Test Report issued under the responsibility of:

TEST REPORT
UL 588
Standard for Seasonal and Holiday Decorative Products

Job Number..... :	AOC250528003S	
Test by (print+signature)..... :	WanYang Ye	
Checked by (print+signature)..... :	Johnson Wang	
Approved by (print+signature)..... :	Robin Liu	
Date of issue..... :	May 28, 2025	
Total number of pages..... :	16 Pages	
Name of Testing Laboratory preparing the Report..... :	**Shenzhen AOCE Electronic Technology Service Co., Ltd** Room 202, 2nd Floor, No.12th Building of Xinhe Tongfuyu Industrial Park, Fuhai Street, Baoan District, Shenzhen, Guangdong, China	
Applicant's name..... :	**Shenzhen Huoyun Industrial Co., LTD**	
Address..... :	Room 402, No. 32-1, Tunji Road, Xinlian Community, Longcheng Sub-district, Longgang District, Shenzhen City	
Manufacturer's name..... :	**Shenzhen Huoyun Industrial Co., LTD**	
Address..... :	Room 402, No. 32-1, Tunji Road, Xinlian Community, Longcheng Sub-district, Longgang District, Shenzhen City	
Product name..... :	Outdoor Projection Lamp	
Brand name..... :	N/A	
Model/Type reference..... :	651-PL-1, 657-FP-1, 655-PL-1, 650-PL-1, HY-011, HY-012, HY-013, HY-014, HY-015	
Test Standard..... :	UL 588:2024 Ed.19	
Test procedure..... :	☒ Type Test	
Non-standard test method..... :	☒ N/A	

General remarks:

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.
Throughout this report a ☐ comma / ☒ point is used as the decimal separator.
When determining the test conclusion, the Measurement Uncertainty of test has been considered.

Possible test case verdicts	
- test case does not apply to the test object..... :	N/A (or N)
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement..... :	F (Fail)
Date of receipt of test item..... :	May 20, 2025
Date(s) of performance of tests..... :	May 20, 2025 to May 28, 2025

Product information	
Product name……:	Outdoor Projection Lamp
Brand name……:	N/A
Model/Type reference……:	651-PL-1, 657-FP-1, 655-PL-1, 650-PL-1, HY-011, HY-012, HY-013, HY-014, HY-015
Ratings……:	5V, 50/60HZ, 1A, 5W

General product information:

The product covered in this report is a Outdoor Projection Lamp, which is supplied from cETLus approved Class 2 Power Supply.

Relevant Technical consideration：

- Maximum ambient temperature: 40°C
- All models are identical with each other except model no., quantity of LED Lamp, equipment rack, and appearance (colour and silkscreen only) for trading purpose
- 651-PL-1 was selected as representative model and all the test were performed on it. And found to comply with the standard was subjected to all the tests.

Copy of marking plate (Representative)

Outdoor Projection Lamp:

Outdoor Projection Lamp
651-PL-1
5V, 50/60HZ, 1A, 5W

Import: XXX
Address: XXX
Manufacturer: Shenzhen Huoyun Industrial Co., LTD
Address: Room 402, No. 32-1, Tunji Road, Xinlian Community, Longcheng Sub-district, Longgang District, Shenzhen City

Made in China

Test Item:

SEASONAL AND HOLIDAY DECORATIVE PRODUCTS
[UL 588:2024 Ed.19]

Test Required		Clause/ Section	Performance Test	Test Verdict	
			Test Item Description		
Yes	N/A			Pass	Fail
☒	☐	**40**	LEAKAGE CURRENT TEST	☒	☐
☒	☐	**41**	LEAKAGE CURRENT FOLLOWING HUMIDITY CONDITIONING	☒	☐
☒	☐	**42**	INPUT TEST	☒	☐
☒	☐	**43**	TEMPERATURE TEST	☒	☐
☐	☒	**44**	MOUNTING POSITION TEST	☐	☐
☒	☐	**45**	DIELECTRIC VOLTAG-WITHSTAND TEST	☒	☐
☐	☒	**46**	STRAIN RELIEF TEST	☐	☐
☐	☒	**47**	WIRE PUSH-BACK RELIEF TEST	☐	☐
☒	☐	**48**	ABNORMAL OPERATION TEST	☒	☐
☐	☒	**49**	COMPONENT POWER MEASUREMENT TEST	☐	☐
☐	☒	**50**	DOWNWARD BURNING RATE TEST	☐	☐
☒	☐	**51**	CONDUCTIVITY OF DECORATIVE PARTS TEST	☒	☐
☒	☐	**52**	ROUTINE FLEXING TEST	☒	☐
☐	☒	**53**	SLIP-RING ENDURANCE TEST	☐	☐
☐	☒	**55**	ABNORMAL TESTS FOR CONTROLLERS	☐	☐
☒	☐	**58**	ENCLOSURE MOLD STRESS RELIEF TEST	☒	☐
☒	☐	**59**	DROP TEST	☒	☐

☒	☐	**60**	IMPACT TEST	☒	☐
☒	☐	**61**	COLD IMPACT TEST	☒	☐
☐	☒	**62**	RESISTANCE TO CRUSHING TEST	☐	☐
☒	☐	**63**	ADHESIVE TEST	☒	☐
☐	☒	**68**	FUSEHOLDER CRUSH TEST	☐	☐
☐	☒	**69**	FUSEHOLDER COVER TEST	☐	☐
☐	☒	**71**	STRAIN RELIEF TEST FOR WIRING DEVICES	☐	☐
☐	☒	**72**	RELIABILITY OF CONDUCTOR CONNECTION TEST	☐	☐
☐	☒	**75**	INSULATION SECURENESS TEST	☐	☐
☒	☐	**78**	OVEN TEST	☒	☐
☐	☒	**79**	LAMPHOLDER STRAIN RELIEF TEST	☐	☐
☐	☒	**80**	SECURENESS OF LAMPHOLDER CONTACTS TEST	☐	☐
☐	☒	**81**	LAMPHOLDER MILLIVOLT DROP TEST	☐	☐
☐	☒	**82**	ROPE STRENGTH TEST	☐	☐
☐	☒	**83**	CRUSH TEST	☐	☐
☐	☒	**84**	CASCADE LAMP BURNOUT SIMULATION TEST	☐	☐
☐	☒	**85**	CASCADE LAMP TEMPERATURE TEST	☐	☐
☐	☒	**86**	CYCLING TEST	☐	☐
☐	☒	**87**	INPUT TEST	☐	☐
☐	☒	**89**	RAIN TEST	☐	☐
☐	☒	**90**	RAIN TEST FOR SERIES-CONNECTED LIGHTING STRINGS	☐	☐

☐	☒	**91**	STANDING WATER IMMERSION TEST	☐	☐
☐	☒	**92**	GASKET ADHESION TEST	☐	☐
☐	☒	**95**	FLEXING TEST	☐	☐
☐	☒	**96**	DECORATIVE LIGHTING STRING INTENDED FOR USE ON A PATIO UMBRELLA	☐	☐
☐	☒	**97**	TEMPERATURE AFTER FLEXING TEST	☐	☐
☐	☒	**99**	STABILITY TEST	☐	☐
☐	☒	**SD8**	STRAIN RELIEF TEST	☐	☐
☐	☒	**SD9**	FLEXING TEST	☐	☐
☐	☒	**SD10**	CONDITIONING TEST PRIOR TO RAIN TEST	☐	☐
☐	☒	**SD11**	ABNORMAL OPERATION TEST	☐	☐

General Note:

- When a test instrument has multiple manually selectable ranges, the range used (i.e. 0-1 V vs. 0-10 V), this should be recorded.
- Statement as to the measurement uncertainty, when required
- N/A means Not Applicable
- Please mark "☒ " in relevant Cell to indicate the status of the item as selected.

Leakage Current Test (40)

Method:

EUT is operating at: U=Un, F=Fn.

Load of the EUT is under maximum normal load.

The input current and voltage to the EUT shall be measured

Location	Voltage	Measured current	Limit	--	
				Pass	Fail
DC input and enclosure	5V	1A	1.02A	√	

Equipment used: AOC-S-002, AOC-S-014

Leakage Current Following Humidity Conditioning (41)

Method:

EUT is operating at: U=Un, F=Fn.

Load of the EUT is under maximum normal load.

The input current and wAOCage to the EUT shall be measured At humidity of 90% , temperature of 32°C, 48h

Location	Voltage	Measured current	Limit	--	
				Pass	Fail
DC input and enclosure	5V	1A	1.01A	√	

Equipment used: AOC-S-002, AOC-S-014

INPUT TEST (42)

Method:

EUT is operating at: U=Un, F=Fn.

Load of the EUT is under maximum normal load.

The input current and watt to the EUT shall be measured.
Multiple rated voltages or rated voltage range, each rated voltage shall be measured.
The current and power shall be taken under steady state conditions.

Result:

42	TABLE: Electrical data (in normal conditions)					P
U (V)	I (A)	Prated (W)	P (W)	Limit	Ifuse (A)	Condition/status
5	1	5	4.9	<110%	--	Max. load
Supplementary information:						

Equipment used: AOC-S-014

Temperature Test (43)

Method:

EUT primary is U=Un, F=Fn, operated under normal max. load.

Temperatures of parts are measured by thermal couplers, windings are measured by resistance change method.
Measuring place shall be a point close to the heat source. The test is continued until thermal stable.

Voltage is changed lower or higher tolerance without rest of time.

Result:

43	**TABLE: Thermal requirements**						Pass
	Supply voltage (V)	5V	5V				
	Ambient Tmin (°C)	24.5	24.6	--	--		
	Ambient Tmax (°C)	24.4	24.5	--	--		
	Max. load	100 lights	lamp envelope 90°C				
Maximum measured temperature T of part/at::		T (°C)					Allowed Tmax (°C)

Lead wire	39.6	--	--	--	105	
Lamp envelope	46.1	--	--	--	Ref.	
Enclosure	40.0	--	--	--	80	
Connector	35.2	--	--	--	80	
Supplementary information:						

Temperature T of winding:	t1 (°C)	R1 (Ω)	t2 (°C)	R2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class
--	--	--	--	--	--	--	--
Supplementary information:							

Equipment used: AOC-S-014, AOC-S-027, AOC-S-028

Dielectric Voltage-Withstand Test (45)

Method:

The test is made while the EUT is still in well-heated condition Make sure the power switch of the EUT is in ON position.
Thin material can be tested in room temperature.
The test voltage is a.c. of 50 or 60 Hz or d.c. voltage equal to peak value of the a.c. voltage.

Test voltage is applied gradually raised from zero to the specified voltage and held at that value for 60s. Insulation breakdown is: Current flows through the insulation rapidly increases in an uncontrolled manner; that is the insulation does not restrict the flow of the current.

Corona discharge or a single momentary flashover is not regarded as insulation breakdown.
A test incorporating reinforced insulation and lower grades insulation (BI, SI), care is taken not to overstress BI or SI.

Where capacitors (X or Y capacitors) are across the insulation, d.c. voltage is recommended for the test. Discharge resistors shall be disconnected before testing.

Result:

45	**Electric strength test**	N/A

Test voltage applied between:	Test voltage (V)	Breakdown

Equipment used:

Strain Relief Test (46)

Pull Location	Samples	Force	Observations	N/A	
				Pass	Fail

Equipment used:

Abnormal Operation Test (48)

Method:

EUT is operating under normal load, U=Un, F=Fn. A fault is then introduced. One fault only at one time. Ventilation openings shall be blocked; Semiconductors shall be short-circuited or open-circuited one at a time; Transformer secondary windings are short-circuited one at a time (other windings are normal loaded); Transformer secondary windings are overloaded one at a time (other windings are normal loaded), Fan is locked; Operational insulation which clearances or creepage distances are less than requirement, is short-circuited; Motors are locked.

The input current, fuse rating current, test duration and observation shall be recorded.
The test is continued until a protection device opened the circuit (fuse) or steady state conditions.
Overload test and fault condition which the current is more than normal current, shall wait until thermal stable, coil temperature of transformer shall be recorded.

Result:

48	**Fault condition tests (Continued)**	Pass
Requirement	Result	Remarks
During the test:		
Fire propagates beyond the EUT?	No	
Enclosures deform to cause non-compliance with the standard?	No	

Conductivity of Decorative Parts Test (51)

EUT is operating at: U=Un, F=Fn.

Load of the EUT is under maximum normal load and connected a 1500 ohm resistor. The input current and wage to the EUT shall be measured

Location	Voltage	Measured current	Limit	--	
				Pass	Fail
DC input and Decorative Parts	124V	1A	1.01A	√	

Equipment used: AOC-S-014, AOC-S-002

Routine Flexing Test (52)

Location	Test conditions	time	Observations	--	
				Pass	Fail
cord	Normal work	100,000 cycles	No damage, can't touch the live part.	√	

Equipment used: AOC-S-056

Tests for Permanence of Cord Tag (56)

Location	Test conditions	Force	Observations	N/A	
				Pass	Fail

Equipment used: AOC-S-004, AOC-S-013

Enclosure Mold Stress Relief Test (58)(100)

Condition: Enclosure of molded or formed thermoplastic materials are subjected this test.

Method:

EUT of complete equipment is placed in a circulating air oven for 7h. The temperature is 70°C.

After test the EUT is permitted to cool to room temperature. Each enclosure material shall be tested.

Result:

Test samples	temperature	time	Observations
Enclosure of LED lamp	70°C	7h	No change the enclosure

Equipment used: AOC-S-004

Drop Test (59)

Test conditions: Height=920mm

Location/Drop test	Drop No.	Observations	--	
			Pass	Fail
Enclosure of LED lamp	1	No damaged	√	
Enclosure of LED lamp	2	No damaged	√	
Enclosure of LED lamp	3	No damaged	√	

Equipment used: AOC-S-050

Impact Test (60)

Location/Drop test	Impact energy	Observations	--	
			Pass	Fail
Enclosure of LED lamp	6.8J for50.8 mm diameter steel sphere	No damaged for Enclosure	√	
Enclosure of LED lamp	6.8J50.8 mm diameter steel sphere	No damaged for Enclosure	√	
Enclosure of LED lamp	6.8J50.8 mm diameter steel sphere	No damaged for Enclosure	√	

Equipment used: AOC-S-025, AOC-S-050

Cold Impact Test (61)

Location/Drop test	Temperature	Impact energy	Observations	--	
				Pass	Fail
Enclosure of LED lamp	-35°C 3h	6.8J for50.8 mm diameter steel sphere	No damaged for Enclosure	√	
Enclosure of LED lamp	-35°C 3h	6.8J50.8 mm diameter steel sphere	No damaged for Enclosure	√	
Enclosure of LED lamp	-35°C 3h	6.8J50.8 mm diameter steel sphere	No damaged for Enclosure	√	

Equipment used: AOC-S-004, AOC-S-025, AOC-S-050

Adhesive Test (63)

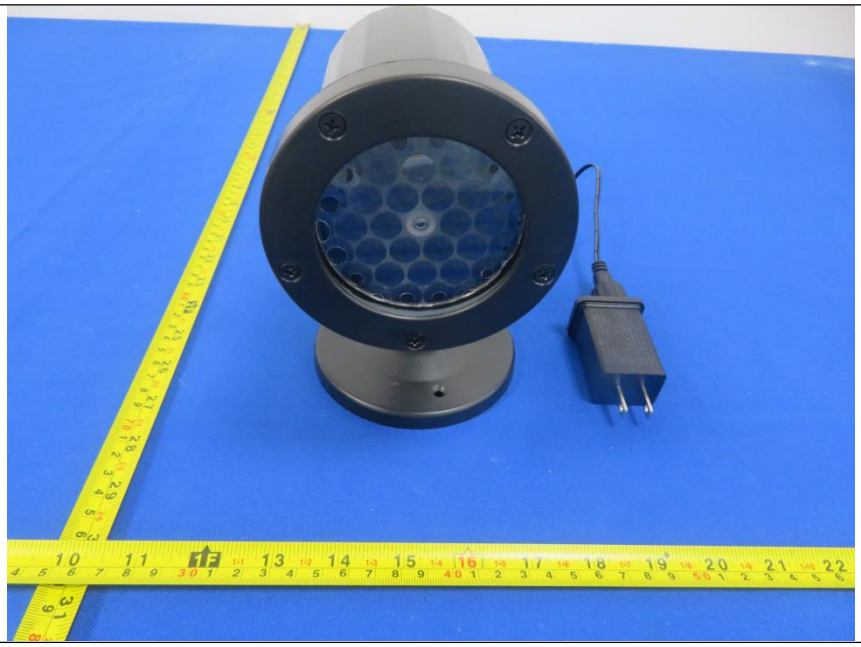
Location	Temperature, humidity	time	Observations
Enclosure of LED lamp	32°C, 88%R.H.	7days	No changer the enclosure, No loose

Equipment used: AOC-S-004

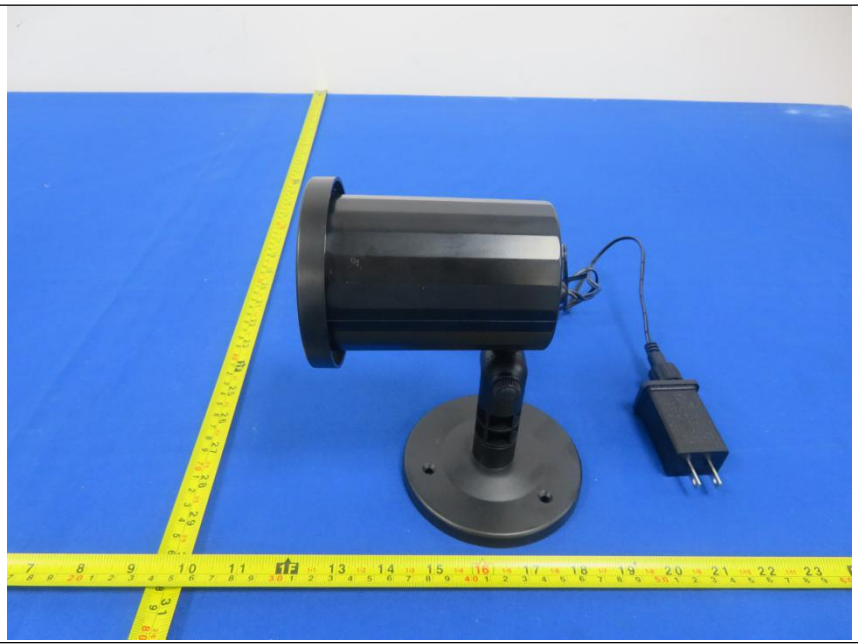
Appendix 1: Critical components information					
Component Name	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity**
Internal wire and connecting wire	Various	Various	105 ºC, 300Vac, 24AWG min.	UL 758	UL
Material of connector	Various	Various	PBT, Min thickness 0.75mm, Min HB, Min 105° C.	UL 94	UL
Remark:					

PHOTOS:

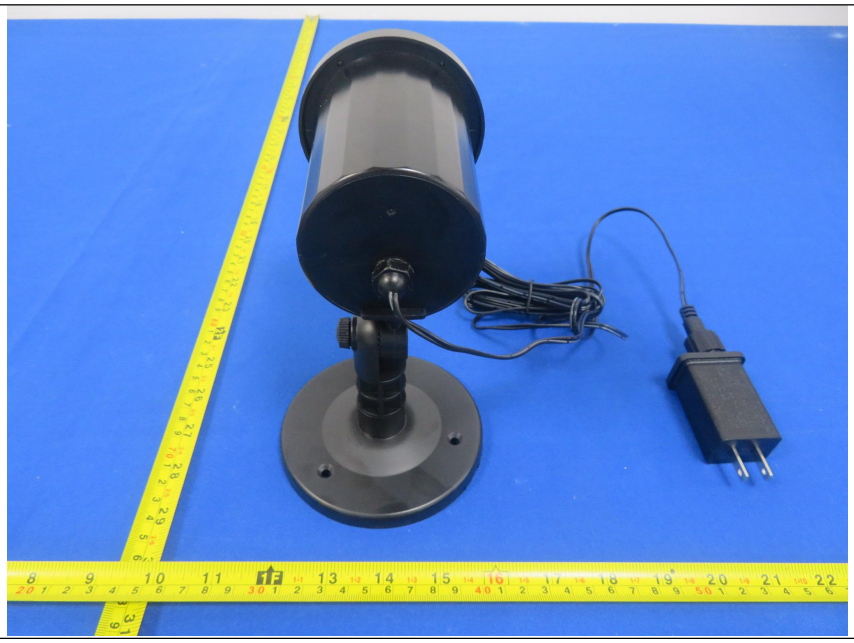
Details of: Overview for model 651-PL-1



Details of: Overview for model 651-PL-1



Details of: Overview for model 651-PL-1



Details of: Overview for model 651-PL-1

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