

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-I1,I2(3000K),I3(3500K), I4(4000K),I5(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"> 1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters
Reference Standard	<ol style="list-style-type: none"> 1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
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° vertical intervals and 22.5° 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 -I1	120.0	60	0.1591	18.54	0.9706	15.37
	277.0	60	0.0748	18.58	0.8966	20.90
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

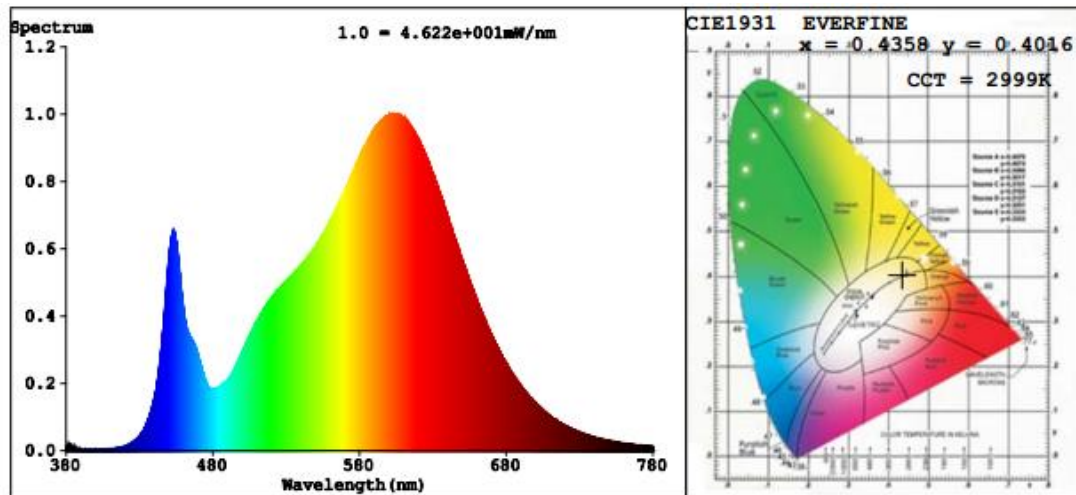
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	5
Frequency (Hz)	60	R2	91	R10	79
CCT (K)	2999	R3	96	R11	78
Duv	-0.0008	R4	79	R12	67
Chromaticity (x, y)	x=0.4358 y=0.4016	R5	80	R13	83
Chromaticity (u', v')	u'=0.2509 v'=0.5202	R6	89	R14	99
Color Rendering Index (CRI)	82.0	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)	2609	2621	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	140.72	141.07	Bare lamp: >= 110(-3%)

Spectral Power Distribution & Chromaticity Diagram



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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	0.3175	37.07	0.9730	15.13
-I1,I2	277.0	60	0.1498	37.15	0.8951	20.85
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

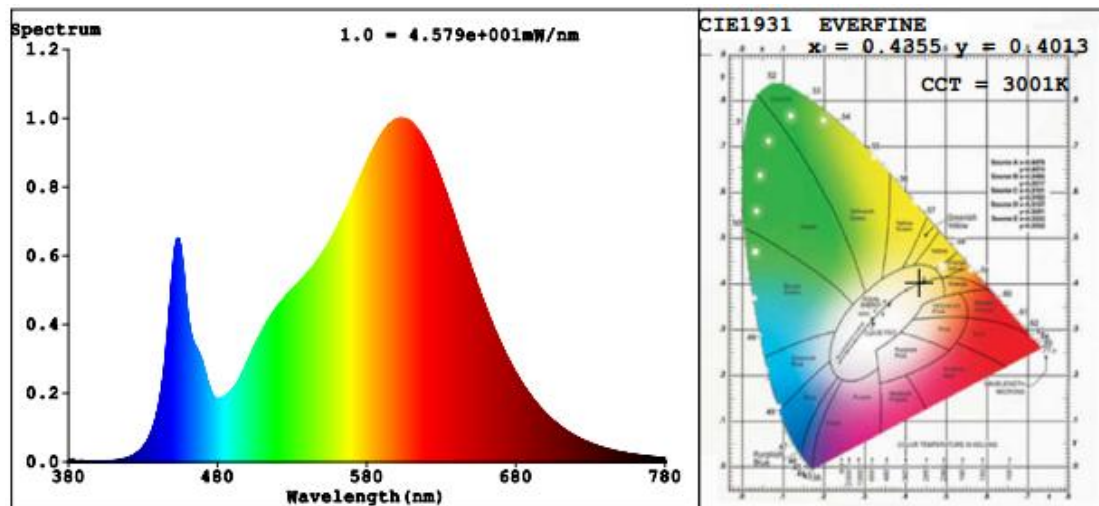
Chromaticity Measurement for 2-lamp in Lithonia 2PM3N 12 cell 2x4 parabolic - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	5
Frequency (Hz)	60	R2	91	R10	79
CCT (K)	3001	R3	96	R11	78
Duv	-0.0009	R4	79	R12	67
Chromaticity (x, y)	x=0.4355 y=0.4013	R5	80	R13	83
Chromaticity (u', v')	u'=0.2509 v'=0.5201	R6	89	R14	99
Color Rendering Index (CRI)	81.9	R7	82	R15	73
R9	5	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)	4879.1	4900.1	In luminaire (2 lamps): >= 3000(-10%)
Luminous Efficacy (lm/W)	131.62	131.90	In luminaire: >= 100(-3%)
Zonal lumens in the 0-60 ° zone (%)	91.6	--	>= 75(-3)
SC: 0-180 °(if applicable)	1.41	--	1.0-2.0(±0.1)
SC: 90-270 °(if applicable)	1.19	--	1.0-2.0(±0.1)
Beam Angle (°)	104.1	--	--
Center Beam Candle Power (cd)	2026	--	--

Spectral Power Distribution & Chromaticity Diagram

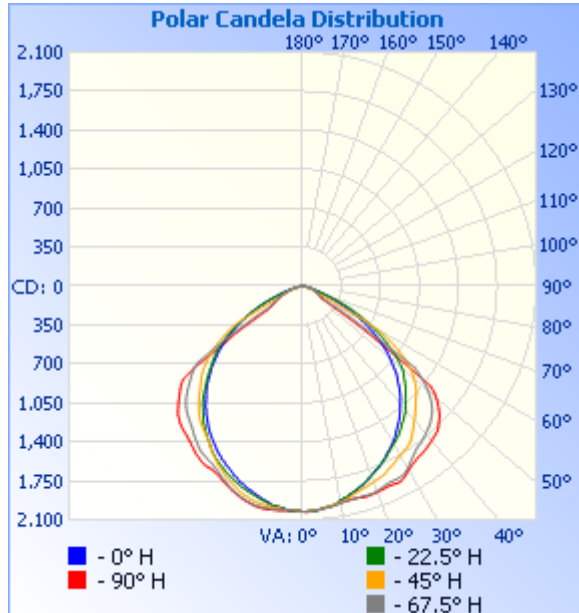


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,569.8	32.2%
0-40	2,589.9	53.1%
0-60	4,468.7	91.6%
60-90	408.4	8.4%
70-100	104.3	2.1%
90-120	0.3	0%
0-90	4,877.1	100%
90-180	1.3	0%
0-180	4,878.4	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	191.0	3.9%	90-100	0.0	0%
10-20	546.3	11.2%	100-110	0.1	0%
20-30	832.6	17.1%	110-120	0.2	0%
30-40	1,020.1	20.9%	120-130	0.3	0%
40-50	1,077.4	22.1%	130-140	0.2	0%
50-60	801.4	16.4%	140-150	0.2	0%
60-70	304.0	6.2%	150-160	0.2	0%
70-80	89.2	1.8%	160-170	0.1	0%
80-90	15.2	0.3%	170-180	0.0	0%

Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	7.01 fc	40.8 ft	46.2 ft
34.0ft	1.75 fc	81.6 ft	92.4 ft
51.0ft	0.78 fc	122.4 ft	138.6 ft
68.0ft	0.44 fc	163.1 ft	184.7 ft
85.0ft	0.28 fc	203.9 ft	230.9 ft
102.0ft	0.19 fc	244.7 ft	277.1 ft

■ Vert. Spread: 100.4°
■ Horiz. Spread: 107.3°

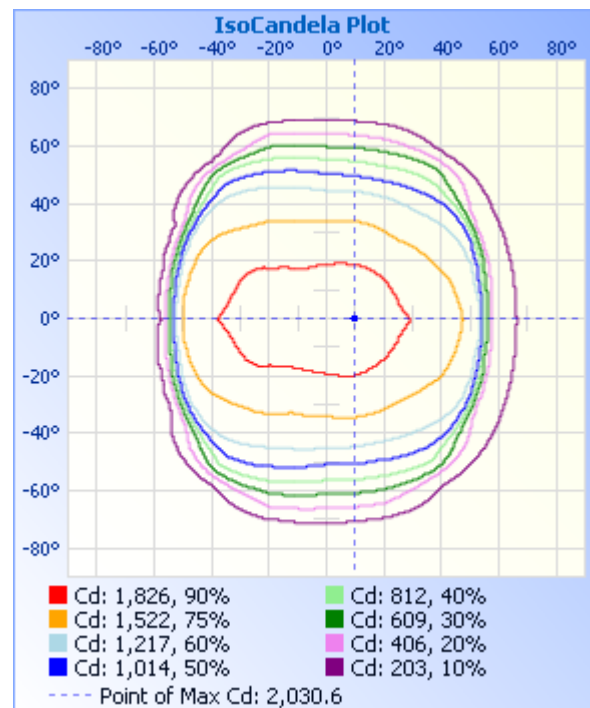
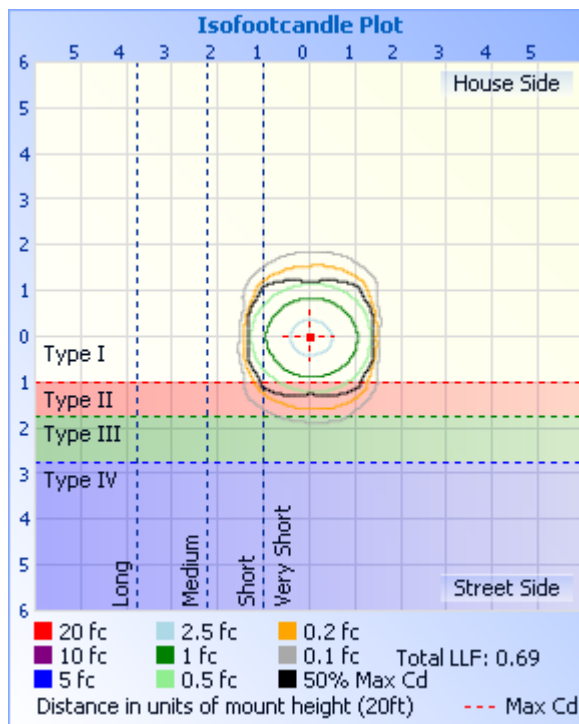


Table--1

UNIT: cd

C (DEG) T (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338	
0	2026	2026	2026	2026	2026	2026	2026	2026	2026	2026	2026	2026	2026	2026	2026	2026	
5	2024	2021	2012	2007	2008	2007	2010	2007	2006	2007	2005	2004	2004	2003	2013	2013	
10	2029	2026	1998	1960	1955	1958	1972	1980	1977	1977	1969	1952	1955	1960	1994	2021	
15	1994	1995	1954	1906	1895	1887	1913	1965	1967	1955	1899	1883	1885	1907	1953	1987	
20	1927	1920	1883	1840	1808	1811	1871	1958	1969	1939	1846	1802	1806	1840	1877	1919	
25	1849	1818	1787	1764	1721	1727	1819	1929	1961	1901	1793	1711	1717	1764	1783	1822	
30	1819	1744	1675	1668	1624	1637	1760	1890	1907	1867	1724	1608	1610	1660	1658	1762	
35	1744	1663	1544	1537	1501	1549	1696	1784	1851	1761	1655	1511	1488	1537	1561	1678	
40	1677	1549	1451	1410	1367	1439	1564	1726	1809	1682	1540	1400	1352	1399	1454	1580	
45	1587	1453	1302	1248	1211	1312	1439	1643	1733	1600	1403	1272	1204	1225	1302	1486	
50	1438	1288	1131	1056	1038	1179	1311	1478	1573	1444	1274	1126	1030	1057	1165	1321	
55	722	1069	940	841	842	959	1108	904	615	1124	1100	961	844	884	970	953	
60	290	290	685	632	616	721	783	190	186	208	806	731	635	655	724	294	
65	214	203	285	383	389	464	156	145	149	150	258	489	429	429	220	211	
70	150	136	124	182	185	207	95.4	105	111	105	112	242	229	214	133	143	
75	94.6	81.6	67.1	79.6	86.5	71.4	56.0	69.3	76.9	69.1	59.9	102	109	91.6	74.3	88.1	
80	43.4	38.2	33.0	35.9	38.6	32.5	29.4	39.5	45.2	37.8	29.9	40.1	41.5	38.5	36.2	41.2	
85	13.8	12.3	10.9	11.2	11.6	10.4	10.5	13.8	15.8	12.5	9.48	10.2	11.0	11.1	11.5	12.8	
90	0.00	0.00	0.00	0.01	0.01	0.02	0.01	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	0.25	0.03	0.29	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	0.30	0.25	0.10	0.30	0.17	0.00	
110	0.00	0.00	0.20	0.00	0.00	0.00	0.05	0.00	0.08	0.10	0.50	0.00	0.10	0.20	0.28	0.30	
115	0.32	0.38	0.34	0.00	0.00	0.00	0.26	0.00	0.25	0.35	0.85	0.00	0.00	0.00	0.38	0.34	
120	0.40	0.51	0.32	0.00	0.00	0.00	0.35	0.30	0.40	0.37	1.02	0.00	0.00	0.00	0.40	0.38	
125	0.55	0.58	0.31	0.00	0.00	0.00	0.42	0.33	0.43	0.39	0.84	0.00	0.00	0.00	0.40	0.42	
130	0.55	0.59	0.24	0.00	0.00	0.00	0.36	0.36	0.47	0.38	0.60	0.00	0.05	0.05	0.35	0.46	
135	0.55	0.59	0.15	0.00	0.00	0.00	0.30	0.38	0.49	0.39	0.30	0.10	0.10	0.05	0.17	0.49	
140	0.59	0.60	0.00	0.00	0.00	0.00	0.08	0.40	0.51	0.48	0.00	0.18	0.30	0.25	0.05	0.48	
145	0.55	0.40	0.00	0.00	0.00	0.00	0.00	0.45	0.52	0.41	0.15	0.35	0.40	0.43	0.15	0.46	
150	0.52	0.35	0.00	0.00	0.10	0.20	0.00	0.35	0.53	0.50	0.15	0.42	0.48	0.50	0.39	0.46	
155	0.49	0.31	0.00	0.30	0.30	0.33	0.00	0.05	0.54	0.65	0.21	0.45	0.60	0.78	0.50	0.47	
160	0.47	0.25	0.00	0.45	0.45	0.45	0.07	0.05	0.52	0.43	0.30	0.48	0.64	0.86	0.65	0.49	
165	0.45	0.21	0.49	0.50	0.53	0.54	0.24	0.05	0.49	0.40	0.35	0.55	0.69	0.93	0.67	0.50	
170	0.43	0.21	0.50	0.53	0.80	0.59	0.55	0.35	0.46	0.37	0.22	0.64	0.73	0.99	0.62	0.57	
175	0.41	0.20	0.50	0.65	0.95	0.65	0.51	0.30	0.40	0.35	0.17	0.50	0.62	0.70	0.55	0.40	
180	0.40	0.20	0.54	0.60	0.75	0.60	0.35	0.20	0.45	0.40	0.25	0.45	0.60	0.70	0.65	0.35	

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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 -I3	120.0	60	0.1595	18.64	0.9739	15.46
	277.0	60	0.0757	18.74	0.8934	20.97
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

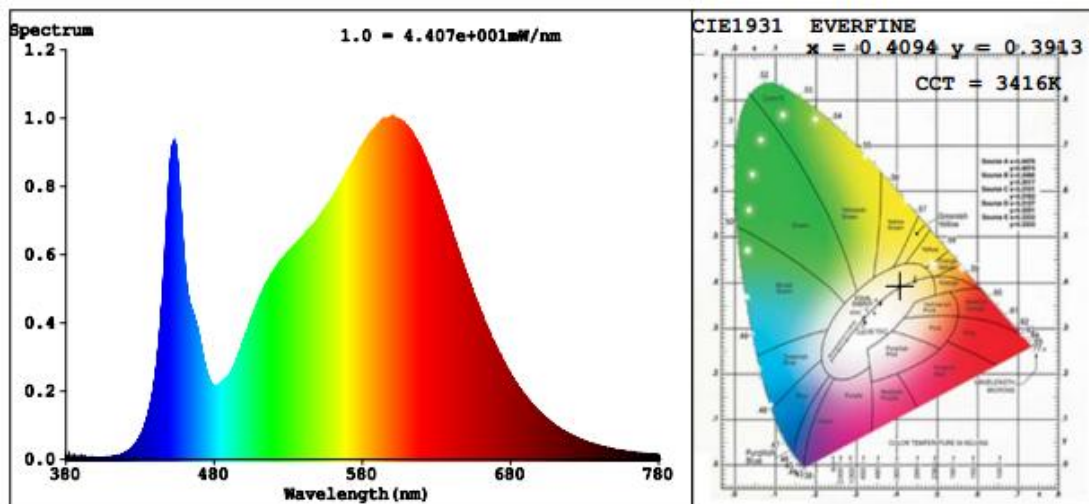
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	8
Frequency (Hz)	60	R2	90	R10	76
CCT (K)	3416	R3	96	R11	79
Duv	-0.0006	R4	80	R12	62
Chromaticity (x, y)	x=0.4094 y=0.3913	R5	81	R13	83
Chromaticity (u', v')	u'=0.2381 v'=0.5121	R6	86	R14	98
Color Rendering Index (CRI)	82.5	R7	84	R15	75
R9	8	R8	61	--	--

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)	2678	2699	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	143.67	144.02	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 -I4	120.0	60	0.1566	18.30	0.9736	15.62
	277.0	60	0.0745	18.48	0.8954	21.07
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

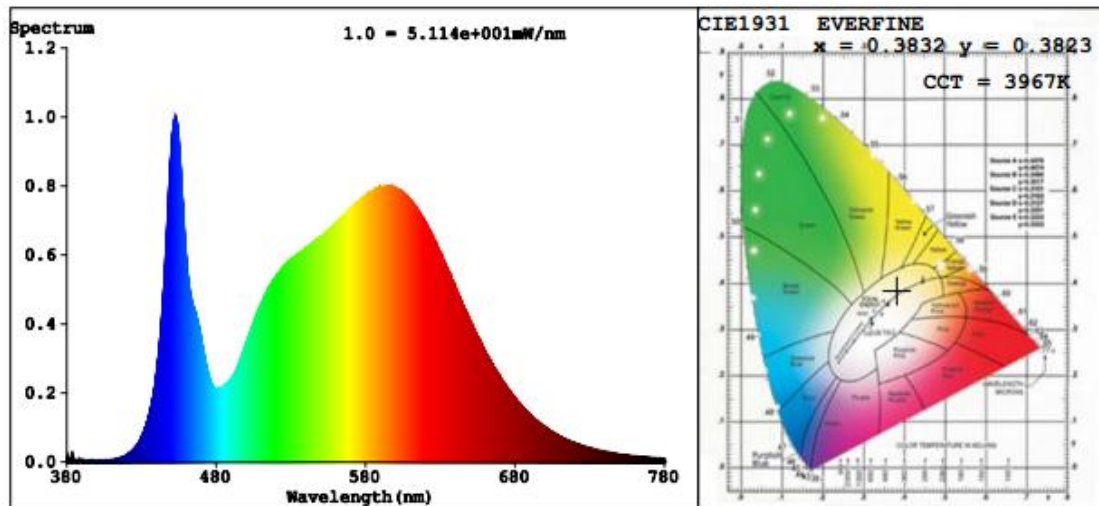
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	7
Frequency (Hz)	60	R2	89	R10	72
CCT (K)	3967	R3	94	R11	79
Duv	0.0018	R4	81	R12	55
Chromaticity (x, y)	x=0.3832 y=0.3823	R5	80	R13	83
Chromaticity (u', v')	u'=0.2247 v'=0.5044	R6	84	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)	2674	2715	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	146.12	146.92	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 -I5	120.0	60	0.1574	18.40	0.9738	15.50
	277.0	60	0.0746	18.50	0.8955	20.86
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

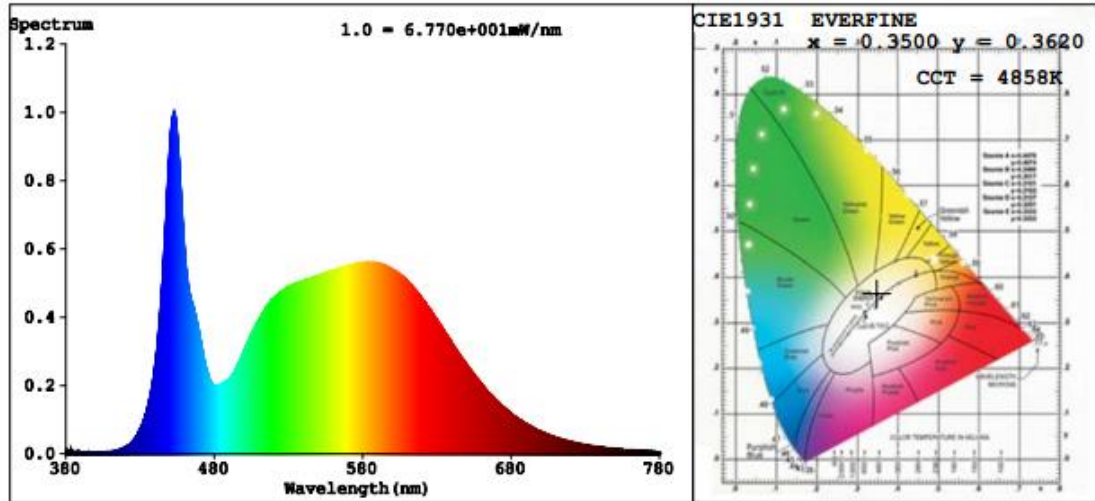
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	6
Frequency (Hz)	60	R2	88	R10	70
CCT (K)	4858	R3	93	R11	78
Duv	0.0032	R4	80	R12	51
Chromaticity (x, y)	x=0.3500 y=0.3620	R5	79	R13	82
Chromaticity (u', v')	u'=0.2107 v'=0.4904	R6	82	R14	96
Color Rendering Index (CRI)	82.1	R7	88	R15	75
R9	6	R8	66	--	--

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)	2707	2735	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	147.12	147.84	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

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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%			

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