

## LM-79-08 Test Report

For

### IKIO LED LIGHTING

(Brand Name: IKIO)

8470 Allison Pointe Blvd, Suite 128  
Indianapolis, IN 46250

### Internal driver Lamp-style retrofit kits (UL Type B)

Model name(s): IK-T804-0018-DN-XXB-J

Representative (Tested) Model:      IK-T804-0018-DN-30B-J  
   IK-T804-0018-DN-35B-J  
   IK-T804-0018-DN-40B-J  
   IK-T804-0018-DN-50B-J

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

Test & Report By:

*Jack Luo*

Engineer: Jack Luo

Date: Nov.07,2016

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-T804-0018-DN-XXB-J	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Internal driver Lamp-style retrofit kits (UL Type B)	
Rated Voltage / Frequency	100 ~ 277 Vac, 50/60 Hz	
Nominal Power	18W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,5000K	
LED Manufacturer	EVERLIGHT ELECTRONICS CO.,LTD	
LED Model	67-21S Series	
Test Ballast	--	
Sample Number	GZE161131-J1,J2(3000K),J3(3500K), J4(4000K),J5(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

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## 1.2 Test Specifications:

Date of Receipt	Oct.31, 2016
Date of Test	Nov.05, 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 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-05	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0018-DN-30B-J		

### Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161131 -J1	120.0	60	0.1583	18.49	0.9732	15.73
	277.0	60	0.0754	18.61	0.8910	20.09
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

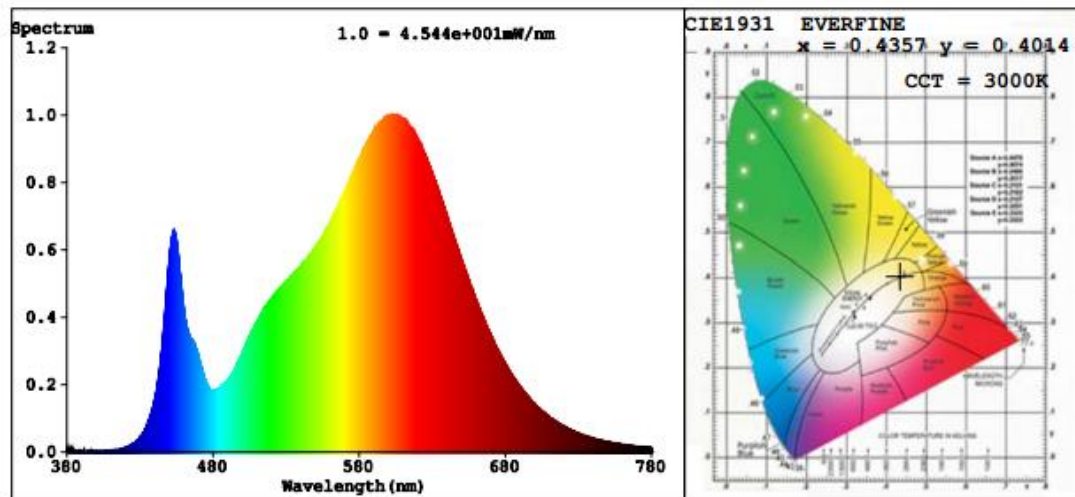
### Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	6
Frequency (Hz)	60	R2	91	R10	80
CCT (K)	3000	R3	96	R11	78
Duv	-0.0009	R4	79	R12	68
Chromaticity (x, y)	x=0.4357 y=0.4014	R5	81	R13	83
Chromaticity (u', v')	u'=0.2509 v'=0.5201	R6	89	R14	99
Color Rendering Index (CRI)	82.2	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)	2453	2462	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	132.67	132.33	Bare lamp: >= 110(-3%)

**Spectral Power Distribution & Chromaticity Diagram**



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

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## 2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-05	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0018-DN-30B-J		

### 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	0.3168	36.98	0.9726	15.38
-J1,J2	277.0	60	0.1507	37.21	0.8911	20.17
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

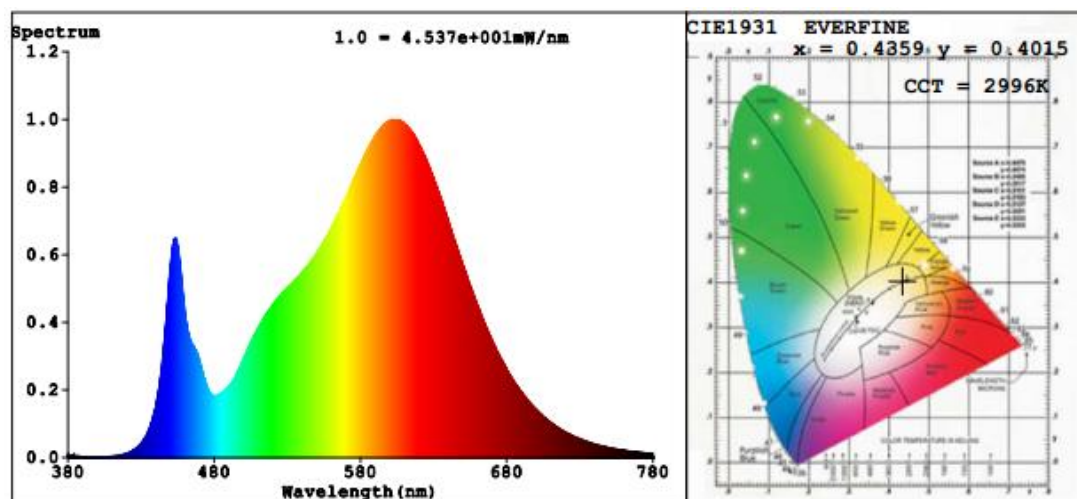
### Chromaticity Measurement for 2-lamp in Lithonia 2PM3N 12 cell 2x4 parabolic - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	6
Frequency (Hz)	60	R2	91	R10	80
CCT (K)	2996	R3	96	R11	78
Duv	-0.0009	R4	79	R12	68
Chromaticity (x, y)	x=0.4359 y=0.4015	R5	81	R13	83
Chromaticity (u', v')	u'=0.2510 v'=0.5202	R6	89	R14	99
Color Rendering Index (CRI)	82.1	R7	82	R15	74
R9	6	R8	58	--	--

### 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)	4516.4	4532.0	In luminaire (2 lamps): >= 3000(-10%)
Luminous Efficacy (lm/W)	122.13	121.80	In luminaire: >= 100(-3%)
Zonal lumens in the 0-60 ° zone (%)	90.2	--	>= 75(-3)
SC: 0-180 °(if applicable)	1.38	--	1.0-2.0(±0.1)
SC: 90-270 °(if applicable)	1.15	--	1.0-2.0(±0.1)
Beam Angle (°)	101.8	--	--
Center Beam Candle Power (cd)	1874	--	--

## Spectral Power Distribution & Chromaticity Diagram



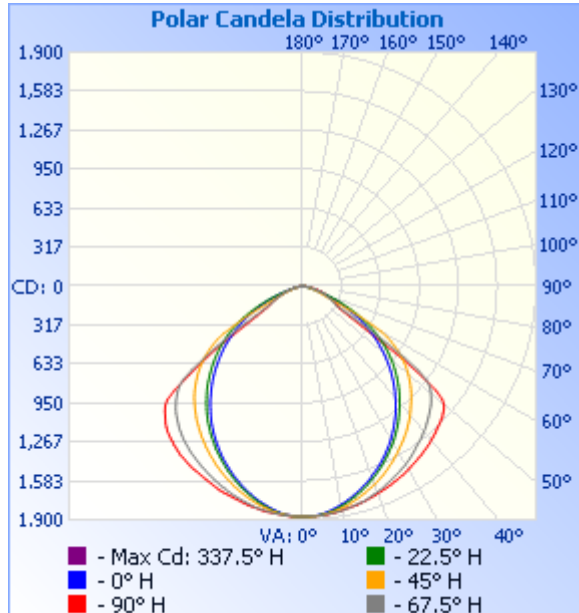
## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,434.5	31.8%
0-40	2,354.6	52.1%
0-60	4,073.0	90.2%
60-90	441.1	9.8%
70-100	120.0	2.7%
90-120	0.6	0%
0-90	4,514.1	100%
90-180	1.6	0%
0-180	4,515.7	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	176.8	3.9%	90-100	0.0	0%
10-20	501.3	11.1%	100-110	0.2	0%
20-30	756.4	16.8%	110-120	0.4	0%
30-40	920.1	20.4%	120-130	0.3	0%
40-50	971.8	21.5%	130-140	0.2	0%
50-60	746.6	16.5%	140-150	0.2	0%
60-70	321.0	7.1%	150-160	0.2	0%
70-80	103.3	2.3%	160-170	0.1	0%
80-90	16.7	0.4%	170-180	0.0	0%



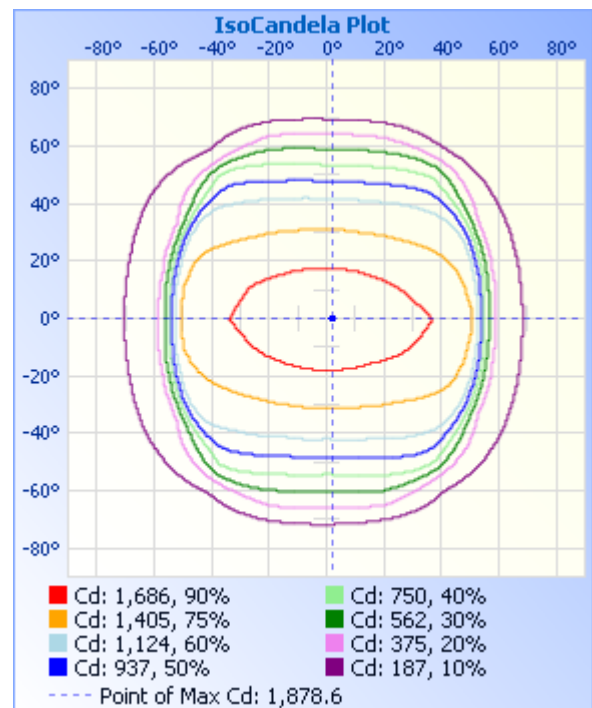
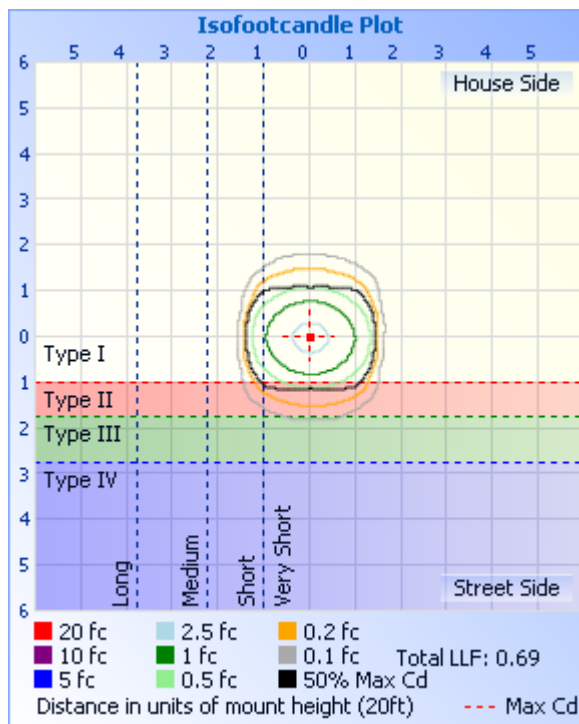
## Photometric Data



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	6.48 fc	37.9 ft	46.5 ft
34.0ft	1.62 fc	75.8 ft	93.0 ft
51.0ft	0.72 fc	113.6 ft	139.5 ft
68.0ft	0.41 fc	151.5 ft	186.0 ft
85.0ft	0.26 fc	189.4 ft	232.5 ft
102.0ft	0.18 fc	227.3 ft	279.0 ft

■ Vert. Spread: 96.2°  
■ Horiz. Spread: 107.6°



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Table--1

UNIT: cd

C (DEG) y (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338	
0	1874	1874	1874	1874	1874	1874	1874	1874	1874	1874	1874	1874	1874	1874	1874	1874	
5	1865	1869	1869	1861	1858	1864	1867	1871	1871	1867	1865	1860	1857	1861	1861	1867	
10	1853	1845	1828	1813	1801	1815	1832	1853	1852	1845	1828	1809	1800	1811	1824	1847	
15	1828	1811	1771	1741	1731	1747	1779	1822	1824	1809	1770	1743	1727	1739	1769	1814	
20	1800	1763	1703	1660	1644	1664	1714	1780	1792	1764	1699	1654	1638	1657	1702	1775	
25	1768	1711	1624	1563	1545	1571	1639	1728	1759	1707	1618	1559	1539	1561	1626	1725	
30	1734	1649	1539	1453	1436	1470	1552	1674	1723	1644	1527	1450	1424	1455	1542	1671	
35	1701	1583	1441	1337	1311	1355	1462	1606	1679	1575	1431	1332	1301	1344	1452	1615	
40	1648	1513	1336	1208	1173	1228	1361	1538	1631	1500	1326	1204	1164	1219	1353	1545	
45	1579	1415	1215	1072	1027	1094	1250	1459	1577	1414	1213	1068	1022	1085	1246	1457	
50	1440	1280	1078	920	871	950	1125	1363	1502	1315	1085	922	870	940	1115	1327	
55	687	909	902	753	706	790	968	1010	761	1054	938	772	712	788	950	851	
60	317	348	684	571	532	608	738	336	333	361	747	609	548	620	656	330	
65	236	220	299	376	355	404	254	250	273	248	330	428	388	422	253	227	
70	158	142	132	185	184	206	144	181	201	176	156	235	222	223	142	150	
75	91.6	78.9	66.6	80.5	88.5	81.6	82.5	115	134	110	84.8	107	108	94.7	74.3	85.8	
80	42.3	35.8	31.4	35.1	39.1	37.5	40.0	56.4	66.0	53.5	41.6	43.5	42.3	38.3	34.3	39.0	
85	13.3	11.2	10.1	10.5	11.6	12.0	13.4	18.0	21.1	16.4	12.6	11.9	11.3	10.7	10.4	11.9	
90	0.00	0.00	0.00	0.01	0.04	0.04	0.01	0.01	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	0.10	0.00	0.05	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	0.30	0.00	0.30	0.00	0.00	
105	0.00	0.00	0.40	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.61	0.05	0.00	0.21	0.51	0.00	
110	0.35	0.60	0.38	0.00	0.15	0.22	0.65	0.10	0.26	0.61	1.04	0.00	0.00	0.00	0.64	0.30	
115	0.60	0.59	0.38	0.00	0.09	0.20	0.50	0.96	0.98	0.90	0.91	0.00	0.00	0.00	0.56	0.24	
120	0.63	0.55	0.40	0.00	0.05	0.00	0.50	0.60	0.74	0.49	1.26	0.00	0.00	0.00	0.48	0.50	
125	0.59	0.58	0.43	0.00	0.00	0.00	0.50	0.57	0.69	0.41	1.21	0.00	0.05	0.00	0.40	0.40	
130	0.55	0.60	0.31	0.00	0.00	0.00	0.38	0.53	0.64	0.44	0.66	0.05	0.05	0.00	0.23	0.43	
135	0.55	0.60	0.15	0.00	0.00	0.00	0.27	0.50	0.59	0.45	0.30	0.05	0.24	0.21	0.10	0.48	
140	0.54	0.60	0.05	0.00	0.00	0.00	0.20	0.46	0.54	0.43	0.05	0.20	0.33	0.28	0.05	0.40	
145	0.50	0.40	0.00	0.00	0.00	0.10	0.00	0.43	0.48	0.40	0.10	0.37	0.43	0.41	0.15	0.35	
150	0.55	0.30	0.00	0.00	0.20	0.20	0.00	0.36	0.43	0.37	0.08	0.47	0.60	0.53	0.35	0.25	
155	0.55	0.38	0.05	0.28	0.45	0.34	0.00	0.24	0.41	0.39	0.06	0.49	0.60	0.71	0.52	0.34	
160	0.47	0.15	0.00	0.41	0.46	0.50	0.00	0.15	0.39	0.43	0.05	0.51	0.60	0.80	0.60	0.41	
165	0.45	0.10	0.30	0.45	0.54	0.50	0.30	0.05	0.38	0.47	0.03	0.53	0.60	0.88	0.63	0.50	
170	0.43	0.00	0.42	0.55	0.70	0.59	0.33	0.25	0.36	0.40	0.01	0.55	0.60	0.99	0.62	0.53	
175	0.41	0.00	0.45	0.52	0.74	0.68	0.40	0.25	0.32	0.33	0.00	0.40	0.60	1.04	0.61	0.45	
180	0.30	0.00	0.45	0.50	0.75	0.56	0.26	0.10	0.35	0.30	0.00	0.51	0.50	0.81	0.60	0.30	

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### 2.3 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-05	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0018-DN-35B-J		

#### Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161131 -J3	120.0	60	0.1601	18.72	0.9746	15.94
	277.0	60	0.0763	18.78	0.8886	21.17
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

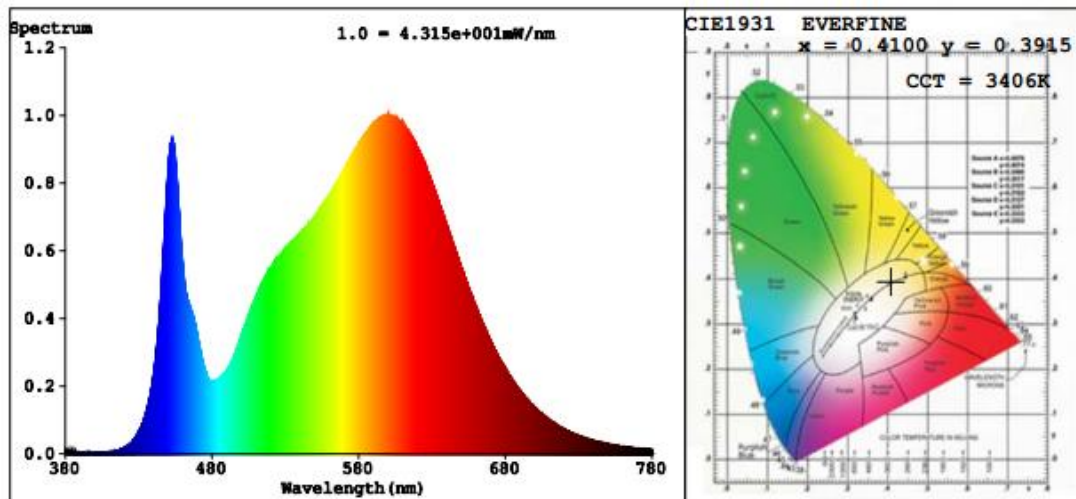
#### Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	9
Frequency (Hz)	60	R2	90	R10	76
CCT (K)	3406	R3	96	R11	79
Duv	-0.0006	R4	81	R12	62
Chromaticity (x, y)	x=0.4100 y=0.3915	R5	81	R13	84
Chromaticity (u', v')	u'=0.2384 v'=0.5123	R6	87	R14	98
Color Rendering Index (CRI)	82.7	R7	84	R15	75
R9	9	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)	2529	2533	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	135.10	134.88	Bare lamp: >= 110(-3%)

**Spectral Power Distribution & Chromaticity Diagram**



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## 2.4 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-05	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0018-DN-40B-J		

### Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161131 -J4	120.0	60	0.1573	18.38	0.9736	15.39
	277.0	60	0.0752	18.56	0.8908	20.68
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

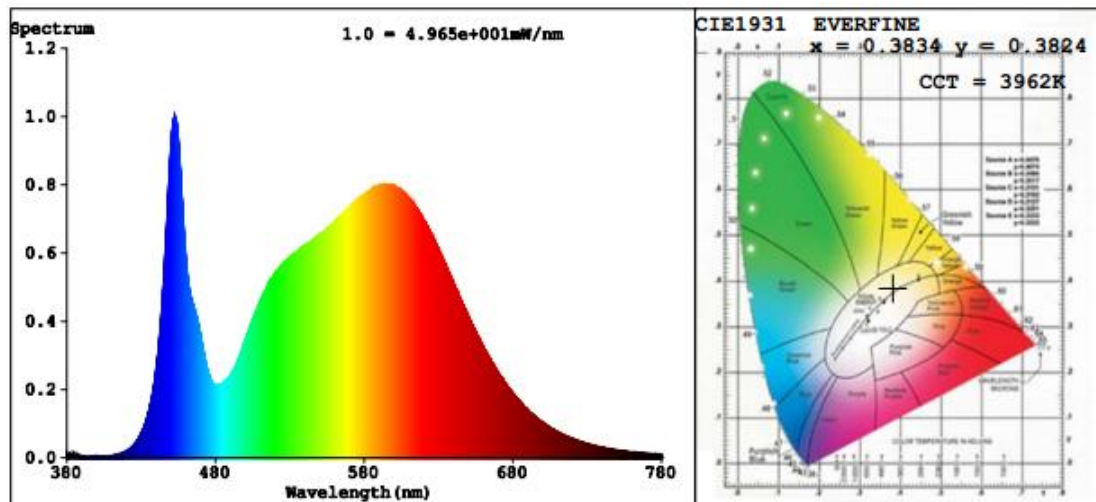
### Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	8
Frequency (Hz)	60	R2	89	R10	72
CCT (K)	3962	R3	94	R11	79
Duv	0.0018	R4	81	R12	56
Chromaticity (x, y)	x=0.3834 y=0.3824	R5	80	R13	83
Chromaticity (u', v')	u'=0.2248 v'=0.5045	R6	84	R14	97
Color Rendering Index (CRI)	82.4	R7	86	R15	75
R9	8	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)	2530	2547	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	137.65	137.23	Bare lamp: >= 110(-3%)

**Spectral Power Distribution & Chromaticity Diagram**



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## 2.5 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-05	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0018-DN-50B-J		

### Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161131 -J5	120.0	60	0.1602	18.67	0.9711	15.85
	277.0	60	0.0758	18.75	0.8935	20.47
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

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

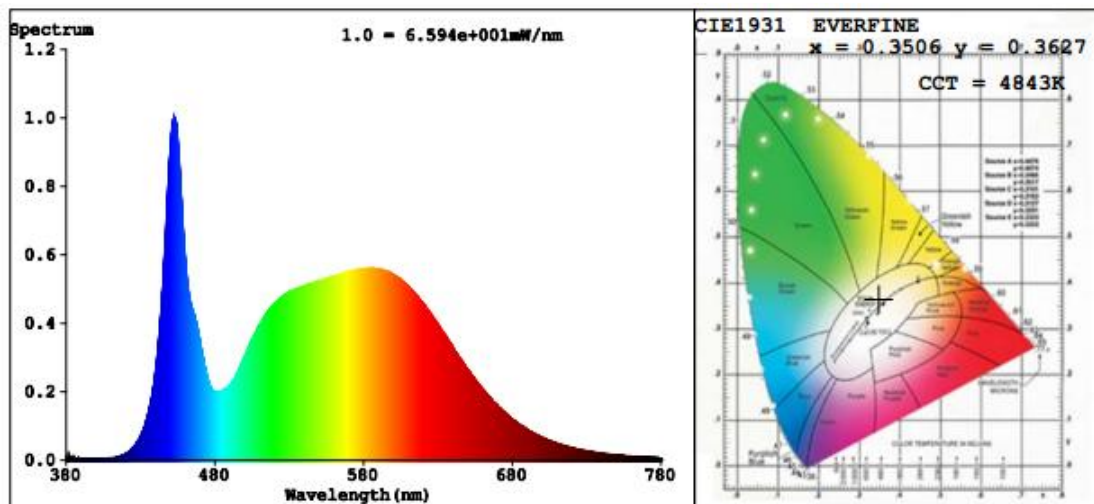
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	7
Frequency (Hz)	60	R2	88	R10	70
CCT (K)	4843	R3	93	R11	79
Duv	0.0033	R4	80	R12	51
Chromaticity (x, y)	x=0.3506 y=0.3627	R5	80	R13	82
Chromaticity (u', v')	u'=0.2108 v'=0.4908	R6	82	R14	96
Color Rendering Index (CRI)	82.2	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)	2583	2587	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	138.35	137.97	Bare lamp: >= 110(-3%)



**Spectral Power Distribution & Chromaticity Diagram**



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

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**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 \*\*\*\*\***