

## LM-79-08 Test Report

For

# Revolution Lighting Technologies, Inc

(Brand Name: Revolution Lighting Technologies)

2280 Ward Ave. Simi Valley CA.93065

## Linear Retrofit Kits for 2x4 Luminaires

Model name(s): 15G213-11C

Remark: "C" denotes to CCT, may be  
1,2,3,5. (1=3000K, 2=3500K, 3=4000K, 5=5000K).Representative (Tested) Model: 15G213-111  
15G213-113  
15G213-115

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

Test &amp; Report By:

*Biao Zhong*

Engineer: Biao Zhong

Date: Apr.19,2018

Review By:

*Univ Xie*

Manager: Univ Xie

Remark: This is multiple listed report, the Project Number of the original report is GZE1803070-G.

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

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	15G213-11C	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Linear Retrofit Kits for 2x4 Luminaires	
Rated Voltage / Frequency	100 ~ 277 Vac, 50/60 Hz	
Nominal Power	24W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K, 3500K, 4000K, 5000K	
LED Manufacturer	XUYU OPTOELECTRONIC (SHEN ZHEN) CO., LTD	
LED Model	XY-2835W3TJ-1C2B XY-2835W2JJ-1C2B XY-2835W1JJ-1C2B	
Sample Number	GZE1803070-G1(3000K), G2(4000K), G3(5000K)	
Lamp Length	--	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

**Photo**



**1.2 Test Specifications:**

Date of Receipt	Apr.05,2018
Date of Test	Apr.07,2018
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  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , 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  $1^{\circ}$  vertical intervals and  $22.5^{\circ}$  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  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . 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  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . 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>	2018-04-07	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	15G213-111		

**Electrical Measurement in Lithonia 2GT8 lensed 2x4:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.1948	22.94	0.9812	11.10
0-G1	277.0	60	0.0946	23.31	0.8892	14.57
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

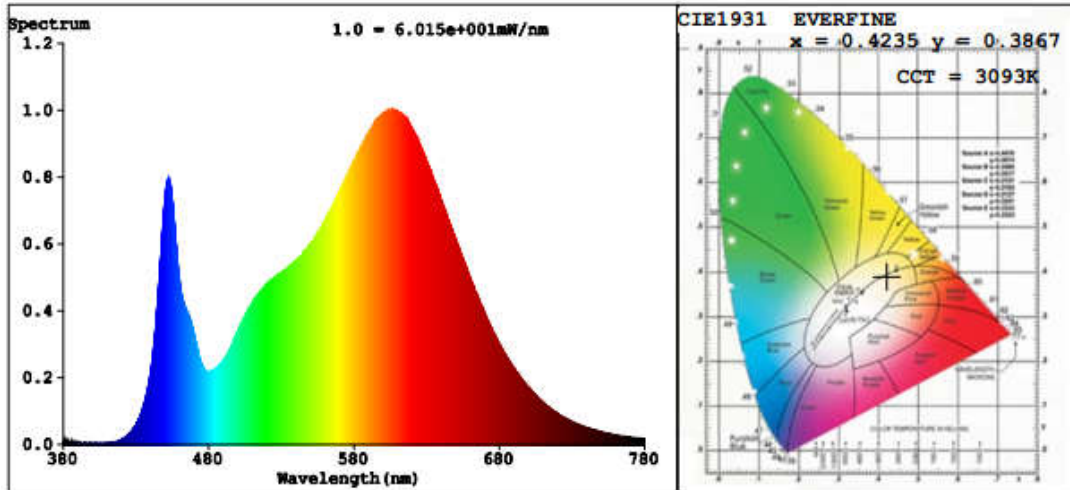
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4-  
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	86	R9	23
Frequency (Hz)	60	R2	95	R10	88
CCT (K)	3093	R3	95	R11	84
Duv	-0.0052	R4	84	R12	76
Chromaticity (x, y)	x=0.4235 y=0.3867	R5	87	R13	89
Chromaticity (u', v')	u'=0.2494 v'=0.5123	R6	93	R14	98
Color Rendering Index (CRI)	85.8	R7	83	R15	80
R9	23	R8	65	--	--

**Photometric Measurement 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)	2906.2	2901.2	>=3000(-10%)	
Luminous Efficacy (lm/W)	126.69	124.46	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	124.46		100(-3%)	125(-3%)
Zonal lumens in the 0-60° zone (%)	84.8	--	>= 75(-3)	
SC: 0-180° (if applicable)	1.30	--	1.0-2.0(±0.1)	
SC: 90-270° (if applicable)	1.22	--	1.0-2.0(±0.1)	
Beam Angle (°)	100.4	--	--	
Center Beam Candle Power (cd)	1172	--	--	

**Spectral Power Distribution & Chromaticity Diagram**

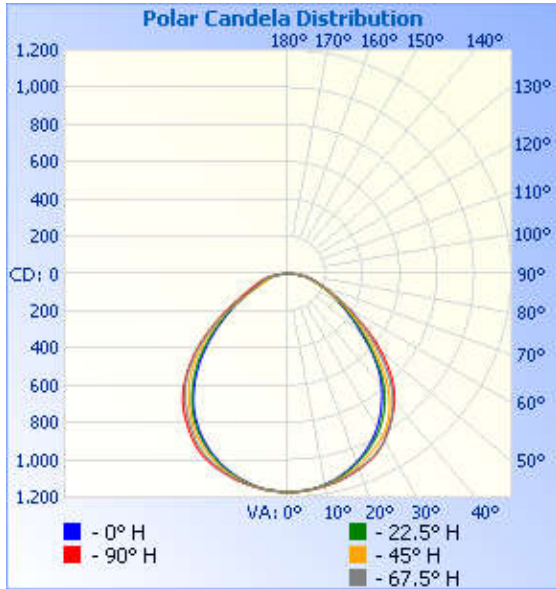


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	915.1	31.5%
0-40	1,492.3	51.4%
0-60	2,463.7	84.8%
60-90	436.3	15%
70-100	190.8	6.6%
90-120	2.9	0.1%
0-90	2,900.0	99.8%
90-180	5.9	0.2%
0-180	2,905.9	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	%Total
0-10	110.9	3.8%	90-100	1.1	0%
10-20	318.7	11.0%	100-110	0.9	0%
20-30	485.5	16.7%	110-120	0.9	0%
30-40	577.2	19.9%	120-130	0.8	0%
40-50	554.5	19.1%	130-140	0.7	0%
50-60	416.9	14.3%	140-150	0.6	0%
60-70	246.6	8.5%	150-160	0.5	0%
70-80	141.2	4.9%	160-170	0.3	0%
80-90	48.4	1.7%	170-180	0.1	0%

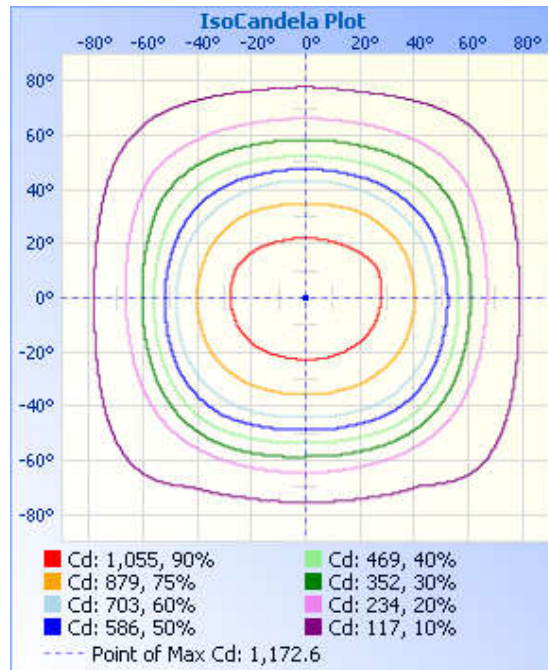
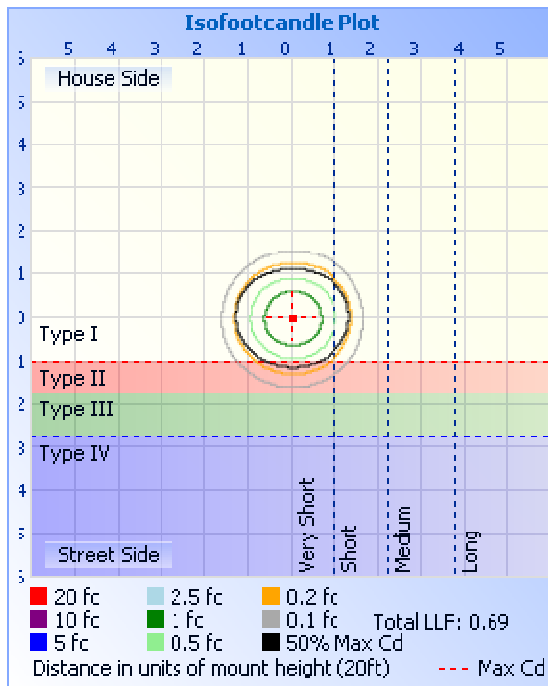
**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
12.0ft	8.14 fc	26.8 ft	31.0 ft
24.0ft	2.03 fc	53.6 ft	62.0 ft
36.0ft	0.90 fc	80.5 ft	93.0 ft
48.0ft	0.51 fc	107.3 ft	124.0 ft
60.0ft	0.33 fc	134.1 ft	155.0 ft

■ Vert. Spread: 96.4°  
■ Horiz. Spread: 104.5°



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Table--1 UNIT: cd

C (DEG) γ (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338
0	1172	1172	1172	1172	1172	1172	1172	1172	1172	1172	1172	1172	1172	1172	1172	1172
5	1166	1168	1167	1165	1167	1167	1169	1168	1168	1167	1168	1165	1167	1166	1167	1166
10	1154	1158	1152	1149	1149	1151	1155	1157	1157	1155	1153	1148	1147	1149	1152	1154
15	1137	1140	1128	1120	1119	1122	1131	1139	1140	1135	1129	1121	1118	1120	1126	1134
20	1113	1115	1094	1081	1076	1083	1099	1113	1117	1110	1097	1083	1076	1081	1092	1105
25	1080	1084	1054	1033	1023	1034	1059	1083	1086	1075	1054	1032	1024	1031	1047	1069
30	1026	1036	1004	973	957	974	1011	1035	1035	1022	998	971	961	969	988	1010
35	956	962	933	899	875	900	943	966	965	952	925	896	882	892	914	937
40	880	869	831	801	782	804	843	877	890	879	844	802	783	796	831	862
45	772	747	696	669	668	678	714	761	787	784	744	695	667	687	728	764
50	643	612	566	540	532	549	587	627	657	655	618	569	543	559	600	635
55	499	487	451	426	421	433	465	498	511	513	491	447	420	436	470	493
60	363	376	347	330	330	334	354	383	371	362	349	329	312	315	331	346
65	257	278	257	253	256	256	261	285	263	237	215	214	221	209	206	228
70	193	197	185	185	194	189	188	203	197	174	141	149	159	148	138	170
75	149	138	134	137	145	140	136	141	150	139	117	116	118	116	116	139
80	104	96.5	92.6	93.9	103	97.1	95.0	96.2	104	101	91.3	83.4	84.4	81.8	90.4	103
85	41.7	46.9	44.7	49.3	52.8	53.0	44.9	47.1	41.9	44.4	40.8	40.5	41.1	40.3	42.8	44.9
90	1.07	1.13	1.33	1.25	1.42	1.49	1.50	1.20	0.83	0.83	0.72	6.10	1.14	1.07	1.01	0.79
95	0.79	0.80	0.66	0.80	0.76	0.96	0.80	0.73	0.72	0.69	0.82	2.94	1.00	0.89	0.88	0.79
100	0.71	0.66	0.78	0.85	0.71	0.89	0.78	0.69	0.59	0.77	0.90	1.82	0.86	0.85	0.92	0.79
105	0.80	0.82	0.86	0.85	0.76	0.90	0.92	0.72	0.79	0.95	1.02	1.22	0.72	0.59	1.17	1.05
110	0.90	0.93	0.99	0.84	0.74	0.98	0.99	0.92	1.03	0.99	1.03	0.85	0.65	0.45	1.13	1.12
115	1.02	1.06	1.18	0.78	0.73	0.79	1.00	0.99	0.99	1.02	1.04	0.52	0.65	0.45	1.17	1.12
120	1.08	1.09	1.18	0.71	0.59	0.66	1.01	1.08	1.18	1.04	1.04	0.56	0.65	0.45	1.15	1.12
125	1.10	1.12	1.18	0.70	0.22	0.66	1.02	1.17	1.17	1.07	0.93	0.64	0.65	0.49	0.98	1.12
130	1.12	1.17	1.12	0.69	0.10	0.66	1.03	1.16	1.16	1.09	0.95	0.74	0.65	0.53	0.92	1.12
135	1.14	1.16	0.99	0.68	0.25	0.66	1.04	1.14	1.15	1.12	0.98	0.81	0.78	0.72	0.79	1.12
140	1.16	1.15	0.88	0.67	0.31	0.66	0.92	1.11	1.14	1.16	0.95	0.94	0.93	0.79	0.74	1.12
145	1.17	1.14	0.72	0.66	0.43	0.69	0.66	1.08	1.13	1.26	0.93	1.06	1.04	0.85	0.92	1.12
150	1.15	1.13	0.72	0.67	0.46	0.75	0.68	1.05	1.12	1.20	0.93	1.08	1.10	1.05	1.05	0.99
155	1.14	1.09	0.72	0.72	0.59	0.91	0.70	1.00	1.15	1.20	0.96	1.16	1.14	1.09	1.13	0.96
160	1.12	1.07	0.72	0.77	0.85	0.85	0.72	0.96	1.18	1.19	1.00	1.20	1.14	1.25	1.18	1.03
165	1.12	0.93	0.82	0.88	0.98	0.98	0.83	0.96	1.19	1.19	1.05	1.22	1.12	1.21	1.18	1.07
170	1.12	0.93	0.92	0.99	1.16	1.02	0.93	1.03	1.22	1.19	1.08	1.20	1.09	1.19	1.18	1.09
175	1.12	0.97	1.18	1.03	1.12	1.04	1.05	1.05	1.25	1.19	1.12	1.13	1.05	1.18	1.18	1.11
180	1.12	0.99	1.05	1.04	1.11	1.24	1.11	1.19	1.12	1.26	0.99	1.04	1.04	1.11	1.18	1.12

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**2.2 Electrical, Photometric and Chromaticity Measurements**

*(Refer to Work Instruction QD25)*

<b>Test date</b>	2018-04-07	<b>Test Ambient:</b>	25.2 ° C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	15G213-113		

**Electrical Measurement in Lithonia 2GT8 lensed 2x4:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.1955	23.01	0.9806	11.14
0-G2	277.0	60	0.0951	23.42	0.8889	14.61
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

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

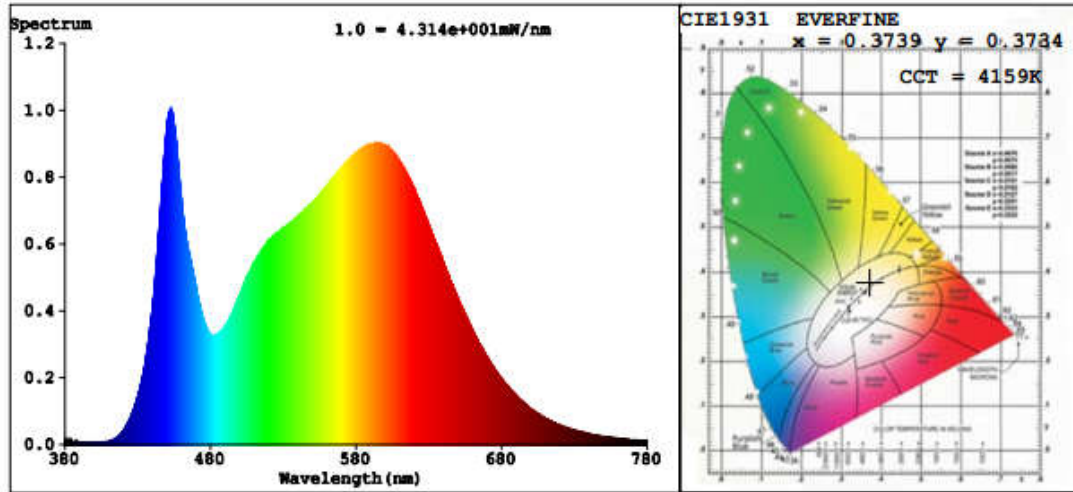
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	8
Frequency (Hz)	60	R2	91	R10	77
CCT (K)	4159	R3	96	R11	80
Duv	0.0004	R4	81	R12	63
Chromaticity (x, y)	x=0.3739 y=0.3734	R5	82	R13	84
Chromaticity (u', v')	u'=0.2221 v'=0.4991	R6	87	R14	98
Color Rendering Index (CRI)	83.4	R7	85	R15	76
R9	8	R8	64	--	--

**Photometric Measurement in Lithonia 2GT8 lensed 2x4-Sphere-Spectroradiometer Method:**

Parameter	Result		DLC V4.3 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	2945	2939	>=3000(-10%)	
Luminous Efficacy (lm/W)	127.99	125.49	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	125.49		100(-3%)	125(-3%)



**Spectral Power Distribution & Chromaticity Diagram**



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**2.3 Electrical, Photometric and Chromaticity Measurements**

*(Refer to Work Instruction QD25)*

<b>Test date</b>	2018-04-07	<b>Test Ambient:</b>	25.2 ° C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	15G213-115		

**Electrical Measurement in Lithonia 2GT8 lensed 2x4:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.1965	23.11	0.9801	11.18
0-G3	277.0	60	0.0952	23.43	0.8887	14.61
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

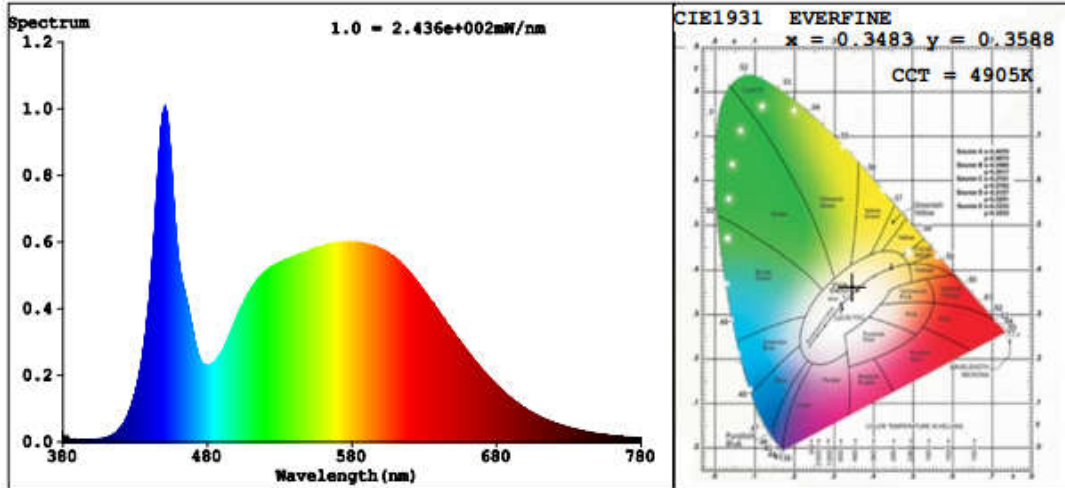
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4-  
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	22
Frequency (Hz)	60	R2	88	R10	72
CCT (K)	4905	R3	92	R11	83
Duv	0.0023	R4	84	R12	58
Chromaticity (x, y)	x=0.3483 y=0.3588	R5	83	R13	84
Chromaticity (u', v')	u'=0.2108 v'=0.4886	R6	83	R14	96
Color Rendering Index (CRI)	84.4	R7	90	R15	79
R9	22	R8	73	--	--

**Photometric Measurement in Lithonia 2GT8 lensed  
 2x4–Sphere-Spectroradiometer Method:**

Parameter	Result		DLC V4.3Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	2989	2983	>=3000(-10%)	
Luminous Efficacy (lm/W)	129.34	127.32	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	127.32		100(-3%)	125(-3%)

**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)
15G213-111	3000K	2906.2	22.94	126.69
15G213-112	3500K	2926 <sup>*1</sup>	22.98 <sup>*2</sup>	127.33 <sup>*3</sup>
15G213-113	4000K	2945	23.01	127.99
15G213-115	5000K	2989	23.11	129.34

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

$$2926 = (2945 - 2906.2) / 2 + 2906.2$$

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

$$22.98 = (22.94 + 23.01) / 2$$

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

$$127.33 = 2926 / 22.98$$

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

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