

LM-79-08 Test Report

For

Revolution Lighting Technologies, Inc.
(Brand Name: Revolution Lighting Technologies)

2280 Ward Ave. Simi Valley CA. 93065

Internal Driver/Line Voltage Lamp-Style Retrofit Kits
(UL Type B)

Model name(s): 207511-21X

Remark: The X represents CCT as below: 1=3000K, 2=3500K, 3=4000K,
5=5000KRepresentative (Tested) Model: 207511-211
207511-215

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

Test & Report By:

Biao Zhong

Engineer: Biao Zhong

Date: Jun.08,2018

Review By:

Univ Xie

Manager: Univ Xie

Note: 1. The results contained in this report pertain only to the rested samples.

2. 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	Revolution Lighting Technologies, Inc.	
Brand Name	Revolution Lighting Technologies	
Model Number	207511-21X	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Internal Driver/Line Voltage Lamp-Style Retrofit Kits (UL Type B)	
Rated Voltage / Frequency	120 ~ 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	67-22S/KK6E-H302930Z6/2T(HN) 67-22S/KK6E-H503030Z6/2T(HN)	
Sample Number	JBE180519-A1, A2(3000K), A3(5000K)	
Lamp Length	600	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

Photo



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1.2 Test Specifications:

Date of Receipt	Mar.28,2018
Date of Test	Mar.30,2018
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

<p>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 °C ± 1 °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.</p>
<p>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 °C ± 1 °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.</p>
<p>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 °C ± 1 °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.</p>

2.1 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2018-05-30	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	207511-211		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180519-	120.0	60	0.1321	15.23	0.9609	23.24
A1	277.0	60	0.0597	15.52	0.9392	17.93
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

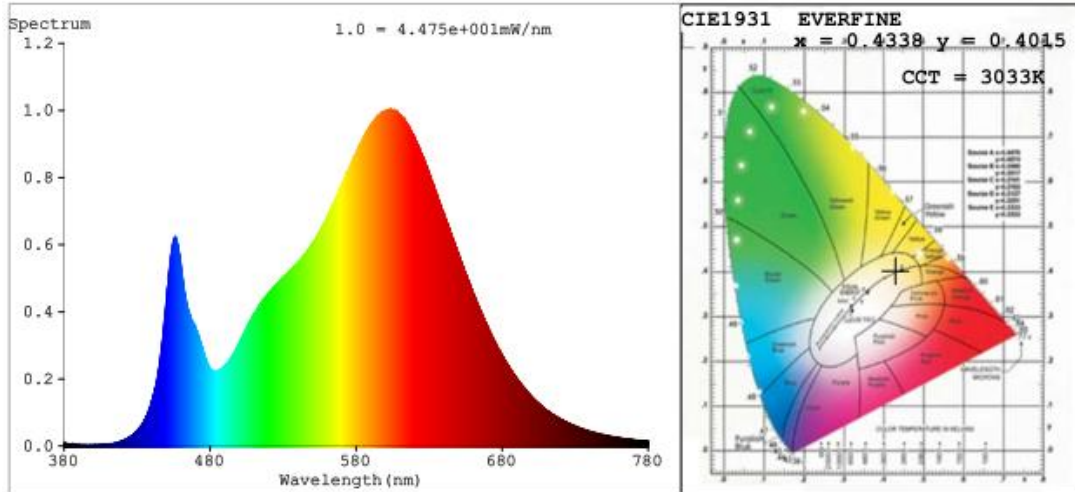
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	6
Frequency (Hz)	60	R2	93	R10	83
CCT (K)	3033	R3	94	R11	78
Duv	-0.0006	R4	79	R12	70
Chromaticity (x, y)	x=0.4338 y=0.4015	R5	81	R13	84
Chromaticity (u', v')	u'=0.2496 v'=0.5199	R6	91	R14	98
Color Rendering Index (CRI)	82.3	R7	81	R15	74
R9	6	R8	58	--	--

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

Parameter	Result		DLC V4.3 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	2063	2065	Bare Lamp: 1400(-10%)
Luminous Efficacy (lm/W)	135.46	133.05	Bare lamp: >= 110(-3%)
Most Worst Luminous/Highest Watts	132.93		

Spectral Power Distribution & Chromaticity Diagram



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2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2018-05-30	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	207511-211		

Electrical Measurement for 2-lamp in Lithonia 2GT8 lensed 2x2:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180519-	120.0	60	0.2632	30.21	0.9565	23.97
A1,A2	277.0	60	0.1178	30.78	0.9433	18.20
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

**Chromaticity Measurement for 2-lamp in Lithonia 2GT8 lensed 2x2 -
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	5
Frequency (Hz)	60	R2	93	R10	83
CCT (K)	3027	R3	94	R11	77
Duv	-0.0005	R4	78	R12	70
Chromaticity (x, y)	x=0.4343 y=0.4019	R5	81	R13	84
Chromaticity (u', v')	u'=0.2498 v'=0.5201	R6	91	R14	98
Color Rendering Index (CRI)	82.1	R7	81	R15	74
R9	5	R8	57	--	--

**Photometric Measurement 2-lamp in Lithonia 2GT8 lensed 2x2 –
 Goniophotometer Method:**

Parameter	Result		DLC V4.3 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	3316.1	3319.4	In luminaire (2 lamps): 2500(-10%)
Luminous Efficacy (lm/W)	109.77	107.84	In luminaire: >= 100(-3%)
Most Worst Luminous/Highest Watts	107.74		
Zonal lumens in the 0-60 ° zone (%)	84.1	--	>= 75(-3)
SC: 0-180 °(if applicable)	1.30	--	1.0-2.0(±0.1)
SC: 90-270 °(if applicable)	1.15	--	1.0-2.0(±0.1)
Beam Angle (°)	101.3	--	--
Center Beam Candle Power (cd)	1318	--	--

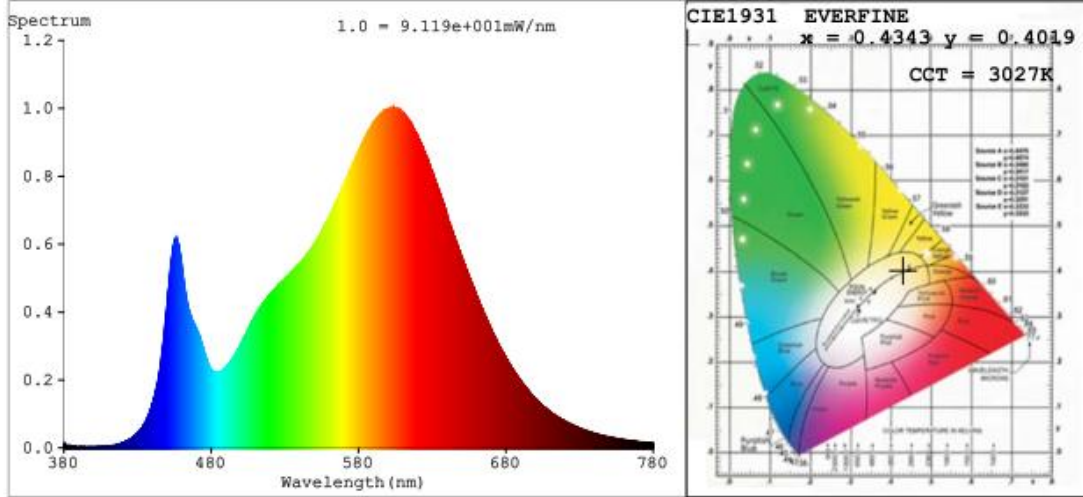
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Spectral Power Distribution & Chromaticity Diagram

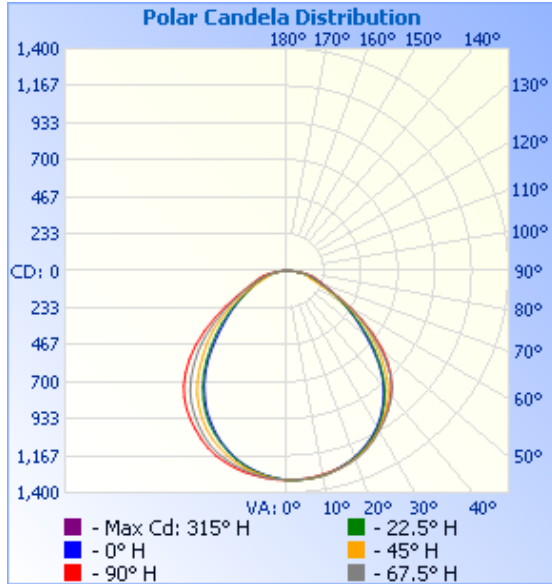


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,027.5	31%
0-40	1,674.9	50.5%
0-60	2,789.2	84.1%
60-90	510.4	15.4%
70-100	223.4	6.7%
90-120	7.9	0.2%
0-90	3,299.6	99.5%
90-180	17.1	0.5%
0-180	3,316.7	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	124.6	3.8%	90-100	2.0	0.1%
10-20	359.4	10.8%	100-110	2.7	0.1%
20-30	543.6	16.4%	110-120	3.2	0.1%
30-40	647.4	19.5%	120-130	3.1	0.1%
40-50	632.0	19.1%	130-140	2.4	0.1%
50-60	482.3	14.5%	140-150	1.7	0.1%
60-70	289.0	8.7%	150-160	1.1	0%
70-80	163.6	4.9%	160-170	0.7	0%
80-90	57.8	1.7%	170-180	0.2	0%

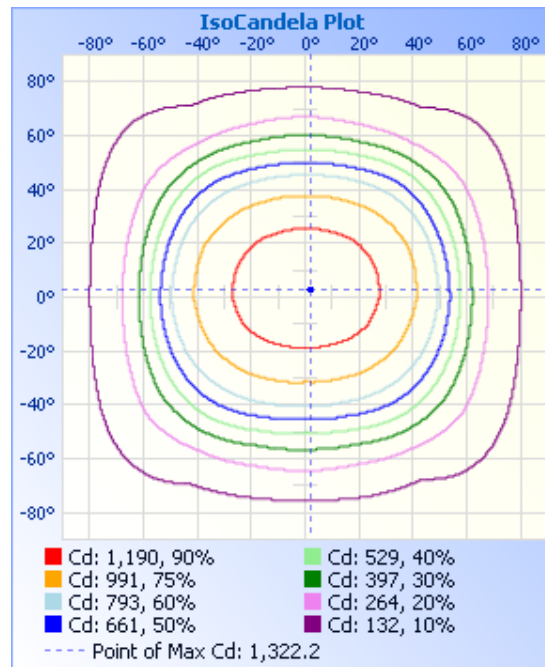
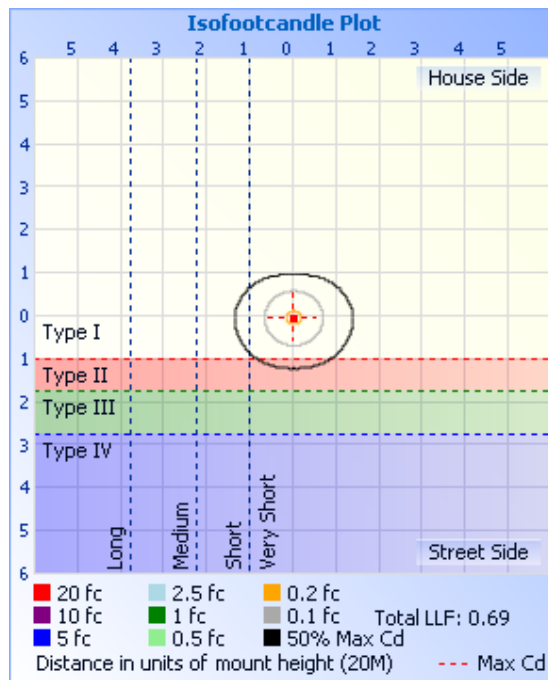
Photometric Data



Illuminance at a Distance

	Center Beam Fc	Beam Width	
3.33M	11.0 fc	7.29 M	9.08 M
6.67M	2.76 fc	14.57 M	18.15 M
10.00M	1.22 fc	21.86 M	27.23 M
13.33M	0.69 fc	29.15 M	36.30 M
16.67M	0.44 fc	36.44 M	45.37 M
20.00M	0.31 fc	43.73 M	54.45 M

■ Vert. Spread: 95.1°
 ■ Horiz. Spread: 107.4°



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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	1318	1318	1318	1318	1318	1318	1318	1318	1318	1318	1318	1318	1318	1318	1318	1318	
5	1315	1317	1321	1320	1319	1321	1319	1319	1316	1311	1306	1302	1301	1302	1307	1311	
10	1303	1309	1312	1311	1309	1311	1310	1309	1304	1294	1285	1275	1269	1274	1283	1296	
15	1285	1293	1293	1289	1285	1289	1291	1290	1285	1270	1251	1234	1228	1231	1249	1270	
20	1257	1267	1264	1254	1250	1253	1259	1265	1256	1235	1206	1179	1169	1177	1204	1236	
25	1213	1225	1220	1206	1200	1205	1216	1225	1215	1191	1151	1112	1098	1110	1146	1187	
30	1155	1165	1159	1146	1136	1145	1159	1165	1158	1127	1083	1036	1014	1028	1073	1120	
35	1091	1100	1088	1064	1053	1063	1085	1101	1096	1056	996	939	910	929	985	1044	
40	1012	1025	1000	961	948	959	996	1027	1024	968	891	822	791	811	875	949	
45	905	919	880	834	819	829	875	924	926	854	767	690	654	679	748	829	
50	769	766	739	688	666	686	738	779	796	726	646	565	523	553	626	698	
55	607	599	593	544	531	543	596	618	632	574	510	438	416	429	490	548	
60	445	444	429	402	413	403	433	456	462	431	376	327	327	318	357	408	
65	311	310	279	285	307	289	282	316	320	316	263	246	251	239	248	299	
70	230	224	178	203	225	210	180	228	239	234	177	183	187	180	167	221	
75	182	173	136	153	166	159	138	176	191	168	130	133	133	133	122	161	
80	129	124	113	110	119	111	116	128	137	114	99.2	86.6	90.8	86.1	93.8	107	
85	57.8	63.2	58.6	56.6	58.1	57.9	62.8	66.9	60.9	53.5	43.5	39.5	38.9	39.8	41.2	49.9	
90	1.53	1.64	1.87	2.09	2.27	2.44	2.27	1.70	1.31	1.16	1.16	1.21	1.05	1.10	1.21	1.10	
95	1.21	1.31	1.58	2.55	3.51	4.59	2.72	1.26	1.37	1.37	1.47	1.42	1.05	1.42	1.53	1.27	
100	1.99	1.94	2.89	3.25	2.68	3.57	3.58	1.84	2.10	1.89	2.00	1.47	1.26	1.52	2.00	2.36	
105	2.10	2.26	3.15	2.94	2.47	3.52	2.90	2.31	2.47	2.42	2.53	1.63	1.37	1.89	3.11	2.58	
110	3.31	3.62	3.84	3.30	2.47	2.94	3.53	2.74	2.95	3.00	3.47	1.63	1.47	1.73	3.05	3.84	
115	4.57	4.46	3.42	3.30	2.41	2.63	4.90	4.15	4.11	4.41	3.31	1.52	1.63	1.63	3.64	3.68	
120	3.94	3.83	4.89	2.78	2.26	2.57	3.74	5.47	5.00	4.52	2.53	1.94	1.78	2.21	3.94	3.79	
125	4.31	4.94	5.05	3.36	2.84	2.84	3.58	4.21	4.36	3.36	2.47	2.25	2.36	2.47	3.26	4.52	
130	5.15	5.20	3.79	3.36	3.15	2.84	2.75	3.42	3.31	3.20	2.10	2.25	2.42	2.57	2.90	4.26	
135	4.64	4.21	3.11	3.36	3.20	2.89	2.63	3.26	3.31	2.99	2.37	2.20	2.47	2.52	2.69	3.15	
140	3.63	3.52	2.63	3.25	3.36	2.89	2.68	2.53	2.73	2.58	1.89	2.20	2.36	2.46	2.53	3.20	
145	3.63	3.47	2.37	2.47	3.20	2.47	2.53	2.63	2.73	2.78	1.84	2.20	2.42	2.36	2.47	2.89	
150	3.68	3.26	2.26	2.20	3.31	2.57	2.32	2.63	2.73	2.57	1.84	2.05	2.57	2.57	2.26	2.52	
155	3.10	2.89	2.16	2.25	3.20	2.78	2.05	2.58	2.63	2.63	1.89	1.99	2.52	2.68	2.05	2.20	
160	2.89	2.73	1.74	2.46	3.25	2.78	1.58	2.52	2.63	2.63	1.95	1.89	2.47	2.68	2.27	1.79	
165	2.52	1.94	1.63	2.57	3.04	2.78	2.11	1.89	2.68	2.63	2.06	1.94	2.36	2.63	2.48	2.05	
170	2.47	2.30	2.31	2.67	2.89	2.89	2.42	2.10	2.63	2.63	2.26	1.94	2.62	3.20	2.79	2.10	
175	2.47	2.26	2.00	2.67	3.15	3.05	2.11	2.16	2.52	2.42	1.95	1.94	2.57	3.05	2.79	1.95	
180	2.47	2.05	1.89	2.57	2.84	2.89	2.05	2.00	2.52	2.47	2.05	1.89	2.57	3.05	2.95	2.00	

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2.3 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2018-05-30	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	207511-215		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180519-	120.0	60	0.1327	15.29	0.9601	23.56
A3	277.0	60	0.0599	15.58	0.9387	18.11
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

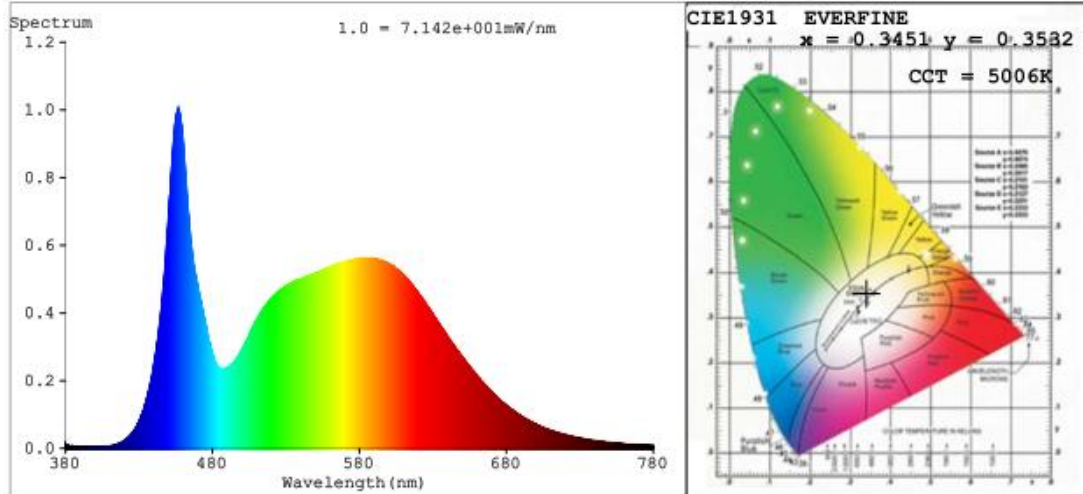
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	13
Frequency (Hz)	60	R2	91	R10	78
CCT (K)	5006	R3	94	R11	79
Duv	0.0008	R4	81	R12	60
Chromaticity (x, y)	x=0.3451 y=0.3532	R5	83	R13	86
Chromaticity (u', v')	u'=0.2108 v'=0.4854	R6	86	R14	97
Color Rendering Index (CRI)	83.9	R7	86	R15	79
R9	13	R8	67	--	--

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

Parameter	Result		DLC V4.3Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	2217	2221	Bare Lamp: 1400(-10%)
Luminous Efficacy (lm/W)	145.00	142.55	Bare lamp: >= 110(-3%)
Most Worst Luminous/Highest Watts	142.30		

Spectral Power Distribution & Chromaticity Diagram



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2.3 Performance Assessment:

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
207511-211	3000K	2063	15.23	135.46
207511-212	3500K	2102 ^{*1}	15.26 ^{*2}	137.75 ^{*3}
207511-213	4000K	2140 ^{*1}	15.26 ^{*2}	140.24 ^{*3}
207511-215	5000K	2217	15.29	145.00

*1: This value is calculated and the calculation formula is as below:

$$2102 = (2217 - 2063) / 4 * 1 + 2063$$

$$2140 = (2217 - 2063) / 4 * 2 + 2063$$

*2: This value is calculated and the calculation formula is as below:

$$15.26 = (15.23 + 15.29) / 2$$

*3: This value is calculated and the calculation formula is as below:

$$137.75 = 2102 / 15.26$$

$$140.24 = 2140 / 15.26$$

3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-331	2 meter Integrating Sphere	2017-07-01	2018-06-30
ST-R-327	Spectral analysis system HAAS-2000	2017-07-01	2018-06-30
D204	Standard Lamp	2017-07-12	2018-07-11
PF2010	Power Meter for Integrating Sphere	2017-07-01	2018-06-30
GO-R5000	Goniophotometer system	2017-07-01	2018-06-30
D908S	Standard Lamp	2017-07-12	2018-07-11
PF210	Power Meter for Goniophotometer	2017-07-07	2018-07-06
Expand Uncertainty: Photometric Measurement (Sphere):2.04%, k=2 Chromaticity Measurement(Sphere):28.8K, k=2 Photometric Measurement(Goniophotometer):2.36%, k=2			

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