

## **LM-79-08 Test Report**

For

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

2280 Ward Ave. Simi Valley CA. 93065

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

Model name(s): 204421-21X

Remark: Remark: The "X" stands for different CCT as bellow: 1=3000K, 2=3500K,  
3=4000K, 5=5000K.

Representative (Tested) Model: 204421-211  
204421-215

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

Test & 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

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**1.1 Product Information:**

Organization Name	Revolution Lighting Technologies, Inc.	
Brand Name	Revolution Lighting Technologies	
Model Number	204421-21X	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	2-lamp External Driver Lamp-Style Retrofit Kits (UL Type C)	
Rated Voltage / Frequency	120-277 Vac, 50/60 Hz	
Nominal Power	12W	
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-E1,E2(3000K),E3(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>	204421-211		

**Electrical Measurement for Bare-lamp:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180607-E1	120.0	60	0.1028	12.23	0.9912	5.01
	277.0	60	0.0502	12.65	0.9099	8.07
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

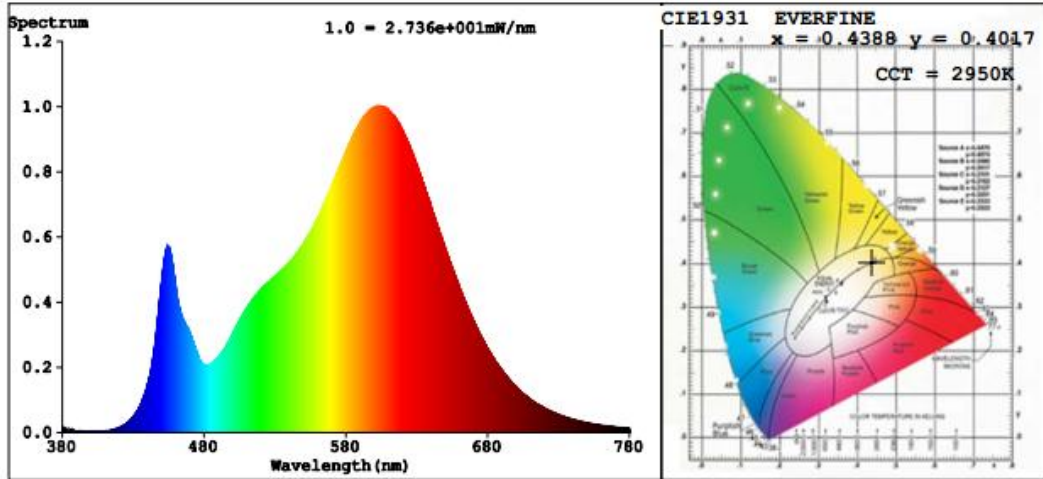
**Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	5
Frequency (Hz)	60	R2	93	R10	83
CCT (K)	2950	R3	94	R11	79
Duv	-0.0012	R4	79	R12	72
Chromaticity (x, y)	x=0.4388 y=0.4017	R5	82	R13	84
Chromaticity (u', v')	u'=0.2528 v'=0.5207	R6	91	R14	98
Color Rendering Index (CRI)	82.2	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)	1656	1696	Bare Lamp: 1600(-10%)
Luminous Efficacy (lm/W)	135.40	134.07	Bare lamp: >= 110(-3%)
Most Worst Luminous/Highest Watts	130.91		

**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>	204421-211		

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

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180607-	120.0	60	0.2049	24.34	0.9900	5.04
E1, E2	277.0	60	0.1002	25.18	0.9073	8.12
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

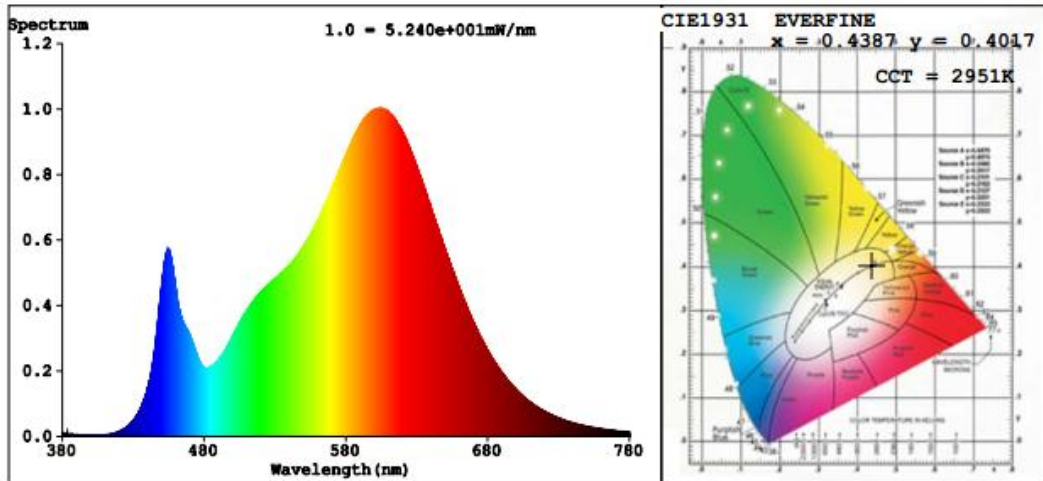
**Chromaticity Measurement for 2-lamp in Lithonia 2GT8 lensed 2x4-  
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	6
Frequency (Hz)	60	R2	93	R10	84
CCT (K)	2951	R3	94	R11	79
Duv	-0.0012	R4	79	R12	72
Chromaticity (x, y)	x=0.4387 y=0.4017	R5	82	R13	85
Chromaticity (u', v')	u'=0.2527 v'=0.5207	R6	91	R14	98
Color Rendering Index (CRI)	82.4	R7	81	R15	74
R9	6	R8	57	--	--

**Photometric Measurement 2-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)	2737.3	2803.3	In luminaire (2 lamps): 3000(-10%)
Luminous Efficacy (lm/W)	112.46	111.33	In luminaire: >= 100(-3%)
Most Worst Luminous/Highest Watts	108.7		
Zonal lumens in the 0-60 ° zone (%)	85	--	>= 75(-3)
SC: 0-180 °(if applicable)	1.26	--	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)	1165	--	--

**Spectral Power Distribution & Chromaticity Diagram**

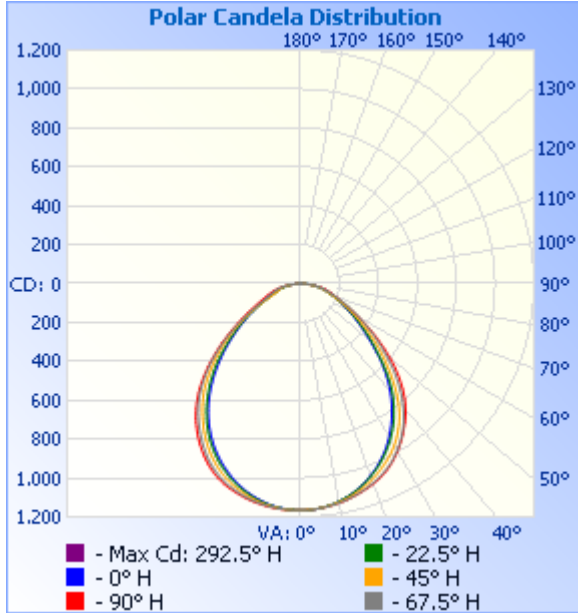


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	895.8	32.7%
0-40	1,441.7	52.7%
0-60	2,327.2	85%
60-90	405.4	14.8%
70-100	178.5	6.5%
90-120	2.0	0.1%
0-90	2,732.6	99.8%
90-180	4.4	0.2%
0-180	2,736.9	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	110.1	4.0%	90-100	0.7	0%
10-20	314.4	11.5%	100-110	0.6	0%
20-30	471.3	17.2%	110-120	0.7	0%
30-40	545.9	19.9%	120-130	0.7	0%
40-50	509.0	18.6%	130-140	0.5	0%
50-60	376.5	13.8%	140-150	0.5	0%
60-70	227.6	8.3%	150-160	0.4	0%
70-80	133.0	4.9%	160-170	0.2	0%
80-90	44.8	1.6%	170-180	0.1	0%

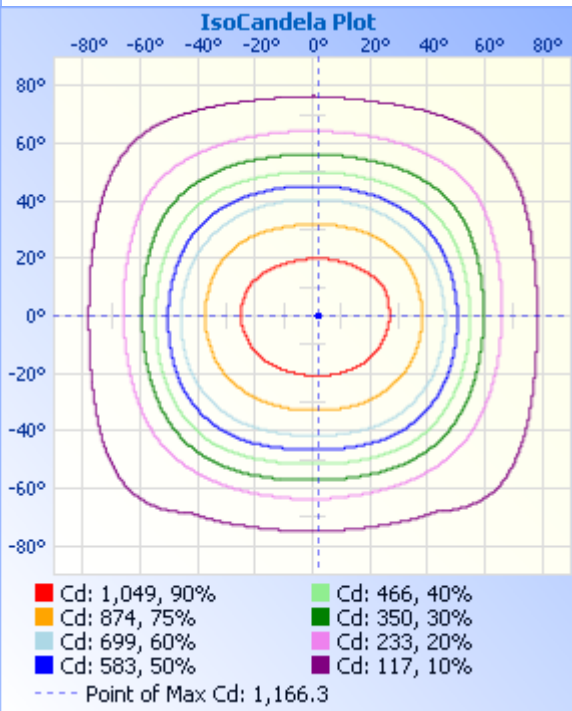
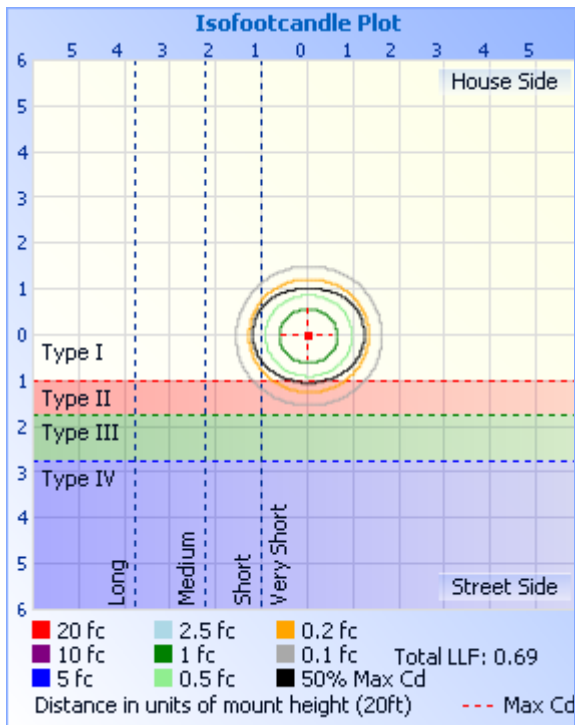
**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	4.03 fc	35.1 ft	41.2 ft
34.0ft	1.01 fc	70.2 ft	82.4 ft
51.0ft	0.45 fc	105.3 ft	123.6 ft
68.0ft	0.25 fc	140.4 ft	164.8 ft
85.0ft	0.16 fc	175.5 ft	205.9 ft
102.0ft	0.11 fc	210.6 ft	247.1 ft

■ Vert. Spread: 91.8°  
 ■ Horiz. Spread: 100.9°



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Table--1 UNIT: cd

C (DEG) \ y (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	1165	1165	1165	1165	1165	1165	1165	1165	1165	1165	1165	1165	1165	1165	1165	1165
5	1163	1165	1161	1160	1159	1158	1158	1159	1159	1157	1157	1157	1158	1159	1161	1162
10	1153	1155	1145	1141	1137	1137	1140	1144	1145	1140	1138	1136	1136	1140	1145	1150
15	1135	1136	1117	1107	1101	1102	1112	1121	1123	1115	1108	1101	1100	1107	1118	1129
20	1108	1107	1077	1060	1050	1054	1072	1090	1094	1083	1069	1055	1051	1061	1080	1098
25	1067	1065	1027	1001	987	995	1022	1049	1055	1039	1018	996	989	1002	1027	1052
30	1005	1003	963	928	909	923	961	992	996	977	952	925	915	930	958	988
35	928	921	878	838	817	836	882	916	923	903	871	839	828	844	875	907
40	836	814	767	732	714	734	778	820	839	821	782	740	723	742	783	819
45	722	691	637	603	600	609	652	704	733	720	677	631	608	629	672	708
50	587	562	515	484	476	490	532	577	604	597	558	511	491	507	547	578
55	452	442	407	381	377	387	418	456	468	462	438	400	380	393	422	441
60	332	338	311	296	294	300	319	350	344	331	313	297	286	287	298	314
65	241	251	231	227	228	230	236	261	250	226	204	203	208	197	195	216
70	184	181	168	168	174	171	173	190	189	168	140	145	153	143	136	164
75	142	129	123	125	131	127	127	136	145	134	114	112	114	111	112	132
80	96.6	87.9	82.7	83.5	90.1	87.0	87.5	92.5	101	97.3	86.1	79.5	80.1	77.4	84.0	94.9
85	38.1	41.5	38.6	42.9	45.4	46.3	41.1	45.6	40.8	43.2	40.0	39.7	40.2	38.3	38.3	40.0
90	0.76	0.82	0.99	1.30	1.39	1.48	1.06	1.05	0.40	0.29	0.58	2.17	0.63	0.57	0.91	0.44
95	0.35	0.40	0.58	0.92	0.86	0.92	0.46	0.49	0.37	0.34	0.60	0.99	0.51	0.51	0.66	0.36
100	0.39	0.42	0.58	0.76	0.82	0.79	0.44	0.38	0.40	0.41	0.63	0.84	0.50	0.51	0.52	0.35
105	0.42	0.51	0.58	0.79	0.81	0.80	0.42	0.45	0.52	0.52	0.80	0.69	0.49	0.49	0.51	0.62
110	0.47	0.75	0.81	0.83	0.81	0.88	0.40	0.53	0.71	0.64	0.92	0.57	0.48	0.47	0.50	0.71
115	0.58	0.94	0.92	0.75	0.80	0.91	0.77	0.67	0.87	0.70	0.99	0.47	0.47	0.45	0.48	0.69
120	0.77	1.05	0.90	0.68	0.80	0.73	0.88	0.80	0.89	0.74	0.92	0.48	0.46	0.43	0.47	0.64
125	0.84	1.07	0.89	0.67	0.67	0.71	0.92	0.90	0.92	0.79	0.85	0.50	0.49	0.41	0.47	0.64
130	0.39	1.05	0.87	0.65	0.68	0.69	0.75	0.97	0.92	0.77	0.86	0.51	0.55	0.47	0.48	0.64
135	0.69	1.02	0.77	0.64	0.68	0.67	0.67	0.93	0.98	0.78	0.65	0.55	0.57	0.51	0.50	0.64
140	0.82	0.99	0.66	0.70	0.68	0.65	0.52	0.89	0.94	0.79	0.62	0.65	0.62	0.55	0.51	0.64
145	0.86	0.87	0.58	0.78	0.69	0.64	0.53	0.87	0.90	0.80	0.69	0.78	0.75	0.80	0.63	0.64
150	0.92	0.73	0.60	0.86	0.74	0.69	0.47	0.87	0.87	0.81	0.66	0.87	0.94	0.89	0.69	0.64
155	0.80	0.69	0.61	0.92	0.91	0.76	0.43	0.69	0.84	0.78	0.72	0.92	0.99	0.94	0.81	0.64
160	0.73	0.68	0.62	0.92	0.90	0.81	0.50	0.68	0.87	0.87	0.77	0.95	1.02	1.03	0.84	0.64
165	0.74	0.67	0.66	0.92	0.89	0.84	0.56	0.66	0.92	0.86	0.83	0.98	1.02	0.93	0.86	0.75
170	0.75	0.65	0.73	0.92	0.87	0.91	0.63	0.65	0.90	0.81	0.91	0.98	1.03	0.88	0.89	0.75
175	0.75	0.64	0.92	0.92	0.86	0.96	0.34	0.64	0.88	0.75	0.80	0.92	0.91	0.87	0.91	0.57
180	0.75	0.64	0.86	0.92	0.86	0.97	0.40	0.75	0.75	0.75	0.63	0.92	0.91	0.86	0.98	0.40

**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>	204421-215		

**Electrical Measurement for Bare-lamp:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180607-E3	120.0	60	0.1029	12.25	0.9921	5.00
	277.0	60	0.0503	12.67	0.9102	8.02
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

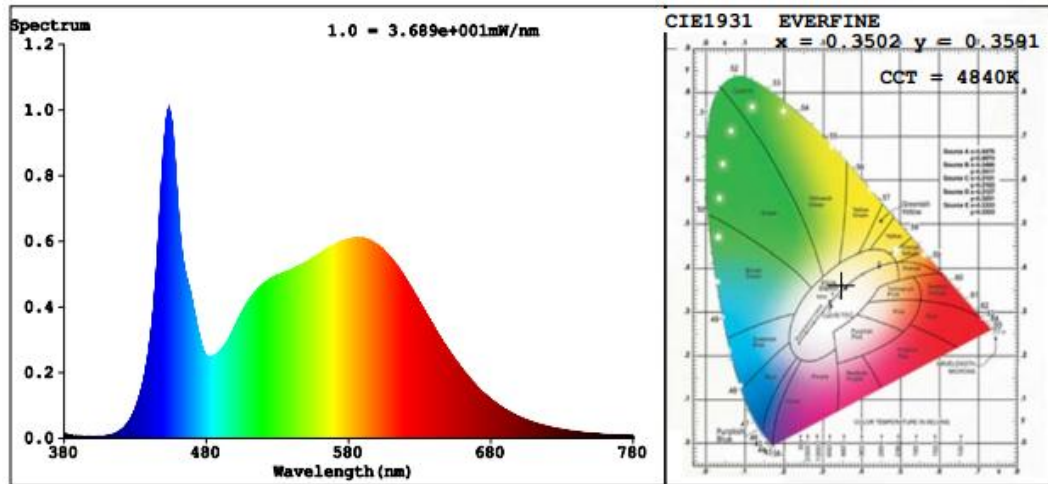
**Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	4
Frequency (Hz)	60	R2	90	R10	76
CCT (K)	4840	R3	95	R11	78
Duv	0.0017	R4	80	R12	55
Chromaticity (x, y)	x=0.3502 y=0.3591	R5	81	R13	84
Chromaticity (u', v')	u'=0.2119 v'=0.4891	R6	85	R14	98
Color Rendering Index (CRI)	82.7	R7	86	R15	75
R9	4	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)	1763	1805	Bare Lamp: 1600(-10%)
Luminous Efficacy (lm/W)	143.92	142.46	Bare lamp: >= 110(-3%)
Most Worst Luminous/Highest Watts	139.15		

**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)
204421-211	3000K	1656	12.23	135.40
204421-212	3500K	1683 <sup>*1</sup>	12.24 <sup>*2</sup>	137.48 <sup>*3</sup>
204421-213	4000K	1710 <sup>*1</sup>	12.24 <sup>*2</sup>	139.67 <sup>*3</sup>
204421-215	5000K	1763	12.25	143.92

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

$$1683=(1763-1656)/4*1+11656$$

$$1710=(1763-1656)/4*2+11656$$

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

$$12.24=(12.23+12.25)/2$$

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

$$137.48=1683/12.24$$

$$139.67=1710/12.24$$

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