



Ref. No.: LC-RT-PL-005-0209

Version: 1.0

Date of issue: Aug. 2, 2018

Total pages: 9



Test report of

IES LM-79-08

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

Rendered to:

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For products:

T8 Four-Foot Linear Replacement Lamps

Models No.:

54210111

Test Date: Jul. 26, 2018

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

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Template No.: LC-RT-PL-005 Rev.1.0

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1. General

1.1 Product Information

Brand Name	ETI
Product Type	T8 Four-Foot Linear Replacement Lamps-Internal Driver/Line Voltage Lamp - Style Retrofit Kit s (UL Type B)
Model Number	54210111
Rated Inputs	120-277VAC, 50/60Hz
Rated Power	15W
Rated Light output	1650lm
Declared CCT	3000K, 3500K
Power Supply	Integrated in lamp
LED Package, Array or Module	SPMWHX228XXXXXXXXX, Samsung Electronics Co., LTD.
Receipt Samples	1 unit
Sample Code of lab.	180718109007
Date of Receipt Samples	Jul. 18, 2018
Note	The CCT of this product can be adjusted from 3000K and 3500K. The mode of 3000K and 3500K are selected to the test.



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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-923	CHP-500	2018-01-10	2019-01-09
AC Power supply	LC-I-987	APW-110N	2018-01-10	2019-01-09
Power analyzer	LC-I-928	WT210	2018-01-05	2019-01-05
Power analyzer	LC-I-954	WT210	2018-01-10	2019-01-09
Multimeter	LC-I-972	Fluke 17B	2017-08-08	2018-08-07
Photometric colorimetric electric system (2 meter sphere)	LC-I-900	SPR3000	Before use	Before use
Standard lamp	LC-PL-I-011	D204C	2017-09-07	2018-09-06
Luminous Flux Standard Lamp	LC-PL-I-003	24V100W	2017-09-22	2018-09-21
Goniophotometer(with mirror)	LC-I-902	GMS2000	2018-05-07	2019-05-06
Wireless temperature transmitter	LC-I-978	DWRF-B	2018-02-10	2019-02-09
Wireless temperature transmitter	LC-I-979	DWRF-B	2018-02-10	2019-02-09

2. Test conducted and method

The lamp 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 $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$; 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	
	3000K	3500K
Input Voltage & Frequency	120.00 V~60Hz	120.00 V~60Hz
Input Current(A)	0.124	0.125
Total Power(W)	14.61	14.69
Power Factor	0.986	0.982
I-THD	14.60%	14.84%
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result	
	3000K	3500K
Total Lumens(lm)	1763.30	1820.40
Luminaire Efficacy(Lm/W)	120.36	123.92
Correlated Color Temperature (CCT)(K)	3030	3441
Color Rendering Index (CRI)	82.0	83.2
R9	5	9
Chromaticity Coordinate (x,y)	x = 0.4327 y = 0.3989	x = 0.4070 y = 0.3882
Chromaticity Coordinate (u,v)	u = 0.2501 v = 0.3458	u = 0.2379 v = 0.3403
Chromaticity Coordinate (u',v')	u' = 0.2501 v' = 0.5187	u' = 0.2379 v' = 0.5104
Duv	-0.0015	-0.0015

3.3 Electrical data on 277V

Criteria Item	Result	
	3000K	3500K
Input Voltage & Frequency	277.00 V~60Hz	277.00 V~60Hz
Power Factor	0.943	0.944
I-THD	16.25%	16.31%

Note: N.A.



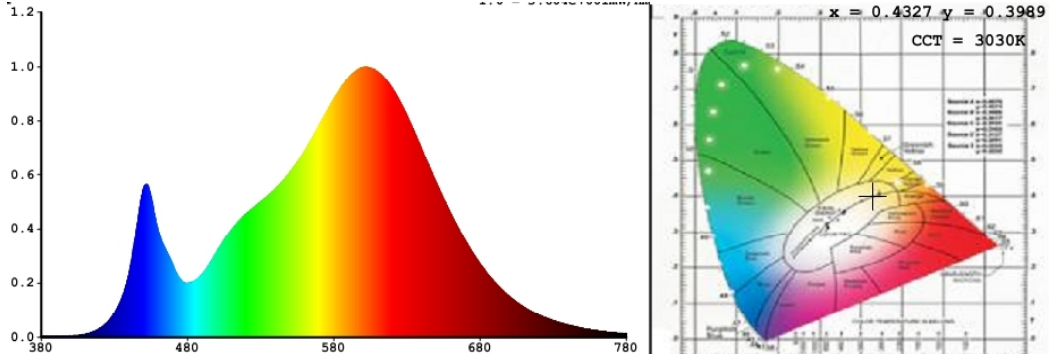
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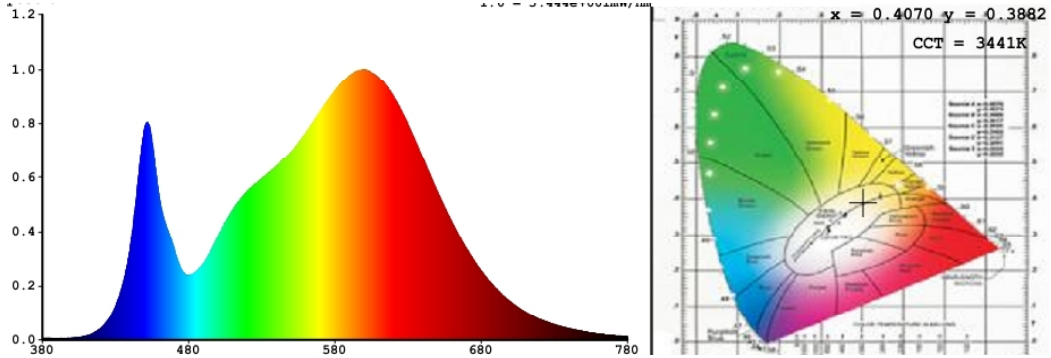
4. Test Data

4.1 Spectral Distribution

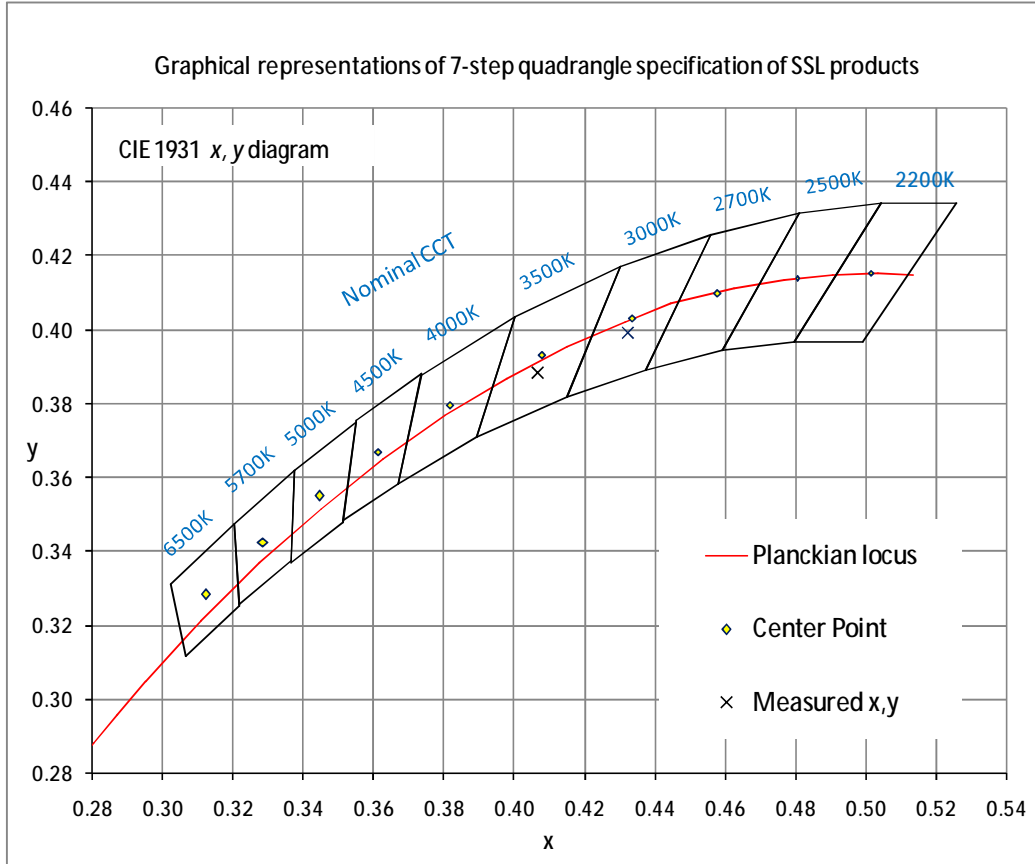
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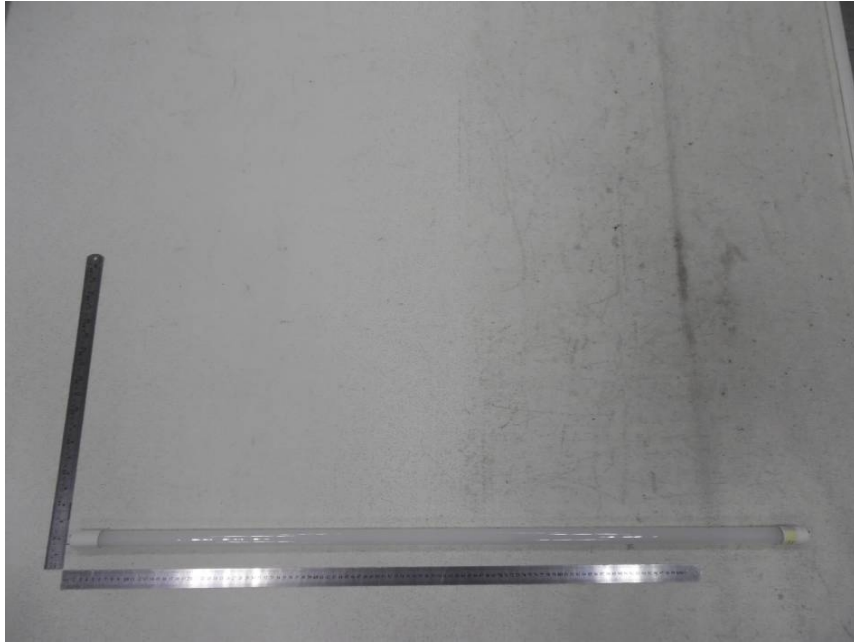
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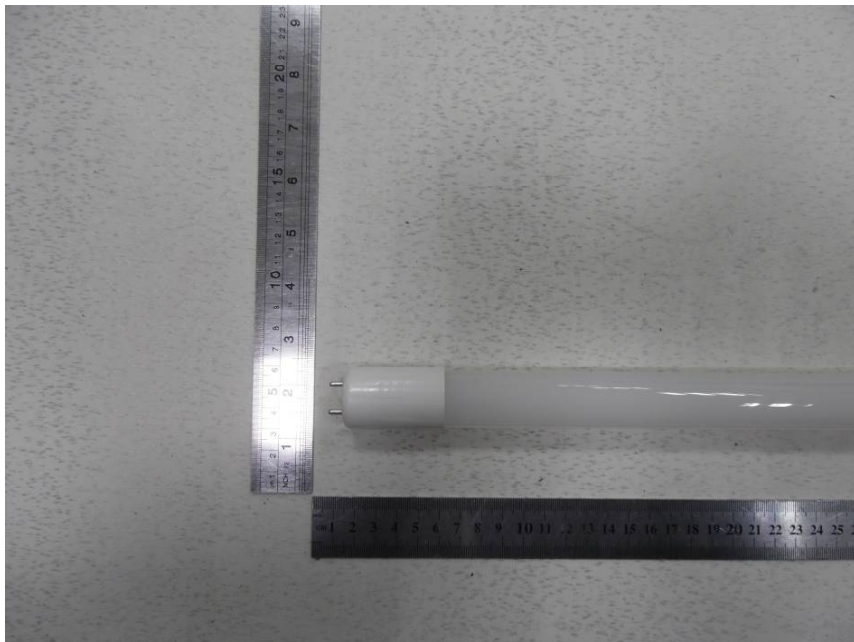
4.2 ANSI Chromaticity Quadrangles Diagram



Appendix 1 Product Photo



Picture 1



Picture 2

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