

**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): 203421-21X

Remark: The "X" stands for different CCT as bellow: 1=3000K,  
2=3500K, 3=4000K, 5=5000K.Representative (Tested) Model: 203421-211  
203421-215

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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**1.1 Product Information:**

Organization Name	Revolution Lighting Technologies, Inc.	
Brand Name	Revolution Lighting Technologies	
Model Number	203421-21X	
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)	
Sample Number	JBE180607-D1, D2(3000K), D3(5000K),	
Lamp Length	900	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**

**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.

**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.

**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.

**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>	203421-211		

**Electrical Measurement for Bare-lamp:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180607-	120.0	60	0.1023	12.12	0.9875	6.24
D1	277.0	60	0.0498	12.53	0.9092	9.52
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

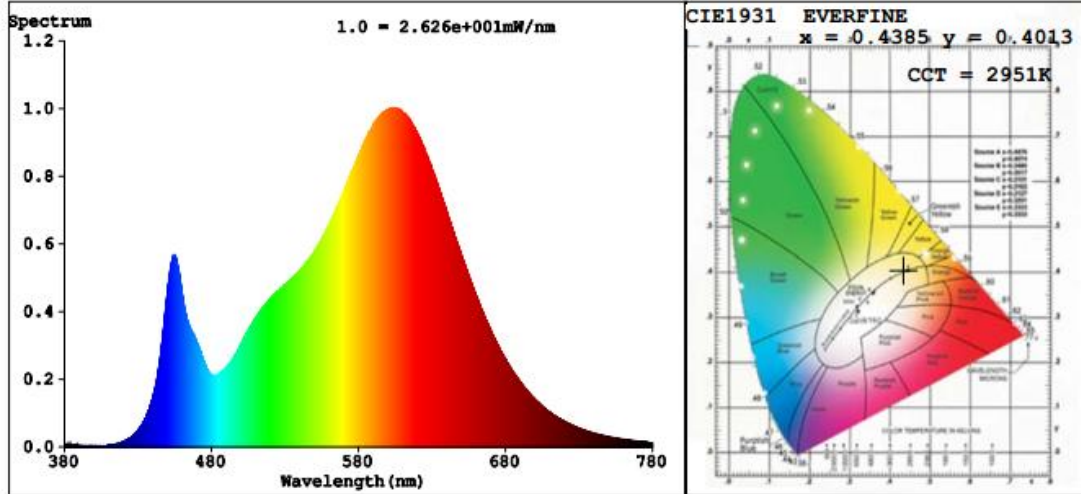
**Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	6
Frequency (Hz)	60	R2	93	R10	84
CCT (K)	2951	R3	94	R11	79
Duv	-0.0013	R4	79	R12	73
Chromaticity (x, y)	x=0.4385 y=0.4013	R5	82	R13	84
Chromaticity (u', v')	u'=0.2528 v'=0.5205	R6	92	R14	97
Color Rendering Index (CRI)	82.3	R7	81	R15	74
R9	6	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)	1701	1700	Bare Lamp: 1200(±10%)
Luminous Efficacy (lm/W)	140.35	135.67	Bare lamp: >= 110(-3%)
Most worst Luminous/Highest Watts	135.67		

**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>	203421-211		

**Electrical Measurement for 2-lamp in Lithonia C2 25 MVOLT GEB10IS:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180607-D	120.0	60	0.2023	24.05	0.9908	5.06
1,D2	277.0	60	0.0986	24.87	0.9108	8.38
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

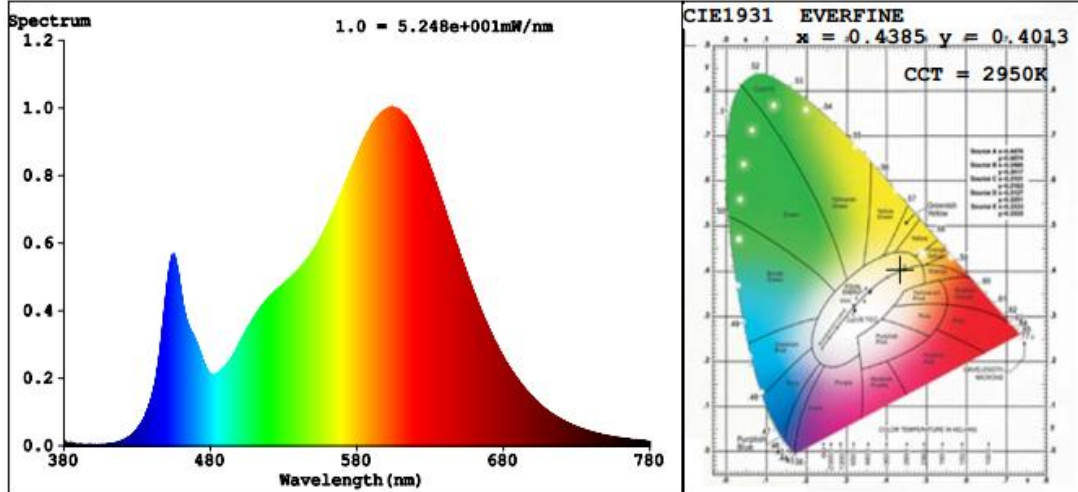
**Chromaticity Measurement for 2-lamp in Lithonia C2 25 MVOLT GEB10IS - Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	6
Frequency (Hz)	60	R2	93	R10	84
CCT (K)	2950	R3	94	R11	79
Duv	-0.0013	R4	79	R12	73
Chromaticity (x, y)	x=0.4385 y=0.4013	R5	82	R13	85
Chromaticity (u', v')	u'=0.2528 v'=0.5205	R6	92	R14	97
Color Rendering Index (CRI)	82.4	R7	81	R15	74
R9	6	R8	57	--	--

**Photometric Measurement 2-lamp in Lithonia C2 25 MVOLT GEB10IS – Goniophotometer Method:**

Parameter	Result		DLC V4.3 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	3169.3	3167.2	In luminaire (3 lamps): 2200(±10%)
Luminous Efficacy (lm/W)	131.78	127.35	In luminaire: >= 100(-3%)
Most worst Luminous/Highest Watts	127.35		
Zonal lumens in the 0-60 ° zone (%)	65.2	--	>= 40(-3)
Beam Angle ( ° )	120.4	--	--
Center Beam Candle Power (cd)	885	--	--

**Spectral Power Distribution & Chromaticity Diagram**

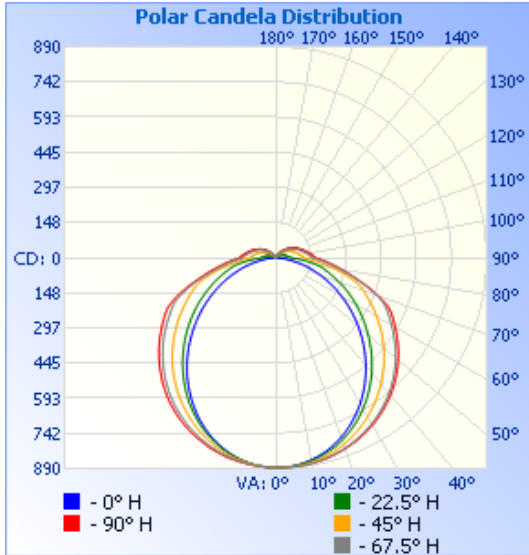


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	691.0	21.8%
0-40	1,137.7	35.9%
0-60	2,065.6	65.2%
60-90	835.5	26.4%
70-100	537.7	17%
90-120	215.6	6.8%
0-90	2,901.1	91.5%
90-180	267.9	8.5%
0-180	3,169.0	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	%Total
0-10	83.8	2.6%	90-100	94.5	3%
10-20	240.7	7.6%	100-110	71.3	2.2%
20-30	366.5	11.6%	110-120	49.8	1.6%
30-40	446.8	14.1%	120-130	30.1	1%
40-50	474.8	15.0%	130-140	14.9	0.5%
50-60	453.1	14.3%	140-150	5.1	0.2%
60-70	392.4	12.4%	150-160	1.2	0%
70-80	284.1	9.0%	160-170	0.7	0%
80-90	159.1	5.0%	170-180	0.3	0%

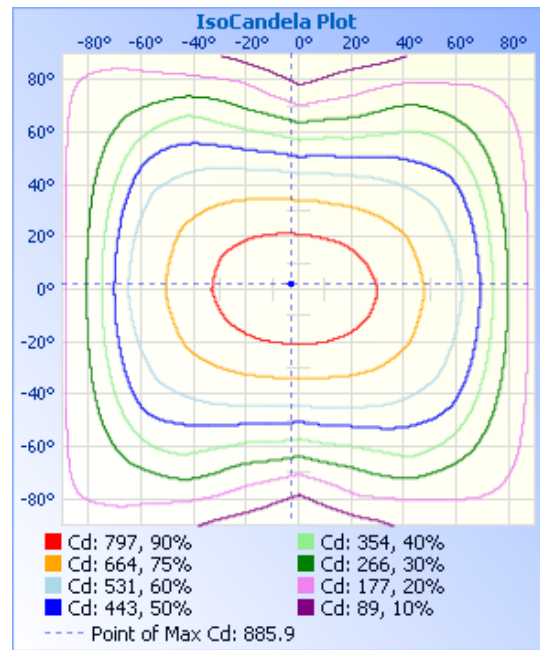
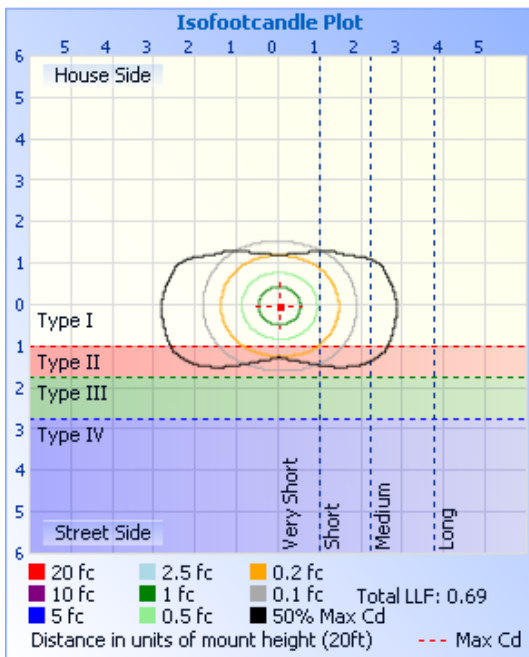
**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	3.06 fc	42.1 ft	91.8 ft
34.0ft	0.77 fc	84.1 ft	183.7 ft
51.0ft	0.34 fc	126.2 ft	275.5 ft
68.0ft	0.19 fc	168.2 ft	367.3 ft
85.0ft	0.12 fc	210.3 ft	459.1 ft
102.0ft	0.09 fc	252.4 ft	551.0 ft

■ Vert. Spread: 102.1°  
 ■ Horiz. Spread: 139.4°



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Table--1 UNIT: cd

C (DEG) \ T (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	885	885	885	885	885	885	885	885	885	885	885	885	885	885	885	885
5	882	882	882	881	881	882	885	886	885	884	882	880	880	879	881	882
10	874	872	870	866	866	869	876	881	880	877	871	866	863	865	867	872
15	862	856	850	842	842	849	861	870	872	864	853	840	836	839	849	858
20	844	836	823	808	807	819	838	855	857	846	827	807	800	807	822	838
25	822	809	789	766	763	781	809	834	839	823	794	765	755	766	790	812
30	795	779	749	718	712	736	775	809	816	794	755	717	702	719	752	783
35	764	745	704	664	654	686	735	779	787	762	711	663	644	666	710	749
40	727	706	655	605	592	631	692	745	754	724	663	604	581	609	665	710
45	686	662	603	544	525	572	645	705	716	683	613	543	514	550	616	667
50	643	614	550	481	457	510	596	660	674	638	560	479	446	490	564	622
55	596	564	495	418	387	449	544	613	629	590	507	416	378	430	512	574
60	549	514	441	355	319	391	492	564	582	540	453	354	310	371	459	524
65	502	467	387	294	251	333	439	517	535	492	400	295	244	313	408	477
70	422	404	339	238	187	277	391	449	455	432	351	240	180	260	361	406
75	333	319	285	184	126	227	324	356	361	344	299	188	121	212	294	319
80	258	242	212	140	72.2	182	244	274	283	265	226	143	69.4	167	218	245
85	200	181	146	91.7	31.1	120	174	210	221	200	158	95.9	29.0	107	152	186
90	153	135	96.4	44.6	7.73	66.9	121	158	170	149	105	47.6	7.21	60.6	108	141
95	139	123	85.0	34.6	2.23	55.4	108	142	153	133	92.3	37.8	1.89	50.6	97.5	127
100	124	110	75.0	27.0	1.11	46.7	96.8	126	137	120	81.2	30.7	1.47	42.2	86.7	114
105	111	98.3	65.8	20.6	1.00	39.0	85.8	113	123	107	71.8	23.9	1.68	34.2	76.4	102
110	99.0	87.2	56.3	15.0	1.47	31.8	75.1	102	110	95.7	62.4	17.9	1.79	26.7	65.9	90.6
115	86.4	75.4	46.9	9.27	1.42	24.8	64.6	89.7	96.7	84.3	52.9	12.3	1.84	19.6	56.0	79.0
120	74.1	64.0	37.4	4.32	1.58	17.8	54.1	77.0	83.7	72.4	43.5	7.12	2.00	13.1	45.6	67.2
125	61.7	52.1	28.3	2.19	1.68	11.7	43.5	64.6	70.6	60.6	34.0	2.70	2.16	6.94	35.6	55.3
130	49.2	40.3	19.7	2.13	1.68	5.82	33.2	52.0	57.8	48.1	25.1	1.98	2.32	2.42	26.1	43.4
135	37.2	29.4	12.0	2.03	1.74	2.63	23.7	40.0	45.1	36.6	17.1	2.03	2.37	2.16	17.1	32.2
140	25.8	19.6	4.84	2.03	1.74	2.21	15.2	28.8	32.9	26.5	10.1	2.03	2.37	2.21	8.81	21.6
145	15.6	10.5	2.25	2.03	1.74	2.21	7.24	18.5	22.0	17.0	4.11	2.03	2.53	2.31	2.21	11.8
150	6.39	2.88	2.09	2.03	1.84	2.21	2.27	9.19	11.6	8.75	1.83	2.03	2.58	2.42	2.06	2.74
155	1.78	1.85	2.09	2.19	2.21	2.42	2.11	2.39	2.74	1.96	1.88	2.03	2.79	2.53	2.42	1.96
160	1.78	1.80	2.25	2.34	2.26	2.42	2.11	1.91	1.78	1.85	1.88	2.08	2.79	2.68	2.42	2.12
165	1.67	1.90	2.35	2.40	2.52	2.52	2.16	1.91	2.10	2.06	2.20	2.45	3.05	3.10	2.95	2.44
170	1.83	2.22	2.51	2.60	2.74	2.84	2.58	2.18	2.37	2.22	2.51	2.71	3.37	3.26	3.16	2.71
175	1.99	2.49	2.66	3.02	3.21	3.16	2.58	2.55	2.53	2.22	2.46	2.60	3.31	3.21	3.16	2.71
180	2.10	2.49	2.61	3.07	3.32	3.16	2.58	2.60	2.53	2.06	2.46	2.60	3.11	3.37	3.16	2.65

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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>	203421-215		

**Electrical Measurement for Bare-lamp:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180607-	120.0	60	0.1025	12.22	0.9932	4.78
D3	277.0	60	0.0499	12.64	0.9141	7.95
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

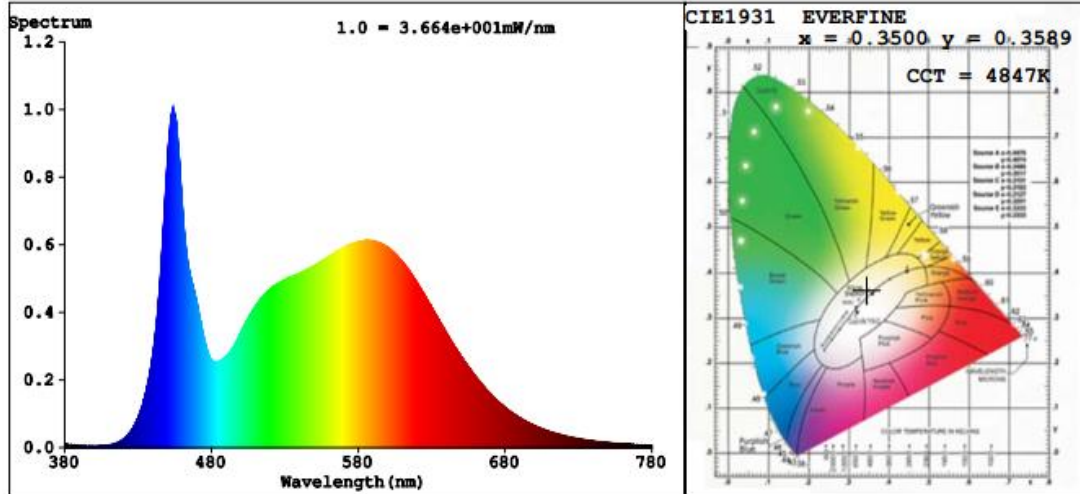
**Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	5
Frequency (Hz)	60	R2	90	R10	76
CCT (K)	4847	R3	95	R11	78
Duv	0.0017	R4	80	R12	55
Chromaticity (x, y)	x=0.3500 y=0.3589	R5	81	R13	84
Chromaticity (u', v')	u'=0.2119 v'=0.4889	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)	1794	1793	Bare Lamp: 1200(±10%)
Luminous Efficacy (lm/W)	146.81	141.85	Bare lamp: >= 110(-3%)
Most worst Luminous/Highest Watts	141.85		

**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)
203421-211	3000K	1701	12.12	140.35
203421-212	3500K	1724 <sup>*1</sup>	12.17 <sup>*2</sup>	141.66 <sup>*3</sup>
203421-213	4000K	1748 <sup>*1</sup>	12.17 <sup>*2</sup>	143.63 <sup>*3</sup>
203421-215	5000K	1794	12.22	146.81

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

$$1724 = (1794 - 1701) / 4 * 1 + 1701$$

$$1748 = (1794 - 1701) / 4 * 2 + 1701$$

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

$$12.17 = (12.12 + 12.22) / 2$$

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

$$141.66 = 1724 / 12.17$$

$$143.63 = 1748 / 12.17$$

### 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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