

**LM-79-08 Test Report**

For

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

2280 Ward Ave. Simi Valley CA. 93065

**3-lamp External Driver Lamp-Style Retrofit Kits**  
**(UL Type C)**

Model name(s): 205422-21X

Remark: The "X" stands for different CCT as bellow: 1=3000K,  
2=3500K, 3=4000K, 5=5000K.Representative (Tested) Model: 205422-211  
205422-215

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

Test &amp; Report By:

*Vicky Sun*

Engineer: Vicky Sun

Date: Jul.09,2018

Review By:

*John Li*

Manager: John Li

- 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

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

**1.1 Product Information:**

Organization Name	Revolution Lighting Technologies, Inc.	
Brand Name	Revolution Lighting Technologies	
Model Number	205422-21X	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	3-lamp External Driver Lamp-Style Retrofit Kits (UL Type C)	
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	67-21S/KK5C-H3030N4P02430Z6/2T(HN), 67-21S/KK5C-H5050N42PA2430Z6/2T(HN)	
Test Ballast	N/A	
Sample Number	JBE180607- I1, I2, I3 (3000K), I4(5000K)	
Lamp Length	1200	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

**Photo**



**1.2 Test Specifications:**

Date of Receipt	Jun.21, 2018
Date of Test	Jun.22, 2018
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**

<p><b>1) Photometric and Light Distribution Measurement – Goniophotometer Method:</b>                  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><b>2) Chromaticity Measurement – Sphere-Spectroradiometer Method:</b>                  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><b>3) Electrical Measurements:</b>                  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)*

<b>Test date</b>	2018-06-22	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	205422-211		

**Electrical Measurement for Bare-lamp:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180607-	120.0	60	0.1280	15.29	0.9956	3.68
I1	277.0	60	0.0584	15.31	0.9457	6.91
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

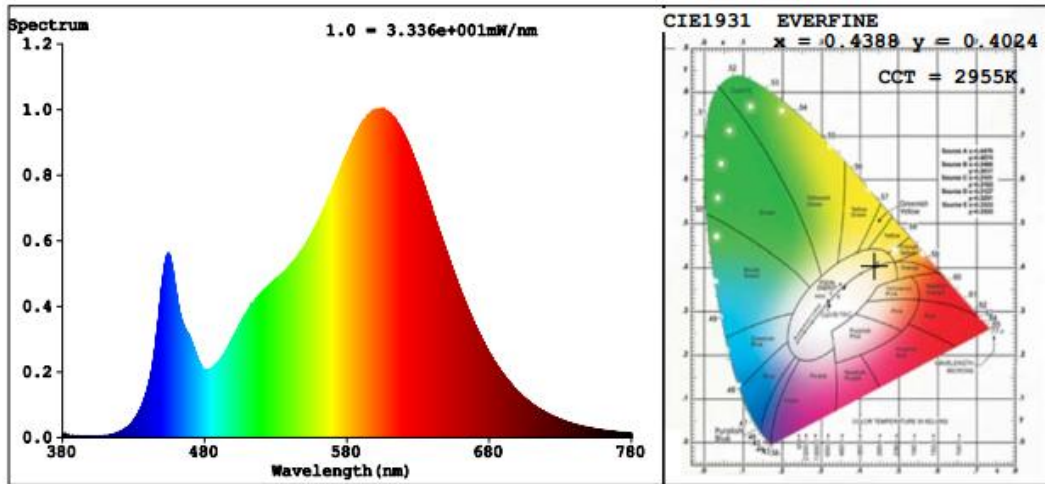
**Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	5
Frequency (Hz)	60	R2	92	R10	83
CCT (K)	2955	R3	94	R11	78
Duv	-0.0009	R4	79	R12	72
Chromaticity (x, y)	x=0.4388 y=0.4024	R5	81	R13	84
Chromaticity (u', v')	u'=0.2525 v'=0.5210	R6	91	R14	98
Color Rendering Index (CRI)	82.1	R7	81	R15	73
R9	5	R8	57	--	--

**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)	2109	2089	Bare Lamp: 1600(-10%)
Luminous Efficacy (lm/W)	137.93	136.45	Bare lamp: >= 110(-3%)
Most Worst Luminous/Highest Watts	136.45		

**Spectral Power Distribution & Chromaticity Diagram**



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**2.2 Electrical, Photometric and Chromaticity Measurements**

(Refer to Work Instruction QD25)

<b>Test date</b>	2018-06-22	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	205422-211		

**Electrical Measurement for 3-lamp in Lithonia 2GT8 lensed 2x4:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180607-	120.0	60	0.3809	45.50	0.9954	3.71
I1, I2, I3	277.0	60	0.1740	45.57	0.9455	6.93
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

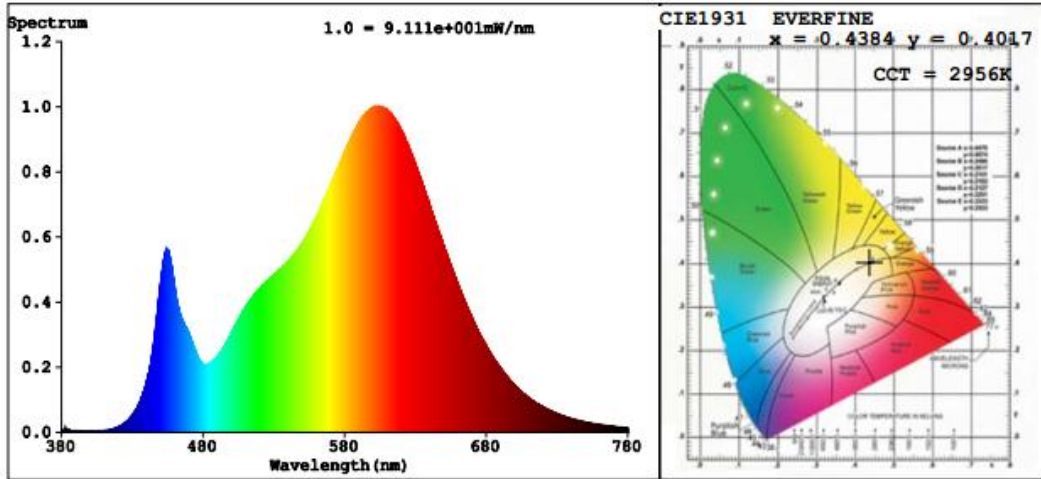
**Chromaticity Measurement for 3-lamp in Lithonia 2GT8 lensed 2x4-  
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	6
Frequency (Hz)	60	R2	93	R10	83
CCT (K)	2956	R3	94	R11	79
Duv	-0.0011	R4	79	R12	73
Chromaticity (x, y)	x=0.4384 y=0.4017	R5	82	R13	85
Chromaticity (u', v')	u'=0.2525 v'=0.5207	R6	91	R14	98
Color Rendering Index (CRI)	82.5	R7	81	R15	74
R9	6	R8	58	--	--

**Photometric Measurement 3-lamp in Lithonia 2GT8 lensed 2x4 –  
 Goniophotometer Method:**

Parameter	Result		DLC V4.3 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	5219.3	5170.8	In luminaire (3 lamps): 4500(-10%)
Luminous Efficacy (lm/W)	114.71	113.47	In luminaire: >= 100(-3%)
Most Worst Luminous/Highest Watts	113.47		
Zonal lumens in the 0-60 ° zone (%)	85.1	--	>= 75(-3)
SC: 0-180 °(if applicable)	1.27	--	1.0-2.0(±0.1)
SC: 90-270 °(if applicable)	1.18	--	1.0-2.0(±0.1)
Beam Angle ( °)	96.4	--	--
Center Beam Candle Power (cd)	2222	--	--

**Spectral Power Distribution & Chromaticity Diagram**



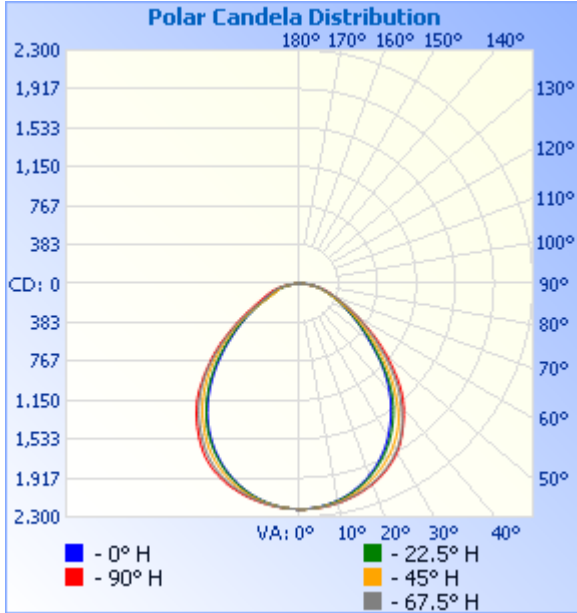
**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,709.9	32.8%
0-40	2,752.1	52.7%
0-60	4,439.4	85.1%
60-90	769.3	14.7%
70-100	337.5	6.5%
90-120	5.3	0.1%
0-90	5,208.7	99.8%
90-180	10.0	0.2%
0-180	5,218.7	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	210.1	4.0%	90-100	2.7	0.1%
10-20	599.9	11.5%	100-110	1.3	0%
20-30	899.9	17.2%	110-120	1.3	0%
30-40	1,042.2	20.0%	120-130	1.3	0%
40-50	969.3	18.6%	130-140	1.1	0%
50-60	717.9	13.8%	140-150	0.9	0%
60-70	434.5	8.3%	150-160	0.7	0%
70-80	251.6	4.8%	160-170	0.5	0%
80-90	83.2	1.6%	170-180	0.2	0%



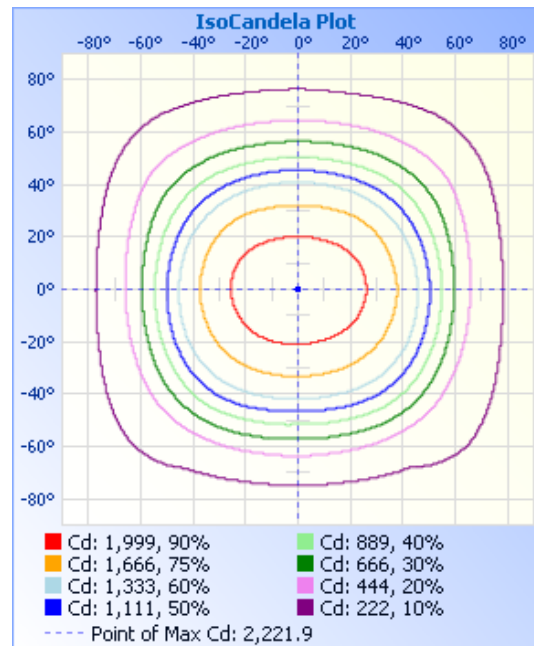
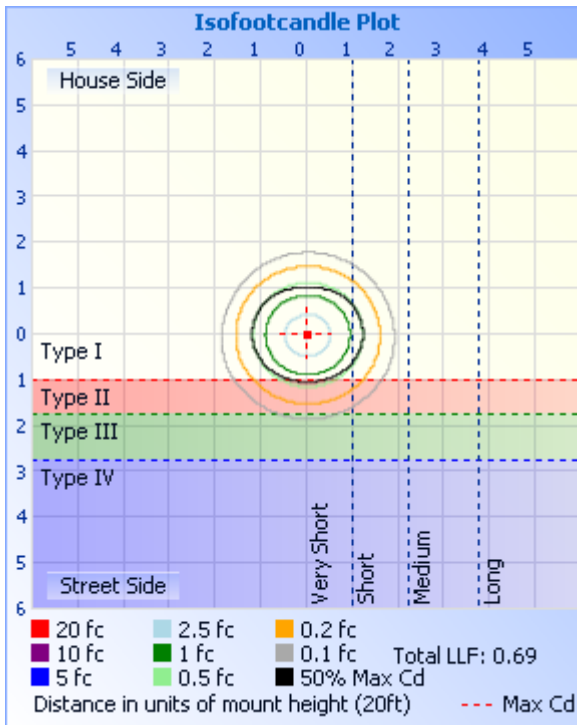
**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	<b>7.69 fc</b>	<b>35.3 ft</b>	<b>41.0 ft</b>
34.0ft	<b>1.92 fc</b>	<b>70.6 ft</b>	<b>82.0 ft</b>
51.0ft	<b>0.85 fc</b>	<b>105.9 ft</b>	<b>123.0 ft</b>
68.0ft	<b>0.48 fc</b>	<b>141.1 ft</b>	<b>164.0 ft</b>
85.0ft	<b>0.31 fc</b>	<b>176.4 ft</b>	<b>205.0 ft</b>
102.0ft	<b>0.21 fc</b>	<b>211.7 ft</b>	<b>246.0 ft</b>

■ Vert. Spread: 92.1°  
 ■ Horiz. Spread: 100.7°



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Table--1

UNIT: cd

C (DEG) \ γ (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5
0	2222	2222	2222	2222	2222	2222	2222	2222	2222	2222	2222	2222	2222	2222	2222	2222
5	2211	2213	2211	2209	2209	2210	2214	2215	2215	2213	2212	2210	2208	2208	2209	2210
10	2188	2188	2180	2172	2169	2174	2184	2192	2194	2187	2180	2172	2167	2169	2176	2183
15	2150	2146	2127	2107	2103	2111	2132	2151	2156	2145	2129	2110	2099	2104	2121	2140
20	2096	2086	2053	2018	2009	2023	2059	2092	2101	2082	2057	2025	2008	2015	2045	2077
25	2018	2004	1957	1906	1891	1911	1964	2011	2024	1998	1962	1916	1891	1903	1946	1991
30	1906	1892	1837	1769	1744	1774	1844	1904	1919	1882	1838	1781	1751	1767	1817	1868
35	1753	1731	1679	1601	1569	1607	1694	1753	1767	1729	1684	1618	1584	1603	1658	1714
40	1581	1533	1467	1402	1374	1413	1486	1557	1595	1557	1506	1425	1384	1408	1481	1543
45	1357	1303	1224	1161	1156	1175	1248	1334	1382	1357	1301	1211	1164	1193	1273	1336
50	1118	1059	992	935	920	944	1011	1087	1136	1120	1068	982	938	963	1036	1093
55	866	832	780	738	728	743	796	861	894	868	828	766	726	745	800	840
60	637	640	596	573	568	576	608	666	665	639	600	563	545	545	569	600
65	458	478	442	437	441	441	451	502	484	434	391	384	395	373	367	405
70	350	342	321	323	336	329	330	363	358	316	268	275	291	272	258	310
75	271	244	237	238	252	245	241	251	267	246	215	212	217	211	212	250
80	183	167	159	160	173	167	160	164	177	169	156	150	151	146	159	178
85	73.2	80.1	72.2	80.6	86.4	85.2	73.6	84.7	80.2	81.1	70.8	69.8	73.8	71.0	67.9	76.0
90	1.68	1.80	1.92	2.06	2.02	2.27	1.81	1.92	1.11	0.99	12.6	3.26	4.62	14.5	9.59	1.58
95	0.99	1.05	1.18	1.47	1.52	1.35	1.23	1.05	0.80	0.74	7.41	1.26	3.38	9.03	2.63	0.92
100	0.96	1.07	1.24	1.41	1.37	1.31	1.09	1.02	1.05	0.87	2.22	1.16	2.15	3.58	1.29	1.17
105	1.05	1.09	1.24	1.35	1.33	1.19	1.06	1.03	1.13	0.99	1.61	1.06	1.44	1.28	1.30	1.28
110	0.99	1.17	1.24	1.29	1.29	1.08	1.23	1.10	1.31	1.30	1.61	0.97	1.16	1.22	1.32	1.38
115	1.42	1.86	1.60	1.24	1.25	0.96	1.59	1.48	1.48	1.48	1.83	0.86	1.08	1.01	1.33	1.37
120	1.73	1.91	1.56	0.98	1.16	1.04	1.78	1.75	1.66	1.59	1.73	0.85	1.06	0.85	1.27	1.37
125	1.86	1.98	1.79	0.98	1.17	0.99	1.72	1.85	1.73	1.66	1.43	0.93	1.04	0.98	1.20	1.36
130	1.99	1.98	1.67	0.98	1.19	1.09	1.55	1.96	1.79	1.71	1.35	1.10	1.16	1.10	1.21	1.36
135	2.02	1.95	1.50	0.98	1.20	1.07	1.41	1.96	1.89	1.72	1.28	1.24	1.28	1.27	1.22	1.36
140	1.99	1.83	1.24	0.98	1.21	1.06	1.21	1.92	1.96	1.72	1.32	1.35	1.53	1.46	1.25	1.36
145	1.93	1.55	1.07	1.14	1.22	1.04	1.11	1.79	1.87	1.72	1.35	1.65	1.69	1.59	1.29	1.36
150	1.88	1.55	1.11	1.22	1.46	1.17	1.13	1.74	1.79	1.73	1.37	1.64	1.86	1.82	1.53	1.36
155	1.67	1.48	1.15	1.29	1.59	1.28	1.15	1.59	1.83	1.73	1.39	1.71	1.96	2.07	1.78	1.42
160	1.67	1.42	1.22	1.46	1.89	1.55	1.10	1.51	1.83	1.76	1.41	1.77	1.99	2.17	2.02	1.52
165	1.63	1.35	1.31	1.59	1.91	1.71	1.41	1.53	1.94	1.79	1.50	1.82	2.02	2.22	2.02	1.67
170	1.79	1.35	1.45	1.90	2.05	1.89	1.63	1.63	1.92	1.87	1.62	1.79	2.04	2.11	1.98	1.69
175	1.89	1.36	1.79	2.09	2.07	1.89	1.78	1.85	1.92	1.95	1.54	1.71	2.07	2.09	1.97	1.72
180	1.92	1.36	1.85	2.20	2.07	2.01	1.72	1.66	1.92	1.91	1.36	1.84	2.01	2.07	1.96	1.85

**2.3 Electrical, Photometric and Chromaticity Measurements**

(Refer to Work Instruction QD25)

<b>Test date</b>	2018-05-28	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	205422-215		

**Electrical Measurement for Bare-lamp:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180607-	120.0	60	0.1275	15.24	0.9957	3.65
I4	277.0	60	0.0582	15.26	0.9458	6.88
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

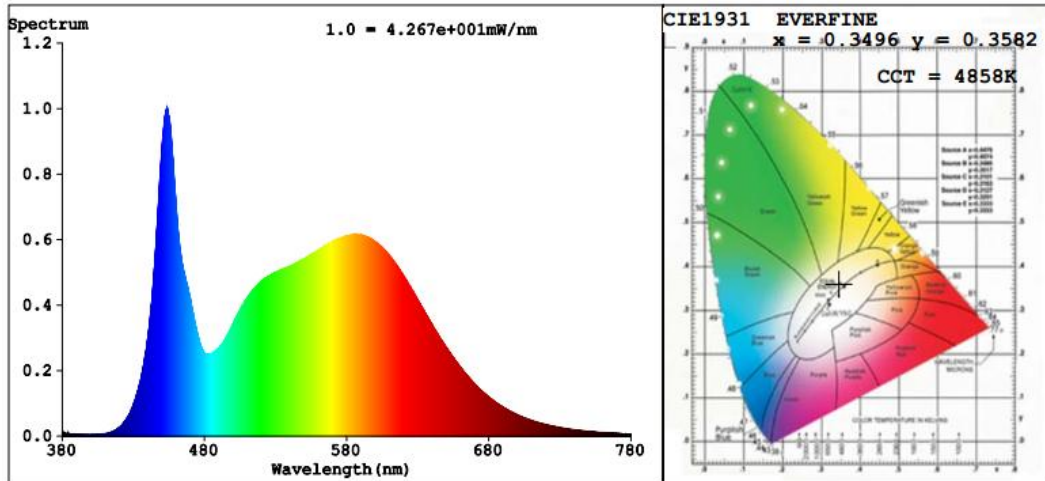
**Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	5
Frequency (Hz)	60	R2	90	R10	75
CCT (K)	4858	R3	95	R11	79
Duv	0.0015	R4	80	R12	56
Chromaticity (x, y)	x=0.3496 y=0.3582	R5	81	R13	84
Chromaticity (u', v')	u'=0.2119 v'=0.4885	R6	85	R14	98
Color Rendering Index (CRI)	82.7	R7	86	R15	75
R9	5	R8	65	--	--

**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)	2196	2175	Bare Lamp: 1600(-10%)
Luminous Efficacy (lm/W)	144.09	142.53	Bare lamp: >= 110(-3%)
Most Worst Luminous/Highest Watts	142.53		

**Spectral Power Distribution & Chromaticity Diagram**



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**2.4 Performance Assessment:**

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
205422-211	3000K	2109	15.29	137.93
205422-212	3500K	2131 <sup>*1</sup>	15.27 <sup>*2</sup>	139.58 <sup>*3</sup>
205422-213	4000K	2153 <sup>*1</sup>	15.27 <sup>*2</sup>	141.01 <sup>*3</sup>
205422-215	5000K	2196	15.24	144.09

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

$$2131=(2196-2109)/4*1+2109$$

$$2153=(2196-2109)/4*2+2109$$

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

$$15.27=(15.29+15.24)/2$$

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

$$139.58=2131/15.27$$

$$141.01=2153/15.27$$

**3. Test Equipment**

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-331	2 meter Integrating Sphere	2018-07-01	2019-06-30
ST-R-327	Spectral analysis system HAAS-2000	2018-07-01	2019-06-30
D204	Standard Lamp	2017-07-12	2018-07-11
PF2010	Power Meter for Integrating Sphere	2018-07-01	2019-06-30
GO-R5000	Goniophotometer system	2018-07-01	2019-06-30
D908S	Standard Lamp	2017-07-12	2018-07-11
PF210	Power Meter for Goniophotometer	2018-07-07	2019-07-06

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