 11 mrad ☐ 1,7 mrad (for small sources)	—

Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	9740	
x/y colour coordinates			0,0980 / 0,6638	
Blue light hazard radiance	L_B	$W/(m^2 \cdot sr^1)$	7,78E+00	@11mrad
Blue light hazard irradiance	E_B	W/m^2	--	
Luminance	L	cd/m^2	3,37E+04	@11mrad
Illuminance	E	lx	4,00+00	
Supplementary information:				

	TABLE:Spectroradiometric measurement		
	Measurement performed on:	☒ **LED package** ☐ **LED module** ☐ **Lamp** ☐ **Luminaire**	
	Model number.....	ND-TO	
	Test voltage (V)	2,2Vdc	—
	Test current (mA)	20 mA	—
	Test frequency (Hz).....	--	—
	Ambient, t(°C)	25**°C**	—
	Measurement distance.....	☒ 20 cm ☐ ... cm	—
	Source size	☒ Non-small ☐ Small :	—
	Field of view	☐ 100 mrad ☒ 11 mrad ☐ 1,7 mrad (for small sources)	—

Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	1275	
x/y colour coordinates			0,6197 / 0,3797	
Blue light hazard radiance	L_B	$W/(m^2 \cdot sr^1)$	0,04E+02	@11mrad
Blue light hazard irradiance	E_B	W/m^2	--	
Luminance	L	cd/m^2	1,44E+04	@11mrad
Illuminance	E	lx	1,44+00	
Supplementary information:				

	TABLE:Spectroradiometric measurement		
	Measurement performed on:	☒ **LED package** ☐ **LED module** ☐ **Lamp** ☐ **Luminaire**	
	Model number	ND-TPG	
	Test voltage (V)	3,6Vdc	—
	Test current (mA)	20 mA	—
	Test frequency (Hz)	--	—
	Ambient, t(°C)	25**°C**	—
	Measurement distance	☒ 20 cm ☐ ... cm	—
	Source size	☒ Non-small ☐ Small :	—
	Field of view	☐ 100 mrad ☒ 11 mrad ☐ 1,7 mrad (for small sources)	—

Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	9315	
x/y colour coordinates			0,1121 / 0,6736	
Blue light hazard radiance	L_B	$W/(m^2 \cdot sr^1)$	9,12E+00	@11mrad
Blue light hazard irradiance	E_B	W/m^2	--	
Luminance	L	cd/m^2	4,59E+04	@11mrad
Illuminance	E	lx	7,01+00	
Supplementary information:				

	TABLE:Spectroradiometric measurement		
	Measurement performed on:	☒ **LED package** ☐ **LED module** ☐ **Lamp** ☐ **Luminaire**	
	Model number	ND-TPI	
	Test voltage (V)	3,6Vdc	—
	Test current (mA)	20 mA	—
	Test frequency (Hz)	--	—
	Ambient, t(°C)	25**°C**	—
	Measurement distance	☒ 20 cm ☐ ... cm	—
	Source size	☒ Non-small ☐ Small :	—
	Field of view	☐ 100 mrad ☒ 11 mrad ☐ 1,7 mrad (for small sources)	—

Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	1266	
x/y colour coordinates			0,4459 / 0,2069	
Blue light hazard radiance	L_B	$W/(m^2 \cdot sr^1)$	3,21E+01	@11mrad
Blue light hazard irradiance	E_B	W/m^2	--	
Luminance	L	cd/m^2	1,93E+04	@11mrad
Illuminance	E	lx	2,15+00	
Supplementary information:				

	TABLE:Spectroradiometric measurement		
	Measurement performed on:	☒ **LED package** ☐ **LED module** ☐ **Lamp** ☐ **Luminaire**	
	Model number.....	ND-TPU	
	Test voltage (V)	3,6Vdc	—
	Test current (mA)	20 mA	—
	Test frequency (Hz).....	--	—
	Ambient, t(°C)	25**°C**	—
	Measurement distance.....	☒ 20 cm ☐ ... cm	—
	Source size	☒ Non-small ☐ Small :	—
	Field of view	☐ 100 mrad ☒ 11 mrad ☐ 1,7 mrad (for small sources)	—

Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	--	
x/y colour coordinates			--	
Blue light hazard radiance	L_B	$W/(m^2 \cdot sr^1)$	1,27E+02	@11mrad
Blue light hazard irradiance	E_B	W/m^2	--	
Luminance	L	cd/m^2	1,04E+04	@11mrad
Illuminance	E	lx	1,09+00	
Supplementary information:				

	TABLE:Spectroradiometric measurement		
	Measurement performed on:	☒ **LED package** ☐ **LED module** ☐ **Lamp** ☐ **Luminaire**	
	Model number.....	ND-TR	
	Test voltage (V)	2,2Vdc	—
	Test current (mA)	20 mA	—
	Test frequency (Hz).....	--	—
	Ambient, t(°C)	25**°C**	—
	Measurement distance.....	☒ 20 cm ☐ ... cm	—
	Source size	☒ Non-small ☐ Small :	—
	Field of view	☐ 100 mrad ☒ 11 mrad ☐ 1,7 mrad (for small sources)	—

Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	780	
x/y colour coordinates			0,6808 / 0,3126	
Blue light hazard radiance	L_B	$W/(m^2 \cdot sr^1)$	0,20E+00	@11mrad
Blue light hazard irradiance	E_B	W/m^2	--	
Luminance	L	cd/m^2	4,60E+04	@11mrad
Illuminance	E	lx	4,17+00	
Supplementary information:				

	TABLE:Spectroradiometric measurement		
	Measurement performed on:	☒ **LED package** ☐ **LED module** ☐ **Lamp** ☐ **Luminaire**	
	Model number.....	ND-TWW	
	Test voltage (V)	3,6Vdc	—
	Test current (mA)	20 mA	—
	Test frequency (Hz).....	--	—
	Ambient, t(°C)	25**°C**	—
	Measurement distance.....	☒ 20 cm ☐ ... cm	—
	Source size	☒ Non-small ☐ Small :	—
	Field of view	☐ 100 mrad ☒ 11 mrad ☐ 1,7 mrad (for small sources)	—

Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	2948	
x/y colour coordinates			0,4454 / 0,4148	
Blue light hazard radiance	L_B	$W/(m^2 \cdot sr^1)$	2,11E+01	@11mrad
Blue light hazard irradiance	E_B	W/m^2	--	
Luminance	L	cd/m^2	7,77E+04	@11mrad
Illuminance	E	lx	5,46+00	
Supplementary information:				

	TABLE:Spectroradiometric measurement		
	Measurement performed on:	☒ **LED package** ☐ **LED module** ☐ **Lamp** ☐ **Luminaire**	
	Model number.....	ND-TY	
	Test voltage (V)	2,2Vdc	—
	Test current (mA)	20 mA	—
	Test frequency (Hz).....	--	—
	Ambient, t(°C)	25**°C**	—
	Measurement distance.....	☒ 20 cm ☐ ... cm	—
	Source size	☒ Non-small ☐ Small :	—
	Field of view	☐ 100 mrad ☒ 11 mrad ☐ 1,7 mrad (for small sources)	—

Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	2054	
x/y colour coordinates			0,5477 / 0,4507	
Blue light hazard radiance	L_B	$W/(m^2 \cdot sr^1)$	0,05E+00	@11mrad
Blue light hazard irradiance	E_B	W/m^2	--	
Luminance	L	cd/m^2	1,64E+04	@11mrad
Illuminance	E	lx	1,96+00	
Supplementary information:				

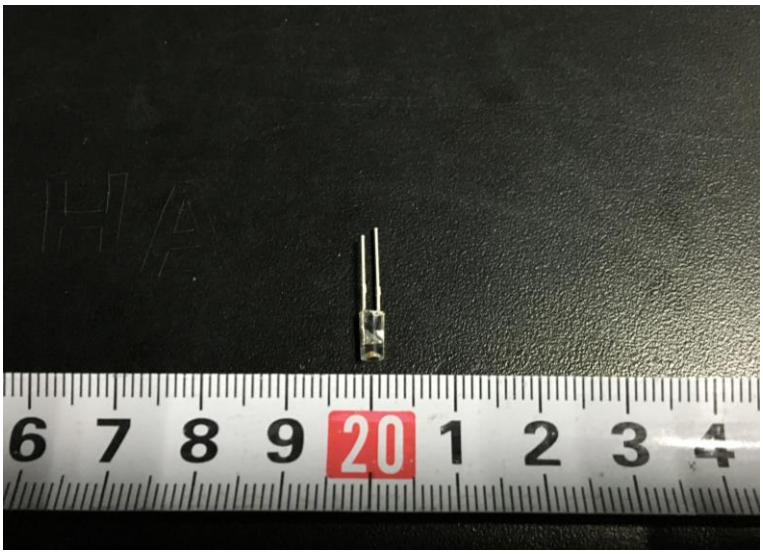
	TABLE: Angular light distribution	**N/A**

List of test equipment used:

A completed list of used test equipment shall be provided in the Test Reports when a Manufacturer Testing Laboratory according to CTF stage 1 or CTF stage 2 procedure has been used.
Note: This page may be removed when CTF stage 1 CTF stage 2 are not used. See also clause 4.8 in OD 2020 for more details.

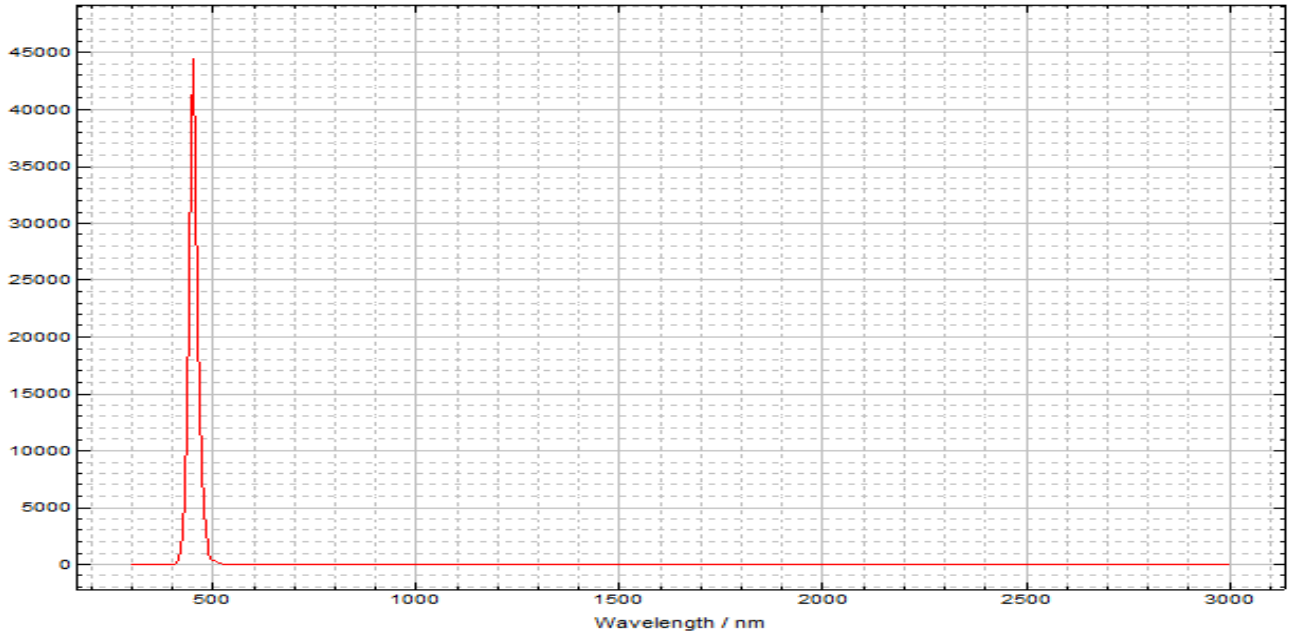
Clause	Measurement / testing	Testing / measuring equipment / material used, (Equipment ID)	Range used	Last Calibration date	Calibration due date
7	Irradiance measurements Radiance measurements	IDR 300 Monochromator (SH 344)	200-3000nm	/	/
7	Radiance measurements	S009 Telescope (SH 345)	300-1400nm	/	/
7	Radiance measurements	SRS 12 Radiance Standard (SH 348)	300-1400nm	2016/3/22	2017/3/22
7	Irradiance measurements	CL6 Spectral irradiance standard (SH 350)	300-3000nm	2016/3/22	2017/3/22
7	Irradiance measurements	CL7 Spectral irradiance standard (SH 351)	200-400nm	2016/3/22	2017/3/22
7	Irradiance measurements	Photometric detector head (SH 359)	380nm-800nm	2016/3/22	2017/3/22
7	Irradiance measurements Radiance measurements	Wattmeter (SH070)	500V,40A	2015/10/16	2016/10/16

Appendix 1: Photo Documentation

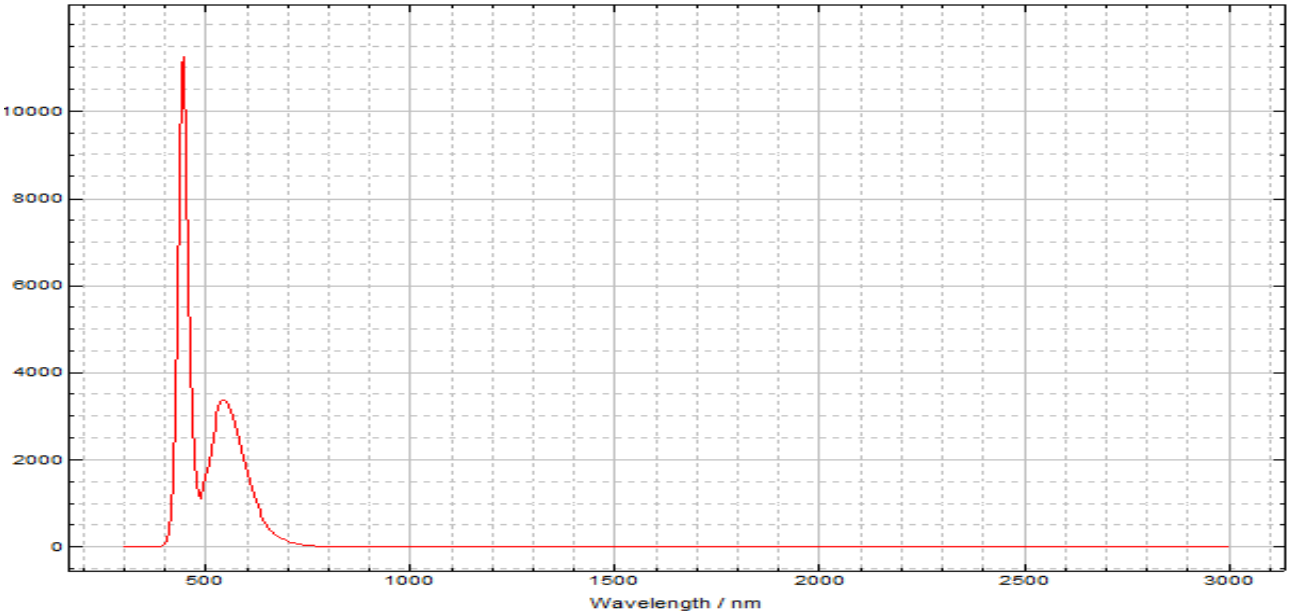


Overview

Appendix 2: Relative Spectrum Of Tested Sample(s)

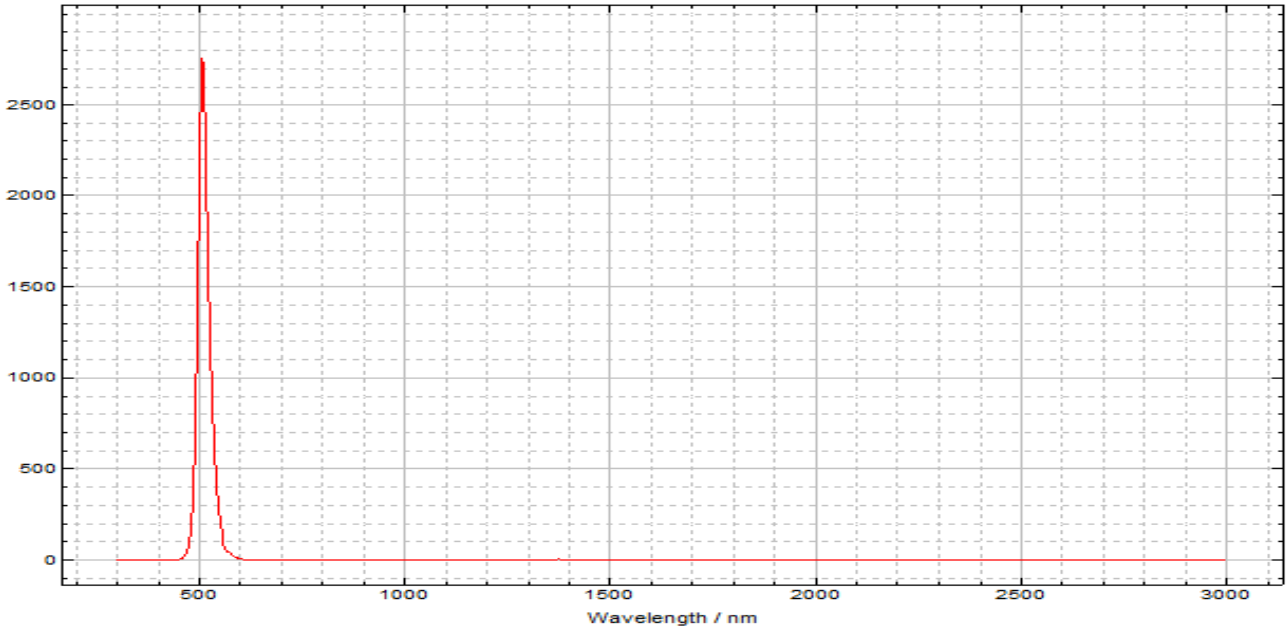


ND-TB

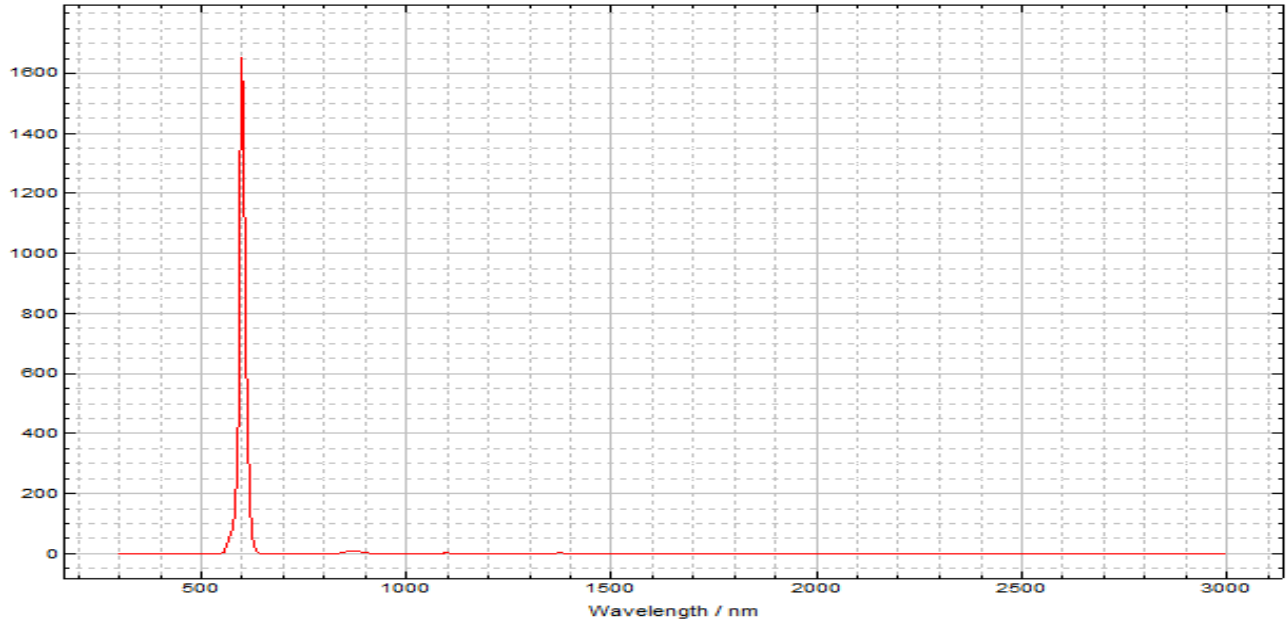


ND-TCW

Appendix 2: Relative Spectrum Of Tested Sample(s)

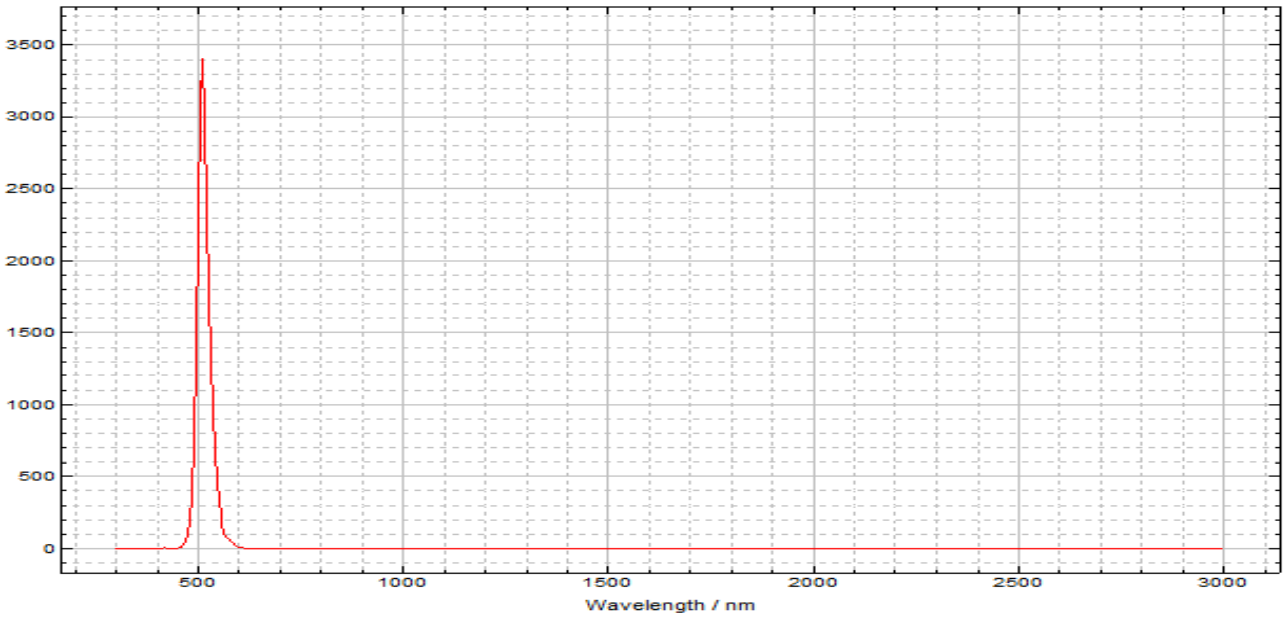


ND-TG

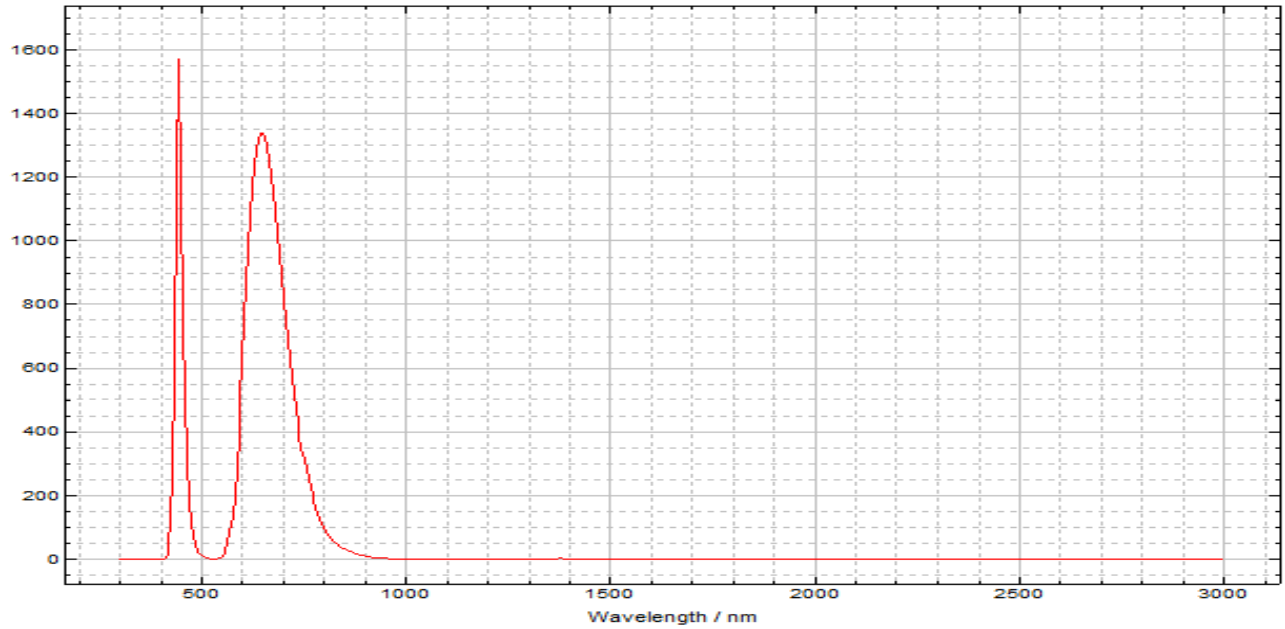


ND-TO

Appendix 2: Relative Spectrum Of Tested Sample(s)

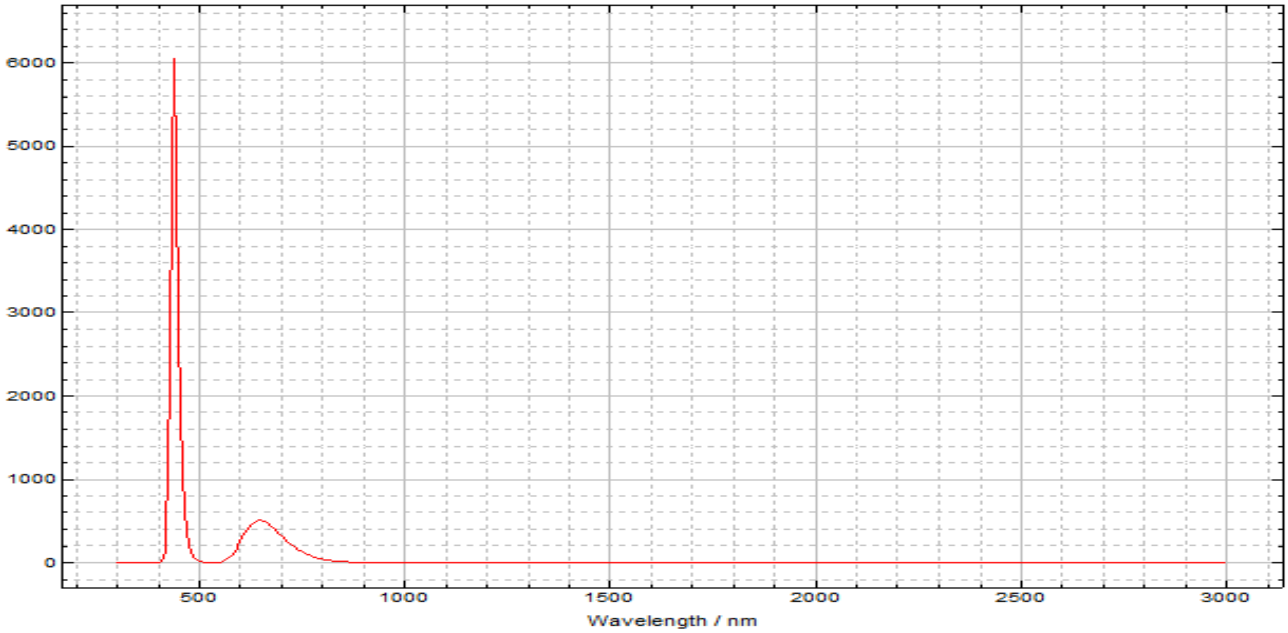


ND-TPG

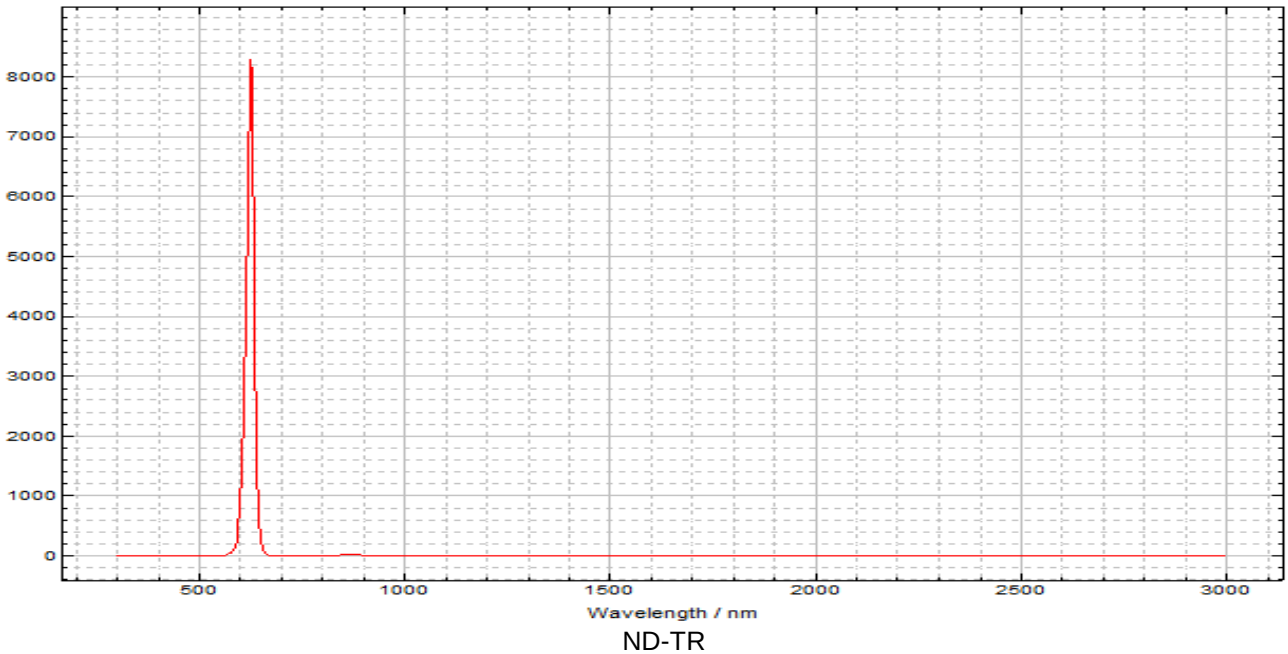


ND-TPI

Appendix 2: Relative Spectrum Of Tested Sample(s)

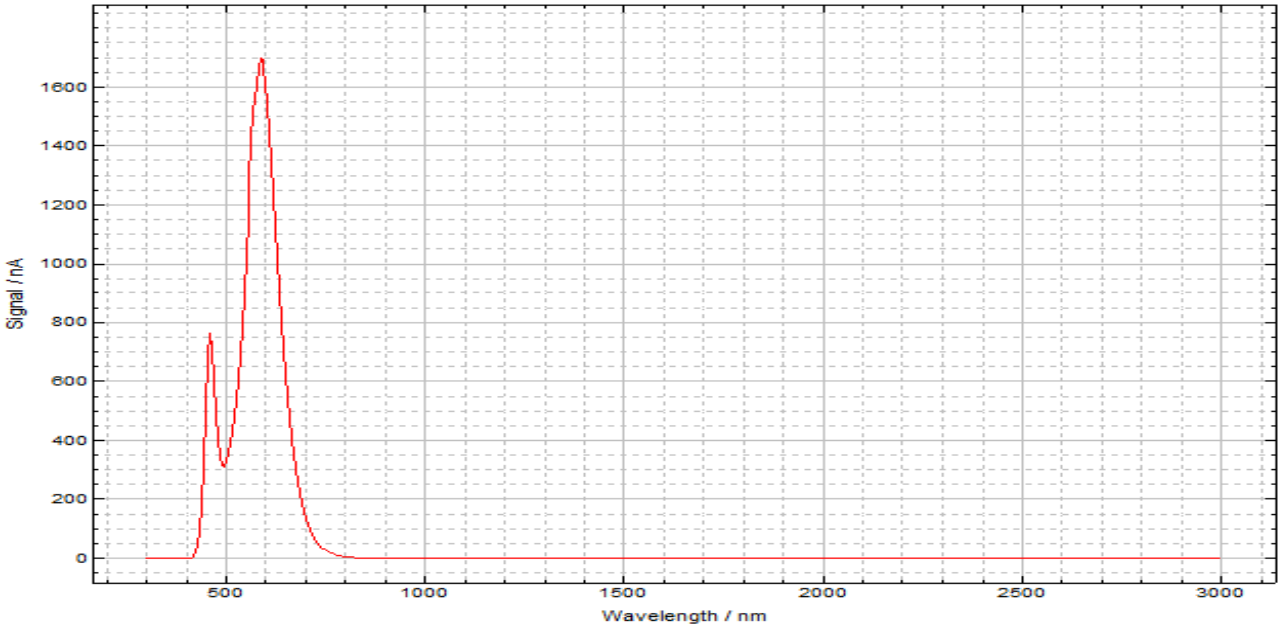


ND-TPU

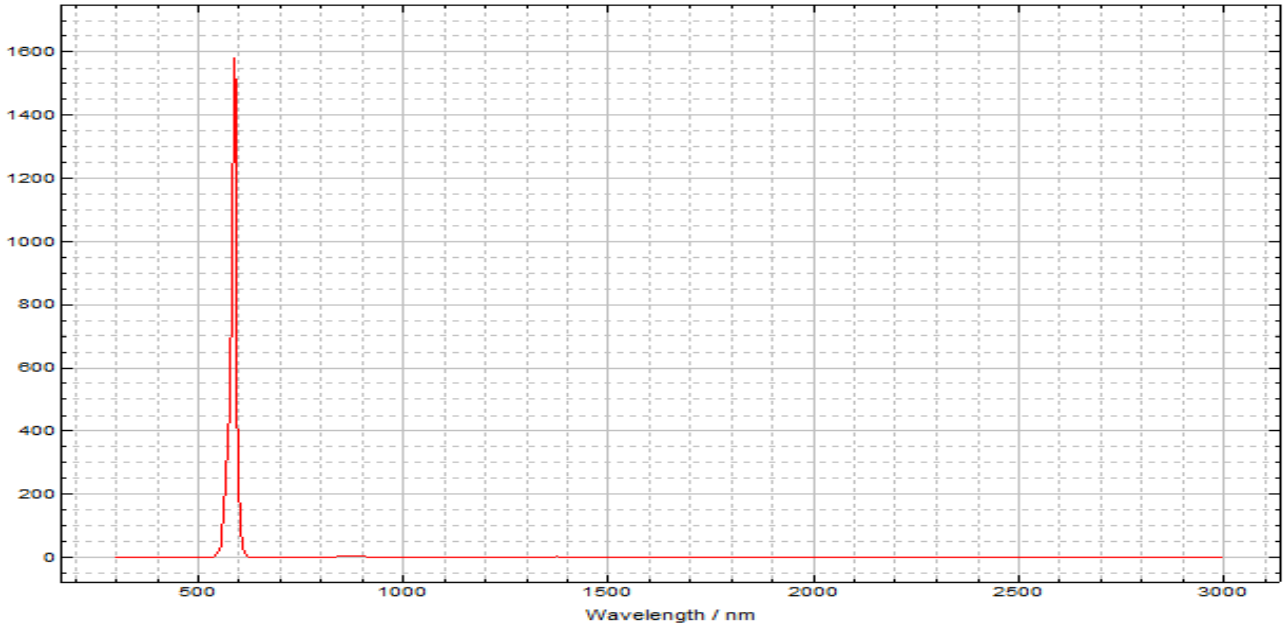


ND-TR

Appendix 2: Relative Spectrum Of Tested Sample(s)



ND-TWW



ND-TY

Appendix 3: Table 6.1 Based On IEC 62471:2006
DUT: ND-TB, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps									P
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	0,003		0,03		
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	0,0000	33		100		
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	8,58E+00	10000	9,73E+02	4000000		
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	1,0*	--	1,0		400		
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	9,73E+03	28000/α		71000/α		
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/α	--	6000/α		6000/α		
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	-0,005	570		3200		

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

Appendix 3: Table 6.1 Based On IEC 62471:2006
DUT: ND-TCW, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps									P
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	0,003		0,03		
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	0,0000	33		100		
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	3,23E+00	10000	3,25E+02	4000000		
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	1,0*	--	1,0		400		
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	3,54E+03	28000/α		71000/α		
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/α	--	6000/α		6000/α		
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	-0,0009	570		3200		

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

Appendix 3: Table 6.1 Based On IEC 62471:2006
DUT: ND-TG, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps									P
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	0,003		0,03		
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	0,0000	33		100		
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	0,12E+00	10000		4000000		
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	1,0*	--	1,0		400		
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	1,12E+02	28000/α		71000/α		
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/α	--	6000/α		6000/α		
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	-0,005	570		3200		

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

Appendix 3: Table 6.1 Based On IEC 62471:2006
DUT: ND-TO, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps									P
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	0,003		0,03		
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	0,0000	33		100		
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	0,48E-02	10000		4000000		
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	1,0*****	--	1,0		400		
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	3,34E+01	28000/α		71000/α		
Retinal thermal, weak visual stimulus******	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/α	--	6000/α		6000/α		
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	1,44	570		3200		

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

Appendix 3: Table 6.1 Based On IEC 62471:2006
DUT: ND-TPG, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps									P
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	0,003		0,03		
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	0,0000	33		100		
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	0,19E+00	10000		4000000		
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	1,0*	--	1,0		400		
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	1,40E+02	28000/α		71000/α		
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/α	--	6000/α		6000/α		
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	-0,0005	570		3200		

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

Appendix 3: Table 6.1 Based On IEC 62471:2006
DUT: ND-TPI, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps									P
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	0,003		0,03		
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	0,0000	33		100		
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	0,37E+00	10000		4000000		
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	1,0*****	--	1,0		400		
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	4,75E+02	28000/α		71000/α		
Retinal thermal, weak visual stimulus******	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/α	--	6000/α		6000/α		
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	-0,0004	570		3200		

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

Appendix 3: Table 6.1 Based On IEC 62471:2006
DUT: ND-TPU, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps									P
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	0,003		0,03		
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	0,0000	33		100		
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	1,40E+00	10000	1,26E+02	4000000		
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	1,0*	--	1,0		400		
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	1,33E+02	28000/α		71000/α		
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/α	--	6000/α		6000/α		
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	-0,005	570		3200		

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

Appendix 3: Table 6.1 Based On IEC 62471:2006
DUT: ND-TR, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps									P
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	0,003		0,03		
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	0,0000	33		100		
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	0,01E+00	10000		4000000		
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	1,0*****	--	1,0		400		
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	1,95E+02	28000/α		71000/α		
Retinal thermal, weak visual stimulus******	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/α	--	6000/α		6000/α		
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	-0,001	570		3200		

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

Appendix 3: Table 6.1 Based On IEC 62471:2006
DUT: ND-TWW, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps									P
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	0,003		0,03		
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	0,0000	33		100		
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	0,18E+00	10000		4000000		
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	1,0*****	--	1,0		400		
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	3,79E+02	28000/α		71000/α		
Retinal thermal, weak visual stimulus******	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/α	--	6000/α		6000/α		
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0,003	570		3200		

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

Appendix 3: Table 6.1 Based On IEC 62471:2006
DUT: ND-TY, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps									P
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	0,003		0,03		
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	0,0000	33		100		
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	-0,008+00	10000		4000000		
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	1,0*	--	1,0		400		
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	3,00E+01	28000/α		71000/α		
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/α	--	6000/α		6000/α		
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	-0,007	570		3200		

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

Appendix 4: Table 6.1 Based On EN62471:2008, Attachment To IEC 62471 European Group Differences And National Differences

DUT: ND-TB, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

EN 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)									P
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	--	--	--	--	
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	0,0000	--	--	--	--	
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	8,58E+00	10000	9,73E+02	4000000		
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	0,01*	--	1,0		400		
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	9,73E+03	28000/α		71000/α		
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017≤ α ≤ 0,011	--					
				6000/α 0,011≤ α ≤ 0,1	--					
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	-0,005	570		3200		

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

NOTE The action functions: see Table 4.1 and Table 4.2
The applicable aperture diameters: see 4.2.1
The limitations for the angular subtenses: see 4.2.2
The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.

Appendix 4: Table 6.1 Based On EN62471:2008, Attachment To IEC 62471 European Group Differences And National Differences

DUT: ND-TCW, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

EN 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)									P
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	--	--	--	--	
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	0,0000	--	--	--	--	
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	3,23E+00	10000	9,73E+02	4000000		
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	0,01*	--	1,0		400		
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	3,54E+03	28000/α		71000/α		
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017≤ α ≤ 0,011	--					
				6000/α 0,011≤ α ≤ 0,1	--					
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	-0,0009	570		3200		

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

NOTE The action functions: see Table 4.1 and Table 4.2
The applicable aperture diameters: see 4.2.1
The limitations for the angular subtenses: see 4.2.2
The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.

Appendix 4: Table 6.1 Based On EN62471:2008, Attachment To IEC 62471 European Group Differences And National Differences

DUT: ND-TG, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

EN 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)									P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	--	--	--	--
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	0,0000	--	--	--	--
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	0,12E+00	10000		4000000	
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	0,01*	--	1,0		400	
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	1,12E+02	28000/α		71000/α	
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017≤ α ≤ 0,011	--				
				6000/α 0,011≤ α ≤ 0,1	--				
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	-0,005	570		3200	

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

NOTE The action functions: see Table 4.1 and Table 4.2
The applicable aperture diameters: see 4.2.1
The limitations for the angular subtenses: see 4.2.2
The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.

Appendix 4: Table 6.1 Based On EN62471:2008, Attachment To IEC 62471 European Group Differences And National Differences

DUT: ND-TO, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

EN 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)									P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	--	--	--	--
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	0,0000	--	--	--	--
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	0,48E-02	10000	9,73E+02	4000000	
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	0,01*	--	1,0		400	
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	3,34E+01	28000/α		71000/α	
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017≤ α ≤ 0,011	--				
				6000/α 0,011≤ α ≤ 0,1	--				
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	1,44	570		3200	

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

NOTE The action functions: see Table 4.1 and Table 4.2
The applicable aperture diameters: see 4.2.1
The limitations for the angular subtenses: see 4.2.2
The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.

Appendix 4: Table 6.1 Based On EN62471:2008, Attachment To IEC 62471 European Group Differences And National Differences

DUT: ND-TPG, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

EN 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)									P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	--	--	--	--
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	0,0000	--	--	--	--
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	0,19E+00	10000	9,73E+02	4000000	
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	0,01*	--	1,0		400	
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	1,40E+02	28000/α		71000/α	
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017≤ α ≤ 0,011	--				
				6000/α 0,011≤ α ≤ 0,1	--				
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	-0,0005	570		3200	

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

NOTE The action functions: see Table 4.1 and Table 4.2
The applicable aperture diameters: see 4.2.1
The limitations for the angular subtenses: see 4.2.2
The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.

Appendix 4: Table 6.1 Based On EN62471:2008, Attachment To IEC 62471 European Group Differences And National Differences

DUT: ND-TPI, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

EN 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)									P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	--	--	--	--
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	0,0000	--	--	--	--
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	0,37E+00	10000	9,73E+02	4000000	
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	0,01*	--	1,0		400	
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	4,75E+02	28000/α		71000/α	
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017≤ α ≤ 0,011	--				
				6000/α 0,011≤ α ≤ 0,1	--				
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	-0,0004	570		3200	

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

NOTE The action functions: see Table 4.1 and Table 4.2
The applicable aperture diameters: see 4.2.1
The limitations for the angular subtenses: see 4.2.2
The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.

Appendix 4: Table 6.1 Based On EN62471:2008, Attachment To IEC 62471 European Group Differences And National Differences

DUT: ND-TPI, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

EN 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)									P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	--	--	--	--
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	0,0000	--	--	--	--
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	0,37E+00	10000	9,73E+02	4000000	
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	0,01*	--	1,0		400	
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	4,75E+02	28000/α		71000/α	
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017≤ α ≤ 0,011	--				
				6000/α 0,011≤ α ≤ 0,1	--				
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	-0,0004	570		3200	

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

NOTE The action functions: see Table 4.1 and Table 4.2
The applicable aperture diameters: see 4.2.1
The limitations for the angular subtenses: see 4.2.2
The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.

Appendix 4: Table 6.1 Based On EN62471:2008, Attachment To IEC 62471 European Group Differences And National Differences

DUT: ND-TR, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

EN 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)									P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	--	--	--	--
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	0,0000	--	--	--	--
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	0,01E+00	10000	9,73E+02	4000000	
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	0,01*	--	1,0		400	
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	1,95E+02	28000/α		71000/α	
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017≤ α ≤ 0,011	--				
				6000/α 0,011≤ α ≤ 0,1	--				
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	-0,001	570		3200	

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

NOTE The action functions: see Table 4.1 and Table 4.2
The applicable aperture diameters: see 4.2.1
The limitations for the angular subtenses: see 4.2.2
The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.

Appendix 4: Table 6.1 Based On EN62471:2008, Attachment To IEC 62471 European Group Differences And National Differences

DUT: ND-TWW, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

EN 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)									P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	--	--	--	--
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	0,0000	--	--	--	--
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	0,18E+00	10000	9,73E+02	4000000	
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	0,01*	--	1,0		400	
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	3,79E+02	28000/α		71000/α	
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017≤ α ≤ 0,011	--				
				6000/α 0,011≤ α ≤ 0,1	--				
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0,003	570		3200	

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

NOTE The action functions: see Table 4.1 and Table 4.2
The applicable aperture diameters: see 4.2.1
The limitations for the angular subtenses: see 4.2.2
The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.

Appendix 4: Table 6.1 Based On EN62471:2008, Attachment To IEC 62471 European Group Differences And National Differences

DUT: ND-TY, Evaluation Distance: 200mm, Angular subtense of the apparent source α: 15 mrad

EN 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)									P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	--	--	--	--
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	0,0000	--	--	--	--
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	-0,008E+00	10000	9,73E+02	4000000	
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	0,01*	--	1,0		400	
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	3,00E+01	28000/α		71000/α	
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017≤ α ≤ 0,011	--				
				6000/α 0,011≤ α ≤ 0,1	--				
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	-0,007	570		3200	

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

NOTE The action functions: see Table 4.1 and Table 4.2
The applicable aperture diameters: see 4.2.1
The limitations for the angular subtenses: see 4.2.2
The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.

VERIFICATION OF CONFORMITY

Applicant Name & Address	:	[redacted]
Product(s)	:	**Lighting Chain**
Model(s)	:	**TTDL-IP-!@@@@L##DC**$$$%-&,** *Additional information on page 2*
Technical Specification	:	**5-36V DC for TTDL-IP-!@@@@LXDCY$$$%-& and TTDL-IP-!@@@@L##DC**$$$%-&, 5-36V AC for TTDL-IP-!@@@@LXACY$$$%-& and TTDL-IP-!@@@@L##AC**$$$%-&, Max.36W for TTDL-IP-!@@@@LXDCY$$$%-& and TTDL-IP-!@@@@L##DC**$$$%-&, Max.12W for TTDL-IP-!@@@@LXACY$$$%-& and TTDL-IP-!@@@@L##AC**$$$%-&.**
Brand name	:	**Tiantian**
Relevant Standard(s)	:	**EN 60598-2-20:2015 EN 60598-1:2015 EN 62493:2015**
Directive(s)	:	**Low Voltage Directive 2014/35/EU**
Verification Number	:	**EFSH201708-L029** *Replace EFSH201607-L002*
Report Number(s)	:	**EFSH16060677-IE-03-L01; EFSH16060677-IE-03-L01-A1; EFSH16060677-IE-03-EMF; EFSH16060677-IE-03-EMF-A1; EFSH16060677-IE-03-CDF**

NOTE 1: This verification is part of the full test report(s) and should be read in conjunction with it.

This is the result of tests carried out on those samples of the product referred to above which were submitted for testing, in accordance with the specification for the respective standards. The sample(s) of the tested product has been found to comply with the relevant standard/specification to the directive(s) listed on this verification at the time the tests were carried out.
The manufacturer according to definition by EU directive may indicate compliance to said directive(s) by signing a DoC himself and applying the CE-marking to products identical to the tested sample(s). In addition, the manufacturer shall file and keep the documentation according to the rules of the applicable directive(s) and shall consider changes of the standard(s) if relevant. Additional requirements may be applicable such as additional directives or local laws.

The 'CE' marking shall consist in the initials 'CE' taking the following form:

The 'CE' marking must be affixed to the product/s or to its marking plate. Where this is not possible or not warranted on account of the nature of the products, it must be affixed to the packaging, if any, and to the accompanying documents.

Teddy Wang
Technical Manager
2017-08-21

Verification issued by: Eurofins Product Testing Service (Shanghai) Co., Ltd.
No. 395 West Jiangchang Road, Jing'an District, Shanghai, China Phone +86-21-61819181 Fax +86-21-61819180

ANNEX I

Verification of conformity Reference No.: EFSH201708-L029

Model(s) : **TTDL-IP-!@@@@L##AC**$$$%-&,**
TTDL-IP-!@@@@LXDCY$$$%-&,
TTDL-IP-!@@@@LXACY$$$%-&
"IP" mean the IP degree of lighting chain, it can be blank(IP20),IP(IP44),
"!"mean the shape of lighting chain, it can be blank(Normal),D(Decoration),C(curtain), N(Net), B(Icicle),
"@@@@"means the quantity of LED, from 0001(1 LED) to 1880(1880 LED),
"##" means the supply voltage of led lighting chain, from 05 (5V) to 36 (36V), step by 0,1,
"X"means the supply voltage of LED lighting chain, from 5V to 36V ,0,1V for each step,
"DC" means the supply voltage is DC,"AC" means the supply voltage is AC,
"" means the current of each group, from 0,1 (0,1mA) to 20 (20mA), step by 0,1,**
"Y" means the current of each group, from 0,1(0,1mA) to 20(20mA), 0,1mA for each step,
"$$$" quantity of parallel connected, from 001to 188
"%" means the colour of LED, it can be R(Red), O(Orange), Y(Yellow), B(Blue), G(Green), PI(Pink),CW(Cool white),W(White), WW(Warm White),PG(Pure Green),PU(Purple),WG(Warm Gold) and M(multi),
"&" can be blank(without controller),C(with controller),P(with can be connected),CP(with controller and can be connected).
About the lightingchain which can be connected, the minimum power of each LED bulbs is 0,006W(3V*0,002A), max quantity of LED=the rating power of the transformer/0,006.

NOTE 1: This verification is part of the full test report(s) and should be read in conjunction with it.

This is the result of tests carried out on those samples of the product referred to above which were submitted for testing, in accordance with the specification for the respective standards. The sample(s) of the tested product has been found to comply with the relevant standard/specification to the directive(s) listed on this verification at the time the tests were carried out.
The manufacturer according to definition by EU directive may indicate compliance to said directive(s) by signing a DoC himself and applying the CE-marking to products identical to the tested sample(s). In addition, the manufacturer shall file and keep the documentation according to the rules of the applicable directive(s) and shall consider changes of the standard(s) if relevant. Additional requirements may be applicable such as additional directives or local laws.

The 'CE' marking shall consist in the initials 'CE' taking the following form:

The 'CE' marking must be affixed to the product/s or to its marking plate. Where this is not possible or not warranted on account of the nature of the products, it must be affixed to the packaging, if any, and to the accompanying documents.

Teddy Wang
Technical Manager
2017-08-21

Verification issued by: Eurofins Product Testing Service (Shanghai) Co., Ltd.
No. 395 West Jiangchang Road, Jing'an District, Shanghai, China Phone +86-21-61819181 Fax +86-21-61819180

CERTIFICATE

Issued to:
Applicant:
Changzhou Jutai Electronic Co., Ltd.
No. 8 Longfa Road, Xinbei District, Changzhou, 213031, Jiangsu
Changzhou, China

Manufacturer/Licensee:
Changzhou Jutai Electronic Co., Ltd.
No. 8 Longfa Road, Xinbei District, Changzhou, 213031, Jiangsu
Changzhou, China

Product	:	Power Supply(Direct plug-in type)
Trade name(s)	:	CZJUTAI
Type(s)/model(s)	:	JT-DCxVyW-E1 and JT-DCxVyW-E1-IP44

The product and any acceptable variation thereto is specified in the Annex to this certificate and the documents therein referred to.

DEKRA hereby declares that the above-mentioned product has been certified on the basis of:
- a type test according to the standard EN 61347-1:2015 and EN 61347-2-13:2014
- an inspection of the production location according to CENELEC Operational Document CIG 021
- a certification agreement with the number 999129

DEKRA hereby grants the right to use the KEMA-KEUR certification mark.

The KEMA-KEUR certification mark may be applied to the product as specified in this certificate for the duration of the KEMA-KEUR certification agreement and under the conditions of the KEMA-KEUR certification agreement.

This certificate is issued on 12 October 2017 and expires upon withdrawal of one of the above mentioned standards.

Certificate number: 31-101552

DEKRA Certification B.V.

drs. G.J. Zoetbrood
Managing Director

Henk Schendstok
Certification Manager

ACCREDITED BY THE
DUTCH ACCREDITATION
COUNCIL

PRODUCTS
RvA C 001

KEMA KEUR

SPECIFICATION OF THE CERTIFIED PRODUCT

Product data

Product	:	Power Supply(Direct plug-in type)
Trade name(s)	:	CZJUTAI
Type(s)/model(s)	:	JT-DCxVyW-E1 and JT-DCxVyW-E1-IP44
Rated voltage	:	220 - 240 V~; 230 - 240 V~; 100 - 240 V~
Nature of supply	:	ac
Rated frequency	:	50 Hz; 50 – 60 Hz
Class	:	II
Degree of protection	:	IP44, IP20
Further information	:	Direct plug-in; independent

TESTS

Test requirements

EN 61347-1:2015
EN 61347-2-13:2014

Test result

The test results are laid down in DEKRA test file 601521000.

Additional Information

Remarks of types:
x means output voltage, it could be from 1 Vdc to 40 Vdc, 0,1 Vdc for each step;
y means output power, it could be from 0,01 W to 7,2 W, 0,01 W for each step

The list of components is laid down at test report 6015210.50.

Conclusion

The examination proved that all requirements were met.

Factory location

Changzhou Jutai Electronic Co., Ltd.
No. 8 Longfa Road, Xinbei District, Changzhou, 213031, Jiangsu
Changzhou, China

Test Report issued under the responsibility of:

eurofins

TEST REPORT
IEC 60598-2-20
Luminaires
Part 2: Particular requirements
Section 20: Lighting Chains

Report Number. .....:	EFSH16060677-IE-03-L01-A1
Date of issue .....:	2016-06-29 Amendment 1: 2017-08-14
Total number of pages.....	24 pages (include 2 pages of photos)
Name of Testing Laboratory preparing the Report.....:	Eurofins Product Testing Service (Shanghai) Co., Ltd. No. 395 West Jiangchang Road, Jing'an District, Shanghai, China
Applicant's name.....:	
Address .....:	
Test specification:	
Standard .....:	☐ IEC 60598-2-20:2014 (Fourth Edition) used in conjunction with IEC 60598-1:2014 (Eighth Edition) ☒ EN 60598-2-20:2015 used in conjunction with EN 60598-1:2015 BS EN 60598-2-20:2015 used in conjunction with BS EN 60598-1:2015
Test procedure .....:	BS/CE_LVD
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC60598_2_20E
Test Report Form(s) Originator.....:	Intertek Semko AB
Master TRF.....:	2015-06

General disclaimer:

The test results presented in this report relate only to the object tested.
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Test item description ..... :	Lighting Chain
Trade Mark ..... :	Tiantian
Manufacturer ..... :	Same as the applicant
Model/Type reference ..... :	TTDL-IP-!@@@@L##DC**$$$%-&, TTDL-IP-!@@@@L##AC**$$$%-&, TTDL-IP-!@@@@LXDCY$$$%-&, TTDL-IP-!@@@@LXACY$$$%-& "IP" mean the IP degree of lighting chain, it can be blank(IP20),IP(IP44), "!"mean the shape of lighting chain, it can be blank(Normal),D(Decoration),C(curtain), N(Net), B(Icicle), "@@@@"means the quantity of LED, from 0001(1 LED) to 1880(1880 LED), "##" means the supply voltage of led lighting chain, from 05 (5V) to 36 (36V), step by 0,1, "X"means the supply voltage of LED lighting chain, from 5V to 36V ,0,1V for each step, "DC" means the supply voltage is DC,"AC" means the supply voltage is AC, "**" means the current of each group, from 0,1 (0,1mA) to 20 (20mA), step by 0,1, "Y" means the current of each group, from 0,1(0,1mA) to 20(20mA), 0,1mA for each step, "$$$" quantity of parallel connected, from 001to 188 "%" means the colour of LED, it can be R(Red), O(Orange), Y(Yellow), B(Blue), G(Green), PI(Pink),CW(Cool white),W(White), WW(Warm White),PG(Pure Green),PU(Purple),WG(Warm Gold) and M(multi), "&" can be blank(without controller),C(with controller),P(with can be connected),CP(with controller and can be connected). About the lightingchain which can be connected, the minimum power of each LED bulbs is 0,006W(3V*0,002A), max quantity of LED=the rating power of the transformer/0,006.
Ratings ..... :	5-36V DC for TTDL-IP-!@@@@LXDCY$$$%-& and TTDL-IP-!@@@@L##DC**$$$%-&, 5-36V AC for TTDL-IP-!@@@@LXACY$$$%-& and TTDL-IP-!@@@@L##AC**$$$%-&, Max.36W for TTDL-IP-!@@@@LXDCY$$$%-& and TTDL-IP-!@@@@L##DC**$$$%-&, Max.12W for TTDL-IP-!@@@@LXACY$$$%-& and TTDL-IP-!@@@@L##AC**$$$%-&.

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**Testing Laboratory:**	Eurofins Product Testing Service (Shanghai) Co., Ltd	
Testing location/ address.....:		No. 395 West Jiangchang Road, Jing'an District, Shanghai, China	
☐	**Associated CB Testing Laboratory:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:		Tony Ni Project Engineer	
Approved by (name, function, signature)...:		Jerry Hu Manager	
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address.....:			
Tested by (name + signature).....:			
Witnessed by (name, function, signature) .:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Witnessed by (name, function, signature) .:			
Approved by (name, function, signature)...:			
Supervised by (name, function, signature) :			

List of Attachments (including a total number of pages in each attachment):

Photos: (4 pages)

Summary of testing:

The products covered by this report have been tested and complies with the applicable requirements of this standard.

Tests performed (name of test and test clause):

☐ Clause 20.3 (0) GENERAL TEST REQUIREMENTS

☐ Clause 20.5 (2) CLASSIFICATION

☐ Clause 20.6 (3) MARKING

☒ Clause 20.7 (4) CONSTRUCTION

☐ Clause 20.8 (11) CREEPAGE DISTANCES AND CLEARANCES

☐ Clause 20.10 (14) SCREW TERMINALS

☐ Clause 20.10 (15) SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS

☐ Clause 20.11 (5) EXTERNAL AND INTERNAL WIRING

☐ Clause 20.12 (8) PROTECTION AGAINST ELECTRIC SHOCK

☒ Clause 20.13 (12) ENDURANCE TEST AND THERMAL TEST

☐ Clause 20.14 (9) RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE

☐ Clause 20.15 (10) INSULATION RESISTANCE AND ELECTRIC STRENGTH

☐ Clause 20.16 (13) RESISTANCE TO HEAT, FIRE AND TRACKING

Testing location:

Eurofins Product Testing Service (Shanghai) Co., Ltd.
No. 395 West Jiangchang Road, Jing'an District, Shanghai, China

Summary of compliance with National Differences:

List of countries addressed

Group Difference.

☒ **The product fulfils the requirements of EN 60598-2-20:2015 (Third edition) used in conjunction with EN 60598-1:2015 (Eighth Edition) and BS EN 60598-2-20:2015 used in conjunction with BS EN 60598-1:2015.**

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

(typical)

Model: TTDL-IP-0096L36DC20008WW-P

36Vdc, 36W

LED Lamp : 3,2V/ 20mA

Serial Number: xxxx-xxxx
Imported by:
(Name: xxxx)
(Address: xxxx)

1. Do not connect this chain electrically to another chain.
2. The lamps are not replaceable.
3. Do not connect the chain to the supply while it is in the packing unless the packing has been adapted for display purposes

On the packing

1. Do not connect the chain to the supply while it is in the packing unless the packing has been adapted for display purposes
2. The lamps are not replaceable

Test item particulars.....:	Lighting Chain for indoor and outdoor use
Classification of installation and use.....:	Class III, IP44 or IP20
Supply Connection.....:	Recognized adaptor
.....:	
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	2017-07-28
Date (s) of performance of tests.....:	2017-07-28 to 2017-08-10

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☒ comma / ☐ point is used as the decimal separator.
Determination of the test results includes consideration of measurement uncertainty from the test equipment and methods.

EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES for EN60598-2-20:2015 used in conjunction with EN60598-1:2015; see Attachment I

The related applicable CTL& OSM have been considered and fulfilled.
Clause numbers between brackets refer to clauses in IEC 60598-1.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☐ **Yes** ☒ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) .....: Same as the applicant

General product information:

The products covered in this report are LED lighting chain for indoor and outdoor use and supplied by approved adaptor listed in component list.

The rated current of the product does not exceed 2A.

Models TTDL-IP-0096L36DC20008WW-P(under the Max. power 36W) and TTDL-IP-0096L36AC20008WW-P(under the Max. power 12W) are selected to for all tests.

Amendment 1:

The original test report ref. No. EFSH16060677-IE-03-L01 dated on 2016-06-29 was amended on 2017-08-14 to include the following changes and/or additions:

1. Add 2 new product series TTDL-IP-!@@@@LXDCY$$$%-& and TTDL-IP-!@@@@LXACY$$$%-&,the new product series and previous product series have same construction and electrical parameters, except for the new products have a connector at the end of the chain.

After review, the new products' construction comply with the requirement, 20.13 (12) endurance test and thermal test have been evaluated and the result is pass.

This report should be used in conjunction with the original report No. EFSH16060677-IE-03-L01.

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict
20.7 (4)	**CONSTRUCTION**		P
20.7 (4.2)	Components replaceable without difficulty		N/A
20.7 (4.3)	Wireways smooth and free from sharp edges		P
20.7 (4.4)	**Lampholders**		**N/A**
20.7 (4.4.1)	Integral lampholder		N/A
20.7 (4.4.2)	Wiring connection		N/A
20.7 (4.4.3)	Lampholder for end-to-end mounting		N/A
20.7 (4.4.4)	Positioning		N/A
	- pressure test (N) ..... :		—
	After test the lampholder comply with relevant standard sheets and show no damage		N/A
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		N/A
	- bending test (N) ..... :		—
	After test the lampholder have not moved from its position and show no permanent deformation		N/A
20.7 (4.4.5)	Peak pulse voltage		N/A
20.7 (4.4.6)	Centre contact		N/A
20.7 (4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
20.7 (4.4.8)	Lamp connectors		N/A
20.7 (4.4.9)	Caps and bases correctly used		N/A
20.7 (4.4.10)	Light source for lampholder or connection according IEC 60061 not connected another way		N/A
20.7 (4.5)	**Starter holders**		N/A
	Starter holder in luminaires other than class II		N/A
	Starter holder class II construction		N/A
20.7 (4.6)	**Terminal blocks**		N/A
	Tails		N/A
	Unsecured blocks		N/A
20.7 (4.7)	**Terminals and supply connections**		**P**
20.7 (4.7.1)	Contact to metal parts		N/A
20.7 (4.7.2)	Test 8 mm live conductor		N/A
	Test 8 mm earth conductor		N/A
20.7 (4.7.3)	Terminals for supply conductors		N/A

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict
20.7 (4.7.3.1)	Welded method and material		N/A
	- stranded or solid conductor		N/A
	- spot welding		N/A
	- welding between wires		N/A
	- Type Z attachment		N/A
	- mechanical test according to 15.6.2		N/A
	- electrical test according to 15.6.3		N/A
	- heat test according to 15.6.2.3 and 15.6.2.4		N/A
20.7 (4.7.4)	Terminals other than supply connection		P
20.7 (4.7.5)	Heat-resistant wiring/sleeves		N/A
20.7 (4.7.6)	Multi-pole plug		N/A
	- test at 30 N		N/A
20.7 (4.8)	**Switches**		N/A
	- adequate rating		N/A
	- adequate fixing		N/A
	- polarized supply		N/A
	- compliance with IEC 61058-1 for electronic switches		N/A
20.7 (4.9)	**Insulating lining and sleeves**		P
20.7 (4.9.1)	Retainment		P
	Method of fixing ..... :	Heating shrinkable tube	P
20.7 (4.9.2)	Insulated linings and sleeves:		P
	Resistant to a temperature > 20 °C to the wire temperature or		P
	a) & c) Insulation resistance and electric strength		P
	b) Ageing test. Temperature (°C) ..... :	63°C	P
20.7 (4.10)	**Double or reinforced insulation**		N/A
20.7 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		N/A
	Safe installation fixed luminaires		N/A
	Capacitors and switches		N/A
	Interference suppression capacitors according to IEC 60384-14		N/A
20.7 (4.10.2)	Assembly gaps:		N/A

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict
	- not coincidental		N/A
	- no straight access with test probe		N/A
20.7 (4.10.3)	Retainment of insulation:		N/A
	- fixed		N/A
	- unable to be replaced; luminaire inoperative		N/A
	- sleeves retained in position		N/A
	- lining in lampholder		N/A
20.7 (4.11)	**Electrical connections and current-carrying parts**		**P**
20.7 (4.11.1)	Contact pressure		P
20.7 (4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
20.7 (4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A
20.7 (4.11.4)	Material of current-carrying parts		P
20.7 (4.11.5)	No contact to wood or mounting surface		P
20.7 (4.11.6)	Electro-mechanical contact systems		N/A
20.7 (4.12)	**Screws and connections (mechanical) and glands**		N/A
20.7 (4.12.1)	Screws not made of soft metal		N/A
	Screws of insulating material		N/A
	Torque test: torque (Nm); part..... :		N/A
	Torque test: torque (Nm); part..... :		N/A
	Torque test: torque (Nm); part..... :		N/A
20.7 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
20.7 (4.12.4)	Locked connections:		N/A
	- fixed arms; torque (Nm) ..... :		N/A
	- lampholder; torque (Nm) ..... :		N/A

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict
	- push-button switches; torque 0,8 Nm ..... :		N/A
20.7 (4.12.5)	Screwed glands; force (Nm)..... :		N/A
20.7 (4.13)	**Mechanical strength**		**P**
20.7 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm) ..... :		N/A
	- other parts; energy (Nm)..... :	Controller: 0,5Nm	P
	1) live parts		P
	2) linings		P
	3) protection		P
	4) covers		N/A
20.7 (4.13.3)	Straight test finger		P
20.7 (4.13.4)	Rough service luminaires		N/A
	- IP54 or higher		N/A
	a) fixed		N/A
	b) hand-held		N/A
	c) delivered with a stand		N/A
	d) for temporary installations and suitable for mounting on a stand		N/A
20.7 (4.13.6)	Tumbling barrel		N/A
20.7 (4.14)	**Suspensions, fixings and means of adjusting**		N/A
20.7 (4.14.1)	Mechanical load:		N/A
	A) four times the weight		N/A
	B) torque 2,5 Nm		N/A
	C) bracket arm; bending moment (Nm)..... :		N/A
	D) load track-mounted luminaires		N/A
	E) clip-mounted luminaires, glass-shelve. Thickness (mm) ..... :		N/A
	Metal rod. diameter (mm) ..... :		N/A
	Fixed luminaire or independent control gear without fixing devices		N/A
20.7 (4.14.2)	Load to flexible cables		N/A

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict
	Mass (kg) ..... :		—
	Stress in conductors (N/mm²) ..... :		N/A
	Mass (kg) of semi-luminaire ..... :		N/A
	Bending moment (Nm) of semi-luminaire ..... :		N/A
20.7 (4.14.3)	Adjusting devices:		N/A
	- flexing test; number of cycles..... :		N/A
	- strands broken ..... :		N/A
	- electric strength test afterwards		N/A
20.7 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N/A
20.7 (4.14.5)	Guide pulleys		N/A
20.7 (4.14.6)	Strain on socket-outlets		N/A
20.7 (4.15)	**Flammable materials**		**P**
	- glow-wire test 650°C ..... :	See Test Table 20.16 (13.3.2)	P
	- spacing ≥30 mm		N/A
	- screen withstanding test of 13.3.1		N/A
	- screen dimensions		N/A
	- no fiercely burning material		P
	- thermal protection		N/A
	- electronic circuits exempted		N/A
20.7 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		P
	a) construction		P
	b) temperature sensing control		N/A
	c) surface temperature		N/A
20.7 (4.16)	**Luminaires for mounting on normally flammable surfaces**		P
	No lamp control gear ..... :	(compliance with Section 12)	N/A
20.7 (4.16.1)	Lamp control gear spacing:		N/A
	- spacing 35 mm		N/A
	- spacing 10 mm		N/A
20.7 (4.16.2)	Thermal protection:		N/A
	- in lamp control gear		N/A

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict
	- external		N/A
	- fixed position		N/A
	- temperature marked lamp control gear		N/A
20.7 (4.16.3)	Design to satisfy the test of 12.6	(see clause 12.6)	N/A
20.7 (4.17)	**Drain holes**		N/A
	Clearance at least 5 mm		N/A
20.7 (4.18)	**Resistance to corrosion**		N/A
20.7 (4.18.1)	- rust-resistance		N/A
20.7 (4.18.2)	- season cracking in copper		N/A
20.7 (4.18.3)	- corrosion of aluminium		N/A
20.7 (4.19)	Ignitors compatible with ballast		N/A
20.7 (4.20)	Rough service vibration		N/A
20.7 (4.21)	**Protective shield**		N/A
20.7 (4.21.1)	Shield fitted if tungsten halogen lamps or metal halide lamps		N/A
	Shield of glass if tungsten halogen lamps		N/A
20.7 (4.21.2)	Particles from a shattering lamp not impair safety		N/A
20.7 (4.21.3)	No direct path		N/A
20.7 (4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment..... :		N/A
20.7 (4.22)	Attachments to lamps not cause overheating or damage		N/A
20.7 (4.23)	Semi-luminaires comply Class II		N/A
20.7 (4.24)	**Photobiological hazards**		N/A
20.7 (4.24.1)	No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P)		N/A
20.7 (4.24.2)	Retinal blue light hazard		P
	Luminaires with E_{thr} :		P
	a) Fixed luminaires		N/A
	- distance x m, borderline between RG1 and RG2 .. :		N/A

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict
	- marking and instruction according 3.2.23		N/A
	b) Portable and handheld luminaires		P
	- marking according 3.2.23 if RG1 exceeded at 200 mm according to IEC/TR 62778		N/A
	Portable luminaires for children IEC 60598-2-10 and Mains socket outlet nightlights IEC 60598-2-12 not exceed RG1 at 200 mm according to IEC/62778		N/A
20.7 (4.25)	**Mechanical hazard**		**P**
	No sharp point or edges		P
20.7 (4.26)	**Short-circuit protection**		N/A
20.7 (4.26.1)	Adequate means of uninsulated accessible SELV parts		N/A
20.7 (4.26.2)	Short-circuit test with test chain according 4.26.3		N/A
	Test chain not melt through		N/A
	Test sample not exceed values of Table 12.1 and 12.2		N/A
20.7 (4.27)	**Terminal blocks with integrated screwless earthing contacts**		N/A
	Test according Annex V		N/A
	Pull test of terminal fixing (20 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Pull test of mechanical connection (50 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Voltage drop test, resistance < 0,05 Ω		N/A
20.7 (4.28)	**Fixing of thermal sensing control**		N/A
	Not plug-in or easily replaceable type		N/A
	Reliably kept in position		N/A
	No adhesive fixing if UV radiations from a lamp can degrade the fixing		N/A
	Not outside the luminaire enclosure		N/A
	Test of adhesive fixing:		N/A
	Max. temperature on adhesive material (°C) ..... :		—
	100 cycles between t min and t max		N/A
	Temperature sensing control still in position		N/A
20.7 (4.29)	**Luminaires with non-replaceable light source**		N/A
	Not possible to replace light source		N/A

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict
	Live part not accessible after parts have been opened by hand or tools		N/A
20.7 (4.30)	**Luminaires with non-user replaceable light source**		N/A
	If protective cover provide protection against electric shock and marked with “caution, electric shock risk” symbol:		N/A
	Minimum two fixing means		N/A
20.7 (4.31)	**Insulation between circuits**		N/A
	Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3		N/A
	Controllable luminaires requiring same level of insulation for all components, the insulation between control terminals and LV supply fulfil requirements according 4.31.1 – 4.31.3		N/A
20.7 (4.31.1)	SELV circuits		P
	Used SELV source		P
	Voltage ≤ ELV		N/A
	Insulating of SELV circuits from LV supply		N/A
	Insulating of SELV circuits from other non SELV circuits		N/A
	Insulating of SELV circuits from FELV		N/A
	Insulating of SELV circuits from other SELV circuits		N/A
	SELV circuits insulated from accessible parts according Table X.1		N/A
	Plugs not able to enter socket-outlets of other voltage systems		N/A
	Socket outlets does not admit plugs of other voltage systems		N/A
	Plugs and socket-outlets does not have protective conductor contact		N/A
20.7 (4.31.2)	FELV circuits		N/A
	Used FELV source		N/A
	Voltage ≤ ELV		N/A
	Insulating of FELV circuits from LV supply		N/A
	FELV circuits insulated from accessible parts according Table X.1		N/A
	Plugs not able to enter socket-outlets of other voltage systems		N/A

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict
	Socket outlets does not admit plugs of other voltage systems		N/A
	Socket-outlets does not have protective conductor contact		N/A
20.7 (4.31.3)	Other circuits		N/A
	Other circuits insulated from accessible parts according Table X.1		N/A
	Class II construction with equipotential bonding for protection against indirect contacts with live parts:		N/A
	- conductive parts are connected together		N/A
	- test according 7.2.3		N/A
	- conductive part not cause an electric shock in case of an insulation fault		N/A
	- equipotential bonding in master/slave applications		N/A
	- master luminaire provided with terminal for accessible conductive parts of slave luminaires		N/A
	- slave luminaire constructed as class I		N/A
20.7 **(4.32)**	**Overvoltage protective devices**		N/A
	Comply with IEC 61643-11		N/A
	External to controlgear and connected to earth:		N/A
	- only in fixed luminaires		N/A
	- only connected to protective earth		N/A
20.7.2 (-)	**Lampholders**		**N/A**
	Tested as part of the lighting chain if non-standardised lampholders		N/A
	E5, E10, E14 and E27 according IEC 60238		N/A
	Bayonet according IEC 61184		N/A
	Insulating piercing terminals only if SELV circuit or permanent non-rewireable connections in class II chain		N/A
	Maximum voltage used for E5, E10 and small lampholders		N/A
	Body of insulating material		N/A
20.7.3 (-)	**Terminal blocks**		N/A
	Clause 4.6 of IEC 60598-1 referring to terminal blocks does not apply		—
20.7.4 (-)	**Terminals and supply connections**		P

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict
	Comply with Annex A		P
20.7.5 (-)	**Gaskets**		N/A
	Gasket weather resistant if outdoor use		N/A
	Gasket remains in place and fit tightly		N/A
20.7.6 (-)	**Mechanical strength**		**N/A**
	Mechanical strength requirements of 4.13 of part 1 or 15 of IEC 61184		N/A
	Accessories comply with 4.13.6 of part 1		N/A
20.7.7 (-)	**Lamp bridging devices**		N/A
	Protection against electric shock and fire will not be impaired by bridging lamp filaments		N/A
20.7.8 (-)	**Control units**		P
	Forming an integral part enclosed in non-flammable insulating material tested according 20.16		P
	Securely fixed to the cable		P
	Electronic control device comply with IEC 61347-2-11		P
	LED driver comply with IEC 61347-2-13		P
20.7.9 (-)	**Lamp rotation**		**N/A**
	Bulb and lamp cap of push-in lamps will not rotate with a torque of 0,025 Nm		N/A
20.7.10 (-)	**Lamp insertion/withdrawal force**		**N/A**
	Pull force up to 3 N for push-in lamps		N/A
	Push-in force up to 3 N for push-in lamps		N/A
	Pull out force of between 3 N and 10 N for push-in lamps		N/A
20.7.11 (-)	**Lamp mechanical requirements**		**N/A**
	Impact test of 0,2 Nm on lamps of Class II chain:		N/A
	- non-removable lamps		N/A
	- non-standardized lamps		N/A

20.13 (12)	**ENDURANCE TEST AND THERMAL TEST**		P
20.13.1 (-)	If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 20.14		P
20.13 (12.3)	Endurance test:		P
	- mounting-position..... :	Normal Position	—

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict
	- test temperature (°C) ..... :	35°C	—
	- total duration (h) ..... :	240h	—
	- supply voltage: Un factor; calculated voltage (V)... :	1,1X rated voltage	—
	- lamp used..... :	LED	—
20.13 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N/A
	- marking legible		P
	- no cracks, deformation etc.		P
20.13 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
20.13 (12.5)	Thermal test (abnormal operation)	(see Annex 2)	P
20.13 (12.6)	Thermal test (failed lamp control gear condition):		N/A
20.13 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A) ..... :		—
	- case of abnormal conditions ..... :		—
	- electronic lamp control gear		N/A
	- measured winding temperature (°C): at 1,1 Un .... :		—
	- measured mounting surface temperature (°C) at 1,1 Un..... :		N/A
	- calculated mounting surface temperature (°C) ..... :		N/A
	- track-mounted luminaires		N/A
20.13 (12.6.2)	Temperature sensing control		N/A
	- case of abnormal conditions ..... :		—
	- thermal link		N/A
	- manual reset cut-out		N/A
	- auto reset cut-out		N/A
	- measured mounting surface temperature (°C) ..... :		N/A
	- track-mounted luminaires		N/A
20.13 (12.7)	Thermal test (failed lamp control gear in plastic luminaires):		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
20.13 (12.7.1)	Luminaire without temperature sensing control		N/A
20.13 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		N/A
	Test method 12.7.1.1 or Annex W ..... :		—
	Test according to 12.7.1.1:		N/A
	- case of abnormal conditions ..... :		—
	- Ballast failure at supply voltage (V) ..... :		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
	Test according to Annex W:		N/A
	- case of abnormal conditions ..... :		—
	- measured winding temperature (°C): at 1,1 Un ..... :		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un ..... :		—
	- calculated temperature of fixing point/exposed part (°C) ..... :		—
	Ball-pressure test .....:		N/A
20.13 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		N/A
	- case of abnormal conditions ..... :		—
	- measured winding temperature (°C): at 1,1 Un ..... :		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un ..... :		—
	- calculated temperature of fixing point/exposed part (°C) ..... :		—
	Ball-pressure test ..... :		N/A
20.13 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N/A
	- case of abnormal conditions ..... :		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
20.13 (12.7.2)	Luminaire with temperature sensing control		N/A
	- thermal link ..... :	Yes ☐ No ☐	—
	- manual reset cut-out ..... :	Yes ☐ No ☐	—
	- auto reset cut-out ..... :	Yes ☐ No ☐	—

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Clause	Requirement + Test	Result - Remark	Verdict
	- case of abnormal conditions ..... :		—
	- highest measured temperature of fixing point/ exposed part (°C): ..... :		—
	Ball-pressure test: ..... :		N/A
20.13.2 (-)	**Test voltage**		P
	Provision of 12.3.1 d) of part 1 and if class III chain 1,1 x rated voltage of transformer/convertor		—
	Provision of 12.4.1 d) of part 1 and if class III chain 1,06 x rated voltage of transformer/convertor		—
20.13.3 (-)	**Lamp bridging devices**		N/A
	Lamp bridging not cause temperature which impair safety		N/A
	Temperature of lampholders and cables not exceed values in Table 12.1 when bridging device operate successively on each lamp		N/A
20.13.4 (-)	**Short-circuit test of rectifier**		N/A
	No emission of flames or molten material or production of flammable gases and no live parts accessible when short-circuit output of the rectifier		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	**TABLE: Temperature measurements, thermal tests of Section 12**		P
	Type reference ..... :	TTDL-IP-0096L36DC20008WW-P	—
	Lamp used..... :	LED lamp	—
	Lamp control gear used..... :	HJXXYY-G-BD	—
	Mounting position of luminaire ..... :	Normal position	—
	Supply wattage (W) ..... :	40,3W	—
	Supply current (A) ..... :	0,175A	—
	Calculated power factor..... :	N/A	—
	Table: measured temperatures corrected for ta = 25 °C:		P
	- abnormal operating mode ..... :	Short-circuit of the output of the adaptor	—
	- test 1: rated voltage..... :	N/A	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage ..... :	1,06X240=254,4V	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :	N/A	—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage ..... :	1,1X240=264V	—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :	N/A	—

Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Appliance inlet	25	-	32	-	100	-	-
Controller enclosure	25	-	39	-	90	-	-
PCB	25	-	50	-	130	-	-
Internal wire	25	-	46	-	90	-	-
LED lamp support	25	-	44	-	100	-	-
LED lamp surface	25	-	46	-	100	-	-
Mounting surface	25	-	41	-	90	43	130

Supplementary information:

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		P
	Type reference ..... :	TTDL-IP-0096L36AC20008WW-P	—
	Lamp used..... :	LED lamp	—
	Lamp control gear used..... :	JT-EL/FCxVyW-I-IP44	—
	Mounting position of luminaire ..... :	Normal position	—
	Supply wattage (W) ..... :	13,5W	—
	Supply current (A) ..... :	0,058A	—
	Calculated power factor..... :	N/A	—
	Table: measured temperatures corrected for ta = 25 °C:		P
	- abnormal operating mode ..... :	Short-circuit of the output of the adaptor	—
	- test 1: rated voltage..... :	N/A	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage ..... :	1,06X240=254,4V	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :	N/A	—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage ..... :	1,1X240=264V	—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :	N/A	—

Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Appliance inlet	25	-	34	-	100	-	-
Controller enclosure	25	-	54	-	90	-	-
PCB	25	-	60	-	130	-	-
Internal wire	25		74	-	90	-	-
LED lamp support	25	-	47	-	100	-	-
LED lamp surface	25	-	52	-	100	-	-
Mounting surface	25	-	46	-	90	48	130

Photo documentation:

Photo 1.
Overall view of TTDL-IP-0096L36DC20008WW-P

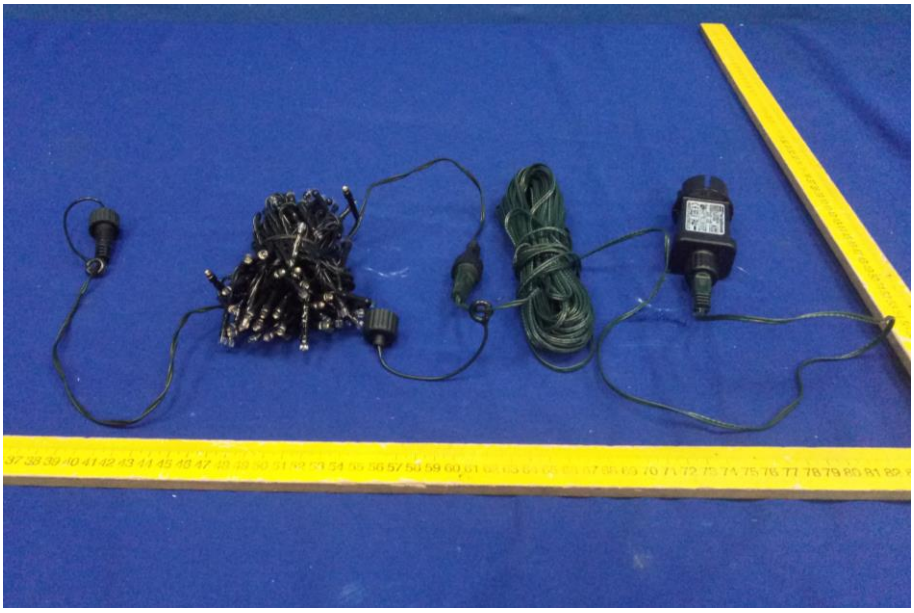


Photo 2.
Partial view of TTDL-IP-0096L36DC20008WW-P

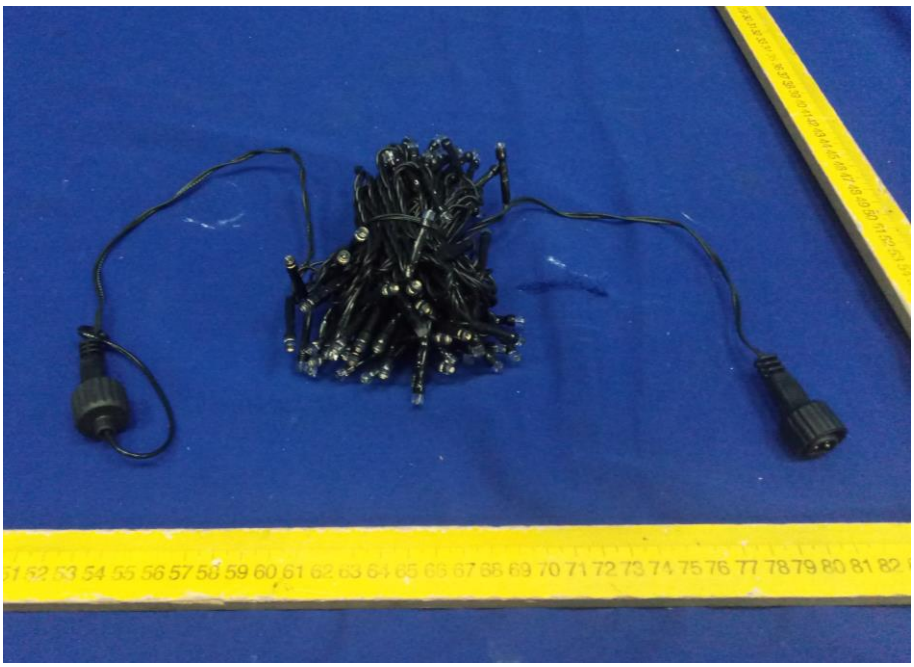


Photo 3.
Partial view of TTDL-IP-0096L36DC20008WW-P

Photo 4.
20m extension lead

**********End of Report**********

Test Report issued under the responsibility of:

DEKRA

TEST REPORT
IEC 61347-2-13
Part 2: Particular requirements:
Section 13 – d.c. or a.c. supplied electronic controlgear for LED modules

Report Number. .....:	6015210.50
Date of issue .....:	2017-09-22
Total number of pages.....	38 (including this page 1)
Name of Testing Laboratory preparing the Report.....:	DEKRA Testing and Certification (Shanghai) Ltd.
Applicant's name.....:	Changzhou Jutai Electronic Co., Ltd.
Address .....:	No. 8 Longfa Road, Xinbei District, Changzhou, 213031, Jiangsu, China
Test specification:	
Standard .....:	IEC 61347-2-13:2014/AMD1:2016 used in conjunction with IEC 61347-1:2015
Test procedure .....:	KEMA-KEUR
Non-standard test method……..:	N/A
Test Report Form No.....:	IEC61347_2_13F
Test Report Form(s) Originator ....:	Intertek Semko AB
Master TRF.....:	2016-10
Test item description..... :	Power Supply (Direct plug-in type)
Trade Mark..... :	CZJUTAI
Manufacturer ..... :	Changzhou Jutai Electronic Co., Ltd. No. 8 Longfa Road, Xinbei District, Changzhou, 213031, Jiangsu, China
Model/Type reference ..... :	JT-DCxVyW-E1, JT-DCxVyW-E1-IP44 x means output voltage, it could be from 1 Vdc to 40 Vdc, 0,1 Vdc for each step; y means output power, it could be from 0,01 W to 7,2 W, 0,01 W for each step
Ratings..... :	Pri.: 220-240 V~; 50-60 Hz / 230-240 V~; 50 Hz / 100-240 V~; 50-60 Hz; Sec.: 1 Vdc to 40 Vdc; 7,2 W max; Independent; SELV; tc = 75 ℃; Class II; IP20/IP44

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**Testing Laboratory:**	DEKRA Testing and Certification (Shanghai) Ltd.	
Testing location/ address ..... :		3/F, #250, Jiangchangsan Road building 16 Headquater Economy Park Shibei Hi-Tech Park, Zhabei District, Shanghai, P.R.C 200436	
Tested by (name, function, signature) ..... :		Li Peng	Peng Li
Approved by (name, function, signature) ..... :		Vicky Zhang	
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address ..... :			
Tested by (name + signature) ..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
Supervised by (name, function, signature) :			

List of Attachments (including a total number of pages in each attachment):

N/A

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
EN 61347-2-13 Clause 7 Marking Clause 8 Protection against accidental contact with live parts Clause 11 Moisture resistance and insulation Clause 12 Electric strength Clause 16 construction Clause 17 Creepage distance and clearances Clause 21 Maximum working voltage (u_{out}) in any load condition EN 61347-1 Annex L.4 Marking Annex L.5 Protection against electric shock Annex L.9 Construction Annex L.11 Creepage distances, clearances and distances through insulation	DEKRA Testing and Certification (Shanghai) Ltd. 3/F, #250, Jiangchangsan Road building 16 Headquater Economy Park Shibei Hi-Tech Park, Zhabei District, Shanghai, P.R.C 200436

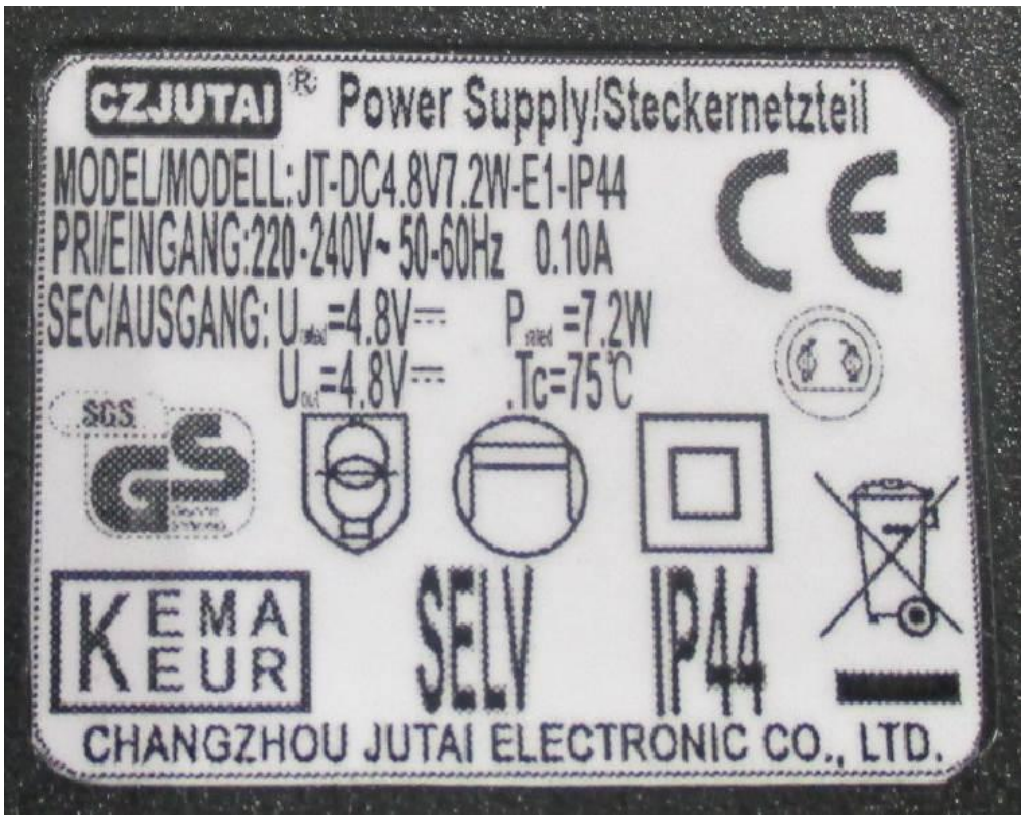
Summary of compliance with National Differences:

List of countries addressed:

☒ **The product fulfils the requirements of EN 61347-1:2015; EN 61347-2-13:2014; EN 62493:2015.**

Copy of marking plate

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



Test item particulars .....:	--
Classification of installation and use.....:	Class II; independent IP20 for indoor use; IP44 for indoor and outdoor use
Supply Connection.....:	Direct plug-in type
.....:	--
Possible test case verdicts:	
- test case does not apply to the test object .....:	N/A
- test object does meet the requirement .....:	P (Pass)
- test object does not meet the requirement .....:	F (Fail)
Testing.....:	--
Date of receipt of test item .....:	2017-09-01
Date (s) of performance of tests .....:	2017-09-01 – 2017-09-08

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☒ comma / ☐ point is used as the decimal separator.

Clause numbers between brackets refer to clauses in IEC 61347-1

EN 61347-1:2015
EN 61347-2-13:2014
EN 62493:2015

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided..... :	☐ **Yes** ☒ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) ..... :	Changzhou Jutai Electronic Co., Ltd. No. 8, Longfa Road, Xinbei district, Changzhou, Jiangsu Province, China

General product information:

The products are plug-in LED driver. JT-DCxVyW-E1 is IP20 series; JT-DCxVyW-E1-IP44 is IP44 series. They share same mechanical and electrical construction except different appearance.

This report is issued basing on SGS CB report NBES170601459401 dated 2017-07-26 and its CB certificate BE-31800 dated 2017-08-02, because the products are all the same.

Additional tests specified in “Summary of testing” were also done on JT-DC4.8V7.2W-E1-IP44.

The products complied with EMF requirement according to EN 62493:2015. Refer to SGS test report SHEM170600384801.

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

4 (4)	**GENERAL REQUIREMENTS**		**P**
- (4)	Insulation materials according requirements in Annex N of IEC 61347-1	(see Annex N)	N/A
- (4)	Compliance of independent controlgear enclosure with IEC 60 598-1		P
- (4)	Built-in electronic controlgear with double or reinforced insulation comply with Annex O of IEC 61347-1	(see Annex O)	N/A
4 (4)	SELV controlgear comply with Annex I of this part 2 and Annex L of IEC 61347-1	(see Annex L)	P
4 (-)	Transformer comply with IEC 61558		P
	Dielectric strength test of insulated winding wires is limited to 3 kV if input voltage ≤ 300 V		P

6 (6)	**CLASSIFICATION**		**P**
	Built-in controlgear ..... :	Yes ☐ No ☒	—
	Independent controlgear ..... :	Yes ☒ No ☐	—
	Integral controlgear ..... :	Yes ☐ No ☒	—
6 (-)	Auto-wound controlgear ..... :	Yes ☐ No ☒	—
	Separating controlgear ..... :	Yes ☐ No ☒	—
	Isolating controlgear ..... :	Yes ☐ No ☒	—
	SELV controlgear ..... :	Yes ☒ No ☐	—

7 (7)	**MARKING**		**P**
7.1 (7.1)	**Mandatory markings**		**P**
	a) mark of origin		P
	b) model number or type reference		P
	c) symbol for independent controlgear, if applicable		P
	d) correlation between interchangeable parts and controlgear marked		N/A
	e) rated supply voltage (V)		P
	supply frequency (Hz)		P
	supply current (A)		P
	f) earthing symbol		N/A
	k) wiring diagram		N/A
	l) value of tc		P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	m) symbol for declared temperature		N/A
	t) LUM earthing symbol		N/A
	u) if not SELV maximum working voltage U_{out} between:		N/A
	- output terminals (V) ..... :		N/A
	- output terminals and earth (V) ..... :		N/A
7.1 (-)	Constant voltage type:	Yes ☒ No ☐	—
	- rated output power P_{rated} (W) ..... :	7,2 W max.	P
	- rated output voltage U_{rated} (V) ..... :	1 Vdc – 40 Vdc for different models	P
	Constant current type:	Yes ☐ No ☒	—
	- rated output power P_{rated} (W) ..... :		N/A
	- rated output current I_{rated} (A) ..... :		N/A
	Indication if for LED modules only		N/A
7.1 (7.2)	Marking durable and legible		P
	Rubbing 15 s water, 15 s petroleum; marking legible		P
7.2 (7.1)	**Information to be provided, if applicable**		**P**
	h) declaration of protection against accidental contact		P
	i) cross-section of conductors (mm²)		N/A
	j) number, type and wattage of lamp(s)		N/A
	s) SELV symbol		P
7.2 (-)	- declaration of mains connected windings		N/A

8 (10)	**PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS**		**P**
- (10.1)	Controlgear protected against accidental contact with live parts		P
- (A2)	Voltage measured with 50 kΩ	(see Annex A)	P
- (A3)	Voltage > 35 V peak or > 60 V d.c. or protective impendance device	(see Annex A)	N/A
- (10.1)	Lacquer or enamel not used for protection or insulation		P
	Adequate mechanical strength on parts providing protection		P
- (10.2)	Capacitors > 0,5 μF: voltage after 1 min (V): < 50 V .....:	0 V	P
- (10.3)	**Controlgear providing SELV**		**P**

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Accessible conductive parts are insulated from live parts by double or reinforced insulation in SELV controlgear		P
	No connection between output circuit and the body or protective earthing circuit		P
	No possibility of connection between output circuit and the body or protective earthing circuit through other conductive parts		P
	SELV outputs separated by at least basic insulation		P
	ELV conductive parts insulated as live parts		N/A
	Tests according Annex L of IEC 61347-1	(see Annex L)	P
- (10.4)	**Accessible conductive parts in SELV circuits**		**P**
	Output voltage under load ≤ 25 V r.m.s. or ≤ 60 V d.c.		P
	If output voltage > 25 V r.m.s. or > 60 V d.c.; No load output ≤ 35 V peak or ≤ 60 V d.c and touch current does not exceed 0,7 mA (peak) or 2 mA d.c. .....:		N/A
	One conductive part is insulated if output voltage or current exceeding the values above and withstand test voltage 500 V		N/A
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		P
	Y1 or Y2 capacitors comply with IEC 60384-14		P
	Resistors comply with test (a) in 14.1 of IEC 60065		N/A
11 (11)	**MOISTURE RESISTANCE AND INSULATION**		**P**
- (11)	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance:		P
	For basic insulation ≥ 2 MΩ ..... :		N/A
	For double or reinforced insulation ≥ 4 MΩ ..... :	> 200 MΩ	P
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		P
12 (12)	**ELECTRIC STRENGTH**		**P**
- (12)	Immediately after clause 11 electric strength test for 1 min		P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Basic insulation for SELV, test voltage 500 V		P
	Working voltage ≤ 50 V, test voltage 500 V		N/A
	Working voltage > 50 V ≤ 1000 V, test voltage (V):		P
	Basic insulation, 2U + 1000 V		N/A
	Supplementary insulation, 2U + 1000 V		N/A
	Double or reinforced insulation, 4U + 2000 V		P
	No flashover or breakdown		P
	Solid or thin sheet insulation for double or reinforced insulation fulfil the requirements in Annex N in IEC 61347-1		N/A
16 (15)	**CONSTRUCTION**		**P**
- (15.1)	**Wood, cotton, silk, paper and similar fibrous material**		**P**
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P
- (15.2)	**Printed circuits**		**P**
	Printed circuits used as internal connections complies with clause 14		P
- (15.3)	**Plugs and socket-outlets used in SELV or ELV circuits**		**P**
	No dangerous compatibility between output socket-outlet and a plug for socket-outlets for input circuit in relation to installation rules, voltages and frequencies		P
	Plugs and socket-outlets for SELV comply with IEC 60906-3 and IEC 60884-2-4		N/A
	Plugs and socket-outlets for SELV ≤ 3 A, ≤ 25 V r.m.s. or ≤ 60 V d.c. and ≤ 72 W comply with IEC 60906-3 and IEC 60884-2-4 or:		N/A
	- plugs not able to enter socket-outlets of other standardised system		N/A
	- socket-outlets not admit plugs of other standardised system		P
	- socket-outlets without protective earth		P
- (15.4)	**Insulation between circuits and accessible parts**		**P**
- (15.4.2)	SELV circuits		P
	Source used to supply SELV circuits:		P
	- safety isolating transformer in accordance with relevant part 2 of IEC 61558		N/A

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	- controlgear providing SELV in accordance with relevant part 2 of IEC 61347		P
	- another source		N/A
	Voltage in the circuit not higher than ELV		N/A
	SELV circuits insulated from LV by double or reinforced insulation		P
	SELV circuits insulated from non SELV circuits by double or reinforced insulation		N/A
	SELV circuits insulated from FELV circuits by supplementary insulation		N/A
	SELV circuits insulated from other SELV circuits by basic insulation		N/A
	SELV circuits insulated from accessible conductive parts according Table 6 in 15.4.5		N/A
- (15.4.3)	FELV circuits		N/A
	Source used to supply FELV circuits:		N/A
	- separating transformer in accordance with relevant part 2 of IEC 61558		N/A
	- separating controlgear providing basic insulation between input and output circuits in accordance with relevant part 2 of IEC 61347		N/A
	- another source		N/A
	- source in circuits separated by the LV supply by basic insulation		N/A
	Voltage in the circuit not higher than ELV		N/A
	FELV circuits insulated from LV supply by at least basic insulation		N/A
	FELV circuits insulated from other FELV circuits if functional purpose		N/A
	FELV circuits insulated from accessible conductive parts according Table 6 in 15.4.5		N/A
	Plugs and socket-outlets for FELV system comply with:		N/A
	- plugs not able to enter socket-outlets of other voltage systems		N/A
	- socket-outlets not admit plugs of other voltage systems		N/A
	- socket-outlets have a protective conductor contact		N/A
- (15.4.4)	Other circuits		N/A

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Insulation between circuits other than SELV or FELV and accessible conductive parts in according Table 6 in 15.4.5.		N/A
- (15.4.5)	Insulation between circuits and accessible conductive parts		P
	Accessible conductive parts insulated from active parts of electric circuits by insulating according Table 6		P
	Requirements for Class II construction with equipotential bonding for protection against indirect contact with live parts:		N/A
	- all conductive parts are connected together		N/A
	- conductive parts are reliably connected together according test of IEC 60598-1 cl. 7.2.3		N/A
	- conductive parts comply with requirements of Annex A in case of insulation fault		P
17 (16)	**CREEPAGE DISTANCES AND CLEARANCES**		**P**
- (16)	Creepage distances and clearances according to 16.2 and 16.3		P
	Controlgears providing SELV comply with additional requirements in Annex L		P
	Insulating lining of metallic enclosures		N/A
	Controlgear protected against pollution comply with Annex P	(see Annex P)	N/A
- (16.2)	**Creepage distances**		**P**
- (16.2.2)	Minimum creepage distances for working voltages		P
	Creepage distances according to Table 7	(see appended table)	P
- (16.2.3)	Creepage distances for working voltages with frequencies above 30 kHz		N/A
	Creepage distances according to Table 8	(see appended table)	N/A
- (16.3)	**Clearances**		**P**
- (16.3.2)	Clearances for working voltages		P
	Clearances distances according to Table 9	(see appended table)	P
- (16.3.3)	Clearances for ignition voltages and working voltages with higher frequencies		N/A
	Clearances distances for basic or supplementary insulation according to Table 10	(see appended table)	N/A
	Clearances distances for reinforced insulation according to Table 11	(see appended table)	N/A
18 (17)	**SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS**		**P**

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Screws, current-carrying parts and connections in compliance with IEC 60598-1 (clause numbers between parentheses refer to IEC 60598-1)		P
(4.11)	**Electrical connections**		**P**
(4.11.1)	Contact pressure		P
(4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
(4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A
(4.11.4)	Material of current-carrying parts		P
(4.11.5)	No contact to wood or mounting surface		P
(4.11.6)	Electro-mechanical contact systems		N/A
(4.12)	**Mechanical connections and glands**		**N/A**
(4.12.1)	Screws not made of soft metal		N/A
	Screws of insulating material		N/A
	Torque test: torque (Nm); part ..... :		N/A
	Torque test: torque (Nm); part ..... :		N/A
	Torque test: torque (Nm); part ..... :		N/A
(4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
(4.12.4)	Locked connections:		N/A
	- fixed arms; torque (Nm)..... :		N/A
	- lampholder; torque (Nm)..... :		N/A
	- push-button switches; torque 0,8 Nm..... :		N/A
(4.12.5)	Screwed glands; force (Nm) ..... :		N/A

21 (-)	**MAXIMUM WORKING VOLTAGE (U_{out}) IN ANY LOAD CONDITION**		**P**
	Not exceed declared maximum working voltage U_{out} in any load condition	4,33V for model JT-DC4.8V7.2W-E1-IP44	P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

17 (16)	TABLE: clearance and creepage distance measurements (mm)						P
Applicable part of IEC 61347-1 Table 7 – 11*							
Distances	**Insulation type ****	**Measured clearance**	**Required**		**Measured creepage**	**Required**	
			clearance	***Table**		**creepage**	***Table**
Distance 1:	B	3,2	1,5	Table 9	3,2	2,5	Table 7
Working voltage (V) ..... :					240		—
Frequency if applicable (kHz) ..... :					--		—
PTI ..... :					< 600 ☒	≥ 600 ☐	—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) ..... :					--		—
Pulse voltage if applicable (kV) ..... :					--		—
Supplementary information: L to N							
Distance 2:	R	6,5	3,0	Table 9	6,5	5,0	Table 7
Working voltage (V) ..... :					240		—
Frequency if applicable (kHz) ..... :					--		—
PTI ..... :					< 600 ☒	≥ 600 ☐	—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) ..... :					--		—
Pulse voltage if applicable (kV) ..... :					--		—
Supplementary information: live parts – accessible parts							
Distance 3:	R	6,5	3,0	Table 9	6,5	5,0	Table 7
Working voltage (V) ..... :					240		—
Frequency if applicable (kHz) ..... :					--		—
PTI ..... :					< 600 ☒	≥ 600 ☐	—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) ..... :					--		—
Pulse voltage if applicable (kV) ..... :					--		—
Supplementary information: live parts – mounting surface							

** Insulation type: B – Basic; S – Supplementary; R – Reinforced

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

I (L)	**ANNEX I IN THIS PART 2 – PARTICULAR ADDITIONAL REQUIREMENTS FOR SELV D.C. OR A.C. SUPPLIED ELECTRONIC CONTROLGEARS FOR LED MODULES**		**P**
(L.3)	**Classification**		**P**
	Class I	Yes ☐ No ☒	—
	Class II	Yes ☒ No ☐	—
	Class III	Yes ☐ No ☒	—
	non-inherently short circuit proof controlgear	Yes ☒ No ☐	—
	inherently short circuit proof controlgear	Yes ☐ No ☒	—
	fail safe controlgear	Yes ☐ No ☒	—
	non-short-circuit proof controlgear	Yes ☐ No ☒	—
(L.4)	**Marking**		**P**
	Adequate symbols are used		P
(L.5)	**Protection against electric shock**		**P**
	Comply with clause 9.2 of IEC 61558-1		P
(L.6)	**Heating**		**P**
	No excessive temperatures in normal use		P
	Value if capacitor t_c marked .....:	75	—
	Winding insulation classified as Class .....:	Class B	—
	Comply with tests of clause 14 of IEC 61558-1 with adjustments		P
(L.7)	**Short-circuit and overload protection**		**P**
	Comply with tests of clause 15 of IEC 61558-1 with adjustments		P
(L.8)	**Insulation resistance and electric strength**		**P**
(L.8.1)	Conditioned 48 h between 91 % and 95 %		P
(L.8.2)	Insulation resistance		P
	Between input- and output circuits not less than 5 MΩ .....:	>200 MΩ	P
	Between metal parts of class II convertors which are separated from live parts by basic insulation only and the body not less than 5 MΩ .....:		N/A
	Between metal foil in contact with the inner and outer surfaces of enclosures of insulating material not less than 2 MΩ .....:	>200 MΩ	P
(L.8.3)	Electric strength		P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	1) Between live parts of input circuits and live parts of output circuits .....:	3000 V	P
	2) Over basic or supplementary insulation between:		P
	a) live parts having different polarity .....:		N/A
	b) live parts and body if intended to be connected to protective earth .....:		N/A
	c) accessible metal parts and a metal rod of the same diameter as the flexible cable or cord .....:		N/A
	d) live parts and an intermediate metal part .....:		N/A
	e) intermediate metal parts and the body .....:		N/A
	f) each input circuit and all other input circuits ...:		N/A
	3) Over reinforced insulation between the body and live parts .....:	3000 V	P
(L.9)	**Construction**		**P**
(L.9.1)	Transformer comply with 19.12 of IEC 61558-1 and 19 of IEC 61558-2-6		N/A
	HF transformer comply with 19 of IEC 61558-2-16		P
(L.10)	**Components**		**P**
	Protective devices comply with 20.6 – 20.11 of IEC 61558-1		P
(L.11)	**Creepage distances, clearances and distances through insulation**		**P**
	Creepage distances and clearances not less than in Clause 16		P
	Distance through insulation according Table L.5 in IEC 61347-1		P
	1) Basic distance through insulation		N/A
	Required distance (mm) .....:		—
	Measured (mm) .....:		N/A
	Supplementary information		—
	2) Supplementary distance through insulation		P
	Required distance (mm) .....:	0,13	—
	Measured (mm) .....:	0,15	P
	Supplementary information	Three layers insulation tape	—
	3) Reinforced distance through insulation		P
	Required distance (mm) .....:	0,83	—
	Measured (mm) .....:	1,5	P
	Supplementary information	Enclosure	—

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 1	TABLE: Critical components information	P

Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
EU plug (IP20)	C	Changzhou Jutai Electronic Co., Ltd.	JT-DCxVyW-E1-EU	250 V; 2,5 A; IP20; Pin: copper alloy	EN 50075	SGS report: NBES170601459401
EU plug (IP44)	C	Changzhou Jutai Electronic Co., Ltd.	JT-DCxVyW-E1-IP44-EU	250 V; 16 A; IP20/IP44; Pin: copper alloy	IEC/EN 60884-1 VDE 0620-1	SGS report: NBES170601459401
Fuse resistor	C	Changzhou Southern Electronic Element Factory Co., Ltd.	RXF	10 ohm; 0,5 or 1 W	EN 61347-2-13	Tested in appliance
Fuse resistor (Alternative)	C	Wujiang Lianyi Electronics Co., Ltd.	FRN	10 ohm; 0,5 W or 1 W	EN 61347-2-13	Tested in appliance
Fuse resistor (Alternative)	C	Dongguan Hongda Electronic Technology Co., Ltd.	RXF	10 ohm; 0,5 W or 1 W	EN 61347-2-13	Tested in appliance
Fuse resistor (Alternative)	C	Shenzhen Great Electronics Co., Ltd.	RXF	10 ohm; 0,5 W or 1 W	EN 61347-2-13	Tested in appliance
Fuse	B	Changzhou China-lay Electronics Co., Ltd.	32T	250 V; 1 A or 2 A	EN 60127-1 EN 60127-3	VDE 40022201
Fuse (Alternative)	B	Changzhou China-lay Electronics Co., Ltd.	32F	250 V; 1 A or 2 A	EN 60127-1 EN 60127-3	VDE 40021677
Fuse (Alternative)	B	Sunny East Enterprise Co., Ltd.	TDP-series	250 V; 1 A or 2 A	EN 60127-1 EN 60127-3	VDE 40024676
Fuse (Alternative)	B	Sunny East Enterprise Co., Ltd.	CFD-series	250 V; 1 A or 2 A	EN 60127-1 EN 60127-3	VDE 40030246

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
Fuse (Alternative)	B	Honghu Bluelight Electronic Co., Ltd.	L3T	250 V; 1 A or 2 A	EN 60127-1 EN 60127-3	VDE 40026874
Y1 capacitor (CY1)	B	Xiamen Wanming Electronics Co., Ltd.	HJ	Y1; 220 pF; 470 pF; 1000 pF; 1500 pF; 2200 pF; 250/400 V; 40/125/21/C	IEC 60384-14	VDE 40034438
Y1 capacitor (CY1 Alternative)	B	JYA-NAY Co., Ltd.	JN	Y1; 220 pF; 470 pF; 1000 pF; 1500 pF; 2200 pF; 250/400 V; 40/125/21/C	IEC 60384-14	TUV Rheinland R50232059
Y1 capacitor (CY1 Alternative)	B	Santou High-new Technology Dev. Zone Songtian Enterprise Co., Ltd.	CD-series	Y1; 220 pF; 470 pF; 1000 pF; 1500 pF; 2200 pF; 250/400 V; 40/125/21/C	IEC 60384-14	VDE 40025754
Y1 capacitor (CY1 Alternative)	B	Guangzhou Yea Electronic Technology Co., LTd.	AR series	Y1; 220 pF; 470 pF; 1000 pF; 1500 pF; 2200 pF; 250/400 V; 40/125/21/B	IEC 60384-14	VDE 40023519
Y1 capacitor (CY1 Alternative)	B	Hsuan Tai Electronic Co., Ltd.	CY	Y1; 220 pF; 470 pF; 1000 pF; 1500 pF; 2200 pF; 400 V; 40/125/21/C	IEC 60384-14	VDE 4008912
Y1 capacitor (CY1 Alternative)	B	Anshan Keifat Electronic Cermic Technical Co., Ltd.	CT-7	Y1; 220 pF; 470 pF; 1000 pF; 1500 pF; 2200 pF; 400 V; 40/125/21/C	IEC 60384-14	VDE 40036847
Y1 capacitor (CY1 Alternative)	B	JYH HSU Electronics Ltd	JD	Y1; 220 pF; 470 pF; 1000 pF; 1500 pF; 2200 pF; 250/400 V; 40/125/21/B	IEC 60384-14	VDE 40038642

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
Internal wire (sec.)	C	Zhongshan City Senbao Electronic Co., Ltd.	1007	24 - 20 AWG; T80; 300 V	EN 61347-2-13	Tested in appliance
Internal wire (sec.) (alternative)	C	Yueqing City Kedaja Telecomminication Cable Co., Ltd.	1007	24 - 20 AWG; T80; 300 V	EN 61347-2-13	Tested in appliance
Internal wire (sec.) (alternative)	C	Dongguan Licheng Electronics Co., Ltd.	1007	24 - 20 AWG; T80; 300 V	EN 61347-2-13	Tested in appliance
Internal wire (sec.) (alternative)	C	Shenzhen Donglu Wire & Cable Co., Ltd.	1007	24 - 20 AWG; T80; 300 V	EN 61347-2-13	Tested in appliance
Internal wire (sec.) (alternative)	C	Changzhou Guosheng Vehicle Accessory Co., Ltd.	1007	24 - 20 AWG; T80; 300 V	EN 61347-2-13	Tested in appliance
Internal wire (sec.) (alternative)	C	Zhuang Shan Chuan Electrical Products (Kunshan) Co., Ltd.	1007	24 - 20 AWG; T80; 300 V	EN 61347-2-13	Tested in appliance
Internal wire (sec.) (alternative)	C	Taizhou Zhongxin Wire Co., Ltd.	1007	24 - 20 AWG; T80; 300 V	EN 61347-2-13	Tested in appliance
Internal wire (sec.) (alternative)	C	Kunshan Hwatek Wires and Cable Co., Ltd.	1007	24 - 20 AWG; T80; 300 V	EN 61347-2-13	Tested in appliance
Internal wire (sec.) (alternative)	C	Kunshan XinHongmeng Electronic Co., Ltd.	1007	24 - 20 AWG; T80; 300 V	EN 61347-2-13	Tested in appliance
Internal wire (sec.) (alternative)	C	Dongguan Kingsingnal Electronics Co., Ltd.	1007	24 - 20 AWG; T80; 300 V	EN 61347-2-13	Tested in appliance

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
Internal wire (sec.) (alternative)	C	Changzhou Feiyang Cable & Wire Co., Ltd.	1007	24 - 20 AWG; T80; 300 V	EN 61347-2-13	Tested in appliance
Internal wire (sec.) (alternative)	C	Shanghai Qiaopu Cable & Wire Co., Ltd.	1007	24 - 20 AWG; T80; 300 V	EN 61347-2-13	Tested in appliance
Internal wire (sec.) (alternative)	C	Danyang Winpower Wire & Cable MFG Co., Ltd.	1007	24 - 20 AWG; T80; 300 V	EN 61347-2-13	Tested in appliance
Internal wire (sec.) (alternative)	C	Leader Electronics INC	1007	24 - 20 AWG; T80; 300 V	EN 61347-2-13	Tested in appliance
Internal wire (sec.) (alternative)	C	Suzhou Jinhaoyu Wire & Cable Co., Ltd.	1007	24 - 20 AWG; T80; 300 V	EN 61347-2-13	Tested in appliance
Internal wire (sec.) (alternative)	C	Changzhou Zhuoshe Electronics Co., Ltd.	1007	24 - 20 AWG; T80; 300 V	EN 61347-2-13	Tested in appliance
Internal wiring (sec.) (alternative)	C	Changzhou City Conhis Electronic Cable factory	1007	24-20AWG; 300V; 80 ℃	EN 61347-2-13	Tested with appliance
PCB	C	Changzhou Shuangjin Electronic Co., Ltd.	CCEM-1 CFR-1	T130; V-0	EN 61347-2-13	Tested in appliance
PCB (Alternative)	C	Changzhou Shengwei Telecommunication Equipment Factory	SW-1	T130; V-0	EN 61347-2-13	Tested in appliance
PCB (Alternative)	C	Changzhou Kelong Electronics Co., Ltd.	JC-1 JC-2 JC-3	T130; V-0	EN 61347-2-13	Tested in appliance
PCB (Alternative)	C	Changzhou City Yuxun Electronics Co., LTd.	YX-1 YX-2	T130; V-0	EN 61347-2-13	Tested in appliance

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
PCB (Alternative)	C	Jiangsu Difeida Electronics Co., Ltd.	DFD-1 DFD-2 DFD-3	T130; V-0	EN 61347-2-13	Tested in appliance
PCB (Alternative)	C	Changzhou Wujin Kechuang Electronics Co., Ltd.	KC-1 KC-2 KC-3	T130; V-0	EN 61347-2-13	Tested in appliance
PCB (Alternative)	C	Yuanman Printed Circuit Co., Ltd.	1V0; 4/ 94V-0	T130; V-0 V-0; T105	EN 61347-2-13	Tested in appliance
PCB (Alternative)	C	Changzhou Henglin Radio Factory	HD-2 HD-4	T130; V-0	EN 61347-2-13	Tested in appliance
PCB (Alternative)	C	Zhenjiang Huayin Printed Circuit Board Co., Ltd.	B C C+ 2C+	T130; V-0	EN 61347-2-13	Tested in appliance
PCB (Alternative)	C	Sichuan shenbel circuits technology co., ltd	SH8188	T130; V-0	EN 61347-2-13	Tested in appliance
PCB (Alternative)	C	Leuchtek Electronic(Zhejiang) co., ltd	PFR-1 PCEM-1 PCEM-3	T130; V-0	EN 61347-2-13	Tested in appliance
PCB (Alternative)	C	Shuochuang Electronic Co., Ltd.	SC-01 SC-02	T130; V-0	EN 61347-2-13	Tested in appliance
PCB (Alternative)	C	Changzhou Jitian Electronic Co., Ltd.	GT-10 GT-11	T130; V-0	EN 61347-2-13	Tested in appliance
Transformer	C	Changzhou Jutai Electronic Coi., Ltd.	TRN-x	Class B	EN 61347-2-13	Tested in appliance
Bobbin	C	Chang Chun Chemical (Zhangzhou) Co., Ltd.	T-210LA	V-0; T150	EN 61347-2-13	Tested in appliance
Primary winding	C	Changzhou Dayang Wire & Cable co., ltd.	UEW/130 xUEW/130 QA-x/130	T130	EN 61347-2-13	Tested in appliance

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
Primary winding (Alternative)	C	Wuxi Jufeng Compound Line co., ltd	xUEWB*$ QA-x/130	T130	EN 61347-2-13	Tested in appliance
Primary winding (Alternative)	C	Liaoning Daongang Magnet Wire Co., ltd	MW28 Xuew/ny(AL)/130 Qan(L)-x/130 xUEW/NY/130 QAN-x/130	T130	EN 61347-2-13	Tested in appliance
Insulating tape	C	Suzhou Malladuona Electronic Material Co., Ltd.	JY312#	T130 0,07mm	EN 61347-2-13	Tested in appliance
Insulating tape (alternative)	C	Jingjiang Yahua Pressure Sensitive Glue Co., Ltd.	CT* Yellow(c)(g)	T130 0,07mm	EN 61347-2-13	Tested in appliance
Insulating tape (alternative)	C	3m company electrical markets divd(EMD)	1350-1(b)	T130 0,07mm	EN 61347-2-13	Tested in appliance
Tube	C	Changyuan Electronic Group Co., Ltd.	CB-TT-S	600 V; T200	EN 61347-2-13	Tested in appliance
Tube (alternative)	C	Great Holding Idustrial Co., LTd.	TFT	300 V; T200	EN 61347-2-13	Tested in appliance
Varnish	C	Zhejiang Rongtal Technical Industry Co., Ltd.	R-1146-m	T155	EN 61347-2-13	Tested in appliance
Secondary winding	C	Dah Jin Technology Co., Ltd.	TLW-B(xx)(y)@	Triple insulated; T130	EN 61347-2-13	Tested in appliance
Secondary winding (Alternative)	C	Furukawa Electronic Co.,Ltd	TEX-E	Triple insulated; T130	EN 61347-2-13	Tested in appliance
Secondary winding (Alternative)	C	Shanghai Xiangxiang Electronic Co., Ltd.	TKW-B	Triple insulated; T130	EN 61347-2-13	Tested in appliance

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
Secondary winding (Alternative)	C	Shanghai Lucky Trade Co., Ltd.	TWI-B	Triple insulated; T130	EN 61347-2-13	Tested in appliance
Output cable	C	Zhongshan City Senbao Electronic Co., Ltd.	2468; 1185; 2464	24-20AWG; 300 V; T80	EN 61347-2-13	Tested with appliance
Output cable (alternative)	C	Dongguan Licheng Electronics Co., Ltd.	2468; 1185; 2464	24-20AWG; 300 V; T80	EN 61347-2-13	Tested with appliance
Output cable (alternative)	C	Shenzhen Dongju Wire & Cable Co., Ltd.	2468; 1185; 2464	24-20AWG; 300 V; T80	EN 61347-2-13	Tested with appliance
Output cable (alternative)	C	Zhuangshuanchuan Electrical Products (Kunshan) Co., Ltd.	2468; 1185; 2464	24-20AWG; 300 V; T80	EN 61347-2-13	Tested with appliance
Output cable (alternative)	C	Taizhou Zhongxin Wire Co., Ltd.	2468; 1185; 2464	24-20AWG; 300 V; T80	EN 61347-2-13	Tested with appliance
Output cable (alternative)	C	Kunshan Hwatek wires and cable Co., Ltd.	2468; 1185; 2464	24-20AWG; 300 V; T80	EN 61347-2-13	Tested with appliance
Output cable (alternative)	C	Suzhou Hongmeng Electonic Co., Ltd.	2468; 1185; 2464	24-20AWG; 300 V; T80	EN 61347-2-13	Tested with appliance
Output cable (alternative)	C	Dongguan hannstar Electronics Co., Ltd.	2468; 1185; 2464	24-20AWG; 300 V; T80	EN 61347-2-13	Tested with appliance
Output cable (alternative)	C	Changzhou City Conhis Electronic Cable factory	2468; 1185; 2464	24-20AWG; 300V; T80	EN 61347-2-13	Tested with appliance
Output cable (alternative)	C	Leader Electronics INC	2468	24-20AWG; 300V; T80	EN 61347-2-13	Tested with appliance
Output cable (alternative)	C	Danyang winpower wire & cable MFG Co.,Ltd	2468; 1185; 2464	24-20AWG; 300V; T80	EN 61347-2-13	Tested with appliance

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
Output cable (alternative)	C	Suzhou Jinhaoyu wire &cable Co.,Ltd	2468; 1185; 2464	24-20AWG; 300V; T80	EN 61347-2-13	Tested with appliance
Output cable (alternative)	C	Changzhou Zhuoshe Electonics Co.,Ltd	2468; 1185; 2464	24-20AWG; 300V; T80	EN 61347-2-13	Tested with appliance
Output cable (alternative)	C	Danyang winpower wire & cable MFG Co.,Ltd	2468; 2464	24-20AWG; 300V; T80	EN 61347-2-13	Tested with appliance
Enclosure, plug holder and plug pin holder	C	Sabic Innovative Plastics China Co., Ltd.	PC950(f1)	V-1; Thickness > 1,5 mm	EN 61347-2-13	Tested in appliance

Supplementary information:

[1)] Provided evidence ensures the agreed level of compliance. See OD-CB2039.

The codes above have the following meaning:

A - The component is replaceable with another one, also certified, with equivalent characteristics

B - The component is replaceable if authorised by the test house

C - Integrated component tested together with the appliance

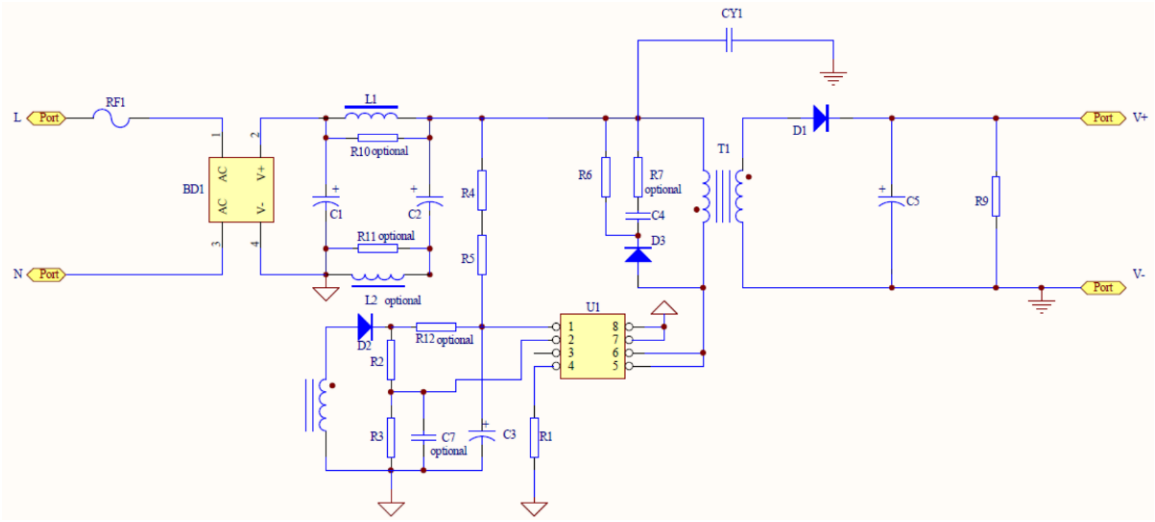
D - Alternative component

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

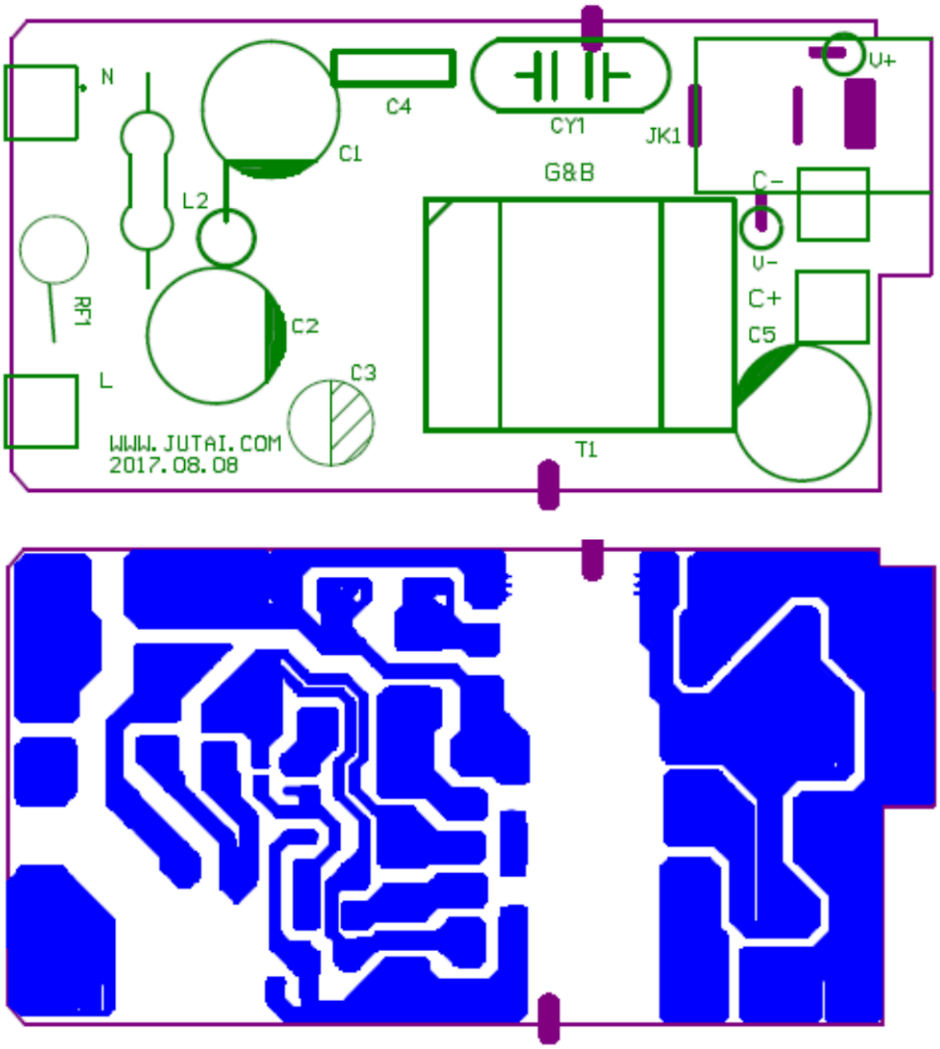
ANNEX 2	**Screw terminals (part of the luminaire)**	**N/A**

ANNEX 3	**Screwless terminals (part of the luminaire)**	**N/A**

Annex circuit diagram and PCB layout:

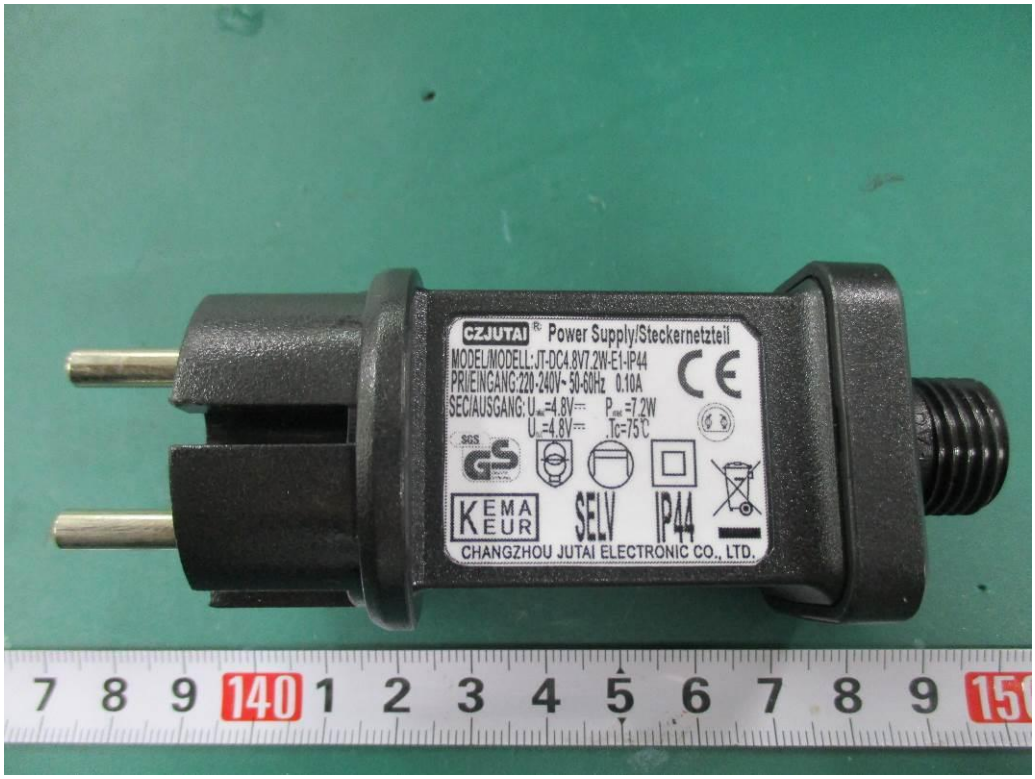


Circuit diagram

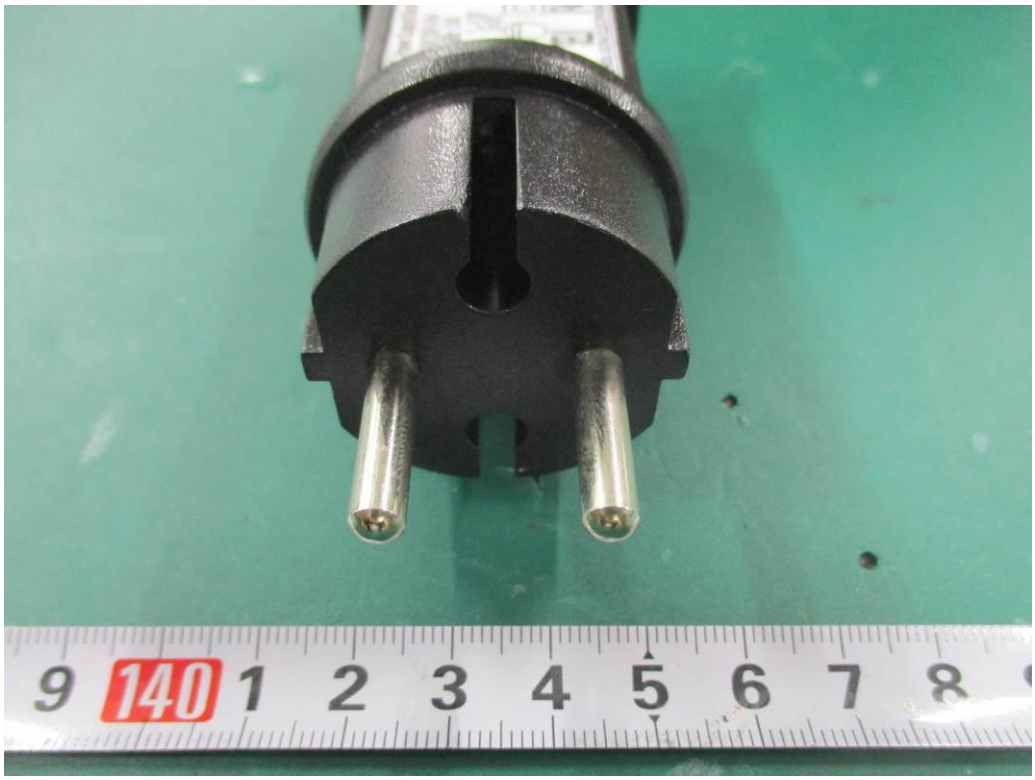


PCB layout

Annex pictures:



Overview(IP20/IP44)



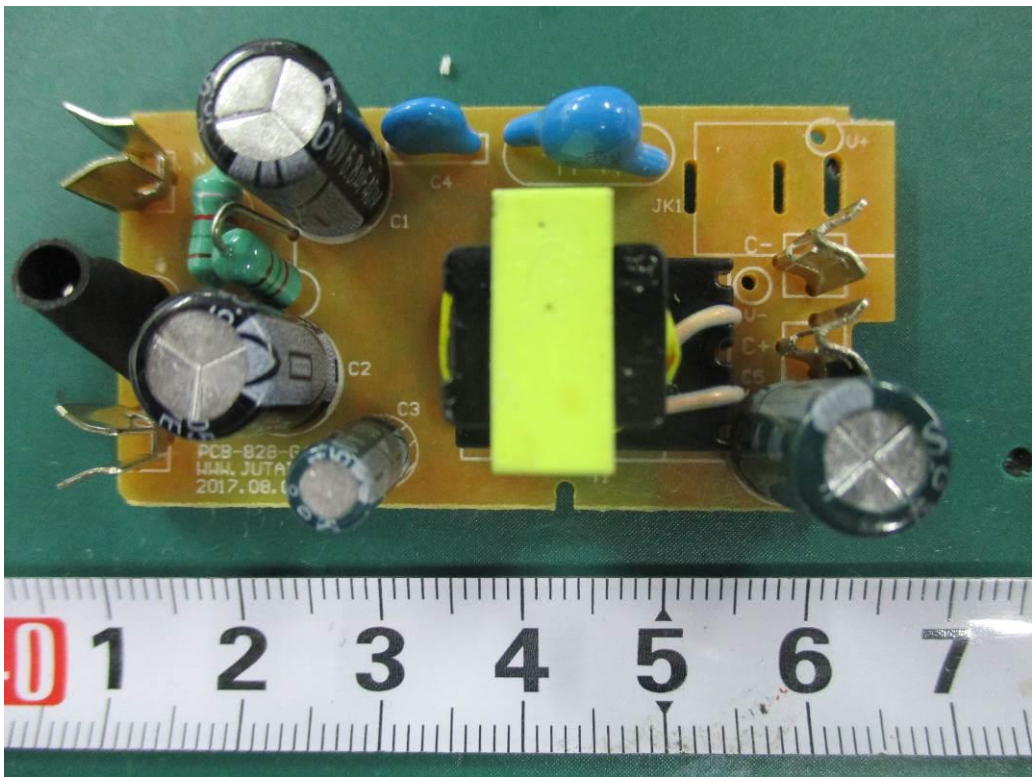
Overview IP44

Annex pictures:

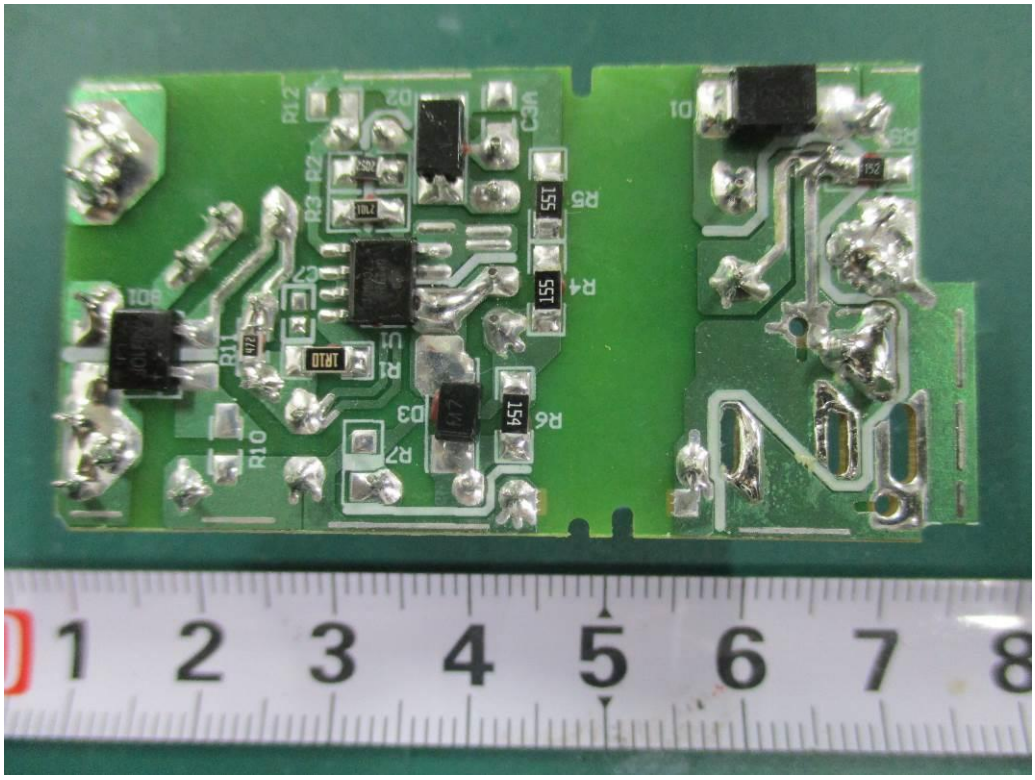
Socket

Internal view

Annex pictures:

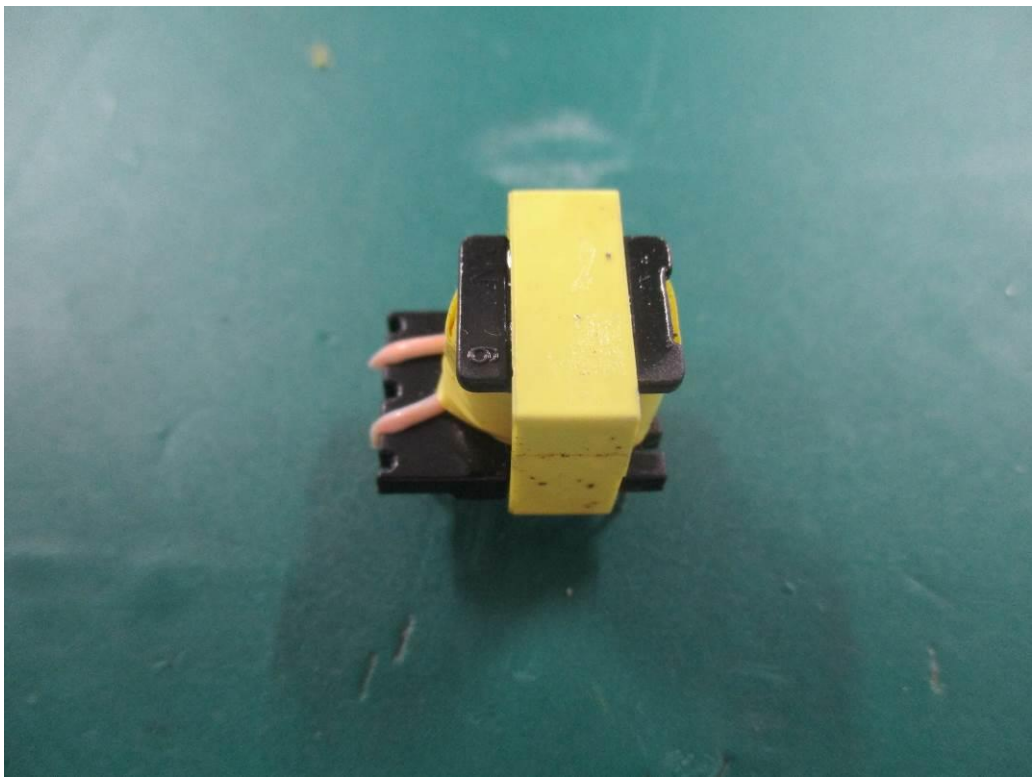


PCB

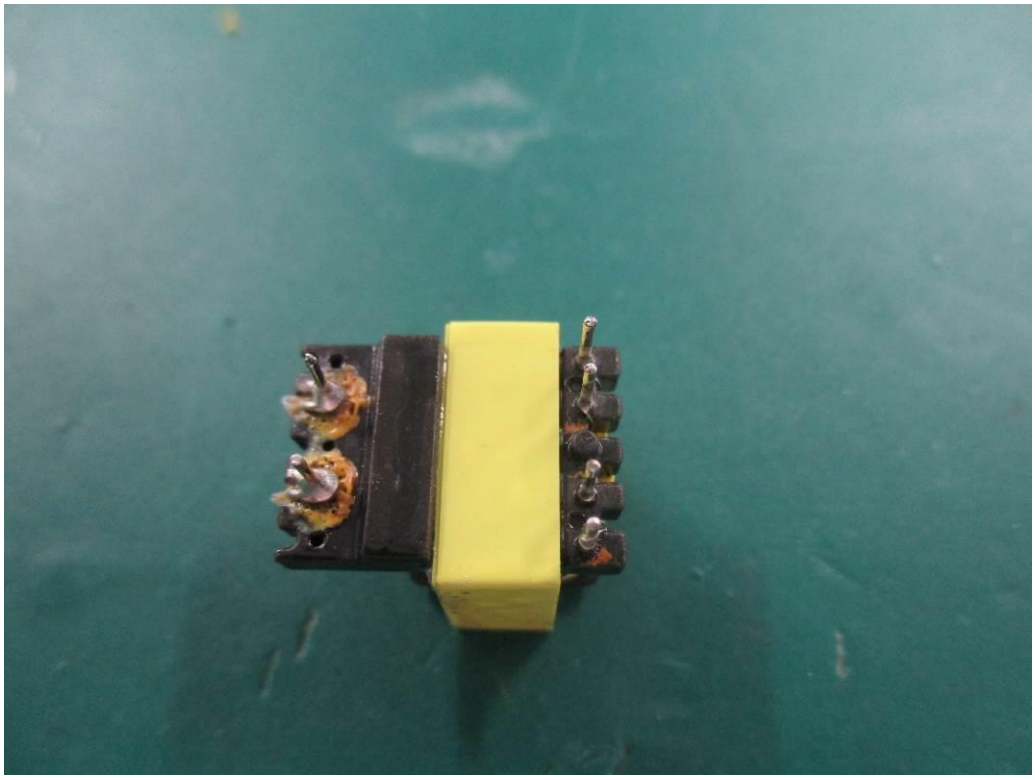


PCB

Annex pictures:

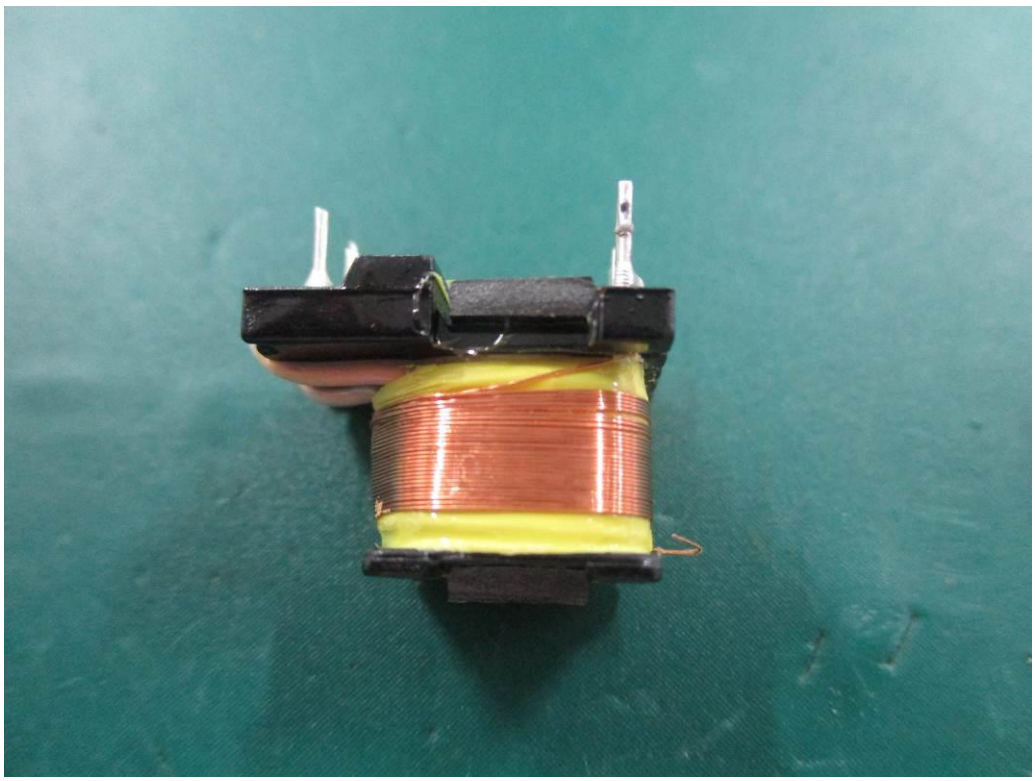


Transformer



Transformer

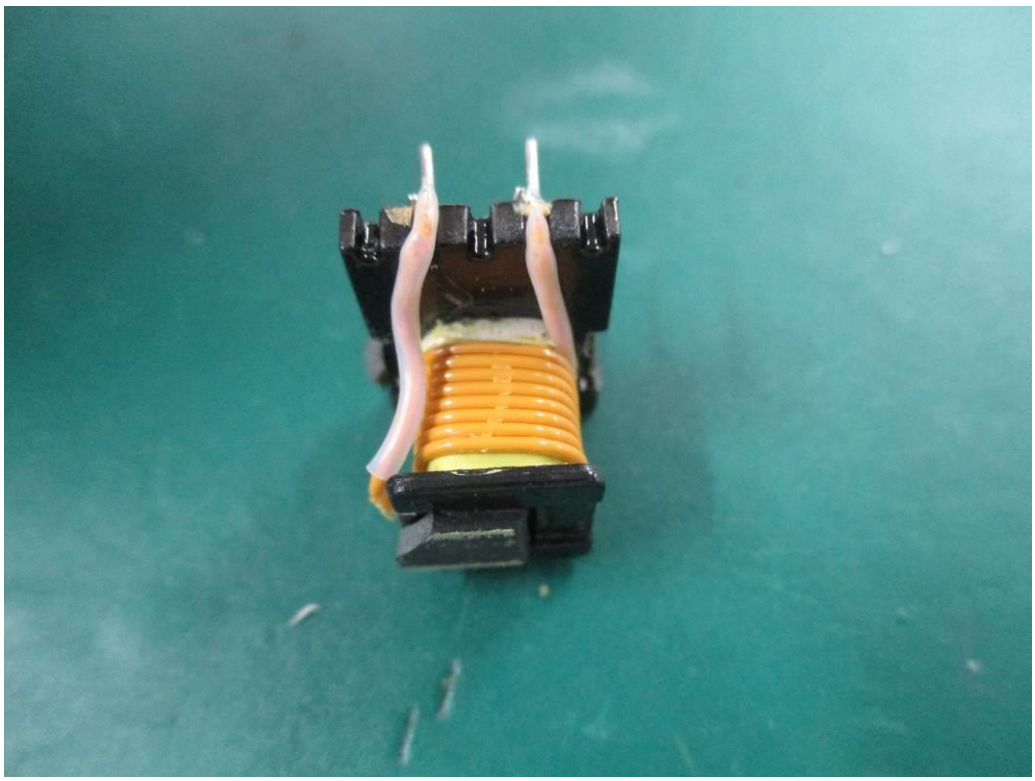
Annex pictures:



Primary windings

Insulation tape between primary windings and secondary windings

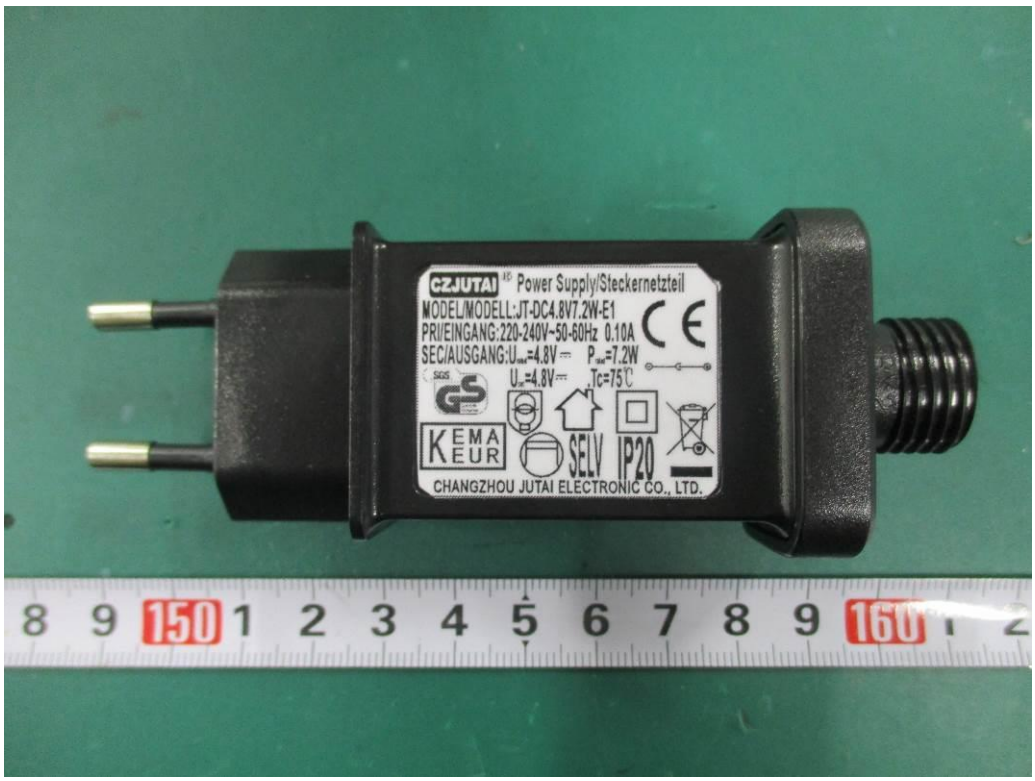
Annex pictures:



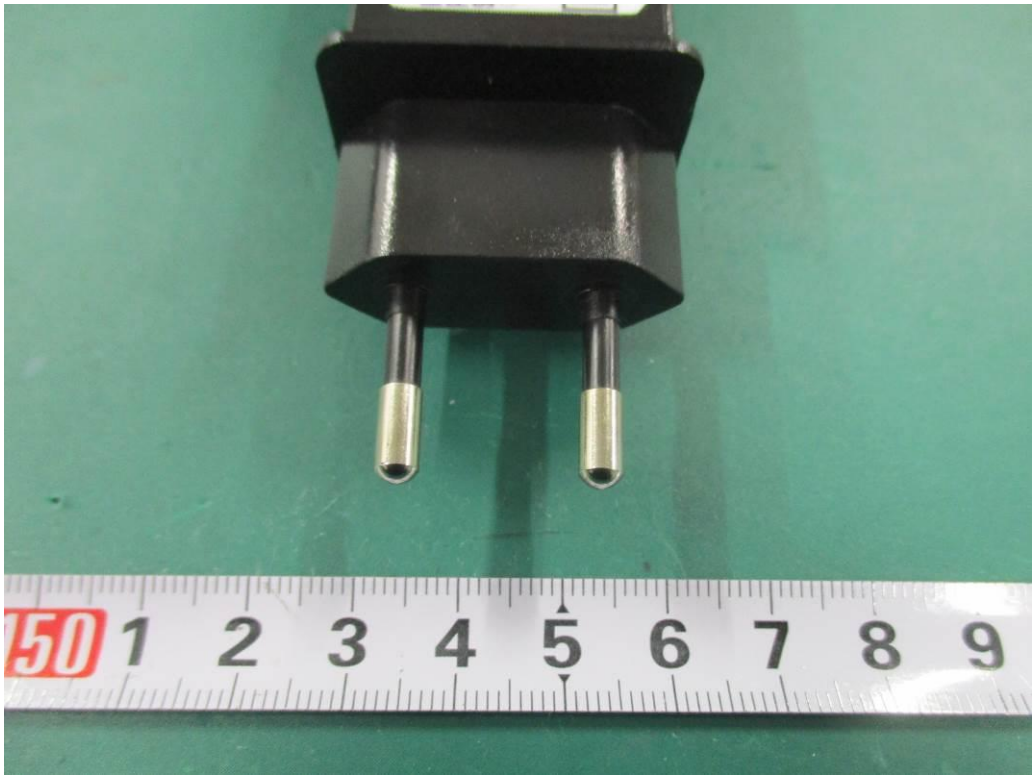
Tube and margin tape

Secondary windings

Annex pictures:

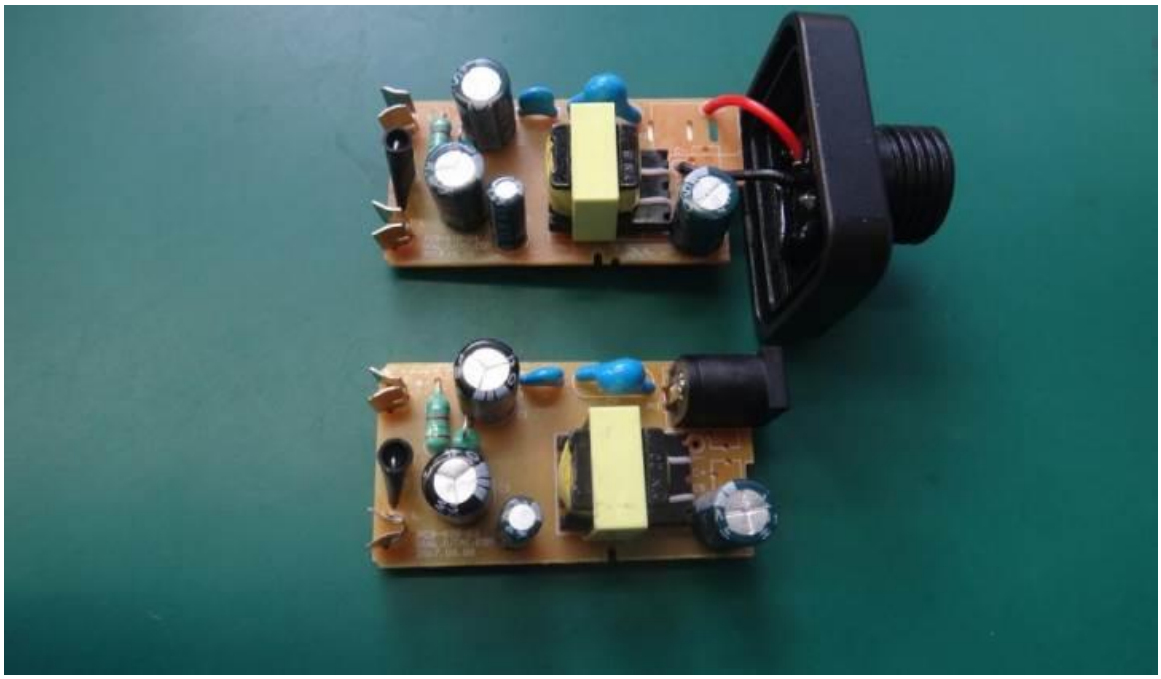


Overview for IP20 model



Plug for IP20 models

Annex pictures:



Alternative PCB

Alternative socket

Annex pictures:

Alternative socket

Alternative socket

Annex pictures:

Alternative socket

Alternative socket

Annex pictures:

Alternative socket

Output Cable with connector (D>6mm)

Annex pictures:

Output Cable with connector (Alternative; D>6mm)

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Report Issue Date: 2017.08.10

TEST REPORT

Test Report No. : 6013327A.50QS
Project no. : 6013327

Client :

Date sample received	:	2017.07.17 / 2017.08.07
Product	:	lighting chain
Product description	:	Please refer to next page(s).
Model	:	TTGL-IP-0080L0048W01WW-2, TTGM-0040L0240W02, TTDL-IP-0050L2412010WW, GISST1L, TTBL-010L, TTDC-TD-M, TTDC-D412, TTSL-020L, TTSP-4LMZ, TTSS-4LM30, TTSF-3LM50
Test Requested	:	Test of RoHS conformity (2011/65/EU)
Test Method	:	Please refer to next page(s).
Result	:	Please refer to next page(s).
Conclusion	:	Requirement passed
Testing Period	:	2017.07.17—2017.08.08

Signed for and on behalf of
DEKRA Testing and Certification (Shanghai) Ltd

Yu Feixiong（郁飞雄）
Project Manager

Shao Baijun（邵柏君）
Test Engineer

Picture of the product

TEST RESULTS

sample -no.	sample designation	Pb (%)	Cd (%)	Hg (%)	Cr VI (%)	PBB (%)	PBDE (%)
001	black plastic(adhesive tape)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
002	black plastic(adhesive tape)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
003	black plastic(adhesive tape)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
004	brown plastic(adhesive tape)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
005	white plastic(adhesive tape)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
006	transparent plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
007	transparent plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
008	transparent plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
009	green plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
010	red plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
011	rose plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
012	blue plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
013	white plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
014	red plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
015	white plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
016	yellow plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
017	light red plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
018	transparent plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
019	orange plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
020	transparent plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
021	green plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
022	white plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
023	white nyron(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
024	transparent plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
025	transparent plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
026	green plastic(bracket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
027	copper-colored metal(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
028	copper-colored metal(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
029	golden metal(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
030	silvery metal(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
031	red metal(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
032	white metal(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
033	white rubber(button)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1

034	green plastic(shell)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
035	brown PCB(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
036	brown chip capacitor(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
037	black IC(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
038	black chip diode(body)	1.0[2] a)	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
039	black chip resistor(body)	< 0.1[2]	< 0.01[3]	< 0.1[4]	< 0.1[5]	< 0.1[1]	< 0.1[1]
040	silvery metal(crystal oscillator)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
041	silvery metal(soldering tin)	< 0.1[2]	< 0.01[3]	< 0.1[4]	< 0.1[5]	N/A	N/A
042	black rubber(button)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
043	white plastic(shell)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
044	black rubber(bar)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
045	brown PCB(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
046	black chip audion(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
047	black chip resistor(body)	< 0.1[2]	< 0.01[3]	< 0.1[4]	< 0.1[5]	< 0.1[1]	< 0.1[1]
048	black rubber(button)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
049	black plastic(shell)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
050	black rubber(sealed ring)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
051	silvery metal(soldering tin)	< 0.1[2]	< 0.01[3]	< 0.1[4]	< 0.1[5]	N/A	N/A
052	green PCB(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
053	black IC(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
054	white glue	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
055	silvery metal(crystal oscillator)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
056	black plastic(slide bar)(switch)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
057	black plastic(shell)(switch)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
058	silvery metal(conductive spring)	< 0.1	< 0.01	< 0.1	< 0.1[5]	N/A	N/A
059	silvery metal(conductive piece)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
060	silvery metal(screw)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
061	black plastic(wire jacket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
062	rose metal(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
063	black plastic(shell)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
064	transparent solar light(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
065	black plastic(shell)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
066	black rubber(button)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
067	black plastic(wire jacket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
068	silvery metal(soldering tin)(PCB)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
069	green PCB(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
070	brown resistor(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
071	green inductor(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
072	black IC(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
073	white plastic(button)(switch)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1

074	gray plastic(shell)(switch)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
075	black plastic(shell)(switch)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
076	silvery metal(pin)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
077	black plastic(shell)(electrolytic capacitor)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
078	silvery metal(shell)(electrolytic capacitor)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
079	black rubber(sealed mat)(electrolytic capacitor)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
080	brown paper(electrolytic capacitor)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
081	gray metal(electrolytic capacitor)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
082	transparent plastic(battery case)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
083	transparent glue	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
084	silvery metal(soldering tin)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
085	silvery metal(shell)(switch)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
086	black plastic(shell)(switch)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
087	silvery metal(conductive piece)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
088	transparent plastic(sheath)(LED)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
089	white plastic(bracket)(LED)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
090	transparent plastic(LED)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
091	silvery metal(soldering tin)(LED)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
092	transparent plastic(wire jacket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
093	silvery metal(buckle)	< 0.1	< 0.01	< 0.1	< 0.1[5]	N/A	N/A
094	silvery metal(pin)(power plug)	2.8[2] b)	< 0.01	< 0.1	< 0.1	N/A	N/A
095	white plastic(bracket)(power plug)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
096	white plastic(shell)(power plug)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
097	white plastic(fixed board)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
098	white plastic(outer jacket)(power wire)	< 0.1	< 0.01[3]	< 0.1	< 0.1	< 0.1	< 0.1
099	blue plastic(inner jacket)(power wire)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
100	brown plastic(inner jacket)(power wire)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
101	copper-colored metal(coil)(power wire)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
102	black plastic(sheath)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
103	white plastic(shell)(switch)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1

104	white plastic(slide bar)(switch)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
105	silvery metal(contact piece)(switch)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
106	white plastic(shell)(lamp base)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
107	white plastic(shell)(lamp base)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
108	white plastic(bracket)(lamp base)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
109	transparent plastic(LED)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
110	silvery metal(soldering tin)(LED)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
111	transparent plastic(sheath)(LED)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
112	white plastic(bracket)(LED)	< 0.1	< 0.01[3]	< 0.1	< 0.1	< 0.1	< 0.1
113	transparent plastic(wire jacket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
114	silvery metal(wire coil)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
115	black plastic(nut)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
116	green plastic(shell)(input plug)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
117	silvery metal(pin)(input plug)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
118	transparent plastic(LED)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
119	silvery metal(soldering tin)(LED)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
120	green plastic(sheath)(LED)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
121	white plastic(bracket)(LED)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
122	green plastic(wire jacket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
123	copper-colored metal(wire coil)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
124	silvery metal(pin)(power plug)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
125	black plastic(bracket)(power plug)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
126	black plastic(shell)(power plug)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
127	black plastic(outer jacket)(power wire)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
128	brown plastic(inner jacket)(power wire)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
129	blue plastic(inner jacket)(power wire)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
130	copper-colored metal(coil)(power wire)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
131	black plastic(stopper)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
132	black plastic(shell)(input plug)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
133	black plastic(shell)(input plug)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
134	black plastic(sheath)(LED)	< 0.1	< 0.01[3]	< 0.1	< 0.1	< 0.1	< 0.1
135	transparent plastic(LED)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
136	black plastic(wire jacket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1

137	black plastic(nut)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
138	black plastic(shell)(control box)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
139	black plastic(sheath)(PCB)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
140	silvery metal(soldering tin)(PCB)	< 0.1[2]	< 0.01[3]	< 0.1[4]	< 0.1[5]	N/A	N/A
141	green PCB(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
142	brown resistor(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
143	black diode(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
144	red plastic(shell)(capacitor)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
145	black plastic(shell)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
146	black plastic(shell)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
147	white foam(sealed ring)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
148	transparent plastic(cover)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
149	black plastic(ring)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
150	black plastic(cover)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
151	black plastic(cover)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
152	black rubber(sealed ring)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
153	black plastic(bracket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
154	transparent plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
155	white LED board(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
156	white plastic(LED)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
157	silvery metal(soldering tin)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
158	silvery metal(screw)	< 0.1	< 0.01	< 0.1	< 0.1[5]	N/A	N/A
159	silvery metal(nut)	< 0.1	< 0.01	< 0.1	< 0.1[5]	N/A	N/A
160	silvery metal(screw)	< 0.1	< 0.01	< 0.1	< 0.1[5]	N/A	N/A
161	silver-blue metal(screw)	< 0.1	< 0.01	< 0.1	< 0.1[5]	N/A	N/A
162	white plastic(footpad)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
163	silvery metal(pole)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
164	white plastic(gear case)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
165	white plastic(gear)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
166	red plastic(wire jacket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
167	black plastic(wire jacket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
168	beige plastic(bracket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
169	gray metal(cover)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
170	gray metal(shell)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
171	black magnet	< 0.1	< 0.01	< 0.1	< 0.1[5]	N/A	N/A
172	silvery metal(shaft)	< 0.1	< 0.01	< 0.1	< 0.1[5]	N/A	N/A
173	silvery metal(silicon plate)	< 0.1	< 0.01	< 0.1	< 0.1[5]	N/A	N/A
174	copper-colored metal(loop)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
175	white plastic(bracket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
176	beige plastic(commutator)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1

177	copper-colored metal(commutator)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
178	black plastic(shell)(input plug)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
179	black plastic(nut)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
180	copper-colored metal(wire coil)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
181	black plastic(wire jacket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
182	black plastic(shell)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
183	black plastic(handle)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
184	transparent plastic(lampshade)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
185	black rubber(sealed ring)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
186	silvery metal(screw)	< 0.1	< 0.01	< 0.1	< 0.1[5]	N/A	N/A
187	silvery metal(screw)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
188	gray metal(fixed board)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
189	white plastic(jack)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
190	blue plastic(wire jacket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
191	pink plastic(wire jacket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
192	yellow plastic(wire jacket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
193	orange plastic(wire jacket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
194	red plastic(wire jacket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
195	black plastic(wire jacket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
196	white plastic(wire jacket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
197	silvery metal(soldering tin)(PCB)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
198	green PCB(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
199	black IC(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
200	black IC(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
201	silvery metal(soldering tin)(LED board)	< 0.1[2]	< 0.01[3]	< 0.1[4]	< 0.1[5]	N/A	N/A
202	white LED board(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
203	white plastic(LED)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
204	black chip resistor(body)	< 0.1[2]	< 0.01[3]	< 0.1[4]	< 0.1[5]	< 0.1	< 0.1
205	white paper(label)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
206	gray metal(shell)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
207	silvery metal(shaft)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
208	copper-colored metal(loop)	< 0.1	< 0.01	< 0.1	< 0.1	N/A	N/A
209	white plastic(bracket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1[1]	< 0.1[1]
210	white semitransparent plastic(bobbin)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
211	white plastic(sheath)(PCB)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
219	black plastic(nut)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
220	black plastic(shell)(input plug)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
221	black plastic(wie fixed sheath)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1

222	black plastic(wire jacket)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
223	black plastic(handle)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
224	black plastic(shell)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
225	silvery plastic(paster)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
226	golden metal(insert piece)	3.2[2] b)	< 0.01	< 0.1	< 0.1	N/A	N/A
227	silvery plastic(bracket)	< 0.1	< 0.01	< 0.1	< 0.1[5]	< 0.1	< 0.1
228	black rubber(button)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
229	silvery plastic(bracket)	< 0.1	< 0.01	< 0.1	< 0.1[5]	< 0.1	< 0.1
230	white rubber(sealed ring)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
231	transparent plastic(cover)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
232	black plastic(screw)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
233	silver-blue metal(screw)	< 0.1	< 0.01	< 0.1	< 0.1[5]	N/A	N/A
234	silvery metal(soldering tin)(PCB)	< 0.1[2]	< 0.01[3]	< 0.1[4]	< 0.1[5]	N/A	N/A
235	black plastic(sheath)(resistor)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1
236	gray resistor(body)	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1

1) The analysis by X-ray fluorescence spectrometry showed a detection for Br. The verification and quantification of PBB/PBDE was performed by GC-MS.

2) The analysis by X-ray fluorescence spectrometry showed a detection for Pb. The verification and quantification of Pb was performed by ICP-OES.

3) The analysis by X-ray fluorescence spectrometry showed a detection for Cd. The verification and quantification of Cd was performed by ICP-OES.

4) The analysis by X-ray fluorescence spectrometry showed a detection for Hg. The verification and quantification of Hg was performed by ICP-OES.

5) The analysis by X-ray fluorescence spectrometry showed a detection for Cr. The verification and quantification of Cr (VI) was performed by photometric analysis.

N/A: Not applicable

a) The annex to directive 2011/65/EU (exemptions of RoHS-directive) contains following point:
"7(c)-I, Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound."

b) The annex to directive 2011/65/EU (exemptions of RoHS-directive) contains following point:
"6 (c) Copper alloy containing up to 4 % lead by weight."

Description of the analysis procedure (brief version):

Test of RoHS conformity

The measurements are performed according to IEC 62321-3-1 : 2013, "Electrotechnical products - Determination of levels of six regulated substances".

The product is divided in single material samples. The materials are analysed on different parameters of the RoHS-directive to assure that the complete product is RoHS-conform or not. At first a XRF (X-ray fluorescence spectrometry) screening is performed. For every sample following statements can be made.

Table: Screening limits in mg/kg for regulated elements in various matrices

Element	Polymers	Metals	Composite Material
Cd	BL ≤ (70-3σ) < X < (130+3σ) ≤ OL	BL ≤ (70-3σ) < X < (130+3σ) ≤ OL	LOD < X < (150+3σ) ≤ OL
Pb	BL ≤ (700-3σ) < X < (1300+3σ) ≤ OL	BL ≤ (700-3σ) < X < (1300+3σ) ≤ OL	BL ≤ *(500-3σ) < X < (1500+3σ)* ≤ OL
Hg	BL ≤ (700-3σ) < X < (1300+3σ) ≤ OL	BL ≤ (700-3σ) < X < (1300+3σ) ≤ OL	BL ≤ *(500-3σ) < X < (1500+3σ)* ≤ OL
Br	BL ≤ (300-3σ) < X		BL ≤ *(250-3σ) < X*
Cr	BL ≤ (700-3σ) < X	BL ≤ (700-3σ) < X	BL ≤ *(500-3σ) < X*

Below limit (**BL**): the tested material complies to the RoHS directive.

Inconclusive (**X**): If the level of the measurement is around the maximum allowed, or if the level for Chrome or Bromine is too high, other more accurate methods are needed to determine the exact level or the composition of Chrome and Bromine.

Over limit (**OL**): If the level of lead, mercury or cadmium is well above the maximum allowed levels (the XRF uncertainty is taken into account), the tested material does not comply with the RoHS directive.

In case of **inconclusive** XRF results, following analysis procedures are applied:

In order to examine the material samples for the heavy metals cadmium, lead and mercury they are digested in acid and the solutions are used to carry out the analysis for the heavy metals by ICP-OES or atomic-absorption spectroscopy.

Hexavalent chromium is checked by extracting the sample with water at 100 °C (determination of Cr VI in colorless and colored chromate coating on metals) respectively with alkaline extraction at 90-95 °C (determination of Cr VI in polymers and electronic components) followed by photometric analysis.

In the case of metallic components with a surface coating containing hexavalent Chromium (passivation) the concentration is expressed in mg of Chromium VI per component. In order to obtain further information about the concentration on the surface coating it is necessary to know the weight per unit area of the coating and the surface area of the component. Information about surface coatings is to be provided by the client.

The examination for bromine-based flame retardant products is carried out by gas chromatography-mass spectrometry after extraction by solvents; this involves the individual analysis and quantification of the substances specified in the RoHS. The current valid regulations relating to exceptions in respect of the analysed substances are to be taken into account by the client.

The following Polybrominated Biphenyls (PBBs) and PolybrominatedDiphenyl Ethers (PBDEs) are analyzed:

2-Bromobiphenyl PBB2, Dibromobiphenyl PBB15, Tribromobiphenyl PBB30, Tetrabromobiphenyl PBB52, Pentabromobiphenyl PBB103, Hexabromobiphenyl PBB153, Heptabromobiphenyl PBB250, Octabromobiphenyl PBB250, Nonabromobiphenyl PBB250, Decabromobiphenyl PBB209, Bromodiphenylether BDE2, Dibromodiphenylether BDE15, Tribromodiphenylether BDE30, Tetrabromodiphenylether BDE62, Pentabromodiphenylether BDE99, Hexabromodiphenylether BDE153, Heptabromodiphenylether BDE183, Octabromodiphenylether BDE203, Nonabromodiphenylether BDE206, Decabromodiphenylether BDE209.

Limits according to RoHS (2011/65/EU) / Test methods (additional chemical analysis):

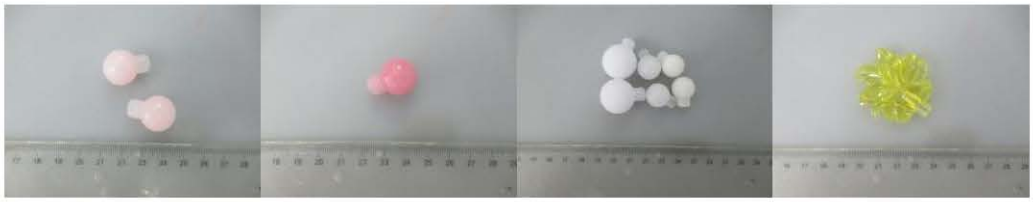
Parameter	Limits according to RoHS	Test method
Cadmium	0,01 % (100 mg/kg or 0,1 g/kg)	IEC62321-5:2013
Lead	0,1 % (1000 mg/kg or 1 g/kg)	IEC62321-5:2013
Hexavalent Chromium	0,1 % (1000 mg/kg or 1 g/kg)	Metal: IEC62321-7-1:2015 Non-metal: IEC62321-7-2:2017
Mercury	0,1 % (1000 mg/kg or 1 g/kg)	IEC62321-4:2013
PBB and PBDE	0,1 % (1000 mg/kg or 1 g/kg)	IEC62321-6:2015

Sample Photos

Test item1 Test item2 Test item3 Test item4

Test item5 Test item6 Test item7 Test item8

Test item9 Test item10 Test item11 Test item12



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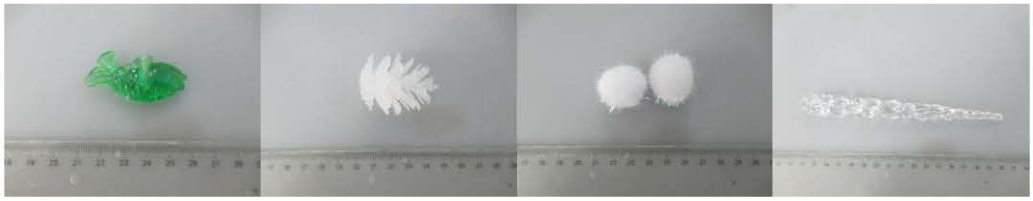
Test item17 Test item18 Test item19 Test item20



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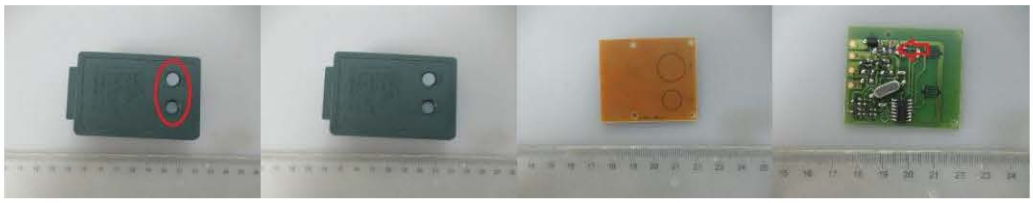
Test item29 Test item30 Test item31 Test item32



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Test item41 Test item42 Test item43 Test item44

Test item45 Test item46 Test item47 Test item48

Test item49 Test item50 Test item51 Test item52

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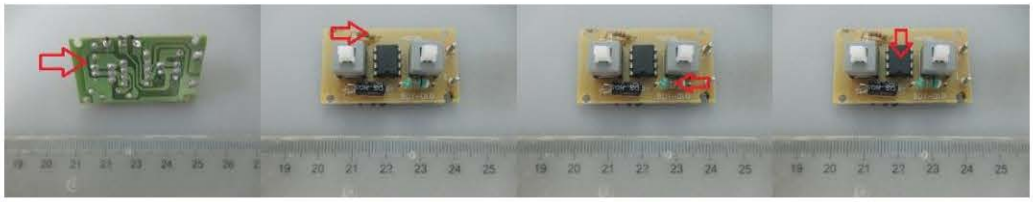
Test item65 Test item66 Test item67 Test item68



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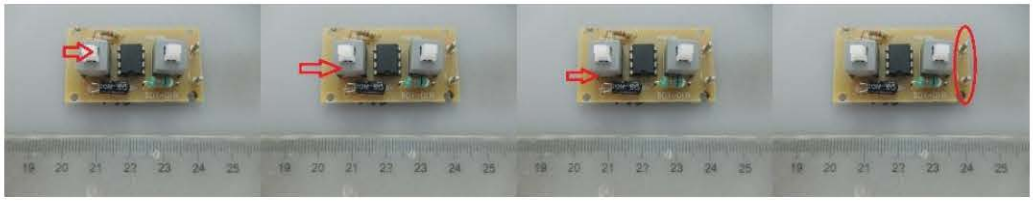

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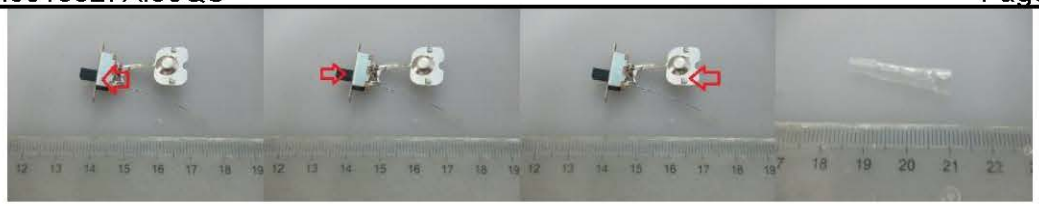

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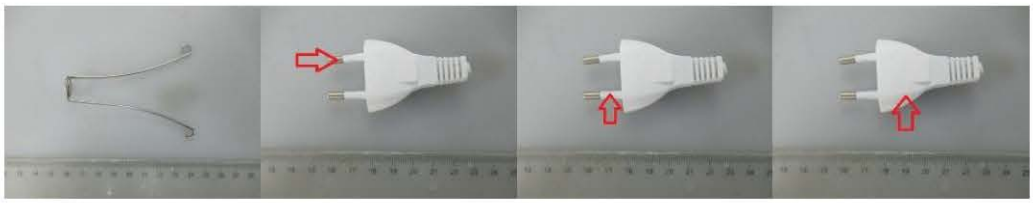
Test item89 Test item90 Test item91 Test item92



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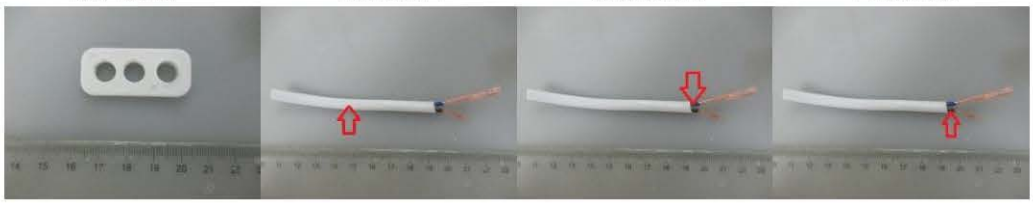

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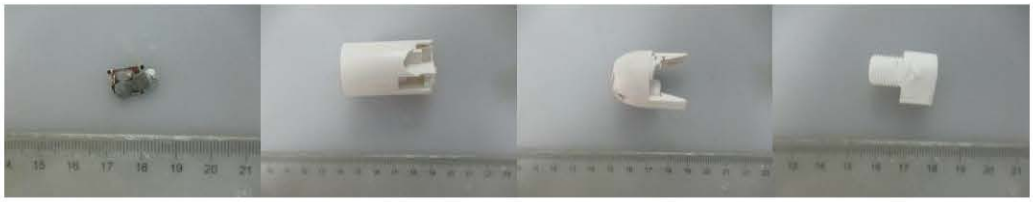

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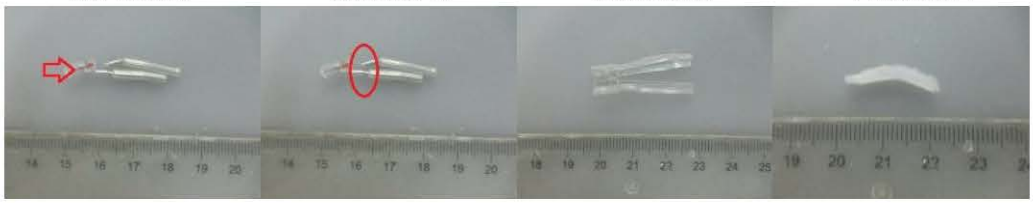

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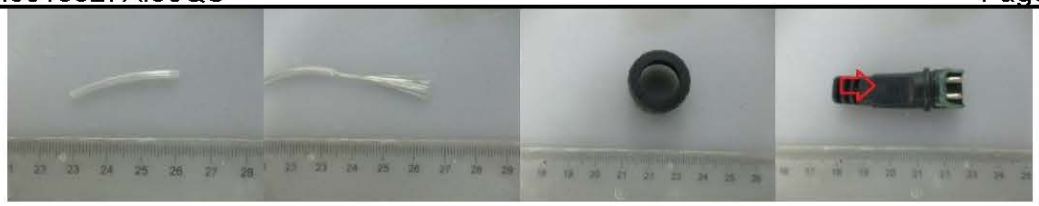

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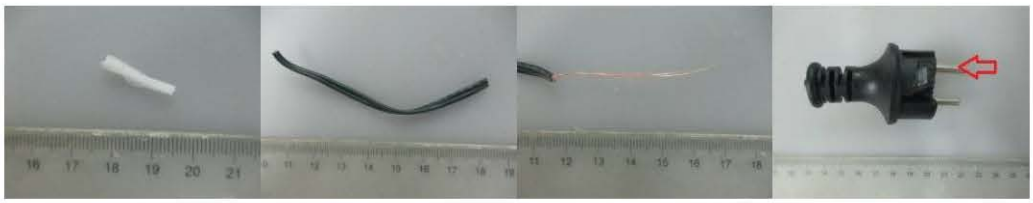

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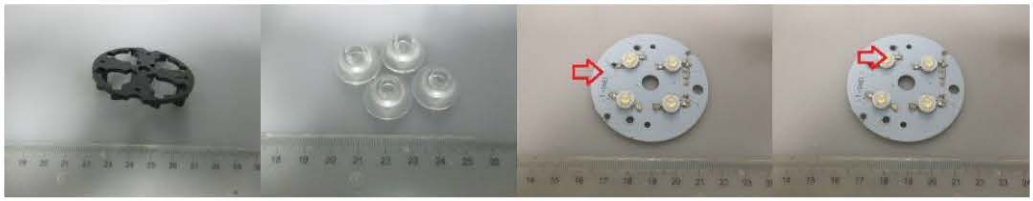
Test item145 Test item146 Test item147 Test item148

Test item149 Test item150 Test item151 Test item152



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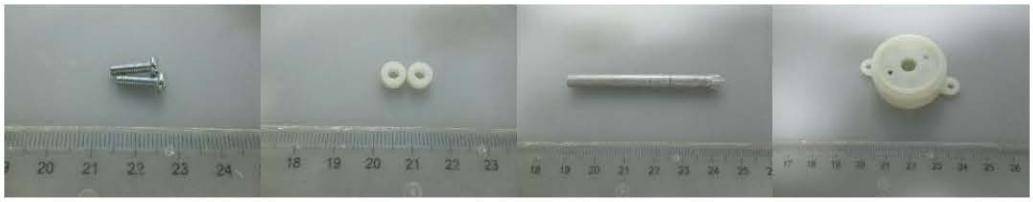

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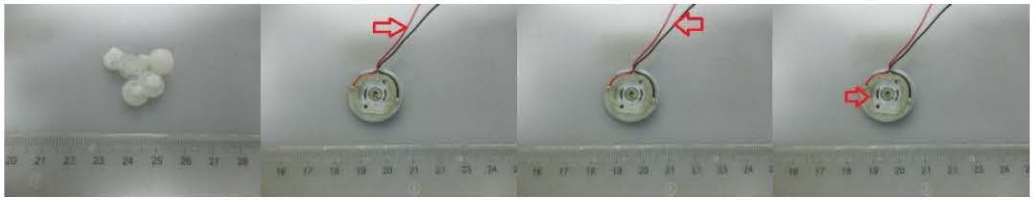

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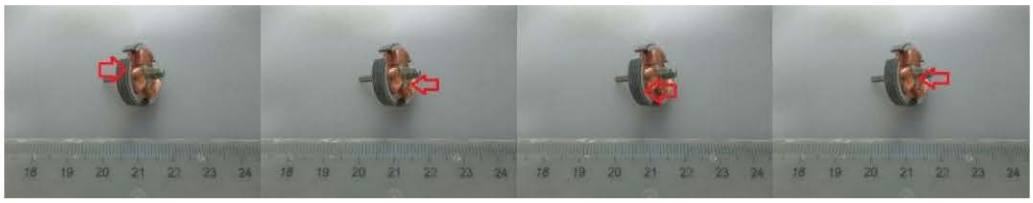

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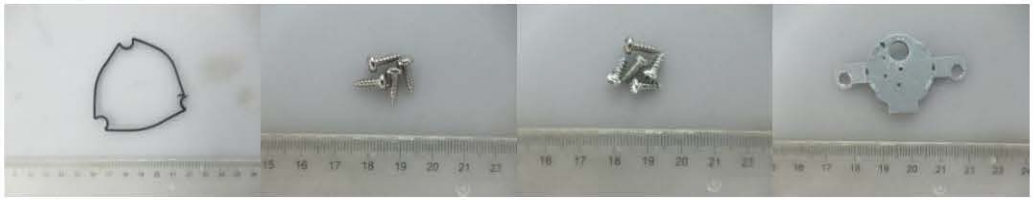

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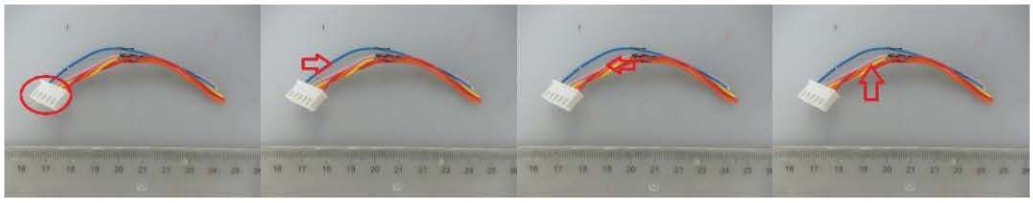

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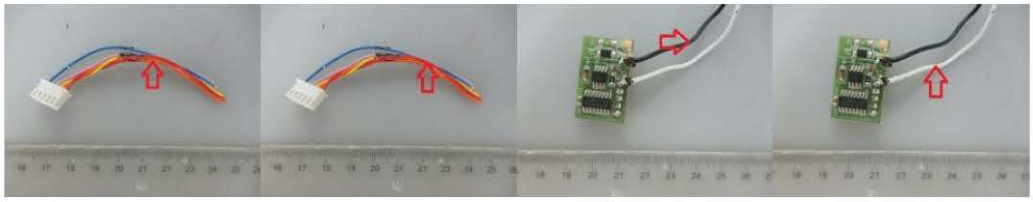

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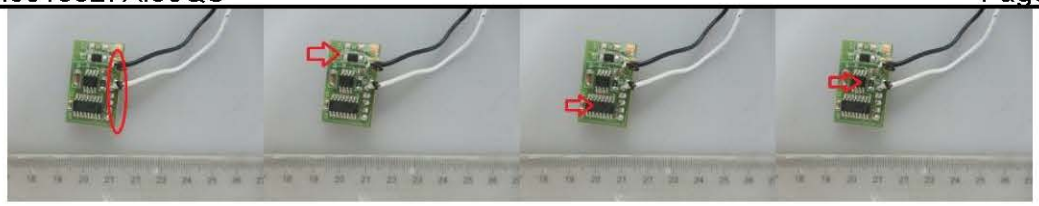
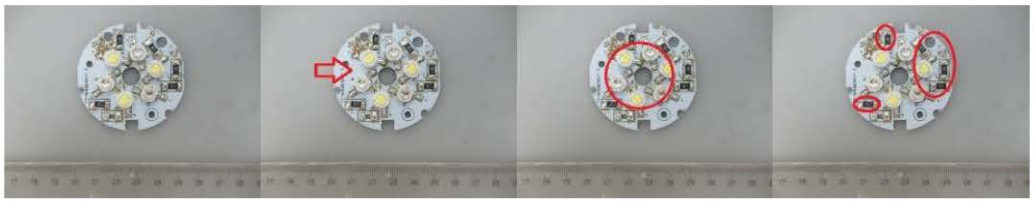


Test item197 Test item198 Test item199 Test item200



Test item201 Test item202 Test item203 Test item204

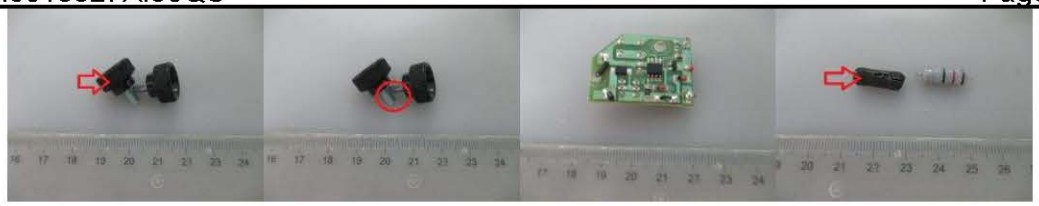
Test item205 Test item206 Test item207 Test item208

Test item209 Test item210 Test item211 Test item219

Test item220 Test item221 Test item222 Test item223

Test item224 Test item225 Test item226 Test item227

Test item228 Test item229 Test item230 Test item231



Test item232 Test item233 Test item234 Test item235

Test item236

---End of Report---

Annex

Information in annex are given by client, the authenticity is guaranteed by client

Reference Model :

Model					Number of Lamps
TTL-***LA	TTL-D***LA	TTL-C***LA	TTL-N***LA	TTL-B***LA	10-600
TTL-***LA-BW	TTL-D***LA-BW	TTL-C***LA-BW	TTL-N***LA-BW	TTL-B***LA-BW	10-600
TTL-***L	TTL-D***L	TTL-C***L	TTL-N***L	TTL-B***L	10-600
TTL-***L-BW	TTL-D***L-BW	TTL-C***L-BW	TTL-N***L-BW	TTL-B***L-BW	10-600
TTLC-***LA	TTLC-D***LA	TTLC-C***LA	TTLC-N***LA	TTLC-B***LA	16-576
TTLC-***LA-BW	TTLC-D***LA-BW	TTLC-C***LA-BW	TTLC-N***LA-BW	TTLC-B***LA-BW	16-576
TTLC-***L	TTLC-D***L	TTLC-C***L	TTLC-N***L	TTLC-B***L	16-576
TTLC-***L-BW	TTLC-D***L-BW	TTLC-C***L-BW	TTLC-N***L-BW	TTLC-B***L-BW	16-576
TTDL-IP-!@@@@L##**$$$%-&					8-1880
TTLI-***LA	TTLI-D***LA	TTLI-C***LA	TTLI-N***LA	TTLI-B***LA	10-600
TTLI-***LA-BW	TTLI-D***LA-BW	TTLI-C***LA-BW	TTLI-N***LA-BW	TTLI-B***LA-BW	10-600
TTLI-***L	TTLI-D***L	TTLI-C***L	TTLI-N***L	TTLI-B***L	10-600
TTLI-***L-BW	TTLI-D***L-BW	TTLI-C***L-BW	TTLI-N***L-BW	TTLI-B***L-BW	10-600
TTLIC-***LA	TTLIC-D***LA	TTLIC-C***LA	TTLIC-N***LA	TTLIC-B***LA	16-576
TTLIC-***LA-BW	TTLIC-D***LA-BW	TTLIC-C***LA-BW	TTLIC-N***LA-BW	TTLIC-B***LA-BW	16-576
TTLIC-***L	TTLIC-D***L	TTLIC-C***L	TTLIC-N***L	TTLIC-B***L	16-576
TTLIC-***L-BW	TTLIC-D***L-BW	TTLIC-C***L-BW	TTLIC-N***L-BW	TTLIC-B***L-BW	16-576
TTDL-!@@@@L##**$$$%-&					8-1880
A-TTLr-s**/***Lt-##	B-TTLr-s**/***Lt-##	C-TTLr-s**/***Lt-##	D-TTLr-s**/***Lt-##	E-TTLr-s**/***Lt-##	10-600
F-TTLr-s**/***Lt-##	G-TTLr-s**/***Lt-##	H-TTLr-s**/***Lt-##	I-TTLr-s**/***Lt-##	J-TTLr-s**/***Lt-##	10-600
K-TTLr-s**/***Lt-##	L-TTLr-s**/***Lt-##	M-TTLr-s**/***Lt-##	N-TTLr-s**/***Lt-##	/	10-600
LGC-****L-R	LGC-D****L-R	LGC-C****L-R	LGC-N****L-R	LGC-B****L-R	10-1440
LGC-****L-Y	LGC-D****L-Y	LGC-C****L-Y	LGC-N****L-Y	LGC-B****L-Y	10-1440
LGC-****L-G	LGC-D****L-G	LGC-C****L-G	LGC-N****L-G	LGC-B****L-G	10-1440
LGC-****L-W	LGC-D****L-W	LGC-C****L-W	LGC-N****L-W	LGC-B****L-W	10-1440
LGC-****L-B	LGC-D****L-B	LGC-C****L-B	LGC-N****L-B	LGC-B****L-B	10-1440
LGC-****L-PG	LGC-D****L-PG	LGC-C****L-PG	LGC-N****L-PG	LGC-B****L-PG	10-1440
LGC-****L-PI	LGC-D****L-PI	LGC-C****L-PI	LGC-N****L-PI	LGC-B****L-PI	10-1440
LGC-****L-PU	LGC-D****L-PU	LGC-C****L-PU	LGC-N****L-PU	LGC-B****L-PU	10-1440

LGK-****L-R	LGK-D****L-R	LGK-C****L-R	LGK-N****L-R	LGK-B****L-R	40-1000
LGK-****L-Y	LGK-D****L-Y	LGK-C****L-Y	LGK-N****L-Y	LGK-B****L-Y	40-1000
LGK-****L-G	LGK-D****L-G	LGK-C****L-G	LGK-N****L-G	LGK-B****L-G	40-1000
LGK-****L-W	LGK-D****L-W	LGK-C****L-W	LGK-N****L-W	LGK-B****L-W	40-1000
LGK-****L-B	LGK-D****L-B	LGK-C****L-B	LGK-N****L-B	LGK-B****L-B	40-1000
LGK-****L-PG	LGK-D****L-PG	LGK-C****L-PG	LGK-N****L-PG	LGK-B****L-PG	40-1000
LGK-****L-PI	LGK-D****L-PI	LGK-C****L-PI	LGK-N****L-PI	LGK-B****L-PI	40-1000
LGK-****L-PU	LGK-D****L-PU	LGK-C****L-PU	LGK-N****L-PU	LGK-B****L-PU	40-1000
RC-****L	RC-D****L	RC-C****L	RC-N****L	RC-B****L	15-1000
TRC-****L	TRC-D****L	TRC-C****L	TRC-N****L	TRC-B****L	15-1000
RC-****L-BW	RC-D****L-BW	RC-C****L-BW	RC-N****L-BW	RC-B****L-BW	15-1000
TRC-****L-BW	TRC-D****L-BW	TRC-C****L-BW	TRC-N****L-BW	TRC-B****L-BW	15-1000
TTGL-!****L####W$$%-&					10-5000
TTGL-IP-!@@@@L####W$$%-*					10-5001
TMPI-***LA-##-##	TMPI-D***LA-##	TMPI-C***LA-##	TMPI-N***LA-##	TMPI-B***LA-##	20-480
TMPIC-***LA-##-##	TMPIC-D***LA-##	TMPIC-C***LA-##	TMPIC-N***LA-##	TMPIC-B***LA-##	20-480
TMPI-***L-##	TMPI-D***L-##	TMPI-C***L-##	TMPI-N***L-##	TMPI-B***L-##	20-480
TMPIC-***L-##	TMPIC-D***L-##	TMPIC-C***L	TMPIC-N***L-##	TMPIC-B***L-##	20-480
TMP-***LA-##-##	TMP-D***LA-##	TMP-C***LA-##	TMP-N***LA-##	TMP-B***LA-##	20-480
TMPC-***LA-##	TMPC-D***LA-##	TMPC-C***LA-##	TMPC-N***LA-##	TMPC-B***LA-##	20-480
TMP-***L-##	TMP-D***L-##	TMP-C***L-##	TMP-N***L-##	TMP-B***L-##	20-480
TMPC-***L-##	TMPC-D***L-##	TMPC-C***L-##	TMPC-N***L-##	TMPC-B***L-##	20-480
A-TMPr-s**/***Lt	B-TMPr-s**/***Lt	C-TMPr-s**/***Lt	D-TMPr-s**/***Lt	E-TMPr-s**/***Lt	20-480
F-TMPr-s**/***Lt	G-TMPr-s**/***Lt	H-TMPr-s**/***Lt	I-TMPr-s**/***Lt	J-TMPr-s**/***Lt	20-480
K-TMPr-s**/***Lt	L-TMPr-s**/***Lt	M-TMPr-s**/***Lt	N-TMPr-s**/***Lt	/	20-480
TTDM-IP-!@@@L###W$$-&					5-999
TTDM-!@@@L###W$$-&					5-999
FLTA-***L	FLTA-***L-1	FLTA-***L-2	FLTA-***L-3	/	60-480
FLTAB-***L	FLTAB-***L-1	FLTAB-***L-2	FLTAB-***L-3	/	60-480
RGC-***L	RGC-D***L	RGC-C***L	RGC-N***L	RGC-B***L	10-300
RGK-***L	RGK-D***L	RGK-C***L	RGK-N***L	RGK-B***L	40-480
DRL-****L	DRL-****LW	DRL-****LB	DRL-****LB-1	/	20-

					1440
TDRL-****L	TDRL-****LW	TDRL-****LB	TDRL-****LB-1	/	20-1440
TTGM-!****L####W$$-&					10-1000
TTP-***L	TTPD-***L	TTPS-***L	TTP-C***L	TTP-N***L	10-200
TTPC-***L	TTPN-***L	/	/	/	40-360
TTP-IP-***L	TTPD-IP-***L	TTP-IP-C***L	TTP-IP-N***L	/	10-320
TTPD-IP-***LA	TTPC-IP-***L	TTPN-IP-***L	/	/	20-320
TTGP-!****L####W$$%-&					10-1000
TTDP-IP-!@@@L###W$$-&					1-999
RL-S-**M	/	/	/	/	1-20
GISS-1L	GISS-1L-15	GISS-1L-20	GISS-1L-25	/	1
GISS-T1L	GISS-T1L-15	GISS-T1L-20	GISS-T1L-25	/	1
GISS-1L	GISS-T1L	GISS-1LN	GISS-T1LN		1
GISS-1L(UK)	GISS-T1L(UK)	GISS-1LN(UK)	GISS-T1LN(UK)		1
TLH-**L	TLH-**LA	TLHC-**L	TLHC-**LA	/	01-100
TMH-**L	TMHC-**L				01-50
TTBL-***L					1-500
TTBM-***L					1-200
TTSL-***LX					1-500
TLHS-***L	TLHS-***LA	TLHS-***L(A)			001-500
TTC-200	/	/	/	/	/
TTDL-!@@@@LXDCY$$$%-&					1-6000
TTDL-!@@@@LXACY$$$%-&					1-6000
TTDL-IP-!@@@@LXDCY$$$%-&					1-6000
TTDL-IP-!@@@@LXACY$$$%-&					1-6000
TTXL-aebfcg					<50 Tubes
TTXH-aebfcg					<60 Tubes
TTXLY					
TTSP-xLyZT	TTSP-xLyT	TTSP-xLyZ	TTSP-xLy		x=1 or 3 or 4
TTSS-4LY24	TTSS-4LY25	TTSS-4LY30			
TTSF-XLY25	TTSF-XLY25-15	TTSF-XLY30	TTSF-XLY50		X=3 or 6