



Ref. No.: LCZP20060345
Version: 1.0
Date of issue: Jul. 2, 2020
Total pages: 11



Test report of

IES LM-79-08

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

Rendered to:

ETI Solid State Lighting (Zhuhai) Ltd
No.1, Zhongzhu Road South, Science & Technology Innovation
Coast, High Tech District, Zhuhai City, Guangdong Prov., China

For products:

LED Downlight

Models No.:

538401##(##=00-99)

(The product is a color tunable luminaire, tunable to 2700K to 5000K and ## can be 00-99 and represent different client and sales districts.)

Test Date: Jun. 19, 2020 to Jun. 20, 2020

Test Lab.: **LCTECH Guangdong Testing Services Co., Ltd.**

2/F., Technology and Enterprise Development Center, Guangyuan Road, Xiaolan, Zhongshan, Guangdong, China

Tel: +86-760-22833366 Fax: +86-760-22833399

E-mail: Service@lccert.com <http://www.lccert.com>

Test Sites: 1/F., Building I, Technology and Enterprise Development Center, Guangyuan Road, Xiaolan, Zhongshan, Guangdong, China

Template No.: LC-RT-PL-001 Rev.1.4

Test Note:

Complied by:

Fish Tan
Jul. 2, 2020

Fish Tan

Reviewed by:

Lin Qiu
Jul. 2, 2020

Lin

The duplication of this report or parts of it and its use for advertising purposes is only allowed with permission of the testing laboratory. This report contains the result of the examination of the product sample submitted by the applicant. A general statement concerning the quality of the products from the series manufacture cannot be derived therefore. This report must not be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Table of Contents

1. General	3
1.1 Product Information	3
1.2 Standards or methods	4
1.3 Equipment list	4
2. Test conducted and method	5
2.1 Ambient Condition	5
2.2 Power Supply Characteristics	5
2.3 Seasoning and Stabilization	5
2.4 Electrical Instrumentation	5
2.5 Color Measurement Method	5
2.6 Total Luminous Flux Measurement Method	5
2.7 Luminous Intensity Distribution Measurement Method	5
2.8 Spatial Non-uniformity of Chromaticity	5
3. Test Result Summary	6
3.1 Electrical data	6
3.2 Photometric data	6
3.3 Color Rendering Details	6
4. Test Data	7
4.1 Spectral Distribution	7
4.2 ANSI Chromaticity Quadrangles Diagram	7
4.3 Goniometry Test Data	8
4.4 Zonal Lumen Summary	8
4.5 Polar Curves	9
4.6 Candela Tabulation	10
Appendix A Product Photo	11



LCTECH



1. General

1.1 Product Information

Brand Name	ETI, Commercial Electric
Product Type	LED Downlight
Model Number	538401##(##=00-99)
Rated Inputs	120-277VAC, 60Hz
Rated Power	10W
Rated Light output	550lm
Declared CCT	2700K, 3000K, 3500K, 4000K, 5000K
Power Supply	ETI-AD00950220042SDA-1
LED Package, Array or Module	SPMWH6229AQ7SGW*SM, SAMSUNG ELECTRONICS CO., LTD.
Receipt Samples	1 unit
Sample Code of lab.	200613112004
Date of Receipt Samples	Jun. 13, 2020
Note	This is a color tunable product, 2700K was selected for the test.

1.2 Standards or methods

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

No.	Name
ANSI/NEMA/ ANSLG C78.377-2011 or 2015 or 2017	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	2020-01-06	2021-01-05
AC Power supply	LC-I-989	APW-120N	2020-01-06	2021-01-05
Power analyzer	LC-I-928	WT210	2019-12-29	2020-12-28
Power analyzer	LC-I-954	WT210	2019-12-26	2020-12-25
Multimeter	LC-I-972	Fluke 17B	2019-07-29	2020-07-28
Photometric colorimetric electric system* (2 meter sphere)	LC-I-956	HAAS-2000	Before use	Before use
Standard lamp**	LC-PL-I-011	D204C	2019-08-01	2020-07-31
Luminous Flux Standard Lamp***	LC-PL-I-003	24V100W	2019-08-01	2020-07-31
Goniophotometer(with mirror)	LC-I-902	GMS2000	2020-04-23	2021-04-22
Wireless temperature transmitter	LC-I-PL-009	DWLR-DLR	2020-01-03	2021-01-02
Wireless temperature transmitter	LC-I-PL-008	DWLR-DLR	2020-01-03	2021-01-02

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 $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$; 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 type C goniophotometer system.

Light intensity distribution was measured by a type C goniophotometer (with mirror) which can keep the sample in burn position when the tests conduct, and the total luminous flux was calculated from the intensity data by software automatically.

2.7 Luminous Intensity Distribution Measurement Method

Luminous intensity distribution was measured by a mirror-type goniophotometer (Type C) which can keep the sample in burn position when the tests conduct, and the kinds of graph were generated by software automatically.

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	120.02 V~60Hz	120.05 V~60Hz
Input Current(A)	0.085	0.082
Total Power(W)	10.07	9.60
Power Factor	0.983	0.981
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	551.71
Luminaire Efficacy(lm/W)	-	57.47
Correlated Color Temperature (CCT)(K)	2676	-
Color Rendering Index (CRI)	92.8	-
R9	57	-
Chromaticity Coordinate (x,y)	x = 0.4620 y = 0.4114	-
Chromaticity Coordinate (u,v)	u = 0.2635 v = 0.3520	-
Chromaticity Coordinate (u',v')	u' = 0.2635 v' = 0.5280	-
Duv	0.0001	-
Zone Lumens between 0-60 °	-	80.31%
Beam Angle(50%Imax)	-	C0/180= 112.8° C90/270= 112.4°

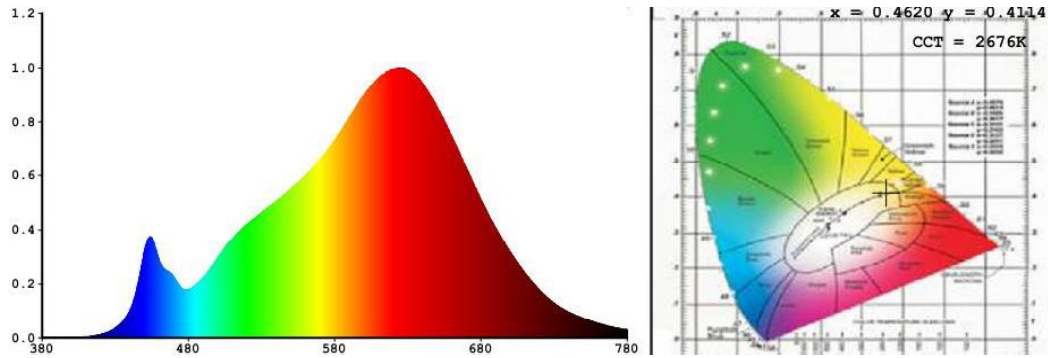
3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
93	97	99	93	93	97	91	80
R9	R10	R11	R12	R13	R14	R15	-
57	92	94	84	94	99	88	-

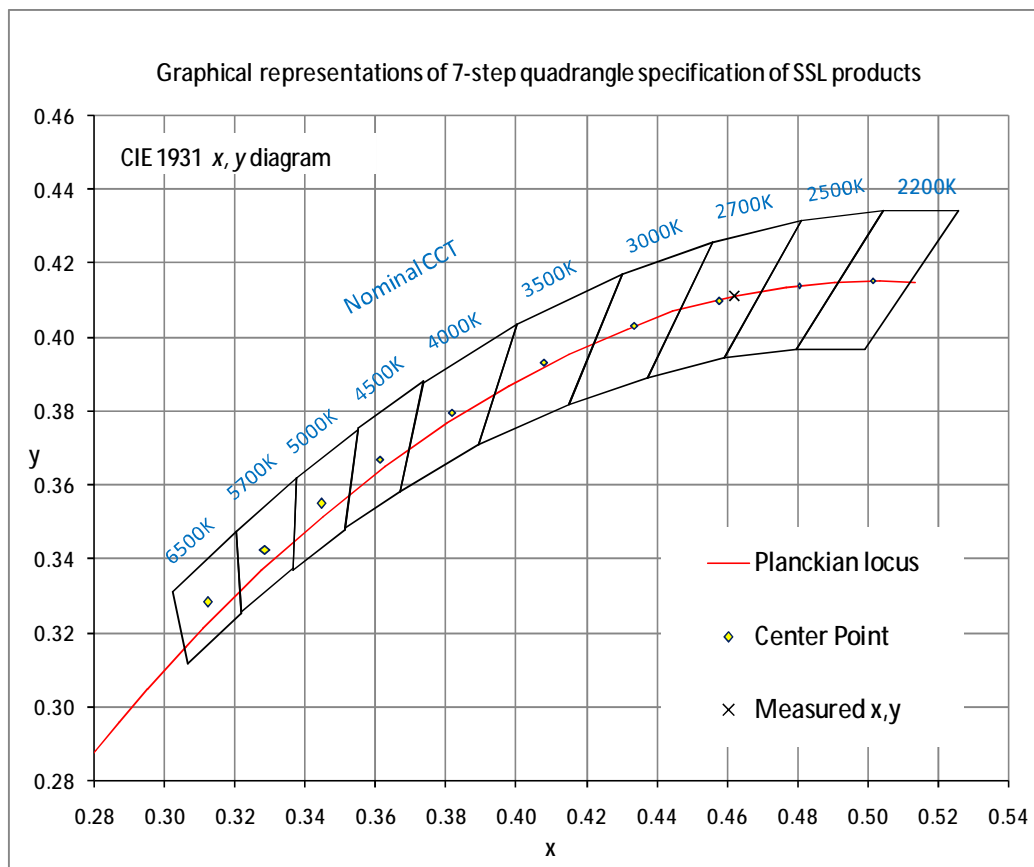
Note: N/A

4. Test Data

4.1 Spectral Distribution



4.2 ANSI Chromaticity Quadrangles Diagram



4.3 Goniometry Test Data

CIE Type	Direct	Basic Luminous Shape	Circular
Spacing Criteria (0-180)	1.28	Luminous Length	0.05 m (Diameter)
Spacing Criteria (90-270)	1.28	Luminous Width	0.05 m (Diameter)
Spacing Criteria (Diagonal)	1.40	Luminous Height	0.00 m
Test Distance	29.77 m		

4.4 Zonal Lumen Summary

Zone	Lumens	%Lamp	%Fixt
0-20	71.89	13.00	13.00
0-30	152.90	27.70	27.70
0-40	250.68	45.40	45.40
0-60	443.05	80.30	80.30
0-80	545.08	98.80	98.80
0-90	551.57	100.00	100.00
10-90	532.99	96.60	96.60
20-40	178.80	32.40	32.40
20-50	280.10	50.80	50.80
40-70	259.88	47.10	47.10
60-80	102.03	18.50	18.50
70-80	34.51	6.30	6.30
80-90	6.49	1.20	1.20
90-110	0.00	0.00	0.00
90-120	0.00	0.00	0.00
90-130	0.00	0.00	0.00
90-150	0.00	0.00	0.00
90-180	0.14	0.00	0.00
110-180	0.14	0.00	0.00
0-180	551.71	100.00	100.00

Total Luminaire Efficiency = 100.00%

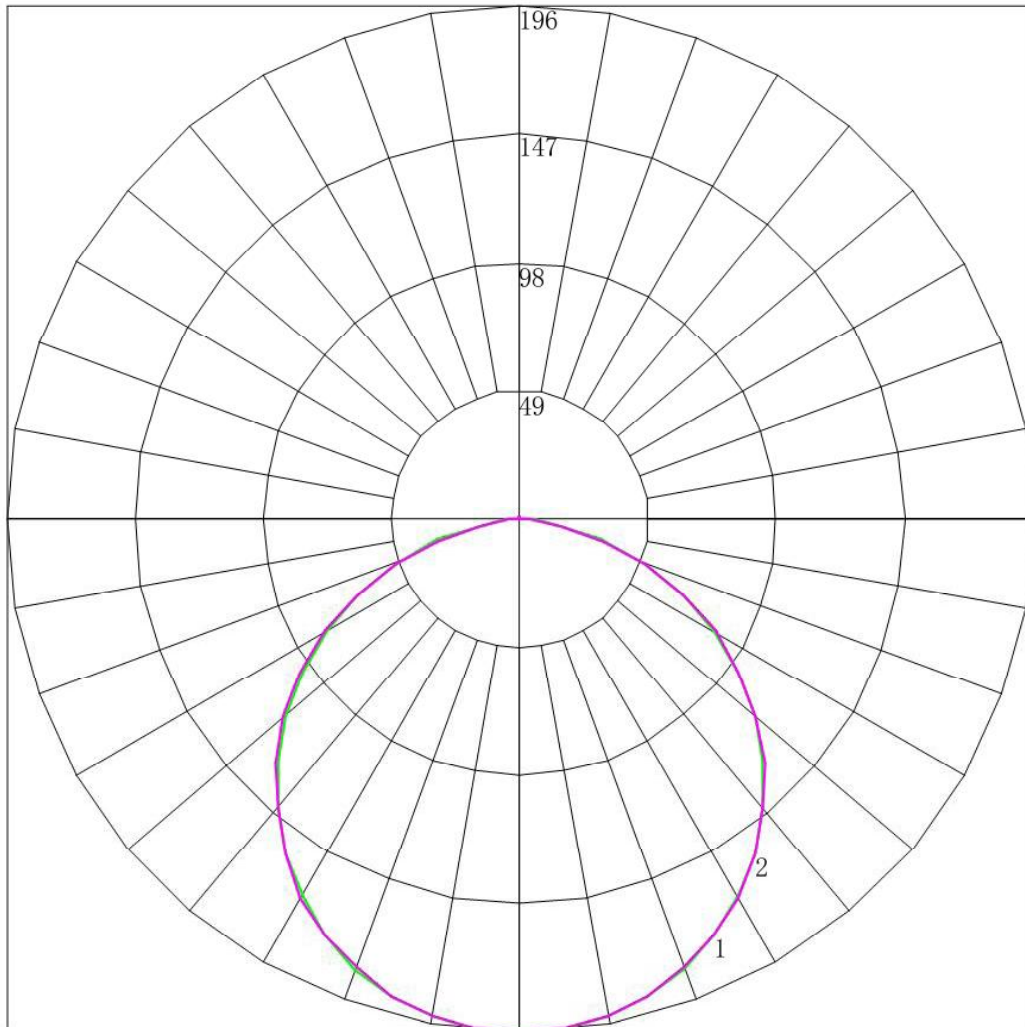
ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	18.58
10-20	53.31
20-30	81.02
30-40	97.78
40-50	101.30
50-60	91.07
60-70	67.52
70-80	34.51
80-90	6.49
90-100	0.00
100-110	0.00
110-120	0.00
120-130	0.00
130-140	0.00
140-150	0.00
150-160	0.00
160-170	0.06
170-180	0.07



LCTECH

4.5 Polar Curves



Maximum Candela = 196.157 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)



LCTECH



4.6 Candela Tabulation

	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
0	196.157	196.157	196.157	196.157	196.157	196.157	196.157
5	196.157	195.048	195.492	195.272	195.272	195.714	195.721
10	193.482	192.607	192.829	192.830	193.051	193.500	193.106
15	189.470	188.613	188.835	188.615	189.056	188.852	189.183
20	184.120	182.400	182.622	183.068	183.289	183.539	183.080
25	176.096	175.299	175.521	175.744	175.742	175.788	176.106
30	167.180	166.645	166.645	166.647	168.425	167.155	167.388
35	156.480	155.994	155.772	156.440	156.217	156.527	156.926
40	144.443	143.790	144.233	144.457	144.234	144.791	144.720
45	131.515	130.698	130.919	132.703	131.364	131.510	132.079
50	117.249	116.274	116.940	116.941	117.162	117.340	118.130
55	102.091	101.185	101.851	101.850	102.071	102.284	102.438
60	85.596	85.430	87.206	85.652	86.096	86.123	86.309
65	67.763	67.901	68.123	68.123	68.567	68.853	68.873
70	50.377	49.927	49.705	50.148	50.148	50.255	50.565
75	32.098	34.172	32.397	32.173	32.173	32.319	32.693
80	15.603	15.533	15.755	15.531	15.529	15.495	15.693
85	5.350	5.104	4.660	4.209	3.542	2.645	3.923
90	0.000	0.000	0.000	0.000	0.000	0.000	0.000
95	0.000	0.000	0.000	0.000	0.000	0.000	0.000
100	0.000	0.000	0.000	0.000	0.000	0.000	0.000
105	0.000	0.000	0.000	0.000	0.000	0.000	0.000
110	0.000	0.000	0.000	0.000	0.000	0.000	0.000
115	0.000	0.000	0.000	0.000	0.000	0.000	0.000
120	0.000	0.000	0.000	0.000	0.000	0.000	0.000
125	0.000	0.000	0.000	0.000	0.000	0.000	0.000
130	0.000	0.000	0.000	0.000	0.000	0.000	0.000
135	0.000	0.000	0.000	0.000	0.000	0.000	0.000
140	0.000	0.000	0.000	0.000	0.000	0.000	0.000
145	0.000	0.000	0.000	0.000	0.000	0.000	0.000
150	0.000	0.000	0.000	0.000	0.000	0.000	0.000
155	0.000	0.000	0.000	0.000	0.000	0.000	0.000
160	0.000	0.000	0.000	0.000	0.000	0.000	0.000
165	0.000	0.222	0.222	0.221	0.000	0.223	0.000
170	0.446	0.888	0.666	0.888	0.665	0.666	0.436
175	0.892	0.888	0.888	0.888	0.888	0.886	0.872
180	0.443	0.443	0.443	0.443	0.443	0.443	0.443

Appendix A Product Photo



Picture 1



Picture 2

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