



Verification of Conformity

Certificate No.: 20ZCTC1228005RC

Applicant : YANGZHOU XINTONG TRANSPORT EQUIPMENT GROUP CO., LTD.
Address : Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu Province, China
Manufacturer : YANGZHOU XINTONG TRANSPORT EQUIPMENT GROUP CO., LTD.
Address : Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu Province, China
Product : LED ROAD AND AREA LUMINAIRES
Brand Name : N/A
Model No. : SH61
 SH6101: 30-60W, SH6102: 80-120W, SH6103: 150-180W, SH6104: 200-250W

Requirement	Applied Standards	Document Evidence	Result
RoHS Directive	2011/65/EU 2015/863	Test Report: 20ZCTC1228005RR	Conform
RoHS Standards	IEC 62321:2013		



RoHS

Remark: The Certificate of compliance is based on a test procedure or an evaluation of the above-mentioned product. This is to certify that the above-mentioned product is in compliance with the RoHS Directive (2011/65/EU) and its subsequent amendments EU No. (2015/863) of the European parliament on the Restriction of the use of certain Hazardous Substances [Lead (Pb), Mercury (Hg), cadmium (Cd), Hexavalent chromium (Cr); polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs), Hexabromocyclododecane (HBCDD), Bis-(2-ethylhexyl) Phthalate (DEHP); Benzylbutyl Phthalate (BBP); Dibutyl Phthalate (DBP)] in Electrical and Electronic equipment. This certificate can be checked for validity at www.renzhengjiance.com



Shenzhen ZCT Technology Co., Ltd.

1/F., Building 5, Hongsheng Industrial Zone, Bao'an Road, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China.
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TEST REPORT for NSS Test according to EN ISO 9227: 2012: Corrosion tests in artificial atmospheres – Salt spray tests

Report Reference No.....:	20ZCTS1228007SP	
Tested by (printed name and signature).....:	Chris Lu	
Approved by (printed name and signature).....:	Tomy Wu	
Date of issue.....:	2020-12-31	
Total number of pages.....:	5 pages	
Testing Laboratory Name.....:	Yangzhou Xintong Transport Equipment Group Co., Ltd.	
Address.....:	Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu Province, China	
Applicant.....:	Yangzhou Xintong Transport Equipment Group Co., Ltd.	
Address.....:	Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu Province, China	
Manufacturer.....:	Same as applicant	
Address.....:	Same as applicant	
Test item description.....:	LED ROAD AND AREA LUMINAIRE	
Trade Mark.....:		
Model/Type reference.....:	SH61 SH6101: 30-60W, SH6102: 80-120W, SH6103: 150-180W, SH6104: 200-250W	
Material.....:	Metal coated with Grey paint, metal screw and metal rivet	
Test sample.....:	LED ROAD AND AREA LUMINAIRE	



General remarks:

The test results presented in this report relate only to the object tested.

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- test conditions does meet the requirement..... P (Pass)

- test conditions does not meet the requirement F (Fail)

Testing Date:

Date of receipt of test item.....: 2020-11-16

Date (s) of performance of tests.....: 2020-11-17 to 2020-12-30

Testing requirement:**1. Preparation of the sodium chloride solution:**

Dissolve a sufficient mass of sodium chloride in distilled or deionized water with a conductivity not higher than $20 \mu\text{S}/\text{cm}$ at $25 \text{ }^\circ\text{C} \pm 2 \text{ }^\circ\text{C}$ to produce a concentration of $50 \text{ g/l} \pm 1 \text{ g/l}$. The sodium chloride concentration of the sprayed solution collected shall be $50 \text{ g/l} \pm 1 \text{ g/l}$.

2. Test specimens pre-treatment:

Before testing, the specimens shall be cleaned carefully with a hydrocarbon solvent, but not include the use of any abrasives or solvents which may attack the surface of the specimens.

3. NSS test requirement for this standard:

Adjust the pH of the salt solution (3.1) so that the pH of the sprayed solution collected within the test cabinet is 6.5 to 7.2 at $25 \text{ }^\circ\text{C} \pm 2 \text{ }^\circ\text{C}$. Check the pH using electrometric measurement or in routine checks, with a short-range pH paper, which can be read in increments of 0.3 pH units or less. Make any necessary correction by adding hydrochloric acid, sodium hydroxide or sodium bicarbonate solution of analytical grade.

Possible changes in pH may result from loss of carbon dioxide from the solution when it is sprayed. Such changes may be avoided by reducing the carbon dioxide content of the solution by, for example, heating it to a temperature above $35 \text{ }^\circ\text{C}$ before it is placed in the apparatus, or by making the solution using freshly boiled water.



Description of Testing conditions:		P
Sample placed	At an angle 15° to 25° to the vertical.	P
Temperature of test cabinet	35 °C ±2 °C	P
Concentration of sodium chloride (collected solution)	50 g/l ±1g/l	P
Average collection rate for a horizontal collecting area of 80 cm ²	1,5 ml/h ±0,5 ml/h	P
pH (collected solution)	6,5 to 7,2 for Neutral salt spray (NSS)	P
Duration of tests	1000 hours (according to the requirements of applicant)	P

Treatment of specimens after test:		P
<p>At the end of the test period, remove the test specimens from the cabinet and allow them to dry for 0,5 h to 1 h before rinsing, in order to reduce the risk of removing corrosion products. Before they are examined, carefully remove the residues of spray solution from their surfaces. A suitable method is to rinse or dip the test specimens gently in clean running water, at a temperature not exceeding 40 °C, and then to dry them immediately in a stream of air, at an overpressure not exceeding 200 kPa and at a distance of approximately 300 mm.</p>		P

Test results:	
1) Original appearance for testing specimens	See appendix photos
2) Preparation of the testing specimens	<ul style="list-style-type: none"> -Using a clean soft brush to Clean the specimens with an hydrocarbon -After cleaning, rinse the reference specimens with fresh solvent and then dry them.
3) The time when appeared rust	1. Metal rivet 2. Metal screw (Observed the test result of sample after 1000h test)
4) The frequency and number of specimen location permutations	One sample used
5) Appearance after the test	See appendix photos
Note: After the testing, There were a little of rust on the test specimens.	



Degree of rusting was evaluated with reference to ISO 10289: 1999

Part of Sample	Degree of Rusting
Metal coated with gray paint	10
Metal screw	5
Metal rivet	3

Degree of Rusting	Area of Defects (%)
10	No defects
9	$0 < A < 0.1$
8	$0.1 < A < 0.25$
7	$0.25 < A < 0.5$
6	$0.5 < A < 1.0$
5	$1.0 < A < 2.5$
4	$2.5 < A < 5.0$
3	$5.0 < A < 10$
2	$10 < A < 25$
1	$25 < A < 50$
0	$50 < A$



Appendix for photos:

Photo 1



Photo 2



-----End report-----



Vibration Test Report

Application provider :	Yangzhou Xintong Transport Equipment Group Co., Ltd.
Address :	Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu Province, China
Manufacturer :	Yangzhou Xintong Transport Equipment Group Co., Ltd.
Address :	Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu Province, China
Product name :	LED ROAD AND AREA LUMINAIRES
Mark :	
Product model :	SH61 SH6101: 30-60W ·SH6102: 80-120W ·SH6103: 150-180W ·SH6104: 200-250W
Testing company :	Shenzhen ZCT Technology Co., Ltd.
Address :	3F, 5th Building, Hongsheng Industrial Zone, No.4336 Bao'an Road, Bao'an District, Shenzhen, China.
Report date :	Dec. 30, 2020
Report number :	20ZCTS1228005SP
Prepared by:	Sandy Chen
Approved & Authorized Signer	Tomy Wu



According to the standard :		IEC60068-2-6:2007, IEC60068-2-64:2008	
Test condition :			
Vibration test conditions		Test result determination	
1. frequency of oscillation 10-55Hz		P	
2. Sweep rate does not exceed 1oct/min		P	
3. Shaking table amplitude 1.5mm		P	
4. Tests were carried out in 3 directions of the sample		P	
5. Total test time for 8 hours		P	
6. Indoor temperature 28.6 degrees Celsius. Humidity 73%RH		P	
Equipment use :		Vibration testing machine	
Testing environment :		room temperature : 24.9℃ ; humidity : 65%RH °	
atmospheric pressure :		86 kPa–106 kPa(860mbar-1060mbar)	
Final conclusion :		Vibration test qualified.	
Sample name:	LED ROAD AND AREA LUMINAIRES	model:	SH61
Sample delivery date:	Dec. 28, 2020	Completion date:	Dec. 29, 2020



PHOTOGRAPHS OF SAMPLE AS RECEIVED

Photo 1



Photo 2



Photo 3



***** END OF REPORT *****





CERTIFICATE OF CONFORMITY

No.: 20ZCTS1228005LC

Applicant : YANGZHOU XINTONG TRANSPORT EQUIPMENT GROUP CO., LTD.
Address : Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu Province, China
Manufacturer : YANGZHOU XINTONG TRANSPORT EQUIPMENT GROUP CO., LTD.
Address : Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu Province, China
Product : LED ROAD AND AREA LUMINAIRES
Trademark : 
Model : SH61
SH6101: 30-60W · SH6102: 80-120W · SH6103: 150-180W · SH6104: 200-250W

The submitted sample of the above equipment has been tested and found to comply with the following European Directive:

Low Voltage Directive - 2014/35/EU

The standard(s) used for showing compliance with the essential requirements:

Applicable Standard(s)	Test Report(s) Number
EN 60598-2-3:2003+A1:2011 EN 60598-1:2015+A1:2018	20ZCTS1228005LR

This certificate is part of the full test report(s) and should be read in conjunction with it. This certificate is based on an evaluation of one sample of above mentioned product. It does not imply assessment of the production of the product. Without the written approval of Shenzhen ZCT Technology Co., Ltd. this certificate is not permitted to be reproduced, except in full. It is not permitted to use the test lab's logo. The CE marking may only be used if all the relevant and effective European Directives are applicable.



Shenzhen ZCT Technology Co., Ltd.

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CE EMC TEST REPORT

for

Product:LED ROAD AND AREA LUMINAIRES

Model: SH61

SH6101: 30-60W • SH6102: 80-120W • SH6103: 150-180W • SH6104:200-250W

Issued for

Yangzhou Xintong Transport Equipment Group Co., Ltd.

**Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu
Province, China**

Issued by

Shenzhen ZCT Technology Co.,Ltd.

**3/F., Building 5, Hongsheng Industrial Zone, Bao'an Road, Xixiang Street,
Bao'an District, Shenzhen, Guangdong, China.**

TEL: 400-669-6965

FAX: (86) 755-23702323

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1. TEST CERTIFICATION

Product:	LED ROAD AND AREA LUMINAIRES
Model:	SH61 SH6101: 30-60W, SH6102: 80-120W, SH6103: 150-180W, SH6104: 200-250W
Applicant:	Yangzhou Xintong Transport Equipment Group Co., Ltd.
Address:	Yangzhou Xintong Transport Equipment Group Co., Ltd., Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu Province, China
Manufacturer:	Yangzhou Xintong Transport Equipment Group Co., Ltd.
Address:	Yangzhou Xintong Transport Equipment Group Co., Ltd., Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu Province, China
Test Date:	Dec.28, 2020 to Jan.4, 2021
Issued Date:	Jan.4, 2021
Test Voltage:	AC 230V/50Hz
Applicable Standards:	EMC Directive 2014/30/EU EN 55015:2013+A1:2015 EN 61547:2009 EN 61000-3-2:2014 EN 61000-3-3:2013



The above equipment has been tested by Shenzhen ZCT Technology Co., Ltd. and found compliance with the requirements in the technical standards mentioned above. The test results presented in this report only relate to the product/system tested. The Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Test Engineer :

Technical Manager :


Shirley Yuan / Engineer


Tomy Wu / Manager



2. TEST SUMMARY

EMISSION			
Standard	Item	Result	Remarks
EN 55015:2013 +A1:2015	Conducted (Main Port)	PASS	Complied with limit
	Radiated Electromagnetic Disturbance	PASS	Complied with limit
	Radiated Emission	PASS	Complied with limit
EN 61000-3-2:2014	Harmonic current emissions	N/A	Not applicable
EN 61000-3-3:2013	Voltage fluctuations & flicker	N/A	Not applicable

IMMUNITY			
Standard	Item	Result	Remarks
EN 61000-4-2:2009	ESD	PASS	Complied with limit
EN 61000-4-3:2006+ A1:2008+A2:2010	RS	PASS	Complied with limit
EN 61000-4-4:2012	EFT	PASS	Complied with limit
EN 61000-4-5:2014	Surge	PASS	Complied with limit
EN 61000-4-6:2014	CS	PASS	Complied with limit
EN 61000-4-8:2010	PFMF	N/A	Not applicable
EN 61000-4-11:2004	Voltage dips & voltage variations	PASS	Complied with limit

Note: 1) The test result verdict is decided by the limit of test standard

2) The information of measurement uncertainty is available upon the customer's request.



3. TEST SITE

3.1. TEST FACILITY

Shenzhen ZCT Technology Co., Ltd.

Address: 3/F., Building 5, Hongsheng Industrial Zone, Bao'an Road, Xixiang Street,
Bao'an District, Shenzhen, Guangdong, China.

3.2. LIST OF TEST AND MEASUREMENT INSTRUMENTS

3.2.1. For conducted emission at the mains terminals test

Name of Equipment	Manufacturer	Model	Serial No.	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	Aug. 19, 2021
Artificial Mains Network	Rohde&Schwarz	L2-16B	000WX31025	Aug. 19, 2021
Artificial Mains Network	Rohde&Schwarz	ENV216	101342	Aug. 19, 2021

3.2.2. For radiated electromagnetic emission test

Name of Equipment	Manufacturer	Model	Serial No.	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	Aug. 19, 2021
Triple-Loop Antenna	PATCH PANEL	RF300	9138	Aug. 19, 2021



3.2.3. For radiated emission test (30MHz-1GHz)

Name of Equipment	Manufacturer	Model	Serial No.	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	Aug. 19, 2021
Bilog Antenna	SCHWARZBECK	VULB 9168	9168-3355	Aug. 21, 2021
Preamplifier (low frequency)	SCHWARZBECK	BBV 9475	9745-0013	Aug. 19, 2021

3.2.4. For harmonic current emissions and voltage fluctuations/flicker test

Name of Equipment	Manufacturer	Model	Serial No.	Calibration Due
Harmonics / Flicker Test System	California Instruments	CTS/PACS-1-115	1534A00401	Aug. 19, 2021
AC Power Source	California Instruments	3001IX-208-CTS	1534A00401	Aug. 19, 2021

3.2.5. For electrostatic discharge immunity test

Name of Equipment	Manufacturer	Model	Serial No.	Calibration Due
ESD Generator	SCHLODER	SESD216	606137	Aug. 20, 2021

3.2.6. For radio frequency electromagnetic field immunity (R/S) test (DQT)

Name of Equipment	Manufacturer	Model	Serial No.	Calibration Due
Signal Generator	Agilent	N517113-50B	MY53050160	Oct.29, 2020
Amplifier	A&R	150W1000M3	313157	Oct.29, 2020
Amplifier	A&R	50SIG6M2	0342835	Oct.29, 2020
Antenna	SCHWARZBECK	STLP9149	9149.222	Oct.29, 2020
Isotropic Field Probe	A&R	FL7006	0342652	Oct.29, 2020



Log-periodic Antenna	SCHWARZBECK	STLP 9128E	9128E-012	Oct.29, 2020
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3.2.7. For electrical fast transient/burst immunity test

Name of Equipment	Manufacturer	Model	Serial No.	Calibration Due
EFT Tester	HTEC	HEFT 51	1416010	Aug. 19, 2021
EFT Coupling Clamp	HTEC	HEFT 51-C	1416011	Aug. 19, 2021

3.2.8. For surge immunity test

Name of Equipment	Manufacturer	Model	Serial No.	Calibration Due
Surge Tester	HTEC	HCWG 71	174302	Aug. 19, 2021
Surge Tester	HTEC	TCOMB 4	142103	Aug. 19, 2021
Surge Tester	HTEC	HTSG 70	175002	Aug. 19, 2021

3.2.9. For injected currents susceptibility test

Name of Equipment	Manufacturer	Model	Serial No.	Calibration Due
C/S Test System	SCHLODER	CDG-6000-25	126A1279/2014	Aug. 19, 2021
Coupling Decoupling Network	SCHLODER	CDN-M2+3	A2210251/2013	Aug. 19, 2021
Electromagnetic Injection Clamp	Luthi	EM101	36041	Aug. 19, 2021



3.2.10. For power frequency magnetic field immunity test

Name of Equipment	Manufacturer	Model	Serial No.	Calibration Due
Magnetic Field Tester	HTEC	HPFMF	142104	Aug. 19, 2021

3.2.11. For voltage dips and short interruptions immunity test

Name of Equipment	Manufacturer	Model	Serial No.	Calibration Due
Dips Tester	HTEC	HV1P16T/HCOM PACT52	170901/190901	Aug. 19, 2021



4. EUT DESCRIPTION

Product	LED ROAD AND AREA LUMINAIRES
Model	SH61 SH6101: 30-60W, SH6102: 80-120W, SH6103: 150-180W, SH6104: 200-250W
Supplied Voltage	AC 100-277V, 50/60Hz
Power	250W

I/O PORT

I/O PORT TYPES	Q'TY	TESTED WITH
AC Port	1	<input checked="" type="checkbox"/>
DC Port	1	<input type="checkbox"/>

Models Difference

All samples are the same except appearance and model number.



5. TEST METHODOLOGY

5.1. TEST MODE

The EUT was tested together with the thereafter additional components, and a configuration, which produced the worst emission levels, was selected and recorded in this report.

The following test mode(s) were assessed.

	Test Items	Test Mode
Emission	Conducted Emission	Lighting
	Radiated Electromagnetic Disturbance	Lighting
	Radiated Emission	Lighting
	Harmonic current emissions	N/A
	Voltage fluctuations & flicker	N/A
Immunity	ESD	Lighting
	RS	Lighting
	EFT	Lighting
	Surge	Lighting
	C/S	Lighting
	M/S	N/A
	Dips	Lighting

5.2. EUT SYSTEM OPERATION

1. Set up EUT with the support equipment.
2. Make sure the EUT work normally during the test.



6. SETUP OF EQUIPMENT UNDER TEST

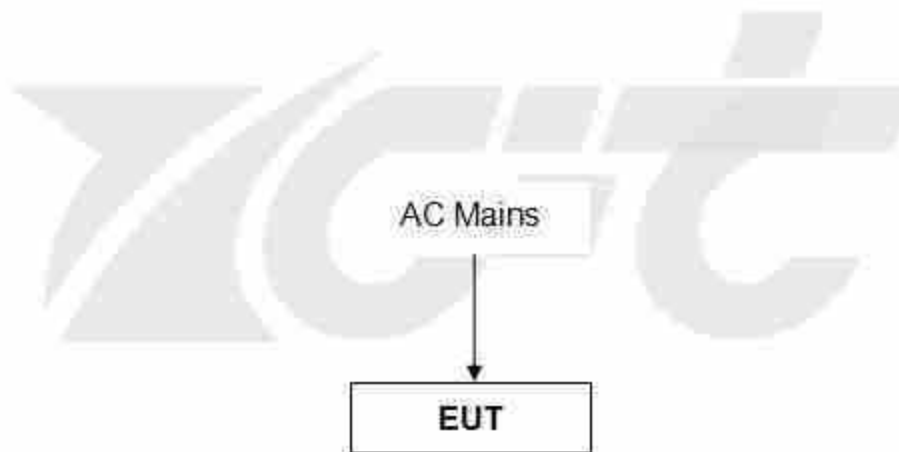
6.1. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Model	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
1.	N/A	N/A	N/A	N/A	N/A	N/A	N/A

- Note: 1) All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2) Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

6.2. CONFIGURATION OF SYSTEM UNDER TEST



(EUT LED ROAD AND AREA LUMINAIRES)



7. EMISSION TEST

7.1. CONDUCTED EMISSION MEASUREMENT

7.1.1. LIMITS

FREQUENCY (MHz)	LIMITS(dB μ V)	
	Quasi-peak	Average
0.009-0.05	110	N/A
0.05-0.15	90 – 80	N/A
0.15 - 0.5	66 – 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1) The lower limit shall apply at the transition frequencies.

2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 MHz to 0.5 MHz

7.1.2. TEST PROCEDURES

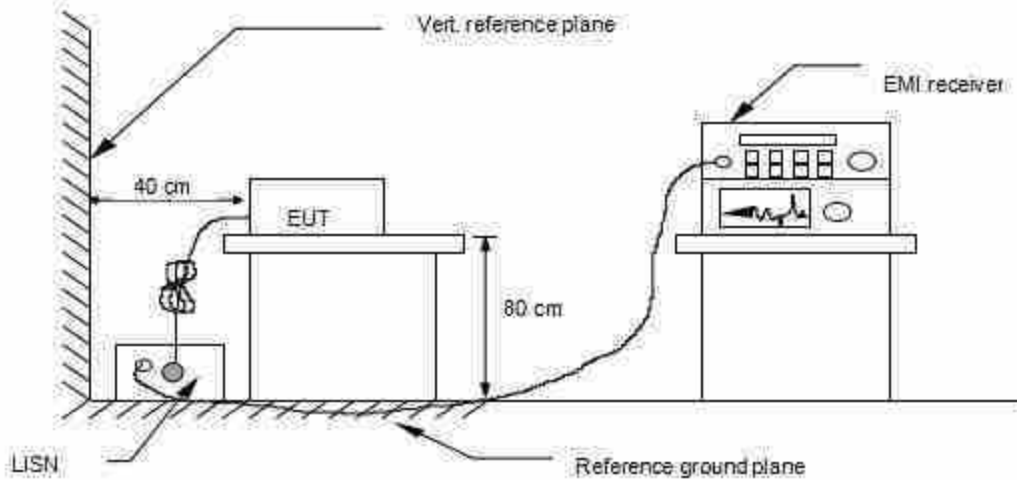
The EUT and Support equipment, if needed, was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane. When the EUT is floor standing equipment, it is placed on the ground plane, which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane. The EUT should be 0.8 m apart from the AMN, where the mains cable supplied by the manufacturer is longer than 0.8 m, the excess should be folded at the centre into a bundle no longer than 0.4 m. Details please refer to test setup photography.

The Receiver scanned from 9 kHz to 30 MHz for emissions in each of the test modes. During the above scans, the emissions were maximized by cable manipulation.

A scanning was taken on the power lines, Line and neutral, recording at least six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. The test data of the worst-case condition(s) was recorded.



7.1.3. TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.1.4. TEST RESULT

Product name	LED ROAD AND AREA LUMINAIRES	Tested By	Yang
Model	SH61	Detector Function	Peak / Quasi-peak / AV
Test Mode	Lighting	6 dB Bandwidth	200 Hz / 9 kHz
Environmental Conditions	24.3°C, 54.1 % RH, 101.1 kPa	Test Result	Pass

Note:

L = Line Line, N = Neutral Line

Freq. = Emission frequency in MHz

Reading level (dB μ V) = Receiver reading

Corr. Factor (dB) = attenuator + Cable loss

Level (dB μ V) = Reading level (dB μ V) + Corr. Factor (dB)

Limit (dB μ V) = Limit stated in standard

Over Limit (dB) = Level (dB μ V) – Limit (dB μ V)

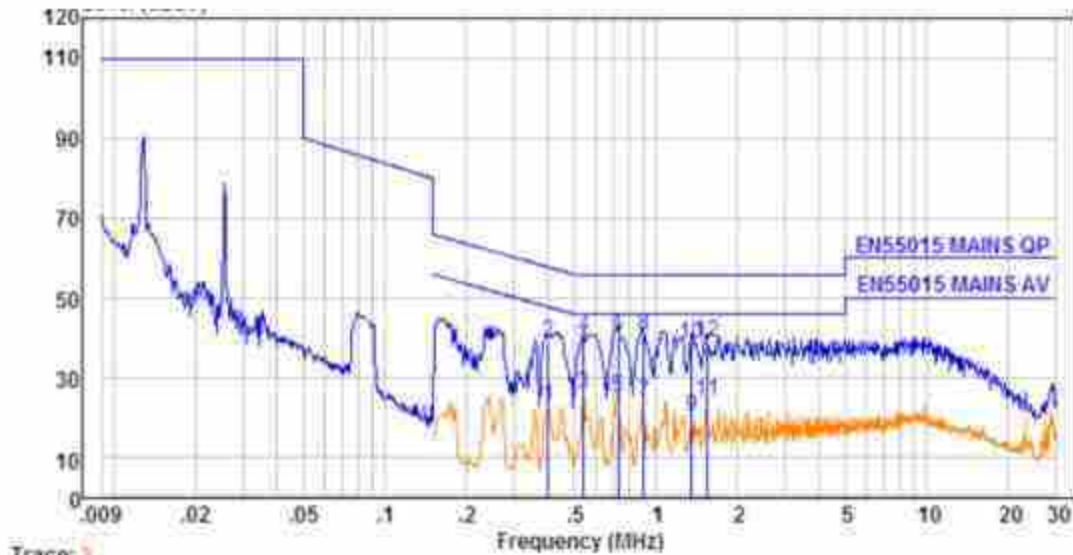
QP = Quasi-Peak

AV = Average



Please refer to the following diagram:

Line:

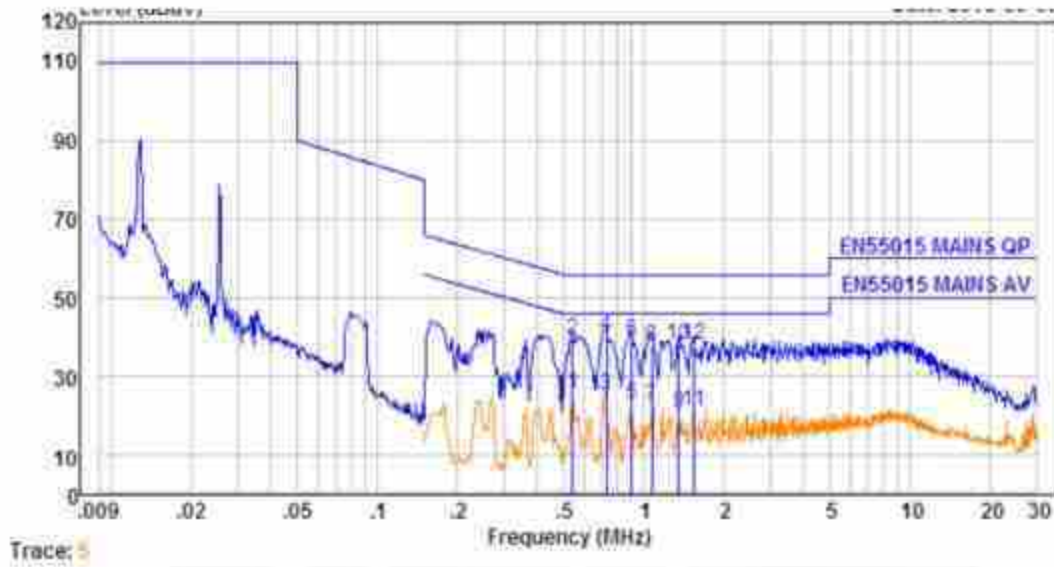


Trace: 3

No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBuV	Emission Level dBuV	Limit dBuV	Over Limit dB	Remark
1.	0.400	0.40	9.73	13.08	23.21	47.86	-24.65	Average
2.	0.400	0.40	9.73	28.64	38.77	57.86	-19.09	QP
3.	0.541	0.43	9.78	16.08	26.29	46.00	-19.71	Average
4.	0.541	0.43	9.78	30.15	40.36	56.00	-15.64	QP
5.	0.724	0.44	9.80	15.14	25.38	46.00	-20.62	Average
6.	0.724	0.44	9.80	30.20	40.44	56.00	-15.56	QP
7.	0.904	0.45	9.81	13.61	23.87	46.00	-22.13	Average
8.	0.904	0.45	9.81	30.67	40.93	56.00	-15.07	QP
9.	1.359	0.46	9.83	10.19	20.48	46.00	-25.52	Average
10.	1.359	0.46	9.83	28.23	38.52	56.00	-17.48	QP
11.	1.535	0.47	9.84	13.98	24.29	46.00	-21.71	Average
12.	1.535	0.47	9.84	28.85	39.16	56.00	-16.84	QP



Neutral:



No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBuV	Emission Level dBuV	Limit dBuV	Over Limit dB	Remark
1.	0.541	0.43	9.81	15.23	25.47	46.00	-20.53	Average
2.	0.541	0.43	9.81	29.31	39.55	56.00	-16.45	QP
3.	0.724	0.44	9.83	15.17	25.44	46.00	-20.56	Average
4.	0.724	0.44	9.83	30.20	40.47	56.00	-15.53	QP
5.	0.904	0.45	9.84	12.58	22.87	46.00	-23.13	Average
6.	0.904	0.45	9.84	28.61	38.90	56.00	-17.10	QP
7.	1.071	0.46	9.85	12.40	22.71	46.00	-23.29	Average
8.	1.071	0.46	9.85	27.44	37.75	56.00	-18.25	QP
9.	1.359	0.46	9.86	10.57	20.89	46.00	-25.11	Average
10.	1.359	0.46	9.86	27.61	37.93	56.00	-18.07	QP
11.	1.535	0.47	9.87	10.87	21.21	46.00	-24.79	Average
12.	1.535	0.47	9.87	27.89	38.23	56.00	-17.77	QP



7.2. RADIATED ELECTROMAGNETIC DISTURBANCE

7.2.1. LIMITS

Frequency	Limits for loop diameter dB(μ A) [*]		
	2 m	3 m	4 m
9 kHz-70 kHz	88	81	75
70 kHz-150 kHz	88-58 ^{**}	81-51 ^{**}	75-45 ^{**}
150 kHz-3.0 MHz	58-22 ^{**}	51-15 ^{**}	45-9 ^{**}
3.0 MHz-30 MHz	22	15-16 ^{***}	9-12 ^{***}

^{*} At the transition frequency, the lower limit applies.

^{**} Decreasing linearly with the logarithm of the frequency.

^{***} Increasing linearly with the logarithm of the frequency.

7.2.2. TEST PROCEDURE

The EUT and support equipment are positioned in the centre of loop antenna system (LAS). The LAS consists of three circular, mutually perpendicular large-loop antennas (LLAs), having a diameter of 2 m, supported by a non-metallic base. A 50 Ω coaxial cable between the current probe of an LLA and the coaxial switch, and between this switch and the measuring equipment, shall have surface transfer impedance smaller than 10 m Ω /m at 100 kHz and 1 m Ω /m at 10 MHz. The distance between the outer diameter of the loop antenna system and nearby objects, such as floor and walls, shall be at least 0.5 m as per CISPR 15/ EN 55015.

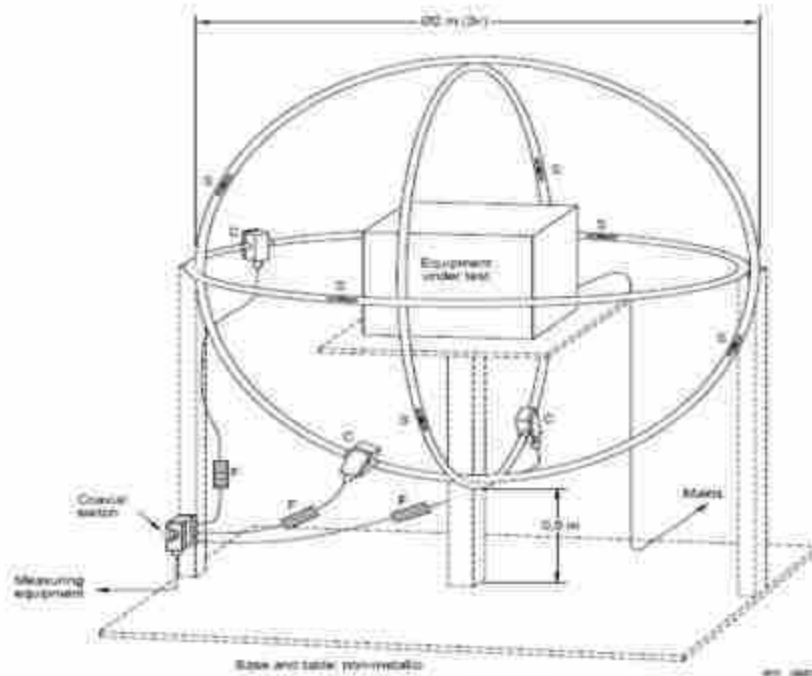
The induced current in the loop antenna is measured by means of a current probe (1 V/A) and the CISPR measuring receiver. By means of a coaxial switch, the three field directions (X, Y, Z) can be measured in sequence.

The receiver scanned from 9 kHz to 30 MHz for emissions in each of the test modes, and recorded at least the six highest emissions. Each value shall comply with the requirement given.

The test data of the worst-case condition(s) was recorded.



7.2.3. TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.2.4. TEST RESULT

Product name	LED ROAD AND AREA LUMINAIRES	Antenna Pole	X, Y, Z
Model	SH61	Antenna Diameter	2 m
Test Mode	Lighting	Detector Function	Peak
Environmental Conditions	24.3°C, 54.1 % RH, 101.1 kPa	6 dB Bandwidth	200 Hz/9 kHz
Tested By	Qick	Test Result	Pass

Note:

Freq. = Emission frequency in MHz

Reading level (dB μ A) = Receiver reading

Corr. Factor (dB) = Antenna factor + Cable loss

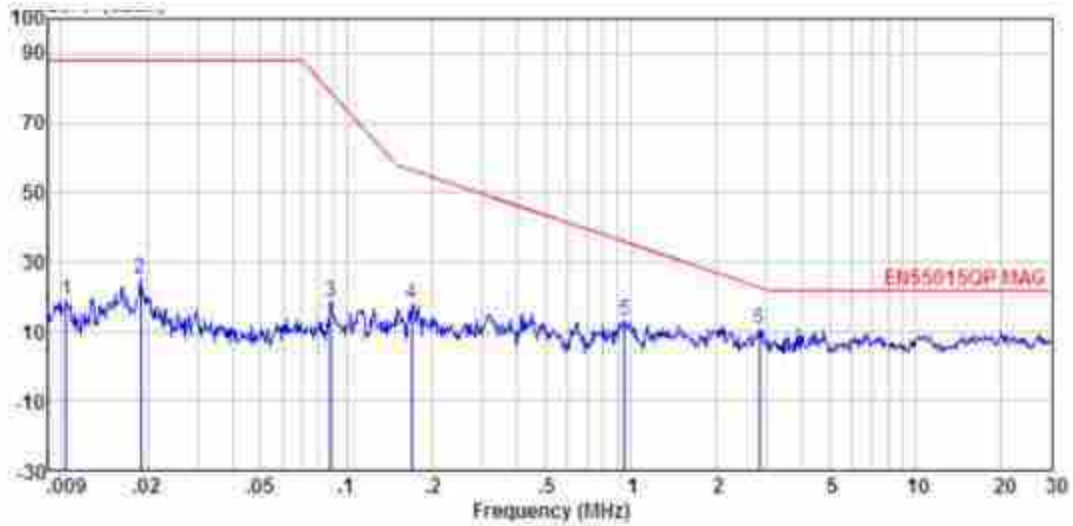
Measurement (dB μ A) = Reading level (dB μ A) + Corr. Factor (dB)

Limit (dB μ A) = Limit stated in standard

Over Limit (dB) = Measurement (dB μ A) – Limit (dB μ A) QP = Quasi-Peak



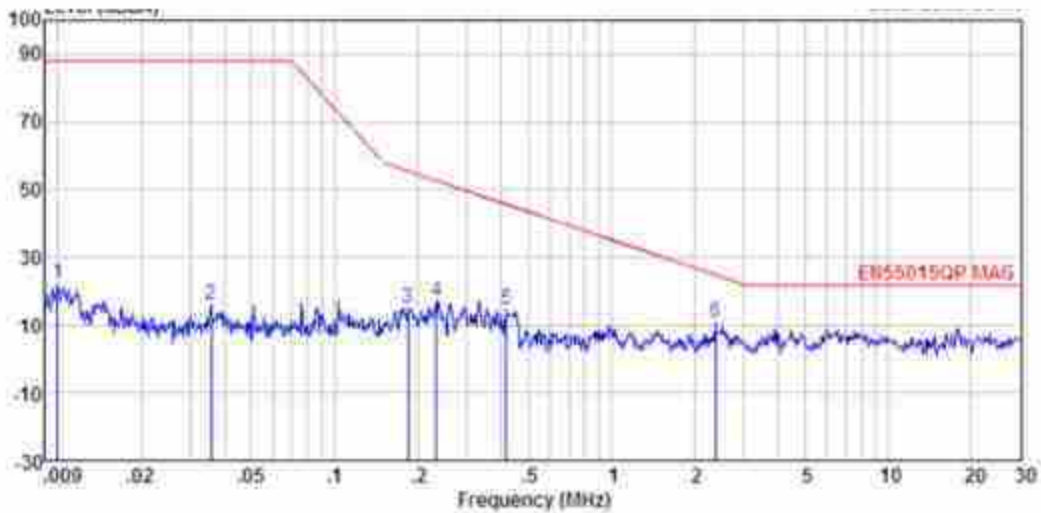
Please refer to the following diagram:
X:



No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBuA	Emission Level dBuA	Limit dBuA	Over Limit dB	Remark
1	0.010	10.80	0.97	7.21	18.98	88.00	-69.02	QP
2	0.019	10.75	0.97	13.60	25.32	88.00	-62.68	QP
3	0.088	10.64	0.92	6.77	18.33	79.02	-60.69	QP
4	0.170	10.60	0.90	6.45	17.95	56.52	-38.57	QP
5	0.955	10.67	0.59	1.94	13.20	35.76	-22.56	QP
6	2.831	10.71	0.73	-0.85	10.59	22.70	-12.11	QP



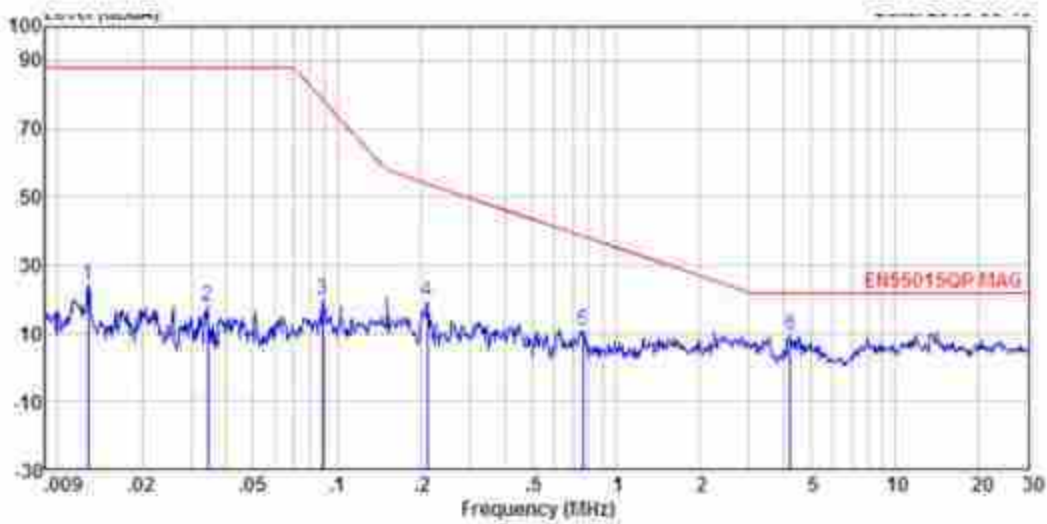
Yes



No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBuA	Emission Level dBuA	Limit dBuA	Over Limit dB	Remark
1.	0.010	10.80	0.97	10.60	22.37	88.00	-65.63	QP
2.	0.036	10.71	0.98	4.39	16.08	88.00	-71.92	QP
3.	0.184	10.61	0.92	3.40	14.93	55.55	-40.62	QP
4.	0.233	10.62	0.98	5.42	17.02	52.72	-35.70	QP
5.	0.417	10.64	0.94	2.84	14.42	45.70	-31.28	QP
6.	2.368	10.70	0.70	-0.82	10.58	24.84	-14.26	QP



Z



No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBuA	Emission Level dBuA	Limit dBuA	Over Limit dB	Remark
1.	0.013	10.78	0.97	12.29	24.04	88.00	-63.96	QP
2.	0.034	10.71	0.98	6.22	17.91	88.00	-70.09	QP
3.	0.089	10.64	0.92	8.31	19.87	78.70	-58.83	QP
4.	0.211	10.61	0.96	7.75	19.32	53.89	-34.57	QP
5.	0.761	10.66	0.73	-0.59	10.80	38.49	-27.69	QP
6.	4.213	10.73	0.85	-2.03	9.55	22.00	-12.45	QP



7.3. RADIATED EMISSION MEASUREMENT

7.3.1. LIMITS

FREQUENCY (MHz)	Limit (dB μ V/m) (At 3 m)	Limit (dB μ V/m) (At 10 m)
30 ~ 230	40	30
230 ~ 300	47	37

Note: 1) The lower limit shall apply at the transition frequencies.

2) Emission level (dB μ V/m) = 20 log Emission level (μ V/m).

7.3.2. TEST PROCEDURE

The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is floor standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.

The antenna was placed at 3 meter away from the EUT. The antenna connected to the spectrum analyzer via a cable and at times a pre-amplifier would be used.

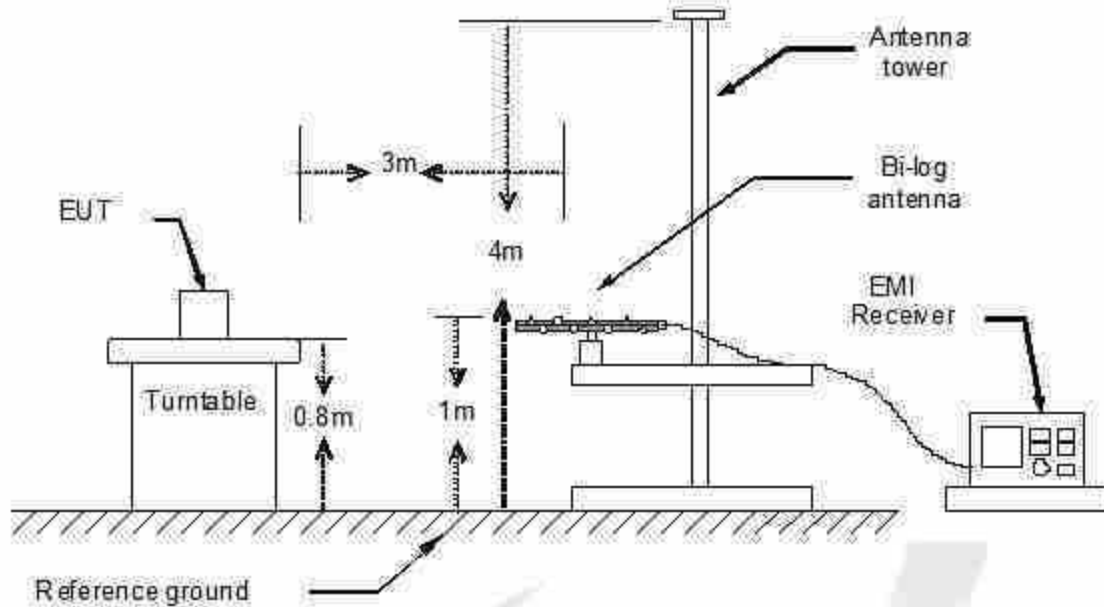
The analyzer / receiver quickly scanned from 30 MHz to 300 MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

During the above scans, the emissions were maximized by cable manipulation. Each modes is measured, recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only Q.P. reading is presented.

The test data of the worst-case condition(s) was recorded.



7.3.3. TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration

7.3.4. TEST RESULT

Product name	LED ROAD AND AREA LUMINAIRES	Antenna Distance	3 m
Model	SH61	Antenna Pole	Vertical / Horizontal
Test Mode	Lighting	Detector Function	Peak / Quasi-peak
Environmental Conditions	24.3°C, 54.1 % RH, 101.1 kPa	6 dB Bandwidth	120 kHz
Tested by	Qick	Test Result	Pass

Note:

Freq. = Emission frequency in MHz

Reading level (dB μ V/m) = Receiver reading

Corr. Factor (dB) = Antenna factor + Cable loss

Measurement (dB μ V/m) = Reading level (dB μ V/m) + Corr. Factor (dB)

Limit (dB μ V/m) = Limit stated in standard

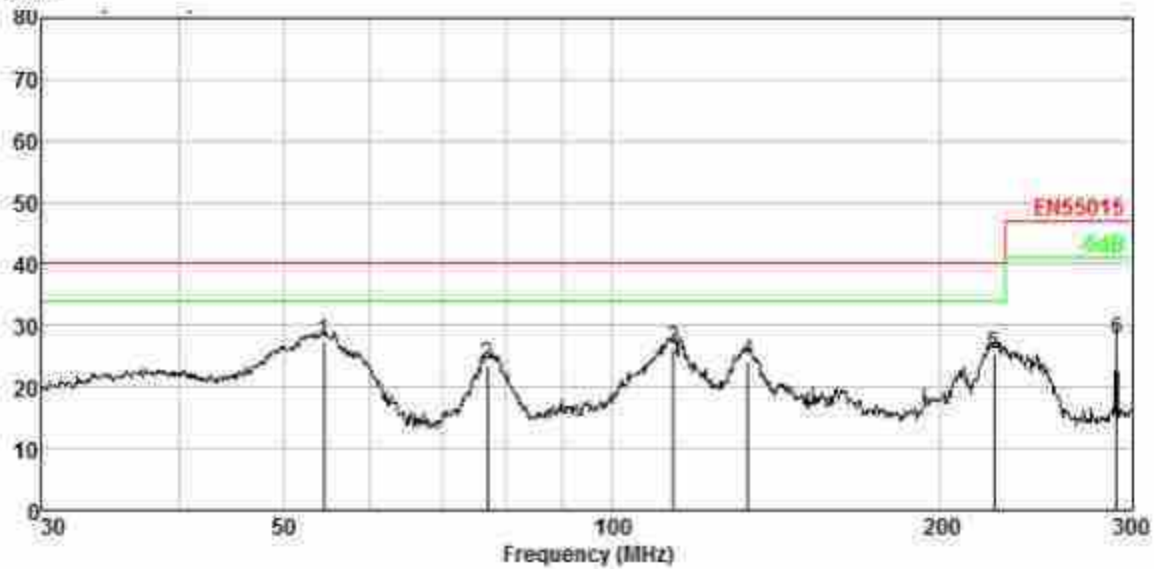
Over Limit (dB) = Measurement (dB μ V/m) – Limit (dB μ V/m)

QP = Quasi-Peak



Please refer to the following diagram:

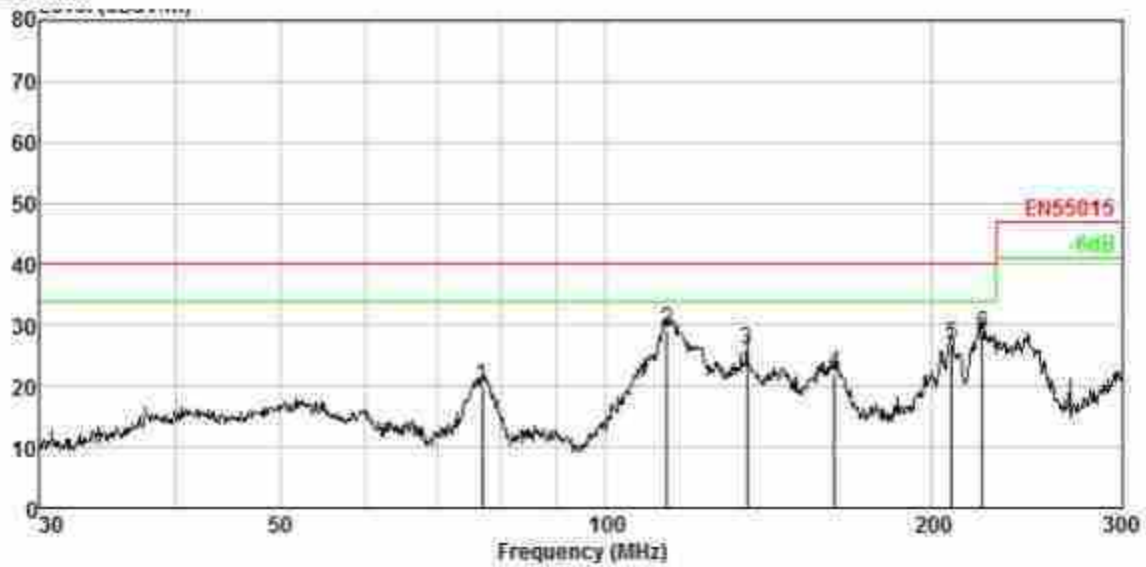
Vertical:



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	54.465	2.23	12.10	42.98	29.93	27.38	40.00	-12.62	QP
2.	76.935	2.82	9.24	41.63	29.96	23.73	40.00	-16.27	QP
3.	114.057	3.50	11.30	41.55	30.00	26.35	40.00	-13.65	QP
4.	133.389	3.77	12.89	37.62	30.01	24.27	40.00	-15.73	QP
5.	224.451	4.66	11.78	39.14	30.12	25.46	40.00	-14.54	QP
6.	290.483	5.10	13.08	39.88	30.30	27.76	47.00	-19.24	QP



Horizontal:



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	76.935	2.82	9.24	37.84	29.96	19.94	40.00	-20.06	QP
2.	114.057	3.50	11.30	44.53	30.00	29.33	40.00	-10.67	QP
3.	135.245	3.79	13.01	39.18	30.01	25.97	40.00	-14.03	QP
4.	162.975	4.11	13.85	34.30	30.03	22.23	40.00	-17.77	QP
5.	208.988	4.54	11.30	41.11	30.07	26.88	40.00	-13.12	QP
6.	222.906	4.65	11.73	42.46	30.11	28.73	40.00	-11.27	QP



7.4. HARMONICS CURRENT MEASUREMENT

7.4.1. LIMITS OF HARMONICS CURRENT MEASUREMENT

Limit for Class A equipment		Limit for Class D equipment		
Harmonics Order N	Max. permissible harmonics current A	Harmonics Order n	Max. permissible harmonics current per watt mA/W	Max. permissible harmonics current A
Odd harmonics		Odd Harmonics only		
3	2.30	3	3.4	2.30
5	1.14	5	1.9	1.14
7	0.77	7	1.0	0.77
9	0.40	9	0.5	0.40
11	0.33	11	0.35	0.33
13	0.21	13	0.30	0.21
$15 \leq n \leq 39$	$0.15 \times (15/n)$	$15 \leq n \leq 39$ (odd harmonics only)	$3.85/n$	$0.15 \times (15/n)$
Even harmonics				
2	1.08			
4	0.43			
6	0.30			
$8 \leq n \leq 40$	$0.23 \times 8/n$			

Limit for Class C equipment	
Harmonics Order n	Max. permissible harmonics current expressed as a percentage of the input current at the fundamental frequency A
2	2
3	$30 \times F$
5	10
7	7
9	5
$11 \leq n < \leq 39$ (odd harmonics only)	3

F is the circuit power factor

Note: Class A, B, C and D are classified according to item 7.4.2. of this report

7.4.2. TEST PROCEDURES

The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce



the maximum harmonic. The classification of EUT is according to section 5 of EN 61000-3-2.

The EUT is classified as follows:

Class A:

Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.

Class B:

Portable tools; Arc welding equipment which is not professional equipment.

Class C:

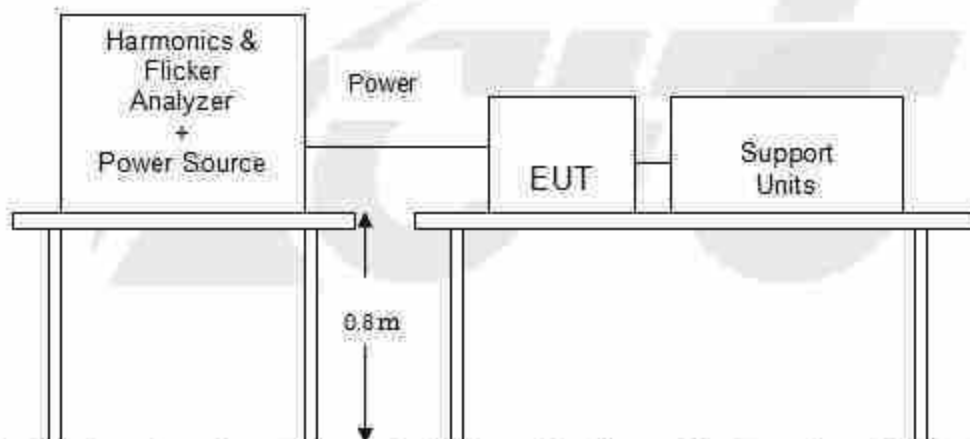
N/A equipment

Class D:

Equipment having a specified power less than or equal to 600 W of the following types: Personal computers and personal computer monitors and television receivers.

The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

7.4.3. TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.4.4. TEST RESULT

N/A



7.5. VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

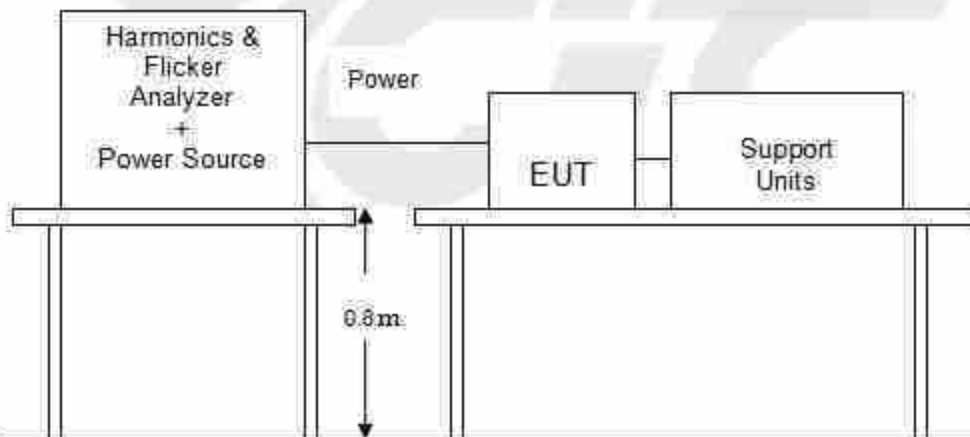
7.5.1. LIMITS OF VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

TEST ITEM	LIMIT	REMARK
P_{st}	1.0	P_{st} means short-term flicker indicator.
P_{lt}	0.65	P_{lt} means long-term flicker indicator.
T_{dt} (ms)	500	T_{dt} means maximum time that dt exceeds 3 %.
d_{max} (%)	4/6/7 %	d_{max} means maximum relative voltage change.
dc (%)	3.3 %	dc means relative steady-state voltage change.

7.5.2. TEST PROCEDURE

The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under N/A operating conditions. During the flick measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

7.5.3. TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.5.4. TEST RESULT

N/A



8. IMMUNITY TEST

8.1. GENERAL DESCRIPTION

Product Standard	EN 61547	
	Test Type	Minimum Requirement
Basic Standard, Specification, and Performance Criterion required	EN 61000-4-2	Electrostatic Discharge – ESD: ±8 kV air discharge, ±4 kV Contact discharge, Performance Criterion B
	EN 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80 ~1000 MHz, 3 V/m, 80 % AM(1 kHz), Performance Criterion A
	EN 61000-4-4	Electrical Fast Transient/Burst - EFT, Power line: ±1 kV, Signal line: ±0.5 kV, Performance Criterion B
	EN 61000-4-5	Surge Immunity Test: 1.2/50 μs Open Circuit Voltage, 8/20 μs Short Circuit Current, Power Port ~ Line to line: ±0.5 kV, Line to ground: ±1 kV (to self-ballasted lamps and semi-luminaires; luminaires and independent auxiliaries which are less than or equal to 25 W) Power Port ~ Line to line: ±1 kV, Line to ground: ±2 kV (to luminaires and independent auxiliaries which are more than 25 W) Signal Port : ±0.5 kV Performance Criterion B
	EN 61000-4-6	Conducted Radio Frequency Disturbances Test –CS: 0.15 ~ 80 MHz, 3 Vrms, 80 % AM, 1 kHz, Performance Criterion A
	EN 61000-4-8	Power frequency magnetic field immunity test 50 Hz, 3 A/m Performance Criterion A



	EN 61000-4-11	Voltage Dips and Interruptions: i) 30 % reduction for 10 period, Performance Criterion C ii) 100 % reduction for 0.5 period, Performance Criterion B
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8.2. GENERAL PERFORMANCE CRITERIA DESCRIPTION

Criteria 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.
Criteria B:	<p>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.</p> <p>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.</p>
Criteria C:	<p>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.</p> <p>Additional requirement for N/A equipment incorporating a starting device:</p> <p>After the test the N/A equipment is switched off. After half an hour it is switched on again. The N/A equipment shall start and operate as intended.</p>



8.3. ELECTROSTATIC DISCHARGE (ESD)

8.3.1. TEST SPECIFICATION

Basic Standard:	EN 61000-4-2
Discharge Impedance:	330 Ω
Charging Capacity:	150 pF
Discharge Voltage:	Air Discharge: ± 8 kV (Direct) Contact Discharge: ± 4 kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	10 times at each test point
Discharge Mode:	1 time/s
Performance Criterion:	B

8.3.2. TEST PROCEDURE

The discharges shall be applied in two ways:

- Contact discharges to the conductive surfaces and coupling planes.
Twenty dischargers (10 with positive and 10 with negative polarity) shall be applied on each accessible metallic part of the enclosure, terminals are excluded. In case of a non-conductive enclosure, dischargers shall be applied on the horizontal or vertical coupling planes. Test shall be performed at a maximum repetition rate of one discharge per second.
- Air discharges at slots and apertures and insulating surfaces.
On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user. A minimum of 10 single air discharges shall be applied to the selected test point for each such area.

The basic test procedure was in accordance with IEC 61000-4-2:

- The EUT was located 0.1 m minimum from all side of the HCP (dimensions 1.6 m x 0.8 m).
- The support units were located another table 30 cm away from the EUT, but direct support unit was/were located at same location as EUT on the HCP and keep at a distance of 10cm with EUT.
- The time interval between two successive single discharges was at least 1 second.
- Contact discharges were applied to the non-insulating coating, with the pointed tip of



the generator penetrating the coating and contacting the conducting substrate.

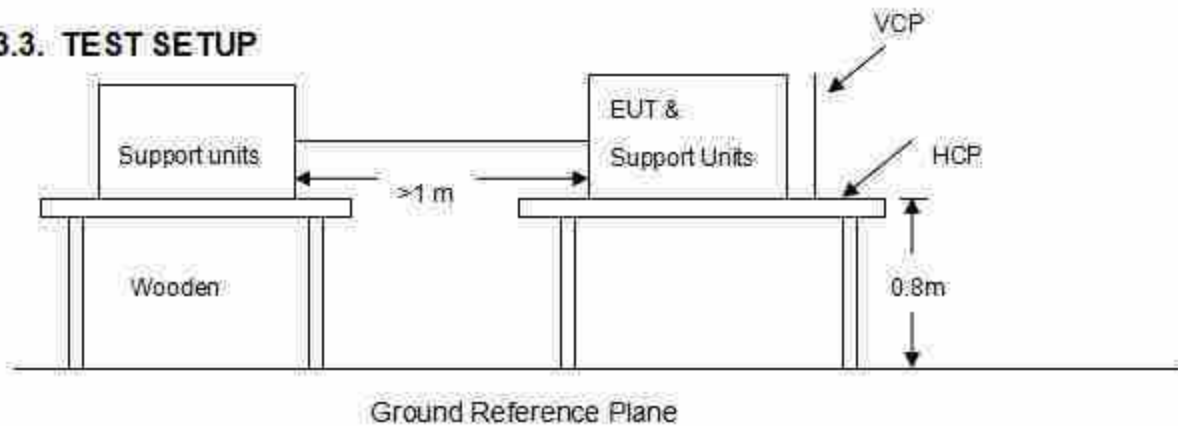
e) Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.

f) At least ten single discharges (in the most sensitive polarity) were applied at the front edge of each HCP opposite the center point of each unit of the EUT and 0.1 meters from the front of the EUT. The long axis of the discharge electrode was in the plane of the HCP and perpendicular to its front edge during the discharge.

g) At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane (VCP) in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5 m x 0.5 m) was placed vertically to and 0.1 meters from the EUT.



8.3.3. TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

Note:

1) TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the ground reference plane (GRP). The GRP consisted of a sheet of aluminum at least 0.25 mm thick, and 2.5 meters square connected to the protective grounding system. A horizontal coupling plane (HCP) (1.6 m x 0.8 m) was placed on the table and attached to the GRP by means of a cable with 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5 mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

2) FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were isolated from the ground reference plane by an insulating support of 0.1 meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25 mm thick, and 2.5 meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.



8.3.4. TEST RESULT

Product	LED ROAD AND AREA LUMINAIRES	Environmental Conditions	24.4°C, 54.6 % RH, 101.1 kPa
Model	SH61	Tested By	Yang
Test mode	Lighting	Test Result	Pass

Air Discharge					
Test Points	Test Levels	Results			
	± 8 kV	Pass	Fail	Observation	Performance Criterion
LED 1 Point	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Note <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3	B
Ports 6 Points	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Note <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3	B
Display 4 Points	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Note <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3	B

Contact Discharge					
Test Points	Test Levels	Results			
	± 4 kV	Pass	Fail	Observation	Performance Criterion
HCP 2 Points	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Note <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3	B
VCP 2 Points	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Note <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3	B

- Note: 1) There was no change compared with initial operation during the test.
 2) During the test the luminous intensity change, and after the test the luminous intensity can be restored to its initial value within 1 min.
 3) During the test, the luminous intensity change and after the test the luminous intensity can return to normal within 30 min.



8.4. RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD (RS)

8.4.1. TEST SPECIFICATION

Basic Standard:	EN 61000-4-3
Frequency Range:	80 MHz ~ 1000 MHz
Field Strength:	3 V/m
Modulation:	1 kHz Sine Wave, 80 %, AM Modulation
Frequency Step:	1 % of preceding frequency value
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Performance Criterion:	A

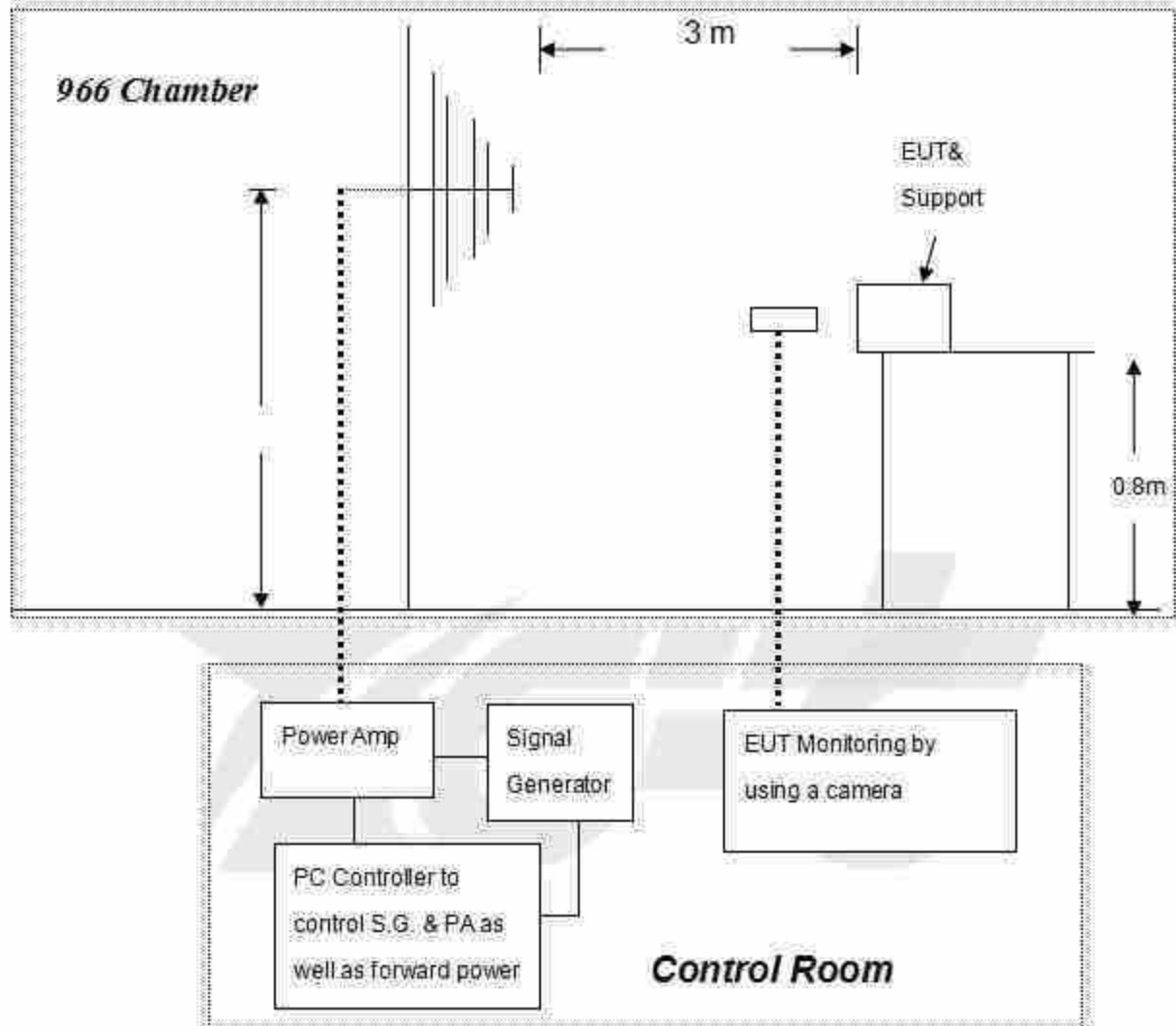
8.4.2. TEST PROCEDURE

The test procedure was in accordance with EN 61000-4-3

- The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.
- The frequency range is swept from 80 MHz to 1000 MHz, with the signal 80% amplitude modulated with a 1 kHz sine-wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s, where the frequency range is swept incrementally, the step size was 1 % of preceding frequency value.
- The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.



8.4.3. TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.
Note:

TABLETOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.



8.4.4. TEST RESULT

Product	LED ROAD AND AREA LUMINAIRES	Environmental Conditions	24.4°C, 54.6% RH, 101.1 kPa
Model	SH61	Tested By	Yang
Test mode	Lighting	Test Result	Pass

Frequency (MHz)	Polarity	Position	Field Strength (V/m)	Observation	Performance Criterion
80 ~ 1000	V&H	Front	3	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	A
80 ~ 1000	V&H	Rear	3	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	A
80 ~ 1000	V&H	Left	3	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	A
80 ~ 1000	V&H	Right	3	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	A

Note: 1) There was no change compared with initial operation during the test.

2) During the test the luminous intensity change and after the test the luminous intensity can be restored to its initial value within 1 min.

3) During the test, the luminous intensity change and after the test the luminous intensity can return to normal within 30 min.



8.5. ELECTRICAL FAST TRANSIENT (EFT)

8.5.1. TEST SPECIFICATION

Basic Standard:	EN 61000-4-4
Test Voltage:	Power Line: ± 1 kV Signal/Control Line: ± 0.5 kV
Polarity:	Positive & Negative
Impulse Frequency:	5 kHz
Impulse Wave-shape:	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	2 mins
Performance Criterion:	B

8.5.2. TEST PROCEDURE

EUT is placed on a 0.1 m tall wooden table.

EUT operate at normal mode, the transient/burst was 5/50 ns in accordance with EN 61000-4-4, both positive and negative polarity burst waveform were applied.

The duration time of each test line was 2 minutes.

8.5.3. TEST SETUP

The EUT installed in a representative system as described in section 7 of EN 61000-4-4.

For the actual test configuration, please refer to the related item – photographs of the test configuration.



8.5.4. TEST RESULT

Product	LED ROAD AND AREA LUMINAIRES	Environmental Conditions	24.4°C, 54.4% RH, 101.1 kPa
Model	SH61	Tested By	Yang
Test mode	Lighting	Test Result	Pass

Test Point	Polarity	Test Level (kV)	Observation	Performance Criterion
L	+/-	1	Note <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3	B
N	+/-	1	Note <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3	B
L - N	+/-	1	Note <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3	B
PE	--	-	N/A	N/A
L - PE	-	-	N/A	N/A
N - PE	--	-	N/A	N/A
L - N - PE	-	-	N/A	N/A
Signal/Control cable	-	-	N/A	N/A

Note: 1) There was no change compared with initial operation during the test.

2) During the test the luminous intensity change and after the test the luminous intensity can be restored to its initial value within 1 min.

3) During the test, the luminous intensity change and after the test the luminous intensity can return to normal within 30 min.



8.6. SURGE IMMUNITY TEST

8.6.1. TEST SPECIFICATION

Basic Standard:	EN 61000-4-5
Wave-Shape:	Combination Wave 1.2/50 μ s Open Circuit Voltage 8/20 μ s Short Circuit Current Power Port ~ Line to line: ± 0.5 kV, Line to ground: ± 1 kV (to self-ballasted lamps and semi-luminaires; luminaires and independent auxiliaries which are less than 25 W)
Test Voltage:	Power Port ~ Line to line: ± 1 kV, Line to ground: ± 2 kV (to luminaires and independent auxiliaries which are more than 25 W)
Surge Input/Output:	Power Line: L-N / L-PE / N-PE
Generator Source Impedance:	2 Ω between networks 12 Ω between network and ground
Polarity:	Positive/Negative
Phase Angle:	90°(positive polarity pulses) / 270°(negative polarity pulses)
Pulse Repetition Rate:	1 time / min.
Number of Tests:	5 positive polarity pulses at the 90° phase angle, and 5 negative polarity pulses at 270° phase angle
Performance Criterion:	B

8.6.2. TEST PROCEDURE

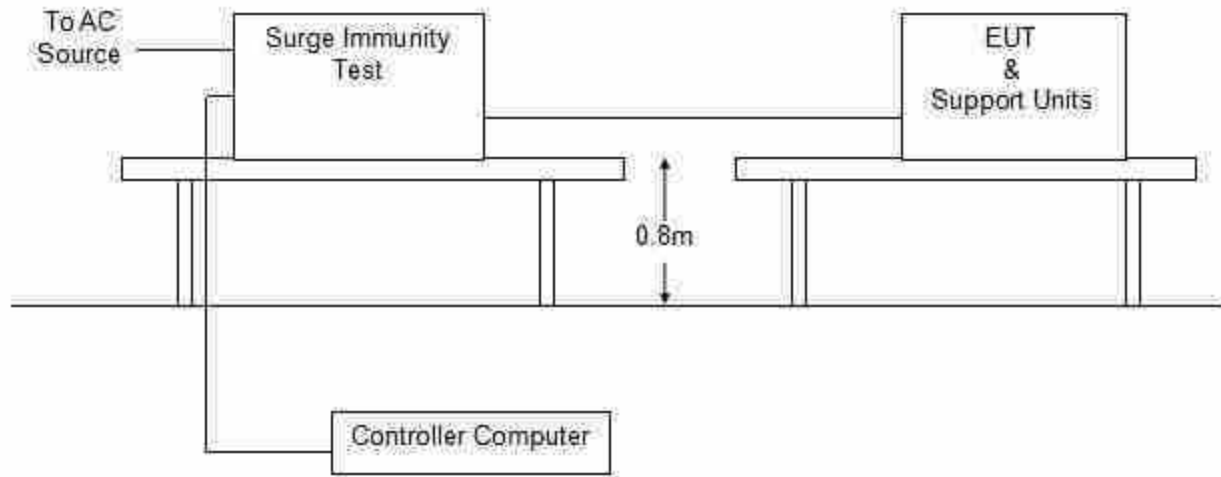
EUT is placed on a 0.1 m (table type equipment) / 0.8 m (floor type equipment) tall wooden table.

EUT operate at normal mode, two types of combination wave generator (1.2/50 μ s open-circuit voltage and 8/20 μ s short-circuit current) are applied to the EUT power supply terminals via the capacitive coupling network.

The power cord between the EUT and the coupling/decoupling network shall not exceed 2 m in length.



8.6.3. TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

8.6.4. TEST RESULT

Product	LED ROAD AND AREA LUMINAIRES	Environmental Conditions	24.4℃, 54.6% RH, 101.1 kPa
Model	SH61	Tested By	Yang
Test mode	Lighting	Test Result	Pass

Test Point	Polarity	Test Level (kV)	Observation	Performance Criterion
L - N	+/-	1	Note <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3	B
L - PE	-	-	-	-
N - PE	-	-	-	-

Note: 1) There was no change compared with initial operation during the test.

2) During the test the luminous intensity change and after the test the luminous intensity can be restored to its initial value within 1 min.

3) During the test, the luminous intensity change and after the test the luminous intensity can return to normal within 30 min.



8.7. CONDUCTED RADIO FREQUENCY DISTURBANCES (CS)

8.7.1. TEST SPECIFICATION

Basic Standard:	EN 61000-4-6
Frequency Range:	0.15 MHz ~80 MHz
Field Strength:	3 V
Modulation:	1 kHz Sine Wave, 80 %, AM Modulation
Frequency Step:	1 % of preceding frequency value
Coupled cable:	Power Mains, Shielded
Coupling device:	CDN-M3/2 (3 wires/2 wires)
Performance Criterion:	A

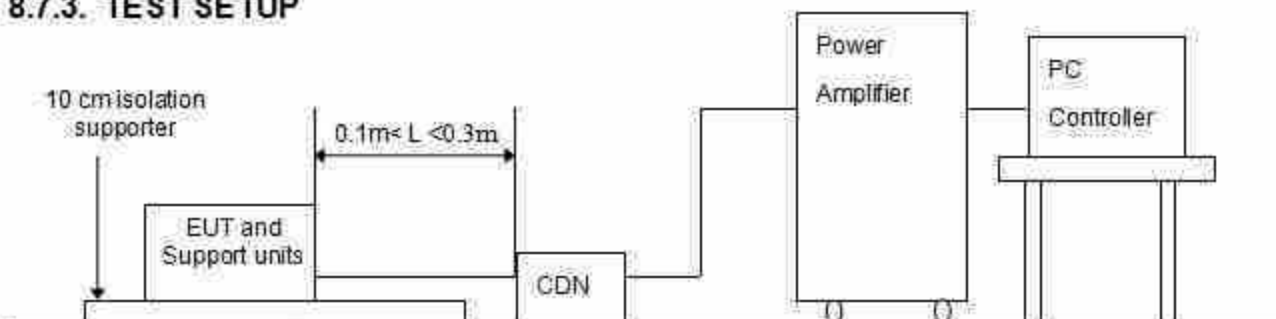
8.7.2. TEST PROCEDURE

The EUT shall be tested within its intended operating and climatic conditions.

The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50 Ω load resistor.

The frequency range was swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal was modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The sweep rate was 1.5×10^{-3} decades/s. Where the frequency range is swept incrementally, the step size was 1 % of preceding frequency value the dwell time of the amplitude modulated carrier at each frequency was 0.5 s.

8.7.3. TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration

Note: 1) The EUT is setup 0.1 m above Ground Reference Plane

2) All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.



8.7.4. TEST RESULT

Product	LED ROAD AND AREA LUMINAIRES	Environmental Conditions	24.4°C, 54.6% RH, 101.1 kPa
Model	SH61	Tested By	Yang
Test mode	Lighting	Test Result	Pass

Frequency (MHz)	Field Strength (Vrms)	Injected Position	Injection Method	Observation	Performance Criterion
0.15 ~ 80	3	AC Mains	CDN-M2/M3	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	A

Note: 1) There was no change compared with initial operation during the test.

2) During the test the luminous intensity change and after the test the luminous intensity can be restored to its initial value within 1 min.

3) During the test, the luminous intensity change and after the test the luminous intensity can return to normal within 30 min.



8.8. POWER FREQUENCY MAGNETIC FIELD

8.8.1. TEST SPECIFICATION

Basic Standard:	EN 61000-4-8
Frequency Range:	50 Hz
Field Strength:	1A/m
Observation Time:	5 minutes
Inductance Coil:	Rectangular type, 1 m x 1 m
Performance Criterion:	A

8.8.2. TEST PROCEDURE

The equipment is configured and connected to satisfy its functional requirements. It shall be placed on the GRP with the interposition of a 0.1 m-thick insulating support.

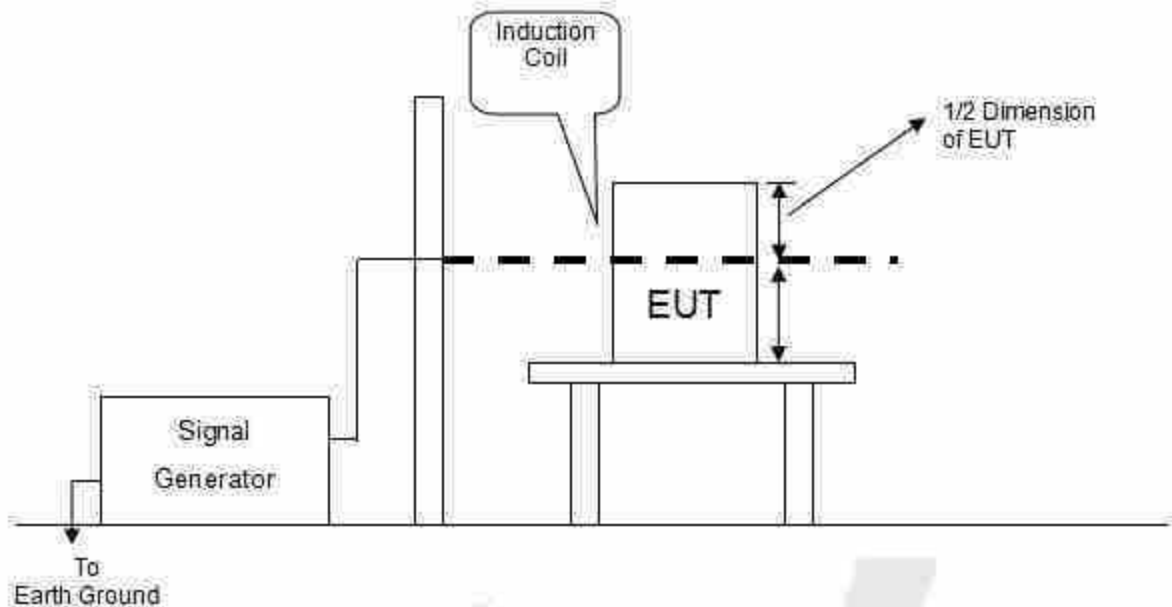
The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.

The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.

The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.



8.8.3. TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration Note:

TABLETOP EQUIPMENT

The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

FLOOR-STANDING EQUIPMENT

The equipment shall be subjected to the test magnetic field by using induction coils of suitable dimensions. The test shall be repeated by moving and shifting the induction coils, in order to test the whole volume of the EUT for each orthogonal direction. The test shall be repeated with the coil shifted to different positions along the side of the EUT, in steps corresponding to 50 % of the shortest side of the coil. The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.



8.8.4. TEST RESULT

Product	LED ROAD AND AREA LUMINAIRES	Environmental Conditions	24.4°C, 54.6% RH, 101.1 kPa
Model	SH61	Tested By	Yang
Test mode	Lighting	Test Result	Pass

Antenna aspect	Duration (min)	Field Strength (A/m)	Observation	Performance Criterion
X	5 min	1	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	A
Y	5 min	1	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	A
Z	5 min	1	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	A

The test only applies to apparatus containing device susceptible to magnetic fields, such as hall elements or magnetic field sensor, so this item isn't applicable to the products.



8.9. VOLTAGE DIP & VOLTAGE INTERRUPTIONS

8.9.1. TEST SPECIFICATION

Basic Standard:	EN 61000-4-11
Test Duration Time:	3 test events in sequence
Interval Between Event:	10 seconds
Phase Angle:	0°
Test Cycle:	3 times
Performance Criterion:	0% U_T / 0.5 P, Criterion: B 70% U_T / 10 P, Criterion: C

8.9.2. TEST PROCEDURE

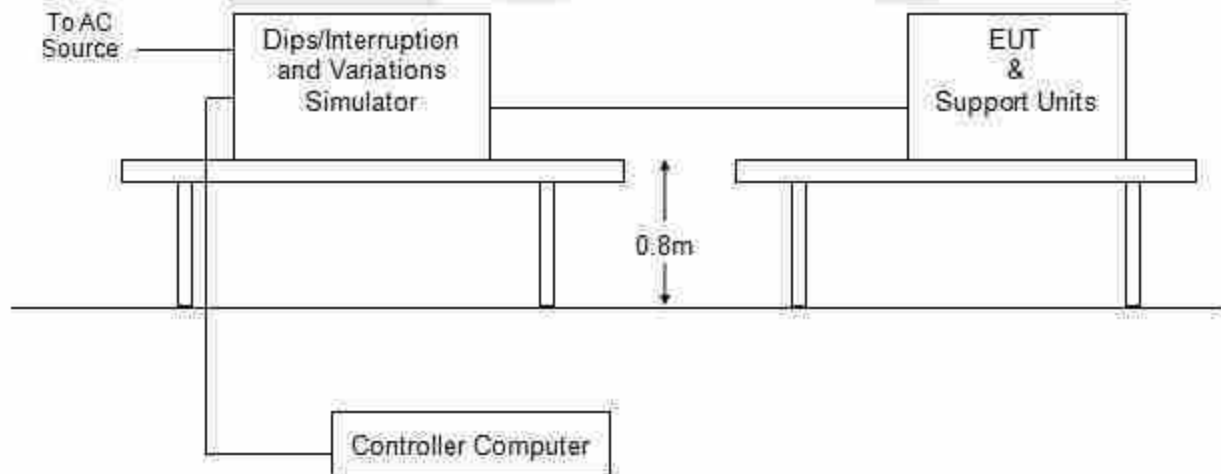
The EUT and support units were located on a wooden table, 0.8 m away from ground floor.

Setting the parameter of tests and then perform the test software of test simulator.

Changes to the voltage level shall occur at 0 degree crossing point in the a.c. voltage waveform.

Record the test result in test record form.

8.9.3. TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.



8.9.4. TEST RESULT

Product	LED ROAD AND AREA LUMINAIRES	Environmental Conditions	24.4°C, 54.6 % RH, 101.1 kPa
Model	SH61	Tested By	Yang
Test mode	Lighting	Test Result	Pass

Test Power: 230 Vac, 50 Hz			
Voltage (% Reduction)	Duration (Period)	Observation	Performance Criterion
100	0.5	Note <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3	A
30	10	Note <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 3	C

Note: 1) There was no change compared with initial operation during the test.

2) During the test the luminous intensity change, and after the test the luminous intensity can be restored to its initial value within 1 min.

3) During the test, the luminous intensity change, and after the test the luminous intensity can return to normal within 30 min.



9. PHOTOGRAPHS OF EUT





— End of report —



TEST REPORT
EN 60598-2-3
Luminaires
Part 2-3: Particular requirements - Luminaires for road and street lighting

Report Number.....: 20ZCTS1228005LR

Date of issue.....: 2020-12-31

Total number of pages.....: 36 pages

Applicant's name.....: Yangzhou Xintong Transport Equipment Group Co., Ltd.
Address.....: Guoji Industrial Zone, Songqiao Town, Gaoyou City,
Yangzhou City, Jiangsu Province, China

Test specification:

Standard.....: EN 60598-2-3:2003+A1:2011 used in conjunction with
EN 60598-1:2015+A1:2018

Test procedure.....: LVD

Non-standard test method.....: N/A

Test Report Form No.....: IEC60598_2_3K

Test Report Form(s) Originator.....: Intertek Semko AB

Master TRF.....: 2016-09

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Test item description.....: LED ROAD AND AREA LUMINAIRES

Trade Mark.....: 

Manufacturer.....: Yangzhou Xintong Transport Equipment Group Co., Ltd.

Address.....: Guoji Industrial Zone, Songqiao Town, Gaoyou City,
Yangzhou City, Jiangsu Province, China

Model/Type reference.....: SH61

SH6101: 30-60W, SH6102: 80-120W, SH6103: 150-180W,
SH6104: 200-250W

Ratings.....: Input: 100-277V~, 50/60Hz, 250W



Testing procedure and testing location: **Testing Laboratory:**

Shenzhen ZCT Technology Co., Ltd.

Testing location/ address: 3/F, Building 5, Hongsheng Industrial Zone, Bao'an Road, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China.

 Associated Laboratory:

Testing location/ address:

Tested by (name + signature): **Sandy Chen**Approved by (+ signature): **Tomy Wu** Testing procedure: TMP N/A

Testing location/ address:

Tested by (name + signature):

Approved by (+ signature):

 Testing procedure: WMT N/A

Testing location/ address:

Tested by (name + signature):

Witnessed by (+ signature):

Approved by (+ signature):

 Testing procedure: SMT N/A

Testing location/ address:

Tested by (name + signature):

Approved by (+ signature):

Supervised by (+ signature):



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

- Appendix 1: For European group national difference. (2 pages)
- Appendix 2: Photo attachment. (4 pages)

Summary of testing:**Tests performed (name of test and test clause):**

1. The luminaire passed clause test according to standard EN 60598-1 and EN 60598-2-3 as below:
 - Clause 3.5: Marking
 - Clause 3.6: Construction
 - Clause 3.7: Creepage distances and clearances
 - Clause 3.8: Provision for earthing
 - Clause 3.10: External and internal wiring
 - Clause 3.11: Protection against electric shock
 - Clause 3.12: Endurance tests and thermal tests
 - Clause 3.13: Resistance to dust, solid objects and moisture
 - Clause 3.14: Insulation resistance and electric strength
 - Clause 3.15 Resistance to heat, fire and tracking

Testing location:

Shenzhen ZCT Technology Co., Ltd.
3/F, Building 5, Hongsheng Industrial Zone, Bao'an Road, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China.

Summary of compliance with National Differences:

1. National difference of European Group

The product fulfils the requirements of EN 60598-2-3:2003+A1:2011 used in conjunction with EN 60598-1:2015+A1:2018

Copy of marking plate:

Test item particulars	LED ROAD AND AREA LUMINAIRES
Classification of installation and use	Fixed installation and outdoor use
Supply Connection	Power cord
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	2020-12-14
Date (s) of performance of tests	2020-12-15 to 2020-12-30
General remarks:	
<p>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 testing laboratory. "(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p> <p>Clause numbers between brackets refer to clauses in IEC 60598-1</p> <p>Determination of the test result includes consideration of measurement uncertainty from the test equipment and methods.</p>	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60598-1:	
<p>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. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable</p> <p>When differences exist, they shall be identified in the General product information section.</p>	
Name and address of factory (ies)	Yangzhou Xintong Transport Equipment Group Co., Ltd. Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu Province, China
General product information:	
<p>1.The model SH61 are LED ROAD AND AREA LUMINAIRES.</p> <p>2.The LED ROAD AND AREA LUMINAIRES SH61 are Fixed installation and outdoor use</p>	

Yangzhou Xintong Transport Equipment Group Co., Ltd.
 Guoji Industrial Zone, Songqiao Town, Gaoyou City,
 Yangzhou City, Jiangsu Province, China



EN 60598-2-3

Clause	Requirement + Test	Result – Remark	Verdict
3.2 (0)	GENERAL TEST REQUIREMENTS		P
3.2 (0.1)	Information for luminaire design considered	Standard Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
3.2 (0.3)	More sections applicable	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—

3.4 (2)	CLASSIFICATION		P
3.4 (2.2)	Type of protection	Class I	—
3.4 (2.3)	Degree of protection	IP66	—
3.4 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
3.4 (2.5)	Luminaire for normal use	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	Luminaire for rough service	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
3.4 (-)	Modes of installation of road or street lighting		—
	a) on a pipe	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	b) on a mast arm	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	c) on a post top	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	d) on span or suspension wires	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	e) on a wall	Yes <input type="checkbox"/> No <input type="checkbox"/>	—

3.5 (3)	MARKING		P
3.5 (3.2)	Mandatory markings		P
	Position of the marking		P
	Format of symbols/text		P
3.5 (3.3)	Additional information		P
	Language of instructions	English	P
3.5 (3.3.1)	Combination luminaires	Not Combination luminaires	N/A
3.5 (3.3.2)	Nominal frequency in Hz	50/60 Hz	P
3.5 (3.3.3)	Operating temperature	Ta: 50°C	P
3.5 (3.3.4)	Symbol or warning notice		N/A
3.5 (3.3.5)	Wiring diagram		N/A
3.5 (3.3.6)	Special conditions		N/A
3.5 (3.3.7)	Metal halide lamp luminaire – warning		N/A
3.5 (3.3.8)	Limitation for semi-luminaires		N/A
3.5 (3.3.9)	Power factor and supply current	PF>0.95	P
3.5 (3.3.10)	Suitability for use indoors		N/A



EN 60598-2-3

Clause	Requirement + Test	Result – Remark	Verdict
3.5 (3.3.11)	Luminaires with remote control		N/A
3.5 (3.3.12)	Clip-mounted luminaire – warning		N/A
3.5 (3.3.13)	Specifications of protective shields		N/A
3.5 (3.3.14)	Symbol for nature of supply		P
3.5 (3.3.15)	Rated current of socket outlet		N/A
3.5 (3.3.16)	Rough service luminaire		N/A
3.5 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments	TypeY	P
3.5 (3.3.18)	Non-ordinary luminaires with PVC cable		N/A
3.5 (3.3.19)	Protective conductor current in instruction if applicable		N/A
3.5 (3.3.20)	Provided with information if not intended to be mounted within arms reach		N/A
3.5 (3.4)	Test with water	15s	P
	Test with hexane	15s	P
	Legible after test		P
	Label attached		P
3.5 (3.5)	Additional necessary marking		P
	a) Operation position		P
	b) Weight and dimensions		P
	c) Maximum protected area		P
	d) Range of mounting heights		N/A
	e) the range of cross-sectional areas of suspension wires		P
	f) Suitability for indoor use		N/A
	g) dimensions of the compartment		N/A
	h) the torque setting		P
	i) method for protection		P
3.6 (4)	CONSTRUCTION		P
3.6.1	Protection against ingress of moisture IPX3 or IPX5 respectively		P
	For column-integrated luminaires, door opening included, IP classification shall be as flow:		N/A
	1) parts below 2.5m: IP3X (see IEC60364-7-714)		N/A



EN 60598-2-3

Clause	Requirement + Test	Result – Remark	Verdict
	2)parts above 2.5m:IP2X(when the external part is open-sided, the IP classification of glazing shall be 5X		N/A
3.6.2	Span Wire		N/A
3.6.3	Withstand wind speeds 150km/h		N/A
	Fixing		N/A
	Sufficient strength(test by 3.6:3.1)		N/A
	Wind-force test(not for tunnel luminaires)		N/A
3.6.3.1	Static load test		N/A
	Constant evenly distributed load		N/A
3.6.4	Single lampholder		N/A
	Adjustable lampholders or optical parts		N/A
3.6.5	Risk of injury caused by breaking glass		N/A
	installed below 5m(no additional requirements)		N/A
	Tunnel luminaires(3.6.5.1 test)		N/A
	Installed above 5m, glass covers shall be:		N/A
	a)fractures into small pieces (according 3.6.5.1)		N/A
	b)having a high impact shock resistance (according3. 6.5.2)		N/A
	c)protected(test by inspection)		N/A
3.6.6	Adequate space for The connection compartment of column-integrated luminaires:		N/A
	– the luminaire terminals;		N/A
	– the protective devices		N/A
	– the termination and looping of electricity supply cables		N/A
	– the connection box(if any)		N/A
	Corrosion-resistant material or suitably protected against corrosion.		N/A
3.6.7	For column-integrated luminaires, Load calculation and verification of structural design by testing, comply with ISO standards, otherwise regional or national standards. (EN40, JIL 1003, ANSI C136)		N/A
3.6.8	The door of column-integrated luminaire shall be treated against corrosion in accordance with the treatment applied to the column-integrated luminaire.		N/A
	Test specified in 4.18 of Part 1		N/A



EN 60598-2-3

Clause	Requirement + Test	Result – Remark	Verdict
	the opening of the door Only Authorized persons can be opened.		N/A
	Type test on sample of the door (pendulum hammer, the vertical fall, spring-operated impact test; 5Nm 3 times for impact energy)		N/A
	Blows the largest side when the door has several facets.		N/A
	After the test, the sample no damage		N/A
	– the locking device shall still be operational		N/A
	– no visible cracks shall be present on the sample		N/A
	– the level of IP protection shall not be reduced (See 3.6.1)		N/A
3.6.9	For column-integrated luminaires:		N/A
	– cable not less than 50mm x 150mm		N/A
	– cable path not less than 50mm, shall be free from obstruction, sharp edges, burrs, flashes.		N/A
3.6 (4.2)	Components replaceable without difficulty		N/A
3.6 (4.3)	Wireways smooth and free from sharp edges		P
3.6 (4.4)	Lampholders		N/A
3.6 (4.4.1)	Integral lampholder		N/A
3.6 (4.4.2)	Wiring connection		N/A
3.6 (4.4.3)	Lampholder for end-to-end mounting		N/A
3.6 (4.4.4)	Positioning		N/A
	- pressure test (N)		N/A
	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)		N/A
	After test the lampholder have not moved from its position and show no permanent deformation		N/A
3.6 (4.4.5)	Peak pulse voltage		N/A
3.6 (4.4.6)	Centre contact		N/A
3.6 (4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
3.6 (4.4.8)	Lamp connectors		N/A
3.6 (4.4.9)	Caps and bases correctly used		N/A



EN 60598-2-3

Clause	Requirement + Test	Result – Remark	Verdict
3.6 (4.5)	Starter holders		N/A
	Starter holder in luminaires other than class II		N/A
	Starter holder class II construction		N/A
3.6 (4.6)	Terminal blocks		N/A
	Tails		N/A
	Unsecured blocks		N/A
3.6 (4.7)	Terminals and supply connections		P
3.6 (4.7.1)	Contact to metal parts		N/A
3.6 (4.7.2)	Test 8 mm live conductor		N/A
	Test 8 mm earth conductor		N/A
3.6 (4.7.3)	Terminals for supply conductors		P
3.6 (4.7.3.1)	Welded connections:		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 15.8.2		N/A
	- electrical test according to 15.9		N/A
	- heat test according to 15.9.2.3 and 15.9.2.4		N/A
3.6 (4.7.4)	Terminals other than supply connection		P
3.6 (4.7.5)	Heat-resistant wiring/sleeves		N/A
3.6 (4.7.6)	Multi-pole plug		N/A
	- test at 30 N		N/A
3.6 (4.8)	Switches:		N/A
	- adequate rating		N/A
	- adequate fixing		N/A
	- polarized supply		N/A
	- compliance with 61058-1 for electronic switches		N/A
3.6 (4.9)	Insulating lining and sleeves		P
3.6 (4.9.1)	Retainment		P
	Method of fixing		P
3.6 (4.9.2)	Insulated linings and sleeves		P
	Resistant to a temperature > 20 °C to the wire temperature or		P



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Clause	Requirement + Test	Result – Remark	Verdict
	a) & c) Insulation resistance and electric strength		N/A
	b) Ageing test: Temperature (°C).....		N/A
3.6 (4.10)	Insulation of Class II luminaires		N/A
3.6 (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
3.6 (4.10.2)	Assembly gaps:		N/A
	- not coincidental		N/A
	- no straight access with test probe		N/A
3.6 (4.10.3)	Retention 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
3.6 (4.11)	Electrical connections		P
3.6 (4.11.1)	Contact pressure		P
3.6 (4.11.2)	Screws:		P
	- self-tapping screws		P
	- thread-cutting screws		N/A
3.6 (4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A
3.6 (4.11.4)	Material of current-carrying parts:		P
3.6 (4.11.5)	No contact to wood or mounting surface:		P
3.6 (4.11.6)	Electro-mechanical contact systems		N/A
3.6 (4.12)	Mechanical connections and glands		P
3.6 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		P
	Torque test: torque (Nm): part.....	Fixed Transparent Cover Screw: 2.91mm 0.5Nm	P
	Torque test: torque (Nm): part.....	Fixed PCB plate screws: 2.91mm 0.5Nm	P
	Torque test: torque (Nm): part.....		N/A



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Clause	Requirement + Test	Result – Remark	Verdict
3.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
3.6 (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
3.6 (4.12.5)	Screwed glands; force (Nm)		P
3.6 (4.13)	Mechanical strength		P
3.6 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm)		N/A
	- other parts; energy (Nm)	Enclosure: 0.7Nm	P
	1) live parts		P
	2) linings		N/A
	3) protection		P
	4) covers		P
3.6 (4.13.3)	Straight test finger		P
3.6 (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
3.6 (4.13.6)	Tumbling barrel		N/A
3.6 (4.14)	Suspensions and adjusting devices:		P
3.6 (4.14.1)	Mechanical load:		P
	A) four times the weight		P
	B) torque 2,5 Nm		P
	C) bracket arm; bending moment (Nm)		P
	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
3.6 (4.14.2)	Load to flexible cables		N/A



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Clause	Requirement + Test	Result – Remark	Verdict
	Mass (kg)		N/A
	Stress in conductors (N/mm ²)		N/A
	Mass (kg) of semi-luminaire		N/A
	Bending moment (Nm) of semi-luminaire		N/A
3.6 (4.14.3)	Adjusting devices:		N/A
	- flexing test, number of cycles	45 times	N/A
	- strands broken		N/A
	- electric strength test afterwards		N/A
3.6 (4.14.4)	Telescopic tubes: cords not fixed to tube, no strain on conductors		N/A
3.6 (4.14.5)	Guide pulleys		N/A
3.6 (4.14.6)	Strain on socket-outlets		N/A
3.6 (4.15)	Flammable materials:		N/A
	- glow-wire test 650 °C	Metal enclosure used	N/A
	- spacing ≥ 30 mm		N/A
	- screen withstanding test of 13.3.1		N/A
	- screen dimensions		N/A
	- no fiercely burning material		N/A
	- thermal protection		N/A
	- electronic circuits exempted		N/A
3.6 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear:		N/A
	a) construction		N/A
	b) temperature sensing control		N/A
	c) surface temperature		N/A
3.6 (4.16)	Luminaires for mounting on normally flammable surfaces		P
	No lamp control gear	Electronic lamp control gear is exempt from the requirements of this clause	N/A
3.6 (4.16.1)	Lamp control gear spacing:		N/A
	- spacing 35 mm		N/A
	- spacing 10 mm		N/A
3.6 (4.16.2)	Thermal protection:		N/A
	- in lamp control gear		N/A
	- external		N/A
	- fixed position		N/A
	- temperature marked lamp control gear		N/A



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Clause	Requirement + Test	Result – Remark	Verdict
3.6 (4.16.3)	Design to satisfy the test of 12.6	(see 12.6)	N/A
3.6 (4.17)	Drain holes		N/A
	Clearance at least 5 mm		N/A
3.6 (4.18)	Resistance to corrosion:		P
3.6 (4.18.1)	- rust-resistance		P
3.6 (4.18.2)	- season cracking in copper		P
3.6 (4.18.3)	- corrosion of aluminium		P
3.6 (4.19)	Igniters compatible with ballast		N/A
3.6 (4.20)	Rough service vibration		N/A
3.6 (4.21)	Protective shield:		N/A
3.6 (4.21.1)	Shield fitted		N/A
	Shield of glass if tungsten halogen lamps		N/A
3.6 (4.21.2)	Particles from a shattering lamp not impair safety		N/A
3.6 (4.21.3)	No direct path		N/A
3.6 (4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment		N/A
3.6 (4.22)	Attachments to lamps		N/A
3.6 (4.23)	Semi-luminaires comply Class II		N/A
3.6 (4.24)	Photobiological hazards		P
3.6 (4.24)	UV radiation for tungsten halogen lamps and metal halide lamps (Annex P)		N/A
3.6 (4.24.1)	No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P)		N/A
3.6 (4.24.2)	Retinal blue light hazard		P
	Class of risk group assessed according to IEC/TR 62778		P
	RG0 or RG1	RG0	P
	Luminaires with Ethr:		P
	a) Fixed luminaires:		N/A
	- distance x m, borderline between RG1 and RG2		N/A
	- marking and instruction according 3.2.23		N/A
	b) Portable and handheld luminaires		N/A
	- marking according 3.2.23 if RG1 exceeded at 200 mm according to IEC/TR 62778		N/A
3.6 (4.25)	No sharp point or edges		P



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Clause	Requirement + Test	Result – Remark	Verdict
3.6 (4.26)	Short-circuit protection:		N/A
3.6 (4.26.1)	Uninsulated accessible SELV parts		N/A
3.6 (4.26.2)	Short-circuit test		N/A
3.6 (4.26.3)	Test chain according to Figure 29		N/A
3.6 (4.27)	Terminal blocks with integrated screwless earthing contacts tested 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
3.6.1 (-)	At least IPX3 if for outdoor use	IP66	P
3.6.2 (-)	Lampholder brackets and lamp supports		N/A
3.6.3 (-)	Adjusting means		N/A
3.6.4 (-)	Controlling components		P
3.6.5 (-)	Fixing device		P
	Wind force test		P
3.6.6 (-)	Locking of angular adjustment		P
3.6.7 (-)	Vibration resistance		P
3.6.8 (-)	Glass cover	120 > 60 pieces	P

3.7 (11)	CREEPAGE DISTANCES AND CLEARANCES		P
	Working voltage (V).....	100-277Vac	—
	Voltage form	Sinusoidal <input checked="" type="checkbox"/> Non-sinusoidal <input type="checkbox"/>	—
	PTI	< 600 <input checked="" type="checkbox"/> > 600 <input type="checkbox"/>	—
	Impulse withstand category (Normal category II) (Category III Annex U)	Category II <input type="checkbox"/> Category III <input type="checkbox"/>	—
	Rated pulse voltage (kV).....	<2.5kV	—
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm).....	Cr.>2.5mm, Cl.>1.5mm	P
	(2) Current-carrying parts and accessible parts: cr (mm); cl (mm).....	Cr.>2.5mm, Cl.>1.5mm	P
	(3) Parts becoming live due to breakdown of basic insulation and metal parts: cr (mm); cl (mm).....		N/A



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Clause	Requirement + Test	Result – Remark	Verdict
	(4) Outer surface of cable where it is clamped and metal parts: cr (mm); cl (mm).....		N/A
	(6) Current-carrying parts and supporting surface: cr (mm); cl (mm).....	Cr.>2.5mm, Cl.>1.5mm	P

3.8 (7)	PROVISION FOR EARTHING		P
3.8 (7.2.1 + 7.2.3)	Accessible metal parts		P
	Metal parts in contact with supporting surface		P
	Resistance < 0.5 Ω	0.033 Ω	P
	Self-tapping screws used		N/A
	Thread-forming screws		P
	Thread-forming screw used in a groove		N/A
	Earth makes contact first		P
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
3.8 (7.2.2 + 7.2.3)	Earth continuity in joints etc.		P
3.8 (7.2.4)	Locking of clamping means		P
	Compliance with 4.7.3		P
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
3.8 (7.2.5)	Earth terminal integral part of connector socket		N/A
3.8 (7.2.6)	Earth terminal adjacent to mains terminals		P
3.8 (7.2.7)	Electrolytic corrosion of the earth terminal		P
3.8 (7.2.8)	Material of earth terminal		P
	Contact surface bare metal		P
3.8 (7.2.10)	Class II luminaire for looping-in		N/A
	Double or reinforced insulation to functional earth		N/A
3.8 (7.2.11)	Earthing core coloured green-yellow		P
	Length of earth conductor		P
3.8.1	Fixed part of the terminal can not rotated when the clamping part is moved(test specified in Section 14 and 15 of Part 1)		N/A

3.9 (14)	SCREW TERMINALS		N/A
	Separately approved: component list	(see Annex 1)	N/A



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Clause	Requirement + Test	Result – Remark	Verdict
	Part of the luminaire	(see Annex 3)	N/A
3.9 (15)	SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS		N/A
	Separately approved; component list	(see Annex 1)	N/A
	Part of the luminaire	(see Annex 4)	N/A
3.10 (5)	EXTERNAL AND INTERNAL WIRING		P
3.10 (5.2)	Supply connection and external wiring		P
3.10 (5.2.1)	Means of connection.....	Power cord	P
3.10 (5.2.2)	Type of cable.....	H05RN-F	P
	Nominal cross-sectional area (mm ²).....	3×1.0mm ²	P
	Cables equal to IEC 60227 or IEC 60245	IEC 60245	P
3.10 (5.2.3)	Type of attachment, X, Y or Z	Type Y	P
3.10 (5.2.5)	Type Z not connected to screws		P
3.10 (5.2.6)	Cable entries:		P
	- suitable for introduction		P
	- adequate degree of protection		P
3.10 (5.2.7)	Cable entries through rigid material have rounded edges		P
3.10 (5.2.8)	Insulating bushings:		P
	- suitably fixed		P
	- material in bushings		P
	- material not likely to deteriorate		P
	- tubes or guards made of insulating material		P
3.10 (5.2.9)	Locking of screwed bushings		N/A
3.10 (5.2.10)	Cord anchorage:		P
	- covering protected from abrasion		P
	- clear how to be effective		P
	- no mechanical or thermal stress		P
	- no tying of cables into knots etc.		P
	- insulating material or lining		P
3.10 (5.2.10.1)	Cord anchorage for type X attachment:		N/A
	a) at least one part fixed		N/A
	b) types of cable		N/A



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Clause	Requirement + Test	Result – Remark	Verdict
	c) no damaging of the cable		N/A
	d) whole cable can be mounted		N/A
	e) no touching of clamping screws		N/A
	f) metal screw not directly on cable		N/A
	g) replacement without special tool		N/A
	Glands not used as anchorage		N/A
	Labyrinth type anchorages		N/A
3.10 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment	Type X	P
3.10 (5.2.10.3)	Tests:		P
	- impossible to push cable; unsafe		P
	- pull test: 25 times; pull (N).....	60N	P
	- torque test: torque (Nm).....	0.15Nm	P
	- displacement ≤ 2 mm	0.73mm	P
	- no movement of conductors		P
	- no damage of cable or cord		P
3.10 (5.2.11)	External wiring passing into luminaire		N/A
3.10 (5.2.12)	Looping-in terminals		N/A
3.10 (5.2.13)	Wire ends not tinned		N/A
	Wire ends tinned: no cold flow		P
3.10 (5.2.14)	Mains plug same protection		N/A
	Class III luminaire plug		N/A
3.10 (5.2.16)	Appliance inlets (IEC 60320)		N/A
	Appliance couplers of class II type		N/A
3.10 (5.2.17)	No standardized interconnecting cables properly assembled		N/A
3.10 (5.2.18)	Used plug in accordance with		N/A
	- IEC 60083		N/A
	- other standard		N/A
3.10 (5.3)	Internal wiring		P
3.10 (5.3.1)	Internal wiring of suitable size and type		P
	Through wiring		N/A
	- not delivered/ mounting instruction		N/A
	- factory assembled		N/A



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Clause	Requirement + Test	Result – Remark	Verdict
	- socket outlet loaded (A).....		N/A
	- temperatures.....	(see Annex 2)	N/A
	Green-yellow for earth only		P
3.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		N/A
	Cross-sectional area (mm ²).....		N/A
	Insulation thickness		N/A
	Extra insulation added where necessary		N/A
3.10 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		N/A
	Adequate cross-sectional area and insulation thickness		N/A
3.10 (5.3.1.3)	Double or reinforced insulation for class II		N/A
3.10 (5.3.1.4)	Conductors without insulation		N/A
3.10 (5.3.1.5)	SELV current-carrying parts		P
3.10 (5.3.1.6)	Insulation thickness other than PVC or rubber		N/A
3.10 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		N/A
	Joints, raising/lowering devices		N/A
	Telescopic tubes etc.		N/A
	No twisting over 360°		N/A
3.10 (5.3.3)	Insulating bushings:		N/A
	- suitable fixed		P
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- cables with protective sheath:		P
3.10 (5.3.4)	Joints and junctions effectively insulated		P
3.10 (5.3.5)	Strain on internal wiring		N/A
3.10 (5.3.6)	Wire carriers		N/A
3.10 (5.3.7)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		N/A
3.10.1	Cord anchorage		P
	If without the cord anchorage, 5 of IEC 60598-1, but with a pull of 60N and a torque of 0.25Nm.		N/A
3.11 (8)	PROTECTION AGAINST ELECTRIC SHOCK		P
3.11 (8.2.1)	Live parts not accessible		P



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Clause	Requirement + Test	Result – Remark	Verdict
	Basic insulated parts not used on the outer surface without appropriate protection		P
	Basic insulated parts not accessible with standard test finger on portable and adjustable luminaires		N/A
	Basic insulated parts not accessible with \varnothing 50 mm probe from outside, within arms reach, on wall-mounted luminaires		P
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N/A
	Basic insulation only accessible under lamp or starter replacement		N/A
	Protection in any position		P
	Double-ended tungsten filament lamp		N/A
	Insulation lacquer not reliable		P
	Double-ended high pressure discharge lamp		N/A
	Relevant warning according to 3.2.18 fitted to the luminaire		N/A
3.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N/A
3.11 (8.2.3.a)	Class II luminaire:		N/A
	- basic insulated metal parts not accessible during starter or lamp replacement		N/A
	- basic insulation not accessible other than during starter or lamp replacement		N/A
	- glass protective shields not used as supplementary insulation		N/A
3.11 (8.2.3.b)	BC lampholder of metal in class I luminaires shall be earthed		N/A
3.11 (8.2.3.c)	Class III luminaires with exposed SELV parts:		N/A
	Ordinary luminaire:		N/A
	- touch current		N/A
	- no-load voltage		N/A
	Other than ordinary luminaire:		N/A
	- nominal voltage		N/A
3.11 (8.2.4)	Portable luminaire have protection independent of supporting surface		N/A
3.11 (8.2.5)	Compliance with the standard test finger or relevant probe		P
3.11 (8.2.6)	Covers reliably secured		N/A



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Clause	Requirement + Test	Result – Remark	Verdict
3.11 (8.2.7)	Discharging of capacitors $\geq 0.5 \mu\text{F}$	1S 8V	P
	Portable plug connected luminaire with capacitor		N/A
	Other plug connected luminaire with capacitor		N/A
	Discharge device on or within capacitor		N/A
	Discharge device mounted separately		N/A
3.12 (12)	ENDURANCE TEST AND THERMAL TEST		P
3.12 (-)	If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 5.13		—
5.12 (12.3)	Endurance test:		P
	- mounting-position.....	On the black board	—
	- test temperature (°C).....	60°C	—
	- total duration (h).....	240h	—
	- supply voltage: Un factor, calculated voltage (V).....	277V×1.1=304.7V	—
	- lamp used :	LED	—
3.12 (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
3.12 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
3.12 (12.5)	Thermal test (abnormal operation)	(see Annex 2)	P
3.12 (12.6)	Thermal test (failLED ROAD AND AREA LUMINAIRES control gear condition):		N/A
3.12 (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
3.12 (12.6.2)	Temperature sensing control		N/A



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Clause	Requirement + Test	Result – Remark	Verdict
	- 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
3.12 (12.7)	Thermal test (fail LED ROAD AND AREA LUMINAIRES control gear in plastic luminaires).		N/A
3.12 (12.7.1)	Luminaire without temperature sensing control		N/A
3.12 (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
	- part tested; temperature (°C).....		N/A
	- part tested; temperature (°C).....		N/A
3.12 (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



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Clause	Requirement + Test	Result – Remark	Verdict
	- part tested, temperature (°C).....		N/A
	- part tested, temperature (°C).....		N/A
3.12 (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
3.12 (12.7.2)	Luminaire with temperature sensing control		N/A
	- thermal link	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- manual reset cut-out	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- auto reset cut-out	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- case of abnormal conditions		—
	- highest measured temperature of fixing point/exposed part (°C).....		—
	Ball-pressure test		N/A
	- part tested, temperature (°C).....		N/A
	- part tested, temperature (°C).....		N/A
3.12.1 (-)	Temperature reduction if for outdoor use only		P
3.12.2	IP classification greater than IP20 shall be subjected to the relevant tests		P
3.12.3	Glass covers shall be used within the thermal limits. Thermal limits shall include the MIN and Max temperature and the MAX Δt on the glass.		P

3.13 (9)	RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE		P
3.13 (-)	If IP > IP 20 the order of the test specified in clause 5.12		—
3.13 (9.2)	Tests for ingress of dust, solid objects and moisture		P
	- classification according to IP.....	IP66	—
	- mounting position during test.....	On the black board	—
	- fixing screws tightened; torque (Nm).....	0.97Nm	—
	- tests according to clauses.....	Clauses 9.2.2 & Clauses 9.2.7	—
	- electric strength test afterwards		P
	a) no deposit in dust-proof luminaire		P
	b) no talcum in dust-tight luminaire		P
	c) no trace of water on current-carrying parts or SELV parts or where it could become a hazard		N/A



EN 60598-2-3

Clause	Requirement + Test	Result – Remark	Verdict
	d) i) For luminaires without drain holes – no water entry		N/A
	d) ii) For luminaires with drain holes – no hazardous water entry		P
	e) no water in watertight luminaire		P
	f) no contact with live parts (IP 2X)		N/A
	f) no entry into enclosure (IP 3X and IP 4X)		N/A
	f) no contact with live parts (IP3X and IP4X)		N/A
	g) no trace of water on part of lamp requiring protection from splashing water		P
	h) no damage of protective shield or glass envelope		P
3.13 (9.3)	Humidity test 48 h:	25°C, 95%RH	P
3.13.1	IP classification greater than IP20(specified in section 9 of IEC 60598-1 and section in 3.12 of this section of IEC 60598-2		P

3.14 (10)	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
3.14 (10.2.1)	Insulation resistance test		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø		—
	Insulation resistance (MΩ)		—
	SELV:		N/A
	- between current-carrying parts of different polarity.....		N/A
	- between current-carrying parts and mounting surface.....		N/A
	- between current-carrying parts and metal parts of the luminaire.....		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts.....		N/A
	- Insulation bushings as described in Section 5.....		N/A
	Other than SELV:		P
	- between live parts of different polarity.....	>2 MΩ	P
	- between live parts and mounting surface.....	>2MΩ	P
	- between live parts and metal parts.....	>2MΩ	P
	- between live parts of different polarity through action of a switch.....		N/A



EN 60598-2-3

Clause	Requirement + Test	Result – Remark	Verdict
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts.....		N/A
	- Insulation bushings as described in Section 5.....		N/A
3.14 (10.2.2)	Electric strength test		P
	Dummy lamp		N/A
	Luminaires with ignitors after 24 h test		N/A
	Luminaires with manual ignitors:		N/A
	Test voltage (V):		N/A
	SELV:		N/A
	- between current-carrying parts of different polarity.....		N/A
	- between current-carrying parts and mounting surface.....		N/A
	- between current-carrying parts and metal parts of the luminaire.....		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts.....		N/A
	- Insulation bushings as described in Section 5.....		N/A
	Other than SELV:		P
	- between live parts of different polarity.....	1554V	P
	- between live parts and mounting surface.....	1554V	P
	- between live parts and metal parts.....	1554V	P
	- between live parts of different polarity through action of a switch.....		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts.....		N/A
	- Insulation bushings as described in Section 5.....		N/A
3.14 (10.3)	Touch current or protective conductor current (mA).....	Protective conductor current: 0.84 mA < 3.5 mA	P

3.15 (13)	RESISTANCE TO HEAT, FIRE AND TRACKING		P
3.15 (13.2.1)	Ball-pressure test:		P
	- part tested; temperature (°C).....	Lamp bead transparent cover: 75°C, 1.08mm	P
	- part tested; temperature (°C).....	PCB: 125°C, 0.89mm	P



EN 60598-2-3

Clause	Requirement + Test	Result – Remark	Verdict
	- part tested; temperature (°C).....	Closed terminal: 125°C, 0.98mm	P
3.15 (13.3.1)	Needle flame test (10 s):		P
	- part tested.....	PCB ;Closed terminal	P
	- part tested.....		N/A
3.15 (13.3.2)	Glow-wire test (650°C):		P
	- part tested.....	Lamp bead transparent cover	P
	- part tested.....		N/A
3.15 (13.4.1)	Tracking test:		N/A
	- part tested.....		N/A



ANNEX 1: components	P
----------------------------	---

TABLE: Critical components information				
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard & Mark(s) of conformity¹⁾
Input wire	TONGXIANG TENGFEI ELECTRON & WIRING CO. LTD		L=280MM three-core 0.5mm ² 300V RoHS	
Output wire	TONGXIANG TENGFEI ELECTRON & WIRING CO. LTD	20AWG	Black PVC multistrand 0.5mm ² L=250mm 600V 105°C	
Output wire	TONGXIANG TENGFEI ELECTRON & WIRING CO. LTD	20AWG	Red PVC multistrand 0.5mm ² L=250mm 600V 105°C	
Drive case	Foshan Yiwang Lighting Technology Co., Ltd		230x42x30 50g	
Transformer	Jianhu Xinxing Lighting Appliance Factory	EQ2518	EQ2518(5+5) PC44 0.35mH±5% 5-1 0.27X2 altogether 40T	
Rectifier bridge	CHANGZHOU MEIBANGLI ELECTRONICS CO., LTD.	KBP310	KBP310 3A 1KV SIP4	
Diode	CHANGZHOU MEIBANGLI ELECTRONICS CO., LTD.	SF58AG	SF58AG 5A 600V DO-201	
Fuse	Huai'an Lingjie Technology Development Co., Ltd		250V_5A	
SMT capacitor	GUANGDONG FENGHUA ADVANCED TECHNOLOGY HOLDING CO., LTD.	X7R_0805	0805 X7R 1uF 25V 10%	
SMT capacitor	GUANGDONG FENGHUA ADVANCED TECHNOLOGY HOLDING CO., LTD.	X7R_1206	X7R_1206_68pF_1000V_10%	
SMT capacitor	GUANGDONG FENGHUA ADVANCED TECHNOLOGY HOLDING CO., LTD.	X7R_0805	X7R_0805_22pF_50V_10%	
LED	XUYU OPTOELECTRONICS (SHENZHEN) CO., LTD.	LED-3030	VF : 5.8-6.0V_160-165LM 1W 5700K_150mA Ra>75 SDCM<6	LM-80
Lens	Foshan Shunde Yaosheng Metal Trade Co., Ltd		PC light transmittance > 95% 105g V0	



ANNEX 2: temperature measurements, thermal tests of Section 12	P
---	----------

Type reference.....	See page 1	—
Lamp used.....	LED	—
Lamp control gear used.....	Built-in LED controlgear	—
Mounting position of luminaire.....	LED module	—
Supply wattage (W).....	250W	—
Supply current (A).....		—
Calculated power factor.....	0.995	—
Table: measured temperatures corrected for $t_a = 25^{\circ}\text{C}$:		P
- abnormal operating mode.....	Short-circuit output of LED Controlgear	—
- test 1: rated voltage.....	—	—
- test 2: 1.06 times rated voltage or 1.05 times rated wattage.....	$1.06 \times 277\text{V} = 293.62\text{V}$	—
- test 3: Load on wiring to socket-outlet, 1.06 times voltage or 1.05 times wattage.....	—	—
- test 4: 1.1 times rated voltage or 1.05 times rated wattage.....	$1.1 \times 277\text{V} = 304.7\text{V}$	—
Through wiring or looping-in wiring loaded by a current of A during the test.....	—	—

temperature (°C) of part	Clause 12.4 – normal				Clause 12.5 – abnormal	
	test 1	test 2	test 3	limit	test 4	limit
Power cord	—	77.2	—	90	—	—
PCB	—	102.3	—	130	—	—
Lamp bead transparent cover	—	70.6	—	90	—	—
Internal Line	—	74.1	—	90	—	—
Closed terminal	—	88.3	—	125	—	—
Mounting surface	—	65.3	—	90	55.3	130
Lighting object(0.1 m)	—	60.4	—	90	—	—
Ambient	—	49.3	—	50	—	—

Remark: Short-circuit output of the controlgear, the unit have not output the temperature is very low.



	ANNEX 3: screw terminals (part of the luminaire)	N/A
--	---	------------

(14)	SCREW TERMINALS		N/A
(14.2)	Type of terminal.....		—
	Rated current (A).....		—
(14.3.2.1)	One or more conductors:		N/A
(14.3.2.2)	Special preparation		N/A
(14.3.2.3)	Terminal size		N/A
	Cross-sectional area (mm ²).....		N/A
(14.3.3)	Conductor space (mm).....		N/A
(14.4)	Mechanical tests		N/A
(14.4.1)	Minimum distance		N/A
(14.4.2)	Cannot slip out		N/A
(14.4.3)	Special preparation		N/A
(14.4.4)	Nominal diameter of thread (metric ISO thread) ...	M	N/A
	External wiring:		N/A
	No soft metal		N/A
(14.4.5)	Corrosion		N/A
(14.4.6)	Nominal diameter of thread (mm).....		N/A
	Torque (Nm).....		N/A
(14.4.7)	Between metal surfaces:		N/A
	Lug terminal		N/A
	Mantle terminal		N/A
	Pull test: pull (N).....		N/A
(14.4.8)	Without undue damage		N/A



	ANNEX 4: Screwless Terminals (Part Of The Luminaire)	N/A
(15)	SCREWLESS TERMINALS	N/A
(15.2)	Type of terminal.....:	—
	Rated current (A).....:	—
(15.3.1)	Material	N/A
(15.3.2)	Clamping	N/A
(15.3.3)	Stop	N/A
(15.3.4)	Unprepared conductors	N/A
(15.3.5)	Pressure on insulating material	N/A
(15.3.6)	Clear connection method	N/A
(15.3.7)	Clamping independently	N/A
(15.3.8)	Fixed in position	N/A
(15.3.10)	Conductor size:	N/A
	Type of conductor	N/A
(15.5.1)	Terminals internal wiring:	N/A
(15.5.1.1)	Pull test spring-type terminals (4 N, 4 samples).....:	N/A
(15.5.1.2)	Pull test pin or tab terminals (4 N, 4 samples).....:	N/A
	Insertion force not exceeding 50 N	N/A
(15.5.1.2)	Permanent connections: pull-off test (20 N)	N/A
(15.6)	Electrical tests	
	Voltage drop (mV) after 1 h (4 samples).....:	N/A
	Voltage drop of two inseparable joints	N/A
	Number of cycles.....:	—
	Voltage drop (mV) after 10th alt. 25th cycle (4 samples).....:	N/A
	Voltage drop (mV) after 50th alt. 100th cycle (4 samples).....:	N/A
	After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples).....:	N/A
	After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples).....:	N/A
(15.7)	Terminals external wiring	N/A
	Terminal size and rating	N/A
(15.8.1)	Pull test spring-type terminals or welded connections (4 samples); pull (N).....:	N/A



	Pull test pin or tab terminals (4 samples): pull (N).....										N/A
(15.9)	Contact resistance test										N/A
	Voltage drop (mV) after 1 h										N/A
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Voltage drop of two inseparable joints										N/A
	Voltage drop after 10th alt. 25th cycle										N/A
	Max. allowed voltage drop (mV).....										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Voltage drop after 50th alt. 100th cycle										N/A
	Max. allowed voltage drop (mV).....										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Continued ageing: voltage drop after 10th alt. 25th cycle										N/A
	Max. allowed voltage drop (mV).....										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Continued ageing: voltage drop after 50th alt. 100th cycle										N/A
	Max. allowed voltage drop (mV).....										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											



Appendix 1: European National Differences

**ATTACHMENT TO TEST REPORT IEC 60598-2-3
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES**

Luminaires

Part 2: Particular requirements:

Section Three – Luminaires for road and street lighting

Differences according	EN 60598-2-3:2003 + A1:2011 used in conjunction with EN 60598-1:2015+A1:2018
Annex Form No	EU_GD_IEC_60598_2_3I
Annex Form Originator	IMQ S.p.A.
Master Annex Form	2016-04
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	CENELEC COMMON MODIFICATIONS (EN)	P
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3.5 (3)	MARKING	P
3.5 (3.3.10.1)	Adequate warning on the package	P

3.6 (4)	CONSTRUCTION	P
3.6 (4.11.6)	Electro-mechanical contact systems	P

3.10 (5)	EXTERNAL AND INTERNAL WIRING	P
3.10 (5.2.1)	Connecting leads	P
	- without a means for connection to the supply	P
	- terminal block specified	P
	- relevant information provided	P
	- compliance with 4.6, 4.7.1, 4.7.2, 4.10.1, 11.2, 12 and 13.2 of Part 1	P
3.10 (5.2.2)	Cables equal to HD21 S2 or HD22 S2	P

3.12 (12)	ENDURANCE TEST AND THERMAL TEST	P
3.12 (12.4.2c)	Thermal test (normal operation)	P

ZB	ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)	P
(3.3)	DK: power supply cord with label	N/A
	IT: warning label on Class 0 luminaire	N/A
(4.5.1)	DK: socket-outlets	N/A
(5.2.1)	CY, DK, FI, SE, GB: type of plug	N/A



ZC	ANNEX ZC, NATIONAL DEVIATIONS (EN)	P
(4 & 5)	FR: Shuttered socket-outlets 10/16A	P
(13.3)	FR: Glow-wire test 850°C alt. 750°C for luminaires in premises open to public or 960°C for luminaires in emergency exits	P
(13.3)	GB: Requirements according to United Kingdom Building Regulation	N/A



Appendix 2:
Photo Documentation

Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6

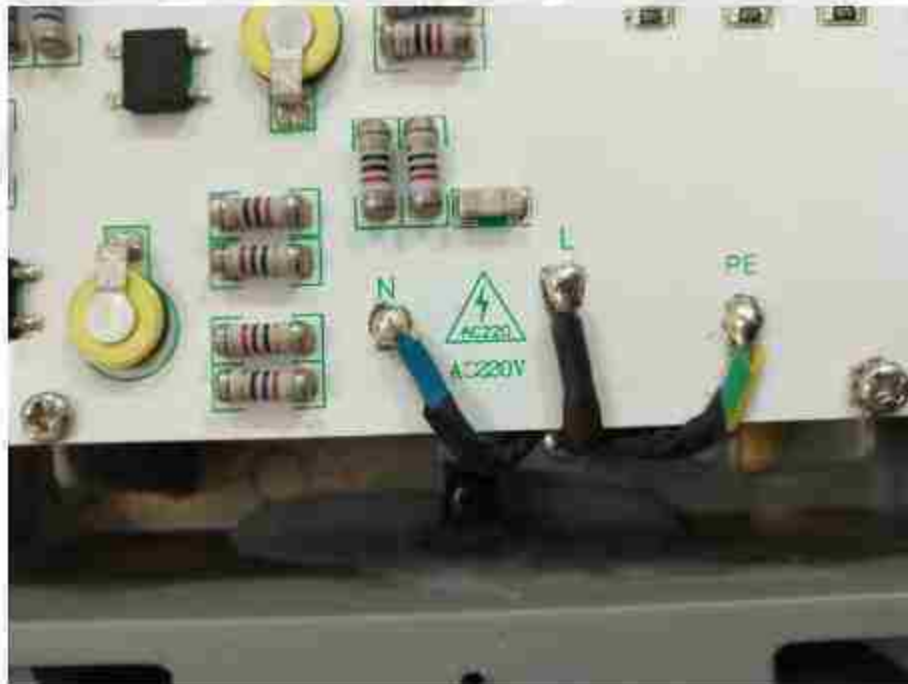


Photo 7



====End of Report====



IK09 TEST REPORT

Report No.: 20ZCTS1228009SP

Trade Name : **XINTONG**

Model Number: SH61

Prepared for : Yangzhou Xintong Transport Equipment Group Co., Ltd.

Address : Guoji Industrial Zone, Songqiao Town, Gaoyou City,
Yangzhou City, Jiangsu Province, China

Test Date: 2020-12-29 to 2020-12-30

Date of Report : 2020-12-31

This test report consists of 4 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by ZCT. The test results in the report only apply to the tested sample. The test report shall be invalid without all the signatures of testing engineers, reviewer and approver. Any objections must be raised to ZCT within 15 days since the date when the report is received. It will not be taken into consideration beyond this limit.

Prepared by:

Chris Lu

Approved by:



TEST REPORT**IEC 62262:2002****Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)**

Testing Laboratory Name : Shenzhen ZCT Technology Co., Ltd.

Address : 3/F., Building 5, Hongsheng Industrial Zone, Bao'an Road, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China.

Testing location : Shenzhen ZCT Technology Co., Ltd.

Applicant's Name : Yangzhou Xintong Transport Equipment Group Co., Ltd.

Address : Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu Province, China

Manufacturer : Yangzhou Xintong Transport Equipment Group Co., Ltd.

Address : Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu Province, China

Standard : IK09 (IEC 62262:2002)

Test Result : Pass

After the test, there is no damage appearance on the sample.

Procedure deviation : N/A

Non-standard test method : N/A

Type of test object : LED ROAD AND AREA LUMINAIRES

Trademark : 

Model/type reference : **SH61**
SH6101: 30-60W, SH6102: 80-120W, SH6103: 150-180W,
SH6104: 200-250W

Description : Normal



Test : IK09

Ambient temperature: 25°CRelative Humidity 70% RH

1 Testing Equipment:

Description	Model	No.	Calibration
Falling ball impact tester	SH61	<i>1</i>	Dec. 31, 2020

2 Test remark & notest:

- (1) Place the sample on the ground, drop the falling-ball which weight is 5Kg to impact the surface of the sample from a height of 200 mm, the impact energy is 10 J.
- (2) Impact 5 points on the mirror surface of the sample each for once.
- (3) Check the sample after the test.



ANNEX : Photo-documentation

Fig.1 Over view



Fig.2 Over view



====End of report====





Verification of Conformity

Certificate No.: 20ZCTS1228003SPC

Applicant : YANGZHOU XINTONG TRANSPORT EQUIPMENT GROUP CO., LTD.
Address : Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu Province, China
Manufacturer : YANGZHOU XINTONG TRANSPORT EQUIPMENT GROUP CO., LTD.
Address : Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu Province, China
Product : **LED ROAD AND AREA LUMINAIRES**
Brand Name : **XINTONG**
Model No. : **SH61**
 SH6101: 30-60W, SH6102: 80-120W, SH6103: 150-180W, SH6104: 200-250W

Requirement	Applied Standards	Document Evidence	Result
LVD Directive	2014/35/EU Low Voltage	Test Report 20ZCTS1228003SP	Conform
LVD Standards	EN 60529:1991+AC:2016-12		

IP66



Remark: This Certification of Conformity has been issued on a voluntary basis. ZCT confirms that a Technical Construction File (TCF) is existent for the above listed product(s). The TCF satisfactorily covers the essential requirements of the above listed Directive(s). Other relevant Directives have to be observed in case they are applicable. This Document is only valid for the equipment and configuration described and in conjunction with the TCF detailed above. Whereas the Manufacturer is responsible of the certification of the product(s) and not exempted to perform all the necessary activities before placing the product(s) on the market. The Manufacturer is also responsible of the internal production control to ensure the product(s) are in compliance with the essential requirements of the above mentioned Directive(s). This certificate can be checked for validity at www.renzhengjiance.com



Shenzhen ZCT Technology Co., Ltd.

3/F., Building 5, Hongsheng Industrial Zone, Bao'an Road, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China.
 ☎ : 400-669-6965 ☎ : 86-755-23702323, ✉ : admin@renzhengjiance.com, 🌐 : http://www.renzhengjiance.com

IP66 TEST REPORT

Applicant : Yangzhou Xintong Transport Equipment Group Co., Ltd.
Address : Yangzhou Xintong Transport Equipment Group Co., Ltd., Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu Province, China
Manufacturer : Yangzhou Xintong Transport Equipment Group Co., Ltd.
Address : Yangzhou Xintong Transport Equipment Group Co., Ltd., Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu Province, China
Product Name : **LED ROAD AND AREA LUMINAIRES**
Trade Mark : 
Model No. : **SH61**
SH6101: 30-60W, SH6102: 80-120W, SH6103: 150-180W, SH6104: 200-250W
Ratings : Input: 100-277VAC 50/60Hz 250W
Standard : Degrees Of Protection Provided By Enclosures:
EN 60529:1991+AC:2016-12
Date of Receiver : Dec. 25, 2020
Date of Test : Dec. 28, 2020 to Dec. 29, 2020
Date of Issue : Dec. 30, 2020
Test Report Form No : 20ZCTS1228003SP
Test Result : Pass *

This Test Report is Issued Under the Authority of :

Compiled by Sandy Chen

Approved by Tomy Wu



***Remarks:**

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of Shenzhen ZCT Technology Co., Ltd. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.



Copy of marking plate: (Representative)**Note:**

- Marking label was stuck on rear external enclosure. Rating label for other models is same above, except the model name.
- The above marking are the minimum requirements required by the safety standard. For the final production sample, the marking which do not give rise to misunderstanding may be add.
- The CE marking and WEEE symbol should be at least 5.0mm and 7.0mm respectively in height.
- The instruction sheet and marking should be translated to the language where the product will be sold.

Test item particulars

Equipment mobility.....: movable hand-held transportable stationary fixed direct plug-in for building-in

Connection to the mains.....: pluggable-equipment type A type B
 permanent connection considered in the final system.

Operating condition.....: continuous short-time intermittent

Over voltage category.....: OVC I OVC II OVCIII OVC IV

Mains supply tolerance (%).....: 277V a.c (+10%)

Tested for IT power systems.....: Yes No

IT testing, phase-phase voltage (V).....: N/A

Class of equipment.....: Class I Class II Class III
 Not classified

Mass of equipment (kg).....: N/A

Pollution degree.....: PD 2 PD3

IP protection class.....: IP66

Possible test case verdicts

-test case does not apply to the test object.....: N(A.)

-test object does meet the requirement.....: P(ass)

-test object does not meet the requirement.....: F(ail)

General remarks

The test results presented in this report relate only to the object tested.

This test report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

"(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.

General product information:

- The equipment was general designed for using with information technology equipment.
- General remarks :
- This report shall not be reproduced except in full without the written approval of the testing laboratory.
- The test results presented in this report relate only to the item(s) tested.
- "(see Annex #)" refers to an annex appended to the report.
- Clause numbers between brackets refer to clauses in EN 60529
- Throughout this report a comma is used as the decimal separator.



5	Degrees of protection against access to hazardous parts and against solid foreign objects indicated by the first characteristic numeral		P
	The designation with a first characteristic numeral implies that conditions stated in both 5.1 and 5.2 are met.		P
	- the enclosure provides protection of persons against access to hazardous parts by preventing or limiting the ingress of a part of the human body or an object held by a person; and simultaneously		P
	- the enclosure provides protection of equipment against the ingress of solid foreign objects:		P
	the tests establishing compliance with any one of the lower degrees of protection need not necessarily be carried out provided that these tests would obviously be met if applied.		P
5.1	Protection against access to hazardous parts		P
5.2	Protection against access solid foreign objects		P
	First characteristic numeral is 0 Non-protected		N
	First characteristic numeral is 1 Brief description: Protected against solid foreign objects of 50 mm Φ and greater Definition: The object probe, sphere of 50 mm Φ , shall not fully penetrate		N
	First characteristic numeral is 2 Brief description: Protected against solid foreign objects of 12.5 mm Φ and greater Definition: The object probe, sphere of 12.5 mm Φ , shall not fully penetrate		N
	First characteristic numeral is 3 Brief description: Protected against solid foreign objects of 2.5 mm Φ and greater Definition: The object probe, sphere of 2.5 mm Φ , shall not penetrate at all		N
	First characteristic numeral is 4 Brief description: Protected against solid foreign objects of 1.0 mm Φ and greater Definition: The object probe of 1.0 mm Φ , shall not penetrate at all		N
	First characteristic numeral is 5 Brief description: Dust-protected Definition: Ingress of dust is not totally prevented, but dust shall not penetrate in a quantity to interfere with satisfactory operation of the apparatus or to impair safety		N
	First characteristic numeral is 6 Brief description: Dust-tight Definition: No ingress of dust	IP 6X	P

6	Degrees of protection against ingress of water indicated by the second characteristic numeral	P
---	--	---



	The second characteristic numeral indicates the degree of protection provided by enclosures with respect to harmful effects on the equipment due to the ingress of water.		P
	The tests for the second characteristic numeral are carried out with fresh water. The actual protection may not be satisfactory if cleaning operations with high pressure and/or solvents are used.		P
	Second characteristic numeral is 0 Non-protected		N
	Second characteristic numeral is 1 Brief description: Protected against vertically falling water drops Definition: Vertically falling drops shall have no harmful effects		N
	Second characteristic numeral is 2 Brief description: Protected against vertically falling water drops when enclosure tilted up to 15° Definition: Vertically falling drops shall have no harmful effects when the enclosure is tilted at any angle up to 15° on either side of the vertical		N
	Second characteristic numeral is 3 Brief description: Protected against spraying water Definition: Water sprayed at an angle up to 60° on either side of the vertical shall have no harmful effects		N
	Second characteristic numeral is 4 Brief description: Protected against splashing water Definition: Water splashed against the enclosure from any direction shall have no harmful effects		N
	Second characteristic numeral is 5 Brief description: Protected against water jets Definition: Water projected in jets against the enclosure from any direction shall have no harmful effects		N
	Second characteristic numeral is 6 Brief description: Protected against powerful water jets Definition: Water projected in powerful jets against the enclosure from any direction shall have no harmful effects	IP X6	P
	Second characteristic numeral is 7 Brief description: Protected against the effects of temporary immersion in water Definition: Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is temporarily immersed in water under standardized conditions of pressure and time		N



	<p>Second characteristic numeral is 8</p> <p>Brief description: Protected against the effects of temporary immersion in water</p> <p>Definition: ingress of water in quantities causing harmful effects shall not be possible when the enclosure is continuously immersed in water under conditions which shall be agreed between manufacturer and user but which are more severe than for numeral 7</p>		N
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10	Marking		P
	<p>The requirements for marking shall be specified in the relevant product standard.</p> <p>Where appropriate, such a standard should also specify the method of marking which is to be used when</p> <ul style="list-style-type: none"> - one part of an enclosure has a different degree of protection to that of another part of the same enclosure; - the mounting position has an influence on the degree of protection; - the maximum immersion depth and time are indicated. 		P

11	General requirements for tests		P
11.1	<p>Atmospheric conditions for water or dust</p> <p>Tests:</p> <p>Temperature range:</p> <p>Relative humidity: 25% to 75%</p> <p>Air pressure:</p> <p>15 °C to 35 °C</p> <p>86 kPa to 106 kPa</p> <p>(860 mbar to 1 060 mbar).</p>		P
11.2	<p>Test samples</p> <p>The tests specified in this standard are type tests.</p>		P

12	Tests for protection against access to hazardous parts indicated by the first characteristic numeral		P
12.1	<p>Access probes</p> <p>Access probes to test the protection of persons against access to hazardous parts</p>	IP6X	P



12.2	<p>Test conditions</p> <p>For tests on low-voltage equipment, a low-voltage supply (of not less than 40 V and not more than 50 V) in series with a suitable lamp should be connected between the probe and the hazardous parts inside the enclosure. Hazardous live parts covered only with varnish or paint, or protected by oxidation or by a similar process, are covered by a metal foil electrically connected to those parts which are normally live in operation. The signal-circuit method should also be applied to the hazardous moving parts of high-voltage equipment. Internal moving parts may be operated slowly, where this is possible.</p>	IP6X	P
12.3	<p>Acceptance conditions: The protection is satisfactory if adequate clearance is kept between the access probe and hazardous parts.</p>	IP6X	P
12.3.1	<p>For low-voltage equipment (rated voltages not exceeding 1 000 V a.c. and 1 500 V d.c.)</p> <p>The access probe shall not touch hazardous live parts.</p>	IP6X	P
12.3.2	<p>For high-voltage equipment (rated voltages exceeding 1 000 V a.c. and 1 500 V d.c.)</p> <p>When the access probe is placed in the most unfavourable position(s), the equipment shall be capable of withstanding the dielectric tests as specified in the relevant product standard applicable to the equipment.</p>		N
12.3.3	<p>For equipment with hazardous mechanical parts.</p> <p>The access probe shall not touch hazardous mechanical parts.</p>		N

13	Tests for protection against solid foreign objects indicated by the first characteristic numeral		P
13.1 & 13.2	Test means & Test conditions		P
	Test means and the main test conditions are given		
	For the first characteristic numeral 0: No test required		N
	For the first characteristic numeral 1: Rigid sphere without handle or guard 50 ⁺⁰⁵ mm diameter 50N \pm 10%		N
	For the first characteristic numeral 2: Rigid sphere without handle or guard 12.5 ⁺⁰⁵ mm diameter 30N \pm 10%		N
	For the first characteristic numeral 3: Rigid steel rod 2.5 ⁺⁰⁵ mm diameter with edges free from burrs 3N \pm 10%		N



	For the first characteristic numeral 4: Rigid steel rod 1.0 ^{+0.05} mm diameter with edges free from burrs 1N±10%		N
	For the first characteristic numeral 5: Dust chamber figure 2, with or without underpressure		N
	For the first characteristic numeral 6: Dust chamber figure 2, with under- Dressure	IP6X	P
13.3	Acceptance conditions for first characteristic numerals 1,2,3,4 The protection is satisfactory if the full diameter of the probe specified in Table VII does not pass through any opening.		N
13.4	Dust test for first characteristic numerals 5 and 6 The test is made using a dust chamber incorporating the basic principles shown in figure 2 whereby the powder circulation pump may be replaced by other means suitable to maintain the talcum powder in suspension in a closed test chamber.the talcum powder used shall be able to pass through a square-meshed sieve the nominal wire diameter of which is 50 um and the nominal width of a gap between wires 75um.the amount of talcum powder to be used is 2 kg per cubic metre of the test chamber volume. It shall not have been used for more than 20 tests.	IP 6X	P

14	Tests for protection against water indicated by the second characteristic numeral		P
14.1 & 14.2	Test means & Test conditions Test means and the main test conditions are given		P
	For the first characteristic numeral 0: No test required		P
	For the second characteristic numeral 1: To test for compliance with IPX1, the sample is rotated on the turntable at 1 rpm and 100 mm eccentricity (the distance between the turntable's axis and the test sample's central axis) under water dripping at a rate of 1 mm/min for 10 minutes.		P
	For the second characteristic numeral 2: For IPX2 testing, the sample is tilted at 15° under water dripping at a rate of 3 mm/min for a total of 10 minutes, 2.5 minutes in each of four positions of tilt.		N
	For the second characteristic numeral 3: For IPX3, the sample is positioned under oscillating spray tubes rotating at ±60° from the vertical for 5 minutes. The oscillation rate is two cycles of 120° in 4 seconds. The flow rate depends upon the tube size, which in turn is dependent upon the sample size. Each surface of the enclosure within the spray arch is to be tested for 1 min/m ²		N

	For the second characteristic numeral 4: For IPX4, the sample is positioned under oscillating spray tubes rotating at nearly ±180° from the vertical for 10 minutes. The oscillation rate is two cycles of about 360° in 12 seconds. Each surface of the		N
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	enclosure within the spray arch is to be tested for 1 min/m ² , with no less than 5 minutes of total test time. The flow rate again depends upon the tube size, which is itself dependent upon the sample size.		
	For the second characteristic numeral 5: To test for compliance with IPX5, the sample is subjected to water jetting from a nozzle with a 6.3-mm-diameter opening at a flow rate of 12.5L/min. Each surface of the enclosure is to be tested for 1 minute at a distance from the jet nozzle of 2.5–3.0 m.		N
	For the second characteristic numeral 6: To test for compliance with IPX6, the sample is subjected to water jetting from a nozzle with a 12.5-mm-diameter opening at a flow rate of 100L/min. Each surface of the enclosure is to be tested for 1 minute at a distance from the jet nozzle of 2.5–3.0 m. -minimum test duration: 3 min	IP X6	P
	For the second characteristic numeral 7: For IPX7 testing, the sample is submerged for 30 minutes. The lowest point of the enclosure should be 1000 mm below the surface of the water, and the highest point at least 150mm below the surface.		N
	For the second characteristic numeral 8: For IPX8, the test time and submersion depth are according to the manufacturer's specifications and must be marked on the product (for example, "submersible for up to 1 hour at a depth upto 2 meters").		N
14.3	Acceptance conditions After testing in accordance with the appropriate requirements of 14.2.1 to 14.2.8 the enclosure shall be inspected for ingress of water. It is the responsibility of the relevant Technical Committee to specify the amount of water which may be allowed to enter the enclosure and the details of a dielectric strength test, if any. In general, if any water has entered, it shall not: - be sufficient to interfere with the correct operation of the equipment or impair safety; - deposit on insulation parts where it could lead to tracking along the creepage distances; - reach live parts or windings not designed to operate when wet - accumulate near the cable end or enter the cable if any. If the enclosure is provided with drain-holes, it should be proved by inspection that any water which enters does not accumulate and that it drains away without doing any harm to the equipment. For enclosures without drain-holes, the relevant product standard shall specify the acceptance conditions if water can accumulate to reach live parts.	No damage	P



EN 60529			
Cl.	Requirement – Test	Result	Verdict

ANNEX A: Test Photos

Photo 1



Photo 2



EN 60529			
Cl.	Requirement – Test	Result	Verdict



Photo 3



Photo 4



***** End of report *****



RoHS Test Report

Applicant : Yangzhou Xintong Transport Equipment Group Co., Ltd.
Address : Yangzhou Xintong Transport Equipment Group Co., Ltd., Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu Province, China
Manufacturer : Yangzhou Xintong Transport Equipment Group Co., Ltd.
Address : Yangzhou Xintong Transport Equipment Group Co., Ltd., Guoji Industrial Zone, Songqiao Town, Gaoyou City, Yangzhou City, Jiangsu Province, China

The following sample(s) was /were submitted and identified on behalf of the clients as :

Sample Name : LED ROAD AND AREA LUMINAIRES
Trade Mark : N/A
: SH61
Model Number : SH6101: 30-60W ; SH6102: 80-120W ; SH6103: 150-180W ; SH6104:200-250W
Sample Received Date : Dec 28, 2020
Testing Period : Dec 28, 2020-Jan. 04, 2021
Test Requested : Selected test (s) in the selected parts as requested by client with the RoHS Directive 2011/65/EU and its subsequent amendments EU No. 2015/863
Test Method : Please refer to next page(s).
Test Result : Please refer to next page(s).

Prepared by: _____


Engineer



Approved & Authorized Signer: _____

Jack Yang / Manager



RoHS Test Report

Sample Description :

No.	Description	Name
1	The glass panel	The glass panel
2	LED	LED
3	Silver metal screw	Silver metal screw
4	Grey metal case	Grey metal case
5	Multicolor cable	Multicolor cable
6	IC	IC
7	Diode	Diode
8	Capacitor	Capacitor
9	Plastics	Plastics
10	PCB	PCB



RoHS Test Report

Test Result (No. 1):

Test Item(s)	Unit	Test Method (Reference)	Result	MDL	Limit
Cadmium(Cd)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	100
Lead(Pb)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	1000
Mercury(Hg)	mg/kg	IEC 62321-4:2013, ICP-AES	N.D.	2	1000
Hexavalent Chromium(CrVI)	mg/kg	IEC 62321:2013, UV-Vis	N.D.	2	1000
Sum of PBBs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Sum of PBDEs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
DEHP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
BBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DIBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000



RoHS Test Report

Test Result (No. 2):

Test Item(s)	Unit	Test Method (Reference)	Result	MDL	Limit
Cadmium(Cd)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	100
Lead(Pb)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	1000
Mercury(Hg)	mg/kg	IEC 62321-4:2013, ICP-AES	N.D.	2	1000
Hexavalent Chromium(CrVI)	mg/kg	IEC 62321:2013, UV-Vis	N.D.	2	1000
Sum of PBBs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Sum of PBDEs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
DEHP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
BBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DIBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000



RoHS Test Report

Test Result (No. 3):

Test Item(s)	Unit	Test Method (Reference)	Result	MDL	Limit
Cadmium(Cd)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	100
Lead(Pb)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	1000
Mercury(Hg)	mg/kg	IEC 62321-4:2013, ICP-AES	N.D.	2	1000
Hexavalent Chromium(CrVI)	mg/kg	IEC 62321:2013, UV-Vis	N.D.	2	1000
Sum of PBBs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Sum of PBDEs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
DEHP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
BBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DIBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000



RoHS Test Report

Test Result (No. 4):

Test Item(s)	Unit	Test Method (Reference)	Result	MDL	Limit
Cadmium(Cd)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	100
Lead(Pb)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	1000
Mercury(Hg)	mg/kg	IEC 62321-4:2013, ICP-AES	N.D.	2	1000
Hexavalent Chromium(CrVI)	mg/kg	IEC 62321:2013, UV-Vis	N.D.	2	1000
Sum of PBBs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Sum of PBDEs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
DEHP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
BBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DIBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000



RoHS Test Report

Test Result (No. 5):

Test Item(s)	Unit	Test Method (Reference)	Result	MDL	Limit
Cadmium(Cd)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	100
Lead(Pb)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	1000
Mercury(Hg)	mg/kg	IEC 62321-4:2013, ICP-AES	N.D.	2	1000
Hexavalent Chromium(CrVI)	mg/kg	IEC 62321:2013, UV-Vis	N.D.	2	1000
Sum of PBBs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Sum of PBDEs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
DEHP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
BBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DIBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000



RoHS Test Report

Test Result (No.6):

Test Item(s)	Unit	Test Method (Reference)	Result	MDL	Limit
Cadmium(Cd)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	100
Lead(Pb)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	1000
Mercury(Hg)	mg/kg	IEC 62321-4:2013, ICP-AES	N.D.	2	1000
Hexavalent Chromium(CrVI)	mg/kg	IEC 62321:2013, UV-Vis	N.D.	2	1000
Sum of PBBs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Sum of PBDEs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
DEHP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
BBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DIBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000



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Test Result (No. 6):

Test Item(s)	Unit	Test Method (Reference)	Result	MDL	Limit
Cadmium(Cd)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	100
Lead(Pb)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	1000
Mercury(Hg)	mg/kg	IEC 62321-4:2013, ICP-AES	N.D.	2	1000
Hexavalent Chromium(CrVI)	mg/kg	IEC 62321:2013, UV-Vis	N.D.	2	1000
Sum of PBBs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Sum of PBDEs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
DEHP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
BBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DIBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000



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Test Result (No. 7):

Test Item(s)	Unit	Test Method (Reference)	Result	MDL	Limit
Cadmium(Cd)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	100
Lead(Pb)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	1000
Mercury(Hg)	mg/kg	IEC 62321-4:2013, ICP-AES	N.D.	2	1000
Hexavalent Chromium(CrVI)	mg/kg	IEC 62321:2013, UV-Vis	N.D.	2	1000
Sum of PBBs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Sum of PBDEs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
DEHP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
BBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DIBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000



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Test Result (No. 8):

Test Item(s)	Unit	Test Method (Reference)	Result	MDL	Limit
Cadmium(Cd)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	100
Lead(Pb)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	1000
Mercury(Hg)	mg/kg	IEC 62321-4:2013, ICP-AES	N.D.	2	1000
Hexavalent Chromium(CrVI)	mg/kg	IEC 62321:2013, UV-Vis	N.D.	2	1000
Sum of PBBs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Sum of PBDEs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
DEHP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
BBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DIBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000



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Test Result (No. 9):

Test Item(s)	Unit	Test Method (Reference)	Result	MDL	Limit
Cadmium(Cd)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	100
Lead(Pb)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	1000
Mercury(Hg)	mg/kg	IEC 62321-4:2013, ICP-AES	N.D.	2	1000
Hexavalent Chromium(CrVI)	mg/kg	IEC 62321:2013, UV-Vis	N.D.	2	1000
Sum of PBBs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Sum of PBDEs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
DEHP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
BBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DIBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000



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Test Result (No. 10):

Test Item(s)	Unit	Test Method (Reference)	Result	MDL	Limit
Cadmium(Cd)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	100
Lead(Pb)	mg/kg	IEC 62321-5:2013, ICP-AES	N.D.	2	1000
Mercury(Hg)	mg/kg	IEC 62321-4:2013, ICP-AES	N.D.	2	1000
Hexavalent Chromium(CrVI)	mg/kg	IEC 62321:2013, UV-Vis	N.D.	2	1000
Sum of PBBs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromobiphenyl	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Sum of PBDEs	mg/kg	IEC 62321:2013, GC-MS	N.D.	--	1000
Monobromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Dibromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tribromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Tetrabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Pentabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Hexabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Heptabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Octabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Nonabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
Decabromodiphenyl ether	mg/kg	IEC 62321:2013, GC-MS	N.D.	5	--
DEHP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
BBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000
DIBP	mg/kg	EN 14372:2004, GC-MS	N.D.	5	1000

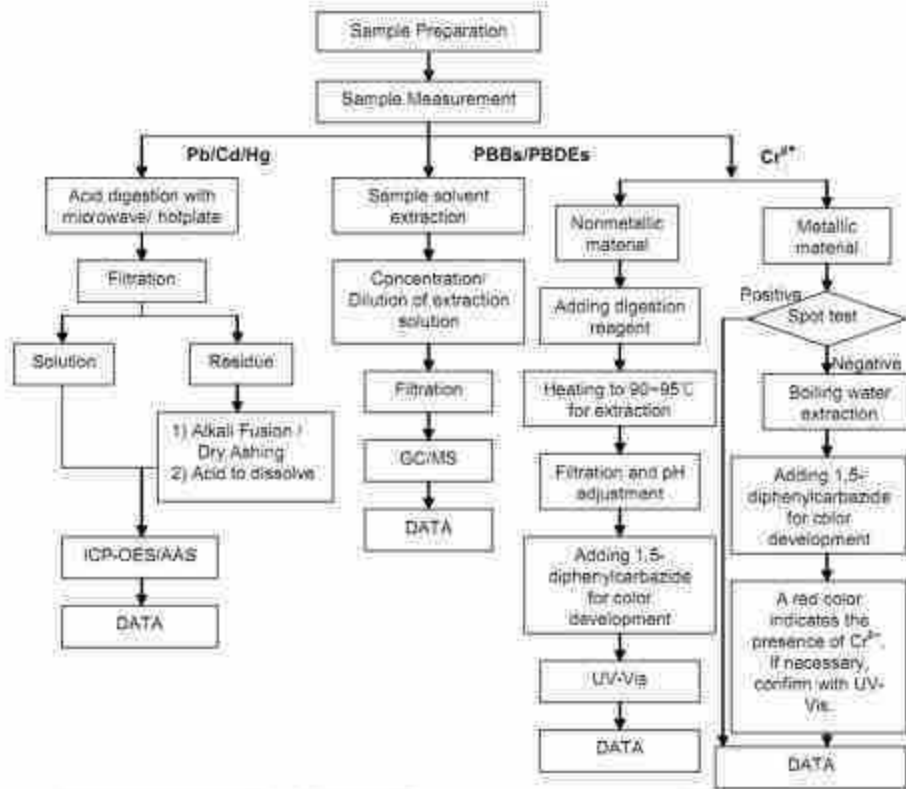
- Note:**
1. mg/kg= ppm
 2. N.D.= Not Detected(<MDL)
 3. MDL = Method Detection Limit



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4. -- = No Testing

Testing Flow Chart (Pb, Cd, Hg, Cr⁶⁺, PBBs, PBDEs):



Testing Flow Chart (DEHP, DBP, BBP, DIBP)



RoHS Test Report

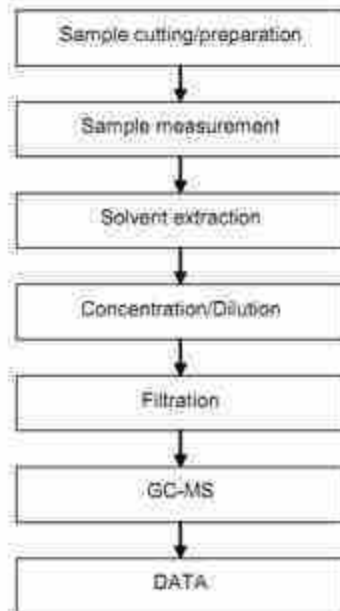


Photo of Sample:



Photo 1



RoHS Test Report



Photo 2



Photo 3



RoHS Test Report



Photo 4

*** End of Report***

