

## LM-79-08 Test Report

For

### IKIO LED LIGHTING

(Brand Name: IKIO)

8470 Allison Pointe Blvd, Suite 128  
Indianapolis, IN 46250

### Dual Mode Internal Driver (UL Type A and Type B)

Model name(s): IK-T804-0015-XXA&B-J (Frosted)

Representative (Tested) Model: IK-T804-0015-30A&B-J (Frosted)  
IK-T804-0015-35A&B-J (Frosted)  
IK-T804-0015-40A&B-J (Frosted)  
IK-T804-0015-50A&B-J (Frosted)

Model Difference: All construction and rating are the same, except CCT

Test & Report By:

*Jack Luo*

Engineer: Jack Luo

Date: Nov.17,2016

Review By:

*Tommy Liang*

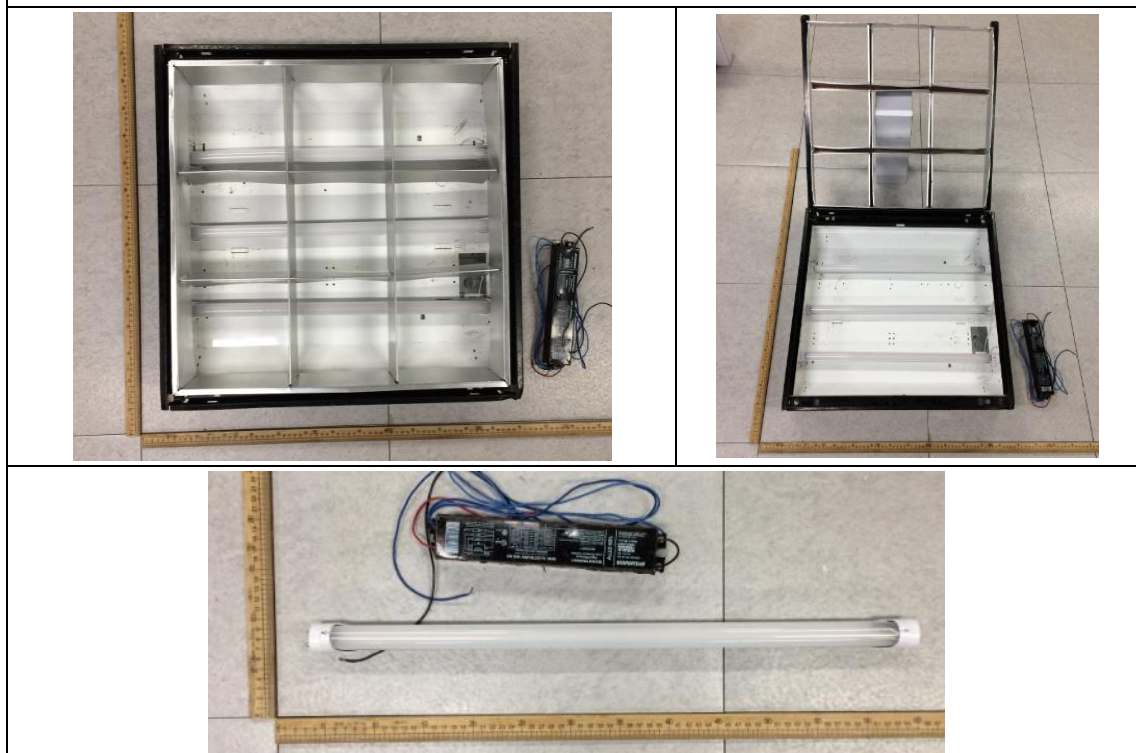
Manager: Tommy Liang

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

### 1.1 Product Information:

Organization Name	IKIO LED LIGHTING	
Brand Name	IKIO	
Model Number	IK-T804-0015-XXA&B-J (Frosted)	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Dual Mode Internal Driver (UL Type A and Type B)	
Rated Voltage / Frequency	100 ~ 277 Vac, 50/60 Hz	
Nominal Power	15W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,5000K	
LED Manufacturer	EVERLIGHT ELECTRONICS CO.,LTD	
LED Model	67-21S Series	
Test Ballast	OSRAM SYLVANIA QTP 3x32T8/UNV ISN-SC	
Sample Number	GZE160031-F1,F2,F3(3000K),F4(3500K), F5(4000K),F6(5000K)	
Lamp Length	600	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

#### Photo



## 1.2 Test Specifications:

Date of Receipt	Nov.17,2016
Date of Test	Nov.17,2016
Test item	<ol style="list-style-type: none"> <li>1. Total Luminous Flux</li> <li>2. Luminous Distribution Intensity</li> <li>3. Luminous Efficacy</li> <li>4. Correlated Color Temperature</li> <li>5. Color Rendering Index</li> <li>6. Chromaticity Coordinate</li> <li>7. Electrical Parameters</li> </ol>
Reference Standard	<ol style="list-style-type: none"> <li>1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products</li> <li>2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products</li> <li>3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources</li> <li>4. CIE 15-2004 Technical Report Colorimetry</li> <li>5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source</li> <li>6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems</li> </ol>
Reference Work Instruction	QD25

## 1.3 Test Methods

### 1) Photometric and Light Distribution Measurement – Goniophotometer Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at  $1^{\circ}$  vertical intervals and  $22.5^{\circ}$  horizontal intervals.

### 2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.

### 3) Electrical Measurements:

Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.

### 2.1.1 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-17	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0015-30A&B-J (Frosted) with ballast OSRAM SYLVANIA QTP 3x32T8/UNV ISN-SC		

#### Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160031	120.0	60	0.1320	15.54	0.9809	5.87
-F1	277.0	60	0.0618	15.43	0.9010	7.03
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

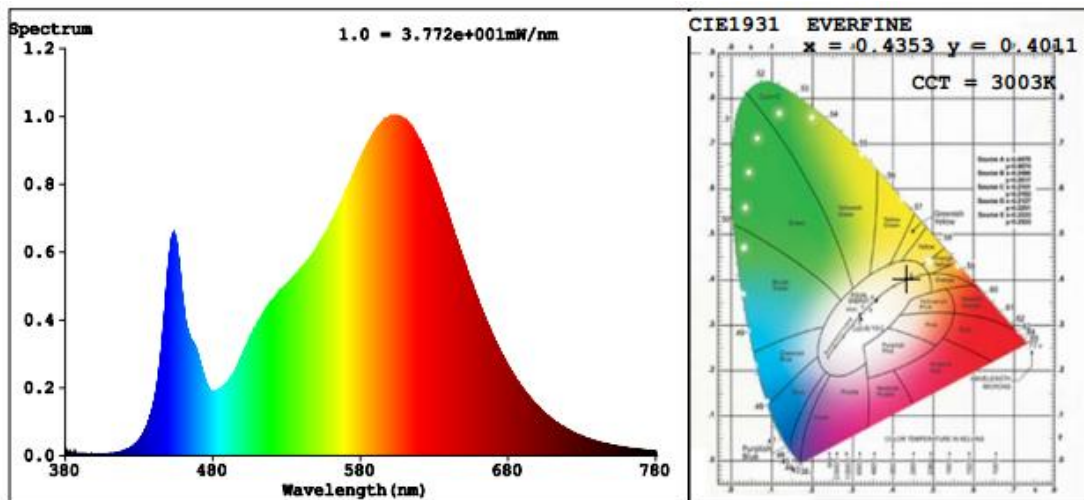
#### Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	6
Frequency (Hz)	60	R2	91	R10	80
CCT (K)	3003	R3	96	R11	78
Duv	-0.0010	R4	79	R12	68
Chromaticity (x, y)	x=0.4353 y=0.4011	R5	81	R13	83
Chromaticity (u', v')	u'=0.2508 v'=0.5200	R6	89	R14	99
Color Rendering Index (CRI)	82.1	R7	82	R15	73
R9	6	R8	58	--	--

#### Photometric Measurement for Bare-lamp –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	1952	1956	Bare Lamp: >= 800(-10%)
Luminous Efficacy (lm/W)	125.64	126.74	Bare lamp: >= 110(-3%)

**Spectral Power Distribution & Chromaticity Diagram**



**Laboratory: Standard-Tech Co. Ltd Testing Center**  
**NVLAP CODE: 201011-0**

Report Format Number STD/QR4909-A/2

Address: Standard-Tech Building, No.6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320

Fax: 8620-32290422

<http://www.standard-tech.com>

## 2.1.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-17	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0015-30A&B-J (Frosted) Connected to line voltage		

### Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160031 -F1	120.0	60	0.1240	14.51	0.9753	8.46
	277.0	60	0.0580	14.45	0.9000	12.17
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

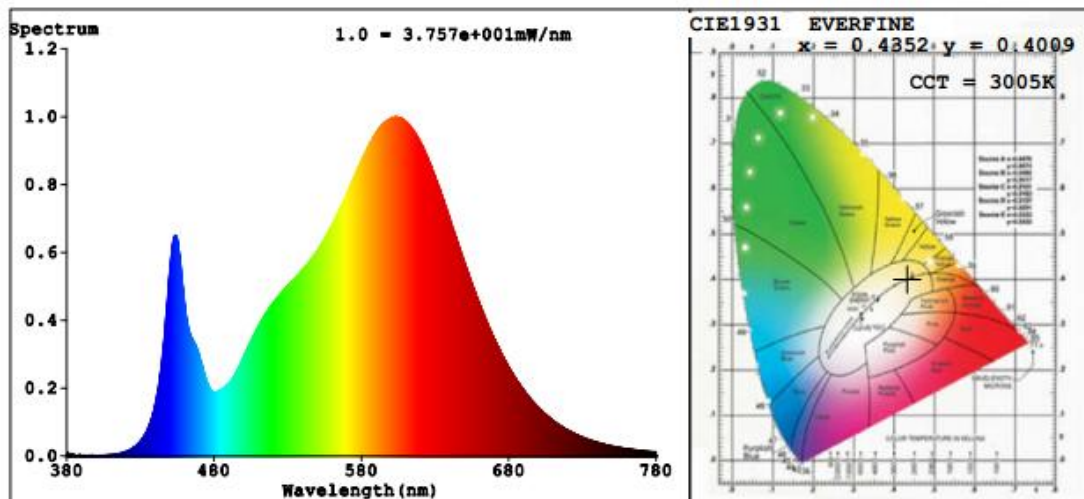
### Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	6
Frequency (Hz)	60	R2	92	R10	80
CCT (K)	3005	R3	96	R11	78
Duv	-0.0010	R4	79	R12	68
Chromaticity (x, y)	x=0.4352 y=0.4009	R5	81	R13	84
Chromaticity (u', v')	u'=0.2508 v'=0.5199	R6	89	R14	98
Color Rendering Index (CRI)	82.1	R7	82	R15	74
R9	6	R8	58	--	--

### Photometric Measurement for Bare-lamp –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	1845	1849	Bare Lamp: >= 800(-10%)
Luminous Efficacy (lm/W)	127.15	127.96	Bare lamp: >= 110(-3%)

**Spectral Power Distribution & Chromaticity Diagram**



**Laboratory: Standard-Tech Co. Ltd Testing Center**  
**NVLAP CODE: 201011-0**

Report Format Number STD/QR4909-A/2

Address: Standard-Tech Building, No.6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320

Fax: 8620-32290422

<http://www.standard-tech.com>



Summary
---------

Sample No.	Test Method	Voltage (Vac)	Frequency (Hz)	Lumen Output(lm)	Lumen Efficacy(lm/w)	Power (W)
GZE160031-F1	With Ballast	120.0	60	1952	125.64	15.54
GZE160031-F1	Connected to line voltage	120.0	60	1845	127.15	14.51

**The measured lumen efficacy of test condition “with ballast” was more than test condition “Connect to line voltage”, but had more power consumption. So the following test will be conducted as test condition “with ballast”.**



## 2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-17	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0015-30A&B-J (Frosted) with ballast OSRAM SYLVANIA QTP 3x32T8/UNV ISN-SC		

### Electrical Measurement for 3-lamp in Lithonia 2PM3 9 cell 2x2 parabolic:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160031	120.0	60	0.4053	46.61	0.9790	5.73
-F1,F2,F3	277.0	60	0.1896	46.30	0.9006	7.76
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

### Chromaticity Measurement for 3-lamp in Lithonia 2PM3 9 cell 2x2 parabolic - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	6
Frequency (Hz)	60	R2	91	R10	80
CCT (K)	3008	R3	96	R11	78
Duv	-0.0010	R4	79	R12	68
Chromaticity (x, y)	x=0.4349 y=0.4009	R5	81	R13	84
Chromaticity (u', v')	u'=0.2506 v'=0.5198	R6	89	R14	99
Color Rendering Index (CRI)	82.1	R7	82	R15	74
R9	6	R8	58	--	--

### Photometric Measurement 3-lamp in Lithonia 2PM3 9 cell 2x2 parabolic – Goniophotometer Method:

Parameter	Result		DLC V4.0 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	4683.3	4692.8	In luminaire (3 lamps): >= 2000(-10%)
Luminous Efficacy (lm/W)	100.48	101.36	In luminaire: >= 100(-3%)
Zonal lumens in the 0-60 °zone (%)	91	--	>= 75(-3)
SC: 0-180 °(if applicable)	1.18	--	1.0-2.0(±0.1)
SC: 90-270 °(if applicable)	1.09	--	1.0-2.0(±0.1)
Beam Angle (°)	95.2	--	--
Center Beam Candle Power (cd)	2139	--	--

Laboratory: Standard-Tech Co. Ltd Testing Center

NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

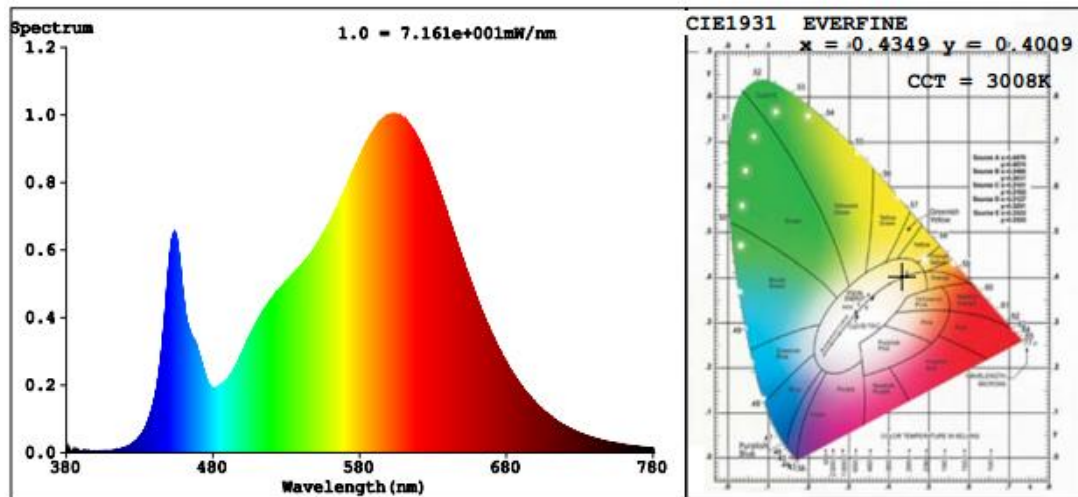
Address: Standard-Tech Building, No.6 Guanhong Road,Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320

Fax: 8620-32290422

<http://www.standard-tech.com>

## Spectral Power Distribution & Chromaticity Diagram

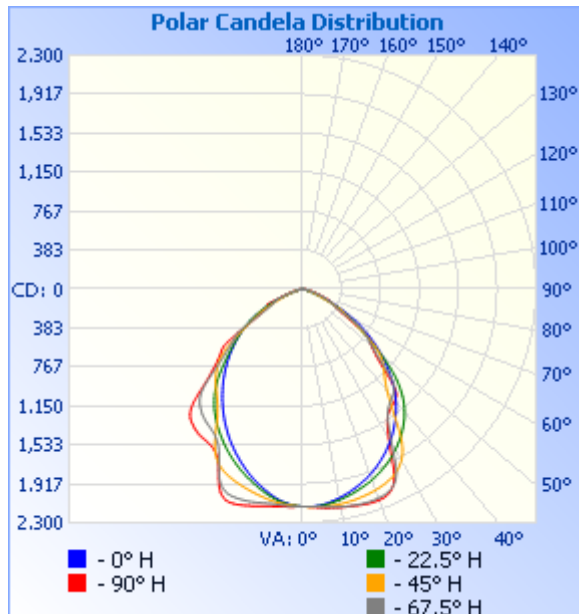


## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,672.8	35.7%
0-40	2,651.9	56.6%
0-60	4,261.1	91%
60-90	416.1	8.9%
70-100	100.9	2.2%
90-120	1.3	0%
0-90	4,677.1	99.9%
90-180	5.5	0.1%
0-180	4,682.6	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	203.0	4.3%	90-100	0.0	0%
10-20	587.9	12.6%	100-110	0.5	0%
20-30	882.0	18.8%	110-120	0.9	0%
30-40	979.1	20.9%	120-130	1.2	0%
40-50	937.9	20.0%	130-140	1.1	0%
50-60	671.2	14.3%	140-150	0.8	0%
60-70	315.1	6.7%	150-160	0.6	0%
70-80	88.2	1.9%	160-170	0.3	0%
80-90	12.7	0.3%	170-180	0.1	0%

**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	7.40 fc	34.3 ft	37.5 ft
34.0ft	1.85 fc	68.5 ft	74.9 ft
51.0ft	0.82 fc	102.8 ft	112.4 ft
68.0ft	0.46 fc	137.0 ft	149.9 ft
85.0ft	0.30 fc	171.3 ft	187.4 ft
102.0ft	0.21 fc	205.6 ft	224.8 ft

■ Vert. Spread: 90.4°  
■ Horiz. Spread: 95.6°

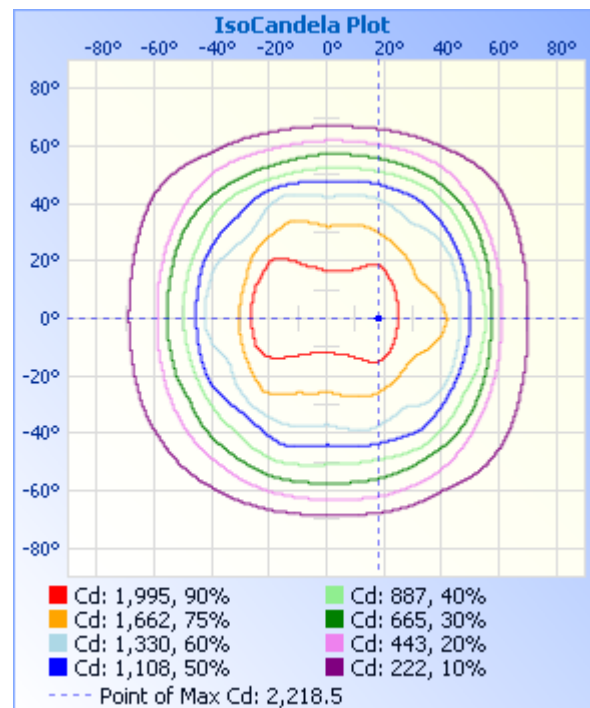
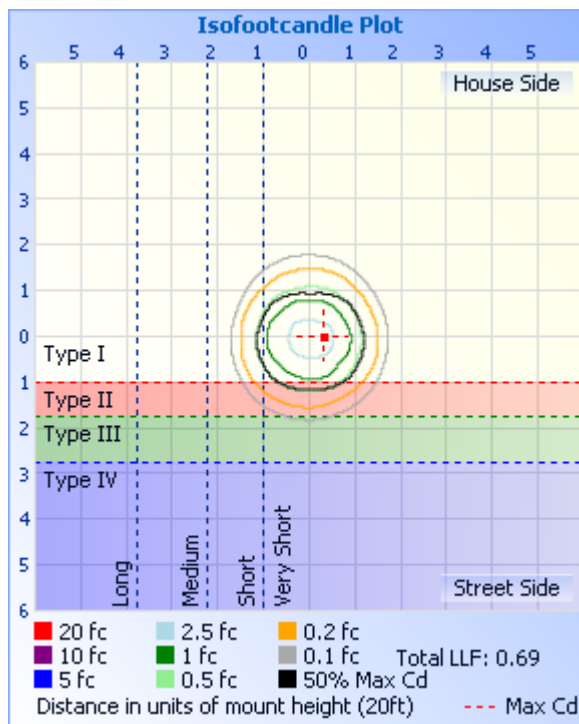


Table--1

UNIT: cd

C (DEG) γ (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338	
0	2139	2139	2139	2139	2139	2139	2139	2139	2139	2139	2139	2139	2139	2139	2139	2139	
5	2150	2144	2143	2133	2133	2139	2148	2151	2159	2138	2124	2112	2104	2111	2122	2135	
10	2168	2153	2122	2093	2085	2106	2147	2175	2179	2142	2089	2039	2022	2044	2090	2138	
15	2203	2163	2096	2034	2021	2056	2130	2190	2199	2136	2032	1945	1918	1955	2046	2155	
20	2210	2164	2065	1964	1941	1997	2104	2186	2208	2110	1965	1837	1798	1859	1997	2144	
25	1961	2032	2017	1878	1842	1921	2056	2126	2119	2037	1881	1720	1668	1752	1922	1956	
30	1788	1739	1904	1778	1725	1826	1946	1754	1700	1753	1766	1589	1526	1634	1730	1701	
35	1759	1640	1635	1659	1588	1710	1625	1466	1478	1396	1586	1448	1377	1505	1460	1627	
40	1705	1576	1419	1514	1429	1562	1294	1378	1420	1249	1265	1298	1222	1349	1321	1556	
45	1447	1456	1284	1329	1236	1347	1135	1237	1163	1137	1003	1133	1062	1143	1210	1396	
50	1094	1099	1131	1093	1022	1020	995	908	896	815	849	954	902	921	1058	1000	
55	899	860	901	817	796	715	712	752	746	637	664	755	737	744	754	808	
60	463	510	569	564	558	497	492	432	418	395	429	528	556	567	519	444	
65	382	322	343	328	321	290	265	303	319	253	271	318	358	362	291	308	
70	214	200	146	137	134	125	141	195	203	160	134	149	167	169	157	186	
75	110	91.1	65.6	59.1	57.3	54.3	68.5	101	109	81.8	64.5	62.3	68.0	69.6	72.4	90.3	
80	48.4	38.9	29.2	25.5	24.0	24.1	30.6	45.0	49.9	36.0	29.5	26.3	27.5	28.9	32.3	39.5	
85	14.0	10.3	8.14	7.59	6.94	7.12	8.41	12.3	14.7	9.76	7.87	6.68	6.64	7.38	8.70	10.9	
90	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.19	0.44	0.00	0.00	0.00	0.15	0.44	
105	0.50	0.87	0.00	0.00	0.00	0.00	0.81	1.24	1.06	0.87	1.12	0.06	0.00	0.00	0.37	0.50	
110	0.62	0.50	0.43	0.00	0.00	0.43	0.73	1.06	1.31	1.36	1.99	0.62	0.06	0.13	0.71	0.56	
115	0.67	0.99	0.80	0.00	0.19	0.54	0.81	1.32	1.74	1.55	2.30	0.43	0.37	0.50	0.87	0.88	
120	0.87	1.20	0.72	0.43	0.54	0.46	1.50	1.58	2.03	1.81	2.45	0.68	0.50	0.87	0.87	1.12	
125	1.87	1.27	0.67	0.62	1.06	1.11	1.60	2.49	2.22	1.83	2.42	1.43	1.37	1.49	0.87	1.40	
130	1.87	1.32	0.63	0.72	1.37	1.49	1.58	2.39	2.31	1.85	1.79	1.19	1.45	1.47	0.87	1.33	
135	1.83	1.37	0.59	0.87	1.40	1.51	1.37	2.27	2.21	1.66	1.30	1.24	1.52	1.44	0.66	1.25	
140	1.79	1.42	0.61	1.17	1.43	1.46	0.88	2.05	1.89	1.55	0.77	1.36	1.37	1.41	0.44	1.18	
145	1.75	1.47	0.50	1.18	1.54	1.40	0.37	1.81	1.73	1.57	0.64	1.47	1.21	1.31	0.48	1.11	
150	1.71	1.30	0.43	1.18	1.71	1.33	0.25	1.64	1.62	1.59	0.73	1.44	1.36	1.44	0.56	1.07	
155	1.49	1.08	0.39	1.20	1.68	1.27	0.56	1.55	1.49	1.60	0.75	1.39	1.50	1.52	0.87	1.04	
160	1.43	0.99	0.42	1.24	1.60	1.22	0.68	1.44	1.47	1.51	0.95	1.19	1.53	1.63	1.12	1.01	
165	1.43	0.92	0.44	1.09	1.51	1.00	0.69	1.20	1.46	1.42	1.12	1.08	1.60	1.62	1.31	0.95	
170	1.38	0.90	0.60	1.49	1.49	1.55	0.79	1.25	1.45	1.55	1.19	0.93	2.24	2.43	1.40	0.88	
175	1.31	0.87	0.57	1.61	2.18	1.62	0.80	1.25	1.43	1.24	0.87	0.81	1.86	2.30	1.48	0.81	
180	1.24	0.87	0.56	1.61	2.00	1.49	0.81	1.12	1.12	1.24	0.87	0.56	1.68	2.11	1.43	0.81	

Laboratory: Standard-Tech Co. Ltd Testing Center

NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: Standard-Tech Building, No.6 Guanhong Road,Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320

Fax: 8620-32290422

<http://www.standard-tech.com>

## 2.3 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-17	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0015-35A&B-J (Frosted) with ballast OSRAM SYLVANIA QTP 3x32T8/UNV ISN-SC		

### Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160031	120.0	60	0.1335	15.71	0.9805	5.55
-F4	277.0	60	0.0622	15.53	0.9018	7.36
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

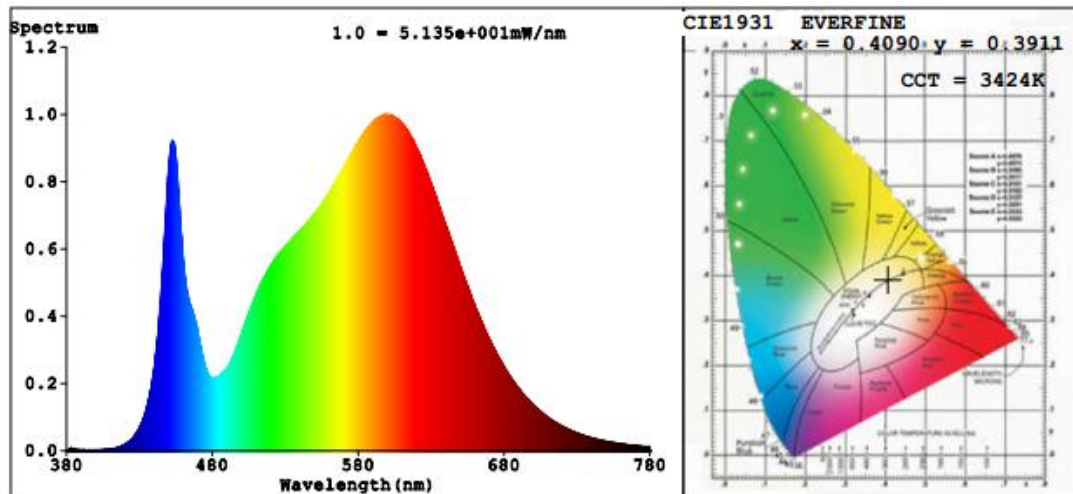
### Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	8
Frequency (Hz)	60	R2	90	R10	76
CCT (K)	3424	R3	96	R11	79
Duv	-0.0006	R4	80	R12	62
Chromaticity (x, y)	x=0.4090 y=0.3911	R5	81	R13	83
Chromaticity (u', v')	u'=0.2379 v'=0.5119	R6	86	R14	98
Color Rendering Index (CRI)	82.6	R7	84	R15	75
R9	8	R8	62	--	--

### Photometric Measurement for Bare-lamp –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	2015	2013	Bare Lamp: >= 800(-10%)
Luminous Efficacy (lm/W)	128.26	129.62	Bare lamp: >= 110(-3%)

**Spectral Power Distribution & Chromaticity Diagram**



**Laboratory: Standard-Tech Co. Ltd Testing Center**  
**NVLAP CODE: 201011-0**

Report Format Number STD/QR4909-A/2

Address: Standard-Tech Building, No.6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320 Fax: 8620-32290422 <http://www.standard-tech.com>



## 2.4 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-17	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0015-40A&B-J (Frosted) with ballast OSRAM SYLVANIA QTP 3x32T8/UNV ISN-SC		

### Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160031	120.0	60	0.1312	15.45	0.9812	5.31
-F5	277.0	60	0.0612	15.29	0.9017	7.10
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

### Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

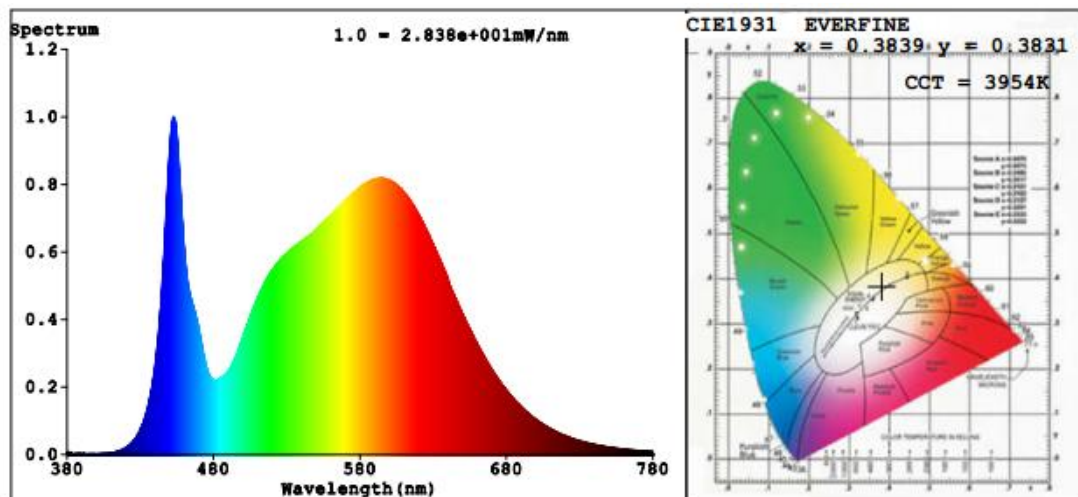
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	6
Frequency (Hz)	60	R2	89	R10	72
CCT (K)	3954	R3	94	R11	79
Duv	0.0020	R4	80	R12	56
Chromaticity (x, y)	x=0.3839 y=0.3831	R5	80	R13	82
Chromaticity (u', v')	u'=0.2249 v'=0.5049	R6	84	R14	97
Color Rendering Index (CRI)	82.1	R7	86	R15	74
R9	6	R8	64	--	--

### Photometric Measurement for Bare-lamp –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	2025	2028	Bare Lamp: >= 800(-10%)
Luminous Efficacy (lm/W)	131.07	132.64	Bare lamp: >= 110(-3%)



**Spectral Power Distribution & Chromaticity Diagram**



**Laboratory: Standard-Tech Co. Ltd Testing Center**  
**NVLAP CODE: 201011-0**

Report Format Number STD/QR4909-A/2

Address: Standard-Tech Building, No.6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320 Fax: 8620-32290422 <http://www.standard-tech.com>

## 2.5 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-17	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0015-50A&B-J (Frosted) Frosted), with ballast OSRAM SYLVANIA QTP 3x32T8/UNV ISN-SC		

### Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160031	120.0	60	0.1324	15.59	0.9815	5.94
-F6	277.0	60	0.0622	15.49	0.8990	8.29
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

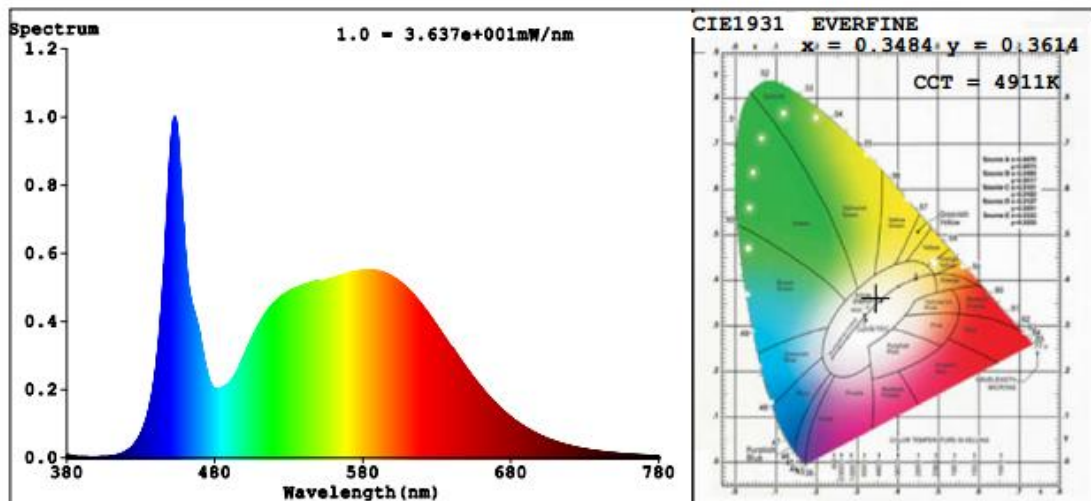
### Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	8
Frequency (Hz)	60	R2	88	R10	71
CCT (K)	4911	R3	93	R11	79
Duv	0.0035	R4	81	R12	51
Chromaticity (x, y)	x=0.3484 y=0.3614	R5	80	R13	83
Chromaticity (u', v')	u'=0.2099 v'=0.4899	R6	82	R14	96
Color Rendering Index (CRI)	82.5	R7	88	R15	75
R9	8	R8	67	--	--

### Photometric Measurement for Bare-lamp –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	2065	2068	Bare Lamp: >= 800(-10%)
Luminous Efficacy (lm/W)	132.46	133.51	Bare lamp: >= 110(-3%)

**Spectral Power Distribution & Chromaticity Diagram**



**Laboratory: Standard-Tech Co. Ltd Testing Center**  
**NVLAP CODE: 201011-0**

Report Format Number STD/QR4909-A/2

Address: Standard-Tech Building, No.6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320 Fax: 8620-32290422 <http://www.standard-tech.com>

**3. Test Equipment**

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-336	2 meter Integrating Sphere	2016-07-01	2017-06-30
ST-R-331	Spectral analysis system HAAS-2000	2016-07-01	2017-06-30
D204	Standard Lamp	2016-07-01	2017-06-30
PF2010	Power Meter for Integrating Sphere	2016-07-01	2017-06-30
EE-09	Goniophotometer system	2016-07-01	2017-06-30
D908S	Standard Lamp	2016-07-01	2017-06-30
PF210	Power Meter for Goniophotometer	2016-07-01	2017-06-30
ST-R-181A	Temperature Tester	2016-07-01	2017-06-30
Uncertainty: Photometric Measurement (Sphere):1.74% Chromaticity Measurement(Sphere):14.3K Photometric Measurement(Goniophotometer):1.62%			

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