

**LM-79-08 Test Report**

For

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

2280 Ward Ave, Simi Valley, CA 93065

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

Model name(s): 202423-21X

Remark: The "X" stands for different CCT as bellow: 1=3000K,  
2=3500K, 3=4000K, 5=5000K.Representative (Tested) Model: 202423-211  
202423-215

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

Test &amp; Report By:

*Clint Chen*

Engineer: Clint Chen

Date: Jul.09,2018

Review By:

*John Li*

Manager: John Li

Note: 1.The results contained in this report pertain only to the tested 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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Tel: 8620-3229 0320

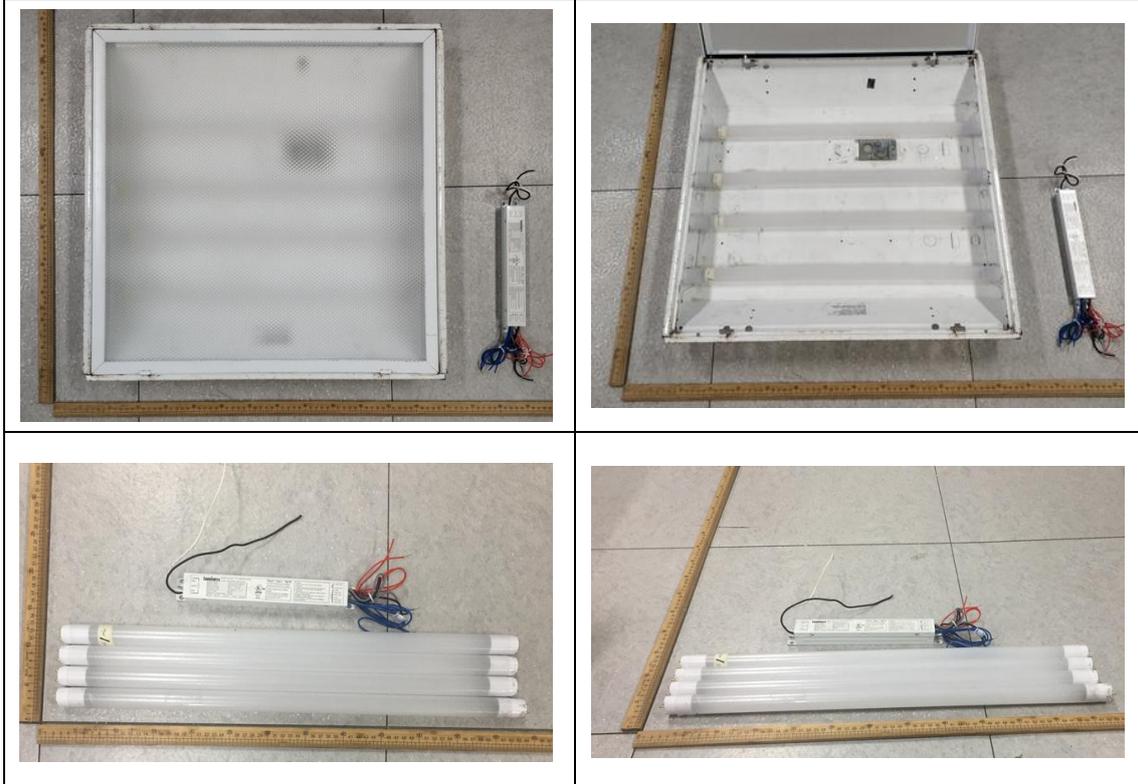
Fax: 8620-32290422

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

**1.1 Product Information:**

Organization Name	Revolution Lighting Technologies, Inc.	
Brand Name	Revolution Lighting Technologies	
Model Number	202423-21X	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	4-lamp External Driver Lamp-Style Retrofit Kits (UL Type C)	
Rated Voltage / Frequency	120-277 Vac, 50/60 Hz	
Nominal Power	10.5W	
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)	
Sample Number	JBE180607-C1, C2, C3, C4(3000K), C3(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	Jul.07,2018
Date of Test	Jul.09,2018
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>	2018-07-09	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	202423-211		

**Electrical Measurement for Bare-lamp:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180607-	120.0	60	0.0840	10.01	0.9932	4.52
C1	277.0	60	0.0388	10.02	0.9328	9.14
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

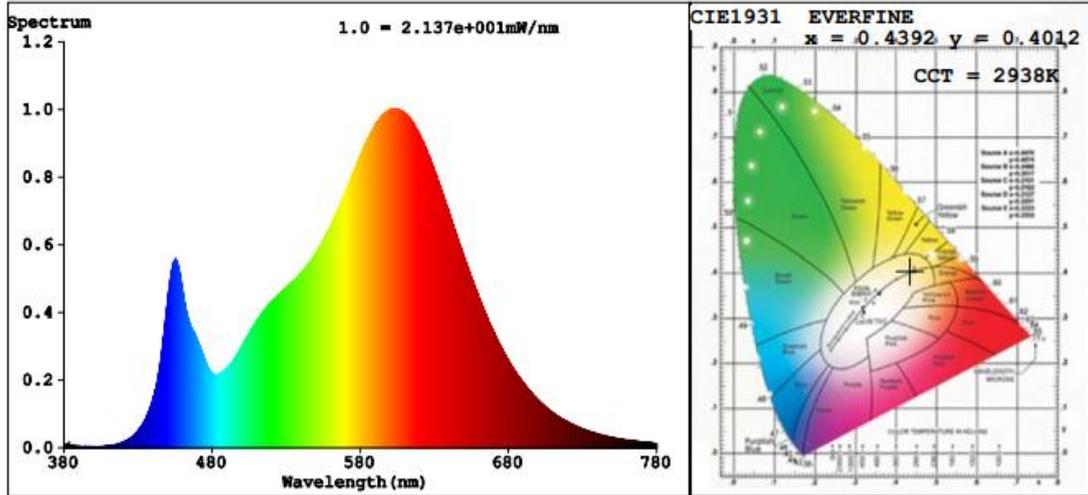
**Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	4
Frequency (Hz)	60	R2	93	R10	84
CCT (K)	2938	R3	93	R11	78
Duv	-0.0015	R4	78	R12	73
Chromaticity (x, y)	x=0.4392 y=0.4012	R5	81	R13	84
Chromaticity (u', v')	u'=0.2533 v'=0.5206	R6	92	R14	97
Color Rendering Index (CRI)	81.9	R7	80	R15	73
R9	4	R8	56	--	--

**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)	1330	1324	Bare Lamp: 800(±10%)
Luminous Efficacy (lm/W)	132.87	132.14	Bare lamp: >= 110(-3%)
Most worst Luminous/Highest Watts	132.14		

**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>	2018-07-09	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	202423-211		

**Electrical Measurement for 4-lamp in Lithonia 2GT8 lensed 2x2:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180607-C1,	120.0	60	0.3340	39.86	0.9946	3.77
C2, C3, C4	277.0	60	0.1541	39.91	0.9348	8.26
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

**Chromaticity Measurement for 4-lamp in Lithonia 2GT8 lensed 2x2 -  
 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)	2921	R3	94	R11	78
Duv	-0.0016	R4	79	R12	73
Chromaticity (x, y)	x=0.4402 y=0.4011	R5	82	R13	85
Chromaticity (u', v')	u'=0.2540 v'=0.5207	R6	92	R14	97
Color Rendering Index (CRI)	82.4	R7	80	R15	74
R9	6	R8	57	--	--

**Photometric Measurement 4-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)	4323.6	4305.5	In luminaire (4 lamps): 2700(±10%)
Luminous Efficacy (lm/W)	108.47	107.88	In luminaire: >= 100(-3%)
Most worst Luminous/Highest Watts	107.88		
Zonal lumens in the 0-60 ° zone (%)	85.3	--	>= 75(-3)
SC: 0-180 °(if applicable)	1.26	--	1.0-2.0(±0.1)
SC: 90-270 °(if applicable)	1.15	--	1.0-2.0(±0.1)
Beam Angle (°)	94.6	--	--
Center Beam Candle Power (cd)	1889	--	--

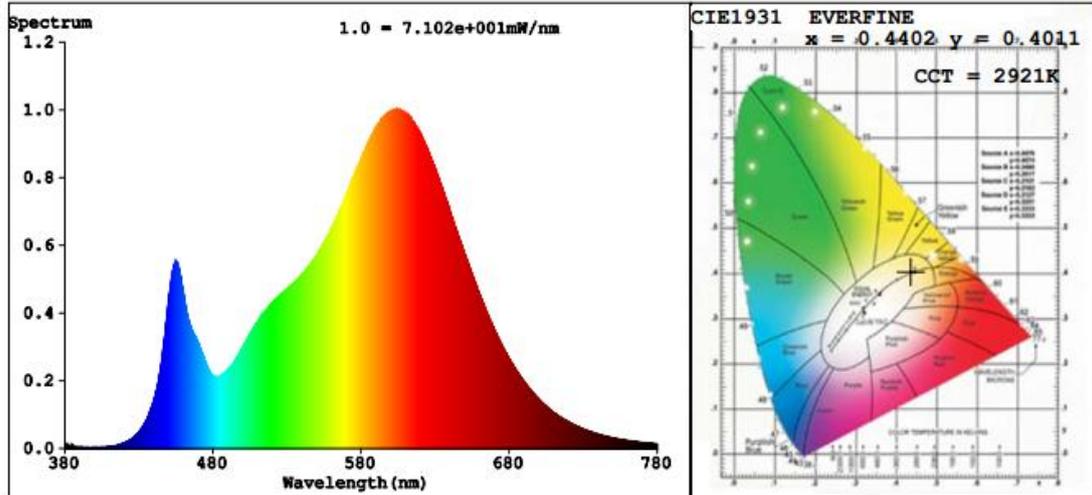
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**Spectral Power Distribution & Chromaticity Diagram**

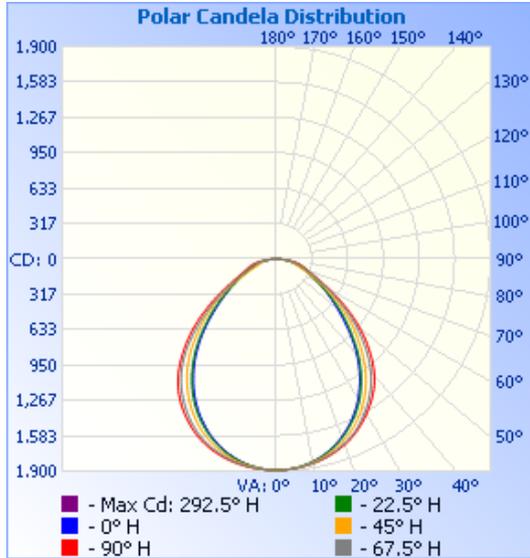


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,442.5	33.4%
0-40	2,309.0	53.4%
0-60	3,686.2	85.3%
60-90	616.4	14.3%
70-100	276.1	6.4%
90-120	9.2	0.2%
0-90	4,302.6	99.5%
90-180	20.5	0.5%
0-180	4,323.1	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	%Total
0-10	178.6	4.1%	90-100	2.2	0.1%
10-20	508.3	11.8%	100-110	3.4	0.1%
20-30	755.6	17.5%	110-120	3.6	0.1%
30-40	866.5	20.0%	120-130	3.4	0.1%
40-50	798.2	18.5%	130-140	2.9	0.1%
50-60	578.9	13.4%	140-150	2.2	0.1%
60-70	342.5	7.9%	150-160	1.5	0%
70-80	202.6	4.7%	160-170	0.9	0%
80-90	71.3	1.6%	170-180	0.3	0%

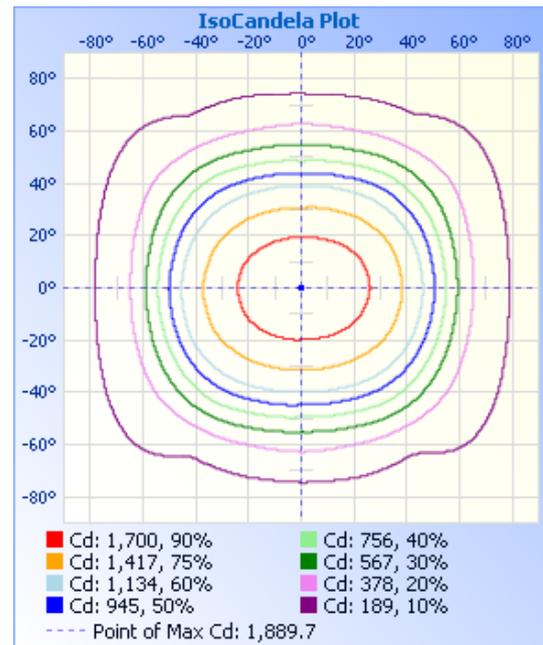
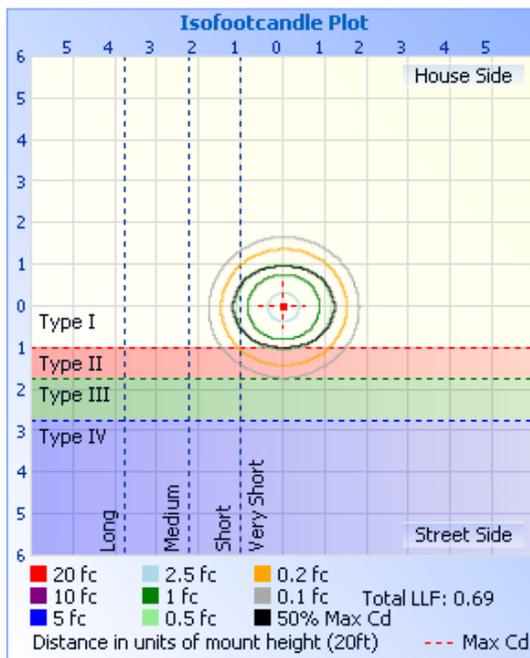
**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	6.54 fc	33.0 ft	41.2 ft
34.0ft	1.63 fc	66.1 ft	82.4 ft
51.0ft	0.73 fc	99.1 ft	123.5 ft
68.0ft	0.41 fc	132.2 ft	164.7 ft
85.0ft	0.26 fc	165.2 ft	205.9 ft
102.0ft	0.18 fc	198.2 ft	247.1 ft

■ Vert. Spread: 88.4°  
 ■ Horiz. Spread: 100.9°



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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	1889	1889	1889	1889	1889	1889	1889	1889	1889	1889	1889	1889	1889	1889	1889	1889
5	1885	1884	1882	1879	1879	1879	1880	1881	1881	1881	1878	1877	1877	1877	1879	1883
10	1867	1864	1856	1846	1842	1844	1850	1858	1858	1856	1849	1841	1838	1842	1850	1862
15	1834	1828	1811	1790	1781	1786	1802	1816	1821	1816	1799	1784	1775	1782	1801	1823
20	1784	1775	1745	1709	1695	1704	1732	1759	1768	1759	1730	1701	1688	1699	1732	1767
25	1713	1701	1657	1607	1584	1598	1641	1681	1694	1679	1639	1597	1578	1593	1640	1690
30	1617	1600	1543	1480	1450	1470	1524	1575	1599	1574	1522	1469	1444	1464	1522	1585
35	1502	1475	1402	1327	1291	1314	1383	1451	1489	1457	1387	1318	1286	1310	1383	1462
40	1357	1318	1234	1147	1109	1135	1216	1301	1352	1318	1233	1147	1109	1136	1220	1312
45	1168	1123	1042	951	909	941	1029	1115	1171	1139	1050	956	914	942	1030	1119
50	960	919	850	766	724	760	846	918	970	921	852	762	719	749	832	897
55	733	705	654	585	572	584	654	709	749	701	658	583	557	570	635	681
60	524	523	478	436	446	432	474	524	542	510	463	422	428	414	443	488
65	372	387	333	329	343	328	331	386	382	361	303	304	327	302	289	347
70	287	294	231	248	257	249	228	292	292	272	202	225	244	227	193	261
75	234	217	174	185	186	188	169	217	234	212	159	171	179	173	154	206
80	168	149	134	124	130	127	132	148	170	151	129	120	124	117	128	149
85	77.2	75.9	61.9	58.9	60.2	62.1	63.8	76.3	80.8	77.7	63.6	57.0	55.6	54.8	59.9	74.0
90	1.84	1.74	1.88	1.90	1.56	1.94	2.19	1.89	1.22	10.6	2.05	2.49	2.27	3.75	3.33	2.34
95	1.53	1.46	1.47	1.22	1.28	1.18	1.50	1.39	1.45	1.78	2.17	2.28	2.53	2.44	2.45	1.95
100	2.55	2.53	2.05	1.22	1.28	1.27	1.72	2.00	2.33	2.72	3.45	3.78	2.89	3.05	4.07	3.01
105	3.87	4.40	2.66	1.49	1.28	1.79	2.66	2.94	3.44	3.83	4.51	3.86	3.22	3.48	4.39	4.23
110	4.37	4.26	2.89	1.72	1.69	1.89	3.23	3.50	4.21	4.77	4.70	3.93	3.43	3.53	4.02	4.89
115	4.41	4.00	2.84	1.78	1.81	2.20	3.47	4.44	4.84	4.99	4.89	4.01	3.54	3.50	3.92	3.89
120	4.15	3.70	2.84	2.16	1.88	2.45	3.45	4.53	4.82	4.76	4.72	4.17	3.94	4.28	3.82	3.60
125	4.13	3.67	2.84	2.94	2.79	3.11	3.45	4.50	4.69	4.38	4.27	4.38	4.43	4.22	3.67	3.55
130	4.12	3.64	2.80	3.33	3.21	3.44	3.45	4.46	4.58	4.26	3.83	4.51	4.26	3.78	3.39	3.54
135	4.10	3.61	2.69	3.56	3.49	3.72	3.30	4.21	4.37	4.18	3.45	4.62	4.25	3.95	3.29	3.51
140	3.88	3.44	2.52	3.11	3.50	3.70	3.12	4.13	4.31	4.17	3.22	4.50	4.27	3.71	3.34	3.50
145	3.98	3.42	2.23	2.95	3.56	3.50	3.11	3.78	4.34	4.16	3.27	4.00	3.84	3.71	3.51	3.64
150	4.26	3.39	1.95	2.95	3.77	3.15	2.95	3.76	4.37	4.29	3.37	3.50	3.76	3.65	3.12	3.52
155	3.98	2.83	1.95	2.80	3.44	2.94	2.77	3.75	4.28	4.34	3.47	2.95	3.44	3.61	3.06	2.84
160	3.21	2.70	1.95	2.29	3.33	3.10	2.60	3.73	4.32	4.27	3.50	2.74	3.56	3.69	3.62	2.39
165	3.14	2.63	2.03	0.86	3.25	3.25	2.34	3.00	3.54	3.49	2.89	2.78	3.60	3.91	3.71	2.59
170	3.12	2.57	2.28	3.39	3.44	3.55	2.67	2.98	3.54	3.55	3.29	3.10	4.01	4.26	3.89	2.82
175	3.11	2.69	2.33	3.43	4.16	3.77	2.91	3.45	3.62	3.51	3.22	2.95	3.81	4.44	3.95	2.89
180	3.54	3.27	2.84	3.84	4.33	3.88	2.89	3.34	3.60	3.49	3.11	2.95	3.66	4.33	3.89	2.89

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**2.3 Electrical, Photometric and Chromaticity Measurements**  
*(Refer to Work Instruction QD25)*

<b>Test date</b>	2018-07-09	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	202423-215		

**Electrical Measurement for Bare-lamp:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180607-	120.0	60	0.0832	9.943	0.9964	3.46
C5	277.0	60	0.0383	9.955	0.9378	7.85
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

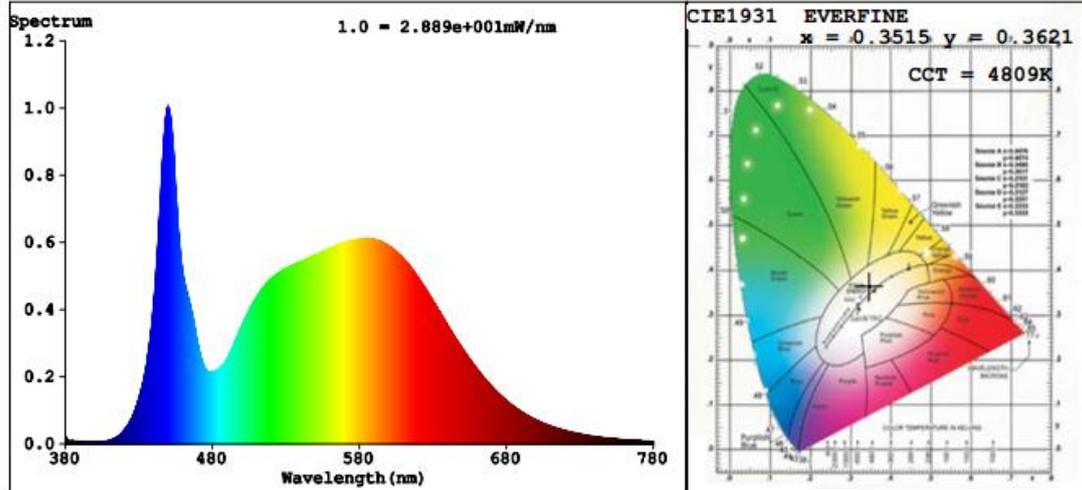
**Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	4
Frequency (Hz)	60	R2	87	R10	69
CCT (K)	4809	R3	92	R11	80
Duv	0.0027	R4	81	R12	55
Chromaticity (x, y)	x=0.3515 y=0.3621	R5	80	R13	82
Chromaticity (u', v')	u'=0.2116 v'=0.4907	R6	81	R14	96
Color Rendering Index (CRI)	81.9	R7	87	R15	74
R9	4	R8	66	--	--

**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)	1382	1376	Bare Lamp: 800(±10%)
Luminous Efficacy (lm/W)	138.99	138.22	Bare lamp: >= 110(-3%)
Most worst Luminous/Highest Watts	138.22		

**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)
202423-211	3000K	1330	10.01	132.87
202423-212	3500K	1343 <sup>*1</sup>	9.98 <sup>*2</sup>	134.57 <sup>*3</sup>
202423-213	4000K	1356 <sup>*1</sup>	9.98 <sup>*2</sup>	135.87 <sup>*3</sup>
202423-215	5000K	1382	9.943	138.99

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

$$1343 = (1382 - 1330) / 4 * 1 + 1330$$

$$1356 = (1382 - 1330) / 4 * 2 + 1330$$

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

$$9.98 = (10.01 + 9.943) / 2$$

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

$$134.57 = 1343 / 9.98$$

$$135.87 = 1356 / 9.98$$

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

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