



Report No.: GZE161131-O

## 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

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

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

Test & Report By:

*Jack Luo*

Engineer: Jack Luo

Date: Nov.14,2016

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.

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>

### 1.1 Product Information:

Organization Name	IKIO LED LIGHTING	
Brand Name	IKIO	
Model Number	IK-T804-0015-XXA&B-J	
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 2x32T8/UNV ISN-SC	
Sample Number	GZE161131-O1,O2(3000K),O3(3500K), O4(4000K),O5(5000K)	
Lamp Length	1200	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

#### Photo



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>

## 1.2 Test Specifications:

Date of Receipt	Nov.12, 2016
Date of Test	Nov.12, 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	2016-11-12	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0015-30A&B-J with ballast OSRAM SYLVANIA QTP 2x32T8/UNV ISN-SC		

#### Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161131	120.0	60	0.1362	16.26	0.9947	3.74
-O1	277.0	60	0.0605	16.06	0.9587	7.13
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

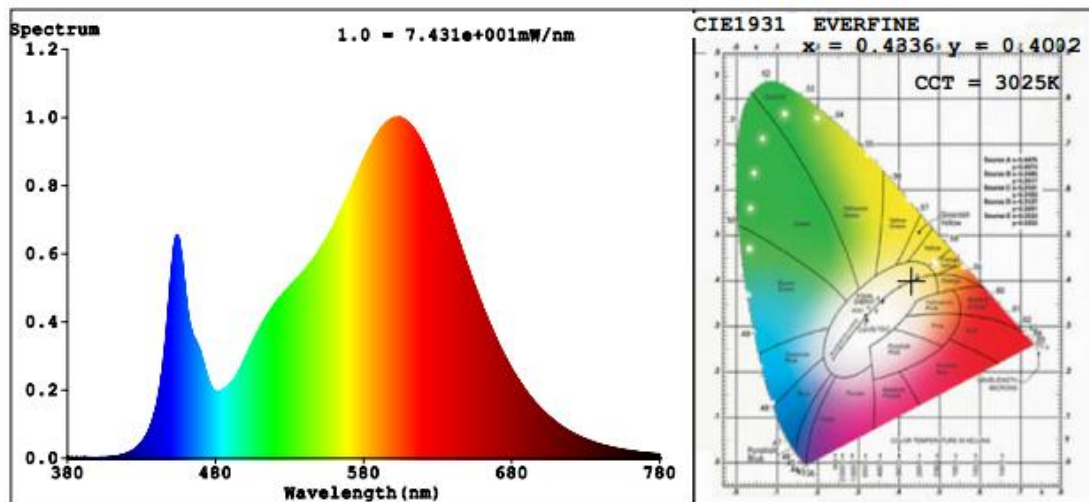
#### Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	5
Frequency (Hz)	60	R2	91	R10	80
CCT (K)	3025	R3	96	R11	77
Duv	-0.0011	R4	79	R12	68
Chromaticity (x, y)	x=0.4336 y=0.4002	R5	80	R13	83
Chromaticity (u', v')	u'=0.2501 v'=0.5193	R6	89	R14	98
Color Rendering Index (CRI)	81.9	R7	82	R15	73
R9	5	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)	2300	2292	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	141.45	142.71	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	2016-11-12	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0015-30A&B-J Connected to line voltage		

### Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161131	120.0	60	0.1295	15.36	0.9883	9.59
-O1	277.0	60	0.0590	15.11	0.9241	12.25
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

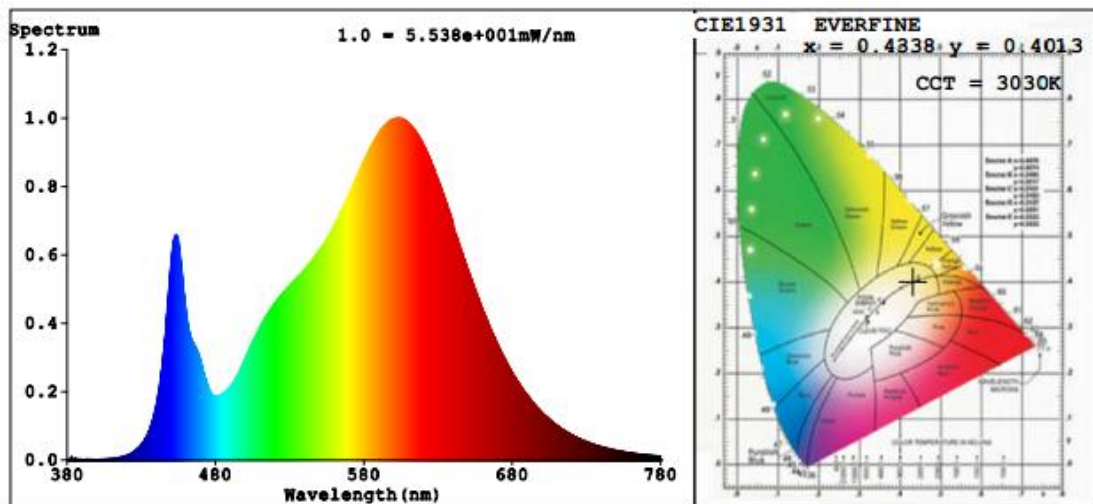
### Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	5
Frequency (Hz)	60	R2	91	R10	79
CCT (K)	3030	R3	96	R11	78
Duv	-0.0007	R4	79	R12	67
Chromaticity (x, y)	x=0.4338 y=0.4013	R5	80	R13	83
Chromaticity (u', v')	u'=0.2498 v'=0.5198	R6	89	R14	99
Color Rendering Index (CRI)	81.9	R7	82	R15	73
R9	5	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)	2192	2174	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	142.71	143.88	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)
GZE161131-O1	With Ballast	120.0	60	2300	141.45	16.26
GZE161131-O1	Connected to line voltage	120.0	60	2192	142.71	15.36

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	2016-11-12	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0015-30A&B-J with ballast OSRAM SYLVANIA QTP 2x32T8/UNV ISN-SC		

### Electrical Measurement for 2-lamp in Lithonia 2PM3N 12 cell 2x4 parabolic:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161131	120.0	60	0.2720	32.52	0.9965	3.71
-O1,O2	277.0	60	0.1209	32.12	0.9593	7.58
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

### Chromaticity Measurement for 2-lamp in Lithonia 2PM3N 12 cell 2x4 parabolic - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	4
Frequency (Hz)	60	R2	91	R10	79
CCT (K)	2989	R3	96	R11	77
Duv	-0.0007	R4	78	R12	67
Chromaticity (x, y)	x=0.4367 y=0.4022	R5	80	R13	83
Chromaticity (u', v')	u'=0.2512 v'=0.5206	R6	88	R14	99
Color Rendering Index (CRI)	81.6	R7	82	R15	73
R9	4	R8	57	--	--

### Photometric Measurement 2-lamp in Lithonia 2PM3N 12 cell 2x4 parabolic – Goniophotometer Method:

Parameter	Result		DLC V4.0 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	3879.3	3865.5	In luminaire (2 lamps): >= 3000(-10%)
Luminous Efficacy (lm/W)	119.29	120.35	In luminaire: >= 100(-3%)
Zonal lumens in the 0-60° zone (%)	91.8	--	>= 75(-3)
SC: 0-180° (if applicable)	1.42	--	1.0-2.0(±0.1)
SC: 90-270° (if applicable)	1.19	--	1.0-2.0(±0.1)
Beam Angle (°)	103.8	--	--
Center Beam Candle Power (cd)	1588	--	--

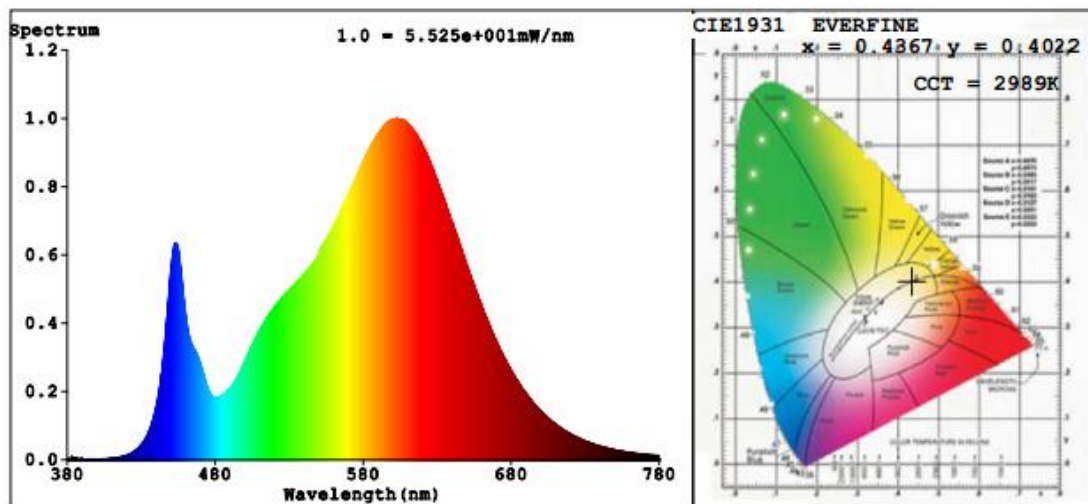
Laboratory: Standard-Tech Co. Ltd Testing Center  
NVLAP CODE: 201011-0

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	1,256.6	32.4%
0-40	2,077.6	53.6%
0-60	3,559.4	91.8%
60-90	319.2	8.2%
70-100	81.4	2.1%
90-120	0.0	0%
0-90	3,878.6	100%
90-180	0.2	0%
0-180	3,878.8	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	151.1	3.9%	90-100	0.0	0%
10-20	436.2	11.2%	100-110	0.0	0%
20-30	669.3	17.3%	110-120	0.0	0%
30-40	821.0	21.2%	120-130	0.0	0%
40-50	855.9	22.1%	130-140	0.0	0%
50-60	625.9	16.1%	140-150	0.0	0%
60-70	237.9	6.1%	150-160	0.0	0%
70-80	69.4	1.8%	160-170	0.0	0%
80-90	12.0	0.3%	170-180	0.0	0%

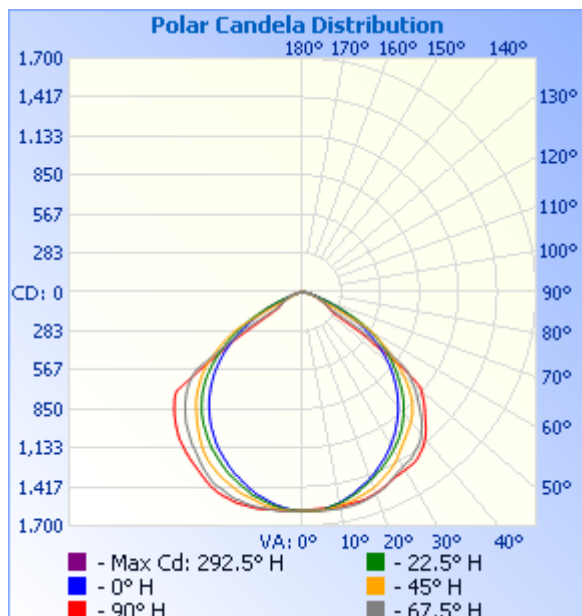
Laboratory: Standard-Tech Co. Ltd Testing Center  
NVLAP CODE: 201011-0

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>

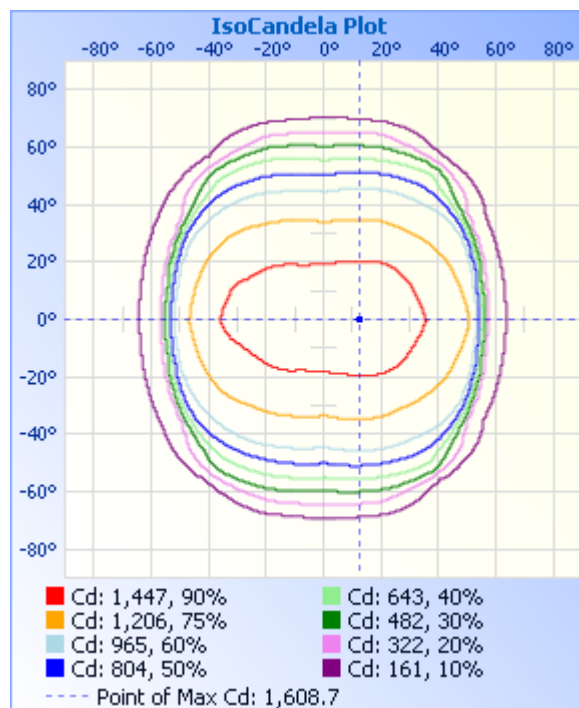
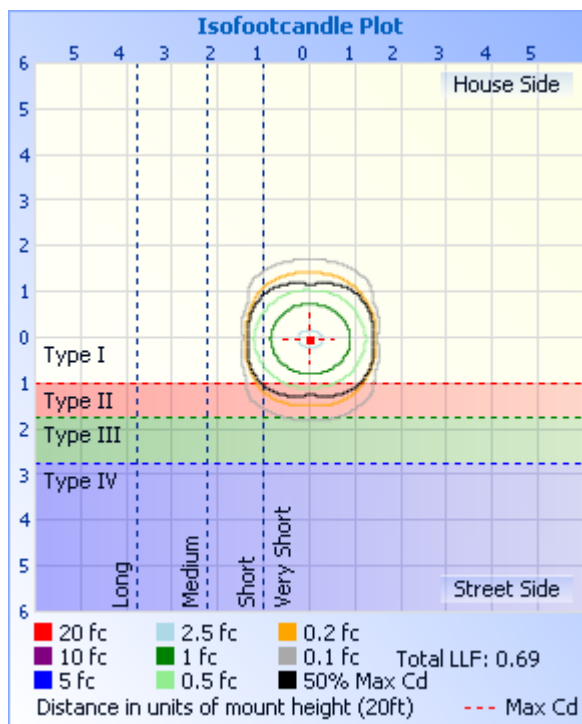
## Photometric Data



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	5.49 fc	42.2 ft	46.2 ft
34.0ft	1.37 fc	84.4 ft	92.4 ft
51.0ft	0.61 fc	126.6 ft	138.6 ft
68.0ft	0.34 fc	168.7 ft	184.8 ft
85.0ft	0.22 fc	210.9 ft	230.9 ft
102.0ft	0.15 fc	253.1 ft	277.1 ft

Vert. Spread: 102.3°  
Horiz. Spread: 107.3°



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>

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	1588	1588	1588	1588	1588	1588	1588	1588	1588	1588	1588	1588	1588	1588	1588	1588	
5	1594	1606	1601	1595	1590	1588	1592	1594	1580	1586	1578	1575	1575	1581	1590	1598	
10	1603	1609	1586	1569	1554	1561	1575	1597	1582	1578	1556	1536	1532	1547	1574	1597	
15	1606	1602	1560	1524	1498	1513	1548	1590	1578	1565	1518	1489	1480	1506	1540	1591	
20	1594	1585	1519	1468	1438	1452	1516	1560	1557	1531	1483	1425	1416	1448	1502	1569	
25	1567	1548	1477	1404	1364	1392	1455	1513	1516	1478	1419	1366	1342	1387	1457	1534	
30	1506	1479	1419	1333	1284	1324	1386	1465	1493	1427	1355	1294	1263	1318	1394	1461	
35	1453	1401	1335	1251	1189	1245	1300	1422	1467	1383	1264	1210	1167	1232	1303	1383	
40	1395	1324	1228	1160	1083	1144	1229	1345	1390	1301	1182	1110	1059	1144	1200	1303	
45	1313	1231	1120	1052	960	1025	1127	1209	1261	1166	1083	993	937	1030	1094	1210	
50	1218	1112	989	922	825	883	971	1056	1133	1009	924	845	794	885	963	1096	
55	593	911	828	752	672	743	783	768	553	755	720	679	633	710	790	728	
60	185	195	636	569	507	575	582	218	213	207	518	504	454	520	580	179	
65	146	144	217	377	339	357	171	159	156	146	148	295	278	312	132	137	
70	106	101	97.5	187	178	175	103	106	109	97.8	86.5	120	123	132	80.6	97.1	
75	72.1	64.9	52.4	77.7	85.1	74.5	56.7	65.9	70.1	59.5	46.8	52.8	58.4	51.8	45.5	63.2	
80	38.0	33.8	25.7	33.4	35.9	33.1	28.2	33.1	35.4	29.7	23.2	23.7	25.3	23.0	22.7	33.3	
85	12.1	10.9	8.91	10.2	11.0	10.7	9.94	10.6	11.9	9.15	7.06	6.60	6.49	6.26	7.05	10.6	
90	0.00	0.00	0.00	0.01	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.00	
115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.48	0.00	0.00	0.00	0.00	0.11	
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.48	0.00	0.00	0.00	0.00	0.11	
125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.00	0.00	0.00	0.00	0.11	
130	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.27	
135	0.00	0.32	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	0.10	
140	0.00	0.27	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	0.05	
145	0.00	0.27	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	0.05	
150	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.11	0.05	0.05	0.05	
155	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.21	0.21	0.16	0.21	0.00	
160	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.21	0.21	0.37	0.37	0.00	
165	0.11	0.26	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.05	0.00	0.37	0.32	0.48	0.37	0.00	
170	0.16	0.00	0.00	0.05	0.16	0.21	0.11	0.00	0.00	0.05	0.00	0.21	0.37	0.48	0.37	0.00	
175	0.16	0.00	0.05	0.05	0.26	0.42	0.11	0.00	0.00	0.05	0.00	0.00	0.11	0.37	0.26	0.00	
180	0.05	0.00	0.05	0.32	0.26	0.37	0.00	0.00	0.00	0.05	0.00	0.11	0.11	0.27	0.16	0.05	

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	2016-11-12	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0015-35A&B-J with ballast OSRAM SYLVANIA QTP 2x32T8/UNV ISN-SC		

### Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161131	120.0	60	0.1346	16.09	0.9960	3.86
-O3	277.0	60	0.0600	15.97	0.9603	6.90
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

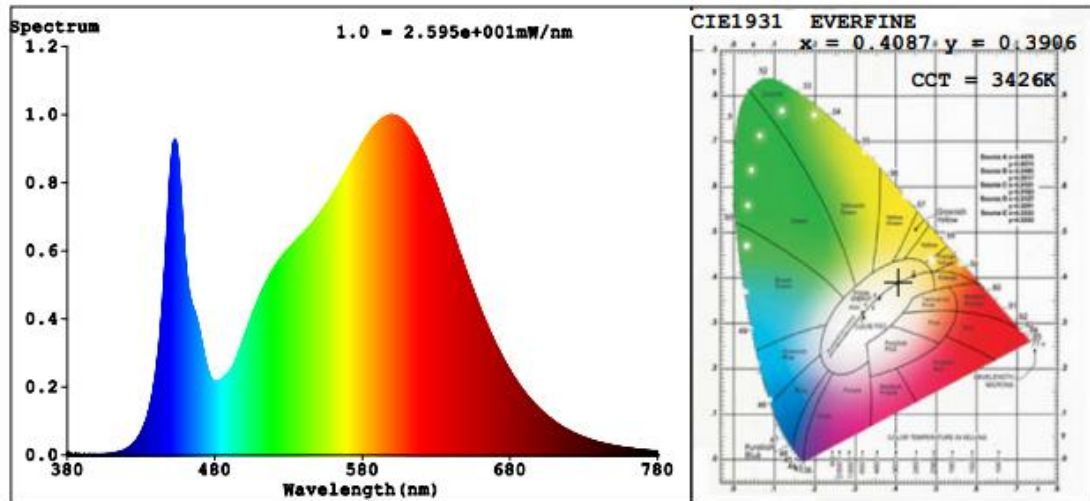
### Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	8
Frequency (Hz)	60	R2	90	R10	76
CCT (K)	3426	R3	96	R11	79
Duv	-0.0008	R4	80	R12	62
Chromaticity (x, y)	x=0.4087 y=0.3906	R5	81	R13	84
Chromaticity (u', v')	u'=0.2379 v'=0.5117	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)	2320	2325	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	144.19	145.59	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	2016-11-12	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0015-40A&B-J with ballast OSRAM SYLVANIA QTP 2x32T8/UNV ISN-SC		

### Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161131	120.0	60	0.1378	16.47	0.9962	3.14
-O4	277.0	60	0.0606	16.15	0.9618	7.90
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

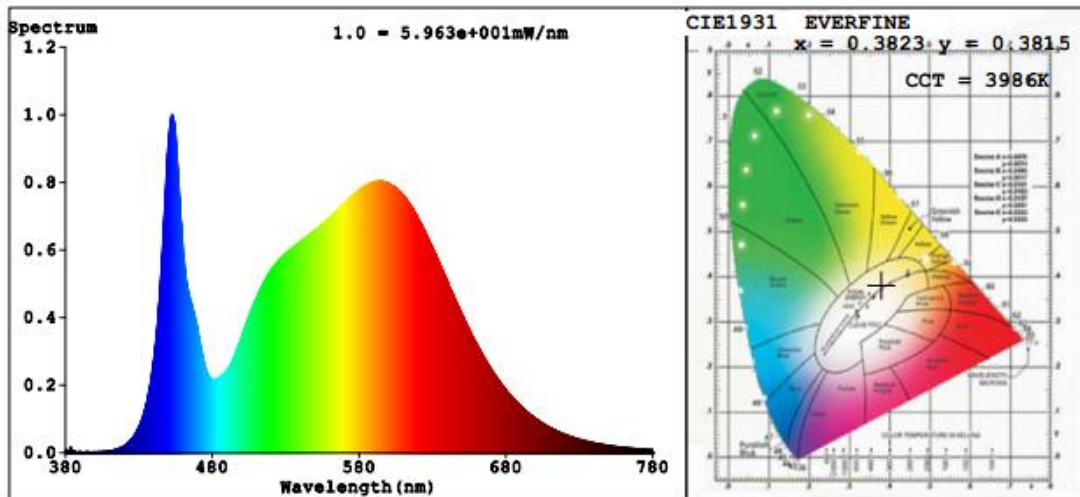
### Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	7
Frequency (Hz)	60	R2	89	R10	72
CCT (K)	3986	R3	94	R11	79
Duv	0.0017	R4	81	R12	56
Chromaticity (x, y)	x=0.3823 y=0.3815	R5	80	R13	8
Chromaticity (u', v')	u'=0.2244 v'=0.5039	R6	83	R14	97
Color Rendering Index (CRI)	82.2	R7	86	R15	74
R9	7	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)	2415	2379	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	146.63	147.31	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	2016-11-12	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0015-50A&B-J with ballast OSRAM SYLVANIA QTP 2x32T8/UNV ISN-SC		

### Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161131	120.0	60	0.1359	16.22	0.9945	3.10
-O5	277.0	60	0.0607	16.13	0.9596	7.03
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

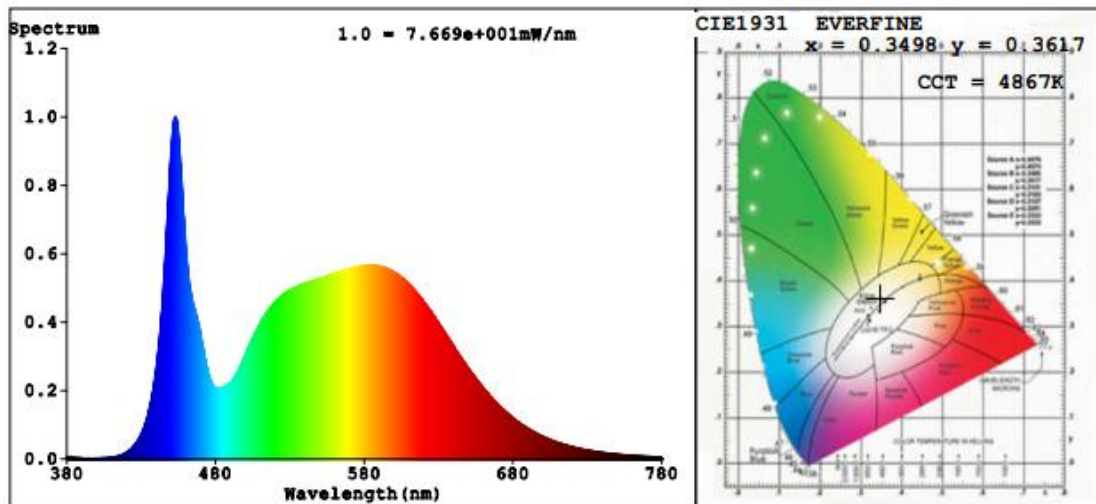
### Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	7
Frequency (Hz)	60	R2	88	R10	71
CCT (K)	4867	R3	93	R11	78
Duv	0.0032	R4	80	R12	51
Chromaticity (x, y)	x=0.3498 y=0.3617	R5	80	R13	83
Chromaticity (u', v')	u'=0.2107 v'=0.4902	R6	82	R14	96
Color Rendering Index (CRI)	82.3	R7	88	R15	75
R9	7	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)	2402	2401	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	148.09	148.85	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 \*\*\*\*\***