



TL-749



# TEST REPORT

For

## LED ONE CORPORATION

45885 HOTCHKISS ST FREMONT, CA 94539

<b>Model Number:</b>	LOC-22TROF-DMWMCCT	
<b>Report Type:</b>	Electrical, Photometric and ISTMT tests according to the following standards and show the compliance to DLC Program SSL Technical Requirements V4.4	
<b>Standards:</b>	IES LM-79-08: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products ANSI C82.77-10-2014: Harmonic Emission Limits – Related Power Quality Requirements for Lighting ANSI/UL 1598-2008: Standard for Safety of Luminaires IES TM-30-18: IES Method for Evaluating Light Source Color Rendition	
<b>Test Engineer:</b>	George Yang	
<b>Report Number:</b>	PKS200428001-10	
<b>Sample Size:</b>	One sample was received on 2019-12-30 and used for testing.	
<b>Test Date:</b>	2020-01-03 to 2020-02-21	
<b>Report Date:</b>	2020-04-28	
<b>Reviewed By:</b>	Ray Gao/ EE Engineer	
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Kunshan). No.248 Chenghu Road, Kunshan, Jiangsu province, China. Tel: +86-0512-86175000 Fax:+86-0512-88934268	

**Note:** The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Kunshan). This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

## 1. Product Information and Description

Product Primary Use:	2x2 Luminaires for Ambient Lighting of Interior Commercial Spaces
Voltage And Frequency:	120-277VAC, 50/60Hz
LED Source Manufacturer:	Lumileds Holding B.V.
LED Source Model:	L128-xx80RA35000Q1
Driver Model:	SDU32CS075V42DN3A
Auxiliary Ballast Model:	NA
Auxiliary Housing Model:	NA
White Tunable:	Yes
Field-Adjustable Light Output:	Yes

### Note:

- The applicant LED ONE CORPORATION declared that their products are the same to the product in report# RKS191230001-10 and is authorized by original applicant to use their test data.
- All the data in previous report (RKS191230001-10) is shared in report

## 2. Product Rated Values

Test Model	CCT(K)	Light Output (lm)	Power(W)	Luminous Efficacy (lm/W)
LOC-22TROF-DMWMCCT	3500	2175	15	145
		2717	19	143
		3384	24	141
		4077.4	29	140.6
	4000	2340	15	156
		2926	19	154
		3648	24	152
		4379	29	151
	5000	2205	15	147
		2755	19	145
		3432	24	143
		4118	29	142

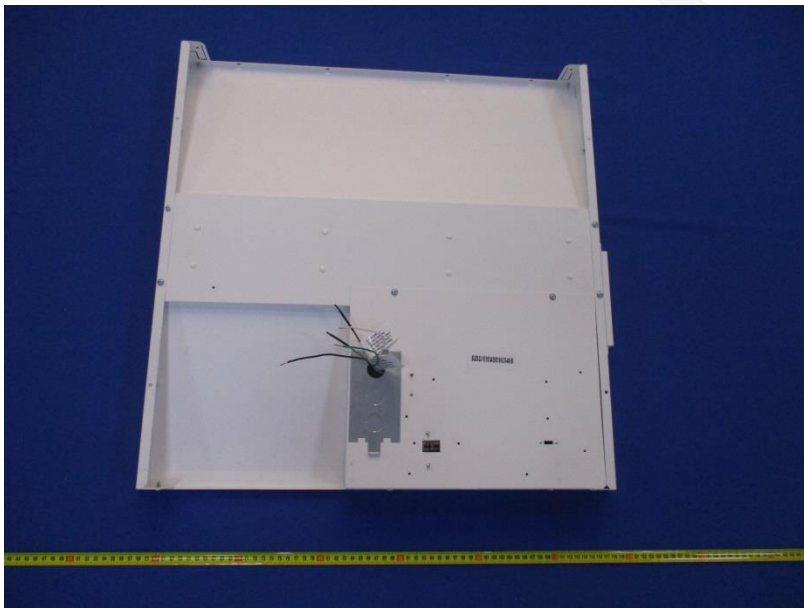
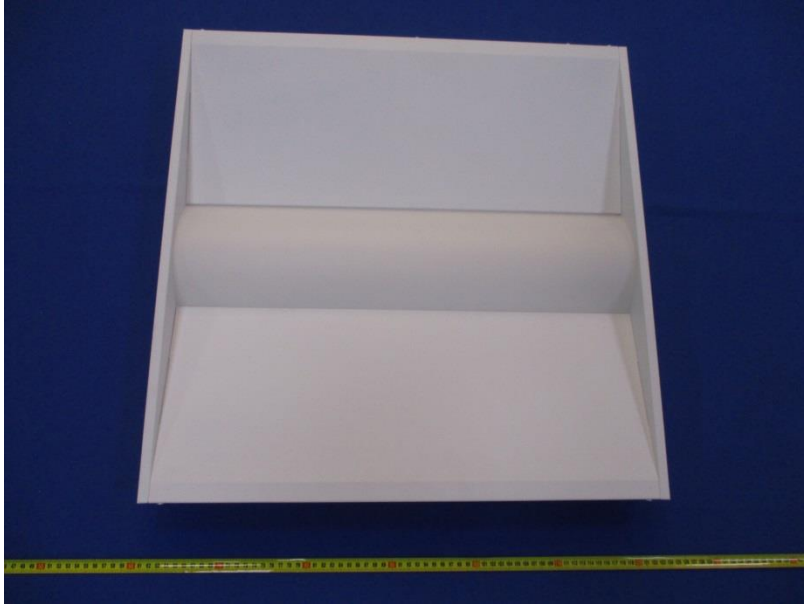
## 3. Test List

Test Model	CCT(K)	Power(W)	Test Item			
			Goniophotometer Test	Integrating Sphere Test	THDi and PF Test	In-Situ Temperature Measurement Test
LOC-22TROF-DMWMCCT	3500	29	Yes	Yes	Yes	Yes
	4000	29	NA	Yes	NA	NA

	5000	29	NA	Yes	NA	NA
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FINAL

#### 4. Product Photo



## 5. Test Result

Control setting: **29W 3500K**

Integrating Sphere Test; Orientation: Downward; Test Voltage: 120V 60Hz;

Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
Total Efficacy(lm/W)	140.65	≥125	≥121.25	Pass
CCT(K)	3416	3220~3710	3220~3710	Pass
Duv	0.000843	-0.0055~0.0065	-0.0055~0.0065	Pass
R <sub>a</sub>	82.1	≥80	≥78	Pass

Goniophotometer Test; Orientation: Downward; Test Voltage: 120V 60Hz;

Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
Light Output(lm)	4079	≥2000	≥1800	Pass
Power(W)	29.01	None.	None.	N/A
Total Efficacy(lm/W)	140.66	≥125	≥121.25	Pass
Zonal Lumen Distribution(0-60°)	74.69%	0-60°≥75%	0-60°≥72%	Pass
SC:0-180°	1.24	1.0≤SC≤2.0	0.9≤SC≤2.1	Pass
SC:90-270°	1.28	1.0≤SC≤2.0	0.9≤SC≤2.1	Pass

THDi、PF Test; Orientation: Downward;

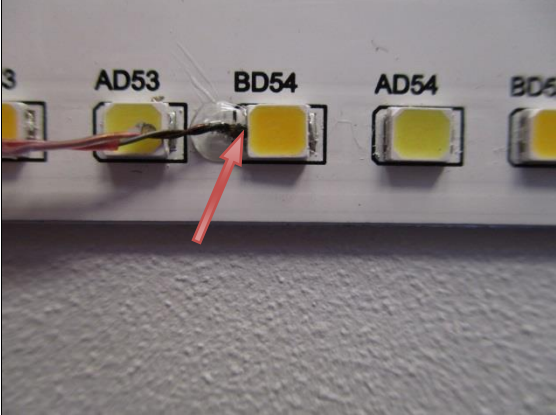
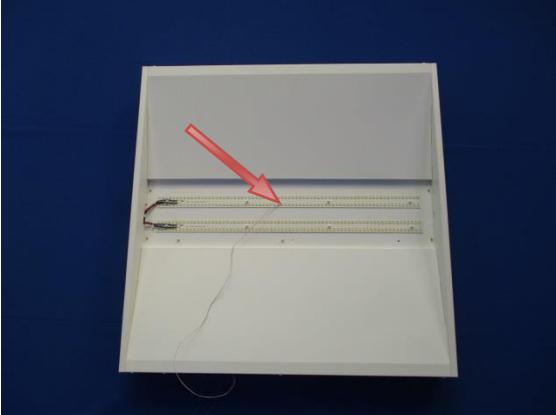
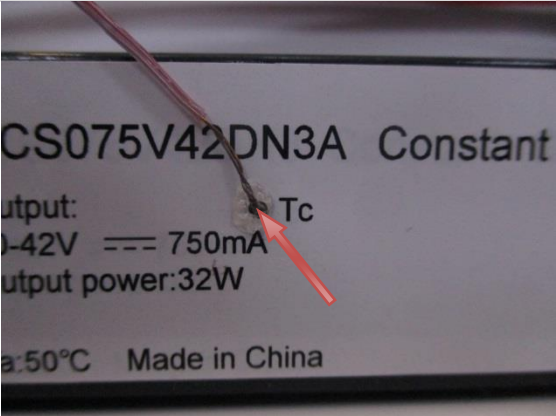
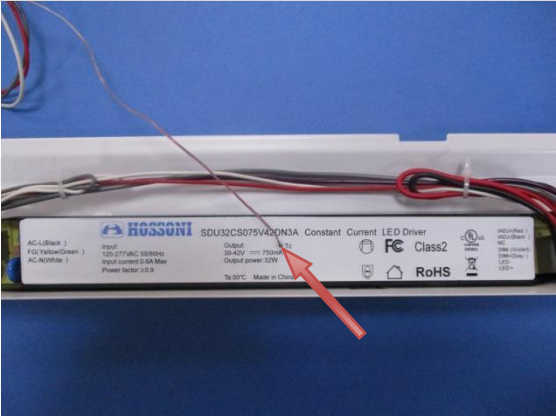
Test Voltage	Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
120	Power Factor	0.9993	≥0.9	≥0.87	Pass
120	THDi	4.41%	≤20%	≤25%	Pass
277	Power Factor	0.9771	≥0.9	≥0.87	Pass
277	THDi	10.60%	≤20%	≤25%	Pass

In-Situ Temperature Measurement Test: Test Voltage: 120V 60Hz;

Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
TMP <sub>LED</sub> (°C)	36	≤115	With tolerance of ≤ 1.1°C or 0.4%, whichever is greater due to thermocouple tolerance	Pass
TMP <sub>c</sub> (°C)	49.7	≤75	With tolerance of ≤ 1.1°C or 0.4%, whichever is greater due to thermocouple tolerance	Pass
Drive Current/Individual LED source(mA)	61.8	≤150	With +5% tolerance	Pass
TM-21 Projected Lumen Maintenance at 50000hours	90.25%	L <sub>70</sub> Life≥50000	L <sub>70</sub> Life≥50000	Pass
L <sub>70</sub> Lumen Maintenance Life (Hours)	>54000			
L <sub>90</sub> Lumen Maintenance Life (Hours)	51000	≥36000	≥36000	Pass

Note:

- The test results were measured directly from the test equipment.
- The DLC requirements were listed according to DLC Technical Requirements V4.4.
- The conclusion is for reference only. Test report that indicate product performance meets DLC Technical Requirements do not represent official DLC product qualification. All decisions regarding product qualification are made by the DLC.

<p>TMP<sub>LED</sub>(Zoomed-in View)</p> 	<p>TMP<sub>LED</sub>(Bird's-eye View)</p> 
<p>TMP<sub>c</sub>(Zoomed-in View)</p> 	<p>TMP<sub>c</sub> (Bird's-eye View)</p> 

FIELD

**Test Data**

**[Integrating Sphere System]**

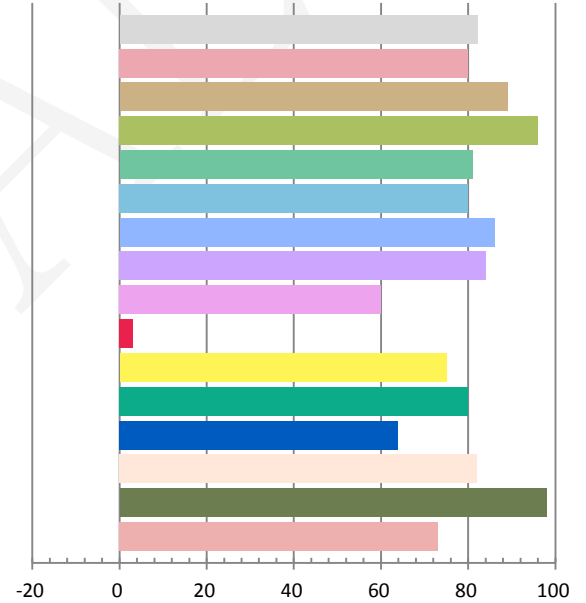
Photometric and Electrical Measurement Result

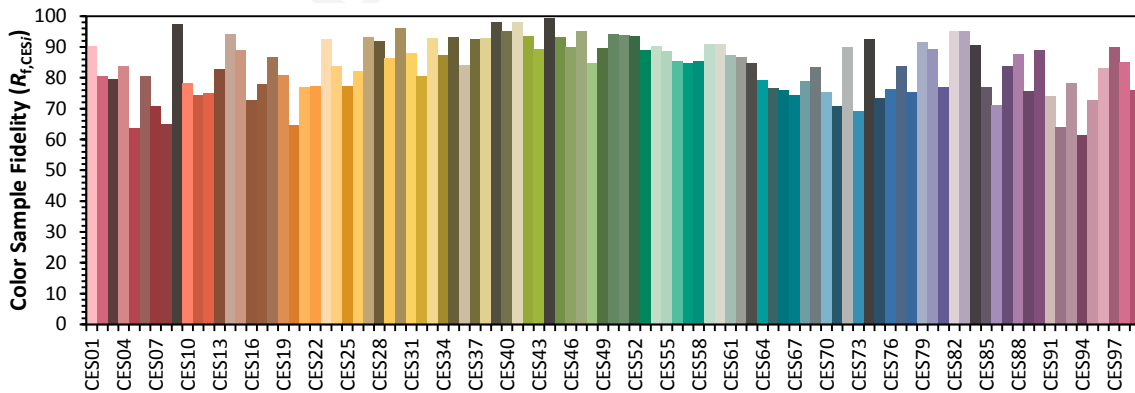
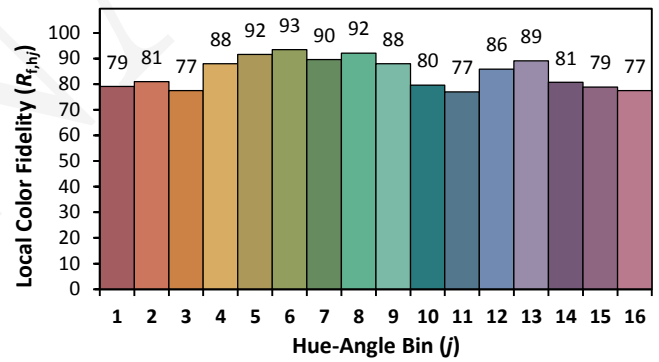
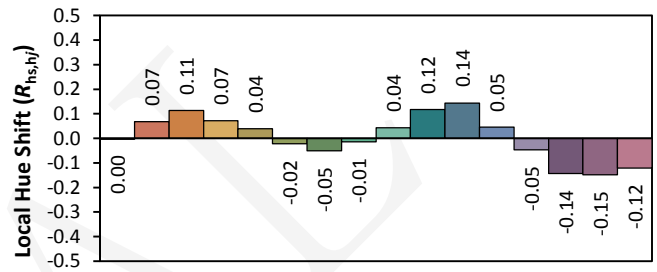
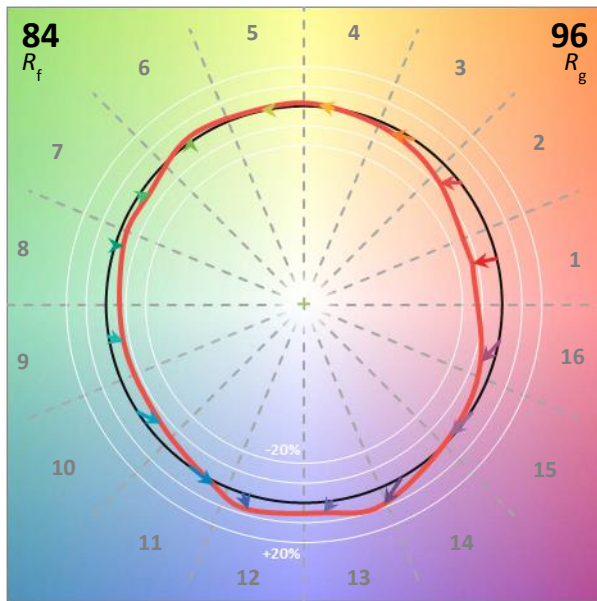
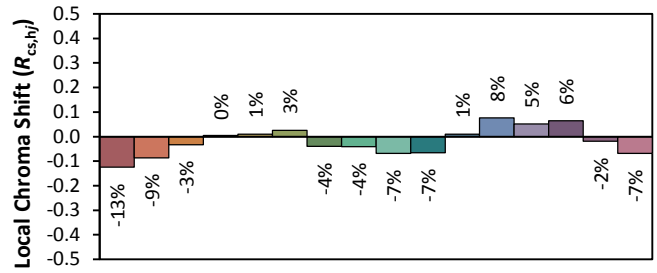
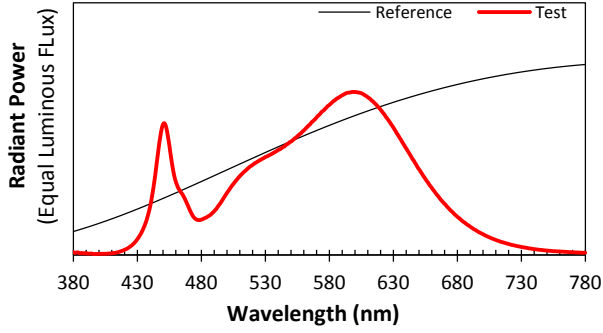
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.2422	29	0.9974	4078.1	140.65

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
12.143	3416	0.00084	0.4111	0.3955	0.2375	0.5141

Color Rendering Index

<b>Ra</b>			
<b>82.1</b>			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
80	89	96	81
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
80	86	84	60
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
3	75	80	64
<b>R13</b>	<b>R14</b>	<b>R15</b>	
82	98	73	

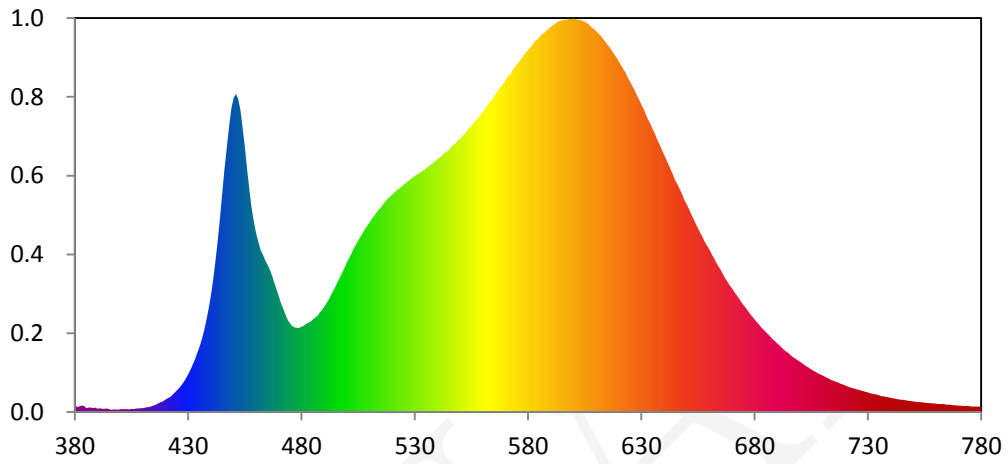




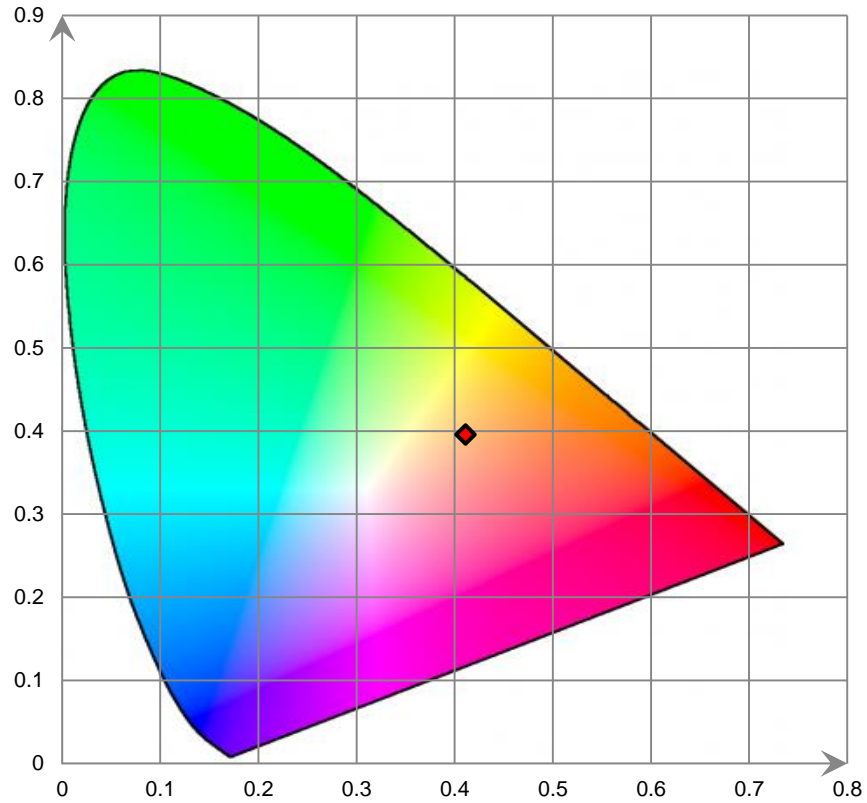


IES $R_f$	84
IES $R_g$	96
IES $R_{cs,h1}$	-13%

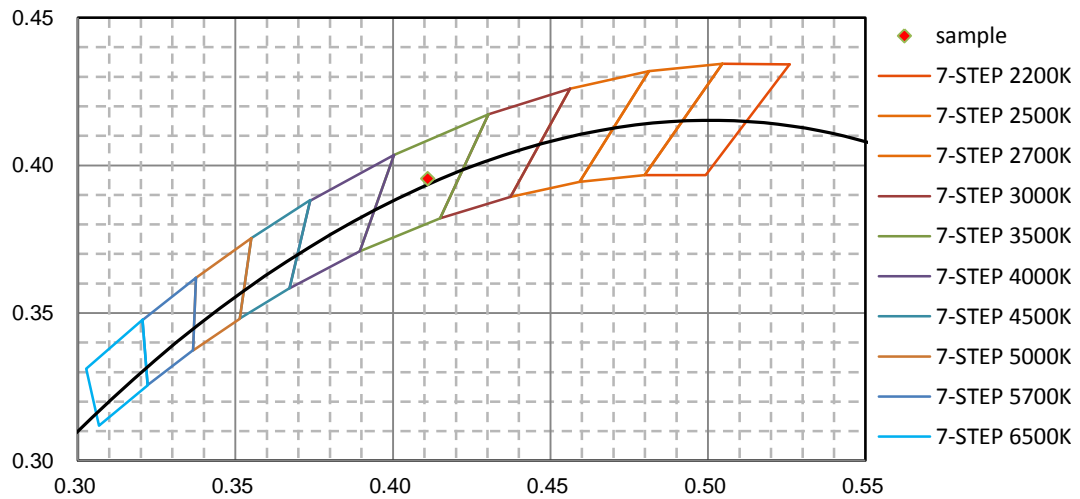
Relative Spectral Power Distribution



CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



**[Goniophotometer System]**

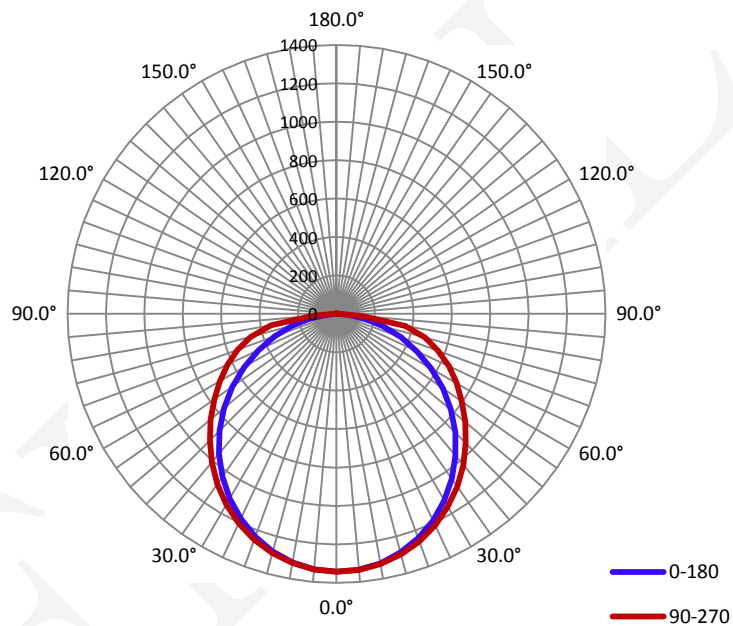
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.242	29.01	0.999

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I <sub>max</sub> (cd)	S/MH (C0/180)	S/MH (C90/270)
4079	140.66	1342.4	1.24	1.28

**Luminous Intensity Distribution**



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I <sub>max</sub> ):	109.8	114.7	125.3	114.8	116.2
Field Angle (10% I <sub>max</sub> ):	161.1	169.1	169.6	169.1	167.2

Luminous Intensity (cd) Distribution Data

C Y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1342.4	1342.4	1342.4	1342.4	1342.4	1342.4	1342.4	1342.4
5.0°	1336.6	1337.1	1336.6	1338.6	1338.5	1337.3	1336.5	1336.6
10.0°	1318.7	1319.1	1319.7	1322.5	1322.2	1322.8	1319.3	1318.6
15.0°	1286.7	1288.1	1290.7	1295.0	1296.7	1295.4	1291.5	1285.6
20.0°	1242.9	1245.4	1250.8	1257.9	1260.8	1258.2	1250.7	1243.5
25.0°	1187.9	1191.0	1199.5	1209.4	1214.5	1209.9	1200.2	1190.2
30.0°	1122.1	1127.8	1140.0	1152.7	1159.3	1152.5	1139.0	1125.4
35.0°	1047.2	1053.0	1068.9	1084.8	1096.7	1087.1	1068.6	1050.9
40.0°	964.3	972.2	991.2	1013.7	1027.7	1013.5	990.3	969.4
45.0°	874.5	882.8	906.1	932.4	951.8	933.6	904.9	881.0
50.0°	776.9	788.6	817.6	851.1	875.1	853.0	817.0	787.6
55.0°	676.1	690.0	725.7	767.5	797.0	770.1	726.0	688.6
60.0°	571.2	587.8	630.7	686.8	722.1	689.3	631.4	586.3
65.0°	463.1	484.5	538.2	606.3	646.3	610.4	539.7	481.1
70.0°	356.8	379.0	447.9	524.9	563.6	526.6	450.7	377.3
75.0°	252.0	277.6	358.6	438.7	477.9	440.0	359.4	276.1
80.0°	152.1	185.3	267.4	337.5	363.2	334.4	267.3	181.3
85.0°	60.7	94.1	130.5	130.3	132.5	125.6	121.3	87.7
90.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
95.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
115.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
130.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
135.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
140.0°	0.0	0.0	0.9	0.8	0.8	0.0	0.0	0.7
145.0°	0.9	1.0	1.7	1.7	1.3	1.5	1.4	1.4
150.0°	1.3	1.0	2.1	2.1	1.8	2.2	1.6	1.8
155.0°	1.8	2.1	2.4	2.3	2.5	2.9	2.2	2.2
160.0°	2.1	2.3	2.6	2.7	2.3	2.8	2.3	2.4
165.0°	2.3	2.0	2.8	2.8	3.0	2.8	2.5	2.8
170.0°	2.1	2.8	3.0	2.6	3.1	3.3	2.6	3.4
175.0°	2.7	2.6	3.2	3.5	3.3	3.7	3.1	3.5
180.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1342.4	1342.4	1342.4	1342.4	1342.4	1342.4	1342.4	1342.4
5.0°	1334.7	1335.8	1334.9	1335.4	1335.2	1335.5	1335.1	1335.9
10.0°	1314.2	1315.9	1315.2	1316.6	1317.6	1316.4	1315.9	1315.5
15.0°	1280.3	1281.2	1285.0	1287.3	1289.8	1286.8	1285.9	1282.4
20.0°	1234.6	1234.9	1242.3	1246.3	1251.6	1246.7	1243.2	1238.2
25.0°	1177.0	1180.1	1188.8	1196.2	1202.9	1195.8	1189.8	1182.4
30.0°	1111.4	1114.3	1125.6	1137.2	1145.4	1136.2	1127.5	1118.0
35.0°	1034.5	1039.6	1054.3	1068.9	1080.7	1068.4	1056.1	1042.4
40.0°	951.0	957.0	975.4	994.3	1009.0	994.0	977.0	959.9
45.0°	860.2	867.3	889.3	913.3	931.7	912.7	891.3	871.7
50.0°	763.2	771.4	798.3	833.4	855.7	830.8	800.5	776.3
55.0°	661.3	671.4	705.5	749.8	775.6	747.3	707.3	676.5
60.0°	554.0	568.9	612.2	668.6	701.0	667.5	613.9	572.5
65.0°	446.8	464.9	521.3	590.6	625.3	589.4	521.9	468.2
70.0°	340.5	360.2	432.3	510.1	546.3	508.0	433.6	366.2
75.0°	236.6	261.2	345.2	424.9	460.8	422.8	347.3	265.9
80.0°	136.5	170.3	254.8	319.2	345.8	322.3	257.9	174.9
85.0°	45.5	77.5	111.6	118.0	119.7	121.4	120.6	83.9
90.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
95.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
115.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
130.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
135.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
140.0°	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0
145.0°	0.0	0.0	0.0	0.0	1.1	1.2	1.3	0.0
150.0°	0.0	0.0	0.0	1.6	1.5	1.3	1.7	1.4
155.0°	0.0	1.0	1.5	2.1	1.9	1.7	2.4	2.2
160.0°	1.0	1.4	2.0	2.0	2.3	2.3	2.8	2.7
165.0°	1.6	2.2	2.8	2.9	2.4	2.8	2.8	3.5
170.0°	2.0	2.8	2.8	3.6	3.4	3.5	2.8	3.5
175.0°	2.2	2.8	3.3	3.6	3.2	3.9	3.3	3.8
180.0°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Control setting: 29W 4000K**

<u>Integrating Sphere Test; Orientation: Downward; Test Voltage: 120V 60Hz;</u>				
Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
Light Output(lm)	4379.7	≥2000	≥1800	Pass
Total Efficacy(lm/W)	151.07	≥125	≥121.25	Pass
CCT(K)	4100	3710~4260	3710~4260	Pass
Duv	0.00129	-0.005~0.007	-0.005~0.007	Pass
$R_a$	83.8	≥80	≥78	Pass

Note:

1. The test results were measured directly from the test equipment.
2. The DLC requirements were listed according to DLC Technical Requirements V4.4.
3. The conclusion is for reference only. Test report that indicate product performance meets DLC Technical Requirements do not represent official DLC product qualification. All decisions regarding product qualification are made by the DLC.

FINAL

**Test Data**

**[Integrating Sphere System]**

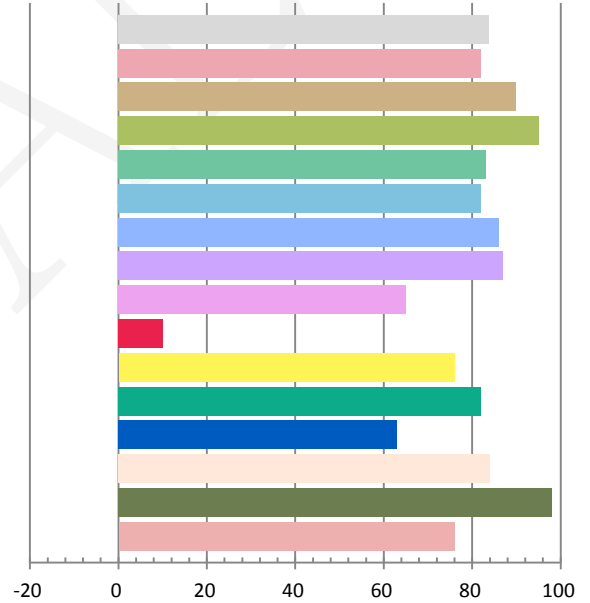
Photometric and Electrical Measurement Result

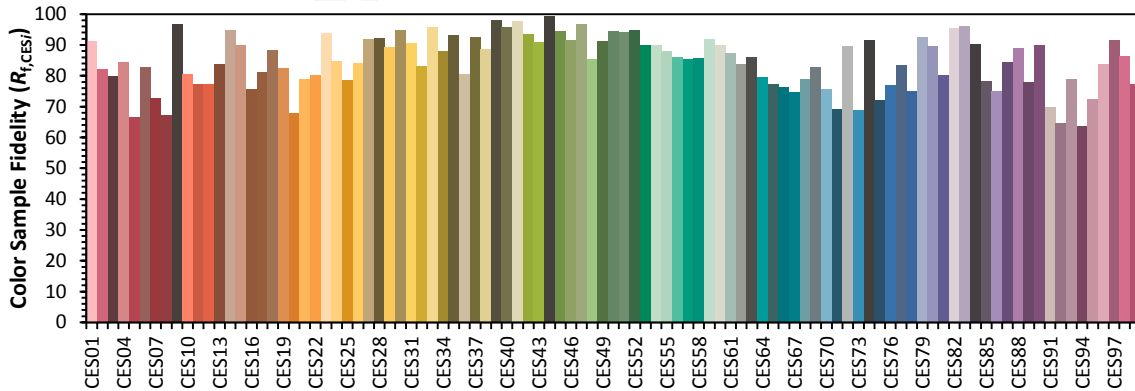
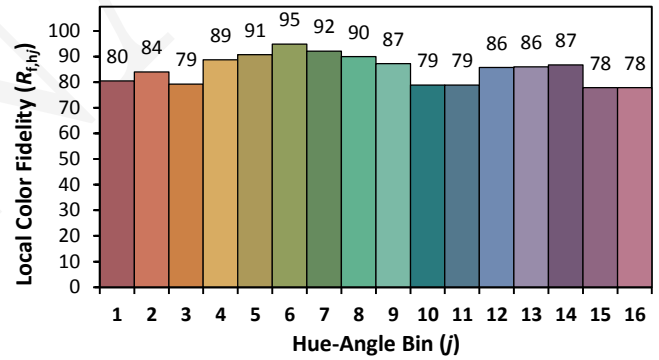
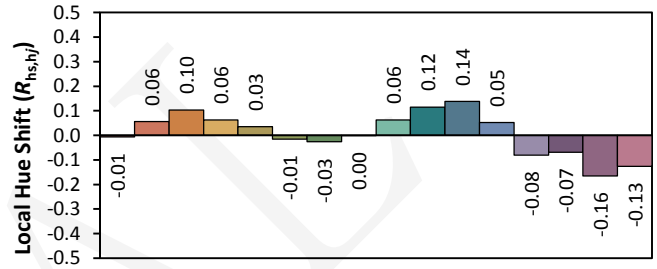
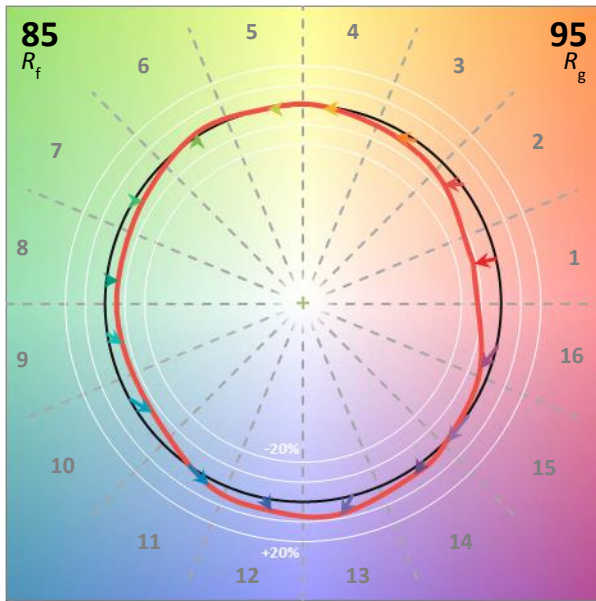
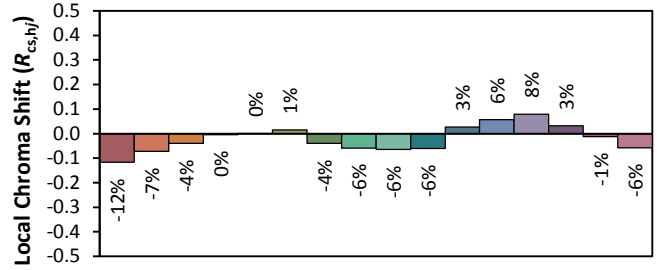
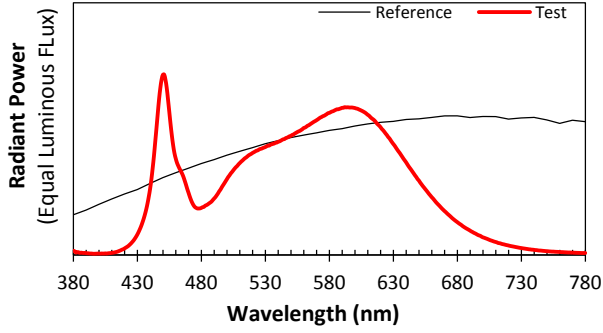
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.2422	28.99	0.9974	4379.7	151.07

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
13.286	4100	0.00129	0.3770	0.3773	0.2226	0.5013

Color Rendering Index

<b>Ra</b>			
<b>83.8</b>			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
82	90	95	83
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
82	86	87	65
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
10	76	82	63
<b>R13</b>	<b>R14</b>	<b>R15</b>	
84	98	76	

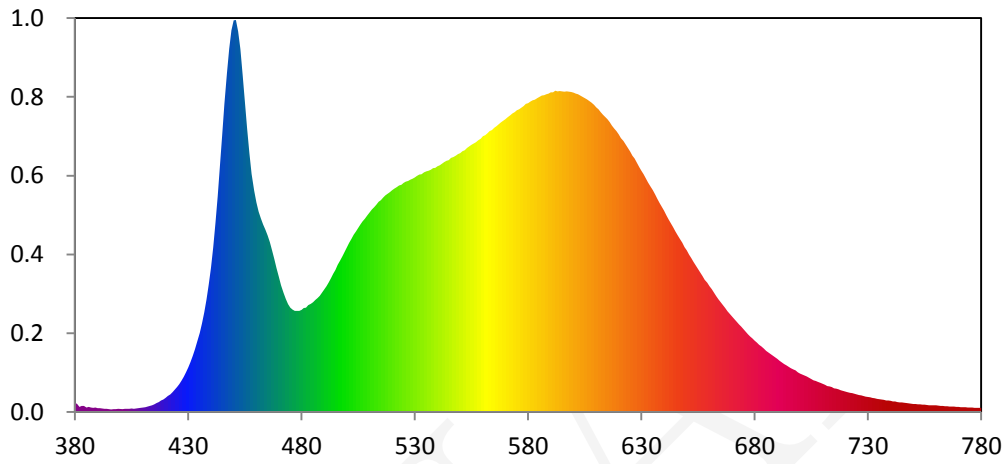




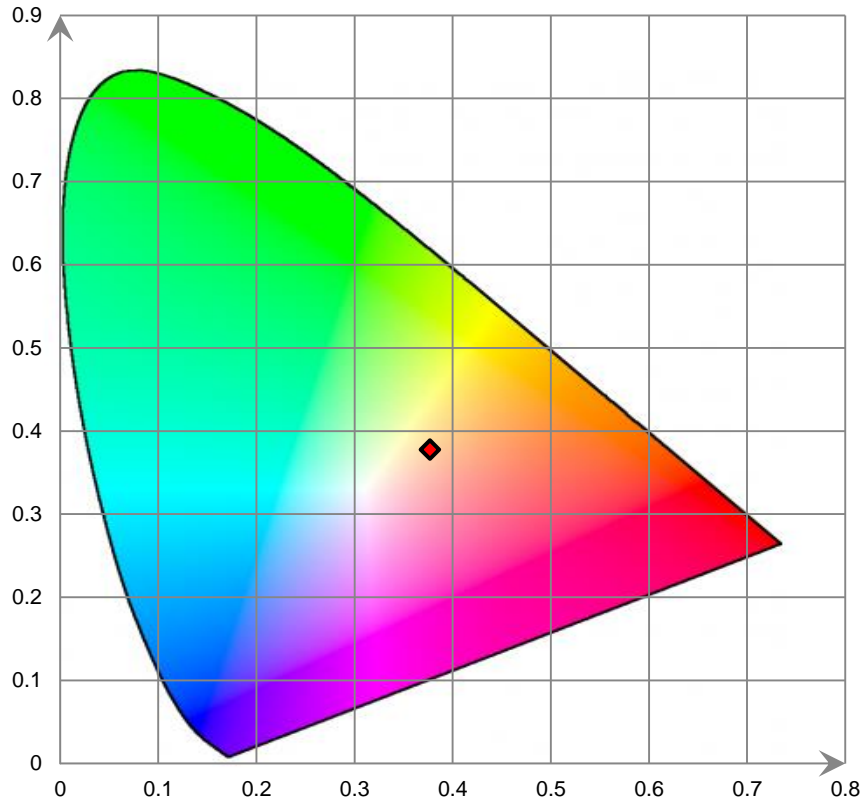


IES $R_f$	85
IES $R_g$	95
IES $R_{cs,h1}$	-12%

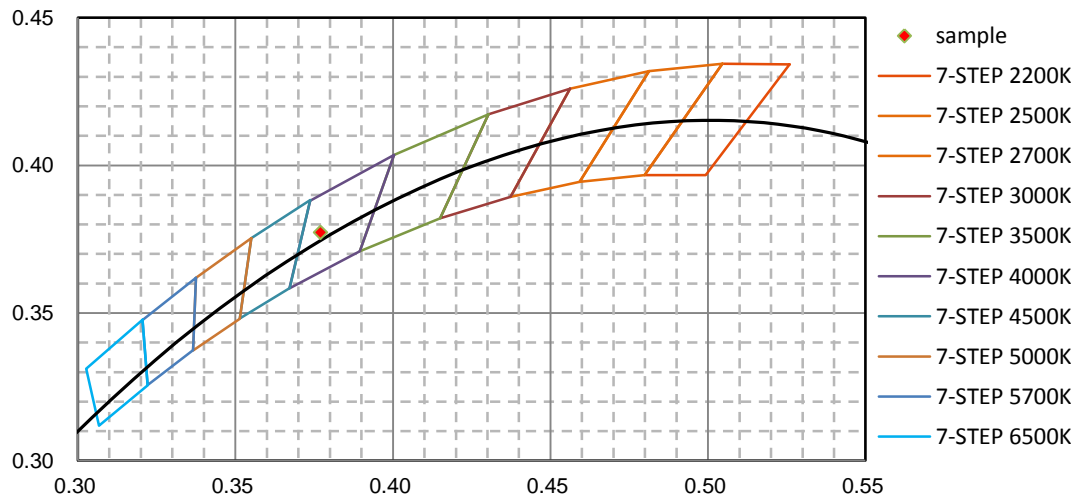
Relative Spectral Power Distribution



CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



**Control setting: 29W 5000K**

<u>Integrating Sphere Test; Orientation: Downward; Test Voltage: 120V 60Hz;</u>				
Test Item	Test Result	DLC Requirements	DLC Requirements(With tolerances and/or allowances)	Conclusion
Light Output(lm)	4118.7	≥2000	≥1800	Pass
Total Efficacy(lm/W)	142.06	≥125	≥121.25	Pass
CCT(K)	4976	4746~5312	4746~5312	Pass
Duv	0.00452	-0.004~0.008	-0.004~0.008	Pass
$R_a$	83.1	≥80	≥78	Pass

Note:

1. The test results were measured directly from the test equipment.
2. The DLC requirements were listed according to DLC Technical Requirements V4.4.
3. The conclusion is for reference only. Test report that indicate product performance meets DLC Technical Requirements do not represent official DLC product qualification. All decisions regarding product qualification are made by the DLC.

FINAL

**Test Data**

**[Integrating Sphere System]**

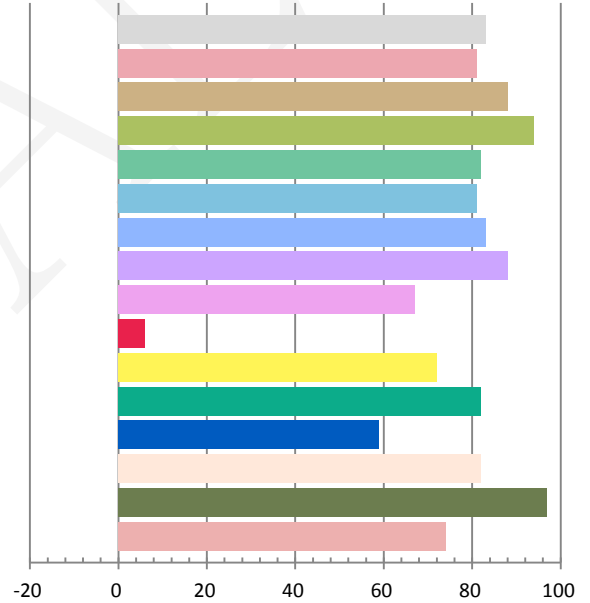
Photometric and Electrical Measurement Result

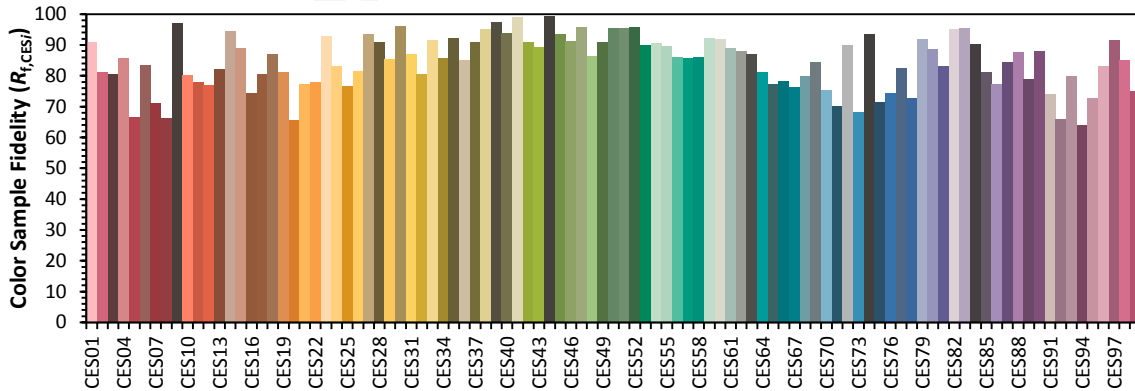
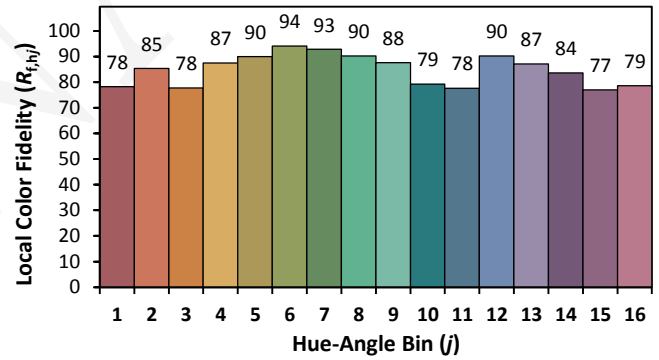
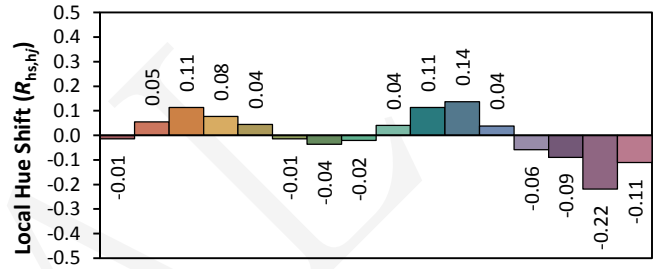
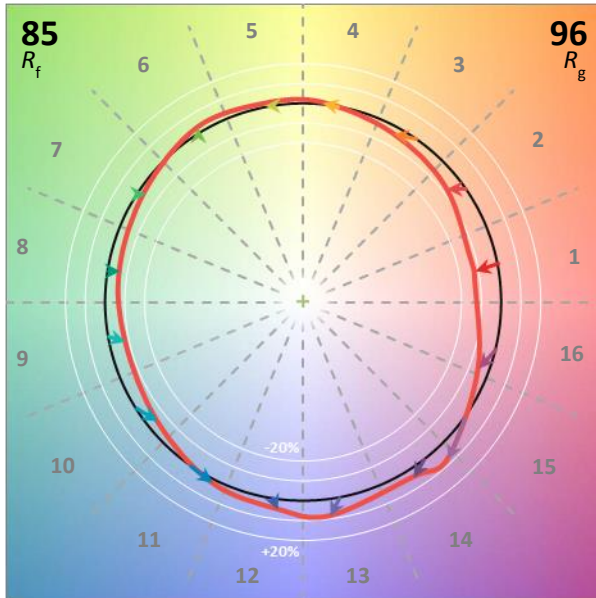
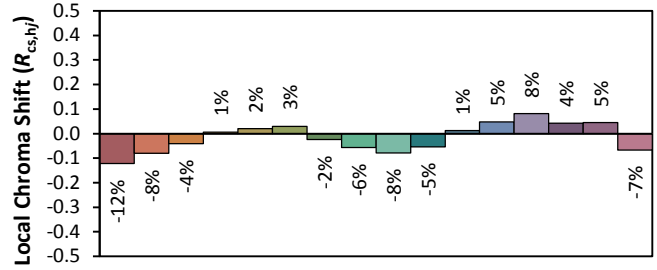
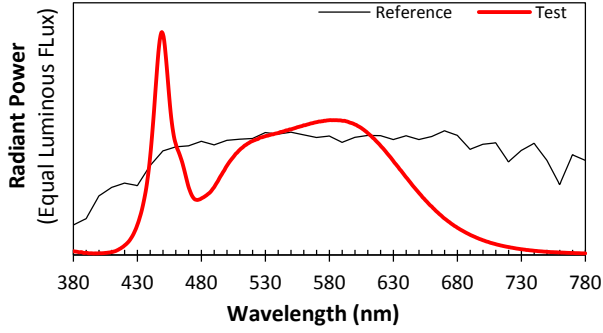
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.2422	28.99	0.9974	4118.7	142.06

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
12.677	4976	0.00452	0.3467	0.3620	0.2085	0.4899

Color Rendering Index

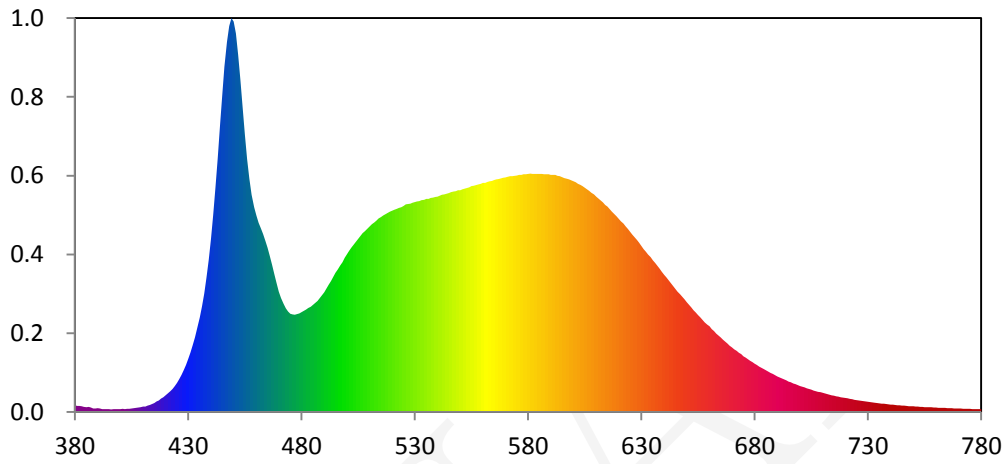
<b>Ra</b>			
<b>83.1</b>			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
81	88	94	82
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
81	83	88	67
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
6	72	82	59
<b>R13</b>	<b>R14</b>	<b>R15</b>	
82	97	74	



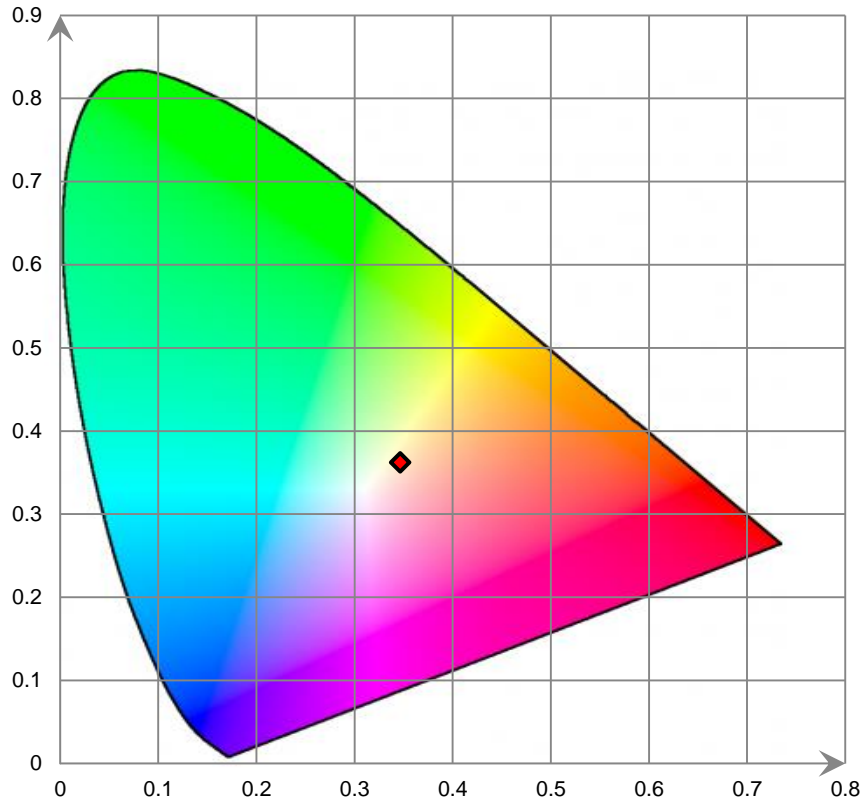


IES $R_f$	85
IES $R_g$	96
IES $R_{cs,h1}$	-12%

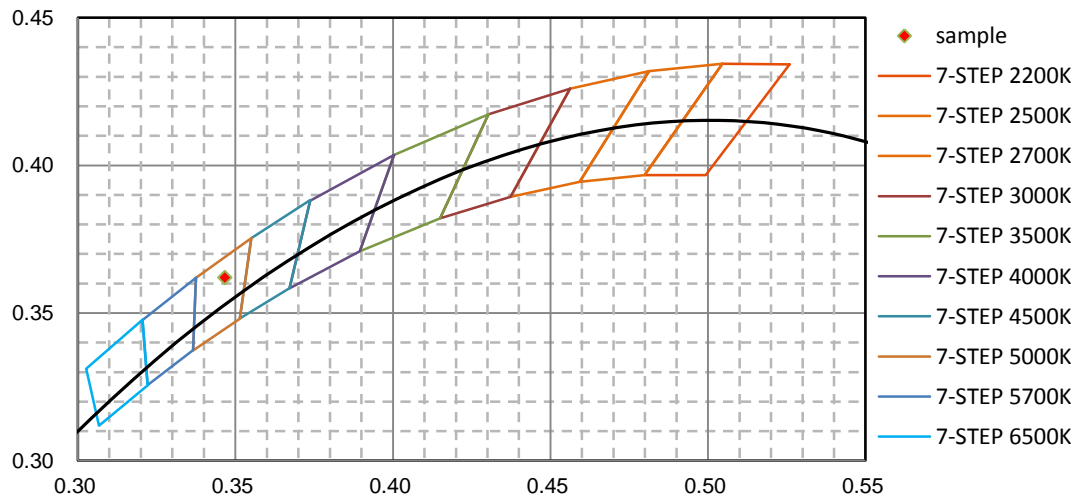
Relative Spectral Power Distribution



CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



## 6. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
2.0m integrating sphere	EVERFINE	R98	G121960CS1361154D	2019-12-24	2020-12-23
spectroradiometer	EVERFINE	HAAS-2000	M12048CS1361148	2019-12-24	2020-12-23
Digital CC&CV DC Power Supply	EVERFINE	WY305	G115986CN1361134	2020-02-14	2021-02-13
Temperature/humidity/clock	KEJIAN	TA298	EE053	2019-12-02	2020-12-01
Standard Light Source	INVENTFINE	N/A	JWWCR020106	2019-11-19	2020-11-18
Digital Power Meter	YOKOGAWA	WT210	91KB35700	2019-04-23	2020-04-22
Intelligence ac power supply	EVERFINE	DPS1005	G119890CS1361121	2020-02-14	2021-02-13
AC Power Supply	INVENTFINE	CHP-5KVA	900511765	2019-04-23	2020-04-22
DC Power Supply	INVENTFINE	WL3010	JWDMP030001	2019-04-23	2020-04-22
Power Meter	INVENTFINE	WT500	GSDSQ200007	2019-04-23	2020-04-22
Goniophotometer	INVENTFINE	GPM-1900	YWGCF120001	2019-12-24	2020-12-23
Wireless Weather Station	ZHONGXING	KG218	N/A	2019-12-02	2020-12-01
Standard Light Source	INVENTFINE	N/A	JWBYR040008	2019-03-08	2020-03-07
Digital Multimeter	FLUKE	115C	37840512WS	2019-10-08	2020-10-07
Hybrid Recorder	YOKOGAWA	DR230	4TJH0903	2019-04-24	2020-04-23
Power Supply	SC	SC/BP-11003	1608110030553	2019-12-14	2020-12-13

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

## 7. Test Method

Product was tested with no seasoning. All stabilization and measurements were made in compliance with IES LM-79-08. The ambient temperature of the sample was maintained at 25°C±1°C during measurement. And relative humidity is less than 65%. The product was operated in its intended orientation in application during all testing.

### Integrating Sphere System

The system includes AC power source, digital power meter, DC power supply, Spectroradiometer, and integrating sphere. The integrating sphere system is calibrated by standard spectrum light source before measurement. 4π geometry was used during measurement.

### Goniophotometer System

Type C goniophotometer was used for measuring luminous intensity distribution. The vertical angle (γ) test intervals were set no more than 1 degree while data for 5 degree intervals is reported. The horizontal angle (C plane) test intervals were set no more than 22.5 degree.

### ISTMT Test

The LED which has the highest temperature was measured at the location of LED case which is specified by LED source manufacturer and detailed by LM-80 report. The drive current of LED package/module/ array was calculated as the total output current of the driver measured by multimeter, divided by the number of branches in parallel of LEDs.

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