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Test report of

IES LM-79-08

Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Rendered to:

P.Q.L., Inc.

2285 Ward Avenue / Simi Valley, CA 93065

For products:

SSL Recessed Downlights

Models No.:

90901

This product is color tunable, 3000K was selected for this test.

Test Date: Apr. 30, 2019

Test Item: Total luminous flux, Luminous Efficacy, Electrical values, Chromaticity coordinates, CCT and CRI, Spectral Power Distribution.

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1. General

1.1 Product Information

Brand Name	Superior Life®
Product Type	SSL Downlight Retrofits
Model Number	90901
Rated Inputs	120VAC, 60Hz
Rated Power	10W
Rated Light output	680lm
Declared CCT	3000K
Power Supply	Intergraded in luminaires
LED Package, Array or Module	Model: HL-AT-2835DW-S1-08-PCT-HR3, Guangzhou Hongli Opto-Electronic Co., Ltd.
Receipt Samples	1 unit
Sample Code of lab.	190216102005
Date of Receipt Samples	Feb. 16, 2019
Note	This product is color tunable, 3000K was selected for test. For Downlight retrofit kits, the used can model number is: EPL405/WL-416-AT

1.2 Standards or methods

The following standards are partly or totally used or referenced for test:

No.	Name
ANSI/NEMA/ ANSLG C78.377-2015	Specifications for the Chromaticity of Solid State Lighting Products
ANSI C82.77-2002	Harmonic Emission Limits—Related Power Quality Requirements for Lighting Equipment
CIE Pub. No. 13.3-1995	Method of Measuring and Specifying Color Rendering of Light Sources
CIE Pub. No. 15:2004	Colorimetry
IES LM-79-08	Electrical and Photometric Measurements of Solid-State Lighting Products

1.3 Equipment list

Instrument	ID	Model name	Cal. date	Next cal. Date
AC Power supply	LC-I-987	APW-120N	2019-01-08	2020-01-07
AC Power supply	LC-I-989	APW-120N	2019-01-08	2020-01-07
Power analyzer	LC-I-928	WT210	2019-01-02	2020-01-01
Power analyzer	LC-I-954	WT210	2019-03-12	2020-03-11
Multimeter	LC-I-972	Fluke 17B	2018-08-01	2019-07-31
Photometric colorimetric electric system* (2 meter sphere)	LC-I-956	HAAS-2000	Before use	Before use
Standard lamp**	LC-PL-I-011	D204C	2018-11-21	2019-11-20
Luminous Flux Standard Lamp***	LC-PL-I-003	24V100W	2018-11-21	2019-11-20
Goniophotometer(with mirror)	LC-I-902	GMS2000	2019-05-06	2020-05-05
Wireless temperature transmitter	LC-I-978	DWRF-B	2019-01-07	2020-01-06
Wireless temperature transmitter	LC-I-979	DWRF-B	2019-01-07	2020-01-06

Note:

* Bandwidth of spectroradiometer is 1 nm.

** halogen lamp, 100W, omni-directional type, and its traceability to NIM.

*** halogen lamp, 100W, omni-directional type, and its traceability to NIM.

2. Test conducted and method

The lamp/luminaire was operated at least 2 hours to reach stabilization and temperature equilibrium before test.

2.1 Ambient Condition

The ambient temperature in which measurements are being taken was maintained at $25\text{ }^{\circ}\text{C} \pm 1^{\circ}\text{C}$; the air flow around the sample(s) being tested did not affect the performance.

2.2 Power Supply Characteristics

The AC power supply had a sinusoidal voltage wave shape at the prescribed frequency (60 Hz) such that the RMS summation of the harmonic components does not exceed 3 percent of the fundamental during operation of the test item.

The voltage of AC power supply (RMS voltage) applied to the device under test was regulated to within ± 0.2 percent under load.

2.3 Seasoning and Stabilization

No seasoning was performed in accordance with IESNA LM-79-08. And before the measurement, the sample was stabilized until the light output and power variations were less than 0.5% in 30 minutes intervals (3 readings, 15 minutes apart).

2.4 Electrical Instrumentation

The calibration uncertainties of the instruments for AC voltage and current were less than 0.2 percent, and the calibration uncertainty of the AC power meter was less than 0.5 percent (95 % confidence interval, $k=2$).

2.5 Color Measurement Method

Spectral radiant flux was measured by a sphere (2 meter)-spectroradiometer system, and the color characteristics (Color rendering index, correlated color temperature, chromaticity coordinate) were calculated from these by software automatically.

2.6 Total Luminous Flux Measurement Method

Total luminous flux was measured by sphere-spectroradiometer system.

Spectral radiant flux was measured by a sphere (2 meter)-spectroradiometer system, and the total luminous flux was calculated from these by software automatically.

2.7 Luminous Intensity Distribution Measurement Method

The customer did not require this measurement.

2.8 Spatial Non-uniformity of Chromaticity

The customer did not require this measurement.

3. Test Result Summary

3.1 Electrical data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	120.00 V~60Hz	-
Input Current(A)	0.090	-
Total Power(W)	9.83	-
Power Factor	0.909	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	681.83	-
Luminaire Efficacy(lm/W)	68.36	-
Correlated Color Temperature (CCT)(K)	3208	-
Color Rendering Index (CRI)	92.8	-
R9	69	-
Chromaticity Coordinate (x,y)	x = 0.4182 y = 0.3880	-
Chromaticity Coordinate (u,v)	u = 0.2453 v = 0.3414	-
Chromaticity Coordinate (u',v')	u' = 0.2453 v' = 0.5121	-
Duv	-0.0037	-

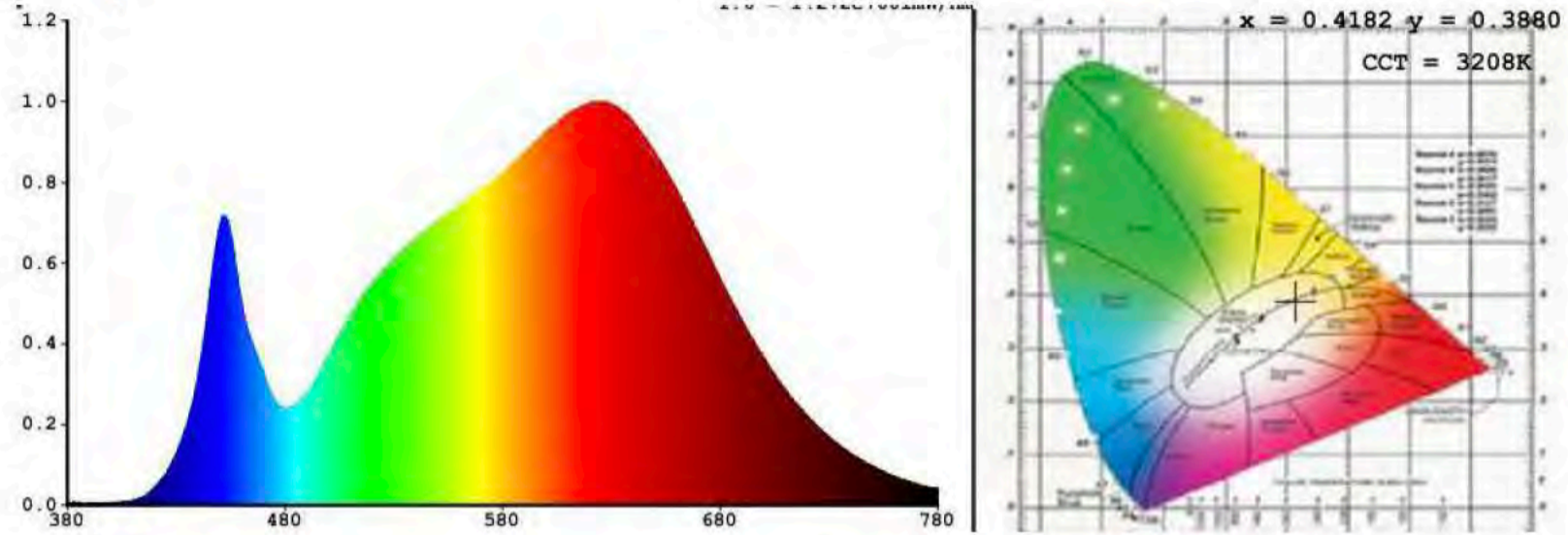
3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
94	96	95	92	93	93	93	86
R9	R10	R11	R12	R13	R14	R15	-
69	88	92	78	94	96	92	-

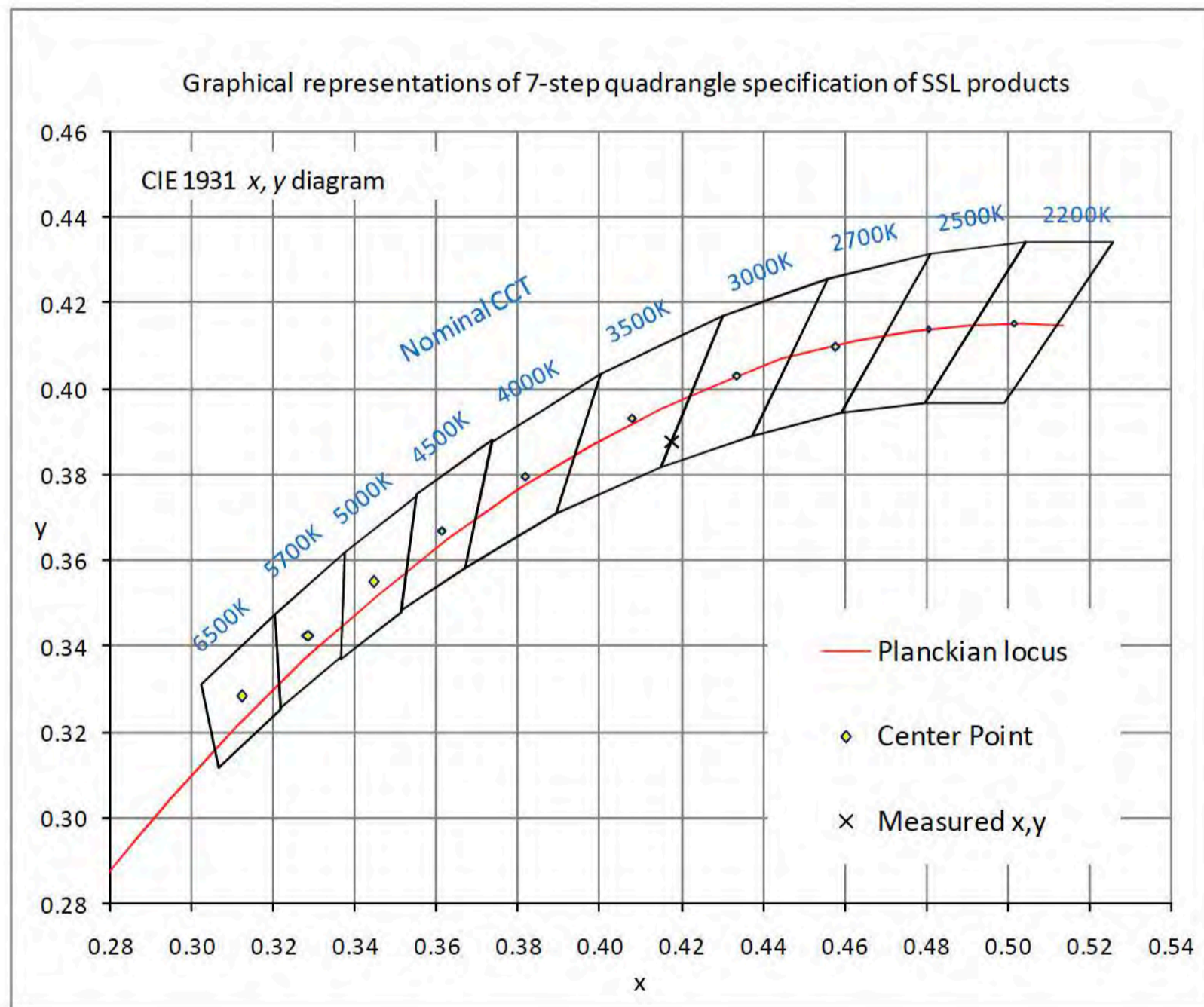
Note: N/A

4. Test Data

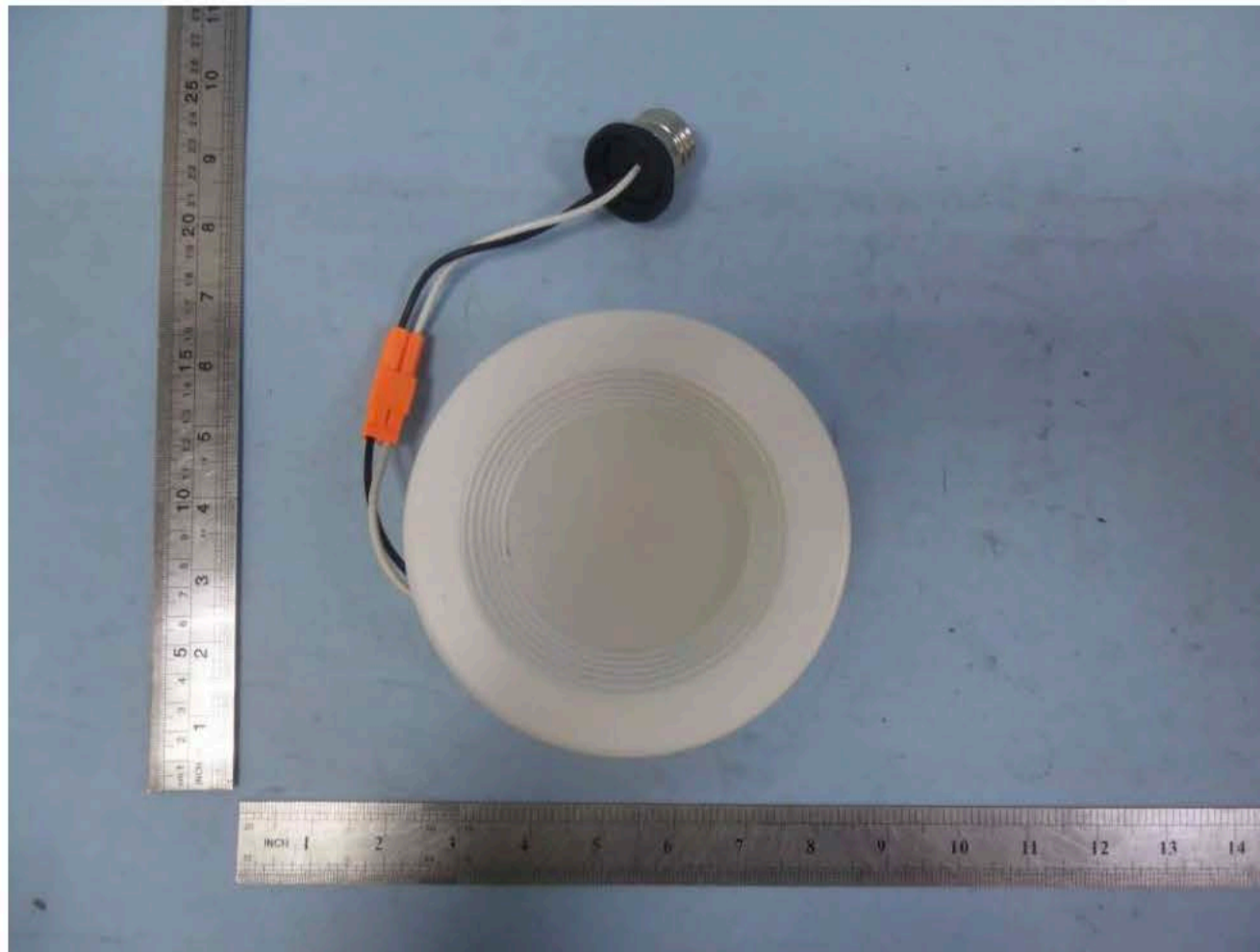
4.1 Spectral Distribution



4.2 ANSI Chromaticity Quadrangles Diagram



Appendix A Product Photo



Picture 1



Picture 2

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